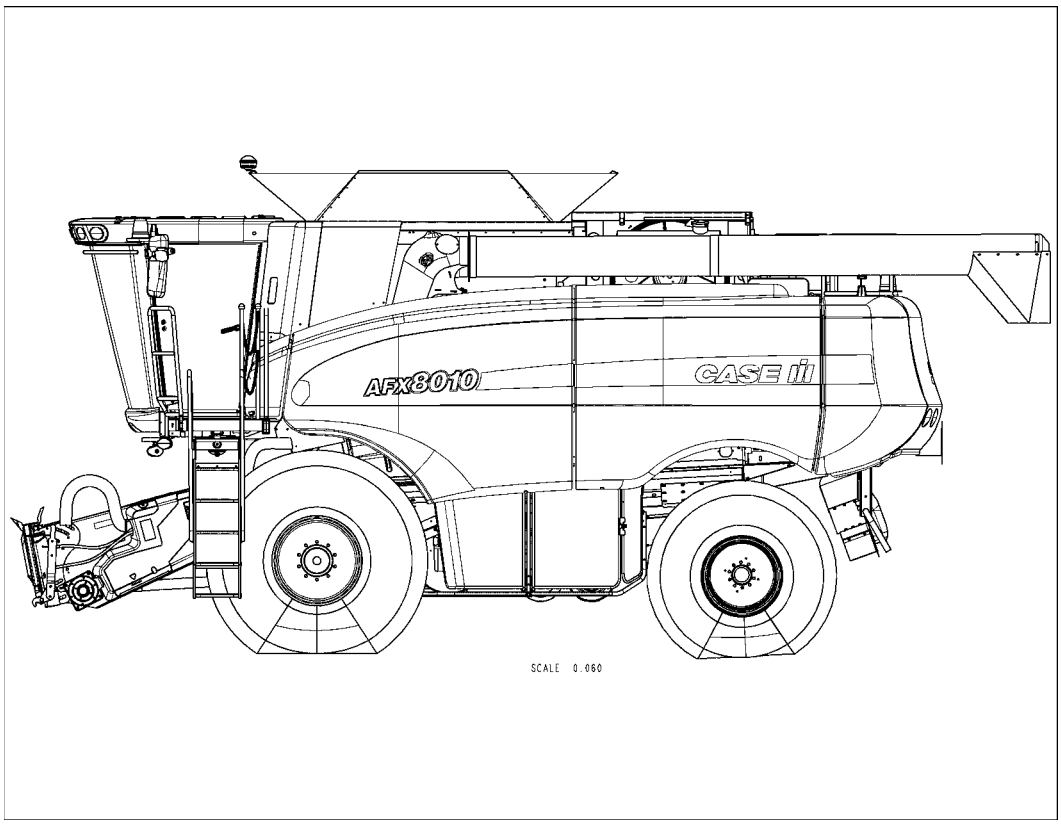
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REPAIR MANUAL



AFX8010

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Contents

INTRODUCTION
DISTRIBUTION SYSTEMS A
POWER PRODUCTION B
POWER TRAIN C
TRAVELLING D
BODY AND STRUCTURE E
TOOL POSITIONING G
CROP PROCESSING K

https://truckmanualshub.com/

INTRODUCTION

https://truckmanualshub.com/

Contents

INTRODUCTION

Foreword (- A.10.A.40) 3
AFX8010

Foreword (- A.10.A.40)

AFX8010

Technical Information

This manual has been produced by a new technical information system. This new system is designed to deliver technical information electronically through CDROM and in paper manuals. A coding system called ICE has been developed to link the technical information to other Product Support functions e.g. Warranty.

Technical information is written to support the maintenance and service of the functions or systems on a customers machine. When a customer has a concern on his machine it is usually because a function or system on his machine is not working at all, is not working efficiently, or is not responding correctly to his commands. When you refer to the technical information in this manual to resolve that customers concern, you will find all the information classified using the new ICE coding, according to the functions or systems on that machine. Once you have located the technical information for that function or system then you will find all the mechanical, electrical or hydraulic devices, components, assemblies and sub-assemblies for that function or system. You will also find all the types of information that have been written for that function or system, the technical data (specifications), the functional data (how it works), the diagnostic data (fault codes and troubleshooting) and the service data (remove, install adjust, etc.).

By integrating this new ICE coding into technical information , you will be able to search and retrieve just the right piece of technical information you need to resolve that customers concern on his machine. This is made possible by attaching 3 categories to each piece of technical information during the authoring process.

The first category is the Location, the second category is the Information Type and the third category is the Product:

- LOCATION - is the component or function on the machine, that the piece of technical information is going to describe e.g. Fuel tank.
- INFORMATION TYPE - is the piece of technical information that has been written for a particular component or function on the machine e.g. Capacity would be a type of Technical Data that would describe the amount of fuel held by the Fuel tank.
- PRODUCT - is the model that the piece of technical information is written for.

Every piece of technical information will have those 3 categories attached to it. You will be able to use any combination of those categories to find the right piece of technical information you need to resolve that customers concern on his machine.

That information could be:

- the description of how to remove the cylinder head
- a table of specifications for a hydraulic pump
- a fault code
- a troubleshooting table
- a special tool

How to Use this Manual

This manual is divided into Sections. Each Section is then divided into Chapters. Contents pages are included at the beginning of the manual, then inside every Section and inside every Chapter. An alphabetical Index is included at the end of a Chapter. Page number references are included for every piece of technical information listed in the Chapter Contents or Chapter Index.

Each Chapter is divided into four Information types:

- Technical Data (specifications) for all the mechanical, electrical or hydraulic devices, components and, assemblies.
- Functional Data (how it works) for all the mechanical, electrical or hydraulic devices, components and assemblies.

- Diagnostic Data (fault codes, electrical and hydraulic troubleshooting) for all the mechanical, electrical or hydraulic devices, components and assemblies.
- Service data (remove disassembly, assemble, install) for all the mechanical, electrical or hydraulic devices, components and assemblies.

Sections

Sections are grouped according to the main functions or a systems on the machine. Each Section is identified by a letter A, B, C etc. The amount of Sections included in the manual will depend on the type and function of the machine that the manual is written for. Each Section has a Contents page listed in alphabetic/numeric order. This table illustrates which Sections could be included in a manual for a particular product.

	SECTION										
	A - Distribution Systems										
		B - Power Production									
			C - Power Train								
				D - Travelling							
					E - Body and Structure						
						F - Frame Positioning					
							G - Tool Positioning				
								H - Working Arm			
									J - Tools and Couplers		
										K - Crop Processing	
											L - Field Processing
PRODUCT											
Tractors	X	X	X	X	X	X		X	X		
Vehicles with working arms: backhoes, excavators, skid steers, ...	X	X	X	X	X	X	X	X	X		
Combines, forage harvesters, balers, ...	X	X	X	X	X	X	X	X	X	X	
Seeding, planting, floating, spraying equipment, ...	X	X	X	X	X	X	X		X		X
Mounted equipment and tools, ...					X	X	X		X		

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This manual contains these Sections. The contents of each Section are explained over the following pages.

Contents

INTRODUCTION	
DISTRIBUTION SYSTEMS	A
POWER PRODUCTION	B
POWER TRAIN	C
TRAVELLING	D
BODY AND STRUCTURE	E
TOOL POSITIONING	G
CROP PROCESSING	K

Section Contents

SECTION A, DISTRIBUTION SYSTEMS
This Section covers the main systems that interact with most of the functions of the product. It includes the central parts of the hydraulic, electrical, electronic, pneumatic, lighting and grease lubrication systems. The components that are dedicated to a specific function are listed in the Chapter where all the technical information for that function is included.

Contents of DISTRIBUTION SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM	A.10.A
AFX8010	
SECONDARY HYDRAULIC POWER SYSTEM	A.12.A
AFX8010	
ELECTRICAL POWER SYSTEM	A.30.A
AFX8010	
LIGHTING SYSTEM	A.40.A
AFX8010	
ELECTRONIC SYSTEM	A.50.A
AFX8010	

https://truckmanualshub.com/

SECTION B, POWER PRODUCTION
This Section covers all the functions related to the production of power to move the machine and to drive various devices.

Contents of POWER PRODUCTION - B

ENGINE	B.10.A
AFX8010	
FUEL AND INJECTION SYSTEM	B.20.A
AFX8010	
AIR INTAKE SYSTEM	B.30.A
AFX8010	
EXHAUST SYSTEM	B.40.A
AFX8010	
ENGINE COOLANT SYSTEM	B.50.A
AFX8010	
LUBRICATION SYSTEM	B.60.A
AFX8010	
STARTING SYSTEM	B.80.A
AFX8010	

SECTION C, POWER TRAIN
This Section covers all the functions related to the transmission of power from the engine to the axles and to internal or external devices and additional Process Drive functions.

Contents of POWER TRAIN - C

POWER COUPLING Fixed Coupling	C.10.B
AFX8010	
TRANSMISSION Mechanical	C.20.B
AFX8010	
TRANSMISSION Hydrostatic	C.20.F
AFX8010	
FRONT PTO Mechanical	C.42.B
AFX8010	
PROCESS DRIVE Primary process drive	C.50.B
AFX8010	
TRANSMISSION LUBRICATION SYSTEM	C.90.A
AFX8010	

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SECTION D, TRAVELLING
This Section covers all the functions related to moving the machine, including tracks, wheels, steering and braking. It covers all the axles both driven axles and non-driven axles, including any axle suspension.

Contents of TRAVELLING - D

FRONT AXLE	D.10.A
AFX8010	
REAR AXLE	D.12.A
AFX8010	
2WD-4WD SYSTEM Hydraulic	D.14.C
AFX8010	
STEERING Hydraulic	D.20.C
AFX8010	
SERVICE BRAKE Hydraulic	D.30.C
AFX8010	
PARKING BRAKE Hydraulic	D.32.C
AFX8010	
WHEELS AND TRACKS Wheels	D.50.C
AFX8010	

SECTION E, BODY AND STRUCTURE
This Section covers all the main functions and systems related to the structure and body of the machine. Including the frame, the shields, the operator’s cab and the platform.

Contents of BODY AND STRUCTURE - E

FRAME Primary frame	E.10.B
AFX8010	
SHIELD	E.20.A
AFX8010	
OPERATOR AND SERVICE PLATFORM	E.30.A
AFX8010	
USER CONTROLS AND SEAT	E.32.A
AFX8010	
USER CONTROLS AND SEAT Operator seat	E.32.C
AFX8010	
USER CONTROLS AND SEAT Instructor seat	E.32.D
AFX8010	
USER PLATFORM	E.34.A
AFX8010	
ENVIRONMENT CONTROL Heating, Ventilation and Air Conditioning	E.40.D
AFX8010	
SAFETY SECURITY ACCESSORIES Safety	E.50.B
AFX8010	
DECALS AND PLATES	E.60.A
AFX8010	

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SECTION G, TOOL POSITIONING
This Section covers all the functions related to the final and/or automatic positioning of the tool once the tool is positioned using the Working Arm or the machine frame.

Contents of TOOL POSITIONING- G

LIFTING	G.10.A
AFX8010	
TILTING	G.20.A
AFX8010	
LEVELING	G.30.A
AFX8010	

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SECTION K, CROP PROCESSING
This Section covers all the functions related to crop processing.

Contents of CROP PROCESSING - K

FEEDING Reel feeding	K.25.B
AFX8010	
FEEDING Header feeding	K.25.D
AFX8010	
FEEDING Feeder housing	K.25.E
AFX8010	
FEEDING Transition cone	K.25.K
AFX8010	
THRESHING Axial flow threshing	K.40.C
AFX8010	
SEPARATING Rotary separator	K.42.C
AFX8010	
STORING AND HANDLING Grain storing	K.60.B
AFX8010	
CLEANING Primary cleaning	K.62.B
AFX8010	
CLEANING Tailings return system	K.62.C
AFX8010	
CLEANING Self-levelling frame	K.62.D
AFX8010	
RESIDUE HANDLING Straw chopper	K.64.C
AFX8010	
RESIDUE HANDLING Chaff Spreader	K.64.D
AFX8010	
RESIDUE HANDLING Straw beater	K.64.E
AFX8010	
UNLOADING Grain unloading	K.72.B
AFX8010	
PROTECTION SYSTEMS Stone trapping	K.90.E
AFX8010	

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Chapters

Each Chapter is identified by a letter and number combination e.g. Engine B.10.A The first letter is identical to the Section letter i.e. Chapter B.10 is inside Section B, Power Production.
CONTENTS
The Chapter Contents lists all the technical data (specifications), functional data (how it works), service data (remove, install adjust, etc..) and diagnostic data (fault codes and troubleshooting) that have been written in that Chapter for that function or system on the machine.

Contents

POWER PRODUCTION
ENGINE _ 10.A
TECHNICAL DATA
ENGINE - General specification (B.10.A - D.40.A.10) 3
AFX8010
FUNCTIONAL DATA
ENGINE - Dynamic description (B.10.A - C.30.A.10) 4
AFX8010
SERVICE
ENGINE - Remove (B.10.A - F.10.A.10) 5
AFX8010
DIAGNOSTIC
ENGINE - Troubleshooting (B.10.A - G.40.A.10) 6
AFX8010

https://truckmanualshub.com/

INDEX

The Chapter Index lists in alphabetical order all the types of information (called Information Units) that have been written in that Chapter for that function or system on the machine.

Index

POWER PRODUCTION - B

ENGINE

ENGINE - Dynamic description (B.10.A - C.30.A.10) 4

AFX8010

ENGINE - General specification (B.10.A - D.40.A.10) 3

AFX8010

ENGINE - Remove (B.10.A - F.10.A.10) 5

AFX8010

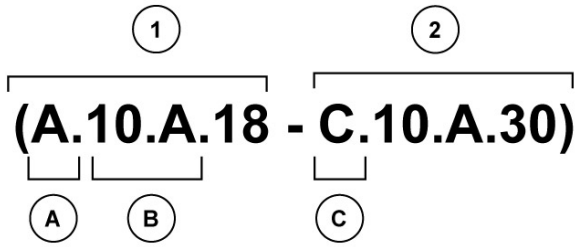
ENGINE - Troubleshooting (B.10.A - G.40.A.10) 6

AFX8010

Information Units and Information Search

Each chapter is composed of information units. Each information unit has the ICE code shown in parentheses which indicates the function and the type of information written in that information unit. Each information unit has a page reference within that Chapter. The information units provide a quick and easy way to find just the right piece of technical information you are looking for.

example information unit	Stack valve - Sectional View (A.10.A.18 - C.10.A.30)				
Information Unit ICE code	A	10.A	18	C	10.A.30
ICE code classification	Distribution systems	Primary hydraulic power	Stack valve	Functional data	Sectional view



CRIL03J033E01 1

Navigate to the correct information unit you are searching for by identifying the function and information type from the ICE code.

- **(1)** Function and **(2)** Information type.
- **(A)** corresponds to the sections of the repair manual.
  (B) corresponds to the chapters of the repair manual.
  (C) corresponds to the type of information listed in the chapter contents, Technical data, Functional Data, Diagnostic or Service.
  (A) and **(B)** are also shown in the page numbering on the page footer.
  THE REST OF THE CODING IS NOT LISTED IN ALPHA-NUMERIC ORDER IN THIS MANUAL.
- You will find a table of contents at the beginning and end of each section and chapter.
  You will find an alphabetical index at the end of each chapter.
- By referring to **(A)**, **(B)** and **(C)** of the coding, you can follow the contents or index (page numbers) and quickly find the information you are looking for.

Page Header and Footer

The page header will contain the following references:

- Section and Chapter description

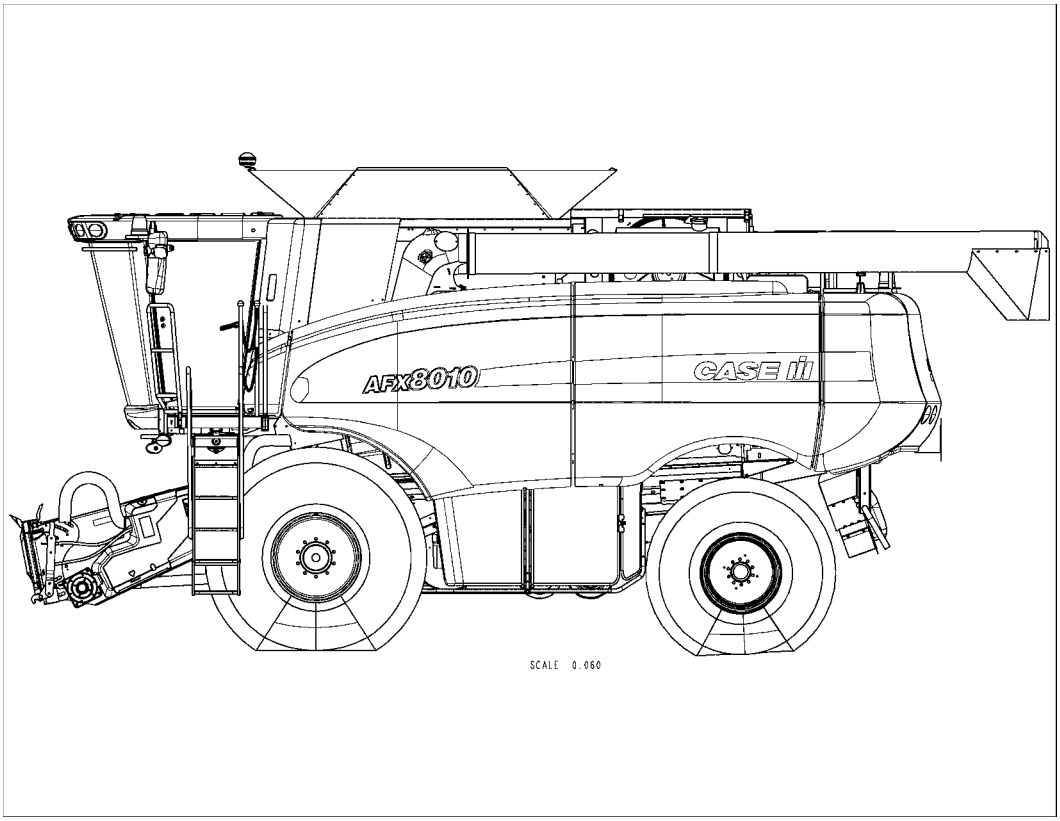
The page footer will contain the following references:

- Publication number for that Manual, Section or Chapter.
- Version reference for that publication.
- Publication date
- Section, chapter and page reference e.g. A.10.A / 9

https://truckmanualshub.com/

REPAIR MANUAL

DISTRIBUTION SYSTEMS



AFX8010

https://truckmanualshub.com/

Contents

DISTRIBUTION SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM A.10.A
AFX8010

SECONDARY HYDRAULIC POWER SYSTEM A.12.A
AFX8010

ELECTRICAL POWER SYSTEM A.30.A
AFX8010

LIGHTING SYSTEM A.40.A
AFX8010

ELECTRONIC SYSTEM A.50.A
AFX8010

https://truckmanualshub.com/

DISTRIBUTION SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM - 10.A

AFX8010

https://truckmanualshub.com/

DISTRIBUTION SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM - 10.A

CONTENTS

FUNCTIONAL

Description	Page
Basic Principles Of The System	5
General Information	7
Specifications	8
Hydraulic System	9
Hydraulic Component Locations	10
Oil Supply	11
Filtration	12
Cooling	12
Gear Pumps	13
Hydraulic Schematic	14
PFC Pump Hydraulic System	18
PFC Pump Schematic	18
PFC Component Locations	19
Signal Circuits	29
Steering Priority Valve	30
Electrical Monitoring Circuits	36
Regulated Pressure	37
Park Brake / Regulated Pressure Valve	37
Component Location	38
Regulated Pressure Schematic	38
Regulated Pressure Valve Operation	39
Electrical Monitoring Circuits	40
Control Pressure	41
Control Pressure Pump	45
Filtration	46
Control / Lubrication Pressure Valve	47
Control Pressure Schematic	48
Electrical Monitoring Circuits	50

https://truckmanualshub.com/

PTO Gearbox Cooling and Lubrication System 51
Lubrication System 52
PTO Gearbox Cooling 55
Electrical Monitoring Circuits 56

DIAGNOSTIC

Hydraulic System Testing Procedures 57
Diagnostic Test Equipment 58
Hydraulic System Testing Procedures 60
1 Low Pressure Standby 61
2 High Pressure Standby 63
3 Steering Relief Setting 65
4 Bench Testing Components 67
5 Control Pressure Test 69
6 PTO Gear Box Lubrication Pressure Test 71
7 Regulated Pressure Test 73
#8 Spreader Pump Flow Test 75
9 Fan Pump Flow Test 77
10 PFC Pump Flow 79
11 Control Pressure Pump Flow Test 81

Signal valve

Signal valve – Unidentified failure (A.10.A.12 – G.30.B.46) 83

Sensing system

Sensing system Differential pressure switch – Short circuit to B+ (A.10.A.95.81–G.30.B.54) 87
Sensing system Temperature sensor – Short circuit to B+ (A.10.A.95.90–G.30.B.54) 90
Sensing system Temperature sensor – Short circuit to ground (A.10.A.95.90–G.30.B.53) . . . 93
Sensing system Temperature sensor – Open circuit (A.10.A.95.90–G.30.B.50) 96
Sensing system Reservoir level sensor – Short circuit to B+ (A.10.A.95.93–G.30.B.54) . . . 101

https://truckmanualshub.com/

https://truckmanualshub.com/

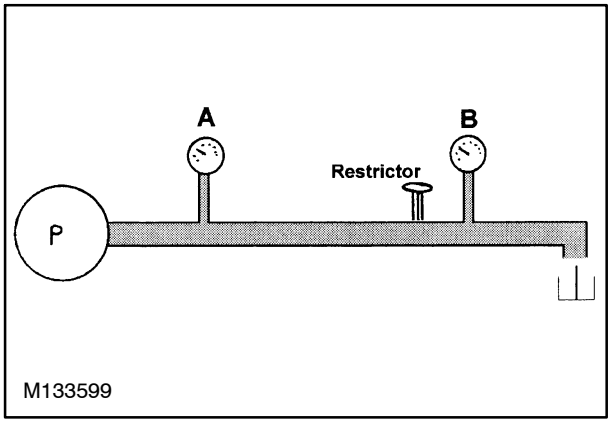
BASIC PRINCIPLES OF THE SYSTEM

Combines use a combination of Pressure Flow Compensated (PFC) and open-center hydraulics. In a **PFC** system, oil flow is minimal unless there is a hydraulic demand. In an **open-center** system, oil is constantly pumped through the system regardless of hydraulic demand.

Flow Across a Restriction

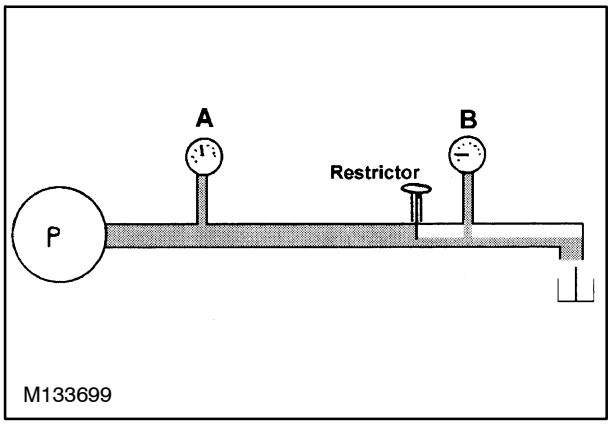
The hydraulic system of the combine uses the principle of flow across a restriction for some functions. It is important to understand this basic principle in order to understand how the system works, or more importantly, why the system may not be working.

1. When oil flows through an **unrestricted** passage, the pressure in this passage, if any, will remain constant as long as pump flow remains constant.



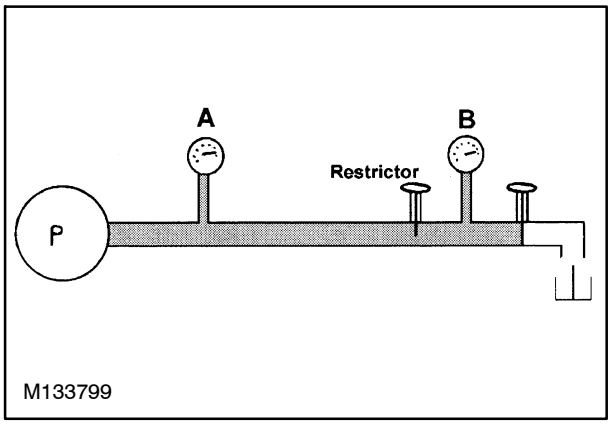
1

2. When oil in a passage **flows across a restriction**, the pressure after the restriction will be less than the pressure before that restriction**. Flow must exist for this to happen**. A restriction can occur by any component causing a resistance to flow.



2

3. When oil in a passage is **fully restricted** from flow (no-flow), the pressure in the passage will build until it reaches the relief valve setting. This relief pressure will be maintained as long as the flow is blocked and the pump is functioning normally. This is true regardless of what component is blocking flow. No flow will create constant pressure in the passage based on the relief valve setting.



3

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BASIC PRINCIPLES OF THE SYSTEM

Pilot Operated Hydraulic System

1. Pilot-operated hydraulic system has two basic parts or sections: A pilot (also called primary) section, and a main (also called secondary) section.
2. When a pilot-operated system is actuated, the pilot (primary) **always** moves first. Once the pilot has operated, the main (secondary) section **always** moves last. This is true whether the system is being activated or deactivated.
3. The movement of the pilot (primary) controls a very small amount of oil flow (pilot flow). The movement of the main (secondary) controls the majority of the oil flow (main flow) and is responsible for actuating a given system.

The header raise/header lower and reel drive valve are three examples of a pilot operated system used on the combine.

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GENERAL INFORMATION

The AFX Axial-Flow combines use a very extensive hydraulic system to operate machine functions that are normally associated with belts and chains, along with the normal hydraulic functions. This section will cover the basics of the hydraulic supply system, each actual function will be included with that function's sections.

This section will cover the reservoirs, filtration, gear pumps, PFC pump and cooling. Since the machine incorporates two reservoirs, the hydraulic system is easily broken into two separate systems.

1. Hydraulics: Operator control functions
2. Control Pressure: Hydrostatic drives, associated valves and clutches

HYDRAULICS Hydraulic Reservoir	CONTROL PRESSURE PTO Gearbox Reservoir
Steering	Ground Drive
Header Raise / Lower	Rotor Drive
Reel Fore / Aft, Raise, and Drive	Feeder Drive
Lateral Tilt	Chopper Clutch
Unloading Auger Swing	Unloader Clutch
Fan Drive	Lubrication
Spreader Drive	
Rotary Air Screen	
Parking Brake / Tow Valve	
Regulated Pressure	

The two systems will incorporate several hydraulic pumps and motor to complete the required operations.

HYDRAULICS Hydraulic Reservoir		HYDROSTATICS PTO Gearbox Reservoir	
PFC Pump	Steering Header Raise / Lower Lateral Tilt Unloading Auger Swing Reel Fore / Aft and Raise Reel Drive Park Brake / Tow Valve Regulated Pressure	Control Circuit Pump	Beater/Chopper Clutch Unloader Clutch Ground Drive Rotor Drive Feeder Drive
Fan Pump	Fan Drive Motor	Lube Pump	Lubrication
Spreader Pump	Spreader Drive Motor and Rotary Air Screen Motor		

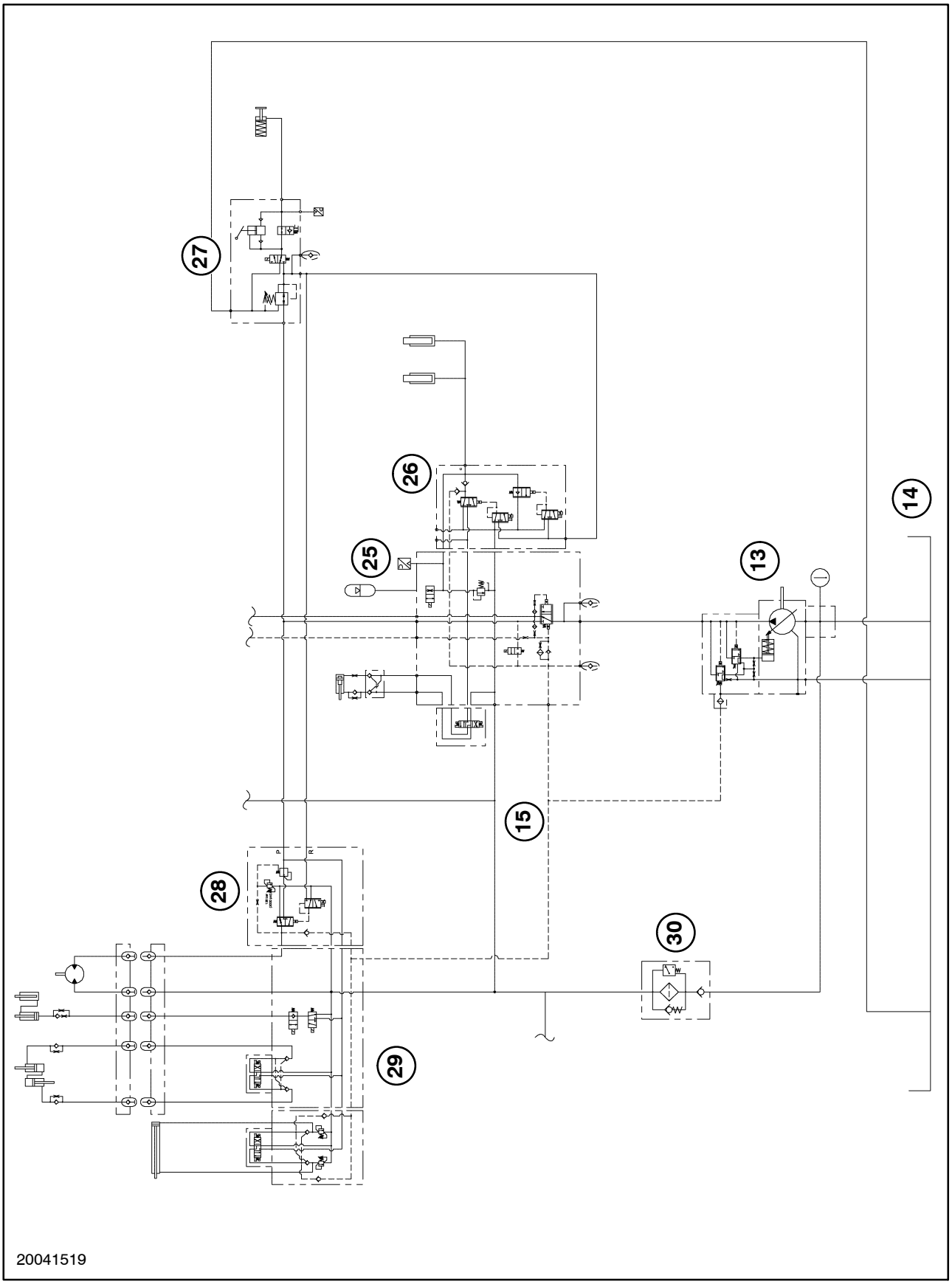
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SPECIFICATIONS

Component	Specification
Electrical	
Parking Brake / Regulated pressure sensor	0.0 PSI = 0.5V signal wire C
Control pressure sensor	Normal PSI = 3V signal wire C
Hydraulic filter restriction switch	N/O, Closes at 2.75 bar (40 PSID)
Control pressure filter restriction switch	N/O, Closes at 2.75 bar (40 PSID)
Hydraulic return oil temperature sensor	2500ohms @ room temperature
Motor Temp. (Ground Drive) sensor	83 ohms @ 128°C (262°F)
Reservoir tank level switch	N/C, Closed with low oil 0.0 ohms
Hydraulic	
Spreader motor relief	210 bar (3000 PSI)
Rotary air screen motor relief	24 bar (350 PSI)
Fan motor relief	241 bar (3500 PSI)
Oil cooler by-pass (Hydraulic cooler)	7.6 bar (110 PSI)
Hydraulic filter by-pass	3.45 barD (50 PSID)
Regulated pressure	22–25 bar (320–360 PSI)
Control pressure filter by-pass	3.45 barD (50 PSID)
Control pressure relief	20–22 bar (290–320 PSI) Hot
	23–25 bar (340–360 PSI) Cold
Lubrication pump / cooler relief	20 bar (290 PSI)
Lubrication system relief	3.5 bar (50 PSI)
PFC pump low pressure stand-by	26–28 bar (375–400 PSID)
PFC pump high pressure stand-by	207–214 bar (3000–3100 PSI)
Steering relief	183–190 bar (2650–2750 PSI)
Reel drive relief	138 bar (2000 PSI)
Header Tilt cushion relief	207 bar (3000 PSI)
Feeder lift cylinder thermal relief	276 bar (4000 PSI)
Spreader drive pump flow	63 l/m (16.5 GPM)
Fan drive pump flow	51 l/m (13.5 GPM)
PFC pump flow	152 l/m (42 GPM)
Control pressure pump flow	150 l/m (39.5 GPM)
Lubrication pump flow	92.7 l/m (23.5 GPM)

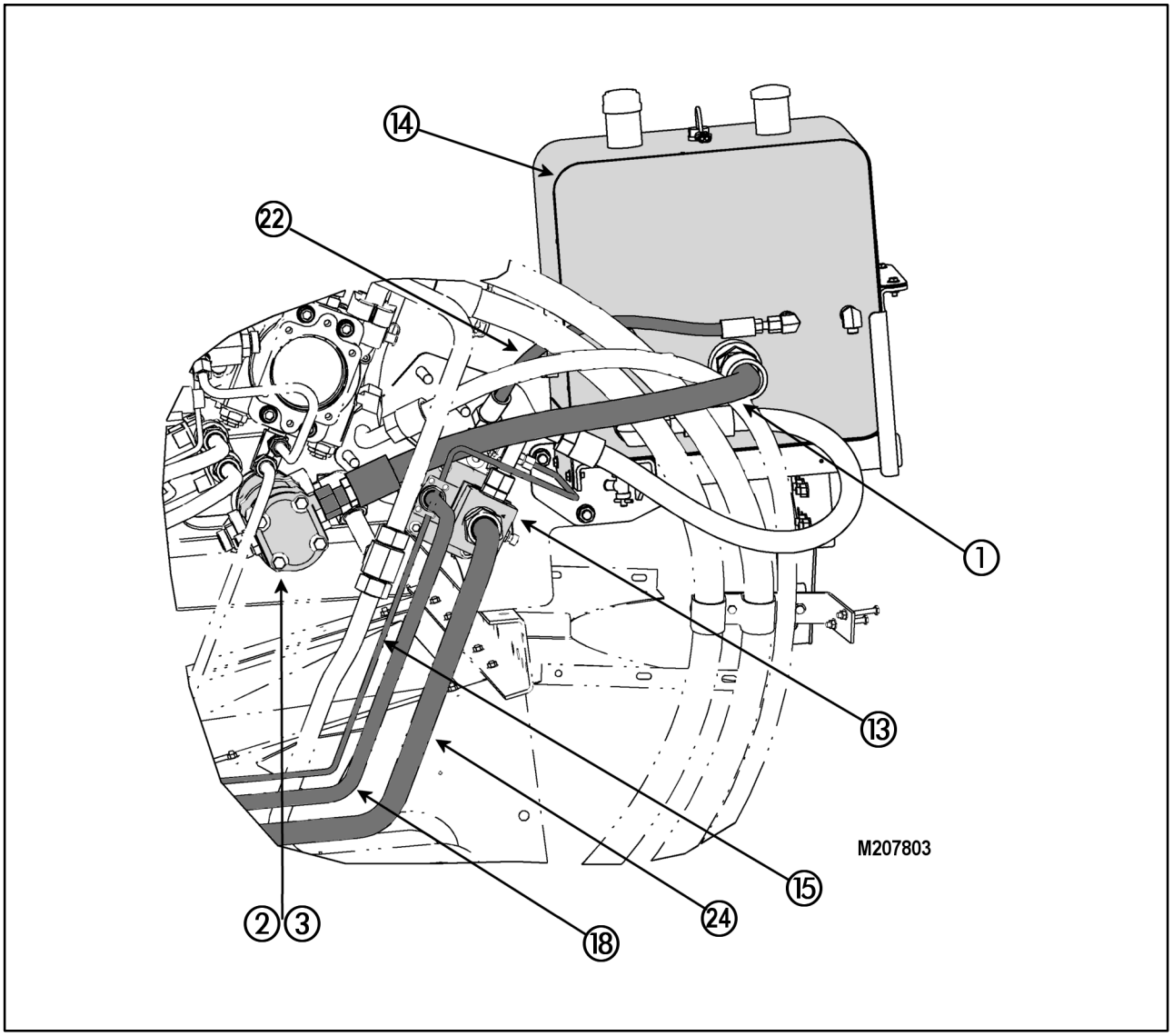
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HYDRAULIC SYSTEM



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Hydraulic Component Locations



5

1. Supply to Spreader and Fan Pumps
2&3. Gear Pump Assembly, Spreader and Fan Drive
13. PFC Piston Pump
14. Hydraulic Reservoir
15. Signal Line to Compensator
18. PFC Pump Discharge Line
22. PFC Pump Case Drain
24. PFC Pump Suctions
25. Main Valve Assembly
26. Header Lift Valve
27. Park Brake / Regulated Pressure Valve
28. Reel Drive Valve
29. Feeder Valve Assembly
30. Hydraulic Return Filter

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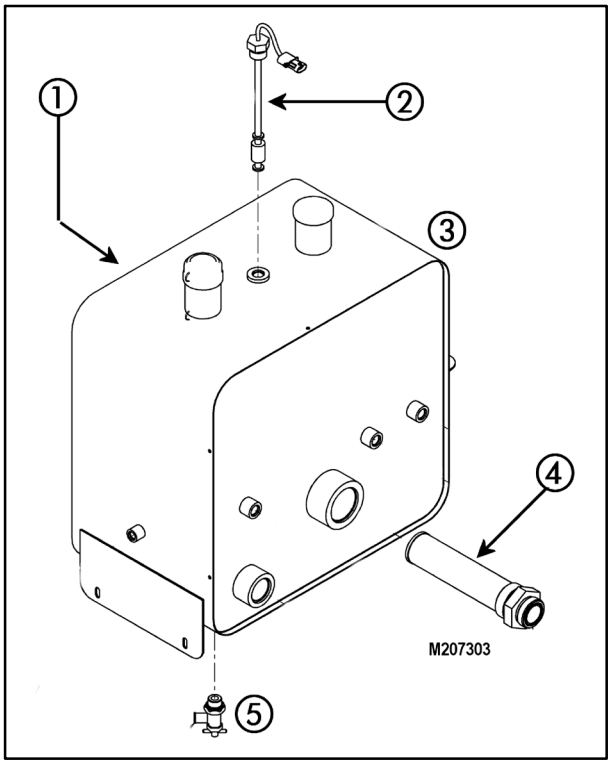
Oil Supply

1. Oil Level Sight Glass
2. Oil Level Sensor
3. Reservoir Tank
4. Outlet Strainer
5. Tank Drain

The hydraulic system is supplied with Hy-Tran Ultra from a central reservoir tank that is mounted behind the PTO gearbox. The tank contains approximately 57L (15 gal) of oil and should be changed out every 1000 hours of operation.

A float type gauge that is mounted in the top of the tanks monitors the proper oil level. The float provides an Open/Closed signal to the Universal Display Plus monitor. The switch is N.C. when held in the operating position, open when oil is present.

The tank incorporates a discharge port strainer and tank breather. The strainer is rated at 100 micron of protection and supplies the gear pumps.



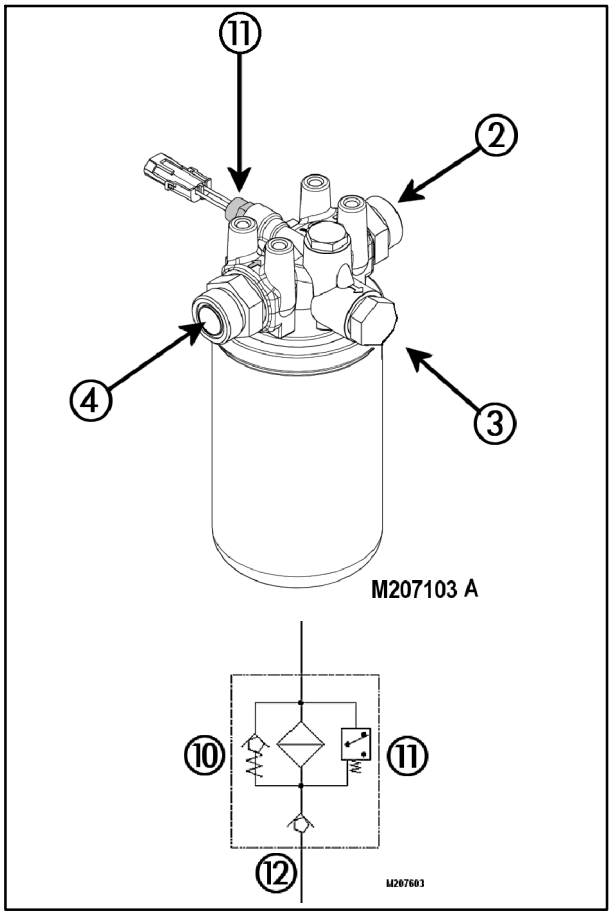
6

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Filtration

2. Discharge Port
3. Not used on the hydraulic filter
4. Inlet Port
10. Filter By-Pass
11. Restrictions Indicator
12. Back Flow Check Valve

The hydraulic filter is on the return side of the hydraulic system, prevent trash from reaching the reservoir tank. It is imperative that only CLEAN Hy-Tran Ultra is placed in the tank. The filter base incorporates a filter restriction sensor (11) that monitors the condition of the filter element. If the restriction increases above 2.76 bar (40 PSID) differential pressure the sensor will CLOSE to create a signal to the Universal Display Plus monitor for operator warning. The filter base incorporates a filter by-pass valve that will open at 3.45 bar (50 PSID) differential pressure to prevent over pressuring the filter. The sensor is set to activate prior to the by-pass valve opening.

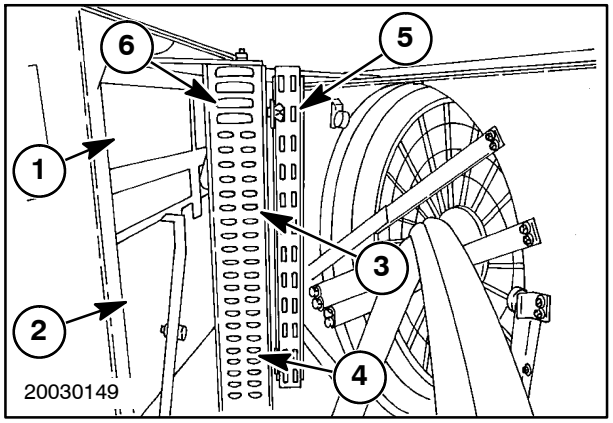


7

Cooling

1. Intercooler
2. Radiator
3. PTO Gearbox Oil Cooler
4. Hydraulic Oil Cooler
5. Air Conditioning Condenser
6. Fuel Cooler

The hydraulic cooler is mounted behind the rotary air screen and is the Lower third of the center cooler. There is a 7.6 bar (110 PSI) oil cooler by-pass valve mounted in the lower front corner to protect the cooler.

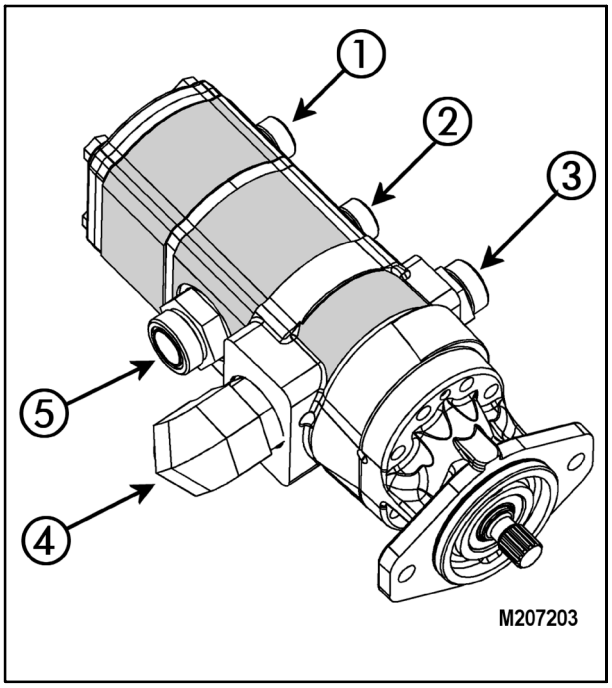


8

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Gear Pumps

1. Fan Drive Output (rear pump)
2. Spreader and Rotary Air Screen Output (center pump)
3. Control Pressure Output (front pump)
4. Supply From PTO Gearbox, (for pump 3)
5. Supply From Hydraulic Reservoir, (for pumps 1 and 2)



9

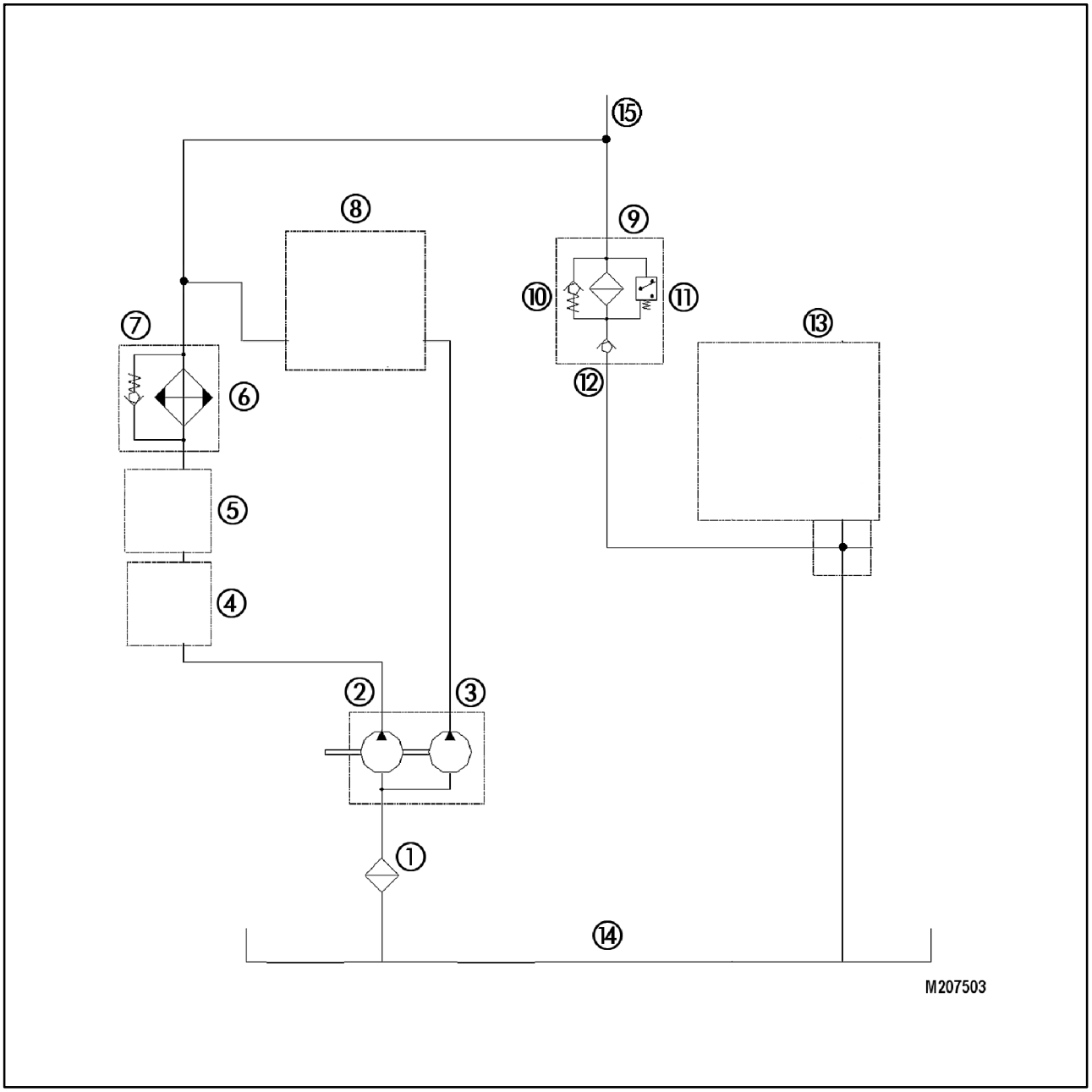
The gear pump assembly is mounted in the PTO gearbox and incorporates three separate gear pumps.

- The **Control Pressure** pump, (pump 3, nearest to the drive shaft), is supplied oil from the **PTO gearbox** and all of its flow is returned to the PTO gearbox. See specification page.
- The **Spreader**/**Rotary Air Screen Drive** pump is supplied oil from the **hydraulic reservoir** and returns all of its flow back to the reservoir. See specification page.
- The **Fan Drive** pump is supplied oil from the **hydraulic reservoir** and returns all of its flow back to the reservoir. See specification page.

NOTE: *If the seal was to leak between the front and center pumps oil could transfer between reservoirs.*

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Hydraulic Schematic



10

1. Reservoir Strainer
2. Spreader/Rotary Air Screen Drive Pump
3. Fan Drive Pump
4. Spreader Drive Valve
5. Rotary Air Screen Valve
6. Oil Cooler
7. Oil Cooler By-Pass Valve
8. Fan Drive Valve
9. Return Filter Base
10. Filter By-Pass Valve
11. Filter Restriction Indicator Switch
12. Back Flow Check Valve
13. PFC Piston Pump
14. Reservoir Tank
15. Return From All Hydraulic Functions

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Hydraulic Schematic

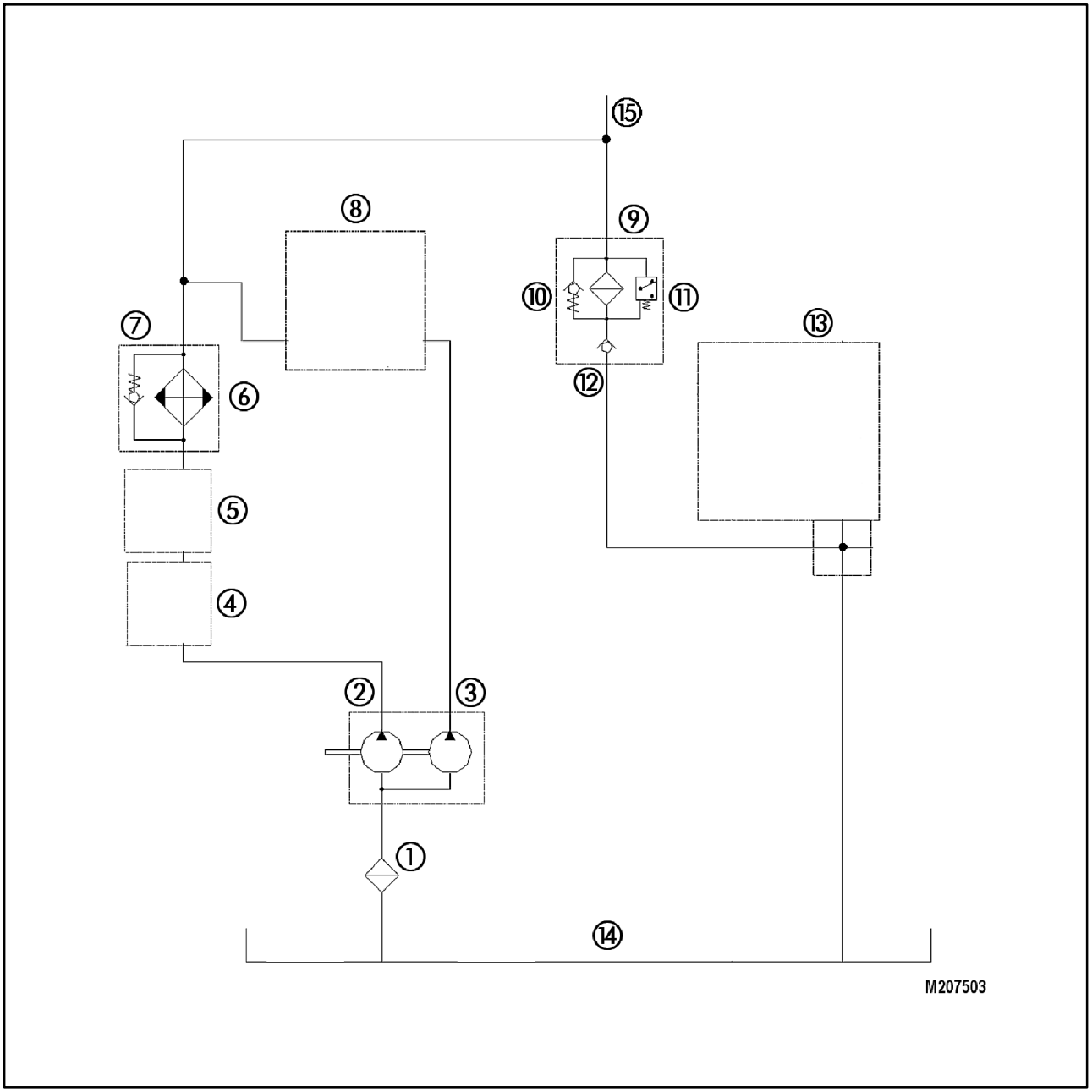
Spreader Pump

The spreader pump (2) will pull oil from the hydraulic reservoir (14) and direct it to the spreader valve (4). The spreader valve will direct the full flow of pump on to the rotary air screen valve (5) once the spreader operation is completed. The rotary air screen valve will direct the full flow of pump on to the oil cooler (6) once the air screen operation is completed. In cold whether the cooler may cause excessive restriction so the by-pass valve (7) can direct the oil flow around the cooler the filter housing (9). The filter restriction is monitored by the filter sensor (11) and is protected by the by-pass valve (10). The filter directs the flow to the PFC pump inlet and the reservoir tank.

IMPORTANT: *The spreader pump being a gear pump is associated with an open center system. In an open center system the pump flow is constant and MUST be routed back to the reservoir at all times. It can not be deadheaded or serious failures can occur.*

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Hydraulic Schematic



11

1. Reservoir Strainer
2. Spreader/Rotary Air Screen Drive Pump
3. Fan Drive Pump
4. Spreader Drive Valve
5. Rotary Air Screen Drive Valve
6. Oil Cooler
7. Oil Cooler By-Pass Valve
8. Fan Drive Valve
9. Return Filter Base
10. Filter By-Pass Valve
11. Filter Restriction Indicator Switch
12. Back Flow Check Valve
13. PFC Piston Pump
14. Reservoir Tank
15. Return From All Hydraulic Functions

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Hydraulic Schematic

Fan Pump

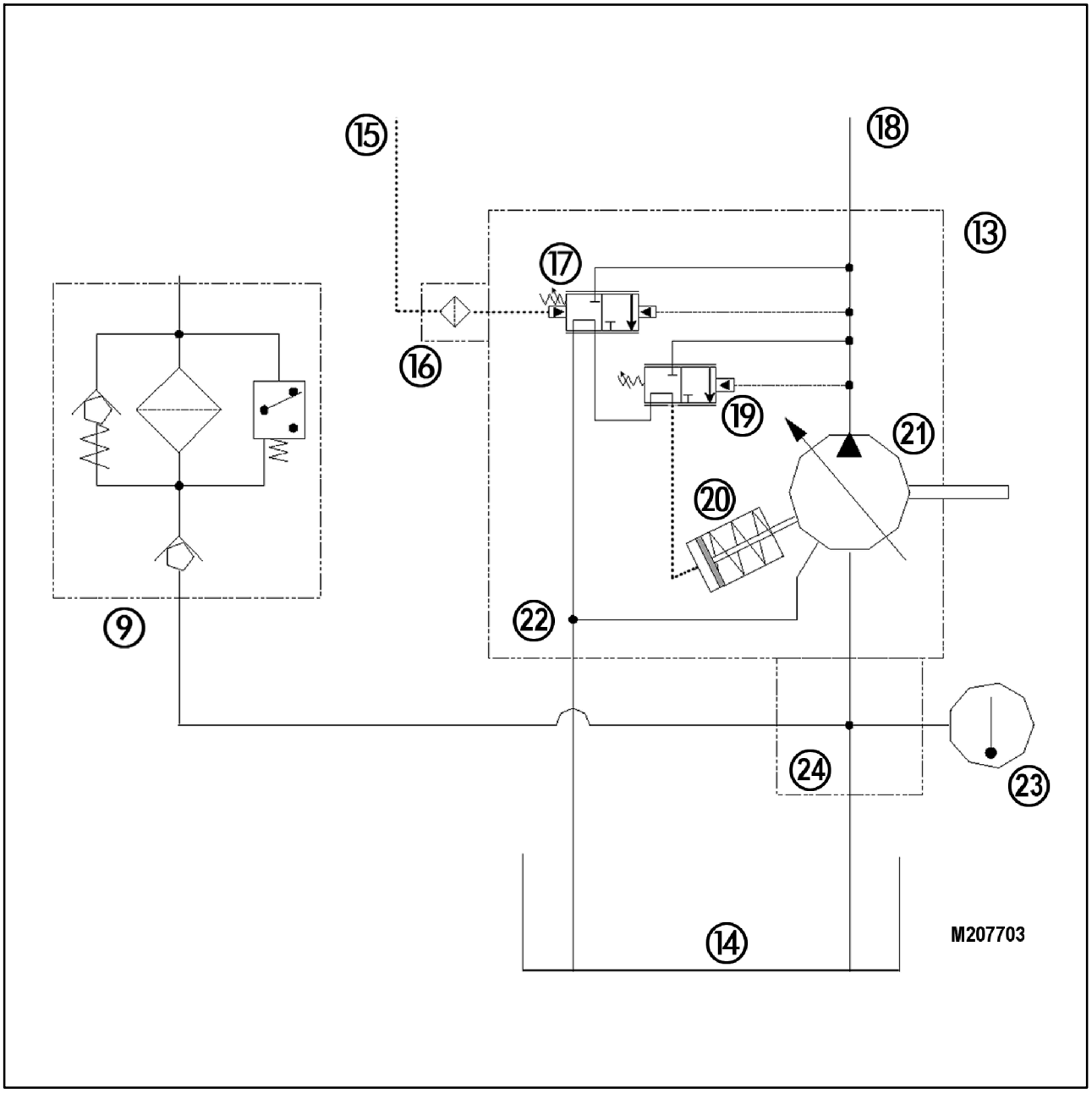
The fan pump (3) will pull oil from the hydraulic reservoir (14) and direct it to the fan valve (8). The fan valve will direct the full flow of pump into the flow from the spreader pump headed to the filter base (9). The filter restriction is monitored by the filter sensor (11) and is protected by the by-pass valve (10). The filter directs the flow to the PFC pump inlet and the reservoir tank.

IMPORTANT: *The fan pump being a gear pump is associated with an open center system. In an open center system the pump flow is constant and MUST be routed back to the reservoir at all times. It can not be deadheaded or serious failures can occur.*

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Pressure Flow Compensating (PFC) Pump Hydraulic System

PFC Pump Schematic

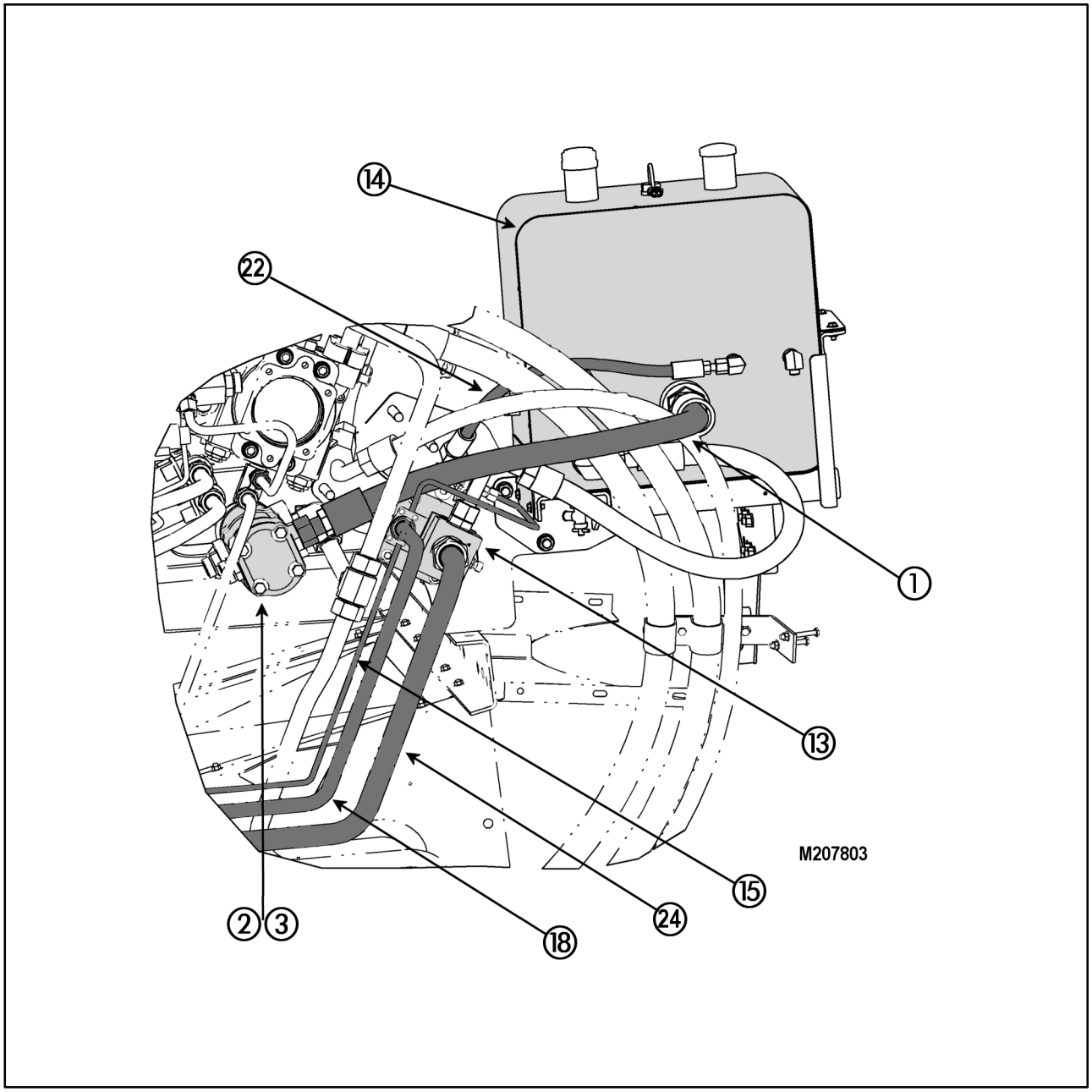


12

9. Return Filter Base
13. PFC Pump Assembly
14. Hydraulic Reservoir
15. Signal Line to Compensator
16. Signal Line Screen
17. Flow Control Spool
18. Pump Discharge Port
19. High Pressure Spool
20. Servo Piston (swashplate)
21. Rotating Assembly
22. Case Drain
23. Temperature Sensor
24. Supply Manifold

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PFC Component Locations



13

1. Supply to Spreader and Fan Pumps
2&3. Gear Pump Assembly, Spreader and Fan Drive
13. PFC Piston Pump
14. Hydraulic Reservoir
15. Signal Line to Compensator
18. PFC Pump Discharge Line
22. PFC Pump Case Drain
24. PFC Pump Suctions

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Hydraulic System

PFC Piston Pump

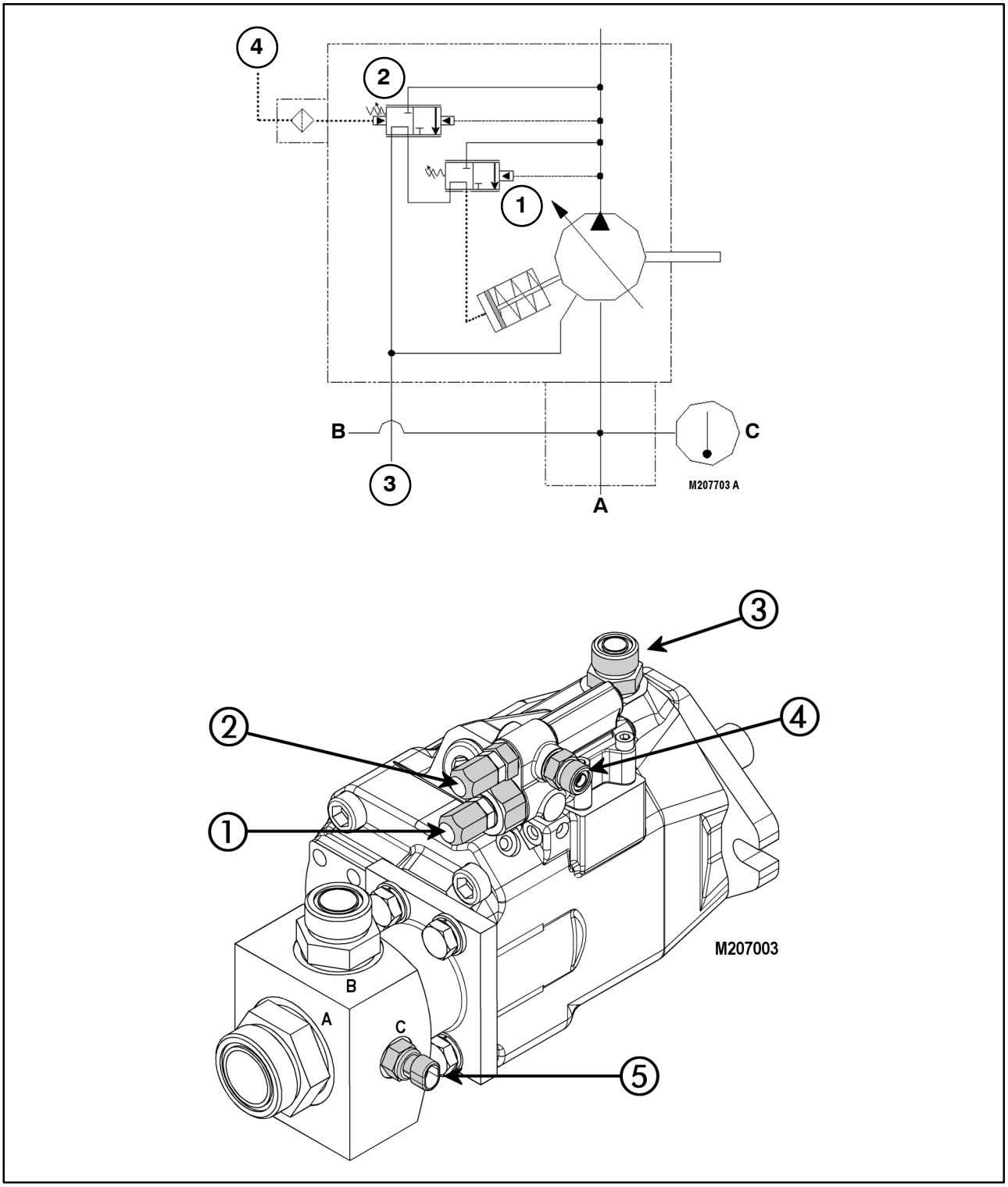
The PFC pump assembly is mounted to and driven by the PTO gearbox. The PFC pump will only produce the pressure and flow required meeting system demands when they occur. When discussing PFC hydraulics, it is important to realize that with the engine running the hydraulic system will always be in one of three modes:

- Low-pressure standby (could be thought of as neutral).
- Pressure and flow compensation (when the system is meeting the demand for oil).
- High-pressure standby (could be thought of as high-pressure relief).

The pump output is also directed to the parking brake / tow valve where a regulated pressure is created and maintained for the pilot operated valve assembles.

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PFC Piston Pump



14

1. High Pressure Spool Adjustment
2. Flow Control Spool Adjustment
3. Case Drain to Tank
4. Signal Line to Compensator
5. Temperature Switch

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Hydraulic Systems

PFC Pump Operation

The PFC pump assembly is located directly in front of the reservoir. The PFC pump is an axial-piston type pump. When the drive shaft of the piston pump is rotated, the piston cylinder block, which is splined to the drive shaft, also turns. The piston block contains nine piston assemblies which have free swiveling slippers attached to the ball-end of the piston assembly. The slippers ride against the machined surface of the swash plate.

When the swash plate is tilted from neutral to its maximum angle by the swash plate control spring, the piston slippers follow the inclined surface of the swash plate and begin moving in and out of the piston block bore. Half of the piston assemblies are being pulled out of the piston block while the remaining half of the pistons are being pushed back into the piston block. As the pistons are pulled from the piston block, they draw oil into the piston block bores. This supply oil comes from the kidney shaped intake port. As the piston crosses over top dead center, the piston push the oil out of the piston block bores into a kidney shaped outlet pressure port. Each of the nine pistons completes this cycle for each revolution of the pump shaft. This causes a continuous even flow of oil from the pump.

The greater the swash plate angle, the greater the piston stroke. This increase in stroke causes more oil to be pulled into the pump and discharged out of the pressure port. When the engine is at high idle and the swash plate is at its maximum angle the pump output is approximately 152 l/m (40 GPM).

NOTE: *The pump is always engaged by the swash plate spring to its maximum output. The compensator is always reducing the pumps output.*

Pump Compensator

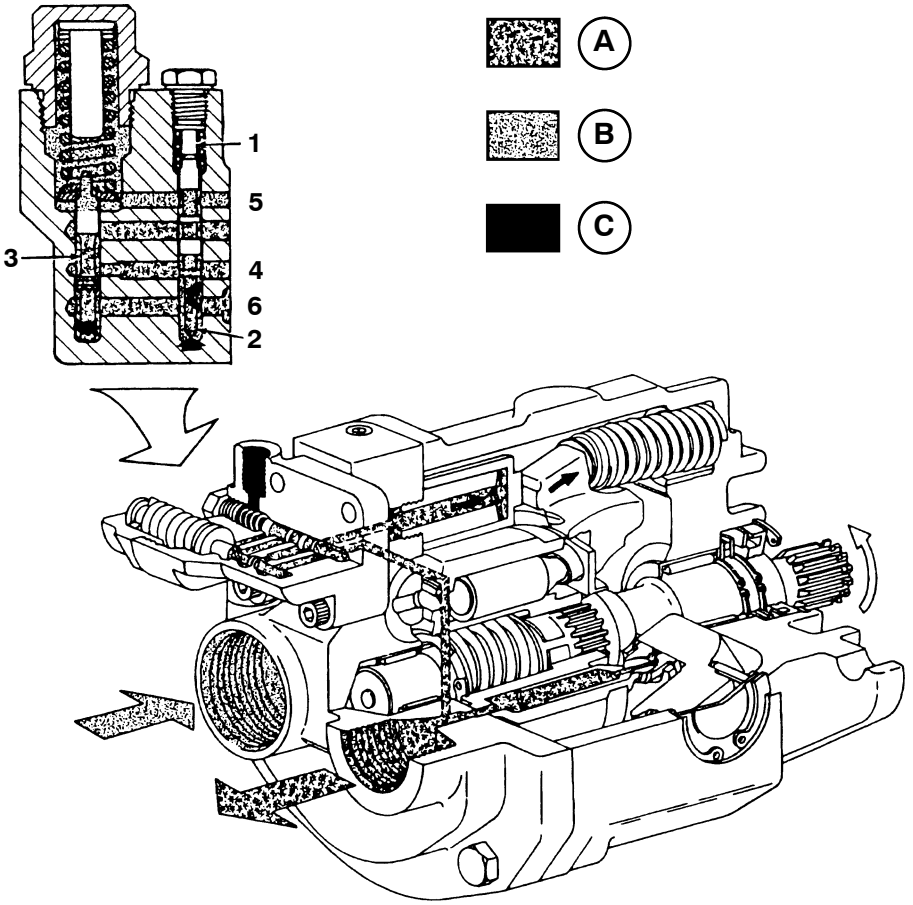
The pump compensator assembly controls the angle of the swash plate by directing oil to the swash plate control piston. The swash plate control piston will over come the swash plate control spring, placing the swash plate at the proper angle.

The main valve assembly, feeder valve assembly and steering hand pump each contain a signal port. The signal port and associated lines direct a signal pressure to the pump compensator. This signal pressure is equal to the system work pressure. The pump compensator will use this signal to place the piston pump swash plate at the proper angle to meet the system demand. The outlet pressure at the pump will be 27.6 bar (400 psi) higher than the signal line pressure due to the 27.6 bar (400 psi) spring in the compensator. The pump outlet pressure will continue to be 27.6 bar (400 psi) higher than signal line pressure until the high-pressure standby pressure is reached. After high pressure standby is reached, the pump outlet pressure and the signal line pressure will become equal.

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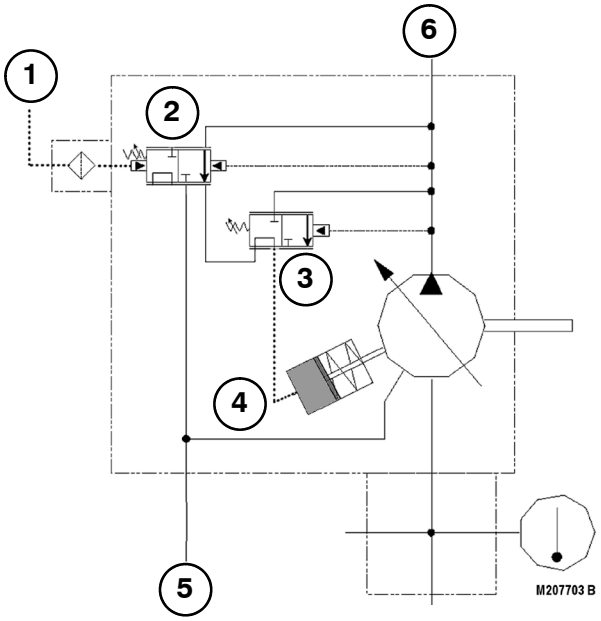
Hydraulic Systems

Low Pressure Standby



20043057

(Pump assembly is a representative drawing only.)



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Hydraulic Systems

Low Pressure Standby

When there is no demand for oil flow, the pump will go into the low-pressure standby mode. Low-pressure standby means low pressure and minimal flow in the system. When the engine is not running, no pressure exists in any circuit. In this state, the swash plate control spring is holding the piston pump at full stroke. When the engine is started and the pump begins to rotate, it will momentarily try to pump oil. This creates outlet pressure at the pump. This pressure is directed to the flow compensator spool and the high-pressure spool through passages in the piston pump back plate. The two spools in the pump compensator are both spring biased. The flow compensator spool has a 27.6 bar (400 psi) spring while the high-pressure spool has a 186.3 bar (3050 psi) spring. The pump pressure is directed to the non-spring side of these two spools. As pressure builds, it will cause the flow compensator spool to shift against its 27.6 bar (400 psi) spring. When the spool shifts it allows pump oil to pass to the pump control piston. This piston will extend and cause the swash plate to move against the control spring. The swash plate will move to a nearly zero degree angle, de-stroking the pump. In this condition, the pump will only move enough oil to make up for internal leakage within the system and maintain 31–41.5 bar (450–600 psi). The pump will remain in this position until there is a demand for oil. In low-pressure standby mode the pump produces less heat and uses less horsepower than an open-center system. Low pressure standby also makes starting the engine easier.

Minimum system pressure is 31–41.5 bar (450–600 psi) in the low-pressure standby mode. There is a 0.61 mm (0.024in) dynamic sensor orifice located in the steering priority spool. The dynamic sensor orifice connects the pump outlet port to the signal port of the pump compensator through the orifice check valve. If the oil in the signal line can flow through the steering hand pump too freely a 0.78 mm (0.031″) orifice in the steering hand pump signal passage provides back pressure in the signal line. This signal pressure of 3.45–10.3 bar (50–150 psi) is sent to the spring-end of the flow compensator spool. The spring pressure of 27.6 bar (400 psi) plus the signal line back pressure puts the pump into low pressure standby mode ranging from 31–41.5 bar (450–600 psi).

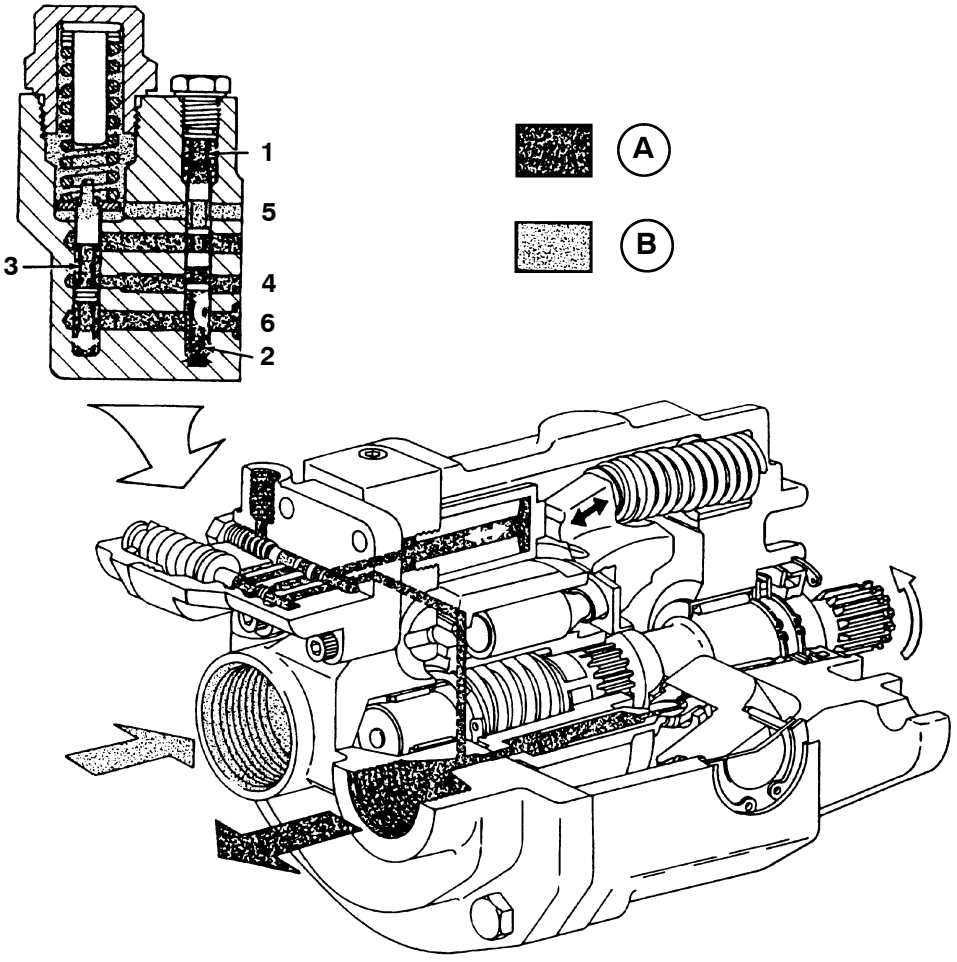
1. Signal Line-In
2. Flow Control Spool
3. High Pressure Spool
4. To Control Piston
5. Drain to Tank
6. Pump Output

A. Low Pressure Standby Oil
B. Drain Oil
C. Trapped Oil

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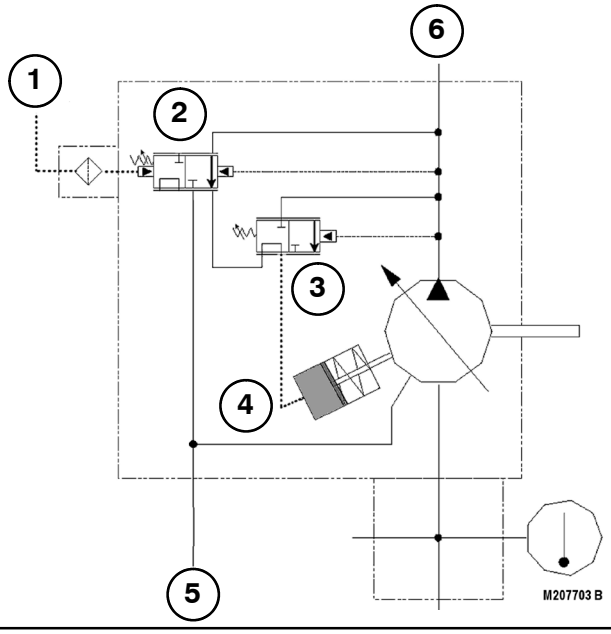
Hydraulic Systems

Pressure and Flow Compensation



20043058

(Pump assembly is a representative drawing only.)



16

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Hydraulic Systems

Pressure and Flow Compensation

The flow of oil from the pump is controlled by the difference in pressure at opposite ends of the flow compensator spool. When a valve is opened to operate a function on the combine, the outlet pressure of the pump will drop. This drop in pressure is detected on the non-spring end of the flow compensator spool. The spring will now shift the spool and allow oil to drain from the pump control piston into the pump case. The swash plate control spring will tilt the swash plate, causing the pump to provide more oil flow. When the flow demand of the system is met, the swash plate will be tilted to provide only the flow required by the component(s) in use. The working pressure in the system is fed back to the spring-end of the flow compensator spool through the signal line. The pump must produce flow at a pressure equal to the working pressure desired, plus enough to overcome the 27.6 bar (400 psi) spring on the flow compensator spool. When the outlet pressure is high enough to overcome both the spring and work pressure, the flow compensator spool will shift allowing oil to flow to the control piston, causing the pump to destroke to match the demand.

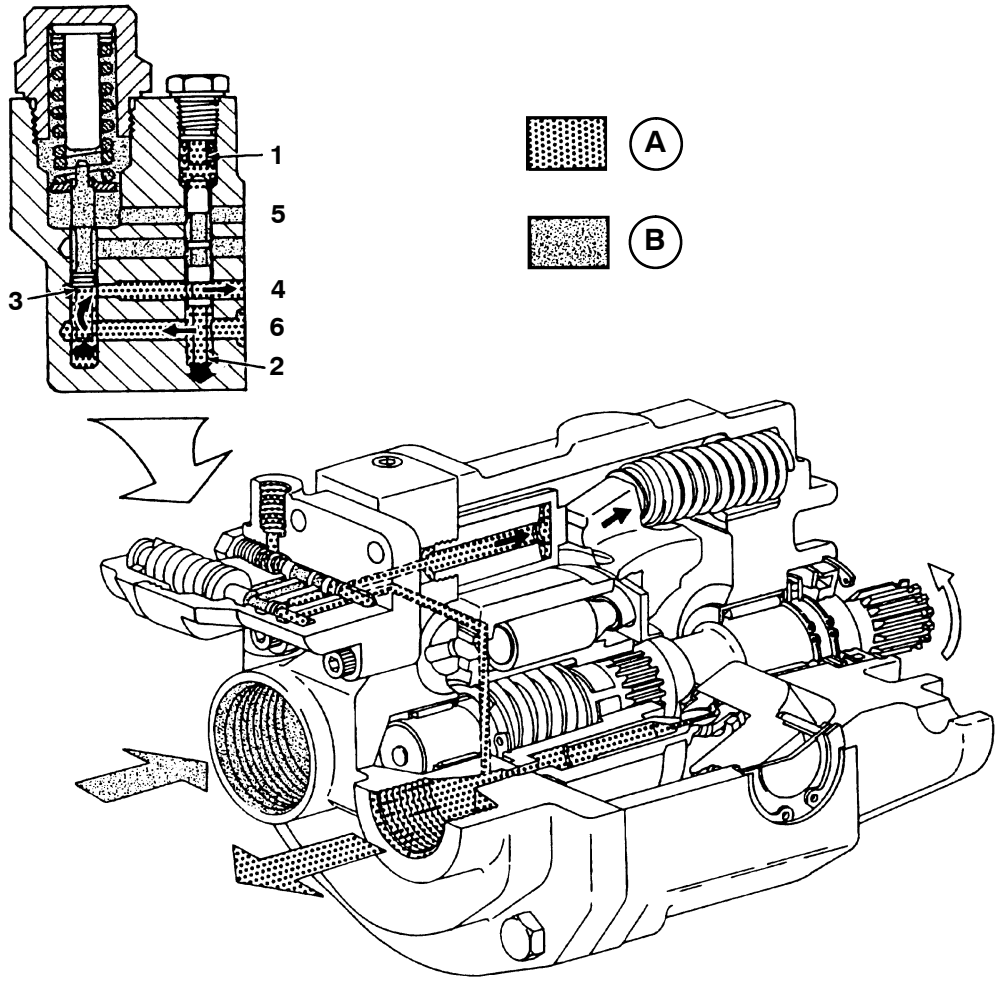
1. Signal Line-In
2. Flow Control Spool
3. High Pressure Spool
4. To Control Piston
5. Drain to Tank
6. Pump Output

A. Pressurized Oil
B. Drain Oil

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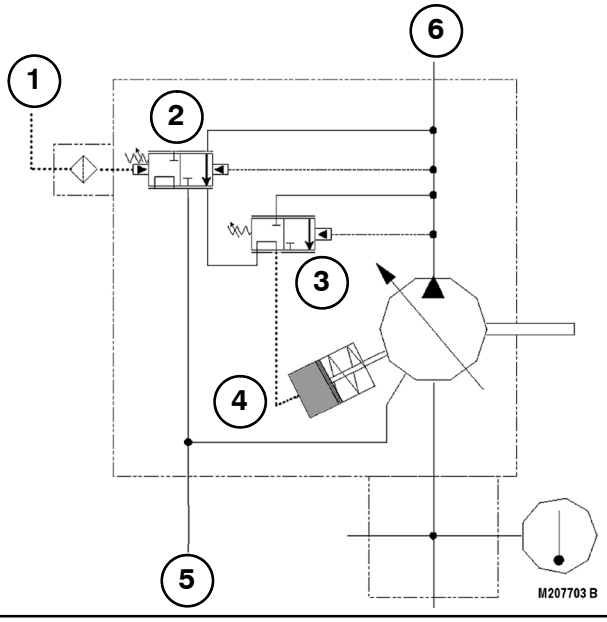
Hydraulic Systems

High Pressure Standby



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(Pump assembly is a representative drawing only.)



17

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Hydraulic Systems

High Pressure Standby

Should the hydraulic system stall-out under a high load, or a cylinder reach the end of its stroke, the pump will go into high-pressure standby until the load is overcome or the valve is returned to neutral. When the system stalls-out, there will be no flow across the controlling valve. The pressure will then equalize on both ends of the flow compensator spool. The spring will then cause the flow compensator spool to shift. At the same time, the pressure will start to rise in the system until it is able to move the spring-loaded high-pressure spool. This spring is set at 182.85–189.75 bar (3050 psi). When the high-pressure compensator spool shifts, it directs oil to the swash plate control piston, de-stroking the pump.

The pump will remain in the high-pressure standby mode until the load is overcome or the valve is returned to neutral. When the valve is returned to neutral, pressure is no longer available to the signal line. The flow compensator spool will shift allowing oil to extend the control piston and destroke the pump. Signal line pressure is bled-off through a 0.5 mm (0.020″) signal orifice check valve threaded into the steering priory valve, a 0.89 mm (0.035″) dampening orifice located in the steering priority valve, a 0.78 mm (0.031″) orifice in the steering hand pump and then to the reservoir. When the signal pressure is bled-off, the flow compensator spool will return the system to low pressure standby.

1. Signal Line-In
2. Flow Control Spool
3. High Pressure Spool
4. To Control Piston
5. Drain to Tank
6. Pump Output

A. Maximum High Pressure Oil
B. Drain Oil

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Signal Circuits
The signal circuit pressure may be generated from the following sources:

- Steering Circuit
- Header Raise Circuit
- Signal Valve Circuit
- Lateral Tilt Valve
- Reel Drive Valve

The steering, header raise, field tracker and reel drive circuits react differently than the reel raise, reel fore/aft and unloading auger swing circuits. This is due to the location of the signal line. The steering, reel drive, terrain tracker and header raise rates are variable by the operator, unlike the other functions, which are not adjustable. For example, the steering speed can be affected by how fast the operator turns the steering wheel. The header raise rate can be increased or decreased by changing the raise rate setting on the Universal Display Plus monitor. However, the adjustments for speed of reel raise, reel fore/aft and unloading auger swing are set by the size of the orifices in each valve.

The signal line for the variable control systems (steering, terrain tracker, reel drive and header raise) is located after each control valve, (monitoring the circuit work pressure). In this location, the signal line will sense actual working pressure in the cylinder(s).

The reel raise, reel fore/aft and unloading auger swing can NOT create a signal. When any of these functions are activated the jammer valve is also activated. The jammer valve is used to direct full pump pressure into the signal line, this causes the PFC pump to go the high pressure standby. A supply side orifice in each valve controls the speed at which these function operated.

The jammer valve is connected before the orifices that control the actuation speed. As a result, the signal pressure sensed is not the actual working pressure at the cylinder(s), but full system pressure. In this case, no pressure drop is detected and the oil pressure on either side of the flow compensator spool will remain equal. This situation will cause the system to go on high-pressure standby whenever reel raise, reel fore/aft and unloading auger swing are operated.

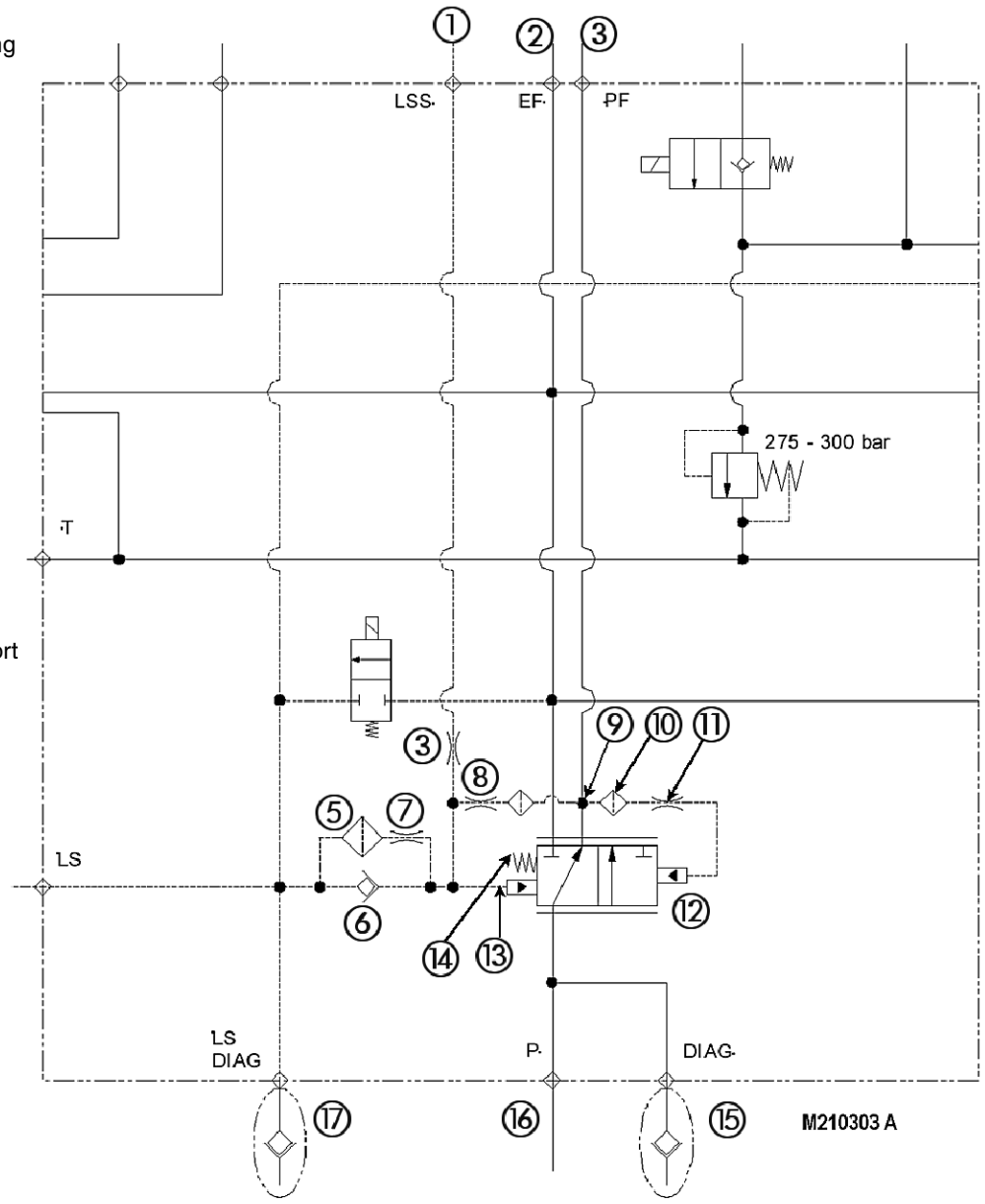
Within the PFC system there are five checks valves located in the signal lines. One at the header valve, one at the steering priority valve, one in the reel drive valve and two in the lateral tilt valve. The purpose of these checks is to allow the highest signal line pressure to get back to the compensator. This will make sure that the component with the highest-pressure demand is satisfied.

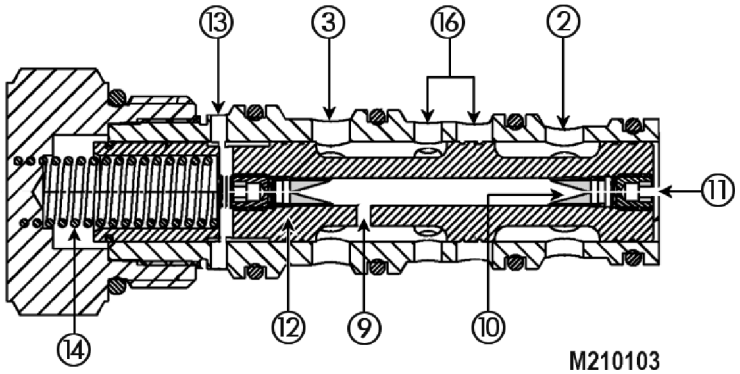
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Steering Priority Valve

Main Machine Stack Valve

1. Signal from Steering
2. Supply to Feeder Valve
3. Supply to Steering Hand pump
4. Not indicated
5. Screen
6. Steering Signal Check Valve
7. Signal Bleed Off Orifice
8. Dynamic Orifice
9. Not indicated
10. Screen
11. Damping Orifice
12. Pump PSI
13. Signal PSI
14. Spring
15. DIAG Test Port
16. From PFC Pump
17. Signal Line Test Port





18

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STEERING CIRCUIT

Steering Priority Valve

The steering priority valve is integral with the main stack valve on the left side of the combine. The primary function of the steering priority valve is to maintain a priority flow of oil to the steering system. Oil from the PFC pump is directed to the inlet of the steering priority valve. Inside the valve is the priority spool, which is spring biased. The spring will position the spool so incoming oil will to go to the steering hand pump first.

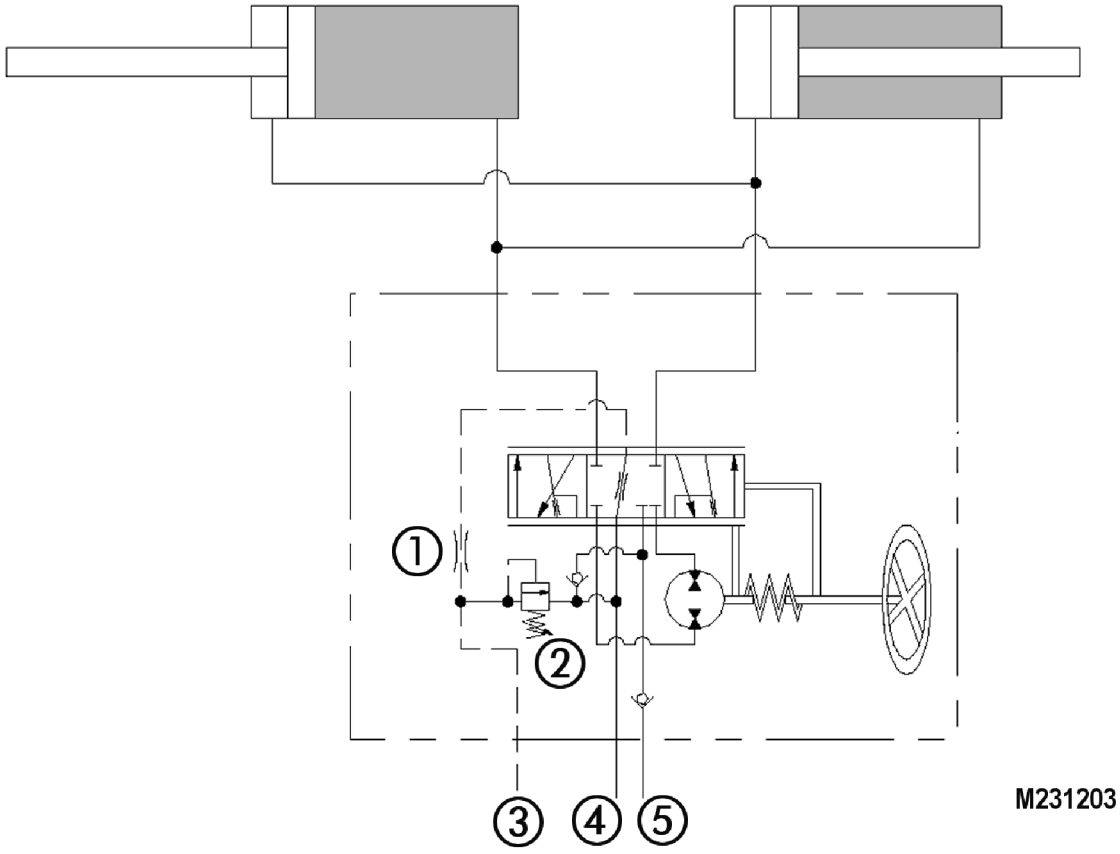
When steering is not being used, pressure will increase due to the closed-center steering hand pump. This build-up of pressure is directed to the non-spring end (12) of the priority spool through a screened 0.79 mm (0.031 in) damping orifice (11). At the same time, a screened 0.64 mm (0.025 in) dynamic sensor orifice (8) directs oil to the spring-end of the priority spool and to the signal line. The dynamic sensor orifice keeps the signal line filled with oil to keep the steering responsive. At the same time this oil is allowed to drain to the reservoir through the orifice in the steering hand pump spool. If the oil in the signal line can flow through the steering hand pump too freely, the 0.79 mm (0.031 in) orifice in the steering hand pump will create a back pressure of 10.3 bar (50–150 psi) in the signal line. This pressure in the signal line plus the 27.6 bar (400 psi) springs in the compensator act together to put the system at low pressure standby. With the oil on the spring-side (13) of the priority spool draining to the reservoir, and the increased pressure on the opposite end, the spool will shift against the spring. The priority spool will meter just enough oil to the steering circuit to make-up for the oil being bled-off through the 0.79 mm (0.031 in) orifice in the steering hand pump during low pressure standby. On the spring-end of the steering priority spool is an orifice (8) fitting that connects the steering hand pump signal line to the steering priority valve. This orifice fitting has a 0.79 mm (0.031 in) orifice in it, which serves as a dampening orifice to control priority spool movement.

The steering hand pump circuit is opened when steering is required. This will cause a pressure drop on the non-spring end of the priority spool. The spring will shift the priority spool to direct oil out to the steering hand pump. The PFC pump will stroke to meet the steering demand. When steering demand is satisfied, pressure will start to build on the non-spring end of the priority spool. The pressure will overcome the spring, shifting the priority spool, thus allowing excess oil to be supplied to the main valve assembly if required.

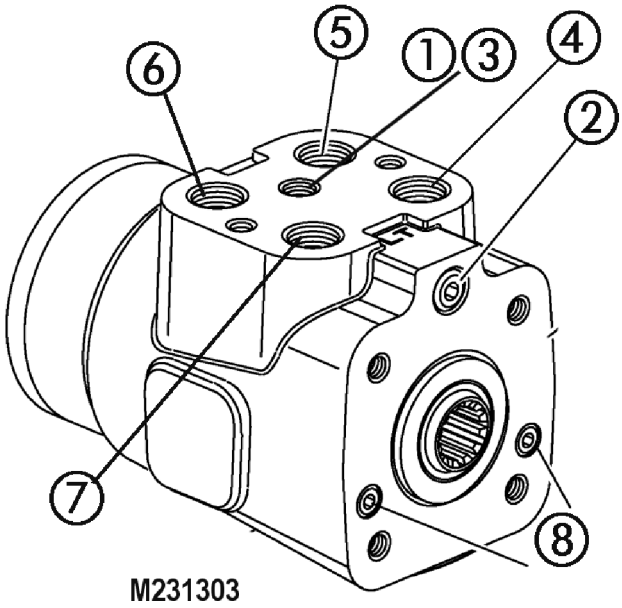
Threaded into the steering priority valve is a screened 0.50–mm (0.020in) orifice check. This orifice check allows oil pressure to get to the compensator when in low-pressure standby mode and when steering the combine. It also allows signal line pressure, once a function has been completed, to bleed from the compensator to reservoir through the steering hand pump, which de-strokes the pump.

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Steering Hand Pump



M231203



M231303

19

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STEERING CIRCUIT

Steering Hand Pump

AFX Series Combines use an Eaton steering hand pump. This hand pump is a closed-center, load-sensing design to minimize horsepower consumption and heat generation. The NA unit is 328 cc with 4.5 turns lock to lock and the EUR unit is 320 cc with 4.7 turns lock to lock. Two 2.25″ X 13.4″ cylinders are used to turn the wheels.

Steering Neutral

When there is no demand for steering, the spring-centered main spool and sleeve block the oil inlet port and the ports to the steering cylinder. At the same time the main spool and sleeve open a passage so the signal line can drain to the reservoir. The 0.64 mm (0.025 in) dynamic sensor orifice directs oil to the spring-end of the priority spool and to the signal line. The dynamic sensor orifice keeps the signal line filled with oil to keep the steering responsive. At the same time this oil is allowed to drain to the reservoir through the orifice (1) in the steering hand pump. The orifice in the steering hand pump will create a back pressure of 10.3 bar (50–150 psi) in the signal line. This pressure in the signal line plus the 27.6 bar (400 psi) spring in the compensator act together to put the system at low pressure standby. The internal check valve between the supply and return passages is closed at this time.

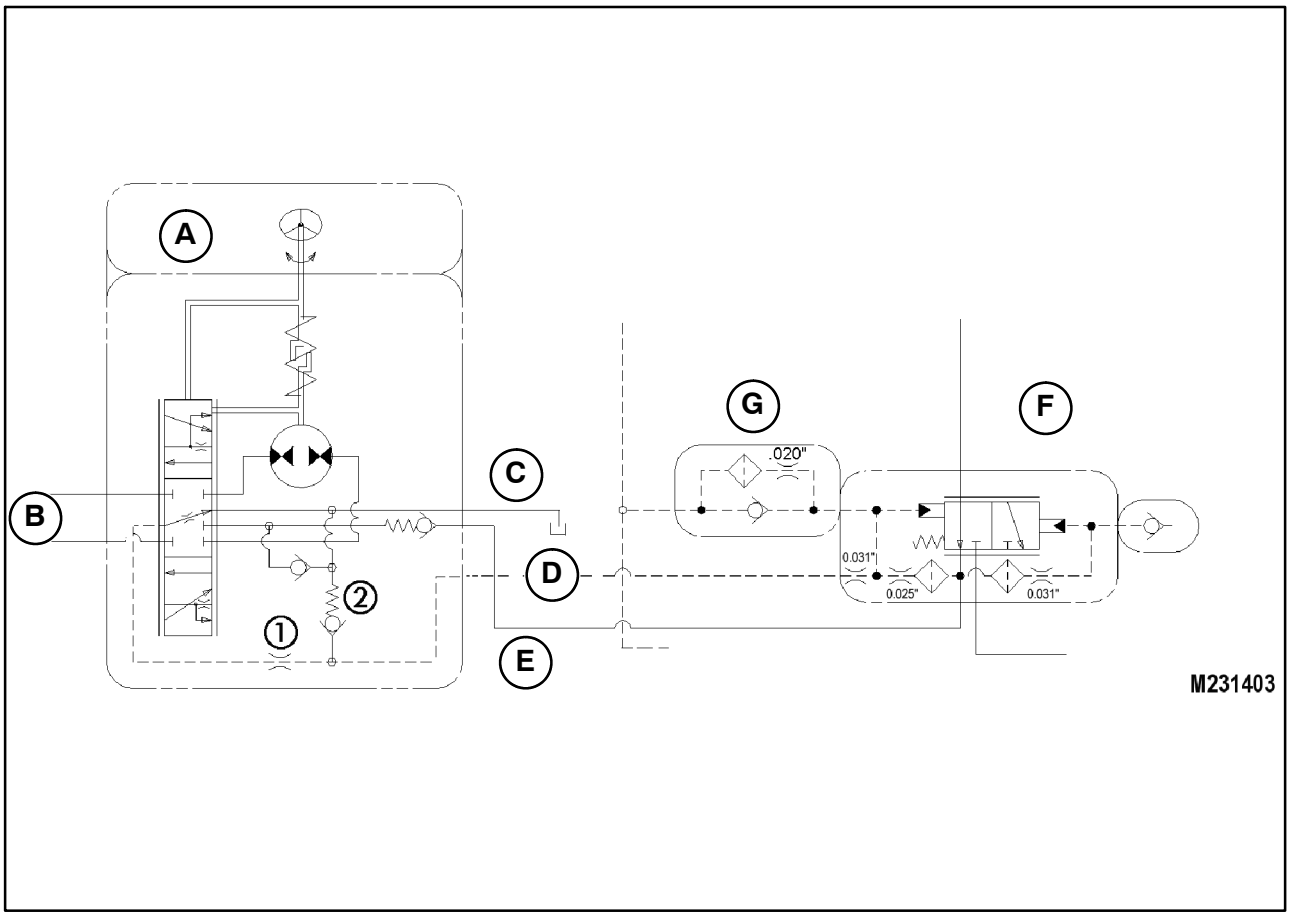
Power Turn (left or right)

Oil from the PFC pump enters the steering hand pump at the supply port. This opens the spring-loaded check valve and seats the recirculation check. As the steering wheel is rotated (left or right), the main spool will move within the sleeve. This movement will direct oil to the metering section as well as to the signal line. The metering section begins to rotate with the rotation of the steering wheel. This moves oil from the PFC pump to the rod-end or the base end of the cylinder depending on the direction of rotation. At this point the oil pressure going to the cylinders is also transmitted back to the compensator by way of the signal line.

Oil returning from the cylinder is directed back to the main spool and sleeve, then out the return port of the steering hand pump to the oil filter. When rotation of the steering wheel is stopped, the spring-centered main spool and sleeve return to the neutral position. This stops oil flow to the metering section and traps oil in the cylinder.

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Steering Relief Valve



20

A. Steering Handpump
B. To Steering Cylinders
C. Return Line
D. Signal Line
E. Supply Line
F. Steering Priority Valve
G. Check Valve

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STEERING RELIEF VALVE

If the steering wheels are turned to their stops, or the wheels can no longer be turned, the steering system pressure increases until it goes on relief. When the pressure increases above 182.7–189.6 bar (2650–2750 psi), a simple relief valve (2) located in the steering hand pump signal line will open. An orifice (1) is located in the hand pump to limit the amount of oil that is being feed into the signal line, so that the relief valve can limit the pressure in the signal line. This will limit the signal pressure available to the steering priority valve and the compensator. The purpose of this relief valve is to limit the maximum pressure available to the spring-side of the priority spool, thus allowing oil to flow to the main valve assembly. If the steering relief pressure is set too close to the high-pressure stand-by pressure, the oil flow to the main valve assembly may be cut off when the steering relief valve opens. This relief valve is factory set to provide a pump supply pressure between 182.7–189.6 bar (2650–2750 psi).

Manual Steering

The steering circuit will permit manual steering control of the combine in the event of a dead engine; however, steering effort is more demanding. Manual steering uses the existing oil in the steering circuit for the oil supply, and the operator turning the steering wheel as input power. In manual steering operation, the metering section (turned by the operator) is used as the pump to supply oil to the steering cylinder.

Manual Turn (left or right)

As the operator rotates the steering wheel, the centering springs compress and the main spool changes relationship to the sleeve. Since there is no supply of hydraulic oil from the PFC pump, the inlet check valve will be held on its seat by the spring. At this point, the recirculation check ball will not be seated due to the fact there is no incoming oil. This allows oil from the return port to be drawn past the recirculation check, through the main spool and sleeve, to supply the metering section, which is now acting as the pump. The metering section controls the amount of oil being directed to the cylinder based on the rotation speed of the steering wheel. Oil flow from the metering section is then directed to the spool and sleeve, then out to the steering cylinder.

Oil returning from the steering cylinder is directed back to the main spool and sleeve, then to the return port. Since return port oil is now the supply to the metering section, and the recirculation ball is off its seat, the oil can again be directed to the metering section for a continuous supply.

When the rotation of the steering wheel is stopped, the centering springs return the main spool and sleeve to a neutral position.

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HYDRAULIC SYSTEM

Electrical Monitoring Circuits
The system uses a number of sensors to monitor the systems operations.

HYDRAULIC FILTER RESTRICTIONS SWITCH

Reference Material:
Electrical schematic frames #10

Key Components:
Hydraulic Filter Restriction Switch S–32, CCM1, ground (1)

The filter restriction switch is used to monitor the condition of the filter. The switch is a N/O switch. When the pressure differential on the filter exceeds the specifications the switch piston will shuttle over connecting the power wire to the filter base, providing a ground. The filter restriction indicator should illuminate prior to the filter by-pass opening, providing the operator time to replace the filter.

Power is supplied to the sensor from the CCM1 connector X019 terminal J2–34 to the sensor terminal B. The sensor terminal A is directed to the chassis ground (1).

HYDRAULIC OIL TEMPERATURE SENSOR

Reference Material:
Electrical schematic frames #10

Key Components:
Hydraulic Oil Temperature Sensor B–18, CCM1

Located:
In the PFC pump inlet manifold

The reservoir tank temperature sensor monitors the oil temperature in the reservoir tank. If the temperature should climb above 128ºC (260ºF), the resistance of the sensor will be reduced to a point at which enough current will flow through it providing the CCM1 with a signal. At room temperature the sensor reads approximately 2500 ohms and reduces as the temperature increases.

Power is supplied to the sensor from the CCM1 connector X019 terminal J2–24 to the sensor terminal B. The sensor terminal A is directed back to the CCM1 connector X019 terminal J2–14.

NOTE: *The diagnostic screen on the Universal Display Plus monitor monitors the supply wire B.*

RESERVOIR TANK LEVEL SWITCH

Reference Material:
Electrical schematic frames #10

Key Components:
Hydraulic Oil Level Switch S–33, CCM2, ground (1)

The reservoir tank level sensor monitors the oil level in the reservoir tank. If the level should fall too low the sensor will close, providing a complete circuit.

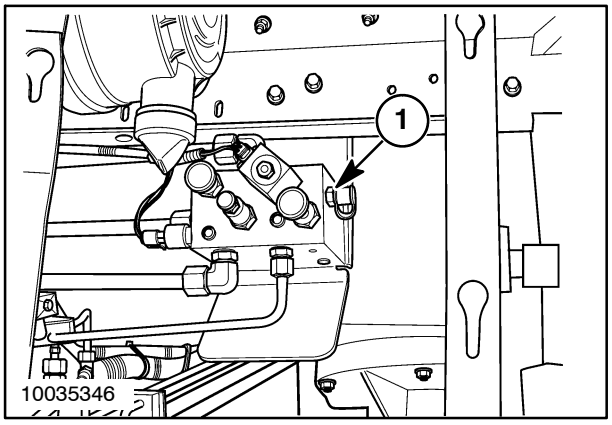
Power is supplied to the sensor from the CCM2 connector X016 terminal J2–39 to the sensor terminal B. The sensor terminal A is directed to the chassis ground (1).

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REGULATED PRESSURE

Park Brake / Regulated Pressure Valve

1. Park Brake/Regulated Pressure Assembly



21

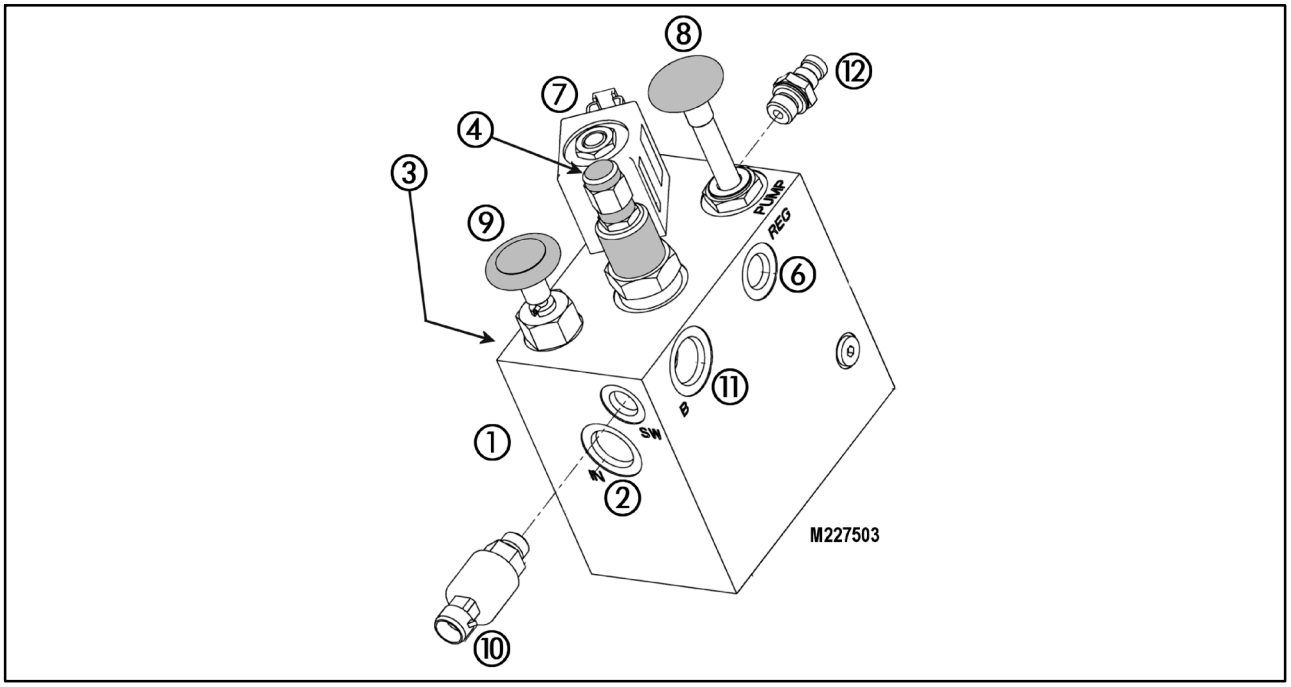
Park Brake / Regulated Pressure Valve

Regulated pressure is used for two functions:

1. To control the secondary portion of pilot operated valve assembles, Header Raise / Lower and Reel Drive valve. The primary spool uses regulated pressure to control the position of the secondary spool, the secondary spools will be controlling the operating flow from the PFC pump.
2. To release the Parking Brake and provide oil for the tow valve assembly.

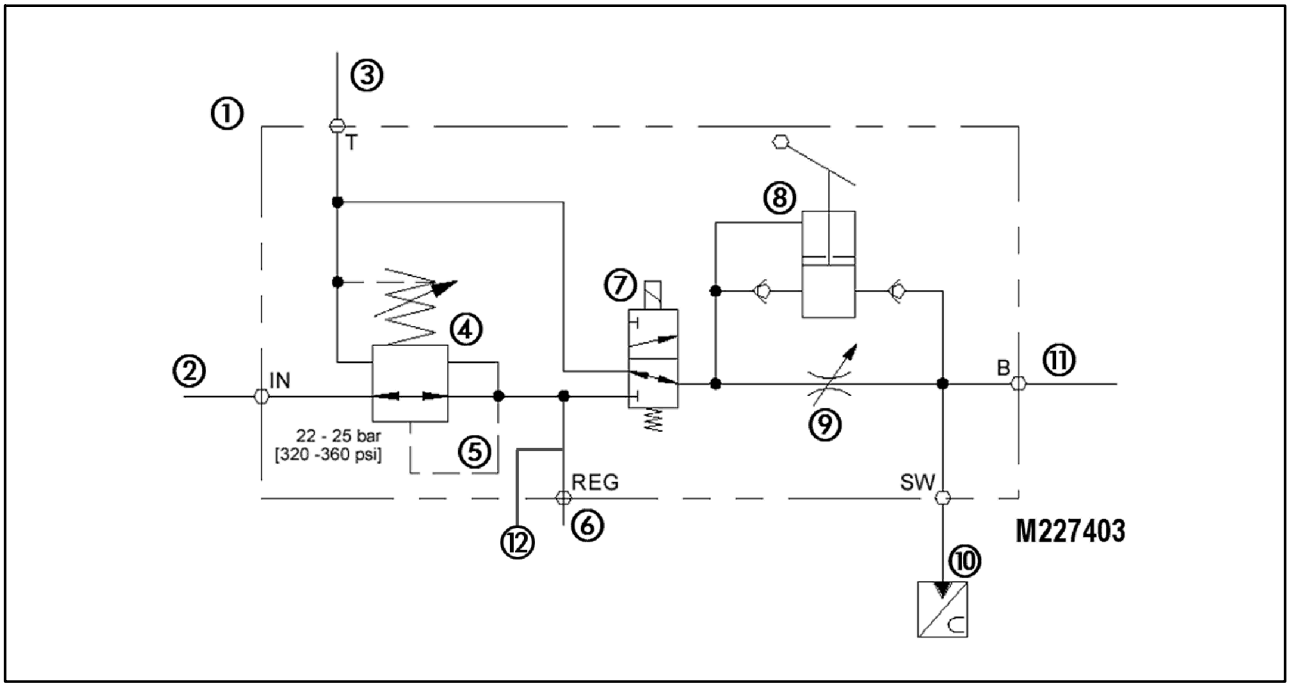
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Component Location



22

Regulated Pressure Schematic



23

1. Park Brake/Reg. Valve Assembly
2. Supply From PFC Pump
3. Return to Tank
4. Regulated Pressure Valve
5. Pilot Line
6. To Regulated Circuits
7. Park Brake Valve
8. Tow Valve (Hand Pump)
9. Isolation Valve (Tow Operations)
10. Regulated Pressure Sensor
11. Park Brake Release
12. Regulated Test Port

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Regulated Pressure Valve Operation

Reference Material:
Hydraulic Schematic

Key Components:
Regulated/Park Brake/Tow Valve Assembly

Regulated Pressure
The Regulating /Park Brake valve is teed into the hydraulic supply line from the PFC pump so when the PFC pump is operating, regardless of output pressure, the valve is receiving pump working pressure. PFC pump low pressure stand-by may vary between 31–41 bar (450–600 PSI) so it is the job of the regulated valve to maintain a regulated pressure of 22–25 bar (320–360 PSI) for the complete regulated circuit.

PFC is supplied at port (2) and is directed to the regulated valve assembly. All regulated functions are closed circuit operations, meaning they don't require large volumes of oil BUT demand constant pressure. Since there is no real flow of oil through the circuits the pressure will stabilize at the current PFC working pressure which is to high. The regulating valve, through the pilot line (5), is monitoring the regulated pressure AFTER the valve. As the regulated pressure increase the pressure is also directed to the non-spring end of the regulating valve and shuttles it against the spring, restricting the inflow of oil into the regulated circuit, maintaining the circuit pressure.

Regulated pressure may be tested at the test port (12).

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Electrical Monitoring Circuits

Park Brake Pressure Sensor

Reference Material:

Electrical schematic frames #9, #27

Key Components:

Park Brake Sensor B–53, CCM2

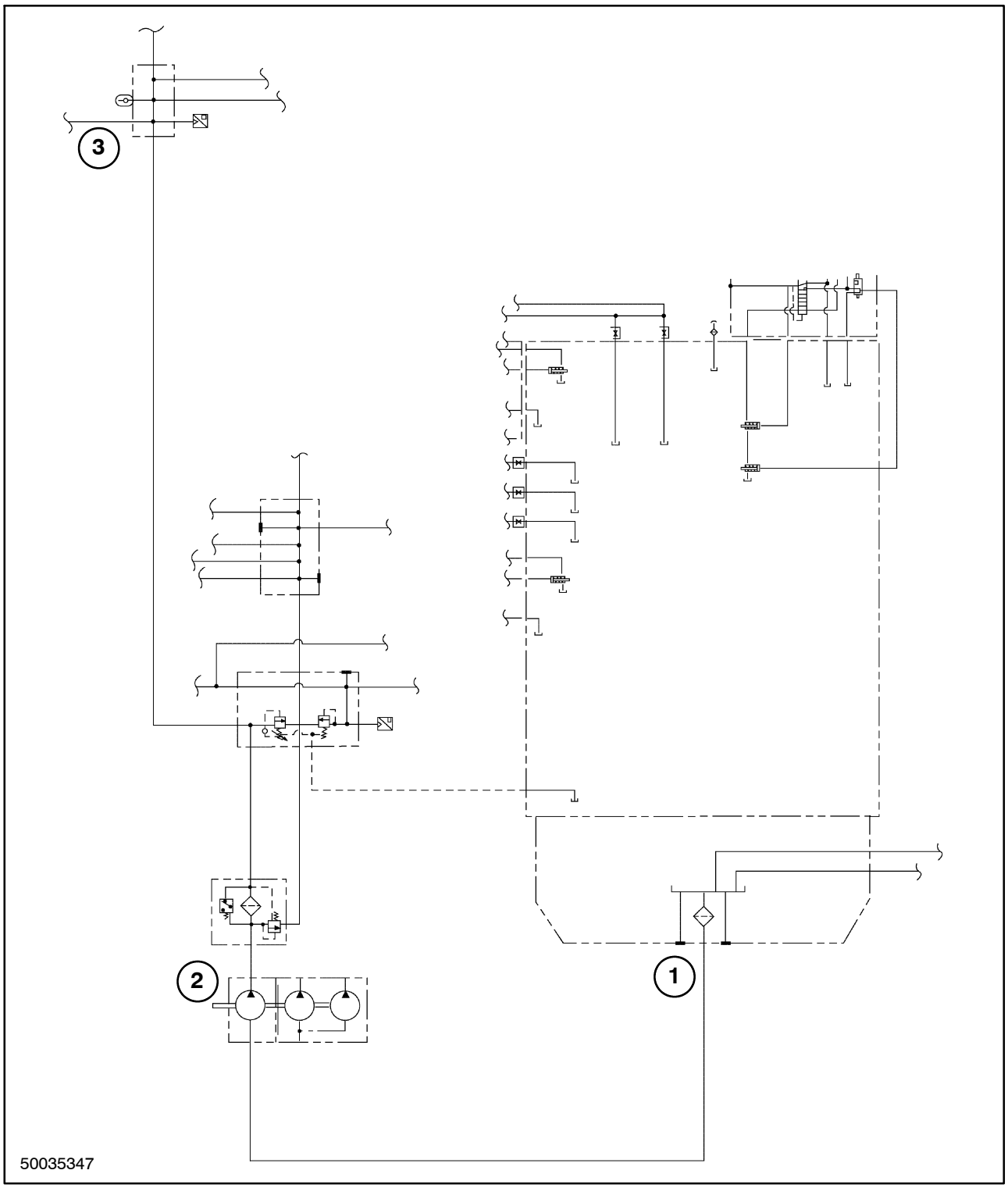
A pressure sensor is used to monitor the parking brake release pressure, in turn monitoring the regulated pressure. The sensor provides a constant voltage reading to the CCM2, and the CCM2 places a message on the data bus for the Universal Display Plus monitor. If the pressure falls below specification the park brake indicator lamp will illuminate warning to the operator. The sensor is a variable resistance sensor.

A 5V power is supplied to the sensor from the CCM2 connector X017 terminal J3–26 to the sensor terminal B. The sensor terminal A is directed back to the CCM2 connector X0016 terminal J2–14. The sensor terminal C is providing a variable signal voltage to the CCM2 connector X017 terminal J3–34.

NOTE: *The diagnostic screen on the Universal Display Plus monitor is monitoring the signal wire C.*

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Control Pressure



24

1. Supply from PTO Gearbox
2. Control Pressure Pump
3. Control Pressure Manifold and Sensor

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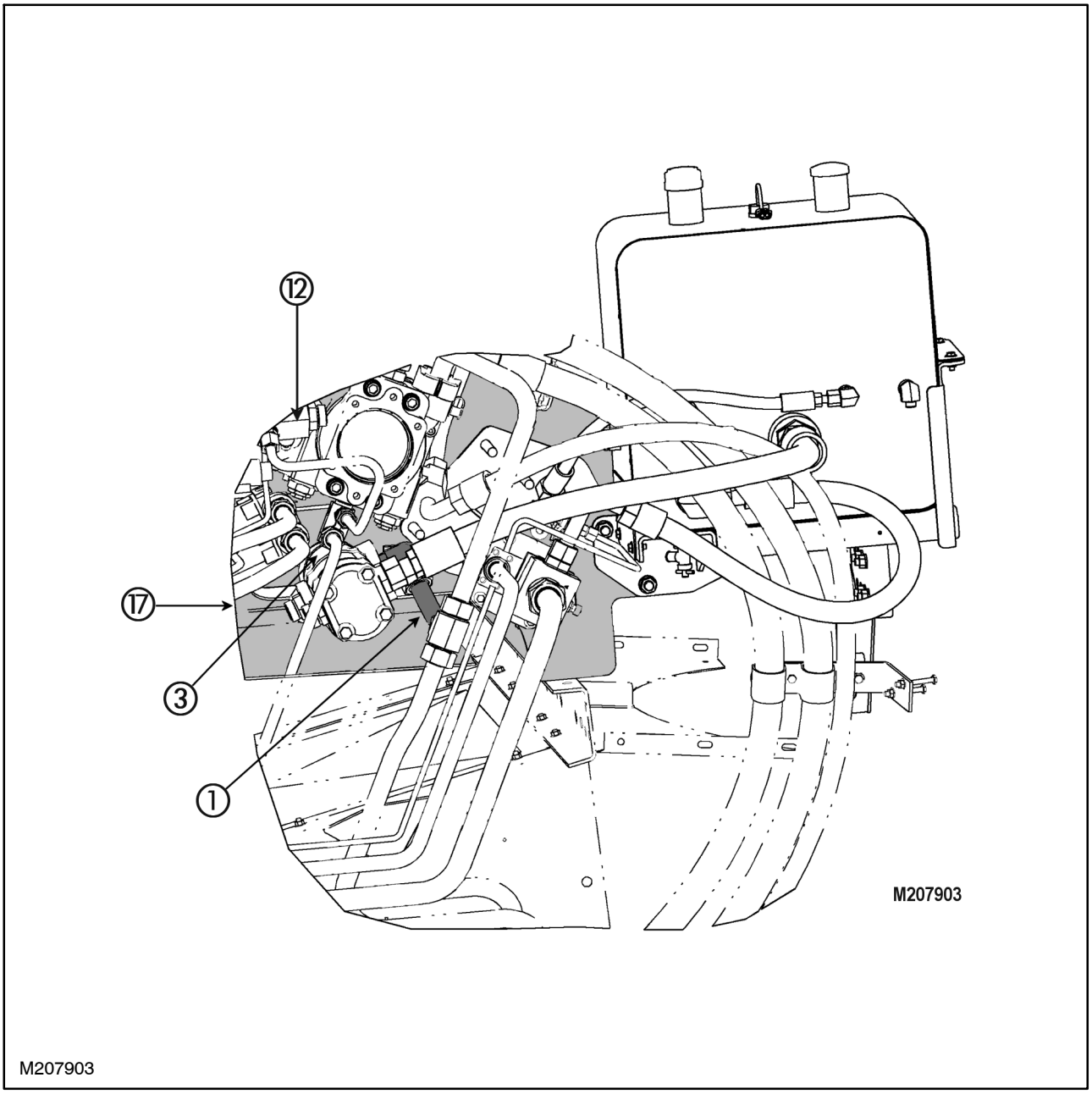
CONTROL PRESSURE SYSTEM

On the AFX combines there are three individual hydrostatic drives, they all share common components. In the past we were accustomed to having a charge pump and filtering system for each hydrostatic drive, this system will use a common charge pump and filter for all drives. We would normally have call this the CHARGE pump and filter for the hydrostatic drive, it is now the CONTROL PRESSURE circuit.

Normally the hydrostatic drive charge pump is mounted inside the hydrostatic pump end cover, not so on the AFX combine. Since the control pump will be supplying all three hydrostatic drives a larger pump is required. The control pump is the largest gear pump section of the gear pump assembly. The customary charge pump that is incorporated into the ground drive hydrostatic pump assembly will be used ONLY for PTO gearbox cooling lubrication.

NOTE: *The Charge pressure is identified as “Control Pressure.”*

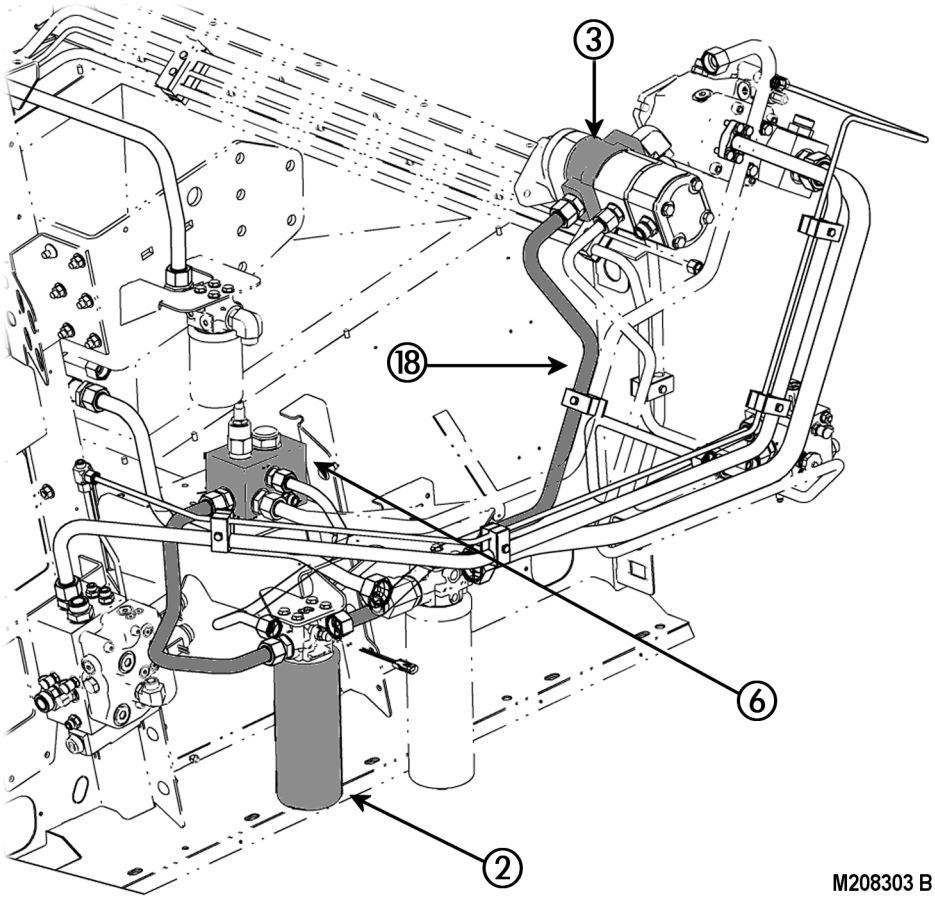
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25

1. Supply From PTO Gearbox
3. Control Pressure Pump
12. Control Pressure Test Port and Sensor
17. PTO Gearbox

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M208303 B

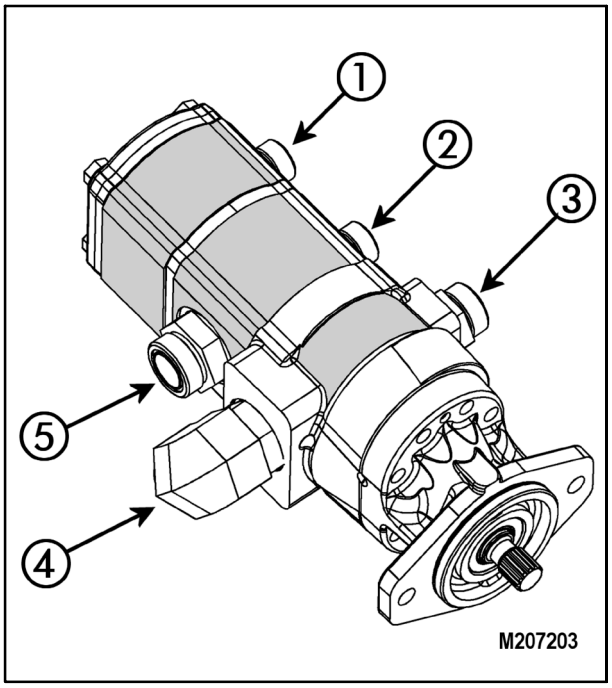
26

2. Control Circuit Filter
3. Gear Pump Assembly
6. Control / Lube Pressure Regulating Valve
18. Pump to Filter Line

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Control Pressure Pump

1. Fan Drive Output (rear pump)
2. Spreader and Rotary Air Screen Output (center pump)
3. Control Pressure Output (front pump)
4. Supply From PTO Gearbox, (for pump 3)
5. Supply From Hydraulic Reservoir, (for pumps 1 and 2)



27

The gear pump assembly is mounted in the PTO gearbox and incorporates three separate gear pumps.

The **Control Pressure** pump, (pump 3, nearest to the drive shaft), is supplied oil from the **PTO gearbox** and all of its flow is returned to the PTO gearbox. See specification page.

The **Spreader**/**Rotary Air Screen Drive** pump is supplied oil from the **hydraulic reservoir** and returns all of its flow back to the reservoir. See specification page.

The **Fan Drive** pump is supplied oil from the **hydraulic reservoir** and returns all of its flow back to the reservoir. See specification page.

NOTE: *If the seal was to leak between the front and center pumps oil could transfer between reservoirs.*

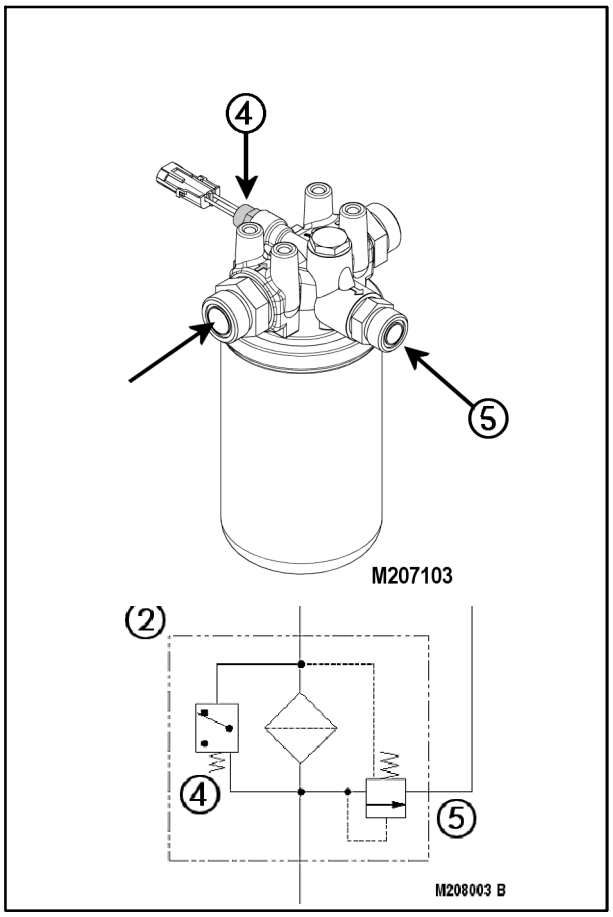
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Filtration

2. Filter Base
4. Restrictions Indicator
5. Filter By-Pass Port

The control pressure filter is on the supply side of the control pressure circuits, the filter is a pressure filter. The filter base incorporates a filter restriction sensor (4) that monitors the condition of the filter element. If the restriction increases above 2.76 bar (40 PSID) differential pressure the sensor will CLOSE to create a signal to the Universal Display Plus monitor for operator warning.

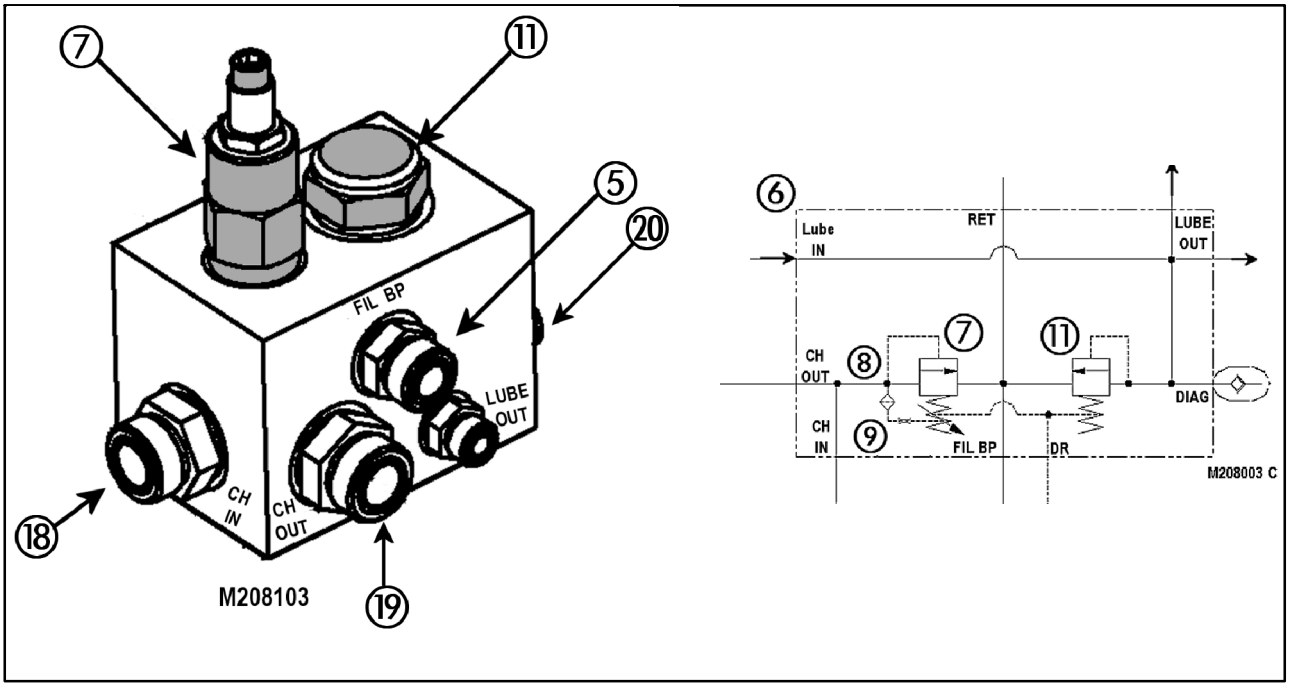
The filter base incorporates a filter by-pass valve that will open at 3.45 bar (50 PSID) differential pressure to prevent over pressuring the filter. Since the flow is supplying the hydrostatic pumps and motor the filter by-pass does NOT permit dirty oil to flow through the filter base down stream. The filter base directs the by-pass out port (5) to the return manifold. The sensor is set to activate prior to the by-pass valve opening.



28

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Control / Lubrication Pressure Valve



29

5. Filter Base By-Pass IN Port
6. Valve Body
7. Control Pressure Regulating Valve
8. Screen
9. Orifice
11. Lubrication Pressure Regulating Valve
18. Control Pressure Supply
19. Control Pressure OUT Port
20. Lubrication Pressure Switch

The Control/Lube pressure control valve regulates both the control pressure and lube pressure. The valve is supplied oil from the control pressure pump at port (18) and is exposed to the regulator (7). The regulator is adjustable to maintain a control pressure of 20–22 bar (290–320 PSI). If the pressure exceeds the spring setting the valve will shuttle and direct the flow to the return port (RET).

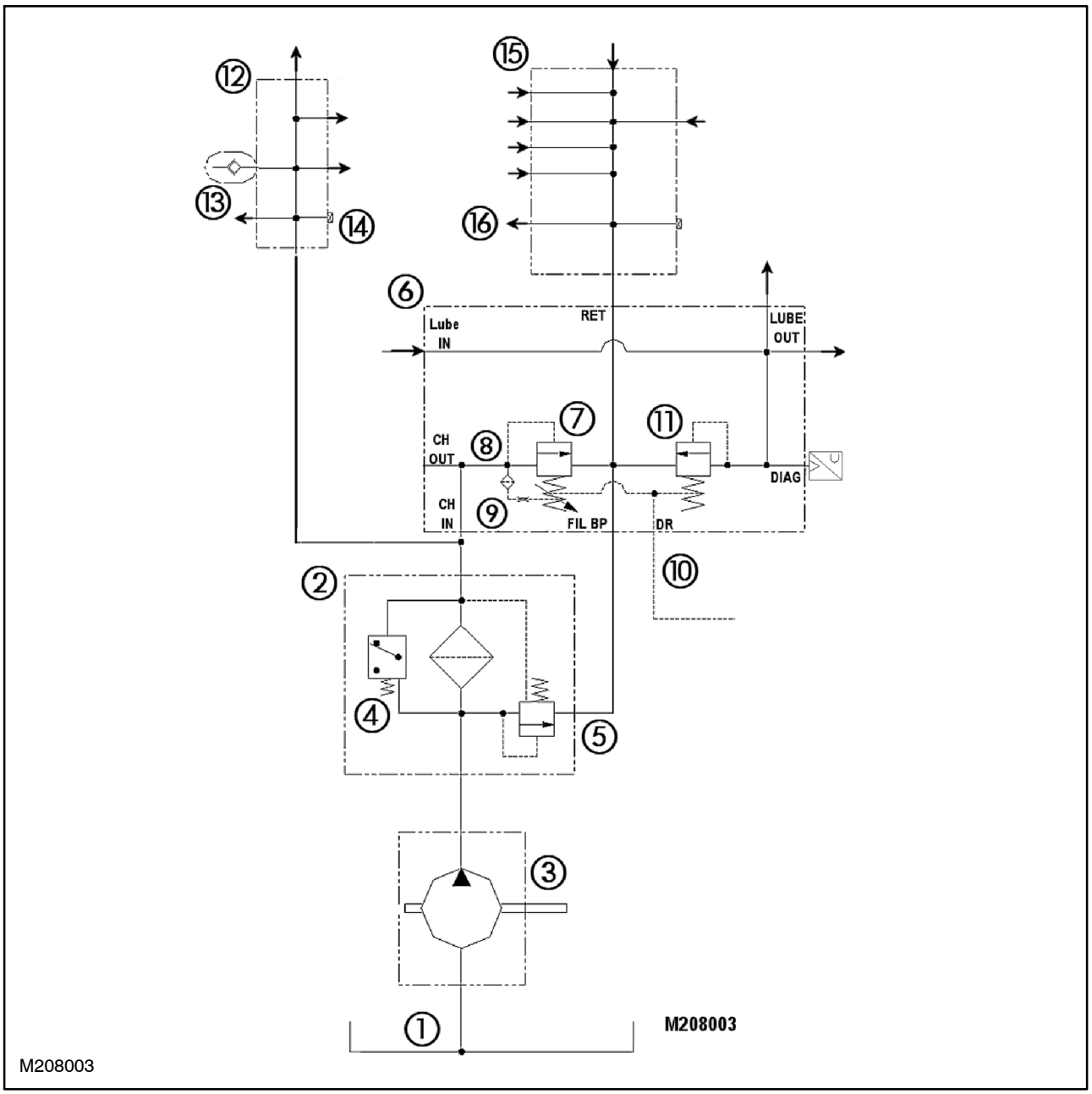
The valve body also receives the filter by-pass oil at port (5) and combines it with the oil from both pressure regulators. The combined oil is directed out the return port (RET) to the return filter and back to the PTO reservoir or the lubrication pump.

The lubrication pressure is checked at the diagnostic test port (20). The lubrication oil is supplied from the lubrication pump, which discussed later in this section.

NOTE: *The screen and orifice provide for an air bleed on initial start up at the plant or if the system is drained completely. If the orifice was plugged the control pressure pump could have problems priming. It will bleed approximately 1.9 L/m (0.5 GPM) to the PTO gearbox.*

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Control Pressure Schematic



30

1. PTO Reservoir
2. Control Pressure Circuit Filter
3. Control Circuit Pump
4. Filter Restriction Switch
5. Filter By-Pass Port
6. Control / Lubrication Pres. Reg. Valve
7. Control Pressure Valve
8. Screen
9. Orifice
10. Drain
11. Lubrication Pressure Valve
12. Control Pressure Distribution Manifold
13. Control Pressure Test Port
14. Control Pressure Sensor
15. Return Manifold
16. To The Lubrication Pump / Tank

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Control Pressure Schematic

The control circuit pump is used to supply the ground, rotor, and feeder drive hydrostatics and their associated control valves, the unloading auger and chopper/separator clutches. Excess oil is bypassed through the control valve and is returned to the return manifold. All the oil from the return manifold is directed to the lubrication pump inlet, then to the control pump inlet. These two pumps will consume all the return flow and still need more oil to pump. The control circuit pump will receive the remaining oil from the PTO gearbox reservoir/sump.

1. The control circuit pump pulls oil from the return manifold and the PTO gearbox and directs it to the control circuit filter base
2. The filter base monitors the filter restriction and by-pass the oil if needed and directs the oil to the Control/Lube Pressure regulating valve.
3. The control pressure is regulated by an adjustable relief valve and directed out to the distribution manifold. All excess oil that is bleed off by the regulating valve is directed to the return manifold and sent to the PTO gearbox and charge the lubrication and control circuit pump.
4. The distribution manifold contains a pressure sensor to monitor the Control Pressure, sending a signal to the Universal Display Plus monitor for operator information.

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Electrical Monitoring Circuits
The system uses two sensors to monitor the systems operations.

Control Pressure Filter Restrictions Switch

Reference Material:
Electrical schematic frames #10

Key Components:
Filter Restrictions Switch S-34, CCM1

The filter restriction switch is used to monitor the condition of the filter. The switch is a N/O switch. When the pressure differential exceeds the specifications the switch piston will shuttle over connecting the power wire to the ground.

Power is supplied from the CCM1 connector X019 terminal J2-35 to the B terminal on the switch. The A terminal is directed to chassis ground point (1).

Control Pressure Sensor

Reference Material:
Electrical schematic frames #10, #27

Key Components:
Control Pressure Sensor B-35, CCM2

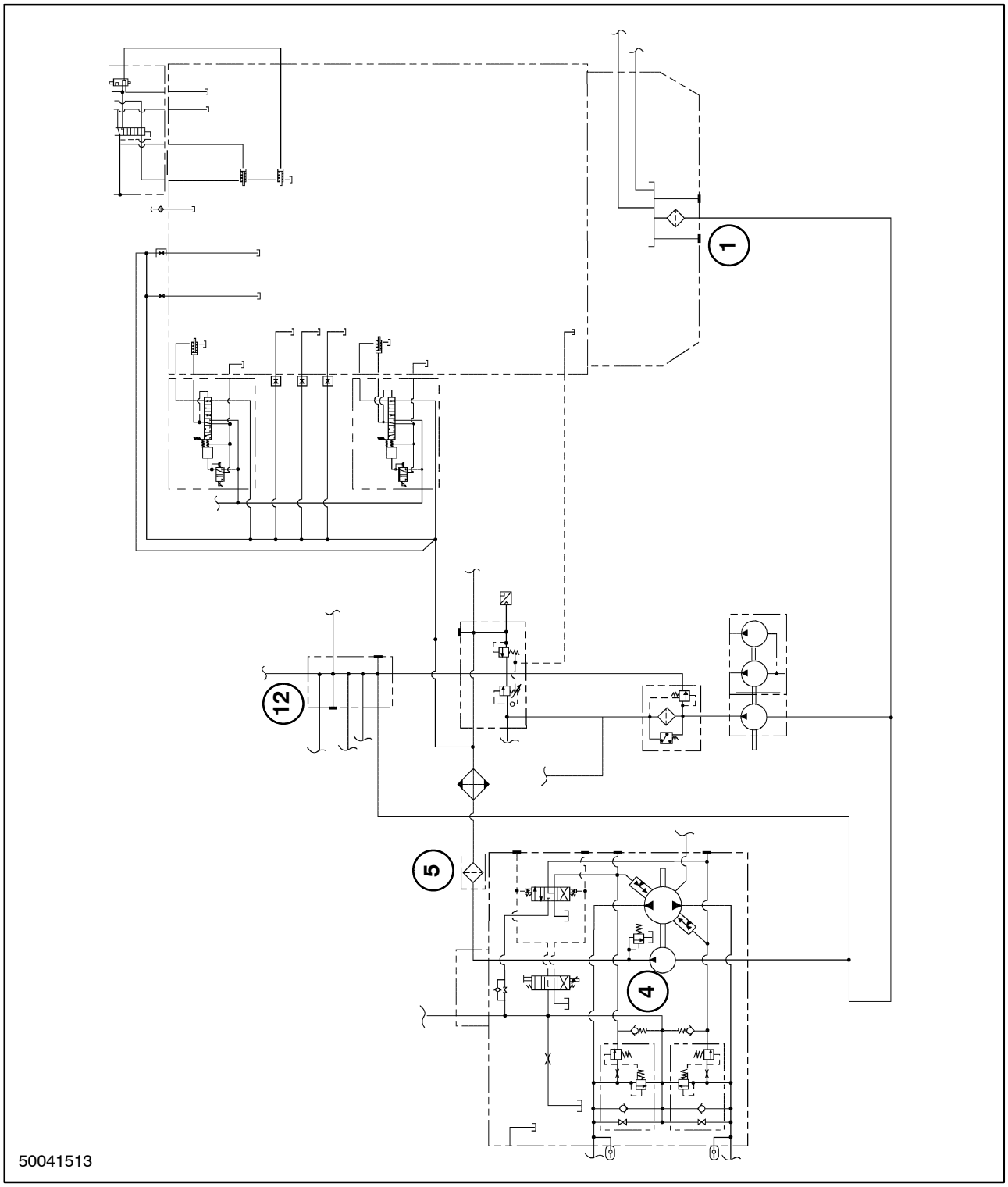
Location:
In the control pressure manifold at the feeder drive pump.

The control pressure sensor is used to monitor the control pressure. The sensor provides a constant pressure reading to the CCM2. The CCM2 places a message on the data bus for the Universal Display Plus monitor to display and provides a warning if the pressure should drop, providing a warning to the operator.

A 5V power supply from the CCM2 connector X016 terminal J2-31 is directed to the B terminal of the sensor and a return wire from the A terminal is directed back to the CCM2 connector X016 terminal J2-14. The sensors C wire provides the pressure signal to the CCM2 connector X016 terminal J2-19. When the pressure is normal, a signal voltage above 3V is normal. The reading may be monitor on the Universal Display Plus monitor diagnostic screen.

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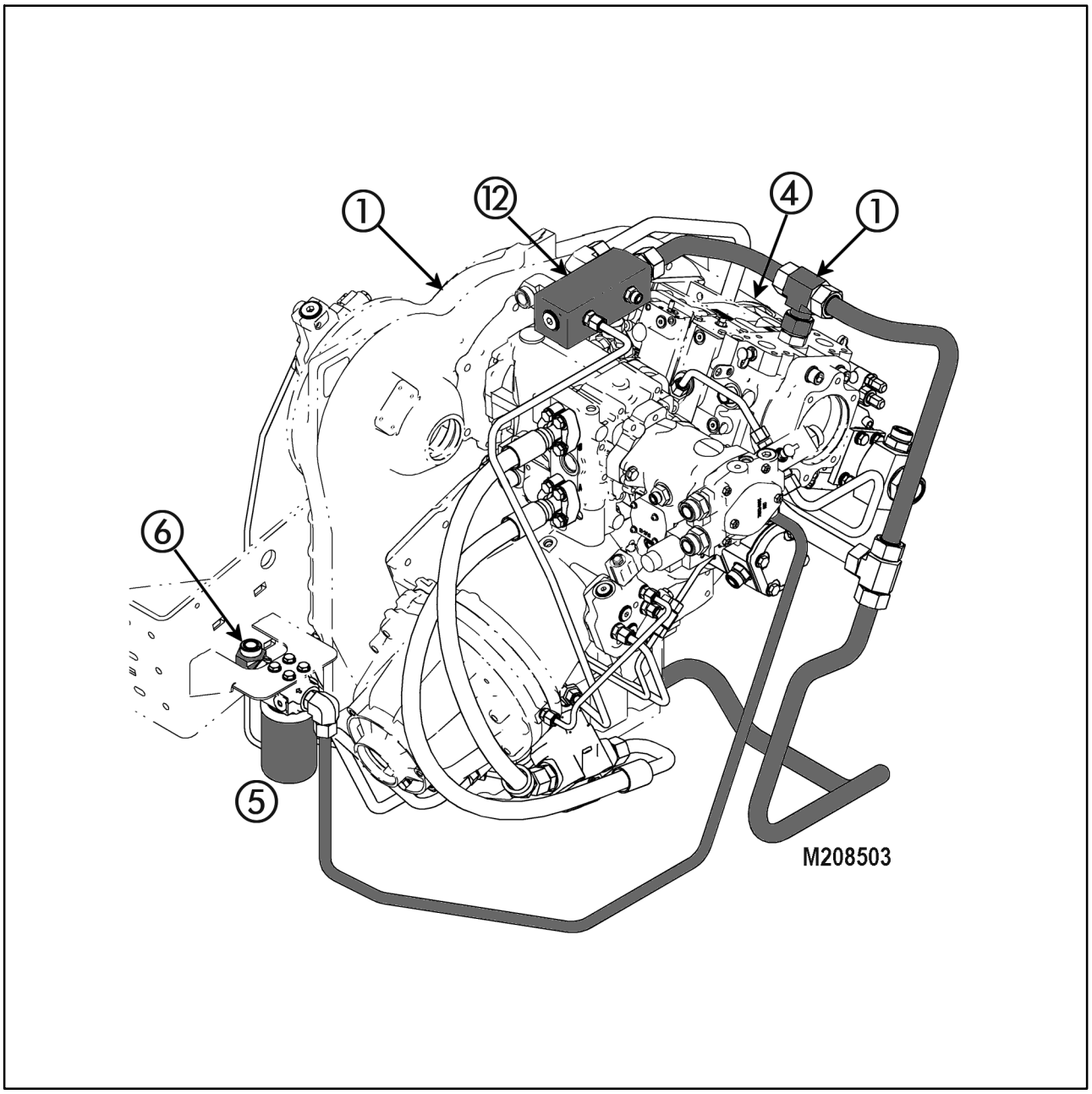
PTO GEARBOX COOLING AND LUBRICATION SYSTEM



31

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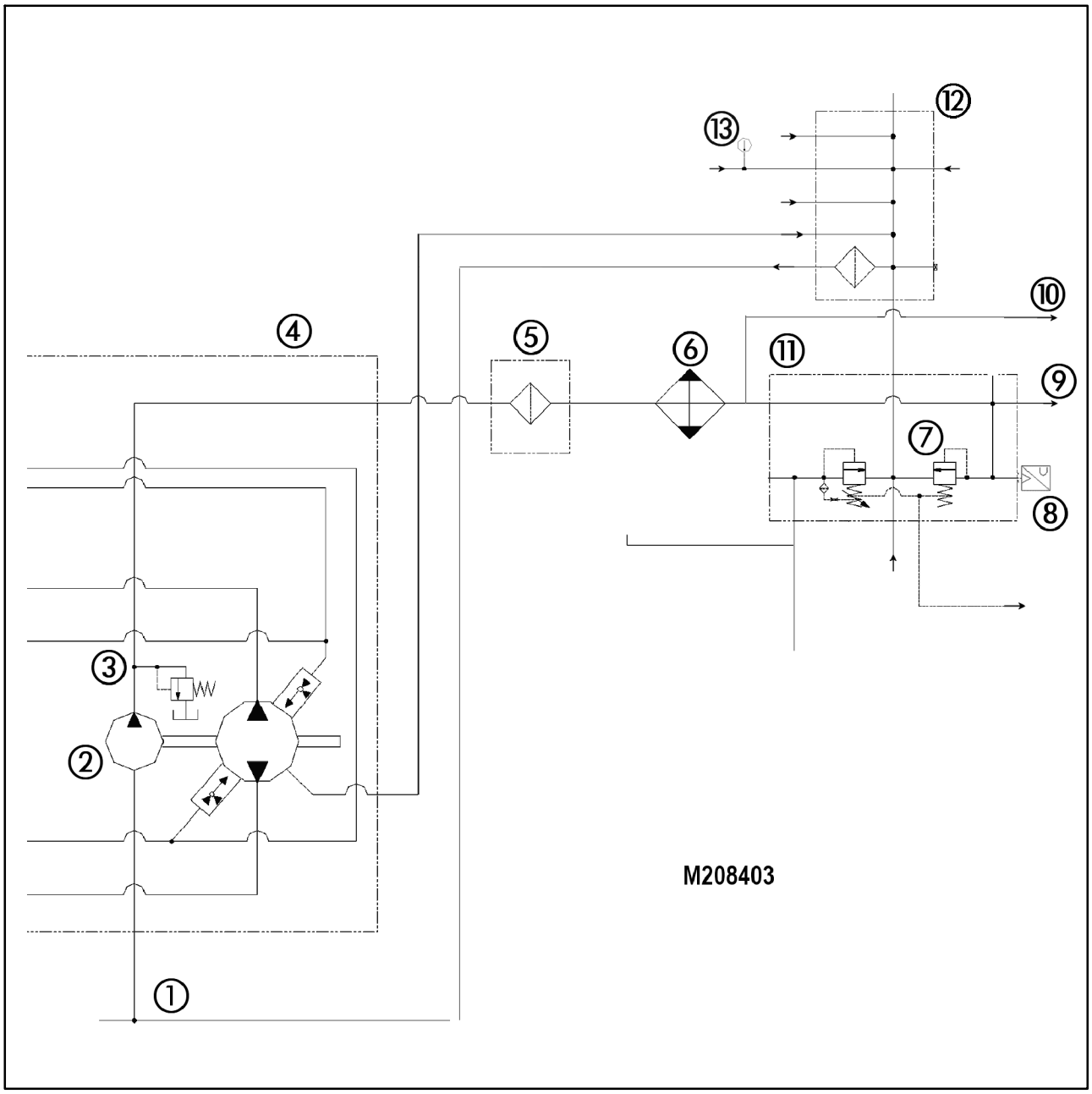
LUBRICATION SYSTEM



32

1. PTO Gearbox Reservoir / To Lube Pump
4. Ground Drive Hydro. Pump
5. Lube Filter
6. To Oil Cooler
12. Return Manifold

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33

1. PTO Gearbox Reservoir
2. Lubrication Pump
3. Filter and Cooler Relief
4. Ground Drive Hydro. Pump
5. Lube Filter
6. Lube Cooler
7. Lube Relief
8. Lube Pressure Sensor
9. Lube to PTO Gearbox
10. Lube to PTO Gearbox
11. Control / Lube Regulator Valve
12. Return Manifold
13. Motor Temp. (ground drive motor) Sensor

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Lubrication System

The lubrication system is used to provide cooling and lubrication to the PTO gearbox and all components housed with in it. The system consist of a lube pump, pump relief, lube filter, oil cooler, lube relief and required plumbing. The pump and pump relief is enclosed in the ground drive hydrostatic pump, we would think of them as the hydro charge pump and charge pressure relief.

If the lube pump relief (3) valve opens the flow is dumped into the ground drive hydro. pump and directed out the pump case drain. The relief protects the pump, filter and cooler from being over pressurized. The cooler is located behind the rotary air screen and is the upper section of the first layer of coolers.

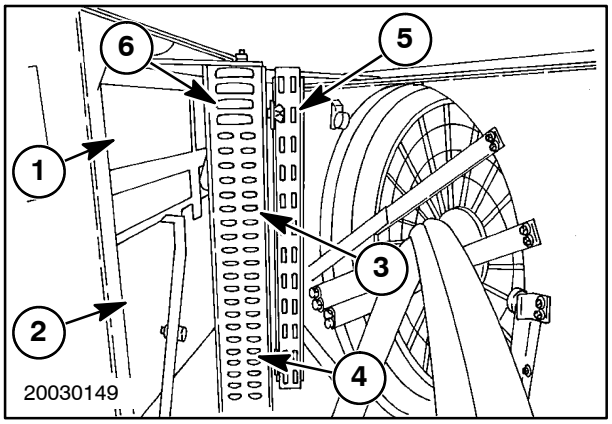
The lube regulating valve (7) limits the maximum lube pressure in the system. The minimum lube pressure will be determined by the output of the lube pump. The pressure may be monitored on the Universal Display Plus monitor from the pressure sensor at port (8).

The ground drive hydrostatic motor case drain (13) is monitor for temperature before it enters the return manifold. The motor case drain should be the hottest return oil in the system.

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PTO Gearbox Cooling

1. Intercooler
2. Radiator
3. PTO Gearbox Oil Cooler
4. Hydraulic Oil Cooler
5. Air-Conditioning Condenser
6. Fuel Cooler



34

Cooling

The PTO gearbox cooler is mounted behind the rotary air screen and is the UPPER two thirds of the center cooler.

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Lubrication System

Electrical Monitoring Circuits
The system uses a sensor to monitor the systems operations.

Ground Drive Motor Temperature Sensor, (case drain)

Reference Material:
Electrical schematic frames #08, #26

Key Components:
Hydrostatic Motor Temperature Sensor B-46, CCM1

The ground drive motor temperature sensor monitors the oil temperature from the case drain of the ground drive hydrostatic motor. The sensor provides a constant temperature reading to the CCM1, the CCM1 then places a message on the data bus. If the temperature rises above specification the CCM1 will place a warning message on the data bus for the Universal Display Plus monitor to display, provide a warning to the operator. The temperature may be monitor on the Universal Display Plus monitor.

Power is supplied to the sensor from the CCM1 connector X020 terminal J3-31 to the B terminal and the sensors A terminal is directed back to the CCM1 connector X020 terminal J3-18. As the temperature increases the resistance of the sensor decreases, providing for a voltage drop on the supply wire. The signal voltage may be monitored on the Universal Display Plus monitor diagnostic screen.

Lubrication Pressure Sensor, (PTO Gearbox)

Reference Material:
Electrical schematic frames #10 and 26

Key Components:
CCM1, Lubrication Pressure Sensor B-60

The lubrication pressure sensor is mounted in the control / lubrication control valve block and is used to monitor the lube pressure to the PTO gearbox components. The sensor provides a constant pressure reading to the CCM1, then places a message on the data bus. If the pressure goes outside of the normal limits the CCM1 will place a message on the data bus for the Universal Display Plus monitor to display a warning to the operator. The pressure may be monitor on the Universal Display Plus monitor.

Power (5V) is supplied to the sensor from the CCM1 connector X019 terminal J2-31 to the B terminal and a sensor return (ground) from terminal A back to the CCM1 connector X019 terminal J2-14. The sensor provides a signal from terminal C to the CCM1 connector X019 terminal J2-29. The signal voltage may be monitored on the Universal Display Plus monitor diagnostic screen.

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HYDRAULIC SYSTEM TESTING PROCEDURES

When diagnosing a hydraulic system problem, check the electrical circuits first by verifying that the proper solenoids are activated at the correct time. This will isolate hydraulic problems from electrical problems.

BEFORE STARTING ANY TESTS:

- Be sure all oil filters are clean and the reservoir is full of clean oil.
- Check the tension and condition of the drive belt.
- Verify the pump is being driven.
- Check the high and low idle settings of the engine.
- Inspect the hydraulic system for leaks and replace hoses and tubing that show damage or wear.
- All tests are to be conducted with an oil temperature of at least 37ºC (100ºF).

⚠ CAUTION ⚠

Hydraulic oil escaping under pressure can have enough force to penetrate the skin. Hydraulic oil may also infect a minor cut or opening in the skin. If injured by escaping oil, see a doctor at once. Serious infection or reaction can result if medical treatment is not given immediately. Make sure all connections are tight and that hoses and lines are in good condition before applying pressure to the system. Relieve all pressure before disconnecting the lines or performing other work on the hydraulic system.

To find a leak under pressure, use a small piece of cardboard or wood, never use hands.

Clean all connecting points thoroughly before disconnecting any lines. Cap all disconnected lines that are not used to maintain system cleanliness.

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DIAGNOSTIC TEST EQUIPMENT

Test Couplers and Hoses

Quick Couplers	Style	Case Part #	Parker Number	Aeroquip Number
Male Tips	1/8 NPT Female		PD322	FD90-1034-02-04
	1/8 NPT Male	H434164	PD323	FD90-1012-02-04
	1/4 NPT Female		PD342	FD90-1034-04-04
	1/4 NPT Male	S243718	PD343	FD90-1012-04-04
	3/8″-24 O Ring			FD90-1044-03-04
	7/16-20 O Ring	R55912	PD341-6	FD90-1044-04-04
	1/2-20 O Ring		PD351	FD90-1045-03-04
	9/16-18 O Ring	1541849c1	PD361-6	FD90-1046-03-04
	M14X1.5 O Ring	84320565	PD367A-6	
	M18X1.5 O Ring	358968A1	PD3127-6	
	M18X1.5 O Ring	325647A2	PD3127-743-6	
	7/16″ - 20 JIC (1/4″ tube)	R54805	PD34BTX	
	9/16″ - 18JIC (3/8″)		PD36BTX	
	3/4″-16JIC (1/2″ Tube		PD38BTX	
	1-1/16″ 12 JIC (3/4″ Tube)	D137625	PD312BTX	FD90-1046-06-04
	1/2″ Tube O Ring Face Seal		PD38BTL	
Female Tips	1/8″ NPT Female		PD222	FD90-1021-02-04
	1/4 NPT Female	1543171C1	PD242	FD90-1021-04-04
	1/4 NPT Male		PD243	
	7/16-20 Female O Ring		PD240	
	9/16-18 Female O Ring		PD260	
	9/16″-18 ORFS	190117A1	PD34BTL-6	
	11/16″-16 ORFS	190119A1	PD36BTL-6	
	13/16″-16 ORFS	190316A1	PD38BTL-6	
	1″-14 ORFS	377921A1	PD310BTL-6	
	M22X1.5 Metric		PD296	
Shut off Valve	14-99-7 1 per hose			
Test Hose	CAS-1281-2			
Hose Adapters	Converts hose to 1/4 Male pipe 211863 2 per hose			

1. Hose is rated for 8,500 psi working pressure and is 8 ft. long.

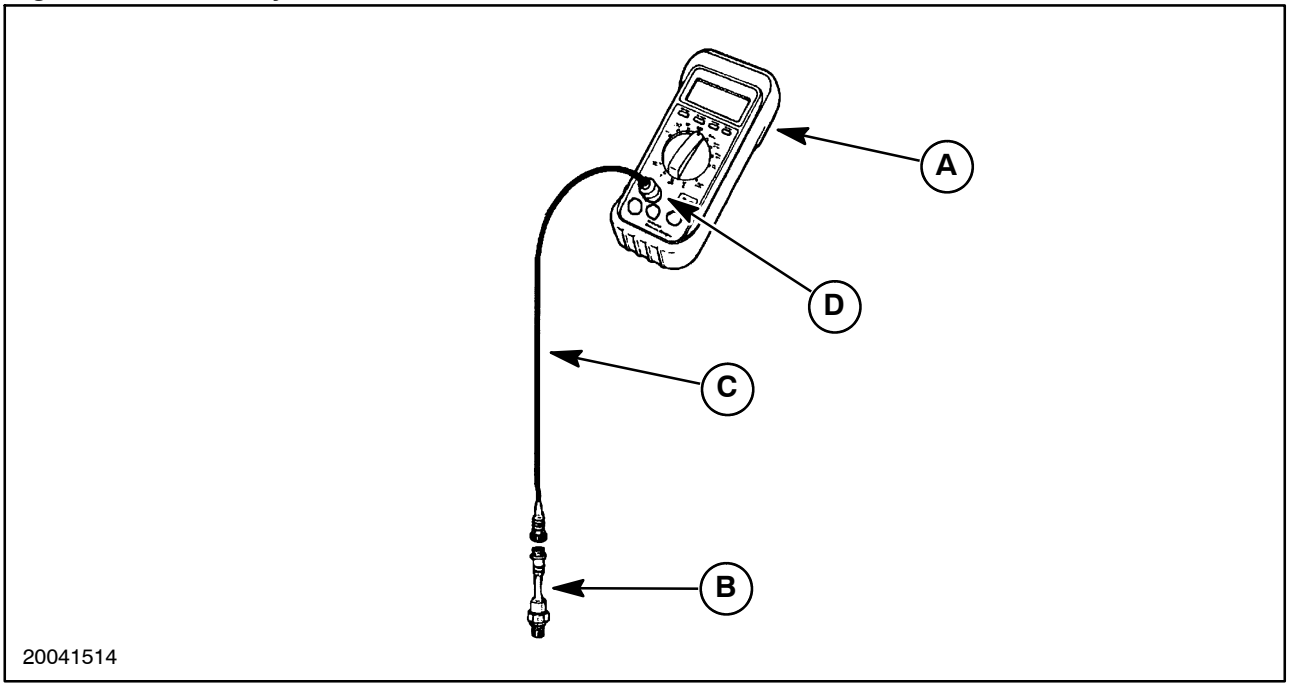
- M14X1.5 Male coupler from OTC includes a special steel washer around the O Ring which is required on the “88” Series Excavators.

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Digital Pressure & Temperature Analyzer

Test Tools	Adapters
Digital Pressure & Temperature Analyzer From OTC Tool Comp., A	Kit # OEM1653 Inc. One each of the units listed below.
500 PSI Sensor, B	OEM1602
5,000 PSI Sensor, B	OEM1603
20ft. Extension Cable, C	OEM1607; two cables
K-Type Thermocouple, D	231509
Additional Items	
10,000 PSI Sensor	OEM1604
Gauge Protector (500psi)	OEM1661
12ft. Cable Extension	OEM1606
6ft. Cable Extension	OEM 1605

Digital Pressure Analyzer



35

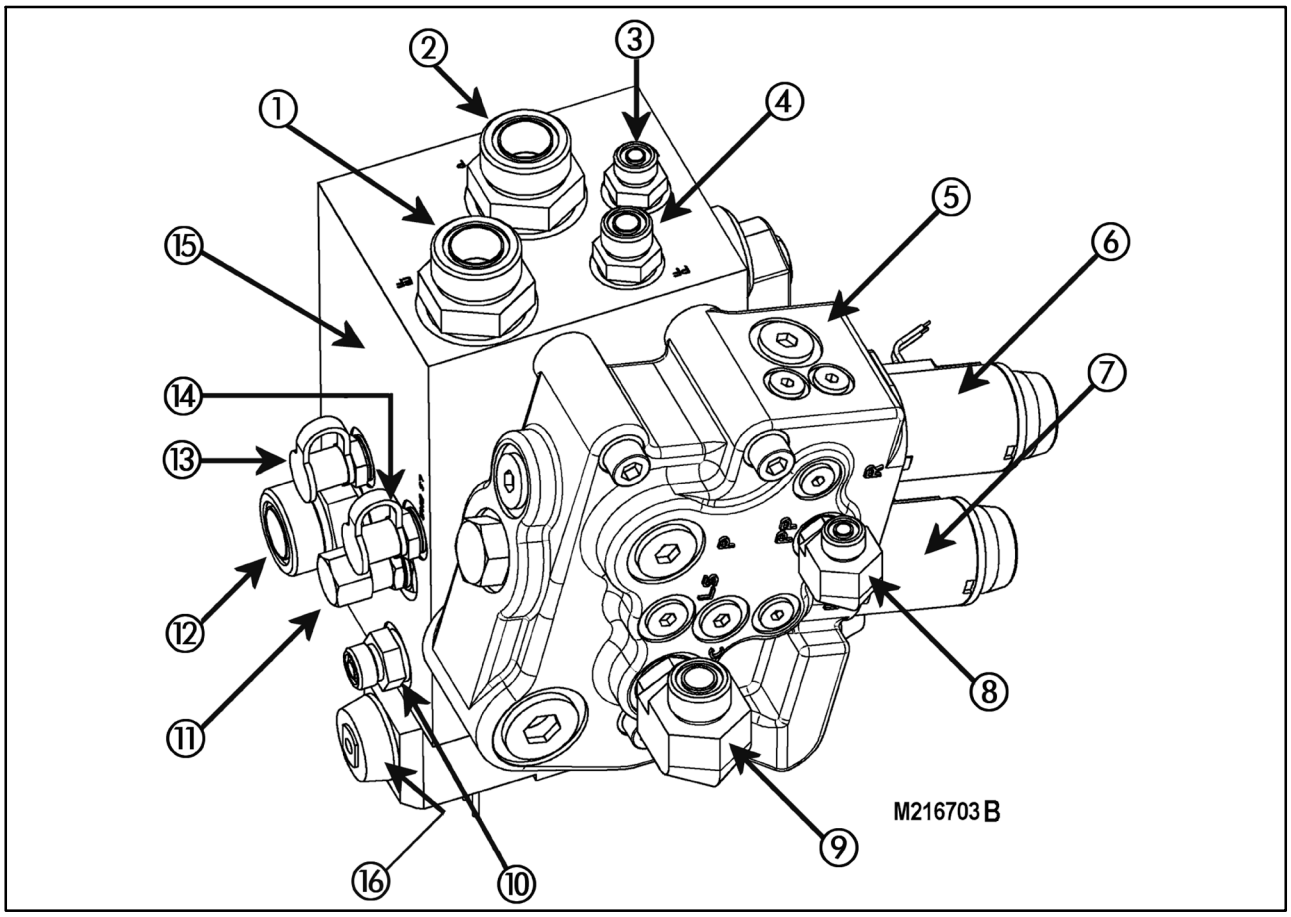
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HYDRAULIC SYSTEM TESTING PROCEDURES

1 Low Pressure Standby . . . . . A.10.A / 61
2 High Pressure Standby . . . . . A.10.A / 63
3 Steering Relief Setting . . . . . A.10.A / 65
4 Bench Testing Components . . . . . A.10.A / 67
5 Control Pressure Test . . . . . A.10.A / 69
6 PTO Gear Box Lubrication Pressure Test . . . . . A.10.A / 71
7 Regulated Pressure Test . . . . . A.10.A / 73
#8 Spreader Pump Flow Test . . . . . A.10.A / 75
9 Fan Pump Flow Test . . . . . A.10.A / 77
10 PFC Pump Flow . . . . . A.10.A / 79
11 Control Pressure Pump Flow Test . . . . . A.10.A / 81

https://truckmanualshub.com/

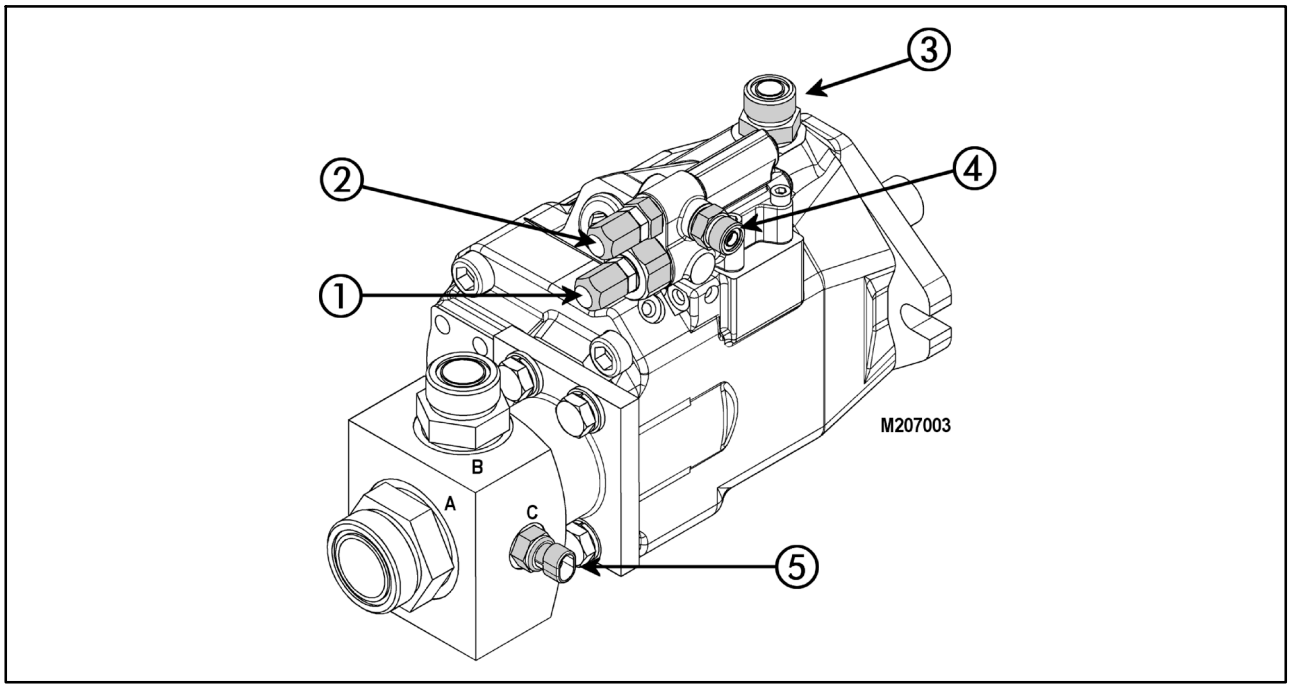
1 Low Pressure Standby



36

13. Pump Pressure Port

14. Signal Line Test Port



37

1. High Pressure Compensator Spool

2. Flow Compensator Spool

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1 Low Pressure Standby

This test is used to determine low-pressure standby. There are two items responsible for low-pressure standby, the 26–28 bar (375–400 PSI) spring on the flow compensator spool and the 0.078 mm (0.031 in) orifice in the steering hand pump – which creates back pressure in the signal line of **approximately** 3.45–10.3 bar (50–150 psi). The 26–28 bar (375–400 PSI) spring plus the back pressure will equal low-pressure standby. The following test will show the spring setting of the flow compensator spool.

Test Procedure

1. Attach a 69 bar (1000 psi) gauge to the signal line pressure test port (14) on the main valve assembly. It is recommended to install a needle valve in the test hose to prevent damage to the gauge. With the needle valve closed, start the engine. At low idle, open the needle valve on the gauge. **Make sure that the steering wheel is not moved or that other hydraulic functions are not activated otherwise the gauge could be damaged.** The signal line pressure should be approximately 3.45–10.4 bar (50–150 PSI). Record this number for use later.
2. Then attach the SAME 69 bar (1000 psi) gauge to the PFC pump pressure test port (13) on the main valve assembly. With the needle valve closed, start the engine. At low idle open the needle valve on the gauge. **Make sure that the steering wheel is not moved or that other hydraulic functions are not activated otherwise the gauge could be damaged.** The PFC pump pressure port should read 26–28 bar (375–400 PSI) above the reading that was recorded from the signal line.

If the PFC pump pressure port does not read 26–28 bar (375–400 PSI) ABOVE the signal line, adjustment of the flow compensator spool spring is required. The adjustment procedure is as follows:

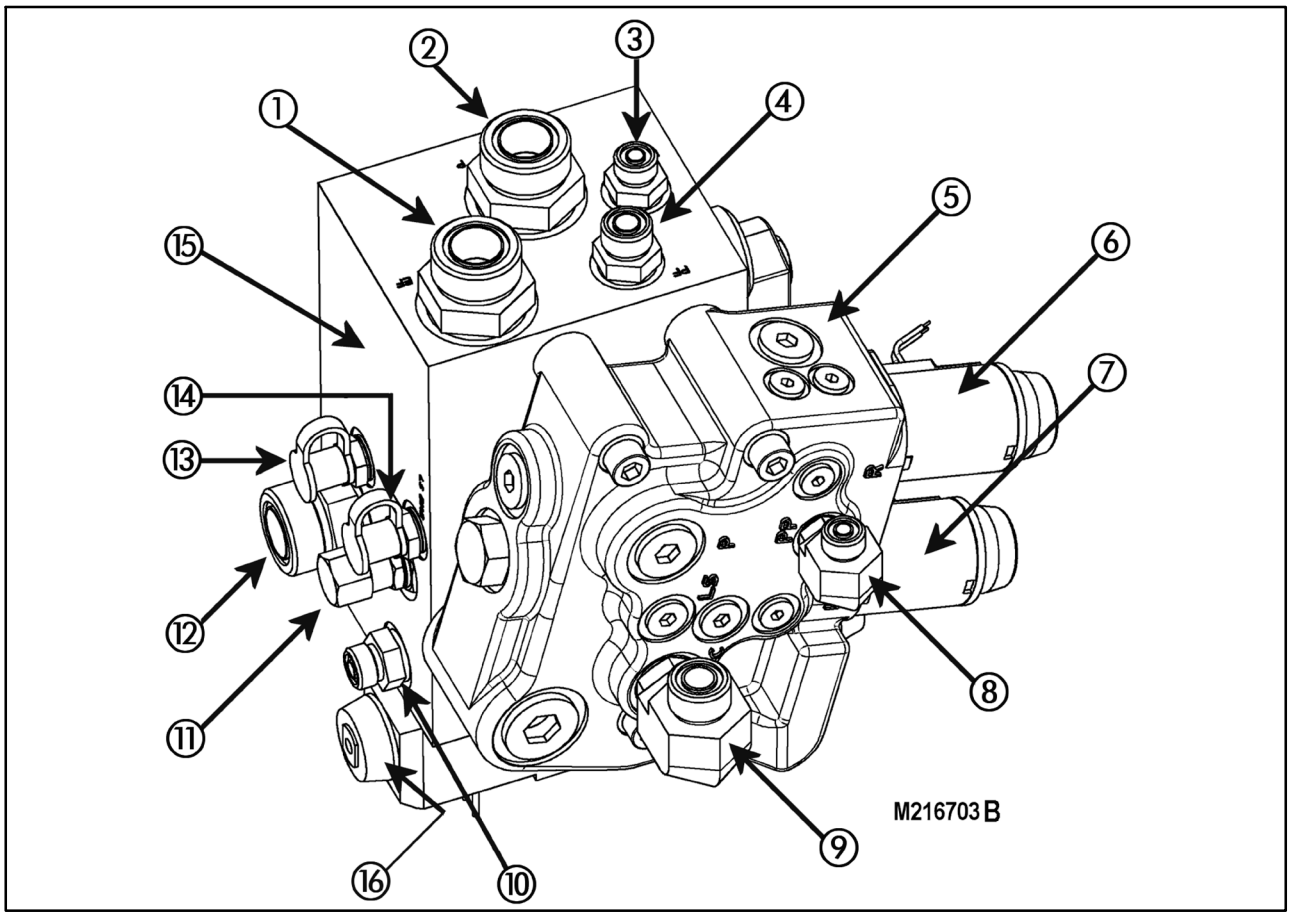
Example:

Signal line pressure port reading	7.7 bar (112 psi)
Flow compensator spool spring setting	+ 27.5±1.7 bar (400±25 psi)
PFC pump pressure port reading AFTER adjustment	35.3±1.7 bar (512±25 psi)

3. Remove the cap for the adjustment screw located on the compensator.
4. Loosen the jam nut.
5. Use an allen wrench to adjust the pressure to match the number calculated. (See example.)
6. Tighten the jam nut. Repeat test to verify the low-pressure standby setting.
7. If not correct, make adjustment again. If it is correct, replace the cap.

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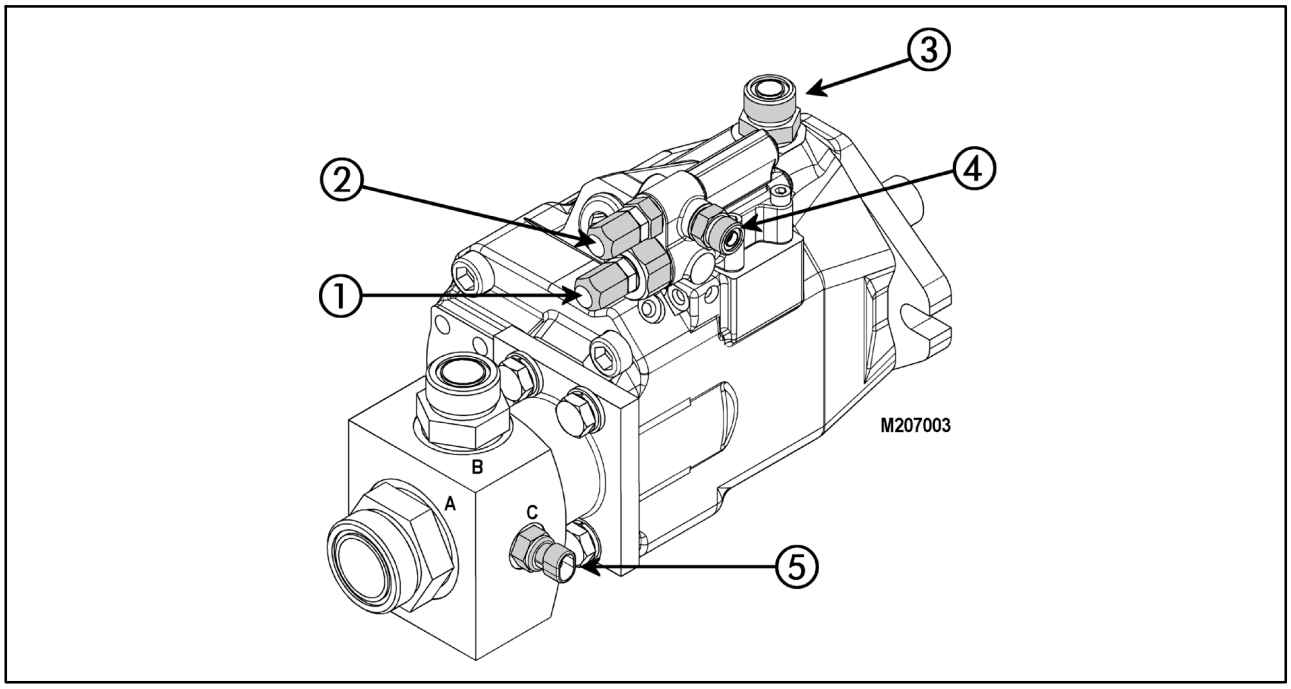
2 High Pressure Standby



38

13. Pump Pressure Port

14. Signal Line Test Port



39

1. High Pressure Compensator Spool

2. Flow Compensator Spool

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2 High Pressure Standby

This test is used to determine the spring setting of the high-pressure spool in the compensator. High-pressure standby is the maximum pressure that the PFC pump will develop. High pressure stand-by on is 207–214 bar (3000–3100 PSI). There is no relief valve in the PFC circuit so the high-pressure standby limit serves as the system relief.

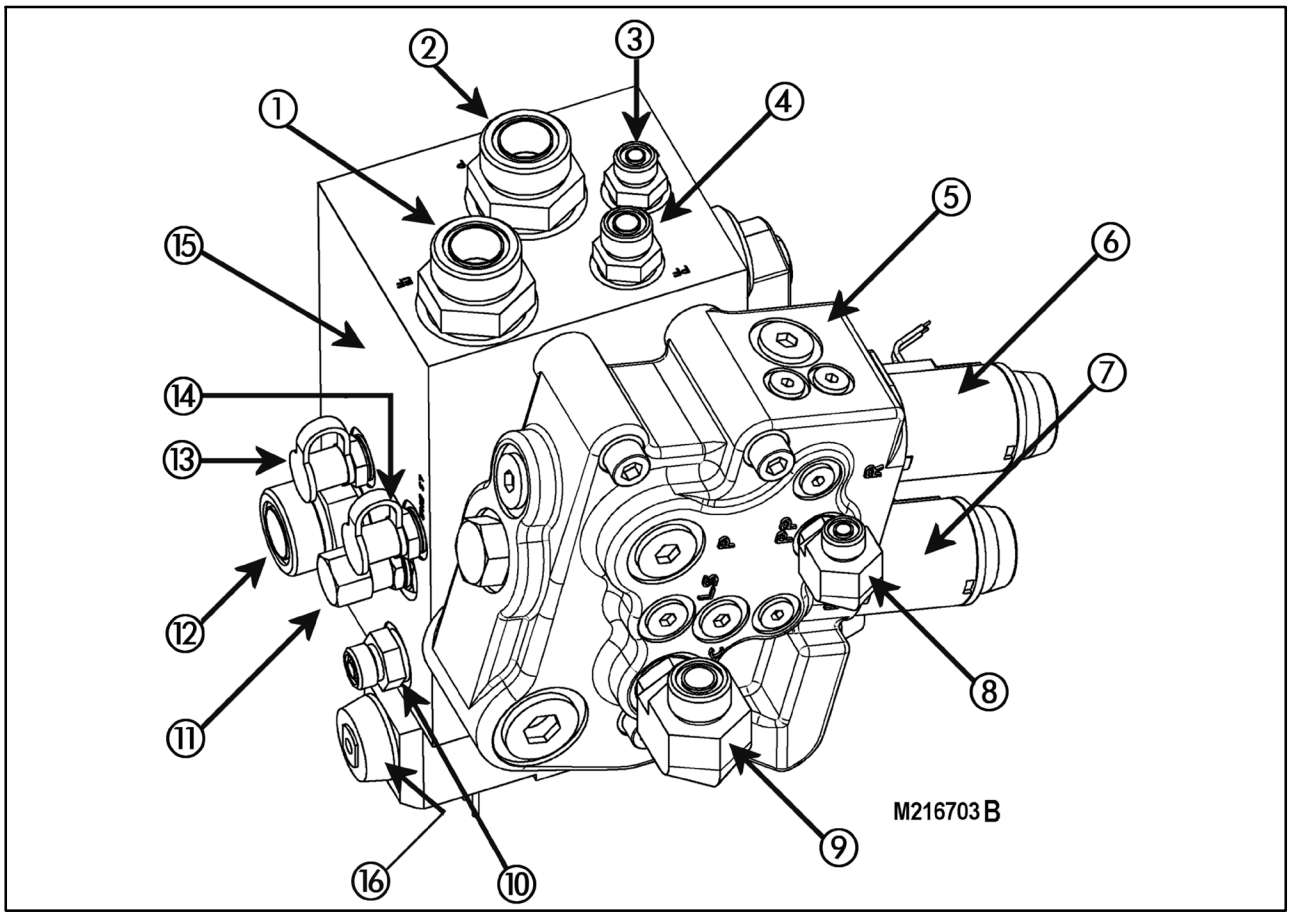
Test Procedure

Attach a 345 bar (5000 psi) gauge to the PFC pump pressure test port (13). Disconnect the reel lift hose from the feeder house if a grain header is attached. With the engine at high idle, activate the reel raise circuit. The gauge should read between 207–214 bar (3000–3100 PSI).

If adjustment is required remove the cap for the adjustment screw located on the compensator. Use an allen wrench to adjust the spring setting. After the adjustment has been made, the test should be repeated to verify the spring setting.

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3 Steering Relief Setting



40

3. From Steering Hand Pump Signal
4. To Steering Hand Pump Supply
13. Pump Pressure Test Port
14. Signal Line Test Port

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3 Steering Relief Setting

This test is used to determine the relief valve setting of the steering signal circuit. The steering signal relief valve is set to provide an operating pressure of 182.7–189.6 bar (2650–2750 psi). If the steering signal is too high the steering circuit can limit or completely stop the oil flow to the other hydraulic functions.

Test Procedure

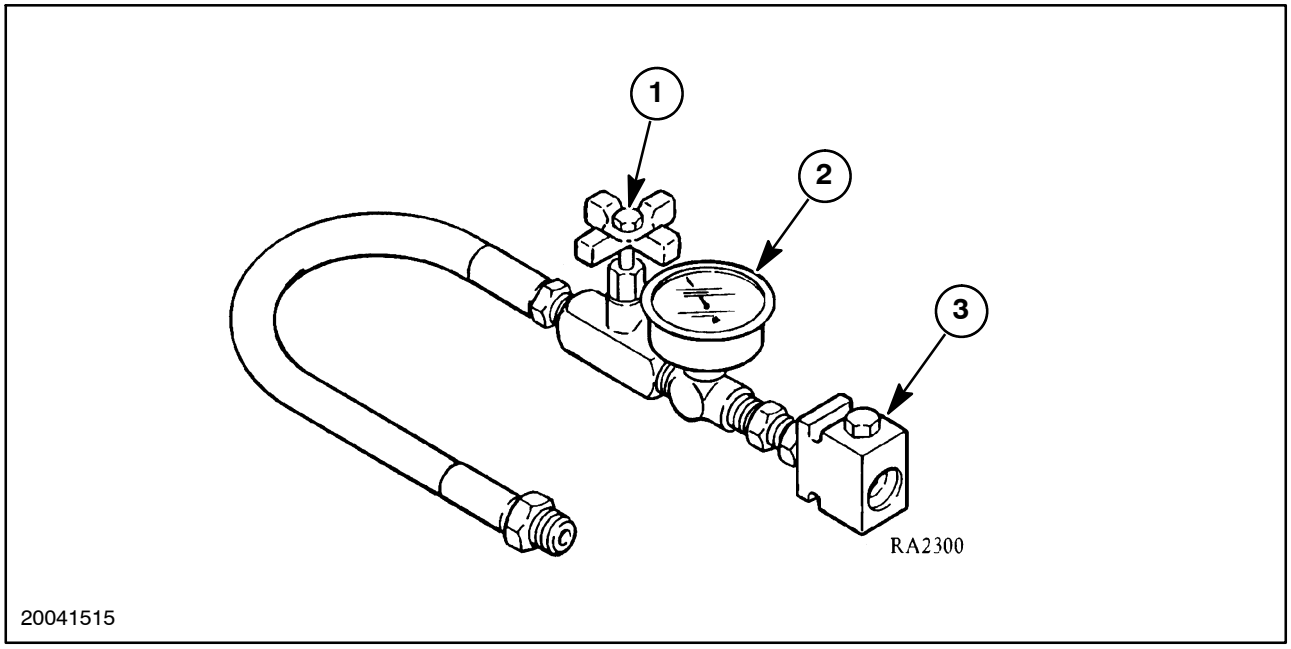
Attach a 345 bar (5000 psi) gauge to the pump pressure DIAG port located on the Main Valve Stack. With the engine at low idle, turn the steering wheel until the steering stops are reached and hold the wheel. The relief valve in the steering hand pump will open. The reading on the gauge should be between 182.7–189.6 bar (2650–2750 psi).

The relief is located in the steering hand pump and is set from the factory. If adjustment is needed, the steering hand pump must be removed from the combine. The relief valve adjustment is an allen plug located on the mounting surface of the hand pump. The plug will be filled with wax. After removing the wax, turn the threaded plug in to increase the relief valve setting, and out to decrease the setting. After the adjustment has been made, the test should be repeated to verify the spring setting. Before installing the hand pump in the combine, replace the wax with LOCTITE to prevent the adjusting plug from moving.

NOTE: *Steering from full RIGHT to full LEFT should take approximately 4.5 turns. If the steering system requires more turns, it could be a sign of a hand pump that has too much internal leakage or a steering cylinder with internal leakage. When holding the steering wheel against the stop, continue to apply normal steering pressure on the wheel, there should not be more then approx. 1.5 wheel rotation per minute due to internal leakage.*

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4 Bench Testing Components

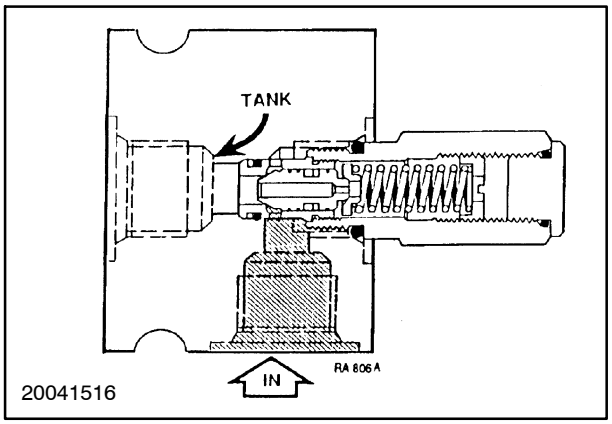


41

1. Needle Valve
2. Gauge
3. Test Block 206934

Pressurizing the valve from the side.

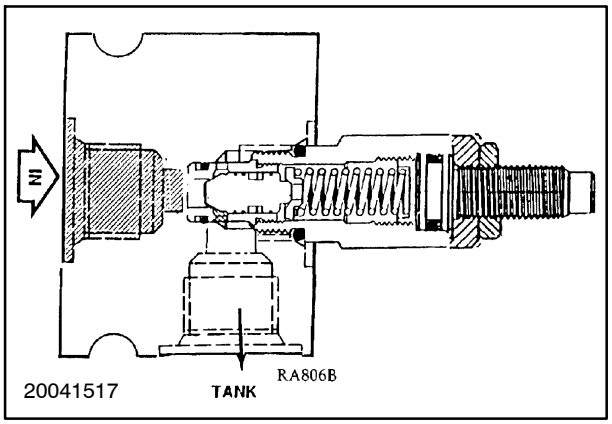
"Terrain Tracker Relief"



42

Pressurizing the valve from the end.

- Spreader Drive Relief
- Feeder Thermal Relief
- Fan Drive Relief



43

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4 Bench Testing Components

Field Tracker, Spreader Relief and Feeder Thermal Relief Valves

This test is used to determine the pressure settings of the relief valves when the system can not be loaded to relief valve settings.

Test Procedure

To bench test relief valves use special tool CAS-1905-2, CAS-1905-3 and adapter 1252331C1. A hydraulic hand pump or tractor remote valve can be used to supply pressure to the test block 206934.

Terrain Tracker Relief Valve

To test the terrain tracker relief valves, thread it in to the test block and attach the supply hose to the test block so that the pressure will act on the side of the relief valve. Create enough pressure to open the relief valve. The reading on the gauge should read 207 bar (3000 psi). If adjustment is required, remove the cap and use an allen wrench to turn the threaded plug. Turn the plug in to increase the relief pressure setting, or turn the plug out to decrease the relief pressure setting. After the adjustment has been made, the test should be repeated to verify the relief valve setting.

Spreader Relief Valve

To test the spreader relief valve, thread it into the test block and attach the supply hose to the test block so that the pressure will act on the end of the relief valve. Create enough pressure to open the relief valve. The reading on the gauge should read 210 bar (3000 psi). If adjustment is required, remove the cap on the relief valve and loosen the jam nut. Use an allen wrench to adjust the screw. Turn the screw in to increase the relief pressure setting, or turn the screw out to decrease the relief pressure setting. After the adjustment has been made the test should be repeated to verify the relief valve setting.

Fan Drive Relief Valve

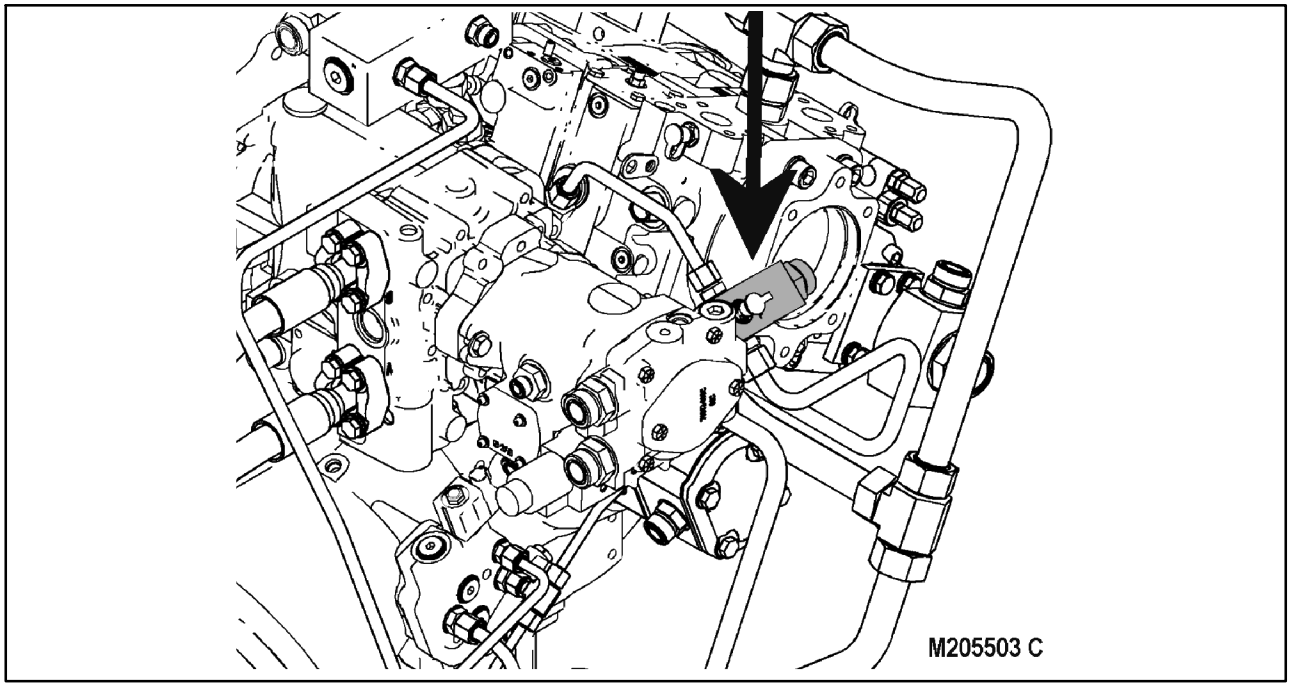
To test the fan drive relief valve, thread it into the test block and attach the supply hose to the test block so that the pressure will act on the end of the relief valve. Create enough pressure to open the relief valve. The reading on the gauge should read 241 bar (3500 psi). If adjustment is required, remove the cap on the relief valve and loosen the jam nut. Use an allen wrench to adjust the screw. Turn the screw in to increase the relief pressure setting, or turn the screw out to decrease the relief pressure setting. After the adjustment has been made the test should be repeated to verify the relief valve setting.

Feeder Lift Cylinder Thermal Relief Valve

To test the feeder thermal relief valve, thread it into the test block and attach the supply hose to the test block so that the pressure will act on the end of the relief valve. Create enough pressure to open the relief valve. The reading on the gauge should read 276 bar (4000 psi). If the valve drips before it opens at the set pressure the header will settle.

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5 Control Pressure Test



44

Control Pressure Test Port

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5 Control Pressure Test
This test is used to determine the control pressure relief valve setting. The control pressure relief valve is set to provide an operating pressure of 20–22 bar (290–320 psi).

NOTE: *This can be checked on the Universal Display Plus monitor by placing the "Control Pressure" on one of the RUN screens.*

Test Procedure
Attach a 41 bar (600 psi) gauge to the control pressure DIAG port located on the Control Pressure/Lubrication Valve. With the engine at **HIGH** idle the pressure reading should be within specification.

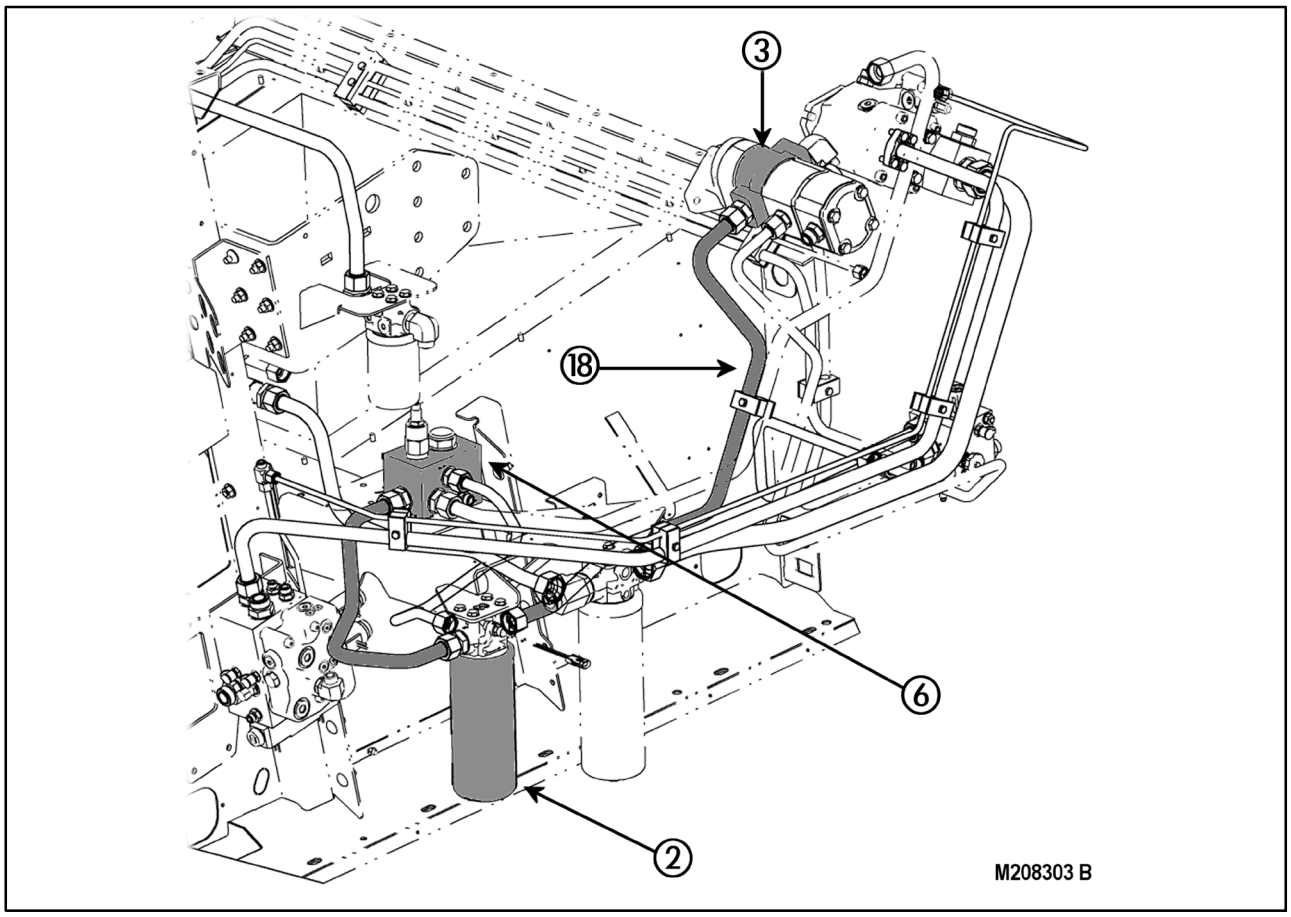
The relief is located in the valve body. If adjustment is needed, loosen the jam nut and using an allen wrench turn the center screw in to increase pressure and out to decrease pressure. After the adjustment has been made, the test should be repeated to verify the spring setting.

NOTE: *Activate all associated clutches and hydrostatic drives to determine if any circuit has excessive leakage. The pressure MUST be maintained during clutch and hydro. activation. The pressure will normally be on the low side when the engine is low idle.*

IMPORTANT: *Do NOT exceed 25 bar (360 PSI) with cold oil, there should be approximately 20 bar (290 psi) at high idle with hot oil and all systems running.*

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6 PTO Gear Box Lubrication Pressure Test



45

2. Control Circuit Filter
3. Gear Pump Assembly
6. Control / Lube Pressure Regulating Valve
18. Pump to Filter Line

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6 PTO Gear Box Lubrication Pressure Test
This test is used to determine the lube pressure relief valve setting. The lube pressure relief valve is set to provide an operating pressure of 3.4 bar (50 psi).

NOTE: *This can be checked on the Universal Display Plus monitor by placing the "Lube Pressure" on one of the RUN screens. On some of the earlier machine there may be a test fitting in place of the sensor, in that case the pressure gauge will have to be used.*

Test Procedure
Pressure may be tested by two different methods:

1. Remove the lube pressure sensor from the CONTROL/LUBE control valve and install a test fitting.
2. If the machine's software has been updated it may be monitored on the Universal Display Plus monitor RUN screen after placing the item on one of the RUN screens.

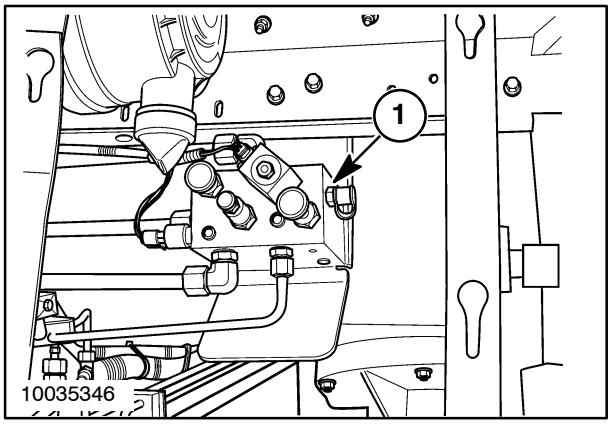
Attach a 41 bar (600 psi) gauge to the lube pressure DIAG port located on the Control Pressure/Lubrication Valve. With the engine at LOW idle the pressure reading should be within specification, check at HIGH idle to verify operation.

The relief is located in the valve body. The cartridge is NOT adjustable, if pressure is not correct the lubrication pump should be flow rated to verify it can produce the proper flow and pressure. If the pump is operating properly replace the LUBE regulating valve.

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7 Regulated Pressure Test

1. Park Brake/Tow Valve



46

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7 Regulated Pressure Test

This test is used to determine the regulated pressure relief valve setting. The regulated pressure relief valve is set to provide an operating pressure of 22–25 bar (320–360 psi).

Test Procedure

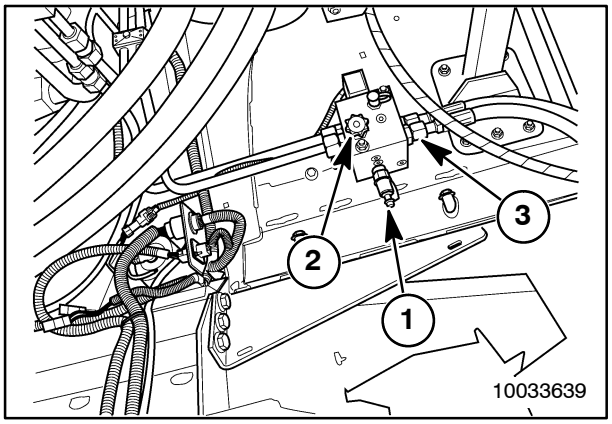
Attach a 41 bar (600 psi) gauge to the regulated pressure DIAG port located on the Park Brake/Tow Valve. With the engine at LOW idle the pressure reading should be within specification, check at HIGH idle to verify operation.

The relief is located in the valve body. The cartridge is adjustable; if pressure is not correct make the required adjustment.

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8 Spreader Pump Flow Test

1. Spreader Relief
2. Spreader Flow Control
3. Valve Outlet to Left Motor



47

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8 Spreader Pump Flow Test

This test is used to determine the efficiency of the spreader pump. The pump will wear internally over time, causing the residue spreader speed to decrease.

NOTE: *Since all the flow from the spreader pump is directed through the rotary air screen motor a quick RPM check of the screen may be all that is required to determine the condition of the pump. The screen should turn a minimum of 205 RPM. Be sure to verify the condition of the spreader relief valve.*

Test Procedure

1. Remove the supply hose that runs between the spreader valve and the left hand spreader motor. Connect the inlet hose from a flow rater to the spreader valve and the outlet hose from the flow rater back to the **hydraulic** reservoir tank.
2. Turn the spreader valve flow control to the maximum flow setting.
3. Open the restriction valve on the flow rater completely.
4. Start the machine's separator and run the engine at high idle.
5. The pump's output should be above minimum specification.
6. Slowly turn in the flow raters restriction control to verify the systems relief valve, it should be above minimum system specification.
7. The pump flow at approximately 21 bar (300 psi) below the relief valve setting should still be above minimum specification.

If Flow Is Below Specifications

1. There could be a problem with the flow control o-rings.
2. There could be a problem with the relief valve o-rings
3. There could be a problem with the control solenoid o-rings and spool.
4. The pump could be worn excessively.

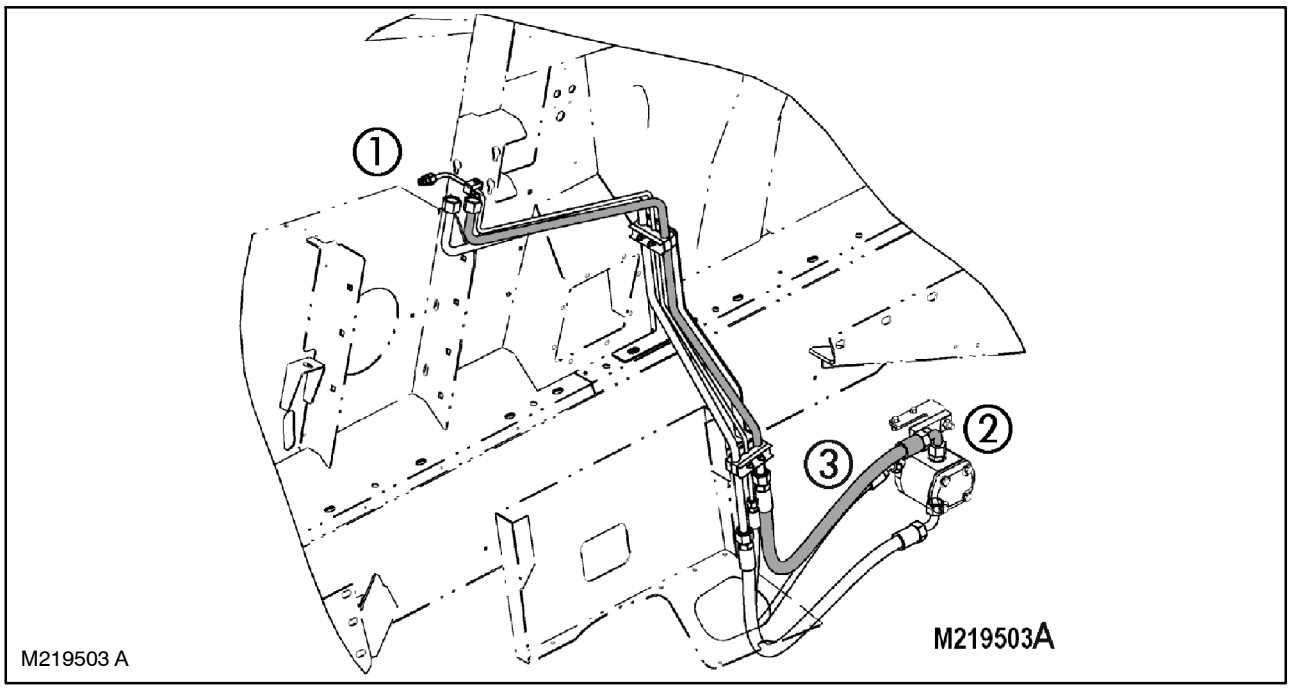
If the flow is below specifications the flow rater could be installed between the pump and the control valve.

⚠ CAUTION ⚠

Use extreme caution if this procedure is used. There is no relief valve in the system when testing in this manner. Be absolutely sure the flow meter restrictor is open when starting the combine engine. Once the machine is started, increase to full throttle and VERY SLOWLY restrict the flowmeter NOT to exceed pressure specifications.

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9 Fan Pump Flow Test



48

1. Fan Valve Location
2. Fan Drive Motor
3. Supply Hose to Motor

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9 Fan Pump Flow Test

This test is used to determine the efficiency of the fan drive pump. The pump will wear internally over time, causing the fan speed to decrease.

Test Procedure

1. Remove the supply hose that runs between the fan drive valve and the fan motor. Connect the inlet hose from a flow rater to the fan valve and the outlet hose from the flow rater back to the **hydraulic** reservoir tank.
2. Open the restriction valve on the flow rater completely.
3. Start the machine's separator, using the operator controls set the fan speed to the minimum setting and run the engine at high idle.
4. While monitoring the fan pump's output increase the fan speed, verifying the solenoid and software operation. The pump's output should be above minimum specification.
5. Slowly turn in the flow raters restriction control to verify the systems relief valve, it should be above minimum system specification.
6. The pump flow at approximately 21 bar (300 psi) below the relief valve setting should still be above minimum specification.

If Flow Is Below Specifications

1. If equipped, use the manual speed control adjustment screw on the top of the control solenoid to override the electrical system.
2. There could be a problem with the relief valve o-rings.
3. There could be a problem with the control solenoid o-rings and spool.
4. The pump could be worn excessively.

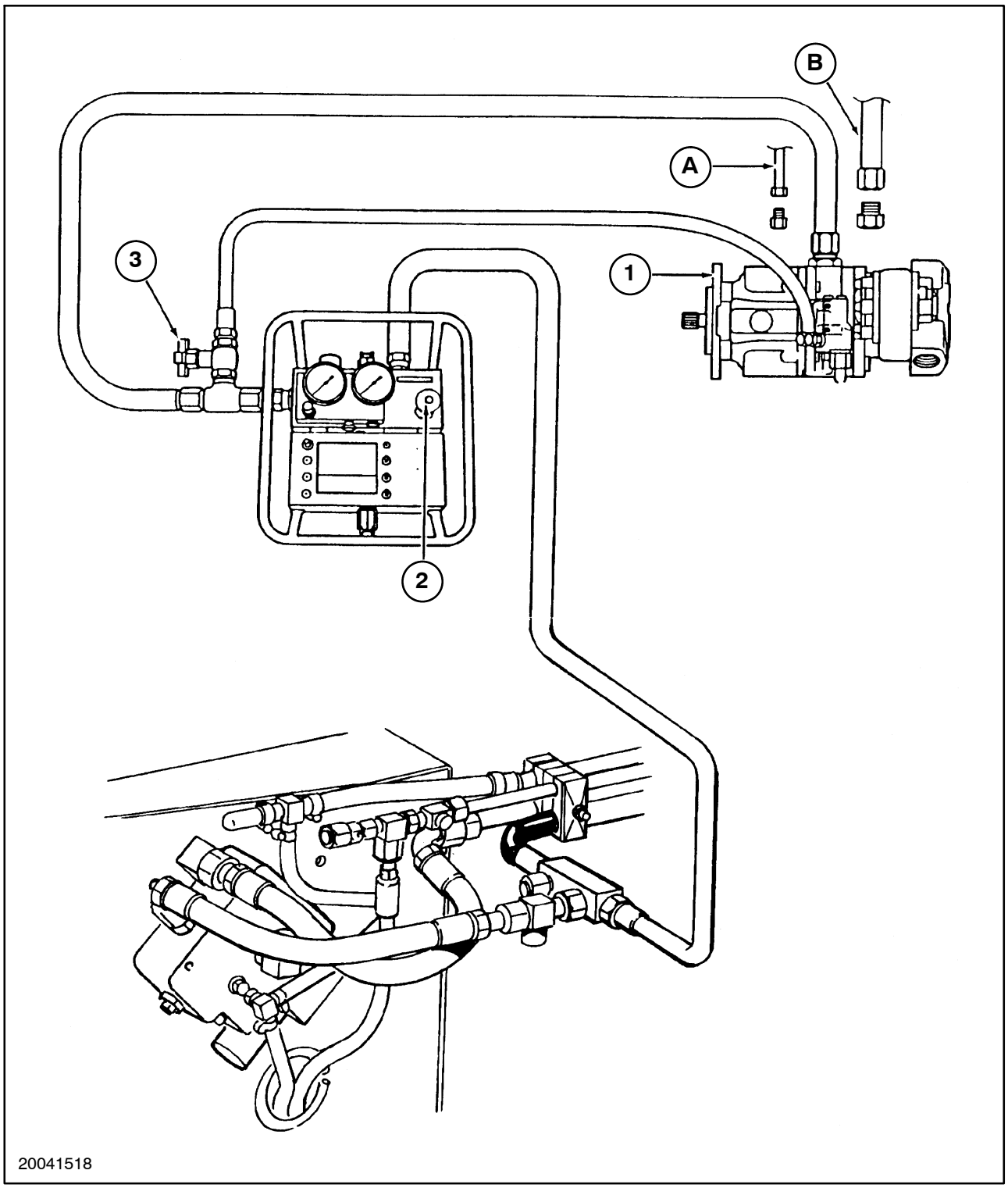
If the flow is below specifications the flow rater could be installed between the pump and the control valve.

⚠ CAUTION ⚠

Use extreme caution if this procedure is used. There is no relief valve in the system when testing in this manner. Be absolutely sure the flow meter restrictor is open when starting the combine engine. Once the machine is started, increase to full throttle and VERY SLOWLY restrict the flowmeter NOT to exceed pressure specifications.

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10 PFC Pump Flow



49

1. PFC Pump
2. Flow Meter Load Control Valve
3. Compensator Shutoff Valve

A. Remove and Plug Signal Line
B. Remove and Plug Outlet Line

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10 PFC Pump Flow

This test is used to determine the oil flow of the PFC pump. When conducting this test, the flowmeter should read 151 l/m (40 gpm). If the reading is less than 143 l/m (38 gpm) there could be a problem with the PFC pump.

Test Procedure

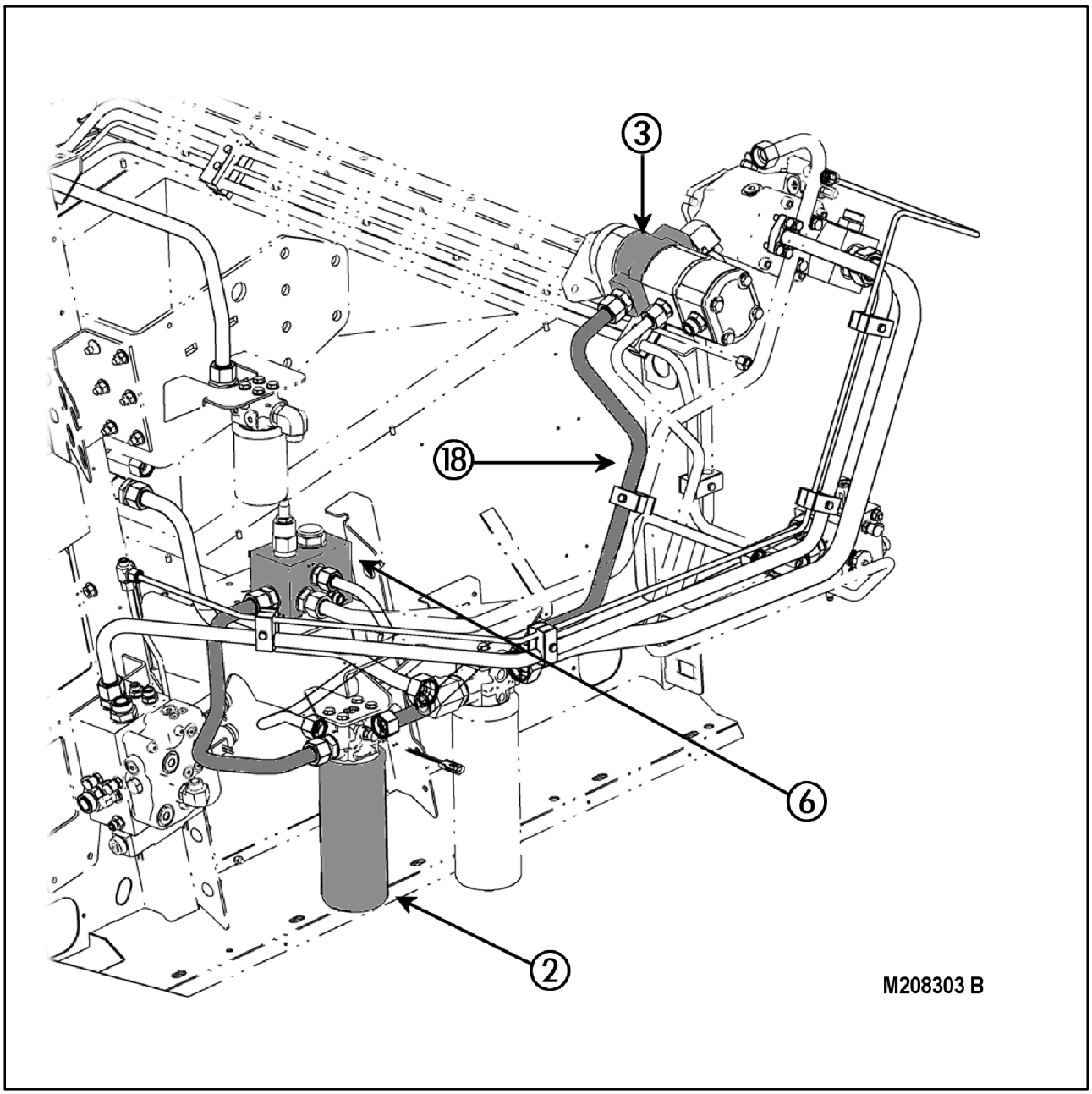
Drain all hydraulic oil from the reservoir. Disconnect and cap the outlet line from the PFC pump. Attach the inlet hose for the flowmeter to the outlet of the PFC pump. Next, attach the outlet hose for the flowmeter to the line that was removed from the PFC pump. Disconnect and cap the signal line. Tee a hose into the inlet hose of the flowmeter and connect it to the compensator. Refill the reservoir with Hy-Tran Ultra.

With the flowmeter restriction valve fully open, start the engine. Move throttle to high idle position and adjust restriction valve to produce a 138 bar (2000 psi) restriction. The flowmeter should read specification. If the reading is under specification the PFC pump could be damaged.

NOTE: *The most common reason for low flow from a PFC pump is NOT due to pump failure, BUT a mis-adjusted or malfunctioning flow control spool in the compensator.*

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11 Control Pressure Pump Flow Test



50

2. Control Circuit Filter
3. Gear Pump Assembly
6. Control / Lube Pressure Regulating Valve
18. Pump to Filter Line

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11 Control Pressure Pump Flow Test

This test is used to determine the efficiency of the control pressure supply pump. The pump will wear internally over time.

Test Procedure

1. Remove the supply hose that runs between the control pressure pump and the pressure filter base. Connect the inlet hose from a flow rater to the control pressure pump and the outlet hose from the flow rater to the filter base.

⚠ CAUTION ⚠

Use extreme caution if this procedure is used. There is no relief valve in the system when testing in this manner. Be absolutely sure the flow meter restrictor is open when starting the combine engine. Once the machine is started, increase to full throttle and VERY SLOWLY restrict the flowmeter NOT to exceed pressure specifications.

2. Open the restriction valve on the flow rater completely.
3. Start and run the engine at **LOW** idle until you have verified the pressure on the flow rater, then increase engine speed to HIGH idle slowing while monitoring the system pressure.
4. The pump's output should be above minimum specification.
5. Slowly turn in the flow raters restriction control to verify the systems relief valve, it should be above minimum system specification.
6. The pump flow at approximately 21 bar (300 psi) below the relief valve setting should still be above minimum specification.

If Flow Is Below Specifications

1. The pump could be worn excessively.
2. There could be problem with the PTO gearbox supply screen.

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Signal valve - Unidentified failure (A.10.A.12 - G.30.B.46)

AFX8010

E0190-11 - Jammer Valve

Cause:
The signal valve solenoid (L-43) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" or "HEADER" sort menu, and select "JAMMER VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X022**. Use a multimeter to check between connector **X022** pin 1 or 8 (valve side) and chassis ground.

   A. If there is continuity, the signal valve solenoid is shorted to ground. Replace the solenoid.

   B. If there is no continuity, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X022** pin 1 (harness side) and chassis ground. Flex the main frame (MF) harness between the signal valve and connector **X008** while making this check.

   A. If there is continuity to ground, continue with Step **4**.

   B. If there is no continuity to ground, continue with Step **5**.
4. Disconnect connector **X008**. Use a multimeter to check for continuity between connector **X008** pin 2 and chassis ground. Flex the front frame (FF) harness between the connector **X008** and connector **X017** while making this check.

   A. If there is no continuity to ground, the short to ground is in the main frame (MF) harness between connector **X008** and connector **X022** wire 1119 white. Locate the short and repair.

   B. If there is continuity to ground, the short to ground is in the front frame (FF) harness between connector **X008** and connector **X017** wire 1119 white. Locate the short and repair.
5. Disconnect connector **X022**. Use a multimeter to check the resistance of the signal valve coil between connector **X022** pins 1 & 8. The proper resistance range is **7.2 - 11.2 ohms**.

   A. If there is no continuity, replace solenoid.

   B. If the coil is within specification, continue with Step **6**.
6. Use a multimeter to check for continuity between connector **X022** pin 8 (harness side) and chassis ground. Flex the main frame (MF) harness between the signal valve and front frame ground #2 while making this check.

   A. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X022** pin 8 and the front frame ground #2 wire 1121 black or 600 black. Locate the open and repair.

   B. If there is continuity to ground, continue with Step **7**.

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7. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the signal valve. Use a multimeter to check for **12 volts** between connector **X022** pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **8**.

   B. If **12 volts** is found, continue with Step **9**.

8. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the signal valve. Use a multimeter to check for **12 volts** between connector **X008** pin 2 and chassis ground.

   A. If **12 volts** is present, the open circuit is in the main frame (MF) harness between connector **X022** pin 1 and connector **X008** pin 2 wire 1119 white. Locate the open circuit and repair.

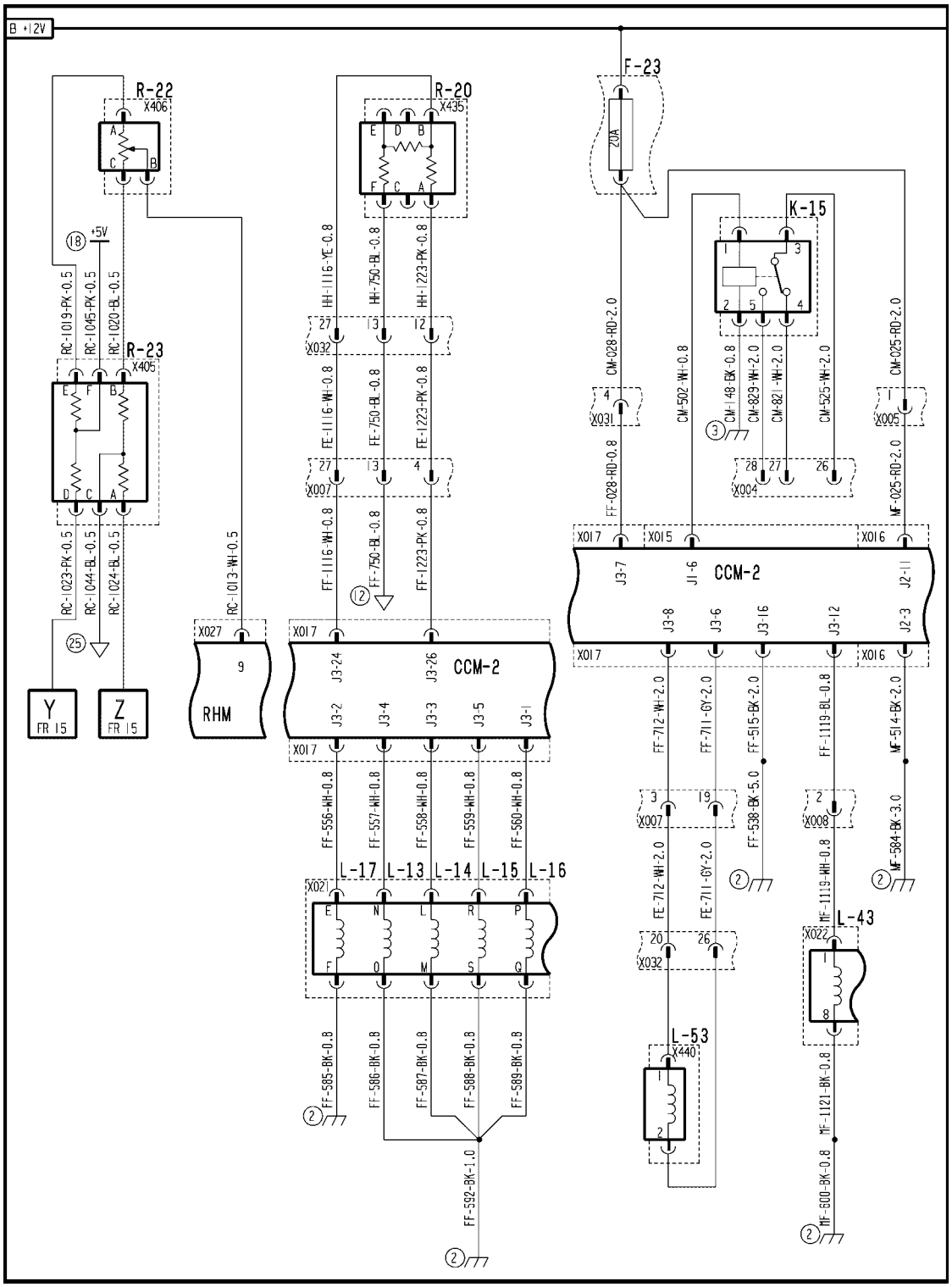
   B. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X008** pin 2 and connector **X017** pin J3-12 wire 1119 white. Locate the open and repair.

9. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Sensing system Differential pressure switch - Short circuit to B+ (A.10.A.95.81 - G.30.B.54)

AFX8010

E0006-03 - Reservoir Oil Filter Restriction Switch

Cause:
The return filter bypass pressure switch (S32) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "RES FILTER SW" to check the voltage range.

   The normal operating range for the return filter bypass circuit is **1.8 - 10.0 volts**

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the return filter bypass pressure switch connector **X239**.

   A. If the voltage drops below **10 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

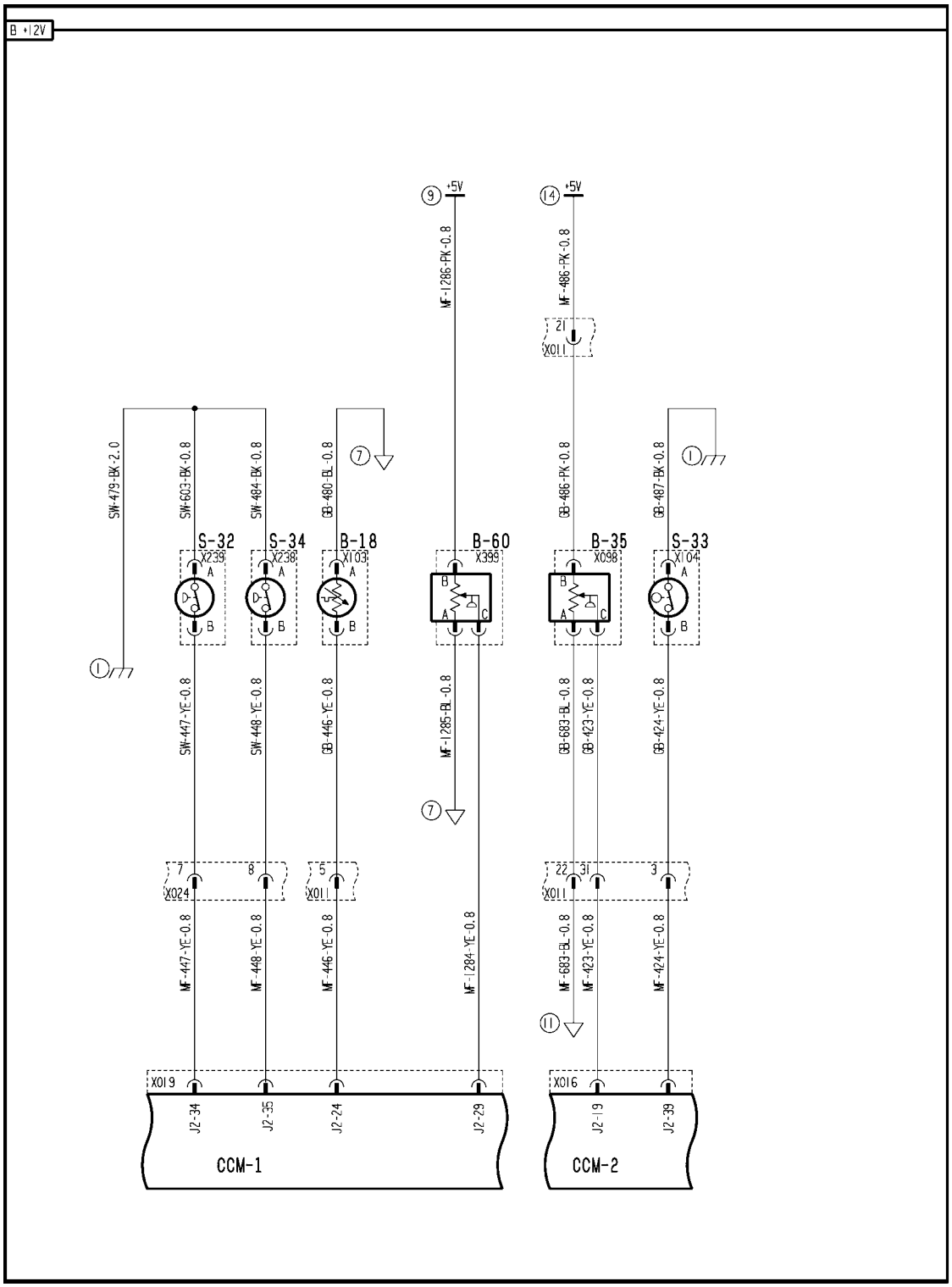
   A. If the voltage drops back within range, the short is in the straw hood front (SW) harness between connector **X024** and connector **X239** wire 447 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X024** and connector **X019** pin J2-34 wire 447 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

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Sensing system Temperature sensor - Short circuit to B+ (A.10.A.95.90 - G.30.B.54)

AFX8010

E0024-03 - Hydraulic Reservoir Temperature Sensor

Cause:
The hydraulic reservoir temperature (B-18) is shorted to high source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "RES TEMP SEN" to check the voltage range.

   The proper voltage range is - **0.5 - 4.9 volts**

   A. If the voltage reading is above **5.2 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the hydraulic reservoir temperature sensor connector **X103**.

   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**.

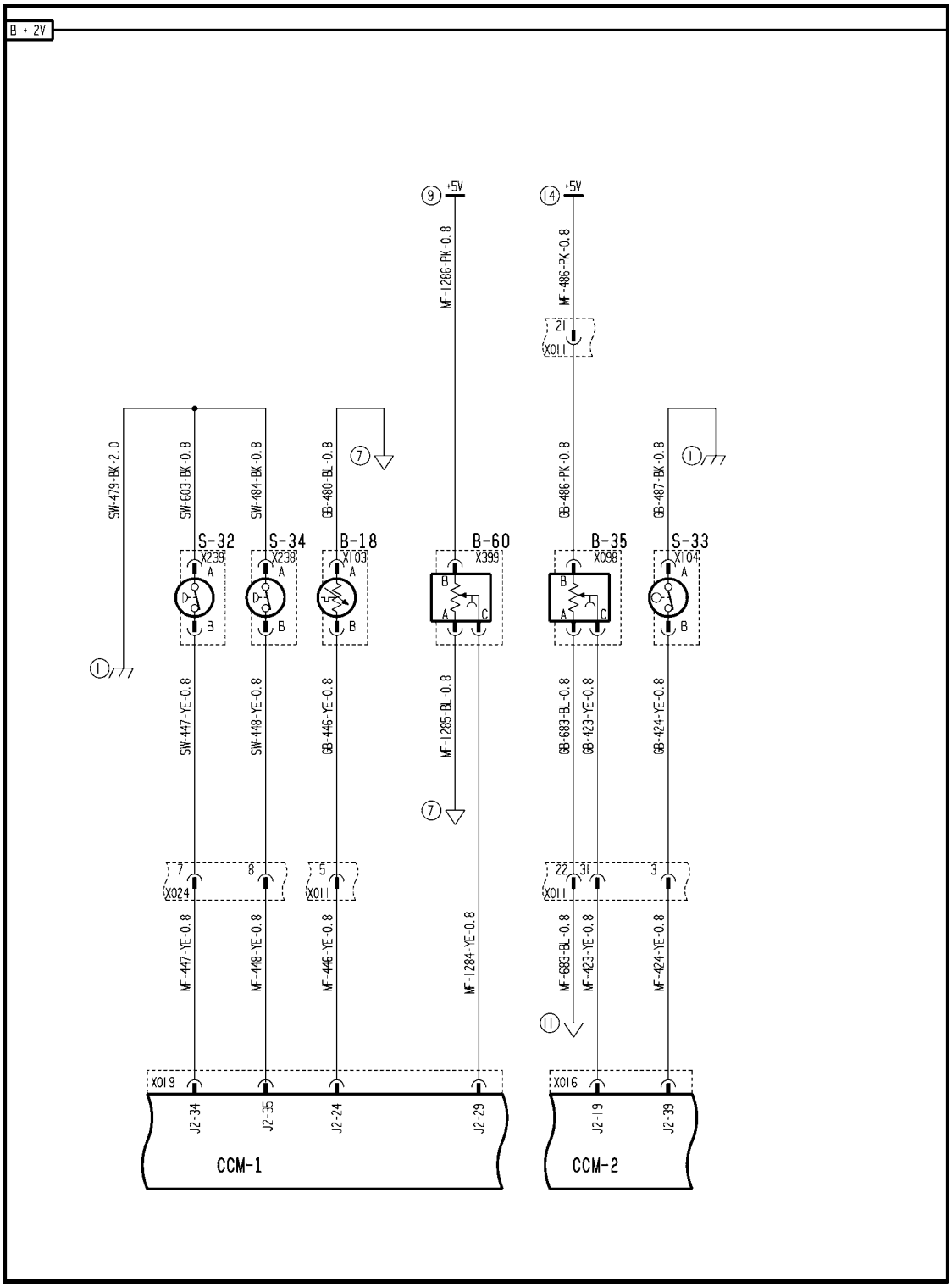
   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the gearbox (GB) harness between connector **X011** and connector **X103** wire 446 yellow. Locate the short and repair.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X011** and connector **X020** J2-24 wire 446 yellow. Locate the short and repair.
4. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



AFXSCHEM10-04 1

FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

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Sensing system Temperature sensor - Short circuit to ground (A.10.A.95.90 - G.30.B.53)

AFX8010

E0024-04 - Hydraulic Reservoir Temperature Sensor

Cause:
The hydraulic reservoir temperature (B-18) is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "RES TEMP SEN" to check the voltage range.

   The normal operating voltage range is - **0.5 - 4.9 volts**

   A. If the voltage reading is **0 - 0.5 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **4**.
2. Disconnect the hydraulic reservoir temperature sensor connector **X103**.

   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**.

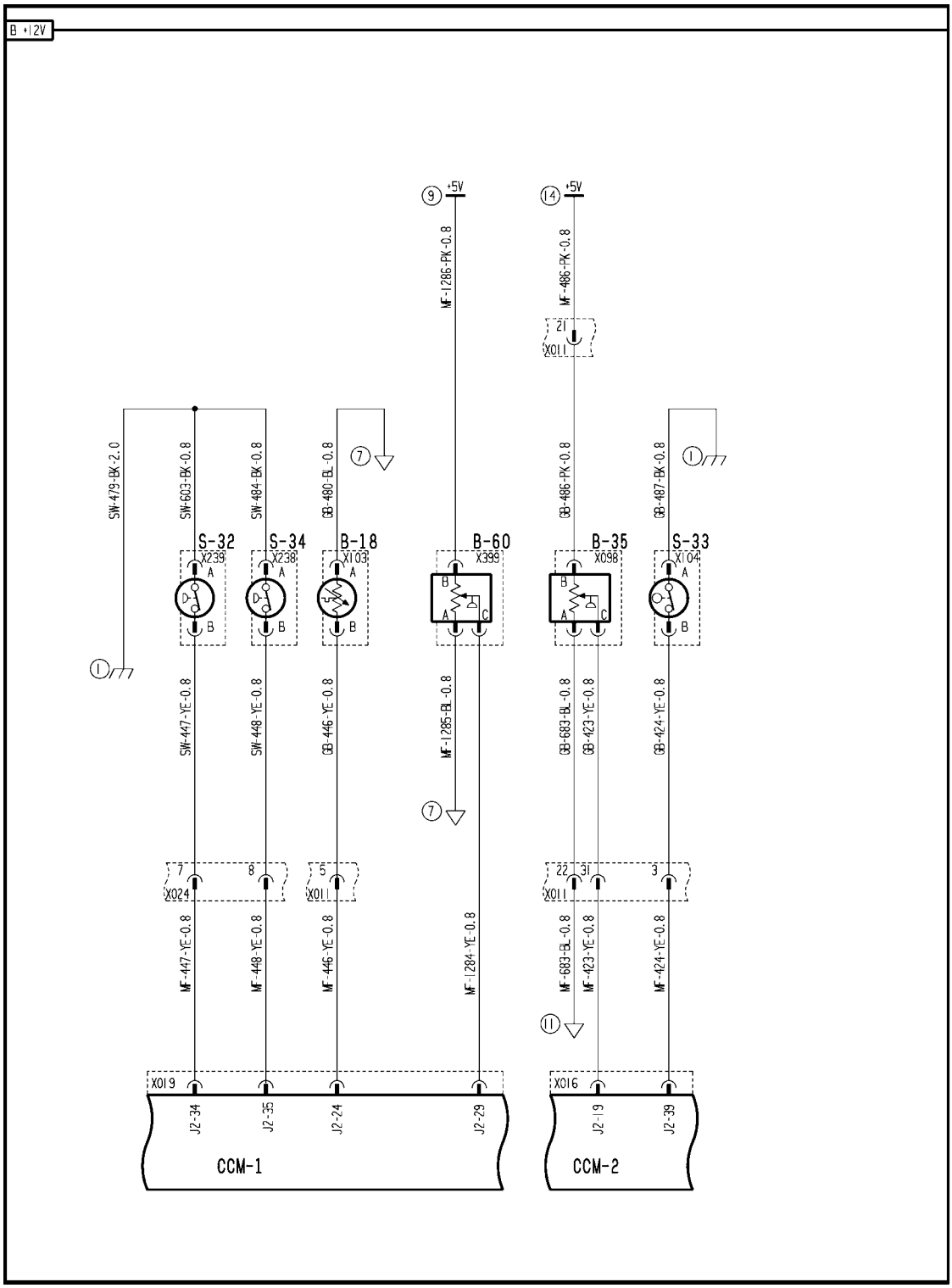
   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the gearbox (GB) harness between connector **X011** and connector **X103** wire 446 yellow. Locate the short and repair.

   B. If the voltage remains low, the short circuit is in the main frame (MF) harness between connector **X011** and connector **X020** J2-24 wire 446 yellow. Locate the short and repair.
4. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

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Sensing system Temperature sensor - Open circuit (A.10.A.95.90 - G.30.B.50)

AFX8010

E0024-05 - Hydraulic Reservoir Temperature Sensor

Cause:
The hydraulic oil reservoir temperature sensor (B-18) circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "RES TEMP SEN" to check the voltage range.

   The normal operating range for the sensor is **0.5 - 4.9 volts**.

   If there is an open in the supply or ground wiring, the voltage will be **4.9 - 5.2 volts**.

   A. If the voltage reading is high **4.9 - 5.2 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the open is not present at this time. Continue the troubleshooting at Step **7**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the hydraulic oil reservoir temperature sensor connector **X103**. Use a jumper wire to short the harness end of connector **X103** pin B to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **4**.

   B. If the monitor still displays **4.9 - 5.2 volts**, continue with Step **3**.

3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a jumper wire to short connector **X011** pin 5 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the gearbox (GB) harness between connector **X011** pin 5 and connector **X103** pin B wire 446 yellow. Locate the open and repair.

   B. If the monitor still displays **4.9 - 5.2 volts**, the open circuit is in the main frame (MF) harness between connector **X011** pin 5 and connector **X019** pin J2-24 wire 446 yellow. Locate the open and repair.

4. Disconnect the hydraulic oil reservoir temperature sensor connector **X103**. Use a multimeter to check for continuity between the harness end of connector **X103** pin A and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with Step **5**.

5. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a multimeter to check for continuity between the harness end of connector **X011** pin 8 and chassis ground.

   A. If there is continuity, the open circuit is in the gearbox (GB) harness between connector **X011** pin 8 and connector **X103** pin A wire 480 blue or 488 blue. Locate the open and repair.

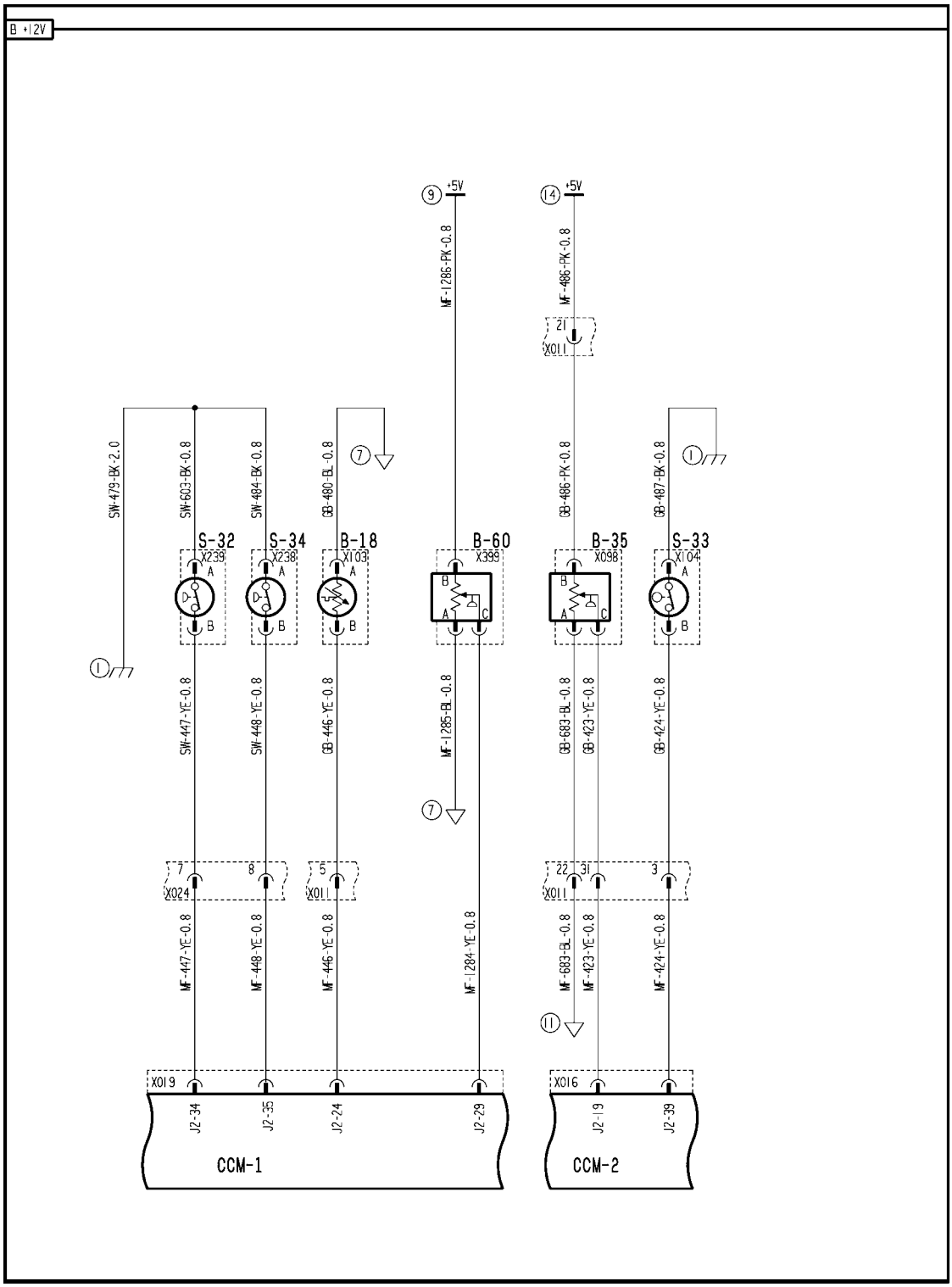
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B. If there is continuity, the open circuit is in the main frame (MF) harness between connector **X011** pin 8 and connector **X019** pin J2-14 wire 488 blue, 401 blue or 460 blue. Locate the open and repair.

6. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase fault code and continue operation.

Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



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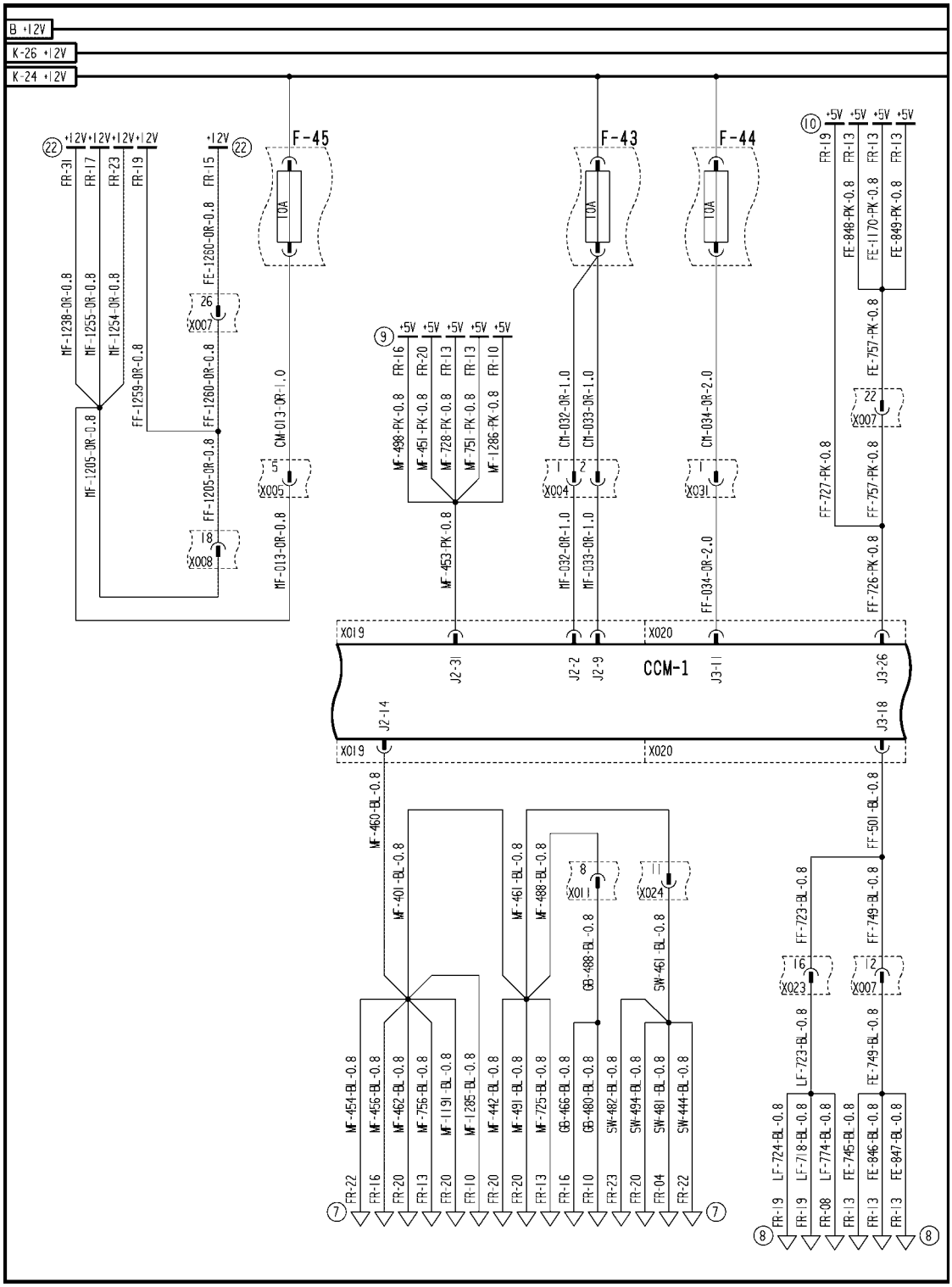
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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Reservoir level sensor - Short circuit to B+ (A.10.A.95.93 - G.30.B.54)

AFX8010

E0133-03 - Hydraulic Reservoir Level Sensor

Cause:
The hydraulic reservoir level switch (S-33) circuit is shorted to 12 volts.

Possible failure modes:

1. Switch supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "RES LEVEL SW" to check the voltage range.

   The proper voltage range for the hydraulic reservoir level switch is - **1.8 volts** or less, oil level okay.

   The proper voltage for the hydraulic reservoir level switch when oil level is low is approximately **8.3 volts**.

   A. If the voltage reading is high out of range (>**10 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the hydraulic reservoir level switch connector **X104** at the reservoir.

   A. If the voltage drops back into the proper range the short is in the switch, or switch wiring. Replace the switch.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the gearbox harness from the main frame harness at connector **X011**.

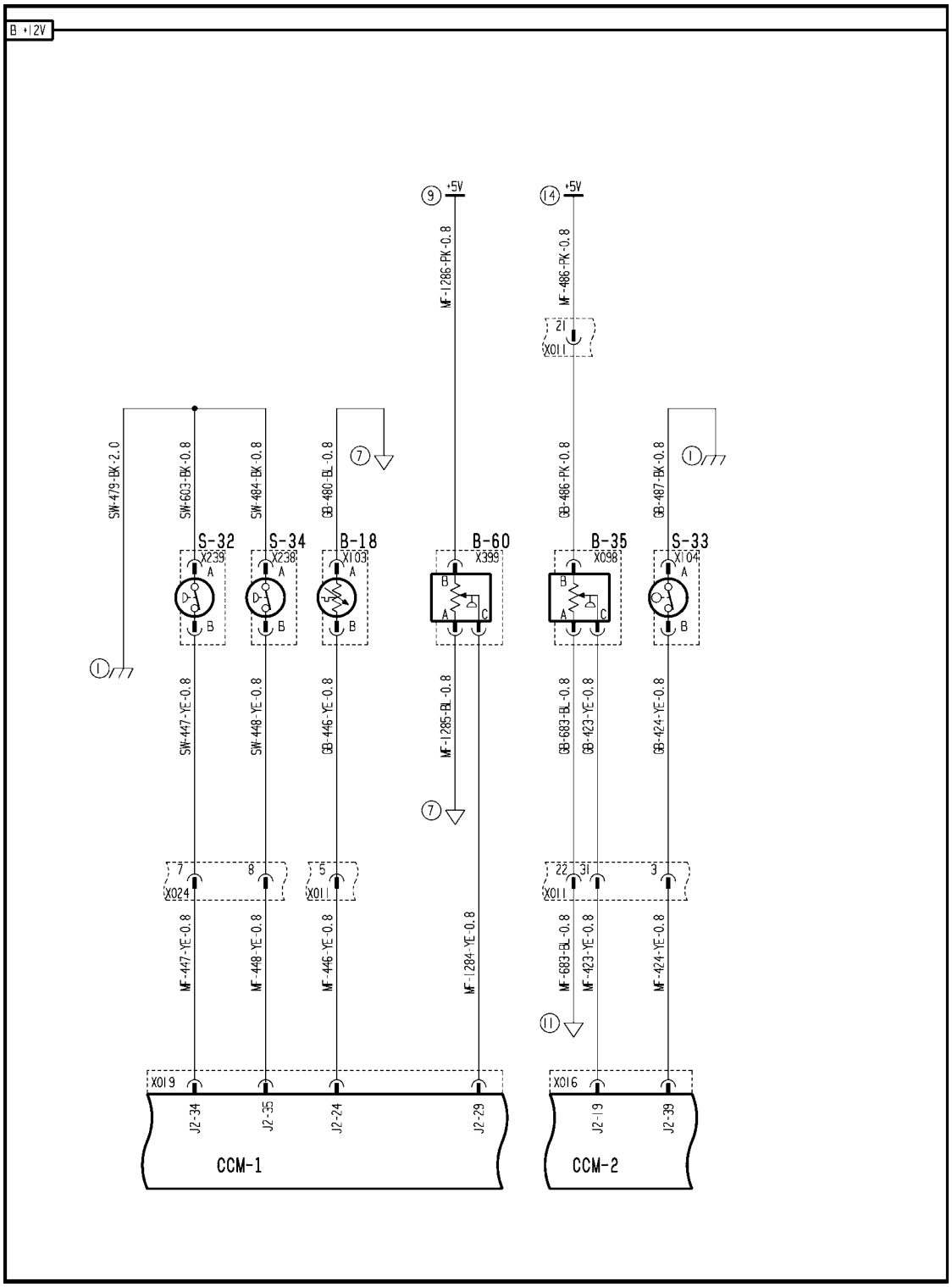
   A. If the voltage drops back into the proper range, the short is in the gearbox (GB) harness between connector **X011** pin 3 and connector **X104** pin B wire 424 yellow. Locate and repair.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X011** pin 3 and connector **X016** pin J2-39 wire 424 yellow. Locate and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

https://truckmanualshub.com/

DISTRIBUTION SYSTEMS - A

PRIMARY HYDRAULIC POWER SYSTEM - 10.A

Basic Principles Of The System 5
Component Location 38
Control / Lubrication Pressure Valve 47
Control Pressure 41
Control Pressure Pump 45
Control Pressure Schematic 48
Cooling 12
Diagnostic Test Equipment 58
Electrical Monitoring Circuits 36
Electrical Monitoring Circuits 40
Electrical Monitoring Circuits 50
Electrical Monitoring Circuits 56
Filtration 12
Filtration 46
Gear Pumps 13
General Information 7
Hydraulic Component Locations 10
Hydraulic Schematic 14
Hydraulic System 9
Hydraulic System Testing Procedures 57
Hydraulic System Testing Procedures 60
1 Low Pressure Standby 61
2 High Pressure Standby 63
3 Steering Relief Setting 65
4 Bench Testing Components 67
5 Control Pressure Test 69
6 PTO Gear Box Lubrication Pressure Test 71
7 Regulated Pressure Test 73
#8 Spreader Pump Flow Test 75
9 Fan Pump Flow Test 77
10 PFC Pump Flow 79
11 Control Pressure Pump Flow Test 81

https://truckmanualshub.com/

Lubrication System 52
Oil Supply 11
Park Brake / Regulated Pressure Valve 37
PFC Pump Hydraulic System 18
PFC Pump Schematic 18
PFC Component Locations 19
PTO Gearbox Cooling 55
PTO Gearbox Cooling and Lubrication System 51
Regulated Pressure 37
Regulated Pressure Schematic 38
Regulated Pressure Valve Operation 39
Sensing system Differential pressure switch – Short circuit to B+ (A.10.A.95.81–G.30.B.54) 87
Sensing system Reservoir level sensor – Short circuit to B+ (A.10.A.95.93–G.30.B.54) . . . 101
Sensing system Temperature sensor – Short circuit to B+ (A.10.A.95.90–G.30.B.54) 90
Sensing system Temperature sensor – Short circuit to ground (A.10.A.95.90–G.30.B.53) . . . 93
Sensing system Temperature sensor – Open circuit (A.10.A.95.90–G.30.B.50) 96
Signal Circuits 29
Signal valve – Unidentified failure (A.10.A.12 – G.30.B.46) 83
Specifications 8
Steering Priority Valve 30

https://truckmanualshub.com/

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DISTRIBUTION SYSTEMS - A

SECONDARY HYDRAULIC POWER SYSTEM - 12.A

AFX8010

https://truckmanualshub.com/

Contents

DISTRIBUTION SYSTEMS - A

SECONDARY HYDRAULIC POWER SYSTEM - 12.A

DIAGNOSTIC

Sensing system

Sensing system Differential pressure switch - Short circuit to B+ (A.12.A.95.81 - G.30.B.54) 3
AFX8010

Sensing system Pressure sensor - Under limit value (A.12.A.95.91 - G.30.C.20) 6
AFX8010

Sensing system Pressure sensor - Short circuit to B+ (A.12.A.95.91 - G.30.B.54) 7
AFX8010

Sensing system Pressure sensor - Open circuit (A.12.A.95.91 - G.30.B.50) 12
AFX8010

https://truckmanualshub.com/

Sensing system Differential pressure switch - Short circuit to B+ (A.12.A.95.81 - G.30.B.54)

AFX8010

E0007-03 - PTO Filter Restriction Switch

Cause:
The PTO box filter bypass switch (S34) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "PTO FILTER SW" to check the voltage range.

   The normal operating range for the PTO box filter bypass is **1.8 - 10.0 volts**

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the PTO box filter bypass pressure switch connector **X238**.

   A. If the voltage drops below **10.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

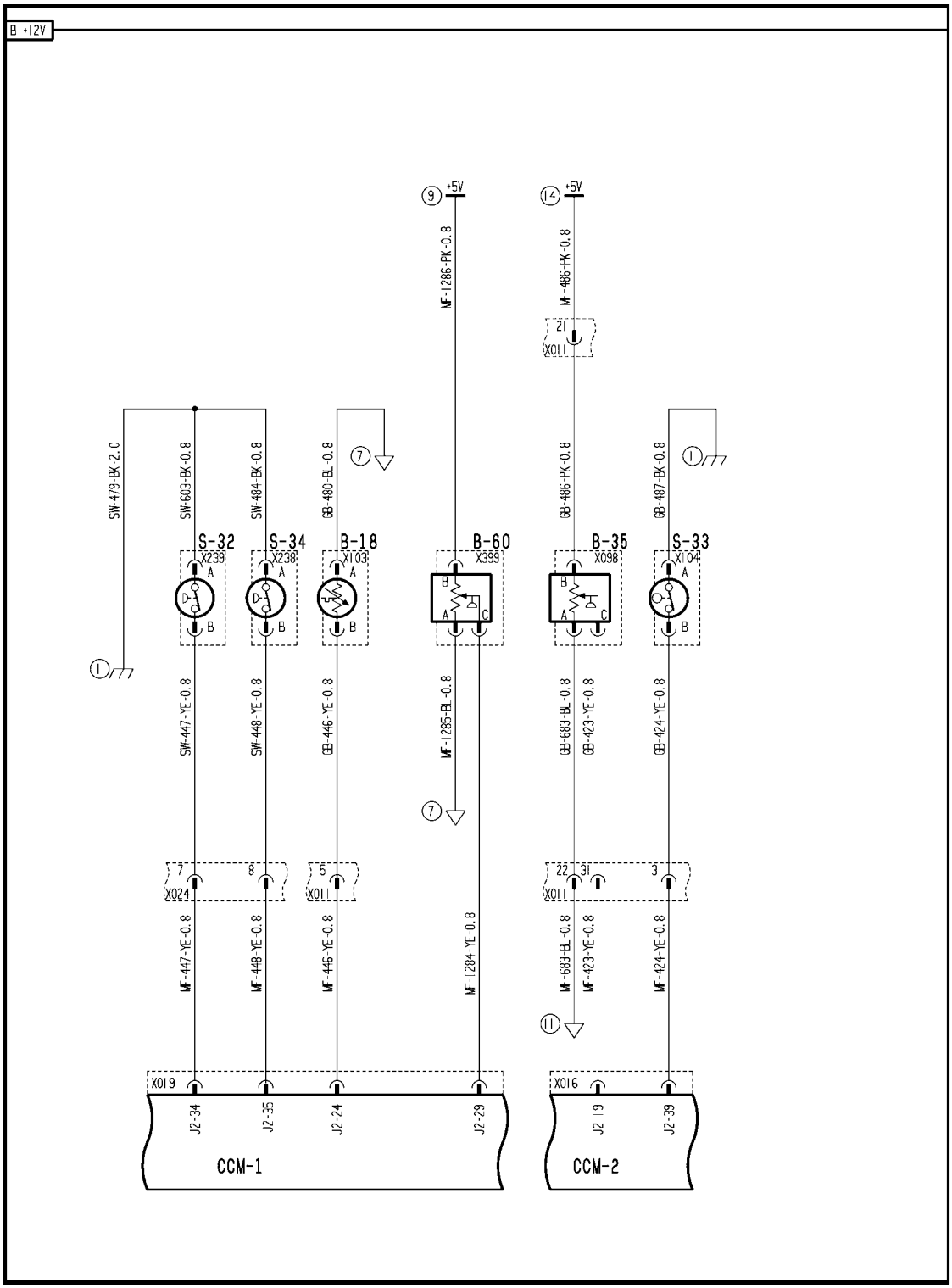
   A. If the voltage drops below **10.0 volts**, the short is in the straw hood front (SW) harness between connector **X024** and connector **X238** wire 448 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X024** and connector **X019** pin J2-35 wire 448 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

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Sensing system Pressure sensor - Under limit value (A.12.A.95.91 - G.30.C.20)

AFX8010

E0162-01 - PTO Control Pressure Sensor

Context:
When the control oil pressure drops below **1827 kPa** (**265 psi**) for more than 2 seconds after the engine has been running for at least 3 seconds, the alarm message "A0012 Control Pressure LOW" will be displayed to the operator. If the oil pressure drops below **1724 kPa** (**250 psi**), the alarm will be displayed, and the engine will be shutdown within 7 seconds to prevent damage to the hydraulic systems. When the alarm message is displayed, a permanent record is created in the error history.

Cause:
The "A0012 Control Pressure LOW" alarm has occurred at least once on the vehicle.

Possible failure modes:

1. The control pressure has dropped below acceptable limits during vehicle operation.

Solution:

1. This error message appears as a permanent record that a low control pressure condition has occurred on the combine, and cannot be erased using the combine display controls. The EST must be used to erase this fault code.

    A. If this fault code appears, remove and inspect the PTO gearbox oil for indication of internal damage.

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Sensing system Pressure sensor - Short circuit to B+ (A.12.A.95.91 - G.30.B.54)

AFX8010

E0162-03 - PTO Control Pressure Sensor

Cause:
The control pressure sensor (B-35) circuit is shorted to 12 volts.

Possible failure modes:

1. Switch supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "CNTL PRESS SEN" to check the voltage range.

   The proper voltage range for the control pressure sensor (key On, engine OFF) is - **0.5 - 2.8 volts**.

   The proper voltage range for the control pressure sensor (key On, engine Running) is - **2.8 - 4.9 volts**.

   A. If the voltage reading is high out of range (>**5.2 volts**), continue with Step **2**.

   B. If the voltage reading is normal, the shorted wire may not be energized at this time. Continue with Step **7**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the control pressure sensor connector **X098**. Use a multimeter to check for voltage on connector **X098** pin B. There should be **5 volts** present.

   A. If high (>**5.5 volts**) voltage is found, the regulated voltage supply is incorrect. The error "
   E0165-03 - CCM2 J2 5V Reference
   " should be listed in the Universal Display Plus "ERROR" screen. Correct that error, and then check to determine if this error has been resolved.

   B. If correct voltage is found, continue with Step **3**.
3. Disconnect the control pressure sensor connector **X098**. Use a multimeter to check for continuity between connector **X098** pin A and chassis ground.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, continue with Step **4**.
4. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a multimeter to check for continuity between the harness end of connector **X011** pin 22 and chassis ground.

   A. If there is continuity, there is an open circuit in the gearbox (GB) harness between connector **X011** pin 22 and connector **X098** pin A wire 683 blue. Locate the open and repair.

   B. If there is continuity, the open circuit is in the main frame (MF) harness between connector **X011** pin 22 and connector **X016** pin J2-14 wire 683 blue, 425 blue or 465 blue. Locate the open and repair.
5. Disconnect the control pressure sensor connector **X098**. Use a multimeter to check for voltage on connector **X098** pin C.

   A. If no voltage is found, continue with Step **7**.

   B. If high (>**5.2 volts**) voltage is found, continue with Step **6**.

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6. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a multimeter to check for voltage on connector **X011** pin 31.

   A. If no voltage is found, the short is in the gearbox (GB) harness between connector **X098** pin C and connector **X011** pin 31 wire 423 yellow. Locate the short and repair.

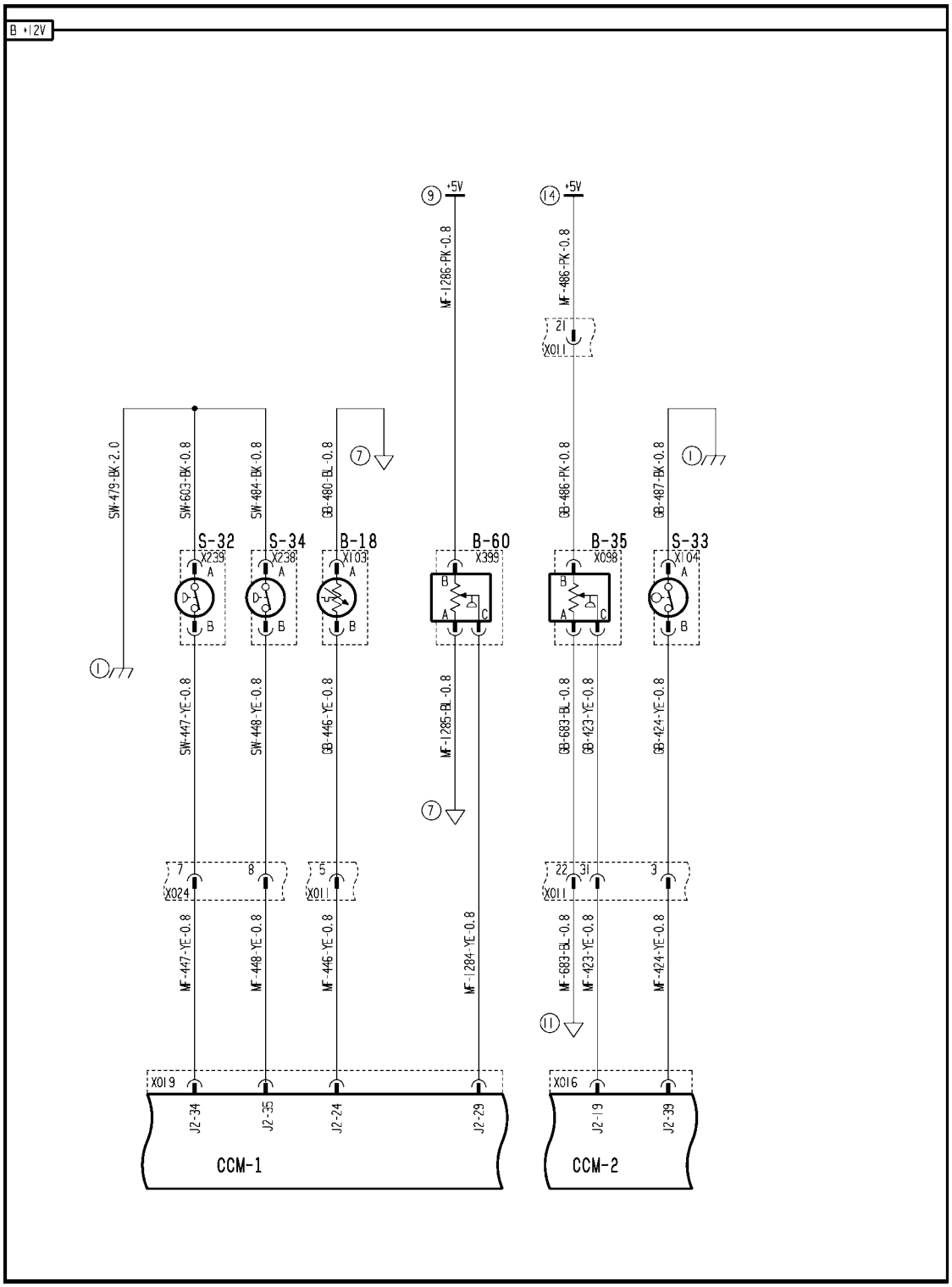
   B. If high (>**5.2 volts**) voltage is found, the short is in the main frame (MF) harness between connector **X011** pin 31 and connector **X016** pin J2-19 wire 423 yellow. Locate the short and repair.

7. Operate the machine while monitoring Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



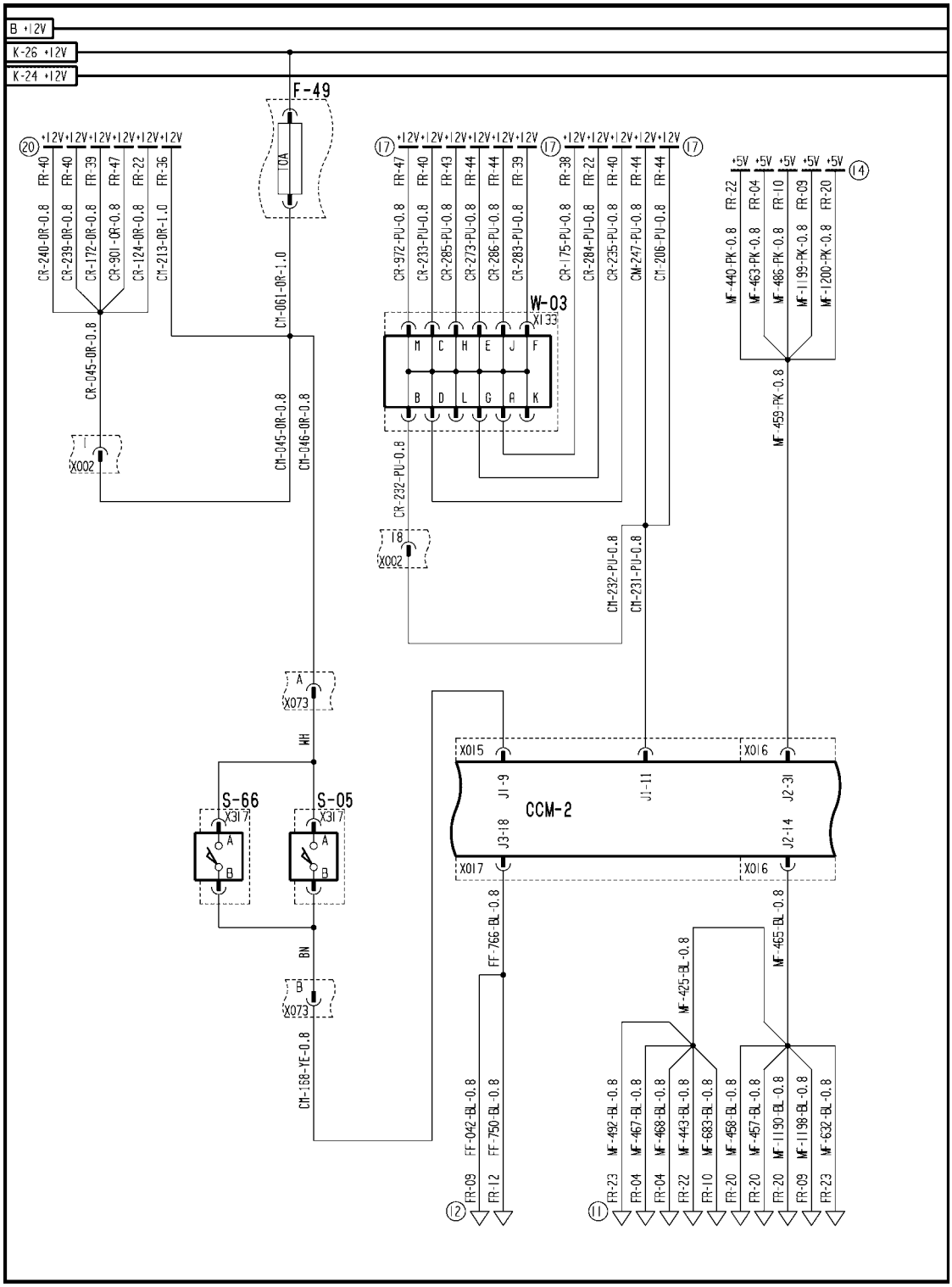
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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Pressure sensor - Open circuit (A.12.A.95.91 - G.30.B.50)

AFX8010

E0162-05 - PTO Control Pressure Sensor

Cause:
The control pressure sensor (B-35) circuit is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring open or shorted to ground.
2. Loss of power to sensor.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HYDRAULIC" sort menu, and select "CNTL PRESS SEN" to check the voltage range.

   The proper voltage range for the control pressure sensor (key On, engine OFF) is **0.5 - 2.8 volts**.

   The proper voltage range for the control pressure sensor (key On, engine Running) is **2.8 - 4.9 volts**.

   A. If the voltage reading is low out of range (<**0.3 volts**), continue with Step **2**.

   B. If the voltage reading is normal, the shorted wire may not be open or grounded at this time. Continue with Step **9**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the control pressure sensor connector **X098** . Use a multimeter to check for voltage on connector **X098** pin B. There should be **5 volts** present.

   A. If no voltage is found, continue with Step **3**.

   B. If correct voltage is found, continue with Step **5**.
3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a multimeter to check for voltage on connector **X011** pin 21. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the gearbox (GB) harness between connector **X098** pin B and connector **X011** pin 21 wire 486 pink. Locate the open and repair.

   B. If no voltage is found, continue with Step **4**.
4. Carefully disconnect the main frame (MF) harness from the CCM2 module at connector **X016**. Use a multimeter to check for voltage on the CCM2 module connector **X016** pin J2-31. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the main frame (MF) harness between connector **X011** pin 21 and connector **X016** pin J2-31 wire 459 pink or 486 pink. Locate the open and repair.

   B. If no voltage is found, there is an internal fault with the CCM2 module. Replace the module.
5. Disconnect the control pressure sensor connector **X098** . Use a multimeter to check for continuity between connector **X098** pin C and chassis ground.

   A. If continuity is found, continue with Step **6**.

   B. If no continuity is found, continue with Step **7**.

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6. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a multimeter to check for continuity between the harness end of connector **X011** pin 31 and chassis ground.

   A. If there is no continuity, there is a short to ground in the gearbox (GB) harness between connector **X011** pin 31 and connector **X098** pin C wire 423 yellow. Locate the short and repair.

   B. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** pin 31 and connector **X016** pin J2-19 wire 423 yellow. Locate the short and repair.

7. Carefully disconnect the main frame (MF) harness from the CCM2 module at connector **X016**. Install a jumper wire between the harness end of connector **X016** pin J2-19 and chassis ground. Use a multimeter to check for continuity between connector **X098** pin C and chassis ground.

   A. If continuity is found, continue with Step **9**.

   B. If no continuity is found, continue with Step **8**.

8. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**. Use a multimeter to check for continuity between the harness end of connector **X011** pin 31 and chassis ground.

   A. If there is continuity, there is an open circuit in the gearbox (GB) harness between connector **X011** pin 31 and connector **X098** pin C wire 423 yellow. Locate the open and repair.

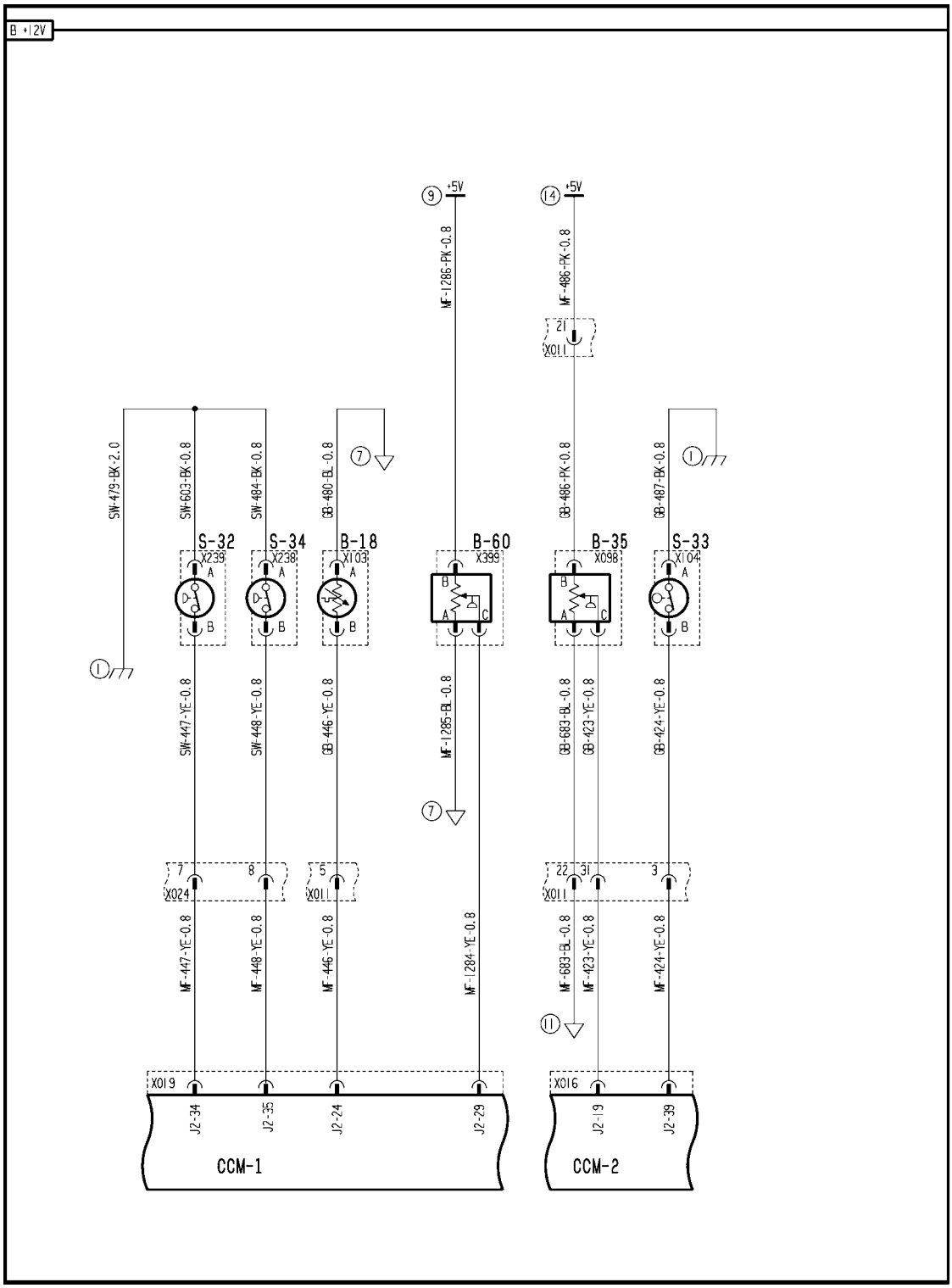
   B. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X011** pin 31 and connector **X016** pin J2-19 wire 423 yellow. Locate the open and repair.

9. Operate the machine while monitoring Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



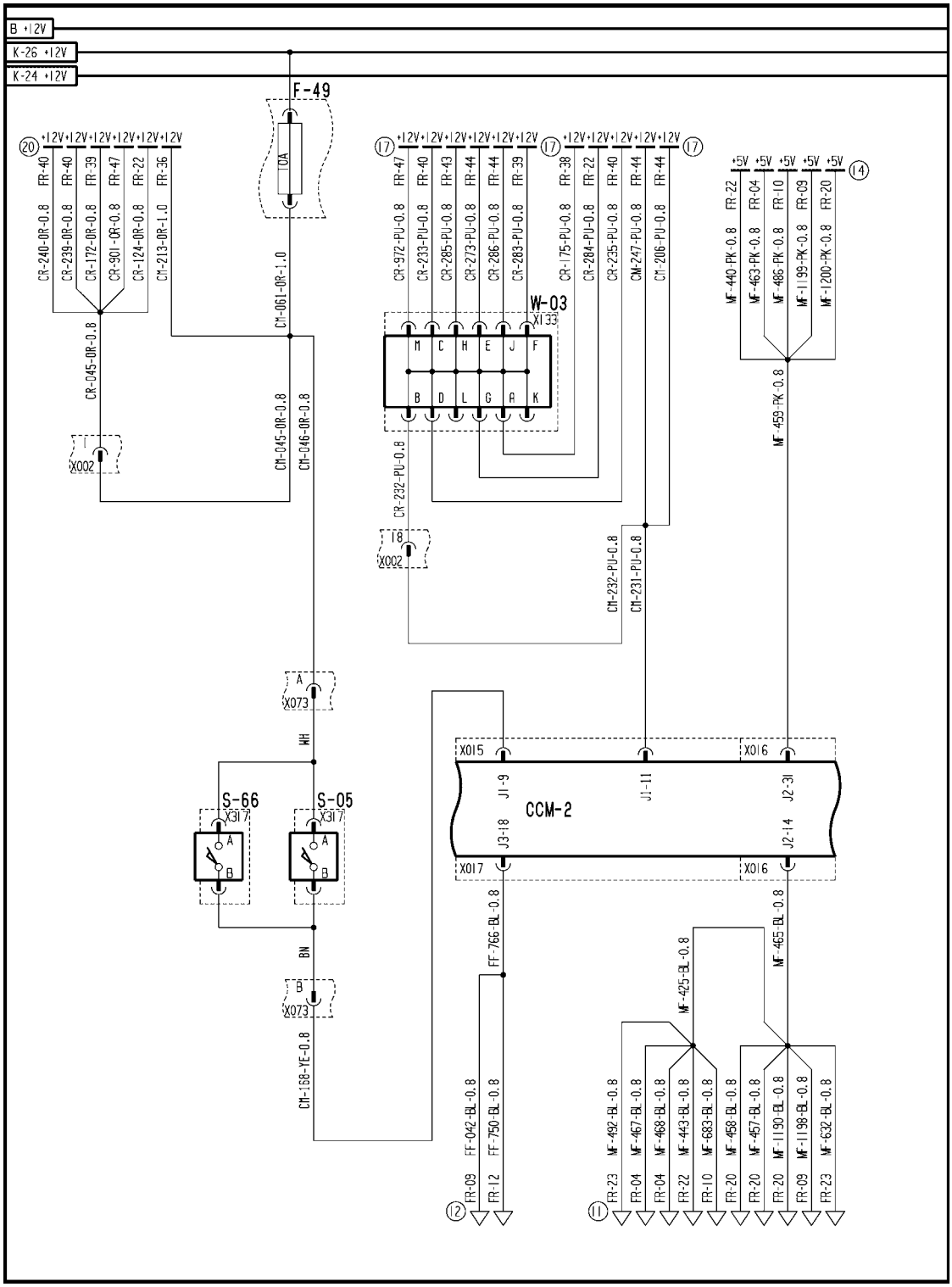
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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Index

DISTRIBUTION SYSTEMS - A

SECONDARY HYDRAULIC POWER SYSTEM - 12.A

Sensing system Differential pressure switch - Short circuit to B+ (A.12.A.95.81 - G.30.B.54) 3
AFX8010

Sensing system Pressure sensor - Open circuit (A.12.A.95.91 - G.30.B.50) 12
AFX8010

Sensing system Pressure sensor - Short circuit to B+ (A.12.A.95.91 - G.30.B.54) 7
AFX8010

Sensing system Pressure sensor - Under limit value (A.12.A.95.91 - G.30.C.20) 6
AFX8010

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https://truckmanualshub.com/

DISTRIBUTION SYSTEMS - A

ELECTRICAL POWER SYSTEM - 30.A

AFX8010

https://truckmanualshub.com/

Contents

DISTRIBUTION SYSTEMS - A

ELECTRICAL POWER SYSTEM - 30.A

TECHNICAL DATA

Alternator

Alternator -Torque (A.30.A.82 - D.20.A.10) 5
AFX8010

Wiring harness

Wiring harness - Torque (A.30.A.88 - D.20.A.10) 5
AFX8010

FUNCTIONAL DATA

Electrical Power System - General Information 5A - 5AF

Wiring harness

Wiring harness - Detailed view (A.30.A.88 - C.10.A.50) 6
AFX8010

Wiring harness - Component diagram (A.30.A.88 - C.20.A.71) 13
AFX8010

Wiring harness - Electrical schema index (A.30.A.88 - C.20.G.40) 191
AFX8010

Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01) 208
AFX8010

Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02) 210
AFX8010

Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03) 212
AFX8010

Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04) 214
AFX8010

Wiring harness - Electrical schematic frame 05 (A.30.A.88 - C.20.E.05) 216
AFX8010

Wiring harness - Electrical schematic frame 06 (A.30.A.88 - C.20.E.06) 218
AFX8010

Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07) 219
AFX8010

Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08) 221
AFX8010

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09) 223
AFX8010

Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10) 225
AFX8010

Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11) 227
AFX8010

Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12) 229
AFX8010

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13) 231
AFX8010
Wiring harness - Electrical schematic frame 14 (A.30.A.88 - C.20.E.14) 233
AFX8010
Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15) 235
AFX8010
Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16) 237
AFX8010
Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17) 239
AFX8010
Wiring harness - Electrical schematic frame 18 (A.30.A.88 - C.20.E.18) 241
AFX8010
Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19) 242
AFX8010
Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20) 244
AFX8010
Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21) 246
AFX8010
Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22) 248
AFX8010
Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23) 250
AFX8010
Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24) 252
AFX8010
Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25) 254
AFX8010
Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26) 256
AFX8010
Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27) 258
AFX8010
Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28) 260
AFX8010
Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29) 262
AFX8010
Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30) 264
AFX8010
Wiring harness - Electrical schematic frame 31 (A.30.A.88 - C.20.E.31) 266
AFX8010
Wiring harness - Electrical schematic frame 32 (A.30.A.88 - C.20.E.32) 268
AFX8010
Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33) 269
AFX8010
Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34) 271
AFX8010
Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35) 273
AFX8010
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36) 275
AFX8010
Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37) 277
AFX8010
Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38) 279
AFX8010
Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39) 281
AFX8010
Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40) 283
AFX8010

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41) 285
AFX8010
Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42) 287
AFX8010
Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43) 289
AFX8010
Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44) 291
AFX8010
Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45) 293
AFX8010
Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46) 295
AFX8010
Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47) 297
AFX8010
Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48) 299
AFX8010

SERVICE

Battery

Battery - Disconnect (A.30.A.83 - F.10.A.11) 301
AFX8010
Battery - Replace (A.30.A.83 - F.10.A.30) 302
AFX8010

DIAGNOSTIC

Alternator

Alternator - Problem solving (A.30.A.82 - G.40.A.30) 303
AFX8010
Alternator - Testing (A.30.A.82 - G.40.A.20) 303
AFX8010

https://truckmanualshub.com/

Alternator - Torque (A.30.A.82 - D.20.A.10)

AFX8010

Screw securing alternator bracket to crankcase

Bolt Length	Bolt Spec	Torque	
L = 35mm	M10x1.5	**27 - 33 Nm**	**20 - 24 lb ft**
L = 60mm	M10x1.5	**40 - 48 Nm**	**29 - 35 lb ft**
L = 30mm	M8x1.25	**22 - 27 Nm**	**16 - 20 lb ft**

Wiring harness - Torque (A.30.A.88 - D.20.A.10)

AFX8010

Description		Torque	
Screw securing electric cables to engine	M6x1	**6 - 10 Nm**	**53 - 87 lb ft**

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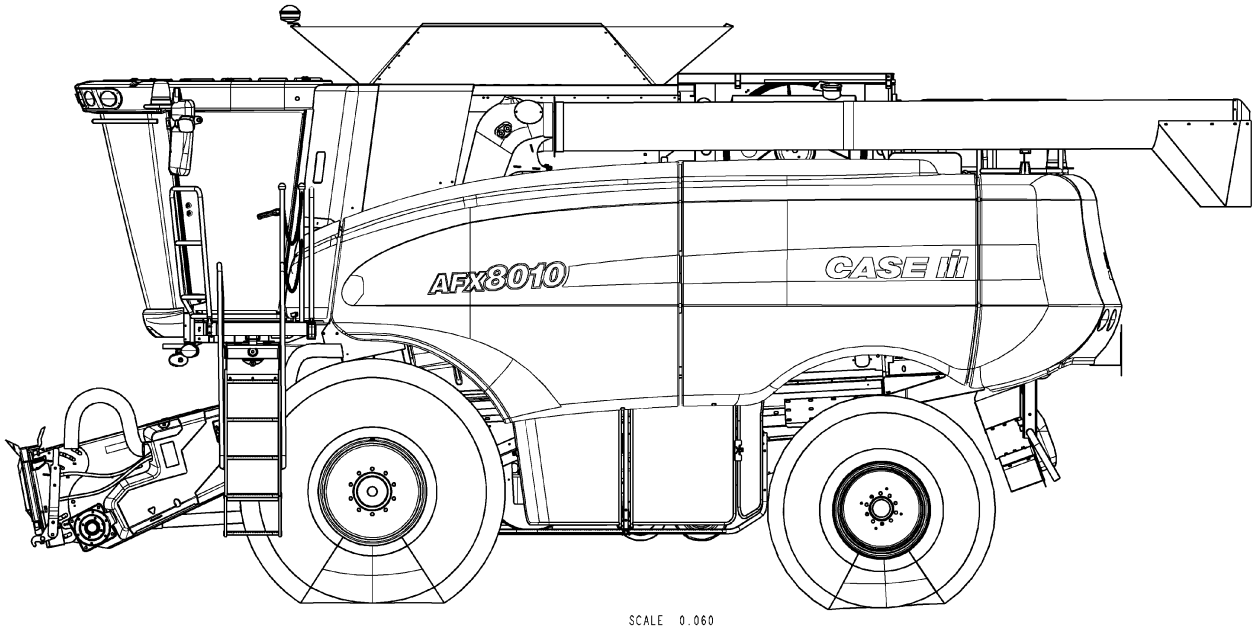
Electrical Power System - General Information (A.30.A)

CONTENTS

Description	Page
Description of Operation	5B
Introduction to Troubleshooting	5E
Wiring Harness Repairs	5F
Digital Multi-Meter	5I
Electrical Test Procedures	5L
Circuit Components - Basic Description and Testing	5O
Fuses	5O
Switches	5P
Flashers	5P
Resistance Devices	5Q
Fluid Level Sender	5Q
Potentiometers	5Q
Potentiometer Adjustment	5R
Electromagnetic Devices	5S
Relays	5S
Solenoids	5T
PWM Solenoid Valves	5U
Sensors	5W
Temperature Sensors	5W
Pressure Sender	5W
Speed and Position Sensors	5X
Cab Electrical Connectors X002 and X003	5Y
Rear Speaker Panel, Removal	5Y
Rear Speaker Panel, Installation	5Z
Electronic Modules (CCM's)	5AA
CCM Power and Ground Supplies	5AB
Combine Control Module (CCM) Removal and Installation	5AD
CCM Identification	5AD
Instructional Seat Removal	5AD
CCM, Removal	5AD
CCM Installation	5AF
Software Installation	5AF
Instructional Seat Installation	5AF

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DESCRIPTION OF OPERATION



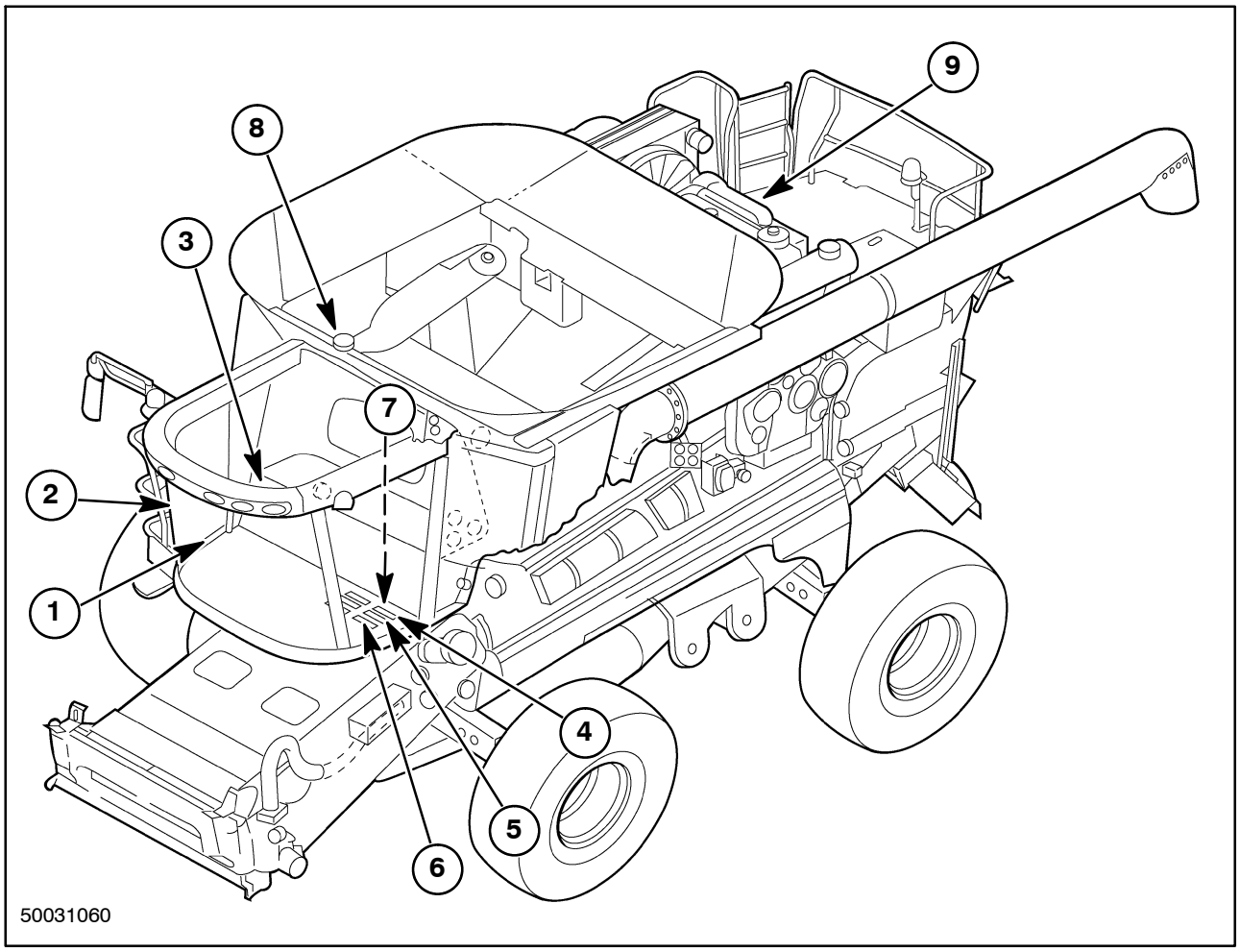
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1

The AFX combines use the latest technology in electronics to provide excellent reliability and serviceability, and to provide enhanced functionality. The system consists of several electronic modules, along with conventional copper wiring to all devices and sensors. The electronic modules are connected together using a special twisted copper wire pair, that allows the modules to communicate with each other using Controller Area Network (CAN) technology. This technology allows the modules to perform many functions through the use of shared input and output resources, thus minimizing sensors and wiring components on the combine.

All of the modules communicate information from the combine sensors, switches and operator controls to each other and to the Universal Display Plus, and then drive the appropriate outputs, such as solenoids and actuators. The operator instructs the electronic modules what to do, the modules interpret the commands, and direct the combine sub systems to complete the functions as required. In addition, the modules check for faults and display or store this information as required for reference in servicing. The modules also provide built-in diagnostics, allowing the technician to monitor activity, or test devices directly through the modules.

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2

The AFX combine is equipped with a minimum of 7 electronic modules, and may be equipped with as many as 9 modules, depending on the configuration and options installed. These modules are:

Universal Display Plus Module, 1; provides the main display of information for the operator.

Shaft Speed Monitor (SSM), 2, provides the display for shaft speed alarms, and for fuel level and coolant temp gauges.

Right Hand Module (RHM), 3; most operator inputs, including from the propulsion handle (MFH), are fed into this module, which then reports this information to the other modules in the network for action.

Chassis Control Modules CCM1, 4, CCM2, 5 and CCM3, 6; these modules drive most of the actuators and solenoids, and monitor most of the sensors and switches on the combine.

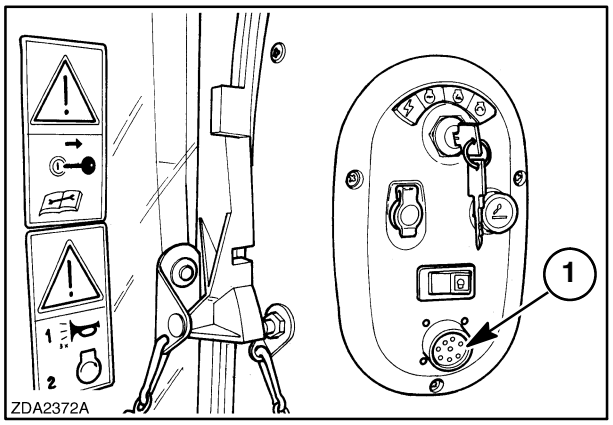
YMIU Module, 7, [optional] is installed and used to control certain options on the combine, such as the precision farming devices.

Differential GPS module, 8, [optional] is available with some precision farming systems, and provides location data to be recorded with the harvest data for mapping purposes.

Engine Control Unit (ECU), 9, is installed to provide enhanced engine control and performance.

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A Diagnostic and Maintenance (DAM) connector, 1, allows the Electronic Service Tool (EST) to be connected to the network, in order to load new operating software into the modules, and to provide more detailed testing and diagnostic abilities.



3

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INTRODUCTION TO TROUBLESHOOTING

Fault Codes and Fault Finding

Troubleshooting and fault finding of the electrical system should always be carried out in a logical and planned sequence. Many apparent faults associated with electronic components are often hastily diagnosed and result in the replacement of expensive components. An extra few minutes confirming the apparent fault will result in a more positive and cost effective repair.

The AFX combines have a built in diagnostic capabilities to assist the operator and service technician to identify and locate the source of electrical system concerns. The Universal Display Plus monitor is used to indicate, in coded format, any malfunction detected in the electrical and electronic systems. Two different coded formats are used to indicate concerns; alarms and errors.

An alarm is an indication of some mechanical condition on the vehicle, and alerts the operator to perform necessary maintenance, or to change operating conditions to correct the alarm condition. Examples of alarms would be to indicate an engine overheat condition, blocked filters, or improper control operation. Alarms are not used to indicate faults with electrical circuits.

An error is an indication of a fault with an electrical circuit or component, and alerts the operator that the circuit or component is no longer functioning. Examples of error messages include open circuits, shorts to ground, or short to high voltage. These errors are typically the result of wire harness damage, or sensor misadjustment or failure.

When investigating an electrical concern, the first step is to fully understand the problem. Get a clear description of the concern from the operator, and if possible, operate the vehicle to confirm the problem.

Once the problem is clearly identified, use the “Diag” screens of the Universal Display Plus monitor to determine if any alarm or error messages exist that relate to the problem. If related error messages are found, diagnostic screens showing voltage, current or frequencies for that specific circuit are available to assist in pinpointing the source of the problem. In most cases, circuit testing may be accomplished using only the on-board diagnostic capabilities. Diagnostic procedures for each error code are detailed in this manual.

Where the fault finding procedure requires checks for continuity, a visual inspection of the wiring should be made prior to conducting any test to ensure that obvious ‘mechanical’ damage has not occurred to the harness or connectors.

In some cases, use of a multimeter will be necessary to locate the source of the fault. A good quality multimeter, capable of measuring voltage, current, and resistance of at least 20,000 ohms, is an essential item to perform fault finding.

IMPORTANT**:** *Use of powered test lights or any 12 volt source to test or activate electrical circuits may result in internal failure of the computer modules. Never apply a 12 volt source directly to a solenoid or other device to prevent damage to the combine electrical system.*

When using a multimeter, it is good practice to select a high range and work downwards to avoid damaging the instrument. Refer to the Operator’s manual supplied with the meter, and to the ‘Basic Multimeter Use” section of this chapter for further details.

IMPORTANT**:** *Care should be taken when using the multimeter. Use the instrument only as instructed to avoid damage to the internal elements of the microprocessors on the combine. When checking the continuity of wiring, sensors or switches, it is necessary to isolate the combine modules and ensure the key switch is turned off to prevent possible further damage. The key switch should only be switched on and the combine modules connected where specifically instructed in the fault finding procedure.*

During fault finding, it will often be necessary to uncouple connectors for inspection, or to provide access for testing. When using the combine on-board diagnostics, uncoupling connectors as directed in the fault finding procedures will often be necessary to locate the source of the fault. Unless specifically noted, connectors should not be back-probed using test spoons or other tools, to prevent damage to the connector and wire seals.

⚠ CAUTION ⚠

Never couple or uncouple electrical connectors while the engine is running, to prevent machine damage and personal injury due to electrical shock.

⚠ WARNING ⚠

To avoid personal injury, never attempt to access electrical connectors under the cab while the engine is running. Accidental contact with the feeder angle sensor or inappropriate access to the electrical circuits to the modules may cause the feeder to move unexpectedly, resulting in personal injury or death.

IMPORTANT**:** *The under-cab connectors to the chassis control modules (CCM’s) do not normally need to be accessed for diagnostic purposes. Repeated coupling and uncoupling of these connectors will result in seal and connector damage, causing electrical circuit failures.*

If it is found necessary to clean the connectors a contact spray should be used. DO NOT USE ANY OTHER METHOD FOR CLEANING TERMINALS. Do not use a cleaner that contains Trichloro-ethylene, this solvent will damage the plastic body of the connector.

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WIRING HARNESS REPAIRS

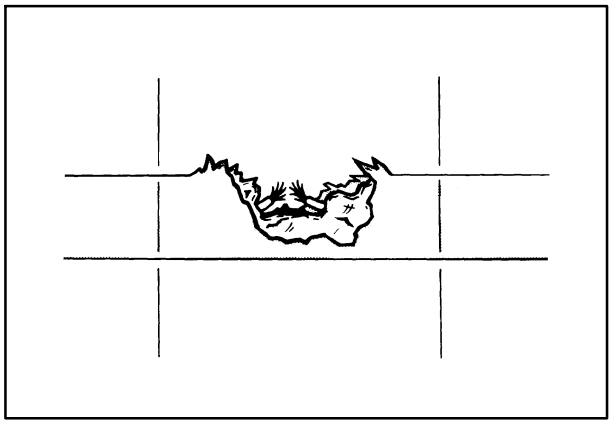
Temporary Wiring Harness Repair

The following method to repair wiring is a temporary expedient only. Wiring should be replaced as soon as possible. Do not attempt to repair the wire on any system sensors as these are sealed and should only be replaced with a new component.

NOTE: *When conducting a cable repair it is important that only RESIN CORED SOLDER is used. Use of other types of solder may result in further cable damage.*

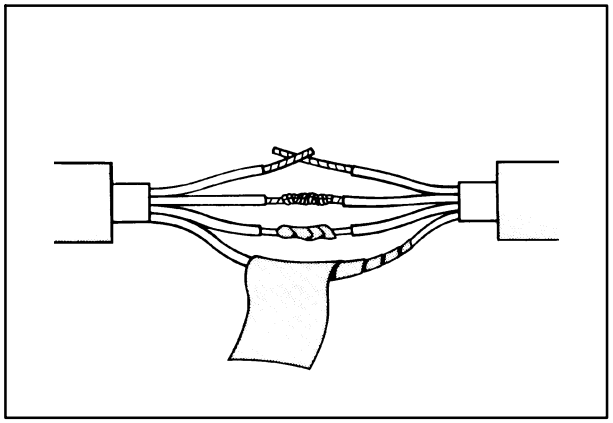
To carry out a temporary repair, proceed as follows:-

1. Locate damaged portion of cable then cut away outer protective cover on both sides of the damaged area.



4

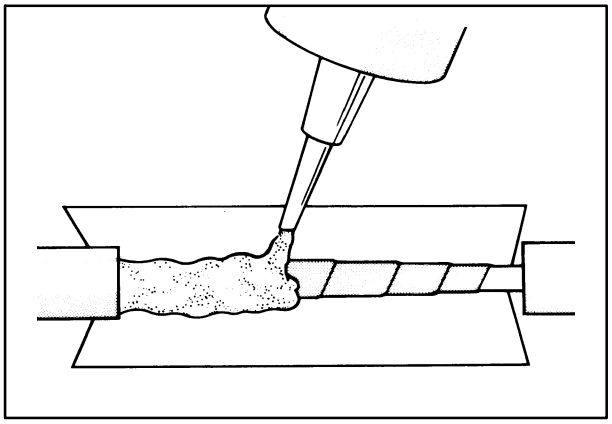
2. Peel back the cable from both ends of the damaged area and carefully cut away the inner cable cover at the damaged area and strip about 13 mm (1/2″) of insulation from the wires. Do not cut away any wire strands.
3. Using a suitable solvent, clean about 2 inches (50 mm) from each cover end. Clean the grey cable cover and the individual leads.
4. Twist two bare leads together for each damaged lead, being careful to match wire colours, then solder the leads using resin cored solder. Tape each repaired lead with vinyl insulation tape.



5

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5. Wind a layer of vinyl insulation tape up to the grey cable cover at each end of the repair section. Make a paper trough, then apply silicon rubber compound (non hardening sealant) over the repaired section up to the cover ends. Sufficient sealant must be used to fill the ends of the cut away area.

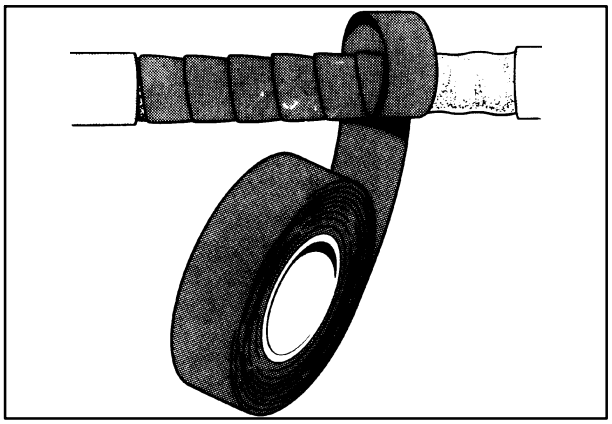


6

6. Allow the compound to cure then cover the area with insulating tape taking the tape well over each end of the repair. An overlap of at least 50 mm (2 inches) of tape at each end is necessary.

7. Check to ensure the repair is satisfactory and secure the repaired cable so that repeat damage is avoided.

NOTE: *This is a temporary repair only. Ensure the damaged cable is replaced as soon as possible to prevent ingress of water or chemicals.*



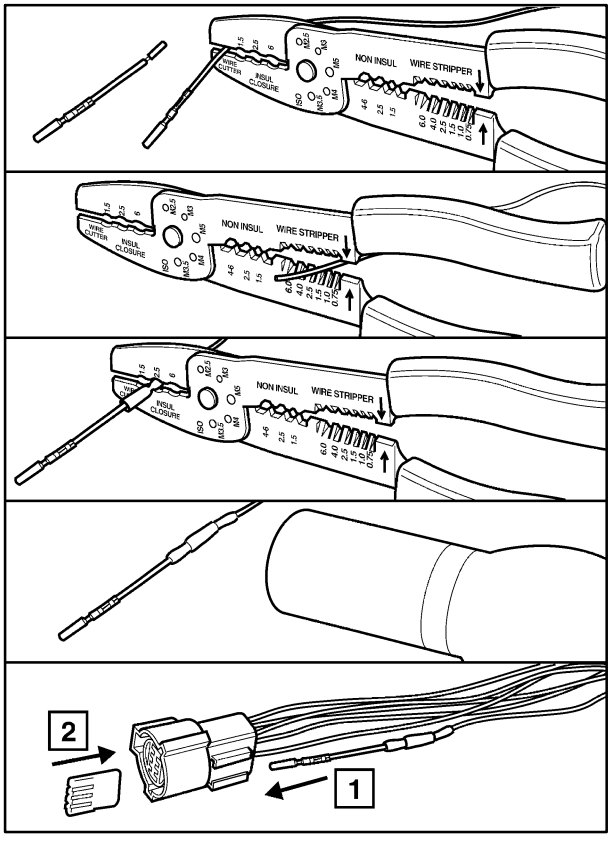
7

Harness Wire Replacement

If a wire within the harness is found to be beyond repair or is open circuit, a jumper wire may be installed as a temporary repair until such time when a new harness assembly can be installed. Use the following procedure to install an additional wire:

1. Locate the faulty wire using the procedures described in the fault code charts.
2. Disconnect the affected connectors.
3. If fitted carefully roll back the seal between the connector and harness outer covering.
4. Remove the pins from the connector blocks of the affected wire using the appropriate removal tool found in the harness repair kit.

NOTE: *Use the instructions supplied with the kit to ensure correct pin removal.*

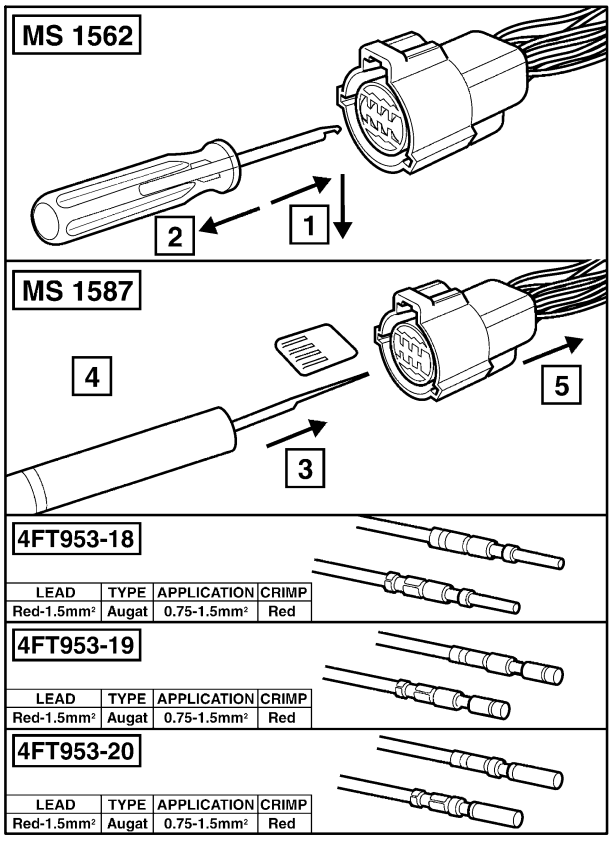


8

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5. From the harness repair kit select the correct pin for the connectors. Obtain locally the correct cross-sectional size wire and measure out the length required by following the harness routing.
6. Join the new wire to the new pins as described in the harness repair kit and install one of the pins into its connector.
7. If possible attempt to run the new wire within the existing harness outer covering, if this is not possible run the wire along the harness, securing regularly with suitable ties. With the wire correctly routed install the second terminal into its connector block. Replace the connector seal if removed.
8. To ensure that the repair has been effective check for continuity of the new wire using a suitable multi-meter.

NOTE: *This is a temporary repair only. Ensure the damaged cable is replaced as soon as possible to prevent ingress of water or chemicals.*



9

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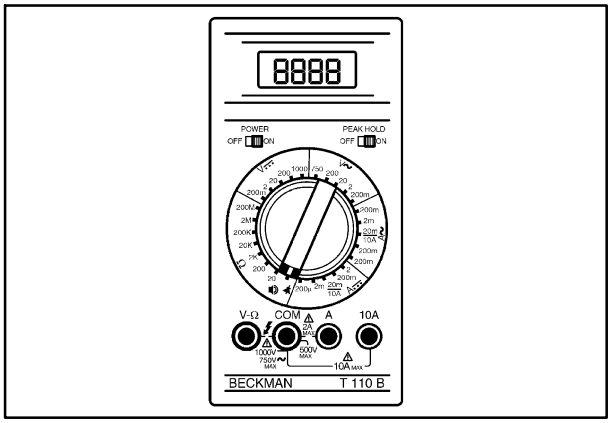
THE DIGITAL MULTI-METER

NOTE: *This section is only intended as a general guide to using a digital multimeter.*
Always refer to the manufacturer's operators manual for correct operation.

A multimeter is an electronic measuring device. The different types of measurement that can be made depend upon the make and model of the multimeter. Most types of multimeter have the capacity to measure:

- Current (A) ac or dc
- Resistance (Ω)
- Voltage (V) ac or dc
- Continuity (Buzz test)

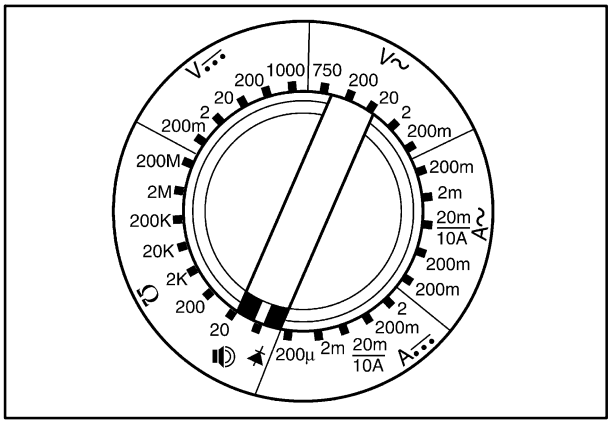
More expensive multimeters have other functions, such as the capacity to measure frequency (Hz) and test diodes.



10

General Operation:

Before proceeding with a test, decide on what is going to be measured (Voltage, Current etc.). Rotate the dial until the pointer is within the relevant zone. Within each zone there are different scales. The scale that is selected will represent the maximum value that the multimeter will read. Always select a scale which is greater than the value that you intend to measure. If you are unsure of the value to be measured, always select the highest scale and then reduce the scale once you have an idea of the measured value.



11

Why are there different scales ?

The closer that the scale is to the measured value, the more accurate the reading will be
e.g. If measuring the voltage of a battery with the scale set at 200V, the display may read 12V. However, if the scale was set to 20V the display may read a more accurate reading of 12.27V.

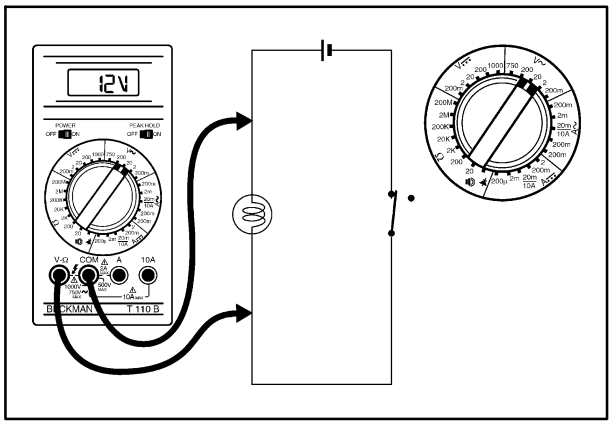
Giga	G	1,000,000,000	10^{9}
Mega	M	1,000,000	10^{6}
Kilo	K	1,000	10^{3}
milli	m	0.001	10^{-3}
micro	µ	0.000 001	10^{-6}
nano	n	0.000 000 001	10^{-9}
pico	p	0.000 000 000 001	10^{-12}

12

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Measuring Voltage (Volts):

Set the range dial to either ac or dc volts. Connect the Black test probe to the “COM” terminal and the Red test probe to the “V/Ω” terminal. Place the test probes across the component to be measured with the circuit complete (closed). Read off the display value.

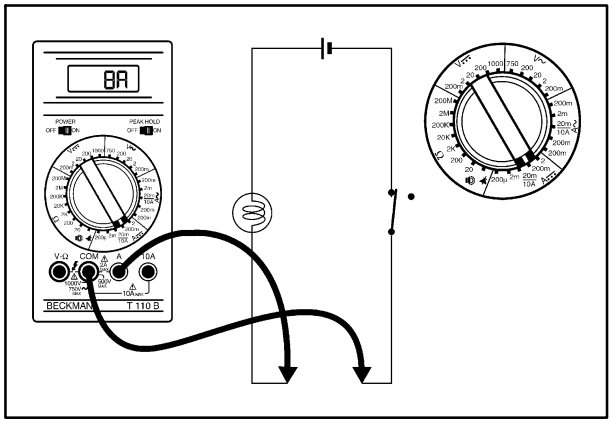


13

Measuring Current (Amps):

Set the range dial to either ac or dc current. When measuring current up to 2 amps, connect the Red test probe to the “A” terminal. When measuring current up to 10 amps, connect the Red test probe to the 10 “A” terminal. Always connect the Black test probe to the “COM” terminal. When taking measurement of current, always break the circuit and connect the multi meter in series with the circuit. Read off the display value.

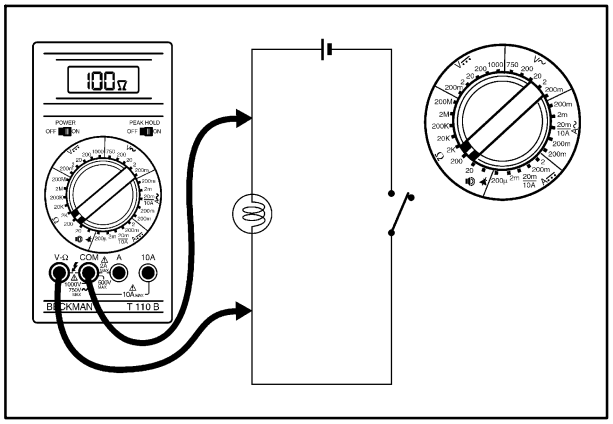
NOTE: For protection, multi meters are usually fused at 10A.



14

Measuring Resistance (Ohms):

Set the range dial to the desired Q position. Connect the Red test probe to the “V/Ω” terminal. Connect the Black test test probe to the “COM” terminal. If the resistance being measured is connected in a circuit, then turn off the power to the circuit. Connect the test probes to the measuring point and read off the display value.

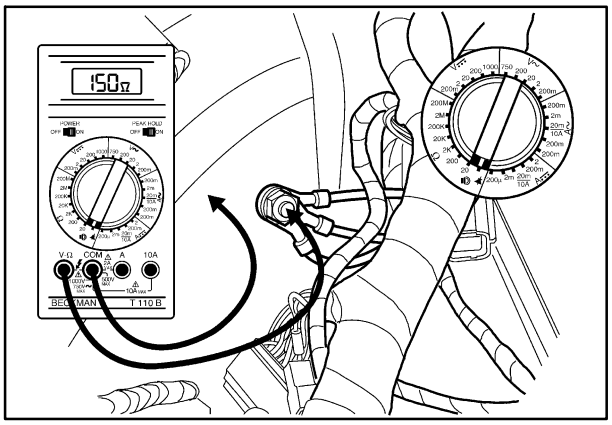


15

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Continuity (Buzzer) test:

Set the range dial to the “Buzz” position. Connect the Red test probe to the “V/Ω” terminal. Connect the Black test probe to the “COM” terminal. Connect the test probes to the measuring point. In general, if the resistance is less than 50Ω then the buzzer will sound, indicating continuity.

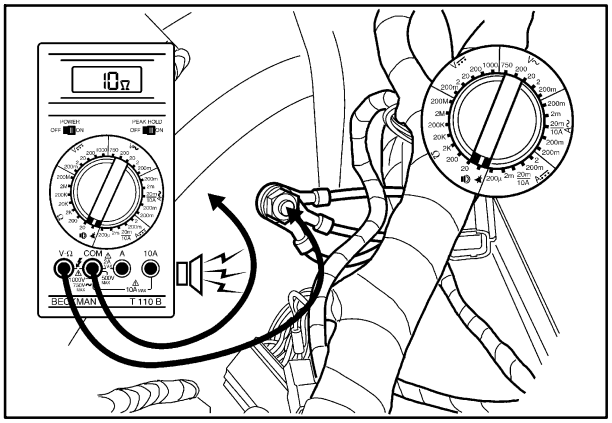


16

Note: Buzzers on different multi meters will sound at different ohmic values, depending on the quality of the meter. This can often be misleading. For example, when checking a corroded earth point, a poor quality multi meter may buzz at 150Ω, indicating continuity and no problem. When using a higher quality multi meter for the same test, it would not buzz due to the high resistance. When carrying out such tests, we should always check the value of resistance as well as listening out for the buzz.

A good connection gives low resistance.

A bad connection gives high resistance.



17

SUMMARY:

When measuring -

Voltage (V):
Connect across the component with the circuit closed.

Current (A):
Connect in series with the circuit. Circuit closed.

Resistance (Ω):
Connect across the component with the circuit open.

Continuity (Buzz):
Connect the meter across the component with the circuit open. (Always check the value of resistance as well!!)

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ELECTRICAL TEST PROCEDURES

Four electrical tests will be required to properly troubleshoot electrical concerns on the combine.

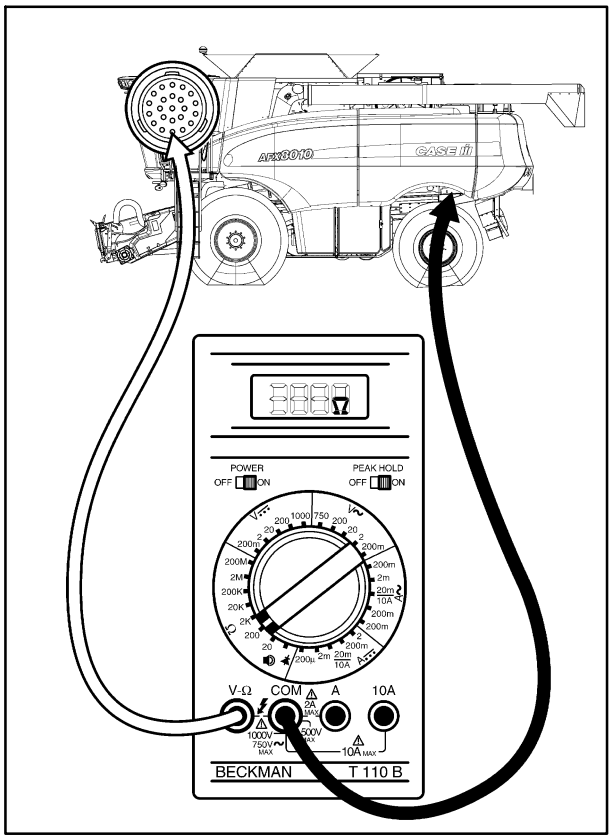
Each test is described in detail. Ensure that all steps are reviewed and followed when testing.

1. Continuity Test, Short to ground
2. Voltage measurement, short to 12 volts
3. Resistance test for components
4. Continuity test, Open circuits

ELECTRICAL TEST PROCEDURE 1: CONTINUITY TEST - SHORT TO GROUND

CONDITIONS FOR PERFORMING TESTS:

1. Power OFF, Keyswitch OFF, (sometimes battery disconnected or fuse pulled out if specified in procedure).
2. Connectors at each end or ends of circuit disconnected to prevent false readings.
3. Set meter to measure resistance or ohms, and measure circuit resistance. Use black lead to make contact with a plated metal part on the chassis such as a jump start post if fitted. Make sure the surface of the part is not corroded. Use the red meter lead to touch the connector pins, one pin at a time, and avoid contact with the case of metal connectors.
4. Determine if measured resistance falls within guidelines specified in the procedure. 3 to 4 ohms indicates a direct short to chassis ground and must be located and repaired. Higher resistances usually indicate circuit paths through modules, and that an additional connector needs to be disconnected to perform the test. More than 100K ohms indicates that the circuit is free of shorts to ground.



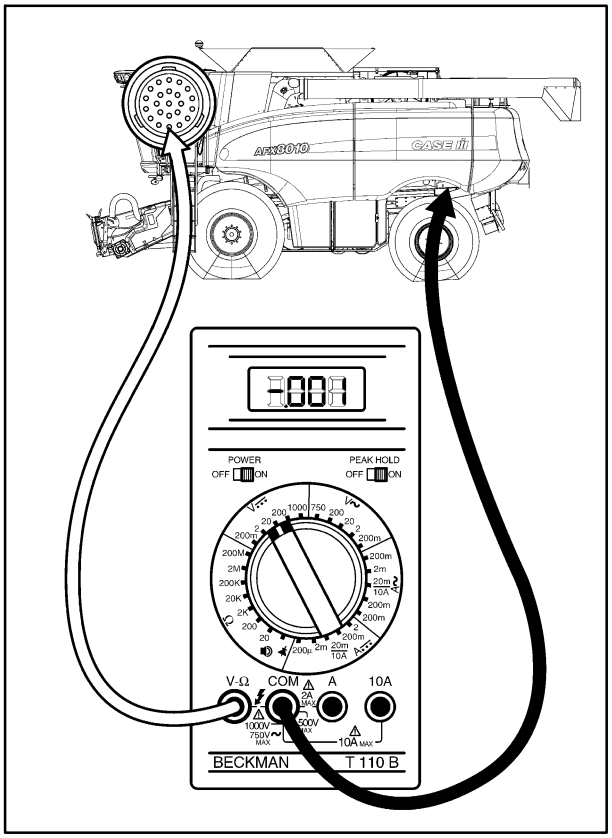
18

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ELECTRICAL TEST PROCEDURE 2: VOLTAGE MEASUREMENT OR SHORT TO POSITIVE SUPPLY VOLTS

CONDITIONS FOR PERFORMING SHORT TO POSITIVE SUPPLY TESTS:

1. Keyswitch ON (sometimes OFF, if specified in procedure).
2. Connectors at sensor, switch or potentiometer end disconnected. All other connectors must be reconnected to perform test.
3. Set meter to measure DC VOLTS, and measure circuit voltage as illustrated. Use the red meter lead to touch the connector pins, one pin at a time, and avoid contact with the case of metal connectors. Use the black lead to make contact with a plated metal part on the chassis such as a jump start post if fitted. Make sure the surface of the part is not corroded.
4. Determine if measured voltage falls within guidelines specified in the procedure.

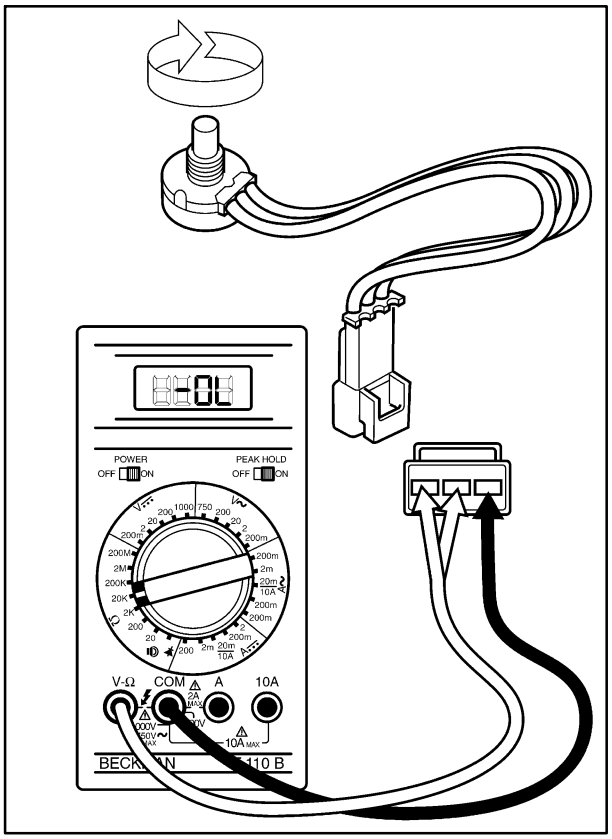


19

ELECTRICAL TEST PROCEDURE 3: RESISTANCE TEST FOR ELECTRICAL PARTS

CONDITIONS FOR PERFORMING RESISTANCE TEST

1. Disconnect part by unplugging electrical connectors to expose the part assembly connector for testing.
2. Set electrical meter to measure resistance or Ohms and insert test probes into connector terminals specified in procedure. When checking potentiometers, measure from wiper terminal to each of the other terminals while TURNING THE POT SHAFT. This will ensure no open spots escape detection. When checking rocker or rotary switches, actuate the switch while measuring for opens and shorts.
3. Compare measured values to values specified in the fault code procedures. Allow plus or minus 5 percent of range tolerance for all measurements.



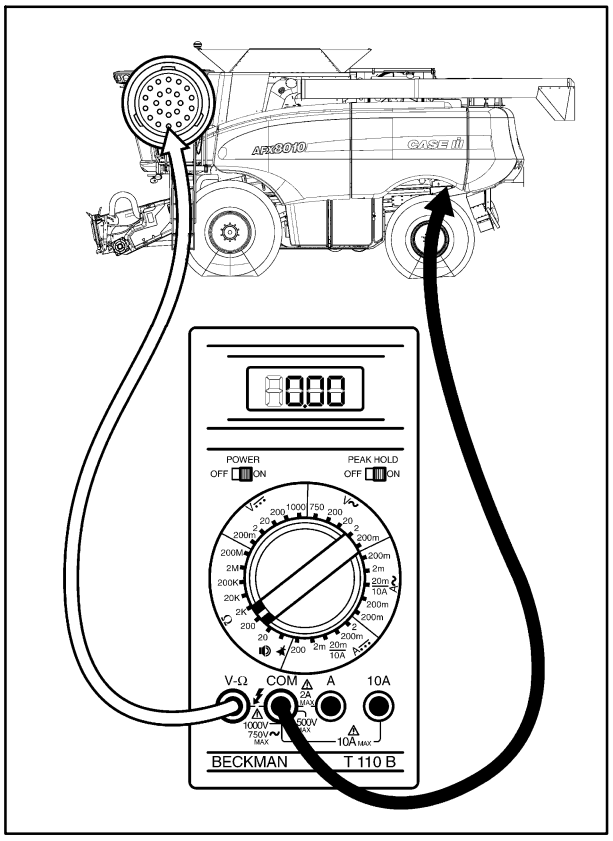
20

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ELECTRICAL TEST PROCEDURE 4: CONTINUITY TEST - CHECK FOR OPEN CIRCUITS

CONDITIONS FOR PERFORMING CONTINUITY TESTS:

1. Keyswitch OFF (sometimes disconnect battery or pull fuses).
2. Connectors at both ends of the circuit disconnected. All other connectors must be reconnected to perform test.
3. Set meter to measure resistance or ohms, and measure circuit resistance as illustrated.
   Use the red meter lead to touch the connector pins, one pin at a time, and avoid contact with the case of metal connectors.
   Use the black lead to make contact with the connector pin at the other end of the circuit. Avoid contact with other pins in the connector and the connector case, if it is metal.
4. Determine if measured resistance falls within guidelines specified in the procedure. If the resistance is no more than 3 to 4 ohms, the circuit is continuous. More resistance usually indicates dirty or corroded terminals in connectors, and 100K ohms or greater indicates an open circuit.



21

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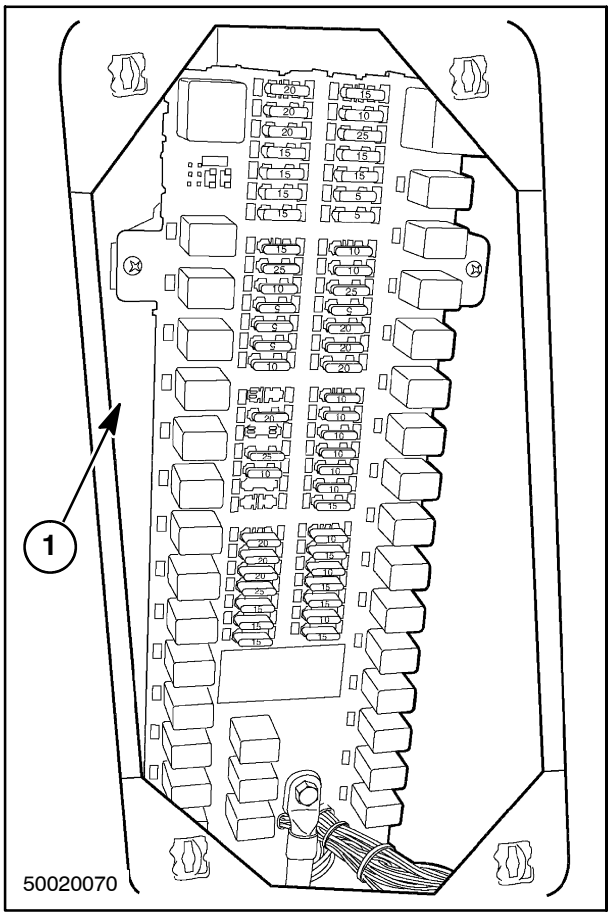
CIRCUIT COMPONENTS - BASIC DESCRIPTION AND TESTING

FUSES

Fuses protect circuits with thin pieces of metal and wire which heat up and melt to open up the circuit when too much current flows through them. The combine fuse panel, 1, is located in the left rear corner of the cab, behind a removable panel.

Fuses are used to protect the circuit from overload. This can occur in the event of a short circuit or by connecting equipment which demands a current greater than the circuit is designed to carry.

There are several types of fuses, but they all consist of a metal conductor which is capable of carrying a limited current. If the specified current is exceeded then the metal conductor will overheat, causing it to melt and break. This will in turn cause an open circuit.

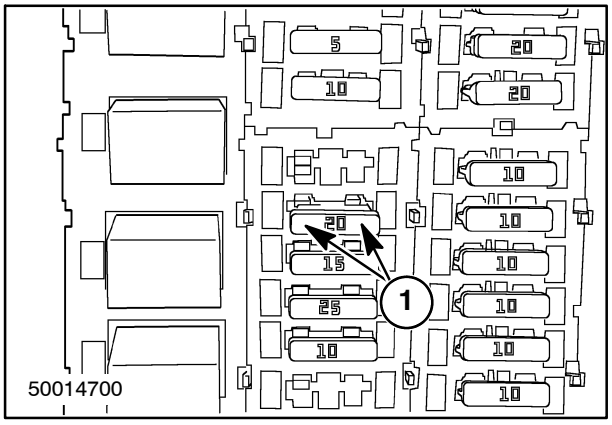


22

The rating of the fuse relates to the current that the fuse can carry continuously.

If a fuse blows, it must be replaced with a fuse of the correct rating, and if it blows again, then the cause must be investigated.

A fuse may be tested by checking continuity across the fuse on the two exposed terminals, 1.



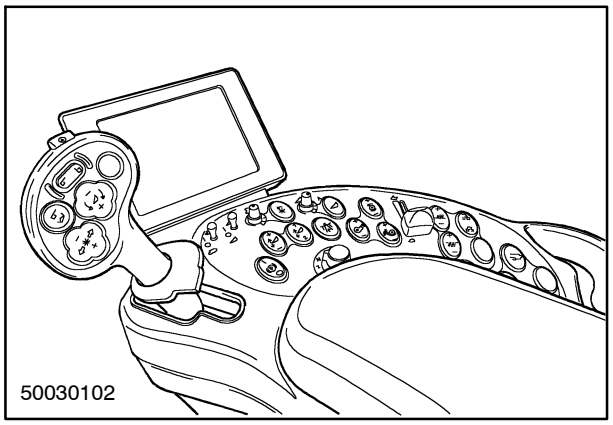
23

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SWITCHES

Switches are a vital part of an electric circuit, providing a method of controlling the circuit itself. One switch can control a number of different circuits at the same time. This is achieved by having several separate connections and/or multi-connector switches (several switch positions').

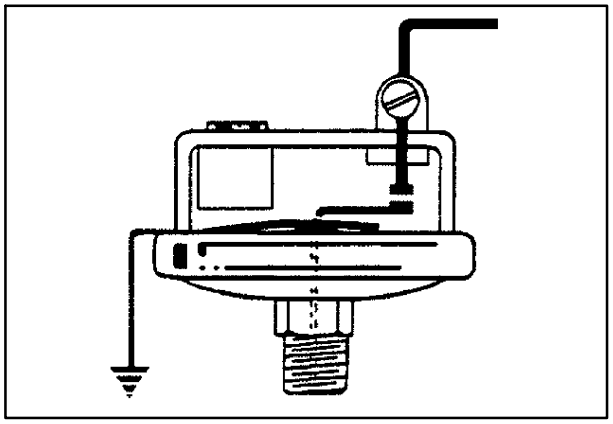
There are several types of switches, and they may incorporate a warning light.



24

Switches can be as simple as that used to turn on an implement lamp or as complex as the ones used to operate the starting and lighting systems. Checking the operation of switches is usually just a matter of testing for power going into the switch and for power leaving the switch at the appropriate contacts when the switch is operated.

One of the most common type of switches is the pressure switch, a switch opened or closed by a fluid pressure. An example of this type of switch is the charge pressure switch, a simple on/off device that opens (or closes) when oil pressure rises or lowers past a preset value.

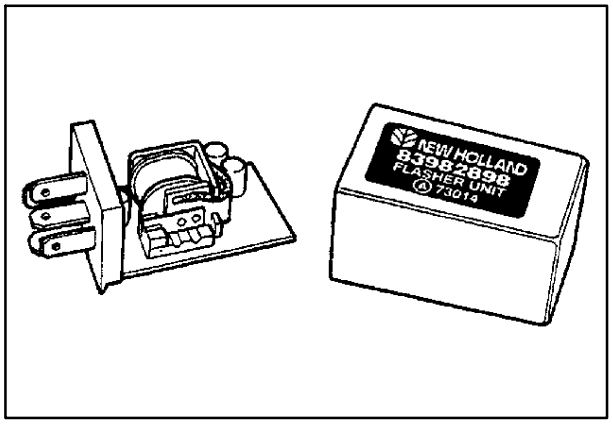


25

FLASHERS

Flashers work automatically to interrupt and connect the flow of current.

In the flasher, a heating element warms a bimetallic strip. The strip bends, breaking contact with the power source. When it cools, the bimetallic strip once again makes contact and the process begins again.



26

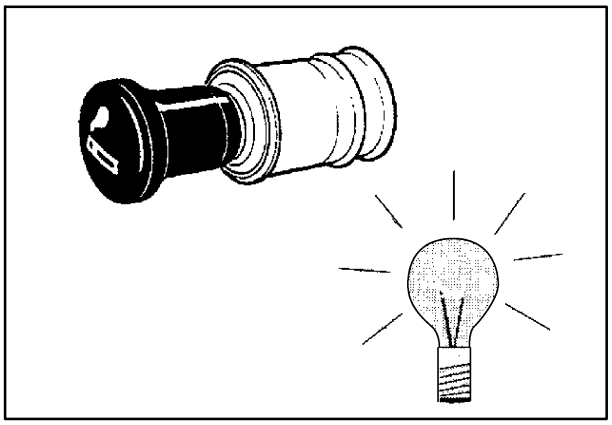
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RESISTANCE DEVICES

A number of electrical components alter or make use of electricity through their resistance to current flow. Resistors are components which are generally used to regulate the supply of voltage and current to other electrical components.

In some cases, the purpose of resistance in an electrical circuit is to provide light or heat. Lamps and cigar lighters are examples. Lamps convert electricity into light, and cigar lighters convert it into heat. Both lamps and lighters make use of the same physical principle, that is Ohms Law.

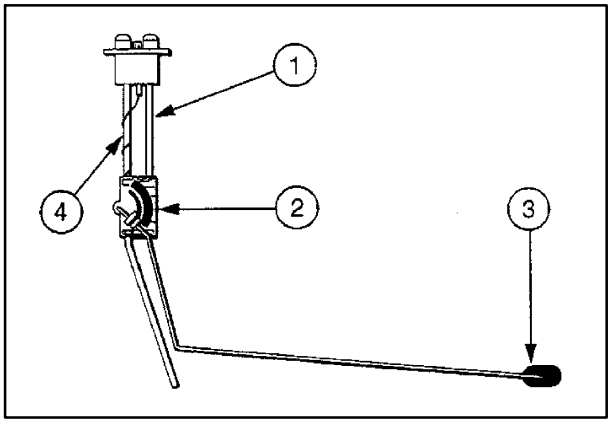
The engine grid heater and heated cab mirrors are other examples of resistance devices designed to convert electricity into heat.



27

FLUID LEVEL SENDER

It operates by varying resistance through the movement of a float. An example is the fuel level sender.

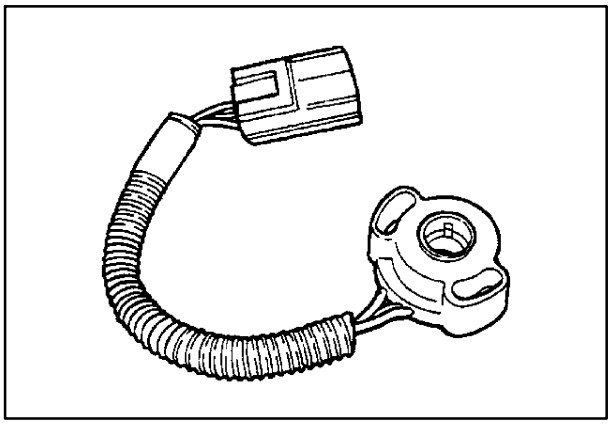


28

POTENTIOMETERS

Potentiometers are variable resistors which are dependant on mechanical movement, i.e. Lateral float movement, to vary the resistance of the component and therefore alter the output voltage.

In order to verify the correct operation of a potentiometer, the resistance should be measured at the minimum and maximum positions and a smooth and continuous change of resistance should be observed between. As the resistance varies with temperature, the test specifications are usually given at 20 °C.

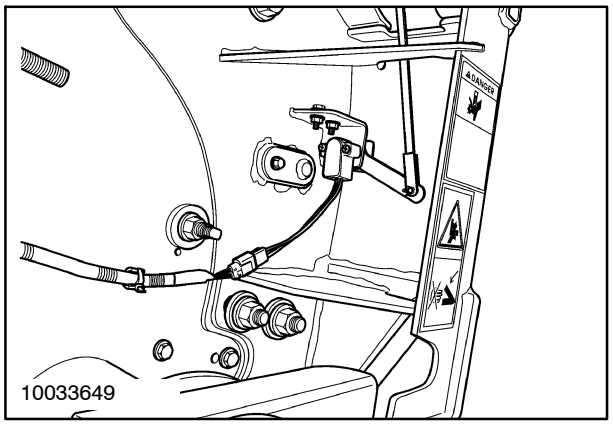


29

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POTENTIOMETER ADJUSTMENT

When installing potentiometers, it is important to ensure that they do not bottom out in either direction, to prevent damage. Most potentiometers have slotted mounting holes to allow some adjustment. Before tightening the mounting hardware, operate the attaching linkage fully in both directions to confirm proper potentiometer positioning.



30

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ELECTROMAGNETIC DEVICES

In general, they use the magnetic field created by flowing current to move metal parts within the components.

RELAYS

The relay is an electromagnetic switch that uses a small amount of current to switch a larger amount on and off.

When the operator closes a switch, current flows through the relay's control circuit. In this circuit there are windings surrounding an iron core which is fixed in place.

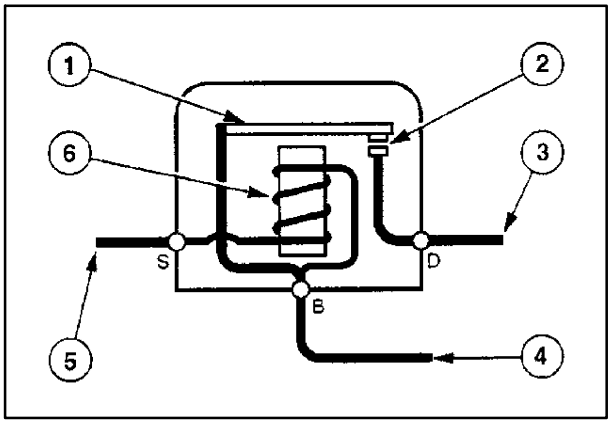
Current turns the iron core into an electromagnet. The core then attracts an arm which has a contact point on it. When the point on the arm contacts the stationary point, current flows through the power circuit.

Relays are basically electrically operated switches. They are used to switch a circuit on/off in similar way to a manual switch.

Two circuits are connected to the relay:

- A work circuit, which is switched on/off by the relay, and provides the supply for the equipment to be operated, i.e., bulbs, solenoids, etc.;
- A control circuit, switched on/off by manual switches, used to operate the relay.

The part of the relay which is connected to the control circuit consists of the winding of an electro-magnet. When the control circuit is switched off, the contacts are kept apart by a return spring. When the control circuit is switched on, a current flows through the coil and a magnetic force is produced. This force, which is stronger than the spring pressure, pulls the contacts of the relay together, causing the work circuit to operate.

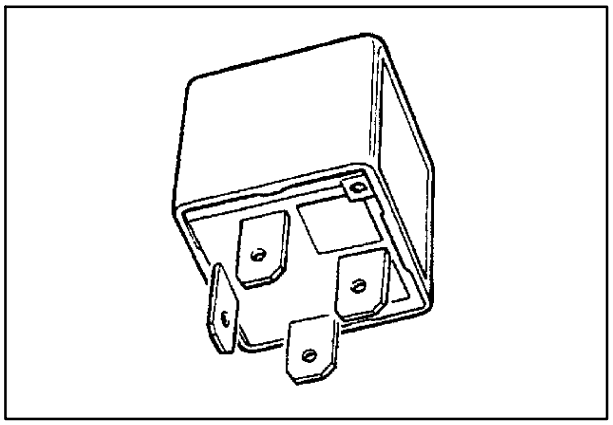


31

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A switch-relay system has two main advantages over a simple switch:

- The current that flows through the switch is not the same as all the current requested by the equipment to be operated, but usually by a smaller current: this allows the usage of smaller and less expensive switches;
- The distance from the supply, to the equipment, can be made as short as possible to minimize voltage drop.

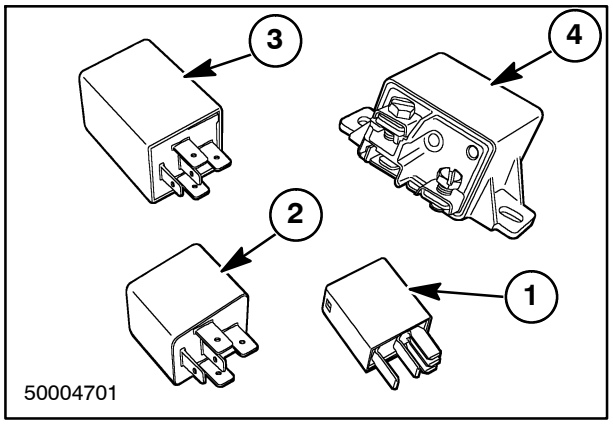


32

There are five styles of relays used on the AFX combine. The micro relay, 1, is the most commonly used relay, and is used on all but two locations on the fuse panel in the cab. One mini relay, 2, is used in the top left position of the fuse panel in the cab, while a time delay relay, 3, is used in the top right position of the fuse panel for controlling the cab interior light and side lights. The fourth style of relay is the start relay, 4, which is located in the engine compartment. The fifth style of relay is the grid heater relay (not shown) located on the engine.

On the relay cover there are 4 or 5 terminal markings:

- 3 or 30: input terminal direct from battery positive, normally live.
- 2 or 85: winding output terminal, usually to ground.
- 1 or 86: winding input terminal.
- 4 or 87: output terminal for normally closed contact.
- 5 or 87a: output terminal for normally open contact.



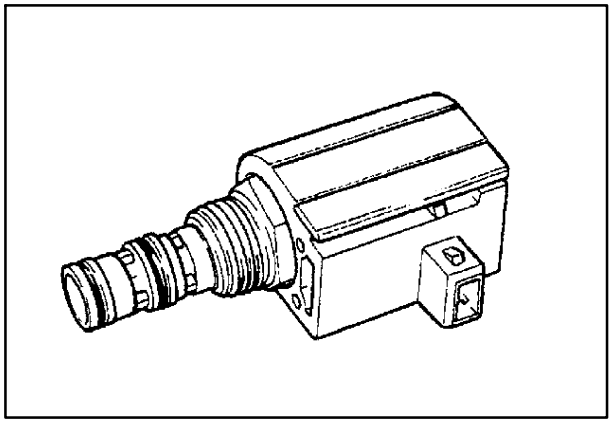
33

SOLENOIDS

Solenoids work in much the same way as relays, except that the iron core is not fixed in place. As a result, the windings in the control circuit cause the iron core to move.

In the starting system, for example, the movement of this core is used to send large amounts of current to the starter motor.

A solenoid is basically a winding around an iron core. In the centre of the core there is a plunger which is free to move through the core. When an electrical current passes through the winding an electro-magnetic force is produced which causes the plunger to move through the core. If the current is switched off, the magnetic force is stopped and the plunger is returned by a spring.



34

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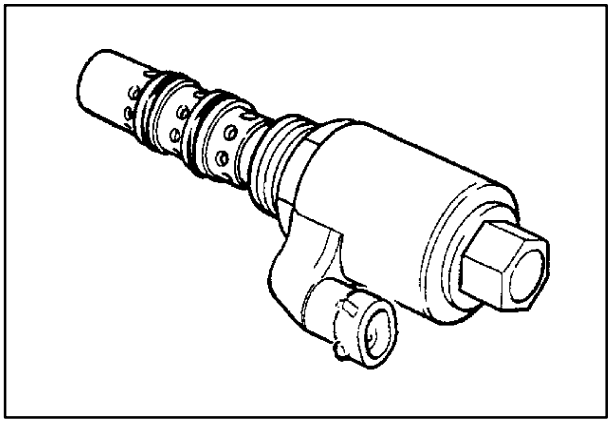
The solenoid plunger may have different uses: the most common are moving a hydraulic spool or a mechanical lever.

The MOST COMMON FAULTS that can occur are:

- Short circuit winding: if a section of the winding allows the current to pass directly from positive (+) to negative (-) terminals without passing through the winding, this will cause the relevant circuit fuse to blow.
- Broken winding: causing an open circuit, it will not allow the current to pass through the winding, so the solenoid will not operate.
- Seized plunger (and/or connected components): the solenoid will only move the plunger if all components are free to move.

PWM SOLENOID VALVES

Whenever it is necessary to provide proportional control to the solenoid valves, it is much better to use a principle of operation called pulse width modulation (PWM). PWM is a variable DC voltage signal that is used to control the solenoid valves. The voltage signal is pulsed on and off many times a second (at a constant frequency of 500 Hz) at a constant supply voltage of 12 V.



35

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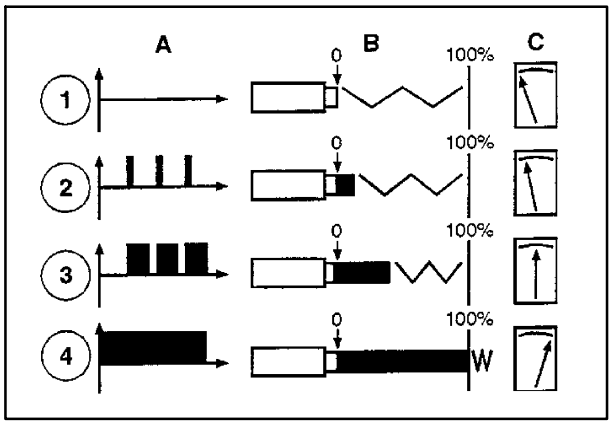
The CCM modules contain transistors that are supplied with a constant input voltage which is switched on and off to achieve the variable input range. In this way the control module is able to limit the armature movement, so the hydraulic output flow of the solenoid is proportional to the average DC voltage. The lower voltage also allows the solenoid to operate with less residual magnetism and so the entire circuit will operate smoother.

The variable DC voltage signal level is determined by varying the duration of the ON pulse relative to the OFF pulse. The ratio between the ON time and the cycle time is called duty cycle and is stated as a percentage of one complete cycle.

Diagrams, 1 to 3, show the normal operating range of the PWM valve, and diagram 4, shows the initial 12V programming and fill time only. The diagrams in column A show the voltage signal that is sent to the valve, whereas column B shows the relevant spring pressure and column C the reading on a voltmeter connected to the solenoid valve.

Diagram, 1, shows the OFF position: no signal is directed to the valve, which means no spring pressure in the valve at all and results in a zero voltage reading. Increasing the duty cycle causes some pressure to be made on the circuit (Diagram 2), which results in a voltmeter reading increase. Diagram, 3, shows the maximum signal that is used during the normal activity of the valve: its duty cycle is around 0.5, which results in a spring pressure for the half of its run and in an indication of a 6 volt average DC current.

The electrical circuit to the solenoids can be checked by using a digital or analogue DC voltmeter, which will indicate the average voltage readings.



36

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SENSORS

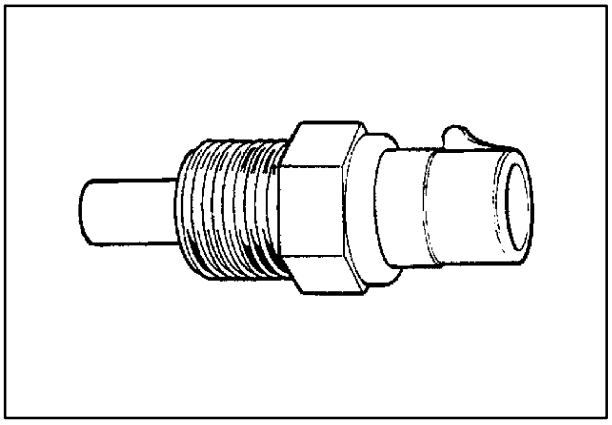
A sensor is the primary component of a measurement chain that converts the input variable (temperature, capacitance, reluctance) into a signal suitable for measurement. The relationship between the input variable and the measured signal is a characteristic of the sensor.

In the above mentioned measurement chain the signal is filtered and treated in order to adapt it to its use. It consists of three elements: the sensor itself; the converter, which converts the output signal from the sensor (in most of the cases into an electric signal); and the conditioner, which transforms the output signal from the converter in the most suitable form. Generally the term sensor indicates the entire measurement chain.

TEMPERATURE SENSORS

Generally based on a simple circuit with a thermistor. A thermistor is a resistor that changes its resistance according to the temperature.

There are two groups of thermistors: NTC (Negative Temperature Coefficient) and PTC (Positive Temperature Coefficient). In the first case the higher the temperature, the lower is the resistance, and for the PTC the higher the temperature, the higher the resistance. The NTC are often used as sensors to indicate temperature change in fluids, such as the engine coolant fluid.

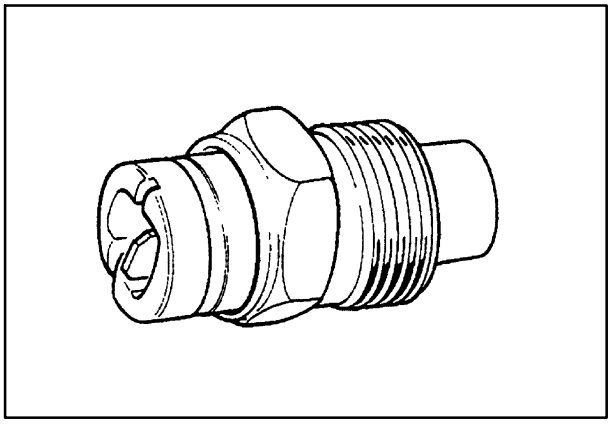


37

An example of these type of senders is the coolant temperature sender. The changes in its resistance (which varies with temperature) are relayed to the Universal Display Plus monitor, which operates the bargraph and the warning indicators accordingly.

PRESSURE SENDER

A pressure sender receives a supply signal and it varies it according to the (oil) pressure. An example is the oil pressure sender, which receives a 5 volt signal and varies it according to the oil pressure. The appropriate module keeps track of these variations and changes its readouts and warnings accordingly.

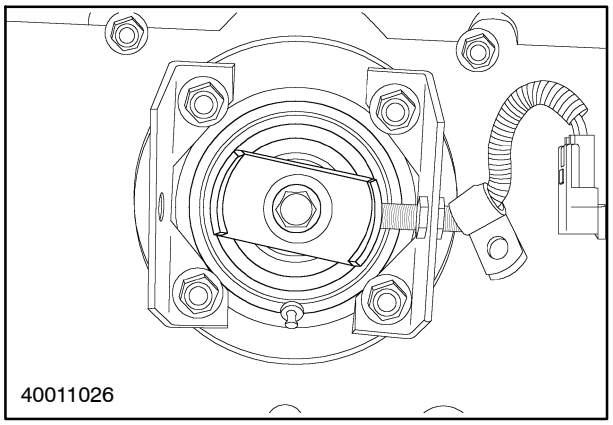


38

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SPEED AND POSITION SENSORS

Most of the speed and position sensors used on the AFX combine are a 2-wire sensing device designed to work with a switching amplifier circuit in the module the sensor is attached to. The operation of this sensor is similar to that of a variable resistor, which changes its impedance as metal approaches the sensor. When no metal is being sensed, the sensor is in a low impedance state. When metal approaches the sensor, the impedance increases. The varying impedance results in a current flow change that the module detects, and converts into a frequency for speed sensing or position monitoring.



39

When installing a new sensor, adjust the sensor to obtain a clearance of 3 mm (1/8″) to the target metal.

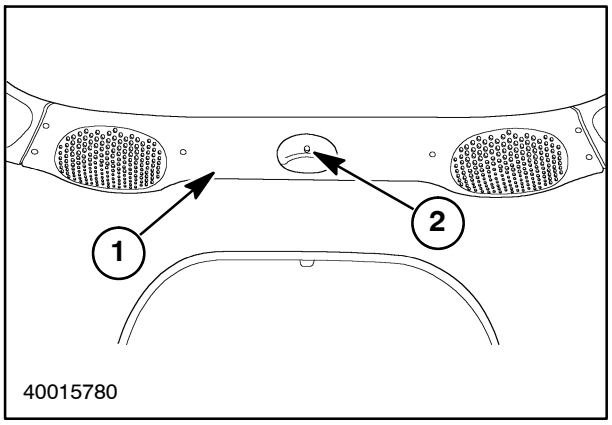
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CAB ELECTRICAL CONNECTORS X002 AND X003

Connectors X002 and X003 are the main connectors from the Cab Main (CM) Harness to the Cab Roof (CR) harness. The connectors are located in the upper left rear corner of the cab along with the Cab Roof Ground. Removal of the rear speaker panel is required to gain access to the connectors for troubleshooting and cab roof removal.

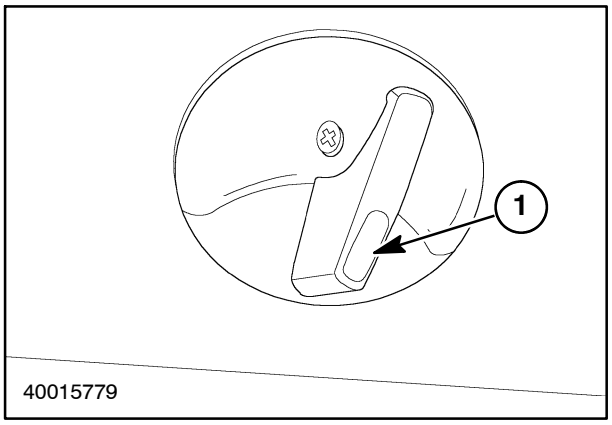
REMOVAL OF REAR SPEAKER PANEL

1. The rear speaker panel, 1, is located at the upper rear of the interior of the cab. Clothing hanger, 2, is the first item to be removed.



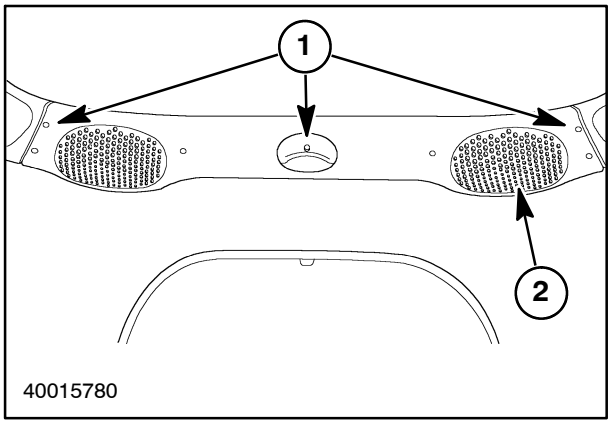
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2. Using a flat bladed screwdriver or knife, pry the screw cover, 1, from the hanger. Turn out the two screws holding the hanger in place. Store the hanger and screws in a suitable location.



41

3. Turn out seven screws, 1, from panel, 2. Allow the panel to hang inside the cab.

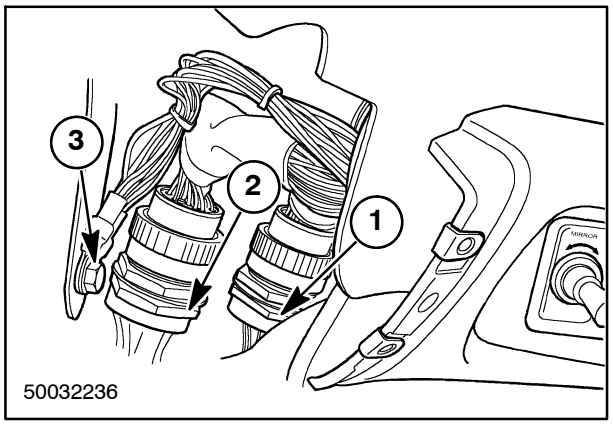


42

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Connector Locations

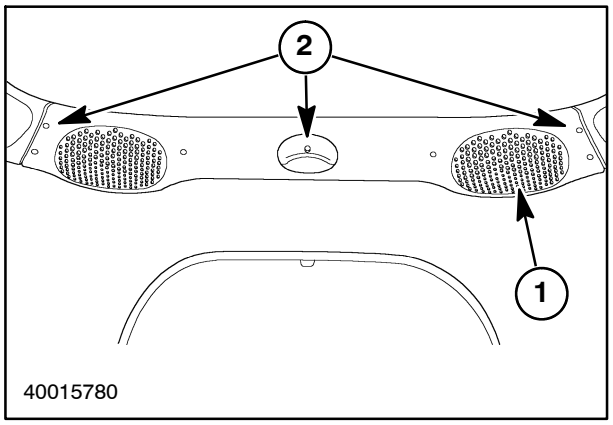
1. Connector X002
2. Connector X003
3. Cab Roof Ground



43

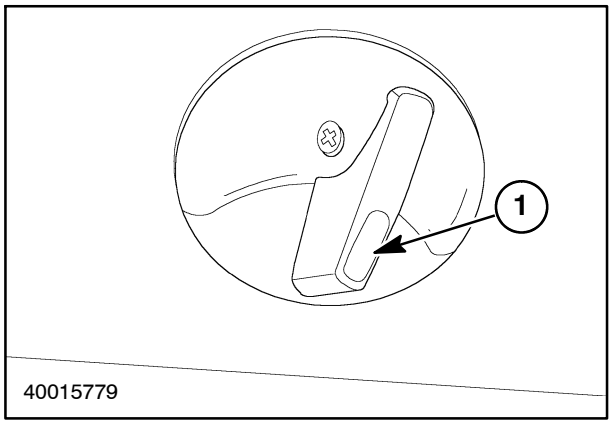
INSTALLATION OF REAR SPEAKER PANEL

1. Set rear panel, 1, into place and secure to the headliner and cab roof using the seven screws, 2.



44

2. Install the hanger using two screws. Push the cover, 1, into place.



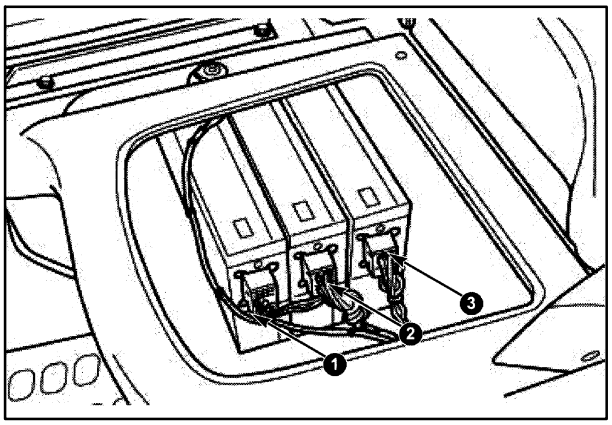
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ELECTRONIC MODULES (CCM's)

The electronic modules are the "black boxes" that provide control on many of the functions of the combine. These functions may vary according to the options that are fitted on the combine.

Inside these "black boxes" there is a processor, the "thinking part" of the module, and inside some of them there is one or more memories, which may allow the module to store calibration values, the configuration of the vehicle (which optional tools or devices have been installed) and the error codes.

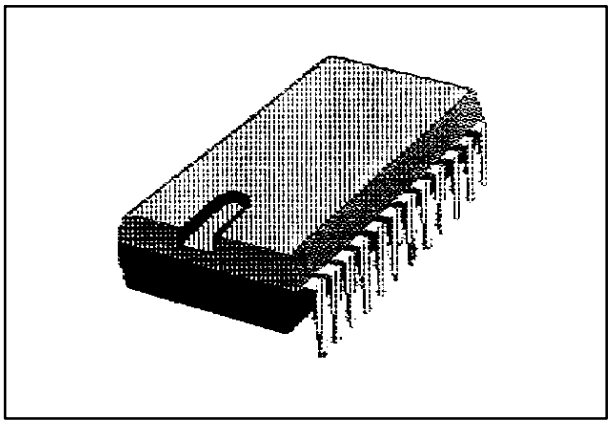


46

A processor has a series of pins, which are electrical contacts. There are three main types of pins: for the inputs of the signals, for the outputs and for the processor supply.

The processor, the memories and the link between them form the hardware of the module, its "physical" part.

Then some software is needed, to handle the communication between the processor and the memories and to manage the various signals going into and out of the processor. The software is designed to operate in a different way for every module, and is called functional code.



47

The electronic modules are often blamed as responsible for most of the problems of the modern vehicles, while they are for certain among the most protected parts of the vehicle. In fact, the pins of the module are protected against spikes (high pulses) of current, and the signals are filtered by the hardware and by the software in input and in output to give the best handling of information.

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CCM POWER AND GROUND SUPPLIES

Each CCM module has two main power supplies. Keep Alive power is supplied to the module at interior connector pin 1, while the main power supply is provided from the key switch at the interior connector pin 4. The module will shutdown if the voltage drops below 9V or exceeds 18V on either of these two circuits. Key switch power is also used to supply the 5V and 8V regulators for voltage outputs to sensors and potentiometers.

Each CCM module has three main ground wires to provide a ground path for all sensors and most valve outputs. These three ground wires are linked together internally, but provide a solid ground path for the module. The module may continue to function if one or two of these ground wires are broken, but sensor reading and other functions may become erratic.

Some circuits on the CCM's provide their own power supply through the engaging switch. This ensures that if power is ever lost through the switch into the module, the output from the module is immediately disengaged. These circuits are the ground speed hydrostat circuit (power supplied through the S22 Neutral switch), thresher engage and feeder engage circuits.

H-bridge circuits in the modules are used to power high current draw components, such as motors and actuators, and have their own dedicated power supplies and grounds, as listed in the charts below.

CCM1

Power Supply	Ground	Components Affected
X018 pin 1 (F39)		Keep Alive power
X018 pin 4 (F38, key switch)		Main power; all potentiometers, speed & position sensors
	X018 pin 8, X019 pins 12 & 18	Main module grounds
X020 pins 29 & 30 (F22)	X020 pins 9 & 10	Shoe Leveling Actuator M-03
X020 pin 7 (F24)	X020 pin 16	None
X019 pin 11 (F24)	X019 pin 3	Concave Clearance actuator M-04 Grain Bin Covers actuator M-12
X019 pin 2 (F43)		Chaff Spreader valve L-28 Head Raise L-11 Head Lower L-12 Cleaning Fan Valve L-44
X019 pin 9 (F43)		Backup Alarm H-08 Brake Limiting Valve L-32 Rear Wheel Assist valve L-26
X020 pin 11 (F44)		Head Tilt CW L-18 Head Tilt CCW L-19 2 Speed Powered Rear Axle L-54/L-55 Header Height Accumulator L-06 Feeder Ring to Frame Brake L-50

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CCM2

Power Supply	Ground	Components Affected
X015 pin 1 (F39)		Keep Alive power
X015 pin 4 (F38, key switch)		Main power; all potentiometers, speed & position sensors
	X015 pin 8, X016 pins 12 & 18	Main module grounds
X017 pins 29 & 30 (F25)	X017 pins 9 & 10	Transmission Shift motor M-02
X017 pin 7 (F23)	X017 pin 16	Draper Header Solenoid L-53
X016 pin 11 (F23)	X016 pin 3	None
X016 pin 2 (F36)		Unload Tube Clutch L-08 Park Brake Disengage valve L-10
X016 pin 9 (F37)		Unload Tube In valve L-03 Unload Tube Out valve L-04
X017 pin 11 (F36)		Reel Fore valve L-16 Reel Aft valve L-15 Reel Up valve L-14 Reel Down valve L-13 Reel Drive valve L-17 Pressure Release valve L-05 Jammer valve L-43

CCM3

Power Supply	Ground	Components Affected
X012 pin 1 (F39)		Keep Alive power
X012 pin 4 (F38, key switch)		Main power; all potentiometers, speed & position sensors
	X012 pin 8, X013 pins 12 & 18	Main module grounds
X014 pins 29 & 30 (F25)	X014 pins 9 & 10	None
X014 pin 7 (F27)	X014 pin 16	None
X013 pin 11 (F27)	X013 pin 3	Upper Sieve actuator M-08 Lower Sieve actuator M-07
X013 pins 2 (F47)		Bypass Unit Engage output M-28 (PF moisture sensor auger)
X013 pins 9 (F47)		Vertical Knives R K-42 Vertical Knives L K-43
X014 pin 11 (F47)		Rotor Ring to Frame Brake L-46

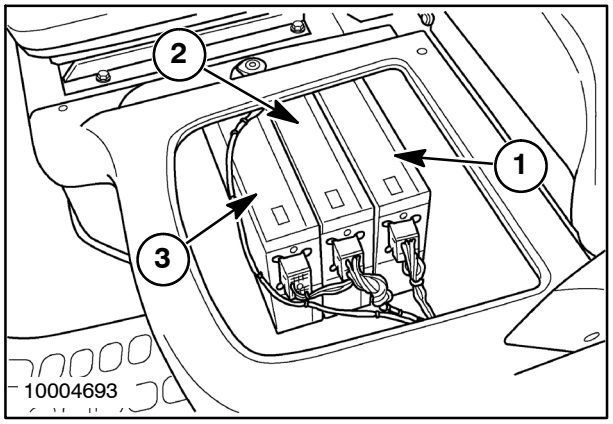
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COMBINE CONTROL MODULE (CCM) REMOVAL AND INSTALLATION

The CCM's are located under the storage box of the instructional seat. The instructional seat must be removed to access the CCM's. The CCM's should be disconnected from the harness before removing. The harness connectors are located under the cab floor.

CCM IDENTIFICATION

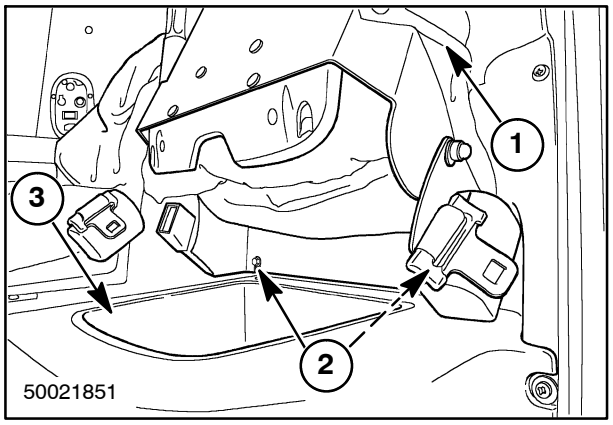
ITEM	DESCRIPTION
1.	CCM 1
2.	CCM 2
3.	CCM 3 (If equipped)



48

INSTRUCTIONAL SEAT REMOVAL

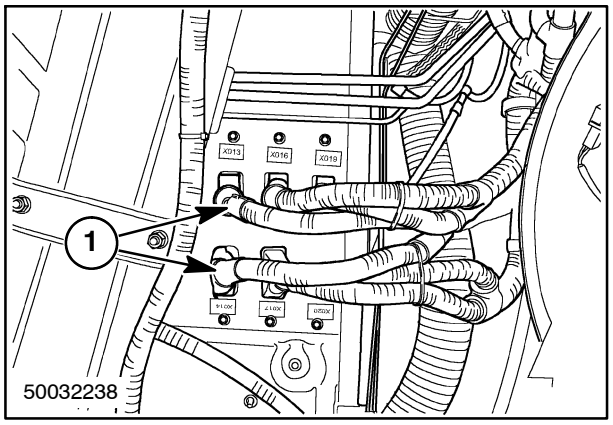
1. Raise bottom cushion and attach strap 1.
2. Loosen two bolts, 2, at bottom of seat back.
3. Lift seat back assembly up and forward to remove from rear of cab.
4. Remove storage box 3.



49

REMOVAL OF CCM

The connectors, 1, are located under the cab floor left of the center line of the combine.



50

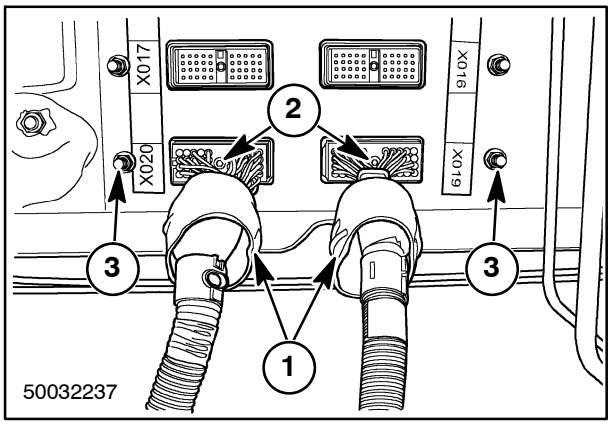
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To remove CCM Module:

1. Peel back connector boots, 1.

IMPORTANT: *Before removing, if connectors are not marked, label the connections for proper installation.*

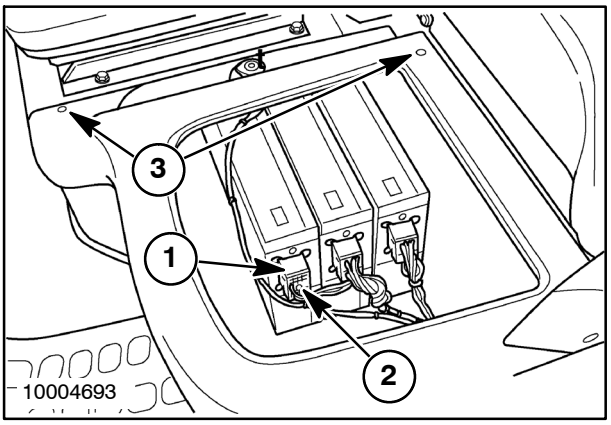
2. Unthread the captured connector screws, 2, and remove connectors.
3. Remove the two mounting nuts and lock washers, 3.



51

4. To disconnect connector,1, unthread captured screw, 2.
5. Carefully remove module from combine.

NOTE: *It may be necessary to remove the seven screws, 3, from the base of the instructional seat to provide clearance to remove the CCM.*

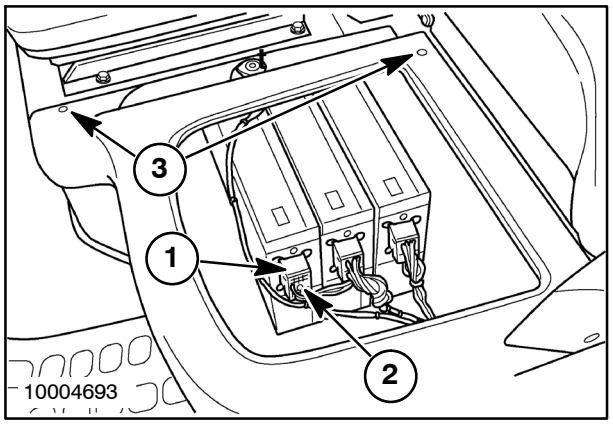


52

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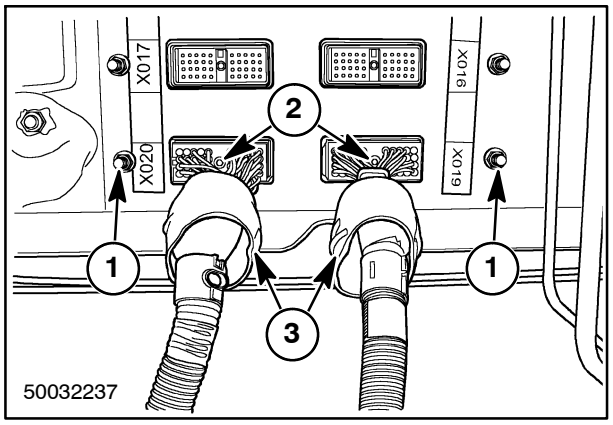
CCM INSTALLATION

1. Inspect the gaskets that seal the connector slots in the cab floor for signs of deterioration, replace as required.
2. Place the CCM mounting studs through the floor of the cab. Connect the appropriate connector, 1, to the CCM. Tighten captured screw, 2, to secure connector to CCM.



53

3. Install lock washers and thread nuts, 1, onto mounting studs of CCM. Tighten nuts to standard torque.
4. Inspect the seals on the connectors, clean or replace as required.
5. Install the connector with the corresponding decal on the underside of the cab floor. Thread in captured screw of connector, 2, and tighten to standard torque.
6. Fold protective boots, 3, around connectors.



54

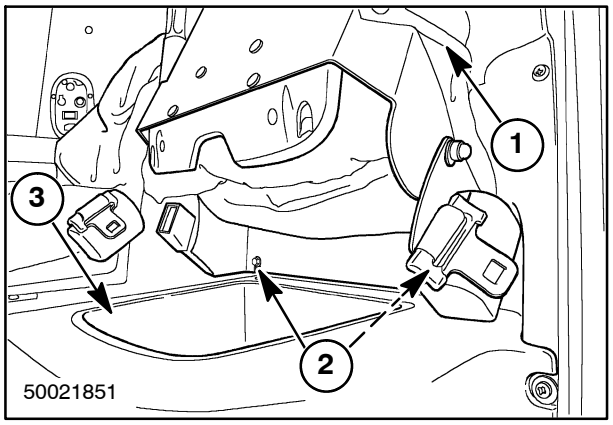
SOFTWARE INSTALLATION

IMPORTANT: *The CCM must be loaded with software.*

Refer to the AFX Combine Electronic Service Tool User's Guide for software download instructions.

INSTRUCTIONAL SEAT INSTALLATION

1. Tighten the seven screws that secure the base of the instructional seat to the cab frame.
2. Insert the storage box, 3.
3. Slide seat onto the 4 bolts by pushing the seat back and downward against the rear of the cab. Make sure the top two bolts fit into the notches on the seat back.
4. Tighten two bolts, 2, at the bottom of the seat back.
5. Release the strap, 1, on the seat cushion.



55

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Wiring harness - Detailed view (A.30.A.88 - C.10.A.50)

AFX8010

Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X001	Cab main (CM) harness to Right hand console (RC) harness	
X002	Cab main (CM) harness to cab roof (CR) harness	
X003	Cab main (CM) harness to cab roof (CR) harness	
X004	Cab main (CM) harness to main frame (MF) harness	373358A1 (MF)
X005	Cab main (CM) harness to main frame (MF) harness	
X006	Cab main (CM) harness to A/C harness	
X007	Front frame (FF) harness to feeder (FE) harness	
X008	Main frame (MF) harness to front frame (FF) harness	373357A1 (MF), 374973A1 (FF)
X009	Main frame (MF) harness to grain tank (GT) harness	
X010	Main frame harness to engine harness	
X011	Main frame (MF) harness to gearbox (GB) harness	291661A1 (MF) 374973A1 (GB)
X012	Cab main harness to CCM3	
X013	Expansion harness to CCM3	225414C1
X014	Expansion harness to CCM3	225414C1
X015	Cab frame harness to CCM2	
X016	Main frame harness to CCM2	225414C1
X017	Front frame harness to CCM2	225414C1
X018	Cab main harness to CCM1	
X019	Main frame harness to CCM1	225414C1
X020	Front frame harness to CCM1	225414C1
X021	Front frame harness to feeder valve stack	319148A1
X022	Main frame harness to valve stack	225389C1
X023	Front frame harness to lower frame harness	
X024	Main frame (MF) harness to straw hood (SW)front harness	373357A1 (MF) 374973A1 (SW)
X025	Expansion (EX) harness to straw hood (SW) harness	291659A1 (EX) 373356A1 (SW)
X026	Right console harness to right hand module	
X027	Right console harness to right hand module	
X028	Propulsion handle harness to right hand module	
X030	Right console harness to right hand module	
X031	Cab main harness to front frame (FF) harness	373356A1 (FF)
X032	Feeder harness to header harness	
X033	Cab main harness to steering column harness	
X034	Main frame harness to expansion harness	225388C1 (MF) 225389C1 (EX)
X034A	Main frame harness to expansion harness	225389C1 (MF) 225388C1 (EX)
X036	Cab roof harness to outer roof (OR) harness	291662A1 (OR)
X048	Right console harness to gear select switch S-24	

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Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X055	Right console harness to separator engage switch S-30	245432C1
X056	Right console harness to feeder engage switch S-31	245432C1
X057	Right hand console harness to ground speed potentiometer R-04	245432C1
X058	Right console harness to audio alarm	
X059	Right console harness to propulsion handle	280458A1
X064	Cab main harness to adapter display harness	
X065	diagnostic and maintenance	
X066	Cab main harness to cold start indicator E-36	
X067	Cab main harness to accessory socket J-06	
X068	Cab main harness to key switch S-02	
X069	Cab main harness to lighter R-08	
X070	Cab main harness to lighter backlight R-08	
X071	Straw hood (SW) harness to straw hood rear harness	291661A1 (SW)
X072	Straw hood harness to lower frame rear harness	
X073	Cab main harness to seat switch S-05/S-66	
X074	Cab main harness to seat	
X075	Cab main harness to accessory outlet J-08	
X076	Cab main harness to accessory outlet J-08	
X077	Cab main harness to cab ground 3	
X081	Feeder harness to lateral tilt potentiometer R-02	276424A1
X084	Lower frame harness to LH brake wear switch S-55	
X085	Lower frame harness to RH brake wear switch S-56	
X087	Lower frame harness to ground speed potentiometer	225316C1
X088	Lower frame harness to shoe leveling actuator M-03	182081A1
X089	Lower frame harness to cleaning fan RPM B-16	225295C1
X091	Lower frame harness to hydrostat motor temp B-46	
X092	Lower frame harness to pressure release L-05	245482C1
X093	Lower frame harness to Trans shift position B-37	225351C1
X094	Lower frame harness to transmission shift motor M-02	182069A1
X098	Gearbox harness to low control pressure B-35	198456A1
X100	Gearbox harness to ground speed hydrostat L-23	245486C1
X103	Gearbox harness to hyd oil reservoir temp B-18	194788A1
X104	Gearbox harness to hydraulic reservoir level S-33	245482C1
X105	Grain tank harness to unload tube light harness	
X106	Straw hood rear harness to LH rear work light E-27	
X107	Grain tank harness to grain bin 3/4 full S-28	
X108	Grain tank harness to grain tank light E-30	
X109	Grain tank harness to grain tank full S-29	
X110	Straw hood rear harness to RH rear work light E-28	
X111	Outer roof harness to LH mirror & side light jumper harness	225351C1
X112	Outer roof harness to LH cab outer work light E-15	
X113	Outer roof harness to LH front beacon light	

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Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X114	Outer roof harness to LH cab mid work light E-19	225316c1
X115	Outer roof harness to LH cab inner work light E-17	
X116	Outer roof harness to wiper motor M-25	239451A1
X117	Outer roof harness to RH cab inner work light E-18	
X118	Outer roof harness to RH cab mid work light E-20	
X119	Outer roof harness to RH front beacon light E-32	225316C1
X120	Outer roof harness to RH cab outer work light E-16	
X121	Outer roof harness to RH mirror and side light jumper harness	225351C1
X122	Cab roof harness to rear right Speaker H-06	
X123	Cab roof harness to rear left speaker H-04	
X124	Cab roof harness to cab roof ground 4	
X125	Cab roof harness to tank extension switch S-42	
X126	cab roof harness to mirror adjust switch S-27	
X127	Cab roof harness to mirror heat switch S-19	
X128	Cab roof harness to HVAC A=09/A-20	
X129	Cab roof harness to dome light E-34	
X130	Cab roof harness to beacon light switch S-41	
X131	Cab roof harness to rear work light switch S-44	
X132	Cab roof harness to front work light switch S-43	
X133	Cab roof harness to splice block C W-03	
X134	Cab roof harness to washer switch S-38	
X135	Cab roof harness to wiper switch S-20	
X136	Cab roof harness to left front speaker H-05	
X137	Cab roof harness to LH door switch S-40	
X138	Cab roof harness to console light E-35	
X139	Cab roof harness to front right speaker H-07	
X141	Cab roof harness - Future option	
X142	Cab roof harness - Future option	
X149	Air conditioning harness to cab temp sensor B-26	
X150	Air conditioning harness to evaporator temp sensor B-28	
X151	Air conditioning harness to water valve	
X152	Air conditioning harness to main blower harness	
X155	Main blower (manual) M-17 Ground	
X156	Main Blower	
X157	Main blower (manual) M-17 Med	
X158	Main blower (manual) M-17 low	
X159	Cab roof harness - Future option	
X160	Main frame harness to LH front hazard light	225295C1
X161	Main frame harness to LH front service socket J-02	877291R1
X163	Main frame harness to LH lower work light E-23	237661A1
X164	Main frame harness to LH road light (EU) E-13	261702C1
X165	Main frame harness to RH front hazard light	225295C1
X166	Main frame harness to RH Service socket J-01	877291R1

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Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X168	Main frame harness to RH lower work light E-24	237661A1
X169	Main frame harness to RH road light (EU) E-14	261702C1
X170	Main frame harness to lateral inclination B-02	225295C1
X171	Main frame harness to wiper washer motor M-24	
X172	Main frame harness to horn H-02	259097A1
X173	Main frame harness to brake pressure S-39	259097A1
X174	Main frame harness to feeder angle R-03	276424A1
X175	Main frame harness to front frame ground 2	
X177	gearbox harness to rotor RPM B-01	225295C1
X178	Cab roof harness to switch bypass fuses F-64 or mirror select switch S-57	
X181	Main frame harness to sieve shake RPM B-56	225316C1
X182	Main frame harness to clean grain elevator RPM B-08	225316C1
X183	Main frame harness to fuel pump M-23	182069A1
X184	Main frame harness to fuel level R-01	225316C1
X186	Main frame harness to tailing RPM B-39	225316C1
X188	Main frame harness to right rotor loss B-20	225316C1
X189	Concave extension harness to concave position	291719A1
X190	Concave extension harness to concave clearance motor M-04	182069A1
X191	Main frame harness to Left rotor loss B-19	225316C1
X192	Iveco Harness to ECU connector ’A’	
X193	Engine harness to ECU connector ’B’	
X194	Engine harness to engine service socket J-05	877291R1
X195	Main frame harness to tank extensions harness	239451A1
X197	Engine harness to Iveco harness	
X199	Engine harness to start relay K-36	
X200	Engine harness to start relay K-36	
X202	Engine harness to air filter switch S-61	291718A1
X205	Engine harness to 24V starter M-29	
X211	Engine harness to grid heater relay K-39	
X213	Engine harness to alternator G-01	
X215	Engine harness to A/C clutch L-07	245480C1
X216	Engine harness to A/C high pressure S-47	292549A1
X217	A/C harness to A/C low pressure (ATC) S-77	
X218	Main frame harness to flip up lighting harness	225316C1 (MF)
X221	Precision farming harness to moisture sensor B-12	225351C1
X222	Precision farming harness to sample motor M-28	239451A1
X223	Precision farming harness to yield sensor B-57	225350C1
X225	Straw hood front harness to upper sieve rear adjust S-35	276426A1
X226	Straw hood front harness to lower sieve rear adjust S-46	276426A1
X227	Lower frame rear harness to upper sieve actuator M-06	
X228	Lower frame rear harness to lower sieve actuator M-07	
X231	Straw hood front harness to rear frame ground 1	

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Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X232	Lower frame harness to sieves loss B-21	
X233	Lower frame harness to rear wheel assist L-26	
X234	Straw hood harness to sieve light front E-37	237661A1
X235	Straw hood front harness to chaff spreader L-28	225316C1
X236	Straw hood front harness to LH side service socket J-04	877291R1
X237	Straw hood front harness to sieve light switch S-54	24582C1
X238	Straw hood front harness to PTO box filter bypass S-34	245482C1
X239	Straw hood front harness to returns filter bypass S-32	245482C1
X240	Straw hood rear harness to spreader position B-11	225316C1
X242	Straw hood rear harness to LH flashing lamp (NA) E-07	
X244	Straw hood rear harness to unload tube cradle B-38	225316C1
X245	Straw hood rear harness to RH flashing lamp (NA) E-08	
X247	Straw hood rear harness to rear beacon light E-33	225316C1
X248	Straw hood rear harness to back up alarm H-08	
X251	Straw hood rear harness to rear ladder B-22	225316C1
X252	Straw hood rear harness to RH side service socket J-03	877291R1
X255	Steering column harness to flasher module	
X256	Cab main harness to road light switch S-26	
X257	Steering column harness to turn indicator E-09	
X258	Steering column harness to high beam indicator E-10	
X259	Steering column harness to hazard switch S-25	
X279	Main frame harness to header lift pressure B-29	
X284	Feeder harness to feeder RPM B-14	
X285	Straw hood front harness to trailer outlet J-09	
X286	Engine harness to 24v start relay	
X287	Outer roof harness to German third mirror	
X288	Tank extension harness to covers closed B-47	
X289	Tanks Extensions harness to covers motor M-12	
X293	Lower frame harness to 2 speed powered rear axle	
X294	Lower frame harness to LH brake wear switch S-55	
X295	Lower frame harness to RH brake wear switch S-56	
X296	Cab roof harness to dome light E-34	
X297	LH mirror & side light jumper harness to LH side work light E-25	
X298	RH mirror & side ligth jumper harness to RH side work light E-26	
X299	Straw hood rear harness to LH brake / tail lamp (NA) E-11	
X300	Straw hood rear harness to RH brake / tail lamp (NA) E-12	
X301	Straw hood rear harness to LH rear flashing lamp (EU) E-05	
X302	Straw hood rear harness to RH rear flashing lamp (EU) E-06	
X311	Iveco harness to engine oil temperature B-03	
X314	Cab roof harness to radio A-04	
X315	Cab roof harness to radio A-04	
X319	Adapter display harness to ICDU A-02	

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Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X320	Adapter display harness to shaft speed monitor A-03	
X321	Main frame harness to GPS antenna A-11	
X322	Unload tube light harness to unload tube light E-29	
X327	Cab main harness to brake fluid level switch S-49	
X328	Cab main harness to brake fluid level switch S-49	
X329	Main frame harness to brake limiting L-32	
X330	Engine harness to air filter resistor R-15	
X331	Flip up lighting harness to flip up low beam relay K-40	
X332	Flip up lighting harness to flip up high beam relay K-41	
X333	Flip up lighting harness to LH flip up road light E-47	
X334	Flip up lighting harness to RH flip up road light E-48	
X335	Flip up lighting harness to LH road light E-13	
X336	Flip up lighting harness to RH road light E-14	
X337	Iveco harness to engine oil harness B-52	
X338	Iveco harness to fuel filter switch S-62	
X339	Under shield lighting harness to under shield light switch S-63	
X340	Engine lighting harness to engine light switch S-64	
X342	Main frame harness to under shield lighting harness	
X343	Straw hood rear harness to engine lighting harness	
X345	Under shield lighting harness to LH front shield light E-42	
X346	Under shield lighting harness to LH rear shield light E-43	
X347	Under shield lighting harness to RH front shield light E-44	
X348	Under shield lighting harness to RH rear shield light E-45	
X349	Engine lighting harness to engine light E-46	
X362	RH license plate lamp (EU) E-57	
X363	LH license plate lamp (EU) E-58	
X368	Main frame harness to park brake pressure B-53	
X369	Iveco harness to engine flywheel RPM B-05	
X370	Iveco harness to engine camshaft B-07	
X371	Iveco harness to boost pressure B-23	
X372	Iveco harness to fuel temperature B-36	
X373	Iveco harness to coolant temperature B-44	
X374	Iveco harness to air temperature B-54	
X375	Iveco harness to engine brake L-33	
X376	Iveco harness to fuel actuator 1 L-34	
X377	Iveco harness to fuel actuator 2 L-35	
X378	Iveco harness to fuel actuator 3 L-36	
X379	Iveco harness to fuel actuator 4 L-37	
X380	Iveco harness to fuel actuator 5 L-38	
X381	Iveco harness to fuel actuator 6 L-39	
X383	Straw hood rear harness to spreader RPM B-55	
X386	Right console harness to front switch panel A-13	
X387	Right console harness to rear switch panel A-18	

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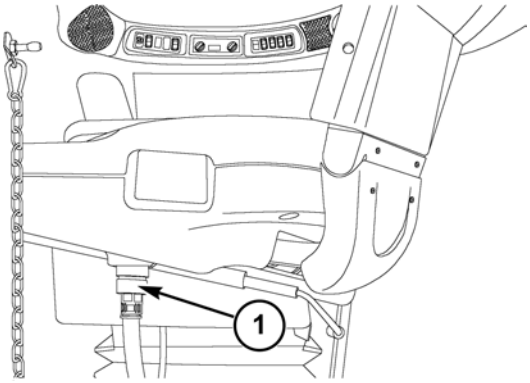
Connector Reference Table		
Connector ID	**Description**	**Connector Part Number**
X388	Right console harness to engine throttle Potentiometer R-21	
X396	Main blower harness to blower speed control (ATC) A-14	
X397	Air conditioning harness to ATC control module A-15	
X398	Air conditioning harness to ATC control module A-15	
X399	Main frame harness to PTO box lube pressure B-60	
X400	Right console harness to feeder engage diodes D-01	
X401	Gearbox harness to feeder engine to ring clutch L-47	
X402	Gearbox harness to feeder pump swash solenoids L-48/L-49	
X403	Gearbox harness to feeder ring to frame brake L-50	
X404	Right console harness to header speed potentiometer R-18	
X405	Right console harness to resistor module R-23	
X406	Right console harness to reel speed potentiometer R-22	
X408	Gearbox harness to rotor pump swash solenoids L-40/L-41	
X409	Gearbox harness to rotor ring to frame brake :-46	
X410	Gearbox harness to rotor engine to ring clutch L-45	
X411	Main frame harness to chopper RPM B-10	
X412	Expansion harness to YMIU module A-12	
X417	Outer roof harness to LH HID field light E-60	
X418	Outer roof harness to RH HID field light E-61	
X428	Gearbox harness to rotor hydrostat RPM B-58	
X438	Expansion harness to YMIU module A-12	
X439	Engine harness to coolant level switch S-67	
X442	Expansion harness to precision farming harness; Bypass motor / Yield sensor	
X443	Expansion harness to precision farming harness; Moisture sensor	
X444	Main frame harness to fan drive solenoid L-44	
X445	Main frame harness to tailing volume R-24	
X446	Adapter display harness to cab CAN termination R-17	
X447	Straw hood front harness to sieve light rear E-59	
X449	Gearbox harness to unload tube clutch L-08	
X450	Gearbox harness to beater/chopper clutch L-22	
X451	Air conditioning harness (manual) to A/C low pressure S-48	
X452	Air conditioning harness (manual) to freeze switch S-76	
X453	Air conditioning harness (manual) to freeze switch S-76	
X456	Main frame harness to concave extension harness	
X457	Main frame harness to park brake disengage L-10	
X470	Air conditioning harness to separator blower M-18	
X471	Iveco harness to injector harness	

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Wiring harness - Component diagram (A.30.A.88 - C.20.A.71)

AFX8010

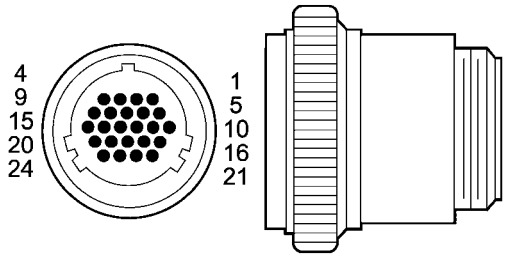
Connector X001 - Cab Main Harness to Right Console Harness



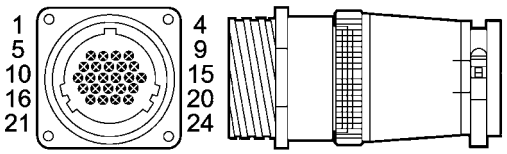
40031029A4 1

Bottom of right hand console

1. Connector X001



AMP_206837-1 2



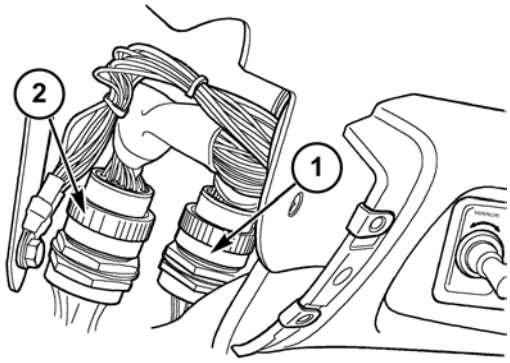
AMP_206838-1 3

Cavity	Circuit ID	Description
1	1212 (YE)	Separator switch S-30 to CCM3 J1-17
2	051 (RD)	Fuse F-39 to RHM X026 pin 13
3	108 (OR)	Fuse F-48 to console switches
4	open	
5	open	
6	127 (YE)	CAN High
7	128 (GN)	CAN Low
8	129 (YE)	CAN High

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Cavity	Circuit ID	Description
9	130 (GN)	CAN Low
10	135 (RD)	CAN Tx to RHM X026 pin 12
11	136 (BK)	CAN Rx to RHM X026 pin 3
12	122 (BK)	Splice block C, W-03 to ground 3
13	147 (YE)	Separator switch S-30 to CCM2 J1-7 & CCM3 J1-7
14	open	
15	112 (YE)	Feeder Engage switch S-31 to CCM1 J1-7
16	open	
17	113 (YE)	Neutral switch S-22 to CCM2 J1-17
18	093 (WH)	Neutral switch S-22 to Neutral Start relay K-23
19	225 (YE)	Feeder Engage Diodes D-01 to CCM1 J1-17
20	1211 (YE)	Feeder Engage switch S-31 to Feeder Disengage relay K-19
21	open	
22	open	
23	open	
24	open	

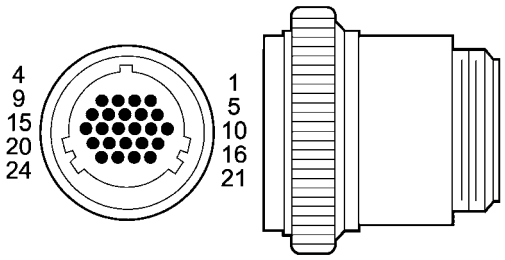
Connector X002 - Cab Main Harness to Cab Roof Harness



50032236A4 4

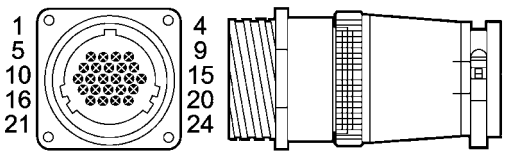
Top left rear corner of cab, behind speaker

1. Connector X002
2. Connector **X003**



AMP_206837-1 5

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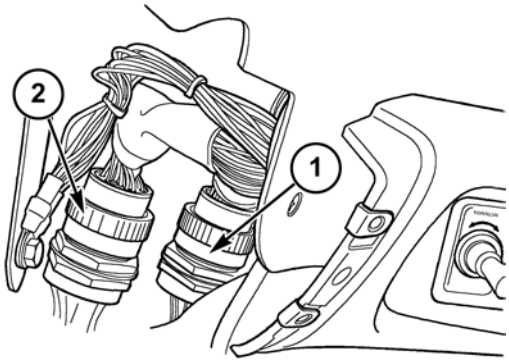


AMP_206838-1 6

Cavity	Circuit ID	Description
1	045 (OR)	Fuse F-49 to HVAC & light switches
2	058 (PU)	Fuse F-06 to LH Outer Cab light E-15
3	072 (PU)	Side work light relay K-35 to RH side work light E-26
4	059 (PU)	Fuse F-07 to RH Outer Cab light E-16
5	open	
6	048 (RD)	Fuse F-35 to Radio A-04 memory
7	063 (PU)	Header work lights relay K-22 to Cab mid work lights E-19, E-20
8	079 (PU)	Fuse F-09 to washer and mirror switches
9	081 (OR)	Fuse F-11 to Radio A-04
10	082 (OR)	Fuse F-12 to future options (right side DIN slots)
11	083 (OR)	Fuse F-13 to accessory socket J-07
12	166 (YE)	Beacon light switch S-41 to CCM2 J1-2
13	167 (YE)	Tank extensions switch S-42 to CCM2 J1-3
14	272 (OR)	Wiper relay K-06 to wiper switch S-20
15	170 (YE)	Rear work lights switch S-44 to CCM1 J1-15
16	171 (YE)	Front work lights switch S-43 to CCM1 J1-3
17	278 (WH)	Washer switch S-38 to wiper washer motor M-24
18	232 (PU)	CCM2 J1-11 to splice block C, W-03 (backlighting)
19	965 (RD)	Fuse F-52 to dome light E-34
20	076 (PU)	Timed side work light relay K-34 to LH side work light E-25
21	579 (PU)	Beacon light relay K-29 to front beacon lights E-31, E-32
22	open	
23	open	
24	open	

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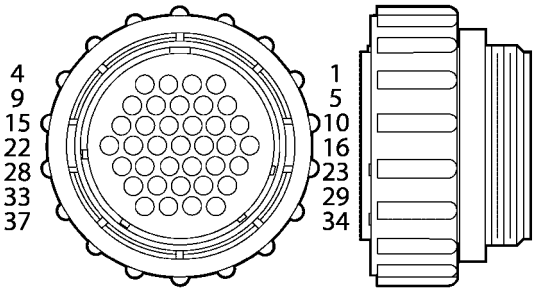
Connector X003 - Cab Main Harness to Cab Roof Harness



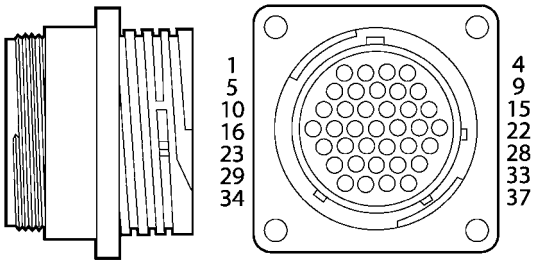
50032236A4 7

Top left rear corner of cab, behind speaker

1. Connector **X002**
2. Connector X003



AMP_206150-1 8



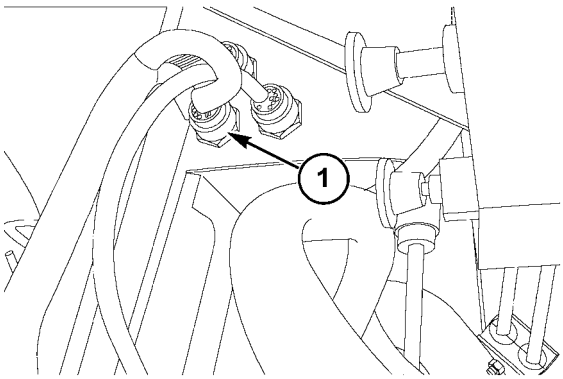
AMP_206151 9

Cavity	Circuit ID	Description
1	131 (YE)	CAN High
2	132 (GN)	CAN Low
3	900 (WH)	HVAC module to A/C Clutch relay K-10
4	137 (YE)	CAN High
5	902 (WH)	HVAC module to Separator Blower relay K-09
6	138 (GN)	CAN Low
7	904 (WH)	HVAC module to main blower relay low K-11
8	905 (WH)	HVAC module to main blower relay med K-12
9	906 (WH)	HVAC module to main blower relay high K-13

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Cavity	Circuit ID	Description
10	907 (BL)	HVAC module to ATC control module A-15 (ATC) / A/C low pressure switch S-48 and Freeze switch S-76 (MAN)
11	908 (YE)	HVAC module to ATC control module A-15 (ATC) / A/C low pressure switch S-48 and Freeze switch S-76 (MAN)
12	909 (BL)	HVAC module to ATC control module A-15
13	910 (YE)	HVAC module - not used
14	911 (BL)	HVAC module to ATC control module A-15
15	912 (YE)	HVAC module to ATC control module A-15
16	913 (BL)	HVAC module to ATC control module A-15, temperature sensors, and A/C low pressure switch
17	914 (YE)	HVAC module to ATC control module A-15
18	939 (YE)	HVAC module - not used
19	934 (BL)	HVAC module to A/C high pressure switch S-47
20	917 (YE)	HVAC module to A/C high pressure switch S-47
21	918 (BK)	HVAC module to ATC control module A-15
22	919 (YE)	HVAC module to ATC control module A-15
23	920 (OR)	HVAC module to ATC control module A-15
24	978 (PU)	Road lights relay K-27 to cab inner work lights E-17, E-18 - low beam
25	922 BK)	HVAC module to cab ground 3 (ATC) / water valve M-16 (MAN)
26	923 (YE)	HVAC module to ATC control module A-15 (ATC) / water valve M-16
27	924 (OR)	HVAC module to ATC control module A-15 (ATC) / water valve M-16
28	open	
29	open	
30	981 (PU)	Road lights relay K-27 to cab inner work lights E-17, E-18 -high beam
31	967 (YE)	Time delay relay K-20 to LH door switch S-40
32	open	
33	open	
34	open	
35	open	
36	open	
37	open	

Connector X004 - Cab Main Harness to Main Frame Harness

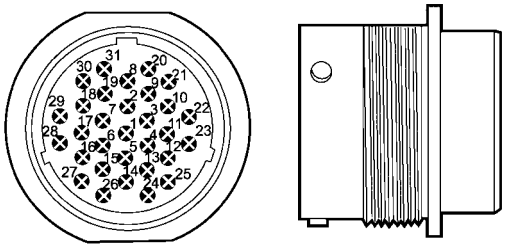


40033777A5 10

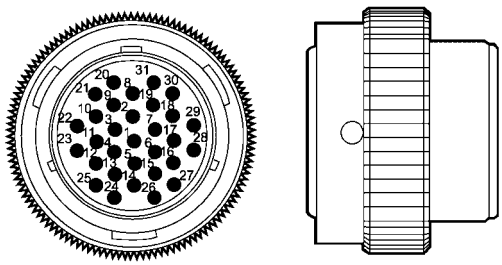
Left rear corner of cab, near park brake valve

1. Connector X004

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DE_HDP24-24-31P 11



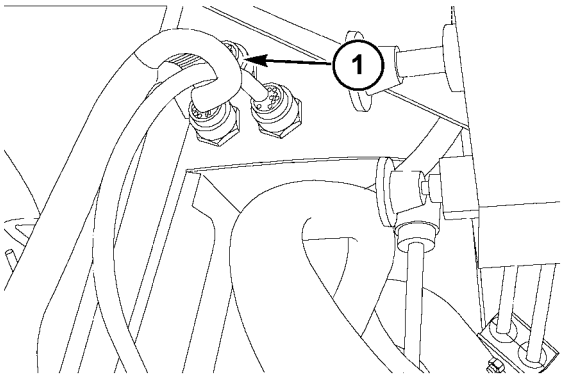
DE_HDP26-24-31S 12

Cavity	Circuit ID	Description
1	032 (OR)	Fuse F-43 to CCM1 J2-2
2	033 (OR)	Fuse F-43 to CCM1 J2-9
3	1159 (WH)	not used
4	035 (OR)	Fuse F-47 to YMIU A-12 and sample motor M-28
5	036 (OR)	Fuse F-47 to CCM3 J2-2 & J2-9
6	037 (OR)	Fuse F-36 to CCM2 J2-2
7	1214 (RD)	Fuse F-34 to Under shield light switch S-63
8	039 (OR)	Fuse F-37 to CCM2 J2-9
9	065 (PU)	Lower work lights relay K-30 to lower work lights E-23, E-24 and grain tank light E-30
10	067 (PU)	Rear work lights relay K-31 to rear work lights E-27, E-28
11	068 (RD)	Fuse F-15 to service sockets J-01, J-02, J-03, J-04, J-05
12	578 (PU)	Beacon light relay K-29 to rear beacon light E-33
13	875 (BL)	Feeder disengage relay K-19 to CCM1 J2-40
14	1210 (BL)	Feeder disengage relay K-19 to Feeder Engine to Ring clutch L-47
15	077 (PU)	Unload tube light relay K-32 to unload tube light E-29
16	078 (PU)	Brake lights relay K-33 to brake lights E-05/E-06/E-11/E-12 and trailer outlet J-09
17	827 (YE)	ECU X193 pin 13 to DAM connector X065 pin E
18	193 (WH)	Road light switch S-26 to horn H-02
19	856 (WH)	Fuel pump relay K-07 to Fuel pump M-23
20	814 (WH)	CCM2 J1-12 to cold start indicator E-36
21	604 (OR)	Fuse F-14 to sieve light switch S-54
22	243 (PU)	Flasher module A-05 to LH flashing lamp E-07
23	244 (PU)	Flasher module A-05 to RH flashing lamp E-08

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Cavity	Circuit ID	Description
24	808 (YE)	ECU power relay K-14 to ECU X193 pin 27
25	809 (WH)	ECU power relay K-14 to ECU X193 pins 3 & 4
26	525 (WH)	Not used
27	821 (WH)	Not used
28	829 (WH)	Not used
29	523 (WH)	Concave / covers relay K-16 to CCM1 J2-21
30	695 (WH)	Concave / covers relay K-16 to covers motor M-12
31	696 (WH)	Concave / covers relay K-16 to concave clearance motor M-04

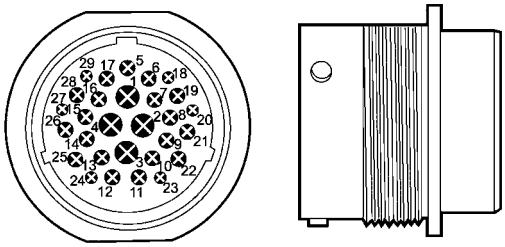
Connector X005 - Cab Main Harness to Main Frame Harness



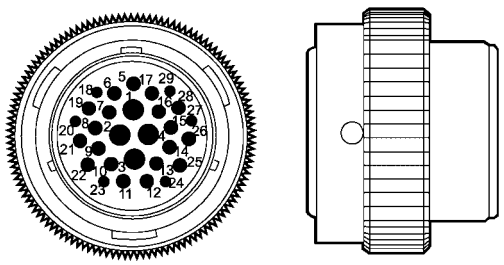
40033777B5 13

Left rear corner of cab, near park brake valve

1. Connector X005



DE_HDP24-24-29P 14

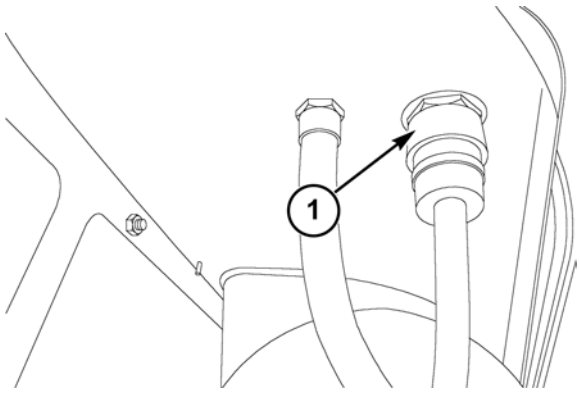


DE_HDP26-24-29S 15

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Cavity	Circuit ID	Description
1	025 (RD)	Fuse F-23 to CCM2 J2-11
2	026 (RD)	Fuse F-24 to CCM1 J2-11
3	030 (RD)	Fuse F-26 to CCM3 J3-29 & 30
4	031 (RD)	Fuse F-27 to CCM3 J2-11 & J3-7
5	013 (OR)	Fuse F-45 to Feeder RPM B-14, Rotor Hydrostat RPM B-58, Cleaning Fan RPM B-16, Spreader RPM B-55 & GPS Antenna A-11
6	092 (WH)	Neutral start relay K-23 to start relay K-36
7	176 (PU)	Fuse F-21 to RH marker lights E-04, E-49, E-53, E-12, E-06 & trailer outlet J-09
8	177 (PU)	Fuse F-20 to LH marker lights E-03, E-50, E-54, E-39, E-11, E-05 & trailer outlet J-09
9	178 (WH)	A/C clutch relay K-10 to A/C clutch L-07
10	186 (PU)	High beam relay K-04 to road lights E-13, E-14 (EU only)
11	196 (PU)	Flasher module A-05 to RH flashing lamps E-02, E-04, E-06, E-51 & trailer outlet J-09
12	200 (PU)	Flasher module A-05 to LH flashing lamps E-01, E-03, E-05, E-52 & trailer outlet J-09
13	237 (PU)	Low beam relay K-05 to road lights E-13, E-14 (EU only)
14	278 (WH)	Washer switch S-38 to wiper washer motor M-24
15	786 (WH)	Upper / lower sieve relay K-18 to CCM3 J2-21
16	790 (WH)	Upper / lower sieve relay K-18 to lower sieve actuator M-07
17	792 (WH)	Upper / lower sieve relay K-18 to upper sieve actuator M-06
18	open	
19	1215 (RD)	Fuse F-34 to engine light switch S-64
20	839 (WH)	CCM2 J1-12 to cold start indicator E-36
21	open	
22	open	
23	open	
24	open	
25	859 (OR)	Key switch S-02 to ECU X193 pin 15
26	open	
27	915 (YE)	Not used
28	916 (BL)	HVAC module to A/C high pressure switch S-47
29	917 (YE)	HVAC module to A/C high pressure switch S-47

Connector X006 - Cab Main Harness to A/C Harness

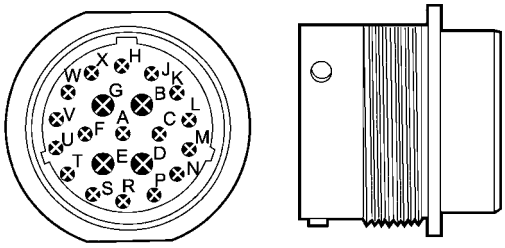


40033776A4 16

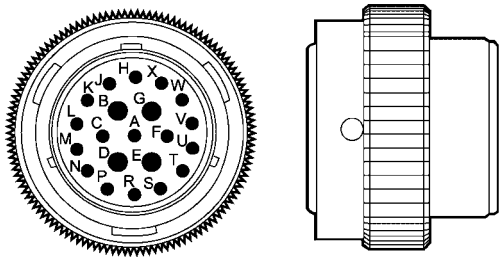
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Left rear corner of cab, outside under shelf

1. Connector X006



DE_HDP24-24-21P 17



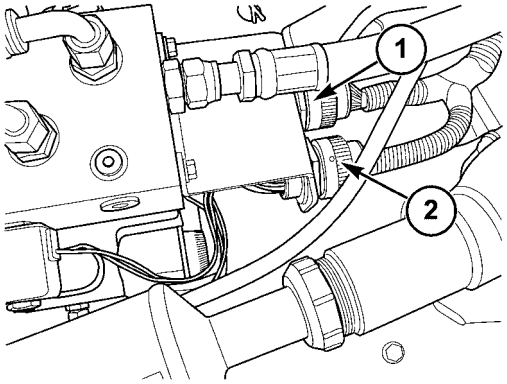
DE_HDP26-24-21S 18

Cavity	Circuit ID	Description
A	907 (BL)	HVAC module A-20 to ATC control module A-15 (ATC) / A/C low pressure switch S-48 and Freeze switch S-76 (MAN)
B	926 (WH)	Separator blower relay K-09 to separator blower M-18
C	908 (YE)	HVAC module A-20 to ATC control module A-15 (ATC) / A/C low pressure switch S-48 and Freeze switch S-76 (MAN)
D	928 (WH)	Main blower relay low K-11 to main blower M-17 (MAN) / not used (ATC)
E	929 (WH)	Main blower relay med K-12 to main blower M-17 (MAN) / not used (ATC)
F	909 (BL)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
G	946 (WH)	Main blower relay high to main blower M-34 and blower speed control A-14 (ATC) / main blower M-17 (MAN)
H	910 (YE)	not used
J	911 (BL)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
K	912 (YE)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
L	913 (BL)	HVAC module A-20 to ATC control module A-15, temperature sensors, and A/C low pressure switch (ATC) / not used (MAN)
M	914 (YE)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
N	918 (BK)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
P	919 (YE)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
R	920 (OR)	HVAC module A-20 to ATC control module A-15 (ATC) / not used (MAN)
S	922 (BK)	HVAC module A-20 to cab ground 3 (ATC) / water valve M-16 (MAN)
T	923 (YE)	HVAC module A-20 to ATC control module A-15 (ATC) / water valve M-16 (MAN)

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Cavity	Circuit ID	Description
U	924 (OR)	HVAC module A-20 to ATC control module A-15 (ATC) / water valve M-16 (MAN)
V	1584 (YE)	not used
W	1583 (BL)	not used
X	open	

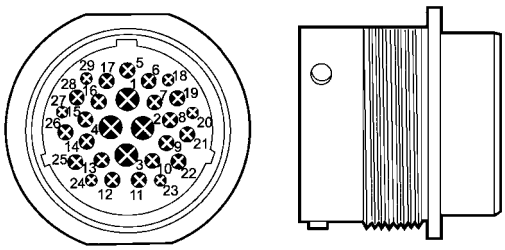
Connector X007 - Front Frame Harness to Feeder Harness



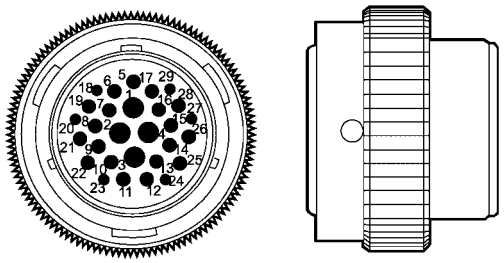
10031037A5 19

Behind feeder valve manifold on left side of feeder

1. Connector X007
2. Connector **X021**



DE_HDP24-24-29P 20



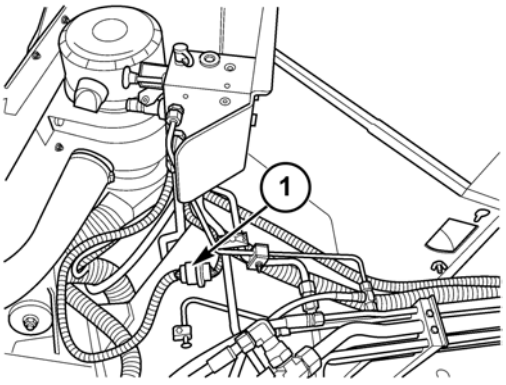
DE_HDP26-24-29S 21

Cavity	Circuit ID	Description
1	open	
2	open	
3	712 (WH)	CCM2 J3-8 to draper header solenoid L-53

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Cavity	Circuit ID	Description
4	1223 (PK)	CCM2 J3-24 to header type module R-20
5	613 (PU)	Flasher module A-05 to LH header flashing light E-01 (NA only)
6	618 (PU)	Flasher module A-05 to RH header flashing light E-02 (NA only)
7	489 (YE)	Feeder RPM B-14 to CCM1 J3-14
8	open	
9	open	
10	open	
11	open	
12	749 (BL)	Sensor ground to CCM1 J3-18
13	750 (BL)	Header type module R-20 to CCM2 J3-18
14	open	
15	738 (YE)	Left height/tilt R-12 to CCM1 J3-24
16	739 (YE)	Right height/tilt R-13 to CCM1 J3-22
17	741 (YE)	Lateral tilt pot R-02 to CCM1 J3-17
18	752 (PU)	Road light switch S-26 to header marker lights E-40, E-41 (EU only)
19	711 (GY)	CCM2 J3-6 to draper header solenoid L-53
20	1103 (YE)	Center height/tilt R-19 to CCM1 J3-34
21	776 (BK)	Ground path for flip up road light relays K-40, K-41
22	757 (PK)	CCM1 J3-26 to lateral float pot R-02 and height/tilt sensors R-12, R-13, R-19
23	open	
24	open	
25	767 (BK)	Header lights to frame ground 2
26	1260 (OR)	Fuse F-45 to feeder RPM B-14
27	1116 (YE)	CCM2 J3-26 to header type module R-20
28	1201 (BK/WH)	Feeder RPM B-14 to battery clean ground
29	1102 (YE)	not used

Connector X008 - Main Frame Harness to Front Frame Harness

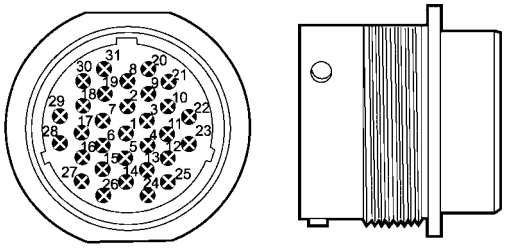


10033638A4 22

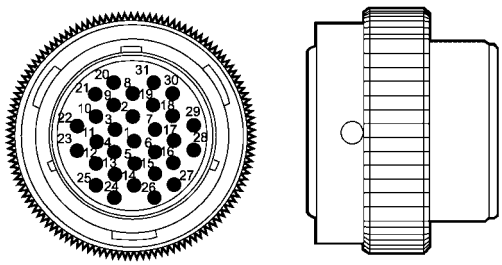
Left front corner of main frame

1. Connector X008

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DE_HDP24-24-31P 23



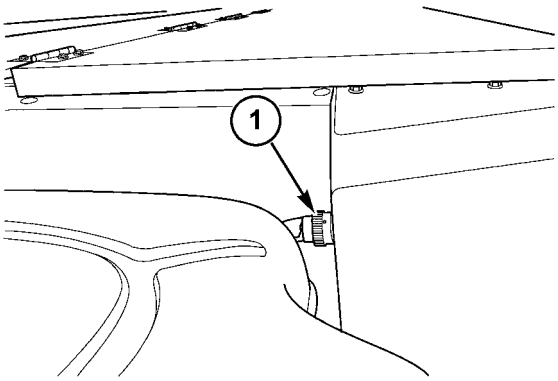
DE_HDP26-24-31S 24

Cavity	Circuit ID	Description
1	759 (WH)	CCM1 J3-4 to header height accumulator L-06
2	1119 (BL)	CCM2 J3-12 to signal valve L-43
3	722 (YE)	CCM1 J3-25 to header lift pressure B-29
4	open	
5	1503 (YE)	CCM1 J2-26 to brake wear switches S-55, S-56 and brake fluid level switch S-49
6	415 (YE)	Spreader position B-11 to CCM1 J3-37
7	1197 (YE)	Park brake pressure B-53 to CCM2 J3-34
8	485 (YE)	Unload cradle B-38 to CCM1 J3-36
9	1053 (WH)	CCM1 J3-15 to Feeder Ring to Frame clutch L-50
10	1051 (WH)	CCM1 J3-21 to feeder pump swash minus L-48
11	879 (GY)	CCM2 J3-21 to ground speed hydrostat L-23
12	880 (WH)	CCM2 J3-31 to ground speed hydrostat L-23
13	555 (BL)	CCM1 J2-10 to lateral tilt solenoids L-18, L-19
14	open	
15	613 (PU)	Flasher module A-05 to LH header flashing lamp E-01 (NA only)
16	618 (PU)	Flasher module A-05 to RH header flashing lamp E-02 (NA only)
17	open	
18	1205 (OR)	Fuse F-45 to Feeder RPM B-14 and Cleaning Fan RPM B-16
19	open	
20	open	
21	open	
22	881 (BL)	CCM2 J3-35 to ground speed hydrostat L-23
23	1050 (WH)	CCM1 J3-31 to feeder pump swash plus L-49
24	1201 (BK/WH)	Feeder RPM B-14 to battery clean ground

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Cavity	Circuit ID	Description
25	open	
26	open	
27	435 (YE)	Covers closed B-47 to CCM1 J3-38
28	open	
29	776 (BK)	Ground path for flip up road light relays K-40, K-41
30	1164 (YE)	Tailing volume R-24 to CCM2 J3-22
31	open	

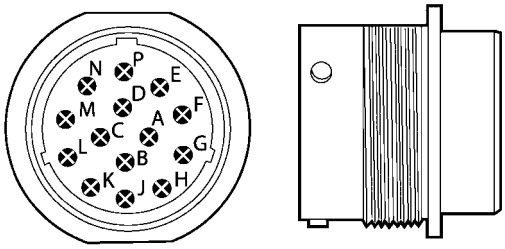
Connector X009 - Main Frame Harness to Grain Tank Harness



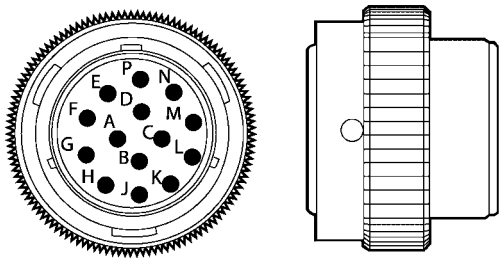
10010900A5 25

Front left corner of grain bin and left rear corner of cab

1. Connector X009



DE_HDP24-18-14P 26



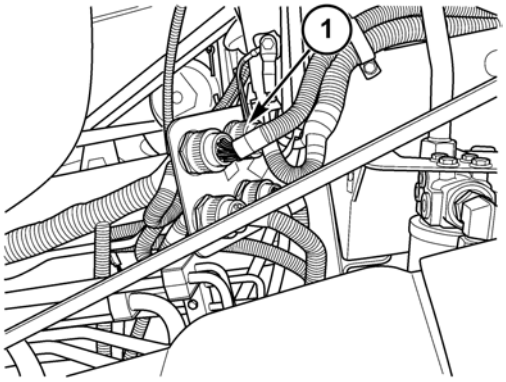
DE_HDP26-18-14S 27

Cavity	Circuit ID	Description
A	open	
B	open	

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Cavity	Circuit ID	Description
C	open	
D	077 (PU)	Unload tube light relay K-32 to unload tube light E-29
E	400 (YE)	Grain bin 3/4 full S-28 to CCM2 J2-22
F	open	
G	440 (PK)	CCM2 J2-31 to grain bin 3/4 full S-28
H	443 (BL)	Grain bin full S-29 to CCM2 J2-14
J	646 (PU)	Lower work lights relay K-30 to grain tank light E-30
K	668 (BK)	Grain tank and unload tube lights to frame ground 2
L	open	
M	open	
N	open	
P	530 (PU)	Road light switch S-26 to unload tube marker light E-39 (France only)

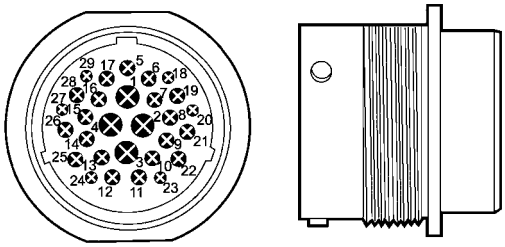
Connector X010 (GREEN) - Main Frame Harness to Engine Harness



10033642A4 28

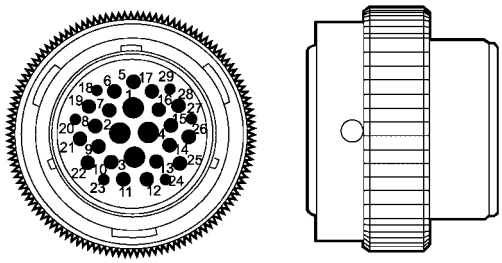
Left side of frame, in front of PTO gearbox

1. Connector X010



DE_HDP24-24-29P 29

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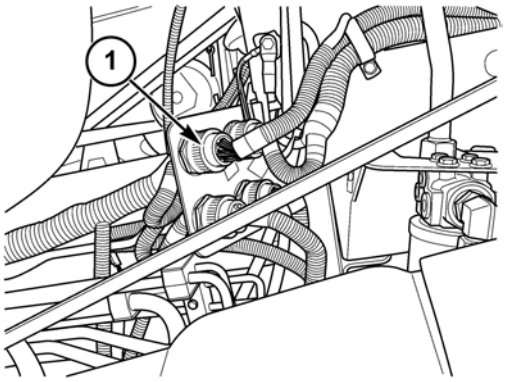


DE_HDP26-24-29S 30

Cavity	Circuit ID	Description
1	open	
2	open	
3	open	
4	open	
5	092 (WH)	Neutral start relay K-23 to start relay K-36
6	419 (YE)	Engine oil pressure B-52 to CCM2 J2-33
7	814 (WH)	CCM2 J1-12 to cold start indicator E-36
8	420 (YE)	Air filter switch S-61 / air filter resistor R-15 to CCM2 J2-29
9	421 (YE)	Not used
10	504 (YE)	Engine oil temp B-03 to CCM2 J2-27
11	178 (WH)	A/C clutch relay K-10 to A/C clutch L-07
12	650 (RD)	Fuse F-15 to engine service socket J-05
13	463 (PK)	CCM2 J2-31 to engine oil pressure B-52 and air filter resistor R-15
14	468 (BL)	CCM2 J2-14 to engine oil temp B-03, fuel filter switch S-62, engine oil pressure B-52 and air filter switch S-61
15	open	
16	open	
17	827 (YE)	ECU X193 pin 13 to DAM connector X065 pin E
18	429 (YE)	Fuel filter switch S-62 to CCM2 J2-24
19	819 (YE)	CAN High
20	839 (WH)	CCM2 J1-12 to cold start indicator E-36 [NOTE: Wire is 814 (WH) on engine side of connector]
21	820 (GN)	CAN Low
22	916 (BL)	HVAC module to A/C high pressure switch S-47
23	859 (OR)	Key switch S-02 to ECU X193 pin 15
24	1216 (YE)	Coolant level switch S-67 to CCM1 J2-39
25	917 (YE)	HVAC module to A/C high pressure switch S-47
26	808 (YE)	ECU power relay K-14 to ECU X193 pin 27
27	1159 (WH)	Not used
28	809 (WH)	ECU power relay K-14 to ECU X193 pins 3 & 4
29	1202 (BK/WH)	Not used

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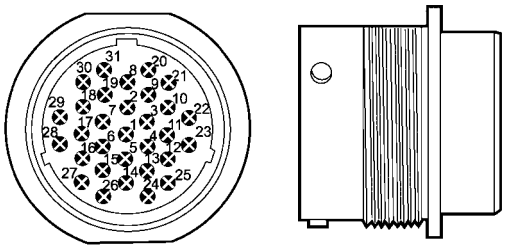
Connector X011 (YELLOW) - Main Frame Harness to Gearbox Harness



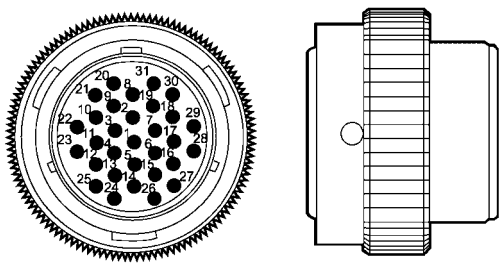
10033642B4 31

Left side of frame, in front of PTO gearbox

1. Connector X011



DE_HDP24-24-31P 32



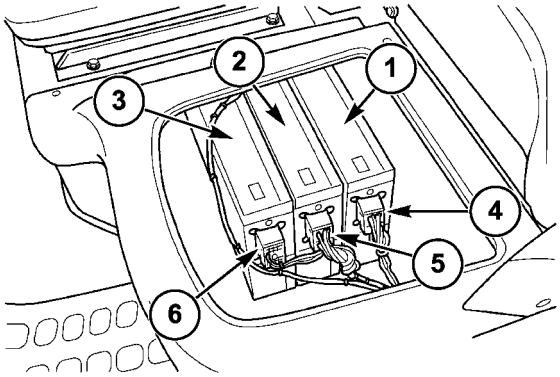
DE_HDP26-24-31S 33

Cavity	Circuit ID	Description
1	1047 (WH)	CCM3 J3-21 to rotor pump swash minus L-41
2	1046 (WH)	CCM3 J3-31 to rotor pump swash plus L-40
3	424 (YE)	Hydraulic reservoir level S-33 to CCM2 J2-39
4	1048 (WH)	CCM3 J2-30 to rotor engine to ring gear clutch L-45
5	446 (YE)	Hydraulic reservoir temperature B-18 to CCM1 J2-24
6	open	
7	881 (BL)	CCM2 J3-35 to ground drive hydrostat L-23
8	488 (BL)	CCM1 J2-14 to hydraulic oil reservoir temperature B-18
9	1051 (WH)	CCM1 J3-21 to feeder pump swash minus L-48
10	1053 (WH)	CCM1 J3-15 to feeder ring to frame clutch L-50
11	1210 (BL)	Feeder disengage relay K-19 to Feeder Engine to Ring clutch L-47

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Cavity	Circuit ID	Description
12	876 (WH)	CCM1 J2-30 to feeder engine to ring clutch L-47
13	877 (BL)	CCM2 J2-40 to beater / chopper clutch L-22
14	878 (WH)	CCM2 J2-30 to beater / chopper clutch L-22
15	879 (GY)	CCM2 J3-21 to ground speed hydrostat L-23
16	880 (WH)	CCM2 J3-31 to ground speed hydrostat L-23
17	1081 (BK/WH)	Clean ground for rotor RPM B-01 and rotor hydrostat RPM B-58
18	568 (WH)	CCM2 J2-4 to unload tube clutch L-08
19	601 (BL)	CCM2 J2-20 to unload tube clutch L-08
20	open	
21	486 (PK)	CCM2 J2-31 to low control pressure B-35
22	683 (BL)	CCM2 J2-14 to low control pressure B-35
23	1050 (WH)	CCM1 J3-31 to feeder pump swash plus L-49
24	1255 (OR)	Fuse F-45 to rotor RPM B-01 and rotor hydrostat RPM B-58
25	1069 (YE)	Rotor hydrostat RPM B-58 to CCM3 J3-14
26	1062 (BL)	CCM3 J2-40 to rotor engine to ring clutch L-45
27	1049 (WH)	CCM3 J3-3 to rotor ring to frame clutch L-46
28	1065 (BL)	CCM3 J2-10 to rotor pump swash plus L-40 & rotor pump swash minus L-41
29	1261 (YE)	Rotor RPM B-01 to CCM2 J2-37 and CCM3 J3-13
30	422 (YE)	Not used
31	423 (YE)	Low control pressure B-35 to CCM2 J2-19

Connector X012 - Cab Main Harness to CCM3

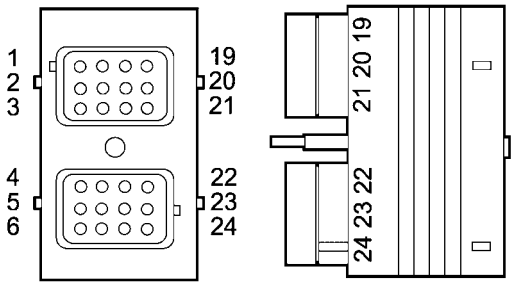


10004693A5 34

Inside cab, underneath instructional seat (remove storage bin)

1. CCM1
2. CCM2
3. CCM3
4. Connector **X018**
5. Connector **X015**
6. Connector X012

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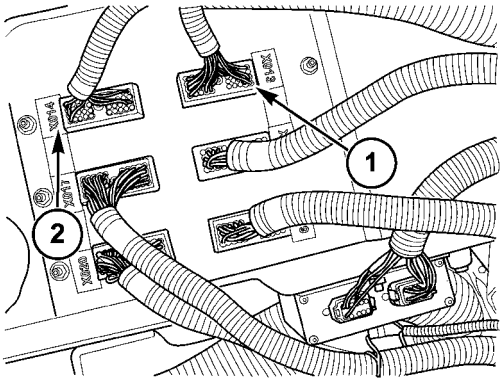


DE_DRC16-24S 35

Cavity	Circuit ID	Description
1	049 (RD)	Keep alive power from fuse F-39
2	open	
3	open	
4	101 (OR)	Power from key switch S-02
5	open	
6	787 (WH)	Output to upper / lower sieve relay K-18
7	1061 (YE)	Signal from separator engage S-30
8	217 (BK)	To cab ground 3
9	open	
10	open	
11	open	
12	open	
13	134 (GN)	CAN low
14	133 (YE)	CAN high
15	open	
16	open	
17	1212 (YE)	Signal from separator engage S-30
18	open	
19	open	
20	open	
21	open	
22	open	
23	open	
24	open	

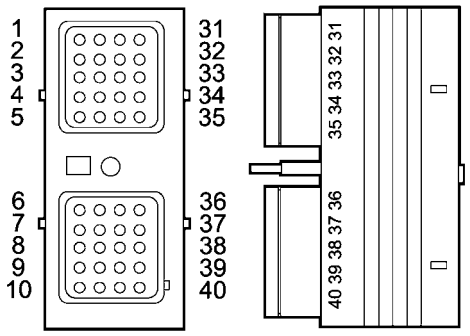
https://truckmanualshub.com/

Connector X013 (WHITE) - Expansion Harness to CCM3



10033631C5 36

1. Connector X013 (WHITE)
2. Connector **X014** (DARK GREY)



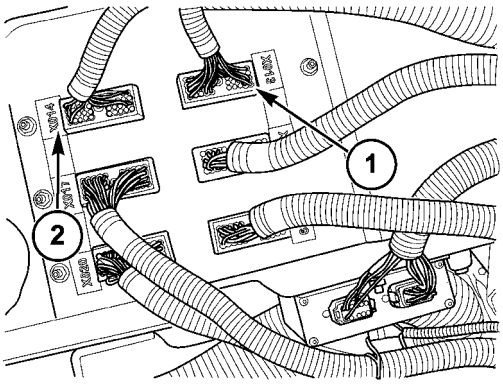
DE_DRC16-40S 37

Cavity	Circuit ID	Description
1	785 (GY)	Output to upper sieve actuator M-06 and lower sieve actuator M-07
2	505 (OR)	Power from fuse F-47
3	520 (BK)	To frame ground 2
4	open	
5	open	
6	open	
7	771 (WH)	Output to LH vertical knife relay K-43
8	772 (WH)	Output to RH vertical knife relay K-42
9	506 (OR)	Power from fuse F-47
10	1065 (BL)	Reference ground from rotor pump swash plus L-40 & rotor pump swash minus L-41
11	511 (RD)	Power from fuse F-27
12	690 (BK)	To frame ground 2
13	837 (WH)	Output to sample motor M-28
14	439 (BL)	Reference ground from upper sieve actuator M-06 and lower sieve actuator M-07
15	open	
16	open	
17	540 (YE)	Signal from upper sieve rear adjust S-35
18	691 (BK)	To frame ground 2
19	476 (YE)	Signal from lower sieve actuator M-07

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Cavity	Circuit ID	Description
20	open	
21	786 (RD)	Output to upper / lower sieve relay K-18
22	475 (YE)	Signal from upper sieve actuator M-06
23	open	
24	open	
25	838 (YE)	Signal to sample motor M-28
26	open	
27	open	
28	open	
29	open	
30	1048 (WH)	Output to rotor engine to ring clutch L-45
31	1196 (PK)	Output to upper sieve actuator M-06 and lower sieve actuator M-07
32	open	
33	open	
34	539 (YE)	Signal from upper sieve rear adjust S-35
35	542 (YE)	Signal from lower sieve rear adjust S-46
36	open	
37	open	
38	open	
39	541 (YE)	Signal from lower sieve rear adjust S-46
40	1062 (BL)	Reference ground from rotor engine to ring clutch L-45

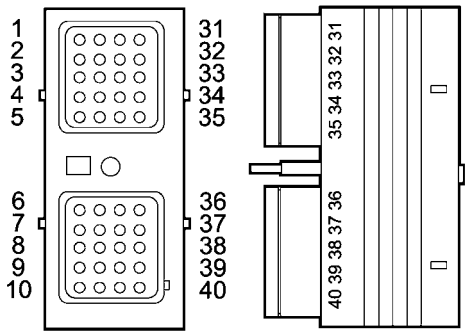
Connector X014 (DARK GREY) - Expansion Harness to CCM3



10033631C5 38

1. Connector **X013** (WHITE)
2. Connector X014 (DARK GREY)

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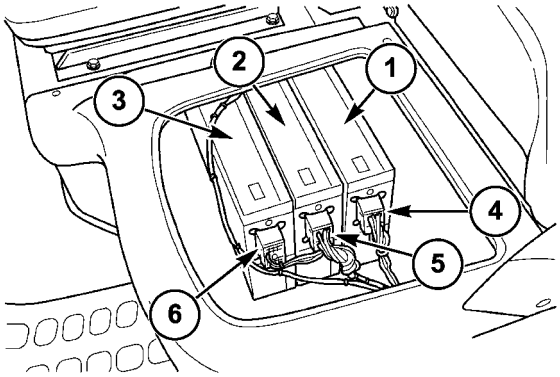
DE_DRC16-40S 39

Cavity	Circuit ID	Description
1	open	
2	open	
3	1049 (WH)	Output to rotor ring to frame clutch L-46
4	open	
5	open	
6	open	
7	512 (RD)	Power from fuse F-27
8	open	
9	536 (BK)	To frame ground 2
10	537 (BK)	To frame ground 2
11	1099 (OR)	Power from fuse F-47
12	open	
13	1068 (YE)	Signal from rotor RPM B-01
14	1069 (YE)	Signal from rotor hydrostat RPM B-58
15	open	
16	521 (BK)	To frame ground 2
17	open	
18	open	
19	open	
20	open	
21	1047 (WH)	Output to rotor pump swash minus L-41
22	open	
23	open	
24	open	
25	open	
26	open	
27	open	
28	open	
29	534 (RD)	Power from fuse F-26
30	535 (RD)	Power from fuse F-26
31	1046 (WH)	Output to rotor pump swash plus L-40
32	open	
33	open	
34	open	

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Cavity	Circuit ID	Description
35	open	
36	open	
37	open	
38	open	
39	open	
40	open	

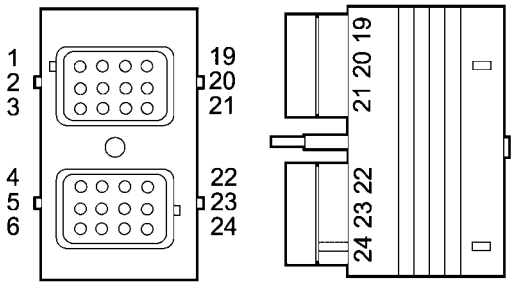
Connector X015 - Cab Frame Harness to CCM2



10004693A5 40

Inside cab, underneath instructional seat (remove storage bin)

1. CCM1
2. CCM2
3. CCM3
4. Connector **X018**
5. Connector X015
6. Connector **X012**



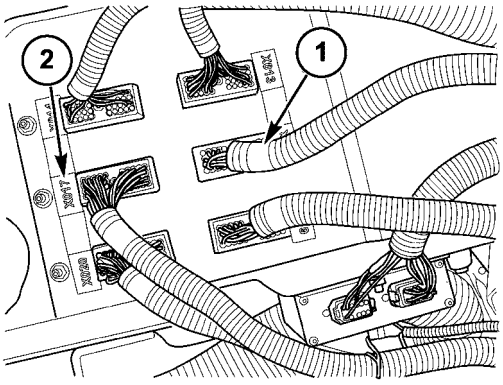
DE_DRC16-24S 41

Cavity	Circuit ID	Description
1	050 (RD)	Keep alive power from fuse F-39
2	166 (YE)	Signal from beacon light switch S-41
3	167 (YE)	Signal from tank extensions switch S-42
4	100 (OR)	Power from key switch S-02
5	204 (YE)	Output to flasher module A-05
6	502 (WH)	Not used
7	111 (YE)	Signal from separator engage S-30
8	216 (BK)	To cab ground 3

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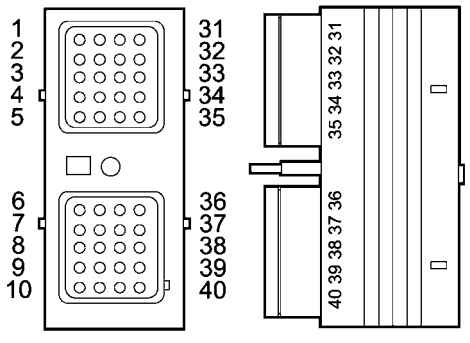
Cavity	Circuit ID	Description
9	168 (YE)	Signal from seat switches S-05 & S-66
10	open	
11	231 (PU)	Output to splice block C, W03 for backlighting
12	839 (WH)	Output to cold start indicator E-36
13	132 (GN)	CAN Low
14	131 (YE)	CAN High
15	1209 (PU)	Signal from hazard switch S-25
16	open	
17	113 (YE)	Signal from neutral switch S-22
18	183 (WH)	Output to brake lights relay K-33
19	134 (GN)	CAN Low
20	133 (YE)	CAN High
21	090 (OR)	Signal from key switch S-02 (start)
22	open	
23	open	
24	182 (WH)	Output to beacon light relay K-29

Connector X016 (RED) - Main Frame Harness to CCM2



10033631B5 42

1. Connector X016 (RED)
2. Connector **X017** (YELLOW)



DE_DRC16-40S 43

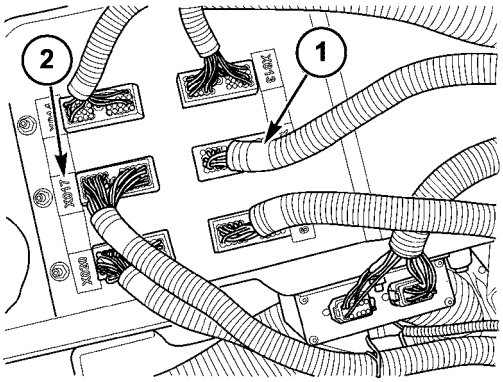
Cavity	Circuit ID	Description
1	open	
2	037 (OR)	Power from fuse F-36

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Cavity	Circuit ID	Description
3	514 (BK)	To frame ground 2
4	568 (WH)	Output to unload tube clutch L-08
5	open	
6	574 (WH)	Output to unload tube in L-03
7	open	
8	open	
9	039 (OR)	Power from fuse F-37
10	open	
11	025 (RD)	Power from fuse F-23
12	688 (BK)	To frame ground 2
13	open	
14	465 (BL)	Reference ground from sensors
15	572 (WH)	Output to park brake disengage L-10
16	573 (WH)	Output to unload tube out L-04
17	427 (YE)	Signal from fuel level R-01
18	689 (BK)	To frame ground 2
19	423 (YE)	Signal from low control pressure B-35
20	601 (BL)	Output to unload tube clutch L-08
21	open	
22	400 (YE)	Signal from grain bin 3/4 full S-28
23	746 (GN)	CAN Low
24	429 (YE)	Signal from fuel filter switch S-62
25	410 (YE)	Signal from left rotor loss B-19
26	402 (YE)	Signal from right rotor loss B-20
27	504 (YE)	Signal from engine oil temperature B-03
28	414 (YE)	Signal from spreader RPM B-55
29	420 (YE)	Signal from air filter switch S-61
30	878 (WH)	Output to beater / chopper clutch L-22
31	459 (PK)	Reference voltage to sensors
32	744 (YE)	CAN High
33	419 (YE)	Signal from engine oil pressure B-52
34	418 (YE)	Signal from brake pressure S-39
35	open	
36	421 (YE)	Not used
37	416 (YE)	Signal from rotor RPM B-01
38	413 (YE)	Signal from chopper RPM B-10
39	424 (YE)	Signal from hydraulic reservoir level S-33
40	877 (BL)	Reference ground from beater / chopper clutch L-22

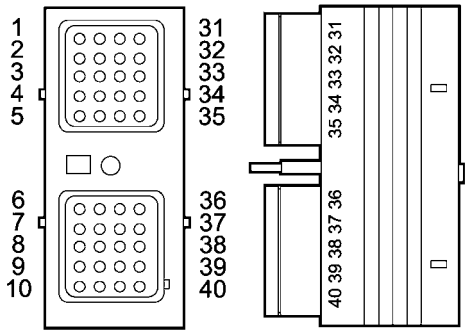
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Connector X017 (YELLOW) - Front Frame Harness to CCM2



10033631B5 44

1. Connector **X016** (RED)
2. Connector X017 (YELLOW)



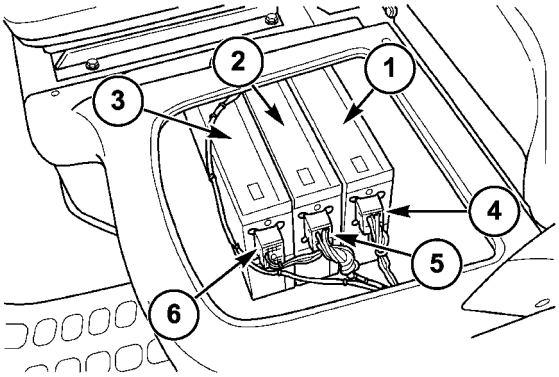
DE_DRC16-40S 45

Cavity	Circuit ID	Description
1	560 (WH)	Output to reel fore L-16
2	556 (WH)	Output to reel drive L-17
3	558 (WH)	Output to reel up L-14
4	557 (WH)	Output to reel down L-13
5	559 (WH)	Output to reel aft L-15
6	711 (GY)	Output to draper header solenoid L-53
7	028 (RD)	Power from fuse F-23
8	712 (WH)	Output to draper header solenoid L-53
9	516 (BK)	To frame ground 2
10	517 (BK)	To frame ground 2
11	038 (OR)	Power from fuse F-36
12	1119 (WH))	Output to signal valve L-43
13	open	
14	403 (YE)	Signal from ground speed RPM B-17
15	575 (WH)	Output to pressure release L-05
16	515 (BK)	To frame ground 2
17	open	
18	766 (BL)	Reference ground from sensors
19	526 (GY)	Output to transmission shift motor M-02
20	527 (GY)	Output to transmission shift motor M-02

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Cavity	Circuit ID	Description
21	879 (GY)	Output to ground speed hydrostat L-23
22	1164 (YE)	Signal from tailing volume R-24
23	open	
24	1116 (WH)	Output to header type module R-20
25	open	
26	1223 (PK)	Output to header type module R-20
27	409 (YE)	Signal (4th) from transmission shift position B-37
28	407 (YE)	Signal (N) from transmission shift position B-37
29	507 (RD)	Power from fuse F-25
30	508 (RD)	Power from fuse F-25
31	880 (WH)	Output to ground speed hydrostat L-23
32	open	
33	open	
34	1197 (YE)	Signal from park brake pressure B-53
35	881 (BL)	Reference ground from ground speed hydrostat L-23
36	405 (YE)	Signal (1st) from transmission shift position B-37
37	406 (YE)	Signal (2nd) from transmission shift position B-37
38	408 (YE)	Signal (3rd) from transmission shift position B-37
39	528 (WH)	Output to transmission shift motor M-02
40	529 (WH)	Output to transmission shift motor M-02

Connector X018 - Cab Main Harness to CCM1

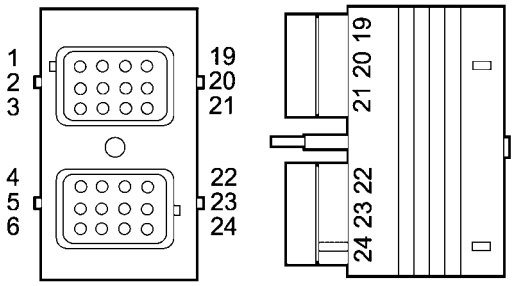


10004693A5 46

Inside cab, underneath instructional seat (remove storage bin)

1. CCM1
2. CCM2
3. CCM3
4. Connector X018
5. Connector **X015**
6. Connector **X012**

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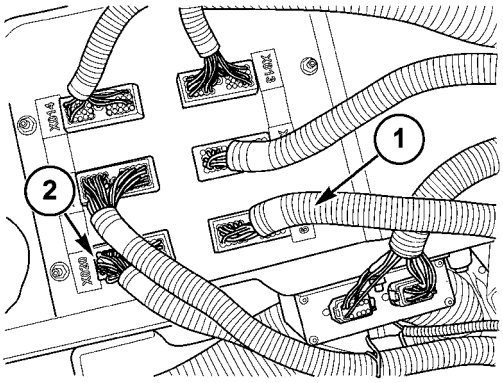


DE_DRC16-24S 47

Cavity	Circuit ID	Description
1	052 (RD)	Keep alive power from fuse F-39
2	198 (PU)	Signal (L turn) from road light switch S-26
3	171 (YE)	Signal from work light switch S-43
4	099 (OR)	Power from key switch S-02
5	117 (WH)	Output to road lights relay K-27, header work lights relay K-22 and lower work light relay K-30
6	692 (WH)	Output to concave / covers relay K-16
7	112 (YE)	Signal from feeder engage S-31
8	215 (BK)	To cab ground 3
9	194 (PU)	Signal (R turn) from road light switch S-26
10	open	
11	190 (WH)	Output to cab roof work lights relay K-01 and distance work lights relay K-21
12	181 (WH)	Output to unload tube light relay K-32
13	138 (GN)	CAN Low
14	137 (YE)	CAN High
15	170 (YE)	Signal from rear work light switch S-44
16	open	
17	225 (YE)	Signal from feeder engage diodes D-01
18	184 (WH)	Output to rear work lights relay K-31
19	130 (GN)	CAN Low
20	129 (YE)	CAN High
21	212 (OR)	Signal (marker) from road light switch S-26
22	open	
23	107 (BK)	Ground for power relays K-24, K-25 & K-26 (Reverse polarity protection)
24	180 (WH)	Output to side work light relay K-35

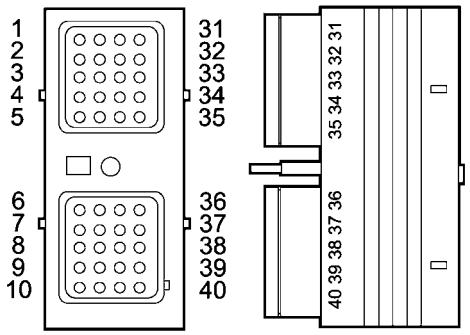
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Connector X019 (BLUE) - Main Frame Harness to CCM1



10033631A5 48

1. Connector X019 (BLUE)
2. Connector **X020** (GREEN)



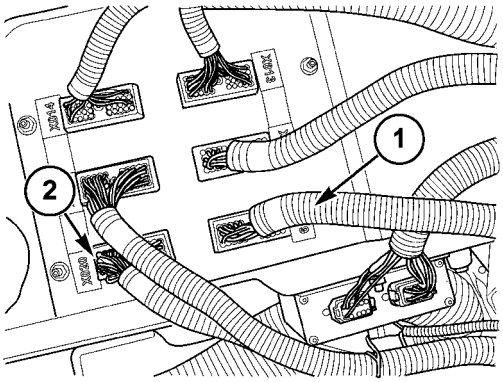
DE_DRC16-40S 49

Cavity	Circuit ID	Description
1	522 (GY)	Output to concave clearance motor M-04 and covers motor M-12
2	032 (OR)	Power from fuse F-43
3	513 (BK)	To frame ground 2
4	1112 (WH)	Output to header raise L-11
5	1113 (WH)	Output to header lower L-12
6	452 (WH)	Output to back up alarm H-08
7	1504 (WH)	Output to brake limiting L-32
8	open	
9	033 (OR)	Power from fuse F-43
10	555 (BL)	Reference ground from lateral tilt L-18 & L-19
11	026 (RD)	Power from fuse F-24
12	686 (BK)	To frame ground 2
13	1161 (WH)	Output to fan drive solenoid L-44
14	460 (BL)	Reference ground from sensors
15	576 (WH)	Output to chaff spreader L-28
16	569 (WH)	Output to rear wheel assist L-26
17	570 (YE)	Signal from rear ladder B-22
18	687 (BK)	To frame ground 2
19	411 (YE)	Signal from concave position R-06
20	1114 (BL)	Reference ground from header raise L-11 & header lower L-12

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Cavity	Circuit ID	Description
21	523 (WH)	Output to concave / covers relay K-16
22	740 (YE)	Signal from feeder angle R-03
23	open	
24	446 (YE)	Signal from hydraulic oil reservoir temperature B-18
25	431 (YE)	Signal from sieves loss B-21
26	1503 (YE)	Signal from brake wear switches S-55 & S-56, and brake fluid level switch S-49
27	422 (YE)	Not used
28	450 (YE)	Signal from clean grain elevator RPM B-08
29	1284 (YE)	Signal from PTO box lube pressure B-60
30	876 (WH)	Output to feeder engine to ring clutch L-47
31	453 (PK)	Reference voltage to sensors
32	open	
33	430 (YE)	Signal from lateral inclination B-02
34	447 (YE)	Signal from returns filter bypass S-32
35	448 (YE)	Signal from PTO box filter bypass S-34
36	open	
37	441 (YE)	Signal from tailing RPM B-39
38	1162 (YE)	Signal from sieve shake RPM B-56
39	1216 (YE)	Signal from coolant level switch S-67
40	875 (BL)	Reference ground from feeder E to R clutch L-47 through feeder disengage relay K-19

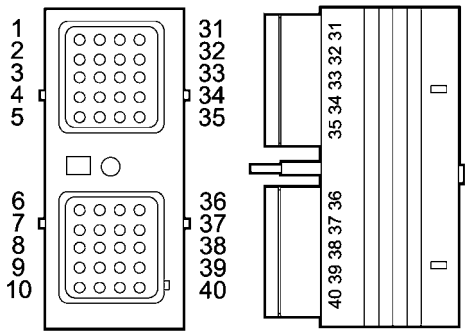
Connector X020 (GREEN) - Front Frame Harness to CCM1



10033631A5 50

1. Connector **X019** (BLUE)
2. Connector X020 (GREEN)

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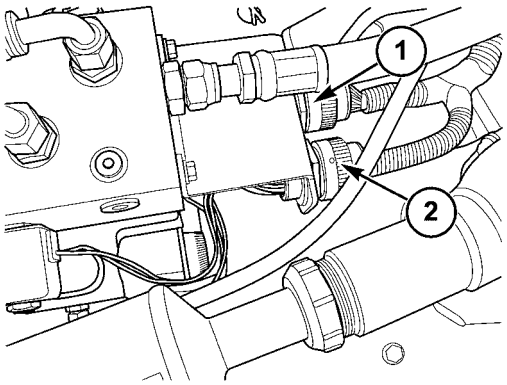
DE_DRC16-40S 51

Cavity	Circuit ID	Description
1	548 (WH)	Output to lateral tilt CCW L-19
2	549 (WH)	Output to lateral tilt CW L-18
3	762 (WH)	Output to 2 speed powered rear axle RH L-54 & LH L-55
4	759 (WH)	Output to header height accumulator L-06
5	open	
6	open	
7	open	
8	open	
9	702 (BK)	To frame ground 2
10	703 (BK)	To frame ground 2
11	034 (OR)	Power from fuse F-44
12	open	
13	404 (YE)	Signal from cleaning fan RPM B-16
14	489 (YE)	Signal from feeder RPM B-14
15	1053 (WH)	Output to feeder ring to frame clutch L-50
16	704 (BK)	To frame ground 2
17	741 (YE)	Signal from lateral tilt pot R-02
18	501 (BL)	Reference ground from sensors
19	705 (GY)	Output to shoe leveling actuator M-03
20	706 (GY)	Output to shoe leveling actuator M-03
21	1051 (WH)	Output to feeder pump swash minus L-48
22	739 (YE)	Signal from right height / tilt R-13
23	1102 (YE)	Not used
24	738 (YE)	Signal from left height / tilt R-12
25	722 (YE)	Signal from header lift pressure B-29
26	726 (PK)	Reference voltage to sensors
27	open	
28	743 (YE)	Not used
29	700 (RD)	Power from fuse F-22
30	701 (RD)	Power from fuse F-22
31	1050 (WH)	Output to feeder pump swash plus L-49
32	721 (YE)	Signal from shoe leveling actuator M-03
33	773 (YE)	Signal from hydrostat motor temperature B-46
34	1103 (YE)	Signal from center height / tilt R-19

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Cavity	Circuit ID	Description
35	open	
36	485 (YE)	Signal from unload cradle B-38
37	415 (YE)	Signal from spreader position B-11
38	435 (YE)	Signal from covers closed B-47
39	708 (WH)	Output to shoe leveling actuator M-03
40	709 (WH)	Output to shoe leveling actuator M-03

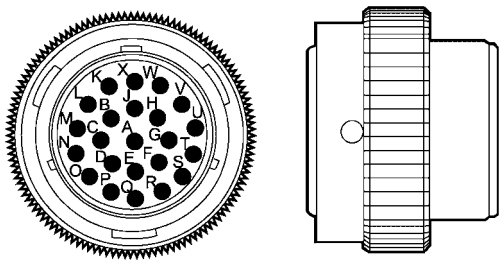
Connector X021 - Front Frame Harness to Feeder Valve Stack



10031037A5 52

Behind feeder valve manifold on left side of feeder

1. Connector **X007**
2. Connector X021



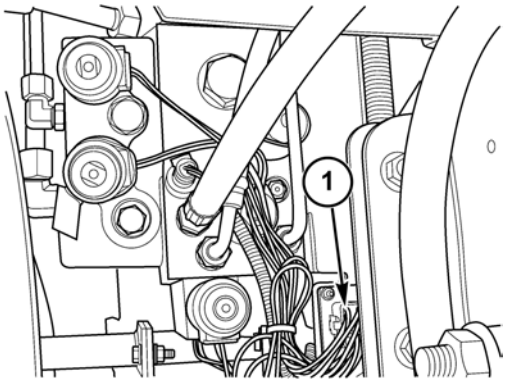
DE_HDP26-24-23S 53

Cavity	Circuit ID	Description
A	open	
B	open	
C	open	
D	open	
E	556 (WH)	CCM2 J3-2 to reel drive L-17
F	585 (BK)	Reel drive L-17 to frame ground 2
G	549 (WH)	CCM1 J3-2 to lateral tilt CW L-18
H	554 (BL)	Lateral tilt CW L-18 to CCM1 J2-10
J	548 (WH)	CCM1 J3-1 to lateral tilt CCW L-19
K	553 (BL)	Lateral tilt CCW L-19 to CCM1 J2-10
L	558 (WH)	CCM2 J3-3 to reel up L-14
M	587 (BK)	Reel up L-14 to frame ground 2

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Cavity	Circuit ID	Description
N	557 (WH)	CCM2 J3-4 to reel down L-13
O	586 (BK)	Reel down L-13 to frame ground 2
P	560 (WH)	CCM2 J3-1 to reel fore L-16
Q	589 (BK)	Reel fore L-16 to frame ground 2
R	559 (WH)	CCM2 J3-5 to reel aft L-15
S	588 (BK)	Reel aft L-15 to frame ground 2
T	open	
U	open	
V	open	
W	open	
X	open	

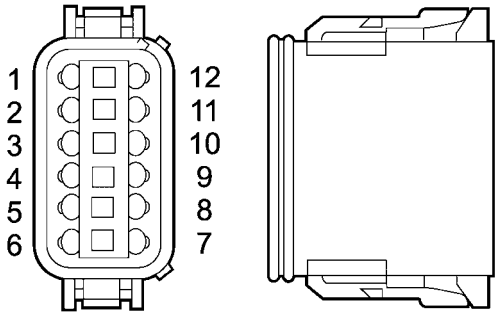
Connector X022 - Main Frame Harness to Valve Stack



10031033A4 54

Left side of main frame, behind main frame valve assembly

1. Connector X022



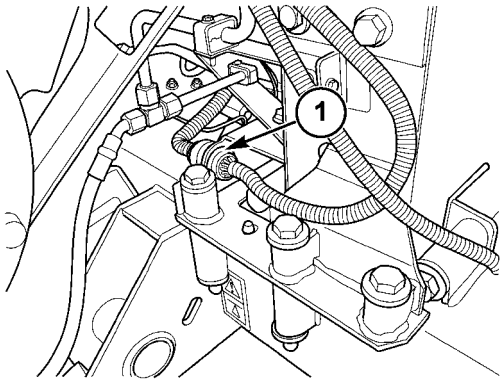
DEU_DT06-12S 55

Cavity	Circuit ID	Description
1	1119 (WH)	CCM2 J3-12 to signal valve L-43
2	574 (WH)	CCM2 J2-6 to unload tube in L-03
3	573 (WH)	CCM2 J2-16 to unload tube out L-04
4	1112 (WH)	CCM1 J2-4 to header raise L-11
5	1113 (WH)	CCM1 J2-5 to header lower L-12
6	1117 (BK)	Header raise L-11 to CCM1 J2-20
7	1118 (BK)	Header lower L-12 to CCM1 J2-20
8	1121 (BK)	Signal valve L-43 to frame ground 2

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Cavity	Circuit ID	Description
9	599 (BK)	Unload tube in L-03 to frame ground 2
10	598 (BK)	Unload tube out L-04 to frame ground 2
11	759 (WH)	CCM1 J3-4 to header height accumulator L-06
12	760 (BK)	Header height accumulator L-06 to frame ground 2

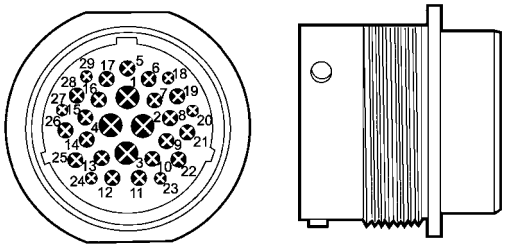
Connector X023 - Front Frame Harness to Lower Frame Harness



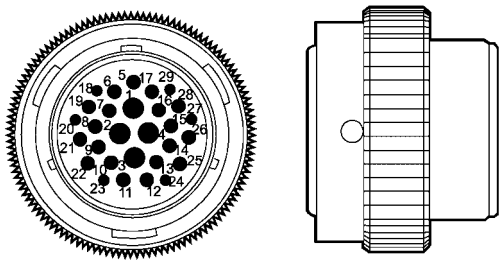
10031038A5 56

Left side of front axle, below feeder pivot

1. Connector X023



DE_HDP24-24-29P 57



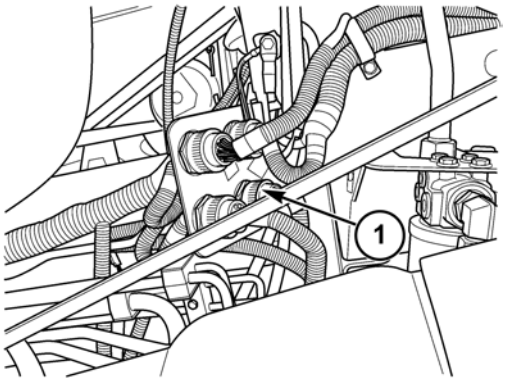
DE_HDP26-24-29S 58

Cavity	Circuit ID	Description
1	707 (GY)	CCM1 J3-19/20 to shoe leveling actuator M-03
2	710 (WH)	CCM1 J3-39/40 to shoe leveling actuator M-03
3	715 (GY)	CCM2 J3-19/20 to transmission shift motor M-02
4	716 (WH)	CCM2 J3-39/40 to transmission shift motor M-02

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Cavity	Circuit ID	Description
5	042 (BL)	Ground speed RPM B-17 and transmission shift position B-37 reference ground to CCM2 J3-18
6	403 (YE)	Ground speed RPM B-17 to CCM2 J3-14
7	404 (YE)	Cleaning fan RPM B-16 to CCM1 J3-13
8	405 (YE)	Transmission shift position B-37 (1st) to CCM2 J3-36
9	406 (YE)	Transmission shift position B-37 (2nd) to CCM2 J3-37
10	407 (YE)	Transmission shift position B-37 (N) to CCM2 J3-28
11	408 (YE)	Transmission shift position B-37 (3rd) to CCM2 J3-38
12	409 (YE)	Transmission shift position B-37 (4th) to CCM2 J3-27
13	575 (WH)	CCM2 J3-15 to pressure release L-05
14	434 (YE)	Brake wear switches S-55 & S-56 to CCM1 J2-26
15	721 (YE)	Shoe leveling actuator M-03 to CCM1 J3-32
16	723 (BL)	Shoe leveling actuator M-03, cleaning fan RPM B-16 and hydrostat motor temp B-46 reference ground to CCM1 J3-18
17	727 (PK)	CCM1 J3-26 to shoe leveling actuator M-03
18	1259 (OR)	Fuse F-45 to cleaning fan RPM B-16
19	open	
20	open	
21	762 (WH)	CCM1 J3-3 to 2 speed powered rear axle L-54 & L-55
22	open	
23	open	
24	open	
25	765 (BK)	Pressure release L-05 and 2 speed powered rear axle L-54 & L-55 to frame ground 2
26	773 (YE)	Hydrostat motor temp B-46 to CCM1 J3-33
27	open	
28	835 (YE)	Not used
29	836 (BK)	Brake wear switches S-55 & S-56 to frame ground 2

Connector X024 (RED) - Main Frame Harness to Straw Hood Front Harness

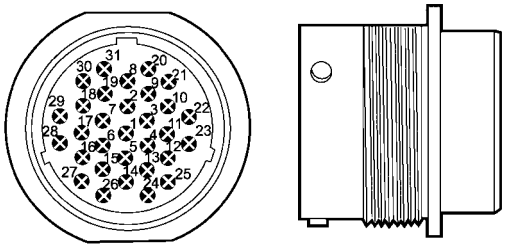


10033642C4 59

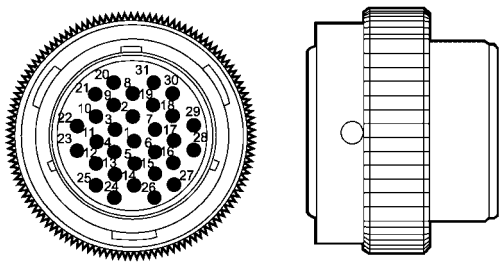
Left side of frame, in front of PTO gearbox

1. Connector X024

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DE_HDP24-24-31P 60



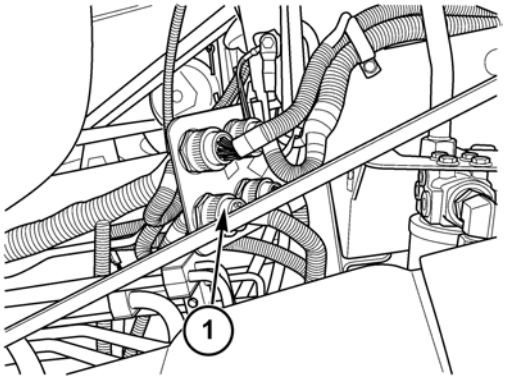
DE_HDP26-24-31S 61

Cavity	Circuit ID	Description
1	1254 (OR)	Fuse F-45 to spreader RPM B-55
2	078 (PU)	Brake lights relay K-33 to brake lights E-05/E-06/E-11/E-12 and trailer outlet J-09
3	414 (YE)	Spreader RPM B-55 to CCM2 J2-28
4	415 (YE)	Spreader position B-11 to CCM1 J3-37
5	431 (YE)	Sieves loss B-21 to CCM1 J2-25
6	open	
7	447 (YE)	Returns filter bypass S-32 to CCM1 J2-34
8	448 (YE)	PTO box filter bypass S-34 to CCM1 J2-35
9	243 (PU)	Flasher module A-05 to LH flashing lamp E-07
10	244 (PU)	Flasher module A-05 to RH flashing lamp E-08
11	461 (BL)	Reference ground from sensors to CCM1 J2-14
12	492 (BL)	Spreader RPM B-55 reference ground to CCM2 J2-14
13	452 (BL)	CCM1 J2-6 to back up alarm H-08
14	485 (YE)	Unload cradle B-38 to CCM1 J3-36
15	569 (WH)	CCM1 J2-16 to rear wheel assist L-26
16	570 (YE)	Rear ladder B-22 to CCM1 J2-17
17	576 (WH)	CCM1 J2-15 to chaff spreader L-28
18	open	
19	578 (PU)	Beacon light relay K-29 to rear beacon light E-33
20	614 (PU)	Flasher module A-05 to LH flashing lamps E-05 & trailer outlet J-09
21	617 (PU)	Flasher module A-05 to RH flashing lamps E-06 & trailer outlet J-09
22	open	
23	open	
24	067 (PU)	Rear work lights relay K-31 to rear work lights E-27 & E-28

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Cavity	Circuit ID	Description
25	1215 (RD)	Fuse F-34 to engine light switch S-64
26	open	
27	open	
28	604 (OR)	Fuse F-14 to sieve light switch S-54
29	625 (PU)	Fuse F-20 to LH marker lights E-11, E-05 & trailer outlet J-09
30	626 (PU)	Fuse F-21 to RH marker lights E-12, E-06 & trailer outlet J-09
31	649 (RD)	Fuse F-15 to side service sockets J-03 & J-04

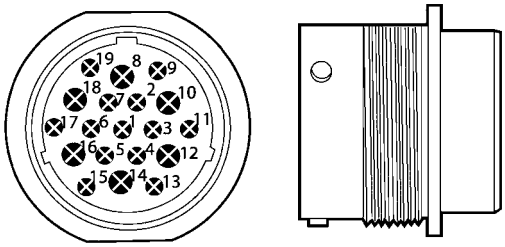
Connector X025 (BLUE) - Expansion Harness to Straw Hood Harness



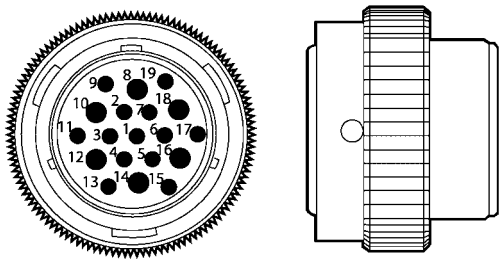
10033642D4 62

Left side of frame, in front of PTO gearbox

1. X025



DE_HDP24-24-19P 63



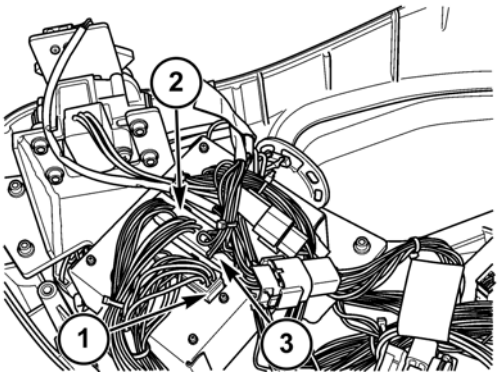
DE_HDP26-24-19S 64

Cavity	Circuit ID	Description
1	683 (PK)	CCM3 J2-31 to sieve actuators M-06 & M-07
2	439 (BL)	Sieve actuators M-06 & M-07 reference ground to CCM3 J2-14

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Cavity	Circuit ID	Description
3	475 (YE)	Upper sieve actuator to CCM3 J2-22
4	476 (YE)	Lower sieve actuator M-07 to CCM3 J2-19
5	open	
6	539 (YE)	Upper sieve rear adjust S-35 to CCM3 J2-34
7	540 (YE)	Upper sieve rear adjust S-35 to CCM3 J2-17
8	open	
9	541 (YE)	Lower sieve rear adjust S-46 to CCM3 J2-39
10	open	
11	542 (YE)	Lower sieve rear adjust S-46 to CCM3 J2-35
12	open	
13	551 (BK)	Lower sieve rear adjust S-46 to frame ground 2
14	785 (GY)	CCM3 J2-1 to upper sieve actuator M-06 and lower sieve actuator M-07
15	790 (WH)	Upper / lower sieve relay K-18 to lower sieve actuator M-07
16	open	
17	792 (WH)	Upper / lower sieve relay K-18 to upper sieve actuator M-06
18	1253 (PK)	Not used
19	550 (BK)	Upper sieve rear adjust S-35 to frame ground 2

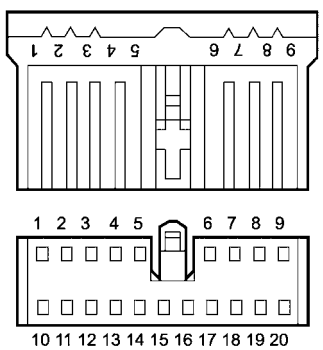
Connector X026 - Right Console Harness to Right Hand Module



10031051C4 65

Inside right hand console

1. Connector X026
2. Connector **X027**
3. Connector **X028**

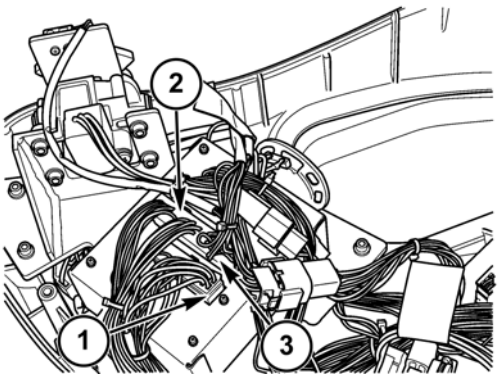


AMP_O-174952-1 66

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Cavity	Circuit ID	Description
1	130 (GN)	CAN Low
2	129 (YE)	CAN High
3	136 (BK)	RS232 - RX
4	098 (OR)	Power from fuse F-48
5	089 (OR)	Power from Fuse F-48
6	320 (BL)	Reference ground from ground speed pot R-04, engine throttle pot R-21, gear select S-24 and resistor module R-23
7	open	
8	open	
9	open	
10	128 (GN)	CAN Low
11	127 (YE)	CAN High
12	135 (RD)	RS232 - TX
13	051 (RD)	Keep alive power from fuse F-39
14	open	
15	389 (BK)	To cab ground 3
16	316 (PK)	Reference voltage to ground speed pot R-04, engine throttle pot R-21, gear select S-24 and resistor module R-23
17	open	
18	388 (BK)	Audio alarm H-01 ground
19	376 (WH)	Output to audio alarm H-01
20	352 (BK)	To cab ground 3

Connector X027 - Right Console Harness to Right Hand Module

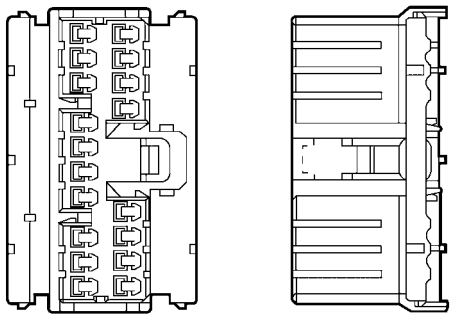


10031051C4 67

Inside right hand console

1. Connector **X026**
2. Connector X027
3. Connector **X028**

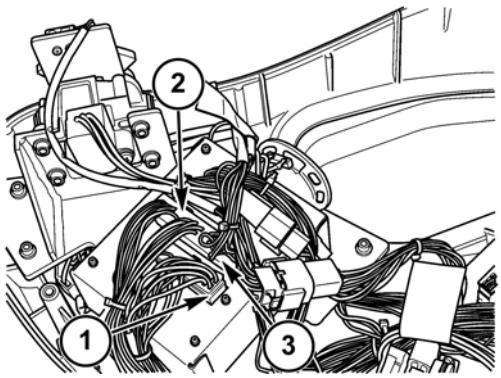
https://truckmanualshub.com/



AMP_173853 68

Cavity	Circuit ID	Description
1	381 (YE)	Signal from ground speed pot R-04
2	open	
3	1093 (WH)	Signal from header speed pot R-18
4	364 (BK)	To cab ground 3
5	356 (BK)	To cab ground 3
6	304 (YE)	Signal from HHC fine adjust S-06 (+)
7	303 (YE)	Signal from HHC fine adjust S-06 (-)
8	1257 (PU)	Output to on the road switch S-12 (lamp)
9	1013 (WH)	Signal from reel speed pot R-22
10	1014 (WH)	Signal from throttle speed pot R-21
11	391 (YE)	Signal from gear select S-24
12	open	
13	1282 (PU)	Output to rear wheel assist HI / LO S-11 (lamp)
14	1012 (WH)	Output to header height mode 2 S-68 (lamp)
15	1094 (PU)	Output to reel speed mode S-08 (lamp)
16	353 (PU)	Output to header height mode 1 S-04 (lamp)
17	1281 (PU)	Output to header mode switch S-69 (lamp)
18	1256 (PU)	Output to rear wheel assist S-10 (lamp)

Connector X028 - Propulsion Handle Harness to Right Hand Module

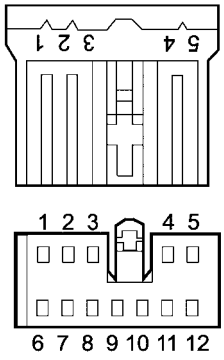


10031051C4 69

Inside right hand console

1. Connector **X026**
2. Connector **X027**
3. Connector X028

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AMP_O-173851-1 70

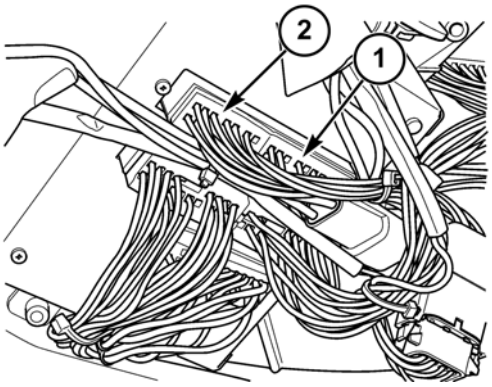
Cavity	Circuit ID	Description
1	WH	Unload circuits - common
2	GN	Header tilt right
3	open	
4	RD	Unload engage / reel raise
5	PK	Header tilt left / reel fore
6	GY	Header circuits - common
7	PU	Reel circuits, emergency stop - common
8	BL	Emergency stop
9	YE	Header resume / unload swing in / reel aft
10	OR	Header raise
11	BK	Header lower / unload swing out / reel lower
12	open	

NOTE: *Use the following table to determine the correct pin combinations for each switch on the propulsion handle. The propulsion handle circuits contain diodes, so the multimeter test leads must be connected to the proper pins as indicated in the table.*

Switch	+ Pin	- Pin
Head raise	10	6
Head lower	11	6
Head tilt left	5	6
Head tilt right	2	6
Header resume	9	6
Unload swing out	11	1
Unload swing in	9	1
Unload engage	4	1
Reel raise	4	7
Reel lower	11	7
Reel fore	5	7
Reel aft	9	7
Emergency stop	8	7

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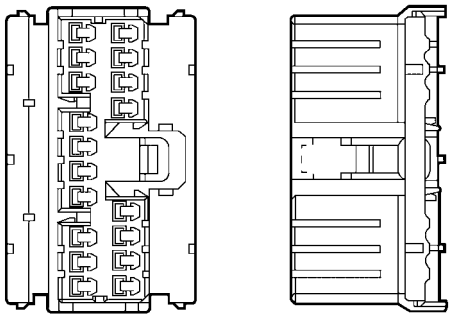
Connector X029 - Right Console Harness to Right Hand Module



10031052A4 71

Inside right hand console

1. Connector X029
2. Connector **X030**

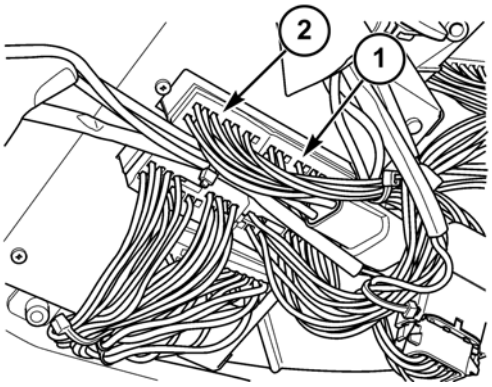


AMP_173853 72

Cavity	Circuit ID	Description
1	335 (YE)	Signal from park brake S-09 (off)
2	1008 (WH)	Signal from header mode switch S-69
3	1010 (WH)	Signal from header height mode 1 S-04
4	open	
5	326 (YE)	Signal from feeder engage S-31
6	337 (YE)	Signal from rear wheel assist HI / LO S-11
7	230 (YE)	Signal from vertical knives S-51 (both)
8	1122 (WH)	Signal from separator engage S-30
9	334 (YE)	Signal from park brake S-09 (ON)
10	1009 (WH)	Signal from reel speed mode S-08
11	open	
12	1011 (WH)	Signal from header height mode 2 S-68
13	open	
14	325 (YE)	Not used
15	229 (YE)	Signal from vertical knives S-51 (right)
16	339 (YE)	Signal from on the road switch S-12
17	336 (YE)	Signal from rear wheel assist S-10
18	324 (YE)	Not used

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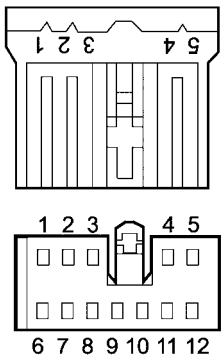
Connector X030 - Right Console Harness to Right Hand Module



10031052A4 73

Inside right hand console

1. Connector **X029**
2. Connector X030

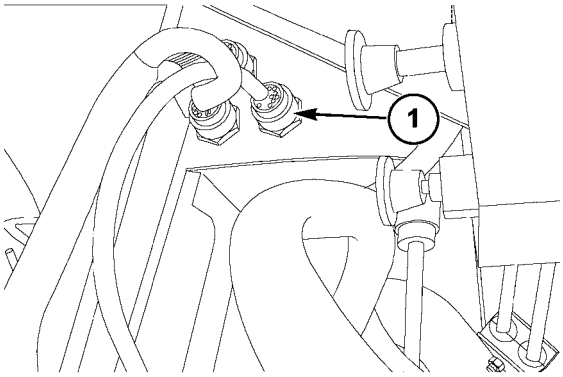


AMP_O-173851-1 74

Cavity	Circuit ID	Description
1	342 (YE)	Signal from lower sieve S-14 (decrease)
2	341 (YE)	Signal from upper sieve S-13 (increase)
3	347 (YE)	Signal from concave clearance S-16 (increase)
4	348 (YE)	Signal from rotor speed S-17 (decrease)
5	open	
6	343 (YE)	Signal from lower sieve S-14 (increase)
7	340 (YE)	Signal from upper sieve S-13 (decrease)
8	346 (YE)	Signal from concave clearance S-16 (decrease)
9	344 (YE)	Signal from fan speed S-15 (decrease)
10	345 (YE)	Signal from fan speed S-15 (increase)
11	349 (YE)	Signal from rotor speed S-17 (increase)
12	open	

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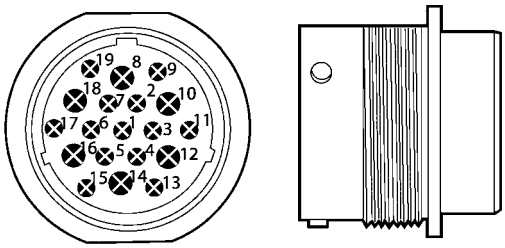
Connector X031 - Cab Main Harness to Front Frame Harness



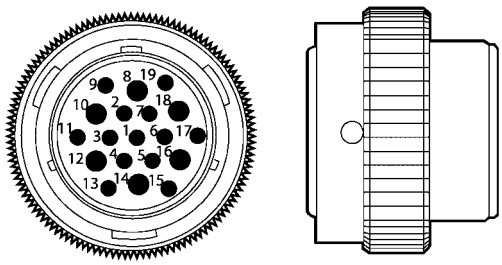
40033777C5 75

Left rear corner of cab, near park brake valve

1. Connector X031



DE_HDP24-24-19P 76



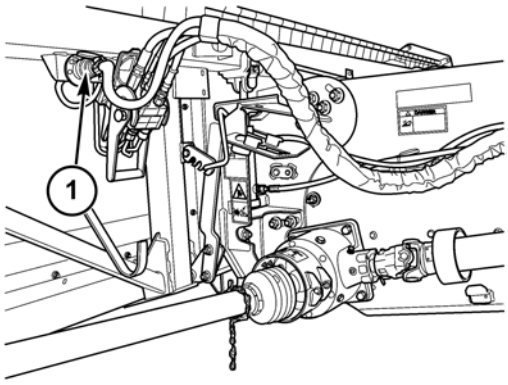
DE_HDP26-24-19S 77

Cavity	Circuit ID	Description
1	034 (OR)	Fuse F-44 to CCM1 J3-11
2	038 (OR)	Fuse F-36 to CCM2 J3-11
3	027 (RD)	Not used
4	028 (RD)	Fuse F-23 to CCM2 J3-7
5	1501 (YE)	Brake fluid level switch S-49 to CCM1 J2-26
6	752 (PU)	Fuse F-21 to header marker lights E-40 & E-41 (EU)
7	580 (OR)	Not used
8	714 (WH)	Not used
9	768 (WH)	Not used
10	719 (WH)	Not used
11	open	

https://truckmanualshub.com/

Cavity	Circuit ID	Description
12	763 (WH)	Not used
13	open	
14	029 (RD)	Fuse F-25 to CCM2 J3-29/30
15	open	
16	024 (RD)	Fuse F-22 to CCM1 J3-29/30
17	open	
18	open	
19	open	

Connector X032 - Feeder Harness to Header Harness



10031256A4 78

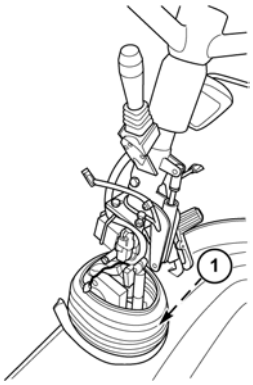
1. Connector X032

Cavity	Circuit ID	Description
1	738 (YE)	Left height / tilt R-12 to CCM1 J3-24
2	739 (YE)	Right height / tilt R-13 to CCM1 J3-22
3	1102 (YE)	Not used
4	1103 (YE)	Center height / tilt R-19 to CCM1 J3-34
5	848 (PK)	CCM1 J3-26 to height / tilt sensors R-12, R-13 & R-19 (5 volt ref)
6	847 (BL)	Height / tilt sensors R-12, R-13 & R-19 reference ground to CCM1 J3-18
7	open	
8	open	
9	open	
10	open	
11	open	
12	1223 (PK)	CCM2 J3-26 to header type module R-20 (5 volt ref)
13	750 (BL)	Header type module R-20 reference ground to CCM2 J3-18
14	open	
15	open	
16	open	
17	open	
18	open	
19	open	
20	712 (WH)	CCM2 J3-8 to draper header solenoid L-53
21	776 (BK)	Ground path for flip up road light relays K-40, K-41
22	613 (PU)	Flasher module A-05 to LH header flashing light E-01 (NA only)

https://truckmanualshub.com/

Cavity	Circuit ID	Description
23	849 (PK)	Not used
24	752 (PU)	Road light switch S-26 to header marker lights E-40, E-41 (EU only)
25	846 (BL)	Not used
26	711 (GY)	CCM2 J3-6 to draper header solenoid L-53
27	1116 (YE)	Header type module R-20 to CCM2 J3-24
28	618 (PU)	Flasher module A-05 to RH header flashing light E-02 (NA only)
29	open	
30	767 (BK)	Header lights to frame ground 2
31	open	

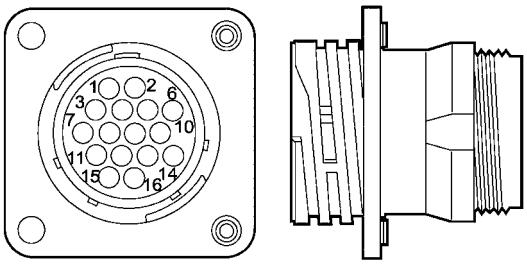
Connector X033 - Cab Main Harness to Steering Column Harness



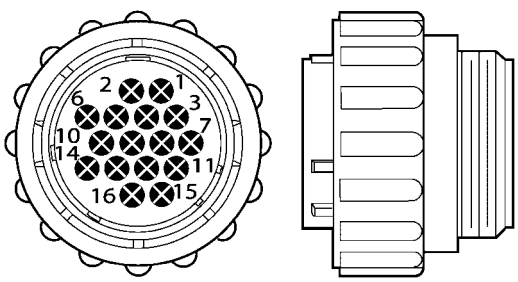
10010914A4 79

Base of steering column, behind cover

1. Connector X033



AMP_206036-1 80

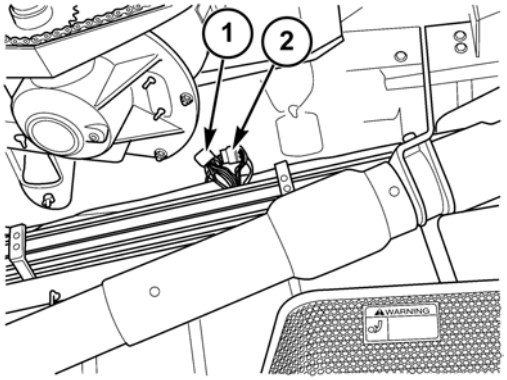


AMP_206037-1 81

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Cavity	Circuit ID	Description
1	054 (RD)	Fuse F-56 to hazard switch S-25
2	1209 (PU)	Hazard switch S-25 to CCM2 J1-15
3	open	
4	043 (YE)	Road light switch S-26 to high beam indicator E-10
5	open	
6	201 (PU)	Road light switch S-26 to flasher module A-05
7	196 (PU)	Flasher module A-05 to RH flashing lamps E-02, E-04, E-06, E-51 & trailer outlet J-09
8	197 (PU)	Road light switch S-26 to flasher module A-05
9	200 (PU)	Flasher module A-05 to LH flashing lamps E-01, E-03, E-05, E-52 & trailer outlet J-09
10	204 (YE)	CCM2 J1-5 to flasher module A-05 (ISO/NASO)
11	open	
12	219 (BK)	Flasher module A-05, indicator lamps E-09 & E-10 and hazard switch S-25 to cab ground 3
13	243 (PU)	Flasher module A-05 to LH flashing lamp E-07
14	244 (PU)	Flasher module A-05 to RH flashing lamp E-08
15	open	
16	open	

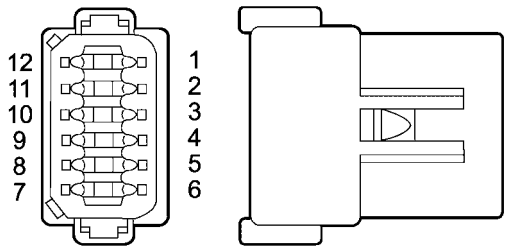
Connector X034 - Main Frame Harness to Expansion Harness



10033635A4 82

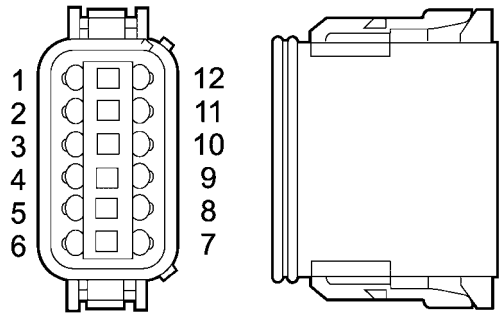
Left side of main frame, below grain tank

1. Connector X034
2. Connector **X034A**



DEU_DT04-12P 83

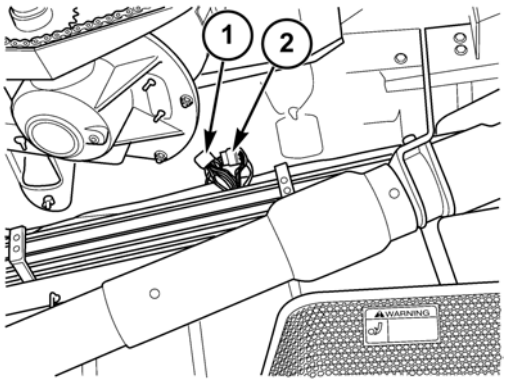
https://truckmanualshub.com/



DEU_DT06-12S 84

Cavity	Circuit ID	Description
1	030 (RD)	Fuse F-26 to CCM3 J3-29/30
2	031 (RD)	Fuse F-27 to CCM3 J2-11 & J3-7
3	035 (OR)	Fuse F-47 to YMIU module A-12 and sample motor M-28
4	036 (OR)	Fuse F-47 to CCM3 J2-2, J2-9 & J3-11
5	786 (RD)	CCM3 J2-21 to upper / lower sieve relay K-18
6	790 (WH)	Upper / lower sieve relay K-18 to lower sieve actuator M-07
7	792 (WH)	Upper / lower sieve relay K-18 to upper sieve actuator M-06
8	open	
9	open	
10	open	
11	819 (YE)	CAN High
12	820 (GN)	CAN Low

Connector X034A - Main Frame Harness to Expansion Harness

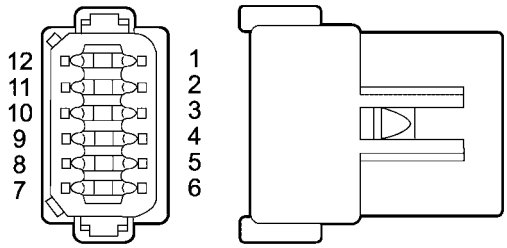


10033635A4 85

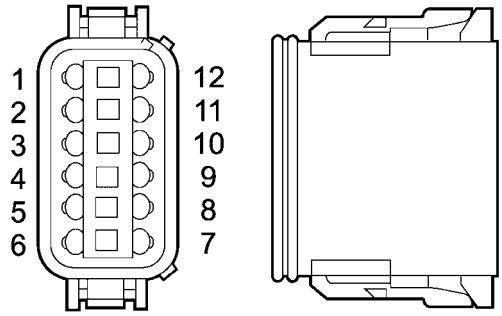
Left side of main frame, below grain tank

1. Connector **X034**
2. Connector X034a

https://truckmanualshub.com/



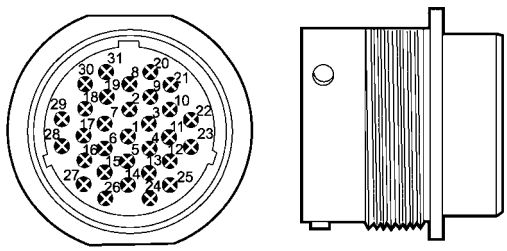
DEU_DT04-12P 86



DEU_DT06-12S 87

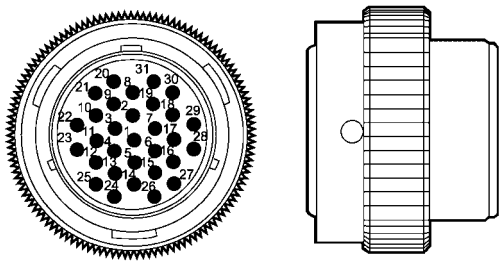
Cavity	Circuit ID	Description
1	1065 (BL)	CCM3 J2-10 to rotor pump swash plus L-40 & rotor pump swash minus L-41
2	1233 (BK/WH)	YMIU module A-12 to battery clean ground
3	1047 (WH)	CCM3 J3-21 to rotor pump swash minus L-41
4	1046 (WH)	CCM3 J3-31 to rotor pump swash plus L-40
5	1048 (WH)	CCM3 J2-30 to rotor engine to ring clutch L-45
6	open	
7	1069 (YE)	Rotor hydrostat RPM B-58 to CCM3 J3-14
8	1062 (BL)	CCM3 J2-40 to rotor engine to ring clutch L-45
9	1049 (WH)	CCM3 J3-3 to rotor ring to frame clutch L-46
10	1068 (YE)	Rotor RPM B-01 to CCM3 J3-13
11	1230 (YE)	CAN High
12	1231 (GN)	CAN Low

Connector X036 - Cab Roof Harness to Outer Roof Harness



DE_HDP24-24-31P 88

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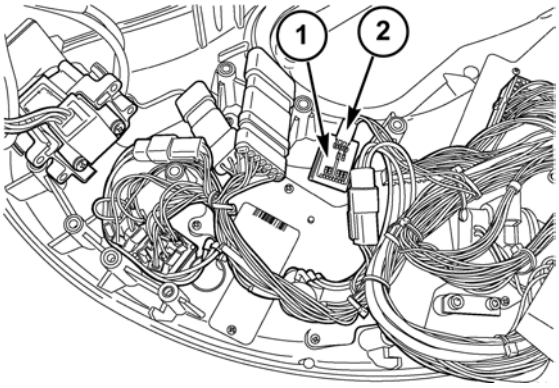


DE_HDP26-24-31S 89

Cavity	Circuit ID	Description
1	058 (PU)	Cab roof work lights relay K-01 to LH cab outer work light E-15
2	059 (PU)	Cab roof work lights relay K-01 to RH cab outer work light E-16
3	open	
4	063 (PU)	Header work lights relay K-22 to cab mid work lights E-19 & E-20
5	072 (PU)	Side work light relay K-35 to RH side work light E-26
6	076 (PU)	Timed side work light relay K-34 to LH side work light E-25
7	579 (PU)	Beacon light relay K-29 to front beacon lights E-31 & E-32
8	245 (BK)	HID field lights E-60 & E-61 to work light switch S-43
9	open	
10	262 (BK)	LH cab outer work light E-15 and LH cab mid work light E-19 to cab roof ground 4
11	266 (BK)	RH cab outer work light E-16 and RH cab mid work light E-20 to cab roof ground 4
12	295 (BK)	Side work lights E-25/26, mirror heat R-10/11/14 and cab inner work lights E-17/18 to cab roof ground 4
13	665 (BK)	Front beacon lights E-31 & E-32 to cab roof ground 4
14	280 (BK)	Wiper motor M-25 to cab roof ground 4
15	275 (WH)	Wiper switch S-20 to wiper motor M-25
16	open	
17	open	
18	931 (OR)	Mirror heat switch S-19 to mirror heat R-10, R-11 & R-14
19	955 (WH)	Switch bypass fuses F-64 OR Mirror select switch S-57 (Germany) to RH mirror up / down M-19
20	963 (WH)	Mirror select switch S-57 to German mirror up / down M-30
21	962 (WH)	Switch bypass fuses F-64 OR Mirror select switch S-57 (Germany) to RH mirror in / out M-20
22	958 (WH)	Mirror adjust switch S-27 to LH mirror up / down M-21
23	959 (WH)	Mirror adjust switch S-27 to LH mirror in / out M-22
24	964 (WH)	Mirror select switch S-57 to German mirror in / out M-31
25	961 (GY)	LH mirror M-21/22 to mirror adjust switch S-27
26	954 (GY)	RH mirror M-19/20 and German mirror M-30/31 to mirror adjust switch S-27
27	978 (PU)	Road lights relay K-27 to cab inner work lights E-17 & E-18 (low beam)
28	981 (PU)	Road lights relay K-27 to cab inner work lights E-17 & E-18 (high beam)
29	210 (PU)	Header work lights relay K-22 to HID field lights E-60 & E-61
30	open	

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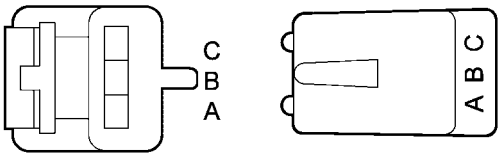
Connector X048 - Right Console Harness to Gear Select Switch S-24



50031061B4 90

Inside right hand console

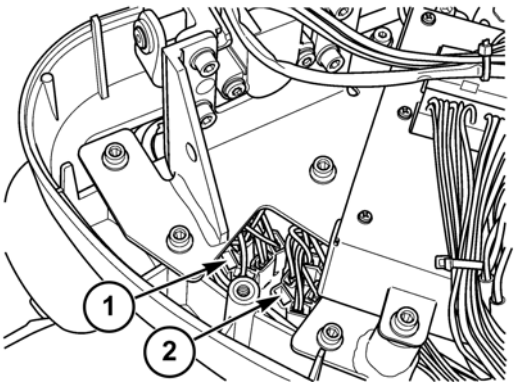
1. Gear select switch S-24
2. Connector X048



JST_VHR-3N 91

Cavity	Circuit ID	Description
1	1016 (PK)	5 volt reference from RHM X026 pin 16
2	391 (YE)	Signal to RHM X027 pin 11
3	1015 (BL)	Ground to RHM X026 pin 6

Connector X055 - Right Console Harness to Separator Engage S-30

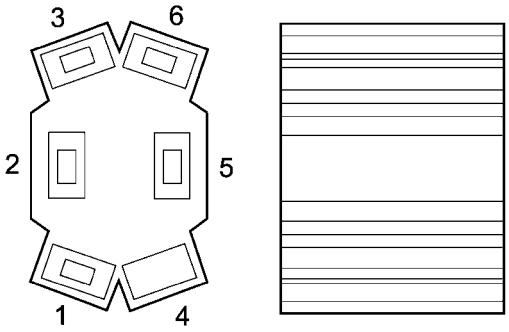


10031050A4 92

Inside right hand console

1. Connector X055 to Separator Engage switch S-30
2. Connector **X056** to Feeder Engage switch S-31

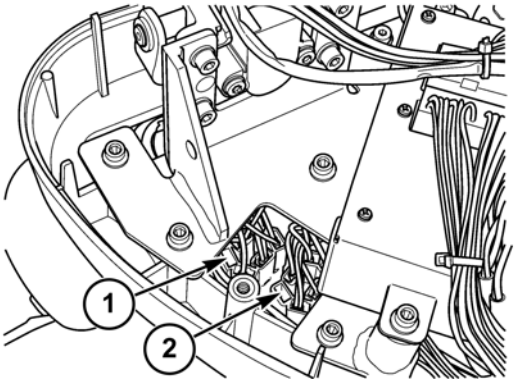
https://truckmanualshub.com/



PAC_8911352 93

Cavity	Circuit ID	Description
1	1122 (WH)	Signal to RHM X029 pin 8 (deslug)
2	110 (OR), 300 (OR)	Power from fuse F-48 (110-OR), supply to neutral switch S-22 (300-OR)
3	302 (YE), 1212 (YE)	Signal to feeder engage S-31 (302-YE), signal to CCM3 J1-17 (1212-YE)
4	plug	
5	110 (OR), 1180 (OR)	Power from fuse F-48 (1180-OR), jumper to pin 2 (110-OR)
6	147 (YE)	Signal to CCM2 J1-7 and CCM3 J1-7

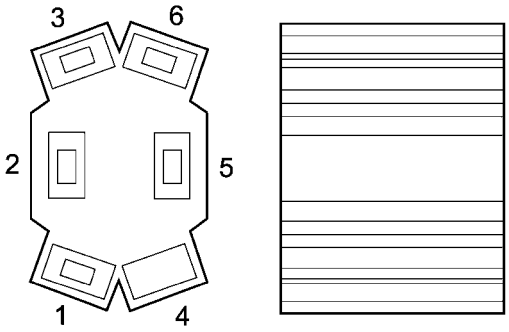
Connector X056 - Right Console Harness to Feeder Engage S-31



10031050A4 94

Inside right hand console

1. Connector **X055** to Separator Engage switch S-30
2. Connector X056 to Feeder Engage switch S-31

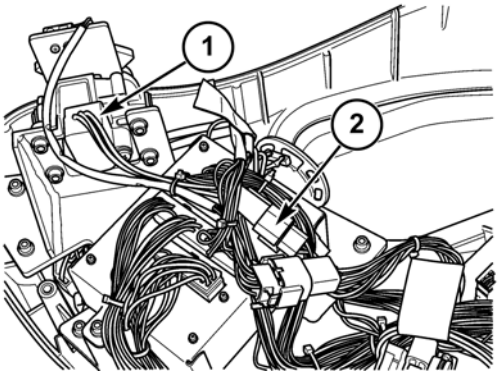


PAC_8911352 95

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	326 (YE), 1244 (YE)	Signal to RHM X029 pin 5 (326-YE)[reverse], signal to feeder engage diodes D-01 (1244-YE)
2	358 (OR)	Power from fuse F-48
3	1211 (YE)	Signal to feeder disengage relay K-19
4	plug	
5	302 (YE)	Power from separator engage S-30
6	112 (YE), 1243 (YE)	Signal to CCM1 J1-7 (112-YE), signal to feeder engage diodes D-01 (1243-YE)

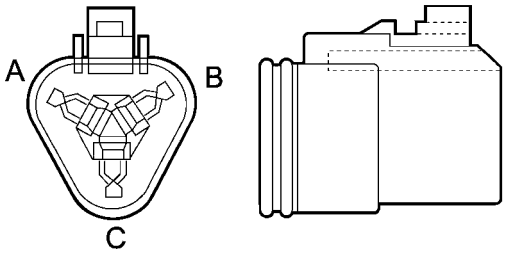
Connector X057 - Right Console Harness to Ground Speed Pot R-04



10031051A4 96

Inside right hand console

1. Ground speed potentiometer R-04
2. Connector X057

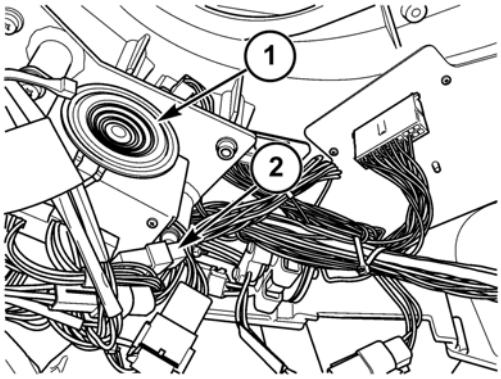


DEUTSCH_DT06-3S 97

Cavity	Circuit ID	Description
A	1030 (PK)	5 volts from RHM X026 pin 16
B	1029 (BL)	Reference ground to RHM X026 pin 6
C	381 (YE)	Signal to RHM X027 pin 11

https://truckmanualshub.com/

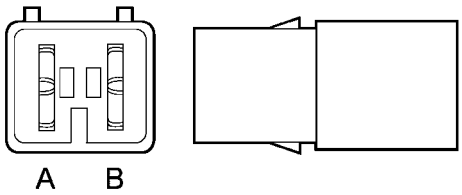
Connector X058 - Right Console Harness to Audio Alarm H-01



10031053A4 98

Inside right hand console

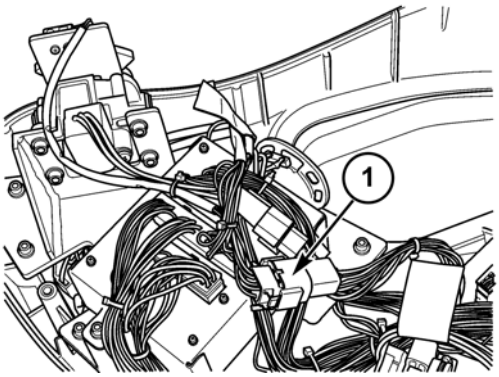
1. Audio alarm H-01
2. Connector X058



AMP_180923 99

Cavity	Circuit ID	Description
A	388 (BK)	To RHM X026 pin 18
B	376 (WH)	To RHM X026 pin 19

Connector X059 - Right Console Harness to Propulsion Harness

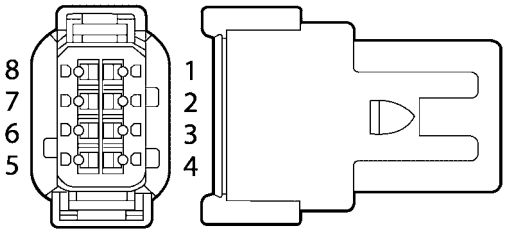


10031051B4 100

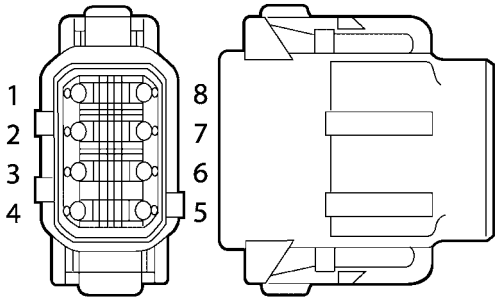
Inside right hand console

1. Connector X059

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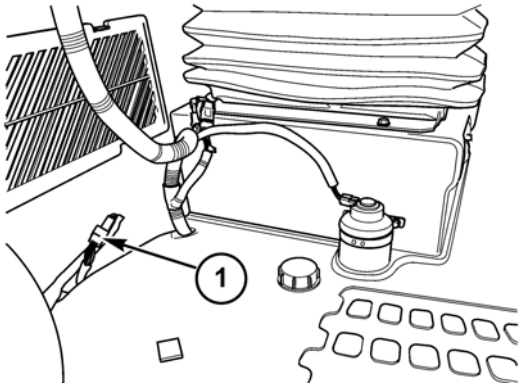
DEU_DTM04-8P 101



DEU_DTM06-8S 102

Cavity	Circuit ID	Description
1	1027 (PU)	Power from fuse F-48
2	1031 (BK)	To cab ground 3
3	300 (OR)	Power from fuse F-48
4	093 (WH)	Neutral switch S-22 to neutral start relay K-23
5	113 (YE)	Neutral switch S-22 to CCM2 J1-17
6	open	
7	open	
8	open	

Connector X064 - Cab Main Harness to Adapter Display Harness

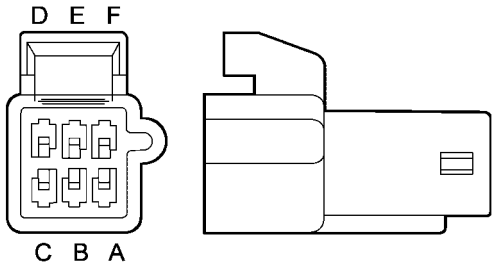


10031048A4 103

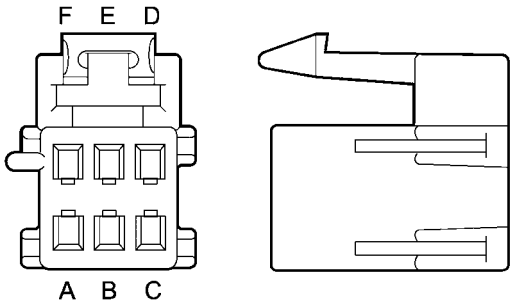
Right side of cab floor, under right hand console

1. Connector X064

https://truckmanualshub.com/



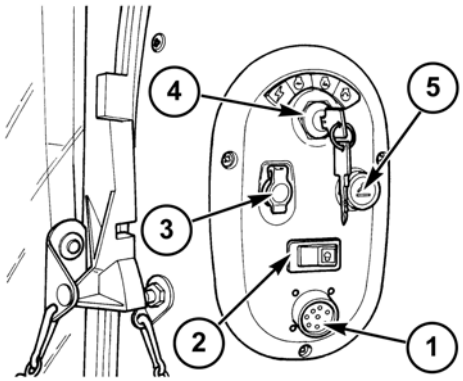
PAC_12064763 104



PAC_12064762 105

Cavity	Circuit ID	Description
A	143 (YE)	CAN High
B	open	
C	097 (OR)	Power from key switch S-02
D	057 (RD)	Keep alive power from fuse F-39
E	144 (GN)	CAN Low
F	145 (BK)	To cab ground 3

Connector X065 - Diagnostic and Maintenance (DAM) Connector

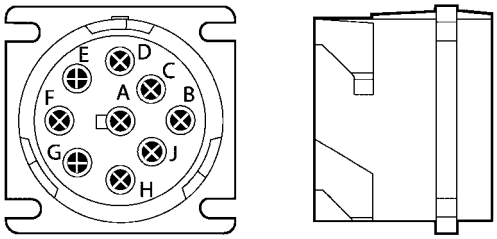


20021822A4 106

Right rear cab post

1. Connector X065
2. Cold start indicator lamp E-36 (connector **X066**)
3. Accessory socket J-08 (connector **X067**)
4. Key switch S-02 (connector **X068**)
5. Cigar lighter R-08 (connectors **X069** & **X070**)

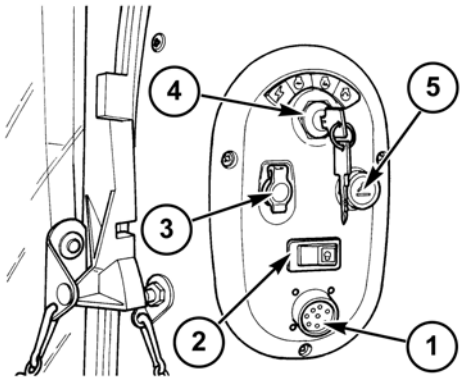
https://truckmanualshub.com/



DE_HD10-9-1939P 107

Cavity	Circuit ID	Description
A	146 (BK)	To cab ground 3
B	142 (RD)	Power from fuse F-39
C	271 (YE)	CAN High
D	270 (GN)	CAN Low
E	827 (YE)	Signal from ECU A-01 X193 pin 13
F	135 (RD)	RS232 TX from RHM X026 pin 12
G	136 (BK)	RS232 RX from RHM X026 pin 3
H	open	
J	open	

Connector X066 - Cab Main Harness to Cold Start Indicator E-36

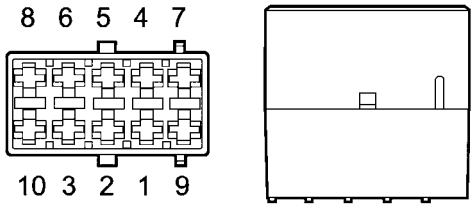


20021822A4 108

Right rear cab post

1. Connector **X065**
2. Cold start indicator lamp E-36 (connector X066)
3. Accessory socket J-08 (connector **X067**)
4. Key switch S-02 (connector **X068**)
5. Cigar lighter R-08 (connectors **X069** & **X070**)

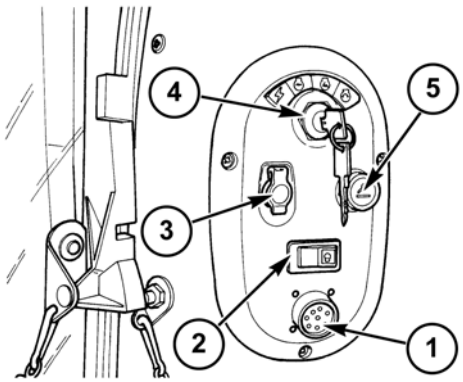
https://truckmanualshub.com/



EATON_25-13936 109

Cavity	Circuit ID	Description
1	open	
2	1002 (OR)	Not used
3	1159 (WH)	Not used
4	open	
5	open	
6	open	
7	814 (WH)	Signal from CCM2 J1-12
8	open	
9	294 (BK)	To cab ground 3
10	open	

Connector X067 - Cab Main Harness to Accessory Socket J-06

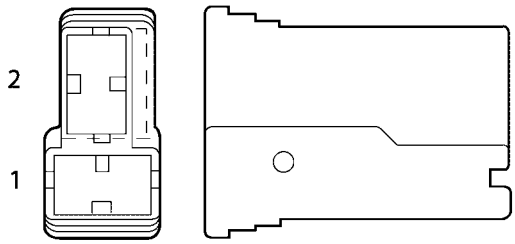


20021822A4 110

Right rear cab post

1. Connector **X065**
2. Cold start indicator lamp E-36 (connector **X066**)
3. Accessory socket J-08 (connector X067)
4. Key switch S-02 (connector **X068**)
5. Cigar lighter R-08 (connectors **X069** & **X070**)

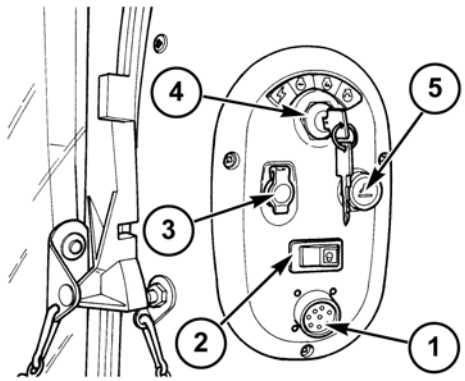
https://truckmanualshub.com/



AMP_926522 111

Cavity	Circuit ID	Description
1	151 (BK)	To cab ground 3
2	084 (OR)	Power from fuse F-08

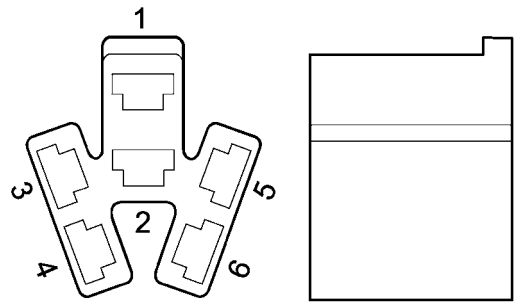
Connector X068 - Cab Main Harness to Key Switch S-02



20021822A4 112

Right rear cab post

1. Connector **X065**
2. Cold start indicator lamp E-36 (connector **X066**)
3. Accessory socket J-08 (connector **X067**)
4. Key switch S-02 (connector X068)
5. Cigar lighter R-08 (connectors **X069** & **X070**)



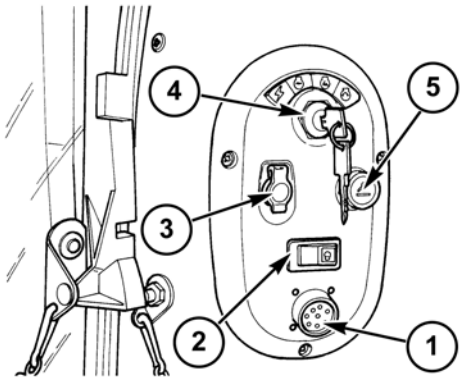
PAC_02984017 113

Cavity	Circuit ID	Description
1	053 (RD)	Power from fuse F-38
2	091 (OR)	Output to neutral start relay K-23 and CCM2 J1-21 (start)
3	open	

https://truckmanualshub.com/

Cavity	Circuit ID	Description
4	123 (OR)	Output to wiper relay K-06, accessory 1 relay K-08 and accessory 2 relay K-03
5	859 (OR)	Output to ECU A-01 X193 pin 15
6	096 (OR)	Output to CCM's, SSM, ICDU, and power relays K-24, K-25 & K-26

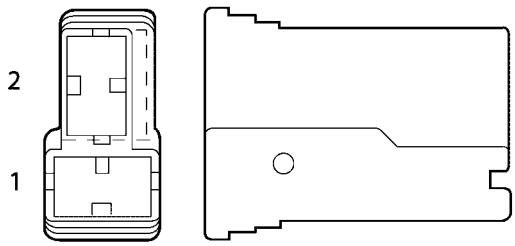
Connector X069 - Cab Main Harness to Lighter R-08



20021822A4 114

Right rear cab post

1. Connector **X065**
2. Cold start indicator lamp E-36 (connector **X066**)
3. Accessory socket J-08 (connector **X067**)
4. Key switch S-02 (connector **X068**)
5. Cigar lighter R-08 (connectors X069 & **X070**)

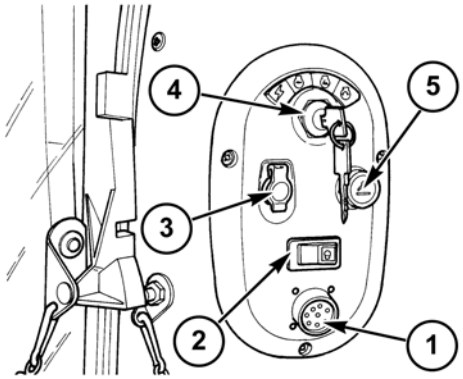


AMP_926522 115

Cavity	Circuit ID	Description
1	152 (BK)	To cab ground 3
2	085 (RD)	Power from fuse F-05

https://truckmanualshub.com/

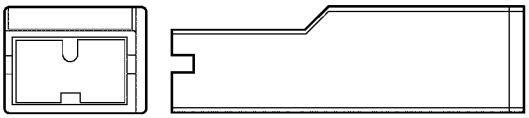
Connector X070 - Cab Main Harness to Lighter Backlight R-08



20021822A4 116

Right rear cab post

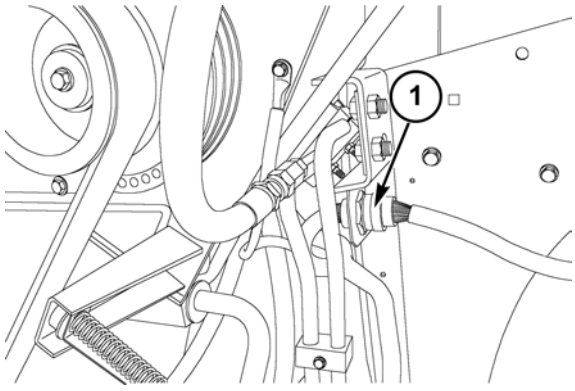
1. Connector **X065**
2. Cold start indicator lamp E-36 (connector **X066**)
3. Accessory socket J-08 (connector **X067**)
4. Key switch S-02 (connector **X068**)
5. Cigar lighter R-08 (connectors **X069** & X070)



AMP_154719 117

Cavity	Circuit ID	Description
3	206 (PU)	Signal from CCM2 J1-11

Connector X071 - Straw Hood Harness to Straw Hood Rear Harness

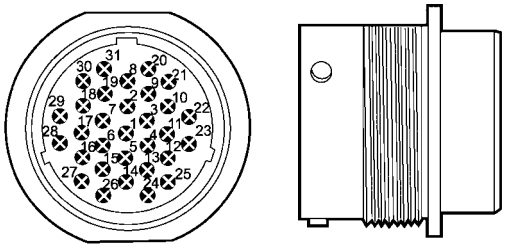


40031058A4 118

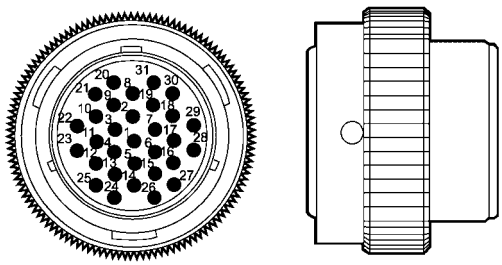
Left rear side of main frame, below PFC pump

1. Connector X071

https://truckmanualshub.com/



DE_HDP24-24-31P 119



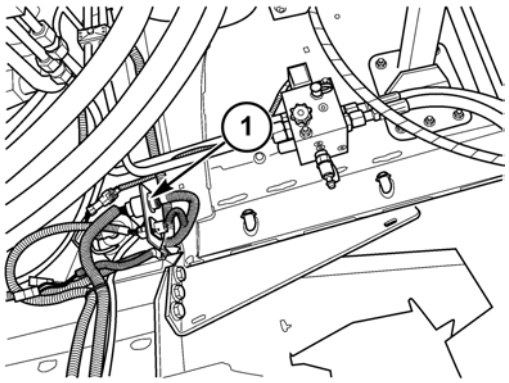
DE_HDP26-24-31S 120

Cavity	Circuit ID	Description
1	1215 (RD)	Fuse F-34 to engine light switch S-64
2	1248 (BK)	Engine light E-46 to frame ground 1
3	481 (BL)	Rear ladder B-22 reference ground to CCM1 J2-14
4	492 (BL)	Spreader RPM B-55 reference ground to CCM2 J2-14
5	1254 (OR)	Fuse F-45 to spreader RPM B-55
6	414 (YE)	Spreader RPM B-55 to CCM2 J2-28
7	open	
8	open	
9	415 (YE)	Spreader position B-11 to CCM1 J3-37
10	open	
11	570 (YE)	Rear ladder B-22 to CCM1 J2-17
12	482 (BL)	Spreader position B-11 reference ground to CCM1 J2-14
13	678 (RD)	Fuse F-15 to RH side service socket J-03
14	452 (WH)	CCM1 J2-6 to back up alarm H-08
15	open	
16	open	
17	243 (PU)	Flasher module A-05 to LH flashing lamp E-07 (NA)
18	412 (PU)	Fuse F-20 to LH marker lights E-11, E-05
19	619 (PU)	Flasher module A-05 to LH rear flashing lamp E-05
20	629 (PU)	Brake lights relay K-33 to LH brake lights E-05/E-11
21	421 (PU)	Fuse F-21 to RH marker lights E-12, E-06
22	578 (PU)	Beacon light relay K-29 to rear beacon light E-33
23	244 (PU)	Flasher module A-05 to RH flashing lamp E-08 (NA)
24	622 (PU)	Flasher module A-05 to RH flashing lamp E-06

https://truckmanualshub.com/

Cavity	Circuit ID	Description
25	630 (PU)	Brake lights relay K-33 to RH brake lights E-06/E-12
26	478 (BK)	Back up alarm H-08 and rear beacon light E-33 to rear frame ground 1
27	628 (BK)	Flashing lamps E-05/E-06/E-07/E-08, brake / tail lamps E-11/E-12 and RH side service socket J-03 to frame ground 1
28	067 (GY)	Rear work lights relay K-31 to rear work lights E-27 & E-28
29	672 (BK)	Rear work lights E-27 & E-28 to frame ground 1
30	444 (BL)	Unload cradle B-38 reference ground to CCM1 J2-14
31	485 (YE)	Unload cradle B-38 to CCM1 J3-36

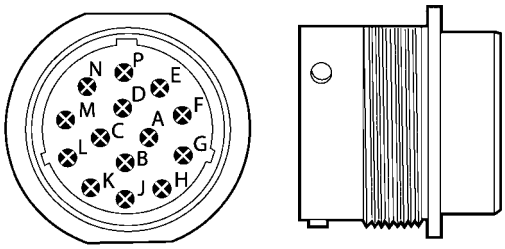
Connector X072 - Straw Hood Harness to Lower Frame Rear Harness



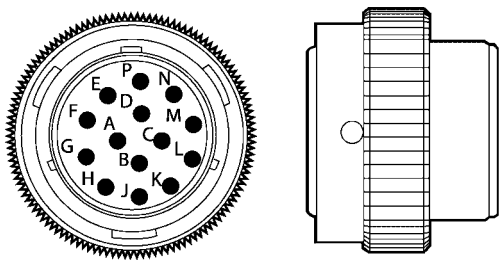
10033639A4 121

Left rear side of main frame , below PFC pump

1. Connector X072



DE_HDP24-18-14P 122

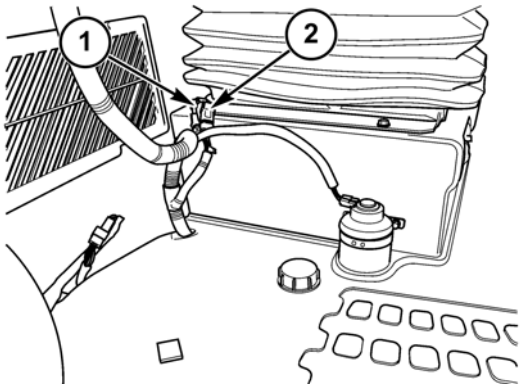


DE_HDP26-18-14S 123

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	569 (WH)	CCM1 J2-16 to rear wheel assist L-26
B	602 (BK)	Rear wheel assist L-26 to frame ground 1
C	494 (BL)	Sieves loss B-21 reference ground to CCM1 J2-14
D	431 (YE)	Sieves loss to CCM1 J2-25
E	793 (PK)	CCM3 J2-31 to upper sieve actuator M-06
F	795 (BL)	Upper sieve actuator reference ground to CCM3 J2-14
G	475 (YE)	Upper sieve actuator M-06 to CCM3 J2-22
H	792 (WH)	Upper / lower sieve relay K-18 to upper sieve actuator M-06
J	791 (GY)	CCM3 J2-1 to upper sieve actuator M-06
K	794 (PK)	CCM3 J2-31 to lower sieve actuator M-07
L	796 (BL)	Lower sieve actuator M-07 to CCM3 J2-14
M	476 (YE)	Lower sieve actuator M-07 to CCM3 J2-19
N	790 (WH)	Upper / lower sieve relay K-18 to lower sieve actuator M-07
P	789 (GY)	CCM3 J2-1 to lower sieve actuator M-07

Connector X073 - Cab Main Harness to Seat Switch S-05/S-66



10031048C4 124

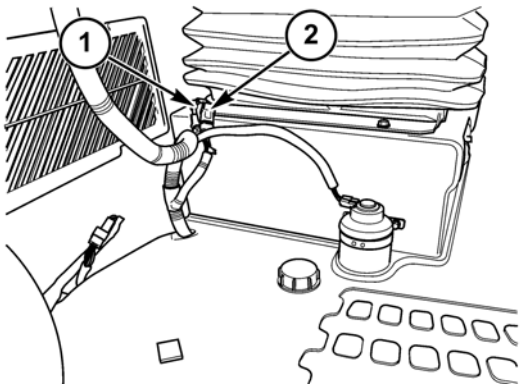
Right rear corner of cab floor, below right hand console

1.

2.

Cavity	Circuit ID	Description
A	046 (OR)	Power from fuse F-49
B	168 (YE)	Signal to CCM2 J1-9

Connector X074 - Cab Main Harness to Seat



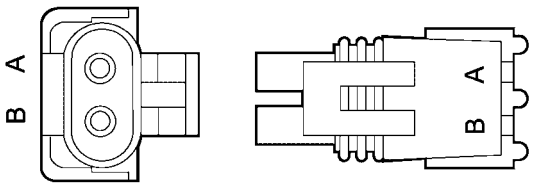
10031048C4 125

https://truckmanualshub.com/

Right rear corner of cab floor, below right hand console

1.

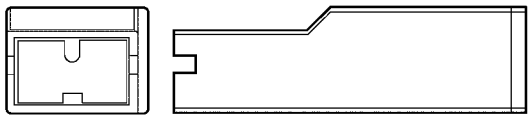
2.



PAC_12015792 126

Cavity	Circuit ID	Description
A	080 (OR)	Fuse F-16 to seat adjust switch S-45
B	164 (BK)	Seat pump motor M-26 to cab ground 3

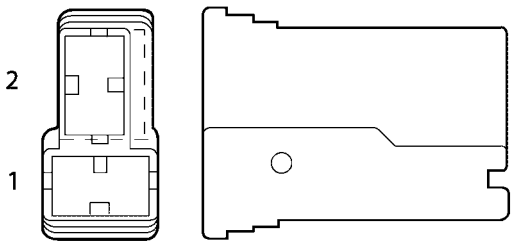
Connector X075 - Cab Main Harness to Accessory Outlet J-08



AMP_154719 127

Cavity	Circuit ID	Description
3	247 (PU)	Signal from CCM2 J1-11

Connector X076 - Cab Main Harness to Accessory Outlet J-08

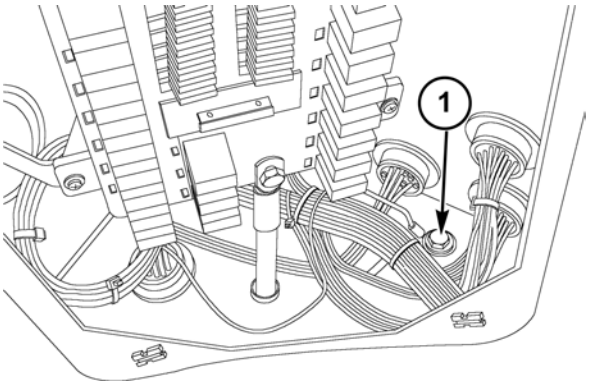


AMP_926522 128

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	153 (BK)	To cab ground 3
2	086 (OR)	Power from fuse F-08

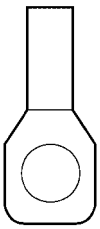
Connector X077 - Cab Main Harness to Cab Ground 3



40033796A4 129

Left rear corner of cab, below fuse panel

1. Connector X077

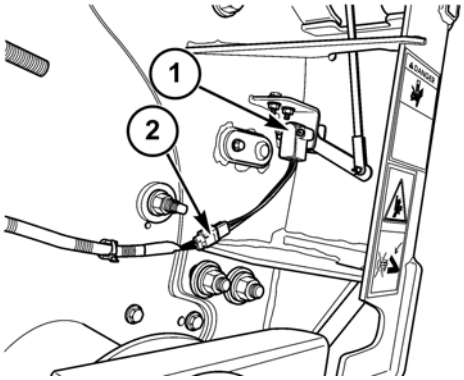


RING_TERMINAL 130

Cavity	Circuit ID	Description
	116 (BK)	Monitors, CCM's, DAM, RHM, Flasher module A-05, front switch panel A-13, rear switch panel A-18
	156 (BK)	Relays K-01 to K-05
	160 (BK)	Relays K-19 to K-23, K-27 to K-29
	161 (BK)	Relays K-30 to K-35
	945 (BK)	Relays K-06 to K-10
	151 (BK)	Accessory socket J-06
	152 (BK)	Lighter R-08
	153 (BK)	Accessory outlet J-08
	164 (BK)	Seat pump motor M-26
	294 (BK)	Cold start indicator E-36
	788 (BK)	Relays K-11 to K-13, K-15 to K-18

https://truckmanualshub.com/

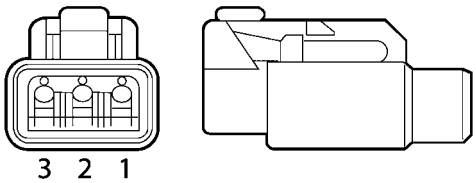
Connector X081 - Feeder Harness to Lateral Tilt Pot R-02



10033649A4 131

Right front corner of feeder

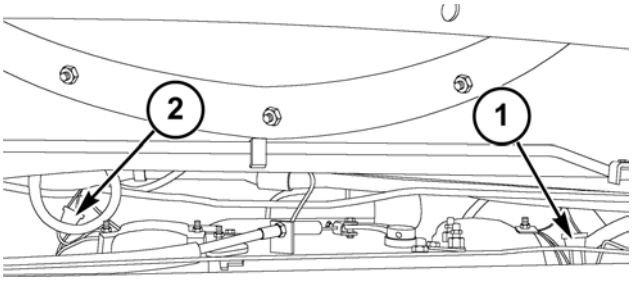
1. Lateral tilt potentiometer R-02
2. Connector X081



DEU_DTM06-3S 132

Cavity	Circuit ID	Description
1	1170 (PK)	5 volts from CCM1 J3-26
2	741 (YE)	Signal to CCM1 J3-17
3	745 (BL)	Reference ground to CCM1 J3-18

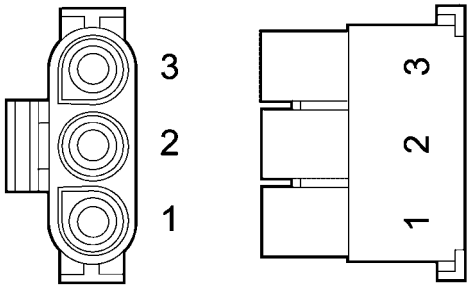
Connector X084 - Lower Frame Harness to LH Brake Wear Switch S-55



40033771A4 133

1. Connector X084
2. Connector **X085**

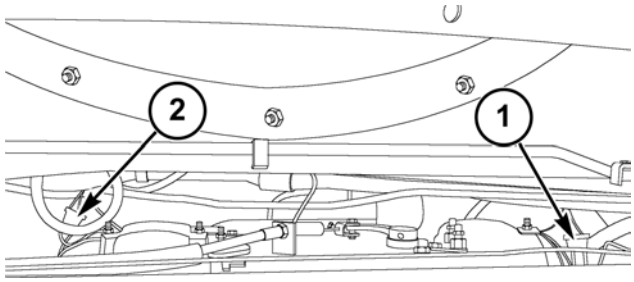
https://truckmanualshub.com/



AMP_794412-1 134

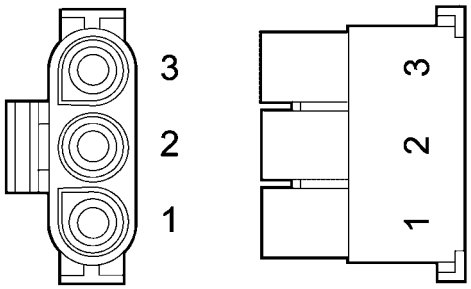
Cavity	Circuit ID	Description
1	607 (YE)	Signal to CCM1 J2-26
2	open	
3	843 (YE)	Signal to CCM1 J2-26

Connector X085 - Lower Frame Harness to RH Brake Wear Switch S-56



40033771A4 135

1. Connector **X084**
2. Connector X085

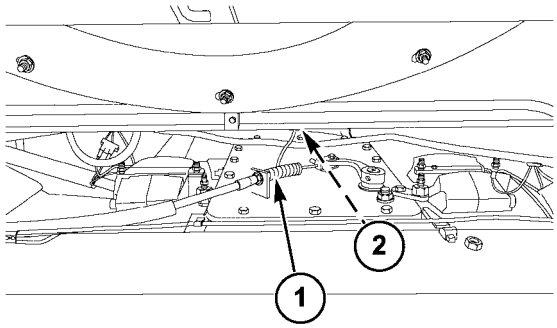


AMP_794412-1 136

Cavity	Circuit ID	Description
1	835 (YE)	Signal to CCM1 J2-26
2	open	
3	844 (YE)	Signal to CCM1 J2-26

https://truckmanualshub.com/

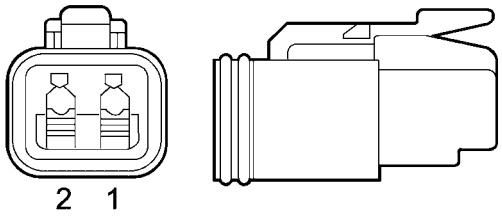
Connector X087 - Lower Frame Harness to Ground Speed RPM B-17



40034843A5 137

Top of ground drive transmission

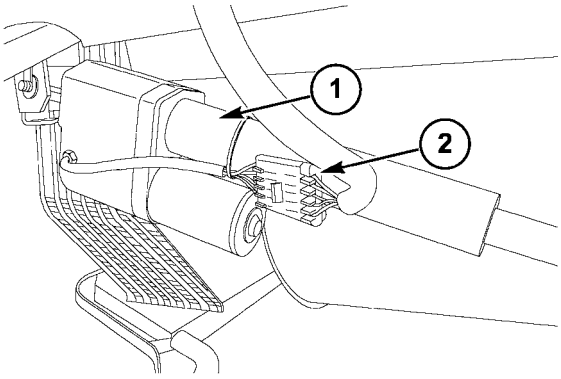
1. Ground speed RPM sensor B-17
2. Connector X087



DEUTSCH_DT06-2S 138

Cavity	Circuit ID	Description
1	717 (BL)	Reference ground to CCM2 J3-18
2	403 (YE)	Signal to CCM2 J3-14

Connector X088 - Lower Frame Harness to Shoe Leveling Actuator M-03

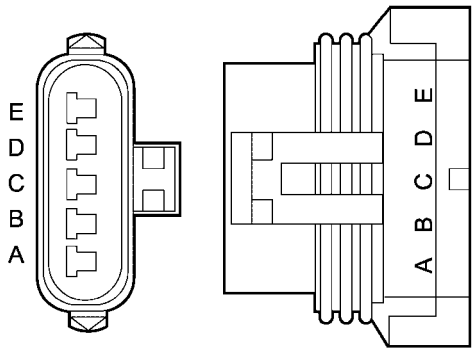


40033773A5 139

Right front corner of cleaning shoe, inside frame

1. Shoe levelling actuator M-03
2. Connector X088

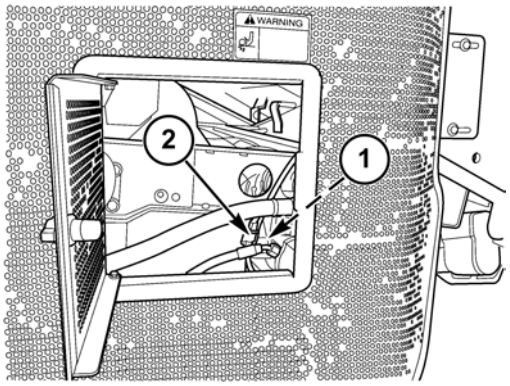
https://truckmanualshub.com/



PAC_12084891 140

Cavity	Circuit ID	Description
A	727 (PK)	5 volts from CCM1 J3-26
B	724 (BL)	Reference ground to CCM1 J3-18
C	721 (YE)	Signal to CCM1 J3-32
D	710 (WH)	To CCM1 J3-39/40
E	707 (GY)	To CCM1 J3-19/20

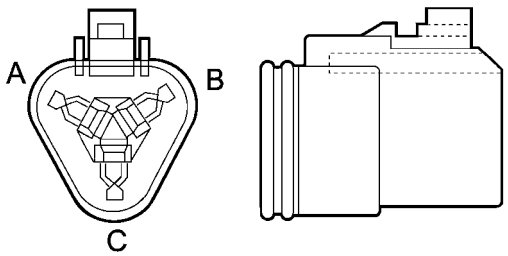
Connector X089 - Lower Frame Harness to Cleaning Fan RPM B-16



10033654A4 141

Right side of main frame at cleaning fan drive

1. Cleaning fan RPM sensor B-16
2. Connector X089



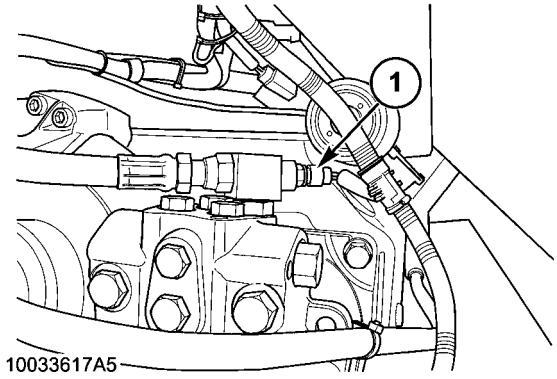
DEUTSCH_DT06-3S 142

Cavity	Circuit ID	Description
A	1259 (OR)	Power from fuse F-45

https://truckmanualshub.com/

Cavity	Circuit ID	Description
B	404 (YE)	Signal to CCM1 J3-13
C	718 (BL)	Reference ground to CCM1 J3-18

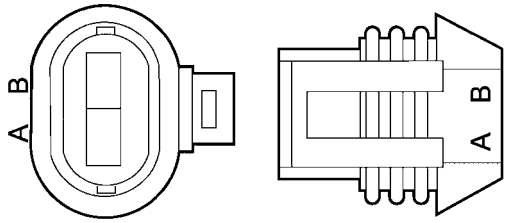
Connector X091 - Lower Frame Harness to Hydrostat Motor Temp B-46



10033617A5 143

Left side of main frame, on top of hydrostat ground drive motor

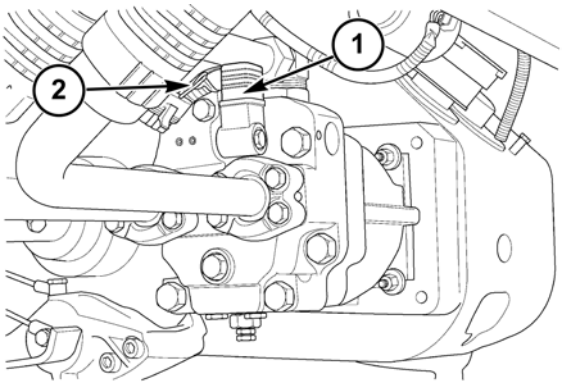
1. Connector X091



PAC_12162193 144

Cavity	Circuit ID	Description
A	774 (BL)	Reference ground to CCM1 J3-18
B	773 (YE)	Signal to CCM1 J3-33

Connector X092 - Lower Frame Harness to Pressure Release L-05

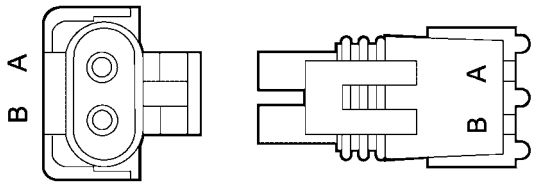


10013278B4 145

Left side of main frame, on hydrostat motor

1. Pressure release solenoid L-05
2. Connector X092

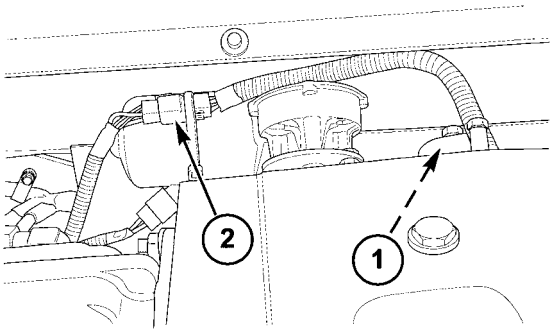
https://truckmanualshub.com/



PAC_12015792 146

Cavity	Circuit ID	Description
A	575 (WH)	Signal from CCM2 J3-15
B	606 (BK)	To frame ground 2

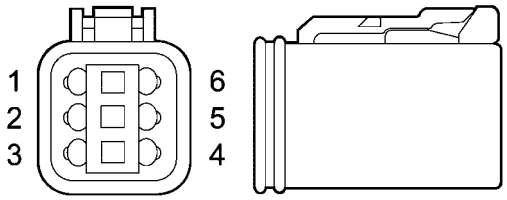
Connector X093 - Lower Frame Harness to Trans Shift Position B-37



10004664A5 147

Top rear of ground drive transmission

1. Transmission shift position sensor B-37
2. Connector X093

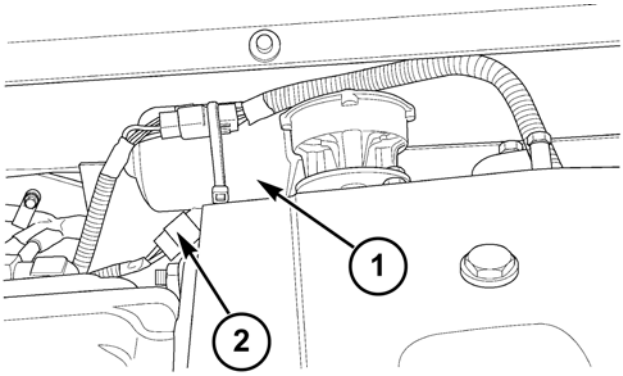


DEUTSCH_DT06-6S 148

Cavity	Circuit ID	Description
1	407 (YE)	Signal (N) to CCM2 J3-28
2	405 (YE)	Signal (1st) to CCM2 J3-36
3	406 (YE)	Signal (2nd) to CCM2 J3-37
4	408 (YE)	Signal (3rd) to CCM2 J3-38
5	409 (YE)	Signal (4th) to CCM2 J3-27
6	426 (BL)	Reference ground to CCM2 J3-18

https://truckmanualshub.com/

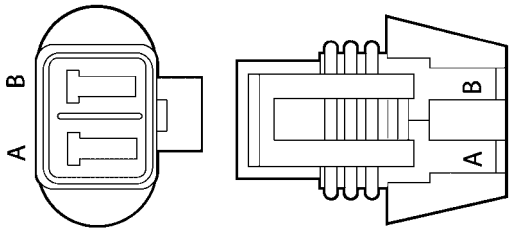
Connector X094 - Lower Frame Harness to Transmission Shift Motor M-02



10004664B4 149

Top rear of ground drive transmission

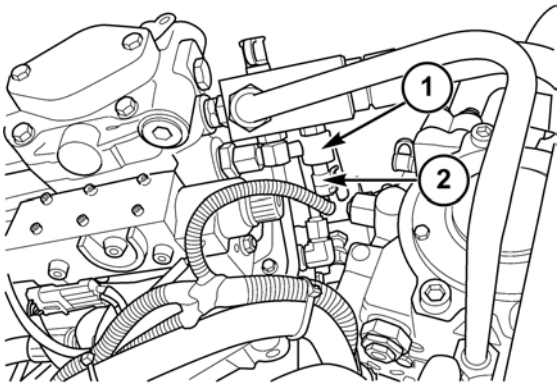
1. Transmission shift motor M-02
2. Connector X094



PAC_15300027 150

Cavity	Circuit ID	Description
A	716 (WH)	Signal from CCM2 J3-39/40
B	715 (GY)	Signal from CCM2 J3-19/20

Connector X098 - Gearbox Harness to Low Control Pressure B-35

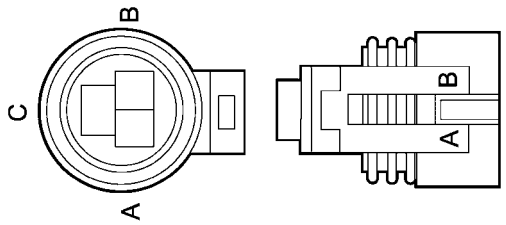


10033637A4 151

Top of PTO gearbox, next to feeder drive hydrostat pump

1. Low control pressure sensor B-35
2. Connector X098

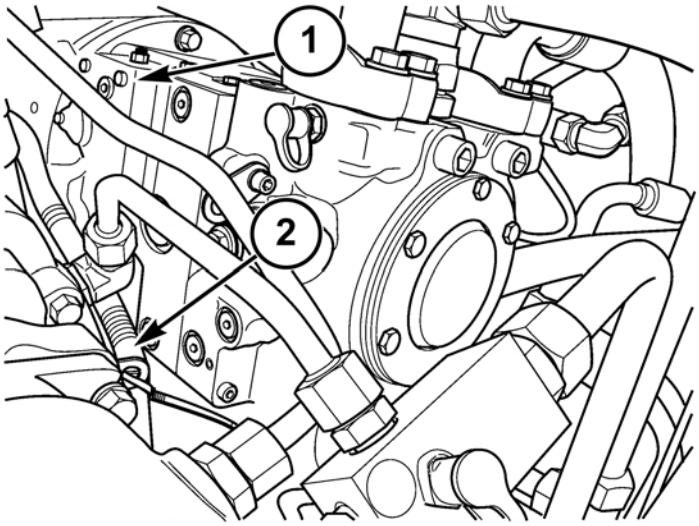
https://truckmanualshub.com/



PAC_12065287 152

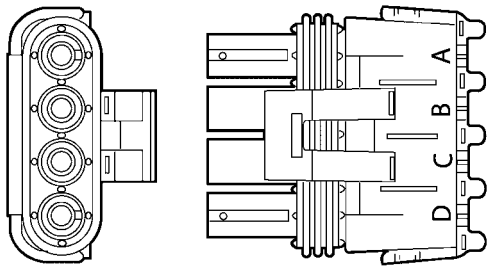
Cavity	Circuit ID	Description
A	683 (BL)	Reference ground to CCM2 J2-14
B	486 (PK)	5 volts from CCM2 J2-31
C	423 (YE)	Signal to CCM2 J2-19

Connector X100 - Gearbox Harness to Ground Speed Hydrostat L-23



10033623B4 153

1. Ground drive hydrostat control valve L-23
2. Connector X100



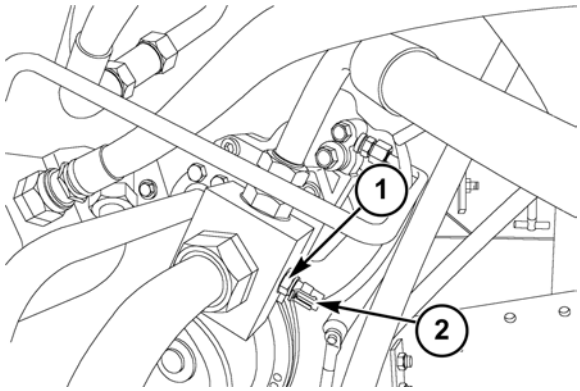
PAC_12015797 154

Cavity	Circuit ID	Description
A	879 (GY)	CCM2 J3-21 to hydrostat coil "B"
B	886 (BL)	Reference ground to CCM2 J3-35

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Cavity	Circuit ID	Description
C	887 (BL)	Reference ground to CCM2 J3-35
D	880 (WH)	CCM2 J3-31 to hydrostat coil "A"

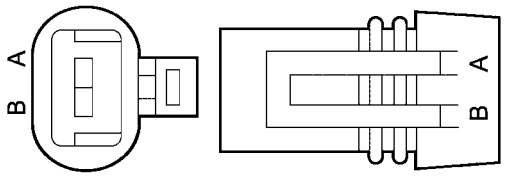
Connector X103 - Gearbox Harness to Hyd Oil Reservoir Temp B-18



40031056A4 155

Lower rear corner of PTO gearbox, at PFC pump inlet manifold

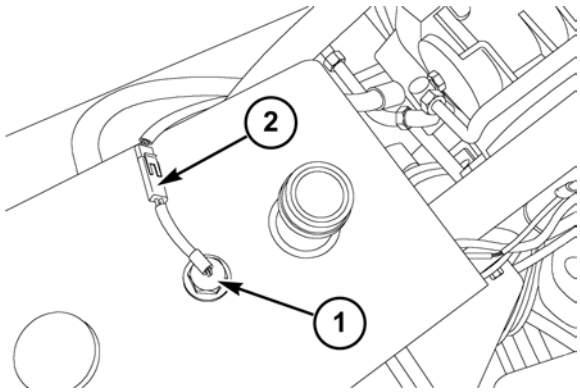
1. Hydraulic oil reservoir temperature sensor B-18
2. Connector X103



PAC_15336024 156

Cavity	Circuit ID	Description
A	480 (BL)	Reference ground to CCM1 J2-14
B	446 (YE)	Signal to CCM1 J2-24

Connector X104 - Gearbox Harness to Hydraulic Reservoir Level S-33



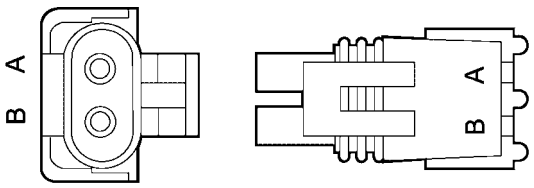
40033787A4 157

Top of hydraulic reservoir

1. Hydraulic reservoir level sensor S-33

https://truckmanualshub.com/

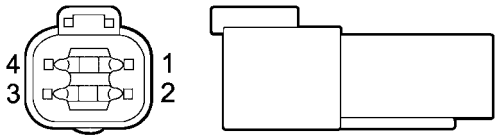
2. Connector X104



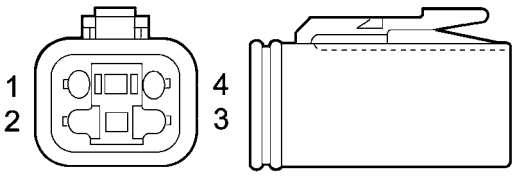
PAC_12015792 158

Cavity	Circuit ID	Description
A	487 (BK)	To frame ground 1
B	424 (YE)	Signal to CCM2 J2-39

Connector X105 - Grain Tank Harness to Unload Tube Light Harness



DEUTSCH_DT04-4P 159

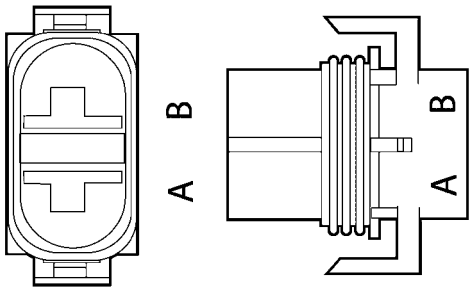


DEUTSCH_DT06-4S 160

Cavity	Circuit ID	Description
1	077 (PU)	Unload tube light relay K-32 to unload tube light E-29
2	669 (BK)	Unload tube light E-29 to frame ground 2
3	530 (PU)	Unload tube marker light (FR) E-39 to frame ground 2
4	531 (BK)	Fuse F-20 to unload tube marker light (FR) E-39

https://truckmanualshub.com/

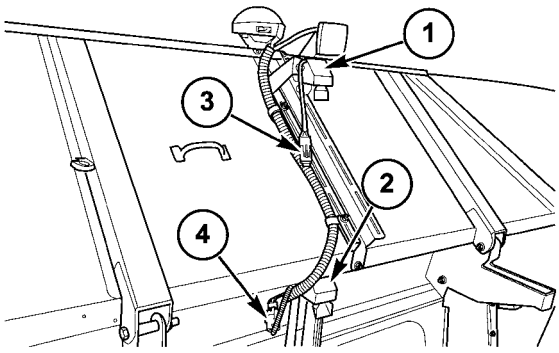
Connector X106 - Straw Hood Rear Harness to LH Rear Work Light E-27



PAC_12124819 161

Cavity	Circuit ID	Description
A	652 (PU)	Signal from rear work lights relay K-31
B	661 (BK)	To frame ground 1

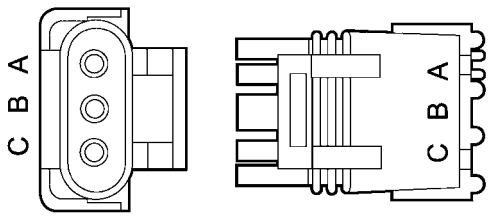
Connector X107 - Grain Tank Harness to Grain Bin 3/4 Full S-28



10030023A5 162

Front wall and extension of grain bin

1. Grain bin full switch S-29
2. Grain bin 3/4 full switch S-29
3. Connector **X109**
4. Connector X107

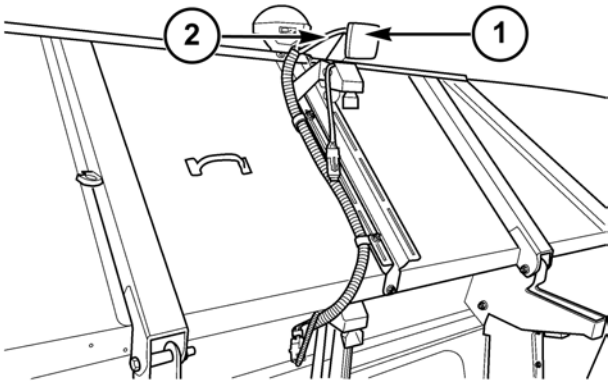


PAC_12015793 163

Cavity	Circuit ID	Description
A	440 (PK)	5 volts from CCM2 J2-31
B	445 (YE)	Signal to grain bin full S-29
C	400 (YE)	Signal to CCM2 J2-22

https://truckmanualshub.com/

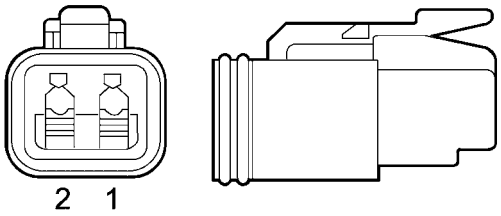
Connector X108 - Grain Tank Harness to Grain Tank Light E-30



10030023C4 164

Front extension of grain tank

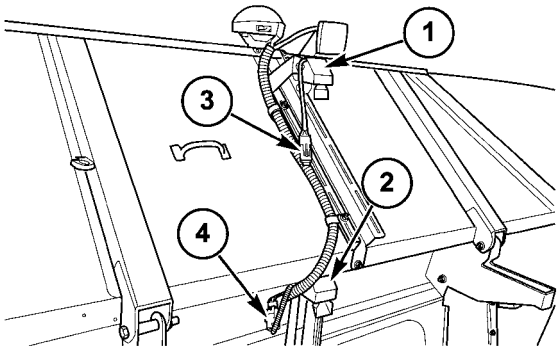
1. Grain tank light E-30
2. Connector X108



DEUTSCH_DT06-2S 165

Cavity	Circuit ID	Description
1	646 (PU)	Signal from lower work lights relay K-30
2	681 (BK)	To frame ground 2

Connector X109 - Grain Tank Harness to Grain Tank Full S-29

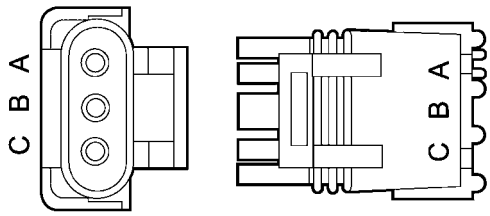


10030023A5 166

Front wall and extension of grain bin

1. Grain bin full switch S-29
2. Grain bin 3/4 full switch S-29
3. Connector X109
4. Connector **X107**

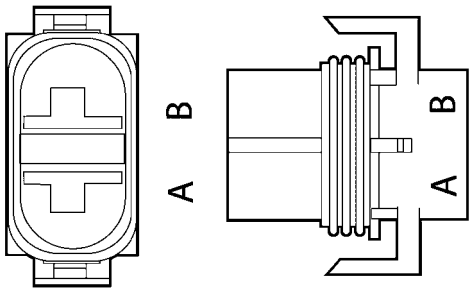
https://truckmanualshub.com/



PAC_12015793 167

Cavity	Circuit ID	Description
A	443 (BL)	Reference ground to CCM2 J2-14
B	445 (YE)	Signal from grain bin 3/4 full S-28
C	open	

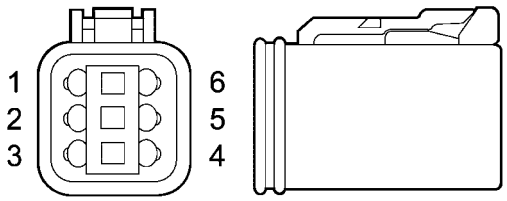
Connector X110 - Straw Hood Rear Harness to RH Rear Work Light E-28



PAC_12124819 168

Cavity	Circuit ID	Description
A	653 (PU)	Signal from rear work lights relay K-31
B	662 (BK)	To frame ground 1

Connector X111 - Outer Roof Harness to LH Mirror & Side Light Jumper Harness



DEUTSCH_DT06-6S 169

Cavity	Circuit ID	Description
1	959 (WH)	Mirror adjust switch S-27 to LH mirror in / out M-22
2	961 (GY)	Mirror adjust switch S-27 to LH mirror motors M-21 & M-22
3	935 (OR)	Mirror heat switch S-19 to LH mirror heat R-11

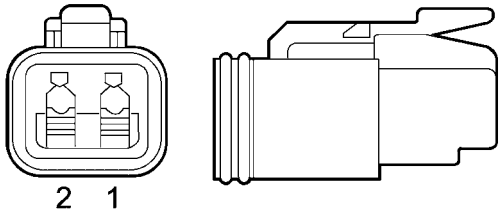
https://truckmanualshub.com/

Cavity	Circuit ID	Description
4	958 (WH)	Mirror adjust switch S-27 to LH mirror up / down M-21
5	076 (PU)	Side work light relays K-34 & K-35 to LH side work light E-25
6	671 (BK)	To cab roof ground 4

Connector X112 - Outer Roof Harness to LH Cab Outer Work Light E-15

Cavity	Circuit ID	Description
A	058 (PU)	Signal from cab roof work lights relay K-01
B	259 (BK)	To cab roof ground 4

Connector X113 - Outer Roof Harness to LH Front Beacon Light E-31



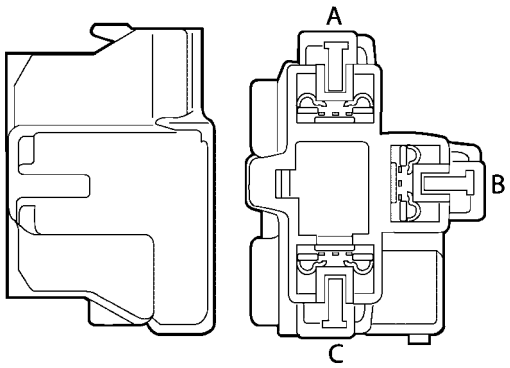
DEUTSCH_DT06-2S 170

Cavity	Circuit ID	Description
1	663 (PU)	Signal from beacon light relay K-29
2	666 (BK)	To cab roof ground 4

Connector X114 - Outer Roof Harness to LH Cab Mid Work Light E-19

Cavity	Circuit ID	Description
A	260 (BK)	To cab roof ground 4
B	252 (PU)	Signal from header work lights relay K-22

Connector X115 - Outer Roof Harness to LH Cab Inner Work Light E-17

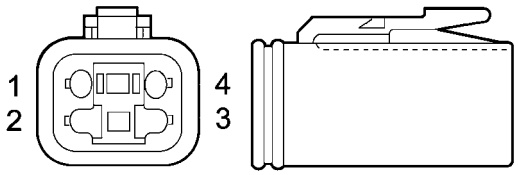


AMP_172615 171

Cavity	Circuit ID	Description
A	1157 (PU)	Power from road lights relay K-27 pin 4 (low beam)
B	1249 (PU)	Power from road lights relay K-27 pin 5 (high beam)
C	261 (BK)	To cab roof ground 4

https://truckmanualshub.com/

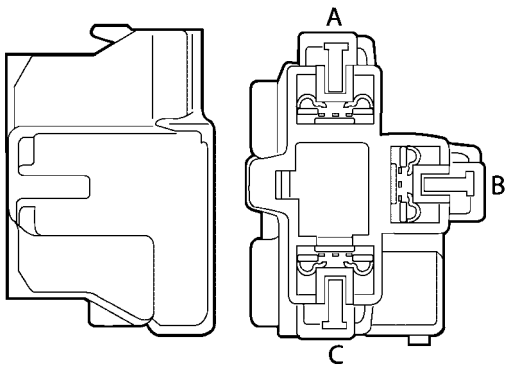
Connector X116 - Outer Roof Harness to Wiper Motor M-25



DEUTSCH_DT06-4S 172

Cavity	Circuit ID	Description
1	open	
2	open	
3	275 (WH)	Signal from wiper switch S-20
4	280 (BK)	To cab roof ground 4

Connector X117 - Outer Roof Harness to RH Cab Inner Work Light E-18



AMP_172615 173

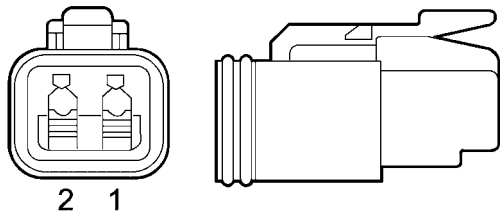
Cavity	Circuit ID	Description
A	1156 (PU)	Power from road lights relay K-27 pin 4 (low beam)
B	1250 (PU)	Power from road lights relay K-27 pin 5 (high beam)
C	265 (BK)	To cab roof ground 4

Connector X118 - Outer Roof Harness to RH Cab Mid Work Light E-20

Cavity	Circuit ID	Description
A	263 (BK)	To cab roof ground 4
B	253 (PU)	Signal from header work lights relays K-22

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Connector X119 - Outer Roof Harness to RH Front Beacon Light E-32



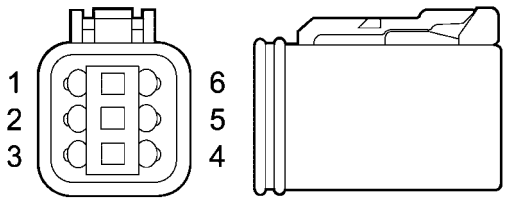
DEUTSCH_DT06-2S 174

Cavity	Circuit ID	Description
1	664 (PU)	Signal from beacon light relay K-29
2	667 (BK)	To cab roof ground 4

Connector X120 - Outer Roof Harness to RH Cab Outer Work Light E-16

Cavity	Circuit ID	Description
A	059 (PU)	Signal from cab roof work lights relay K-01
B	264 (BK)	To cab roof ground 4

Connector X121 - Outer Roof Harness to RH Mirror & Side Light Jumper Harness

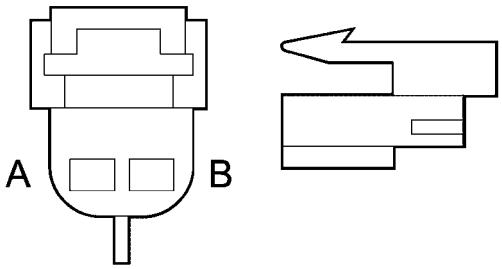


DEUTSCH_DT06-6S 175

Cavity	Circuit ID	Description
1	962 (WH)	Switch bypass fuses F-64 OR mirror select switch S-57 to RH mirror in / out M-20
2	956 (GY)	Mirror adjust switch S-27 to RH mirror motors M-19 & M-20
3	932 (OR)	Mirror heat switch S-19 to RH mirror heat R-10
4	955 (WH)	Switch bypass fuses F-64 OR mirror select switch S-57 to RH mirror up / down M-19
5	072 (PU)	Side work light relays K-34 & K-35 to RH side work light E-26
6	670 (BK)	RH side work light E-26 to cab roof ground 4

https://truckmanualshub.com/

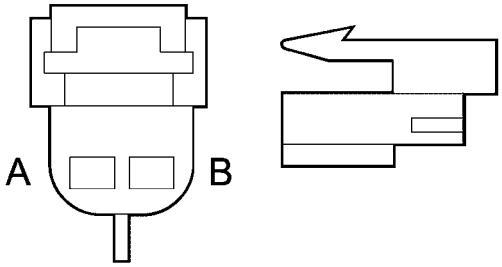
Connector X122 - Cab Roof Harness to Rear Right Speaker H-06



PAC_12052832 176

Cavity	Circuit ID	Description
A	979 (BL)	Ground to radio A-04 X315 pin 2
B	974 (WH)	Signal from radio A-04 X315 pin 1

Connector X123 - Cab Roof Harness to Rear Left Speaker H-04



PAC_12052832 177

Cavity	Circuit ID	Description
A	982 (BL)	Ground to radio A-04 X315 pin 8
B	975 (WH)	Signal from radio A-04 X315 pin 7

Connector X124 - Cab Roof Harness to Cab Roof Ground 4

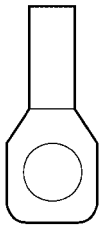


50032236B4 178

Top left rear corner of cab, behind speaker

1. Connector X124

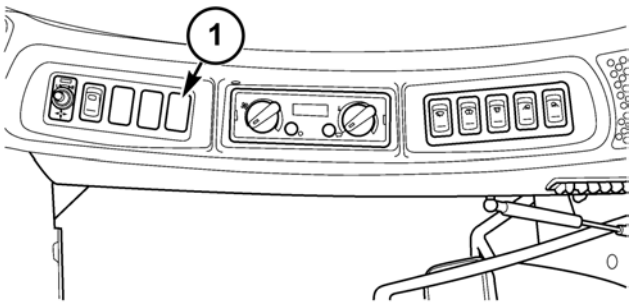
https://truckmanualshub.com/



RING_TERMINAL 179

Cavity	Circuit ID	Description
	280 (BK)	Wiper motor M-25
	281 (BK)	Transceiver outlet J-07
	282 (BK)	Future option
	299 (BK)	Backlighting ground from work light switches S43/44, wiper switch S-20, beacon switch S-41 and washer switch S-38
	246 (BK)	Not used
	262 (BK)	LH outer & mid work lights E-15 & E-19
	269 (BK)	Console light E-35
	665 (BK)	Beacon lights E-31/32
	925 (BK)	Outer HID lights E-60/61 through work light switch S-43
	266 (BK)	RH outer & mid work lights E-16 & E-20
	295 (BK)	Mirror heaters R-10/11/14 and side lights E-25/26
	854 (BK)	Future option
	855 (BK)	Future option
	947 (BK)	Backlighting ground from tank extension switch S-42, mirror adjust switch S-27, mirror heat switch S-19, dome light E-34 and HVAC control panel A-09

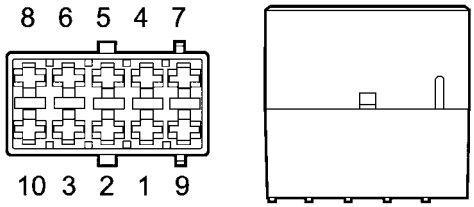
Connector X125 - Cab Roof Harness to Tank Extensions Switch S-42



10031047F4 180

1. Tank extension switch (connector X125)

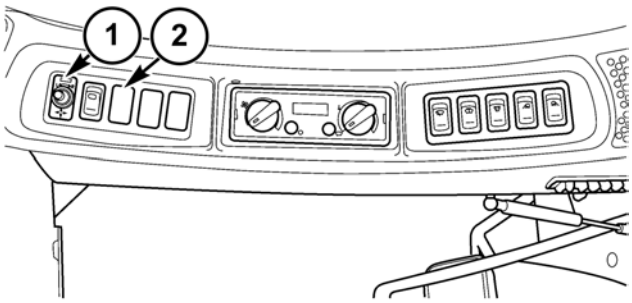
https://truckmanualshub.com/



EATON_25-13936 181

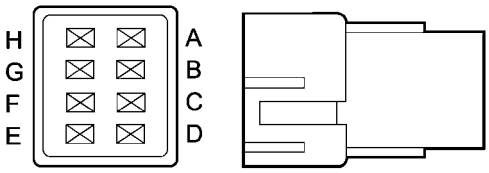
Cavity	Circuit ID	Description
1	open	
2	124 (OR)	Power from fuse F-49
3	167 (YE)	Signal to CCM2 J1-3
4	open	
5	open	
6	open	
7	284 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	
9	298 (BK)	To cab roof ground 4
10	open	

Connector X126 - Cab Roof Harness to Mirror Adjust Switch S-27



10031047E4 182

1. Mirror adjust switch (connector X126)
2. Mirror heat switch S-19 (connector **X127**)

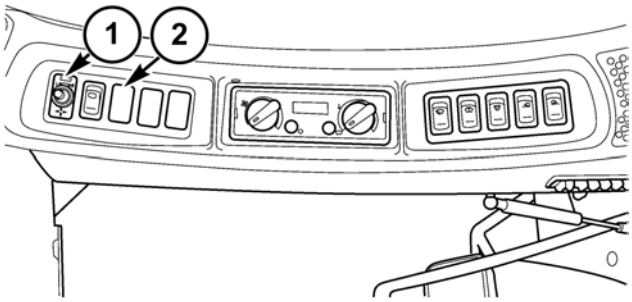


PAC_12045688 183

https://truckmanualshub.com/

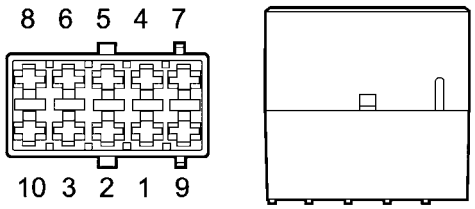
Cavity	Circuit ID	Description
A	949 (BK)	To cab roof ground 4
B	959 (WH)	Output to LH mirror in / out M-22
C	961 (GY)	Output to LH mirror motors M-21/22
D	958 (WH)	Output to LH mirror up / down M-21
E	957 (WH)	Output to RH mirror up / down M-19
F	954 (GY)	Output to RH mirror motors M-19/20
G	960 (WH)	Output to RH mirror in / out M-20
H	274 (OR)	Power from fuse F-09

Connector X127 - Cab Roof Harness to Mirror Heat Switch S-19



10031047E4 184

1. Mirror adjust switch S-27 (connector **X126**)
2. Mirror heat switch S-19 (connector X127)

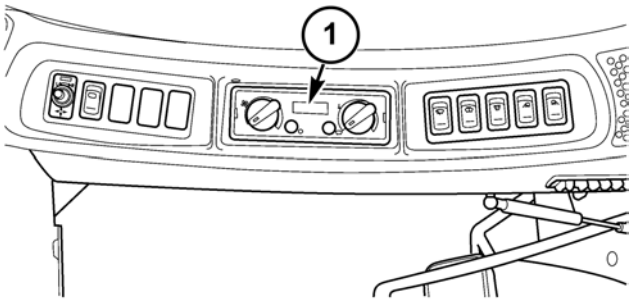


EATON_25-13936 185

Cavity	Circuit ID	Description
1	open	
2	953 (OR)	Power from fuse F-09
3	931 (OR)	Output to mirror heat R-10/11/14
4	open	
5	open	
6	open	
7	285 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	
9	950 (BK)	To cab roof ground 4
10	open	

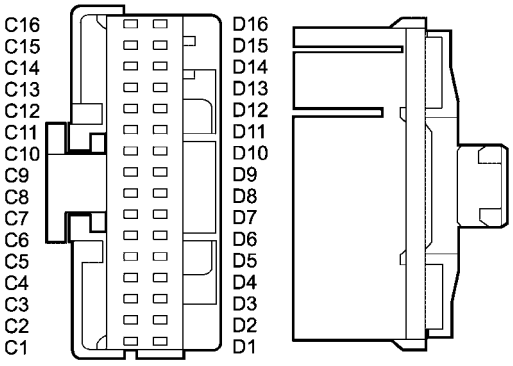
https://truckmanualshub.com/

Connector X128 - Cab Roof Harness to HVAC A-09/A-20



10031047D4 186

1. HVAC module (connector X128)



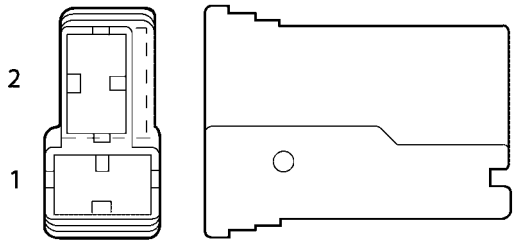
PAC_12110207 187

Cavity	Circuit ID	Description
C1	972 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
C2	901 (OR)	Power from fuse F-49
C3	900 (WH)	Output to A/C clutch relay K-10
C4	902 (WH)	Output to separator blower relay K-09
C5	open	
C6	open	
C7	904 (WH)	Output to main blower relay low K-11
C8	905 (WH)	Output to main blower relay med K-12
C9	906 (WH)	Output to main blower relay high K-13
C10	907 (BL)	Reference ground for A/C low pressure S-48 and freeze switch S-76
C11	908 (YE)	Signal from A/C low pressure S-48 and freeze switch S-76
C12	909 (BL)	To ATC control module A-15
C13	910 (YE)	Not used
C14	911 (BL)	To ATC control module A-15
C15	912 (YE)	To ATC control module A-15
C16	913 (BL)	Reference ground for cab temp sensor B-26, evaporator temp sensor B-28 and A/C low pressure S-77 (ATC)
D1	914 (YE)	To ATC control module A-15
D2	939 (YE)	Not used
D3	934 (BL)	Reference ground for A/C high pressure S-47
D4	917 (YE)	Signal from A/C high pressure S-47
D5	918 (BK)	To ATC control module A-15
D6	919 (YE)	To ATC control module A-15

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Cavity	Circuit ID	Description
D7	920 (OR)	To ATC control module A-15
D8	open	
D9	922 (BK)	To cab ground 3
D10	923 (YE)	To ATC control module A-15
D11	924 (OR)	To ATC control module A-15
D12	open	
D13	open	
D14	921 (BK)	To cab roof ground 4
D15	open	
D16	open	

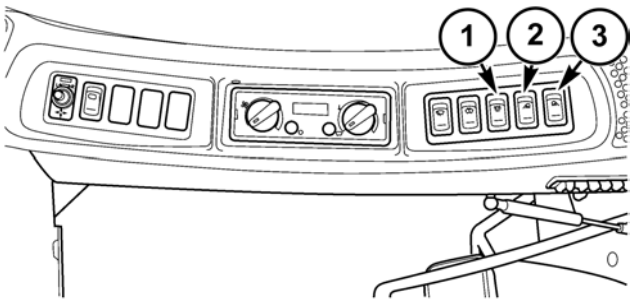
Connector X129 - Cab Roof Harness to Dome Light E-34



AMP_926522 188

Cavity	Circuit ID	Description
1	971 (BK)	To cab roof ground 4
2	865 (YE), 967 (YE)	Signal to LH door switch S-40, jumper from time delay module K-20

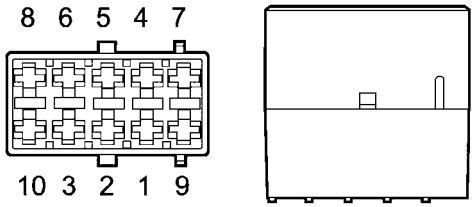
Connector X130 - Cab Roof Harness to Beacon Light Switch S-41



10031047B4 189

1. Beacon light switch S-41 (connector X130)
2. Rear work lights switch S-44 (connector **X131**)
3. Front work lights switch S-43 (connector **X132**)

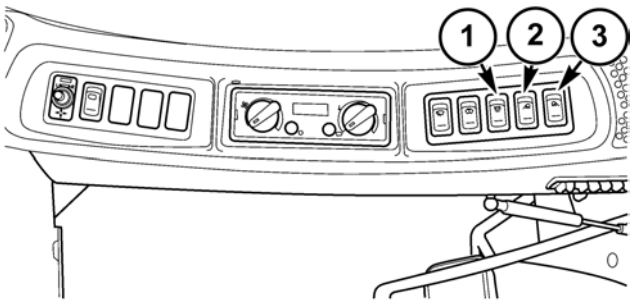
https://truckmanualshub.com/



EATON_25-13936 190

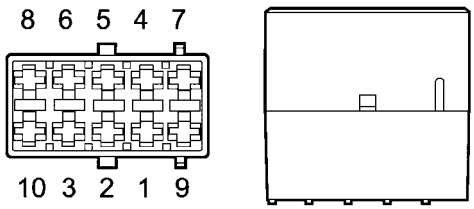
Cavity	Circuit ID	Description
1	open	
2	172 (OR)	Power from fuse F-49
3	166 (YE)	Signal to CCM2 J1-2
4	open	
5	open	
6	open	
7	283 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	
9	297 (BK)	To cab roof ground 4
10	open	

Connector X131 - Cab Roof Harness to Rear Work Light Switch S-44



10031047B4 191

1. Beacon light switch S-41 (connector **X130**)
2. Rear work lights switch S-44 (connector X131)
3. Front work lights switch S-43 (connector **X132**)

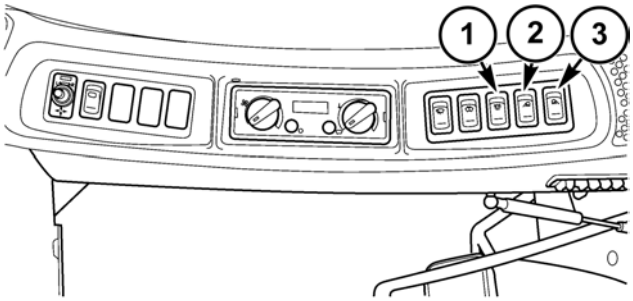


EATON_25-13936 192

https://truckmanualshub.com/

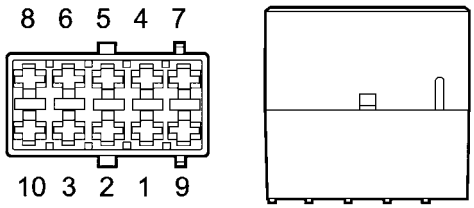
Cavity	Circuit ID	Description
1	open	
2	239 (OR)	Power from fuse F-49
3	170 (YE)	Signal to CCM1 J1-15
4	open	
5	open	
6	open	
7	233 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	
9	223 (BK)	To cab roof ground 4
10	open	

Connector X132 - Cab Roof Harness to Work Light Switch S-43



10031047B4 193

1. Beacon light switch S-41 (connector **X130**)
2. Rear work lights switch S-44 (connector **X131**)
3. Front work lights switch S-43 (connector X132)



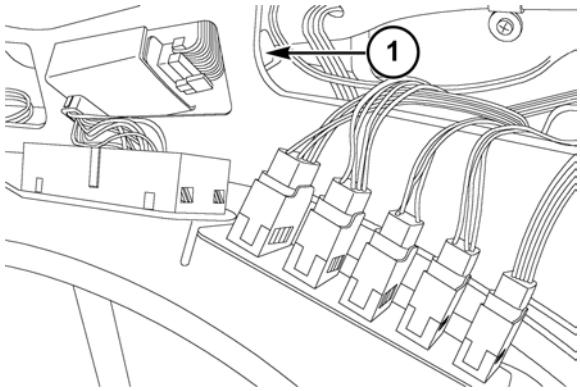
EATON_25-13936 194

Cavity	Circuit ID	Description
1	open	
2	240 (OR)	Power from fuse F-49
3	171 (YE)	Signal to CCM1 J1-3
4	open	
5	245 (BK)	Ground from outer HID lights E-60/61
6	925 (BK)	To cab roof ground 4
7	235 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	

https://truckmanualshub.com/

Cavity	Circuit ID	Description
9	224 (BK)	To cab roof ground 4
10	open	

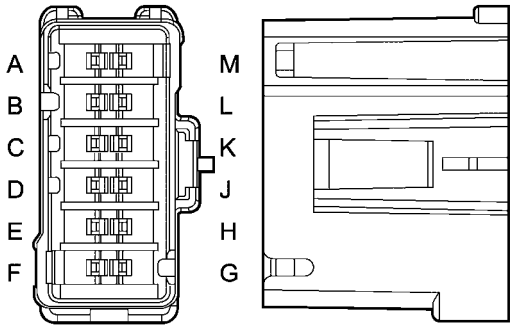
Connector X133 - Cab Roof Harness - Splice Block C W-03



40033801A4 195

Left side cab roof, behind HVAC module

1. Connector X133

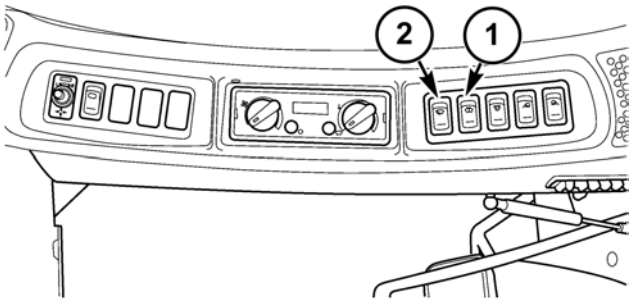


PAC_15305291 196

Cavity	Circuit ID	Description
A	175 (PU)	To console light E-35
B	232 (PU)	Backlight power from CCM2 J1-11
C	233 (PU)	To rear work light switch S-44
D	235 (PU)	To work light switch S-43
E	273 (PU)	To wiper switch S-20
F	283 (PU)	To beacon light switch S-41
G	284 (PU)	To tank extensions switch S-42
H	285 (PU)	To mirror heat switch S-19
J	286 (PU)	To washer switch S-38
K	open	
L	open	
M	972 (PU)	To HVAC control panel A-09

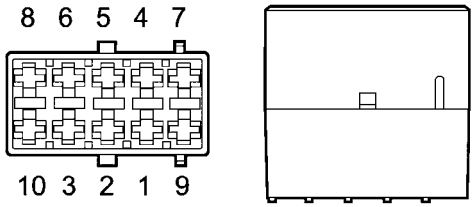
https://truckmanualshub.com/

Connector X134 - Cab Roof Harness to Washer Switch S-38



10031047C4 197

1. Washer switch S-38 (connector X134)
2. Wiper switch S-20 (connector **X135**)

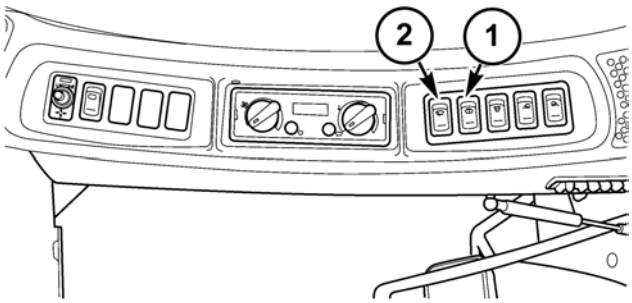


EATON_25-13936 198

Cavity	Circuit ID	Description
1	open	
2	279 (OR)	Power from fuse F-09
3	278 (WH)	Output to wiper washer motor M-24
4	open	
5	open	
6	open	
7	286 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	
9	951 (BK)	To cab roof ground 4
10	open	

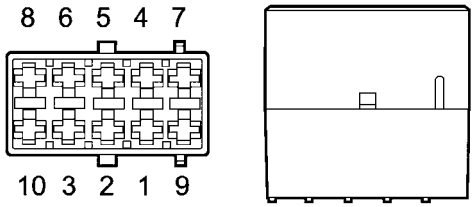
https://truckmanualshub.com/

Connector X135 - Cab Roof Harness to Wiper Switch S-20



10031047C4 199

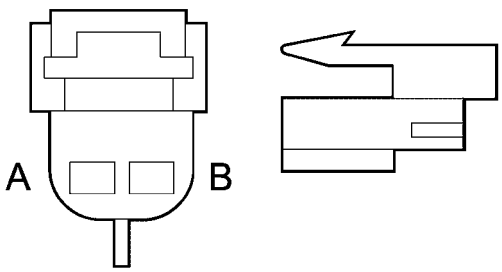
1.
2.



EATON_25-13936 200

Cavity	Circuit ID	Description
1	276 (WH)	Not used
2	272 (OR)	Power from wiper relay K-06
3	275 (WH)	Output to wiper motor M-25
4	open	
5	open	
6	277 (WH)	Not used
7	273 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
8	open	
9	296 (BK)	To cab roof ground 4
10	open	

Connector X136 - Cab Roof Harness to Front Left Speaker H-05

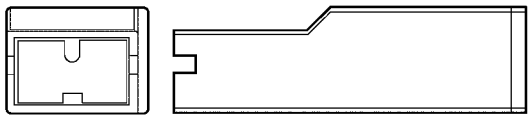


PAC_12052832 201

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	983 (BL)	Ground to radio A-04 X315 pin 6
B	977 (WH)	Signal from radio A-04 X315 pin 5

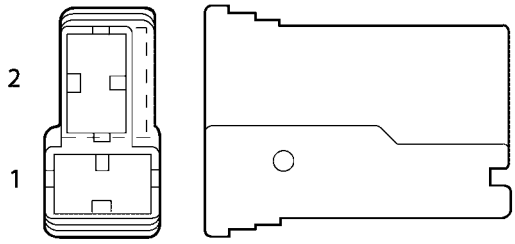
Connector X137 - Cab Roof Harness to LH Door Switch S-40



AMP_154719 202

Cavity	Circuit ID	Description
1	865 (YE)	Signal wire from dome light E-34 and time delay module K-20

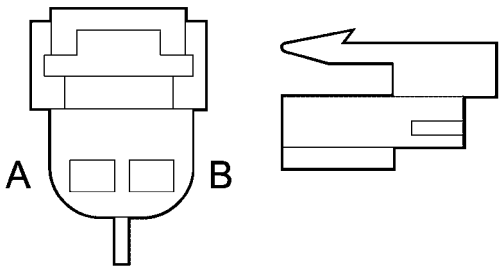
Connector X138 - Cab Roof Harness to Console Light E-35



AMP_926522 203

Cavity	Circuit ID	Description
1	175 (PU)	Backlighting from CCM2 J1-11 through splice block C, W-03
2	269 (BK), 973 (BK)	From radio A-04 X314 pin 8 (973 BK) to cab roof ground 4 (269 BK)

Connector X139 - Cab Roof Harness to Front Right Speaker H-07

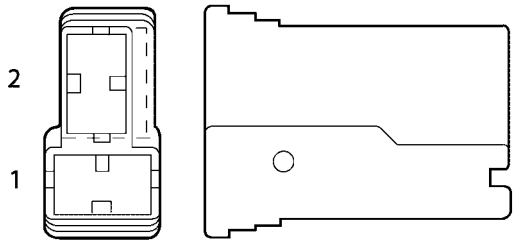


PAC_12052832 204

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	980 (BL)	Ground to radio A-04 X315 pin 4
B	976 (WH)	Signal from radio A-04 X315 pin 3

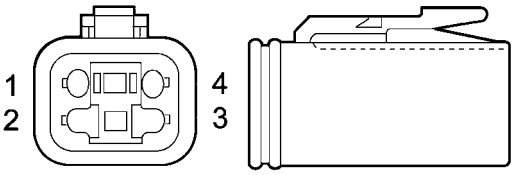
Connector X141 - Cab Roof Harness - Future Option



AMP_926522 205

Cavity	Circuit ID	Description
1	281 (BK)	To cab roof ground 4
2	083 (OR)	Power from fuse F-13

Connector X142 - Cab Roof Harness to Future Option

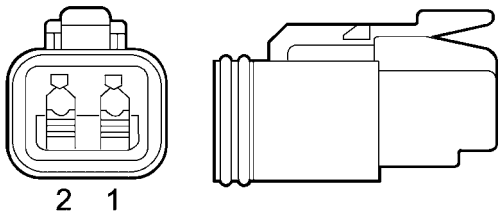


DEUTSCH_DT06-4S 206

Cavity	Circuit ID	Description
1	903 (OR)	Power from fuse F-12
2	999 (YE)	CAN High
3	282 (BK)	To cab roof ground 4
4	996 (GN)	CAN Low

https://truckmanualshub.com/

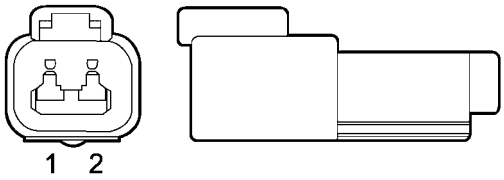
Connector X149 - Air Conditioning Harness to Cab Temp Sensor B-26



DEUTSCH_DT06-2S 207

Cavity	Circuit ID	Description
1	952 (BL)	To ATC control module A-15 X397 pin 2C
2	913 (YE)	To HVAC control panel A-20 X128 pin C16

Connector X150 - Air Conditioning Harness to Evaporator Temp Sensor B-28

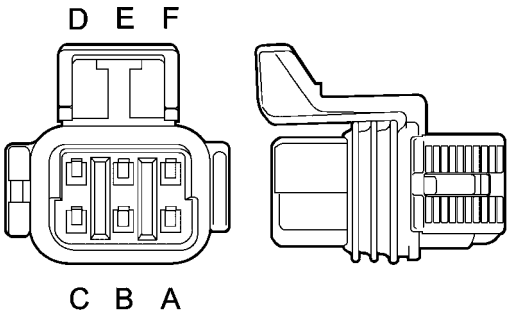


DEUTSCH_DT04-2P 208

Cavity	Circuit ID	Description
1	951 (BL)	To ATC control module A-15 X397 pin 1B
2	913 (YE)	To HVAC control panel A-20 X128 pin C16

Connector X151 - Air Conditioning Harness to Water Valve

Water Valve M-16 (manual)



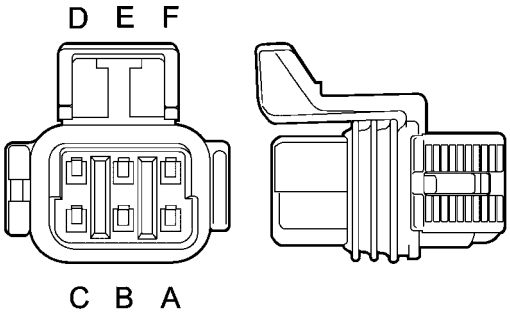
PAC_12052848 209

Cavity	Circuit ID	Description
A	924 (OR)	To HVAC control panel A-09 X128 pin D11
B	open	

https://truckmanualshub.com/

Cavity	Circuit ID	Description
C	922 (BK)	To HVAC control panel A-09 X128 pin D10
D	923 (YE)	To HVAC control panel A-09 X128 pin D9
E	open	
F	open	

Water Valve M-33 (ATC)



PAC_12052848 210

Cavity	Circuit ID	Description
A	956 (BL)	To ATC control module A-15 X398 pin L
B	open	
C	957 (BL)	To cab ground 3
D	955 (BL)	To ATC control module A-15 X397 pin 2E
E	open	
F	open	

Connector X152 - Air Conditioning Harness to Main Blower Harness

Manual HVAC System

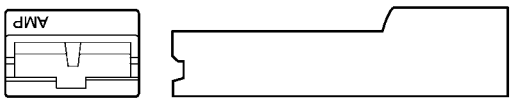
Cavity	Circuit ID	Description
1	928 (YE)	Main blower relay low K-11 to main blower (manual) M-17
2	929 (OR)	Main blower relay med K-12 to main blower (manual) M-17
3	946 (RD)	Main blower relay high K-13 to main blower (manual) M-17
4	948 (BK)	Main blower (manual) M-17 to cab ground 3

ATC System

Cavity	Circuit ID	Description
1	946 (RD)	Main blower relay high K-13 to main blower (ATC) M-34 and blower speed control A-14
2	948 (BK)	Blower speed control A-14 to cab ground 3
3	953 (YE)	ATC control module A-15 X397 pin 1F to blower speed control A-14
4	open	

https://truckmanualshub.com/

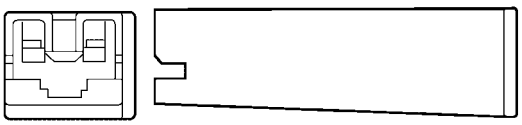
Connector X155 - Main Blower (Manual) M-17 Ground



AMP_154509 211

Cavity	Circuit ID	Description
	948 (BK)	To cab ground 3

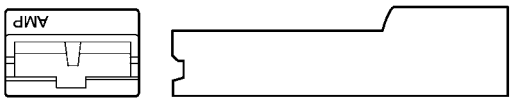
Connector X156 - Main Blower



AMP_172076 212

Main Blower (Manual) M-17 High

Cavity	Circuit ID	Description
	946 (RD)	Power from Main blower relay high K-13



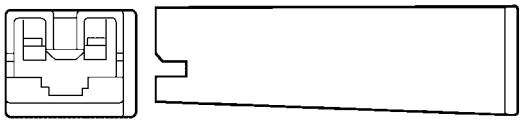
AMP_154509 213

Main Blower M-34

Cavity	Circuit ID	Description
	946 (RD)	Power from main blower relay high K-13 and blower speed control A-14
	958 (BK)	To blower speed control A-14

https://truckmanualshub.com/

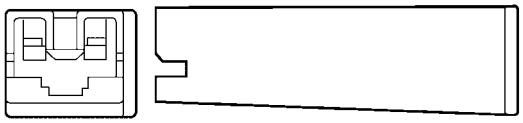
Connector X157 - Main Blower (Manual) M-17 Med



AMP_172076 214

Cavity	Circuit ID	Description
	929 (OR)	Power from main blower relay med K-12

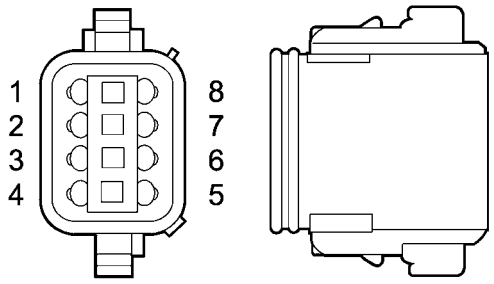
Connector X158 - Main Blower (Manual) M-17 Low



AMP_172076 215

Cavity	Circuit ID	Description
	928 (YE)	Power from main blower relay low K-11

Connector X159 - Cab Roof Harness to Future Option



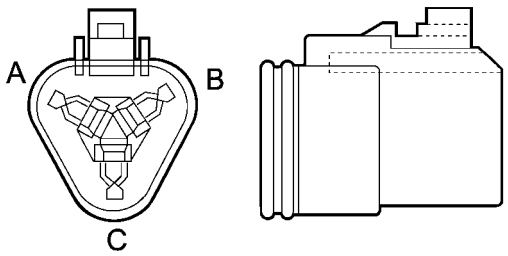
DEUTSCH_DT06-8S 216

Cavity	Circuit ID	Description
1	831 (RD)	Power from fuse F-35
2	807 (YE)	CAN High
3	open	
4	open	
5	805 (OR)	Power from fuse F-12

https://truckmanualshub.com/

Cavity	Circuit ID	Description
6	854 (BK)	To cab roof ground 4
7	806 (GN)	CAN Low
8	855 (BK)	To cab roof ground 4

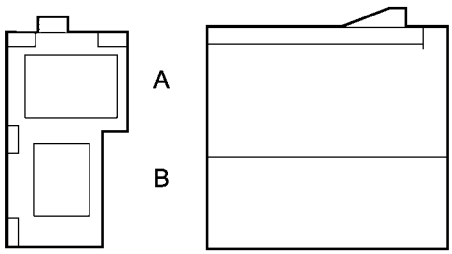
Connector X160 - Main Frame Harness to LH Front Hazard Light



DEUTSCH_DT06-3S 217

Cavity	Circuit ID	Description
A	624 (PU)	Fuse F-20 to LH marker lights E-03, E-50 or E-54
B	615 (PU)	Flasher module A-05 to LH flashing lamps E-03 or E-52
C	620 (BK)	To front frame ground 2

Connector X161 - Main Frame Harness to LH Front Service Socket J-02

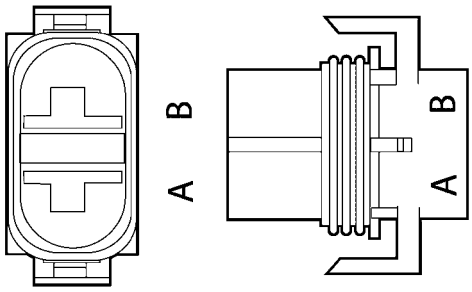


PAC_2973781 218

Cavity	Circuit ID	Description
A	656 (BK)	To front frame ground 2
B	647 (RD)	Power from fuse F-15

https://truckmanualshub.com/

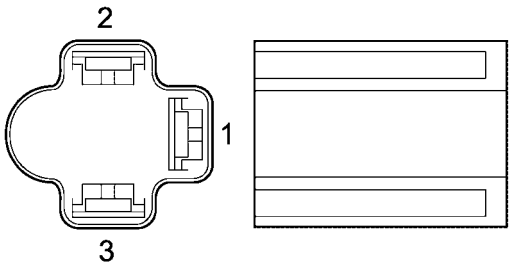
Connector X163 - Main Frame Harness to LH Lower Work Light E-23



PAC_12124819 219

Cavity	Circuit ID	Description
1	644 (PU)	Power from lower work lights relay K-30
2	654 (BK)	To front frame ground 2

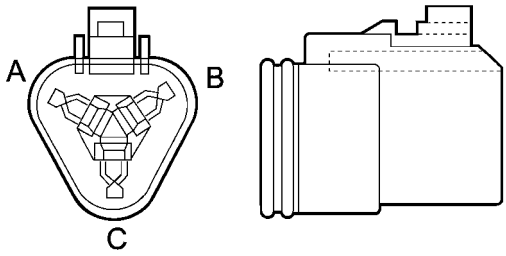
Connector X164 - Main Frame Harness to LH Road Light (EU) E-13



PAC_08917857 220

Cavity	Circuit ID	Description
A	640 (PU)	Power from high beam relay K-04
B	638 (PU)	Power from low beam relay K-05
C	642 (BK)	To front frame ground 2

Connector X165 - Main Frame Harness to RH Front Hazard Light



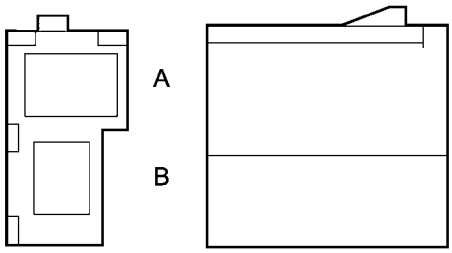
DEUTSCH_DT06-3S 221

Cavity	Circuit ID	Description
A	627 (PU)	Fuse F-21 to RH marker lights E-04, E-49 or E-53

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Cavity	Circuit ID	Description
B	616 (PU)	Flasher module A-05 to RH flashing lamps E-04 or E-51
C	621 (BK)	To front frame ground 2

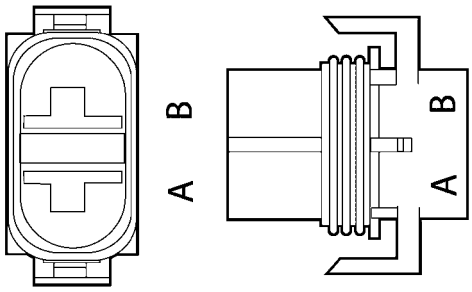
Connector X166 - Main Frame Harness to RH Front Service Socket J-01



PAC_2973781 222

Cavity	Circuit ID	Description
A	660 (BK)	To front frame ground 2
B	651 (RD)	Power from fuse F-15

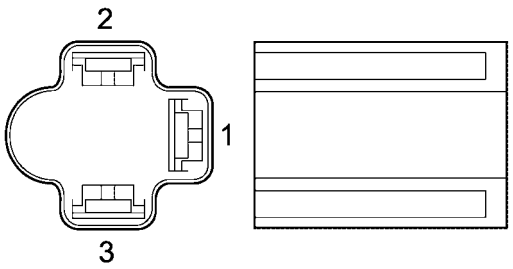
Connector X168 - Main Frame Harness to RH Lower Work Light E-24



PAC_12124819 223

Cavity	Circuit ID	Description
1	645 (PU)	Power from lower work lights relay K-30
2	655 (BK)	To front frame ground 2

Connector X169 - Main Frame Harness to RH Road Light (EU) E-14

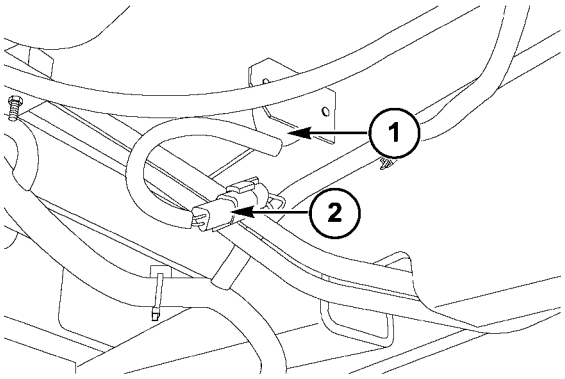


PAC_08917857 224

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	641 (PU)	Power from high beam relay K-04
B	639 (PU)	Power from low beam relay K-05
C	643 (BK)	To front frame ground 2

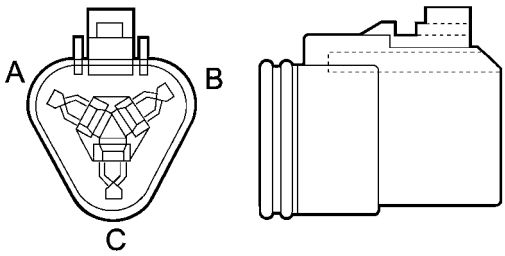
Connector X170 - Main Frame Harness to Lateral Inclination B-02



40033772A5 225

Underneath cab, right front corner

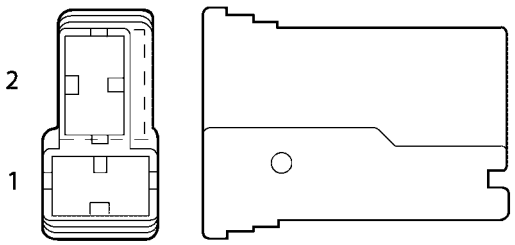
1. Lateral Inclination sensor B-02
2. Connector X170



DEUTSCH_DT06-3S 226

Cavity	Circuit ID	Description
1	451 (PK)	5 volts from CCM1 J2-31
2	462 (BL)	Reference ground to CCM1 J2-14
3	430 (YE)	Signal to CCM1 J2-33

Connector X171 - Main Frame Harness to Wiper Washer Motor M-24

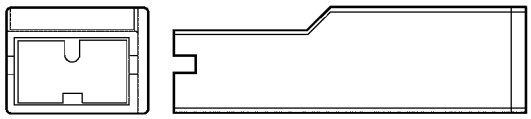


AMP_926522 227

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	449 (BK)	To front frame ground 2
2	278 (WH)	Power from washer switch S-38

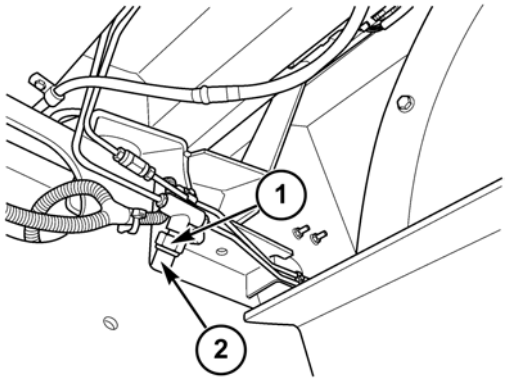
Connector X172 - Main Frame Harness to Horn H-02



AMP_154719 228

Cavity	Circuit ID	Description
	193 (WH)	Power from road light switch S-26
	631 (BK)	To front frame ground 2

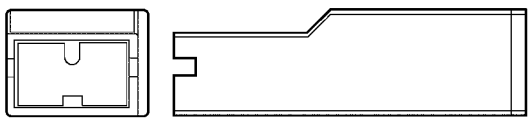
Connector X173 - Main Frame Harness to Brake Pressure S-39



10033636A4 229

Under cab platform, right side

1. Brake pressure switch S-39
2. Connector X173

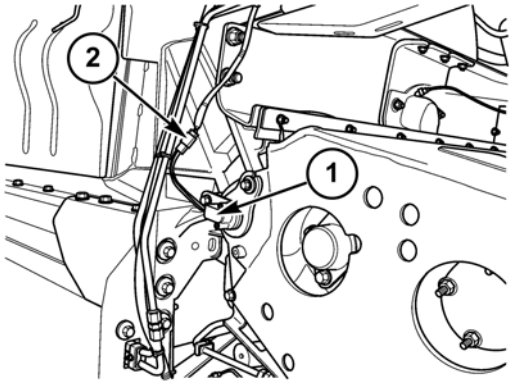


AMP_154719 230

https://truckmanualshub.com/

Cavity	Circuit ID	Description
	418 (YE)	Signal to CCM2 J2-34
	497 (BK)	To front frame ground 2

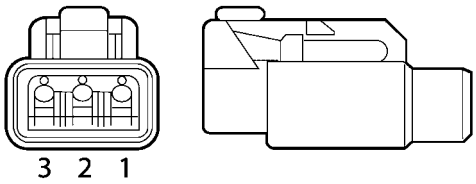
Connector X174 - Main Frame Harness to Feeder Angle R-03



10033647A4 231

Right side feeder pivot

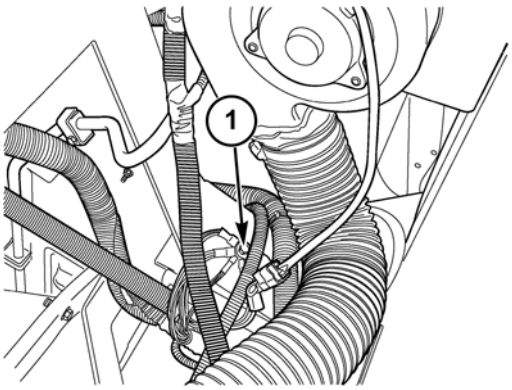
1. Feeder angle potentiometer R-03
2. Connector X174



DEU_DTM06-3S 232

Cavity	Circuit ID	Description
1	751 (PK)	5 volts from CCM1 J2-31
2	740 (YE)	Signal to CCM1 J2-22
3	756 (BL)	Reference ground to CCM1 J2-14

Connector X175 - Main Frame Harness to Front Frame Ground 2

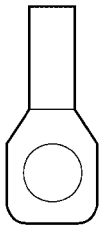


50031062A4 233

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Left side of main frame, behind left rear cab mount

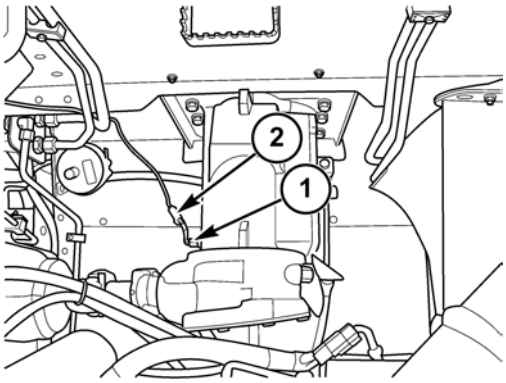
1. Connector X175 to front frame ground #2



RING_TERMINAL 234

Cavity	Circuit ID	Description
	246 (BK)	Wiper washer motor M-24, brake pressure S-39 and brake limiting L-32
	668 (BK)	Grain tank and unload tube lights
	676 (BK)	LH hazard, road and lower work lights, LH service socket J-02
	677 (BK)	RH hazard, road and lower work lights, horn H-02 and RH service socket J-01
	1192 (BK)	Fan drive solenoid L-44
	583 (BK)	CCM1 J2-3, J2-12 & J2-18
	584 (BK)	CCM2 J2-3, J2-12 & J2-18
	845 (BK)	Fuel pump M-23
	600 (BK)	Unload tube in L-03, unload tube out L-04, header height accumulator L-06 and signal valve L-43
	605 (BK)	Park brake disengage L-10
	1247 (BK)	Undershield lighting

Connector X177 - Gearbox Harness to Rotor RPM B-01

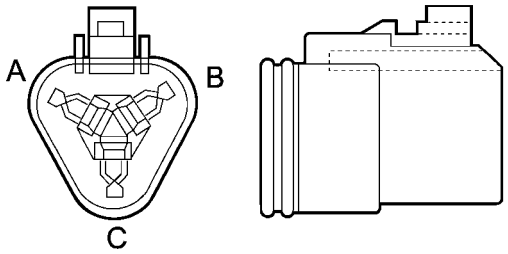


10033632A4 235

Left side of rotor drive gearbox

1. Rotor RPM sensor B-01
2. Connector X177

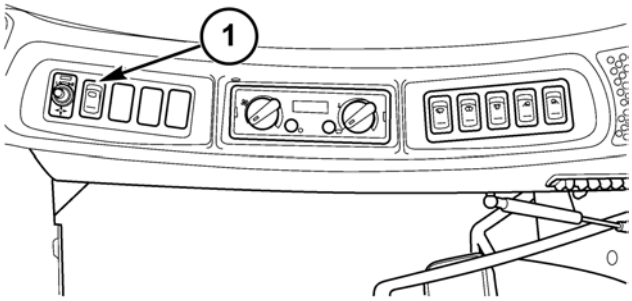
https://truckmanualshub.com/



DEUTSCH_DT06-3S 236

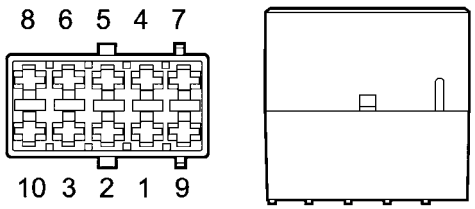
Cavity	Circuit ID	Description
A	1262 (OR)	Power from fuse F-45
B	1261 (YE)	Signal to CCM2 J2-37 and CCM3 J3-13
C	1264 (BK/WH)	Battery clean ground 6

Connector X178 - Cab Roof Harness to Switch Bypass Fuses F-64 or Mirror Select Switch S-57



10031047A4 237

1. Connector X178



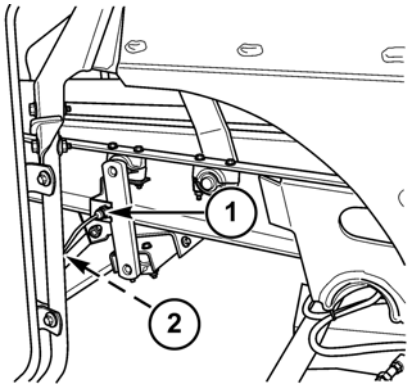
EATON_25-13936 238

Cavity	Circuit ID	Description
1	963 (WH)	Output to German mirror up / down M-30
2	957 (WH)	Input from mirror adjust switch S-27
3	955 (WH)	Output to RH mirror up / down M-19
4	964 (WH)	Output to German mirror in / out M-31
5	960 (WH)	Input from mirror adjust switch S-27
6	962 (WH)	Output to RH mirror in / out M-20
7	open	
8	open	

https://truckmanualshub.com/

Cavity	Circuit ID	Description
9	open	
10	open	

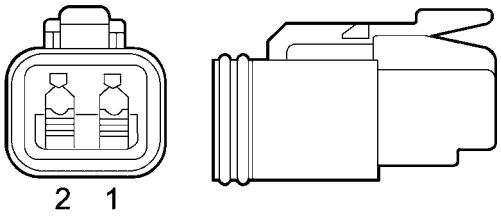
Connector X181 - Main Frame Harness to Sieve Shake RPM B-56



10033651A4 239

Left side of main frame, in front of rear axle

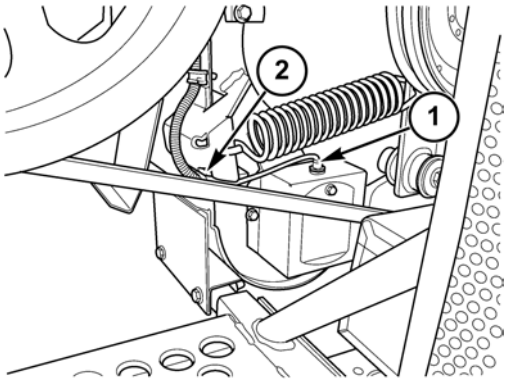
1. Sieve shake RPM sensor B-56
2. Connector X181



DEUTSCH_DT06-2S 240

Cavity	Circuit ID	Description
1	1191 (BL)	Reference ground to CCM1 J2-14
2	1162 (YE)	Signal to CCM1 J2-38

Connector X182 - Main Frame Harness to Clean Grain Elevator RPM B-08



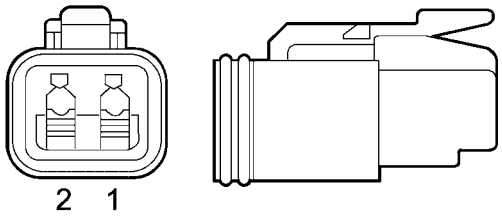
10031036A4 241

Left side of main frame, behind cleaning fan

1. Clean grain elevator RPM sensor B-08

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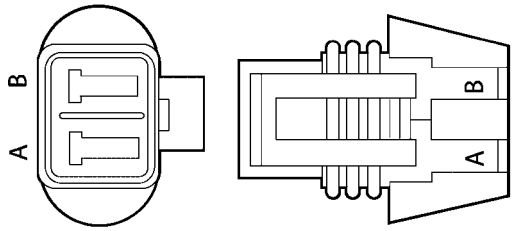
2. Connector X182



DEUTSCH_DT06-2S 242

Cavity	Circuit ID	Description
1	491 (BL)	Reference ground to CCM1 J2-14
2	450 (YE)	Signal to CCM1 J2-28

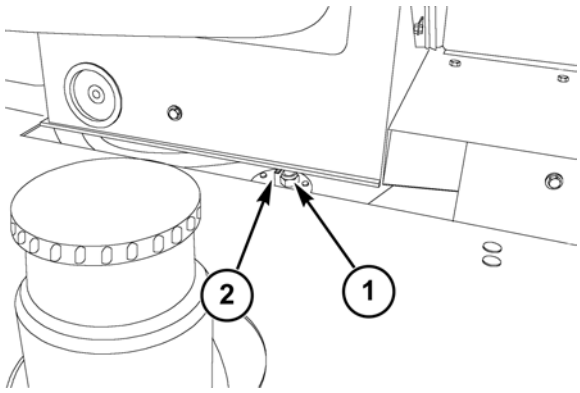
Connector X183 - Main Frame Harness to Fuel Pump M-23



PAC_15300027 243

Cavity	Circuit ID	Description
1	856 (WH)	Power from fuel pump relay K-07
2	845 (BK)	To engine ground 5

Connector X184 - Main Frame Harness to Fuel Level R-01

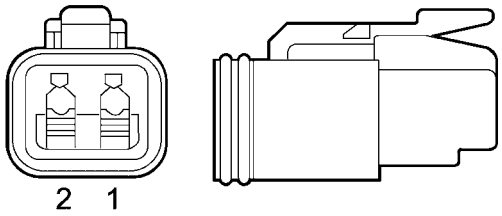


40031055A4 244

Engine platform, under radiator housing

1. Fuel level sensor R-01
2. Connector X184

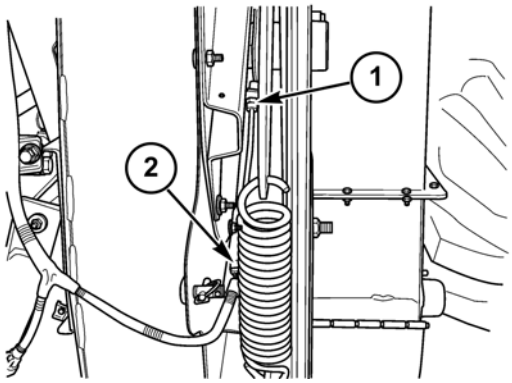
https://truckmanualshub.com/



DEUTSCH_DT06-2S 245

Cavity	Circuit ID	Description
1	467 (BL)	Reference ground to CCM2 J2-14
2	427 (YE)	Signal to CCM2 J2-17

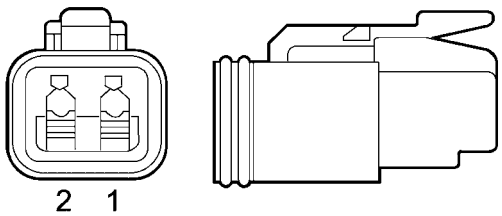
Connector X186 - Main Frame Harness to Tailing RPM B-39



10033653A4 246

Right side of main frame

1. Tailings RPM sensor B-39
2. Connector X186

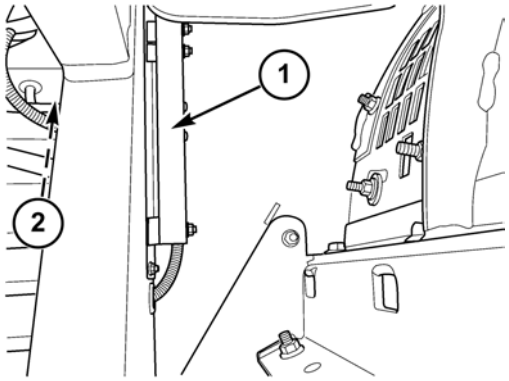


DEUTSCH_DT06-2S 247

Cavity	Circuit ID	Description
1	442 (BL)	Reference ground to CCM1 J2-14
2	441 (YE)	Signal to CCM1 J2-37

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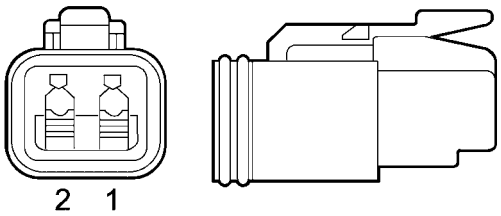
Connector X188 - Main Frame Harness to Right Rotor Loss B-20



10033657A4 248

Right side, inside rear of threshing area

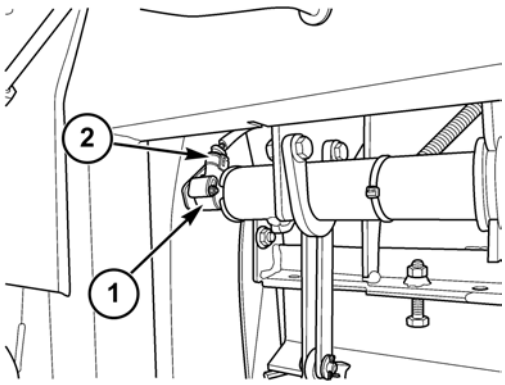
1. Right rotor loss sensor B-20
2. Connector X188



DEUTSCH_DT06-2S 249

Cavity	Circuit ID	Description
1	458 (BL)	Reference ground to CCM2 J2-14
2	402 (YE)	Signal to CCM2 J2-26

Connector X189 - Concave Extension Harness to Concave Position R-06

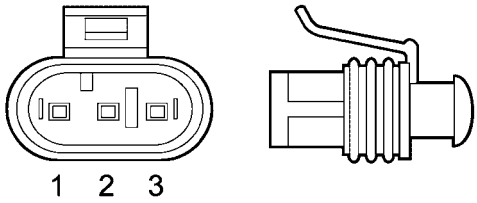


10031040A4 250

Left side of main frame, inside threshing area

1. Concave position potentiometer R-06
2. Connector X189

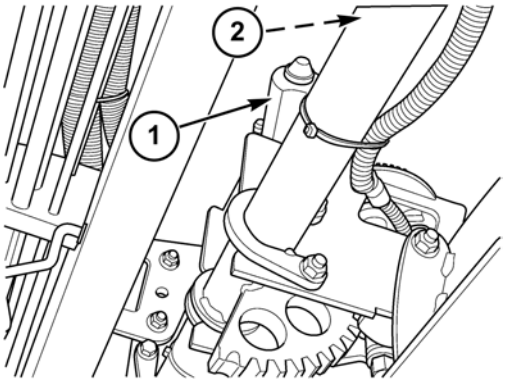
https://truckmanualshub.com/



AMP_282087 251

Cavity	Circuit ID	Description
1	498 (PK)	5 volts from CCM1 J2-31
2	411 (YE)	Signal to CCM1 J2-19
3	456 (BL)	Reference ground to CCM1 J2-14

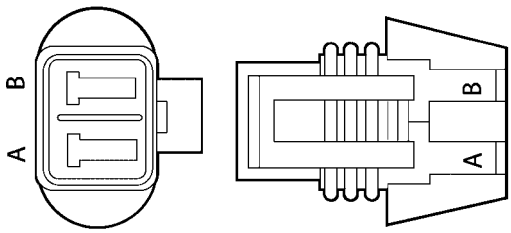
Connector X190 - Concave Extension Harness to Concave Clearance Motor M-04



10031039A4 252

Left side of main frame, inside threshing area

1. Concave clearance motor M-04
2. Connector X190

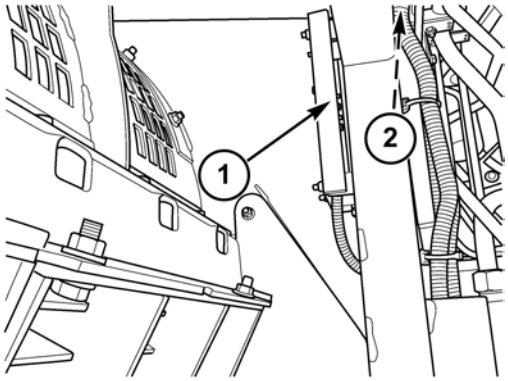


PAC_15300027 253

Cavity	Circuit ID	Description
1	694 (GY)	Signal from CCM1 J2-1
2	695 (WH)	Signal from CCM1 J2-21 through concave / covers relay K-16

https://truckmanualshub.com/

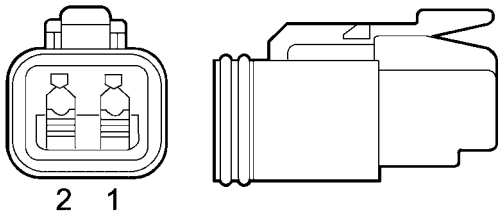
Connector X191 - Main Frame Harness to Left Rotor Loss B-19



10031034A4 254

Left side of main frame, inside threshing area

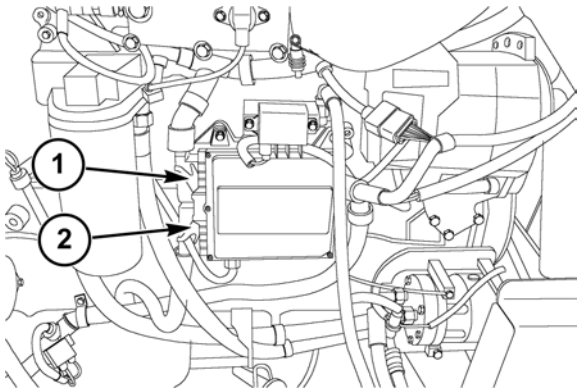
1. Left rotor loss sensor B-19
2. Connector X191



DEUTSCH_DT06-2S 255

Cavity	Circuit ID	Description
1	457 (BL)	Reference ground to CCM2 J2-14
2	410 (YE)	Signal to CCM2 J2-25

Connector X192 - Iveco Harness to ECU Connector "A"

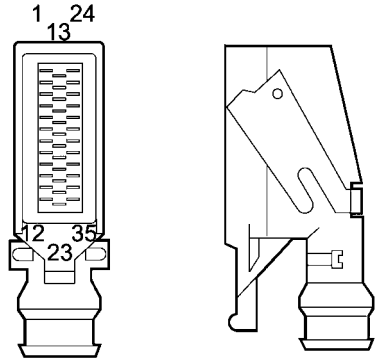


40033791A4 256

Rear of engine

1. Connector X192
2. Connector **X193**

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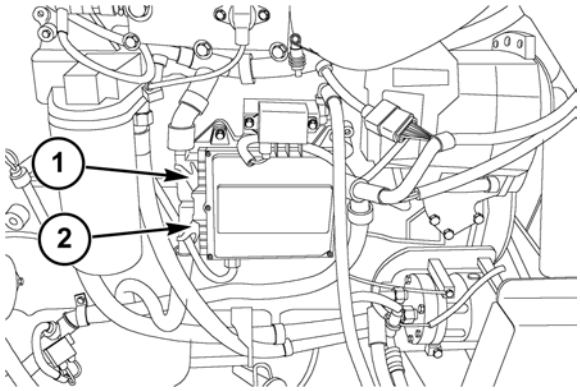
BOSCH_1-928-401 257

Cavity	Circuit ID	Description
1	WH	Engine flywheel RPM B-05
2	WH	Engine camshaft RPM B-07
3	BN	Engine brake L-33
4	BK	Air temperature B-54
5	PK	Coolant temperature B-44
6	WH/RD	Fuel temperature B-36
7	open	
8	open	
9	open	
10	open	
11	OR/BK	Fuel temperature B-36
12	GN	Signal from boost pressure B-23
13	BK	Engine flywheel RPM B-05
14	BK	Engine camshaft RPM B-07
15	open	
16	open	
17	WH	Boost pressure B-23
18	BN	Engine brake L-33
19	open	
20	open	
21	OR	Air temperature B-54
22	YE	Coolant temperature B-44
23	RD	Boost pressure B-23
24	RD	Common for fuel actuators 1, 3 & 5, L-34/36/38
25	BK	Common for fuel actuators 2, 4 & 6, L-35/37/39
26	BL	Fuel actuator 2 L-35
27	GY	Fuel actuator 4 L-37
28	PU	Fuel actuator 6 L-39
29	open	
30	open	
31	open	
32	BL	Engine brake L-33
33	GN	Fuel actuator 5 L-38

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Cavity	Circuit ID	Description
34	YE	Fuel actuator 3 L-36
35	WH	Fuel actuator 1 L-34

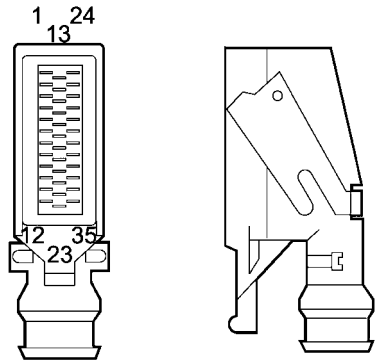
Connector X193 - Engine Harness to ECU Connector "B"



40033791A4 258

Rear of engine

1. Connector **X192**
2. Connector X193



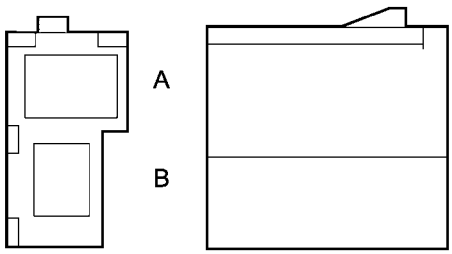
BOSCH_1-928-401 259

Cavity	Circuit ID	Description
1	815 (BK)	To engine ground 5
2	816 (BK)	To engine ground 5
3	810 (WH)	Power from ECU power relay K-14
4	811 (WH)	Power from ECU power relay K-14
5	open	
6	open	
7	open	
8	open	
9	open	
10	822 (WH)	Ground for grid heater relay K-39
11	820 (GN)	CAN Low
12	819 (YE)	CAN High
13	827 (BK)	To DAM connector X065 pin E
14	open	
15	859 (OR)	Power from key switch S-02
16	open	

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Cavity	Circuit ID	Description
17	open	
18	open	
19	open	
20	open	
21	open	
22	open	
23	open	
24	open	
25	open	
26	open	
27	808 (YE)	Ground path for ECU power relay K-14
28	open	
29	open	
30	open	
31	open	
32	open	
33	open	
34	open	
35	open	

Connector X194 - Engine Harness to Engine Service Socket J-05

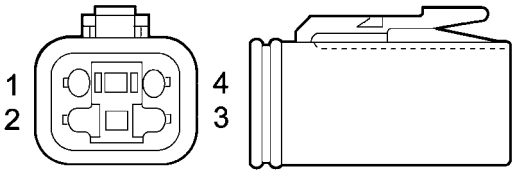


PAC_2973781 260

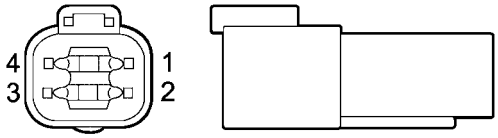
Cavity	Circuit ID	Description
A	659 (BK)	To engine ground 5
B	650 (RD)	Power from fuse F-15

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Connector X195 - Main Frame Harness to Tank Extensions Harness



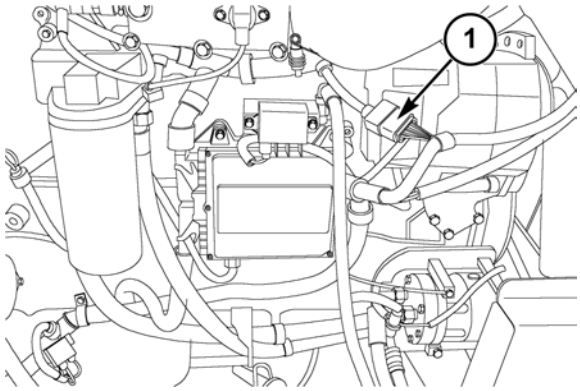
DEUTSCH_DT06-4S 261



DEUTSCH_DT04-4P 262

Cavity	Circuit ID	Description
1	435 (YE)	Covers closed B-47 to CCM1 J3-38
2	454 (BL)	Covers closed B-47 reference ground to CCM1 J2-14
3	693 (GY)	CCM1 J2-1 to covers motor M-12
4	696 (WH)	CCM1 J2-21 through concave / covers relay K-16 to covers motor M-12

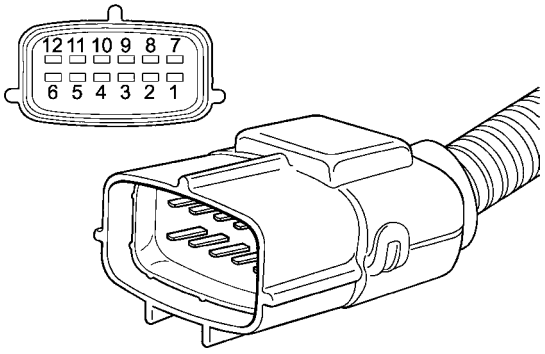
Connector X197 - Engine Harness to Iveco Harness



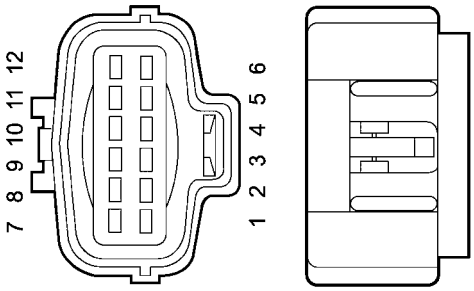
40033791E4 263

1. Connector X197

https://truckmanualshub.com/



AMP_174663 264

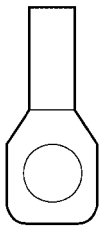


AMP_174661-2 265

Cavity	Circuit ID	Description
1	852 (BL) [BN - Iveco]	Fuel filter switch S-62 reference ground to CCM2 J2-14
2	open [PU - Iveco]	Not used
3	open [OR - Iveco]	Not used
4	853 (BL) [BN - Iveco]	Engine oil pressure B-52 reference ground to CCM2 J2-14
5	490 (PK) [OR - Iveco]	CCM2 J2-31 5 volt reference to engine oil pressure B-52
6	419 (YE) [OR - Iveco]	Engine oil pressure B-52 to CCM2 J2-33
7	open [BL - Iveco]	Not used
8	open [BN - Iveco]	Not used
9	504 (YE) [BL - Iveco]	Engine oil temp B-03 to CCM2 J2-27
10	850 (BL) [BN - Iveco]	Engine oil temp B-03 reference ground to CCM2 J2-14
11	open [BL - Iveco]	Not used
12	429 (YE) [RD - Iveco]	Fuel filter switch S-62 to CCM2 J2-24

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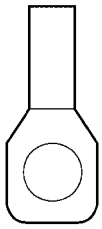
Connector X199 - Engine Harness to Start Relay K-36



RING_TERMINAL 266

Cavity	Circuit ID	Description
	092 (WH)	Power from neutral start relay K-23
	800 (BK)	To engine ground 5

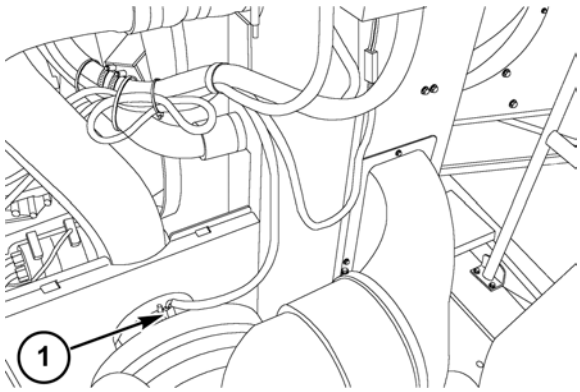
Connector X200 - Engine Harness to Start Relay K-36



RING_TERMINAL 267

Cavity	Circuit ID	Description
	801 (RD)	Power from rear battery G-03 through 24V start relay K-38
	804 (WH)	Power to 24V start relay K-38

Connector X202 - Engine Harness to Air Filter Switch S-61



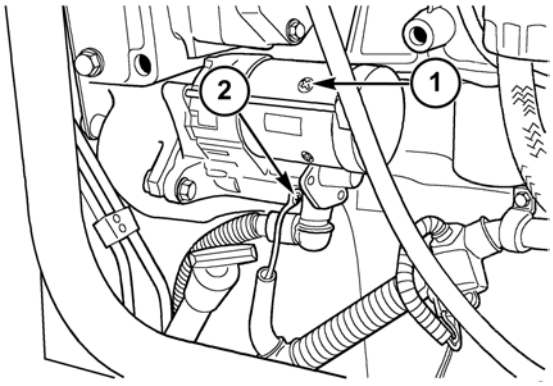
40033786A4 268

1. Connector X202

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	851 (BL)	Reference ground to CCM2 J2-14
2	864 (YE)	5 volts from CCM2 J2-31, signal to CCM2 J2-29

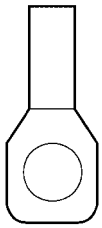
Connector X205 - Engine Harness to 24V Starter M-29



50030161B4 269

Rear of engine

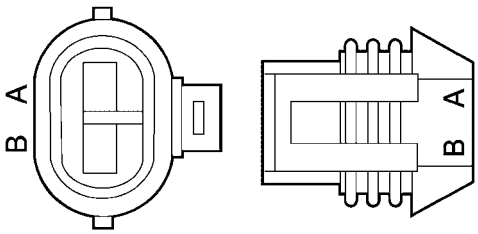
1. 24V starter motor M-29
2. Connector X205



RING_TERMINAL 270

Cavity	Circuit ID	Description
	834 (WH/BK)	Power from 24V start relay K-38

Connector X211 - Engine Harness to Grid Heater Relay K-39

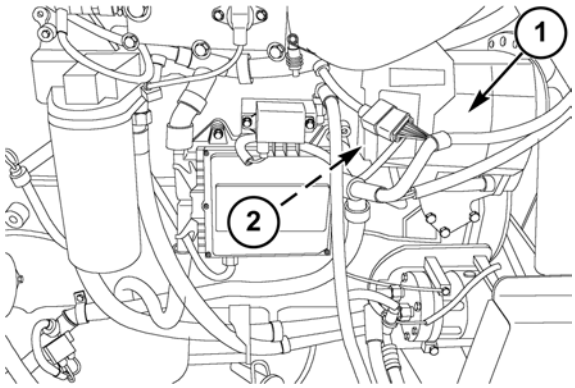


AMP_282080-1 271

https://truckmanualshub.com/

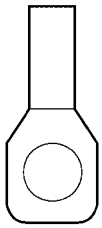
Cavity	Circuit ID	Description
1	818 (WH)	Power from ECU power relay K-14
2	822 (BK)	Ground to ECU A-01 X193 pin 10

Connector X213 - Engine Harness to Alternator G-01



40033791C4 272

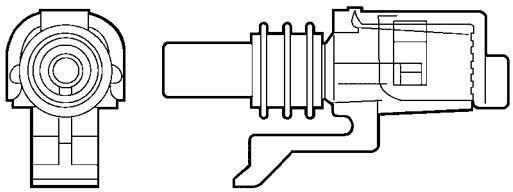
1. Alternator G-01
2. Connector X213



RING_TERMINAL 273

Cavity	Circuit ID	Description
	803 (BK)	To engine ground 5

Connector X215 - Engine Harness to A/C Clutch L-07

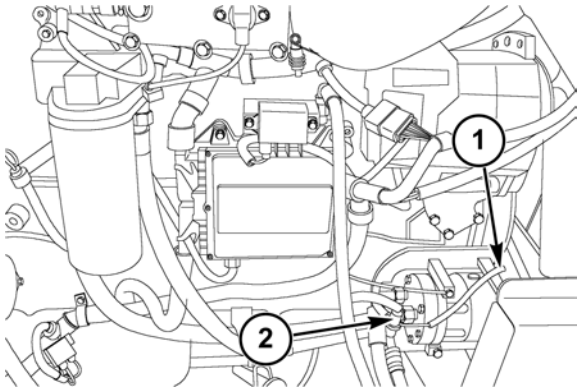


PAC_12015791 274

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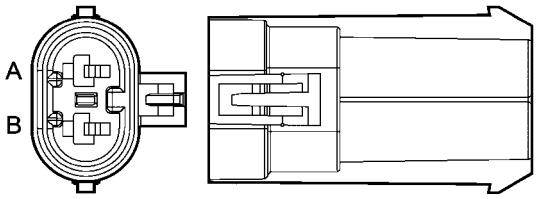
Cavity	Circuit ID	Description
A	178 (WH)	Power from A/C clutch relay K-10
ring	1218 (BK)	To engine ground 5

Connector X216 - Engine Harness to A/C High Pressure S-47

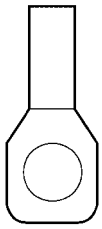


40033791F4 275

1. Connector X216
2. A/C high pressure switch S-47



PAC_12065863 276

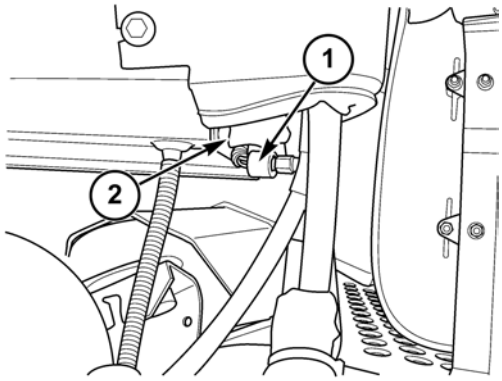


RING_TERMINAL 277

Cavity	Circuit ID	Description
1	917 (YE)	Signal to HVAC Control Panel X128 pin D-4
2	916 (BL)	Reference ground to HVAC Control Panel X128 pin D-3

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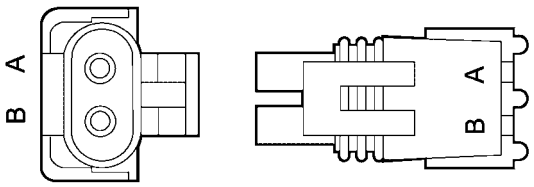
Connector X217 - A/C Harness to A/C Low Pressure (ATC) S-77



10031042A4 278

Right rear corner outside of cab

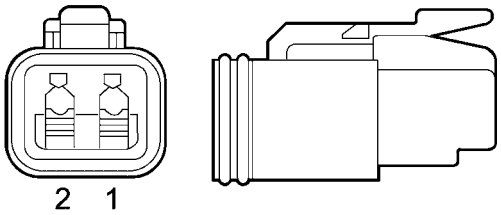
1. A/C low pressure switch S-77
2. Connector X217



PAC_12015792 279

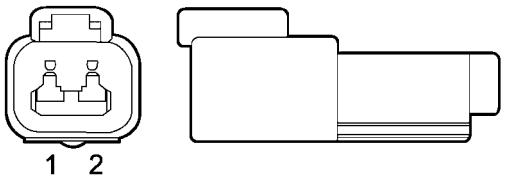
Cavity	Circuit ID	Description
A	913 (YE)	Reference ground to HVAC control panel A-20 X128 pin C16
B	950 (BL)	Signal to ATC control module A-15 X397 pin 1C

Connector X218 - Main Frame Harness to Flip-Up Lighting Harness



DEUTSCH_DT06-2S 280

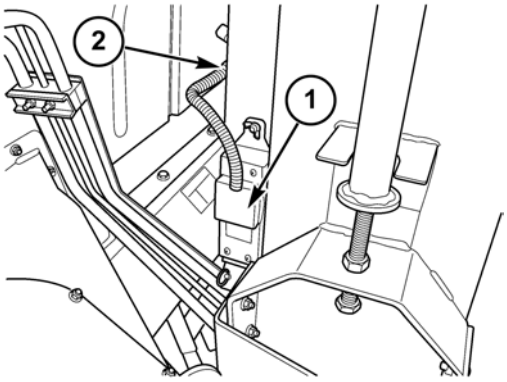
https://truckmanualshub.com/



DEUTSCH_DT04-2P 281

Cavity	Circuit ID	Description
1	637 (PU)	RH marker lights fuse F-21 to flip up road light relays K-40, K-41
2	776 (BK)	To front frame ground 2

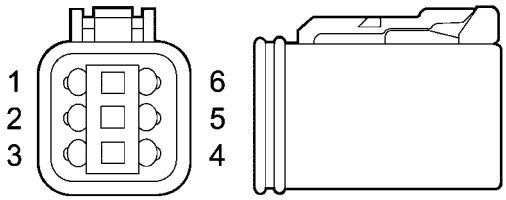
Connector X221 - Precision Farming Harness to Moisture Sensor B-12



10031035A4 282

Right side of main frame, inside face of clean grain elevator housing

1. Moisture sensor B-12
2. Connector X221

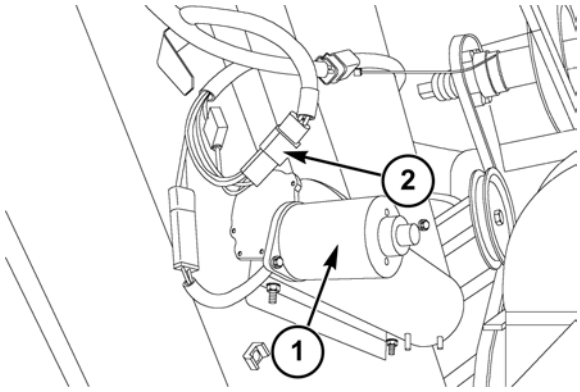


DEUTSCH_DT06-6S 283

Cavity	Circuit ID	Description
1	699 (OR)	Power from YMIU module A-12 X412 pin 1
2	565 (BK)	Ground to YMIU module A-12 X412 pin 12
3	593 (YE)	Sensor (+) to YMIU module A-12 X412 pin 2
4	594 (YE)	Sensor (-) to YMIU module A-12 X412 pin 3
5	595 (YE)	Moisture temp to YMIU module A-12 X412 pin 4
6	open	

https://truckmanualshub.com/

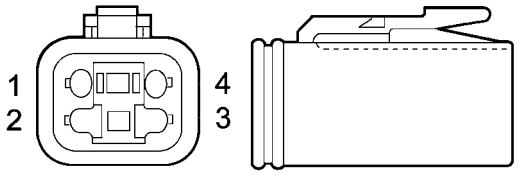
Connector X222 - Precision Farming Harness to Sample Motor M-28



40033785A4 284

Right side of main frame, inside face of clean grain elevator housing

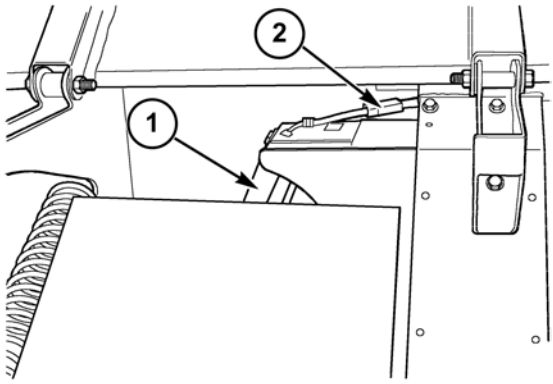
1. Sample motor M-28
2. Connector X222



DEUTSCH_DT06-4S 285

Cavity	Circuit ID	Description
1	682 (OR)	Power from fuse F-47
2	564 (BK)	To front frame ground 2
3	838 (YE)	Signal to CCM3 J2-25
4	837 (WH)	Power from CCM3 J2-13

Connector X223 - Precision Farming Harness to Yield Sensor B-57

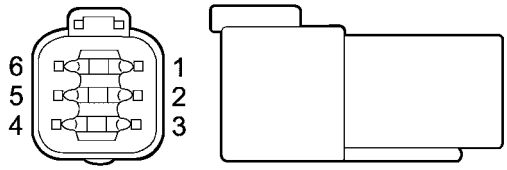


50030167A4 286

Inside grain tank, top of clean grain elevator housing

1. Yield sensor B-57
2. Connector X223

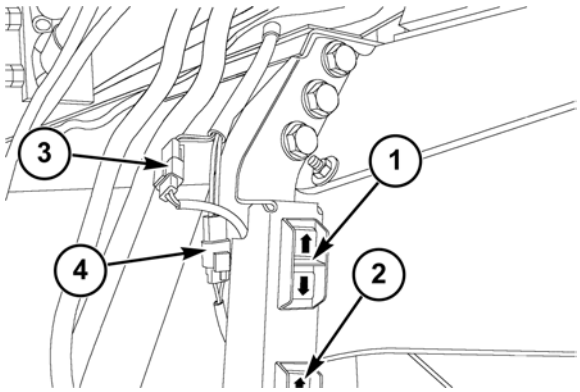
https://truckmanualshub.com/



DEUTSCH_DT04-6P 287

Cavity	Circuit ID	Description
1	552 (WH/RD)	Power from YMIU module A-12 X412 pin 6
2	698 (WH/YE)	Signal (+) to YMIU module A-12 X412 pin 8
3	563 (WH)	Signal (-) to YMIU module A-12 X412 pin 7
4	1235 (WH/BK)	Ground to YMIU module A-12 X412 pin 9
5	open	
6	open	

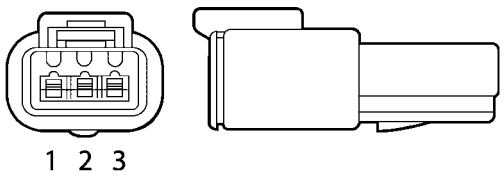
Connector X225 - Straw Hood Front Harness to Upper Sieve Rear Adjust S-35



40033782A4 288

Left rear corner of main frame

1. Upper sieve rear adjust switch S-35
2. Lower sieve rear adjust switch S-46
3. Connector X225
4. Connector **X226**

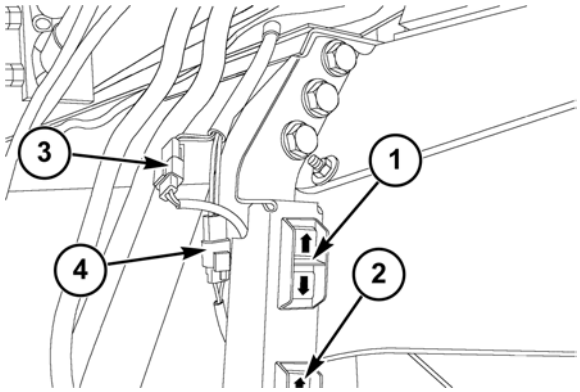


DEU_DTM04-3P 289

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	540 (YE)	Signal (close) to CCM3 J2-17
2	550 (BK)	To front frame ground 2
3	539 (YE)	Signal (open) to CCM3 J2-34

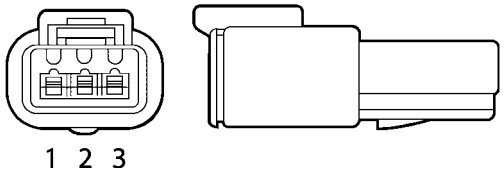
Connector X226 - Straw Hood Front Harness to Lower Sieve Rear Adjust S-46



40033782A4 290

Left rear corner of main frame

1. Upper sieve rear adjust switch S-35
2. Lower sieve rear adjust switch S-46
3. Connector **X225**
4. Connector X226

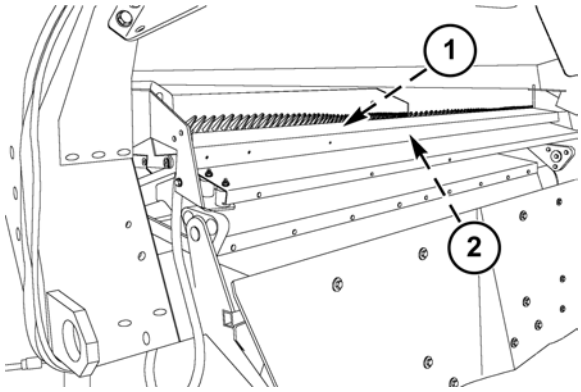


DEU_DTM04-3P 291

Cavity	Circuit ID	Description
1	542 (YE)	Signal (close) to CCM3 J2-35
2	551 (BK)	To front frame ground 2
3	541 (YE)	Signal (open) to CCM3 J2-39

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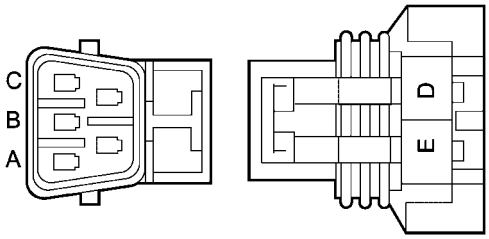
Connector X227 - Lower Frame Rear Harness to Upper Sieve Actuator M-06



40031059B4 292

Rear of cleaning shoe

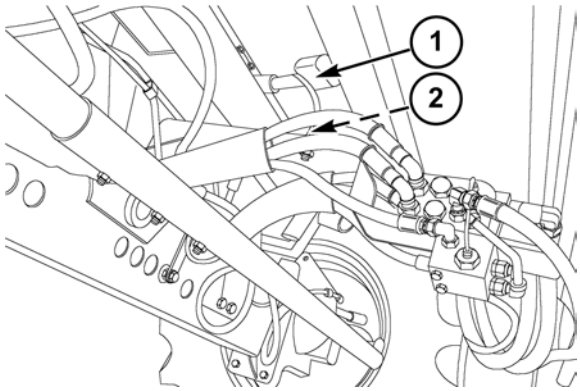
1. Upper sieve actuator motor M-06
2. Connector X227 (under sieve loss sensor)



PAC_12146045 293

Cavity	Circuit ID	Description
A	793 (PK)	5 volts from CCM3 J2-31
B	795 (BL)	Reference ground to CCM3 J2-14
C	475 (YE)	Signal to CCM3 J2-22
D	792 (WH)	Power from CCM3 J2-21 through upper / lower sieve relay K-18
E	791 (GY)	Power from CCM3 J2-1

Connector X228 - Lower Frame Rear Harness to Lower Sieve Actuator M-07

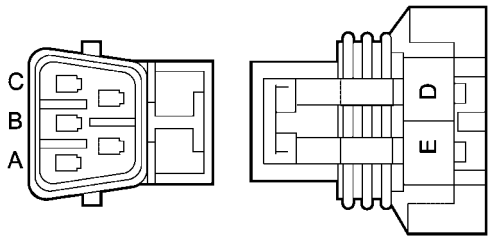


40033803A4 294

Under cleaning shoe, in front of rear axle

1. Lower sieve actuator M-07
2. Connector X228

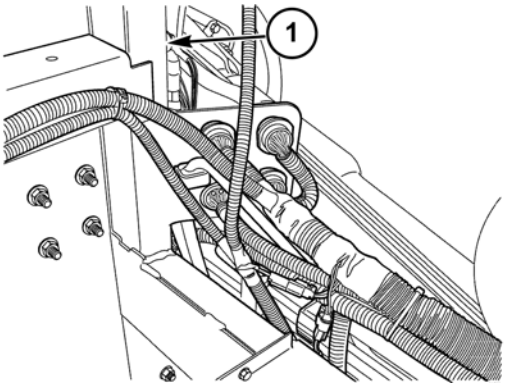
https://truckmanualshub.com/



PAC_12146045 295

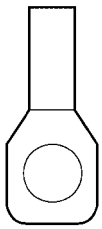
Cavity	Circuit ID	Description
A	793 (PK)	5 volts from CCM3 J2-31
B	796 (BL)	Reference ground to CCM3 J2-14
C	476 (YE)	Signal to CCM3 J2-19
D	790 (WH)	Power from CCM3 J2-21 through upper / lower sieve relay K-18
E	789 (GY)	Power from CCM3 J2-1

Connector X231 - Straw Hood Front Harness to Rear Frame Ground 1



50031063B4 296

1. Connector X231



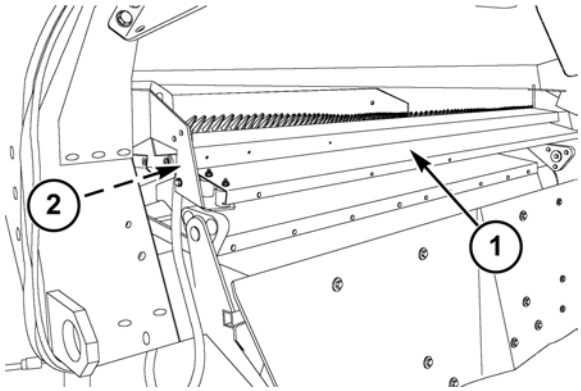
RING_TERMINAL 297

Cavity	Circuit ID	Description
	478 (BK)	Back up alarm H-08 and rear beacon light E-33
	479 (BK)	Returns filter bypass S-32, PTO box filter bypass S-34, rear wheel assist L-26, chaff spreader L-28, sieve light front E-37 and trailer outlet J-09
	628 (BK)	Flashing lamps E-05/E-06/E-07/E-08, brake / tail lamps E-11/E-12 and RH side service socket J-03

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Cavity	Circuit ID	Description
	657 (BK)	LH side service socket J-04
	672 (BK)	Rear work lights E-27 & E-28
	1195 (BK)	Sieve light rear E-59
	1248 (BK)	Engine light E-46

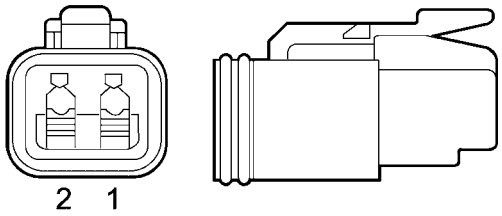
Connector X232 - Lower Frame Rear Harness to Sieves Loss B-21



40031059A4 298

Rear of cleaning shoe

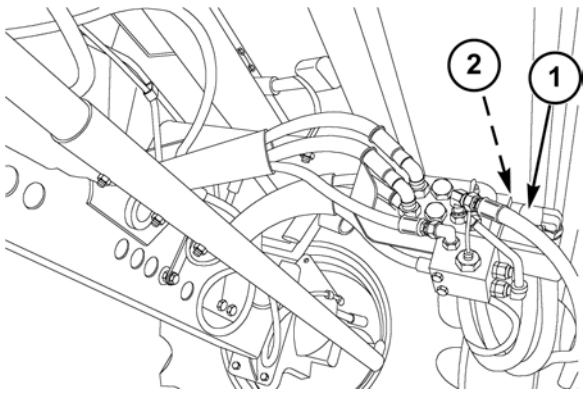
1. Sieve loss sensor B-21
2. Connector X232



DEUTSCH_DT06-2S 299

Cavity	Circuit ID	Description
1	494 (BL)	Reference ground to CCM1 J2-14
2	431 (YE)	Signal to CCM1 J2-25

Connector X233 - Lower Frame Rear Harness to Rear Wheel Assist L-26

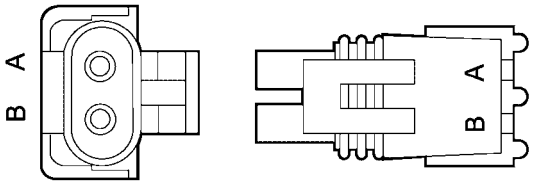


40033803B4 300

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Under cleaning shoe, in front of rear axle

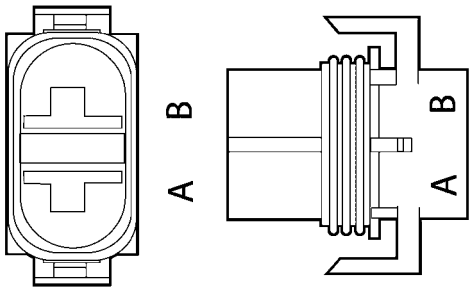
1. Rear wheel assist valve L-26
2. Connector X233



PAC_12015792 301

Cavity	Circuit ID	Description
A	569 (WH)	Power from CCM1 J2-16
B	602 (BK)	To rear frame ground 1

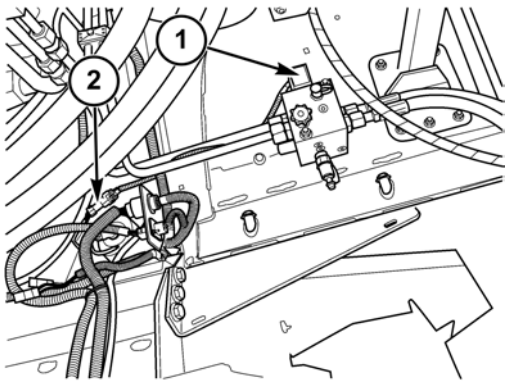
Connector X234 - Straw Hood Front Harness to Sieve Light Front E-37



PAC_12124819 302

Cavity	Circuit ID	Description
A	1194 (PU)	Power from sieve light switch S-54
B	611 (BK)	To rear frame ground 1

Connector X235 - Straw Hood Front Harness to Chaff Spreader L-28



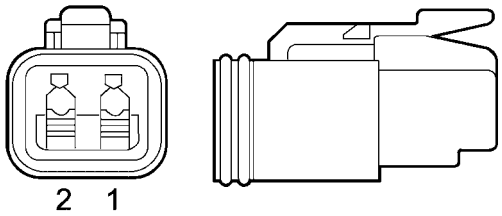
10033639C4 303

Left rear of main frame, above rear axle

1. Chaff spreader valve L-28

https://truckmanualshub.com/

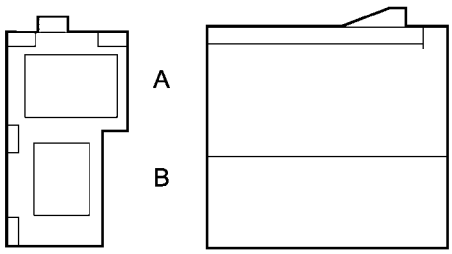
2. Connector X235



DEUTSCH_DT06-2S 304

Cavity	Circuit ID	Description
1	576 (WH)	Power from CCM1 J2-15
2	577 (BK)	To rear frame ground 1

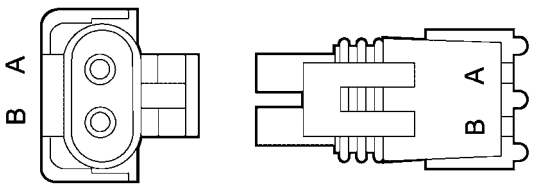
Connector X236 - Straw Hood Front Harness to LH Side Service Socket J-04



PAC_2973781 305

Cavity	Circuit ID	Description
A	657 (BK)	To rear frame ground 1
B	648 (RD)	Power from fuse F-15

Connector X237 - Straw Hood Front Harness to Sieve Light Switch S-54

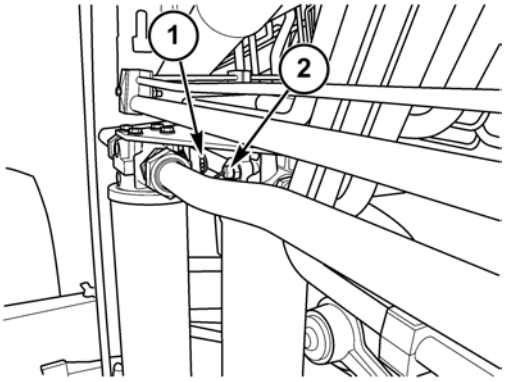


PAC_12015792 306

Cavity	Circuit ID	Description
A	604 (OR)	Power from fuse F-14
B	610 (PU)	Output to sieve lights E-37 & E-59

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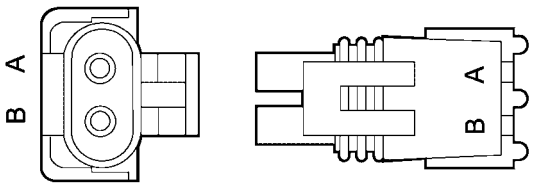
Connector X238 - Straw Hood Front Harness to PTO Box Filter Bypass S-34



10031041A4 307

Left side of main frame, below PTO gearbox

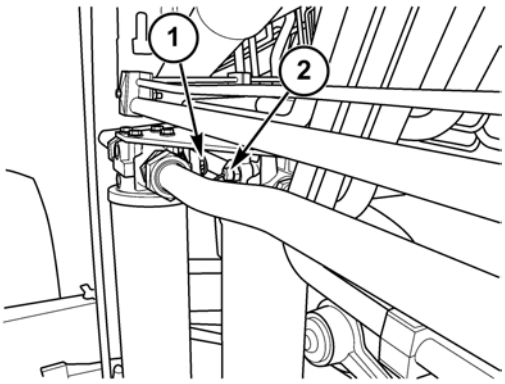
1. Connector **X239**
2. Connector X238



PAC_12015792 308

Cavity	Circuit ID	Description
A	484 (BK)	To rear frame ground 1
B	448 (YE)	Signal to CCM1 J2-35

Connector X239 - Straw Hood Front Harness to Returns Filter Bypass S-32

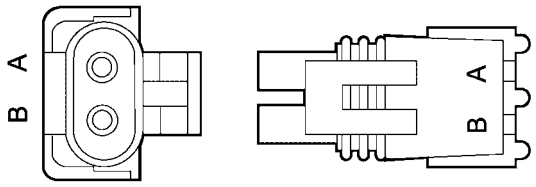


10031041A4 309

Left side of main frame, below PTO gearbox

1. Connector X239
2. Connector **X238**

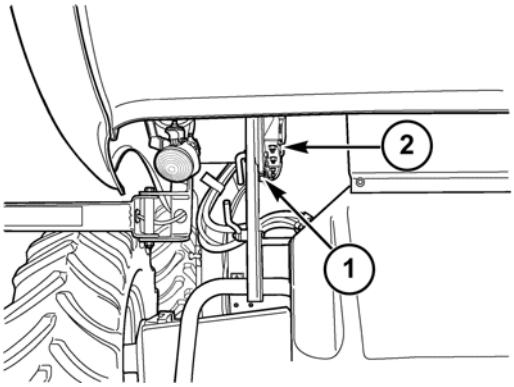
https://truckmanualshub.com/



PAC_12015792 310

Cavity	Circuit ID	Description
A	603 (BK)	To rear frame ground 1
B	447 (YE)	Signal to CCM1 J2-34

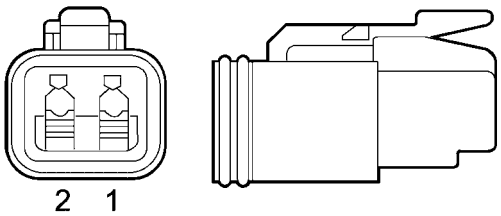
Connector X240 - Straw Hood Rear Harness to Spreader Position B-11



50031032A4 311

Left rear corner

1. Spreader position sensor B-11
2. Connector X240

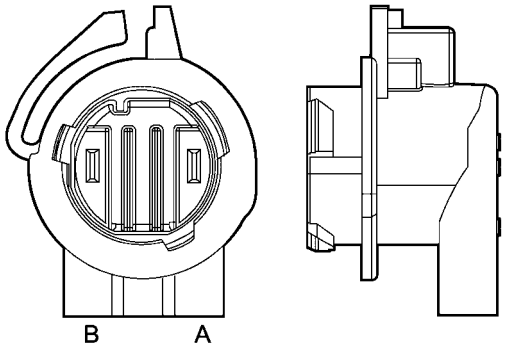


DEUTSCH_DT06-2S 312

Cavity	Circuit ID	Description
1	482 (BL)	Reference ground to CCM1 J2-14
2	415 (YE)	Signal to CCM1 J3-37

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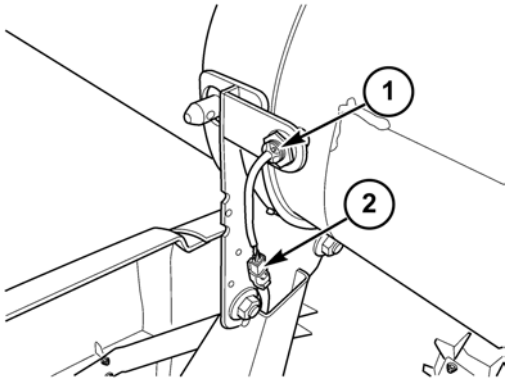
Connector X242 - Straw Hood Rear Harness to LH Flashing Lamp (NA) E-07



PAC_12160393 313

Cavity	Circuit ID	Description
A	243 (PU)	Power from flasher module A-05 X255 pin 10
B	679 (BK)	To rear frame ground 1

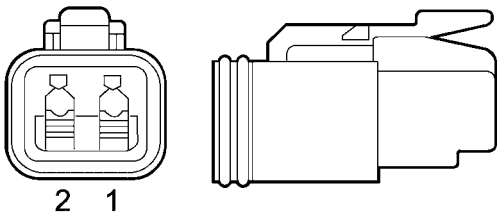
Connector X244 - Straw Hood Rear Harness to Unload Cradle B-38



10033644A4 314

Upper left rear corner (accessible from engine platform)

1. Unload cradle sensor B-38
2. Connector X244

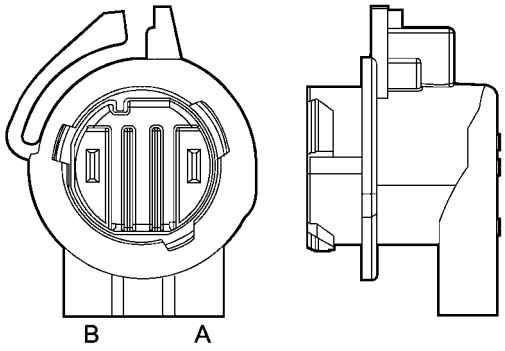


DEUTSCH_DT06-2S 315

Cavity	Circuit ID	Description
1	444 (BL)	Reference ground to CCM1 J2-14
2	485 (YE)	Signal to CCM1 J3-36

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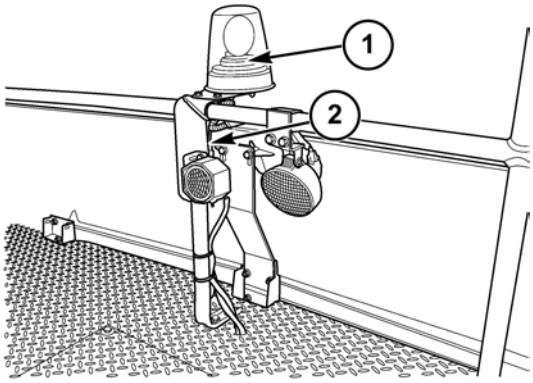
Connector X245 - Straw Hood Rear Harness to RH Flashing Lamp (NA) E-08



PAC_12160393 316

Cavity	Circuit ID	Description
A	244 (PU)	Power from flasher module A-05 X255 pin 11
B	680 (BK)	To rear frame ground 1

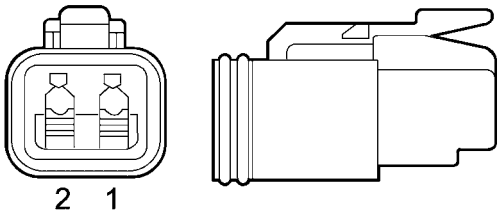
Connector X247 - Straw Hood Rear Harness to Rear Beacon Light E-33



10033643C4 317

Rear of engine platform

1. Rear beacon light E-33
2. Connector X247

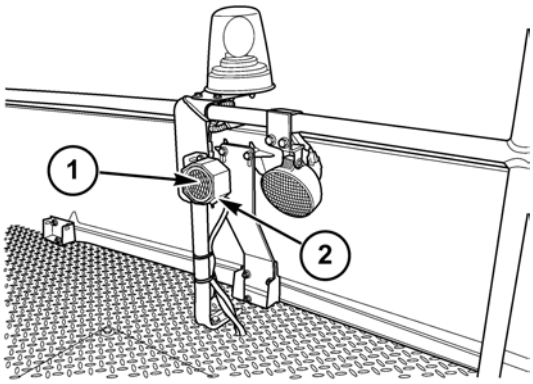


DEUTSCH_DT06-2S 318

Cavity	Circuit ID	Description
1	578 (PU)	Power from beacon light relay K-29
2	623 (BK)	To rear frame ground 1

https://truckmanualshub.com/

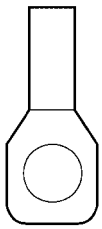
Connector X248 - Straw Hood Rear Harness to Back Up Alarm H-08



10033643B4 319

Rear of engine platform

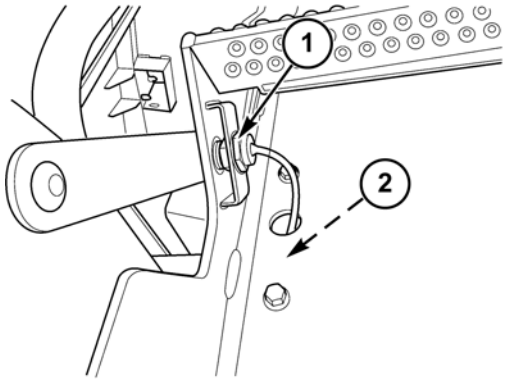
1. Back up alarm H-08
2. Connector X248



RING_TERMINAL 320

Cavity	Circuit ID	Description
	452 (WH)	Power from CCM1 J2-6
	478 (BK), 623 (BK)	To rear frame ground 1 (478 BK), ground from rear beacon light E-33 (623 BK)

Connector X251 - Straw Hood Rear Harness to Rear Ladder B-22

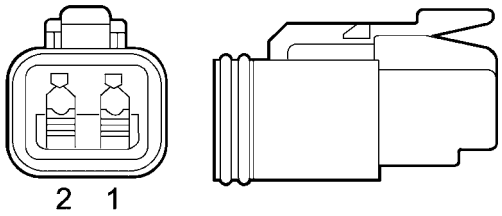


10033640A4 321

Right rear corner of combine

1. Rear ladder sensor B-22
2. Connector X251

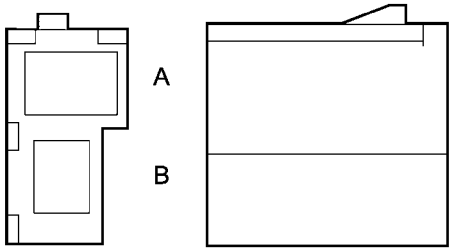
https://truckmanualshub.com/



DEUTSCH_DT06-2S 322

Cavity	Circuit ID	Description
1	481 (BL)	Reference ground to CCM1 J2-14
2	570 (YE)	Signal to CCM1 J2-17

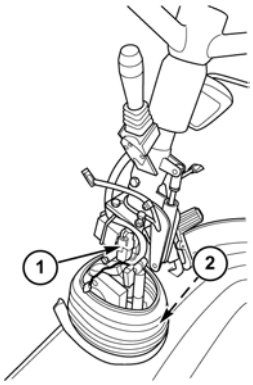
Connector X252 - Straw Hood Rear Harness to RH Side Service Socket J-03



PAC_2973781 323

Cavity	Circuit ID	Description
1	658 (BK)	To rear frame ground 1
2	678 (RD)	Power from fuse F-15

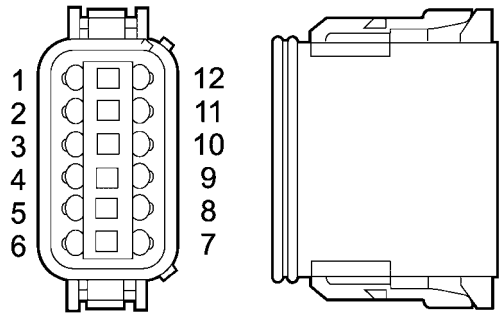
Connector X255 - Steering Column Harness to Flasher Module A-05



10010914B4 324

1. Connector X255
2. Connector **X033**

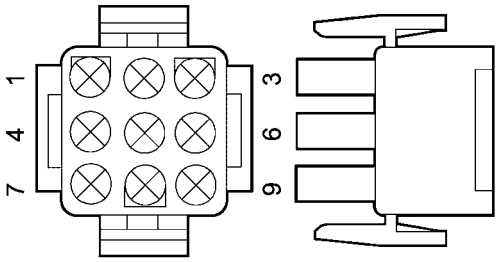
https://truckmanualshub.com/



DEU_DT06-12S 325

Cavity	Circuit ID	Description
1	102 (RD)	Power from fuse F-56
2	179 (PU)	Signal from hazard switch S-25
3	199 (PU)	Output to LH flashing lamps E-01, E-03, E-05, E-52 & trailer outlet J-09
4	195 (PU)	Output to RH flashing lamps E-02, E-04, E-06, E-51 & trailer outlet J-09
5	208 (PU)	Output to high beam indicator E-10
6	141 (BK)	To cab ground 3
7	201 (PU)	Signal (right turn) from road light switch S-26
8	197 (PU)	Signal (left turn) from road light switch S-26
9	204 (PU)	Signal (ISO/NASO) from CCM2 J1-5
10	243 (PU)	Output to LH flashing lamp E-07
11	244 (PU)	Output to RH flashing lamp E-08
12	open	

Connector X256 - Cab Main Harness to Road Light Switch S-26



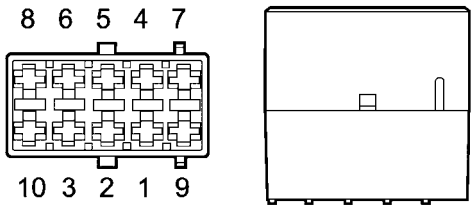
AMP_1-480706-O 326

Cavity	Circuit ID	Description
1	173 (OR)	Output to CCM1 J1-21, fuses F-20 & F-21, LH marker lights (E-03, E-50, E-54, E-39, E-11, E-05), RH marker lights (E-04, E-49, E-53, E-12, E-06) & trailer outlet J-09
2	203 (PU)	Output (right turn) to CCM1 J1-9 and flasher module A-05 X255 pin 7
3	202 (PU)	Output (left turn) to CCM1 J1-2 and flasher module A-05 X255 pin 8
4	218 (YE)	Output to high beam relay K-04 and high beam indicator E-10
5	213 (OR)	Power from fuse F-49
6	055 (OR)	Power from key switch S-02 (IGN)
7	169 (YE)	Output to low beam relay K-05

https://truckmanualshub.com/

Cavity	Circuit ID	Description
8	214 (RD)	Power from fuse F-51
9	193 (WH)	Output to horn H-02

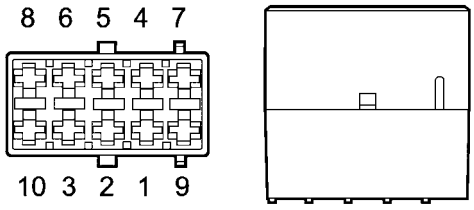
Connector X257 - Steering Column Harness to Turn Indicator E-09



EATON_25-13936 327

Cavity	Circuit ID	Description
1	open	
2	open	
3	open	
4	open	
5	open	
6	open	
7	140 (PU)	Power from flasher module A-05 X255 pin 3
8	open	
9	209 (BK)	To cab ground 3
10	139 (PU)	Power from flasher module A-05 X255 pin 4

Connector X258 - Steering Column Harness to High Beam Indicator E-10



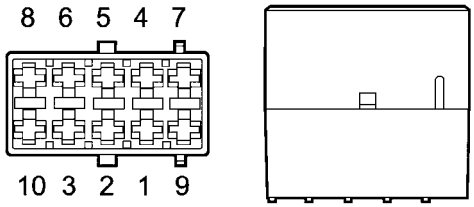
EATON_25-13936 328

Cavity	Circuit ID	Description
1	open	
2	open	
3	open	
4	open	
5	open	
6	open	

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Cavity	Circuit ID	Description
7	208 (PU)	Power from flasher module A-05 X255 pin 5
8	open	
9	221 (BK)	To cab ground 3
10	043 (PU)	Power from road light switch S-26

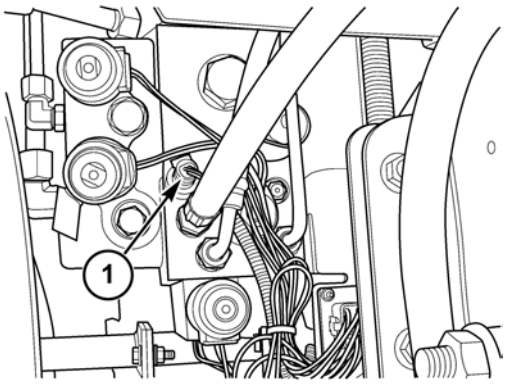
Connector X259 - Steering Column Harness to Hazard Switch S-25



EATON_25-13936 329

Cavity	Circuit ID	Description
1	open	
2	040 (RD)	Power from fuse F-56
3	207 (PU)	Signal to CCM2 J1-15 and flasher module A-05 X255 pin 2
4	open	
5	open	
6	open	
7	open	
8	open	
9	220 (BK)	To cab ground 3
10	open	

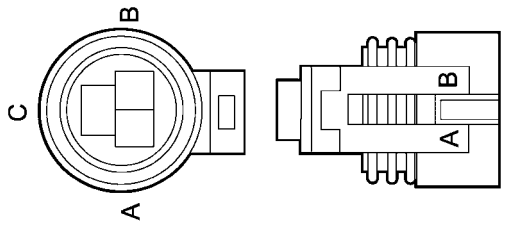
Connector X279 - Main Frame Harness to Header Lift Pressure B-29



10031033B4 330

1. Connector X279

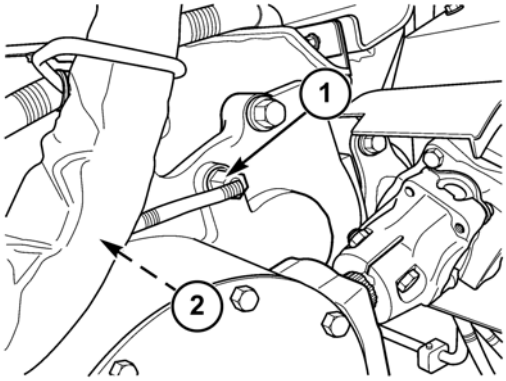
https://truckmanualshub.com/



PAC_12065287 331

Cavity	Circuit ID	Description
A	725 (BL)	Reference ground to CCM1 J2-14
B	728 (PK)	5 volts from CCM1 J2-31
C	722 (YE)	Signal to CCM1 J3-25

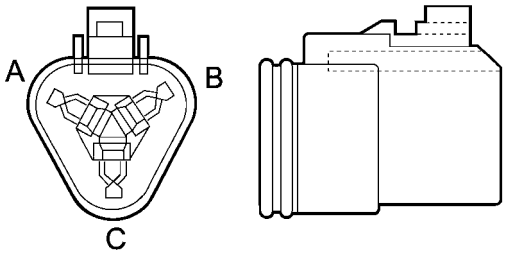
Connector X284 - Feeder Harness to Feeder RPM B-14



10033648A4 332

Left side of feeder, near pivot

1. Feeder RPM sensor B-14
2. Connector X284

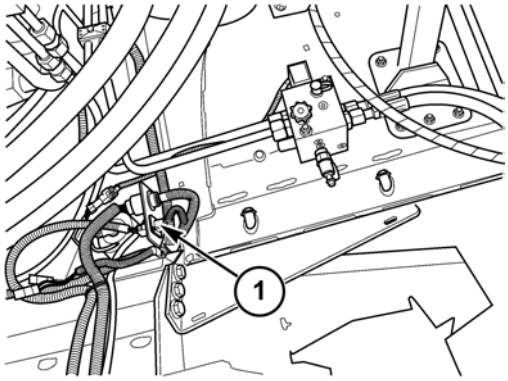


DEUTSCH_DT06-3S 333

Cavity	Circuit ID	Description
A	1260 (OR)	Power from fuse F-45
B	489 (YE)	Signal to CCM1 J3-14
C	1201 (BK/WH)	To battery clean ground 6

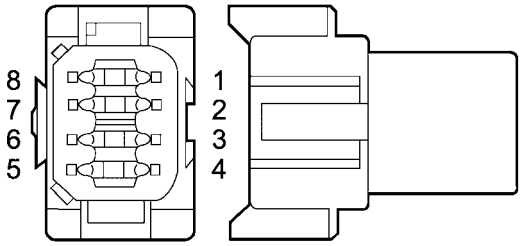
https://truckmanualshub.com/

Connector X285 - Straw Hood Front Harness to Trailer Outlet J-09

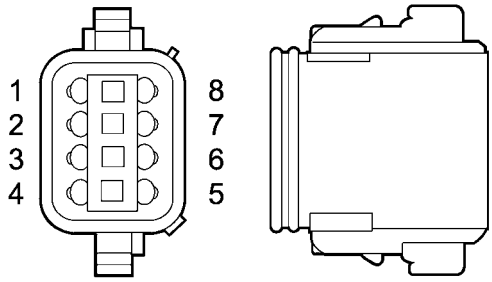


10033639B4 334

1. Connector X285



DEUTSCH_DT04-8P 335



DEUTSCH_DT06-8S 336

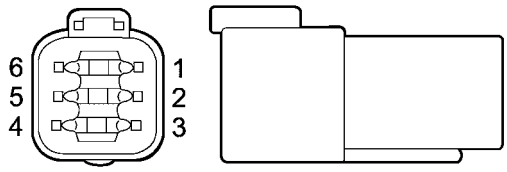
Cavity	Circuit ID	Description
1	997 (PU)	Power from brake lights relay K-33
2	992 (PU)	Power from flasher module A-05 X255 pin 3 (left flashing)
3	993 (PU)	Power from flasher module A-05 X255 pin 4 (right flashing)
4	994 (PU)	Power from road light switch S-26 (left marker)
5	995 (PU)	Power from road light switch S-26 (right marker)
6	998 (BK)	To rear frame ground 1
7	open	
8	open	

https://truckmanualshub.com/

Connector X286 - Engine Harness to 24V Start Relay K-38

Terminal	Circuit ID	Description
30	802 (RD)	Output to alternator G-01
50	834 (WH/BK)	Output to 24V starter M-29
50a	804 (WH)	Signal from start relay K-36
51	801 (RD)	Output to start relay K-36

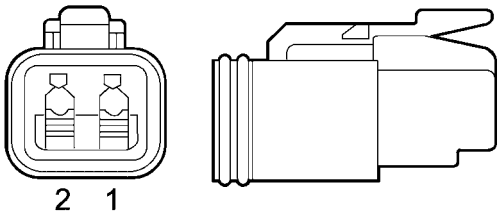
Connector X287 - Outer Roof Harness to German Third Mirror



DEUTSCH_DT04-6P 337

Cavity	Circuit ID	Description
1	964 (WH)	Mirror select switch S-57 to German mirror in / out M-31
2	966 (GY)	German mirror motors M-30/31 to mirror adjust switch S-27
3	862 (OR)	Mirror heat switch S-19 to RH German mirror heat R-14
4	963 (WH)	Mirror select switch S-57 to German mirror up / down M-30
5	open	
6	863 (BK)	To cab roof ground 4

Connector X288 - Tank Extensions Harness to Covers Closed B-47

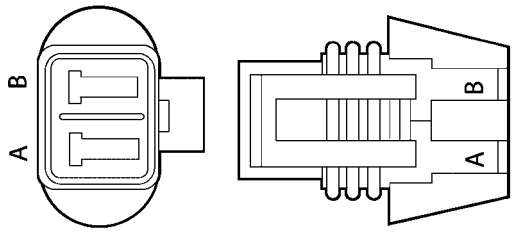


DEUTSCH_DT06-2S 338

Cavity	Circuit ID	Description
1	454 (BL)	Reference ground to CCM1 J2-14
2	435 (YE)	Signal to CCM1 J3-38

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Connector X289 - Tanks Extensions Harness to Covers Motor M-12



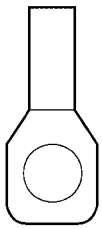
PAC_15300027 339

Cavity	Circuit ID	Description
A	696 (WH)	Power from CCM1 J2-21 through concave / covers relay K-16
B	693 (GY)	Power from CCM1 J2-1

Connector X293 - Lower Frame Harness to 2 Speed Powered Rear Axle

Cavity	Circuit ID	Description
A	762 (WH)	Output from CCM1 J3-3 to 2 speed powered rear axle solenoids L54/55
B	764 (BK)	To front frame ground 2

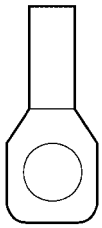
Connector X294 - Lower Frame Harness to LH Brake Wear Switch S-55



RING_TERMINAL 340

Cavity	Circuit ID	Description
	866 (BK)	To front frame ground 2

Connector X295 - Lower Frame Harness to RH Brake Wear Switch S-56

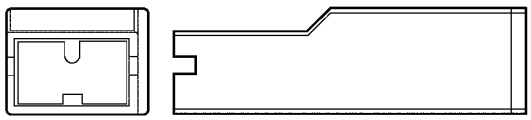


RING_TERMINAL 341

https://truckmanualshub.com/

Cavity	Circuit ID	Description
	867 (BK)	To front frame ground 2

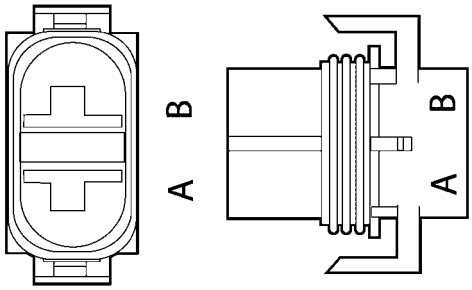
Connector X296 - Cab Roof Harness to Dome Light E-34



AMP_154719 342

Cavity	Circuit ID	Description
1	965 (RD)	Power from fuse F-52

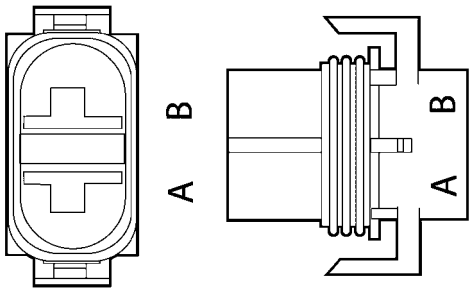
Connector X297 - LH Mirror & Side Light Jumper Harness to LH Side Work Light E-25



PAC_12124819 343

Cavity	Circuit ID	Description
A	(GN)	Power from side work light relays K-34 & K-35
B	(BK)	To cab roof ground 4

Connector X298 - RH Mirror & Side Light Jumper Harness to RH Side Work Light E-26

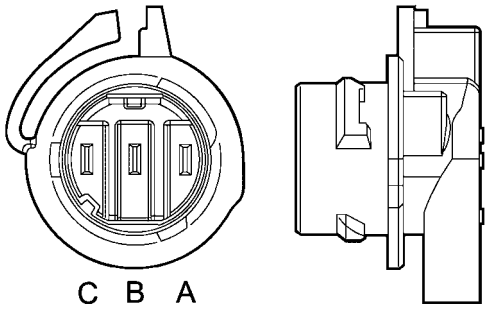


PAC_12124819 344

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	(GN)	Power from side work light relays K-34 & K-35
B	(BK)	To cab roof ground 4

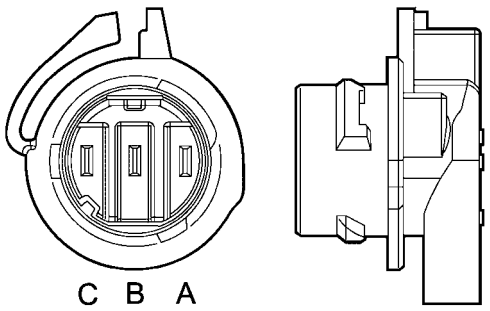
Connector X299 - Straw Hood Rear Harness to LH Brake / Tail Lamp (NA) E-11



PAC_12160395 345

Cavity	Circuit ID	Description
A	1270 (PK)	Power from brake lights relay K-33
B	1266 (PK)	Power from road light switch S-26 through fuse F-20
C	1274 (BK)	To rear frame ground 1

Connector X300 - Straw Hood Rear Harness to RH Brake / Tail Lamp (NA) E-12

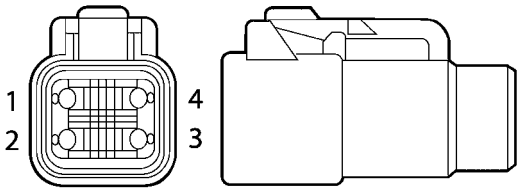


PAC_12160395 346

Cavity	Circuit ID	Description
A	1268 (PK)	Power from brake lights relay K-33
B	1272 (PK)	Power from road light switch S-26 through fuse F-21
C	1275 (BK)	To rear frame ground 1

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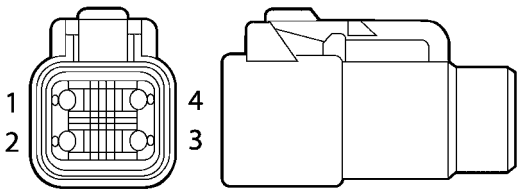
Connector X301 - Straw Hood Rear Harness to LH Rear Flashing Lamp (EU) E-05



DEU_DTM06-4S 347

Cavity	Circuit ID	Description
1	619 (PU)	Power from flasher module A-05 X255 pin 3
2	1267 (PK)	Power from road light switch S-26 through fuse F-20
3	1271 (PK)	Power from brake lights relay K-33
4	634 (BK)	To rear frame ground 1

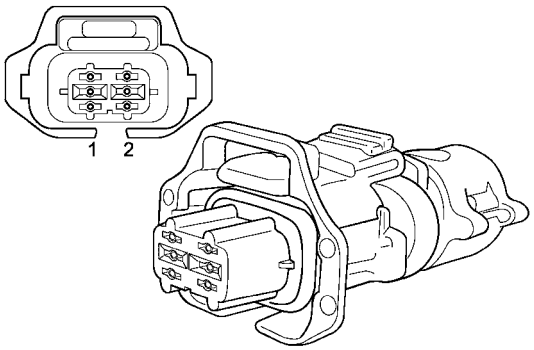
Connector X302 - Straw Hood Rear Harness to RH Rear Flashing Lamp (EU) E-06



DEU_DTM06-4S 348

Cavity	Circuit ID	Description
1	622 (PU)	Power from flasher module A-05 X255 pin 4
2	1273 (PK)	Power from road light switch S-26 through fuse F-21
3	1269 (PK)	Power from brake lights relay K-33
4	635 (BK)	To rear frame ground 1

Connector X311 - Iveco Harness to Engine Oil Temperature B-03

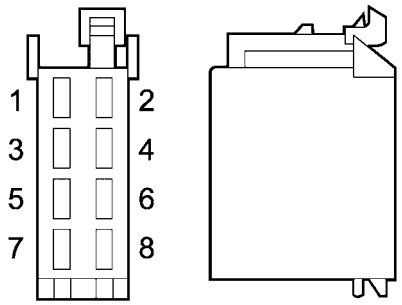


CONN_X311 349

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Cavity	Circuit ID	Description
A	BL	Signal to CCM2 J2-27
B	BN	Reference ground to CCM2 J2-14

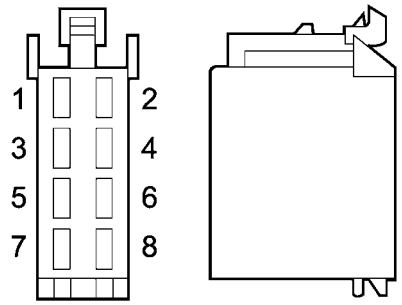
Connector X314 - Cab Roof Harness to Radio A-04



AMP_962189-1 350

Cavity	Circuit ID	Description
1	open	
2	open	
3	open	
4	830 (RD)	Power from fuse F-35
5	open	
6	open	
7	081 (OR)	Power from fuse F-11
8	973 (BK)	To cab roof ground 4

Connector X315 - Cab Roof Harness to Radio A-04

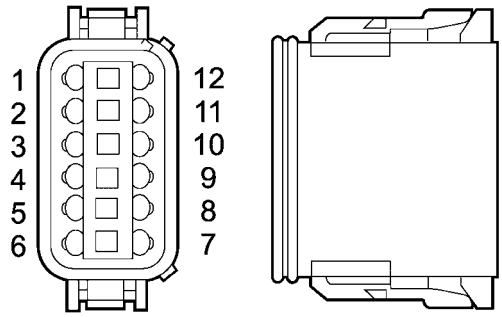


AMP_962191-1 351

Cavity	Circuit ID	Description
1	974 (WH)	Output to rear right speaker H-06
2	979 (BL)	Ground for rear right speaker H-06
3	976 (WH)	Output to front right speaker H-07
4	980 (BL)	Ground for front right speaker H-07
5	977 (WH)	Output to front left speaker H-05
6	983 (BL)	Ground for front left speaker H-05
7	975 (WH)	Output to rear left speaker H-04
8	982 (BL)	Ground for rear left speaker H-04

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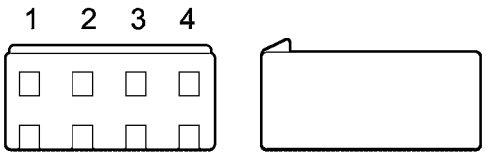
Connector X319 - Adapter Display Harness to ICDU A-02



DEU_DT06-12S 352

Cavity	Circuit ID	Description
1	1188 (OR)	Power from key switch S-02
2	057 (RD)	Power from fuse F-39
3	1189 (BK)	To cab ground 3
4	open	
5	open	
6	open	
7	1172 (GN)	CAN Low
8	1171 (YE)	CAN High
9	open	
10	open	
11	open	
12	open	

Connector X320 - Adapter Display Harness to Shaft Speed Monitor A-03

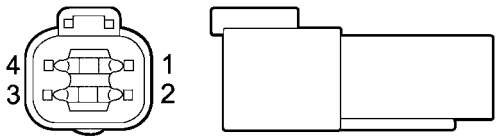


AMP_640250 353

Cavity	Circuit ID	Description
1	1186 (BK)	To cab ground 3
2	1185 (OR)	Power from key switch S-02
3	1182 (YE)	CAN High
4	1183 (GN)	CAN Low

https://truckmanualshub.com/

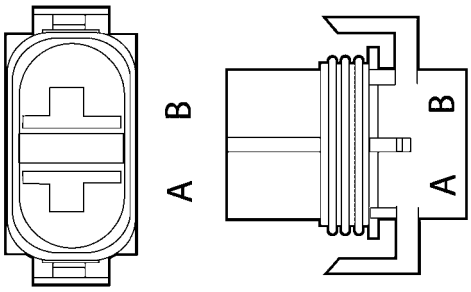
Connector X321 - Main Frame Harness to GPS Antenna A-11



DEUTSCH_DT04-4P 354

Cavity	Circuit ID	Description
1	1238 (OR)	Power from fuse F-45
2	1240 (YE)	CAN High
3	1239 (BK/WH)	To battery clean ground 6
4	1241 (GN)	CAN Low

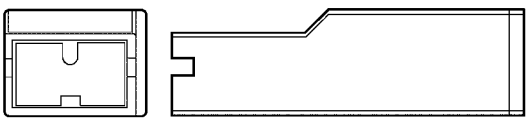
Connector X322 - Unload Tube Light Harness to Unload Tube Light E-29



PAC_12124819 355

Cavity	Circuit ID	Description
A	077 (WH)	Power from unload tube light relay K-32
B	669 (BK)	To front frame ground 2

Connector X327 - Cab Main Harness to Brake Fluid Level Switch S-49



AMP_154719 356

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	1501 (YE)	Signal to CCM1 J2-26

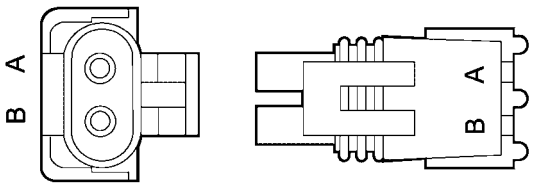
Connector X328 - Cab Main Harness to Brake Fluid Level Switch S-49



AMP_154719 357

Cavity	Circuit ID	Description
1	122 (BK), 1502 (BK)	Ground from splice block C, W-03 (122 BK), to cab ground 3

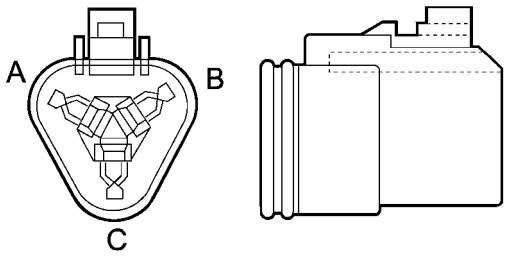
Connector X329 - Main Frame Harness to Brake Limiting L-32



PAC_12015792 358

Cavity	Circuit ID	Description
A	1504 (WH)	Power from CCM2 J2-7
B	1505 (BK)	To front frame ground 2

Connector X330 - Engine Harness to Air Filter Resistor R-15

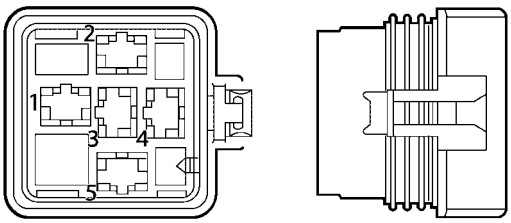


DEUTSCH_DT06-3S 359

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	860 (YE)	Signal to air filter switch S-61 and CCM2 J2-29
B	469 (PK)	5 volts from CCM2 J2-31
C	open	

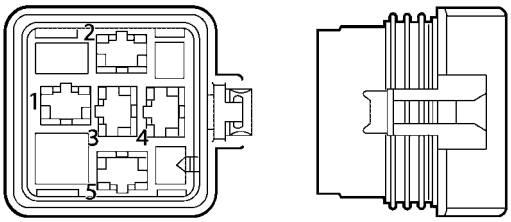
Connector X331 - Flip Up Lighting Harness to Flip Up Low Beam Relay K-40



PAC_12065685 360

Cavity	Circuit ID	Description
1	1509 (PU)	Power from road light switch S-26 though fuse F-21
2	1510 (BK)	To front frame ground 2 through header connector X032
3	1518 (PU)	Power from low beam relay K-05 through road light connectors X164 & X169
4	1515 (PU)	Output to road lights E-13 & E-14
5	1512 (PU)	Output to flip up road lights E-47 & E-48

Connector X332 - Flip Up Lighting Harness to Flip Up High Beam Relay K-41

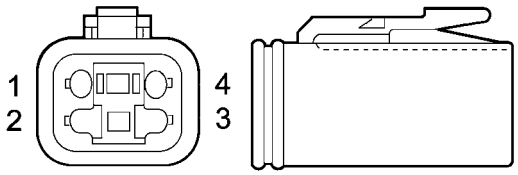


PAC_12065685 361

Cavity	Circuit ID	Description
1	1507 (PU)	Power from road light switch S-26 though fuse F-21
2	1511 (BK)	To front frame ground 2 through header connector X032
3	1527 (PU)	Power from high beam relay K-04 through road light connectors X164 & X169
4	1524 (PU)	Output to road lights E-13 & E-14
5	1521 (PU)	Output to flip up road lights E-47 & E-48

https://truckmanualshub.com/

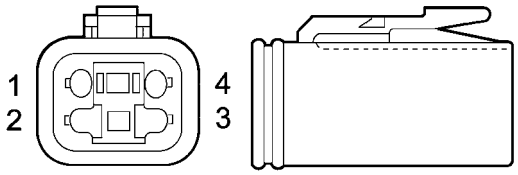
Connector X333 - Flip Up Lighting Harness to LH Flip Up Road Light E-47



DEUTSCH_DT06-4S 362

Cavity	Circuit ID	Description
1	1513 (PU)	Power from flip up low beam relay K-40
2	1523 (PU)	Power from flip up high beam relay K-41
3	1530 (BK)	To front frame ground 2 through road light connectors X164 & X169
4	1508 (PU)	Power from road light switch S-26 though fuse F-21

Connector X334 - Flip Up Lighting Harness to RH Flip Up Road Light E-48



DEUTSCH_DT06-4S 363

Cavity	Circuit ID	Description
1	1514 (PU)	Power from flip up low beam relay K-40
2	1522 (PU)	Power from flip up high beam relay K-41
3	1531 (BK)	To front frame ground 2 through road light connectors X164 & X169
4	1506 (PU)	Power from road light switch S-26 though fuse F-21

Connector X335 - Flip Up Lighting Harness to LH Road Light E-13

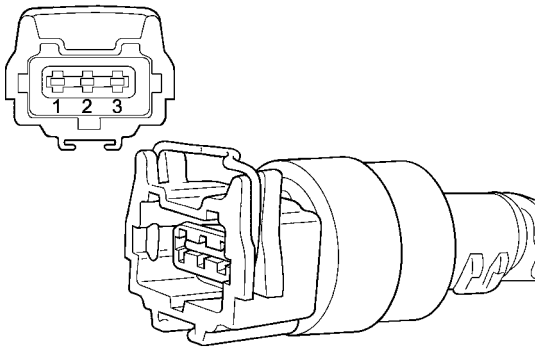
Cavity	Circuit ID	Description
A	1525 (PU)	Power from flip up high beam relay K-41
B	1516 (PU)	Power from flip up low beam relay K-40
C	1532 (BK)	To front frame ground 2 through road light connectors X164 & X169

Connector X336 - Flip Up Lighting Harness to RH Road Light E-14

Cavity	Circuit ID	Description
A	1526 (PU)	Power from flip up high beam relay K-41
B	1517 (PU)	Power from flip up low beam relay K-40
C	1535 (BK)	To front frame ground 2 through road light connectors X164 & X169

https://truckmanualshub.com/

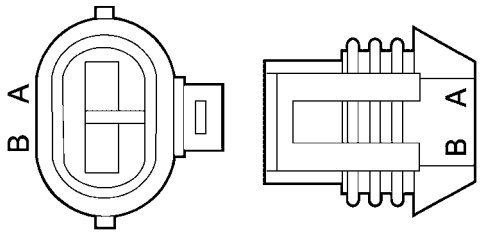
Connector X337 - Iveco Harness to Engine Oil Harness B-52



AMP_282729 364

Cavity	Circuit ID	Description
A	BN	Reference ground to CCM2 J2-14
B	OR	5 volts from CCM2 J2-31
C	OR	Signal to CCM2 J2-33

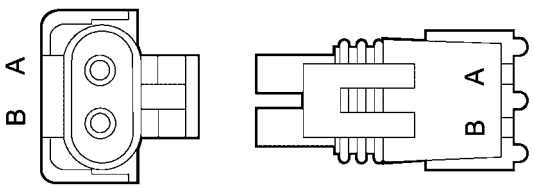
Connector X338 - Iveco Harness to Fuel Filter Switch S-62



AMP_282080-1 365

Cavity	Circuit ID	Description
1	RD	Signal to CCM2 J2-24
2	BN	Reference ground to CCM2 J2-14

Connector X339 - Under Shield Lighting Harness to Under Shield Light Switch S-63

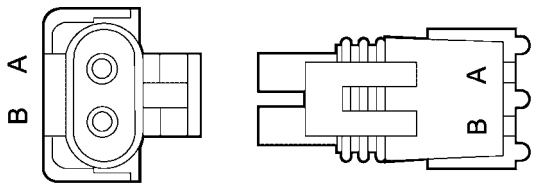


PAC_12015792 366

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	1214 (RD)	Power from fuse F-34
B	2004 (PU)	Power to under shield lights E-42/3/4/5

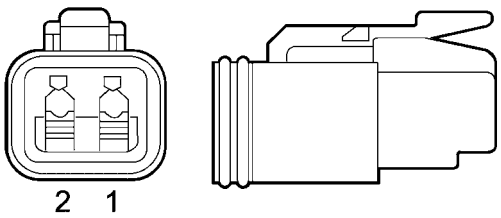
Connector X340 - Engine Lighting Harness to Engine Light Switch S-64



PAC_12015792 367

Cavity	Circuit ID	Description
A	1215 (PU)	Power from fuse F-34
B	2009 (PU)	Power to engine light E-46

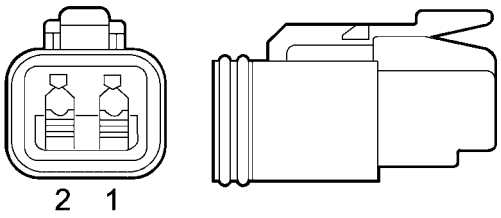
Connector X342 - Main Frame Harness to Under Shield Lighting Harness



DEUTSCH_DT06-2S 368

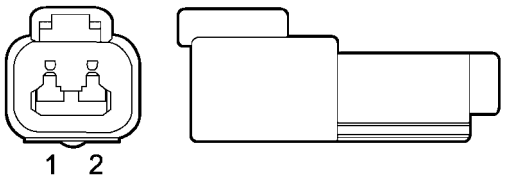
Cavity	Circuit ID	Description
1	1214 (RD)	Power from fuse F-34 to under shield light switch S-63
2	1247 (BK)	To front frame ground 2

Connector X343 - Straw Hood Rear Harness to Engine Lighting Harness



DEUTSCH_DT06-2S 369

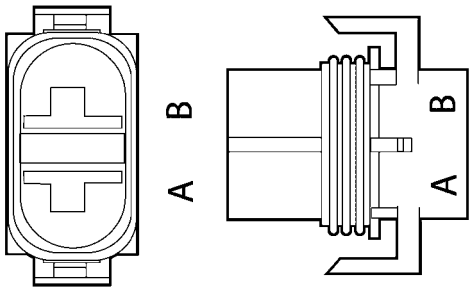
https://truckmanualshub.com/



DEUTSCH_DT04-2P 370

Cavity	Circuit ID	Description
1	1215 (RD)	Power from fuse F-34 to engine light switch S-64
2	1248 (BK)	To rear frame ground 1

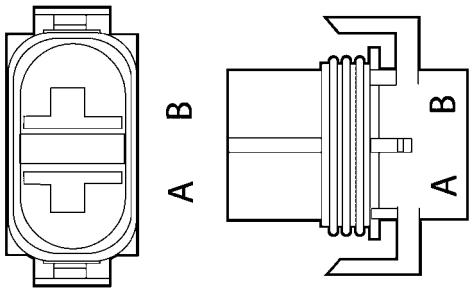
Connector X345 - Under Shield Lighting Harness to LH Front Shield Light E-42



PAC_12124819 371

Cavity	Circuit ID	Description
A	2005 (PU)	Power from under shield light switch S-63
B	2017 (BK)	To front frame ground 2

Connector X346 - Under Shield Lighting Harness to LH Rear Shield Light E-43

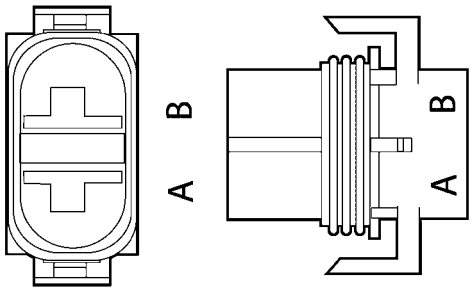


PAC_12124819 372

Cavity	Circuit ID	Description
A	2006 (PU)	Power from under shield light switch S-63
B	2016 (BK)	To front frame ground 2

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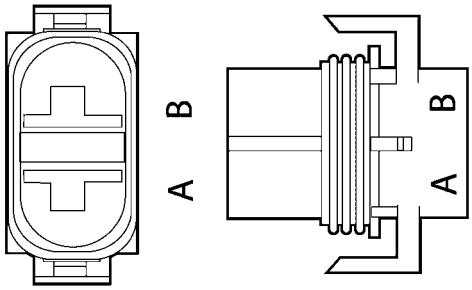
Connector X347 - Under Shield Lighting Harness to RH Front Shield Light E-44



PAC_12124819 373

Cavity	Circuit ID	Description
A	2012 (PU)	Power from under shield light switch S-63
B	2018 (BK)	To front frame ground 2

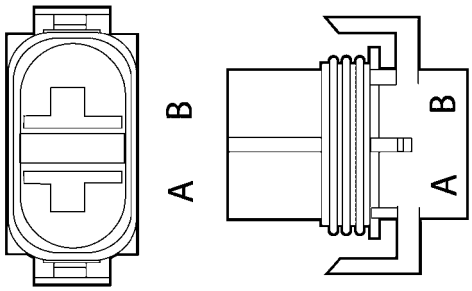
Connector X348 - Under Shield Lighting Harness to RH Rear Shield Light E-45



PAC_12124819 374

Cavity	Circuit ID	Description
A	2011 (PU)	Power from under shield light switch S-63
B	2019 (BK)	To front frame ground 2

Connector X349 - Engine Lighting Harness to Engine Light E-46

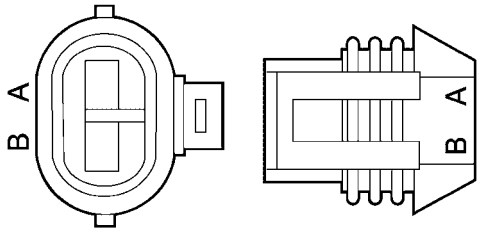


PAC_12124819 375

Cavity	Circuit ID	Description
A	2009 (PU)	Power from engine light switch S-64
B	1248 (BK)	To rear frame ground 1

https://truckmanualshub.com/

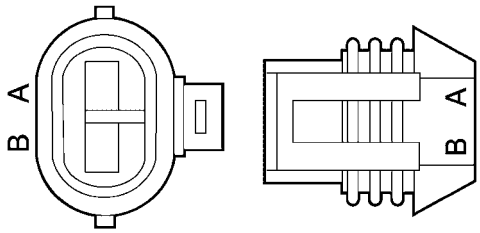
Connector X362 - RH License Plate Lamp (EU) E-57



AMP_282080-1 376

Cavity	Circuit ID	Description
1	(PU)	Power from road light switch S-26 through fuse F-21
2	(BK)	To rear frame ground 1

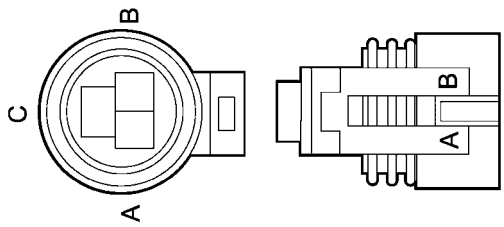
Connector X363 - LH License Plate Lamp (EU) E-58



AMP_282080-1 377

Cavity	Circuit ID	Description
1	(PU)	Power from road light switch S-26 through fuse F-21
2	(BK)	To rear frame ground 1

Connector X368 - Main Frame Harness to Park Brake Pressure B-53

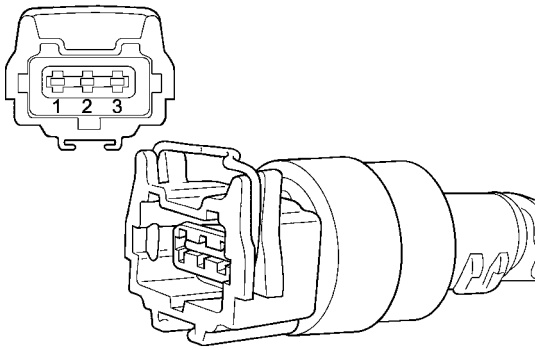


PAC_12065287 378

Cavity	Circuit ID	Description
A	1198 (BL)	Reference ground to CCM2 J2-14
B	1199 (PK)	5 volts from CCM2 J2-31
C	1197 (YE)	Signal to CCM2 J3-34

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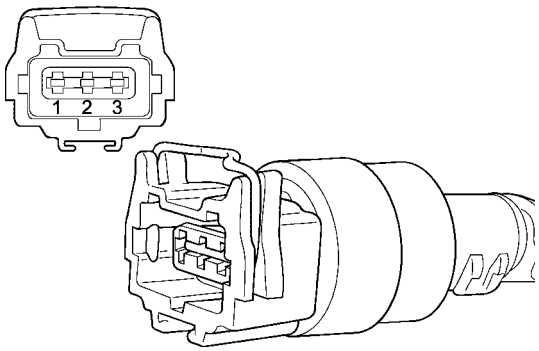
Connector X369 - Iveco Harness to Engine Flywheel RPM B-05



AMP_282729 379

Cavity	Circuit ID	Description
A	BK	To ECU A-01 X192 pin 13
B	WH	To ECU A-01 X192 pin 1
C	BN	Drain wire for shielding

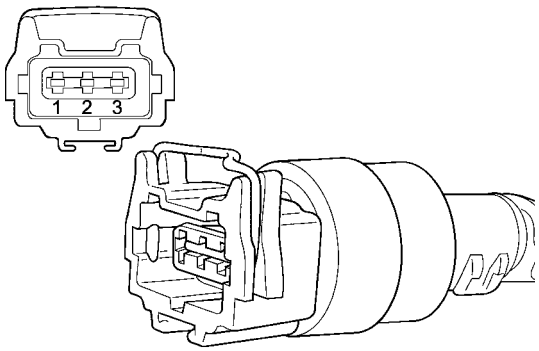
Connector X370 - Iveco Harness to Engine Camshaft RPM B-07



AMP_282729 380

Cavity	Circuit ID	Description
A	WH	To ECU A-01 X192 pin 2
B	BK	To ECU A-01 X192 pin 14
C	BN	Drain wire for shielding

Connector X371 - Iveco Harness to Boost Pressure B-23

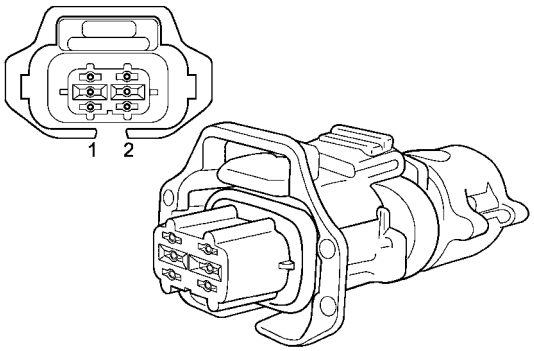


AMP_282729 381

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Cavity	Circuit ID	Description
A	GN	To ECU A-01 X192 pin 12
B	RD	To ECU A-01 X192 pin 23
C	WH	To ECU A-01 X192 pin 17

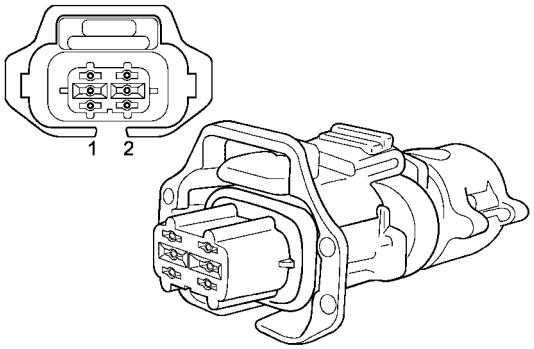
Connector X372 - Iveco Harness to Fuel Temperature B-36



CONN_X311 382

Cavity	Circuit ID	Description
1	WH/RD	To ECU A-01 X192 pin 6
2	OR/BK	To ECU A-01 X192 pin 11

Connector X373 - Iveco Harness to Coolant Temperature B-44



CONN_X311 383

Cavity	Circuit ID	Description
1	PK	To ECU A-01 X192 pin 5
2	YE	To ECU A-01 X192 pin 22

Connector X374 - Iveco Harness to Air Temperature B-54

Cavity	Circuit ID	Description
1	OR	To ECU A-01 X192 pin 21
2	BK	To ECU A-01 X192 pin 4

Connector X375 - Iveco Harness to Engine Brake L-33

Cavity	Circuit ID	Description
1	OR	To ECU A-01 X192 pin 32
2	BN	To ECU A-01 X192 pins 3 & 18

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Connector X376 - Iveco Harness to Fuel Actuator 1 L-34

Cavity	Circuit ID	Description
		To ECU A-01 X192 pin 35
		To ECU A-01 X192 pin 24

Connector X377 - Iveco Harness to Fuel Actuator 2 L-35

Cavity	Circuit ID	Description
		To ECU A-01 X192 pin 26
		To ECU A-01 X192 pin 25

Connector X378 - Iveco Harness to Fuel Actuator 3 L-36

Cavity	Circuit ID	Description
		To ECU A-01 X192 pin 34
		To ECU A-01 X192 pin 24

Connector X379 - Iveco Harness to Fuel Actuator 4 L-37

Cavity	Circuit ID	Description
		To ECU A-01 X192 pin 27
		To ECU A-01 X192 pin 25

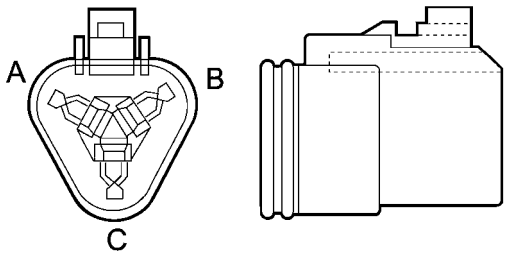
Connector X380 - Iveco Harness to Fuel Actuator 5 L-38

Cavity	Circuit ID	Description
		To ECU A-01 X192 pin 33
		To ECU A-01 X192 pin 24

Connector X381 - Iveco Harness to Fuel Actuator 6 L-39

Cavity	Circuit ID	Description
		To ECU A-01 X192 pin 28
		To ECU A-01 X192 pin 25

Connector X383 - Straw Hood Rear Harness to Spreader RPM B-55

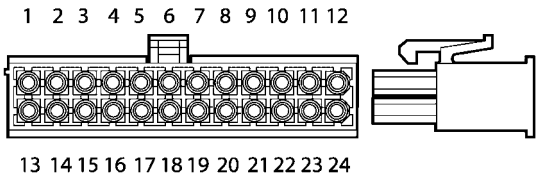


DEUTSCH_DT06-3S 384

Cavity	Circuit ID	Description
A	1254 (OR)	Power from fuse F-45
B	414 (YE)	Signal to CCM2 J2-28
C	492 (BL)	Reference ground to CCM2 J2-14

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Connector X386 - Right Console Harness to Front Switch Panel A-13

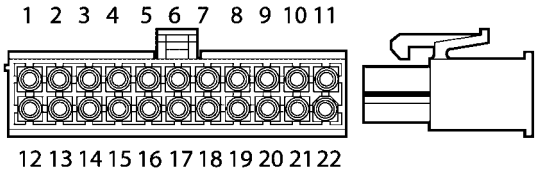


AMP_770587 385

Cavity	Circuit ID	Description
1	1028 (PU)	Power from fuse F-48 (backlighting)
2	346 (YE)	Concave clearance S-16 (-) to RHM X030 pin 8
3	347 (YE)	Concave clearance S-16 (+) to RHM X030 pin 3
4	345 (YE)	Fan speed S-15 (+) to RHM X030 pin 10
5	1281 (PU)	RHM X027 pin 17 to header mode switch S-69 (LED)
6	339 (YE)	On the road switch S-12 to RHM X029 pin 16
7	1257 (PU)	RHM X027 pin 8 to on the road switch S-12 (LED)
8	1011 (WH)	Header height mode 2 S-68 to RHM X029 pin 12
9	353 (PU)	RHM X027 pin 16 to header height mode 1 S-04 (LED)
10	303 (YE)	HHC fine adjust S-06 (-) to RHM X027 pin 7
11	334 (YE)	Park brake switch S-09 (ON) to RHM X029 pin 9
12	open	
13	349 (YE)	Rotor speed S-17 (+) to RHM X030 pin 11
14	1123 (OR)	Power from fuse F-48
15	1175 (BK)	To cab ground 3
16	348 (YE)	Rotor speed S-17 (-) to RHM X030 pin 4
17	344 (YE)	Fan speed S-15 (-) to RHM X030 pin 9
18	1008 (WH)	Header mode switch S-69 to RHM X029 pin 2
19	1094 (PU)	RHM X027 pin 15 to reel speed mode S-08 (LED)
20	1009 (WH)	Reel speed mode S-08 to RHM X029 pin 10
21	1010 (WH)	Header height mode 1 S-04 to RHM X029 pin 3
22	304 (YE)	HHC fine adjust S-06 (+) to RHM X027 pin 6
23	1012 (YE)	RHM X027 pin 14 to header height mode 2 S-68 to RHM X027 pin 14
24	335 (YE)	Park brake switch S-09 (OFF) to RHM X029 pin 1

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Connector X387 - Right Console Harness to Rear Switch Panel A-18

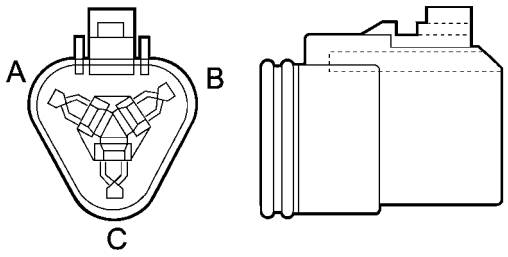


AMP_770586 386

Cavity	Circuit ID	Description
1	open	
2	open	
3	open	
4	230 (YE)	Vertical knives S-51 (both) to RHM X029 pin 7
5	1283 (PU)	Power from fuse F-48 (backlighting)
6	1125 (BK)	To cab ground 3
7	341 (YE)	Upper sieve S-13 (+) to RHM X030 pin 2
8	325 (YE)	Not used
9	340 (YE)	Upper sieve S-13 (-) to RHM X030 pin 7
10	343 (YE)	Lower sieve S-14 (+) to RHM X030 pin 6
11	342 (YE)	Lower sieve S-14 (-) to RHM X030 pin 1
12	open	
13	229 (YE)	Vertical knives S-51 (right) to RHM X029 pin 15
14	1177 (OR)	Power from fuse F-48
15	336 (YE)	Rear wheel assist S-10 to RHM X029 pin 17
16	337 (YE)	Rear wheel assist Hi / Low S-11 to RHM X029 pin 6
17	1256 (PU)	RHM X027 pin 18 to rear wheel assist S-10 (LED)
18	1126 (BK)	To cab ground 3
19	1282 (PU)	RHM X027 pin 13 to rear wheel assist Hi / Low S-11 (LED)
20	open	
21	open	
22	324 (YE)	Not used

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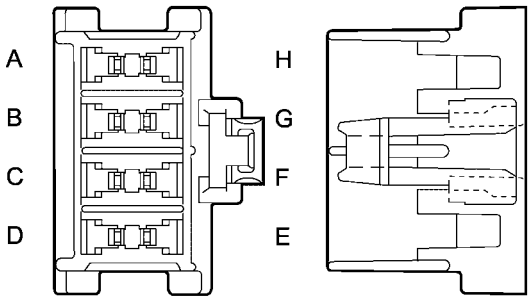
Connector X388 - Right Console Harness to Engine Throttle Pot R-21



DEUTSCH_DT06-3S 387

Cavity	Circuit ID	Description
A	1025 (BL)	Reference ground to RHM X026 pin 6
B	1014 (WH)	Signal to RHM X027 pin 10
C	1026 (PK)	5 volts from RHM X026 pin 16

Connector X396 - Main Blower Harness to Blower Speed Control (ATC) A-14

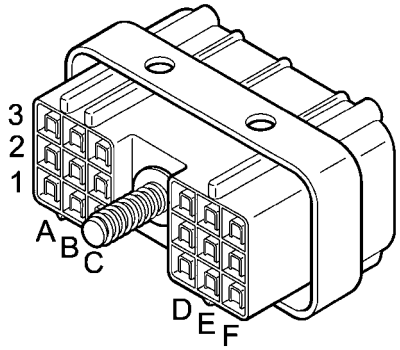


PAC_12110626 388

Cavity	Circuit ID	Description
A	946 (RD)	Power from main blower relay high K-13
B	958 (BK)	Ground for main blower (ATC) M-34
C	948 (BK)	To cab ground 3
D	953 (YE)	Signal from ATC control module A-15
E	open	
F	948 (BK)	To cab ground 3
G	958 (BK)	Ground for main blower (ATC) M-34
H	open	

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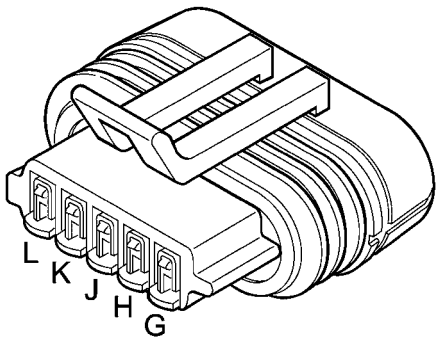
Connector X397 - Air Conditioning Harness to ATC Control Module A-15



ATC_X397 389

Cavity	Circuit ID	Description
1A	911 (YE)	To HVAC control panel A-20 X128 pin C-14
1B	951 (BL)	To evaporator temp sensor B-28
1C	950 (BL)	To A/C low pressure S-77
1D	910 (BL)	To HVAC control panel A-20 X128 pin C-12
1E	912 (YE)	To HVAC control panel A-20 X128 pin C-15
1F	953 (YE)	To blower speed control A-14 X396 pin D
2A	920 (YE)	To HVAC control panel A-20 X128 pin D-7
2B	918 (YE)	To HVAC control panel A-20 X128 pin D-5
2C	952 (BL)	To cab temp sensor B-26
2D	914 (YE)	To HVAC control panel A-20 X128 pin D-1
2E	955 (YE)	To water valve M-33
2F	954 (BK)	To cab ground 3
3A	954 (BK)	To cab ground 3
3B	954 (BK)	To cab ground 3
3C	954 (BK)	To cab ground 3
3D	924 (OR)	To HVAC control panel A-20 X128 pin D-11
3E	922 (BK)	To cab ground 3
3F	913 (YE)	HVAC control panel A-20, cab temp sensor B-26, evaporator temp sensor B-28 and A/C low pressure S-77

Connector X398 - Air Conditioning Harness to ATC Control Module A-15

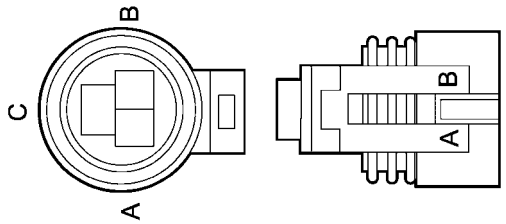


ATC_X398 390

https://truckmanualshub.com/

Cavity	Circuit ID	Description
G	923 (YE)	To HVAC control panel A-20 X128 pin D-10
H	907 (RD)	To HVAC control panel A-20 X128 pin C-10
J	908 (BK)	To HVAC control panel A-20 X128 pin C-11
K	919 (YE)	To HVAC control panel A-20 X128 pin D-6 (splice to cab ground 3 for display temp in degrees C)
L	956 (OR)	To water valve M-33

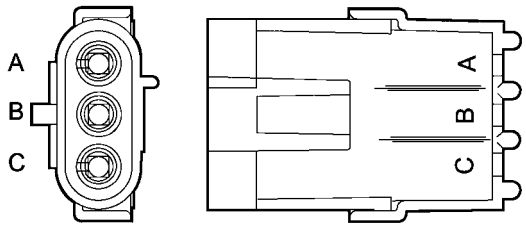
Connector X399 - Main Frame Harness to PTO Box Lube Pressure B-60



PAC_12065287 391

Cavity	Circuit ID	Description
A	1285 (BL)	Reference ground to CCM1 J2-14
B	1286 (PK)	5 volts from CCM1 J2-31
C	1284 (YE)	Signal to CCM1 J2-29

Connector X400 - Right Console Harness to Feeder Engage Diodes D-01

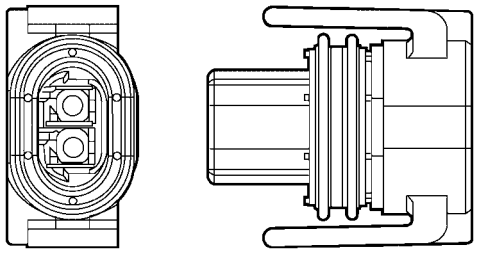


PAC_12010717 392

Cavity	Circuit ID	Description
A	1243 (YE)	Signal from feeder engage S-31 (pin 6)
B	225 (YE)	Signal to CCM1 J1-17
C	1244 (YE)	Signal from feeder engage S-31 (pin 1)

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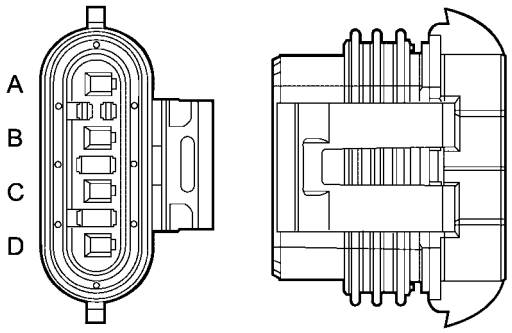
Connector X401 - Gearbox Harness to Feeder Engine to Ring Clutch L-47



PAC_12162215 393

Cavity	Circuit ID	Description
A	876 (WH)	Power from CCM1 J2-30
B	1210 (BL)	Power from CCM1 J2-40 through feeder disengage relay K-19

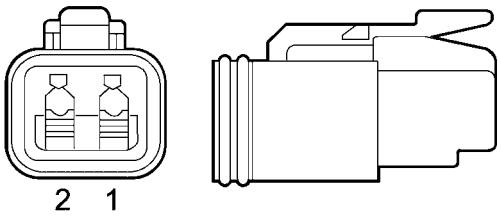
Connector X402 - Gearbox Harness to Feeder Pump Swash Solenoids L-48/L-49



PAC_12186568 394

Cavity	Circuit ID	Description
A	1050 (WH)	CCM1 J3-31 output to feeder pump swash plus L-49
B	1057 (BL)	Feeder pump swash plus L-49 to rear frame ground 1
C	1051 (WH)	CCM1 J3-21 output to feeder pump swash minus L-48
D	1058 (BL)	Feeder pump swash minus L-48 to rear frame ground 1

Connector X403 - Gearbox Harness to Feeder Ring to Frame Brake L-50

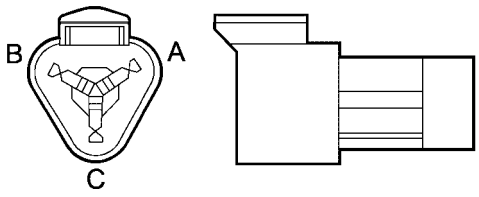


DEUTSCH_DT06-2S 395

https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	1053 (WH)	Power from CCM1 J3-15
2	1056 (BK)	To rear frame ground 1

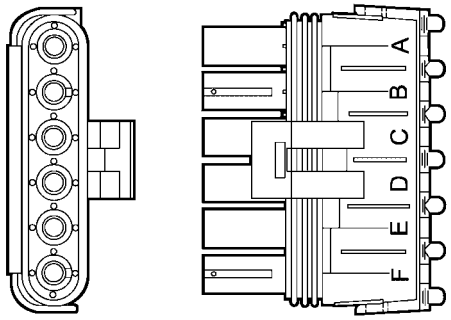
Connector X404 - Right Console Harness to Header Speed Pot R-18



DEUTSCH_DT04-3P 396

Cavity	Circuit ID	Description
A	1023 (PK)	Power from RHM X026 pin 16 through resistor module R-23
B	1093 (WH)	Signal to RHM X027 pin 3
C	1024 (BL)	Reference ground to RHM X026 pin 6 through resistor module R-23

Connector X405 - Right Console Harness to Resistor Module R-23

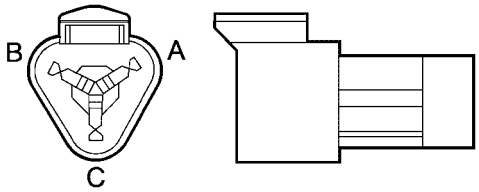


PAC_12015799 397

Cavity	Circuit ID	Description
A	1024 (BL)	Reference ground from header speed pot R-18 to RHM X026 pin 6
B	1020 (BL)	Reference ground from reel speed pot R-22 to RHM X026 pin 6
C	1044 (BL)	Reference ground to RHM X026 pin 6
D	1023 (PK)	Reference power from RHM X026 pin 16 to header speed pot R-18
E	1019 (PK)	Reference power from RHM X026 pin 16 to reel speed pot R-22
F	1045 (PK)	Reference power from RHM X026 pin 16

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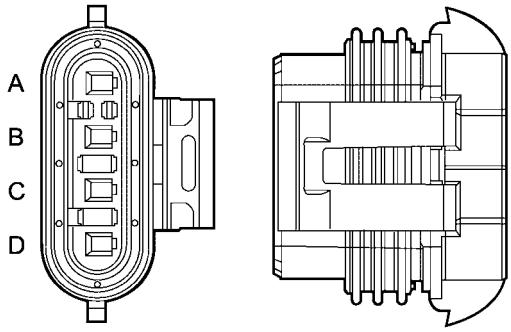
Connector X406 - Right Console Harness to Reel Speed Pot R-22



DEUTSCH_DT04-3P 398

Cavity	Circuit ID	Description
A	1019 (PK)	Power from RHM X026 pin 16 through resistor module R-23
B	1013 (WH)	Signal to RHM X027 pin 9
C	1020 (BL)	Reference ground to RHM X026 pin 6 through resistor module R-23

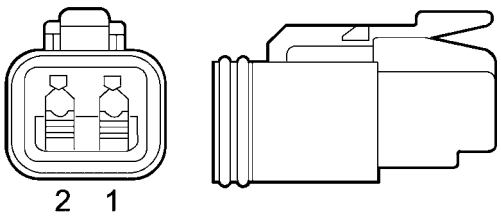
Connector X408 - Gearbox Harness to Rotor Pump Swash Solenoids L-40/L-41



PAC_12186568 399

Cavity	Circuit ID	Description
A	1046 (WH)	CCM3 J3-31 output to rotor pump swash plus L-40
B	1067 (BL)	Rotor pump swash plus L-40 reference ground to CCM3 J2-10
C	1047 (WH)	CCM3 J3-21 output to rotor pump swash minus L-41
D	1066 (BL)	Rotor pump swash minus L-41 reference ground to CCM3 J2-10

Connector X409 - Gearbox Harness to Rotor Ring to Frame Brake L-46

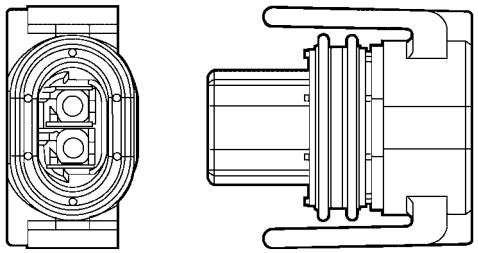


DEUTSCH_DT06-2S 400

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Cavity	Circuit ID	Description
1	1049 (WH)	Power from CCM3 J3-3
2	1063 (BK)	To rear frame ground 1

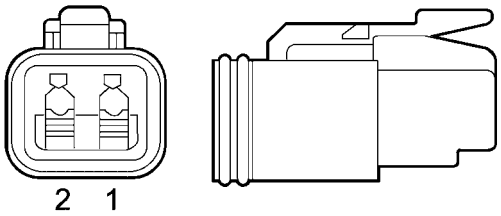
Connector X410 - Gearbox Harness to Rotor Engine to Ring Clutch L-45



PAC_12162215 401

Cavity	Circuit ID	Description
A	1048 (WH)	Power from CCM3 J2-30
B	1062 (BL)	Reference ground to CCM3 J2-40

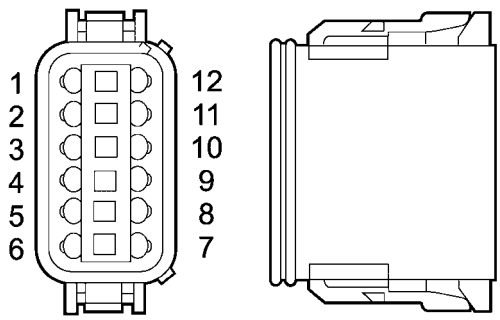
Connector X411 - Main Frame Harness to Chopper RPM B-10



DEUTSCH_DT06-2S 402

Cavity	Circuit ID	Description
1	632 (BL)	Reference ground to CCM2 J2-14
2	413 (YE)	Signal to CCM2 J2-38

Connector X412 - Expansion Harness to YMIU Module A-12



DEU_DT06-12S 403

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Cavity	Circuit ID	Description
1	699 (OR)	Output to moisture sensor B-12
2	593 (YE)	Signal from moisture sensor B-12
3	594 (YE)	Signal from moisture sensor B-12
4	595 (YE)	Signal from moisture sensor B-12
5	open	
6	552 (WH/RD)	Output to yield sensor B-57
7	563 (WH)	Signal from yield sensor B-57
8	698 (WH/YE)	Signal from yield sensor B-57
9	1235 (WH/BK)	Ground for yield sensor B-57
10	open	
11	open	
12	565 (BK)	Ground for moisture sensor B-12

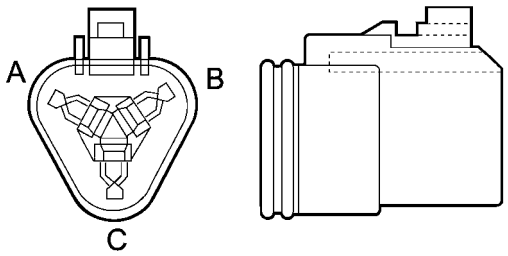
Connector X417 - Outer Roof Harness to LH HID Field Light E-60

Cavity	Circuit ID	Description
A	1280 (BK)	To cab roof ground through work light switch S-43
B	1278 (PU)	Power from header work lights relay K-22

Connector X418 - Outer Roof Harness to RH HID Field Light E-61

Cavity	Circuit ID	Description
A	1279 (BK)	To cab roof ground through work light switch S-43
B	1277 (PU)	Power from header work lights relay K-22

Connector X428 - Gearbox Harness to Rotor Hydrostat RPM B-58

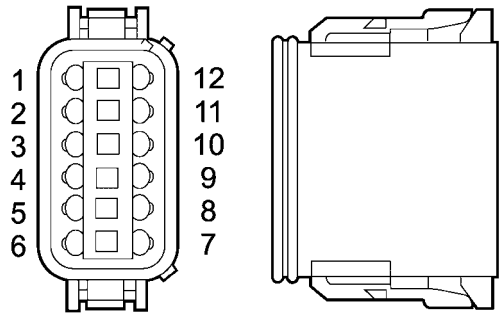


DEUTSCH_DT06-3S 404

Cavity	Circuit ID	Description
A	1263 (OR)	Power from fuse F-45
B	1069 (YE)	Signal to CCM3 J3-14
C	1265 (BK/WH)	To battery clean ground 6

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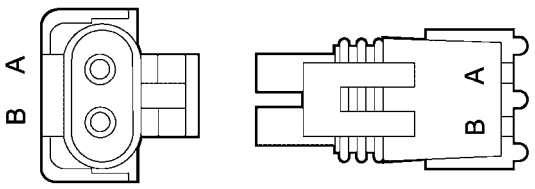
Connector X438 - Expansion Harness to YMIU Module A-12



DEU_DT06-12S 405

Cavity	Circuit ID	Description
1	1251 (YE)	CAN High
2	1252 (GN)	CAN Low
3	open	
4	open	
5	open	
6	open	
7	open	
8	open	
9	open	
10	1232 (OR)	Power from fuse F-47
11	open	
12	1287 (BK/WH)	To battery clean ground 6

Connector X439 - Engine Harness to Coolant Level Switch S-67

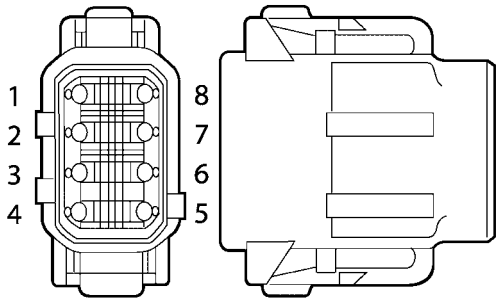


PAC_12015792 406

Cavity	Circuit ID	Description
A	1216 (YE)	Signal to CCM1 J2-39
B	1217 (BK)	To engine ground 5

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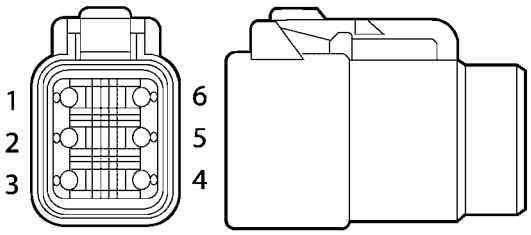
Connector X442 - Expansion Harness to Precision Farming Harness



DEU_DTM06-8S 407

Cavity	Circuit ID	Description
1	682 (OR)	Power from fuse F-47 to sample motor M-28
2	564 (BK)	Sample motor M-28 to front frame ground 2
3	838 (YE)	Sample motor M-28 signal to CCM3 J2-25
4	837 (WH)	CCM3 J2-13 output to sample motor M-28
5	552 (WH/RD)	YMIU module A-12 power to yield sensor B-57
6	698 (WH/YE)	Yield sensor B-57 X223 pin 2 signal (+) to YMIU module A-12 X412 pin 8
7	563 (WH)	Yield sensor B-57 X223 pin 3 signal (-) to YMIU module A-12 X412 pin 7
8	1235 (WH/BK)	Yield sensor X223 pin 4 ground to YMIU module A-12 X412 pin 9

Connector X443 - Expansion Harness to Precision Farming Harness

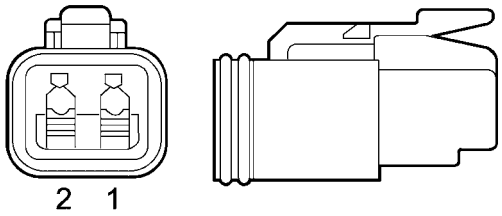


DEU_DTM06-6S 408

Cavity	Circuit ID	Description
1	699 (OR)	YMIU module A-12 X412 pin 1 power to moisture sensor B-12 X221 pin 1
2	565 (BK)	Moisture sensor B-12 X221 pin 2 ground to YMIU module A-12 X412 pin 12
3	593 (YE)	Moisture sensor B-12 (+) to YMIU module A-12 X412 pin 2
4	594 (YE)	Moisture sensor B-12 (-) to YMIU module A-12 X412 pin 3
5	595 (YE)	Moisture sensor B-12 temp to YMIU module A-12 X412 pin 4
6	Drain wire (BK)	Yield sensor B-57 harness shield wire to battery clean ground 6

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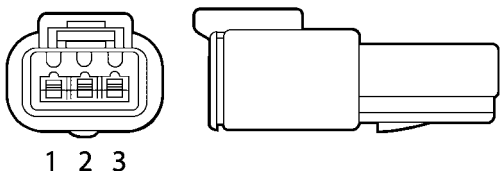
Connector X444 - Main Frame Harness to Fan Drive Solenoid L-44



DEUTSCH_DT06-2S 409

Cavity	Circuit ID	Description
1	1161 (WH)	Power from CCM1 J2-13
2	1192 (BK)	To front frame ground 2

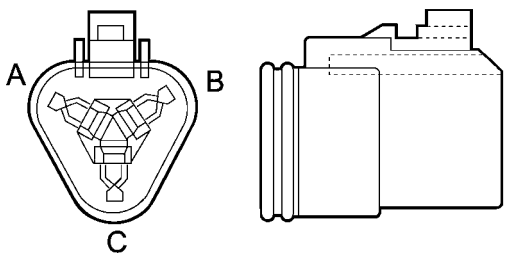
Connector X445 - Main Frame Harness to Tailing Volume R-24



DEU_DTM04-3P 410

Cavity	Circuit ID	Description
1	1200 (PK)	5 volts from CCM2 J2-31
2	1164 (YE)	Signal to CCM2 J3-22
3	1190 (BL)	Reference ground to CCM2 J2-14

Connector X446 - Adapter Display Harness to Cab CAN Termination R-17



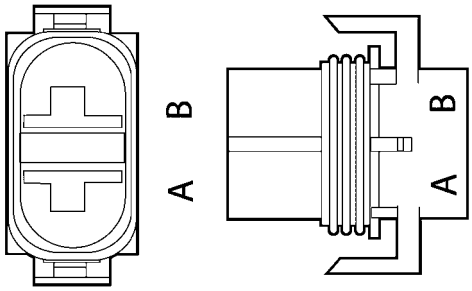
DEUTSCH_DT06-3S 411

Cavity	Circuit ID	Description
A	1208 (GN)	CAN Low

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Cavity	Circuit ID	Description
B	1207 (YE)	CAN High
C	open	

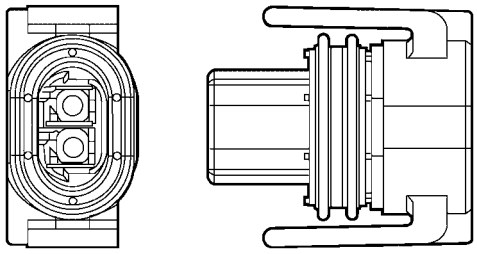
Connector X447 - Straw Hood Front Harness to Sieve Light Rear E-59



PAC_12124819 412

Cavity	Circuit ID	Description
A	1193 (PU)	Power from sieve light switch S-54
B	1195 (BK)	To rear frame ground 1

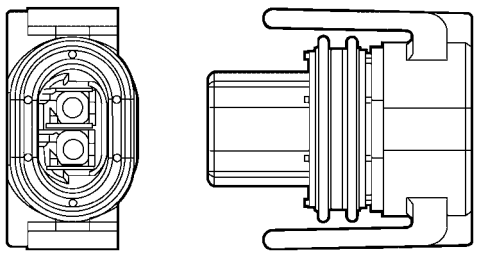
Connector X449 - Gearbox Harness to Unload Tube Clutch L-08



PAC_12162215 413

Cavity	Circuit ID	Description
A	568 (WH)	Power from CCM2 J2-4
B	601 (BL)	Reference ground to CCM2 J2-20

Connector X450 - Gearbox Harness to Beater / Chopper Clutch L-22

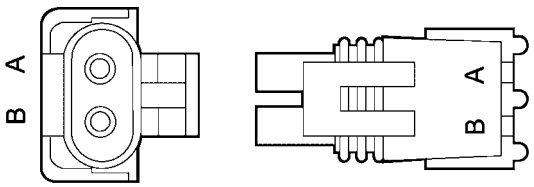


PAC_12162215 414

https://truckmanualshub.com/

Cavity	Circuit ID	Description
A	878 (WH)	Power from CCM2 J2-30
B	877 (BL)	Reference ground to CCM2 J2-40

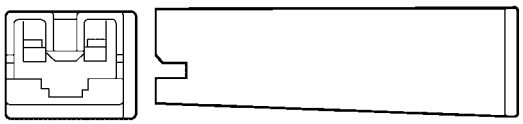
Connector X451 - Air Conditioning Harness (manual) to A/C Low Pressure S-48



PAC_12015792 415

Cavity	Circuit ID	Description
A	908 (BK)	To HVAC control panel A-09 X128 pin C-11
B	950 (BL)	To freeze switch S-76

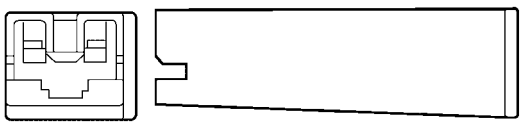
Connector X452 - Air Conditioning Harness (manual) to Freeze Switch S-76



AMP_172076 416

Cavity	Circuit ID	Description
	950 (BL)	To A/C low pressure S-48

Connector X453 - Air Conditioning Harness (manual) to Freeze Switch S-76

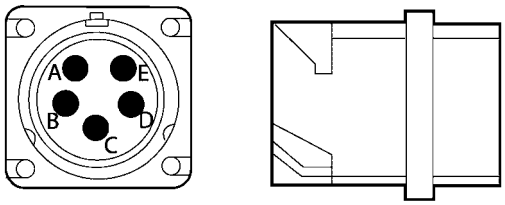


AMP_172076 417

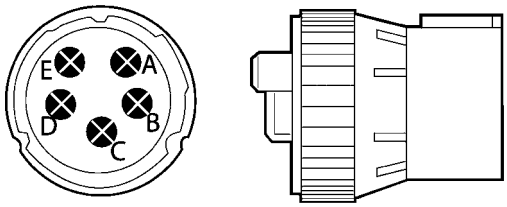
https://truckmanualshub.com/

Cavity	Circuit ID	Description
	907 (RD)	To HVAC control panel A-09 X128 pin C-10

Connector X456 - Main Frame Harness to Concave Extension Harness



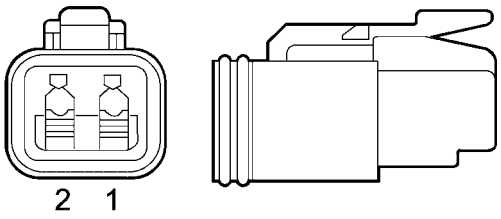
DEU_HD10-5-16P 418



DEU_HD16-5-16S 419

Cavity	Circuit ID	Description
1	694 (GY)	CCM1 J2-1 to concave clearance motor M-04
2	695 (WH)	CCM1 J2-21 through concave / covers relay K-16 to concave clearance motor M-04
3	498 (PK)	CCM1 J2-31 power to concave position R-06
4	456 (BL)	Concave position R-06 reference ground to CCM1 J2-14
5	411 (YE)	Concave position R-06 signal to CCM1 J2-19

Connector X457 - Main Frame Harness to Park Brake Disengage L-10



DEUTSCH_DT06-2S 420

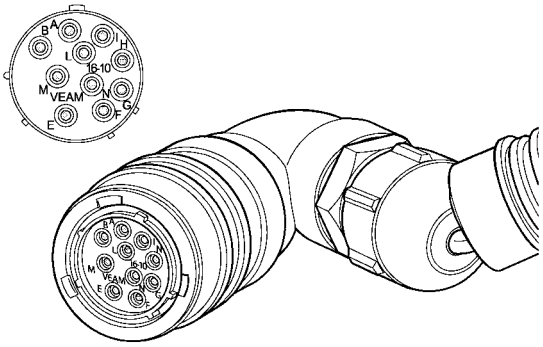
https://truckmanualshub.com/

Cavity	Circuit ID	Description
1	572 (WH)	Power from CCM2 J2-15
2	605 (BK)	To front frame ground 2

Connector X470 - Air Conditioning Harness to Separator Blower M-18

Cavity	Circuit ID	Description
A	926 (RD)	Power from separator blower relay K-09
B	933 (BK)	To cab ground 3

Connector X471 - Iveco Harness to Injector Harness



VE_VPT08-16-10S 421

Cavity	Circuit ID	Description
A	WH	ECU A-01 X192 pin 35 to fuel actuator 1 L-34
B	YE	ECU A-01 X192 pin 34 to fuel actuator 3 L-36
E	GN	ECU A-01 X192 pin 33 to fuel actuator 5 L-38
F	RD	ECU A-01 X192 pin 24 to fuel actuators 1, 3 & 5, L-34/36/38
G	BL	ECU A-01 X192 pin 26 to fuel actuator 2 L-35
H	PU	ECU A-01 X192 pin 28 to fuel actuator 6 L-39
I	BN	ECU A-01 X192 pins 3 & 18 to engine brake L-33
L	OR	ECU A-01 X192 pin 32 to engine brake L-33
M	GY	ECU A-01 X192 pin 27 to fuel actuator 4 L-37
N	BK	ECU A-01 X192 pin 25 to fuel actuators 2, 4 & 6, L-35/37/39

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WIRING HARNESS - READING ELECTRICAL SCHEMATICS

INTRODUCTION

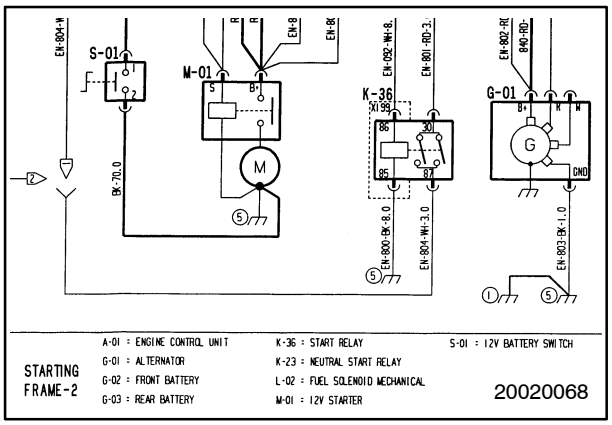
The electrical schematic index is organized into groupings of components. Each component on the combine is assigned a unique alpha-numeric code that is used in all documentation, and uniquely identifies that component. To locate a specific component in the schematic, use the chart below to determine the label prefix for that component type, and look in that component group in the index to determine which frame the component is located on.

Label Prefix	Component Type
A	Modules
B	Sensors
E	Lights, Lamps
F	Fuses
G	Alternator, batteries
H	Horns, speakers
J	Power Outlets
K	Relays
L	Solenoids
M	Motors, actuators
R	Potentiometers
S	Switches
W	Splice blocks

Schematic Frames

The electrical schematic is divided into page-sized frames, and are numbered sequentially. The schematic frames are ordered by system, as follows:

Starting	Fr 1
Engine	Fr 2 - 5
Drives	Fr 7 - 9
Hydraulic	Fr 10
Header	Fr 11 - 14
Feeder	Fr 15
Thresher	Fr 16, 17
Cleaning	Fr 19 - 21
Unload	Fr 22
Trash	Fr 23
Precision	Fr 24
Distribution	Fr 25 - 31
Lighting	Fr 33 - 43
Accessory	Fr 44 - 45
HVAC	Fr 46 - 48

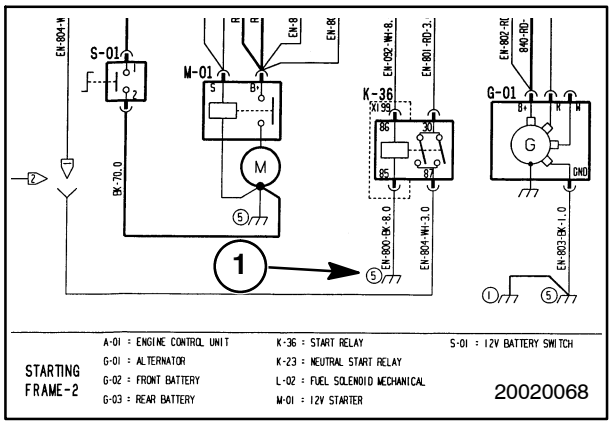


1

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To accurately determine the location of a particular circuit, use the index to locate circuits by component label.

A table following each frame lists all devices shown on that frame, with their label. In most cases, circuits are contained completely within the frame. However, in some cases, wires can cross frame borders to the previous or next frame.

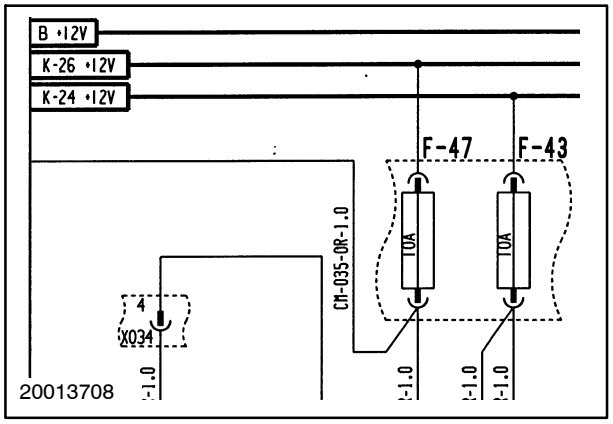


2

Power runs across the top of each frame, while grounds generally occur at the bottom. Labels are used to identify the power supply on the power wires at the top of the frame. The top wire label “B +12V” indicates this wire is directly supplied by the batteries, while the wires below are supplied by the K26 and K24 relays respectively.

Grounds are identified with a circled number, 1, Figure 2, which indicates a specific ground location on the combine. An absence of this circled number indicates that the device is grounded locally.

There are five grounding locations on the combine, as listed.



3

① REAR FRAME GROUND

② FRONT FRAME GROUND

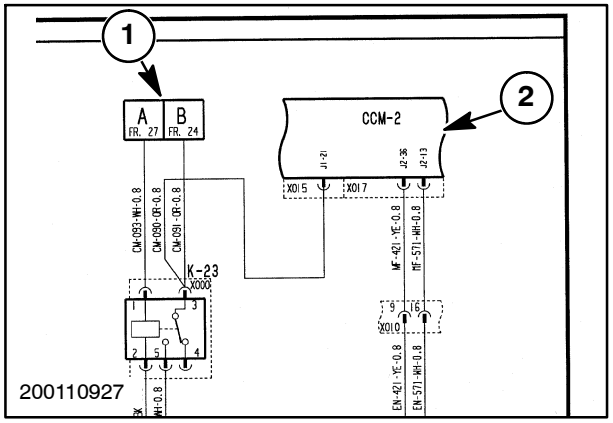
③ CAB FLOOR GROUND

④ CAB ROOF GROUND

⑤ ENGINE GROUND

A minimal number of jumpers, 1, are used to extend circuits to other frames in the schematic. These jumpers are shown as a wire terminating in a square box, with a letter-identifier and a frame number that the wire is jumping to. To continue following the circuit, flip to the identified frame number, and look for a jumper box with the same letter-identifier.

Connectors in the schematic are shown as a dotted box around a component, or around connections in a wire, in the case of an inline connector between harnesses. The connector number will be identified in one corner of the box.



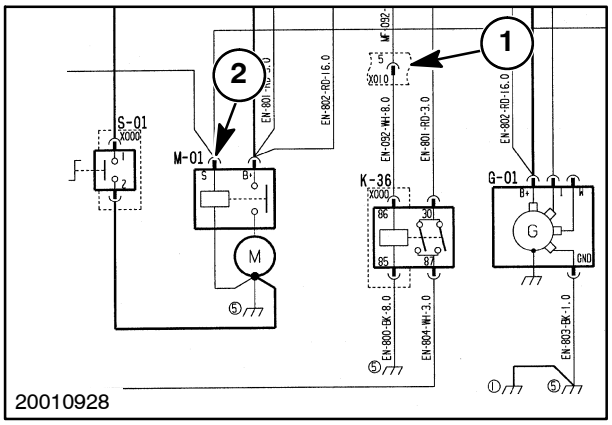
4

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If only part of the connector is shown, a wavy dotted line, 1, will be shown at one or both ends of the box to indicate that part of the connector is missing, and located in another frame of the schematic. The connectors will identify pins or sockets in each connector.

Bolted connections, 2, such as to batteries or alternators, will not have a dotted box surrounding the connection.

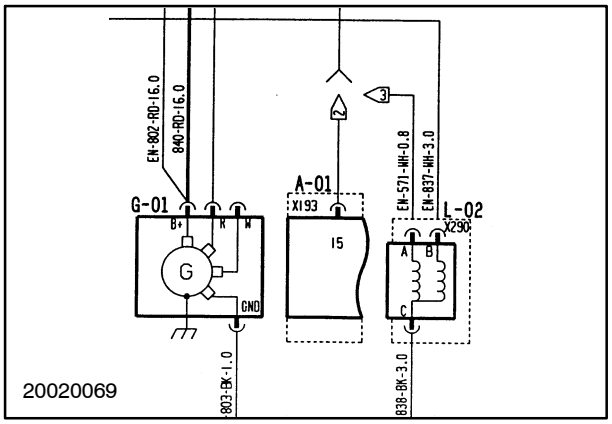
In most cases, an entire component is shown on a single frame of the schematic. In some cases, however, the component (typically a computer module), 2, Figure 4, may be shown on several frames of the schematic. If only part of the component is shown, a solid wavy line will be shown at one, or both ends of the component to indicate part of the component is missing, and is located in another frame of the schematic.



5

Machine Options

In some cases, the wiring may have slight differences from one machine to another, depending on the specific options that are installed. In these cases, the schematic will show a reverse arrow head on one wire, with two or more arrow heads available to “plug in”. These arrow heads have a number in them to identify the specific option or configuration they represent. The arrow head options are listed at the bottom of the Index frame for reference.



6

The options used in the schematic are:

3> BASE UNIT WITH MANUAL A/C

4> BASE UNIT WITH MANUAL ATC

7> EUROPEAN BASE UNIT

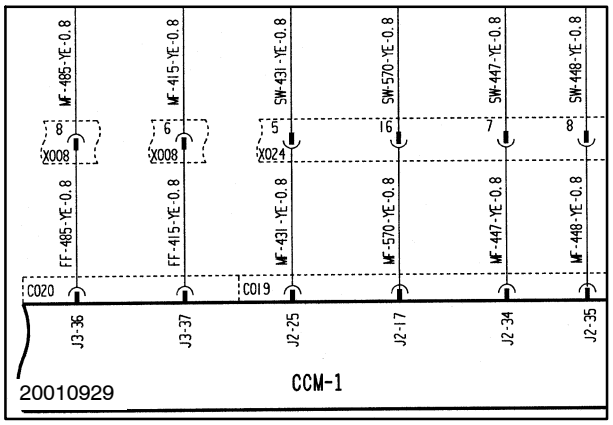
8> NORTH AMERICAN BASE UNIT

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Harnesses

A two digit alpha code is assigned to each harness used on the combine (with the exception of two or three wire jumper harnesses). This label is used on each wire on the schematic to identify which harness any given wire is located in. The harness codes are:

Code	Harness
MF	Main Frame
FF	Front Frame
LF	Lower Frame
CM	Cab Main
RC	Right Hand Console
SC	Steering Column
CR	Cab Roof
OR	Outer Roof
AC	HVAC
FE	Feeder
GT	Grain Tank
GB	Gearbox
EN	Engine
EX	Expansion
SW	Straw Hood, Front
SH	Straw Hood, Rear
LR	Lower Frame Rear
PF	Precision Farming
AD	Adapter, Display
JP	Jumper
FC	Flip-Up Lighting
UL	Undershield Lighting
UE	Undershield Lighting, Engine
CC	Concave Clearance
TL	Unload Tube Light
HH	Header



7

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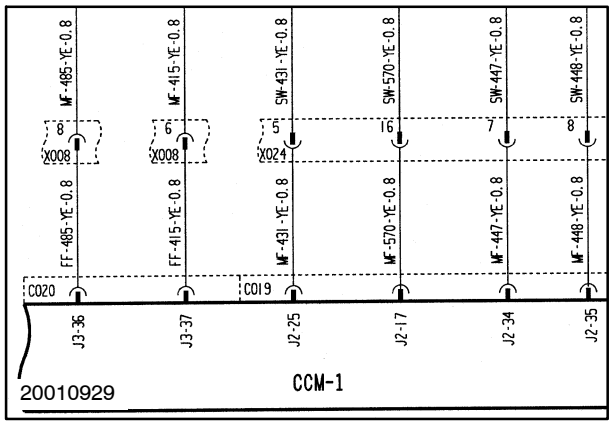
All wires in the schematic are labeled to indicate the specific harness they are in, the circuit number, the wire color (see chart below), and the wire size, indicated in square mm cross-section. On the combine, the appropriate circuit number is printed on each wire approximately every 50 mm (2″) to identify it.

Wire Size Chart	
Square mm	AWG
0.5	20
0.8	18
1.0	16
2.0	14
3.0	12
5.0	10
8.0	8

In addition, the wire colors used identify the function of the wire, depending on the type of component that the wire is connected to. The following wire colors are used for the CR combine wiring harnesses:

Color	Color Code	Function
Black	BK	Ground, Chassis
Blue	BL	Printed Circuit Ground
White	WH	Increasing Actuation
Gray	GY	Decreasing Actuation
Orange	OR	Power After Ignition
Yellow	Y	Signal Wires
Red	RD	Battery Voltage
Purple	P	Lighting
Pink	K	Reference Voltage
Black w/ White tracer	BK/WH	Clean Ground

The following tables identify the specific wiring colors and functions, as well as the standard connector location for each wire type for each component group.

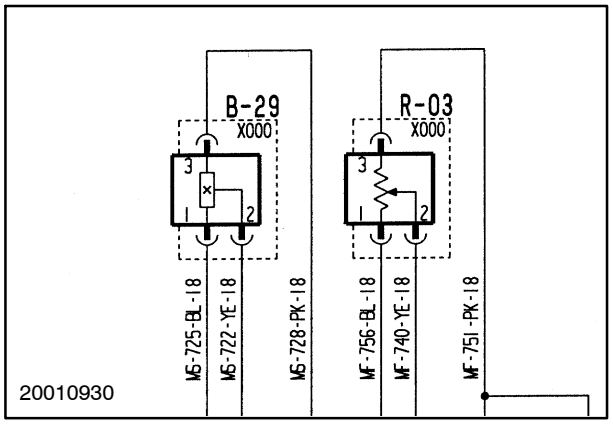


8

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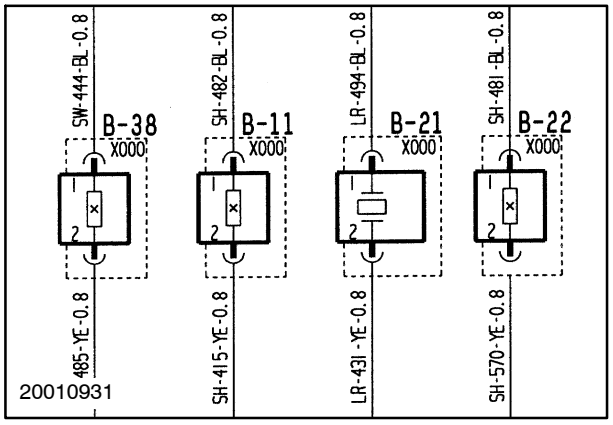
Sensors

3 Wire Sensors (eg. Potentiometers)		
Signal	**Pin**	**Harness Wire Color**
Power	1 or A	Pink
Ground	2 or B	Blue
Signal	3 or C	Yellow



9

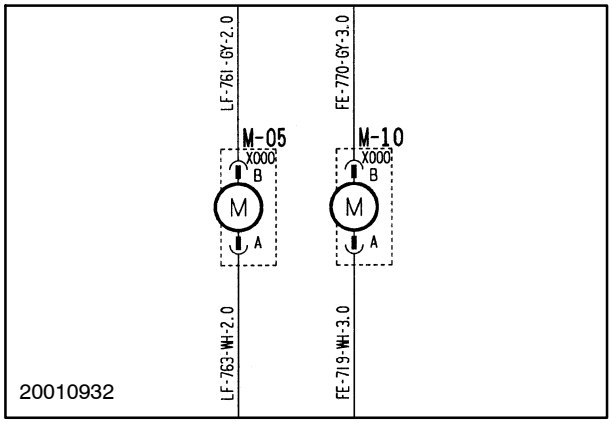
2 Wire Sensors (eg. Speed Sensors)		
Signal	**Pin**	**Harness Wire Color**
Ground	1 or A	Blue
Power	2 or B	Yellow



10

Actuators

Linear Actuators (eg. Shoe)		
Signal	**Pin**	**Harness Wire Color**
Increase	1 or A	White
Decrease	2 or B	Gray

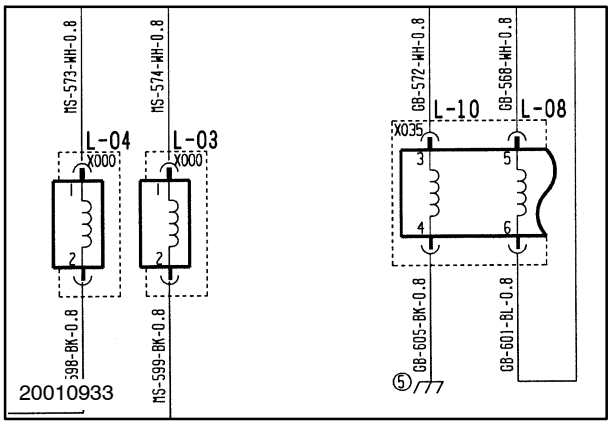


11

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Solenoids w/Current Sensing (eg. Header Raise/Lower)		
Signal	**Pin**	**Harness Wire Color**
High Side	1 or A	White
Current Sense	2 or B	Blue

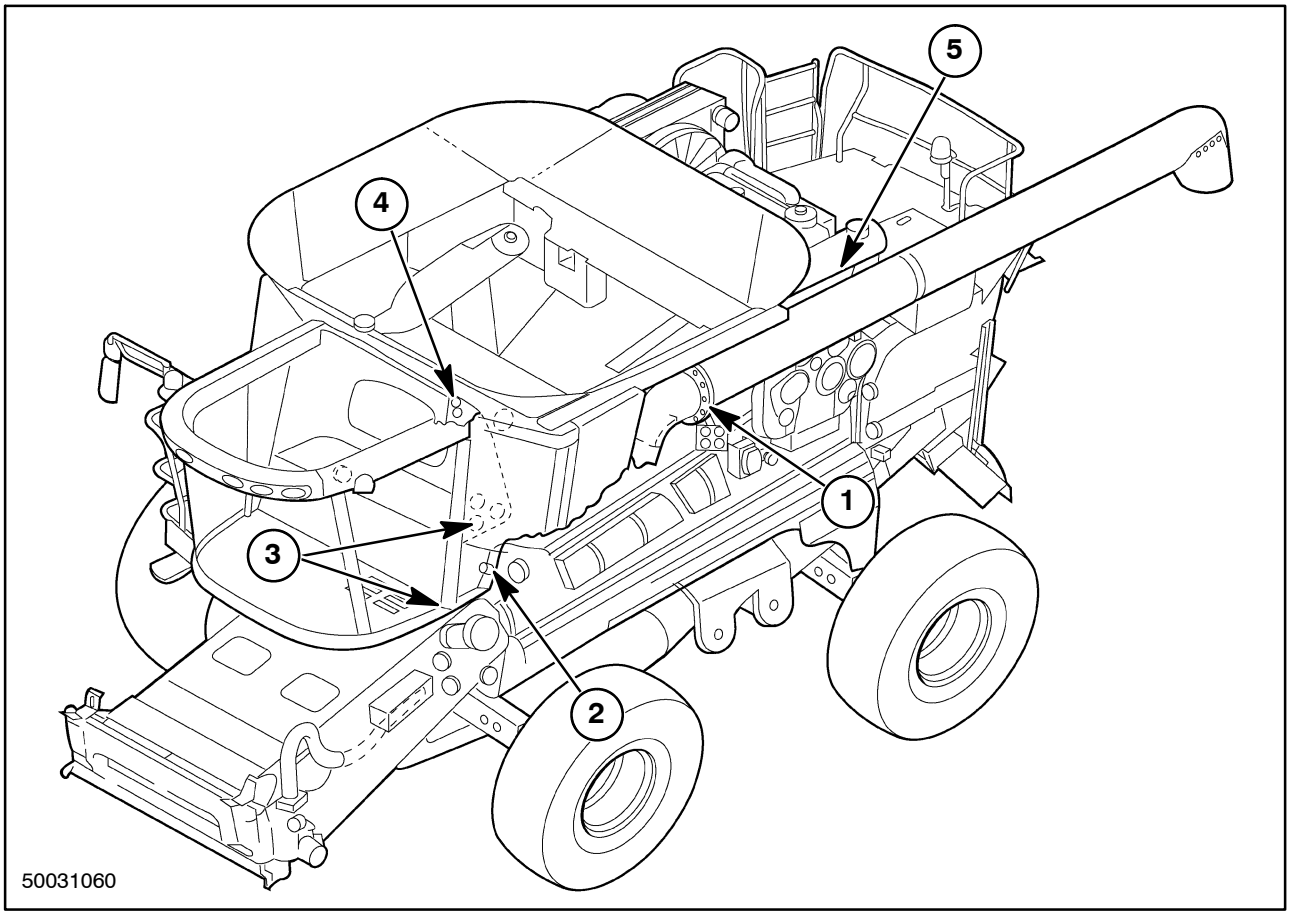
Solenoids w/o Current Sensing (eg. Reel Fore)		
Signal	**Pin**	**Harness Wire Color**
High Side	1 or A	White
Low Side	2 or B	Black



12

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HARNESS ROUTING



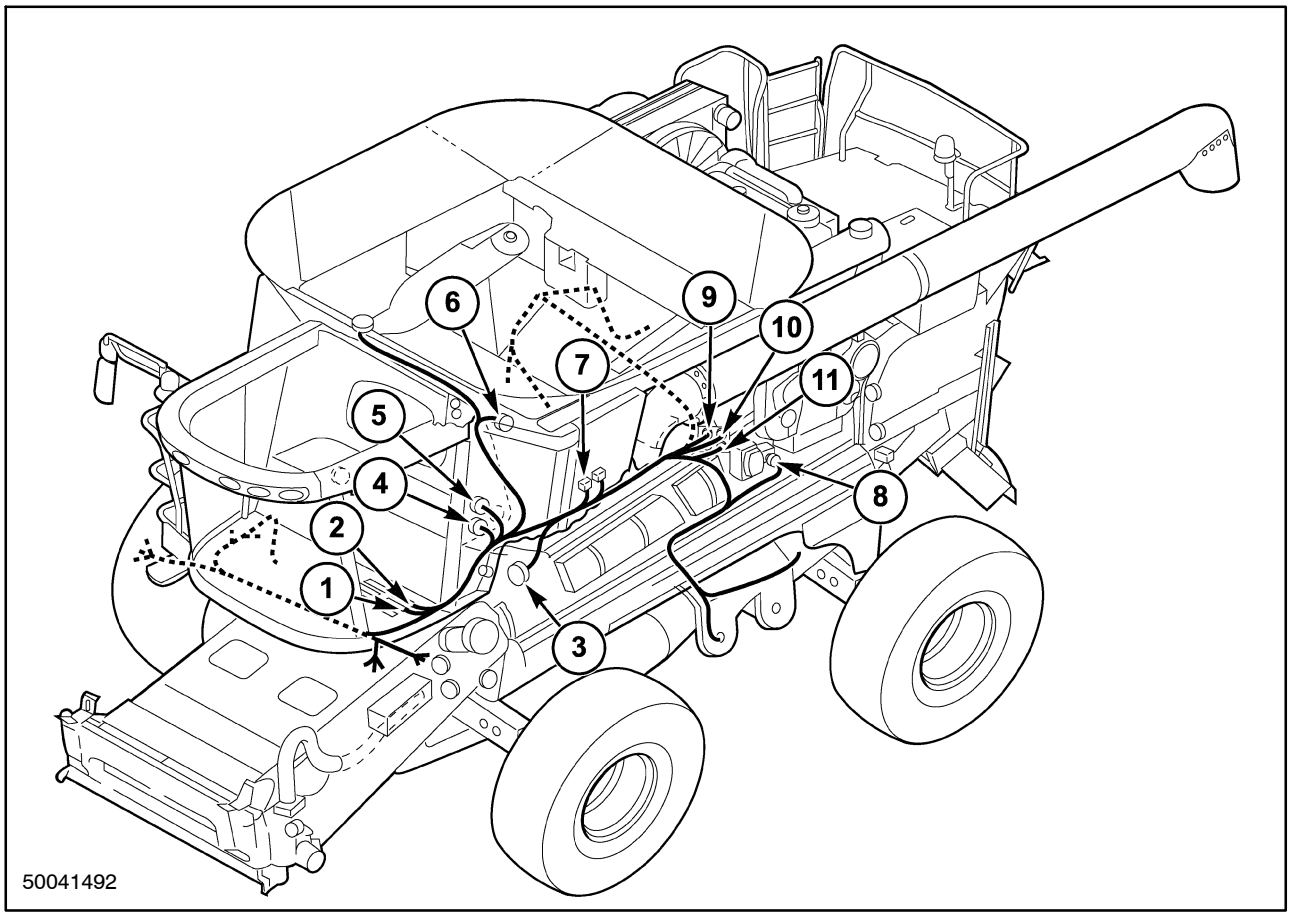
13

Ground Locations

1. Rear Frame Ground
2. Front Frame Ground
3. Cab Floor Ground
4. Cab Roof Ground
5. Engine Frame Ground (left rear mount)

NOTE: *Cab Floor Ground is shown as two locations. Upper location on rear deck is main ground point. Location at bottom attaches ground strap from cab to front frame ground, 2.*

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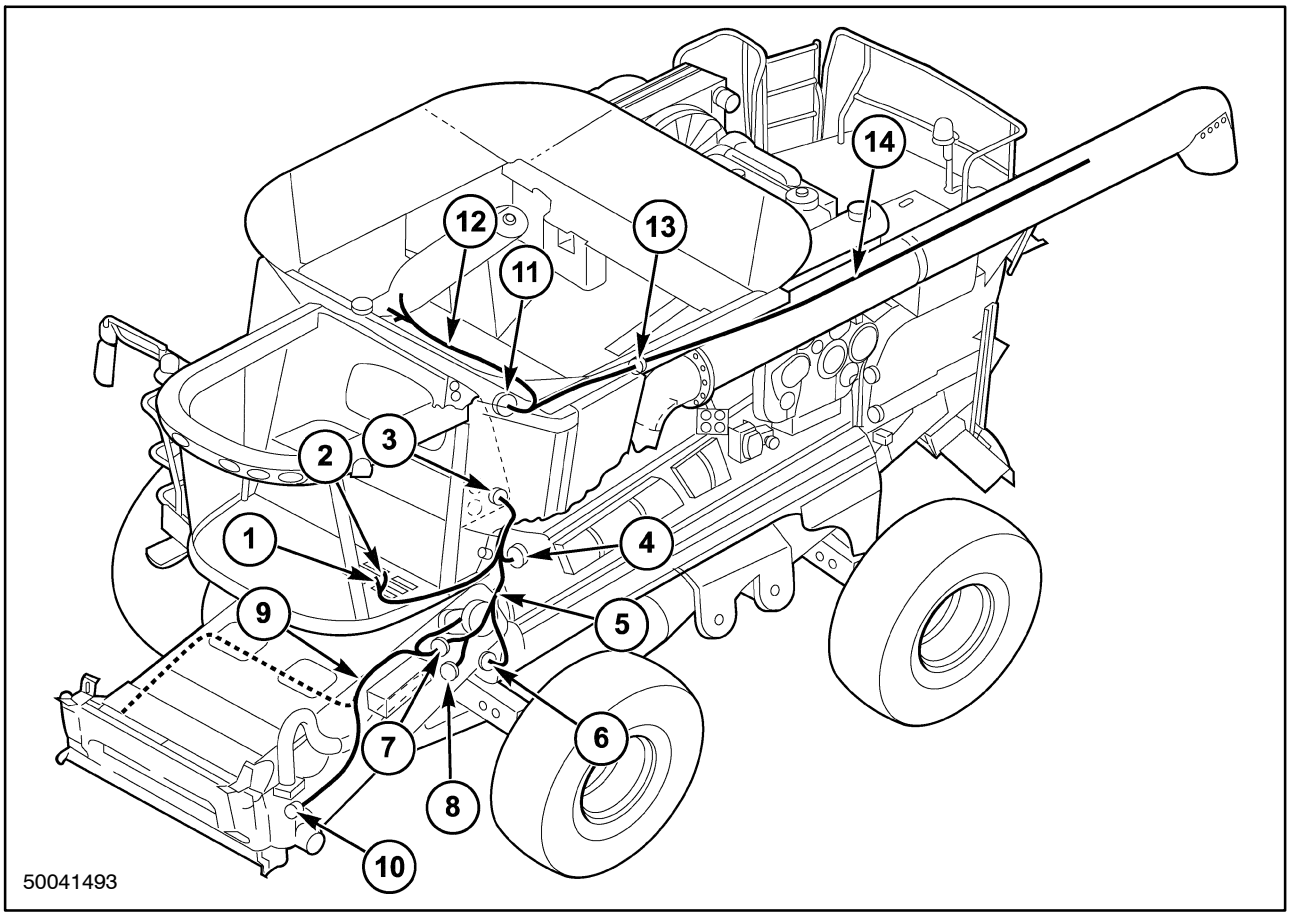


14

Main Frame (MF) Wire Harness

1. Connector X016, CCM2 - J2
2. Connector X019, CCM1 - J2
3. Connector X008 to Front Frame harness
4. Connector X004 to Cab Main harness
5. Connector X005 to Cab Main harness
6. Connector X009 to Grain Tank harness
7. Connector X034, X034A to Expansion harness
8. Connector X022 to Main Stack Valves
9. Connector X010 to Engine harness
10. Connector X011 to Gearbox harness
11. Connector X024 to Straw Hood

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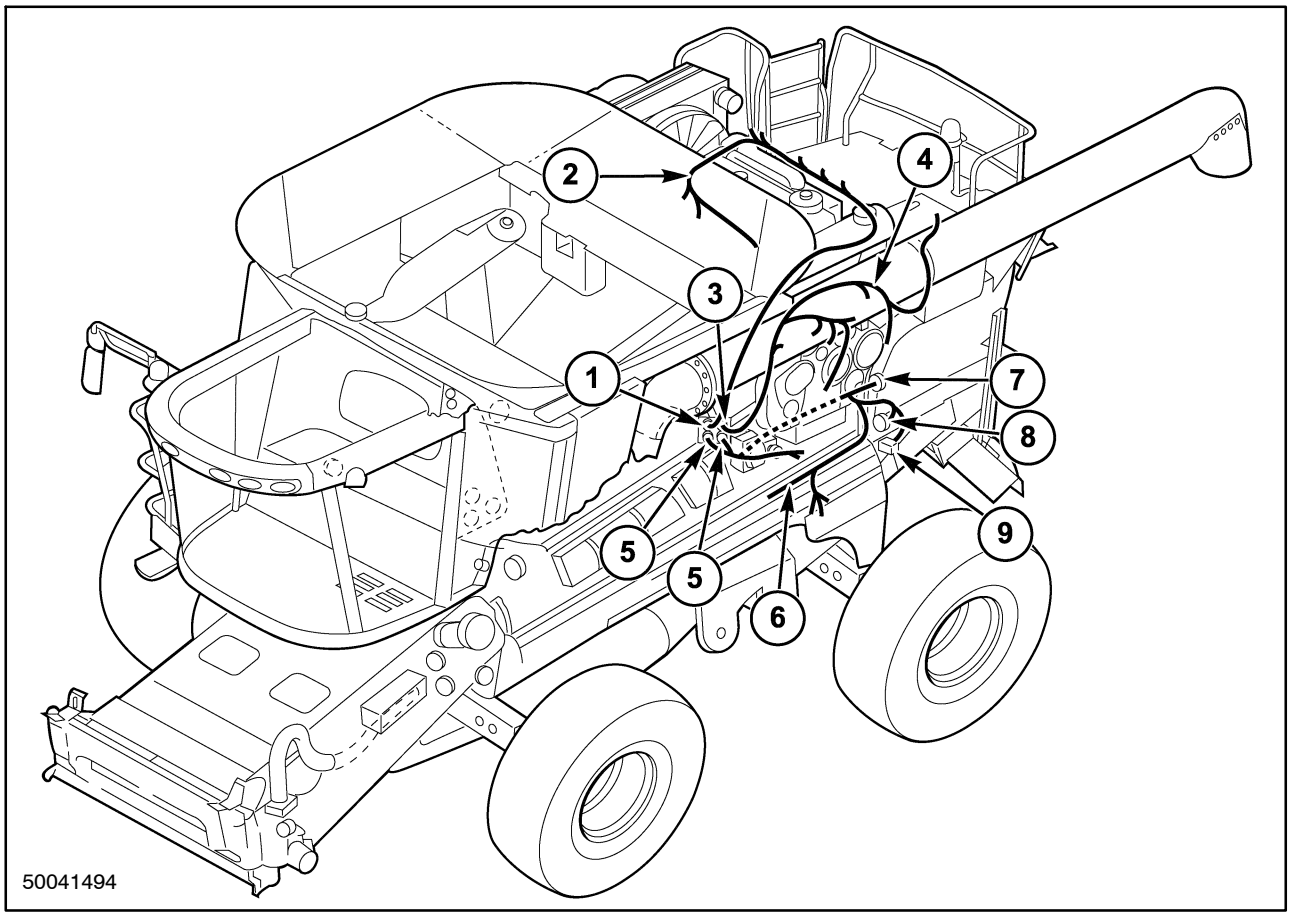


15

Front Frame (FF), Feeder (FE) Grain Tank (GT) and Tube Light (TL) Wire Harnesses

1. Connector X017, CCM2 - J3
2. Connector X020, CCM1 - J3
3. Connector X031 to Cab Main harness
4. Connector X008 to Main Frame harness
5. Front Frame (FF) wire harness
6. Connector X023 to Lower Frame harness
7. Connector X007 to Feeder harness
8. Connector X021 to Feeder Valves harness
9. Feeder (FE) wire harness
10. Connector X032 to Header harness
11. Connector X009 to Main Frame harness
12. Grain Tank (GT) harness
13. Connector X105 to Tube Light harness
14. Tube Light (TL) harness

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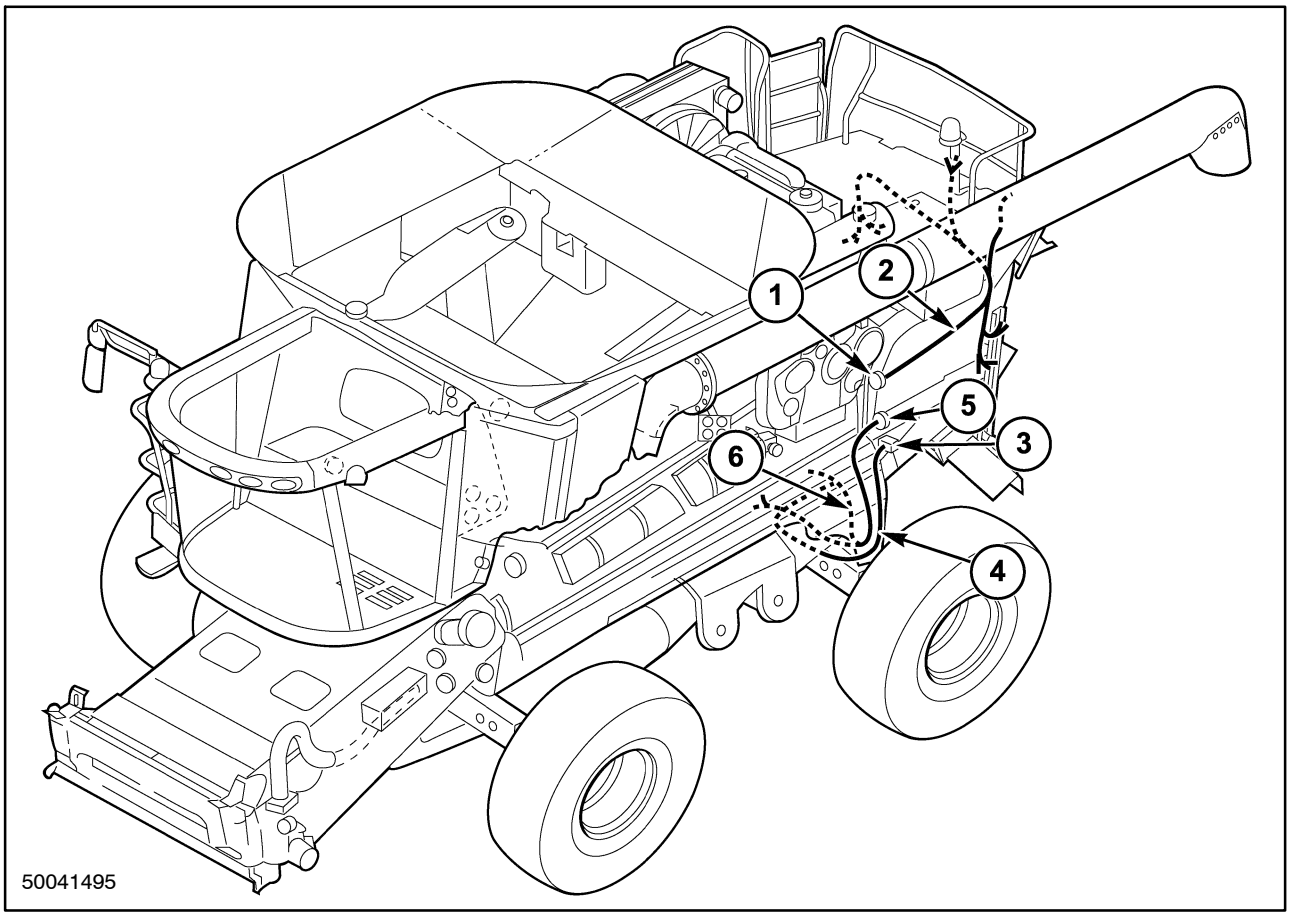


16

Engine (EN), Gearbox (GB) and Straw Hood Front (SW) Wire Harnesses

1. Connector X010 to Engine harness
2. Engine (EN) wire harness
3. Connector X011 to Gearbox harness
4. Gearbox (GB) wire harness
5. Connectors X024 and X025 to Straw Hood Front harness
6. Straw Hood Front (SW) harness
7. Connector X071 to Straw Hood Rear harness
8. Connector X072 to Lower Frame Rear harness
9. Connector X285 to Trailer harness

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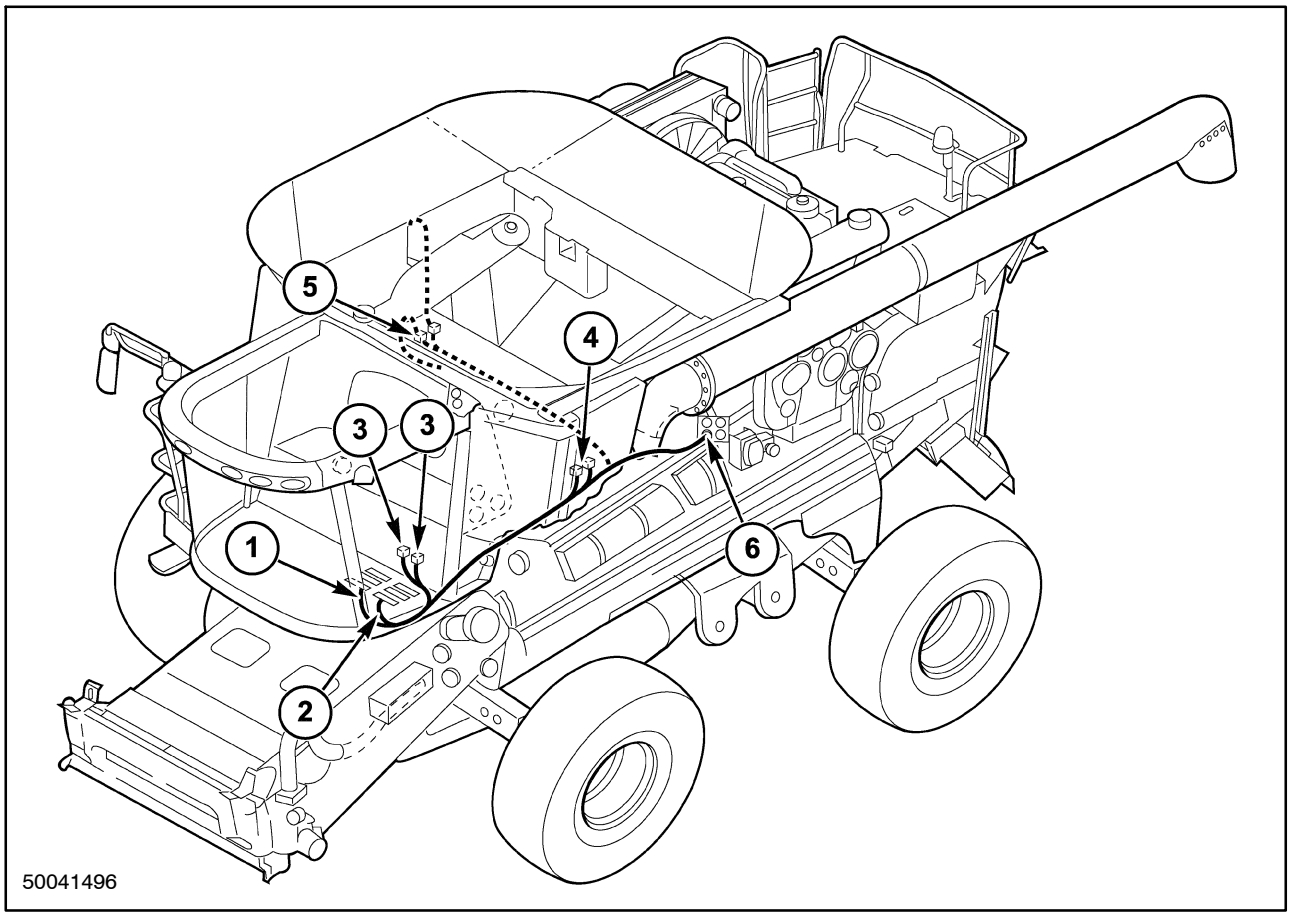


17

Straw Hood Front (SW) and Straw Hood Rear (SH) Wire Harnesses

1. Connector X071 to Straw Hood Front harness
2. Straw Hood Rear (SH) wire harness
3. Connector X285 to Straw Hood Front harness
4. Trailer (JP) harness
5. Connector X072 to Lower Frame Rear harness
6. Lower Frame Rear (LR) harness

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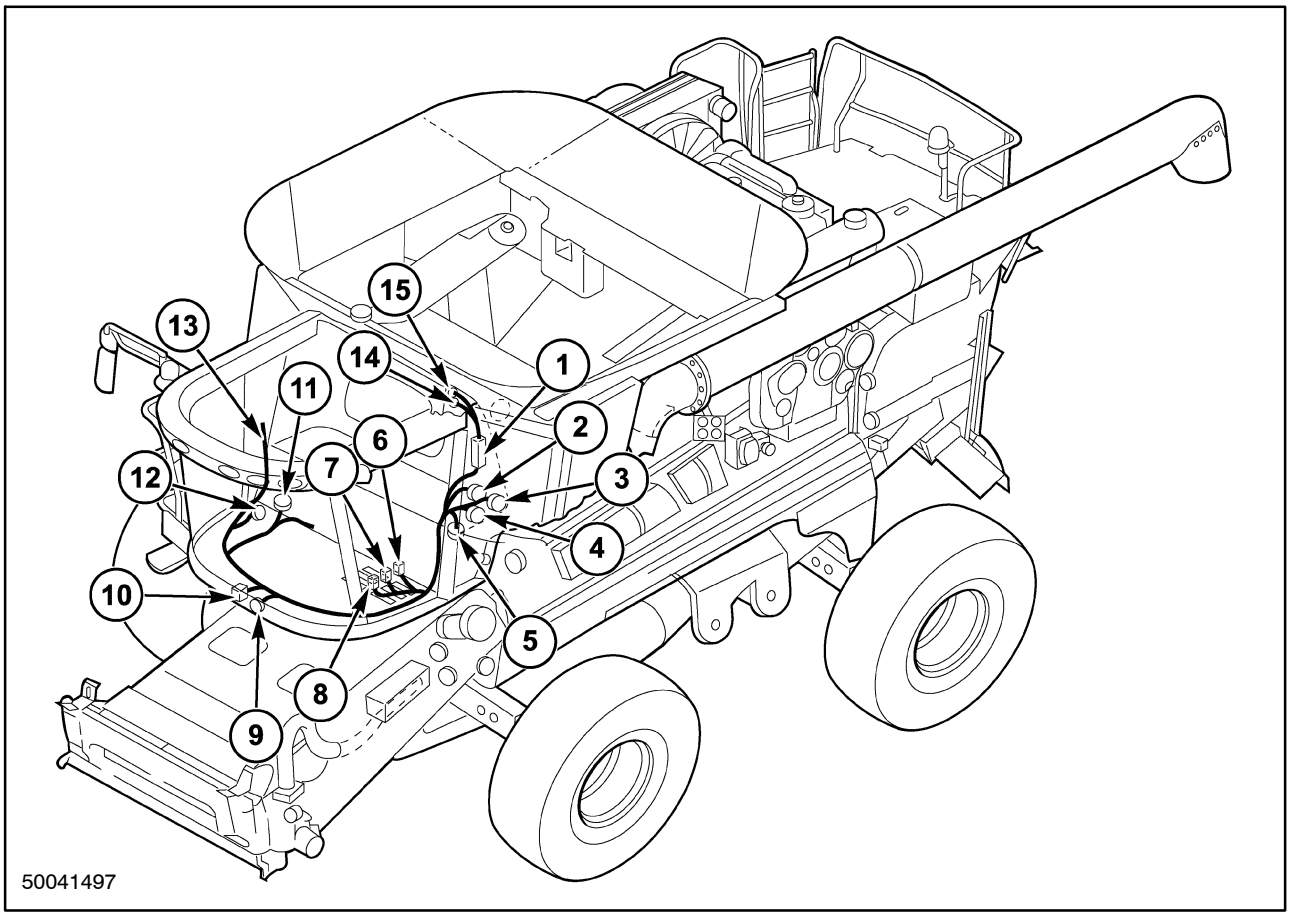


18

Expansion (EX), Grain Tank (GT) and Unload Tube Light Wire Harnesses

1. Connector X014, CCM3 - J3
2. Connector X013, CCM3 - J2
3. Connectors X412 and X438 to YMIU Module
4. Connectors X034, X034A to Main Frame harness
5. Connectors X442 and X443 to Precision Farming harness
6. Connector X025 to Straw Hood Front harness

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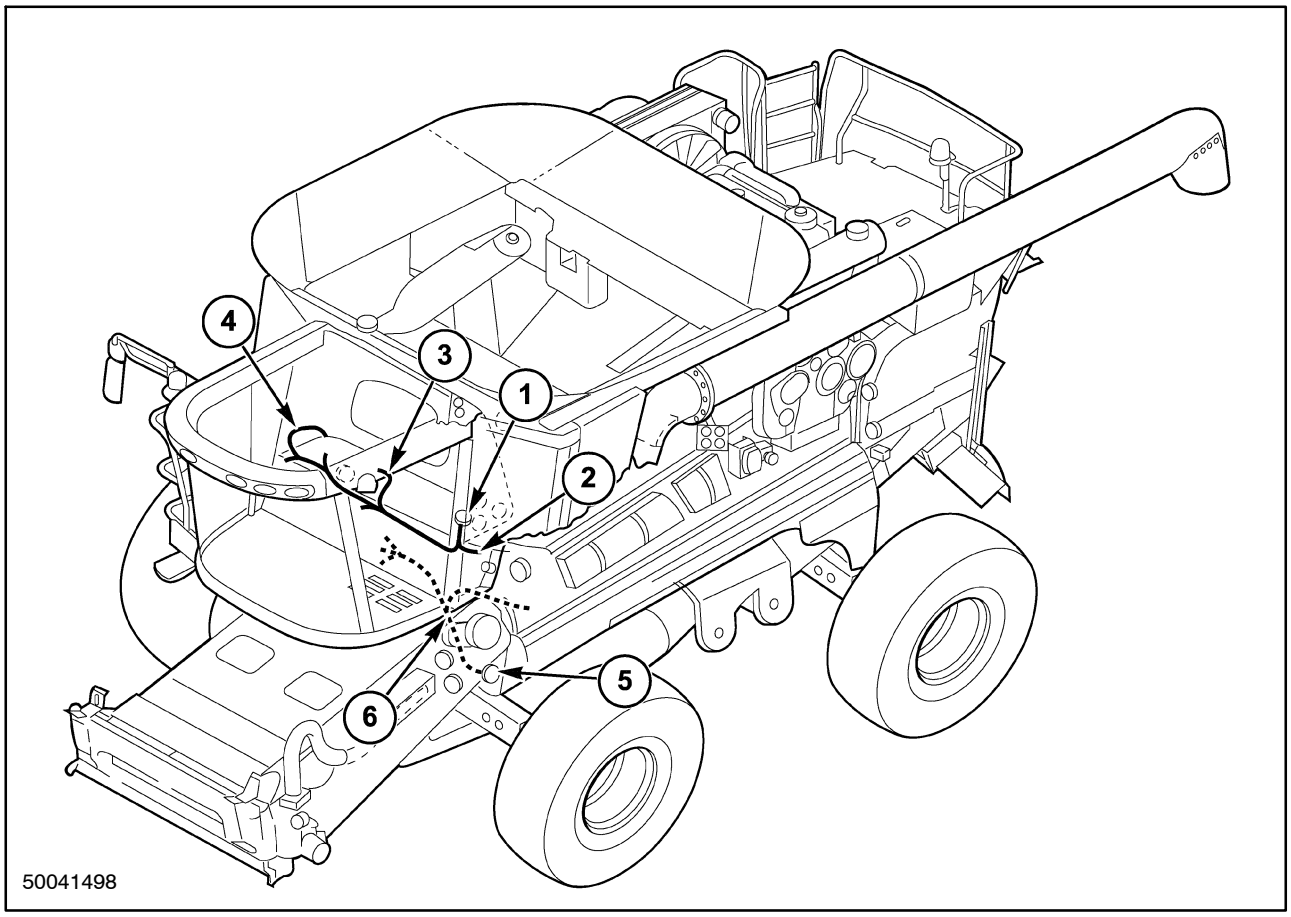


19

Cab Main (CM) Wire Harness

1. Fuse Panel
2. Connector X005 to Main Frame harness
3. Connector X031 to Front Frame harness
4. Connector X004 to Main Frame harness
5. Connector X006 to HVAC harness
6. Connector X018, CCM1 - J1
7. Connector X015, CCM2 - J1
8. Connector X012, CCM3 - J1
9. Connector X033 to Steering Column harness
10. Connector X256 to Road Light switch (S26)
11. Connector X001 to RH Console
12. Connector X064 to Adapter Display harness
13. To Start Panel
14. Connector X002 to Cab Roof harness
15. Connector X003 to Cab Roof harness

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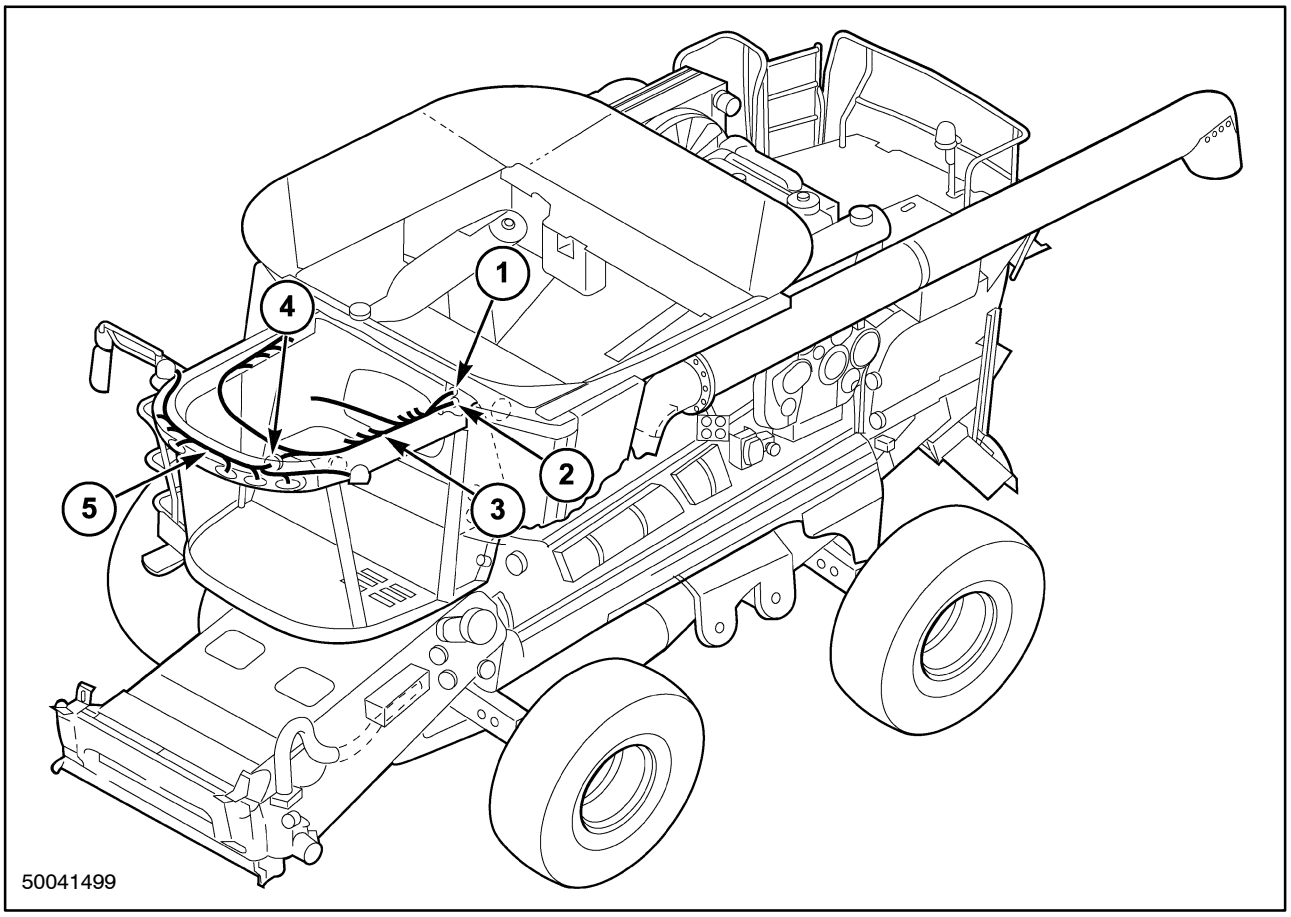


20

Lower Frame (LF) and HVAC (AC) Wire Harnesses

1. Connector X006 to Cab Main harness
2. To separator blower fan
3. HVAC (AC) wire harness
4. To cab blower fan
5. Connector X023 to Front Frame harness
6. Lower Frame (LF) harness

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21

Outer Roof (OR) and Cab Roof (CR) Wire Harnesses

1. Connector X003 to Cab Main harness
2. Connector X002 to Cab Main harness
3. Cab Roof (CR) harness
4. Connector X036 to Outer Roof harness
5. Outer Roof (OR) harness

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Wiring harness - Electrical schema index (A.30.A.88 - C.20.G.40)

AFX8010

Electronics				
Code	**Name**	**Connector**	**Frame**	**System**
A-01	Iveco Engine Control Unit	**X192**, **X193**	**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Engine
A-02	Universal Display Plus	**X319**	**Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)**	Distribution
A-03	Shaft Speed Monitor (SSM)	**X320**	**Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)**	Distribution
A-04	Radio	**X314**, **X315**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
A-05	Flasher Module	**X255**	**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
A-09	HVAC Control Panel (Manual)	**X128**	**Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47)**	HVAC
A-11	GPS Antenna	**X321**	**Wiring harness - Electrical schematic frame 31 (A.30.A.88 - C.20.E.31)**	Precision
A-12	YMIU Module	**X412**, **X438**	**Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)**	Precision
A-13	Front Switch Panel	**X386**	**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	
A-14	Blower Speed Control (ATC)	**X396**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC
A-15	ATC Control Module	**X397**, **X398**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC
A-17	Propulsion Handle	**X028**	**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	
A-18	Rear Switch Panel	**X387**	**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	
A-20	HVAC Control Panel (ATC)	**X128**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC

Sensors				
Code	**Name**	**Connector**	**Frame**	**System**
B-01	Rotor RPM	**X177**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
B-02	Lateral Inclination	**X170**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-03	Engine Oil Temperature	**X311**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
B-05	Engine Flywheel RPM	**X369**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
B-07	Engine Camshaft RPM	**X370**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
B-08	Clean Grain Elevator RPM	**X182**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-10	Chopper RPM	**X411**	**Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)**	Trash
B-11	Spreader Position	**X240**	**Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)**	Trash

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Sensors				
Code	**Name**	**Connector**	**Frame**	**System**
B-12	Moisture Sensor	**X221**	**Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)**	Precision
B-14	Feeder RPM	**X284**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
B-16	Cleaning Fan RPM	**X089**	**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
B-17	Ground Speed RPM	**X087**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
B-18	Hydraulic Oil Reservoir Temperature	**X103**	**Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)**	Hydraulic
B-19	Left Rotor Loss	**X191**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-20	Right Rotor Loss	**X188**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-21	Sieves Loss	**X232**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-22	Rear Ladder	**X251**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
B-23	Boost Pressure	**X371**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
B-26	Cab Temperature Sensor (ATC)	**X149**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC
B-28	Evaporator Temperature Sensor (ATC)	**X150**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC
B-29	Header Lift Pressure	**X279**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
B-32	PTO Box Temperature		**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Thresher
B-35	Low Control Pressure	**X098**	**Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)**	Hydraulic
B-36	Fuel Temperature	**X372**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
B-37	Transmission Shift Position	**X093**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
B-38	Unload Cradle	**X244**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
B-39	Tailings RPM	**X186**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-44	Coolant Temperature	**X373**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
B-46	Hydrostat Motor Temperature	**X091**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
B-47	Covers Closed	**X288**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
B-52	Engine Oil Pressure	**X337**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
B-53	Park Brake Pressure	**X368**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
B-54	Air Temperature	**X374**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine

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Sensors				
Code	**Name**	**Connector**	**Frame**	**System**
B-55	Spreader RPM	**X383**	**Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)**	Trash
B-56	Sieve Shake RPM	**X181**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning
B-57	Yield Sensor	**X223**	**Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)**	Precision
B-58	Rotor Hydrostat RPM	**X428**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
B-59	Water in Fuel		**Wiring harness - Electrical schematic frame 05 (A.30.A.88 - C.20.E.05)**	Engine
B-60	PTO Box Lube Pressure	**X399**	**Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)**	Hydraulic

Diode Assembly				
Code	**Name**	**Connector**	**Frame**	**System**
D-01	Feeder Engage Diodes	**X400**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder

Lights				
Code	**Name**	**Connector**	**Frame**	**System**
E-01	LH Header Flashing Lamp		**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-02	RH Header Flashing Lamp		**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-03	LH Front Hazard Lamp	**X160** (NA), X357 (EU)	**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-04	RH Front Hazard Lamp	**X165** (NA), X356 (EU)	**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-05	LH Rear Flashing Lamp (EU)	**X301**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
E-06	RH Rear Flashing Lamp (EU)	**X302**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
E-07	LH Flashing Lamp (NA)	**X242**	**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-08	RH Flashing Lamp (NA)	**X245**	**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-09	Turn Indicator	**X257**	**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-10	High Beam Indicator	**X258**	**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-11	LH Brake / Tail Lamp (NA)	**X299**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
E-12	RH Brake / Tail Lamp (NA)	**X300**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
E-13	LH Road Light (EU)	**X164**	**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
E-14	RH Road Light (EU)	**X169**	**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
E-15	LH Cab Outer Work Light	**X112**	**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting

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Lights				
Code	**Name**	**Connector**	**Frame**	**System**
E-16	RH Cab Outer Work Light	**X120**	**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
E-17	LH Cab Inner Work Light	**X117**	**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
E-18	RH Cab Inner Work Light	**X117**	**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
E-19	LH Cab Mid Work Light	**X114**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
E-20	RH Cab Mid Work Light	**X118**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
E-23	LH Lower Work Light	**X163**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
E-24	RH Lower Work Light	**X168**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
E-25	LH Side Work Light	**X297**	**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
E-26	RH Side Work Light	**X298**	**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
E-27	LH Rear Work Light	**X106**	**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
E-28	RH Rear Work Light	**X110**	**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
E-29	Unload Tube Light	**X322**	**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
E-30	Grain Tank Light	**X108**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
E-31	LH Front Beacon Light	**X113**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
E-32	RH Front Beacon Light	**X119**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
E-33	Rear Beacon Light	**X247**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
E-34	Dome Light	**X129**, **X296**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
E-35	Console Light	**X138**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
E-36	Cold Start Indicator	**X066**	**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Lighting
E-37	Sieve Light Front	**X234**	**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
E-39	Unload Tube Marker Light (France)		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-40	Header LH Marker Light (EU)		**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-41	Header RH Marker Light (EU)		**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
E-42	LH Front Shield Light	**X345**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
E-43	LH Rear Shield Light	**X346**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting

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Lights				
Code	**Name**	**Connector**	**Frame**	**System**
E-44	RH Front Shield Light	**X347**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
E-45	RH Rear Shield Light	**X348**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
E-46	Engine Light	**X349**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
E-47	LH Flip Up Road Light	**X333**	**Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)**	Lighting
E-48	RH Flip Up Road Light	**X334**	**Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)**	Lighting
E-49	RH Position Marker Lamp (EU)		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-50	LH Position Marker Lamp (EU)		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-51	RH Flashing Lamp (EU)		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-52	LH Flashing Lamp (EU)		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-53	RH Front Austria Marker Lamp		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-54	LH Front Austria Marker Lamp		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
E-57	RH License Plate Lamp (EU)	**X362**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
E-58	LH License Plate Lamp (EU)	**X363**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
E-59	Sieve Light Rear	**X447**	**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
E-60	LH HID Field Light	**X417**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
E-61	RH HID Field Light	**X418**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting

Fuses				
Code	**Name**	**Connector**	**Frame**	**System**
F-01	ECU Power Fuse		**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Starting
F-02	Accessory 2 Fuse		**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
F-03	Accessory 1 Fuse		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
F-04	Wiper Fuse		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
F-05	Cigar Lighter Fuse		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
F-06	LH Outer Road / Work Lights Fuse		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
F-07	RH Outer Road / Work Lights Fuse		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting

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Fuses				
Code	**Name**	**Connector**	**Frame**	**System**
F-08	Accessory Outlet Fuse		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
F-09	Washer / Mirror Fuse		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
F-10	Cold Start Fuse (Not Used)		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
F-11	Radio Fuse		**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
F-12	Future Option		**Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)**	
F-13	Transceiver Power Fuse (Not Used)		**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	
F-14	Service Lights Fuse		**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
F-15	Service Sockets Fuse		**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
F-16	Seat Pump Fuse		**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
F-17	Separator Blower Fuse		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
F-18	Main Blower Fuse		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
F-19	A/C Clutch Fuse		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
F-20	LH Marker / Tail Lights Fuse		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
F-21	RH Marker / Tail Lights Fuse		**Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)**	Lighting
F-22	Shoe Leveling Motor Fuse		**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
F-23	Not Used		**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	
F-24	Concave / Covers Fuse		**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Thresher
F-25	Transmission Shift Suse		**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
F-26	Not Used		**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	
F-27	Sieve Fuse		**Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)**	Cleaning
F-28	Fuel Pump Fuse		**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Engine
F-29	Inner Road / Work Lights Fuse		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
F-30	Mid Work Lights Fuse		**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
F-31	Outer Road / Work Lights Fuse		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
F-32	High Beam Fuse (EU)		**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting

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Fuses				
Code	**Name**	**Connector**	**Frame**	**System**
F-33	Low Beam Fuse (EU)		**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
F-34	Under Shield Lights		**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
F-35	Radio Memory Fuse		**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
F-36	CCM-2A Fuse		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
F-37	CCM-2B Fuse		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
F-38	Key Switch Fuse		**Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)**	Distribution
F-39	Memory (KAPWR)		**Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)**	Distribution
F-40	CCM-1 Power Fuse		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
F-41	CCM-2 Power Fuse		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
F-42	CCM-3 / Cab Power Fuse		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
F-43	CCM-1A Fuse		**Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)**	Distribution
F-44	CCM-1B Fuse		**Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)**	Distribution
F-45	GPS Antenna Fuse		**Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)**	Distribution
F-46	Not Used		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	
F-47	CCM-3 Fuse		**Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)**	Distribution
F-48	RH Console Fuse		**Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)**	Distribution
F-49	Cab Fuse		**Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)**	Distribution
F-50	Side / Tube Lights Fuse		**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
F-51	Horn / Marker Lights Fuse		**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
F-52	Dome / Brake Lights Fuse		**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
F-53	Beacon Lights Fuse		**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
F-54	Lower Work Lights Fuse		**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
F-55	Rear Work Lights Fuse		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
F-56	Hazard Lights Fuse		**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
F-64	Switch Bypass Fuses	**X178**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Lighting

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Generators				
Code	**Name**	**Connector**	**Frame**	**System**
G-01	Alternator		**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
G-02	Front Battery		**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
G-03	Rear Battery		**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting

Audio				
Code	**Name**	**Connector**	**Frame**	**System**
H-01	Audio Alarm	**X058**	**Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)**	Distribution
H-02	Horn	**X172**	**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
H-04	Rear Left Speaker	**X123**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
H-05	Front Left Speaker	**X136**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
H-06	Rear Right Speaker	**X122**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
H-07	Front Right Speaker	**X139**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
H-08	Back Up Alarm	**X248**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive

Outlets				
Code	**Name**	**Connector**	**Frame**	**System**
J-01	RH Front Service Socket	**X166**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
J-02	LH Front Service Socket	**X161**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
J-03	RH Side Service Socket	**X252**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
J-04	LH Side Service Socket	**X236**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
J-05	Engine Service Socket	**X194**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
J-06	Accessory Socket	**X067**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
J-07	Not Used	**X141**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
J-08	Accessory Outlet	**X075**, **X076**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
J-09	Trailer Outlet	**X285**	**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**	Lighting
J-10	Diagnostic Outlet	**X065**	**Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)**	Distribution

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Relays				
Code	**Name**	**Connector**	**Frame**	**System**
K-01	Outer Road / Work Lights Relay		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
K-02	Light Control Relay		**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
K-03	Accessory 2 Relay		**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
K-04	High Beam Relay (EU)		**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
K-05	Low Beam Relay (EU)		**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
K-06	Wiper Relay		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
K-07	Fuel Pump Relay		**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Engine
K-08	Accessory 1 Relay		**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
K-09	Separator Blower Relay		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
K-10	A/C Clutch Relay		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
K-11	Main Blower Relay Low		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
K-12	Main Blower Relay Medium		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
K-13	Main Blower Relay High		**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
K-14	ECU Power Relay		**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Starting
K-15	Not Used		**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	
K-16	Concave / Covers Relay		**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Thresher
K-17	Not Used		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	
K-18	Upper / Lower Sieve Relay		**Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)**	Cleaning
K-19	Feeder Disengage Relay		**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
K-20	Time Delay Module		**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
K-21	Inner Road Lights Relay		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
K-22	Mid Work Lights Relay		**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
K-23	Neutral Start Relay		**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
K-24	CCM-1 Power Relay		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
K-25	CCM-2 Power Relay		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution

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Relays				
Code	**Name**	**Connector**	**Frame**	**System**
K-26	CCM-3 / Cab Power Relay		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	Distribution
K-27	Inner Work Lights Relay		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
K-28	Not Used		**Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)**	
K-29	Beacon Lights Relay		**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
K-30	Lower Work Lights Relay		**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
K-31	Rear Work Lights Relay		**Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**	Lighting
K-32	Unload Tube Light Relay		**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
K-33	Brake Lights Relay		**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
K-34	Side Exit Lights Relay		**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
K-35	Side Work Lights Relay		**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
K-36	Start Relay	**X199**, **X200**	**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
K-38	24V Start Relay	**X286**	**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
K-39	Grid Heater Relay	**X211**	**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Starting
K-40	Flip Up Low Beam Relay	**X331**	**Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)**	Lighting
K-41	Flip Up High Beam Relay	**X332**	**Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)**	Lighting
K-42	RH Vertical Knife Relay (Opt)		**Wiring harness - Electrical schematic frame 14 (A.30.A.88 - C.20.E.14)**	Header
K-43	LH Vertical Knife Relay (Opt)		**Wiring harness - Electrical schematic frame 14 (A.30.A.88 - C.20.E.14)**	Header

Solenoids				
Code	**Name**	**Connector**	**Frame**	**System**
L-03	Unload Tube In	**X022**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
L-04	Unload Tube Out	**X022**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
L-05	Pressure Release	**X092**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
L-06	Header Height Accumulator	**X022**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
L-07	A/C Clutch	**X215**	**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
L-08	Unload Tube Clutch	**X449**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload

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Solenoids				
Code	**Name**	**Connector**	**Frame**	**System**
L-10	Park Brake Disengage	**X457**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
L-11	Header Raise	**X022**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
L-12	Header Lower	**X022**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
L-13	Reel Down	**X021**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
L-14	Reel Up	**X021**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
L-15	Reel Aft	**X021**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
L-16	Reel Fore	**X021**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
L-17	Reel Drive	**X021**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
L-18	Lateral Tilt CW	**X021**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
L-19	Lateral Tilt CCW	**X021**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
L-22	Beater / Chopper Clutch	**X450**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
L-23	Ground Speed Hydrostat	**X100**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
L-26	Rear Wheel Assist	**X233**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
L-28	Chaff Spreader	**X235**	**Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)**	Trash
L-32	Brake Limiting	**X329**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
L-33	Engine Brake	**X375**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-34	Fuel Actuator 1	**X376**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-35	Fuel Actuator 2	**X377**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-36	Fuel Actuator 3	**X378**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-37	Fuel Actuator 4	**X379**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-38	Fuel Actuator 5	**X380**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-39	Fuel Actuator 6	**X381**	**Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**	Engine
L-40	Rotor Pump Swash Minus	**X408**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
L-41	Rotor Pump Swash Plus	**X408**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
L-43	Jammer Solenoid	**X022**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header

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Solenoids				
Code	**Name**	**Connector**	**Frame**	**System**
L-44	Fan Drive Solenoid	**X444**	**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
L-45	Rotor Engine To Ring Clutch	**X410**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
L-46	Rotor Ring To Frame Brake	**X409**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
L-47	Feeder Engine To Ring Clutch	**X401**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
L-48	Feeder Pump Swash Minus	**X402**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
L-49	Feeder Pump Swash Plus	**X402**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
L-50	Feeder Ring To Frame Brake	**X403**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
L-53	Draper Header Solenoid		**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
L-54	2 Speed Rear Wheel Assist RH		**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
L-55	2 Speed Rear Wheel Assist LH		**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive

Motors				
Code	**Name**	**Connector**	**Frame**	**System**
M-02	Transmission Shift Motor	**X094**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
M-03	Shoe Leveling Actuator	**X088**	**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
M-04	Concave Clearance Motor	**X190**	**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Thresher
M-06	Upper Sieve Actuator	**X227**	**Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)**	Cleaning
M-07	Lower Sieve Actuator	**X228**	**Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)**	Cleaning
M-12	Covers Motor	**X289**	**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Unload
M-16	Water Valve (manual)	**X151**	**Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47)**	HVAC
M-17	Main Blower (manual)	**X155**, **X156**, **X157**, **X158**	**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
M-18	Separator Blower	**X470**	**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
M-19	RH Mirror Up / Down	**X121**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
M-20	RH Mirror In / Out	**X121**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
M-21	LH Mirror Up / Down	**X111**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
M-22	LH Mirror In / Out	**X111**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory

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Motors				
Code	**Name**	**Connector**	**Frame**	**System**
M-23	Fuel Pump	**X183**	**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Starting
M-24	Wiper Washer Motor	**X171**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
M-25	Wiper Motor	**X116**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
M-26	Seat Pump Motor	**X074**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
M-28	Sample Motor	**X222**	**Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)**	Precision
M-29	24V Starter	**X205**	**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
M-30	German Mirror Up / Down	**X287**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
M-31	German Mirror In / Out	**X287**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
M-33	Water Valve (ATC)	**X151**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC
M-34	Main Blower (ATC)	**X156**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC

Resistive				
Code	**Name**	**Connector**	**Frame**	**System**
R-01	Fuel Level	**X184**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
R-02	Lateral Tilt Pot	**X081**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
R-03	Feeder Angle Pot	**X174**	**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
R-04	Ground Speed Pot	**X057**	**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	Drive
R-06	Concave Position	**X189**	**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Thresher
R-08	Cigar Lighter	**X069**, **X070**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
R-09	Engine Grid Heater	**X211**	**Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**	Starting
R-10	RH Mirror Heat	**X121**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
R-11	LH Mirror Heat	**X111**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
R-12	LH Header Height / Tilt		**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
R-13	RH Header Height / Tilt		**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
R-14	German Mirror Heat	**X287**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
R-15	Air Filter Resistor	**X330**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine

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Resistive				
Code	**Name**	**Connector**	**Frame**	**System**
R-17	Cab CAN Termination	**X446**	**Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)**	Distribution
R-18	Header Speed Pot	**X404**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
R-19	Center Header Height / Tilt		**Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)**	Header
R-20	Header Type Module		**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
R-21	Engine Throttle Pot	**X388**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
R-22	Reel Speed Pot	**X406**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
R-23	Resistor Module	**X405**	**Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)**	Header
R-24	Tailing Volume	**X445**	**Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)**	Cleaning

Switches				
Code	**Name**	**Connector**	**Frame**	**System**
S-02	Key Switch	**X068**	**Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)**	Distribution
S-03	Propulsion Handle	**X059**	**Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)**	Distribution
S-04	Header Height Mode 1		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-05	Seat Switch	**X073**	**Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)**	Distribution
S-06	HHC Fine Adjust		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-08	Reel Speed Mode		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-09	Park Brake		**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	Drive
S-10	Rear Wheel Assist		**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	Drive
S-11	Rear Wheel Assist Hi / Low		**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	Drive
S-12	Road Mode Switch		**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	Drive
S-13	Upper Sieve		**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
S-14	Lower Sieve		**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
S-15	Fan Speed		**Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)**	Cleaning
S-16	Concave Clearance		**Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)**	Thresher
S-17	Rotor Speed		**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher

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Switches				
Code	**Name**	**Connector**	**Frame**	**System**
S-19	Mirror Heat Switch	**X127**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
S-20	Wiper Switch	**X135**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
S-22	Neutral Switch	**X059**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
S-23	Spread Pattern		**Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)**	Trash
S-24	Gear Select	**X048**	**Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)**	Drive
S-25	Hazard Switch	**X259**	**Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**	Lighting
S-26	Road Light Switch	**X256**	**Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**	Lighting
S-27	Mirror Adjust Switch	**X126**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
S-28	Grain Bin 3/4 Full	**X107**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
S-29	Grain Bin Full	**X109**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
S-30	Separator Engage	**X055**	**Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**	Thresher
S-31	Feeder Engage	**X056**	**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
S-32	Returns Filter Bypass	**X239**	**Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)**	Hydraulic
S-33	Hydraulic Reservoir Level	**X104**	**Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)**	Hydraulic
S-34	PTO Box Filter Bypass	**X238**	**Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)**	Hydraulic
S-35	Upper Sieve Rear Adjust	**X225**	**Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)**	Cleaning
S-38	Washer Switch	**X134**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**	Accessory
S-39	Brake Pressure	**X173**	**Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)**	Drive
S-40	LH Door Switch	**X137**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
S-41	Beacon Light Switch	**X130**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**	Lighting
S-42	Tank Extensions Switch	**X125**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**	Unload
S-43	Work Light Switch	**X132**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
S-44	Rear Work Light Switch	**X131**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**	Lighting
S-45	Seat Adjust Switch	**X074**	**Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)**	Accessory
S-46	Lower Sieve Rear Adjust	**X226**	**Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)**	Cleaning

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Switches				
Code	**Name**	**Connector**	**Frame**	**System**
S-47	A/C High Pressure	**X216**	**Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)**	HVAC
S-48	A/C Low Pressure (manual)	**X451**	**Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47)**	HVAC
S-49	Brake Fluid Level Switch	**X327**, **X328**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
S-51	Vertical Knives		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-52	Battery Switch (EU)		**Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)**	Starting
S-54	Sieve Light Switch	**X237**	**Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**	Lighting
S-55	LH Brake Wear Switch	**X084**, **X294**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
S-56	RH Brake Wear Switch	**X085**, **X295**	**Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)**	Drive
S-57	Mirror Select Switch	**X178**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**	Accessory
S-61	Air Filter Switch	**X202**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
S-62	Fuel Filter Switch	**X338**	**Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**	Engine
S-63	Under Shield Light Switch	**X339**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
S-64	Engine Light Switch	**X340**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**	Lighting
S-66	Second Seat Switch	**X073**	**Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)**	Distribution
S-67	Coolant Level Switch	**X439**	**Wiring harness - Electrical schematic frame 05 (A.30.A.88 - C.20.E.05)**	Engine
S-68	Header Height Mode 2		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-69	Header Mode Switch		**Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)**	Feeder
S-70	Header Position Switch		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-71	Header Resume Switch		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-72	Unload Swing Switch		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-73	Unload Engage Switch		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-74	Reel Position Switch		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-75	Emergency Stop Switch		**Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)**	Header
S-76	A/C Freeze Switch (manual)	**X452**, **X453**	**Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47)**	HVAC
S-77	A/C Low Pressure (ATC)	**X217**	**Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)**	HVAC

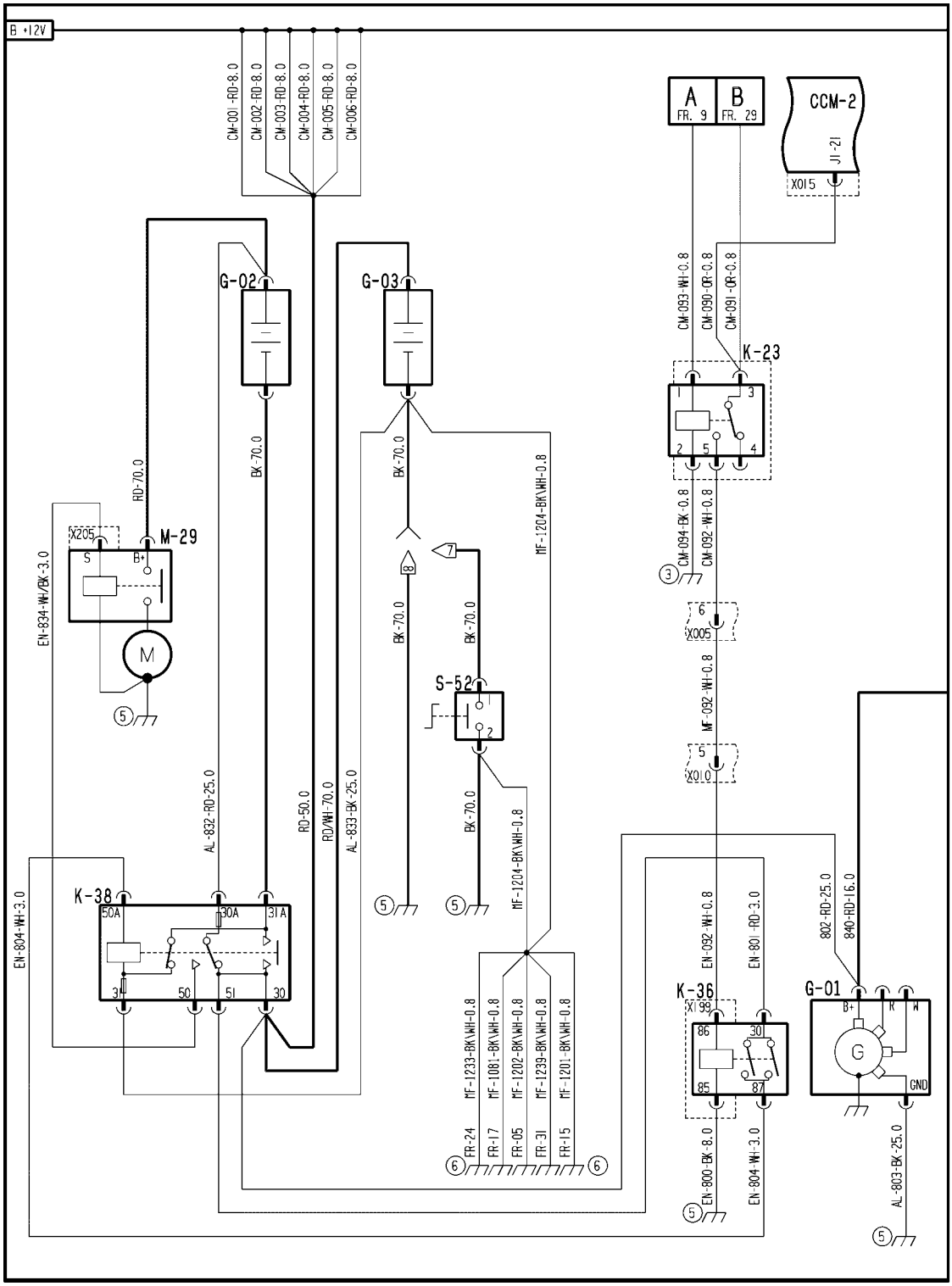
https://truckmanualshub.com/

Splice Blocks				
Code	**Name**	**Connector**	**Frame**	**System**
W-03	Splice Block C	**X133**	**Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)**	Distribution

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Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)

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AFXSCHEM01A-04 1

FRAME 1 - STARTING

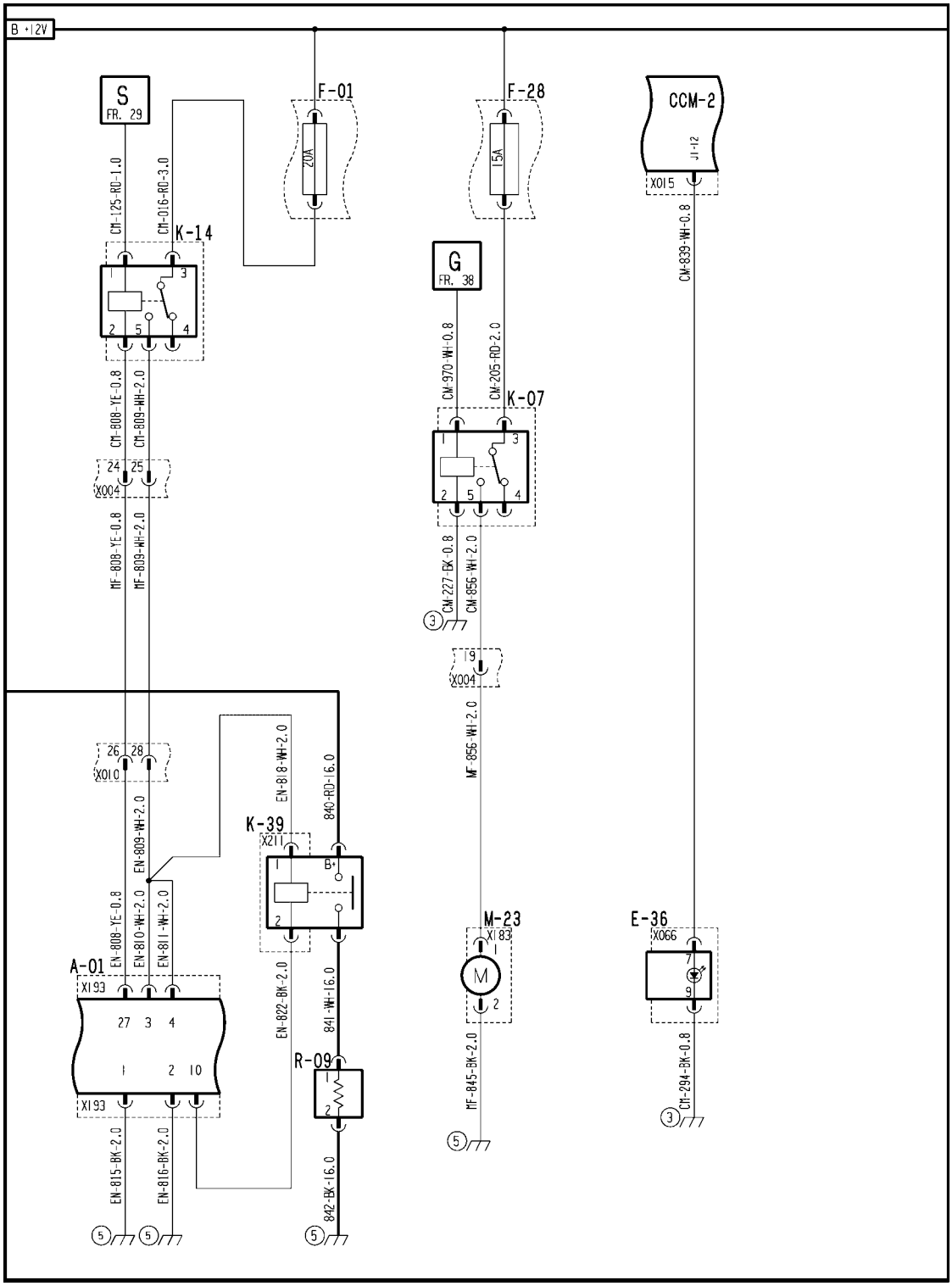
https://truckmanualshub.com/

G-01 Alternator	G-02 Front Battery	G-03 Rear Battery
K-23 Neutral Start Relay	K-36 Start Relay	K-38 24V Start Relay
M-29 24V Starter	S-52 Battery Switch (EU)	7 = European Base Unit
	8 = North American Base Unit	

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)

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AFXSCHEM02A-04 1

FRAME 2 - ENGINE

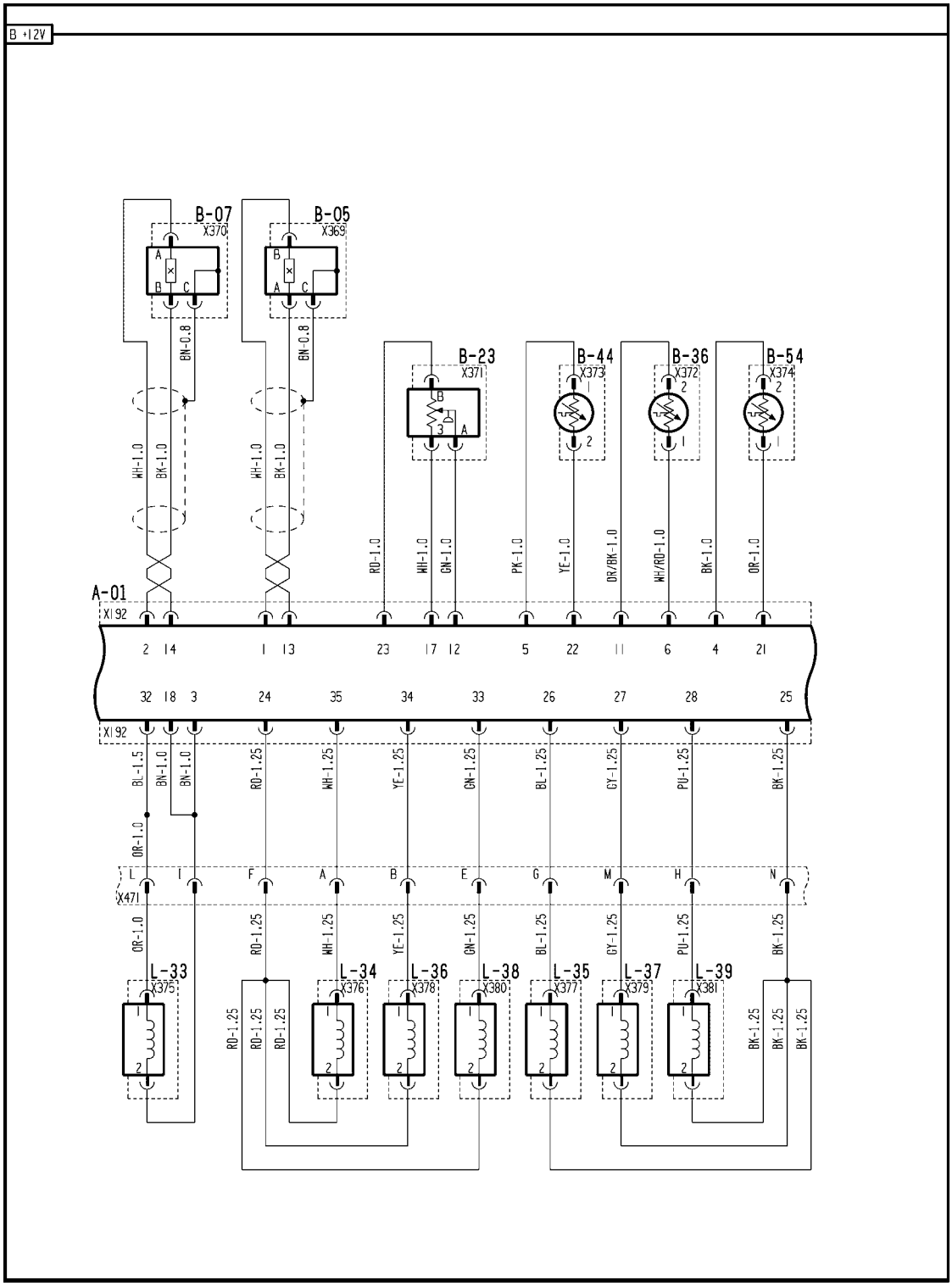
https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)

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AFXSCHEM03A-04 1

FRAME 3 - ENGINE

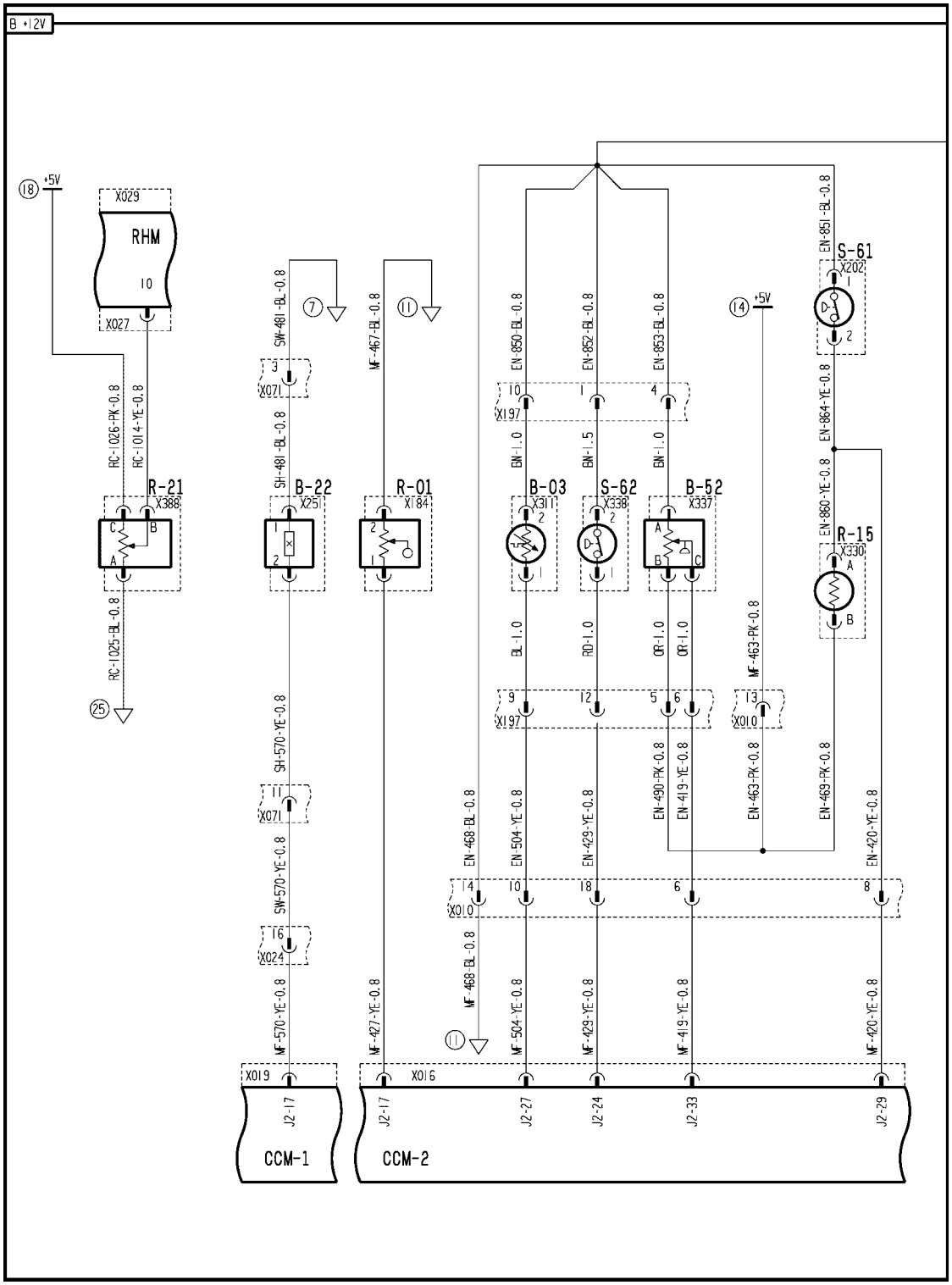
https://truckmanualshub.com/

A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)

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AFXSCHEM04A-04 1

FRAME 4 - ENGINE

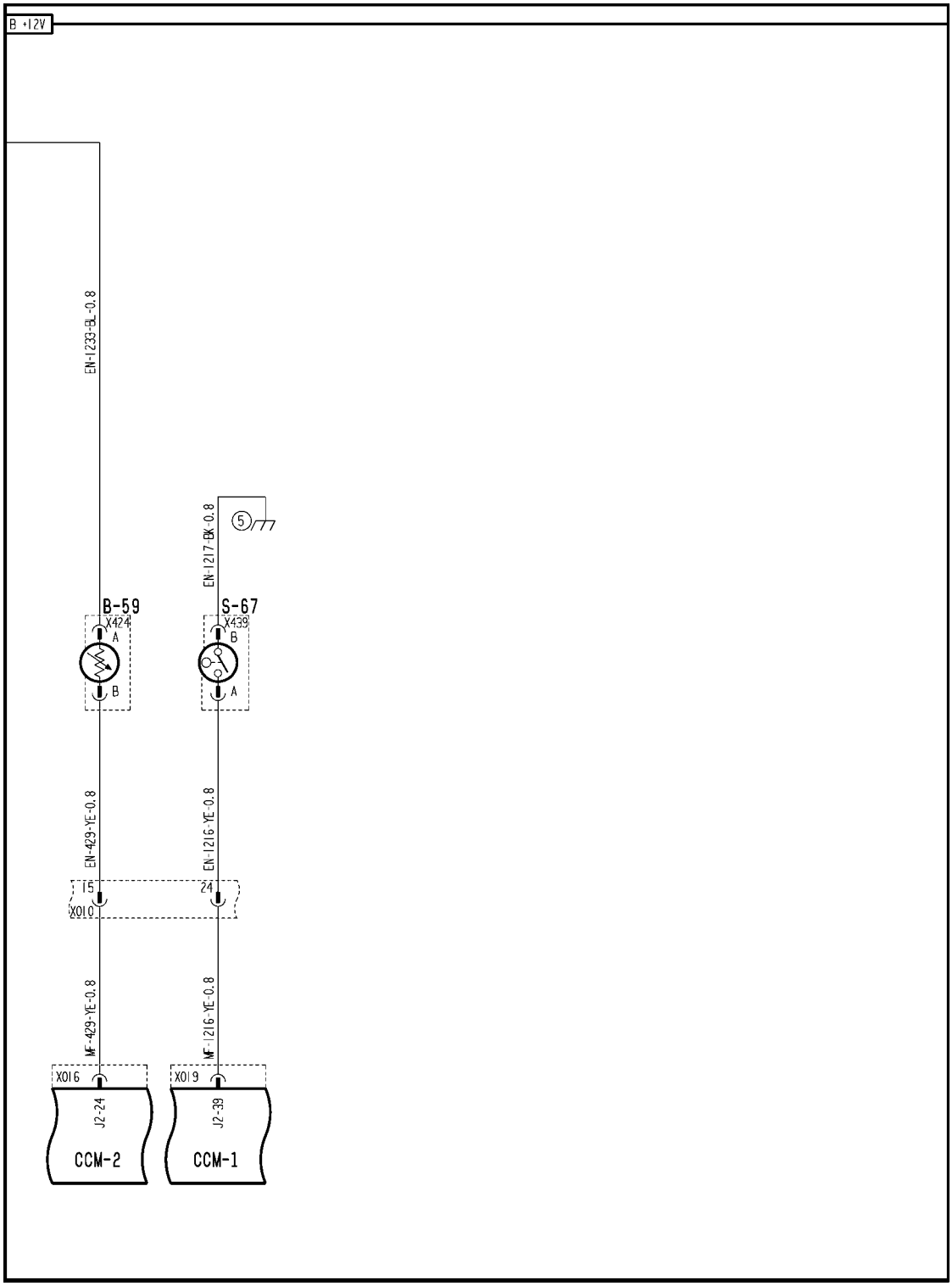
https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

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Wiring harness - Electrical schematic frame 05 (A.30.A.88 - C.20.E.05)

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AFXSCHEM05A-04 1

FRAME 5 - ENGINE

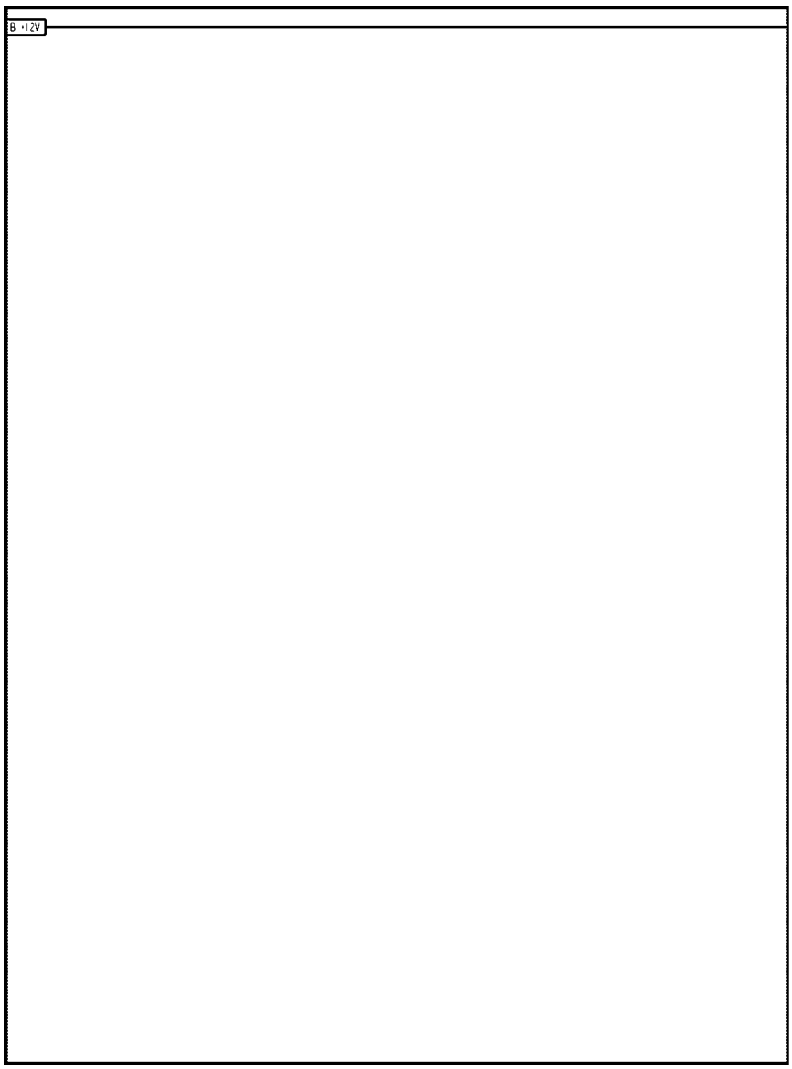
https://truckmanualshub.com/

B-59 Water in Fuel	S-67 Coolant Level Switch	

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Wiring harness - Electrical schematic frame 06 (A.30.A.88 - C.20.E.06)

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AFXSCHEM06A-04 1

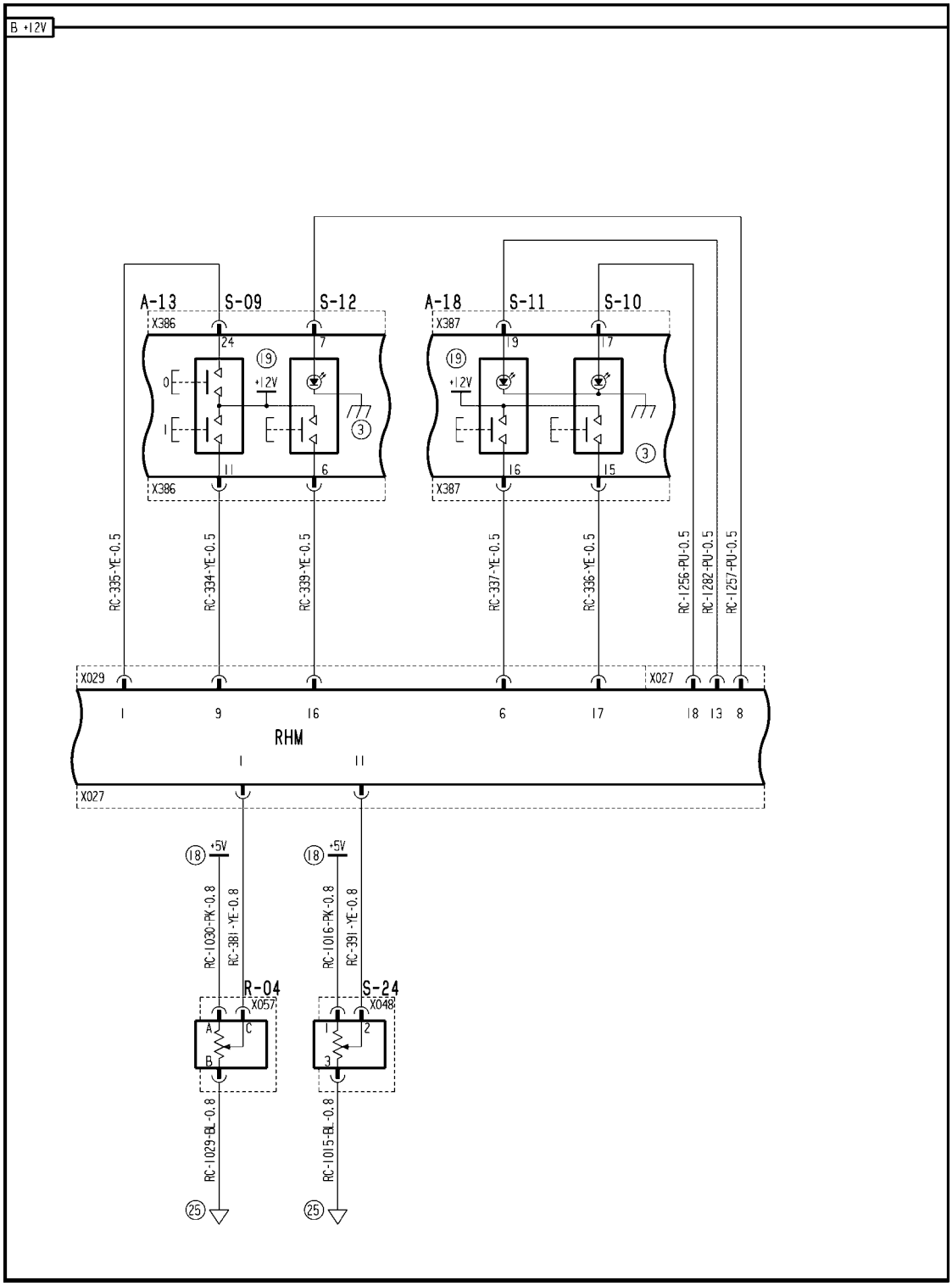
FRAME 6 - BLANK

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Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)

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AFXSCHEM07-04 1

FRAME 7 - DRIVES

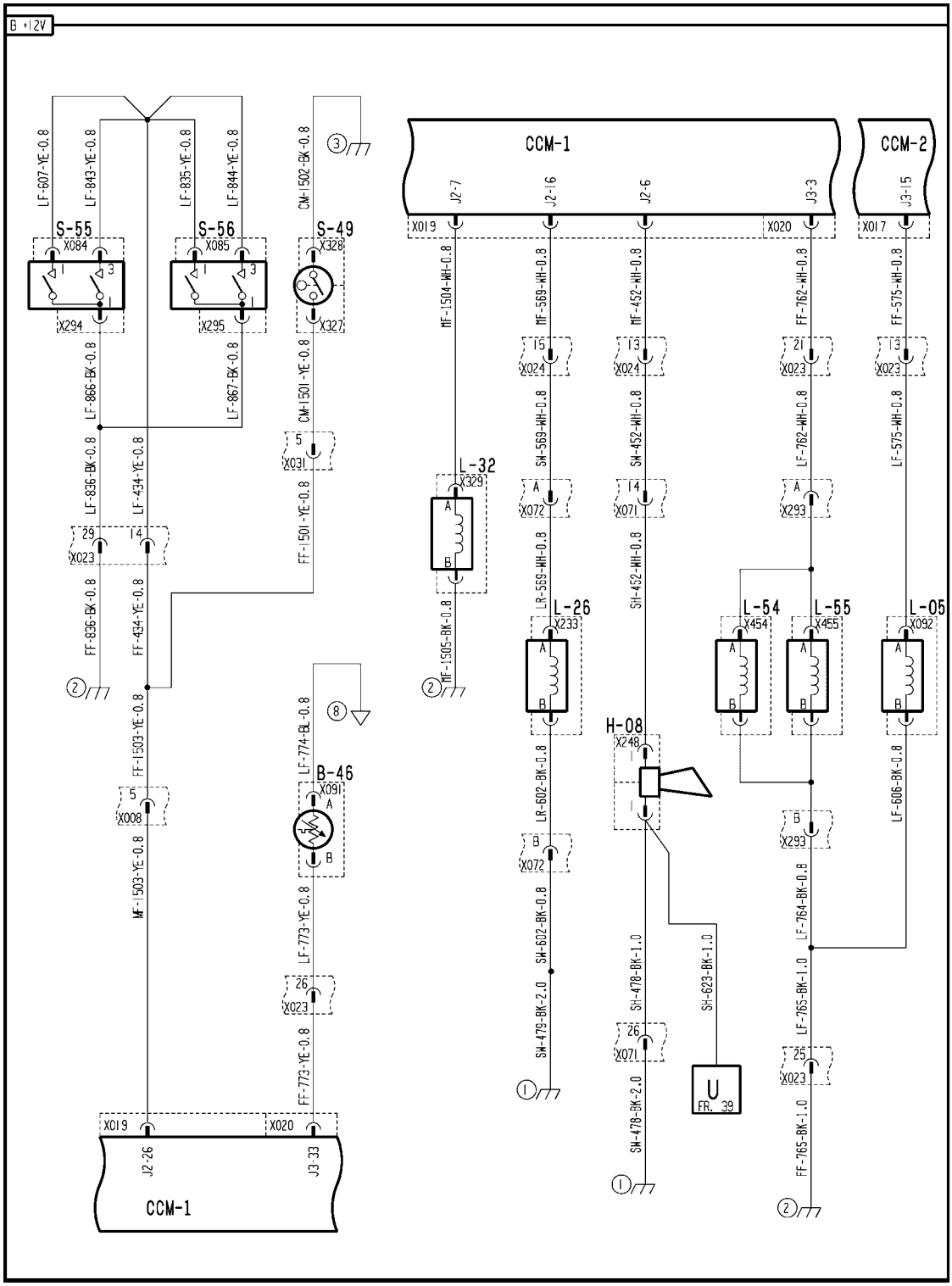
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A-13 Front Switch Panel	A-18 Rear Switch Panel	R-04 Ground Speed Potentiometer
S-09 Park Brake	S-10 Rear Wheel Assist	S-11 Rear Wheel Assist Hi/Low
S-12 Road Mode Switch	S-24 Gear Select	

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)

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AFXSCHEM08-04 1

FRAME 8 - DRIVES

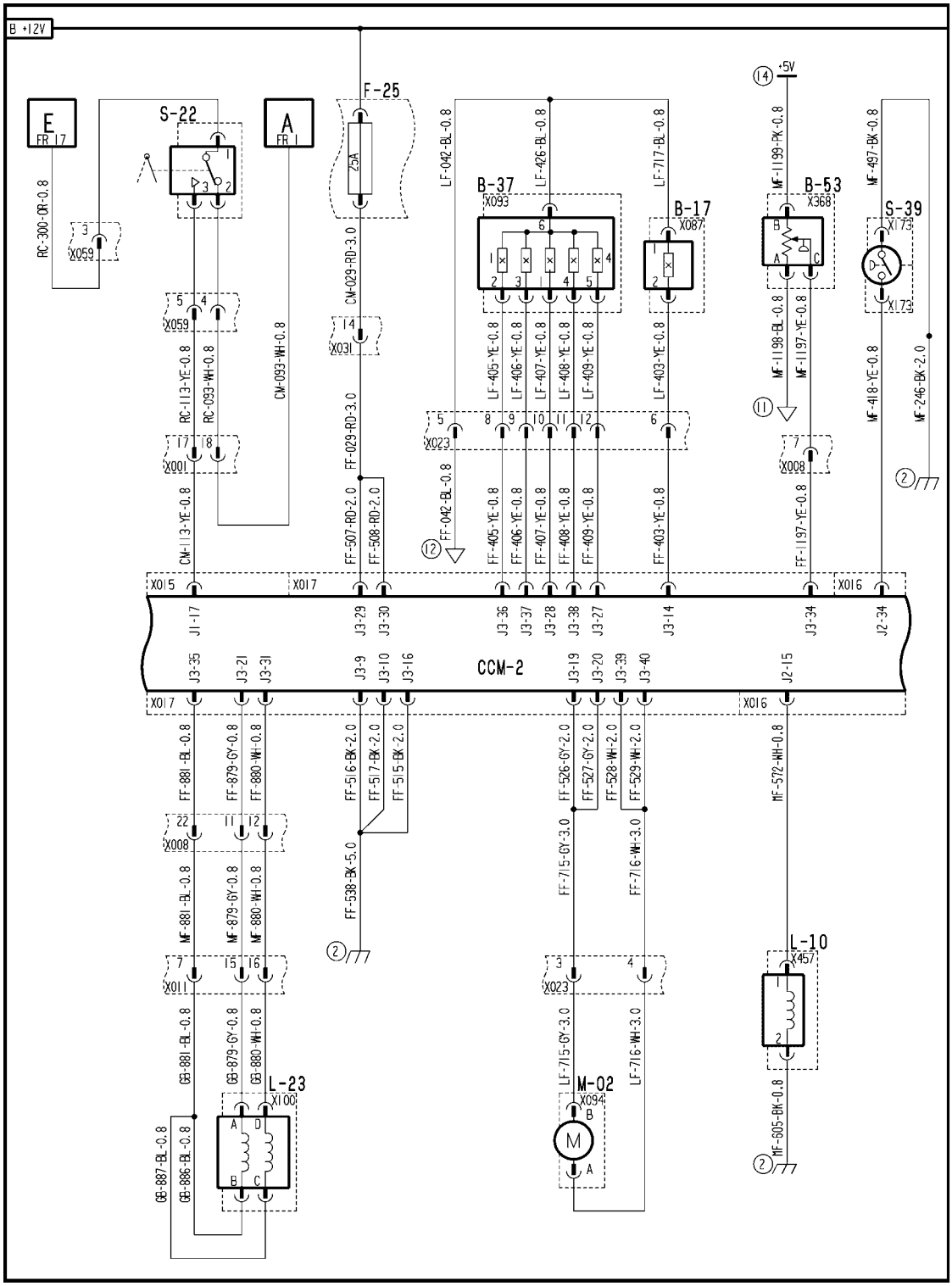
https://truckmanualshub.com/

B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)

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AFXSCHEM09-04 1

FRAME 9 - DRIVES

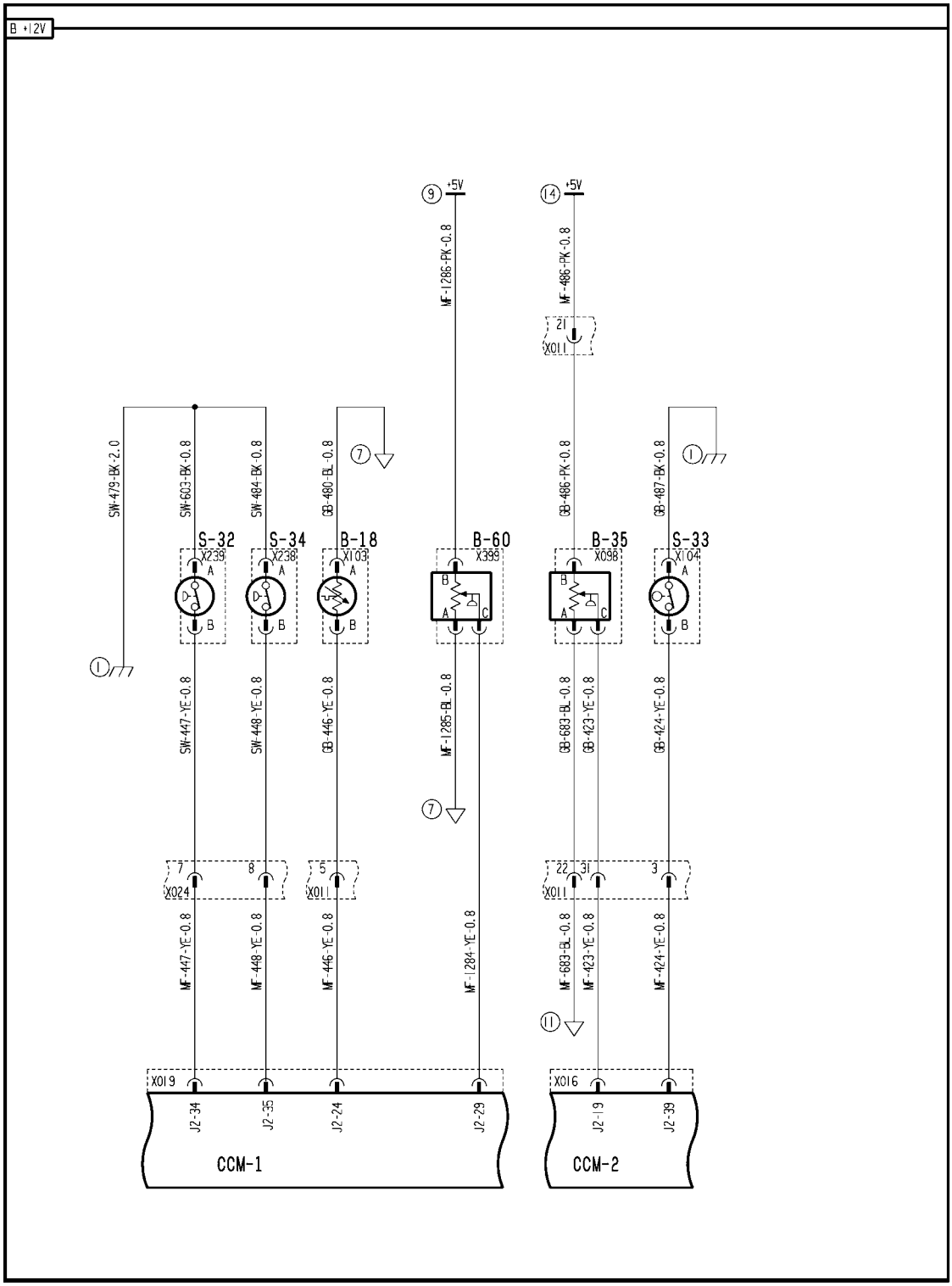
https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)

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AFXSCHEM10-04 1

FRAME 10 - HYDRAULIC

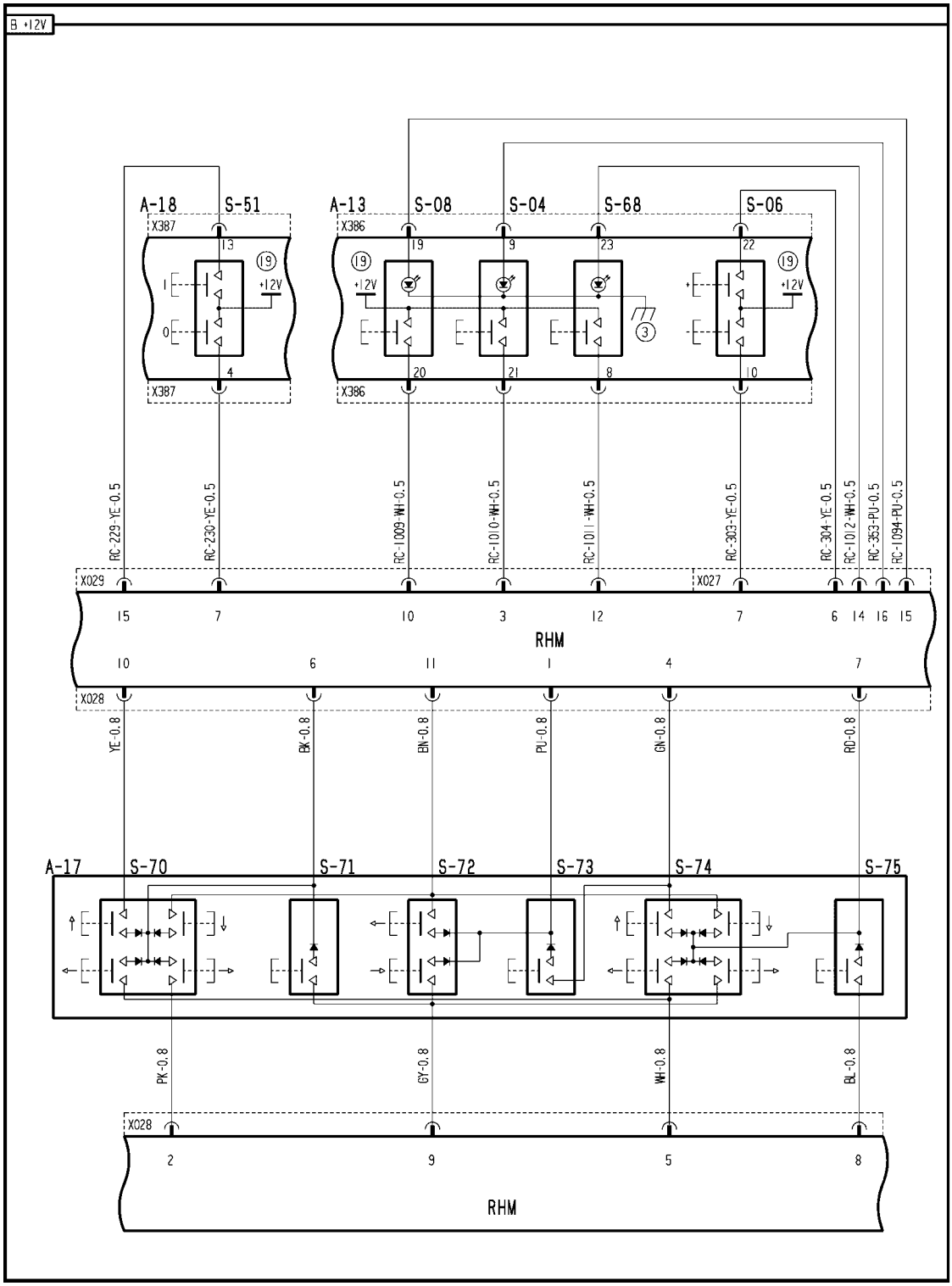
https://truckmanualshub.com/

B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

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Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11)

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AFXSCHEM11-04 1

FRAME 11 - HEADER

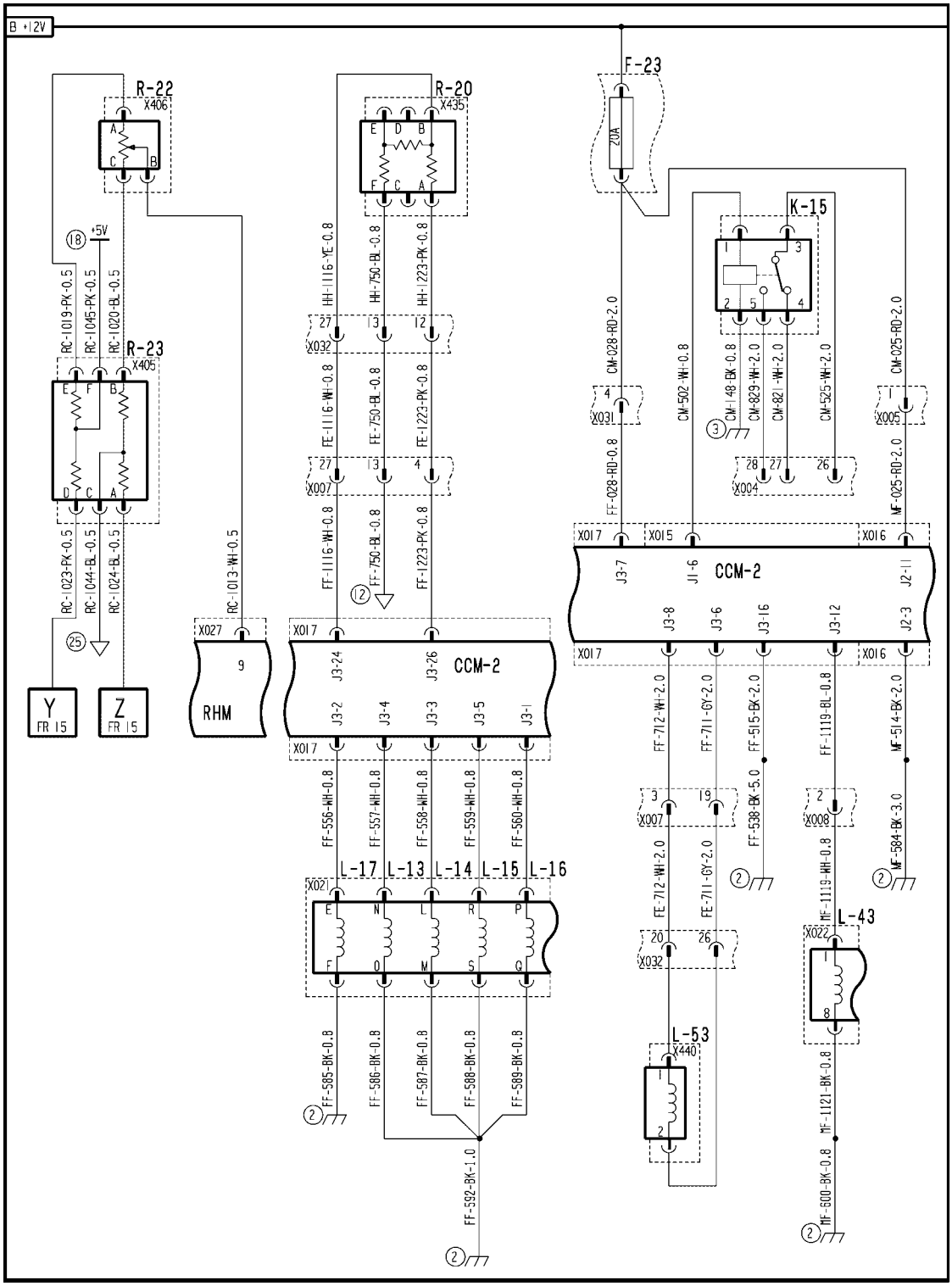
https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	A-17 Propulsion Handle
S-04 Header Height Mode 1	S-06 Header Height Control Fine Adjust	S-08 Reel Speed Mode
S-51 Vertical Knives	S-68 Header Height Mode 2	S-70 Header Position
S-71 Header Resume	S-72 Unload Swing	S-73 Unload Engage
S-74 Reel Position	S-75 Emergency Stop	

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)

AFX8010



AFXSCHEM12-04 1

FRAME 12 - HEADER

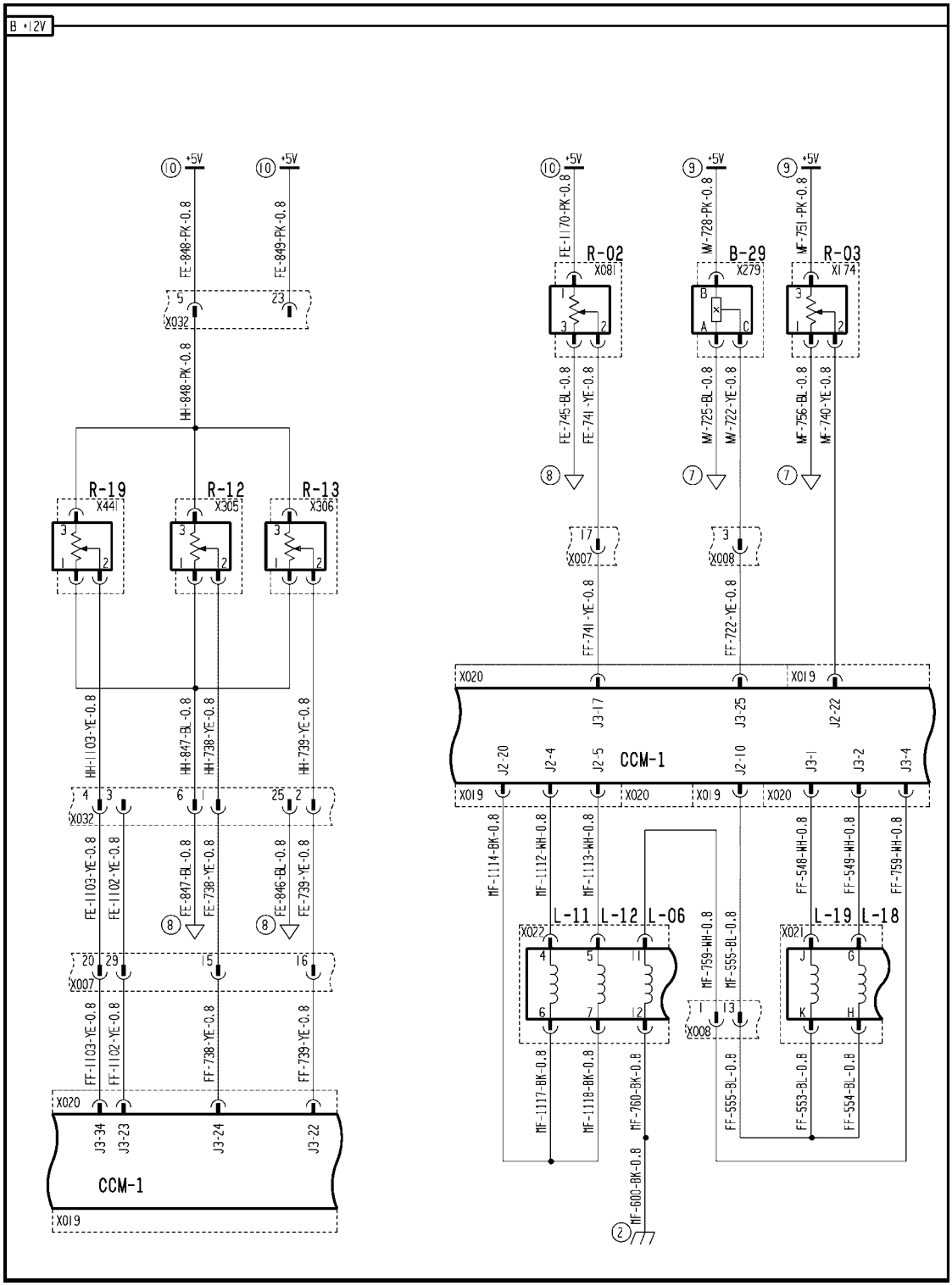
https://truckmanualshub.com/

F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)

AFX8010



AFXSCHEM13-04 1

FRAME 13 - HEADER

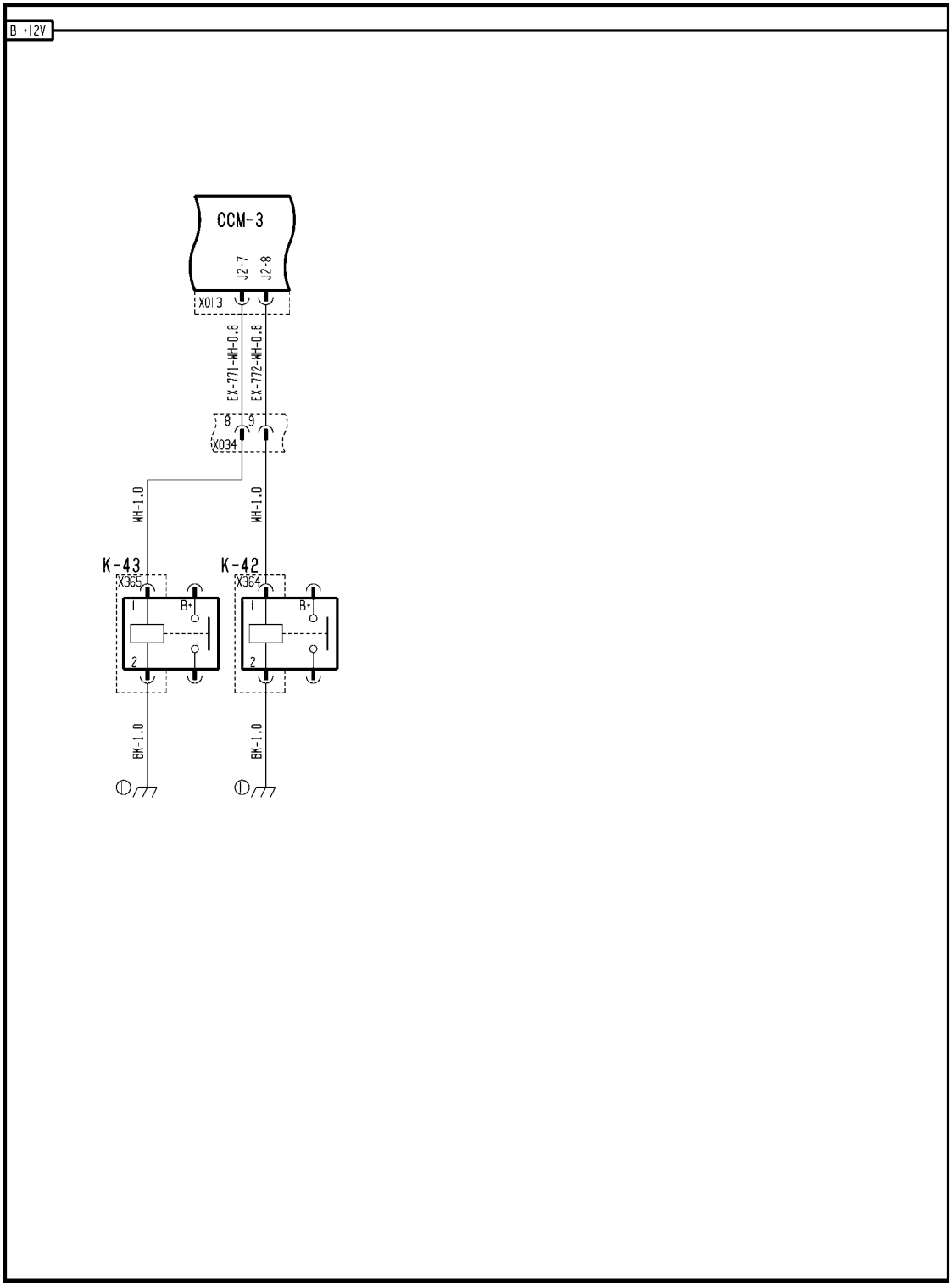
https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Wiring harness - Electrical schematic frame 14 (A.30.A.88 - C.20.E.14)

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AFXSCHEM14-04 1

FRAME 14 - HEADER

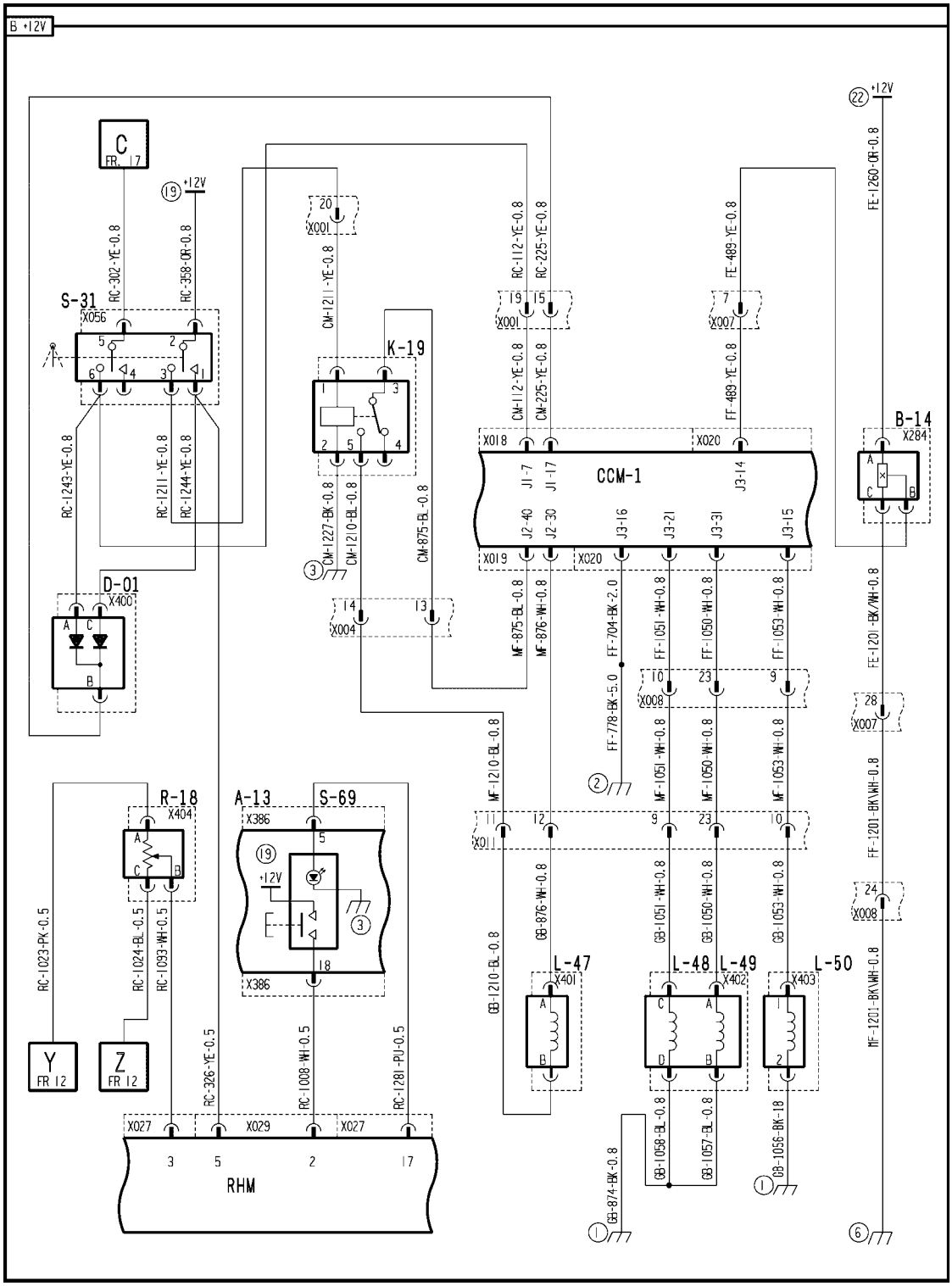
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K-42 RH Vertical Knife Relay (Optional)	K-43 LH Vertical Knife Relay (Optional)	

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)

AFX8010



AFXSCHEM15-04 1

FRAME 15 - FEEDER

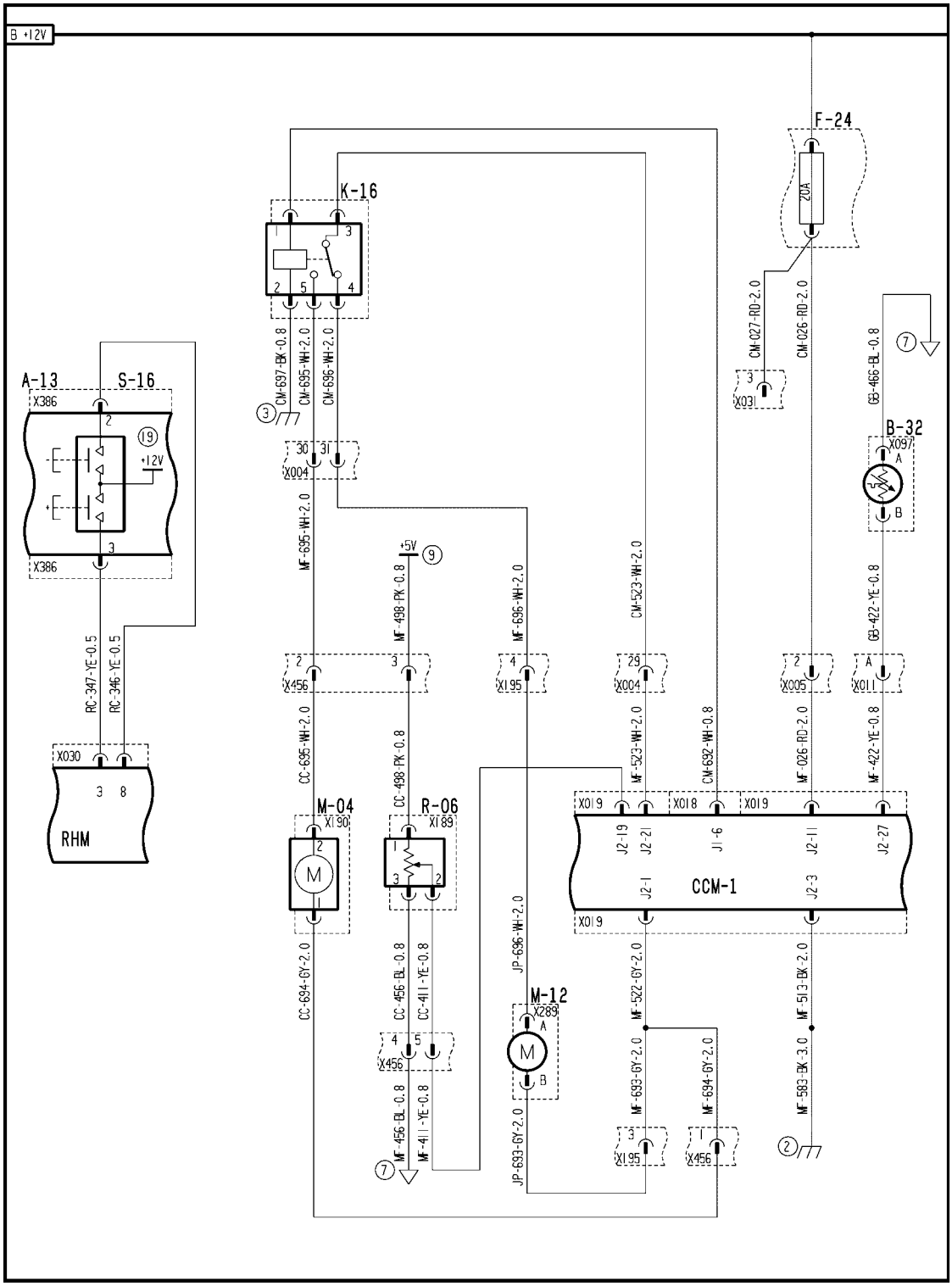
https://truckmanualshub.com/

A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)

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AFXSCHEM16-04 1

FRAME 16 - THRESHER

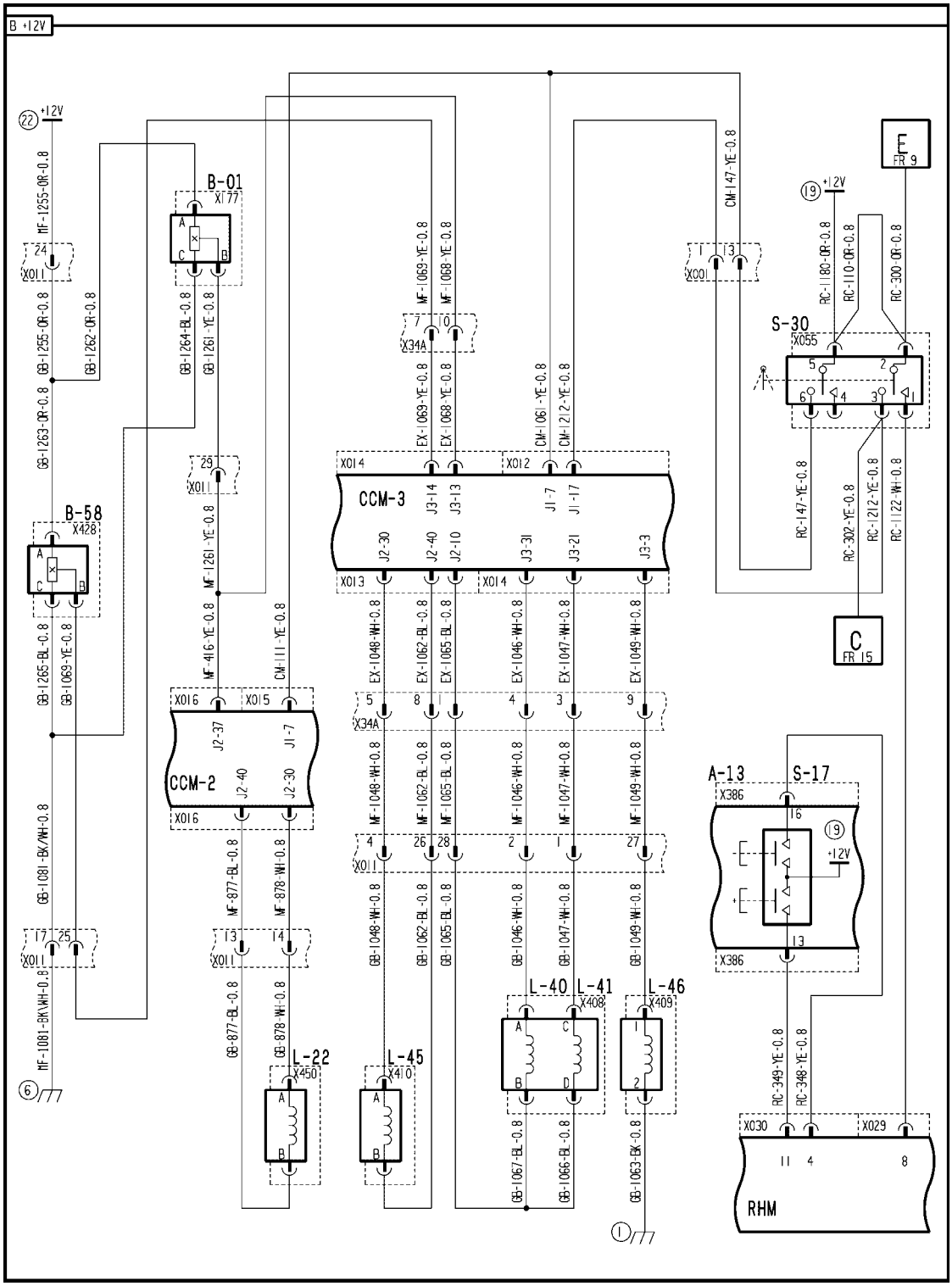
https://truckmanualshub.com/

A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)

AFX8010



AFXSCHEM17-04 1

FRAME 17 - THRESHER

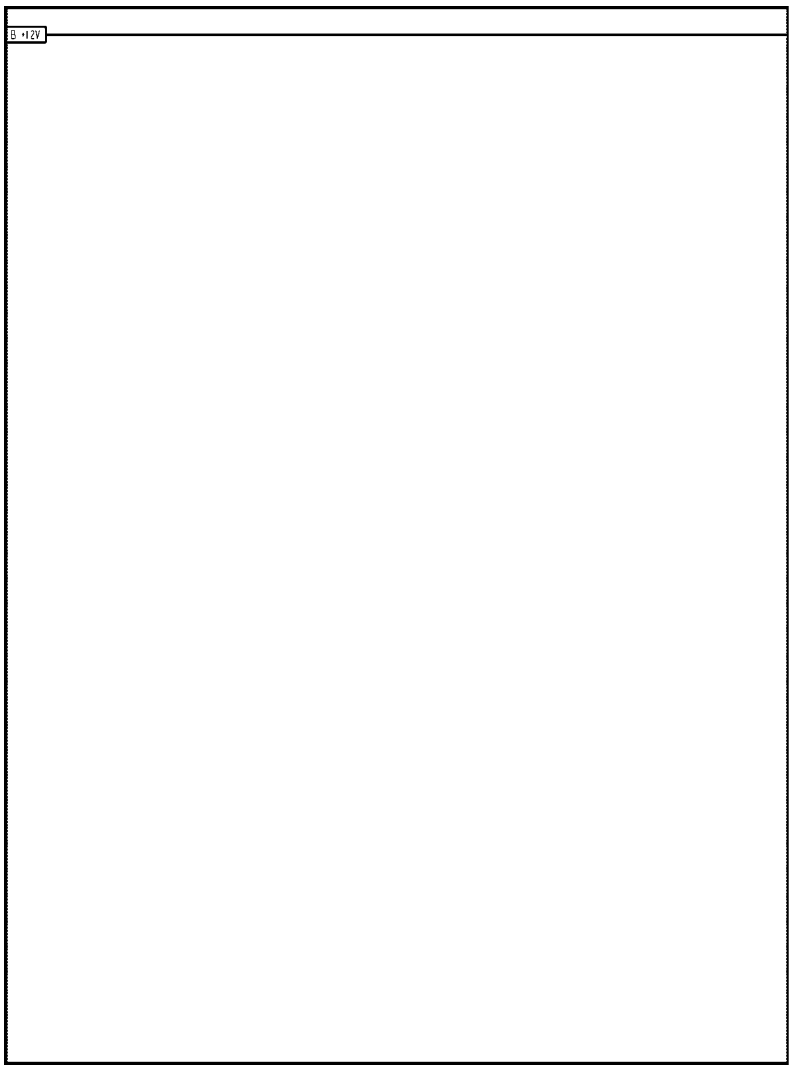
https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Wiring harness - Electrical schematic frame 18 (A.30.A.88 - C.20.E.18)

AFX8010



AFXSCHEM18-04 1

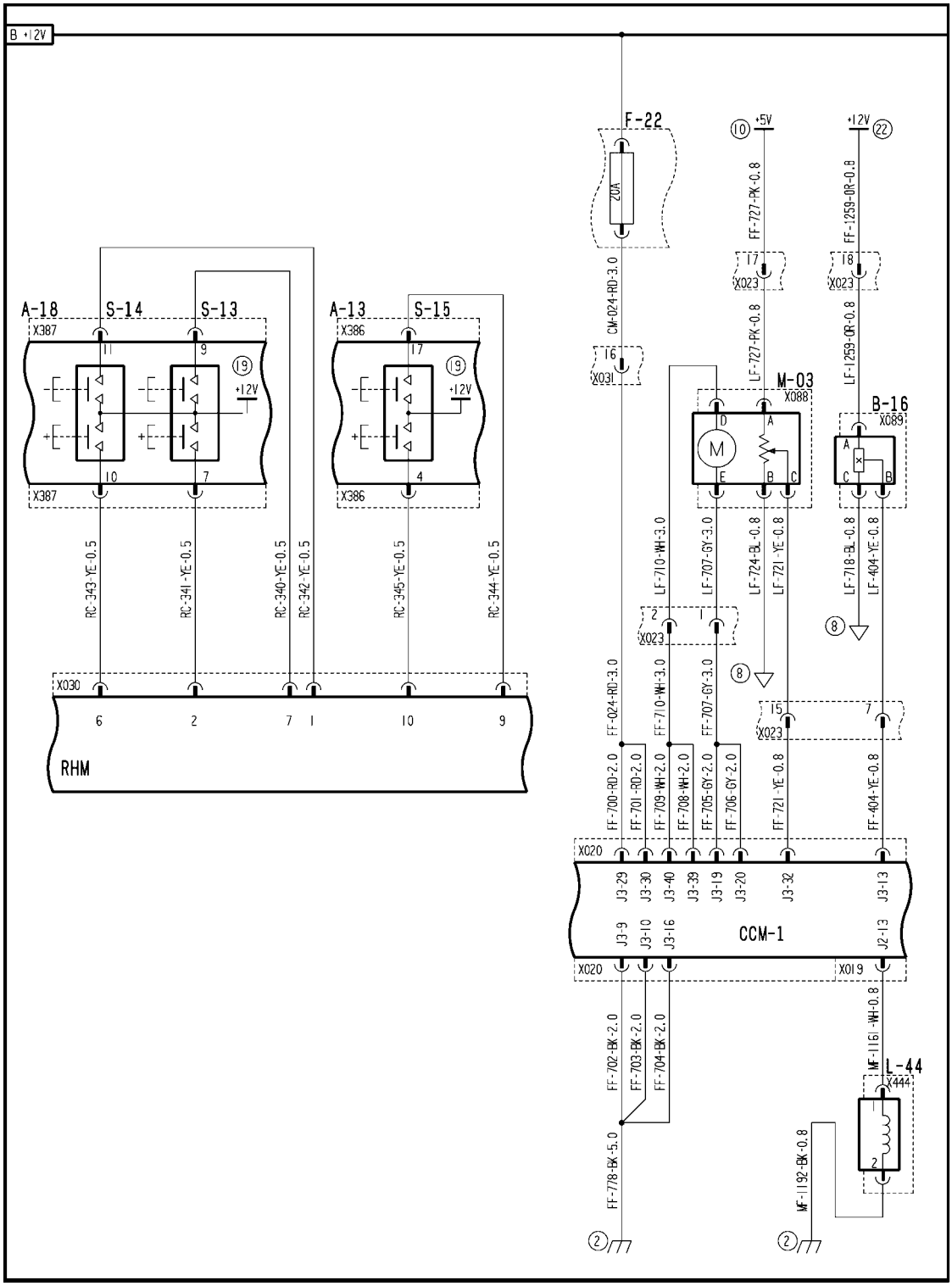
FRAME 18 - BLANK

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)

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AFXSCHEM19-04 1

FRAME 19 - CLEANING

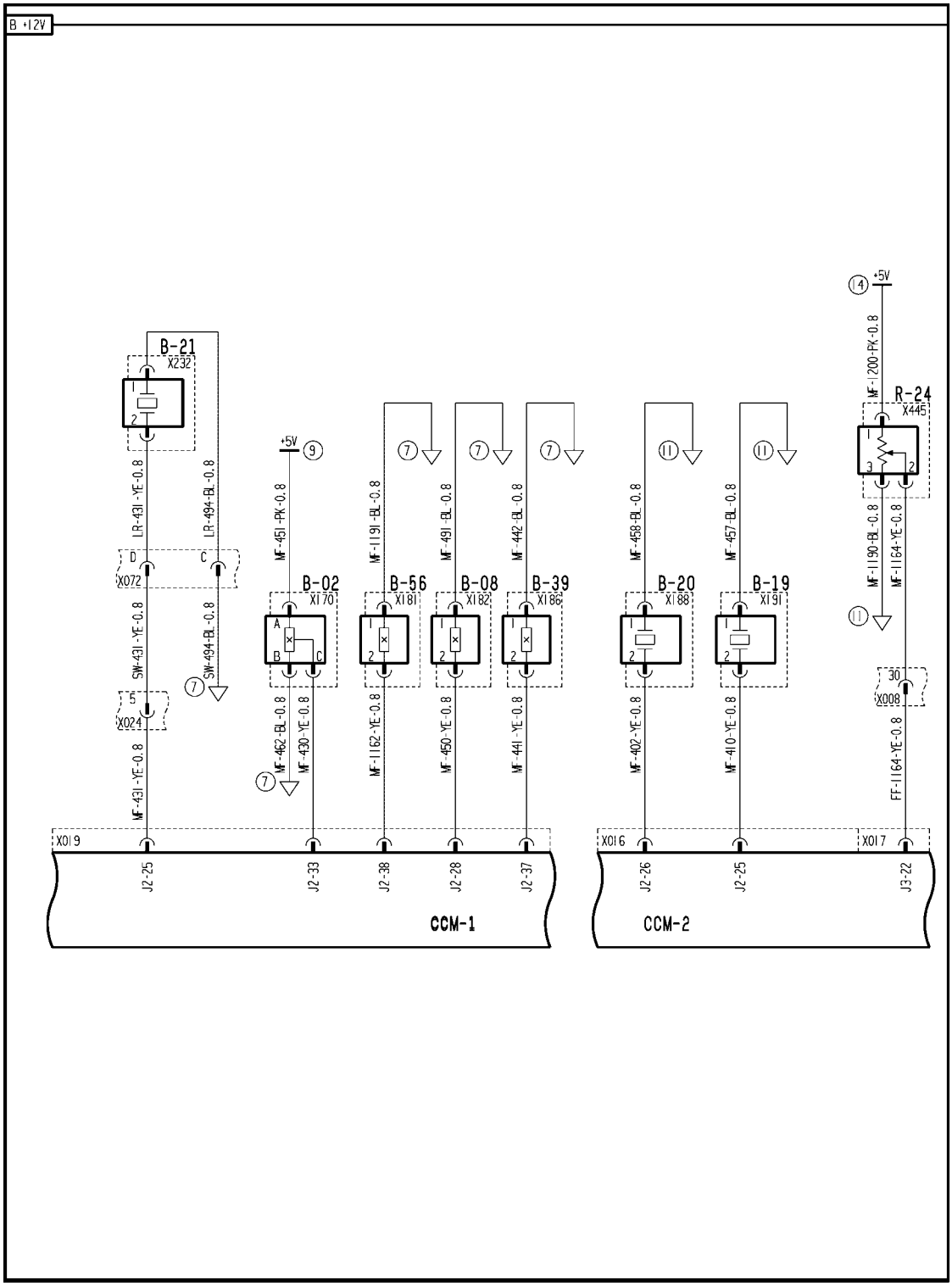
https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)

AFX8010



AFXSCHEM20-04 1

FRAME 20 - CLEANING

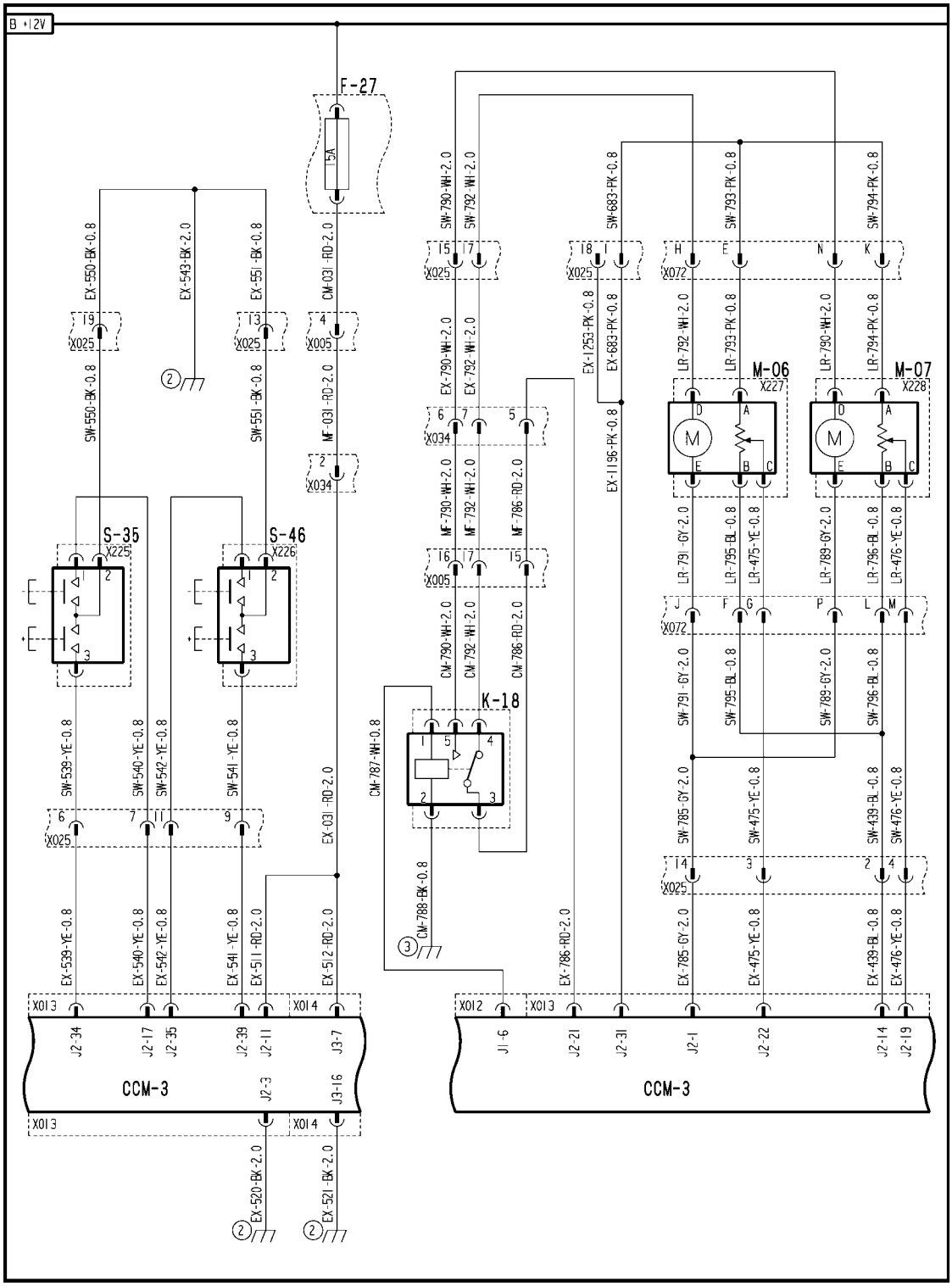
https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)

AFX8010



AFXSCHEM21-04 1

FRAME 21 - CLEANING

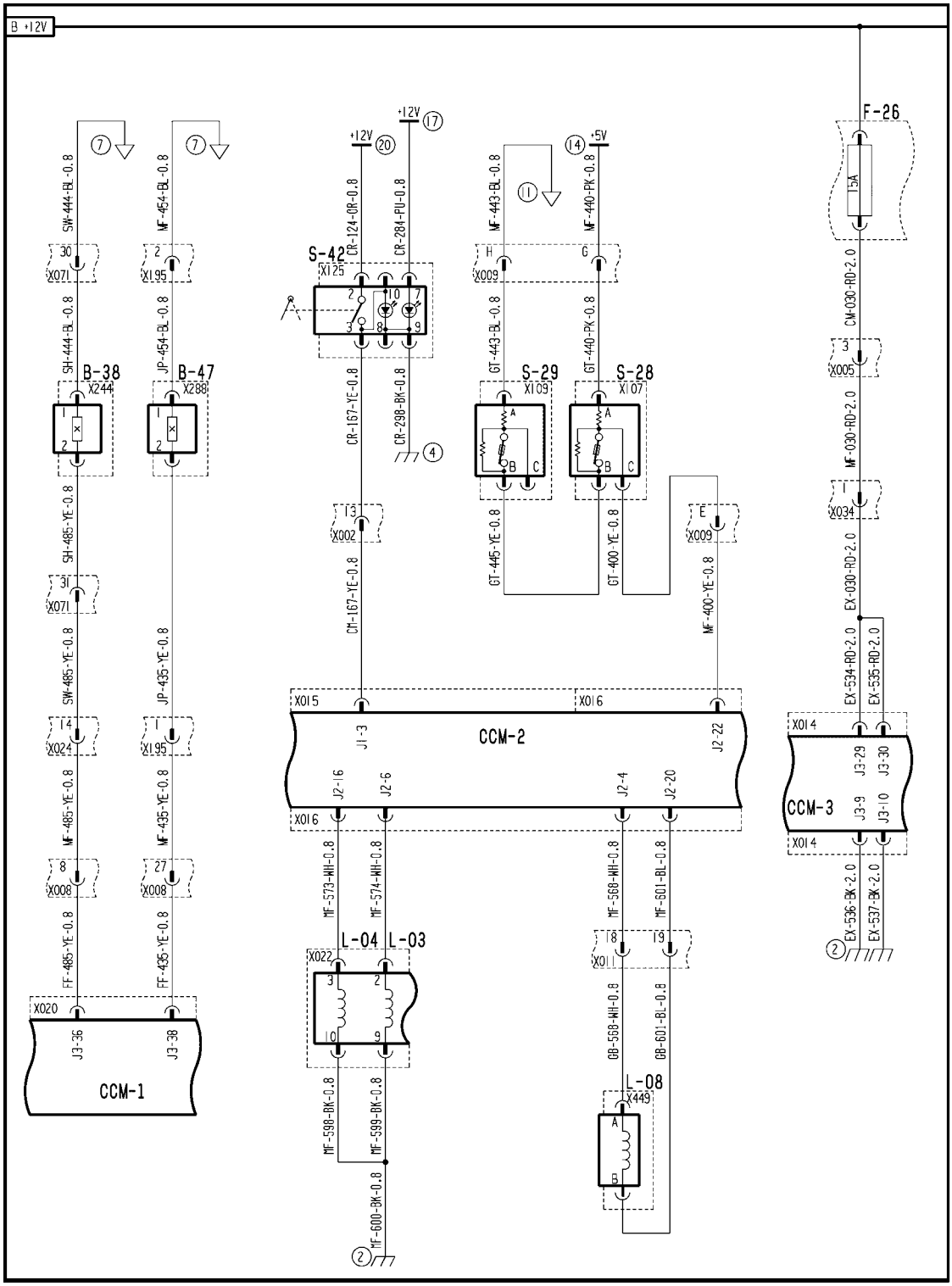
https://truckmanualshub.com/

F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)

AFX8010



AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)

AFX8010



AFXSCHEM23-04 1

FRAME 23 - TRASH

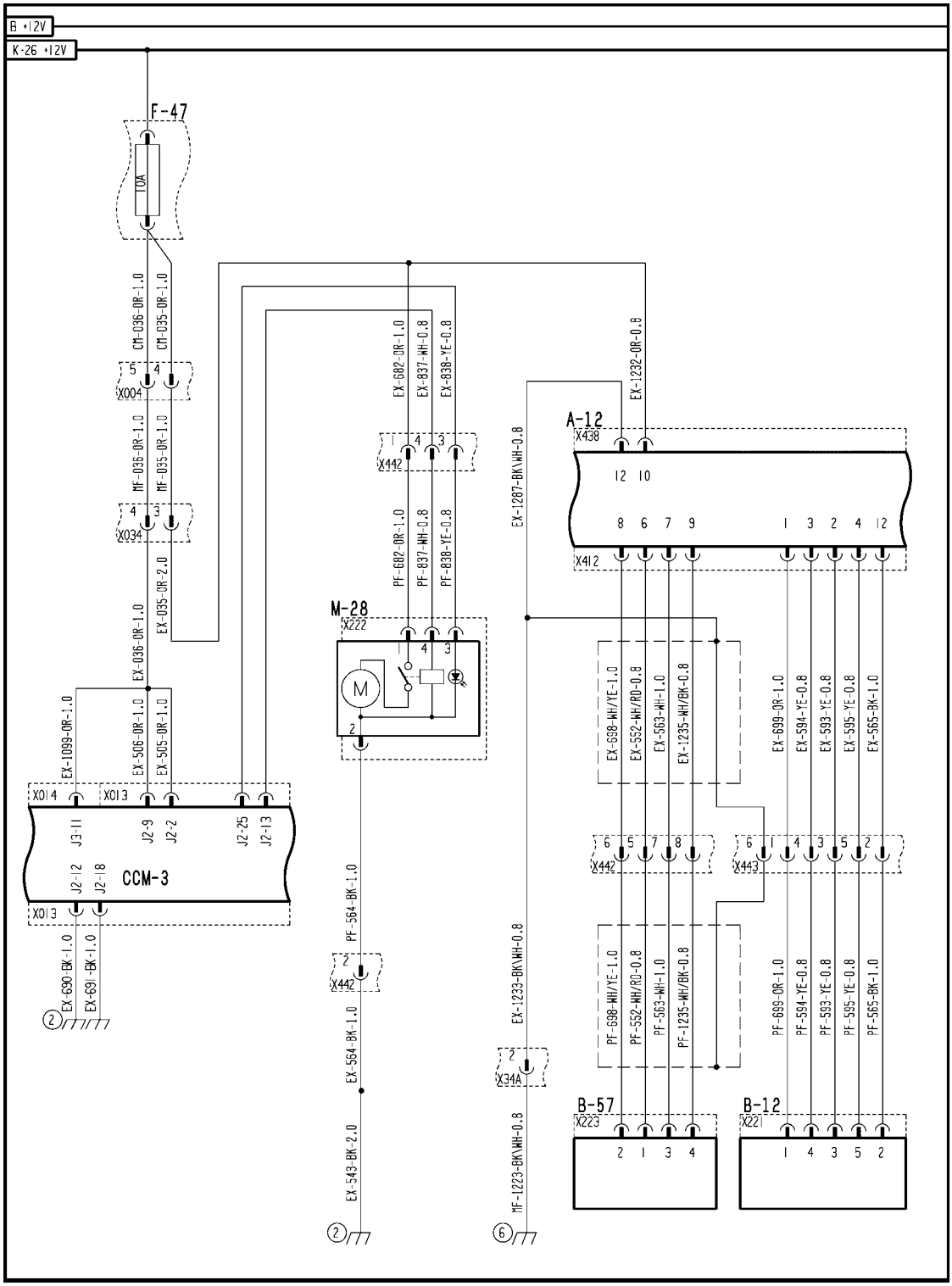
https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)

AFX8010



AFXSCHEM24-04 1

FRAME 24 - PRECISION

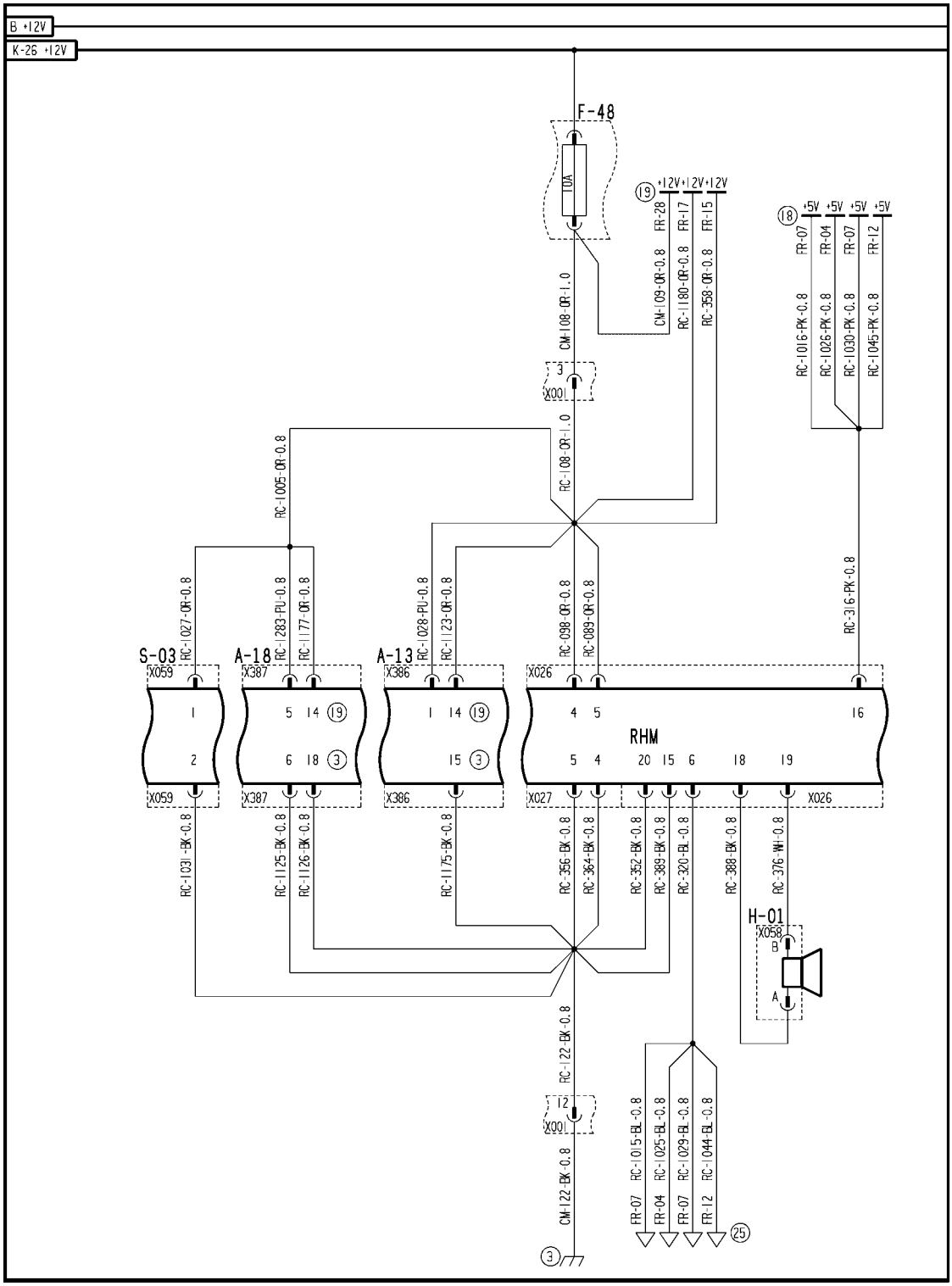
https://truckmanualshub.com/

A-12 YMIU Module	B-12 Moisture Sensor	B-57 Yield Sensor
F-47 CCM3 Fuse	M-28 Sample Motor	

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)

AFX8010



AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

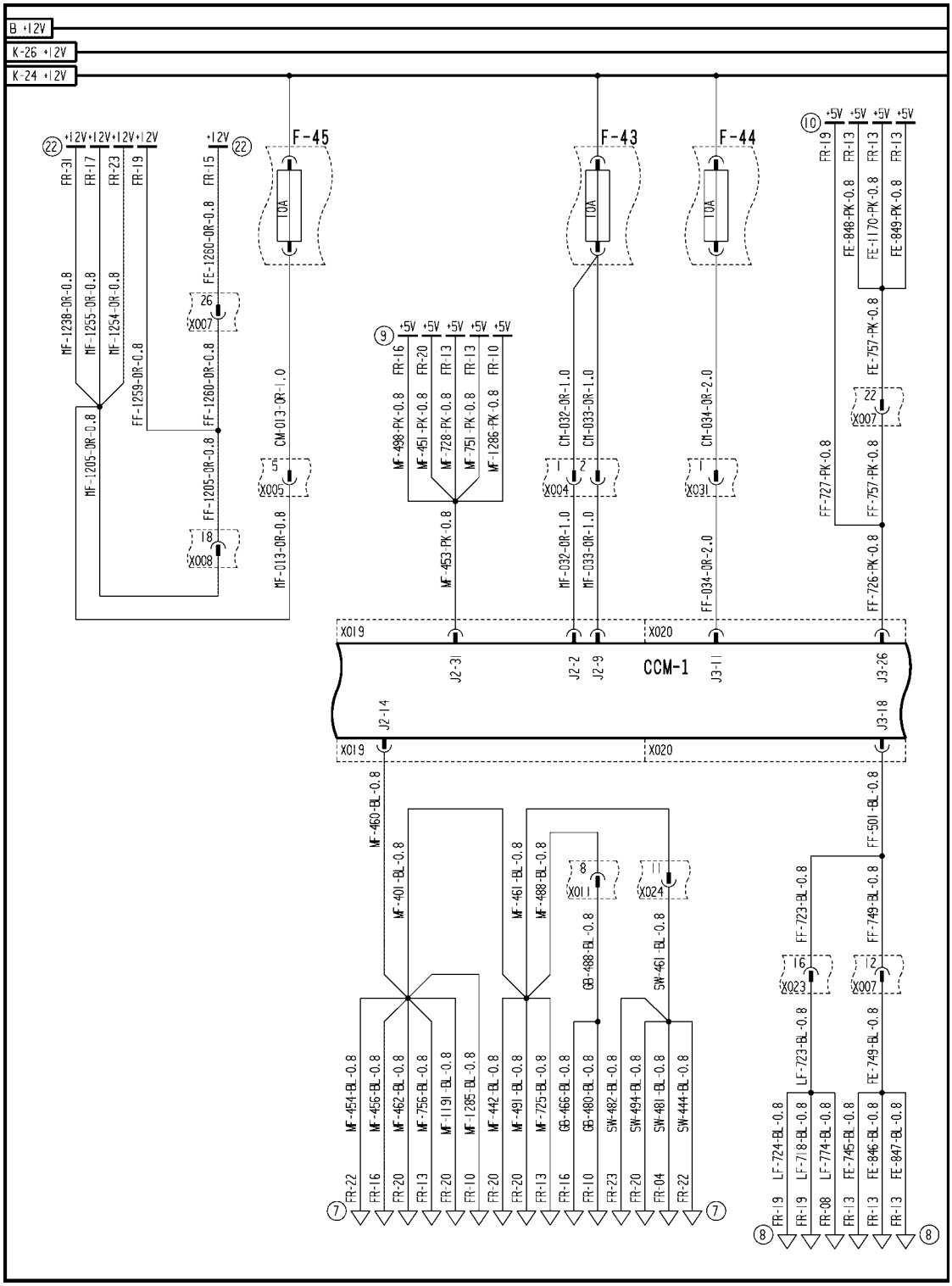
https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

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Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)

AFX8010



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

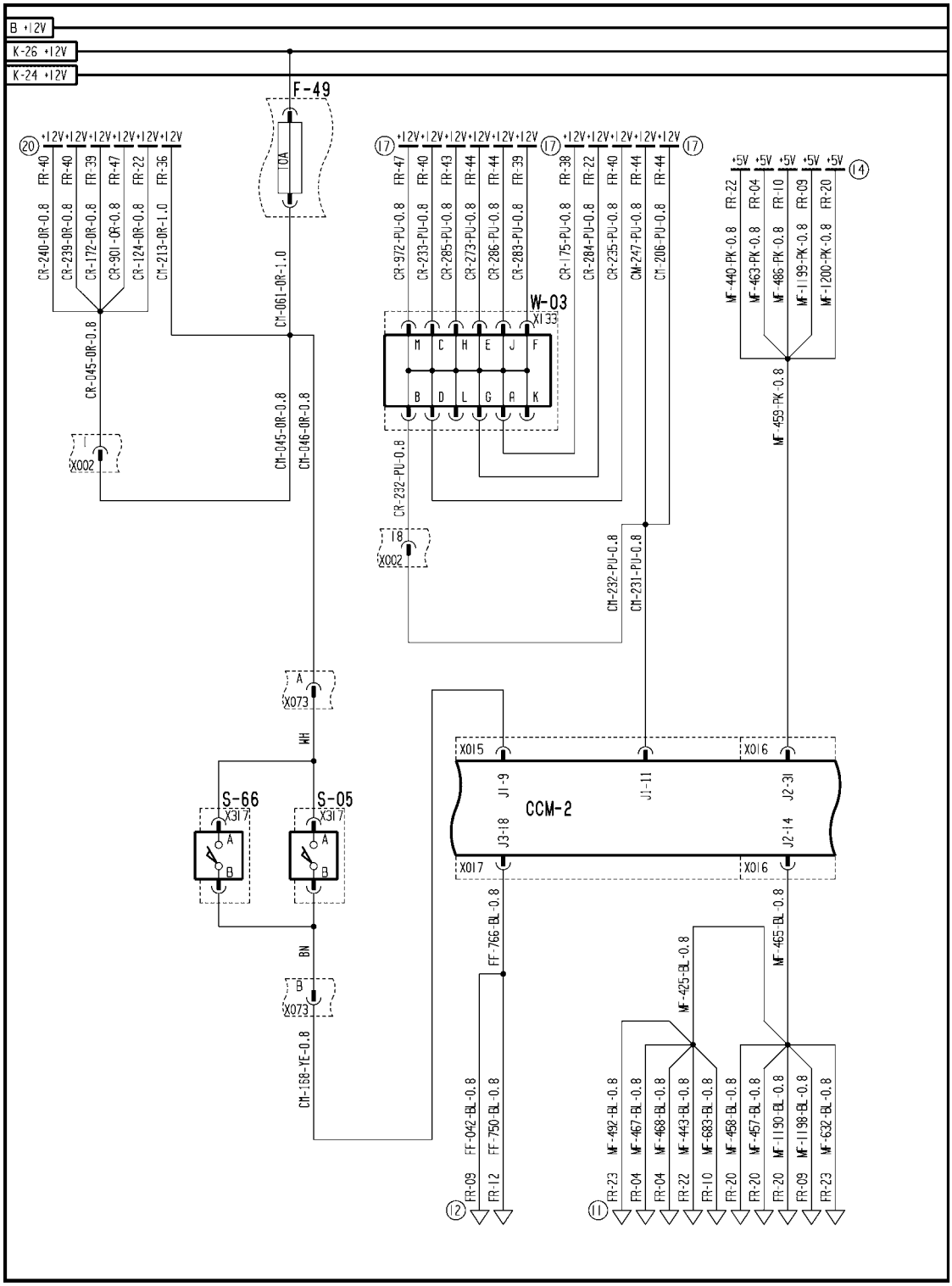
https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)

AFX8010



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

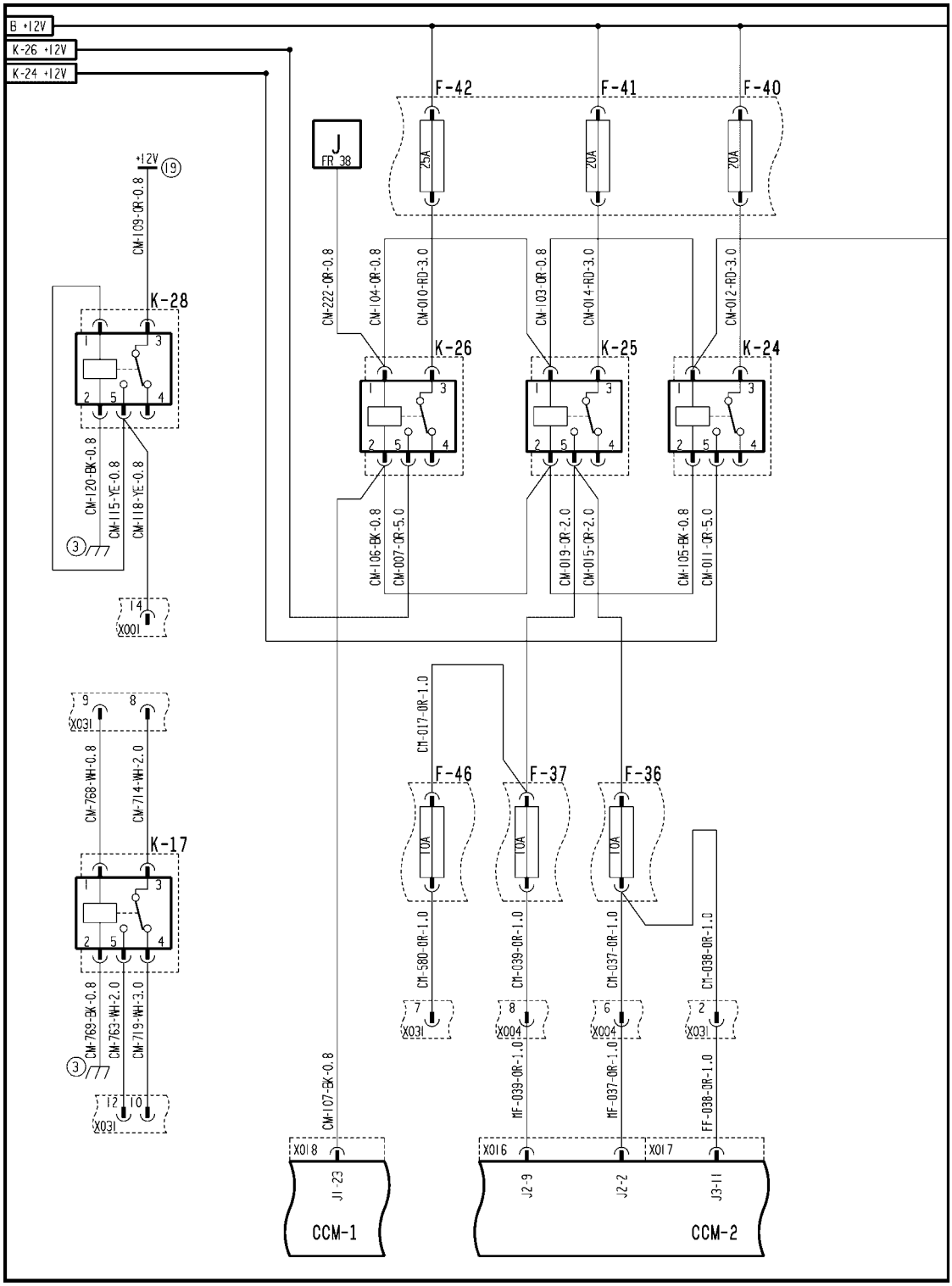
https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)

AFX8010



AFXSCHEM28-04 1

FRAME 28 - DISTRIBUTION

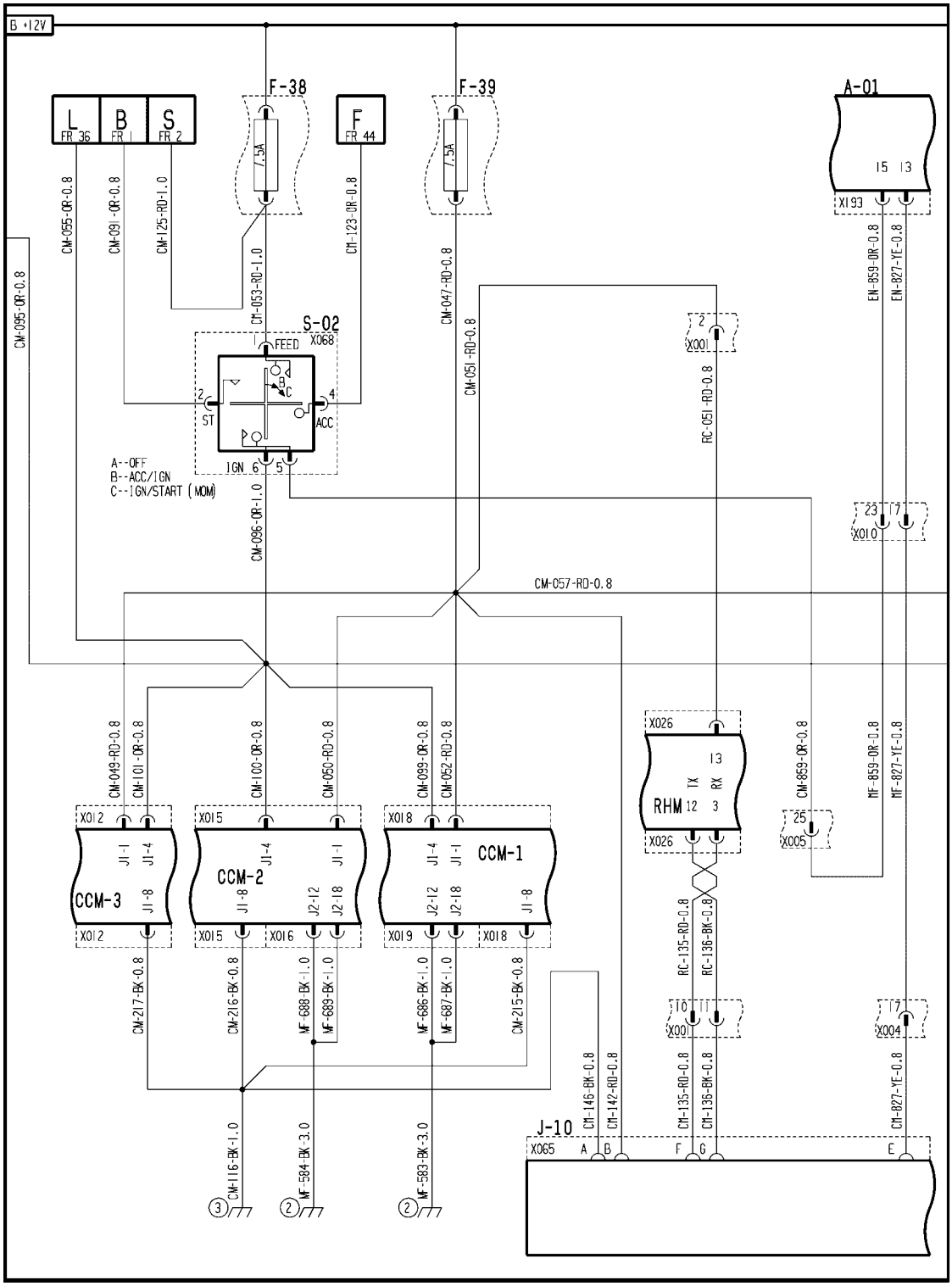
https://truckmanualshub.com/

F-36 CCM2a Fuse	F-37 CCM2b Fuse	F-40 CCM1 Power Fuse
F-41 CCM2 Power Fuse	F-42 CCM3, Cab Power Fuse	F-46 Not Used
K-17 Not Used	K-24 CCM1 Power Relay	K-25 CCM2 Power Relay
K-26 CCM3, Cab Power Relay	K-28 Not Used	

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)

AFX8010



AFXSCHEM29A-04 1

FRAME 29 - DISTRIBUTION

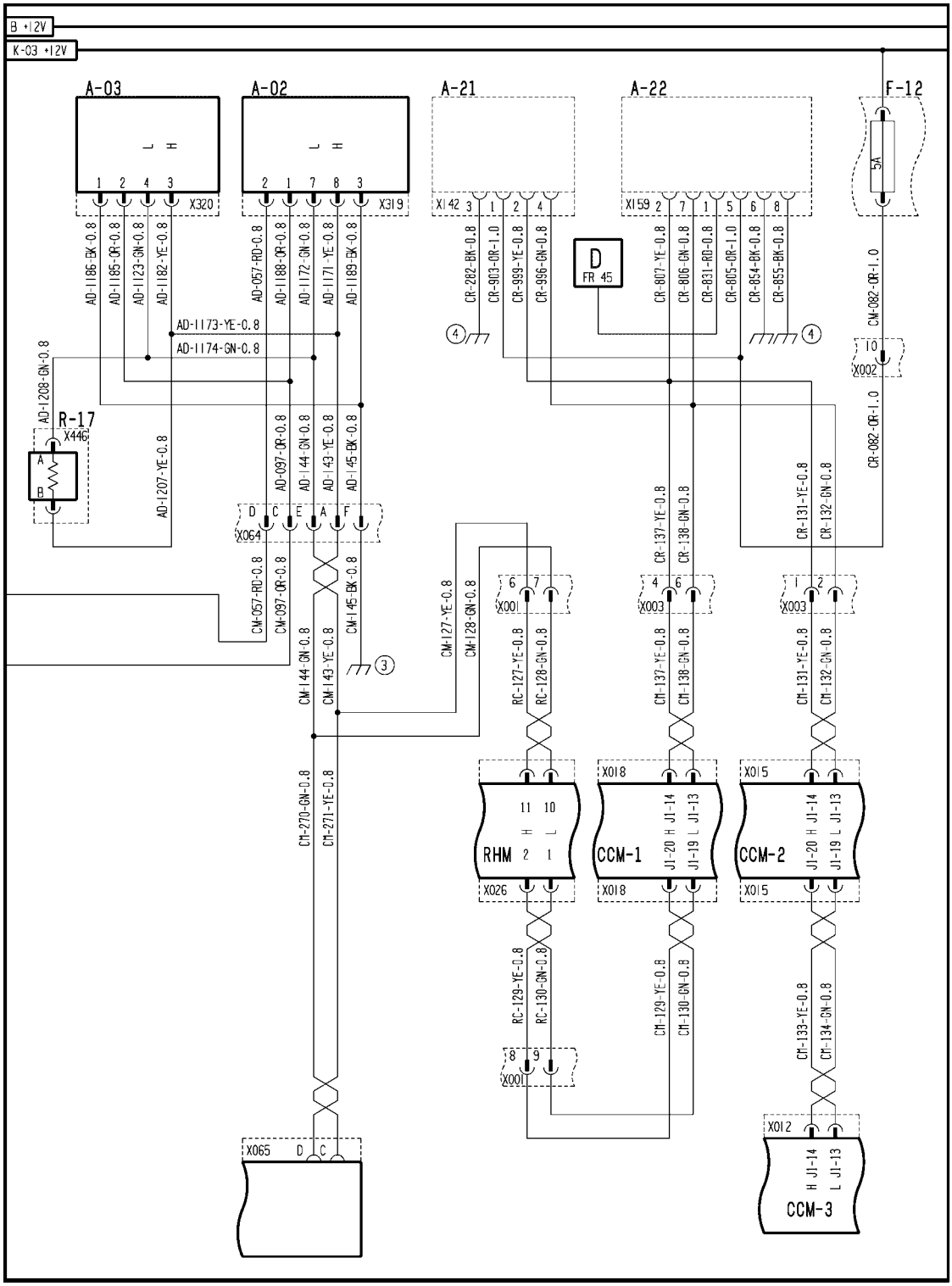
https://truckmanualshub.com/

A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)

AFX8010



AFXSCHEM30-04 1

FRAME 30 - DISTRIBUTION

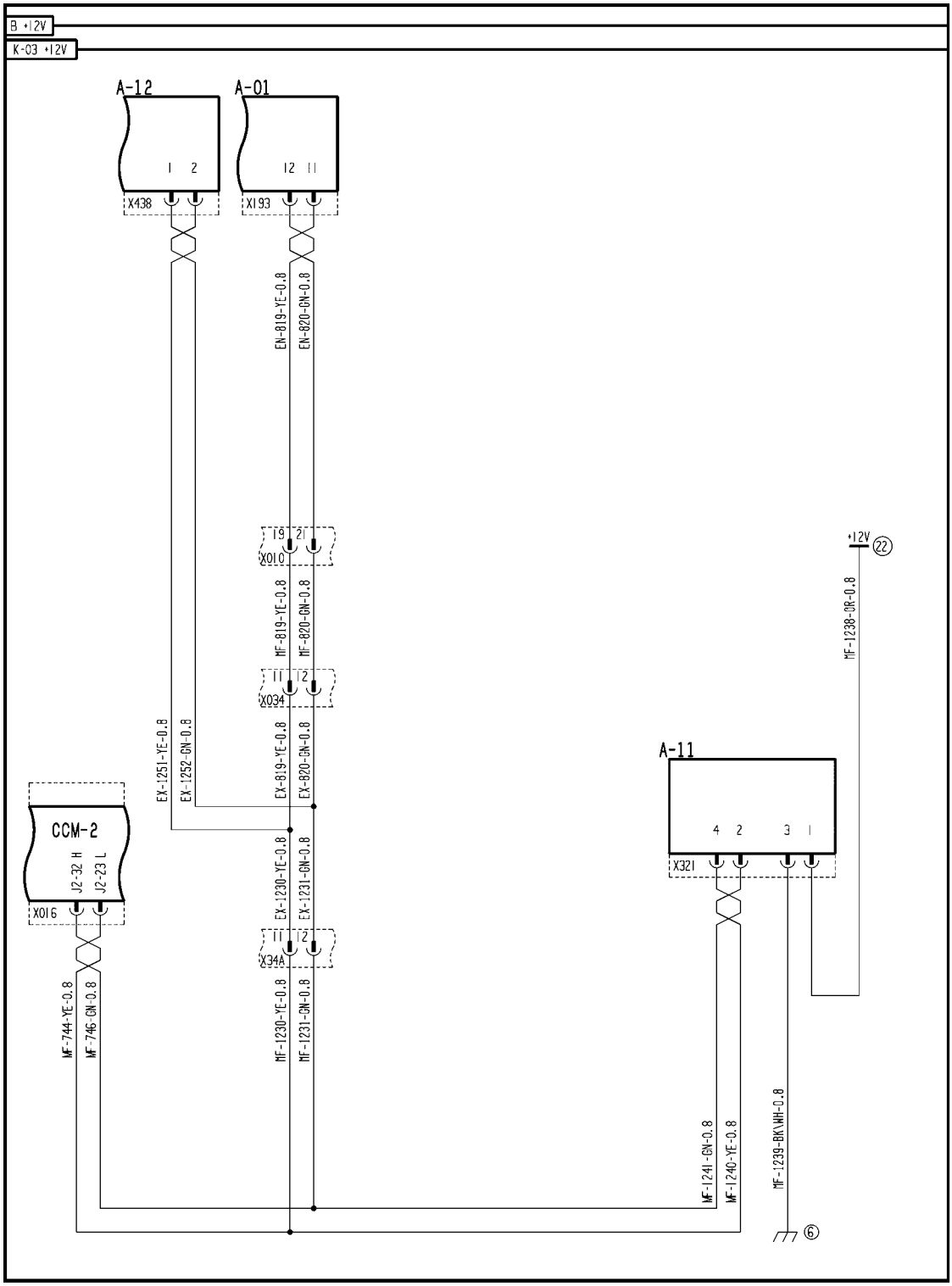
https://truckmanualshub.com/

A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 31 (A.30.A.88 - C.20.E.31)

AFX8010



AFXSCHEM31A-04 1

FRAME 31 - DISTRIBUTION

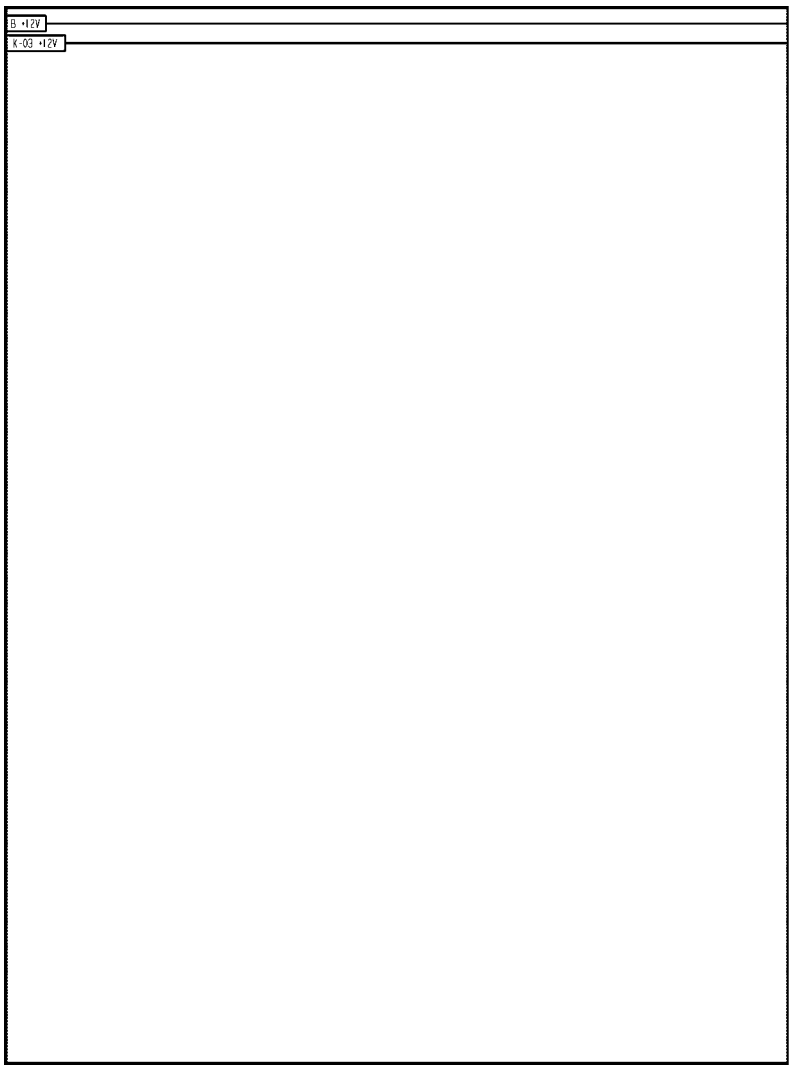
https://truckmanualshub.com/

A-01 Iveco ECU	A-11 GPS Module	A-12 YMIU Module

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 32 (A.30.A.88 - C.20.E.32)

AFX8010



AFXSCHEM32-04 1

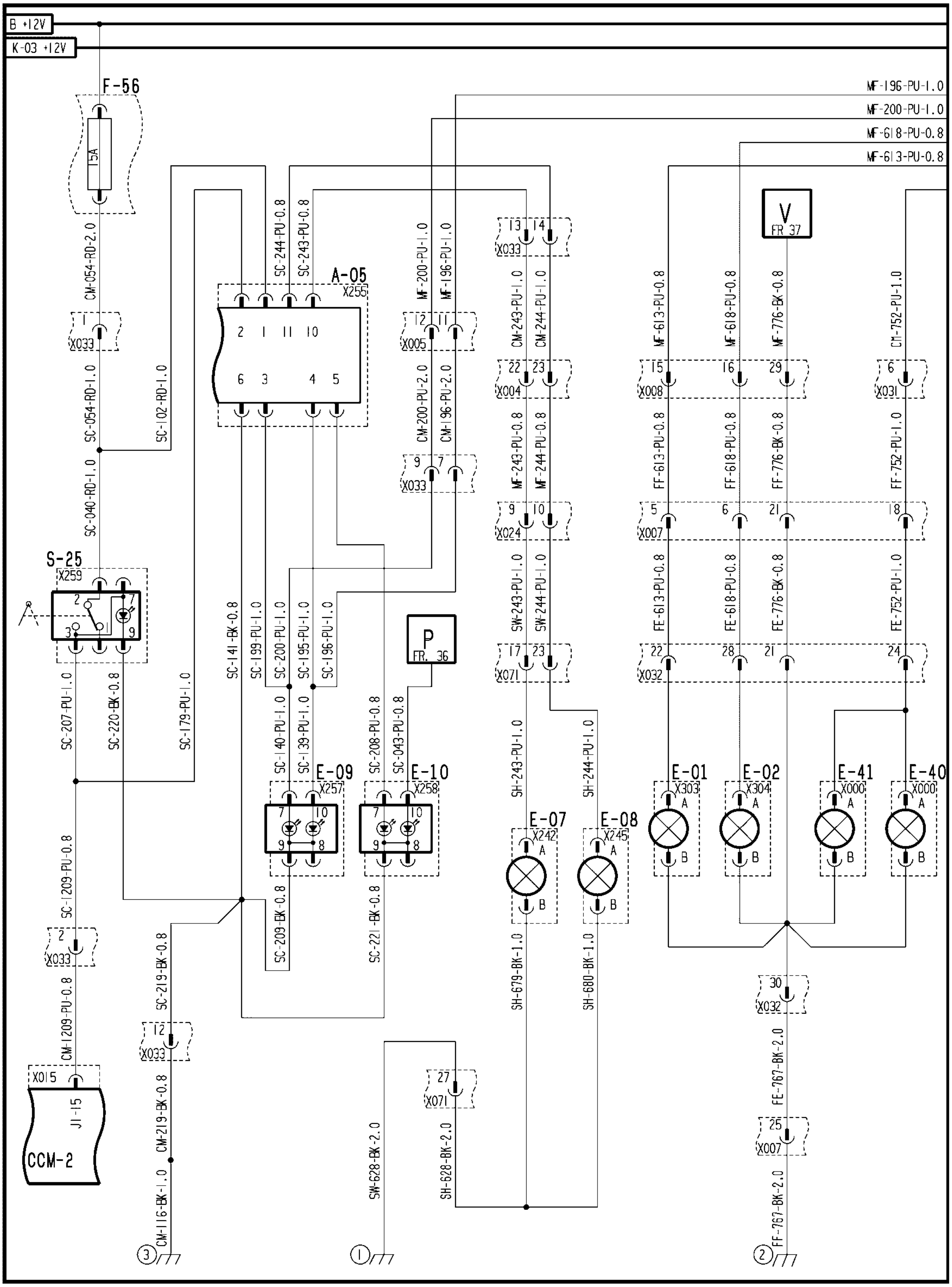
FRAME 32 - BLANK

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https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)

AFX8010



AFXSCHEM33-04 1

FRAME 33 - LIGHTING

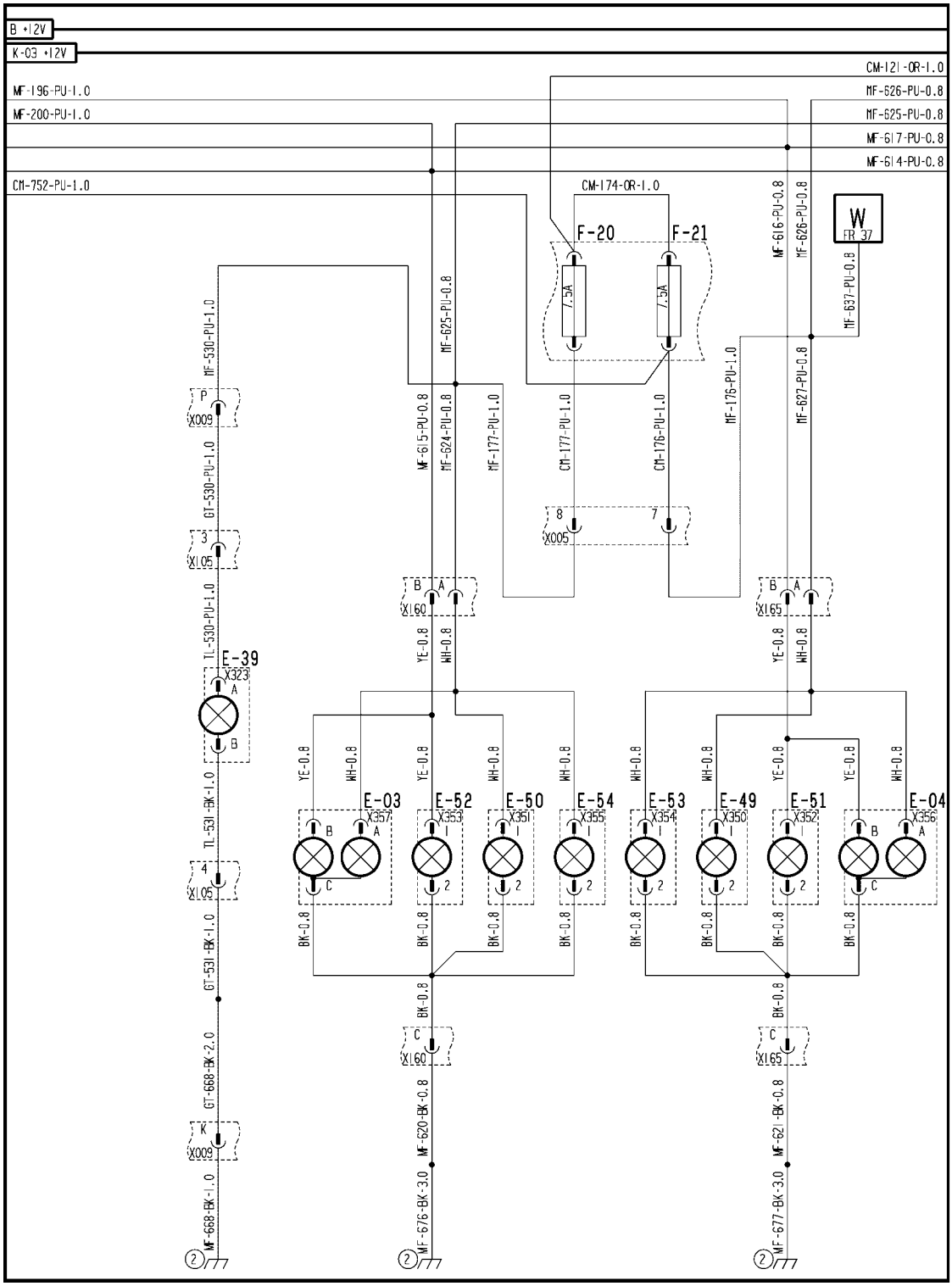
https://truckmanualshub.com/

A-05 Flasher Module	E-01 LH Header Flashing Lamp (NA)	E-02 RH Header Flashing Lamp (NA)
E-07 LH Flashing Lamp (NA)	E-08 RH Flashing Lamp (NA)	E-09 Turn Indicator
E-10 High Beam Indicator	E-40 Header LH Marker Light (EU)	E-41 Header RH Marker Light (EU)
F-56 Hazard Lights Fuse	S-25 Hazard Switch	

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)

AFX8010



AFXSCHEM34-04 1

FRAME 34 - LIGHTING

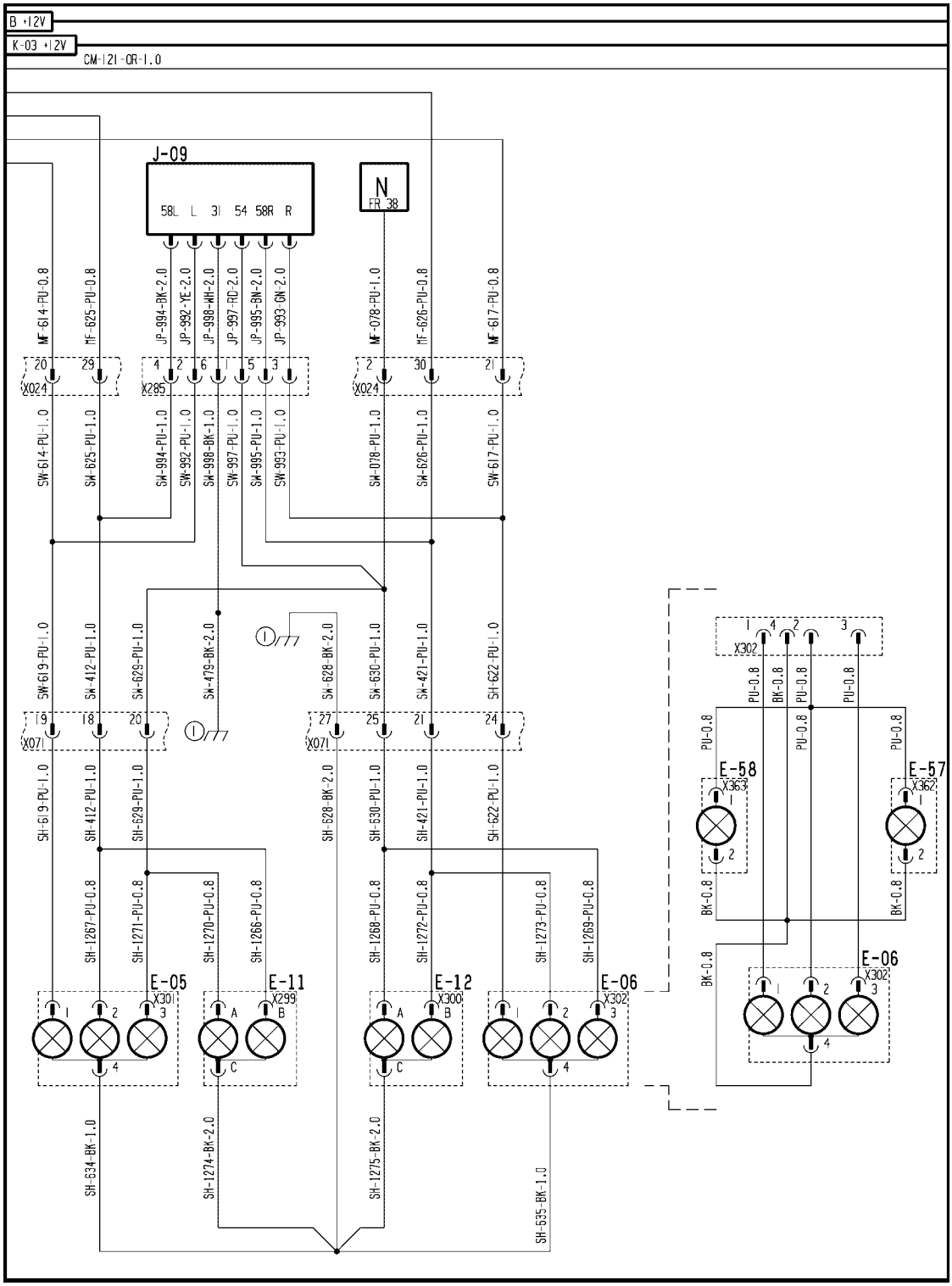
https://truckmanualshub.com/

E-03 LH Front Hazard Lamp	E-04 RH Front Hazard Lamp	E-39 Unload Tube Marker Light (France)
E-49 RH Position Marker Lamp (EU)	E-50 LH Position Marker Lamp (EU)	E-51 RH Flashing Lamp (EU)
E-52 LH Flashing Lamp (EU)	E-53 RH Front Austria Marker Lamp	E-54 LH Front Austria Marker Lamp
F-20 LH Marker / Tail Lights Fuse	F-21 RH Marker / Tail Lights Fuse	

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Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)

AFX8010



AFXSCHEM35-04 1

FRAME 35 - LIGHTING

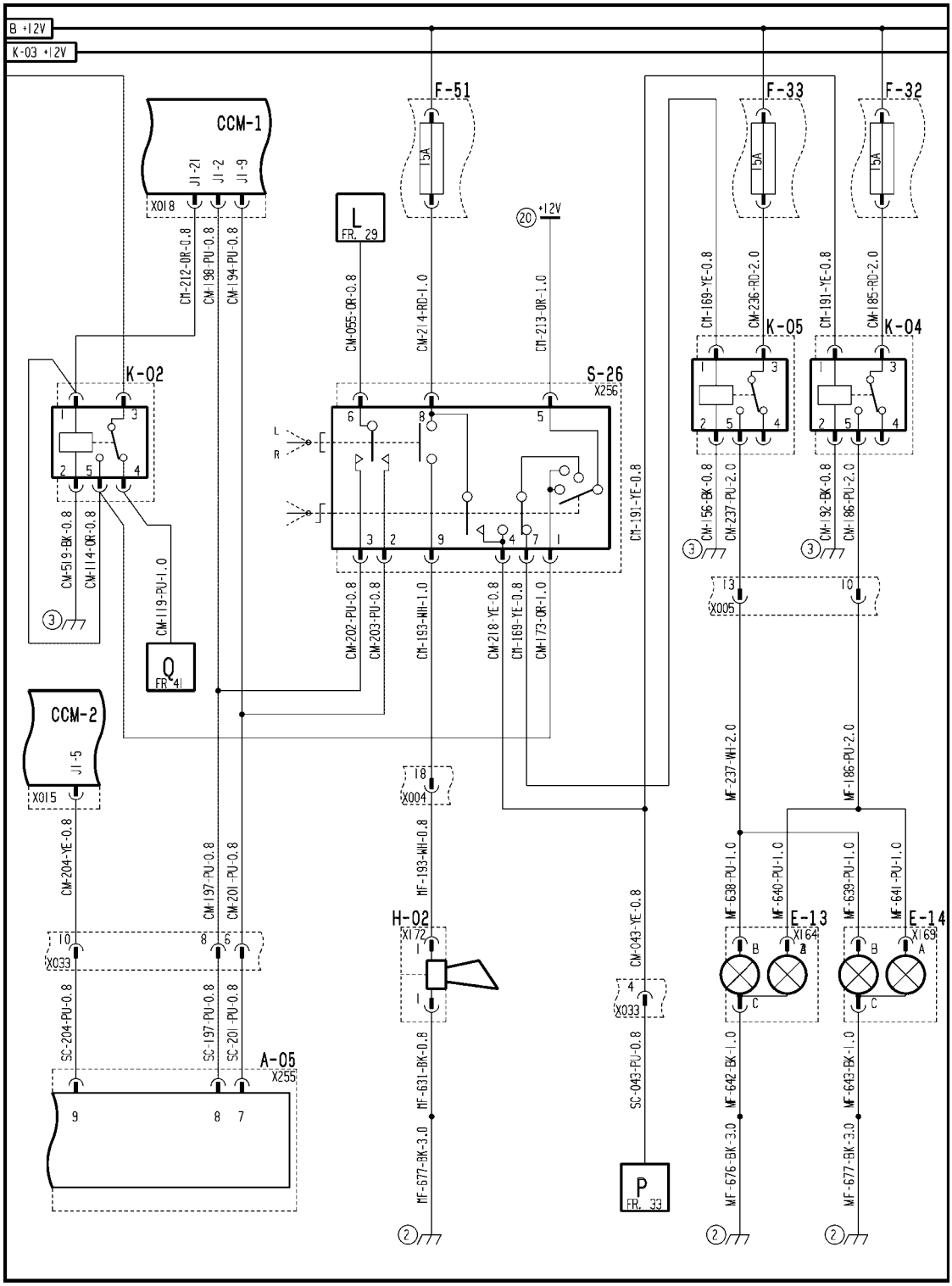
https://truckmanualshub.com/

E-05 LH Rear Flashing Lamp (EU)	E-06 RH Rear Flashing Lamp (EU)	E-11 LH Brake / Tail Lamp (NA)
E-12 RH Brake / Tail Lamp (NA)	E-57 RH License Plate Lamp (EU)	E-58 LH License Plate Lamp (EU)
	J-09 Trailer Outlet	

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Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)

AFX8010



AFXSCHEM36-04 1

FRAME 36 - LIGHTING

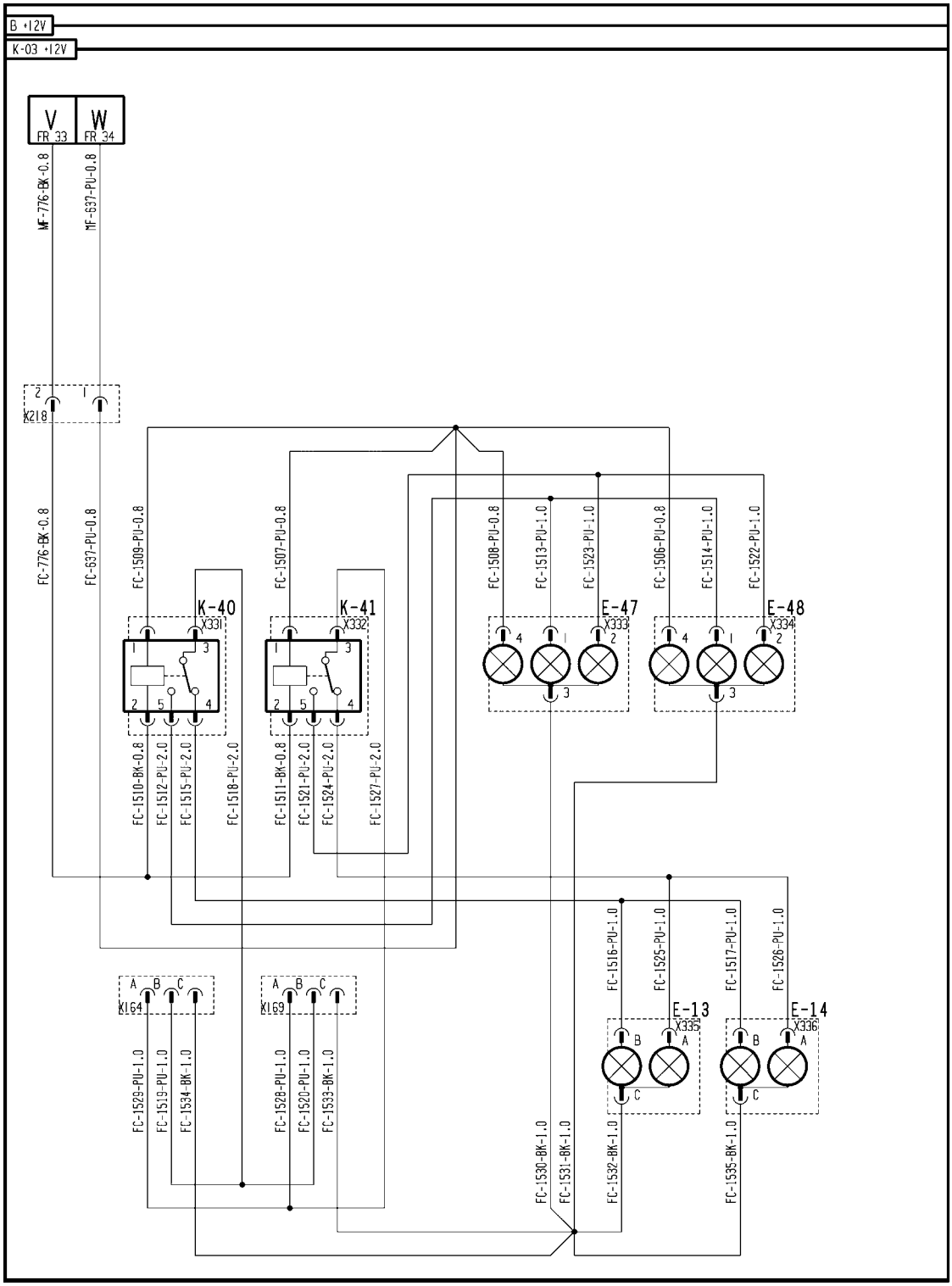
https://truckmanualshub.com/

A-05 Flasher Module	E-13 LH Road Light (EU)	E-14 RH Road Light (EU)
F-32 High Beam Fuse	F-33 Low Beam Fuse (EU)	F-51 Horn, Marker Lights Fuse
H-02 Horn	K-02 Light Control Relay	K-04 High Beam Relay (EU)
K-05 Low Beam Relay (EU)	S-26 Road Light Switch	

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Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)

AFX8010



AFXSCHEM37-04 1

FRAME 37 - LIGHTING

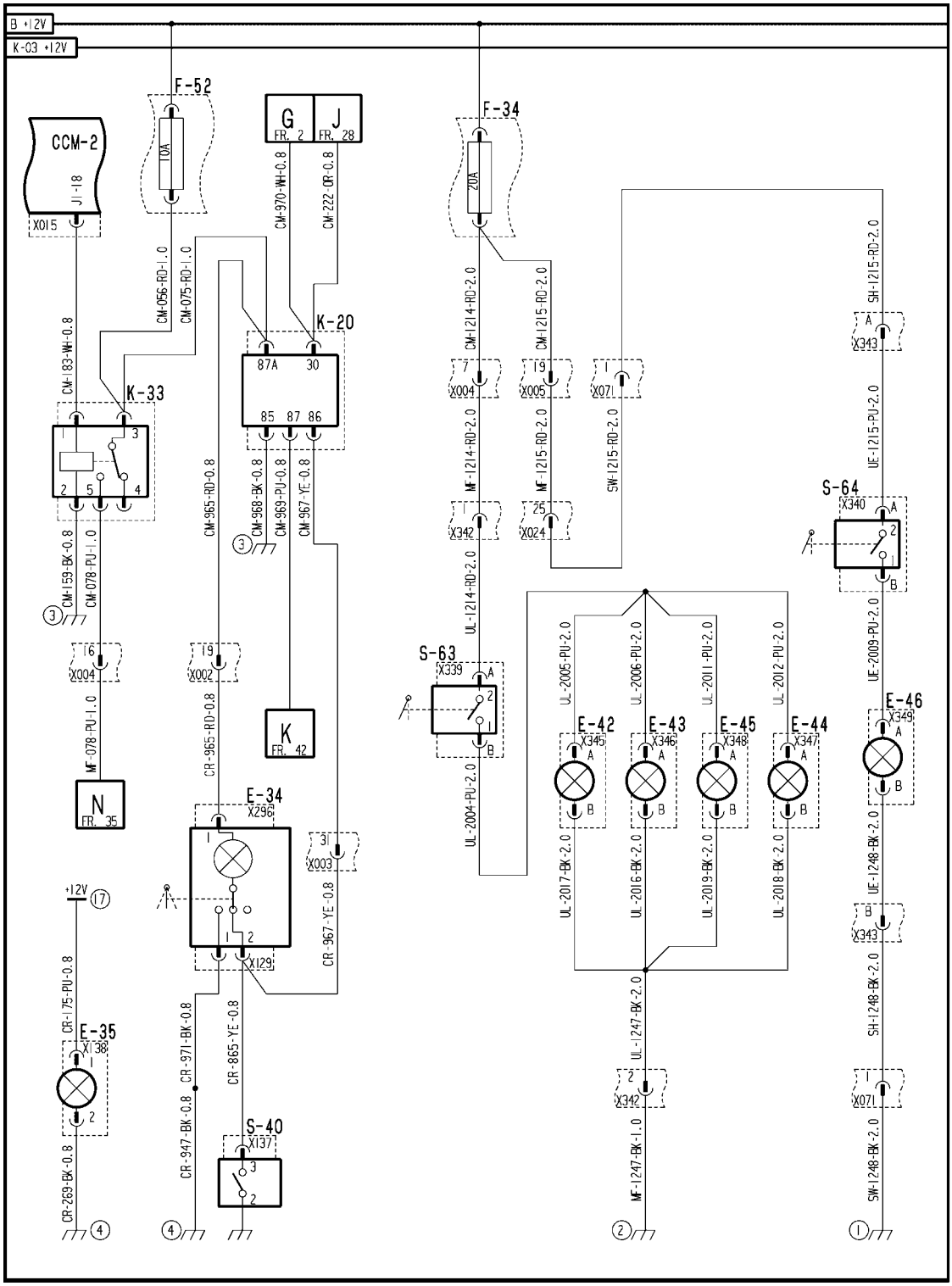
https://truckmanualshub.com/

E-13 LH Road Light (EU)	E-14 RH Road Light (EU)	E-47 LH Flip Up Road Light
E-48 RH Flip Up Road Light	K-40 Flip Up Low Beam Relay	K-41 Flip Up High Beam Relay

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Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)

AFX8010



AFXSCHEM38-04 1

FRAME 38 - LIGHTING

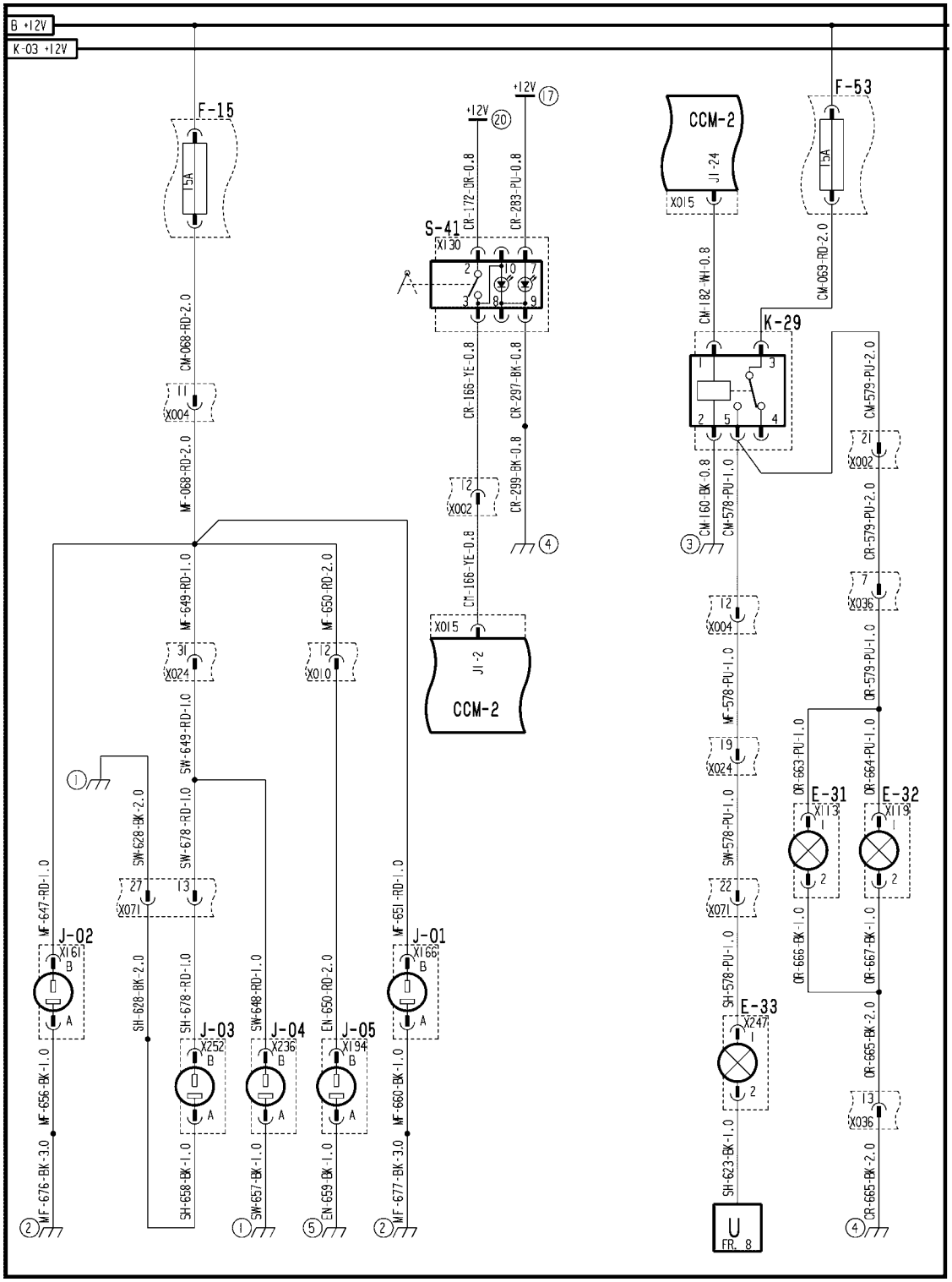
https://truckmanualshub.com/

E-34 Dome Light	E-35 Console Light	E-42 LH Front Shield Light
E-43 LH Rear Shield Light	E-44 RH Front Shield Light	E-45 RH Rear Shield Light
E-46 Engine Light	F-34 Under Shield Lights Fuse	F-52 Dome / Brake Lights Fuse
K-20 Time Delay Module	K-33 Brake Lights Relay	S-40 LH Door Switch
S-63 Under Shield Light Switch	S-64 Engine Light Switch	

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Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)

AFX8010



AFXSCHEM39-04 1

FRAME 39 - LIGHTING

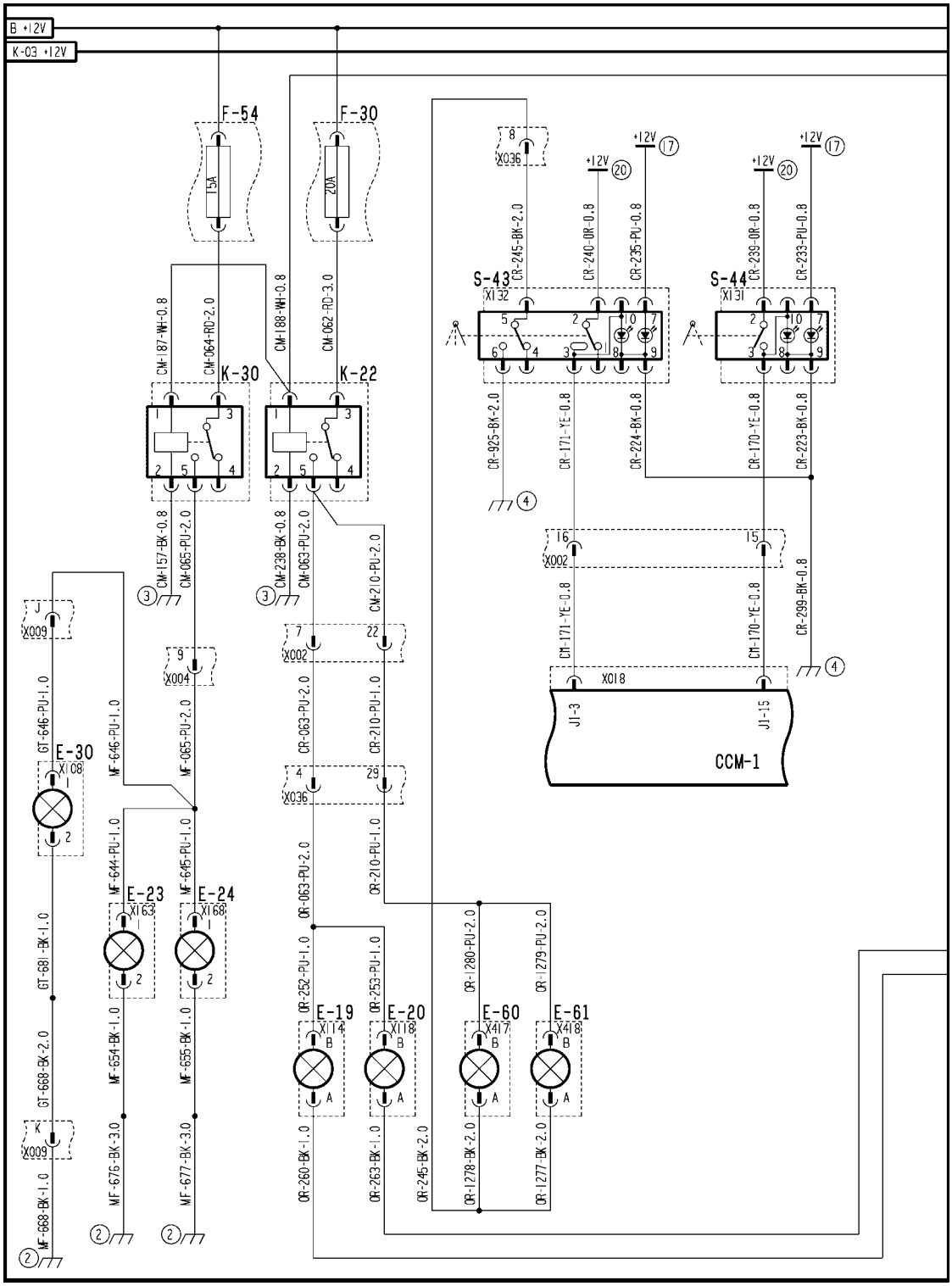
https://truckmanualshub.com/

E-31 LH Front Beacon Light	E-32 RH Front Beacon Light	E-33 Rear Beacon Light
F-15 Service Sockets Fuse	F-53 Beacon Light Fuse	J-01 RH Front Service Socket
J-02 LH Front Service Socket	J-03 RH Side Service Socket	J-04 LH Side Service Socket
J-05 Engine Service Socket	K-29 Beacon Light Relay	S-41 Beacon Light Switch

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Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)

AFX8010



AFXSCHEM40-04 1

FRAME 40 - LIGHTING

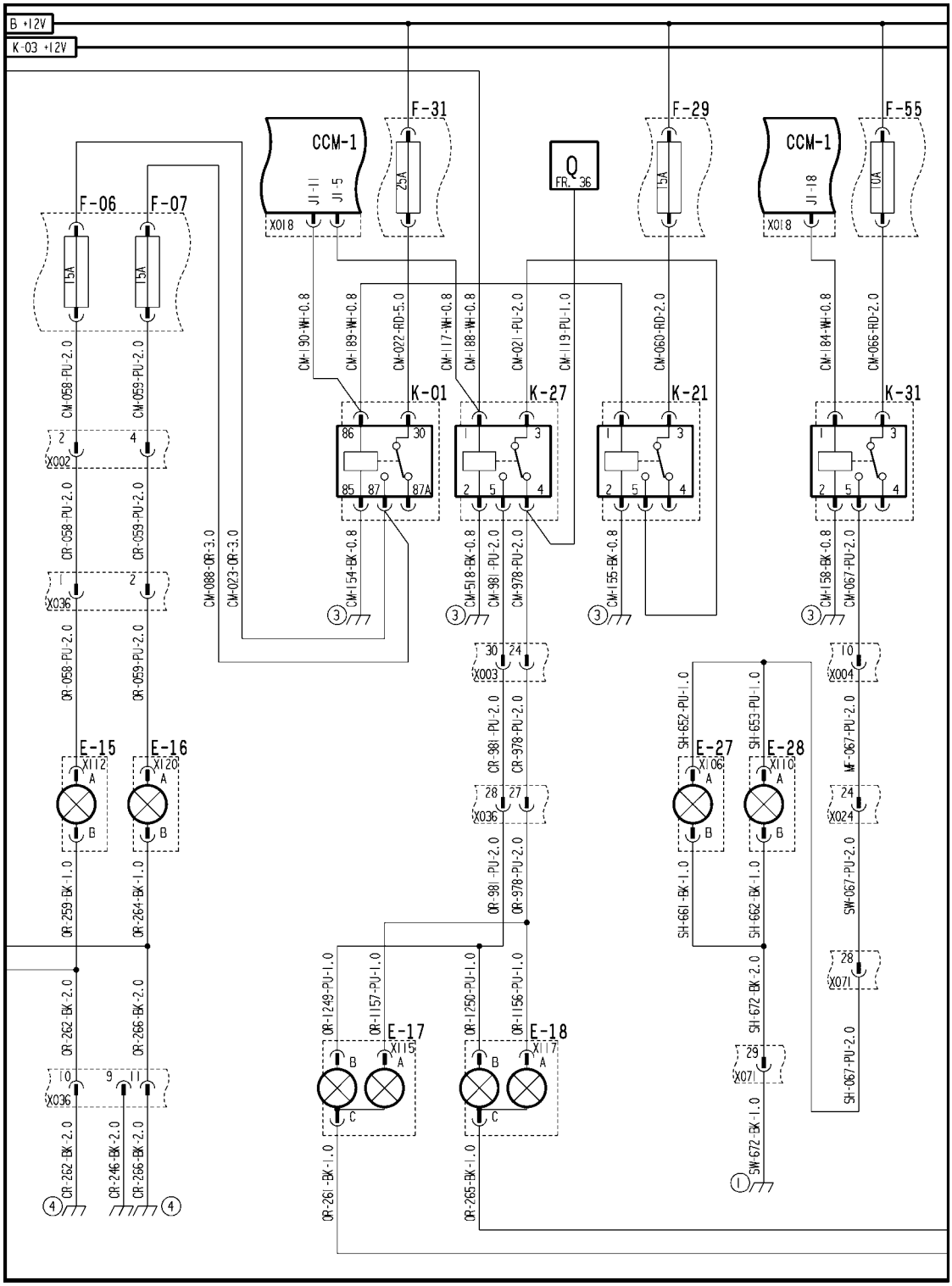
https://truckmanualshub.com/

E-19 LH Cab Mid Work Light	E-20 RH Cab Mid Work Light	E-23 LH Lower Work Light
E-24 RH Lower Work Light	E-30 Grain Tank Light	E-60 LH HID Field Light
E-61 RH HID Field Light	F-30 Mid Work Lights Fuse	F-54 Lower Work Lights Fuse
K-22 Header Work Lights Relay	K-30 Lower Work Lights Relay	S-43 Work Light Switch
	S-44 Rear Work Light Switch	

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Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)

AFX8010



AFXSCHEM41-04 1

FRAME 41 - LIGHTING

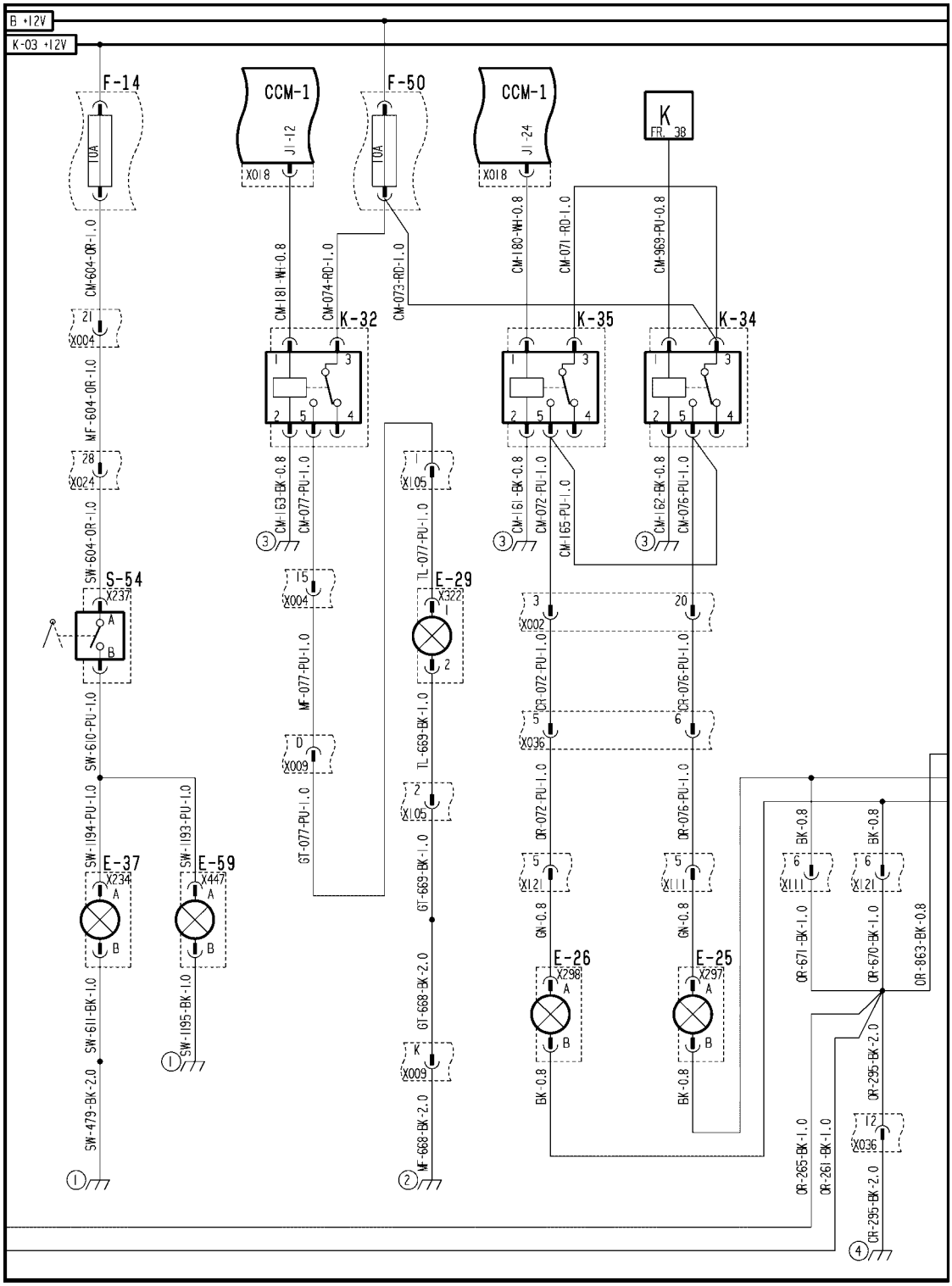
https://truckmanualshub.com/

E-15 LH Cab Outer Work Light	E-16 RH Cab Outer Work Light	E-17 LH Cab Inner Work Light
E-18 RH Cab Inner Work Light	E-27 LH Rear Work Light	E-28 RH Rear Work Light
F-06 LH Outer Road/Work Lights Fuse	F-07 RH Outer Road/Work Lights Fuse	F-29 Inner Road/Work Lights Fuse
F-31 Outer Road/Work Lights Fuse	F-55 Rear Work Lights Fuse	K-01 Outer Road/Work Lights Relay
K-21 Inner Road Lights Relay	K-27 Inner Work Lights Relay	K-31 Rear Work Lights Relay

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Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)

AFX8010



AFXSCHEM42-04 1

FRAME 42 - LIGHTING

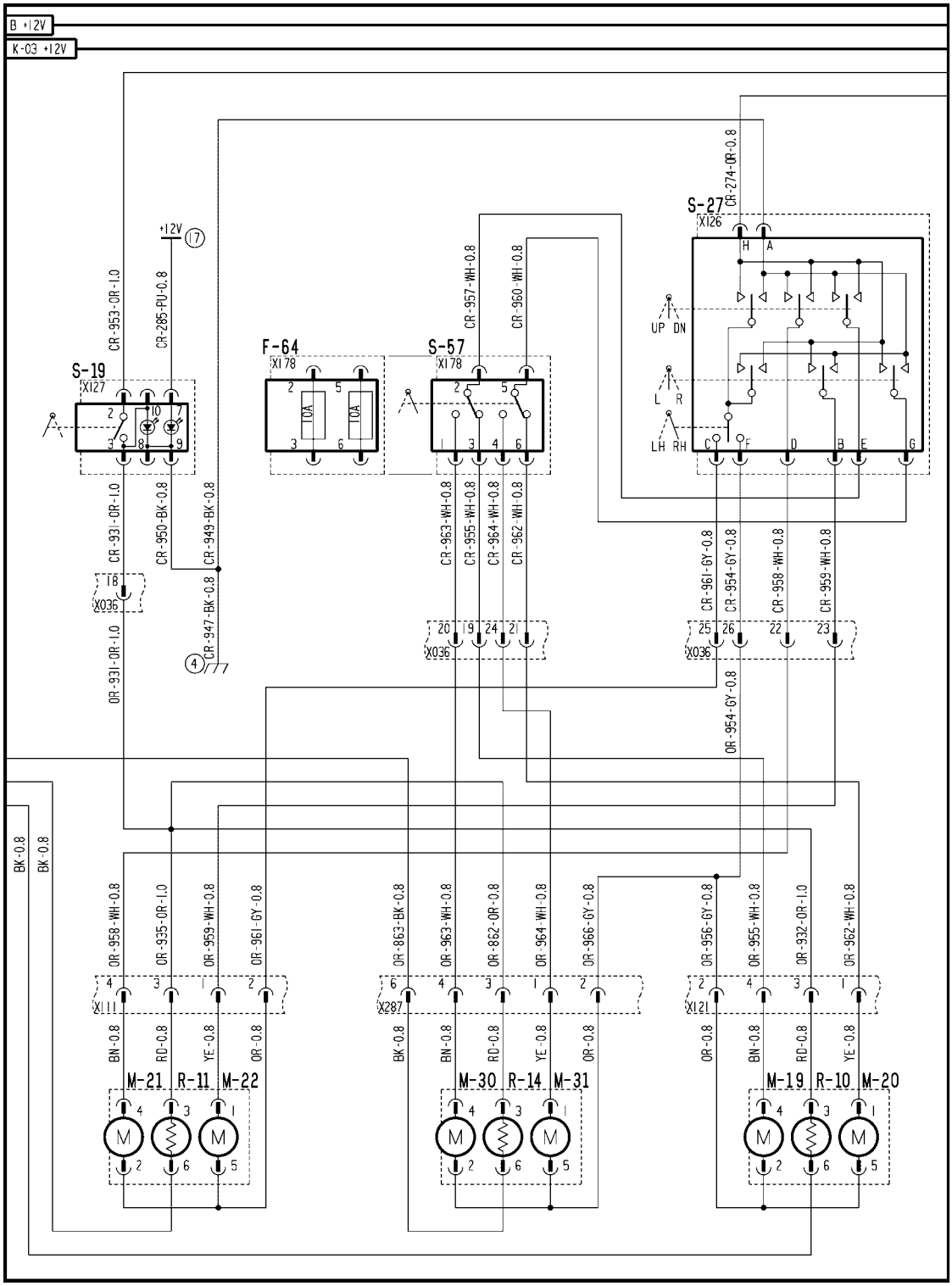
https://truckmanualshub.com/

E-25 LH Side Work Light	E-26 RH Side Work Light	E-29 Unload Tube Light
E-37 Sieve Light Front	E-59 Sieve Light Rear	F-14 Service Lights Fuse
F-50 Side / Tube Lights Fuse	K-32 Unload Tube Light Relay	K-34 Timed Side Work Light Relay
K-35 Side Work Light Relay	S-54 Sieve Light Switch	

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Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)

AFX8010



AFXSCHEM43-04 1

FRAME 43 - LIGHTING

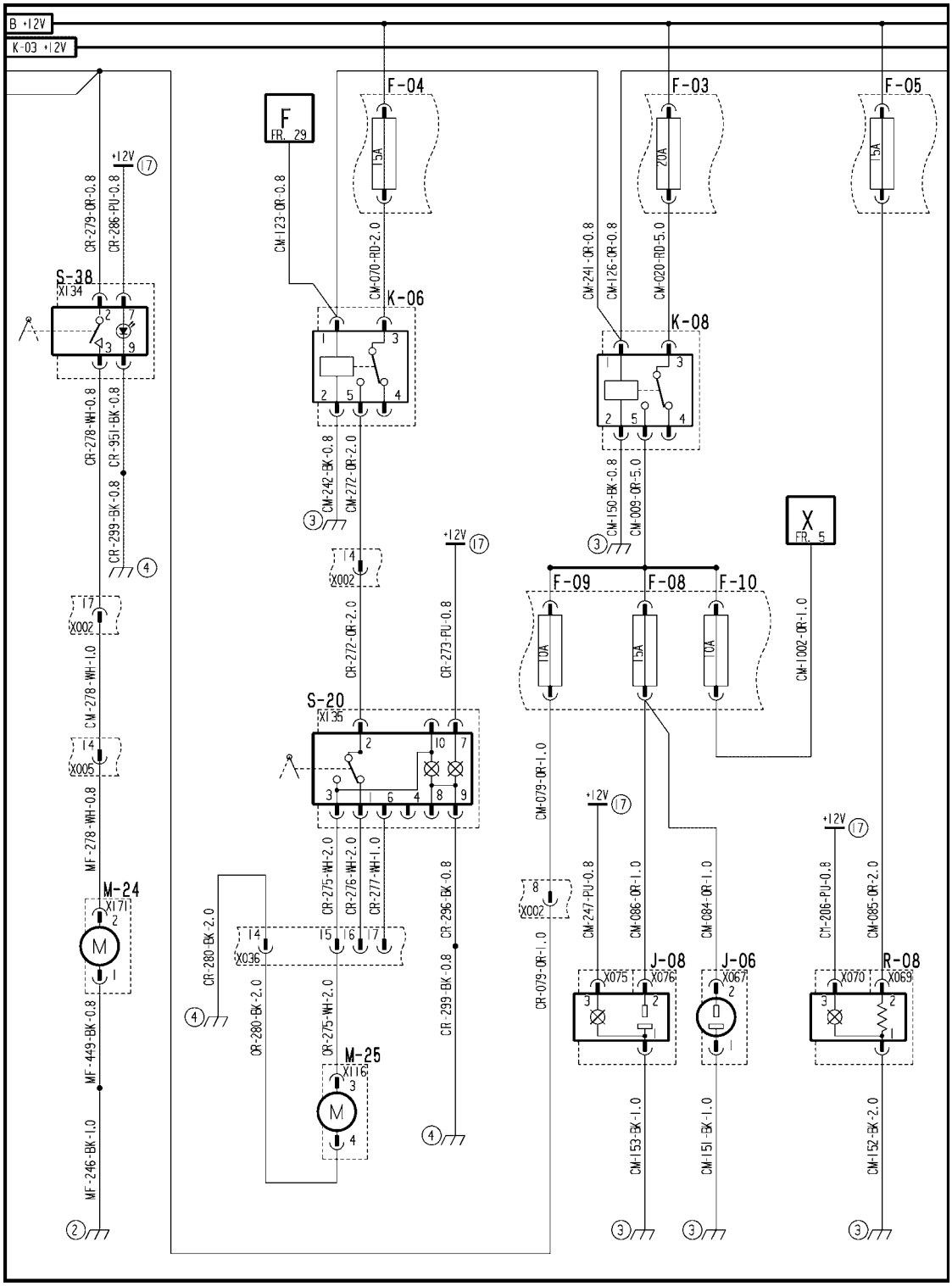
https://truckmanualshub.com/

F-64 Switch Bypass Fuses	M-19 RH Mirror Up / Down	M-20 RH Mirror In / Out
M-21 LH Mirror Up / Down	M-22 Mirror In / Out	M-30 German Mirror Up / Down
M-31 German Mirror In / Out	R-10 RH Mirror Heat	R-11 LH Mirror Heat
R-14 RH German Mirror Heat	S-19 Mirror Heat Switch	S-27 Mirror Adjust Switch
	S-57 Mirror Select Switch	

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Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)

AFX8010



AFXSCHEM44-04 1

FRAME 44 - ACCESSORY

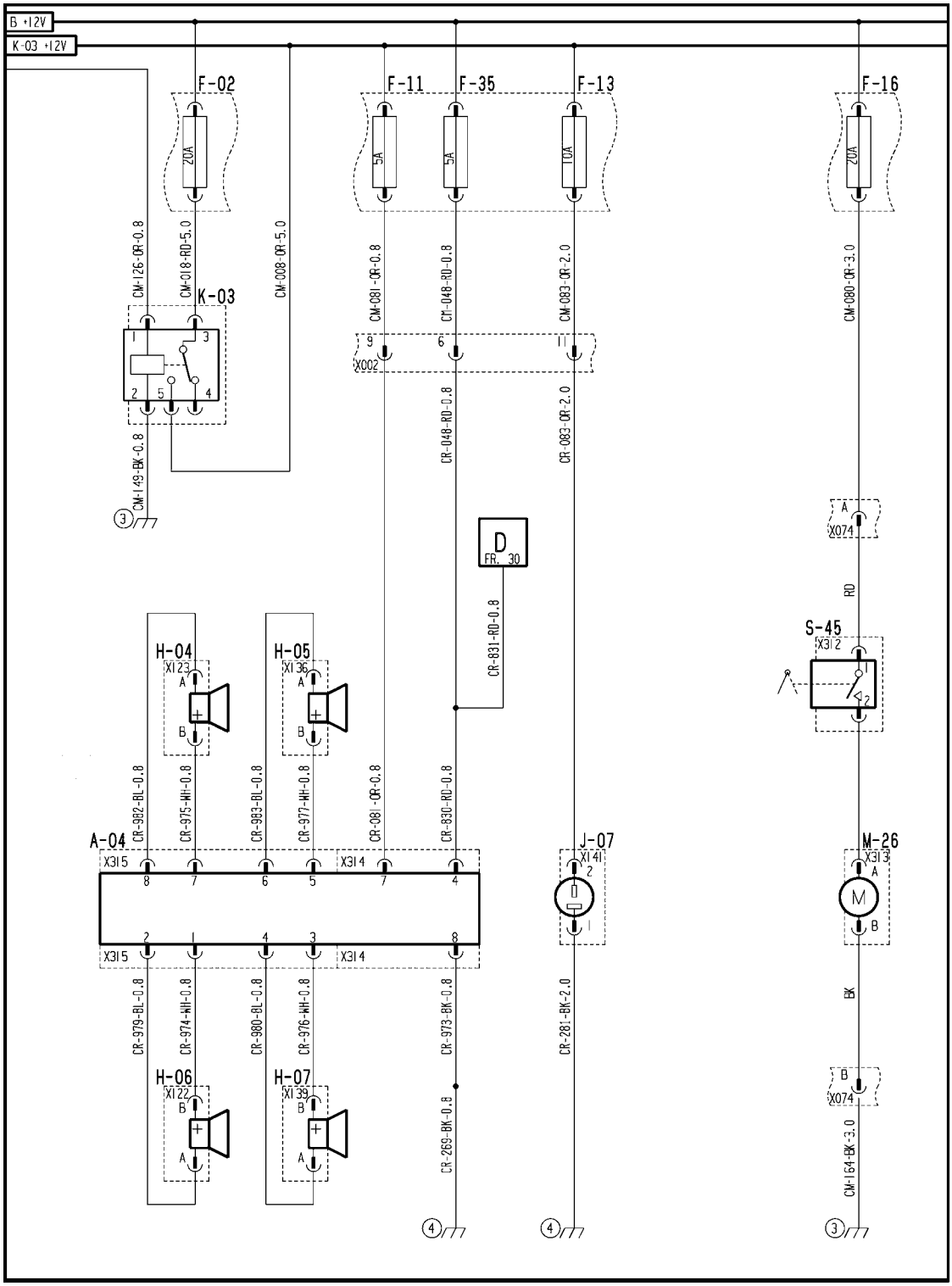
https://truckmanualshub.com/

F-03 Accessory 1 Fuse	F-04 Wiper Fuse	F-05 Cigar Lighter Fuse
F-08 Accessory Outlet Fuse	F-09 Washer / Mirror Fuse	F-10 Not Used
J-06 Accessory Socket	J-08 Accessory Outlet	K-06 Wiper Relay
K-08 Accessory 1 Relay	M-24 Wiper Washer Motor	M-25 Wiper Motor
R-08 Cigar Lighter	S-20 Wiper Switch	S-38 Washer Switch

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Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)

AFX8010



AFXSCHEM45-04 1

FRAME 45 - ACCESSORY

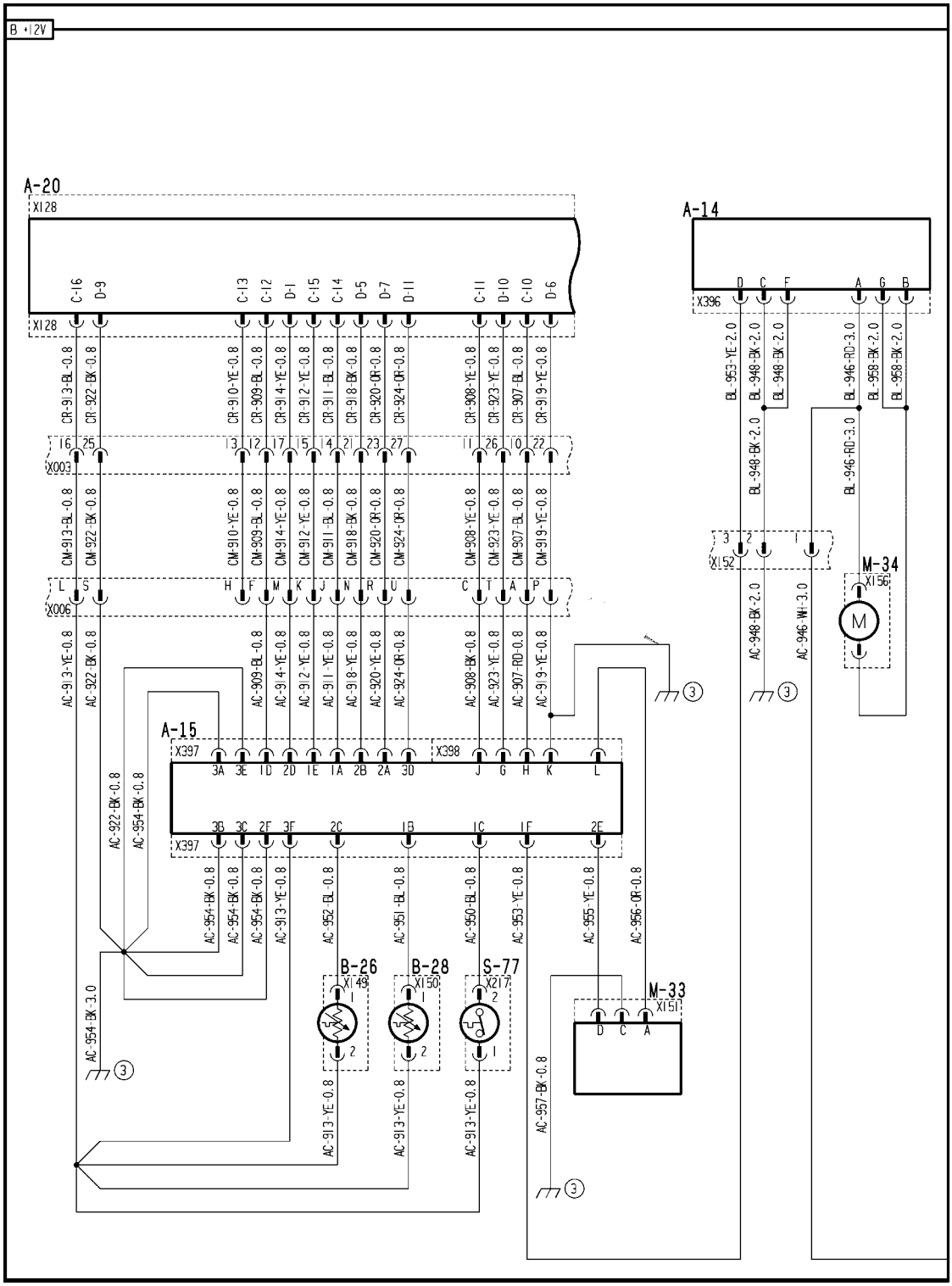
https://truckmanualshub.com/

A-04 Radio	F-02 Accessory 2 Fuse	F-11 Radio Fuse
F-13 Transceiver Fuse	F-16 Seat Pump Fuse	F-35 Radio Memory Fuse
H-04 Rear Left Speaker	H-05 Front Left Speaker	H-06 Rear Right Speaker
H-07 Front Right Speaker	J-07 Not Used	K-03 Accessory 2 Relay
M-26 Seat Pump Motor	S-45 Seat Adjust Switch	

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Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46)

AFX8010



AFXSCHEM46-04 1

FRAME 46 - HVAC (ATC)

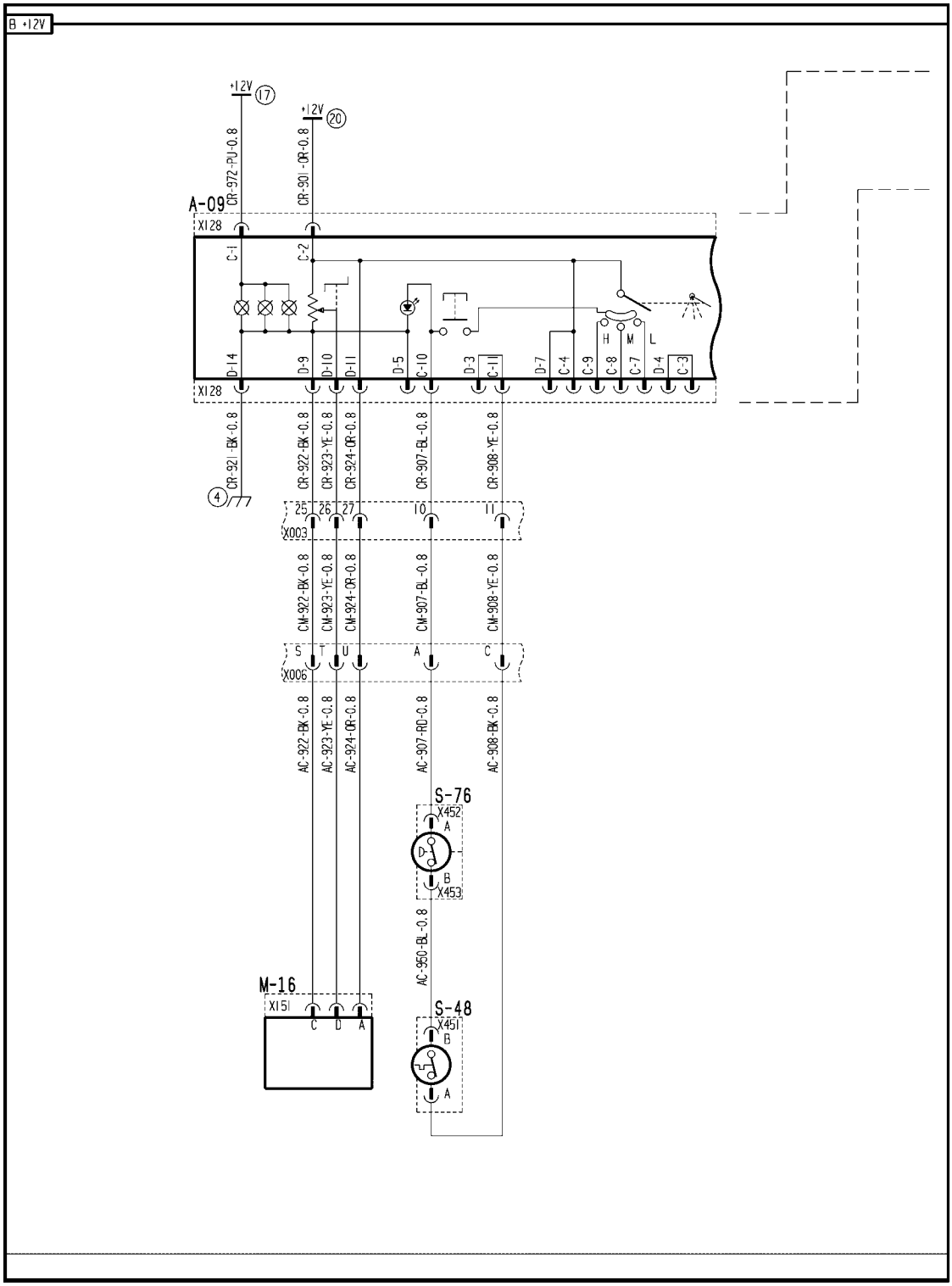
https://truckmanualshub.com/

A-14 Blower Speed Control (ATC)	A-15 ATC Control Module	A-20 HVAC Control Panel (ATC)
B-26 Cab Temperature Sensor (ATC)	B-28 Evaporator Temperature Sensor (ATC)	M-34 Main Blower (ATC)
M-33 Water Valve (ATC)	S-77 A/C Low Pressure (ATC)	
*1) connect wire 919 to ground for display temperature in Celsius		

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Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47)

AFX8010



AFXSCHEM47-04 1

FRAME 47 - HVAC (MAN)

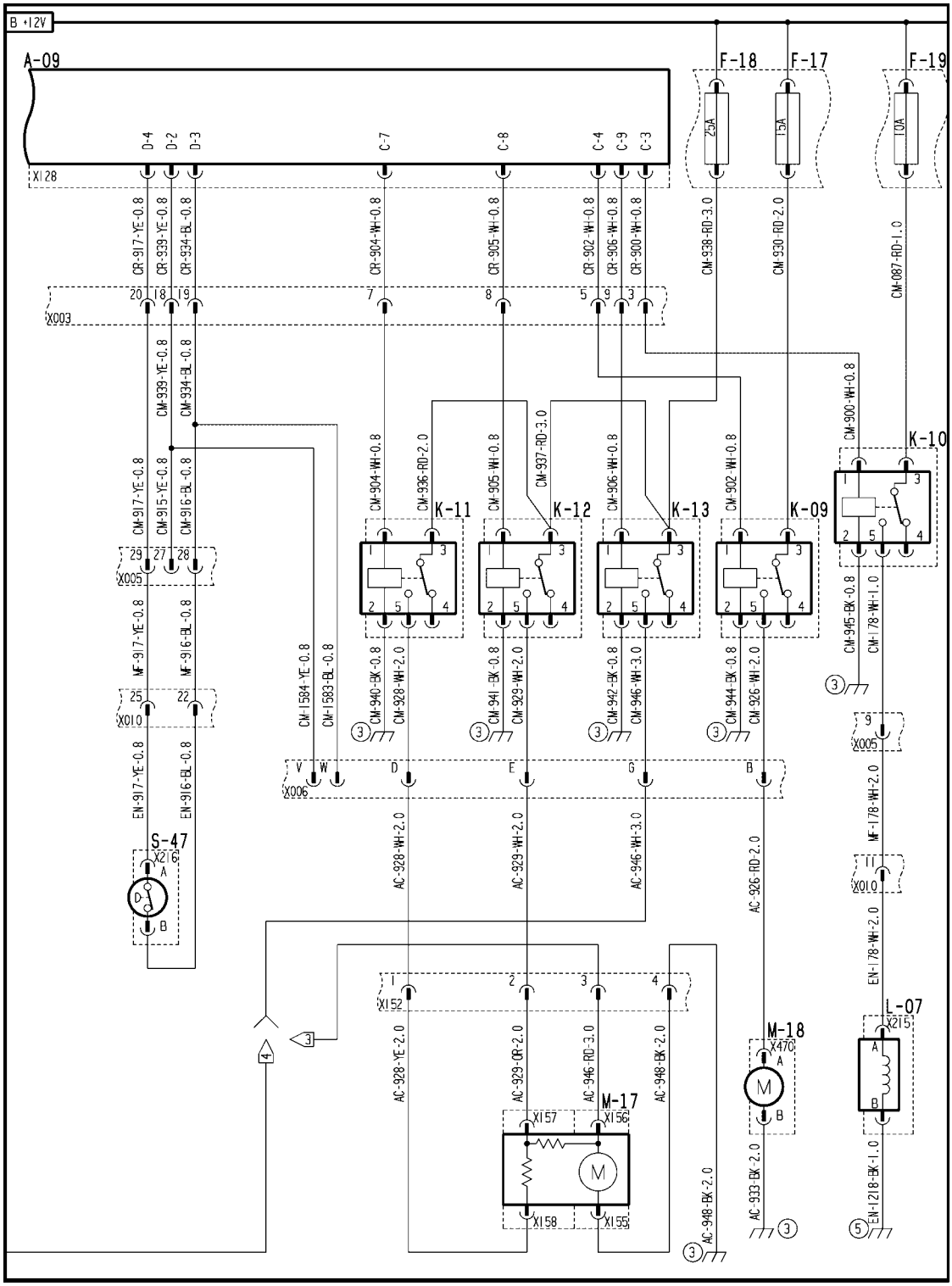
https://truckmanualshub.com/

A-09 HVAC Control Panel (manual)	M-16 Water Valve (manual)	S-48 A/C Low Pressure (manual)
	S-76 Freeze Switch (manual)	

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Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48)

AFX8010



AFXSCHEM48-04 1

FRAME 48 - HVAC (BOTH)

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A-09 HVAC Control Panel	F-17 Separator Blower Fuse	F-18 Main Blower Fuse
F-19 A/C Clutch Fuse	K-09 Separator Blower Relay	K-10 A/C Clutch Relay
K-11 Main Blower Relay Low	K-12 Main Blower Relay Medium	K-13 Main Blower Relay High
L-07 A/C Clutch	M-17 Main Blower (manual)	M-18 Separator Blower
S-47 A/C High Pressure	3 = Base Unit with Manual A/C	4 = Base Unit with ATC

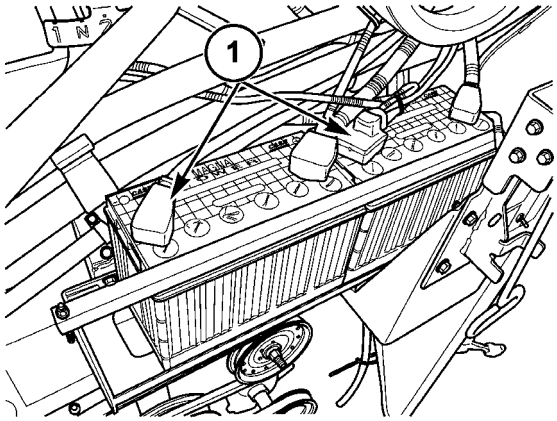
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Battery - Disconnect (A.30.A.83 - F.10.A.11)

AFX8010

1. To temporarily disconnect the batteries to weld or work on the machine, disconnect the negative terminals **(1)** only.

IMPORTANT: *If jumping or charging the batteries, only use the battery to the right when facing. Failure to do so can cause damage to equipment.*



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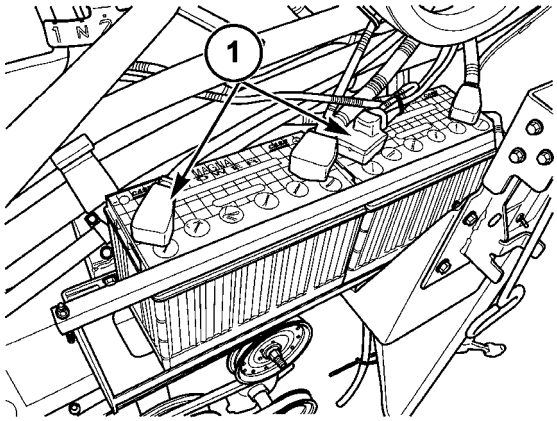
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Battery - Replace (A.30.A.83 - F.10.A.30)

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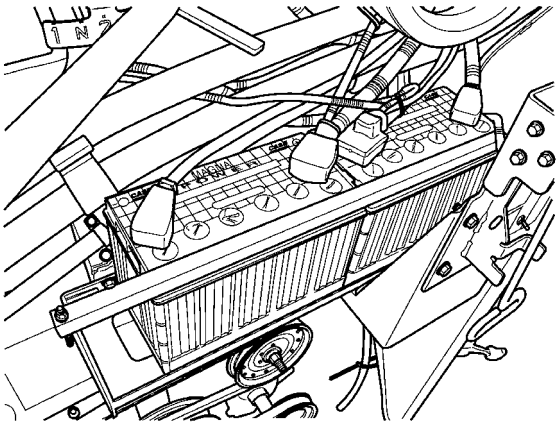
1. To replace the two **12 volts** batteries in the machine start by disconnecting the negative battery terminals **(1)**.

NOTE: *Use only OEM recommended 12 volt batteries when replacing with the proper cranking amps. Failure to do so may result in component failure.*



10035350A5 1

2. Remove the positive terminals from the batteries.
3. Loosen the bolts on the battery hold down clamp, and remove the clamp from the batteries.



10035350 2

4. Remove the batteries from the machine and replace with new batteries.

IMPORTANT: *Note that the batteries are heavy, so use caution when handling.*

5. Install the new batteries onto the tray with the negative terminals to the left, or the negative terminals to the front of the machine. connect the positive terminals first. Then connect the negative terminals.

IMPORTANT: *Always connect the positive terminals first to prevent sparks if accidently grounded to the machine.*

6. Install the battery hold down bar across the tops of the batteries. Tighten the bar bolts until the batteries are snug, but be careful to not overtighten the bolts as damage to the battery cases may occur.

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Alternator - Problem solving (A.30.A.82 - G.40.A.30)

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OPERATION

The Alternator (B+) connector **X213** is connected to the battery via terminal B+ on the Starter Motor and is grounded to the engine through connector **X213**.
The Alternator is self exciting and does not require an excitation circuit. Charging system output is controlled by an integral voltage regulator/brush assembly. The regulator is set to 14.2 volt regulation. The Alternator is temperature compensated so that output will drop as the Alternator warms up.

TROUBLESHOOTING

Before troubleshooting the charging system, make sure that the following conditions are met:

1. The batteries are fully charged and all connections are clean and tight.
2. Transmission in neutral or park.
3. Check all connectors for full installation, loose, corroded, pushed out, or bent terminals.

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multi-meter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

IMPORTANT: *Do not use a self-powered test light for any of the following tests. Use of a self-powered test light may cause damage to the components of this system.*

⚠ **WARNING** ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

Problem	Possible Cause	Correction
System not charging or Charging poorly. Battery goes dead.	Alternator Belt slipping or failed	Replace alternator belt. Inspect tensioner assembly.
	B+ Circuit	**Alternator - Testing (A.30.A.82 - G.40.A.20)**
	Alternator	**Alternator - Testing (A.30.A.82 - G.40.A.20)**
System overcharging	Alternator	**Alternator - Testing (A.30.A.82 - G.40.A.20)**

Alternator - Testing (A.30.A.82 - G.40.A.20)

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N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Transmission in "Park" Start Engine and set to **1200 RPM**. Measure voltage at battery.	**12.8 - 14.5 volts** If good reading, charging system is operating properly.	High resistance between battery and B+ terminal at Alternator. Go to test **2**
2	Place Negative Lead of multimeter to battery positive terminal and positive terminal to starter B+ terminal. Check voltage.	Less than **0.4 volts** If good reading, Go to test **3**	High Resistance between Battery and starter B+ terminal. Repair/replace wiring as needed.
3	Attach positive lead of multimeter to B+ terminal of alternator and negative lead to starter B+ terminal. Read voltage.	Less than **0.4 volts** If good reading, Go to test **4**	High Resistance in circuit 802 (RD). Repair/replace wiring as needed.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
4	Measure for **12 volts** at the B+ terminal of the Alternator while turning on various loads on and off (lights, heater, fan, etc.)	Voltage varies between **12.8 - 14.5 volts** in response to load applied. If good reading, charging system is operating properly.	Alternator Go to test **5**
5	Stop Engine, Key switch in OFF position. Measure resistance between alternator housing and engine ground.	Less than **1 ohms**. If good reading, repair or replace Alternator.	High resistance on circuit 803 (BK) from Alternator to engine ground. Clean surfaces at Alternator and engine block. Ensure that all mountings are clean and tight.

https://truckmanualshub.com/

Index

DISTRIBUTION SYSTEMS - A

ELECTRICAL POWER SYSTEM - 30.A

Alternator - Problem solving (A.30.A.82 - G.40.A.30) 303
AFX8010

Alternator - Testing (A.30.A.82 - G.40.A.20) 303
AFX8010

Alternator - Torque (A.30.A.82 - D.20.A.10) 5
AFX8010

Battery - Disconnect (A.30.A.83 - F.10.A.11) 301
AFX8010

Battery - Replace (A.30.A.83 - F.10.A.30) 302
AFX8010

Wiring harness - Component diagram (A.30.A.88 - C.20.A.71) 13
AFX8010

Wiring harness - Detailed view (A.30.A.88 - C.10.A.50) 6
AFX8010

Wiring harness - Electrical schema index (A.30.A.88 - C.20.G.40) 191
AFX8010

Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01) 208
AFX8010

Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02) 210
AFX8010

Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03) 212
AFX8010

Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04) 214
AFX8010

Wiring harness - Electrical schematic frame 05 (A.30.A.88 - C.20.E.05) 216
AFX8010

Wiring harness - Electrical schematic frame 06 (A.30.A.88 - C.20.E.06) 218
AFX8010

Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07) 219
AFX8010

Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08) 221
AFX8010

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09) 223
AFX8010

Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10) 225
AFX8010

Wiring harness - Electrical schematic frame 11 (A.30.A.88 - C.20.E.11) 227
AFX8010

Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12) 229
AFX8010

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13) 231
AFX8010

Wiring harness - Electrical schematic frame 14 (A.30.A.88 - C.20.E.14) 233
AFX8010

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15) 235
AFX8010

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16) 237
AFX8010
Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17) 239
AFX8010
Wiring harness - Electrical schematic frame 18 (A.30.A.88 - C.20.E.18) 241
AFX8010
Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19) 242
AFX8010
Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20) 244
AFX8010
Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21) 246
AFX8010
Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22) 248
AFX8010
Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23) 250
AFX8010
Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24) 252
AFX8010
Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25) 254
AFX8010
Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26) 256
AFX8010
Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27) 258
AFX8010
Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28) 260
AFX8010
Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29) 262
AFX8010
Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30) 264
AFX8010
Wiring harness - Electrical schematic frame 31 (A.30.A.88 - C.20.E.31) 266
AFX8010
Wiring harness - Electrical schematic frame 32 (A.30.A.88 - C.20.E.32) 268
AFX8010
Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33) 269
AFX8010
Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34) 271
AFX8010
Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35) 273
AFX8010
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36) 275
AFX8010
Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37) 277
AFX8010
Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38) 279
AFX8010
Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39) 281
AFX8010
Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40) 283
AFX8010
Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41) 285
AFX8010
Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42) 287
AFX8010
Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43) 289
AFX8010

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44) 291
AFX8010
Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45) 293
AFX8010
Wiring harness - Electrical schematic frame 46 (A.30.A.88 - C.20.E.46) 295
AFX8010
Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47) 297
AFX8010
Wiring harness - Electrical schematic frame 48 (A.30.A.88 - C.20.E.48) 299
AFX8010
Wiring harness - Torque (A.30.A.88 - D.20.A.10) 5
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

DISTRIBUTION SYSTEMS - A

LIGHTING SYSTEM - 40.A

AFX8010

https://truckmanualshub.com/

Contents

DISTRIBUTION SYSTEMS - A

LIGHTING SYSTEM - 40.A

FUNCTIONAL DATA

LIGHTING SYSTEM - Overview (A.40.A - C.10.A.10) 5
AFX8010

Head light
Head light - Overview (A.40.A.11 - C.10.A.10) 9
AFX8010

Marker light
Marker light - Overview (A.40.A.12 - C.10.A.10) 11
AFX8010

Turn/hazard light
Turn/hazard light - Overview (A.40.A.13 - C.10.A.10) 13
AFX8010

Brake light
Brake light - Overview (A.40.A.14 - C.10.A.10) 18
AFX8010

Beacon
Beacon - Overview (A.40.A.15 - C.10.A.10) 19
AFX8010

Front work light
Front work light - Overview (A.40.A.16 - C.10.A.10) 20
AFX8010

Rear work light
Rear work light - Overview (A.40.A.17 - C.10.A.10) 23
AFX8010

Side work light
Side work light - Overview (A.40.A.18 - C.10.A.10) 24
AFX8010

Under shield service light
Under shield service light - Overview (A.40.A.19 - C.10.A.10) 26
AFX8010

Cleaning shoe service light
Cleaning shoe service light - Overview (A.40.A.20 - C.10.A.10) 27
AFX8010

Engine component service light
Engine component service light - Overview (A.40.A.21 - C.10.A.10) 28
AFX8010

Back light
Back light - Overview (A.40.A.24 - C.10.A.10) 29
AFX8010

https://truckmanualshub.com/

DIAGNOSTIC

LIGHTING SYSTEM - Problem solving (A.40.A - G.40.A.30) 31
AFX8010

Head light

Head light Relay - Testing (A.40.A.11.82 - G.40.A.20) 32
AFX8010

Head light Switch - Testing (A.40.A.11.83 - G.40.A.20) 33
AFX8010

Head light Wiring harness - Testing (A.40.A.11.88 - G.40.A.20) 34
AFX8010

Marker light

Marker light Wiring harness - Testing (A.40.A.12.88 - G.40.A.20) 35
AFX8010

Turn/hazard light

Turn/hazard light Flasher unit - Unidentified failure (A.40.A.13.86 - G.30.B.46) 37
AFX8010

Turn/hazard light Flasher unit - Testing (A.40.A.13.86 - G.40.A.20) 40
AFX8010

Turn/hazard light Wiring harness - Testing (A.40.A.13.88 - G.40.A.20) 42
AFX8010

Turn/hazard light Hazard switch - Testing (A.40.A.13.90 - G.40.A.20) 44
AFX8010

Brake light

Brake light Relay - Testing (A.40.A.14.82 - G.40.A.20) 45
AFX8010

Brake light Wiring harness - Testing (A.40.A.14.88 - G.40.A.20) 45
AFX8010

Brake light Switch - Short circuit to B+ (A.40.A.14.83 - G.30.B.54) 47
AFX8010

Brake light Relay - Unidentified failure (A.40.A.14.82 - G.30.B.46) 50
AFX8010

Beacon

Beacon Relay - Unidentified failure (A.40.A.15.82 - G.30.B.46) 53
AFX8010

Beacon Relay - Testing (A.40.A.15.82 - G.40.A.20) 56
AFX8010

Beacon Switch - Testing (A.40.A.15.83 - G.40.A.20) 56
AFX8010

Beacon Wiring harness - Testing (A.40.A.15.88 - G.40.A.20) 57
AFX8010

Front work light

Front work light Switch - Testing (A.40.A.16.83 - G.40.A.20) 57
AFX8010

Front work light Relay - Testing (A.40.A.16.82 - G.40.A.20) 58
AFX8010

Front work light Wiring harness - Testing (A.40.A.16.88 - G.40.A.20) 60
AFX8010

Front work light Relay - Unidentified failure (A.40.A.16.82 - G.30.B.46) 64
AFX8010

Front work light Relay - Unidentified failure (A.40.A.16.82 - G.30.B.46) 67
AFX8010

Rear work light

https://truckmanualshub.com/

Rear work light Relay - Testing (A.40.A.17.82 - G.40.A.20) 71
AFX8010
Rear work light Switch - Testing (A.40.A.17.83 - G.40.A.20) 71
AFX8010
Rear work light Wiring harness - Testing (A.40.A.17.88 - G.40.A.20) 72
AFX8010
Rear work light Relay - Unidentified failure (A.40.A.17.82 - G.30.B.46) 73
AFX8010

Side work light
Side work light Relay - Testing (A.40.A.18.82 - G.40.A.20) 75
AFX8010
Side work light Wiring harness - Testing (A.40.A.18.88 - G.40.A.20) 76
AFX8010
Side work light Relay - Unidentified failure (A.40.A.18.82 - G.30.B.46) 77
AFX8010

Under shield service light
Under shield service light Switch - Testing (A.40.A.19.83 - G.40.A.20) 79
AFX8010
Under shield service light Wiring harness - Testing (A.40.A.19.88 - G.40.A.20) 79
AFX8010

Cleaning shoe service light
Cleaning shoe service light Switch - Testing (A.40.A.20.83 - G.40.A.20) 80
AFX8010
Cleaning shoe service light Wiring harness - Testing (A.40.A.20.88 - G.40.A.20) 80
AFX8010

Engine component service light
Engine component service light Switch - Testing (A.40.A.21.83 - G.40.A.20) 81
AFX8010
Engine component service light Wiring harness - Testing (A.40.A.21.88 - G.40.A.20) 81
AFX8010

Back light
Back light - Unidentified failure (A.40.A.24 - G.30.B.46) 82
AFX8010

Unloading tube light
Unloading tube light - Testing (A.40.A.35 - G.40.A.20) 86
AFX8010
Unloading tube light - Unidentified failure (A.40.A.35 - G.30.B.46) 87
AFX8010

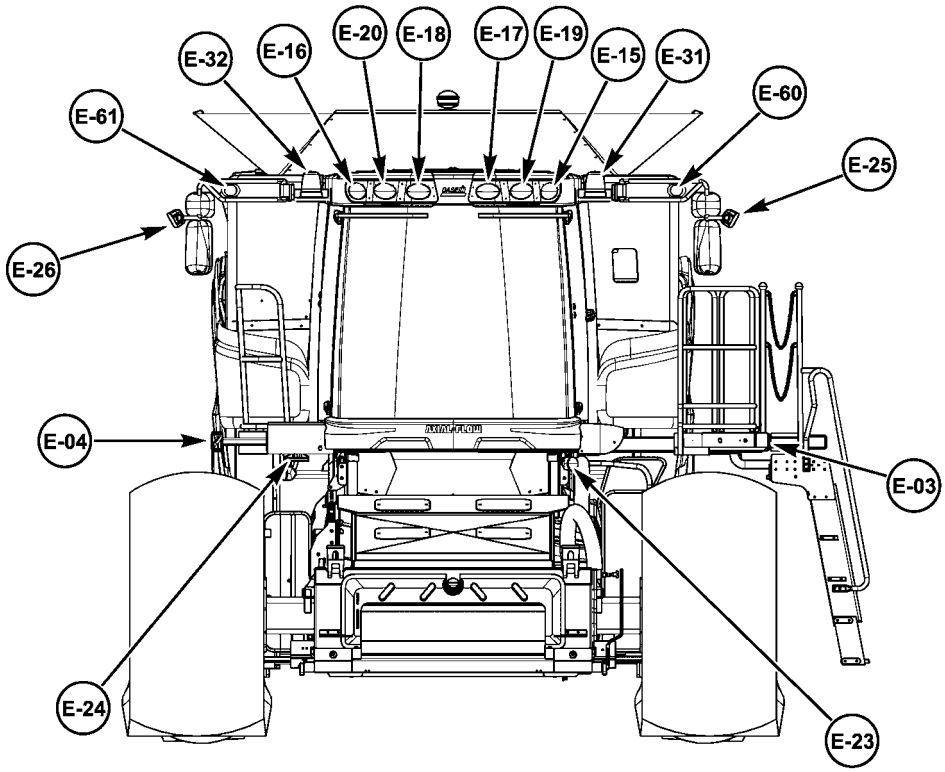
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LIGHTING SYSTEM - Overview (A.40.A - C.10.A.10)

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The AFX Series combines are equipped with several lighting circuits to provide illumination as required for different operations.
Lighting packages may vary depending on country. The lighting circuits can generally grouped as follows:

- Hazard Lights
- Turn Signals
- Marker Lights
- Road Lights
- Brake Lights
- Beacon Lights
- Front Work Lights
- Rear Work Lights
- Side Work Lights
- Under Shield Lighting / Service Lights
- Backlighting
- Flip Up Lights

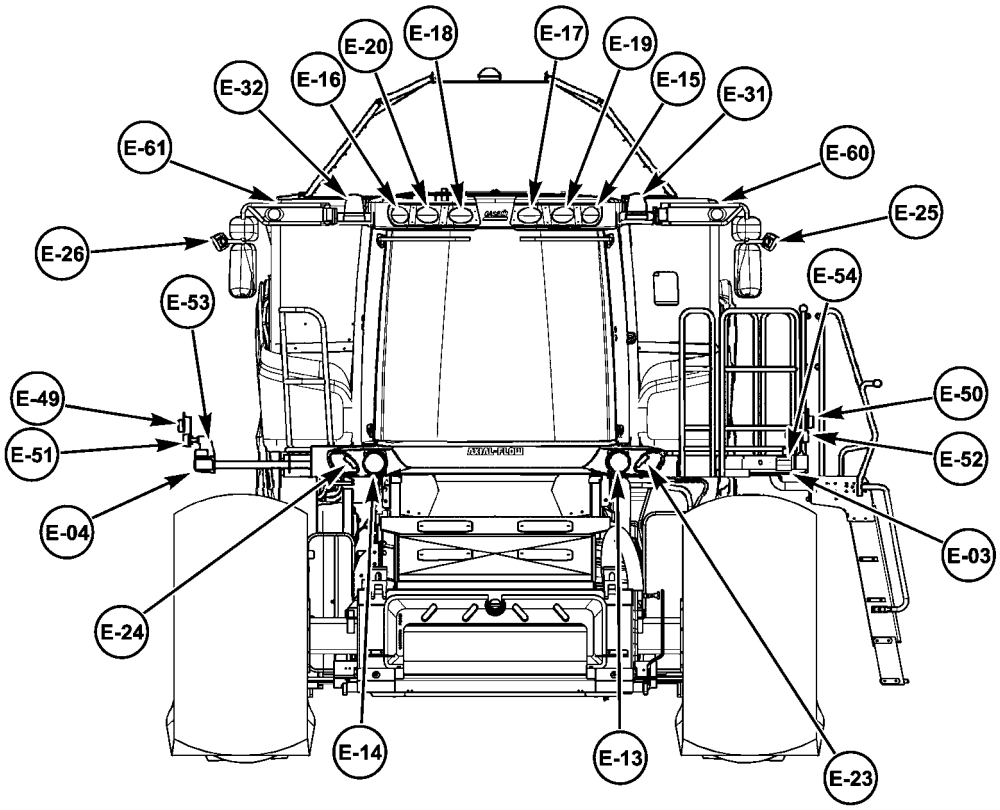


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North American - Front View

E-24	RH LOWER WORK LIGHT		E-17	LH CAB INNER WORK LIGHT
E-04	RH FRONT HAZARD LAMP		E-19	LH CAB MID WORK LIGHT
E-26	RH SIDE WORK LIGHT		E-15	LH CAB OUTER WORK LIGHT
E-61	RH HID FIELD LIGHT		E-31	LH FRONT BEACON LiGHT
E-32	RH FRONT BEACON LIGHT		E-60	LH HID FIELD LIGHT
E-16	RH CAB OUTER WORK LIGHT		E-25	LH SIDE WORK LIGHT
E-20	RH CAB MID WORK LIGHT		E-03	LH FRONT HAZARD LAMP
E-18	RH CAB MID WORK LIGHT		E-23	LH LOWER WORK LIGHT

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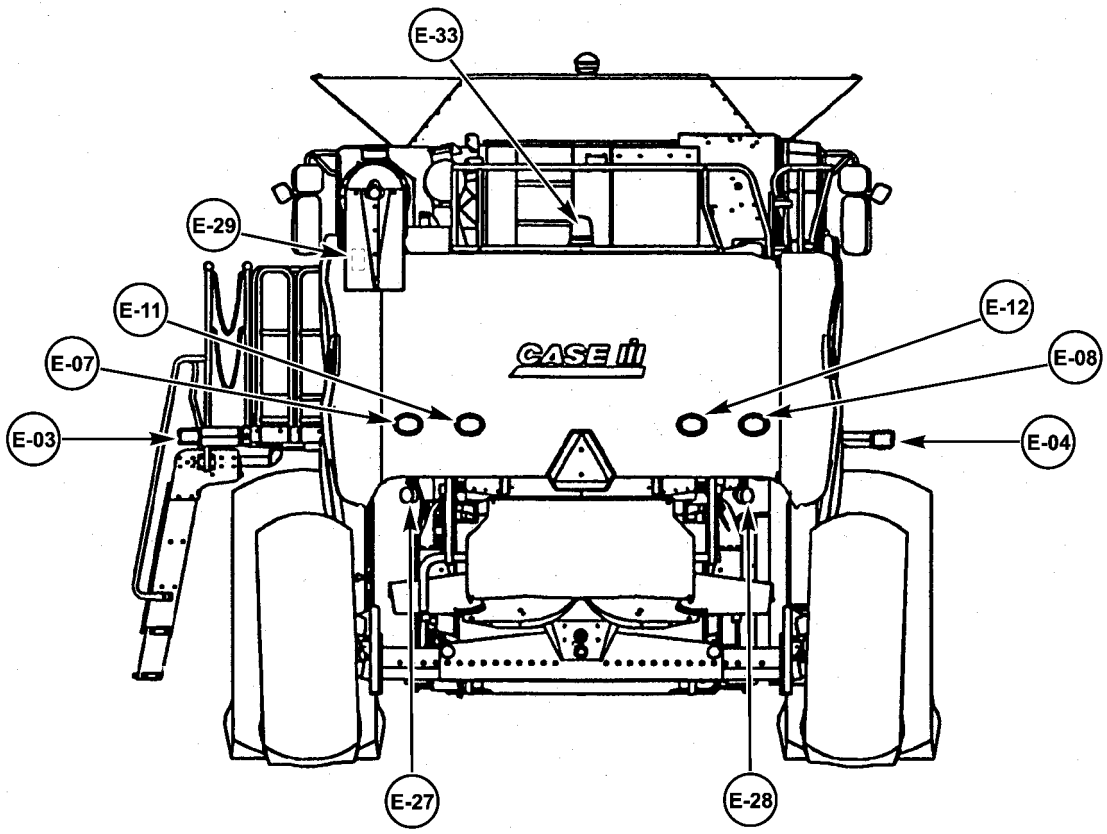
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European - Front View

E-13	LH ROAD LIGHT		E-49	RH POSITION MARKER LIGHT
E-14	RH ROAD LIGHT		E-50	LH POSITION MARKER LIGHT
E-32	RH FRONT BEACON		E-51	RH FLASHING LAMP
E-33	LH FRONT BEACON		E-52	LH FLASHING LAMP
E-47	LH FLIP UP ROAD LIGHT		E-60	LH HID FIELD LIGHT*
E-48	RH FLIP UP ROAD LIGHT		E-61	RH HID FIELD LIGHT*
E-53	RH Front Austria Marker Lamp**			
E-54	LH Front Austria Marker Lamp**			

* DIA KIT ITEM.** Specific Market

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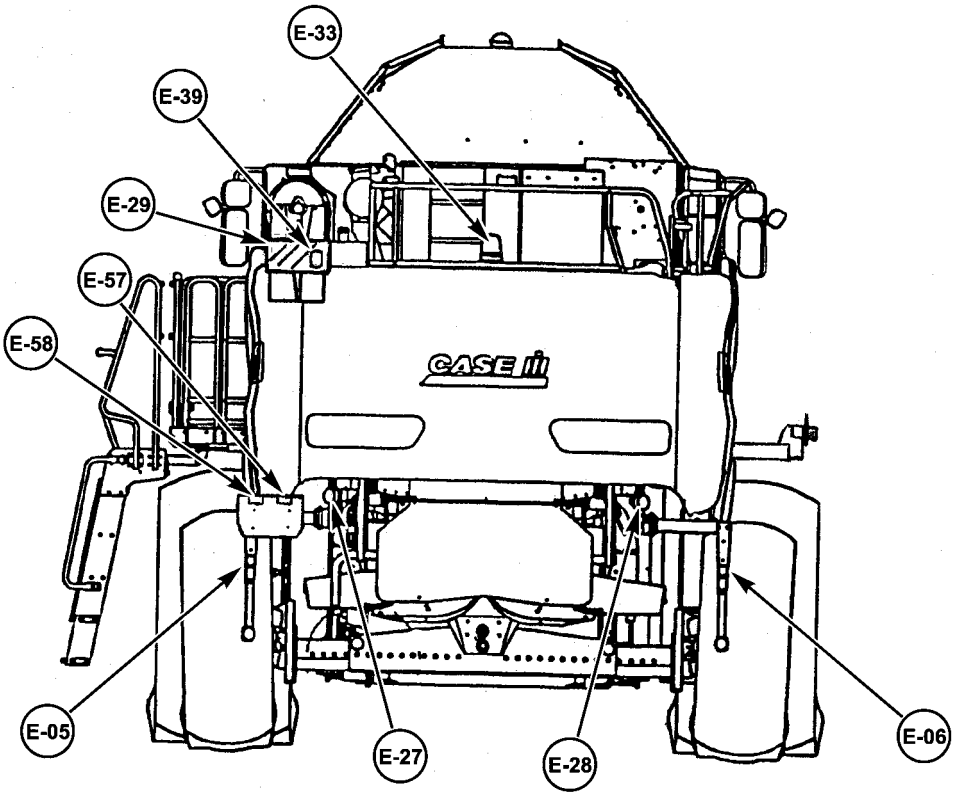


50035355A5 3

North American - Rear View

E-03	LH FRONT HAZARD LIGHT		E-12	RH FLIP UP ROAD LIGHT
E-07	LH FLASHING LAMP (NA)		E-08	RH FLASHING LAMP (NA)
E-11	LH BRAKE / TAIL LAMP		E-04	RH BRAKE / TAIL LAM
E-29	UNLOAD TUBE LIGHT		E-28	RH REAR WORK LIGHT
E-33	REAR BEACON LIGHT		E-27	LH REAR WORK LIGHT

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50035356A5 4

European - Rear View

E-05	LH REAR FLASHING LAMP (EU)		E-33	REAR BEACON LIGHT
E-58	LH LICENSE PLATE LAMP (EU)		E-06	RH REAR FLASHING LAMP (EU)
E-57	RH LICENSE PLATE LAMP (EU)		E-28	RH REAR WORK LIGHT
E-29	UNLOAD TUBE LIGHT		E-27	LH REAR WORK LIGHT
E-39	UNLOAD TUBE MARKER LIGHT (FRANCE ONLY)			

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Head light - Overview (A.40.A.11 - C.10.A.10)

AFX8010

DESCRIPTION

The road lights E-13/E-14 are used only on European configuration combines, and are controlled by the road light switch S-26, which is mounted on the steering column. The road lights E-13/E-14 are dual beam lights, with both low beam and high beam filaments.

POWER SUPPLY
Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)

- Current from the Cab Power Relay K-26 travels across the electrical system buss bar to reach fuse F-49.
- Current passes through fuse F-49 and a wire splice to reach connector **X256** pin 5 of the Road Light Switch (S-26), which supplies power for the marker and road lights circuits.
- Rotating the Road Light Switch (S-26) to the second position will activate the marker lights alone (refer to **Marker light - Overview (A.40.A.12 - C.10.A.10)** for more information), while the third position will activate both the marker lights and the road lights. When the road light switch is rotated to the third position, current may cross from pin 5 to reach pin 4 or pin 7, depending on the fore and aft position of the road light switch.
- Pulling the road light switch stalk toward the operator (low beam position) will result in current exiting pin 7, while pushing the stalk away from the operator (high beam position) will result in current exiting pin 4. If the road light switch stalk is pulled firmly past the low beam position toward the operator, a momentary contact will also provide power to pin 4 (high beam flash).

LOW BEAM OPERATION
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)

- Current flows from connector **X256** pin 7 to reach pin 1 of the low beam relay (K-05). The ground path of the relay exits pin 2 and travels to the cab floor ground location #3. This causes the low beam relay to energize and latch pin 3 to pin 5.
- Current passes through the low beam fuse F-33 to the low beam relay pin 3, through the relay, and continues through connector **X005** pin 13 to reach a wire splice. From here current flows to the LH road light E-13 connector **X164** pin B and RH road light E-14 connector **X169** pin B. Wires from pin C of each light go to the front frame ground #2, causing both lights to illuminate.

HIGH BEAM OPERATION
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)

- Current flows from connector **X256** pin 4 to reach pin 1 of the high beam relay (K-04). The ground path of the relay exits pin 2 and travels to the cab floor ground location #3. This causes the high beam relay to energize and latch pin 3 to pin 5.
- Current passes through the high beam fuse F-32 to the high beam relay pin 3, through the relay, and continues through connector **X005** pin 10 to reach a wire splice. From here current flows to the LH road light E-13 connector **X164** pin A and RH road light E-14 connector **X169** pin A. Wires from pin C of each light go to the front frame ground #2, causing both lights to illuminate.

FLIP-UP LIGHTS CIRCUIT
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)
Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)

The flip-up lights are designed for use with flip-up headers. The flip-up light (FC) harness plugs into the main frame (MF) harness at the existing road lights E-13 & E-14. The flip-up lighting consists of marker lights, road lights, and two relays. The flip up lighting is controlled by the road light switch S-26 in the same manner as the standard marker lights and road lights.

A wire in the flip-up header (HH) harness (box V, Frame 37) provides the ground path for the flip-up low beam and high relays. When a flip-up head is attached to the combine, the relays will be energized to send current to the flip up lights instead of the standard road lights. This wire is not present in other header (HH) harnesses, so when other headers are installed, the standard road lighting will function instead of the flip-up lights.

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Schematic frame #37 shows the optional flip-up kit harness as it would be installed on the combine. The following items should be understood:

- The existing main frame (MF) harness is unplugged from the standard road lights E-13 & E-14, shown on frame #36, and plugs into connectors X164 and X169 of the flip-up harness. The flip-up (FC) harness connectors **X335** and **X336** are then plugged into the standard road lights E-13 & E-14, as shown on frame #37.
- The flip-up light assemblies E-47 & E-48 come with the kit, and are installed on the cab platform railing. These light assemblies contain high & low beam road lights, and marker lights.
- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**
  Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)
  Connector **X218** from the flip-up (FC) harness plugs into an open connector on the main frame (MF) harness, and supplies power to the marker lights and relays (box W, supplied through fuse F21 from the marker light circuit). The ground path for the relays is also supplied through this connector (box V), and travels through the header connector **X032** and header (HH) harness before making its way back to the combine to the front frame ground location #2. If a flip-up head is not installed, the ground path wiring does not exist in the header (HH) harness, and the flip-up relays will not energize.
- If the flip-up high & low beam relays K-40 & K-41 are energized, the flip-up road lights are enabled, and the standard road lights are disabled. If these relays are not energized, then the standard road lights are used. Both the standard and flip-up marker lights are enabled at all times.

FLIP-UP LIGHTS OPERATION
Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)
Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)
Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)

- When the road light switch S-26 is turned to the marker lights position, the markers lights circuit provides power from fuse F-21 (frame #34) through connector **X218** pin 1 to illuminate the marker lights in the flip-up road light assemblies E-47/E-48, and also provides power to the flip-up high and low beam relays K-40/K-41 at pin 1. If a flip-up head is installed, a ground path is provided from the relays at pin 2 though connector **X218** pin 2 and the header harness to the front frame ground #2 (frame #33), causing the relays to be energized.
- When the road light switch S-26 is turned to the road lights, low beam position, the low beam relay K-05 is energized, and power is sent through connectors **X164** pin B and **X169** pin B to the Flip-up Low Beam Relay K-40 pin 3. Power flows through the relay to pin 5, and then to the flip-up light assemblies E-47/E-48 connectors **X333** pin 1 and **X334** pin 1. These light assemblies go to ground back through connectors **X164** pin C and **X169** pin C to the front frame ground #2. This causes the flip-up light assembly low beam lamps to illuminate.
- When the road light switch S-26 is turned to the road lights, high beam position, the high beam relay K-04 is energized, and power is sent through connectors **X164** pin A and **X169** pin A to the Flip-up High Beam Relay K-41 pin 3. Power flows through the relay to pin 5, and then to the flip-up light assemblies E-47/E-48 connectors **X333** pin 2 and **X334** pin 2. These light assemblies go to ground back through connectors **X164** pin C and **X169** pin C to the front frame ground #2. This causes the flip-up light assembly high beam lamps to illuminate.
- If a flip-up head is not installed, the Flip-up Low & High Beam Relays K-40/K-41 will not be energized, and power will instead flow through the relays to pin 4, and then to the standard road lights E-13/E-14.

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Marker light - Overview (A.40.A.12 - C.10.A.10)

AFX8010

DESCRIPTION

- Current travels across the electrical system buss bar to reach fuse F-49. **Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)**
- **Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**Current passes through fuse F-49 and a wire splice to reach connector **X256** pin 5 of the Road Light Switch (S-26) (control stalk found on the left side of the steering column).
- Rotating the Road Light Switch (S-26) to the second (marker lights) or third position (road lights) causes current to cross from pin 5 to reach pin 1. Current exits pin 1 of the road light switch (and travels to pin 5 of the Light Control Relay (K-02).
- Current travels from pin 5 to pin 1 of the light control relay (K-02). A jumper wire at pin 1 of the light control relay delivers current to connector **X018** Pin J1-21 of CCM-1. CCM-1 then activates the backlighting circuit. Refer to the backlighting circuit for more information.**Back light - Overview (A.40.A.24 - C.10.A.10)**
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** Current enters pin 1 of the light control relay and reaches the coil within the relay. The ground path to the relay exits pin 2 and travels to the cab floor ground location #3. This causes the light control relay to energize and send current from pin 3 to fuse F-20. A jumper wire sends current from fuse F-20 to fuse F-21.

FUSE F-20 (7.5 Amp)

- Current exits fuse F-20 and travels through connector **X005** to reach a wire splice. The wire splice sends current to three different paths:
- The first path (French Models Only) sends current through connectors **X009**, **X105** and X323 to reach pin A of the Unload Tube Marker LT (E-39). The ground path exits pin B and travels through connector **X105** and **X009** to reach the front frame ground location #2. This causes the Unload Tube Marker Light to illuminate.
- **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)** The second path sends current through connector **X024** to reach a wire splice. The wire splice splits the current into two different paths. The first path sends current through connector **X285** to reach pin 58L of the Trailer Outlet (J-09). This provides current for the LH Trailer Marker Lights (if equipped). The second path sends current through connector **X071** to reach a wire splice. The wire splice splits the current into two different paths. The first path (European Models Only) sends current to the LH Rear Flashing Lamp (EU) (E-05). The ground path exits pin 4 and travels through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the LH Rear Marker Lamp (EU) to illuminate. The second path (North American Models Only) sends current to the LH Brake / Tail Lamp (NA) (E-11). The ground path exits pin C and travels through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the LH Brake / Tail Lamp (NA) to illuminate.
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The third path sends current through connector **X160** to reach a wire splice. The wire splice sends current to the LH Front Hazard Lamp (E-03), LH Position Lamp E-50 (European Models Only), and the LH Front Austria Lamp (E-54). The ground paths to the lights listed above travel through a wire splice and connector **X160** to reach the front frame ground location #2. This causes the lights to illuminate.

FUSE F-21 (7.5 Amp)

- Current flows from fuse F-21 and splits into two paths:
- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** The first path (European Only) sends current through connectors **X031**, and **X007**, to reach header connector **X032**. If equipped with a header, current passes through connector **X032** and reaches a wire splice. The wire splice sends current to the Header LH Marker LT (EU) (E-41) and the Header RH Marker LT (EU) (E-40). The ground path for the marker lights travels through a wire splice, connectors **X032** and **X007** to reach the front frame ground location #2. This causes the Header LH Marker LT (EU) and the Header RH Marker LT (EU) (E-40) to illuminate.
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The second path sends current from fuse F-21 through connector **X005** to reach a wire splice. The wire splice splits the current into three paths:

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- **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)** The first path sends current through connector **X024** to reach a wire splice. The wire splice sends current to two different paths. The first path sends current through connector **X285** to reach pin 58R of the trailer outlet J-09. The second path sends current through connector **X071** to reach a wire splice. The wire splice splits the current into two different paths. The first path (North American Models) sends current to the RH Brake / Tail Lamp (NA) (E-12). The ground path to the RH Brake / Tail Lamp (NA) exits pin C and travels through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the RH Brake / Tail Lamp (NA) to illuminate. The second path (European Models) sends current to pin 2 of the RH Rear Flashing Lamp (EU) (E-06). The ground path to the RH Rear Flashing Lamp (EU) exits pin 4 and travels through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the RH Rear Flashing Lamp (EU) to illuminate.
- **Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)** The second path (European Models Only) sends current to LH Flip Up Road Light (E-47) and RH Flip Up Road Light (E-48).
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The third path sends current through connector **X165** to reach a wire splice. The wire splice sends current to the RH Front Hazard Lamp (E-04), RH Position Lamp (E-49) (European Models Only), and the RH Front Austria Lamp (E-53). The ground paths to the lights listed above travel through a wire splice and connector **X165** to reach the front frame ground location #2. This causes the lights to illuminate.

License Plate Lights (European Models Only) **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**

- If equipped with license plate lights, a jumper harness will be plugged into connector **X302**. When the marker lights are on, current flows through pin 2 of connector **X302** to reach a wire splice. The wire splice splits the current into three paths. The first path sends current to pin 1 of the LH License Plate Lamp (EU) (E-58). The ground path to the LH License Plate Lamp (EU) exits pin 2 and travels through two wire splices and connector **X071** to reach the rear frame ground location #1. This causes the LH License Plate Lamp (EU) to illuminate. The second path sends current to pin 2 of the RH Rear Flashing Lamp (EU) (E-06). The ground path to the RH Rear Flashing Lamp (EU) exits pin 4 and travels through a wire splice and connectors **X302** and **X071** to reach the rear frame ground location #1. This causes the RH Rear Flashing Lamp (EU) to illuminate. The third path sends current to the RH License Plate Lamp (EU) (E-57). The ground path to the RH License Plate Lamp (EU) exits pin 2 and travels through two wire splices and connector **X071** to reach the rear frame ground location #1. This causes the RH License Plate Lamp (EU) to illuminate.

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Turn/hazard light - Overview (A.40.A.13 - C.10.A.10)

AFX8010

HAZARD LIGHTS CIRCUIT

NOTE: *Failed bulbs, poor connections, or broken circuitry may cause the flashers to flash on and off at an irregular pace. If trailer lights are connected, the lighting system will function differently. For example, when trailer lights are connected to the lighting circuit, a bulb failure will have less affect on the operation of the circuit.*
Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33) Current travels from the electrical system buss bar and passes through fuse F-56 (15-amp) and connector **X033** to reach a wire splice. The wire splice directs current to two different paths:
The first path sends current through connector **X255** to reach pin 1 of the Flasher Module (A-05). Current reaching pin 1 of the Flasher Module provides power for the module to function. The ground path exits pin 6 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This provides power for the Flasher Module to function.
The second path sends current to pin 2 of the Hazard Switch (S-25).
When the hazard switch is moved to the ON position, current crosses from pin 2 to reach pin 3. An internal jumper also sends current through pin 7 to reach the indicator lamp within the switch. The ground path for the internal indicator lamp exits pin 9 and passes through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the internal indicator lamp to illuminate.
Current travels from pin 3 to reach a wire splice. The wire splice sends current to two different paths:
The first path sends current through connectors **X033** and **X015** to reach pin J1-15 of CCM-2. This informs the network that the hazard switch has been activated.

When the hazard switch is activated, the following work lights are disabled:

- LH Cab Inner Work Light (E-17) will only operate in "Low Beam" mode.
- RH Cab Inner Work Light (E-18) will only operate in "Low Beam" mode.
- LH Lower Work Light (E-23)
- RH Lower Work Light (E-24)
- Unload Tube Light (E-29)
- LH Rear Work Light (E-27)
- RH Rear Work Light (E-28)
- LH HID Field Lights (E-60)
- RH HID Field Lights (E-61)

The second path sends current to pin 2 of the Flasher Module (A-05). The Flasher Module energizes and sends pulsing current from pins 3 and 4.

PIN 3 of the Flasher Module

- Pulsing current exits pin 3 and reaches a wire splice. The wire splice directs current to two paths:
  The first path sends pulsing current through connector **X257** to reach pin 7 of the Turn Indicator (Left) (E-09) found on the steering column. The ground path exits pin 9 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the left light within the turn indicator to flash on and off.
  The second path sends pulsing current through connectors **X033** and **X005** to reach a wire splice. **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The wire splice sends pulsing current to three different paths:
- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** The first path (North American models only) sends pulsing current through connector **X008** and connector **X007** to reach connector **X032**. If a header is equipped, the header harness is used to send pulsing current through connector X303 to the LH Header Flashing Lamp (NA) (E-01). The ground path exits connector X303 and passes through a wire splice, connector **X032**, and connector **X071** to reach the front frame ground location #2. This causes the LH Header Flashing Lamp (NA) (E-01) to flash on and off.
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The second path sends pulsing current through connector **X160** to a wire splice. The wire splice sends pulsing current to the LH Front Hazard Lamp (E-03) (All Markets) and the LH Flashing Lamp (E-52) (European Models Only). The ground path for the lights travels through a wire splice and connector **X160** to reach the front frame ground location

#2. This causes the LH Front Hazard Lamp (E-03) and the LH Flashing Lamp (E-52) (European Models Only) to flash on and off.

- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** The third path sends pulsing current through connector X024 to reach a wire splice. The wire splice sends pulsing current to two different paths. The first path sends current through connector **X285** to reach pin L on the Trailer Outlet (J-09).
- The second path (European models only) sends pulsing current through connector **X071** and pin 1 of connector **X301** to reach the LH Rear Flashing Lamp (EU) (E-05). The ground path exits pin 4 of the lamp and travels through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the LH Rear Flashing Lamp to flash on and off.

PIN 4 of the Flasher Module

- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** Pulsing current exits pin 4 and reaches a wire splice. The wire splice directs current to two paths:
  The first path (North American models only) sends pulsing current through connector **X257** to reach pin 10 of the Turn Indicator (Right) (E-09) found on the steering column. The ground path exits pin 9 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the right light within the turn indicator to flash on and off.
  The second path sends pulsing current through connectors **X033** and **X005** to reach a wire splice. **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The wire splice sends pulsing current to three different paths:
- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** The first path sends pulsing current through connector **X008** and connector **X007** to reach connector **X032**. If a header is equipped, the header harness is used to send pulsing current through connector X304 to the RH Header Flashing Lamp (NA) (E-02). The ground path exits connector X304 and passes through a wire splice, connector **X032**, and connector **X007** to reach the front frame ground location #2. This causes the RH Header Flashing Lamp (NA) (E-02) to flash on and off.
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The second path sends pulsing current through connector **X165** to a wire splice. The wire splice sends pulsing current to the RH Front Hazard Lamp (E-04) (All Markets) and the RH Flashing Lamp (E-51) (European Models Only). The ground path for the lights travels through a wire splice and connector **X165** to reach the front frame ground location #2. This causes the RH Front Hazard Lamp (E-04) and the RH Flashing Lamp (E-51) (European Models Only) to flash on and off.
- The third path sends pulsing current through connector **X024** to reach a wire splice. **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)** The wire splice sends pulsing current to two different paths:
  The first path sends current through connector **X285** to reach pin R on the Trailer Outlet (J-09).

European Models Only

- The second path sends pulsing current through connector **X071** and pin 1 of connector **X302** to reach the RH Rear Flashing Lamp (EU) (E-06). The ground path exits pin 4 of the lamp and travels through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the RH Rear Flashing Lamp to flash on and off.

LEFT-HAND FLASHER (TURN SIGNAL) CIRCUIT

NOTE: *Failed bulbs, poor connections, or broken circuitry may cause flasher to flash on and off at an irregular pace. If trailer lights are connected, the lighting system will function differently. For example, when trailer lights are connected to the lighting circuit, a bulb failure will have less effect on the operation of the circuit.*

NOTE: *If the road/field mode switch is in the "Field" position and the work lights are "ON", activating the left turn signal causes the side work lights to illuminate. This is to help the operator negotiate a turn in low light conditions. The right hand control module, CCM-1, and CCM-2 communicate through the network to control this feature. See the work light circuit for more information on the side work lights.*

Flasher Module Power **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**

- Current travels from the electrical system buss bar to reach fuse F-56 (15-amp). Current passes through fuse F-56, connector **X033** and a wire splice to reach pin 1 of the flasher module (A-05). The ground path exits pin 6 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This provides power for the flasher module to function.

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Road Light Switch Power

- Current travels from the electrical system buss bar to reach fuse F-38 (7.5-amp) **Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)**. Current passes through fuse F-38 and connector **X068** to reach the key switch (S-02). When the key switch is turned to the "ACC/Run" position, current flows from connector **X068** pin 6 to reach a wire splice. The wire splice directs the current to connector **X256** pin 6 of the road light switch (S-26) **Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**.

Left Turn Operation

- When the road light switch is moved to the LH Turn position (control stalk pulled toward the operator), current crosses from pin 6 to pin 3 and reaches a wire splice. The wire splice directs the current to two different paths:
- The first path sends current to connector **X018** pin J1-2 of CCM-1. Current enters pin J1-2 to inform CCM-1 that the left-hand turn signal circuit has been activated. If the combine is in "Field" mode and the work lights are "On", CCM-1 will activate the side work lights.
- The second path sends current through connector **X033** to reach connector **X255** pin 8 of the flasher module (A-05). Depending on the configuration of the combine, the flasher module then activates the left turn signal circuit in ISO (European) or NASO (North American) mode.

ISO or NASO Mode Selection

- Whether the combine flashing lights will operate in ISO or NASO mode is controlled by current sent from CCM-2 to the flasher module. When configured for ISO operation, CCM-2 sends current from pin J1-5 through connector **X033** to pin 9 of the flasher module (A-05). When in NASO mode, current will not be sent to pin 9 of the flasher module. The flasher module will function accordingly.

Pin 10 of the Flasher Module (Pulsing) **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**

- Pulsing current exits pin 10 of the flasher module and passes through connectors **X033**, **X004**, **X024**, and **X071**, to reach connector **X242** pin A of the LH Flashing Lamp (E-07). The ground path exits pin B and passes through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the LH flashing lamp (NA) (E-07) to flash on and off.

Pin 3 of the Flasher Module (Pulsing)

- Pulsing current exits pin 3 and reaches a wire splice. The wire splice directs current to two paths. The first path sends pulsing current through connector **X257** to reach pin 7 of the Turn Indicator (Left) (E-09) found on the steering column. The ground path exits pin 9 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the left light within the turn indicator to flash on and off. The second path sends pulsing current through connectors **X033** and **X005** to reach a wire splice. **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The wire splice sends pulsing current to three different paths:
- North American Models **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** - The first path sends pulsing current through connector **X008** and connector **X007** to reach connector **X032**. If a header is equipped, the header harness is used to send pulsing current through connector X303 to the LH Header Flashing Lamp (NA) (E-01). The ground path exits connector X303 and passes through a wire splice, connector **X032**, and connector **X007** to reach the front frame ground location #2. This causes the LH Header Flashing Lamp (NA) (E-01) to flash on and off.
- The second path sends pulsing current through connector **X160** to a wire splice. **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The wire splice sends pulsing current to the LH Front Hazard Lamp (E-03) (All Markets) and the LH Flashing Lamp (E-52) (European Models Only). The ground path for the lights travels through a wire splice and connector **X160** to reach the front frame ground location #2. This causes the LH Front Hazard Lamp (E-03) and the LH Flashing Lamp (E-52) (European Models Only) to flash on and off.
- The third path sends pulsing current through connector **X024** to reach a wire splice.**Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)** The wire splice sends pulsing current through connector **X285** to reach pin L on the Trailer Outlet (J-09).

NASO MODELS ONLY (North American)

- With the combine in NASO mode and the left turn signal activated, pulsing current flows from pin 10 and pin 3 and solid current travels from pin 4 of the flasher module (A-05).

Pin 4 of the Flasher Module (Solid) **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**

- Solid current exits pin 4 and reaches a wire splice. The wire splice directs current to two paths. The first path sends solid current through connector **X257** to reach pin 10 of the Turn Indicator (Right) (E-09) found on the steering column. The ground path exits pin 9 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the right light within the turn indicator to Illuminate. The second path sends solid current through connectors **X033** and **X005** to reach a wire splice. **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The wire splice sends pulsing current to three different paths:

- **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)** North American Models - The first path sends solid current through connector **X008** and connector **X007** to reach connector **X032**. If a header is equipped, the header harness is used to send solid current through connector X304 to the RH Header Flashing Lamp (NA) (E-02). The ground path exits connector X304 and passes through a wire splice, connector **X032**, and connector **X007** to reach the front frame ground location #2. This causes the RH Header Flashing Lamp (NA) (E-02) to illuminate.

- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The second path sends solid current through connector X165 to a wire splice. The wire splice sends solid current to the RH Front Hazard Lamp (E-04). The ground path for the lamp travels through a wire splice and connector **X165** to reach the front frame ground location #2. This causes the RH Front Hazard Lamp (E-04) to illuminate.

- **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)** The third path sends solid current through connector **X024** to reach a wire splice. The wire splice sends solid current through connector **X285** to reach pin R on the Trailer Outlet (J-09). This causes the trailer light to illuminate (if equipped).

RIGHT-HAND FLASHER (TURN SIGNAL) CIRCUIT

NOTE: *Failed bulbs, poor connections, or broken circuitry may cause flasher to flash on and off at an irregular pace. If trailer lights are connected, the lighting system will function differently. For example, when trailer lights are connected to the lighting circuit, a bulb failure will have less effect on the operation of the circuit.*

NOTE: *If the road/field mode switch is in the "Field" position and the work lights are "ON", activating the right turn signal causes the side work lights to illuminate. This is to help the operator negotiate a turn in low light conditions. The right hand control module, CCM-1, and CCM-2 communicate through the network to control this feature. See the work light circuit for more information on the side work lights.*

Flasher Module Power **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**

- Current travels from the electrical system buss bar to reach fuse F-56 (15-amp). Current passes through fuse F-56, connector **X033** and a wire splice to reach pin 1 of the flasher module (A-05). The ground path exits pin 6 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This provides power for the flasher module to function.

Road Light Switch Power

- **Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)** Current travels from the electrical system buss bar to reach fuse F-38 (7.5-amp). Current passes through fuse F-38 and connector **X068** to reach the key switch (S-02). When the key switch is turned to the "ACC/Run" position, current flows from connector **X068** pin 6 to reach a wire splice. The wire splice directs the current to connector **X256** pin 6 of the road light switch (S-26) **Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)**.

Right Turn Operation

- When the road light switch (S-26) is moved to the RH Turn position (control stalk pushed away from the operator), current crosses from pin 6 to pin 2 and reaches a wire splice. The wire splice directs the current to two different paths:

- The first path sends current to connector **X018** pin J1-9 of CCM-1. Current enters pin J1-9 to inform CCM-1 that the right-hand turn signal circuit has been activated. If the combine is in "Field" mode and the work lights are ON, CCM-1 will activate the side work lights.

- The second path sends current through connector **X033** to reach connector **X255** pin 7 of the flasher module (A-05). Depending on the configuration of the combine, the flasher module then activates the right turn signal circuit in ISO (European) or NASO (North American) mode.

ISO or NASO Mode Selection

- Whether the combine flashing lights will operate in ISO or NASO mode is controlled by current sent from CCM-2 to the flasher module. When configured for ISO operation, CCM-2 sends current from pin J1-5 through connector **X033** to pin 9 of the flasher module (A-05). When in NASO mode, current will not be sent to pin 9 of the flasher module. The flasher module will function accordingly.

Pin 11 of the Flasher Module (Pulsing)

- Pulsing current exits pin 11 of the flasher module (A-05) and passes through connectors **X033**, **X004**, **X024**, and **X071**, to reach connector **X245** pin A of the RH Flashing Lamp (E-08). The ground path exits pin B and passes through a wire splice and connector **X071**to reach the rear frame ground location #1. This causes the RH flashing lamp (NA) (E-08) to flash on and off.

Pin 4 of the Flasher Module (Pulsing) **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**

- Pulsing current exits pin 4 and reaches a wire splice. The wire splice directs current to two paths:
  The first path sends pulsing current through connector **X257** to reach pin 10 of the Turn Indicator (Right) (E-09) found on the steering column. The ground path exits pin 9 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the right light within the turn indicator to flash on and off.
  The second path sends pulsing current through connectors **X033** and **X055** to reach a wire splice. The wire splice sends pulsing current to three different paths:
- North American Models - The first path sends pulsing current through connector **X008** and connector **X007** to reach connector **X032**. If a header is equipped, the header harness is used to send pulsing current through connector X304 to the RH Header Flashing Lamp (NA) (E-02). The ground path exits connector X304 and passes through a wire splice, connector **X032**, and connector **X007** to reach the front frame ground location #2. This causes the RH Header Flashing Lamp (NA) (E-02) to flash on and off.
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The second path sends pulsing current through connector **X165** to a wire splice. The wire splice sends pulsing current to the RH Front Hazard Lamp (E-04) (All Markets) and the RH Flashing Lamp (E-51) (European Models Only). The ground path for the lights travels through a wire splice and connector **X165** to reach the front frame ground location #2. This causes the RH Front Hazard Lamp (E-04) and the RH Flashing Lamp (E-51) (European Models Only) to flash on and off.
- **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)** The third path sends pulsing current through connector **X024** to reach a wire splice. The wire splice sends pulsing current through connector **X285** to reach pin R on the Trailer Outlet (J-09).

NASO MODELS ONLY (North American) **Wiring harness - Electrical schematic frame 33 (A.30.A.88 - C.20.E.33)**

- With the combine in NASO mode and the right turn signal activated, pulsing current flows from pin 11 and pin 4 and solid current travels from pin 3 of the flasher module (A-05).

Pin 3 of the Flasher Module (Solid)

- Solid current exits pin 3 and reaches a wire splice. The wire splice directs current to two paths.
  The first path sends solid current through connector **X257** to reach pin 7 of the Turn Indicator (Left) (E-09) found on the steering column. The ground path exits pin 9 and travels through a wire splice and connector **X033** to reach the cab floor ground location #3. This causes the Left light within the turn indicator to Illuminate.
  The second path sends solid current through connectors **X033** and **X005** to reach a wire splice. The wire splice sends pulsing current to three different paths:
- The first path (North American models only) sends solid current through connector **X008** and connector **X007** to reach connector **X032**. If a header is equipped, the header harness is used to send solid current through connector X303 to the LH Header Flashing Lamp (NA) (E-01). The ground path exits connector X303 and passes through a wire splice, connector **X032**, and connector **X007** to reach the front frame ground location #2. This causes the LH Header Flashing Lamp (NA) (E-01) to illuminate.
- **Wiring harness - Electrical schematic frame 34 (A.30.A.88 - C.20.E.34)** The second path sends solid current through connector **X165** to a wire splice. The wire splice sends solid current to the RH Front Hazard Lamp (E-04). The ground path for the lamp travels through a wire splice and connector **X165** to reach the front frame ground location #2. This causes the RH Front Hazard Lamp (E-04) to illuminate.
- **Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)**The third path sends solid current through connector **X024** to reach a wire splice. The wire splice sends solid current through connector **X285** to reach pin R on the Trailer Outlet (J-09). This causes the trailer light to illuminate (if equipped).

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Brake light - Overview (A.40.A.14 - C.10.A.10)

AFX8010

BRAKE LIGHTS CIRCUIT

The brake lights warn motorists that the combine is slowing or stopping. The brake lights are activated when the brake pedal is depressed, the hydrostatic control lever is pulled back quickly, or the engine is automatically shutdown. The brake light circuit consists of the following components:

- 2 Brake Lights (E-11, E-12 NASO), (E-05, E-06 ISO)
- CCM2
- Brake Pressure Switch (S-39)
- Ground Speed Pot (R-04)
- Brake Light Relay (K-33)

CCM-2 activates the brake lights when any of the following conditions are met:

Brake Pedal Depressed
Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)

- When the brake pedal is depressed, the pressure created in the brake lines causes the Brake Pressure Switch S-39 to close and complete the ground path from Pin J2-34 of CCM-2 to the front frame ground location #2. CCM-2 activates the Brake Light Circuit.

Hydrostatic Control Lever Pulled Back Quickly
Wiring harness - Electrical schematic frame 07 (A.30.A.88 - C.20.E.07)
Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)

- The RHM sends 5 volts from pin 16 of connector **X026** through a wire splice to pin A on the Ground Speed Pot R-04. The potentiometer's ground path exits pin B and travels through a wire splice to reach pin 6 of connector X026 of the RHM. The RHM monitors the signal between pin 1 of connector **X027** and pin C of the Ground Speed Pot R-04. When the hydrostatic control lever is pulled back quickly, the RHM sends a message across CAN to CCM-2. CCM-2 activates the Brake Light Circuit.

Emergency Shutdown

- When the combine senses a serious problem, CCM-2 forces the engine to automatically shutdown. During these conditions, CCM-2 will activate the Brake Light Circuit.

Brake Light Circuit Activation
Wiring harness - Electrical schematic frame 35 (A.30.A.88 - C.20.E.35)
Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)

- When the brake lights are activated, CCM-2 sends current from connector **X015** pin J1-18 to pin 1 of the Brake Lights Relay K-33. The brake light relay energizes and latches pins 3 and 5. Current flows from the electrical system buss bar and passes through fuse F-52 to reach pin 3 of the Brake Lights Relay. Current crosses from pin 3 to pin 5 and travels through connectors **X004** and **X024** to reach a wire splice. The wire splice sends the current to 3 paths:
- The first path sends current through connector **X285** to reach pin 54 of the trailer outlet (J-09). This activates the trailer brake lights (if equipped).
- The second path sends current through connector **X071** to reach a wire splice. The wire splice sends current to the LH Brake/Tail Lamp (E-11) (North American) and the LH Rear Flashing Lamp (E-05) (European). The ground path to the lamp passes through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the lamp to illuminate.
- The third path sends current through connector **X071** to reach a wire splice. The wire splice sends current to the RH Brake/Tail Lamp (E-12) (North American) and the RH Rear Flashing Lamp (E-06) (European). The ground path to the lamp passes through a wire splice and connector **X071** to reach the rear frame ground location #1. This causes the lamp to illuminate.

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Beacon - Overview (A.40.A.15 - C.10.A.10)

AFX8010

Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)
The AFX Combine is equipped with three beacon lights. There are two beacon lights mounted to the cab roof and one mounted at the rear railing of the combine (engine platform).
Three things cause the beacon lights to activate:

- Beacon Switch pressed to the "On" position.
- Initial Startup - Beacon Lights illuminate when the ignition key is moved from the "Off" position.
- Grain Bin Becoming Full - The combine is equipped with a lower (3/4) and upper (bin full) grain tank level sensor. These sensors monitor the level of material in the grain bin. When the thresher is engaged and the material in the grain bin reaches the lower sensor, the rotating beacons will flash (If the work lights are activated, the rotating beacons will only flash for approximately 10 seconds. The rotating beacons flash again for another 10 seconds when the upper sensor detects material). The flashing beacons inform a grain truck operator to prepare for unloading the grain bin.

NOTE: *The beacon light circuit shows the beacon switch in the "On" position.*

Description

- Current flows through the electrical system buss bar and passes through fuse F-53 to reach pin 3 of the beacon light relay (K-29). Current flow to the coil within the beacon light relay (Pin 1) is controlled by CCM-2. If one of the three conditions listed above occurs, current travels from CCM-2 connector **X015** pin J1-24 to the beacon light relay pin 1. The ground path exits pin 2 and travels to the cab floor ground location #3. This energizes the relay.
- The beacon light relay latches and current crosses from pin 3 to reach pin 5. From pin 5, current flows to two different paths.
- The first path sends current through connectors **X004**, **X024**, and **X071** to reach pin 1 of connector **X247**. Current enters pin 1 and reaches the rear beacon light (E-33). The ground path exits pin 2 and travels through a wire splice, and connector **X071** to reach the rear frame ground location #1 (refer to **Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)** for complete ground path). This activates the rear beacon.
- The second path sends current through connectors **X002**, and **X036** to reach a wire splice. The wire splice splits the current into two paths:
- The first path sends current to pin 1 of connector **X113**. Current enters pin 1 to reach the LH Front Beacon Light (E-31). The ground path exits pin 2 and travels through a wire splice and connector **X036** to reach the cab roof ground location #4. This causes the LH Front Beacon light to activate.
- The second path sends current to pin 1 of connector **X119**. Current enters pin 1 to reach the RH Front Beacon Light (#32). The ground path exits pin 2 and travels through a wire splice and connector **X036** to reach the cab roof ground location #4. This causes the RH Front Beacon Light to activate.

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Front work light - Overview (A.40.A.16 - C.10.A.10)

AFX8010

Description

- The Front Work Lights are controlled by the Work Light Switch (S-43) found on the upper left switch panel. When the Key Switch (S-02) is in the "Start" or "Run" positions, current flows from pin 6, energizes the Cab Power Relay (K-26) and travels through the Cab Fuse Relay (F-49), to reach pin 2 of the Work Light Switch (S-43). The Work Light Switch (S-43) is a toggle switch with three positions:

1ST POSITION (OFF)
Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)

- When the Work Light Switch (S-43) is in the first position, current flow is stopped.

NOTE: *To reduce the possibility of blinding other drivers, some Front Work Lights are disabled when the combine is "Road Mode" or the Hazard Switch (S-25) is in the "On" Position. Both modes are explained below.*

2ND POSITION

- When the Work Light Switch (S-43) is in the SECOND position, current flows from pin 3 and travels through connector **X002** to reach connector **X018** pin J1-3 of CCM-1. Depending on the positions of the On The Road Switch (S-12) and the Hazard Switch (S-25), current is sent to the following work lights:

On The Road Switch (S-12) and Hazard Switch in the "OFF" position

- Cab Outer Work Lights (E-15, E16) - **Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**
  When the Work Lights Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-11 to reach pin 86 of the Cab Roof Work Lights Relay (K-01). The relay energizes and latches terminals 30 and 87. Current sent from the electrical buss bar passes through the Cab Roof Light Fuse (F-31) and the Cab Roof Work Lights Relay and is split into two paths:
  The first path sends current through the LH Cab Roof Light Fuse (F-06), connector **X002**, and connector **X036** to reach pin A of the LH Cab Outer Work Light (E-15). The ground path exits pin B and passes through a wire splice and connector **X036** to reach the cab roof ground location #4. This causes the LH Cab Roof Light to illuminate.
  The second path sends current through the RH Cab Roof Light Fuse (F-07), connector **X002**, and connector **X036** to reach pin A of the RH Cab Outer Work Light (E-16). The ground path exits pin B and passes through a wire splice and connector **X036** to reach the cab roof ground location #4. This causes the RH Cab Roof Light to illuminate.

- Cab Inner Work Lights (E-17, E-18) High Beam - **Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)**
  When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-5 to reach pin 1 of the Road Lights Relay (K-27). The relay energizes and latches terminals 3 and 5. Current sent from the Distance Work Light Relay (K-21) passes through the Road Lights Relay (K-27) and travels through connectors **X003** and **X036** to reach a wire splice. The wire splice splits the current into two paths:
  The first path sends current to pin B of the LH Cab Inner Work Light (E-17). The ground path to the LH Cab Inner Work Light exits pin C and travels through a wire splice and connector **X036** to reach the cab ground location #4. This causes the LH Cab Inner Work Light to illuminate (High Beam).
  The second path sends current to pin B of the RH Cab Inner Work Light (E-18). The ground path to the RH Cab Inner Work Light exits pin C and travels through a wire splice and connector **X036** to reach the cab ground location #4. This causes the RH Cab Inner Work Light to illuminate (High Beam).

- Cab Mid Work Lights (E-19, E-20) - **Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**
  When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-5 to reach pin 1 of the Road Lights Relay (K-27). From pin 1, current flows to pin 1 of the Header Work Lights Relay (K-22). The relay energizes and latches terminals 3 and 5. Current flows from the electrical system buss bar and passes through the Header Work Lights Relay (K-22) and connectors **X002** and **X036** to reach a wire splice. The wire splice splits the current into two different paths:
  The first path sends current to pin B of the LH Cab Mid Work Light (E-19). The ground path to the light exits pin A and travels through connector **X036** to reach the Cab Roof ground location #4. This causes the LH Cab Mid Work Light to Illuminate.
  The second path sends current to pin B of the RH Cab Mid Work Light (E-20). The ground path to the light exits pin A and travels through connector **X036** to reach the Cab Roof ground location #4. This causes the LH RH Mid Work Light to Illuminate.

- Lower Work Lights (E-23, E-24) - **Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)** When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-5 to reach pin 1 of the Road Lights Relay (K-27). From pin 1, current flows to pin 1 of the Header Work Lights Relay (K-22). Current travels from pin 1 to reach pin 1 of the Lower Work Lights Relay (K-30). The relay energizes and latches terminals 3 and 5. Current flows from the electrical system buss bar and passes through the Lower Work Lights Relay (K-30) and travels through connector **X004** to reach a wire splice. The wire splice splits the current into two different paths:
  The first path sends current to pin 1 of the LH Lower Work Light (E-23). The ground path to the light exits pin 2 and travels to the Front Frame Ground Location #2. This causes the LH Lower Work Light to illuminate.
  The second path sends current to pin 1 of the RH Lower Work Light (E-24) The ground path to the RH Lower Work Light (E-24) exits pin 2 and travels to the Front Frame Ground Location #2. This causes the light to illuminate.
- Side Work Lights (E-25, E-26) - Activated when header is raised above a programmable height or the road light switch is moved to the "Left" or "Right" Turn Signal position. For more information, refer to: **Side work light - Overview (A.40.A.18 - C.10.A.10)**
- Rear Work Lights (E-27, E-28) - The Rear work lights will come on when the Work Light Switch (S-43) is ON and the combine is put in reverse. For more information, refer to: **Rear work light - Overview (A.40.A.17 - C.10.A.10)**
- Unload Tube Light (E-29) - If the front work lights are ON and the unload tube is extended outward, the Unload Tube Light will illuminate. For more information, refer to: **Rear work light - Overview (A.40.A.17 - C.10.A.10)**
- Grain Tank Light (E-30) - When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-5 to reach pin 1 of the Road Lights Relay (K-27). From pin 1, current flows to pin 1 of the Header Work Lights Relay (K-22). Current travels from pin 1 to reach pin 1 of the Lower Work Lights Relay (K-30). The relay energizes and latches terminals 3 and 5. Current flows from the electrical system buss bar and passes through the Lower Work Lights Relay (K-30) and travels through connector **X004** to reach a wire splice. The wire splice directs the current through connector **X009** to reach pin 1 of the Grain Tank Light (E-30). The ground path to the grain tank light exits pin 2 and passes through connector **X009** to reach the Front Frame ground location #2. This causes the Grain Tank Light (E-30) to illuminate.
- Back Lighting Circuits - Activated when the front work lights are turned on. For more information, refer to: **Back light - Overview (A.40.A.24 - C.10.A.10)**

On The Road Switch (S-12) and/or Hazard Switch (S-25) in the "ON" position

- Cab Outer Work Lights (E-15, E16) - When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-11 to reach pin 86 of the Cab Roof Work Light Relay (K-01). The relay energizes and latches terminals 30 and 87. Current sent from the electrical buss bar passes through the Cab Roof Light Fuse (F-31), and travels through the Cab Roof Work Lights Relay (K-01), and splits into two paths:
  The first path sends current through the LH Cab Roof Light Fuse (F-06), connector **X002**, and connector **X036** to reach pin A of the LH Cab Outer Work Light (E-15). The ground path exits pin B and passes through a wire splice and connector **X036** to reach the cab roof ground location #4. This causes the LH Cab Roof Light to illuminate.
  The second path sends current through the RH Cab Roof Light Fuse (F-07), connector **X002**, and connector **X036** to reach pin A of the RH Cab Outer Work Light (E-16). The ground path exits pin B and passes through a wire splice and connector **X036** to reach the cab roof ground location #4. This causes the RH Cab Roof Light to illuminate.
- Cab Inner Work Lights (E-17, E-18) Low Beam - When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-5 to reach pin 1 of the Road Lights Relay (K-27). The relay energizes and latches terminals 3 and 5. Current sent from the Distance Work Lights Relay (K-21) passes through the Road Lights Relay (K-27) and travels through connectors **X003** and **X036** to reach a wire splice. The wire splice splits the current into two paths:
  The first path sends current to pin B of the LH Cab Inner Work Light (E-17). The ground path to the LH Cab Inner Work Light exits pin C and travels through a wire splice and connector **X036** to reach the cab ground location #4. This causes the LH Cab Inner Work Light to illuminate (Low Beam).
  The second path sends current to pin B of the RH Cab Inner Work Light (E-18). The ground path to the RH Cab Inner Work Light exits pin C and travels through a wire splice and connector **X036** to reach the cab ground location #4. This causes the RH Cab Inner Work Light to illuminate (Low Beam).
- Taillights (E-11, E-12) (E-03, E-04) - When the Work Light Switch (S-43) is in the Second or Third position, CCM-1 sends current from connector **X018** pin J1-21 to pin 1 of the Light Control Relay (K-02). The relay

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energizes and latches pins 3 and 5. This allows current to flow from the CCM-1, through the Light Control Relay (K-02) to fuses F-20 and F-21. This energizes the Marker Lights Circuit. For more information, refer to: **Marker light - Overview (A.40.A.12 - C.10.A.10)**

- Back Lighting Circuits - Activated when the front work lights are turned on. For more information, refer to: **Back light - Overview (A.40.A.24 - C.10.A.10)**

NOTE: *If the ON THE ROAD SWITCH (S-12) or HAZARD SWITCH (S-25) in the "ON" position, the third position of the WORK LIGHT SWITCH (S-43) will not activate any additional lighting.*

3RD POSITION

- When the Work Light Switch (S-43) is in the THIRD position, current flows the same as the 2ND position except the following lights are also activated:

- HID Field Lights (E-60, E-61) DIA Kit Item - **Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**
  When the Work Light Switch (S-43) is activated, CCM-1 sends current from connector **X018** pin J1-5 to reach pin 1 of the Road Lights Relay (K-27). From pin 1, current flows to pin 1 of the Header Work Lights Relay (K-22). The relay energizes and latches terminals 3 and 5. Current flows from the electrical system buss bar and passes through the Header Work Lights Relay (K-30) and reaches a wire splice. The wire splice splits the current into two different paths:
  The first path sends current to pin B of the LH HID Field Light (E-60) and pin B of the RH HID Field Light (E-61).
  The second path sends current to pin B of the LH Cab and Work Light (E-19) and pin B of the RH Cab Mid Work Light (E-20) These lights rely on the Work Light Switch (S-43) for ground. When the Work Light Switch (S-43) is in the THIRD position, terminals 5 and 6 latch to complete the ground path to the lights. This causes the HID lights to illuminate.

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Rear work light - Overview (A.40.A.17 - C.10.A.10)

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The rear work lights illuminate the rear of the combine for better visibility in low light conditions.

The rear work lights can be activated in two different ways:

- Rear Work Light Switch (S-44) turned to the ON position
  Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)
- Combine In Reverse (with front work lights ON). For more information, refer to: **Front work light - Overview (A.40.A.16 - C.10.A.10)**

REAR WORK LIGHT SWITCH (S-44) Turned to ON Position
Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)

- If either of the two conditions listed above are met, CCM-1 sends current from connector **X018** pin J1-18 to reach pin 1 of the Rear Work Lights Relay (K-31). The ground path for the Rear Work Lights Relay exits pin 2 to reach the Cab Floor Ground location #3. The Rear Work Light Relay energizes and latches pins 3 and 5. The relay sends current from Fuse F-55 through the Rear Work Light Relay and connectors **X004**, **X024**, and **X071** to reach a wire splice. The wire splice splits current into two different paths:
- The first path sends current to pin A of the LH Rear Work Light (E-27). The ground path to the LH Rear Work Light exits pin B and travels through a wire splice and connector **X071** to reach the Rear Frame Ground Location #1. This causes the work light to illuminate.
- The second path sends current to pin A of the RH Rear Work Light (E-28). The ground path to the RH Rear Work Light exits pin B and travels through a wire splice and connector **X071** to reach the Rear Frame Ground Location #1. This causes the work light to illuminate.

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Side work light - Overview (A.40.A.18 - C.10.A.10)

AFX8010

The side work lights illuminate the left and right sides of the combine for better visibility in low light conditions.

The side work lights can be activated in three different ways:

- DOOR - The side lights will be activated whenever the key switch is OFF and the left side door is opened or closed. Controlled by LH Door Switch (S-40), Time Delay Module (K-20) and Timed Side Work Light Relay (K-34).
- ROAD LIGHT SWITCH (S-26) - The side work lights are activated when the key switch is ON, the combine is in field mode, the front work lights are on and the road light switch (S-32) is moved to either the left or right position. Controlled by CCM-1 and Side Work Light Relay (K-35).
- HEADER HEIGHT - The side lights are activated when the key switch is ON, the combine is in the field operation mode, the front work lights are ON and the header is above the maximum stubble height. Controlled by CCM-1 and the Side Work Light Relay (K-35).

DOOR OPERATION
Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)
Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)

- The side lights may be controlled by the LH Door Switch (S-40) and the Timed Delay Relay (K-20) whenever the Key Switch (S-02) is in the OFF position.

The Timed Delay Relay (K-20) works as follows:

- Power direct from battery is supplied from fuse F52 to (K-33) relay, then to Time Delay Relay (K-20) pin 87a, then to Dome Light (E-34).
- Time Delay Relay (K-20) ground path exits pin 85 and travels to the Cab Floor Ground Location #3.
- Time Delay Relay (K-20) pin 86 is connected to the LH Door Switch (S-40); note that it does NOT go through the dome light switch, but that the time delay connects to the LH Door Switch in parallel with the dome light assembly.
- Time Delay Relay (K-20) pin 30 receives Key-ON power from Key Switch (S-02). Time Delay Relay (K-20) pin 87 is output to timed Side Work Light Relay (K-34) pin 1 (frame #44) to energize it.
- Time delay relay operation is relatively simple. If the Key Switch (S-02) is not ON (no power to pin 30), the Time Delay Relay (K-20) will start its time cycle any time the door switch changes state (either opens OR closes). When the Door Switch (S-40) changes state (pin 86), the time delay relay activates its output (pin 87) to energize the timed Side Work Light Relay (K-34), which turns on the side lights. The Time Delay Relay (K-20) will power its output (pin 87) for approximately 60 seconds, and then shut off. If the key switch is turned ON during that time cycle, power from the Key Switch (S-02) to pin 30 of the Time Delay Relay (K-20) will interrupt its cycle, and shut the lights off. The Time Delay Relay (K-20) will not cycle based on the Door Switch (S-40) changing state if the key switch (S-02) is turned ON.

ROAD LIGHT SWITCH (S-26)
Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)
Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)

- When the key switch is in the ON position, the combine is in Field Operation mode, the front work lights are activated, and the road light switch (S-26) is moved to the "left" or "right" position, power from the road light switch (S-26) enters CCM-1 at connector **X018** pin J1-2 (left) or pin J1-9 (right). When this happens, CCM-1 sends current from connector **X018** pin J1-24 to pin 1 of the side work light relay (K-35). Current enters pin 1 and reaches the coil within the relay. The ground path exits pin 2 to reach the cab floor ground location #3. This causes the side work light relay to energize and latch pins 3 and 5. The side lights are powered from Fuse F50 through the side work light relay (K-35).

HEADER HEIGHT **Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)**

- When the key switch is in the ON position, the combine is in Field operation mode, the front work lights are activated, and the header is above the operator-set maximum stubble height, CCM-1 sends current from connector **X018** pin J1-24 to pin 1 of the side work light relay (K-35). Current enters pin 1 and reaches the

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coil within the relay. The ground path exits pin 2 to reach the cab floor ground location #3. This causes the side work light relay to energize and latch pins 3 and 5. The side work lights are powered from Fuse F50 through the side work light relay (K-35).

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Under shield service light - Overview (A.40.A.19 - C.10.A.10)

AFX8010

Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)

The AFX combine is equipped with two under shield lights on each side of the combine to allow for easier servicing and adjustment of the combine components.

- Current flows from the electrical system buss bar and passes through fuse F-34 and connectors **X024**, and **X342** to reach pin 2 of the Under Shield Light Switch (S-63). When the switch is moved to the "ON" position, current crosses from pin 2 to reach pin 1. Current exits pin 1 to reach a wire splice. The wire splice sends current to the following components:
- LH Front Shield Light (E-42)
- LH Rear Shield Light (E-43)
- RH Front Shield Light (E-44)
- RH Rear Shield Light (E-45)

Each of the components above are grounded at the Front Frame Ground Location #2, causing the lights to illuminate.

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Cleaning shoe service light - Overview (A.40.A.20 - C.10.A.10)

AFX8010

SIEVE LIGHT
Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)

The sieve lights are used to illuminate the top of the cleaning shoe in the combine, to facilitate cleaning or adjustments.

- When the Key Switch (S-02) is in the "Start" or "Run" positions, current flows through the electrical system buss bar K-03 to reach the Service Lights Fuse (F-14). Current passes through fuse (F-14) and connectors **X004** and **X024** to reach pin A of the Sieve Light Switch (S-54). When the switch is moved to the "ON" position, current crosses to pin B and travels to a wire splice. The wire splice splits the current into two paths:
- The first path sends current to pin A of Sieve Light Front (E-37). The ground path to the Sieve Light Front (E-37) exits pin B and travels to the Rear Frame Ground location #1. This causes the light to illuminate.
- The second path sends current to pin A of Sieve Light Rear (E-59). The ground path to the Sieve Light Rear (E-59) exits pin B and travels to the Rear Frame Ground location #1. This causes the light to illuminate.

NOTE: *The sieve lamps are used to provide light inside the threshing area while making adjustments and repairs. The lamp housing incorporates a thermostatic circuit breaker that will prevent the lamps from over heating. If the housing should get too hot due to debris buildup or extended usage, the breaker will open and reset itself when the unit has cooled sufficiently.*

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Engine component service light - Overview (A.40.A.21 - C.10.A.10)

AFX8010

Wiring harness - Electrical schematic frame 37 (A.30.A.88 - C.20.E.37)

The engine light is located on the engine platform near the rear rotating beacon. The engine light is used to illuminate the engine compartment.

- Current flows from the electrical system buss bar and passes through fuse F-34 and connectors **X005**, **X024**, **X071**, and **X343** to reach pin 2 of the Engine Light Switch (S-64). When the switch is moved to the "ON" position, current crosses from pin 2 to reach pin 1. Current exits pin 1 to reach pin A of the Engine Light (E-46). The ground path for the Engine Light exits pin B and travels through connectors **X343** and **X071** to reach the Rear Frame Ground location #1. This causes the light to illuminate.

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Back light - Overview (A.40.A.24 - C.10.A.10)

AFX8010

Backlighting is provided to illuminate the gauges and switches within the cab of the combine. The backlighting circuit consists of two different groups.

GROUP 1 - The first group of backlights are powered any time the key switch is in the "Start" or "Run" positions. These backlights are found along the right side of the operator in the Propulsion Handle (S-03), the Front Switch Panel (A-13), and the Rear Switch Panel (A-18).

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)

When the Key Switch (S-02) is turned to the "Start" or "Run" positions, current exits connector **X068** pin 6 and passes through a wire splice to reach CCM-1 Power Relay (K-24) , CCM-2 Power Relay (K-25), and CCM-3 Cab Power Relay (K-26). The ground path to the three relays is completed through CCM-1 module connector **X018** pin J1-23. This causes the three relays to energize. Current is sent from pin 5 of CCM-3 Cab Power Relay (K-26) to reach electrical system buss bar K-26. Current passes through the buss bar to reach RH Console Fuse F-48.

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)

Current travels through fuse F-48 and connector **X001** and a wire splice to reach another wire splice. The wire splice sends current to the following components:

- Propulsion Handle (S-03, A-17) - **Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)** Current enters connector **X059** pin 1 of the Propulsion Handle (S-03, A-17) and reaches the backlighting circuit in the handle. The ground path to the backlights exits pin 2 and travels through a wire splice and connector **X001** to reach the Cab Floor Ground location #3. This causes the backlights to illuminate.
- Front Switch Panel (A-13) - **Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)** Current enters connector **X386** pin 1 of the Front Switch Panel (A-13) and reaches the backlighting. The ground path to the backlights exits pin 15 and travels through a wire splice and connector **X001** to reach the Cab Floor Ground location #3. This causes the backlights to illuminate.
- Rear Switch Panel (A-18) - **Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)** Current enters connector **X387** pin 5 of the Rear Switch Panel (A-18) and reaches the backlighting. The ground path to the backlights exits pin 6 and travels through a wire splice and connector **X001** to reach the Cab Floor Ground location #3. This causes the backlights to illuminate.

GROUP 2 - The second group of backlights are powered whenever the following circuits are activated:

- Marker Light Circuit - **Marker light - Overview (A.40.A.12 - C.10.A.10)**
- Road Light Circuit - **Head light - Overview (A.40.A.11 - C.10.A.10)**
- Front Work Light Circuit - **Front work light - Overview (A.40.A.16 - C.10.A.10)**
- Side Work Light Circuit - **Side work light - Overview (A.40.A.18 - C.10.A.10)**
- Rear Work Light Circuit - **Rear work light - Overview (A.40.A.17 - C.10.A.10)**

Activating the circuits listed above causes a message to be sent across the network. CCM-2 receives this message and sends current from connector **X015** pin J1-11 to splice block C (W-03) connector **X133** pin B. This provides power to the backlights within the following components:

CCM-2 Pin ID (Backlighting)		
Splice Block C (W-03) Pin ID	**Circuit**	**Frame #**
Pin A	Console Light E-35, connector **X138**	**Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)**
Pin B	Power (+) from CCM-2 connector **X015** pin J1-11	**Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)**
Pin C	Rear Work light Switch S-44, connector **X131**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**

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CCM-2 Pin ID (Backlighting)		
Splice Block C (W-03) Pin ID	**Circuit**	**Frame #**
Pin D	Work Light Switch S-43, connector **X132**	**Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)**
Pin E	Wiper Switch S-20, connector **X135**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**
Pin F	Beacon Light Switch S-41, connector **X130**	**Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)**
Pin G	Tank Extensions Switch S-42, connector **X125**	**Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)**
Pin H	Mirror Heat Switch S-19, connector **X127**	**Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)**
Pin J	Washer Switch S-38, connector **X134**	**Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)**
Pin K	*	*
Pin L	*	*
Pin M	HVAC Control Panel A-09/A-20, connector **X128**	**Wiring harness - Electrical schematic frame 47 (A.30.A.88 - C.20.E.47)**

NOTE: *Each of the components found in the chart above are grounded at the cab roof location. To gain access to the cab roof wiring, remove the rear center speaker panel.*

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LIGHTING SYSTEM - Problem solving (A.40.A - G.40.A.30)

AFX8010

OPERATION

Use this reference chart to quickly determine the most likely causes of exterior lighting problems.

1. Determine which light does not operate properly.
2. Investigate each of the possible causes and perform the corresponding test.
3. Continue investigating possible causes until the problem is found or tests are eliminated.
4. If testing fails to correct problem, refer to "Overview" section for detailed description of how the circuit works.

TROUBLESHOOTING

Before performing the following tests:

- Observe and correct any corresponding fault codes.
- Check for any loose connectors, damaged wires, or bad grounds.

IMPORTANT: *Do not use self-powered test lights for any of these tests. Use of a self-powered test light can cause damage to components in this system.*

⚠ WARNING ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

Problem	Possible Cause	Correction
One or more Turn/Hazard Lights Do Not Operate.	Hazard Switch	**Turn/hazard light Hazard switch - Testing (A.40.A.13.90 - G.40.A.20)**
	Flasher Module	**Turn/hazard light Flasher unit - Testing (A.40.A.13.86 - G.40.A.20)**
	Bulbs and Wiring	**Turn/hazard light Wiring harness - Testing (A.40.A.13.88 - G.40.A.20)**
One or More Marker Lights Do Not Operate	Road Light Switch	**Head light Switch - Testing (A.40.A.11.83 - G.40.A.20)**
	Bulbs and Wiring	**Marker light Wiring harness - Testing (A.40.A.12.88 - G.40.A.20)**
One or More Brake Lights Do Not Operate	Brake Lights Relay	**Brake light Relay - Testing (A.40.A.14.82 - G.40.A.20)**
	Bulbs and Wiring	**Brake light Wiring harness - Testing (A.40.A.14.88 - G.40.A.20)**
One or More Headlights Does Operate	Relay	**Head light Relay - Testing (A.40.A.11.82 - G.40.A.20)**
	Head Light Switch	**Head light Switch - Testing (A.40.A.11.83 - G.40.A.20)**
	Bulbs and Wiring	**Head light Wiring harness - Testing (A.40.A.11.88 - G.40.A.20)**
One or More Rear Work Lights Do Not Operate	Rear Work Light Switch	**Rear work light Switch - Testing (A.40.A.17.83 - G.40.A.20)**
	Rear Work Lights Relay	**Rear work light Relay - Testing (A.40.A.17.82 - G.40.A.20)**
	Bulbs and Wiring	**Rear work light Wiring harness - Testing (A.40.A.17.88 - G.40.A.20)**
One or More Sieve Lights Do Not Operate	Bulbs and Wiring	**Cleaning shoe service light Wiring harness - Testing (A.40.A.20.88 - G.40.A.20)**
	Sieve Light Switch	**Cleaning shoe service light Switch - Testing (A.40.A.20.83 - G.40.A.20)**

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Problem	Possible Cause	Correction
One or More Beacon Lights Do Not Operate	Beacon Light Relay	**Beacon Relay - Testing (A.40.A.15.82 - G.40.A.20)**
	Beacon Light Switch	**Beacon Switch - Testing (A.40.A.15.83 - G.40.A.20)**
	Bulbs and Wiring	**Beacon Wiring harness - Testing (A.40.A.15.88 - G.40.A.20)**
One or More Side Lights Do Not Operate	Work Light Switch	**Front work light Switch - Testing (A.40.A.16.83 - G.40.A.20)**
	Side Work Light Relay	**Side work light Relay - Testing (A.40.A.18.82 - G.40.A.20)**
	Bulbs and Wiring	**Side work light Wiring harness - Testing (A.40.A.18.88 - G.40.A.20)**
Unload Tube Light Does Not Operate	Unload Tube Light	**Unloading tube light - Testing (A.40.A.35 - G.40.A.20)**
One or More Front Work Lights Do Not Operate	Work Light Switch	**Front work light Switch - Testing (A.40.A.16.83 - G.40.A.20)**
	Work Light Relay	**Front work light Relay - Testing (A.40.A.16.82 - G.40.A.20)**
	Bulbs and Wiring	**Front work light Wiring harness - Testing (A.40.A.16.88 - G.40.A.20)**
One or More Under Shield Lights Do Not Operate	Light Switch	**Under shield service light Switch - Testing (A.40.A.19.83 - G.40.A.20)**
	Bulbs and Wiring	**Under shield service light Wiring harness - Testing (A.40.A.19.88 - G.40.A.20)**
Engine Component Light Does Not Operate	Engine Light Switch	**Engine component service light Switch - Testing (A.40.A.21.83 - G.40.A.20)**
	Engine Light Wiring Harness	**Engine component service light Wiring harness - Testing (A.40.A.21.88 - G.40.A.20)**

Head light Relay - Testing (A.40.A.11.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Turn Road Light Switch S-26 to Low Beam position. Measure for **12 volts** at Low Beam Relay K-05 (pin 5).	**12 volts** If good reading, relay is functioning properly.	Low Beam Relay K-05. Adjacent circuits. Go to test **2**
2	Turn Road Light Switch S-26 to Low Beam. position. Measure for **12 volts** at Low Beam Relay K-05 (pin 1).	**12 volts** If good reading, Go to test **3**	Open or short to ground in circuit 169 (YE) between Low Beam Relay K-05 (pin 1) and Road Light Switch S-26 connector X256 (pin 7). A short to ground will blow the Fuse #51. Road Light Switch S-26.
3	Measure for **12 volts** at Low Beam Relay K-05 (pin 3).	**12 volts** If good reading, Go to test **4**	Open circuit 236 (RD) between Low Beam Relay K-05 (pin 3) and Fuse #33. A short to ground will blow the Fuse #33.
4	Disconnect the Low Beam Relay K-05. Measure resistance on circuit 156 (BK) between Low Beam Relay K-05 (pin 2) and ground.	Less than 1ohm.. If good reading, replace Low Beam Relay K-05 Go to test **5**	Open in circuit 156 (BK) between Low Beam Relay K-05 (pin 2) and ground.
5	Turn Road Light Switch S-26 to .High Beam. position Measure for **12 volts** at High Beam Relay K-04 (pin 5).	**12 volts** If good reading, relay is functioning properly. High Beam Relay K-04.	Adjacent circuits. Go to test **6**

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N°	Test Point	Expected Result	Other Result (Possible Cause)
6	Turn Road Light Switch S-26 to High Beam position. Measure for **12 volts** at High Beam Relay K-04 (pin 1).	**12 volts** If good reading, Go to test **7**	Open or short to ground in circuit 191 (YE) or 218 (YE) between High Beam Relay K-04 (pin 1) and Road Light Switch S-26 connector X256 (pin 4). A short to ground will blow the Fuse #51. Road Light Switch S-26.
7	Measure for **12 volts** at High Beam Relay K-04 (pin 3).	**12 volts** If good reading, Go to test **8**	Open circuit 185 (RD) between High Beam Relay K-04 (pin 3) and Fuse #32. A short to ground will blow the Fuse #32.
8	Disconnect the High Beam Relay K-04. Measure resistance on circuit 192 (BK) between High Beam Relay K-04 (pin 2) and ground.	Less than 1ohm. If good reading, replace the High Beam Relay K-04.	Open in circuit 192 (BK) between High Beam Relay K-04 (pin 2) and ground.

Head light Switch - Testing (A.40.A.11.83 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 5).	**12 volts** If good reading, . Go to test **3**	Open or short to ground on circuit 213 (RD) between Road Light Switch S-26 connector X256 (pin 5) and Fuse #51
2	Disconnect Road Light Switch S-26. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 5).	**12 volts** If good reading, replace Road Light Switch.	Open or short to ground on circuit 213 (RD) between Road Light Switch S-26 connector X256 (pin 5) and Fuse #51.
3	Reconnect Road Light Switch S-26. Measure for **12 volts** at Road Light Switch S-26 connector (pin 8).	**12 volts** If good reading, Go to test **5**	Open or short to ground on circuit 214 (RD) between Road Light Switch S-26 connector X256 (pin 8) and Fuse #51.
4	Disconnect Road Light Switch S-26. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 8).	**12 volts** If good reading, replace Road Light Switch. Go to test **5**	Open or short to ground on circuit 214 (RD) between Road Light Switch S-26 connector X256 (pin 5) and Fuse #51.
5	Place Key in ON position. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 6).	**12 volts** If good reading, Go to test **7**	Open or short to ground on circuit 96 (OR) or 55 (OD) between Road Light Switch S-26 connector X256 (pin 6) and Key Switch S-02 connector X068 (pin 6).
6	Disconnect Road Light Switch S-26. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 6).	**12 volts** If good reading, replace Road Light Switch. Go to test **7**	Open or short to ground on circuit 96 (OR) or 55 (OD) between Road Light Switch S-26 connector X256 (pin 6) and Key Switch S-02 connector X068 (pin 6).
7	Place Key in ON position and Road Light Switch S-26 in the RIGHT turn position. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 3).	0 to **12 volts** If good reading, Go to test **8**	Short to ground on circuit 197 (PU) between Road Light Switch S-26 connector X256 and CCM1 (pin J1-2) and Flasher Module A-05 connector X255 (pin 8).
8	Place Key in ON position and Road Light Switch S-26 in the LEFT turn position. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 2).	0 to **12 volts** If good reading, Go to test **9**	Road Light Switch S-26 Short to ground on circuit 201 (PU) between Road Light Switch S-26 connector X256 (pin 2) and CCM1 (pin J1-9) and Flasher Module A-05 connector X255 (pin 7).

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N°	Test Point	Expected Result	Other Result (Possible Cause)
9	Place Road Light Switch S-26 in the High Beam position. Measure voltage at Road Light Switch S-26 connector X256 (pin 4).	**12 volts** If good reading, Road Light Switch S-26 is working properly. Go to test **10**	Short to ground on circuits 218 (YE), 43 (YE) and 191 (YE) between Road Light Switch S-26 connector X256 (pin 4) and High Beam Relay K-04 (pin 1) or High Beam Indicator.
10	Place Road Light Switch S-26 in the Hazard position. Measure voltage at Road Light Switch S-26 connector X256 (pin 1).	**12 volts** If good reading, Road Light Switch S-26 is working properly.	Short to ground on circuit 173 (OR) between Road Light Switch S-26 connector X256 (pin 1) and K-02 Light Control Relay (pin 5).
11	Place Road Light Switch S-26 in the Low Beam. position. Measure voltage at Road Light Switch S-26 connector X256 (pin 7).	**12 volts** If good reading, Road Light Switch S-26 is working properly.	Short to ground on circuits 169 (YE) between Road Light Switch S-26 connector X256 (pin 7) and Low Beam Relay K-05 (pin 1).

Head light Wiring harness - Testing (A.40.A.11.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Turn Road Light Switch S-26 to Low Beam position. Measure for **12 volts** at Low Beam Relay K-05 (pin 5).	**12 volts** If good reading, Go to test **2**	Perform Low Beam Relay Test.
2	Measure the voltage at LH Road Light E-13 connector X164 (pin B).	**12 volts** If good reading, Go to test **3**	Open circuit 237 (PU) or 638 (PU) between Low Beam Relay K-05 (pin 5) and LH Road Light E-13 connector X164 (pin B).
3	Disconnect the LH Road Light E-13. Measure the resistance on circuit 642 (BK) between LH Road Light E-13 connector X164 (pin A) and ground.	Less than 1 ohm. If good reading, replace the low beam bulb of the LH Road Light E-13.	Open in circuit 642 (BK) between LH Road Light E-13 connector X164 (pin A) and ground.
4	Turn Road Light Switch S-26 to Low Beam position. Measure for **12 volts** at Low Beam Relay K-05 (pin 5).	**12 volts** If good reading, Go to test **5**	Perform Low Beam Relay Test.
5	Measure the for **12 volts** at RH Road Light E-14 connector X169 (pin B).	**12 volts** If good reading, Go to test **6**	Open circuit 237 (PU) or 639 (PU) between Low Beam Relay K-05 (pin 5) and RH Road Light E-14 connector X169 (pin B)
6	Disconnect the RH Road Light E-14. Measure the resistance on circuit 643 (BK) between RH Road Light E-14 connector X169 (pin A) and ground.	Less than **1 ohms** If good reading, replace the low beam bulb of the RH Road Light E-14. Go to test **7**	Open in circuit 643 (BK) between RH Road Light E-14 connector X169 (pin A) and ground.
7	Turn Road Light Switch S-26 to .High Beam. position. Measure for **12 volts** at High Beam Relay K-04 (pin 5).	**12 volts** If good reading, Go to test **8**	Perform High Beam Relay Test.
8	Measure the voltage at LH Road Light E-13 connector X164 (pin A).	**12 volts** If good reading, Go to test **9**	Open circuit 186 (PU) or 640 (PU) between High Beam Relay K-04 (pin 5) and LH Road Light E-13 connector X164 (pin A).
9	Disconnect the LH Road Light E-13. Measure the resistance on circuit 642 (BK) between LH Road Light E-13 connector X164 (pin A) and ground.	Less than 1 ohm. If good reading, replace the High beam bulb of the LH Road Light E-13.	Open in circuit 642 (BK) between LH Road Light E-13 connector X164 (pin A) and ground.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
10	Turn Road Light Switch S-26 to High Beam position. Measure for **12 volts** at High Beam Relay K-04 (pin 5).	**12 volts** If good reading, Go to test **11**	Perform High Beam Relay Test.
11	Measure the voltage at RH Road Light E-14 connector X169 (pin C).	**12 volts** If good reading, Go to test **12**	Open circuit 186 (PU) or 641 (PU) between High Beam Relay K-04 (pin 5) and RH Road Light E-14 connector X169 (pin C).
12	Disconnect the RH Road Light E-14. Measure the resistance on circuit 643 (BK) between RH Road Light E-14 connector X169 (pin A) and ground.	Less than 1 ohm. If good reading, replace the High beam bulb of the RH Road Light E-14.	Open in circuit 643 (BK) between RH Road Light E-14 connector X169 (pin A) and ground.

Marker light Wiring harness - Testing (A.40.A.12.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Turn Road Light Switch S-26 to Marker Lights position. Measure for 12 volts at Fuse #20.	**12 volts** If good reading, go to next test point.	Perform Road Light Switch Test.
2	Measure for **12 volts** at LH Front Hazard Lamp E-03 connector X357 (pin B).	**12 volts** If good reading, go to next test point.	Open circuit 624 (PU) between Fuse #20 and LH Front Hazard Lamp E-03 connector X357 (pin B). Short to ground on circuit 624 (PU) and 177 (PU) between Fuse #20 and LH Front Hazard Lamp E-03 connector X357 (pin B). Any short to ground will blow the Fuse #20.
3	Disconnect the LH Front Hazard Lamp E-03. Measure the resistance on circuit 620 (BK) between LH Front Hazard Lamp E-03 connector X357 (pin C) and ground.	Less than **1 ohms**. If good reading, replace the marker bulb of the LH Front Hazard Lamp E-03.	Open in circuit 620 (BK) between LH Front Hazard Lamp E-03 connector X357 (pin C) and ground.
4	Turn Road Light Switch S-26 to Marker Lights position. Measure for 12 volts at Fuse #21.	**12 volts** If good reading, go to next test point.	Perform Road Light Switch Test.
5	Measure for **12 volts** at RH Front Hazard Lamp E-04 connector X356 (pin B).	**12 volts** If good reading, go to next test point.	Open circuit 627 (PU) between Fuse #21 and RH Front Hazard Lamp E-04 connector X356 (pin B). Short to ground on circuit 627 (PU) and 176 (PU) between Fuse #21 and RH Front Hazard Lamp E-04 connector X356 (pin B). Any short to ground will blow the Fuse #21.
6	Disconnect the RH Front Hazard Lamp E-04. Measure the resistance on circuit 621 (BK) between RH Front Hazard Lamp E-04 connector X356 (pin C) and ground.	Less than **1 ohms**. If good reading, replace the marker bulb of the RH Front Hazard Lamp E-04.	Open in circuit 621 (BK) between RH Front Hazard Lamp E-04 connector X356 (pin C) and ground.
7	Turn Road Light Switch S-26 to Marker Lights position. Measure for **12 volts** at Fuse #20.	**12 volts** If good reading, go to next test point.	Perform Road Light Switch Test.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
8	Measure for **12 volts** at LH Brake/Tail Lamp E-11 connector X299 (pin 3).	**12 volts** If good reading, go to next test point.	Open circuit 412 (PU) between Fuse #20 and LH Brake/Tail Lamp E-11 connector X299 (pin 3). Short to ground in circuit 412 (PU), 625 (PU) and 177 (PU) between Fuse #20 and LH Brake/Tail Lamp E-11 connector X299 (pin 3). Any short to ground will blow the Fuse #20.
9	Disconnect the LH Brake/Tail Lamp E-11. Measure the resistance on circuit 634 (BK) between LH Brake/Tail Lamp E-11 connector X299 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace the marker bulb of the LH Brake/Tail Lamp E-11.	Open circuit 634 (BK) between LH Brake/Tail Lamp E-11 connector X299 (pin 2) and ground.
10	Turn Road Light Switch S-26 to Marker Lights position. Measure for**12 volts** at Fuse #21.	**12 volts** If good reading, go to next test point.	Perform Road Light Switch Test.
11	Measure for **12 volts** at RH Brake/Tail Lamp E-12 connector X300 (pin 3).	**12 volts** If good reading, go to next test point.	Open circuit 421 (PU) between Fuse #21 and RH Brake/Tail Lamp E-12 connector X300 (pin 3). Short to ground in circuit 421 (PU), 626 (PU) and 176 (PU) between Fuse #21 and RH Brake/Tail Lamp E-12 connector X300 (pin 3). Any short to ground will blow the Fuse #21.
12	Disconnect the RH Brake/Tail Lamp E-12. Measure the resistance on circuit 635 (BK) between RH Brake/Tail Lamp E-12 connector X300 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace the marker bulb of the RH Brake/Tail Lamp.	Open in circuit 635 (BK) between RH Brake/Tail Lamp E-12 connector X300 (pin 2) and ground.
13	Place Road Light Switch S-26 in .ON. position. Measure for **12 volts** at Road Light Switch S-26 connector X256 (pin 5).	**12 volts** If good reading, the wiring has good continuity, go to next test point.	Open circuit 213 (RD) between Road Light Switch S-26 connector X256 (pin 5) and Fuse #51
14	Remove the Light Control Relay K-02. Measure for 12 volts at (pin 5).	**12 volts** If good reading, the wiring has good continuity, go to next test point.	Open in circuit 173 (RD) between Light Control Relay K-02 (pin 5) and Road Light Switch S-26 connector X256 (pin 1). A short will cause Fuse # 51 to blow.
15	Reinstall the Light Control Relay K-02. Measure for 12 volts at LH Marker Light Fuse #20.	**12 volts** If good reading, the wiring has good continuity, go to next test point.	Open in circuit 121 (OR) between LH Marker Light Fuse #20 and Light Control Relay K-02 (pin 3). A short will cause Fuse # 51 to blow.
16	Measure for **12 volts** at RH License Plate Lamp E-57 connector X362 (pin 1) and LH License Plate Lamp E-58 connector X363 (pin 1).	**12 volts** If good reading, the wiring has good continuity, go to next test point.	Open in circuit 177 (PU), 625 (PU) or 412 (PU) between Fuse #20 and RH License Plate Lamp E-57 connector X362 (pin 1) and LH License Plate Lamp E-58 connec- tor X363 (pin 1). Also Test backwards for 12 volts at circuits X005, X024, X071 and X243. A short will cause Fuse # 51 to blow.
17	Measure resistance at circuit 634 (BK) and 628 (BK) between RH License Plate Lamp E-57 connector X362 (pin 2) and LH License Plate Lamp E-58 connector X363 (pin 2) and ground.	0-2 OHMS If good reading, system OK.	Open circuit 634 (BK) or 628 (BK) between RH License Plate Lamp E-57 connector X362 (pin 2) and LH License Plate Lamp E-58 connector X363 (pin 2) and ground.

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Turn/hazard light Flasher unit - Unidentified failure (A.40.A.13.86 - G.30.B.46)

AFX8010

E0201-11 - ISO/NASO Selection

Context:
The CCM2 module is used to control the hazard light operation, depending on which market area the combine is operating in. The "NASO" mode is factory -selected for combines being used in North America, while the "ISO" mode is factory-set for all other market areas. This ensures that the hazard light respond correctly to meet legal and homologation requirements. When "ISO" mode is selected, the CCM2 module will send a **12 volts** signal to the flasher module A-05 to switch it into the ISO operating mode. If a **12 volts** signal is not applied, then the flasher module will operate in the "NASO" operating mode.

Cause:
The ISO/NASO Selection circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Flasher module A-05 failed.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "ISO/NASO SELECT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON". The "STATUS" screen should indicate "OK" is the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with step **6**.

2. Turn the ignition key "OFF". Disconnect connector **X255** from the flasher module A-05. Use a multimeter to check for continuity between the harness end of connector **X255** pin 9 and chassis ground. Flex the steering column (SC) harness between the flasher module and connector **X033** while making this check. There should not be any continuity to ground.

   A. If there is continuity to ground, continue with step **3**.

   B. If there is no continuity to ground, continue with step **4**.

3. Disconnect connector **X033**. Use a multimeter to check for continuity between the cab main (CM) harness end of connector **X033** pin 10 and chassis ground. Flex the cab main (CM) harness between connector **X033** and connector **X015** while making this check. There should not be any continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the steering column (SC) harness between connector **X033** and connector **X255** wire 204 purple. Locate the short and repair.

   B. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X033** and connector **X015** wire 204 purple. Locate the short and repair.

4. Turn the key switch to the "ON" position. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "ISO/NASO SELECT". Press the "OFF" button to change the circuit output to "ON". Use a multimeter to check for **12 volts** between the harness end of connector **X255** pin 9 and chassis ground. There should be **12 volts**.

   A. If **12 volts** is not present, continue with step **5**.

   B. If **12 volts** is present, continue with step **6**.

5. Turn the key switch to the "ON" position. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "ISO/NASO SELECT". Press the "OFF" button to change the circuit output to "ON".

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Use a multimeter to check for **12 volts** between the harness end of connector **X033** pin 10 and chassis ground. There should be **12 volts**.

A. If 12 volts is present, there is an open circuit in the steering column (SC) harness between connector **X255** pin 9 and connector **X033** pin 10 wire 204 purple. Locate the open and repair.

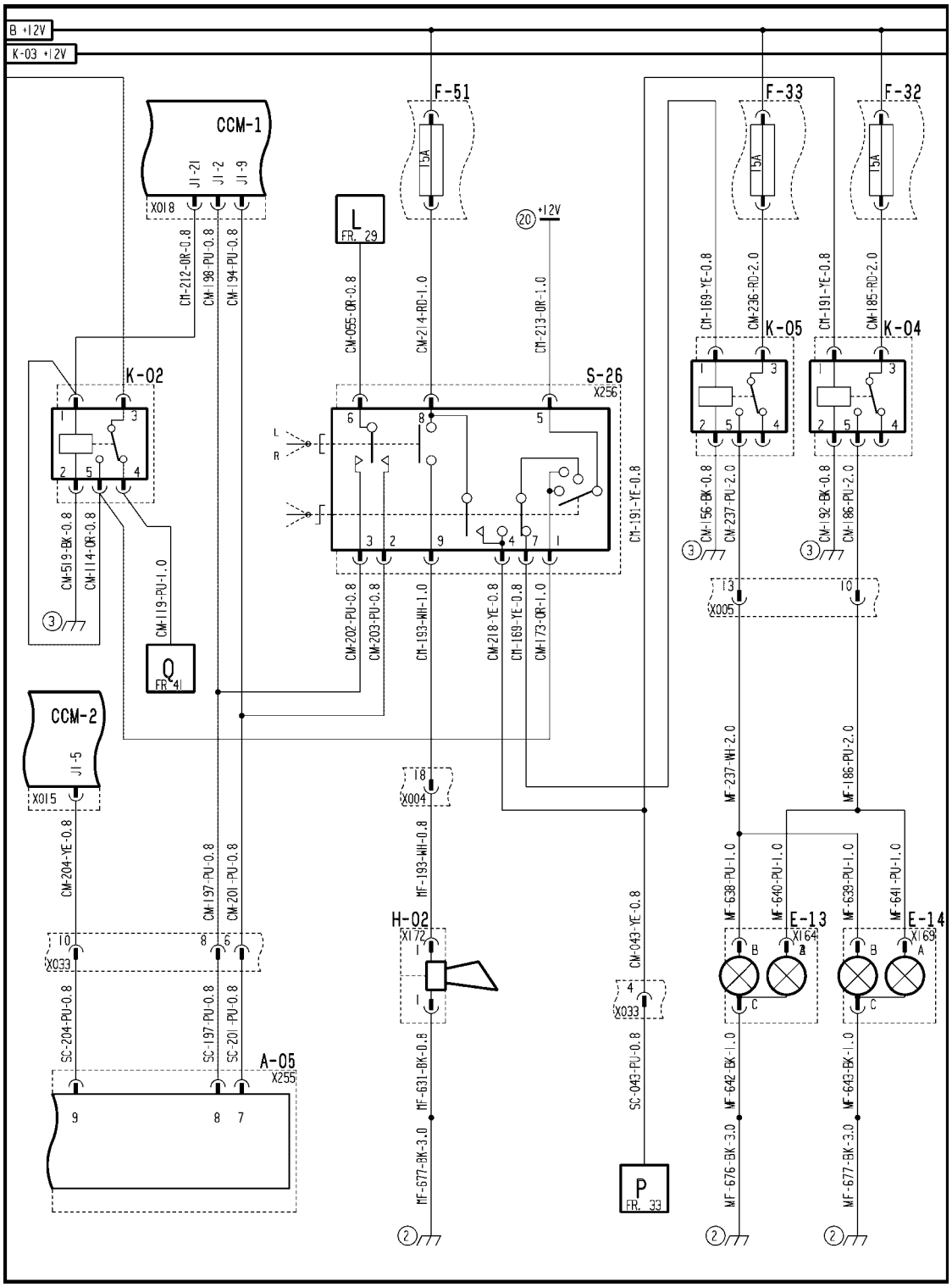
B. If 12 volts is not present, there is an open circuit in the cab main (CM) harness between connector **X033** pin 10 and connector **X015** pin J1-5 wire 204 purple. Locate the open and repair.

6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)



AFXSCHEM36-04 1

FRAME 36 - LIGHTING

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A-05 Flasher Module	E-13 LH Road Light (EU)	E-14 RH Road Light (EU)
F-32 High Beam Fuse	F-33 Low Beam Fuse (EU)	F-51 Horn, Marker Lights Fuse
H-02 Horn	K-02 Light Control Relay	K-04 High Beam Relay (EU)
K-05 Low Beam Relay (EU)	S-26 Road Light Switch	

Turn/hazard light Flasher unit - Testing (A.40.A.13.86 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Measure for **12 volts** at Flasher Module A-05 connector **X255** (pin 1).	**12 volts** If good reading, go to next test point.	Open in power feed circuit between Flasher Module A-05 connector **X255** (pin 1) and Fuse #56. Short to ground, which affect circuit between Flasher Module A-05 connector **X255** (pin 1) and Fuse #56 (see test A-Hazard Switch Test, steps 1-4).
2	Close the Hazard Switch S-25 Measure for **12 volts** at Flasher Module A-05 connector **X255** (pin 2).	**12 volts** If good reading, go to next test point.	Open in circuit 207 (PU) or 179 (PU) between Flasher Module A-05 connector **X255** (pin 2) and Hazard Switch S-25 (pin 3). Perform Hazard Switch Test.
3	Place Road Light Switch in LEFT turn position. Measure for **12 volts** at the Road Light Switch S-26 connector **X256** (pin 2).	**12 volts** If good reading, go to next test point.	Perform Road Light Switch Test.
4	Measure for **12 volts** at Flasher Module A-05 connector **X255** (pin 7).	**12 volts** If good reading, go to next test point.	Open in circuit 201 (PU) or 203 (PU) between Flasher Module A-05 connector **X255** (pin 7) and Road Light Switch S-26 connector **X256**(pin 2).
5	Place Road Light Switch in RIGHT turn position. Measure for **12 volts** at the Road Light Switch S-26 connector **X256** (pin 3).	**12 volts** If good reading, go to next test point.	Perform Road Light Switch Test.
6	Measure for **12 volts** at Flasher Module A-05 connector **X255** (pin 8).	**12 volts** If good reading, go to next test point.	Open in circuit 197 (PU) or 202 (PU) between Flasher Module A-05 connector **X255** (pin 8) and Road Light Switch S-26 connector **X256**(pin 3).
7	Disconnect the Flasher Module A-05. Measure resistance on circuit 141 (BK) between Flasher Module A-05 connector **X255** (pin 6) and ground.	Less than **1 ohms**.	Open in circuit 141 (BK) between the Flasher Module A-05 connector **X255** (pin 6) and ground.
8	Reconnect the Flasher Module A-05. Place Hazard Switch S-25 in the .ON. position. Measure for voltage at Flasher Module A-05 connector **X255** (pins 3 and 4).	0 to **12 volts** If good reading, go to test point 13.	Flasher Module A-05. Short to ground on circuit 199 (PU), 200 (PU), 195 (PU) or 196 (PU) between Flasher Module A-05 connector **X255** (pins 3 and 4) and Turn Indicator E-09 and flashing lamps. Go to next test point.
9	Test Point Good Reading Possible Cause of Bad Reading 9 Disconnect the Flasher Module A-05. Place a jumper wire across pins 1 and 4 of the Flasher Module A-05 connector **X255**.	LH flashing lamps illuminate. If good reading, go to next test point	Short to ground will blow Fuse #56. Repair short to ground.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
10	Disconnect the Flasher Module A-05. Place a jumper wire across pins 1 and 3 of the Flasher Module A-05 connector **X255**.	RH flashing lamps illuminate. If good reading, go to next test point.	Short to ground will blow Fuse #56. Repair short to ground.
11	Reconnect the Flasher Module A-05. Place Hazard Switch S-25 in the "ON"position. Measure for voltage at Turn Indicator E-09 connector **X257** (pins 7 and 10).	0 to **12 volts** If good reading, go to next test point.	Open circuit 199 (PU) or 196 (PU) between Flasher Module A-05 connector **X255** (pins 3 and 4) and Turn Indicator E-09 connector **X257** (pins 7 and 10).
12	Measure resistance on circuit 209 (BK) between Turn Indicator E-09 connector **X257** (pin 9) and ground.	Less than **1 ohms**. If good reading, go to next test point.	Turn Indicator E-09 Open in circuit 141 (BK) between the Flasher Module A-05 connector **X255** (pin 6) and ground.
13	Measure **12 volts** at Flasher Module A-05 connector **X255** (pin 5).	**12 volts**If good reading, go to text point 16.	Flasher Module A-05. Short to ground on circuit 208 (PU) between Flasher Module A-05 connector **X255** (pin 5) and High Beam Indicator E-10 connector **X258** (pin 7). Go to next test point.
14	Disconnect the Flasher Module A-05. Place a jumper wire across pins 1 and 5 of the Flasher Module A-05 connector **X255**.	High Beam Indicator E-10 illuminates. If good reading, go to next test point.	Short to ground on circuit 208 (PU) will blow Fuse #56. Repair short to ground between Flasher Module A-05 connector **X255** (pin 5) and High Beam Indicator E-10 connector **X258** (pin 7).
15	Measure resistance on circuit 221 (BK) between High Beam Indicator E-10 connector **X258** (pin 9) and ground.	Less than **1 ohms** If good reading, check High Beam Indicator E-10.	Open circuit 221 (BK) between High Beam Indicator E-10 connector **X258**(pin 9) and ground.
16	Place Hazard Switch S-25 in the "ON" position. Measure the voltage at Flasher Module A-05 connector **X255** (pin 10).	0 to **12 volts** If good reading, go to test point 17.	Flasher Module A-05. Short to ground on circuit 243 (PU) between Flasher Module A-05 connector **X255** (pin 10) and LH NASO Flashing Lamp E-07 connector **X242** (pin A). Go to next test point.
17	Disconnect the Flasher Module A-05. Place a jumper wire across pins 1 and 10 of the Flasher Module A-05 connector.	LH NASO Flashing Lamp E-07 illuminates. If good reading, go to next test point.	Short to ground on circuit 243 (PU) will blow Fuse #56. Repair short to ground on circuit 243 (PU) between Flasher Module A-05 connector **X255** (pin 10) and LH NASO Flashing Lamp E-07 connector **X242** (pin A).
18	Measure the voltage at Flasher Module A-05 connector **X255** (pin 11).	0 to **12 volts** Flasher Module A-05.	Short to ground on circuit 244 (PU) between Flasher Module A-05 connector **X255** (pin 11) and RH NASO Flashing Lamp E-08 connector **X245** (pin A). Go to next test point.
19	Disconnect the Flasher Module A-05. Place a jumper wire across pins 1 and 11 of the Flasher Module A-05 connector **X255**. RH NASO.	RH NASO Flashing Lamp E-09 illuminates. If good reading, replace the Flasher Module A-05.	Short to ground on circuit 244 (PU) will blow Fuse #56. Repair short to ground on circuit 244 (PU) between Flasher Module A-05 connector **X255** (pin 11) and RH NASO Flashing Lamp E-08 connector **X245** (pin A).

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Turn/hazard light Wiring harness - Testing (A.40.A.13.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Hazard Switch S-25 in the "ON" position. Measure the voltage at LH NASO Flashing Lamp E-07, connector **X242** terminal A.	0 to **12 volts** If good reading, go to test point 2.	Open circuit 243 (PU) between Flasher Module A-05 connector X255 (pin 10) and LH NASO Flashing Lamp E-07 connector **X242** (pin A). Short to ground on circuit 243 (PU) between Flasher Module A-05 connector X255 (pin 10) and LH NASO Flashing Lamp E-07 connector **X242** (pin A). Go to next test point.
2	Disconnect the LH NASO Flashing Lamp E-07. Measure resistance on circuit 679 (BK) between LH NASO Flashing Lamp E-07 connector **X242** (pin B) and ground.	Less than **1 ohms**. If good reading, replace the bulb.	Open circuit 679 (BK) between LH NASO Flashing Lamp E-07 connector **X242** (pin B) and ground.
3	1 Place Hazard Switch S-25 in the ON position. Measure the voltage at RH NASO Flashing Lamp E-08, connector X245 terminal A.	0 to **12 volts** If good reading, go to test point 2.	Open circuit 244 (PU) between Flasher Module A-05 connector X255 (pin 11) and RH NASO Flashing Lamp E-08 connector X245 (pin A). Short to ground on circuit 244 (PU) between Flasher Module A-05 connector X255 (pin 11) and RH NASO Flashing Lamp E-08 connector X245 (pin A). See Test B- Flasher Module A-05 step 18. Go to next test point.
4	Disconnect the RH NASO Flashing Lamp E-08. Measure resistance on circuit 680 (BK) between RH NASO Flashing Lamp E-08, connector X245 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the bulb.	Open circuit 680 (BK) between RH NASO Flashing Lamp E-08 connector X245 (pin B) and ground.
5	Place Hazard Switch S-25 in the ON position. Measure the voltage at LH Header Flashing Lamp E-01 connector X303 (pin A).	0 to**12 volts** If good reading, go to next test point.	Open circuit 613 (PU) between Flasher Module A-05 connector X255 (pin 3) and LH Header Flashing Lamp E-01 connector X303 (pin A). Short to ground on circuit 613 (PU) between Flasher Module A-05 connector X255 (pin 3) and LH Header Flashing Lamp E-01 connector X303 (pin A). See text B-Flasher Module Test step 8. Go to next test point.
6	Disconnect the LH Header Flashing Lamp E-01. Measure the resistance on circuit 775 (BK) and 776 (BK) between the LH Header Flasher Lamp E-01 connector X303 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the bulb.	Open in circuit 775 (BK) or 776 (BK) between LH Header Flashing Lamp E-01 connector X303 (pin B) and ground.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
7	Place Hazard Switch S-25 in the ON position. Measure the voltage at RH Header Flashing Lamp E-02 connector X304 (pin A).	0 to**12 volts** If good reading, go to next test point.	Open circuit 618 (PU) between Flasher Module A-05 connector X255 (pin 4) and RH Header Flashing Lamp E-02 connector X304 (pin A). Short to ground on circuit 613 (PU) between Flasher Module A-05 connector X255 (pin 4) and RH Header Flashing Lamp E-02 connector X304 (pin A). See text B-Flasher Module Test step 8. Go to next test point.
8	Disconnect the RH Header Flashing Lamp E-02. Measure the resistance on circuit 775 (BK) and 776 (BK) between the RH Header Flasher Lamp E-02 connector X304 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the bulb.	Open in circuit 775 (BK) or 776 (BK) between RH Header Flashing Lamp E-02 connector X304 (pin B) and ground.
9	Place Hazard Switch S-25 in the ON position. Measure the voltage at LH Front Hazard Lamp E-03 connector X160 (pin A).	0 to **12 volts** If good reading, go to next test point.	Open circuit 615 (PU) between Flasher Module A-05 connector X255 (pin 3) and LH Front Hazard Lamp E-03 connector X160 (pin A). Short to ground on circuit 615 (PU) between Flasher Module A-05 (pin 3) and LH Front Hazard Lamp E-03 (pin A). See Test B-Flasher Module Test step 8. Go to next test point.
10	Disconnect the LH Front Hazard Lamp E-03. Measure the resistance on circuit 620 (BK) between LH Front Hazard Lamp E-03 connector X160 (pin C) and ground.	Less than **1 ohms**. If good reading, replace the hazard bulb of the LH Front Hazard Lamp E-03.	Open in circuit 620 (BK) between LH Front Hazard Lamp E-03 connector X160 (pin C) and ground.
11	Place Hazard Switch S-25 in the ON position. Measure the voltage at RH Front Hazard Lamp E-04 connector X165 (pin A).	0 to **12 volts** If good reading, go to next test point.	Open circuit 616 (PU) between Flasher Module A-05 connector X255 (pin 3) and RH Hazard Lamp E-04 connector X165 (pin A). Short to ground on circuit 616 (PU) between Flasher Module A-05 connector X255 (pin 4) and RH Front Hazard Lamp E-04 connector X165 (pin A). See Test B-Flasher Module Test step 8. Go to next test point.
12	Disconnect the RH Front Hazard Lamp E-04. Measure the resistance on circuit 621 (BK) between RH Front Hazard Lamp E-04 connector X165 (pin C) and ground.	Less than **1 ohms**. If good reading, replace the hazard bulb of the RH Front Hazard Lamp E-04	Open in circuit 621 (BK) between RH Front Hazard Lamp E-04 connector X165 (pin C) and ground.
13	Place Hazard Switch S-25 in the ON position. Measure the voltage at RH Rear Flashing Lamp E-06 connector X302 (pin 1).	0 to **12 volts** If good reading, go to test point 2.	Open circuit 619 (PU) between Flasher Module A-05 connector X255 (pin 3) and LH Rear Flashing Lamp E-05 connector X301 (pin 1). Short to ground on circuit 619 (PU) between Flasher Module A-05 connector X255 (pin 3) and LH Rear Flashing Lamp E-05 connector X301 (pin 1). See test B-Flasher Module Test step 8. Go to next test point.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
14	Disconnect the LH Rear Flashing Lamp E-05. Measure the resistance on circuit 634 (BK) between LH Rear Flashing Lamp E-05 connector X301 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace the bulb.	Open in circuit 634 (BK) between LH Rear Flashing Lamp E-05 connector X301 (pin 2) and ground.
15	Place Hazard Switch S-25 in the .ON. position. Measure the voltage at RH Rear Flashing Lamp E-06 connector X302 (pin 1).	0 to **12 volts** If good reading, go to test point 2.	Open circuit 622 (PU) between Flasher Module A-05 (pin 3) and RH Rear Flashing Lamp E-06 connector X302 (pin 1). Short to ground on circuit 622 (PU) between Flasher Module A-05 connector X255 (pin 3) and RH Rear Flashing Lamp E-06 connector X302 (pin 1). See test B-Flasher Module Test step 8. Go to next test point.
16	Disconnect the RH Rear Flashing Lamp E-06. Measure the resistance on circuit 635 (BK) between RH Rear Flashing Lamp E-06 connector X302 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace the bulb.	Open in circuit 635 (BK) between RH Rear Flashing Lamp E-06 connector X302 (pin 2) and ground.

Turn/hazard light Hazard switch - Testing (A.40.A.13.90 - G.40.A.20)

AFX8010

IMPORTANT: *Do not use a self-powered test light for any of these tests. Use of a self powered test light can cause damage to components in this system.*

⚠ WARNING ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Measure for **12 volts** at Switch S-25 connector **X259**(pin 2).	**12 volts** If good reading, Go to test **3**	Open circuit 40 (RD) or 54 (RD) between Hazard Switch S-25 connector **X259** and Fuse F-56. Short to ground between Hazard Switch S-25 connector **X259** (pin2) and Fuse F-56. Go to next test point.
2	Flasher Module disconnected Measure for **12 volts** at Hazard Switch S-25 connector **X259** (pin 2).	**12 volts** If good reading, check Flasher Module.	Short to ground in circuit 102 (RD) between flasher module A-05 connector **X259** (pin 1) and fuse F-56.
3	Hazard Switch (S-25) in the "Closed" position. Measure for **12 volts** at Hazard Switch S-25 connector **X259** (pin 3).	**12 volts** If good reading, go to next test point.	Hazard Switch S-25.
4	Measure for **12 volts** at Hazard Switch (S-25) connector **X259** (pin9).	**12 volts** If good reading, go to next test point.	Hazard Switch S-25.
5	Hazard Switch (S-25) in the "Open" position. Measure for resistance from Hazard Switch S-25 connector **X259** (pin 9) to ground.	Less than **1 ohms** If good reading, Hazard Switch (S-25) is operating properly.	Open circuit 220 (BK) or 219 (BK) between hazard switch S-25 **X259** (pin 9) and ground.

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Brake light Relay - Testing (A.40.A.14.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Depress brake pedal. Measure for **12 volts** at Brake Lights Relay K-33 (pin 5).	**12 volts** If good reading, the relay is OK.	Brake Lights Relay K-33. Adjacent circuits. Go to test **2**
2	Depress brake pedal. Measure for **12 volts** at Brake Lights Relay K-33 (pin 1).	**12 volts** If good reading, Go to test **3**	Open or short to ground in circuit 183 (WH) between Brake Lights Relay K-33 (pin 1) and CCM-2 connector X015 (pin J1-18). See Service manual for testing of CCM.
3	Measure for **12 volts** at Brake Lights Relay K-33 (pin 3).	**12 volts** If good reading, Go to test **4**	Open circuit 56 (RD) between Brake Lights Relay K-33 (pin 3) and Fuse #52. Short to ground on circuit 78 (PU) between Brake Lights Relay K-33 (pin 5) and Brake Lamps. A short will cause Fuse #52 to blow.
4	Disconnect the Brake Lights Relay K-33. Measure resistance on circuit 159 (BK) between Brake Lights Relay K-33 (pin 2) and ground.	Less than **1 ohms**. If good reading,	Open circuit 159 (BK) between Brake Lights Relay K-33 (pin 2) and ground.

Brake light Wiring harness - Testing (A.40.A.14.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Depress brake pedal. Measure for **12 volts** at Brake Light Relay K-33 (pin 5).	**12 volts** If good reading, go to next test point.	Perform Brake Light Relay Test.
2	Depress brake pedal. Measure for **12 volts** at LH Brake/Tail Lamp E-11 connector X299 (pin 1).	**12 volts** If good reading, go to next test point.	Open circuit 629 (PU) between Brake Light Relay K-33 (pin 5) and LH Brake/Tail Lamp E-11 connector X299 (pin 1). Short to ground on circuit 629 (PU) between Brake Light Relay K-33 (pin 5) and LH Brake/Tail Lamp E-11 connector X299 (pin 1). Any short to ground will blow the Fuse #52.
3	Disconnect the LH Brake/Tail Lamp E-11. Measure the resistance on circuit 634 (BK) between LH Brake/Tail Lamp E-11 connector X299 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace the brake bulb of the LH Brake/Tail Lamp E-12.	Open in circuit 634 (BK) between LH Brake/Tail Lamp E-11 connector X299 (pin 2) and ground.
4	Place Key Switch S-02 in ON position. Depress brake pedal. Measure for **12 volts** at Brake Light Relay K-33 (pin 5).	**12 volts** If good reading, go to next test point.	Perform Brake Light Relay Test.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
5	Depress brake pedal. Measure for **12 volts** at RH Brake/Tail Lamp E-12 connector X300 (pin 1).	**12 volts** If good reading, go to next test point.	Open circuit 630 (PU) between Brake Light Relay K-33 (pin 5) and RH Brake/Tail Lamp E-12 connector X300 (pin 1). Short to ground on circuit 630 (PU) between Brake Light Relay K-33 (pin 5) and RH Brake/Tail Lamp E-12 connector X300 (pin 1). Any short to ground will blow the Fuse #52.
6	Disconnect the RH Brake/Tail Lamp E-12. Measure the resistance on circuit 635 (BK) between RH Brake/Tail Lamp E-12 connector X300 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace the brake bulb of the RH Brake/Tail Lamp E-12.	Open circuit 635 (BK) between RH Brake/Tail Lamp E-12 connector X300 (pin 2) and ground.

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Brake light Switch - Short circuit to B+ (A.40.A.14.83 - G.30.B.54)

AFX8010

E0134-03 - Service Brake Pressure Sensor

Cause:
The brake pressure switch (S-39) circuit is shorted to 12 volts.

Possible failure modes:

1. Switch supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" sort menu, and select "SERVICE PRESS SW" to check the voltage range.

   The proper voltage for the brake pressure switch is approximately **8.3 volts** - brakes off.

   The proper voltage range for the brake pressure switch is **1.8 volts** or less - brakes on.

   A. If the voltage reading is high out of range (>**10 volts**), continue with Step **2**.

   B. If the voltage is within range, the short may not be present at this time. Continue with Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the brake pressure switch connector **X173**.

   A. If the voltage drops back into the proper range, the short is in the switch, or switch wiring. Replace the switch.

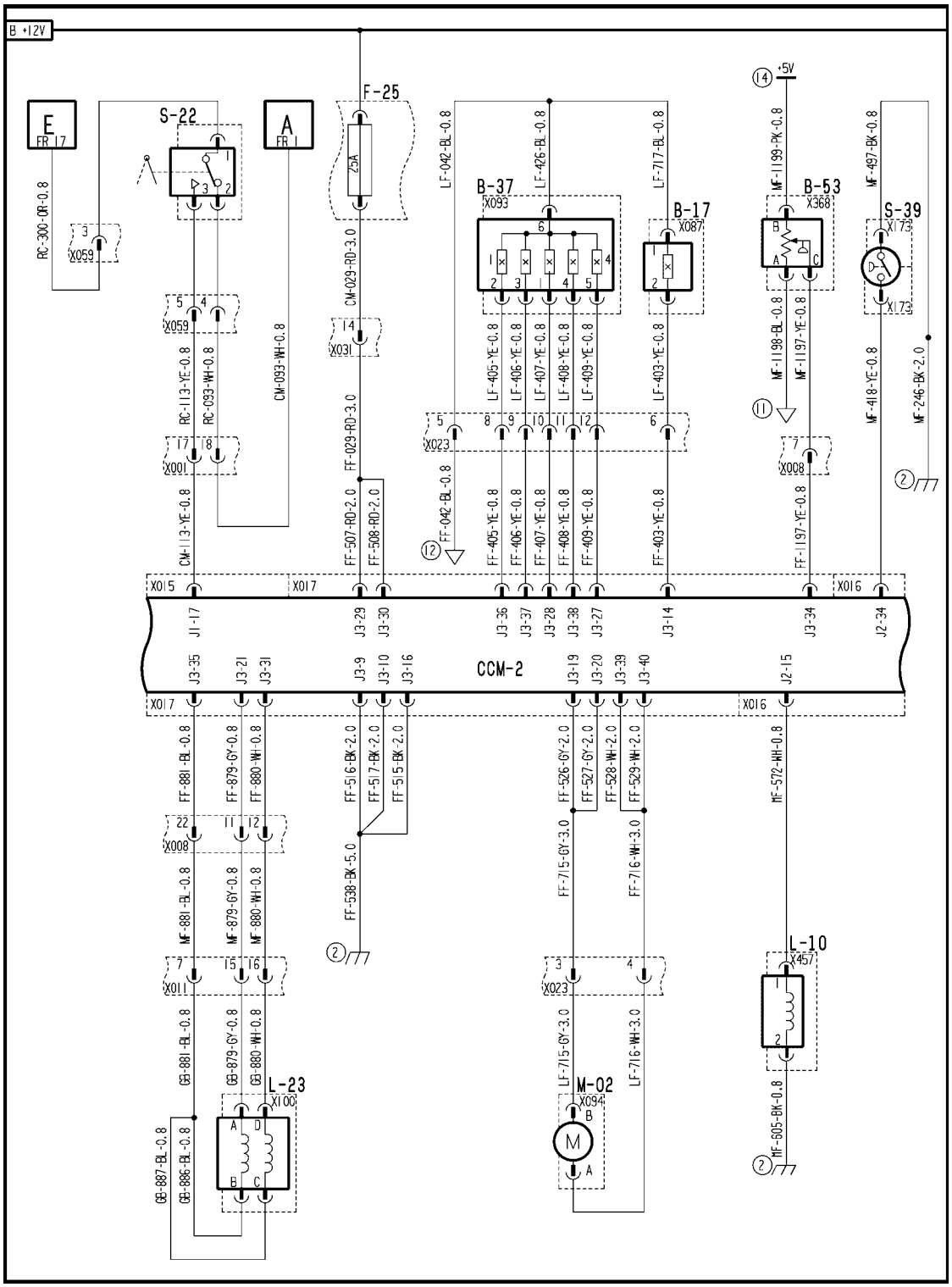
   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X173** and connector **X016** pin J2-34 wire 418 yellow. Locate the short and repair.

3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

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Brake light Relay - Unidentified failure (A.40.A.14.82 - G.30.B.46)

AFX8010

E0199-11 - Brake Lights

Cause:
The Brake lights Relay (K-33) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad relay.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" or "LIGHTS" sort menu, and select "BRAKE LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the reading is within the proper range, the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position and remove the Brake Lights Relay K-33. Use a multimeter to check the resistance of the relay coil. The proper resistance range for the relay coil is **74.3 - 78.3 ohms**.

   A. If out of specification, replace relay.

   B. If the coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between relay socket pin 1 and chassis ground.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between the brake lights relay base and connector **X015** pin J1-18 wire 183 white. Locate the short and repair.
4. Use a multimeter to check for continuity between relay socket pin 2 and chassis ground.

   A. If continuity to ground is found, continue with Step **5**.

   B. If there is no continuity to ground, there is an open circuit in the cab main (CM) harness between the fuse panel and cab ground #3 wire 159 black. Locate the open and repair.
5. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the brake lights relay. Use a multimeter to check for **12 volts** between relay socket pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **6**.

   B. If **12 volts** is found, continue with Step **7**.
6. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the brake lights relay. Use a multimeter to check for **12 volts** between connector **X015** J1-18 and chassis ground.

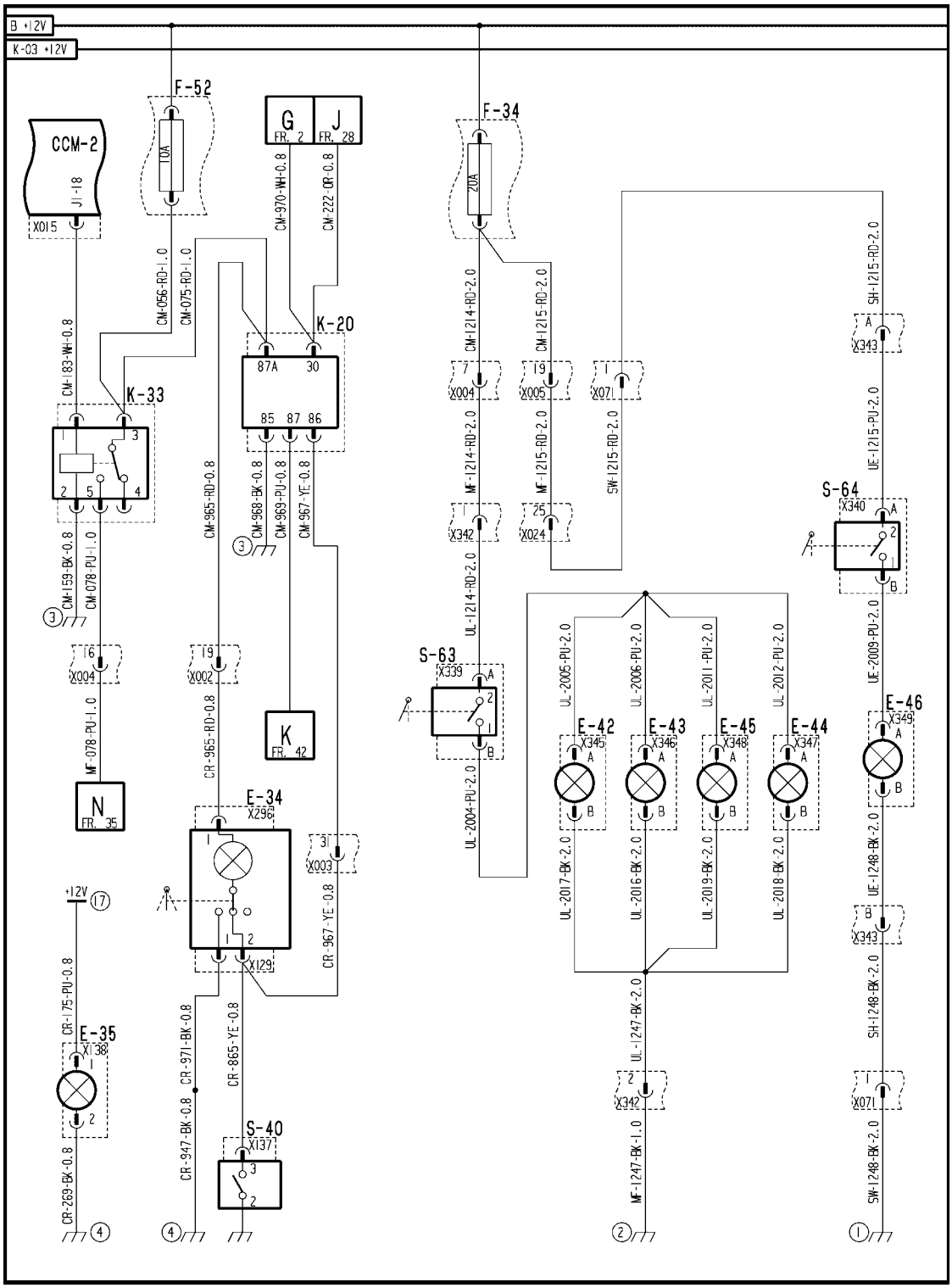
   A. If **12 volts** is not present, replace the CCM2 with a known good controller.

   B. If **12 volts** is present, there is an open circuit in the cab main (CM) harness between connector **X015** J1-18 and relay socket pin 1 wire 183 white. Locate the open and repair.
7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

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A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)



AFXSCHEM38-04 1

FRAME 38 - LIGHTING

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E-34 Dome Light	E-35 Console Light	E-42 LH Front Shield Light
E-43 LH Rear Shield Light	E-44 RH Front Shield Light	E-45 RH Rear Shield Light
E-46 Engine Light	F-34 Under Shield Lights Fuse	F-52 Dome / Brake Lights Fuse
K-20 Time Delay Module	K-33 Brake Lights Relay	S-40 LH Door Switch
S-63 Under Shield Light Switch	S-64 Engine Light Switch	

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Beacon Relay - Unidentified failure (A.40.A.15.82 - G.30.B.46)

AFX8010

E0200-11 - Beacon Light

Cause:
The beacon lights relay K-29 circuit is open or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Relay failed.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" menu. Select the "LIGHTS" sort menu, and select "BEACON LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON". The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with step **7**.

2. Turn the key switch "OFF". Remove the beacon lights relay K-29 from the fuse/relay panel, and use a multimeter to check the resistance of the relay coil. The proper resistance range for the relay coil is **74 - 78 ohms**.

   A. If the resistance is out of specification, replace the relay.

   B. If the resistance is within specifications, continue with step **3**.

3. Use a multimeter to check for continuity between the relay socket pin 1 on the fuse/relay panel and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground on the cab main (CM) harness between the fuse/relay panel and connector **X015** pin J1-24 wire 182 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with step **4**.

4. Use a multimeter to check for continuity between the relay socket pin 2 on the fuse/relay panel and chassis ground. There should be continuity to ground.

   A. If there is no continuity to ground, there is an open circuit in the cab main (CM) harness between the fuse/relay panel and cab ground 3 wire 160 black. Locate the open and repair.

   B. If there is continuity to ground, continue with step **5**.

5. Turn the key switch to the "ON" position. Enter the Universal Display Plus "DIAG" menu. Select the "LIGHTS" sort menu, and select "BEACON LT". Press the "OFF" button to change the circuit output to "ON". Use a multimeter to check for **12 volts** between the relay socket pin 1 on the fuse/relay panel and chassis ground. There should be **12 volts**.

   A. If **12 volts** is not present, continue with step **6**.

   B. If **12 volts** is present, continue with step **7**.

6. Turn the key switch to the "ON" position. Enter the Universal Display Plus "DIAG" menu. Select the "LIGHTS" sort menu, and select "BEACON LT". Press the "OFF" button to change the circuit output to "ON". Use a multimeter to check for **12 volts** between connector **X015** pin J1-24 and chassis ground. There should be **12 volts**.

   A. If **12 volts** is not present, the CCM2 controller is not functioning properly.Reload the software in CCM2 using the EST, and recheck the circuit operation. If the CCM2 module is still not providing **12 volts** output, replace the module.

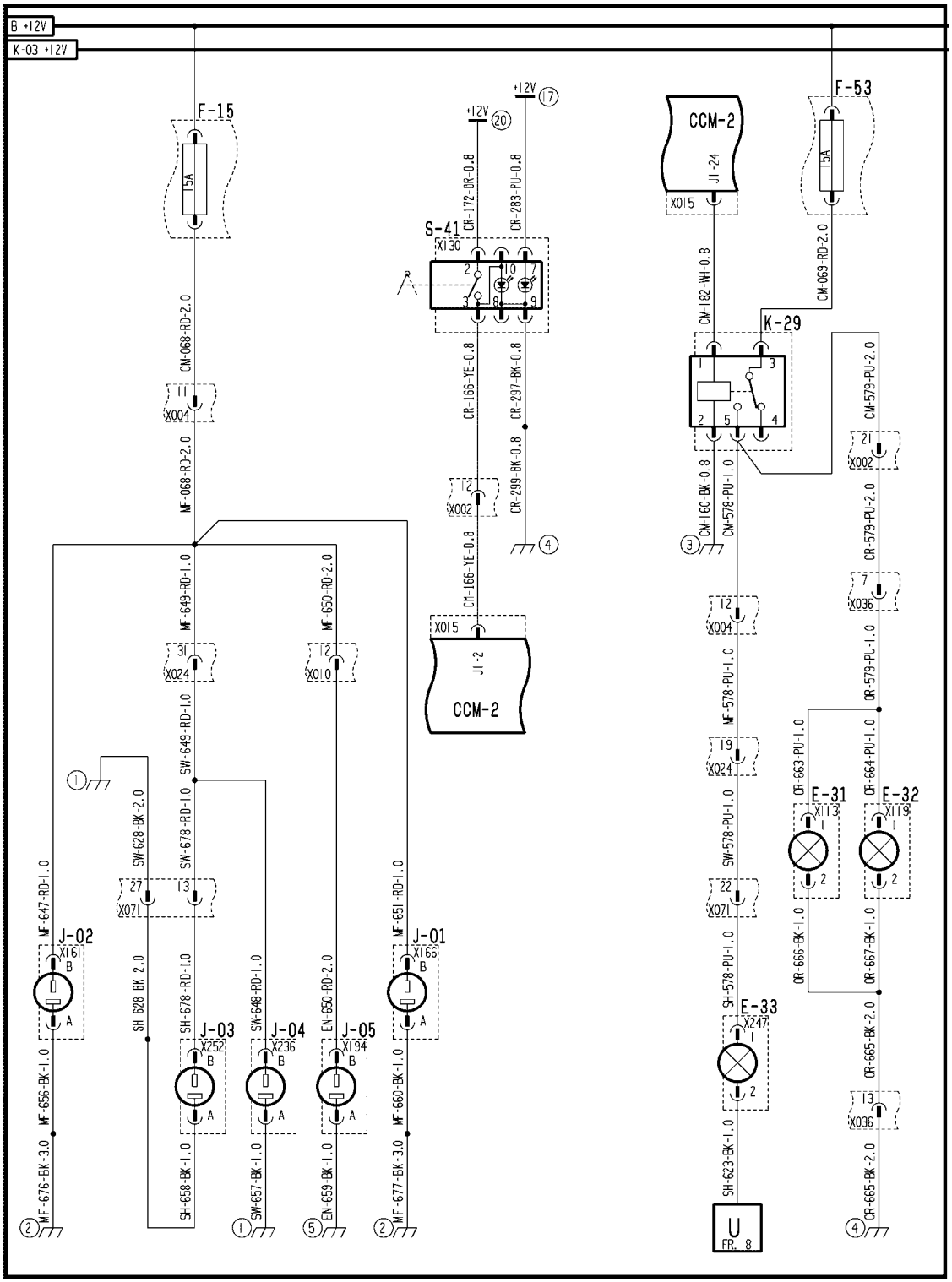
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B. If **12 volts** is present, there is an open circuit in the cab main (CM) harness between the fuse/relay panel and connector **X015** pin J1-24 wire 182 white. Locate the open and repair.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 39 (A.30.A.88 - C.20.E.39)



AFXSCHEM39-04 1

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FRAME 39 - LIGHTING

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E-31 LH Front Beacon Light	E-32 RH Front Beacon Light	E-33 Rear Beacon Light
F-15 Service Sockets Fuse	F-53 Beacon Light Fuse	J-01 RH Front Service Socket
J-02 LH Front Service Socket	J-03 RH Side Service Socket	J-04 LH Side Service Socket
J-05 Engine Service Socket	K-29 Beacon Light Relay	S-41 Beacon Light Switch

Beacon Relay - Testing (A.40.A.15.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Close Beacon Light Switch S-41. Measure for **12 volts** at Beacon Light Relay K-29 (pin 5).	**12 volts** If good reading, the relay is operating properly.	Beacon Light Relay K-29. Adjacent circuits. Go to next test point. Go to test **2**
2	Measure for **12 volts** at Beacon Light Relay K-29 (pin 1).	**12 volts** If good reading, Go to test **3**	Open or short to ground in circuit between Beacon Light Relay K-29 (pin 1) and CCM-2 connector X015 (pin J1-24). See Service Manual for testing of CCM.
3	Measure for **12 volts** at Beacon Light Relay K-29 (pin 3).	**12 volts** If good reading, Go to test **4**	Open in circuit 69 (RD) between Beacon Light Relay K-29 (pin 3) and Fuse #53. Short to ground on circuit 578 (PU) between Beacon Light Relay K-29 (pin 5) and Rear Beacon Light E-33 connector X247 (pin A). A short will cause Fuse #53 to blow.
4	Disconnect the Beacon Light Relay K-29. Measure resistance on circuit 160 (BK) between Beacon Light Relay K-29 (pin 2) and ground.	Less than 1 ohm. If good reading,	Open circuit 160 (BK) between Beacon Light Relay K-29 (pin 2) and ground.

Beacon Switch - Testing (A.40.A.15.83 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Measure for **12 volts** at Beacon Light Switch S-41 connector X130 (pin 2).	**12 volts**. If good reading, Go to test **2**	Open circuit 172 (OR) or 45 (OR) between Beacon Light Switch S-41 connector X130 (pin 2) and Fuse #49.
2	Close Beacon Light Switch S-41. Measure for **12 volts** at Beacon Light Switch S-41 connector X130 (pin 3).	**12 volts** If good reading, system OK.	Beacon Light Switch. Short to ground on circuit 166 (YE) between Beacon Light Switch S-41 connector X130 (pin 3) and CCM-2 (pin J1-2) A short to ground will blow Fuse #49.

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Beacon Wiring harness - Testing (A.40.A.15.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Close Beacon Light Switch S-41. Measure for **12 volts** at Beacon Light Relay K-29 (pin 5).	**12 volts** If good reading, Go to test **2**	Perform Beacon Light Relay Test.
2	Measure the voltage at Rear Beacon Light E-33 connector X247 (pin A).	**12 volts** If good reading, Go to test **3**	Open circuit 578 (PU) between Beacon Light Relay K-29 (pin 5) and Rear Beacon Light E-33 connector X247 (pin A).
3	Disconnect the Rear Beacon. Measure the resistance on circuit 623 (BK) between Rear Beacon Light E-33 connector X247 (pin B) and ground.	Less than 1 ohm. If good reading, replace the Beacon Light bulb of the Rear Beacon E-33.	Open circuit 623 (BK) between Rear Beacon Light E-33 connector X247 (pin B) and ground.
4	Place Key Switch S-02 in ON position. Close Beacon Light Switch S-41. Measure for **12 volts** at Beacon Light Relay K-29 (pin 5).	**12 volts** If good reading, Go to test **5**	Perform Beacon Light Relay Test.
5	Measure for **12 volts** at LH Front Beacon Light E-31 connector X113 (pin A).	**12 volts** If good reading, Go to test **6**	Open in circuit 579 (PU) or 663 (PU) between Beacon Light Relay K-29 (pin 5) and LH Front Beacon Light E-31 connector X113 (pin A).
6	Disconnect the LH Front Beacon E-31. Measure the resistance on circuit 666 (BK) between LH Front Beacon Light E-31 connector X113 (pin B) and ground.	Less than **1 ohms** If good reading, replace the Beacon Light bulb of the LH Front Beacon E-31.	Open in circuit 666 (BK) between LH Front Beacon Light E-31 connector X113 (pin B) and ground.
7	Place Key Switch S-02 in ON position. Close Beacon Light Switch S-41. Measure for **12 volts** at Beacon Light Relay K-29 (pin 5).	**12 volts** If good reading, Go to test **8**	Perform Beacon Light Relay Test.
8	Measure for **12 volts** at RH Front Beacon Light E-32 connector X119 (pin A).	**12 volts** If good reading, Go to test **9**	Open in circuit 579 (PU) or 664 (PU) between Beacon Light Relay K-29 (pin 5) and RH Front Beacon Light E-32 connector X119 (pin A).
9	Disconnect the RH Front Beacon E-32. Measure the resistance on circuit 667 (BK) between RH Front Beacon Light E-32 connector X119 (pin B) and ground.	Less than **1 ohms** If good reading, replace the Beacon Light bulb of the RH Front Beacon E-32.	Open in circuit 667 (BK) between RH Front Beacon Light E-32 connector X119 (pin B) and ground.

Front work light Switch - Testing (A.40.A.16.83 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Measure for **12 volts** at Work Light Switch S-43 connector X132 (pin 2).	**12 volts**. If good reading, Go to test **2**	Open or short circuit 240 (OR) or 45 (OR) between Work Light Switch S-43 connector X132 (pin 2) and Fuse #49.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
2	Close Work Light Switch. Use INFO Diagnostic Screen to check for voltage at CCM-1 (pin J1-3).	**12 volts**. If good reading, Go to test **3**	Work Light Switch S-43. Short to ground on circuit 171(YE) between Work Light Switch S-43 connector X132 (pin 3) and CCM-1 (pin J1-3) A short will cause Fuse #49 to blow.
3	Measure for continuity at Work Light Switch S-43 connector X132 (pin 5) and Distance Work Light Relay K-21.	**12 volts**. If good reading, Go to test **4**	Open circuit 1 (OR) between Work Light Switch S-43 connector X132 (pin 5) and Distance Work Lights Relay K-21 (pin 5).
4	Measure for continuity at Work Light Switch S-43 connector X132 (pin 6) and Cab Roof Ground.	Continuity to ground. If good reading,	Work Light Switch S-43. Short to ground on circuit 61 (PU) between Work Light Switch S-43 connector X132 (pin 6) and Cab Inner Work Lights E-15 and E-17 connector X115 and X117 (pin A).

Front work light Relay - Testing (A.40.A.16.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Lower Work Lights Relay K-30 (pin 5).	**12 volts**. If good reading, the relay is operating properly.	Lower Work Lights Relay. Adjacent circuits. Go to test **2**
2	Measure for **12 volts** at Lower Work Lights Relay K-30 (pin 1).	**12 volts** Go to test **3**	Open or short to ground in circuit 187 (WH), 188 (WH), 189 (WH) or 190 (WH) between Lower Work Lights Relay K-30 (pin 1) and CCM-1 (J1-11). See Service Manual for testing of CCM.
3	Measure for **12 volts** at Lower Work Lights Relay K-30 (pin 3).	**12 volts** If good reading, Go to test **4**	Open in circuit 64 (RD) between Lower Work Lights Relay K-30 (pin 3) and Fuse #54. Short to ground in circuit 65 (PU), 645 (PU), 644 (PU) or 646 (PU) between Lower Work Lights Relay K-30 (pin 3) and Lower Work Lights E-23 and E-24 or Grain Tank Light E-30. A short will cause the Fuse #54 to blow.
4	Disconnect the Lower Work Lights Relay K-30. Measure resistance on circuit 157 (BK) to Lower Work Lights Relay K-30 (pin 2) and ground.	Less than <Physi-cal_Data><Value>1</Value><Unit>ohms</Unit></Physi-cal_Data>.**1 ohms** If good reading, replace Lower Work Lights Relay K-30.	Open in circuit 157 (BK) to Lower Work Lights Relay K-30 (pin 2) and ground.
5	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Header Work Lights Relay (pin 5).	**12 volts**. If good reading, the relay is operating properly.	Header Work Lights Relay Test. Adjacent circuits. Go to test **6**
6	Measure for **12 volts** at Header Work Lights Relay K-22 (pin 1).	**12 volts** If good reading, Go to test **7**	Open or short on circuit 188 (PU), 189 (PU) or 190 (PU) between Header Work Lights Relay K-22 (pin 1) and CCM-1 (pin J1-11). See Service Manual for testing of CCM.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
7	Measure for **12 volts** at Header Work Lights Relay K-22 (pin 3).	**12 volts** If good reading, Go to test **8**	Open in circuit 62 (RD) between Header Work Lights Relay K-22 (pin 3) and Fuse #30. Short to ground in circuit 63 (PU), 258 (PU) or 257 (PU) between Header Work Lights Relay K-22 (pin 5) and Header Lights E-21 and E-22 connectors X167 and X162 (pin A). A short will cause Fuse #30 to blow.
8	Disconnect the Header Work Lights Relay K-22. Measure resistance on circuit 238 (BK) between Header Work Lights Relay K-22 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace Header Work Lights Relay.	Open circuit 238 (BK) between Header Work Lights Relay K-22 (pin 2) and ground.
9	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 87).	**12 volts**. If good reading, the relay is operating properly.	Cab Work Lights Relay K-01. Adjacent circuits. Go to test **10**
10	Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 86).	**12 volts** If good reading, Go to test **11**	Open or short circuit 190 (WH) between Cab Roof Work Lights Relay K-01 (pin 86) and CCM-1 (pin J1-11). See Service Manual for testing of CCM.
11	Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 30).	**12 volts** If good reading, Go to test **12**	Open circuit 22 (RD) between Cab Roof Work Lights Relay K-01 (pin 30) and Fuse #31. Short to ground in circuit 23 (OR) or 88 (OR) between Cab Roof Work Lights Relay K-01 (pin 87) and Mid/Outer Work Lights E-15, E-16, E-19 and E-20. A short will cause Fuse #31 to blow.
12	Disconnect the Cab Roof Work Lights Relay K-01. Measure resistance on circuit 154 (BK) between Cab Roof Work Lights Relay K-01 (pin 85) and ground.	Less than **1 ohms**. If good reading, replace Cab Roof Work Lights Relay K-01.	Open circuit 54 (BK) between Cab Roof Work Lights Relay K-01 (pin 85) and ground.
13	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Cab Roof Work Light Relay K-01 (pin 86).	**12 volts** If good reading, the wiring has good continuity.	Distance Work Lights Relay K-21. Adjacent circuits. Go to next test point.
14	Measure the voltage at Dis- tance Work Lights Relay K-21 (pin 1).	**12 volts** If good reading, Go to test **15**	Open or short circuit 189 (WH) or 190 (WH) between Distance Work Lights Relay K-21 (pin 1) and CCM-1 (pin j1-11). See Service Manual for testing of CCM.
15	Measure for **12 volts** at Distance Work Lights Relay K-21 (pin 3).	**12 volts** If good reading, Go to test **16**	Open circuit 60 (RD) between Distance Work Lights Relay K-21 (pin 3) and Fuse #29.
16	Disconnect the Distance Work Lights Relay K-21. Measure the resistance on circuit 155 (BK) between Distance Work Lights Relay K-21 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace Distance Work Lights Relay K-21. Go to test **17**	Open circuit 155 (BK) between Distance Work Lights Relay K-21 (pin 2) and ground.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
17	Place Key Switch S-02 in ON position. Close Work Light Switch S-43 Measure for **12 volts** at Road Lights Relay K-27 (pin 1).	**12 volts** If good reading, the wiring has good continuity. Go to test **18**	Road lights Relay K-27. Adjacent circuits. Go to test **18**
18	Measure the voltage at Road Lights Relay K-27 (pin 1).	**12 volts** If good reading, Go to test **19**	Open or short circuit 117 between Road Lights Relay K-27 (pin 1) and CCM-1 (pin j1-5). See Service Manual for testing of CCM.
19	Measure for **12 volts** at Road Lights Relay K-27 (pin 3).	**12 volts** If good reading, Go to test **20**	Open circuit 60 (RD) between Distance Work Lights Relay K-21 (pin 3) and Fuse #29. Short to ground on circuit 21 (PU) between Distance Work Lights Relay K-21 (pin 5) and Road Lights Relay K-27 (pin 3). A short will cause Fuse #29 to blow.
20	Measure for **12 volts** at Road Lights Relay K-27 (pin 4). Measure the resistance in circuit 119 (PU) between Light Control Relay K-02 (pin 4) and Road Lights Relay K-27 (pin 4) and ground.	**12 volts** If good reading; Go to test **21**	Open circuit 119 (PU) between Light Control Relay K-02 (pin 4) and Road Lights Relay K-27 (pin 4).
21	Disconnect the Road Lights Relay K-27. Measure the resistance in circuit 158 (BK) between Road Lights Relay K-27 (pin 2) and ground.	Less than **1 ohms**. If good reading, replace Road Lights Relay K-27.	Open circuit 158 (BK) between Road Lights Relay K-27 (pin 2) and ground.

Front work light Wiring harness - Testing (A.40.A.16.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in .ON. position. Close Work Light Switch S-43. Measure for **12 volts** at (pin 5).	**12 volts**. If good reading, Go to test **2**	Perform Lower Work Lights Relay Test.
2	Measure for **12 volts** at Grain Tank Light E-30 connector X108 (pin A).	**12 volts** If good reading, Go to test **3**	Open circuit 65 (PU) or 646 (PU) between Lower Work Lights Relay K-30 (pin 5) and Grain Tank Light E-30 connector X108 (pin A).
3	Disconnect the Grain Tank Light E-30. Measure the resistance on circuit 681 (BK) between Grain Tank Light E-30 connector X108 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the Grain Tank Light E-30 bulb.	Open in circuit 681 (BK) between Grain Tank Light E-30 connector X108 (pin B) and ground.
4	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Lower Work Light Relay K-30 (pin 5).	**12 volts**. If good reading, Go to test **5**	Perform Lower Work Lights Relay Test.
5	Measure for **12 volts** at LH Lower Work Light E-23 connector X163 (pin A).	**12 volts** If good reading, Go to test **6**	Open circuit 65 (PU) or 644 (PU) between Lower Work Lights Relay K-30 (pin 5) and LH Lower Work Light E-23 connector X163 (pin A).

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N°	Test Point	Expected Result	Other Result (Possible Cause)
6	Disconnect the LH Lower Work Light E-23. Measure the resistance on circuit 654 (BK) between LH Lower Work Light E-23 connector X163 (pin B) and ground.	Less than **1 ohms**. Go to test **7**	LH Lower Work Light bulb. Open in circuit 654 (BK) between LH Lower Work Light E-23 connector X163 (pin B) and ground.
7	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at RH Lower Work Light Relay K-30 (pin 5).	**12 volts**. If good reading, Go to test **8**	Perform Lower Work Lights Relay Test.
8	Measure for **12 volts** at Lower Work Light E-24 connector X168 (pin A).	**12 volts** If good reading, Go to test **9**	Open circuit 65 (PU) or 645 (PU) between Lower Work Lights Relay K-30 (pin 5) and RH Lower Work Light E-24 connector X168 (pin A).
9	Disconnect the RH Lower Work Light E-24. Measure the resistance on circuit 655 (BK) between RH Lower Work Light E-24 connector X168 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the RH Lower Work Light bulb.	Open in circuit 655 (BK) between RH Lower Work Light E-24 connector X168 (pin B) and ground.
10	Place Key Switch S-02 in .ON. position. Close Work light Switch S-43. Measure for **12 volts** at Header Work Lights Relay K-22 (pin 5).	**12 volts**. If good reading, Go to test **11**	Perform Header Work Lights Relay Test.
11		Go to test **12**	
12	Measure for **12 volts** at LH Header Light E-21 connector X162 (pin A).	**12 volts** If good reading, Go to test **13**	Open circuit 63 (PU) or 257 (PU) between Header Work Lights Relay K-22 (pin 5) and LH Header Light E-21 connector X162 (pin A).
13	Disconnect the LH Header Light E-21. Measure the resistance on circuit 267 (BK) between LH Header Light E-21 connector X162 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the LH Header Light bulb.	Open circuit 267 (BK) between LH Header Light E-21 connector X162 (pin B) and ground.
14	Place Key Switch S-02 in .ON. position. Close Work light Switch S-43. Measure for **12 volts** at Header Work Lights Relay K-22 (pin 5).	**12 volts**. If good reading, Go to test **15**	Perform Header Work Lights Relay Test.
15	Measure for **12 volts** at RH Header Light E-22 connector X167 (pin A).	**12 volts** If good reading, Go to test **16**	Open circuit 63 (PU) or 258 (PU) between Header Work Lights Relay K-22 (pin 5) and RH Header Light E-22 connector X167 (pin A).
16	Disconnect the RH Header Light E-22. Measure the resistance on circuit 268 (BK) between RH Header Light E-22 connector X167 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the RH Header Light bulb. Go to test **17**	Open circuit 268 (BK) between RH Header Light E-22 connector X167 (pin B) and ground.
17	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 87).	**12 volts**. If good reading, Go to test **18**	Perform Cab Roof Work Lights Relay Test.
18	Measure for **12 volts** at Fuse #6, circuit 23 (OR).	**12 volts** If good reading, Go to test **19**	Open circuit 23 (OR) between Fuse #6 and Cab Roof Work Lights Relay K-01 (pin 87).

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N°	Test Point	Expected Result	Other Result (Possible Cause)
19	Measure for **12 volts** at LH Cab Outer Work Light E-15 connector X112 (pin A).	**12 volts** If good reading, Go to test **20**	Fuse #6 Open circuit 58 (PU) or 251 (PU) between Fuse #6 and LH Cab Outer Work Light E-15 connector X112 (pin A).
20	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 87).	**12 volts**. If good reading, Go to test **21**	Perform Cab Roof Work Lights Relay Test.
21	Measure for **12 volts** at Fuse #6, circuit 23 (OR).	**12 volts** If good reading, Go to test **22**	Open circuit 23 (OR) between Fuse #6 and Cab Roof Work Lights Relay K-01 (pin 87).
22	Measure for **12 volts** at LH Cab Mid Work Light E-19 connector X114 (pin A).	**12 volts** If good reading, Go to test **23**	Fuse #6 Open circuit 58 (PU) or 252 (PU) between Fuse #6 and LH Cab Mid Work Light E-19 connector X114 (pin A).
23	Disconnect the LH Cab Mid Work Light E-19. Measure the resistance on circuit 260 (BK) between LH Cab Mid Work Light E-19 connector X114 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the LH Cab Mid Work Light E-19 bulb.	Open circuit 260 (BK) between LH Cab Mid Work Light E-19 connector X114 (pin B) and ground.
24	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 87).	**12 volts**. If good reading, Go to test **25**	Perform Cab Roof Work Lights Relay Test.
25	Measure for **12 volts** at Fuse #7, circuit 88 (OR).	**12 volts** If good reading, Go to test **26**	Open circuit 88 (OR) between Fuse #7 and Cab Roof Work Lights Relay K-01 (pin 87).
26	Measure for **12 volts** at RH Cab Outer Work Light E-16 connector X120 (pin A).	**12 volts** If good reading, Go to test **27**	Fuse #7 Open circuit 59 (PU) or 254 (PU) between Fuse #7 and RH Cab Outer Work Light E-16 connector X120 (pin A).
27	Disconnect the RH Cab Outer Work Light E-16. Measure the resistance on circuit 264 (BK) between RH Cab Outer Work Light E-16 connector X120 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the RH Cab Outer Work Light E-16 bulb.	Open circuit 264 (BK) between RH Cab Outer Work Light E-16 connector X120 (pin B) and ground.
28	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Cab Roof Work Lights Relay K-01 (pin 87).	**12 volts**. If good reading, Go to test **29**	Perform Cab Roof Work Lights Relay Test.
29	Measure for **12 volts** at Fuse #7, circuit 88 (OR).	**12 volts** If good reading, Go to test **30**	Open circuit 88 (OR) between Fuse #7 and Cab Roof Work Lights Relay K-01 (pin 87).
30	Measure for **12 volts** at RH Cab Mid Work Light E-20 connector X118 (pin A).	**12 volts** If good reading, Go to test **31**	Fuse #7 Open circuit 59 (PU) or 253 (PU) between Fuse #7 and RH Cab Mid Work Light E-20 connector X118 (pin A).
31	Disconnect the RH Cab Mid Work Light E-20. Measure the resistance on circuit 263 (BK) between RH Cab Mid Work Light E-20 connector X118 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the RH Cab Mid Work Light bulb.	Open circuit 263 (BK) between RH Cab Mid Work Light E-20 connector X118 (pin B) and ground.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
32	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Distance Work Lights Relay K-21 (pin 5).	**12 volts**. If good reading, Go to test **33**	Perform the Work Light Switch Test.
33	Measure for **12 volts** at LH Cab Inner Work Lights E-17 (pin A).	**12 volts** If good reading, Go to test **34**	Open circuit 61 (PU) or 255 (PU) between Work Light Relay K-21 (pin 5) and LH Cab Inner Work Light E-17 connector X115 (pin A).
34	Disconnect the LH Cab Inner Work Light E-17. Measure the resistance on circuit 261 (BK) between LH Cab Inner Work Light E-17 connector X115 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the LH Cab Inner Work Light bulb.	Open circuit 261 (BK) between LH Cab Inner Work Light E-17 connector X115 (pin B) and ground.
35	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Distance Work Lights Relay K-21 (pin 5).	**12 volts**. If good reading, go to next test point. Go to test **36**	Perform the Work Light Switch Test.
36	Measure for **12 volts** at RH Cab Inner Work Lights E-18 Relay (pin A).	**12 volts** If good reading, Go to test **37**	Open circuit 61 (PU) or 256 (PU) between Work Light Relay K-21 (pin 5) and RH Cab Inner Work Light E-18 connector X117 (pin A).
37	Disconnect the RH Cab Inner Work Light E-18. Measure the resistance on circuit 265 (BK) between RH Cab Inner Work Light E-18 connector X117 (pin B) and ground.	Less than **1 ohms**. If good reading, replace the RH Cab Inner Work Light bulb.	Open circuit 265 (BK) between RH Cab Inner Work Light E-18 connector X117 (pin B) and ground.

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Front work light Relay - Unidentified failure (A.40.A.16.82 - G.30.B.46)

AFX8010

E0070-11 - Front Work Lights

Context:
Two relays are used to control the numerous work lights installed on the combine, but both relays are engaged using a single output signal from CCM1. Since the two relays are wired in parallel, it is possible to have a single relay fail, preventing certain lighting from coming on, without having a fault code indicated. This fault code will only occur if there is a short to ground anywhere on the supply wiring to the relays, or if there is an open circuit between the CCM1 module and the first relay (K-01). An open circuit on one of the relay ground paths, or in the supply wiring to the K-21 relay will not cause this error to be displayed.

Cause:
The front work lights relay(s) (K-01, K-21) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad relay(s).
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "FRONT WORK LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **4**.
2. Key OFF. Remove the Cab Roof Work Lights relay K-01, and use a multimeter to check for continuity between relay base pin 1 and chassis ground.

   A. If there is not continuity to ground, continue with Step **3**.

   B. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X018** pin J1-11 and the work lights relays on one of the following wires:
   - wire 190 white, connector **X018** pin J1-11 to relay K01 pin 1
   - wire 189 white, relay K01 pin 1 to relay K21 pin 1.
   Locate the short and repair.
3. Key OFF. Remove the Cab Roof Work Lights relay K-01. Use the Universal Display Plus "DIAG" screen controls to manually power the front work lights relays. Use a multimeter to check for 12V power between relay base pin 1 and chassis ground.

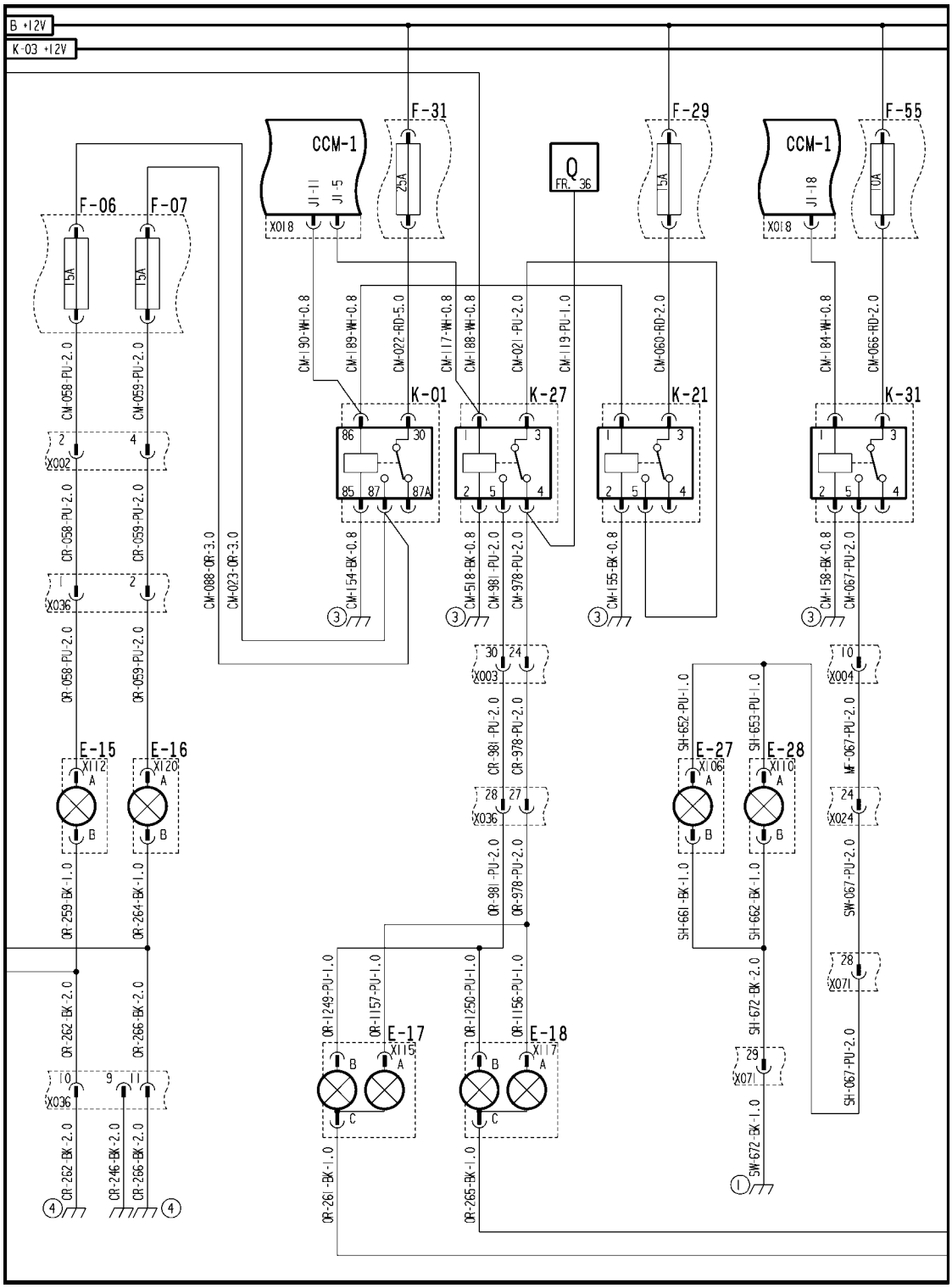
   A. If 12V is not present, there is an open circuit in the cab main (CM) harness between connector **X018** pin J1-11 and relay base (K01) pin 1 wire 190 white. Locate the open and repair.

   B. If 12V is present, continue with Step **4**.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)



AFXSCHEM41-04 1

FRAME 41 - LIGHTING

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E-15 LH Cab Outer Work Light	E-16 RH Cab Outer Work Light	E-17 LH Cab Inner Work Light
E-18 RH Cab Inner Work Light	E-27 LH Rear Work Light	E-28 RH Rear Work Light
F-06 LH Outer Road/Work Lights Fuse	F-07 RH Outer Road/Work Lights Fuse	F-29 Inner Road/Work Lights Fuse
F-31 Outer Road/Work Lights Fuse	F-55 Rear Work Lights Fuse	K-01 Outer Road/Work Lights Relay
K-21 Inner Road Lights Relay	K-27 Inner Work Lights Relay	K-31 Rear Work Lights Relay

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Front work light Relay - Unidentified failure (A.40.A.16.82 - G.30.B.46)

AFX8010

E0073-11 - Field Lights

Context:
Three relays are used to control the numerous work lights installed on the combine, but all relays are engaged using a single output signal from CCM1. Since the three relays are wired in parallel, it is possible to have a single relay fail, preventing certain lighting from coming on, without having a fault code indicated. This fault code will only occur if there is a short to ground anywhere on the supply wiring to the relays, or if there is an open circuit between the CCM1 module and the first relay (K-27). An open circuit on one of the relay ground paths, or in the supply wiring to the K-22 or K-30 relay will not cause this error to be displayed.

Cause:
The front work lights relay(s) (K-22, K-27, K-30) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad relay(s).
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "FIELD LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON". The "STATUS" screen should indicate "OK" is the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **4**.

2. Key OFF. Remove the Inner Work Lights relay K27, and use a multimeter to check between relay base pin 1 and chassis ground.

   A. If there is not continuity to ground, continue with Step **3**.

   B. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X018** pin J1-5 and the work lights relays on one of the following wires:
   wire 117 white, connector **X018** pin J1-5 to relay K-27 pin 1
   wire 188 white, relay K-27 pin 1 to relay K-22 pin 1
   wire 187 white, relay K-22 pin 1 to relay K-30 pin 1 Locate the short and repair.

3. Key OFF. Remove the Inner Work Lights relay K27. Use the Universal Display Plus monitor "DIAG" screen to manually power the front work lights relays. Use a multimeter to check for 12V power between relay base pin 1 and chassis ground.

   A. If 12V is not present, there is an open circuit in the cab main (CM) harness between connector **X018** pin J1-5 and relay base K-27 pin 1 wire 117 white. Locate the open and repair.

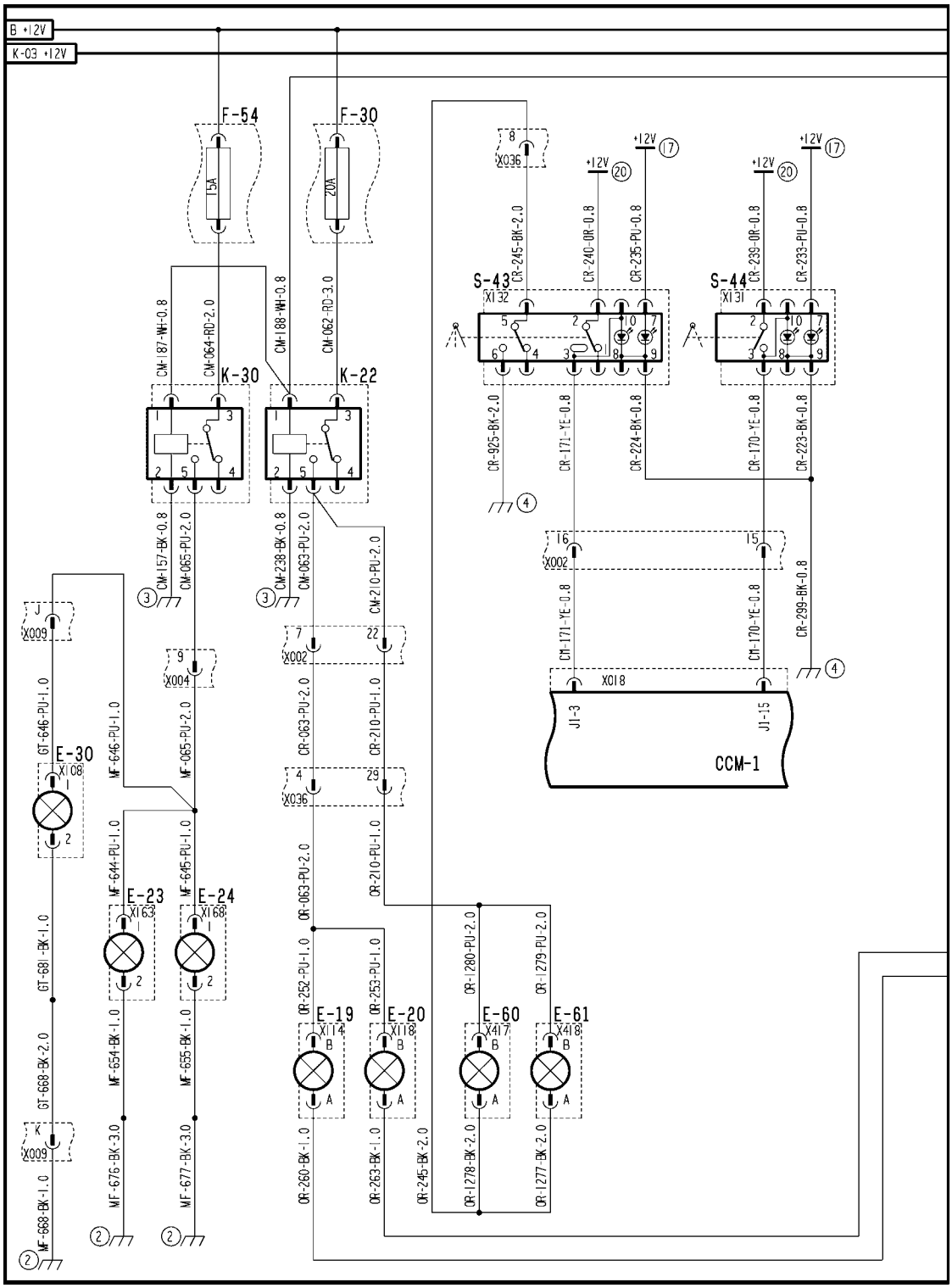
   B. If 12V is present, continue with Step **4**.

4. Visually inspect the harness and connector for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 40 (A.30.A.88 - C.20.E.40)



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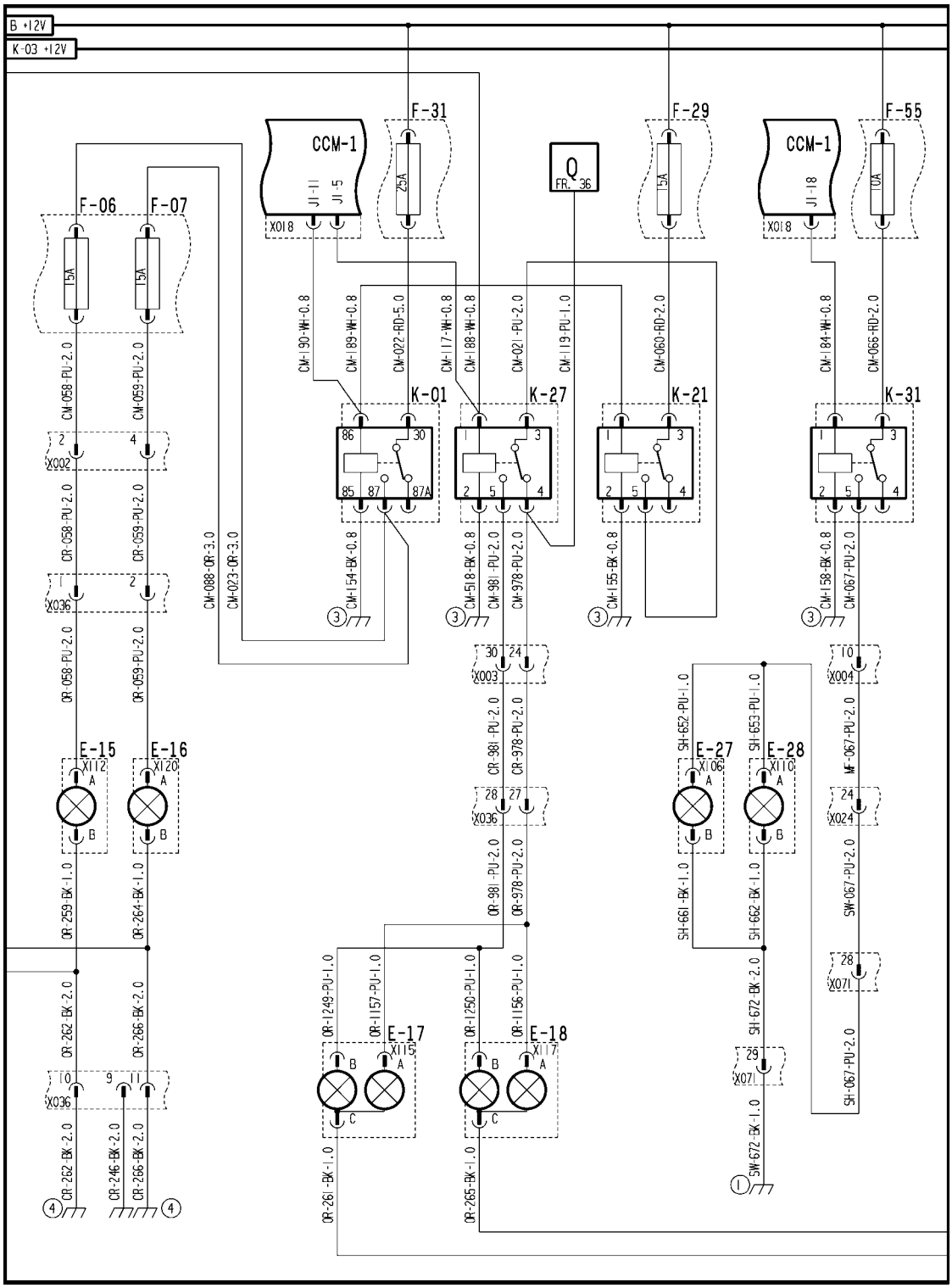
FRAME 40 - LIGHTING

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E-19 LH Cab Mid Work Light	E-20 RH Cab Mid Work Light	E-23 LH Lower Work Light
E-24 RH Lower Work Light	E-30 Grain Tank Light	E-60 LH HID Field Light
E-61 RH HID Field Light	F-30 Mid Work Lights Fuse	F-54 Lower Work Lights Fuse
K-22 Header Work Lights Relay	K-30 Lower Work Lights Relay	S-43 Work Light Switch
	S-44 Rear Work Light Switch	

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Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)



AFXSCHEM41-04 1

FRAME 41 - LIGHTING

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E-15 LH Cab Outer Work Light	E-16 RH Cab Outer Work Light	E-17 LH Cab Inner Work Light
E-18 RH Cab Inner Work Light	E-27 LH Rear Work Light	E-28 RH Rear Work Light
F-06 LH Outer Road/Work Lights Fuse	F-07 RH Outer Road/Work Lights Fuse	F-29 Inner Road/Work Lights Fuse
F-31 Outer Road/Work Lights Fuse	F-55 Rear Work Lights Fuse	K-01 Outer Road/Work Lights Relay
K-21 Inner Road Lights Relay	K-27 Inner Work Lights Relay	K-31 Rear Work Lights Relay

Rear work light Relay - Testing (A.40.A.17.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Close Rear Work Light Switch S-44. Measure for **12 volts** at Rear Work Lights Relay K-31 (pin 5).	**12 volts** If good reading, the relay is operating properly.	Rear Work Lights Relay K-31. Adjacent circuits. Go to test **2**
2	Measure for **12 volts** at Rear Work Lights Relay K-31 (pin 1).	**12 volts** If good reading, Go to test **3**	Open or short circuit 184 (WH) between Rear Work Lights Relay K-31 (pin 1) and CCM-1 connector X018 (pin J1-18). See Service Manual for testing of CCM.
3	Measure for **12 volts** at Rear Work Lights Relay K-31 (pin 3).	**12 volts** If good reading, Go to test **4**	Open in circuit 66 (RD) between Rear Work Lights Relay K-31 (pin 3) and Fuse #55. Short to ground on circuit 67 (PU) between Rear Work Lights Relay K-31 (pin 5) and Rear Work Lights E-27 and E-28 connector X106 and X110 (pin A). A short to ground will blow the Fuse #55.
4	Disconnect the Rear Work Lights Relay K-31. Measure resistance on circuit 158 (BK) between Rear Work Lights Relay K-31 (pin 2) and ground.	Less than 1 ohm. If good reading,	Open circuit 158 (BK) between Rear Work Lights Relay K-31 (pin 2) and ground.

Rear work light Switch - Testing (A.40.A.17.83 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Measure for **12 volts** at Rear Work Light Switch S-44 connector X131 (pin 2).	**12 volts**. v Go to test **2**	Open circuit 239 (OR) or 45 (OR) between Rear Work Light Switch S-44 connector X131 (pin 2) and Fuse #49.
2	Close Rear Work Light Switch. Measure for **12 volts** at Rear Work Light Switch S-44 connector X131 (pin 3).	**12 volts** If good reading, system OK.	Rear Work Light Switch S-44. Short to ground on circuit 170 (YE) between Rear Work Light Switch S-44 connector X131 (pin 3) and CCM-1 (pin J1-15) A short to ground will blow Fuse #49.

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Rear work light Wiring harness - Testing (A.40.A.17.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Close Rear Work Light Switch S-43. Measure for **12 volts** at Rear Work Lights Relay K-31 (pin 5).	**12 volts** If good reading, Go to test **2**	Perform Rear Work Lights Relay Test.
2	Measure the voltage at LH Rear Work Light E-27 connector X106 (pin A).	**12 volts** If good reading, Go to test **3**	Open circuit 652 (PU) or 67 (PU) between Rear Work Lights Relay K-31 (pin 5) and LH Rear Work Light E-27 connector X106 (pin A).
3	Disconnect the LH Rear Work Light E-27. Measure the resistance o circuit 661 (BK) between LH Rear Work Light E-27 connector X106 (pin B) and ground.	Less than 1 ohm. If good reading, replace the Rear Work Lights bulb of the LH Rear Work Light E-27.	Open in circuit 661 (BK) between LH Rear Work Light E-27 connector X106 (pin B) and ground.
4	Place Key Switch S-02 in .ON. position. Close Rear Work Light Switch S-44. Measure for **12 volts** at Rear Work Lights Relay K-31 (pin 5).	**12 volts** If good reading, Go to test **5**	Perform Rear Work Lights Relay Test.
5	Measure the voltage at RH Rear Work Light E-28 connector X110 (pin A).	**12 volts** If good reading, Go to test **6**	Open circuit 653 (PU) or 67 (PU) between Rear Work Lights Relay K-31 (pin 5) and RH Rear Work Light E-28 connector X110 (pin A).
6	Disconnect the RH Rear Work Light E-28. Measure the resistance o circuit 662 (BK) between RH Rear Work Light E-28 connector X110 (pin B) and ground.	Less than 1 ohm. If good reading, replace the Rear Work Lights bulb of the RH Rear Work Light E-28.	Open in circuit 662 (BK) between RH Rear Work Light E-28 connector X110 (pin B) and ground.

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Rear work light Relay - Unidentified failure (A.40.A.17.82 - G.30.B.46)

AFX8010

E0071-11 - Rear Work Lights

Cause:
The rear work lights relay (K-31) circuit is open or shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and relay.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "REAR WORK LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **5**.

2. Turn the key switch to the OFF position and remove the rear work light relay K-31 from relay base in cab. Use a multimeter to check for continuity between relay base (K-31) pin 1 and chassis ground. Flex the cab main (CM) harness while making this check.

   A. If no continuity to ground is found, continue with Step **3**.

   B. If there is continuity to ground, the short to ground is in the cab main (CM) harness between relay base and connector **X018** J1-18 wire 184 white. Locate the short and repair.

3. Use a multimeter to check for continuity between relay base (K-31) pin 2 and chassis ground.

   A. If there is continuity to ground, continue with Step **4**.

   B. If no continuity to ground is found, there is an open circuit in the cab main (CM) harness between relay base pin 2 and cab ground #3 wire 158 black. Locate the open and repair.

4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rear work light relay K-31. Use the multimeter to check for **12 volts** between relay base (K-31) pin 1 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the cab main (CM) harness between the relay base K31 and connector **X018** J1-18 wire 184 white. Locate the open and repair.

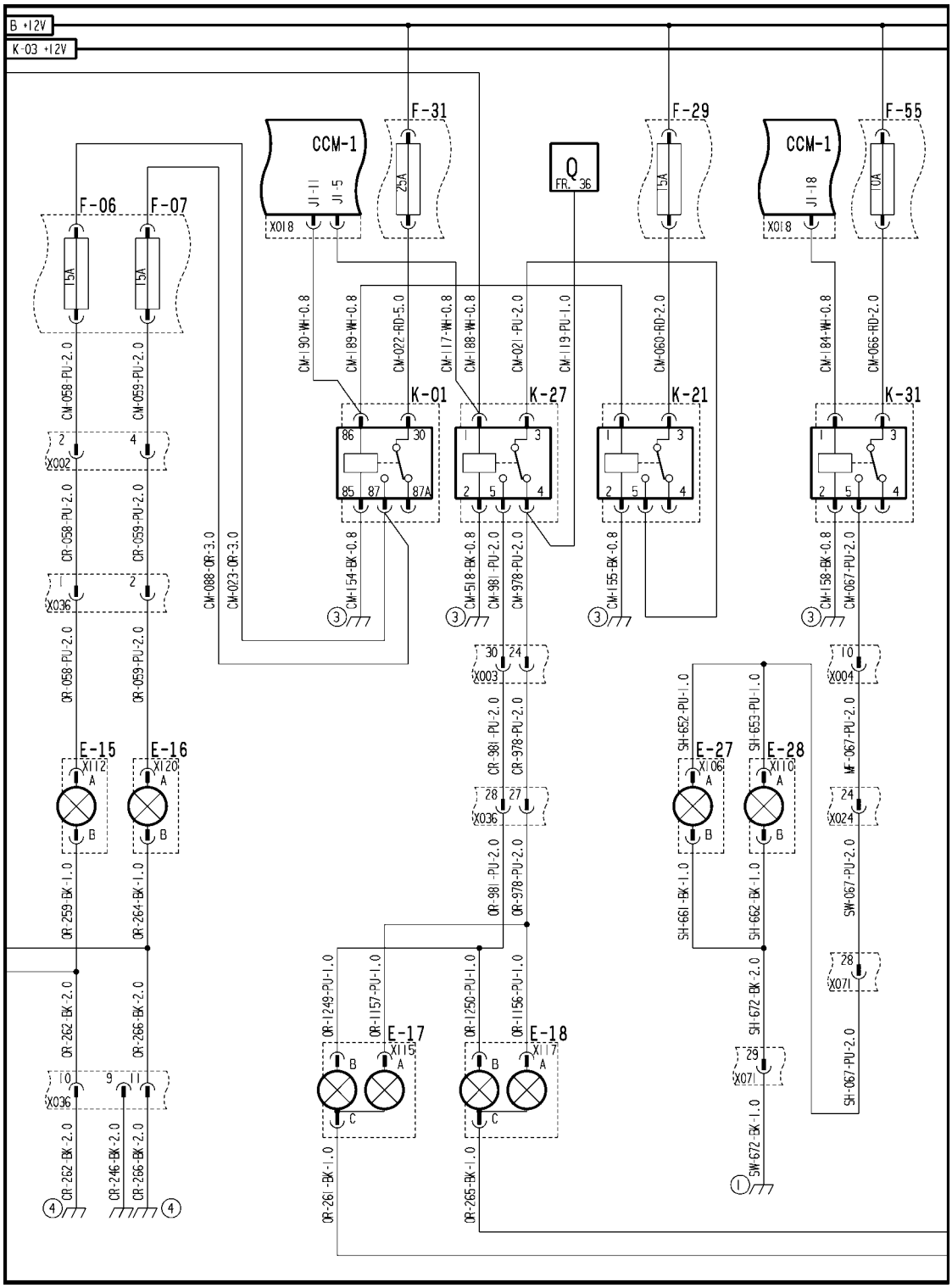
   B. If **12 volts** is found, continue with Step **5**.

5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 41 (A.30.A.88 - C.20.E.41)



AFXSCHEM41-04 1

FRAME 41 - LIGHTING

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E-15 LH Cab Outer Work Light	E-16 RH Cab Outer Work Light	E-17 LH Cab Inner Work Light
E-18 RH Cab Inner Work Light	E-27 LH Rear Work Light	E-28 RH Rear Work Light
F-06 LH Outer Road/Work Lights Fuse	F-07 RH Outer Road/Work Lights Fuse	F-29 Inner Road/Work Lights Fuse
F-31 Outer Road/Work Lights Fuse	F-55 Rear Work Lights Fuse	K-01 Outer Road/Work Lights Relay
K-21 Inner Road Lights Relay	K-27 Inner Work Lights Relay	K-31 Rear Work Lights Relay

Side work light Relay - Testing (A.40.A.18.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Remove Timed Side Work Light Relay K-34. Cycle LH Door Switch. Measure for **12 volts** at Timed Side Work Light Relay K-34 (pin 1).	**12 volts** If good reading, Go to test **2**	Open or short to ground in circuit 969 (PU) between Time Delay Module K-20 (pin 87) and Timed Side Work Light Relay K-34 (pin 1). Time Delay Module K-20. See Interior Lights section for testing.
2	Measure for **12 volts** at LH Side Work Light Relay (pin 3).	**12 volts** If good reading, Go to test **3**	Open in circuit 73 (RD) between Timed Side Work Light Relay K-34 (pin 3) and Fuse #50. Short to ground on circuit 76 (PU) 165 (PU) or 72 (PU) between Timed Side Work Light Relay K-34 (pin 5) and Side Work Lights E-25 and E-26 connector X297 and X298 (pin A). A short will cause Fuse #50 to blow.
3	Disconnect the Timed Side Work Light Relay K-34. Measure the resistance on circuit 161 (BK) between Timed Side Work Light Relay K-34 (pin 2) and ground.	Less than **1 ohms** If good reading, replace Timed Side Work Light Relay K-34.	Open in circuit 161 (BK) between Timed Side Work Light Relay K-34 (pin 2) and ground.
4	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Side Work Light Relay K-35 (pin 5).	**12 volts** If good reading, the relay is operating properly. Side Work Light Relay K-35.	Adjacent circuits. Go to test **5**
5	Partially remove Side Work Light Relay K-35. Measure for **12 volts** at LH Side Work Light Relay (pin 2).	**12 volts** If good reading, Go to test **6**	Open or short to ground in circuit 180 (WH) between Side Work Light Relay K-35 (pin 1) and CCM-1 connector X018 (pin J1-24). See Service Manual for testing of CCM.
6	Measure for **12 volts** at Side Work Light Relay K-35 (pin 3).	**12 volts** If good reading, Go to test **7**	Open circuit 71 (RD) or 73 (RD) between Side Work Light Relay K-35 (pin 3) and Fuse #50. Short to ground on circuit 72 (PU), 165 (PU) or 76 (PU) between Side Work Light Relay K-35 (pin 5) and Side Work Lights E-25 and E-26 connectors X297 and X298 (pin A). A short will cause Fuse #50 to blow.
7	Disconnect the Timed Side Work Light Relay K-34. Measure the resistance on circuit 161 (BK) between Timed Side Work Light Relay K-34 (pin 2) and ground.	Less than **1 ohms**	Open in circuit 161 (BK) between Side Work Light Relay K-35 (pin 2) and ground.

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Side work light Wiring harness - Testing (A.40.A.18.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Side Work Light Relay K-34 (pin 5).	**12 volts**. If good reading, Go to test **2**	Perform Timed Side Work Light Relay Test K-34.
2	Measure for **12 volts** at Timed Side Work Light E-25 connector X297 (pin A).	**12 volts** If good reading, If good reading Go to test **3**	Open circuit 76 (PU) between Timed Side Work Lights Relay K-34 (pin 5) and Timed Side Work Light E-25 connector X297 (pin A).
3	Disconnect the Timed Side Work Light E-25. Measure the resistance on circuit 671 (BK) between Timed Side Work Light E-25 connector X297 (pin B) and ground.	Less Than**1 ohms**. If good reading, replace the Timed Side Work Light bulb.	Open circuit 671 (BK) between Side Work Light Relay K-34 (pin B) and ground.
4	Place Key Switch S-02 in ON position. Close Work Light Switch S-43. Measure for **12 volts** at Side Work Light Relay K-35 (pin 5).	**12 volts**. If good reading Go to test **5**	Perform Side Work Light Relay Test K-35.
5	Measure for **12 volts** at RH Side Work Light E-26 connector X298 (pin A).	**12 volts** If good reading, Go to test **6**	Open circuit 72 (PU) between Side Work Lights Relay K-35 (pin 5) and RH Side Work Light connector E-26 X298 (pin A).
6	Disconnect the RH Side Work Light E-26. Measure the resistance on circuit 670 (BK) between RH Side Work Light E-26 connector X298 (pin B) and ground.	Less Than **1 ohms** If good reading,	RH Side Work Light bulb. Open circuit 670 (BK) between Side Work Light Relay K-35 (pin B) and ground.

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Side work light Relay - Unidentified failure (A.40.A.18.82 - G.30.B.46)

AFX8010

E0072-11 - Side Work Lights

Cause:
The side work lights relay (K-35) circuit is open or shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and relay.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" sort menu, and select "SIDE WORK LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **5**.

2. Turn the key switch to the OFF position and remove the side work light relay K-35 from relay base in cab. Use a multimeter to check for continuity between relay base (K-35) pin 1 and chassis ground. Flex the cab main (CM) harness while making this check.

   A. If no continuity to ground is found, continue with Step **3**.

   B. If there is continuity to ground, the short to ground is in the cab main (CM) harness between relay base and connector **X018** J1-24 wire 180 white. Locate the short and repair.

3. Use a multimeter to check for continuity between relay base (K-35) pin 2 and chassis ground.

   A. If there is continuity to ground, continue with Step **4**.

   B. If no continuity to ground is found, there is an open circuit in the cab main (CM) harness between relay base pin 2 and cab ground #3 wire 161 black. Locate the open and repair.

4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the side work light relay K35. Use the multimeter to check for **12 volts** between relay base (K 35) pin 1 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the cab main (CM) harness between the relay base K-35 and connector **X018** J1-24 wire 180 white. Locate the open and repair.

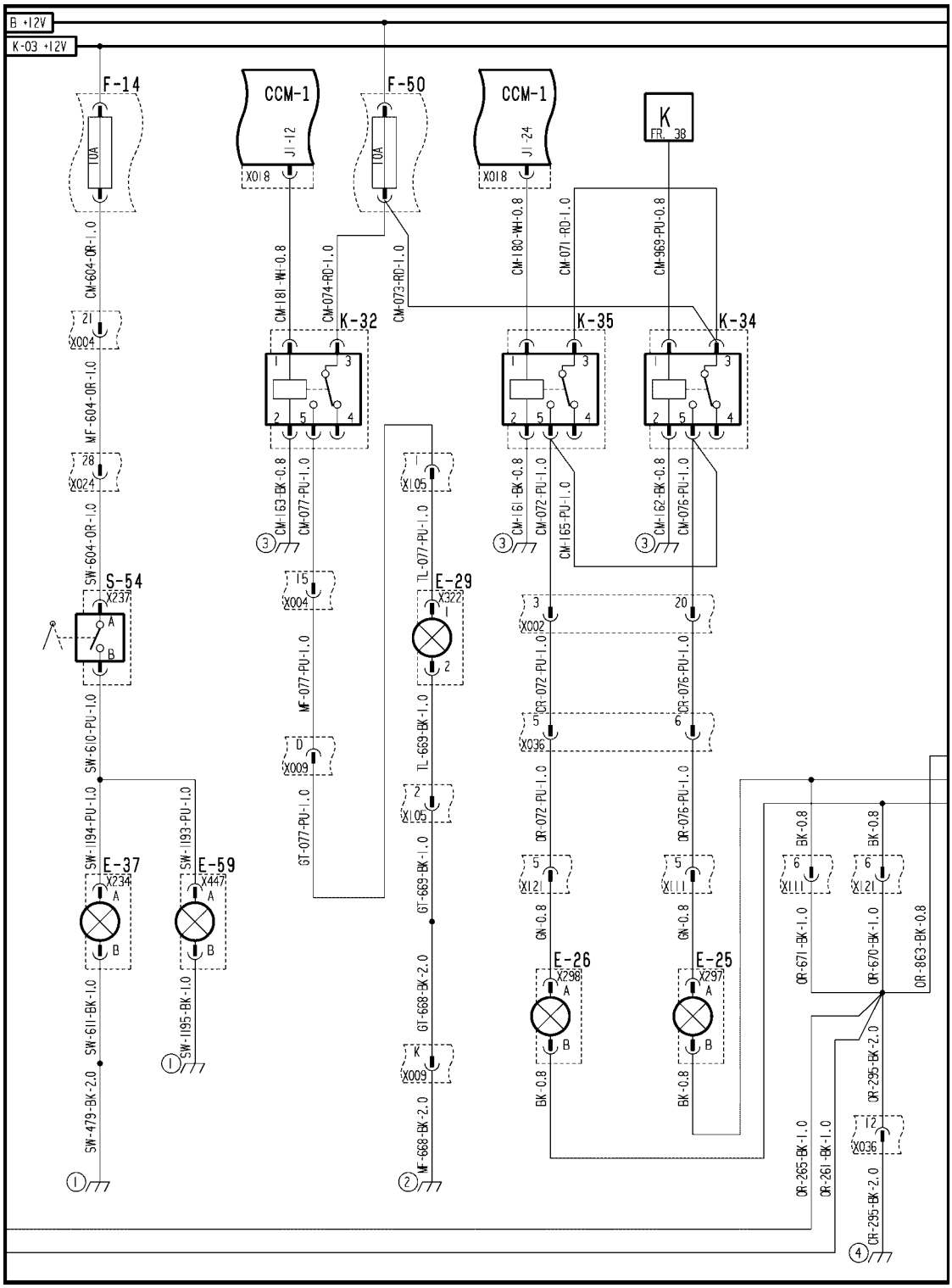
   B. If **12 volts** is found, continue with Step **5**.

5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)



AFXSCHEM42-04 1

FRAME 42 - LIGHTING

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E-25 LH Side Work Light	E-26 RH Side Work Light	E-29 Unload Tube Light
E-37 Sieve Light Front	E-59 Sieve Light Rear	F-14 Service Lights Fuse
F-50 Side / Tube Lights Fuse	K-32 Unload Tube Light Relay	K-34 Timed Side Work Light Relay
K-35 Side Work Light Relay	S-54 Sieve Light Switch	

Under shield service light Switch - Testing (A.40.A.19.83 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place LH Undershield Light Switch S-63 in ON position. Measure for **12 volts** at LH Undershield Light Switch S-63 connector X339 (pin 2).	**12 volts** If good reading, the wiring has good continuity, Go to test **2**	Open circuit 1214 (RD) between LH Undershield Light Switch S-63 connector X339 (pin 2) and Fuse #34.
2	Close LH Undershield Light Switch S-63. Measure for **12 volts** at LH Undershield Light Switch S-63. connector X339 (pin 3) and ground.	**12 volts** If good reading, system OK.	LH Undershield Light Switch S-63. Short to ground on circuit 2014 (BK) between LH Undershield Light Switch S-63 connector X339 (pin 3) and ground. A short to ground will blow Fuse #34.
3	Place RH Undershield Light Switch S-65 in ON position. **12 volts** at RH Undershield Light Switch S-65 connector X341 (pin 2).	**12 volts** If good reading, the wiring has good continuity, Go to test **4**	Open circuit 1215 (RD) or 2008 (RD) between RH Undershield Light Switch S-65 connector X341 (pin 2) and Fuse #34.
4	Close RH Undershield Light Switch S-65. Measure for **12 volts** at RH Undershield Light Switch S-65. connector X341 (pin 3) and ground.	**12 volts** If good reading, system OK.	RH Undershield Light Switch S-65. Short to ground on circuit 2015 or 2008 (RD) between RH Undershield Light Switch S-65 connector X341 (pin 3) and ground. A short to ground will blow Fuse #34.

Under shield service light Wiring harness - Testing (A.40.A.19.88 - G.40.A.20)

AFX8010

IMPORTANT: *Do not use a self-powered test light for any of these tests. Use of a self powered test light can cause damage to components in this system.*

⚠ **WARNING** ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Under Shield Light Switch (S-63) in the ON position. Measure voltage at LH Front Shield Light (E-42) connector X345 (pin A).	**12 volts**	Open circuit 2005 (PU) or 2004 (PU).
2	Under Shield Light Switch (S-63) in the ON position. Measure voltage at LH Rear Shield Light (E-43) connector X346 (pin A).	**12 volts**	Open circuit 2006 (PU) or 2004 (PU).
3	Under Shield Light Switch (S-63) in the ON position. Measure voltage at RH Front Shield Light (E-44) connector X347 (pin A).	**12 volts**	Open circuit 2012 (PU) or 2004 (PU).

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N°	Test Point	Expected Result	Other Result (Possible Cause)
4	Under Shield Light Switch (S-63) in the ON position. Measure voltage at RH Rear Shield Light (E-45) connector X348 (pin A).	**12 volts**	Open circuit 2011 (PU) or 2004 (PU).
5	Disconnect LH Front Shield Light (E-42) from connector X345. Measure electrical resistance at connector X345 (pin B).	Less than **1 ohms** If good reading, replace the LH Front Shield Light bulb.	Open circuit 2017 (BK) or 1247 (BK). Repair or Replace as wiring necessary.
6	Disconnect LH Rear Shield Light (E-43) from connector X346. Measure electrical resistance at connector X346 (pin B).	Less than **1 ohms** If good reading, replace the LH Rear Shield Light bulb.	Open circuit 2016 (BK) or 1247 (BK). Repair or Replace as wiring necessary.
7	Disconnect RH Front Shield Light (E-44) from connector X347. Measure electrical resistance at connector X347 (pin B).	Less than **1 ohms** If good reading, replace the RH Front Shield Light bulb.	Open circuit 2018 (BK) or 1247 (BK). Repair or Replace as wiring necessary.
8	Disconnect RH Rear Shield Light (E-45) from connector X348. Measure electrical resistance at connector X348 (pin B).	Less than **1 ohms** If good reading, replace the RH Rear Shield Light bulb.	Open circuit 2019 (BK) or 1247 (BK). Repair or Replace as wiring necessary.

Cleaning shoe service light Switch - Testing (A.40.A.20.83 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Measure the voltage at Sieve Light Switch S-54 connector X237 (pin 2).	**12 volts** If good reading, Go to test **2**	Blown Fuse #14 Open circuit 604 (OR) between Sieve Light Switch S-54 connector X237 (pin 2) and Fuse #14. Short to ground on circuit 604 (OR) between Sieve Light Switch S-54 connector X237 (pin 2) and Fuse #14. A short to ground will blow the Fuse #14.
2	Close Sieve Light Switch S-54. Measure for **12 volts** at Sieve Light Switch S-54 connector X237 (pin 3).	**12 volts** IIf good reading, switch is working properly.	Sieve Light Switch S-54 Short to ground in circuit 610 (PU between Sieve Light Switch S-54 connector X237 (pin 3) and Sieve Light E-37 connector X234 (pin A). A short to ground will blow the Fuse #14.

Cleaning shoe service light Wiring harness - Testing (A.40.A.20.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Close Sieve Light Switch S-54. Measure for **12 volts** at Sieve Light Switch S-54 connector X237 pin 3).	**12 volts**. If good reading, Go to test **2**	Perform Sieve Light Switch Test.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
2	Measure for **12 volts** at Sieve Light E-37 connector X234 (pin A).	**12 volts** If good reading, Go to test **3**	Open circuit 610 (PU) between Sieve Light Switch S-54 connector X237 (pin 3) and Sieve Light E-37 connector X234 (pin A).
3	Disconnect the Sieve Light E-37. Measure the resistance on circuit 611 (BK) between Sieve Light E-37 connector X234 (pin B) and ground.	Less than **1 ohms** If good reading, replace the Sieve Light bulb.	Open circuit 611 (BK) between Sieve Light E-37 connector X234 (pin B) and ground.

Engine component service light Switch - Testing (A.40.A.21.83 - G.40.A.20)

AFX8010

IMPORTANT: *Do not use a self-powered test light for any of these tests. Use of a self powered test light can cause damage to components in this system.*

⚠ **WARNING** ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Engine Light Switch S-64 in ON position. Measure for **12 volts** at Engine Light Switch S-64 connector X340 (pin 2).	**12 volts**. If good reading, Go to test **2**	Open or short circuit 1215 (RD) and Fuse #34.
2	Place Engine Light Switch S-64 in ON position. Measure for **12 volts** at Engine Light Switch S-64 connector X340 (pin 1).	**12 volts**.	Replace Engine Light Switch (S-64).

Engine component service light Wiring harness - Testing (A.40.A.21.88 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Perform test on Engine Light Switch (S-64) to determine the switch is functioning properly. Move the Engine Light Switch to the ON position. Disconnect the Engine Light (E-46) from the wiring harness and measure voltage at pin A of connector X349.	**12 volts**	Problem with circuit 1248 (BK). Replace or repair as necessary.
2	Disconnect the Engine Light (E-46) from the wiring harness and measure continuity at pin B of connector X349.	Less than **1 ohms** If good reading, replace the Engine Service Light bulb.	Open circuit 1248 (BK). Repair or Replace wiring harness.

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Back light - Unidentified failure (A.40.A.24 - G.30.B.46)

AFX8010

E0198-11 - Backlighting

Context:
The backlighting circuit is used to power the backlights in the HVAC module and all cab roof switches. Power is sent from the CCM2 module to the splice block C, W-03, in the cab roof. From there, power is distributed to all switches for backlighting. The backlighting circuits in each cab roof switch are grounded to the cab roof ground 4.
A short to ground between the module and any one of the switch backlights fed by this circuit will cause this error, while an open circuit must be between the CCM2 module and the splice block C, W-03, in order to generate this error. An open circuit between the splice block and one of the switches will result in that backlight not functioning, while the overall circuit will still perform properly.

Cause:
The backlighting lamps circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" menu.. Select the "LIGHTS" sort menu, and select "BACKLIGHT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON". The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with step **2**.

   B. If the status screen indicates "OK", continue with step **15**.

2. Turn the key switch to the "ON" position. Enter the Universal Display Plus "DIAG" menu.. Select the "LIGHTS" sort menu, and select "BACKLIGHT". Press the "OFF" button to change the circuit output to "ON". Use a multimeter to check for **12 volts** between connector **X015** pin J1-11 and chassis ground. There should be **12 volts**.

   A. If **12 volts** is not present, the CCM2 module is not functioning properly. Reload the software in CCM2 module using the EST, and recheck the circuit operation. If the CCM2 module is still not providing **12 volts** output, replace the module.

   B. If **12 volts** is present, continue with step **3**.

3. Turn the key switch to the "OFF" position. Remove the HVAC controller from its DIN slot to provide access to the cab roof (CR) harness. Remove the cap/buss strip from the cab roof (CR) harness splice block C connector **X133**. Use a multimeter to check for continuity between connector **X133** pin B and chassis ground. There should not be any continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the cab main (CM) harness or cab roof (CR) harness between connector **X015** pin J1-11 through connector **X002** pin 18 to connector **X133** pin B on one of the following wires;
   wire 231 purple, connector **X015** pin J1-11 to cab main (CM) harness splice,
   wire 247 purple, cab main (CM) harness splice to connector **X075** on accessory socket J-08,
   wire 206 purple, cab main (CM) harness splice to connector **X070** on cigar lighter R-08,
   wire 232 purple, cab main (CM) harness splice to connector **X002** pin 18,
   wire 232 purple, connector **X002** pin 18 to connector **X133** pin B. Locate the short and repair.

   B. If there is no continuity to ground, continue with step **4**.

4. Turn the key switch to the "ON" position. Enter the Universal Display Plus "DIAG" menu.. Select the "LIGHTS" sort menu, and select "BACKLIGHT". Press the "OFF" button to change the circuit output to "ON". Use a multimeter to check for **12 volts** between connector**X133** pin B and chassis ground. There should be **12 volts**.

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A. If **12 volts** is not present, there is an open circuit in the cab main (CM) harness or cab roof (CR) harness between connector **X015** pin J1-11 through connector **X002** pin 18 to connector **X133** pin B on wires 231 purple or 232 purple. Locate the open and repair.

B. If **12 volts** is present, continue with step **5**.

5. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin A and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

   A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin A and connector **X138** pin 1 wire 175 purple to the console light E-35.Locate the short and repair.

   B. If there is no continuity to ground, continue with step **6**.

6. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin C and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

   A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin C and connector **X131** pin 7 wire 233 purple to the rear work lights switch S-44.Locate the short and repair.

   B. If there is no continuity to ground, continue with step **7**.

7. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin D and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

   A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin D and connector **X132** pin 7 wire 235 purple to the work lights switch S-43.Locate the short and repair.

   B. If there is no continuity to ground, continue with step **8**.

8. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin E and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

   A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin E and connector **X135** pin 7 wire 273 purple to the wiper switch S-20.Locate the short and repair.

   B. If there is no continuity to ground, continue with step **9**.

9. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin F and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

   A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin F and connector **X130** pin 7 wire 283 purple to the beacon light switch S-41.Locate the short and repair.

   B. If there is no continuity to ground, continue with step **10**.

10. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin G and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

    A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin G and connector **X125** pin 7 wire 284 purple to the tank extensions switch S-42.Locate the short and repair.

    B. If there is no continuity to ground, continue with step **11**.

11. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin H and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

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A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin H and connector **X127** pin 7 wire 285 purple to the console light E-35.Locate the short and repair.

B. If there is no continuity to ground, continue with step **12**.

12. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin J and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin J and connector **X134** pin 7 wire 286 purple to the washer switch S-38.Locate the short and repair.

B. If there is no continuity to ground, continue with step **13**.

13. Turn the key switch to the "OFF" position. Use a multimeter to check for continuity between connector **X133** pin M and chassis ground. There should be no continuity, or very high continuity to ground, depending on the type of multimeter used..

A. If there is continuity to ground, there is a short to ground in the cab roof (CR) harness between connector **X133** pin M and connector **X128** pin C1 wire 972 purple to the HVAC module A-09/A-20.Locate the short and repair.

B. If there is no continuity to ground, continue with step **14**.

14. Remove the tank extensions switch from the cab roof head liner, and unplug connector **X125**. Use a multimeter to check for continuity between connector **X125** pin 9 and chassis ground. There should be continuity to ground.

A. If there is no continuity to ground, remove the cab head liner and check the condition of the cab roof ground 4. If all switch backlighting ground wires were disconnected from this ground point, this could also generate this fault code.

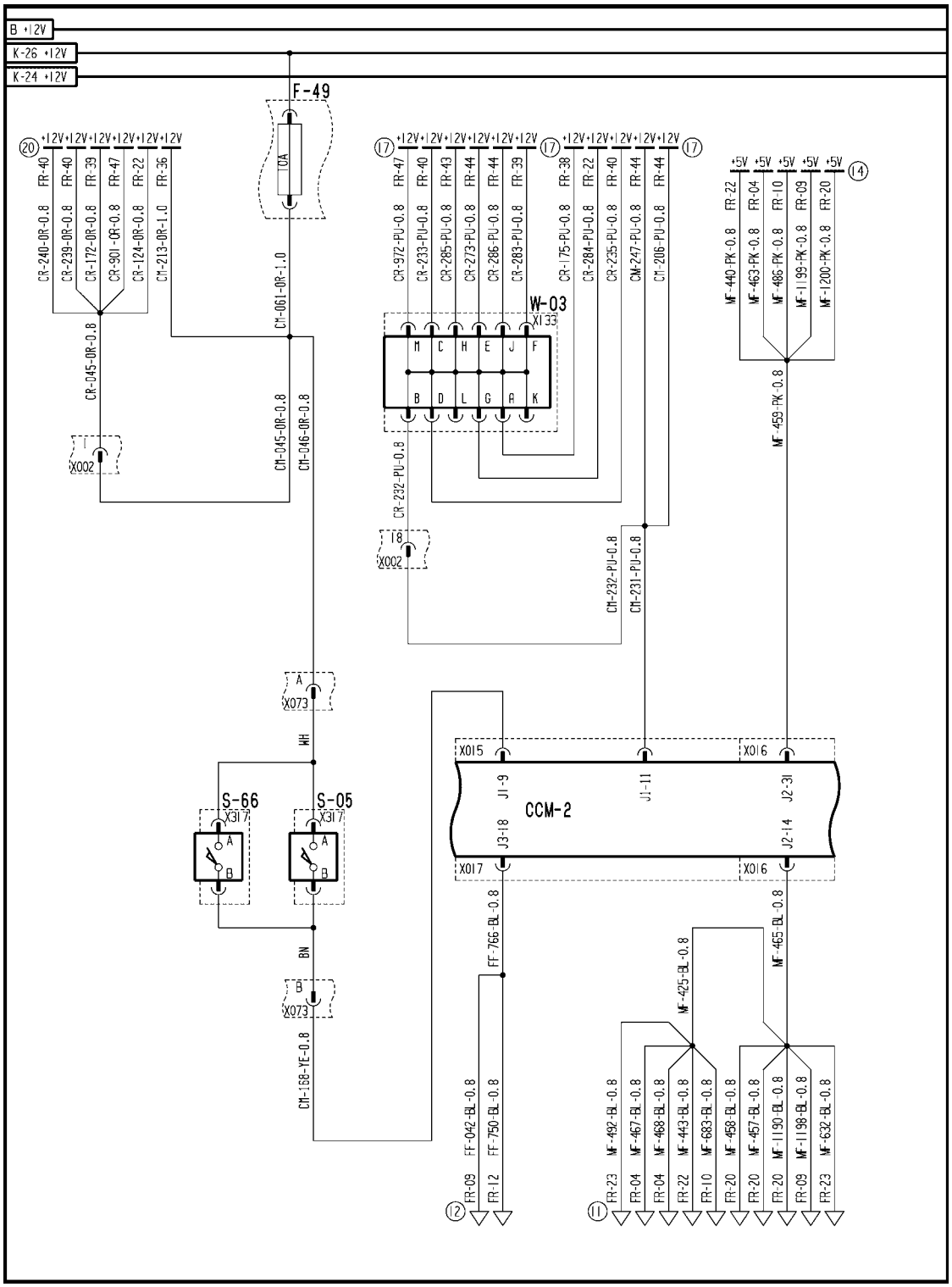
B. If there is continuity to ground, continue with step **15**.

15. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

Unloading tube light - Testing (A.40.A.35 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch S-02 in ON position. Activate and Unload Tube Light Relay K-32. Measure for **12 volts** at Unload Tube Light Relay K-32 (pin 5).	**12 volts**. If good reading, the relay is operating properly. Go to test **2**	Unload Tube Light Relay K-32. Adjacent circuits. Go to next test point.
2	Measure for **12 volts** at Unload Tube Light Relay K-32 (pin 1).	**12 volts** If good reading, Go to test **3**	Open or short to ground in circuit between Unload Tube Light Relay K-32 (pin 1) and CCM-1 (J1-12).
3	Measure for **12 volts** at Unload Tube Light Relay K-32 (pin 3).	**12 volts** If good reading, Go to test **4**	Open in circuit 74 (RD) between Unload Tube Light Relay K-32 (pin 3) and Fuse #50. Short to ground on circuit 77 (PU) between Unload Tube Light Relay K-32 (pin 5) and Unload Tube Light E-29 connector X105 (pin A). A short will cause Fuse #50 to blow.
4	Disconnect the Unload Tube Light Relay K-32, Measure the resistance on circuit 163 (BK) between Unload Tube Light Relay K-32 (pin 2) and ground.	Less than **1 ohms**. Go to test **5**	If good reading, replace Unload Tube Light Relay K-32. Open in circuit 163 (BK) between Unload Tube Light Relay K-32 (pin 2) and ground.
5	Place Key Switch S-02 in ON position. Activate Unload Tube Light Relay K-32. Measure for **12 volts** at Unload Tube Relay K-32 (pin 5).	**12 volts**. If good reading, Go to test **6**	Perform Unload Tube Light Relay Test.
6	Measure for **12 volts** at Unload Tube Light E-29 connector X105 (pin A).	**12 volts** If good reading, Go to test **7**	Open circuit 77 (PU) between Unload Tube Relay K-32 (pin 5) and Unload Tube Light E-29 connector X105 (pin A).
7	Disconnect the Unload Tube Light E-29. Measure the resistance on circuit 669 (BK) between Unload Tube Light E-29 connector X105 (pin B) and ground.	Less Than **1 ohms**. If good reading, replace the Unload Tube Light bulb.	Open in circuit 669 (BK) between Unload Tube Light E-29 connector X105 (pin B) and ground.

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Unloading tube light - Unidentified failure (A.40.A.35 - G.30.B.46)

AFX8010

E0068-11 - Unload Tube Light

Cause:
The unload tube light relay (K-32) circuit open or shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and relay.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "LIGHTS" or "UNLOADING" sort menu, and select "UNLOAD TUBE LT". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **5**.

2. Turn the key switch to the OFF position and remove the unload tube light relay K-32 from relay base in cab. Use a multimeter to check for continuity between relay base (K-32) pin 1 and chassis ground. Flex the cab main (CM) harness while making this check.

   A. If no continuity to ground is found, continue with Step **3**.

   B. If there is continuity to ground, the short to ground is in the cab main (CM) harness between relay base and connector **X018** J1-12 wire 181 white. Locate the short and repair.

3. Use a multimeter to check for continuity between relay base (K-32) pin 2 and chassis ground.

   A. If there is continuity to ground, continue with Step **4**.

   B. If no continuity to ground is found, there is an open circuit in the cab main (CM) harness between relay base pin 2 and cab ground #3 wire 163 black. Locate the open and repair.

4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the unload tube light relay K-32. Use the multimeter to check for **12 volts** between relay base (K-32) pin 1 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the cab main (CM) harness between the relay base K-32 and connector **X018** J1-12 wire 181 white. Locate the open and repair.

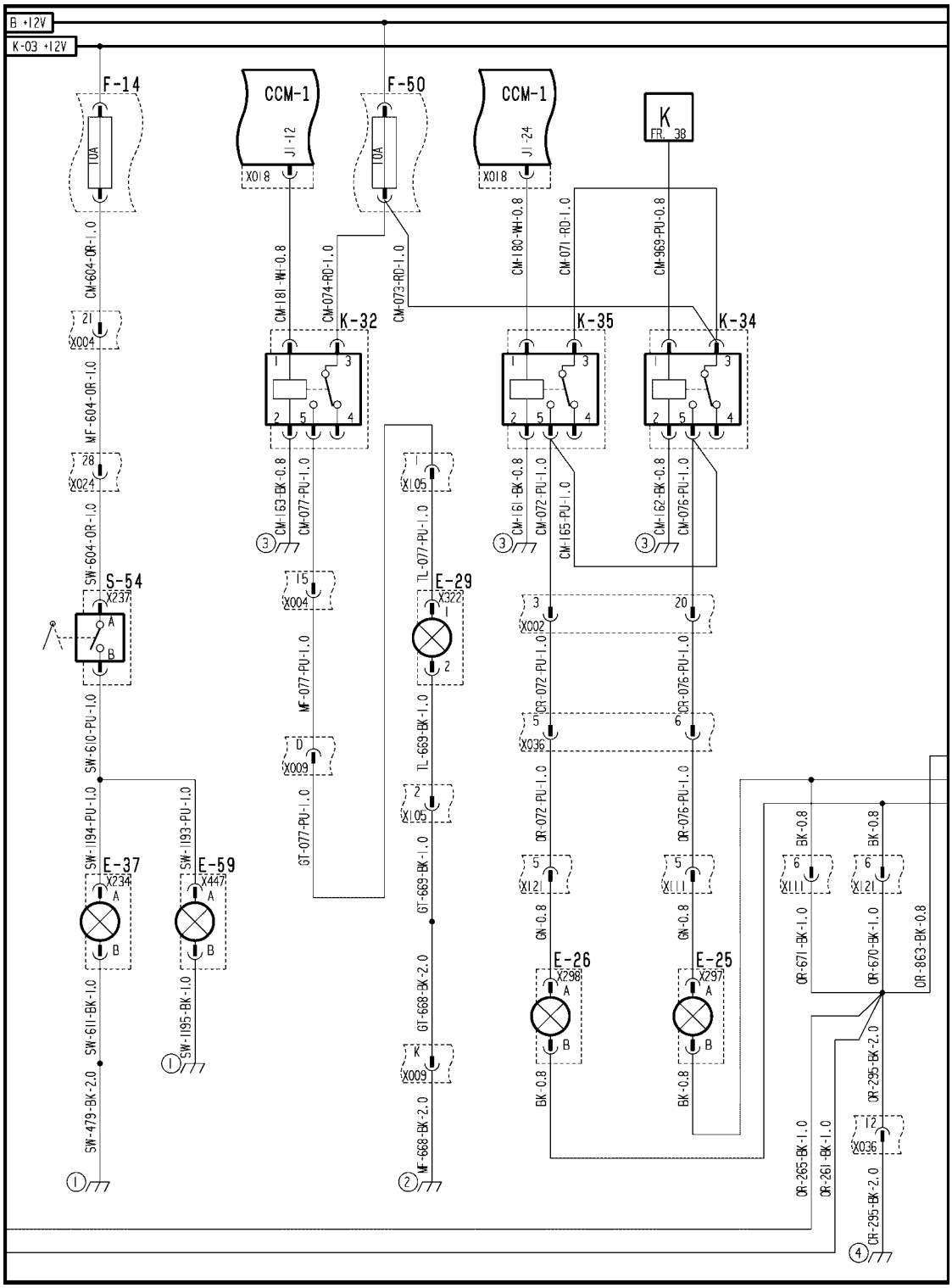
   B. If **12 volts** is found, continue with Step **5**.

5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)



AFXSCHEM42-04 1

FRAME 42 - LIGHTING

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E-25 LH Side Work Light	E-26 RH Side Work Light	E-29 Unload Tube Light
E-37 Sieve Light Front	E-59 Sieve Light Rear	F-14 Service Lights Fuse
F-50 Side / Tube Lights Fuse	K-32 Unload Tube Light Relay	K-34 Timed Side Work Light Relay
K-35 Side Work Light Relay	S-54 Sieve Light Switch	

https://truckmanualshub.com/

Index

DISTRIBUTION SYSTEMS - A

LIGHTING SYSTEM - 40.A

Back light - Overview (A.40.A.24 - C.10.A.10) 29
AFX8010

Back light - Unidentified failure (A.40.A.24 - G.30.B.46) 82
AFX8010

Beacon - Overview (A.40.A.15 - C.10.A.10) 19
AFX8010

Beacon Relay - Testing (A.40.A.15.82 - G.40.A.20) 56
AFX8010

Beacon Relay - Unidentified failure (A.40.A.15.82 - G.30.B.46) 53
AFX8010

Beacon Switch - Testing (A.40.A.15.83 - G.40.A.20) 56
AFX8010

Beacon Wiring harness - Testing (A.40.A.15.88 - G.40.A.20) 57
AFX8010

Brake light - Overview (A.40.A.14 - C.10.A.10) 18
AFX8010

Brake light Relay - Testing (A.40.A.14.82 - G.40.A.20) 45
AFX8010

Brake light Relay - Unidentified failure (A.40.A.14.82 - G.30.B.46) 50
AFX8010

Brake light Switch - Short circuit to B+ (A.40.A.14.83 - G.30.B.54) 47
AFX8010

Brake light Wiring harness - Testing (A.40.A.14.88 - G.40.A.20) 45
AFX8010

Cleaning shoe service light - Overview (A.40.A.20 - C.10.A.10) 27
AFX8010

Cleaning shoe service light Switch - Testing (A.40.A.20.83 - G.40.A.20) 80
AFX8010

Cleaning shoe service light Wiring harness - Testing (A.40.A.20.88 - G.40.A.20) 80
AFX8010

Engine component service light - Overview (A.40.A.21 - C.10.A.10) 28
AFX8010

Engine component service light Switch - Testing (A.40.A.21.83 - G.40.A.20) 81
AFX8010

Engine component service light Wiring harness - Testing (A.40.A.21.88 - G.40.A.20) 81
AFX8010

Front work light - Overview (A.40.A.16 - C.10.A.10) 20
AFX8010

Front work light Relay - Testing (A.40.A.16.82 - G.40.A.20) 58
AFX8010

Front work light Relay - Unidentified failure (A.40.A.16.82 - G.30.B.46) 64
AFX8010

Front work light Relay - Unidentified failure (A.40.A.16.82 - G.30.B.46) 67
AFX8010

Front work light Switch - Testing (A.40.A.16.83 - G.40.A.20) 57
AFX8010

https://truckmanualshub.com/

Front work light Wiring harness - Testing (A.40.A.16.88 - G.40.A.20) 60
AFX8010
Head light - Overview (A.40.A.11 - C.10.A.10) 9
AFX8010
Head light Relay - Testing (A.40.A.11.82 - G.40.A.20) 32
AFX8010
Head light Switch - Testing (A.40.A.11.83 - G.40.A.20) 33
AFX8010
Head light Wiring harness - Testing (A.40.A.11.88 - G.40.A.20) 34
AFX8010
LIGHTING SYSTEM - Overview (A.40.A - C.10.A.10) 5
AFX8010
LIGHTING SYSTEM - Problem solving (A.40.A - G.40.A.30) 31
AFX8010
Marker light - Overview (A.40.A.12 - C.10.A.10) 11
AFX8010
Marker light Wiring harness - Testing (A.40.A.12.88 - G.40.A.20) 35
AFX8010
Rear work light - Overview (A.40.A.17 - C.10.A.10) 23
AFX8010
Rear work light Relay - Testing (A.40.A.17.82 - G.40.A.20) 71
AFX8010
Rear work light Relay - Unidentified failure (A.40.A.17.82 - G.30.B.46) 73
AFX8010
Rear work light Switch - Testing (A.40.A.17.83 - G.40.A.20) 71
AFX8010
Rear work light Wiring harness - Testing (A.40.A.17.88 - G.40.A.20) 72
AFX8010
Side work light - Overview (A.40.A.18 - C.10.A.10) 24
AFX8010
Side work light Relay - Testing (A.40.A.18.82 - G.40.A.20) 75
AFX8010
Side work light Relay - Unidentified failure (A.40.A.18.82 - G.30.B.46) 77
AFX8010
Side work light Wiring harness - Testing (A.40.A.18.88 - G.40.A.20) 76
AFX8010
Turn/hazard light - Overview (A.40.A.13 - C.10.A.10) 13
AFX8010
Turn/hazard light Flasher unit - Testing (A.40.A.13.86 - G.40.A.20) 40
AFX8010
Turn/hazard light Flasher unit - Unidentified failure (A.40.A.13.86 - G.30.B.46) 37
AFX8010
Turn/hazard light Hazard switch - Testing (A.40.A.13.90 - G.40.A.20) 44
AFX8010
Turn/hazard light Wiring harness - Testing (A.40.A.13.88 - G.40.A.20) 42
AFX8010
Under shield service light - Overview (A.40.A.19 - C.10.A.10) 26
AFX8010
Under shield service light Switch - Testing (A.40.A.19.83 - G.40.A.20) 79
AFX8010
Under shield service light Wiring harness - Testing (A.40.A.19.88 - G.40.A.20) 79
AFX8010
Unloading tube light - Testing (A.40.A.35 - G.40.A.20) 86
AFX8010
Unloading tube light - Unidentified failure (A.40.A.35 - G.30.B.46) 87
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

DISTRIBUTION SYSTEMS - A

ELECTRONIC SYSTEM - 50.A

AFX8010

https://truckmanualshub.com/

Contents

DISTRIBUTION SYSTEMS - A

ELECTRONIC SYSTEM - 50.A

FUNCTIONAL DATA

Control module

Control module - Overview (A.50.A.91 - C.10.A.10) 4
AFX8010

Data bus

Data bus - Overview (A.50.A.92 - C.10.A.10) 5
AFX8010

SERVICE

Farming system

Sensing system Moisture sensor - Electrical adjust (A.50.A.96.95.80 - F.45.A.61) 7
AFX8010

DIAGNOSTIC

Control module

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 11
AFX8010

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53) 15
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 19
AFX8010

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53) 23
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 27
AFX8010

Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53) 31
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 35
AFX8010

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53) 43
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 51
AFX8010

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53) 55
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 59
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 63
AFX8010

https://truckmanualshub.com/

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53) 67
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 71
AFX8010

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53) 80
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 89
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 93
AFX8010

Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53) 96
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 99
AFX8010

Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53) 100
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 101
AFX8010

Data bus

Data bus - Diagnostic (A.50.A.92 - G.10.G) 105
AFX8010

Data bus - Special instruction (A.50.A.92 - G.30.E.11) 117
AFX8010

Data bus - Special instruction (A.50.A.92 - G.30.E.11) 118
AFX8010

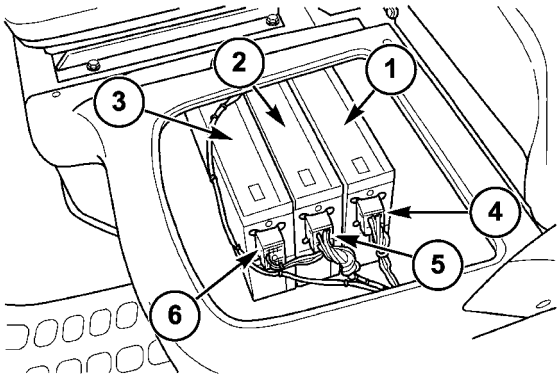
Farming system

Sensing system Moisture sensor - Unidentified failure (A.50.A.96.95.80 - G.30.B.46) 119
AFX8010

https://truckmanualshub.com/

Control module - Overview (A.50.A.91 - C.10.A.10)

AFX8010



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

The chassis control modules (CCM's) are the primary modules that control many of the functions on the combine. The modules are located inside the cab, under the instructional seat, and are bolted to the cab floor over access holes for electrical connectors. Each module has three electrical connectors attached to it. The cab main (CM) harness attaches to each module from inside the cab, while the main frame (MF), front frame (FF), and expansion (EX) harnesses attach to the modules from outside the cab, through the holes in the cab floor.

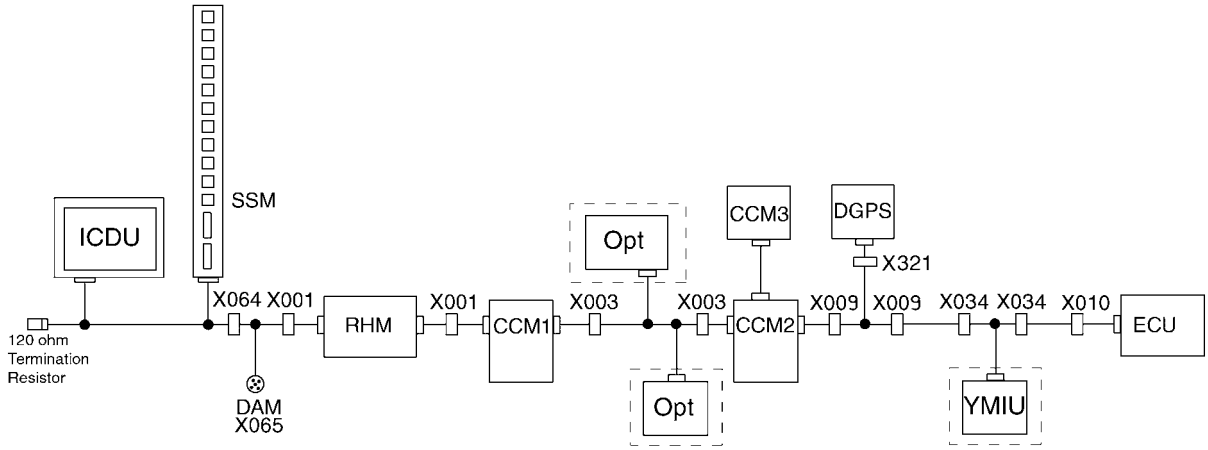
In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Data bus - Overview (A.50.A.92 - C.10.A.10)

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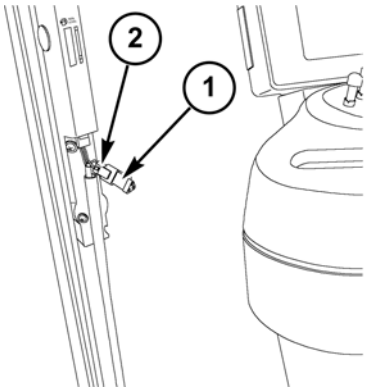
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AFX Combine CAN Data Bus Layout

- optional modules are shown in dotted boxes

The CAN network is a multiplex system which follows the guidelines established in **SAE J1939**. Multiplexing simply stated is linking two or more digital devices through a network. In the past, if an RPM sensor's information was needed by a tachometer, an engine controller, and a transmission, all three devices would need to be hard wired to the RPM sensor. Through the CAN data bus, only one wire is needed. The information is then accessed through the network by other systems that need it. Any other system on the network that does not care about RPM data ignores the message on the network. On today's high tech machinery, the complexity of wiring can be greatly reduced through the use of the CAN data bus network.

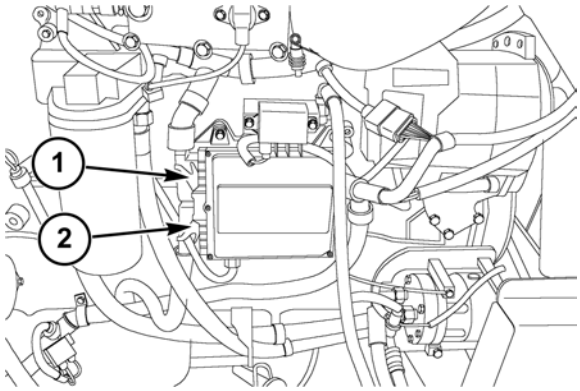
The network is made up of a twisted pair of wires, identified as CAN HI (yellow) and CAN LO (green). These two wires are used to form a "linear bus" network, in that the wires run in parallel from one end of the vehicle to the other, and each module is connected to both wires as a "node". These two wires are connected together at each end of the network using a **120 ohms** resistor, which is known as a "termination" resistor. Because there is a **120 ohms** resistor at each end of the network, the resistance should always be **60 ohms** between the CAN HI and CAN LO wires.



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- One termination resistor **(1)** is located in the right front cab post, below the shaft speed monitor (SSM).

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40033791A4 3

- The other termination resistor is part of the engine control module, or ECU, **(1)**, located in the engine compartment.

Each control module "tees" into the network, and acts as a separate "node" on the network. As a control module receives data from sensors, switches and potentiometers, it broadcasts this information on the network for other modules to pick up and use as needed. Each module knows which information it needs through the software programmed into it.

When the network is initially powered up (operator turns key on), each module on the network sends out a message announcing its existence. The Universal Display Plus monitor (ICDU) knows which modules should be on the network, and will issue an alarm message if a module does not report its existence at start-up. After this initial message, each control module sends out data messages as necessary, and, if necessary, it will send out another broadcast message announcing its existence if it has not sent any messages within the last 5 seconds. This is done in order to monitor each module’s status on the network. If a certain module has not transmitted any messages for more than 5 seconds, then the Universal Display Plus monitor will generate an alarm message indicating that the module is offline (communication lost).

NOTE: *If a control module never powers up and broadcasts its initial message, the Universal Display Plus monitor will generate a "Not Detected" alarm message indicating the module is not broadcasting.*

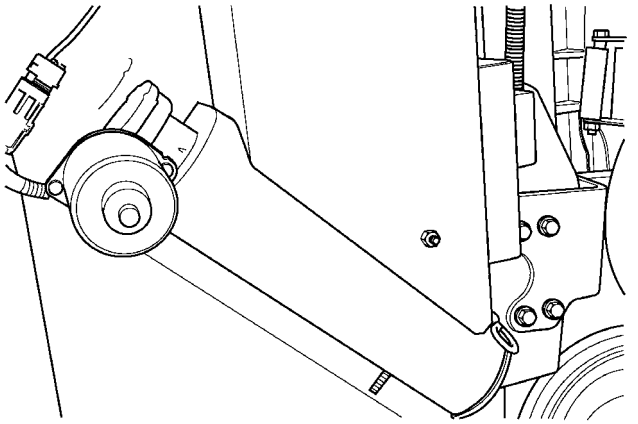
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Sensing system Moisture sensor - Electrical adjust (A.50.A.96.95.80 - F.45.A.61)

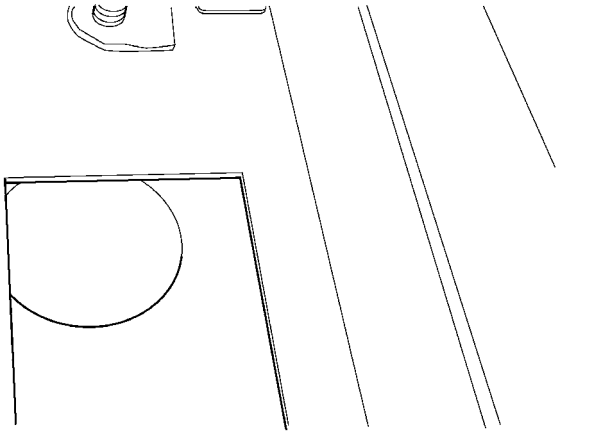
AFX8010

1. The moisture sensor measures grain that is falling out of the clean grain elevator into a small bin of the by-pass unit. The moisture sensor is at the back of the by-pass unit and senses the moisture content of the grain in this bin. A proximity switch controls the level of grain in the bin. It is located at the top of the bin and an auger is at the bottom of the bin. In order to have a good moisture reading, the moisture sensor fin must always be clean and totally covered by grain. In other words, the bin always has to contain a certain minimum amount of grain. The sensitivity of the proximity switch can be adjusted. If the level sensor is set too sensitive, the auger will start turning too early and not enough grain will be available in the sensor chamber to have a good moisture reading. As a result, you will see the moisture value on the Universal Display Plus fluctuating a lot and suddenly drop to a low level. If the level sensor is not set sensitive enough, the bin will always contain the same grain, resulting in a nearly constant moisture reading all over the field.
2. NOTE: It should be noted that, although the level sensor sensitivity may be set correctly, it is possible that material blockage (i.e., pieces of corn cobs) in front of the level sensor will also cause the auger to turn continuously when the threshing system is on. This situation can be recognized when the moisture readings are abnormally low or fluctuating greatly. Therefore, before changing the sensitivity of the level sensor, remove the moisture sensor. Then you can look into the bin. In the top of the bin, a white circle (level sensor head surface) must be visible without being covered by dirt or crop residues. If you found material accumulated in front of the level sensor, remove it. If the moisture reading is still fluctuating or the electrical motor keeps on turning all the time, then it is advised to change the sensitivity of the level sensor.
3. To set the sensitivity of the level sensor, proceed as follows:

IMPORTANT: *Before setting the sensitivity, check first that the moisture sensor fin and the level sensor are clean. Refer to Operator's Manual, Section 4 – "Grain Storage - Moisture Sensor."*



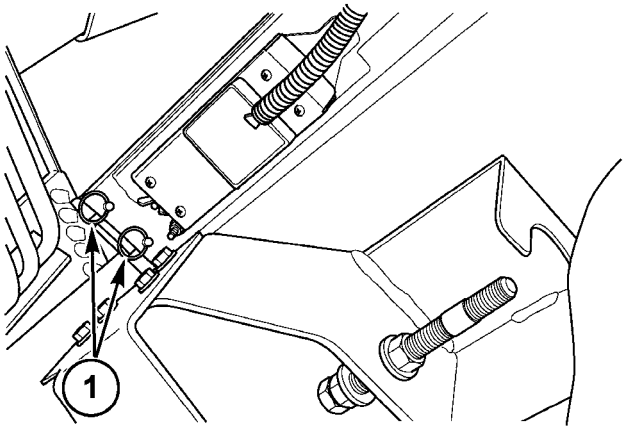
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10037330 2

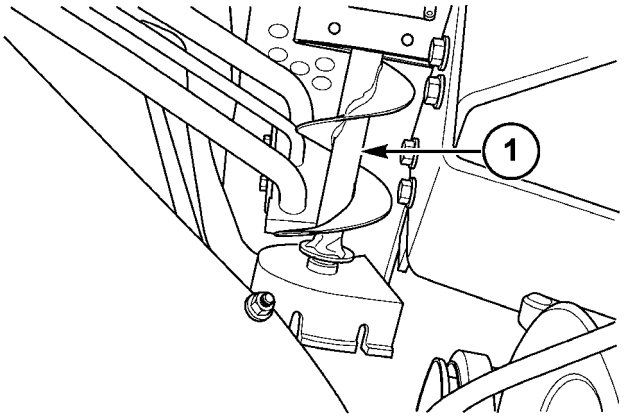
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4. Pull two pins **(1)** to remove the auger.



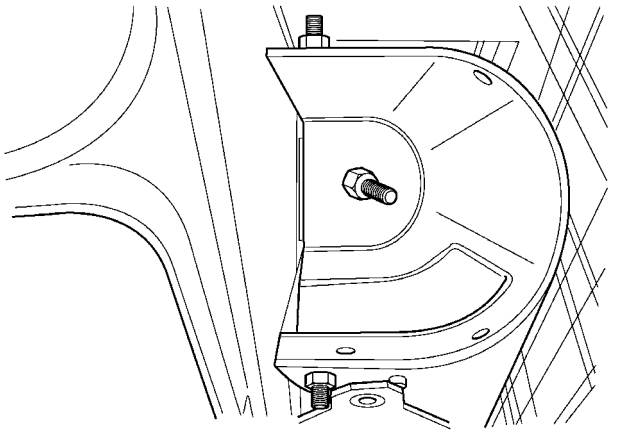
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5. Remove the auger **(1)**.



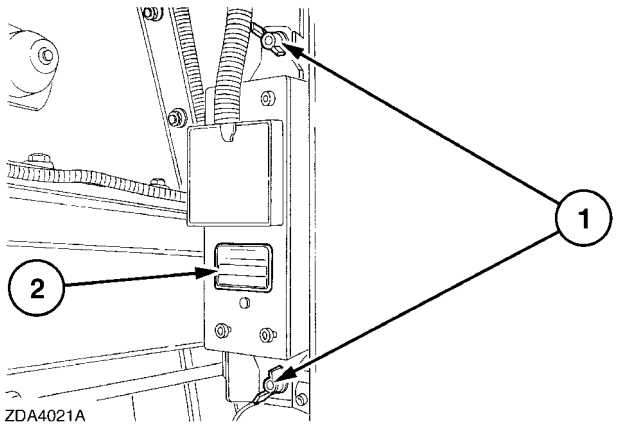
10041742A5 4

6. Remove all the grain out of the auger chamber.



10041743 5

7. Loosen two wing nuts **(1)** to remove moisture sensor and fin assembly **(2)**.

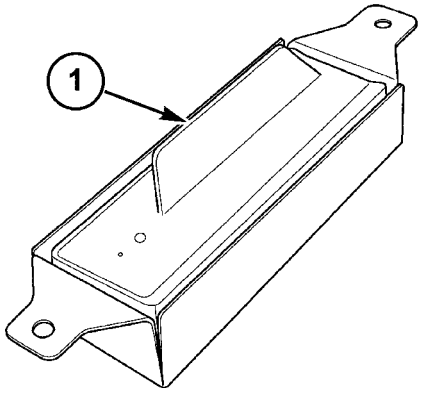


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8. Clean the fin **(1)** using a cloth.

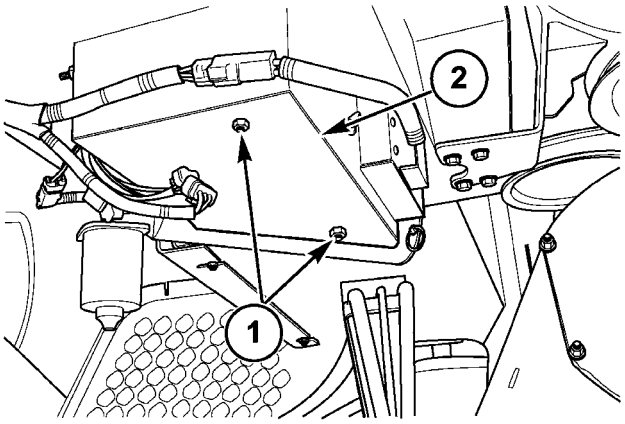
IMPORTANT: *Do not use a screw driver or any other sharp object to avoid scratches on the sensor fin while cleaning.*



10037334A5 7

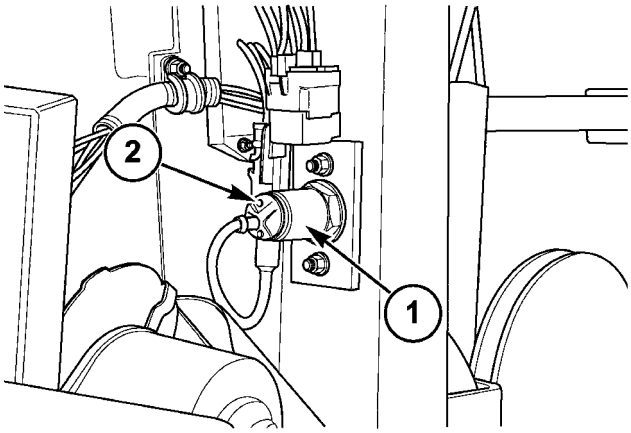
9. Clean inside the bin housing in the area of the white circle, which is the face of the level sensor.

10. Turn the ignition switch to the “RUN” position. Remove the two nuts **(1)** to remove cover **(2)**.



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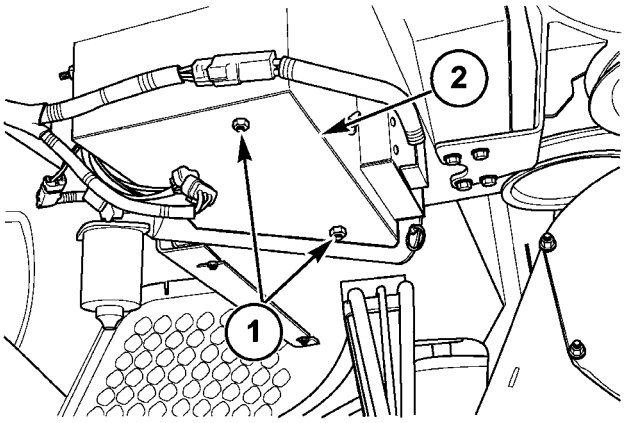
11. The cylindrical level sensor **(1)** is now visible. At the back of the sensor, there is a small screw **(2)**. To set the sensor, use the Universal Display Plus “DIAG” screen. Select the “AFS” sort menu, and select “BYPASS FULL SW” to check the voltage range. Turn the small adjustment screw **(2)** clockwise (CW) until the voltage just switches to something less than **2.5 volts**. Turn the adjustment screw four full revolutions CCW from this point. Now the sensitivity of the level sensor should be set correctly.



10037336A5 9

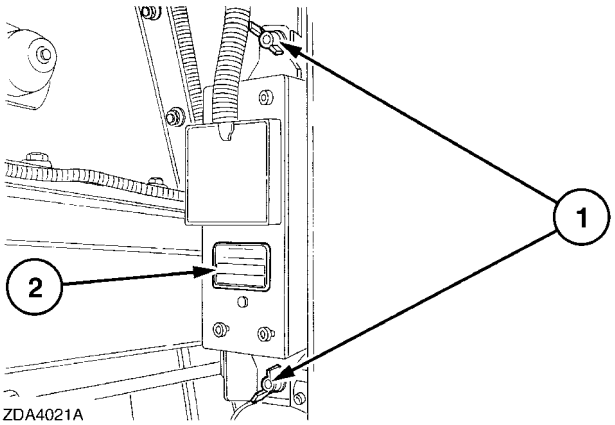
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12. Install the cover **(2)** and tighten the two lock nuts **(1)**.



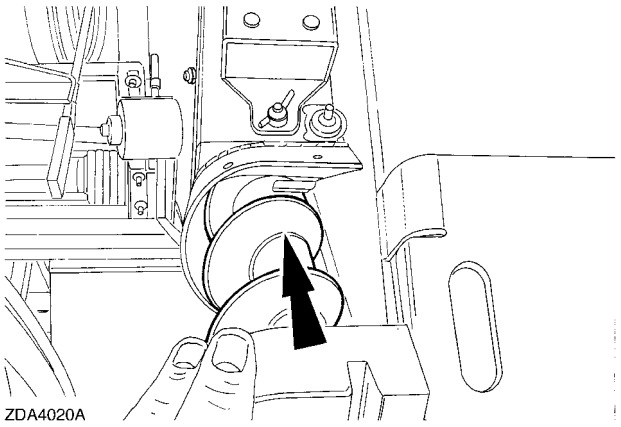
10037335A5 10

13. Install the moisture sensor and fin assembly **(2)** and tighten the wing nuts **(1)**.



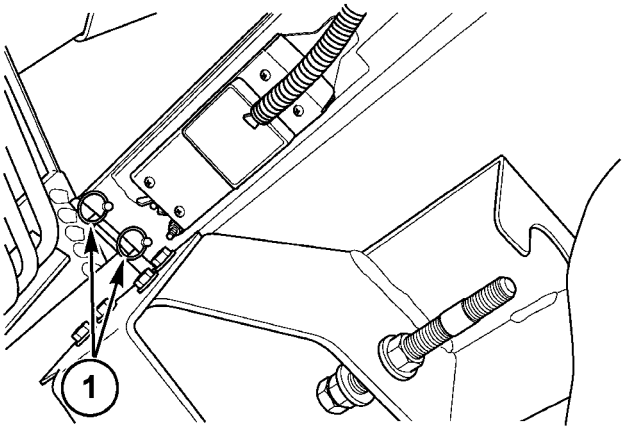
ZDA4021A 11

14. Install the auger.



ZDA4020A 12

15. Install two retaining pins **(1)**.



10041741A5 13

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Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54)

AFX8010

E0038-03 - CCM1 8V Reference

Cause:
The CCM1 8V Reference circuit is shorted to a higher than normal source.

Possible failure modes:

1. **12 volts** short on the **8 volts** regulated power circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the reading is high (>**8.5 volts**) out of range, continue with step **2**.

   B. If the reading is within the proper range, reload the software in CCM1. Erase the fault code and continue operation. If the fault code persists, replace the module.

   NOTE: *The **8 volts** regulated power supply is provided from the key switch power to the module, and is used to provide power to speed and position sensor circuits. In some cases, a **12 volts** short on one of the sensor signal wires could result in backfeeding that upsets the **8 volts** regulator, and may cause the short to high source fault.*

2. Turn off the key switch, and disconnect the negative battery cables to remove all power from the CCM1 module. Carefully remove connector **X019** and connector **X020** from the bottom of the CCM1 module. Reconnect the negative battery cables, and turn the key on. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the voltage reading is within the proper range, there is a short to high source on one of the sensor wires. Continue with step **3**.

   B. If the voltage reading is still high (>**8.5 volts**) out of range, then there is an internal failure in the CCM1 module. Replace the module.

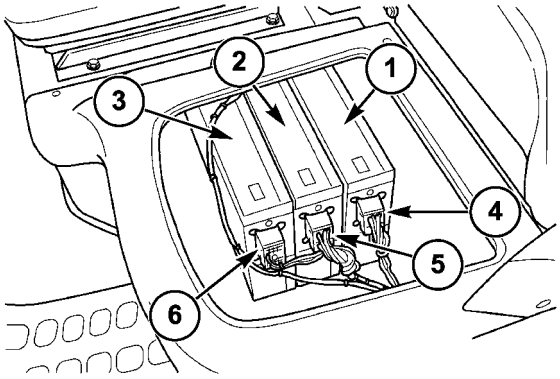
3. Turn off the key switch, and disconnect the negative battery cables to remove all power from the CCM1 module. Carefully reconnect connector **X019** and connector **X020** to the bottom of the CCM1 module. Reconnect the negative battery cables, and turn the key on. Enter the Universal Display Plus "ERROR" screen to check for any errors for sensor circuits short to high source on the CCM1 module.

   A. If there are any sensor circuits on CCM1 that are shorted to high source, correct those circuits, and then continue with step **1** of this troubleshooting to verify that this concern is resolved.

   B. If there are no sensor circuit errors on CCM1 module, reload the software in CCM1. Erase the fault code and continue operation. If the fault code persists, replace the module.

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Control module - Overview (A.50.A.91 - C.10.A.10)



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

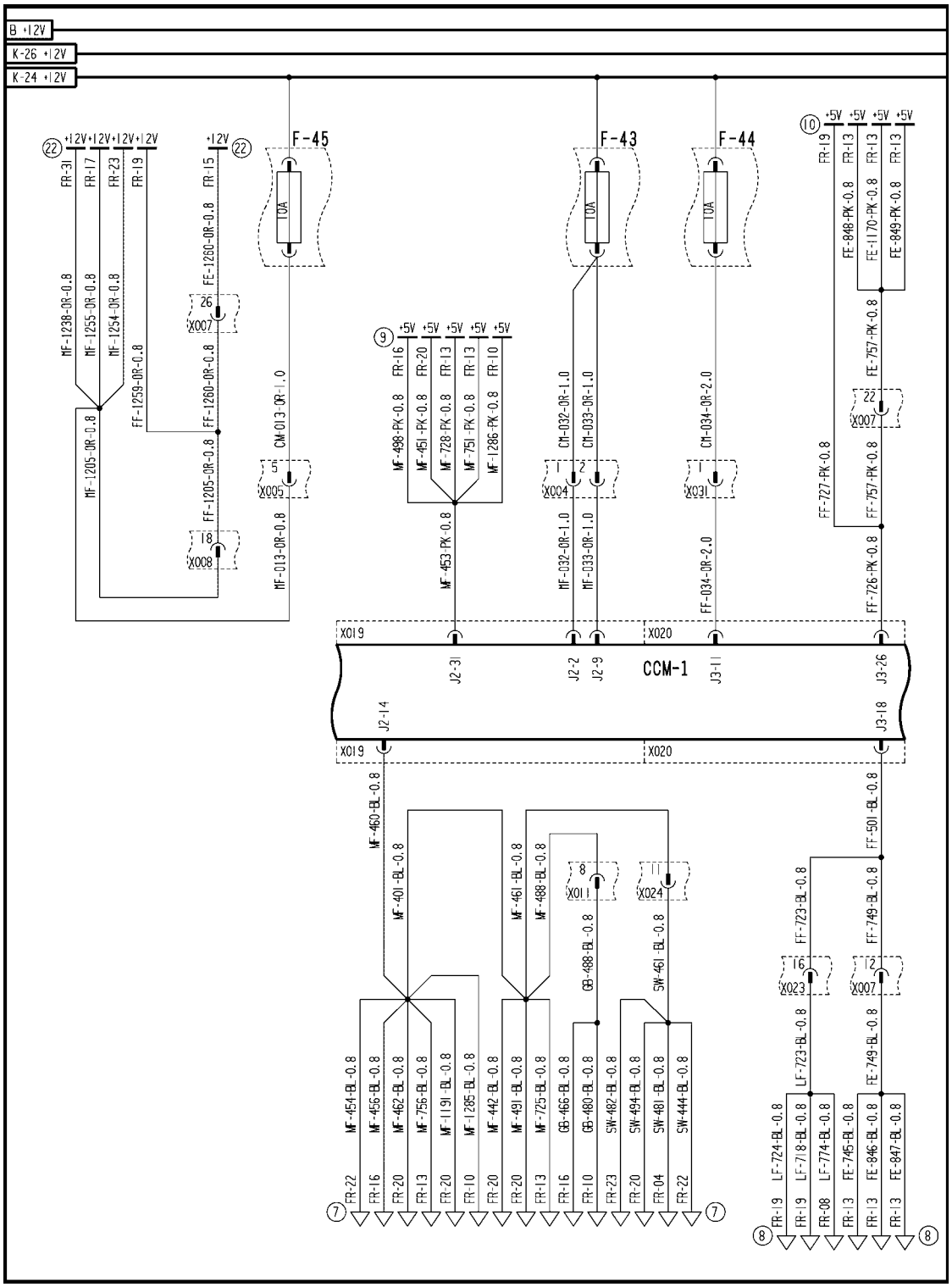
The chassis control modules (CCM's) are the primary modules that control many of the functions on the combine. The modules are located inside the cab, under the instructional seat, and are bolted to the cab floor over access holes for electrical connectors. Each module has three electrical connectors attached to it. The cab main (CM) harness attaches to each module from inside the cab, while the main frame (MF), front frame (FF), and expansion (EX) harnesses attach to the modules from outside the cab, through the holes in the cab floor.

In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53)

AFX8010

E0038-04 - CCM1 8V Reference

Cause:
The CCM1 8V Reference circuit is shorted to ground.

Possible failure modes:

1. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the voltage reading is low (<**7.5 volts**) out of range, then the CCM1 module has an internal failure. Replace the module.

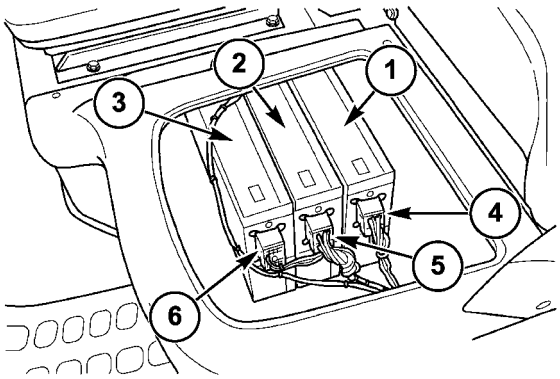
   B. If the voltage reading is within the proper limits, the failure may not be present at this time. Continue with step **2**.

   NOTE: *Visually inspect the wiring harness and connectors to CCM1 module. Verify that the connectors are fully installed. Inspect the terminals and wires at the connectors for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "CCM1 8V REF" voltage range.

   A. If no low (<**7.5 volts**) out of range readings are indicated, erase the fault code and continue operation.

Control module - Overview (A.50.A.91 - C.10.A.10)



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

The chassis control modules (CCM's) are the primary modules that control many of the functions on the combine. The modules are located inside the cab, under the instructional seat, and are bolted to the cab floor over access holes for electrical connectors. Each module has three electrical connectors attached to it. The cab main (CM)

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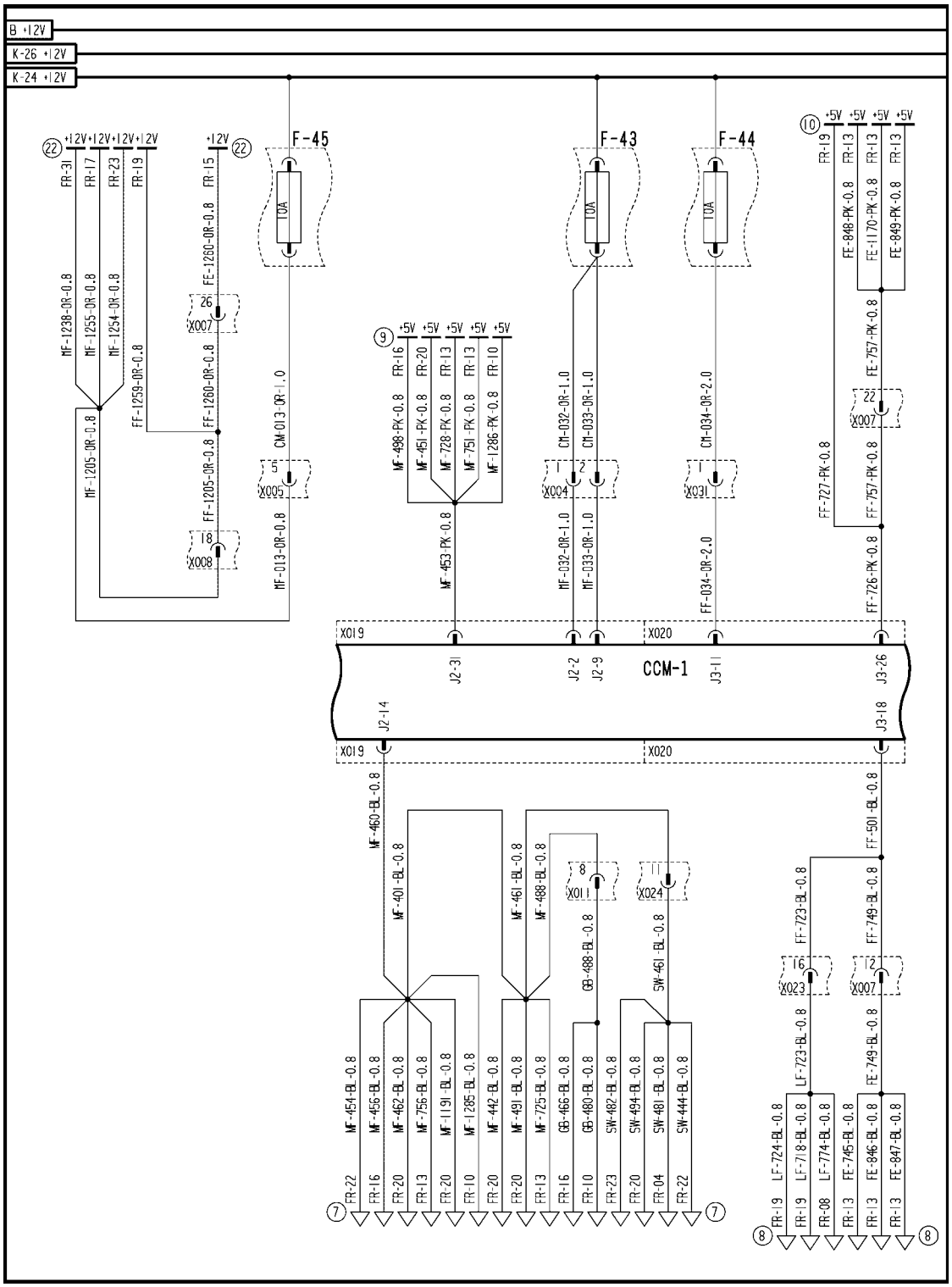
harness attaches to each module from inside the cab, while the main frame (MF), front frame (FF), and expansion (EX) harnesses attach to the modules from outside the cab, through the holes in the cab floor.

In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54)

AFX8010

E0166-03 - CCM2 8V Reference

Cause:
The CCM2 8V Reference circuit is shorted to a higher than normal source.

Possible failure modes:

1. **12 volts** short on the **8 volts** regulated power circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the reading is high (>**8.5 volts**) out of range, continue with step **2**.

   B. If the reading is within the proper range, reload the software in CCM2. Erase the fault code and continue operation. If the fault code persists, replace the module.

   NOTE: *The **8 volts** regulated power supply is provided from the key switch power to the module, and is used to provide power to speed and position sensor circuits. In some cases, a **12 volts** short on one of the sensor signal wires could result in backfeeding that upsets the **8 volts** regulator, and may cause the short to high source fault.*

2. Turn off the key switch, and disconnect the negative battery cables to remove all power from the CCM2 module. Carefully remove connector **X016** and connector **X017** from the bottom of the CCM2 module. Reconnect the negative battery cables, and turn the key on. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the voltage reading is within the proper range, there is a short to high source on one of the sensor wires. Continue with step **3**.

   B. If the voltage reading is still high (>**8.5 volts**) out of range, then there is an internal failure in the CCM2 module. Replace the module.

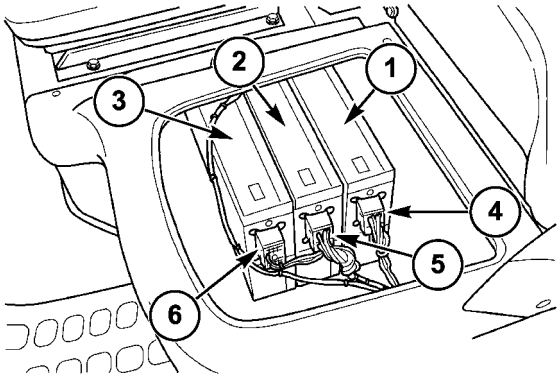
3. Turn off the key switch, and disconnect the negative battery cables to remove all power from the CCM2 module. Carefully reconnect connector **X016** and connector **X017** to the bottom of the CCM2 module. Reconnect the negative battery cables, and turn the key on. Enter the Universal Display Plus "ERROR" screen to check for any errors for sensor circuits short to high source on the CCM2 module.

   A. If there are any sensor circuits on CCM2 that are shorted to high source, correct those circuits, and then continue with step **1** of this troubleshooting to verify that this concern is resolved.

   B. If there are no sensor circuit errors on CCM2 module, reload the software in CCM2. Erase the fault code and continue operation. If the fault code persists, replace the module.

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Control module - Overview (A.50.A.91 - C.10.A.10)



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

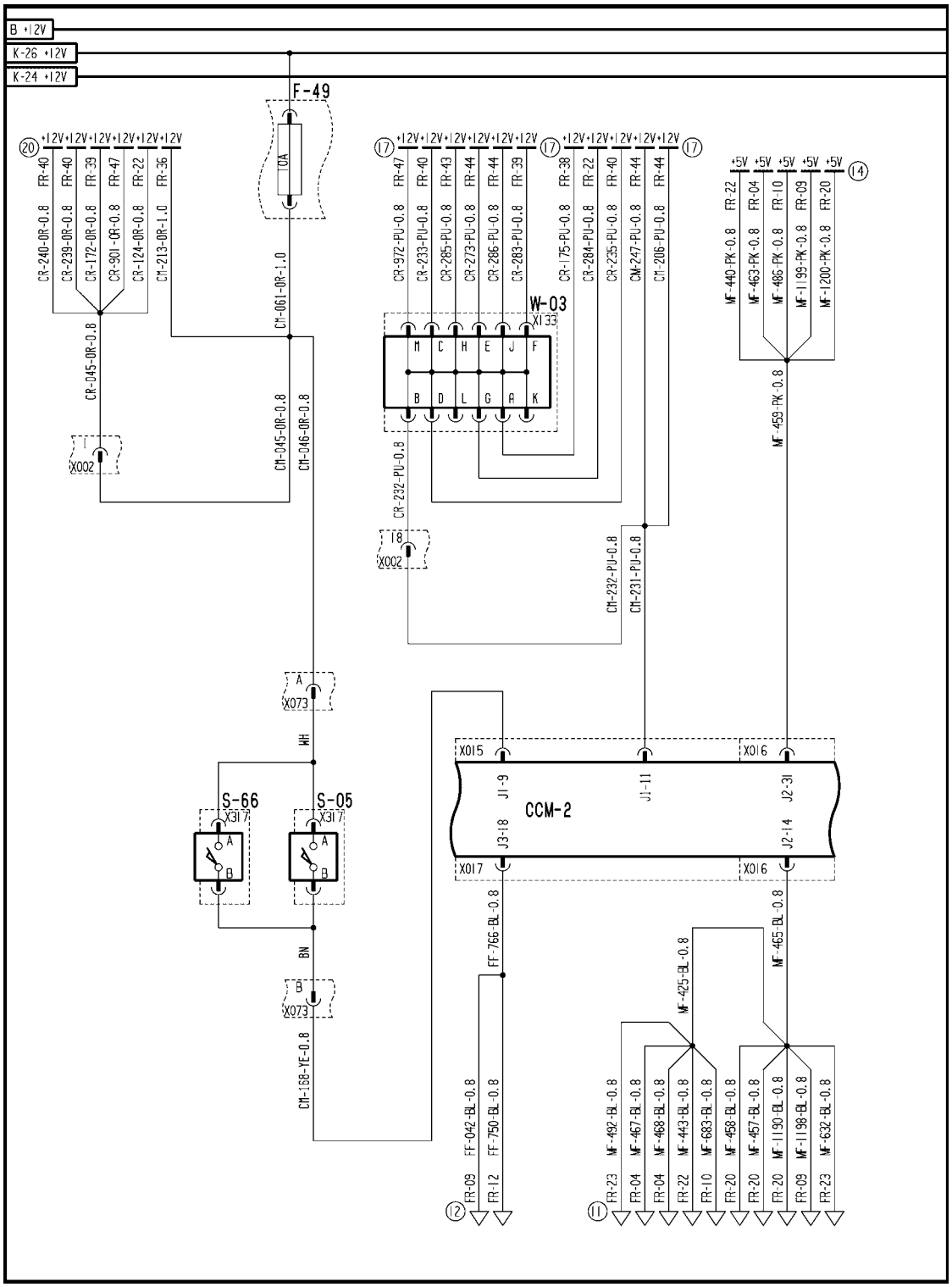
The chassis control modules (CCM's) are the primary modules that control many of the functions on the combine. The modules are located inside the cab, under the instructional seat, and are bolted to the cab floor over access holes for electrical connectors. Each module has three electrical connectors attached to it. The cab main (CM) harness attaches to each module from inside the cab, while the main frame (MF), front frame (FF), and expansion (EX) harnesses attach to the modules from outside the cab, through the holes in the cab floor.

In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53)

AFX8010

E0166-04 - CCM2 8V Reference

Cause:
The CCM2 8V Reference circuit is shorted to ground.

Possible failure modes:

1. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the voltage reading is low (<**7.5 volts**) out of range, then the CCM2 module has an internal failure. Replace the module.

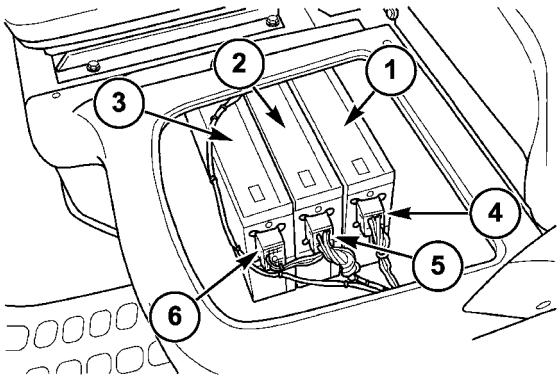
   B. If the voltage reading is within the proper limits, the failure may not be present at this time. Continue with step **2**.

   NOTE: *Visually inspect the wiring harness and connectors to CCM2 module. Verify that the connectors are fully installed. Inspect the terminals and wires at the connectors for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "CCM2 8V REF" voltage range.

   A. If no low (<**7.5 volts**) out of range readings are indicated, erase the fault code and continue operation.

Control module - Overview (A.50.A.91 - C.10.A.10)



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

The chassis control modules (CCM's) are the primary modules that control many of the functions on the combine. The modules are located inside the cab, under the instructional seat, and are bolted to the cab floor over access holes for electrical connectors. Each module has three electrical connectors attached to it. The cab main (CM)

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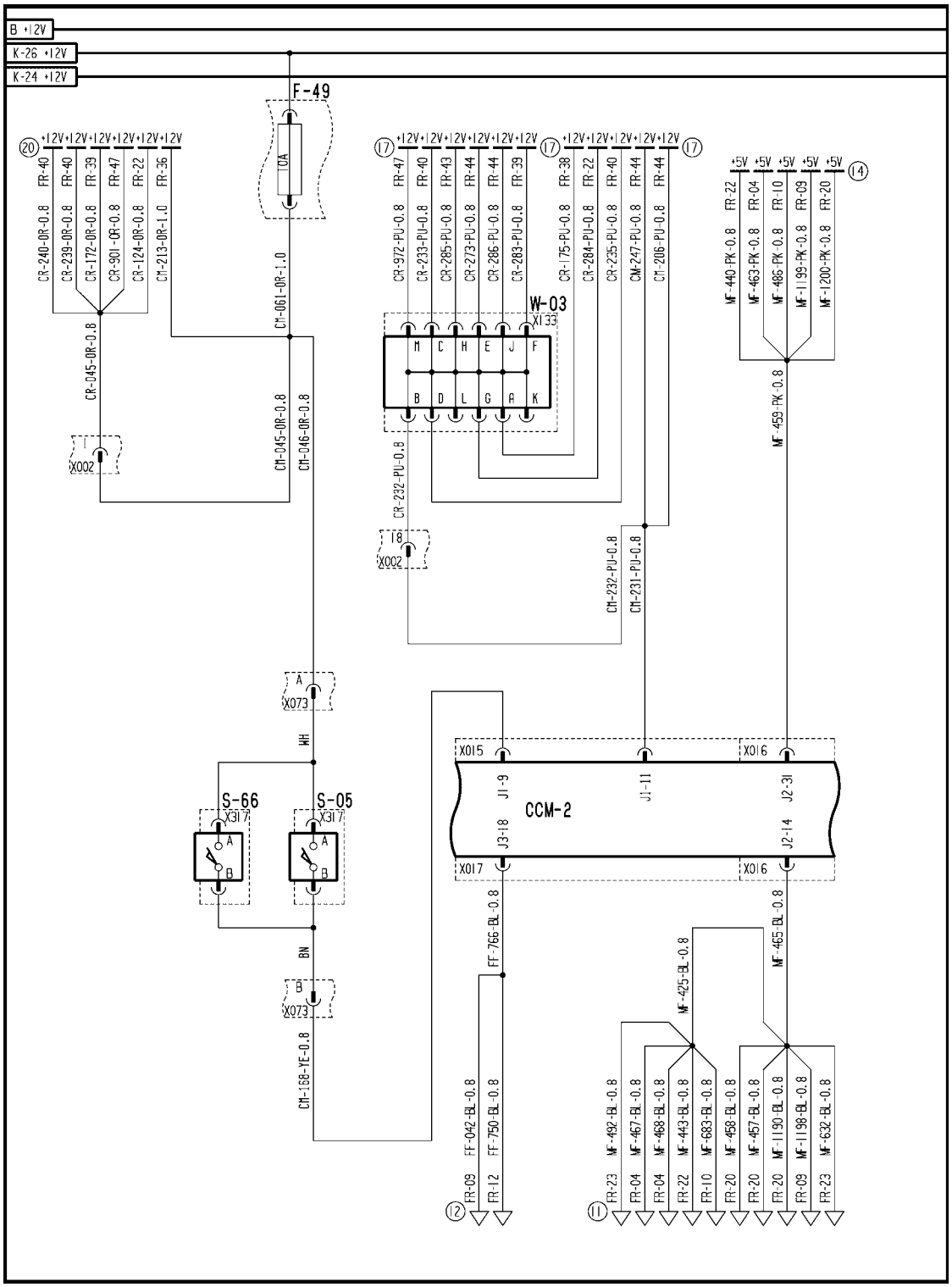
harness attaches to each module from inside the cab, while the main frame (MF), front frame (FF), and expansion (EX) harnesses attach to the modules from outside the cab, through the holes in the cab floor.

In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54)

AFX8010

E0294-03 - CCM3 8V Reference

Cause:
The CCM3 8V Reference circuit is shorted to a higher than normal source.

Possible failure modes:

1. **12 volts** short on the **8 volts** regulated power circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the reading is high (>**8.5 volts**) out of range, continue with step **2**.

   B. If the reading is within the proper range, reload the software in CCM3. Erase the fault code and continue operation. If the fault code persists, replace the module.

   NOTE: *The **8 volts** regulated power supply is provided from the key switch power to the module, and is used to provide power to speed and position sensor circuits. In some cases, a **12 volts** short on one of the sensor signal wires could result in backfeeding that upsets the **8 volts** regulator, and may cause the short to high source fault.*

2. Turn off the key switch, and disconnect the negative battery cables to remove all power from the CCM3 module. Carefully remove connector **X013** and connector **X014** from the bottom of the CCM3 module. Reconnect the negative battery cables, and turn the key on. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the voltage reading is within the proper range, there is a short to high source on one of the sensor wires. Continue with step **3**.

   B. If the voltage reading is still high (>**8.5 volts**) out of range, then there is an internal failure in the CCM3 module. Replace the module.

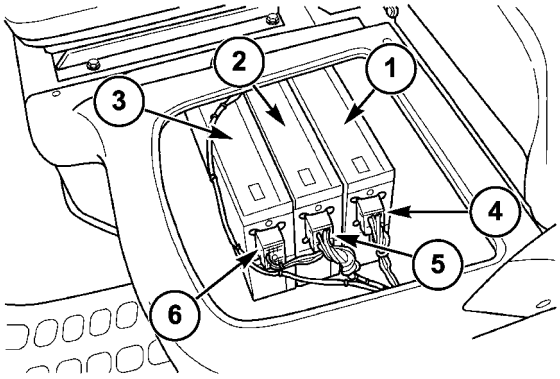
3. Turn off the key switch, and disconnect the negative battery cables to remove all power from the CCM3 module. Carefully reconnect connector **X013** and connector **X014** to the bottom of the CCM3 module. Reconnect the negative battery cables, and turn the key on. Enter the Universal Display Plus "ERROR" screen to check for any errors for sensor circuits short to high source on the CCM3 module.

   A. If there are any sensor circuits on CCM3 that are shorted to high source, correct those circuits, and then continue with step **1** of this troubleshooting to verify that this concern is resolved.

   B. If there are no sensor circuit errors on CCM3 module, reload the software in CCM3. Erase the fault code and continue operation. If the fault code persists, replace the module.

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Control module - Overview (A.50.A.91 - C.10.A.10)



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

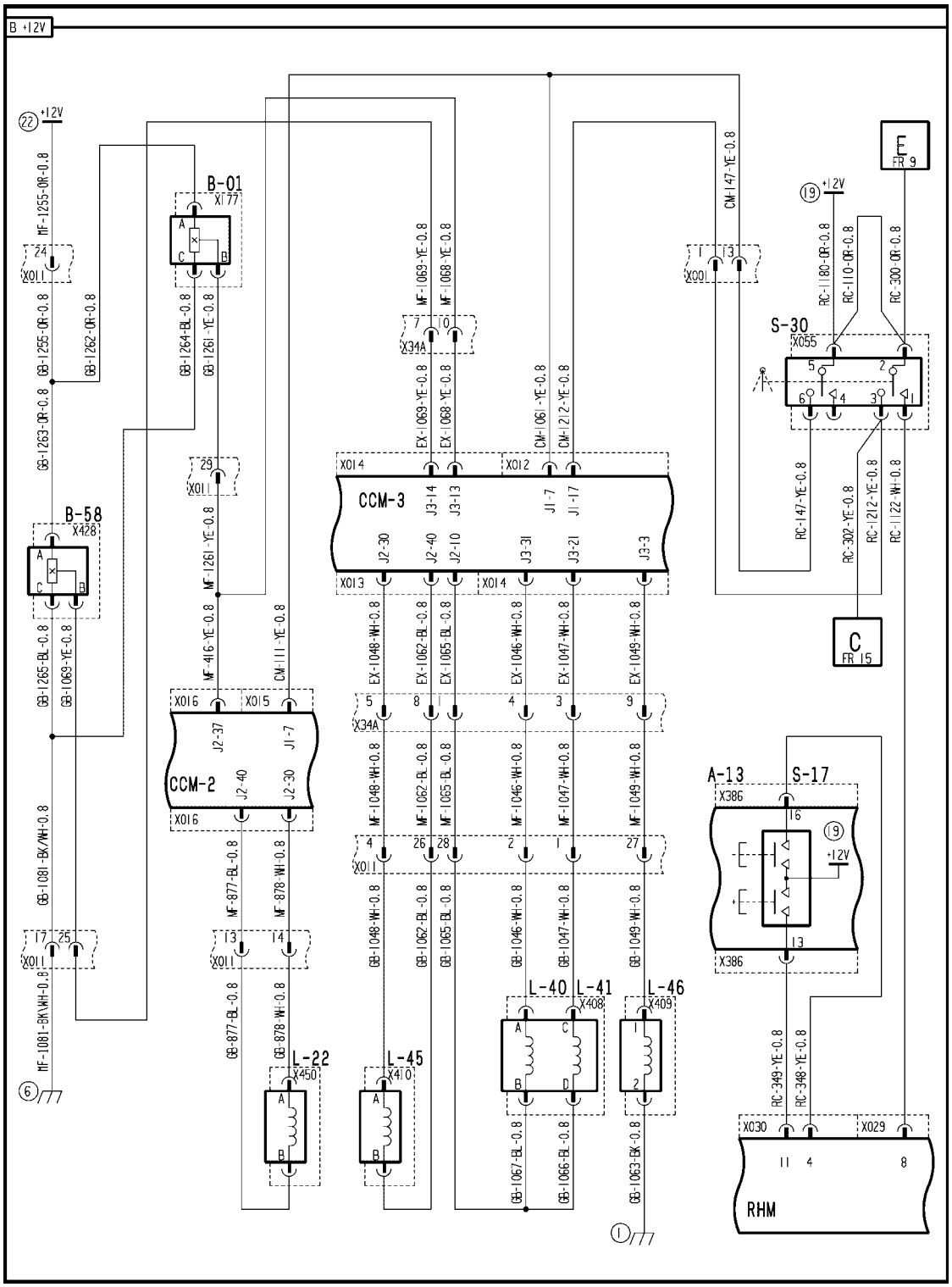
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In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53)

AFX8010

E0294-04 - CCM3 8V Reference

Cause:
The CCM3 8V Reference circuit is shorted to ground.

Possible failure modes:

1. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 8V REF" to check the voltage range. The proper voltage is **7.5 - 8.5 volts**.

   A. If the voltage reading is low (<**7.5 volts**) out of range, then the CCM3 module has an internal failure. Replace the module.

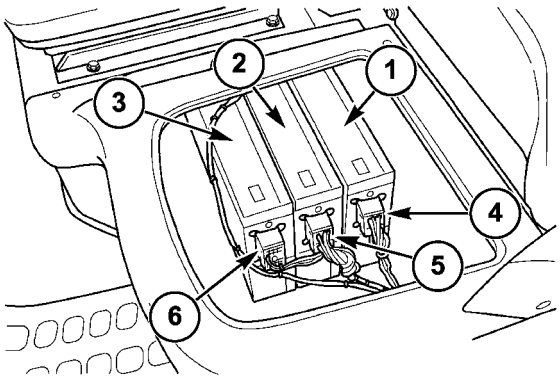
   B. If the voltage reading is within the proper limits, the failure may not be present at this time. Continue with step **2**.

   NOTE: *Visually inspect the wiring harness and connectors to CCM3 module. Verify that the connectors are fully installed. Inspect the terminals and wires at the connectors for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "CCM3 8V REF" voltage range.

   A. If no low (<**7.5 volts**) out of range readings are indicated, erase the fault code and continue operation.

Control module - Overview (A.50.A.91 - C.10.A.10)



10004693A5 1

Chassis Control Modules (under Instructional seat in cab)

1. CCM1
2. CCM2
3. CCM3
4. Cab main (CM) harness connector **X018** to CCM1
5. Cab main (CM) harness connector **X015** to CCM2
6. Cab main (CM) harness connector **X012** to CCM3

The chassis control modules (CCM's) are the primary modules that control many of the functions on the combine. The modules are located inside the cab, under the instructional seat, and are bolted to the cab floor over access holes for electrical connectors. Each module has three electrical connectors attached to it. The cab main (CM)

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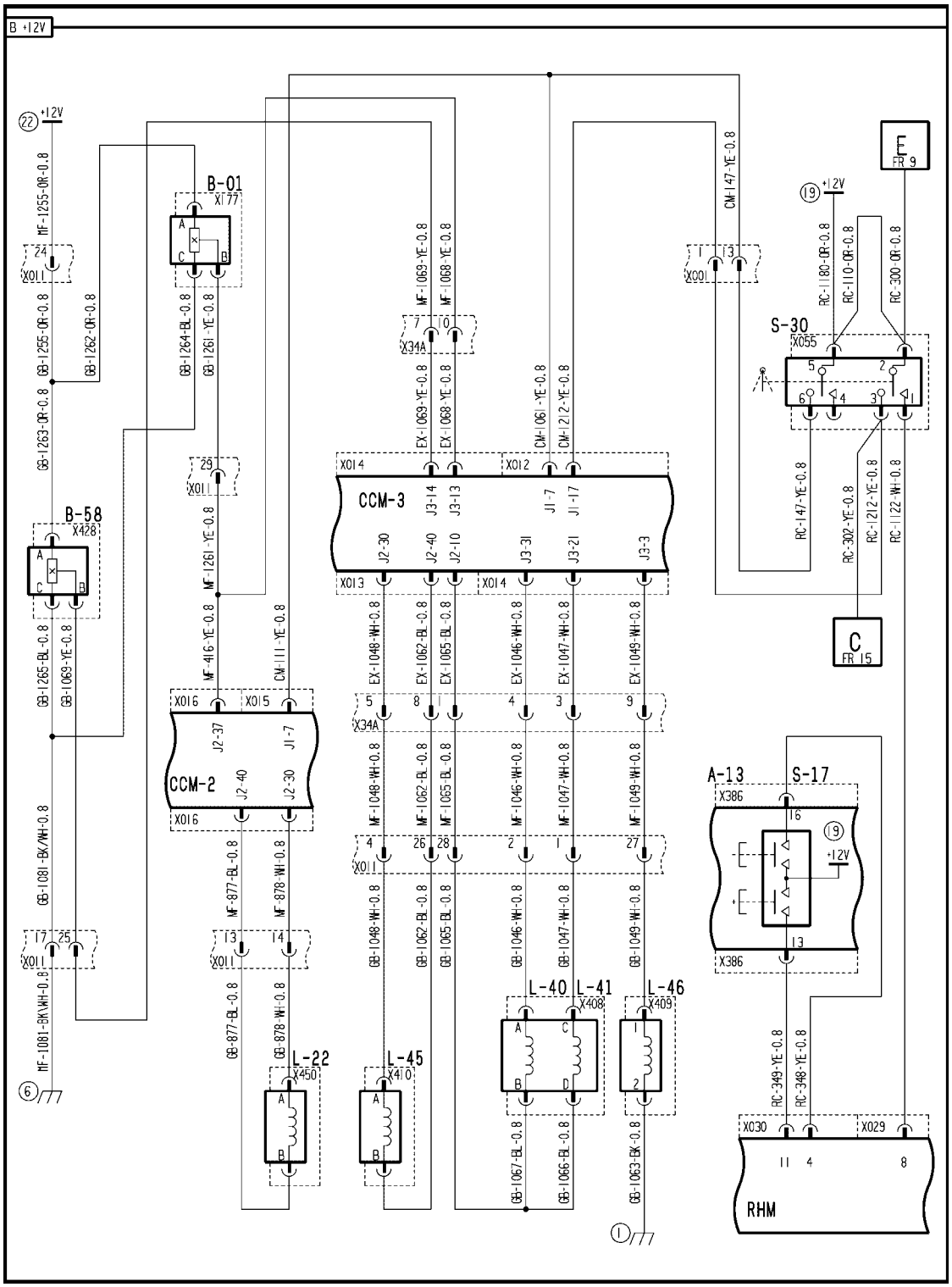
harness attaches to each module from inside the cab, while the main frame (MF), front frame (FF), and expansion (EX) harnesses attach to the modules from outside the cab, through the holes in the cab floor.

In general, the modules take care of the following functional areas of the combine:

- CCM1 module manages feeder engagement, header height control, cleaning system self-leveling, and concave adjustment. The main frame (MF) harness attaches to CCM1 connector **X019**, while the front frame (FF) harness attaches to CCM1 connector **X020**.
- CCM2 module manages threshing system engagement, ground drive systems including transmission shifting, reel and unload tube hydraulics, and engine sensors monitoring. The main frame (MF) harness attaches to CCM2 connector **X016**, while the front frame (FF) harness attaches to CCM2 connector **X017**.
- CCM3 module manages rotor drive engagement, optional remote sieve adjustment, and some precision farming system operations. The expansion (EX) harness attaches to the CCM3 connectors **X013** and **X014**.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54)

AFX8010

E0037-03 - CCM1 J2 5V Reference

Cause:
The CCM1 J2 **5 volts** reference circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Circuit wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 J2 5V REF" to check the voltage range.

   The proper voltage range is **4.5 - 5.5 volts**

   A. If the voltage reading is high out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the concave (CC) harness from the main frame (MF) harness at connector **X456**.

   A. If the voltage drops back to the normal range, the short is in the concave (CC) harness, concave position sensor R-06, or sensor wiring. Inspect the concave (CC) harness for shorts, and replace the concave position sensor if necessary.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the lateral inclination sensor connector **X170**.

   A. If the voltage drops back to the normal range, the short is in the lateral inclination sensor B-02, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the feeder angle sensor connector **X174**.

   A. If the voltage drops back to the normal range, the short is in the feeder angle sensor R-03, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **5**.
5. Disconnect the header lift pressure sensor connector **X279**.

   A. If the voltage drops back to the normal range, the short is in the header lift pressure sensor B-29, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step .
6. Disconnect the PTO box lube pressure sensor connector **X399**.

   A. If the voltage drops back to the normal range, the short is in the PTO box lube pressure sensor B-60, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, there is a short to high voltage in the main frame (MF) harness between connector **X456** pin 3, connector **X170** pin A (B-02), connector **X174** pin 3 (R-03), connector **X279** pin B (B-29), connector **X399** pin B (B-60) and connector **X019** pin J2-31 on one of the following wires:
   - wire 498 pink, connector **X456** pin 3 to MF harness splice
   - wire 451 pink, connector **X170** pin A to MF harness splice
   - wire 751 pink, connector **X174** pin 3 to MF harness splice

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- wire 728 pink, connector **X279** pin B to MF harness splice
- wire 1286 pink, connector **X399** pin B to MF harness splice
- wire 453 pink, MF harness splice to connector **X019** pin J2-31.

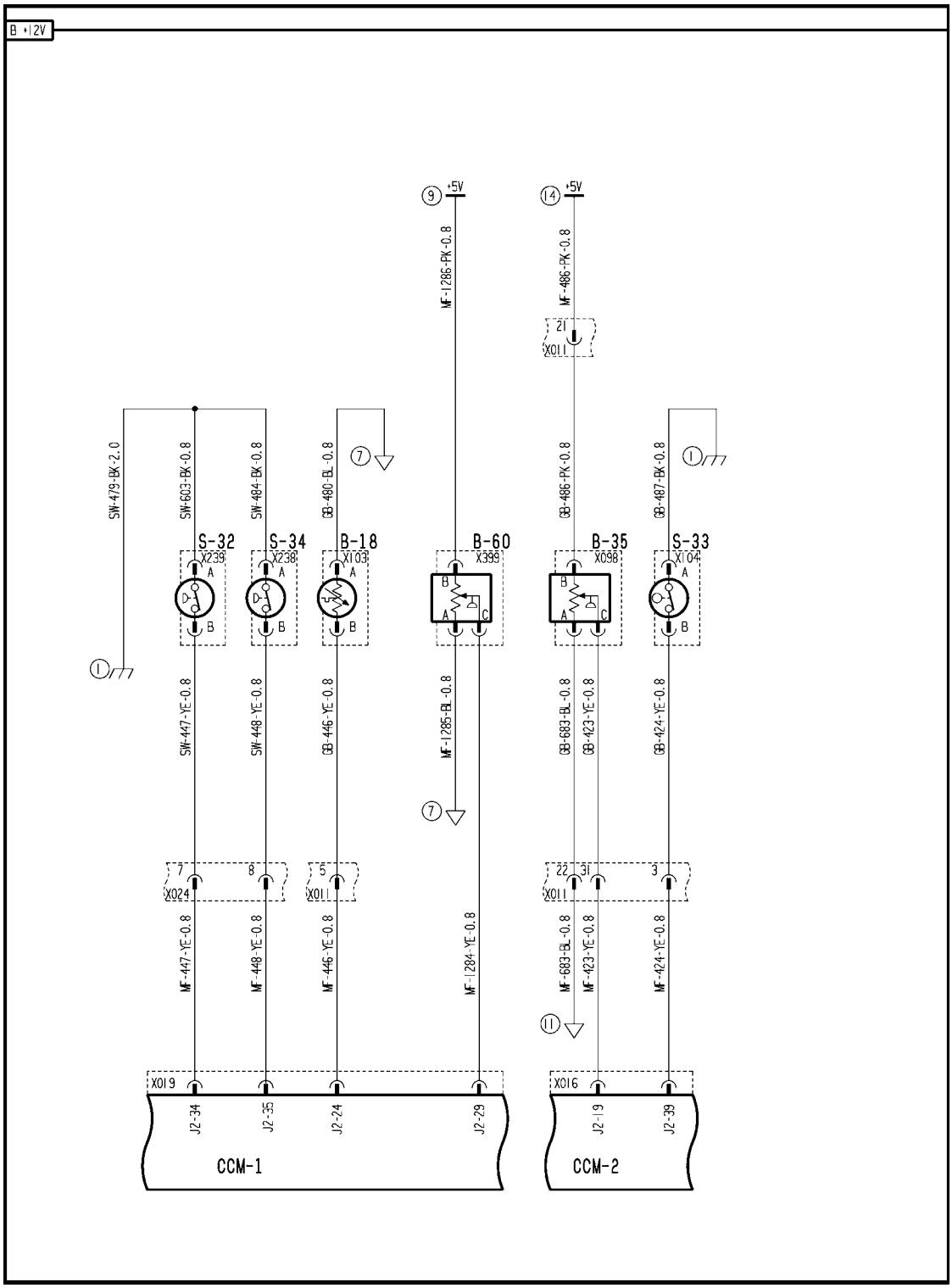
Locate the short and repair.

7. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



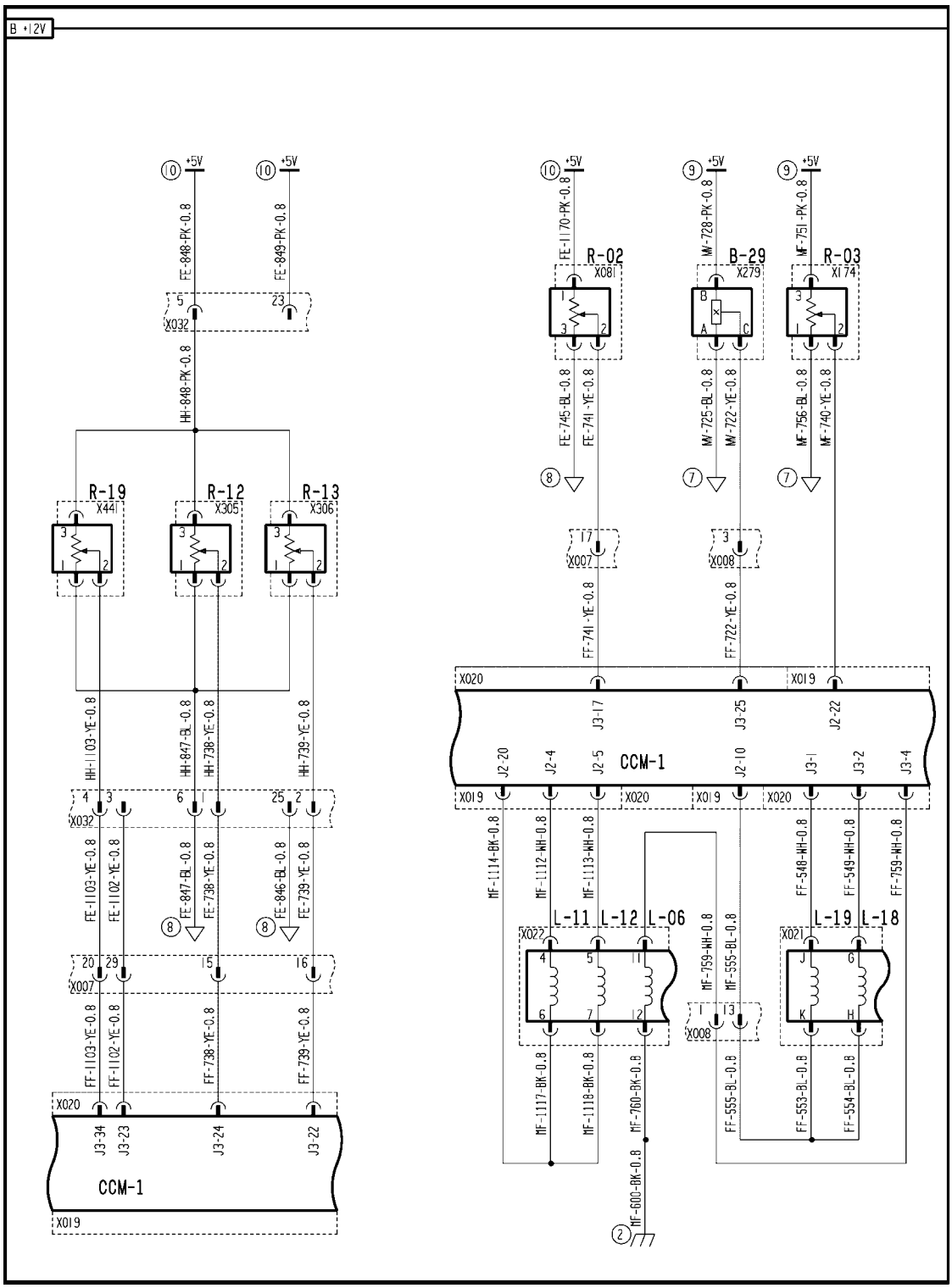
AFXSCHEM10-04 1

FRAME 10 - HYDRAULIC

https://truckmanualshub.com/

B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



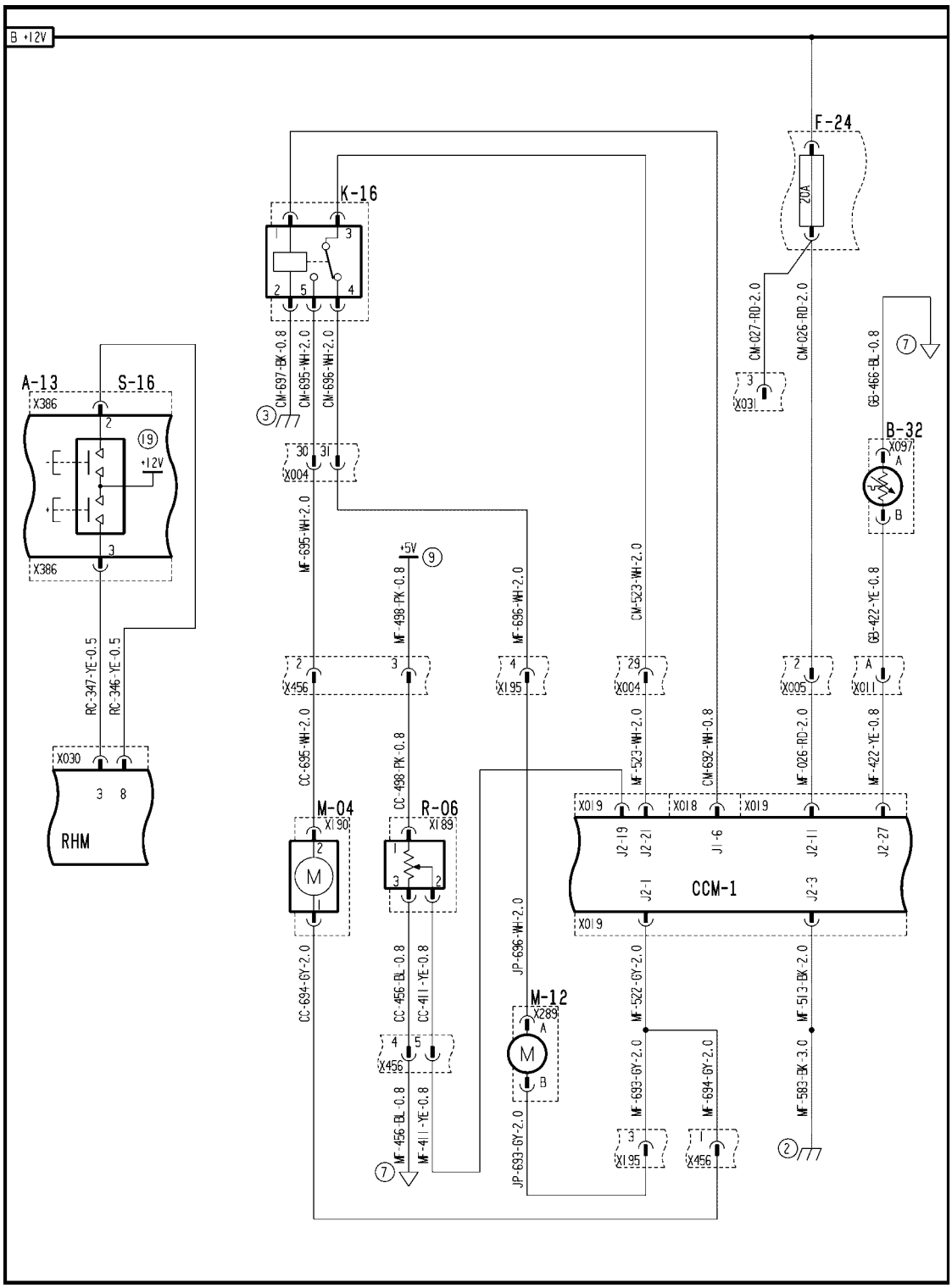
AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



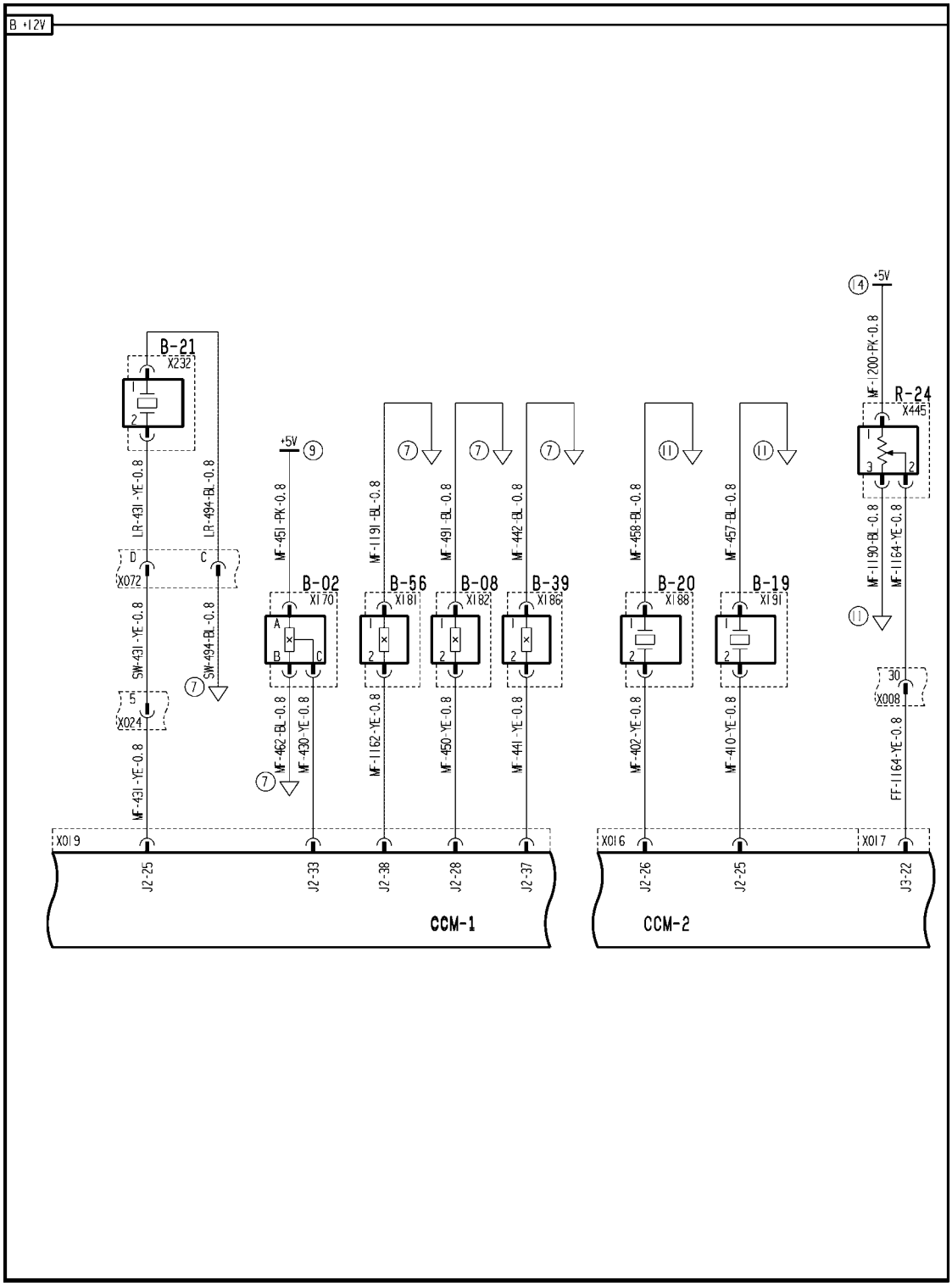
AFXSCHEM16-04 1

FRAME 16 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



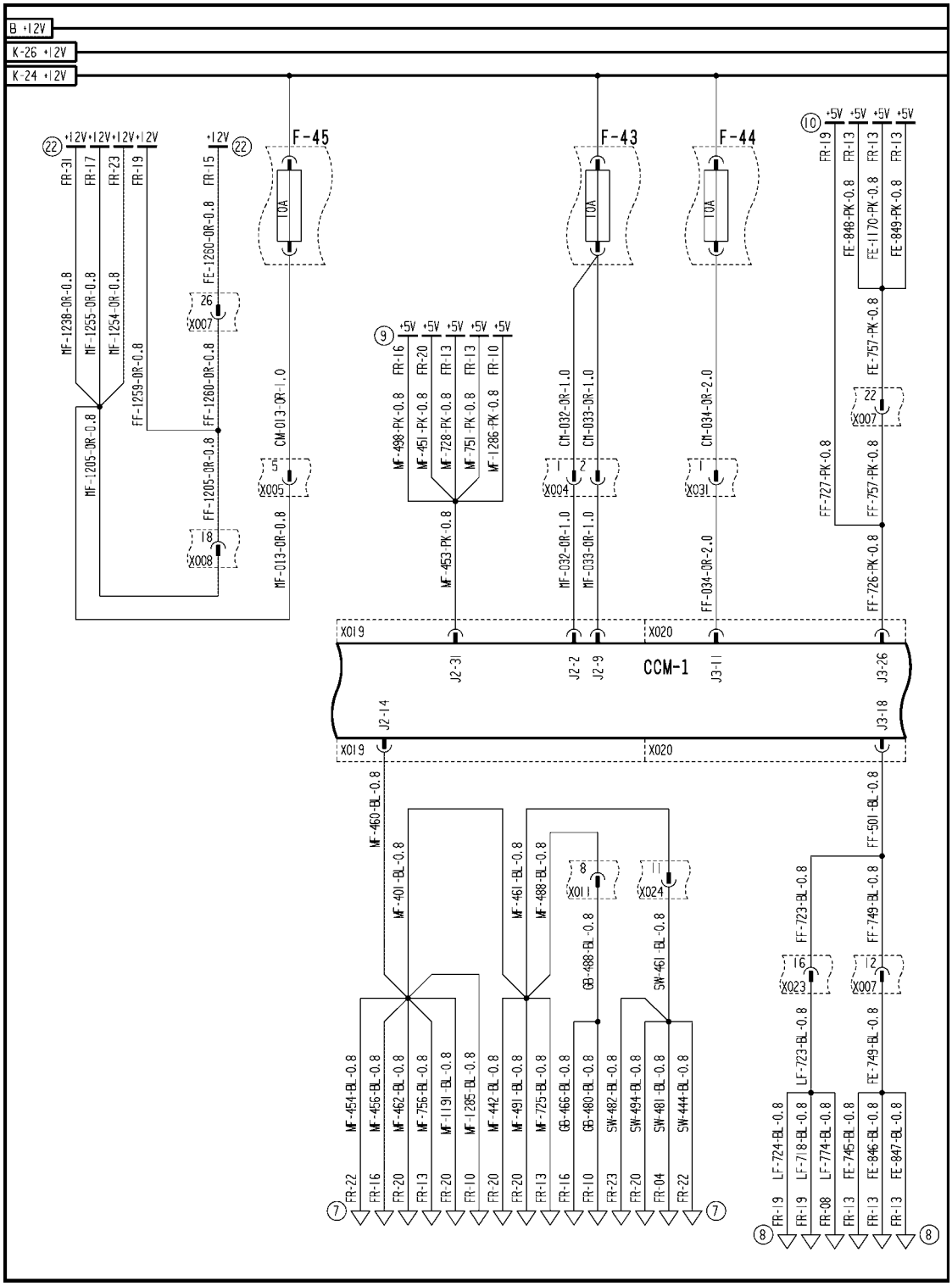
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53)

AFX8010

E0037-04 - CCM1 J2 5V Reference

Cause:
The CCM1 J2 **5 volts** reference circuit is shorted to ground.

Possible failure modes:

1. Circuit wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 J2 5V REF" to check the voltage range.

   The proper voltage range is **4.5 - 5.5 volts**

   A. If the voltage reading is low (less than **4.5 volts**) continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **4**.
2. Disconnect the concave (CC) harness from the main frame (MF) harness at connector **X456**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the concave (CC) harness, concave position sensor R-06, or sensor wiring. Inspect the concave (CC) harness for shorts, and replace the concave position sensor if necessary.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the lateral inclination sensor connector **X170**.

   A. If the voltage increases to **4.5 - 5.5 volts** the short is in the lateral inclination sensor B-02, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the feeder angle sensor connector **X174**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the feeder angle sensor R-03, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **5**.
5. Disconnect the header lift pressure sensor connector **X279**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the header lift pressure sensor B-29, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **6**.
6. Disconnect the PTO box lube pressure sensor connector **X399**.

   A. If the voltage increases to **4.5 - 5.5 volts** the short is in the PTO box lube pressure sensor B-60, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, there is a short to ground in the main frame (MF) harness between connector **X456** pin 3, connector **X170** pin A (B-02), connector **X174** pin 3 (R-03), connector **X279** pin B (B-29), connector **X399** pin B (B-60) and connector **X019** pin J2-31 on one of the following wires:
   - wire 498 pink, connector **X456** pin 3 to MF harness splice
   - wire 451 pink, connector **X170** pin A to MF harness splice
   - wire 751 pink, connector **X174** pin 3 to MF harness splice

https://truckmanualshub.com/

- wire 728 pink, connector **X279** pin B to MF harness splice
- wire 1286 pink, connector **X399** pin B to MF harness splice
- wire 453 pink, MF harness splice to connector **X019** pin J2-31.

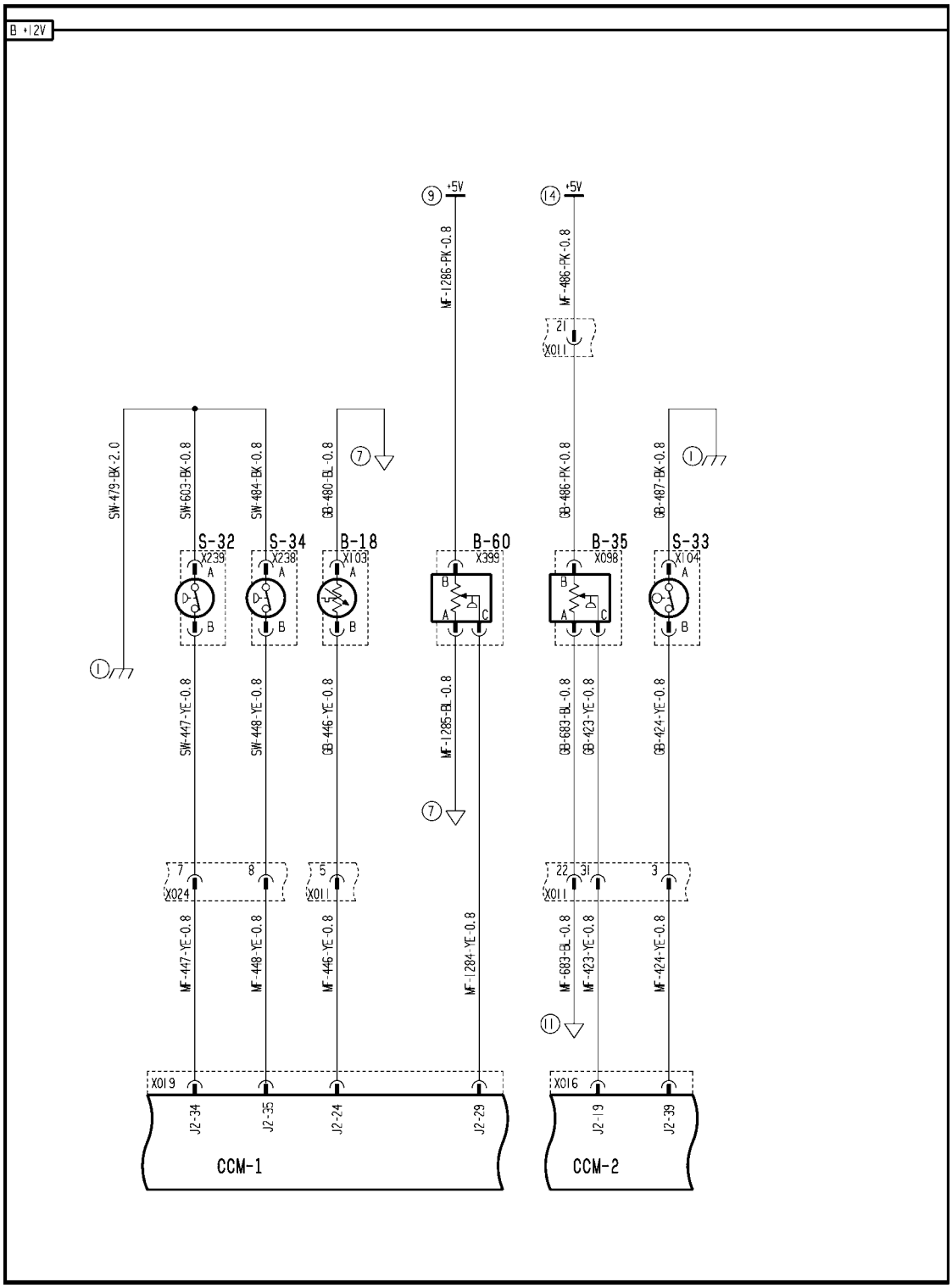
Locate the short and repair.

7. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



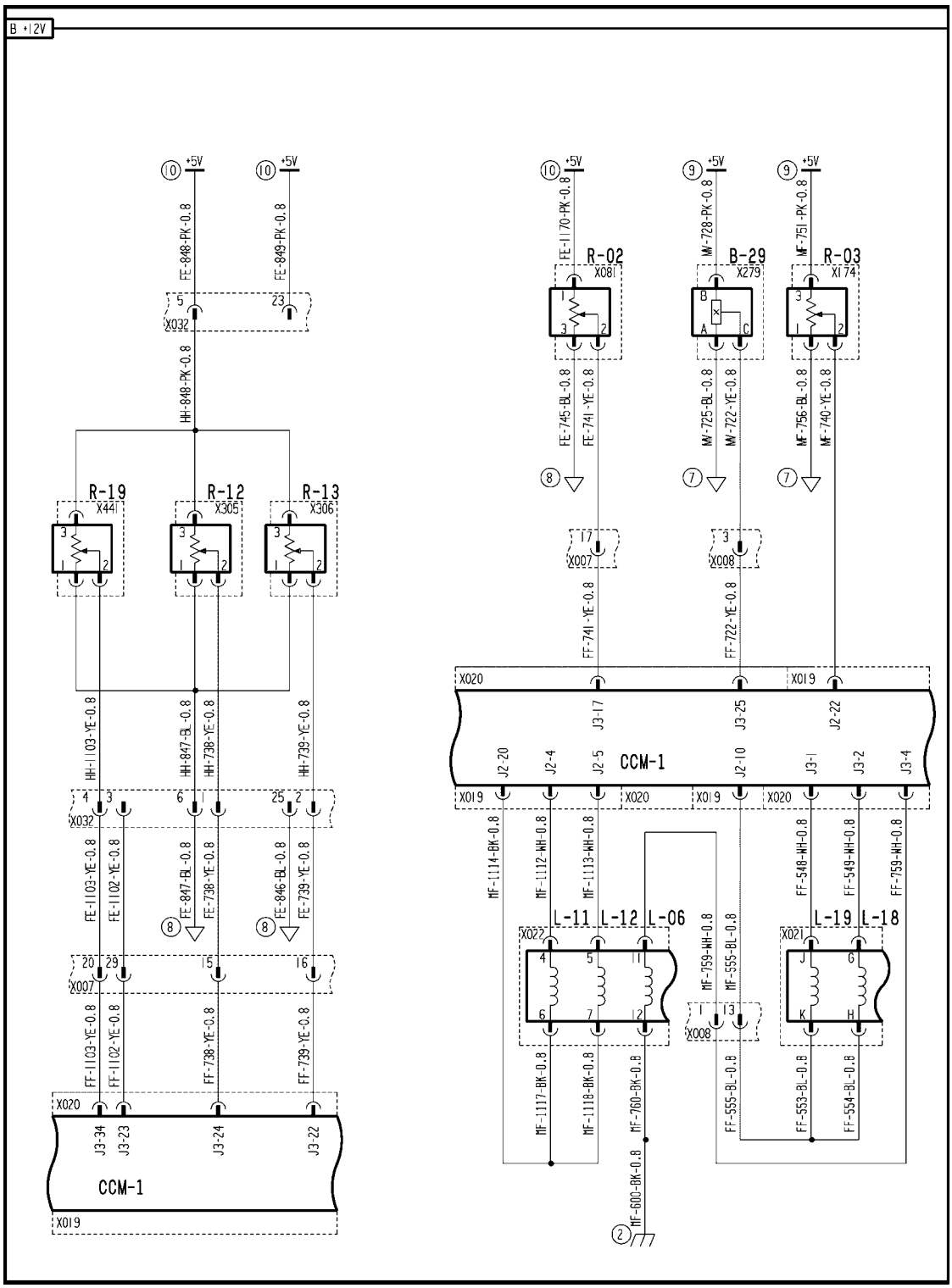
AFXSCHEM10-04 1

FRAME 10 - HYDRAULIC

https://truckmanualshub.com/

B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



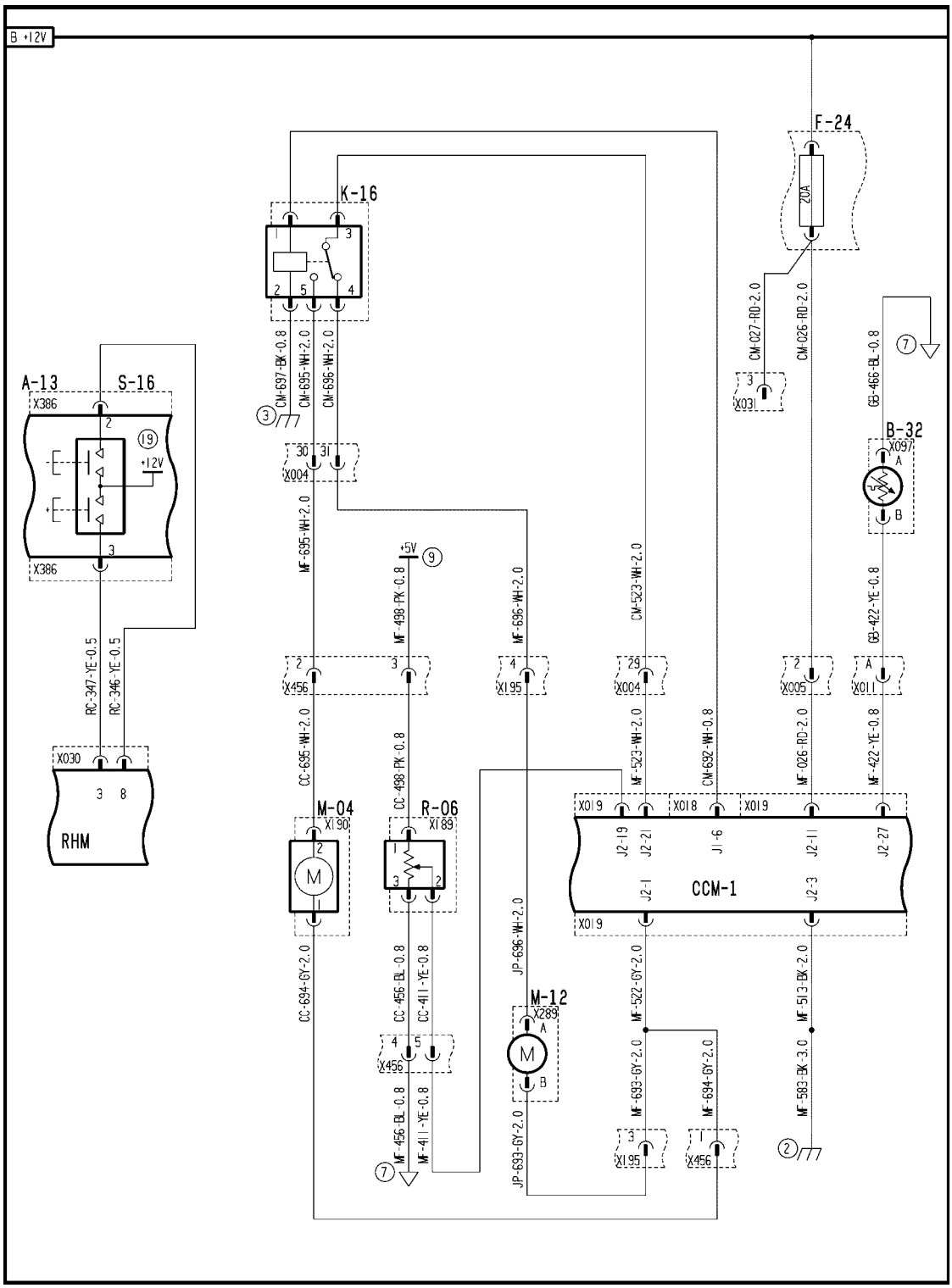
AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



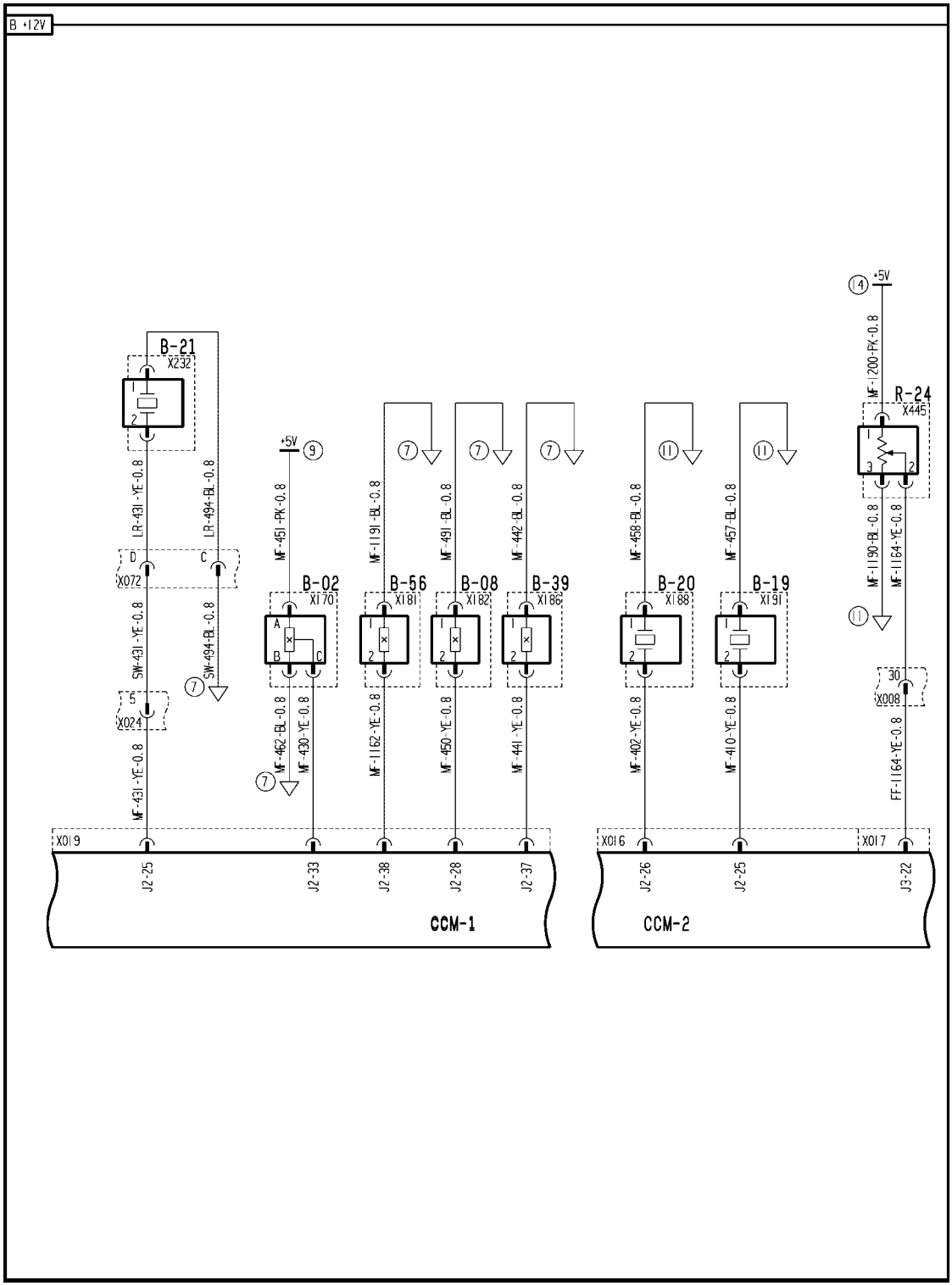
AFXSCHEM16-04 1

FRAME 16 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



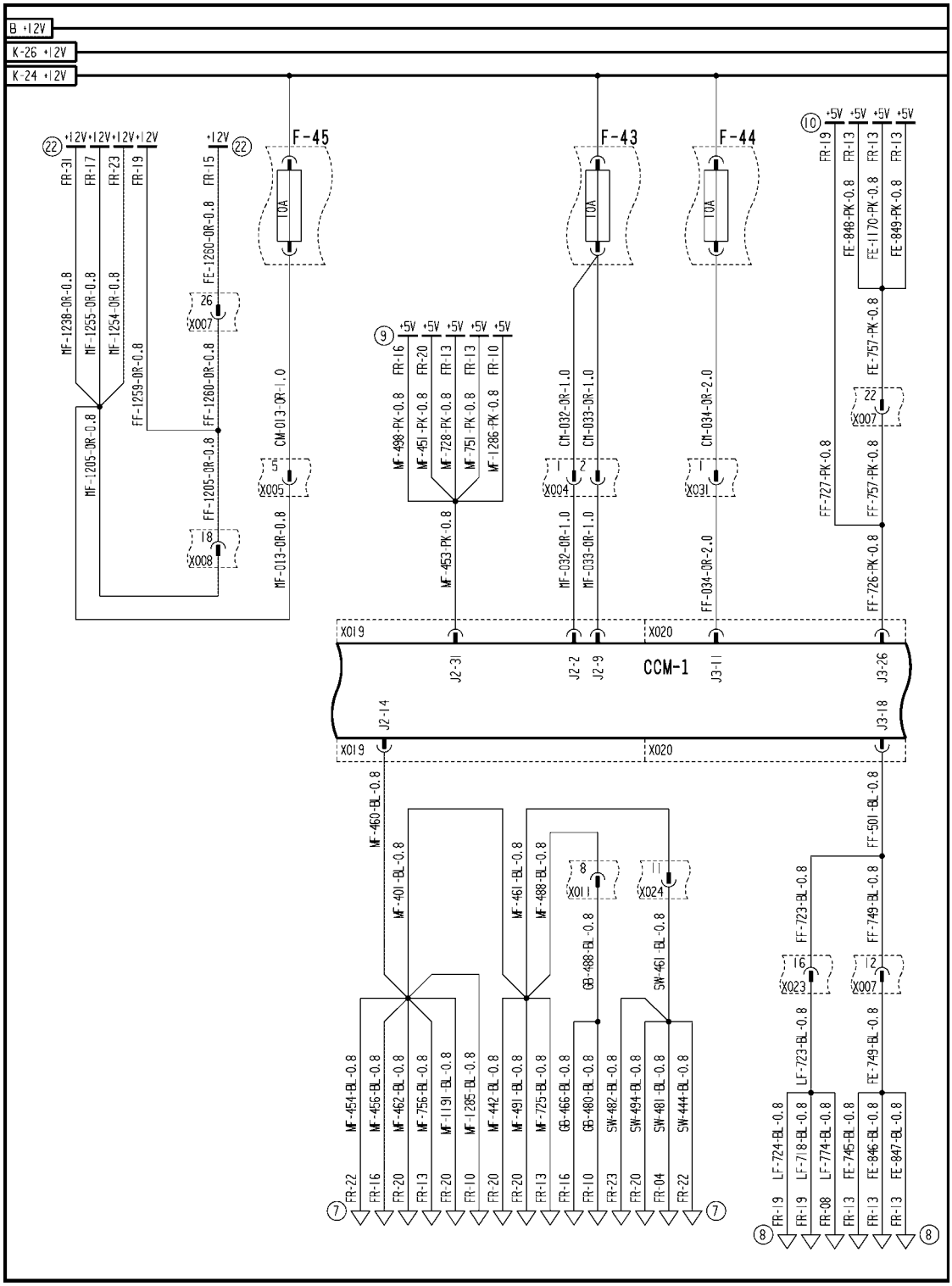
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54)

AFX8010

E0039-03 - CCM1 J3 5V Reference

Cause:
The CCM1 J3 **5 volts** reference circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Circuit wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 J3 5V REF" to check the voltage range.

   The proper voltage range is **4.5 - 5.5 volts**

   A. If the voltage reading is high out of range continue with Step **2**.

   B. If the voltage reading is within the proper limits, since the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.

2. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops back to the normal range, the short is in the lower frame (LF) harness between connector **X023** and the shoe leveling actuator (M-03) connector **X088**. Locate the short and repair.

   B. If the voltage remains high, continue with Step **3**.

3. Disconnect the feeder (FE) harness from the front frame (FF) harness at connector **X007**.

   A. If the voltage drops back to the normal range, the short is in the feeder (FE) harness between connector **X007** and the header tilt potentiometer (R02) connector **X081**. Locate the short and repair.

   B. If the voltage remains high, the short circuit is in the front frame (FF) harness between connectors **X023**, **X007** and connector **X020** J3-26 wires 726 pink, 727 pink or 757 pink. Locate the short and repair.

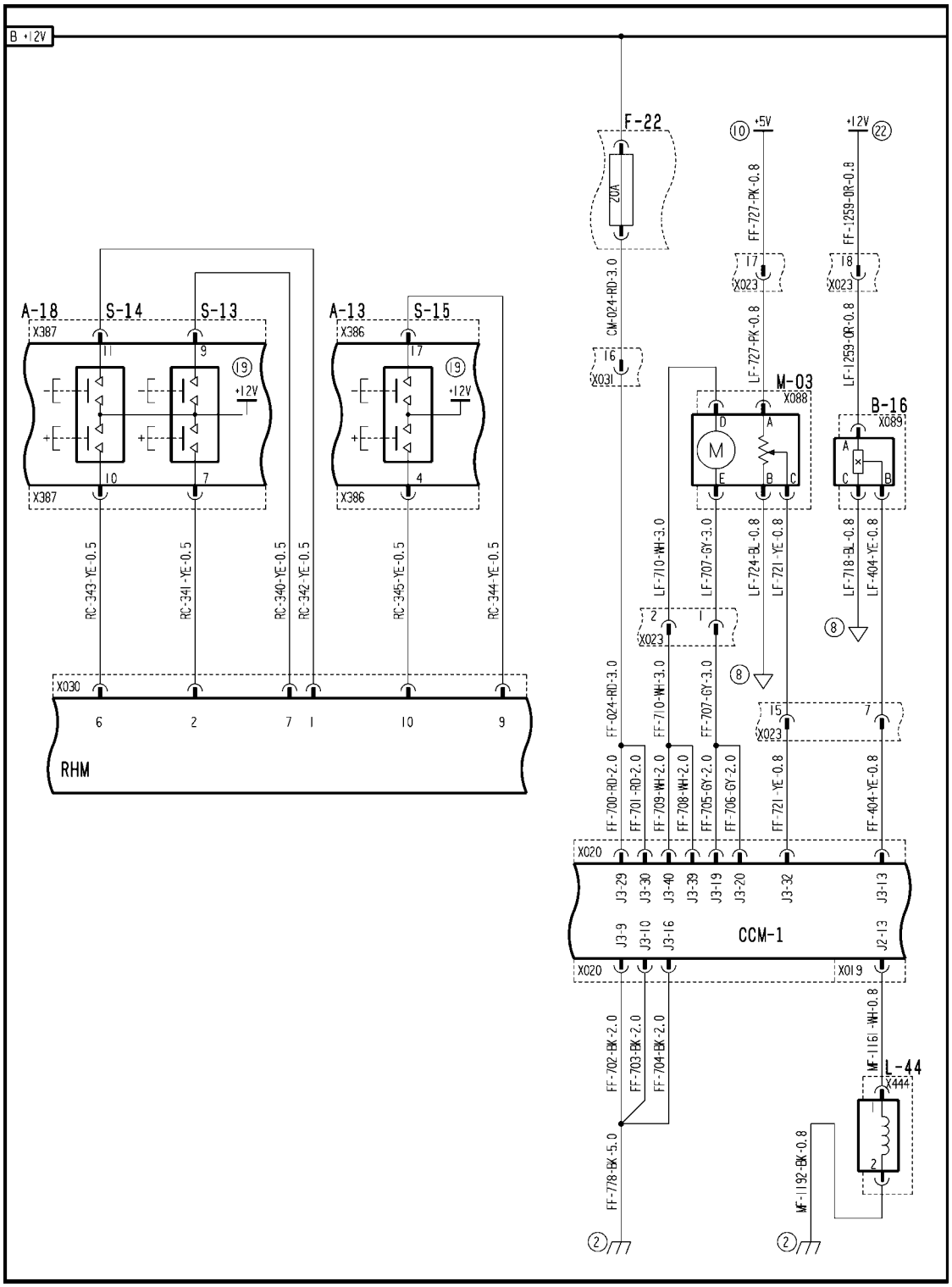
4. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



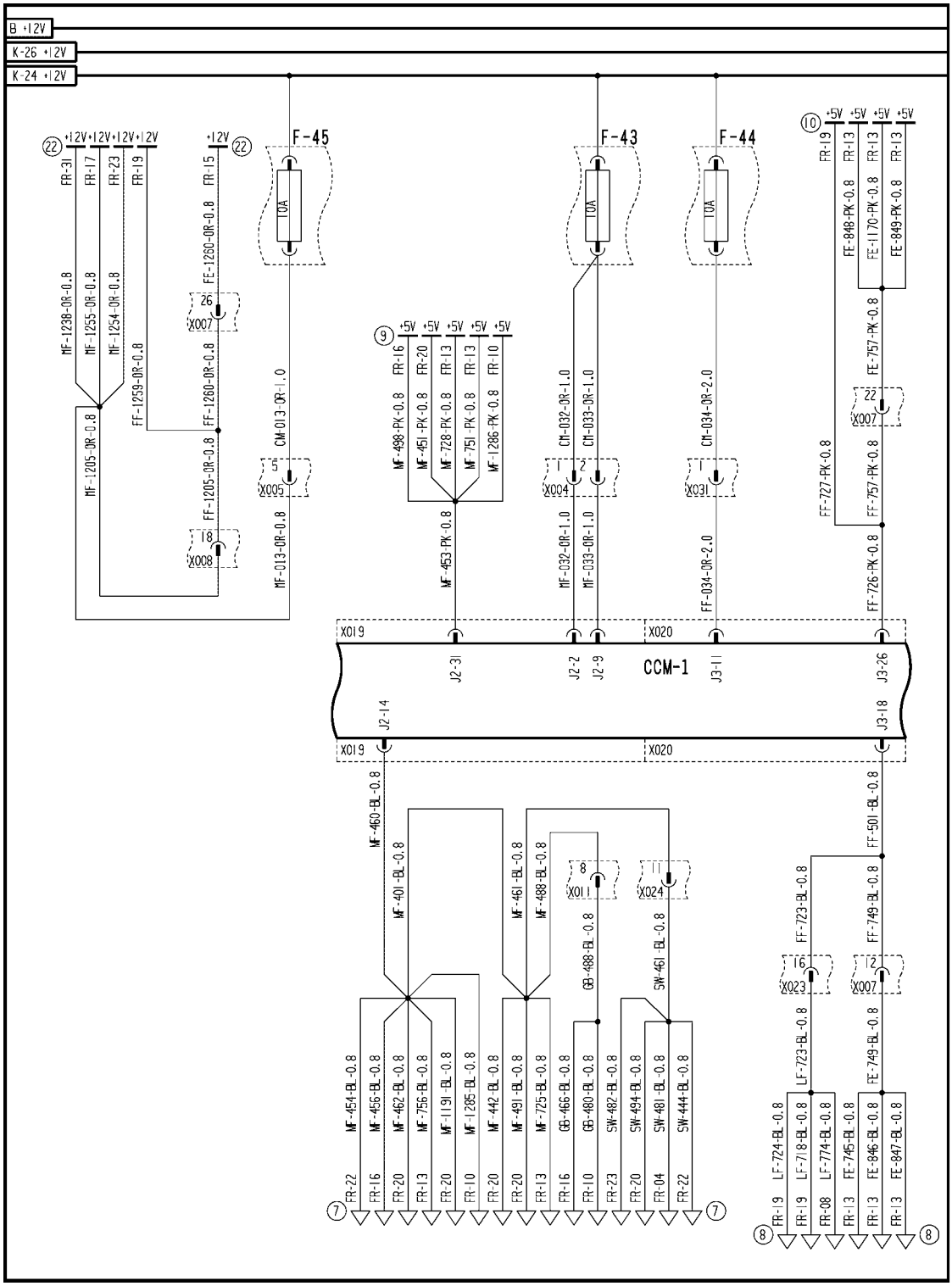
AFXSCHEM19-04 1

FRAME 19 - CLEANING

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53)

AFX8010

E0039-04 - CCM1 J3 5V Reference

Cause:
The CCM1 J3 **5 volts** reference circuit is shorted to ground.

Possible failure modes:

1. Circuit wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 J3 5V REF" to check the voltage range.

   The proper voltage range is **4.5 - 5.5 volts**

   A. If the voltage reading is low (less than **4.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **4**.
2. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the lower frame (LF) harness between connector **X023** and the shoe leveling actuator (M-03) connector **X088**. Locate the short and repair.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the feeder (FE) harness from the front frame (FF) harness at connector **X007**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the feeder (FE) harness between connector **X007** and the header tilt potentiometer (R02) connector **X081**. Locate the short and repair.

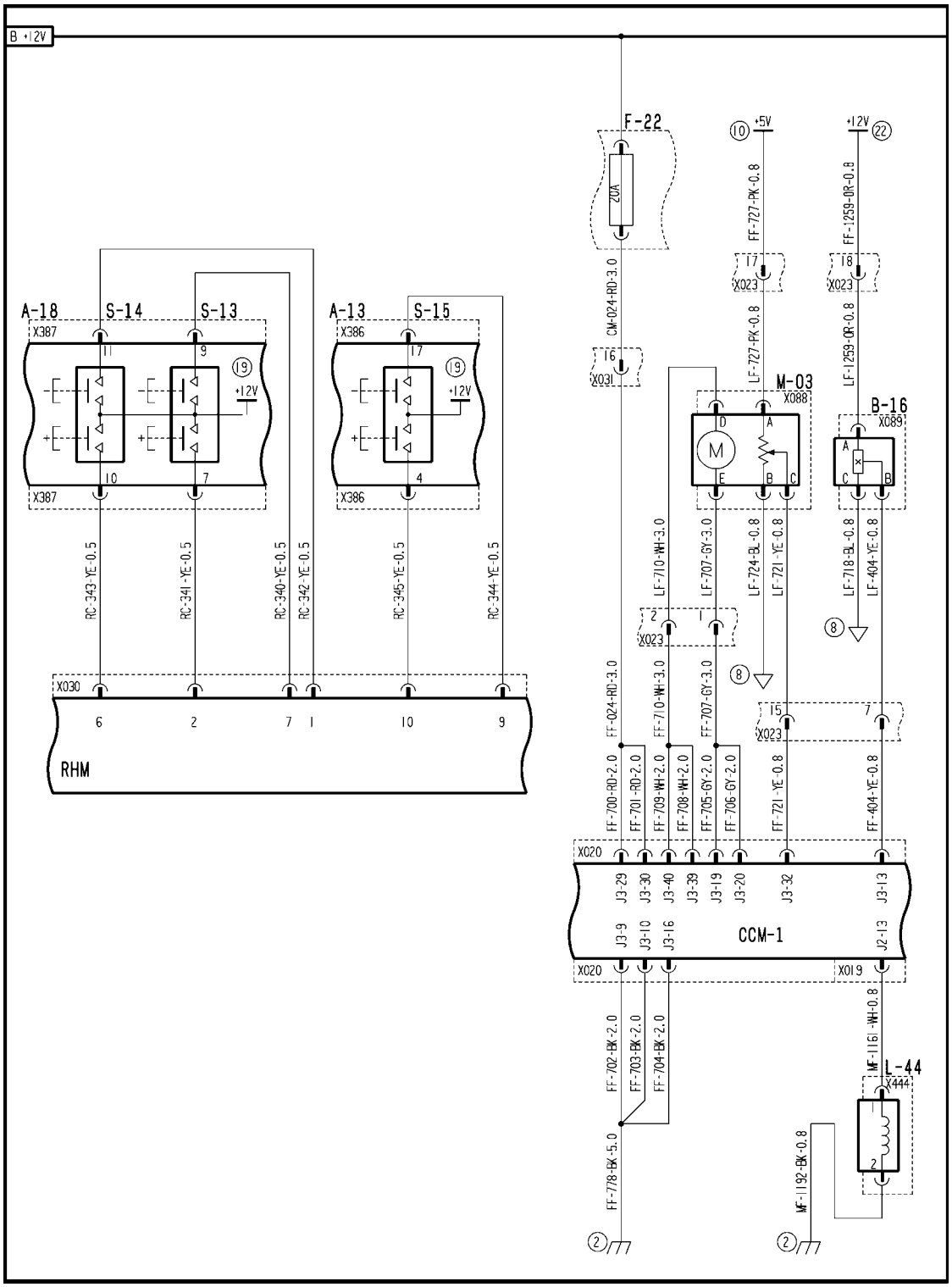
   B. If the voltage remains low, the short circuit is in the front frame (FF) harness between connectors **X023**, **X007** and connector **X020** J3-26 wires 726 pink, 727 pink or 757 pink. Locate the short and repair.
4. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



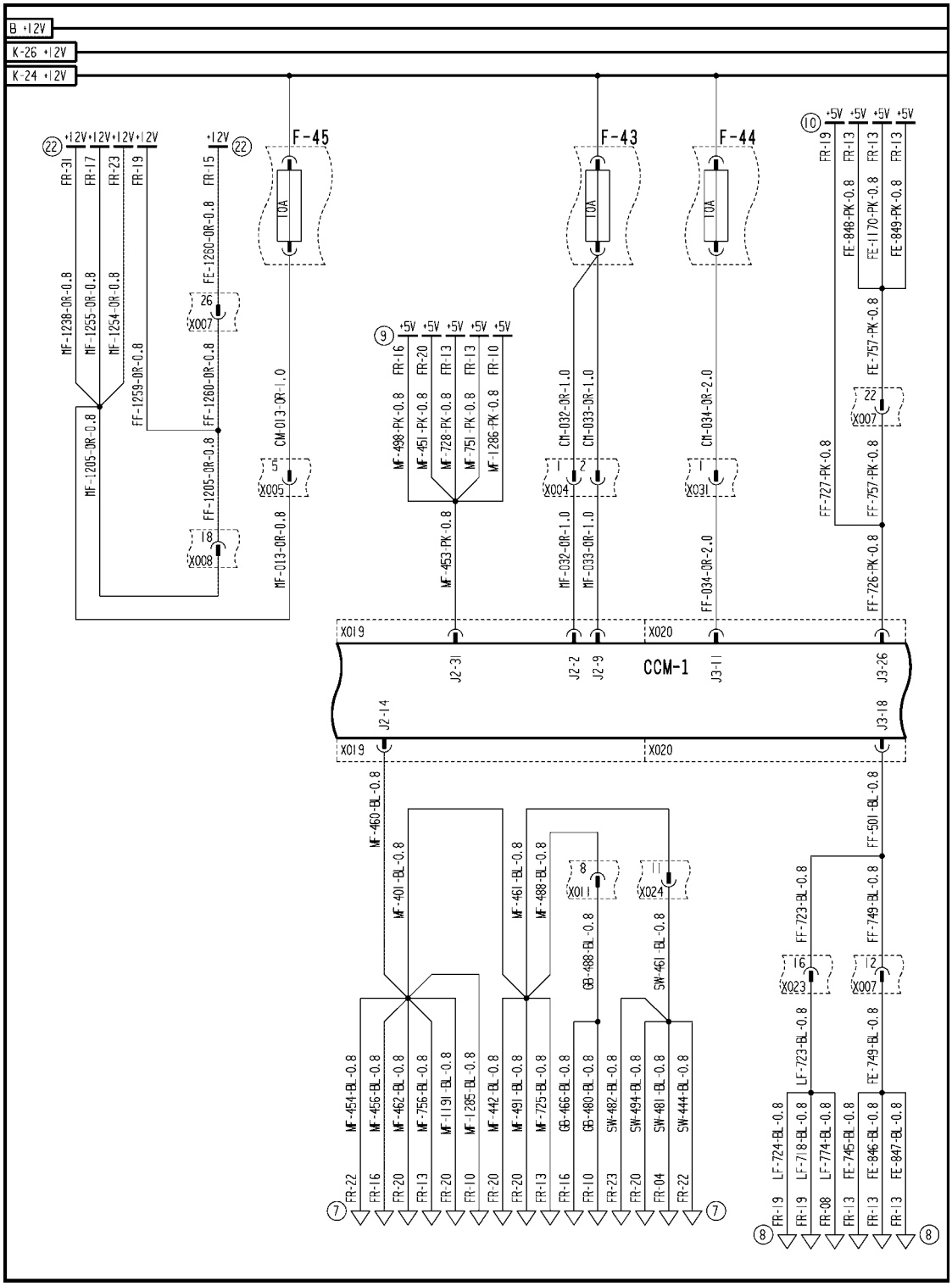
AFXSCHEM19-04 1

FRAME 19 - CLEANING

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54)

AFX8010

E0046-03 - CCM1 Battery Voltage

Cause:
The CCM1 battery power supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 BAT" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.

2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.

3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-39.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.

4. Remove the instructional seat and storage bin to gain access to the CCM1 connector **X018**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X018** pin J1-1.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the cab main (CM) harness:
   - wire 047 red, fuse F39 to CM harness splice
   - wire 049 red, CM harness splice to CCM3 connector **X012** pin J1-1
   - wire 050 red, CM harness splice to CCM2 connector **X015** pin J1-1
   - wire 052 red, CM harness splice to CCM1 connector **X018** pin J1-1
   - wire 057 red, CM harness splice to display adapter (AD) harness connector **X064** pin D
   - wire 051 red, CM harness splice through connector **X001** to RHM connector **X026** pin 13
   - wire 142 red, CM harness splice to DAM connector **X065** pin B

   Locate the source of high voltage and repair.

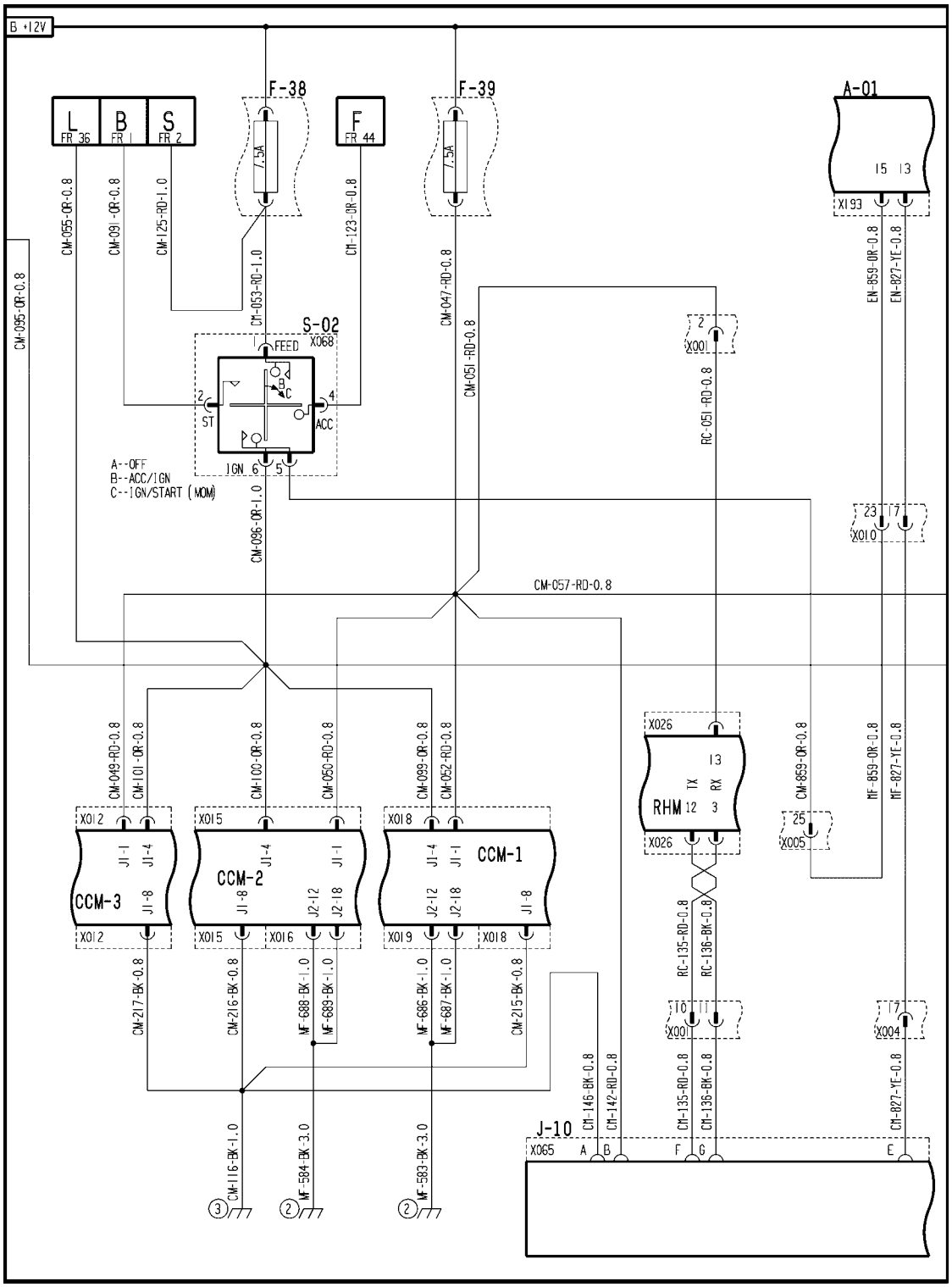
   B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM1.Reload the software for CCM1. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

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A. If no high out of range voltage readings are seen, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)



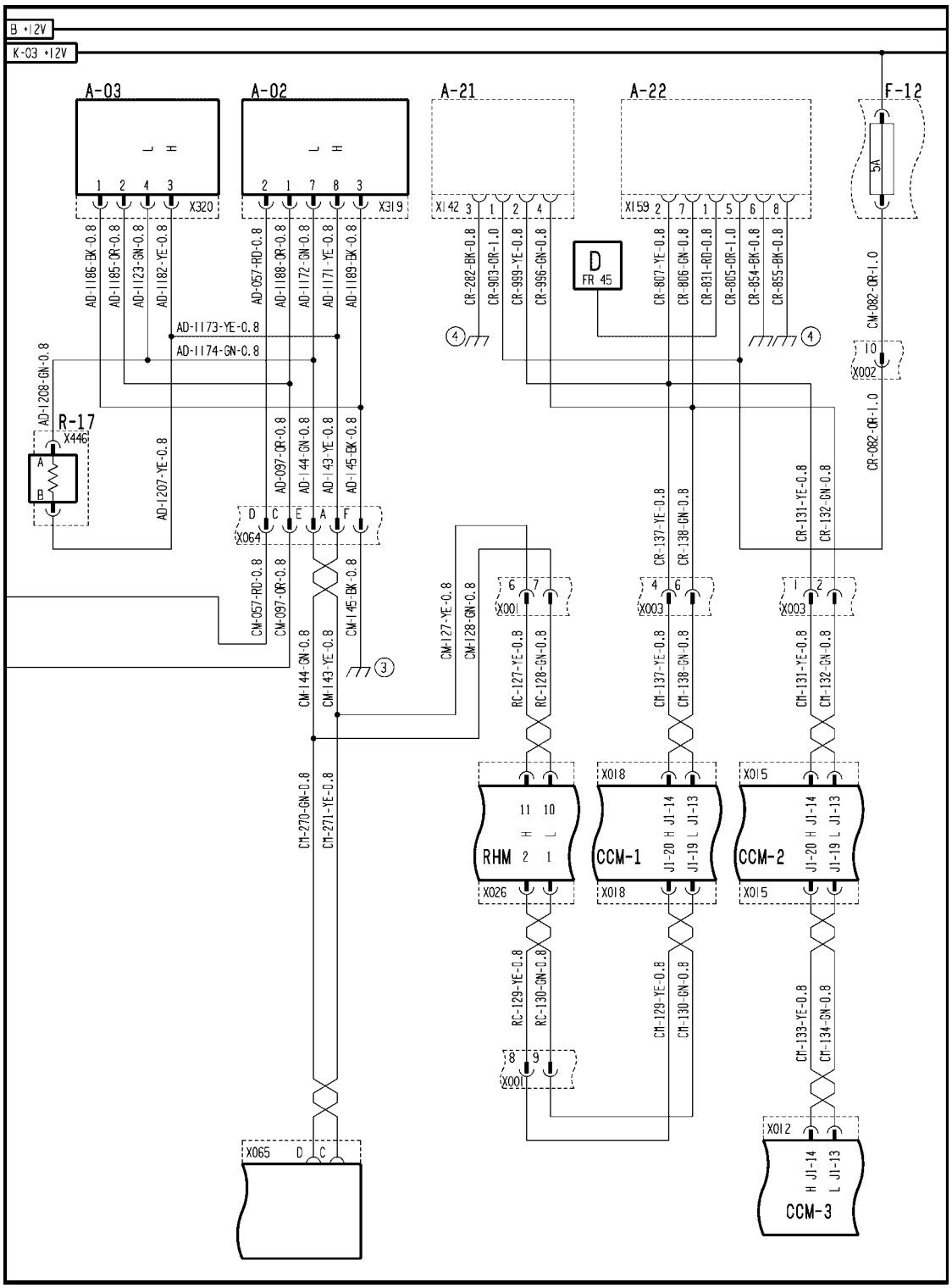
AFXSCHEM29A-04 1

FRAME 29 - DISTRIBUTION

https://truckmanualshub.com/

A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)



AFXSCHEM30-04 1

FRAME 30 - DISTRIBUTION

https://truckmanualshub.com/

A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

https://truckmanualshub.com/

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54)

AFX8010

E0167-03 - CCM2 J3 5V Reference

Context:
The CCM2 J3 5V Reference circuit supplies power from connector X017 pin J3-26 to the header type module R-20 in the header (HH) harness. A short to high voltage on this supply wire will result in this fault code being displayed.

Cause:
The CCM2 J3 5V Reference circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J3 5V REF" to check the voltage range.

   The proper voltage supply is **4.5 - 5.5 volts**.

   A. If the voltage reading is high out of range (>**5.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the header type module connector X435.

   A. If the voltage decreases to **4.5 - 5.5 volts**, the short is in the sensor. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the header (HH) harness from the feeder (FE) harness at connector **X032**.

   A. If the voltage decreases to **4.5 - 5.5 volts**, there is a short circuit in the header (HH) harness between connector X435 and connector **X032** wire 1223 pink. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the feeder (FE) harness from the front frame (FF) harness at connector **X007**.

   A. If the voltage decreases to **4.5 - 5.5 volts**, there is a short circuit in the feeder (FE) harness between connector **X007** and connector **X032** wire 1223 pink. Locate the short and repair.

   B. If the voltage remains high, continue with Step **3**.
5. Carefully disconnect connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for voltage at connector **X017** pin J3-26. There should be **4.5 - 5.5 volts**.

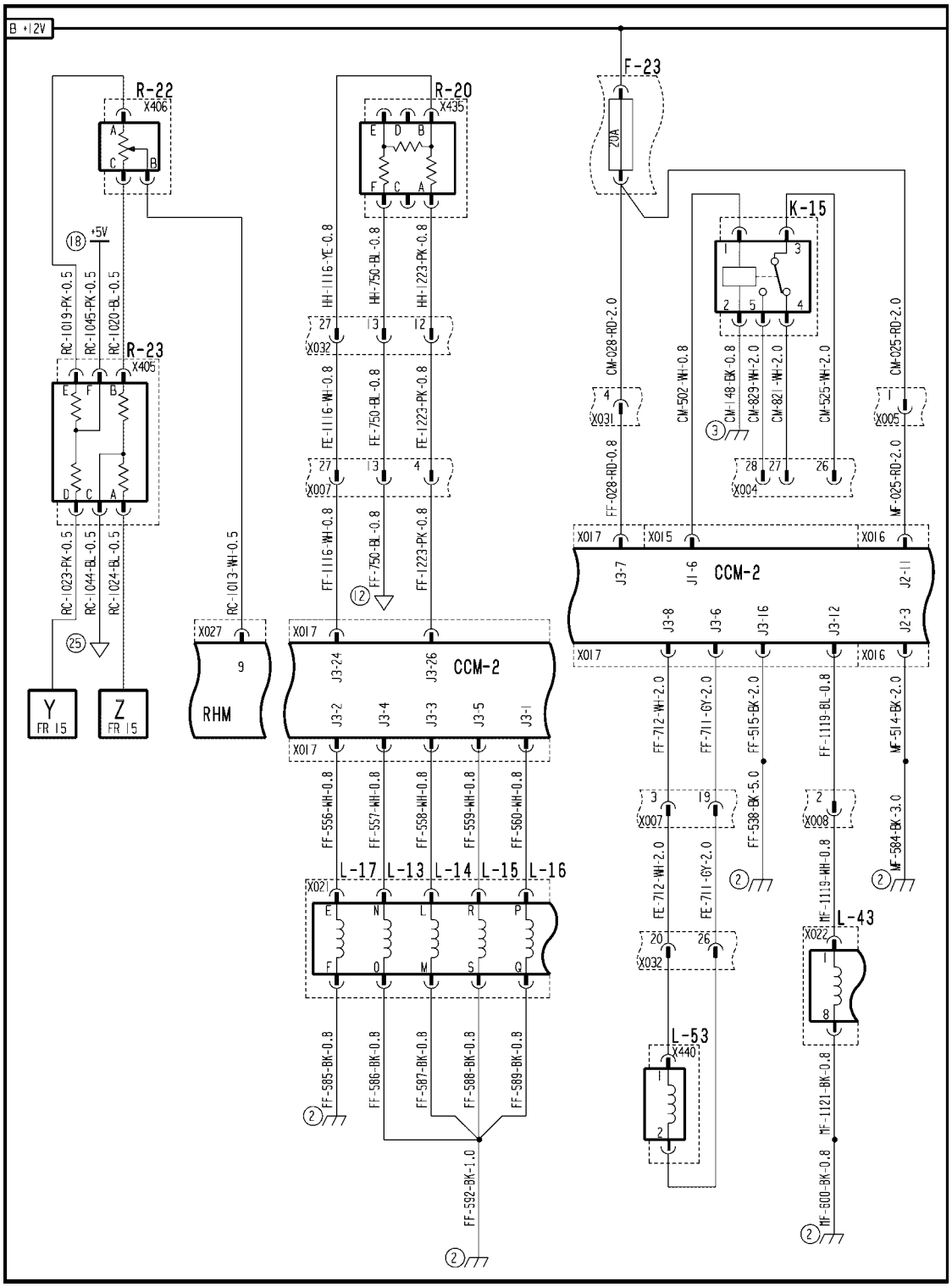
   A. If the voltage is within **4.5 - 5.5 volts**, there is a short in the front frame (FF) harness between connector **X017** and connector **X007** wire 1223 pink. Locate the short and repair.

   B. If the voltage is greater than **5.5 volts**, there is a problem with an internal component in the CCM2 module. Replace the module.
6. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



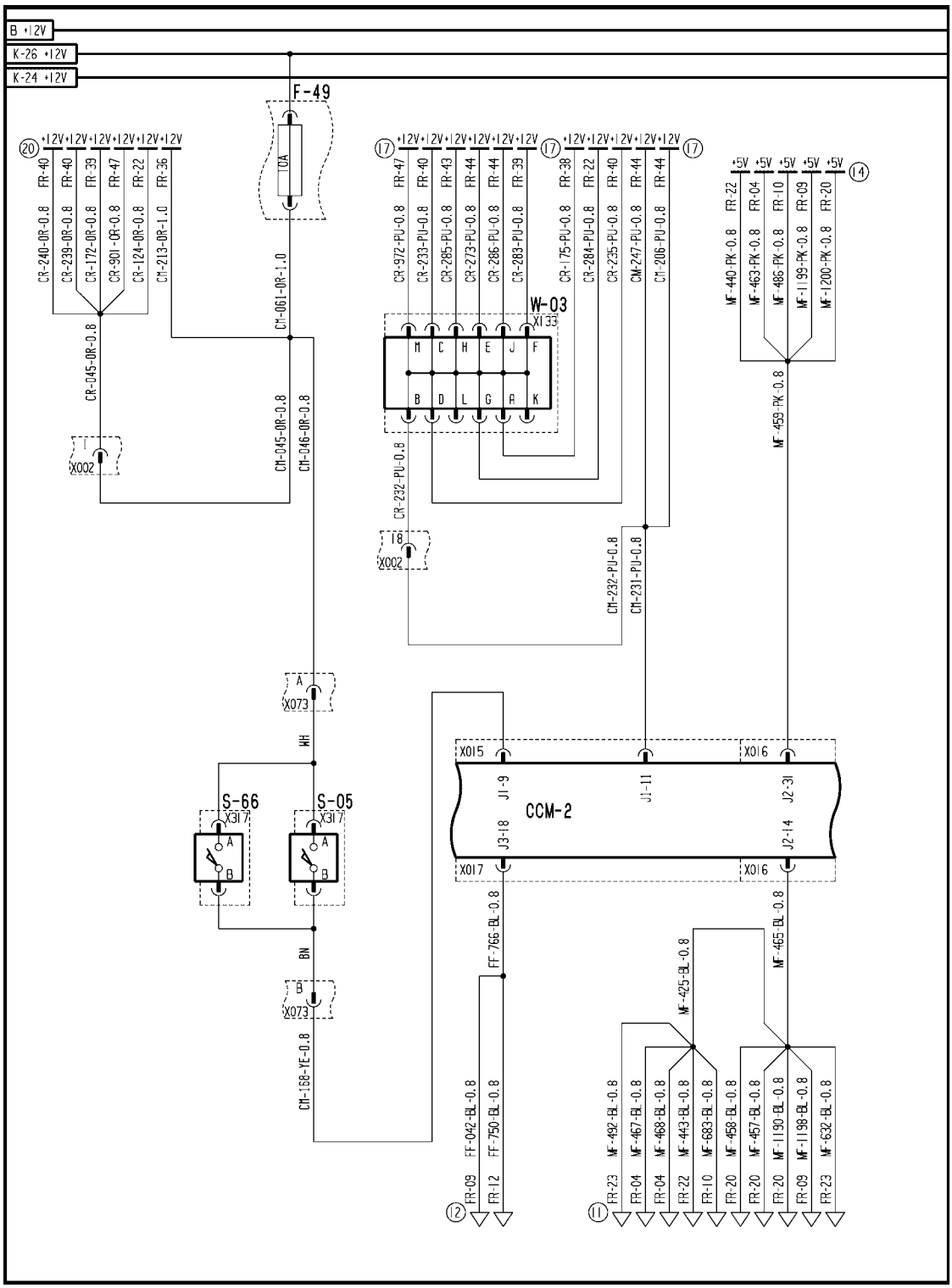
AFXSCHEM12-04 1

FRAME 12 - HEADER

https://truckmanualshub.com/

F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53)

AFX8010

E0167-04 - CCM2 J3 5V Reference

Context:
The CCM2 J3 5V Reference circuit supplies power from connector X017 pin J3-26 to the header type module R-20 in the header (HH) harness. A short to ground on this supply wire will result in this fault code being displayed.

Cause:
The CCM2 J3 5V Reference circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J3 5V REF" to check the voltage range.

   The proper voltage supply is **4.5 - 5.5 volts**.

   A. If the voltage reading is low out of range (<**4.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the header type module connector X435.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the sensor. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the header (HH) harness from the feeder (FE) harness at connector **X032**.

   A. If the voltage increases to **4.5 - 5.5 volts**, there is a short to ground in the header (HH) harness between connector X435 and connector **X032** wire 1223 pink. Locate the short and repair.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the feeder (FE) harness from the front frame (FF) harness at connector **X007**.

   A. If the voltage increases to **4.5 - 5.5 volts**, there is a short to ground in the feeder (FE) harness between connector **X007** and connector **X032** wire 1223 pink. Locate the short and repair.

   B. If the voltage remains low, continue with Step **3**.
5. Carefully disconnect connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for voltage at connector **X017** pin J3-26. There should be **4.5 - 5.5 volts**.

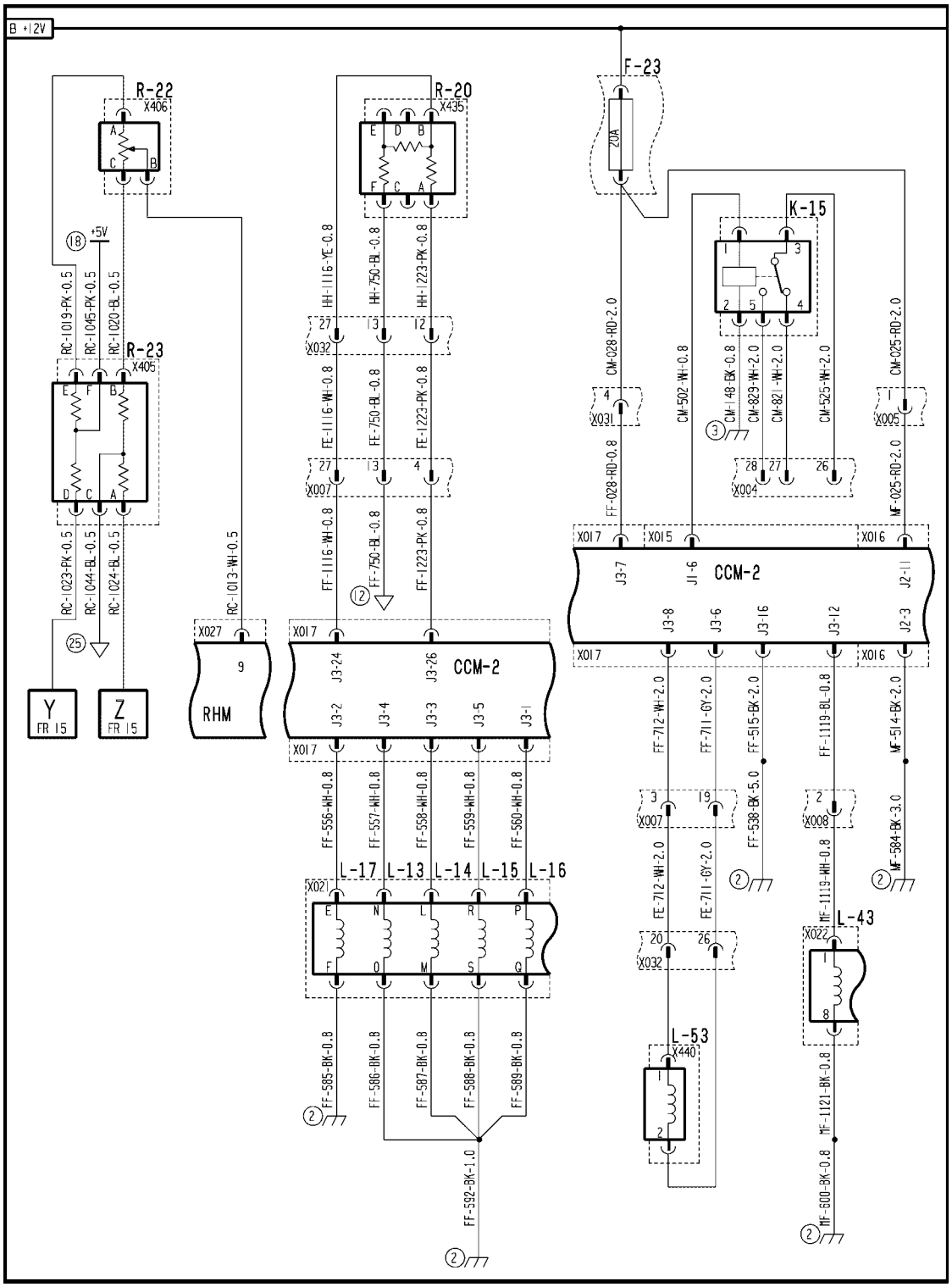
   A. If the voltage is within **4.5 - 5.5 volts**, there is a short to ground in the front frame (FF) harness between connector **X017** and connector **X007** wire 1223 pink. Locate the short and repair.

   B. If the voltage is less than **4.5 volts**, there is a problem with an internal component in the CCM2 module. Replace the module.
6. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



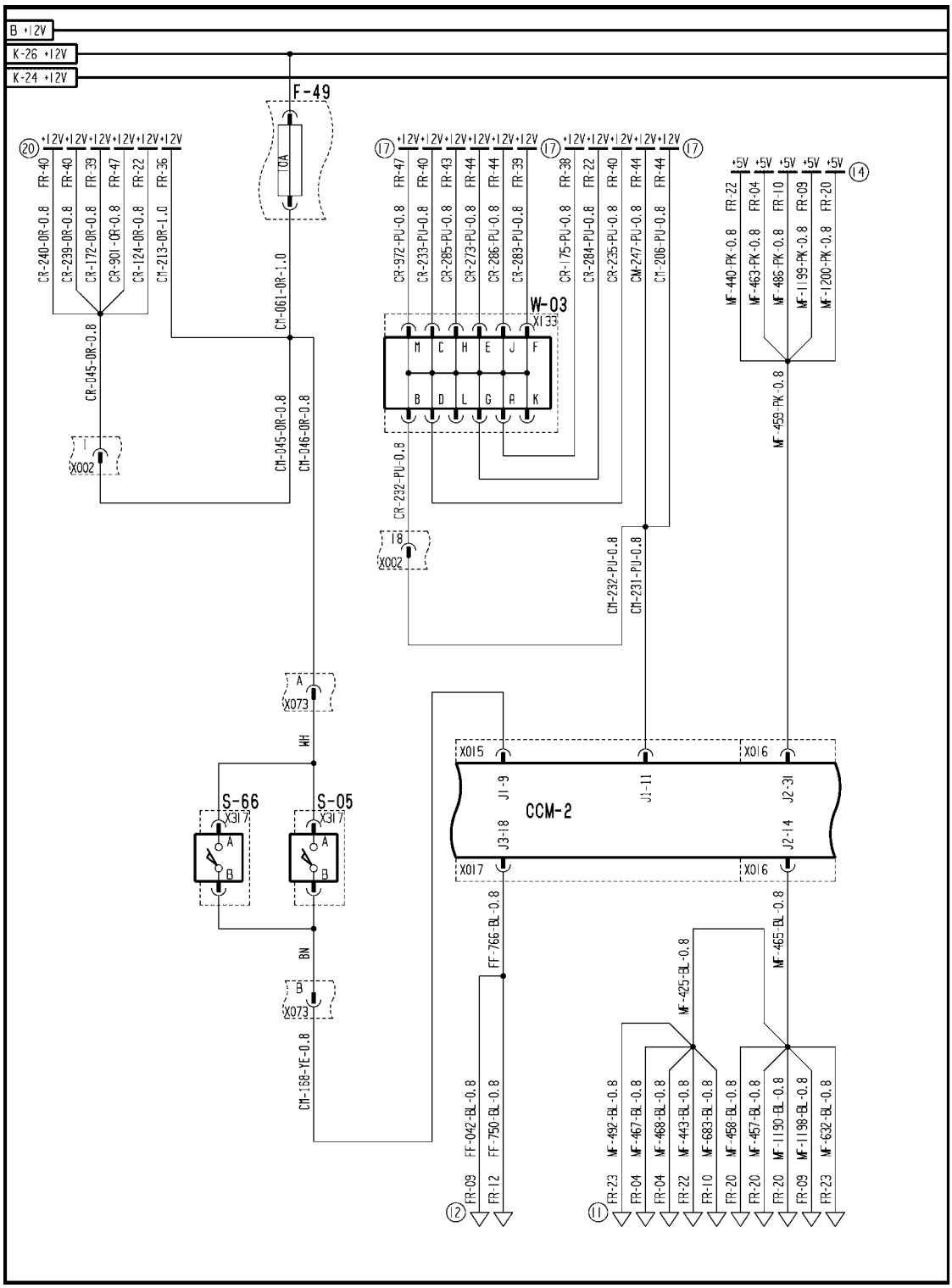
AFXSCHEM12-04 1

FRAME 12 - HEADER

https://truckmanualshub.com/

F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54)

AFX8010

E0165-03 - CCM2 J2 5V Reference

Context:
The CCM2 J2 5V Reference circuit supplies power from connector **X016** pin J2-31 through the main frame (MF) harness to several different sensors;
- the air filter switch S-61 and oil pressure sensor B-52 in the engine (EN) harness,
- the grain bin level switches S-28 & S-29 in the grain tank (GT) harness,
- the control pressure sensor B-35 in the gearbox (GB) harness,
- the tailings volume sensor R-24 and park brake pressure sensor B-53 in the main frame (MF) harness.

A short to high voltage on any of these supply wires will result in this fault code being displayed.

Cause:
The CCM2 J2 5V Reference circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J2 5V REF" to check the voltage range.

   The proper voltage supply is **4.5 - 5.5 volts**.

   A. If the voltage reading is high out of range (>**5.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the grain tank (GT) harness from the main frame (MF) harness at connector **X009**.

   A. If the voltage decreases to **4.5 - 5.5 volts**, the short is in the grain tank (GT) harness between connector **X009** pin G and connector **X107** pin A wire 440 pink. Locate the short and repair.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**.

   A. If the voltage decreases to **4.5 - 5.5 volts**, the short is in the gearbox (GB) harness between connector **X011** pin 21 and connector **X098** pin B wire 486 pink. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**.

   A. If the voltage decreases to **4.5 - 5.5 volts**, the short is in the engine (EN) harness on one of the following wires:
   - wire 463 pink, connector **X010** pin 13 to engine harness splice
   - wire 469 pink, engine harness splice to connector **X330** pin B (air filter resistor R15)
   - wire 490 pink, engine harness splice to connector **X197** pin 5
   - wire orange, connector **X197** pin 5 to oil pressure sensor connector **X337** pin B

   Locate the short and repair.

   B. If the voltage remains high, continue with Step **5**.

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5. Carefully disconnect connector **X016** from the bottom of the CCM2 module. Use a multimeter to check for voltage at connector **X016** pin J2-31. There should be **4.5 - 5.5 volts**.

   A. If the voltage is within **4.5 - 5.5 volts**, the short is in the main frame (MF) harness on one of the following wires:
   - wire 459 pink, **X016** pin J2-31 to MF harness splice
   - wire 440 pink, MF harness splice to connector **X009** pin G
   - wire 463 pink, MF harness splice to connector **X010** pin 13
   - wire 486 pink, MF harness splice to connector **X011** pin 21
   - wire 1199 pink, MF harness splice to connector **X368** pin B
   - wire 1200 pink, MF harness splice to connector **X445** pin 1

   Carefully inspect the main frame harness between connector **X016** and the grain tank, engine and gearbox harnesses for any signs of chaffing, pinch marks, or other damage which could result in an internal short. Repair any damage found.

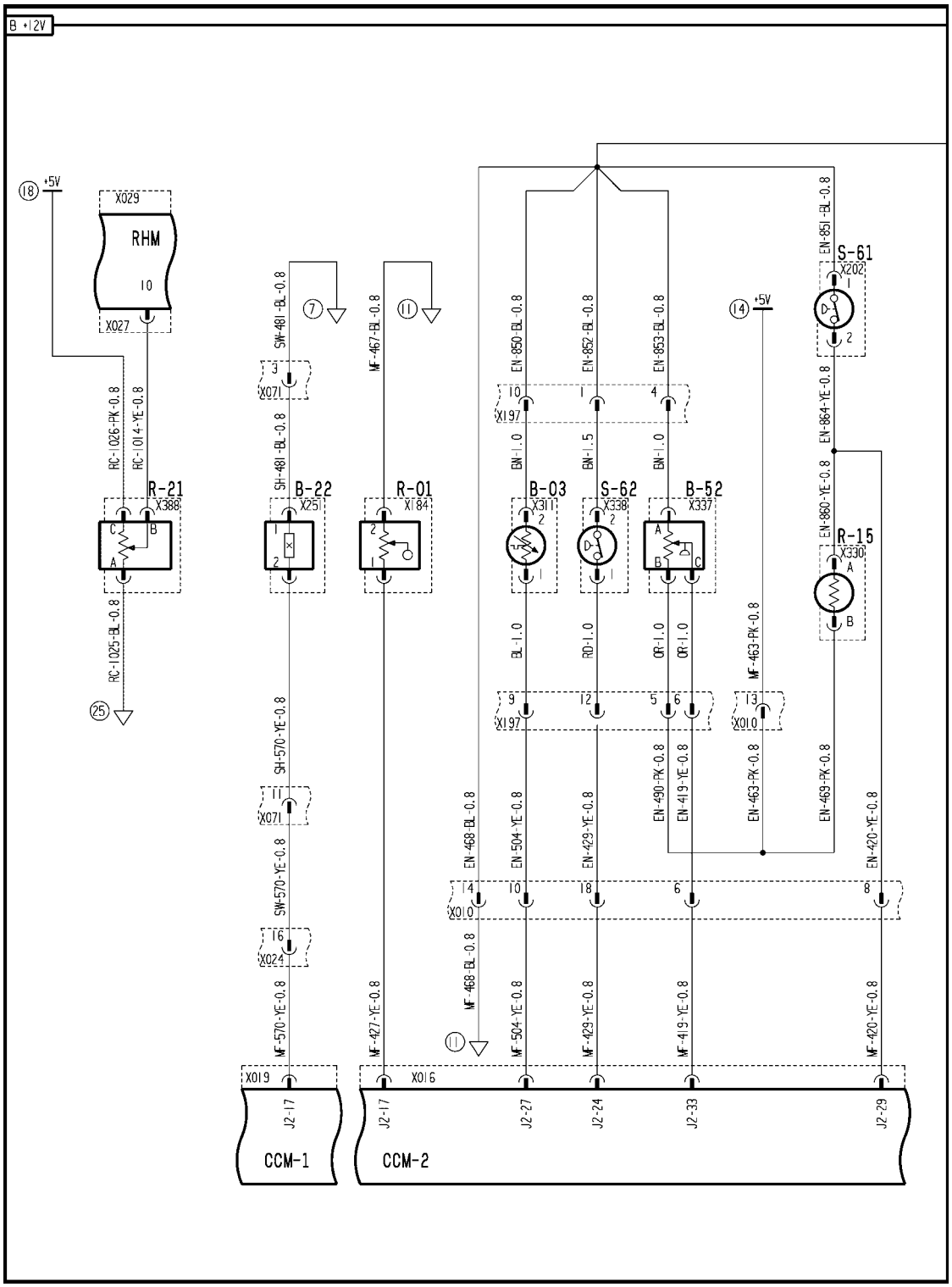
   B. If the voltage is greater than **5.5 volts**, there is a problem with an internal component in the CCM2 module. Replace the module.

6. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



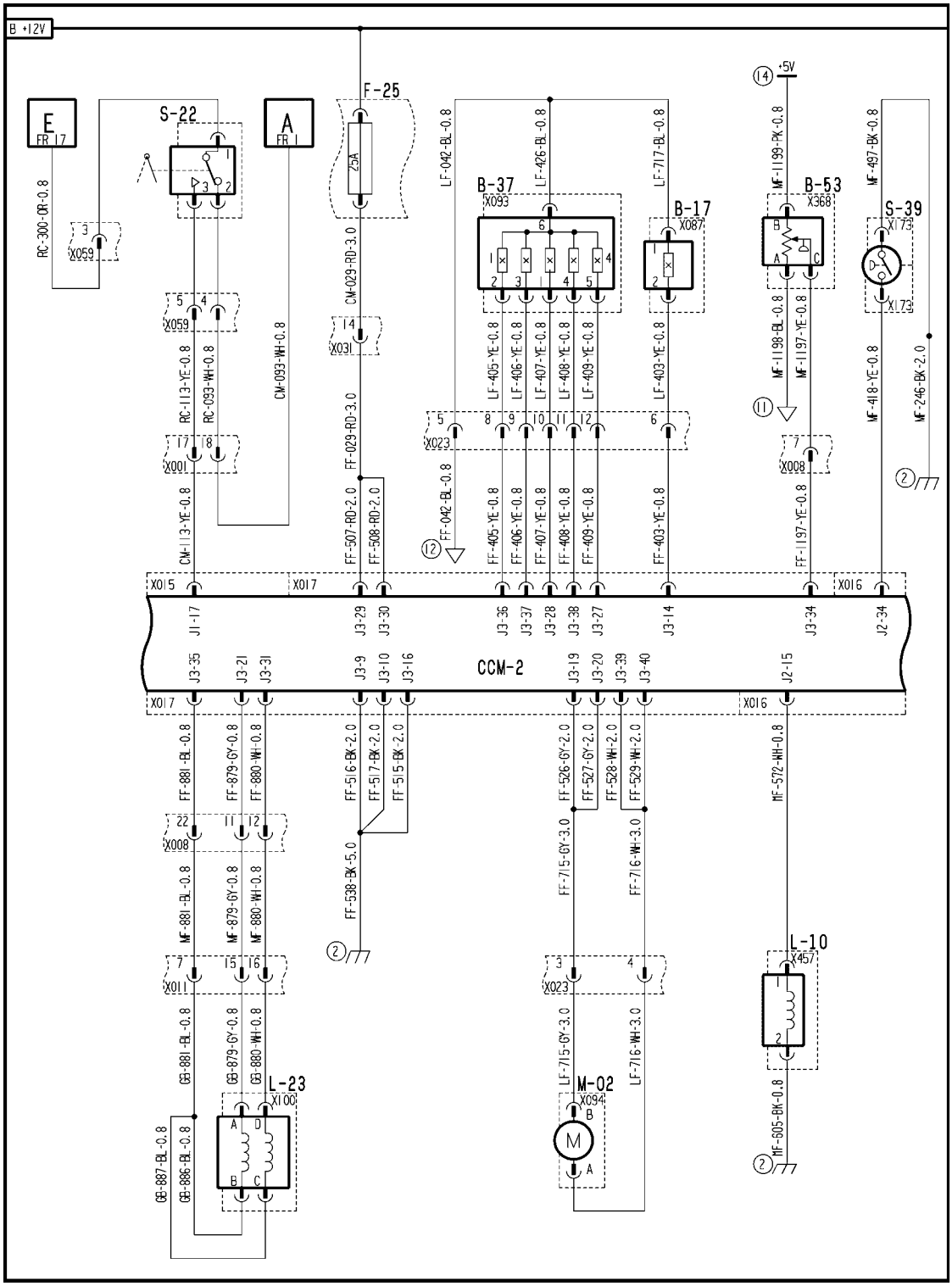
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



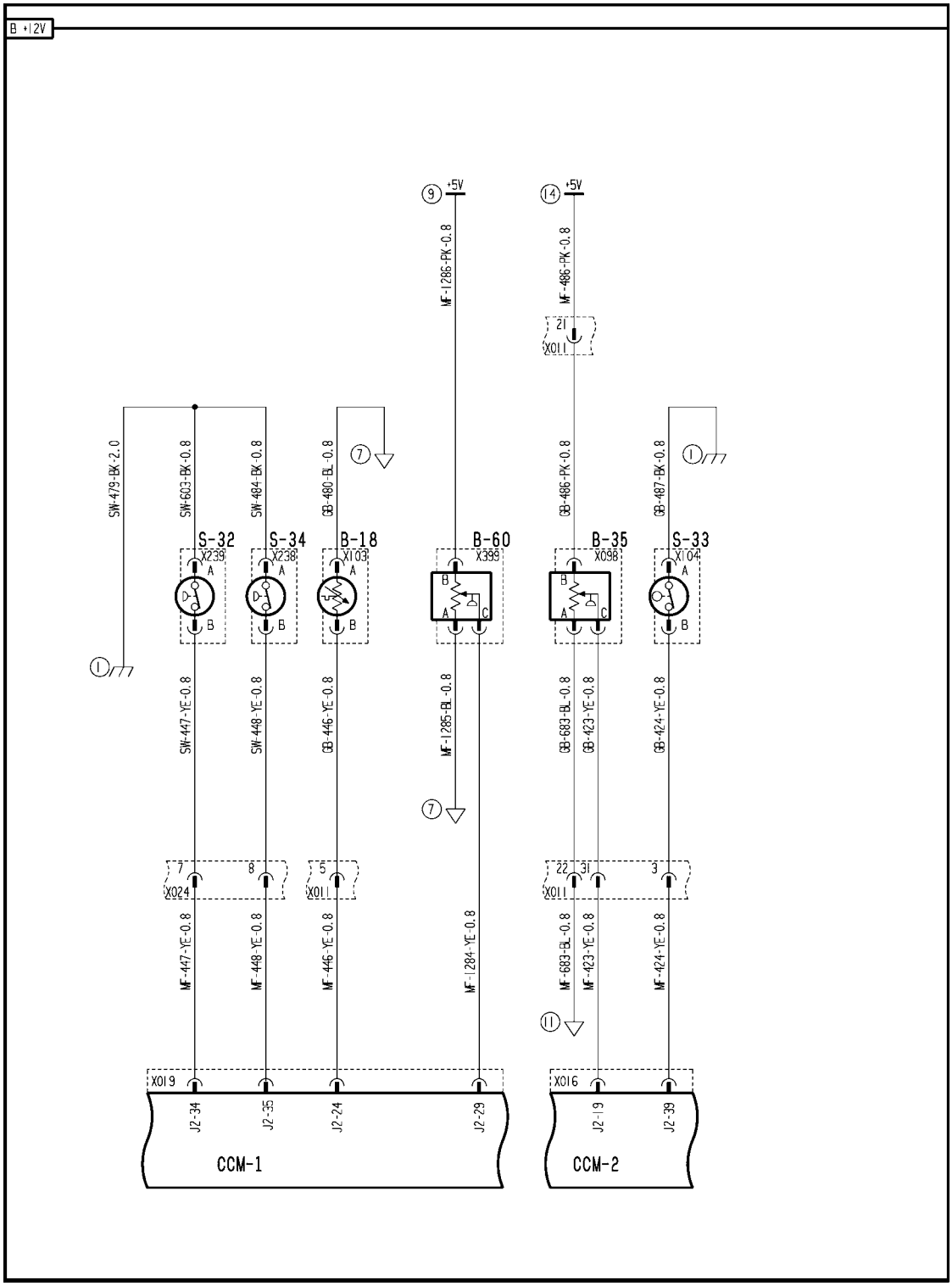
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



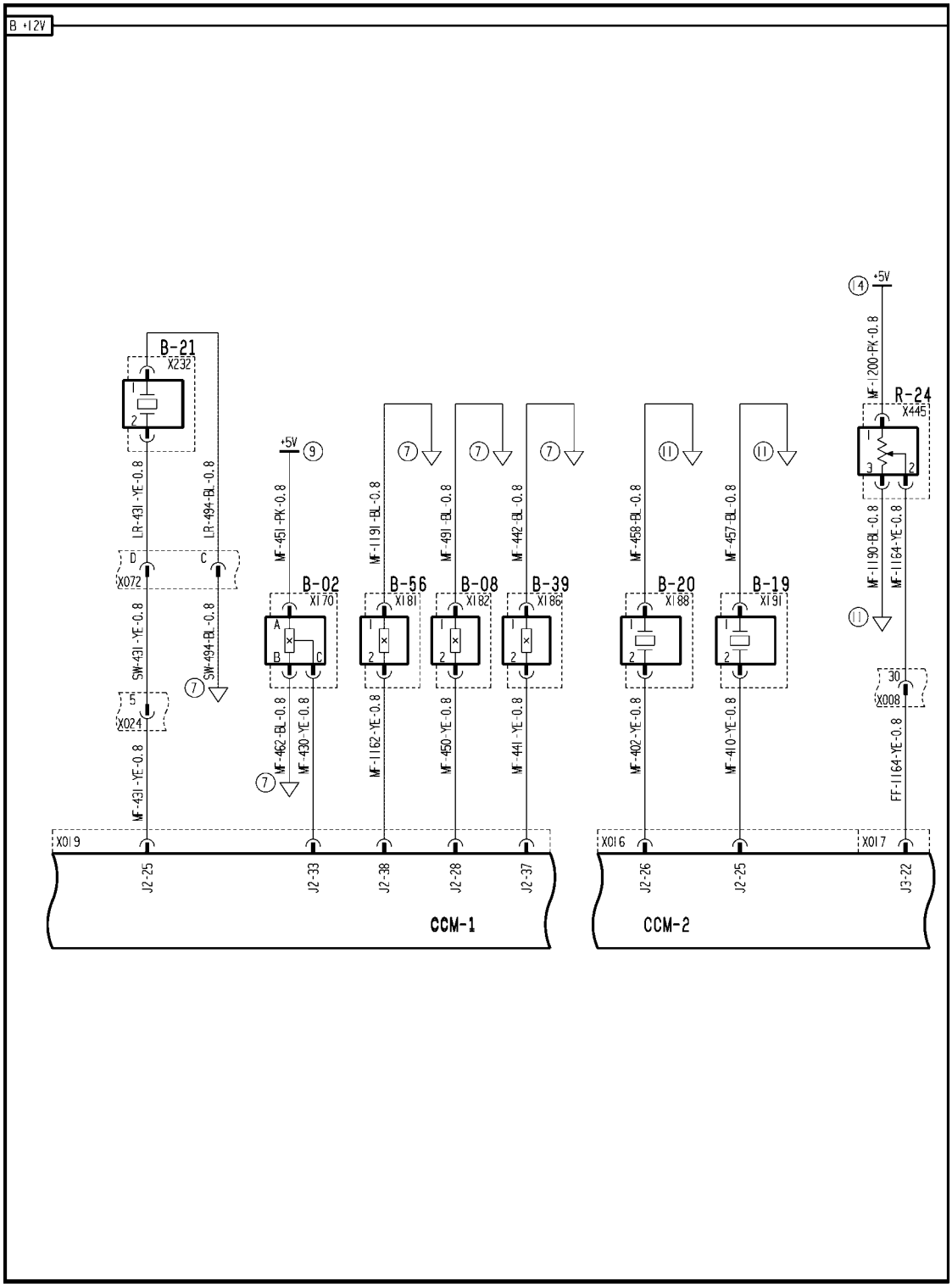
AFXSCHEM10-04 1

FRAME 10 - HYDRAULIC

https://truckmanualshub.com/

B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



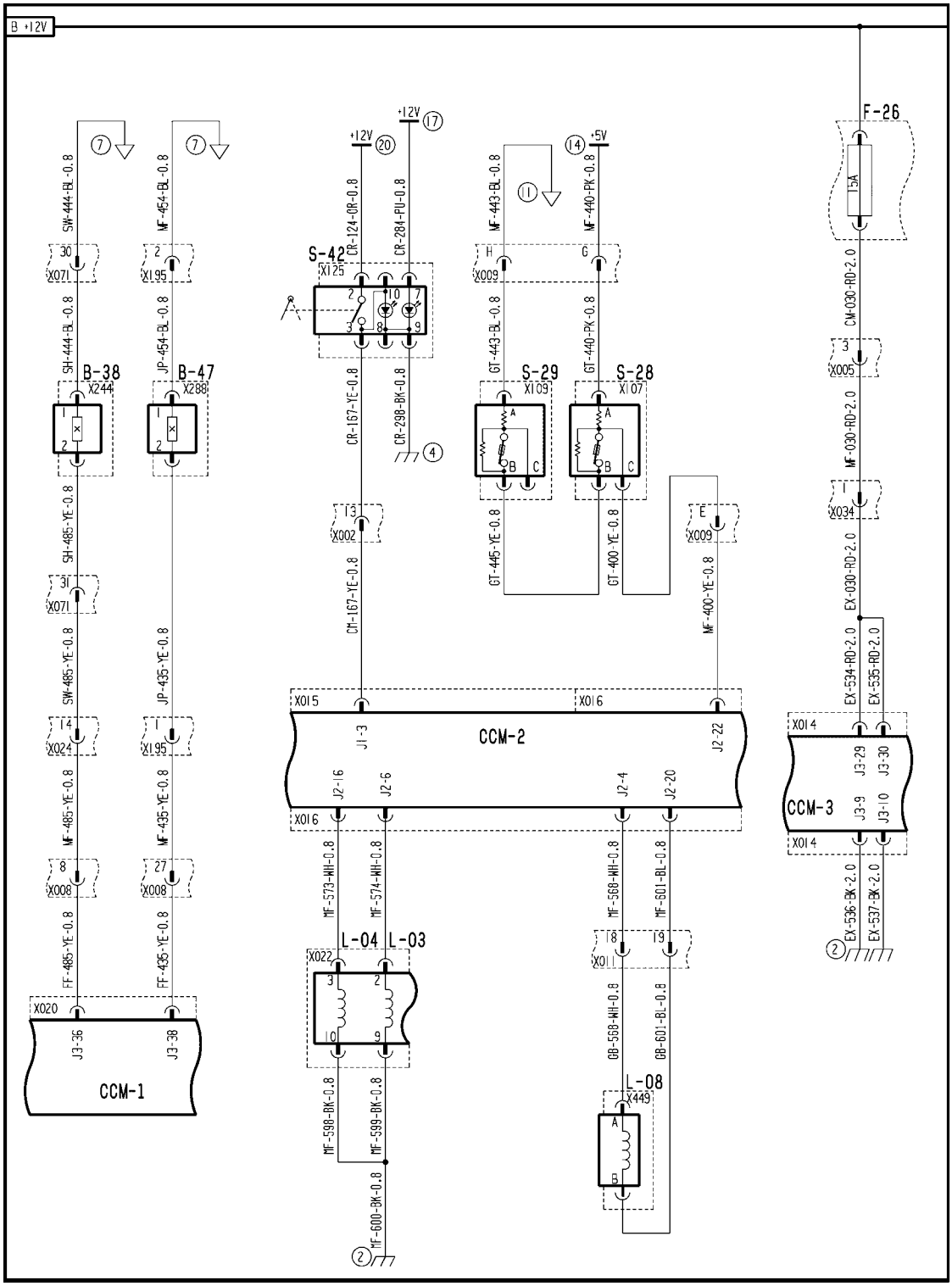
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



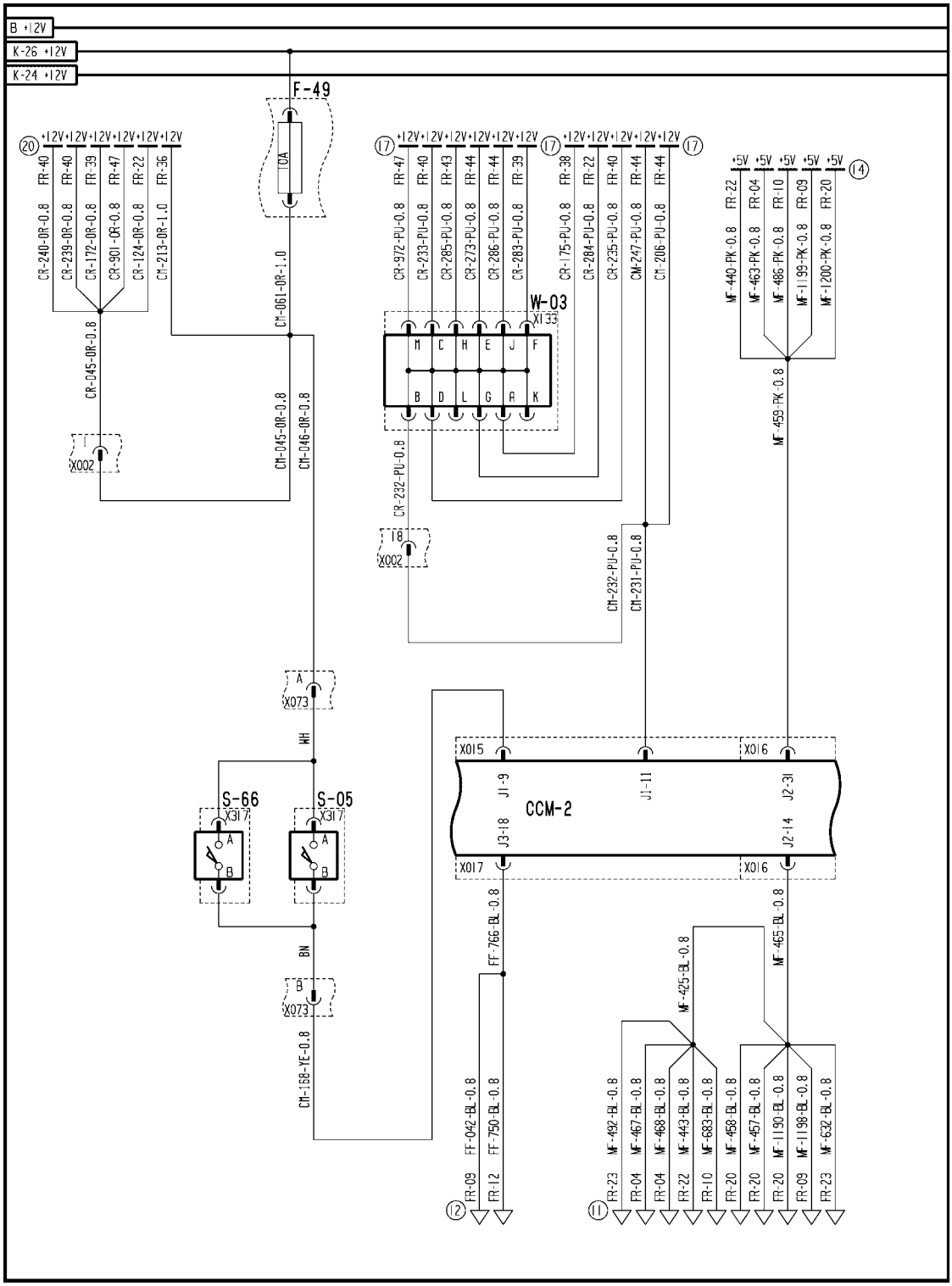
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53)

AFX8010

E0165-04 - CCM2 J2 5V Reference

Context:
The CCM2 J2 5V Reference circuit supplies power from connector **X016** pin J2-31 through the main frame (MF) harness to several different sensors;
- the air filter switch S-61 and oil pressure sensor B-52 in the engine (EN) harness,
- the grain bin level switches S-28 & S-29 in the grain tank (GT) harness,
- the control pressure sensor B-35 in the gearbox (GB) harness,
- the tailings volume sensor R-24 and park brake pressure sensor B-53 in the main frame (MF) harness.

A short to ground on any of these supply wires will result in this fault code being displayed.

Cause:
The CCM2 J2 5V Reference circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J2 5V REF" to check the voltage range.

   The proper voltage supply is **4.5 - 5.5 volts**.

   A. If the voltage reading is low out of range (<**4.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the grain tank (GT) harness from the main frame (MF) harness at connector **X009**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the grain tank (GT) harness between connector **X009** pin G and connector **X107** pin A wire 440 pink. Locate the short and repair.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the gearbox (GB) harness from the main frame (MF) harness at connector **X011**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the gearbox (GB) harness between connector **X011** pin 21 and connector **X098** pin B wire 486 pink. Locate the short and repair.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**.

   A. If the voltage increases to **4.5 - 5.5 volts**, the short is in the engine (EN) harness on one of the following wires:
   - wire 463 pink, connector **X010** pin 13 to engine harness splice
   - wire 469 pink, engine harness splice to connector **X330** pin B (air filter resistor R15)
   - wire 490 pink, engine harness splice to connector **X197** pin 5
   - wire orange, connector **X197** pin 5 to oil pressure sensor connector **X337** pin B

   Locate the short and repair.

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B. If the voltage remains low, continue with Step **5**.

5. Carefully disconnect connector **X016** from the bottom of the CCM2 module. Use a multimeter to check for voltage at connector **X016** pin J2-31. There should be **4.5 - 5.5 volts**.

   A. If the voltage is within **4.5 - 5.5 volts**, the short is in the main frame (MF) harness on one of the following wires:
   - wire 459 pink, **X016** pin J2-31 to MF harness splice
   - wire 440 pink, MF harness splice to connector **X009** pin G
   - wire 463 pink, MF harness splice to connector **X010** pin 13
   - wire 486 pink, MF harness splice to connector **X011** pin 21
   - wire 1199 pink, MF harness splice to connector **X368** pin B
   - wire 1200 pink, MF harness splice to connector **X445** pin 1

   Carefully inspect the main frame harness between connector **X016** and the grain tank, engine and gearbox harnesses for any signs of chaffing, pinch marks, or other damage which could result in an internal short. Repair any damage found.

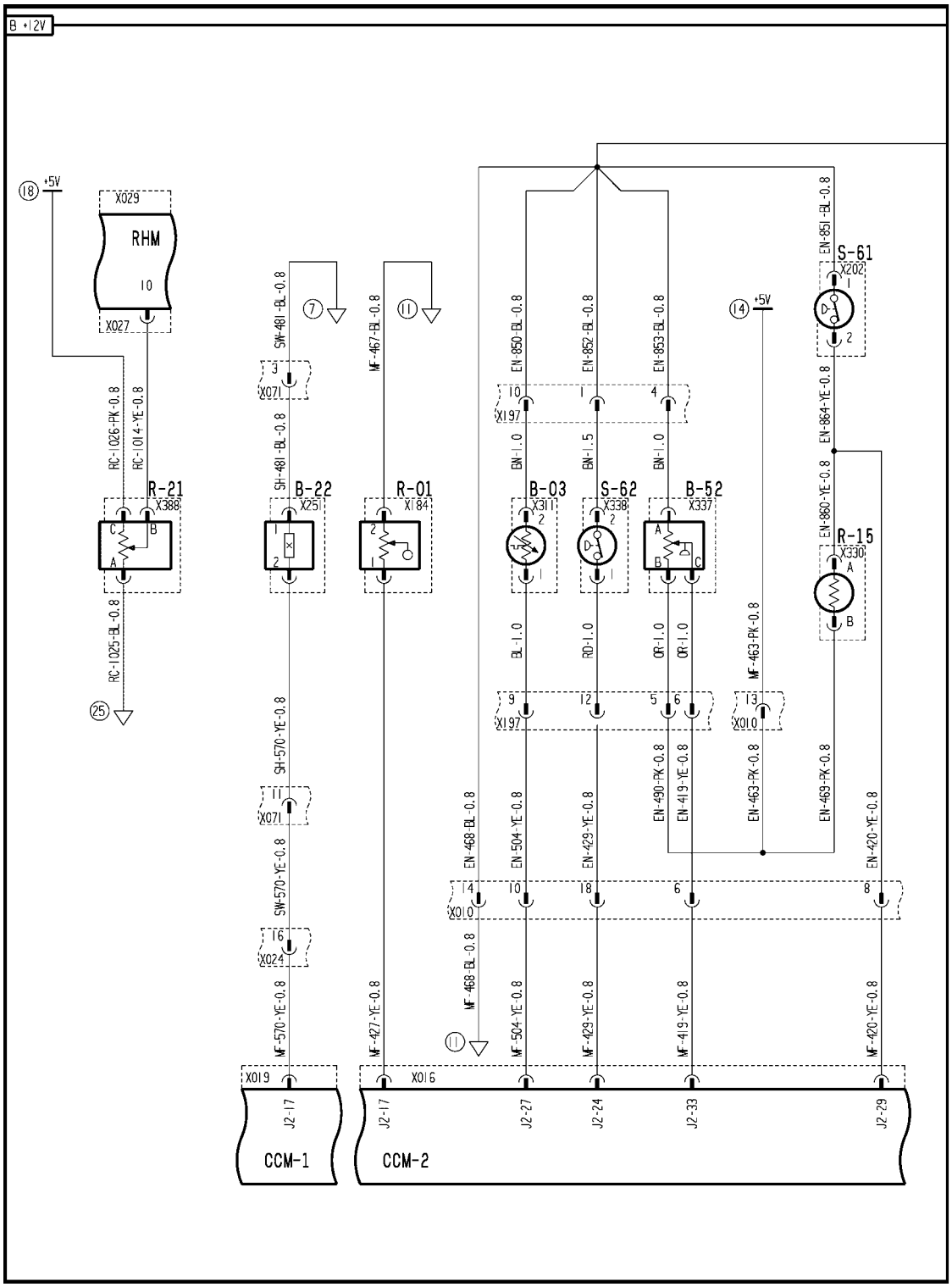
   B. If the voltage is less than **4.5 volts**, there is a problem with an internal component in the CCM2 module. Replace the module.

6. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



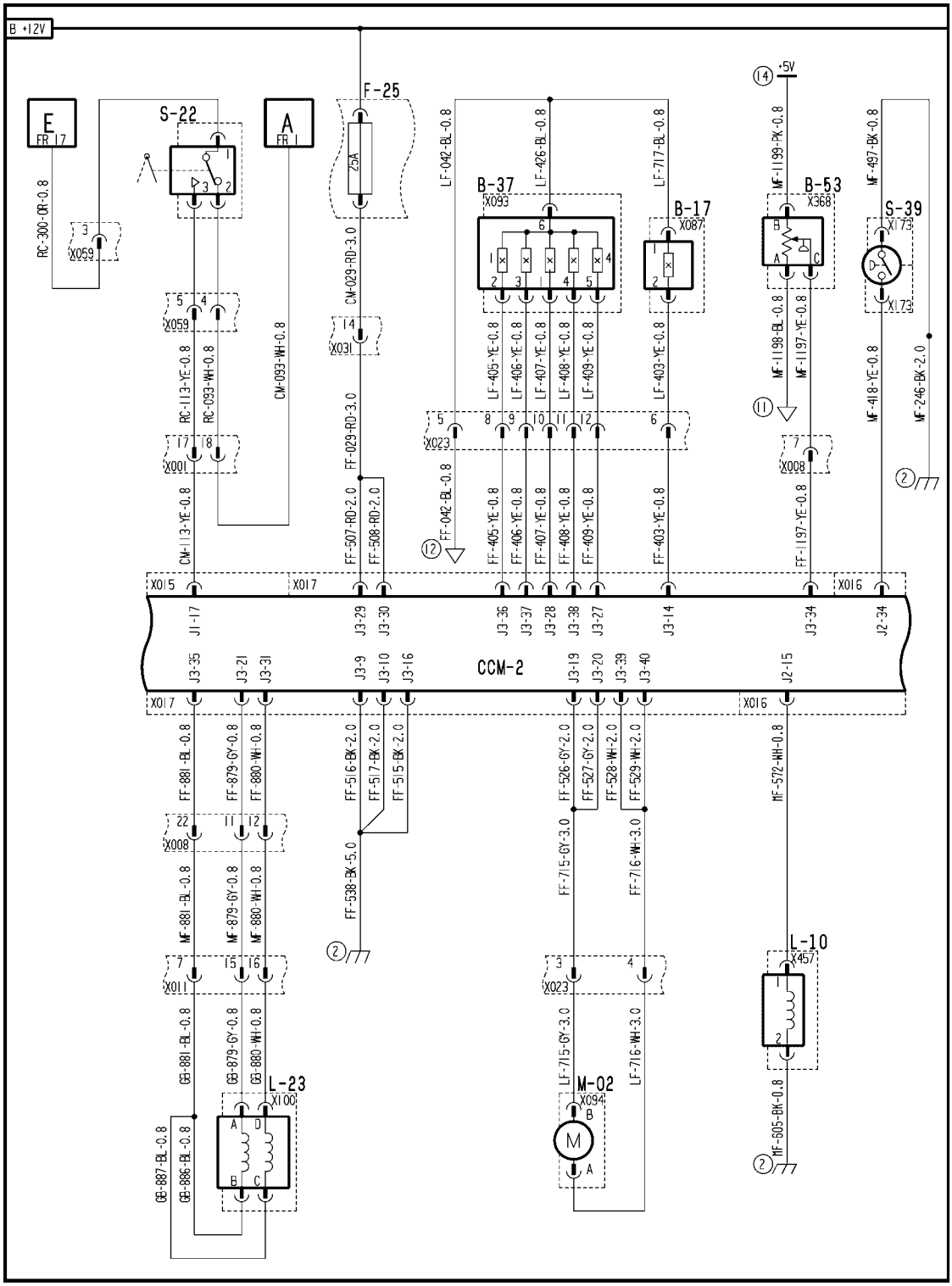
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



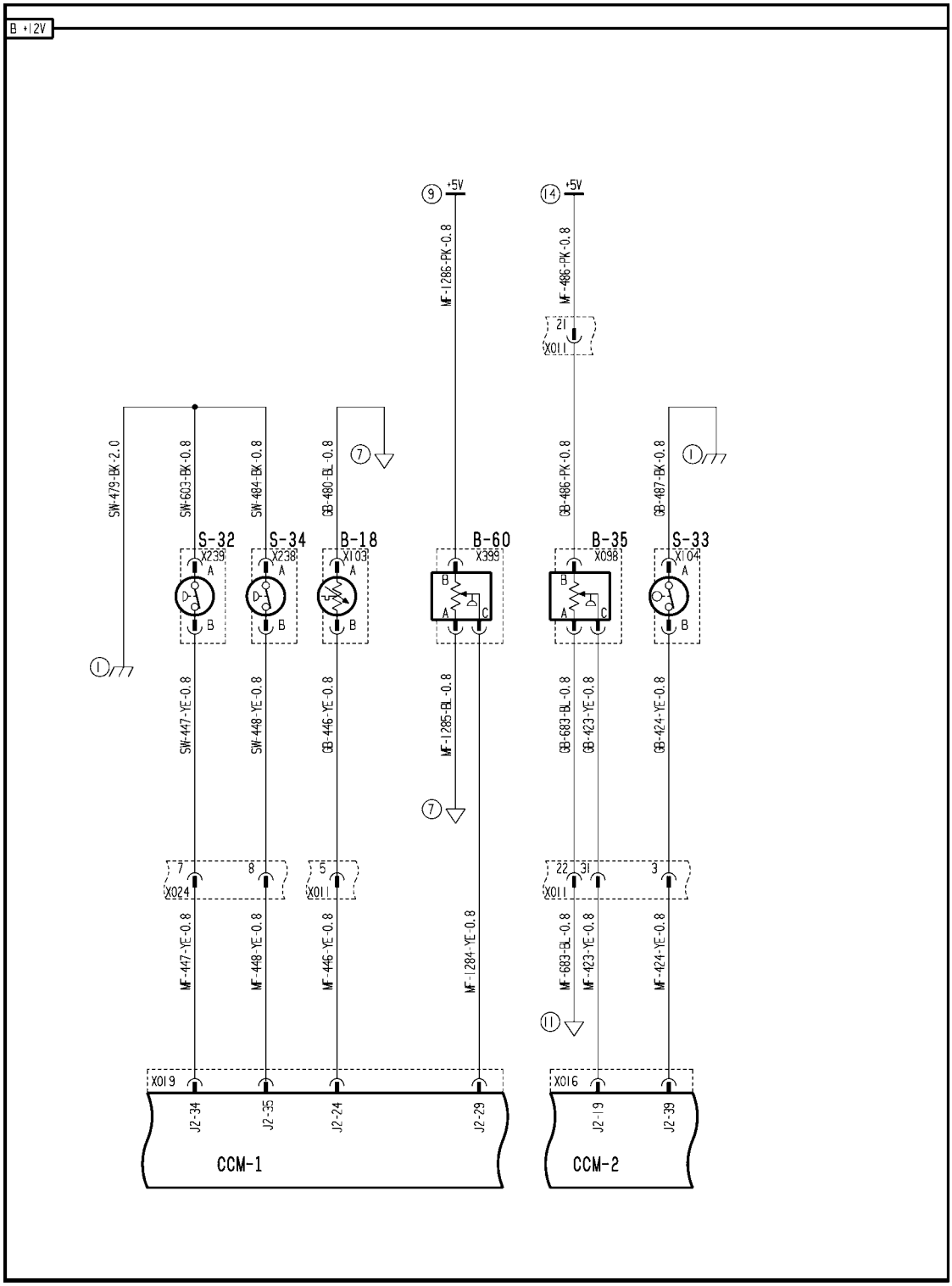
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



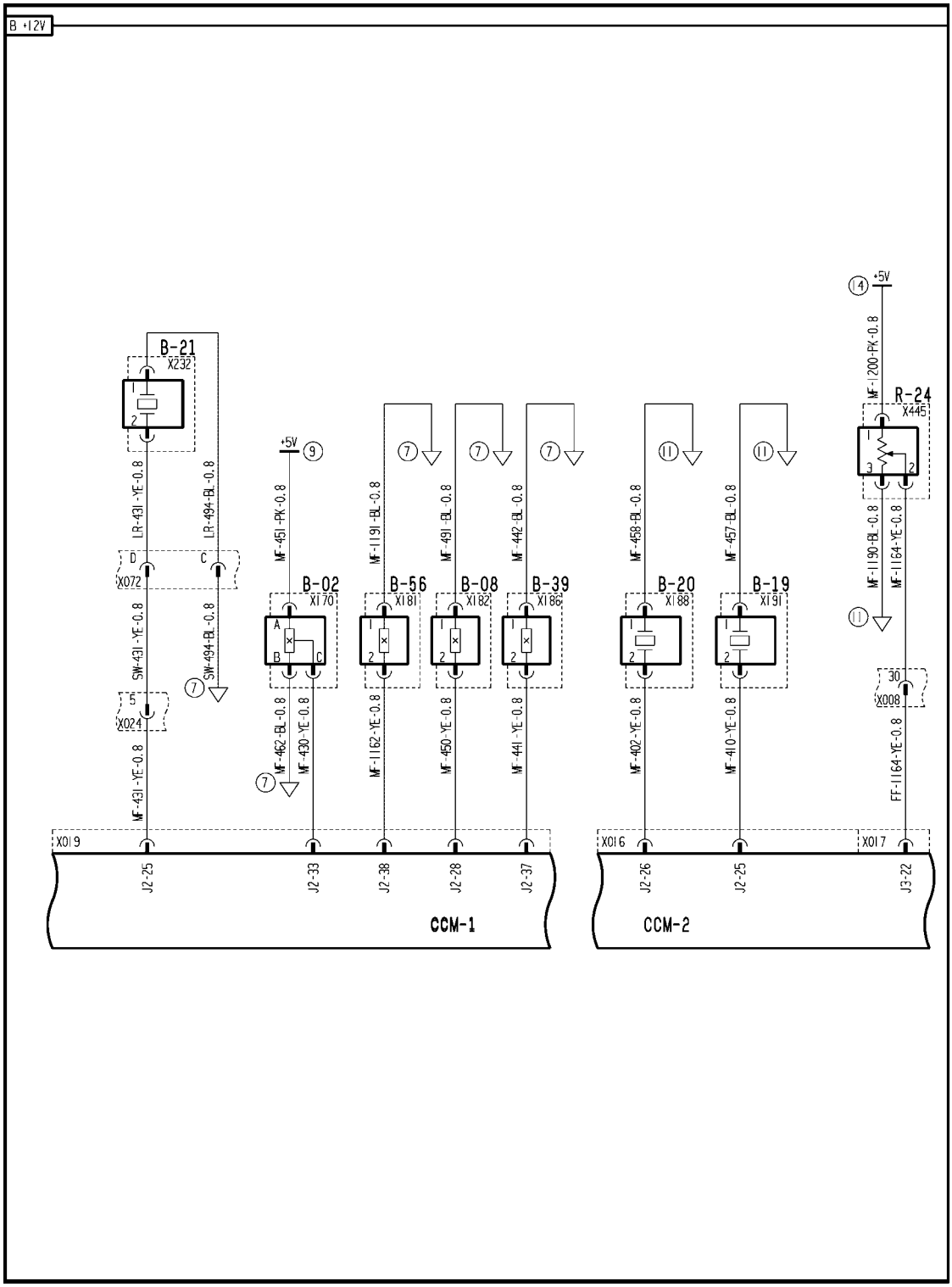
AFXSCHEM10-04 1

FRAME 10 - HYDRAULIC

https://truckmanualshub.com/

B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



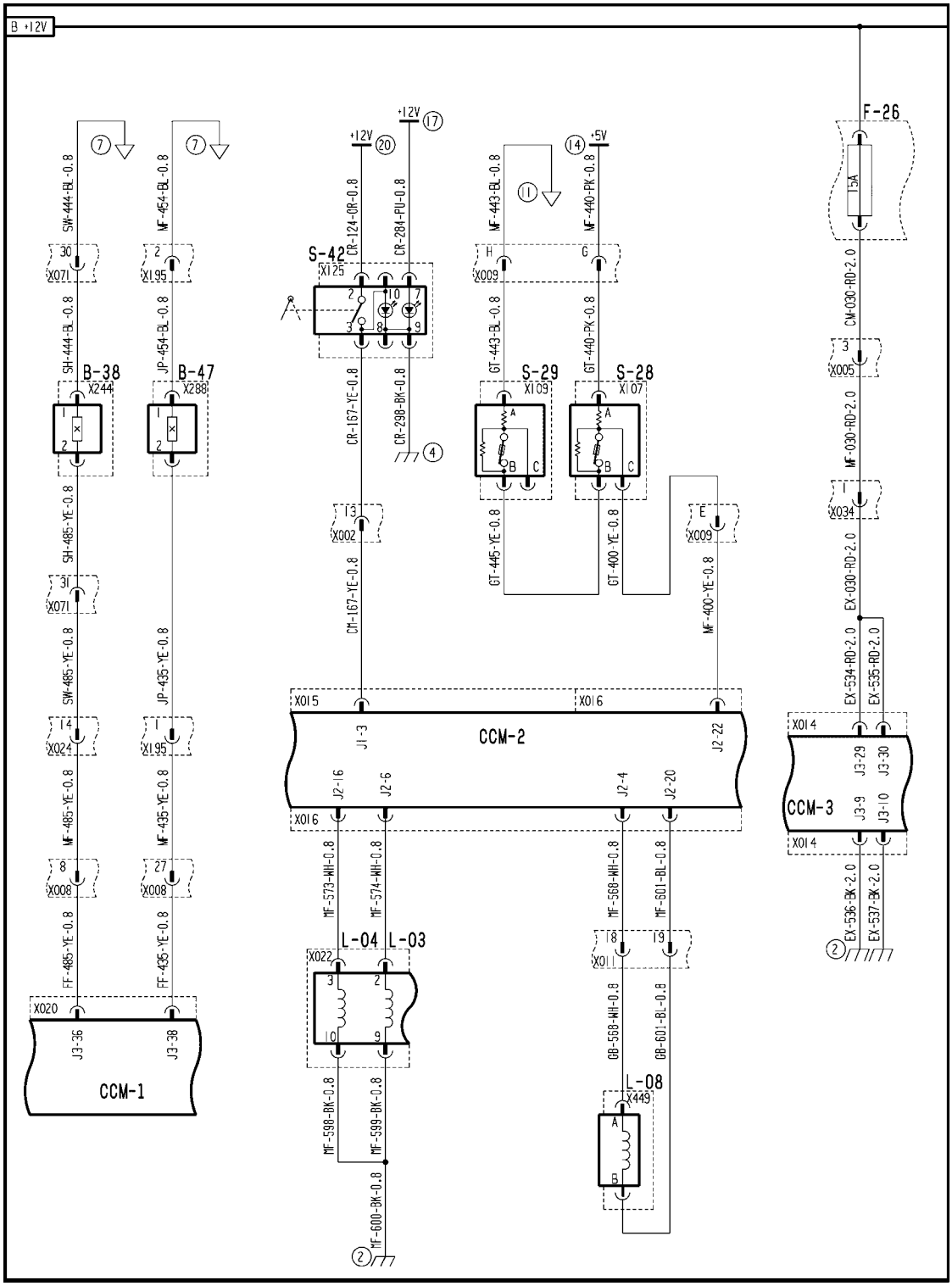
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



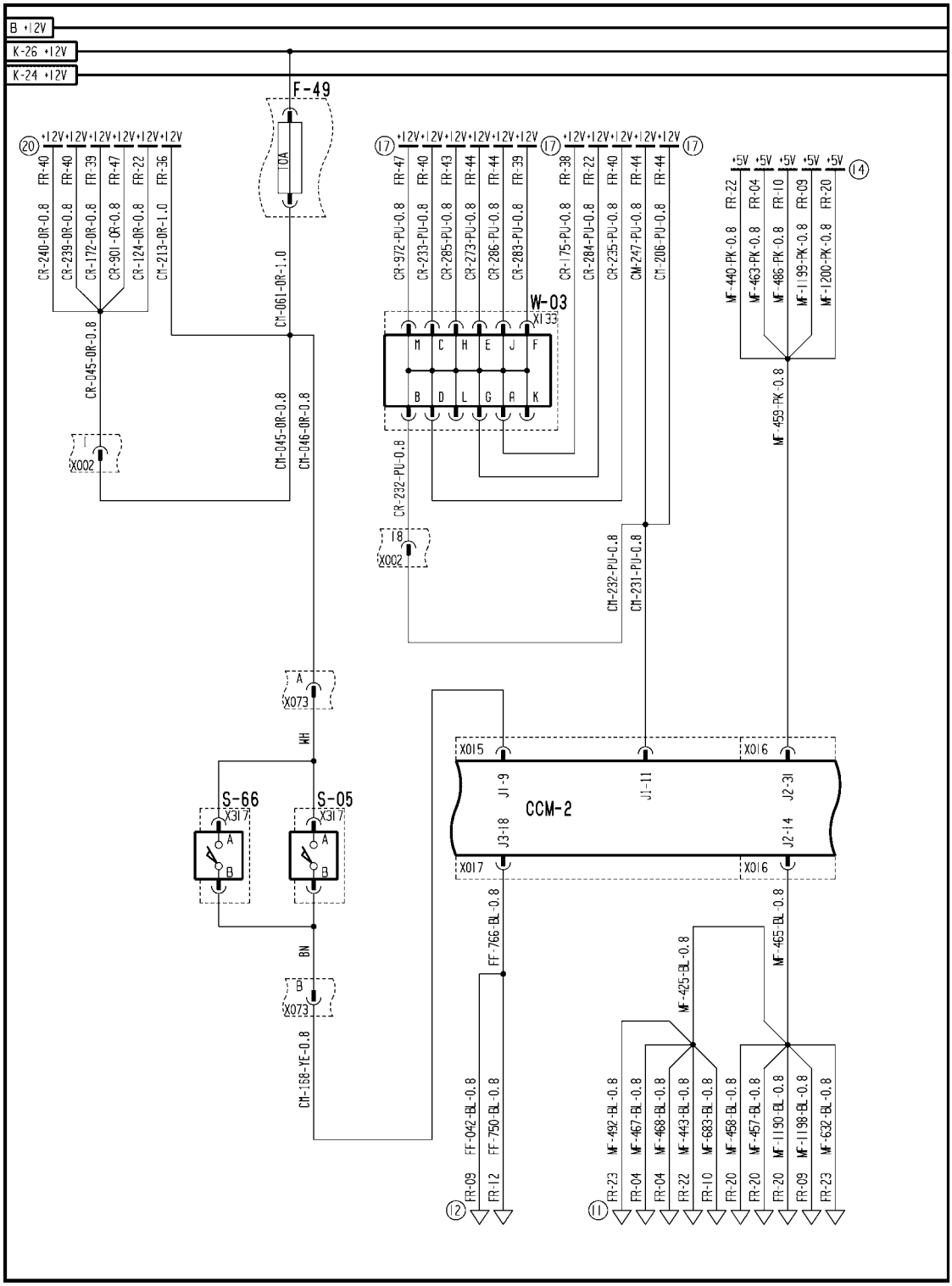
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54)

AFX8010

E0174-03 - CCM2 Battery Voltage

Cause:
The CCM2 battery power supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.

2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.

3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-39.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.

4. Remove the instructional seat and storage bin to gain access to the CCM2 connector **X015**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X015** pin J1-1.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the cab main (CM) harness:
   - wire 047 red, fuse F39 to CM harness splice
   - wire 049 red, CM harness splice to CCM3 connector **X012** pin J1-1
   - wire 050 red, CM harness splice to CCM2 connector **X015** pin J1-1
   - wire 052 red, CM harness splice to CCM1 connector **X018** pin J1-1
   - wire 057 red, CM harness splice to display adapter (AD) harness connector **X064** pin D
   - wire 051 red, CM harness splice through connector **X001** to RHM connector **X026** pin 13
   - wire 142 red, CM harness splice to DAM connector **X065** pin B

   Locate the source of high voltage and repair.

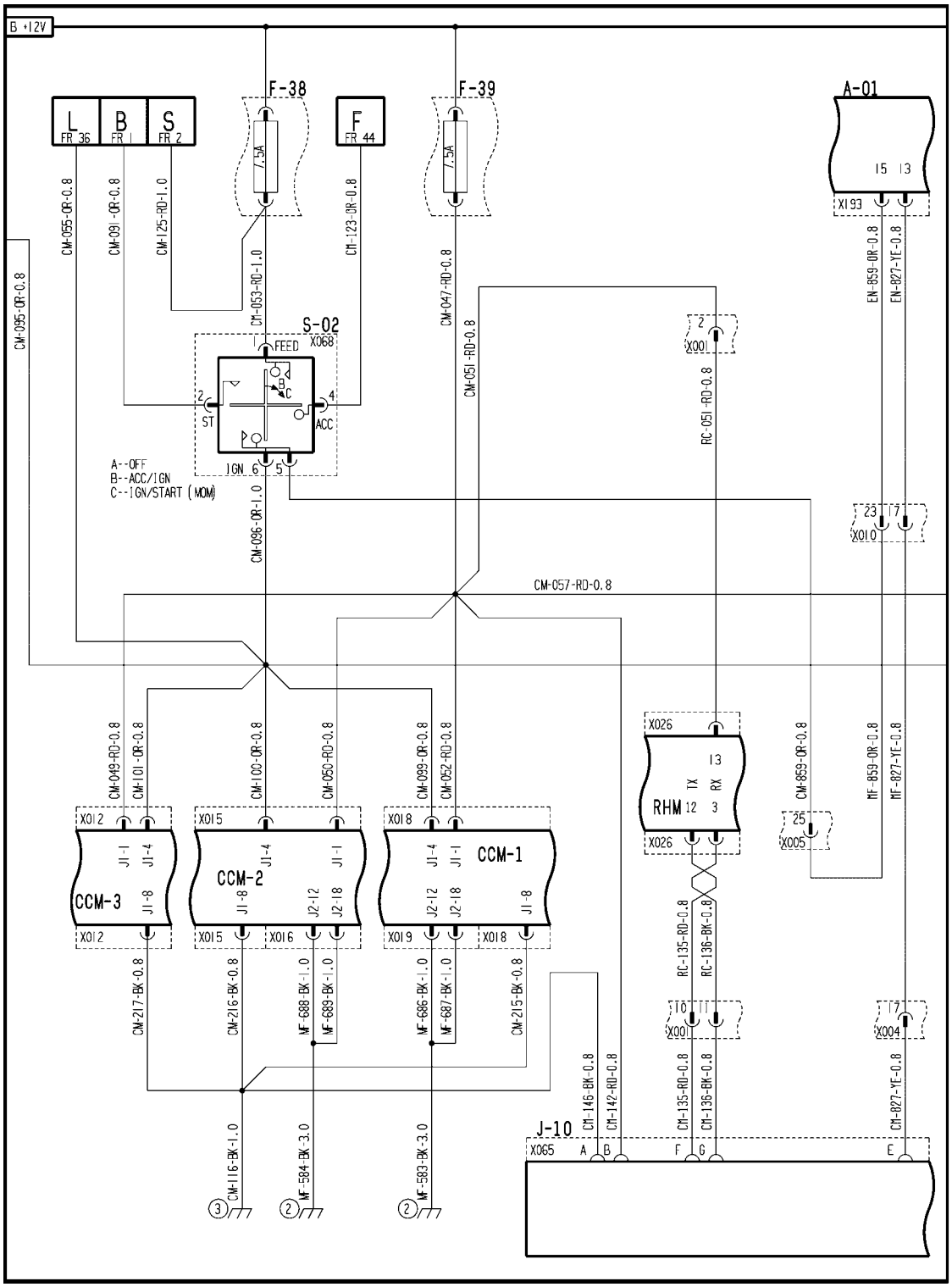
   B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM2.Reload the software for CCM2. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

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A. If no high out of range voltage readings are seen, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)



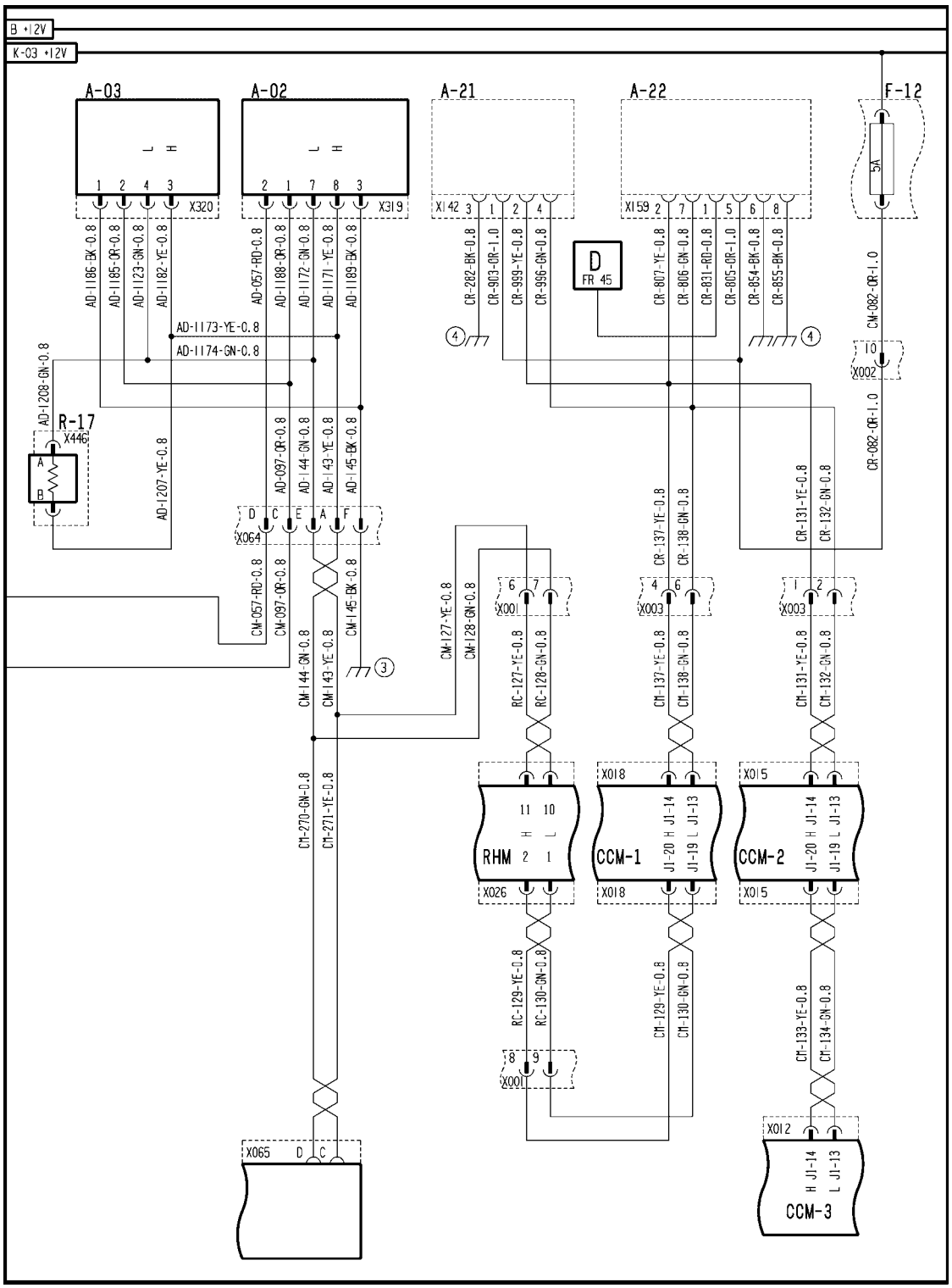
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FRAME 29 - DISTRIBUTION

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A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)



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FRAME 30 - DISTRIBUTION

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A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

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Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54)

AFX8010

E0293-03 - CCM3 J2 5V Reference

Context:
The CCM3 J2 5V Reference circuit supplies power from connector **X013** pin J2-31 to the upper sieve actuator M-06 and lower sieve actuator M-07 for the internal position sensors. A short to high voltage on these supply wires will result in this fault code being displayed.

Cause:
The CCM3 J2 5V Reference circuit is shorted to a higher than normal source.

Possible failure modes:

1. CCM3 J2 5V Reference wiring shorted to a higher than normal source.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J2 5V REF" to check the voltage range.

   The proper voltage is **4.5 - 5.5 volts**.

   A. If the voltage reading is high, out of range (>**5.5 volts**), continue with Step **2**.

   B. If the voltage reading is within proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting with Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the straw hood front (SW) harness from the lower frame rear (LR) harness at connector **X072**.

   A. If the voltage drops to the normal range, there is a short to high voltage in the lower frame rear (LR) harness between connector **X072** pin E and connector **X227** pin A wire 793 pink, or between connector **X072** pin K and connector **X228** pin A wire 794 pink. Locate the short and repair.

   B. If the voltage remains high, continue with Step **3**.

3. Disconnect the main frame (MF) harness from the straw hood front (SW) harness at connector **X025**.

   A. If the voltage drops to the normal range, there is a short to high voltage in the straw hood front (SW) harness between connector **X025** pin 1 and connector **X072** pins E & K on one of the following wires:
   - wire 683 pink, connector **X025** pin 1 to SW harness splice
   - wire 793 pink, SW harness splice to connector **X072** pin E
   - wire 794 pink, SW harness splice to connector **X072** pin K.

   Locate the short and repair.

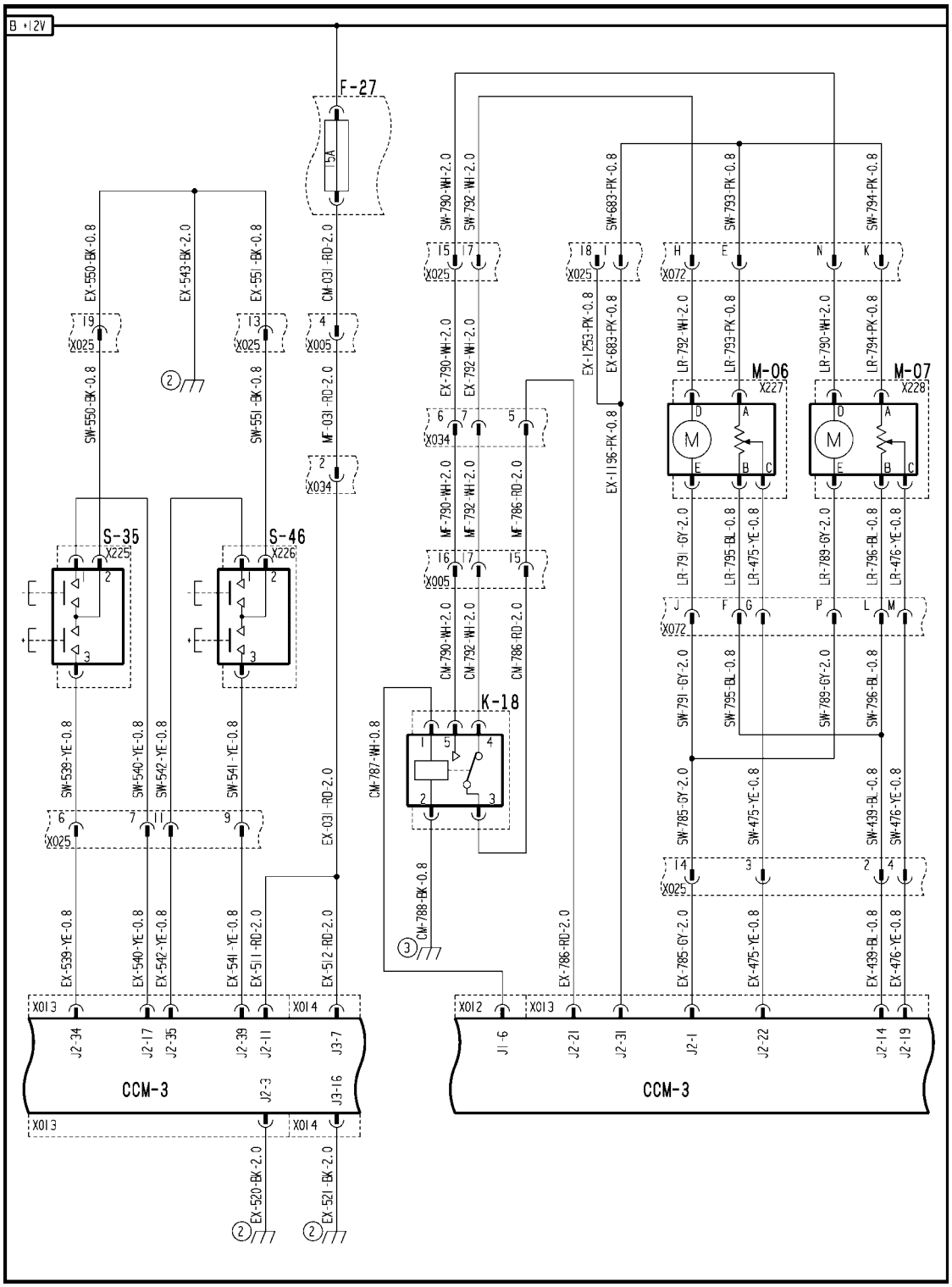
   B. If the voltage remains high, there is a short in the expansion (EX) harness between connector **X025** pin 1 and connector **X013** pin J2-31 wire 683 pink, 1253 pink or 1196 pink. Locate the short and repair.

4. Operate the machine while monitoring the Universal Display Plus "DIAG" screen. Operate the remote sieves to determine if the fault occurs while the sieve actuators are operating.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



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FRAME 21 - CLEANING

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F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53)

AFX8010

E0293-04 - CCM3 J2 5V Reference

Context:
The CCM3 J2 5V Reference circuit supplies power from connector **X013** pin J2-31 to the upper sieve actuator M-06 and lower sieve actuator M-07 for the internal position sensors. A short to ground on these supply wires will result in this fault code being displayed.

Cause:
The CCM3 J2 5V Reference circuit is shorted to ground.

Possible failure modes:

1. CCM3 J2 5V Reference wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J2 5V REF" to check the voltage range.

   The proper voltage is **4.5 - 5.5 volts**.

   A. If the voltage reading is low, out of range (<**4.5 volts**), continue with Step **2**.

   B. If the voltage reading is within proper limits, continue troubleshooting with Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the straw hood front (SW) harness from the lower frame rear (LR) harness at connector **X072**.

   A. If the voltage rises to the normal range, there is a short to ground in the lower frame rear (LR) harness between connector **X072** pin E and connector **X227** pin A wire 793 pink, or between connector **X072** pin K and connector **X228** pin A wire 794 pink. Locate the short and repair.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the main frame (MF) harness from the straw hood front (SW) harness at connector **X025**.

   A. If the voltage rises to the normal range, there is a short to ground in the straw hood front (SW) harness between connector **X025** pin 1 and connector **X072** pins E & K on one of the following wires:
   - wire 683 pink, connector **X025** pin 1 to SW harness splice
   - wire 793 pink, SW harness splice to connector **X072** pin E
   - wire 794 pink, SW harness splice to connector **X072** pin K.

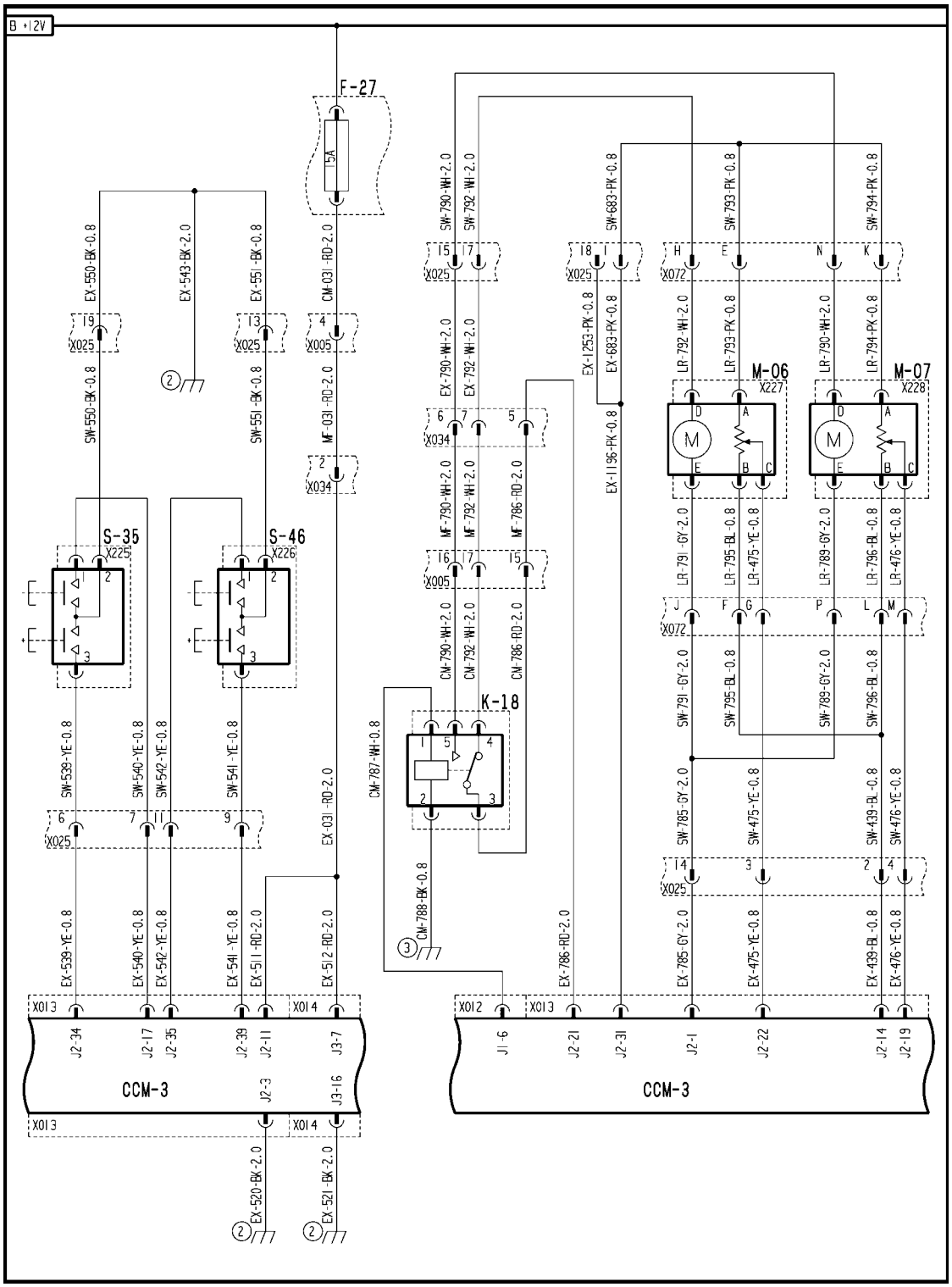
   Locate the short and repair.

   B. If the voltage remains low, there is a short in the expansion (EX) harness between connector **X025** pin 1 and connector **X013** pin J2-31 wire 683 pink, 1253 pink or 1196 pink. Locate the short and repair.
4. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



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FRAME 21 - CLEANING

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F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54)

AFX8010

E0295-03 - CCM3 J3 5V Reference

Context:
The CCM3 J3 5V Reference circuit is not currently being used at this time, and there is no wiring connected to this output from the module. If this fault code occurs, there may be moisture in connector **X014** that is shorting this pin to power, or there may be an internal fault in the module.

Cause:
The CCM3 J3 5V Reference circuit is shorted to a higher than normal source.

Possible failure modes:

1. CCM3 J3 5V Reference wiring shorted to a higher than normal source.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J3 5V REF" to check the voltage range.

   The proper voltage is **4.5 - 5.5 volts**.

   A. If the voltage reading is high, out of range (>**5.5 volts**), continue with Step **2**.

   B. If the voltage reading is within proper limits, the condition that generated the fault is not present at this time. Continue troubleshooting with Step **3**.

2. Disconnect connector **X014** from the bottom of the CCM3 module. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for bent pins, pushed back or corroded terminals or damaged wires. Thoroughly clean and dry the connector and reinstall it.

   A. If the voltage reading remains high, out of range (>**5.5 volts**), there is an internal fault with the CCM3 module. If there are no other faults with the circuits attached to this module, it should be possible to continue operation without replacing the module. If fault code
   E0293-03 - CCM3 J2 5V Reference
   is also present and can not be corrected, then the module will need to be replaced.

   B. If the voltage reading is within proper limits, continue with Step **3**.

3. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53)

AFX8010

E0295-04 - CCM3 J3 5V Reference

Context:
The CCM3 J3 5V Reference circuit is not currently being used at this time, and there is no wiring connected to this output from the module. If this fault code occurs, there may be moisture in connector **X014** that is shorting this pin to ground, or there may be an internal fault in the module.

Cause:
The CCM3 J3 5V Reference circuit is shorted to a lower than normal source.

Possible failure modes:

1. CCM3 J3 5V Reference circuit wiring is shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 J3 5V REF" to check the voltage range.

   The proper voltage is **4.5 - 5.5 volts**.

   A. If the voltage reading is low, out of range (<**4.5 volts**), continue with Step **2**.

   B. If the voltage reading is within proper limits, the condition that generated the fault is not present at this time. Continue troubleshooting with Step **3**.

2. Disconnect connector **X014** from the bottom of the CCM3 module. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for bent pins, pushed back or corroded terminals or damaged wires. Thoroughly clean and dry the connector and reinstall it.

   A. If the voltage reading remains low, out of range (<**4.5 volts**), there is an internal fault with the CCM3 module. If there are no other faults with the circuits attached to this module, it should be possible to continue operation without replacing the module. If fault code
   E0293-04 - CCM3 J2 5V Reference
   is also present and can not be corrected, then the module will need to be replaced.

   B. If the voltage reading is within proper limits, continue with Step **3**.

3. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54)

AFX8010

E0302-03 - CCM3 Battery Voltage

Cause:
The CCM3 battery power supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 BAT" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.

2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.

3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-39.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.

4. Remove the instructional seat and storage bin to gain access to the CCM3 connector **X012**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X012** pin J1-1.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the cab main (CM) harness:
   - wire 047 red, fuse F39 to CM harness splice
   - wire 049 red, CM harness splice to CCM3 connector **X012** pin J1-1
   - wire 050 red, CM harness splice to CCM2 connector **X015** pin J1-1
   - wire 052 red, CM harness splice to CCM1 connector **X018** pin J1-1
   - wire 057 red, CM harness splice to display adapter (AD) harness connector **X064** pin D
   - wire 051 red, CM harness splice through connector **X001** to RHM connector **X026** pin 13
   - wire 142 red, CM harness splice to DAM connector **X065** pin B

   Locate the source of high voltage and repair.

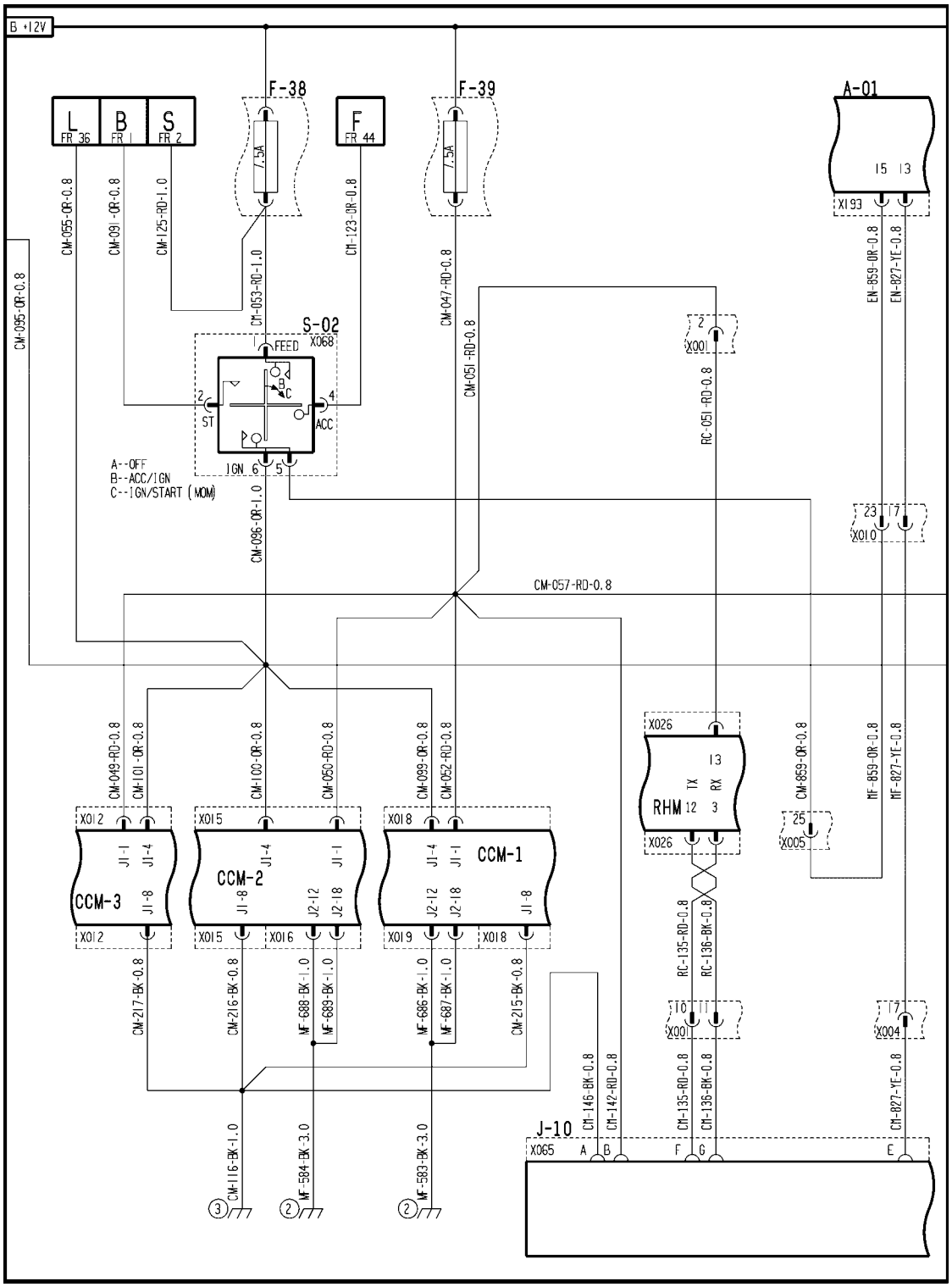
   B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM3.Reload the software for CCM3. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

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A. If no high out of range voltage readings are seen, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)



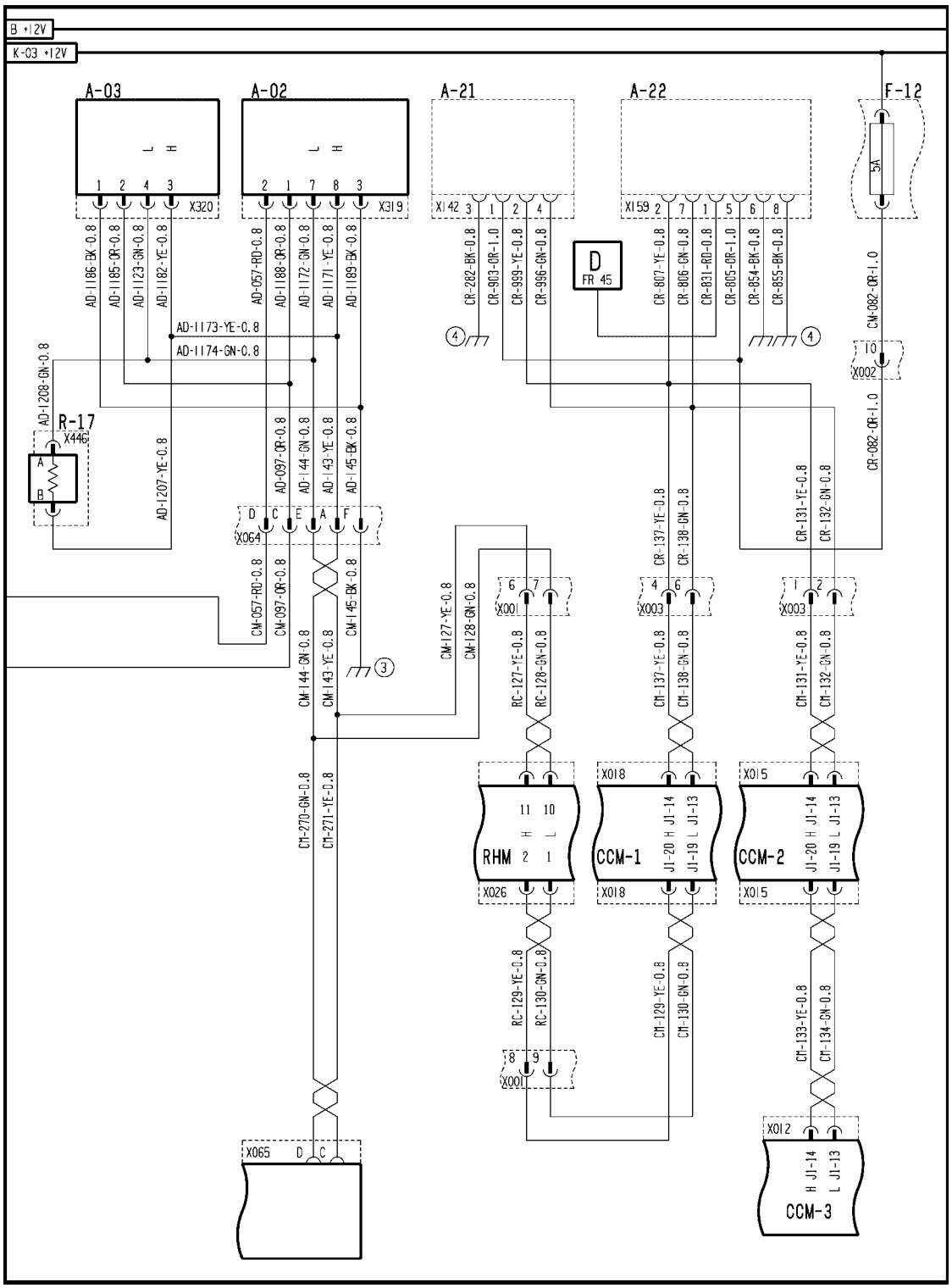
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FRAME 29 - DISTRIBUTION

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A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)



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FRAME 30 - DISTRIBUTION

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A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

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DISTRIBUTION SYSTEMS - A

Data Bus - Diagnostic A.50.A92 - G.10.G

CONTENTS

Description	Page
Alarm Messages	106
Troubleshooting an individual module alarm	107
Troubleshooting Multiple Module Alarms	110

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Alarm Messages

The network is capable of diagnosing itself and generating alarm messages to the operator when problems are detected. The combine may continue to function when a network alarm message appears, but the systems related to that module will no longer function. The alarm messages that are related to the CAN network are listed below.

Alarm Message	Description/Symptom
D0100 YMIU Not Detected	The YMIU module was not present when the network powered up.
D0101 YMIU Communication Lost	The YMIU module has dropped “offline”.
D0180 GPS Receiver Communication Lost	The GPS receiver is not broadcasting on the network.
D2000 CCM1 Not Detected	The CCM1 module was not present when the network powered up.
D2001 CCM2 Not Detected	The CCM2 module was not present when the network powered up.
D2002 CCM3 Not Detected	The CCM3 module was not present when the network powered up.
D2003 RHM Not Detected	The Right Hand Module (RHM) was not present when the network powered up.
D2004 SSM Not Detected	The Shaft Speed Monitor (SSM) was not present when the network powered up.
D2005 GOV Not Detected	The engine module (GOV) was not present when the network powered up.
D2006 CCM1 Communication Lost	The CCM1 module has dropped “offline”.
D2007 CCM2 Communication Lost	The CCM2 module has dropped “offline”.
D2008 CCM3 Communication Lost	The CCM3 module has dropped “offline”.
D2009 RHM Communication Lost	The Right Hand Module (RHM) has dropped “offline”.
D2010 SSM Communication Lost	The Shaft Speed Monitor (SSM) has dropped “offline”.
D2011 GOV Communication Lost	The engine module (GOV) has dropped “offline”.

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TROUBLESHOOTING AN INDIVIDUAL MODULE ALARM

There are two general conditions that may cause a “Not Detected” or “Communication Lost” alarm message for a module; loss of module power or ground, or CAN-related faults.

Each module requires a power and ground supply to provide main operating power for the module; if either of these is lost, the module will power down and will not be active on the network.

There are several possible CAN-related faults that may cause a module to go offline. External problems include bad or open connections to the CAN HI and CAN LO network wires as a result of damaged wiring. Internal problems may include a failure of the CAN controller itself (the device that actually does the “communicating” on the network), or the module may be “bussing off” due to excessive error messages.

Whenever a module transmits or receives a faulty message, it keeps a record of that error. After its error history fills up, the CAN controller assumes that it is faulty, and will stop transmitting on the network (module has gone “Bus Off”); this will result in a “Communication Lost” alarm message. This error history is erased and reset at zero when the module is powered down.

Troubleshooting Steps

1. A quick way to verify if a module has a power and ground connection is to activate a function within that module that does not require other CAN message information (function is controlled entirely by affected module). If the function operates, then the module is powered up, and the alarm is due to a CAN fault. See available functions by module below. If the module that is offline is not listed below, continue with step 2.

   YMIU: Inspect the front of the module to determine if the green light is illuminated and flashing - this indicates the module is powered and functioning.

   CCM1: Turn on Road Lights or Work Lights. If lights come on, CCM1 is powered up and functioning.

   CCM2: Depress brake pedal to activate brake lights. If lights come on, CCM2 is powered up and functioning.

   CCM3: Use remote Sieve Adjust switches to activate sieve actuators (if installed). If sieves operate, CCM3 is powered up and functioning.

   RHM: Turn key switch S-02 “OFF” and then “ON”. If speaker sounds, the RHM module is powered up and functioning.

   SSM: If it has power but no CAN, warning lights will flash in rotating sequence.

   A. If the module function operates, the module is powered up, and the fault is due to a CAN problem. Continue with step 3.
   B. If the module function does not operate, the module may not be powered up. Continue with step 2.

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2. Refer to the power and ground chart below for the specific power and ground sources for each module. Use a multimeter to test for continuity to ground on the ground path, and for 12V power on the supply wires. If the module power and ground supplies are good, but the module is still offline, continue with step 3.

Module	Power	Ground	Comments
YMIU	Connector X438 pin 10 wire 1232 orange	Connector X438 pin 12 wire 1287 black/white	• Power from fuse F47 • Ground to battery clean ground
GPS	Connector X321 pin 1 wire 1238 orange	Connector X321 pin 3 wire 1239 black/white	• Power from fuse F45 • Ground to battery clean ground
CCM1	• KAM* power @ connector X018 pin J1-1 wire 052 red • Main power @ connector X018 pin J1-4 wire 099 red	• Connector X018 pin J1-8 wire 215 black • Connector X019 pin J2-12 & 18 wires 686 & 687 black	• KAM power from fuse F39 • Main power from fuse F38 through key switch • Refer to schematic frame 29
CCM2	• KAM* power @ connector X015 pin J1-1 wire 050 red • Main power @ connector X015 pin J1-4 wire 100 red	• Connector X015 pin J1-8 wire 216 black • Connector X016 pin J2-12 & 18 wires 688 & 689 black	• KAM power from fuse F39 • Main power from fuse F38 through key switch • Refer to schematic frame 29
CCM3	• KAM* power @ connector X012 pin J1-1 wire 049 red • Main power @ connector X012 pin J1-4 wire 101 red	• Connector X012 pin J1-8 wire 217 black • Connector X013 pin J2-12 & 18 wires 690 & 691 black	• KAM power from fuse F39 • Main power from fuse F38 through key switch • Refer to schematic frame 29
RHM	• KAM* power @ connector X026 pin 13 wire 051 red • Main power @ connector X026 pins 4 & 5 wires 098 & 089 orange	Connector X026 pins 15 & 20 wires 389 & 352 black	• Main power from fuse F42 through Cab power relay K26 to fuse F48 • Ground path though connector X001 pin 12 • Refer to schematic frames 25, 28 & 29
SSM	Connector X064 pin C wire 097 orange	Connector X064 pin F wire 145 black	• Power from fuse F38 through key switch • May also test at white plastic circuit board connector X320 prior to replacing module
GOV (ECU)	Connector X193 pin 3 & 4 wires 810 & 811 white.	Connector X193 pins 1 & 2 wires 815 & 816 black	• Main power from fuse F01 through ECU Power relay K14 • Refer to schematic frame 2

NOTE: *KAM* = Keep Alive Memory; constant, key-off power.*

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3. Testing has determined that the module is offline due to a CAN fault, either with the CAN controller inside the module, or with the physical wiring to the network. Use a multimeter to check for continuity between the two wires that connect the module to the network.

NOTE: *Several modules are connected to the network through internal solder paths on the circuit boards, and cannot be tested as described. These modules include the RHM, CCM1, CCM2, and the Engine Control Unit (GOV/ECU). If one of these modules are offline, continue with step 4.*

   A. If there is continuity between the two network wires, and the resistance measured is 60 ohms, the external wiring is okay, and the fault is internal to the module. Continue with step 4.
   B. If there is continuity between the two network wires, but the resistance is very high (> 70 ohms), there is a bad connection in the external wiring to the network. Check the harness and connectors for damage and repair as necessary.
   C. If there is no continuity between the two network wires, there is an open circuit in one of the two wires. Locate the open and repair.

Module	Network Connection	Comments
YMIU	Connector X438 pin 1 wire 1251 yellow (CAN HI) and pin 2 wire 1252 green (CAN LO)	• Connects to network at splice in expansion (EX) harness • Refer to schematic frame 31
GPS	Connector X321 pin 4 wire 1241 yellow (CAN HI) and pin 2 wire 1240 green (CAN LO)	• Connects to network at splice in main frame (MF) harness • Refer to schematic frame 31
CCM3	Connector X012 pin J1-14 wire 133 yellow (CAN HI) and pin J1-13 wire 134 green (CAN LO)	• Connects to network at CCM2 connector X015 pins J1-20 (CAN HI) and J1-19 (CAN LO) • Refer to schematic frame 30
SSM	Connector X320 pin 3 wire 1182 yellow (CAN HI) and pin 4 wire 1123 green (CAN LO)	• Connects to splice in adapter display (AD) harness just before reaching connector X064 • Refer to schematic frame 30

4. CAN fault is internal to the module. Use the Electronic Service Tool to reload the correct version software in the module.
   A. If module now functions properly, fault was due to corrupt software. Fault should be resolved.
   B. If module still remains offline after software is reloaded, the module has failed internally, and must be replaced to repair the fault.

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TROUBLESHOOTING MULTIPLE MODULE ALARMS

If multiple alarm messages related to the network appear at once, this is an indication of problems with the network itself, instead of problems with a specific module.

1. Use a multimeter to check the resistance between pin D and pin C on connector X065.
   A. A reading of 0 ohms indicates that CAN HI (yellow wire) is shorted to CAN LO (green wire). Go to Data Bus - Short Circuit Troubleshooting.
   B. A reading of 120 ohms indicates an open circuit in either CAN HI (yellow wire) or CAN LO (green wire). Go to Data Bus - Open Circuit Troubleshooting.
   C. A reading of 60 ohms indicates that the network wiring is okay. Continue with Step 2.
2. Remove the cover over the electrical connector on the bottom of the display module (ICDU). Unplug connector X319 from the bottom of the ICDU, and use a multimeter to check the resistance between connector X319 pin 7 & 8. There should be 60 ohms resistance.
   A. If there is infinite resistance, there is an open circuit in the adapter display (AD) harness between connector X319 and the splice near connector X064 wires 1171 yellow (CAN HI) and 1172 green (CAN LO). Locate the open and repair.
   B. If there is 60 ohms resistance, the ICDU has a good connection to the network. Refer to the troubleshooting for the individual alarm messages to correct the concern.

Data Bus - Short Circuit Troubleshooting

1. Open the service door on the right side of the cab. Disconnect connector X001 from the bottom of the right console. Use a multimeter to check the resistance between the cab main harness end of connector X001 pins 6 & 7. There should be 120 ohms resistance.
   A. If there is 0 ohms resistance, continue with step 2.
   B. If there is 120 ohms resistance, continue with step 4.
2. Remove the right cab A-post cover to expose the termination resistor R17. Remove the resistor plug, and use a multimeter to check the resistance between pins A & B of the resistor connector on the harness.
   A. If there is infinite resistance, the termination resistor is shorted internally. Replace the resistor.
   B. If there is 0 ohms resistance, continue with step 3.
3. Disconnect connector X064 in the right cab post, and use a multimeter to check the resistance between the cab main harness end of connector X064 pins A & E.
   A. If there is infinite resistance, there is a short in the adapter display (AD) harness between connector X064 and the termination resistor connector in the following wires:
      Wire 143 yellow, connector X064 pin A to AD harness splice
      Wire 1173 yellow, AD harness splice to AD harness splice
      Wire 1207 yellow, AD harness splice to resistor connector pin B
      Wire 144 green, connector X064 pin E to AD harness splice
      Wire 1174 green, AD harness splice to AD harness splice
      Wire 1208 green, AD harness splice to resistor connector pin A

   Locate the short and repair.

   B. If there is 0 ohms resistance, there is a short in the cab main (CM) harness between connector X064, connector X001 and connector X065 in the following wires:
      Wire 143 yellow, connector X064 pin A to CM harness splice
      Wire 271 yellow, CM harness splice to connector X065 pin C
      Wire 127 yellow, CM harness splice to connector X001 pin 6
      Wire 144 green, connector C064 pin E to CM harness splice
      Wire 270 green, CM harness splice to connector X065 pin D
      Wire 128 green, CM harness splice to connector X001 pin 7

   Locate the short and repair.

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4. Use a multimeter to check the resistance between the console harness end of connector X001 pins 6 & 7.
   A. If there is 0 ohms resistance, there is a short in the right console (RC) harness between connector X001 and the RHM connector X026 wires 127 & 129 yellow and 128 & 130 green. Locate the short and repair.
   B. If there is infinite resistance, continue with step 5.
5. Disconnect connector X193 from the ECU (engine control unit) on units with electronically controlled engines, or unplug the CAN node connector X291 on units with mechanically controlled engines. Use a multimeter to check for continuity between connector X001 pins 8 and 9.
   A. If there is no continuity, there is a fault in the ECU. Replace the ECU.
   B. If there is continuity, continue with step 6.
6. Disconnect the engine harness at connector X010. Use a multimeter to check for continuity between connector X001 pins 8 and 9.
   A. If there is no continuity, there is a short in the engine (EN) harness between connector X193 and connector X010 wires 819 yellow and 820 green. Locate the short and repair.
   B. If there is continuity, continue with step 7.
7. Disconnect the main frame harness from the expansion harness at connector X034. Use a multimeter to check for continuity between connector X001 pins 8 and 9.
   A. If there is no continuity, there is a fault in the main frame (MF) harness between connector X010 and connector X034 wires 819 yellow and 820 green. Locate the short and repair.
   B. If there is continuity, continue with step 8.
8. Disconnect the expansion harness from the main frame harness at connector X034A. Use a multimeter to check for continuity between connector X001 pins 8 and 9.
   A. If there is no continuity, there is a short in the expansion (EX) harness between connector X034 and connector X034A wires 819, 1230 & 1251 yellow and 820, 1231 & 1252 green. Locate the short and repair.
   B. If there is continuity, continue with step 9.
9. Disconnect the main frame harness from the CCM2 module at connector X016. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
   A. If there is no continuity, there is a short in the main frame (MF) harness between connector X009 and connector X016 wires 744 yellow and 746 green. Locate the short and repair.
   B. If there is continuity, continue with step 10.
10. Disconnect the cab main harness from the CCM3 module at connector X012. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a fault in the CCM3 module. Replace the module.
    B. If there is continuity, continue with step 11.
11. Disconnect the cab main harness from the CCM2 module at connector X015. Install jumper wires on the cab main half of connector X015 between pins J1-13 & J1-19 and between pins J1-14 & J1-20. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a fault in the CCM2 module. Replace the module.
    B. If there is continuity, continue with step 12.

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12. Remove the jumper wires from the cab main half of connector X015. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a short in the cab main (CM) harness between connector X012 and connector X015 wires 133 yellow and 134 green. Locate the short and repair.
    B. If there is continuity, continue with step 13.
13. Disconnect the cab roof harness from the cab main harness at connector X003 (it will be necessary to remove the upper trim panel in the cab to gain access to this connector). Install jumper wires on the cab main end of connector X003 between pins 1 & 4 and between pins 2 & 6. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a short in the cab roof (CR) harness between connector X142, connector X159 and connector X003 on one of the following pairs of wires:
    Wires 999 yellow and 996 green from connector X142 pins 2 & 4 to CR harness splice.
    Wires 807 yellow and 806 green from connector X159 pins 2 & 7 to CR harness splice.
    Wires 131 yellow and 132 green from connector X003 pins 1 & 2 to CR harness splice.
    Wires 137 yellow and 138 green from CR harness splice to connector X003 pins 4 & 6.
Locate the short and repair.
    B. If there is continuity, continue with step 14.
14. Remove the jumper wires from the cab main half of connector X003. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a short in the cab main (CM) harness between connector X015 and connector X003 wires 131 yellow and 132 green. Locate the short and repair.
    B. If there is continuity, continue with step 15.
15. Disconnect the cab main harness from the CCM1 module at connector X018. Install jumper wires on the cab main end of connector X018 between pins J1-13 & J1-19 and between pins J1-14 & J1-20. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a fault in the CCM1 module. Replace the module.
    B. If there is continuity, continue with step 16.
16. Remove the jumper wires from the cab main end of connector X018. Use a multimeter to check for continuity between connector X001 pins 8 & 9.
    A. If there is no continuity, there is a short in the cab main (CM) harness between connector X003 and connector X018 wires 137 yellow and 138 green. Locate the short and repair.
    B. If there is continuity, there is a short in the cab main (CM) harness between connector X018 and connector X001 wires 129 yellow and 130 green. Locate the short and repair.

Data Bus - Open Circuit Troubleshooting

1. Open the service door on the right side of the cab. Disconnect connector X001 from the bottom of the right console. Use a multimeter to check the resistance between the cab main harness end of connector X001 pins 6 & 7. There should be 120 ohms resistance.
    A. If there is infinite resistance, continue with step 2.
    B. If there is 120 ohms resistance, continue with step 4.
2. Remove the right cab A-post cover to expose the termination resistor R17. Remove the resistor plug, and use a multimeter to check the resistance between pins A & B of the resistor plug.
    A. If there is infinite resistance, the termination resistor is open internally. Replace the resistor.
    B. If there is 120 ohms resistance, continue with step 3.

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3. Disconnect connector X064 in the right cab post. Use a multimeter to check for continuity between the adapter display harness end of connector X064 pin A and resistor connector pin B.

   A. If there is infinite resistance, there is an open circuit in the adapter display (AD) harness between connector X064 and the termination resistor connector in the following wires:

   Wire 143 yellow, connector X064 pin A to AD harness splice

   Wire 1173 yellow, AD harness splice to AD harness splice

   Wire 1207 yellow, AD harness splice to resistor connector pin B

Locate the open and repair.

   B. If there is 0 ohms resistance, continue with step 4.

4. Use a multimeter to check for continuity between the adapter display harness end of connector X064 pin E and resistor connector pin A.

   A. If there is infinite resistance, there is an open circuit in the adapter display (AD) harness between connector X064 and the termination resistor connector in the following wires:

   Wire 144 green, connector X064 pin E to AD harness splice

   Wire 1174 green, AD harness splice to AD harness splice

   Wire 1208 green, AD harness splice to resistor connector pin A

Locate the open and repair.

   B. If there is 0 ohms resistance, continue with step 5.

5. Use a multimeter to check for continuity between the cab main harness end of connector X064 pin A and connector X001 pin 6.

   A. If there is infinite resistance, there is an open circuit in the cab main (CM) harness between connector X064 and connector X001 wires 143 and 127 yellow. Locate the open and repair.

   B. If there is 0 ohms resistance, continue with step 6.

6. Use a multimeter to check for continuity between the cab main harness end of connector X064 pin E and connector X001 pin 7.

   A. If there is infinite resistance, there is an open circuit in the cab main (CM) harness between connector X064 and connector X001 wires 144 and 128 green. Locate the open and repair.

   B. If there is 0 ohms resistance, continue with step 7.

7. Use a multimeter to check the resistance between the console harness end of connector X001 pins 6 & 8.

   A. If there is infinite resistance, there is an open circuit in the right console (RC) harness between connector X001 pin 6 & 8 wires 127 & 129 yellow. Locate the open and repair.

   B. If there is infinite resistance, continue with step 8.

8. Use a multimeter to check the resistance between the console harness end of connector X001 pins 7 & 9.

   A. If there is infinite resistance, there is an open circuit in the right console (RC) harness between connector X001 pin 7 & 9 wires 128 & 130 yellow. Locate the open and repair.

   B. If there is infinite resistance, continue with step 9.

9. Disconnect the cab main harness from the CCM1 module at connector X018. Install a jumper wire on the cab main end of connector X018 between pins 19 & 20. Use a multimeter to check for continuity between connector X001 pins 8 & 9.

   A. If there is no continuity, there is an open circuit in the cab main (CM) harness between connector X001 and connector X018 wires 129 yellow or 130 green. Locate the open circuit and repair.

   B. If there is continuity, continue with step 10.

10. Remove the jumper wire from the cab main end of connector X018. Use a multimeter to check for continuity between connector X018 pins J1-13 and J1-14.

    A. If there is continuity (approx. 120 ohms), there is a fault in the CCM1 module. Replace the module.

    B. If there is no continuity, continue with step 11.

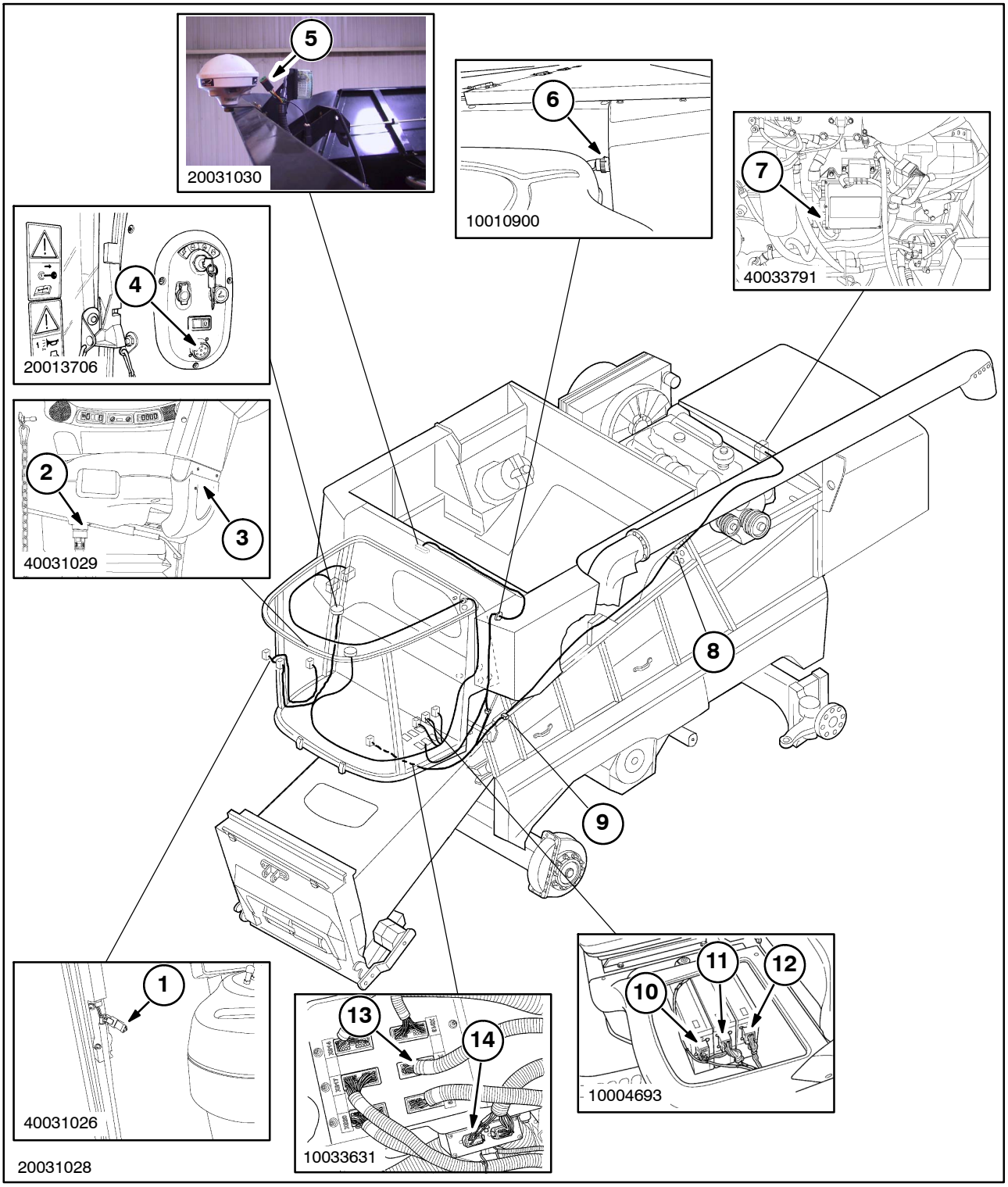
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11. Disconnect the cab roof harness from the cab main harness at connector X003 (it will be necessary to remove the upper trim panel in the cab to gain access to this connector). Install a jumper wire on the cab roof end of connector X003 between pins 1 & 2. Use a multimeter to check for continuity between connector X003 pins 4 & 6 (cab roof end).
    A. If there is no continuity, there is an open circuit in the cab roof (CR) harness between connector X003 pins 1 & 4 wire 131 yellow and 137 yellow or between connector X003 pins 2 & 6 wires 132 green and 138 green. Locate the open and repair.
    B. If there is continuity, continue with step 12.
12. Reattach connector X003, and disconnect the cab main harness from the CCM2 module at connector X015. Install a jumper wire on the cab main end of connector X015 pins J1-13 & J1-14. Use a multimeter to check for continuity between connector X018 pins J1-13 & J1-14.
    A. If there is no continuity, there is an open circuit in the cab main (CM) harness between connector X018 and connector X003 wires 137 yellow and 138 green, or between connector X003 and connector X015 wires 131 yellow and 132 green. Locate the open and repair.
    B. If there is continuity, continue with step 13.
13. Disconnect the main frame harness from the CCM2 module at connector X016. Use a multimeter to check for continuity between connector X016 pins J2-23 & J2-32.
    A. If there is continuity (approx. 120 ohms), there is a fault in the CCM2 module. Replace the module.
    B. If there is no continuity, continue with step 14.
14. Disconnect the main frame harness from the expansion harness at connector X034A. Use a multimeter to check for continuity on the expansion harness end of connector X034A pins 11 & 12.
    A. If there is continuity (approx. 120 ohms), there is an open circuit in the main frame (MF) harness between connector X009 and connector X034A wires 1230 yellow and 1231 green. Locate the open and repair.
    B. If there is no continuity, continue with step 15.
15. Disconnect the expansion harness from the main frame harness at connector X034. Use a multimeter to check for continuity on the main frame harness end of connector X034 pins 11 & 12.
    A. If there is continuity (approx. 120 ohms), there is an open circuit in the expansion (EX) harness between connector X034A and connector X034 wires 1230 & 819 yellow and 1231 & 820 green. Locate the open and repair.
    B. If there is no continuity, continue with step 16.
16. Disconnect the main frame harness from the engine harness at connector X010. Use a multimeter to check for continuity on the engine harness end of connector X010 between pins 19 & 21.
    A. If there is continuity (approx. 120 ohms), there is an open circuit in the main frame (MF) harness between connector X034 and connector X010 wires 819 yellow and 820 green. Locate the open and repair.
    B. If there is no continuity, continue with step 17.
17. Disconnect the engine harness from the ECU module at connector X193. Use a multimeter to check for continuity on the ECU module connector X193 between pins 11 & 12.
    A. If there is continuity (approx. 120 ohms), there is an open circuit in the engine (EN) harness between connector X010 and connector X193 wires 819 yellow and 820 green. Locate the open and repair.
    B. If there is no continuity, there is a fault in the ECU module. Replace the module.

Wiring Harness - Electrical Schematic Frame 30 (A.30.A.88 - C.20.E.30)

Wiring Harness - Electrical Schematic Frame 31 (A.30.A.88 - C.20.E.31)

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1

1. Termination Resistor R17
2. Connector X001
3. Connector X319 to ICDU
4. Connector X065
5. Connector X321 to GPS
6. Connector X009
7. Connector X193 to ECU
8. Connector X010
9. Connectors X034 and X034A
10. Connector X012
11. Connector X015
12. Connector X018
13. Connector X016
14. Connector X438 to YMIU

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Data bus - Special instruction (A.50.A.92 - G.30.E.11)

AFX8010

E0084-14 - Voting Conflicts Found - Contact Your Dealer

Context:
When installing a new or replacement CCM module into the vehicle, the other modules will supply current configuration information to this module based on true democratic voting rules. If all reporting modules have different configuration data, there is no majority consensus as to what the values should be. As a result, configuration information will not be written to the new or replacement module, and the configuration data will remain unchanged (and therefore different) in all modules.

Cause:
A data location has data which is different in all of the voting modules.

Possible failure modes:

1. Vehicle configuration and calibration information corrupted.

Solution:

1. Review machine configurations to make sure that they are correct.

    A. If this error message appears, re-write configuration data using the electronic service tool (EST).

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Data bus - Special instruction (A.50.A.92 - G.30.E.11)

AFX8010

E0085-14 - Voting Differences Found and Corrected

Context:
When installing a new or replacement CCM module into the vehicle, the other modules will supply current configuration information to this module based on true democratic voting rules. If one reporting module has different configuration data, this will be reported, however, there is majority consensus as to what the value should be. The majority data is copied to all modules on the network so that the configuration data will be the same in all modules.

Cause:
A data location has data which is different in one of the voting modules.

Possible failure modes:

1. One of the voting modules has corrupted configuration and calibration data.

Solution:

1. This error message appears as a notification message only.

    A. This error message appears as a notification message; no further action is required, as the problem is automatically corrected.

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Sensing system Moisture sensor - Unidentified failure (A.50.A.96.95.80 - G.30.B.46)

AFX8010

E0310-11 - Bypass Unit

Cause:
The sample motor (M-28) engage circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad relay in moisture sensor assembly.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "AFS" sort menu, and select "BYPASS MTR". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **6**.
2. Disconnect connector **X222** at the sample motor M28. Use a multimeter to check the resistance of the sample motor engage relay between connector **X222** pins 2 & 4. The proper resistance range is **65 - 80 ohms**.

   A. If there is zero resistance, the sample motor engage relay is shorted internally. Replace the relay.

   B. If there is infinite resistance, the sample motor engage relay is open. Replace the relay.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X222** pin 4 (harness side) and chassis ground. Flex the precision farming (PF) harness while making this check.

   A. If there is continuity to ground, continue with step **4**.

   B. If there is no continuity to ground, continue with Step **4**.
4. Use a multimeter to check for continuity between the expansion (EX) harness end of connector **X442** pin 4 and chassis ground. Flex the expansion (EX) harness while making this check.

   A. If there is continuity to ground, there is a short to ground in the expansion (EX) harness between connector **X442** pin 4 and connector **X013** pin J2-13 wire 837 white. Locate the short and repair.

   B. If there is no continuity to ground, there is a short to ground in the precision farming (PF) harness between connector **X442** pin 4 and connector **X222** pin 4 wire 837 white. Locate the short and repair.
5. Use a multimeter to check for continuity between connector **X222** pin 2 (harness side) and chassis ground. Flex the precision farming (PF) harness while making this check.

   A. If there is no continuity to ground, continue with step **6**.

   B. If there is continuity to ground, continue with Step **5**.
6. Use a multimeter to check for continuity between the expansion (EX) harness end of connector **X442** pin 2 and chassis ground. Flex the expansion (EX) harness while making this check.

   A. If there is no continuity to ground, there is an open circuit in the expansion (EX) harness between connector **X442** pin 2 and front frame ground #2 wire 564 black or 543 black. Locate the open and repair.

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B. If there is continuity to ground, there is an open circuit in the precision farming (PF) harness between connector **X442** pin 2 and connector **X222** pin 2 wire 564 black. Locate the open and repair.

7. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the bypass unit engage output. Use a multimeter to check for **12 volts** between connector **X222** pin 4 and chassis ground.

   A. If **12 volts** is not present, continue with step **8**.

   B. If **12 volts** is found, continue with Step **6**.

8. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the bypass unit engage output. Use a multimeter to check for **12 volts** between connector **X442** pin 4 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the expansion (EX) harness between connector **X442** pin 4 and connector **X013** pin J2-13 wire 837 white. Locate the open and repair.

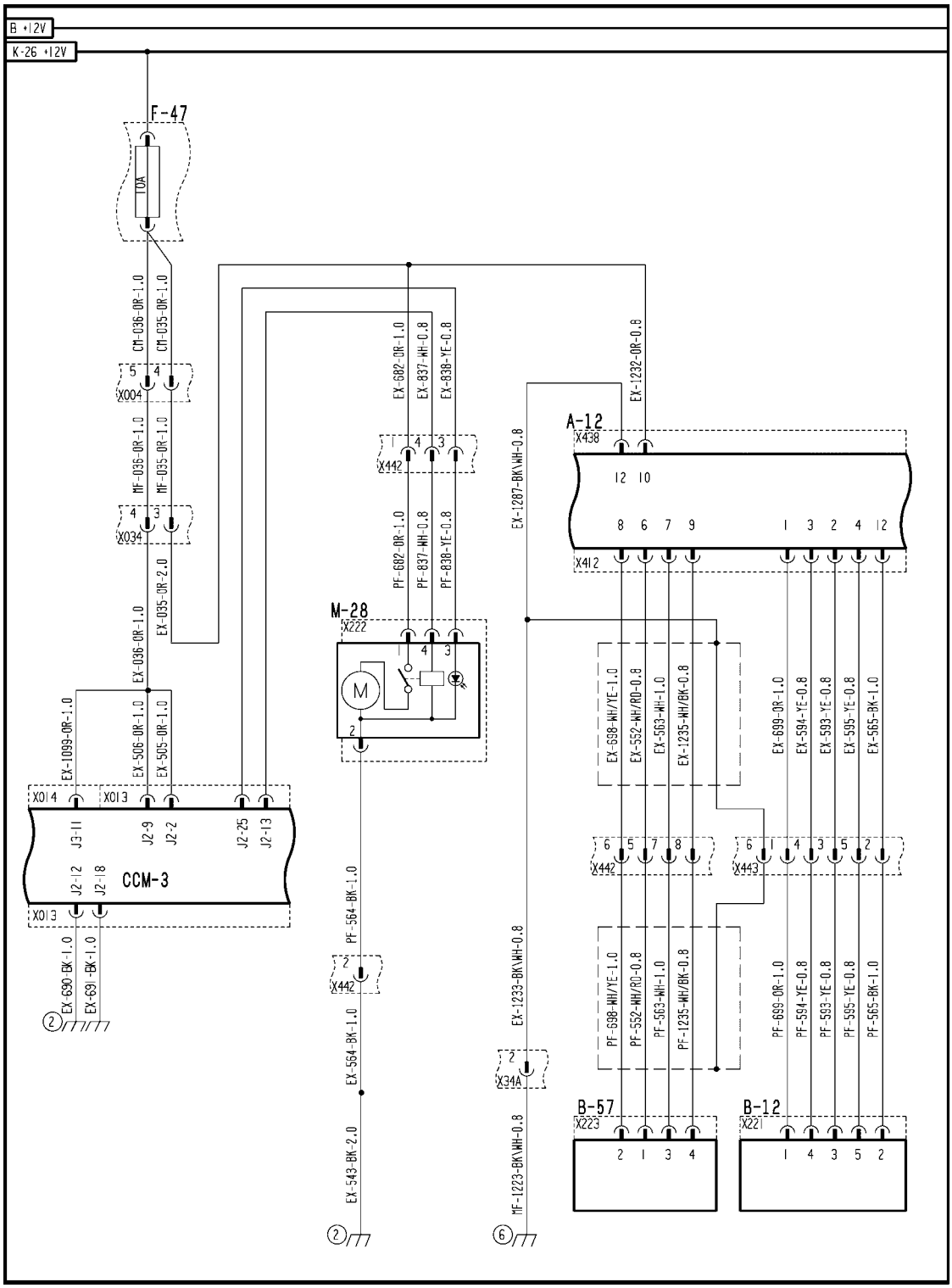
   B. If **12 volts** is found, there is an open circuit in the precision farming (PF) harness between connector **X442** and connector **X222** wire 837 white. Locate the open and repair.

9. Visually inspect the harness and connector for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 24 (A.30.A.88 - C.20.E.24)



AFXSCHEM24-04 1

FRAME 24 - PRECISION

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A-12 YMIU Module	B-12 Moisture Sensor	B-57 Yield Sensor
F-47 CCM3 Fuse	M-28 Sample Motor	

https://truckmanualshub.com/

Index

DISTRIBUTION SYSTEMS - A

ELECTRONIC SYSTEM - 50.A

Control module - Overview (A.50.A.91 - C.10.A.10) 4
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 11
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 35
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 51
AFX8010

Control module CCM1 - Short circuit to B+ (A.50.A.91.81 - G.30.B.54) 59
AFX8010

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53) 15
AFX8010

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53) 43
AFX8010

Control module CCM1 - Short circuit to ground (A.50.A.91.81 - G.30.B.53) 55
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 19
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 63
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 71
AFX8010

Control module CCM2 - Short circuit to B+ (A.50.A.91.82 - G.30.B.54) 89
AFX8010

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53) 23
AFX8010

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53) 67
AFX8010

Control module CCM2 - Short circuit to ground (A.50.A.91.82 - G.30.B.53) 80
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 27
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 93
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 99
AFX8010

Control module CCM3 - Short circuit to B+ (A.50.A.91.83 - G.30.B.54) 101
AFX8010

Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53) 31
AFX8010

Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53) 96
AFX8010

Control module CCM3 - Short circuit to ground (A.50.A.91.83 - G.30.B.53) 100
AFX8010

Data bus - Overview (A.50.A.92 - C.10.A.10) 5
AFX8010

https://truckmanualshub.com/

Data bus - Diagnostic (A.50.A.92 - G.10.G) 105
AFX8010
Data bus - Special instruction (A.50.A.92 - G.30.E.11) 117
AFX8010
Data bus - Special instruction (A.50.A.92 - G.30.E.11) 118
AFX8010
Sensing system Moisture sensor - Electrical adjust (A.50.A.96.95.80 - F.45.A.61) 7
AFX8010
Sensing system Moisture sensor - Unidentified failure (A.50.A.96.95.80 - G.30.B.46) 119
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

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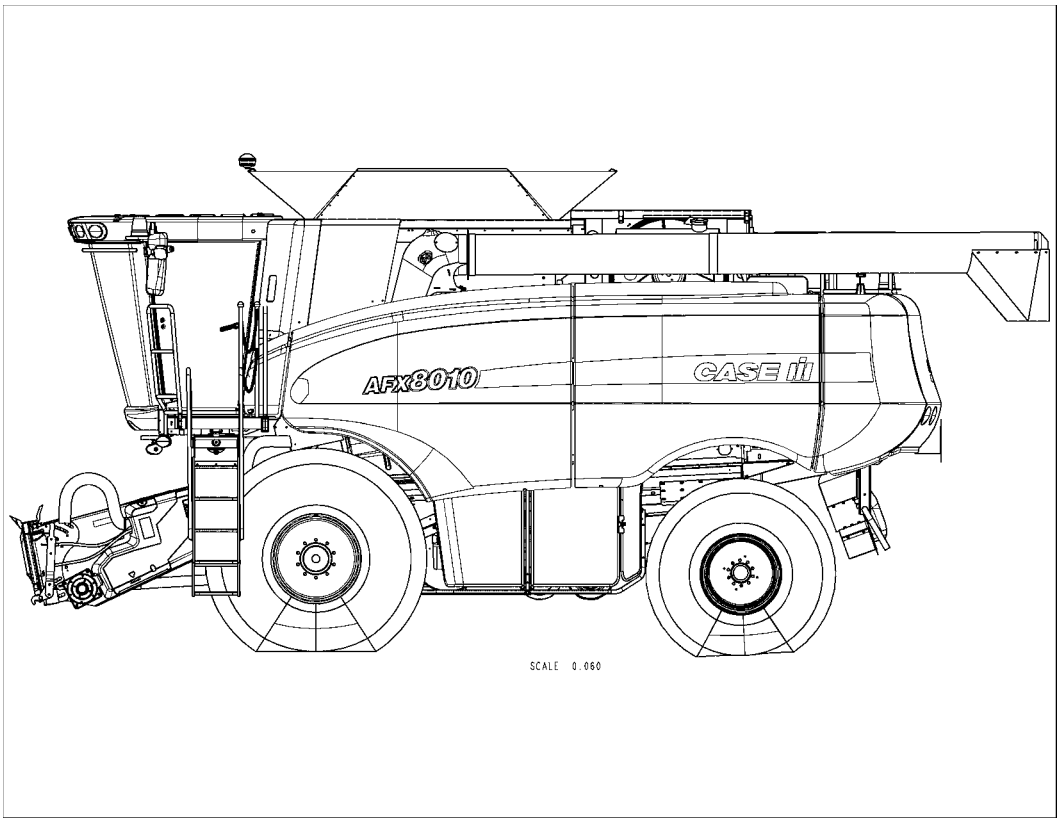
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REPAIR MANUAL

POWER PRODUCTION



AFX8010

https://truckmanualshub.com/

Contents

POWER PRODUCTION - B

ENGINE B.10.A
AFX8010

FUEL AND INJECTION SYSTEM B.20.A
AFX8010

AIR INTAKE SYSTEM B.30.A
AFX8010

EXHAUST SYSTEM B.40.A
AFX8010

ENGINE COOLANT SYSTEM B.50.A
AFX8010

LUBRICATION SYSTEM B.60.A
AFX8010

STARTING SYSTEM B.80.A
AFX8010

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POWER PRODUCTION - B

ENGINE - 10.A

AFX8010

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Contents

POWER PRODUCTION - B

ENGINE - 10.A

TECHNICAL DATA

ENGINE - General specification (B.10.A - D.40.A.10) 5
AFX8010

ENGINE - Torque (B.10.A - D.20.A.10) 6
AFX8010

ENGINE - Special tools (B.10.A - D.20.A.40) 6
AFX8010

Valve drive

Valve drive - General specification (B.10.A.40 - D.40.A.10) 7
AFX8010

Valve drive - Dimension (B.10.A.40 - D.40.A.30) 7
AFX8010

Valve drive - Torque (B.10.A.40 - D.20.A.10) 14
AFX8010

Valve drive - Special tools (B.10.A.40 - D.20.A.40) 15
AFX8010

Crankshaft

Crankshaft - Dimension (B.10.A.43 - D.40.A.30) 16
AFX8010

Crankshaft - Torque (B.10.A.43 - D.20.A.10) 21
AFX8010

Crankshaft - Special tools (B.10.A.43 - D.20.A.40) 21
AFX8010

Timing gear

Timing gear - Torque (B.10.A.45 - D.20.A.10) 22
AFX8010

Connecting rod and piston

Connecting rod and piston - Dimension (B.10.A.47 - D.40.A.30) 23
AFX8010

Flywheel

Flywheel - Torque (B.10.A.50 - D.20.A.10) 25
AFX8010

Flywheel - Special tools (B.10.A.50 - D.20.A.40) 25
AFX8010

Cylinder block

Cylinder block - Dimension (B.10.A.70 - D.40.A.30) 26
AFX8010

Cylinder block - Torque (B.10.A.70 - D.20.A.10) 27
AFX8010

Cylinder block - Special tools (B.10.A.70 - D.20.A.40) 29
AFX8010

Cylinder head

https://truckmanualshub.com/

Cylinder head - Dimension (B.10.A.72 - D.40.A.30) 29
AFX8010

Cylinder head - Torque (B.10.A.72 - D.20.A.10) 29
AFX8010

FUNCTIONAL DATA

ENGINE - Overview (B.10.A - C.10.A.10) 31
AFX8010

ENGINE - Static description (B.10.A - C.30.A.20) 33
AFX8010

Valve drive

Valve drive - Static description (B.10.A.40 - C.30.A.20) 34
AFX8010

Crankshaft

Crankshaft - Static description (B.10.A.43 - C.30.A.20) 35
AFX8010

Timing gear

Timing gear - Static description (B.10.A.45 - C.30.A.20) 37
AFX8010

Connecting rod and piston

Connecting rod and piston - Static description (B.10.A.47 - C.30.A.20) 38
AFX8010

Flywheel

Flywheel - Static description (B.10.A.50 - C.30.A.20) 40
AFX8010

Cylinder block

Cylinder block - Static description (B.10.A.70 - C.30.A.20) 41
AFX8010

Sensing system

Sensing system Camshaft speed sensor - Overview (B.10.A.95.82 - C.10.A.10) 42
AFX8010

Sensing system Flywheel speed sensor - Overview (B.10.A.95.83 - C.10.A.10) 43
AFX8010

SERVICE

ENGINE - Disassemble (B.10.A - F.10.A.25) 44
AFX8010

ENGINE - Assemble (B.10.A - F.10.A.20) 50
AFX8010

Valve drive

Valve drive - Disassemble (B.10.A.40 - F.10.A.25) 55
AFX8010

Valve drive - Measure (B.10.A.40 - F.40.A.16) 57
AFX8010

Valve drive - Assemble (B.10.A.40 - F.10.A.20) 59
AFX8010

Valve drive - Timing adjust (B.10.A.40 - F.45.A.64) 62
AFX8010

Valve drive - Clearance (B.10.A.40 - F.45.A.12) 65
AFX8010

Crankshaft

https://truckmanualshub.com/

Crankshaft - Measure (B.10.A.43 - F.40.A.16) 66
AFX8010

Crankshaft - Install (B.10.A.43 - F.10.A.15) 71
AFX8010

Timing gear

Timing gear - Disassemble (B.10.A.45 - F.10.A.25) 76
AFX8010

Timing gear - Assemble (B.10.A.45 - F.10.A.20) 79
AFX8010

Connecting rod and piston

Connecting rod and piston - Disassemble (B.10.A.47 - F.10.A.25) 81
AFX8010

Connecting rod and piston - Measure (B.10.A.47 - F.40.A.16) 82
AFX8010

Connecting rod and piston - Visual inspection (B.10.A.47 - F.40.A.10) 87
AFX8010

Connecting rod and piston - Assemble (B.10.A.47 - F.10.A.20) 89
AFX8010

Connecting rod and piston - Install (B.10.A.47 - F.10.A.15) 91
AFX8010

Flywheel

Flywheel - Install (B.10.A.50 - F.10.A.15) 93
AFX8010

Cylinder block

Cylinder block - Measure (B.10.A.70 - F.40.A.16) 94
AFX8010

Cylinder block - Replace (B.10.A.70 - F.10.A.30) 96
AFX8010

Cylinder head

Cylinder head - Disassemble (B.10.A.72 - F.10.A.25) 98
AFX8010

Cylinder head - Assemble (B.10.A.72 - F.10.A.20) 100
AFX8010

Cylinder head - Install (B.10.A.72 - F.10.A.15) 102
AFX8010

Cylinder head - Measure (B.10.A.72 - F.40.A.16) 103
AFX8010

Cylinder head - Rebore (B.10.A.72 - F.75.C.30) 105
AFX8010

DIAGNOSTIC

ENGINE - Troubleshooting (B.10.A - G.40.A.10) 106
AFX8010

https://truckmanualshub.com/

ENGINE - General specification (B.10.A - D.40.A.10)

AFX8010

Engine, technical type:	F3A E0684D*B001
Cycle	Diesel, 4-stroke
Injection	Direct
Number of on-line cylinders	6
Cylinder liners	Wet force-fitted in cylinder block
Piston diameter	**125 mm** (**4.9 in**)
Piston stroke	**140 mm** (**5.5 in**)
Total displacement	**10300 cm³** (**629 in³**)
Compression ratio mod.	**16.2 - 17.8**
Maximum power	**313 kW** (**420 Hp**)
Maximum power speed	**2100 RPM**
Number of main bearings	7
Sump	Steel

Rev counter	Incorporated in control panel
Operating system	From gear on camshaft

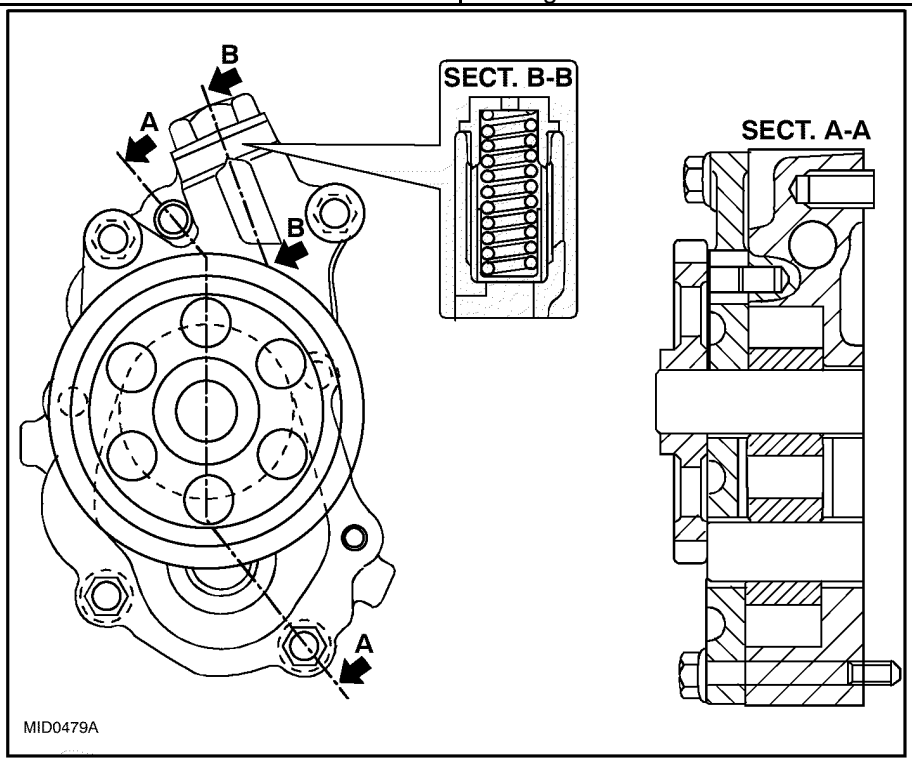


FIG_219 1

Overpressure valve. Pressure of starting opening. **9.4 - 10.8 bar** (**136 - 156 psi**)

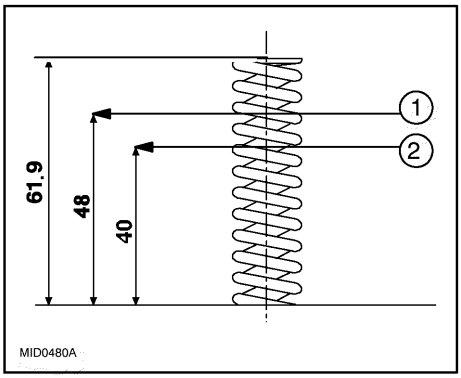
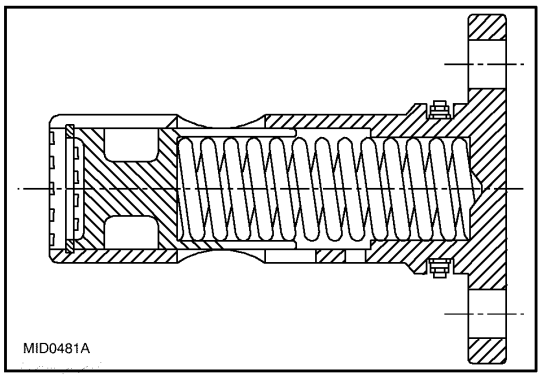


FIG_220 2

Main Data for Checking the Overpressure Valve Spring - 1. Load of **312 - 356 Nm** (**74.6 - 75.6 lb ft**. 2. Load of **502 - 550 Nm** (**113 - 123.8 lb ft**



mid0481a 3

Oil Pressure Control Valve - Pressure of starting opening **5 bar** (**72.5 psi**). The oil pressure control valve is located on the left side of the crankcase.

ENGINE - Torque (B.10.A - D.20.A.10)

AFX8010

Screw securing engine lifting bracket to cylinder head	M18x2	
First phase: Pre-torque	**120 Nm**	**88 lb ft**
Second phase: Angle closed	45 deg	
Screw securing engine lifting bracket to timing system gearbox	M16x2	
First phase: Pre-torque	**100 Nm**	**73 lb ft**
Second phase: Angle closed	60 deg	

ENGINE - Special tools (B.10.A - D.20.A.40)

AFX8010

Refer to the following information units for details of your Special Tools

Valve drive - Special tools (B.10.A.40 - D.20.A.40)
Crankshaft - Special tools (B.10.A.43 - D.20.A.40)
Connecting rod and piston - Special tools (B.10.A.47 - D.20.A.40)

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Flywheel - Special tools (B.10.A.50 - D.20.A.40)
Cylinder block - Special tools (B.10.A.70 - D.20.A.40)

Valve drive - General specification (B.10.A.40 - D.40.A.10)

AFX8010

Valve drive	Overhead valves operated by rocker arms via the camshaft located in the engine block; the camshaft is driven by the crankshaft using helical gears

Intake

- Start: before T.D.C.	16 deg
- End: after B.D.C.	32 deg

Exhaust

- Start: before T.D.C.	51 deg
- End: after B.D.C.	11 deg

Valve-rocker arm clearance for timing check	mm

Valve-rocker arm clearance (with engine cold):

Intake	**0.35 - 0.45 mm**	**0.014 - 0.018 in**
Exhaust	**0.35 - 0.45 mm**	**0.014 - 0.018 in**

Ignition sequence: 1-4-2-6-3-5

Start and clockwise rotation	Balance valves of cylinder no.	Adjust clearance of valves of cylinder no.	Adjust preload of injectors of cylinder no.
1 and 6 at TDC	6	1	5
120 °	3	4	1
120 °	5	2	4
120 °	1	6	2
120 °	4	3	6
120 °	2	5	3

Valve drive - Dimension (B.10.A.40 - D.40.A.30)

AFX8010

Diameter of valve guide bores in the cylinder head

14.980 - 14.997 mm	**0.5898 - 0.5904 in**

Valve guide external diameter

15.012 - 15.025 mm	**0.5910 - 0.5915 in**

Valve guide internal diameter (after fitting)

9.015 - 9.030 mm	**0.3549 - 0.3555 in**

Valve guide and bore interference in head

0.015 - 0.045 mm	**0.0006 - 0.0018 in**

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Valve guide oversizes

0.2 - 0.4 mm	**0.0079 - 0.0157 in**

Valve stem diameter

8.960 - 8.975 mm	**0.3528 - 0.3533 in**

Valve seat angle

Intake	60 deg - 30’	7’30"
Exhaust	45 deg - 30’	7’30"

Valve stem and relative guide assembly clearance

0.040 - 0.070 mm	**0.0016 - 0.0028 in**

Internal diameter of bore on head for valve seat

Intake	**44.185 - 44.220 mm**	**1.7396 - 1.7409 in**
Exhaust	**42.985 - 43.020 mm**	**1.6923 - 1.6937 in**

Valve seat external diameter

Intake	**44.260 - 44.275 mm**	**1.7425 - 1.7431 in**
Exhaust	**43.060 - 43.075 mm**	**1.6953 - 1.695 in**

Valve seat angle in cylinder head

Intake	60 deg	30 min
Exhaust	45 deg	30 min

Valve depth in relation to cylinder head surface

Intake	**0.65 - 0.95 mm**	**0.0256 - 0.0374 in**
Exhaust	**1.8 - 2.1 mm**	**0.0709 - 0.0827 in**

Valve seat and bore fit on cylinder head (interference)

0.040 - 0.090 mm	**0.0016 - 0.0035 in**

Valve mushroom-head diameter:

Intake	**42.985 - 43.015 mm**	**1.6923 - 1.6935 in**
Exhaust	**41.985 - 42.015 mm**	**1.6530 - 1.6541 in**

Maximum off-centering of the valve with the indicator resting in the center of the contact surface

0.03 mm	**0.0012 in**

Camshaft bushing seat diameter in cylinder head

88.000 - 88.030 mm	**3.4646 - 3.4657 in**

Camshaft support journal diameter

82.950 - 82.968 mm	**3.2657 - 3.2665 in**

Camshaft bushing external diameter

88.153 - 88.183 mm	**3.4706 - 3.4718 in**

Internal diameter of finished bushings in seats

83.018 - 83.085 mm	**3.2684 - 3.2711 in**

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Bush and seat interference in block

0.123 - 0.183 mm	**0.0048 - 0.0072 in**

Coupling between bushings and support journals of the camshaft (assembly clearance)

0.050 - 0.135 mm	**0.0020 - 0.0053 in**

Cam lift

Intake	**9.30 mm**	**0.3661 in**
Exhaust	**9.45 mm**	**0.3720 in**
Injector-pump	**11.21 mm**	**0.4413 in**

Rocker arm support shaft diameter

41.984 - 42.000 mm	**1.6529 - 1.6535 in**

Seat diameter for rocker arm support shaft bushings in rocker arms

Intake valves	**41.984 - 42.000 mm**	**1.6529 - 1.6535 in**
Exhaust valves	**41.984 - 42.000 mm**	**1.6529 - 1.6535 in**
Injectors-pump	**41.984 - 42.000 mm**	**1.6529 - 1.6535 in**

Bushing external diameter for rocker arms

Intake valves	**45.090 - 45.130 mm**	**1.7752 - 1.7768 in**
Exhaust valves	**59.100 - 59.140 mm**	**2.3268 - 2.3283 in**
Injectors-pump	**46.066 - 46.091 mm**	**1.8136 - 1.8146 in**

Bushing internal diameter for rocker arms with bushing fitted

Intake valves	**42.025 - 42.041 mm**	**1.6545 - 1.6552 in**
Exhaust valves	**56.030 - 56.049 mm**	**2.2059 - 2.2067 in**
Injectors-pump	**42.015 - 42.071 mm**	**1.6541 - 1.6563 in**

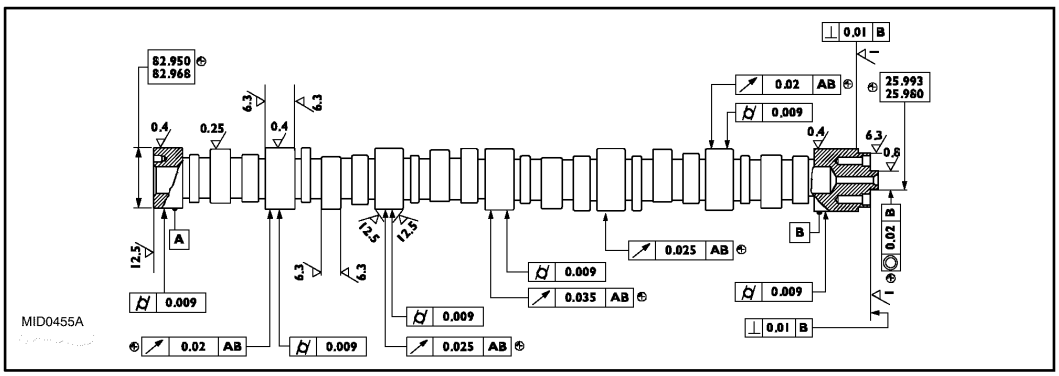
Clearance between bushings and rocker arm support shaft

Intake valves	**0.025 - 0.057 mm**	**0.0010 - 0.0022 in**
Exhaust valves	**0.025 - 0.057 mm**	**0.0010 - 0.0022 in**
Injectors-pump	**0.015 - 0.087 mm**	**0.0006 - 0.0034 in**

Coupling between bushings and seats in rocker arms

Intake valves	**0.074 - 0.130 mm**	**0.0029 - 0.0051 in**
Exhaust valves	**0.081 - 0.140 mm**	**0.0032 - 0.0055 in**
Injectors-pump	**0.050 - 0.091 mm**	**0.0020 - 0.0036 in**

Main Data of the Camshaft and Tolerances (Dimensions in mm)



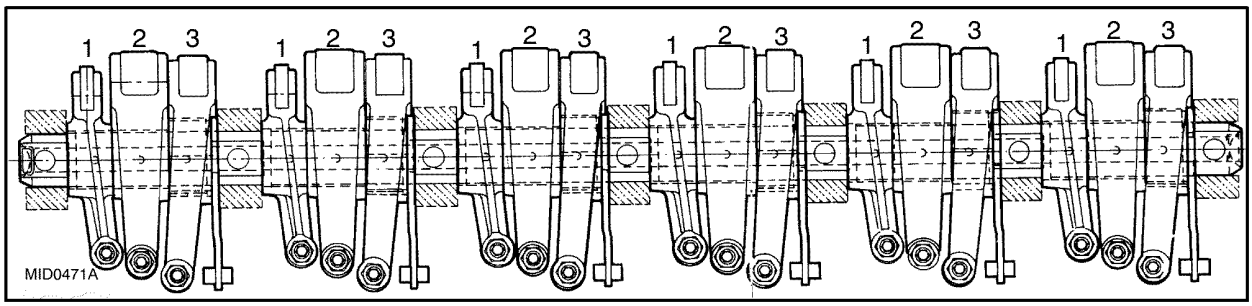
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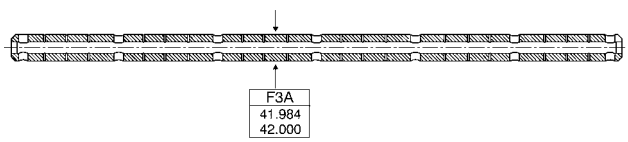
TOLERANCES	SUBJECT OF TOLERANCE	GRAPHIC SYMBOL
ORIENTATION	Perpendicularity	
POSITION	Concentricity or co-axiality	
OSCILLATION	Circular oscillation	

CLASSES OF IMPORTANCE ATTRIBUTED TO THE CHARACTERISTICS OF THE PRODUCT	GRAPHIC SYMBOL
CRITICAL	
IMPORTANT	
SECONDARY	

1. Intake valve rocker arm - 2. Injector rocker arm - 3. Exhaust valve rocker arm.

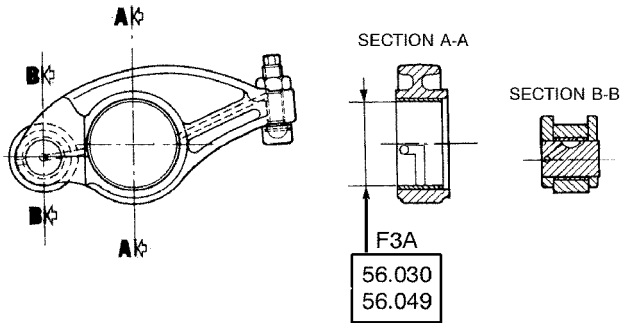


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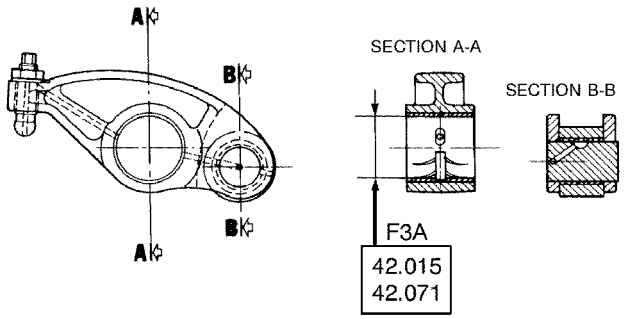
Main Data of the Rocker Arm Shaft (Dimensions in mm)



50034755 4

Exhaust Valve Rocker Arm - Main data for rocker arms (Dimensions in mm)

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50034756 5

Injector Pump Rocker Arms (Dimensions in mm)

Main Data for Checking the Oil Pressure Control Valve Spring

1. Load N	**189 - 199 Nm**	**139 - 147 lb ft**
2. Load N	**430 - 470 Nm**	**317 - 347 lb ft**
A mm	**68 Nm**	**50 lb ft**
B mm	**56 Nm**	**41 lb ft**
	40 Nm	**29 lb ft**

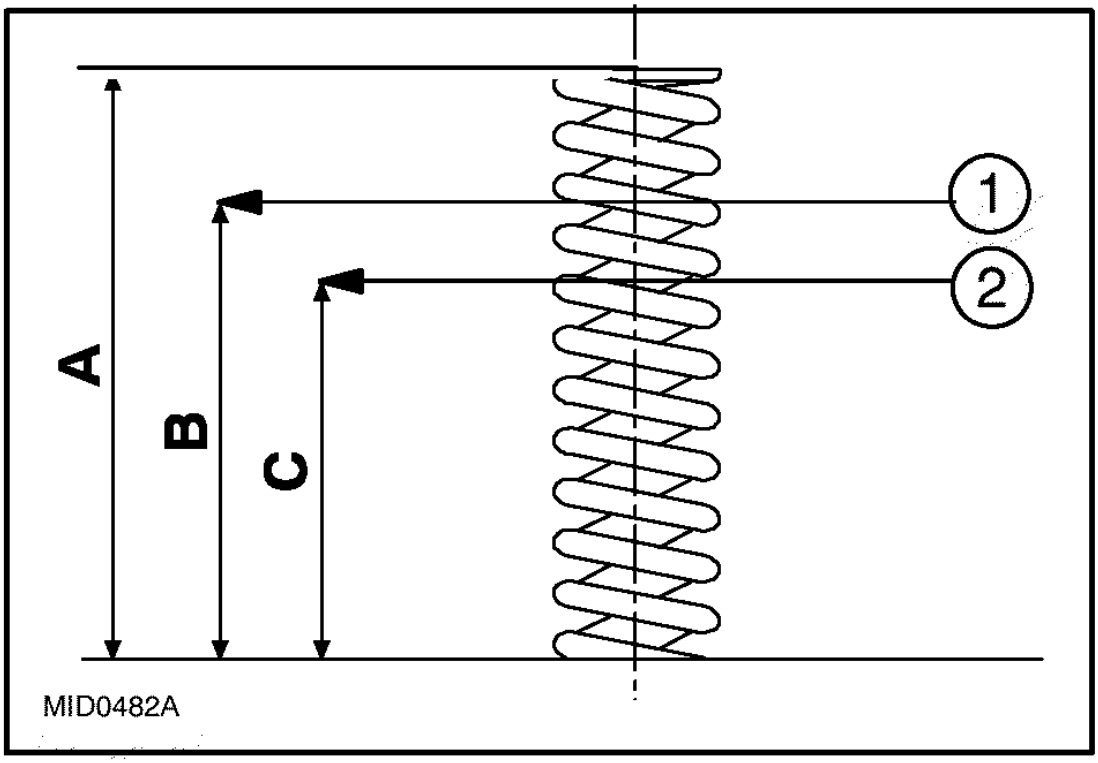
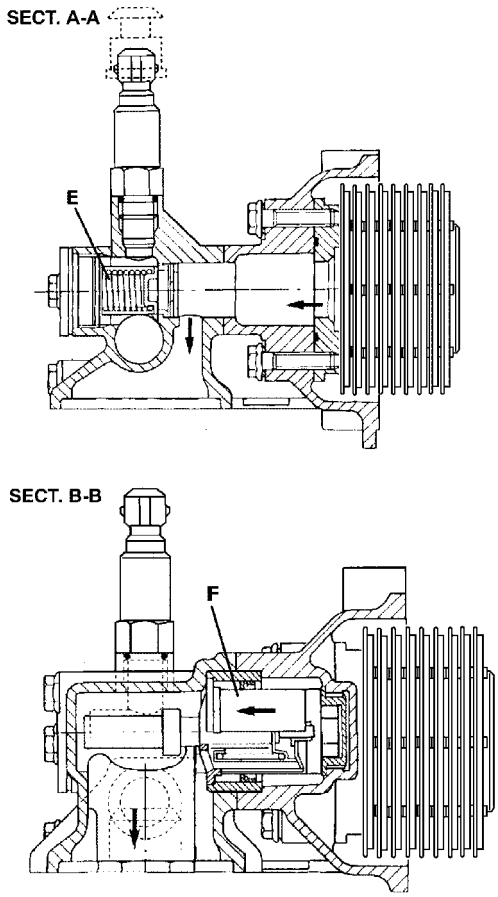


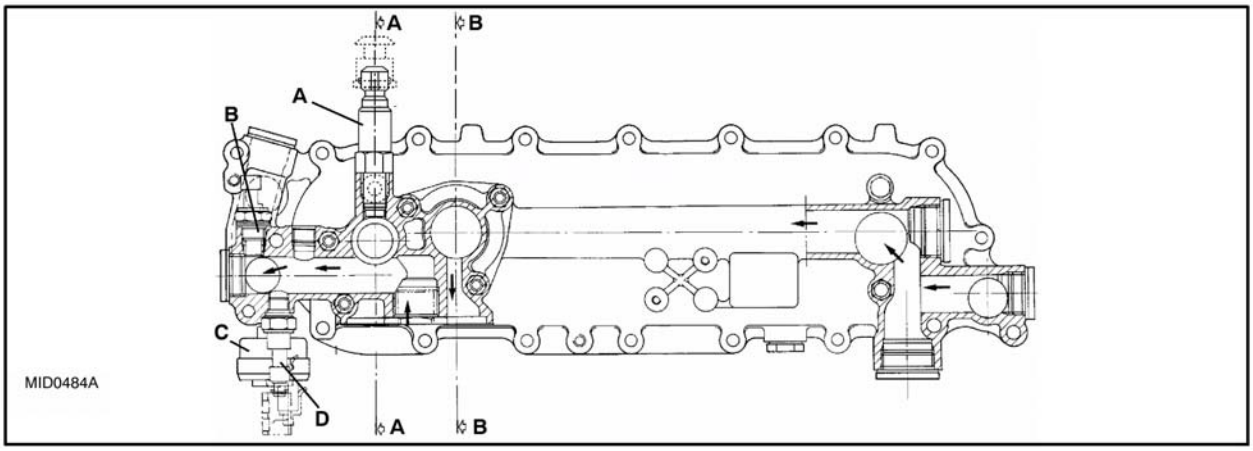
FIG_222 6

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50034757 7

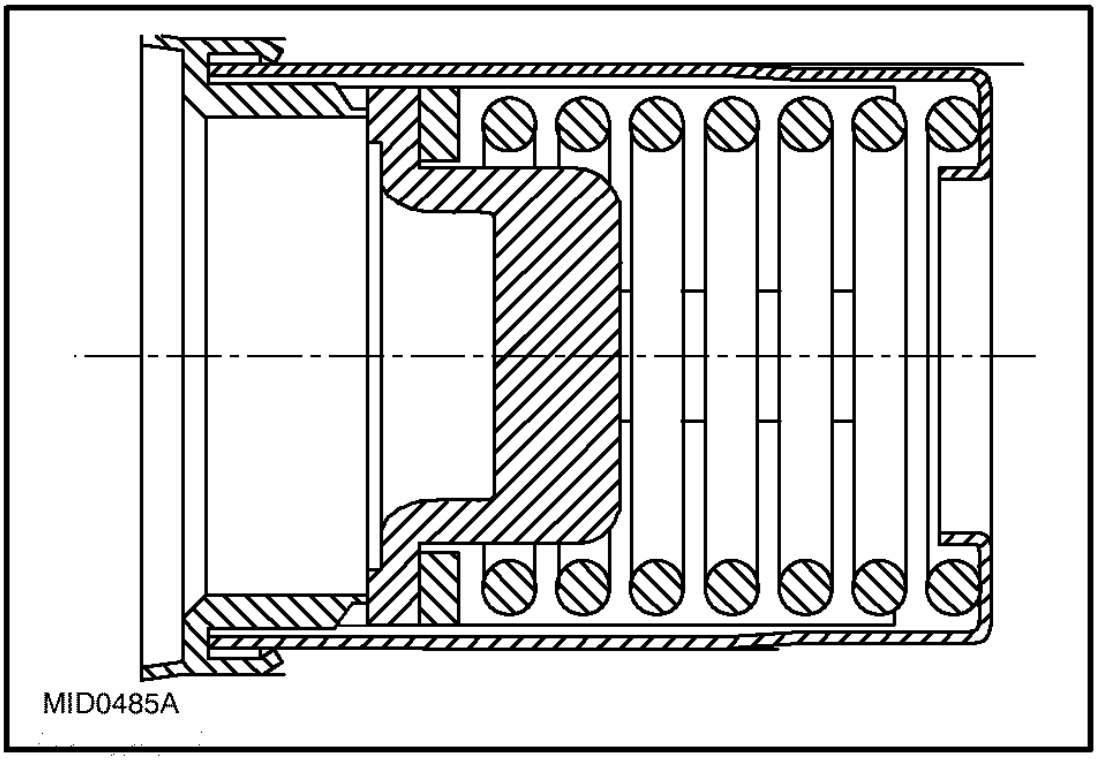
Heat Exchanger - The heat exchanger is fitted with: A. Oil filter clogging indicator; B. Oil temperature transmitter; C. Oil pressure transmitter; D. Low oil pressure switch; E. Filter bypass Valve, and F. Thermostat. Number of heat exchanger elements: 9.



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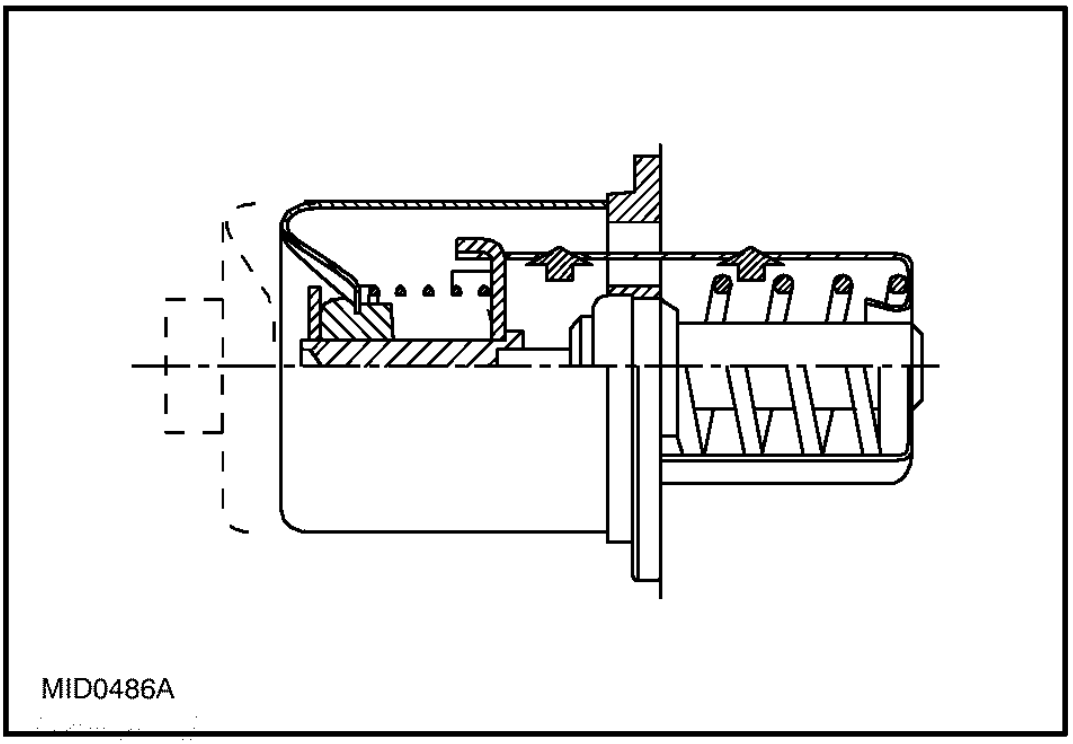
Bypass Valve - The valve quickly opens at a pressure of **3 bar** (**43.5 psi**).

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mid0485a 9

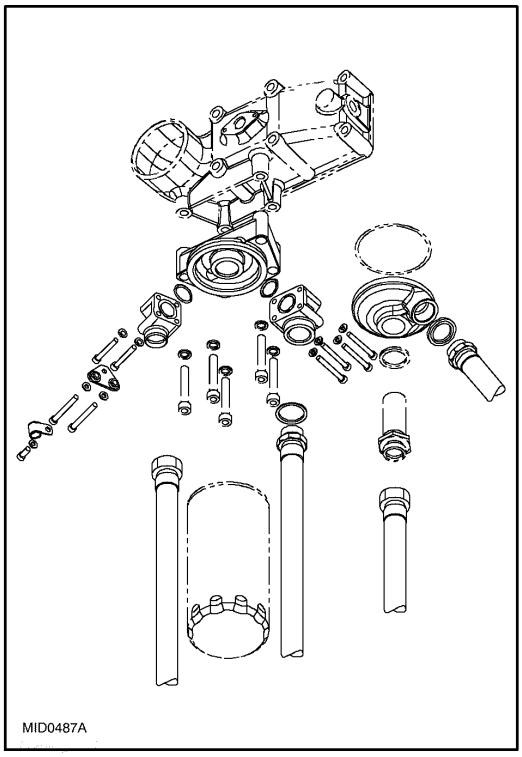
Thermostat Valve: Start of opening - travel **0.1 mm** (**0.004 in**) at a temperature of **80 - 84 °C** (**176 - 183.2 °F**); End of opening - travel **8 mm** (**0.315 in**) at a temperature of **87 °C** (**206.6 °F**).



mid0486a 10

High-filtration oil filter. When fitting the filters, observe the following: Oil the seals; screw the filters down to bring the seals into contact with the bases; tighten the filter to a torque of **35 - 40 Nm** (**25 - 29 lb ft**).

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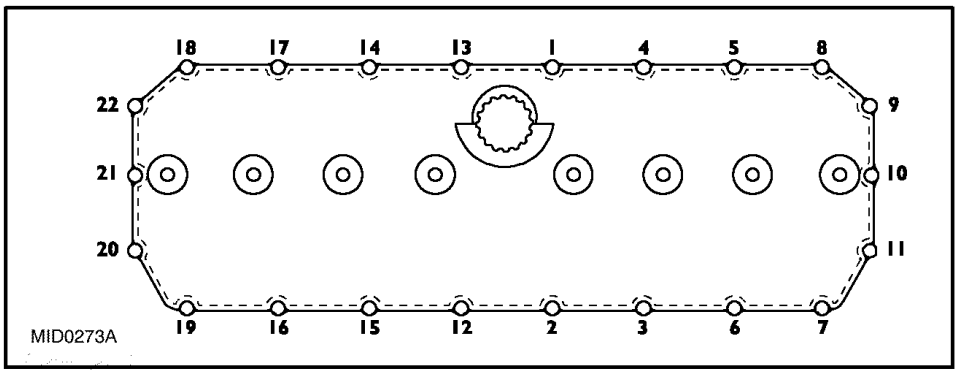
mid0487a 11

IMPORTANT: *Always replace the ring seals every time after removing the pipes or taking the covers off the oil filter mount.*

Valve drive - Torque (B.10.A.40 - D.20.A.10)

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Screw securing rocker arm cover	M6x1	**7 - 10 Nm**	**62 - 88 lb in**



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Screw securing rocker arm shaft (Before assembly, lubricate with engine oil)	M16x1.5

First phase: Pre-torque	**100 Nm**	**73 lb ft**

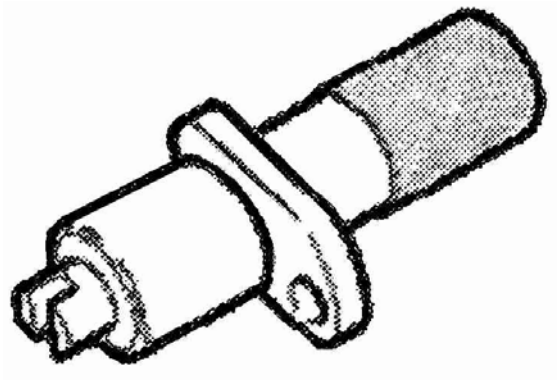
Second phase: Angle closed	60 deg

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Lock nut for injector fixing brackets (Before assembly, lubricate with engine oil)	M10x1.25	**34 - 44 Nm**	**25 - 31 lb ft**

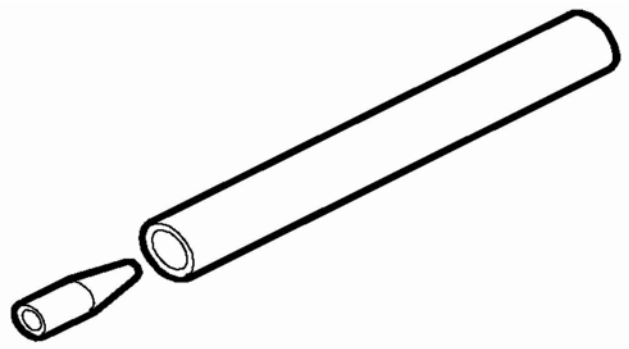
Valve drive - Special tools (B.10.A.40 - D.20.A.40)

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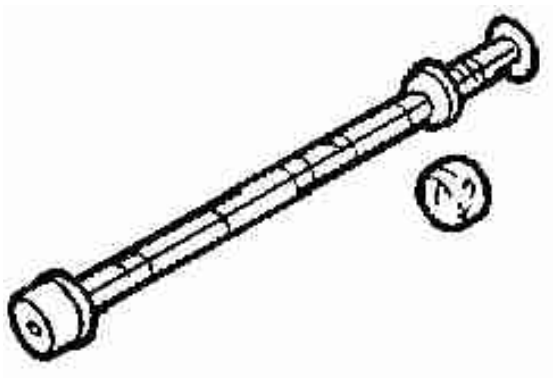
380000151 1

380000151 - Camshaft Phonic Disc Setting Tool



380000139 2

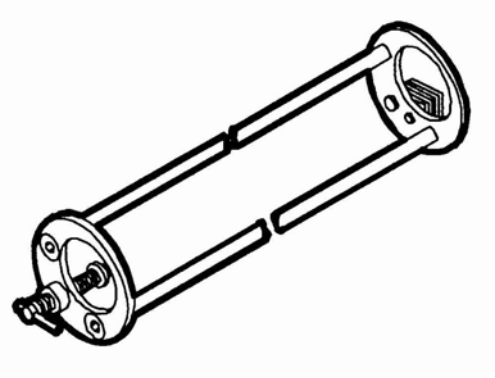
380000139 - Valve Guide Seal Installer



380000146 3

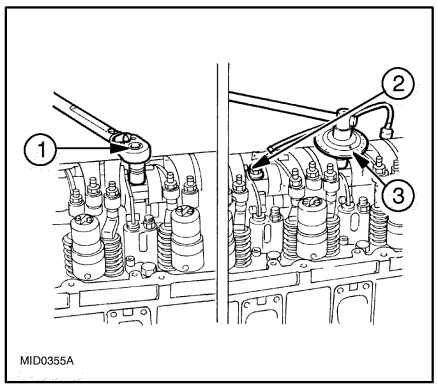
380000146 - Camshaft Bushing Remover/Installer

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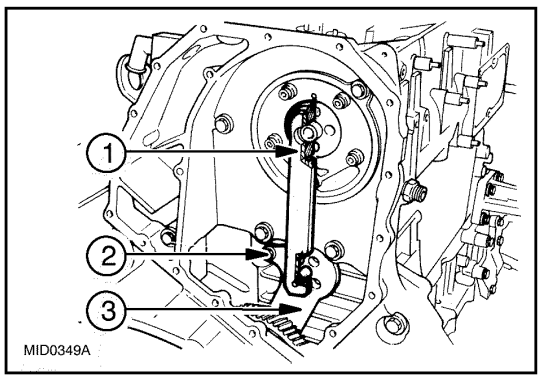
380000148 4

380000148 - Rocker Shaft Remover/Installer



mid0355a 5

380000304 - Pair of Gauges for Measuring Angular Torque



mid0349a 6

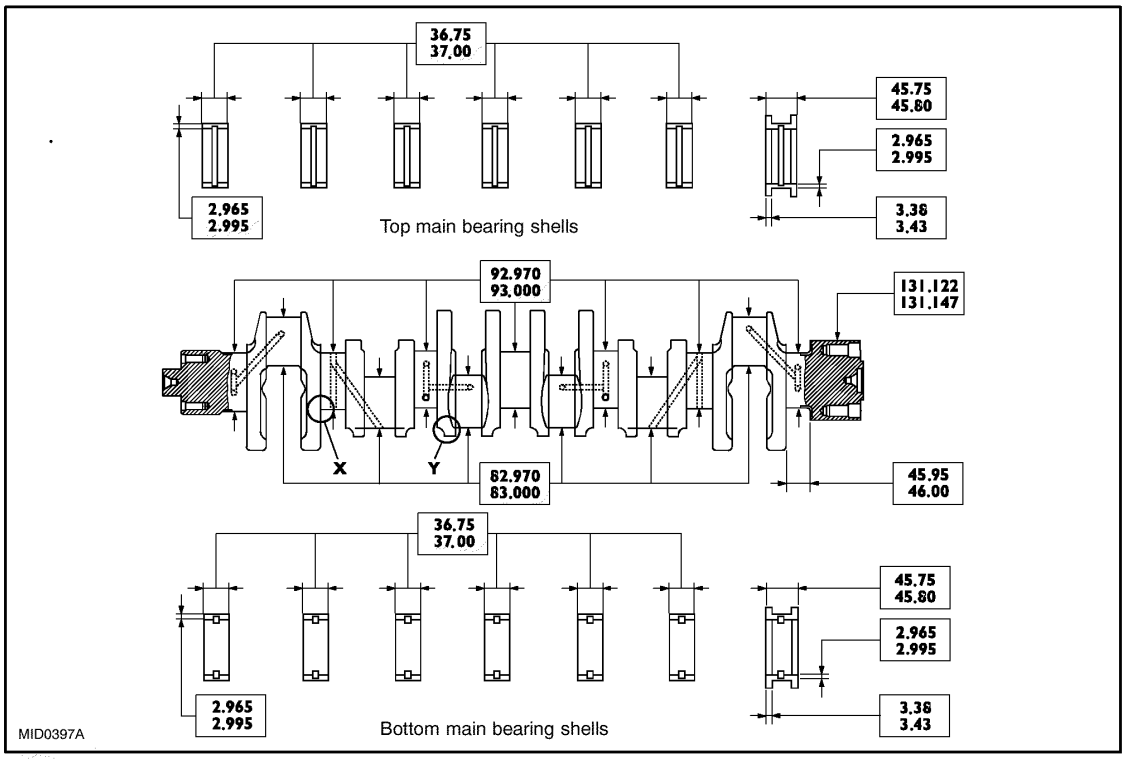
380000167 - Gauges

Crankshaft - Dimension (B.10.A.43 - D.40.A.30)

AFX8010

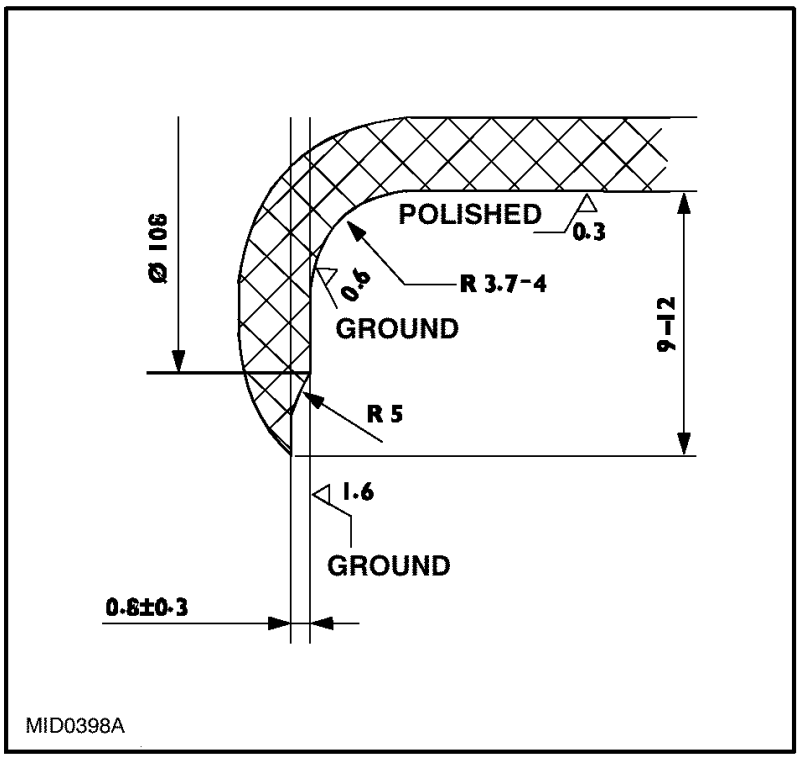
The main data for a crankshaft and main bearing shells are shown in the figure above.

https://truckmanualshub.com/



280820031390789 1

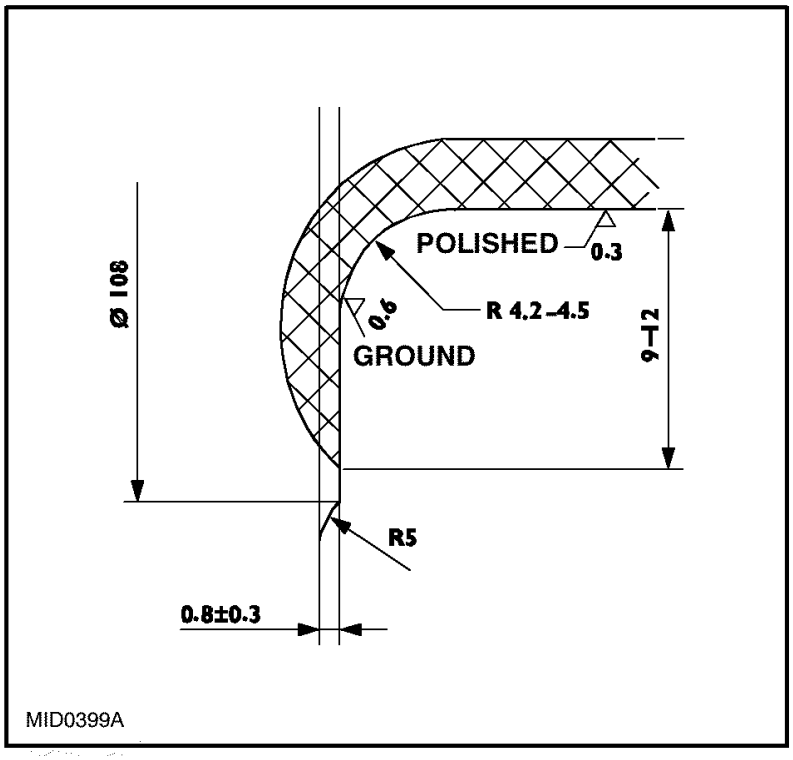
(X) The figure above shows the details of the fittings of the main journals.



280820031391878 2

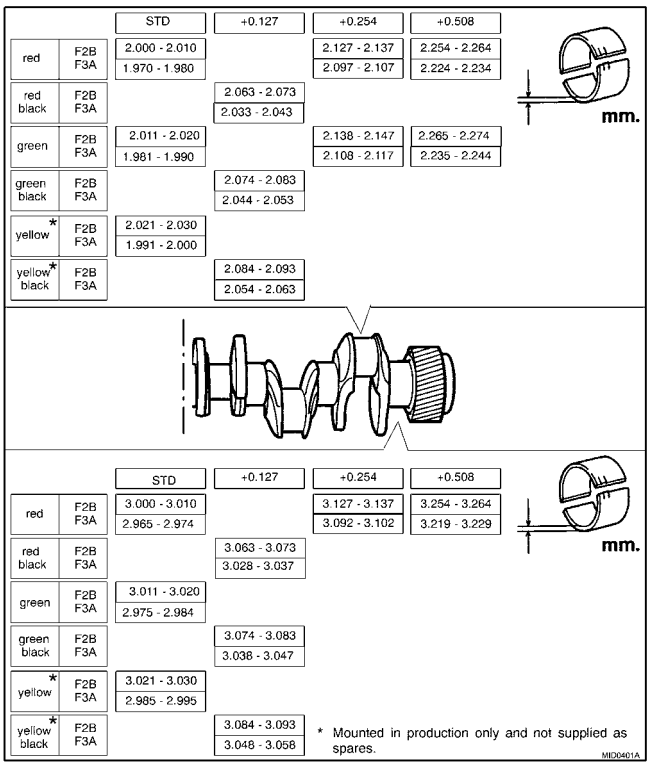
(Y) The figure above shows the details of the fittings of the main journals.

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280820031392431 3

To obtain the required assembly clearances, the main and big end bearing shells need to be selected as described above. This operation makes it possible to identify the most suitable half bearings for each of the pins of the shaft (the half bearings may even be of a different class from one pin to another). Depending on the thickness, the half bearings are selected in classes of tolerance, marked by a color (red/green - red/black - green/black). The data above gives the characteristics of the main and big end bearing shells available as spares in the standard (STD) sizes and in the permissible oversizes (**0.127 mm**, **0.254 mm**, **0.508 mm** [**0.0050 in**, **0.0100 in**, **0.0200 in**]).

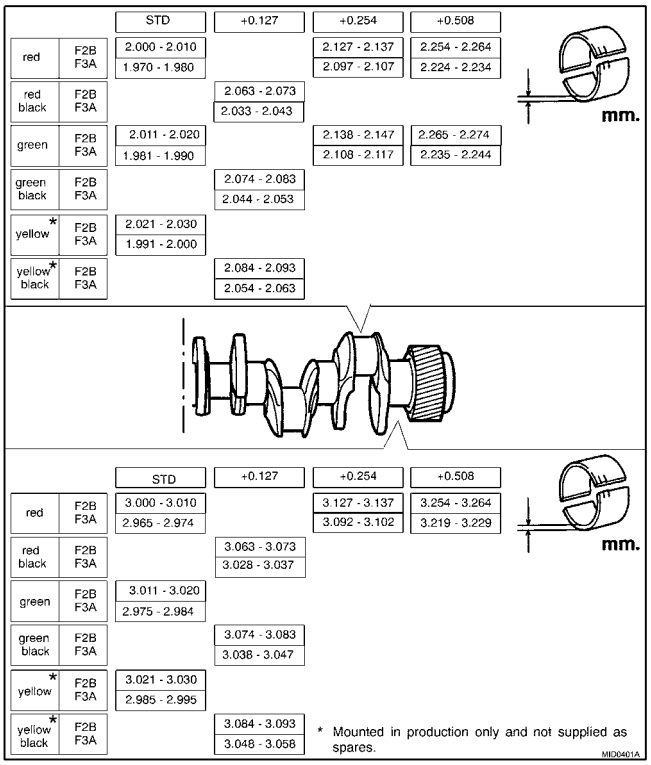


280820031399055 4

For each of the pins of the crankshaft, it is necessary to carry out the following: Main Journals - determine the class of diameter of the seat in the crankcase; determine the class of diameter of the main journal and choose the class of half bearings to fit; Crankpins - determine the class of diameter of the seat in the connecting rod; determine the class of diameter of the crankpin and choose the class of half bearings to fit; Selecting Small End Bearings (Pins With Nominal Diameter) - two sets of figures are marked on the front of the crankcase, in the position shown (top

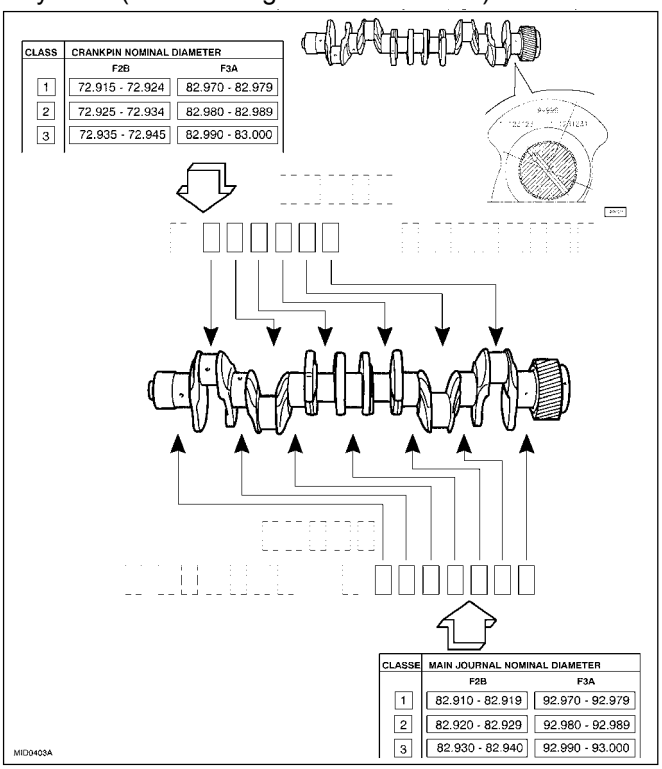
https://truckmanualshub.com/

section of figure above), a four-digit number represents the coupling number of the crankcase with its respective sub-crankcase, the following seven digits, taken singly, represent the class of diameter of each of the main bearing seats to which they refer (bottom section of figure above) and each of these digits may be 1, 2 or 3.



280820031399055 5

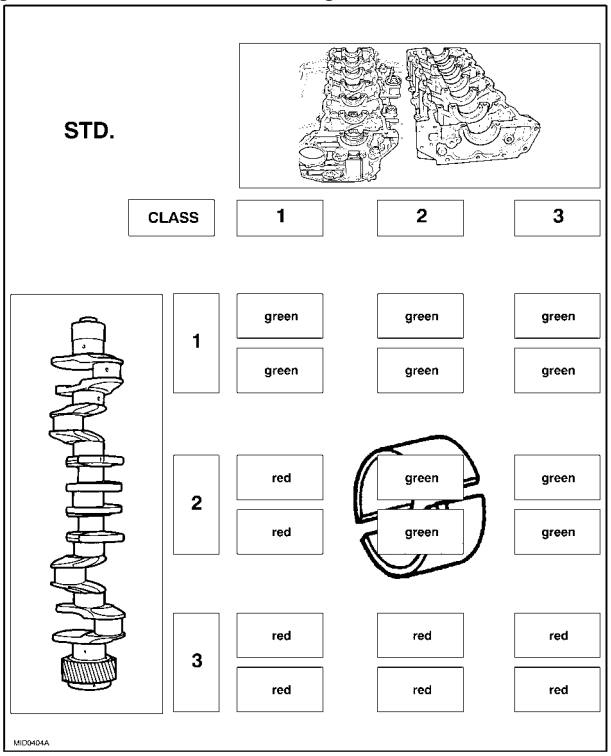
Main journals and crankpins: determining the class of diameter of the pins. Three sets of figures are marked on the crankshaft, in the position shown by the arrow (top of figure shown above): the first number, comprising five digits, is the serial number of the shaft; underneath this number, on the left, a set of six digits refers to the crankpins and is preceded by a single digit, which indicates the status of the pins (1 - STD, 2 = -0.127 [0.0050"]), the other six digits, taken singly, represent the class of diameter of each of the crankshafts to which they refer. The set of seven digits on the right side refers to the main journals and is preceded by a single digit, which indicates the status of the pins (1 - STD, 2 = 0.127 [0.0050]). The other seven digits taken singly represent the class of diameter of each of the main journals to which they refer (bottom of figure shown above).



280820031400886 6

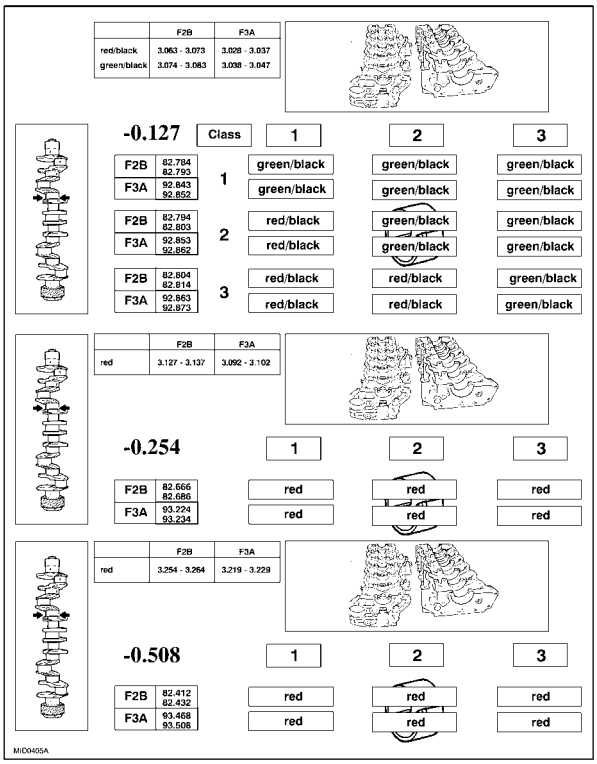
https://truckmanualshub.com/

After measuring the essential data, for each of the main journals on the crankcase and crankshaft, choose the type of half bearings to use according to the information in the figure above.



280820031402021 7

If the pins have been ground, the procedure described thus far cannot be applied. In this case, it is necessary to check that the new diameter of the pins is as indicated in the figure above and to fit the only type of half bearings contemplated for the undersize at issue.



280820031402195 8

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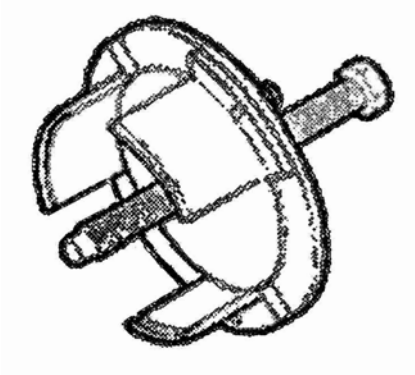
Crankshaft - Torque (B.10.A.43 - D.20.A.10)

AFX8010

Screw securing crankshaft gasket cover	M8x1.25	**23 - 27 Nm**	**203 - 238 lb in**

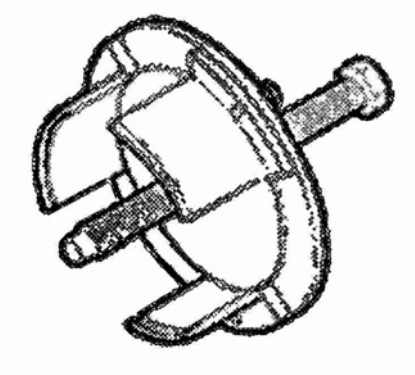
Crankshaft - Special tools (B.10.A.43 - D.20.A.40)

AFX8010



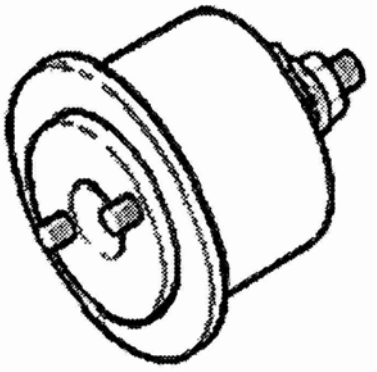
380000121 1

380000120 - Crankshaft Front Seal Puller



380000121 2

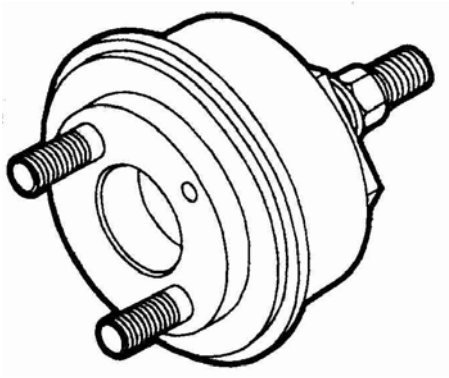
380000121 - Crankshaft Rear Seal Puller



380000126 3

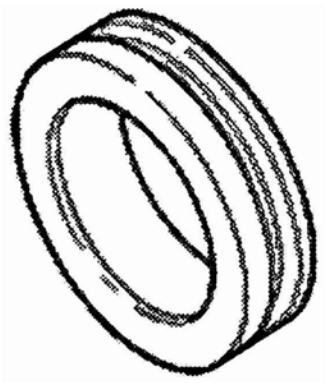
380000126 - Crankshaft Front Oil Seal Installer

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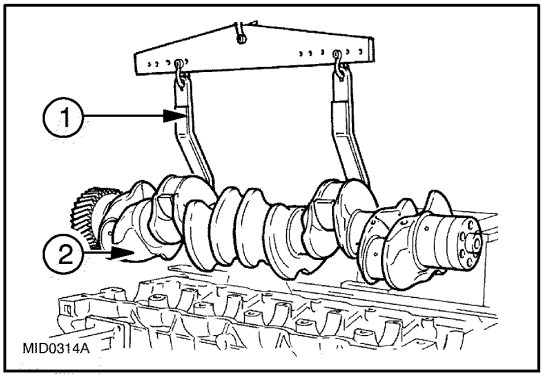
380000127 4

380000127 - Crankshaft Rear Oil Seal Installer



380000169 5

380000169 - Crankshaft Front Oil Seal and Cover



mid0314a 6

380000362 - Crankshaft Removal Tool

Timing gear - Torque (B.10.A.45 - D.20.A.10)

AFX8010

Screw securing camshaft gear (Before assembly, lubricate with engine oil)	M14x2

First phase: pre-torque	**60 Nm**	**44 lb ft**

Second phase: angle closed	60 deg

Screw securing phonic wheel to timing system gear	M6x1	**7 - 10 Nm**	**62 - 88 lb in**

Screw securing middle gear pins (Before assembly, lubricate with engine oil)	M12x1.75

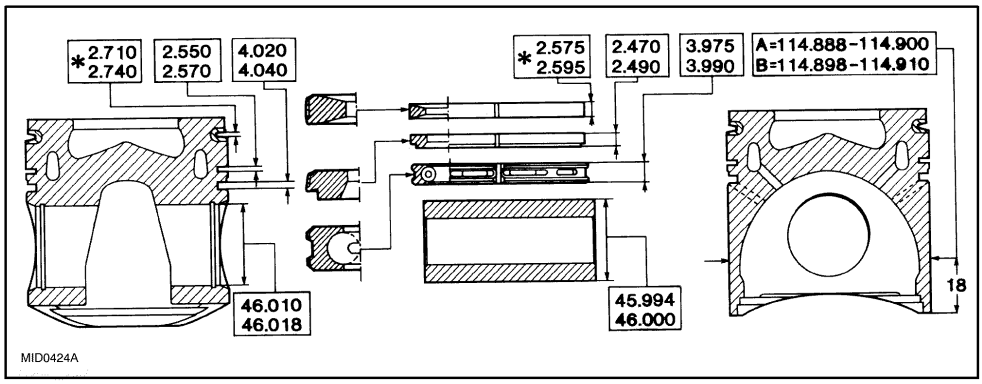
First phase: pre-torque	**30 Nm**	**265 lb in**

Second phase: angle closed	90 deg

Screw securing connecting rod for transmission gear adjustment (Before assembly, lubricate with engine oil)	M8x1.25	**22.5 - 27.5 Nm**	**199 - 243 lb in**

Connecting rod and piston - Dimension (B.10.A.47 - D.40.A.30)

AFX8010



mid0424a 1

The figure above contains data for piston, piston rings and pin. (* is measured on O 120 mm).

Pistons

Standard piston diameter measured from skirt base:	**10 mm**	**0.7480 in**

Pistons

Standard piston diameter measured from skirt base:	19

Class A (Pistons supplied as spare parts.)	**124.881 - 124.890 mm**	**4.9166 - 4.9168 in**
Class B (Class B pistons are assembled solely in production and are not supplied as spares.)	**124.890 - 124.899 mm**	**4.9168 - 4.9137 in**

Pin seat diameter

50.010 - 50.018 mm	**1.9689 - 1.9692 in**

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Piston assembly clearance - cylinder liners

0.110 - 0.134 mm	**0.0043 - 0.0053 in**

Piston pin diameter

49.994 - 50.000 mm	**1.9683 - 1.9685 in**

Piston pin - pin seat clearance

0.010 - 0.024 mm	**0.0004 - 0.0009 in**

Piston ring seat depth

1st seat (measured on diameter **120 mm** (**4.724 in**))	**2.94 mm**	**0.116 in**
2nd seat	**3.05 - 3.07 mm**	**0.120 - 0.121 in**
3rd seat	**4.02 - 4.04 mm**	**0.158 - 0.159 in**

Piston ring thickness

1st ring (measured on diameter **120 mm** (**4.724 in**))	**2.796 - 2.830 mm**	**0.1101 - 0.1114 in**
2nd ring	**2.970 - 3.000 mm**	**0.1169 - 0.1181 in**
3rd ring	**3.970 - 3.990 mm**	**0.1563 - 0.1571 in**

Piston ring - seat clearance

1st ring	**0.110 - 0.144 mm**	**0.0043 - 0.0057 in**
2nd ring	**0.050 - 0.100 mm**	**0.0020 - 0.0039 in**
3rd ring	**0.030 - 0.070 mm**	**0.0012 - 0.0028 in**

Piston ring end gap in cylinder liner

1st ring	**0.35 - 0.50 mm**	**0.0138 - 0.0020 in**
2nd ring	**0.60 - 0.75 mm**	**0.0024 - 0.0295 in**
3rd ring	**0.35 - 0.65 mm**	**0.0138 - 0.0256 in**

Small end bushing seat diameter

54.000 - 54.030 mm	**2.1260 - 2.1272 in**

Small end bearing seat diameter

Nominal	**87.000 - 87.030 mm**	**3.4252 - 3.4264 in**
Class 1	**87.000 - 87.010 mm**	**3.4252 - 3.4256 in**
Class 2	**87.011 - 87.020 mm**	**3.4256 - 3.4606 in**
Class 3	**87.021 - 87.030 mm**	**3.4260 - 3.4264 in**

Small end bushing diameter

External diameter	**54.085 - 54.110 mm**	**2.1293 - 2.1303 in**
Internal diameter (with bushings fitted)	**50.019 - 50.035 mm**	**1.9693 - 1.9699 in**

Small end bushing - seat interference

0.055 - 0.110 mm	**0.0022 - 0.0043 in**

Piston pin - bushing clearance

0.019 - 0.041 mm	**0.0007 - 0.0016 in**

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Connecting rod half bearing undersizes	**0.127 mm**	**0.0050 in**
	0.254 mm	**0.0100 in**
	0.508 mm	**0.0200 in**

Tolerance for parallelism between the two connecting rod axes

Measured **125 mm (4.921 in)**	**0.08 mm**	**0.0031 in**

Flywheel - Torque (B.10.A.50 - D.20.A.10)

AFX8010

Screws securing engine flywheel (Before assembly, lubricate with engine oil)	M18x1.5

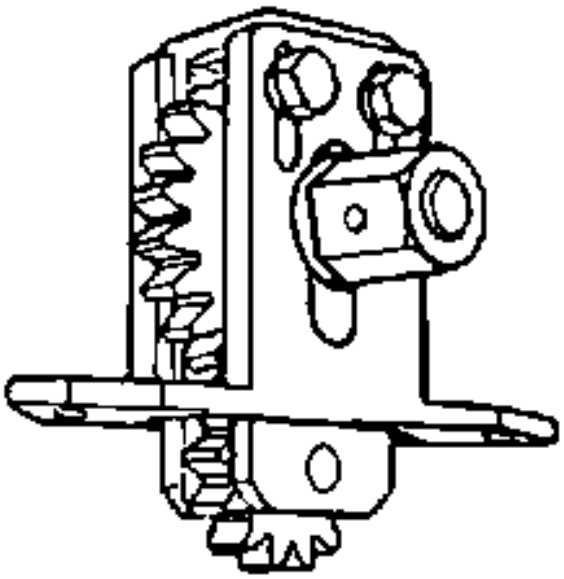
First phase: angle closed	**120 Nm**	**88 lb ft**

Second phase: angle closed	60 deg

Third phase: angle closed	30 deg

Flywheel - Special tools (B.10.A.50 - D.20.A.40)

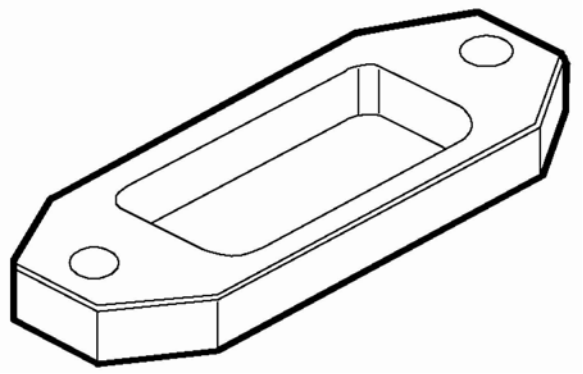
AFX8010



380000137 1

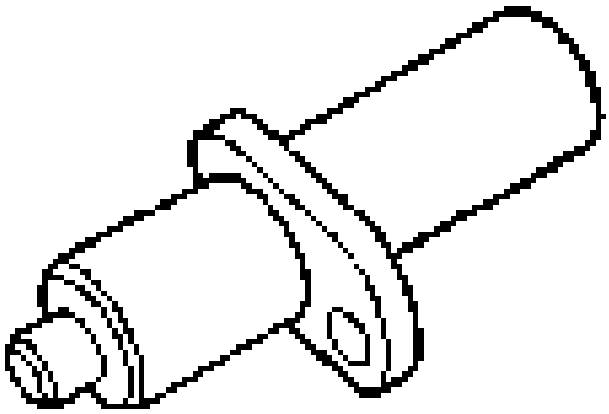
380000137 - Flywheel Turn Adaptor

https://truckmanualshub.com/



380000138 2

380000138 - Adaptor



380000150 3

380000150 - Top Dead Center Setting Tool

Cylinder block - Dimension (B.10.A.70 - D.40.A.30)

AFX8010

Diameter of cylinder liner bores on block

Upper	**142.000 mm (5.5906 in)**	**142.025 mm (5.5915 in)**
Lower	**140.000 mm (5.5118 in)**	**140.025 mm (5.5128 in)**

Cylinder liners - external diameter

Upper	**141.961 mm (5.5890 in)**	**141.986 mm (5.5900 in)**
Lower	**139.890 mm (5.5075 in)**	**139.915 mm (5.5085 in)**

Cylinder liner interference - bores on block

Upper	**0.014 mm (0.0006 in)**	**0.064 mm (0.0025 in)**
Lower	**0.085 mm (0.0033 in)**	**0.135 mm (0.0053 in)**

Cylinder liner external diameter oversizes	-

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Cylinder liners - internal diameter driven in and machined

Class A	**125.00 mm (4.9213 in)**	**125.013 mm (4.9218 in)**
Class B	**125.011 mm (4.9217 in)**	**125.014 mm (4.9222 in)**
Protrusion of cylinder liner from crankcase	**0.045 mm (0.0018 in)**	**0.075 mm (0.0030 in)**

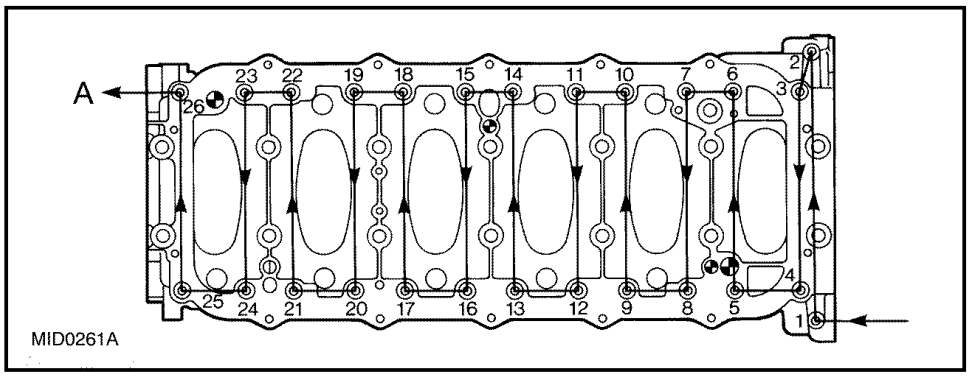
Cylinder block - Torque (B.10.A.70 - D.20.A.10)

AFX8010

Screws securing sub-crankcase to crankcase (see Figs. 1-2-3-4-5) (Before assembly, lubricate with engine oil)

External screws - First phase: pre-torque

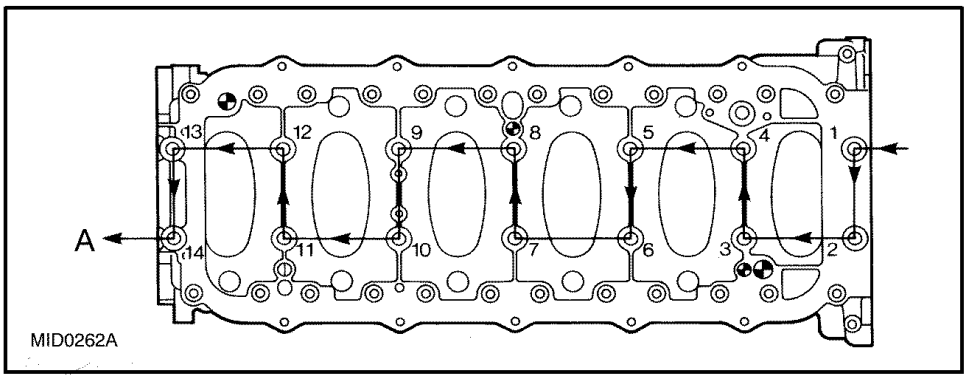
M12x1.75	**30 Nm**	**265 lb in**



MID0261A 1

Internal screws - Second phase: pre-torque

M17x2	**120 Nm**	**88 lb ft**

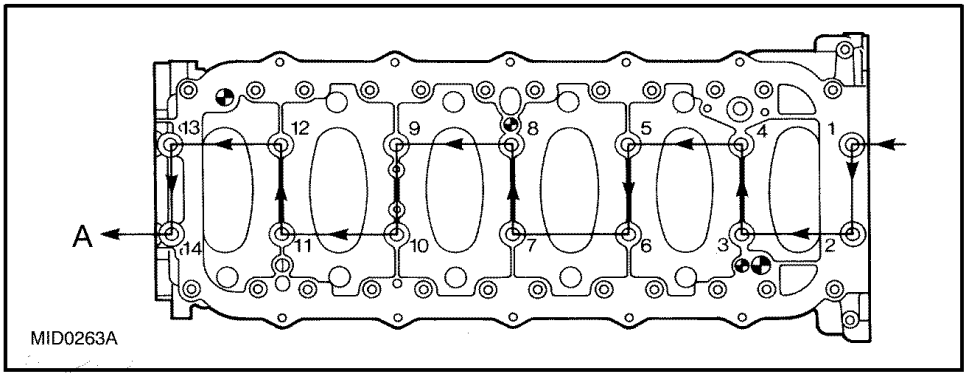


mid0262a 2

Internal screws - Third phase: angle closed

M17x2	90 deg

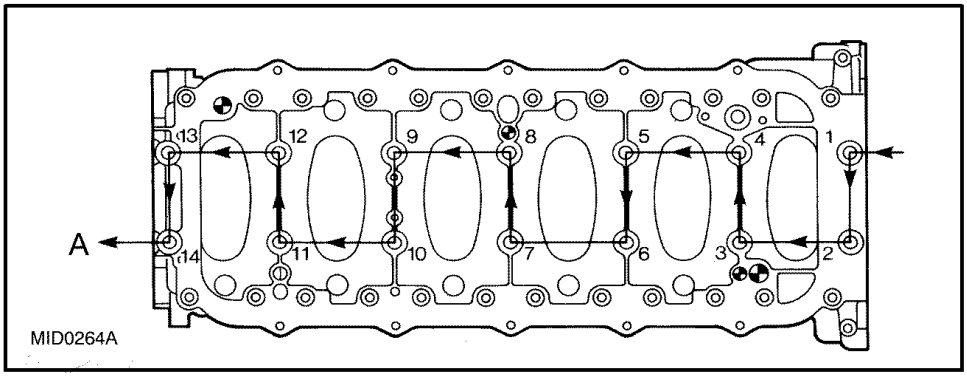
https://truckmanualshub.com/



mid0263a 3

Internal screws - Fourth phase: angle closed

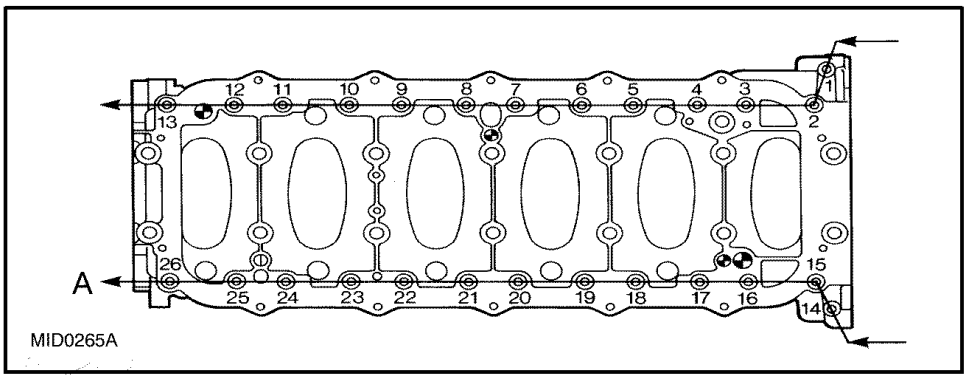
M17x2	45 deg



mid0264a 4

External screws - Fifth phase: angle closed

M17x1.75	60 deg



mid0265a 5

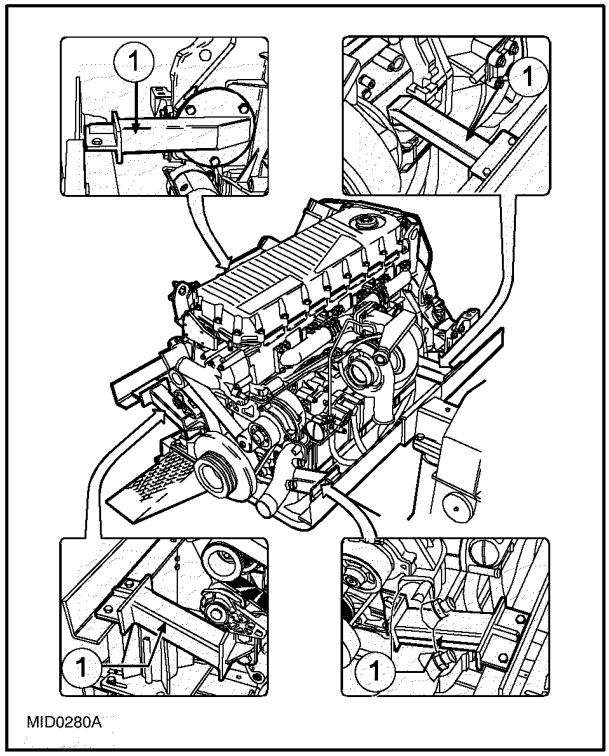
Screws securing gearbox to crankcase

M12x1.25	**56 - 70 Nm**	**41 - 51 lb ft**

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Cylinder block - Special tools (B.10.A.70 - D.20.A.40)

AFX8010



mid0280a 1

380000155 - Brackets (1)

Cylinder head - Dimension (B.10.A.72 - D.40.A.30)

AFX8010

Cylinder Head - Timing System	F3A
Free spring height	**75 mm 2.9528 in**
Under a load of N - (kg) [lbs.] **475 - 525 N 47.5 - 52.5 kg 114.5 - 115.5 lb** height	**61 mm 2.4016 in**
924 - 1020 N 94.7 - 99.7 kg 199.5 - 219.5 lb height	**47.8 mm 1.8819 in**
Injector protrusion	**1.14 mm 0.0449 in / 1.4 mm 0.0551 in**

Cylinder head - Torque (B.10.A.72 - D.20.A.10)

AFX8010

Screw securing cylinder head (Before assembly, lubricate with engine oil)	M17x2

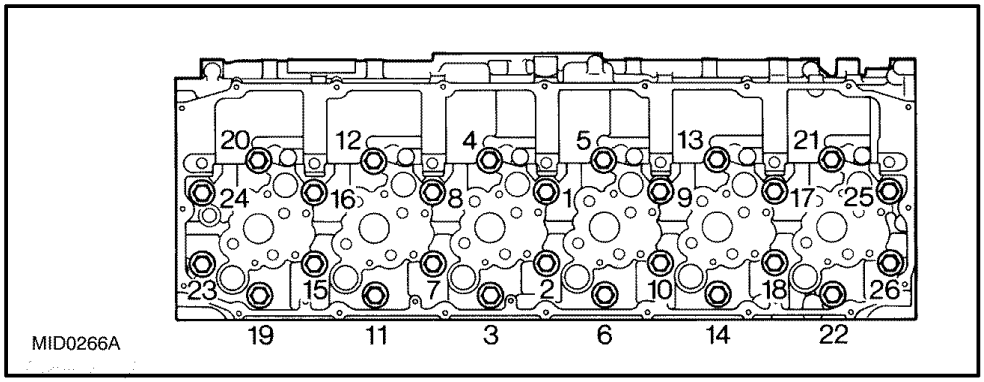
First phase: Pre-torque	**60 Nm**	**44 lb ft**

Second phase: Pre-torque	**120 Nm**	**88 lb ft**

Third phase: Angle closed	120 deg

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Fourth phase: Angle closed	60 deg



mid0266a 1

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ENGINE - Overview (B.10.A - C.10.A.10)

AFX8010

Engine - Left Side View

Ref.	Description
1	Coolant Temperature Sensor (for Instrument)
2	Coolant Temperature Sensor (for EDC)
3	Coolant Return Line from Turbocharger
4	Oil Delivery Line to Turbocharger
5	Turbocharger
6	Exhaust Manifold
7	Cam Cover
8	Oil Filter Mount and Intercooler
9	Oil Return Line from Turbocharger
10	Coolant Delivery Line to Turbocharger
11	Flywheel Sensor

Engine - Right Side View

Ref.	Description
1	Cam Cover with Filter and Blow-By Valve
2	Rocker Cover
3	Filter Mount with Fuel Temperature Sensor
4	Intake Manifold with Heater Element and Air Sensor
5	Fuel Feed Pump
6	Starter Motor
7	Air Compressor
8	Electronic Control Unit
9	A.C. Compressor

Engine - Front View

Ref.	Description
1	Alternator
2	Alternator
3	Thermostat Case
4	Fixed Drive Pulley for Poly-V Belt
5	Coolant Pump
6	Poly-V Belt
7	Air Conditioner Compressor Drive Belt
8	Tensioner for Belt "I"
9	Viscostatic Damping Flywheel

Engine - Rear View

Ref.	Description
1	Turbocharger
2	Blow by Valve
3	Blow by Filter
4	Engine Flywheel

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5	Inspection Hole for Positioning Flywheel During Adjustments
6	Window for Applying Flywheel Rotation Tool

Engine - Top View

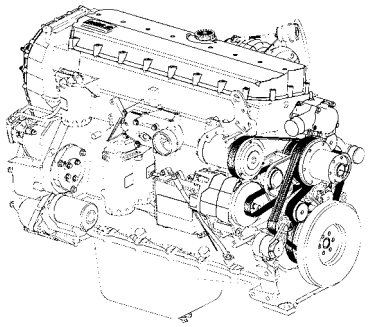
Ref.	Description
1	Flywheel Cover Casing
2	Exhaust Manifold
3	Turbocharger
4	Fitting
5	Rocker Cover
6	Compressed Air Line

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ENGINE - Static description (B.10.A - C.30.A.20)

AFX8010

The 10.3L engine is a six cylinder turbocharged and aftercooled diesel engine. The engine uses an electronically controlled mechanical injection pump and has been designed to meet current emission regulations. The injection system on this engine is a high pressure type with the pump/injector operated by an overhead camshaft. The electronic control unit is physically identical for all versions, but contains software specific to each engine family and to each different power rating within individual families. During service, the control unit software cannot be altered, except to enter certain configuration data when required.



20034763 1

Unlike conventional injection systems (with a single injection pump), the new injector pump injection system reduces particulate levels due to the high pressures generated. The sophisticated electronic management system also reduces other pollutants. The engine must only be serviced by an authorized service agent. The engine features cross-flow cylinder heads, with inlet and exhaust manifolds on opposite sides of the cylinder head. The fuel and air combustion process takes place in the specially designed bowl in the crown of the pistons.

https://truckmanualshub.com/

Valve drive - Static description (B.10.A.40 - C.30.A.20)

AFX8010

The camshaft turns on seven mounts (without removable caps), which are built into the cylinder head and fitted with bushings. There are three drive cams per cylinder.



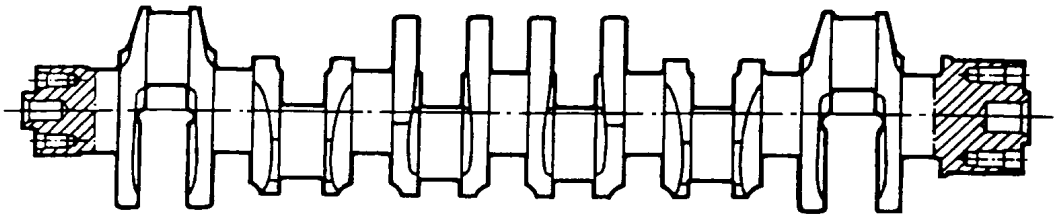
20034768 1

https://truckmanualshub.com/

Crankshaft - Static description (B.10.A.43 - C.30.A.20)

AFX8010

The crankshaft is steel, with built-in counterweights. The main journals and crankpins are treated by induction hardening. The crankshaft is mounted on half bearings, the last of these is close to the flywheel and comprises built-in side shoulders. On this crankshaft, the throws are arranged so that the firing order is different to that of conventional 6 cylinder in-line engines. The firing order of the engine is 1-4-2-6-3-5. The crankpins and half-bearings are sorted into three thickness categories, with a difference of .01 mm between one category and the next. When servicing, carefully select the category of half-bearing to be fitted to each main journal and crankpin in order to ensure radial clearance is maintained within specified limits.



20015804a 1

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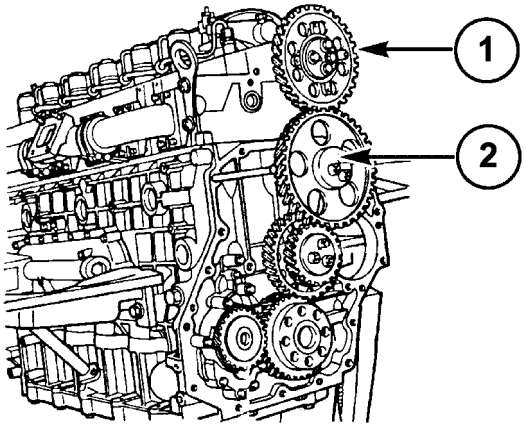
The crankshaft front and rear sealing rings are the Rotostat sliding type. The rings take the form of a washer **(1)**, fitted directly onto the crankshaft, a sealing lip **(2)** and a case **(3)**, fitted into a seat on the front cover or flywheel cover case. This type of seal offers the advantage of creating a seal on the washer (at point **(4)**), instead of directly on the shaft. This type of seal is more effective, because it is not affected by side-to-side shaft movements and the shaft itself does not become grooved. Special tools must be used to remove and refit these seals.

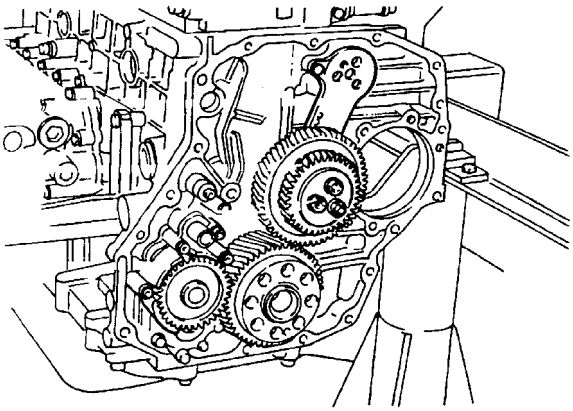
https://truckmanualshub.com/

Timing gear - Static description (B.10.A.45 - C.30.A.20)

AFX8010

The camshaft is driven by a series of helical gears in a cascade unit located to the rear of the engine. The upper intermediate gear **(2)**, is fitted on an adjustable mount. This maintains the correct clearance between this gear and gear **(1)**whose position is affected by head gasket thickness tolerances. The center of rotation of all other gears is fixed and determined by machining. Timing gears are not marked with notches or codes as on conventional models because gear timing adjustment is no longer necessary on the new engines.



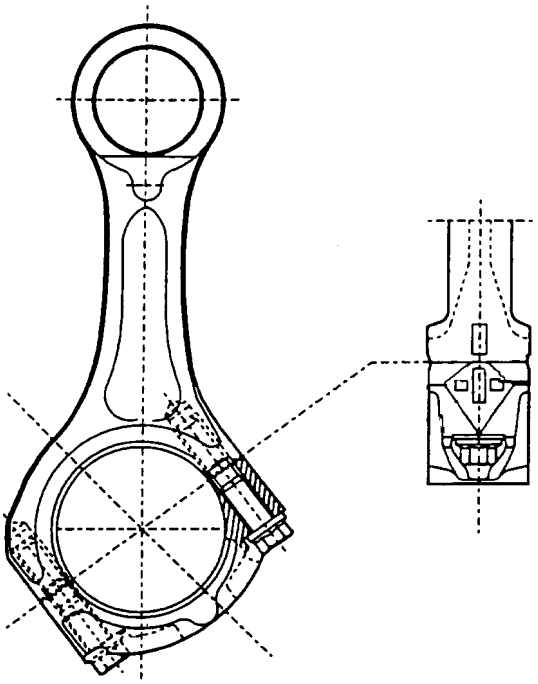


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Connecting rod and piston - Static description (B.10.A.47 - C.30.A.20)

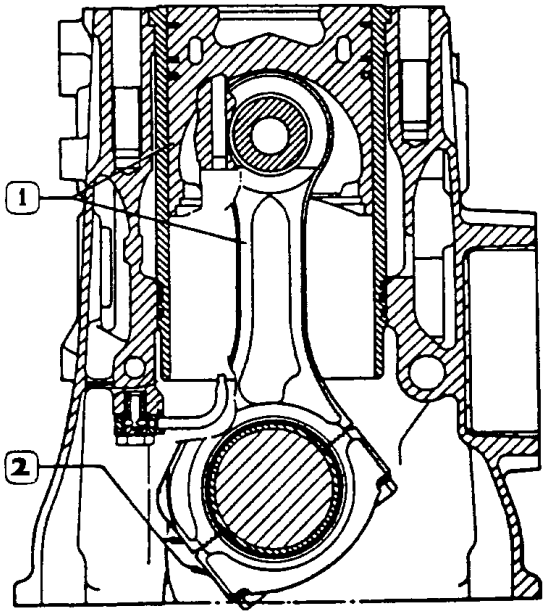
AFX8010



20034766 1

The connecting rods are oblique-cut type, in pressed steel, with broaching on mating surfaces between rod and cap. Data on weight category, half-bearing seat bore category and rod/cap mating numbers are stamped on the connecting rod.

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20034767 2

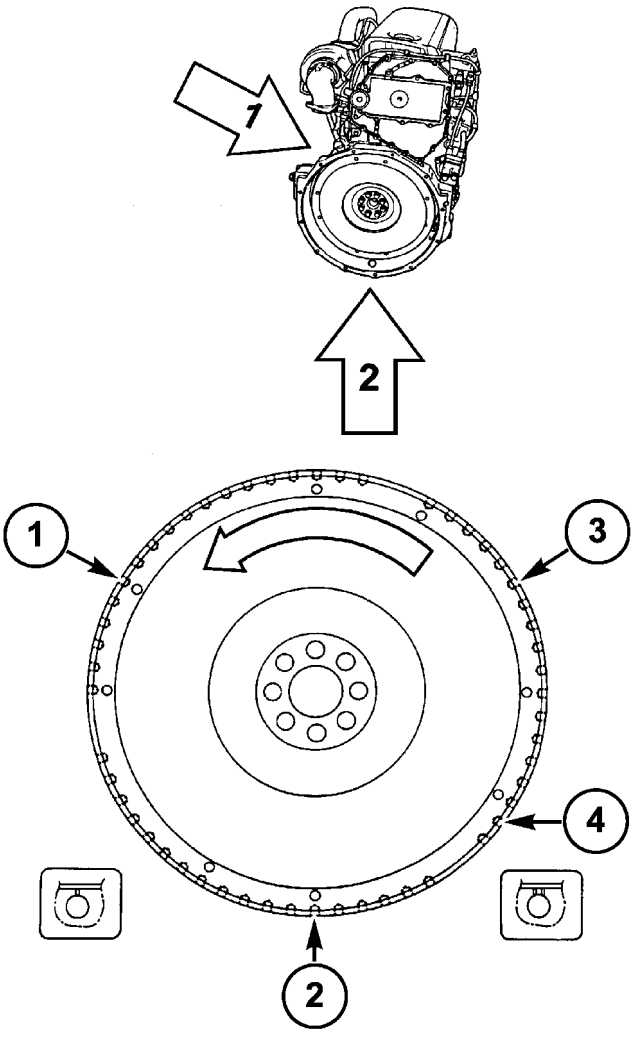
The pistons are fitted with three piston rings. The first sealing ring is trapezoid in cross-section, the second sealing ring is chamfered, and the third is a scraper ring. Pistons are sorted into two categories, **(1)** and **(2)**, according to diameter. They are elliptical in shape and made out of aluminum alloy. The piston crown includes a high-turbulence combustion chamber.

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Flywheel - Static description (B.10.A.50 - C.30.A.20)

AFX8010

A locating dowel is used to ensure the flywheel is fitted to the crankcase in a single fixed position. The flywheel performs conventional functions (balancing mass, mount for starter ring gear and frictional surface), while also acting as a phonic wheel for a sensor connected to the electronic control unit. For this purpose, fifty-four holes have been made. These are divided into three sectors of eighteen holes each. Each of these sectors is linked to one pair of crankpins (1-6, 2-5, 3-4). The electronic system does not require the holes to be specially marked, but some (**(1)**, **(2)**, **(3)** and **(4)**, lower figure) are notched to allow repairers to carry out certain adjustments and timing settings. The sixth hole of each sector (**(1)**, **(2)** and **(3)**, lower figure) is marked with a notch. The seventeenth hole of one of the sectors (**(4)**, lower figure) is marked with two notches. The angular position of the flywheel at every instant is detected by the EDC control unit by means of an induction sensor (**(1)**, upper figure). The holes marked with notches should be aligned alternatively with the inspection hole (**(2)**, upper figure) in the flywheel cover casing during adjustment and timing setting.



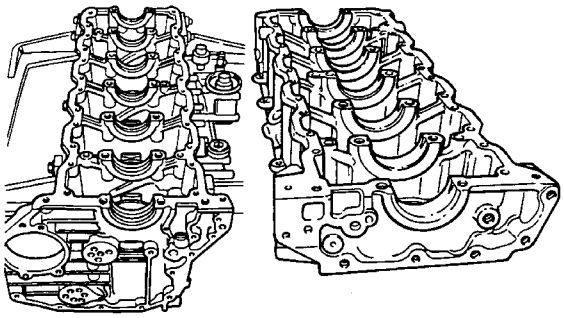
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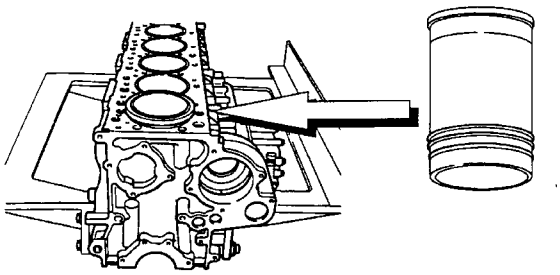
Cylinder block - Static description (B.10.A.70 - C.30.A.20)

AFX8010

The structure comprises of an engine block, which is attached to a separate base. The seal between the engine block and base is ensured by a layer of sealant. The wet cylinder liners are fitted into the engine block. They are interchangeable and can be removed. Water tightness is assured by rubber washers fitted in the lower part of the cylinder liners. Cylinder liner protrusion can be adjusted using shims, which are available as spares.
The main journal seats are machined with both parts of the engine block fitted together. The inner finish of the cylinder block structure are so well engineered that part deformation is not possible and engine oil consumption is therefore exceptionally low. Liner bores are sorted into two categories; Category A and Category B. A piston of a corresponding category is then matched with each cylinder liner.



20015803 1

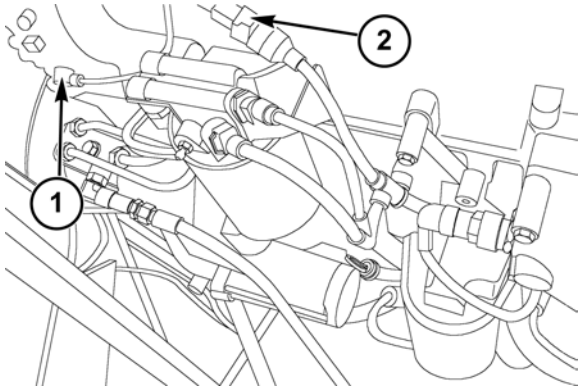


20015829 2

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Sensing system Camshaft speed sensor - Overview (B.10.A.95.82 - C.10.A.10)

AFX8010



40033790C4 1

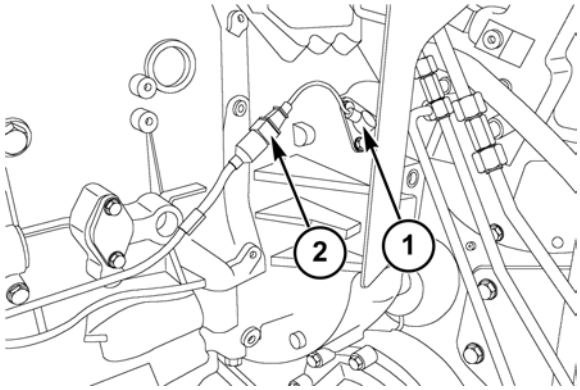
The engine camshaft RPM sensor B-07 **(1)** monitors the camshaft speed for timing purposes, and sends the information to the ECU module connector **X192** pins 2 & 14. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0413-02 SEG Signal Data Incorrect
E0413-03 SEG Signal Short to High Source
E0413-04 SEG Signal Short to Low Source

For additional information on the engine camshaft RPM sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Sensing system Flywheel speed sensor - Overview (B.10.A.95.83 - C.10.A.10)

AFX8010



40033794A4 1

The engine flywheel RPM sensor B-05 **(1)** monitors the flywheel speed for timing purposes, and sends the information to the ECU module connector **X192** pins 1 & 13. This information is used by the ECU module to control fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0412-02 INK Signal Data Incorrect
E0412-03 INK Signal Short to High Source
E0412-04 INK Signal Short to Low Source

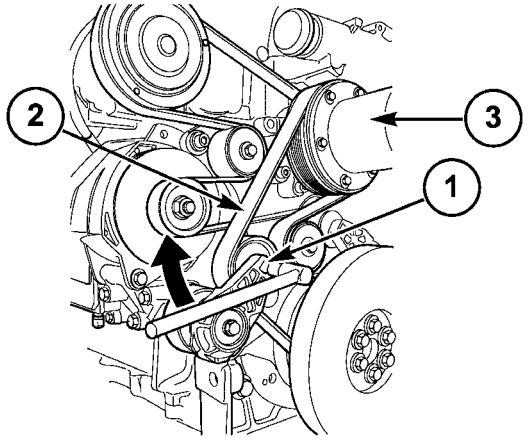
For additional information the engine flywheel RPM sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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ENGINE - Disassemble (B.10.A - F.10.A.25)

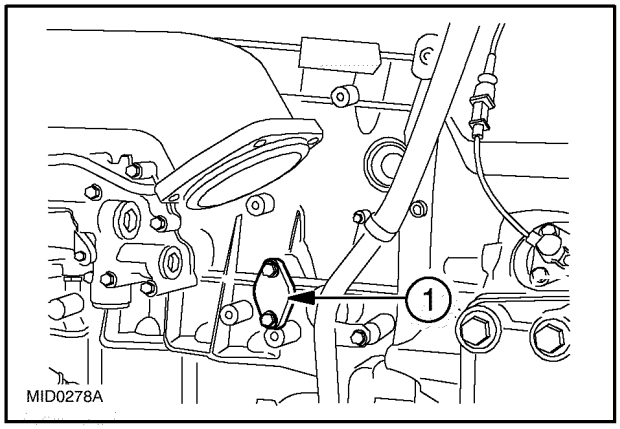
AFX8010

1. Protect or cover engine electrical parts before washing the engine with a high-pressure washer. Before securing the engine on the rotary stand, remove the electric cable from the engine, disconnecting it from the control unit and from all the sensors/transmitters to which it is connected. With an appropriate tool **(1)**, turn in the direction of the arrow on the tightener and remove the fan belt **(2)** from the fan **(3)**. Remove the compressor, together with the engine mount.



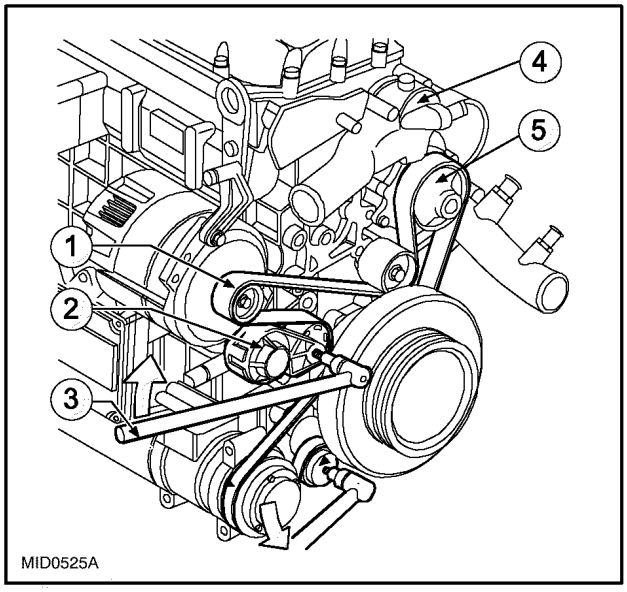
50034738A5 1

2. Remove the oil pressure adjustment valve **(1)**.



mid0278a 2

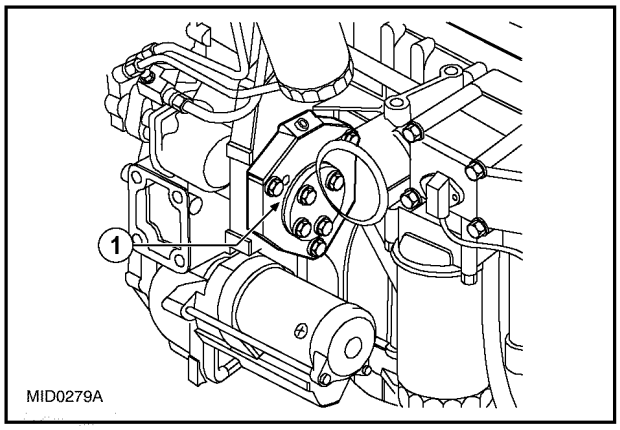
3. Drain off the coolant from the engine cooling system. Using a suitable tool **(3)**, turn in the direction of the arrow on the tightener **(2)** and remove the drive belt **(1)**. Take out the fixing screws and remove the water pump **(5)**. For refitting, reverse the removal operations, fitting a new ring seal on the water pump and tightening the fixing screws to the required torque, as noted in **Water pump - Torque (B.50.A.20 - D.20.A.10)**. To remove the thermostat, remove the fixing screws and disconnect the thermostat box **(4)**. Reverse this step if replacing the thermostat and install a new gasket. Upon completion, fill the cooling system with the required type and amount of coolant.



MID0498B 3

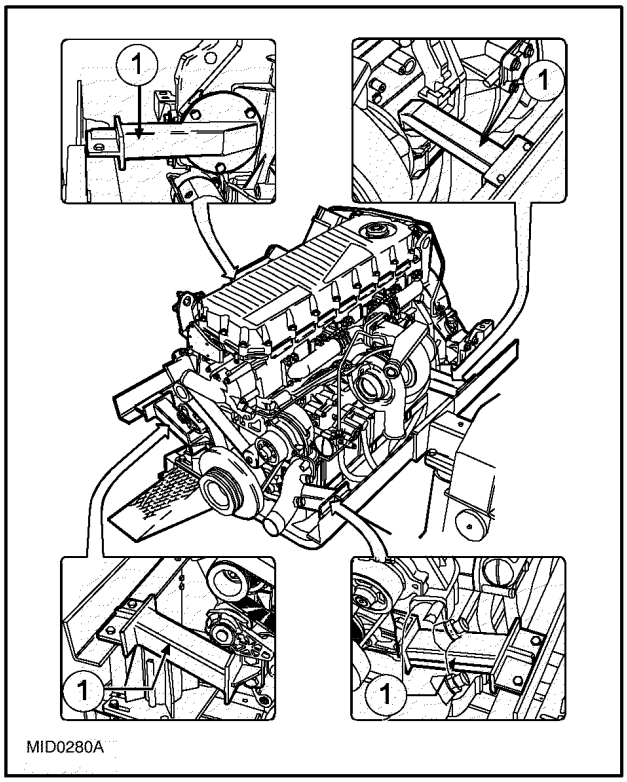
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4. Remove the engine mounts. Remove the drive **(1)**.



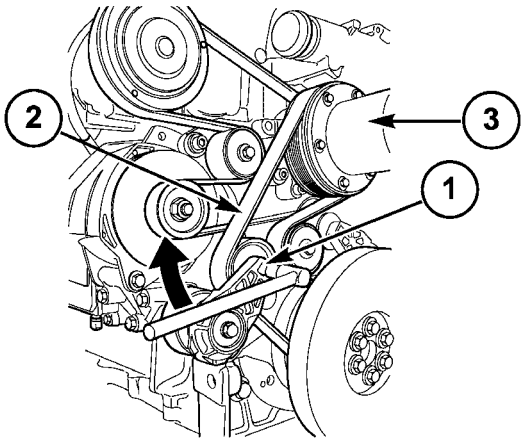
mid0279a 4

5. Secure the engine to the rotary stand with the brackets, **(1)** using tool **380000155**.



mid0280a 5

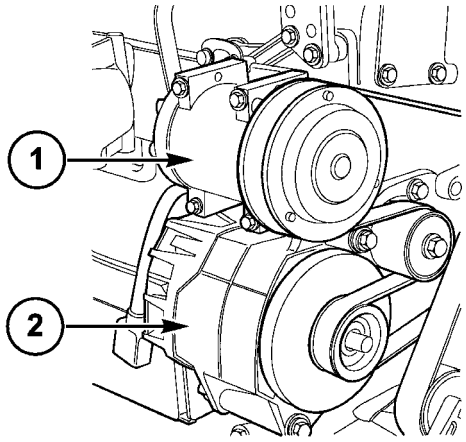
6. Drain the lubricating oil from the sump pan. Using a suitable tool **(1)**, turn in the direction of the arrow on the tightener and remove the front drive belt **(2)** from the fan pulley **(3)**.



50034738A5 6

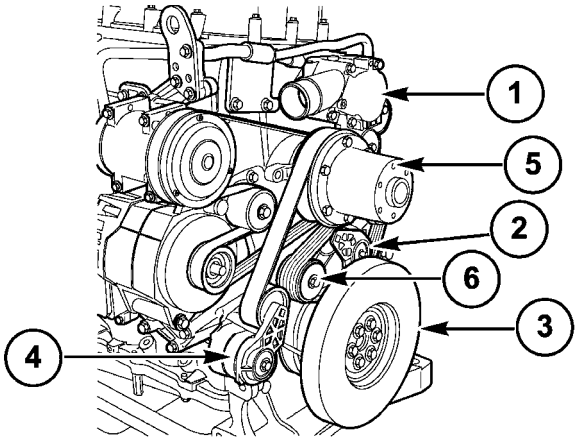
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7. Remove the air conditioner compressor **(1)**, the alternator **(2)** and all of their mounting hardware by first releasing the tension on the belt, using a tool as done in Step 1, and then remove the belt.



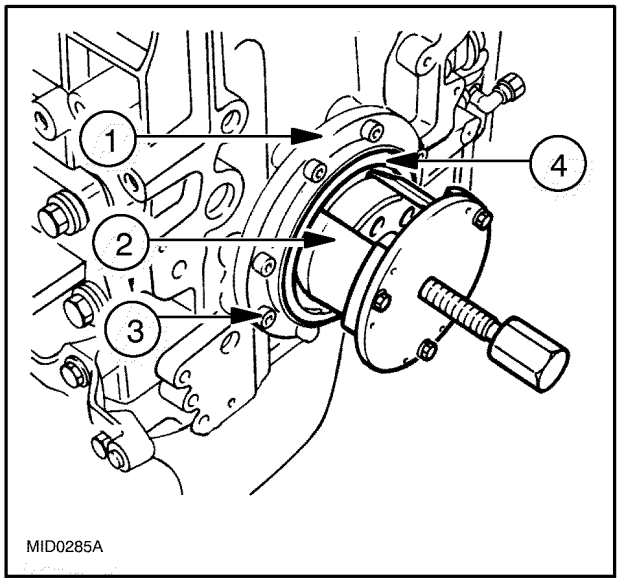
50034748A5 7

8. Remove the water pump/thermostat **(1)** and all its associated cooling lines, automatic tightener mount **(2)**, damper flywheel **(3)** and pulley beneath, automatic tightener, **(4)**, fan pulley **(5)**, and fixed tightener **(6)**.



50034749A5 8

9. With the extractor **380000120**, **(2)**, mounted as illustrated in the Figure, remove the gasket **(4)**. Unscrew the screws **(3)** and take off the cover **(1)**. Disconnect all of the electrical connections and sensors.



mid0285a 9

10. From the engine exhaust side, remove the oil delivery pipe **(1)**, air pipe for actuator **(2)**, oil return pipe **(3)** and turbocharger **(4)**. Remove the exhaust manifold **(1)**.

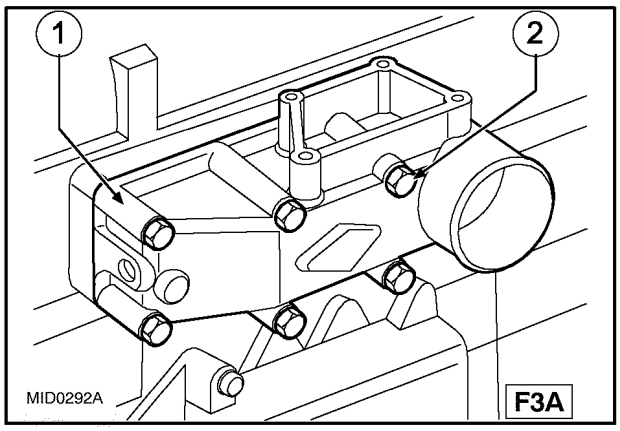
11. Remove the oil pipes **(1)** and **(2)** and heat exchanger **(3)** with the oil pump.

12. Disconnect the fuel pipes, **(1)**, from the fuel supply pump, **(2)**. Remove the fuel supply pump.

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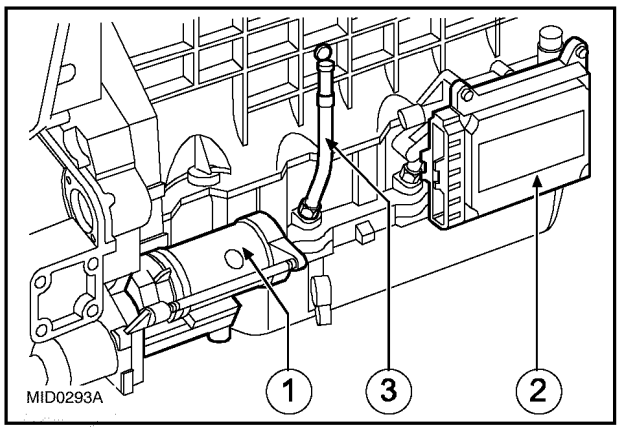
13. Unscrew the oil filters **(1)**. Disconnect the pipes **(2)** , from the mounts **(3)**, and remove the mounts.

14. Remove the screws **(2)** and intake manifold **(1)**.



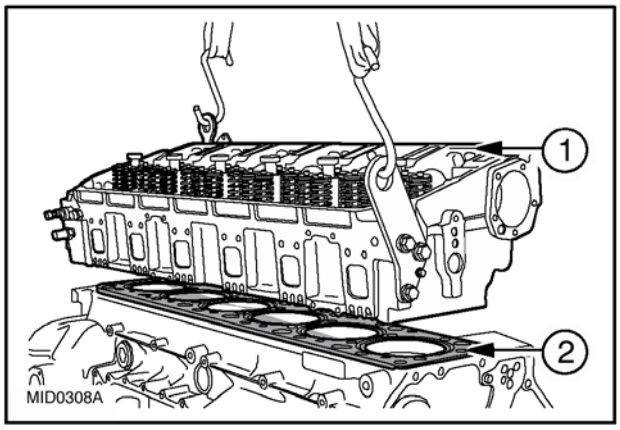
mid0292a 10

15. Remove the starter motor **(1)**, the control unit **(2)**, the relevant mount, and the oil dipstick **(3)**, from the crankcase. For service information on Timing Gear Service, see **Timing gear - Disassemble (B.10.A.45 - F.10.A.25)**For service information on Valve Drive Service, see **Valve drive - Disassemble (B.10.A.40 - F.10.A.25)**



mid0293a 11

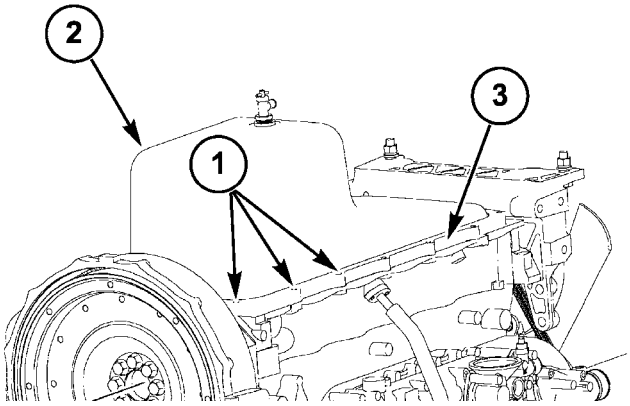
16. With a suitable chain and lift, remove the cylinder head **(1)**, from the engine and then remove the gasket **(2)**.



mid0308a 12

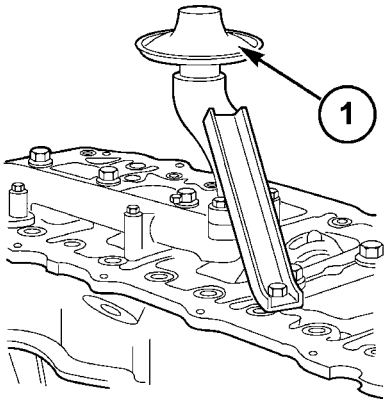
https://truckmanualshub.com/

17. Unscrew the screws **(1)** and remove the engine oil sump **(2)**, together with the spacer **(3)** and the gasket.



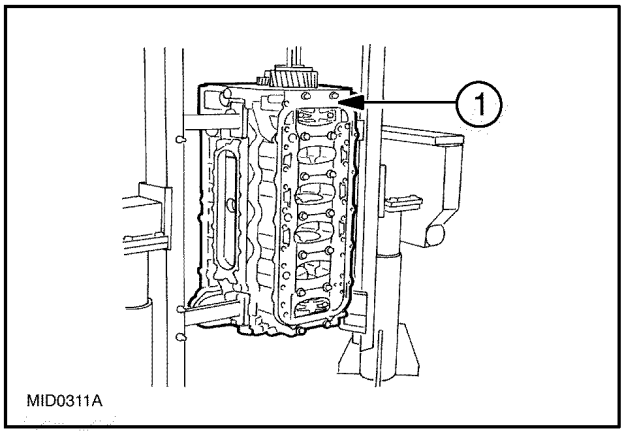
50034760A5 13

18. Unscrew the screws and remove the suction hose **(1)**.



50030332A5 14

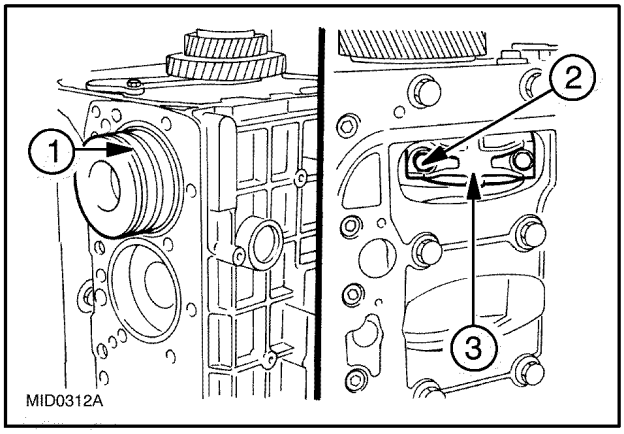
19. Turn the engine block **(1)**, upright as shown in the Figure.



mid0311a 15

20. Remove the screws **(2)**, attaching the connecting rod cap **(3)** and remove it. From the top of the engine block, take out the piston connecting rod assembly **(1)**. Repeat the same operation for the other pistons.

IMPORTANT: *Keep the connecting rod half bearings in their housings and/or note their assembly position since, if they are to be reused, they must be fitted in the same position found in disassembly.*

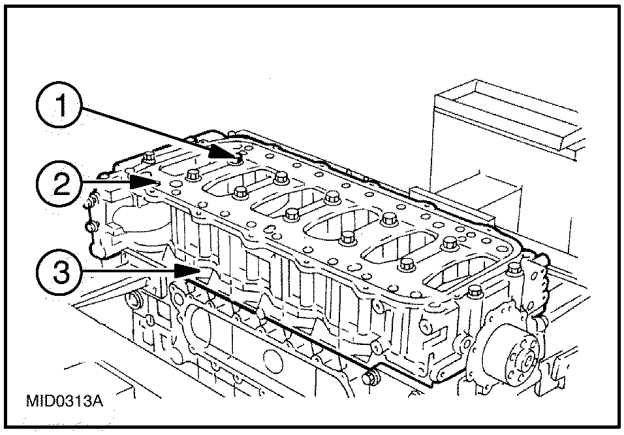


mid0312a 16

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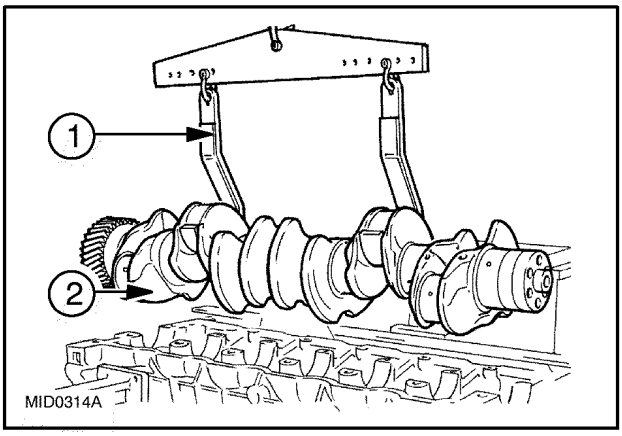
21. Using an appropriate wrench and a hex wrench, unscrew screws **(1)** and **(2)** and remove the sub-crankcase **(3)**

IMPORTANT: *Make note of the assembly position of the top and bottom main bearing shells since, if they are to be reused, they must be fitted in the same position as found in disassembly.*



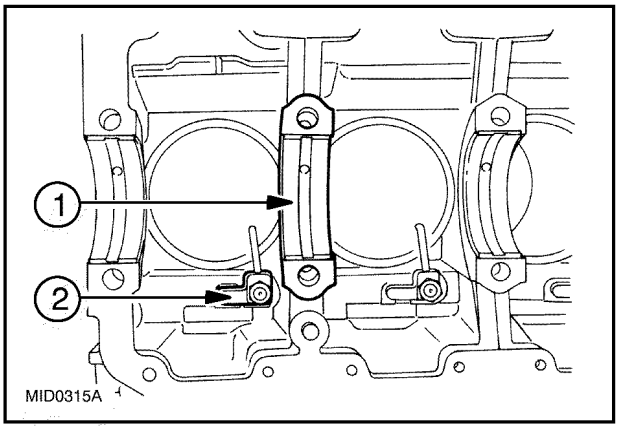
mid0313a 17

22. Using tool **380000362**, **(1)**, remove the crankshaft **(2)**.



mid0314a 18

23. Remove the main bearing shells **(1)**. Unscrew the screws and remove the oil nozzles **(2)**. Remove the cylinder liners as described in **Cylinder block - Replace (B.10.A.70 - F.10.A.30)**. For crankcase service assembly information, see **ENGINE - Assemble (B.10.A - F.10.A.20)**.



mid0315a 19

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ENGINE - Assemble (B.10.A - F.10.A.20)

AFX8010

General Notes

After taking down the engine, clean and inspect the parts carefully.

Read all assembly operations very carefully in order to assemble the parts correctly.

The torques of the parts and the instructions must be followed meticulously.

Instructions for the main checks and measurements necessary for determining whether the existing parts are sound enough for reuse must be followed meticulously.

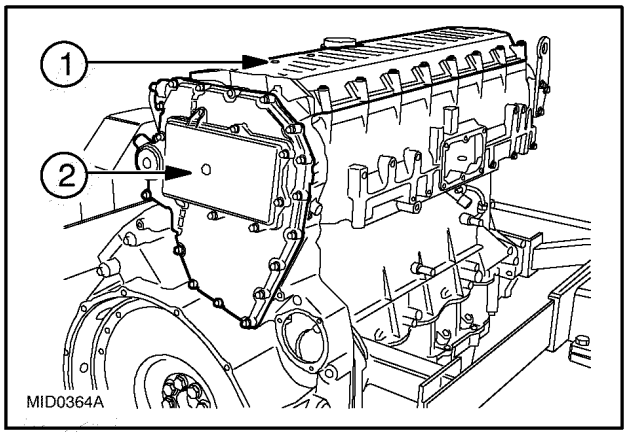
When totally or partially stripping down the engine, any gaskets that are removed must be replaced with a new gasket.

Before inserting the rotary parts and gaskets in the coupling, it is necessary to lubricate all parts with engine oil.

When fitting the oil filter, lubricate the oil filter seal with engine oil.

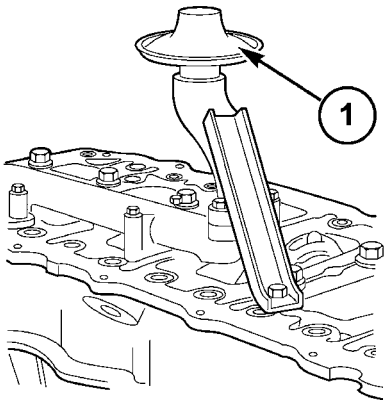
1. Mount the rocker arm cover **(1)** and the timing system cover **(2)**, with new gaskets, tightening the fixing screws to the required torque.

IMPORTANT: *The fixing screws of the rocker arm cover **(1)**, must be tightened in the sequence shown in the diagrams in **Valve drive - Torque (B.10.A.40 - D.20.A.10)**.*



mid0364a 1

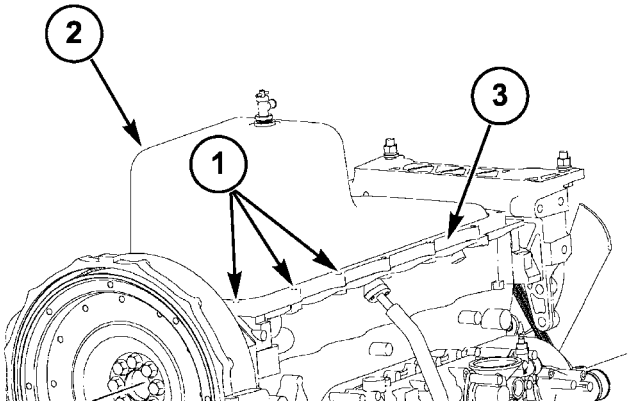
2. Mount the suction hose **(1)** and tighten the fixing screws to the required torque. Refer to **Oil pump - Torque (B.60.A.20 - D.20.A.10)** for torque information.



50030332A5 2

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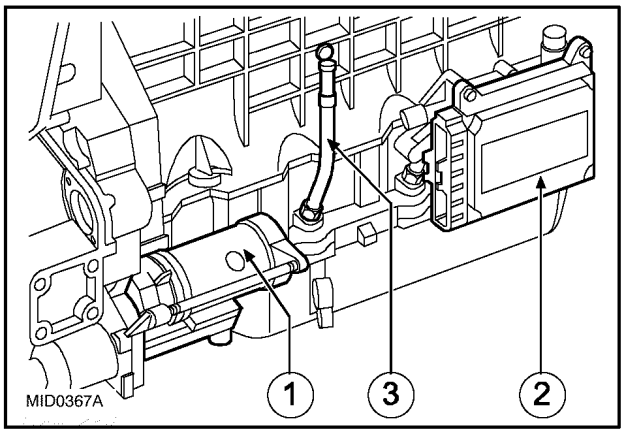
3. Place the gasket on the oil pan**(2)**, position the spacer **(3)** and fit the sump on the crankcase, screwing down the screws **(1)**, to the required torque. Refer to **Oil pan - Torque (B.60.A.23 - D.20.A.10)** for torque information.



50034760A5 3

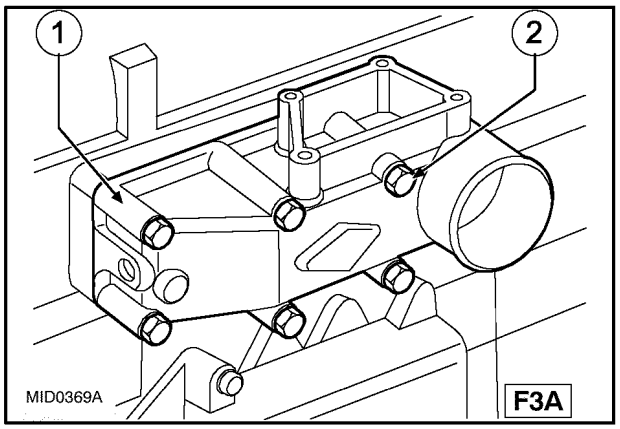
4. Mount the following, tightening the fixing screws to the required torque: starter motor **(1)**; control unit **(2)** (Refer to **Sensing system - Torque (B.50.A.95 - D.20.A.10)**), and its mount; oil dipstick **(3)**, in the crankcase.

IMPORTANT: *Check the state of the elastic elements of the control unit mount and replace them if they are deteriorated.*



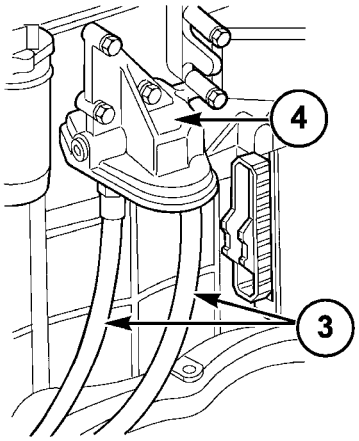
mid0367a 4

5. Fit the intake manifold **(1)** and tighten the fixing screws **(2)**, to the required torque.



19082003601429 5

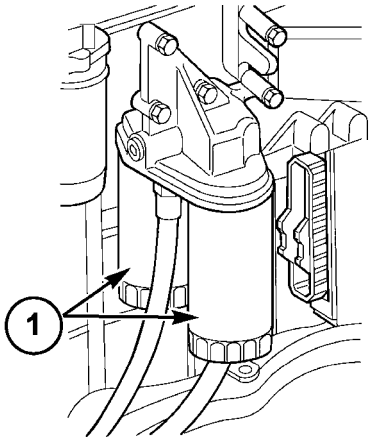
6. Fit the oil filter mount and tighten the fixing screws to the required torque. Connect the oil pipes **(3)**, to the mounts tightening the fittings to the required torque.



50030330A5 6

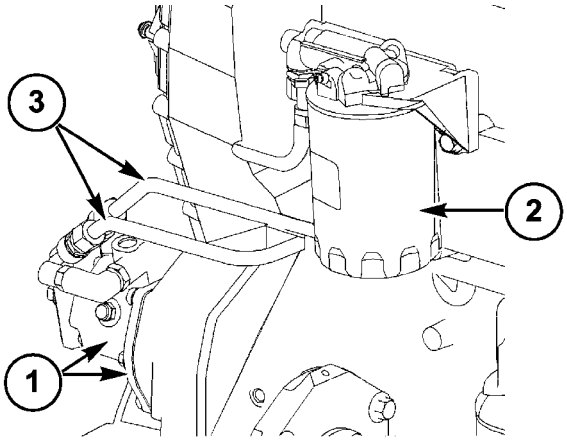
https://truckmanualshub.com/

7. Fit the oil filters **(1)**, as follows: oil the gaskets; screw down the filters until the gaskets come into contact with the supporting bases; tighten the filter to a torque of **35 - 40 Nm** (**25 - 29 lb ft**).



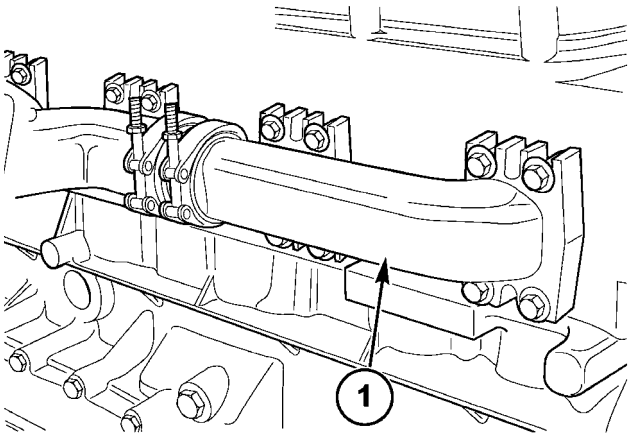
50030331A5 7

8. Mount the following with their gaskets and tightening the screws to the required torque: fuel pump and mount **(1)**; mount with fuel filter **(2)** and pipes **(3)**; connect the pipes **(13)**, to the fuel pump **(1)**.



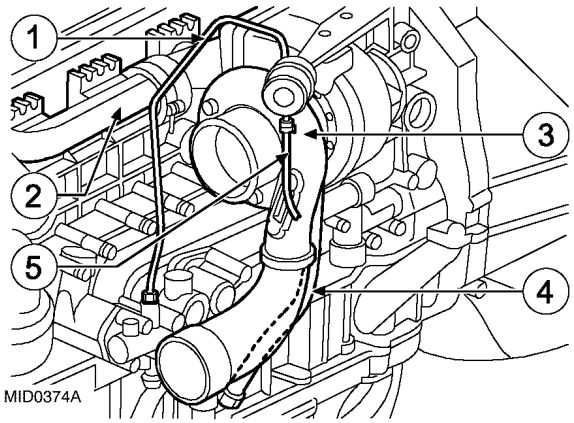
20040333A5 8

9. Fit the heat exchanger **(1)**, with the gasket and tighten the fixing screws to the required torque. Tighten the screws fixing the pipe clamps and to the spacer.



50034751A5 9

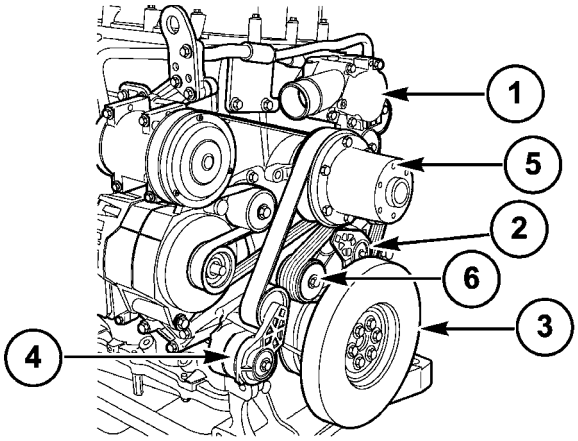
10. Mount the following with new gaskets: exhaust manifold **(2)**; turbocharger **(3)**; oil pipe **(1)** and **(4)**; pipe to actuator **(5)**. Refer to **Turbocharger - Torque (B.30.A.31 - D.20.A.10)** for torque information.



20040336 10

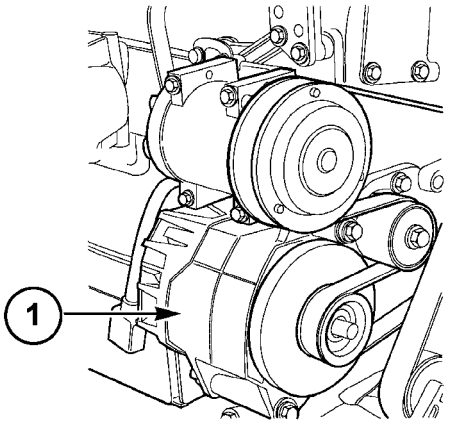
https://truckmanualshub.com/

11. Mount the following parts with their gaskets and tightening the screws to the required torque: automatic tightener mount **(2)**; and automatic tightener **(4)**, damper flywheel **(3)** and the pulley beneath; fixed tightener **(6)**; water pump and thermostat assembly**(1)**; fan pulley **(5)**; pipes with coolant . Refer to **Water pump - Torque (B.50.A.20 - D.20.A.10)**, **Fan and drive - Torque (B.50.A.54 - D.20.A.10)** for torque specifications.



50034749A5 11

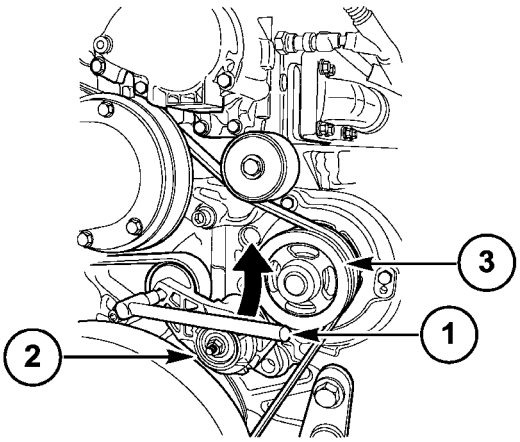
12. Mount the following, tightening the screws to the required torque: mounts **(1)** and alternator **(2)**. Refer to **Alternator - Torque (A.30.A.82 - D.20.A.10)** for torque information.



20040337 12

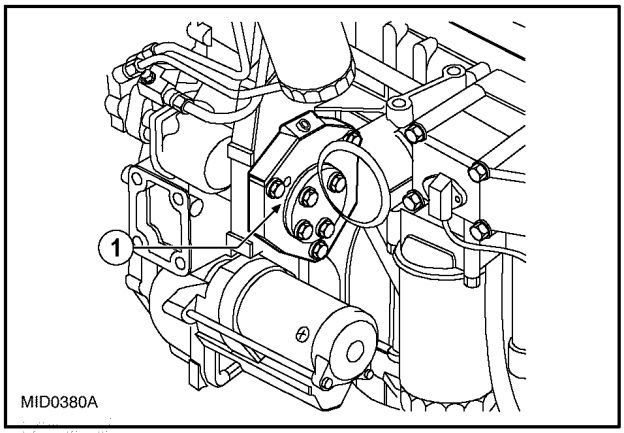
13. With a suitable tool **(1)**, operate the tightener **(2)**, in the direction of the arrow and fit the belt **(3)**.

NOTE: *The tighteners are automatic, so no further adjustments are required after assembly.*



50034764A5 13

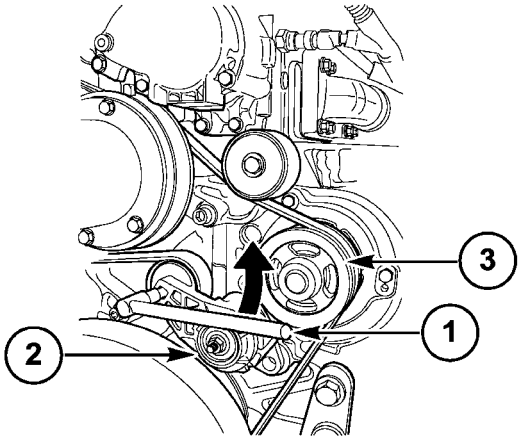
14. Put the tool **380000360**, on the engine fitting hooks, fasten this on the hoist. Remove the screws fixing the brackets: **380000155**, to the rotary stand, lift the engine and disconnect the above-mentioned brackets. Complete the assembly of the engine with the following parts and tighten the fixing screws or nuts to the required torque: fit the drive **(1)**, then fit the engine mounts.



mid0380a 14

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15. Next, fit the oil pressure adjustment valve. Fit the engine mount together with the air conditioner compressor. With an appropriate tool **(1)**, operate the tightener **(2)**, in the direction of the arrow and fit the belt **(3)**, around the air conditioner compressor, alternator and water pump pulleys. Connect the engine electric cable to the sensors and to the control unit. Refill the engine with the required amount and grade of lubricating oil. Refer to **Compressor - Torque (E.40.D.31 - D.20.A.10)** for torque information.



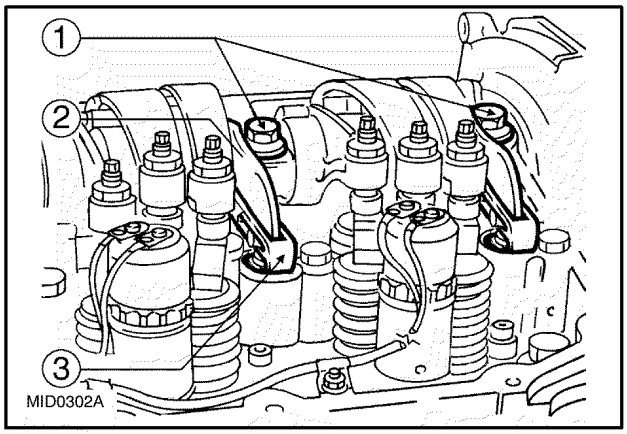
50034764A5 15

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Valve drive - Disassemble (B.10.A.40 - F.10.A.25)

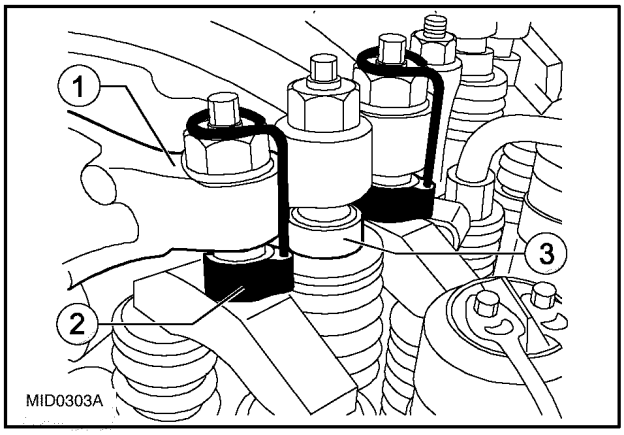
AFX8010

1. Unhook the springs **(3)** and lever check **(2)**. Unscrew the rocker arm shaft fixing screws **(1)**.



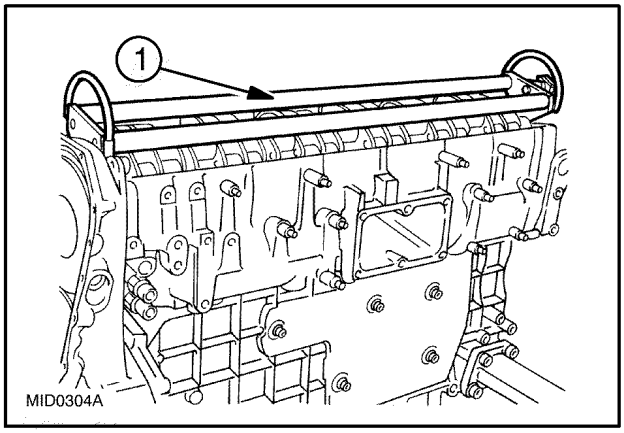
mid0302a 1

2. With tool **380000128**, **(2)**, constrain the sliding blocks **(3)**, to the rocker arms **(1)**.



mid0303a 2

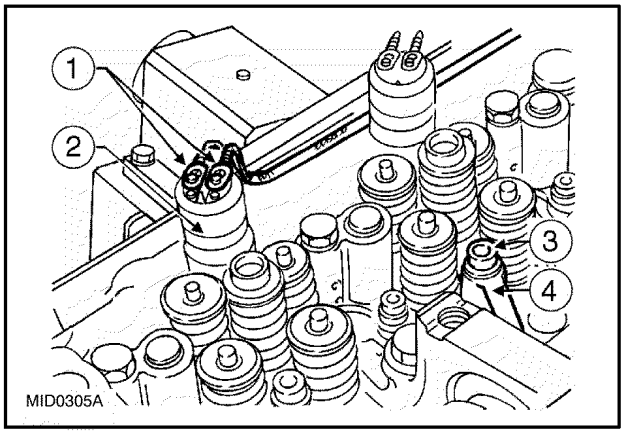
3. With the tool, **380000148**, applied as in the figure, remove the rocker arm shaft assembly.



mid0304a 3

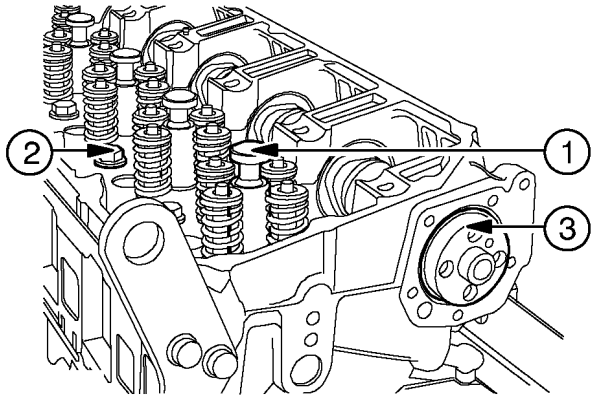
https://truckmanualshub.com/

4. Remove the cross-pieces from the valves. Unscrew the screws and remove the electrical connections **(1)**, from the solenoid valves. Unscrew the screws **(3)**, fixing the brackets **(4)**, retaining the pump injectors **(2)**. Remove the pump injectors **(2)**.



mid0305a 4

5. Fit the caps **(1)**, in place of the injectors **380000130**. Remove the camshaft **(3)**. Remove the screws **(2)**, fixing the cylinder head.



20040339 5

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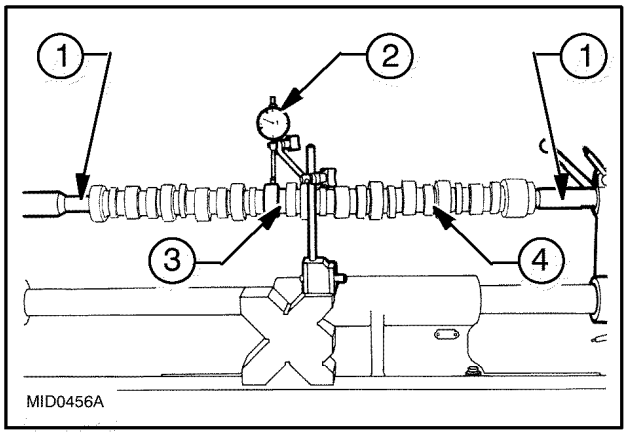
Valve drive - Measure (B.10.A.40 - F.40.A.16)

AFX8010

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

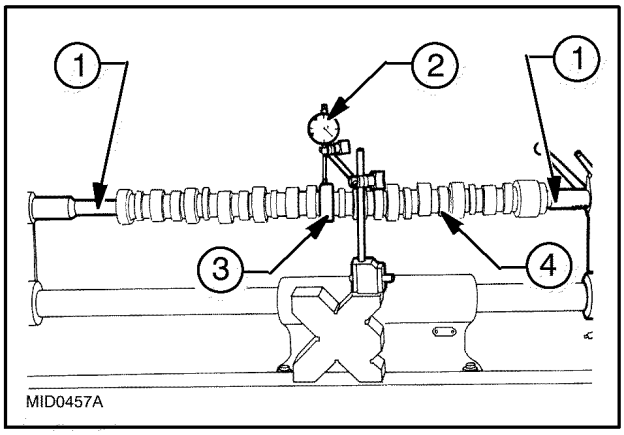
1. The surfaces of the supporting pins of the shaft and those of the cams must be extra smooth. If they show any sign of seizing or scoring, replace the shaft and the relevant bushings.

2. To check cam lift and pin alignment, place the camshaft **(4)**, on the v-block centers **(1)** and using a dial gauge **(2)**, check that the lift of the cams **(3)**, corresponds to the values given in **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**.



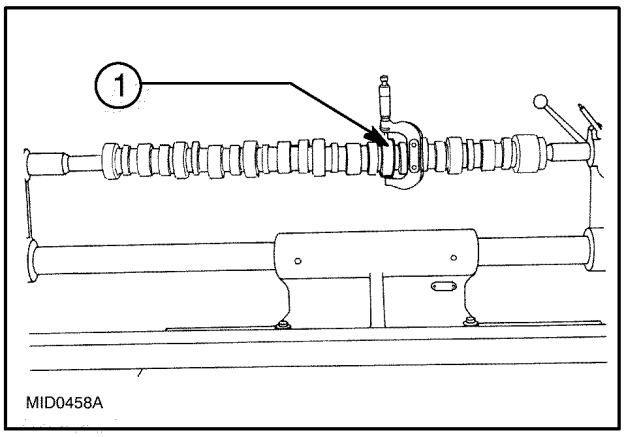
mid0456a 1

3. Again, with the camshaft **(4)**, on the v-block centers **(1)**, using a dial gauge **(2)**, check the alignment of the supporting pins **(3)**; it must be no greater than **0.020 mm** (**0.0008 in**). If there is any greater misalignment, replace the shaft.



mid0457a 2

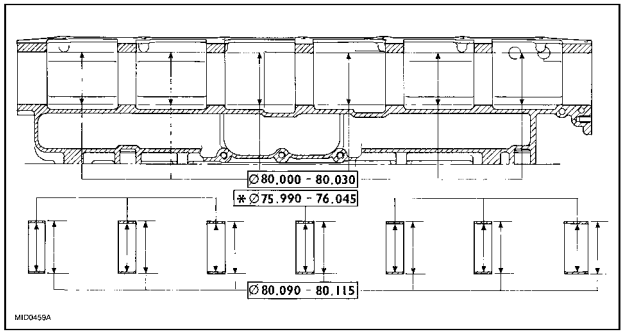
4. To check the assembly clearance, measure the inside diameter of the bushings using a micrometer **(1)** and the diameter of the pins of the camshaft. The difference will give the actual clearance. If the clearance is greater than **0.160 mm** (**0.0063 in**), replace the bushings and, if necessary, the camshaft as well.



mid0458a 3

https://truckmanualshub.com/

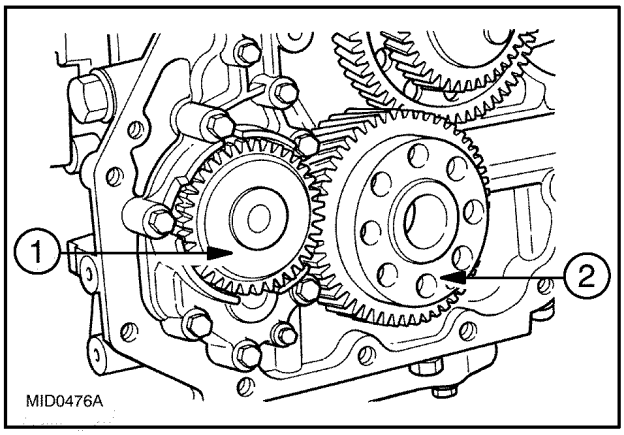
5. Main data for the camshaft bushings and seats on the cylinder head are shown in the figure **4**(all dimensions are shown in mm). An * denotes the inside diameter of bushings after driving them in.



MID0441A 4

6. Lubrication is by forced circulation, obtained with a gear pump **(1)**. The pump is driven by gearing to the crankshaft **(2)**. Check the gears have no sign of wear or seizure; if they do, replace the entire pump. To replace the gear **(2)**, see **ENGINE - Disassemble (B.10.A - F.10.A.25)**.

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*



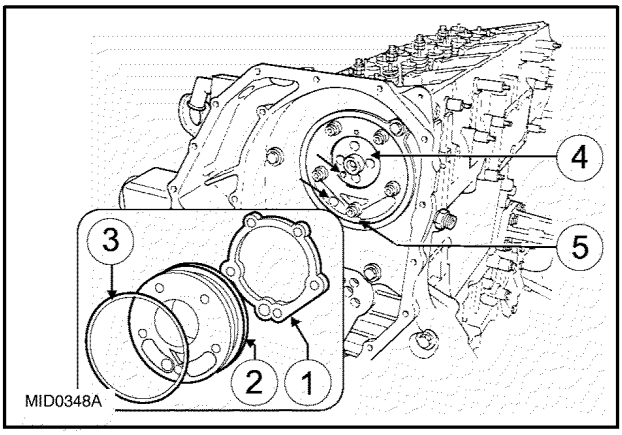
mid0476a 5

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Valve drive - Assemble (B.10.A.40 - F.10.A.20)

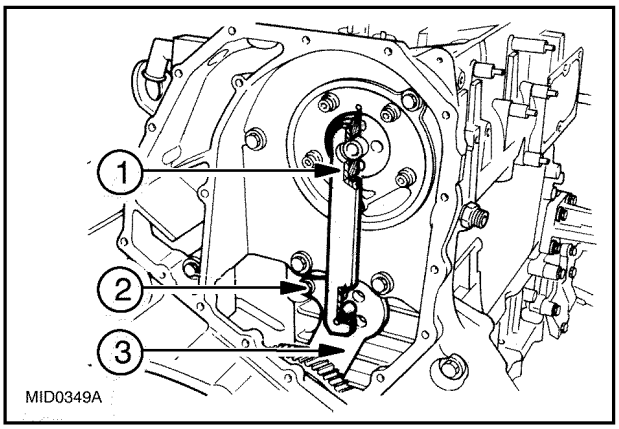
AFX8010

1. Mount the camshaft, **(4)**, arranging it with the holes (see arrow at front of camshaft) positioned as shown in the figure to the right. Lubricate the ring seal **(3)** and fit it on the shoulder plate **(2)**. Mount the shoulder plate **(3)**, with the sheet metal gasket **(1)** and tighten the screws **(5)**, to the required torque.



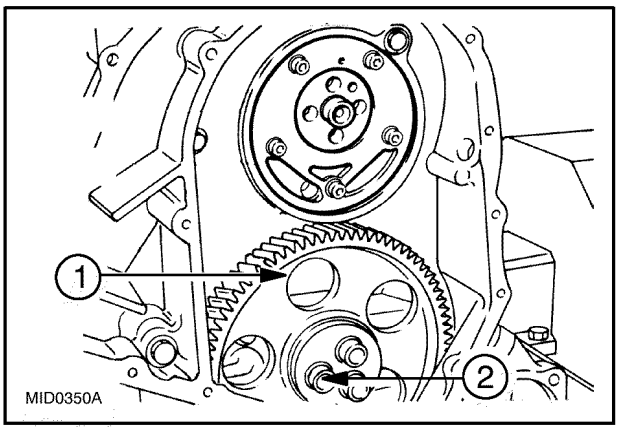
mid0348a 1

2. Apply the gauge **(1)**. **380000167**. Check and adjust the position of the connecting rod **(3)**. For the transmission gear, lock the screw **(2)**, to the required torque. Refer to **Connecting rod and piston - General specification (B.10.A.47 - D.40.A.10)**



mid0349a 2

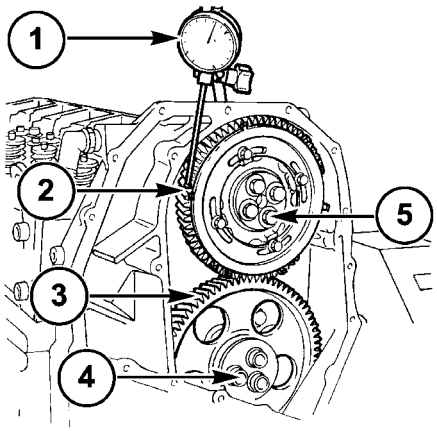
3. Fit the transmission gear **(1)**, back on and lock the screws **(2)**, with an appropriate hex wrench to the required torque. Refer to **Connecting rod and piston - General specification (B.10.A.47 - D.40.A.10)**



mid0350a 3

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4. Fit the gear **(2)**, back on the camshaft, without fully locking the screws **(5)**, positioning it so that the 4 slots are centered with the camshaft fixing holes. Using a dial gauge with a magnetic base **(1)**, check the clearance between the gears **(2)** and **(3)**: **4.39 - 4.49 mm** (**0.173 - 0.177 in**). If this is not so, adjust the clearance as follows: loosen the screws **(4)**, fixing the transmission gear **(3)**, loosen the screw fixing the lever, then move the connecting rod to obtain the required clearance; lock the screw fixing the connecting rod and the screws fixing the transmission gear to the required torque. See **Timing gear - Torque (B.10.A.45 - D.20.A.10)**.



20043353 4

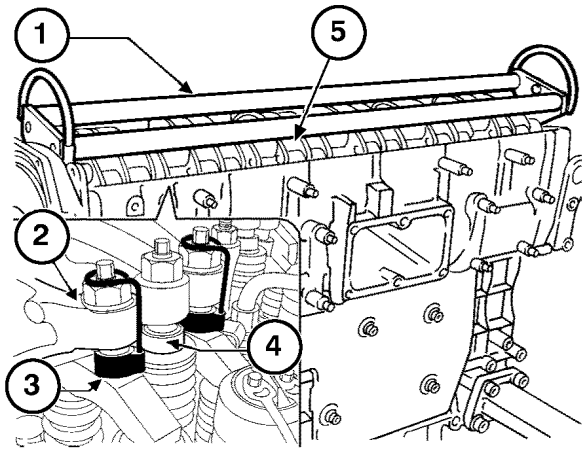
5. Position the exhaust and intake valve control crosspieces.

IMPORTANT: *Position the crosspieces on the valve stem, all with the largest hole on the same side.*

IMPORTANT: *Before refitting the rocker arm shaft assembly, make sure that all the adjustment screws have been fully unscrewed.*

6. With tool **380000128 (3)**, constrain the sliding blocks **(4)**, to the rocker arms **(3)**. Apply tool **(1)**, to the rocker arm shaft **(5) 380000148** and position it on the cylinder head.

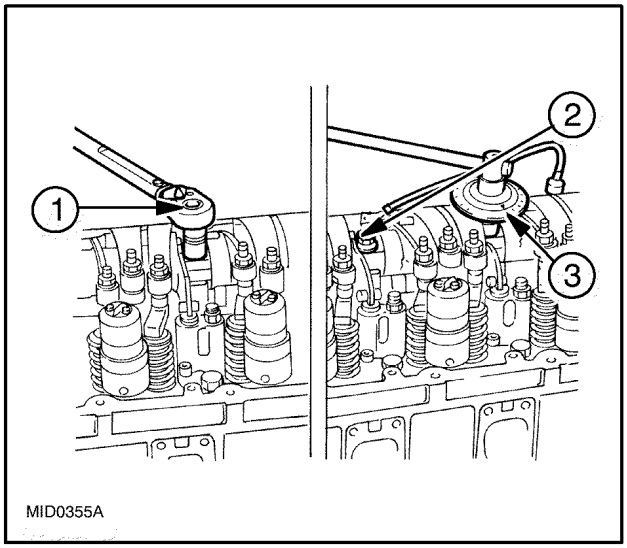
IMPORTANT: *Before assembly, the screws **(2)**, must be lubricated with engine oil.*



20043352 5

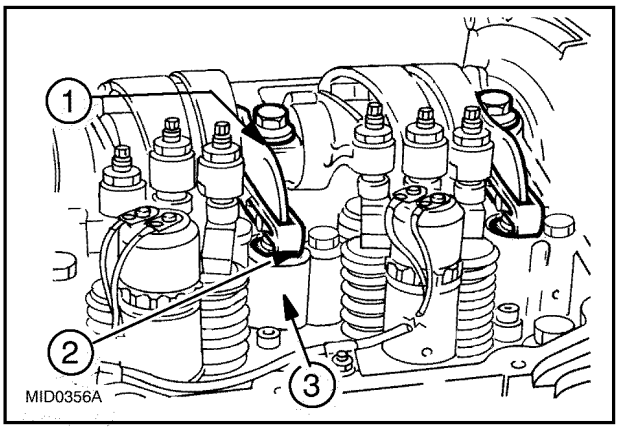
https://truckmanualshub.com/

7. Tighten the screws **(2)**, fixing the rocker arm shaft in two phases: 1st phase - tightening with torque wrench **(1)**, to a torque of **100 Nm** (10 kgm [**73 lb ft**]); 2nd phase - closing, with tool **(380000304) (3)**, with an angle of **60 °**.



mid0355a 6

8. Constrain the levers **(1)**, to the spacer **(3)**, with the springs **(2)**.



mid0356a 7

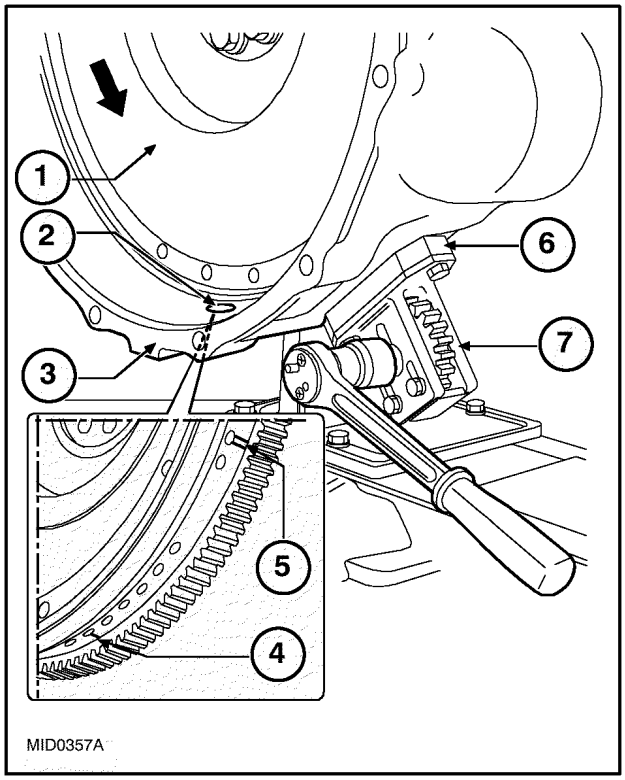
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Valve drive - Timing adjust (B.10.A.40 - F.45.A.64)

AFX8010

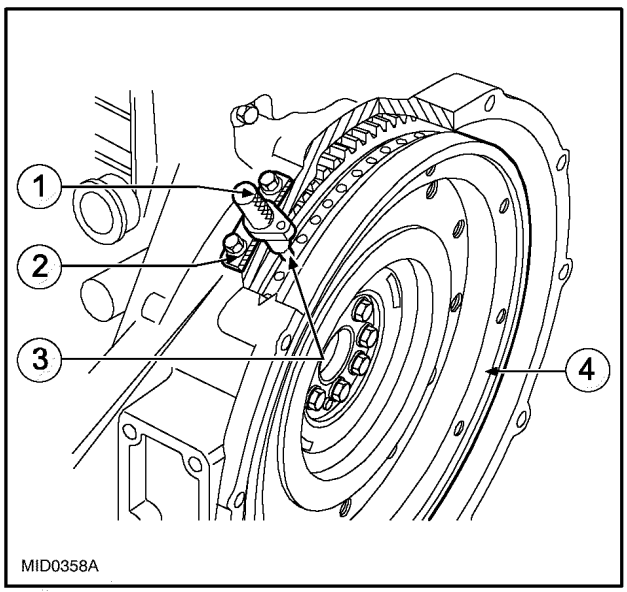
1. Apply the tool for flywheel rotation to the gear box **(2)**; **380000137**, **(7)** and spacer **380000138 (6)**.

IMPORTANT: *The arrow indicates the direction of rotation of the working engine. With the above-mentioned tool, turn the engine flywheel **(1)**, in the direction of rotation of the engine so as to take the piston of cylinder No. 1 to approximately the TDC in the phase of combustion. This condition is accomplished when the hole with one notch **(4)**, after the hole with two notches **(5)**, on the engine flywheel **(1)**, can be seen through the inspection window **(3)**.*



mid0357a 1

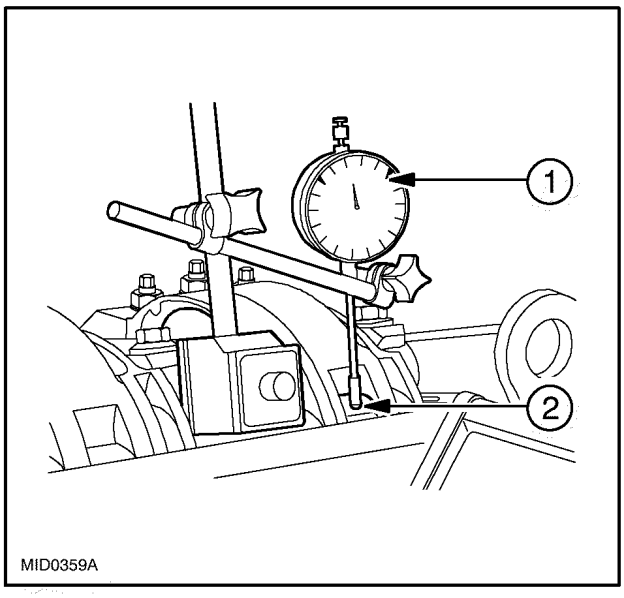
2. The exact position of the piston of cylinder No. 1 at TDC is obtained when, in the above-described conditions, the tool **380000150 (1)**, enters the hole **(3)**, on the engine flywheel **(4)**, through the seat **(2)**, of the engine speed sensor. If this is not the case, orient the engine flywheel **(4)**, appropriately. Remove the tool **380000150 (1)**.



mid0358a 2

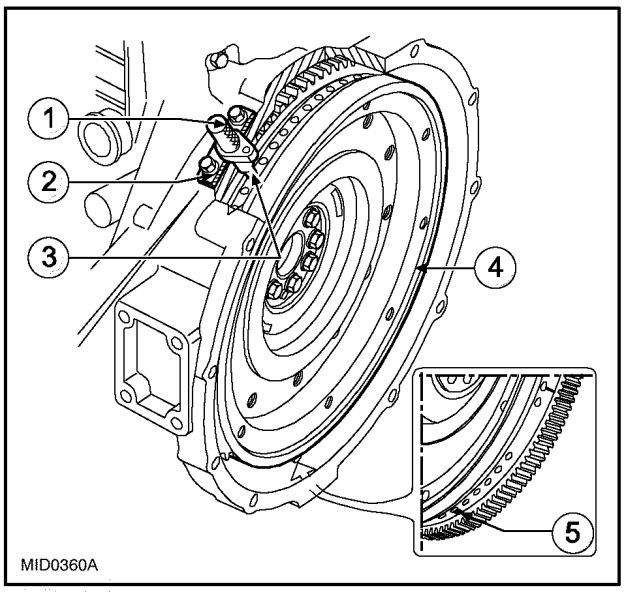
https://truckmanualshub.com/

3. Position the dial gauge with a magnetic base **(1)**, with the rod on the roller **(2)**, of the rocker arm governing the injector of cylinder No. 1 and pre-load it by approximately **6 mm**(**0.236 in**). Using tool **380000137**, turn the crankshaft clockwise until the pointer of the dial gauge reaches the minimum value under which it cannot go. Zero the dial gauge. Turn the engine flywheel anti-clockwise until on the dial gauge you read the cam lift value of the camshaft of: **4.39 - 4.49 mm** (**0.173 - 0.177 in**).



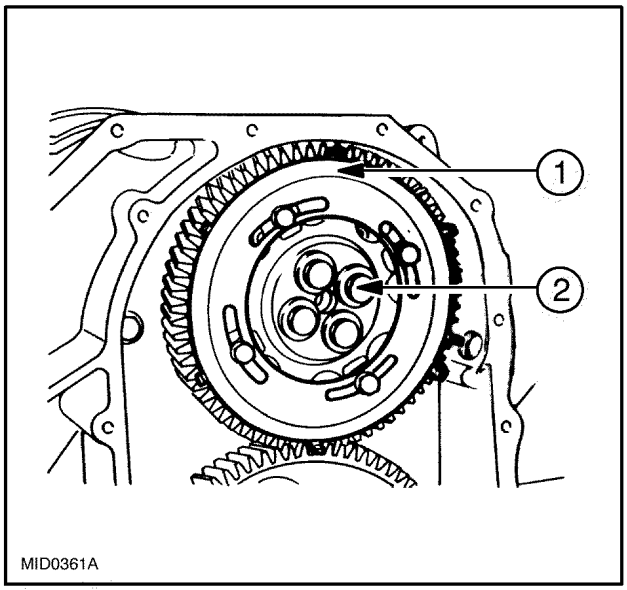
mid0359a 3

4. The camshaft timing is correct if the above cam list values correspond to the following conditions: The hole with a double notch **(5)**, can be seen through the inspection window; the tool **380000150 (1)**, through the seat **(2)**, of the engine speed sensor, enters the hole **(3)**, in the engine flywheel **(4)**.



mid3060a 4

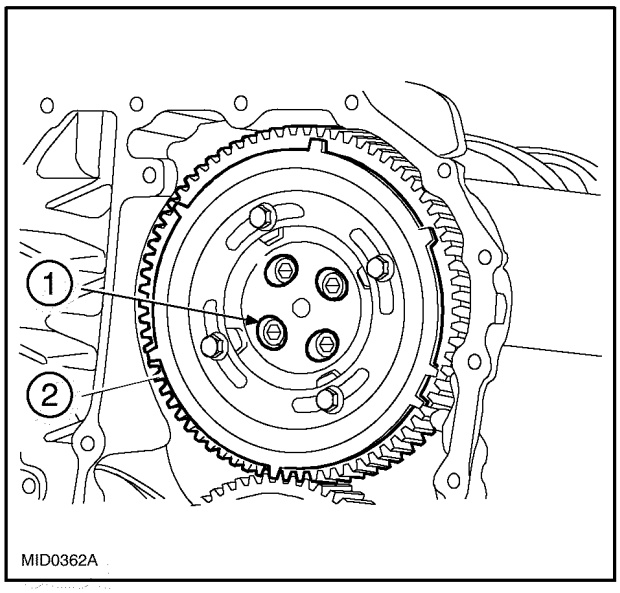
5. If the results noted above were not obtained, proceed by loosening the screws **(2)**, fixing the gear **(1)**, to the camshaft **(3)**. Take appropriate action on the engine flywheel to bring about the conditions indicated in points 1 and 2 above, but the cam lift must not be affected. Lock the screws **(2)** and repeat the check as described above. Tighten the screws **(2)**, to the required torque.



mid0361a 5

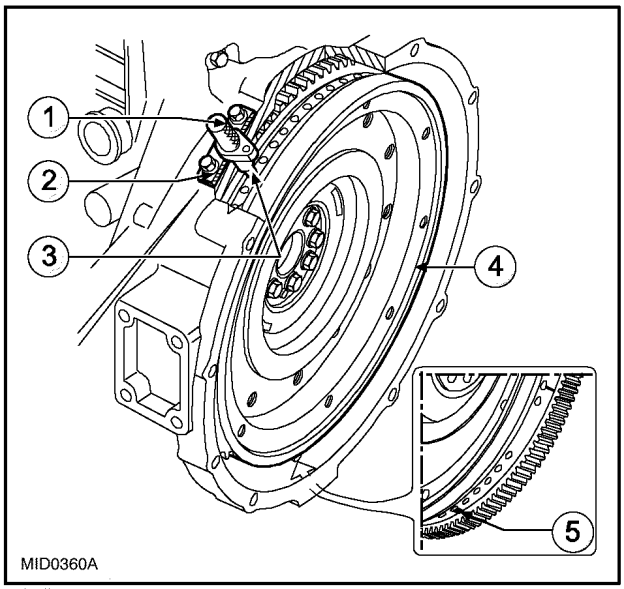
https://truckmanualshub.com/

6. When the slots **(1)**, are not sufficient to recover the timing, the camshaft turns because it becomes integral with the gear **(2)**. The reference value of the cam lift changes accordingly and it is necessary to proceed as follows: Make sure the screws securing the camshaft gear are tight. Turn the engine flywheel clockwise by approximately 1/2 turn. Turn the engine flywheel counterclockwise until the dial gauge shows a camshaft cam lift value of: **4.39 - 4.49 mm** (**0.173 - 0.177 in**). Take out the screws attaching the camshaft gear and remove the gear from the camshaft.



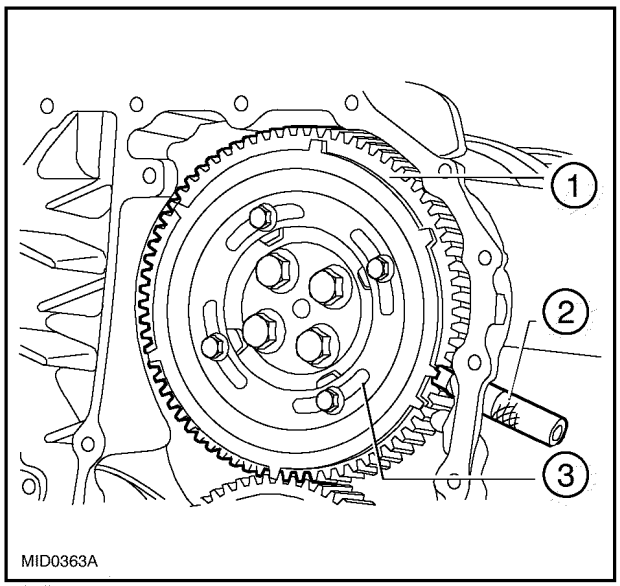
mid0362a 6

7. The camshaft timing is correct if the above cam lift values correspond to the following conditions: The hole with a double notch **(5)**, can be seen through the inspection window; the tool **380000150 (1)**, through the seat **(2)**, of the engine speed sensor, enters the hole **(3)**, in the engine flywheel **(4)**. Reinstall the camshaft gear and tighten the fixing screws to the required torque, as noted in **Timing gear - Torque** (**B.10.A.45 - D.20.A.10**).



mid3060a 7

8. In the conditions described above, check that the pin **380000151 (2)**, is positioned on the marked tooth of the phonic wheel **(1)**. If this is not so, loosen the screws **(3)** and orient the phonic wheel **(1)**, appropriately. Then tighten the screws **(3)**, to the required torque, as noted in **Timing gear - Torque (B.10.A.45 - D.20.A.10)**.



mid0363a 8

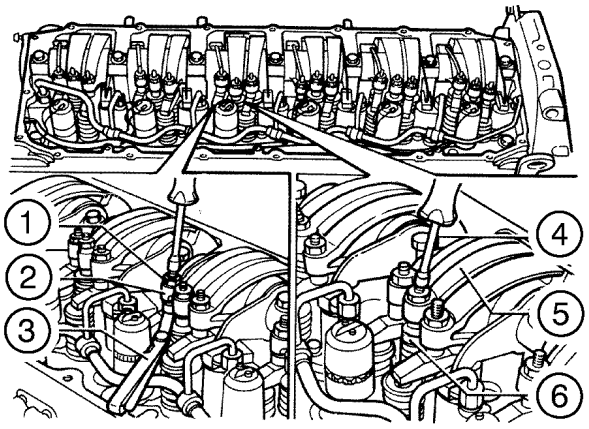
https://truckmanualshub.com/

Valve drive - Clearance (B.10.A.40 - F.45.A.12)

AFX8010

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

1. Adjusting the clearance between the rocker arms and the intake and exhaust valve cross-pieces and adjusting the pre-load of the pump injector rocker arms must be done very carefully. Take the cylinder associated with the valves involved in the clearance adjustment into the combustion phase. The valves of this cylinder will be closed while they balance those of the symmetrical cylinder. The symmetrical cylinders are 1 - 6, 2 - 5, and 3 - 4. To perform these operations correctly, proceed as described below and as shown in the ignition sequence table in **Valve drive - General specification (B.10.A.40 - D.40.A.10)**. To adjust the clearance between rocker arms and intake and exhaust valve cross-pieces: Loosen the nut locking the adjustment screw **(1)**. Insert the blade of the feeler gauge **(2)**. Using a wrench, screw or unscrew the adjustment screw. Check that the blade of the feeler gauge **(2)**, can slide with a slight amount of friction. Lock the nut **(1)**, securing the adjustment screw.



20040340 1

https://truckmanualshub.com/

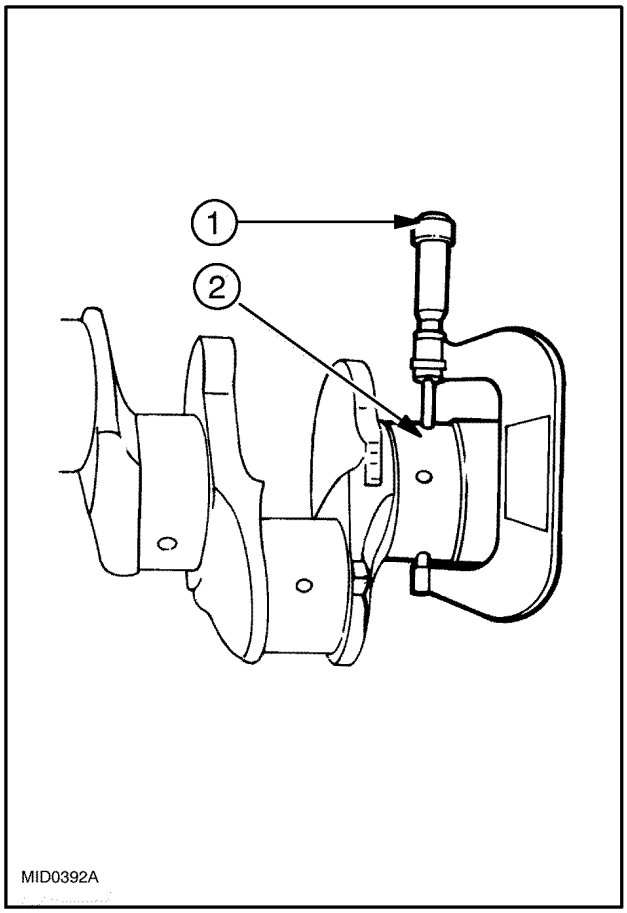
Crankshaft - Measure (B.10.A.43 - F.40.A.16)

AFX8010

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

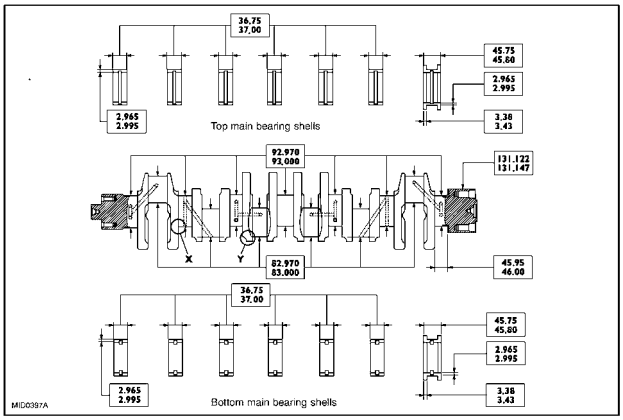
1. Before reinstalling the crankshaft, the main journals and crankpins must be checked for size. Before grinding the pins of the shaft **(2)**, measure the pins with a micrometer **(1)** and establish, depending on the level of undersizing of the bearings, what diameter you need to reduce the pins. The classes of undersizing are **0.127 mm** - **0.254 mm** - **0.508 mm** (**0.0050 in** - **0.0100 in** - **0.0200 in**). It is recommended that all measurements are noted in a table for reference.

IMPORTANT: *All the main journals and crankpins should always be ground to the same class of undersizing so the balance of the crankshaft is not altered.*



280820031389310 1

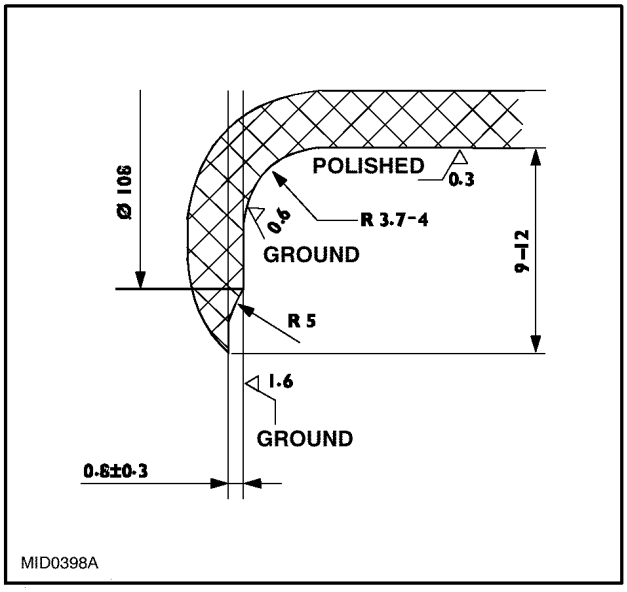
2. The main data for a crankshaft and main bearing shells are shown in **Crankshaft - Dimension (B.10.A.43 - D.40.A.30)**.



280820031390789 2

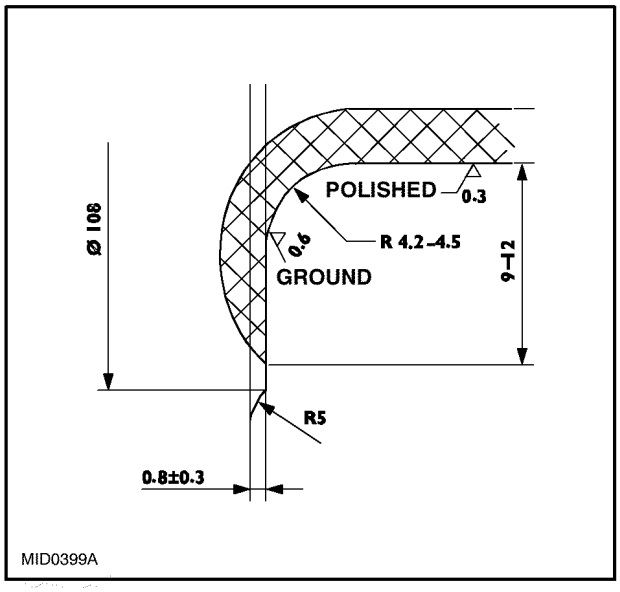
https://truckmanualshub.com/

3. (X) The figure on the right shows the details of the fittings of the main journals.



280820031391878 3

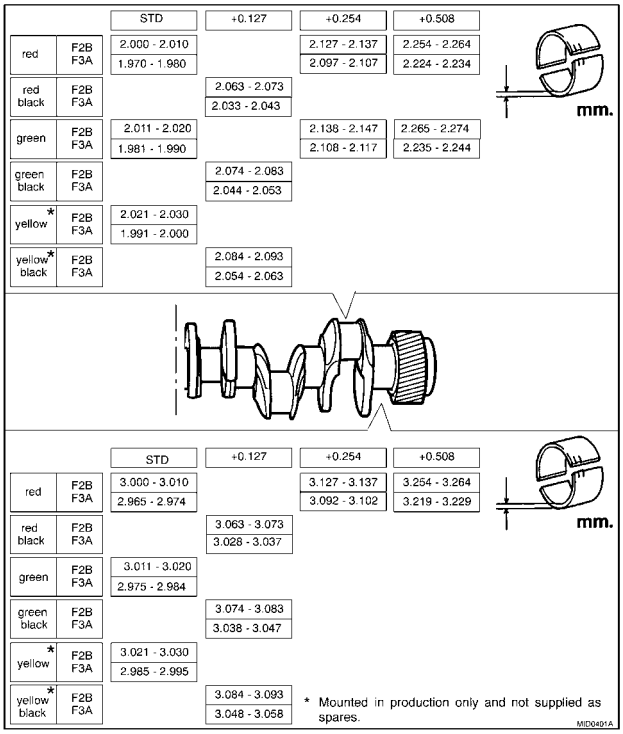
4. (Y) The figure on the right shows the details of the fittings of the main journals.



280820031392431 4

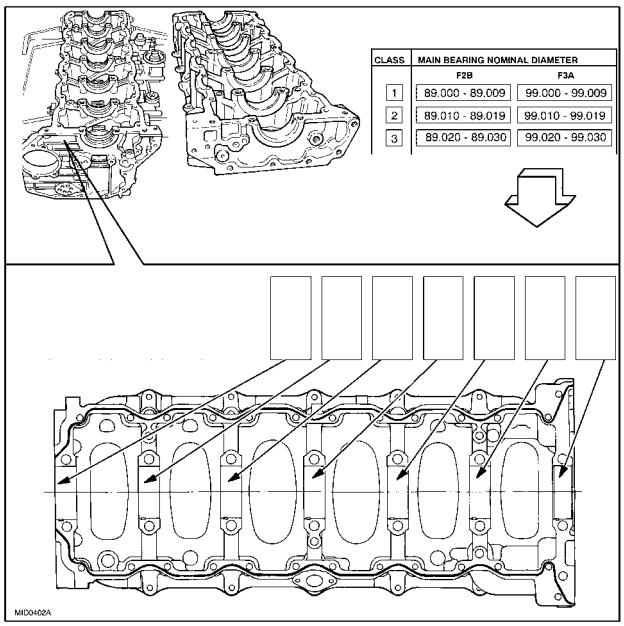
https://truckmanualshub.com/

5. To obtain the required assembly clearances, the main and big end bearing shells need to be selected as described below. This operation makes it possible to identify the most suitable half bearings for each of the pins of the shaft (the half bearings may even be of a different class from one pin to another). Depending on the thickness, the half bearings are selected in classes of tolerance, marked by a color (red/green - red/black - green/black). The data below gives the characteristics of the main and big end bearing shells available as spares in the standard (STD) sizes and in the permissible oversizes (**0.127 mm**, **0.254 mm**, **0.508 mm** [**0.0050 in**, **0.0100 in**, **0.0200 in**]).



280820031399055 5

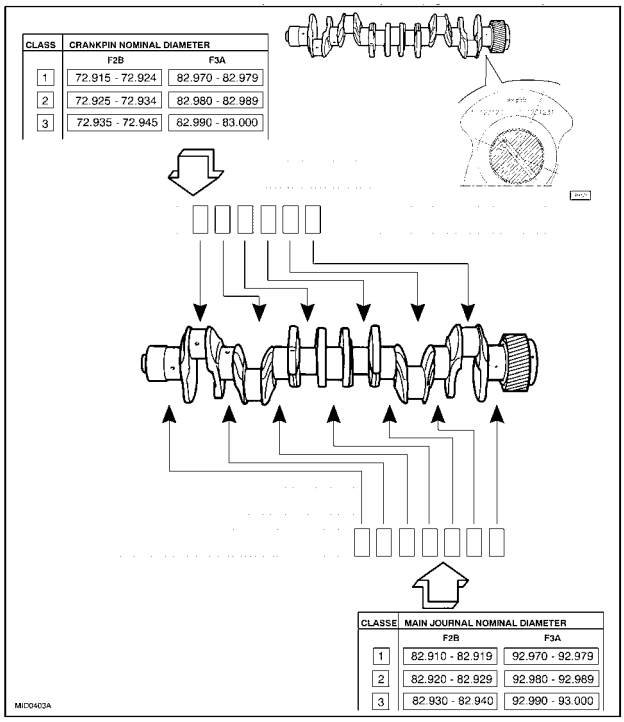
6. For each of the pins of the crankshaft, it is necessary to carry out the following: Main Journals - determine the class of diameter of the seat in the crankcase; determine the class of diameter of the main journal; and choose the class of half bearings to fit. Crankpins - determine the class of diameter of the seat in the connecting rod; determine the class of diameter of the crankpin and choose the class of half bearings to fit. Selecting Small End Bearings (Pins With Nominal Diameter) - two sets of figures are marked on the front of the crankcase, in the position shown (top section of figure below) a four-digit number represents the coupling number of the crankcase with its respective sub-crankcase; the following seven digits, taken singly, represent the class of diameter of each of the main bearing seats to which they refer (bottom section of figure below), and each of these digits may be 1, 2 or 3.



280820031399829 6

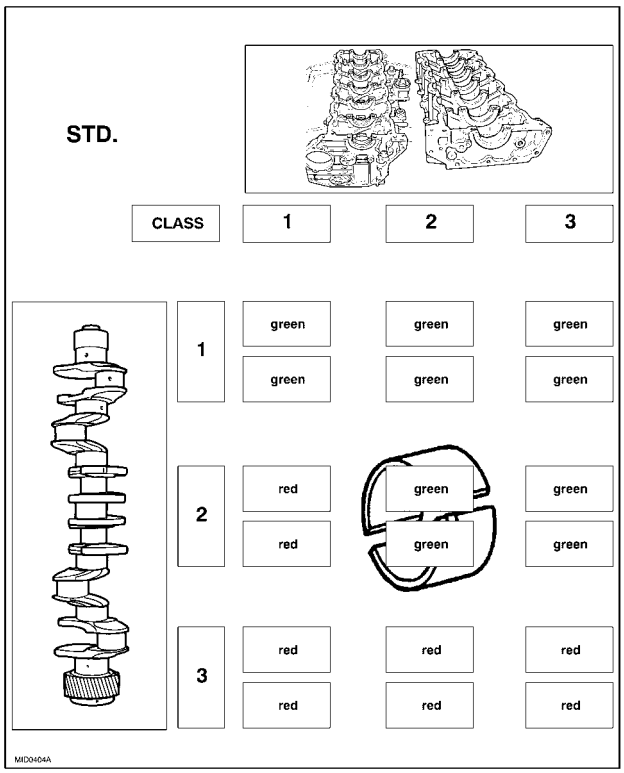
https://truckmanualshub.com/

7. Main journals and crankpins: determining the class of diameter of the pins. Three sets of figures are marked on the crankshaft, in the position shown by the arrow (top of figure shown below): the first number, comprising five digits, is the serial number of the shaft; underneath this number, on the left, a set of six digits refers to the crankpins and is preceded by a single digit, which indicates the status of the pins (1 - STD, 2 = -0.127 [0.0050"]), the other six digits, taken singly, represent the class of diameter of each of the crankshafts to which they refer. The set of seven digits, on the right side, refers to the main journals and is preceded by a single digit, which indicates the status of the pins (1 - STD, 2 = 0.127 [0.0050]), the other seven digits taken singly, represent the class of diameter of each of the main journals to which they refer (bottom of figure shown below).



280820031400886 7

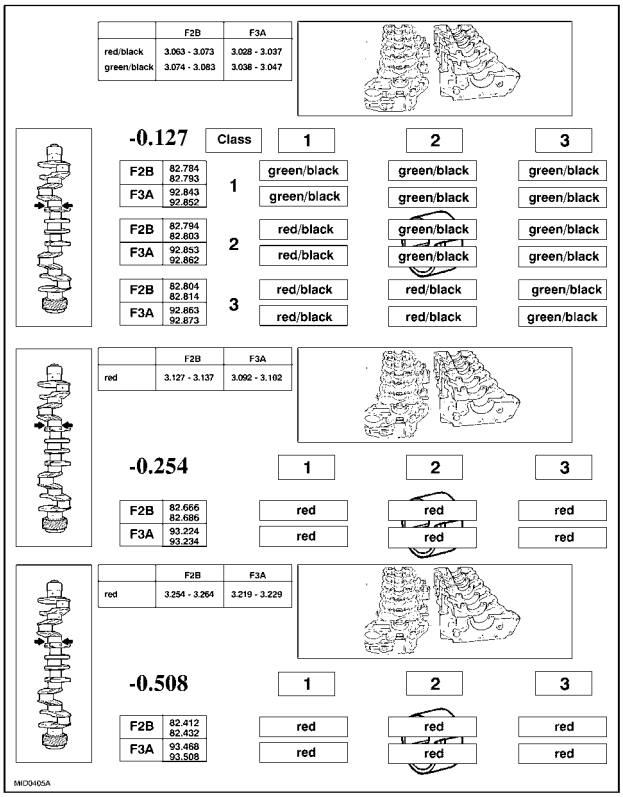
8. After measuring the essential data for each of the main journals on the crankcase and crankshaft, choose the type of half bearings to use according to the information in the figure below.



280820031402021 8

https://truckmanualshub.com/

9. If the pins have been ground, the procedure described thus far cannot be applied. In this case, it is necessary to check that the new diameter of the pins is as indicated in the figure below and to fit the only type of half bearings contemplated for the undersize at issue.



280820031402195 9

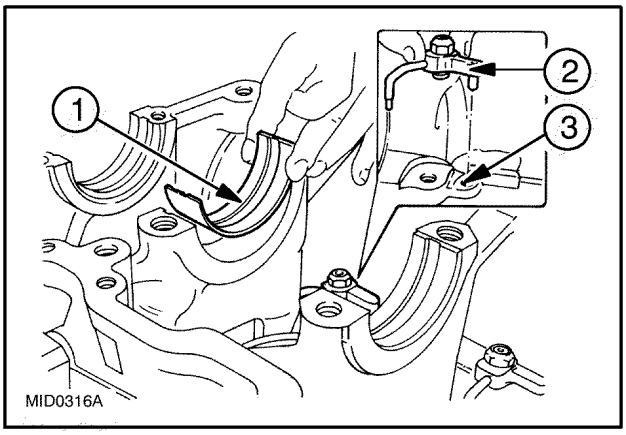
https://truckmanualshub.com/

Crankshaft - Install (B.10.A.43 - F.10.A.15)

AFX8010

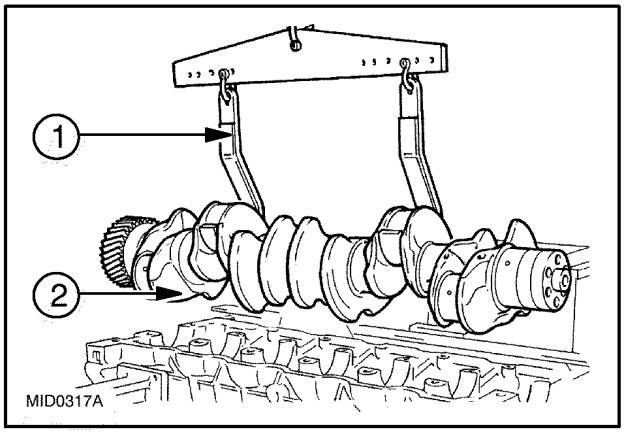
1. If dismantled, refit the oil nozzles **(2)**, tightening the union **(3)**, to the required torque, as noted in **Oil line - Torque (B.60.A.36 - D.20.A.10)**. Put the half bearings **(1)**, on the crankshaft mounts of the crankcase. The crankshaft bearings are supplied as spare parts with an undersized internal diameter of **0.127 mm** - **0.254 mm** - **0.508 mm** (**.005 in** - **.010 in** - **.015 in**).

IMPORTANT: *Do not make any adjustments to the bearings.*



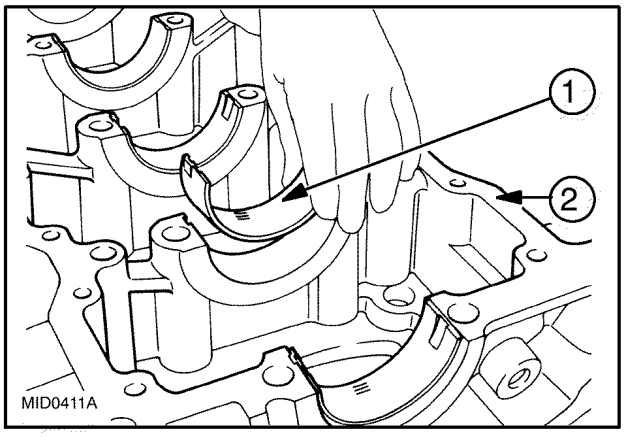
260820031231263 1

2. Using a hoist and hook **380000362**, **(1)**, mount the crankshaft **(2)**.



260820031231790 2

3. Put the half bearings **(1)**, on the main bearings in the sub-crankcase **(2)**.

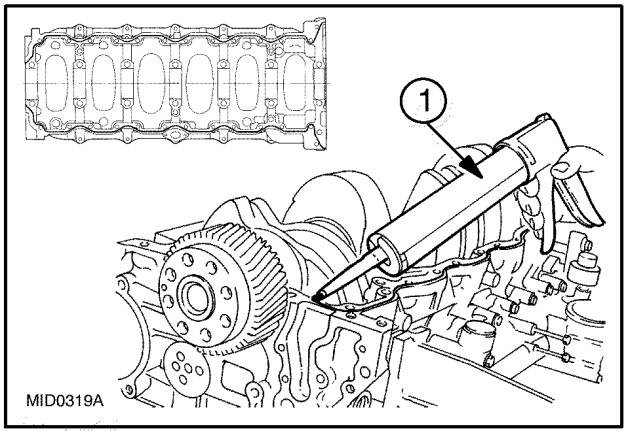


270820031313705 3

https://truckmanualshub.com/

4. Apply Loctite 5699 sealant on the crankcase with an appropriate tool **(1)**, as shown in the Figure. The box contains a diagram for applying Loctite 5699 sealant.

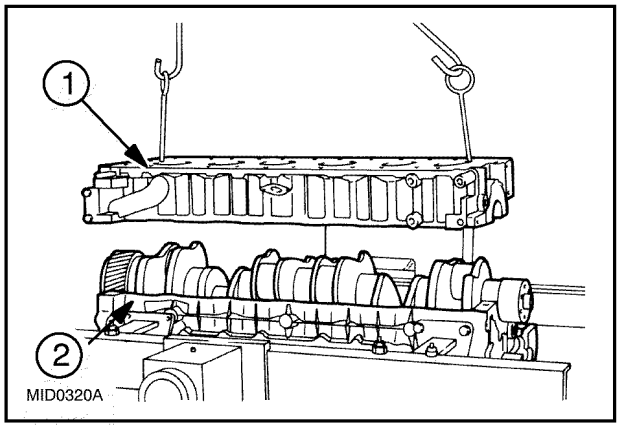
IMPORTANT: *Fill the sub-crankcase within 10 minutes of applying the sealant.*



260820031232243 4

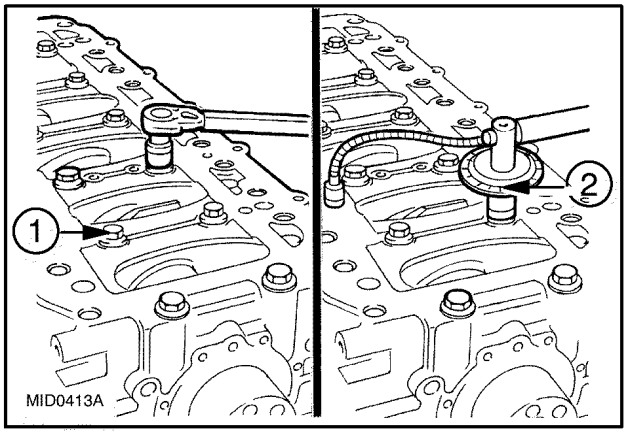
5. Fit the sub-crankcase **(1)**, using a hoist and appropriate hooks.

IMPORTANT: *The sub-crankcase fixing screws of the engine must be lubricated with engine oil before assembly.*



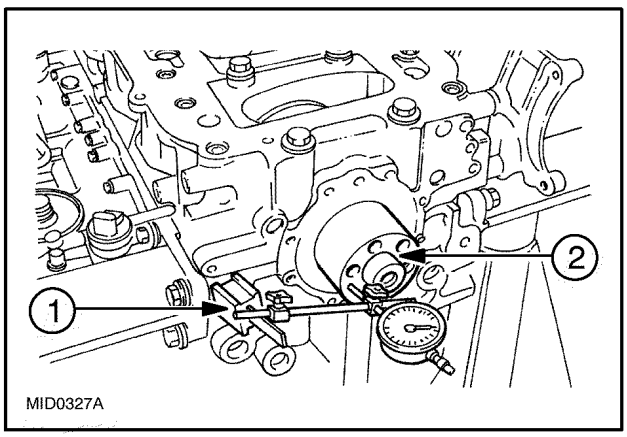
260820031232442 5

6. Screw down the screws **(1)** and tighten them according to the torques and phases shown in **Crankshaft - Torque (B.10.A.43 - D.20.A.10)**.



270820031314267 6

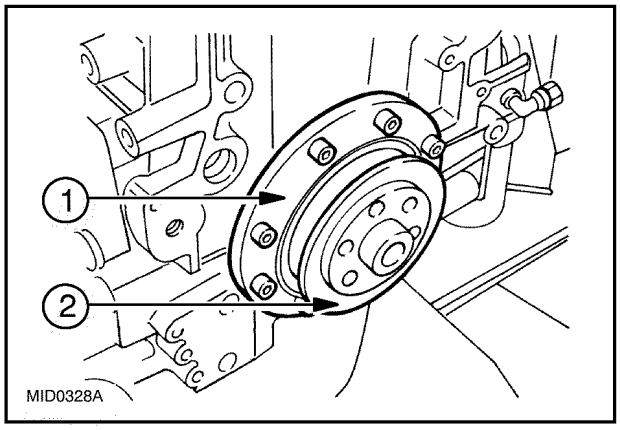
7. The crankshaft end play is checked by placing a dial gauge **(1)**, with a magnetic base on the crankshaft **(2)**, as shown in the Figure. If the clearance is found to be greater than required, replace the rear main thrust bearing shells and check the clearance again.



260820031233140 7

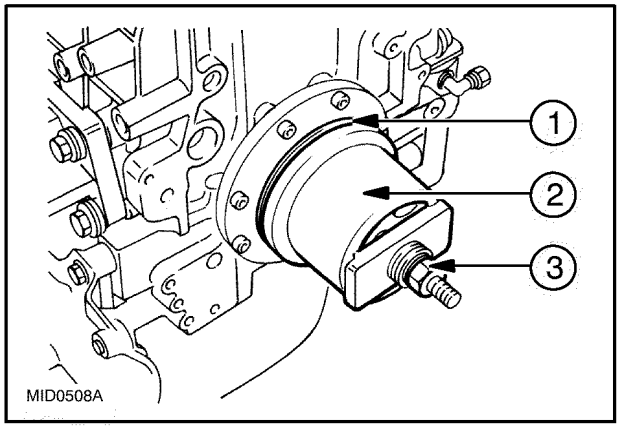
https://truckmanualshub.com/

8. With the centering ring **(2) 380000169**, position the front cover **(1)**, on the crankcase. Screw down the screws and tighten them to the required torque, as noted in **Crankshaft - Torque (B.10.A.43 - D.20.A.10)**.



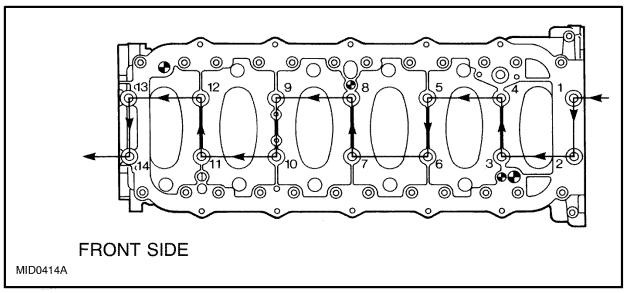
260820031233549 8

9. Key the ring seal **(1)**, onto the crankshaft, on which you should apply the tool **(2)**, **380000126**. Screw down the nut **(3)**, to mount the ring seal **(1)**, completely in the cover **(2)**.



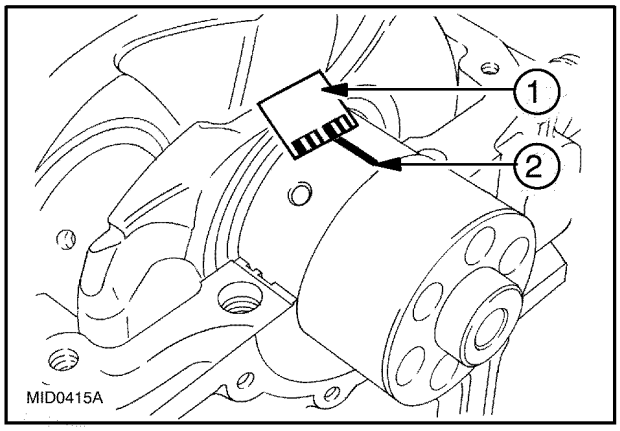
290820031478855 9

10. The diagram on the right shows the tightening sequence of the screws fixing the sub-crankcase under the crankcase.



270820031315613 10

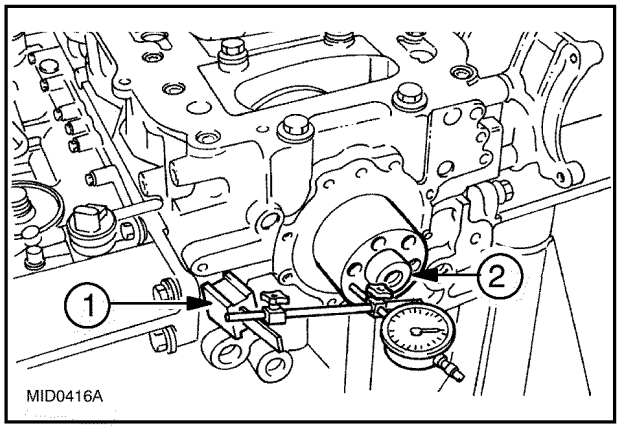
11. The clearance between the crankshaft bearings and the relevant pins is measured by comparing the width taken on by the plasti-gauge**(2)**, at the point of greatest crushing with the graduated scale on the case **(1)**, containing the plasti-gauge wire. The numbers given on the scale give the clearance of the coupling in millimeters. If you find the clearance is not as required, replace the half bearings and repeat the check.



270820031316515 11

https://truckmanualshub.com/

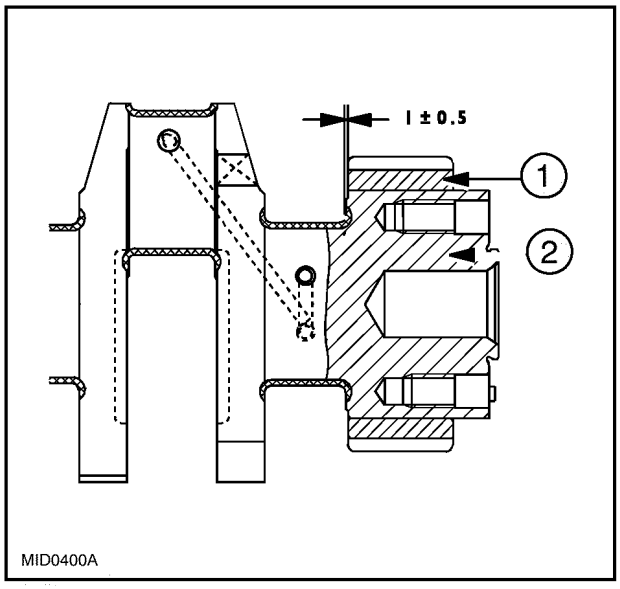
12. Crankshaft end play is checked by placing a dial gauge **(1)**, with a magnetic base on the crankshaft **(2)**, as shown. If you find the clearance is higher than as required, replace the rear main thrust bearing shells and repeat the clearance check.



270820031316656 12

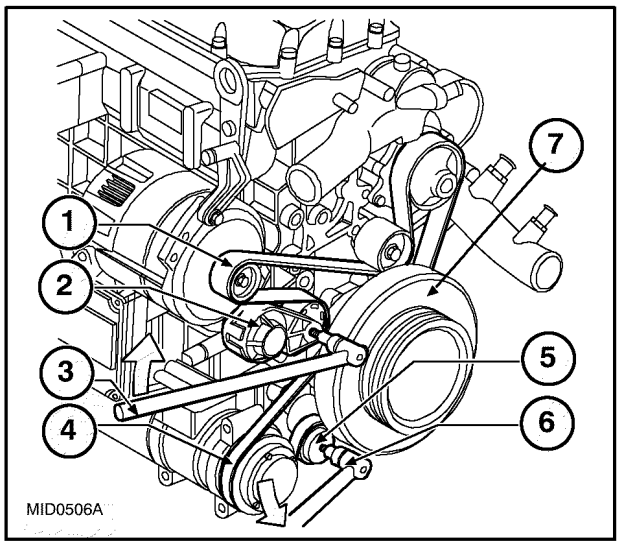
13. Before replacing the oil pump and timing system gear, check that the teeth of the gear are not damaged or worn. If damage or excessive wear is found, remove the gear with the appropriate extractor and replace it. When fitting the gear **(1)**, on the crankshaft **(2)**, heat it for approximately 15 minutes in an oven at a temperature of **180 °C** (**356 °F**). After driving it home, leave it to cool.

IMPORTANT: *After heating the gear **(1)**, fit it on the shaft by applying a load of **6000 Nm** (**1350 lb ft**) to the gear, positioning the load at the distance shown in the figure on the right. After cooling, the gear must have no axial movement under a load of **29100 Nm** (**6547.5 lb ft**).*



290820031486131 13

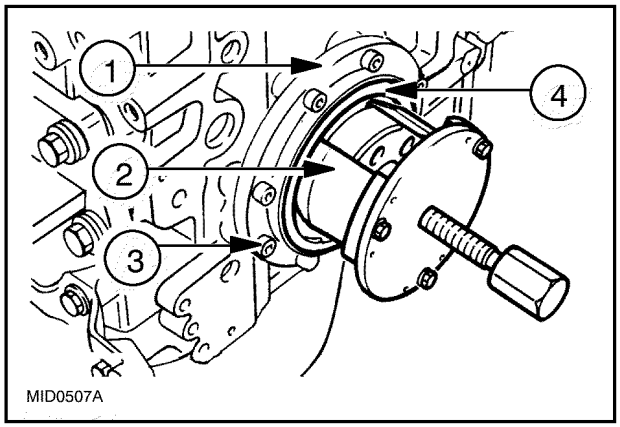
14. To replace the crankshaft front cover seal, drain off the coolant from the engine cooling system. Disconnect the pipes from the thermostat housing. Using a suitable tool **(6)**, turn in the direction of the arrow on the tightener **(5)** and remove the belt **(4)**. Using a suitable tool **(3)**, turn in the direction of the arrow on the tightener **(2)** and remove the belt **(1)**. Take out the fixing screws and remove the damper flywheel **(7)** and the pulley beneath.



mid0506a 14

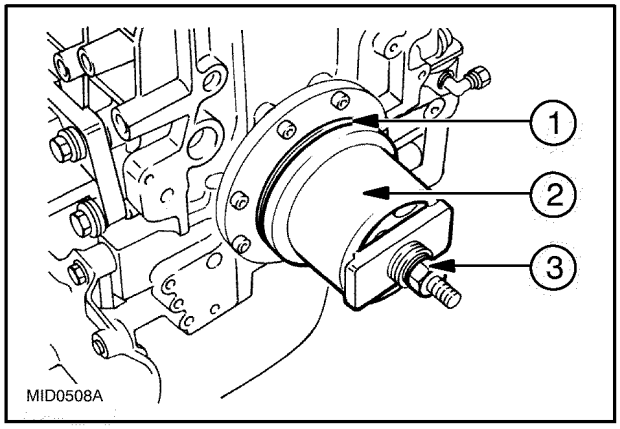
https://truckmanualshub.com/

15. With the extractor **(2)**, **380000120** applied as shown in the figure, extract the seal **(4)**. Unscrew the screws **(3)** and take off the cover **(1)**. Disconnect all electrical connections and sensors.



mid0507a 15

16. Key the ring seal **(1)**, on to the crankshaft and then apply tool **(2)**, **380000126**. Screw the nut **(3)**, down to mount the ring seal **(1)**, completely in the cover. Fit the remaining parts back on following the reverse order used for disassembly. Upon completion, fill the cooling system with the required type and amount of coolant.



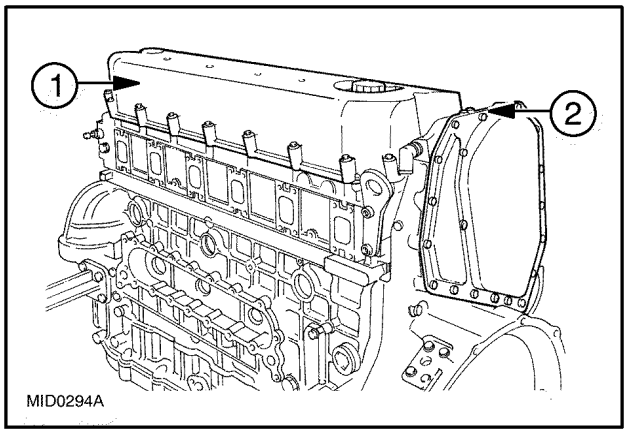
mid0508a 16

https://truckmanualshub.com/

Timing gear - Disassemble (B.10.A.45 - F.10.A.25)

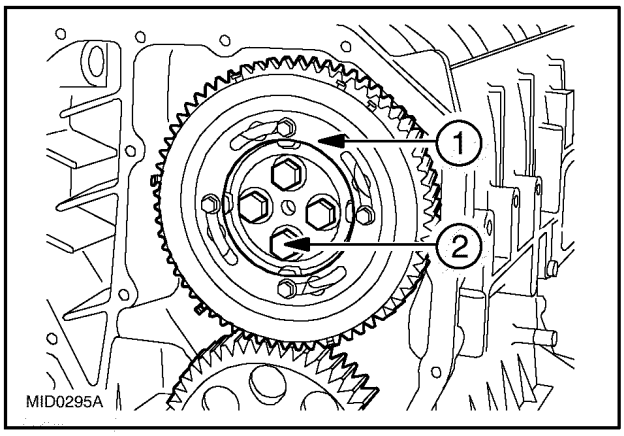
AFX8010

1. Remove the rocker arm cover **(1)**. Remove the timing system cover **(2)**.



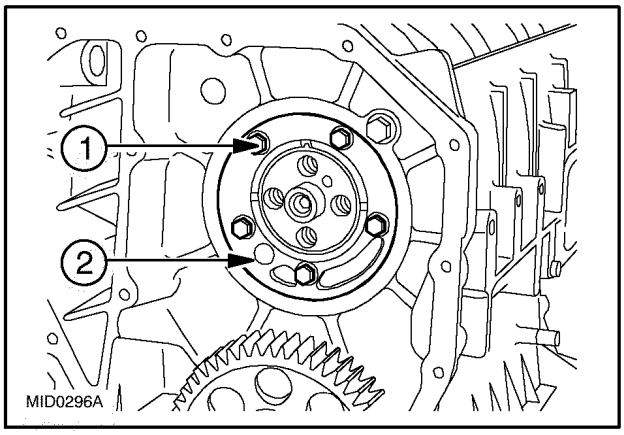
mid0294a 1

2. Unscrew the screws **(2)** and take out the gear **(1)**, together with the phonic wheel.



mid0295a 2

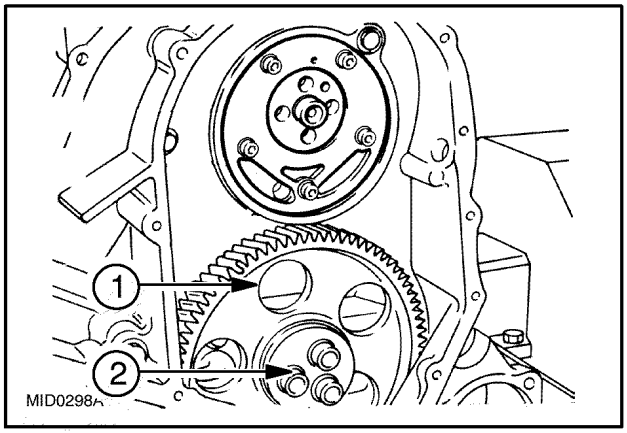
3. Unscrew the five screws **(1)**. Take out the thrust plate **(2)**, together with the ring seal as follows: Screw three M10x38mm screws in the holes to extract the thrust plate **(2)**. Remove the sheet metal gasket.



mid0296a 3

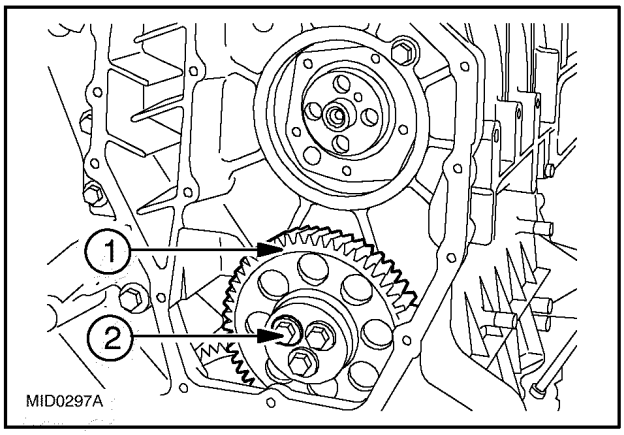
https://truckmanualshub.com/

4. Unscrew the screws **(1)** and remove the transmission gear **(2)**.



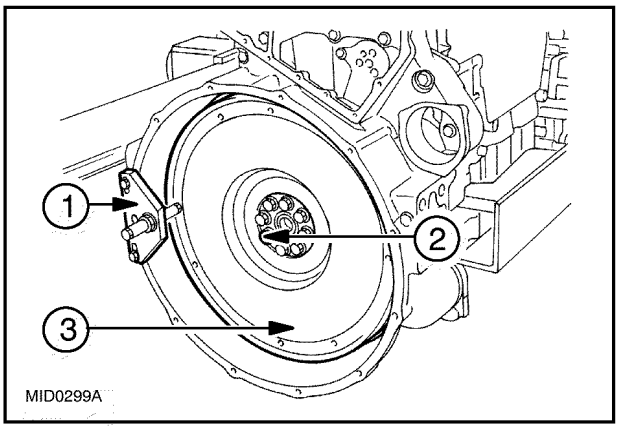
mid0298a 4

5. With an appropriate wrench, unscrew the screw **(2)** and remove the transmission gear **(1)**.



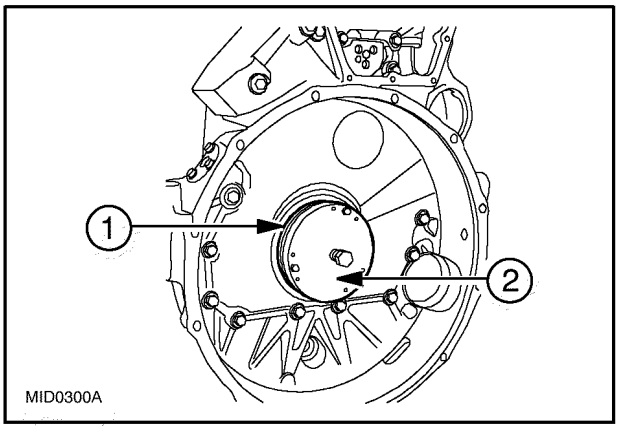
mid0297a 5

6. Block rotation of the engine flywheel **(3)**, with tool **380000144**, **(1)**. Unscrew the fixing screws **(2)** and remove the engine flywheel.



mid0299a 6

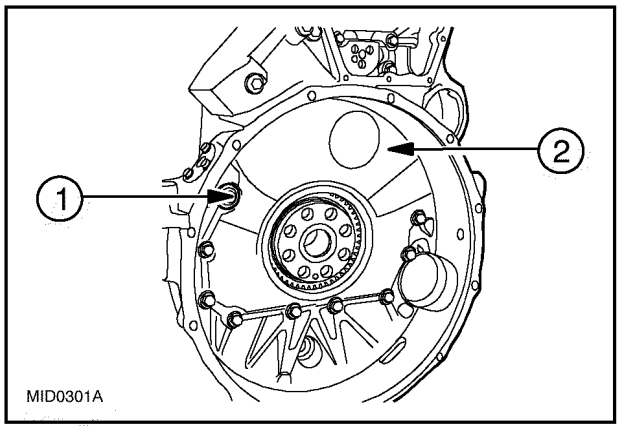
7. With the extractor **380000121** applied as illustrated in the figure, remove the ring seal **(1)**, from the timing box.



mid0300a 7

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8. Unscrew the screws **(1)** and remove the timing gear box **(2)**.



mid0301a 8

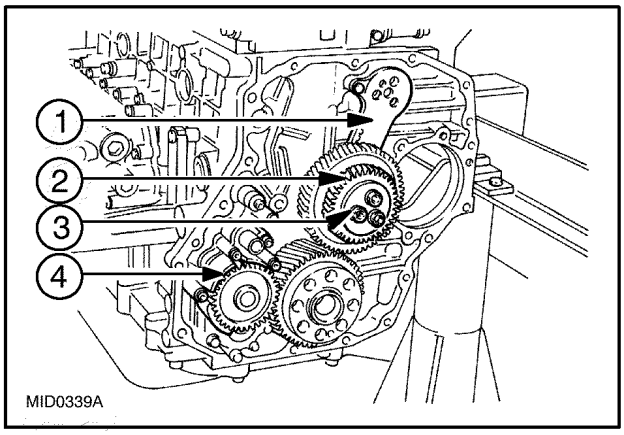
https://truckmanualshub.com/

Timing gear - Assemble (B.10.A.45 - F.10.A.20)

AFX8010

1. Fit the oil pump **(4)**, and intermediate gears **(2)**, together with connecting rod **(1)**and tighten the screws **(3)**, in two stages: pre-torque, **30 Nm** (**22 lb ft**) closed angle, **90 °**.

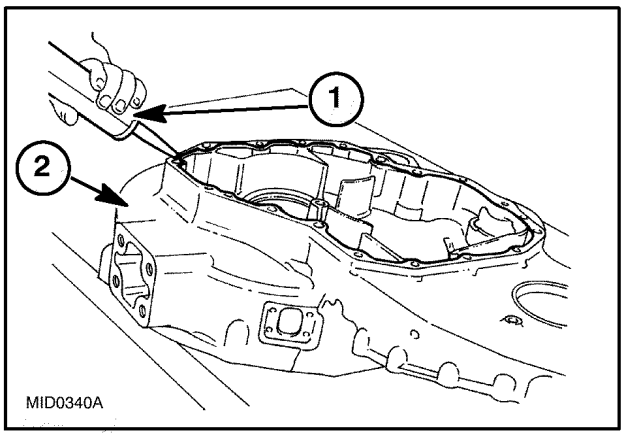
IMPORTANT: *The screws fixing the intermediate gear of the engine must be lubricated with engine oil before assembly.*



mid0339a 1

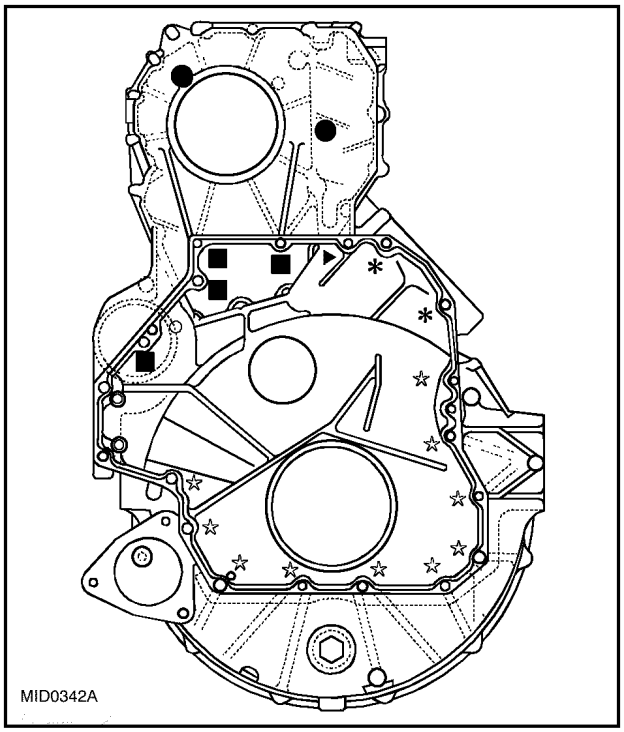
2. Apply Loctite 5699 silicone on the gear box **(2)**, with an appropriate tool **(1)**, as shown in the figure.

IMPORTANT: *Fit the gear box within 10 minutes of applying the sealant.*



mid0340a 2

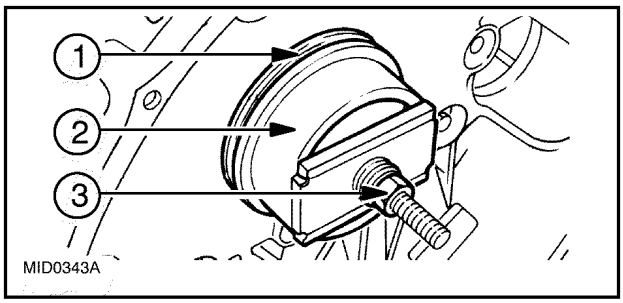
3. Tighten the fixing screws of the timing system box to the torques indicated here and according to the given sequence.
   Star symbol - 10 screws M12 x 1.75 x 100 mm, **63 Nm** (**46 lb ft**)
   Circle symbol - 2 screws M12 x 1.75 x 70 mm, **63 Nm** (**46 lb ft**)
   Square symbol - 4 screws M12 x 1.75 x 35 mm, **63 Nm** (**46 lb ft**)
   Triangle symbol - 1 screw M12 x 1.75 x 120 mm, **63 Nm** (**46 lb ft**)
   Asterix symbol - 2 screws M12 x 1.75 x 193 mm, **63 Nm** (**46 lb ft**).



15082003283483 3

https://truckmanualshub.com/

4. Key the ring seal, **(1)**, onto the crankshaft, on which you should apply the tool **(2)**, **380000127**. Screw down the nut **(3)**, to mount the ring seal **(1)**, completely in the gear box.



mid0343a 4

https://truckmanualshub.com/

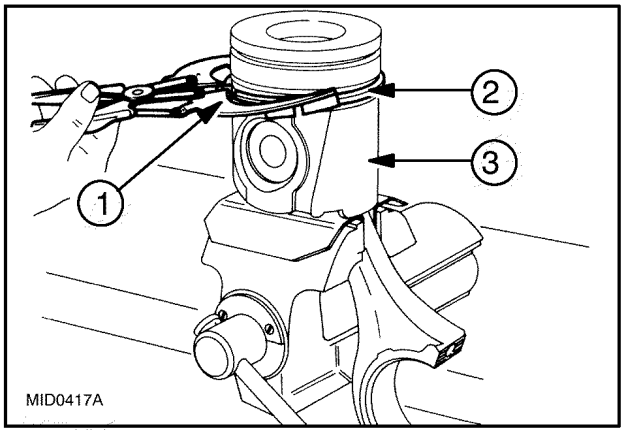
Connecting rod and piston - Disassemble (B.10.A.47 - F.10.A.25)

AFX8010

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

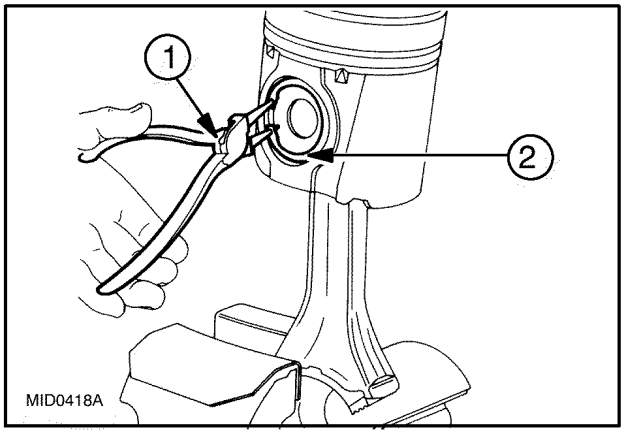
1. Clean the parts thoroughly before doing any work and check the pistons carefully. If they show any signs of seizure, scoring, cracking or excessive wear, they must be replaced.

2. Remove the piston rings **(2)**, from the piston **(3)**, with the pliers **380000324 (1)**.



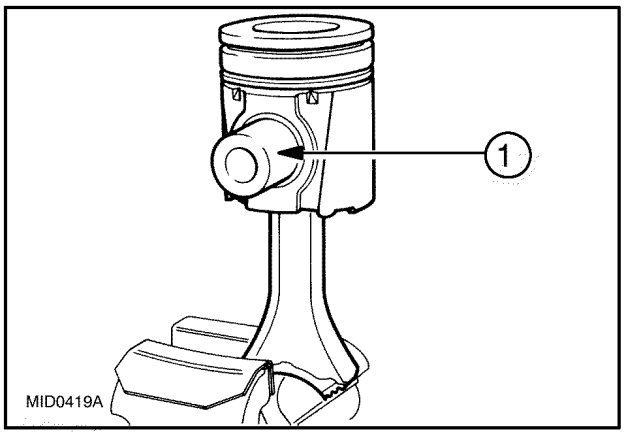
mid0417a 1

3. Remove the split rings **(2)**, holding the piston pin with round-nose pliers **(1)**.



mid0418a 2

4. Remove the piston pin **(1)**. If disassembly is difficult, use an appropriate drift.



mid0419a 3

https://truckmanualshub.com/

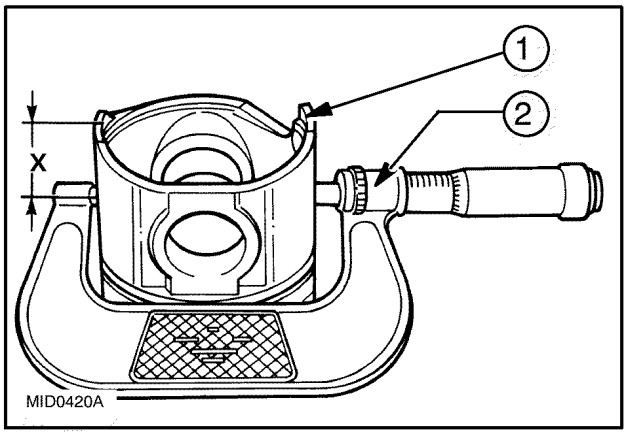
Connecting rod and piston - Measure (B.10.A.47 - F.40.A.16)

AFX8010

1. To measure piston diameter, use a micrometer **(2)**, to measure the diameter of the piston **(1)** and to determine the assembly clearance.

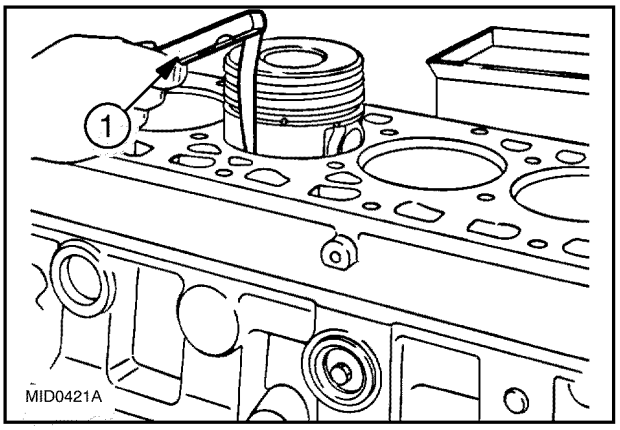
IMPORTANT: *The diameter has to be measured at the distance X from the base of the piston skirt: X =* ***19 mm*** *(****0.748 in****).*

2. The pistons are selected in two classes A and B, according to the diameter.



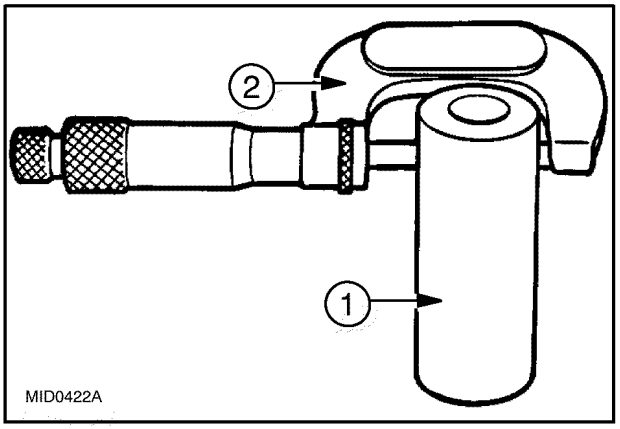
mid0420a 1

3. As spares they are supplied in class A and can also be mounted in the cylinder liners with inside diameter class B. The clearance between piston and cylinder liner can also be measured with a feeler gauge.



mid0421a 2

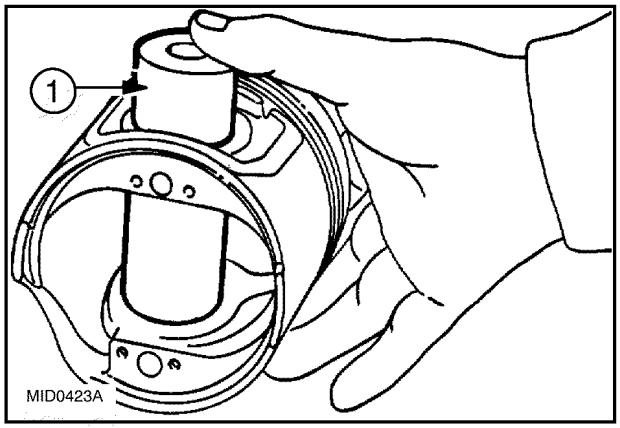
4. Piston pins are mounted with clearance on both the small end and on the piston. Measure the diameter of the pin **(1)**, with a micrometer **(2)**.



mid0422a 3

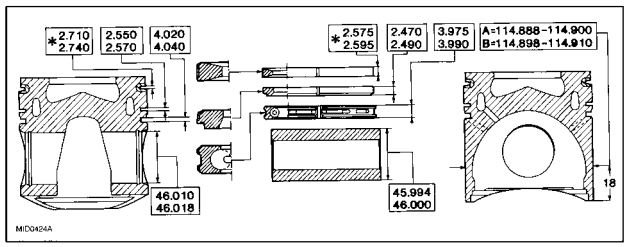
https://truckmanualshub.com/

5. Certain conditions must be met for correct pin-piston coupling. When fitting new pins **(1)**, check that they couple correctly with the seat on the piston in the following manner: lubricate the pin and seat on the piston pin bosses with engine oil; holding the pin upright, insert it into the piston pin bosses; the pin must slide in by simply pressing it and the pin must not slip out of the bosses on its own.



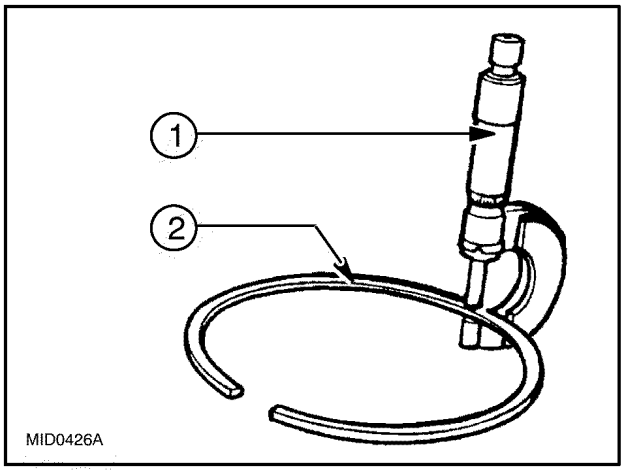
mid0423a 4

6. The figure to the right contains data for piston, piston rings and pin. (* is measured on O **120 mm**). See also **Connecting rod and piston - Dimension (B.10.A.47 - D.40.A.30)**.



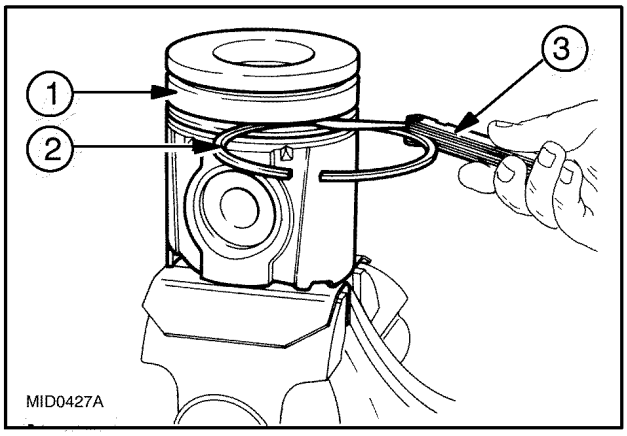
mid0424a 5

7. Check the thickness of the piston ring **(2)**, with a micrometer **(1)**.



mid0426a 6

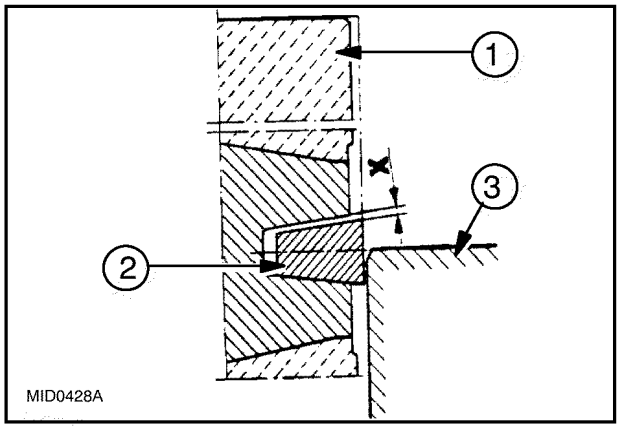
8. Check the clearance between the ring seals **(2)** and their seats on the piston **(1)**, with a feeler gauge **(3)**.



mid0427a 7

https://truckmanualshub.com/

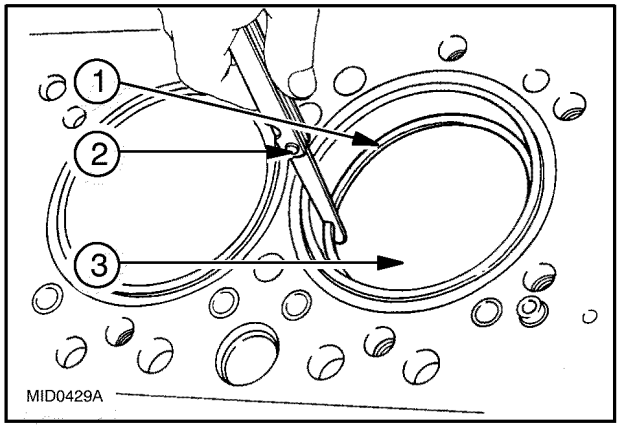
9. The ring seal **(2)**, of the first slot is trapezoidal in shape. The clearance "X" between the ring seal and its seat is measured by placing the piston **(1)**, with the ring in the cylinder liner **(3)**, so that the ring seal is half out of the cylinder liner.



mid0428a 8

10. Using a feeler gauge **(2)**, check the opening between the ends of the ring seals **(1)**, inserted in the cylinder liner **(3)**. On finding a higher or lower distance between the ends than is required, replace the piston rings.

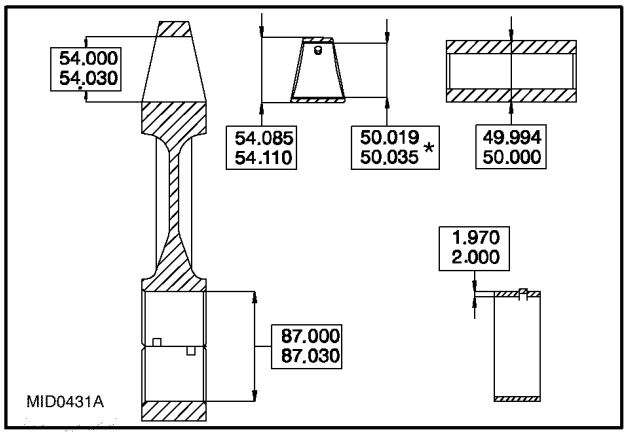
IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*



mid0429a 9

11. Clean the parts thoroughly before performing any work.

12. Main data for the connecting rod, bushing, pin and half bearings are shown on the right (dimensions are in mm). Dimensions indicated with an **(*)** should be obtained after driving home the bushing. The data for the classes of selection for the big end bearing seat and weights are punched on the big end of the connecting rod.

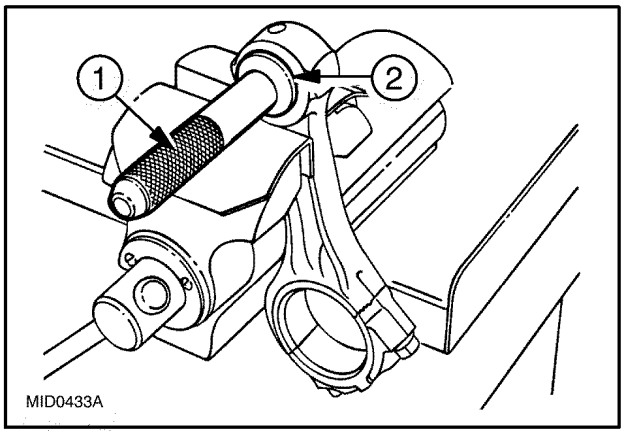


mid0431a 10

https://truckmanualshub.com/

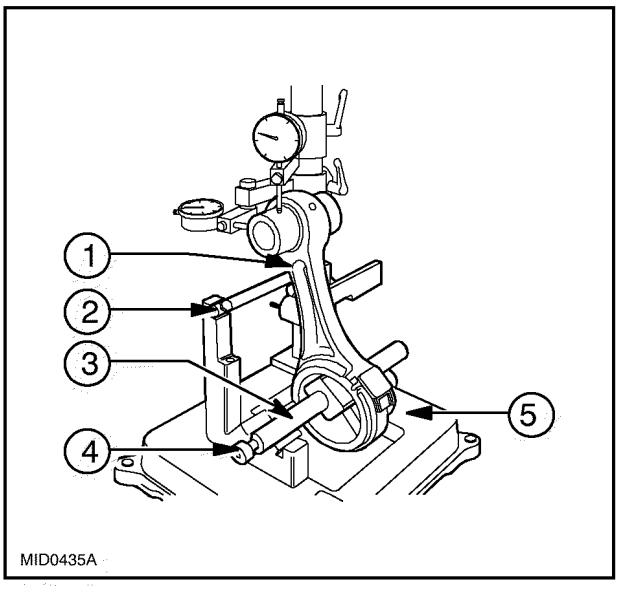
13. The bushing **(2)**, is disassembled and assembled with the appropriate drift **(1)**.

IMPORTANT: *After driving home the bushing in the small end of the connecting rod, remove the portion that comes out of the side, then rebore the bushing in order to obtain the required diameter.*



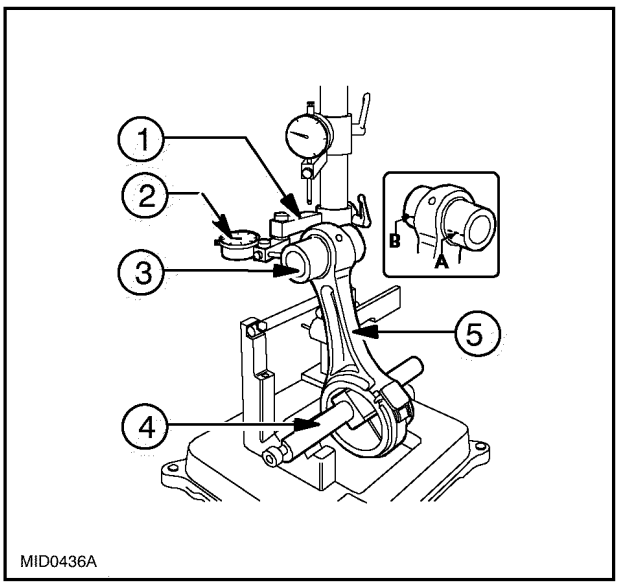
mid0433a 11

14. The alignment of the connecting rod, twisting and bending is checked with the appropriate tool. Check the alignment of the connecting rods **(1)**, as follows: Fit the connecting rod **(1)**, on the spindle of the tool **(5)** and lock it with the screw **(4)**. Place the spindle **(3)**, on the V-prisms resting the connecting rod **(1)**, on the stop bar **(2)**.



mid0435a 12

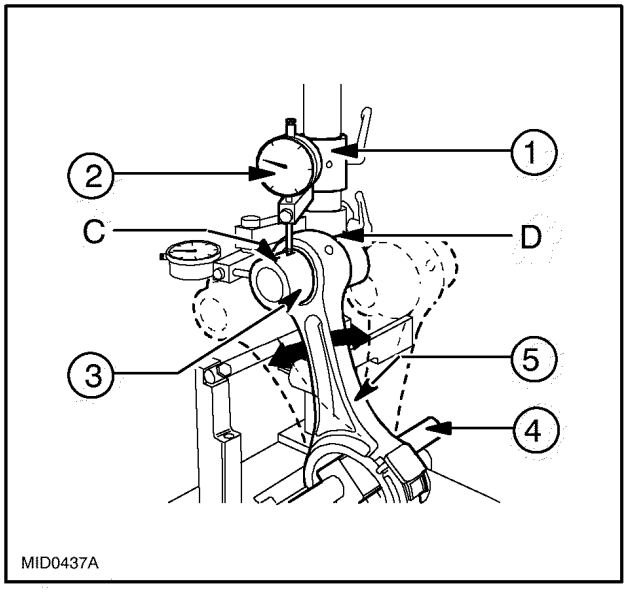
15. Check the twist of the connecting rod **(5)**, by comparing two points (A and B) of the pin **(3)**, on the horizontal plane of the connecting rod. Position the mount **(1)**, of the dial gauge **(2)**, so that the latter is pre-loaded by approximately **0.5 mm** (**0.020 in**) on the pin **(3)**, at point A and zero the dial gauge **(2)**. Move the spindle **(4)**, with the connecting rod **(5)** and on the opposite side (B) of the pin **(3)**, compare any deviation: the difference between A and B must be no greater than **0.08 mm** (**0.003 in**).



mid0436a 13

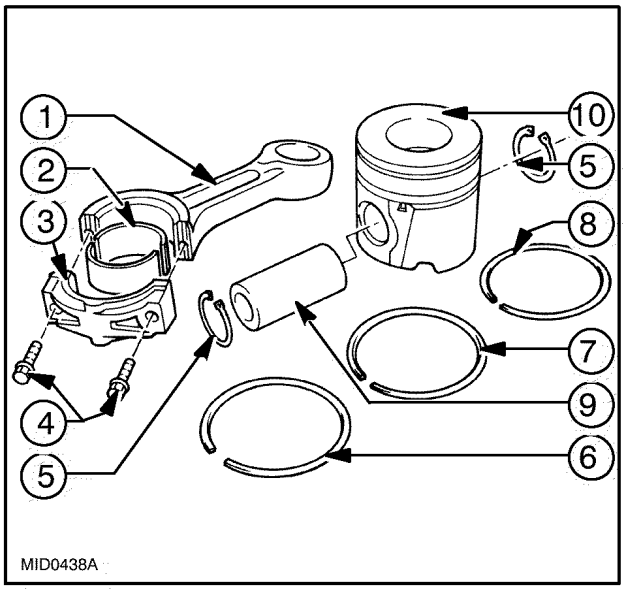
https://truckmanualshub.com/

16. Check the bend of the connecting rod **(5)**, by comparing two points C and D of the pin **(3)**, on the vertical plane of the connecting rod. Position the vertical mount **(1)**, of the dial gauge **(2)**, so that the latter rests on the pin **(3)**, at point C. Swing the connecting rod forwards and backwards, searching for the highest position of the pin and zero the dial gauge **(2)**, in this condition. Move the spindle with the connecting rod **(5)** and on the opposite side D of the pin **(3)**, repeat the check for the highest point. The difference between points C and D must be no greater than **0.08 mm** (**0.003 in**).



mid0437a 14

17. A piston-connecting rod assembly consists of the following parts: **(1)**, connecting rod body; **(2)**, half bearings; **(3)**, connecting rod cap; **(4)**, cap fixing screws; **(5)**, split ring; **(6)**, oil scraper ring with slots with spiral spring; **(7)**, ring seal; **(8)**, trapezoidal ring seal; **(9)**, piston pin and **(10)** piston.



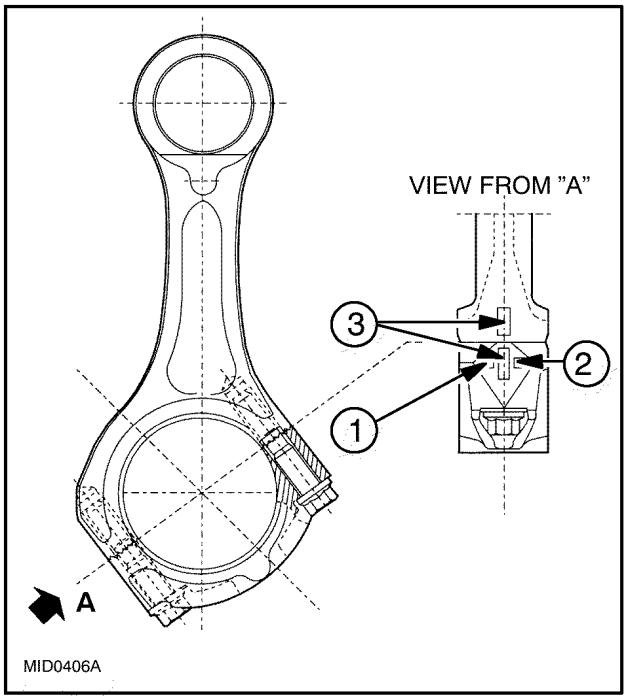
mid0438a 15

https://truckmanualshub.com/

Connecting rod and piston - Visual inspection (B.10.A.47 - F.40.A.10)

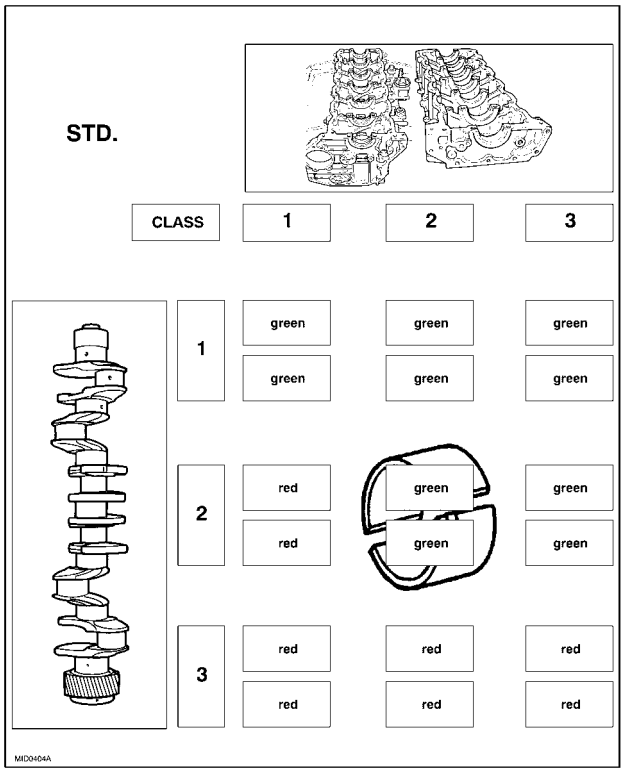
AFX8010

1. On the body of the connecting rod, in position "A", there are three markings: a letter specifying the weight classes,
   A = **3973 - 4003 g** (**8.76 - 8.83 lb**),
   B = **4004 - 4034 g** (**8.8 - 8.89 lb**),
   C = **4035 - 4065 g** (**8.9 - 8.96 lb**),
   Number specifying the selection of the diameter of the big end bearings at:
   1 = **87.00 - 87.010 mm** (**3.4252 - 3.4256 lb in**),
   2 = **87.011 - 87.020 mm** (**3.4256 - 3.4260 lb in**) **3 = 87.021 - 87.030 mm** (**3.4260 - 3.4264 lb in**)
   Numbers identifying the cap rod coupling. The number specifying the class of the diameter of the half-bearing seat may be: **(1)**, **(2)**, or **(3)**. Determine the type of big end bearing shell to fit on each pin, following the guidelines in the following tables.



mid0406a 1

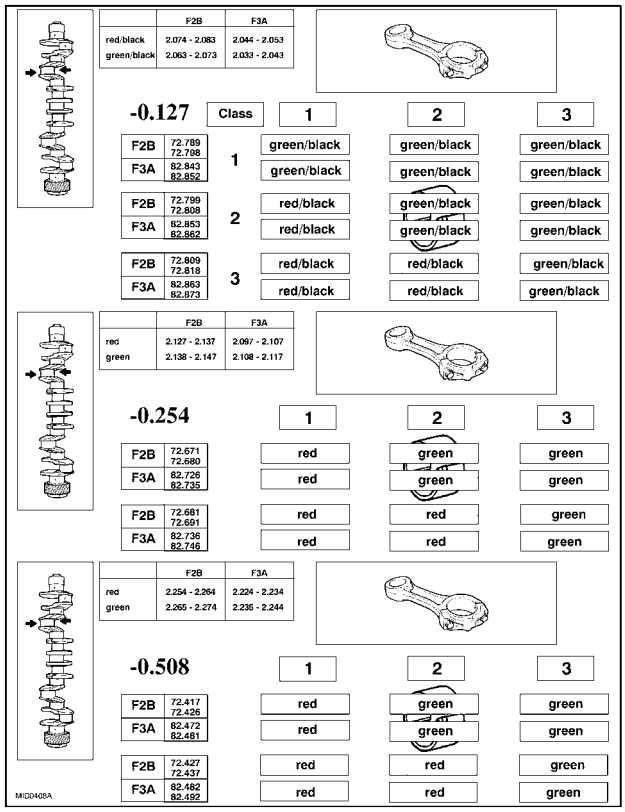
2. Refer to the crankshaft and bearing chart in figure **2**.



mid0404a 2

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3. Refer to the connecting rod and crankshaft bearing chart in figure **3**.



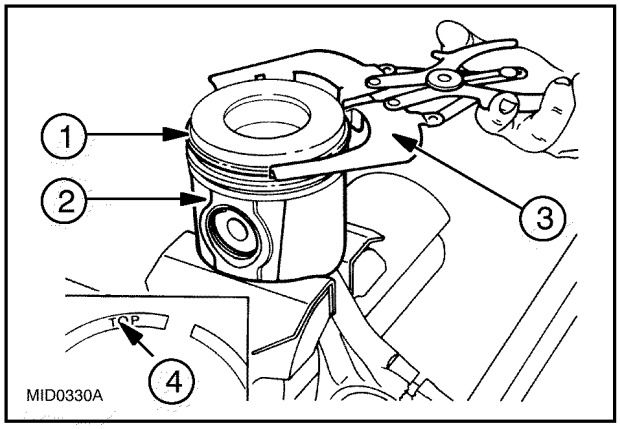
mid0408a 3

https://truckmanualshub.com/

Connecting rod and piston - Assemble (B.10.A.47 - F.10.A.20)

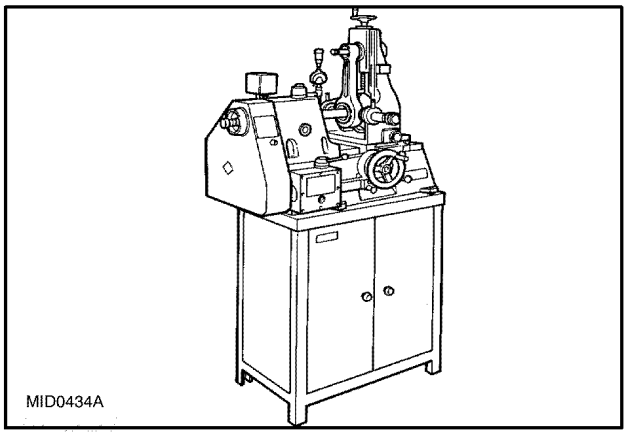
AFX8010

1. Fit the rings**(1)**, on the pistons **(2)**, with the pliers **380000324**, **(3)**. The rings have to be fitted with the word "TOP" **(4)** facing upwards. Also, position the openings of the piston rings so they are out of step with each other by **120 °**.



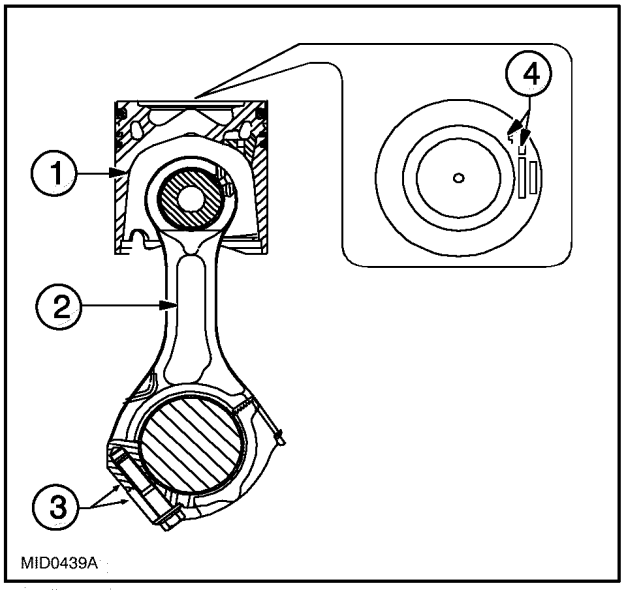
mid0330a 1

2. Rebore the small-end bushing with a boring machine.



MID0434A 2

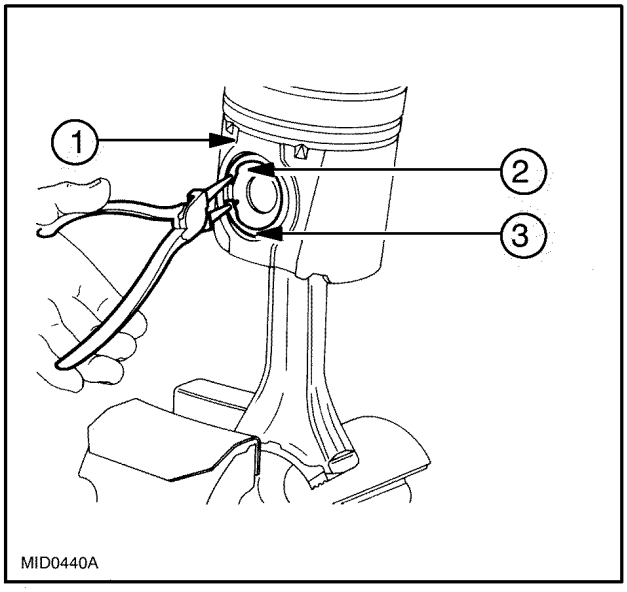
3. The piston **(1)**, must be fitted on the connecting rod **(2)**, so that the symbol **(4)**, showing the assembly position in the cylinder liner and the punch mark **(3)**, of the connecting rod are observed as shown in the Figure.



MID0424A 3

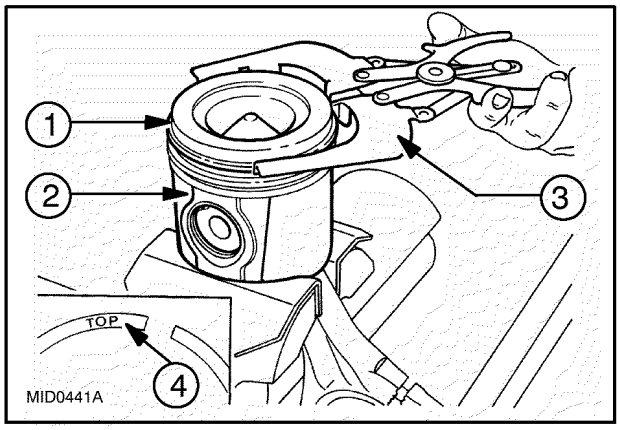
https://truckmanualshub.com/

4. Mount the pin **(2)** and constrain it to the piston **(1)**, with the split rings **(3)**.



MID0440A 4

5. To fit the piston rings **(1)**, on the piston **(2)**, use the pliers 296028, **(3)**. The rings need to be fitted with the word "TOP" **(4)** facing upwards. Also, direct the openings of the rings so they are staggered **120 °** apart.



mid0441a 5

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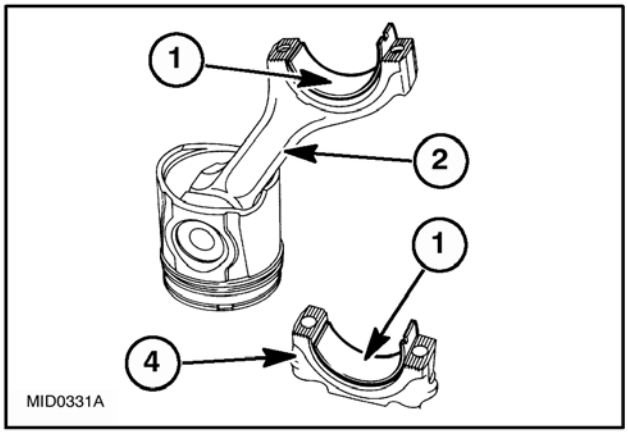
Connecting rod and piston - Install (B.10.A.47 - F.10.A.15)

AFX8010

IMPORTANT: *If visual inspection indicates there is no need to replace the connecting rod bearings, it is necessary that they are reinstalled back in the same sequence and position found during disassembly. If you need to replace them, select the connecting rod bearings according to the selection described in* ***Connecting rod and piston - Assemble (B.10.A.47 - F.10.A.20)****.*

1. Lubricate the half bearings **(1)** and fit them on the connecting rod **(2)** and on the cap **(4)**.

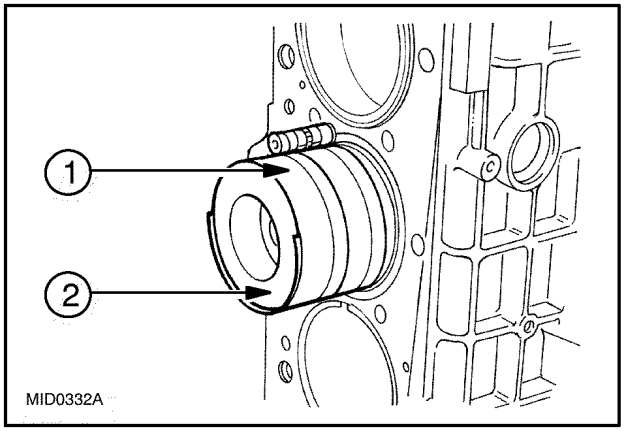
IMPORTANT: *Do not make any adjustments to the half bearings.*



mid0331a 1

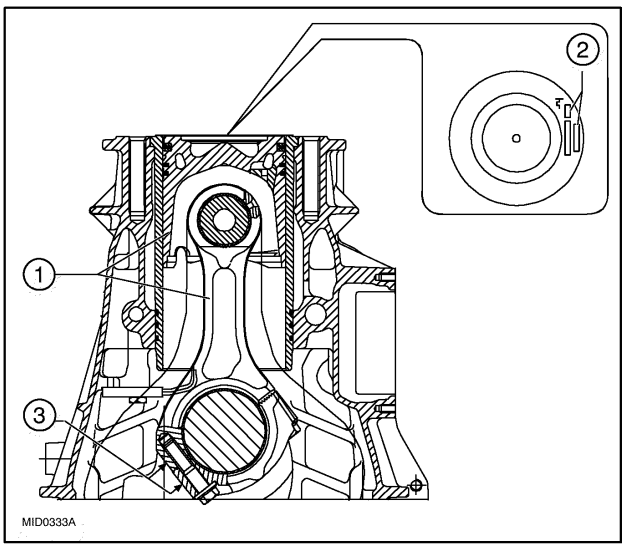
2. Lubricate the pistons, piston rings and the inside of the cylinder liners. With the aid of the clamp, **(1)**, **380000220**, fit the connecting rod-piston assemblies, **(2)**, in the cylinder liners according to Figure **1**, checking that: the number of each connecting rod corresponds to the cap coupling number; the symbol **(2)** Figure **3**, punched on the top of the pistons faces towards the engine flywheel; or the cavity in the shell of the pistons correspond to the position of the oil nozzles.

IMPORTANT: *Class A pistons are supplied as spares and they can also be fitted in a class B cylinder liner.*



mid0332a 2

3. The order for fitting the connecting rod-piston assembly in the cylinder liner is: connecting rod-piston assembly; punch mark area on the top of the piston with symbols for assembly position and selection class and **(3)**, connecting rod punch mark area.



mid0333a 3

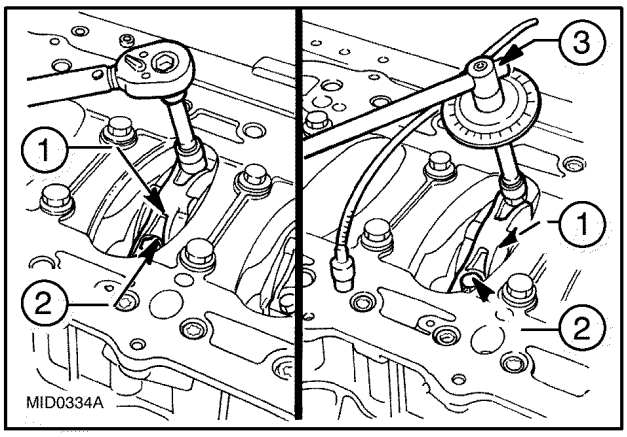
https://truckmanualshub.com/

4. Connect the connecting rods to the relevant pins of the crankshaft. Fit on the caps of the connecting rod **(1)**, together with the half bearings. Screw down the fixing screws **(2)**, and tighten them in two stages to the torques given in the table at: **Cylinder head - Torque (B.10.A.72 - D.20.A.10)**.

IMPORTANT: *The connecting rod cap fixing screws of the engine must be lubricated with engine oil before assembly.*

5. Angle closing is performed with tool **380000304**, **(3)**. Remove the caps and determine the existing clearance, comparing the width of the calibrated wire with the graduated scale on the bag containing the wire.

IMPORTANT: *Lubricate all relevant parts before final assembly with engine oil. Before reusing the connecting rod cap fixing screws, measure the thread diameter. If a connecting rod cap fixing screw diameter is lower than* ***13.4 mm*** *(****.528 in****), it must be replaced.*



mid0334a 4

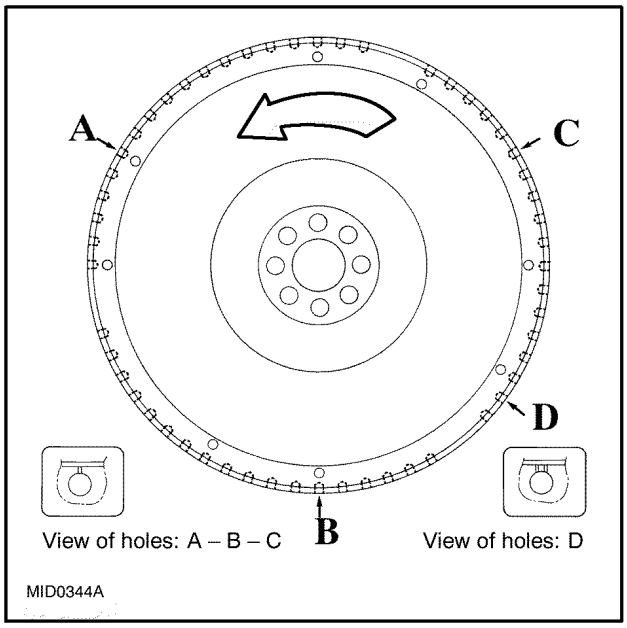
https://truckmanualshub.com/

Flywheel - Install (B.10.A.50 - F.10.A.15)

AFX8010

1. Details of the punch marks on an engine flywheel which indicate piston position are: "A" - Hole on flywheel with 1 notch, corresponding to the TDC of pistons 3-4; "B" - hole on flywheel with 1 notch, corresponding to the TDC of pistons 1-6; "C" - hole on flywheel with 1 notch, corresponding to the TDC of pistons 2-5 and "D" - hole on flywheel with 2 notches, position corresponding to **54 °**.

IMPORTANT: *If the teeth of the rim mounted on the engine flywheel for starting the engine are badly damaged, replace the rim. Assembly must be done after heating the rim to a temperature of* ***200 °C*** *(****392 °F****).*



mid0344a 1

2. Fit the engine flywheel without locking the fixing screws **(2)** and insert the pin **380000150 (1)**.

IMPORTANT: *The engine flywheel fixing screws must be lubricated with engine oil before assembly.*

3. Lock flywheel rotation with tool **380000144**, **(1)**; and tighten the screws, **(2)**, as noted in **Flywheel - Torque (B.10.A.50 - D.20.A.10)**.

4. Second phase: closed angle with tool **380000304**, **(1)**. Refer to **Flywheel - Torque (B.10.A.50 - D.20.A.10)**.

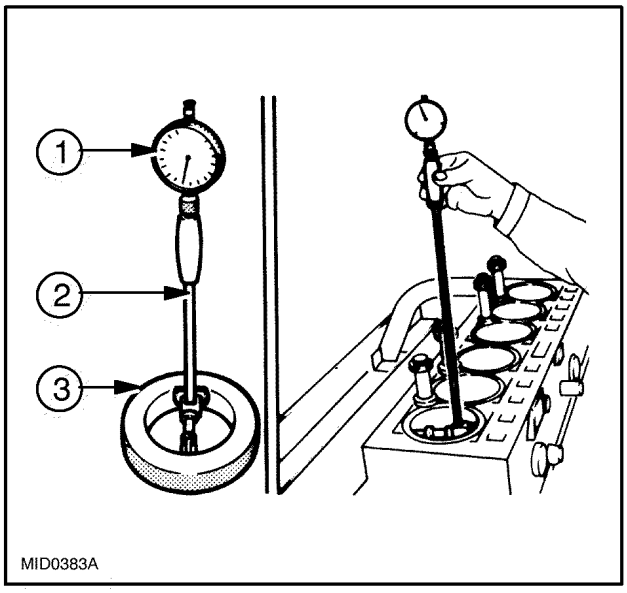
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Cylinder block - Measure (B.10.A.70 - F.40.A.16)

AFX8010

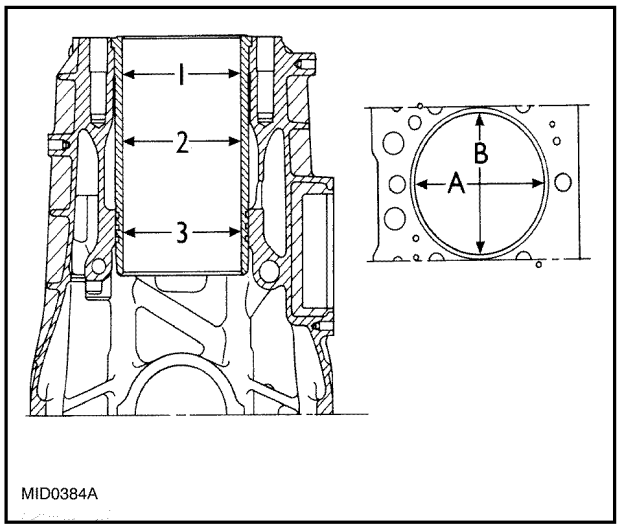
IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

1. Check the inside diameter of the cylinder liners to verify the extent of ovalization, taper and wear with the gauge **(2)**, equipped with a dial gauge **(1)**, **380000153** of diameter **125 mm** (**4.921 in**). If the ring gauge is not available, use a micrometer.



mid0383a 1

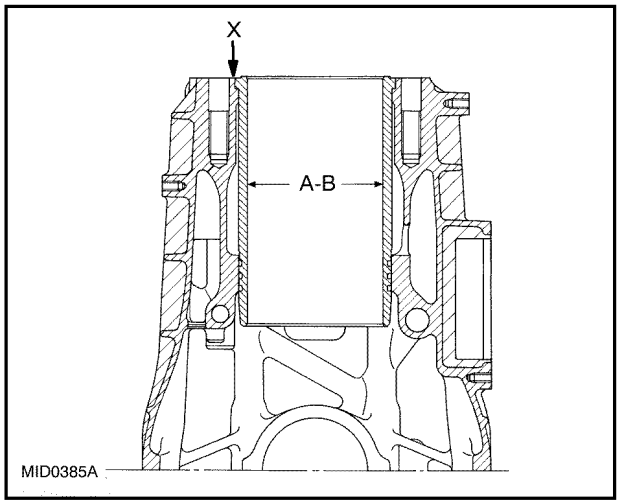
2. Outline for Measuring the Diameter of the Cylinder Liners (dimensions in mm) are: **(1)** first measurement; **(2)** second measurement and **(3)**, third measurement. The measurements have to be made on each single cylinder liner at three different heights and on two planes (A-B) at right angles to each other, as shown in the figure to the right. Dimensions for the two planes are: A, **125 - 125.013 mm** (**4.9213 - 4.9218 in**); B, **125.011 - 125.024 mm** (**4.9217 - 4.9222 in**).



mid0384a 2

3. On finding greater wear than **0.150 mm** (**0.0059 in**) or maximum ovalization of **0.100 mm** (**0.0039 in**) over the values given in the figure, it is necessary to replace the cylinder liner as grinding, lapping and dressing are not permitted. The "X" in the illustration indicates selection class marking area.

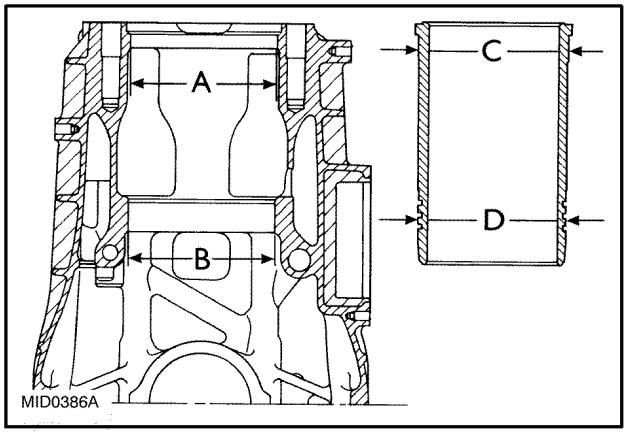
IMPORTANT: *The cylinder liners are supplied as spares with selection Class A. Class B is mounted solely in production.*



mid0385a 3

https://truckmanualshub.com/

4. For cylinder wall specifications see **Cylinder block - Dimension (B.10.A.70 - D.40.A.30)**. If necessary, the cylinder liners can be taken out and fitted in different seats a number of times. Check the state of the plugs of the cylinder assembly; if rusty or there is any doubt at all about their seal, replace them.



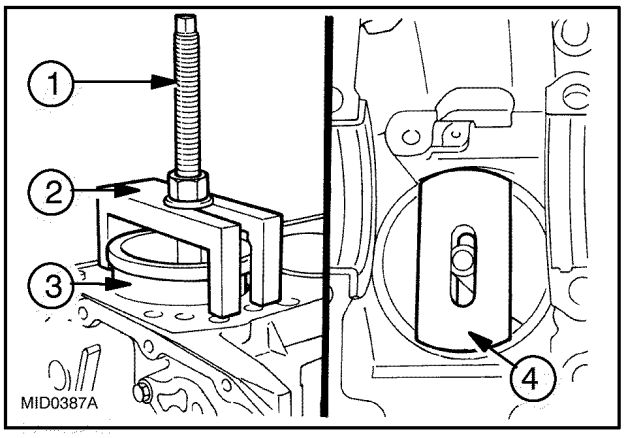
mid0386a 4

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Cylinder block - Replace (B.10.A.70 - F.10.A.30)

AFX8010

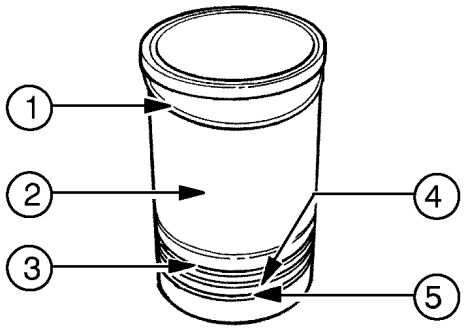
1. Position the parts **(2)** and the plate **(4)**, of tool **380000366**, as shown in the figure, checking that the plate **(4)**, rests correctly on the cylinder liner. Screw down the nut of the screw **(1)** and extract the cylinder liner **(3)**, from the crankcase.



mid0387a 1

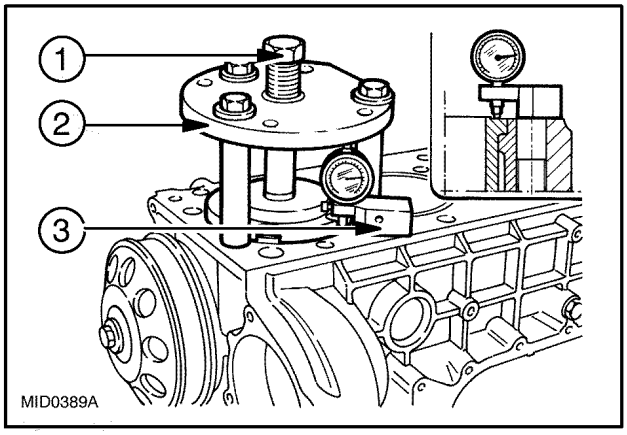
2. Always replace the water ring seals **(3)**, **(4)** and **(5)**. Fit the adjustment ring **(1)**on the cylinder liner **(2)**. Lubricate its bottom portion and fit it in the cylinder assembly with an appropriate tool.

IMPORTANT: *The adjustment ring **(1)**, is supplied as a spare in the following thicknesses: 0.08 mm - 0.10 mm - 0.12 mm (0.003 - 0.004 - 0.005 in).*



20040341 2

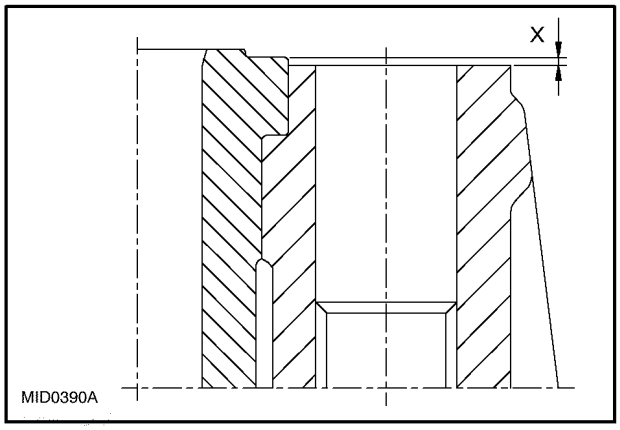
3. Check the protrusion of the cylinder liners with tool **380000140**, **(2)** and tightening the screw **(1)**, to the torque of **220 Nm** (**162 lb ft**). Measure with the dial gauge **(3)**, that the protrusion of the cylinder liner from the supporting surface of the cylinder head is the X value, as noted in **Cylinder block - Dimension (B.10.A.70 - D.40.A.30)**



mid0389a 3

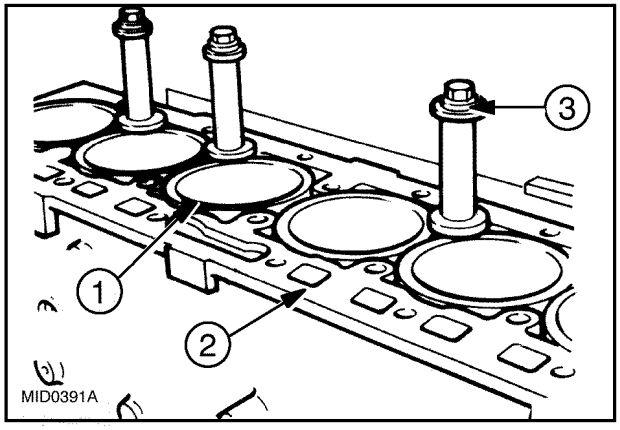
https://truckmanualshub.com/

4. Refer to **Cylinder block - Dimension (B.10.A.70 - D.40.A.30)** for cylinder liner protrusion information.



mid0390a 4

5. Upon completing assembly, lock the cylinder liners **(1)**, to the crankcase **(2)**, with the pins **380000363 (3)**.



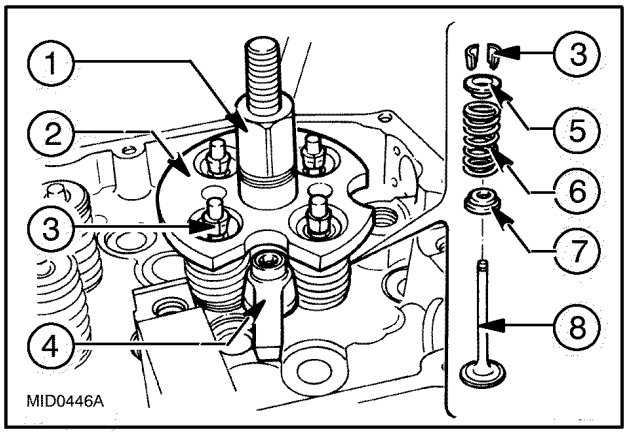
mid0391a 5

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Cylinder head - Disassemble (B.10.A.72 - F.10.A.25)

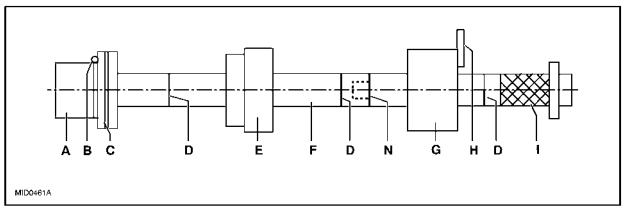
AFX8010

1. To remove the valves, secure the tool, 296173-296174 **(2)**, with the bracket **(4)**, to the cylinder head. Screw down with lever **(1)**, until it is possible to remove the cotter pins **(3)**. Remove the tool **(2)** and extract the top plate **(5)**, spring **(6)** and bottom plate **(7)**. Repeat this process for all of the valves. Turn the cylinder head over and extract the valves **(8)**.



mid0446a 1

2. Before replacing used camshaft bearings, inspect them closely. The surfaces of the bushings must not show any signs of seizing or scoring. If they show any signs of damage, they must be replaced. Using a bore gauge, measure the inside diameter of the bushings. If it is above the tolerance value, replace the bushings (see **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**). To disassemble and reassemble the bushings of the camshaft, use the drift: 296188. A. Drift; B. Bushing positioning grub screw; C. Reference for fitting the 7th bushing; D. Reference for fitting bushings: 1 - 2 - 3 - 4 - 5 - 6, reference mark for the F2B engine, red mark for the F3A engine; E. Guide bushing; G. Guide bushing to secure to the 7th bushing mount; H. Plate for securing bushing G to cylinder head; I. Grip, and L. Extension coupling.

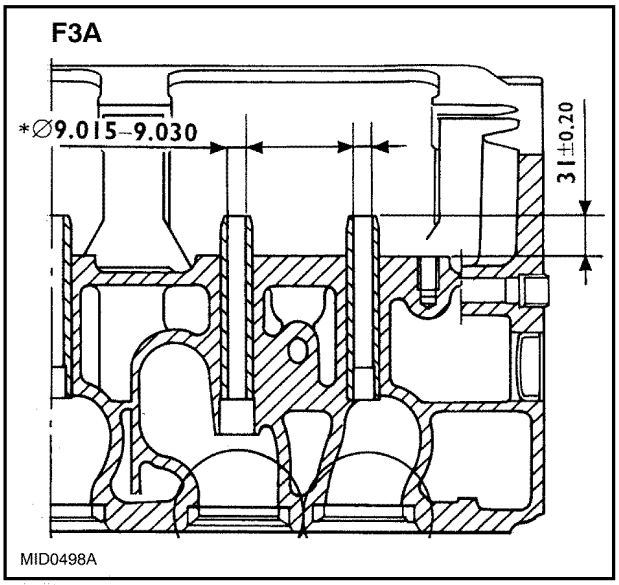


MID0442A 2

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

3. The valve guides are removed with drift 296153. Assembly is performed with drift 296153 equipped with part 296178.

IMPORTANT: *Part 296178 determines the exact position of assembly of the valve guides in the cylinder head. If they are not available, it is necessary to drive the valve guides into the cylinder head so they protrude from it by* ***31.3 - 31.7 mm*** *(****1.232 - 1.248 in****).*



mid0498a 3

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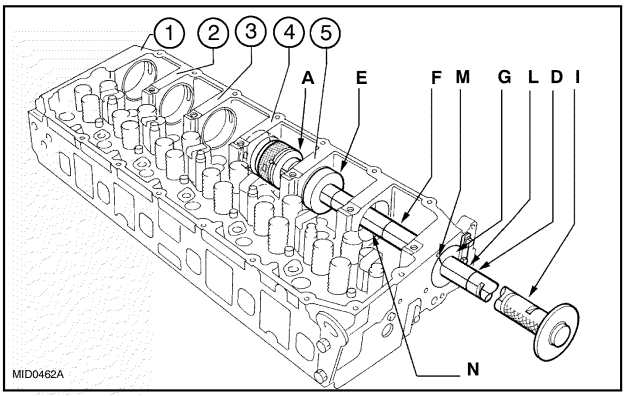
4. After driving in the valve guides, rebore their hole with the reamer 290884. Dimensions should be as noted in the figure to the right.

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Cylinder head - Assemble (B.10.A.72 - F.10.A.20)

AFX8010

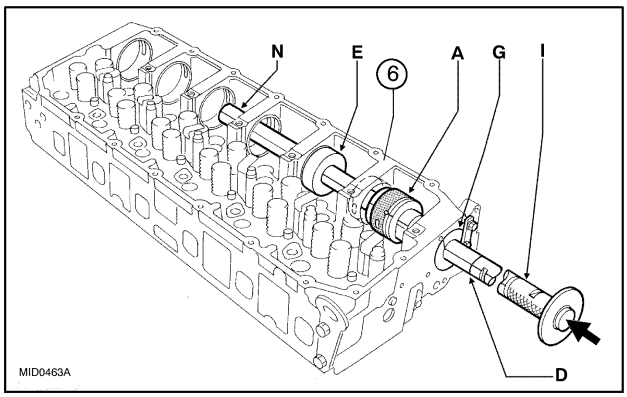
1. Assemble the camshaft bushing installer **380000146**. To fit the bushings 1 - 2 - 3 - 4 - 5 - 6; proceed as follows: 1. Position the bushing to mount on the drift **(A)** making its grub screw coincide with the seat on the bushing. 2. Position the guide bushing **(E)** and secure the guide bushing **(G)** on the seat of the 7th bushing with the plate **(H)**. 3. When driving in the bushing, make the reference mark **(F)** coincide with the mark **(M)**. In this way, after driving it home, the hole in the bushing for lubrication coincides with the oil duct in it seat. The bushing is completely driven home when the first yellow reference mark **(D)** is flush with the guide bushing **(G)**.



MID0443A 1

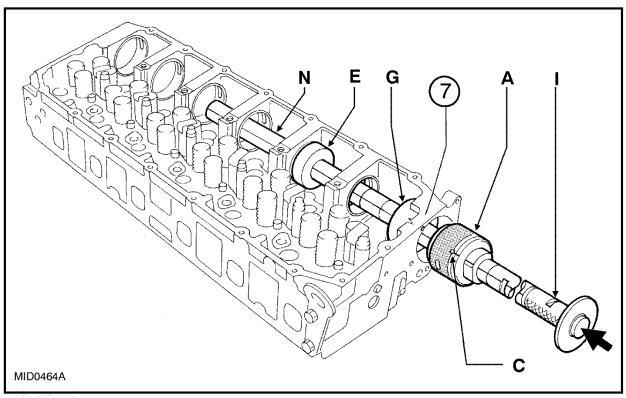
IMPORTANT: *To remove the bushings from the cylinder head it is necessary to make the grub screw of the tool* ***380000146*** *coincide with the bushing.*

2. To mount the bushing 6: Unscrew the grip **(1)** and the extension **(N)**. Position the extension **(N)** and the guide bushing **(E)** as shown in the figure above. Repeat steps 1, 2, and 3 performed for driving in the bushings 1, 2, 3, 4 and 5.



MID0444A 2

3. To mount the 7th bushing: Remove the grip and the guide bushing **(G)** secured to the cylinder head (see figure above). Fit the guide **(G)** back on without securing it with the plates. Position the bushing on the drift **(A)** and bring it up to its seat. Make the hole in the bushing coincide with the lubrication hole on the head, then fit the bushing.

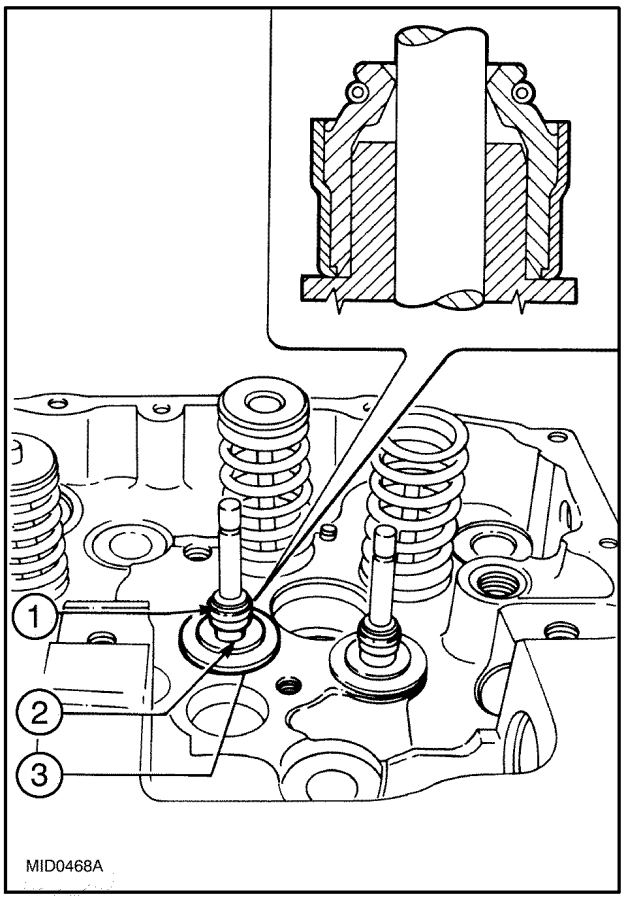


MID0445A 3

IMPORTANT: *The bushing is driven in correctly when the reference C is flush with the bushing seat.*

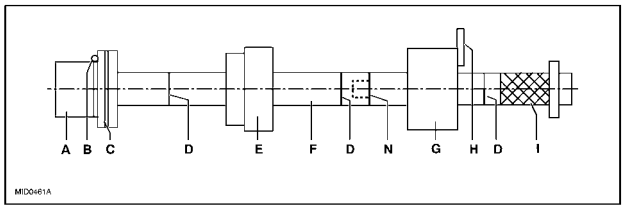
https://truckmanualshub.com/

4. Lubricate the stem of the valves and insert them in their valve guides. Mount the bottom plates **(3)**. Fit the oil seal **(1)**, on the valve guide **(2)**, then mount the valves as follows.



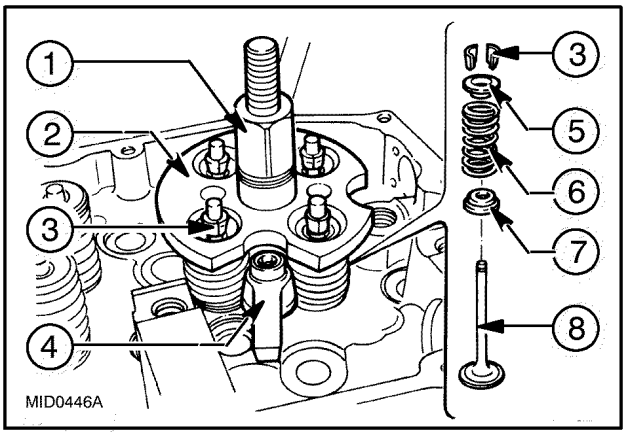
MID0448A 4

5. The surfaces of the bushings must have no sign of seizing or scoring; and must be replaced if they do. Using a bore gauge, measure the inside diameter of the bushings. If it is above the tolerance value, replace the bushings. To disassemble and reassemble the bushings of the camshaft, use the drift A: **380000146**. B. Bushing positioning grub screw; C. Reference for fitting the 7th bushing; D. Reference for fitting bushings: 1 - 2 - 3 - 4 - 5 - 6, reference mark for the F2B engine, red mark for the F3A engine; E. Guide bushing; G. Guide bushing to secure to the 7th bushing mount; H. Plate for securing bushing G to cylinder head; I. Grip, and L. Extension coupling.



MID0442A 5

6. Mount the springs **(6)** and top plate **(5)**. On the cylinder head, fit as suitable valve spring compressor **(2)**. Secure it with the bracket **(4)**. Screw down the lever **(1)**, until it is possible to mount the cotter pins **(3)**, then remove the tool **(2)**. Check the rocker arm shaft and all mating surfaces to ensure that they have no scoring or signs of seizing. If they do, replace any damaged parts. Check the clearance between the bushings of the rocker arms and the shaft. If you find the bushings worn, replace the entire rocker arm.



MID0449A.jpg 6

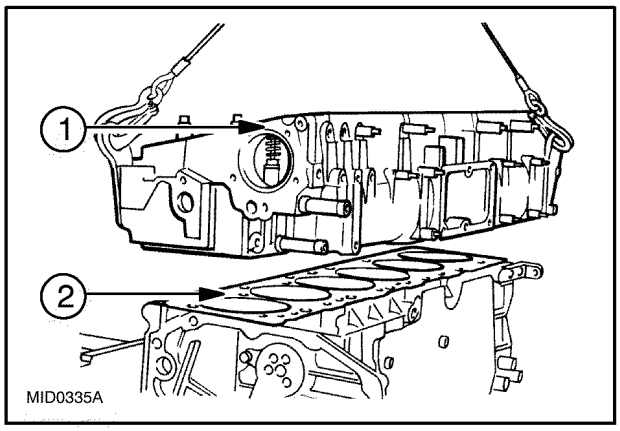
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Cylinder head - Install (B.10.A.72 - F.10.A.15)

AFX8010

1. Check that pistons 1-6 are exactly at TDC. Place the gasket **(2)**, on the crankcase. Fit the cylinder head **(1)** and tighten the fixing screws according to the tightening sequence given in the**Cylinder head - Torque (B.10.A.72 - D.20.A.10)** section.

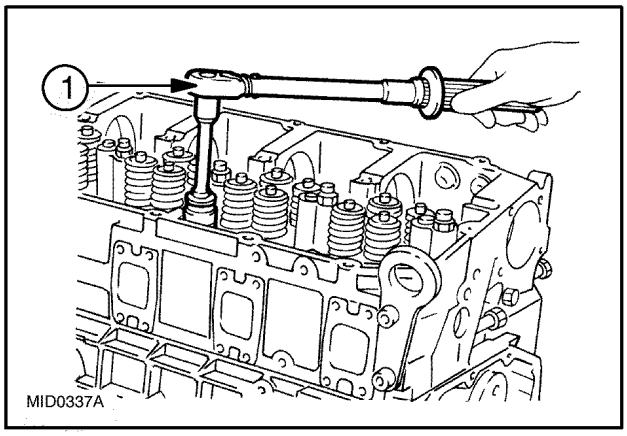
IMPORTANT: *The cylinder head fixing screws of the engine must be lubricated with engine oil before assembly.*



mid0335a 1

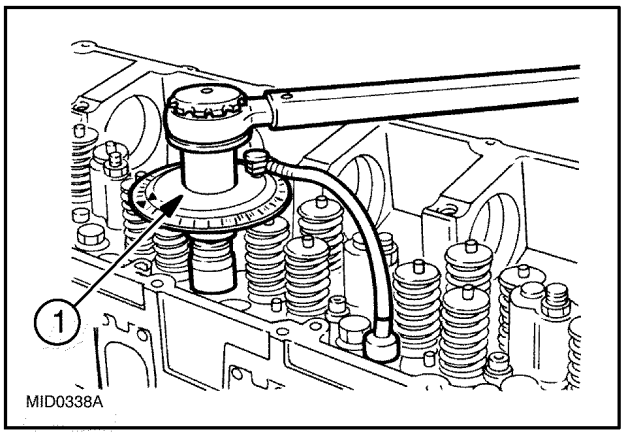
2. Cylinder head tightening sequence for the fixing screws are shown in section **Cylinder head - Torque (B.10.A.72 - D.20.A.10)**.

3. Pre-tightening information using a torque wrench can be found at **Cylinder head - Torque (B.10.A.72 - D.20.A.10)**.



mid0337a 2

4. Angle closing with tool **380000304 (1)** and refer to **Valve drive - Torque (B.10.A.40 - D.20.A.10)**.



mid0338a 3

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Cylinder head - Measure (B.10.A.72 - F.40.A.16)

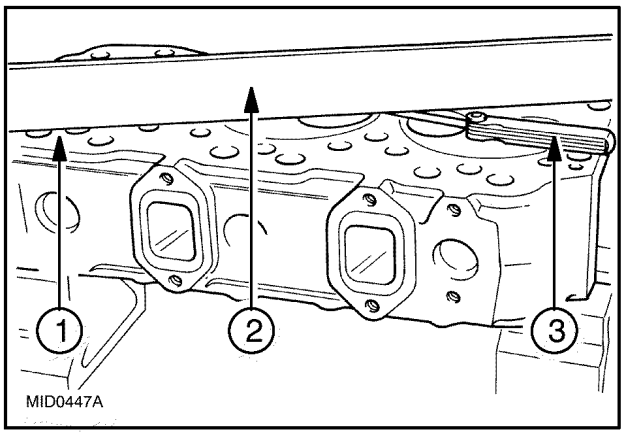
AFX8010

1. Before removing the cylinder head, check the hydraulic seal with the appropriate equipment. Replace the cylinder head if there is any leakage.

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

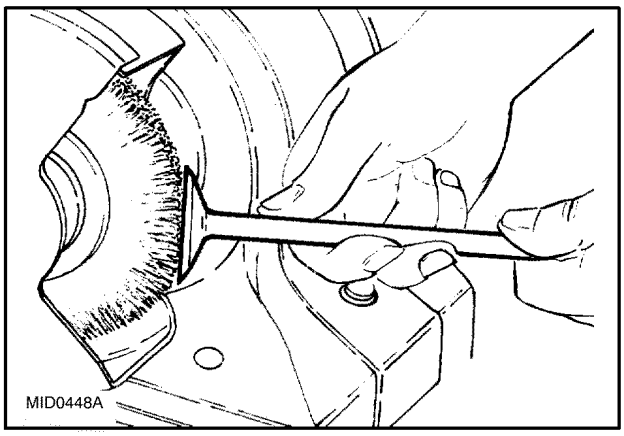
2. Check the mating surface **(1)**, of the head on the cylinder assembly with a rule **(2)** and a feeler gauge **(3)**. If you find any deformation greater than **0.2 mm** (**0.008 in**), replace the cylinder head.

IMPORTANT: *After this process you need to check the valve cavity and injector protrusion.*



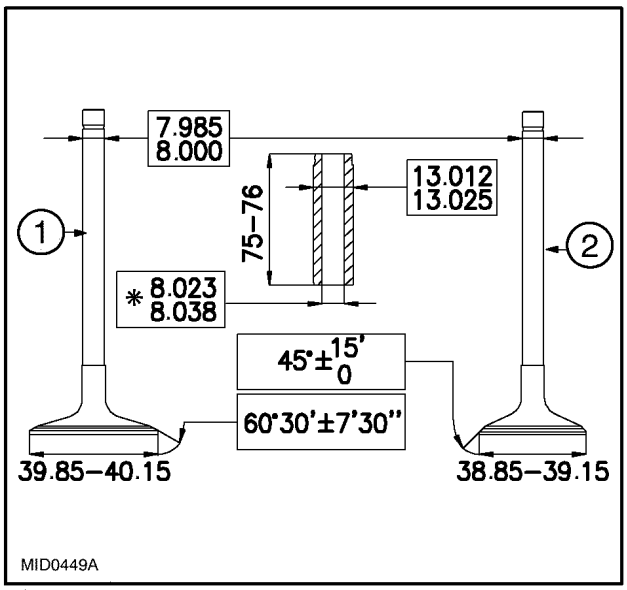
mid0447a 1

3. Decarbonize the valves using the specific metal brush. Check that the valves show no signs of seizure or cracking and in addition, check with a micrometer that the diameter of the valve stem falls within the required values; if it does not, replace the valves. Using a micrometer, check that the diameter of the valve stems are**8.960 - 8.975 mm** (**0.3528 - 0.3533 in**).



mid0448a 2

4. The main data of the valves and valve guides are shown in the figure to the right (all dimensions are in mm). An * indicates the measurement to make after driving in the valve guides, **(1)**, showing intake valve and **(2)**, indicating the exhaust valve. If necessary, grind the seats on the valves with a valve grinding machine, scalping as little material as possible. Using a dial gauge with a magnetic base, check the clearance between the valve stem and the relevant guide. Refer to **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**. If the clearance is too great, replace the valve and if necessary, the valve guide.

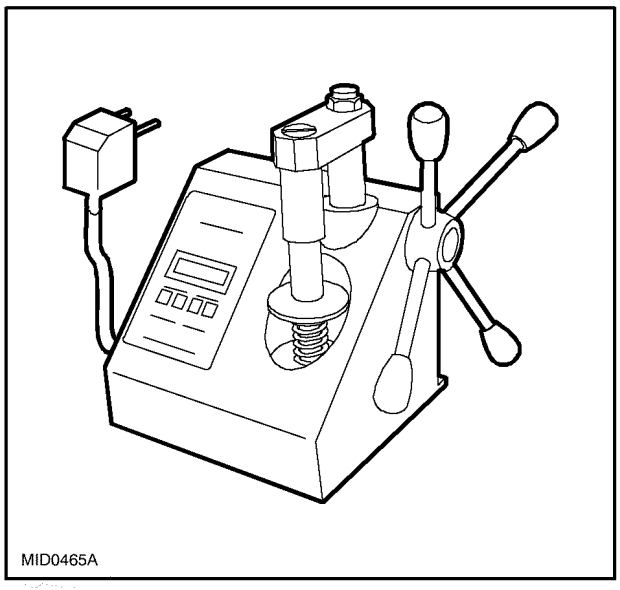


mid0449a 3

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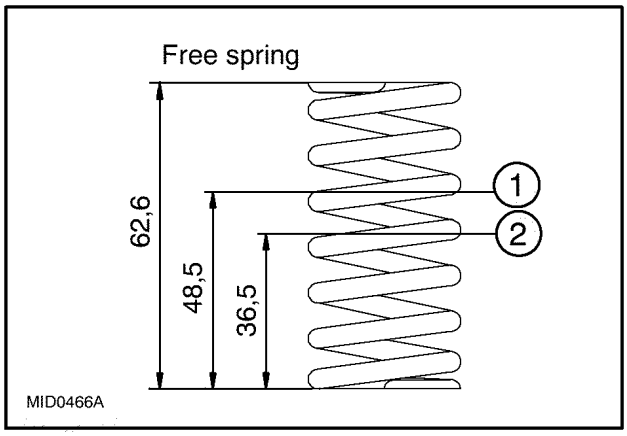
5. Before assembly, the flexibility of the valve springs needs to be checked with an appropriate tool. Compare the load and elastic deformation data with the data of a new spring in the next figure

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*



mid0465a 4

6. The main data for checking the valve springs is: **(1)**, load of **475 - 525 Nm** (**106.9 - 118.1 lb ft**); **(2) 947 - 997 Nm** (**213.1 - 224.3 lb ft**).



mid0466a 5

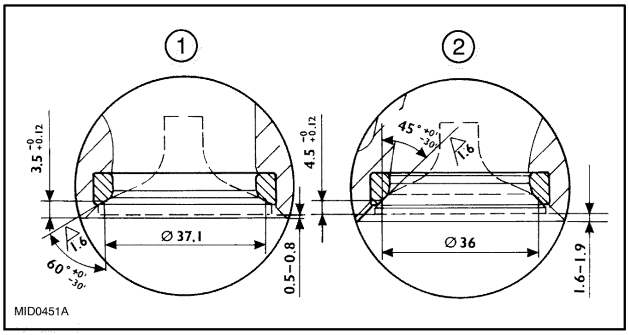
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Cylinder head - Rebore (B.10.A.72 - F.75.C.30)

AFX8010

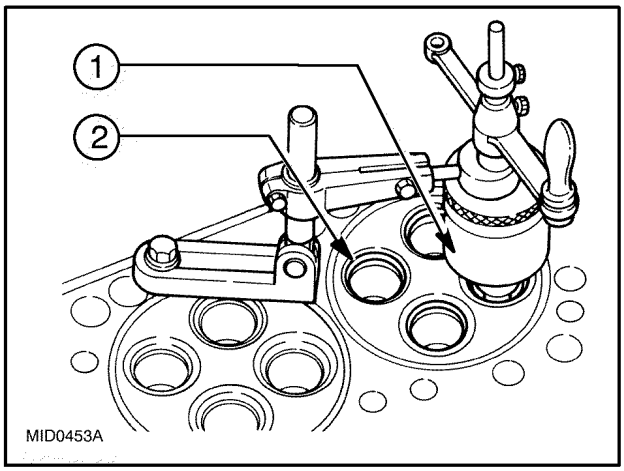
1. The main data on the intake and exhaust valve seats are shown in the figure to the right (all dimensions are in mm) as, **(1)**, intake valve seat and **(2)**, exhaust valve seat. **(1)**, indicates a intake valve seat and **(2)**, exhaust valve seat. Also, refer to **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**.

IMPORTANT: *The valve seats on the cylinder head are ground every time the valves or valve guides are ground or replaced.*



MID0435A 1

2. Check the valve seats **(2)**. If you find any slight scoring or burns, rebore them with the tool **(1)**, according to the angles given in the figure above. If you need to replace them, with the same tool and taking care not to damage the cylinder head, scalp as much material as possible from the valve seats until it is possible with a punch to extract them from the cylinder head. Heat the cylinder head to **80 - 100 °C** (**176 - 212 °F**) and using a suitable drift, mount the new valve seats (chilled in liquid nitrogen), **(2)**, in them. Using the tool **(1)**, rebore the valve seats according to the angles given in the figure above. Also, refer to **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**. After reboring the valve seats, use the dial gauge to check that the position of the valves in relation to the face of the cylinder head is: **-0.65 - -0.95 mm** (**-0.0256 - -0.0374 in**) (cavity) intake valves; **-1.8 - -2.1 mm** (**-0.0709 - -0.0827 in**) (cavity) exhaust valves.



MID0436A 2

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ENGINE - Troubleshooting (B.10.A - G.40.A.10)

AFX8010

ATTENTION: *Before troubleshooting the engine, make sure the following operating conditions are met:*
1. Electrical troubleshooting has to have been performed with specific testing instruments.
2. The air system must be operating properly.
3. The engine must have the proper oil pressure. If the engine runs but has an occasional or non-constant problem, check the earth connections on connector B of the control unit PIN 1 and PIN 2.

Problem	Possible Cause	Correction
Engine Fails to Start	Low charge in batteries	Recharge and/or replace batteries; check alternator output
	Poor connections at battery terminals	Check, clean, tighten and/or replace the terminals
	Starter motor inoperative	Check connections and/or replace starter
	Air intake heater inoperative	Check heater feed and ground wiring connections; check heater relay for proper operation; perform diagnostic test
	Main relay not functioning or fuse inoperative	Check and replace relay or fuse
	Fuel supply pump fails to prime (incoming air)	Check seal on intake branch; check pressure on filter inlet
	Fuel circuit not correctly filled (air in the circuit)	Check seal; bleed fuel lines. Refer to steps 15 through 17 of **Fuel injector - Install (B.20.A.29 - F.10.A.15)**
	Fuel filter and/or pre-filter clogged	Replace filters, as required
Engine Overheats	Coolant level under minimum	Check for hose/radiator leaks; top off with fluids to level indicator
	Fan and water pump drive belt not operating properly	Check belt tension and/or replace belt; check for water leaks from water pump drainage hole
	Water pump not operating properly or is leaking	Replace water pump.
	Thermostat jammed shut or partially open	Replace thermostat
	Radiator clogged on outside	Wash and/or blow out debris; replace radiator
	Air filter clogged or sleeves closed	Check filter clogging indicator; clean or replace filter
	Cylinder head gasket shows compression blow-by from cylinder head gasket	Check water circuit pressure; replace head gasket (see steps 1 and 2 of **Cylinder head - Install (B.10.A.72 - F.10.A.15)**
Low Power, Fuel Consumption Too High, Noisy Engine	Mesh filter on fuel tank clogged	Clean screen
	Fuel pre-filter clogged	Replace pre-filter
	Fuel filter clogged	Replace fuel filter
	Air in circuit	Check intake seals (quick couplings, when hot)
	Valve **0.8 bar** on fuel return from cylinder head due to being jammed open (low pressure); jammed shut (high temperature)	Replace valve
	Bad fuel leakage	Check and/or repair leak
	Supply pump broken (seized, broken coupling, pressure adjustment valve, etc.)	Check pressure on filter inlet and/or replace supply pump
	Irregular fuel injector operation	Replace injector(s). Refer to **Fuel injector - Install (B.20.A.29 - F.10.A.15)**
	Fuel leakage from injector O rings	Check for fuel in the engine
	Air supply filtration to engine (constricted and/or clogged filter)	Check cartridge clogging indicator; clean and/or replace filter

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Problem	Possible Cause	Correction
	Gas exhaust leakage at exhaust manifold	Check and/or repair leak
	Turbo blade or bearing noise	Check and/or replace turbocharger
	Turbocharger waste-gate valve not operating properly	Adjust valve and/or replace waste-gate valve and adjust
	Excessive injector control cam wear	Check and/or replace injector control cams, as required
	Excessive or no valve clearance	Check and/or adjust valve clearance. Refer to **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**
Grey-White Smoke From Engine Exhaust	Water in cylinders due to head gasket leakage	Check water circuit pressurization liquid level and/or replace head gasket (see steps 1 and 2 of **Cylinder head - Install (B.10.A.72 - F.10.A.15)**.
	Water in cylinders due to injector sheath leakage	Check and/or replace injector sheaths
	Water in cylinders due to incoming water from intake system	Repair leak
	Water in cylinders due to water in diesel fuel	Check for water in fuel tank and clean or drain fuel tank
Blue Smoke From Engine Exhaust	Oil in cylinders with excessive oil consumption	Repair engine as required
	Oil in cylinders with oil blow-by from turbine	Repair engine as required
	Oil in cylinders with blow-by from valve guide	Repair engine as required
Engine Stalls or Stops	Combine is overloaded	Reduce harvesting speed
	Fuel tank is empty; no diesel fuel	Refuel and bleed fuel line circuit. (Refer to steps 15 through 17 of **Fuel injector - Install (B.20.A.29 - F.10.A.15)** for bleeding procedure).
	Mesh filter, pre-filter or fuel filter clogged	Clean and/or replace, as required. (Refer to steps 15 through 17 of **Fuel injector - Install (B.20.A.29 - F.10.A.15)** for bleeding procedure).
	Trouble with fuel circuit; refer to **ENGINE - Low performance (B.10.A - G.10.E.50)**.	Refer to **ENGINE - Low performance (B.10.A - G.10.E.50)**.
	Idling speed too low	Adjust as required
	Main relay not operating	Replace relay

https://truckmanualshub.com/

Index

POWER PRODUCTION - B

ENGINE - 10.A

Connecting rod and piston - Assemble (B.10.A.47 - F.10.A.20) 89
AFX8010

Connecting rod and piston - Dimension (B.10.A.47 - D.40.A.30) 23
AFX8010

Connecting rod and piston - Disassemble (B.10.A.47 - F.10.A.25) 81
AFX8010

Connecting rod and piston - Install (B.10.A.47 - F.10.A.15) 91
AFX8010

Connecting rod and piston - Measure (B.10.A.47 - F.40.A.16) 82
AFX8010

Connecting rod and piston - Static description (B.10.A.47 - C.30.A.20) 38
AFX8010

Connecting rod and piston - Visual inspection (B.10.A.47 - F.40.A.10) 87
AFX8010

Crankshaft - Dimension (B.10.A.43 - D.40.A.30) 16
AFX8010

Crankshaft - Install (B.10.A.43 - F.10.A.15) 71
AFX8010

Crankshaft - Measure (B.10.A.43 - F.40.A.16) 66
AFX8010

Crankshaft - Special tools (B.10.A.43 - D.20.A.40) 21
AFX8010

Crankshaft - Static description (B.10.A.43 - C.30.A.20) 35
AFX8010

Crankshaft - Torque (B.10.A.43 - D.20.A.10) 21
AFX8010

Cylinder block - Dimension (B.10.A.70 - D.40.A.30) 26
AFX8010

Cylinder block - Measure (B.10.A.70 - F.40.A.16) 94
AFX8010

Cylinder block - Replace (B.10.A.70 - F.10.A.30) 96
AFX8010

Cylinder block - Special tools (B.10.A.70 - D.20.A.40) 29
AFX8010

Cylinder block - Static description (B.10.A.70 - C.30.A.20) 41
AFX8010

Cylinder block - Torque (B.10.A.70 - D.20.A.10) 27
AFX8010

Cylinder head - Assemble (B.10.A.72 - F.10.A.20) 100
AFX8010

Cylinder head - Dimension (B.10.A.72 - D.40.A.30) 29
AFX8010

Cylinder head - Disassemble (B.10.A.72 - F.10.A.25) 98
AFX8010

Cylinder head - Install (B.10.A.72 - F.10.A.15) 102
AFX8010

Cylinder head - Measure (B.10.A.72 - F.40.A.16) 103
AFX8010
Cylinder head - Rebore (B.10.A.72 - F.75.C.30) 105
AFX8010
Cylinder head - Torque (B.10.A.72 - D.20.A.10) 29
AFX8010
ENGINE - Assemble (B.10.A - F.10.A.20) 50
AFX8010
ENGINE - Disassemble (B.10.A - F.10.A.25) 44
AFX8010
ENGINE - General specification (B.10.A - D.40.A.10) 5
AFX8010
ENGINE - Overview (B.10.A - C.10.A.10) 31
AFX8010
ENGINE - Special tools (B.10.A - D.20.A.40) 6
AFX8010
ENGINE - Static description (B.10.A - C.30.A.20) 33
AFX8010
ENGINE - Torque (B.10.A - D.20.A.10) 6
AFX8010
ENGINE - Troubleshooting (B.10.A - G.40.A.10) 106
AFX8010
Flywheel - Install (B.10.A.50 - F.10.A.15) 93
AFX8010
Flywheel - Special tools (B.10.A.50 - D.20.A.40) 25
AFX8010
Flywheel - Static description (B.10.A.50 - C.30.A.20) 40
AFX8010
Flywheel - Torque (B.10.A.50 - D.20.A.10) 25
AFX8010
Sensing system Camshaft speed sensor - Overview (B.10.A.95.82 - C.10.A.10) 42
AFX8010
Sensing system Flywheel speed sensor - Overview (B.10.A.95.83 - C.10.A.10) 43
AFX8010
Timing gear - Assemble (B.10.A.45 - F.10.A.20) 79
AFX8010
Timing gear - Disassemble (B.10.A.45 - F.10.A.25) 76
AFX8010
Timing gear - Static description (B.10.A.45 - C.30.A.20) 37
AFX8010
Timing gear - Torque (B.10.A.45 - D.20.A.10) 22
AFX8010
Valve drive - Assemble (B.10.A.40 - F.10.A.20) 59
AFX8010
Valve drive - Clearance (B.10.A.40 - F.45.A.12) 65
AFX8010
Valve drive - Dimension (B.10.A.40 - D.40.A.30) 7
AFX8010
Valve drive - Disassemble (B.10.A.40 - F.10.A.25) 55
AFX8010
Valve drive - General specification (B.10.A.40 - D.40.A.10) 7
AFX8010
Valve drive - Measure (B.10.A.40 - F.40.A.16) 57
AFX8010
Valve drive - Special tools (B.10.A.40 - D.20.A.40) 15
AFX8010

https://truckmanualshub.com/

Valve drive - Static description (B.10.A.40 - C.30.A.20) 34
AFX8010

Valve drive - Timing adjust (B.10.A.40 - F.45.A.64) 62
AFX8010

Valve drive - Torque (B.10.A.40 - D.20.A.10) 14
AFX8010

https://truckmanualshub.com/

POWER PRODUCTION - B

FUEL AND INJECTION SYSTEM - 20.A

AFX8010

https://truckmanualshub.com/

Contents

POWER PRODUCTION - B

FUEL AND INJECTION SYSTEM - 20.A

TECHNICAL DATA

FUEL AND INJECTION SYSTEM - General specification (B.20.A - D.40.A.10) 5
AFX8010

FUEL AND INJECTION SYSTEM - Special tools (B.20.A - D.20.A.40) 7
AFX8010

Fuel filter system

Fuel filter system - Torque (B.20.A.24 - D.20.A.10) 7
AFX8010

Fuel injector

Fuel injector - Dimension (B.20.A.29 - D.40.A.30) 7
AFX8010

Fuel injector - Torque (B.20.A.29 - D.20.A.10) 7
AFX8010

Fuel injector - Special tools (B.20.A.29 - D.20.A.40) 8
AFX8010

Fuel lift pump

Fuel lift pump - Torque (B.20.A.34 - D.20.A.10) 10
AFX8010

Sensing system

Sensing system - Torque (B.20.A.95 - D.20.A.10) 10
AFX8010

FUNCTIONAL DATA

FUEL AND INJECTION SYSTEM - Overview (B.20.A - C.10.A.10) 11
AFX8010

FUEL AND INJECTION SYSTEM - Static description (B.20.A - C.30.A.20) 12
AFX8010

Fuel injector

Fuel injector - Overview (B.20.A.29 - C.10.A.10) 13
AFX8010

Fuel injector - Static description (B.20.A.29 - C.30.A.20) 14
AFX8010

Fuel injector - Dynamic description (B.20.A.29 - C.30.A.10) 15
AFX8010

Fuel lift pump

Fuel lift pump Electrical fuel pump - Overview (B.20.A.34.22 - C.10.A.10) 17
AFX8010

Sensing system

Sensing system Level sensor - Overview (B.20.A.95.90 - C.10.A.10) 18
AFX8010

https://truckmanualshub.com/

Sensing system Differential pressure switch - Overview (B.20.A.95.82 - C.10.A.10) 19
AFX8010

Sensing system Temperature sensor - Overview (B.20.A.95.89 - C.10.A.10) 20
AFX8010

SERVICE

Fuel injector

Fuel injector - Remove (B.20.A.29 - F.10.A.10) 21
AFX8010

Fuel injector - Install (B.20.A.29 - F.10.A.15) 23
AFX8010

Fuel injector - Preload (B.20.A.29 - F.45.A.30) 30
AFX8010

DIAGNOSTIC

Electrical control

Electrical control Relay - Incorrect value (B.20.A.91.21 - G.30.C.10) 31
AFX8010

Electrical control Relay - Short circuit to B+ (B.20.A.91.21 - G.30.B.54) 34
AFX8010

Electrical control Relay - Short circuit to ground (B.20.A.91.21 - G.30.B.53) 37
AFX8010

Injection control

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 40
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 41
AFX8010

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 44
AFX8010

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 47
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 50
AFX8010

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 53
AFX8010

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 56
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 59
AFX8010

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 62
AFX8010

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 65
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 68
AFX8010

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 69
AFX8010

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 72
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 75
AFX8010

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 78
AFX8010

https://truckmanualshub.com/

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 79
AFX8010

Sensing system

Sensing system Level sensor - Short circuit to B+ (B.20.A.95.90 - G.30.B.54) 80
AFX8010

Sensing system Level sensor - Short circuit to ground (B.20.A.95.90 - G.30.B.53) 83
AFX8010

Sensing system Level sensor - Open circuit (B.20.A.95.90 - G.30.B.50) 86
AFX8010

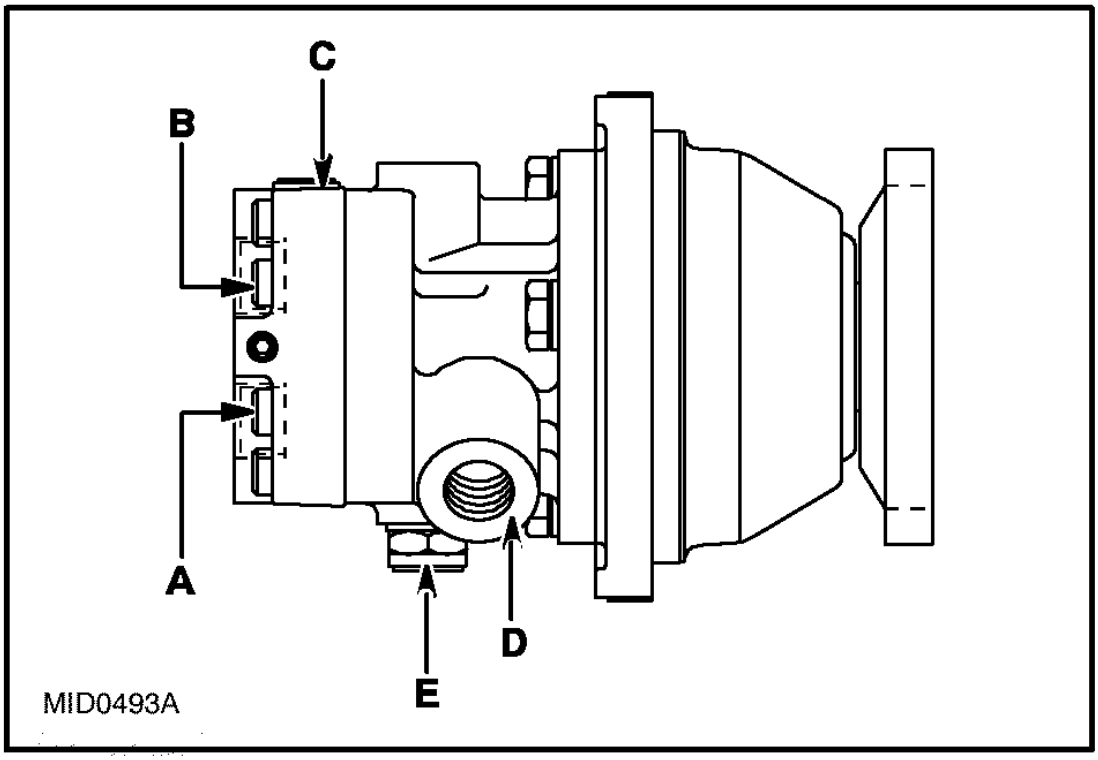
Engine Fault Codes (B.20.A) 90

https://truckmanualshub.com/

FUEL AND INJECTION SYSTEM - General specification (B.20.A - D.40.A.10)

AFX8010

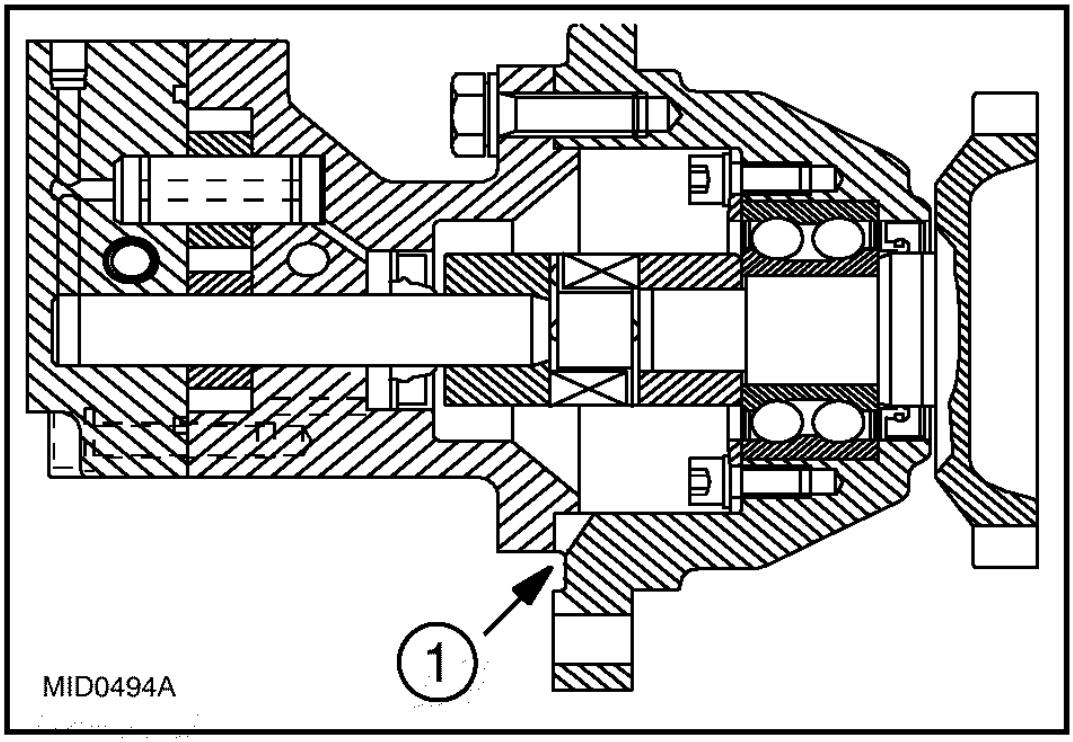
Fuel is supplied via a fuel pump, fuel filter and prefilter, six pump-injectors governed by the camshaft by means of rocker arms and by the electronic control unit. A - Fuel inlet; B - Fuel delivery; C - Bypass nut; D - Fuel return from the pump-injectors and E - Pressure relief valve (opening pressure: **5 - 8 bar** (**72.5 - 116 psi**).



mid0493a 1

Cross-section view of the Fuel Pump. **(1)** Oil or fuel leakage gauge. The pump injector is composed of a pumping element, nozzle and solenoid valve; **(1)** diesel/oil ring seal, **(2)** diesel/diesel ring seal and **(3)** diesel/exhaust gas ring seal. The pumping element is operated by a rocker arm that, in its turn, is directly governed by the cam of the camshaft. The pumping element can ensure a high delivery pressure. Its return stroke is activated by a spring. The fault diagnosis program of the control unit checks the operation of each injector by deactivating each injector, one at a time, and checks the capacity of the other five. Fault diagnosis makes it possible to distinguish between errors of an electrical origin from those of a mechanical/hydraulic origin. It indicates broken pump injectors. It is therefore necessary to interpret all the control unit's error messages correctly. Any defects in the injectors require them to be replaced as no repairs are permitted.

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mid0494a 2

The solenoid, which is energized at each active phase in the cycle, governs a slide valve with a signal from the control unit that shuts off the delivery pipe of the pumping element. When the solenoid is not energized, the valve is open. Fuel is pumped but it flows back into the return pipe with the standard transfer pressure of approximately **5 bar** (**72.5 psi**). When the solenoid is energized, the valve closes. As the fuel cannot flow back into the return pipe, it is pumped into the nozzle at high pressure, causing the needle to lift. The amount of fuel injected depends on the closing time of the slide valve and hence on how long the solenoid is energized. The solenoid valve is joined to the injector body and cannot be removed. On the top there are two screws securing the cables transmitting the signal from the control unit. To ensure signal transmission, tighten the screws with a torque wrench **380000158** to a torque of **1.36 - 1.92 Nm** (0.136 - 0.192 kgm [**12 - 17 lb ft**]).

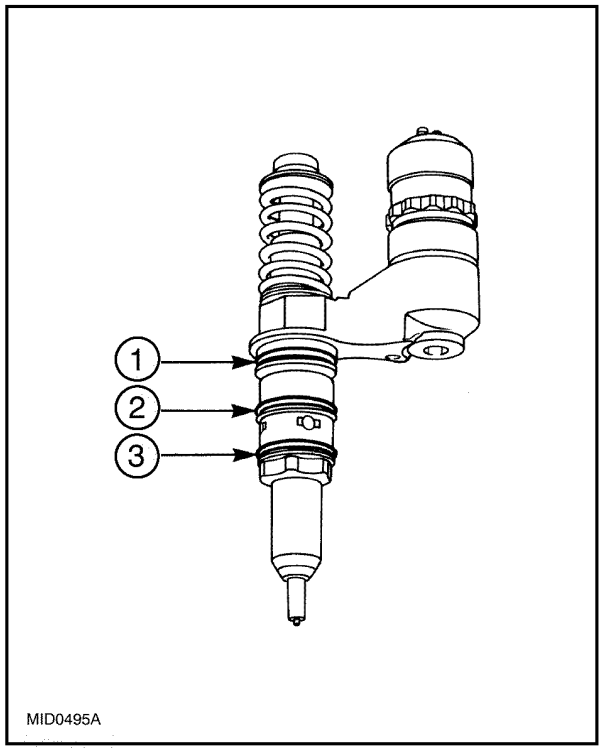


FIG_235 3

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FUEL AND INJECTION SYSTEM - Special tools (B.20.A - D.20.A.40)

AFX8010

Refer to the following information units for details of your Special Tools

Fuel injector - Special tools (B.20.A.29 - D.20.A.40)

Fuel filter system - Torque (B.20.A.24 - D.20.A.10)

AFX8010

Screw securing fuel pump to flywheel cover box	M8x1.25	(**16 - 22 Nm**) (**141 - 195 lb in**)

Fuel injector - Dimension (B.20.A.29 - D.40.A.30)

AFX8010

Injectors	Pump electro-injectors governed by the camshaft and controlled by the electronic control unit
BOSCH type	PDE 31 12 Volt
Nozzle: BOSCH type	DLLA 140
Number of nozzle holes	8
Nozzle hole diameter	**0.21 mm** (**0.0083 in**)
Pressure setting	**290 - 302 bar 4202 - 4379 psi**
Injection pressure	**1500 bar 1,750 psi**
Injection sequence	
Fuel pump	Gear pump
Gear operated	Operated via the engine timing system
Fuel filtering	Via mesh filter in the tank, sediment pre-filter, replaceable cartridge filter on the delivery line to the injectors-pump
Electronic injection type	BOSCH EDC MS6.2

Injector protrusion	**1.14 mm** (**0.0449 in**)	**1.4 mm** (**0.0551 in**)

Fuel injector - Torque (B.20.A.29 - D.20.A.10)

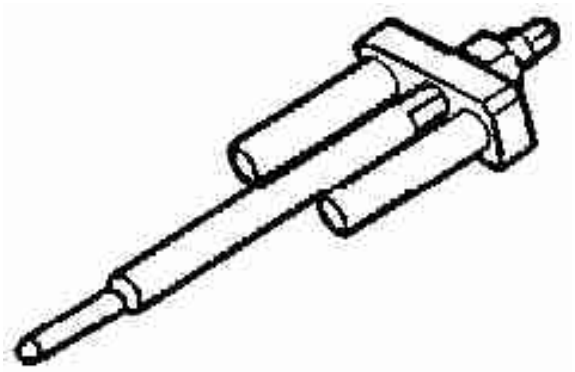
AFX8010

Screw for injector fixing brackets (Before assembly, lubricate with engine oil)	M8x1.25	**26 Nm**	**230 lb in**
Screw securing thrust plates to the head	M8x1.25	**19 Nm**	**168 lb in**
Screw securing fuel filter to cylinder head	108x1.5	**34 - 40 Nm**	**300 - 354 lb in**

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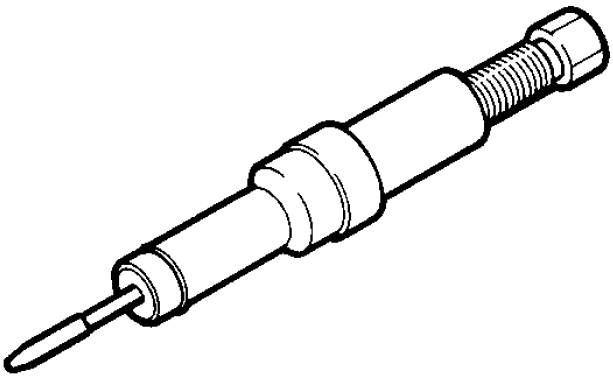
Fuel injector - Special tools (B.20.A.29 - D.20.A.40)

AFX8010



380000123 1

380000123 - Injector Sleeve Puller



380000157 2

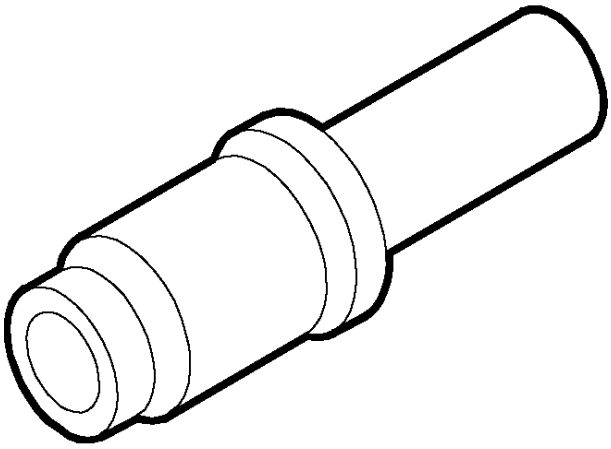
380000157 - Injector Sleeve Heading Tools



380000158 3

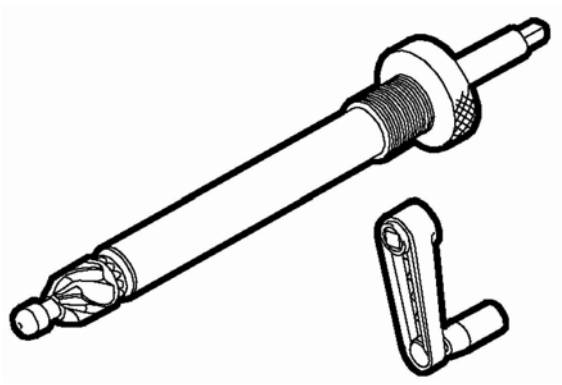
380000158 - Torque Wrench

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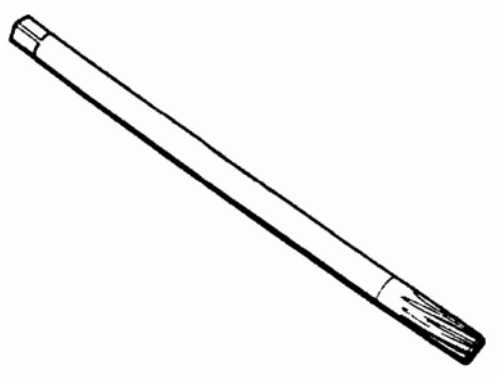
380000162 4

380000162 - Bushing Guide



380000163 5

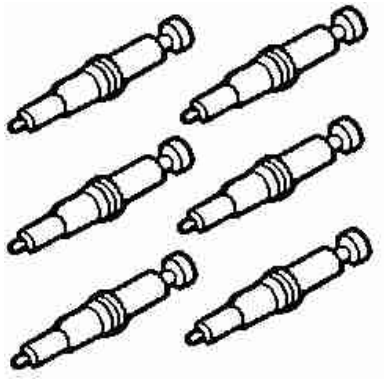
380000163 - Injector Sleeve Cutter



380000164 6

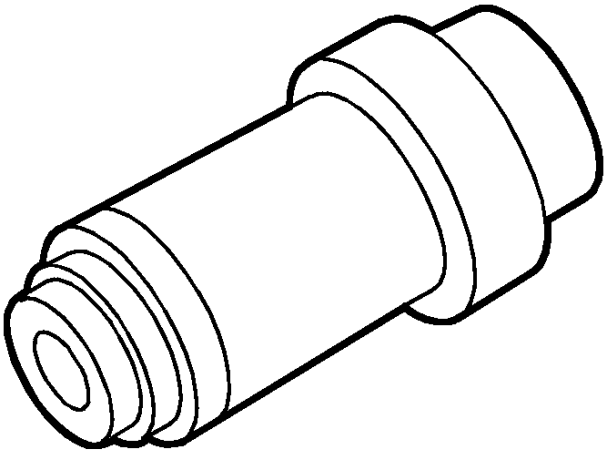
380000164 - Injector Sleeve Reamer

https://truckmanualshub.com/



380000130 7

380000130 - Injector Seal Plug Set



380000160 8

380000160 - Bushing Guide

Fuel lift pump - Torque (B.20.A.34 - D.20.A.10)

AFX8010

Screw securing fuel pump to flywheel cover box	M8x1.25	**16 - 22 Nm**	**141 - 194 lb in**

Sensing system - Torque (B.20.A.95 - D.20.A.10)

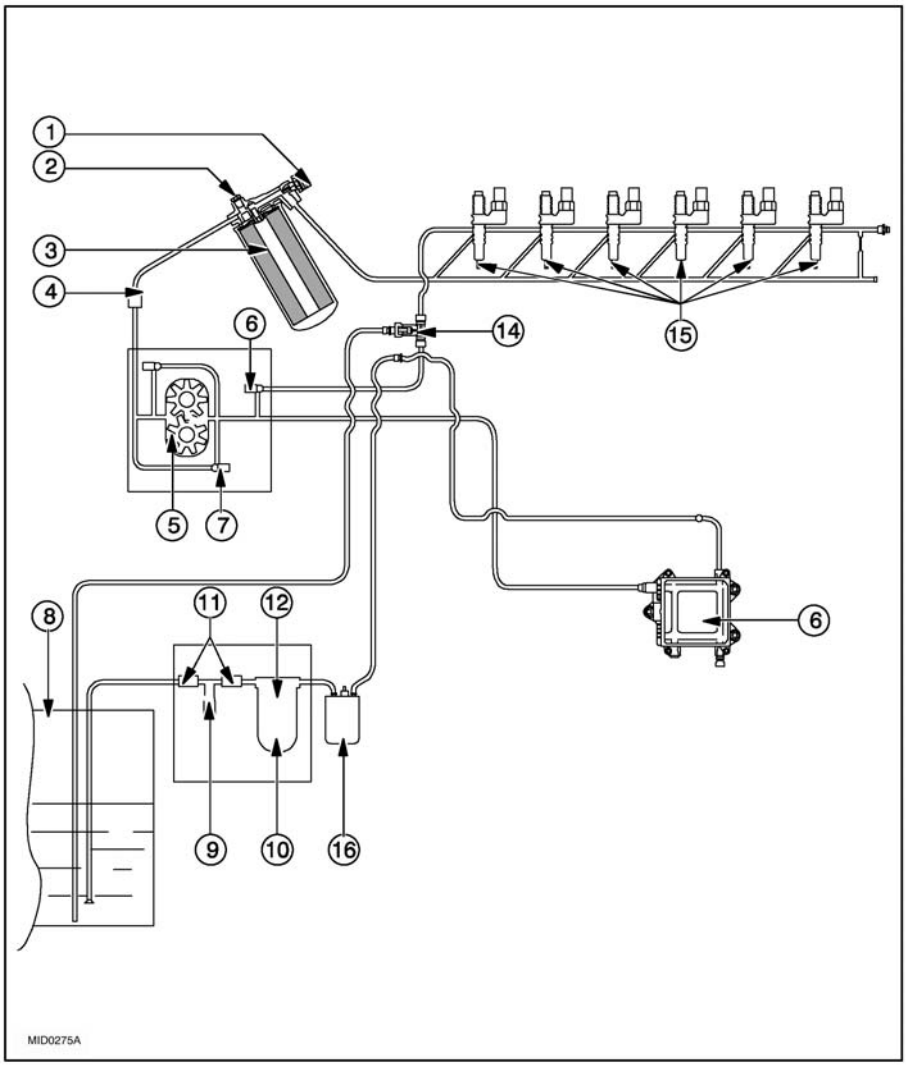
AFX8010

Screw securing control unit mount to crankcase	M8x1.25	**16 - 22 Nm**	**141 - 194 lb in**

https://truckmanualshub.com/

FUEL AND INJECTION SYSTEM - Overview (B.20.A - C.10.A.10)

AFX8010



mid0275a 1

Fuel supply system diagram

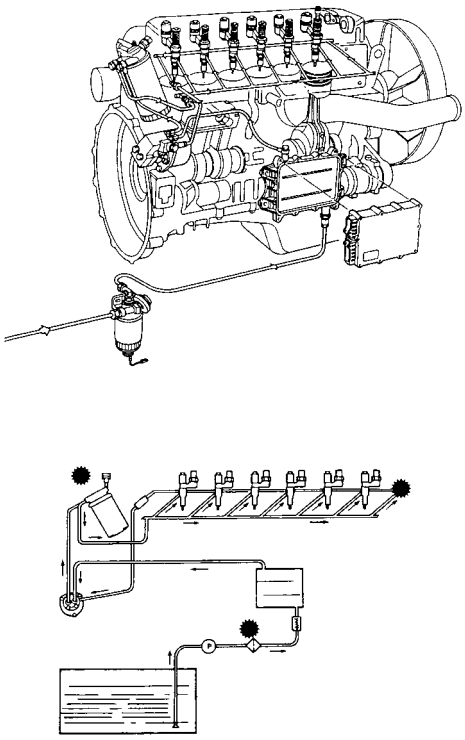
1. Temperature sensor	5. Fuel supply pump	9. Priming pump	13. Electronic control unit
2. Bleeder	6. Integrated valve **3.5 bar** (**50.8 psi**)	10. Primary fuel filter	14. Fuel return fitting with incorporated valve **0.2 bar** (**3 psi**)
3. Secondary fuel filter	7. Pressure relief valve **5 bar** (**72.5 psi**)	11. Check valve opening **0.1 bar** (**1.5 psi**)	15. Injector unit
4. Bypass valve **0.3 - 0.4 bar** (**4.4 - 5.8 psi**)	8. Fuel tank	12. Heater	16. Fuel pump

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FUEL AND INJECTION SYSTEM - Static description (B.20.A - C.30.A.20)

AFX8010

The new Bosch PDE 30 electronically controlled fuel pump injectors can achieve higher injection pressures than conventional systems with a separate pump and external piping. The electronic injection management (EDC) already applied to some conventional engine versions is similar in basic layout, but the new system is much more sophisticated and differs in many respects, e.g. individual management of each individual injector and advanced fault diagnostics function built into the electronic control unit. The electronic control unit (ECU) also manages many other systems, including turbocharging.Electronic Control Unit: To reduce the number of connections, the length of injector connection leads and hence signal interference, the control unit is fitted directly onto the engine via a heat exchanger (used for cooling) by means of flexible blocks which reduce vibrations transmitted by the engine. An internal environmental pressure sensor further improves injection system management. The control unit is equipped with a highly advanced self-diagnostic system. The control unit is able to take environmental factors into consideration in order to detect and store anomalies (even if intermittent) occurring within the system during vehicle operation to ensure more effective, reliable repairs. The electronic control unit (ECU) manages the following main functions: fuel injection, accessory functions, self-diagnosis and recovery. It also permits: interface with other on-board electronic systems EOL and Service programming and fault diagnosis.



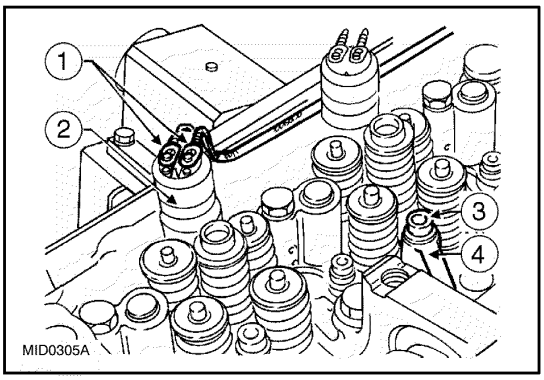
20034773.tif 1

The pump injector consists mainly of three parts: solenoid **(1)**, pumping element **(2)** and nozzle **(3)**. These three parts cannot be individually replaced and cannot be serviced. The pumping element is operated mechanically upon each cycle by a rocker. It compresses the fuel in the delivery chamber. Nozzle configuration and operation are similar to those of conventional injector nozzles. It is opened by fuel under pressure to inject a fine spray of fuel into the combustion chamber. The solenoid is controlled directly by the electronic control unit and determines delivery mode on the basis of a control signal. An injector case houses the lower part of the pump injector in the cylinder head.

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Fuel injector - Overview (B.20.A.29 - C.10.A.10)

AFX8010



MID0489B 1

The fuel actuators **(2)** are an integral fuel injector and solenoid assembly mounted in the cylinder head. The fuel injectors are operated by rocker arms and the camshaft. The timing and duration of fuel delivery is controlled by the solenoid, which is directly controlled by the ECU module. The ECU is connected to the fuel actuators through connector **X471**, which connects directly to the side of the cylinder head.

Injector	Connector X471 pins	Connector X192 pins
Fuel actuator 1 L-34	Pins A & F	Pins 35 & 24
Fuel actuator 2 L-35	Pins G & N	Pins 26 & 25
Fuel actuator 3 L-36	Pins B & F	Pins 34 & 24
Fuel actuator 4 L-37	Pins M & N	Pins 27 & 25
Fuel actuator 5 L-38	Pins E & F	Pins 33 & 24
Fuel actuator 6 L-39	Pins H & N	Pins 28 & 25

These circuits are monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

Injector	Fault Codes
Fuel actuator 1 L-34	E0414-02 Cylinder 1 Data Incorrect E0414-03 Cylinder 1 Short to High Source E0414-04 Cylinder 1 Short to Low Source
Fuel actuator 2 L-35	E0416-02 Cylinder 2 Data Incorrect E0416-03 Cylinder 2 Short to High Source E0416-04 Cylinder 2 Short to Low Source
Fuel actuator 3 L-36	E0418-02 Cylinder 3 Data Incorrect E0418-03 Cylinder 3 Short to High Source E0418-04 Cylinder 3 Short to Low Source
Fuel actuator 4 L-37	E0415-02 Cylinder 4 Data Incorrect E0415-03 Cylinder 4 Short to High Source E0415-04 Cylinder 4 Short to Low Source
Fuel actuator 5 L-38	E0419-02 Cylinder 5 Data Incorrect E0419-03 Cylinder 5 Short to High Source E0419-04 Cylinder 5 Short to Low Source
Fuel actuator 6 L-39	E0417-02 Cylinder 6 Data Incorrect E0417-03 Cylinder 6 Short to High Source E0417-04 Cylinder 6 Short to Low Source

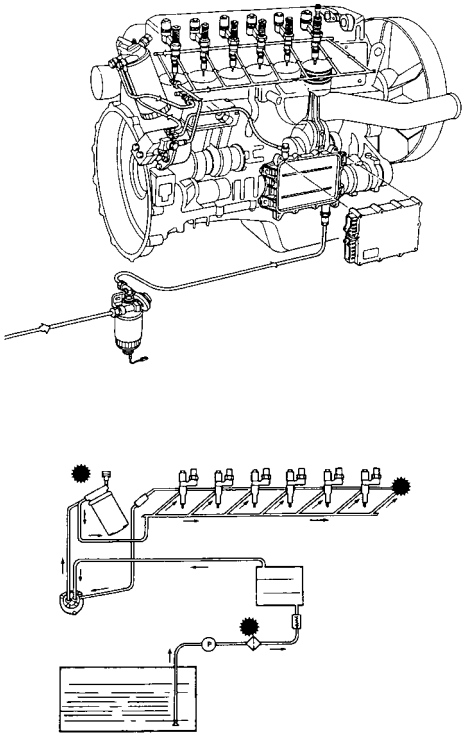
For additional information on the fuel actuator electrical circuits, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Fuel injector - Static description (B.20.A.29 - C.30.A.20)

AFX8010

The new Bosch PDE 30 electronically controlled fuel pump injectors can achieve higher injection pressures than conventional systems with a separate pump and external piping. The electronic injection management (EDC) already applied to some conventional engine versions is similar in basic layout, but the new system is much more sophisticated and differs in many respects, e.g. individual management of each individual injector and advanced fault diagnostics function built into the electronic control unit. The MS6 electronic control unit also manages many other systems, including turbocharging.Electronic Control Unit: To reduce the number of connections, the length of injector connection leads and hence signal interference, the control unit is fitted directly onto the engine via a heat exchanger (used for cooling) by means of flexible blocks which reduce vibrations transmitted by the engine. A internal environmental pressure sensor further improves injection system management. The control unit is equipped with a highly advanced self-diagnostic system. It is able to take environmental factors into consideration in order to detect and store anomalies (even if intermittent) occurring within the system during vehicle operation to ensure more effective, reliable repairs. The MS6.2 electronic control unit manages the following main functions: fuel injection, accessory functions, self-diagnosis and recovery. It also permits: interface with other on-board electronic systems EOL and Service programming and fault diagnosis.



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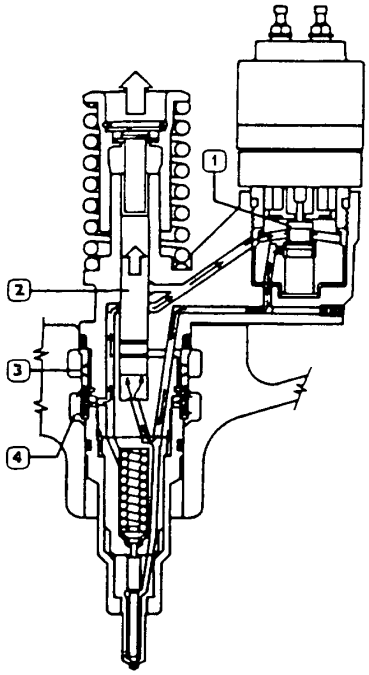
The pump injector consists mainly of three parts: solenoid **(1)**, pumping element **(2)** and nozzle **(3)**. These three parts cannot be individually replaced and cannot be serviced. The pumping element is operated mechanically upon each cycle by a rocker. It compresses the fuel in the delivery chamber. Nozzle configuration and operation are similar to those of conventional injector nozzles. It is opened by fuel under pressure to inject a fine spray of fuel into the combustion chamber. The solenoid is controlled directly by the electronic control unit and determines delivery mode on the basis of a control signal. An injector case houses the lower part of the pump injector in the cylinder head.

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Fuel injector - Dynamic description (B.20.A.29 - C.30.A.10)

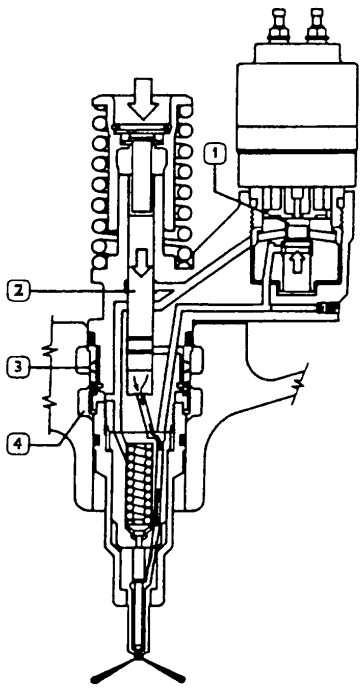
AFX8010

During the filling stage, pumping element **(2)**, moves upward. The highest point of the cam is passed and the rocker roller moves toward the cam base ring. Fuel valve **(1)**, is opened and fuel is free to flow into the injector from the cylinder head lower channel **(4)**. Filling continues until the pumping element reaches the top end of its travel.



20034775 1

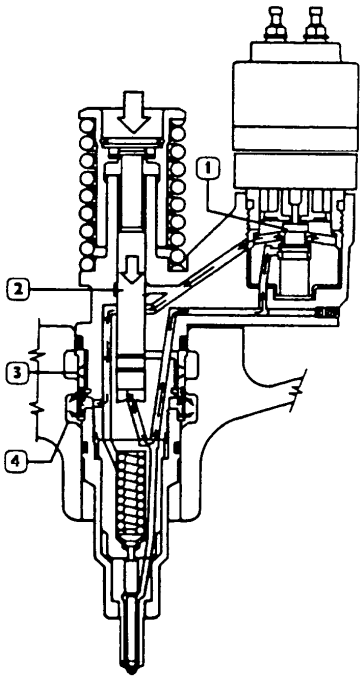
The injection stage begins when the solenoid is excited at a certain point on the pumping element descending stroke and fuel valve **(1)**, closes. The instant at which delivery starts is processed by the electronic control unit and varies according to engine service conditions. The cam continues to push pumping element **(2)**, via the rocker and the injection stage continues while fuel valve **(1)**, remains closed.



20034776 2

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Injection finishes when fuel valve **(1)**, opens at a certain point on the pumping element descending stroke following solenoid deactivation. Fuel flows through open valve **(1)**, the injector holes and channel **(4)**, in the cylinder head. The time for which the solenoid is excited is processed by the electronic control unit and represents the duration of injection (output). It varies according to engine service conditions. The electronic control unit is able to monitor current uptake by the solenoid in order to establish whether injection has taken place correctly or if mechanical problems have occurred, e.g. binding. The control unit can detect injector errors only when the engine is running or during start up.

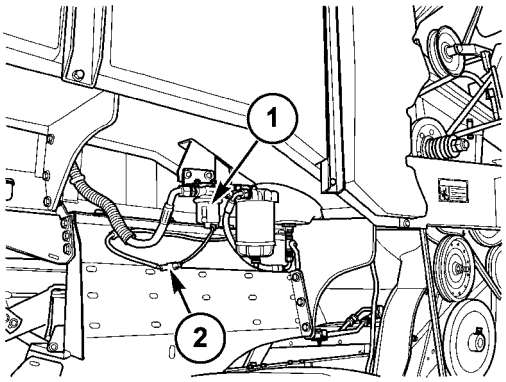


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https://truckmanualshub.com/

Fuel lift pump Electrical fuel pump - Overview (B.20.A.34.22 - C.10.A.10)

AFX8010



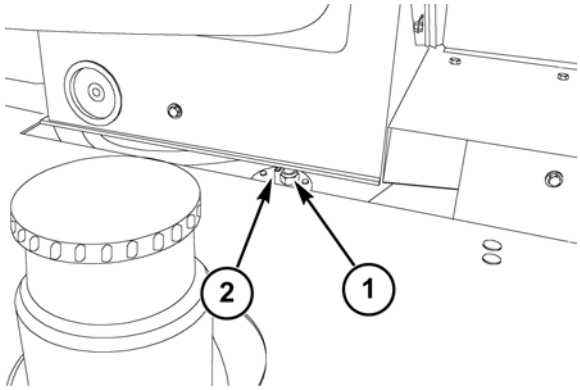
10041506A5 1

The fuel pump M-23 **(1)** delivers fuel to the engine, where it is used to cool the ECU, and is supplied to a fuel gallery in the cylinder head where it is available to each fuel actuator. The fuel pump is powered from fuse F-28 through the fuel pump relay K-07 whenever the key switch is in the ON position. For additional information on the fuel pump electrical circuit, refer to: **Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)**

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Sensing system Level sensor - Overview (B.20.A.95.90 - C.10.A.10)

AFX8010



40031055A4 1

The Fuel Level Sensor R-01 **(1)** monitors the amount of fuel inside the fuel tank and sends the information to CCM-2 connector **X016** pin J2-17. As the fuel level rises and lowers inside the fuel tank, the variable resistance through the sensor changes. CCM-2 monitors this variable resistance and sends the information to the fuel gauge found in the cab. When the fuel level drops below **60 L** (**16 US gal**), the alarm message "A0004 Fuel Level LOW" will be displayed to the operator; when the fuel level drops below **20 L** (**5 US gal**), the message will be displayed and the alarm will sound.

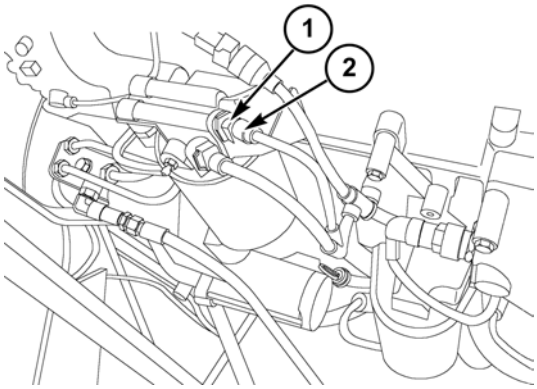
The fuel level sensor circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0154-03 - Fuel Level Sensor
E0154-04 - Fuel Level Sensor
E0154-05 - Fuel Level Sensor

For additional information on the fuel level sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**

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Sensing system Differential pressure switch - Overview (B.20.A.95.82 - C.10.A.10)

AFX8010



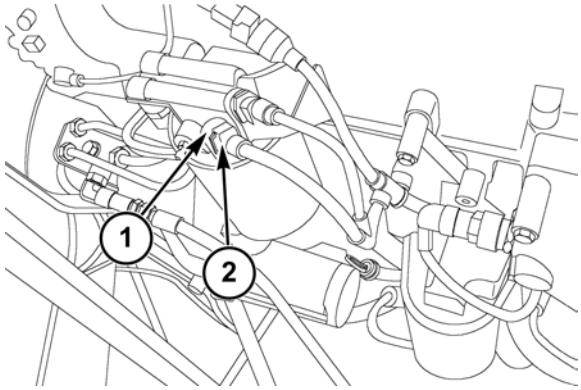
40033790A4 1

The fuel filter switch S-62 **(1)** monitors the fuel flow through the fuel filter. When the filter becomes clogged, the filter switch will send the information to the CCM2 module connector **X016** pin J2-24.

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Sensing system Temperature sensor - Overview (B.20.A.95.89 - C.10.A.10)

AFX8010



40033790B4 1

The fuel temperature sensor B-36 **(1)** monitors the temperature of the fuel and sends the information to the ECU module connector **X192** pins 6 & 11. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0401-02 Fuel Temperature Sensor Data Incorrect
E0401-03 Fuel Temperature Sensor Short to High Source
E0401-04 Fuel Temperature Sensor Short to Low Source

For additional information on the fuel temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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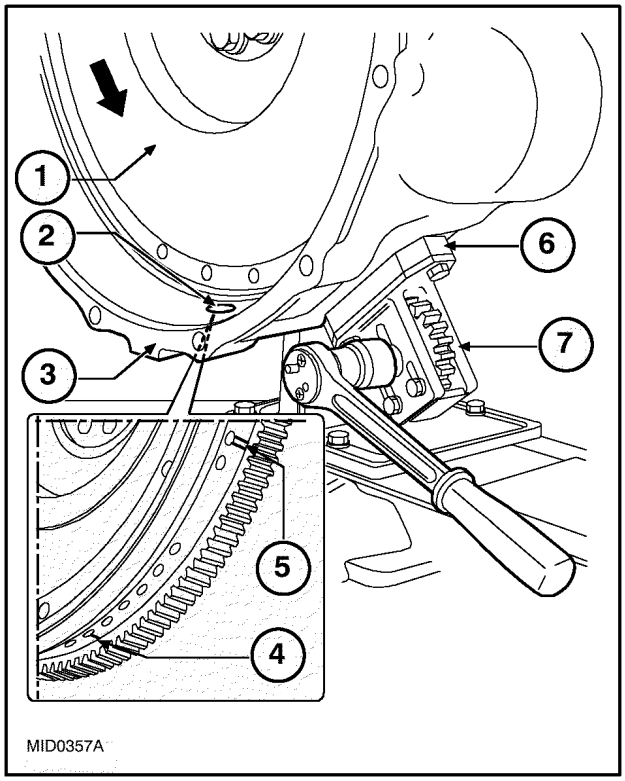
Fuel injector - Remove (B.20.A.29 - F.10.A.10)

AFX8010

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*

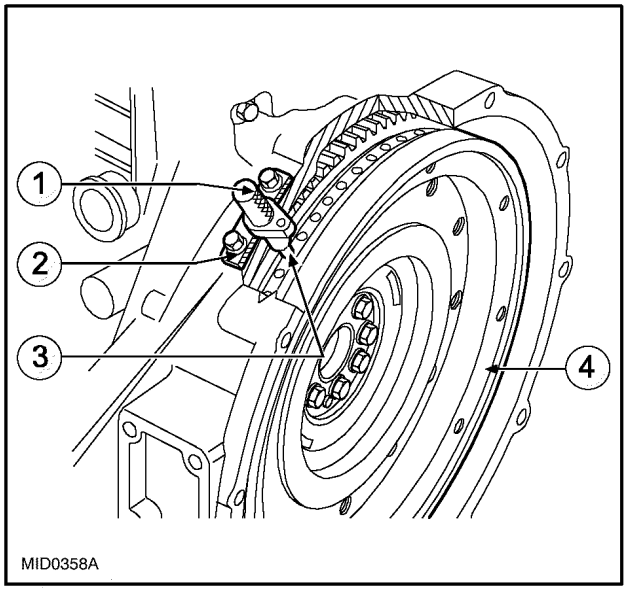
1. From underneath the vehicle, take the inspection cover off the timing system gearbox. Fit the flywheel rotation tool on the gearbox **(2)**, 296179 **(7)** and spacer 296180 **(6)**.

IMPORTANT: *The arrow shows in which direction the engine turns. Using the above-mentioned tool, turn the engine flywheel **(1)**, in the direction of rotation of the engine so as to bring the piston of cylinder no. 1 approximately to the TDC in the phase of combustion. This condition is accomplished when the hole with one reference mark **(4)**, after the hole with two reference marks **(5)**, on the engine flywheel **(1)** can be seen through the inspection window **(3)**.*



MID0484B 1

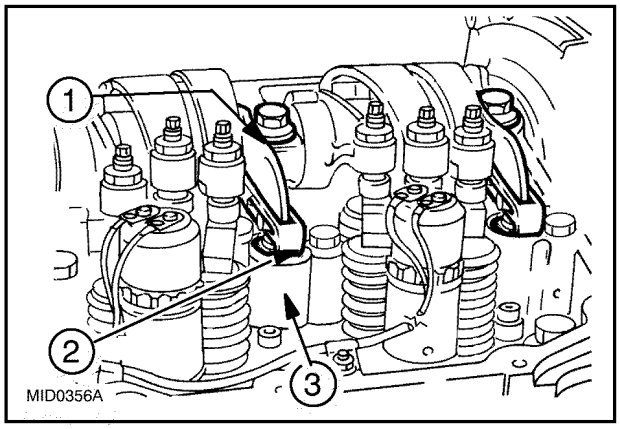
2. The exact position of the piston of cylinder no. 1 at the TDC is obtained when, in the above-described conditions, the tool 296192 **(1)**, enters the hole **(3)**, in the engine flywheel **(4)** through the seat **(2)**, of the engine speed sensor. If this is not the case, turn the engine flywheel **(4)** appropriately. Remove the tool 296192 **(1)**.



MID0485B 2

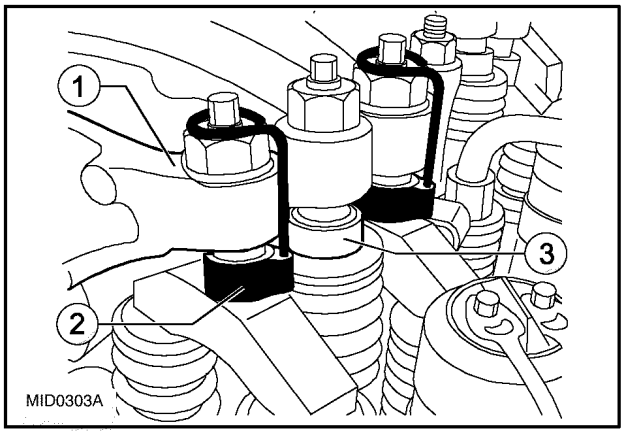
https://truckmanualshub.com/

3. From the engine bay, take out the fixing screws and remove the tappet cover. Disconnect the fuel pipes from the fuel filter and from the cylinder head. Unhook the springs **(3)** and lever check **(2)**. Unscrew the rocker arm shaft fixing screws **(1)**.



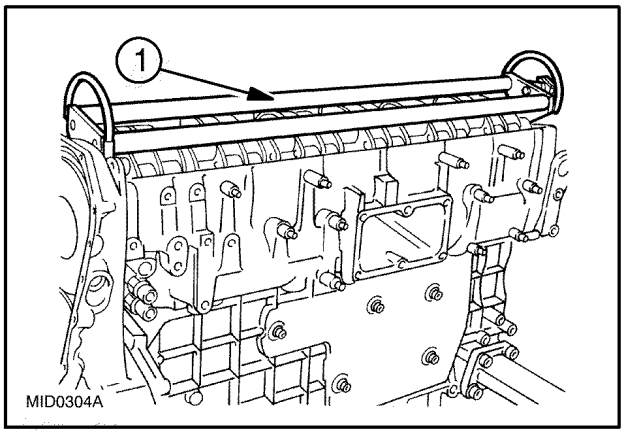
MID0356B 3

4. With tool 296170 **(2)**, constrain the sliding blocks **(3)**, to the rocker arms **(1)**.



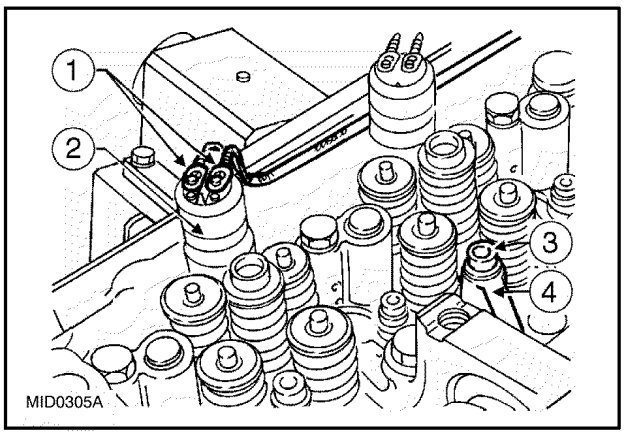
MID0487B 4

5. With the tool **(1)**, 296190 applied as in the Figure, remove the rocker arm shaft assembly.



MID0488B 5

6. Remove the cross-pieces from the valves. Unscrew the screws and remove the electrical connections **(1)**, from the solenoid valves. Unscrew the screws **(3)**, fixing the brackets **(4)**, retaining the pump injectors **(2)**. Remove the pump injectors **(2)**.



MID0489B 6

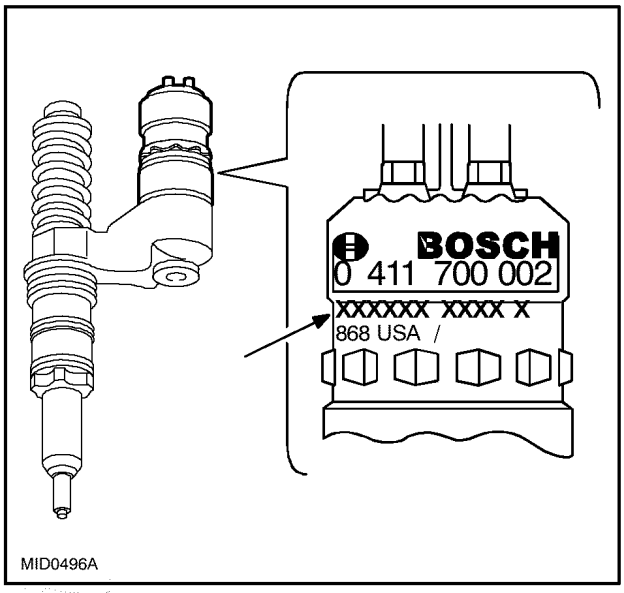
https://truckmanualshub.com/

Fuel injector - Install (B.20.A.29 - F.10.A.15)

AFX8010

1. The injectors must be replaced with great care.

IMPORTANT: *If the job is done with the engine in the vehicle, and before disassembling the pump injectors, drain off the fuel contained in the pipes in the cylinder head by unscrewing the delivery and return fittings on the cylinder head.*



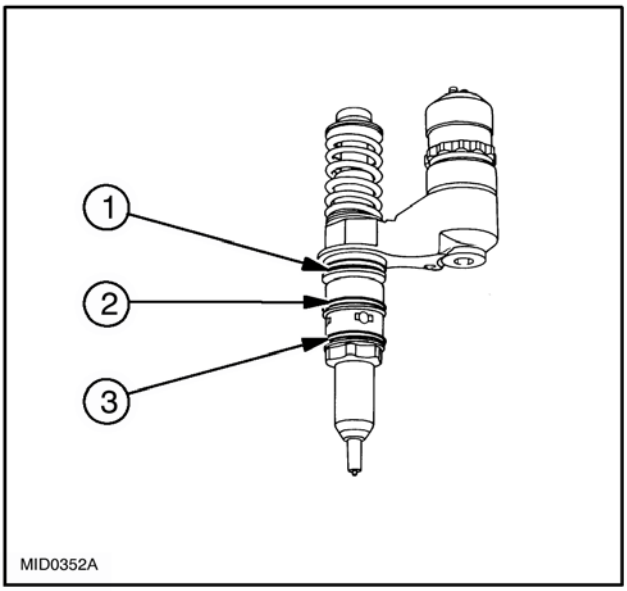
mid0496a 1

2. For each injector replaced, hook up to the electronic diagnostic station or instrument, and when directed by the program, enter the code number stamped on the injector to reprogram the control unit. Refer to **FUEL AND INJECTION SYSTEM - General specification (B.20.A - D.40.A.10)** for the code number for your specific application.

IMPORTANT: *If the electronic diagnosis instrument is not available, it is nearly impossible to replace an injector without the control unit identification.*

IMPORTANT: *When checking the rocker arm clearance, you must check the pump injector preload. Refer to* ***Fuel injector - Preload (B.20.A.29 - F.45.A.30)****.*

3. Thoroughly clean the pump injector seats and the pump injectors. Mount the ring seals **(1)**, **(2)** and **(3)**, on the injectors.

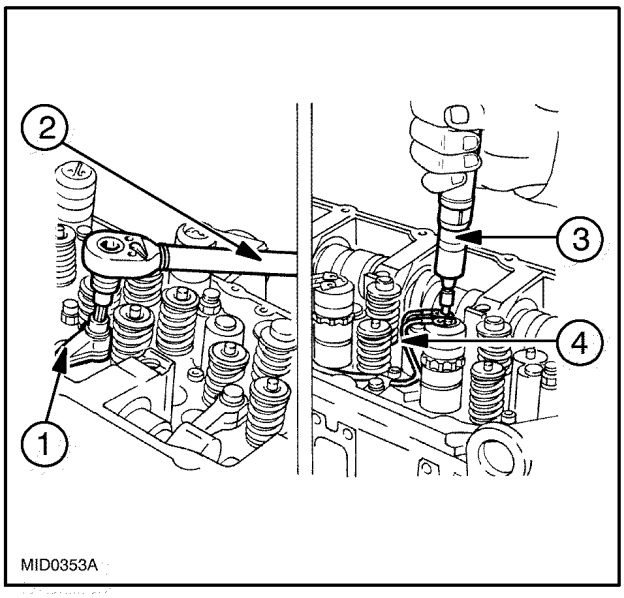


mid0352a 2

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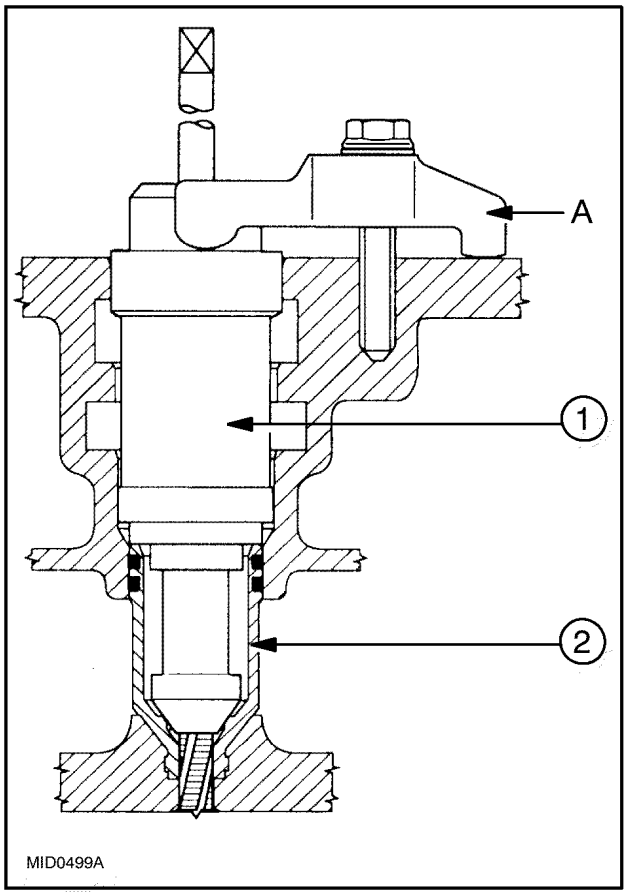
4. Fit the injectors, and with a torque wrench **(2)**, lock the screws fixing the brackets **(1)**, for the injectors to the required torque as shown in **Fuel injector - Torque (B.20.A.29 - D.20.A.10)**. Screw down the screws for the electric connections **(4)**, locking with them a torque screwdriver **380000158 (3)**, to the required torque. See **Fuel injector - Torque (B.20.A.29 - D.20.A.10)**. Position the intake and exhaust valve cross-pieces.

IMPORTANT: *Position the cross-pieces on the valve stem, all with the largest hole on the same side.*



mid0353a 3

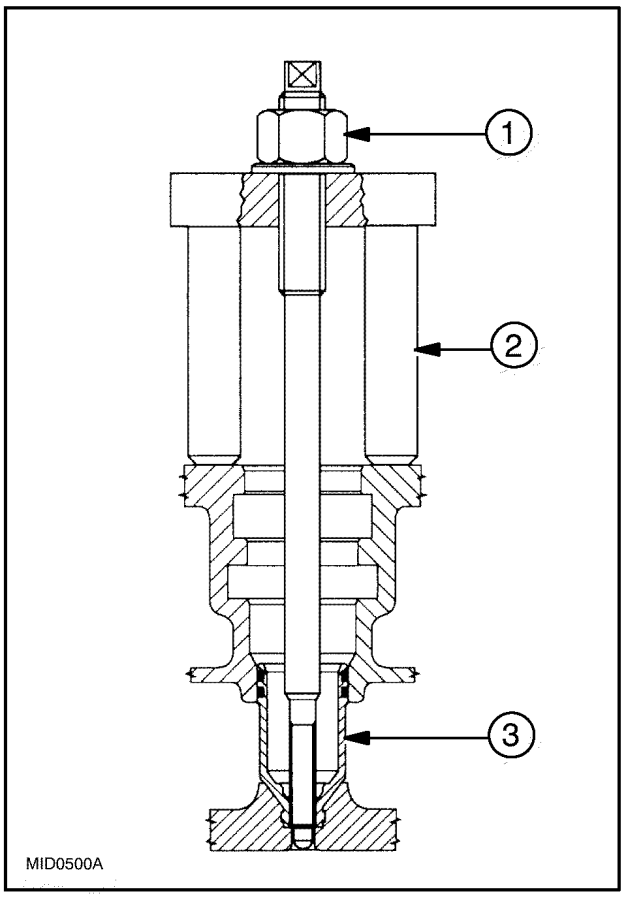
5. To replace the injector case **(2)**, proceed as follows: Thread the case **(2)**, with tool **380000159 (1)**. The steps described in Figures 4 through Figure 7 must be performed by securing the tools with bracket "A" to the cylinder head.



mid0499a 4

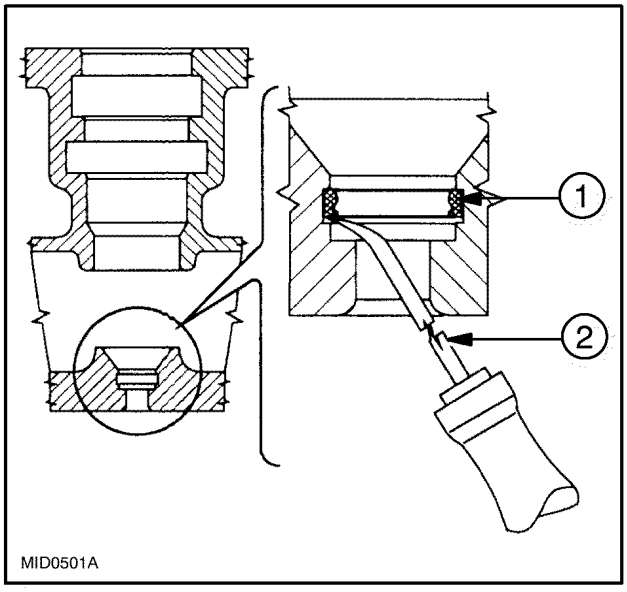
https://truckmanualshub.com/

6. Screw the extractor **380000123 (2)**, into the case **(3)**. Screw down the nut **(1)** and extract the case from the cylinder head.



mid0500a 5

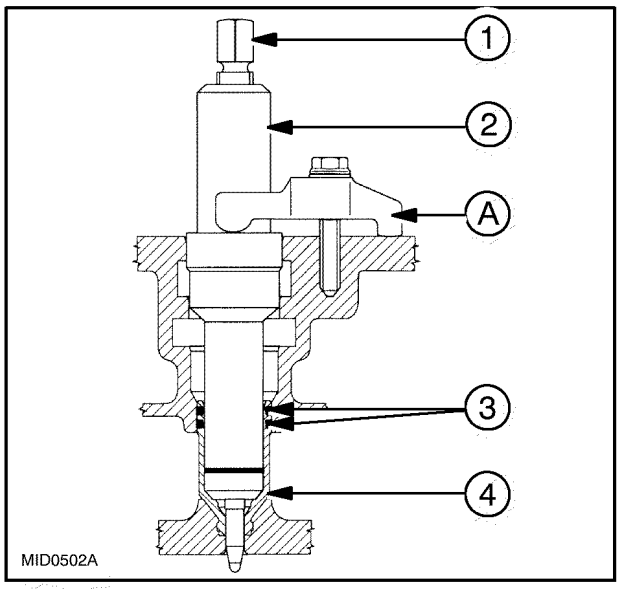
7. With a suitable scraping tool **(2)**, remove any residue **(1)**, left in the groove of the cylinder head.



mid0501a 6

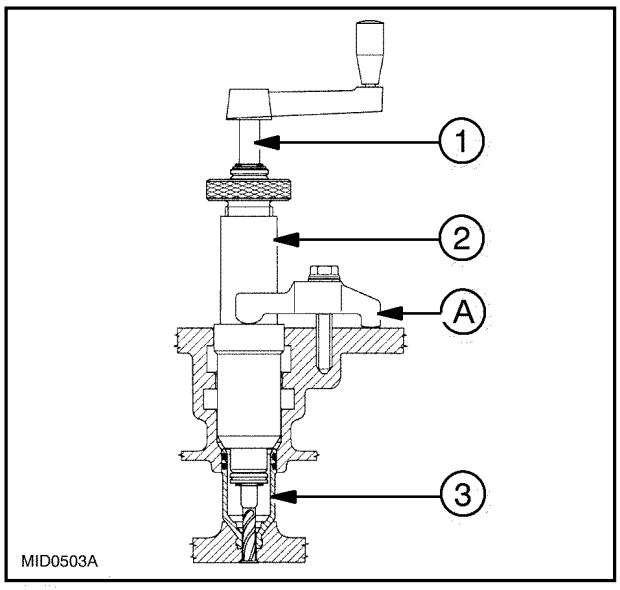
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8. Lubricate the ring seals **(3)** and fit them on the case **(4)**. With tool **380000157 (2)**, secured to the cylinder head with bracket "A", drive in the new case and screw down the screw **(1)**, pressing the bottom of the case.



mid0502a 7

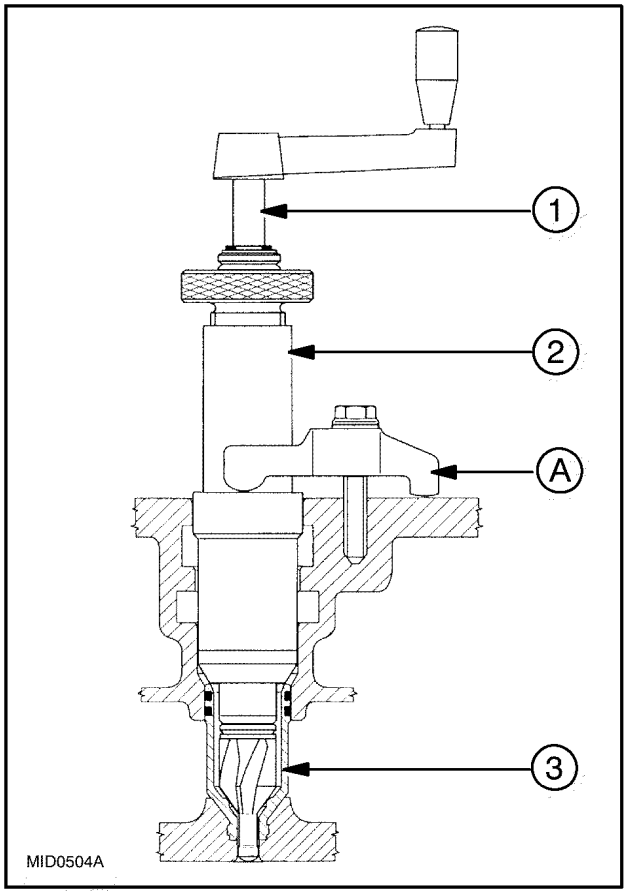
9. Rebore the hole in the case **(3)**, with the reamer **380000164 (1)** and bushing guide **380000162**.



mid0503a 8

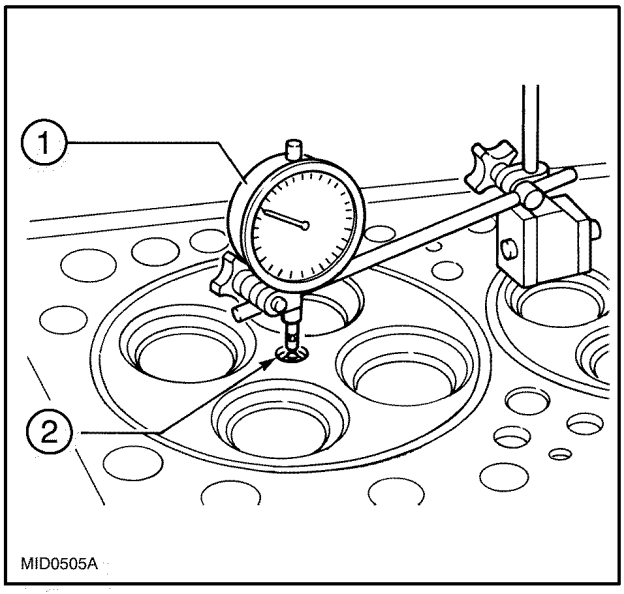
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10. Rebore the seat of the injector in the case **(3)**, with the milling cutter **380000163 (1)** and **(2)** bushing guide **380000162**.



mid0504a 9

11. Check the injector protrusion **(2)**, with a dial gauge **(1)**. The protrusion needs to be **1.14 - 1.4 mm** (**0.045 - 0.055 in**).

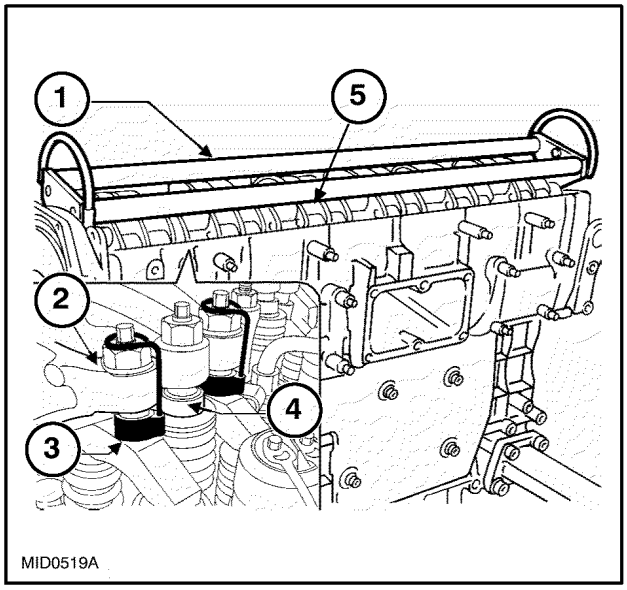


mid0505a 10

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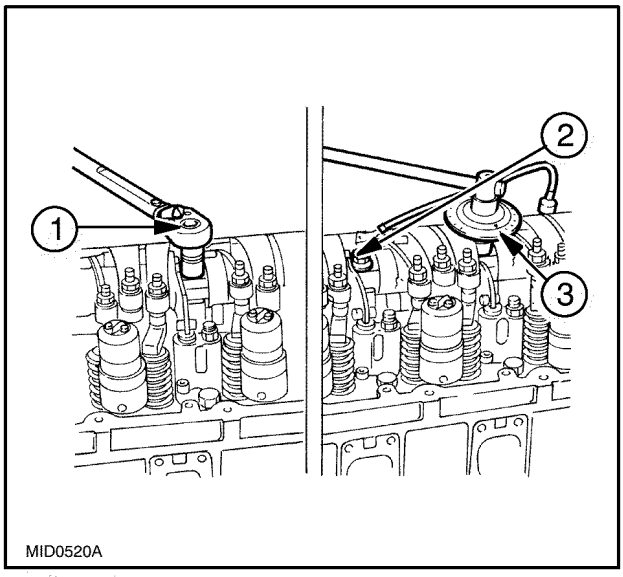
12. Using tool **380000128 (3)**, constrain the sliding blocks **(4)**, to the rocker arms **(3)**. Apply tool **380000148 (1)**, to the rocker arm shaft **(5)**, and position it on the cylinder head.

IMPORTANT: *Before reassembling the rocker arm shaft assembly, make sure all the adjustment screws are fully unscrewed.*



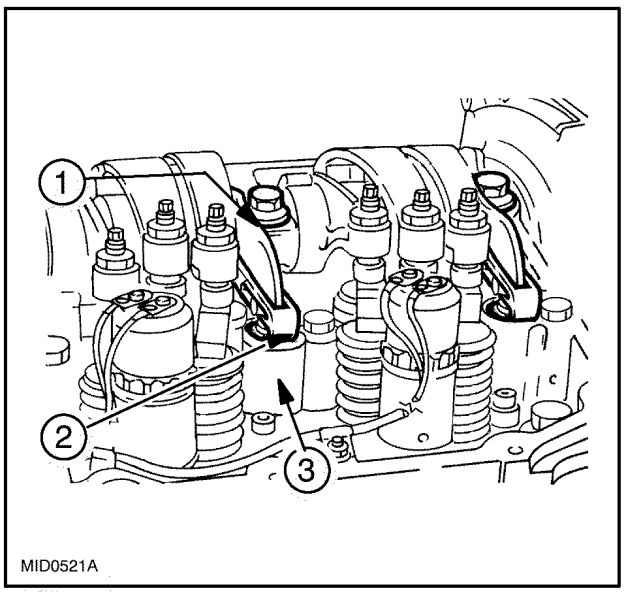
MID0492B 11

13. Tighten the screws **(2)**, fixing the rocker arm shaft in two stages: Stage 1: tightening with a torque wrench **(1)**, to a torque of: **100 Nm** (10 kgm [**73 lb ft**]). Stage 2: closing, with tool **380000304 (3)**, with an angle of **60 °**.



MID0493B 12

14. Constrain the levers **(1)**, to the spacer **(3)**, with the springs **(2)**. To adjust the rocker arm clearance, see **Valve drive - General specification (B.10.A.40 - D.40.A.10)**. Mount the rocker arm cover using a new gasket. Tighten the fixing screws to the required torque noted in **Valve drive - Torque (B.10.A.40 - D.20.A.10)** and in the tightening sequence shown in **Valve drive - Dimension (B.10.A.40 - D.40.A.30)**.

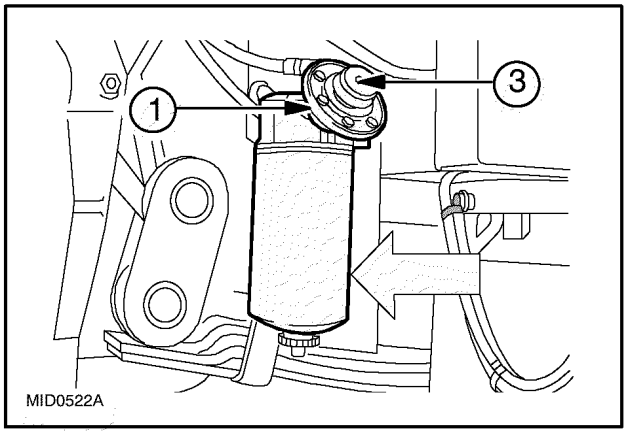


MID0494B 13

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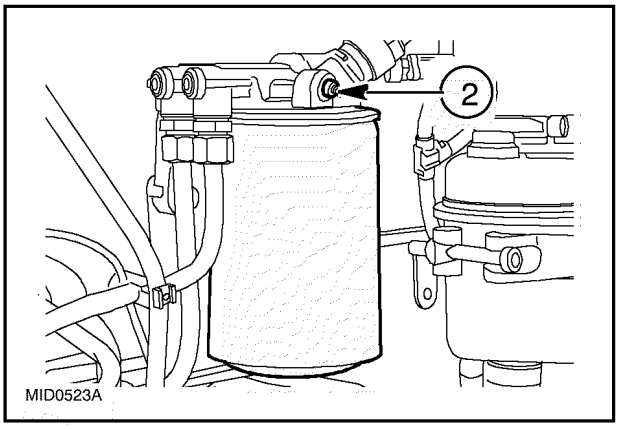
15. Before starting the engine, it is necessary to bleed the fuel supply system. Starting with the pre-filter, fit a tube to the bleed screw **(1)** and bleed the fuel into a container by turning the key switch to the ON position **(3)**, until fuel flows out through the screw **(1)**, without any air bubbles in it. Tighten the screw and remove the tube.

IMPORTANT: *Handle all parts carefully. Do not put your hands or fingers between parts. Wear suitable safety clothing - safety goggles, gloves and shoes.*



MID0495B 14

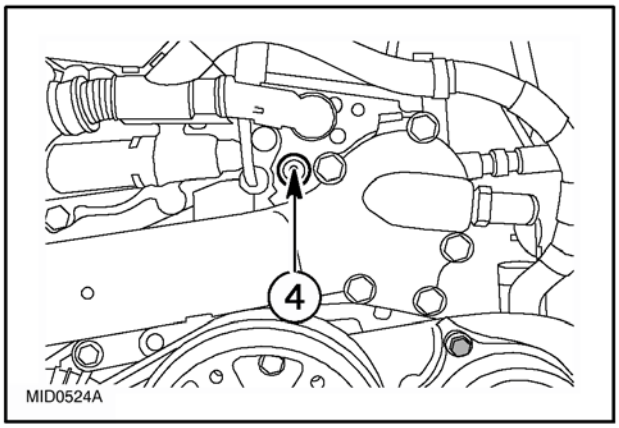
16. Attach a tube to the bleed screw **(2)**, on the support filter. Open the screw and then operate the pump on the pre-filter mount until fuel flows without any air bubbles in it. Tighten the screw and remove the tube.



MID0496B 15

17. Attach a tube to the bleed screw **(4)**, located on the front of the cylinder head. Open the screw and then operate the pump on the pre-filter mount until fuel flows without any air bubbles in it. Tighten the screw and remove the tube.

IMPORTANT: *To reduce premature failure, never let fuel contaminate the drive belts of the alternator, water pump, etc. If a belt becomes contaminated, replace the belt.*



MID0524B 16

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Fuel injector - Preload (B.20.A.29 - F.45.A.30)

AFX8010

1. To adjust the preload on pump injector rocker arms: Loosen the nut locking the rocker arm adjustment screw **(1)** and pump injector rocker arm screw **(2)**. Loosen the adjustment screw to take the pumping element to the end of its travel. Using a torque wrench, tighten the adjustment screw to a torque of **5 Nm** (0.5 kgm [**44 lb in**]). Unscrew the adjustment screw by 1/2 - 3/4 of a turn. Tighten the locknut.

IMPORTANT: *To make the above-mentioned adjustments correctly, you must follow the sequence given in the table in* ***Valve drive - General specification (B.10.A.40 - D.40.A.10)****, checking correct positioning at each phase of rotation with pin 296192 to be inserted in the 11th hole of each of the three sectors of 18 holes each.*

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Electrical control Relay - Incorrect value (B.20.A.91.21 - G.30.C.10)

AFX8010

E0393-02 - Main Relay Defect

Cause:
Defective Main Relay K-14 - not switching off

Possible failure modes:

Engine enabled - no restriction on fuel or speed

1. Faulty relay
2. Faulty wiring harness

Solution:

1. Replace relay K-14. Remove the fault code from the engine ECU using the electronic service tool. Check the operation of the engine.

   A. If the fault reoccurs,continue with **2**.

   B. If the fault does not reoccur, continue operation.

2. Check wiring between relay K-14 and engine ECU (short to low source).

   A. ENSURE THE KEYSTART SWITCH IS OFF. Remove relay 14 and disconnect the connectors from the engine ECU (A-01). Using a suitable multi-meter check for a short to ground at pin 27 of **X193** . If no short to ground is indicated, continue with step **3**.

   B. If a short to ground is indicated, disconnect connector **X010**; if a short to ground is still indicated, trace and repair the wiring between the engine ECU (A-01) and connector **X010**.

   C. Continue to trace the short to ground at the female side of connector **X010**. Disconnect connector **X004** and check for a short to ground at **X010** pin 26. If a short is indicated, repair the wiring between connectors **X010** and **X004**. If no short is indicated here then the short to ground must be between the male side of connector **X004** and holder of relay K-14.

3. Check wiring between relay 14 and engine ECU. (Short to high source)

   A. Remove relay 14 and disconnect the connectors from the engine ECU (A-01).Using a suitable multi-meter check for a short to +12V at pins 3 and 4 of **X192**. If no short to +12V is indicated, continue with step **4**.

   B. If a short to +12V is indicated, disconnect connector **X010**, if a short to +12V is still indicated, trace and repair the wiring between the engine ECU (A-01) and connector **X010**.

   C. Continue to trace the short to +12V at the female side of connector **X010**. Disconnect connector **X004** and check for a short to +12V at **X010** pin 28. If a short is indicated,repair the wiring between connectors **X010** and **X004**. If no short is indicated here then the short to +12V must be between the male side of connector **X004** and holder of relay 14.

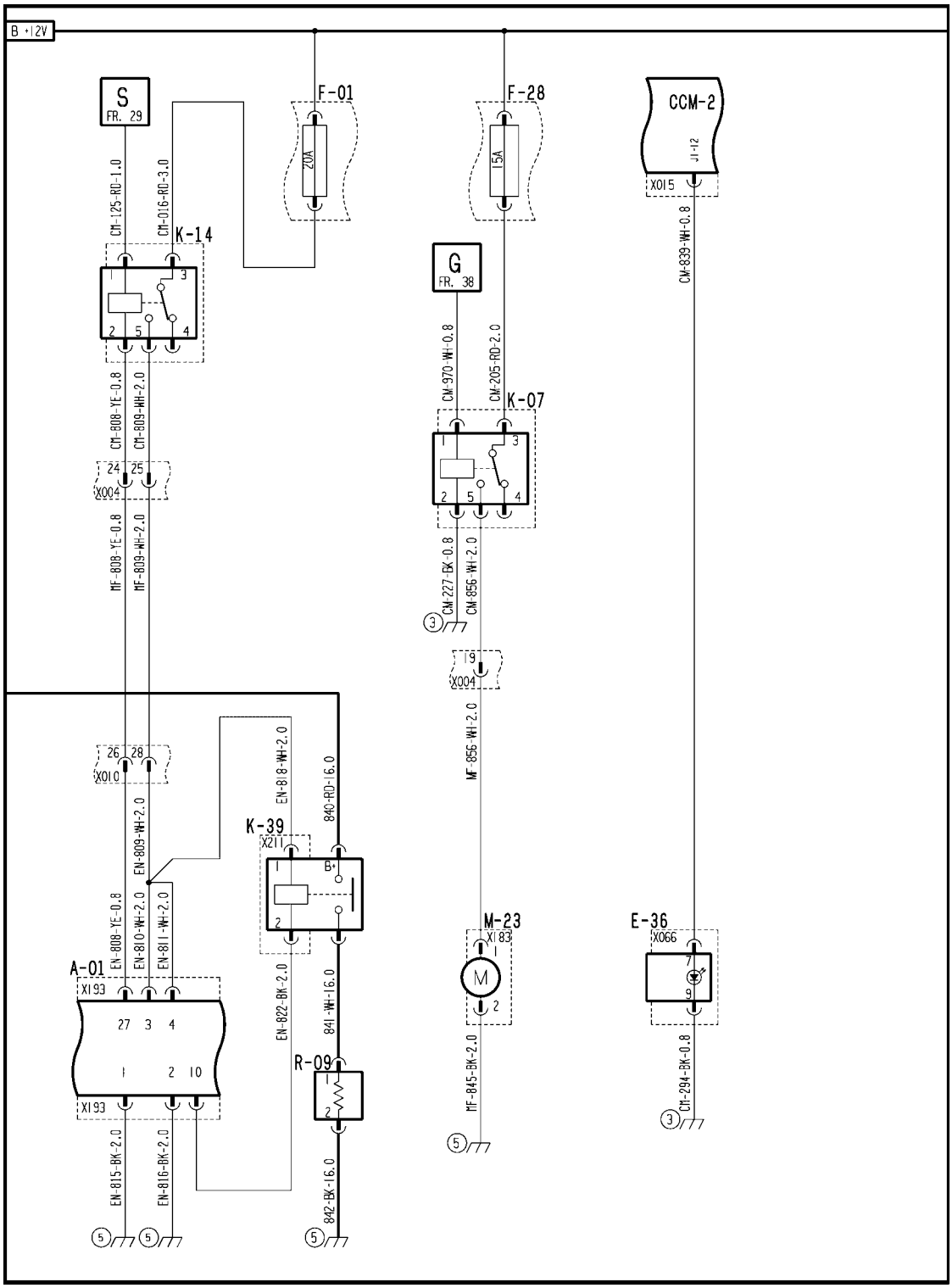
4. Check for good connections onto engine ECU and at connectors **X004** and **X010**. Check main Engine ECU relay, K14, for correct operation. Remove the fault code from the ECU memory using the electronic service tool. Operate the engine, the fault may be intermittent, wiggle test the harness and operate other functions to attempt to induce fault.

   A. If fault reoccurs, return to step **2**.

   B. If fault does not occur, continue with vehicle operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Electrical control Relay - Short circuit to B+ (B.20.A.91.21 - G.30.B.54)

AFX8010

E0393-03 - Main Relay Defect

Cause:
Defective Main Relay K-14 - not switching off

Possible failure modes:

Engine enabled - no restriction on fuel or speed

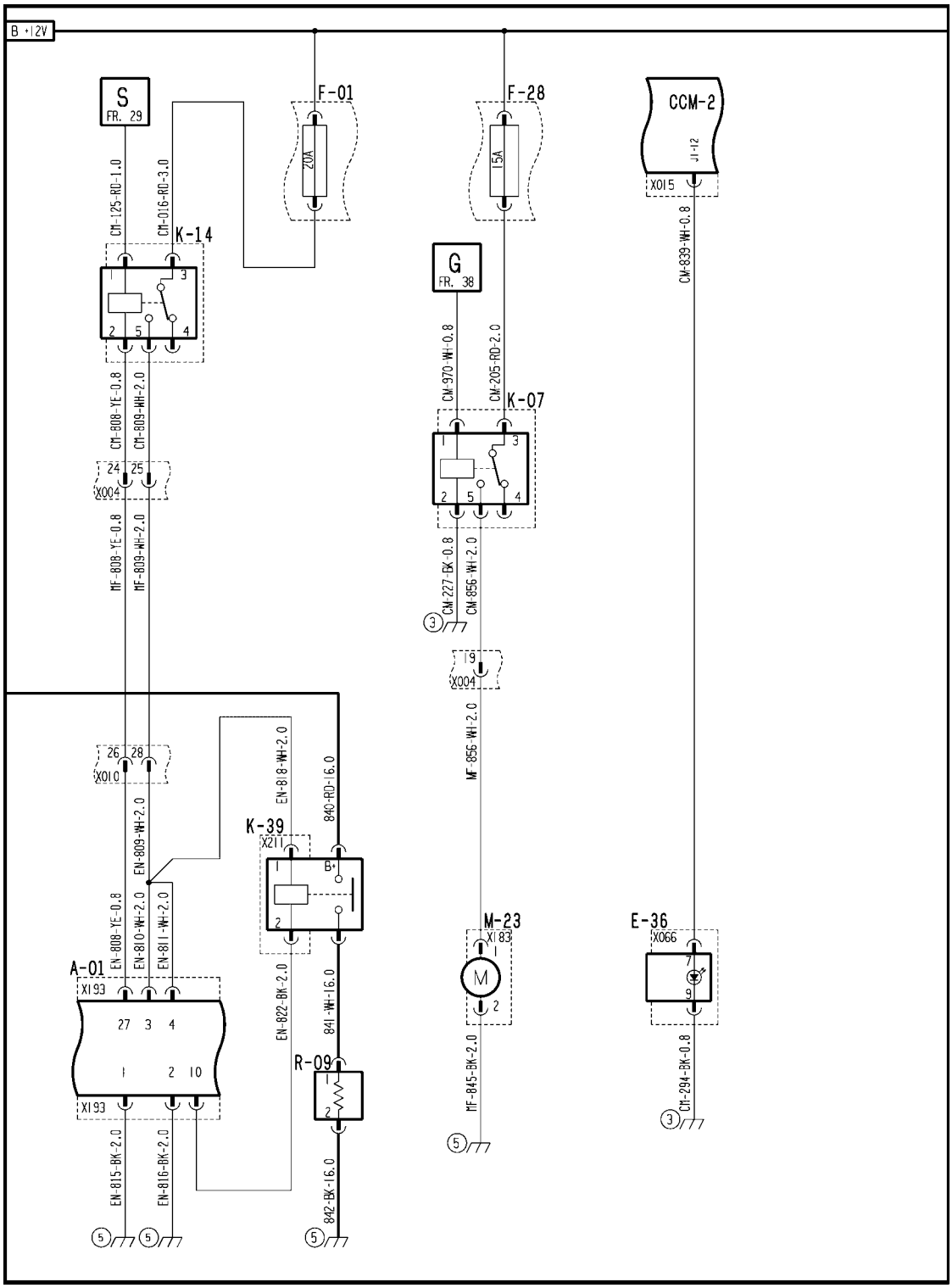
1. Faulty relay
2. Faulty wiring harness

Solution:

1. Replace relay K-14. Remove the fault code from the engine ECU using the electronic service tool. Check the operation of the engine.
   A. If the fault reoccurs,continue with **2**.
   B. If the fault does not reoccur, continue operation.
2. Check wiring between relay K-14 and engine ECU (short to low source).
   A. ENSURE THE KEYSTART SWITCH IS OFF. Remove relay 14 and disconnect the connectors from the engine ECU (A-01). Using a suitable multi-meter check for a short to ground at pin 27 of **X193** . If no short to ground is indicated, continue with step **3**.
   B. If a short to ground is indicated, disconnect connector **X010**; if a short to ground is still indicated, trace and repair the wiring between the engine ECU (A-01) and connector **X010**.
   C. Continue to trace the short to ground at the female side of connector **X010**. Disconnect connector **X004** and check for a short to ground at **X010** pin 26. If a short is indicated, repair the wiring between connectors **X010** and **X004**. If no short is indicated here then the short to ground must be between the male side of connector **X004** and holder of relay K-14.
3. Check wiring between relay 14 and engine ECU. (Short to high source)
   A. Remove relay 14 and disconnect the connectors from the engine ECU (A-01).Using a suitable multi-meter check for a short to +12V at pins 3 and 4 of **X192**. If no short to +12V is indicated, continue with step **4**.
   B. If a short to +12V is indicated, disconnect connector **X010**, if a short to +12V is still indicated, trace and repair the wiring between the engine ECU (A-01) and connector **X010**.
   C. Continue to trace the short to +12V at the female side of connector **X010**. Disconnect connector **X004** and check for a short to +12V at **X010** pin 28. If a short is indicated,repair the wiring between connectors **X010** and **X004**. If no short is indicated here then the short to +12V must be between the male side of connector **X004** and holder of relay 14.
4. Check for good connections onto engine ECU and at connectors **X004** and **X010**. Check main Engine ECU relay, K14, for correct operation. Remove the fault code from the ECU memory using the electronic service tool. Operate the engine, the fault may be intermittent, wiggle test the harness and operate other functions to attempt to induce fault.
   A. If fault reoccurs, return to step **2**.
   B. If fault does not occur, continue with vehicle operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Electrical control Relay - Short circuit to ground (B.20.A.91.21 - G.30.B.53)

AFX8010

E0393-04 - Main Relay Defect

Cause:
Defective Main Relay K-14 - not switching off

Possible failure modes:

Engine enabled - no restriction on fuel or speed

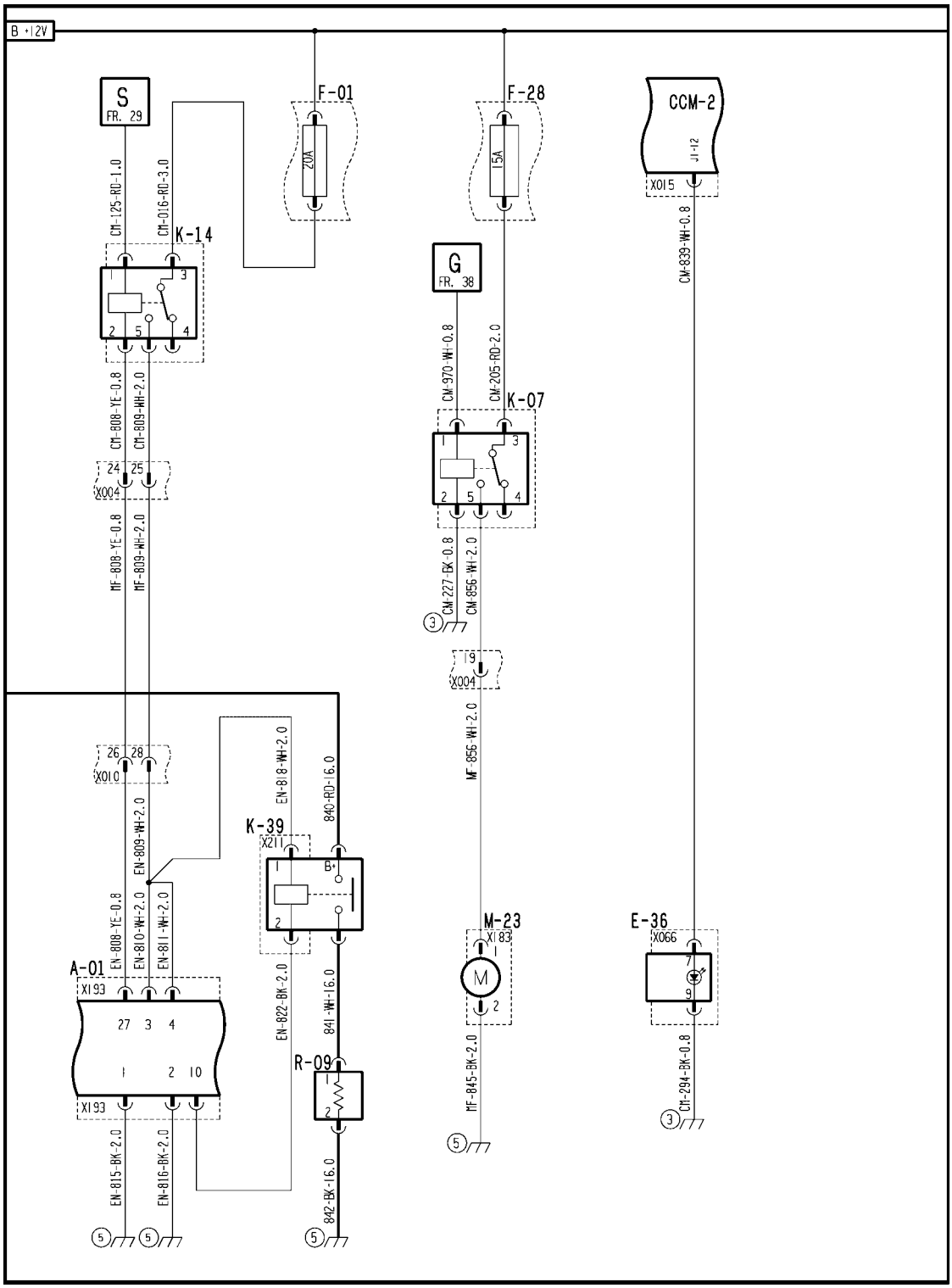
1. Faulty relay
2. Faulty wiring harness

Solution:

1. Replace relay K-14. Remove the fault code from the engine ECU using the electronic service tool. Check the operation of the engine.
   A. If the fault reoccurs,continue with **2**.
   B. If the fault does not reoccur, continue operation.
2. Check wiring between relay K-14 and engine ECU (short to low source).
   A. ENSURE THE KEYSTART SWITCH IS OFF. Remove relay 14 and disconnect the connectors from the engine ECU (A-01). Using a suitable multi-meter check for a short to ground at pin 27 of **X193** . If no short to ground is indicated, continue with step **3**.
   B. If a short to ground is indicated, disconnect connector **X010**; if a short to ground is still indicated, trace and repair the wiring between the engine ECU (A-01) and connector **X010**.
   C. Continue to trace the short to ground at the female side of connector **X010**. Disconnect connector **X004** and check for a short to ground at **X010** pin 26. If a short is indicated, repair the wiring between connectors **X010** and **X004**. If no short is indicated here then the short to ground must be between the male side of connector **X004** and holder of relay K-14.
3. Check wiring between relay 14 and engine ECU. (Short to high source)
   A. Remove relay 14 and disconnect the connectors from the engine ECU (A-01).Using a suitable multi-meter check for a short to +12V at pins 3 and 4 of **X192**. If no short to +12V is indicated, continue with step **4**.
   B. If a short to +12V is indicated, disconnect connector **X010**, if a short to +12V is still indicated, trace and repair the wiring between the engine ECU (A-01) and connector **X010**.
   C. Continue to trace the short to +12V at the female side of connector **X010**. Disconnect connector **X004** and check for a short to +12V at **X010** pin 28. If a short is indicated,repair the wiring between connectors **X010** and **X004**. If no short is indicated here then the short to +12V must be between the male side of connector **X004** and holder of relay 14.
4. Check for good connections onto engine ECU and at connectors **X004** and **X010**. Check main Engine ECU relay, K14, for correct operation. Remove the fault code from the ECU memory using the electronic service tool. Operate the engine, the fault may be intermittent, wiggle test the harness and operate other functions to attempt to induce fault.
   A. If fault reoccurs, return to step **2**.
   B. If fault does not occur, continue with vehicle operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Injection control - Incorrect value (B.20.A.92 - G.30.C.10)

AFX8010

E0208-02 - Engine Configuration

Context:
The ECU module communicates with the CCM2 module to report error messages and other operational information. In some cases, due to design changes, there may be some incompatibility between certain versions of the software installed in either module.

Cause:
The ECU module (A-01) software is incompatible with the current CCM2 module software.

Possible failure modes:

1. Incorrect software loaded in either ECU module or CCM2 module.

Solution:

1.
   A. If this error message appears, contact the Case IH Technical Support Group (TSG) to obtain information on software version compatibilities.

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Injection control - Incorrect value (B.20.A.92 - G.30.C.10)

AFX8010

E0386-02 - EEPROM Defect

Cause:
An error in the Engine ECU EEPROM.

Possible failure modes:

Engine ECU malfunction.

1. Engine enabled - fuel restricted and speed restriction to **1500 RPM**.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (**20 amps**) and Fuse 38, Relay 14 and keystart switch fuse, (**7.5 amps**). Check for good connections onto engine ECU and at connector **X004** and **X010**. Check main engine ECU relay, K-14 for correct operation.

   A. If a fuse is blown or the relay is faulty, replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay and wiring are okay, continue with step **2**.

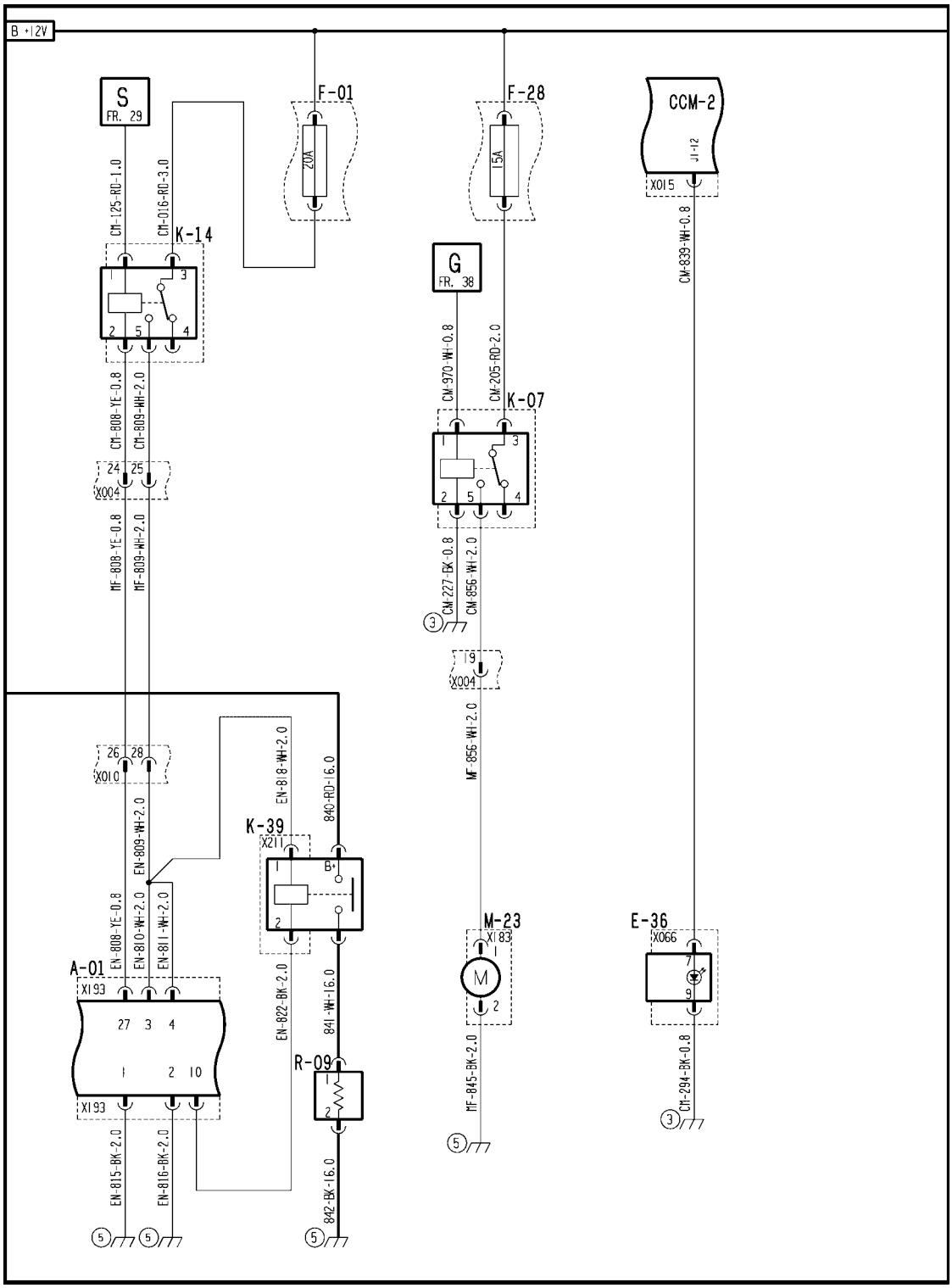
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

   A. If the software is accepted, check engine for correct operation.

   B. If the software is not accepted, replace the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54)

AFX8010

E0385-03 - ECU Defect

Cause:
An error in the monitoring module.

Possible failure modes:

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors **X004** and **X010**. Check main Engine ECU relay K-14 for correct operation.

   A. If a fuse is blown or the relay is faulty, replace and check engine operation. If engine performs okay.Remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay, and wiring are okay,continue with step **2**.

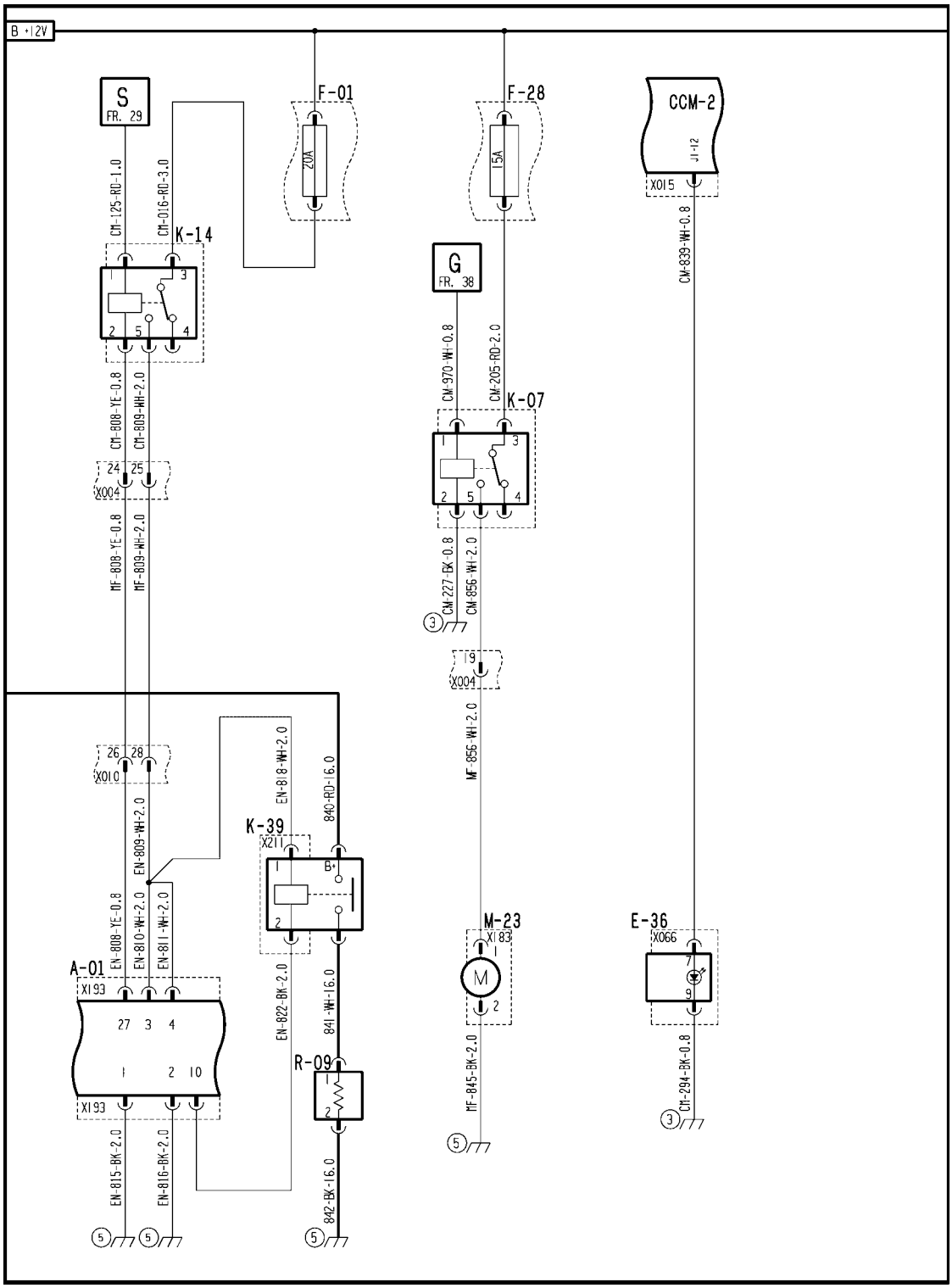
2. Attempt to reload the engine ECU software using the electronic service tool.

   A. If the software is accepted,check engine for correct operation.

   B. If the software is not accepted, substitute the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53)

AFX8010

E0385-04 - ECU Defect

Cause:
An error in the monitoring module.

Possible failure modes:

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors **X004** and **X010**. Check main Engine ECU relay K-14 for correct operation.

   A. If a fuse is blown or the relay is faulty, replace and check engine operation. If engine performs okay.Remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay, and wiring are okay,continue with step **2**.

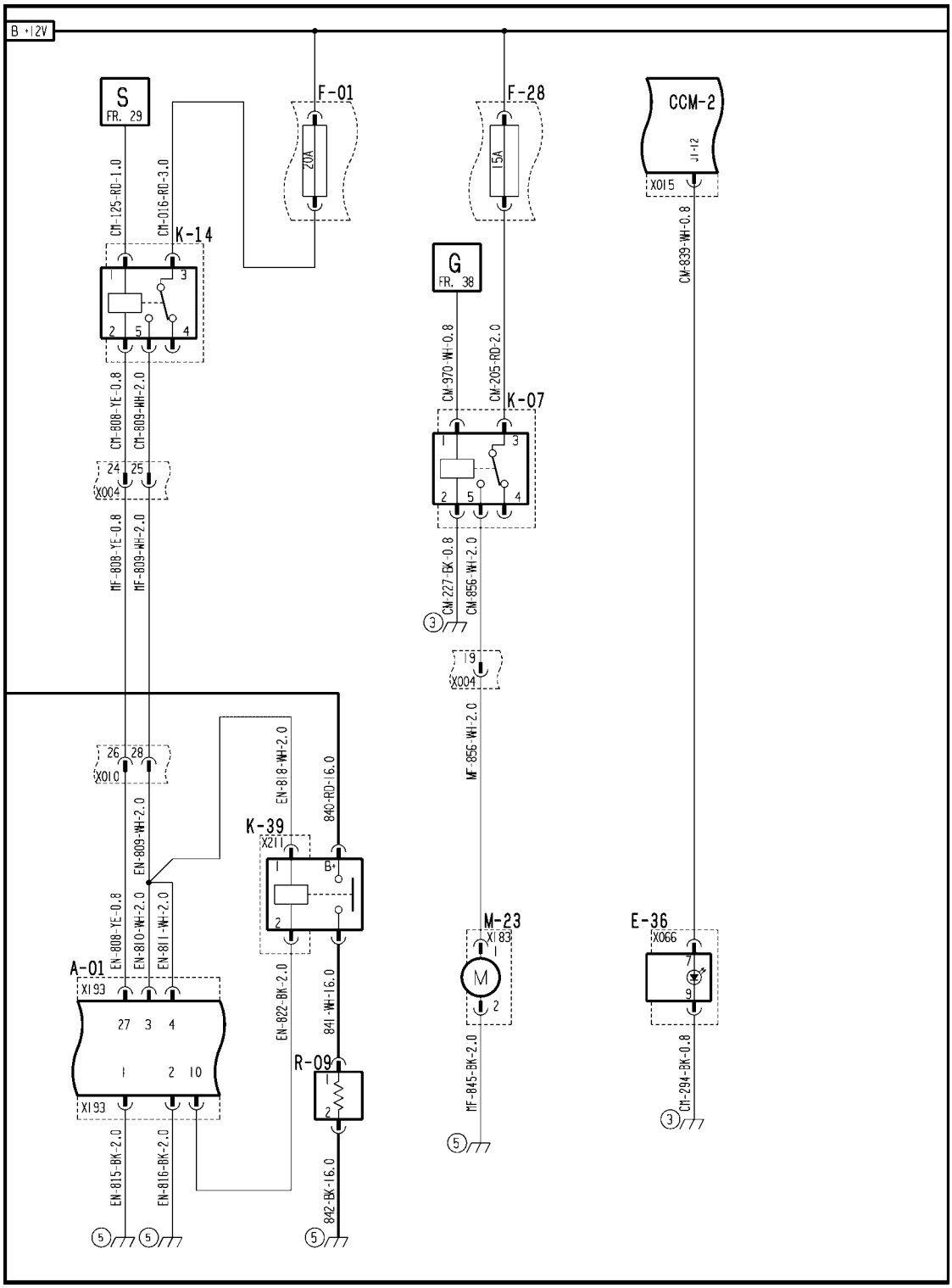
2. Attempt to reload the engine ECU software using the electronic service tool.

   A. If the software is accepted,check engine for correct operation.

   B. If the software is not accepted, substitute the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

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A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Injection control - Incorrect value (B.20.A.92 - G.30.C.10)

AFX8010

E0385-02 - ECU Defect

Cause:
An error in the monitoring module.

Possible failure modes:

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors **X004** and **X010**. Check main Engine ECU relay K-14 for correct operation.

   A. If a fuse is blown or the relay is faulty, replace and check engine operation. If engine performs okay.Remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay, and wiring are okay,continue with step **2**.

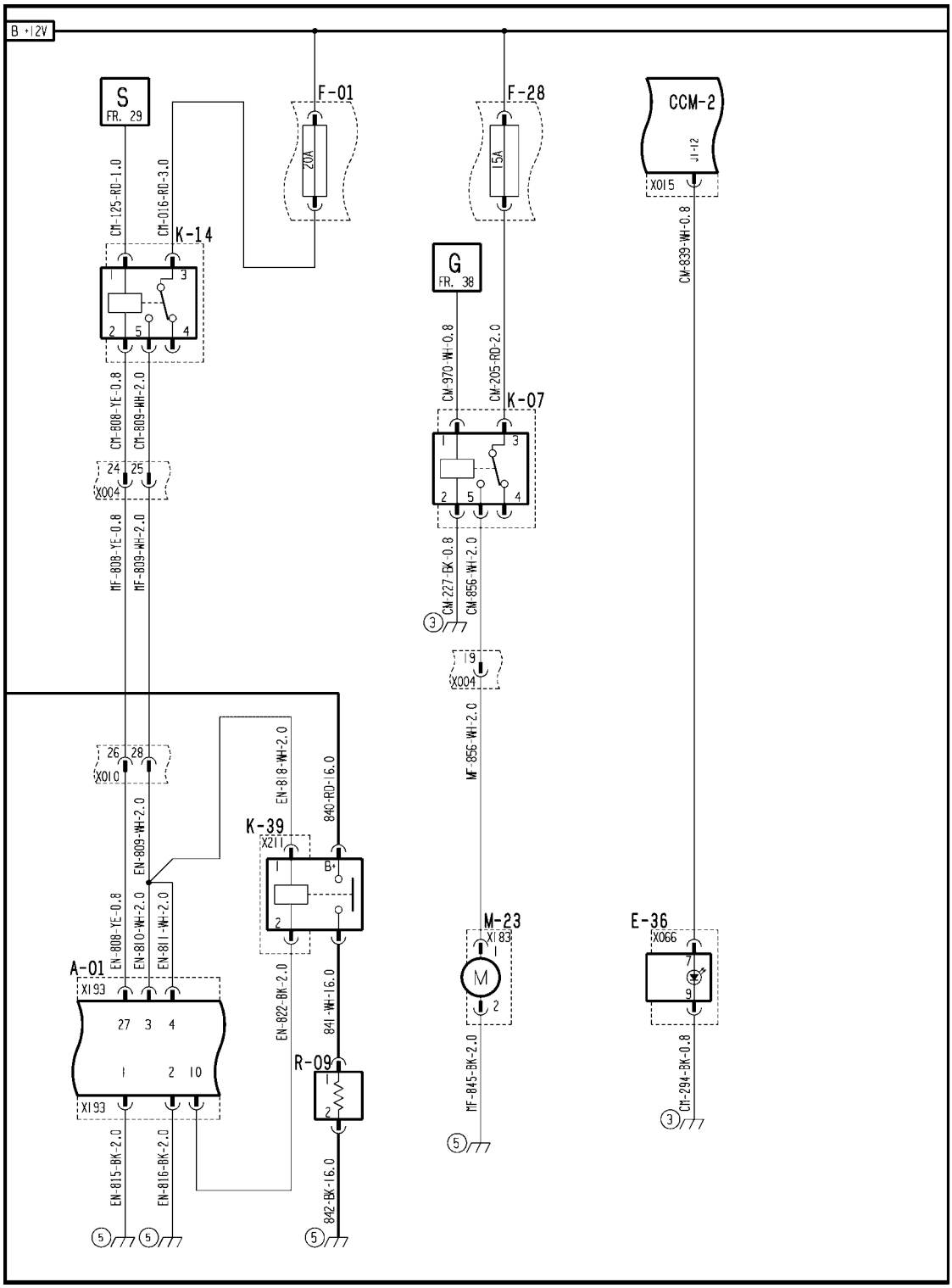
2. Attempt to reload the engine ECU software using the electronic service tool.

   A. If the software is accepted,check engine for correct operation.

   B. If the software is not accepted, substitute the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54)

AFX8010

E0394-03 - Afterrun Not Completed

Cause:
Afterrun monitoring not completed

Possible failure modes:

Effect on Engine:
Engine enabled -- no restriction on fuel or speed

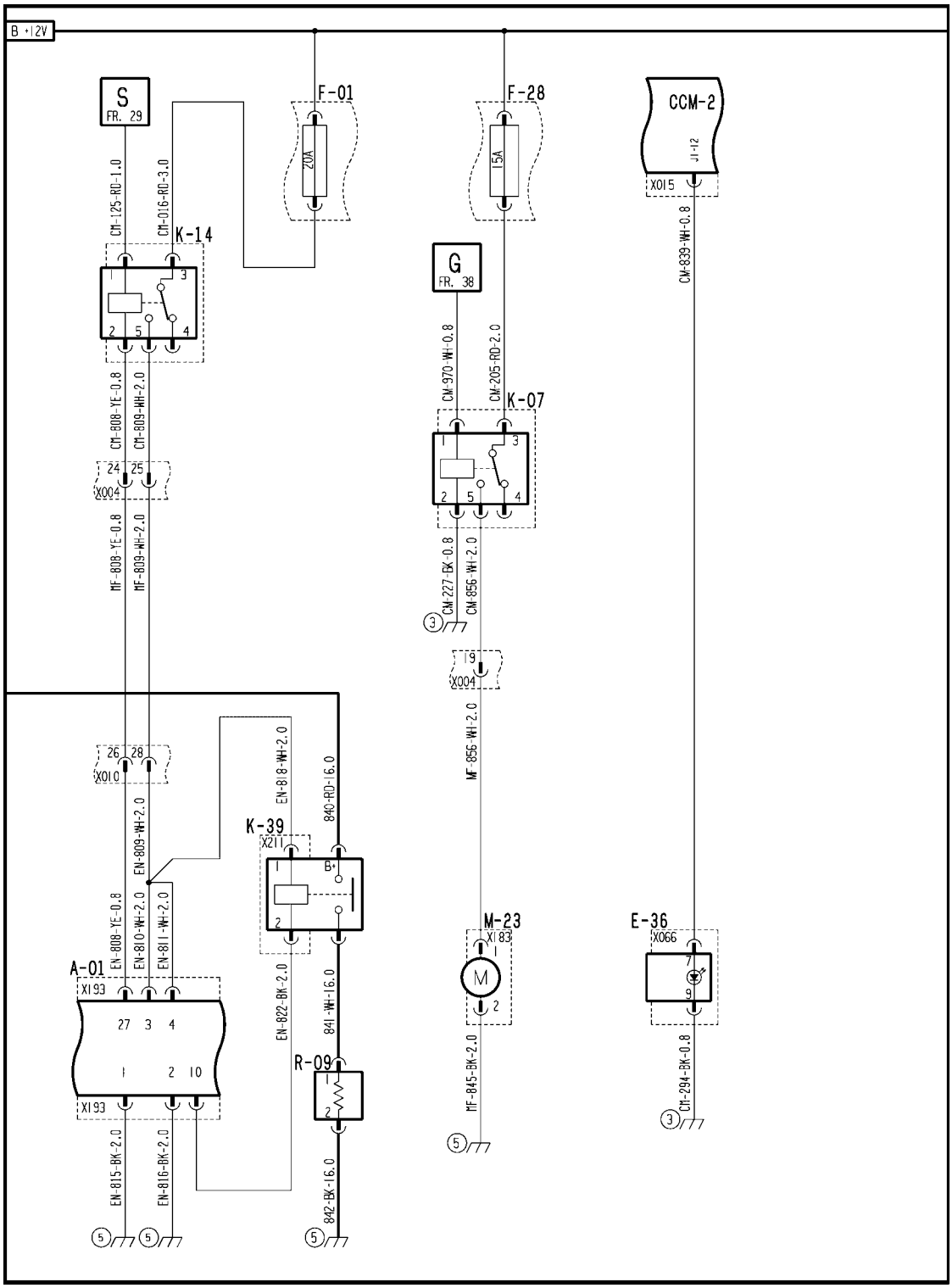
1. Faulty Main Relay (K14)
2. Low battery voltage

Solution:

1. Check fuses F-01 and F-38.
   A. Replace fuse if blown. Remove the fault code from the engine ECU memory using the electronic service tool and check the operation of the engine. If fuse blows again,inspect wiring harness for damage.
   B. If fuses are okay, continue with step **2**.
2. Check battery voltage.
   A. If voltage is less than 9.5 Volts, check the battery and charging system. Ensure the battery has the correct voltage and remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs continue with step **3**.
   B. If the voltage is greater than 9.5 Volts, continue with step **3**.
3. Check the Main Relay (K-14).
   A. Remove the relay and check its operation. If okay, continue with step **4**.
   B. Replace the relay if faulty. Remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs, continue with step **4**.
4. Check the wiring harness.
   A. Remove relay 14 and check for continuity of the wiring between the engine ECU connector **X193** and the relay 14 holder. Check between pin 2 of the holder and pin 27 of **X193** and between pin 5 of the holder and pins 3 and 4 of **X193**. If an open circuit is indicated at any stage repair or replace the wiring as required.
   B. If continuity is good remove the fault code from the ECU memory, using the electronic service tool and operate the engine. The fault may be intermittent, wiggle test the harness to attempt to induce the fault. If fault reoccurs, repeat step **4**.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53)

AFX8010

E0386-04 - EEPROM Defect

Cause:
An error in the Engine ECU EEPROM.

Possible failure modes:

Engine ECU malfunction.

1. Engine enabled - fuel restricted and speed restriction to **1500 RPM**.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (**20 amps**) and Fuse 38, Relay 14 and keystart switch fuse, (**7.5 amps**). Check for good connections onto engine ECU and at connector **X004** and **X010**. Check main engine ECU relay, K-14 for correct operation.

   A. If a fuse is blown or the relay is faulty, replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay and wiring are okay, continue with step **2**.

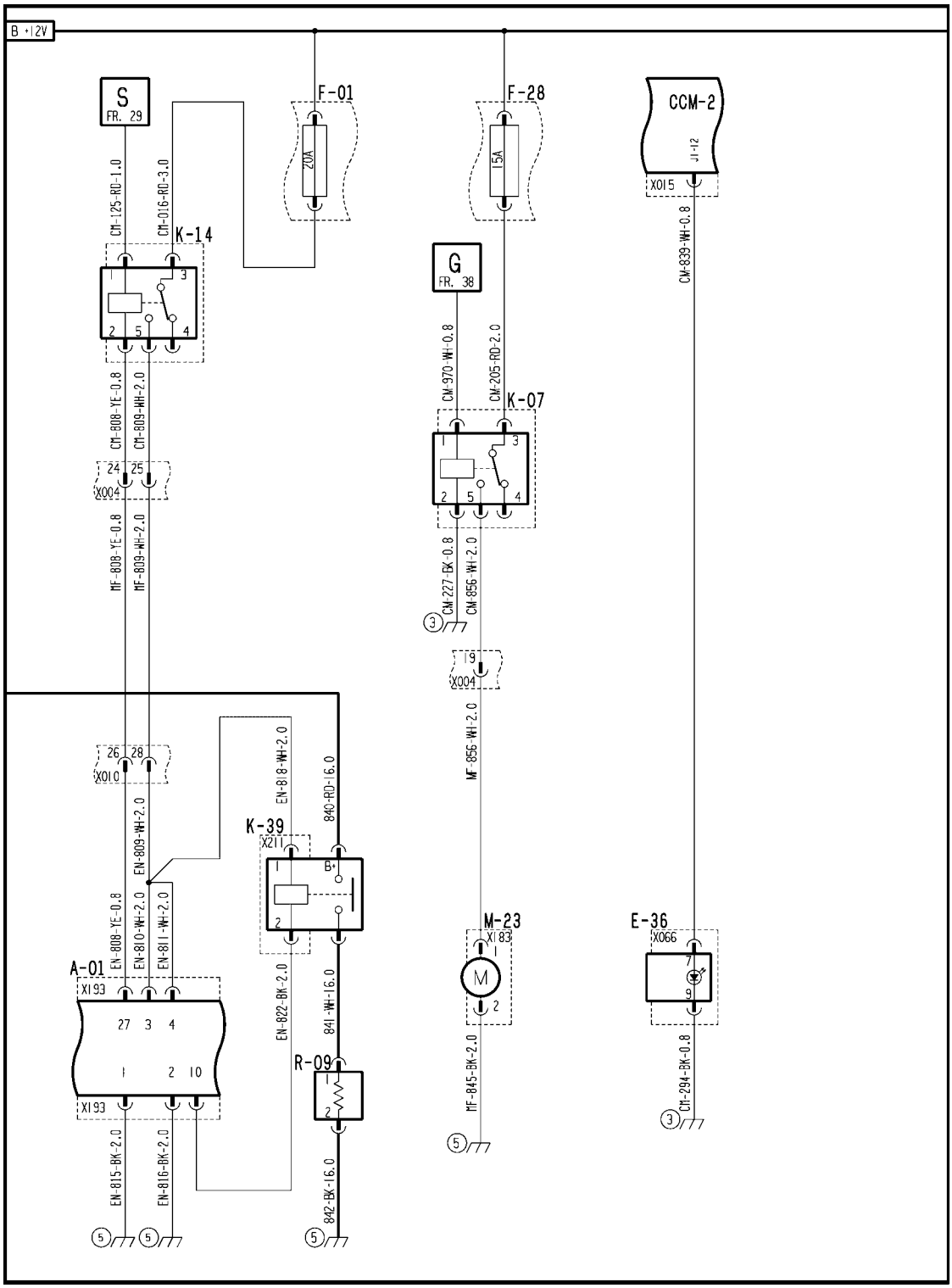
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

   A. If the software is accepted, check engine for correct operation.

   B. If the software is not accepted, replace the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Incorrect value (B.20.A.92 - G.30.C.10)

AFX8010

E0394-02 - Afterrun Not Completed

Cause:
Afterrun monitoring not completed

Possible failure modes:

Effect on Engine:
Engine enabled -- no restriction on fuel or speed

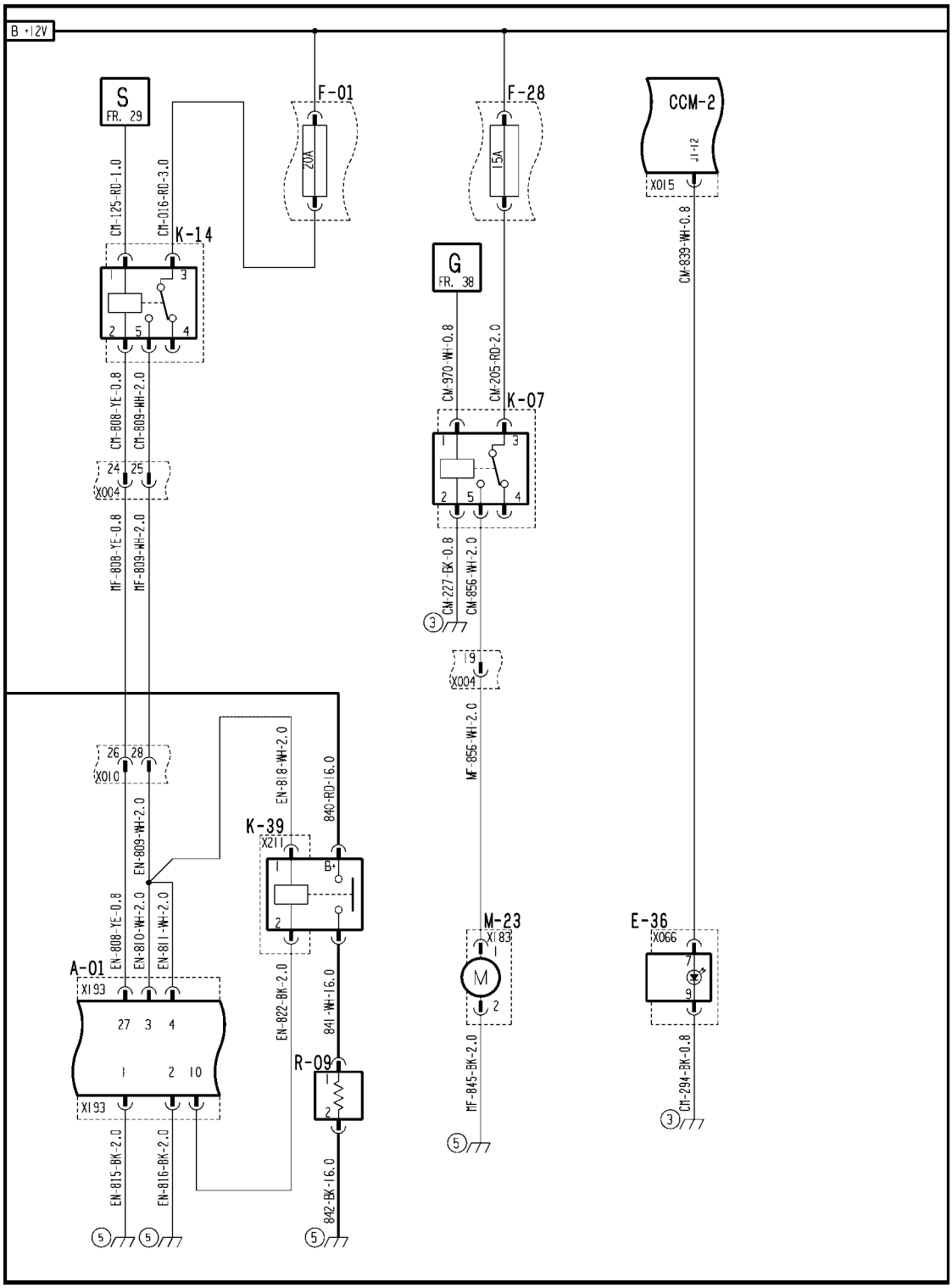
1. Faulty Main Relay (K14)
2. Low battery voltage

Solution:

1. Check fuses F-01 and F-38.
   A. Replace fuse if blown. Remove the fault code from the engine ECU memory using the electronic service tool and check the operation of the engine. If fuse blows again,inspect wiring harness for damage.
   B. If fuses are okay, continue with step **2**.
2. Check battery voltage.
   A. If voltage is less than 9.5 Volts, check the battery and charging system. Ensure the battery has the correct voltage and remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs continue with step **3**.
   B. If the voltage is greater than 9.5 Volts, continue with step **3**.
3. Check the Main Relay (K-14).
   A. Remove the relay and check its operation. If okay, continue with step **4**.
   B. Replace the relay if faulty. Remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs, continue with step **4**.
4. Check the wiring harness.
   A. Remove relay 14 and check for continuity of the wiring between the engine ECU connector **X193** and the relay 14 holder. Check between pin 2 of the holder and pin 27 of **X193** and between pin 5 of the holder and pins 3 and 4 of **X193**. If an open circuit is indicated at any stage repair or replace the wiring as required.
   B. If continuity is good remove the fault code from the ECU memory, using the electronic service tool and operate the engine. The fault may be intermittent, wiggle test the harness to attempt to induce the fault. If fault reoccurs repeat step 4. If fault does not occur continue with vehicle operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54)

AFX8010

E0386-03 - EEPROM Defect

Cause:
An error in the Engine ECU EEPROM.

Possible failure modes:

Engine ECU malfunction.

1. Engine enabled - fuel restricted and speed restriction to **1500 RPM**.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (**20 amps**) and Fuse 38, Relay 14 and keystart switch fuse, (**7.5 amps**). Check for good connections onto engine ECU and at connector **X004** and **X010**. Check main engine ECU relay, K-14 for correct operation.

   A. If a fuse is blown or the relay is faulty, replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay and wiring are okay, continue with step **2**.

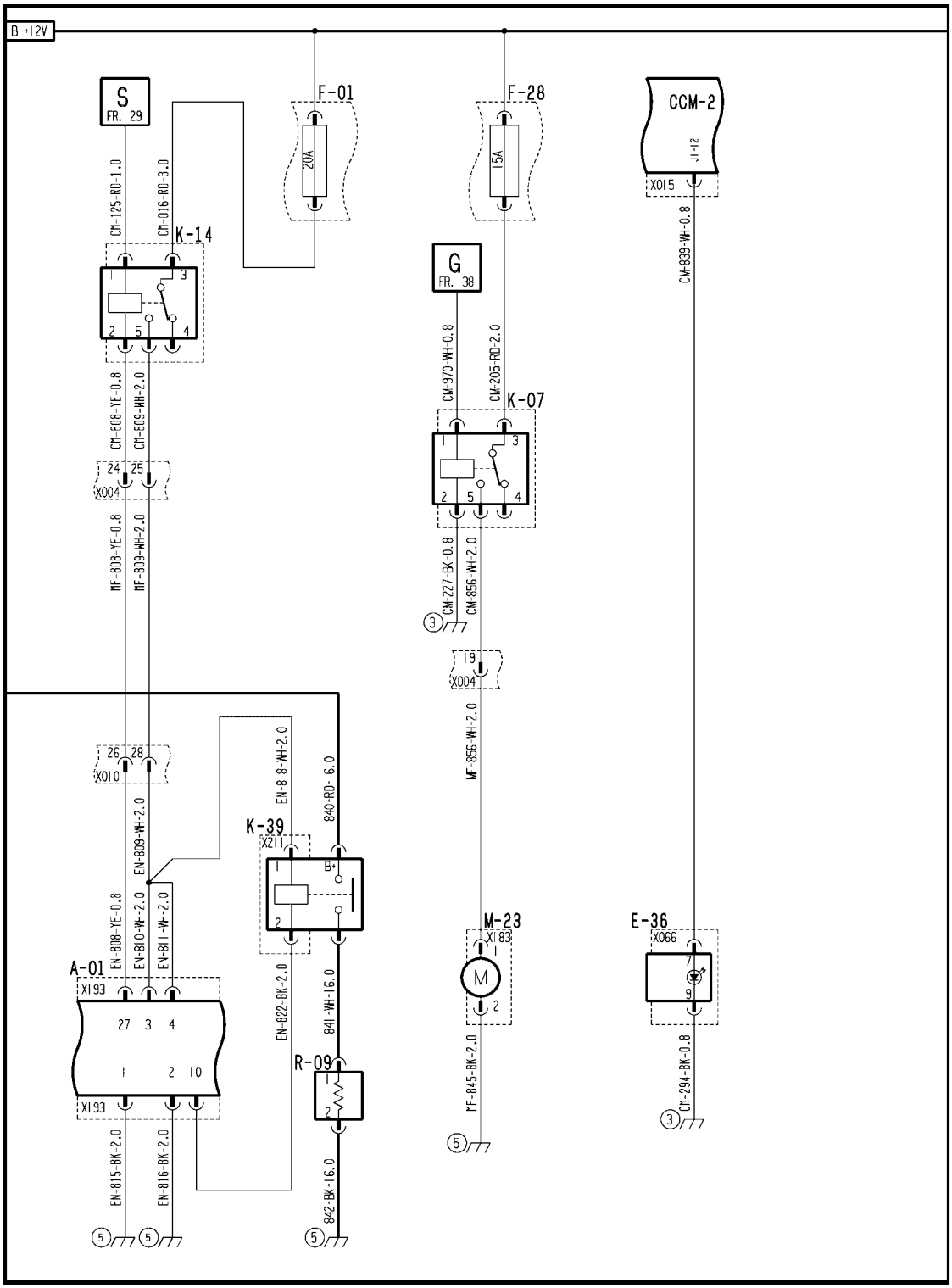
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

   A. If the software is accepted, check engine for correct operation.

   B. If the software is not accepted, replace the engine ECU.

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53)

AFX8010

E0394-04 - Afterrun Not Completed

Cause:
Afterrun monitoring not completed

Possible failure modes:

Effect on Engine:
Engine enabled -- no restriction on fuel or speed

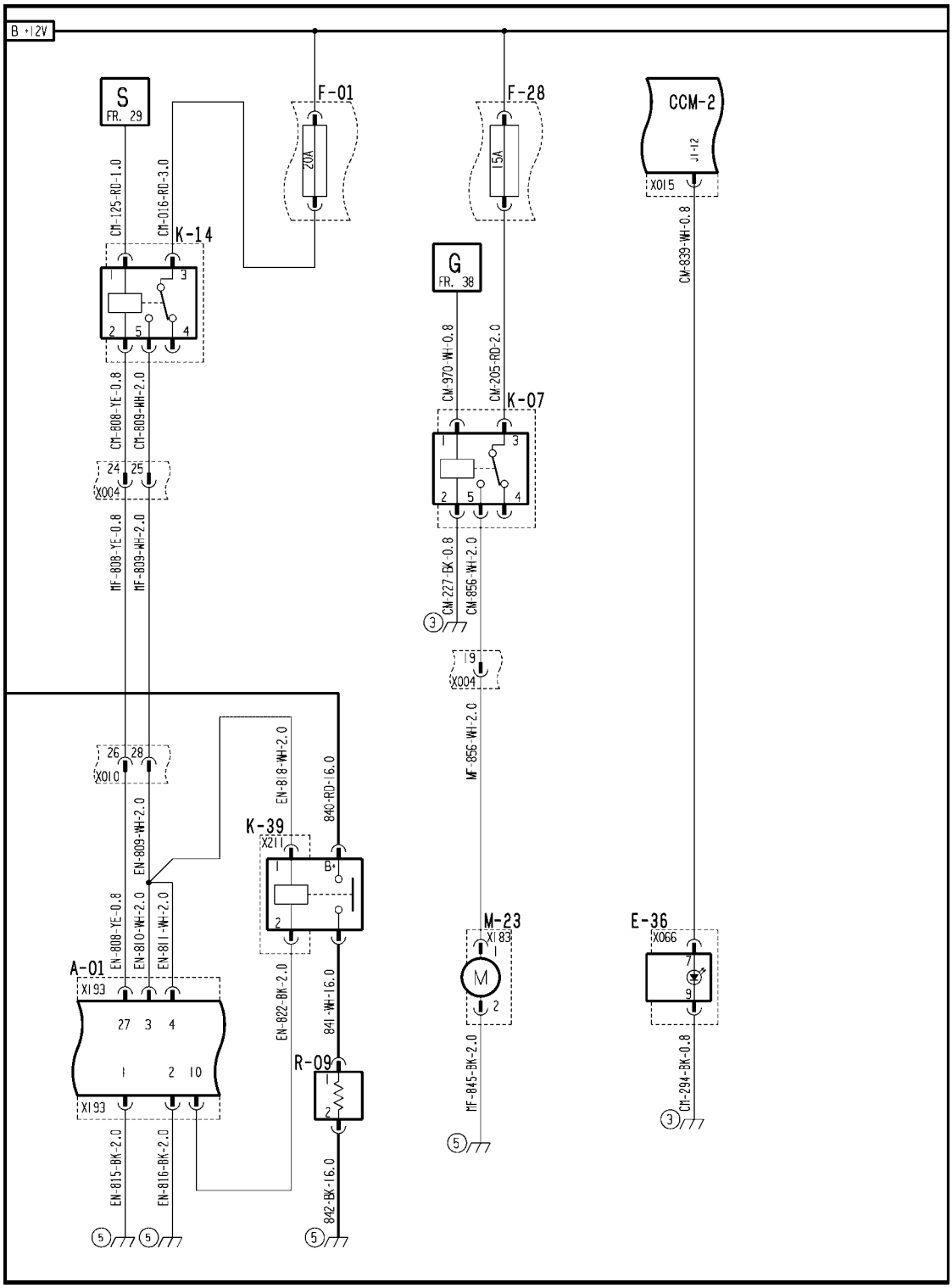
1. Faulty Main Relay (K14)
2. Low battery voltage

Solution:

1. Check fuses F-01 and F-38.
   A. Replace fuse if blown. Remove the fault code from the engine ECU memory using the electronic service tool and check the operation of the engine. If fuse blows again,inspect wiring harness for damage.
   B. If fuses are okay, continue with step **2**.
2. Check battery voltage.
   A. If voltage is less than 9.5 Volts, check the battery and charging system. Ensure the battery has the correct voltage and remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs continue with step **3**.
   B. If the voltage is greater than 9.5 Volts, continue with step **3**.
3. Check the Main Relay (K-14).
   A. Remove the relay and check its operation. If okay, continue with step **4**.
   B. Replace the relay if faulty. Remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs, continue with step **4**.
4. Check the wiring harness.
   A. Remove relay 14 and check for continuity of the wiring between the engine ECU connector **X193** and the relay 14 holder. Check between pin 2 of the holder and pin 27 of **X193** and between pin 5 of the holder and pins 3 and 4 of **X193**. If an open circuit is indicated at any stage repair or replace the wiring as required.
   B. If continuity is good remove the fault code from the ECU memory, using the electronic service tool and operate the engine. The fault may be intermittent, wiggle test the harness to attempt to induce the fault. If fault reoccurs, repeat **4**.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Incorrect value (B.20.A.92 - G.30.C.10)

AFX8010

E0403-02 - Ambient Pressure Sensor

Cause:
No signal or signal range outside threshold limits.
Signal not plausible

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

1. Failure within ECU

Solution:

1. A sensor within the ECU is used to detect ambient air pressure. This sensor can not be tested.
   A. Replace engine ECU.

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Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54)

AFX8010

E0397-03 - Shut-Off Tests

Cause:
Shut-off test failure within the engine ECU

Possible failure modes:

Effect on Engine - Engine enabled - fuel restricted and speed restricted to 1500 rev/min.

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors **X004** and **X010**.

   A. If a fuse is blown or the relay is faulty replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay and wiring are okay, continue with step **2**.

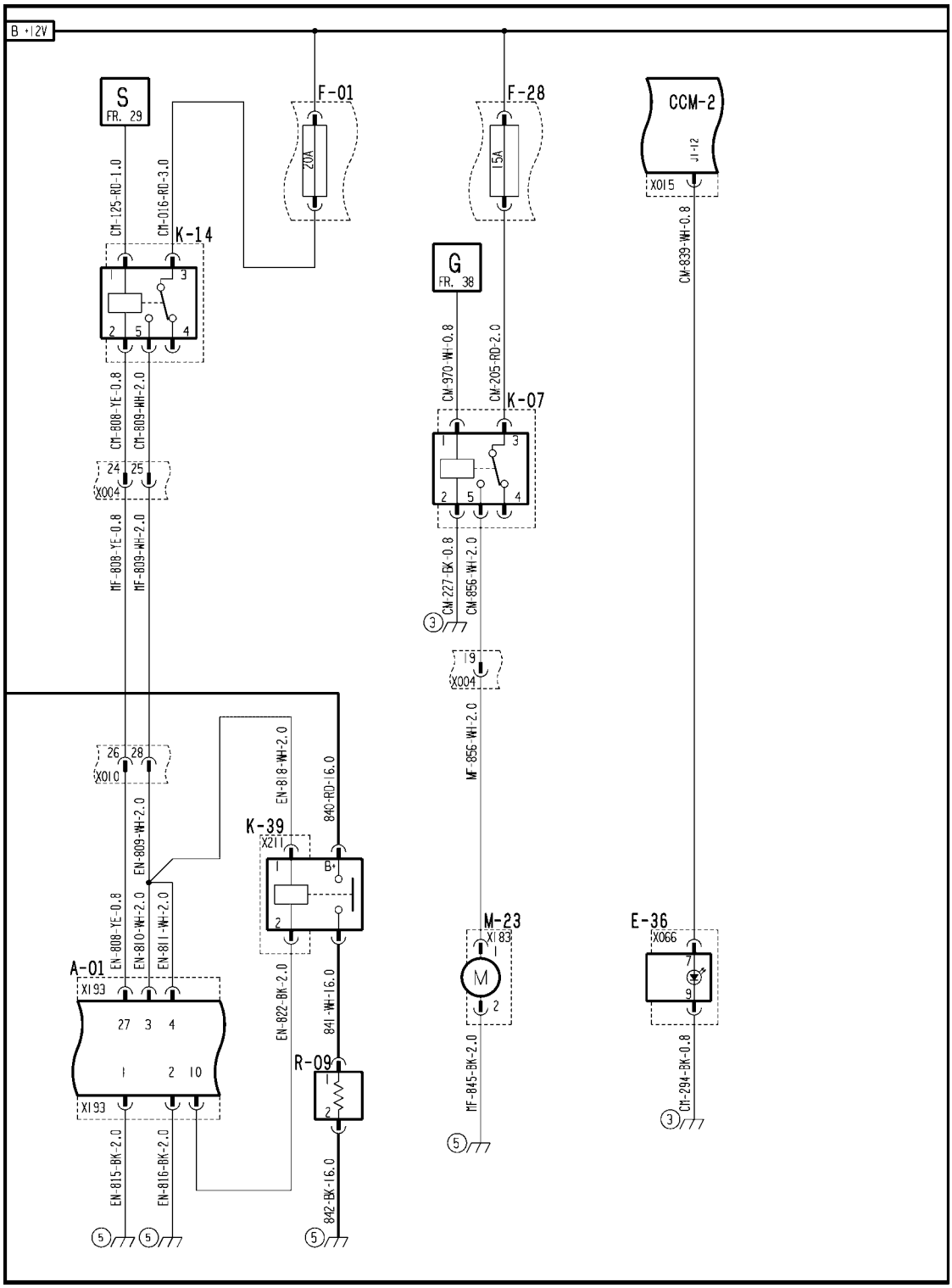
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

   A. If the software is accepted check engine for correct operation.

   B. If the software is not accepted, substitute the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53)

AFX8010

E0397-04 - Shut-Off Tests

Cause:
Shut-off test failure within the engine ECU

Possible failure modes:

Effect on Engine - Engine enabled - fuel restricted and speed restricted to 1500 rev/min.

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors **X004** and **X010**.

   A. If a fuse is blown or the relay is faulty replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay and wiring are okay, continue with step **2**.

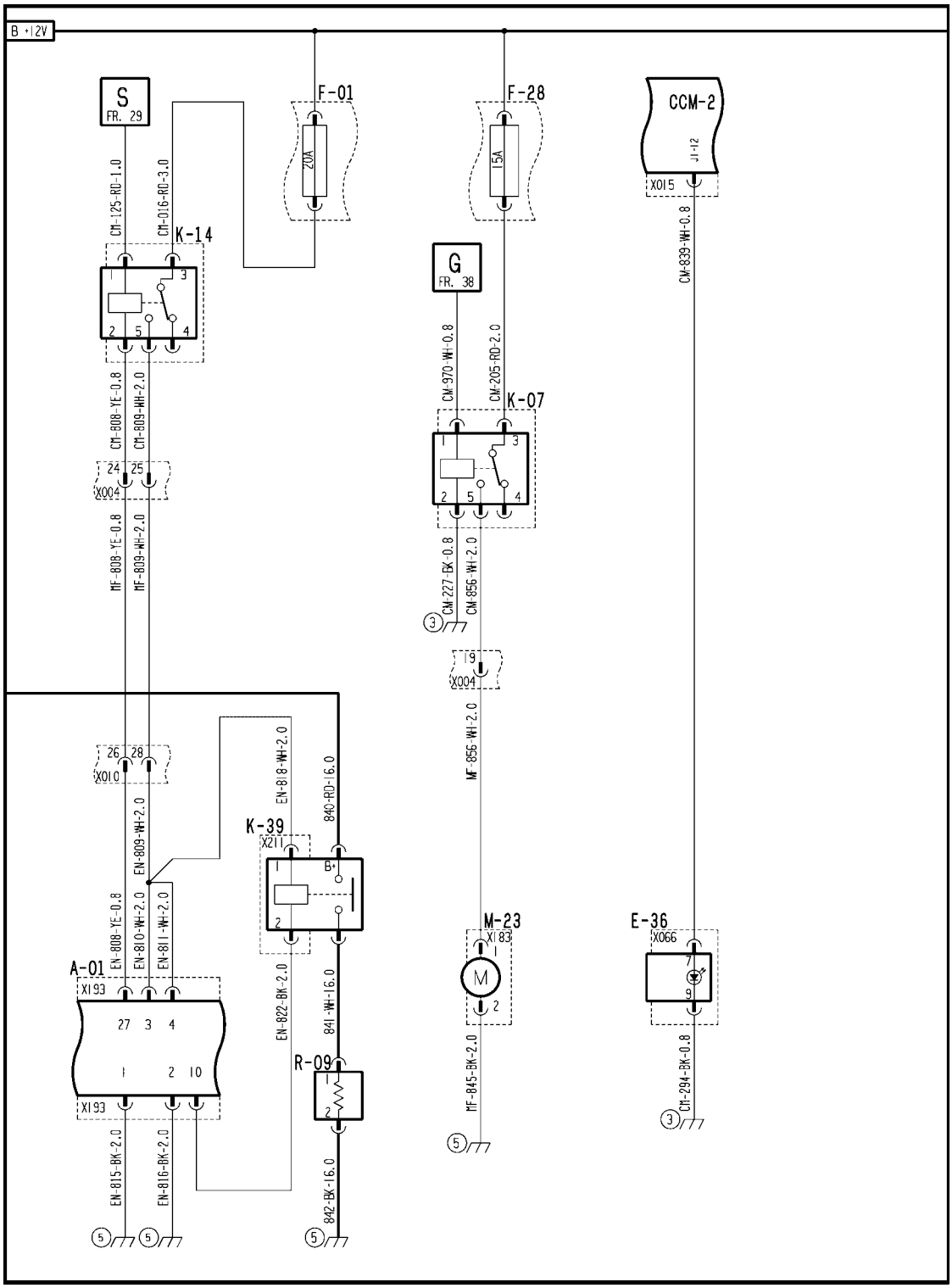
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

   A. If the software is accepted check engine for correct operation.

   B. If the software is not accepted, substitute the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

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Injection control - Incorrect value (B.20.A.92 - G.30.C.10)

AFX8010

E0397-02 - Shut-Off Tests

Cause:
Shut-off test failure within the engine ECU

Possible failure modes:

Effect on Engine - Engine enabled - fuel restricted and speed restricted to 1500 rev/min.

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors **X004** and **X010**.

   A. If a fuse is blown or the relay is faulty replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

   B. If the fuses, relay and wiring are okay, continue with step **2**.

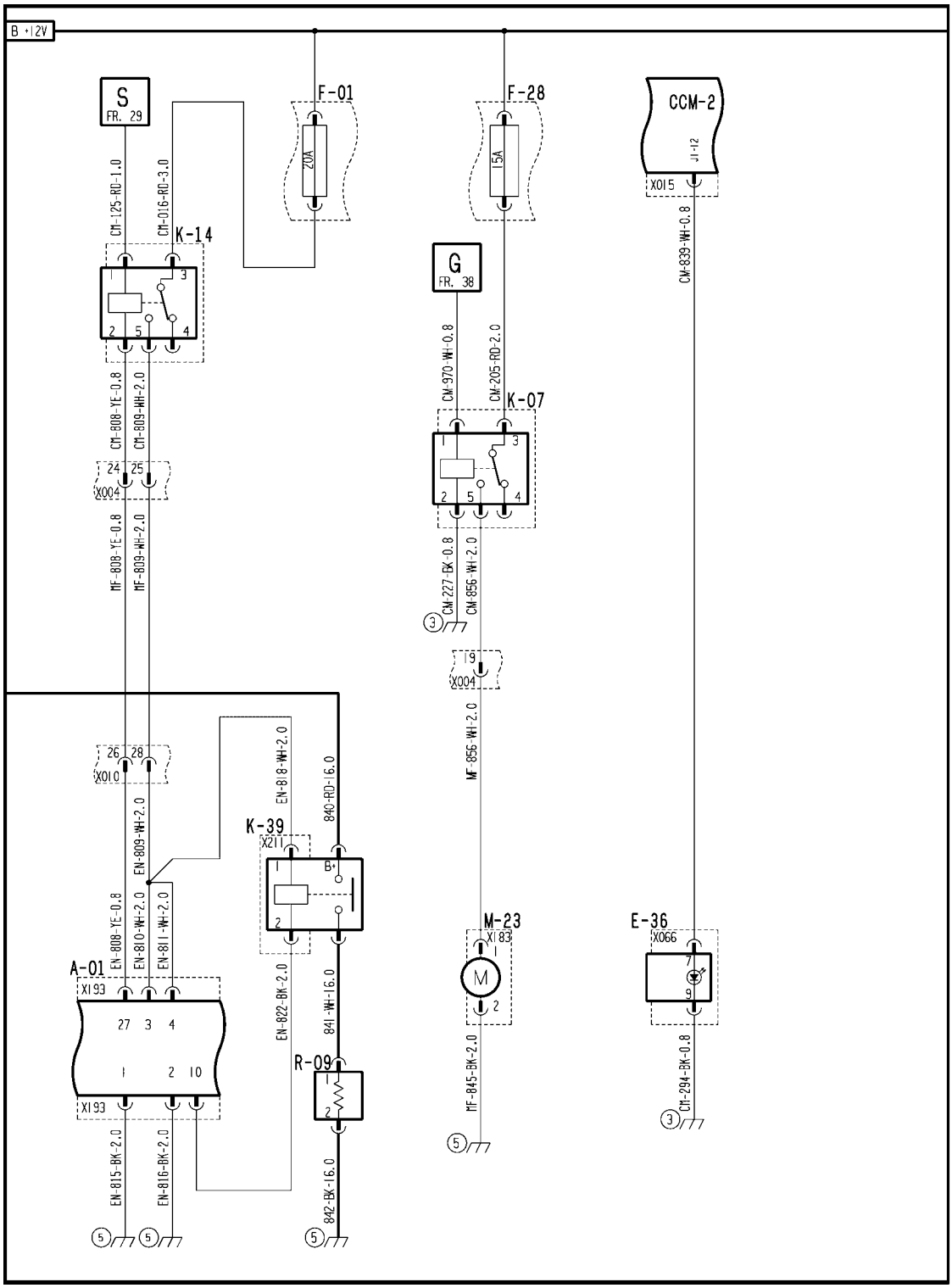
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

   A. If the software is accepted check engine for correct operation.

   B. If the software is not accepted, substitute the engine ECU.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

https://truckmanualshub.com/

Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54)

AFX8010

E0403-03 - Ambient Pressure Sensor

Cause:
No signal or signal range outside threshold limits.
Signal not plausible

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

1. Failure within ECU

Solution:

1. A sensor within the ECU is used to detect ambient air pressure. This sensor can not be tested.
   A. Replace engine ECU.

https://truckmanualshub.com/

Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53)

AFX8010

E0403-04 - Ambient Pressure Sensor

Cause:
No signal or signal range outside threshold limits.
Signal not plausible

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

1. Failure within ECU

Solution:

1. A sensor within the ECU is used to detect ambient air pressure. This sensor can not be tested.
   A. Replace engine ECU.

https://truckmanualshub.com/

Sensing system Level sensor - Short circuit to B+ (B.20.A.95.90 - G.30.B.54)

AFX8010

E0154-03 - Fuel Level Sensor

Cause:
The fuel level sensor (R-01) circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "FUEL LEVEL SEN" to check the voltage range.

   The proper voltage range is - **0.5 - 4.9 volts**.

   A. If the voltage reading is high out of range, (> **5.2 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the fuel level sensor connector **X184**.

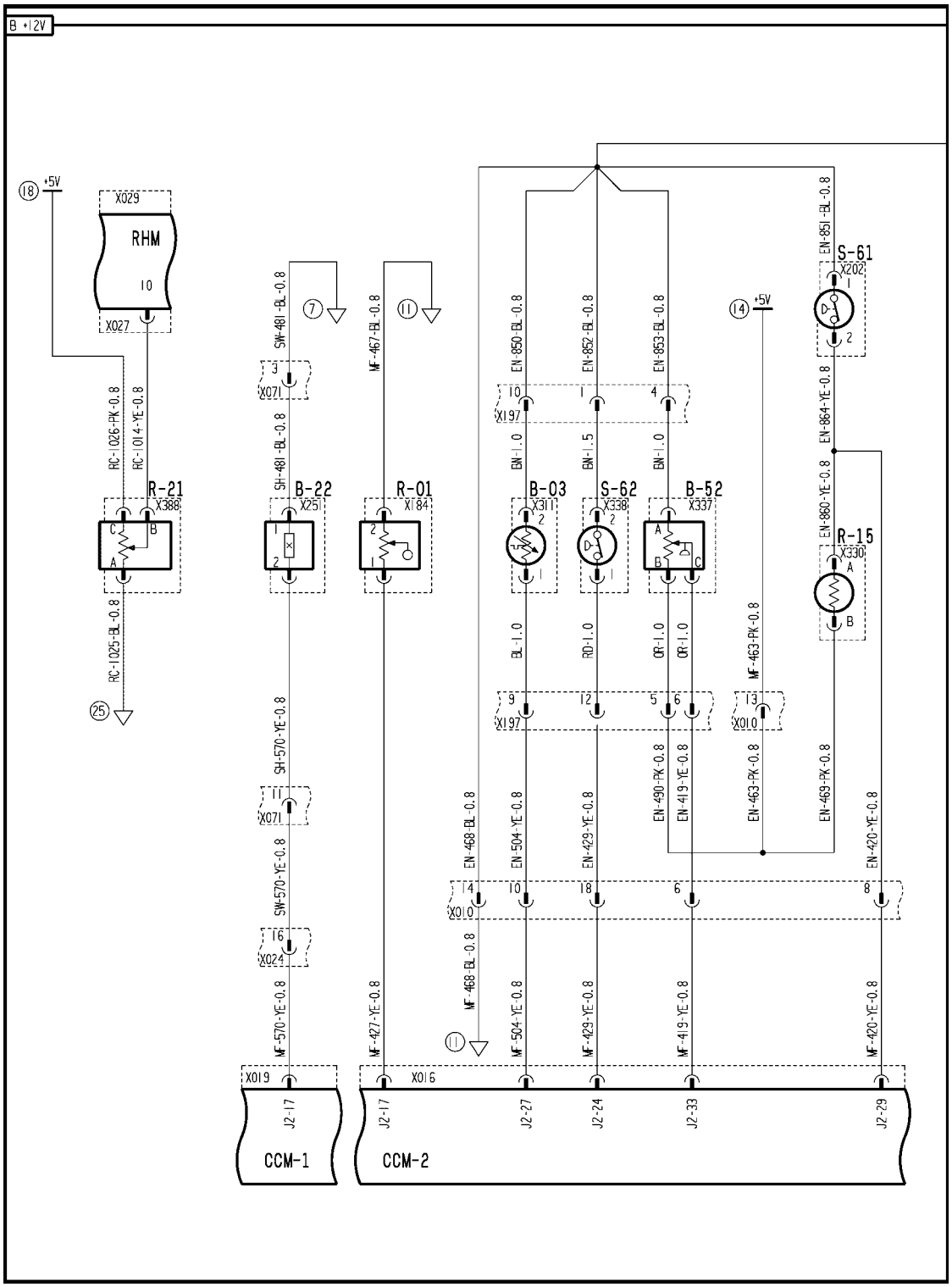
   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains high, there is a short circuit in the main frame (MF) harness between connector **X184** pin 1 and connector **X016** pin J2-17 wire 427 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

https://truckmanualshub.com/

Sensing system Level sensor - Short circuit to ground (B.20.A.95.90 - G.30.B.53)

AFX8010

E0154-04 - Fuel Level Sensor

Cause:
The fuel level sensor (R-01) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "FUEL LEVEL SEN" to check the voltage range.

   The proper voltage range is **0.5 - 4.9 volts**.

   A. If the voltage reading is low out of range (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the fuel level sensor connector **X184**.

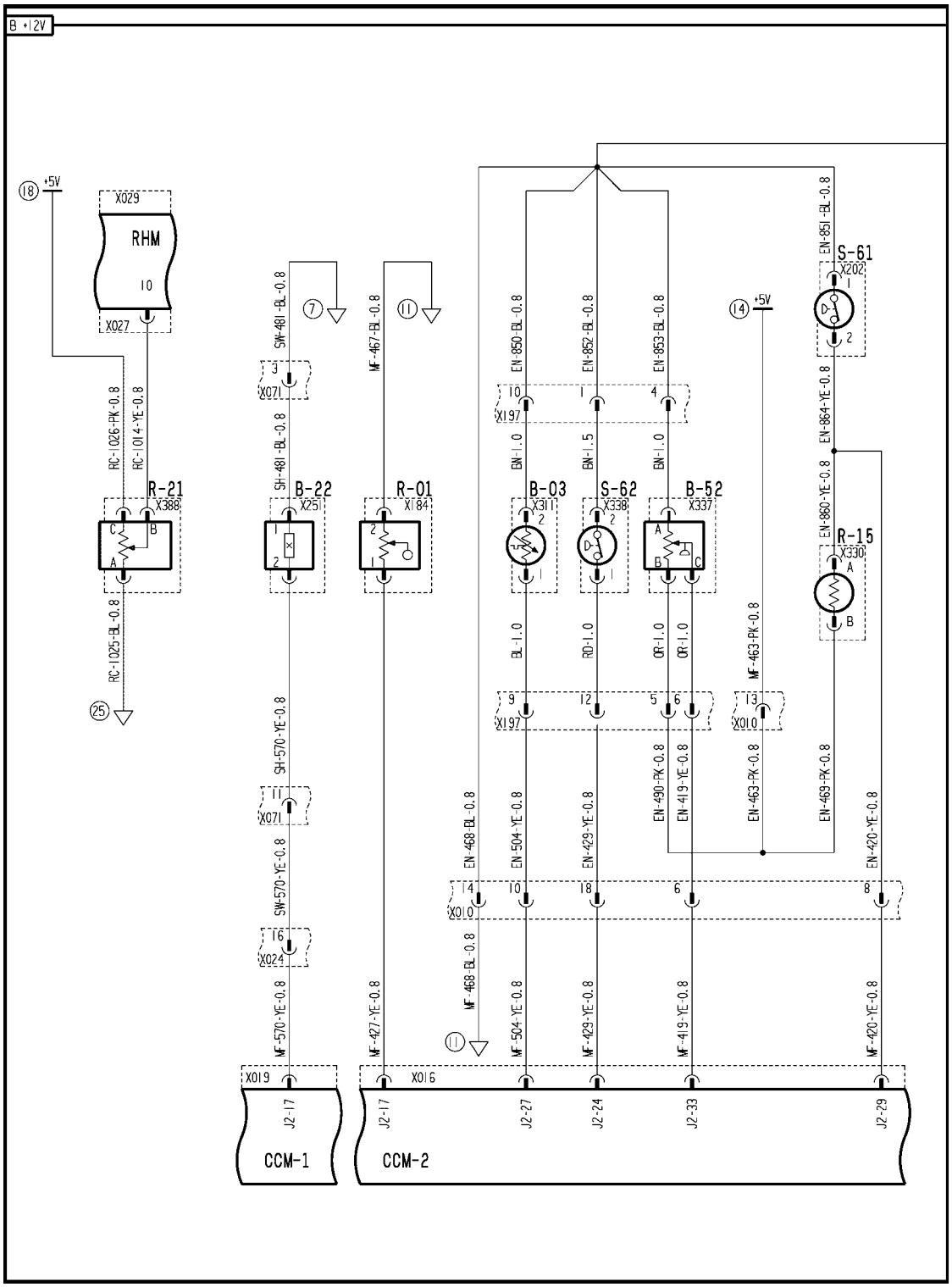
   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low, there is a short to ground in the main frame (MF) harness between connector **X184** pin 1 and connector **X016** pin J2-17 wire 427 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

https://truckmanualshub.com/

Sensing system Level sensor - Open circuit (B.20.A.95.90 - G.30.B.50)

AFX8010

E0154-05 - Fuel Level Sensor

Cause:
The fuel level sensor (R-01) circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "FUEL LEVEL SEN" to check the voltage range.

   The proper voltage range is **0.5 - 4.9 volts**.

   A. If the voltage reading is high out of range (**4.9 - 5.2 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the fuel level sensor connector **X184**. Use a jumper wire to short connector **X184** pin 1 to chassis ground.

   A. If voltage drops to less than **0.5 volts**, the open circuit is not in the supply side of the circuit. Continue with Step **3**.

   B. If the voltage remains high, there is an open circuit in the main frame (MF) harness between connector **X184** pin 1 and connector **X016** pin J2-17 wire 427 yellow. Locate the open and repair.
3. Disconnect the fuel level sensor connector **X184**. Use a multimeter to check for continuity between the harness end of Connector **X184** pin 2 and chassis ground.

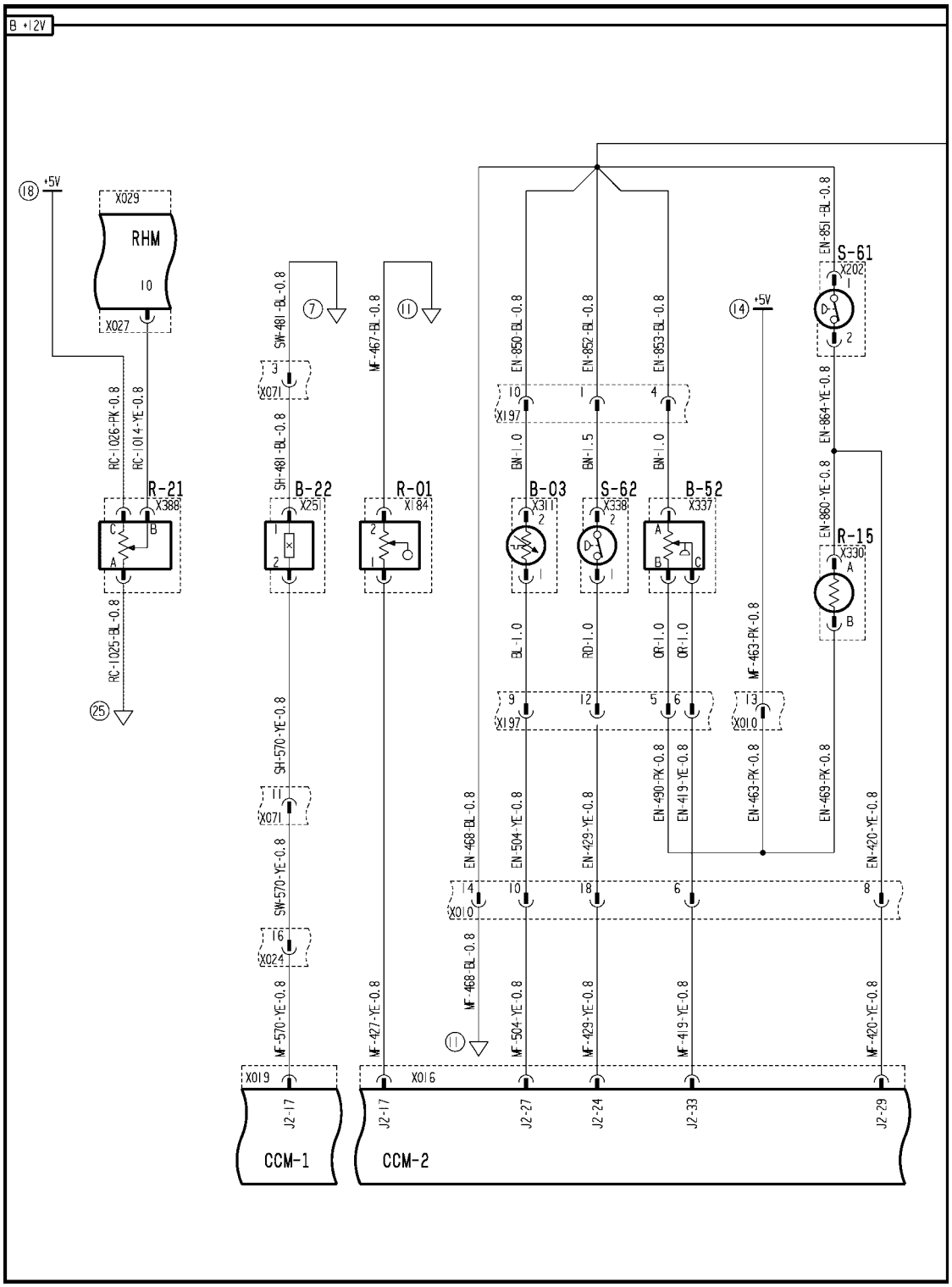
   A. If there is continuity, the sensor has failed. Replace the sensor.

   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X184** pin 2 and connector **X016** pin J2-14 wire 467 blue, 425 blue or 465 blue. Locate the open and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



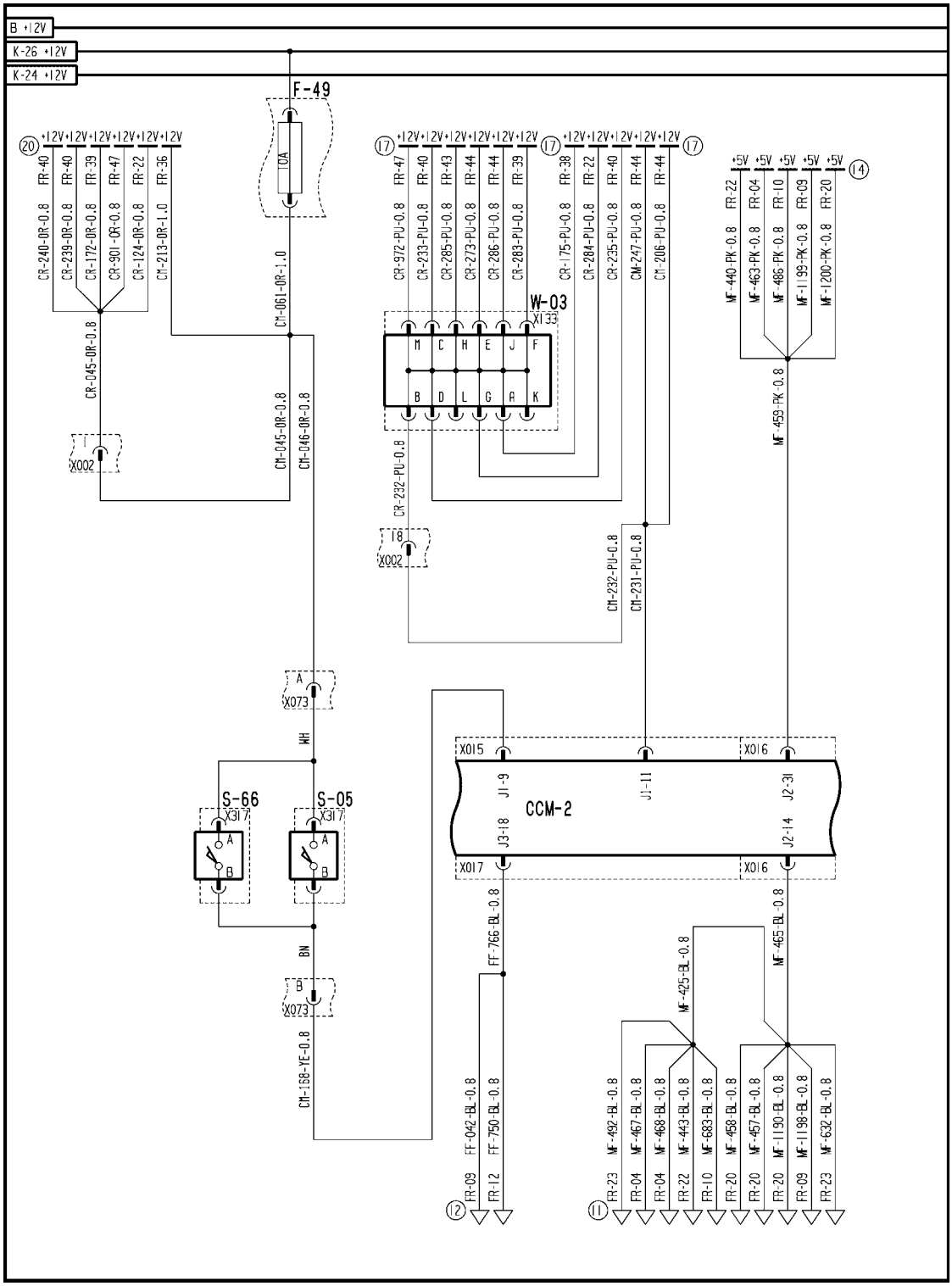
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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POWER PRODUCTION - B

Engine Fault Codes – 20.A

CONTENT

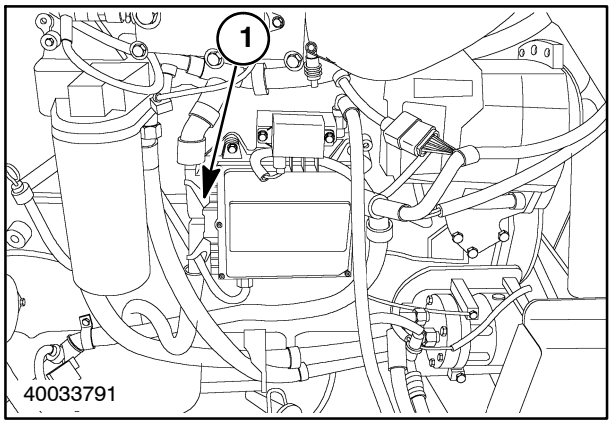
Section	Description	Page
	Introduction	90
	Fault Code List	91
	Fault Code Charts – (IVECO F3A engines)	92

INTRODUCTION

The engine installed into the AFX Combine has an electronically controlled fuel injection system.

The engine uses injector pumps, one per cylinder, with an electronically controlled solenoid determining the fuel quantity.

The fuel injector solenoids of the Iveco engines are controlled by an engine electronic control unit (ECU), 1, which is linked to the vehicle ECU via the CAN BUS system.



1

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IVECO F3A Engine

Universal Display Plus Fault Code	Error Text String	Effect on Engine	Page No.
385	ECU defect	Engine disabled	92
386	EEPROM defect	Fuel restricted and speed restricted to 1500 rev/min.	94
393	Main relay defect	No restriction on fuel or speed	96
394	Afterrun Not Completed	No restriction on fuel or speed	98
397	Shut-off-tests	Fuel restricted and speed restricted to 1500 rev/min.	99
399	Coolant Temperature sens	No restriction on fuel or speed	101
400	Boost Air Temperature	No restriction on fuel or speed	103
401	Fuel Temperature sensor	No restriction on fuel or speed	108
402	Boost Pressure sensor	No restriction on fuel or speed	106
403	Ambient Pressure sensor	No restriction on fuel or speed	110
408	Engine Overspeed	No restriction on fuel or speed	111
412	INK signal	Fuel restricted and speed restricted to 1500 rev/min.	113
413	SEG signal	Engine may stop or not start and remains disabled	115
414	Cylinder 1	Engine speed restricted and only operating on 5 cylinders	117
415	Cylinder 4	Engine speed restricted and only operating on 5 cylinders	119
416	Cylinder 2	Engine speed restricted and only operating on 5 cylinders	121
417	Cylinder 6	Engine speed restricted and only operating on 5 cylinders	123
418	Cylinder 3	Engine speed restricted and only operating on 5 cylinders	125
419	Cylinder 5	Engine speed restricted and only operating on 5 cylinders	127
420	Battery Voltage	No restriction on fuel or speed	129

NOTE: *Some fault codes have been repeated from earlier in this manual, in order to provide all faults in one location.*

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UNIVERSAL DISPLAY PLUS FAULT CODE

0385.2 ECU DEFECT, DATA INCORRECT
0385.3 ECU DEFECT, SHORTED TO HIGH SOURCE
0385.4 ECU DEFECT, SHORTED TO LOW SOURCE

Cause:

An error in the monitoring module.

Effect on Engine:

Engine disabled – fuel pump shut off.

Possible failure modes:

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors X004 and X010. Check main Engine ECU relay, K14, for correct operation.

   A. If a fuse is blown or the relay is faulty replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

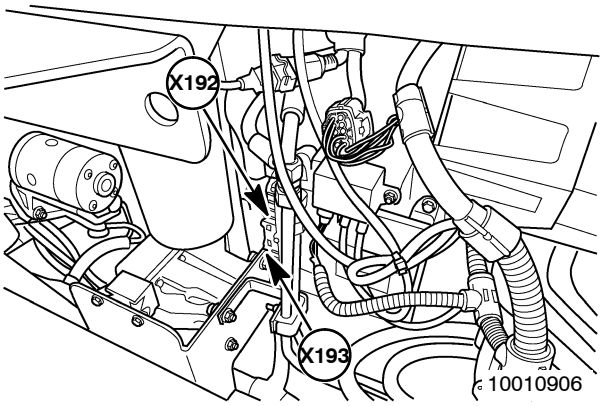
   B. If the fuses, relay and wiring are okay continue with step 2.
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

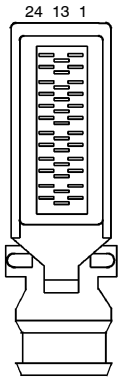
   A. If the software is accepted check engine for correct operation.

   B. If the software is not accepted continue with step 3.
3. Substitute the engine ECU.

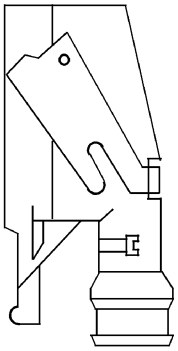
Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)

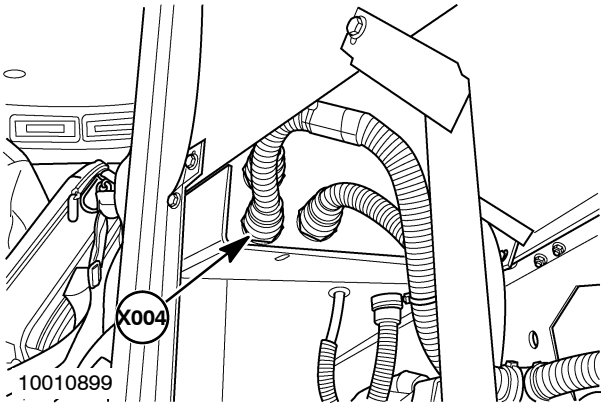
https://truckmanualshub.com/



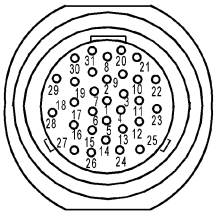


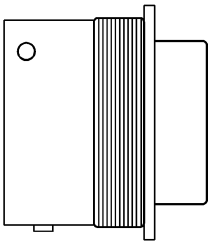
X192
&
X193



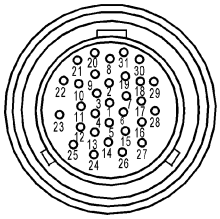


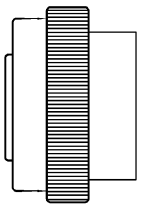
X004
MAIN FRAME

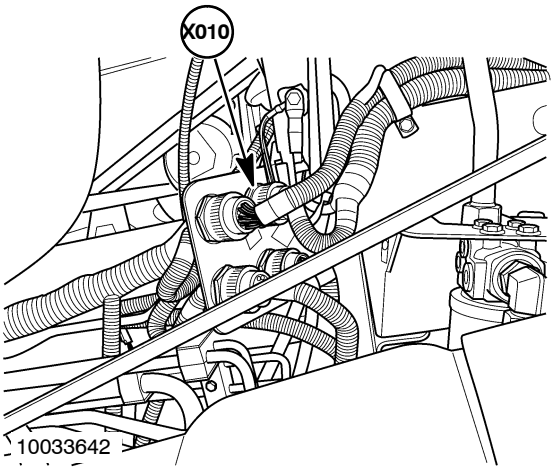




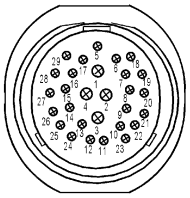
X004
CAB MAIN

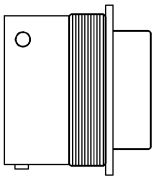




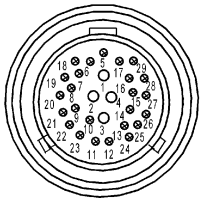


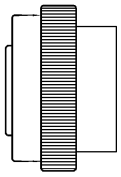
X010
MAIN FRAME





X010
ENGINE





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UNIVERSAL DISPLAY PLUS FAULT CODE

0386.2 EEPROM DEFECT, DATA INCORRECT
0386.3 EEPROM DEFECT, SHORTED TO HIGH SOURCE
0386.4 EEPROM DEFECT, SHORTED TO LOW SOURCE

Cause:

An error in the Engine ECU EEPROM.

Effect on Engine:

Engine enabled – fuel restricted and speed restricted to 1500 rev/min.

Possible failure modes:

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors X004 and X010. Check main Engine ECU relay, K14, for correct operation.

   C. If a fuse is blown or the relay is faulty replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

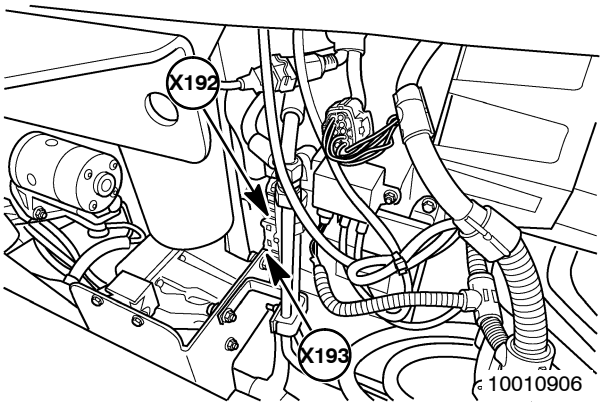
   B. If the fuses, relay and wiring are okay continue with step 2.
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

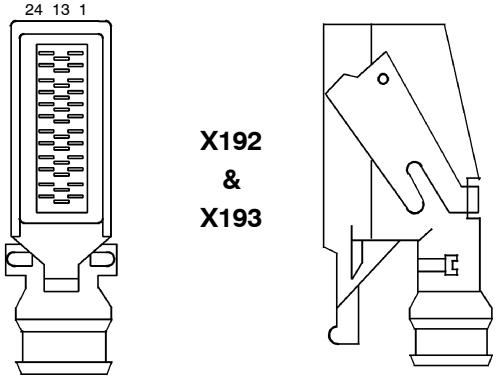
   A. If the software is accepted check engine for correct operation.

   B. If the software is not accepted continue with step 3.
3. Substitute the engine ECU.

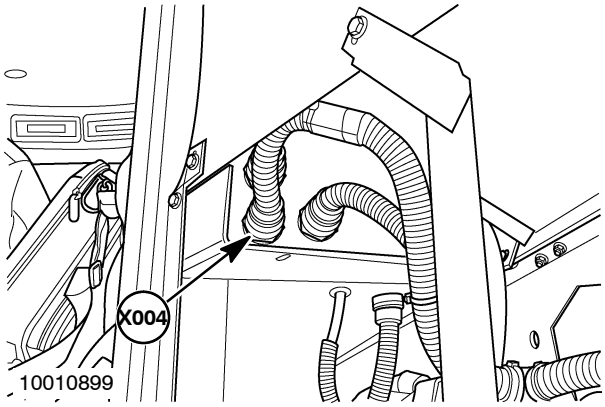
Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)

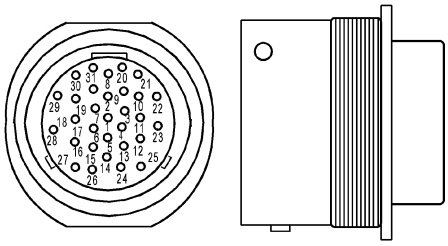
https://truckmanualshub.com/



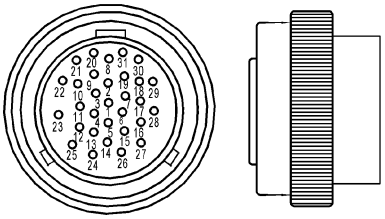


X192
&
X193

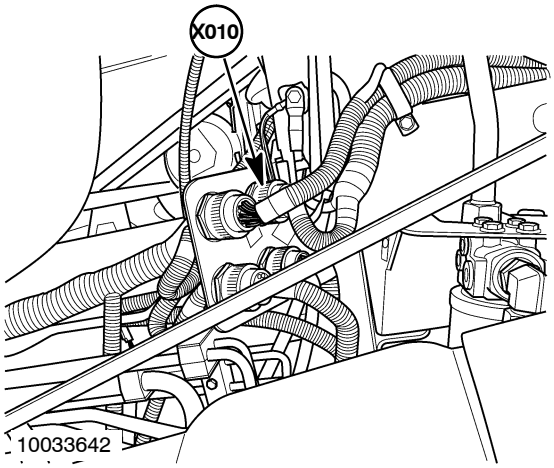


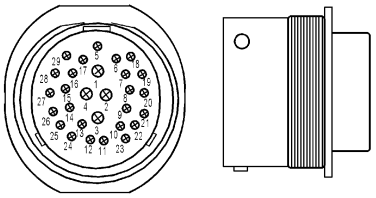


X004
MAIN FRAME

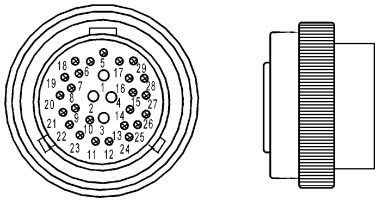


X004
CAB MAIN





X010
MAIN FRAME



X010
ENGINE

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UNIVERSAL DISPLAY PLUS FAULT CODE

0393.2 MAIN RELAY DEFECT, DATA INCORRECT
0393.3 MAIN RELAY DEFECT, SHORTED TO HIGH SOURCE
0393.4 MAIN RELAY DEFECT, SHORTED TO LOW SOURCE

Cause:

Defective main relay (K14) – not switching off

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Faulty relay
2. Fault in wiring harness

Solution:

1. Replace relay 14.

   A. Remove the fault code from the engine ECU using the electronic service tool. Check the operation of the engine. If the fault reoccurs continue with step 2.

2. Check wiring between relay 14 and engine ECU. (Short to low source)

   A. ENSURE THE KEYSTART SWITCH IS OFF. Remove relay 14 and disconnect the connectors from the engine ECU (A–01). Using a suitable multi-meter check for a short to ground at pin 27 of X193 . If no short to ground is indicated continue with step 3.

   B. If a short to ground is indicated, disconnect connector X010, if a short to ground is still indicated trace and repair the wiring between the engine ECU (A–01) and connector X010.

   C. Continue to trace the short to ground at the female side of connector X010. Disconnect connector X004 and check for a short to ground at X010 pin 26. If a short is indicated repair the wiring between connectors X010 and X004. If no short is indicated here then the short to ground must be between the male side of connector X004 and holder of relay 14.

3. Check wiring between relay 14 and engine ECU. (Short to high source)

   A. Remove relay 14 and disconnect the connectors from the engine ECU (A–01). Using a suitable multi-meter check for a short to +12V at pins 3 and 4 of X192 . If no short to +12V is indicated continue with step 4.

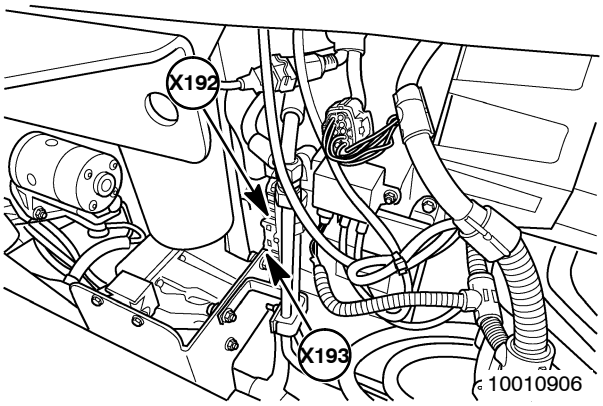
   B. If a short to +12V is indicated, disconnect connector X010, if a short to +12V is still indicated trace and repair the wiring between the engine ECU (A–01) and connector X010.

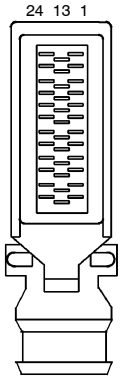
   C. Continue to trace the short to +12V at the female side of connector X010. Disconnect connector X004 and check for a short to +12V at X010 pin 28. If a short is indicated repair the wiring between connectors X010 and X004. If no short is indicated here then the short to +12V must be between the male side of connector X004 and holder of relay 14.

4. Check for good connections onto engine ECU and at connectors X004 and X010. Check main Engine ECU relay, K14, for correct operation. Remove the fault code from the ECU memory using the electronic service tool. Operate the engine, the fault may be intermittent, wiggle test the harness and operate other functions to attempt to induce fault. If fault reoccurs return to step 2. If fault does not occur continue with vehicle operation.

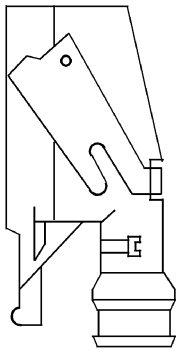
Wiring harness – Electrical schematic frame 02 (A.30.A.88 – C.20.E.02)

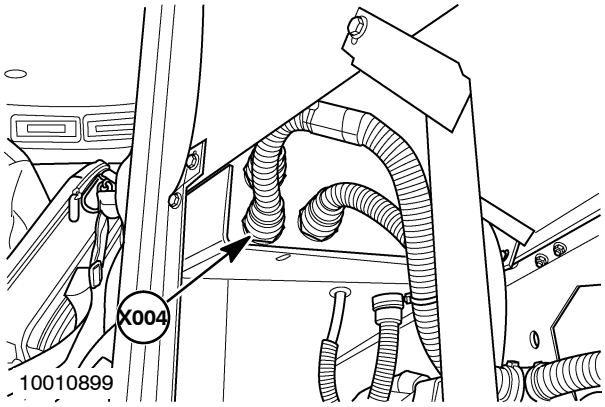
https://truckmanualshub.com/



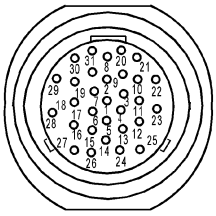


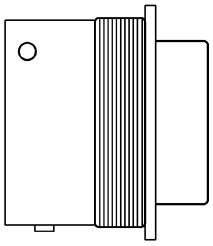
X192
&
X193



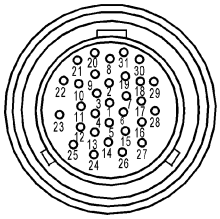


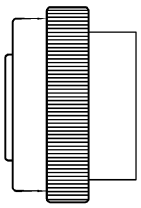
X004
MAIN FRAME

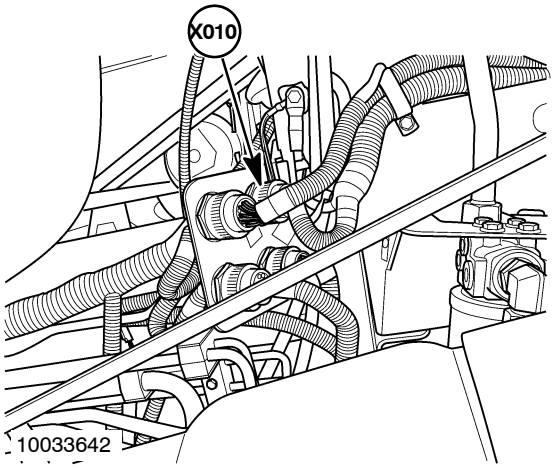




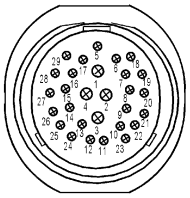
X004
CAB MAIN

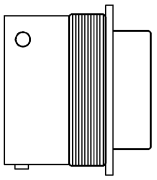




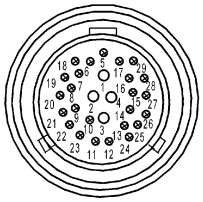


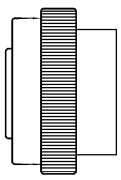
X010
MAIN FRAME





X010
ENGINE





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UNIVERSAL DISPLAY PLUS FAULT CODE

0394.2 AFTERRUN NOT COMPLETED, DATA INCORRECT
0394.3 AFTERRUN NOT COMPLETED, SHORTED TO HIGH SOURCE
0394.4 AFTERRUN NOT COMPLETED, SHORTED TO LOW SOURCE

Cause:
Afterrun monitoring not completed

Effect on Engine:
Engine enabled – no restriction on fuel or speed

Possible failure modes:
1. Faulty Main Relay (K14)
2. Low battery voltage

Solution:
1. Check fuses 1 and 38.

   A. Replace fuse if blown. Remove the fault code from the engine ECU memory using the electronic service tool and check the operation of the engine. If fuse blows again inspect wiring harness for damage.

   B. If fuses are okay continue with step 2.
2. Check battery voltage.

   A. If voltage is less than 9.5 Volts, check the battery and charging system. Ensure the battery has the correct voltage and remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs continue with step 3.

   B. If the voltage is greater than 9.5 Volts continue with step 3.
3. Check the Main Relay (K14).

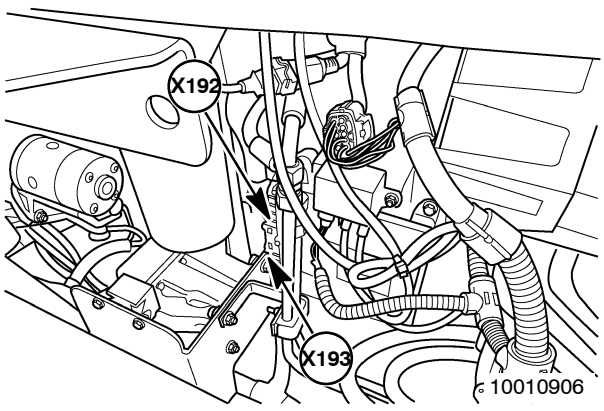
   A. Remove the relay and check its operation. If okay continue with step 4.

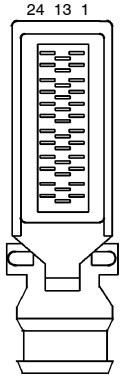
   B. Replace the relay if faulty. Remove the fault code from the engine ECU memory using the electronic service tool. Operate the engine, if the fault reoccurs continue with step 4.
4. Check the wiring harness.

   A. Remove relay 14 and check for continuity of the wiring between the engine ECU connector X193 and the relay 14 holder. Check between pin 2 of the holder and pin 27 of X193 and between pin 5 of the holder and pins 3 and 4 of X193. If an open circuit is indicated at any stage repair or replace the wiring as required.

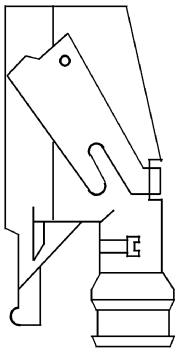
   B. If continuity is good remove the fault code from the ECU memory, using the electronic service tool and operate the engine. The fault may be intermittent, wiggle test the harness to attempt to induce the fault. If fault reoccurs repeat step 4. If fault does not occur continue with vehicle operation.

Wiring harness – Electrical schematic frame 02 (A.30.A.88 – C.20.E.02)





X192 & X193



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UNIVERSAL DISPLAY PLUS FAULT CODE

0397.2 SHUT-OFF TESTS, DATA INCORRECT
0397.3 SHUT-OFF TESTS, SHORTED TO HIGH SOURCE
0397.4 SHUT-OFF TESTS, SHORTED TO LOW SOURCE

Cause:

Shut-off test failure within the engine ECU

Effect on Engine:

Engine enabled – fuel restricted and speed restricted to 1500 rev/min.

Possible failure modes:

1. Engine ECU malfunction.

Solution:

1. Check condition of Fuse 1, engine ECU fuse, (20 Amp) and Fuse 38, Relay 14 and keystart switch fuse, (7.5 Amp). Check for good connections onto engine ECU and at connectors X004 and X010. Check main Engine ECU relay, K14, for correct operation.

   C. If a fuse is blown or the relay is faulty replace and check engine operation. If engine performs okay, remove the fault code from the engine ECU memory using the electronic service tool.

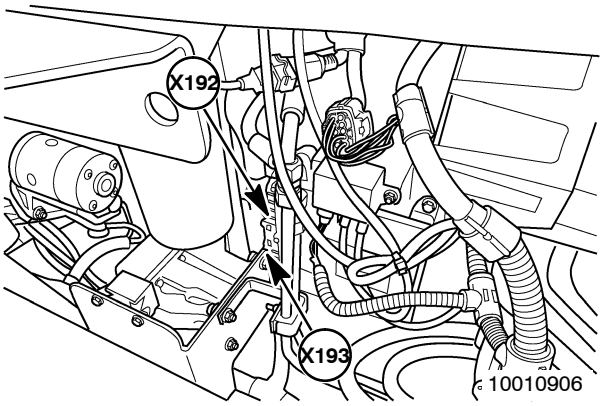
   B. If the fuses, relay and wiring are okay continue with step 2.
2. Attempt to reload the engine ECU software using the Electronic Service Tool.

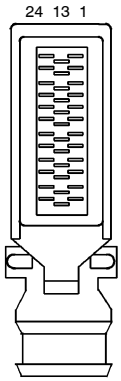
   A. If the software is accepted check engine for correct operation.

   B. If the software is not accepted continue with step 3.
3. Substitute the engine ECU.

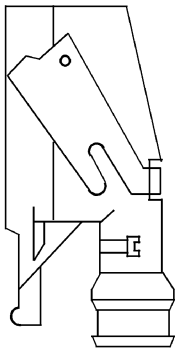
Wiring harness – Electrical schematic frame 02 (A.30.A.88 – C.20.E.02)

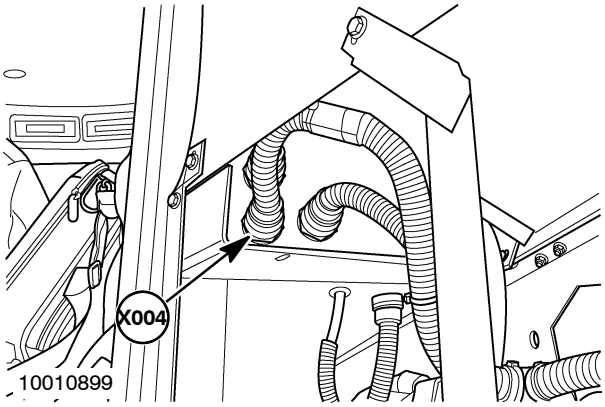
https://truckmanualshub.com/



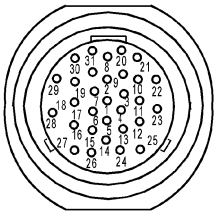


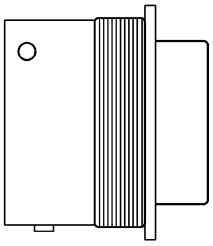
X192
&
X193



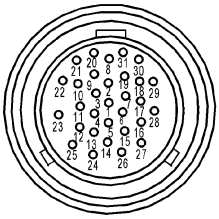


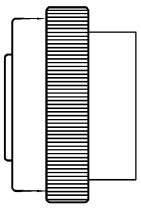
X004
MAIN FRAME

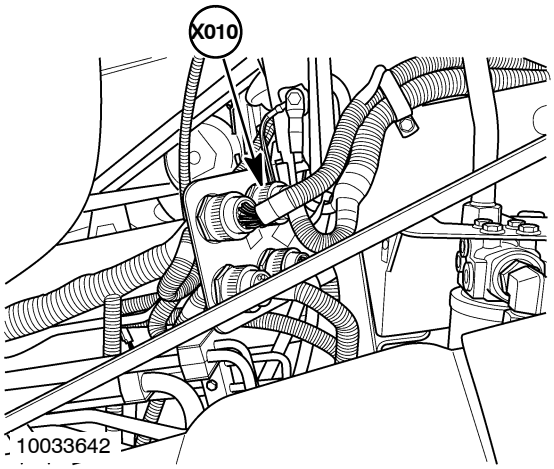




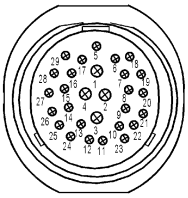
X004
CAB MAIN

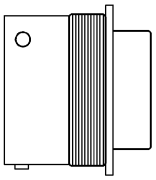




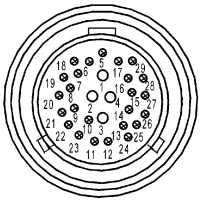


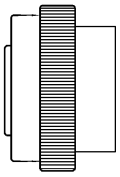
X010
MAIN FRAME





X010
ENGINE





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UNIVERSAL DISPLAY PLUS FAULT CODE

0399.2 COOLANT TEMPERATURE SENS, DATA INCORRECT
0399.3 COOLANT TEMPERATURE SENS, SHORT TO HIGH SOURCE
0399.4 COOLANT TEMPERATURE SENS, SHORT TO LOW SOURCE

Cause:

Signal range outside threshold limits

Signal not plausible or intermittent fault

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Faulty coolant sensor
2. Faulty connector or wiring

Solution:

1. Check the engine Coolant level.

   A. Ensure the coolant level is within the min/max indicators. Adjust as required. If the level was very low, ie, no fluid visible in the header tank, investigate the cause of the fluid loss and repair. Remove the fault code from the ECU memory, using the electronic service tool and operate the engine, if the fault does not reoccur continue with vehicle operation.

   B. If the fault reoccurs continue with step 2

2. Check connector X373 at coolant temp sensor B44.

   A. Ensure the connector X373 is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the sensor. Repair or replace damaged components as required.

   B. If the connector is okay continue with step 3.

3. Check coolant temp sensor B44.

   A. Remove the connector X373 and check the sensor using a suitable multi-meter. Measure the resistance across the sensor terminals, the resistance should vary between **8-10kΩ@-10°C**, **2.2-2.7kΩ@20°C** and **0.29-0.36kΩ@80°C** . Check for a short to ground between each sensor terminal and the engine block, an open circuit should be recorded on each terminal. If any readings are incorrect replace the sensor.

   B. If the sensor is okay continue with step 4.

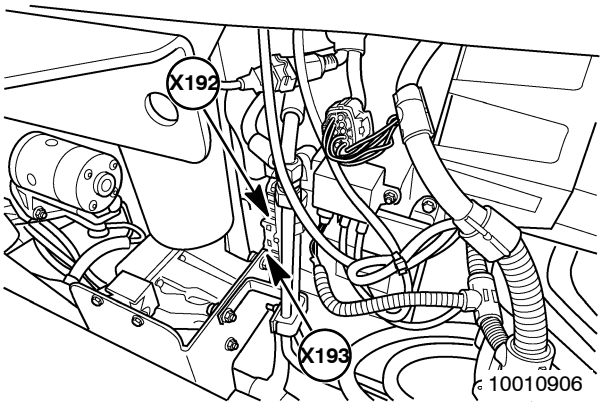
4. Check wiring.

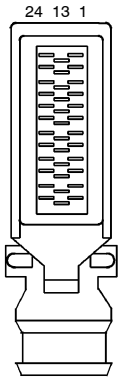
   A. Disconnect the sensor connector X373. With the keystart switch ON, measure the voltage at pin 1 (pink wire), +5V should be measured. If no voltage is measured check the wiring for continuity between Pin 1 of the sensor connector X373 and pin 5 of engine ECU connector X192. Repair wiring as required.
   Check for voltage on Pin 2; 0V should be measured. If voltage is measured trace and repair short circuit in wiring between Pin 2 of the sensor connector X373 and Pin 22 of the engine ECU connector X192.
   With the keystart OFF, also check for continuity of the wire between Pin 2 of the sensor connector X373 and Pin 22 of the engine ECU connector X192, and for a short to ground. Trace fault and repair as required.

   B. If the wiring is okay suspect a faulty engine ECU. Download engine software using the electronic service tool and operate engine. If fault still occurs substitute engine ECU.

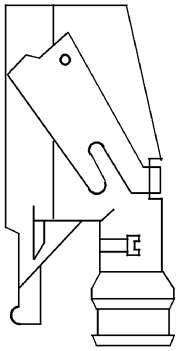
Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)

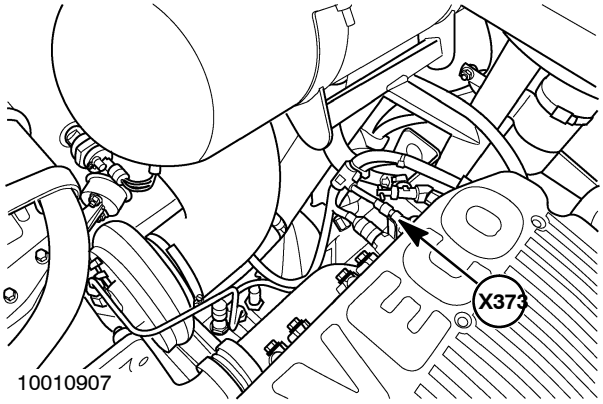
https://truckmanualshub.com/

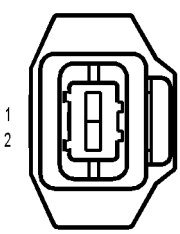


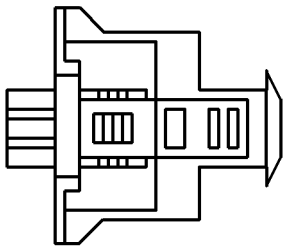


X192
&
X193









X373

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UNIVERSAL DISPLAY PLUS FAULT CODE

0400.2 BOOST AIR TEMPERATURE, DATA INCORRECT
0400.3 BOOST AIR TEMPERATURE, SHORTED TO HIGH SOURCE
0400.4 BOOST AIR TEMPERATURE, SHORTED TO LOW SOURCE

Cause:

Signal range outside threshold limits

Signal not plausible or intermittent fault

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Faulty sensor
2. Faulty connector or wiring

Solution:

1. Harness connector fault

   A. Inspect the harness connector X374 onto the air temp sensor B54. Ensure that the connector is not damaged, the pins are correctly located in the connector body and that it is a tight fit onto the sensor.

   B. If the harness connector is okay continue with step 3.

2. Air Temp Sensor B54 Fault

   To test the sensor measure the resistance across pins 1 and 2 of the sensor. The resistance will vary according to the temperature detailed in the table below:

Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

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C. If the sensor is to specification continue with step 3.

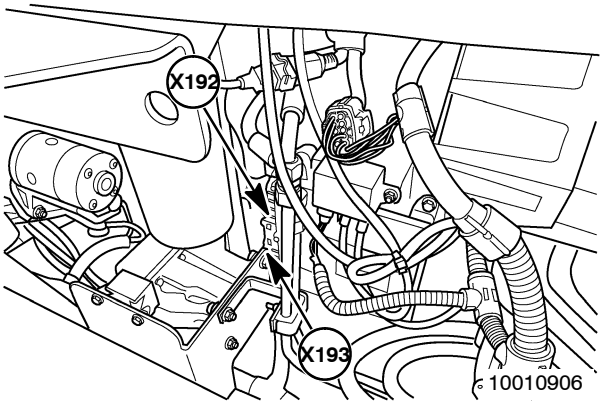
	Resistance in Ω		
Temperature in °C	Minimum	Nominal	Maximum
−40 ± 1	38313	45313	53103
−30 ± 1	22362	26114	30258
−20 ± 1	13402	15462	17718
−10 ± 1	8244	9397	10661
0 ± 1	5227	5896	6623
10 ± 1	3396	3792	4222
20 ± 1	2262	2500	2760
30 ± 1	1555	1707	1867
40 ± 1	1080	1175	1277
50 ± 1	771	834	900
60 ± 1	555	595	639
70 ± 1	408	435	465
80 ± 1	304	322	342
90 ± 1	231	243	257
100 ± 1	178	186	196
110 ± 1	137	144	152
120 ± 1	106	112	119
130 ± 1	84	89	95

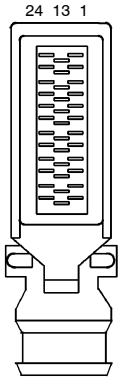
3. Wiring faulty

   A. Check the wiring from the the engine ECU to the sensor connector. With the keystart ON, +5V should be measured on pin 1 of sensor connector X374 (+5V common line). If ZERO volts is indicated check for an Open Circuit or Short to ground back to the engine ECU , connector X192, pin 21. Trace fault and repair wiring as required. If wiring to pin 1 is okay continue with step B.

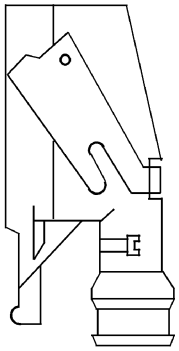
   B. With the keystart OFF, continuity to ground should be indicated on pin 2 of sensor connector X374 (ground common line). If no ground is indicated, check for an Open circuit back to the engine ECU, connector X192, pin 4. Trace fault and repair wiring as required.
   With the keystart ON, check pin 2 for a short to +12V. If +12V is indicated trace fault and repair wiring to pin 2.

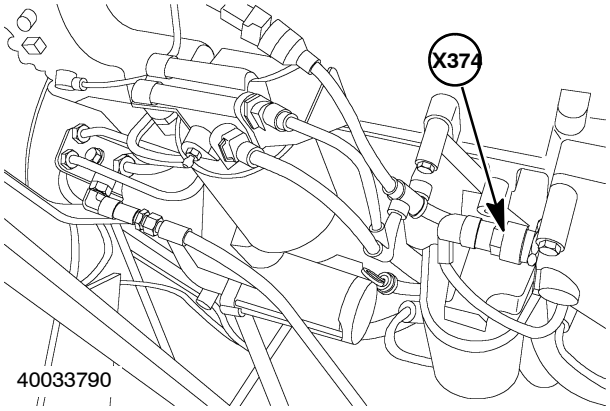
https://truckmanualshub.com/

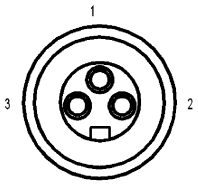


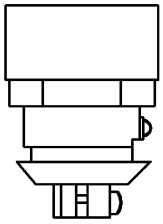


X192
&
X193









X374

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UNIVERSAL DISPLAY PLUS FAULT CODE

0402.2 BOOST PRESSURE SENSOR, DATA INCORRECT
0402.3 BOOST PRESSURE SENSOR, SHORTED TO HIGH SOURCE
0402.4 BOOST PRESSURE SENSOR, SHORTED TO LOW SOURCE

Cause:

Signal range outside threshold limits

Signal not plausible or intermittent fault

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Faulty boost pressure sensor B23
2. Faulty connector X371 or wiring

Solution:

1. Mechanical Fault

   A. Inspect the tubing between turbocharger and inlet manifold. Ensure that no leakage points exist and all connections are tight.

   B. If the tubing and connections are okay continue with step 2.

2. Harness connector fault

   A. Inspect the harness connector X371 onto the sensor. Ensure that the connector is not damaged, the pins are correctly located in the connector body and that it is a tight fit onto the sensor.

   B. If the harness connector is okay continue with step 3.

3. Boost Pressure Sensor B23 Fault

   A. To test the sensor the voltage needs to be read between the output wire, pin 1 and the sensor ground, pin 3, of the connector. Using a suitable probe into the wire, the voltage should range from 0.9–1.1V at 450–550 erpm, to 1.0–1.3V at 2660 erpm. If there is voltage but out of range replace sensor, if Zero volts is indicated continue with step 4.

   B. The resistance of the wiring within the sensor can also be checked:–
   resistance between pins 1 and 2 = 3.3KΩ
   resistance between pins 2 and 3 = 2.5KΩ
   resistance between pins 1 and 3 = 2.5KΩ
   If the sensor is to specification continue with step 4.

4. Wiring faulty

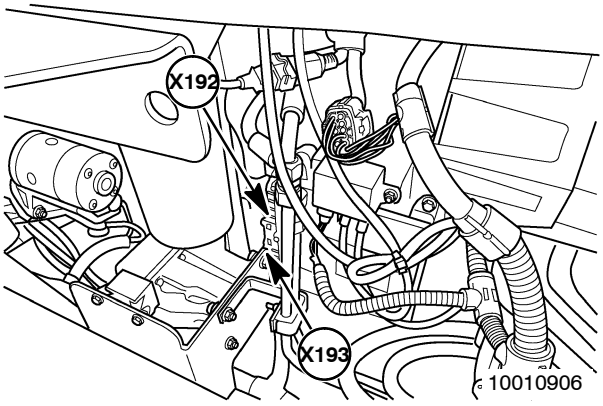
   A. Check the wiring from the the engine ECU to the sensor connector X371. With the keystart ON, +5V should be measured on pin 2 of sensor connector X371. If ZERO volts is indicated check for an Open Circuit or Short to ground back to the engine ECU , connector X192, pin 23. Trace fault and repair wiring as required. If wiring to pin 2 is okay continue with step B.

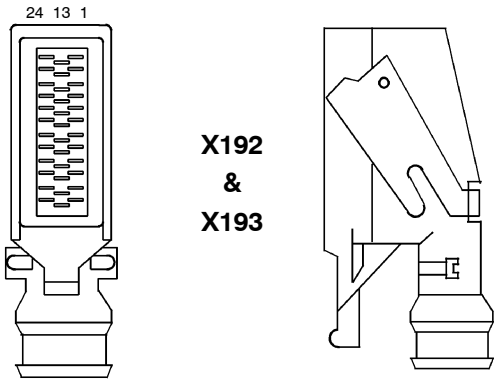
   B. With the keystart OFF, continuity to ground should be indicated on pin 3 of sensor connector X371. If no ground is indicated, check for an Open circuit back to the engine ECU, connector X192, pin17. Trace fault and repair wiring as required. If wiring to pin 3 is okay continue with step C.

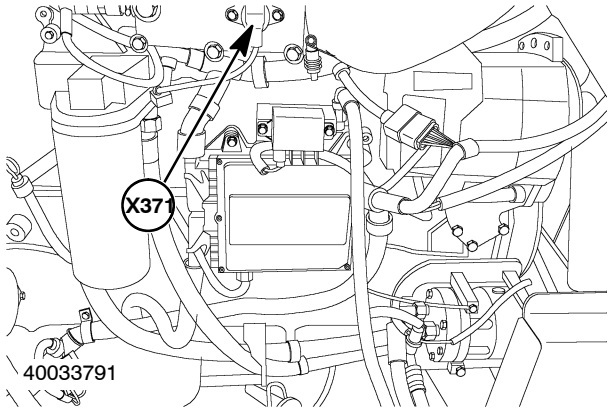
   C. With the keystart ON, check pin 1 for a short to +12V. If +12V is indicated trace fault and repair wiring to pin 1. If okay check for an open circuit back to engine ECU, connector X193, pin 12. Check also for a short to ground. If any fault is indicated trace and repair the wiring as required.

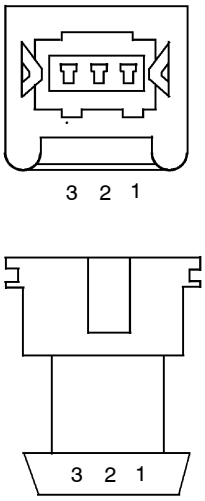
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

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UNIVERSAL DISPLAY PLUS FAULT CODE

0401.2 FUEL TEMPERATURE SENSOR, DATA INCORRECT
0401.3 FUEL TEMPERATURE SENSOR, SHORT TO HIGH SOURCE
0401.4 FUEL TEMPERATURE SENSOR, SHORT TO LOW SOURCE

Cause:

No signal or signal range outside threshold limits

Signal not plausible or intermittent fault

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Faulty fuel temp sensor B36
2. Faulty connector X372 or wiring

Solution:

1. Check connector X372 at sensor B36.

   A. Ensure the connector, X372, is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the sensor. Repair or replace damaged components as required.

   B. If the connector is okay continue with step 2.

2. Check fuel temp sensor B36.

   A. To test the sensor the voltage needs to be read between the output wire, pin 1 and the sensor ground, pin 2, of the connector X372. Using a suitable probe into the wire, the voltage should range from 0.6–2.4V between 60°–90°C. If there is voltage but out of range replace sensor, if Zero volts is indicated continue with step B.

   B. Remove the connector X372 and check the sensor using a suitable multi-meter. Measure the resistance across the sensor terminals, the resistance should vary between **8–10kΩ@–10°C**, **2.2–2.7kΩ@20°C** and **0.29–0.36kΩ@80°C**. Check for a short to ground between each sensor terminal and the engine block, an open circuit should be recorded on each terminal. If any readings are incorrect replace the sensor. If the sensor is okay continue with step 3.

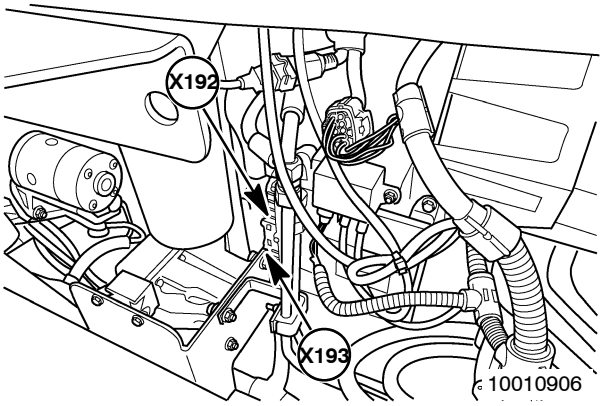
3. Check wiring

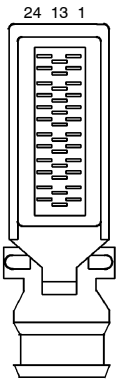
   A. Disconnect the sensor connector X372. With the keystart switch ON, measure the voltage at pin 2, +5V should be measured. If no voltage is measured check the wiring for continuity between Pin 2 of the sensor connector X372 and pin 11 of engine ECU connector X192. Repair wiring as required.
   Check for voltage on Pin 1, 0V should be measured. If voltage is measured trace and repair short circuit in wiring between Pin 1 of the sensor connector X372 and Pin 6 of the engine ECU connector X192.
   With the keystart OFF, also check for continuity of the wire between Pin 1 of the sensor connector X372 and Pin 6 of the engine ECU connector X192, and for a short to ground. Trace fault and repair as required.

   B. If the wiring is okay suspect a faulty engine ECU. Download engine software using the electronic service tool and operate engine. If fault still occurs substitute engine ECU.

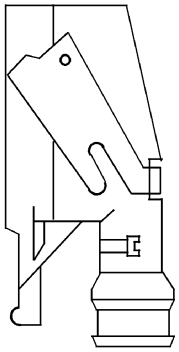
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

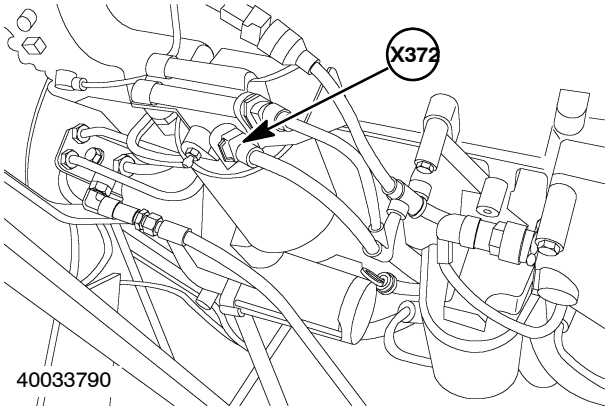
https://truckmanualshub.com/

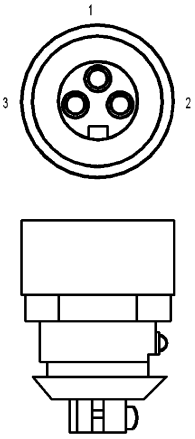




X192
&
X193







X372

https://truckmanualshub.com/

UNIVERSAL DISPLAY PLUS FAULT CODE

0403.2 AMBIENT PRESSURE SENSOR, DATA INCORRECT
0403.3 AMBIENT PRESSURE SENSOR, SHORTED TO HIGH SOURCE
0403.4 AMBIENT PRESSURE SENSOR, SHORTED TO LOW SOURCE

Cause:

No signal or signal range outside threshold limits
Signal not plausible

Effect on Engine:

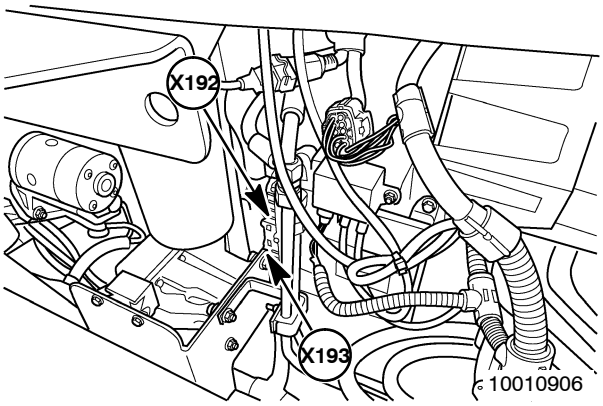
Engine enabled – no restriction on fuel or speed

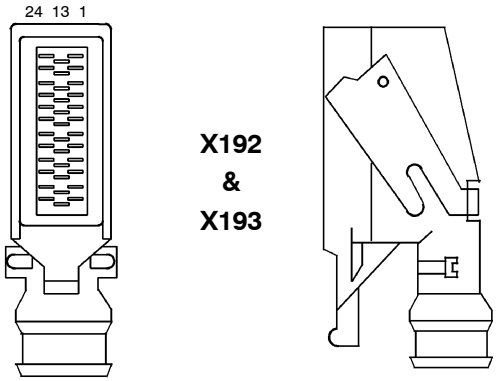
Possible failure modes:

1. Failure within ECU

Solution:

1. Replace engine ECU.





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UNIVERSAL DISPLAY PLUS FAULT CODE

0408.2 ENGINE OVERSPEED, DATA INCORRECT
0408.3 ENGINE OVERSPEED, SHORTED TO HIGH SOURCE
0408.4 ENGINE OVERSPEED, SHORTED TO LOW SOURCE

Cause:

Engine has exceeded the overspeed limit

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Speed sensors faulty
2. Faulty Vehicle electronic control unit (CCM2) software or hardware

Solution:

1. Check the engine flywheel rpm sensor B05.

   A. Using a suitable multi-meter check across the speed sensor terminals at connector X369 for a short circuit or an open circuit and between each terminal for a short to ground. If any of the above conditions exist, replace the engine flywheel rpm sensor. The sensor resistance value is 820–920KΩ between the terminals 1 and 2.

   B. If the sensor appears to be okay continue with step 2.
2. Check the engine camshaft rpm sensor B07.

   A. Using a suitable multi-meter check across the speed sensor terminals at connector X370 for a short circuit or an open circuit and between each terminal for a short to ground. If any of the above conditions exist, replace the engine camshaft rpm sensor. The sensor resistance value is 820–920KΩ between the terminals 1 and 2.

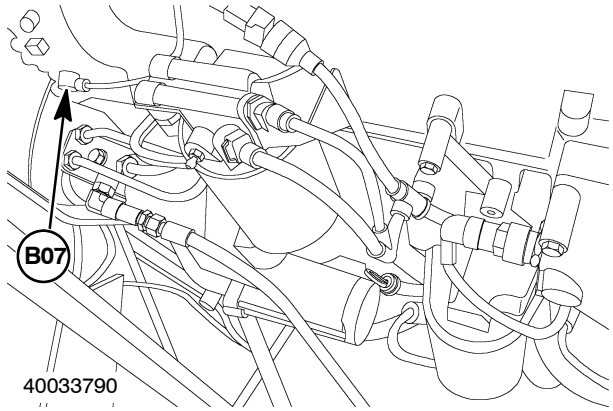
   B. If the sensor appears to be okay continue with step 3.
3. Check CCM2 controller.

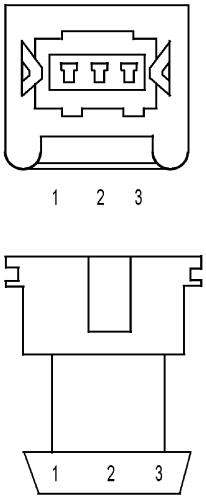
   A. Check the hardware of the CCM2 controller. Remove and inspect the connectors, check the installation of the controller to the vehicle frame, check the ground connections for the controller and check the power feeds from fuse 36 and fuse 37. Repair / replace any damaged items.

   B. Check the software installed in the controller on the Universal Display Plus screen. If the Universal Display Plus monitor is indicating software installed and has no CCM2 ECU errors, download the correct level software again into the controller. Operate the engine, if the error re-occurs substitute the CCM2 controller.

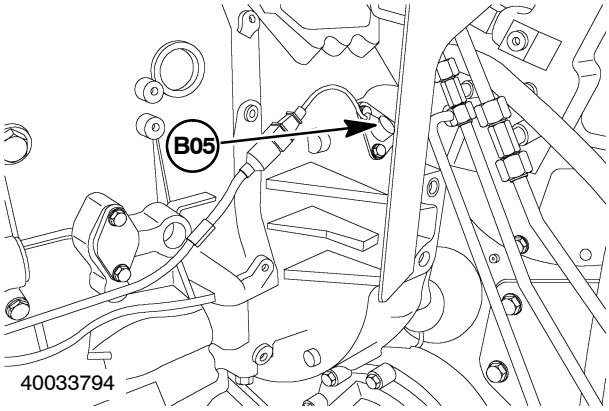
NOTE: *If CCM2 ECU errors are indicated rectify these errors first. Refer to the CCM2 fault code charts.*

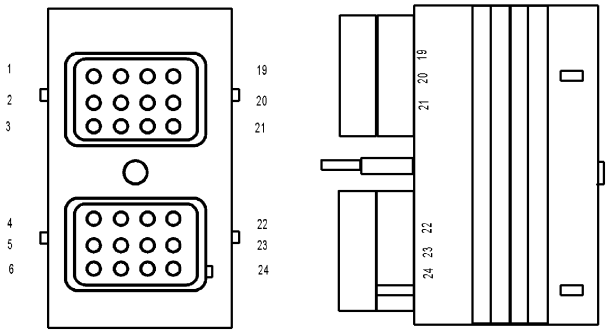
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)
Wiring harness – Electrical schematic frame 28 (A.30.A.88 – C.20.E.28)
Wiring harness – Electrical schematic frame 29 (A.30.A.88 – C.20.E.29)



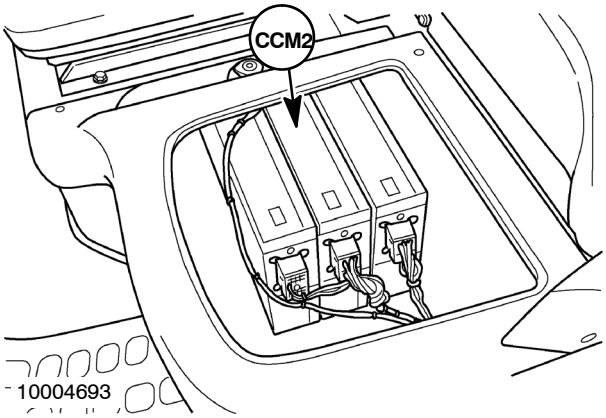


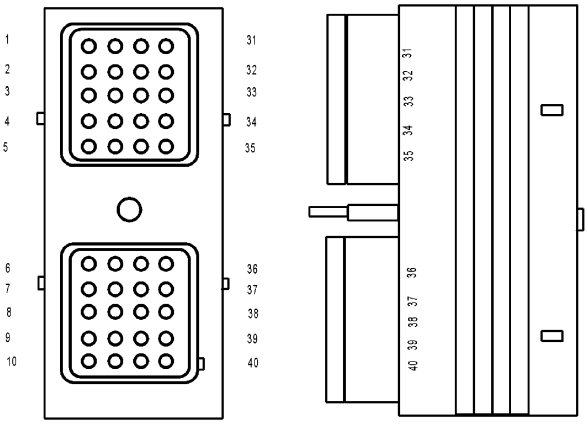
B05, B07





X015
CCM-2 J1





X016 **&** **X017**
CCM-2 J2 **CCM-2 J3**

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UNIVERSAL DISPLAY PLUS FAULT CODE

0412.2 INK SIGNAL, DATA INCORRECT
0412.3 INK SIGNAL, SHORTED TO HIGH SOURCE
0412.4 INK SIGNAL, SHORTED TO LOW SOURCE

Cause:

Primary (flywheel) engine speed sensor B05

Effect on Engine:

Fuel restricted and speed restricted to 1500 rev/min.

Possible failure modes:

1. Speed sensor faulty
2. Wiring to speed sensor faulty

Solution:

1. Check the engine flywheel rpm sensor B05.

   A. Using a suitable multi-meter check across the speed sensor terminals at connector X369 for a short circuit or an open circuit and between each terminal for a short to ground. If any of the above conditions exist replace the engine flywheel rpm sensor. The sensor resistance value is 820–920KΩ between the terminals 1 and 2.

   B. If the sensor appears to be okay continue with step 2.

2. Check the engine speed sensor to flywheel air gap. The gap should be 0.5–1.5mm.

NOTE: *The air gap is a set dimension determined by design and is not adjustable. The only reason the air gap will be incorrect is if damage has occurred to either the speed sensor or flywheel or if the sensor has been incorrectly installed.*

   A. Remove the engine flywheel speed sensor and inspect for damage or a build up of dirt. With the sensor removed also inspect the flywheel for damage. If any damage is evident replace the component.

   B. If the engine speed sensor to flywheel air gap is correct continue with step 3.

3. Check the wiring to the speed sensor.

   A. With the keystart switch OFF, disconnect the engine flywheel rpm sensor connector X369 and connector X192 of the engine ECU. Using a suitable multi-meter check for continuity between pin 1 of the speed sensor and pin 1 of the engine ECU connector. Also check for continuity between pin 2 of the speed sensor and pin 13 of the engine ECU connector. If an open circuit is indicated trace the fault and repair the wiring as required.

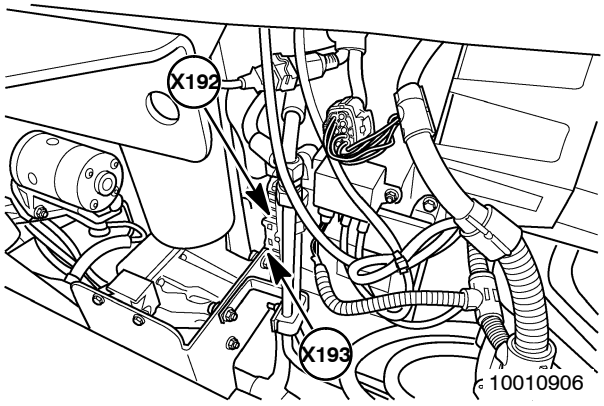
   B. With the keystart switch OFF, and the engine flywheel rpm sensor connector X369 and connector X192 of the engine ECU still disconnected check for a short to ground on each of the speed sensor pins. If a short to ground is indicated trace the fault and repair the wiring as required.

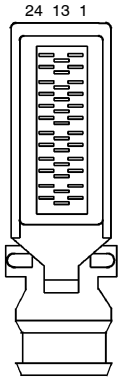
   C. With the engine flywheel rpm sensor connector X369 and connector X192 of the engine ECU still disconnected, turn the keystart ON, (not cranking), and check for a short to +12V on each of the speed sensor pins. If a short to +12V is indicated trace the fault and repair the wiring as required.

   D. With the keystart switch OFF, reconnect the engine ECU connector. Turn the keystart ON, (not cranking), and check for approximately 0.25V at the speed sensor connector X369, pin 1. If 0.25V is not indicated replace the engine ECU.

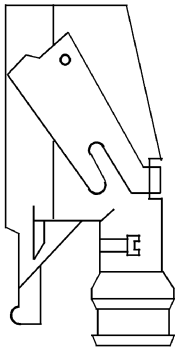
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

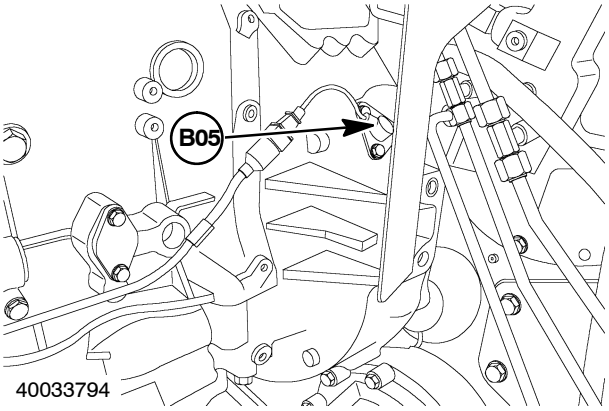
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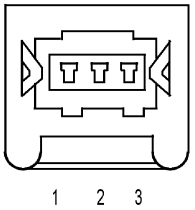


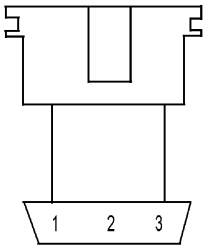


X192
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X193









B05

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UNIVERSAL DISPLAY PLUS FAULT CODE

0413.2 SEG SIGNAL, DATA INCORRECT
0413.3 SEG SIGNAL, SHORTED TO HIGH SOURCE
0413.4 SEG SIGNAL, SHORTED TO LOW SOURCE

Cause:

Secondary (camshaft) engine speed sensor B07

NOTE: *This fault will occur only when engine is running.*

Effect on Engine:

Fuel restricted and speed restricted to 1500 rev/min.

Possible failure modes:

1. Speed sensor faulty
2. Wiring to speed sensor faulty

Solution:

1. Check the engine camshaft rpm sensor B07.

   A. Using a suitable multi-meter check across the speed sensor terminals at connector X370 for a short circuit or an open circuit and between each terminal for a short to ground. If any of the above conditions exist replace the engine camshaft rpm sensor. The sensor resistance value is 820–920KΩ between the terminals 1 and 2.

   B. If the sensor appears to be okay continue with step 2.

2. Check the camshaft speed sensor to phonic wheel air gap. The gap should be 0.5–1.5mm.

NOTE: *The air gap is a set dimension determined by design and is not adjustable. The only reason the air gap will be incorrect is if damage has occurred to either the speed sensor or phonic wheel or if the sensor has been incorrectly installed.*

   A. Remove the camshaft speed sensor and inspect for damage or a build up of dirt. With the sensor removed also inspect the camshaft for damage. If any damage is evident replace the component.

   B. If the camshaft speed sensor to phonic wheel air gap is correct continue with step 3.

3. Check the wiring to the speed sensor.

   A. With the keystart switch OFF, disconnect the engine camshaft rpm sensor connector X370 and connector X192 of the engine ECU. Using a suitable multi-meter check for continuity between pin 1 of the speed sensor and pin 2 of the engine ECU connector. Also check for continuity between pin 2 of the speed sensor and pin 14 of the engine ECU connector. If an open circuit is indicated trace the fault and repair the wiring as required.

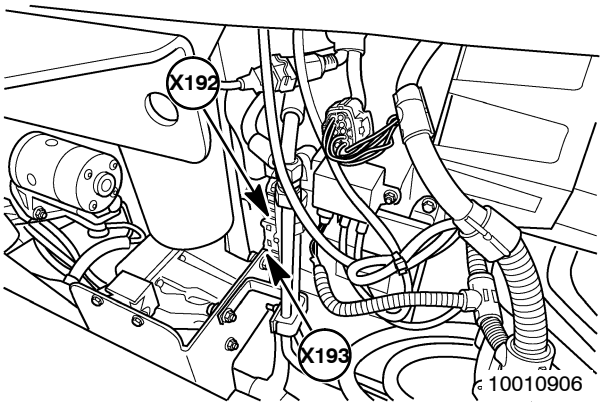
   B. With the keystart switch OFF, and the engine camshaft rpm sensor connector X370 and connector X192 of the engine ECU still disconnected check for a short to ground on each of the speed sensor pins. If a short to ground is indicated trace the fault and repair the wiring as required.

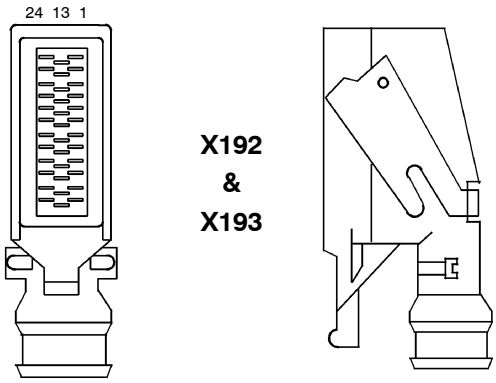
   C. With the engine camshaft rpm sensor connector X370 and connector X192 of the engine ECU still disconnected, turn the keystart ON, (not cranking), and check for a short to +12V on each of the speed sensor pins. If a short to +12V is indicated trace the fault and repair the wiring as required.

   D. With the keystart switch OFF, reconnect the engine ECU connector. Turn the keystart ON, (not cranking), and check for approximately 0.25V at connector X370 pin 1 of the speed sensor. If 0.25V is not indicated replace the engine ECU.

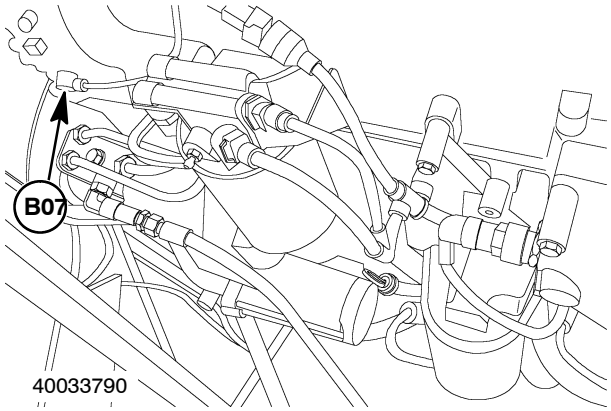
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

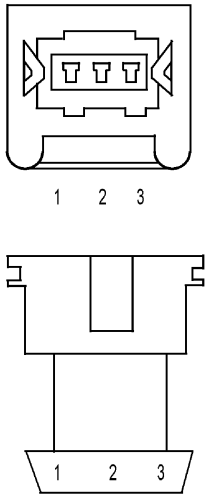
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X192
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X193





B07

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UNIVERSAL DISPLAY PLUS FAULT CODE

0414.2 CYLINDER 1, DATA INCORRECT
0414.3 CYLINDER 1, SHORTED TO HIGH SOURCE
0414.4 CYLINDER 1, SHORTED TO LOW SOURCE

Cause:

Injection circuit fault

Effect on Engine:

Engine speed restricted and only operating on 5 cylinders

Possible failure modes:

1. Faulty injector
2. Wiring fault between injector and engine ECU.

Solution:

1. Check the connector at the Injector.

   A. Ensure the connector is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the injector.

NOTE: *The separate injector harness assembly is specially constructed to avoid interference from electromagnetic sources, therefore no repairs should be attempted on this harness. If the connector or wiring is damaged it will be necessary to replace the complete injector harness assembly.*

   B. If the connector is okay continue with step 2.

2. Check the injector.

   A. With the connector removed, measure the resistance across the injector coil terminals. The resistance should be 0.56–0.57Ω. If the coil is outside the range or indicates either a short or open circuit, replace the injector assembly.

   B. If the injector is okay continue with step 3.

3. Check the wiring between the injector and Engine ECU.

NOTE: *A common positive is supplied to groups of three injectors. Injectors for cylinders 1, 2 and 3 are supplied from pin 24 of X192 (engine ECU) and injectors for cylinders 4, 5 and 6 are supplied from pin 25 of X192 (engine ECU).*

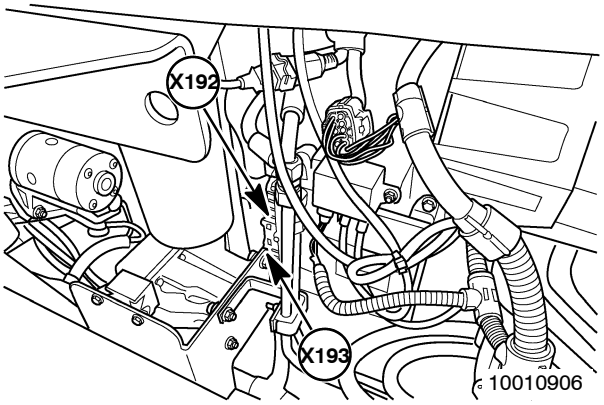
   A. Disconnect the injector harness and engine ECU connector X192. Using a suitable multi-meter check the injector control wiring between pin A of the injector harness connector and pin 35 of X192, engine ECU. Check the wiring for continuity and short to ground. Repair/replace the wiring if a fault is found. If no fault is found continue with step B.

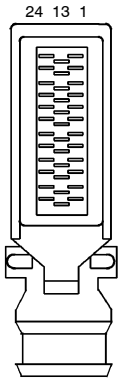
   B. Reconnect connector X192 to the engine ECU. With the keystart ON (not cranking), check for a short to +12V at pin A of the injector harness connector. If a short to +12V is indicated trace the fault and repair the wiring as required. If +12V does not exist continue with step C.

   C. With the keystart OFF, check the wiring on the separate injector harness assembly. Using a suitable multi-meter check across pins A and B, with the injector still connected, the resistance should be approximately 0.56–0.57Ω. Having previously eliminated the injector coil, if an open or short circuit is indicated the fault is in the harness. Replace the harness.

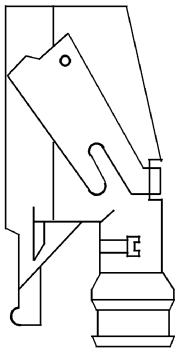
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

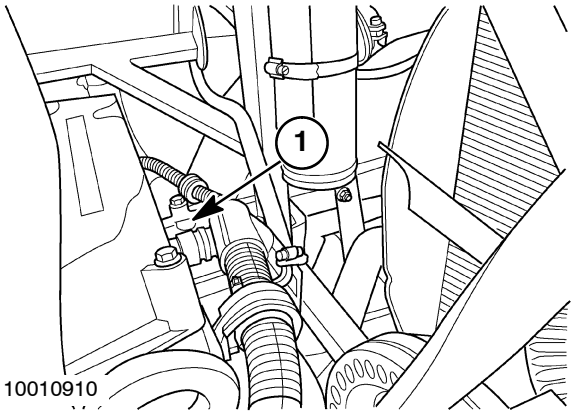
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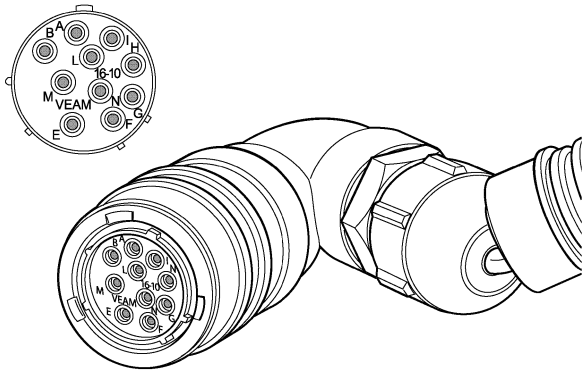




X192
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X193







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UNIVERSAL DISPLAY PLUS FAULT CODE

0415.2 CYLINDER 4, DATA INCORRECT
0415.3 CYLINDER 4, SHORTED TO HIGH SOURCE
0415.4 CYLINDER 4, SHORTED TO LOW SOURCE

Cause:

Injection circuit fault

Effect on Engine:

Engine speed restricted and only operating on 5 cylinders

Possible failure modes:

1. Faulty injector
2. Wiring fault between injector and engine ECU.

Solution:

1. Check the connector at the Injector.

   A. Ensure the connector is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the injector.

NOTE: *The separate injector harness assembly is specially constructed to avoid interference from electromagnetic sources, therefore no repairs should be attempted on this harness. If the connector or wiring is damaged it will be necessary to replace the complete injector harness assembly.*

   B. If the connector is okay continue with step 2.

2. Check the injector.

   A. With the connector removed, measure the resistance across the injector coil terminals. The resistance should be 0.56–0.57Ω. If the coil is outside the range or indicates either a short or open circuit, replace the injector assembly.

   B. If the injector is okay continue with step 3.

3. Check the wiring between the injector and Engine ECU.

NOTE: *A common positive is supplied to groups of three injectors. Injectors for cylinders 1, 2 and 3 are supplied from pin 24 of X192 (engine ECU) and injectors for cylinders 4, 5 and 6 are supplied from pin 25 of X192 (engine ECU).*

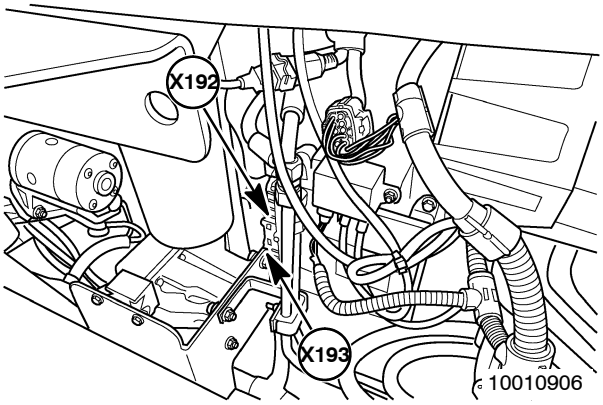
   A. Disconnect the injector harness and engine ECU connector X192. Using a suitable multi-meter check the injector control wiring between pin G of the injector harness connector and pin 26 of X192, engine ECU. Check the wiring for continuity and short to ground. Repair/replace the wiring if a fault is found. If no fault is found continue with step B.

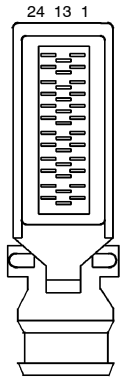
   B. Reconnect connector X192 to the engine ECU. With the keystart ON (not cranking), check for a short to +12V at pin G of the injector harness connector. If a short to +12V is indicated trace the fault and repair the wiring as required. If +12V does not exist continue with step C.

   C. With the keystart OFF, check the wiring on the separate injector harness assembly. Using a suitable multi-meter check across pins G and H, with the injector still connected, the resistance should be approximately 0.56–0.57Ω. Having previously eliminated the injector coil, if an open or short circuit is indicated the fault is in the harness. Replace the harness.

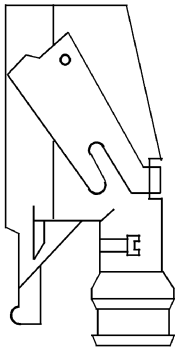
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

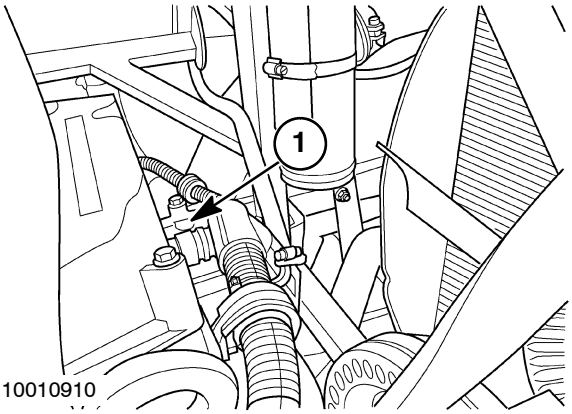
https://truckmanualshub.com/

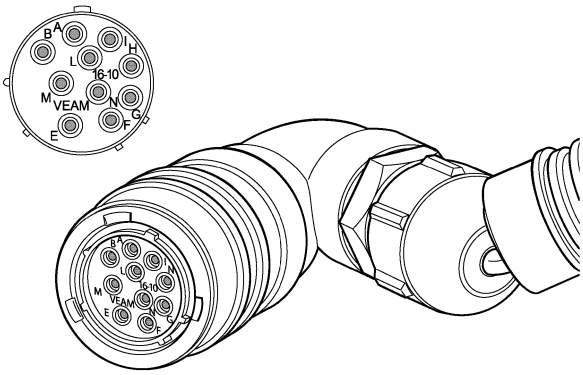




X192
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X193







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UNIVERSAL DISPLAY PLUS FAULT CODE

0416.2 CYLINDER 2, DATA INCORRECT
0416.3 CYLINDER 2, SHORTED TO HIGH SOURCE
0416.4 CYLINDER 2, SHORTED TO LOW SOURCE

Cause:

Injection circuit fault

Effect on Engine:

Engine speed restricted and only operating on 5 cylinders

Possible failure modes:

1. Faulty injector
2. Wiring fault between injector and engine ECU.

Solution:

1. Check the connector at the Injector.

   A. Ensure the connector is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the injector.

NOTE: *The separate injector harness assembly is specially constructed to avoid interference from electromagnetic sources, therefore no repairs should be attempted on this harness. If the connector or wiring is damaged it will be necessary to replace the complete injector harness assembly.*

   B. If the connector is okay continue with step 2.

2. Check the injector.

   A. With the connector removed, measure the resistance across the injector coil terminals. The resistance should be 0.56–0.57Ω. If the coil is outside the range or indicates either a short or open circuit, replace the injector assembly.

   B. If the injector is okay continue with step 3.

3. Check the wiring between the injector and Engine ECU.

NOTE: *A common positive is supplied to groups of three injectors. Injectors for cylinders 1, 2 and 3 are supplied from pin 24 of X192 (engine ECU) and injectors for cylinders 4, 5 and 6 are supplied from pin 25 of X192 (engine ECU).*

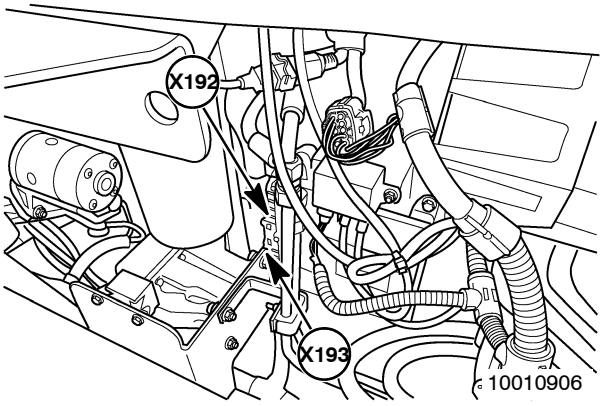
   A. Disconnect the injector harness and engine ECU connector X192. Using a suitable multi-meter check the injector control wiring between pin C of the injector harness connector and pin 34 of X192, engine ECU. Check the wiring for continuity and short to ground. Repair/replace the wiring if a fault is found. If no fault is found continue with step B.

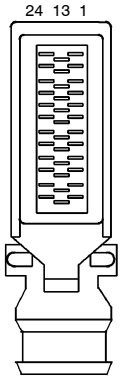
   B. Reconnect connector X192 to the engine ECU. With the keystart ON (not cranking), check for a short to +12V at pin C of the injector harness connector. If a short to +12V is indicated trace the fault and repair the wiring as required. If +12V does not exist continue with step C.

   C. With the keystart OFF, check the wiring on the separate injector harness assembly. Using a suitable multi-meter check across pins C and D, with the injector still connected, the resistance should be approximately 0.56–0.57Ω. Having previously eliminated the injector coil, if an open or short circuit is indicated the fault is in the harness. Replace the harness.

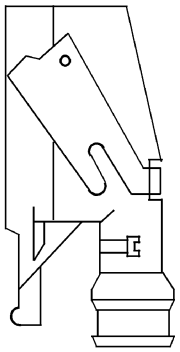
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

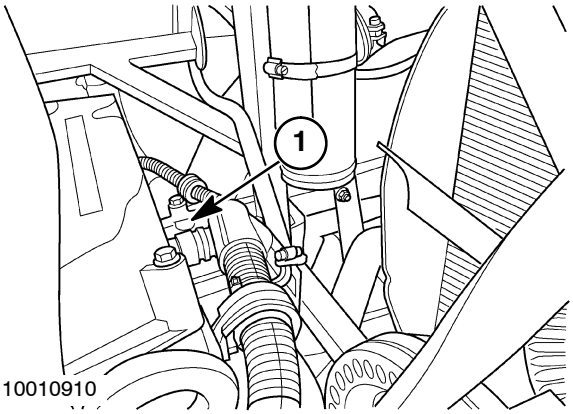
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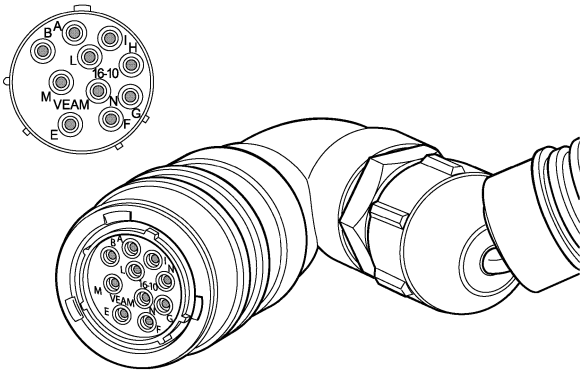




X192
&
X193







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UNIVERSAL DISPLAY PLUS FAULT CODE

0417.2 CYLINDER 6, DATA INCORRECT
0417.3 CYLINDER 6, SHORTED TO HIGH SOURCE
0417.4 CYLINDER 6, SHORTED TO LOW SOURCE

Cause:

Injection circuit fault

Effect on Engine:

Engine speed restricted and only operating on 5 cylinders

Possible failure modes:

1. Faulty injector
2. Wiring fault between injector and engine ECU.

Solution:

1. Check the connector at the Injector.

   A. Ensure the connector is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the injector.

NOTE: *The separate injector harness assembly is specially constructed to avoid interference from electromagnetic sources, therefore no repairs should be attempted on this harness. If the connector or wiring is damaged it will be necessary to replace the complete injector harness assembly.*

   B. If the connector is okay continue with step 2.

2. Check the injector.

   A. With the connector removed, measure the resistance across the injector coil terminals. The resistance should be 0.56–0.57Ω. If the coil is outside the range or indicates either a short or open circuit, replace the injector assembly.

   B. If the injector is okay continue with step 3.

3. Check the wiring between the injector and Engine ECU.

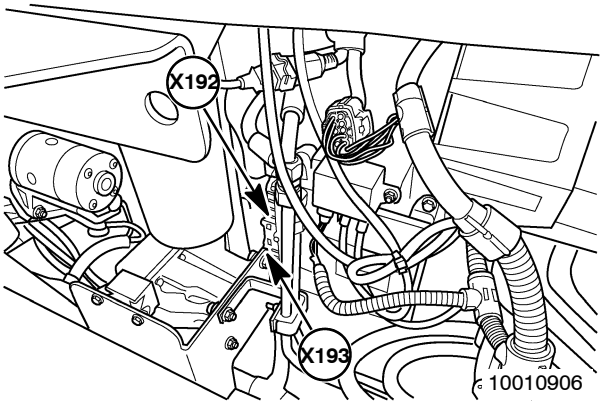
NOTE: *A common positive is supplied to groups of three injectors. Injectors for cylinders 1, 2 and 3 are supplied from pin 24 of X192 (engine ECU) and injectors for cylinders 4, 5 and 6 are supplied from pin 25 of X192 (engine ECU).*

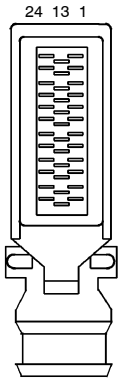
   A. Disconnect the injector harness and engine ECU connector X192. Using a suitable multi-meter check the injector control wiring between pin M of the injector harness connector and pin 27 of X192, engine ECU. Check the wiring for continuity and short to ground. Repair/replace the wiring if a fault is found. If no fault is found continue with step B.

   B. Reconnect connector X192 to the engine ECU. With the keystart ON (not cranking), check for a short to +12V at pin M of the injector harness connector. If a short to +12V is indicated trace the fault and repair the wiring as required. If +12V does not exist continue with step C.

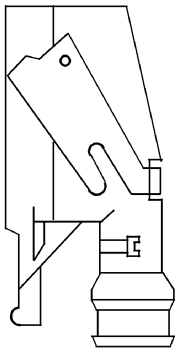
   C. With the keystart OFF, check the wiring on the separate injector harness assembly. Using a suitable multi-meter check across pins M and N, with the injector still connected, the resistance should be approximately 0.56–0.57Ω. Having previously eliminated the injector coil, if an open or short circuit is indicated the fault is in the harness. Replace the harness.

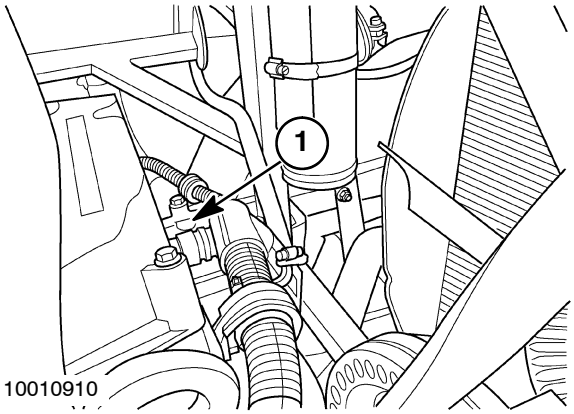
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

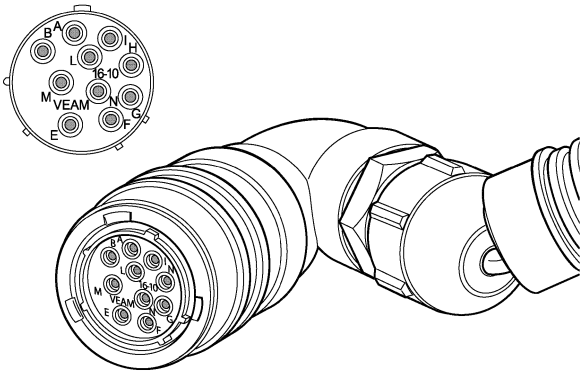




X192 & X193







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UNIVERSAL DISPLAY PLUS FAULT CODE

0418.2 CYLINDER 3, DATA INCORRECT
0418.3 CYLINDER 3, SHORTED TO HIGH SOURCE
0418.4 CYLINDER 3, SHORTED TO LOW SOURCE

Cause:

Injection circuit fault

Effect on Engine:

Engine speed restricted and only operating on 5 cylinders

Possible failure modes:

1. Faulty injector
2. Wiring fault between injector and engine ECU.

Solution:

1. Check the connector at the Injector.

   A. Ensure the connector is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the injector.

NOTE: *The separate injector harness assembly is specially constructed to avoid interference from electromagnetic sources, therefore no repairs should be attempted on this harness. If the connector or wiring is damaged it will be necessary to replace the complete injector harness assembly.*

   B. If the connector is okay continue with step 2.

2. Check the injector.

   A. With the connector removed, measure the resistance across the injector coil terminals. The resistance should be 0.56–0.57Ω. If the coil is outside the range or indicates either a short or open circuit, replace the injector assembly.

   B. If the injector is okay continue with step 3.

3. Check the wiring between the injector and Engine ECU.

NOTE: *A common positive is supplied to groups of three injectors. Injectors for cylinders 1, 2 and 3 are supplied from pin 24 of X192 (engine ECU) and injectors for cylinders 4, 5 and 6 are supplied from pin 25 of X192 (engine ECU).*

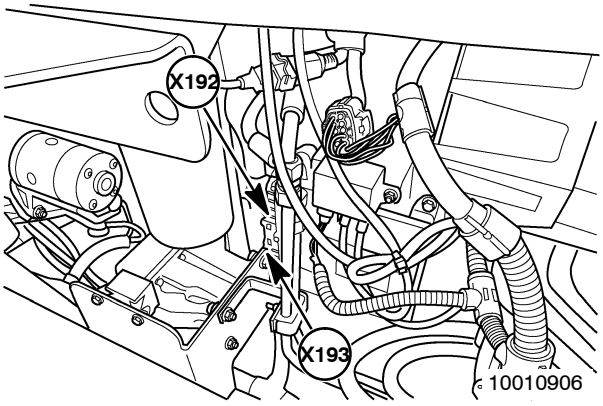
   A. Disconnect the injector harness and engine ECU connector X192. Using a suitable multi-meter check the injector control wiring between pin E of the injector harness connector and pin 33 of X192, engine ECU. Check the wiring for continuity and short to ground. Repair/replace the wiring if a fault is found. If no fault is found continue with step B.

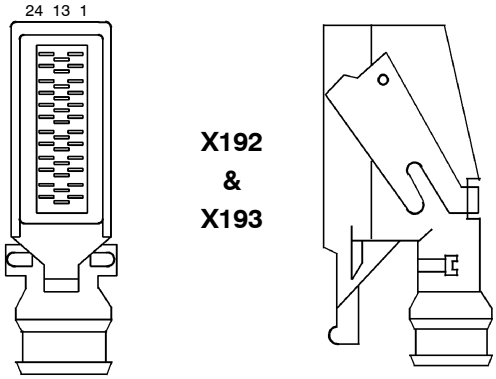
   B. Reconnect connector X192 to the engine ECU. With the keystart ON (not cranking), check for a short to +12V at pin E of the injector harness connector. If a short to +12V is indicated trace the fault and repair the wiring as required. If +12V does not exist continue with step C.

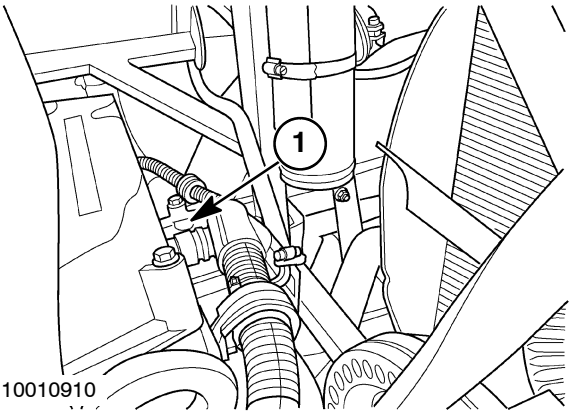
   C. With the keystart OFF, check the wiring on the separate injector harness assembly. Using a suitable multi-meter check across pins E and F, with the injector still connected, the resistance should be approximately 0.56–0.57Ω. Having previously eliminated the injector coil, if an open or short circuit is indicated the fault is in the harness. Replace the harness.

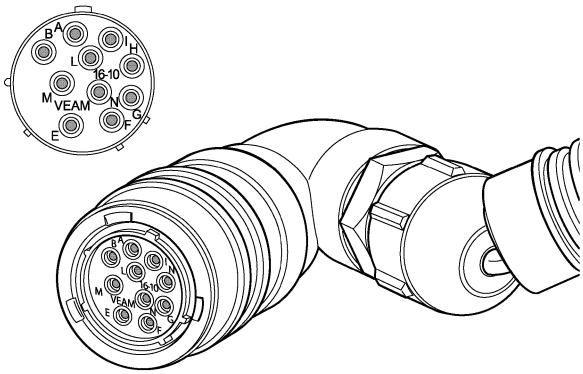
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

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UNIVERSAL DISPLAY PLUS FAULT CODE

0419.2 CYLINDER 5, DATA INCORRECT
0419.3 CYLINDER 5, SHORTED TO HIGH SOURCE
0419.4 CYLINDER 5, SHORTED TO LOW SOURCE

Cause:

Injection circuit fault

Effect on Engine:

Engine speed restricted and only operating on 5 cylinders

Possible failure modes:

1. Faulty injector
2. Wiring fault between injector and engine ECU.

Solution:

1. Check the connector at the Injector.

   A. Ensure the connector is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the injector.

NOTE: *The separate injector harness assembly is specially constructed to avoid interference from electromagnetic sources, therefore no repairs should be attempted on this harness. If the connector or wiring is damaged it will be necessary to replace the complete injector harness assembly.*

   B. If the connector is okay continue with step 2.

2. Check the injector.

   A. With the connector removed, measure the resistance across the injector coil terminals. The resistance should be 0.56–0.57Ω. If the coil is outside the range or indicates either a short or open circuit, replace the injector assembly.

   B. If the injector is okay continue with step 3.

3. Check the wiring between the injector and Engine ECU.

NOTE: *A common positive is supplied to groups of three injectors. Injectors for cylinders 1, 2 and 3 are supplied from pin 24 of X192 (engine ECU) and injectors for cylinders 4, 5 and 6 are supplied from pin 25 of X192 (engine ECU).*

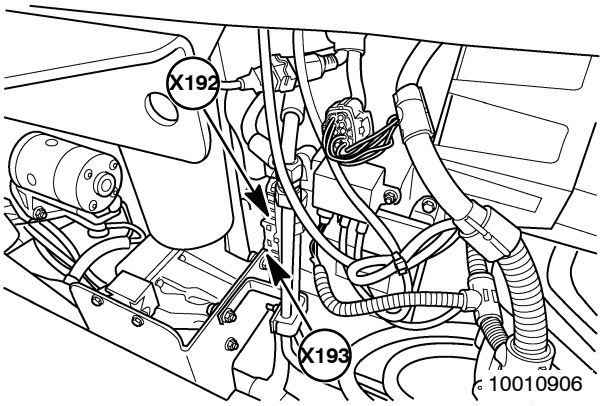
   A. Disconnect the injector harness and engine ECU connector X192. Using a suitable multi-meter check the injector control wiring between pin I of the injector harness connector and pin 28 of X192, engine ECU. Check the wiring for continuity and short to ground. Repair/replace the wiring if a fault is found. If no fault is found continue with step B.

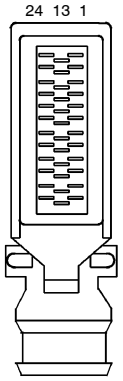
   B. Reconnect connector X192 to the engine ECU. With the keystart ON (not cranking), check for a short to +12V at pin I of the injector harness connector. If a short to +12V is indicated trace the fault and repair the wiring as required. If +12V does not exist continue with step C.

   C. With the keystart OFF, check the wiring on the separate injector harness assembly. Using a suitable multi-meter check across pins I and L, with the injector still connected, the resistance should be approximately 0.56–0.57Ω. Having previously eliminated the injector coil, if an open or short circuit is indicated the fault is in the harness. Replace the harness.

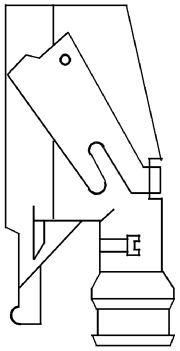
Wiring harness – Electrical schematic frame 03 (A.30.A.88 – C.20.E.03)

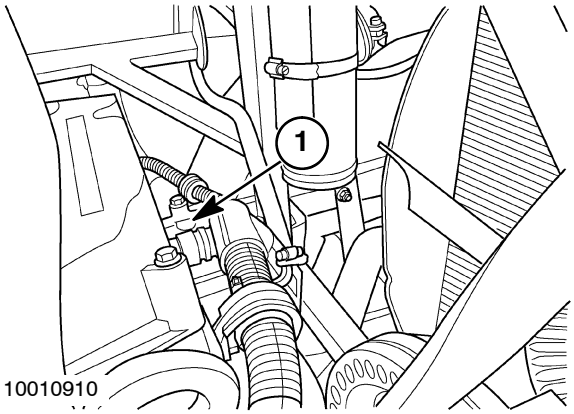
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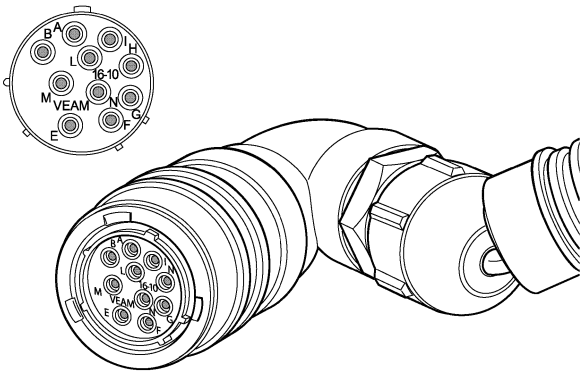




X192
&
X193







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UNIVERSAL DISPLAY PLUS FAULT CODE

0420.2 BATTERY VOLTAGE, DATA INCORRECT
0420.3 BATTERY VOLTAGE, SHORTED TO HIGH SOURCE
0420.4 BATTERY VOLTAGE, SHORTED TO LOW SOURCE

Cause:

Battery voltage to ECU below minimum value (<7V) or above maximum valve (>18V)

Effect on Engine:

Engine enabled – no restriction on fuel or speed

Possible failure modes:

1. Excessive resistance on wiring to ECU.
2. Short to high voltage source (24V starting circuit)
3. Alternator failure

Solution:

When the key switch is turned to the “Run” position, power is sent to the ECU. When the ECU receives this power, it immediately provides a ground path for the K14 ECU Power relay, so that the relay energizes, and provides the main power supply for the ECU. When the key switch is turned to the “Off” position, the ECU continues to provide a ground path for the K14 relay in order to complete a controlled shutdown of the engine. After approximately 5 seconds, the ECU opens the ground path for the K14 relay, disconnecting the main power supply.

The error message “E0420–03 Battery Voltage – Shorted to High Source” will occur if the main power supply through the K14 relay is greater than 18 volts. Start the troubleshooting at step 7.

The error message “E0420–04 Battery Voltage – Shorted to Low Source” will occur if the main power supply through the K14 relay is 5 to 7 volts. The ECU will not power up if the voltage is below 5 volts. Start the troubleshooting at step 1.

1. Turn the key switch to the “Run” position. Check the voltage at fuse F01; it should be approximately 12 volts.
   A. If the voltage is less than 12 volts, there is excessive resistance in the fuse panel wiring to fuse F01. Check the battery cable connection to the fuse panel, and the wiring from the battery cable to fuse F01 on the back of the panel.
   B. If the voltage is approx. 12 volts, continue with step 2.
2. Remove the K14 ECU Power relay from the fuse panel. Check the voltage at the K14 mounting socket pin 3; it should be approx. 12 volts.
   A. If the voltage is less than 12 volts, there is excessive resistance in the fuse panel wiring between fuse F01 and K14 relay pin 3. Inspect wiring and connections.
   B. If the voltage is approx. 12 volts, continue with step 3.
3. Install a jumper wire between pin 3 and pin 5 of the K14 relay mounting socket. Remove **connector X004**, and check the voltage at **connector X004 pin 25**; it should be approx. 12 volts.
   A. If the voltage is less than 12 volts, there is excessive resistance in the cab main (CM) harness between **connector X004 pin 25** and K14 relay mounting socket pin 5 wire 809 white. Inspect the wiring and repair.
   B. If the voltage is approx. 12 volts, continue with step 4.
4. Remove **connector X010**, and check the voltage at **connector X010 pin 28**; it should be approx. 12 volts.
   A. If the voltage is less than 12 volts, there is excessive resistance in the main frame (MF) harness between **connector X004 pin 25** and **connector X010 pin 28** wire 809 white. Inspect the harness and connectors and repair.
   B. If the voltage is approx. 12 volts, continue with step 5.

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5. Remove **connector X193** from the ECU, and check the voltage at **connector X193 pin 3 or 4**; it should be approx. 12 volts.
   A. If the voltage is less than 12 volts, there is excessive resistance in the engine (EN) harness between **connector X010 pin 28** and **connector X193 pin 3 or 4** in one of the following wires:

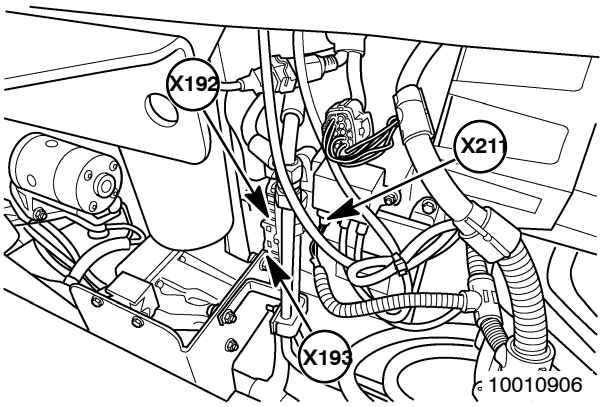
      Wire 809 white, connector X010 pin 28 to harness splice

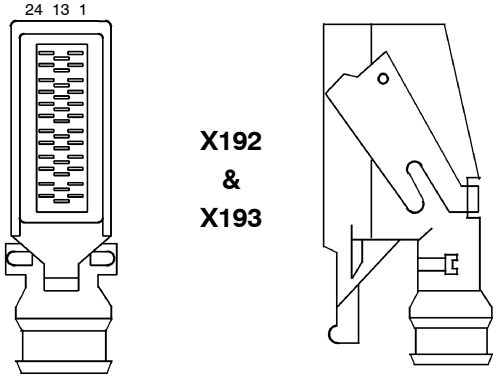
      Wire 810 white, harness splice to connector X193 pin 3

      Wire 811 white, harness splice to connector X193 pin 4

      Inspect the harness and connectors and repair.
   B. If the voltage is approx. 12 volts, continue with step 6.
6. Remove the jumper wire from the K14 relay mounting socket, and install the K14 relay. Remove **connector X211** from the K39 grid heater relay, and check for voltage at **connector X211 pin 1 wire 818 white**; it should be approx. 12 volts.
   A. If the voltage is less than 12 volts, there is a fault in the K14 relay. Replace the relay.
   B. If the voltage is approx. 12 volts, erase the fault code and continue operation.
7. Remove **connector X211** from the K39 grid heater relay, and monitor the voltage at **connector X211 pin 1 wire 818 white**. Have an operator start the engine and run the engine to high idle and back to low idle. The voltage should not exceed 15 volts.
   A. If the voltage exceeds 15 volts, there is a fault with the alternator. Repair the alternator to correct the cause of overcharging.
   B. If the voltage remains under 15 volts, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)





https://truckmanualshub.com/

POWER PRODUCTION - B

Engine Fault Codes - 20.A

INDEX

E0385 ECU defect 92
E0386 EEPROM defect 94
E0393 Main relay defect 96
E0394 Afterrun Not Completed 98
E0397 Shut-off tests 99
E0399 Coolant Temperature sens 101
E0400 Boost Air Temperature 103
E0401 Fuel Temperature sensor 108
E0402 Boost Pressure sensor 106
E0403 Ambient Pressure sensor 110
E0408 Engine Overspeed 111
E0412 INK signal 113
E0413 SEG signal 115
E0414 Cylinder 1 117
E0415 Cylinder 4 119
E0416 Cylinder 2 121
E0417 Cylinder 6 123
E0418 Cylinder 3 125
E0419 Cylinder 5 127
E0402 Battery Voltage 129

https://truckmanualshub.com/

https://truckmanualshub.com/

Index

POWER PRODUCTION - B

FUEL AND INJECTION SYSTEM - 20.A

Electrical control Relay - Incorrect value (B.20.A.91.21 - G.30.C.10) 31
AFX8010

Electrical control Relay - Short circuit to B+ (B.20.A.91.21 - G.30.B.54) 34
AFX8010

Electrical control Relay - Short circuit to ground (B.20.A.91.21 - G.30.B.53) 37
AFX8010

FUEL AND INJECTION SYSTEM - General specification (B.20.A - D.40.A.10) 5
AFX8010

FUEL AND INJECTION SYSTEM - Overview (B.20.A - C.10.A.10) 11
AFX8010

FUEL AND INJECTION SYSTEM - Special tools (B.20.A - D.20.A.40) 7
AFX8010

FUEL AND INJECTION SYSTEM - Static description (B.20.A - C.30.A.20) 12
AFX8010

Fuel filter system - Torque (B.20.A.24 - D.20.A.10) 7
AFX8010

Fuel injector - Dimension (B.20.A.29 - D.40.A.30) 7
AFX8010

Fuel injector - Dynamic description (B.20.A.29 - C.30.A.10) 15
AFX8010

Fuel injector - Install (B.20.A.29 - F.10.A.15) 23
AFX8010

Fuel injector - Overview (B.20.A.29 - C.10.A.10) 13
AFX8010

Fuel injector - Preload (B.20.A.29 - F.45.A.30) 30
AFX8010

Fuel injector - Remove (B.20.A.29 - F.10.A.10) 21
AFX8010

Fuel injector - Special tools (B.20.A.29 - D.20.A.40) 8
AFX8010

Fuel injector - Static description (B.20.A.29 - C.30.A.20) 14
AFX8010

Fuel injector - Torque (B.20.A.29 - D.20.A.10) 7
AFX8010

Fuel lift pump - Torque (B.20.A.34 - D.20.A.10) 10
AFX8010

Fuel lift pump Electrical fuel pump - Overview (B.20.A.34.22 - C.10.A.10) 17
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 40
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 41
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 50
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 59
AFX8010

Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 68
AFX8010
Injection control - Incorrect value (B.20.A.92 - G.30.C.10) 75
AFX8010
Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 44
AFX8010
Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 53
AFX8010
Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 62
AFX8010
Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 69
AFX8010
Injection control - Short circuit to B+ (B.20.A.92 - G.30.B.54) 78
AFX8010
Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 47
AFX8010
Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 56
AFX8010
Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 65
AFX8010
Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 72
AFX8010
Injection control - Short circuit to ground (B.20.A.92 - G.30.B.53) 79
AFX8010
Sensing system - Torque (B.20.A.95 - D.20.A.10) 10
AFX8010
Sensing system Differential pressure switch - Overview (B.20.A.95.82 - C.10.A.10) 19
AFX8010
Sensing system Level sensor - Open circuit (B.20.A.95.90 - G.30.B.50) 86
AFX8010
Sensing system Level sensor - Overview (B.20.A.95.90 - C.10.A.10) 18
AFX8010
Sensing system Level sensor - Short circuit to B+ (B.20.A.95.90 - G.30.B.54) 80
AFX8010
Sensing system Level sensor - Short circuit to ground (B.20.A.95.90 - G.30.B.53) 83
AFX8010
Sensing system Temperature sensor - Overview (B.20.A.95.89 - C.10.A.10) 20
AFX8010

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POWER PRODUCTION - B

AIR INTAKE SYSTEM - 30.A

AFX8010

https://truckmanualshub.com/

Contents

POWER PRODUCTION - B

AIR INTAKE SYSTEM - 30.A

TECHNICAL DATA

AIR INTAKE SYSTEM - General specification (B.30.A - D.40.A.10) 4
AFX8010

Turbocharger

Turbocharger - Torque (B.30.A.31 - D.20.A.10) 4
AFX8010

Sensing system

Sensing system - Torque (B.30.A.95 - D.20.A.10) 4
AFX8010

FUNCTIONAL DATA

Sensing system

Sensing system Air cleaner restriction - Overview (B.30.A.95.95 - C.10.A.10) 5
AFX8010

Sensing system Manifold pressure sensor - Overview (B.30.A.95.82 - C.10.A.10) 6
AFX8010

Sensing system Air temperature sensor - Overview (B.30.A.95.80 - C.10.A.10) 7
AFX8010

SERVICE

Air cleaner

Air cleaner - Remove (B.30.A.25 - F.10.A.10) 8
AFX8010

Air cleaner - Cleaning (B.30.A.25 - F.30.A.10) 11
AFX8010

Air cleaner - Install (B.30.A.25 - F.10.A.15) 13
AFX8010

Air cooler

Air cooler - Remove (B.30.A.32 - F.10.A.10) 15
AFX8010

Air cooler - Install (B.30.A.32 - F.10.A.15) 17
AFX8010

DIAGNOSTIC

Sensing system

Sensing system Air cleaner restriction - Short circuit to B+ (B.30.A.95.95 - G.30.B.54) 19
AFX8010

https://truckmanualshub.com/

Sensing system Air cleaner restriction - Open circuit (B.30.A.95.95 - G.30.B.50) 24
AFX8010

Sensing system Air temperature sensor - Incorrect value (B.30.A.95.80 - G.30.C.10) 29
AFX8010

Sensing system Air temperature sensor - Short circuit to B+ (B.30.A.95.80 - G.30.B.54) 33
AFX8010

Sensing system Air temperature sensor - Short circuit to ground (B.30.A.95.80 - G.30.B.53) 37
AFX8010

https://truckmanualshub.com/

AIR INTAKE SYSTEM - General specification (B.30.A - D.40.A.10)

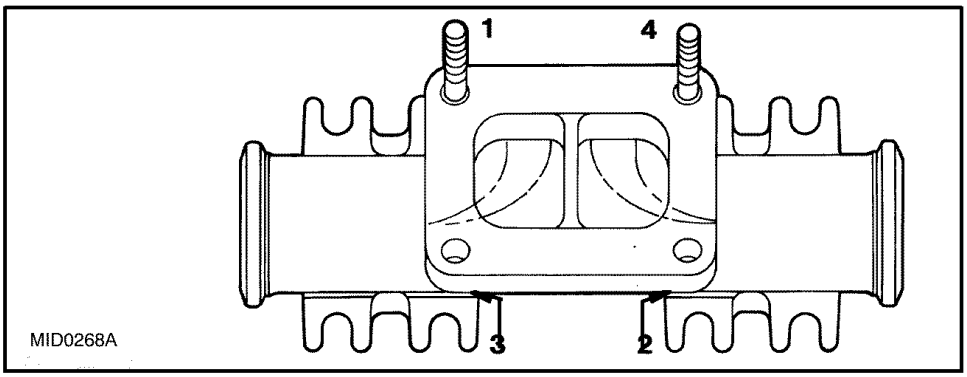
AFX8010

Air cleaning	Dual cartridge dry air filter, with clogged filter indicator with centrifugal pre-filter and automatic dust ejector
Turbocharger:- Holset type	HX50W9861 B A/P 22PC3

Turbocharger - Torque (B.30.A.31 - D.20.A.10)

AFX8010

Screws and nuts securing turbocharger (Before assembly, lubricate with engine oil)	M10x1.5



mid0268a 1

Torque Sequence

Pre-torque	**26 - 41 Nm**	**19 - 29 lb ft**
Torque	**44 - 48 Nm**	**33 - 35 lb ft**

Sensing system - Torque (B.30.A.95 - D.20.A.10)

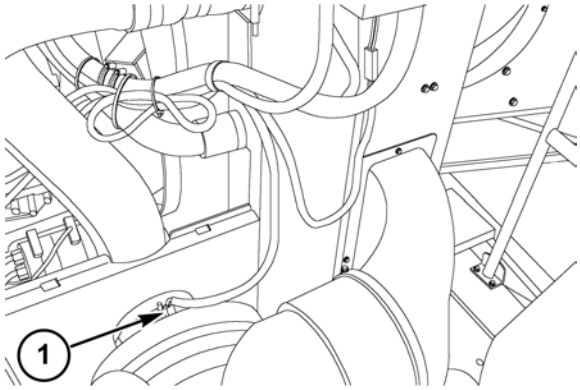
AFX8010

Air temperature transmitter fixing	M16x1.5	**30 - 35 Nm**	**22 - 26 lb ft**
Pulse transmitter fixing	M6x1	**6 - 10 Nm**	**53 - 87 lb ft**

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Sensing system Air cleaner restriction - Overview (B.30.A.95.95 - C.10.A.10)

AFX8010



40033786A4 1

The Air Filter Switch S-61 **(1)** monitors the air pressure inside the intake manifold, and sends the information to the CCM2 module connector **X016** pin J2-29. When the filter becomes clogged with debris, and the air intake pressure drops significantly, an alarm message "A0005 Air Filter RESTRICTION" will be displayed to the operator.

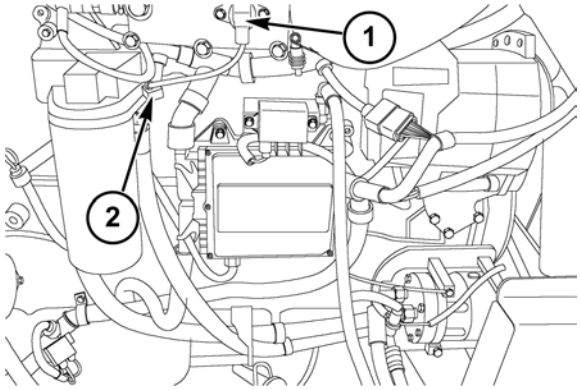
The air filter switch circuit is monitored by the CCM2 module; in the event that a fault occurs with the switch itself of the wiring to the switch, a fault code will be displayed to the operator.
E0163-03 - Air Filter Sensor
E0163-05 - Air Filter Sensor

For additional information on the air filter switch circuit, refer to: **Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**

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Sensing system Manifold pressure sensor - Overview (B.30.A.95.82 - C.10.A.10)

AFX8010



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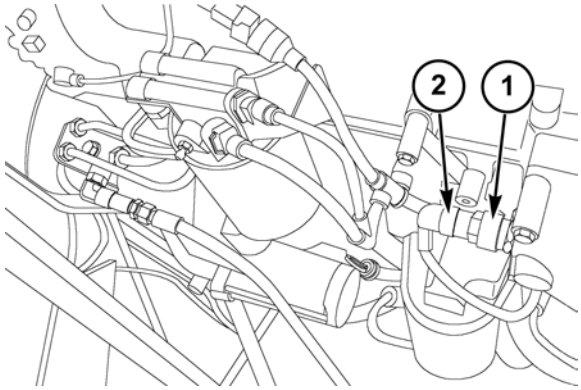
The Engine Boost Pressure sensor B-23 **(1)** measures the amount of air pressure in the inlet manifold, and sends this information to the ECU module connector **X192** pins 12, 17 & 23. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module: in the event hat a fault occurs with teh sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0402-02 Boost Pressure Sensor Data Incorrect
E0402-03 Boost Pressure Sensor Short to High Source
E0402-04 Boost Pressure Sensor Short to Low Source

For additional information on the engine boost pressure sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Sensing system Air temperature sensor - Overview (B.30.A.95.80 - C.10.A.10)

AFX8010



40033790D4 1

The Air Temperature Sensor B-54 **(1)** monitors the temperature of the air in the intake manifold and sends the information to the ECU module connector **X192** pins 4 & 21. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0400-02 Boost Air Temperature Data Incorrect
E0400-03 Boost Air Temperature Short to High Source
E0400-04 Boost Air Temperature Short to Low Source

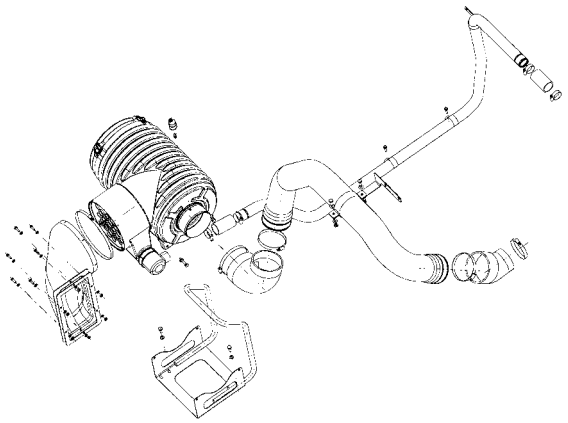
For additional information on the air temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Air cleaner - Remove (B.30.A.25 - F.10.A.10)

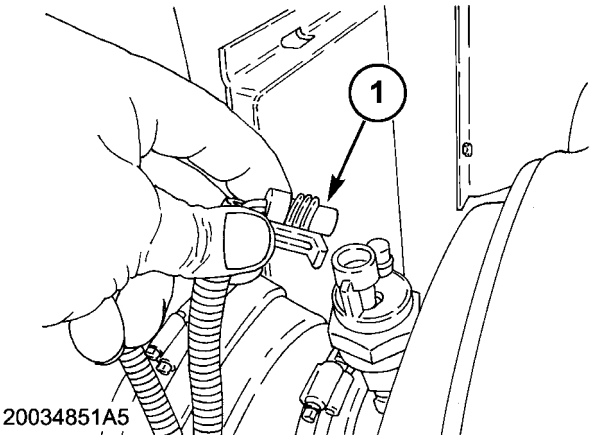
AFX8010

1. Pay attention to air box orientation



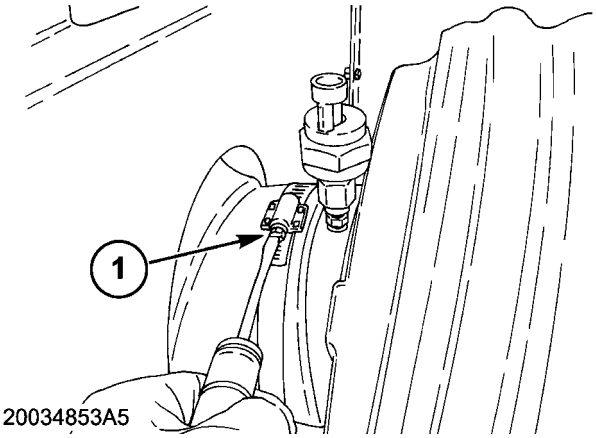
50034881 1

2. Remove the harness connector **(1)** to the restriction sensor on the air box housing.



20034851A5 2

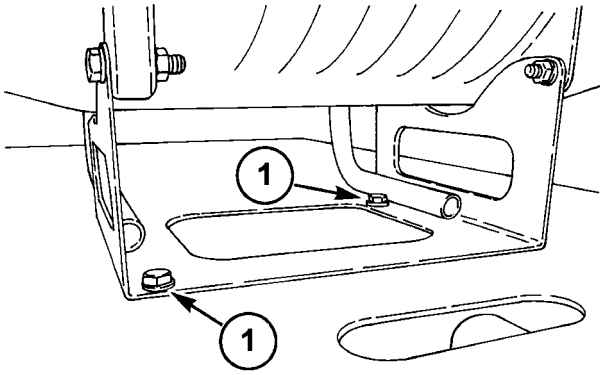
3. Loosen the three worm gear hose clamps **(1)** attached to the tubing.



20034853A5 3

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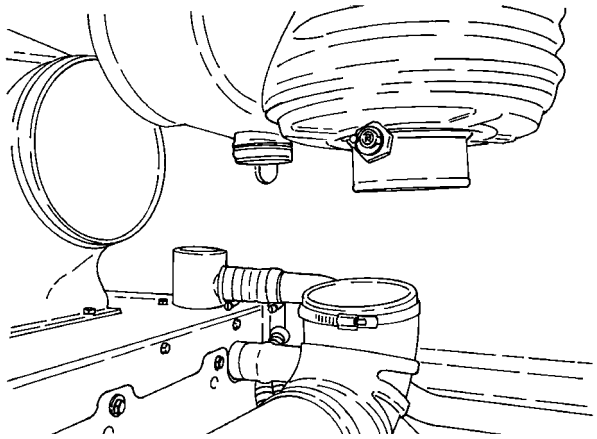
4. Remove the two bolts **(1)** securing the air box frame to the deck. The bolts are secured by weld nuts so they can be removed easily by one person.



20034849A5

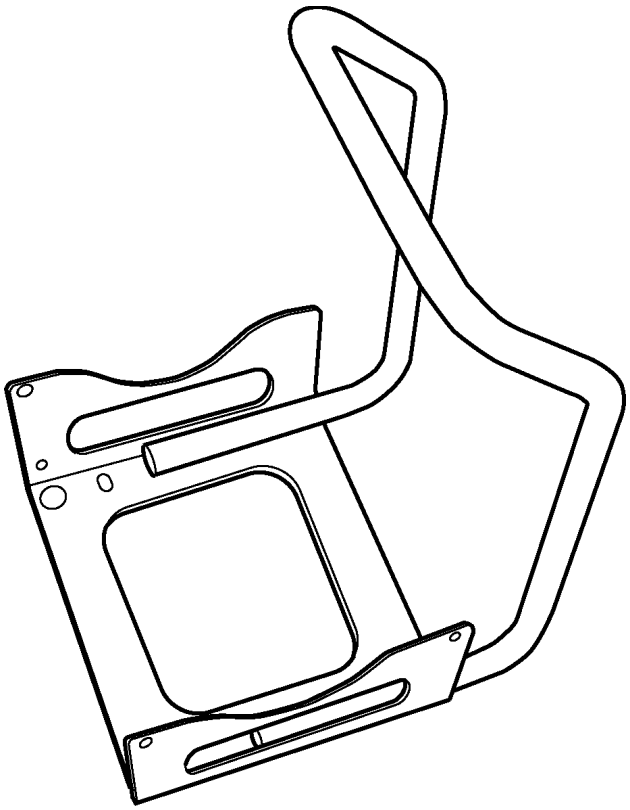
20034849A5 4

5. Carefully move the air box and frame together to pull the unit away from the tubing.



20034856 5

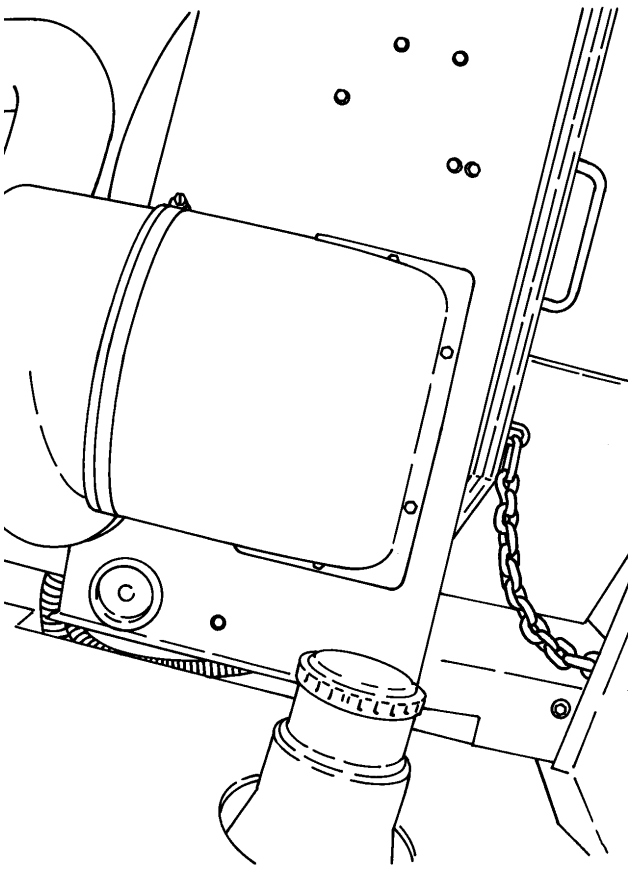
6. To remove the tube frame from the air box, remove the four bolts from the frame securing the air box to it.



10034858 6

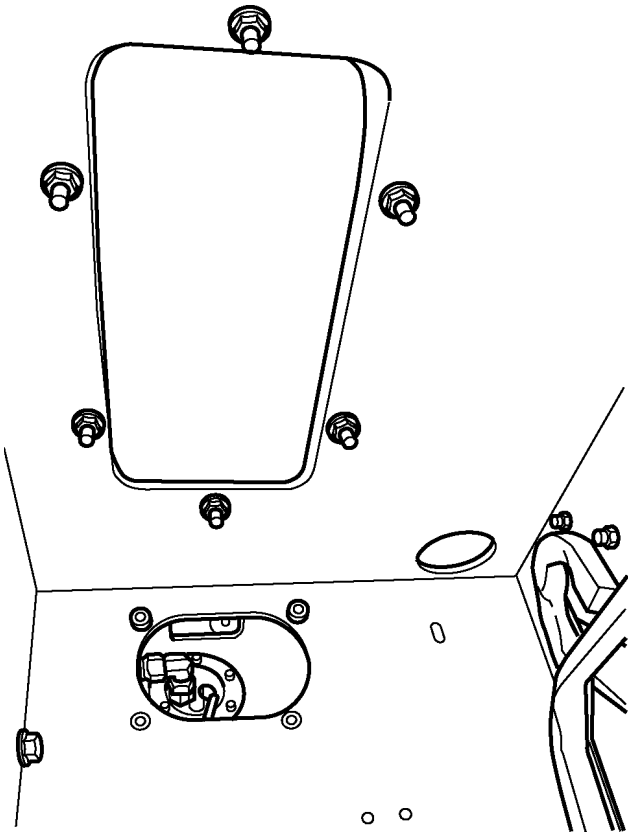
https://truckmanualshub.com/

7. To remove the air plenum from the cooler housing, remove the six bolts securing it to the housing.



20034857B 7

8. To gain access to the inside of the cooler housing to aid in removing the bolts, open the rotary screen service door.



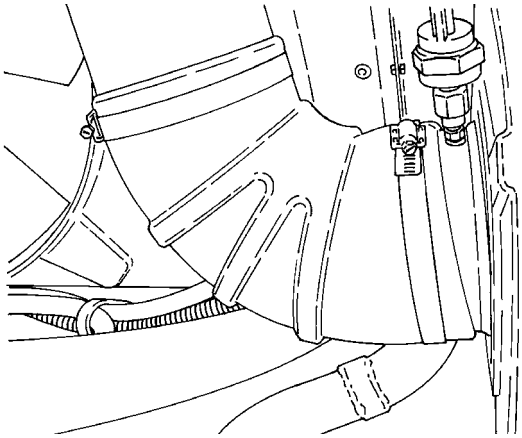
10034861 8

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Air cleaner - Cleaning (B.30.A.25 - F.30.A.10)

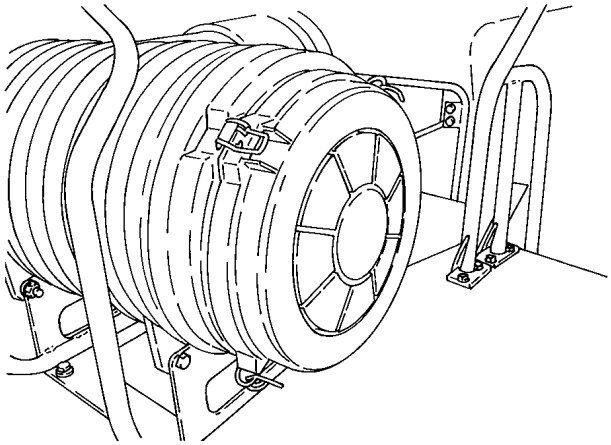
AFX8010

1. The filter element should only be cleaned when there is an alarm stating "Air filter blocked" (625 mm) (24 - 5/8" vacuum)" on the display monitor in the cab.



20034854 1

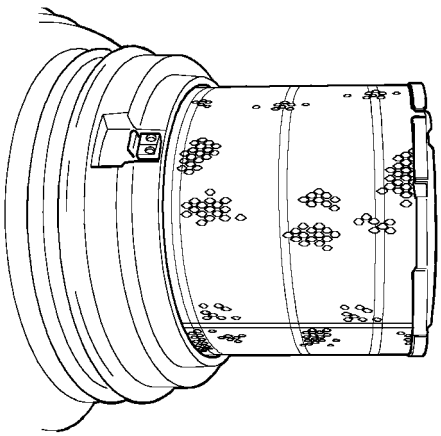
2. To remove the air cleaner element, remove cover by loosening clamps.



20030145 2

3. Remove the primary filter from housing. Do not let dirt fall on the safety filter.

IMPORTANT: *Do not remove safety element unless it is to be replaced.*



50030146 3

4. To clean the element, hold the top and tap it against the palm of the other hand to remove the dust. Never tap it on a hard surface or you can damage the filter.
5. When tapping does not remove the dirt, direct compressed air through the element, from the inside towards the outside.

NOTE: *Never blow compressed air from the outside to the inside of the filter because particles can become embedded or lodged in the filter and later be released into the engine causing damage.*

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6. To prevent damage to the element when cleaning with compressed air, take the following precautions: 1) Maximum air pressure should not exceed 5 Bar or 72.5 psi. 2) Move the nozzle up and down when rotating the element. 3) Keep the nozzle at least 25 mm (1" inch.) from the pleated paper.

NOTE: *To keep the interval acceptable it is highly recommended to clean the element with compressed air.*

7. If the element is soiled with oil or soot, it is possible to dip the filter in and out of a bucket containing 75 grams (0.165 lbs.) of non-sudsey detergent and 10 liters (2.6 US gal.) and lukewarm water. Once the filter appears to be clean rinse the filter off lightly with clean water to remove the soap.

NOTE: *Do not allow water to get into the inside of the filter. Always keep the open end up while dipping.*

NOTE: *Do not use high pressure water to clean the filter when rinsing. Use only low pressure tap water.*

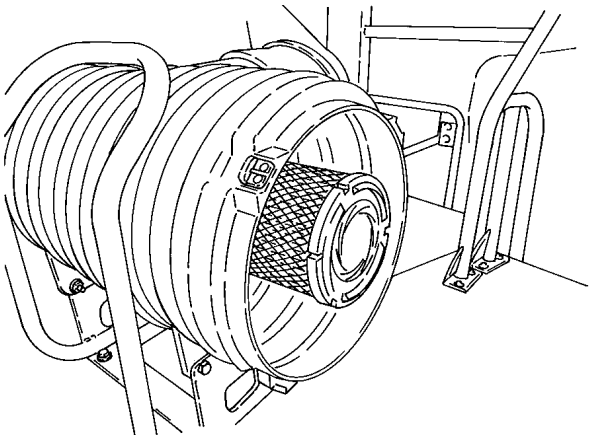
NOTE: *Never use Gasoline or Diesel fuel to clean the Air filter element.*

8. Every time the element is cleaned, it should be examined for holes and cracks by holding an electric light bulb inside the element and looking through it. If any damage is noted, discard the element and fit a new one.

9. Replace the element after 3 cleanings or once a year, whichever comes first.

10. When fitting, make sure the element is seated properly and the sealing is in good condition.

11. A safety element is fitted as an additional security to prevent dust from entering the engine when replacing the standard element. The safety element should normally not be cleaned. Replace the safety element when the primary element is changed.



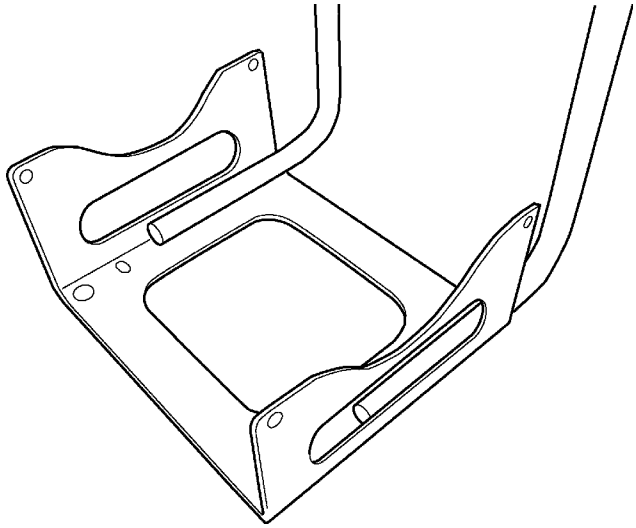
20030147 4

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Air cleaner - Install (B.30.A.25 - F.10.A.15)

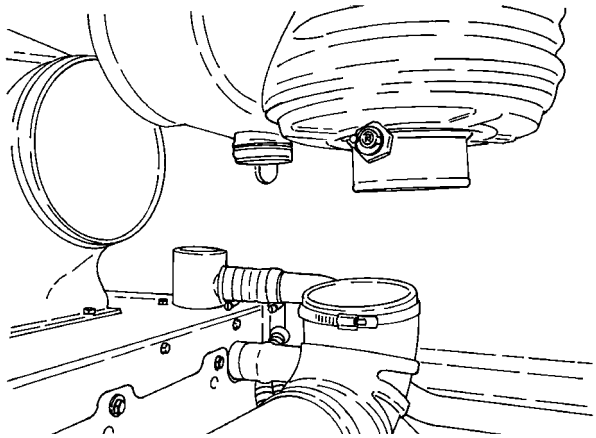
AFX8010

1. To install the air box first attach the frame to the air box using four M8 x 60mm bolts.



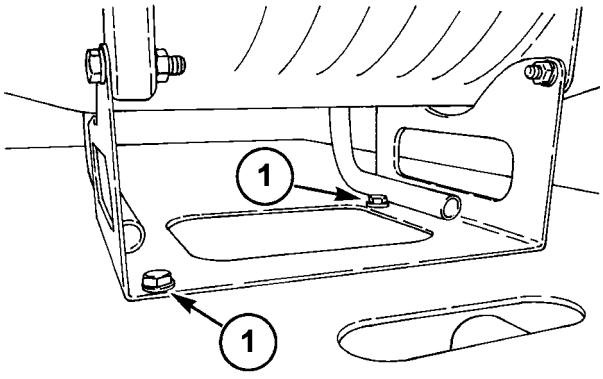
10034859 1

2. Next, position the air box so all the ducting is lined up. Attach the air box to the plenum and the air inlet tubes.



20034856 2

3. Secure the air box frame to the floor using M8 hardware.

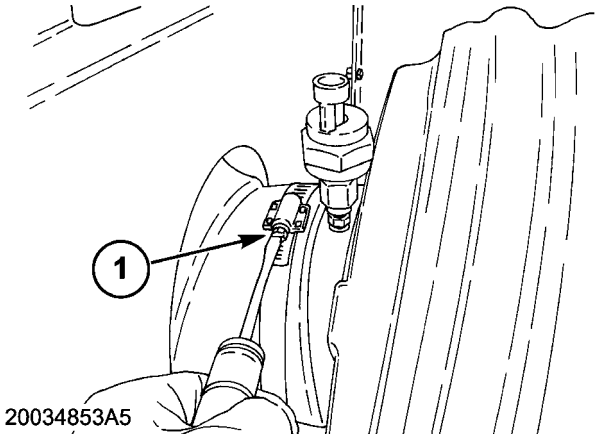


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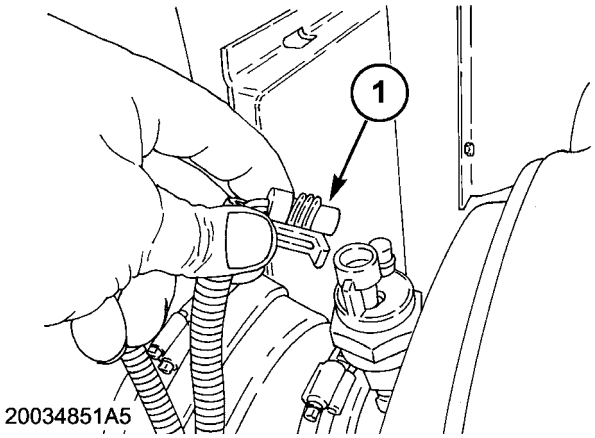
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4. Tighten all the clamps on the duct tubes connecting to the air box.



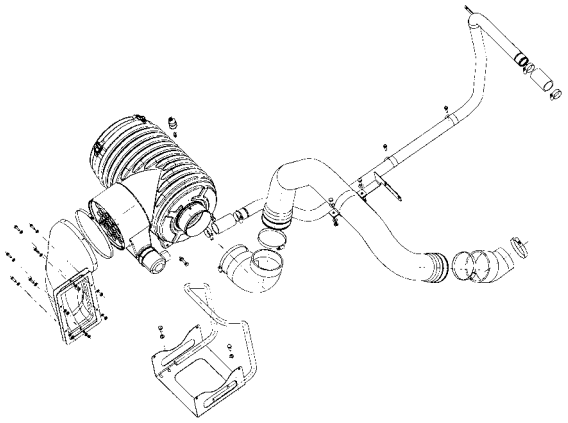
20034853A5 4

5. Connect the air restriction sensor connector harness.



20034851A5 5

6. Be sure all connections and routing is correct.



50034881 6

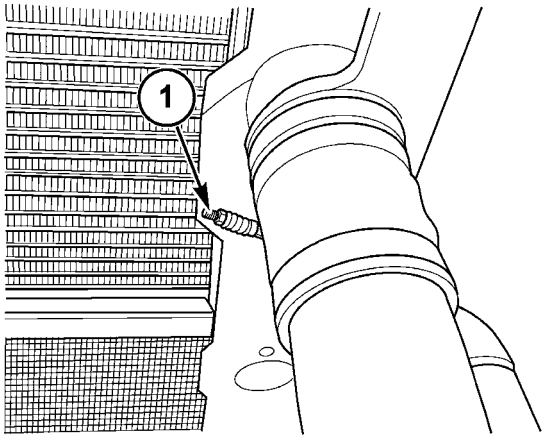
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Air cooler - Remove (B.30.A.32 - F.10.A.10)

AFX8010

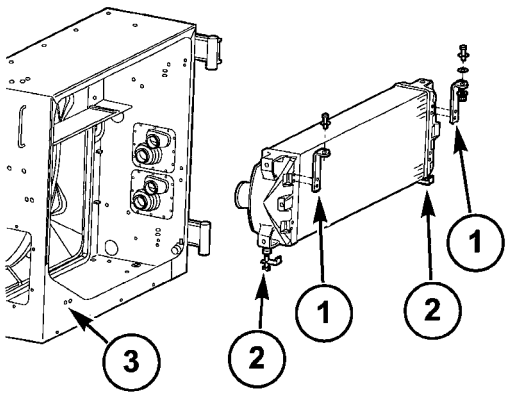
Prior operation: For access to the intercooler, engine shielding may be removed. **Engine hood - Remove (E.20.A.72 - F.10.A.10)**
Prior operation: The engine fan and shroud may also be removed for improved accessibility.**Fan and drive - Remove (B.50.A.54 - F.10.A.10)Radiator Wiper - Remove (B.50.A.32.65 - F.10.A.10)**

1. Loosen the spring clamps **(1)** on the air cooler inlet/outlet hoses.



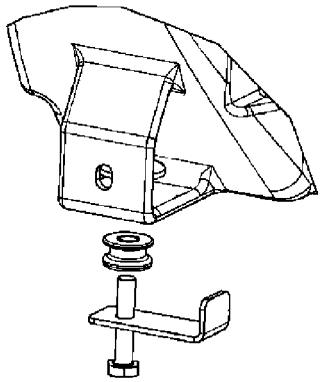
10034879A5 1

2. Remove the brackets and hardware **(1)** attaching to the top front of the cooler to the housing **(3)**. First remove the bolts through the cooler housing. Then remove the bolts that fasten the brackets to the cooler **(2)**.



50040346A5 2

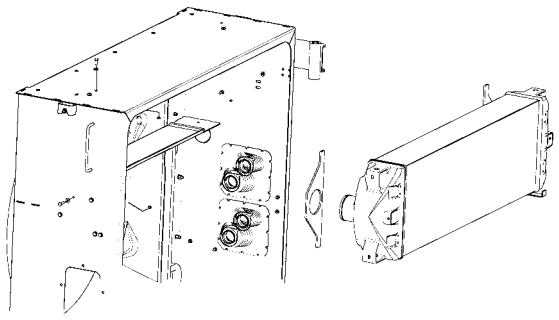
3. Remove the two bolts on each side of the lower section of the cooler to the housing.



50034938 3

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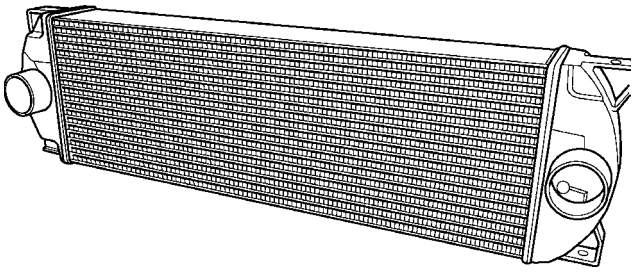
4. With all the hardware and brackets removed, the cooler is retained only by hoses. Remove hose as cooler is removed. Careful to not damage the cooler.



50034909 4

5. The cooler can now be removed from the housing.

IMPORTANT: *Although the air cooler can be removed by one person, use caution while working on the side of the machine, and be careful to not damage the cooler.*



10034878 5

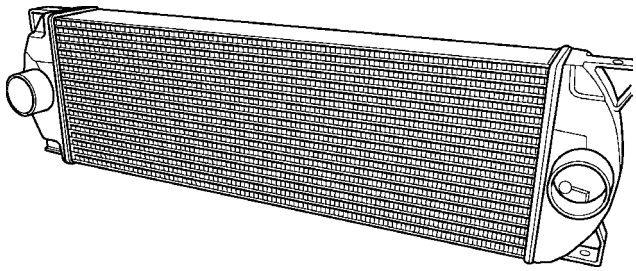
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Air cooler - Install (B.30.A.32 - F.10.A.15)

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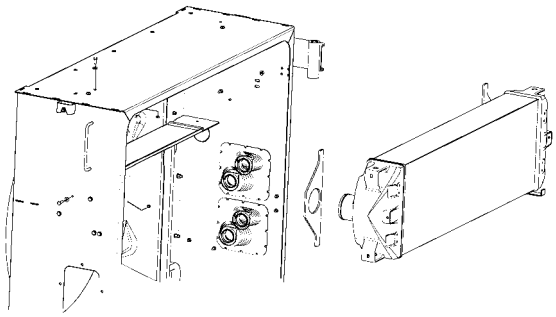
Prior operation: Inspect all intercooler seals inside the cooler housing for damage and integrity before installation of the cooler, including isolation mounts.

1. Check the cooler to be sure there is no noticeable damage.



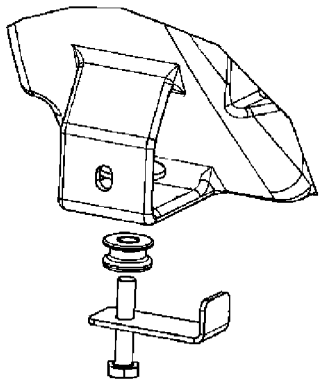
10034878 1

2. Place the cooler into the cooler housing.



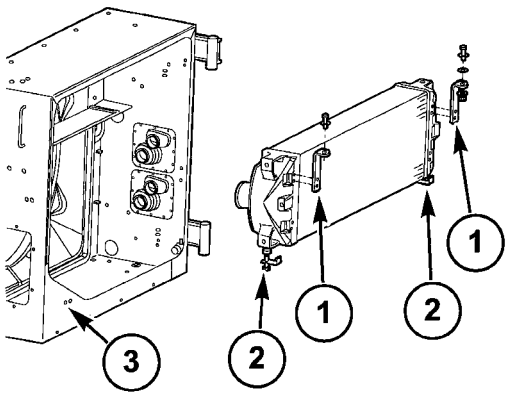
50034909 2

3. Adjust the cooler so the lower mounting holes align with the cooler housing holes. Install the hardware with the isolation mount configuration, but do not torque at this time.



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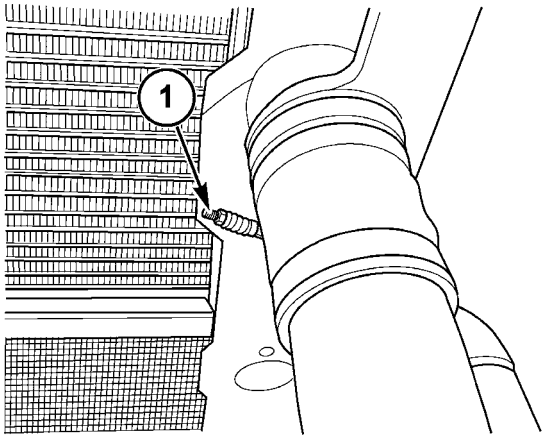
4. Install the top mounting brackets **(1)**.
   Mount the support brackets **(1)** to the front of the cooler and torque the M8 x 25mm hardware to **18 Nm** (**13 lb ft**).
   Install the hardware through the support bracket and the cooler housing **(3)** with the ISO mount configuration installed. Torque the M10 x 50mm hardware to **26.5 Nm** (**19.5 lb ft**).
   Go back to the lower mounting hardware **(2)** on the cooler and torque to **26.5 Nm** (**19.5 lb ft**).



50040346A5 4

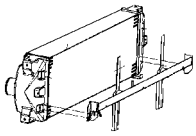
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5. Install the cooler inlet/outlet hoses to the cooler. Be sure hoses slide far enough on to assure proper clamping. Torque the spring clamps **(1)** to **6 Nm** (**4 lb ft**).



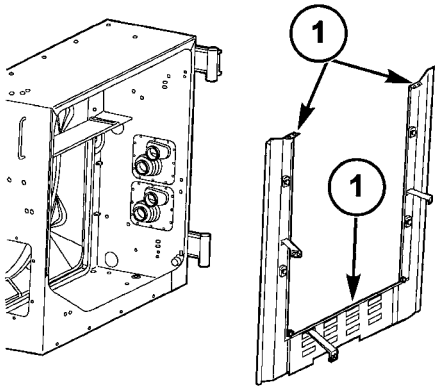
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6. Install the chaff wiper assembly and torque the hardware to **18 Nm** (**13 lb ft**).



50034902u 6

7. Install shielding **(1)** back into cooler housing.



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Sensing system Air cleaner restriction - Short circuit to B+ (B.30.A.95.95 - G.30.B.54)

AFX8010

E0163-03 - Air Filter Sensor

Cause:
The engine air filter switch (S-61) circuit is shorted to 12 volts.

Possible failure modes:

1. Switch supply or signal wiring shorted to **12 volts**.
2. Switch ground path open.
3. Engine controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "AIR FILTER SEN" to check the voltage range.

   The proper voltage range for the engine air filter switch (key On, engine OFF or Running) is **0.3 - 5.2 volts**.

   A. If the voltage reading is high out of range (>**5.2 volts**), continue with Step **2**.

   B. If the voltage is in the proper range, the shorted wire may not be energized at this time. Continue with Step **7**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the resistor plug at connector **X330**. Use a multimeter to check for voltage on connector **X330** pin B. There should be **5 volts** present.

   A. If high (>**5.5 volts**) voltage is found, the regulated voltage supply is incorrect. The error "
   E0165-03 - CCM2 J2 5V Reference
   " should be listed in the Universal Display Plus "ERROR" screen. Correct that error, and then check to determine if this error has been resolved.

   B. If correct voltage is found, continue with Step **3**.

3. Disconnect the air filter pressure switch connector **X202**. Use a multimeter to check for continuity between connector **X202** pin 1 and chassis ground.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, continue with Step **4**.

4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X010** pin 14 and chassis ground.

   A. If there is continuity, there is an open circuit in the engine (EN) harness between connector **X010** pin 14 and connector **X202** pin 1 wire 851 blue or 468 blue. Locate the open and repair.

   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X010** pin 14 and connector **X016** pin J2-14 wire 468 blue, 425 blue or 465 blue. Locate the open and repair.

5. Disconnect the air filter pressure switch connector **X202**. Use a multimeter to check for voltage between connector **X202** pin 2 and chassis ground.

   A. If high (>**5.5 volts**) voltage is found, continue with Step **6**.

   B. If no voltage is found, continue with Step **7**.

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6. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for voltage on the main frame (MF) harness end of connector **X010** pin 8.

   A. If no voltage is found, there is a short in the engine (EN) harness between connector **X202** pin 2 and connector **X010** pin 8 wire 864 yellow or 420 yellow. Locate the short and repair.

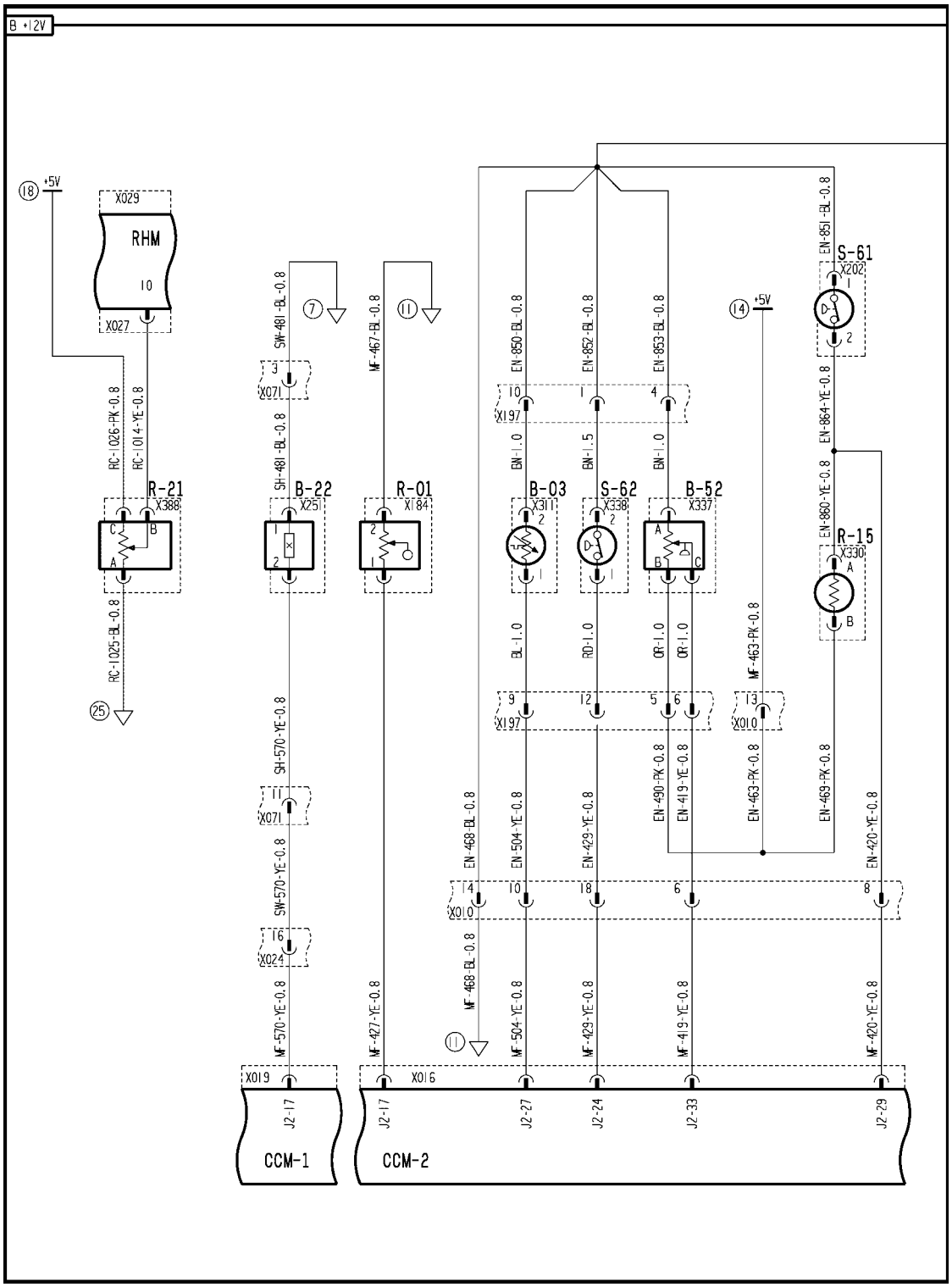
   B. If high (>**5.5 volts**) voltage is found, there is a short in the main frame (MF) harness between connector **X010** pin 8 and connector **X016** pin J2-29 wire 420 yellow. Locate the short and repair.

7. Operate the machine while monitoring Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



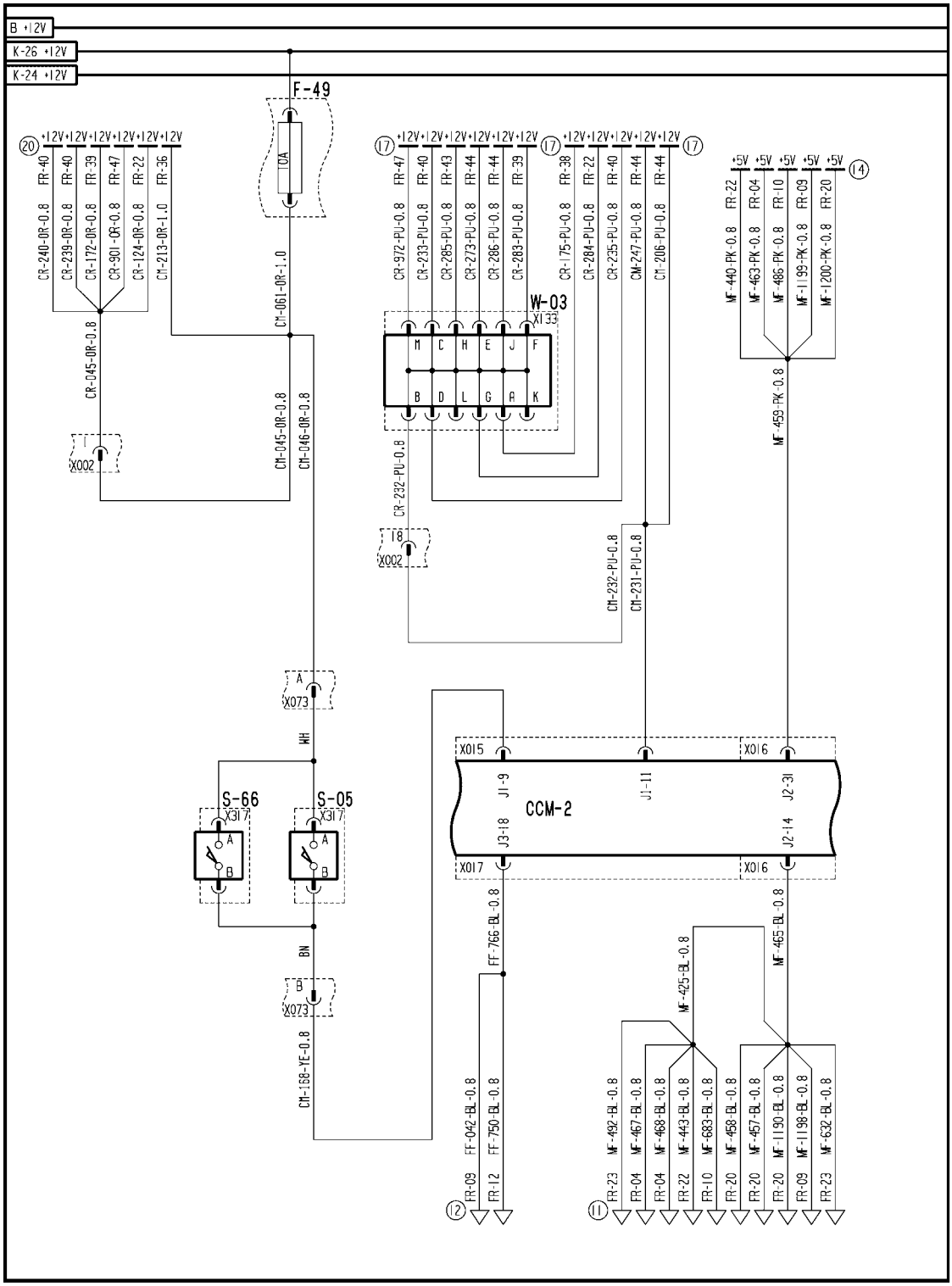
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Air cleaner restriction - Open circuit (B.30.A.95.95 - G.30.B.50)

AFX8010

E0163-05 - Air Filter Sensor

Cause:
The engine air filter switch (S-61) circuit is open or shorted to ground.

Possible failure modes:

1. Switch signal wiring open or shorted to ground.
2. Loss of power to the switch.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "AIR FILTER SEN" to check the voltage range.

   The proper voltage range for the engine air filter switch (key On, engine Off or Running) is - **0.3 - 5.2 volts**.

   A. If the voltage reading is low out of range continue with Step **2**.

   B. If the voltage is normal the shorted wire may not be grounded at this time. Continue with Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the resistor plug at connector **X330** . Use a multimeter to check for voltage on connector **X330** pin B. There should be **5 volts** present.

   A. If no voltage is found, continue with Step **3**.

   B. If correct voltage is found, continue with Step **5**.

3. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for voltage on the main frame (MF) harness end of connector **X010** pin 13. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the engine (EN) harness between connector **X330** pin B and connector **X010** pin 13 wire 469 pink or 463 pink. Locate the open and repair.

   B. If no voltage is found, continue with Step **4**.

4. Carefully disconnect the main frame (MF) harness from the CCM2 module at connector **X016**. Use a multimeter to check for voltage on the CCM2 module connector **X016** pin J2-31. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the main frame (MF) harness between connector **X010** pin 13 and connector **X016** pin J2-31 wire 459 pink or 463 pink. Locate the open and repair.

   B. If no voltage is found, there is an internal fault with the CCM2 module. Replace the module.

5. Disconnect the air filter pressure switch connector **X202** and resistor plug at connector **X330**. Use a multimeter to check for continuity between connector **X202** pin 2 and chassis ground.

   A. If there is continuity to ground, continue with Step **6**.

   B. If there is no continuity to ground, continue with step **7**.

6. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the main frame harness end of connector **X010** pin 8 and chassis ground.

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A. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X010** pin 8 and connector **X016** pin J2-29 wire 420 yellow. Locate the short and repair.

B. If there is no continuity to ground, there is a short to ground in the engine (EN) harness between connector **X010** pin 8 and connector **X202** pin 2 wire 864 yellow, 860 yellow or 420 yellow. Locate the short and repair.

7. Carefully disconnect the main frame (MF) harness from the CCM2 module at connector **X016**. Install a jumper wire between the harness end of connector **X016** pin J2-29 and chassis ground. Use a multimeter to check for continuity between connector **X202** pin 2 and chassis ground, and between connector **X330** pin A and chassis ground.

   A. If continuity is found from both connectors, continue with Step **9**.

   B. If no continuity is found, continue with Step **8**.

8. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X010** pin 8 and chassis ground.

   A. If there is continuity, there is an open circuit in the engine (EN) harness between connector **X010** pin 8, connector **X330** pin A and connector **X202** pin 2 wire 420 yellow, 860 yellow or 864 yellow. Locate the open and repair.

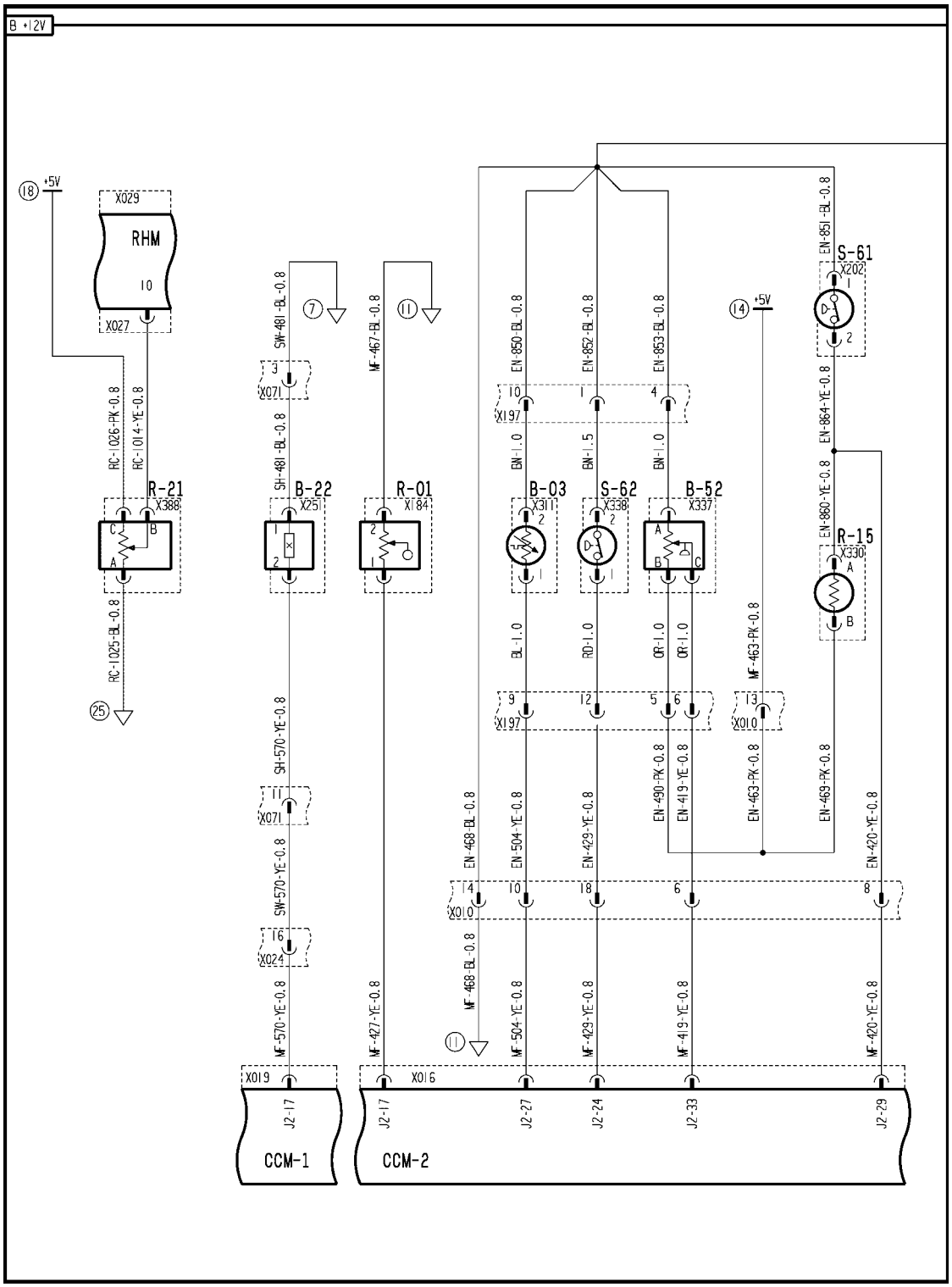
   B. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X010** pin 8 and connector **X016** pin J2-29 wire 420 yellow. Locate the open and repair.

9. Operate the machine while monitoring Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated , erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



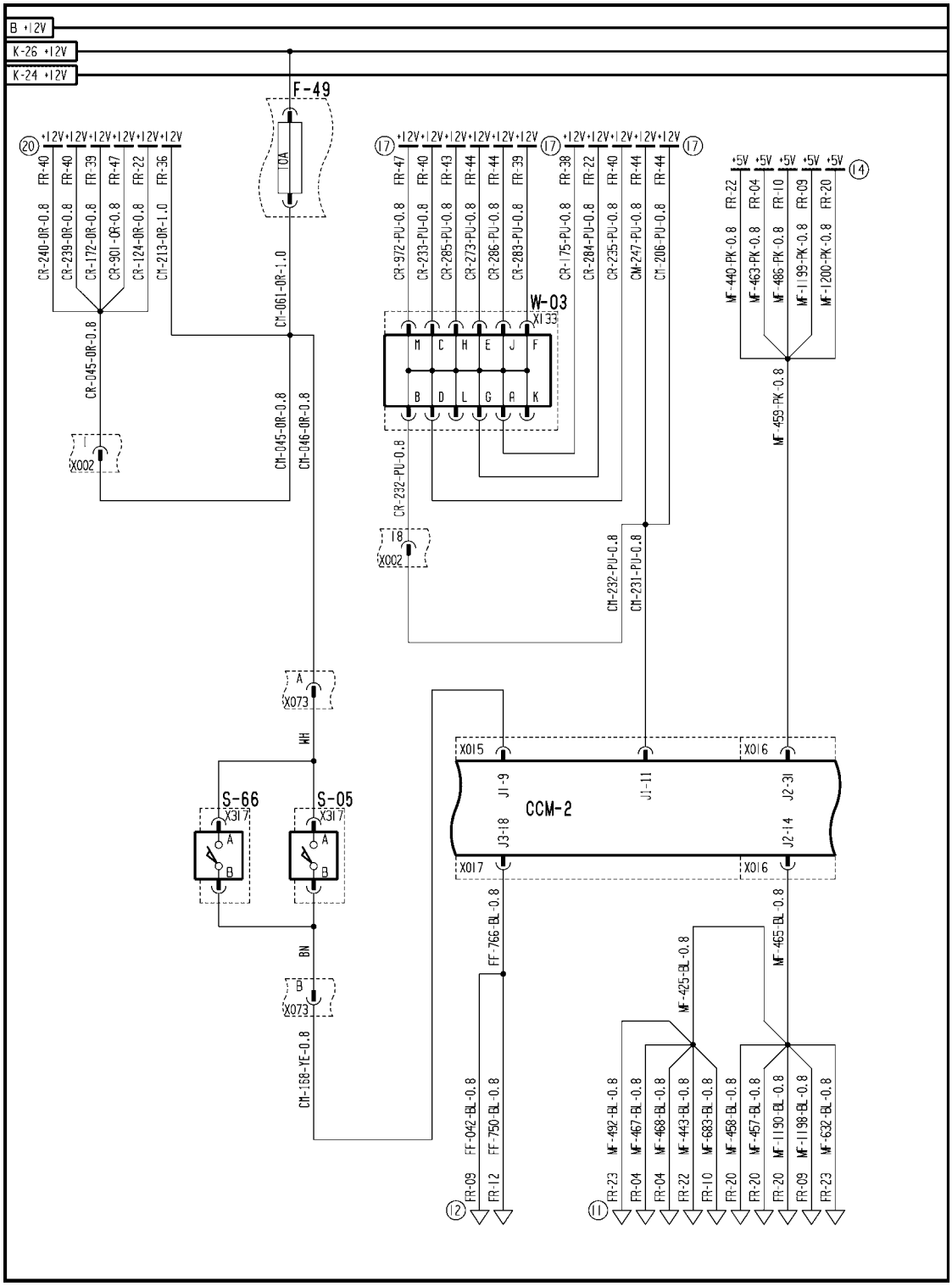
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Air temperature sensor - Incorrect value (B.30.A.95.80 - G.30.C.10)

AFX8010

E0400-02 - Boost Air Temperature

Cause:
Signal range outside threshold limits
Signal not plausible or intermittent fault

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

1. Faulty sensor
2. Faulty connector or wiring

Solution:

1. Harness connector fault

   A. Inspect the harness connector **X374** onto the air temp sensor B-54. Ensure that the connector is not damaged, the pins are correctly located in the connector body and that it is a tight fit onto the sensor.

   B. If the harness connector is okay, continue with step **3**.

2. Air Temp Sensor B54 Fault: To test the sensor measure the resistance across pins 1 and 2 of the sensor. The resistance will vary according to the temperature detailed in the table below:

	Resistance in Ohms		
Ambient Air Temperature	**Minimum**	**Nominal**	**Maximum**
-40 °C (-40 °F)	**38313 ohms**	**45313 ohms**	**53103 ohms**
-30 °C (-22 °F)	**22362 ohms**	**26114 ohms**	**30258 ohms**
-20 °C (-4 °F)	**13402 ohms**	**15462 ohms**	**17718 ohms**
-10 °C (14 °F)	**8244 ohms**	**9397 ohms**	**10661 ohms**
0 °C (32 °F)	**5227 ohms**	**5896 ohms**	**6623 ohms**
10 °C (50 °F)	**3396 ohms**	**3792 ohms**	**4222 ohms**
20 °C (68 °F)	**2262 ohms**	**2500 ohms**	**2760 ohms**
30 °C (86 °F)	**1555 ohms**	**1707 ohms**	**1867 ohms**
40 °C (104 °F)	**1080 ohms**	**1175 ohms**	**1277 ohms**
50 °C (122 °F)	**771 ohms**	**834 ohms**	**900 ohms**
60 °C (140 °F)	**555 ohms**	**595 ohms**	**639 ohms**
70 °C (158 °F)	**408 ohms**	**435 ohms**	**465 ohms**
80 °C (176 °F)	**304 ohms**	**322 ohms**	**342 ohms**
90 °C (194 °F)	**231 ohms**	**243 ohms**	**257 ohms**
100 °C (212 °F)	**178 ohms**	**186 ohms**	**196 ohms**
110 °C (230 °F)	**137 ohms**	**144 ohms**	**152 ohms**
120 °C (248 °F)	**106 ohms**	**112 ohms**	**119 ohms**
130 °C (266 °F)	**84 ohms**	**89 ohms**	**95 ohms**

   A. If the sensor resistance is incorrect, replace the sensor.

   B. If the sensor resistance is correct, continue with step **3**.

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3. Wiring faulty

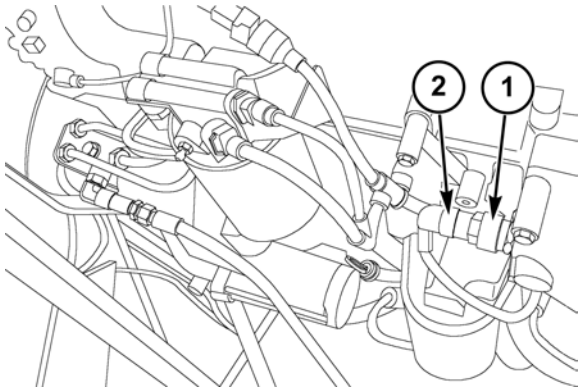
   A. Check the wiring from the engine ECU to the sensor connector. With the keystart ON, +5V should be measured on pin 1 of sensor connector **X374** (+5V common line). If ZERO volts is indicated check for an Open Circuit or Short to ground back to the engine ECU , connector **X192**, pin 21. Trace fault and repair wiring as required. If wiring to pin 1 is okay continue with step B.

   B. With the keystart OFF, continuity to ground should be indicated on pin 2 of sensor connector **X374** (ground common line). If no ground is indicated, check for an Open circuit back to the engine ECU, connector **X192**, pin

4. Trace fault and repair wiring as required.

   A. With the keystart ON, check pin 2 for a short to **+12 volts**. If **+12 volts** is indicated trace fault and repair wiring to pin 2.

Sensing system Air temperature sensor - Overview (B.30.A.95.80 - C.10.A.10)



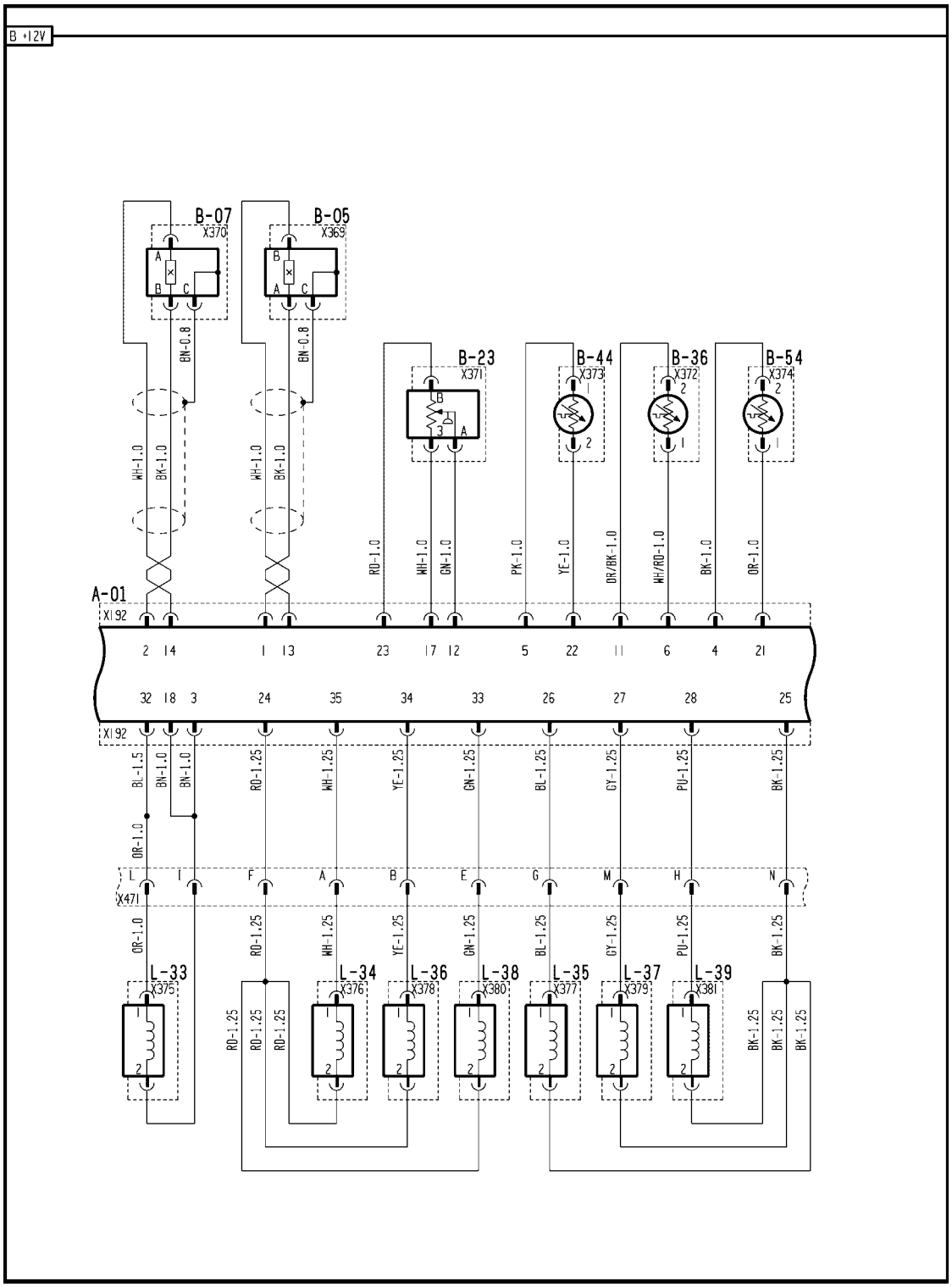
40033790D4 1

The Air Temperature Sensor B-54 **(1)** monitors the temperature of the air in the intake manifold and sends the information to the ECU module connector **X192** pins 4 & 21. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0400-02 Boost Air Temperature Data Incorrect
E0400-03 Boost Air Temperature Short to High Source
E0400-04 Boost Air Temperature Short to Low Source

For additional information on the air temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

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A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

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Sensing system Air temperature sensor - Short circuit to B+ (B.30.A.95.80 - G.30.B.54)

AFX8010

E0400-03 - Boost Air Temperature

Cause:
Signal range outside threshold limits
Signal not plausible or intermittent fault

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

1. Faulty sensor
2. Faulty connector or wiring

Solution:

1. Harness connector fault

   A. Inspect the harness connector **X374** onto the air temp sensor B-54. Ensure that the connector is not damaged, the pins are correctly located in the connector body and that it is a tight fit onto the sensor.

   B. If the harness connector is okay, continue with step **3**.

2. Air Temp Sensor B54 Fault: To test the sensor measure the resistance across pins 1 and 2 of the sensor. The resistance will vary according to the temperature detailed in the table below:

	Resistance in Ohms		
Ambient Air Temperature	**Minimum**	**Nominal**	**Maximum**
-40 °C (-40 °F)	**38313 ohms**	**45313 ohms**	**53103 ohms**
-30 °C (-22 °F)	**22362 ohms**	**26114 ohms**	**30258 ohms**
-20 °C (-4 °F)	**13402 ohms**	**15462 ohms**	**17718 ohms**
-10 °C (14 °F)	**8244 ohms**	**9397 ohms**	**10661 ohms**
0 °C (32 °F)	**5227 ohms**	**5896 ohms**	**6623 ohms**
10 °C (50 °F)	**3396 ohms**	**3792 ohms**	**4222 ohms**
20 °C (68 °F)	**2262 ohms**	**2500 ohms**	**2760 ohms**
30 °C (86 °F)	**1555 ohms**	**1707 ohms**	**1867 ohms**
40 °C (104 °F)	**1080 ohms**	**1175 ohms**	**1277 ohms**
50 °C (122 °F)	**771 ohms**	**834 ohms**	**900 ohms**
60 °C (140 °F)	**555 ohms**	**595 ohms**	**639 ohms**
70 °C (158 °F)	**408 ohms**	**435 ohms**	**465 ohms**
80 °C (176 °F)	**304 ohms**	**322 ohms**	**342 ohms**
90 °C (194 °F)	**231 ohms**	**243 ohms**	**257 ohms**
100 °C (212 °F)	**178 ohms**	**186 ohms**	**196 ohms**
110 °C (230 °F)	**137 ohms**	**144 ohms**	**152 ohms**
120 °C (248 °F)	**106 ohms**	**112 ohms**	**119 ohms**
130 °C (266 °F)	**84 ohms**	**89 ohms**	**95 ohms**

   A. If the sensor resistance is incorrect, replace the sensor.

   B. If the sensor resistance is correct, continue with step **3**.

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3. Wiring faulty

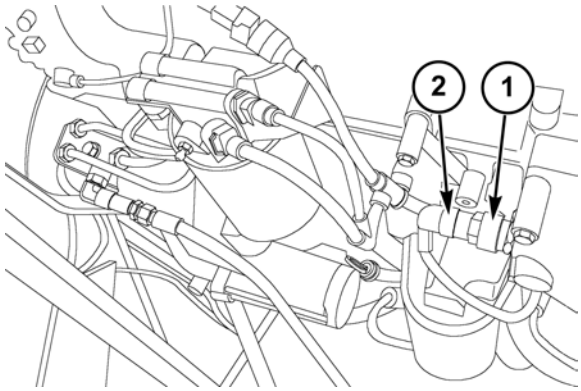
   A. Check the wiring from the engine ECU to the sensor connector. With the keystart ON, +5V should be measured on pin 1 of sensor connector **X374** (+5V common line). If ZERO volts is indicated check for an Open Circuit or Short to ground back to the engine ECU , connector **X192**, pin 21. Trace fault and repair wiring as required. If wiring to pin 1 is okay continue with step B.

   B. With the keystart OFF, continuity to ground should be indicated on pin 2 of sensor connector **X374** (ground common line). If no ground is indicated, check for an Open circuit back to the engine ECU, connector **X192**, pin

4. Trace fault and repair wiring as required.

   A. With the keystart ON, check pin 2 for a short to **+12 volts**. If **+12 volts** is indicated trace fault and repair wiring to pin 2.

Sensing system Air temperature sensor - Overview (B.30.A.95.80 - C.10.A.10)



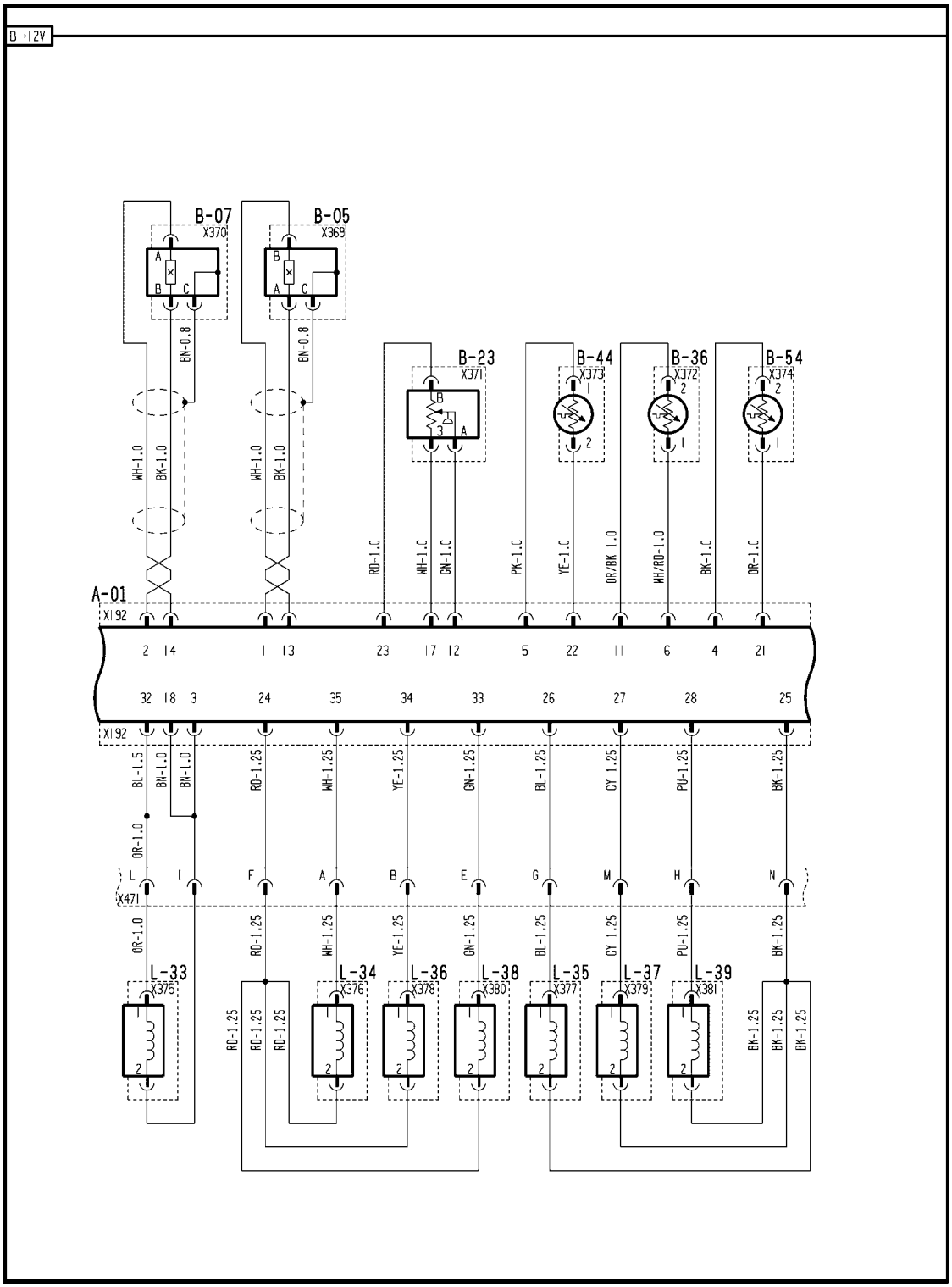
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The Air Temperature Sensor B-54 **(1)** monitors the temperature of the air in the intake manifold and sends the information to the ECU module connector **X192** pins 4 & 21. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0400-02 Boost Air Temperature Data Incorrect
E0400-03 Boost Air Temperature Short to High Source
E0400-04 Boost Air Temperature Short to Low Source

For additional information on the air temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

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Sensing system Air temperature sensor - Short circuit to ground (B.30.A.95.80 - G.30.B.53)

AFX8010

E0400-04 - Boost Air Temperature

Cause:
Signal range outside threshold limits
Signal not plausible or intermittent fault

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

1. Faulty sensor
2. Faulty connector or wiring

Solution:

1. Harness connector fault

   A. Inspect the harness connector **X374** onto the air temp sensor B-54. Ensure that the connector is not damaged, the pins are correctly located in the connector body and that it is a tight fit onto the sensor.

   B. If the harness connector is okay, continue with step **3**.

2. Air Temp Sensor B54 Fault: To test the sensor measure the resistance across pins 1 and 2 of the sensor. The resistance will vary according to the temperature detailed in the table below:

	Resistance in Ohms		
Ambient Air Temperature	**Minimum**	**Nominal**	**Maximum**
-40 °C (-40 °F)	**38313 ohms**	**45313 ohms**	**53103 ohms**
-30 °C (-22 °F)	**22362 ohms**	**26114 ohms**	**30258 ohms**
-20 °C (-4 °F)	**13402 ohms**	**15462 ohms**	**17718 ohms**
-10 °C (14 °F)	**8244 ohms**	**9397 ohms**	**10661 ohms**
0 °C (32 °F)	**5227 ohms**	**5896 ohms**	**6623 ohms**
10 °C (50 °F)	**3396 ohms**	**3792 ohms**	**4222 ohms**
20 °C (68 °F)	**2262 ohms**	**2500 ohms**	**2760 ohms**
30 °C (86 °F)	**1555 ohms**	**1707 ohms**	**1867 ohms**
40 °C (104 °F)	**1080 ohms**	**1175 ohms**	**1277 ohms**
50 °C (122 °F)	**771 ohms**	**834 ohms**	**900 ohms**
60 °C (140 °F)	**555 ohms**	**595 ohms**	**639 ohms**
70 °C (158 °F)	**408 ohms**	**435 ohms**	**465 ohms**
80 °C (176 °F)	**304 ohms**	**322 ohms**	**342 ohms**
90 °C (194 °F)	**231 ohms**	**243 ohms**	**257 ohms**
100 °C (212 °F)	**178 ohms**	**186 ohms**	**196 ohms**
110 °C (230 °F)	**137 ohms**	**144 ohms**	**152 ohms**
120 °C (248 °F)	**106 ohms**	**112 ohms**	**119 ohms**
130 °C (266 °F)	**84 ohms**	**89 ohms**	**95 ohms**

   A. If the sensor resistance is incorrect, replace the sensor.

   B. If the sensor resistance is correct, continue with step **3**.

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3. Wiring faulty

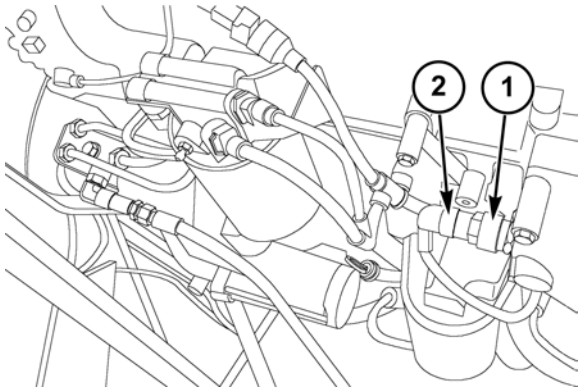
   A. Check the wiring from the engine ECU to the sensor connector. With the keystart ON, +5V should be measured on pin 1 of sensor connector **X374** (+5V common line). If ZERO volts is indicated check for an Open Circuit or Short to ground back to the engine ECU , connector **X192**, pin 21. Trace fault and repair wiring as required. If wiring to pin 1 is okay continue with step B.

   B. With the keystart OFF, continuity to ground should be indicated on pin 2 of sensor connector **X374** (ground common line). If no ground is indicated, check for an Open circuit back to the engine ECU, connector **X192**, pin

4. Trace fault and repair wiring as required.

   A. With the keystart ON, check pin 2 for a short to **+12 volts**. If **+12 volts** is indicated trace fault and repair wiring to pin 2.

Sensing system Air temperature sensor - Overview (B.30.A.95.80 - C.10.A.10)



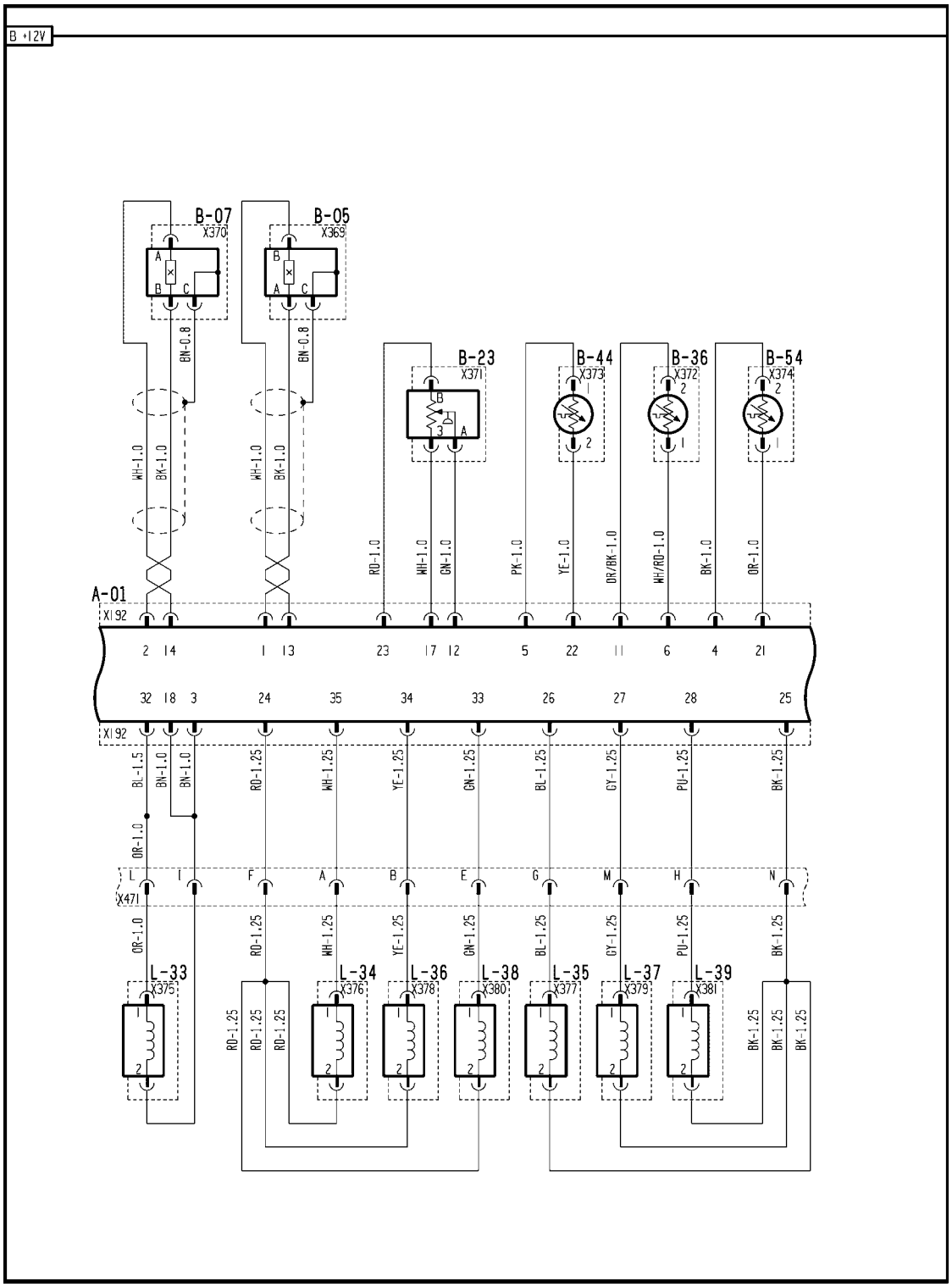
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The Air Temperature Sensor B-54 **(1)** monitors the temperature of the air in the intake manifold and sends the information to the ECU module connector **X192** pins 4 & 21. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0400-02 Boost Air Temperature Data Incorrect
E0400-03 Boost Air Temperature Short to High Source
E0400-04 Boost Air Temperature Short to Low Source

For additional information on the air temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

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A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

https://truckmanualshub.com/

Index

POWER PRODUCTION - B

AIR INTAKE SYSTEM - 30.A

Air cleaner - Cleaning (B.30.A.25 - F.30.A.10) 11
AFX8010

Air cleaner - Install (B.30.A.25 - F.10.A.15) 13
AFX8010

Air cleaner - Remove (B.30.A.25 - F.10.A.10) 8
AFX8010

Air cooler - Install (B.30.A.32 - F.10.A.15) 17
AFX8010

Air cooler - Remove (B.30.A.32 - F.10.A.10) 15
AFX8010

AIR INTAKE SYSTEM - General specification (B.30.A - D.40.A.10) 4
AFX8010

Sensing system - Torque (B.30.A.95 - D.20.A.10) 4
AFX8010

Sensing system Air cleaner restriction - Open circuit (B.30.A.95.95 - G.30.B.50) 24
AFX8010

Sensing system Air cleaner restriction - Overview (B.30.A.95.95 - C.10.A.10) 5
AFX8010

Sensing system Air cleaner restriction - Short circuit to B+ (B.30.A.95.95 - G.30.B.54) 19
AFX8010

Sensing system Air temperature sensor - Incorrect value (B.30.A.95.80 - G.30.C.10) 29
AFX8010

Sensing system Air temperature sensor - Overview (B.30.A.95.80 - C.10.A.10) 7
AFX8010

Sensing system Air temperature sensor - Short circuit to B+ (B.30.A.95.80 - G.30.B.54) 33
AFX8010

Sensing system Air temperature sensor - Short circuit to ground (B.30.A.95.80 - G.30.B.53) 37
AFX8010

Sensing system Manifold pressure sensor - Overview (B.30.A.95.82 - C.10.A.10) 6
AFX8010

Turbocharger - Torque (B.30.A.31 - D.20.A.10) 4
AFX8010

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POWER PRODUCTION - B

EXHAUST SYSTEM - 40.A

AFX8010

https://truckmanualshub.com/

Contents

POWER PRODUCTION - B

EXHAUST SYSTEM - 40.A

TECHNICAL DATA

Exhaust manifold

Exhaust manifold - Torque (B.40.A.38 - D.20.A.10) 3
AFX8010

SERVICE

Silencer

Silencer - Replace (B.40.A.36 - F.10.A.30) 4
AFX8010

https://truckmanualshub.com/

Exhaust manifold - Torque (B.40.A.38 - D.20.A.10)

AFX8010

Screws securing exhaust manifold (Before assembly, lubricate with engine oil)	M10x1.5

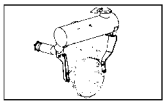
Pre-torque	**25 - 40 Nm**	**19 - 29 lb ft**
Torque	**40 - 540 Nm**	**30 - 36 lb ft**

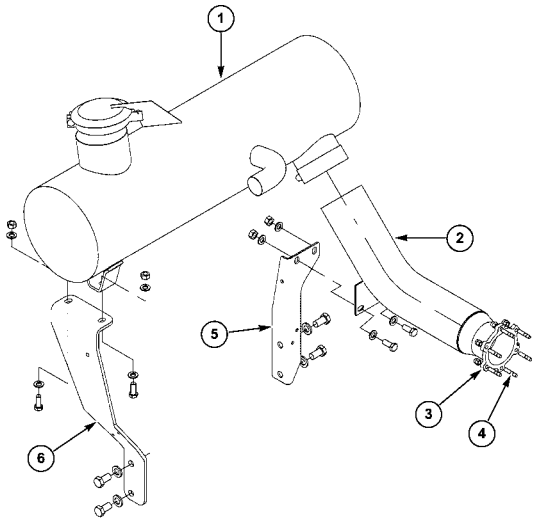
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Silencer - Replace (B.40.A.36 - F.10.A.30)

AFX8010

1. To remove the muffler **(1)** and the turbo pipe **(2)** from the engine, start by removing hardware **(4)** from the turbo flange **(3)** and also the hardware from brackets **(5)** and **(6)** that are attached to the muffler.





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2. To replace the muffler **(1)** and turbo downpipe **(2)** attach the turbo downpipe to the muffler. Install the hardware that attaches the muffler to brackets **(5)** and **(6)**. When the muffler is in place, tighten the M8 lock nut to the M8 x 40 studs **(4)** at the turbo flange **(3)**.

https://truckmanualshub.com/

Index

POWER PRODUCTION - B

EXHAUST SYSTEM - 40.A

Exhaust manifold - Torque (B.40.A.38 - D.20.A.10) 3
AFX8010

Silencer - Replace (B.40.A.36 - F.10.A.30) 4
AFX8010

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https://truckmanualshub.com/

POWER PRODUCTION - B

ENGINE COOLANT SYSTEM - 50.A

AFX8010

https://truckmanualshub.com/

Contents

POWER PRODUCTION - B

ENGINE COOLANT SYSTEM - 50.A

TECHNICAL DATA

ENGINE COOLANT SYSTEM - General specification (B.50.A - D.40.A.10) 4
AFX8010

Thermostat

Thermostat - Torque (B.50.A.18 - D.20.A.10) 4
AFX8010

Water pump

Water pump - Torque (B.50.A.20 - D.20.A.10) 4
AFX8010

Fan and drive

Fan and drive - Torque (B.50.A.54 - D.20.A.10) 4
AFX8010

Sensing system

Sensing system - Torque (B.50.A.95 - D.20.A.10) 5
AFX8010

FUNCTIONAL DATA

ENGINE COOLANT SYSTEM - Static description (B.50.A - C.30.A.20) 6
AFX8010

Thermostat

Thermostat - Dynamic description (B.50.A.18 - C.30.A.10) 7
AFX8010

Water pump

Water pump - Sectional view (B.50.A.20 - C.10.A.30) 8
AFX8010

Fan and drive

Fan and drive - Overview (B.50.A.54 - C.10.A.10) 9
AFX8010

Fan and drive - Static description (B.50.A.54 - C.30.A.20) 10
AFX8010

Sensing system

Sensing system Coolant temperature - Overview (B.50.A.95.90 - C.10.A.10) 11
AFX8010

SERVICE

ENGINE COOLANT SYSTEM - Drain fluid (B.50.A - F.35.A.20) 12
AFX8010

De-aeration tank

https://truckmanualshub.com/

De-aeration tank - Remove (B.50.A.23 - F.10.A.10) 15
AFX8010

De-aeration tank - Install (B.50.A.23 - F.10.A.15) 17
AFX8010

Radiator

Radiator - Remove (B.50.A.32 - F.10.A.10) 19
AFX8010

Radiator - Install (B.50.A.32 - F.10.A.15) 23
AFX8010

Radiator Wiper - Remove (B.50.A.32.65 - F.10.A.10) 27
AFX8010

Radiator Wiper - Install (B.50.A.32.65 - F.10.A.15) 29
AFX8010

Radiator Wiper - Replace (B.50.A.32.65 - F.10.A.30) 31
AFX8010

Fan and drive

Fan and drive - Remove (B.50.A.54 - F.10.A.10) 32
AFX8010

Fan and drive - Install (B.50.A.54 - F.10.A.15) 34
AFX8010

Sensing system

Sensing system Coolant level - Replace (B.50.A.95.93 - F.10.A.30) 36
AFX8010

DIAGNOSTIC

Sensing system

Sensing system Coolant level - Short circuit to B+ (B.50.A.95.93 - G.30.B.54) 38
AFX8010

Sensing system Coolant temperature - Over limit value (B.50.A.95.90 - G.30.C.22) 41
AFX8010

Sensing system Coolant temperature - Incorrect value (B.50.A.95.90 - G.30.C.10) 42
AFX8010

Sensing system Coolant temperature - Incorrect value (B.50.A.95.90 - G.30.C.10) 45
AFX8010

Sensing system Coolant temperature - Short circuit to B+ (B.50.A.95.90 - G.30.B.54) 49
AFX8010

Sensing system Coolant temperature - Short circuit to ground (B.50.A.95.90 - G.30.B.53) 53
AFX8010

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ENGINE COOLANT SYSTEM - General specification (B.50.A - D.40.A.10)

AFX8010

Cooling system	Water circulation
Fan, attached to the water pump pulley	Intake, 7-blade in sheet metal
Water pump	Poly -V belt driven centrifugal vane type

Engine speed/water pump speed ratio	1:1.62	1.83
Start of opening	**85 °C185 °F**	**80 °C176 °F**
Max	**95 °C203 °F**	**95 °C203 °F**

System Pressure Max Relief:	**69 kPa (10 psi)**

Coolant Capacity:	**42 L (11.1 US gal)**

Coolant Specification:	Use Case IH XHD antifreeze or a premium blend that meets TMC RP329 and TMC RP330 Specifications.

Thermostat - Torque (B.50.A.18 - D.20.A.10)

AFX8010

Screw securing thermostat box to cylinder head	M8x1.25	**16 - 22 Nm**	**12 - 16 lb ft**

Water pump - Torque (B.50.A.20 - D.20.A.10)

AFX8010

Screw securing water pump to crankcase	M8x1.25	**23 - 27 Nm**	**17 - 19 lb ft**

Fan and drive - Torque (B.50.A.54 - D.20.A.10)

AFX8010

Screw securing spacer/pulley to fan	M10x1.25	**54 - 61 Nm**	**40 - 45 lb ft**
Screw securing automatic tightener to crankcase	M10x1.25	**45 - 55 Nm**	**34 - 40 lb ft**
Screw securing fixed tightener to crankcase	M12x1.75	**100 - 110 Nm**	**74 - 80 lb ft**
Screw fan mount to crankcase	M812x1.75	**95 - 105 Nm**	**70 - 76 lb ft**

Screws securing pulley to crankshaft (Before assembly, lubricate with engine oil)	M14x2

Pre-torque	**70 Nm**	**51 lb ft**

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Angle closed	50 deg

Screw securing crankshaft gasket cover	M8x1.25	**100 - 27 Nm**	**24 - 26 lb ft**

Sensing system - Torque (B.50.A.95 - D.20.A.10)

AFX8010

Screw securing control unit mount to crankcase	M8x1.25	**16 - 22 Nm**	**12 - 16 lb ft**

Coolant/fuel temperature sensor fixing	M16x1.5	**30 - 35 Nm**	**22 - 26 lb ft**

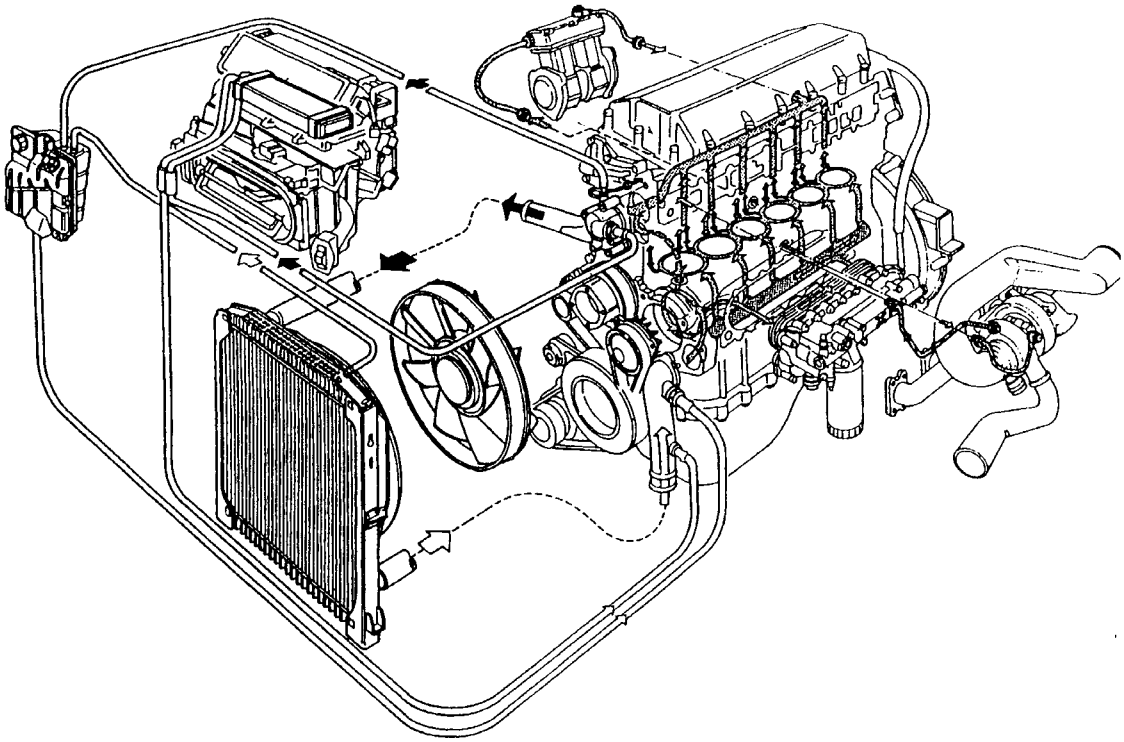
Temperature switch/ transmitter fixing	M16x1.5	**20.5 - 25.5 Nm**	**15 - 19 lb ft**

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ENGINE COOLANT SYSTEM - Static description (B.50.A - C.30.A.20)

AFX8010

The coolant pump is housed in a seat in the engine block. Many possible sources of leaks are eliminated by the almost total lack of outer pipes, sleeves and collars.



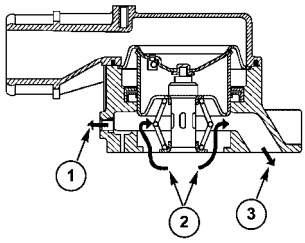
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Thermostat - Dynamic description (B.50.A.18 - C.30.A.10)

AFX8010

Temperature of start of travel is **84 °C** (**183.2 °F**). Minimum travel is 15 mm at **92 - 96 °C** (**197.6 - 204.8 °F**). The "diagonal" lines in the figure indicate water flow circulating in the engine and the shaded arrows indicate water flow leaving the thermostat, where **(1)** is water flow to the expansion tank; **(2)** is water flow from the engine and **(3)** is water flow to the bypass.



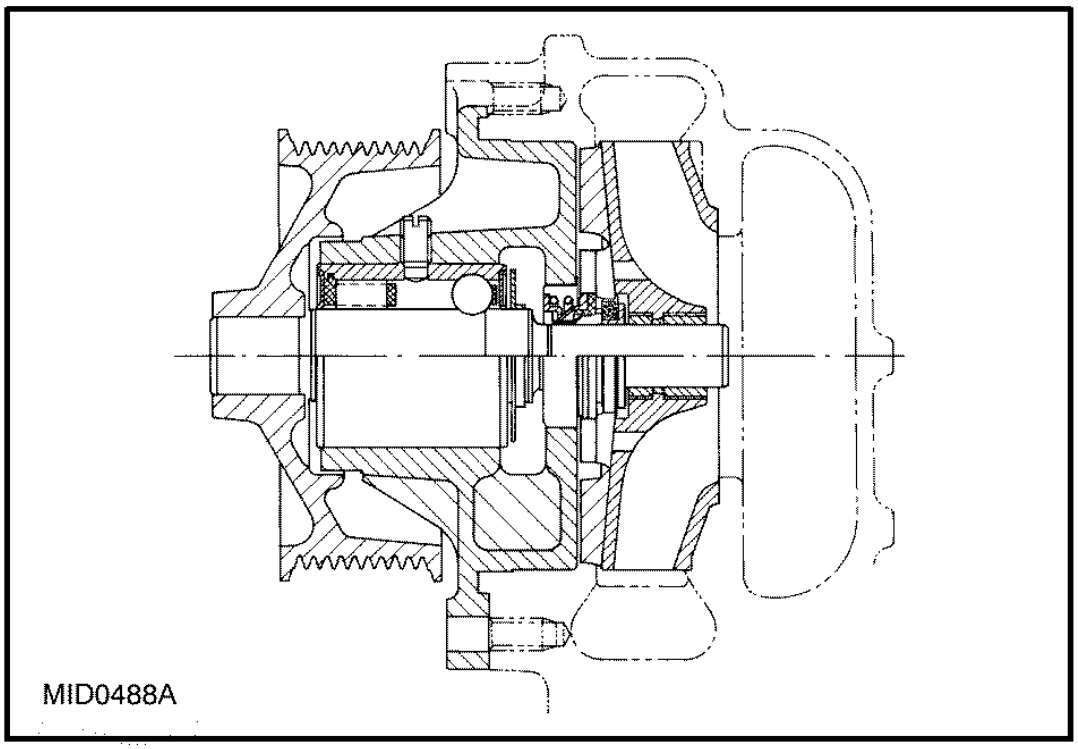
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Water pump - Sectional view (B.50.A.20 - C.10.A.30)

AFX8010

Sectional View of the Water Pump - The water pump is a centrifugal vane pump. The pump bearing forms a single piece with the impeller shaft. The drive pulley is keyed onto this shaft.

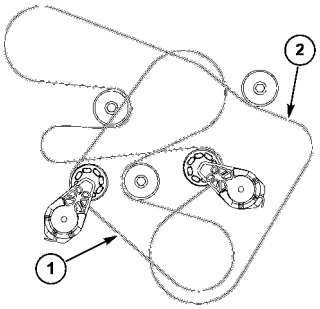


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Fan and drive - Overview (B.50.A.54 - C.10.A.10)

AFX8010



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Engine Fan and Drive

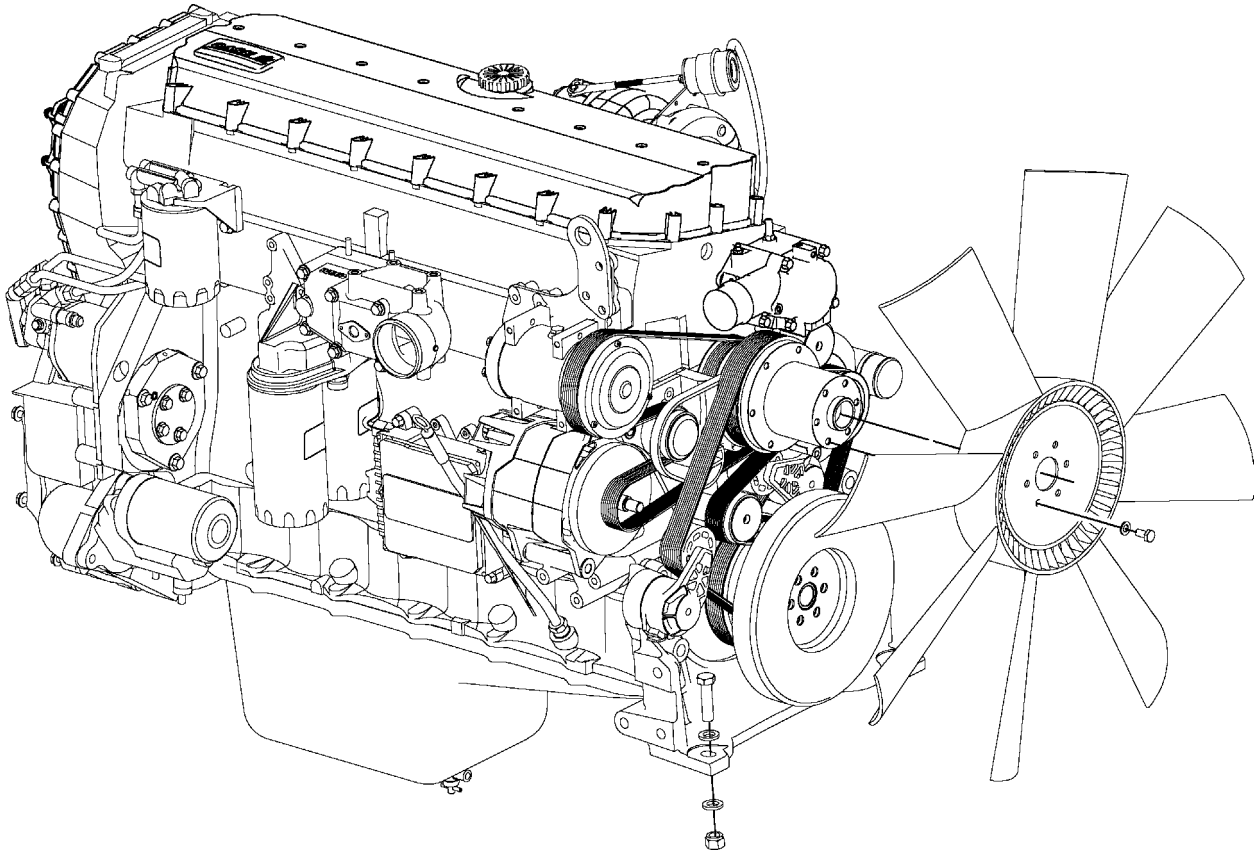
(1), Engine fan drive belt; **(2)**, Alternator, water pump and air conditioning compressor drive belt.

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Fan and drive - Static description (B.50.A.54 - C.30.A.20)

AFX8010

The engine fan and accessories are driven by two Poly V-belts. The engine fan is driven by the front belt, which is driven off the bottom pulley at the engine flywheel. The rear V-belt transmits drive to the coolant pump, alternator and air conditioning compressor respectively. A calibrated spring in the belt tensioner for each V-belt automatically adjusts belt tension. A fixed guide pulley on each belt increases the contact surface on the coolant pump and fan pulleys to increase efficiency.

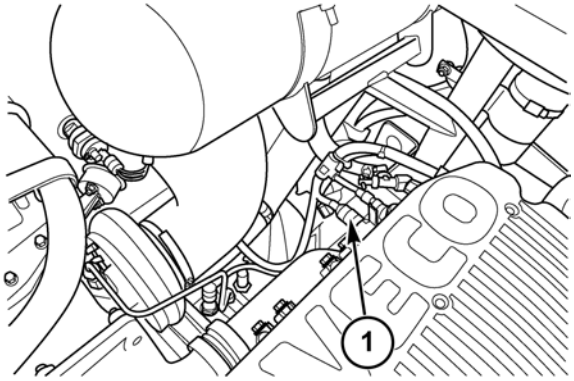


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Sensing system Coolant temperature - Overview (B.50.A.95.90 - C.10.A.10)

AFX8010



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The Coolant Temperature Sensor B-44 **(1)** monitors the temperature of the engine coolant and sends the information to the ECU module connector **X192** pins 5 & 22. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E399-03 Coolant Temperature Sens Data Incorrect
E0399-03 Coolant Temperature Sens Short to High Source
E0399-04 Coolant Temperature Sens Short to Low Source

For additional information on the coolant temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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ENGINE COOLANT SYSTEM - Drain fluid (B.50.A - F.35.A.20)

AFX8010

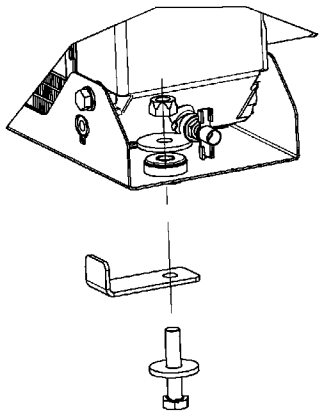
When replacing the coolant proceed as follows:

Prior operation: Before draining fluid loosen the pressure/filler cap on the shunt tank, on the cold engine, and run the engine at **1500 RPM** until the coolant temperature is at normal operating range. Return to low idle and allow engine to run for 1 Minute as a Turbocharger precaution. This will allow the coolant to circulate through the system picking up any settled sediment and suspending it in the fluid momentarily while being drained out.

⚠ CAUTION ⚠

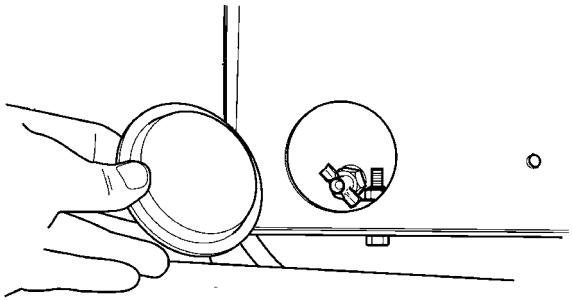
D49-39 - Hot coolant can spray out if radiator cap is removed. To remove radiator cap: Let system cool, turn to first notch, then wait until all pressure is released. Scalding can result from fast removal of radiator cap. Check and service cooling system according to maintenance instructions.

1. The location of the stopcock to drain the radiator is on the bottom front side of the cooler box. .



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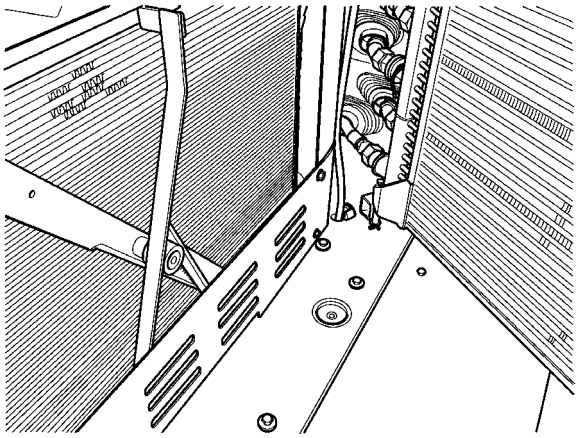
2. Remove plastic plug access cover.



10034862B 2

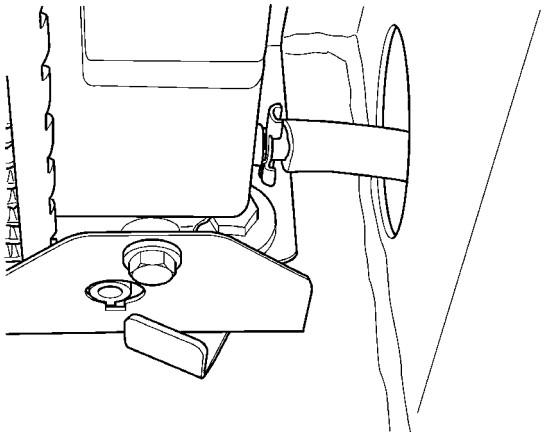
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3. To gain further access to the stopcock, open the rotary screen access door in the cooler housing.



10034911 3

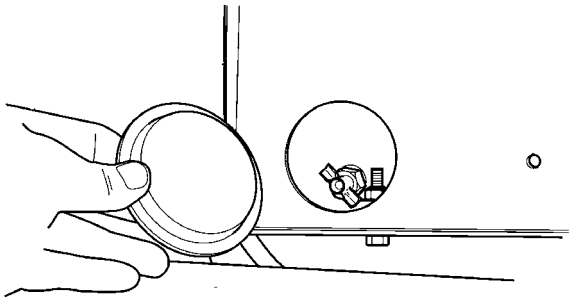
4. Install drain hose to stopcock and route to suitable container to collect coolant. Drain the coolant by opening stopcock at the bottom of the radiator.



10034869B 4

5. Flush the cooling system with clean water. Close stopcock, and fill the cooling system with clean water through the shunt tank filler opening . Start the engine and run it at low idle until the water temperature is at normal operating temperature. Stop the engine. Drain the water by opening stopcock .
6. Remove hose, close stopcock and fill the cooling system with coolant as specified.
7. Install the cover.

IMPORTANT: *Always fill the cooling system with an approved fully formulated antifreeze/water mixture. Check the freezing point of the coolant after each refill.*



10034862B 5

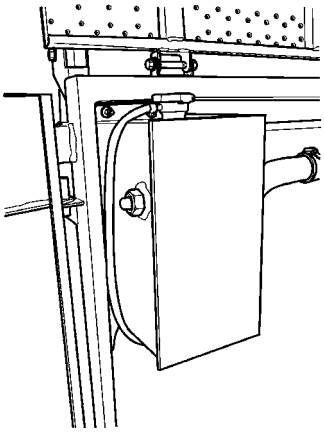
8. To fill the system with coolant be sure the stopcock is closed.

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9. Add the proper amount and specified coolant (See Operators Manual) to the shunt tank. Fill the shunt tank to above sight glass and install pressure/filler cap . Start the engine and run it at low idle until the water temperature is at normal operating temperature. Re-check the shunt tank to ensure proper level was maintained. If system is low add coolant until air pockets have been filled in the system.

⚠ **CAUTION** ⚠

D49-39 - Hot coolant can spray out if radiator cap is removed. To remove radiator cap: Let system cool, turn to first notch, then wait until all pressure is released. Scalding can result from fast removal of radiator cap. Check and service cooling system according to maintenance instructions.



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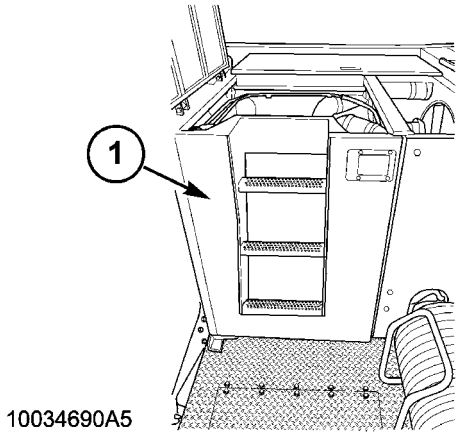
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De-aeration tank - Remove (B.50.A.23 - F.10.A.10)

AFX8010

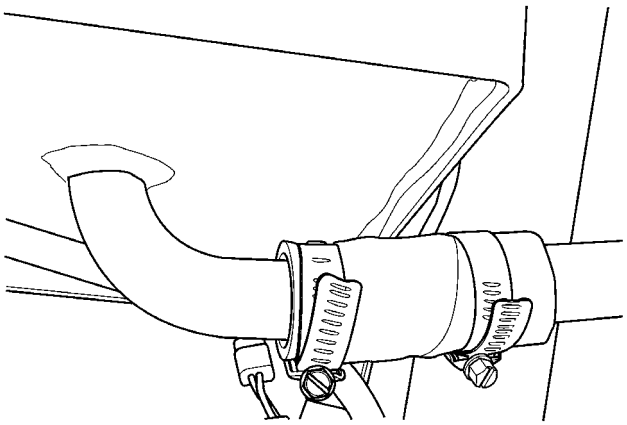
Removal of the tank requires coolant removal from the system only until the level coincides below the tank. However, remove coolant as necessary. **ENGINE COOLANT SYSTEM - Drain fluid (B.50.A - F.35.A.20)**

1. To remove the tank, first open the shielding and the stepped door **(1)** to gain adequate access.



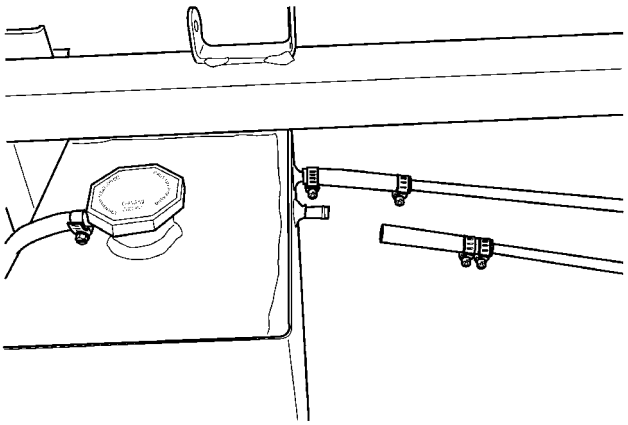
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2. Remove the coolant hose on the bottom of the de-aeration tank by loosening the hose clamp.



10034913 2

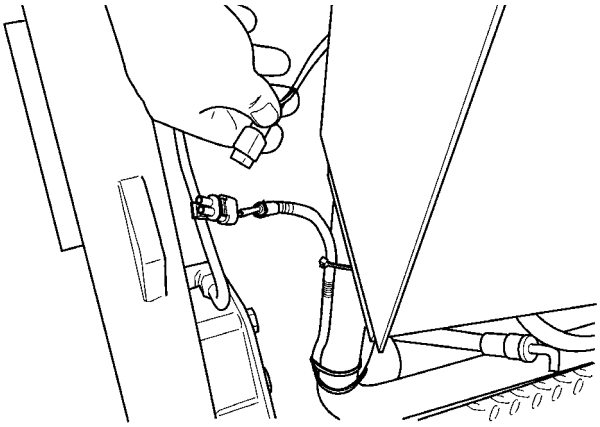
3. Remove the two bleed lines at the top of the de-aeration tank by loosening the hose clamps and pulling back the short rubber sections attached to the tanks barbs. Loosen the hose clamp on the top of the tank connecting the overflow line near the fill cap.



10034896 3

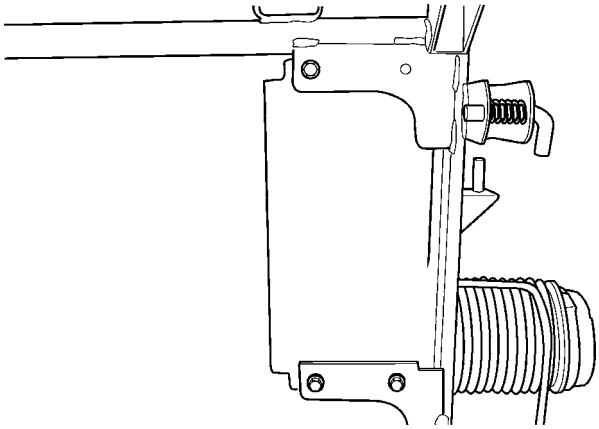
https://truckmanualshub.com/

4. Disconnect the electrical connection from the harness to the tank level sensor. **Sensing system Coolant level - Replace (B.50.A.95.93 - F.10.A.30)**



10034912 4

5. Remove the four bolts attaching the de-aeration tank to the engine shielding frame.



10034892 5

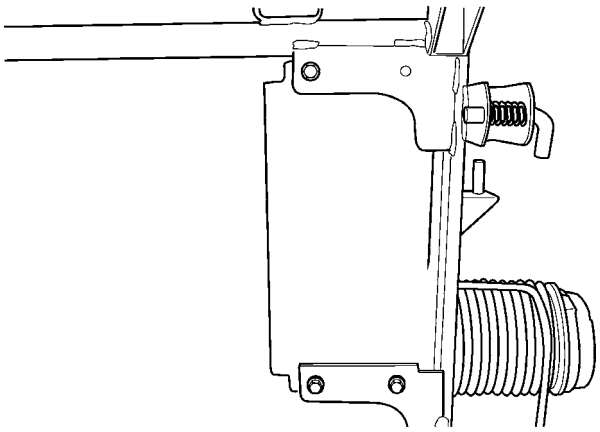
https://truckmanualshub.com/

De-aeration tank - Install (B.50.A.23 - F.10.A.15)

AFX8010

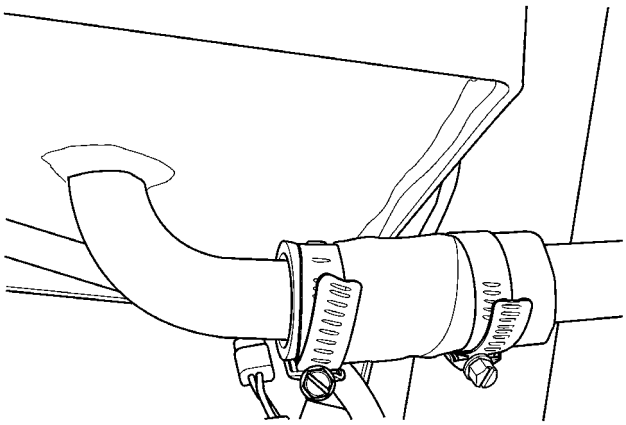
Prior operation: Install the de-aeration tank cap, sight glass, and level sensor.**Sensing system Coolant level - Replace (B.50.A.95.93 - F.10.A.30)**

1. Attach the tank to the engine shielding frame rail with 4 bolts.



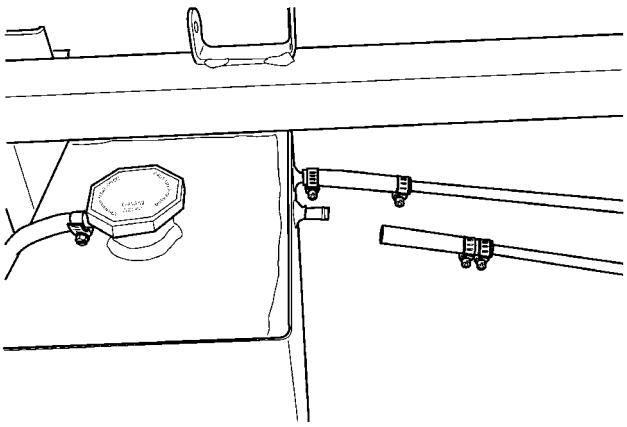
10034892 1

2. Attach the coolant hose on the bottom of the tank with a hose clamp.



10034913 2

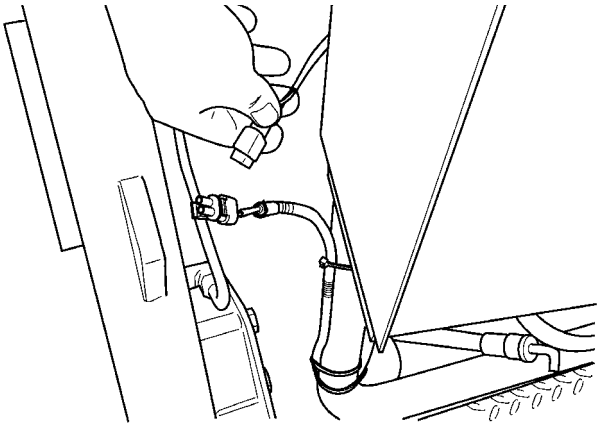
3. Attach the two bleed line hoses to the steel tank barbs with hose clamps.



10034896 3

https://truckmanualshub.com/

4. Connect the electrical connection for the tank level sensor.

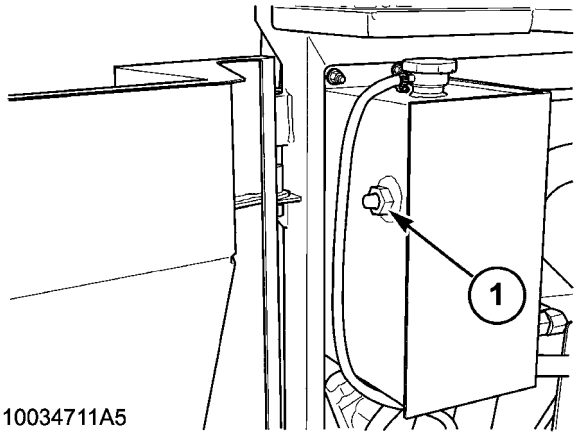


10034912 4

5. Fill the system as necessary until coolant reaches the site glass **(1)** on the tank. Check level after engine has run and cooled for verification system has been properly purged of air.

⚠ WARNING ⚠

M471 - Check and service cooling system according to maintenance instructions. Hot coolant can spray out if the deaeration tank cap is removed while system is hot. To remove deaeration cap, let system cool, turn to first notch, then wait until all pressure is released. Scalding can result from fast removal of the deaeration tank cap.



10034711A5 5

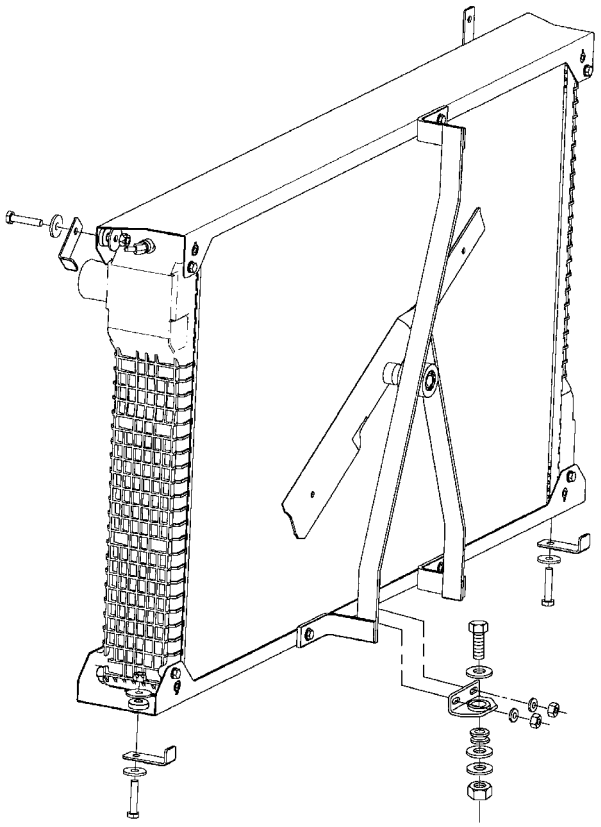
https://truckmanualshub.com/

Radiator - Remove (B.50.A.32 - F.10.A.10)

AFX8010

Prior operation: Engine hood - Remove (E.20.A.72 - F.10.A.10)
Fan and drive - Remove (B.50.A.54 - F.10.A.10)
ENGINE COOLANT SYSTEM - Drain fluid (B.50.A - F.35.A.20)
Radiator Wiper - Remove (B.50.A.32.65 - F.10.A.10)
Prior operation: Refer to the Operators Manual for instructions on how to "Un-Hinge" the double hinge access door. This will allow for more room.

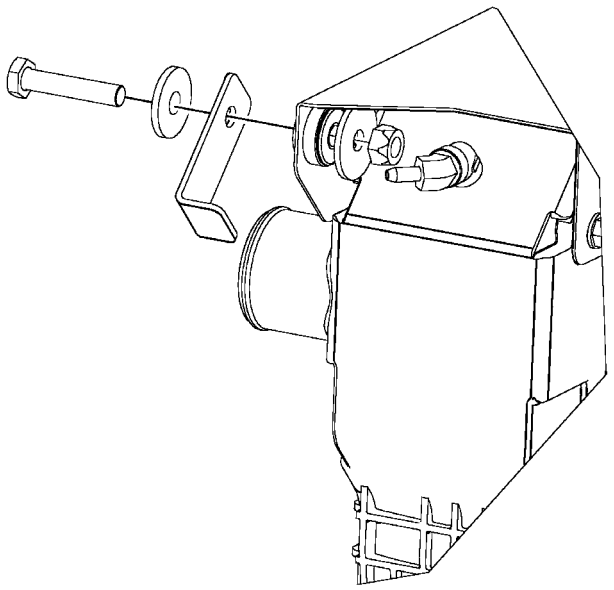
1. Disconnect both upper and lower radiator hoses by loosening the clamps attached to the radiator and pulling away the hoses slightly to free the radiator .



50034915 1

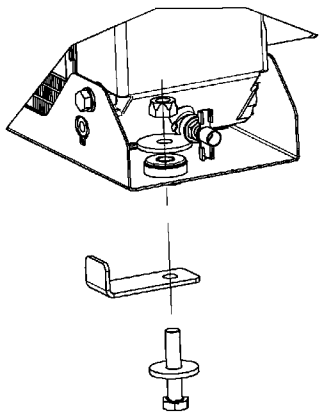
https://truckmanualshub.com/

2. Remove the two bolts from the back top of the radiator through the cooler housing.



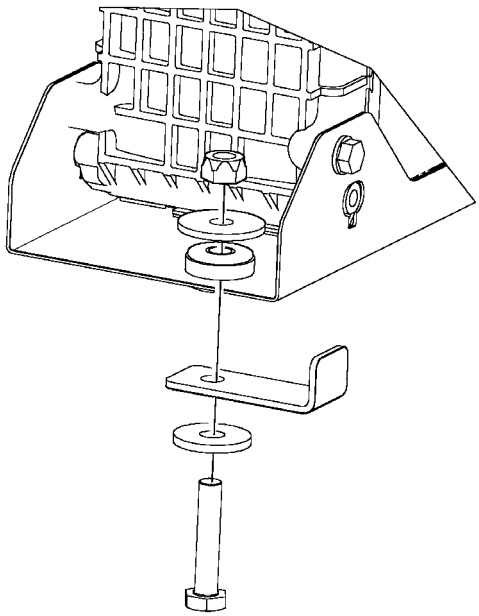
50034908 2

3. Remove the right lower isolation mount assembly located at the bottom of the radiator. Use the access holes with the plastic plugs to gain better access if needed.



50034941Inverse 3

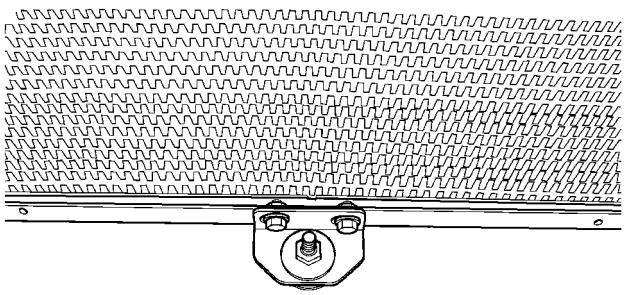
4. Remove the left lower isolation mount assembly.



50034919 4

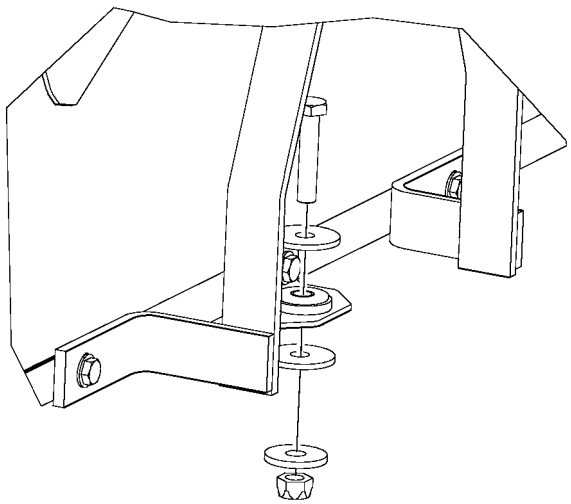
https://truckmanualshub.com/

5. Remove the center isolation mount assembly bracket completely by removing the two bolts to the radiator and the one bolt isolation mount assembly through the floor of the cooler housing.



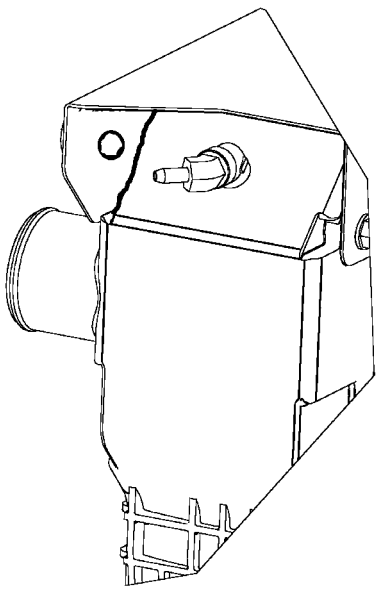
10034870 5

6. On the center isolation mount, the bolt is removed from the top.



50034928 6

7. Remove the de-aeration line connected to the top Left hand corner of the radiator. The line can be disconnected by removing the hose clamp and sliding off the hose from the barb fitting.

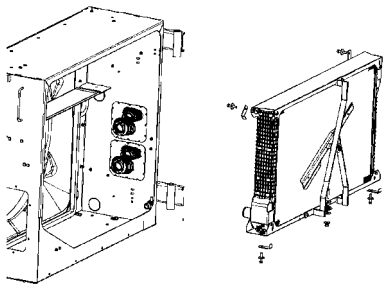


50034908X 7

https://truckmanualshub.com/

8. Remove the radiator from the cooler housing.

NOTE: *Use caution when removing to not damage the radiator, and to be careful working on the side of the machine.*



50034884B 8

https://truckmanualshub.com/

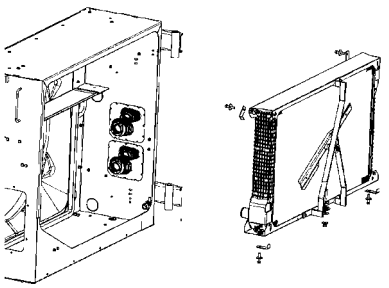
Radiator - Install (B.50.A.32 - F.10.A.15)

AFX8010

1. Clean out cooler housing area to be free of debris.

NOTE: *Before installing the radiator into the cooler housing check seal condition. The seals are in place to provide vibration dampening and to seal out debris. It is important these seals are in good condition to maintain proper cooling performance.*

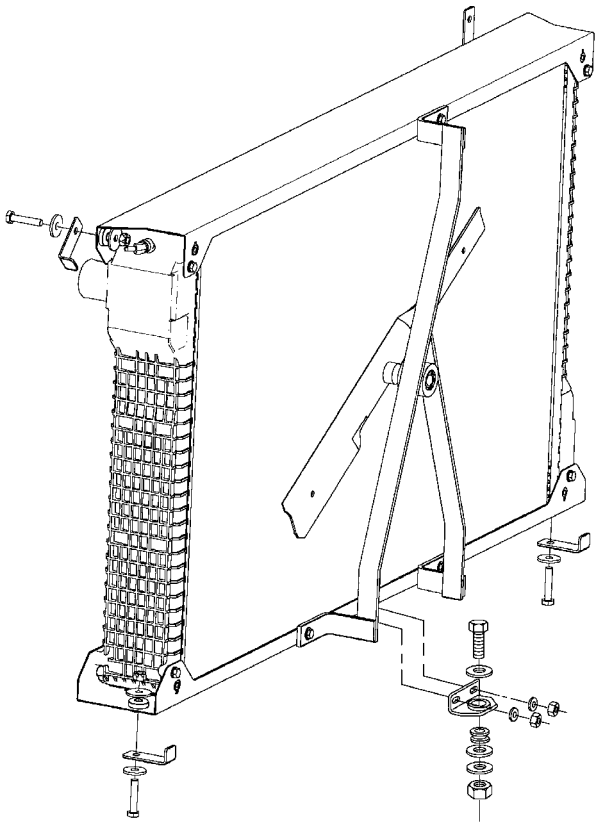
2. Place the radiator into the cooler housing.



50034884B 1

3. Locate all the hardware for the upper and lower isolation mount assembly.

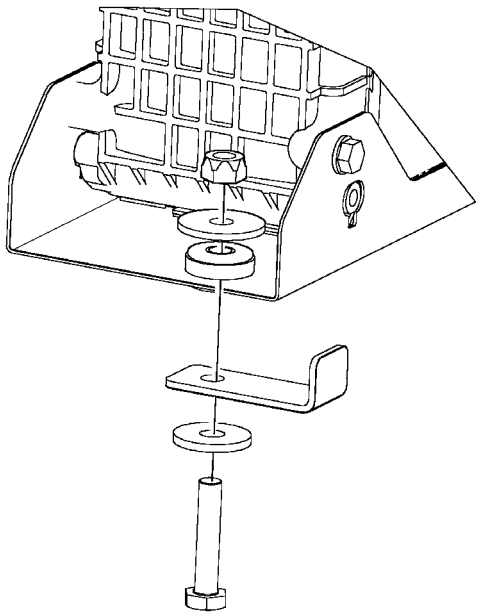
NOTE: *Do not use petroleum products to install elastic mounts, this can deteriorate the material, use soapy water.*



50034915 2

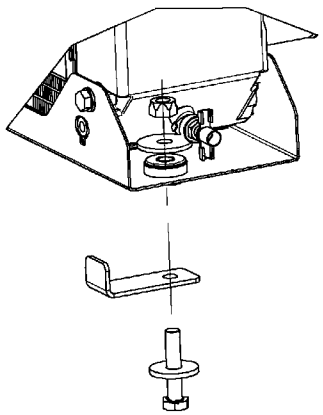
https://truckmanualshub.com/

4. Install the left lower end isolation mount securing the radiator to the floor of the cooler housing. Be sure to correctly install the isolation mounts and spacers.



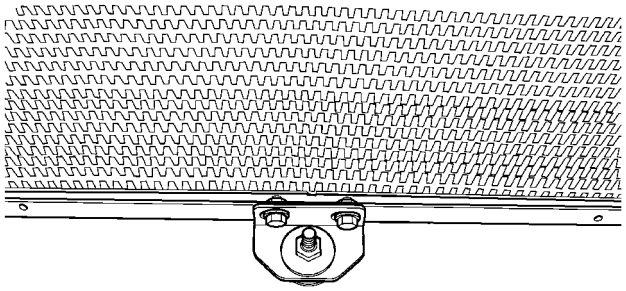
50034919 3

5. Install the right lower isolation mounts and hardware.



50034941Inverse 4

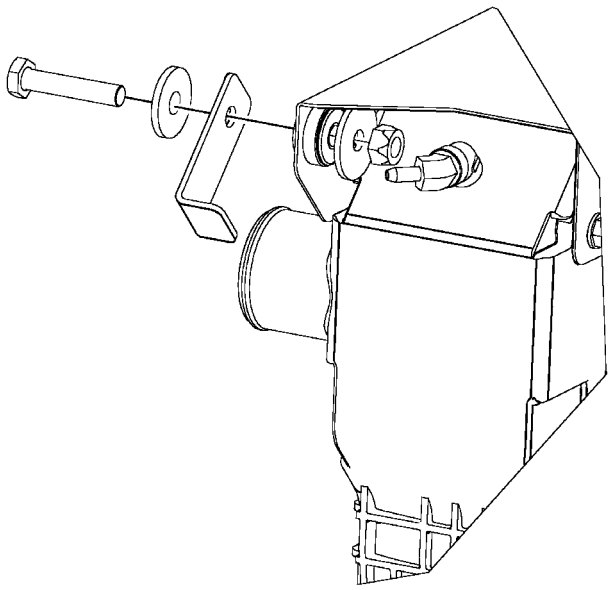
6. Install the center isolation mount assembly and hardware.



10034870 5

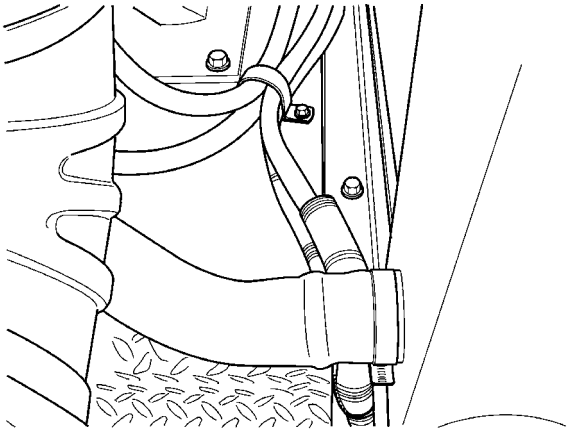
https://truckmanualshub.com/

7. Install the two upper bolts that secure the radiator to the cooler housing. The bolts are installed from the outside of the cooler housing.



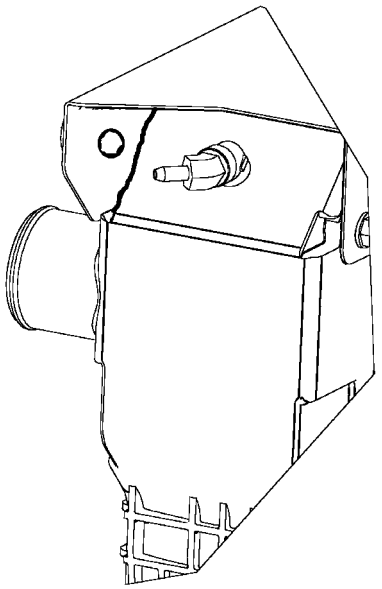
50034908 6

8. Hook up the upper and lower radiator hoses and fasten the clamps.



10034865 7

9. Install the line to the de-aeration tank on the fitting on the upper left hand corner of the radiator. Tighten the hose clamp.



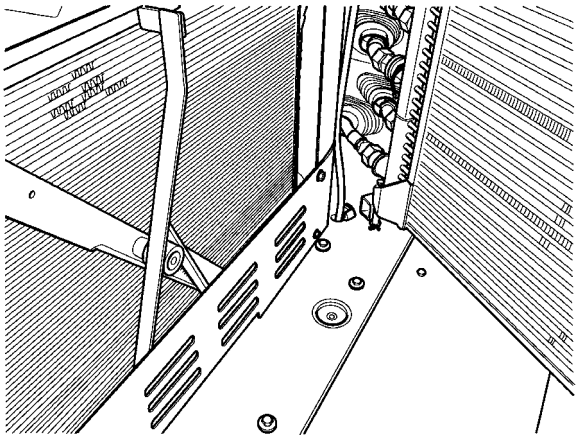
50034908X 8

https://truckmanualshub.com/

10. Tighten all the bolts with isolation mounts to a maximum torque **36 Nm** (**26.5 lb ft**)

IMPORTANT: *Do not over tighten the elastic fasteners.*

11. Install chaff wiper assembly.**Radiator Wiper - Install (B.50.A.32.65 - F.10.A.15)**
12. Be sure all plastic access plugs are re-installed into the cooler housing.



10034911 9

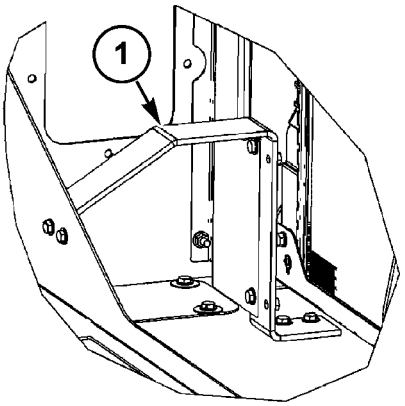
Next operation: Fan and drive - Install (B.50.A.54 - F.10.A.15)
Next operation: Engine hood - Install (E.20.A.72 - F.10.A.15)

https://truckmanualshub.com/

Radiator Wiper - Remove (B.50.A.32.65 - F.10.A.10)

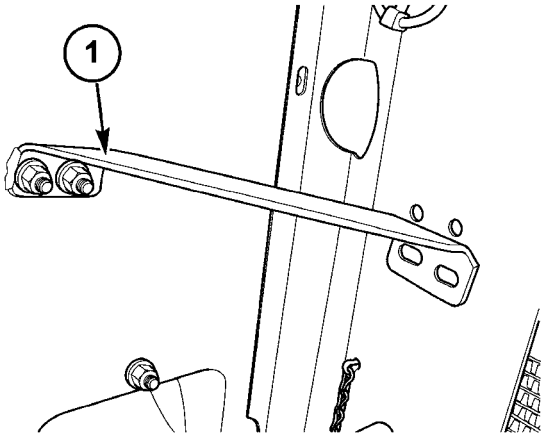
AFX8010

1. Remove the lower shield bracket **(1)**.



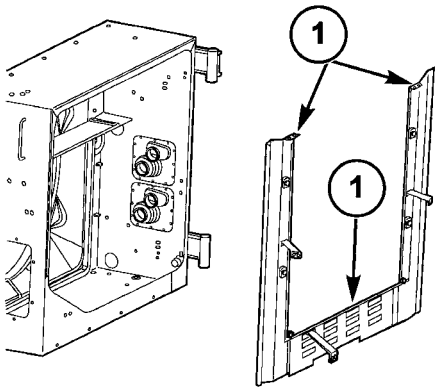
50034875A5 1

2. Remove the side bracket **(1)**.



10034906A5 2

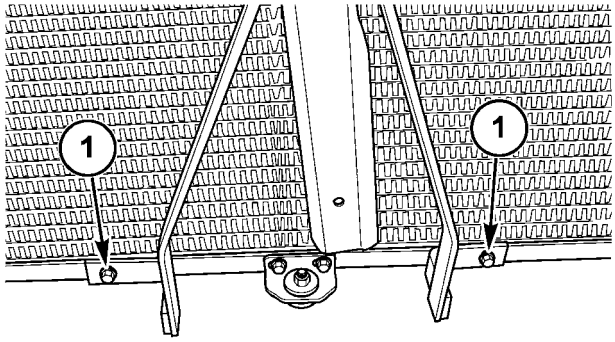
3. Remove the shields **(1)**.



50040347A5 3

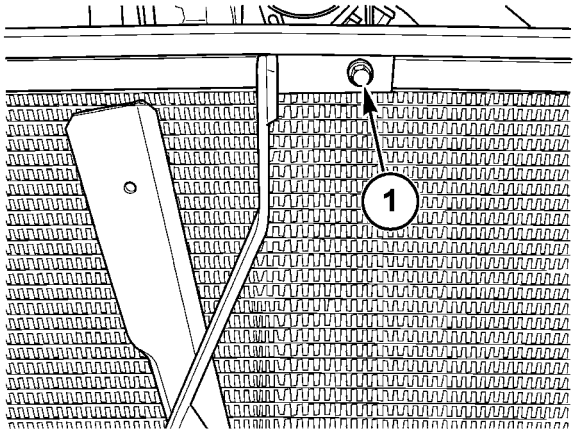
https://truckmanualshub.com/

4. When the shielding is removed you now have access to the wiper hardware. Remove the two lower bolts **(1)** using a 13 mm wrench.



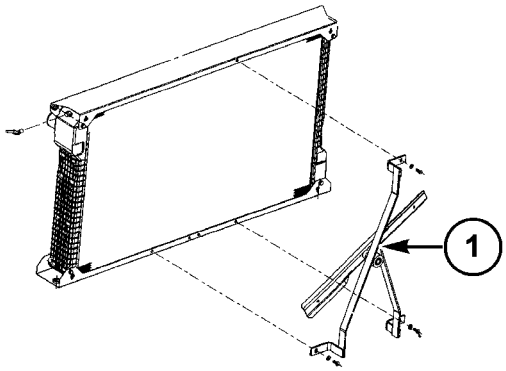
10034904A5 4

5. Remove the single bolt **(1)** at the top of the assembly using a 13mm wrench.



10034903A5 5

6. Remove the chaff wiper assembly **(1)** from the radiator.



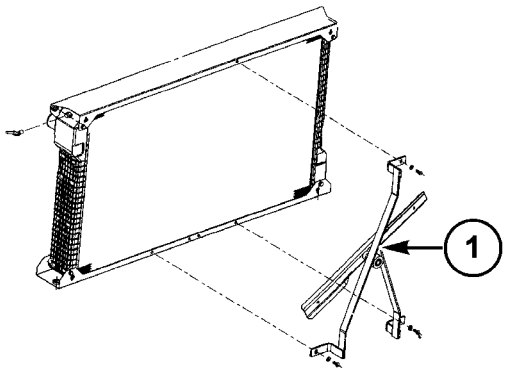
50035681A5 6

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Radiator Wiper - Install (B.50.A.32.65 - F.10.A.15)

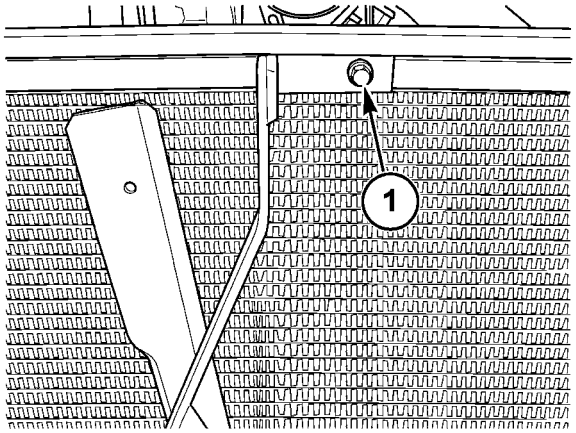
AFX8010

1. Place the chaff wiper assembly **(1)** at its location in front of the radiator.



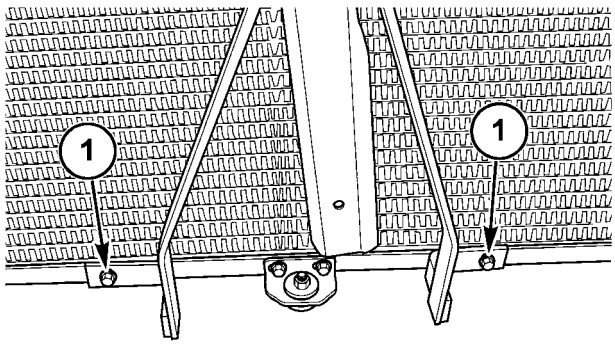
50035681A5 1

2. Install loose the center bolt **(1)** on the top of the assembly.



10034903A5 2

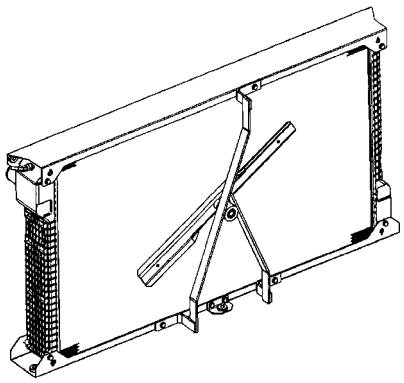
3. Install loose the two bolts **(1)** on the bottom of the assembly. Once all the hardware is in place torque the bolts to **18 Nm** (**13 lb ft**) .



10034904A5 3

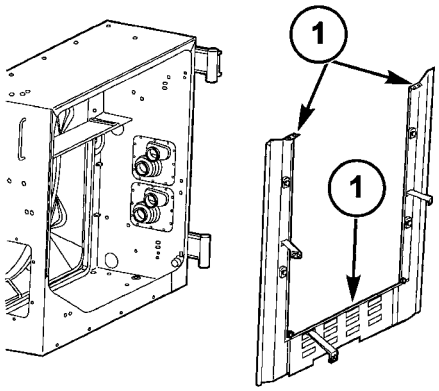
https://truckmanualshub.com/

4. Be sure chaff wiper blade spins freely with no binding and does not contact the radiator. If contact to the radiator does occur. Shim the top or bottom wiper mounts as necessary to clear the radiator.



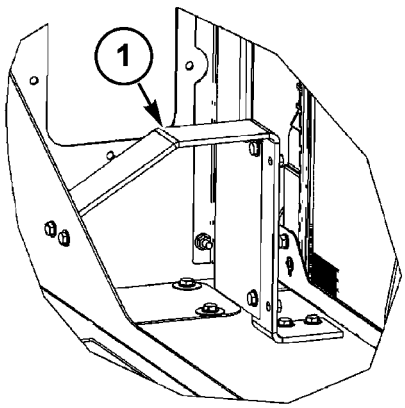
50035680 4

5. Re-install the lower and outer shielding **(1)**.



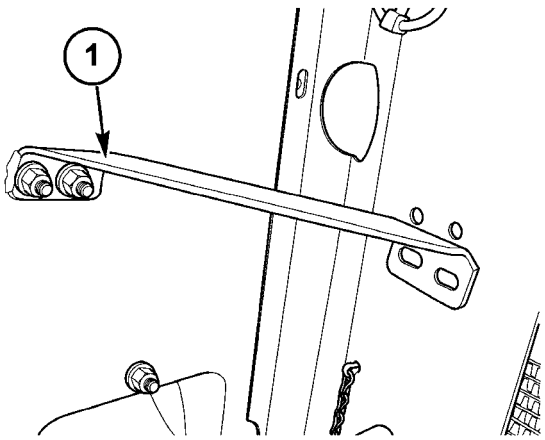
50040347A5 5

6. Install the lower bracket **(1)**.



50034875A5 6

7. Install the side bracket **(1)**.



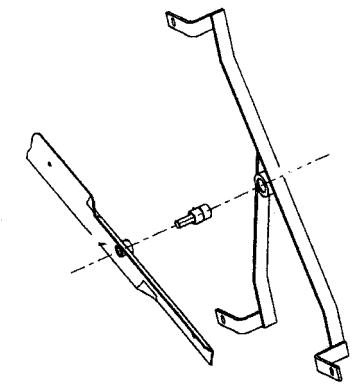
10034906A5 7

https://truckmanualshub.com/

Radiator Wiper - Replace (B.50.A.32.65 - F.10.A.30)

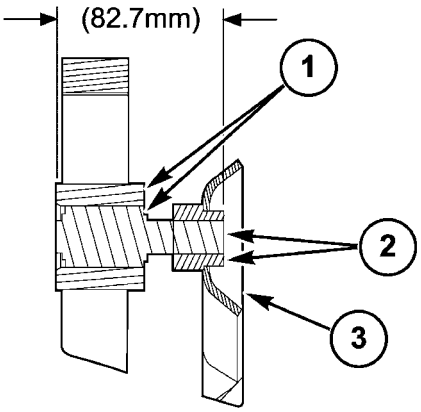
AFX8010

1. To disassemble the blade from the support use a press with the proper slugs to press out the bearing. First press off the blade, but remember to support it well so it does not bend.



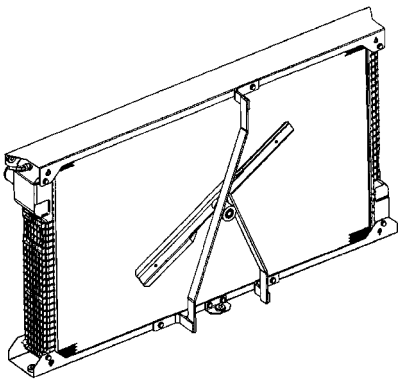
50035894 1

2. Once the blade is removed press the bearing out of the assembly.
3. To install the new bearing, first be sure the assembly where the bearing will be placed is clean and free of burrs.
4. Press the bearing into the housing until the until the shaft is flush **(1)** with the housing. Support the housing and shaft so when the blade is pressed on it will not change position. Orient the blade **(3)** as shown for proper air flow. Press on the blade to the shaft until the end of the shaft on the blade side is flush with the shaft housing. See illustration **(2)**. There should be a **82.7 mm** (**3.25 in**) tolerance from the front to back housing edges.



50041919A5 2

5. Turn over the blade by hand to assure proper rotation and no binding is occurring.



50035680 3

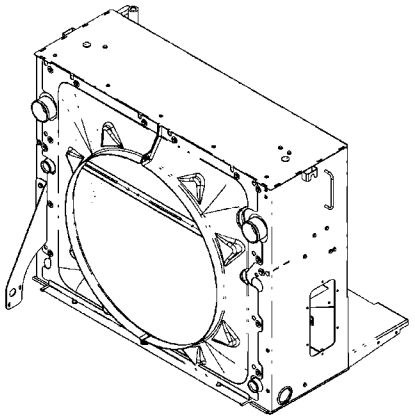
https://truckmanualshub.com/

Fan and drive - Remove (B.50.A.54 - F.10.A.10)

AFX8010

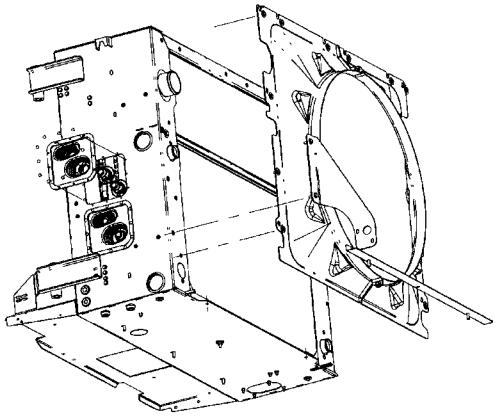
Prior operation: To gain better access to the fan and drive, certain engine shields may be removed, see; **Engine hood - Remove (E.20.A.72 - F.10.A.10)**

1. To remove the fan shroud the engine shielding needs to be removed so access can be gained, and enough clearance to remove the shroud halves.



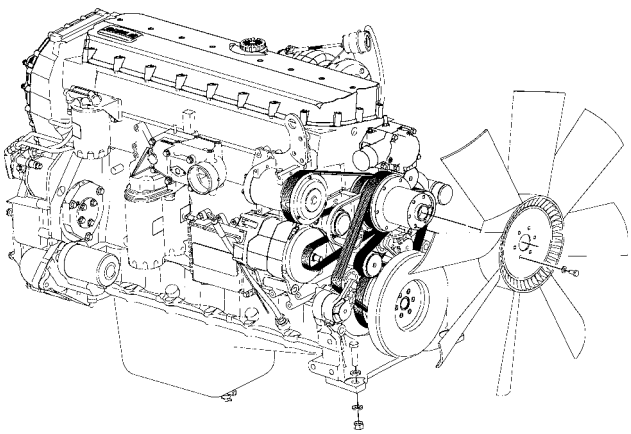
50034944 1

2. Each halve is held to the cooler housing by 6 M8 x 20 mm bolts . The halves are bolted to each other by two M6 x 20 mm bolts one at the top and one at the lower center of the halves.



50034942 2

3. Remove the six M10 x 20 mm bolts from the fan using a 17mm socket and ratchet. Remove the fan from the engine.

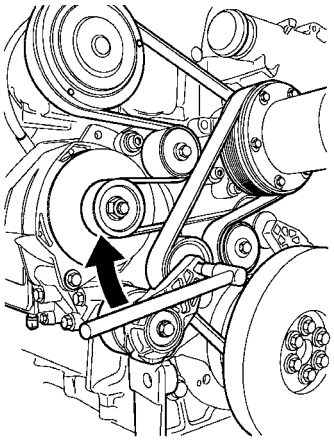


50035890 3

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4. To remove the belt from the engine drive, use a long handled 1/2 inch drive breaker bar and insert it into the belt tensioner. Pulling up on the handle will allow the belt tension to loosen. At this point the belt can be removed, and the tensioner relaxed.

NOTE: *The belt tensioner has strong spring force that can cause harm if not careful. Take care when removing the belt and holding pressure to the tensioner. Try and keep fingers clear of potential pinch points. Use of another person may be helpful to remove the belt while the tension is relaxed.*



50034738 4

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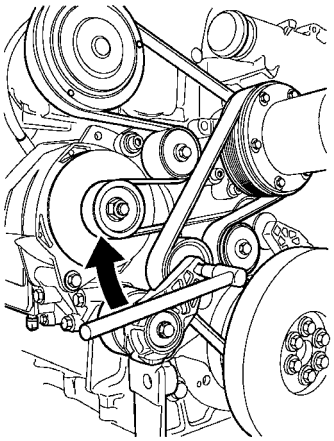
Fan and drive - Install (B.50.A.54 - F.10.A.15)

AFX8010

Prior operation: Fan and drive - Remove (B.50.A.54 - F.10.A.10)

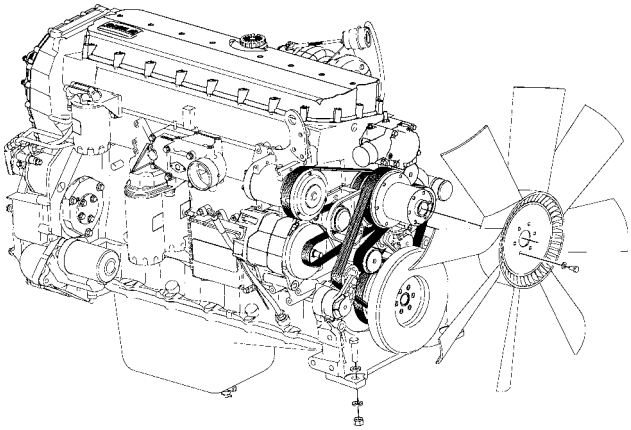
1. Insert a 1/2 inch drive long handled breaker bar into the belt tensioner. Pulling up on the handle will allow the tension to relax and install the belt.

IMPORTANT: *Be sure the belt is fully seated into the grooves of the pulleys before the tension is applied or else belt stretch can occur causing premature failure of the belt.*



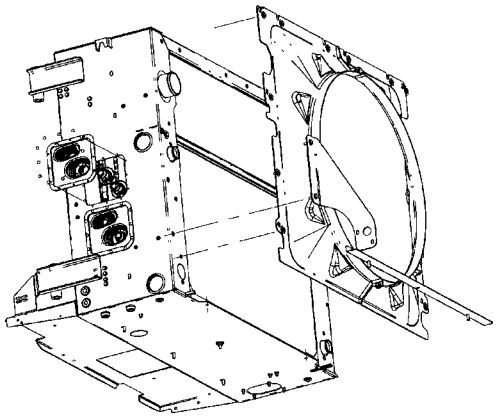
50034738 1

2. Install fan to the engine pulley hub with 6 - M10 x 20mm bolts and torque to **54 - 61 Nm** (**40 - 45 lb ft**).



50035890 2

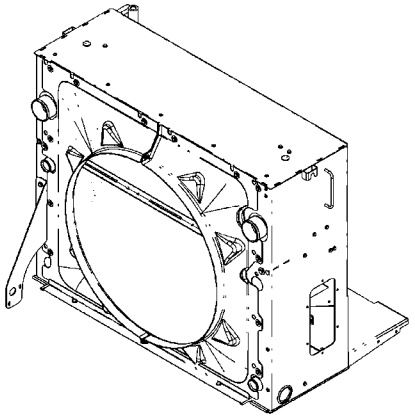
3. Install the two halves of the fan shroud. Be sure the lower lip fits into the groove. Bolt the two halves together using two M6 x 20 mm bolts. Do not over tighten the bolts you will crack the fan shroud.



50034942 3

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4. Use 12 - M8 x 20mm bolts to secure the shroud to the cooler housing. Do not over tighten bolts, damage can occur to the shroud and threaded fasteners.



50034944 4

5. Be sure fan shroud is in center so fan will not contact shroud. Look around the edges of the fan to assure no contact with the shroud.

⚠ CAUTION ⚠

M150A - Rotating fan and belts. Contact can injure. Keep clear.

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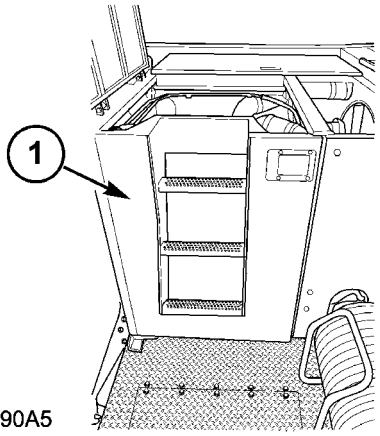
Sensing system Coolant level - Replace (B.50.A.95.93 - F.10.A.30)

AFX8010

Prior operation: ENGINE COOLANT SYSTEM - Drain fluid (B.50.A - F.35.A.20)

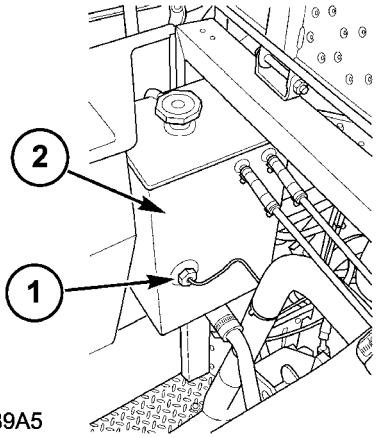
NOTE: *Complete system does not have to be drained for sensor replacement. Drain only until coolant level is below sensor.*

1. Open the access door **(1)** and shielding to gain access to the tank and sensor.



10034690A5 1

2. Disconnect the electrical connection from the harness to the sensor. With a 24mm wrench remove the sensor **(1)** from the tank **(2)** .

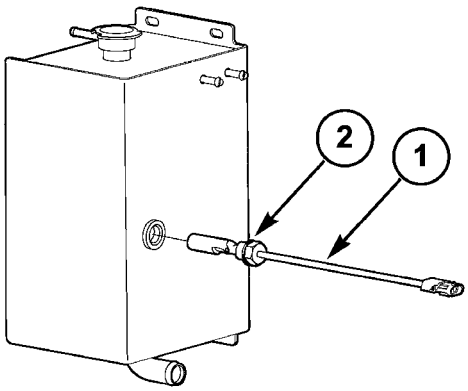


10034689A5 2

3. To install new sensor **(1)** install new O-ring **(2)** over the threads until it is seated on the recessed groove near the hex end. Apply Teflon thread sealant to the sensor threads. Thread the sensor into the tank until the O-ring becomes in contact with the threaded bung. Thread in the sensor (approximately one turn) until the arrow on the Hex head is facing up.

IMPORTANT: *Do not over torque the sensor. The threads are plastic and can easily strip. Apply only enough torque until O-ring is gently seated, and arrow is facing up.*

ATTENTION: *It is important that you verify the arrow on the sensor is facing up for the sensor to operate properly.*



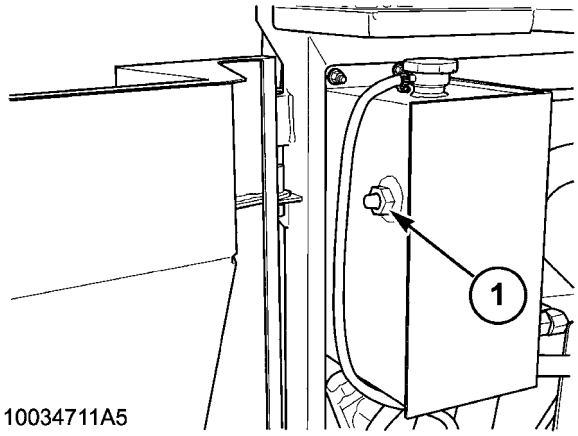
50034910A5 3

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4. Connect the electrical connection to the sensor. Fill the de-aeration tank as required until coolant level reaches the sight glass **(1)** Check level after engine has ran and cooled.

⚠ CAUTION ⚠

M141C - Hot coolant can spray out if radiator cap is removed while system is hot. To remove radiator cap, let system cool, turn to first notch, then wait until all pressure is released. Scalding can result from fast removal of radiator cap.



10034711A5 4

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Sensing system Coolant level - Short circuit to B+ (B.50.A.95.93 - G.30.B.54)

AFX8010

E0005-03 - Coolant Level Switch

Cause:
The coolant level switch (S-67) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Switch supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "COOLANT LEVEL SW" to check the voltage range.

   The normal operating range for the coolant level switch circuit is **1.8 - 10.0 volts**

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the coolant level switch connector **X439**.

   A. If the voltage drops below **10 volts**, there is a fault in the switch. Replace the switch.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**.

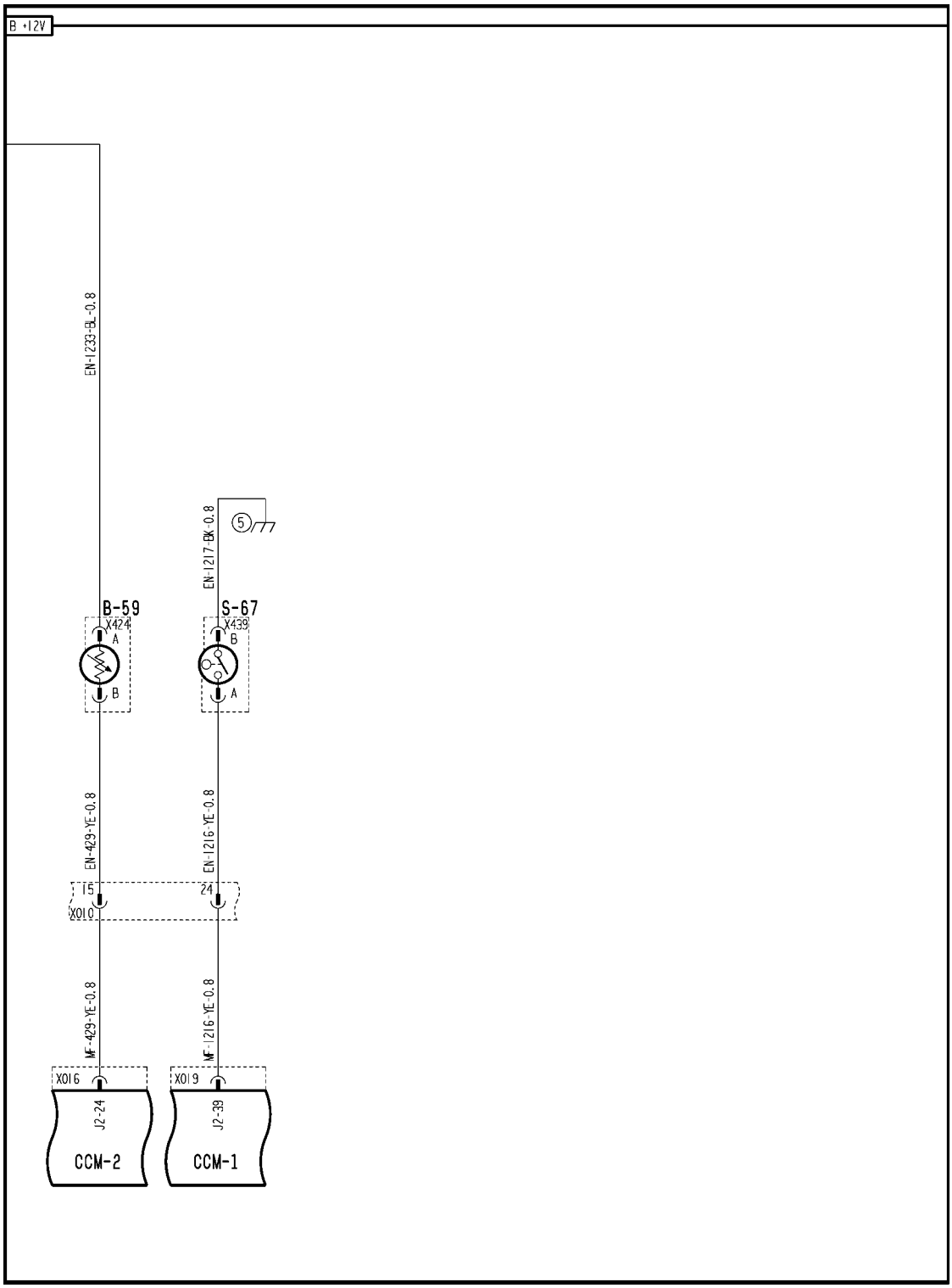
   A. If the voltage drops back within range, the short is in the engine (EN) harness between connector **X010** and connector **X439** wire 1216 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X010** and connector **X019** pin J2-39 wire 1216 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 05 (A.30.A.88 - C.20.E.05)



AFXSCHEM05A-04 1

FRAME 5 - ENGINE

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B-59 Water in Fuel	S-67 Coolant Level Switch	

https://truckmanualshub.com/

Sensing system Coolant temperature - Over limit value (B.50.A.95.90 - G.30.C.22)

AFX8010

E0152-00 - Coolant Temperature Sensor

Context:
When the engine coolant temperature exceeds **102 °C** (**223 °F**) for more than 2 seconds, the alarm message "A0000 Engine Coolant Temperature HIGH" will be displayed to the operator, and the engine will be shutdown within 2 seconds to prevent engine damage from occurring. When the alarm message is displayed, a permanent record is created in the error history.

Cause:
The "A0000 Engine Coolant Temperature HIGH" alarm has occurred at least once on the vehicle.

Possible failure modes:

1. The engine cooling system has been overheated during vehicle operation.

Solution:

1. This error message appears as a permanent record that an engine coolant overheat condition has occurred on the combine, and cannot be erased using the combine display controls. The EST must be used to erase this fault code.

   A. If this fault code appears, remove and inspect the engine oil for indication of internal damage.

   NOTE: *This fault code is reported by the ECU (which monitors the coolant temperature using the coolant temp sensor B-44) via CAN to the CCM2 module. This fault condition is recorded in both the ECU and the CCM2 module.*

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Sensing system Coolant temperature - Incorrect value (B.50.A.95.90 - G.30.C.10)

AFX8010

E0152-02 - Coolant Temperature Sensor

Context:
This fault code is sent by the ECU to the CCM2 module via CAN when the ECU detects a fault with the engine coolant temperature sensor B-44 circuit.

Cause:
ECU coolant temperature sensor B-44 reports an error.

Possible failure modes:

1. Sensor failed.
2. Sensor wiring shorted or open.
3. Internal failure in ECU.

Solution:

1. Key OFF. Disconnect the engine coolant temperature sensor connector **X373**, and install a jumper wire between pins 1 & 2. Carefully remove connector **X192** from the ECU module. Use a multimeter to check for continuity between connector **X192** pins 5 & 22.

   A. If there is continuity, continue with step **2**.

   B. If there is no continuity, there is an open circuit in one of the two coolant temperature sensor wires. Locate the open and repair.

2. Remove the jumper wire from connector **X373**. Use a multimeter to check for continuity between connector **X192** pins 5 & 22 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the Iveco engine harness between connector **X192** and connector **X373**. Locate the short and repair.

   B. If there is no continuity to ground on either wire, continue with step **3**.

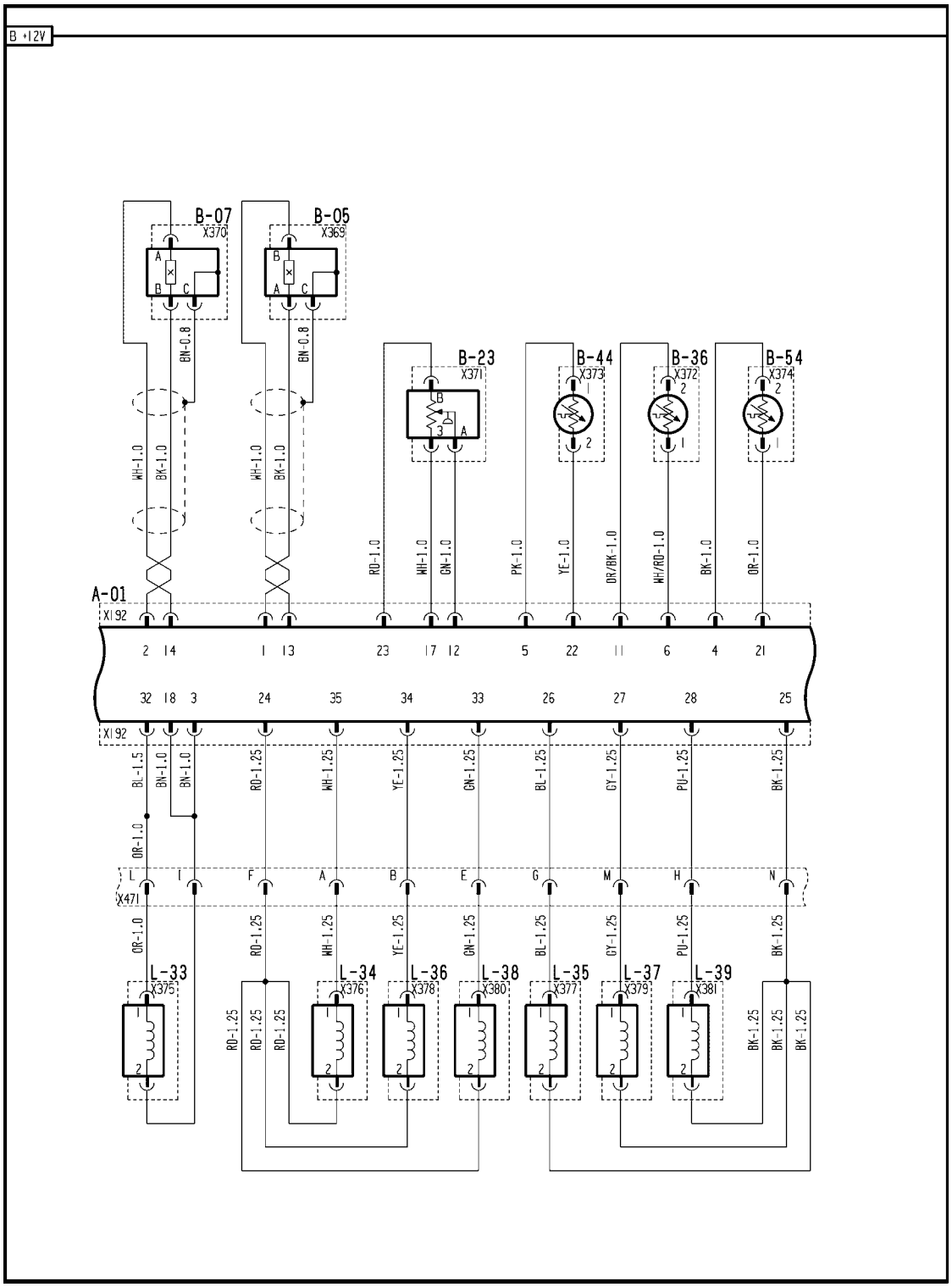
3. Use a multimeter to check for continuity between connector **X192** pin 5 and all other pins in the connector. There should not be any continuity to any other pins. Repeat this process for connector **X192** pin 22.

   A. If there is a continuity to any other wire, there is a short circuit in the Iveco engine harness between connector **X192** and connector **X373**. Locate the short and repair.

   B. If there is no continuity to other wires, the coolant temperature sensor is faulty.Replace the coolant temperature sensor.

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

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A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

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Sensing system Coolant temperature - Incorrect value (B.50.A.95.90 - G.30.C.10)

AFX8010

E0399-02 - Coolant Temperature Sens

Cause:
Signal range outside threshold limits
Signal not plausible or intermittent fault

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

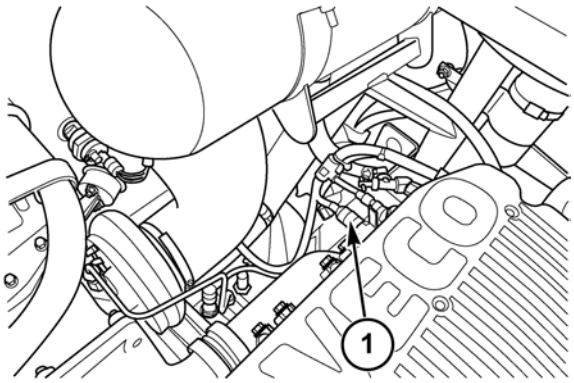
1. Faulty coolant sensor
2. Faulty connector or wiring

Solution:

1. Check the engine Coolant level.
   A. Ensure the coolant level is within the min/max indicators. Adjust as required. If the level was very low, ie, no fluid visible in the header tank, investigate the cause of the fluid loss and repair. Remove the fault code from the ECU memory, using the electronic service tool and operate the engine, if the fault does not reoccur, continue with vehicle operation.
   B. If the fault reoccurs, continue with step **2**.
2. Check connector **X373** at coolant temp sensor B44.
   A. Ensure the connector **X373** is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the sensor. Repair or replace damaged components as required.
   B. If the connector is okay,continue with step **3**.
3. Check coolant temp sensor B44.
   A. Remove the connector **X373** and check the sensor using a suitable multi-meter. Measure the resistance across the sensor terminals, the resistance should vary between **8 - 10 kOhms** @ -**10 °C**, **2.2 - 2.7 kOhms @ 20 °C**, and **0.29 - 0.36 kOhms @ 80 °C**, . Check for a short to ground between each sensor terminal and the engine block, an open circuit should be recorded on each terminal. If any readings are incorrect replace the sensor.
   B. If the sensor is okay continue with step **4**.
4. Check wiring.
   A. Disconnect the sensor connector **X373**. With the keystart switch ON, measure the voltage at pin 1 (pink wire), **+5 volts** should be measured. If no voltage is measured check the wiring for continuity between Pin 1 of the sensor connector **X373** and pin 5 of engine ECU connector **X192X192**. Repair wiring as required. Check for voltage on Pin 2; **0 volts** should be measured. If voltage is measured trace and repair short circuit in wiring between Pin 2 of the sensor connector **X373** and Pin 22 of the engine ECU connector **X192**. With the keystart OFF, also check for continuity of the wire between Pin 2 of the sensor connector **X373** and Pin 22 of the engine ECU connector **X192**, and for a short to ground. Trace fault and repair as required.
   B. If the wiring is okay suspect a faulty engine ECU. Download engine software using the electronic service tool and operate engine. If fault still occurs substitute engine ECU.

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Sensing system Coolant temperature - Overview (B.50.A.95.90 - C.10.A.10)



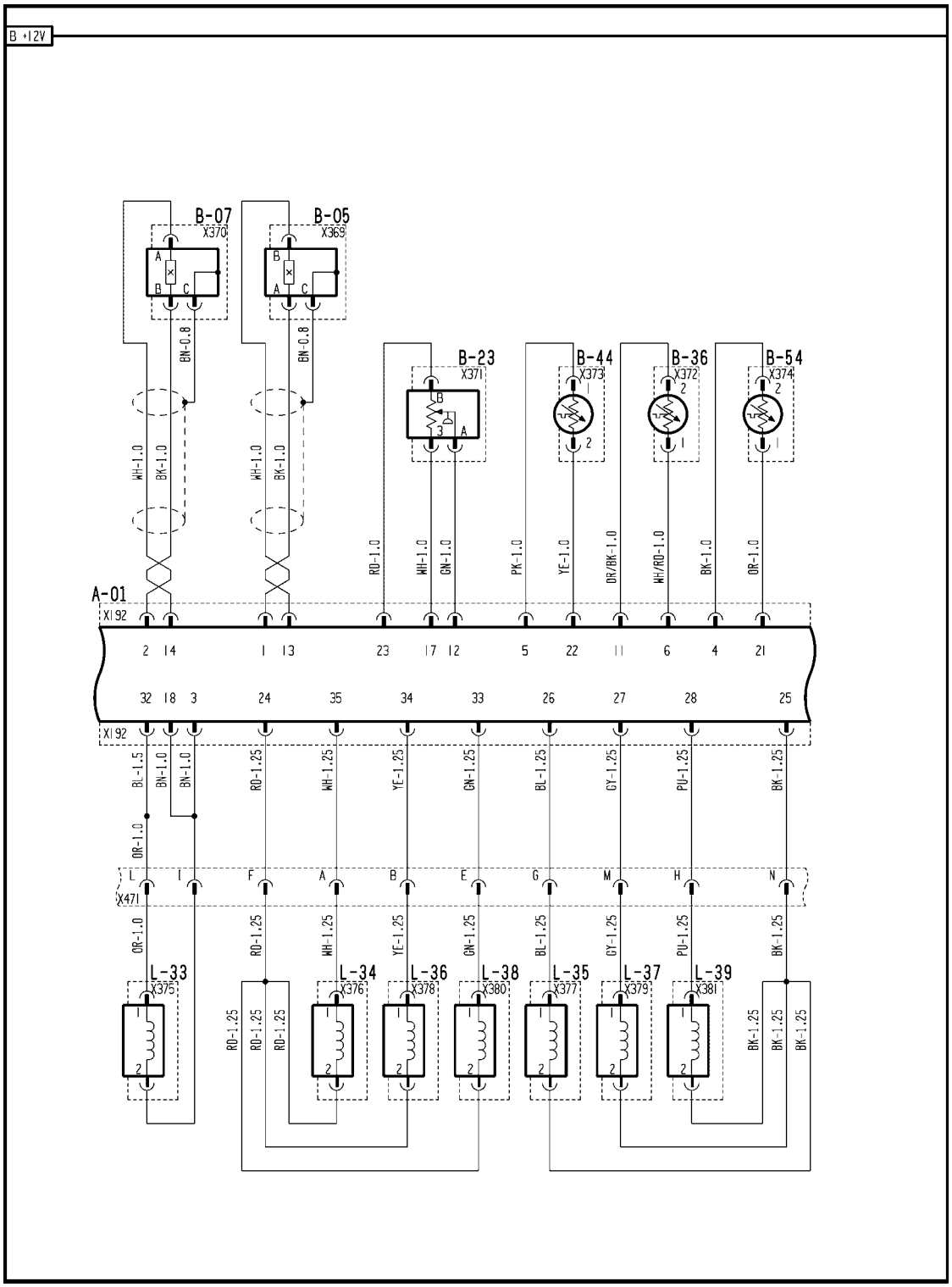
10010907A4 1

The Coolant Temperature Sensor B-44 **(1)** monitors the temperature of the engine coolant and sends the information to the ECU module connector **X192** pins 5 & 22. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E399-03 Coolant Temperature Sens Data Incorrect
E0399-03 Coolant Temperature Sens Short to High Source
E0399-04 Coolant Temperature Sens Short to Low Source

For additional information on the coolant temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

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A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

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Sensing system Coolant temperature - Short circuit to B+ (B.50.A.95.90 - G.30.B.54)

AFX8010

E0399-03 - Coolant Temperature Sens

Cause:
Signal range outside threshold limits
Signal not plausible or intermittent fault

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

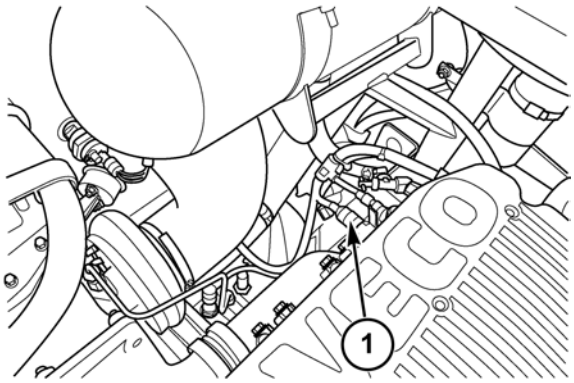
1. Faulty coolant sensor
2. Faulty connector or wiring

Solution:

1. Check the engine Coolant level.
   A. Ensure the coolant level is within the min/max indicators. Adjust as required. If the level was very low, ie, no fluid visible in the header tank, investigate the cause of the fluid loss and repair. Remove the fault code from the ECU memory, using the electronic service tool and operate the engine, if the fault does not reoccur, continue with vehicle operation.
   B. If the fault reoccurs, continue with step **2**.
2. Check connector **X373** at coolant temp sensor B44.
   A. Ensure the connector **X373** is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the sensor. Repair or replace damaged components as required.
   B. If the connector is okay, continue with step **3**.
3. Check coolant temp sensor B44.
   A. Remove the connector **X373** and check the sensor using a suitable multi-meter. Measure the resistance across the sensor terminals, the resistance should vary between **8 - 10 kOhms** @ -**10 °C**, **2.2 - 2.7 kOhms @ 20 °C**, and **0.29 - 0.36 kOhms @ 80 °C**, . Check for a short to ground between each sensor terminal and the engine block, an open circuit should be recorded on each terminal. If any readings are incorrect replace the sensor.
   B. If the sensor is okay, continue with step **4**.
4. Check wiring.
   A. Disconnect the sensor connector **X373**. With the keystart switch ON, measure the voltage at pin 1 (pink wire), **+5 volts** should be measured. If no voltage is measured check the wiring for continuity between Pin 1 of the sensor connector **X373** and pin 5 of engine ECU connector **X192X192**. Repair wiring as required. Check for voltage on Pin 2; **0 volts** should be measured. If voltage is measured trace and repair short circuit in wiring between Pin 2 of the sensor connector **X373** and Pin 22 of the engine ECU connector **X192**. With the keystart OFF, also check for continuity of the wire between Pin 2 of the sensor connector **X373** and Pin 22 of the engine ECU connector **X192**, and for a short to ground. Trace fault and repair as required.
   B. If the wiring is okay suspect a faulty engine ECU. Download engine software using the electronic service tool and operate engine. If fault still occurs substitute engine ECU.

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Sensing system Coolant temperature - Overview (B.50.A.95.90 - C.10.A.10)



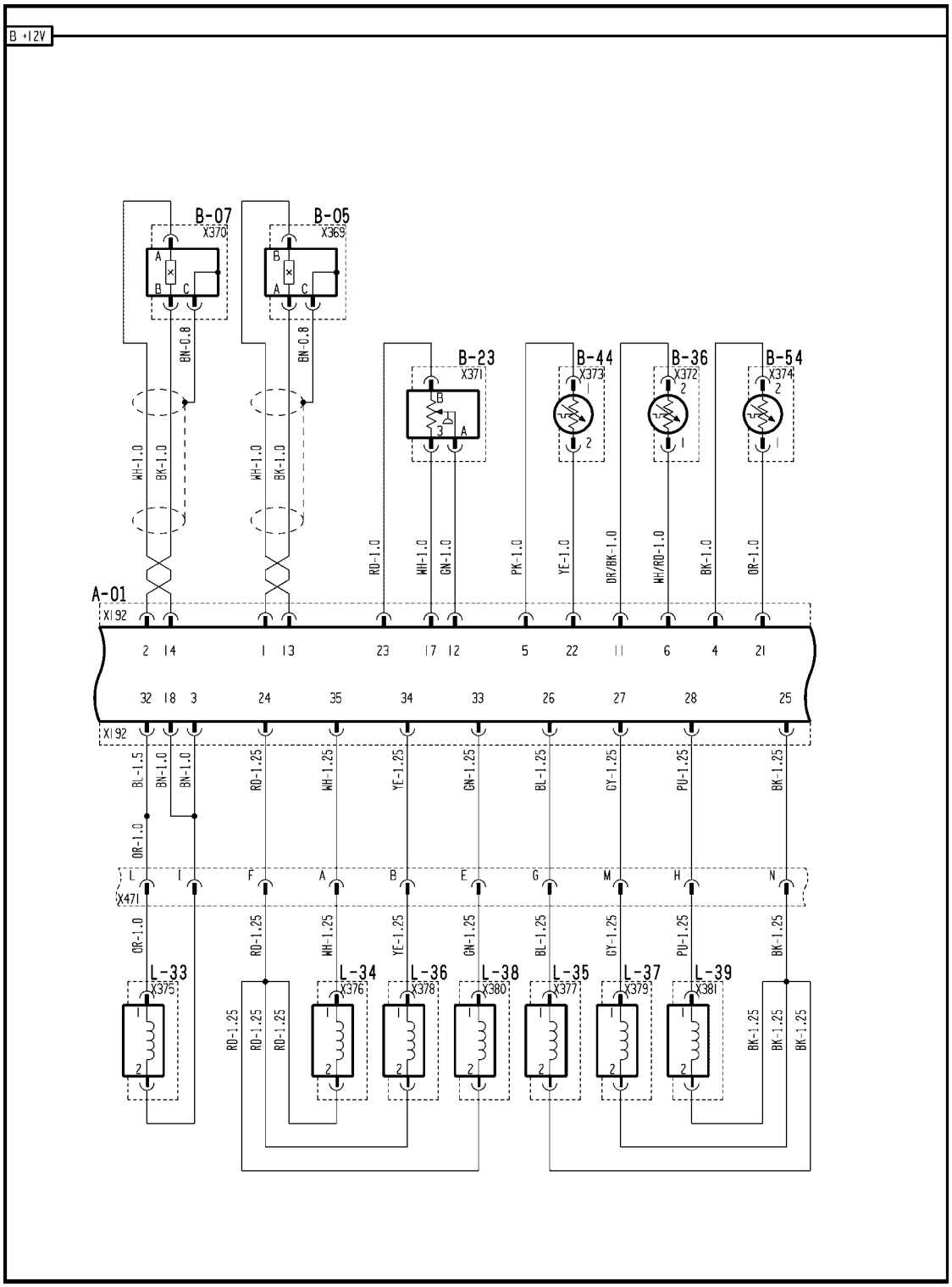
10010907A4 1

The Coolant Temperature Sensor B-44 **(1)** monitors the temperature of the engine coolant and sends the information to the ECU module connector **X192** pins 5 & 22. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E399-03 Coolant Temperature Sens Data Incorrect
E0399-03 Coolant Temperature Sens Short to High Source
E0399-04 Coolant Temperature Sens Short to Low Source

For additional information on the coolant temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

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Sensing system Coolant temperature - Short circuit to ground (B.50.A.95.90 - G.30.B.53)

AFX8010

E0399-04 - Coolant Temperature Sens

Cause:
Signal range outside threshold limits
Signal not plausible or intermittent fault

Possible failure modes:

Effect on Engine: Engine enabled - no restriction on fuel or speed

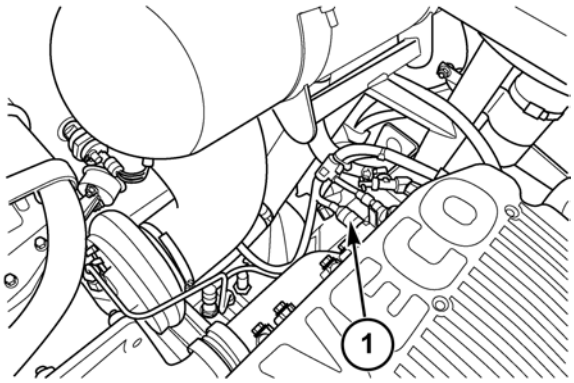
1. Faulty coolant sensor
2. Faulty connector or wiring

Solution:

1. Check the engine Coolant level.
   A. Ensure the coolant level is within the min/max indicators. Adjust as required. If the level was very low, ie, no fluid visible in the header tank, investigate the cause of the fluid loss and repair. Remove the fault code from the ECU memory, using the electronic service tool and operate the engine, if the fault does not reoccur, continue with vehicle operation.
   B. If the fault reoccurs, continue with step **2**.
2. Check connector **X373** at coolant temp sensor B44.
   A. Ensure the connector **X373** is not damaged, the terminals are in the correct position in the housing, and that the fit is tight on the sensor. Repair or replace damaged components as required.
   B. If the connector is okay continue with step **3**.
3. Check coolant temp sensor B44.
   A. Remove the connector **X373** and check the sensor using a suitable multi-meter. Measure the resistance across the sensor terminals, the resistance should vary between **8 - 10 kOhms** @ -**10 °C**, **2.2 - 2.7 kOhms @ 20 °C**, and **0.29 - 0.36 kOhms @ 80 °C**, . Check for a short to ground between each sensor terminal and the engine block, an open circuit should be recorded on each terminal. If any readings are incorrect replace the sensor.
   B. If the sensor is okay continue with step **4**.
4. Check wiring.
   A. Disconnect the sensor connector **X373**. With the keystart switch ON, measure the voltage at pin 1 (pink wire), **+5 volts** should be measured. If no voltage is measured check the wiring for continuity between Pin 1 of the sensor connector **X373** and pin 5 of engine ECU connector **X192X192**. Repair wiring as required. Check for voltage on Pin 2; **0 volts** should be measured. If voltage is measured trace and repair short circuit in wiring between Pin 2 of the sensor connector **X373** and Pin 22 of the engine ECU connector **X192**. With the keystart OFF, also check for continuity of the wire between Pin 2 of the sensor connector **X373** and Pin 22 of the engine ECU connector **X192**, and for a short to ground. Trace fault and repair as required.
   B. If the wiring is okay suspect a faulty engine ECU. Download engine software using the electronic service tool and operate engine. If fault still occurs substitute engine ECU.

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Sensing system Coolant temperature - Overview (B.50.A.95.90 - C.10.A.10)



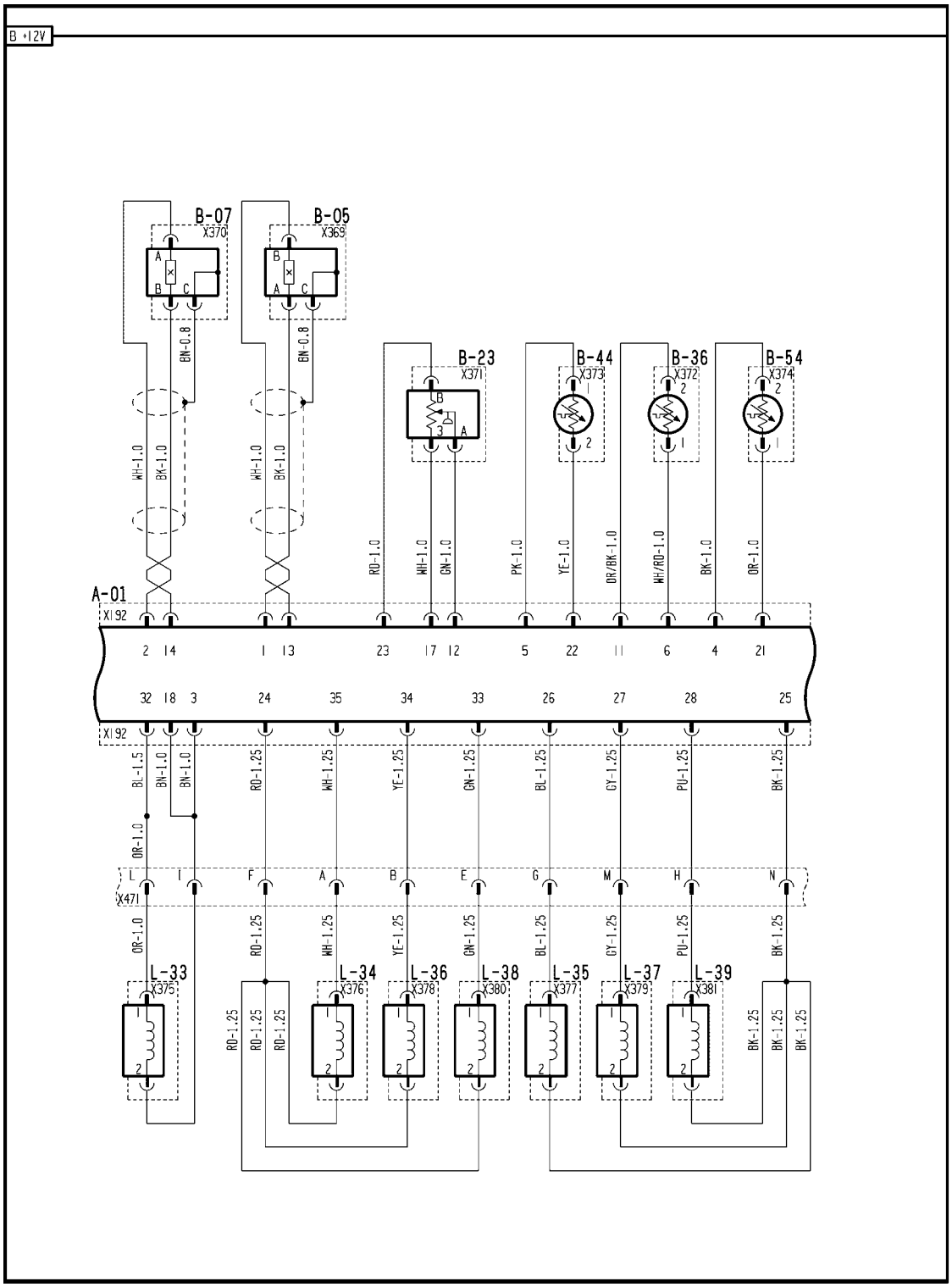
10010907A4 1

The Coolant Temperature Sensor B-44 **(1)** monitors the temperature of the engine coolant and sends the information to the ECU module connector **X192** pins 5 & 22. This information is used by the ECU module to control engine fuel delivery. This circuit is monitored by the ECU module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E399-03 Coolant Temperature Sens Data Incorrect
E0399-03 Coolant Temperature Sens Short to High Source
E0399-04 Coolant Temperature Sens Short to Low Source

For additional information on the coolant temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)**

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Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)



AFXSCHEM03A-04 1

FRAME 3 - ENGINE

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A-01 Iveco ECU	B-05 Engine Flywheel RPM	B-07 Engine Camshaft RPM
B-23 Boost Pressure	B-36 Fuel Termperature	B-44 Coolant Temperature
B-54 Air Temperature	L-33 Engine Brake	L-34 Fuel Actuator 1
L-35 Fuel Actuator 2	L-36 Fuel Actuator 3	L-37 Fuel Actuator 4
L-38 Fuel Actuator 5	L-39 Fuel Actuator 6	

https://truckmanualshub.com/

Index

POWER PRODUCTION - B

ENGINE COOLANT SYSTEM - 50.A

De-aeration tank - Install (B.50.A.23 - F.10.A.15) 17
AFX8010

De-aeration tank - Remove (B.50.A.23 - F.10.A.10) 15
AFX8010

ENGINE COOLANT SYSTEM - Drain fluid (B.50.A - F.35.A.20) 12
AFX8010

ENGINE COOLANT SYSTEM - General specification (B.50.A - D.40.A.10) 4
AFX8010

ENGINE COOLANT SYSTEM - Static description (B.50.A - C.30.A.20) 6
AFX8010

Fan and drive - Install (B.50.A.54 - F.10.A.15) 34
AFX8010

Fan and drive - Overview (B.50.A.54 - C.10.A.10) 9
AFX8010

Fan and drive - Remove (B.50.A.54 - F.10.A.10) 32
AFX8010

Fan and drive - Static description (B.50.A.54 - C.30.A.20) 10
AFX8010

Fan and drive - Torque (B.50.A.54 - D.20.A.10) 4
AFX8010

Radiator - Install (B.50.A.32 - F.10.A.15) 23
AFX8010

Radiator - Remove (B.50.A.32 - F.10.A.10) 19
AFX8010

Radiator Wiper - Install (B.50.A.32.65 - F.10.A.15) 29
AFX8010

Radiator Wiper - Remove (B.50.A.32.65 - F.10.A.10) 27
AFX8010

Radiator Wiper - Replace (B.50.A.32.65 - F.10.A.30) 31
AFX8010

Sensing system - Torque (B.50.A.95 - D.20.A.10) 5
AFX8010

Sensing system Coolant level - Replace (B.50.A.95.93 - F.10.A.30) 36
AFX8010

Sensing system Coolant level - Short circuit to B+ (B.50.A.95.93 - G.30.B.54) 38
AFX8010

Sensing system Coolant temperature - Incorrect value (B.50.A.95.90 - G.30.C.10) 42
AFX8010

Sensing system Coolant temperature - Incorrect value (B.50.A.95.90 - G.30.C.10) 45
AFX8010

Sensing system Coolant temperature - Over limit value (B.50.A.95.90 - G.30.C.22) 41
AFX8010

Sensing system Coolant temperature - Overview (B.50.A.95.90 - C.10.A.10) 11
AFX8010

Sensing system Coolant temperature - Short circuit to B+ (B.50.A.95.90 - G.30.B.54) 49
AFX8010

https://truckmanualshub.com/

Sensing system Coolant temperature - Short circuit to ground (B.50.A.95.90 - G.30.B.53) 53
AFX8010

Thermostat - Dynamic description (B.50.A.18 - C.30.A.10) 7
AFX8010

Thermostat - Torque (B.50.A.18 - D.20.A.10) 4
AFX8010

Water pump - Sectional view (B.50.A.20 - C.10.A.30) 8
AFX8010

Water pump - Torque (B.50.A.20 - D.20.A.10) 4
AFX8010

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POWER PRODUCTION - B

LUBRICATION SYSTEM - 60.A

AFX8010

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Contents

POWER PRODUCTION - B

LUBRICATION SYSTEM - 60.A

TECHNICAL DATA

LUBRICATION SYSTEM - General specification (B.60.A - D.40.A.10) 4
AFX8010

Oil pump

Oil pump - Torque (B.60.A.20 - D.20.A.10) 4
AFX8010

Oil pan

Oil pan - Torque (B.60.A.23 - D.20.A.10) 4
AFX8010

Oil cooler

Oil cooler - Torque (B.60.A.32 - D.20.A.10) 4
AFX8010

Oil line

Oil line - Torque (B.60.A.36 - D.20.A.10) 5
AFX8010

Sensing system

Sensing system - Torque (B.60.A.95 - D.20.A.10) 5
AFX8010

FUNCTIONAL DATA

LUBRICATION SYSTEM - Overview (B.60.A - C.10.A.10) 6
AFX8010

LUBRICATION SYSTEM - Static description (B.60.A - C.30.A.20) 7
AFX8010

Oil pan

Oil pan - Static description (B.60.A.23 - C.30.A.20) 8
AFX8010

Oil filter

Oil filter - Static description (B.60.A.24 - C.30.A.20) 9
AFX8010

Sensing system

Sensing system Oil temperature - Overview (B.60.A.95.92 - C.10.A.10) 10
AFX8010

Sensing system Oil pressure - Overview (B.60.A.95.91 - C.10.A.10) 11
AFX8010

DIAGNOSTIC

Sensing system

https://truckmanualshub.com/

Sensing system Oil temperature - Over limit value (B.60.A.95.92 - G.30.C.22) 12
AFX8010

Sensing system Oil temperature - Short circuit to B+ (B.60.A.95.92 - G.30.B.54) 13
AFX8010

Sensing system Oil temperature - Short circuit to ground (B.60.A.95.92 - G.30.B.53) 16
AFX8010

Sensing system Oil temperature - Open circuit (B.60.A.95.92 - G.30.B.50) 19
AFX8010

Sensing system Oil pressure - Under limit value (B.60.A.95.91 - G.30.C.20) 24
AFX8010

Sensing system Oil pressure - Short circuit to B+ (B.60.A.95.91 - G.30.B.54) 25
AFX8010

Sensing system Oil pressure - Open circuit (B.60.A.95.91 - G.30.B.50) 30
AFX8010

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LUBRICATION SYSTEM - General specification (B.60.A - D.40.A.10)

AFX8010

Lubrication	Forced, with gear pump
Pump drive	From crankshaft
Engine speed/oil pump speed ratio	1:1.6
Oil cleaning	Mesh filter on oil intake and high-filtration cartridge on delivery line
Oil filter quantity	2
Normal oil pressure with engine warm **95 - 105 °C** (**203 - 221 °F**) and at top speed	**5 bar** (**72.5 psi**).
Normal oil pressure with engine warm **95 - 105 °C** (**203 - 221 °F**) and at idling speed of 1300 rpm	**4 bar** (**58 psi**)
Minimum permissible pressure	**2.5 bar** (**36.3 psi**)
Adjustment valve	In the oil pump body
Valve initial opening pressure	**5 bar** (**72.5 psi**)

Oil pump - Torque (B.60.A.20 - D.20.A.10)

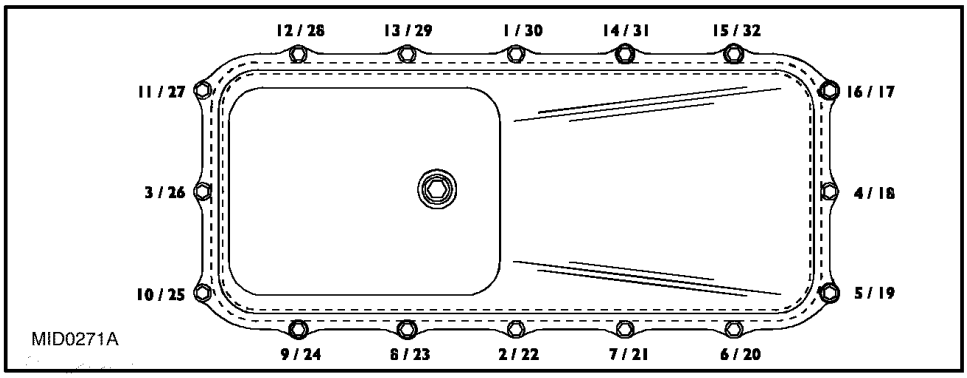
AFX8010

Screw securing oil pump	M8x1.25	**23 - 27 Nm**	**17 - 19 lb ft**
Screw securing oil pump suction hose and pipe to crankcase	M8x1.25	**23 - 27 Nm**	**17 - 19 lb ft**

Oil pan - Torque (B.60.A.23 - D.20.A.10)

AFX8010

Screws securing spacer and oil pan	M8x1.25



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Pre-torque	**11.5 Nm**	**8 lb ft**
Torque	**45 Nm**	**33 lb ft**

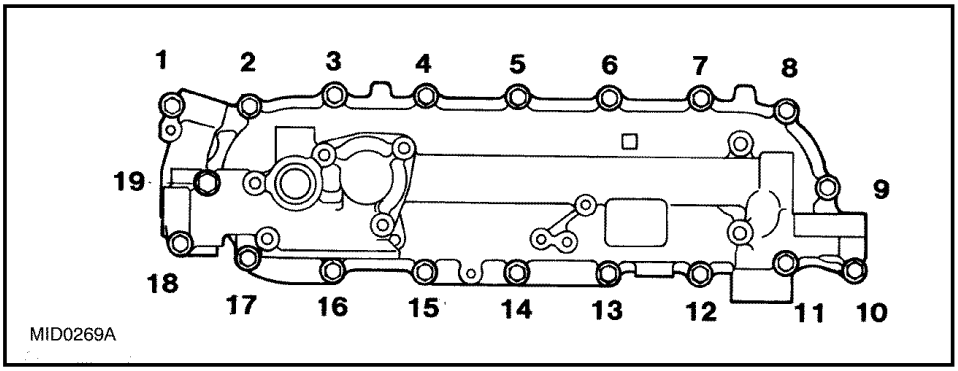
Oil cooler - Torque (B.60.A.32 - D.20.A.10)

AFX8010

Screws securing oil cooler to crankcase (Before assembly, lubricate with engine oil)	M8x1.25

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Pre-torque	**11.5 Nm**	**8 lb ft**
Torque	**19 Nm**	**14 lb ft**



mid0269a 1

Plan of tightening sequence of screws securing heat exchanger

Oil line - Torque (B.60.A.36 - D.20.A.10)

AFX8010

Piston cooling oil nozzle union

M12x15	**33 - 37 Nm**	**24 - 26 lb ft**

Sensing system - Torque (B.60.A.95 - D.20.A.10)

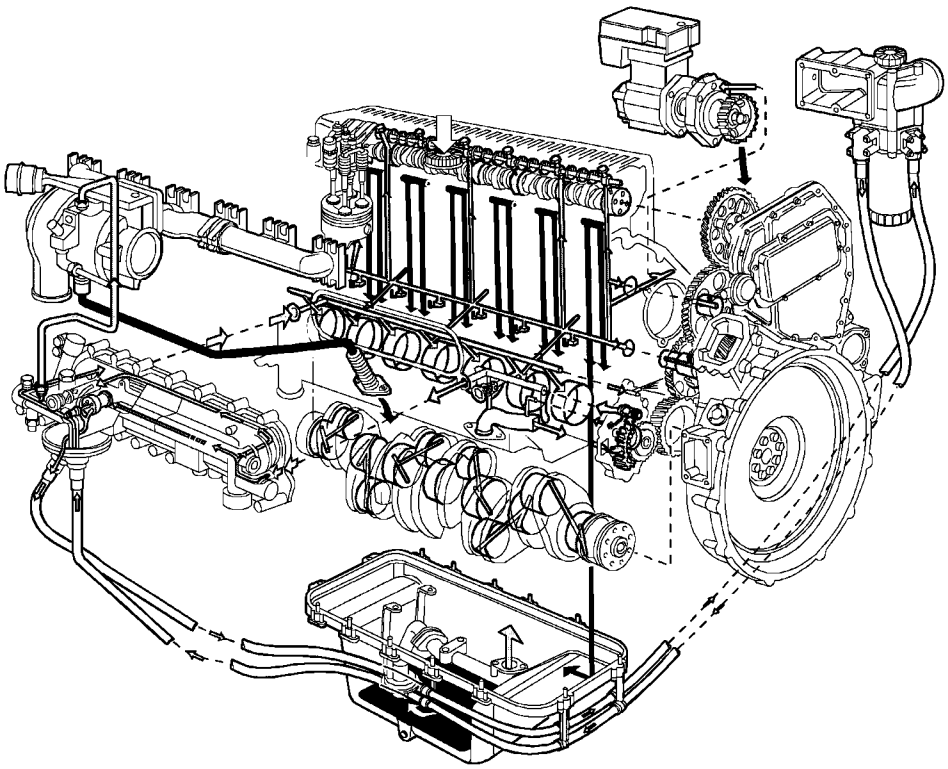
AFX8010

Screw securing control unit mount to crankcase	M8x1.25	**16 - 22 Nm**	**12 - 16 lb ft**
Connections to injector-pump	M3x0.5	**6 - 10 Nm**	**53 - 87 lb in**
Screw securing air-conditioner compressor mount	M8x1.25	**22 - 27 Nm**	**16 - 20 lb ft**
Screw securing guard	M8x1.25	**22 - 27 Nm**	**16 - 20 lb ft**
Filter clogging sensor fixing	3/4-16 UNF	**50 - 60 Nm**	**37 - 43 lb ft**
Pressure transmitter fixing	M6x1	**6 - 10 Nm**	**53 - 87 lb in**

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LUBRICATION SYSTEM - Overview (B.60.A - C.10.A.10)

AFX8010



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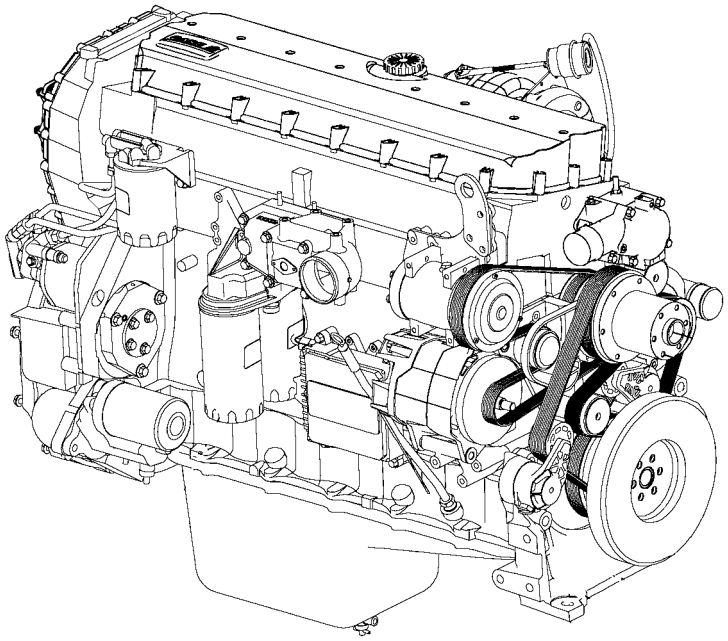
Lubrication diagram: Solid lines, Oil by gravity flow and shaded lines, Oil flow under pressure.

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LUBRICATION SYSTEM - Static description (B.60.A - C.30.A.20)

AFX8010

Lubrication is a forced circulation type via gear pump. The pump is gear driven by the crankshaft. An oil pressure valve is fitted to the pump. A heat exchanger and two oil filters are attached to the lubrication circuit. The oil thermostat is housed in the heat exchanger case. The filter mount is fitted with:a oil filter bypass valve, a pressure sender unit for the pressure gauge, a low pressure switch for the warning light and an oil temperature sender unit



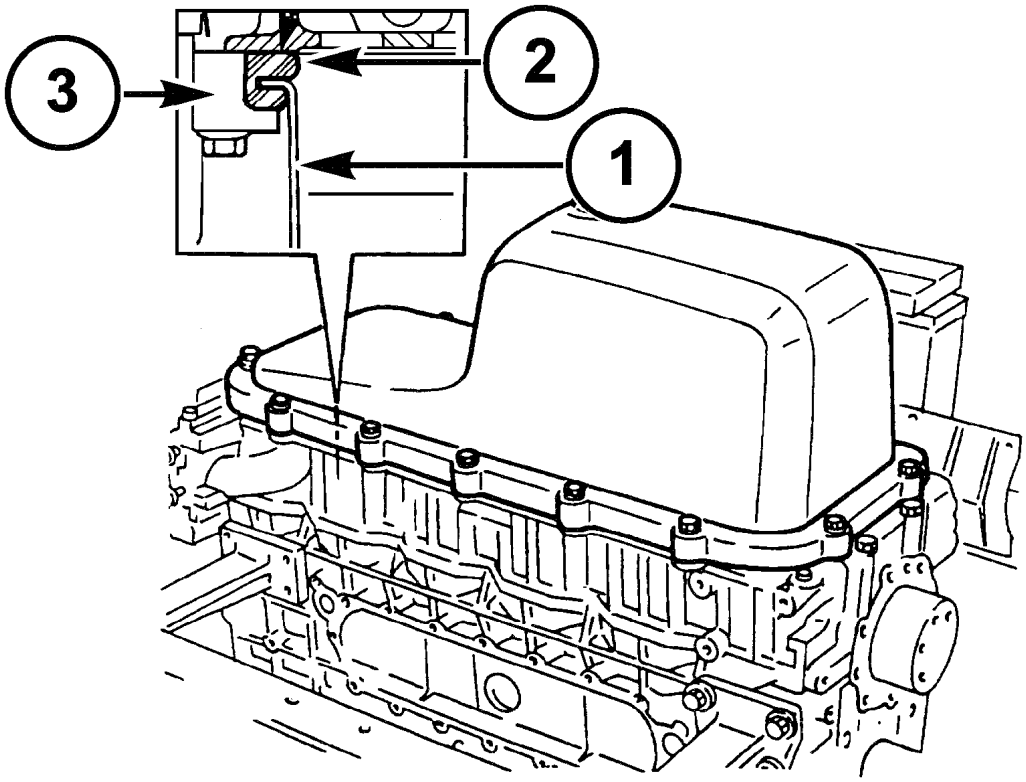
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Oil pan - Static description (B.60.A.23 - C.30.A.20)

AFX8010

The oil sump is fastened to the engine block in a new way, i.e. it is flexibly mounted. The edge of sump **(1)**, is enclosed inside a thick rubber "C" gasket **(2)** and is contained and supported by an aluminum element **(3)**, bolted to the engine block. This solution prevents noise and improves the seal. It also requires fewer bolts than the conventional system. A further benefit of this system is that the gasket does not need changing every time the sump is removed.



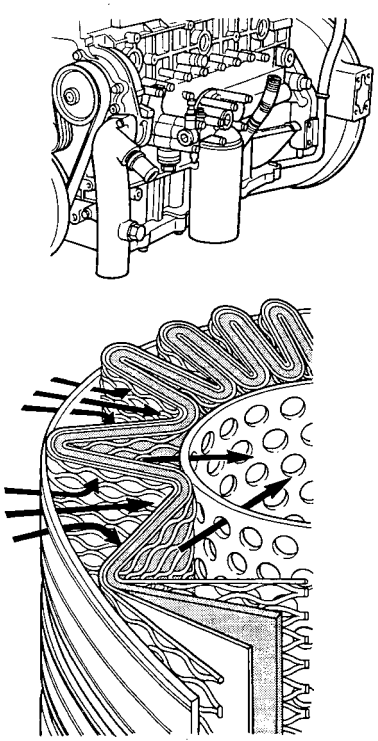
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Oil filter - Static description (B.60.A.24 - C.30.A.20)

AFX8010

The new generation of filters fitted to this engine are more effective because they are able to trap more particles of smaller size than conventional filters with a paper cartridge.
External Coil:
The filter elements are tightly wound up in a coil. This means that each fold is firmly anchored to the coil. Fluid is therefore filtered evenly over the septum surface even under difficult conditions, i.e. cold starts with high viscosity fluid and peak flow rates. This system also ensures even flow distribution over the entire length of the filter element. Less load is lost and the unit lasts longer.
Upstream Mount:
The filter is fitted with an exclusive mount to optimize slow distribution and stiffen the filter element. The mount takes the form of a sturdy high strength nylon and synthetic material mesh.
Filter Septum:
Consists of inert inorganic fibers bonded with resin of exclusive manufacture to a structure with graduated pores. The septum is manufactured in accordance with precise requirements and is subject to strict quality control checks.
Downstream Mount:
The septum is further strengthened by a mount and sturdy nylon mesh. This extra mount is particularly useful during cold starts and long periods of use. Filter performance remains constant and reliable throughout its working life and from element to element, regardless of changes in service conditions.
Structural Parts:
The O rings fitted to the filter element ensure an excellent seal between element and container to eliminate the risk of bypass and maintain constant filter performance. Corrosion resistant bases and a sturdy internal steel core complete the filter element structure.



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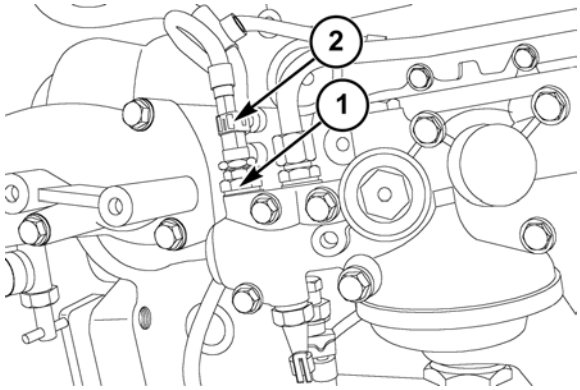
These high filtration devices have so far only been adopted for industrial processes. When used on vehicles, they enable us to:

1. Reduce war on engine components with time. 2. Maintain oil performance/properties and thus extend oil change intevernals.

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Sensing system Oil temperature - Overview (B.60.A.95.92 - C.10.A.10)

AFX8010



40033793A4 1

The Engine Oil Temperature Sensor B-03 **(1)** monitors the oil temperature and sends the information to CCM2 module connector **X016** pin J2-27. When the engine oil exceeds safe operating temperatures [>**126 °C** (>**259 °F**)] for more than 3 seconds, CCM-2 displays the alarm code "A0001 Engine Oil Temperature HIGH" to the operator. After the alarm has been displayed for 2 seconds, the engine will be shutdown to prevent internal damage.

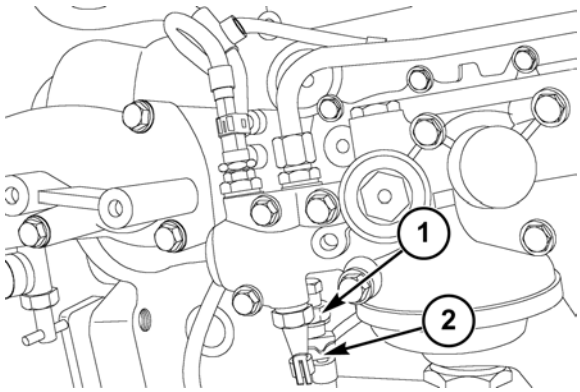
The engine oil temperature sensor circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0153-00 - Engine Oil Temperature Sensor
E0153-03 - Engine Oil Temperature Sensor
E0153-04 - Engine Oil Temperature Sensor
E0153-05 - Engine Oil Temperature Sensor

For additional information on the engine oil temperature sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**

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Sensing system Oil pressure - Overview (B.60.A.95.91 - C.10.A.10)

AFX8010



40033793B4 1

The Engine Oil Pressure Sensor B-52 **(1)** monitors the engine oil pressure and sends the information to the CCM2 module connector **X016** pin J2-33. The CCM2 module monitors the engine oil pressure in an effort to prevent major engine damage, and to warn the operator of insufficient oil pressure. If the engine has been running for at least 10 seconds, and the oil pressure drops to < **1 bar** (**14 psi**) for 3 seconds, the alarm message "A0002 Engine Oil Pressure LOW" will be displayed to the operator, and the engine will shut down automatically within 7 seconds to prevent damage.

The engine oil pressure sensor circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0161-01 - Oil Pressure Sensor
E0161-03 - Oil Pressure Sensor
E0161-05 - Oil Pressure Sensor

For additional information on the engine oil pressure sensor electrical circuit, refer to: **Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)**

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Sensing system Oil temperature - Over limit value (B.60.A.95.92 - G.30.C.22)

AFX8010

E0153-00 - Engine Oil Temperature Sensor

Context:
When the engine oil temperature exceeds **126 °C** (**260 °F**) for more than 3 seconds, the alarm message "A0001 Engine Oil Temperature HIGH" will be displayed to the operator, and the engine will be shutdown within 2 seconds to prevent engine damage from occurring. When the alarm message is displayed, a permanent record is created in the error history.

Cause:
The "A0001 Engine Oil Temperature HIGH" alarm has occurred at least once on the vehicle.

Possible failure modes:

1. The engine oil has been overheated during vehicle operation.

Solution:

1. This error message appears as a permanent record that an engine oil overheat condition has occurred on the combine, and cannot be erased using the combine display controls. The EST must be used to erase this fault code.

   A. If this fault code appears, remove and inspect the engine oil for indication of internal damage.

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Sensing system Oil temperature - Short circuit to B+ (B.60.A.95.92 - G.30.B.54)

AFX8010

E0153-03 - Engine Oil Temperature Sensor

Cause:
The engine oil temperature sensor (B-03) circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "OIL TEMP SEN" to check the voltage range.

   The proper voltage range is - **0.5 - 4.9 volts**.

   A. If the voltage reading is high out of range (>**5.2 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the engine oil temperature sensor connector **X311**.

   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**.

   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the Iveco engine harness between connector **X197** pin 9 and connector **X311** pin 1 on the blue wire. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**.

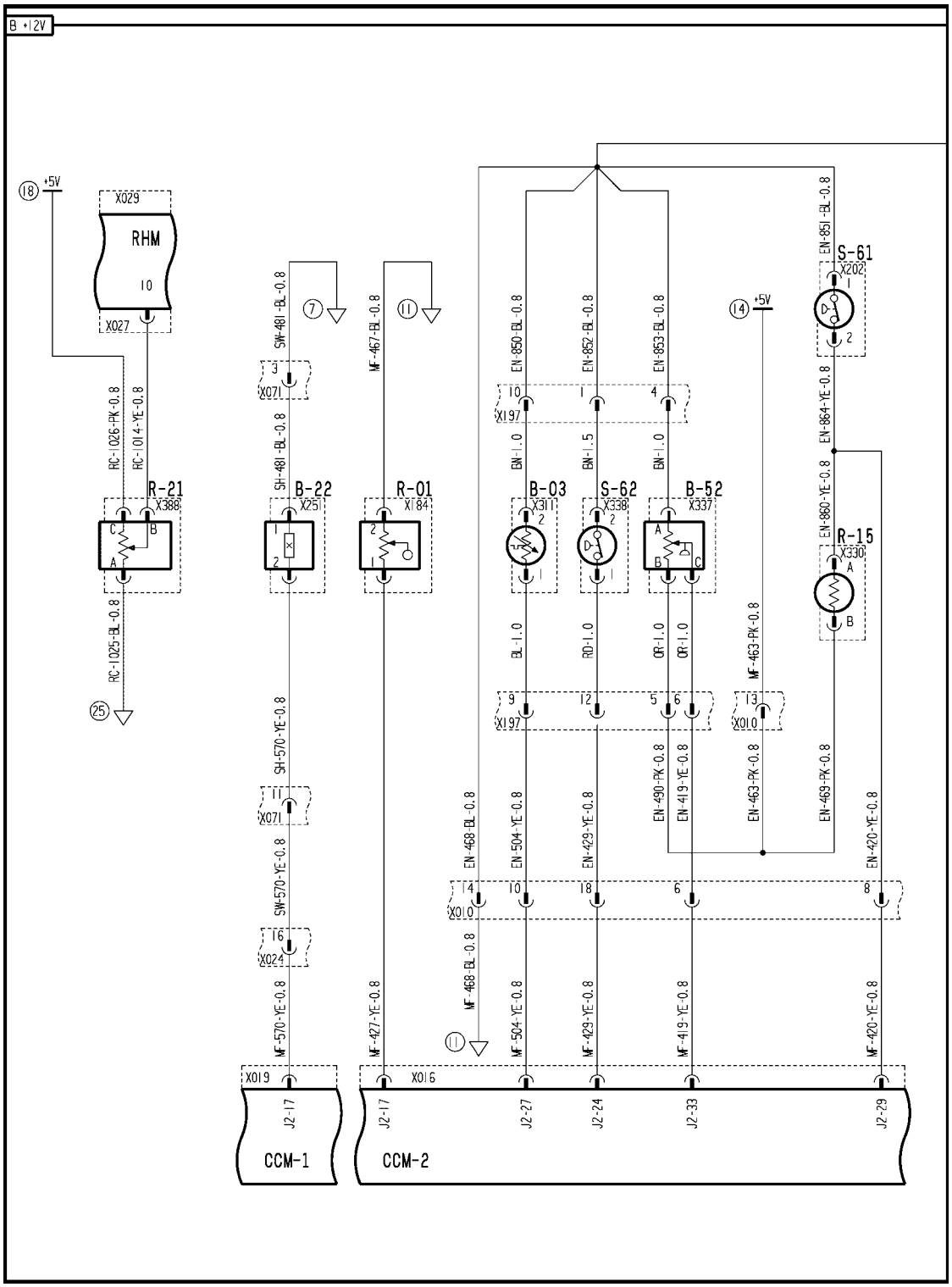
   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the engine (EN) harness between connector **X010** pin 10 and connector **X197** pin 9 wire 504 yellow. Locate the short and repair.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X010** pin 10 and connector **X016** pin J2-27 wire 504 yellow. Locate the short and repair.
5. Operate the machine while monitoring Universal Display Plus monitor.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

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Sensing system Oil temperature - Short circuit to ground (B.60.A.95.92 - G.30.B.53)

AFX8010

E0153-04 - Engine Oil Temperature Sensor

Cause:
The engine oil temperature sensor (B-03) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "OIL TEMP SEN" to check the voltage range.

   The proper voltage range is **0.5 - 4.9 volts**.

   A. If the voltage reading is low out of range (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the engine oil temperature sensor connector **X311**.

   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low out of range, continue with Step **3**.
3. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**.

   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the Iveco engine harness between connector **X197** pin 9 and connector **X311** pin 1 on the blue wire. Locate the short and repair.

   B. If the voltage remains low out of range, continue with Step **4**.
4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**.

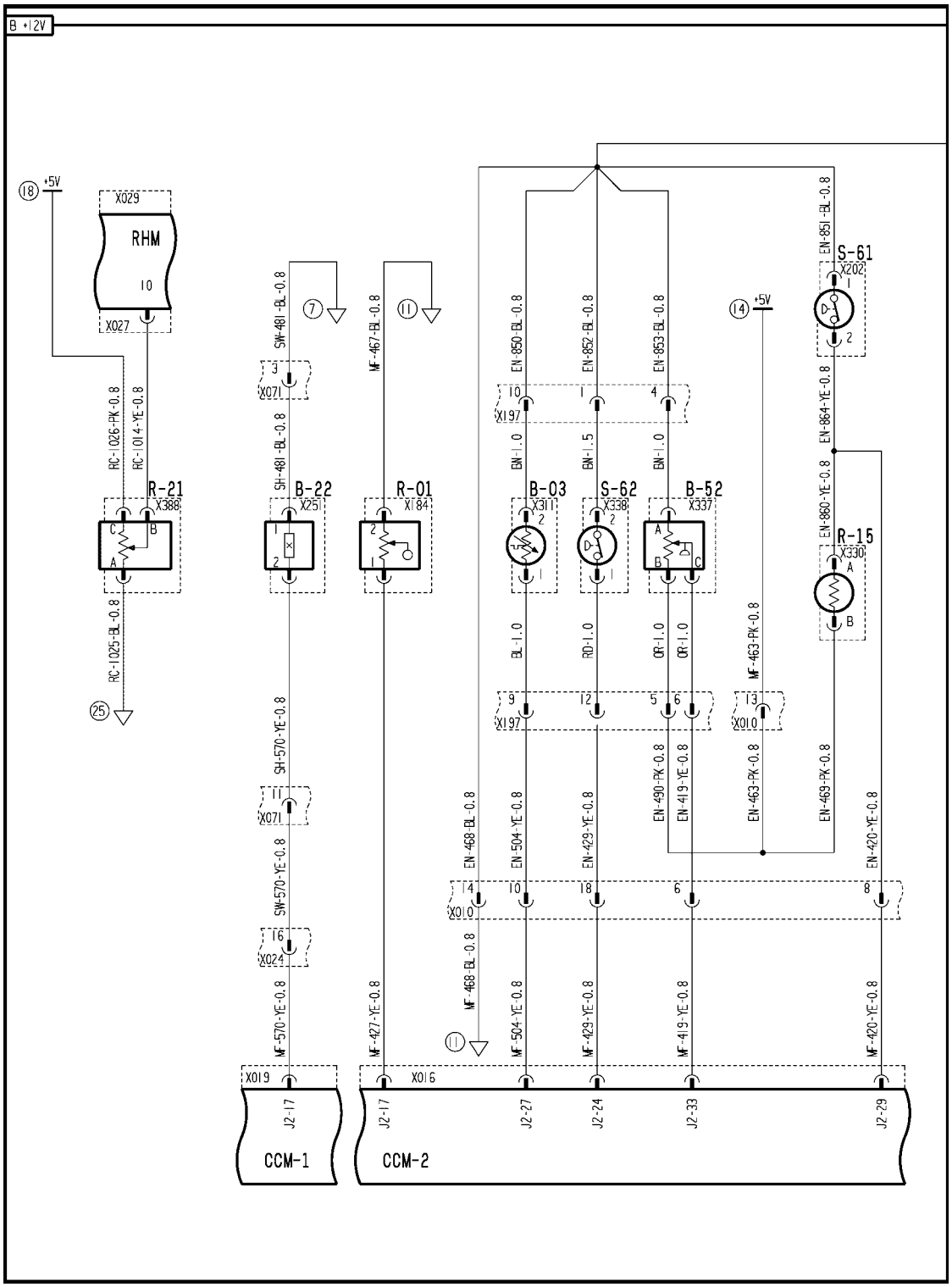
   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the engine (EN) harness between connector **X010** pin 10 and connector **X197** pin 9 wire 504 yellow. Locate the short to ground and repair.

   B. If the voltage remains low out of range, the short is in the main frame (MF) harness between connector **X010** pin 10 and connector **X016** pin J2-27 wire 504 yellow. Locate the short to ground and repair.
5. Operate the machine while monitoring Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

https://truckmanualshub.com/

Sensing system Oil temperature - Open circuit (B.60.A.95.92 - G.30.B.50)

AFX8010

E0153-05 - Engine Oil Temperature Sensor

Cause:
The engine oil temperature sensor (B-03) circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "OIL TEMP SEN" to check the voltage range.

   The proper voltage range is **0.5 - 4.9 volts**.

   A. If the voltage reading is high out of range (**4.9 - 5.2 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the engine oil temperature sensor connector **X311**. Use a jumper wire to short Connector **X311** pin 1 to chassis ground.

   A. If voltage drops to less than **0.5 volts**, the open circuit is not in the supply side of the circuit. Continue with Step **5**.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a jumper wire to short the engine harness end of connector **X197** pin 9 to ground.

   A. If voltage drops to less than **0.5 volts**, the open is in the Iveco engine harness between connector **X197** pin 9 and connector **X311** pin 1 on the blue wire. Locate the open and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a jumper wire to short the main frame (MF) harness end of connector **X010** pin 10 to chassis ground.

   A. If voltage drops to less than **0.5 volts**, the open is in the engine (EN) harness between connector **X010** pin 10 and connector **X197** pin 9 wire 504 yellow. Locate the open and repair.

   B. If voltage remains high, the open is in the main frame (MF) harness between connector **X010** pin 10 and connector **X016** pin J2-27 wire 504 yellow. Locate the open and repair.
5. Disconnect the engine oil temperature sensor connector **X311**. Use a multimeter to check for continuity between the harness end of connector **X311** pin 2 and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with Step **6**.
6. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a multimeter to check for continuity between the engine (EN) harness end of connector **X197** pin 10 and chassis ground.

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A. If there is continuity, the open circuit is in the Iveco engine harness between connector **X197** pin 10 and connector **X311** pin 2 on the brown wire. Locate the open and repair.

B. If there is no continuity, continue with Step **7**.

7. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X010** pin 14 and chassis ground.

   A. If there is continuity, the open circuit is in the engine (EN) harness between connector **X010** pin 14 and connector **X197** pin 10 wire 850 blue or 468 blue. Locate the open and repair.

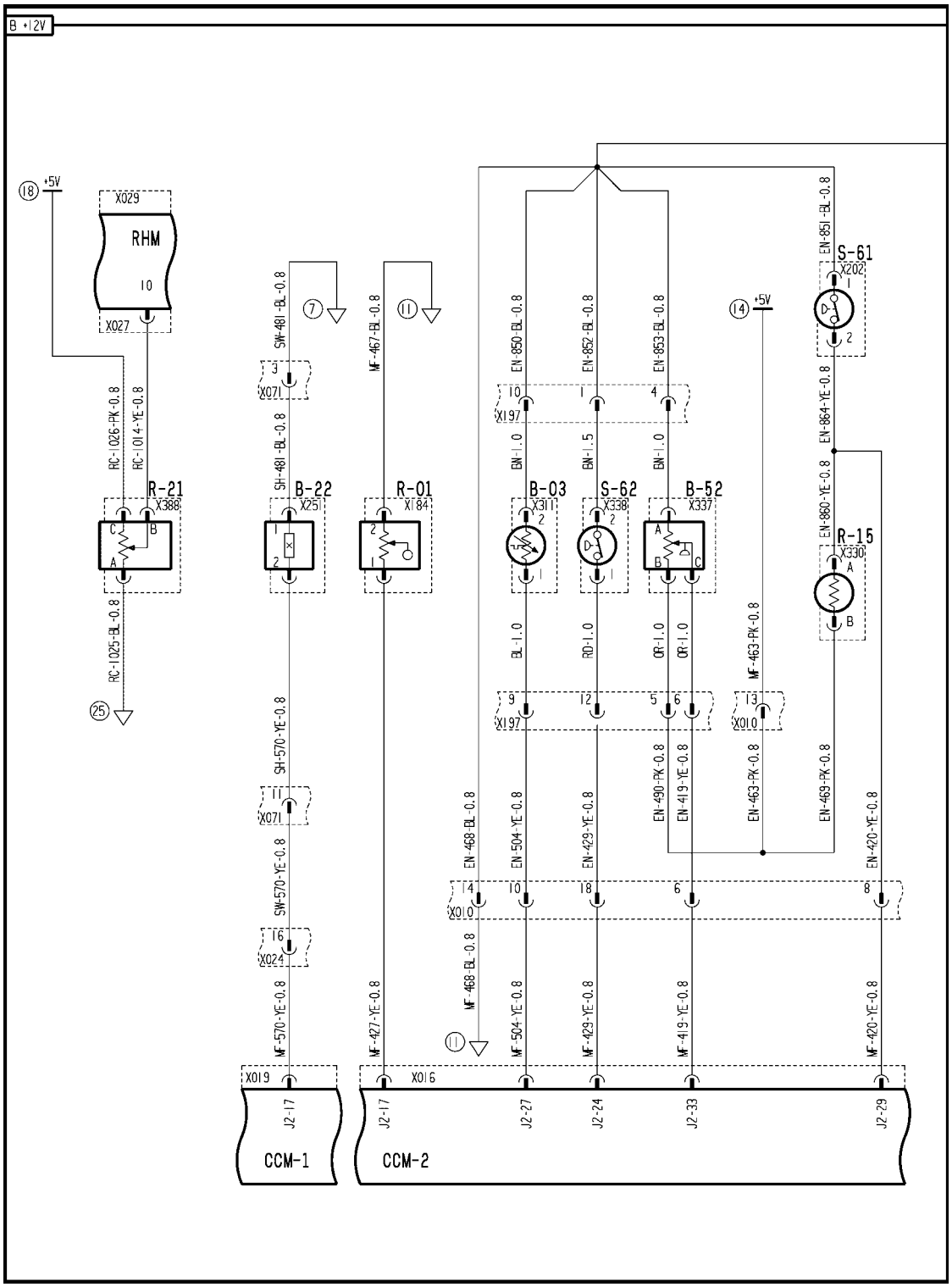
   B. If there is continuity, the open circuit is in the main frame (MF) harness between connector **X010** pin 14 and connector **X016** pin J2-14 wire 468 blue, 425 blue or 465 blue. Locate the open and repair.

8. Operate the machine while monitoring Universal Display Plus "DIAG" screen..

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



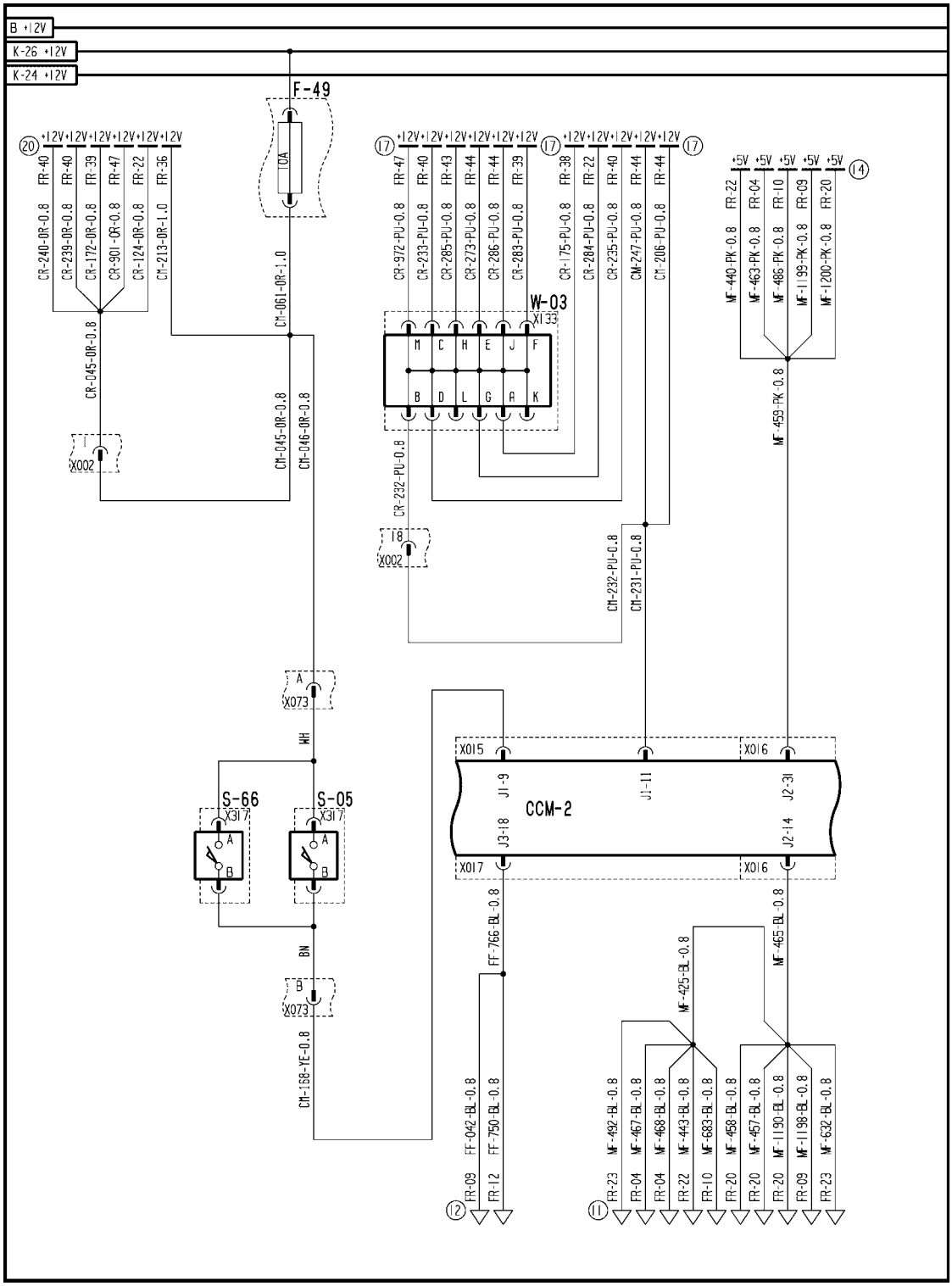
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Oil pressure - Under limit value (B.60.A.95.91 - G.30.C.20)

AFX8010

E0161-01 - Oil Pressure Sensor

Context:
When the engine oil pressure drops below**1 bar** (**14 psi**) for more than 3 seconds after the engine has been running for at least 10 seconds, the alarm message "A0002 Engine Oil Pressure LOW" will be displayed to the operator, and the engine will be shutdown within 7 seconds to prevent engine damage from occurring. When the alarm message is displayed, a permanent record is created in the error history.

Cause:
The "A0002 Engine Oil Pressure LOW" alarm has occurred at least once on the vehicle.

Possible failure modes:

1. The engine oil pressure has dropped below acceptable limits during vehicle operation.

Solution:

1. This error message appears as a permanent record that a low engine oil pressure condition has occurred on the combine, and cannot be erased using the combine display controls. The EST must be used to erase this fault code.

   A. If this fault code appears, remove and inspect the engine oil for indication of internal damage.

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Sensing system Oil pressure - Short circuit to B+ (B.60.A.95.91 - G.30.B.54)

AFX8010

E0161-03 - Oil Pressure Sensor

Cause:
The engine oil pressure sensor (B-52) circuit is shorted to 12 volts.

Possible failure modes:

1. Switch supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "OIL PRESS SEN" to check the voltage range.

   The proper voltage range for the engine oil pressure sensor (key On, engine OFF) is - **0.5 - 0.8 volts**.

   The proper voltage range for the engine oil pressure sensor (key On, engine Running) is - **0.8 - 4.9 volts**.

   A. If the voltage reading is high out of range (>**5.2 volts**), continue with Step **2**.

   B. If voltage is normal, the shorted wire may not be energized at this time. Continue with Step **9**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the engine oil pressure sensor connector **X337**. Use a multimeter to check for voltage on connector **X337** pin B. There should be **5 volts** present.

   A. If high (>**5.5 volts**) voltage is found, the regulated voltage supply is incorrect. The error "
   E0165-03 - CCM2 J2 5V Reference
   " should be listed in the Universal Display Plus "ERROR" screen. Correct that error, and then check to determine if this error has been resolved.

   B. If correct voltage is found, continue with Step **3**.
3. Disconnect the engine oil pressure sensor connector **X337**. Use a multimeter to check for continuity between connector **X337** pin A and chassis ground.

   A. If continuity is found, continue with Step **6**.

   B. If no continuity is found, continue with Step **4**.
4. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a multimeter to check for continuity between the engine (EN) harness end of connector **X197** pin 4 and chassis ground.

   A. If there is no continuity, continue with Step **5**.

   B. If there is continuity, there is an open circuit in the Iveco engine harness between connector **X197** pin 4 and connector **X337** pin A on the brown wire. Locate the open and repair.
5. Disconnect the engine harness (EN) from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the harness end of connector **X010** pin 14 and chassis ground.

   A. If there is continuity, there is an open circuit in the engine (EN) harness between connector **X010** pin 14 and connector **X197** pin 4 wire 853 blue or 468 blue. Locate the open and repair.

   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X010** pin 14 and connector **X016** pin J2-14 wire 468 blue, 425 blue or 465 blue. Locate the open and repair.

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6. Disconnect the engine oil pressure sensor connector **X337**. Use a multimeter to check for voltage on connector **X337** pin C.

   A. If no voltage is found, continue with Step **9**.

   B. If high (>**5.2 volts**) voltage is found, continue with Step **7**.

7. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a multimeter to check for voltage on connector **X197** pin 6.

   A. If high (>**5.2 volts**) voltage is found, continue with Step **8**.

   B. If no voltage is found, there is a short in the Iveco engine harness between connector **X197** pin 6 and connector **X337** pin C on the orange wire. Locate the short and repair.

8. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for voltage on connector **X010** pin 6.

   A. If no voltage is found, there is a short in the engine (EN) harness between connector **X197** pin 6 and connector **X010** pin 6 wire 419 yellow. Locate the short and repair.

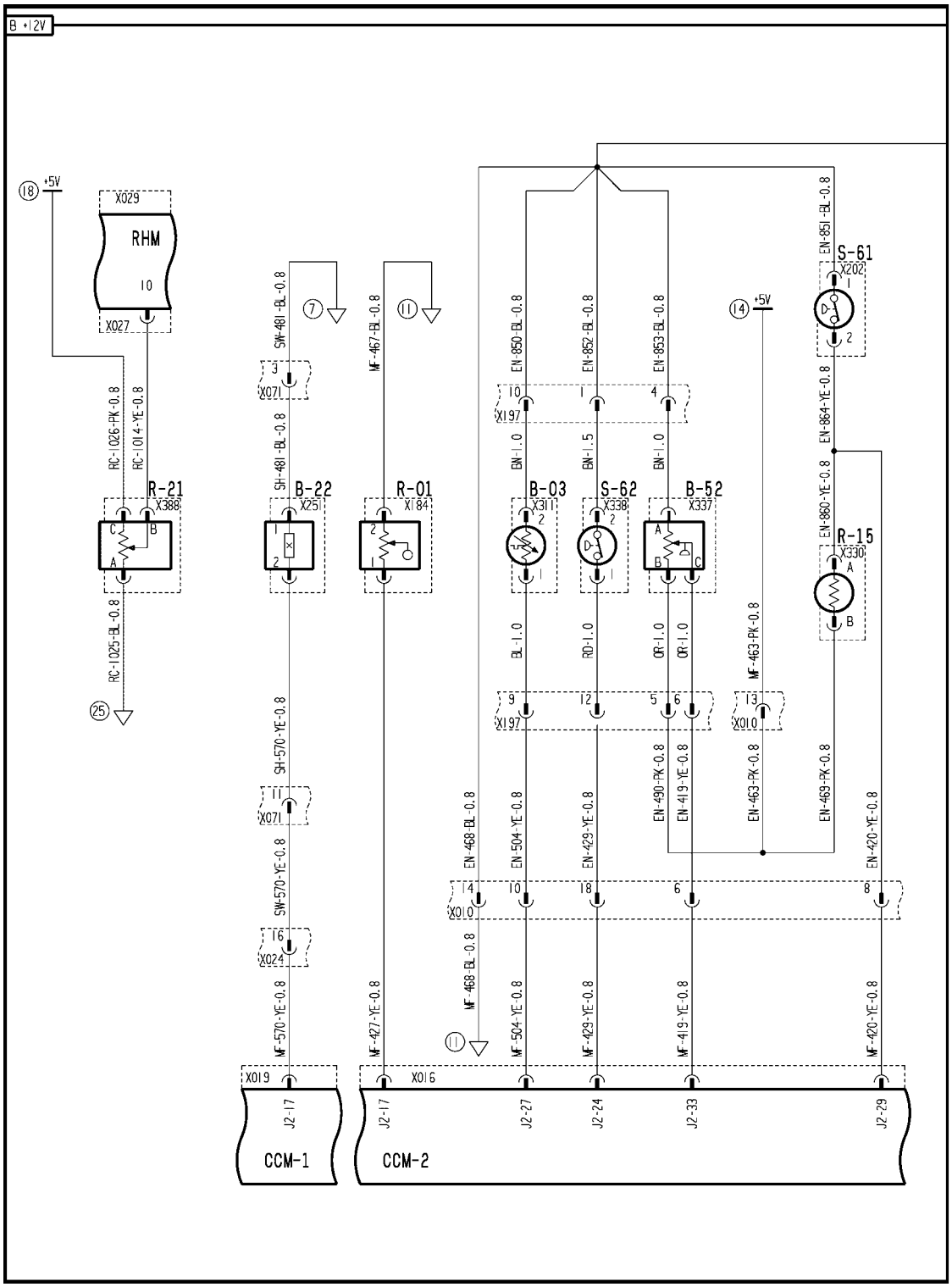
   B. If high (>**5.2 volts**) voltage is found, there is a short in the main frame (MF) harness between connector **X010** pin 6 and connector **X016** pin J2-33 wire 419 yellow. Locate the short and repair.

9. Operate the machine while monitoring Univeresal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



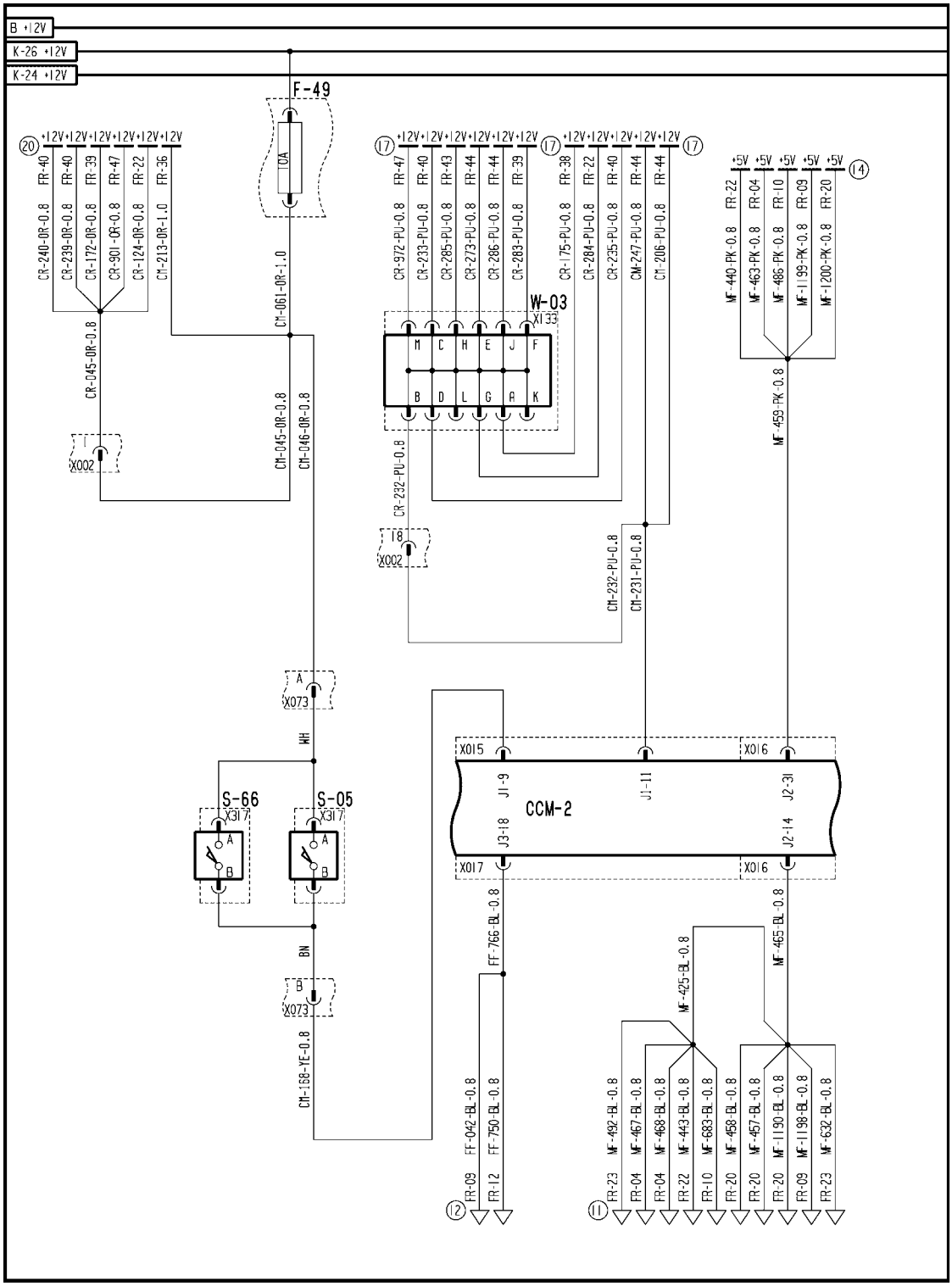
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Oil pressure - Open circuit (B.60.A.95.91 - G.30.B.50)

AFX8010

E0161-05 - Oil Pressure Sensor

Cause:
The engine oil pressure sensor (B52) circuit signal wire is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring open or shorted to ground.
2. Loss of power to the sensor.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "OIL PRESS SEN" to check the voltage range.

   The proper voltage range for the engine oil pressure sensor (key On, engine OFF) is **0.5 - 0.8 volts**.

   The proper voltage range for the engine oil pressure sensor (key On, engine Running) is **0.8 - 4.9 volts**.

   A. If the voltage reading is low out of range (<**0.3 volts**), continue with Step **2**.

   B. If the voltage is normal, the shorted wire may not be open or grounded at this time. Continue with Step **12**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the engine oil pressure sensor connector **X337**. Use a multimeter to check for voltage on connector **X337** pin B. There should be **5 volts** present.

   A. If no voltage is found, continue with Step **3**.

   B. If correct voltage is found, continue with Step **6**.

3. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a multimeter to check for voltage on connector **X197** pin 5. There should be **5 volts** present.

   A. If no voltage is found, continue with Step **4**.

   B. If correct voltage is found, there is an open circuit in the Iveco engine harness between connector **X197** pin 5 and connector **X337** pin B on the orange wire. Locate the open and repair.

4. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for voltage on connector **X010** pin 13. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the engine (EN) harness between connector **X197** pin 5 and connector **X010** pin 13 wire 490 pink or 463 pink. Locate the open and repair.

   B. If no voltage is found, continue with Step **5**.

5. Carefully disconnect the main frame harness from the CCM2 module at connector **X016**. Use a multimeter to check for voltage on the CCM2 module connector **X016** pin J2-31. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the main frame (MF) harness between connector **X010** pin 13 and connector **X016** pin J2-31 wire 459 pink or 463 pink. Locate the open and repair.

   B. If no voltage is found, there is an internal fault with the CCM2 module. Replace the module.

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6. Disconnect the engine oil pressure sensor connector **X337**. Use a multimeter to check for continuity between connector **X337** pin C and chassis ground.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, continue with Step **9**.

7. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a multimeter to check for continuity between the engine (EN) harness end of connector **X197** pin 6 and chassis ground.

   A. If there is continuity, continue with Step **8**.

   B. If there is no continuity, there is a short to ground in the Iveco engine harness between connector **X197** pin 6 and connector **X337** pin C on the orange wire. Locate the short and repair.

8. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the harness end of connector **X010** pin 6 and chassis ground.

   A. If there is no continuity, there is a short to ground in the engine (EN) harness between connector **X010** pin 6 and connector **X197** pin 6 wire 419 yellow. Locate the short and repair.

   B. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X010** pin 6 and connector **X016** pin J2-33 wire 419 yellow. Locate the short and repair.

9. Carefully disconnect the main frame harness from the CCM2 module at connector **X016**. Install a jumper wire between the harness end of connector **X016** pin J2-33 and chassis ground. Use a multimeter to check for continuity between connector **X337** pin C and chassis ground.

   A. If continuity is found, continue with Step **12**.

   B. If no continuity is found, continue with Step **10**.

10. Disconnect the Iveco engine harness from the engine (EN) harness at connector **X197**. Use a multimeter to check for continuity between the engine (EN) harness end of connector **X197** pin 6 and chassis ground.

    A. If there is no continuity, continue with Step **11**.

    B. If there is continuity, there is an open circuit in the Iveco engine harness between connector **X197** pin 6 and connector **X337** pin C on the orange wire. Locate the open and repair.

11. Disconnect the engine (EN) harness from the main frame (MF) harness at connector **X010**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X010** pin 6 and chassis ground.

    A. If there is continuity, there is an open circuit in the engine (EN) harness between connector **X010** pin 6 and connector **X197** pin 6 wire 419 yellow. Locate the open and repair.

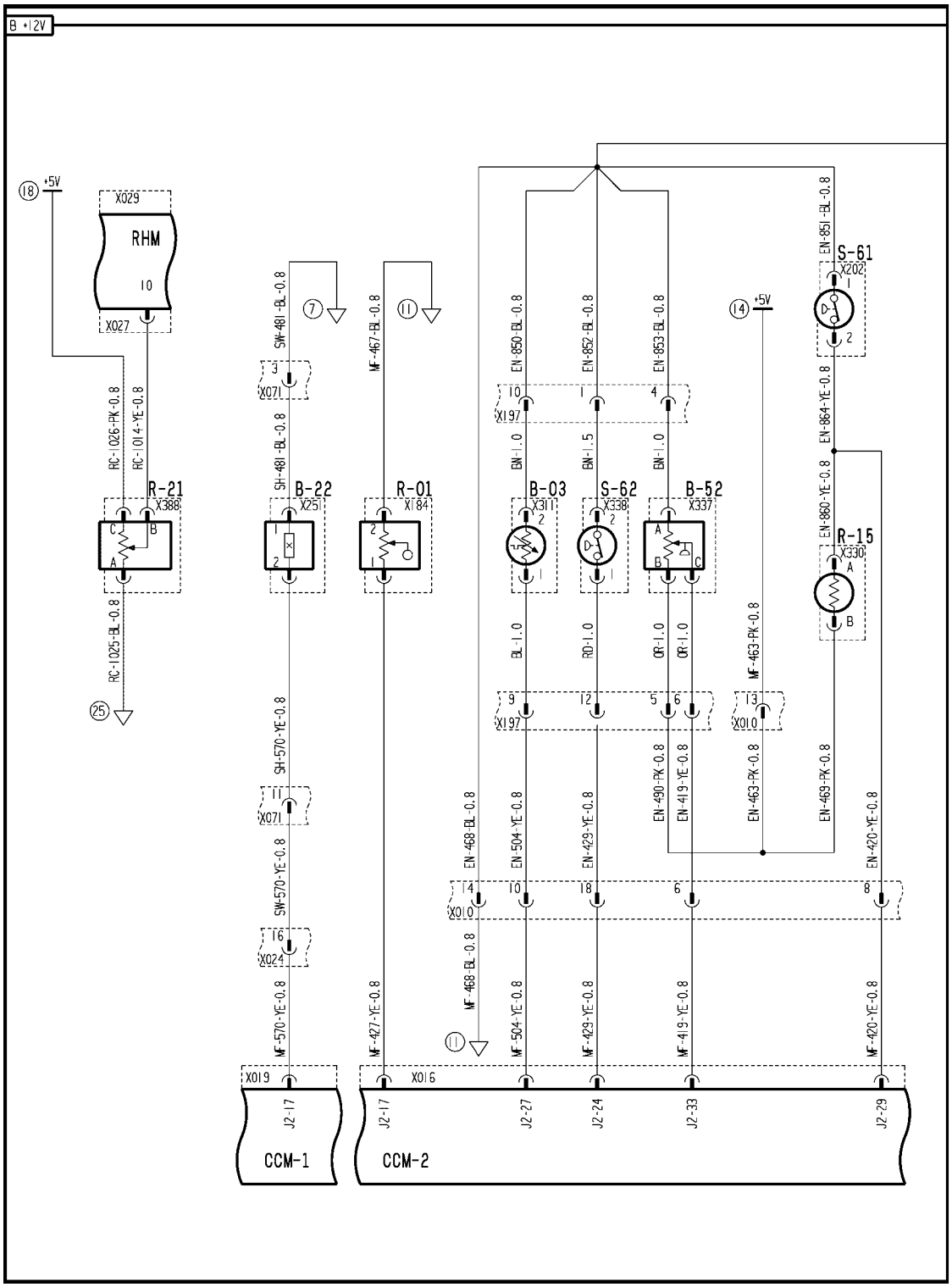
    B. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X010** pin 6 and connector **X016** pin J2-33 wire 419 yellow. Locate the open and repair.

12. Operate the machine while monitoring Universal Display Plus "DIAG" screen..

    A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



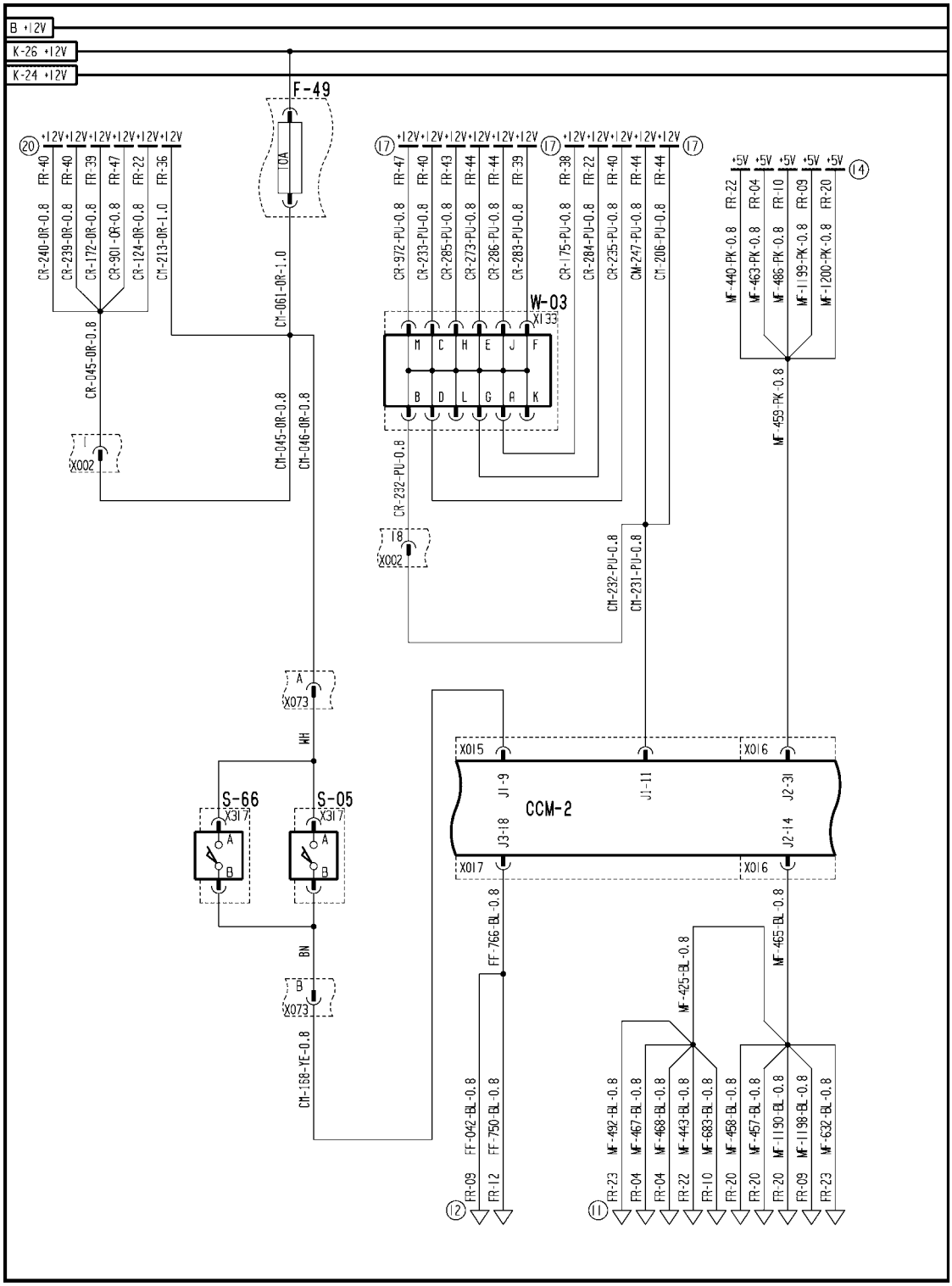
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Index

POWER PRODUCTION - B

LUBRICATION SYSTEM - 60.A

LUBRICATION SYSTEM - General specification (B.60.A - D.40.A.10) 4
AFX8010

LUBRICATION SYSTEM - Overview (B.60.A - C.10.A.10) 6
AFX8010

LUBRICATION SYSTEM - Static description (B.60.A - C.30.A.20) 7
AFX8010

Oil cooler - Torque (B.60.A.32 - D.20.A.10) 4
AFX8010

Oil filter - Static description (B.60.A.24 - C.30.A.20) 9
AFX8010

Oil line - Torque (B.60.A.36 - D.20.A.10) 5
AFX8010

Oil pan - Static description (B.60.A.23 - C.30.A.20) 8
AFX8010

Oil pan - Torque (B.60.A.23 - D.20.A.10) 4
AFX8010

Oil pump - Torque (B.60.A.20 - D.20.A.10) 4
AFX8010

Sensing system - Torque (B.60.A.95 - D.20.A.10) 5
AFX8010

Sensing system Oil pressure - Open circuit (B.60.A.95.91 - G.30.B.50) 30
AFX8010

Sensing system Oil pressure - Overview (B.60.A.95.91 - C.10.A.10) 11
AFX8010

Sensing system Oil pressure - Short circuit to B+ (B.60.A.95.91 - G.30.B.54) 25
AFX8010

Sensing system Oil pressure - Under limit value (B.60.A.95.91 - G.30.C.20) 24
AFX8010

Sensing system Oil temperature - Open circuit (B.60.A.95.92 - G.30.B.50) 19
AFX8010

Sensing system Oil temperature - Over limit value (B.60.A.95.92 - G.30.C.22) 12
AFX8010

Sensing system Oil temperature - Overview (B.60.A.95.92 - C.10.A.10) 10
AFX8010

Sensing system Oil temperature - Short circuit to B+ (B.60.A.95.92 - G.30.B.54) 13
AFX8010

Sensing system Oil temperature - Short circuit to ground (B.60.A.95.92 - G.30.B.53) 16
AFX8010

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POWER PRODUCTION - B

STARTING SYSTEM - 80.A

AFX8010

https://truckmanualshub.com/

Contents

POWER PRODUCTION - B

STARTING SYSTEM - 80.A

TECHNICAL DATA

Cold start aid

Cold start aid - Torque (B.80.A.30 - D.20.A.10) 4
AFX8010

Engine starter

Engine starter - Torque (B.80.A.82 - D.20.A.10) 4
AFX8010

FUNCTIONAL DATA

STARTING SYSTEM - Dynamic description (B.80.A - C.30.A.10) 5
AFX8010

Cold start aid

Cold start aid Pre-heating - Dynamic description (B.80.A.30.81 - C.30.A.10) 6
AFX8010

SERVICE

Cold start aid

Cold start aid Pre-heating - Remove (B.80.A.30.81 - F.10.A.10) 7
AFX8010

Engine starter

Engine starter - Replace (B.80.A.82 - F.10.A.30) 8
AFX8010

DIAGNOSTIC

STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30) 9
AFX8010

Cold start aid

Cold start aid - Problem solving (B.80.A.30 - G.40.A.30) 11
AFX8010

Cold start aid Indicator lamp - Testing (B.80.A.30.84 - G.40.A.20) 11
AFX8010

Cold start aid Relay - Testing (B.80.A.30.21 - G.40.A.20) 12
AFX8010

Cold start aid Pre-heating - Testing (B.80.A.30.81 - G.40.A.20) 12
AFX8010

Cold start aid Indicator lamp - Unidentified failure (B.80.A.30.84 - G.30.B.46) 13
AFX8010

https://truckmanualshub.com/

Engine starter

Engine starter - Testing (B.80.A.82 - G.40.A.20) 15
AFX8010

Start control

Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20) 16
AFX8010

Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20) 16
AFX8010

Start control Safety switch - Testing (B.80.A.90.81 - G.40.A.20) 17
AFX8010

Start control Start relay - Testing (B.80.A.90.80 - G.40.A.20) 17
AFX8010

Start control Neutral start relay - Testing (B.80.A.90.84 - G.40.A.20) 18
AFX8010

Start control 24V start relay - Testing (B.80.A.90.85 - G.40.A.20) 18
AFX8010

Start control Safety switch - Short circuit to B+ (B.80.A.90.81 - G.30.B.54) 19
AFX8010

Start control Safety switch - Short circuit to ground (B.80.A.90.81 - G.30.B.53) 25
AFX8010

Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54) 32
AFX8010

Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54) 41
AFX8010

Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54) 50
AFX8010

https://truckmanualshub.com/

Cold start aid - Torque (B.80.A.30 - D.20.A.10)

AFX8010

Screw securing air heater to the cylinder head	M10x1.5	**34 - 40 Nm**	**25 - 29 lb ft**

Engine starter - Torque (B.80.A.82 - D.20.A.10)

AFX8010

Screw securing starter motor	M12x1.75	**66 - 82 Nm**	**48 - 60 lb ft**

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STARTING SYSTEM - Dynamic description (B.80.A - C.30.A.10)

AFX8010

24V STARTING SYSTEM CIRCUIT OPERATION
Wiring harness - Electrical schematic frame 01 (A.30.A.88 - C.20.E.01)
Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)
Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)
Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)

- The Battery Switch S-52 (if equipped) must be closed before attempting to start the vehicle. When the Key Switch S-02 (frame 29) is turned to the RUN position and the Neutral Switch S-22 (frame 09) is closed (propulsion handle in neutral), current flows through Fuse F-48 (frame 17) and the Neutral Switch to energize the coil of the Neutral Start Relay K-23 (frame 01).
- When the Key Switch is turned to the START position, current flows from Fuse F-38 through the key switch and Neutral Start Relay K-23 to the coil side of the Start Relay K-36. The Start relay K-36 coil circuit is grounded to the engine ground #5, so the relay will energize. This closes the switch side of the Start Relay and allows current flow to energize the solenoid of the 24V Start Relay K-38, as well as energizing the starter solenoid on the 24V starter motor M-29.
- The 24V starting circuit starts with the rear 12V battery G-03 obtaining ground through the 24V Battery Switch S-52 (EU only, all other markets are grounded directly to engine ground #5) and supplying 12V to terminal 30 of the 24V Start Relay. This terminal supplies 12V through the now closed 24V Start Relay to the negative side of the front 12V battery G-02. This places two batteries in series creating 24 volts at the B+ terminal of the 24V Starter motor M-29.

NOTE: *The cab 12V power supply is connected to terminal 30 of the 24V start relay K-38, so that the cab fuse panel will only ever receive 12V, even when the 24V starter system is engaged.*

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Cold start aid Pre-heating - Dynamic description (B.80.A.30.81 - C.30.A.10)

AFX8010

Grid Heater Operation
Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)
Wiring harness - Electrical schematic frame 03 (A.30.A.88 - C.20.E.03)

- The grid heater relay K39 receives power from fuse F01 through an energized ECU Power relay K14, which also provides power to the ECU. The ECU activates the grid heater relay K39 by completing the ground path for the relay, and sends a CAN message to CCM2 whenever this occurs. The CCM2 module then turns on the cold start indicator light E36 in the cab.
- When the key switch is first turned on and the ECU powers up, it reads the temperatures from the fuel temperature sensor B36, coolant temperature sensor B44 and air temperature sensor B54. If the one or more of these temperatures are less than 10 degrees C (50 degrees F), and the battery voltage is greater than 7 volts, the ECU will activate the grid.
- In "Stand-by" mode, the grid heater will remain engaged for an additional 15 seconds, and then shut off. The grid heater will be reengaged when the operator starts cranking the engine, and will remain on for a certain period of time after the engine starts. The amount of time the grid heater remains on after the engine is running is dependant on the specific temperatures read from the fuel temperature sensor B36, coolant temperature sensor B44 and air temperature sensor B54, and may vary between 80 and 300 seconds.

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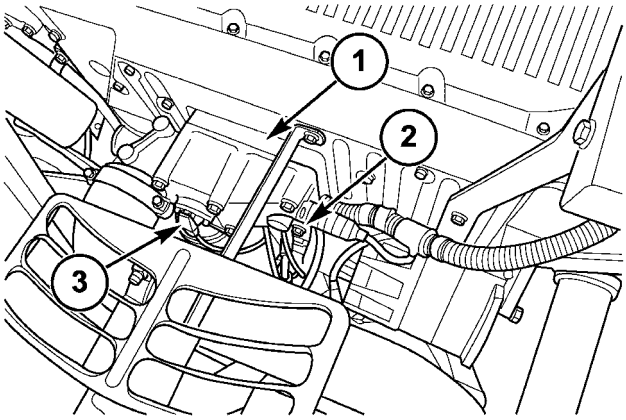
Cold start aid Pre-heating - Remove (B.80.A.30.81 - F.10.A.10)

AFX8010

1. Disconnect the battery.
2. Disconnect the temperature sensor, **(2)**, by carefully un-threading the locking ring. Disconnect the boost pressure sensor connector, **(3)**. Remove the two power leads from the grid heater unit.

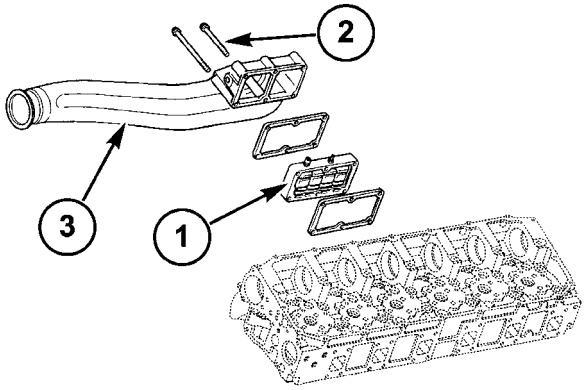
NOTE: *There is a dry gasket on either side of the grid heater. Observe the proper orientation and position of the grid gaskets for installation.*

NOTE: *During grid heater removal, make sure no dirt and debris enters the engine head. Cover the engine head whenever the grid heater is not in place.*



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3. Un-thread the bolts, **(2)** to remove the air intake manifold, **(3)**, and grid heater, **(1)**, from the engine head.



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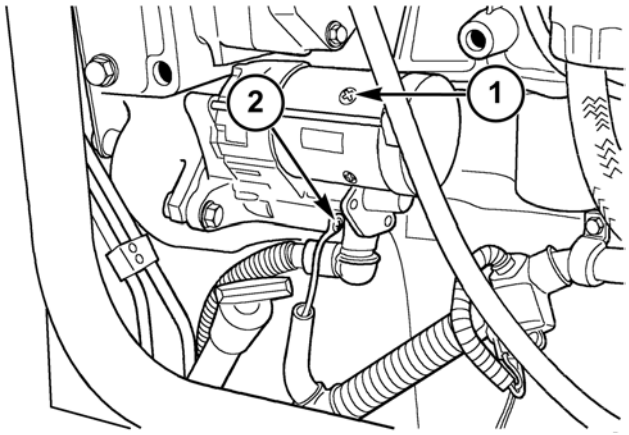
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Engine starter - Replace (B.80.A.82 - F.10.A.30)

AFX8010

Prior operation: Disconnect the battery connections.

1. To remove the starter motor **(1)** from the engine disconnect the two electrical connections **(2)**, and remove the three nuts attached to the M12 studs.



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2. To replace the starter motor **(1)** use three M12 nuts to secure the motor to the studs, and torque the nuts to **98 Nm** (**72 lb ft**) . Secure the electrical connections to the starter motor. Connect the battery.

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STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)

AFX8010

OPERATION

The starting system consists of two batteries, a Neutral start relay K-23, Start relay K-36, 24V Start relay K-38 and 24V Starter motor M-29. All components must function properly in order for the starting system to operate. For more information on starting system operation, refer to: **STARTING SYSTEM - Dynamic description (B.80.A - C.30.A.10)**

TROUBLESHOOTING

Before troubleshooting the starting system, make sure that the following operating conditions are met:

1. The batteries are fully charged and all the connections are clean and tight.
2. Check fuses F-38 and F-48.
3. Transmission in Neutral or Park.
4. Battery switch closed.

NOTE: *The batteries must be fully charged and all the connections clean and tight. Use a multi-meter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ **WARNING** ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

IMPORTANT: *Do not use a self-powered test light for any of the following tests. Use of a self-powered test light may cause damage to components in this system.*

Problem	Possible Cause	Correction
Engine does not crank when key is turned to "Start" position.	Fuse F-38	**Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)**
	Key Switch S-02	**Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)** **Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)**Test Points 1 and 2
	Neutral Switch S-22	**Start control Safety switch - Testing (B.80.A.90.81 - G.40.A.20)**
	Neutral Start Relay K-23	**Start control Neutral start relay - Testing (B.80.A.90.84 - G.40.A.20)**
	Start Relay K-36	**Start control Start relay - Testing (B.80.A.90.80 - G.40.A.20)**
	24V Start Relay K-38	**Start control 24V start relay - Testing (B.80.A.90.85 - G.40.A.20)**
	Starter Motor M-29	**Engine starter - Testing (B.80.A.82 - G.40.A.20)**
Click is heard when key is turned, but engine does not crank	24V Starter Motor M-29	**Engine starter - Testing (B.80.A.82 - G.40.A.20)**
	24V Start Relay K-38	**Start control 24V start relay - Testing (B.80.A.90.85 - G.40.A.20)**
	Start Relay K-36	**Start control Start relay - Testing (B.80.A.90.80 - G.40.A.20)**
	Neutral Start Relay K-23	**Start control Neutral start relay - Testing (B.80.A.90.84 - G.40.A.20)**
Engine cranks slowly	24V Starter Motor M-29	**Engine starter - Testing (B.80.A.82 - G.40.A.20)**

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Problem	Possible Cause	Correction
	Excessive loading on engine	Check PTO gearbox clutches and hydraulic pumps to verify that they are not causing excessive load on engine. Check clutches for warped plates causing them to drag. Check hydraulic pumps for incorrect neutral position.
	Engine mechanical problem	Rotate engine crankshaft manually to determine if engine requires excessive force to rotate. Refer to engine section in repair manual for information on inspecting engine internal components.
Starter motor continues to operate when key is released from START to RUN position	Key Switch S-02	**Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)** Confirm that switch open when key switch turned off.
	Start Relay K-36	**Start control Start relay - Testing (B.80.A.90.80 - G.40.A.20)** Confirm relay opens when key switch turned off.
	Starter Solenoid on 24V Starter motor M-29	**Engine starter - Testing (B.80.A.82 - G.40.A.20)**
Cold Start Does Not Function Properly	Cold Start Indicator Light E-36 not indicating proper function	**Cold start aid Indicator lamp - Testing (B.80.A.30.84 - G.40.A.20)**
	Grid Heater Relay K-39	**Cold start aid Relay - Testing (B.80.A.30.21 - G.40.A.20)**
	Engine Grid Heater R-09	**Cold start aid Pre-heating - Testing (B.80.A.30.81 - G.40.A.20)**

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Cold start aid - Problem solving (B.80.A.30 - G.40.A.30)

AFX8010

OPERATION

The cold start aid system consists of grid heater relay K-39, engine grid heater R-09, and the cold start indicator lamp E-36. The grid heater relay is controlled by the Engine Control Unit (ECU), which broadcasts a message on the CAN network whenever the grid heater relay is energized. When CCM2 sees this CAN message, it will power the indicator lamp.

TROUBLESHOOTING

1. Observe the grid heater for defective or damaged components.
2. Use an ohmmeter to test the grid heater for electrical continuity. The resistance between the two grid heater terminals should be approximately **0.50 ohms**.

NOTE: *The batteries must be fully charged and all the connections clean and tight. Use a multi-meter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ **WARNING** ⚠

M980 - Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

IMPORTANT: *Do not use a self-powered test light for any of the following tests. Use of a self-powered test light may cause damage to components in this system.*

Problem	Possible Cause	Correction
Cold Start Does Not Function Properly	Cold Start Indicator Light E-36 not indicating proper function	**Cold start aid Indicator lamp - Testing (B.80.A.30.84 - G.40.A.20)**
	Grid Heater Relay K-39	**Cold start aid Relay - Testing (B.80.A.30.21 - G.40.A.20)**
	Engine Grid Heater R-09	**Cold start aid Pre-heating - Testing (B.80.A.30.81 - G.40.A.20)**

Cold start aid Indicator lamp - Testing (B.80.A.30.84 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Disconnect battery cables. Remove instructional seat and the key switch panel to access the relevant connectors. Use a multimeter to check for continuity between CCM2 connector **X015** pin J1-12 and indicator lamp connector **X066** pin 7.	There should be continuity. Go to test **2**	If there is no continuity, there is an open circuit in the main frame (MF) harness between CCM2 connector **X015** pin J1-12 and indicator lamp connector **X066** pin 7 wire 839 white. Locate open and repair.
2	Use a multimeter to check for continuity between indicator lamp connector **X066** pin 8 and chassis ground.	There should be continuity to chassis ground. If there is continuity, replace the indicator lamp.	If there is no continuity, there is an open circuit in the main frame (MF) harness between the indicator lamp connector **X066** pin 8 and chassis ground wire 294 black. Locate open and repair.

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Cold start aid Relay - Testing (B.80.A.30.21 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Key switch S-02 in the ON position. Measure for **12 volts** at Grid Heater Relay K-39 connector **X211** pin 1.	**12 volts** If good reading, Go to test **2**	If no voltage is found, Go to test **2**
2	Key switch S-02 in the ON position. Measure for **12 volts** at Engine Control Unit (ECU) connector **X193** pin 3 or 4.	**12 volts** Open circuit in the engine (EN) harness between connector **X193** pin 3 & 4 and grid heater relay K-39 connector **X211** pin 1 wire 818 white. Locate open and repair.	If no voltage is found, the ECU Power supply circuit is not functioning. Refer to the ECU Power Supply circuit testing for more information.
3	Key switch S-02 in the ON position. Measure for **12 volts** at Grid Heater Relay terminal B+.	**12 volts** If good reading, Go to test **4**	If no voltage is found, Go to test **3**
4	Measure for **12 volts** at Alternator G-01 terminal B+.	**12 volts** If good reading, there is an open circuit in wire 840 red between the alternator G-01 and grid heater relay K-39 pin B+. Locate the open and repair.	If no voltage is found, there is an open circuit in wire 802 red between the 24V Start relay K-38 and the alternator G-01. Locate the open and repair.
5	Key Switch in the OFF position. Measure resistance from Grid Heater Relay K-39 connector **X211** pin 2 to ECU connector **X193** pin 10.	Less than **1 ohms** resistance. If good reading, Go to test **5**	If there is excessive resistance, there is an open circuit in the engine harness between Grid Heater Relay K-39 connector **X211** pin 2 and ECU connector **X193** pin 10 wire 882 black. Locate the open and repair.
6	Remove wire 841 white from the grid heater relay. Connect a jumper wire between the grid heater connector **X211** pin 2 and chassis ground. Key Switch in ON position. Measure for **12 volts** at Grid Heater Relay output terminal (white wire connection).	**12 volts** If good reading, the Grid Heater Relay K-39 is operating properly.	Grid Heater Relay K-39 is faulty. Replace relay.

Cold start aid Pre-heating - Testing (B.80.A.30.81 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Engine Grid Heater R-09; use a multimeter to check for resistance between the two terminals.	Ohms resistance between two terminals should be approximately **55 ohms**. Go to test **2**	If resistance is infinite, grid heater is defective and requires replacement.
2	Use a multimeter to check for continuity between the terminal end of the black wire and chassis ground.	There should be continuity. Go to test **3**	If resistance is infinite, there is an open circuit between the grid heater and chassis ground. Locate the open and repair.
3	Use a multimeter to check for continuity between the grid heater relay K-39 white wire and the white wire connection to the grid heater.	There should be continuity.	If resistance is infinite, there is an open circuit in the white wire between the grid heater relay K-39 and the grid heater R-09. Locate the open and repair.

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Cold start aid Indicator lamp - Unidentified failure (B.80.A.30.84 - G.30.B.46)

AFX8010

E0196-11 - Grid Heater

Cause:
The cold start indicator lamp E-36 circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad cold start indicator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "ENGINE" sort menu, and select "GRID HEATER". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **5**.
2. Turn the key switch to the OFF position and remove the cold start indicator lamp E-36 from the start panel in the cab. Disconnect connector **X066** from the indicator lamp. Use a multimeter to check for continuity between **X066** pin 7 and chassis ground. Flex the cab main (CM) harness while making this check.

   A. If no continuity to ground is found, continue with Step **3**.

   B. If there is continuity to ground, the short to ground is in the cab main (CM) harness between connector **X066** and connector **X015** J1-12 wire 839 white. Locate the short and repair.
3. Use a multimeter to check for continuity between **X066** pin 9 and chassis ground.

   A. If there is continuity to ground, continue with Step **4**.

   B. If no continuity to ground is found, there is an open circuit in the cab main (CM) harness between connector **X066** and cab ground #3 wire 294 black. Locate the open and repair.
4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the cold start indicator lamp E-36. Use the multimeter to check for **12 volts** between connector **X066** pin 7 and chassis ground.

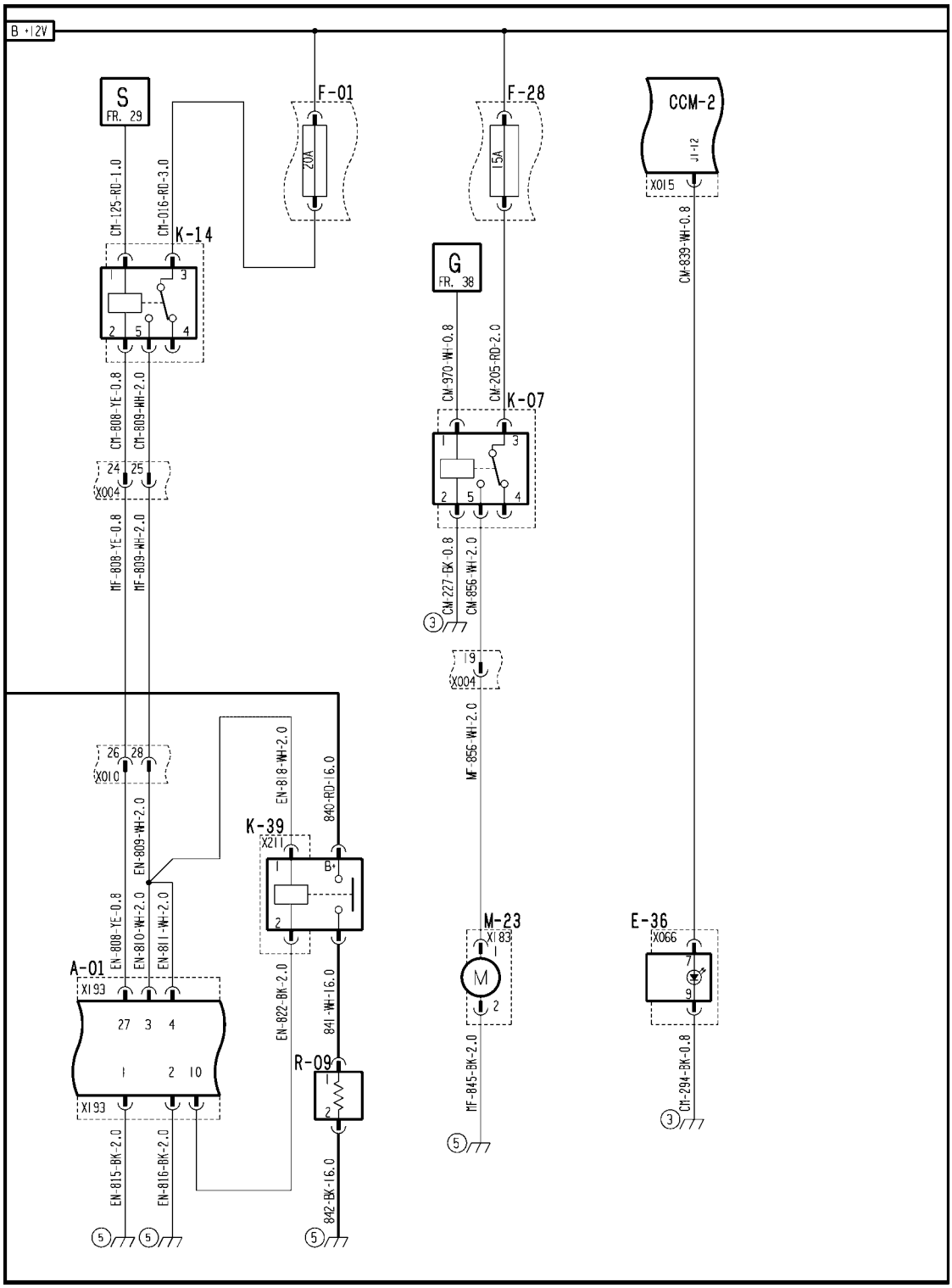
   A. If **12 volts** is not present, there is an open circuit in the cab main (CM) harness between the connector **X066** and connector **X015** J1-12 wire 839 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **5**.
5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



AFXSCHEM02A-04 1

FRAME 2 - ENGINE

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A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

Engine starter - Testing (B.80.A.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Key Switch S-02 in the START position. Measure for **24 volts** at B+ terminal of 24V starter.	**24 volts** If good reading, Go to test **6**	Open circuit in the battery circuit. Go to test **2**
2	Key Switch S-02 in the START position. Measure for **24 volts** at front battery G-02 positive terminal.	**24 volts** Open circuit between 24V Starter B+ terminal and front battery G-02 positive terminal. Check continuity of cable and connections. Caution: When performing continuity tests on this circuit, ensure that the cable is disconnected from the positive battery terminal. Failure to do so could result in damage to the test meter.	If there is no voltage, Go to test **3**
3	Key Switch S-02 in the START position. Measure for **12 volts** at 24V Start Relay K-38 terminal 31A.	**12 volts** Open circuit between 24V Start relay terminal 31A and front battery G-02 negative terminal. Check continuity of cable and connections. Caution: When performing continuity tests on this circuit, ensure that the cable is disconnected from the battery terminal. Failure to do so could result in damage to the test meter.	If there is no voltage, Go to test **4**
4	Key Switch S-02 in the START position. Measure for **12 volts** at 24V Start Relay K-38 terminal 30.	**12 volts** Open circuit between 24V Start Relay terminal 30 and terminal 31A. Remove battery cables and check continuity through energized relay. Replace 24V Start Relay.	If there is no voltage, Go to test **5**
5	Key Switch S-02 in the OFF position. Measure for **12 volts** at the rear battery G-03 positive terminal.	**12 volts** Open circuit between 24V Start Relay terminal 30 and rear battery G-03 positive terminal. Check continuity of cable and connections. Caution: When performing continuity tests on this circuit, ensure that the cable is disconnected from the positive battery terminal. Failure to do so could result in damage to the test meter.	If there is no voltage, there is an open circuit between rear battery G-03 negative terminal and chassis ground, or a failed Battery Switch S-52 (EU only). Check continuity of cables and connections.
6	Key Switch S-02 in the START position. Measure for **24 volts** at 24V Starter motor M-29 terminal S.	**24 volts** Go to test **8**	If there is no voltage, Go to test **7**

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N°	Test Point	Expected Result	Other Result (Possible Cause)
7	Key Switch S-02 in START position. Measure for **24 volts** at 24V Start Relay K-38 terminal 50.	**24 volts** Open circuit in engine (EN) harness between 24V Start Relay terminal 50 and 24V Starter motor M-29 wire 834 white/black. Check continuity of cable and connections.	If there is no voltage, Go to test **8**
8	Key Switch S-02 in START position. Measure for **24 volts** at 24V Start Relay K-38 terminal 30A.	**24 volts** Open circuit between 24V Start Relay terminal 50 and terminal 30A. Remove battery cables and check continuity through energized relay. Replace 24V Start Relay.	Open circuit between 24V Start relay terminal 30A and front battery G-02 positive terminal. Check continuity of cable and connections. Caution: When performing continuity tests on this circuit, ensure that the cable is disconnected from the battery terminal. Failure to do so could result in damage to the test meter.
9	Key Switch in OFF position. Measure resistance from 24V starter M-29 case to chassis ground.	Less than **1 ohms** If good reading, Go to test **9**	Check contact surface of 24V Starter with engine. Ensure 24V Starter is mounted securely. Check ground strap between engine and chassis.
10	Set multimeter to read VOLTAGE. Attach positive lead to battery positive terminal. Attach negative lead to B+ terminal of 24V Starter. Turn key to START position. Check Voltage.	If less than **0.4 volts** shown, and 24V Starter does not operate, replace 24V Starter.	More than **0.4 volts** indicated on multimeter, replace cable between positive battery terminal and 24V Starter B+ terminal.

Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Measure for **12 volts** at key switch connector **X068** (pin1).	12 volts If good reading, go to the next test point.	Open circuit 053 (RD) between fuse F-38 and Key Switch connector **X068** (pin 1). Go to next test
2	Key Switch in "IGN/ACC" position. Measure for **12 volts** at key switch connector **X068** (pin 6 and 4).	12 volts If good reading, go to the next test point.	Key Switch
3	Key Switch in "START" position Measure for **12 volts** at key switch connector **X068** (pin 2).	12 volts If good reading, Key Switch operating normally.	Key Switch

Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Remove the electrical connector from the Key Switch S-02. While holding the Key Switch in the "START" position, check for continuity between (pins 1 and 2).	Continuity Go to test **2**	If no continuity, replace Key Switch.
2	While holding the Key Switch in the "START" position, check for continuity between (pins 1 and 6).	Continuity Go to test **3**	If no continuity, replace Key Switch.

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N°	Test Point	Expected Result	Other Result (Possible Cause)
3	While holding the Key Switch in the "IGN/ACC" position, check for continuity between (pins 1 and 6).	Continuity Go to test **4**	If no continuity, replace Key Switch.
4	While holding the Key Switch in the "IGN/ACC" position, check for continuity between (pins 1 and 4).	Continuity Go to test **5**	If no continuity, replace Key Switch.
5	While holding the Key Switch in the "ACC" position, check for continuity between (pins 1 and 4).	Continuity Go to test **6**	If no continuity, replace Key Switch.
6	While holding the Key Switch in the "OFF" position, check for continuity between (pin 1) and (pins 2, 4, 6).	No Continuity If good reading, Key Switch is operating normally.	If no continuity, replace Key Switch.

Start control Safety switch - Testing (B.80.A.90.81 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Key Switch in "IGN" position Measure for **12 volts** at connector **X059** (Pin 1).	**12 volts** If good reading, Go to test **2**	Open circuit 300 (OR) or 108 (OR) between fuse F-48 and Neutral Switch connector **X059** (Pin 1). Blown fuse F-48 (Refer to Power Distribution - Testing)
2	Place Neutral Switch in the CLOSED position. Measure for **12 volts** at Neutral Switch connector **X059** (pin 3).	**12 volts** If good reading, Go to test **3**	Neutral Switch
3	Place Neutral Switch in the OPEN position. Measure for **12 volts** at Neutral Switch connector **X059** (pin 2).	**12 volts** If good reading, Neutral Switch functioning properly.	Neutral Switch

Start control Start relay - Testing (B.80.A.90.80 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Place Key Switch in the START position. Measure for **12 volts** at Key Switch connector **X199**(pin 86).	**12 volts** If good reading, Go to test **2**	Open circuit 092 (WH) between Start Relay connector **X199** (pin 86) and Neutral Start Relay (pin 5). Check in-line connectors **X005** (pin 6) and **X010** (pin 5) for connection.
2	Measure for **12 volts** at Start Relay (pin 30).	**12 volts** If good reading, Go to test **4**	Open circuit 801 (RD) from Start Relay (pin 30) to 12V starter B+ terminal. Faulty 12V Battery Switch. Go to next test point
3	Measure for **12 volts** at 12V Starter B+ terminal.	**12 volts** If good reading, Repair open in 801 (RD) circuit.	Open B+ circuit between 12 System Batteries and 12 V Starter. Faulty 12V Battery Switch.
4	Key Switch in OFF Position. Measure resistance from Start Relay connector **X199** (pin 85) to ground.	Less than **1 ohms** If good reading, Go to test **5**	Open circuit 800 (BK) from start relay to ground.
5	Key Switch in OFF position. Measure for **12 volts** at Start Relay (pin 87).	**12 volts** If good reading, Start Relay is operating properly.	Start Relay

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Start control Neutral start relay - Testing (B.80.A.90.84 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Key switch in the START position. Measure for **12 volts** at Neutral Start Relay (pin1).	**12 volts** If good reading, Go to test **2**	Perform **Start control Safety switch - Testing (B.80.A.90.81 - G.40.A.20)**.
2	Key Switch in the START position. Measure for **12 volts** at Neutral Start Relay (pin3).	**12 volts** If good reading, Go to test **4**	Open or short to ground in circuit 91 (OR) between Key Switch connector **X068** (pin2) and Neutral Start Relay (pin3). A short to ground will blow Fuse F-38. Go to next test point.
3	Measure for **12 volts** at Key Switch connector **X068** (pin2).	**12 volts** If good reading, repair open in 91 (OR) circuit between Neutral Start Relay (pin 1) and Key Switch Connector **X068** (pin 2).	Open in unswitched B+ circuit. Perform **Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20)** Key Switch Perform **Start control Neutral start relay - Testing (B.80.A.90.84 - G.40.A.20)**
4	Key Switch in the OFF position. Measure resistance from Neutral Start Relay (pin 2) to ground.	**12 volts** If good reading, Go to test **5**	Open in circuit 094 (BK) between Neutral Start Relay (pin 2) and ground.
5	Key Switch in OFF position. Measure for **12 volts** at Neutral Start Relay (pin 5).	**12 volts** If good reading, Neutral Start Relay operating properly.	Neutral Start Relay

Start control 24V start relay - Testing (B.80.A.90.85 - G.40.A.20)

AFX8010

N°	Test Point	Expected Result	Other Result (Possible Cause)
1	Key Switch in START position. Measure for **12 volts** at 24V Start Relay (pin 50A).	**12 volts** If good reading, Go to test **2**	Open circuit 804 (WH) between 24V Start Relay (pin 50A) and Start Relay (pin 87). Go to test **2**
2	Measure for **12 volts** at 24V Start Relay (pin 87).	**12 volts** If good reading, Go to test **3**	Open circuit 804 (WH) between 24V Start Relay (pin 50A) and Start Relay (pin 87).
3	Measure for **24 volts** at 24V Start Relay (pin 30A).	**24 volts** If good reading, Go to test **4**	Open circuit 832 (RD) between 24V System Batteries and 24V Start Relay (pin 30A). Faulty 24V Battery Switch.
4	Key Switch in OFF position. Measure for resistance from 24V Start Relay (pin 50).	Less than **1 ohms** If good reading, Go to test **5**	Open circuit 833 (BK) between 24V Start Relay and Ground.
5	Key Switch in START position. Measure for **24 volts** at 24V Start Relay (pin 50).	**24 volts** If good reading, Go to test **6**	24V Start Relay
6	Measure for **12 volts** at 24V Start Relay (pin 30).	**12 volts** If good reading, Go to test **7**	Open circuit between 24V System Batteries and 24V Start Relay (pin 30). Faulty 24V Battery Switch.
7	Measure for **12 volts** at 24V Start Relay (pin 31A).	**12 volts** If good reading, Go to the next test point.	24V Battery Switch. 24V Start Relay.

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Start control Safety switch - Short circuit to B+ (B.80.A.90.81 - G.30.B.54)

AFX8010

E0164-03 - Ground Drive Hydro Voltage Supply

Cause:
The Ground Drive Hydro Voltage Supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Supply wiring shorted to greater than **18.0 volts**.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine. Engage the park brake, and shift the transmission into neutral (N). Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "HYDRO VOLT" to check the voltage range.

   Carefully move the propulsion handle (MFH) forward and reverse from neutral and check voltage range.

   The proper voltage supply is **10.0 - 18.0 volts** with the propulsion handle (MFH) out of the neutral position.

   A. If the voltage reading is high out of range (**18 volts** or more), continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **5**.

2. Shut off the combine engine, and then turn the key switch on again. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "HYDRO VOLT" to check the voltage range.

   Carefully move the propulsion handle (MFH) forward and reverse from neutral and check voltage range.

   The proper voltage supply is **10.0 - 18.0 volts** with the propulsion handle (MFH) out of the neutral position.

   A. If the voltage reading is between 10 and **18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage is greater than **18 volts**, continue with Step **3**.

3. Key switch in the "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between 10 and **18 volts**, continue with Step **4**.

4. Key switch in the "On" position. Position the propulsion handle (MFH) out of neutral. Remove the buddy seat and storage bin to gain access to connector **X015** on CCM2. Check the voltage at connector **X015** pin J1-17.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires:
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RH harness splice
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   - wire 113 yellow, neutral switch S22 through connector **X001** pin 17 to CCM2, pin J1-17.

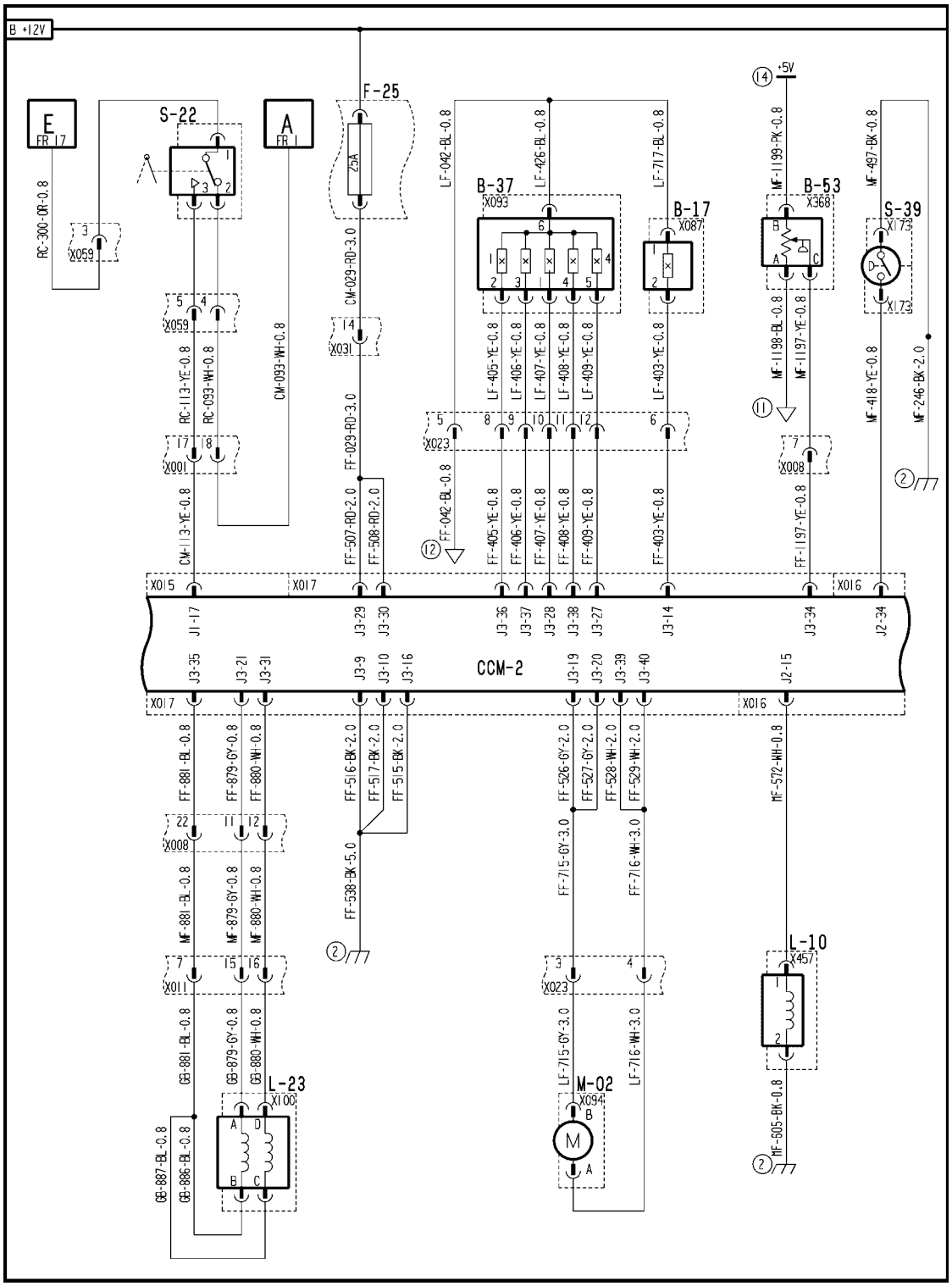
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B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM2. Reload the software for CCM2. If that does not correct the concern, replace the module.

5. Operate the machine while observing the Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are detected, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



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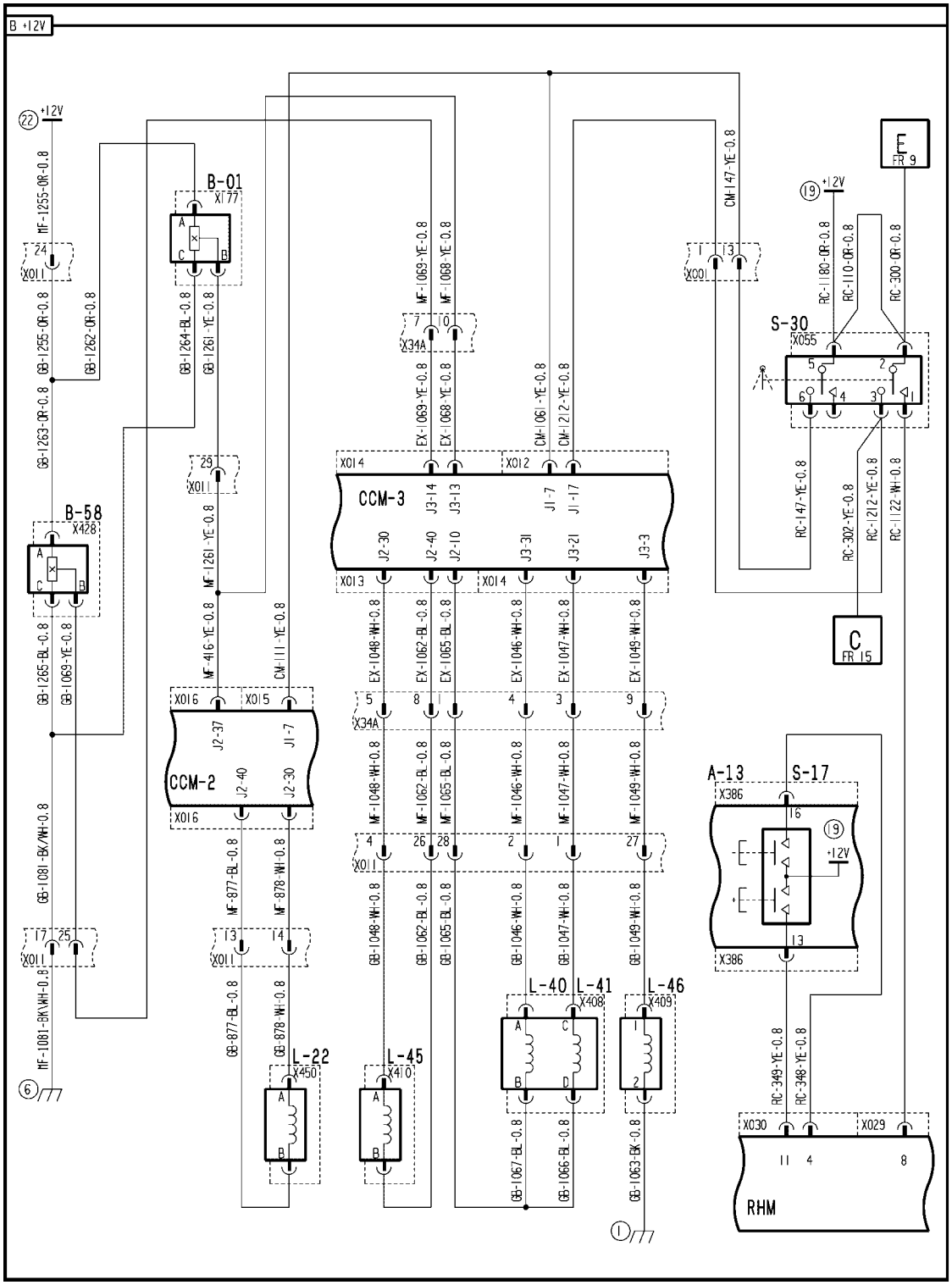
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



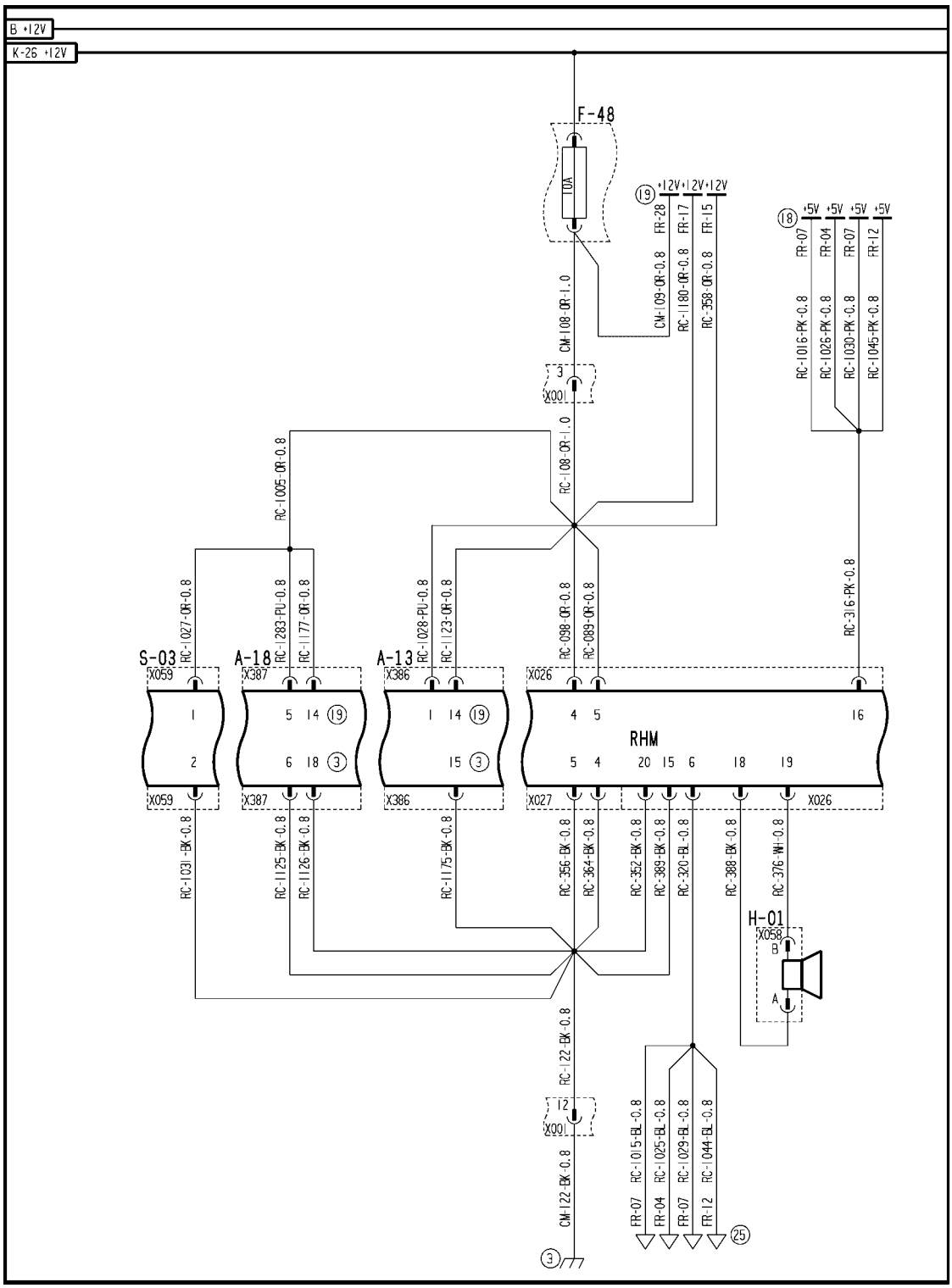
AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



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FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

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Start control Safety switch - Short circuit to ground (B.80.A.90.81 - G.30.B.53)

AFX8010

E0164-04 - Ground Drive Hydro Voltage Supply

Cause:
Low battery voltage to CCM2 through the Neutral switch S22, or the Ground Drive Hydro Voltage Supply circuit is shorted to a ground.

Possible failure modes:

1. Loose or corroded connections, or damaged wires.
2. Batteries are discharged, and/or alternator/regulator failure.
3. Supply wiring shorted to ground.
4. Controller internal failure (internal regulator failure).

Solution:

1. Key switch in "Off" position. Check the condition of fuse F42.
   A. If fuse F42 is okay, continue with Step **3**.
   B. If the fuse has failed, go to Step **2**.
2. Replace the failed fuse F42.
   A. If the fuse is okay, continue with Step **3**.
   B. If the fuse immediately fails again, a short to ground exists in wire 010 red to Cab Power Relay K-26 pin 3. Locate short and repair.
3. Key switch in "On" position. Check the condition of fuse F48.
   A. If fuse F48 is okay, continue with Step **5**.
   B. If the fuse is blown, go to Step **4**.
4. Replace the failed fuse F48.
   A. If the fuse is okay, continue with Step **5**.
   B. If the fuse immediately fails again, a short to ground exists in one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RH harness splice
   - wire 358 orange, RH harness splice to feeder engage switch S-31 connector **X056** pin 2
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   Locate the short and repair.
5. Move the propulsion handle (MFH) out of neutral, and observe the fuse F48.
   A. If the fuse is okay, continue with Step **6**.
   B. If the fuse immediately fails, a short to ground exists in wire 113 yellow from the neutral switch S22 connector **X059** pin 5 through connector **X001** pin 17 to CCM2 **X015** pin J1-17. Locate short and repair.
6. Key switch in "Off" position. Check the voltage at fuse F42 using a multi-meter.
   A. If the voltage reading is between 10 and **18 volts**, continue with Step **7**.

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B. If the voltage reading is less than **10 volts**, there is excessive resistance between the batteries and the cab fuse panel, due to loose or corroded connections, or the batteries have discharged excessively, and are not capable of supplying the minimum voltage requirement for CCM2. Inspect the wiring from the batteries to the engine compartment, and from there to the cab. Recharge or replace the batteries.

7. Key switch in "On" position. Move the propulsion handle (MFH) out of neutral. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "HYDRO VOLT" to check the voltage range.

   The proper voltage supply is **10.0 - 18.0 volts**.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **8**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the fuse panel and CCM2. Inspect the following wires for loose or corroded connections, or damage:
   - wire 010 red, fuse F42 to Cab Power relay K26, terminal 3
   - wire 007 orange, Cab Power relay K26, terminal 5 to buss strip
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RH harness splice
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   - wire 113 yellow, neutral switch S22 through connector **X001** pin 17 to CCM2, pin J1-17.
   Locate any damage and repair.

8. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   With the engine RPM at low idle, engage road and work lights. Check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, continue with Step **9**.

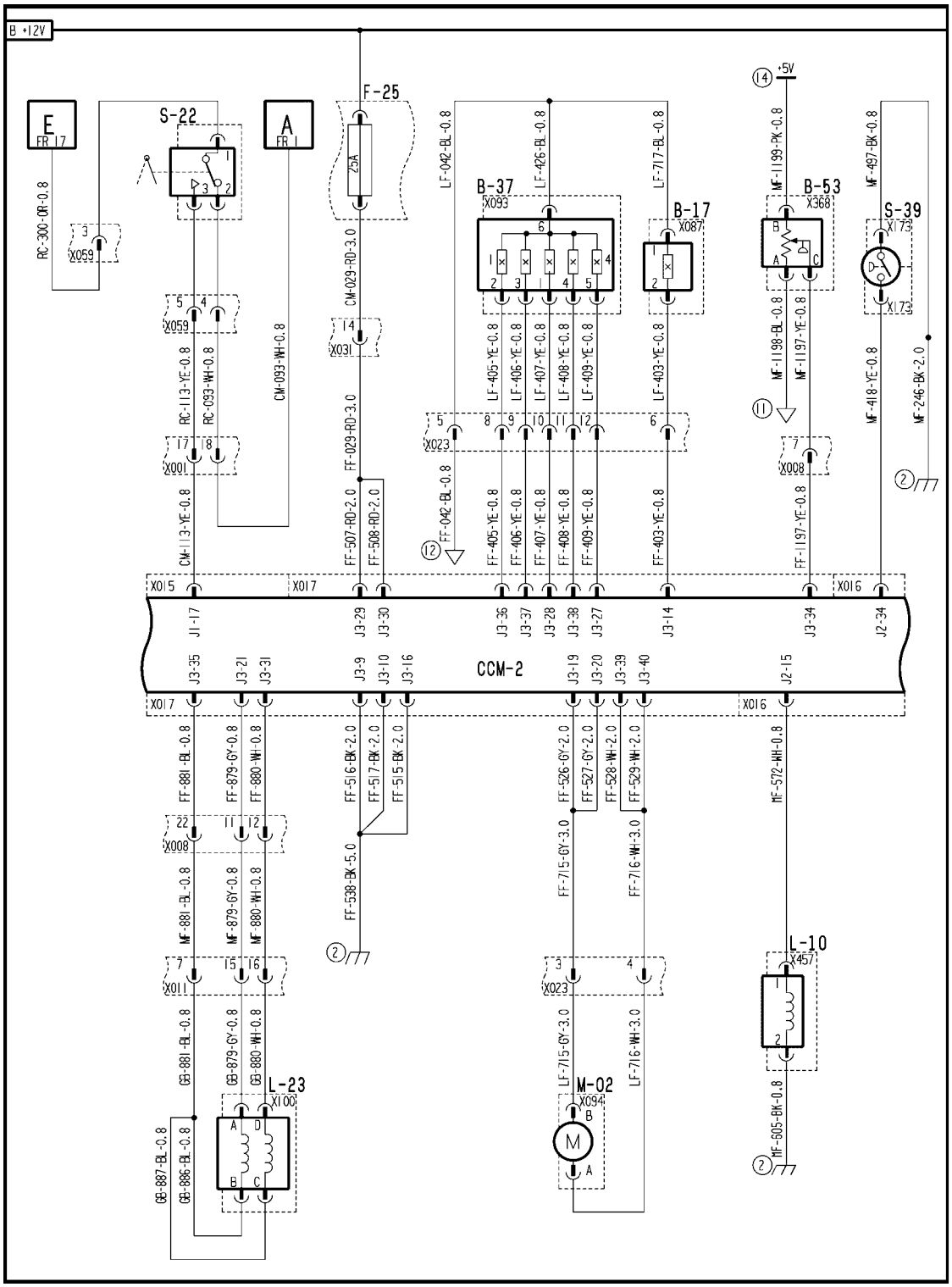
   B. If the voltage reading is less than **10 volts**, the alternator and/or regulator may have failed, and the charging system is not producing sufficient voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

9. Operate the machine while observing the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



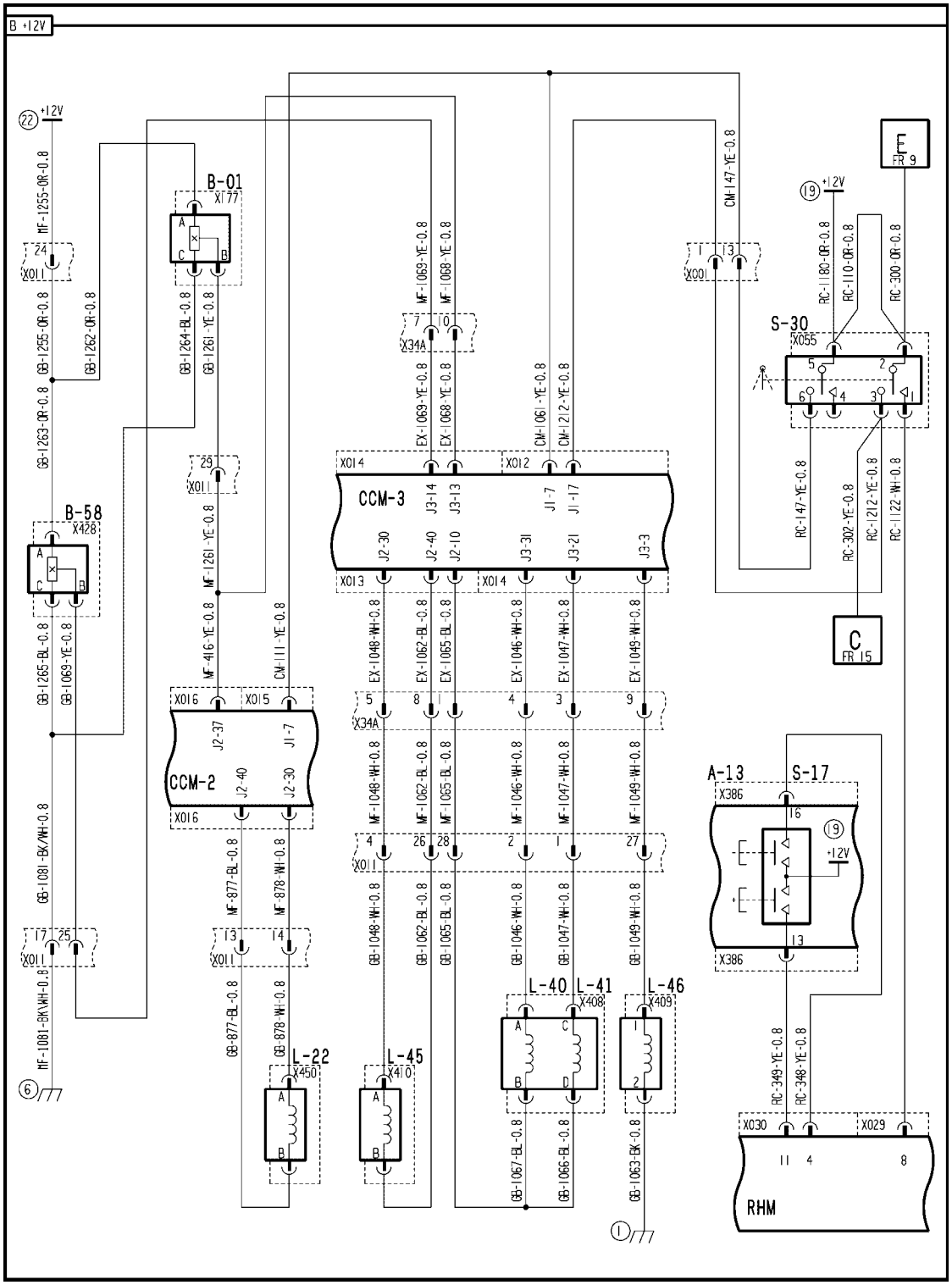
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



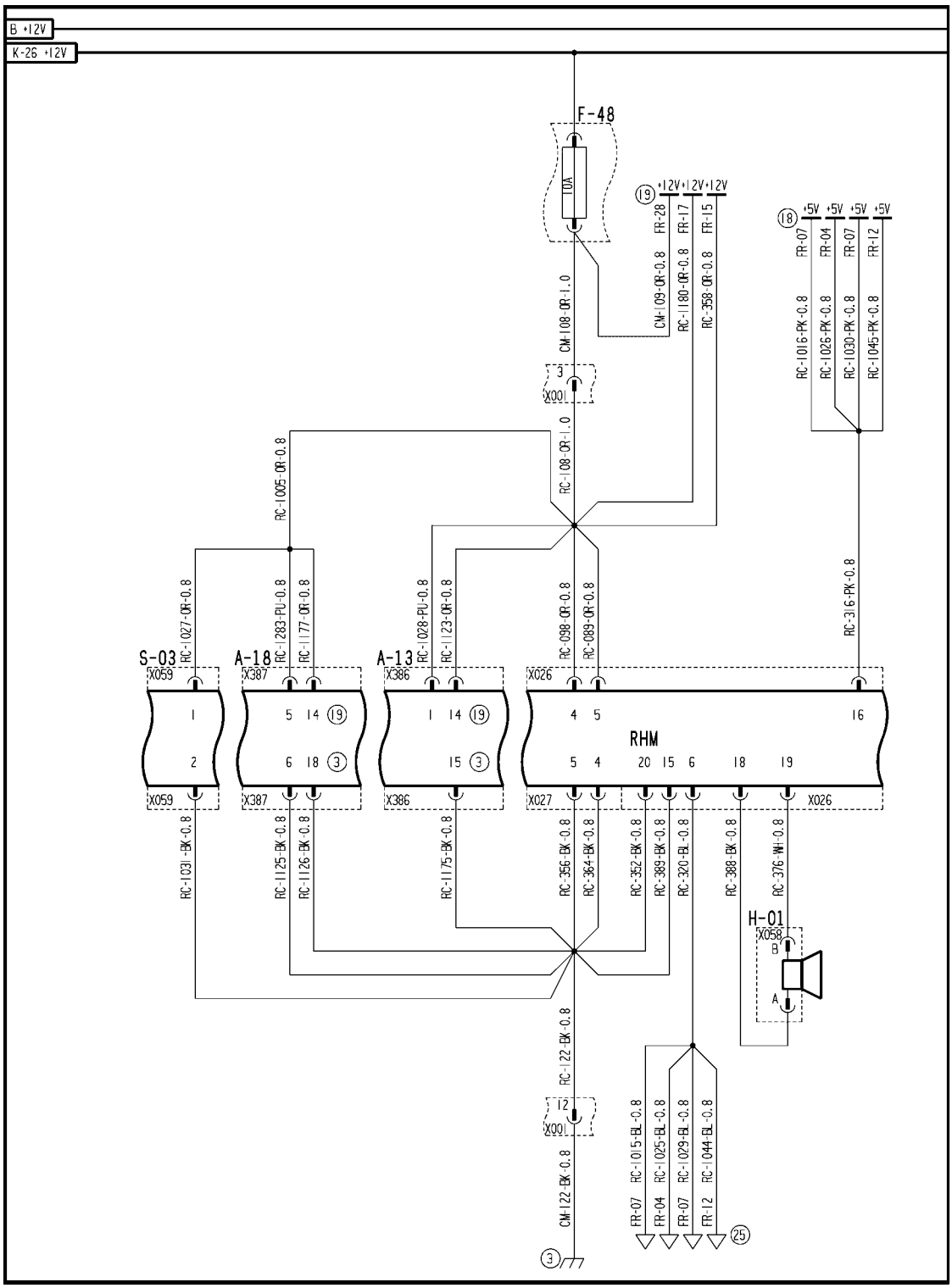
AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



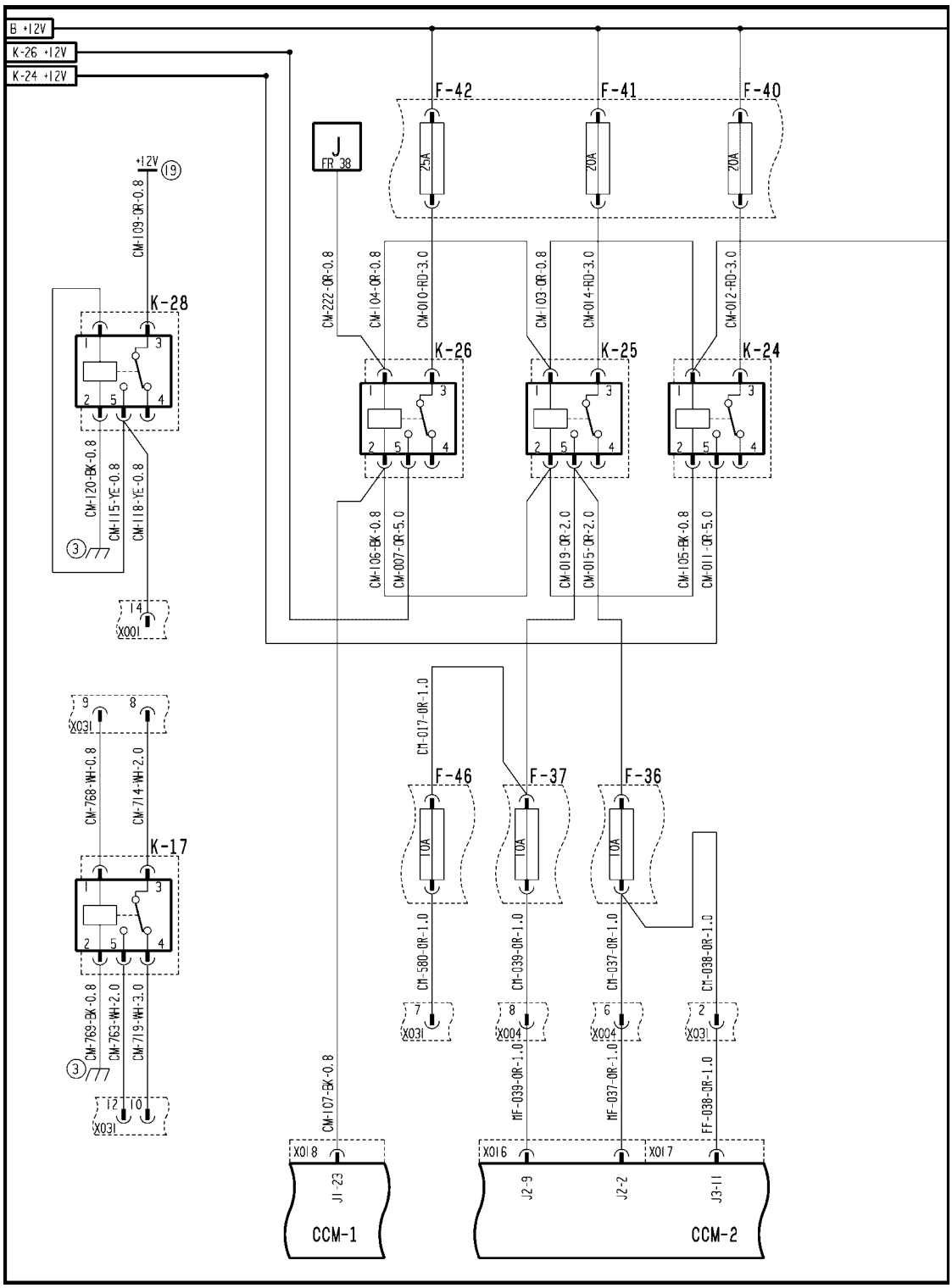
AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)



AFXSCHEM28-04 1

FRAME 28 - DISTRIBUTION

https://truckmanualshub.com/

F-36 CCM2a Fuse	F-37 CCM2b Fuse	F-40 CCM1 Power Fuse
F-41 CCM2 Power Fuse	F-42 CCM3, Cab Power Fuse	F-46 Not Used
K-17 Not Used	K-24 CCM1 Power Relay	K-25 CCM2 Power Relay
K-26 CCM3, Cab Power Relay	K-28 Not Used	

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Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54)

AFX8010

E0040-03 - CCM1 Key Switch Voltage

Context:
Key switch voltage is used to initialize (wake-up) the module, and also supplies power to the 5V and 8V regulators for the regulated voltage circuits. The module will shutdown if the voltage is less than **9 volts**, but there is no shutdown for excessive voltage.

Cause:
The CCM1 key switch power supply circuit is shorted to a higher than normal source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 KEY SW" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.
2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 KEY SW" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.
3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-38.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.
4. Remove the instructional seat and storage bin to gain access to the CCM1 connector **X018**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X018** pin J1-4.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the cab main (CM) harness:
   - wire 053 red, fuse F38 to key switch S-02 pin 1
   - wire 125 red, fuse F38 to ECU Power relay K14 pin 1
   - wire 859 orange, key switch S-02 pin 5 to ECU connector **X193** pin 15
   - wire 096 orange, key switch S-02 pin 6 to CM harness splice
   - wire 055 orange, CM harness splice to Road Light switch S-26 pin 6
   - wire 095 orange, CM harness splice to CCM1 Power relay K24 pin 1

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- wire 103 orange, CCM1 power relay K-24 pin 1 to CCM2 Power relay K-25 pin 1
- wire 104 orange, CCM2 Power relay K-25 pin 1 to Cab Power relay K-26 pin 1
- wire 222 orange, Cab Power relay pin 1 to Time Delay module K-20 pin 30
- wire 970 white, Time Delay relay K-20 pin 30 to Fuel Pump relay K-07 pin 1
- wire 101 orange, CM harness splice to CCM3 connector **X012** pin J1-4
- wire 100 orange, CM harness splice to CCM2 connector **X015** pin J1-4
- wire 099 orange, CM harness splice to CCM1 connector **X018** pin J1-4
- wire 097 orange, CM harness splice to display adapter (AD) harness connector **X064** pin C

Locate the source of high voltage and repair.

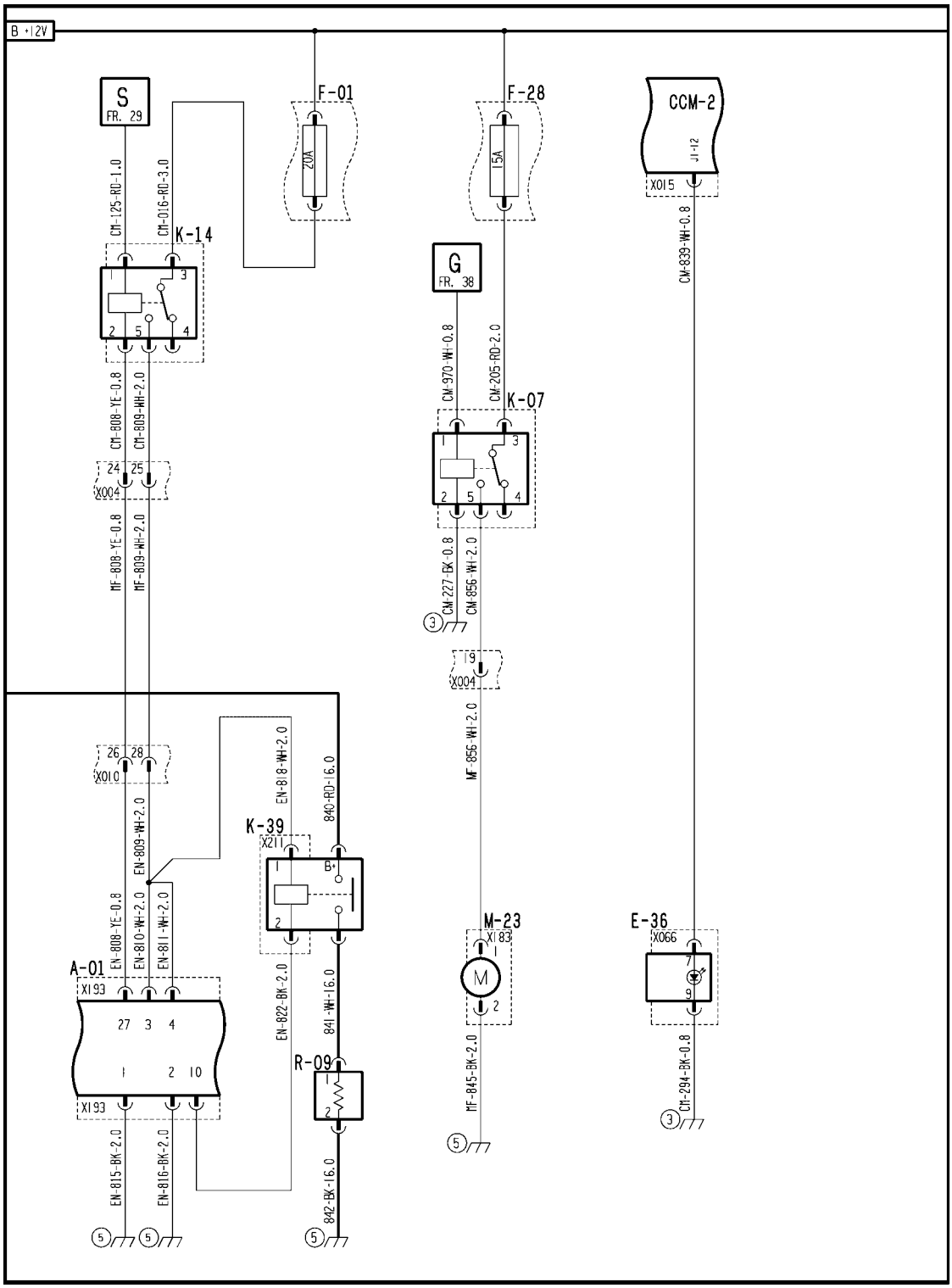
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM1.Reload the software for CCM1. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

A. If no high out of range voltage readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



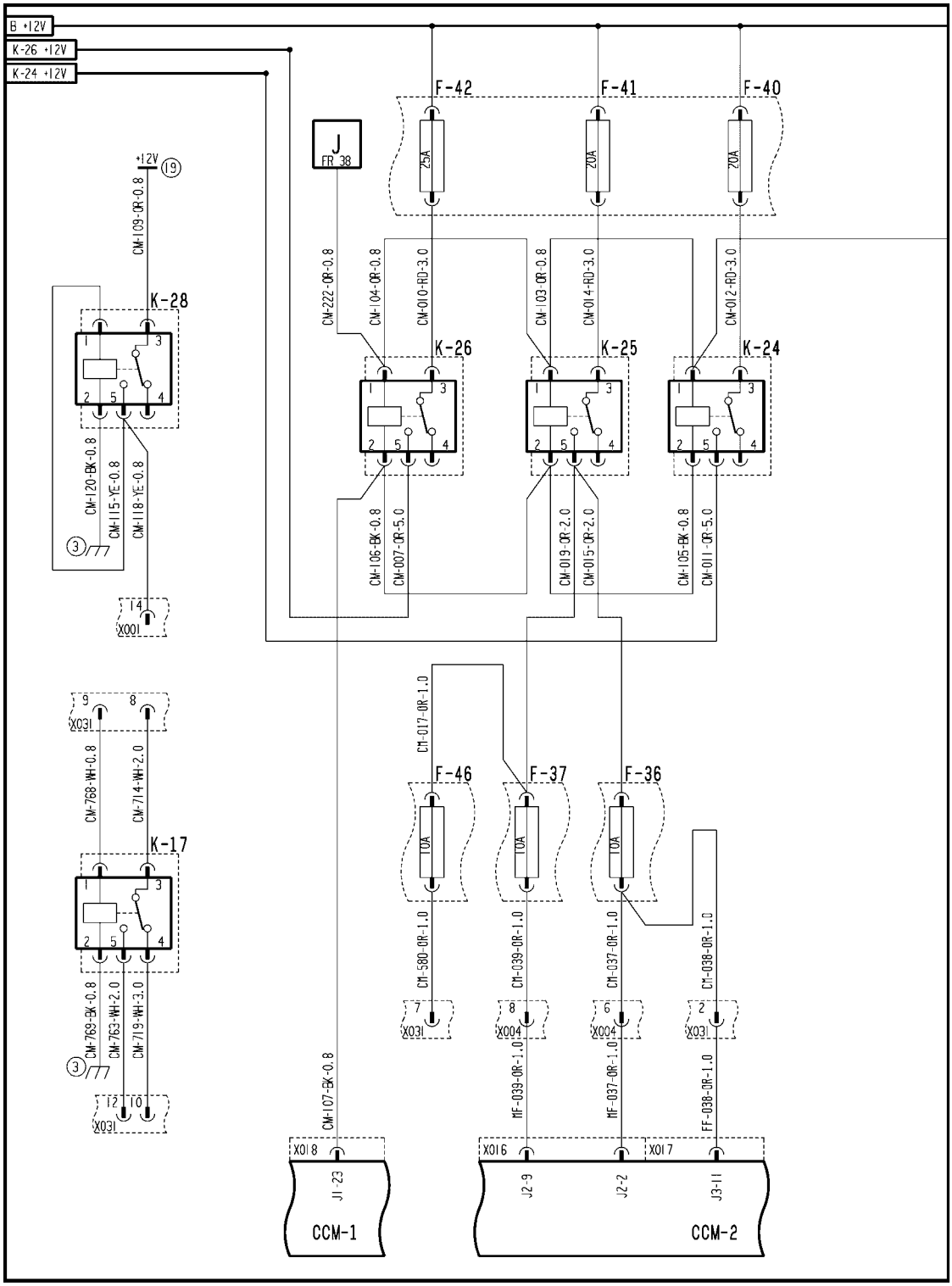
AFXSCHEM02A-04 1

FRAME 2 - ENGINE

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A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)



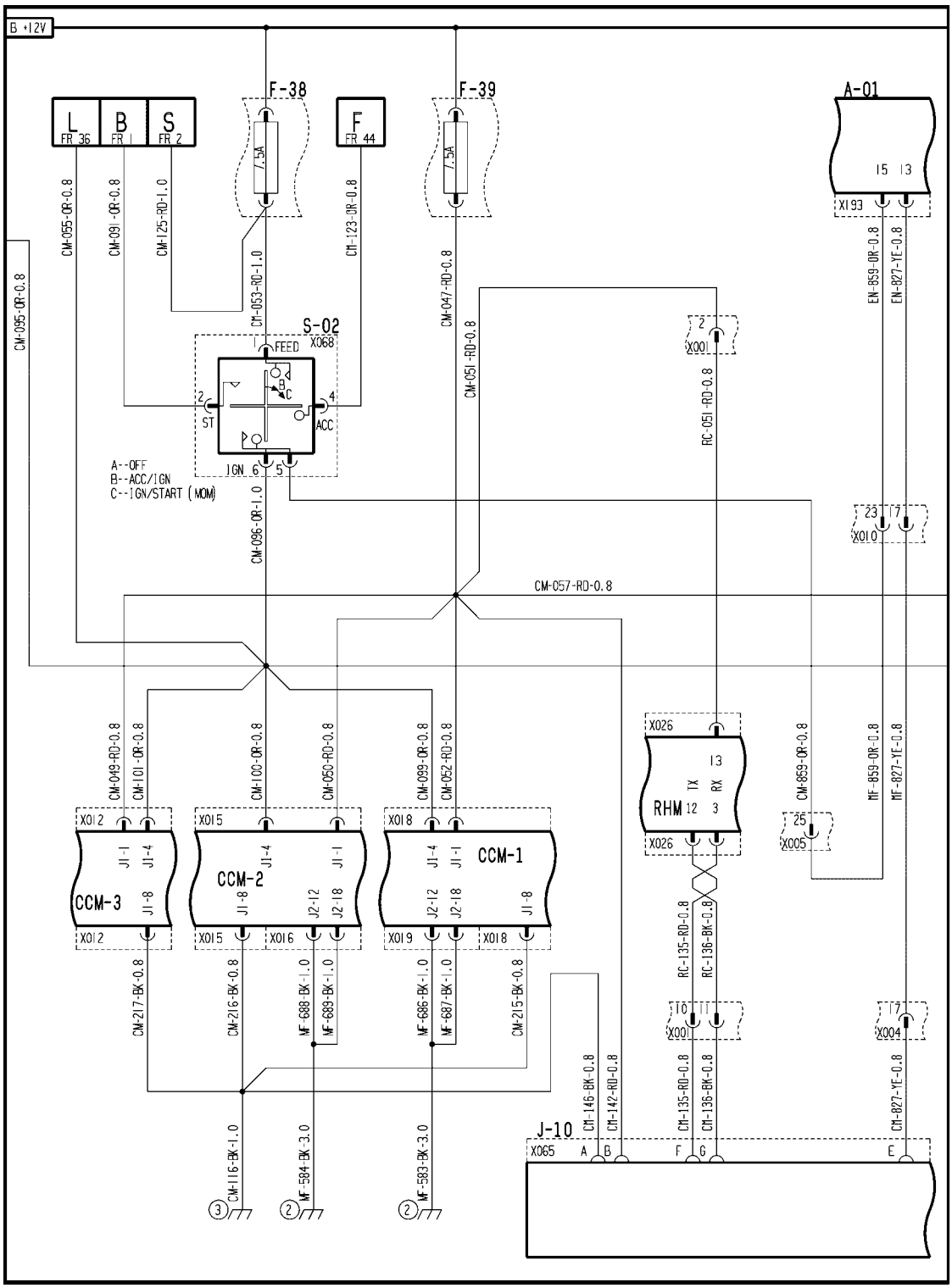
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FRAME 28 - DISTRIBUTION

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F-36 CCM2a Fuse	F-37 CCM2b Fuse	F-40 CCM1 Power Fuse
F-41 CCM2 Power Fuse	F-42 CCM3, Cab Power Fuse	F-46 Not Used
K-17 Not Used	K-24 CCM1 Power Relay	K-25 CCM2 Power Relay
K-26 CCM3, Cab Power Relay	K-28 Not Used	

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)



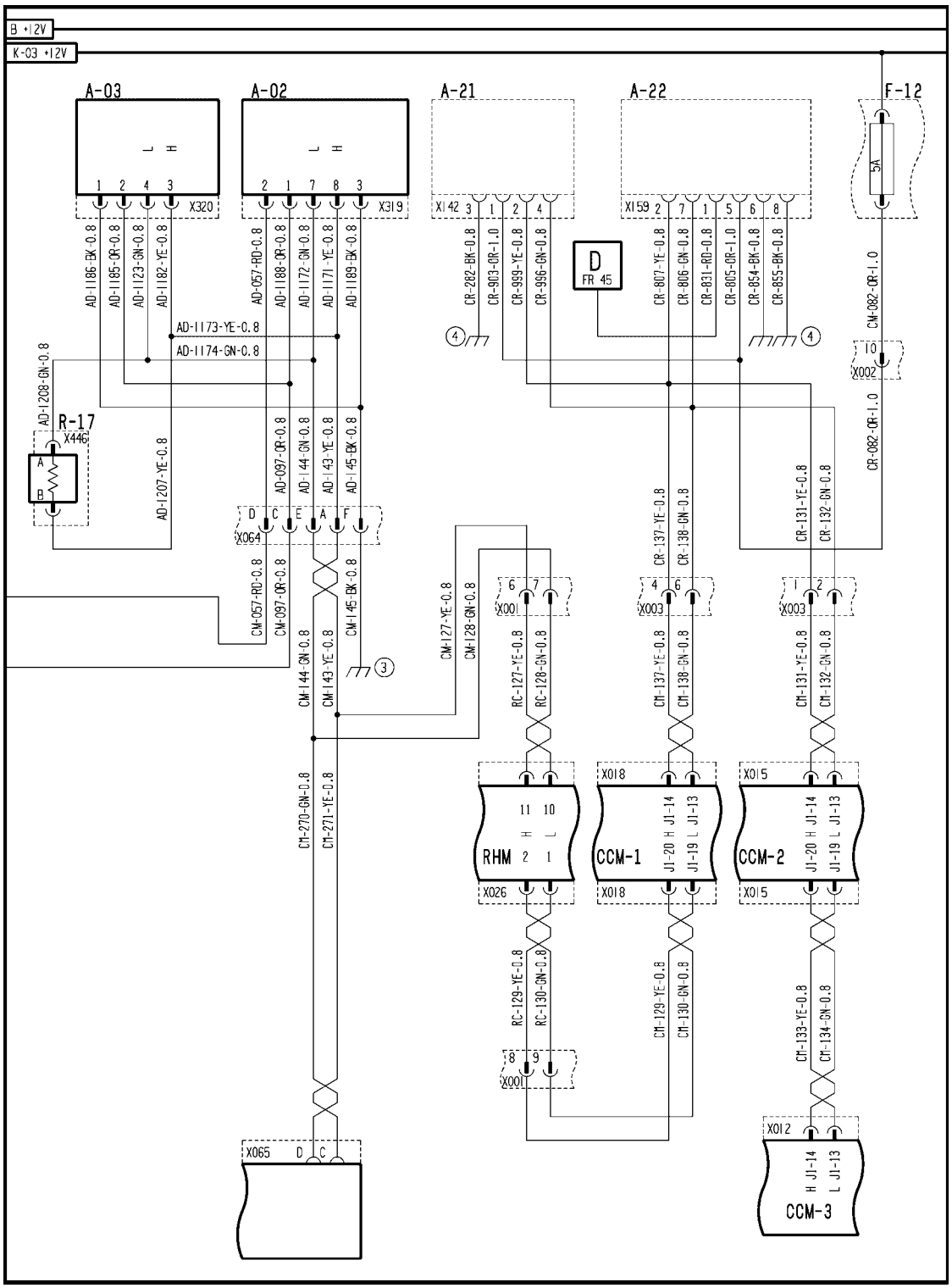
AFXSCHEM29A-04 1

FRAME 29 - DISTRIBUTION

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A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)



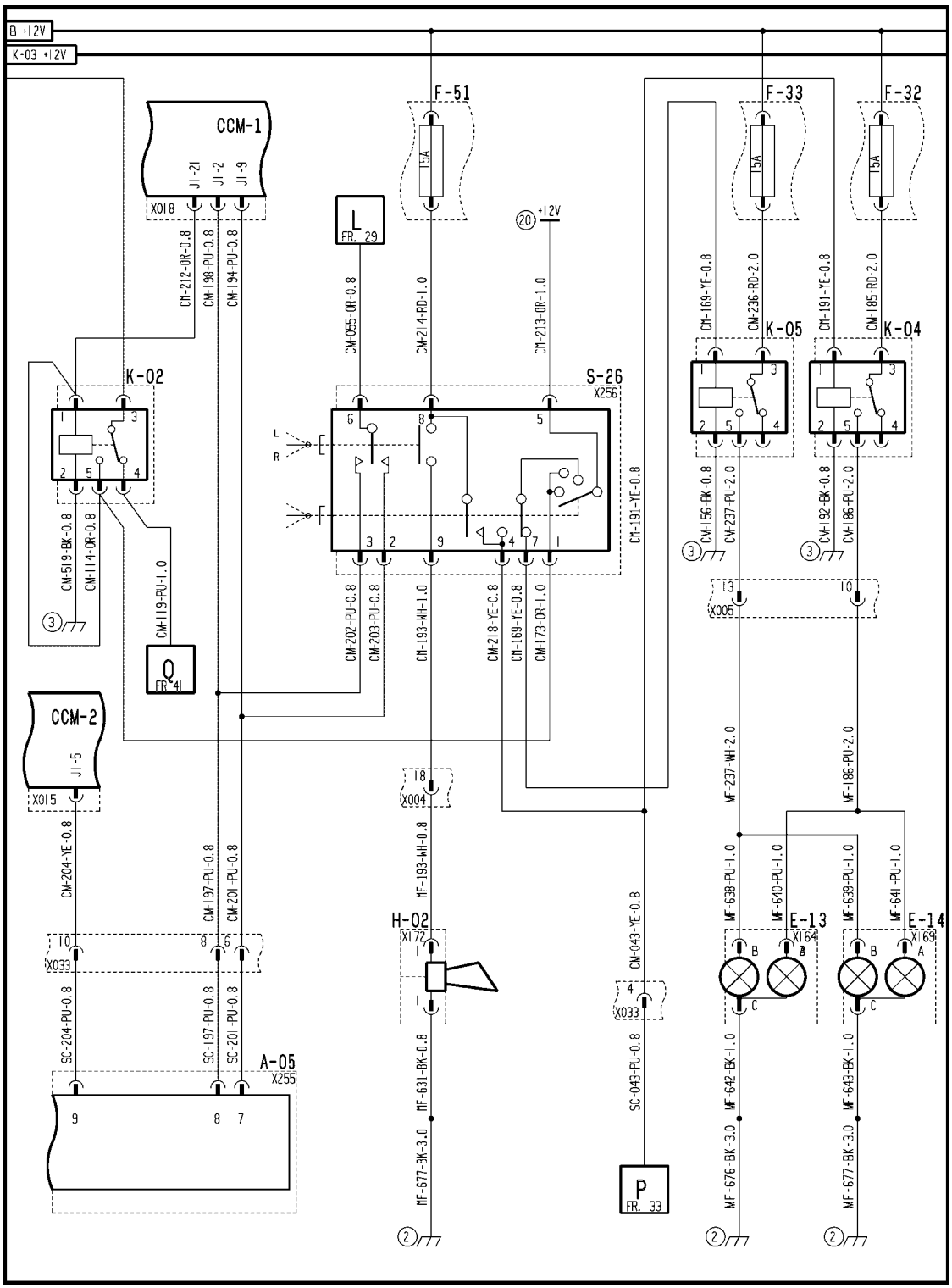
AFXSCHEM30-04 1

FRAME 30 - DISTRIBUTION

https://truckmanualshub.com/

A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)



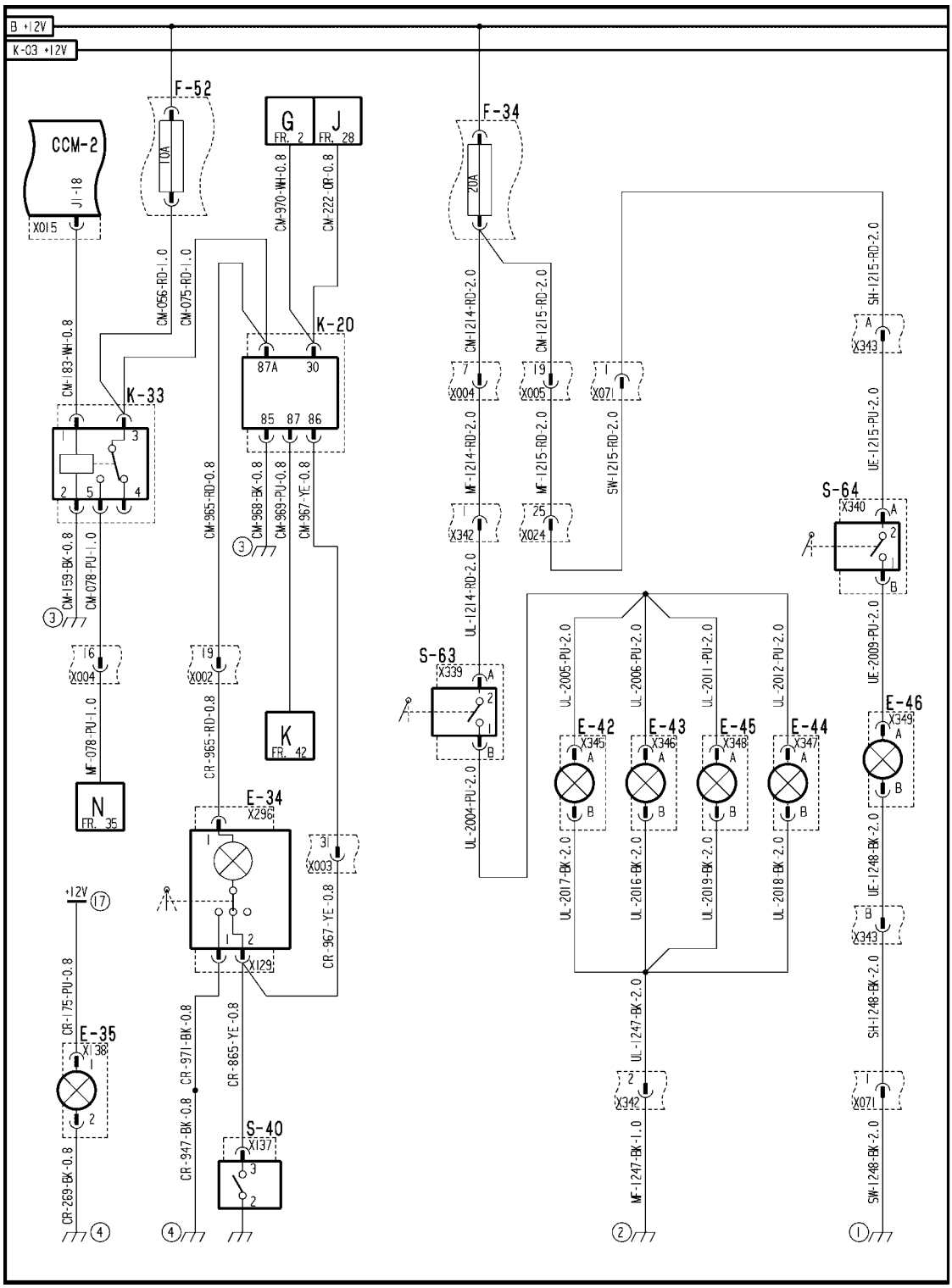
AFXSCHEM36-04 1

FRAME 36 - LIGHTING

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A-05 Flasher Module	E-13 LH Road Light (EU)	E-14 RH Road Light (EU)
F-32 High Beam Fuse	F-33 Low Beam Fuse (EU)	F-51 Horn, Marker Lights Fuse
H-02 Horn	K-02 Light Control Relay	K-04 High Beam Relay (EU)
K-05 Low Beam Relay (EU)	S-26 Road Light Switch	

Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)



AFXSCHEM38-04 1

FRAME 38 - LIGHTING

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E-34 Dome Light	E-35 Console Light	E-42 LH Front Shield Light
E-43 LH Rear Shield Light	E-44 RH Front Shield Light	E-45 RH Rear Shield Light
E-46 Engine Light	F-34 Under Shield Lights Fuse	F-52 Dome / Brake Lights Fuse
K-20 Time Delay Module	K-33 Brake Lights Relay	S-40 LH Door Switch
S-63 Under Shield Light Switch	S-64 Engine Light Switch	

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Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54)

AFX8010

E0168-03 - CCM2 Key Switch Voltage

Context:
Key switch voltage is used to initialize (wake-up) the module, and also supplies power to the 5V and 8V regulators for the regulated voltage circuits. The module will shutdown if the voltage is less than **9 volts**, but there is no shutdown for excessive voltage.

Cause:
The CCM2 key switch power supply circuit is shorted to a higher than normal source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 KEY SW" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.
2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 KEY SW" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.
3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-38.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.
4. Remove the instructional seat and storage bin to gain access to the CCM2 connector **X015**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X015** pin J1-4.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the cab main (CM) harness:
   - wire 053 red, fuse F38 to key switch S-02 pin 1
   - wire 125 red, fuse F38 to ECU Power relay K14 pin 1
   - wire 859 orange, key switch S-02 pin 5 to ECU connector **X193** pin 15
   - wire 096 orange, key switch S-02 pin 6 to CM harness splice
   - wire 055 orange, CM harness splice to Road Light switch S-26 pin 6
   - wire 095 orange, CM harness splice to CCM1 Power relay K24 pin 1

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- wire 103 orange, CCM1 power relay K-24 pin 1 to CCM2 Power relay K-25 pin 1
- wire 104 orange, CCM2 Power relay K-25 pin 1 to Cab Power relay K-26 pin 1
- wire 222 orange, Cab Power relay pin 1 to Time Delay module K-20 pin 30
- wire 970 white, Time Delay relay K-20 pin 30 to Fuel Pump relay K-07 pin 1
- wire 101 orange, CM harness splice to CCM3 connector **X012** pin J1-4
- wire 100 orange, CM harness splice to CCM2 connector **X015** pin J1-4
- wire 099 orange, CM harness splice to CCM1 connector **X018** pin J1-4
- wire 097 orange, CM harness splice to display adapter (AD) harness connector **X064** pin C

Locate the source of high voltage and repair.

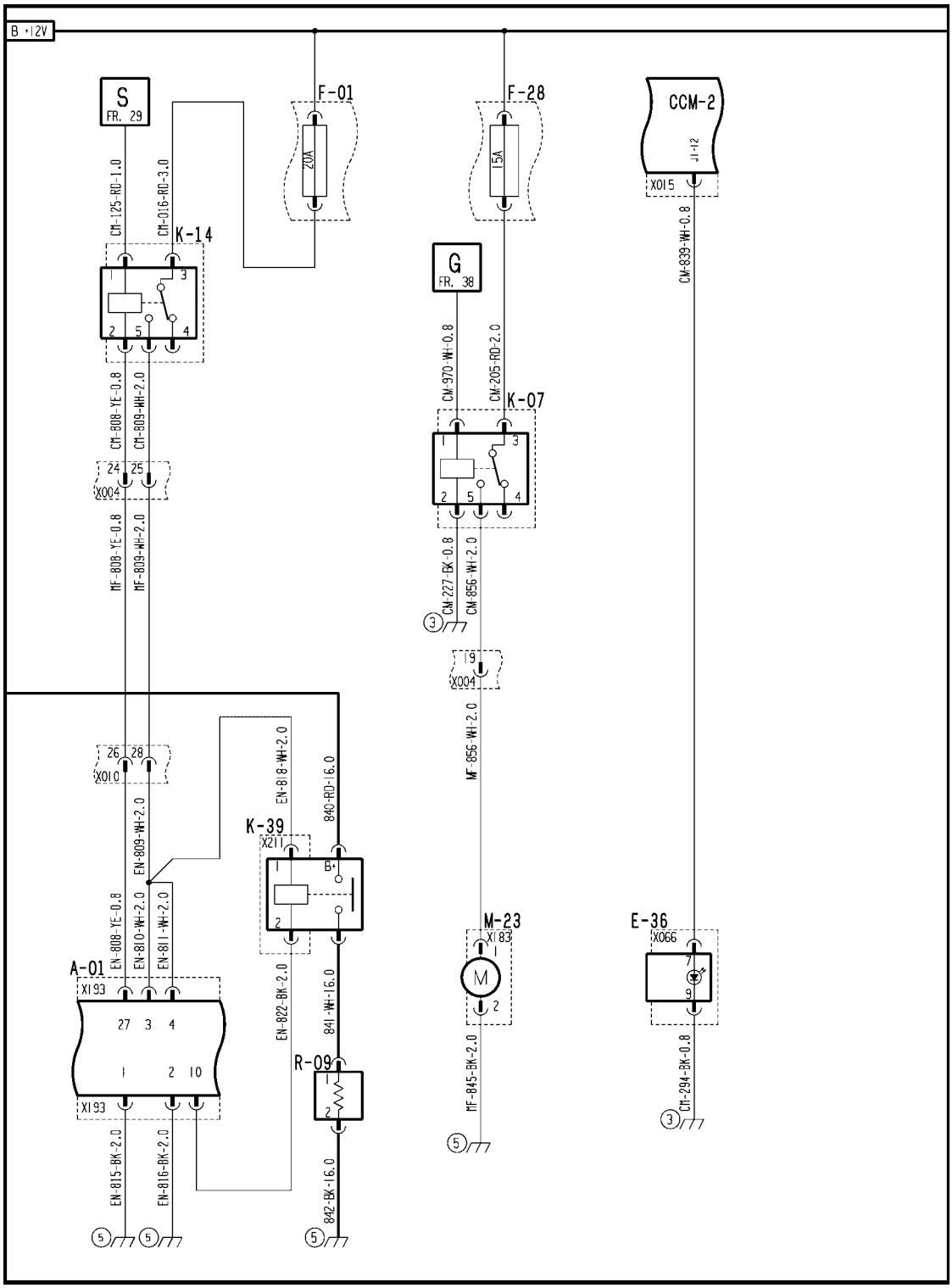
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM2.Reload the software for CCM2. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

A. If no high out of range voltage readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



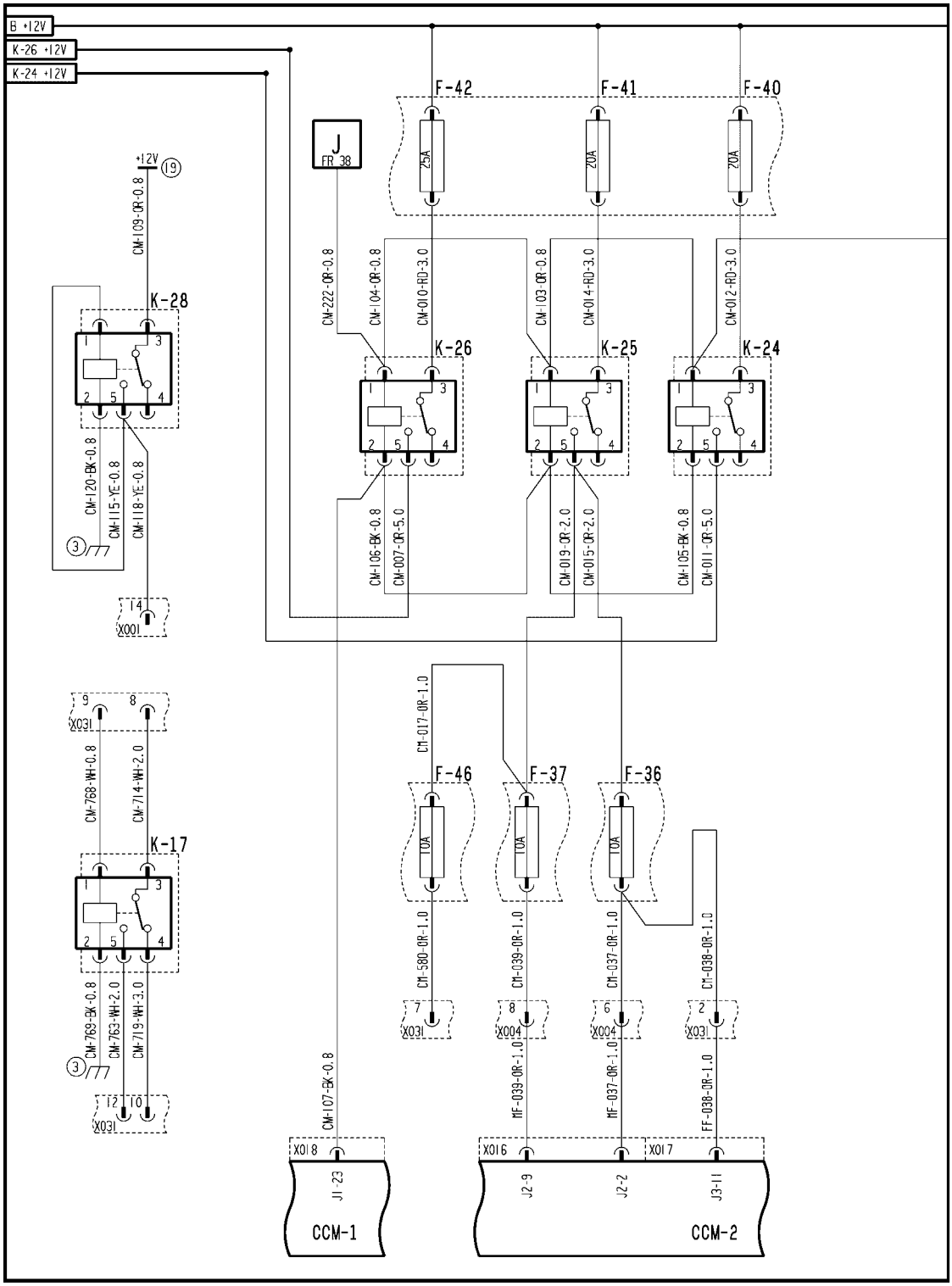
AFXSCHEM02A-04 1

FRAME 2 - ENGINE

https://truckmanualshub.com/

A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)



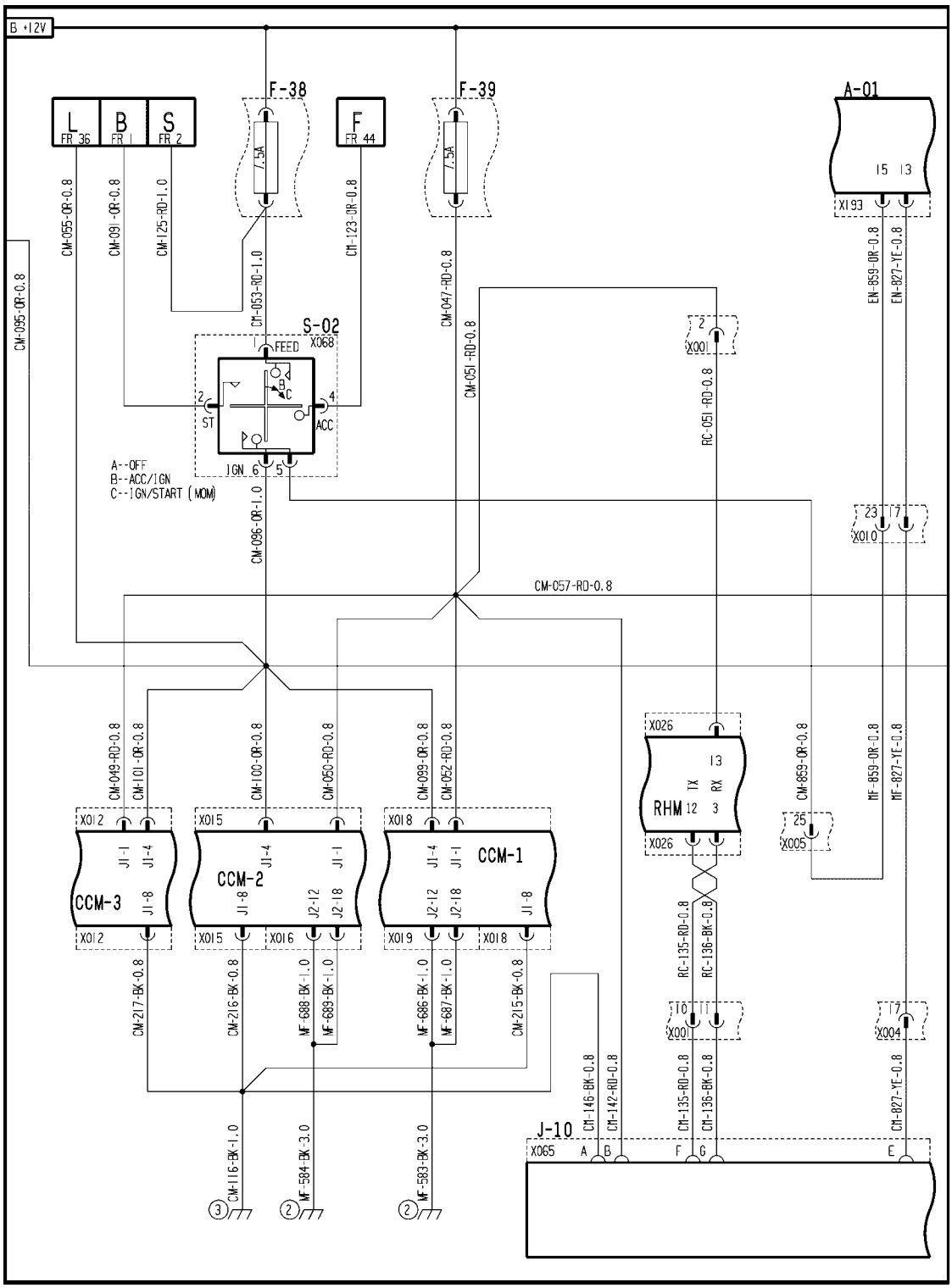
AFXSCHEM28-04 1

FRAME 28 - DISTRIBUTION

https://truckmanualshub.com/

F-36 CCM2a Fuse	F-37 CCM2b Fuse	F-40 CCM1 Power Fuse
F-41 CCM2 Power Fuse	F-42 CCM3, Cab Power Fuse	F-46 Not Used
K-17 Not Used	K-24 CCM1 Power Relay	K-25 CCM2 Power Relay
K-26 CCM3, Cab Power Relay	K-28 Not Used	

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)



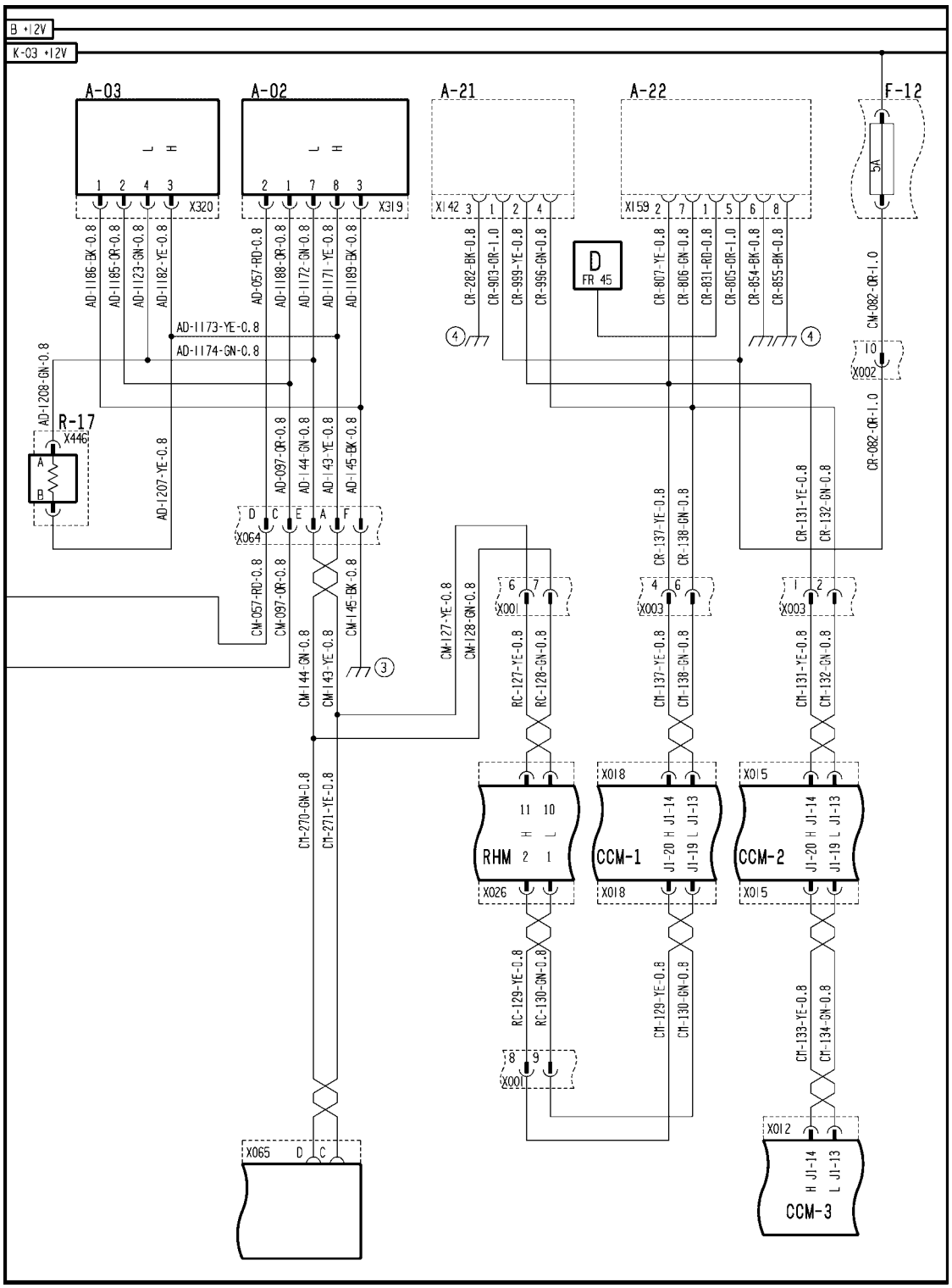
AFXSCHEM29A-04 1

FRAME 29 - DISTRIBUTION

https://truckmanualshub.com/

A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)



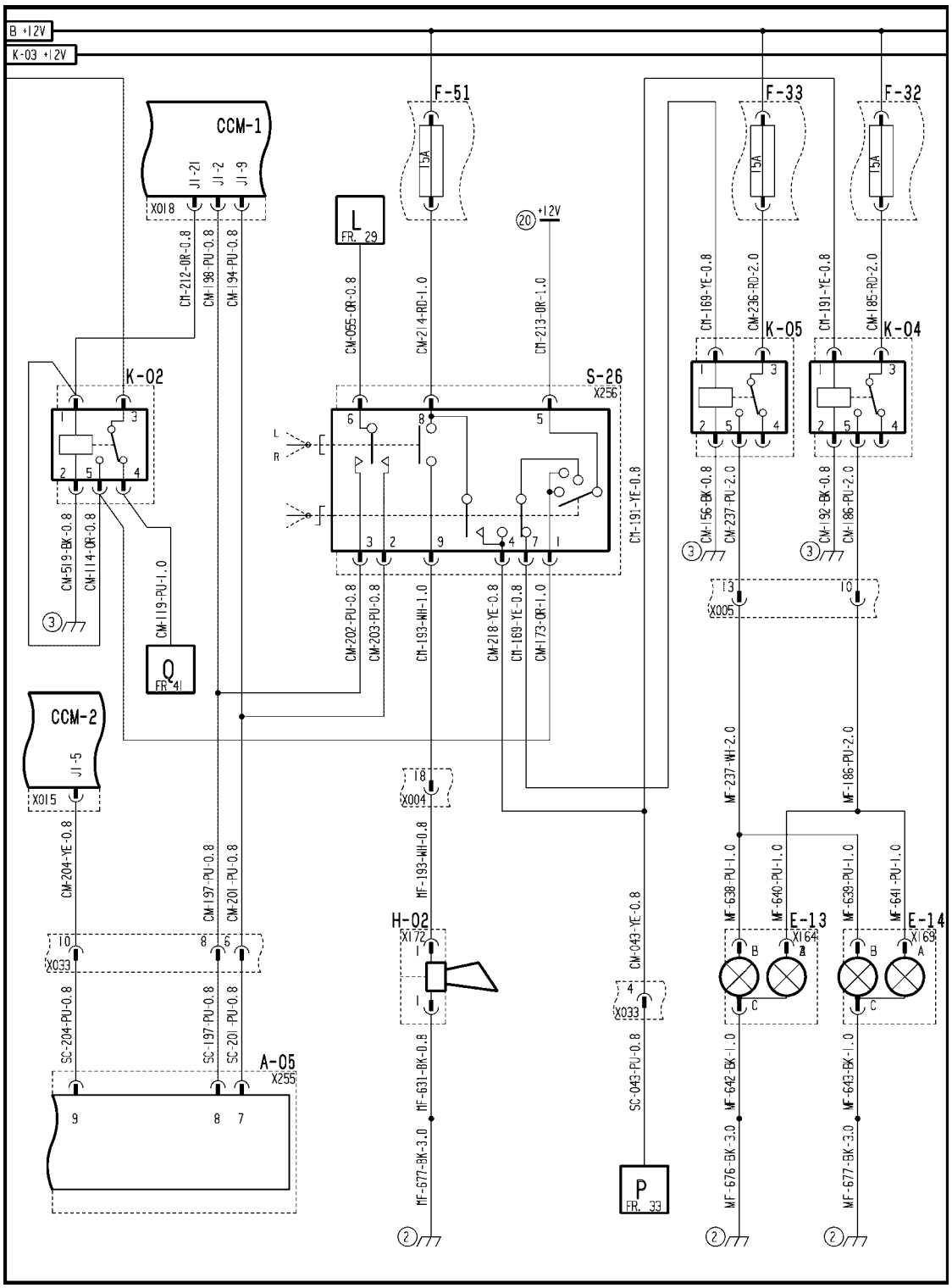
AFXSCHEM30-04 1

FRAME 30 - DISTRIBUTION

https://truckmanualshub.com/

A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)



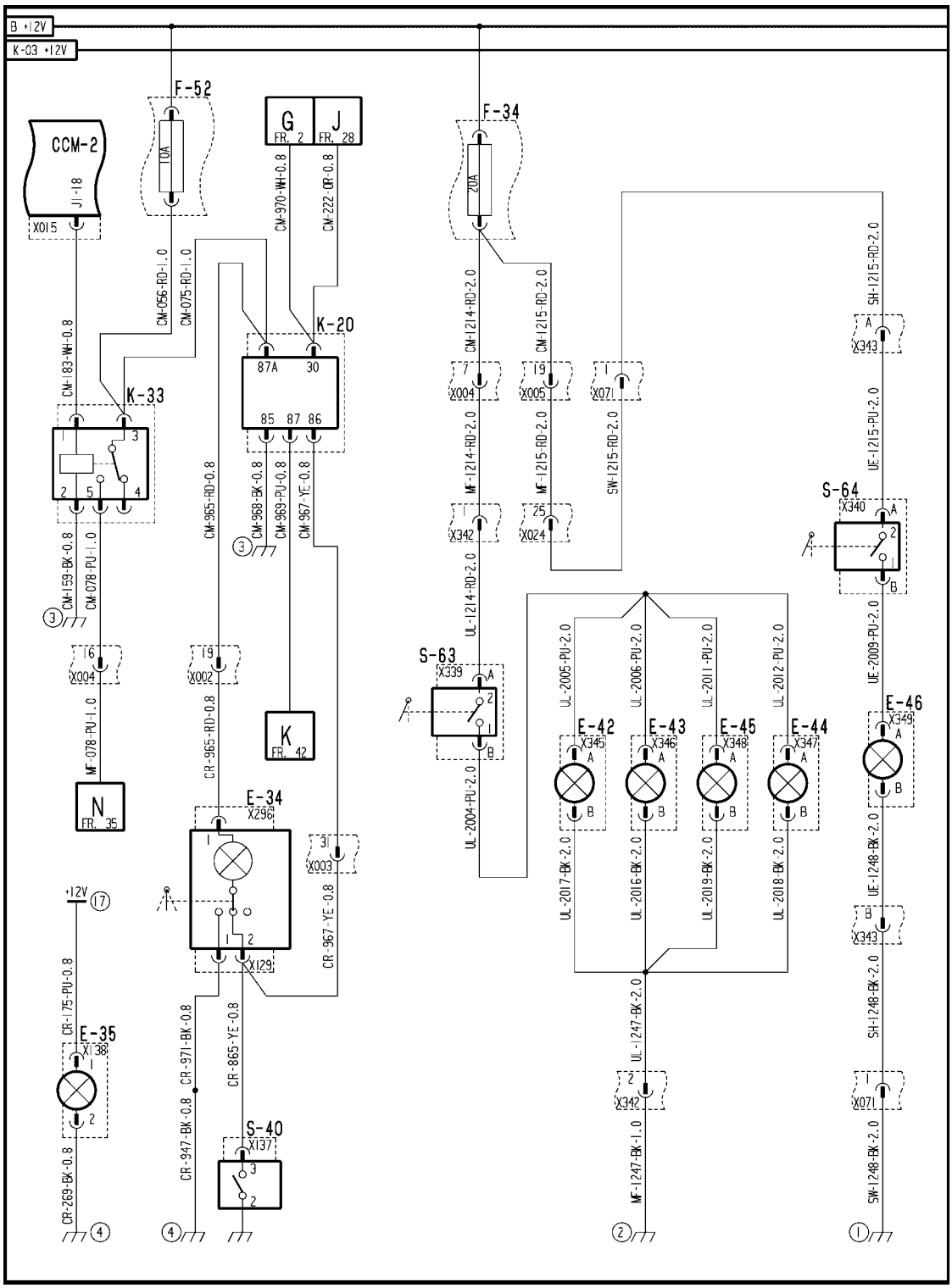
AFXSCHEM36-04 1

FRAME 36 - LIGHTING

https://truckmanualshub.com/

A-05 Flasher Module	E-13 LH Road Light (EU)	E-14 RH Road Light (EU)
F-32 High Beam Fuse	F-33 Low Beam Fuse (EU)	F-51 Horn, Marker Lights Fuse
H-02 Horn	K-02 Light Control Relay	K-04 High Beam Relay (EU)
K-05 Low Beam Relay (EU)	S-26 Road Light Switch	

Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)



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FRAME 38 - LIGHTING

https://truckmanualshub.com/

E-34 Dome Light	E-35 Console Light	E-42 LH Front Shield Light
E-43 LH Rear Shield Light	E-44 RH Front Shield Light	E-45 RH Rear Shield Light
E-46 Engine Light	F-34 Under Shield Lights Fuse	F-52 Dome / Brake Lights Fuse
K-20 Time Delay Module	K-33 Brake Lights Relay	S-40 LH Door Switch
S-63 Under Shield Light Switch	S-64 Engine Light Switch	

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Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54)

AFX8010

E0296-03 - CCM3 Key Switch Voltage

Context:
Key switch voltage is used to initialize (wake-up) the module, and also supplies power to the 5V and 8V regulators for the regulated voltage circuits. The module will shutdown if the voltage is less than **9 volts**, but there is no shutdown for excessive voltage.

Cause:
The CCM3 key switch power supply circuit is shorted to a higher than normal source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 KEY SW" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.
2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 KEY SW" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.
3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-38.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.
4. Remove the instructional seat and storage bin to gain access to the CCM3 connector **X012**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X012** pin J1-4.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the cab main (CM) harness:
   - wire 053 red, fuse F38 to key switch S-02 pin 1
   - wire 125 red, fuse F38 to ECU Power relay K14 pin 1
   - wire 859 orange, key switch S-02 pin 5 to ECU connector **X193** pin 15
   - wire 096 orange, key switch S-02 pin 6 to CM harness splice
   - wire 055 orange, CM harness splice to Road Light switch S-26 pin 6
   - wire 095 orange, CM harness splice to CCM1 Power relay K24 pin 1

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- wire 103 orange, CCM1 power relay K-24 pin 1 to CCM2 Power relay K-25 pin 1
- wire 104 orange, CCM2 Power relay K-25 pin 1 to Cab Power relay K-26 pin 1
- wire 222 orange, Cab Power relay pin 1 to Time Delay module K-20 pin 30
- wire 970 white, Time Delay relay K-20 pin 30 to Fuel Pump relay K-07 pin 1
- wire 101 orange, CM harness splice to CCM3 connector **X012** pin J1-4
- wire 100 orange, CM harness splice to CCM2 connector **X015** pin J1-4
- wire 099 orange, CM harness splice to CCM1 connector **X018** pin J1-4
- wire 097 orange, CM harness splice to display adapter (AD) harness connector **X064** pin C

Locate the source of high voltage and repair.

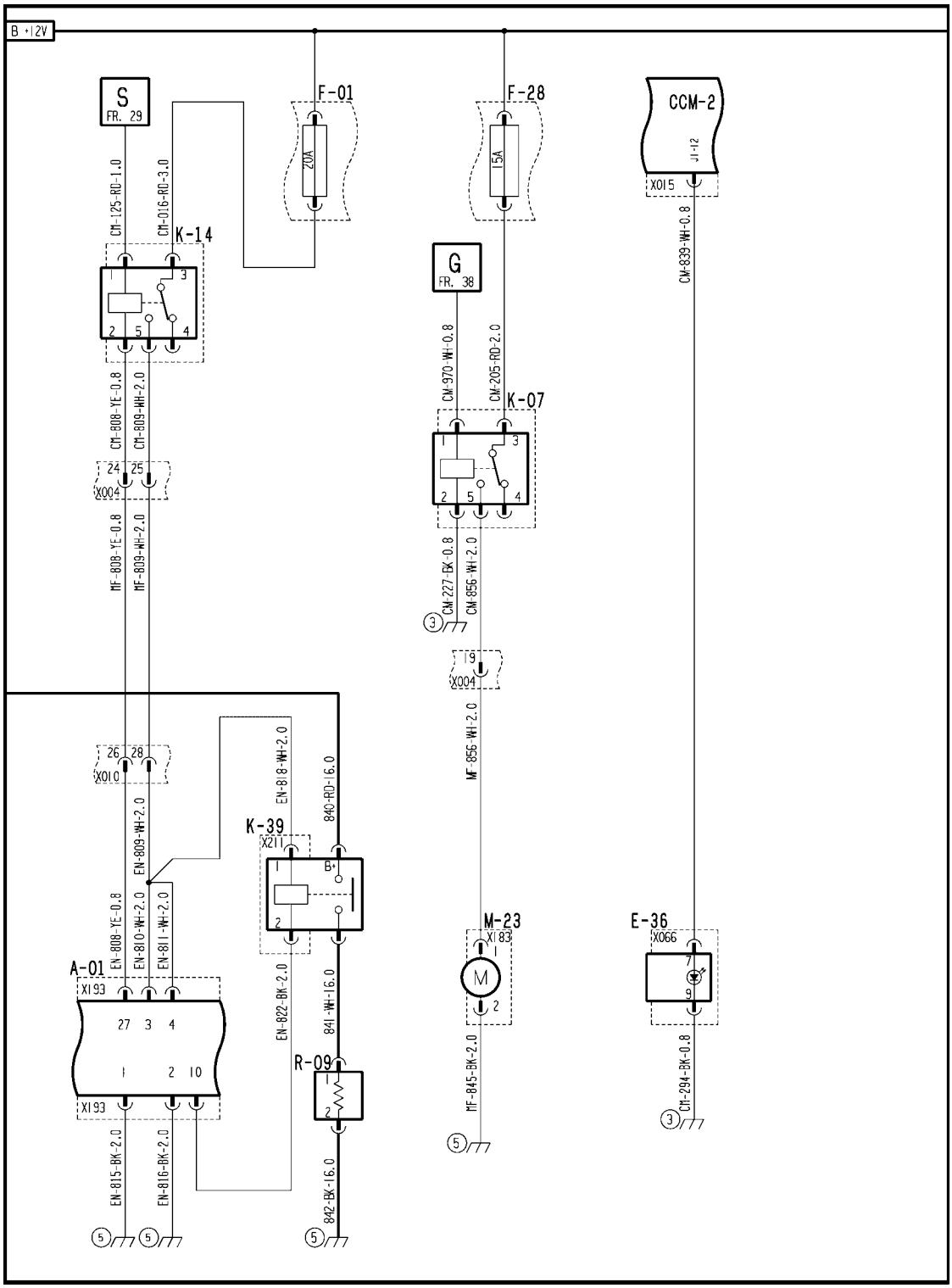
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM3.Reload the software for CCM3. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

A. If no high out of range voltage readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 02 (A.30.A.88 - C.20.E.02)



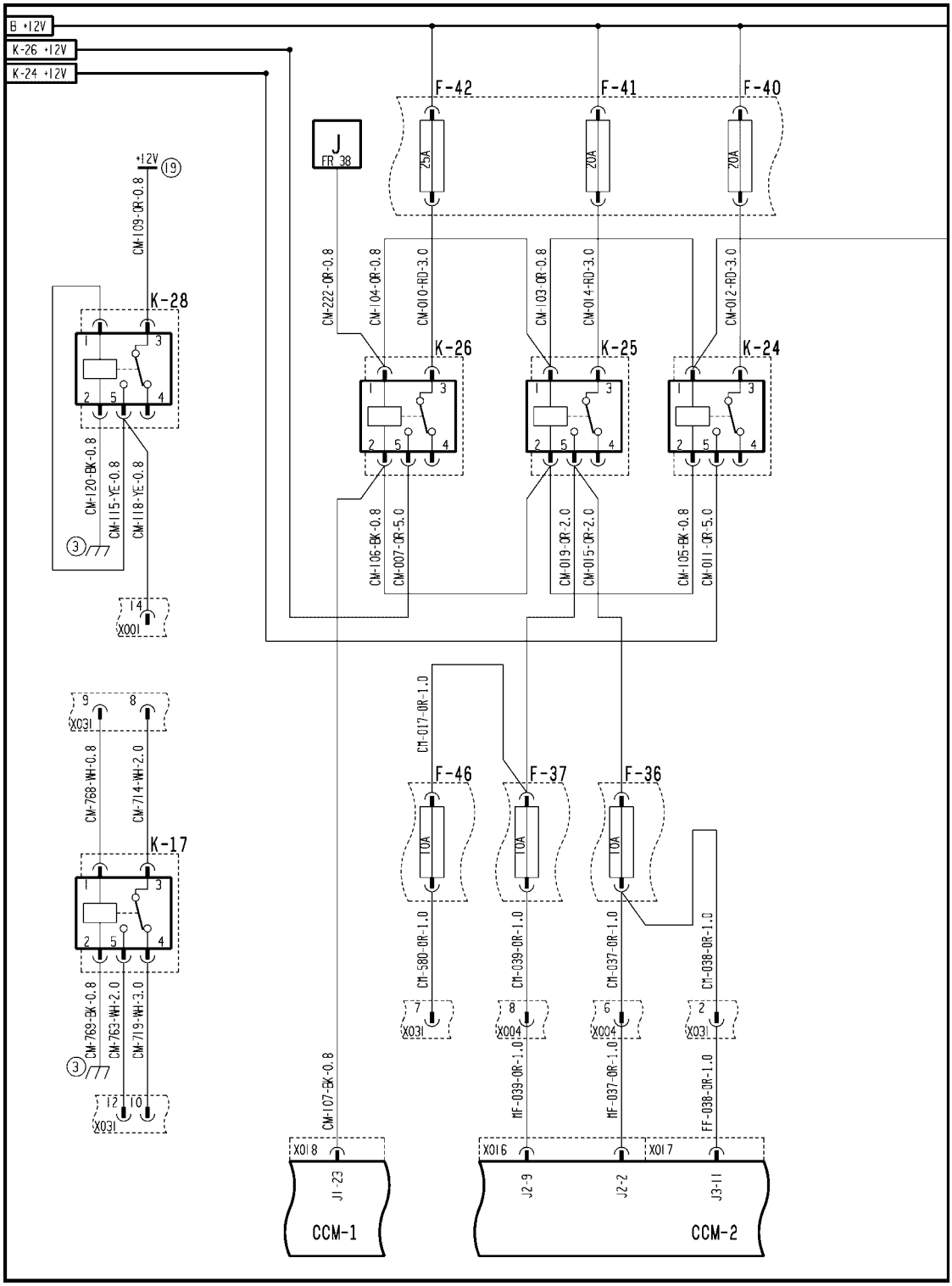
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FRAME 2 - ENGINE

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A-01 Iveco ECU	E-36 Cold Start Indicator	F-01 ECU Power Fuse
F-28 Fuel Pump Fuse	K-07 Fuel Pump Relay	K-14 ECU Power Relay
K-39 Grid Heater Relay	M-23 Fuel Pump	R-09 Engine Grid Heater

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)



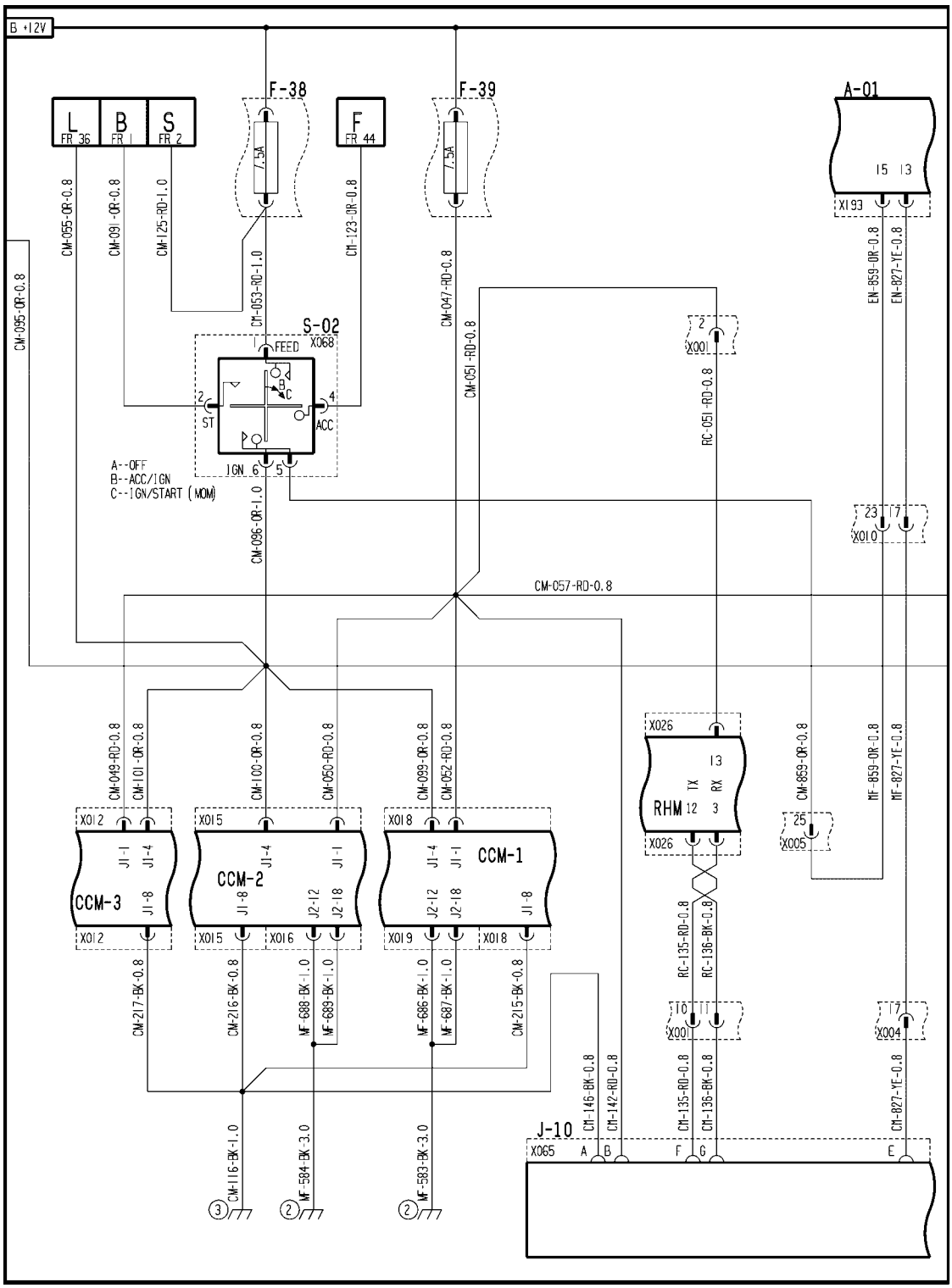
AFXSCHEM28-04 1

FRAME 28 - DISTRIBUTION

https://truckmanualshub.com/

F-36 CCM2a Fuse	F-37 CCM2b Fuse	F-40 CCM1 Power Fuse
F-41 CCM2 Power Fuse	F-42 CCM3, Cab Power Fuse	F-46 Not Used
K-17 Not Used	K-24 CCM1 Power Relay	K-25 CCM2 Power Relay
K-26 CCM3, Cab Power Relay	K-28 Not Used	

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)



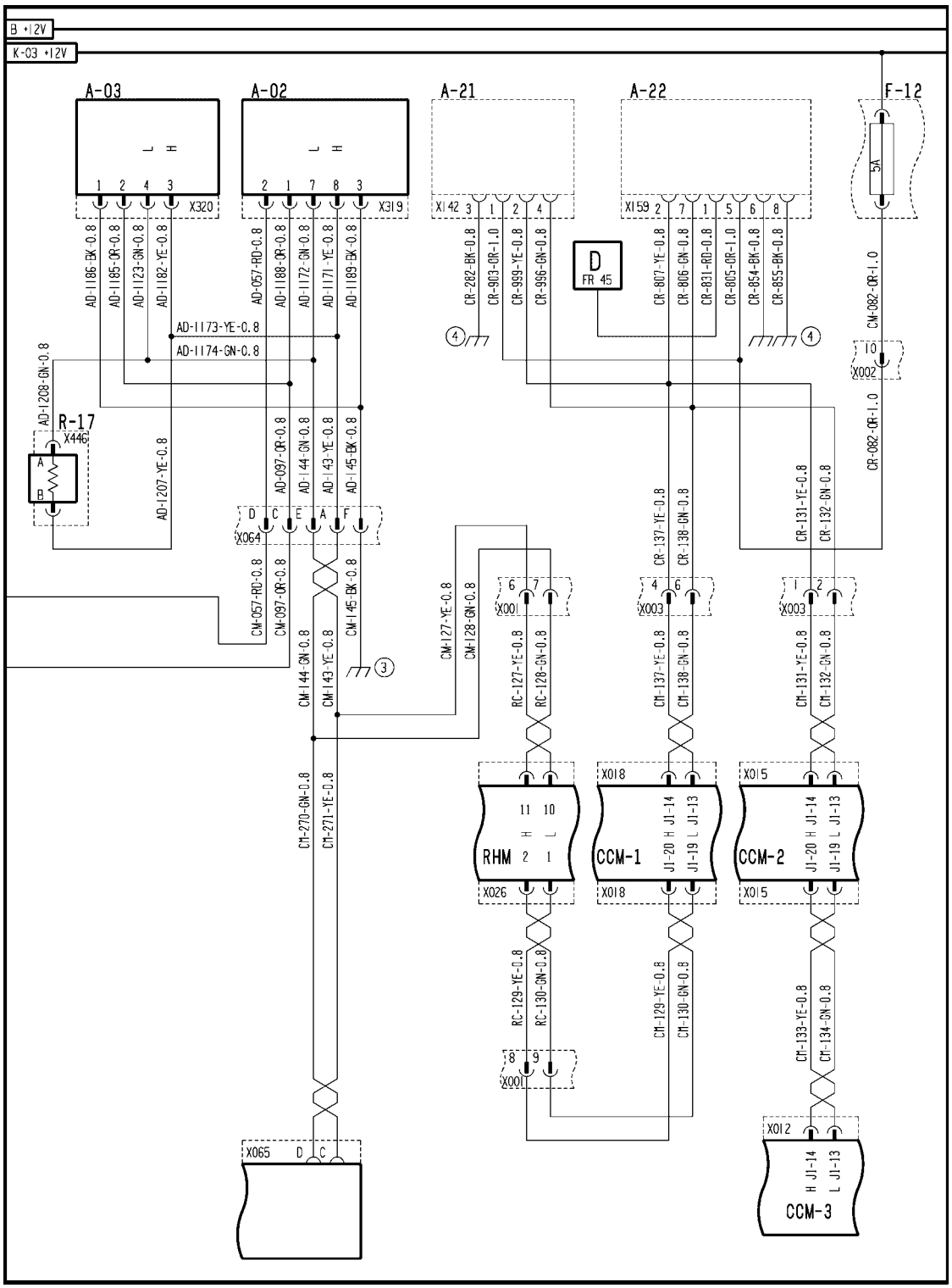
AFXSCHEM29A-04 1

FRAME 29 - DISTRIBUTION

https://truckmanualshub.com/

A-01 Iveco ECU	F-38 Key Switch Fuse	F-39 Memory (KAPwr)
J-10 Diagnostic Outlet	S-02 Key Switch	

Wiring harness - Electrical schematic frame 30 (A.30.A.88 - C.20.E.30)



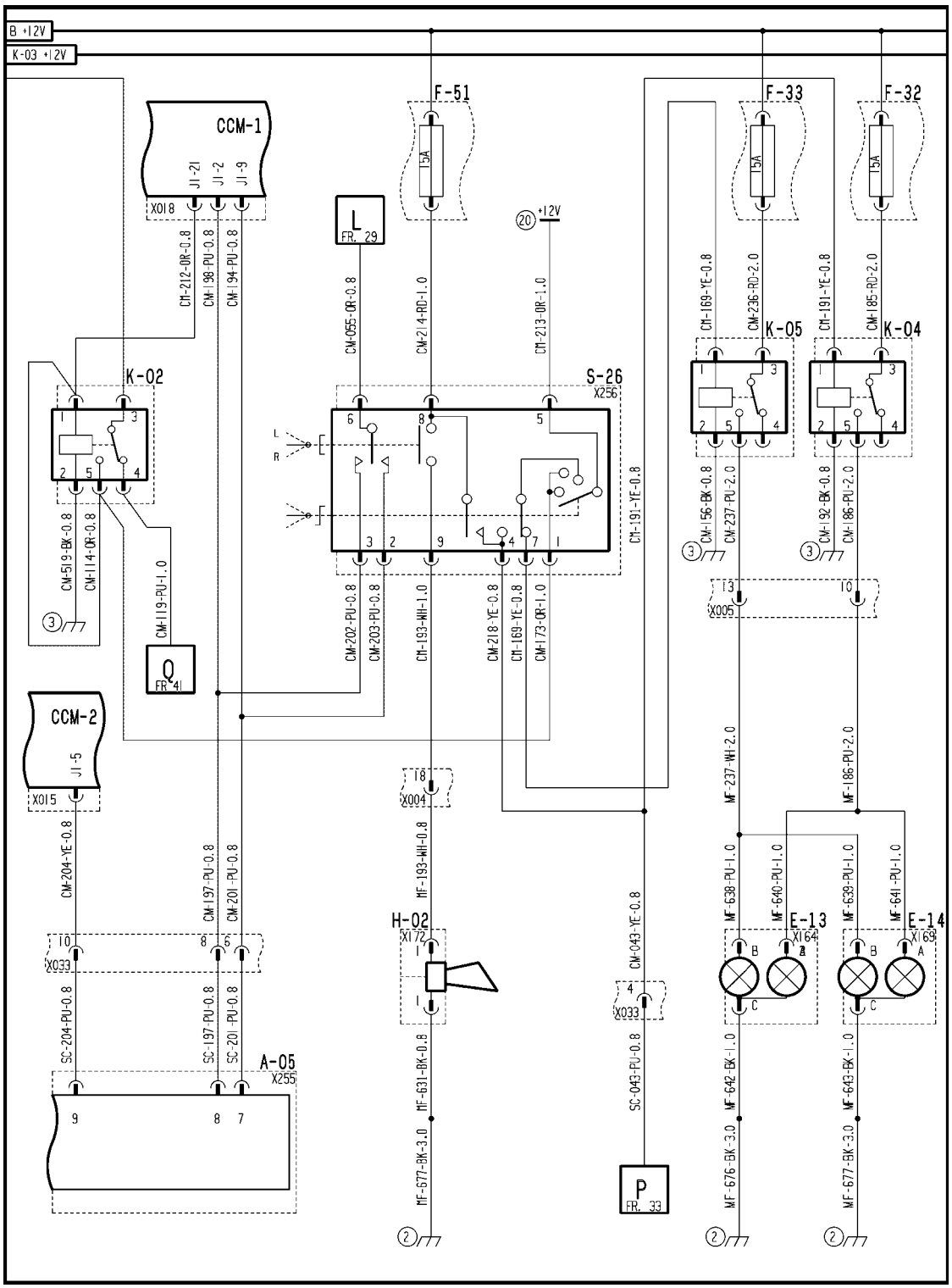
AFXSCHEM30-04 1

FRAME 30 - DISTRIBUTION

https://truckmanualshub.com/

A-02 Universal Display Plus	A-03 Shaft Speed Monitor	A-21 Future Option
A-22 Future Option	F-12 Future Option	R-17 Cab CAN Termination

Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)



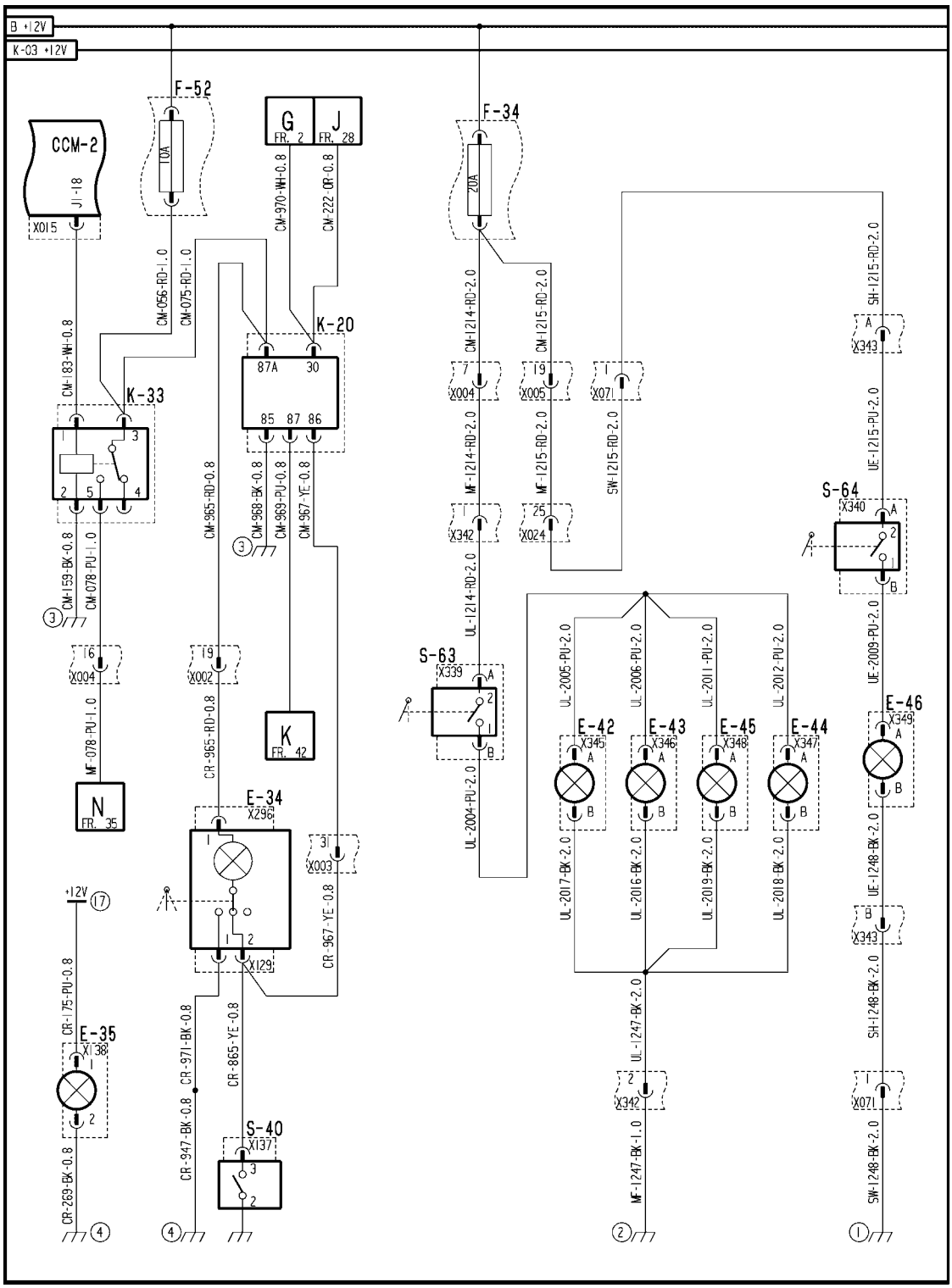
AFXSCHEM36-04 1

FRAME 36 - LIGHTING

https://truckmanualshub.com/

A-05 Flasher Module	E-13 LH Road Light (EU)	E-14 RH Road Light (EU)
F-32 High Beam Fuse	F-33 Low Beam Fuse (EU)	F-51 Horn, Marker Lights Fuse
H-02 Horn	K-02 Light Control Relay	K-04 High Beam Relay (EU)
K-05 Low Beam Relay (EU)	S-26 Road Light Switch	

Wiring harness - Electrical schematic frame 38 (A.30.A.88 - C.20.E.38)



AFXSCHEM38-04 1

FRAME 38 - LIGHTING

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E-34 Dome Light	E-35 Console Light	E-42 LH Front Shield Light
E-43 LH Rear Shield Light	E-44 RH Front Shield Light	E-45 RH Rear Shield Light
E-46 Engine Light	F-34 Under Shield Lights Fuse	F-52 Dome / Brake Lights Fuse
K-20 Time Delay Module	K-33 Brake Lights Relay	S-40 LH Door Switch
S-63 Under Shield Light Switch	S-64 Engine Light Switch	

https://truckmanualshub.com/

Index

POWER PRODUCTION - B

STARTING SYSTEM - 80.A

Cold start aid - Problem solving (B.80.A.30 - G.40.A.30) 11
AFX8010

Cold start aid - Torque (B.80.A.30 - D.20.A.10) 4
AFX8010

Cold start aid Indicator lamp - Testing (B.80.A.30.84 - G.40.A.20) 11
AFX8010

Cold start aid Indicator lamp - Unidentified failure (B.80.A.30.84 - G.30.B.46) 13
AFX8010

Cold start aid Pre-heating - Dynamic description (B.80.A.30.81 - C.30.A.10) 6
AFX8010

Cold start aid Pre-heating - Remove (B.80.A.30.81 - F.10.A.10) 7
AFX8010

Cold start aid Pre-heating - Testing (B.80.A.30.81 - G.40.A.20) 12
AFX8010

Cold start aid Relay - Testing (B.80.A.30.21 - G.40.A.20) 12
AFX8010

Engine starter - Replace (B.80.A.82 - F.10.A.30) 8
AFX8010

Engine starter - Testing (B.80.A.82 - G.40.A.20) 15
AFX8010

Engine starter - Torque (B.80.A.82 - D.20.A.10) 4
AFX8010

Start control 24V start relay - Testing (B.80.A.90.85 - G.40.A.20) 18
AFX8010

Start control Neutral start relay - Testing (B.80.A.90.84 - G.40.A.20) 18
AFX8010

Start control Safety switch - Short circuit to B+ (B.80.A.90.81 - G.30.B.54) 19
AFX8010

Start control Safety switch - Short circuit to ground (B.80.A.90.81 - G.30.B.53) 25
AFX8010

Start control Safety switch - Testing (B.80.A.90.81 - G.40.A.20) 17
AFX8010

Start control Start relay - Testing (B.80.A.90.80 - G.40.A.20) 17
AFX8010

Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54) 32
AFX8010

Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54) 41
AFX8010

Start control Start switch - Short circuit to B+ (B.80.A.90.82 - G.30.B.54) 50
AFX8010

Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20) 16
AFX8010

Start control Start switch - Testing (B.80.A.90.82 - G.40.A.20) 16
AFX8010

https://truckmanualshub.com/

STARTING SYSTEM - Dynamic description (B.80.A - C.30.A.10) 5
AFX8010

STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30) 9
AFX8010

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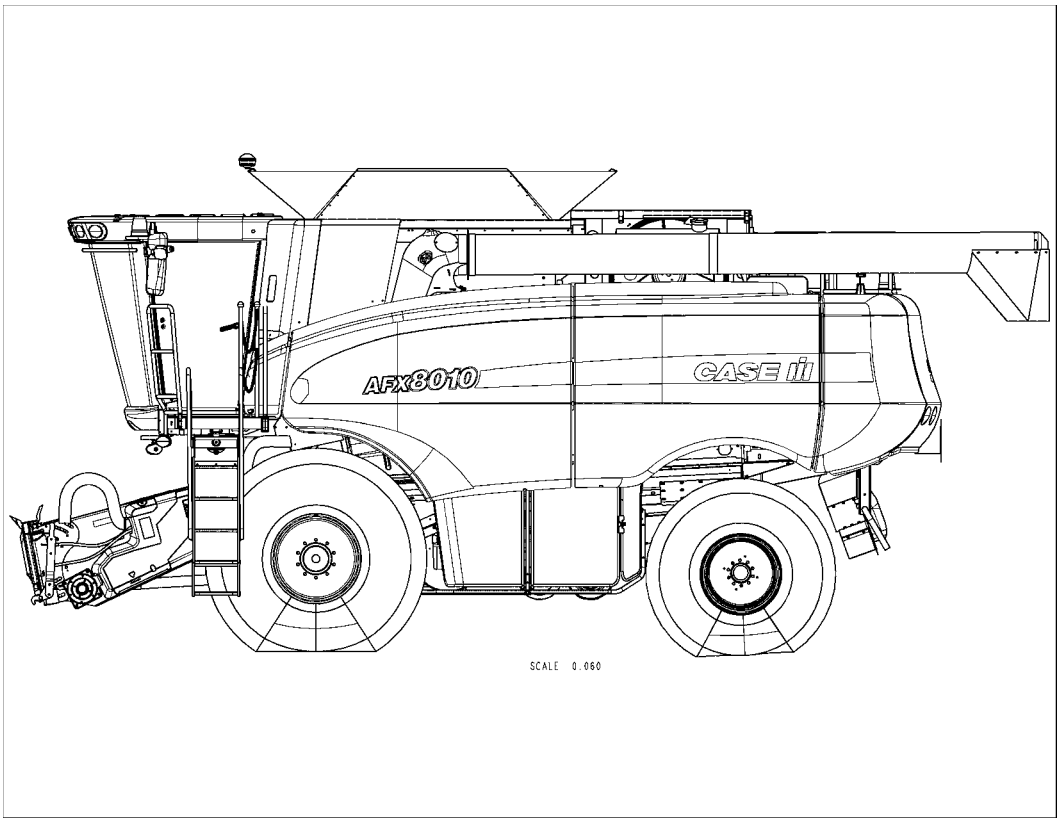
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REPAIR MANUAL

POWER TRAIN



AFX8010

https://truckmanualshub.com/

Contents

POWER TRAIN - C

POWER COUPLING Fixed coupling C.10.B
AFX8010

TRANSMISSION Mechanical C.20.B
AFX8010

TRANSMISSION Hydrostatic C.20.F
AFX8010

FRONT PTO Mechanical C.42.B
AFX8010

PROCESS DRIVE Primary process drive C.50.B
AFX8010

https://truckmanualshub.com/

POWER TRAIN - C

POWER COUPLING Fixed coupling - 10.B

AFX8010

https://truckmanualshub.com/

Contents

POWER TRAIN - C

POWER COUPLING Fixed coupling - 10.B

FUNCTIONAL DATA

PTO drive

PTO drive - Overview (C.10.B.42 - C.10.A.10) 3
AFX8010

SERVICE

PTO drive

PTO drive - Place on stand (C.10.B.42 - F.35.A.10) 4
AFX8010

PTO drive - Disassemble (C.10.B.42 - F.10.A.25) 6
AFX8010

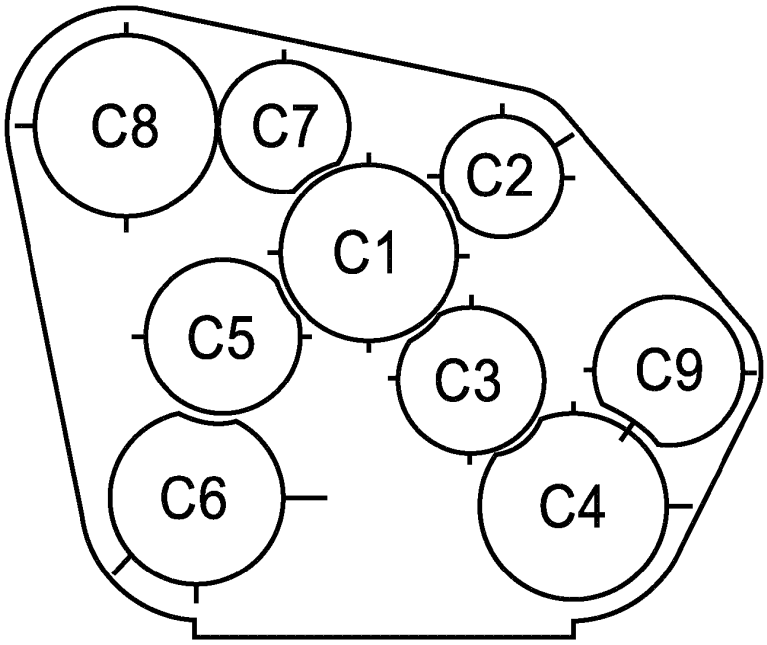
PTO drive - Assemble (C.10.B.42 - F.10.A.20) 10
AFX8010

https://truckmanualshub.com/

PTO drive - Overview (C.10.B.42 - C.10.A.10)

AFX8010

Shaft	Use	Rated RPM	Tooth Gear
C1	ENGINE INPUT	2100	58
C2	GROUND DRIVE HYDRO	2900	42
C3	TRIPLE GEAR PUMP	2538	48
C4	SEPARATOR CLUTCH	2030	60
C5	FEEDER CVT	2388	51
C6	ROTOR CVT AND CVT DRIVE MOTOR	2137	57
C7	ROTOR AND FEEDER HYDRO PUMPS	2900	42
C8	UNLOAD CLUTCH	2030	60
C9	PFC SYSTEM PUMP	2538	48



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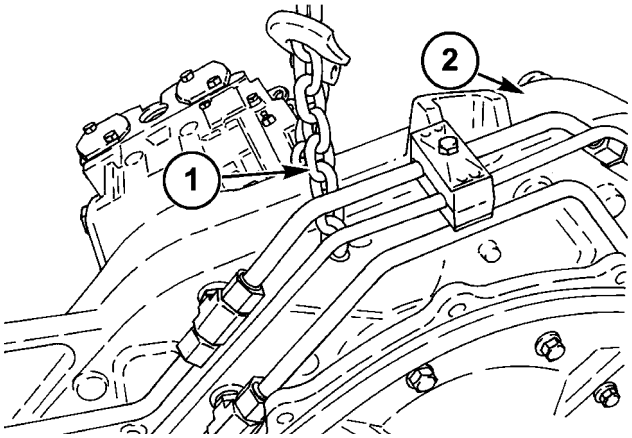
- Definition: (PFC) Pressure Flow Compensated, (CVT) Continuously Variable Transmission

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PTO drive - Place on stand (C.10.B.42 - F.35.A.10)

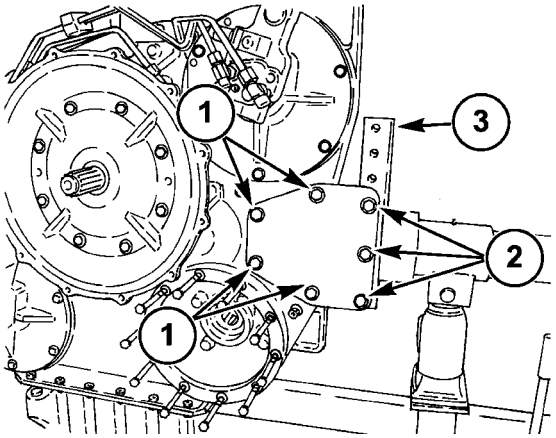
AFX8010

1. Using a lift chain **(1)** with a minimum **907 kg** (**2000 lb**) weight rating, securely lift the gearbox **(2)** from the center lifting loop to evenly lift the gearbox. Once the gearbox is lifted, attach the mounting brackets using the correct hardware.



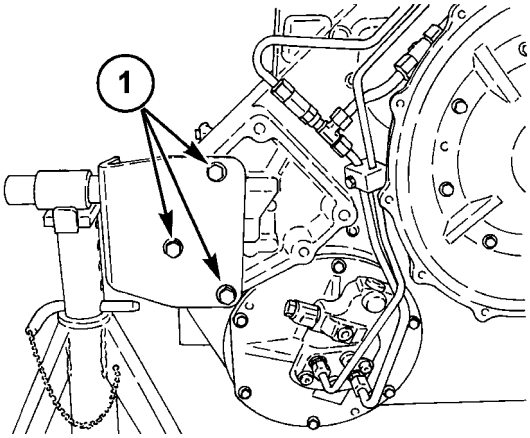
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2. While facing the inboard side of the gearbox, attach the Right Hand Side mounting plate using four **85 mm** bolts **(1)** to the gearbox. The three remaining holes are used by three **35 mm** bolts **(2)** to attach to the engine mounting stand **(3)**.



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3. On the Left Hand Side of the gearbox, use three M16 bolts **(1)** to secure the mounting bracket. The two lower bolts use **35 mm**, and the top bolt uses **110 mm** length bolts.

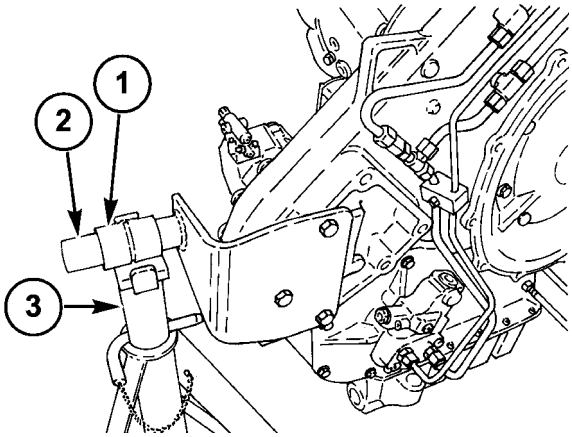


20036402A5 3

https://truckmanualshub.com/

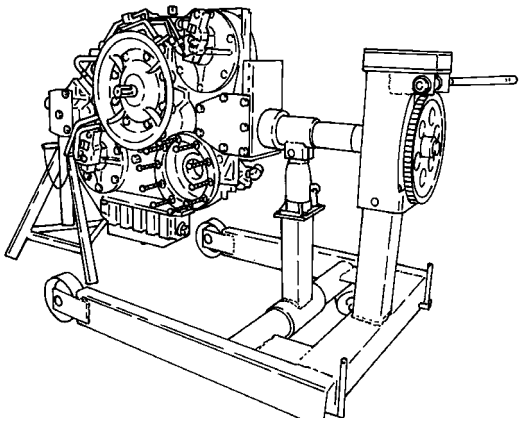
4. On the Left Hand Side, use an adjustable jack stand **(3)** to help share the load of the gearbox. The stand should have at least a **907 kg** (**2000 lb**) capacity. Install rubber O-ring on shaft **(2)** so collar **(1)** does not slide off the shaft during rotation.

NOTE: *The Gearbox is heavy. Use extreme caution when working around. Be sure to use adequate lifting equipment and hardware.*



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5. Torque all plated M16 bolts to **230 Nm** (**170 lb ft**) and all un-plated bolts to **176 Nm** (**130 lb ft**).



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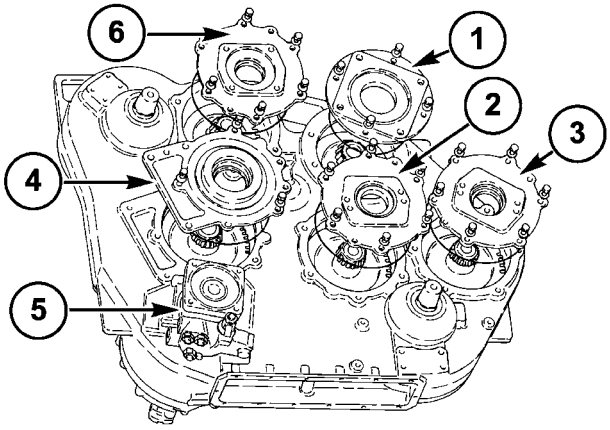
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PTO drive - Disassemble (C.10.B.42 - F.10.A.25)

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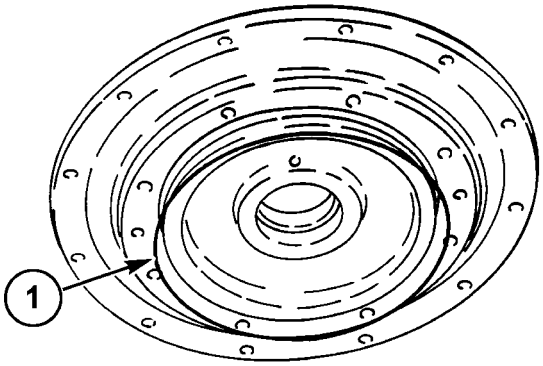
Prior operation: Drain the oil from the PTO Gearbox.
Prior operation: Remove all pumps and motors from the PTO gearbox.
Prior operation: Remove the Feeder and Rotor variators from the PTO gearbox.
Prior operation: Remove Gearbox from machine.

1. Beginning with the outboard side of the gearbox start removing the mounting flanges for the Ground Drive Hydro Pump shaft **(1)**, the Triple Gear Pump shaft **(2)**, the PFC System Pump shaft **(3)**, the Feeder CVT shaft **(4)**, the Rotor CVT and CVT Drive Motor shaft **(5)**, and the Rotor and Feeder Hydro Pumps shaft **(6)** by removing the mounting bolts.



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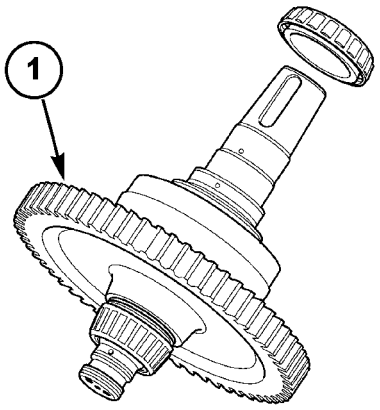
2. Remove the O-rings **(1)** from behind the flange covers.



20035873A5 2

3. Remove the shafts and gear assembly **(1)** for each cover removed.

NOTE: *For each shaft removed, remember the shaft location and the number of tooth gear for that location.*

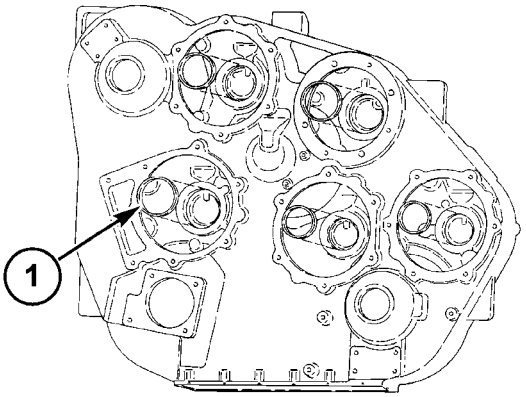


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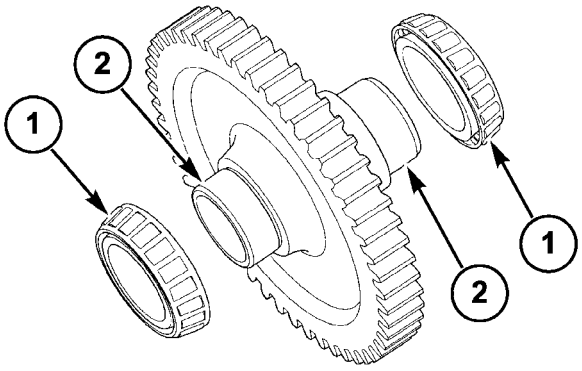
4. To remove the bearing cups **(1)** from the housing and the flange use a small pry bar to work them out carefully.

NOTE: *When removing the bearing cups from the covers, use care as to how many shims came from that location. Also if re-using bearings keep track of sets. Bearings are matched fitted sets.*



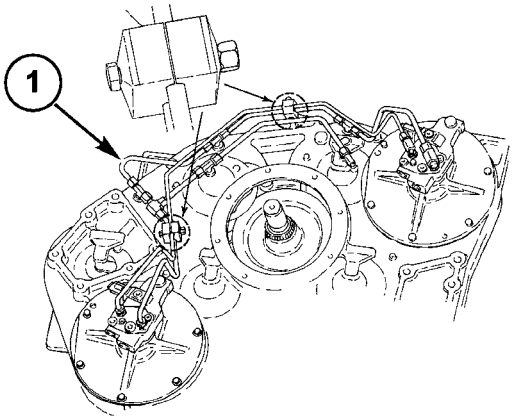
20034949A5 4

5. To remove the bearings **(1)** from the gear shafts **(2)** use pullers with the correct adapters.



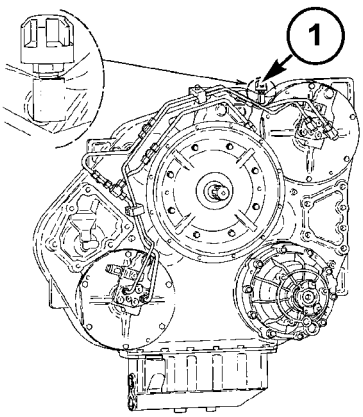
10034954A5 5

6. On the "inboard" side of the PTO gearbox remove the lube oil plumbing lines **(1)**, and fittings.



20035872A5 6

7. Remove the breather and fitting **(1)**.

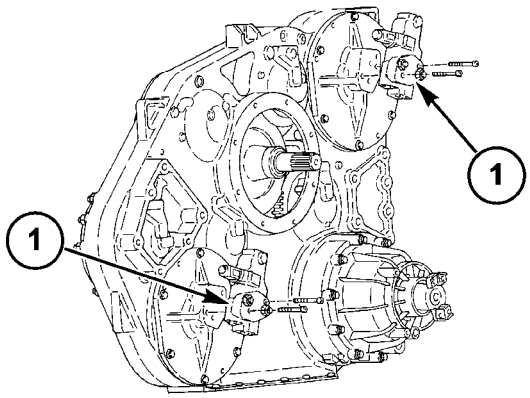


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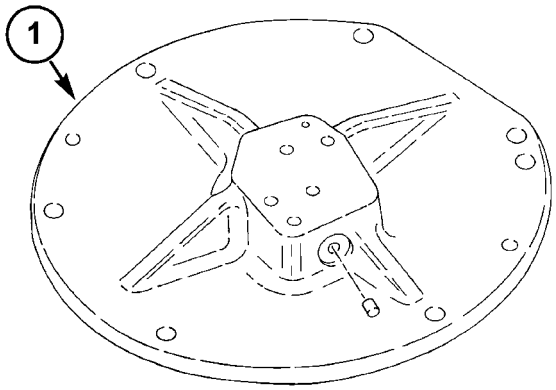
8. To remove the valves **(1)** from the flanges remove the 2 Hex Head Socket Cap Screws from each valve.

NOTE: *Careful of the 4 O-rings on each valve.*



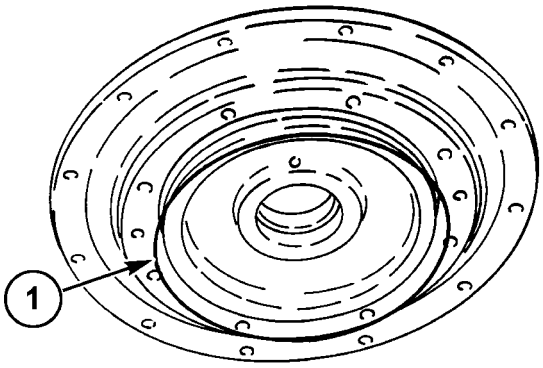
20035868A5 8

9. To remove the Unload Clutch and Separator Clutch covers **(1)**, remove the 6 bolts from each cover.



20035852A5 9

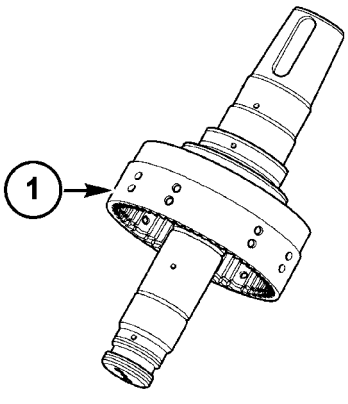
10. Remove the cover O-ring **(1)**.



20035873A5 10

11. Remove the shaft and gear with clutch assembly **(1)** from the separator clutch and unload clutch locations.

NOTE: *Refer to* ***Clutch - Disassemble (C.50.B.46 - F.10.A.25)*** *and* ***Clutch - Disassemble (K.72.B.16 - F.10.A.25)****.*



50040354A5 11

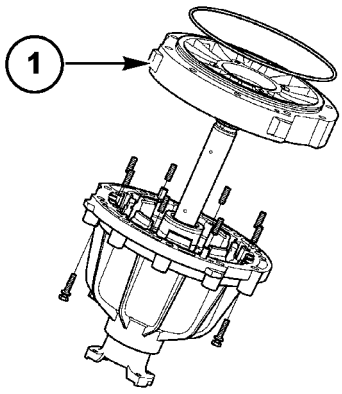
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12. Remove the bearing cups from the gearbox using a small pry bar.

13. To remove the lip seals from the housing for separator clutch and unload clutch shafts, use a driver or seal puller.

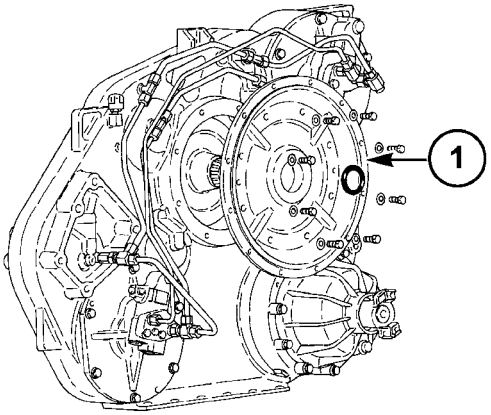
14. Remove the Rotor CVT and CVT Drive Motor variator bearing cover **(1)**.

NOTE: *If rotor variator is still attached to the gearbox, use caution when separating the gear assembly from the variator shaft. The shaft seals need to be removed first so they are not damaged. Once the seals are removed, the gear assembly can be removed easily.*



10035855A5 12

15. Remove the engine to gearbox flange. Remove the 8 bolts and pull away the cover **(1)**.

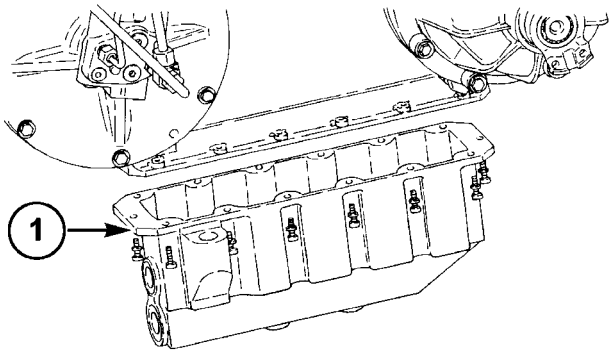


20035874A5 13

16. Remove the Engine Input shaft and gear assembly from the gearbox.

17. Remove the bearings and bearing cups from the housing, cover, and shaft. To remove the lip seals use a driver and seal puller.

18. Remove the oil pan **(1)** on the bottom of the gearbox by removing the 14 bolts.



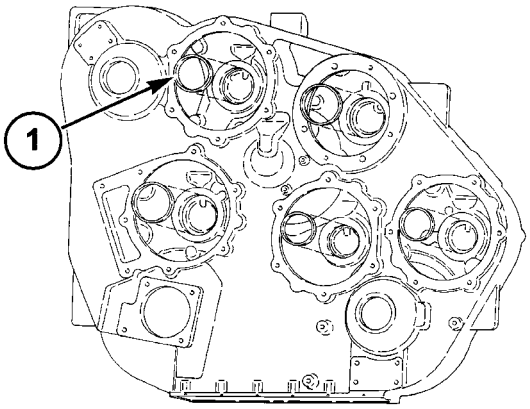
20035883A5 14

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PTO drive - Assemble (C.10.B.42 - F.10.A.20)

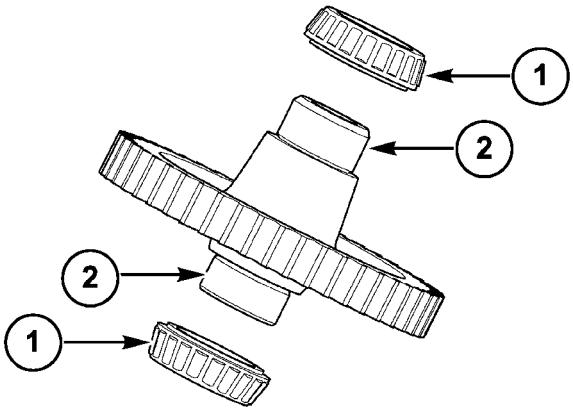
AFX8010

1. Chill bearing cups **(1)** in an ice bath. Press the chilled cups **(1)** into the appropriate bores using the appropriate drivers. Check to see each cup is fully seated.



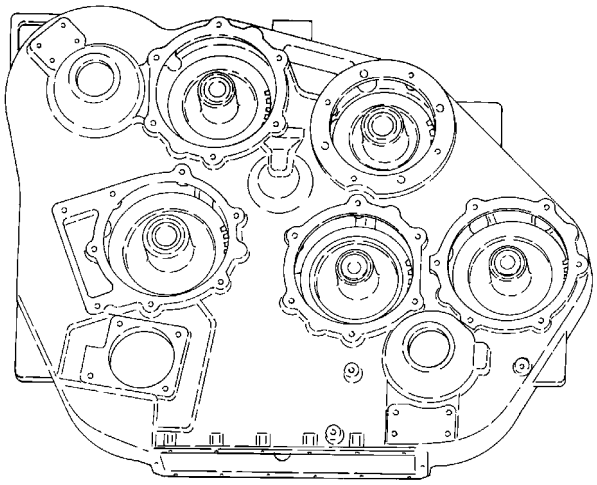
20034949B5 1

2. Press bearing cones **(1)** onto PFC System Pump shaft **(2)** using a driver. Repeat on the Triple Gear Pump shaft, Rotor and Feeder Hydro Pumps shaft, Ground Drive Pump shaft, and Feeder CVT shaft. Check to see each is fully seated.



10034950A5 2

3. Place the now assembled shafts into housing subassembly. Be sure the shaft location is correct using the correct tooth gear and shaft. Refer to **PTO drive - Overview (C.10.B.42 - C.10.A.10)**. Be sure the shafts are fully seated into the cups in the housing.

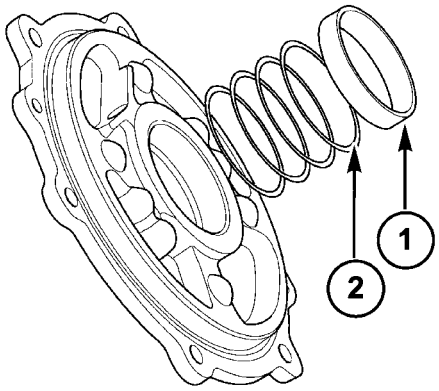


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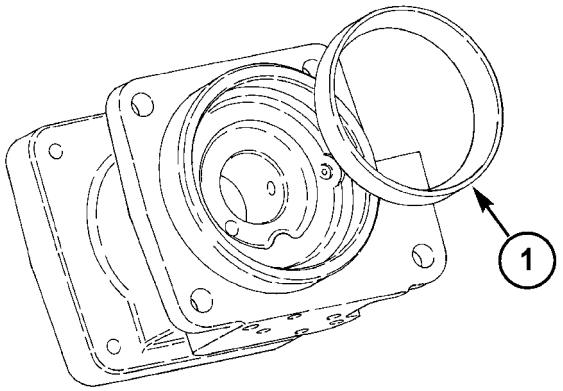
4. Place the bearing cup **(1)** onto the PFC System Pump shaft. Measure the height of the cup above the cover mounting surface. Measure the depth of the cup seating surface relative to the cover mounting flange. Calculate the required thickness of shims **(2)**. Press the required amount of shims **(2)** and the bearing cup **(1)** into the flange using a driver. Check to be sure cup is fully seated.

NOTE: *Repeat this step for the Triple Gear Pump flange, Rotor and Feeder Hydro Pumps flange, Ground Drive Pump flange, and Feeder CVT flange.*



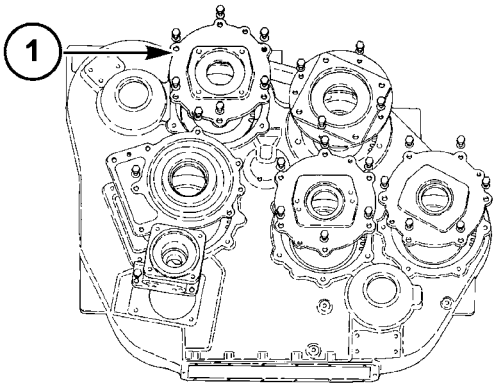
10034959A5 4

5. On the Rotor CVT and CVT Drive Motor sleeve, press bearing cup **(1)** into bore shown using a driver. Check to verify cup is fully seated.



20034963A5 5

6. To install the mounting flanges **(1)** orient the arrows on the flange to the arrows on the gearbox.



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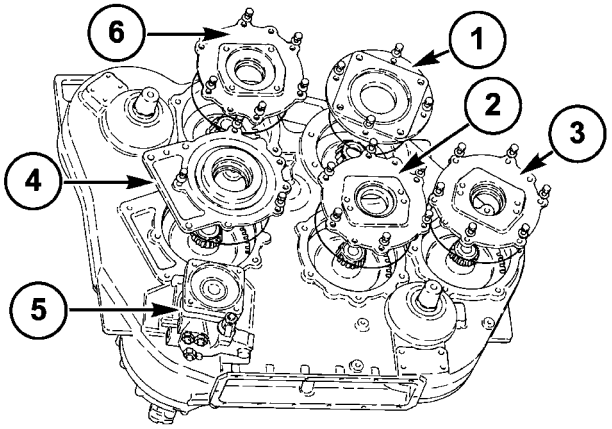
7. Bolt Ground Drive Hydro Pump mounting flange **(1)** over the shaft using four washers and bolts. Torque to **89 - 100 Nm (66 - 74 lb ft)**. Check rolling torque. Nominal range should be **0.2 - 1.2 Nm** (**2 - 11 lb in**). Add or remove shims to obtain the desired rolling torque. Remove the flange, shaft and shims from the gearbox and set aside.

   Bolt Triple Gear Pump mounting flange **(2)** over the shaft using six washers and bolts. Torque to **89 - 100 Nm (66 - 74 lb ft)**. Check rolling torque. Nominal range should be **0.2 - 1.0 Nm** (**2 - 9 lb in**). Add or remove shims to obtain the desired rolling torque. Remove the flange, shaft and shims from the gearbox and set aside.

   Bolt PFC System Pump mounting flange **(3)** over the shaft using six washers and bolts. Torque to **89 - 100 Nm (66 - 74 lb ft)**. Check rolling torque. Nominal range should be **0.2 - 1.1 Nm** (**2 - 10 lb in**). Add or remove shims to obtain the desired rolling torque. Remove the flange, shaft and shims from the gearbox and set aside.

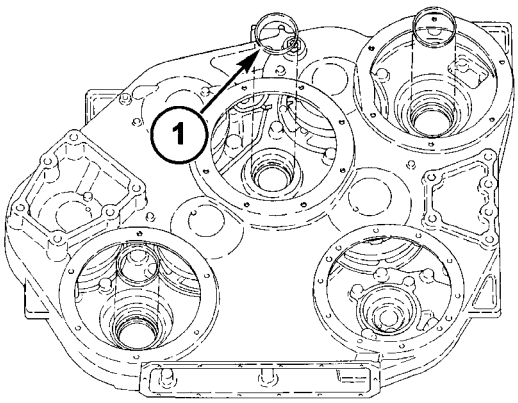
   Bolt Feeder CVT Driveshaft mounting flange **(4)** over the shaft using three washers and bolts. Torque to **89 - 100 Nm (66 - 74 lb ft)**. Check rolling torque. Nominal range should be **0.2 - 1.1 Nm** (**2 - 10 lb in**). Add or remove shims to obtain the desired rolling torque. Remove the flange, shaft and shims from the gearbox and set aside.

   Bolt Rotor and Feeder Hydro Pumps mounting flange **(6)** over the shaft using six washers and bolts. Torque to **89 - 100 Nm (66 - 74 lb ft)**. Check rolling torque. Nominal range should be **0.2 - 0.9 Nm** (**2 - 8 lb in**). Add or remove shims to obtain the desired rolling torque. Remove the flange, shaft and shims from the gearbox and set aside.



20035881A5 7

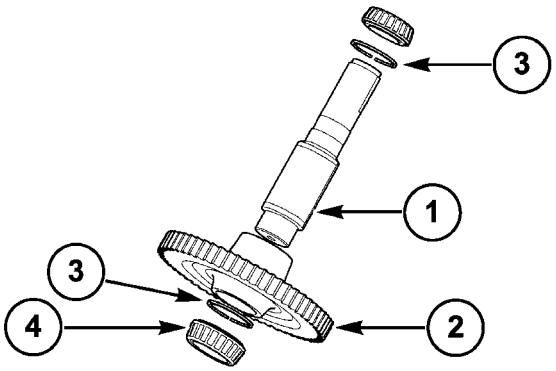
8. Chill bearing cups **(1)** in an ice bath. On the inboard side of gearbox, press the chilled cups **(1)** into the appropriate bores using the appropriate drivers. Check to see each cup is fully seated.



20035833A5 8

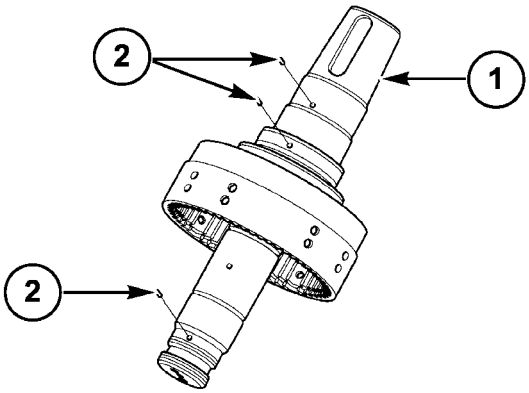
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9. Subassemble Engine Input shaft. Place gear **(2)** on shaft **(1)** and retain with 2 retaining rings **(3)**. Short side of gear goes to short end of shaft and the narrow side of snap ring away from gear. Press cones **(4)** onto shaft **(1)** using appropriate drivers for each cone. Check to see each cone is fully seated.



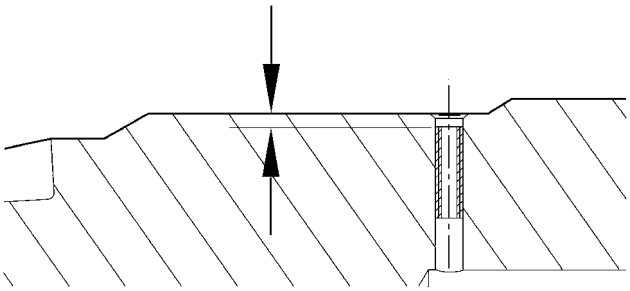
10035834A5 9

10. Subassemble Separator Clutch and Unload Clutch shafts. Press spring pins **(2)** into holes in shaft **(1)**.



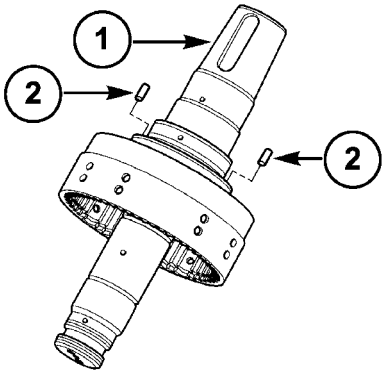
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11. Ends of pins must be **0.8 - 1.8 mm** (**0.031 - 0.071 in**) below OD.



10035838 11

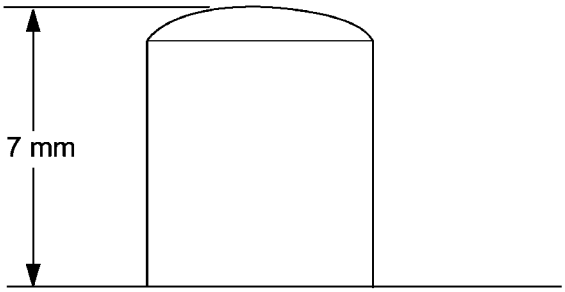
12. Coat tapered end of dowel pins **(2)** with a small amount of Loctite 609 and install into holes in first step flange above drum using a driver to the depth shown.



50040357A5 12

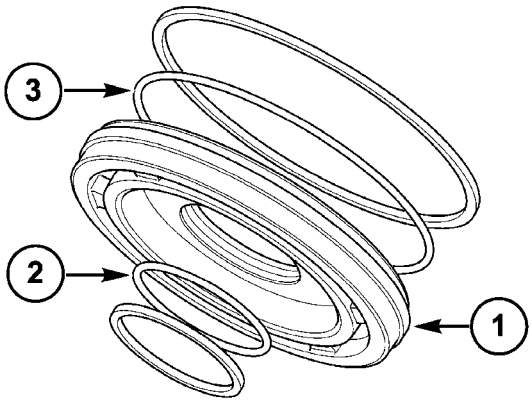
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13. The dowel pin height should be **7 mm** (**0.28 in**).



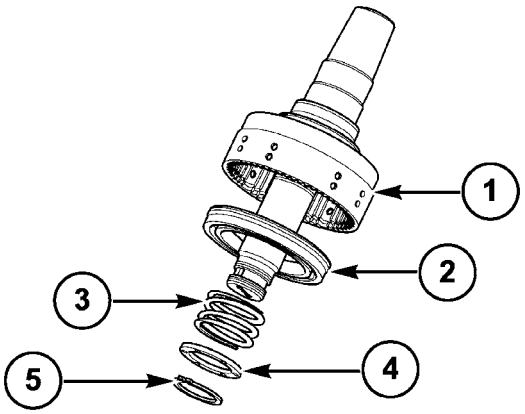
50040358 13

14. Sub-assemble the clutch piston **(1)** by inserting the smaller O-ring and small seal **(2)** into groove in the ID of the piston. Install the larger o-ring and larger seal **(3)** into the groove on the piston OD.



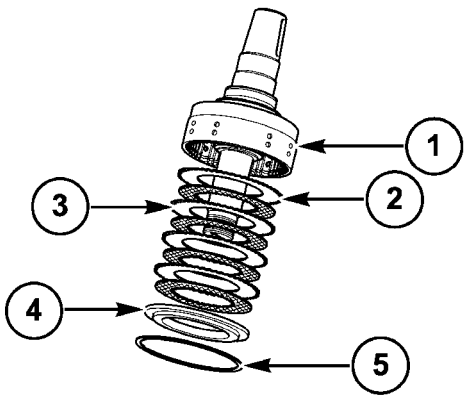
10035840A5 14

15. Size the inner seal and outer seal on the clutch piston **(2)**. Lube both seals with petroleum jelly and then press the piston onto the clutch shaft **(1)**. Place piston return spring **(3)** over shaft and into piston, drop spring retainer **(4)** (lips toward spring) and retain on shaft with external snap ring **(5)** (narrow side up). This will require pressure to be applied to spring with tool (long snap ring driver).



10035841A5 15

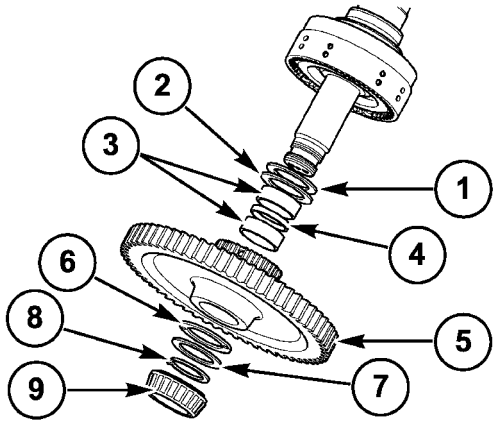
16. Assemble the clutch pack using 4 each of the following: separator plate **(3)**, friction plate **(2)**, separator plate, in this order until they are all used. Use an aligning tool to align the friction plates. After all separator plates and friction plates are in place, seated, and aligned place the clutch backing plate **(4)** on the stack and retain with backing plate retaining ring **(5)** (narrow side up). Be sure retaining ring **(5)** is fully seated into groove. Carefully insert 4 wedge pins, equally spaced, into assembly through holes in sides to retain alignment.



10035842A5 16

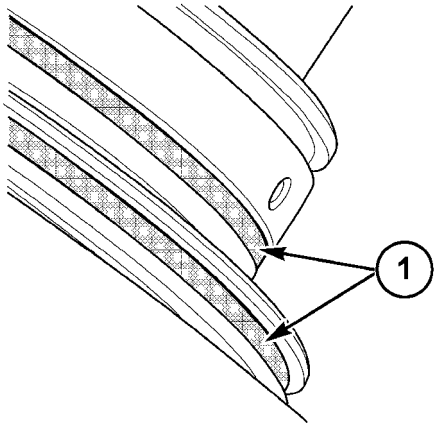
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17. Place thrust bearing race (washer) **(1)** over shaft against retaining ring. Place bearing **(2)** side of thrust bearing on washer. Install ring clutch lube seal on gear in groove on spline side (See art for step 28). Lube the seal. Place gear assembly on shaft, spline into clutch stack. Remove wedge pins. Slide needle roller bearing **(3)**, inner ring **(4)**, and another needle bearing **(3)** over shaft and press down into gear **(5)** hub. Assemble thrust bearing **(7)**(smooth side toward gear), thrust bearing race (washer) **(6)**, and retaining ring **(8)** (narrow side up) onto shaft. Be sure retaining ring seats fully into groove. Press cone **(9)** onto shaft end using driver. Check to see if cone is fully seated.



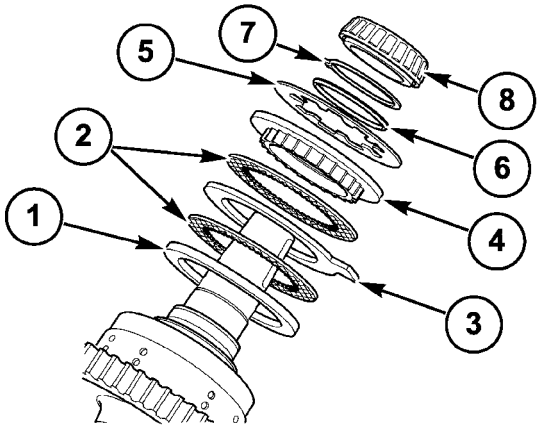
10035843A5 17

18. Dab seal grooves with petroleum jelly. Apply large seal and small seal **(1)** into indicated grooves on brake end of shaft. Make sure seals **(1)** are not twisted and are fully seated into grooves.



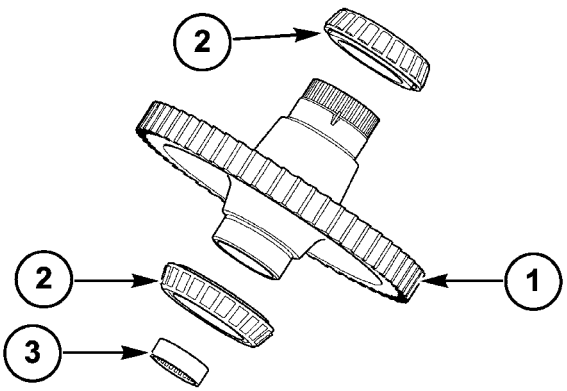
10035847A5 18

19. Place plate **(1)** on top of can, flat side up. Put a friction disk **(2)**, plate **(3)**, and another friction disk **(2)** over shaft. Carefully assemble piston **(4)** over shaft. Piston must be aligned over dowel pins and through discs and plates. When in place the ear on the middle plate will be held when pressing on top of the piston. Place return spring **(5)** over shaft, fingers up. Assemble ring **(6)** over shaft with the lip down and inserted in the spring fingers. Using the compressor tool, compress return spring **(5)** and ring **(6)**. Install retaining ring **(7)** on shaft. Be sure retaining ring is fully seated before releasing press. Assemble bearing cone **(8)** onto brake end of shaft using a driver. Check to be sure bearing is fully seated.



10035846A5 19

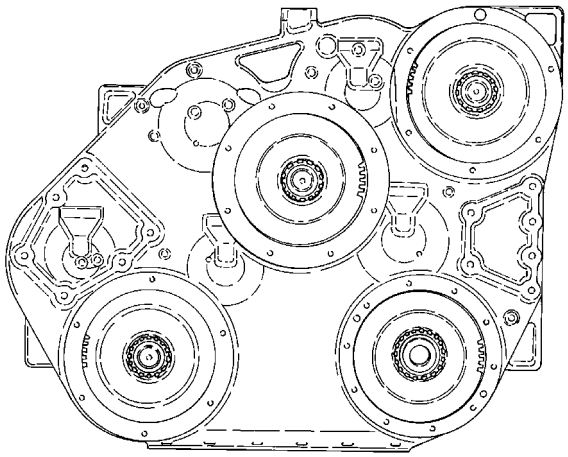
20. Sub-assemble Rotor CVT and CVT Drive Motor Gear. Press cones **(2)** onto shaft **(1)** using the appropriate driver. Check to see each cone is fully seated. Press needle bearing **(3)** assembly into shaft using driver. Must be flush with end of shaft.



10035848A5 20

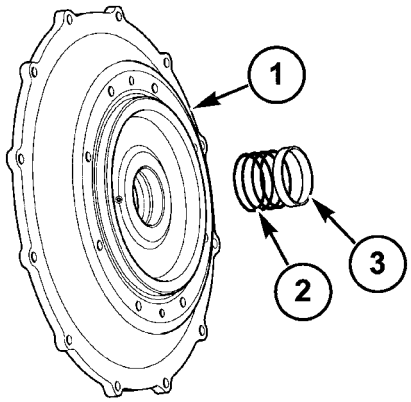
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21. To assemble the back shafts on the inboard side of the gearbox. Place the previously assembled shafts into housing subassembly as shown. Take care to get the correct shaft into the correct location. Make sure all shafts are seated into their individual cups in the housing.



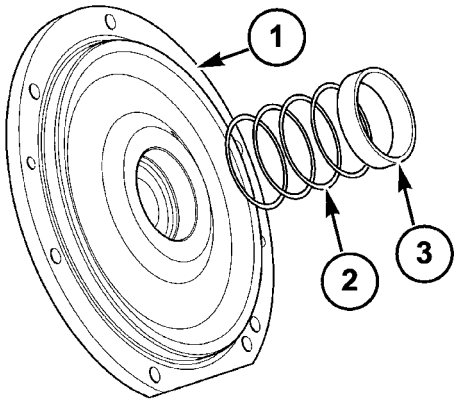
20035849 21

22. Engine Input Shaft Cover Assembly. Place bearing cup **(3)** onto shaft. Measure height of cup above cover **(1)** mounting surface. Measure depth of cup seating surface relative to cover mounting flange. Calculate required thickness of shims **(2)** to give the desired rolling torque of **0.2 - 1.2 Nm** (**2 - 11 lb in**). Press required shims **(2)** and bearing cup **(3)** into cover **(1)** using the appropriate driver. Check to be sure cup is fully seated.



10035850A5 22

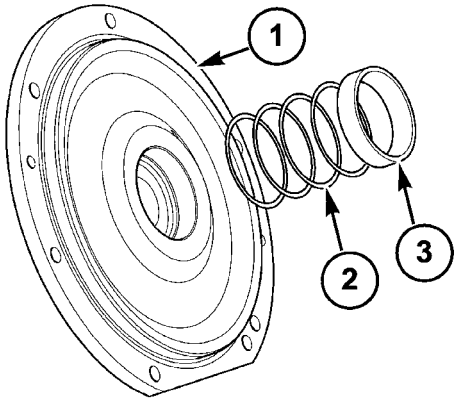
23. Separator Clutch Cover Assembly. Place bearing cup **(3)** onto lower shaft. Measure height of cup above cover **(1)** mounting surface. Measure depth of cup seating surface relative to cover mounting flange. Calculate required thickness of shims **(2)** to give the desired rolling torque of **0.2 - 1.2 Nm** (**2 - 11 lb in**). Press required shims **(2)** and bearing cup **(3)** into cover **(1)** using driver. Check to make sure cup is fully seated.



10035853A5 23

https://truckmanualshub.com/

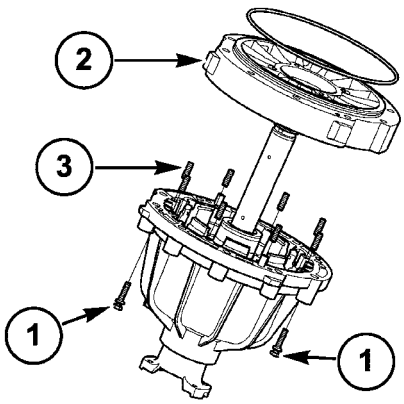
24. Unload Clutch Cover Assembly. Place bearing cup **(3)** onto upper shaft. Measure height of cup above cover **(1)** mounting surface. Measure depth of cup seating surface relative to cover mounting flange. Calculate required thickness of shims **(2)** to give a rolling torque of **0.2 - 1.2 Nm** (**2 - 11 lb in**). Press required shims **(2)** and bearing cup **(3)** into cover **(1)** using driver. Check to be sure cup is fully seated.



10035853A5 24

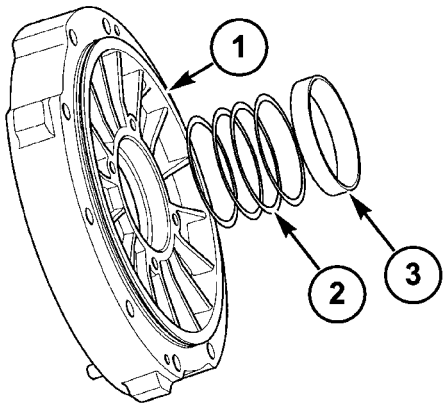
25. Rotor CVT and CVT Drive Motor (Variator) Assembly. Remove and set aside the O-ring type seal from end of variator assembly **(2)** to prevent damage. Using a 12 mm wrench remove the two small bolts **(1)** retaining the bearing flange **(2)** to assembly and set them aside. Carefully separate bearing flange **(2)** from rest of variator assembly. Clean the mating surfaces of the flange and the variator assembly.

NOTE: *Use caution there are 8 springs **(3)** trapped in the assembly by this part and they must be retained.*



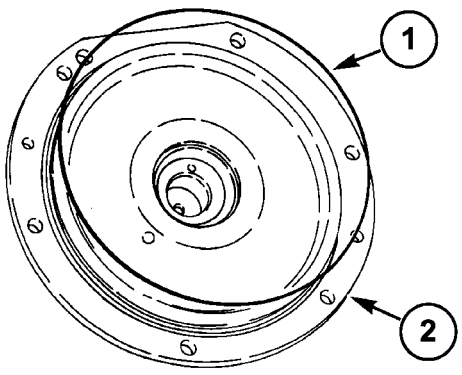
10035862A5 25

26. Place the cup **(3)** part of the bearing onto rotor drive gear assembly. Measure the height of cup above variator mounting surface **(1)**. Measure the depth of cup seating surface relative to variator mounting flange. Calculate required thickness of shims **(2)** to give the desired rolling torque of **0.2 - 1.5 Nm** (**2 - 13 lb in**). Press required shims **(2)** and bearing cup **(3)** into variator mounting flange **(1)** using a driver. Check to be sure cup is fully seated.



10035856A5 26

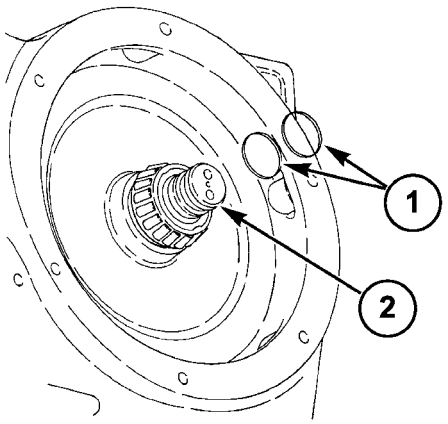
27. Place O-ring **(1)** in groove on inner face of the Unload Clutch mounting flange **(2)** and dab with Petroleum jelly to hold in place.



20035857A5 27

https://truckmanualshub.com/

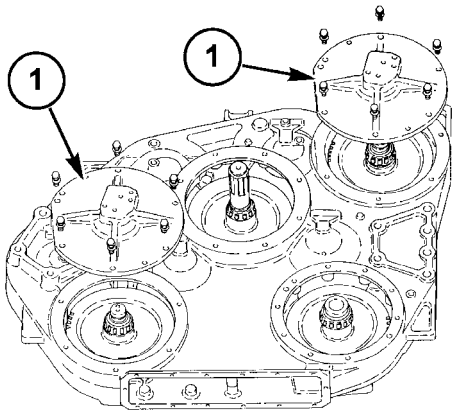
28. Place the seal **(1)** over the expander tool and slide tool over shaft C8 **(2)**. Use the tool to slide the seal off the end of the expander and verify that it goes into the groove. Remove the expander tool from the shaft and insert a spacer into the expander and repeat the step for the other seal . Liberally brush seals with petroleum jelly.



20035858A5 28

29. Repeat Steps 27 and 28 for the Separator Clutch Mounting Flange.

30. Orient flat sides of Unload Clutch and Separator Clutch mounting flanges **(1)** as shown. Place the mounting flange on shaft, being careful not to damage seals. Loosely bolt in place using six washers and bolts. Leave the bolts loose enough so the washers can still be turned. Assemble pressurizing tool to flange face using two M10 x 40 mm bolt and two M10 washers. Torque bolts to **51 - 58 Nm** (**38 - 43 lb ft**). Orient such that tool lines up with flange face.



20035859A5 29

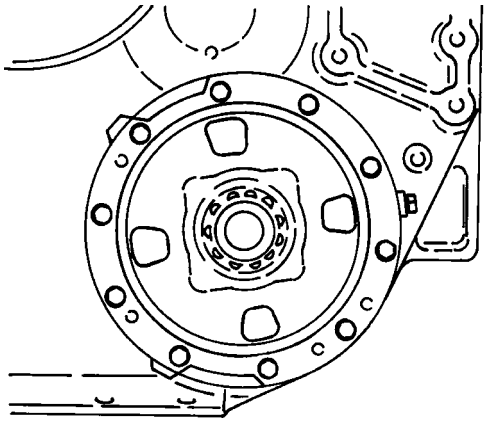
31. Thread an M12 x 35 mm bolt with an M12 washer into shaft from opposite side of assembly. Apply **20.7 bar** (**300 psi**) to tool. Check rolling torque using a tool with an 18mm socket. Note torque value. Torque the six mounting bolts to full torque value of **89 - 100 Nm** (**66 - 74 lb ft**) using an 18mm torque wrench. Recheck the rolling torque.

32. The previously noted torque value should be subtracted from the torque value lastly obtained. This is the final rolling torque. This torque value should be **0.2 - 0.9 Nm** (**2 - 8 lb in**).

33. Repeat these steps for the other shaft and mounting flange.

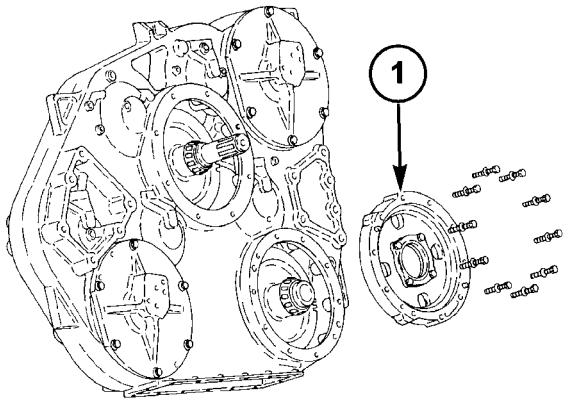
https://truckmanualshub.com/

34. Temporarily bolt variator mounting flange over variator gear hub using 10 washers and bolts. Torque bolts to **89 - 100 Nm** (**66 - 74 lb ft**) using an 18 mm torque wrench. Orient mounting flange as shown.



20035860 30

35. Rotate shaft using torque tool with gauge, and note the rolling torque value. Rolling torque should be **0.2 - 1.5 Nm** (**2 - 13 lb in**). Remove mounting flange **(1)** and set bolts aside.

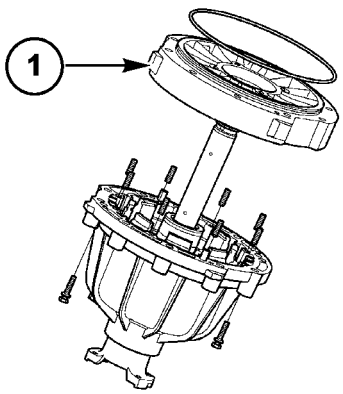


20035861A5 31

36. Assemble Input Cover. Place O-ring in groove on inner face of appropriate input cover and dab with Petroleum jelly to hold in place. Note the oil port location.

37. Bolt input cover over Engine Input shaft using 8 washers and 8 bolts. Make sure oil port is oriented to the top. Torque bolts to **89 - 100 Nm** (**66 - 74 lb ft**) using an 18 mm torque wrench. Thread an M12 bolt into the end of the shaft. Check rolling torque using a tool with an 18mm socket. Torque should be **0.2 - 1.2 Nm** (**2 - 11 lb in**). Remove M12 bolt from end of shaft and set aside. Drive shaft seal into cover using a driver and be sure it is fully seated.

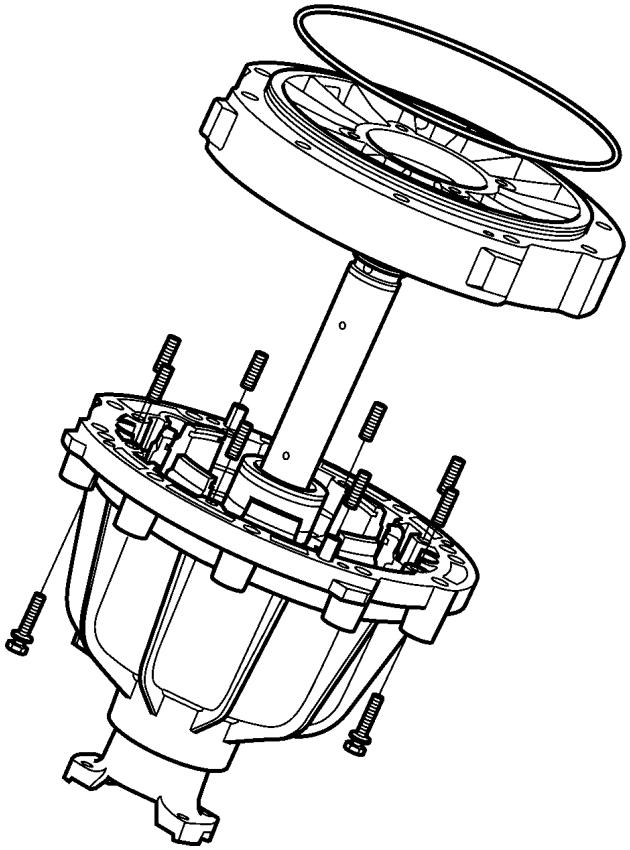
38. Rotor CVT and CVT Drive Motor Shaft seal. Remove rotor variator sleeve **(1)** that was temporarily installed. Place O-ring in groove on pilot of rotor variator sleeve assembly and dab with petroleum jelly to hold in place. Place the seal over the expander tool and slide tool over shaft C6. Start with the last groove and work your way back towards the end of the shaft. Using a tool resize all three seals. Liberally brush seals with petroleum jelly.



10035855A5 32

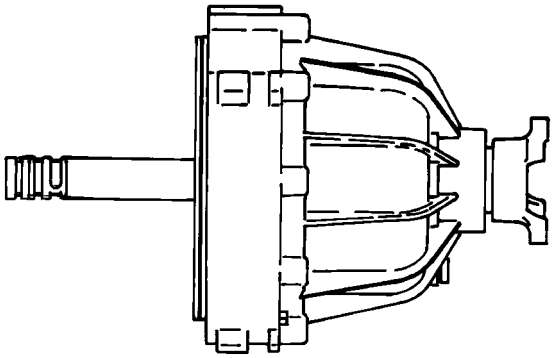
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39. Replace the sleeve assembly carefully so you do not damage seals or O-ring. Use the same bolts and washers removed and torque to **89 - 100 Nm** (**66 - 74 lb ft**) with an 18mm torque wrench.



10035862 33

40. Install lip seal over Unload Clutch shaft and seat into place using a driver. Repeat for Separator Clutch shaft.

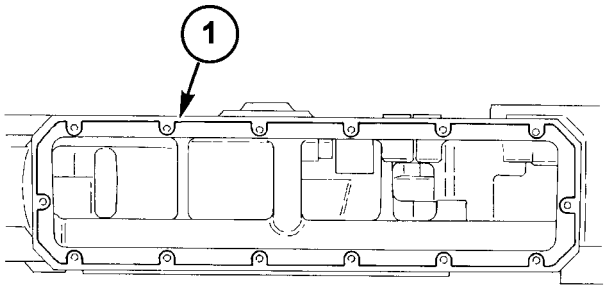


20035864 34

41. Assemble mounting flanges. Place O-ring on flange and dab with petroleum jelly to stay in place. Bolt the flange to the housing using the correct hardware. Torque all bolts to **89 - 100 Nm** (**66 - 74 lb ft**) using an 18 mm torque wrench.

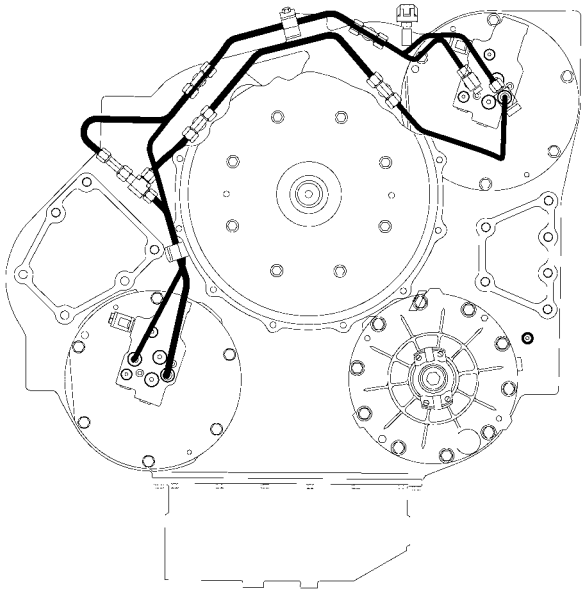
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42. Assemble PTO pan to housing. Clean both mating surfaces. Apply a unbroken bead **(1)** of Loctite 515 to bottom flange of PTO housing as shown. The bead must be held close to outside edges and as close to the bolt holes as possible.



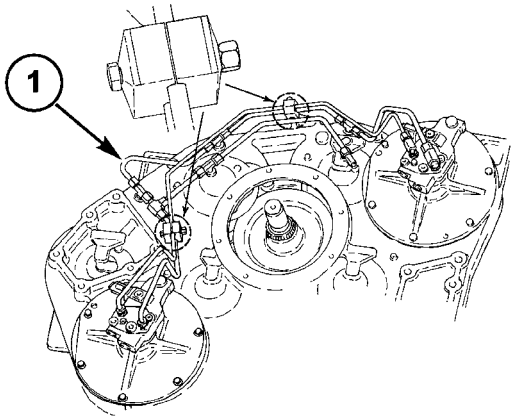
20035882A5 35

43. Loose assemble the lube oil lines onto the gearbox to get them aligned. Once they are routed correctly torque the tube nuts to **43 - 47 Nm** (**32 - 35 lb ft**) using a 24mm open end torque wrench. Torque the lock nuts on the tee to **45 - 49 Nm** (**33 - 36 lb ft**) using a 19mm open end torque wrench. Hold the tee body with a 30mm open end wrench while torquing to prevent tube damage.



50040394 36

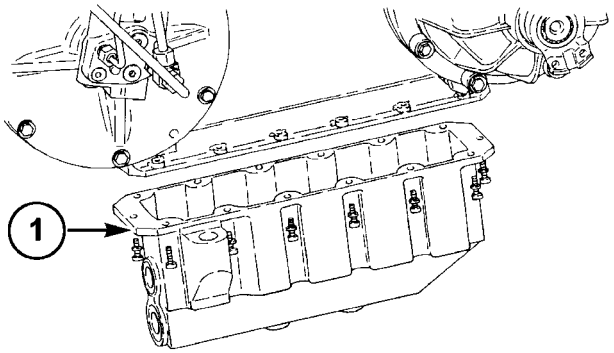
44. Add ISO mounts **(1)** to lube lines. Torque bolts to **24 - 26 Nm** (**18 - 19 lb ft**).



20035872A5 37

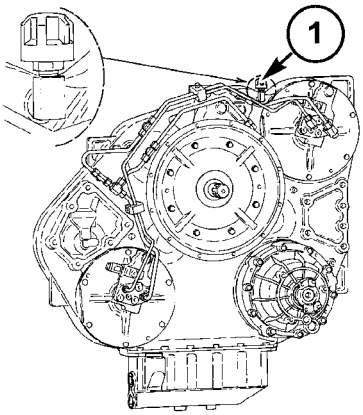
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45. Carefully place the pan **(1)** onto the PTO housing as shown using 14 bolts and 13 washers. The bolt next to the dipstick boss does not get a washer. Torque all bolts to **26 - 29 Nm** (**19 - 21 lb ft**) using a 13mm torque wrench.



20035883A5 38

46. Assemble breather **(1)** to PTO assembly. Apply sealant Loctite 592 to the threads on elbow. Screw elbow into port indicated. Torque with a 3/4 inch wrench to **20 - 27 Nm** (**15 - 20 lb ft**). Be sure elbow is oriented with open port facing up after being torqued. Thread breather into elbow and torque to **20 - 27 Nm** (**15 - 20 lb ft**) using a 20 mm open end torque wrench.



20035884A5 39

https://truckmanualshub.com/

Index

POWER TRAIN - C

POWER COUPLING Fixed coupling - 10.B

PTO drive - Assemble (C.10.B.42 - F.10.A.20) 10
AFX8010

PTO drive - Disassemble (C.10.B.42 - F.10.A.25) 6
AFX8010

PTO drive - Overview (C.10.B.42 - C.10.A.10) 3
AFX8010

PTO drive - Place on stand (C.10.B.42 - F.35.A.10) 4
AFX8010

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POWER TRAIN - C

TRANSMISSION Mechanical - 20.B

AFX8010

https://truckmanualshub.com/

Contents

POWER TRAIN - C

TRANSMISSION Mechanical - 20.B

TECHNICAL DATA

TRANSMISSION Mechanical - Torque (C.20.B - D.20.A.10) 5
AFX8010

TRANSMISSION Mechanical - General specification (C.20.B - D.40.A.10) 5
AFX8010

TRANSMISSION Mechanical - Special tools (C.20.B - D.20.A.40) 6
AFX8010

FUNCTIONAL DATA

TRANSMISSION Mechanical - Overview (C.20.B - C.10.A.10) 7
AFX8010

Transmission command

Transmission command - Sectional view (C.20.B.05 - C.10.A.30) 8
AFX8010

Transmission command - Exploded view (C.20.B.05 - C.10.A.20) 9
AFX8010

Transmission command - Detailed view (C.20.B.05 - C.10.A.50) 10
AFX8010

Shaft

Shaft - Sectional view (C.20.B.43 - C.10.A.30) 11
AFX8010

Shaft - Exploded view (C.20.B.43 - C.10.A.20) 13
AFX8010

Shaft - Overview (C.20.B.43 - C.10.A.10) 15
AFX8010

Differential

Differential - Sectional view (C.20.B.50 - C.10.A.30) 17
AFX8010

Differential - Exploded view (C.20.B.50 - C.10.A.20) 18
AFX8010

Electrical motor

Electrical motor - Overview (C.20.B.82 - C.10.A.10) 20
AFX8010

Electrical motor - Dynamic description (C.20.B.82 - C.30.A.10) 21
AFX8010

Sensing system

Sensing system Ground speed sensor - Overview (C.20.B.95.80 - C.10.A.10) 23
AFX8010

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10) 24
AFX8010

https://truckmanualshub.com/

SERVICE

TRANSMISSION Mechanical - Remove (C.20.B - F.10.A.10) 26
AFX8010

TRANSMISSION Mechanical - Disassemble (C.20.B - F.10.A.25) 29
AFX8010

TRANSMISSION Mechanical - Assemble (C.20.B - F.10.A.20) 30
AFX8010

TRANSMISSION Mechanical - Install (C.20.B - F.10.A.15) 31
AFX8010

Transmission command

Transmission command - Remove (C.20.B.05 - F.10.A.10) 34
AFX8010

Transmission command - Install (C.20.B.05 - F.10.A.15) 37
AFX8010

Shaft

Shaft - Remove (C.20.B.43 - F.10.A.10) 40
AFX8010

Shaft - Install (C.20.B.43 - F.10.A.15) 44
AFX8010

Shaft - Disassemble (C.20.B.43 - F.10.A.25) 49
AFX8010

Shaft - Assemble (C.20.B.43 - F.10.A.20) 53
AFX8010

Differential

Differential - Remove (C.20.B.50 - F.10.A.10) 56
AFX8010

Differential - Disassemble (C.20.B.50 - F.10.A.25) 59
AFX8010

Differential - Assemble (C.20.B.50 - F.10.A.20) 61
AFX8010

Differential - Install (C.20.B.50 - F.10.A.15) 63
AFX8010

Differential lock command

Differential lock command - Overhaul (C.20.B.51 - F.10.A.40) 66
AFX8010

Fork and shift rail

Fork and shift rail - Remove (C.20.B.56 - F.10.A.10) 68
AFX8010

Fork and shift rail - Install (C.20.B.56 - F.10.A.15) 69
AFX8010

Housing

Housing - Disassemble (C.20.B.74 - F.10.A.25) 70
AFX8010

Housing - Assemble (C.20.B.74 - F.10.A.20) 71
AFX8010

DIAGNOSTIC

Electrical motor

Electrical motor - Short circuit (C.20.B.82 - G.30.B.52) 72
AFX8010

Electrical motor - Unidentified failure (C.20.B.82 - G.30.B.46) 78
AFX8010

Sensing system

Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 84
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 89
AFX8010
Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 94
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 100
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 105
AFX8010
Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 110
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 116
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 121
AFX8010
Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 126
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 132
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 137
AFX8010
Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 142
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 148
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 153
AFX8010
Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 158
AFX8010
Sensing system Ground speed sensor - Short circuit to B+ (C.20.B.95.80 - G.30.B.54) 164
AFX8010
Sensing system Ground speed sensor - Short circuit to ground (C.20.B.95.80 - G.30.B.53) 169
AFX8010
Sensing system Ground speed sensor - Open circuit (C.20.B.95.80 - G.30.B.50) 174
AFX8010

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TRANSMISSION Mechanical - Torque (C.20.B - D.20.A.10)

AFX8010

TIGHTENING TORQUES

Nut on drive shaft	**150 - 170 Nm** (**111 - 125 lb ft**)
Nut on input shaft	**150 - 170 Nm** (**111 - 125 lb ft**)
Shifting disc fixation nut	**25 - 30 Nm** (**19 - 22 lb ft**)
Nut on indicator plate	**8 - 12 Nm** (**71 - 106 lb in**)
Micro Switch Bar Bolts	**4 - 6 Nm** (**3 - 4 lb ft**)
Shifting Disc Shaft Castle Head Lock Nut	**25 Nm** (**18 lb ft**)
Top cover bolts.	**45 - 55 Nm** (**33 - 41 lb ft**)
Sensor	**4 - 6 Nm** (**3 - 4 lb ft**)
Drain Plug	**90 - 110 Nm** (**66 - 81 lb ft**)
Breather	**90 - 110 Nm** (**66 - 81 lb ft**)
Differential Lock Lever Plug	**45 - 55 Nm** (**33 - 41 lb ft**)

TRANSMISSION Mechanical - General specification (C.20.B - D.40.A.10)

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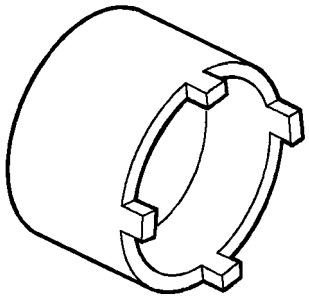
Specifications

Differential ratio	20/61
Differential lock	Yes/No
Gear ratio	
1st gear ratio	18/58
2nd gear ratio	35/62
3rd gear ratio	45/61
4th gear ratio	63/44
Max. input rpm (high idle)	**2752 RPM**
Max. input rpm (full load)	**2752 RPM**
Max. input torque	**823 Nm (607 lb ft)**
Max. output rpm (high idle)	**1292 RPM**
Max. output torque (1st gear)	**7378 Nm (5441 lb ft.)**
Max. power (motor - transmission input)	**221 kW (296 Hp)**
Brake disc diam.	**400 mm** (**15.7 in**)
Approx. total weight	**420 kg (926 lb)**

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TRANSMISSION Mechanical - Special tools (C.20.B - D.20.A.40)

AFX8010



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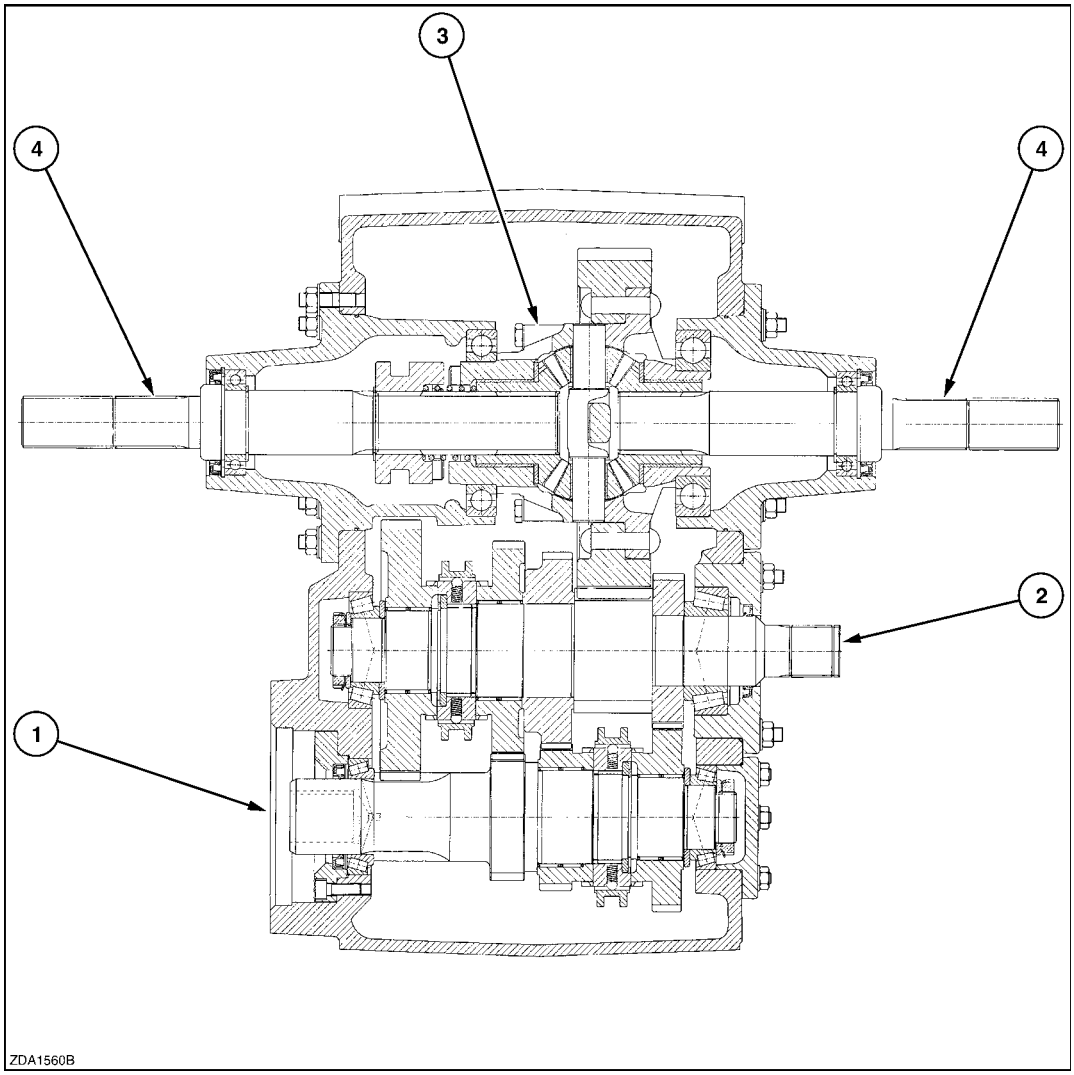
Locknut socket (45 mm)

Required for shaft disassembly. **380001074**

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TRANSMISSION Mechanical - Overview (C.20.B - C.10.A.10)

AFX8010



1560b 1

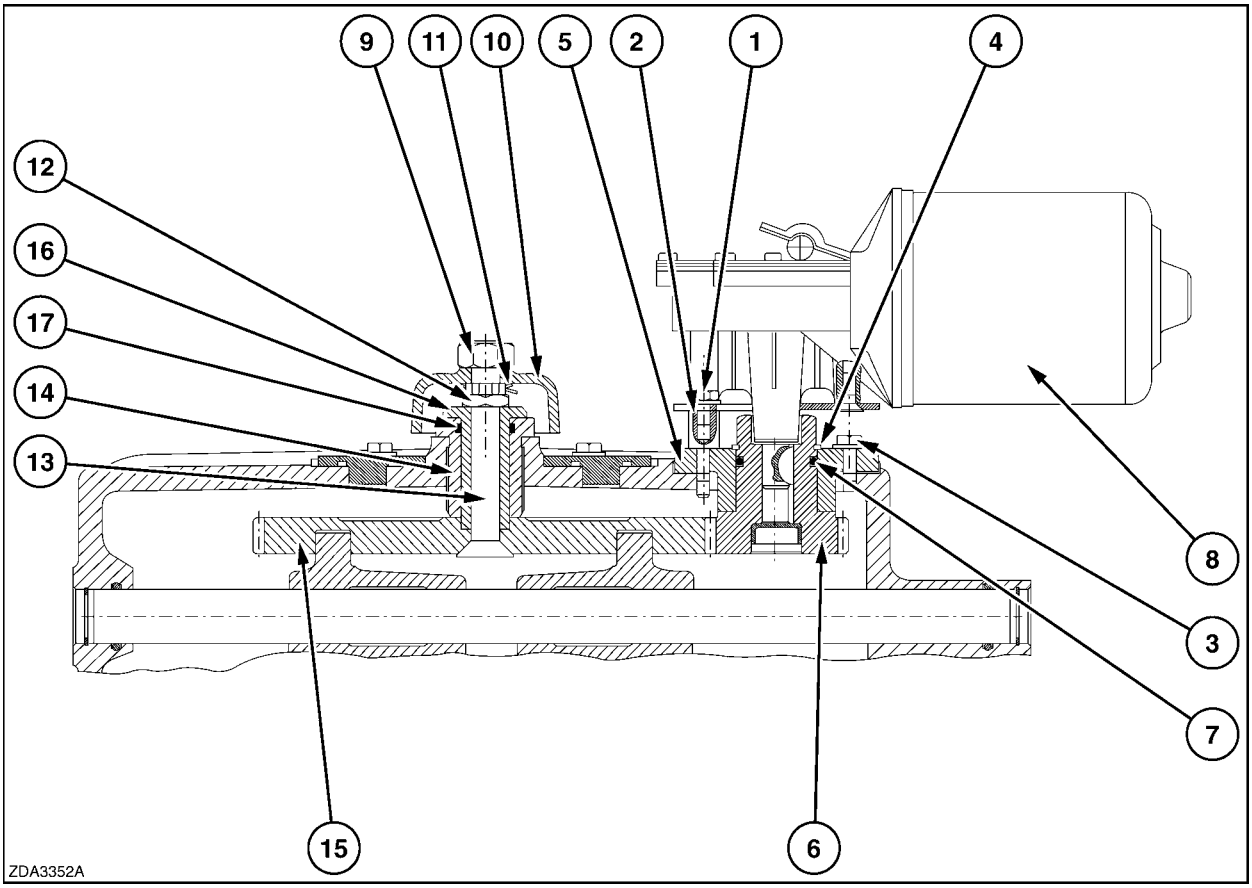
Shafts

1.Input Shaft	2.Drive Shaft	3.Differential	4.Differential Shafts

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Transmission command - Sectional view (C.20.B.05 - C.10.A.30)

AFX8010



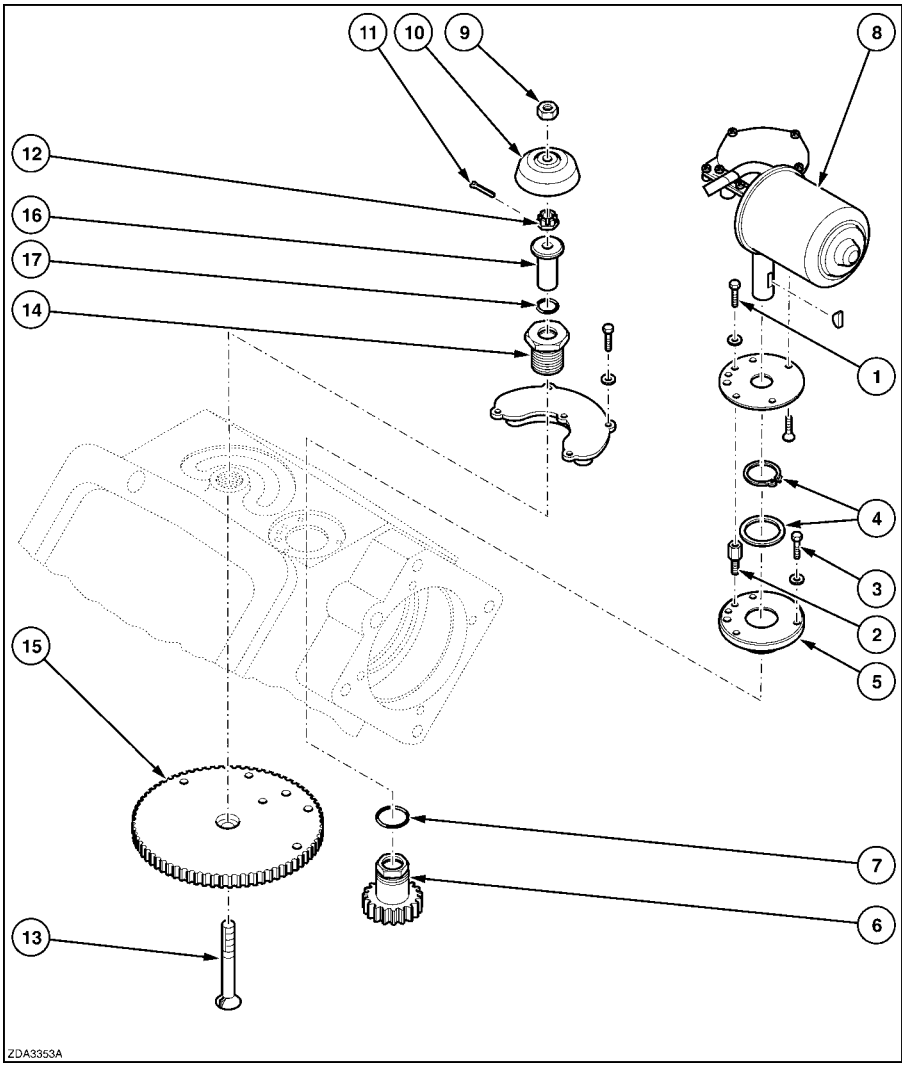
3352a 1

1.Bolt	10.Indicator Plate
2.Special Bolt	11.Cotter Pin
3.Bolt	12.Nut
4.Friction Ring and Circlip	13.Bolt
5.Housing	14.Shifting Disc Housing
6.Shifting Drive Gear	15.Shifting Disc
7.O-Ring	16.Bushing
8.Electric Motor	17.O-Ring
9.Nut	.

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Transmission command - Exploded view (C.20.B.05 - C.10.A.20)

AFX8010



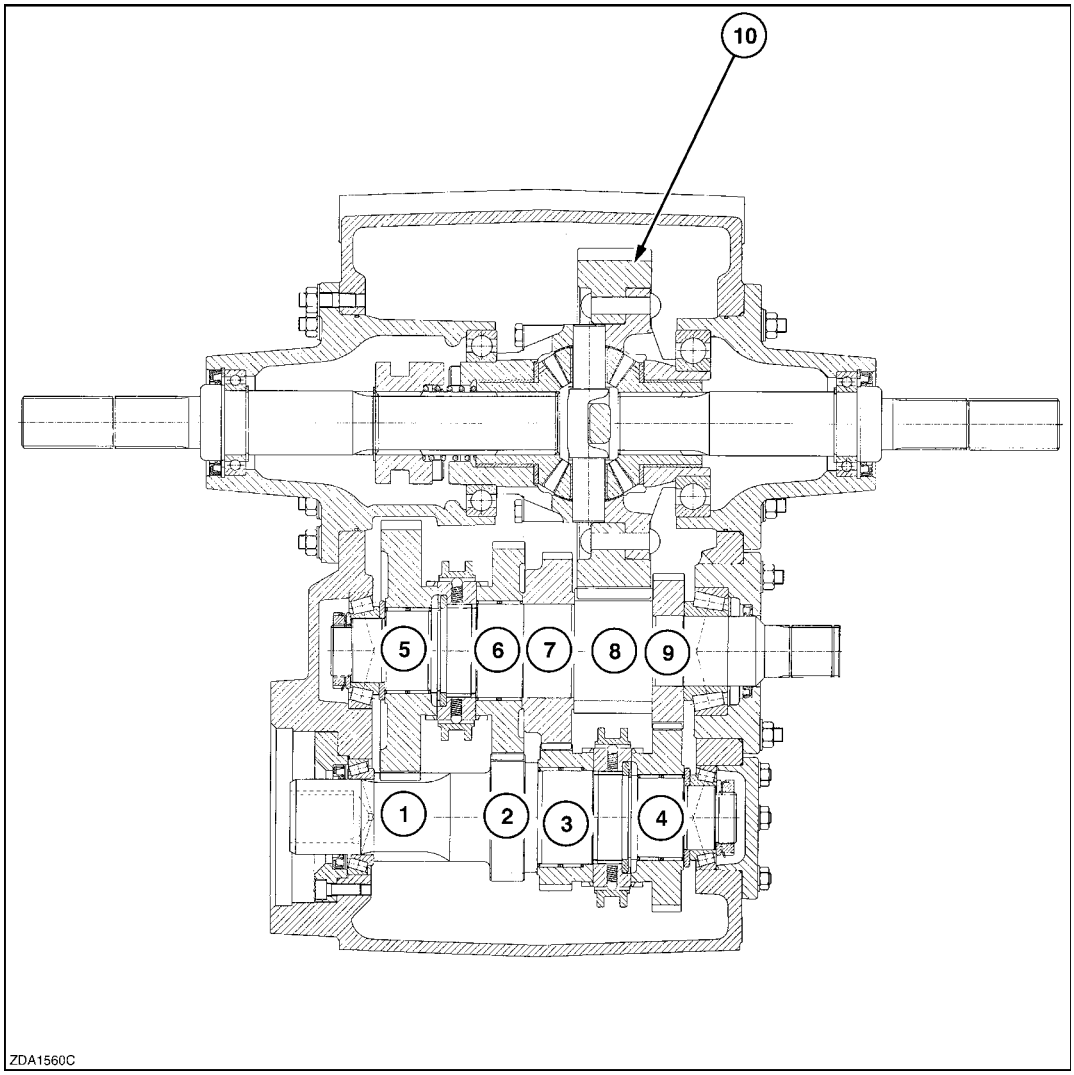
3353a 1

1.Bolt	10.Indicator Plate
2.Special Bolt	11.Cotter Pin
3.Bolt	12.Nut
4.Friction Ring and Retaining Ring	13.Bolt
5.Housing	14.Shifting Disc Housing
6.Shifting Drive Gear	15.Shifting Disc
7.O-ring	16.Bushing
8.Electric Motor	17.O-ring
9.Nut	

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Transmission command - Detailed view (C.20.B.05 - C.10.A.50)

AFX8010



1560c 1

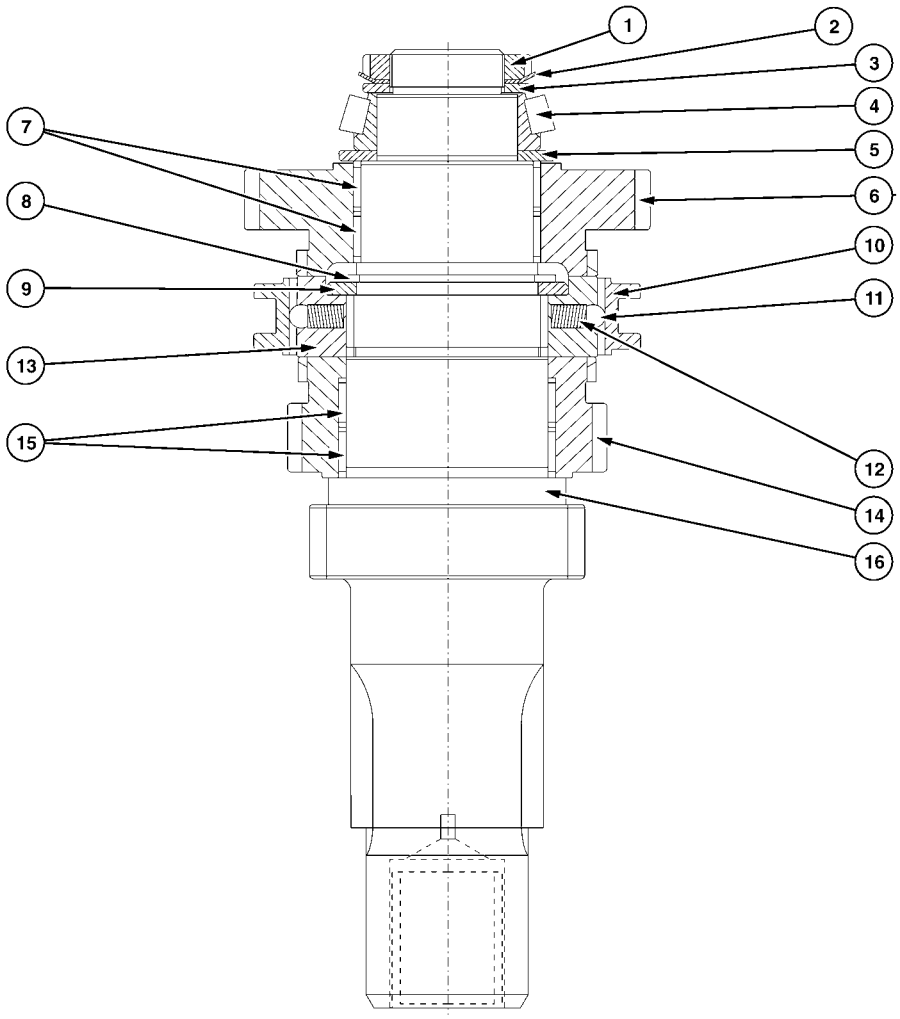
Gears Selection

First Gear : 1 - 5 - 8 - 10	Third. Gear : 3 - 7 - 8 - 10
Second Gear : 2 - 6 - 8 - 10	Fourth Gear : 4 - 9 - 8 - 10

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Shaft - Sectional view (C.20.B.43 - C.10.A.30)

AFX8010

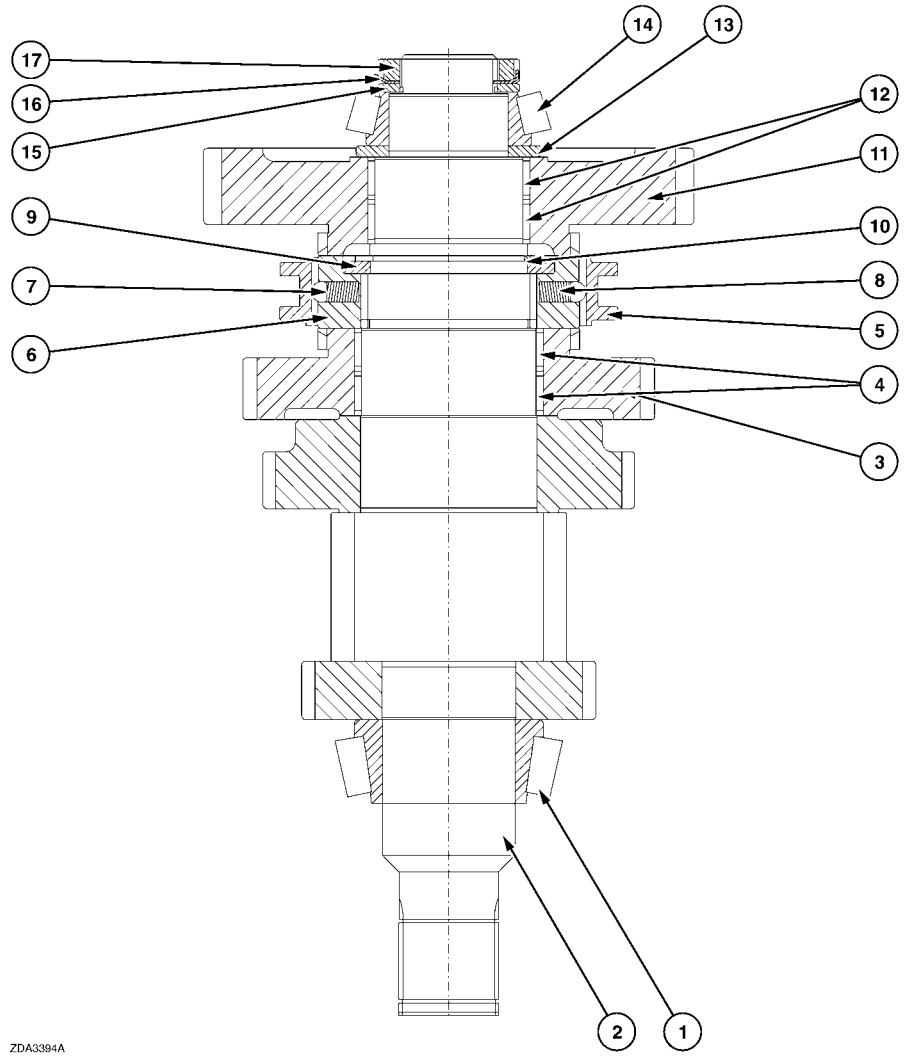


3404a 1

Input Shaft

1.Nut	9.Washer
2.Lockwasher	10.Selector Ring
3.Washer	11.Ball
4.Bearing	12.Spring
5.Washer	13.Selector Housing
6.Gear	14.Gear
7.Needle Bearing	15.Needle Bearing
8.Retaining Ring	16.Input Shaft

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3394a 2

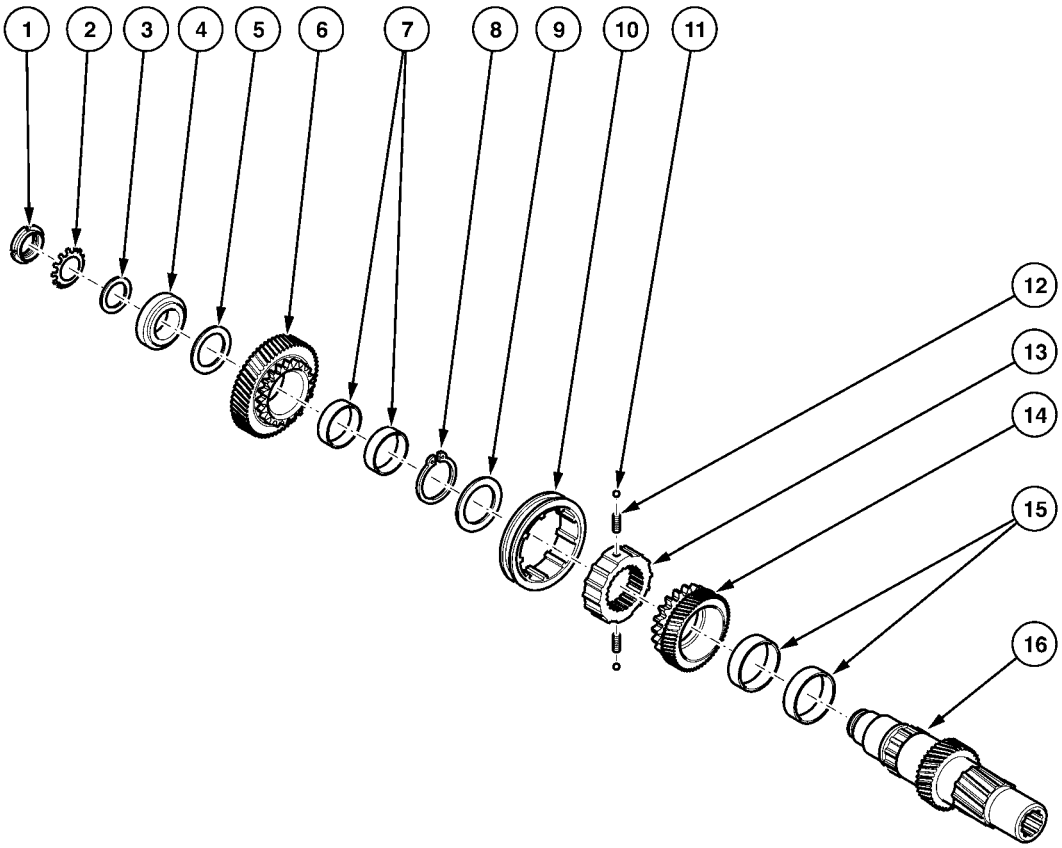
Drive Shaft

1.Bearing	10.Retaining Ring
2.Drive Shaft	11.Gear
3.Gear	12.Needle Bearings
4.Needle Bearings	13.Washer
5.Selector Ring	14.Bearing
6.Selector Housing	15.Washer
7.Spring	16.Lock Washer
8.Ball	17.Nut
9.Washer	

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Shaft - Exploded view (C.20.B.43 - C.10.A.20)

AFX8010



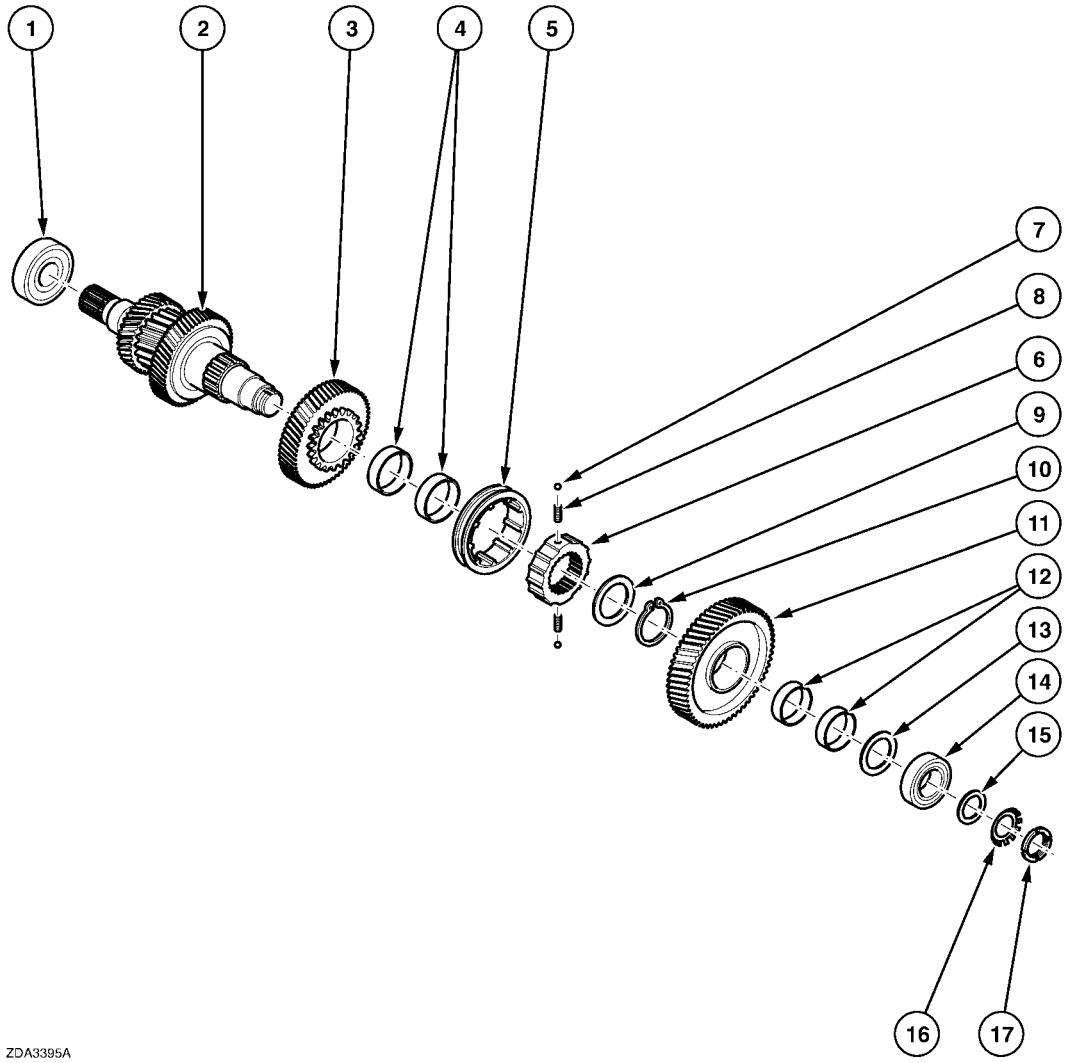
ZDA3405A

3405a 1

Input Shaft

1.Nut	9.Washer
2.Lockwasher	10.Selector Ring
3.Washer	11.Ball
4.Bearing	12.Spring
5.Washer	13.Selector Housing
6.Gear	14.Gear
7.Needle Bearing	15.Needle Bearing
8.Retaining Ring	16.Input Shaft

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3395a 2

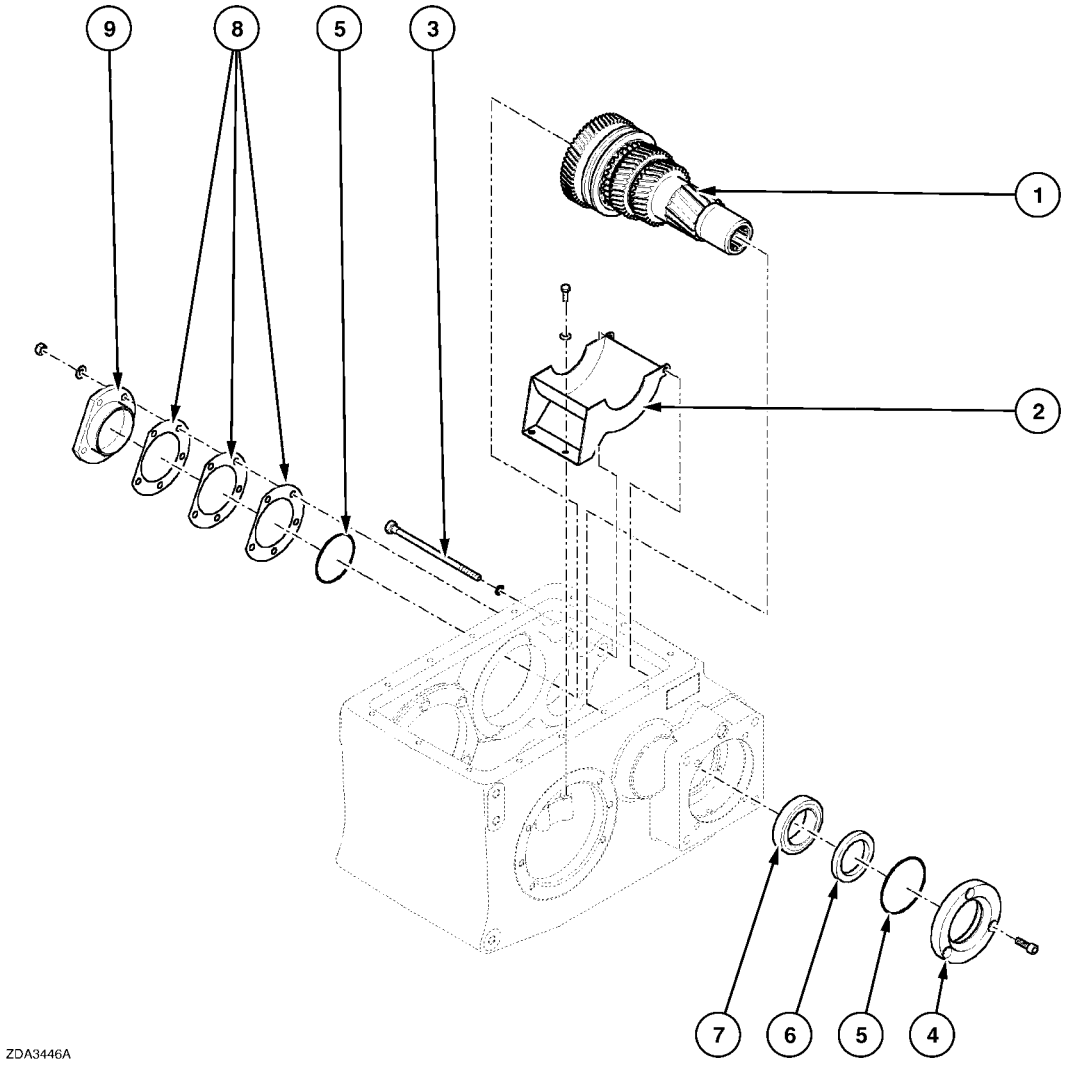
Drive Shaft

1.Bearing	10.Retaining Ring
2.Drive Shaft	11.Gear
3.Gear	12.Needle Bearings
4.Needle Bearings	13.Washer
5.Selector Ring	14.Bearing
6.Selector Housing	15.Washer
7.Spring	16.Lock Washer
8.Ball	17.Nut
9.Washer	

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Shaft - Overview (C.20.B.43 - C.10.A.10)

AFX8010

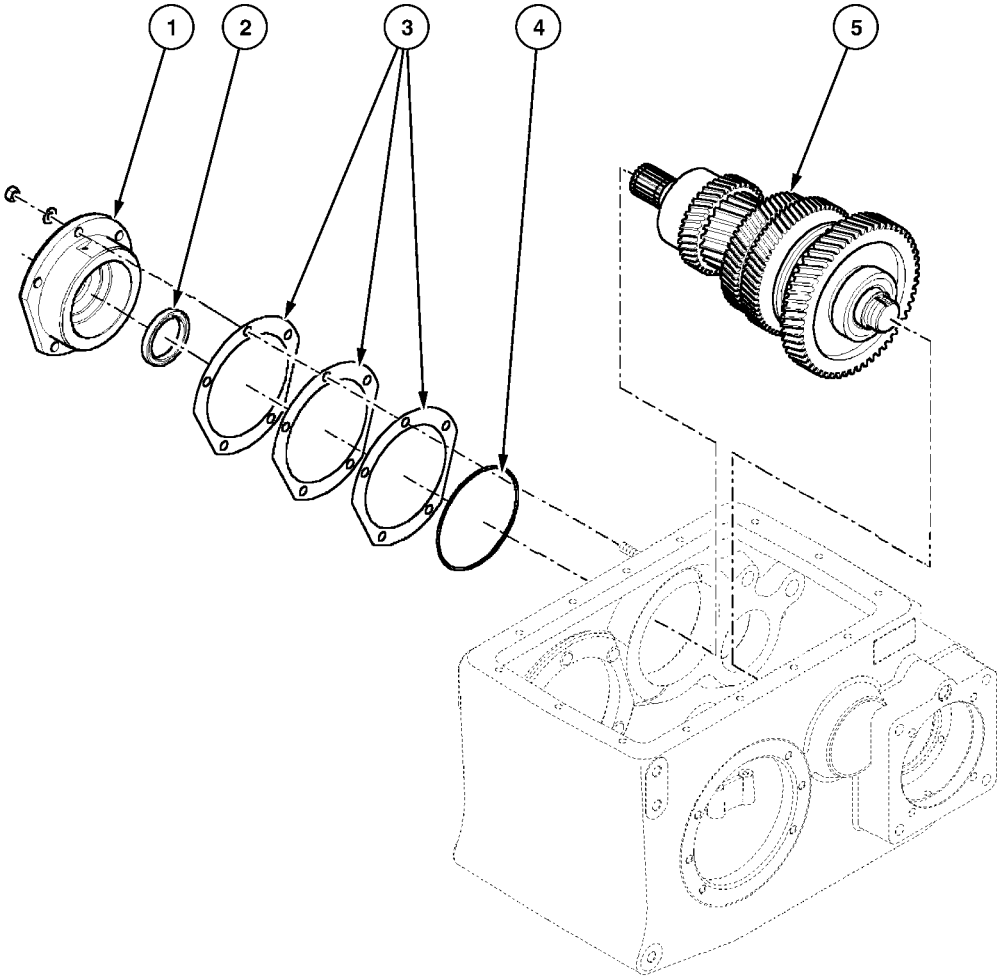


3446a 1

Input Shaft

1.Input Shaft	6.Seal
2.Oil Baffle Plate	7.Bearing
3.Threaded Shaft	8.Shims
4.Housing	9.Cover
5.O-ring	

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ZDA3447A

3447a 2

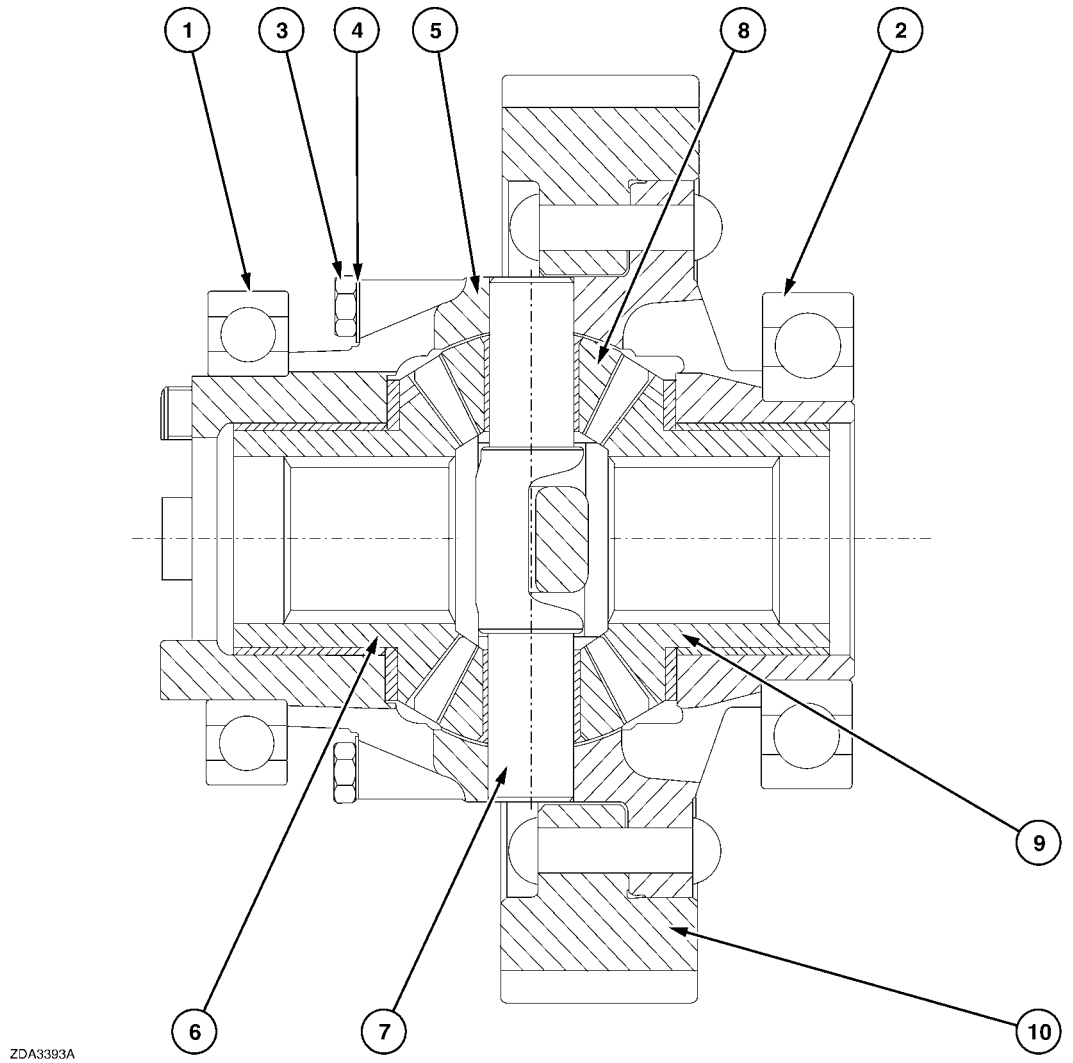
Drive Shaft

1.Cover
2.Seal
3.Shim pack
4.O-ring
5.Drive Shaft

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Differential - Sectional view (C.20.B.50 - C.10.A.30)

AFX8010



3393a 1

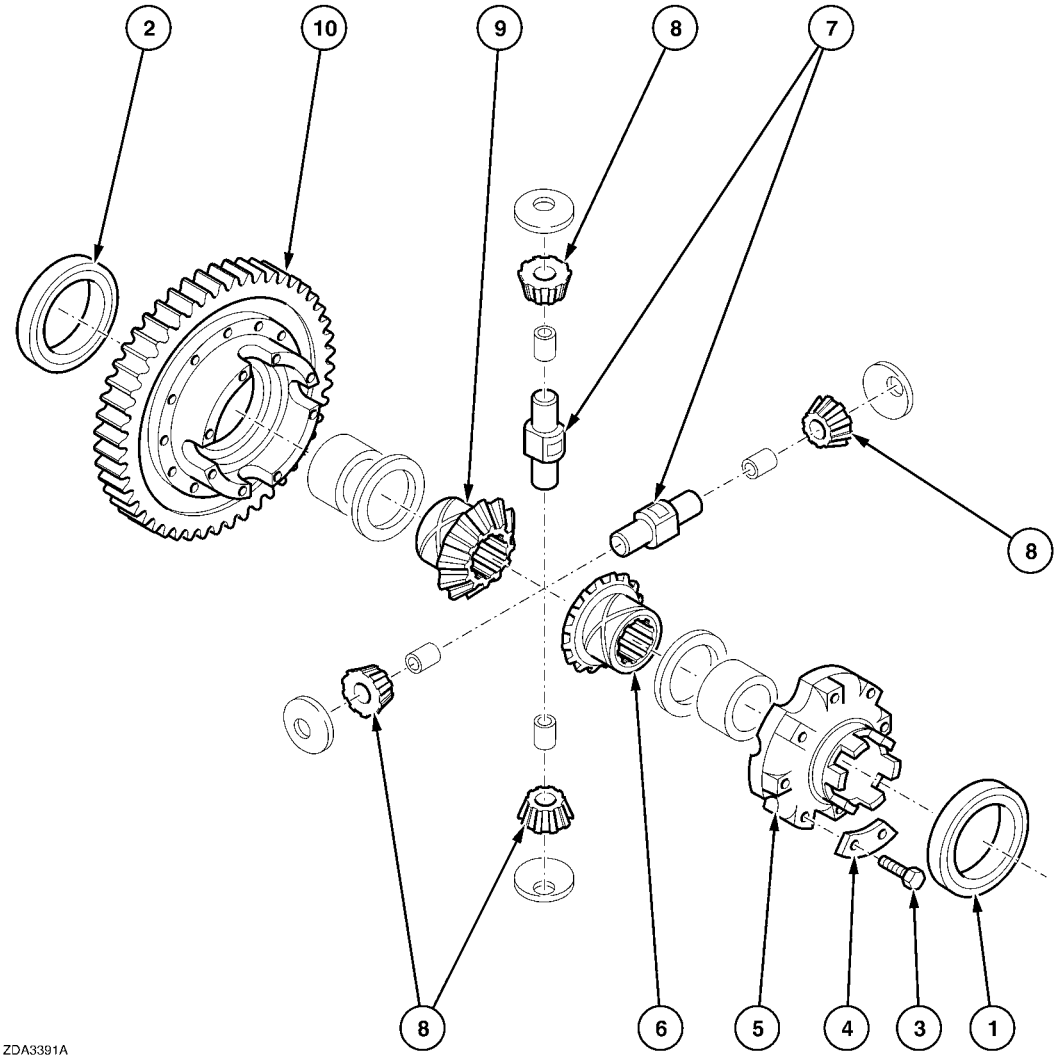
Differential

1.Bearing	6.Differential Output Gear
2.Bearing	7.Planet Gear Shaft
3.Bolt	8.Planet Gear
4.Lockplate	9.Differential Output Gear
5.Differential Housing	10.Ring Gear

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Differential - Exploded view (C.20.B.50 - C.10.A.20)

AFX8010

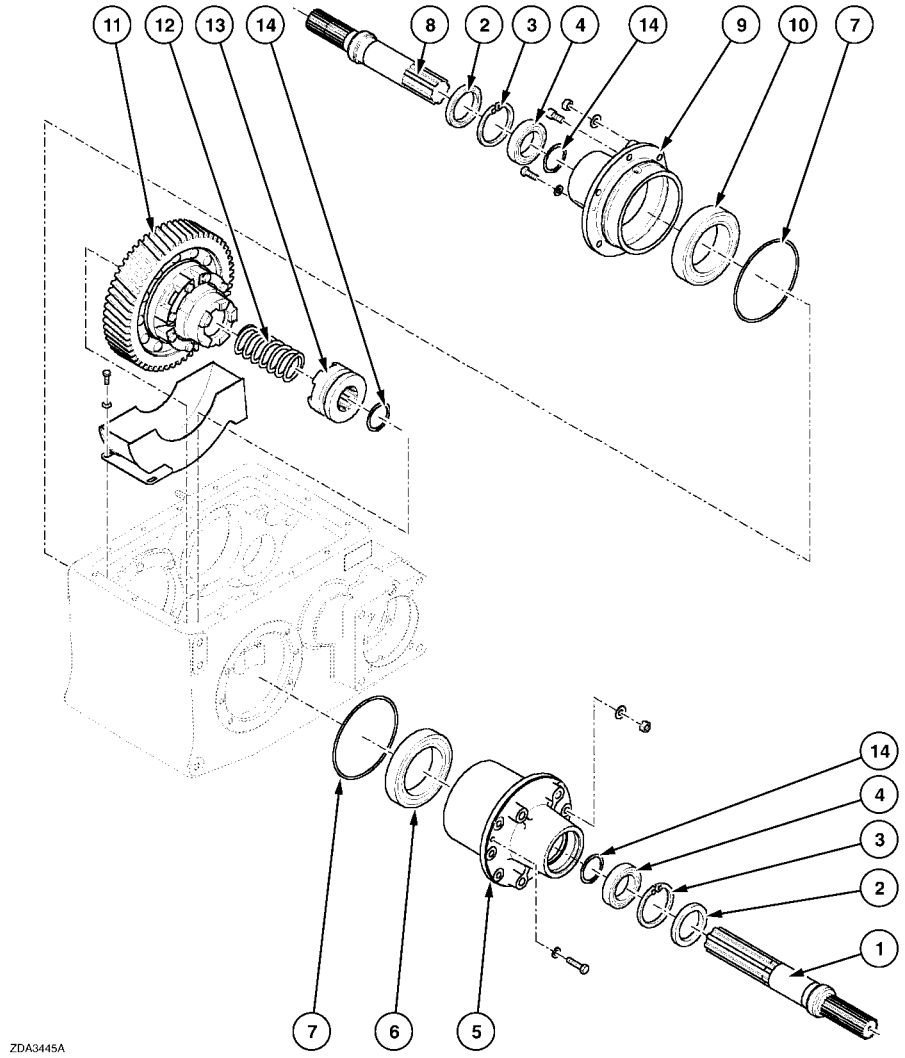


3391a 1

Differential

1.Bearing	6.Differential Output Gear
2.Bearing	7.Planet Gear Shaft
3.Bolt	8.Planet Gear
4.Lockplate	9.Differential Output Gear
5.Differential Housing	10.Ring Gear

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3445a 2

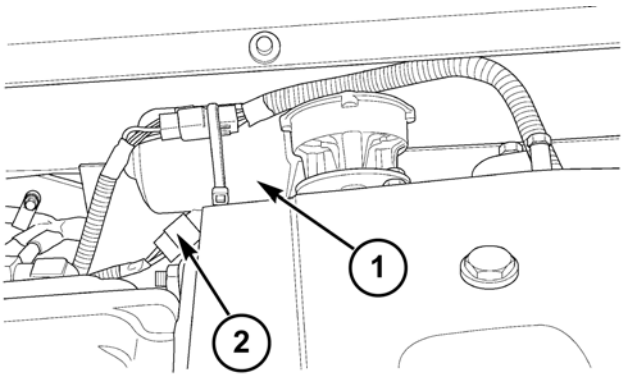
Differential shafts and Housings

1. Differential Shaft	8. Differential Shaft
2. Seal	9. Housing
3. Retaining Ring	10. Bearing
4. Bearing	11. Differential
5. Housing	12. Spring
6. Bearing	13. Differential Lock
7. O-ring	14. Retaining Ring

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Electrical motor - Overview (C.20.B.82 - C.10.A.10)

AFX8010



10004664B4 1

The transmission shift motor M-02 **(1)** is located on the top left rear corner of the transmission. The motor is mounted to a right angle drive gearbox, and drives a gear inside the transmission to rotate the shifting disc that controls the movement of the shift forks. The transmission shift motor M-02 is connected (**X094**) to the lower frame (LF) harness at **(2)**, and is controlled by the CCM2 module through connector **X017** as follows:

Transmission shift motor function	Pin number at CCM1 connector X017
Up-shifting	J3-19, J3-20 = power; J3-39, J3-40 = ground
Down-shifting	J3-39, J3-40 = power; J3-19, J3-20 = ground

The CCM2 module uses two pairs of pins to send current to the transmission shift motor using an H-bridge controlled circuit, which reverses the power and ground connections to the transmission shift motor in order to move it in either direction. The CCM2 module monitors both sides of the circuit during operation; in the event that a fault occurs with the motor or wiring, a fault code will be displayed to the operator.

E0171-06 - Transmission Shift Current Sense

E0203-11 - Transmission Shift Motor

For additional information on the gear shifting process, refer to: **Electrical motor - Dynamic description (C.20.B.82 - C.30.A.10)**.

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Electrical motor - Dynamic description (C.20.B.82 - C.30.A.10)

AFX8010

In order to change the operating gear within the mechanical transmission, the operator rotates the gear select switch S-24 on the right hand console to the desired transmission gear; gear positions 1, 2, N, 3 and 4 are possible. The gear select switch may be rotated at anytime whether in motion or parked, however, the actual gear shifting will not start until the propulsion handle is moved to the neutral position (to disable the hydrostatic driveline), and the combine stops forward or rearward travel.

The following sequence of events occurs after the combine travel stops:

- The park brake starts to be applied. The park brake LED on the shaft speed monitor will flash until the park brake is applied. The park brake LED will remain lit for the duration of the shift sequence.
- The pressure release solenoid L-05 in the hydrostat motor is activated to equalize the hydraulic pressure to release any load on the transmission gears. (For more information on the pressure release valve, refer to: **Pressure release valve - Overview (C.20.F.17 - C.10.A.10)**).
- The transmission shift motor M-02 will begin to turn in the appropriate direction. (For more information on the transmission shift motor, refer to: **Electrical motor - Overview (C.20.B.82 - C.10.A.10)**).
- When the selected gear is engaged, as sensed by the transmission shift position sensor B-37, the transmission shift motor M-02 will stop rotating, and the pressure release solenoid L-05 is deactivated. (For more information on the shift position sensor, refer to: **Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)**).
- The park brake will start to release.
- The hydrostatic driveline will be enabled and driving can resume. This will be confirmed when the park brake LED on the shaft speed monitor is no longer illuminated.

NOTE: *If the park brake switch S-09 is engaged before shifting, the park brake will remain on after shifting is completed. The park brake must then be manually released using the park brake switch S-09.*
The currently selected gear, as detected by the shift position sensor B-37, will be displayed in the top right corner of the Universal Display Plus when the gear shifting sequence is completed.
When the desired gear can not be engaged because of either a mechanical reason, or due to failure of the shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
In the event of a problem with the gear shifting sequence, an alarm message should alert the operator as to the possible cause of the problem.

Alarm Code	Description	Priority	Activation	Resetting
A0080	Gearshift Not Successful => Return To Previous Gear	2 - Prompt	Not able to shift to selected gear (shift position sensor B-37 has not seen next gear within 6 seconds).	Selected gear found
A0097	Stop Before Shifting Gears	2 - Prompt	Attempting to shift transmission when ground speed is not zero. (Shifting disabled)	When ground speed equals zero, shifting is enabled.
A0098	Move Propulsion Handle to Neutral	2 - Prompt	Propulsion handle out of neutral AND attempting to shift transmission (Shifting disabled).	When propulsion handle is in neutral, shifting is enabled.

In the event of an electrical system fault, a fault code will alert the operator as to the source of the concern. The following fault codes must be resolved before any other troubleshooting is performed.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor

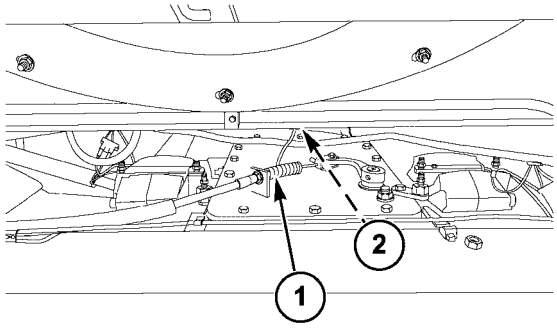
https://truckmanualshub.com/

E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor
E0171-06 - Transmission Shift Current Sense

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Sensing system Ground speed sensor - Overview (C.20.B.95.80 - C.10.A.10)

AFX8010



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The ground speed sensor B-17 **(1)** is located on the top cover of the transmission, positioned above the differential ring gear. The sensor is connected (**X087**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** pin J3-14. The ground speed sensor B-17 circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

E0142-03 - Ground Speed Sensor
E0142-04 - Ground Speed Sensor
E0142-05 - Ground Speed Sensor

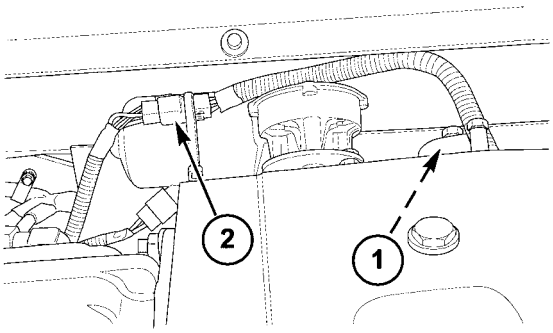
The input from the ground speed sensor B-17 supports several functions, such as:

- ground speed readout on display.
- prevents activation of the transmission shift motor M-02 when the value from the sensor is above the threshold value. This avoids gear shifting when the gearbox has components that are in motion.
- automatic reel speed synchronization with ground speed.
- automatic feeder speed synchronization with ground speed.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)

AFX8010



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

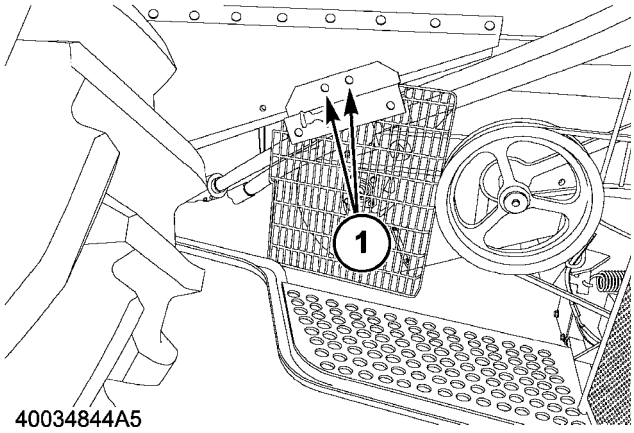
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TRANSMISSION Mechanical - Remove (C.20.B - F.10.A.10)

AFX8010

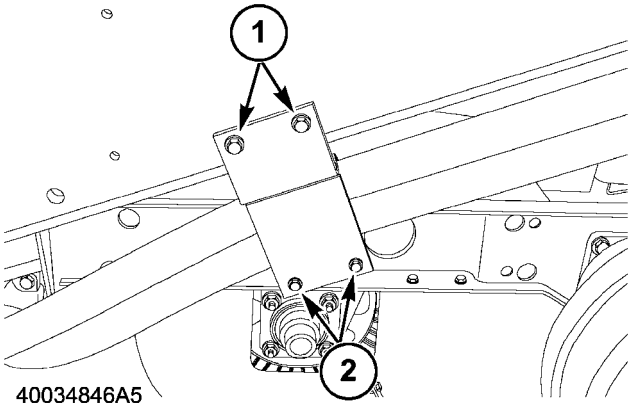
Prior operation: Half-shaft - Remove (D.10.A.43 - F.10.A.10)

1. Remove shield bracket and shield **(1)** .



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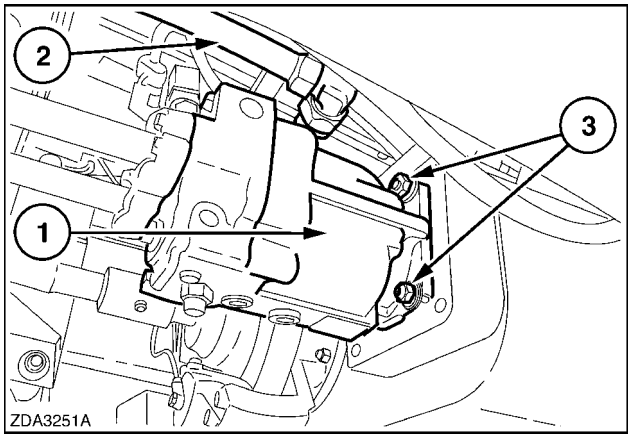
2. Remove hose clamp **(1)**.



40034846A5 2

3. Remove hydrostatic motor **(1)** by loosening hydrostatic line **(2)** on top of the hydrostatic motor. Support the hydrostatic motor **(1)** and loosen the four bolts **(3)** . Pull hydrostatic motor **(1)** out of the gearbox

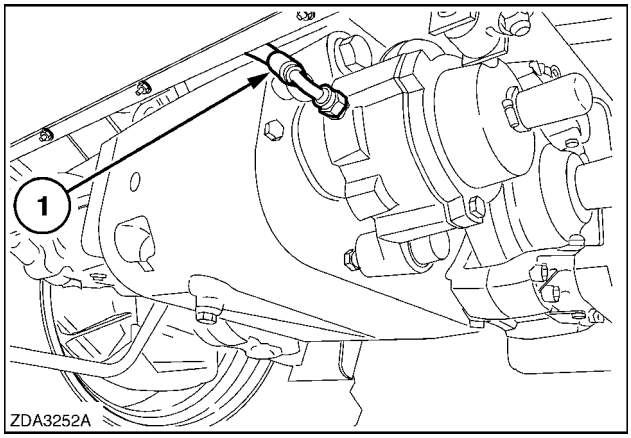
NOTE: *In some cases it will be necessary to remove the left side traction wheel to take the hydrostatic motor out of the gearbox.*



3251a 3

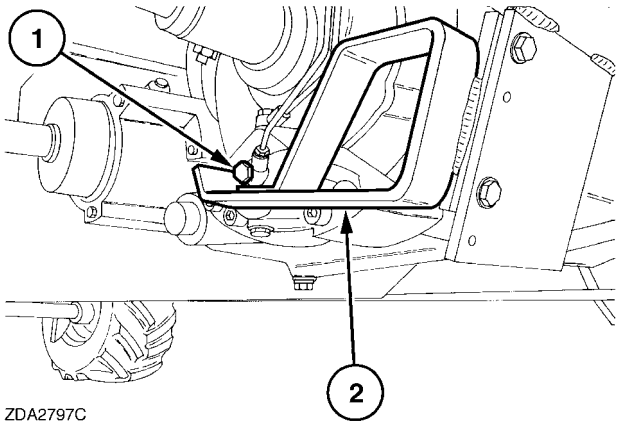
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4. Disconnect parking brake hydraulic line **(1)**.



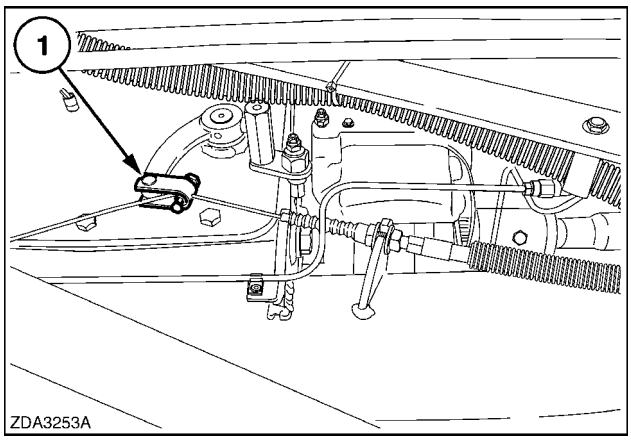
3252a 4

5. Disconnect brake lines **(1)** and supports **(2)** on both sides of the traction gearbox.



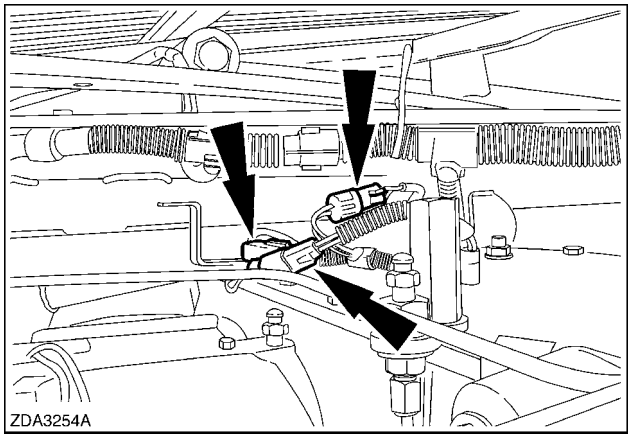
2797c 5

6. Disconnect differential lock cable **(1)** if equipped.



3253a 6

7. Disconnect brake shoe wear wires **(1)** on both sides of the transmission. Disconnect electrical connectors: Combine Speed Sensor, Gear Shift Sensor, Gear Shift Motor.



3254a 7

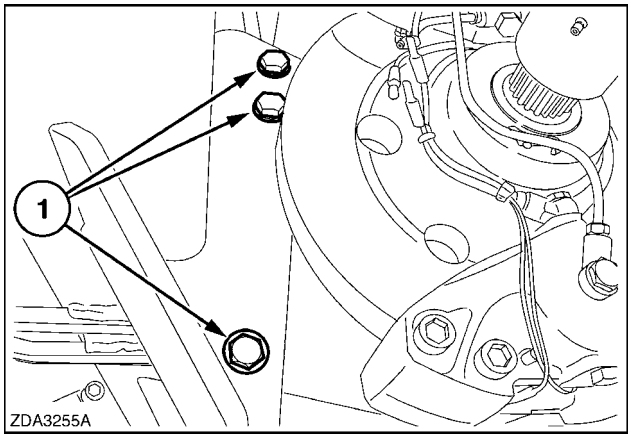
https://truckmanualshub.com/

8. Install a suitable and safe support underneath the gearbox.

⚠ CAUTION ⚠

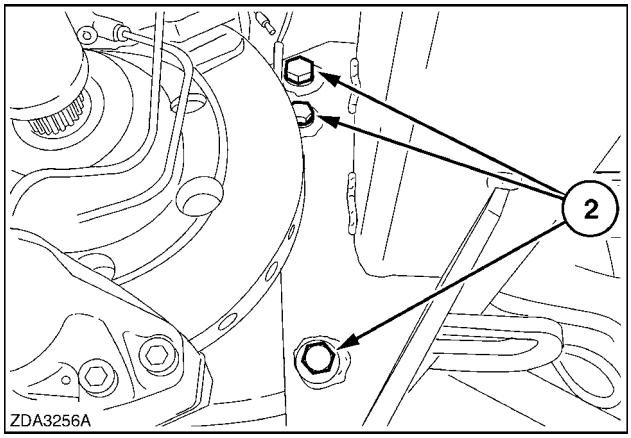
M501 - Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in the Service Manual.

9. Loosen three bolts **(1)** at the left side of transmission.



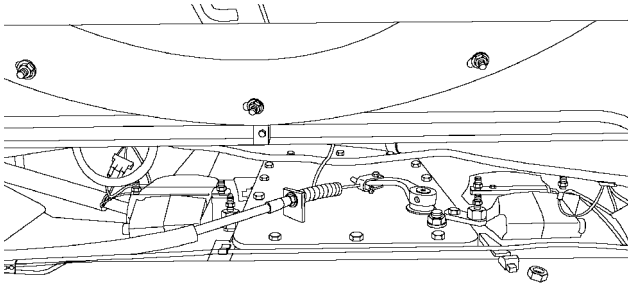
3255a 8

10. Loosen three bolts **(2)** at the right side of transmission.



3256a 9

11. Lower the transmission and remove it from underneath the combine.



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TRANSMISSION Mechanical - Disassemble (C.20.B - F.10.A.25)

AFX8010

To disassemble the traction gearbox, proceed as follows:

Prior operation: Remove the transmission. **TRANSMISSION Mechanical - Remove (C.20.B - F.10.A.10)**
Prior operation: Remove service brakes. **Brake - Remove (D.30.C.58 - F.10.A.10)**
Prior operation: Remove parking brake. **Braking device - Remove (D.32.C.58 - F.10.A.10)**

1. Remove the cover. **Housing - Disassemble (C.20.B.74 - F.10.A.25)**
2. Remove the differential shafts and differential. **Differential - Remove (C.20.B.50 - F.10.A.10)**
3. Remove the fork and shift rail. **Fork and shift rail - Remove (C.20.B.56 - F.10.A.10)**.
4. Remove the drive shaft and input shaft. **Shaft - Remove (C.20.B.43 - F.10.A.10)**
5. Remove the shifting disc and shifting drive gear. **Transmission command - Remove (C.20.B.05 - F.10.A.10)**
6. Disassemble the differential. **Differential - Disassemble (C.20.B.50 - F.10.A.25)**
7. Disassemble the drive shaft, input shaft. and differential shafts. **Shaft - Disassemble (C.20.B.43 - F.10.A.25)**

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TRANSMISSION Mechanical - Assemble (C.20.B - F.10.A.20)

AFX8010

Prior operation: Assemble drive shaft, input shaft and differential shafts. **Shaft - Assemble (C.20.B.43 - F.10.A.20)**
Prior operation: Differential - Assemble (C.20.B.50 - F.10.A.20)

1. Install shifting disc and shifting drive gear. **Transmission command - Install (C.20.B.05 - F.10.A.15)**
2. Install the input shaft and drive shaft. **Shaft - Install (C.20.B.43 - F.10.A.15)**
3. Install the selector shaft. **Fork and shift rail - Install (C.20.B.56 - F.10.A.15)**
4. Install the differential shafts and the differential. **Differential - Install (C.20.B.50 - F.10.A.15)**
5. Install the cover. **Housing - Assemble (C.20.B.74 - F.10.A.20)**

Next operation: Braking device - Install (D.32.C.58 - F.10.A.15)
Next operation: Brake - Install (D.30.C.58 - F.10.A.15)

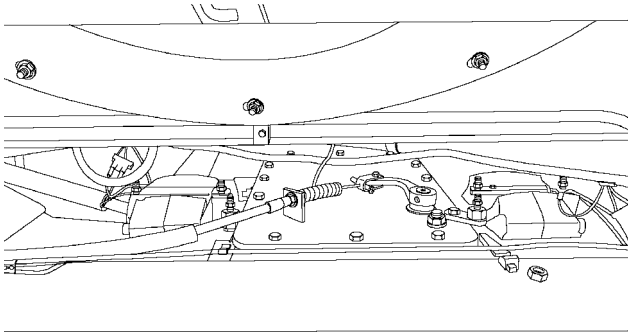
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TRANSMISSION Mechanical - Install (C.20.B - F.10.A.15)

AFX8010

1. Using a suitable jack, lift the transmission into its cradle in the machine.

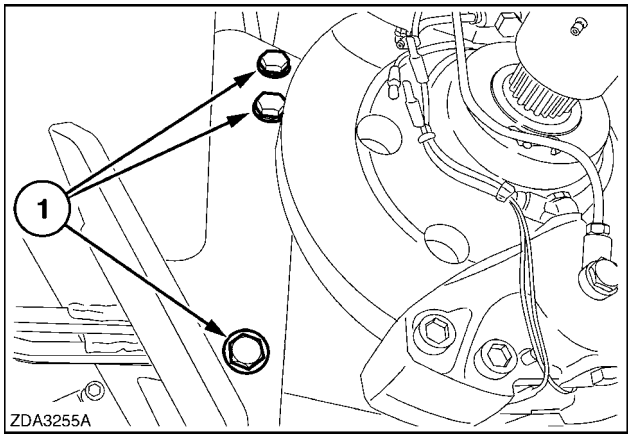
NOTE: *The transmission is HEAVY. Use proper lift/support equipment that is capable of handling the weight of the transmission.*



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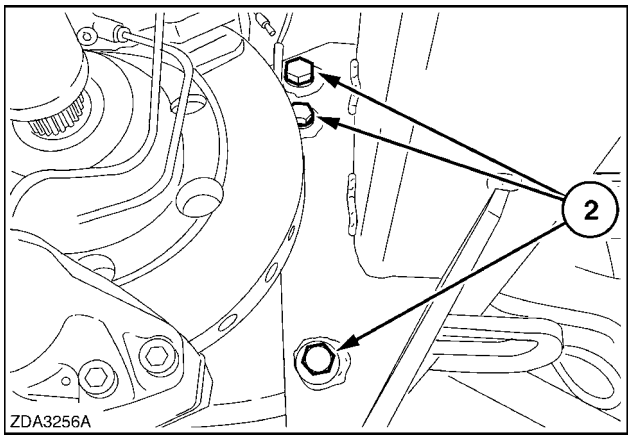
2. Line up the holes in the transmission and the holes into the transmission support brackets, to install the bolts.

3. Install hand tight the three bolts **(1)** on the Left side of the transmission.



3255a 2

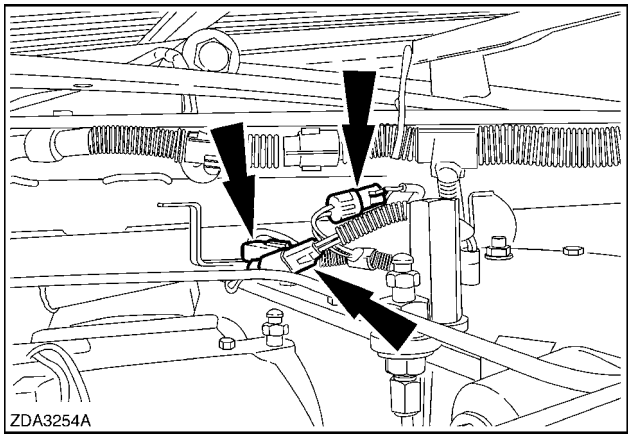
4. Install hand tight the three bolts **(2)** on the Right side of the transmission. Torque the six M16 x 30mm bolts to **240 Nm (177 lb ft)**.



3256a 3

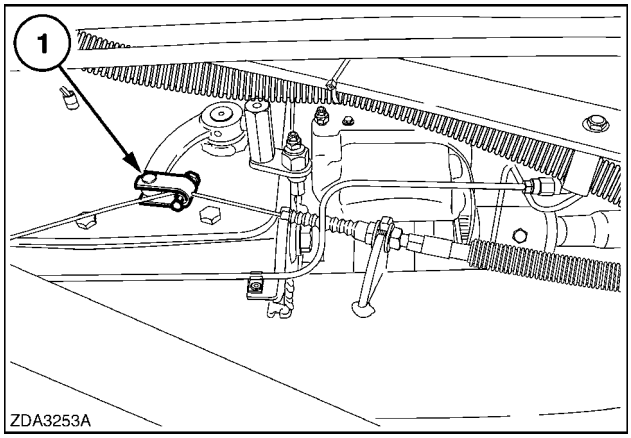
https://truckmanualshub.com/

5. Connect all the electrical connections for the brake shoe wear wires, speed sensor, shift sensor, and gear shift motor.



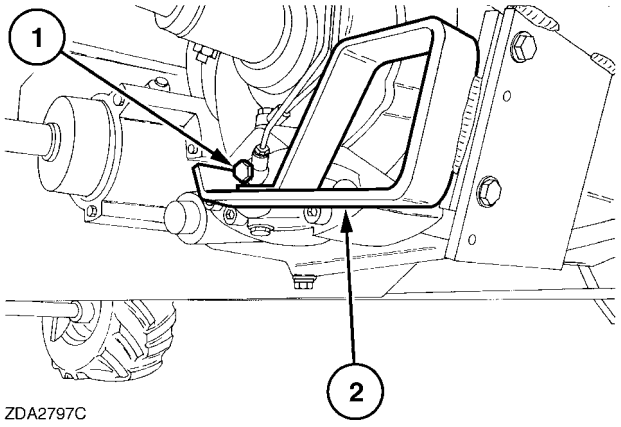
3254a 4

6. Connect the differential lock cable **(1)** if equipped. Adjust the differential lock cable.



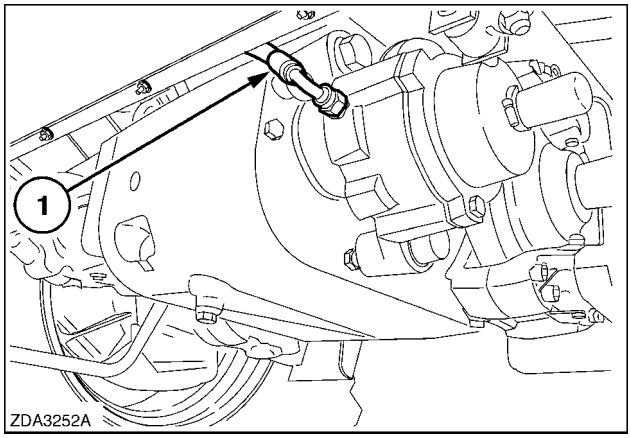
3253a 5

7. Connect all the lines **(1)** for the machine service brakes. Install the Left and Right caliper protect brackets **(2)**. Also install the protective skid plate in front of the transmission.



2797c 6

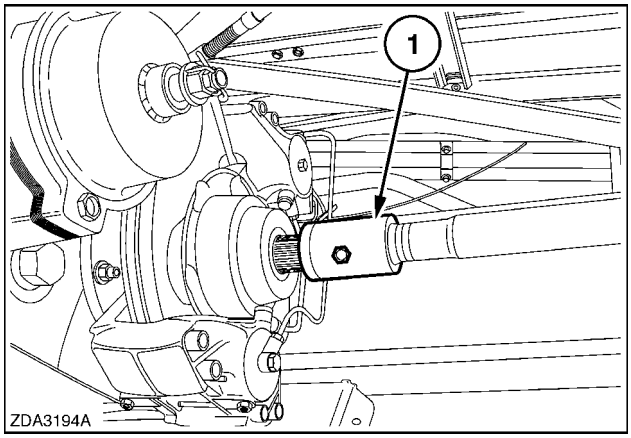
8. Connect the hydraulic line **(1)** for the parking brake.



3252a 7

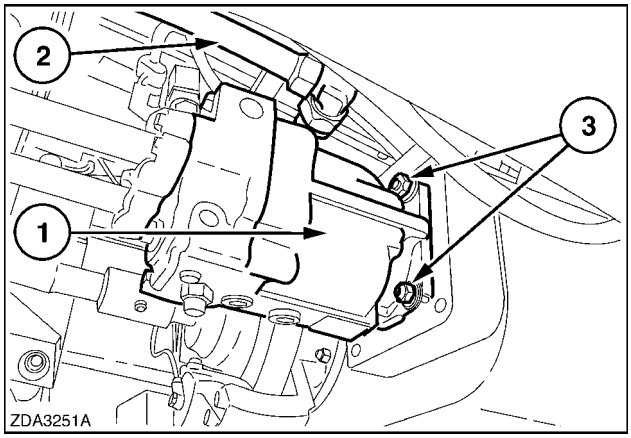
https://truckmanualshub.com/

9. Connect the half shaft drive axles **(1)** to both sides of the transmission. **Half-shaft - Install (D.10.A.43 - F.10.A.15)**



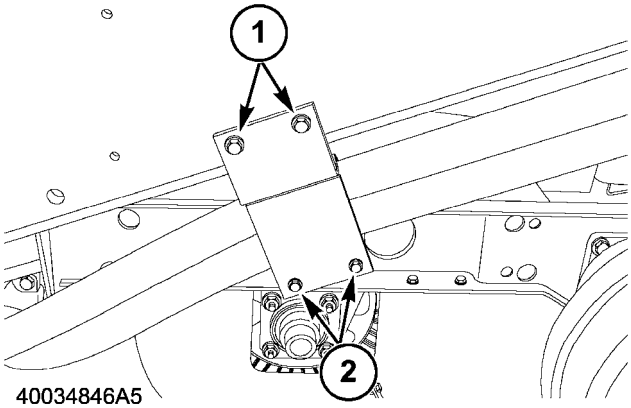
3194a 8

10. Install the hydrostatic motor **(1)** into the transmission (Apply a light coat of grease to the splines) and connect the lines **(2)** if they were removed. Tighten the motor bolts **(3)**. Torque the motor bolts to **258 - 280 Nm (190 - 206 lb ft)**



3251a 9

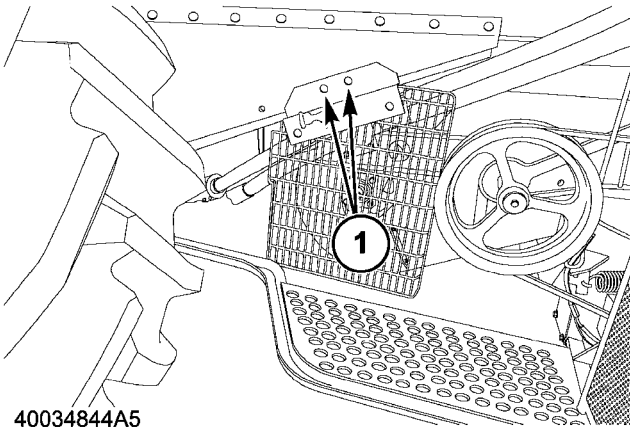
11. Install the hydraulic hose routing clamps with four bolts **(1)**.



40034846A5 10

12. Instal the shield bracket and shield **(1)** back onto the machine. Bleed the service brakes. **SERVICE BRAKE Hydraulic - Bleed (D.30.C - F.35.A.25)**. Check all lines are secure and tight. Remove the blocks or wheel chocks from the unit.

IMPORTANT: *Be sure to check the fluid level of transmission fluid before operation, failure to do so could result in transmission failure.*



40034844A5 11

https://truckmanualshub.com/

Transmission command - Remove (C.20.B.05 - F.10.A.10)

AFX8010

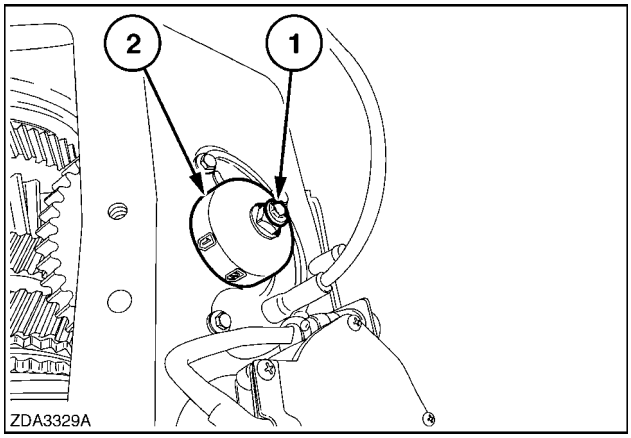
To remove the shifting disc and the shifting drive gear, proceed as follows:

⚠ WARNING ⚠

84-108 - Raised equipment or machine movement without an operator can cause injury or death. Before you service this machine, do the following: 1. Park the machine on a level surface. 2. Support or lower the equipment (backhoe, blade, boom, bucket, etc.) to the ground (if equipped). 3. Apply the parking brake (if equipped). 4. Stop the engine. 5. Block the machine (wheels, tracks, etc.) to prevent machine movement.

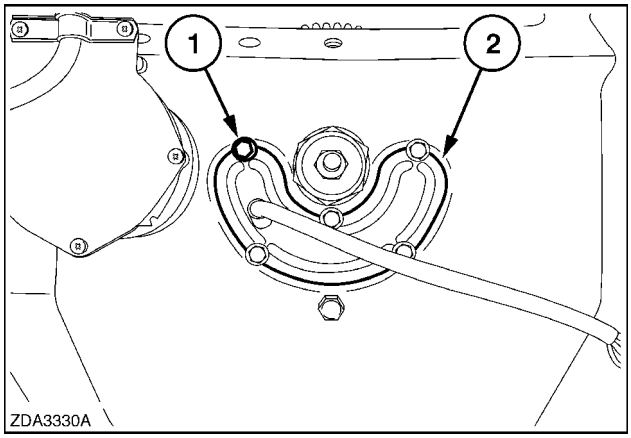
NOTE: *It is possible to remove and to install the shifting disc and the shifting drive gear without disassembly of the gearbox shafts.*

1. Remove nut **(1)** and indicator plate **(2)**.



3329a 1

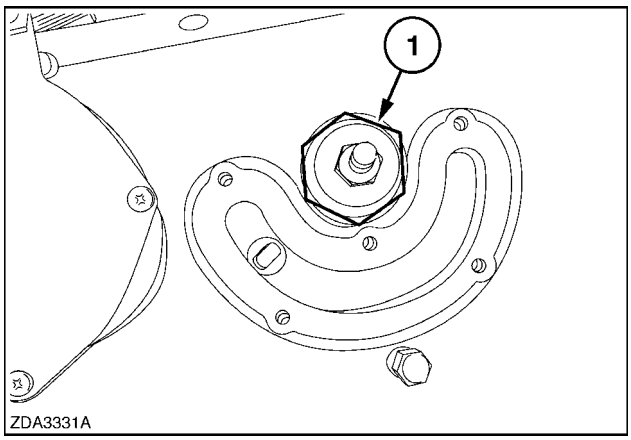
2. Remove five bolts **(1)** and remove micro-switch bar **(2)**.



3330a 2

3. Bring the shifting disc in it's highest position by turning shifting disc housing **(1)** out until the shifting disc blocks are against the gearbox housing.

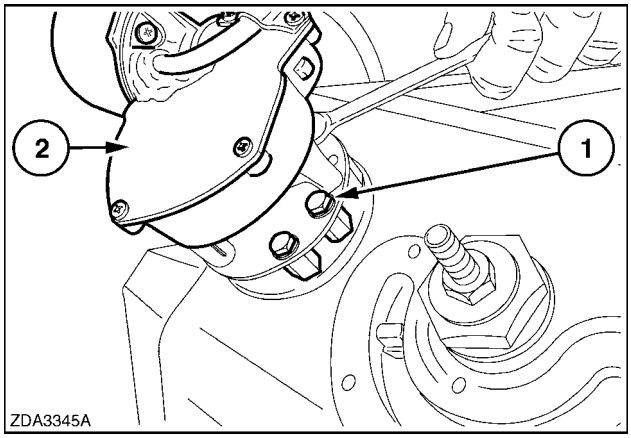
NOTE: *This step is only necessary when the drive shaft and the input shaft need to be removed from the transmission without removal of the shifting disk.*



3331a 3

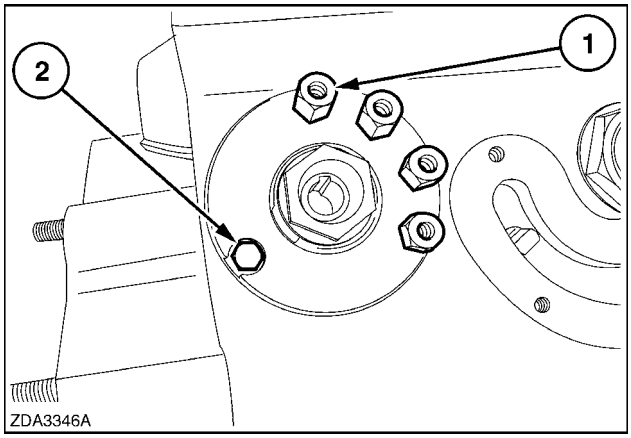
https://truckmanualshub.com/

4. Remove three bolts and washers **(1)** and remove electric motor **(2)**.



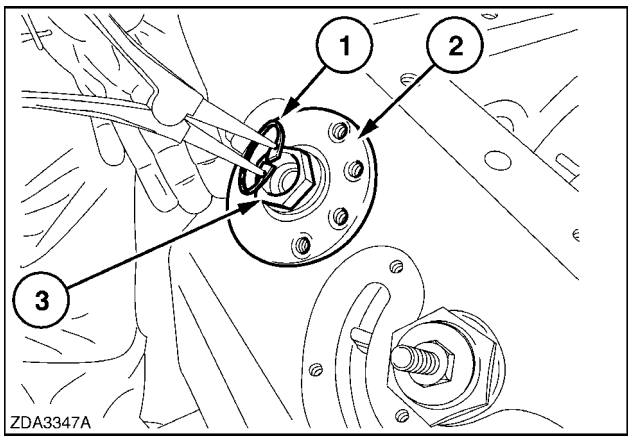
3345a 4

5. Remove four special bolts **(1)** and bolt **(2)**.



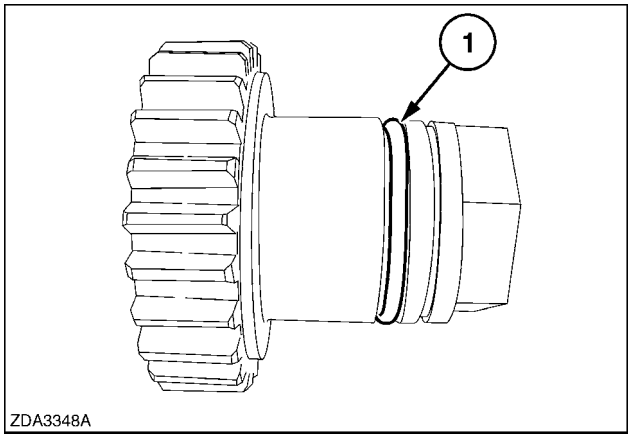
3346a 5

6. Remove snap ring **(1)** and the friction ring behind it. Slide shifting drive gear **(3)** out of housing **(2)** and remove it from the inside of the transmission gearbox. Remove shifting drive gear housing **(2)**.



3347a 6

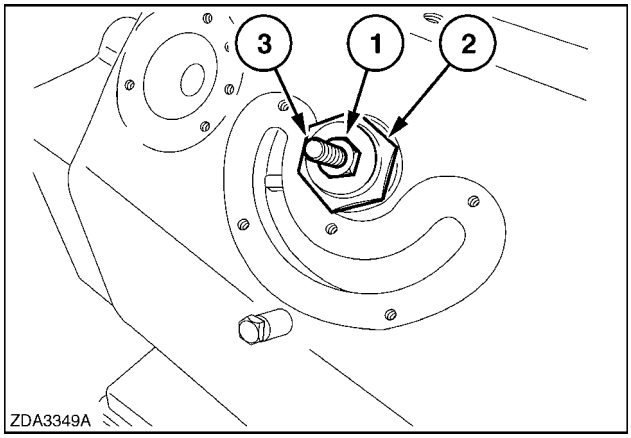
7. Replace O-ring **(1)**.



3348a 7

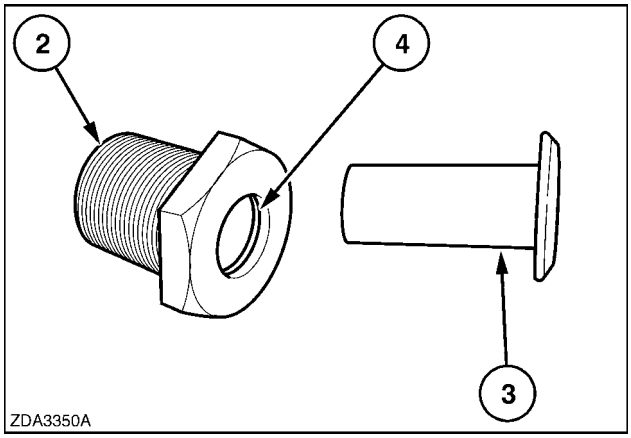
https://truckmanualshub.com/

8. Remove the cotter pin and nut **(1)**. Remove bolt **(3)** and the shifting disc from the inside of the gearbox. Remove shifting disc housing **(2)**.



3349a 8

9. Remove bushing **(3)** from housing **(2)**. If necessary, replace O-ring **(4)** inside housing **(2)**.



3350a 9

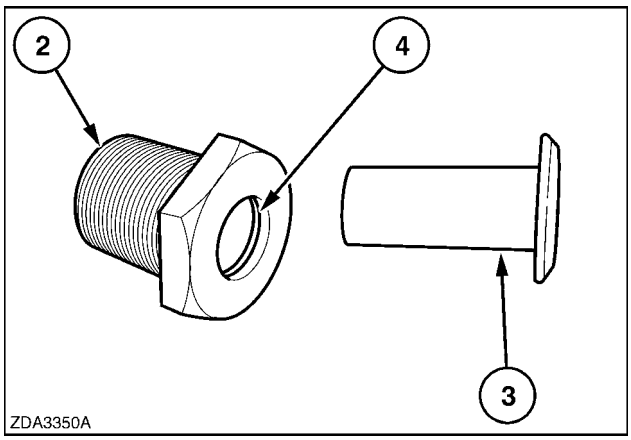
https://truckmanualshub.com/

Transmission command - Install (C.20.B.05 - F.10.A.15)

AFX8010

To install the shifting disc and the shifting drive gear, proceed as follows:

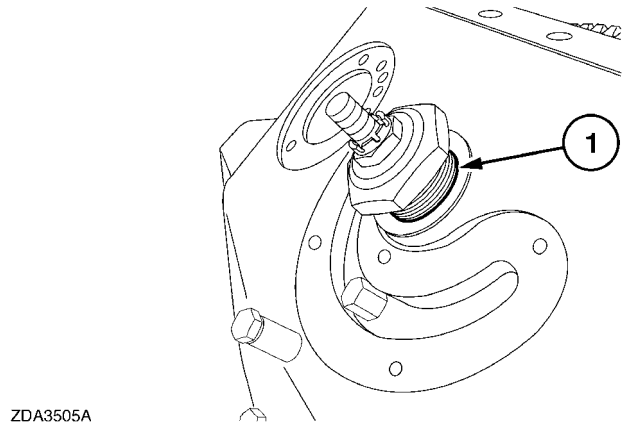
1. If necessary, replace O-ring **(4)** inside housing **(2)**. Replace bushing **(3)** if necessary and install in housing **(2)**.



3350a 1

2. Apply a few drops of Loctite Brand 242 to the shifting disc housing at **(1)** and tighten the insert. Torque the threaded insert to **190 - 210 Nm (140 - 155 lb ft)** into the housing. Torque the M8 x 40mm bolt with the bushing to **8 - 12 Nm (6 - 9 lb ft)** .

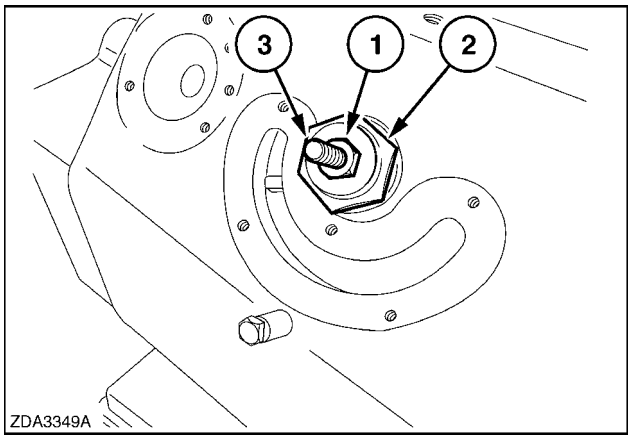
IMPORTANT: *Verify if the followers on the selector forks fit into the notches on the shifting disc.*



3505a 2

3. Install the shifting disc and bolt **(3)** from the inside of the gearbox and install washer and nut **(1)**

NOTE: *Be sure that bolt **(3)** with its cam is in the shifting disc's slot.*

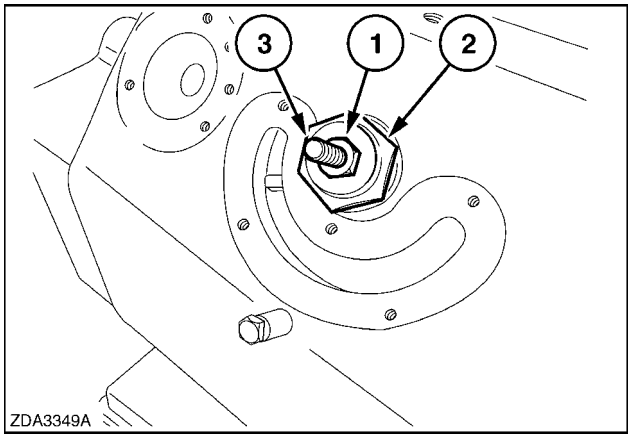


3349a 3

https://truckmanualshub.com/

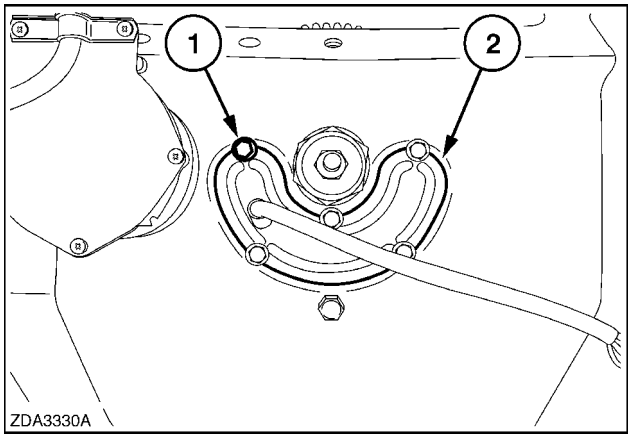
4. Install the castle head lock nut and torque to **25 Nm (18 lb ft)** and then torque further until the nut can be assembled. Use a new cotter pin.

NOTE: *If the input shaft, the drive shaft and the differential are not assembled into the gearbox, bring the shifting disc in it's highest position by turning the shifting disc housing out until the shifting disc blocks against the gearbox housing.*



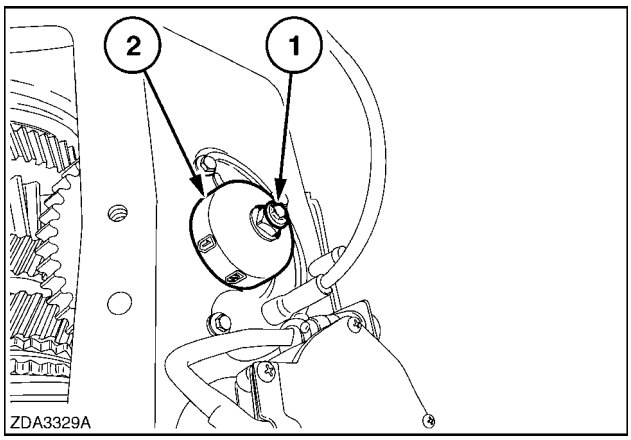
3349a 4

5. Install micro-switch bar **(2)**, install five washers and bolts and tighten five bolts **(1)**. Torque the bolts to **4 - 6 Nm (3 - 4 lb ft)**.



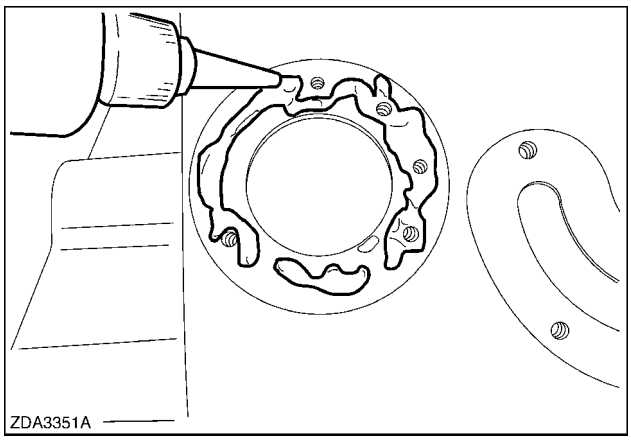
3330a 5

6. Install indicator plate **(2)** and tighten nut **(1)** to a torque of **8 - 12 Nm (71 - 106 lb in)**.



3329a 6

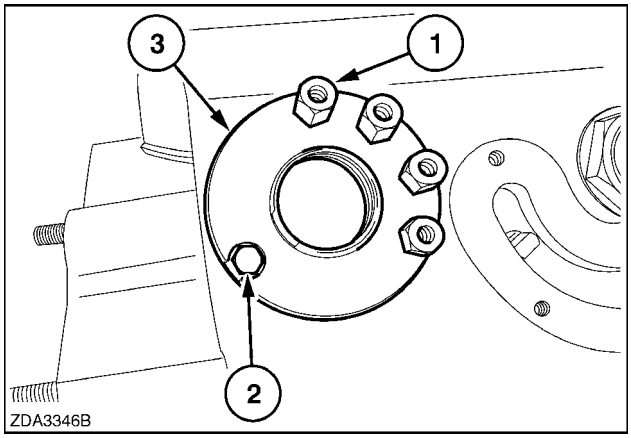
7. Apply Loctite 573 following around the mating surface and around the bolt holes. Spread evenly and wipe off the excess.



3351a 7

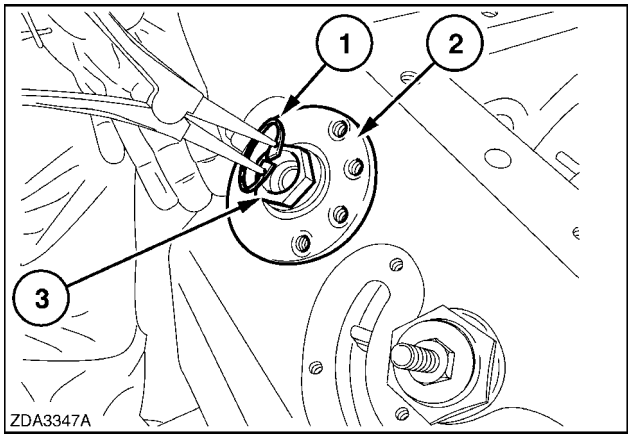
https://truckmanualshub.com/

8. Install shifting drive gear housing **(3)** and tighten four special bolts **(1)** and bolt **(2)**. Torque the M6 bolts to **10 - 11 Nm(7 - 8 lb ft)**



3346b 8

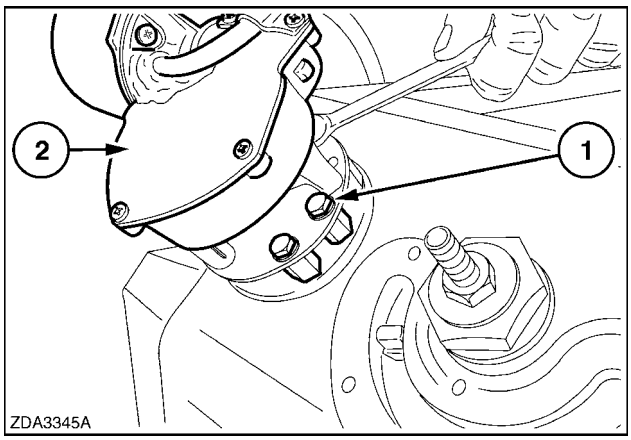
9. Insert the shifting drive gear from the inside of the gearbox and install the friction ring and retaining ring **(1)**.



3347a 9

10. Install electric motor. **(2)**. Install special bolts and washers **(1)**.Torque the M6 bolts to **10 - 11 Nm (7 - 8 lb ft)** .

NOTE: *If necessary to change gears manually while assembling the input shaft, the drive shaft and the differential into the gearbox, wait for installing the electric motor until the end.*



3345a 10

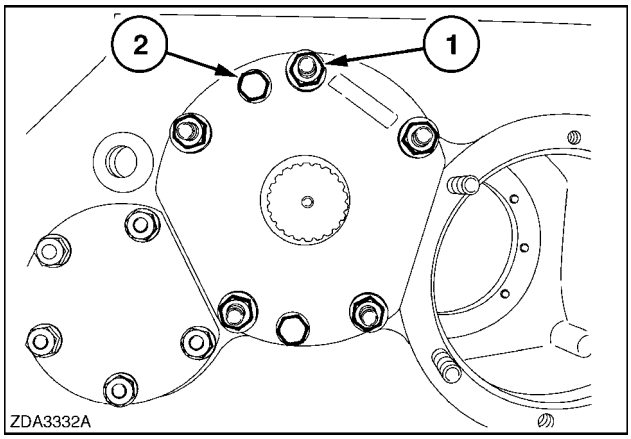
https://truckmanualshub.com/

Shaft - Remove (C.20.B.43 - F.10.A.10)

AFX8010

Prior operation: If the shifting disc is not removed from the transmission, first proceed with the first three steps of **Transmission command - Remove (C.20.B.05 - F.10.A.10)** to bring the shifting disc to it's highest position.

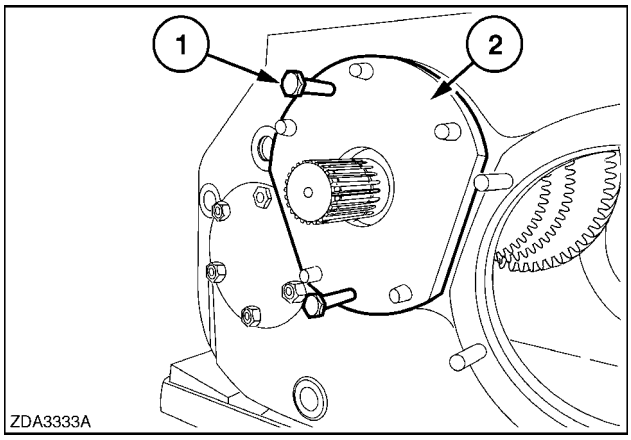
1. To remove the drive shaft, first remove the five nuts and washers **(1)**. Remove two bolts and washers **(2)**.



3332a 1

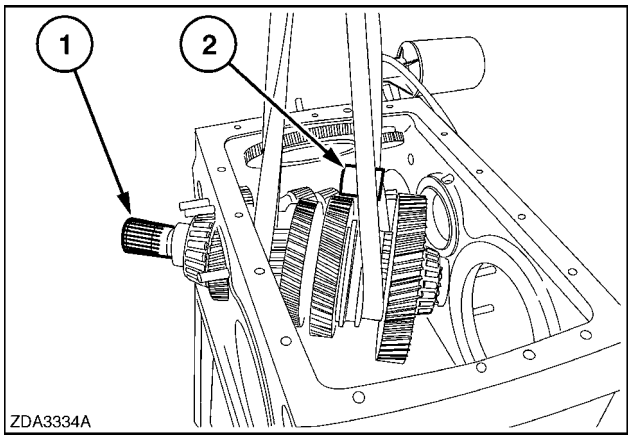
2. Insert two bolts **(1)** in cover **(2)** and pull the cover.

NOTE: *Keep shim pack and O-ring with the cover.*



3333a 2

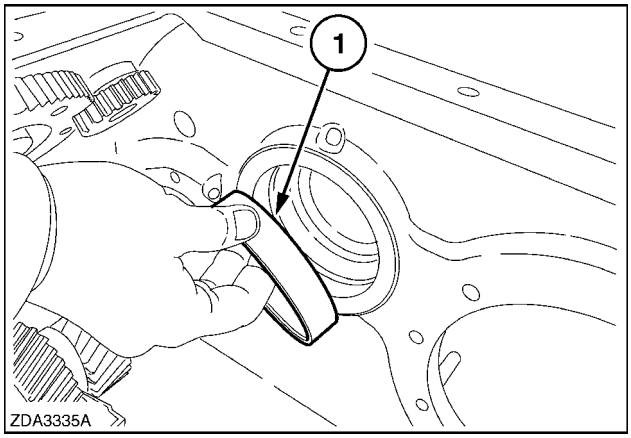
3. Remove driver shaft **(1)** and selector fork **(2)** with a hoist.



3334a 3

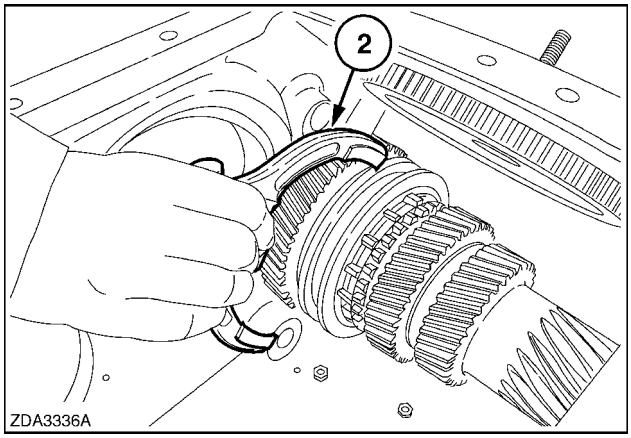
https://truckmanualshub.com/

4. if necessary, remove the bearing cup **(1)**.



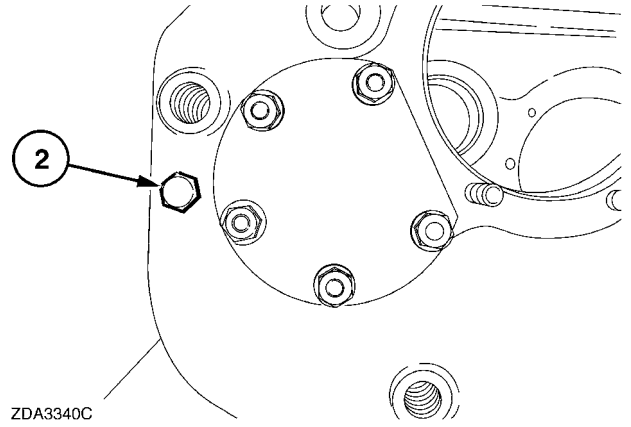
3335a 4

5. To remove the input shaft, remove the selector fork **(2)** from the input shaft.



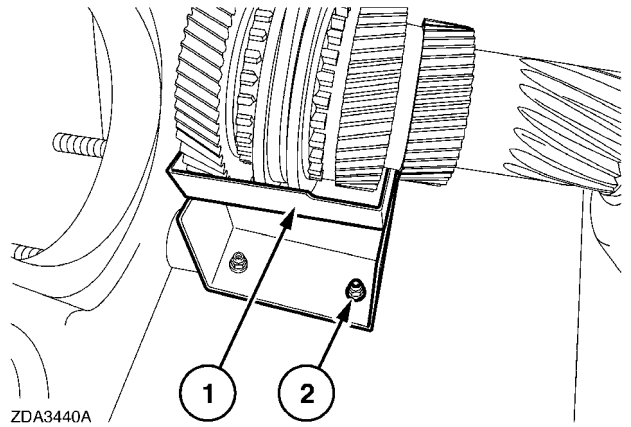
3336a 5

6. Remove threaded shaft **(2)**, and seal ring .



3340c 6

7. Remove oil baffle plate **(1)** by turning out cap screws **(2)**.

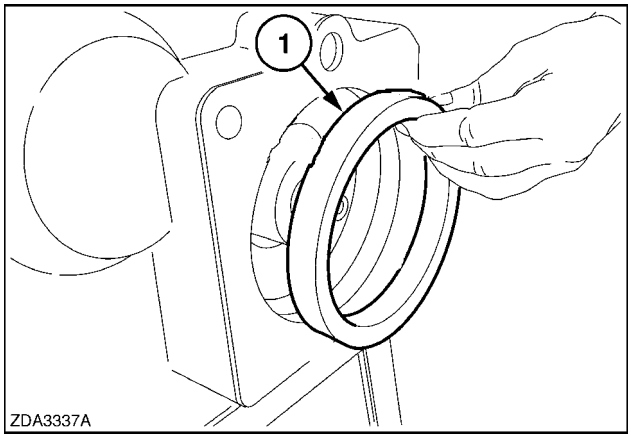


3440a 7

https://truckmanualshub.com/

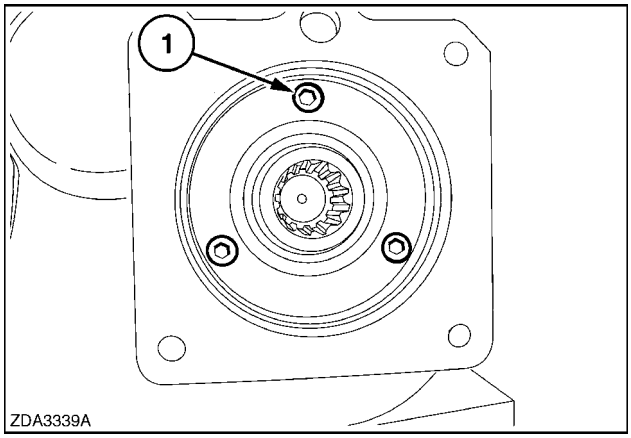
8. Remove the motor pilot ring **(1)**.

NOTE: *The motor pilot ring is only used with the 100 cc hydrostatic motor to center the motor in the housing. . The 130 cc motor mounts directly to transmission housing without use of the ring.*



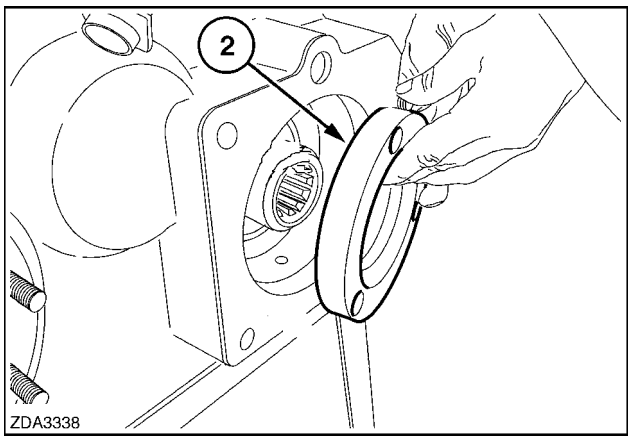
Zda3337z 8

9. Remove three hex socket head cap screws **(1)**.



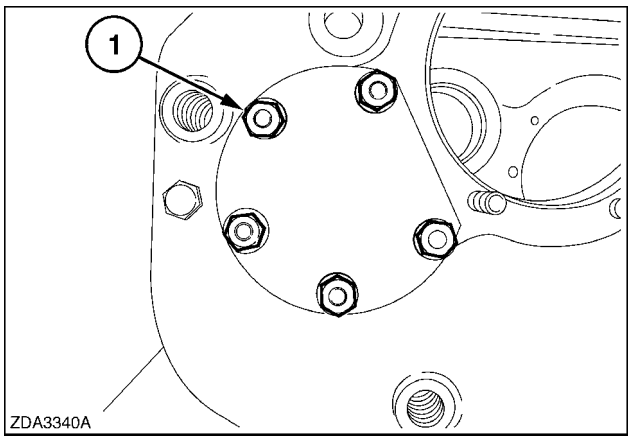
Zda3339z 9

10. Remove seal housing **(2)** with the lip seal and the O-ring.



Zda3338z 10

11. Remove five nuts and washers **(1)**.

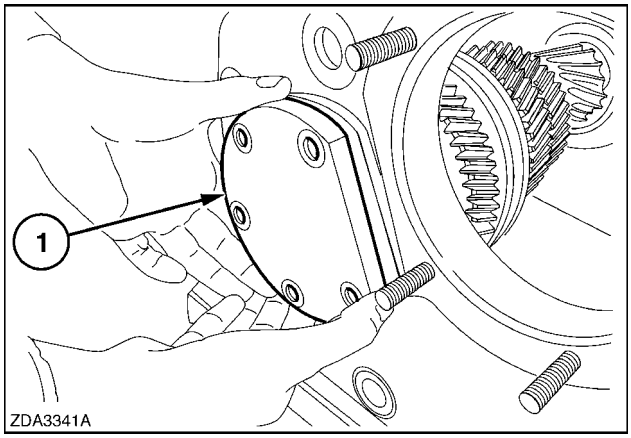


3340a 11

https://truckmanualshub.com/

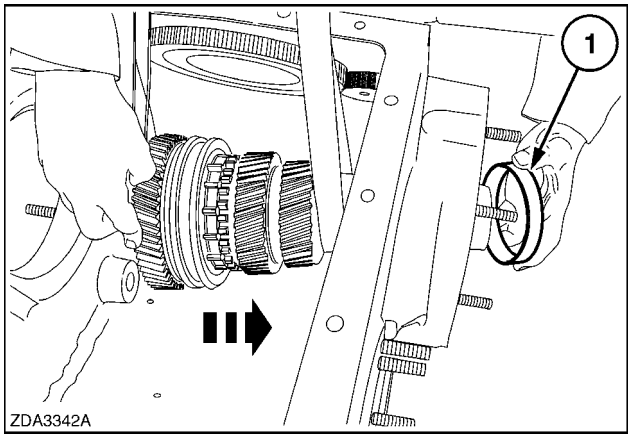
12. Remove cover **(1)**.

NOTE: *Keep shims and O-ring with the cover.*



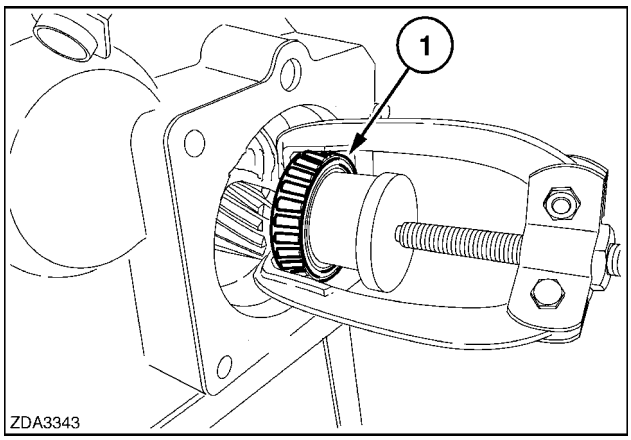
3341a 12

13. Support the input shaft on a hoist to avoid from falling into the gearbox. Drive the shaft in the direction shown, toward motor side of transmission, and remove bearing outer ring **(1)**.



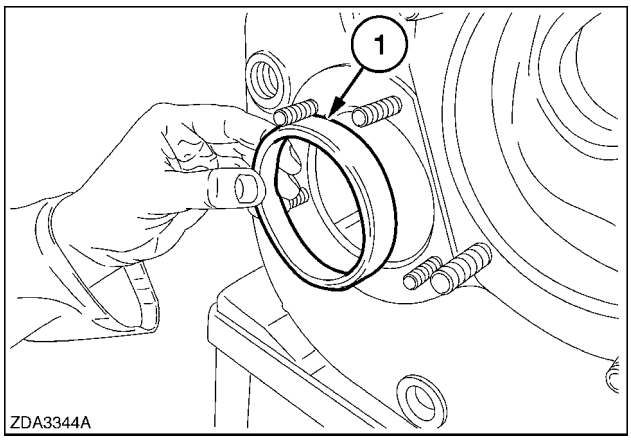
3342a 13

14. Pull bearing **(1)** from the input shaft. Remove the input shaft out of the gearbox.



Zda3343z 14

15. If necessary, remove bearing cup **(1)**.



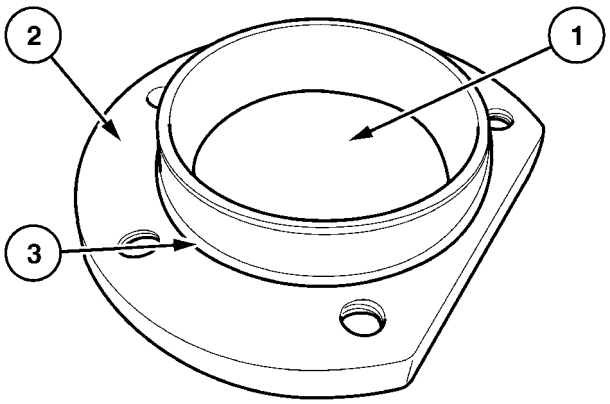
3344a 15

https://truckmanualshub.com/

Shaft - Install (C.20.B.43 - F.10.A.15)

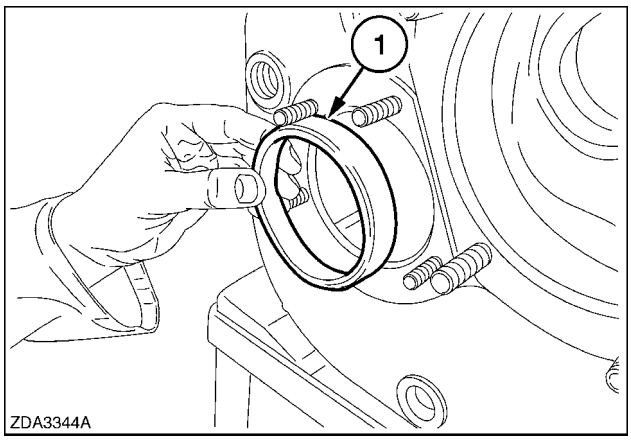
AFX8010

1. To install the input shaft in the transmission, first install shim pack **(2)** of **1.5 mm** (**1/16 in**) and O-ring, **(3)** on cover **(1)**.



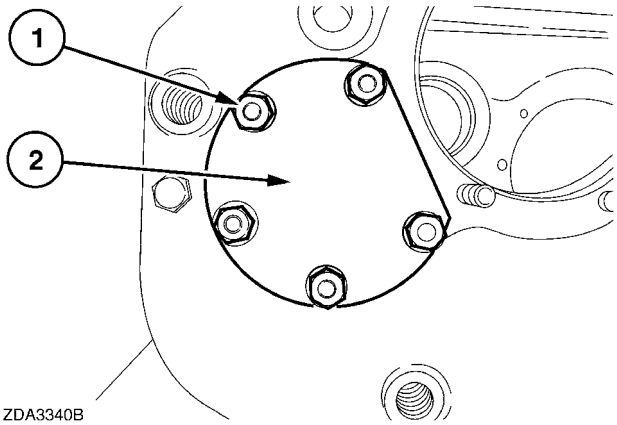
3414a 1

2. Install bearing cup **(1)**.



3344a 2

3. Install cover **(2)** with shim pack and O-ring and tighten the five nuts **(1)**. Torque the five M10 nuts to **46 - 52 Nm (34 - 38 lb ft)**. Support the input shaft on a hoist and bring it into the transmission.



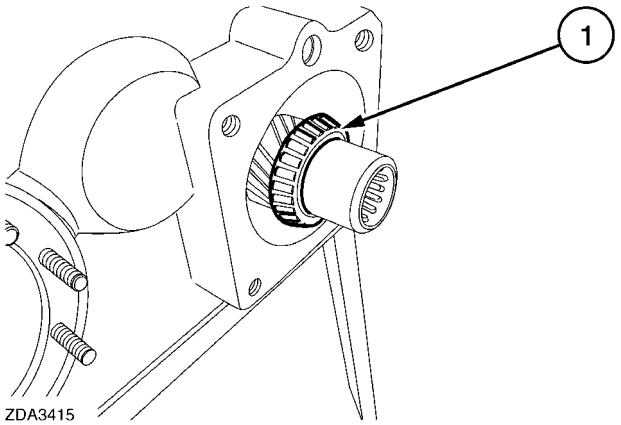
3340b 3

https://truckmanualshub.com/

4. Heat bearing **(1)** to **80 °C** (**176 °F)** and install it on the input shaft.

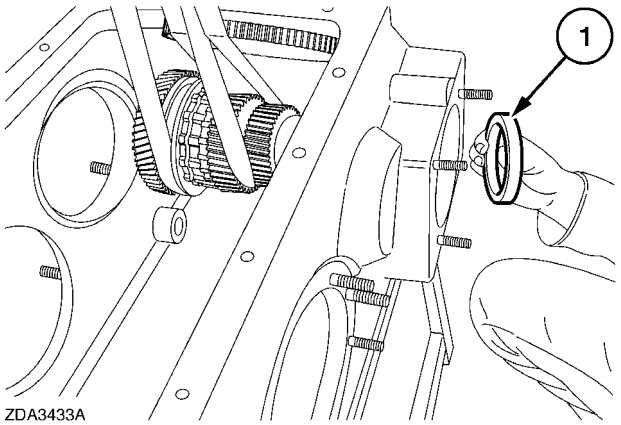
⚠ CAUTION ⚠

47-41B - Use insulated gloves or mittens when working with hot parts.



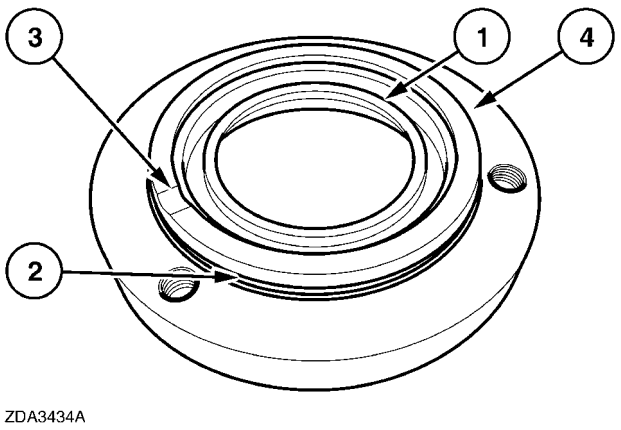
zda3415d 4

5. Install bearing cup **(1)**.



3433a 5

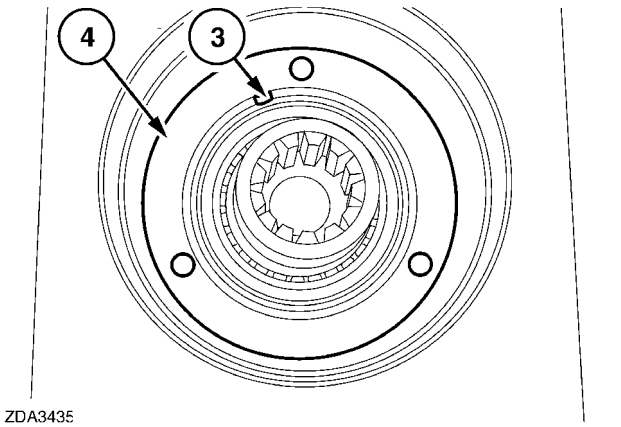
6. If necessary, replace seal, **(1)** and O-ring **(2)** on seal housing **(4)**.



3434 6

7. Install seal housing **(4)**.

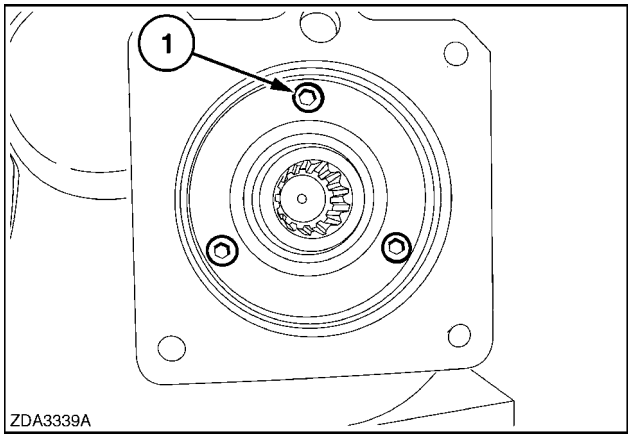
IMPORTANT: *Align notch **(3)** with lubrication hole.*



Zda3435b 7

https://truckmanualshub.com/

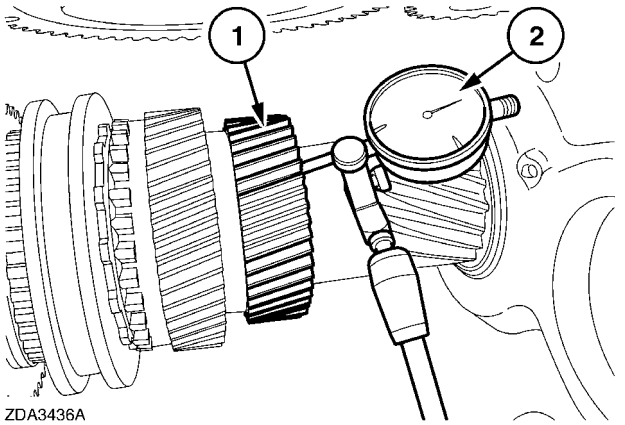
8. Apply Loctite 242 to hex socket head cap screws **(1)** and tighten them. Torque to **50 - 60 Nm (37 - 44 lb ft)**



Zda3339b 8

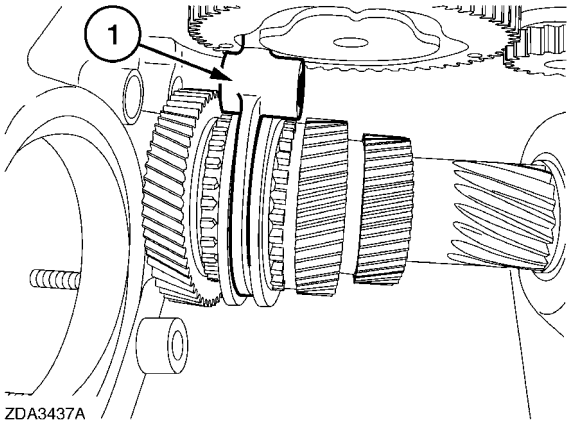
9. Install a dial gauge **(2)** in the gearbox housing and locate the probe perpendicular against the side of gear **(1)**. Apply a load in one direction and oscillate the shaft several times while the load is applied. Set the dial gauge to zero. Apply the load in the opposite direction, oscillate and read the axial movement of the shaft. Make three measurements at 120 degrees of the input shaft. The average of the readings should be **0 - 0.03 mm** (**0 - .001 in**) . If required, adjust the shims. To decrease the axial movement, decrease the number of shims.

NOTE: *Be sure to measure on gear **(1)** as the other gears are mounted on needle bearings.*



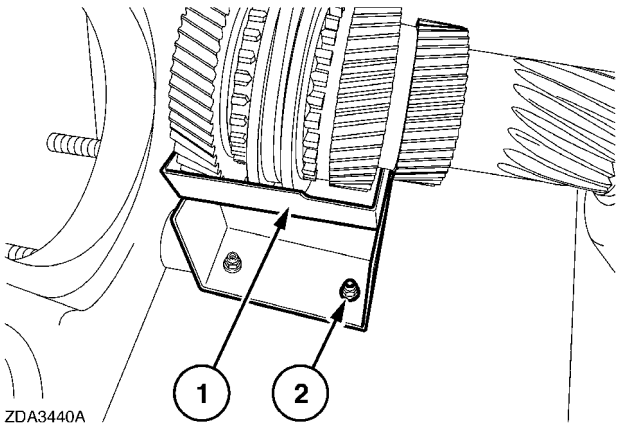
3436a 9

10. Install selector fork **(1)**.



3437a 10

11. Install oil baffle plate **(1)**. Install bolts **(2)**. Torque the M8 bolts to **23 - 26 Nm (17 - 19 lb ft)** .

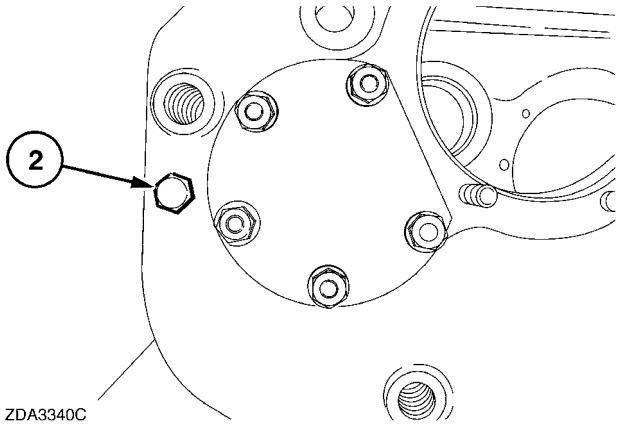


3440a 11

https://truckmanualshub.com/

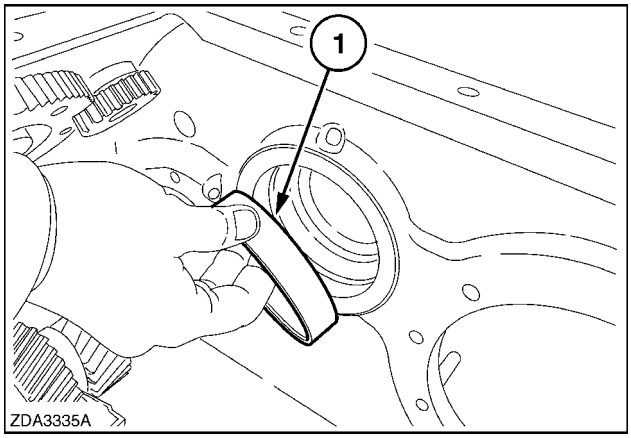
12. Insert threaded shaft **(2)** and seal ring. Torque to **50 - 60 Nm (37 - 44 lb ft)** .

IMPORTANT: *After tightening baffle bolts, rotate the input shaft and verify that the oil baffle does not interfere with the input shaft. If there is interference adjust and shim as necessary or modify baffle as needed.*



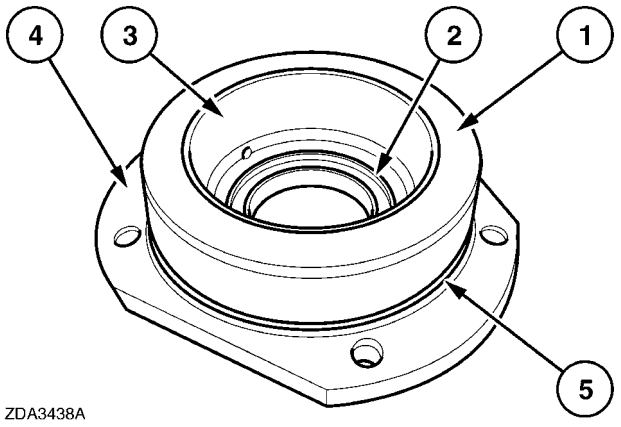
3340c 12

13. To install the drive shaft in the transmission, first install the bearing cup **(1)**.



3335a 13

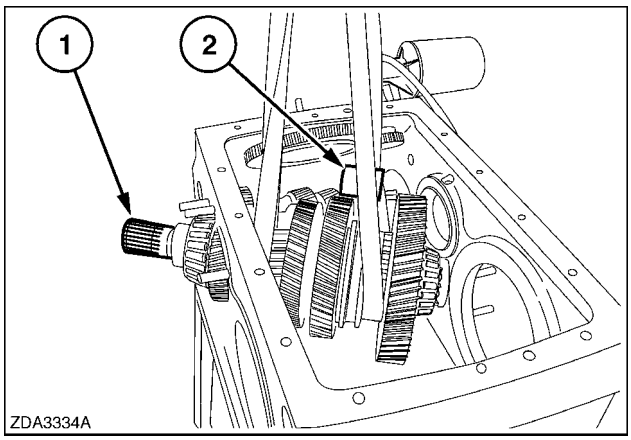
14. If necessary replace the seal **(2)**. Install bearing cup **(3)**. Install shim pack **(4)** of **1.5 mm** (**1/16 in**) and O-ring **(5)** on cover **(1)**.



3438a 14

15. Support the drive shaft **(1)** on a hoist and bring it into the transmission.

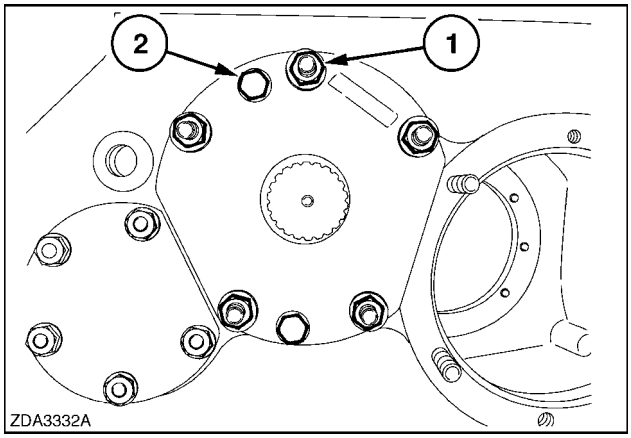
NOTE: *If the shifting disc is installed* ***(3)****, selector fork* ***(2)*** *should be installed together with the counter shaft.*



3334a 15

https://truckmanualshub.com/

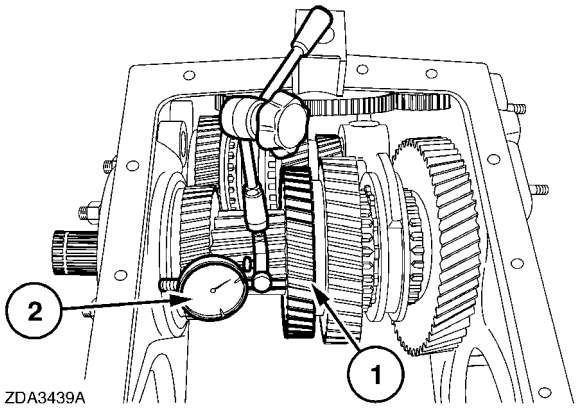
16. Install the cover with shims, seals and bearing cup, and tighten nuts **(1)**. Install two bolts **(2)**. Torque the M12 nuts to **80 - 90 Nm (59 - 66 lb ft)** .



3332a 16

17. Install a dial gauge **(1)** on the gearbox housing and locate the probe perpendicular against the side of the gear **(1)**. Apply a load in one direction and oscillate the shaft several times while the load is applied. Set the dial gauge to zero. Apply the load in the opposite direction, oscillate and read the axial movement of the shaft. Make three measurements at 120 degrees of the intermediate shaft. The average of the three readings, should be **0 - 0.03 mm** (**0 - .001 in**). If required, adjust the shims. To decrease the axial movement, decrease the number of shims.

NOTE: *Be sure to measure on gear **(1)** as the other gears are mounted on needle bearings.*



3439a 17

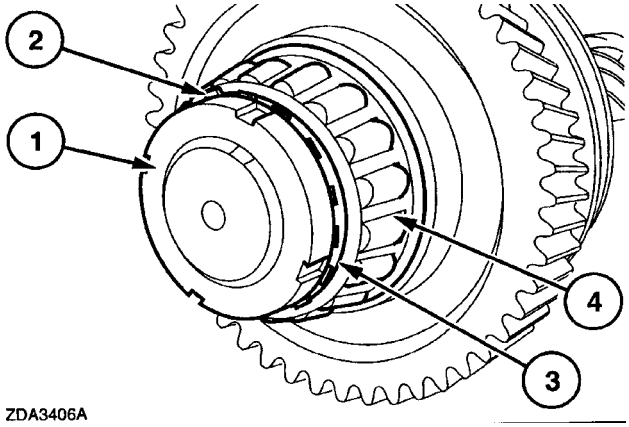
Next operation: Fork and shift rail - Install (C.20.B.56 - F.10.A.15)

https://truckmanualshub.com/

Shaft - Disassemble (C.20.B.43 - F.10.A.25)

AFX8010

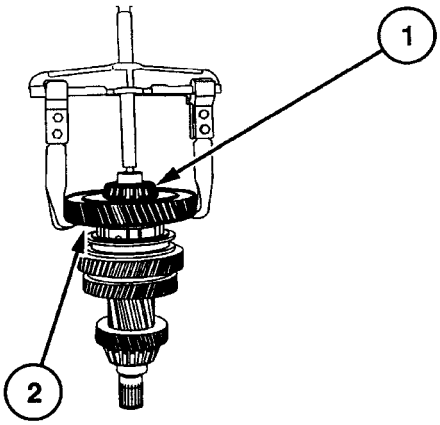
1. To disassemble the drive shaft, unlock lock-washer **(2)**. Remove nut **(1)** using tool **380001074** , lock-washer **(2)** and washer **(3)**.



ZDA3406A

3406a 1

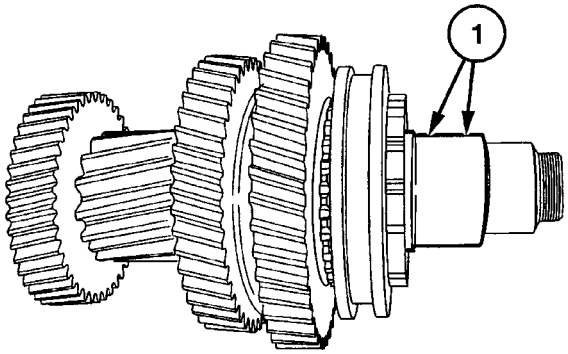
2. Remove gear **(2)** and bearing **(1)** together with a puller.



ZDA3397A

3397a 2

3. Remove needle bearings **(1)**.

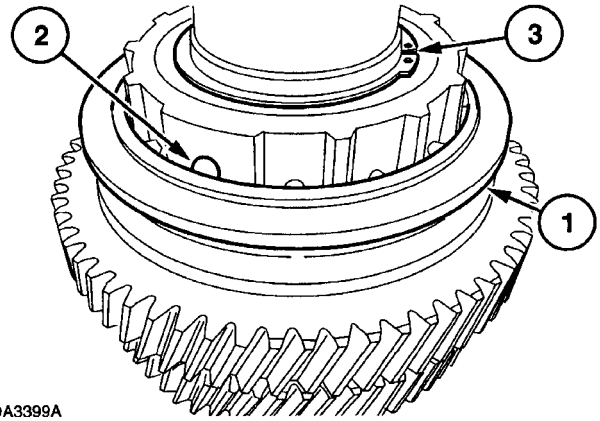


ZDA3398A

3398a 3

https://truckmanualshub.com/

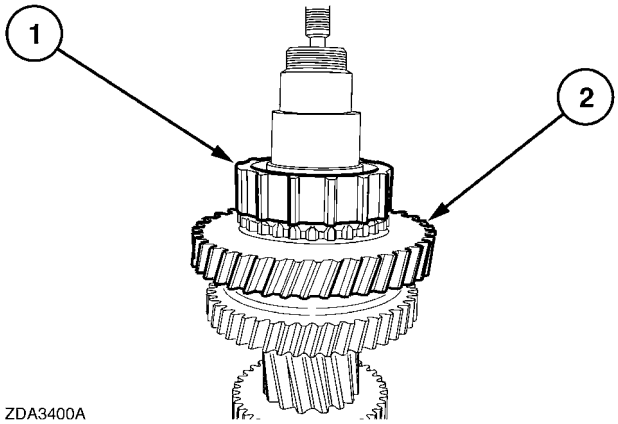
4. Remove selector ring **(1)** at the same time remove two balls **(2)** and the springs behind it. The balls **(2)** are spring loaded, do not lose them. Remove retaining ring **(3)** and the washer.



ZDA3399A

3399a 4

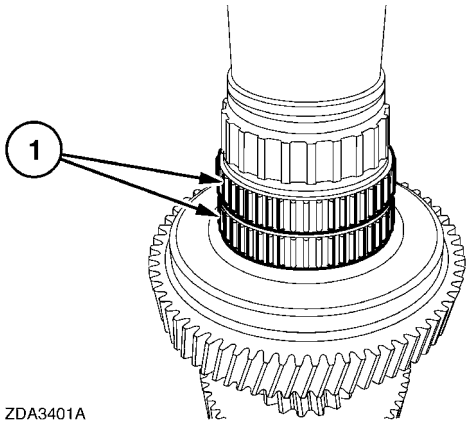
5. Remove housing **(1)** and gear **(2)**.



ZDA3400A

3400a 5

6. Remove needle bearings **(1)**.

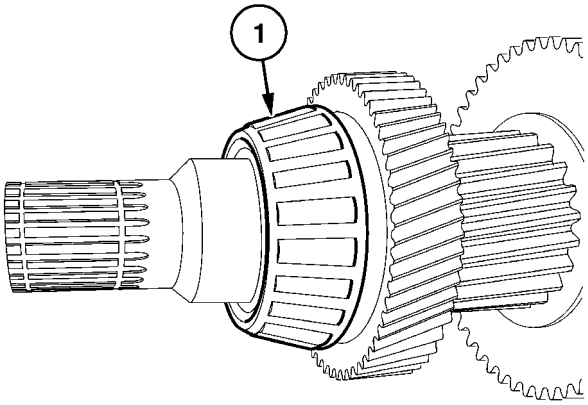


ZDA3401A

3401a 6

7. Remove bearing **(1)** on the other side.

NOTE: *Bearing **(1)** will be damaged when it is removed.*

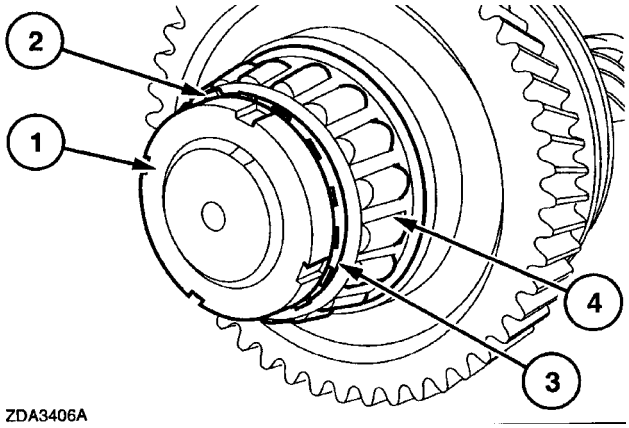


ZDA3402A

3402a 7

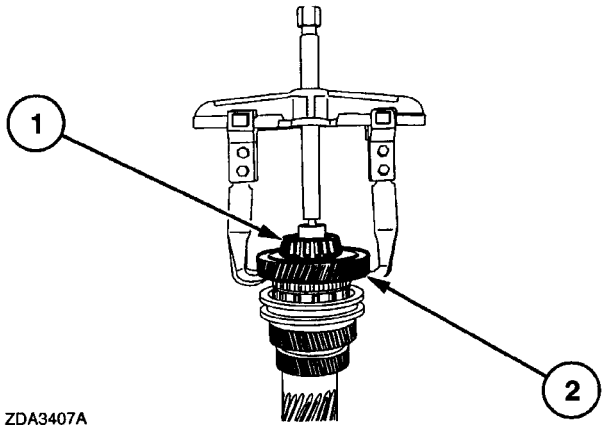
https://truckmanualshub.com/

8. To disassemble the input shaft proceed as follows. Unlock lock washer **(2)**. Remove nut **(1)** using tool **380001074** lock washer **(2)** and washer **(3)**.



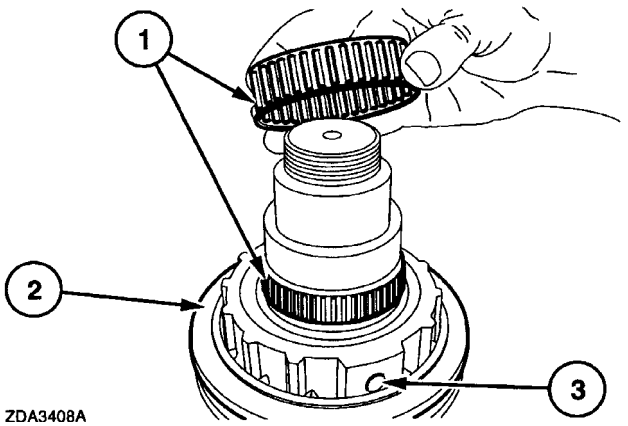
3406a 8

9. Remove gear **(2)** bearing **(1)** and the washer between the two parts with a puller.



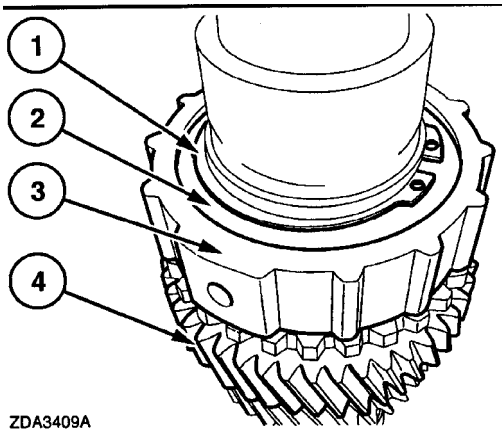
3407a 9

10. Remove needle bearings **(1)**. Remove selector ring **(2)** at the same time remove two balls **(3)** and the springs behind it. The balls **(3)** are spring loaded, do not lose them.



3408a 10

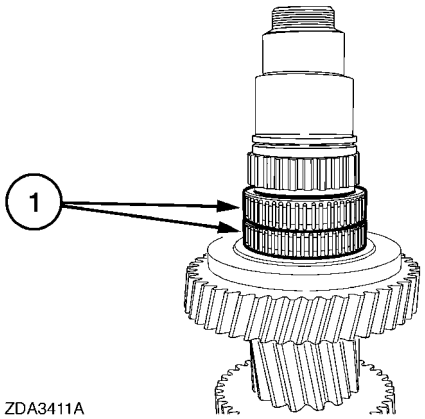
11. Remove retaining ring **(1)**. Remove washer **(2)** and selector housing **(3)** at the same time. Remove gear **(4)**.



3409a 11

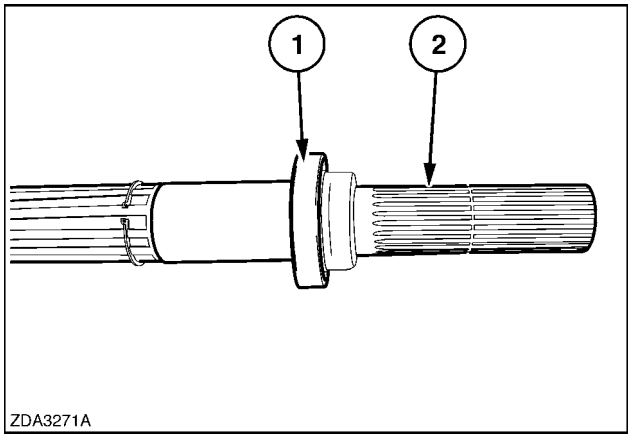
https://truckmanualshub.com/

12. Remove needle bearings **(1)**.



3411a 12

13. To disassemble the differential shafts, remove bearing **(1)** from shaft **(2)**.



3271a 13

https://truckmanualshub.com/

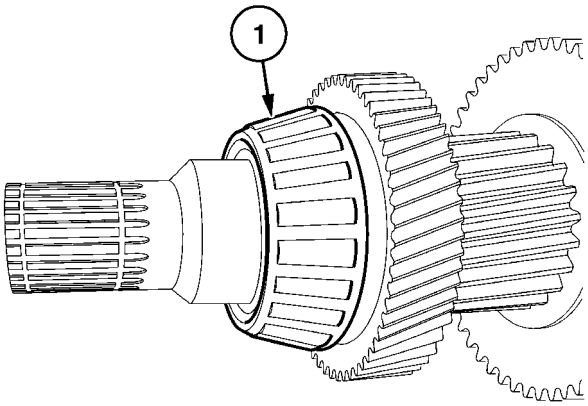
Shaft - Assemble (C.20.B.43 - F.10.A.20)

AFX8010

1. To assemble the drive shaft, heat bearing **(1)** to **80 °C** (**176 °F**) and install it on the counter shaft.

⚠ CAUTION ⚠

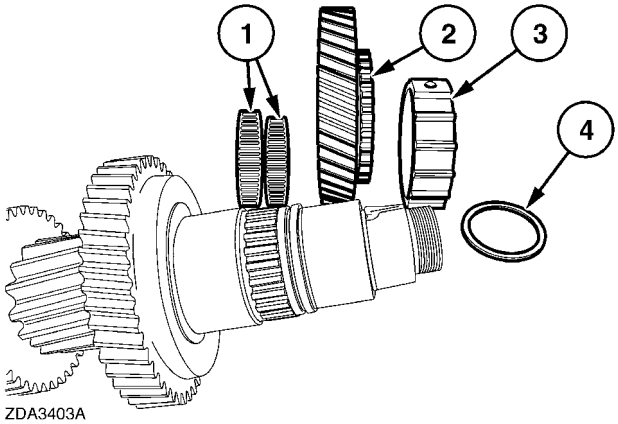
47-41B - Use insulated gloves or mittens when working with hot parts.



ZDA3402A

3402a 1

2. Install needle bearings **(1)**. Install gear **(2)**. Install selector housing **(3)**. Install washer **(4)**.

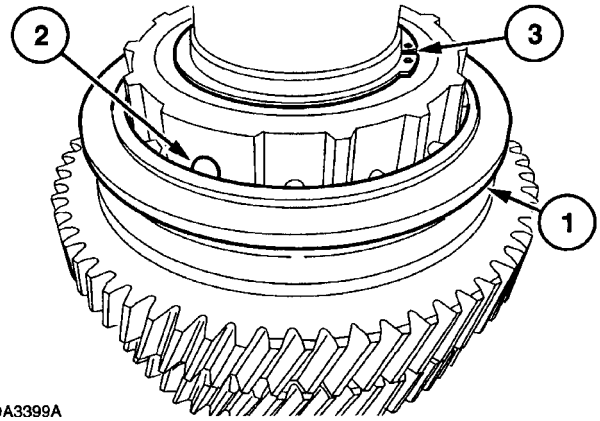


ZDA3403A

3403a 2

3. Install retaining ring **(3)**. Install two springs and two balls **(2)** and at the same time install selector ring **(1)**.

NOTE: *Be careful not to lose the balls.*

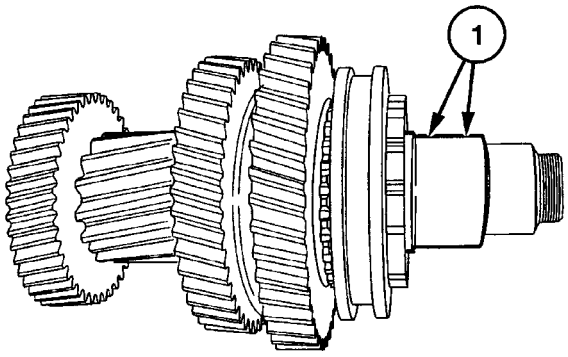


ZDA3399A

3399a 3

https://truckmanualshub.com/

4. Install needle bearings **(1)**.



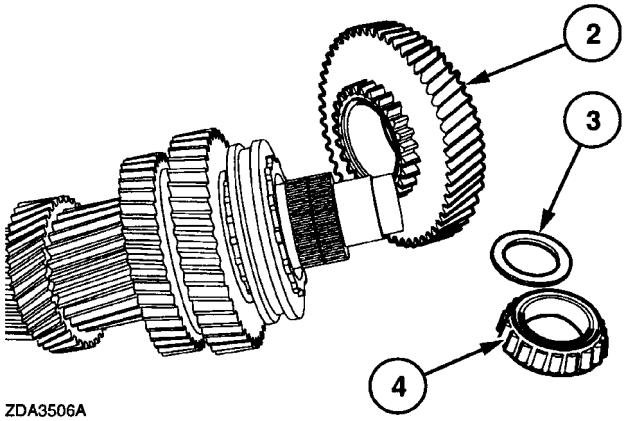
ZDA3398A

3398a 4

5. Install gear **(2)**. Install washer **(3)** and heat bearing **(4)** to **80 °C** (**176 °F**) and install it on the drive shaft.

⚠ CAUTION ⚠

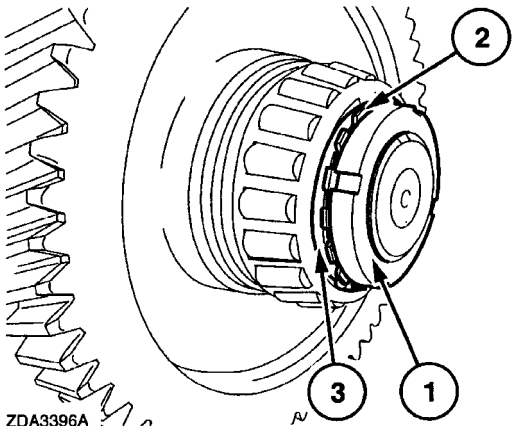
47-41B - Use insulated gloves or mittens when working with hot parts.



ZDA3506A

3506a 5

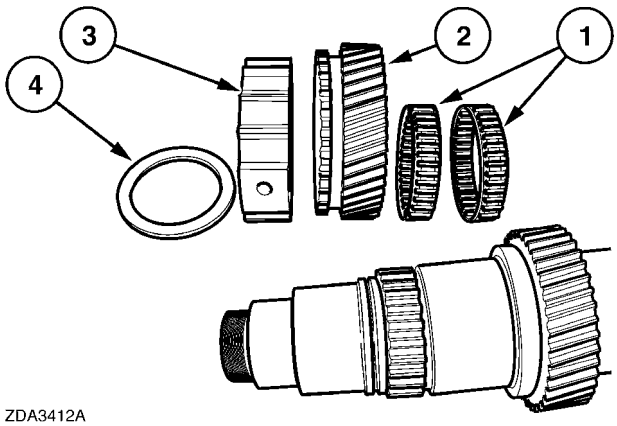
6. Install washer **(3)**. Install new lock-washer **(2)**. Install nut **(1)** using tool **380001074** and tighten it to a torque of **150 - 170 Nm** (**111 - 125 lb ft**) . Secure nut **(1)** by bending a lip of the lock-washer into one of the notches of the nut.



ZDA3396A

3396a 6

7. To assemble the input shaft begin by installing needle bearings **(1)**. Install gear **(2)**. Install selector housing **(3)**. Install washer **(4)**.

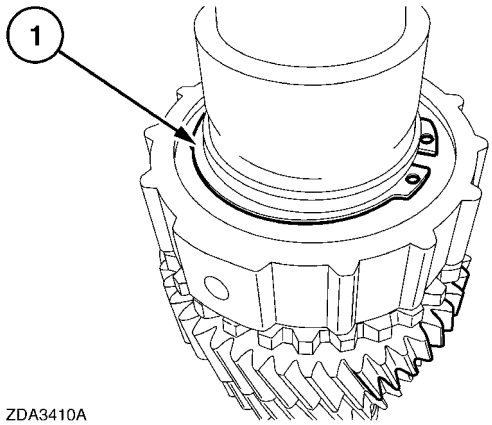


ZDA3412A

3412a 7

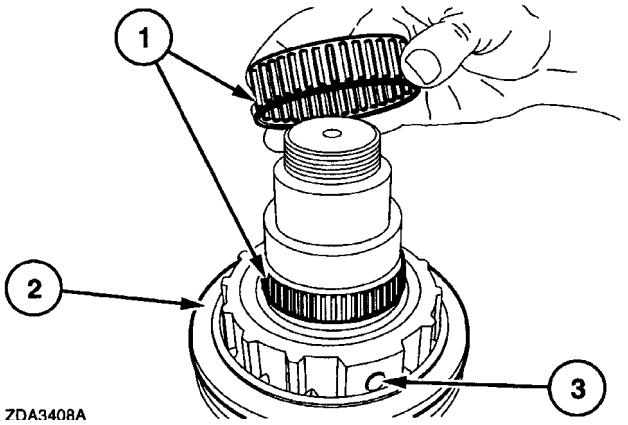
https://truckmanualshub.com/

8. Install retaining ring **(1)**.



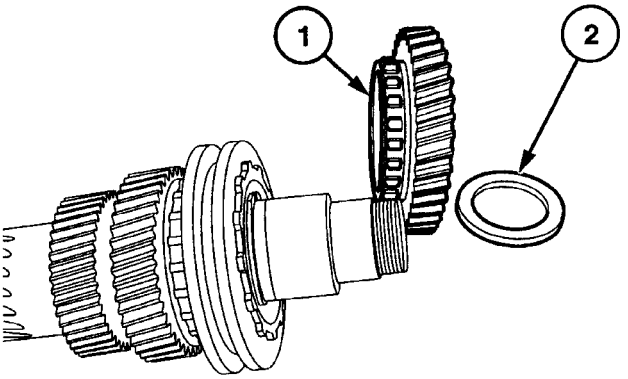
3410a 8

9. Install the two springs and two balls **(3)** and at the same time install selector ring **(2)**. Do not to lose the balls. Install needle bearings **(1)**.



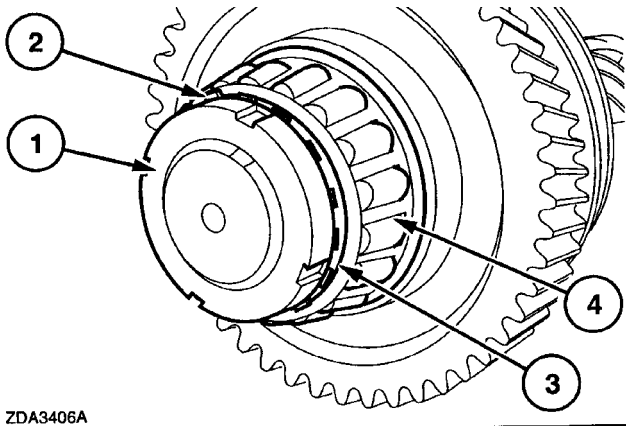
3408a 9

10. Install gear **(1)**. Install washer **(2)**.



3413a 10

11. Heat bearing **(4)** to **80 °C** (**176 °F**) and install it on the input shaft. Install washer **(3)**. Install new lock-washer **(2)**. Install nut **(1)** using tool **380001074** and tighten to a torque of **150 - 170 Nm** (**111 - 125 lb ft**). Secure nut **(1)** by bending a lip of the lock-washer in one of the notches of the nut.



3406a 11

https://truckmanualshub.com/

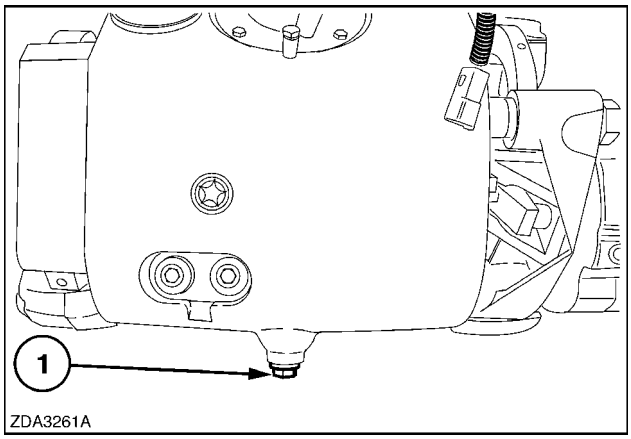
Differential - Remove (C.20.B.50 - F.10.A.10)

AFX8010

Prior operation: Remove top cover. **Housing - Disassemble (C.20.B.74 - F.10.A.25)**
Prior operation: Remove service brakes. **Brake - Remove (D.30.C.58 - F.10.A.10)**

1. Drain the oil through plug **(1)**.

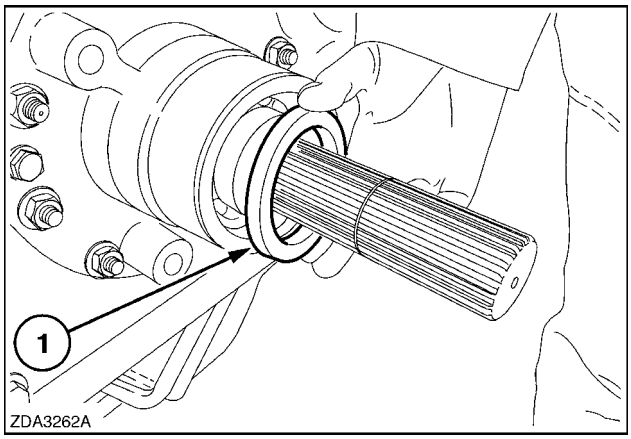
NOTE: *The transmission gearbox contains 19 liters (20 quarts) of oil.*



3261a 1

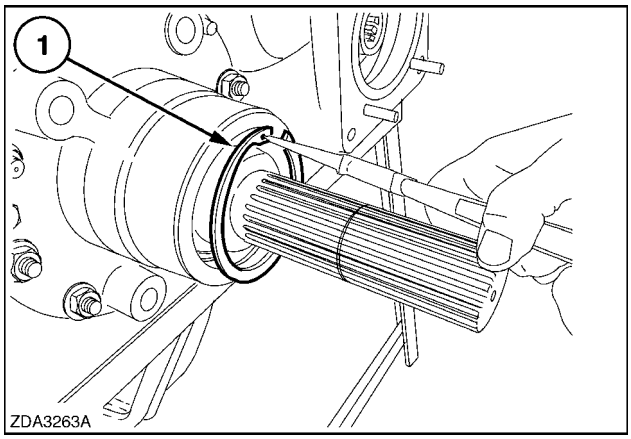
2. Remove the seal **(1)** from the right side differential shaft.

NOTE: *It is not possible to remove seal **(1)** without damaging it.*



3262a 2

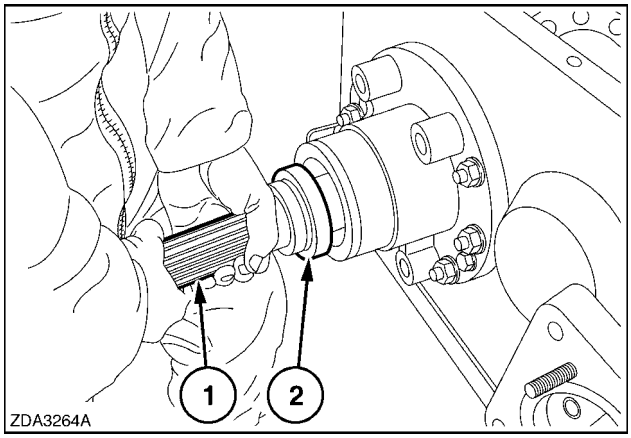
3. Remove retaining ring **(1)**.



3263a 3

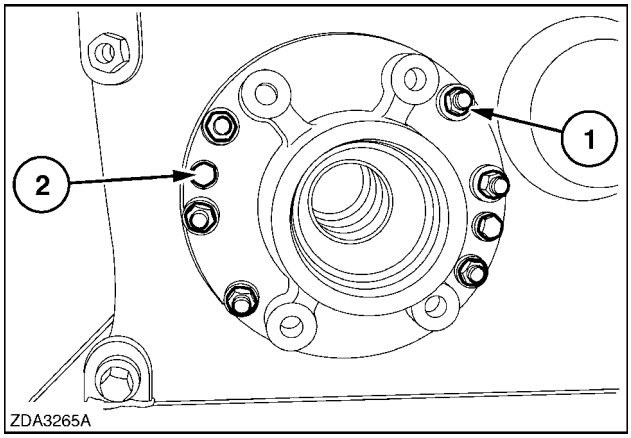
https://truckmanualshub.com/

4. Pull out shaft **(1)** together with bearing **(2)**.



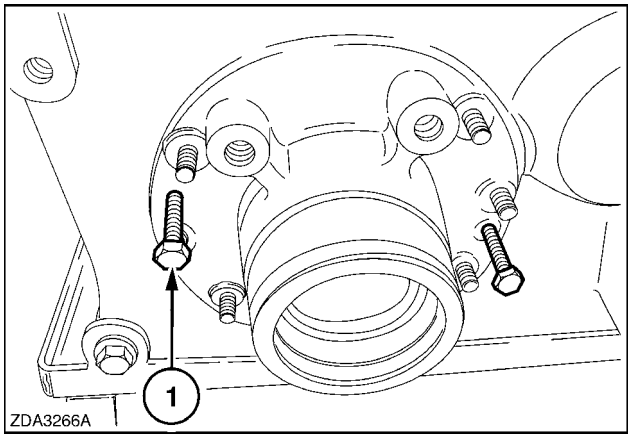
3264a 4

5. Remove six nuts and washers **(1)**. Remove two bolts and washers **(2)**.



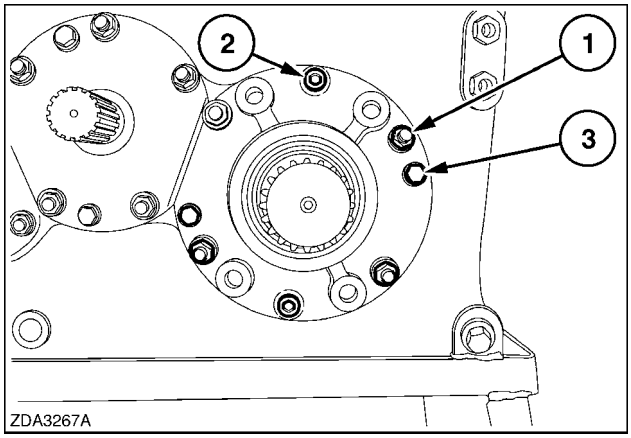
3265a 5

6. Install two bolts **(1)** (M10 x 60) to push bearing housing out of gearbox housing **(2)**.



3266a 6

7. Support the differential with a hoist to prevent it from falling into the gearbox. Remove four nuts and washers **(1)** from the right side differential shaft housing. Remove two Hex Socket Head Cap Screws **(2)**. Remove two bolts and washers **(3)**.

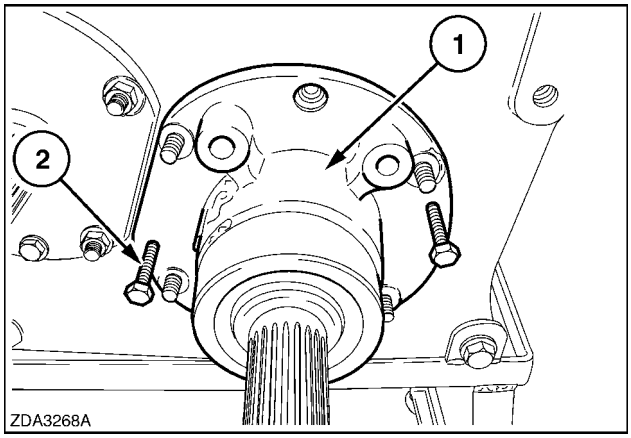


3267a 7

https://truckmanualshub.com/

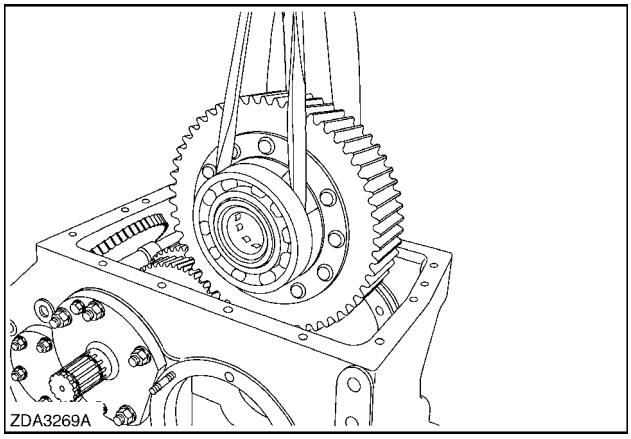
8. Install two bolts (M10 x 60) **(2)**, to push bearing housing **(1)** out of the gearbox housing.

NOTE: *If transmission is equipped with optional differential lock, lock collar and spring will remain on shaft when bearing housing is removed.*



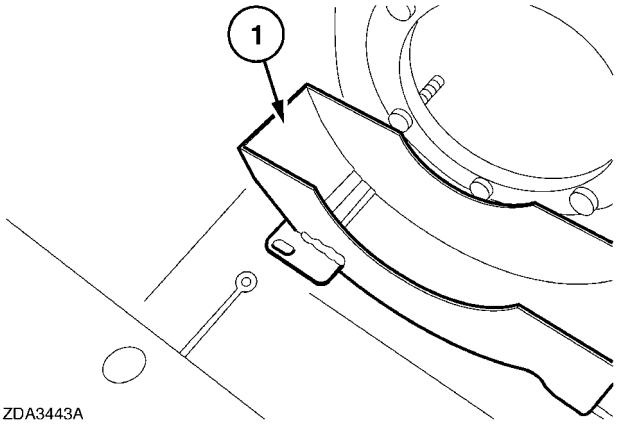
3268a 8

9. Remove the differential.



3269a 9

10. Remove oil baffle plate **(1)** by removing 4 bolts and washers.



3443a 10

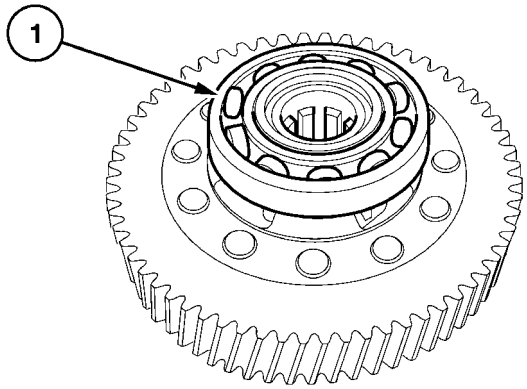
Next operation: Differential - Disassemble (C.20.B.50 - F.10.A.25)
Next operation: Disassemble differential shaft per **Shaft - Disassemble (C.20.B.43 - F.10.A.25)**.

https://truckmanualshub.com/

Differential - Disassemble (C.20.B.50 - F.10.A.25)

AFX8010

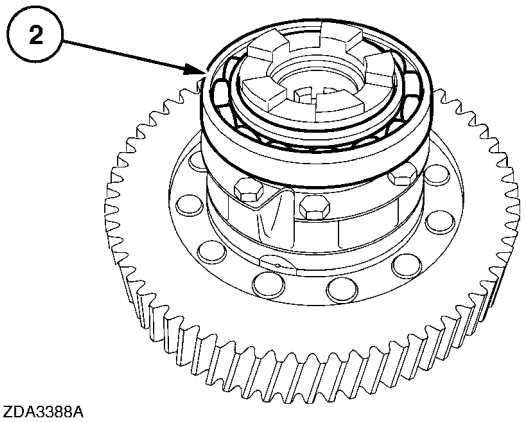
1. Remove bearing **(1)**.



ZDA3387A

3387a 1

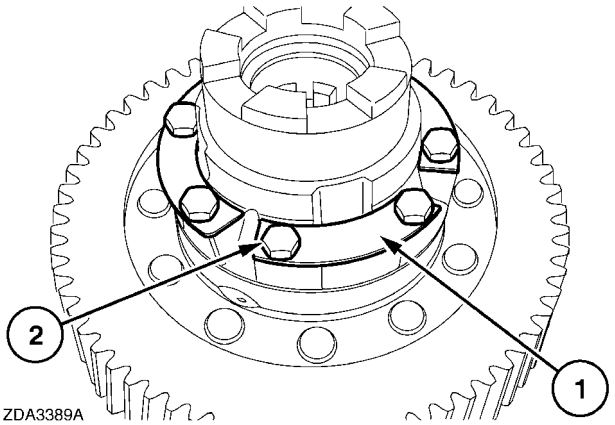
2. Turn over the differential and remove bearing **(2)**.



ZDA3388A

3388a 2

3. Unlock lock plates, **(1)** and remove bolts **(2)**and the lock plates.

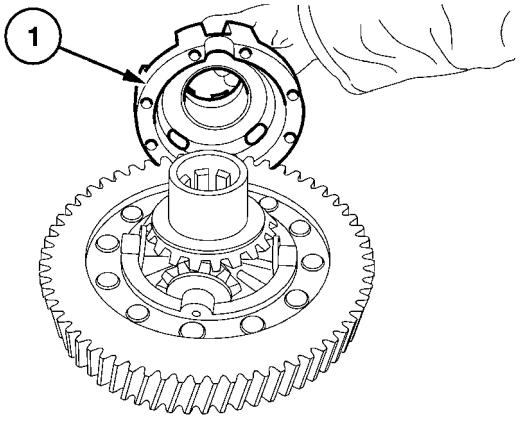


ZDA3389A

3389a 3

https://truckmanualshub.com/

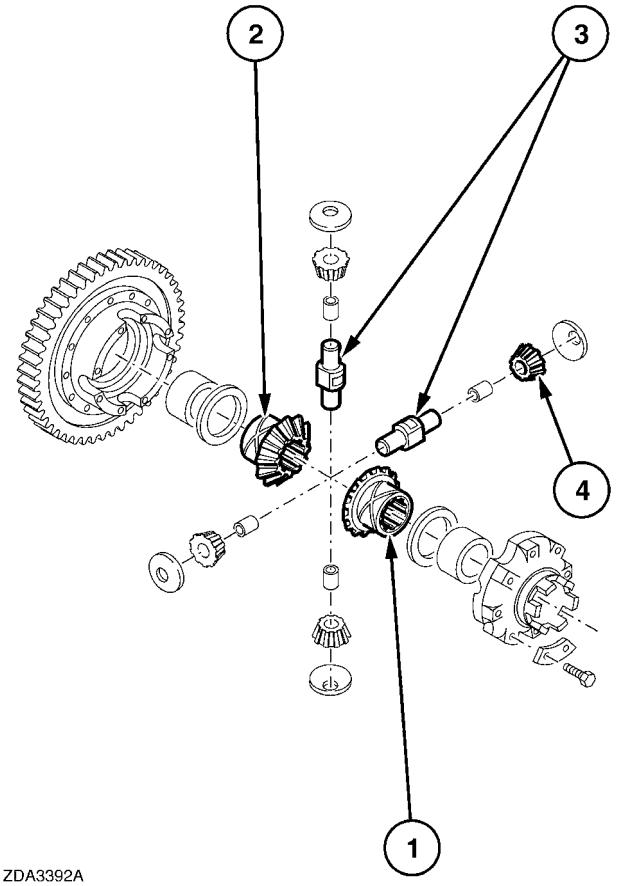
4. Remove upper part **(1)** of the differential housing.



ZDA3390A

3390a 4

5. Remove differential output gears **(1)** and **(2)**. Remove two planet gear shafts **(3)** with the planet gears **(4)**.



ZDA3392A

3392a 5

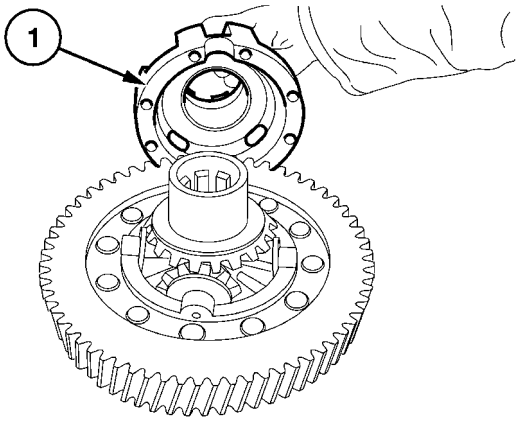
https://truckmanualshub.com/

Differential - Assemble (C.20.B.50 - F.10.A.20)

AFX8010

1. Replace thrust washers, bushings, gears and shafts as necessary.
2. Install the bushings, thrust washers, differential output gears, planet gears and thrust washers with the planet gear shafts.
3. Install differential housing **(1)**.

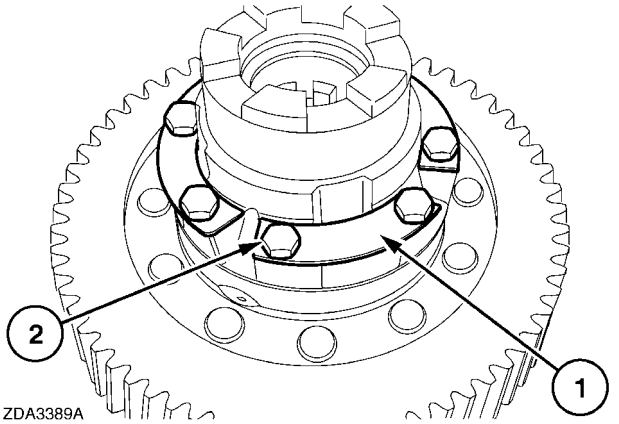
NOTE: *The two castings of the housing are machined together and are marked in this position. When re-assembling make sure that these marks are aligned.*



ZDA3390A

3390a 1

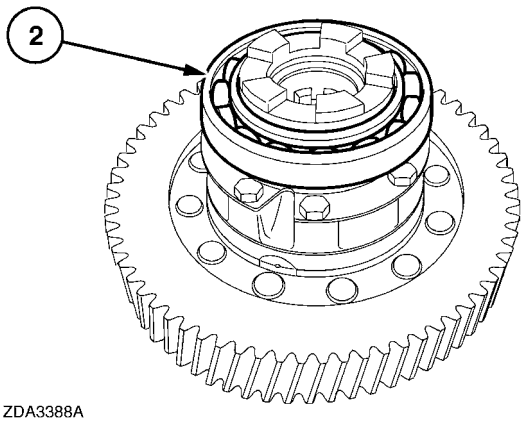
4. Install new lock plates **(1)** and bolts **(2)**. Torque the M10 bolts to **46 - 52 Nm** (**34 - 38.3 lb ft**)



ZDA3389A

3389a 2

5. Secure bolts **(2)** by bending the tabs of the identity plate to lock the head of the bolt..
6. Install bearing **(2)**.

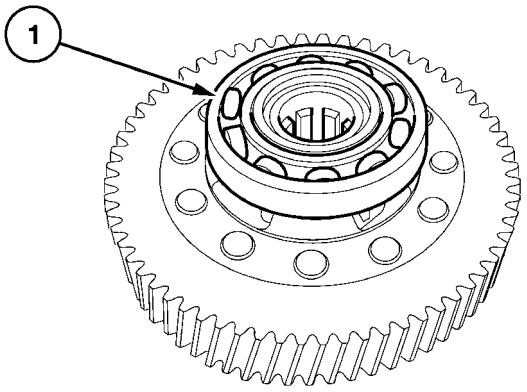


ZDA3388A

3388a 3

https://truckmanualshub.com/

7. Install bearing **(1)**.



ZDA3387A

3387a 4

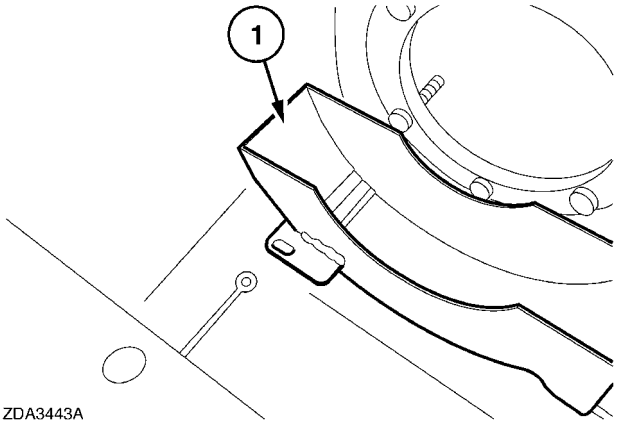
https://truckmanualshub.com/

Differential - Install (C.20.B.50 - F.10.A.15)

AFX8010

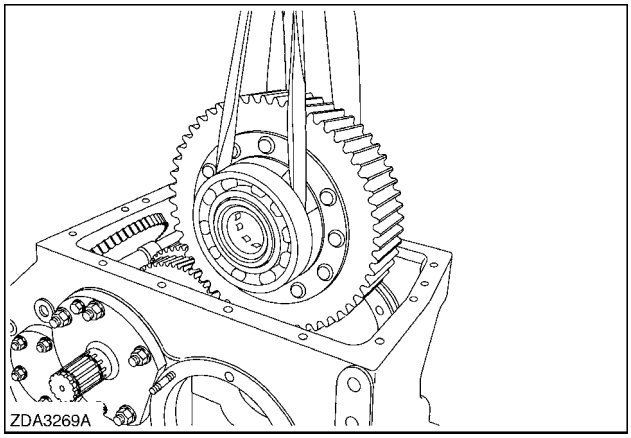
Prior operation: Differential - Assemble (C.20.B.50 - F.10.A.20)

1. Install oil baffle plate **(1)** with cap screws and washers. Torque the M8 bolts to **23.1 - 25.9 Nm** (**17 - 19.1 lb ft**) .



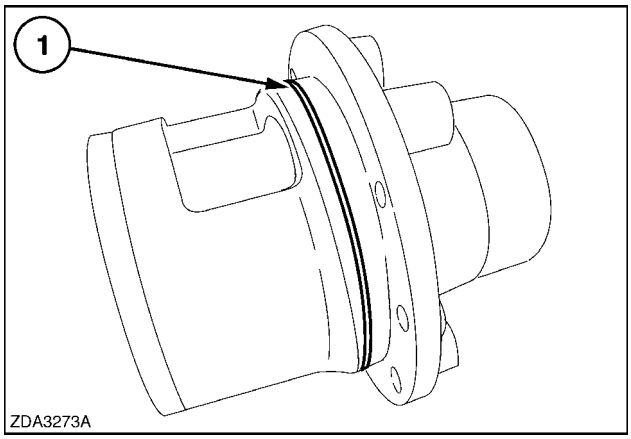
3443a 1

2. Support the differential on a hoist and bring it into the gearbox.



3269a 2

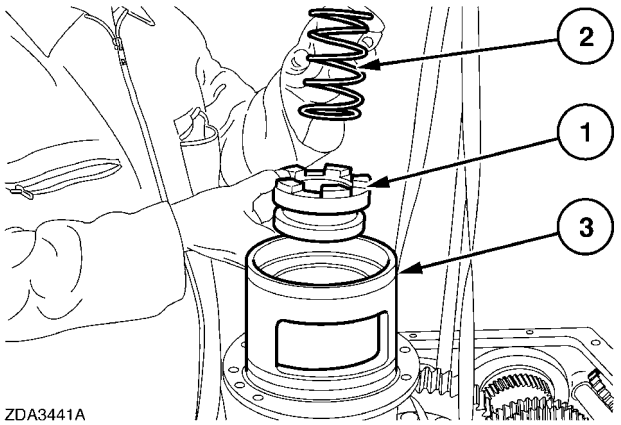
3. On the differential shaft housings, replace O-rings **(1)**.



3273a 3

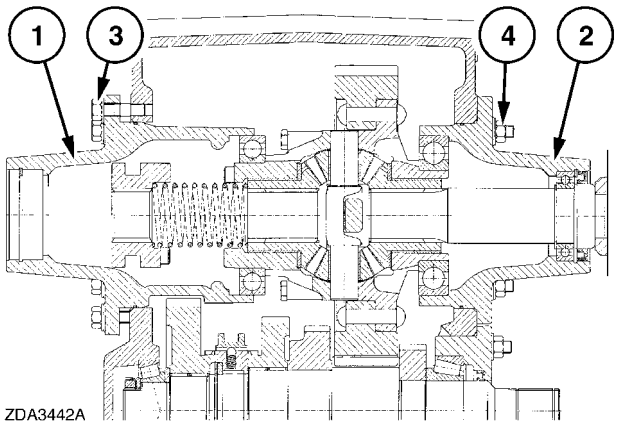
https://truckmanualshub.com/

4. If transmission has differential lock option, bring differential lock **(1)** and spring **(2)** into left differential shaft housing **(3)**.



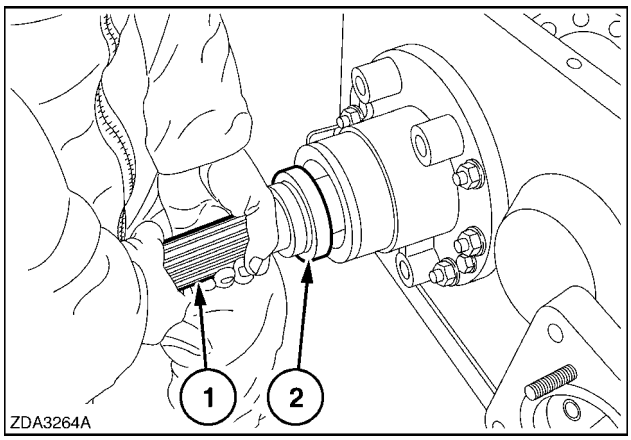
3441a 4

5. Install both half shafts housings **(1)** and **(2)** and tighten all nuts, bolts and hex socket screws **(3)** and **(4)** simultaneously. Torque the M12 nuts to **80 - 90 Nm (59 - 66 lb ft)**. Torque the M10 bolts to **46 - 52 Nm** (**34 - 38.3 lb ft**) . Torque the M16 bolts to **90 - 100 Nm** (**66 - 74 lb ft**) .



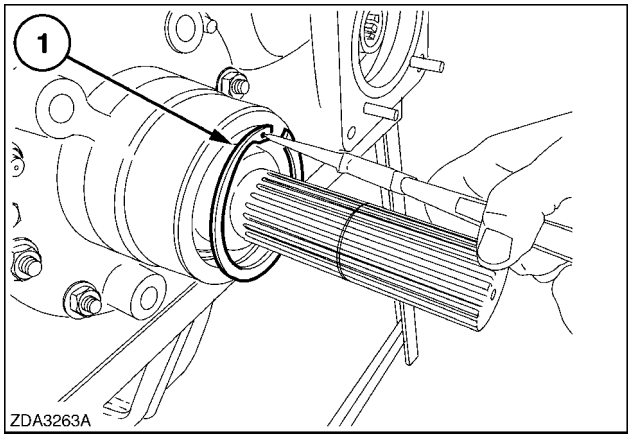
3442a 5

6. Install shafts **(1)** with bearings **(2)**. If transmission is equipped with optional differential lock, insure that lock collar and spring are assembled on Left side shaft, before shaft engages differential.



3264a 6

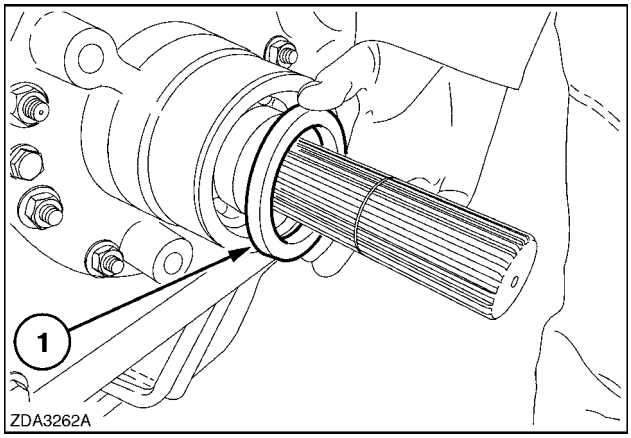
7. Install retaining rings **(1)**.



3263a 7

https://truckmanualshub.com/

8. Install new seals **(1)**, recessed into bearing housings.



3262a 8

Next operation: Replace transmission cover. **Housing - Assemble (C.20.B.74 - F.10.A.20)**

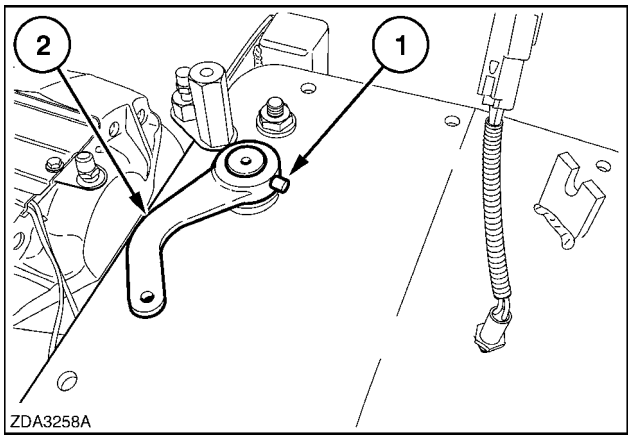
https://truckmanualshub.com/

Differential lock command - Overhaul (C.20.B.51 - F.10.A.40)

AFX8010

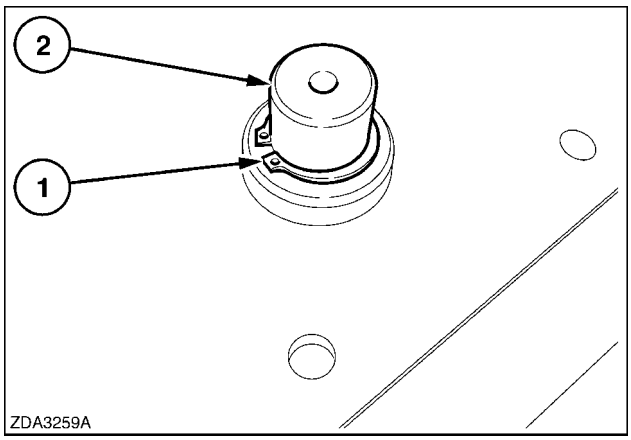
Prior operation: Remove the transmission cover per: **Housing - Disassemble (C.20.B.74 - F.10.A.25)**

1. Remove the pin **(1)** and differential lock control lever **(2)** .



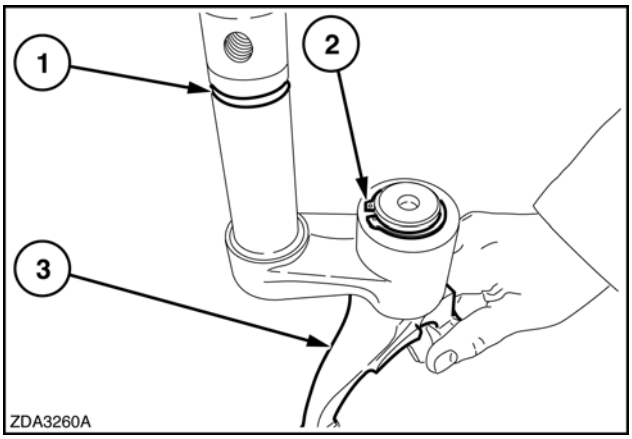
3258a 1

2. Remove retaining ring **(1)** and differential lock control shaft **(2)**.



3259a 2

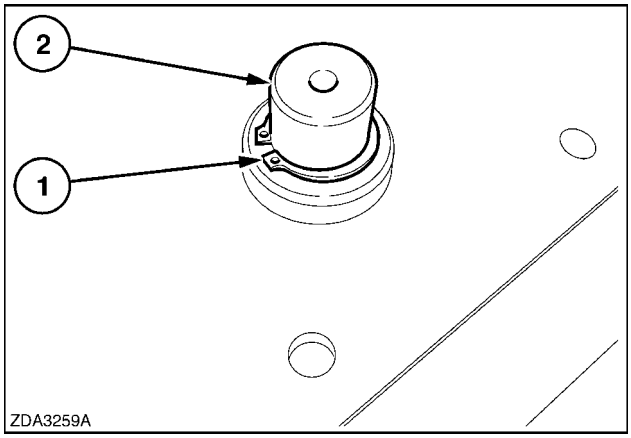
3. Replace O-ring **(1)**. Remove retaining ring **(2)** to remove fork **(3)**. To assemble, install fork **(3)** and fix with retaining ring **(2)** .



3260a 3

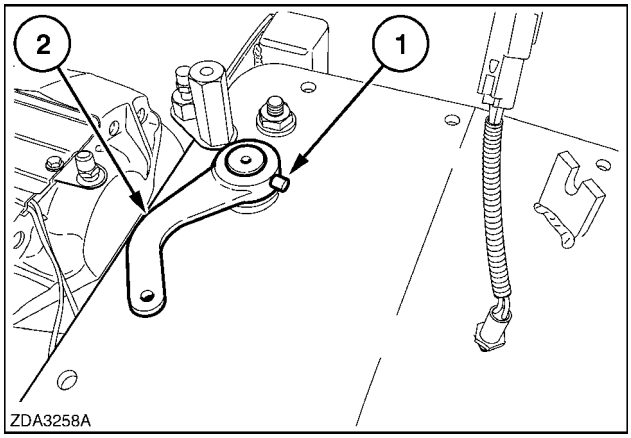
https://truckmanualshub.com/

4. Install differential lock control shaft **(2)** and install retaining ring **(1)**.



3259a 4

5. Install differential lock control lever **(2)** and fix with retaining pin **(1)**.



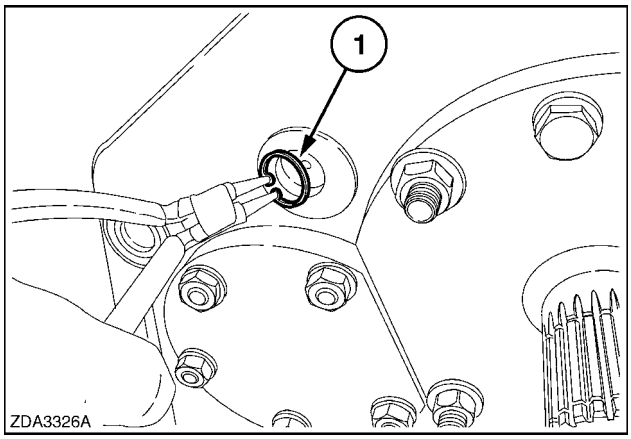
3258a 5

https://truckmanualshub.com/

Fork and shift rail - Remove (C.20.B.56 - F.10.A.10)

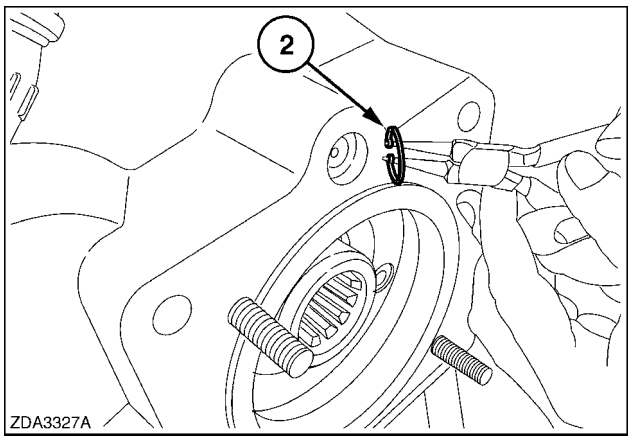
AFX8010

1. Remove retaining ring **(1)**.



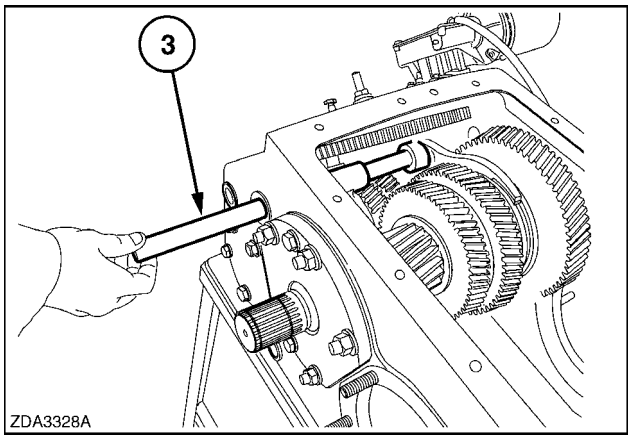
3326a 1

2. Remove retaining ring **(2)**.



3327a 2

3. Remove selector shaft **(3)**.



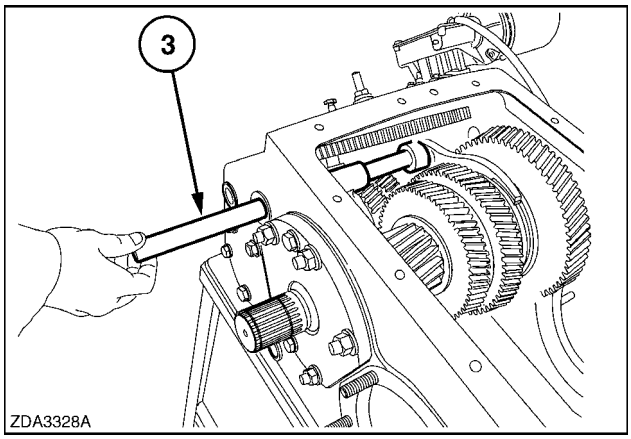
3328a 3

https://truckmanualshub.com/

Fork and shift rail - Install (C.20.B.56 - F.10.A.15)

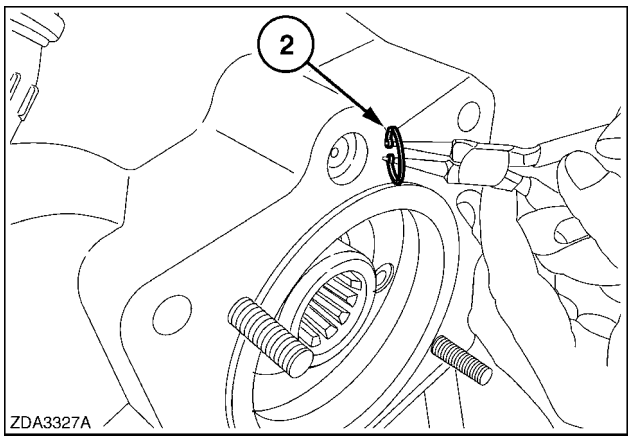
AFX8010

1. To install the selector shaft in the transmission, start with replacing the O-rings in the gearbox housing, where the selector shaft **(3)** is installed, if necessary. Install selector shaft **(3)**. Put the selector forks on the shaft. Make sure guide blocks are installed on selector forks.



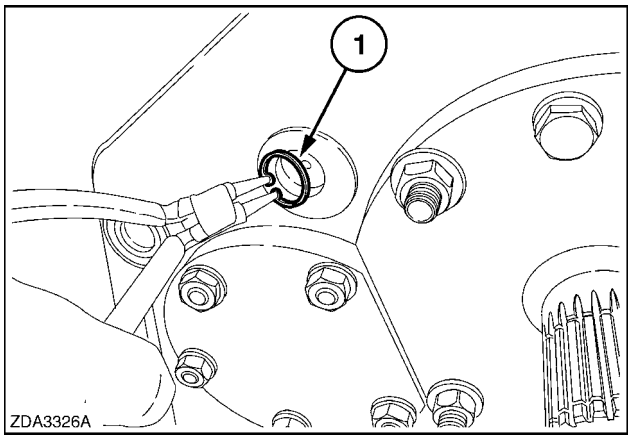
3328a 1

2. Install retaining ring **(2)**.



3327a 2

3. Install retaining ring **(1)**.



3326a 3

https://truckmanualshub.com/

Housing - Disassemble (C.20.B.74 - F.10.A.25)

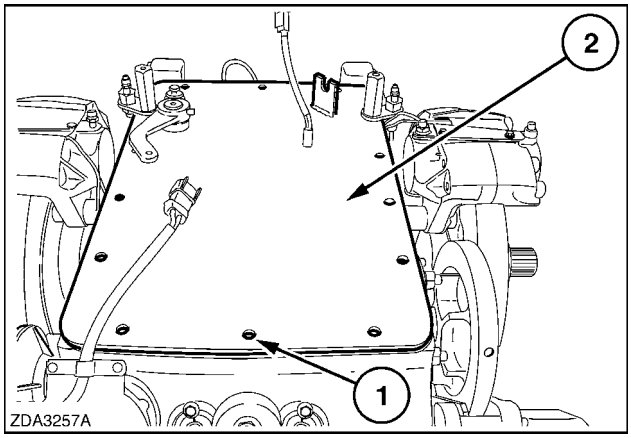
AFX8010

To remove the transmission cover proceed as follows:

⚠ WARNING ⚠

84-108 - Raised equipment or machine movement without an operator can cause injury or death. Before you service this machine, do the following: 1. Park the machine on a level surface. 2. Support or lower the equipment (backhoe, blade, boom, bucket, etc.) to the ground (if equipped). 3. Apply the parking brake (if equipped). 4. Stop the engine. 5. Block the machine (wheels, tracks, etc.) to prevent machine movement.

1. Remove all bolts **(1)** and cover **(2)** .



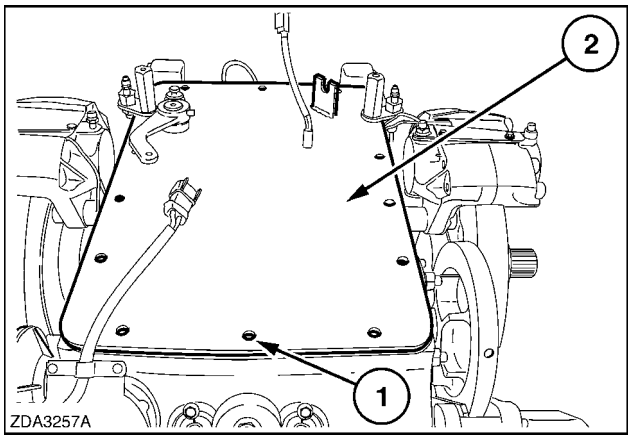
3257a 1

https://truckmanualshub.com/

Housing - Assemble (C.20.B.74 - F.10.A.20)

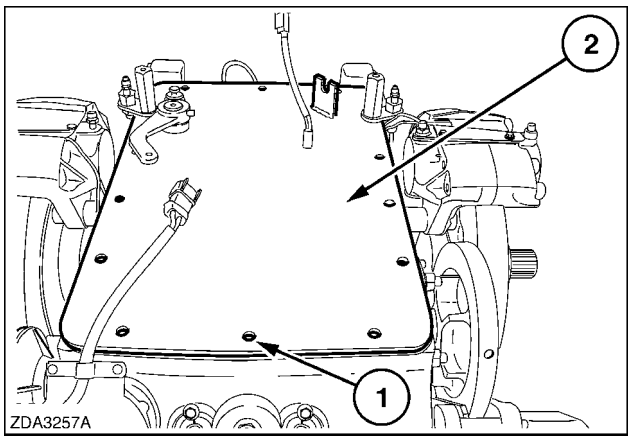
AFX8010

1. Install cover **(2)** with a new gasket, being sure that the differential lock control fork is correctly positioned (if equipped).



3257a 1

2. Install cover bolts **(1)** and tighten. Torque the cover bolts in a cross pattern evenly to **45 - 55 Nm** (**33 - 41 lb ft**).



ZDA3257A 2

https://truckmanualshub.com/

Electrical motor - Short circuit (C.20.B.82 - G.30.B.52)

AFX8010

E0171-06 - Transmission Shift Current Sense

Cause:
The transmission shift motor M-02 circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted to ground.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the transmission shift motor in order to move it in either direction. The CCM module monitors both sides of the circuit during operation, and issues one or both fault codes, depending on the type of failure detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM2 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "SHIFT MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually shift the transmission in each direction. Record in which directions the transmission shift motor operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for fault codes **E0171 - Transmission Shift Current Sense** and **E0203-11 - Transmission Shift Motor** .
4	Use the appropriate result below to determine the location of the fault.

   A. If the transmission shift motor operates in one direction only, and the fault code **E0171 - Transmission Shift Current Sense** is displayed, continue with step **2**.

   B. If the transmission shift motor operates in one direction only, and both fault codes **E0171 - Transmission Shift Current Sense** and **E0203-11 - Transmission Shift Motor** are displayed, continue with step **3**.

   C. If the transmission shift motor does not operate in either direction, and the fault code **E0171 - Transmission Shift Current Sense** is displayed, continue with step **2**.

   D. If the transmission shift motor does not operate in either direction, and both fault codes **E0171 - Transmission Shift Current Sense** and **E0203-11 - Transmission Shift Motor** are displayed, continue with step **8**.

   E. If the transmission shift motor does not operate in either direction, and no fault codes are displayed, continue with step **13**.

2. The transmission shift mechanism is mechanically bound up, resulting in high current draw.

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A. Refer to the appropriate repair manual chapter for repair and adjustment of the transmission shift assembly.

3. Fault codes indicate circuit fault due to short to ground. Disconnect the transmission shift motor connector **X094**. Use a multimeter to check for continuity between the motor side of connector **X094** pins A and B and chassis ground. There should not be any continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the motor. Replace the transmission shift motor.

   B. If there is no continuity to ground, continue with step **4**.

4. Disconnect the batteries by removing the negative battery cables. Use a multimeter to check for continuity between the harness end of connector **X094** pin B and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **5**.

   B. If no continuity is found, continue with step **6**.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

5. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 3 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 3 and connector**X094** pin B wire 715 grey. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 3 and connector **X017** pins J3-19 and J3-20 on one of the following wires: wire 715 grey, connector **X023** pin 3 to FF harness splice, wire 526 grey, harness splice to connector **X017** pin J3-19, and wire 527 grey, harness splice to connector **X017** pin J3-20. Locate the short and repair.

6. Disconnect connector **X094**. Use a multimeter to check for continuity between the harness end of connector **X094** pin A and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **7**.

   B. If no continuity is found, recheck the motor for continuity to ground at step **3**.

7. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 4 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 4 and connector**X094** pin A wire 716 white. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 4 and connector **X017** pins J3-39 and J3-40 on one of the following wires: wire 716 white, connector **X023** pin 4 to FF harness splice, wire 528 white, harness splice to connector **X017** pin J3-39, and wire 529 white, harness splice to connector **X017** pin J3-40. Locate the short and repair.

8. Fault codes indicate circuit failure due to open circuit condition. Disconnect the transmission shift motor connector **X094**. Use a multimeter to measure the resistance between the motor end of connector **X094** pins A and B. The correct resistance is **28 - 33 ohms**.

   A. If the resistance is infinite, there is an open condition in the motor. Replace the transmission shift motor.

   B. If the resistance is within specification, continue with step **9**.

9. Ensure that the battery cables are securely connected, and that fuse F-25 is good. Use a multimeter to check for continuity between the harness end of connector **X094** pin B and chassis ground. There should be continuity to ground.

   A. If continuity is found, continue with step **11**.

   B. If no continuity is found, continue with step **10**.

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NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F-25. This ground path may be used to test for an open circuit condition.*

10. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 3 and chassis ground. There should be continuity to ground.

    A. If continuity is found, there is as open circuit in the lower frame (LF) harness between connector **X023** pin 3 and connector**X094** pin B wire 715 grey. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 3 and connector **X017** pins J3-19 and J3-20 on one of the following wires: wire 715 grey, connector **X023** pin 3 to FF harness splice, wire 526 grey, harness splice to connector **X017** pin J3-19, and wire 527 grey, harness splice to connector **X017** pin J3-20. Locate the open and repair.

11. Disconnect connector **X094**. Use a multimeter to check for continuity between the harness end of connector **X094** pin A and chassis ground. There should be continuity to ground.

    A. If no continuity is found, continue with step **12**.

    B. If continuity is found, recheck the motor for continuity at step **8**.

12. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 4 and chassis ground. There should not be any continuity to ground.

    A. If continuity is found, there is an open circuit to ground in the lower frame (LF) harness between connector **X023** pin 4 and connector**X094** pin A wire 716 white. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 4 and connector **X017** pins J3-39 and J3-40 on one of the following wires: wire 716 white, connector **X023** pin 4 to FF harness splice, wire 528 white, harness splice to connector **X017** pin J3-39, and wire 529 white, harness splice to connector **X017** pin J3-40. Locate the open and repair.

13. If the transmission shift motor does not operate in either direction, and there are no fault codes indicated, the supply power for the circuit may not be present. Remove and inspect fuse F-25.

    A. If the fuse has failed, continue with step **14**.

    B. If the fuse is okay, continue with step **15**.

14. If fuse F-25 has failed, replace the fuse.

    A. If the fuse immediately fails, there is a short to ground in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 029 red, from the fuse panel through connector **X031** pin 14 to front frame (FF) harness splice, wire 507 red, harness splice to connector **X017** pin J3-29 on CCM2 module, or wire 508 red, harness splice to connector **X017** pin J3-30 on CCM2 module. Locate the short to ground and repair.

    B. If the fuse is okay, continue with step **15**.

15. Carefully remove connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for voltage on the harness end of connector **X017** pins J3-29 and J3-30. There should be **12 volts**.

    A. If there is no voltage, there is an open circuit in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 029 red, from the fuse panel through connector **X031** pin 14 to front frame (FF) harness splice, wire 507 red, harness splice to connector **X017** pin J3-29 on CCM2 module, or wire 508 red, harness splice to connector **X017** pin J3-30 on CCM2 module. Locate the open and repair. After repair, go to step **16**.

    B. If there is voltage, continue with step **16**.

16. Carefully remove connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for continuity between the harness end of connector **X017** pins J3-9 and J3-10 and chassis ground. There should be continuity to ground.

    A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness in one of the following wires; wire 516 black, connector **X017** pin J3-9 to front frame (FF) harness splice, wire 517

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black, connector **X017** pin J3-10 to front frame (FF) harness splice, or wire 538 black, harness splice to front frame ground #2.Locate the open and repair. After repair, go to step **17**.

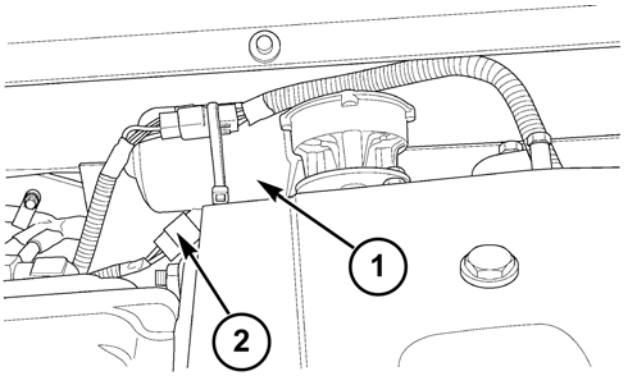
B. If there is continuity to ground, continue with step **17**.

17. Once it has been verified that power is being supplied to the module, recheck circuit operation as described in step 1.

A. If the fuse fails during testing, a short to ground on the circuit to the transmission shift motor is causing the fuse to fail. Start the troubleshooting at step **3** to locate the short to ground.

B. If the circuit operates properly, erase the fault codes and continue operation.

Electrical motor - Overview (C.20.B.82 - C.10.A.10)



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The transmission shift motor M-02 **(1)** is located on the top left rear corner of the transmission. The motor is mounted to a right angle drive gearbox, and drives a gear inside the transmission to rotate the shifting disc that controls the movement of the shift forks. The transmission shift motor M-02 is connected (**X094**) to the lower frame (LF) harness at **(2)**, and is controlled by the CCM2 module through connector **X017** as follows:

Transmission shift motor function	Pin number at CCM1 connector X017
Up-shifting	J3-19, J3-20 = power; J3-39, J3-40 = ground
Down-shifting	J3-39, J3-40 = power; J3-19, J3-20 = ground

The CCM2 module uses two pairs of pins to send current to the transmission shift motor using an H-bridge controlled circuit, which reverses the power and ground connections to the transmission shift motor in order to move it in either direction. The CCM2 module monitors both sides of the circuit during operation; in the event that a fault occurs with the motor or wiring, a fault code will be displayed to the operator.

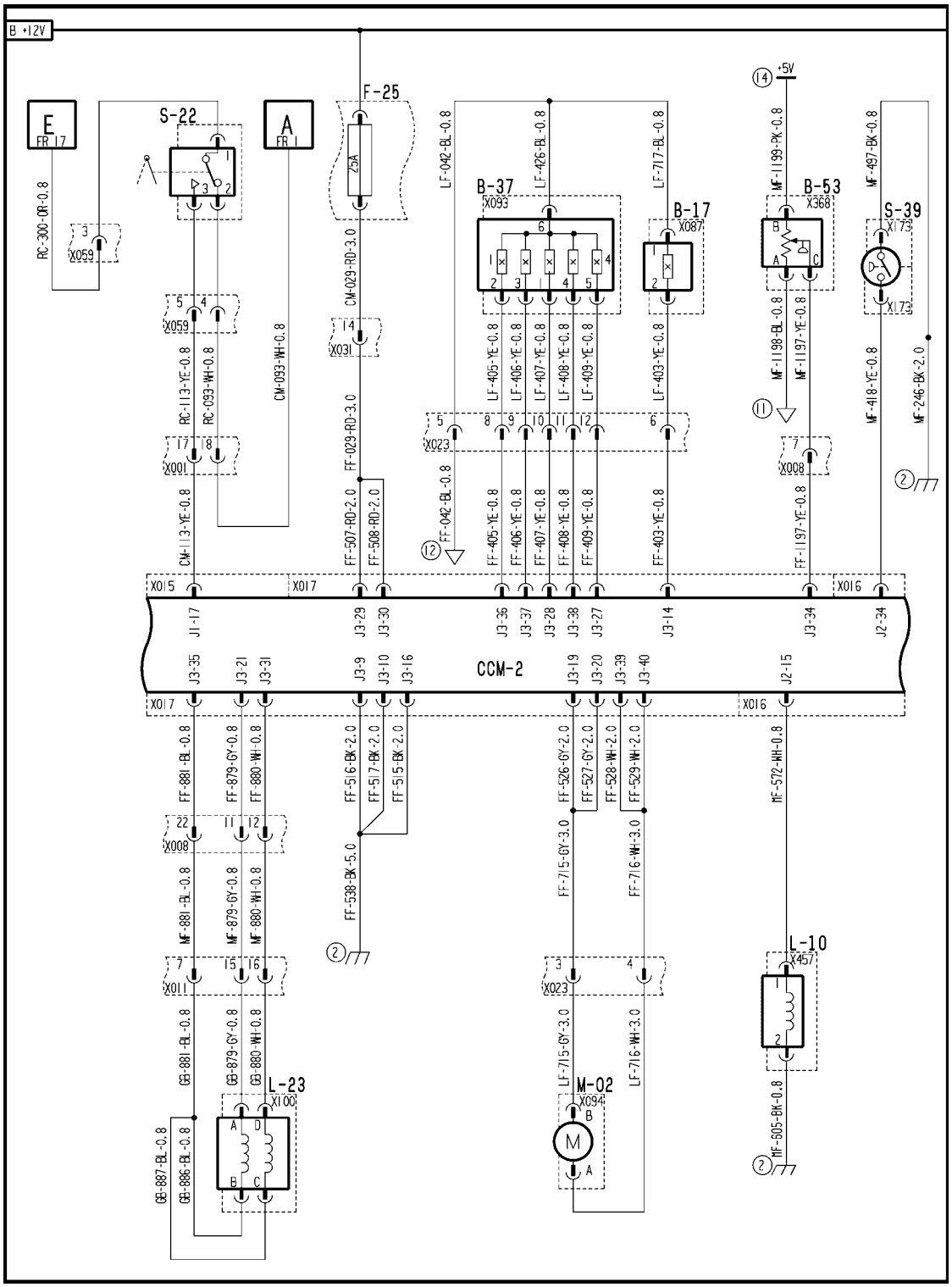
E0171-06 - Transmission Shift Current Sense

E0203-11 - Transmission Shift Motor

For additional information on the gear shifting process, refer to: **Electrical motor - Dynamic description (C.20.B.82 - C.30.A.10)**.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

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Electrical motor - Unidentified failure (C.20.B.82 - G.30.B.46)

AFX8010

E0203-11 - Transmission Shift Motor

Cause:
The transmission shift motor M-02 circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted to ground.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the transmission shift motor in order to move it in either direction. The CCM module monitors both sides of the circuit during operation, and issues one or both fault codes, depending on the type of failure detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM2 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "SHIFT MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually shift the transmission in each direction. Record in which directions the transmission shift motor operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for fault codes **E0171 - Transmission Shift Current Sense** and **E0203-11 - Transmission Shift Motor** .
4	Use the appropriate result below to determine the location of the fault.

   A. If the transmission shift motor operates in one direction only, and the fault code **E0171 - Transmission Shift Current Sense** is displayed, continue with step **2**.

   B. If the transmission shift motor operates in one direction only, and both fault codes **E0171 - Transmission Shift Current Sense** and **E0203-11 - Transmission Shift Motor** are displayed, continue with step **3**.

   C. If the transmission shift motor does not operate in either direction, and the fault code **E0171 - Transmission Shift Current Sense** is displayed, continue with step **2**.

   D. If the transmission shift motor does not operate in either direction, and both fault codes **E0171 - Transmission Shift Current Sense** and **E0203-11 - Transmission Shift Motor** are displayed, continue with step **8**.

   E. If the transmission shift motor does not operate in either direction, and no fault codes are displayed, continue with step **13**.

2. The transmission shift mechanism is mechanically bound up, resulting in high current draw.

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A. Refer to the appropriate repair manual chapter for repair and adjustment of the transmission shift assembly.

3. Fault codes indicate circuit fault due to short to ground. Disconnect the transmission shift motor connector **X094**. Use a multimeter to check for continuity between the motor side of connector **X094** pins A and B and chassis ground. There should not be any continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the motor. Replace the transmission shift motor.

   B. If there is no continuity to ground, continue with step **4**.

4. Disconnect the batteries by removing the negative battery cables. Use a multimeter to check for continuity between the harness end of connector **X094** pin B and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **5**.

   B. If no continuity is found, continue with step **6**.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

5. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 3 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 3 and connector**X094** pin B wire 715 grey. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 3 and connector **X017** pins J3-19 and J3-20 on one of the following wires: wire 715 grey, connector **X023** pin 3 to FF harness splice, wire 526 grey, harness splice to connector **X017** pin J3-19, and wire 527 grey, harness splice to connector **X017** pin J3-20. Locate the short and repair.

6. Disconnect connector **X094**. Use a multimeter to check for continuity between the harness end of connector **X094** pin A and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **7**.

   B. If no continuity is found, recheck the motor for continuity to ground at step **3**.

7. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 4 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 4 and connector**X094** pin A wire 716 white. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 4 and connector **X017** pins J3-39 and J3-40 on one of the following wires: wire 716 white, connector **X023** pin 4 to FF harness splice, wire 528 white, harness splice to connector **X017** pin J3-39, and wire 529 white, harness splice to connector **X017** pin J3-40. Locate the short and repair.

8. Fault codes indicate circuit failure due to open circuit condition. Disconnect the transmission shift motor connector **X094**. Use a multimeter to measure the resistance between the motor end of connector **X094** pins A and B. The correct resistance is **28 - 33 ohms**.

   A. If the resistance is infinite, there is an open condition in the motor. Replace the transmission shift motor.

   B. If the resistance is within specification, continue with step **9**.

9. Ensure that the battery cables are securely connected, and that fuse F-25 is good. Use a multimeter to check for continuity between the harness end of connector **X094** pin B and chassis ground. There should be continuity to ground.

   A. If continuity is found, continue with step **11**.

   B. If no continuity is found, continue with step **10**.

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NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F-25. This ground path may be used to test for an open circuit condition.*

10. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 3 and chassis ground. There should be continuity to ground.

    A. If continuity is found, there is as open circuit in the lower frame (LF) harness between connector **X023** pin 3 and connector**X094** pin B wire 715 grey. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 3 and connector **X017** pins J3-19 and J3-20 on one of the following wires: wire 715 grey, connector **X023** pin 3 to FF harness splice, wire 526 grey, harness splice to connector **X017** pin J3-19, and wire 527 grey, harness splice to connector **X017** pin J3-20. Locate the open and repair.

11. Disconnect connector **X094**. Use a multimeter to check for continuity between the harness end of connector **X094** pin A and chassis ground. There should be continuity to ground.

    A. If no continuity is found, continue with step **12**.

    B. If continuity is found, recheck the motor for continuity at step **8**.

12. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 4 and chassis ground. There should not be any continuity to ground.

    A. If continuity is found, there is an open circuit to ground in the lower frame (LF) harness between connector **X023** pin 4 and connector**X094** pin A wire 716 white. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 4 and connector **X017** pins J3-39 and J3-40 on one of the following wires: wire 716 white, connector **X023** pin 4 to FF harness splice, wire 528 white, harness splice to connector **X017** pin J3-39, and wire 529 white, harness splice to connector **X017** pin J3-40. Locate the open and repair.

13. If the transmission shift motor does not operate in either direction, and there are no fault codes indicated, the supply power for the circuit may not be present. Remove and inspect fuse F-25.

    A. If the fuse has failed, continue with step **14**.

    B. If the fuse is okay, continue with step **15**.

14. If fuse F-25 has failed, replace the fuse.

    A. If the fuse immediately fails, there is a short to ground in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 029 red, from the fuse panel through connector **X031** pin 14 to front frame (FF) harness splice, wire 507 red, harness splice to connector **X017** pin J3-29 on CCM2 module, or wire 508 red, harness splice to connector **X017** pin J3-30 on CCM2 module. Locate the short to ground and repair.

    B. If the fuse is okay, continue with step **15**.

15. Carefully remove connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for voltage on the harness end of connector **X017** pins J3-29 and J3-30. There should be **12 volts**.

    A. If there is no voltage, there is an open circuit in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 029 red, from the fuse panel through connector **X031** pin 14 to front frame (FF) harness splice, wire 507 red, harness splice to connector **X017** pin J3-29 on CCM2 module, or wire 508 red, harness splice to connector **X017** pin J3-30 on CCM2 module. Locate the open and repair. After repair, go to step **16**.

    B. If there is voltage, continue with step **16**.

16. Carefully remove connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for continuity between the harness end of connector **X017** pins J3-9 and J3-10 and chassis ground. There should be continuity to ground.

    A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness in one of the following wires; wire 516 black, connector **X017** pin J3-9 to front frame (FF) harness splice, wire 517

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black, connector **X017** pin J3-10 to front frame (FF) harness splice, or wire 538 black, harness splice to front frame ground #2.Locate the open and repair. After repair, go to step **17**.

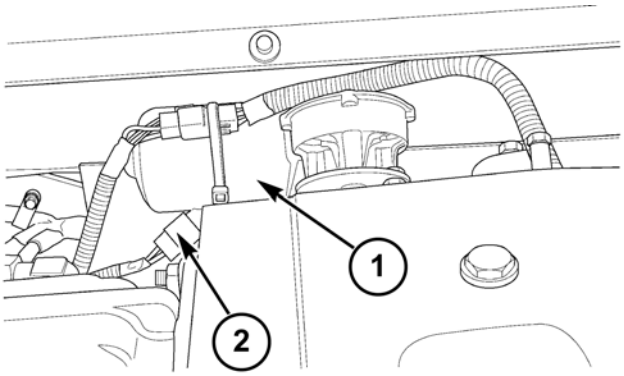
B. If there is continuity to ground, continue with step **17**.

17. Once it has been verified that power is being supplied to the module, recheck circuit operation as described in step 1.

A. If the fuse fails during testing, a short to ground on the circuit to the transmission shift motor is causing the fuse to fail. Start the troubleshooting at step **3** to locate the short to ground.

B. If the circuit operates properly, erase the fault codes and continue operation.

Electrical motor - Overview (C.20.B.82 - C.10.A.10)



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The transmission shift motor M-02 **(1)** is located on the top left rear corner of the transmission. The motor is mounted to a right angle drive gearbox, and drives a gear inside the transmission to rotate the shifting disc that controls the movement of the shift forks. The transmission shift motor M-02 is connected (**X094**) to the lower frame (LF) harness at **(2)**, and is controlled by the CCM2 module through connector **X017** as follows:

Transmission shift motor function	Pin number at CCM1 connector X017
Up-shifting	J3-19, J3-20 = power; J3-39, J3-40 = ground
Down-shifting	J3-39, J3-40 = power; J3-19, J3-20 = ground

The CCM2 module uses two pairs of pins to send current to the transmission shift motor using an H-bridge controlled circuit, which reverses the power and ground connections to the transmission shift motor in order to move it in either direction. The CCM2 module monitors both sides of the circuit during operation; in the event that a fault occurs with the motor or wiring, a fault code will be displayed to the operator.

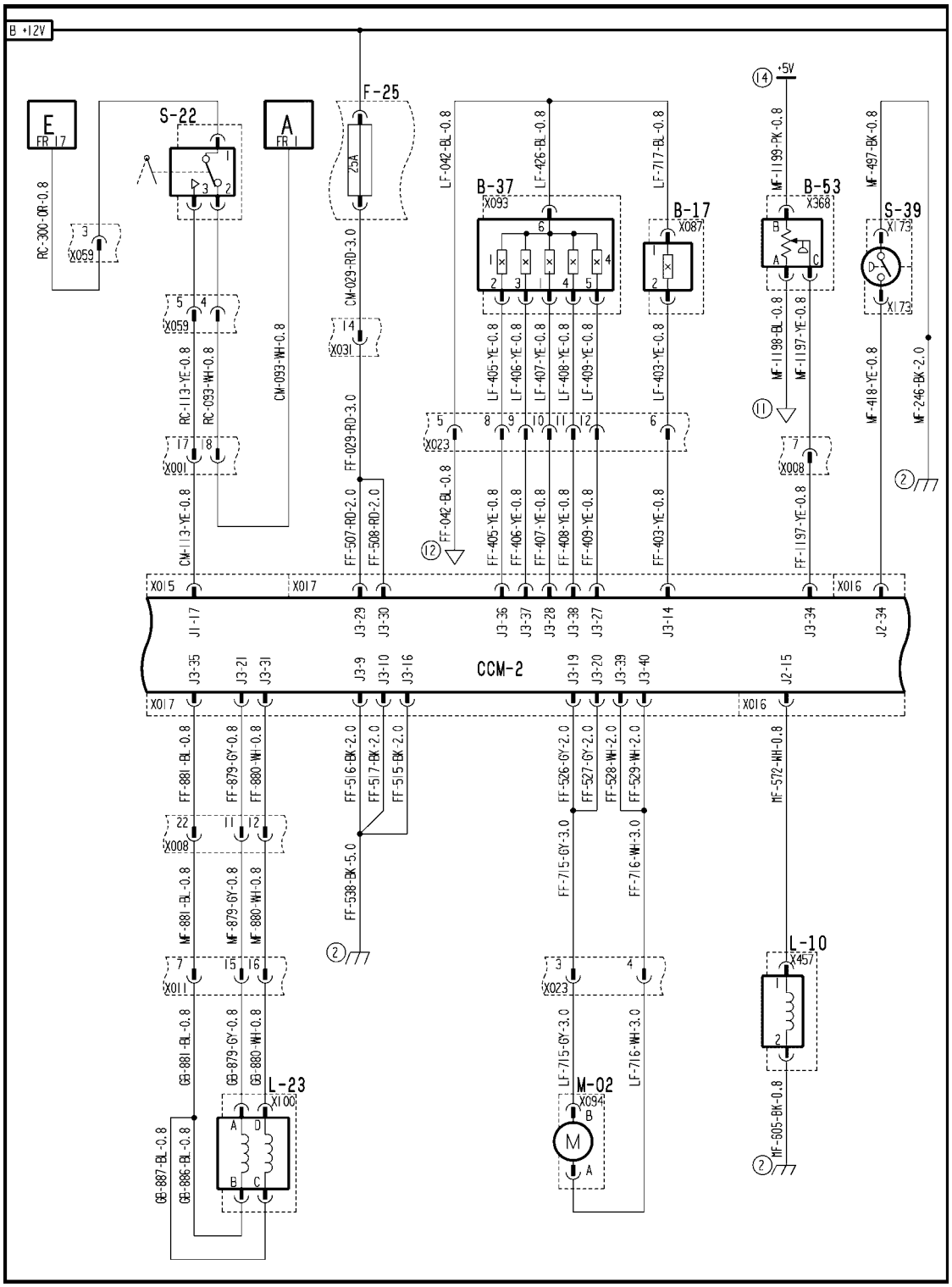
E0171-06 - Transmission Shift Current Sense

E0203-11 - Transmission Shift Motor

For additional information on the gear shifting process, refer to: **Electrical motor - Dynamic description (C.20.B.82 - C.30.A.10)**.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

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Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54)

AFX8010

E0128-03 - Trans Shift Position N Sensor

Cause:
The transmission shift position sensor B-37 "N" circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure)

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS N SEN" to check the voltage range. The proper voltage when in shift position N is **5.6 - 7.3 volts**. The proper voltage when not in shift position N is **0.5 - 5.6 volts**.

   A. If the voltage reading is high (>**9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the sensor or sensor wiring. Replace the sensor. To temporarily bypass the sensor, continue with step **5**.

   B. If the voltage remains high (>**9 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the lower frame (LF) harness between connector **X023** pin 10 and connector **X093** pin 1 wire 407 yellow. Locate the short and repair.

   B. If the voltage remains high (>**9 volts**) out of range, there is a short in the front frame (FF) harness between connector **X023** pin 10 and connector **X017** pin J3-28 wire 407 yellow. Locate the short and repair.

4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS N SEN" voltage readings on the Universal Display Plus.

   A. If a high (>**9 volts**) voltage reading is now viewed, note which gear position generated the high voltage. Continue the troubleshooting at step **2**.

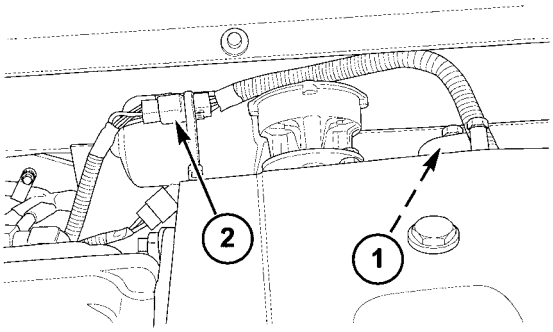
   B. If a high (>**9 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

5. If one sensor in the transmission shift position sensor has failed, it is possible to temporarily bypass that circuit to restore partial operation until the sensor can be replaced.

   A. Use a jumper wire to create a short circuit between connector **X093** pin 1 ("POS N SEN") and pin 6 (common circuit ground). The fault code
   E0128-04 - Trans Shift Position N Sensor
   should now be displayed, and the operator can continue operation without this gear.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

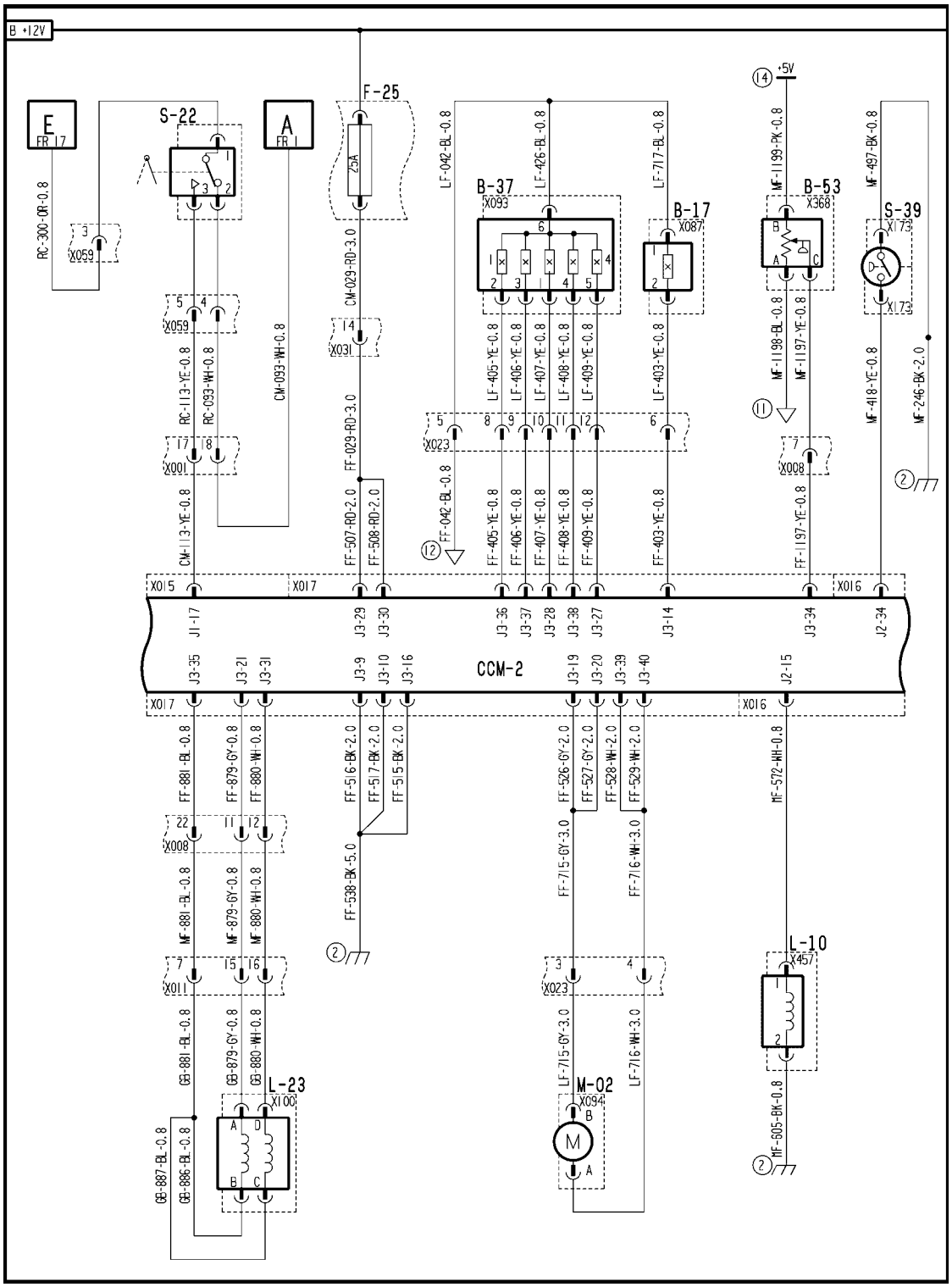
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



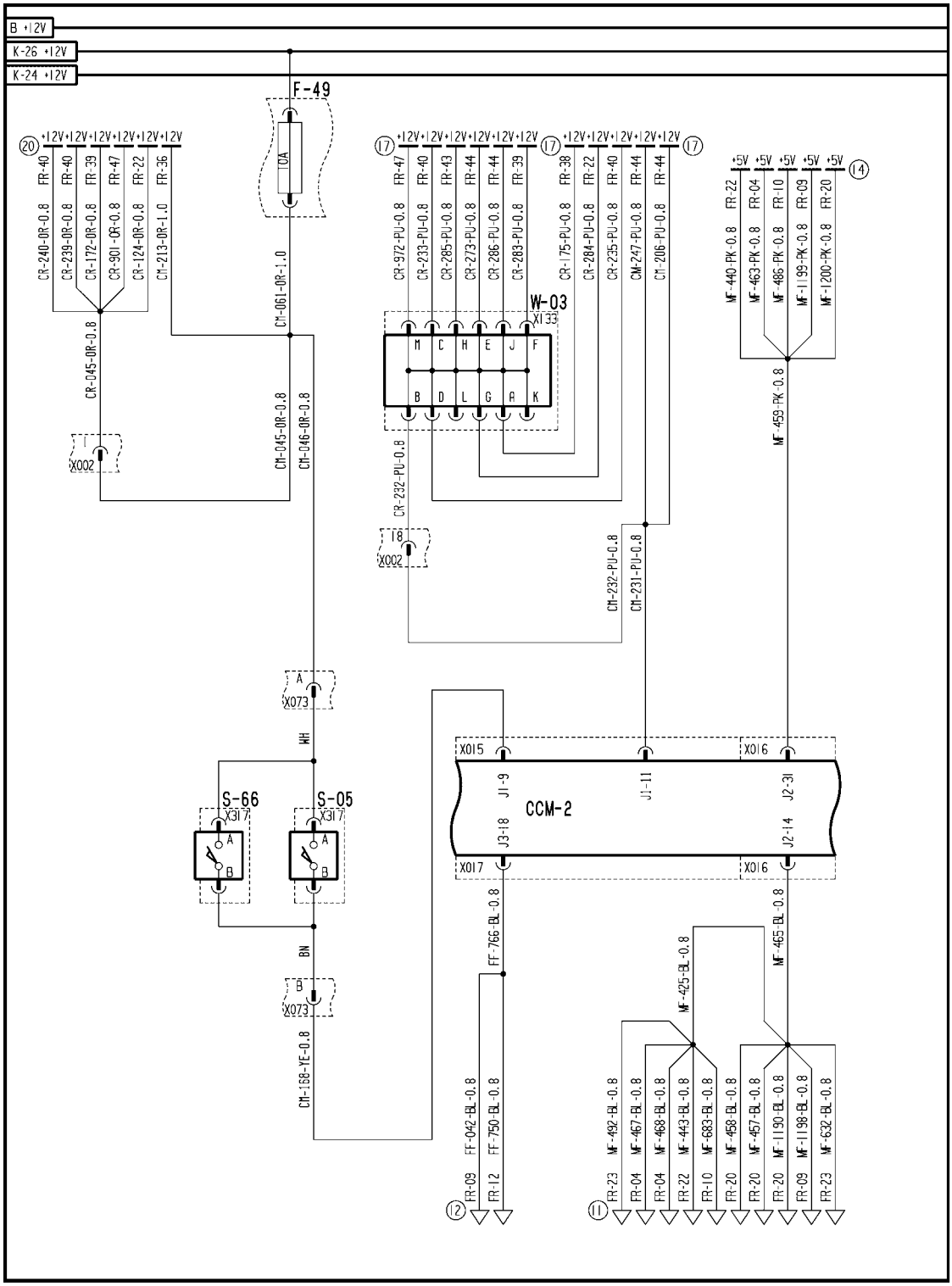
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53)

AFX8010

E0128-04 - Trans Shift Position N Sensor

Cause:
The transmission shift position sensor B-37 "N" circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS N SEN" to check the voltage range. The proper voltage when in shift position N is **5.6 - 7.3 volts**. The proper voltage when not in shift position N is **0.5 - 5.6 volts**.

   A. If the voltage reading is low (<**0.5 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (<**0.5 volts**) out of range, continue with step **3**.
3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 10 and connector **X093** pin 1 wire 407 yellow. Locate the short and repair.

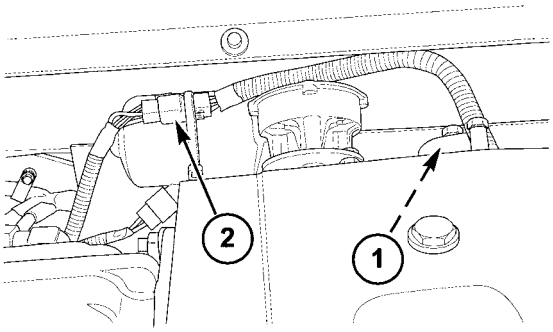
   B. If the voltage remains low (<**0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 10 and connector **X017** pin J3-28 wire 407 yellow. Locate the short and repair.
4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS N SEN" voltage readings on the Universal Display Plus.

   A. If a low (<**0.5 volts**) out of range voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a low (<**0.5 volts**) out of range voltage reading cannot be generated, clear the fault code and continue operation.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

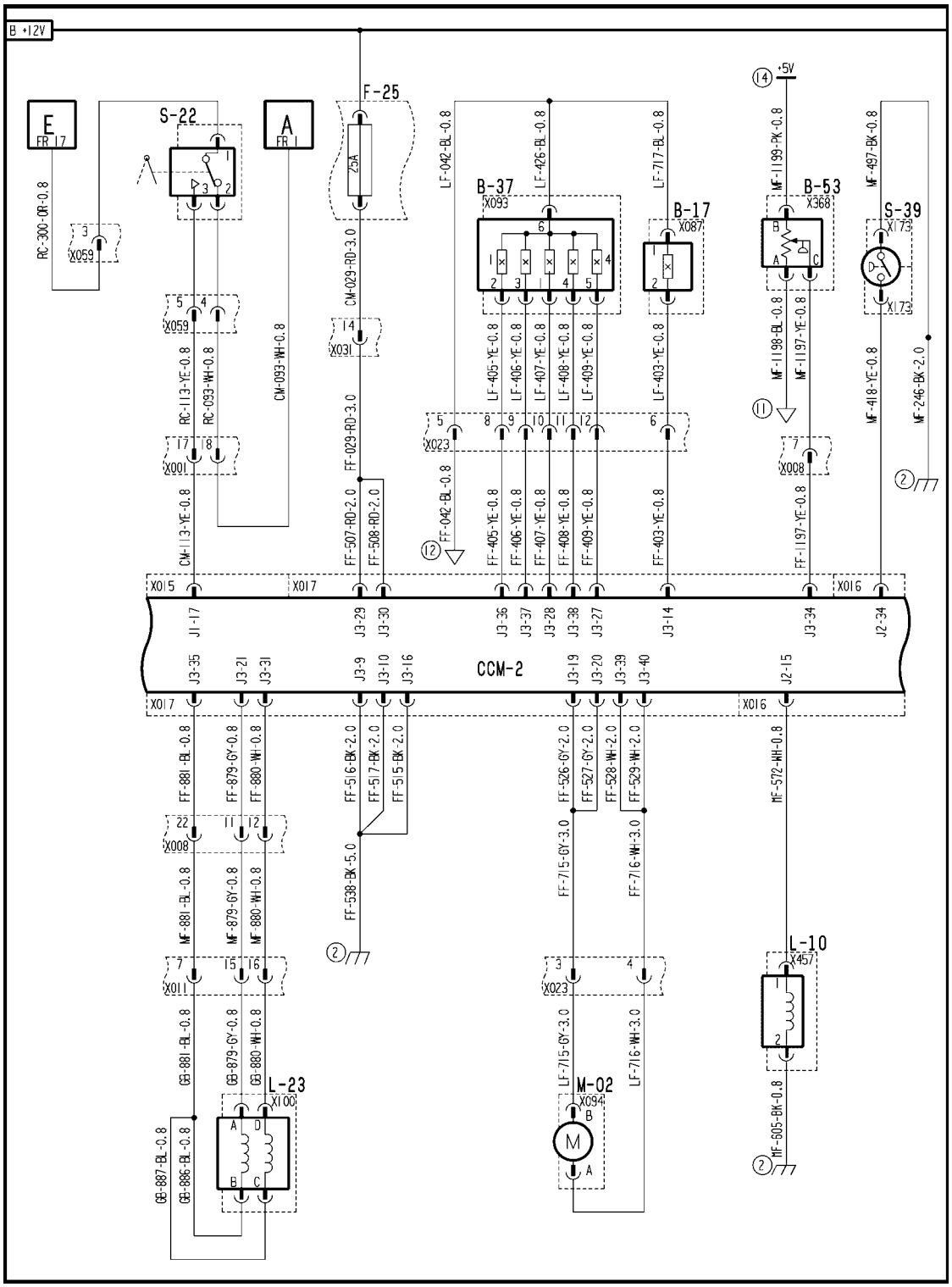
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)

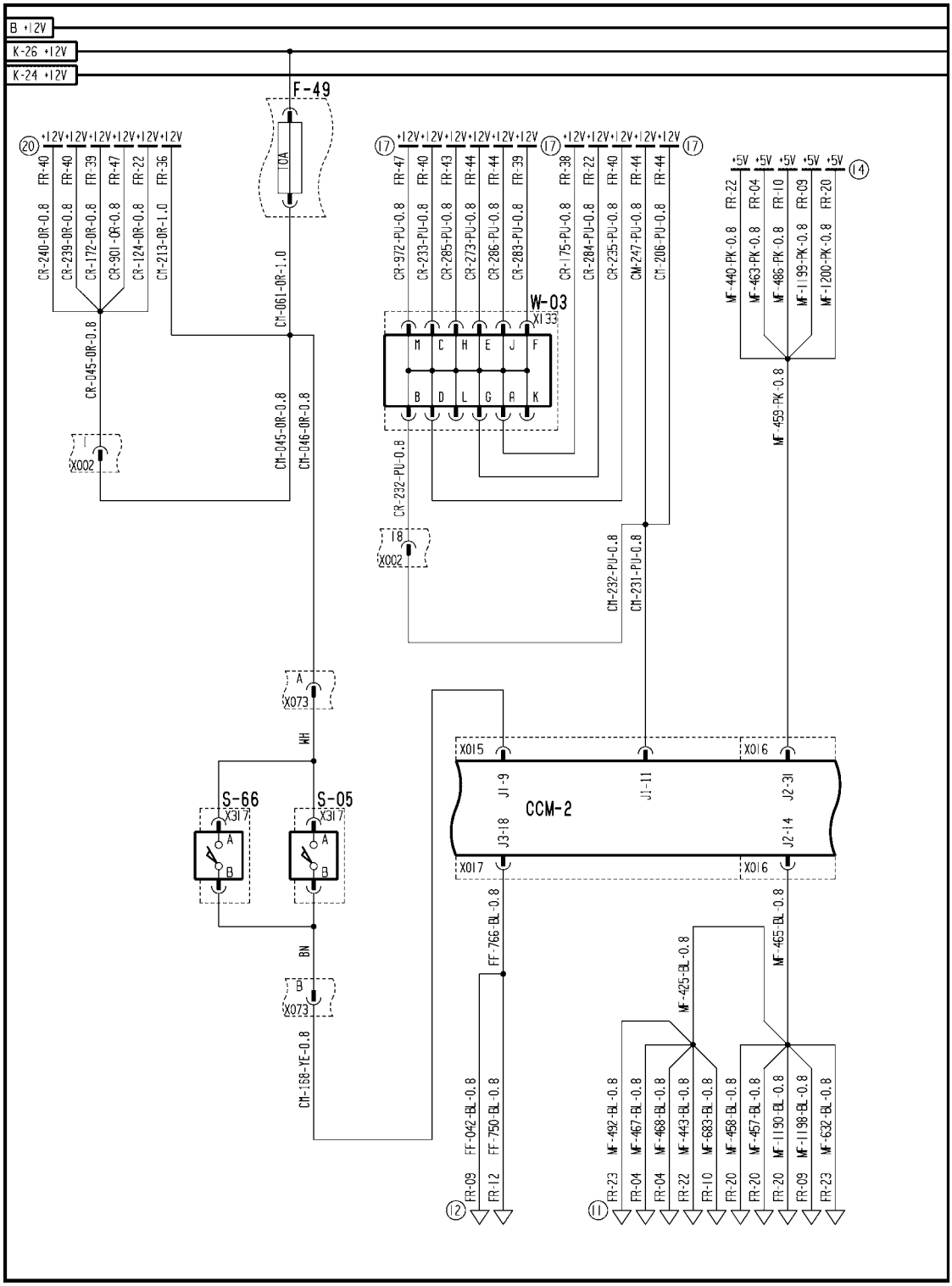


FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50)

AFX8010

E0128-05 - Trans Shift Position N Sensor

Cause:
The transmission shift position sensor B-37 "N" circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS N SEN" to check the voltage range. The proper voltage when in shift position N is **5.6 - 7.3 volts**. The proper voltage when not in shift position N is **0.5 - 5.6 volts**.

   A. If the voltage reading is **7.3 - 9.0 volts**, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a jumper wire to short connector **X093** pin 1 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, the open circuit is not in the supply side of the circuit. Continue with step **4**.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a jumper wire to short connector **X023** pin 10 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 10 and connector **X093** pin 1 wire 407 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** pin 10 and connector **X017** pin J3-28 wire 407 yellow. Locate the open and repair.

4. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a multimeter to check for continuity between the harness end of connector **X093** pin 6 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step **5**.

5. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 5 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 5 and connector **X093** pin 6 wire 426 blue or wire 042 blue. Locate the open and repair.

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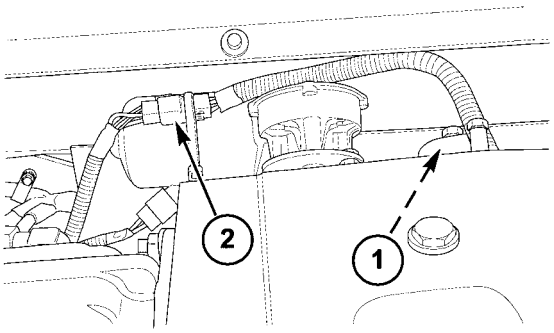
B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 5 and connector **X017** pin J3-18 wire 042 blue or wire 766 blue. Locate the open and repair.

6. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS N SEN" voltage readings on the Universal Display Plus.

   A. If a high (**7.3 - 9.0 volts**) voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a high (**7.3 - 9.0 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor

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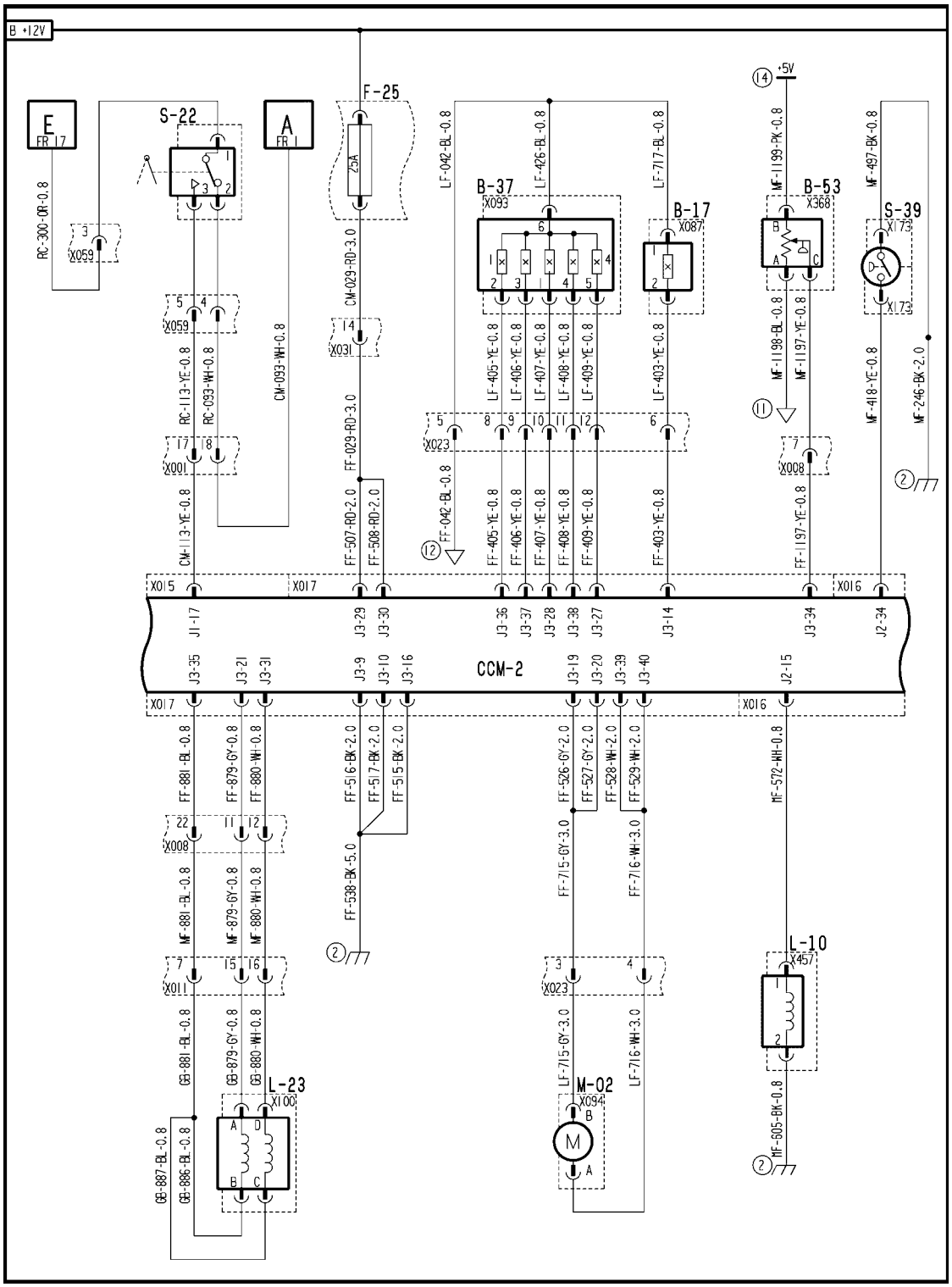
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.
- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



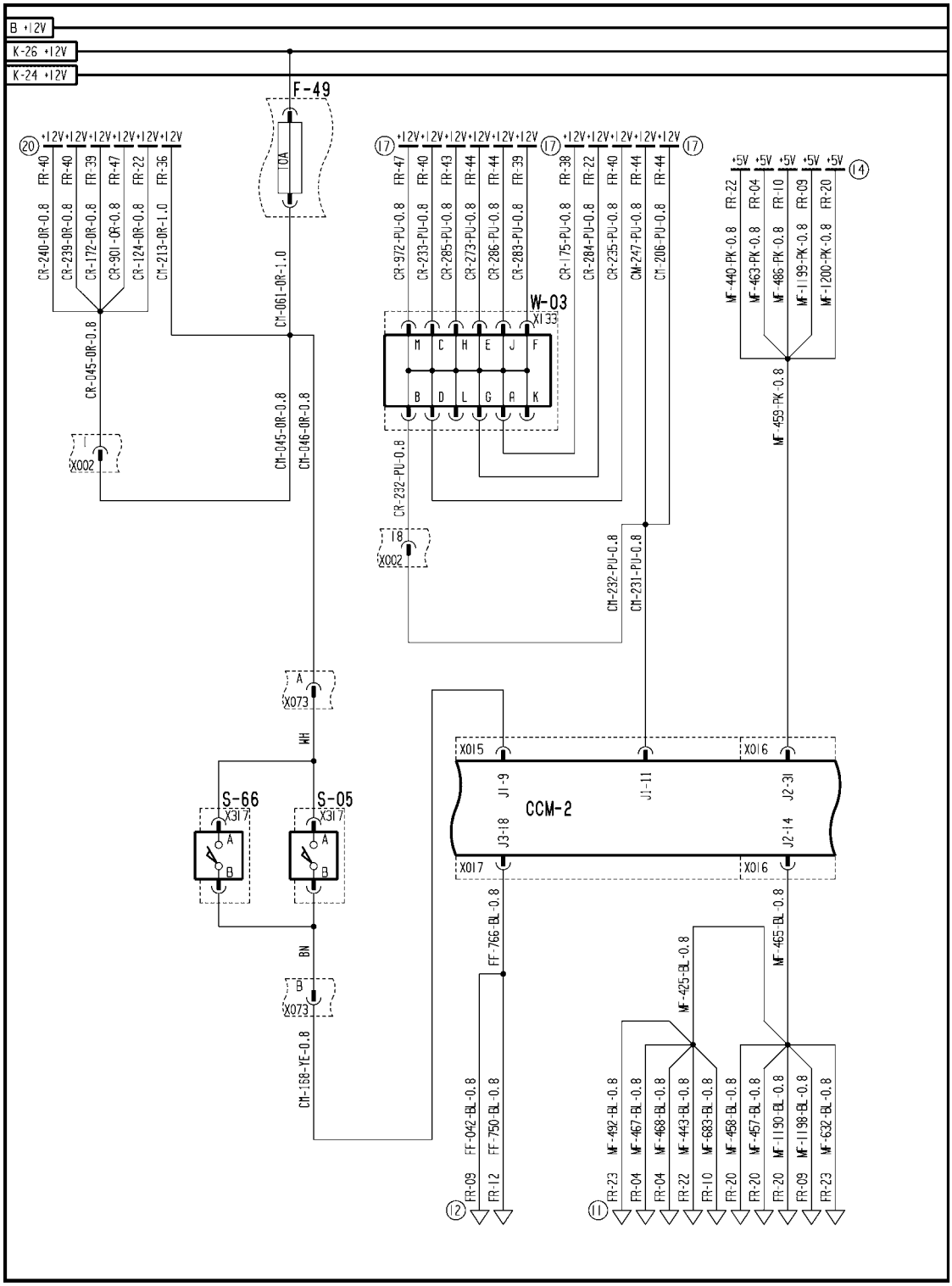
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54)

AFX8010

E0129-03 - Trans Shift Position 3 Sensor

Cause:
The transmission shift position sensor B-37 "3" circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure)

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 3 SEN" to check the voltage range. The proper voltage when in shift position 3 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 3 is **0.5 - 5.6 volts**.

   A. If the voltage reading is high (>**9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the sensor or sensor wiring. Replace the sensor. To temporarily bypass the sensor, continue with step **5**.

   B. If the voltage remains high (>**9 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the lower frame (LF) harness between connector **X023** pin 11 and connector **X093** pin 4 wire 408 yellow. Locate the short and repair.

   B. If the voltage remains high (>**9 volts**) out of range, there is a short in the front frame (FF) harness between connector **X023** pin 11 and connector **X017** pin J3-38 wire 408 yellow. Locate the short and repair.

4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 3 SEN" voltage readings on the Universal Display Plus.

   A. If a high (>**9 volts**) voltage reading is now viewed, note which gear position generated the high voltage. Continue the troubleshooting at step **2**.

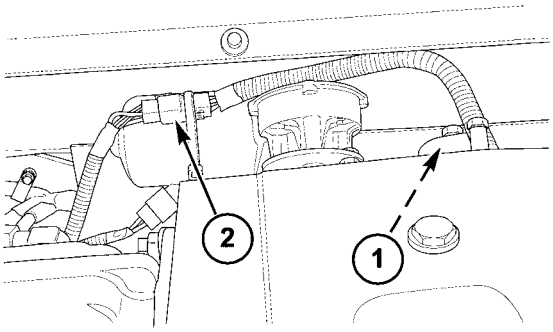
   B. If a high (>**9 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

5. If one sensor in the transmission shift position sensor has failed, it is possible to temporarily bypass that circuit to restore partial operation until the sensor can be replaced.

   A. Use a jumper wire to create a short circuit between connector **X093** pin 4 ("POS 3 SEN") and pin 6 (common circuit ground). The fault code
   E0129-04 - Trans Shift Position 3 Sensor
   should now be displayed, and the operator can continue operation without this gear.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

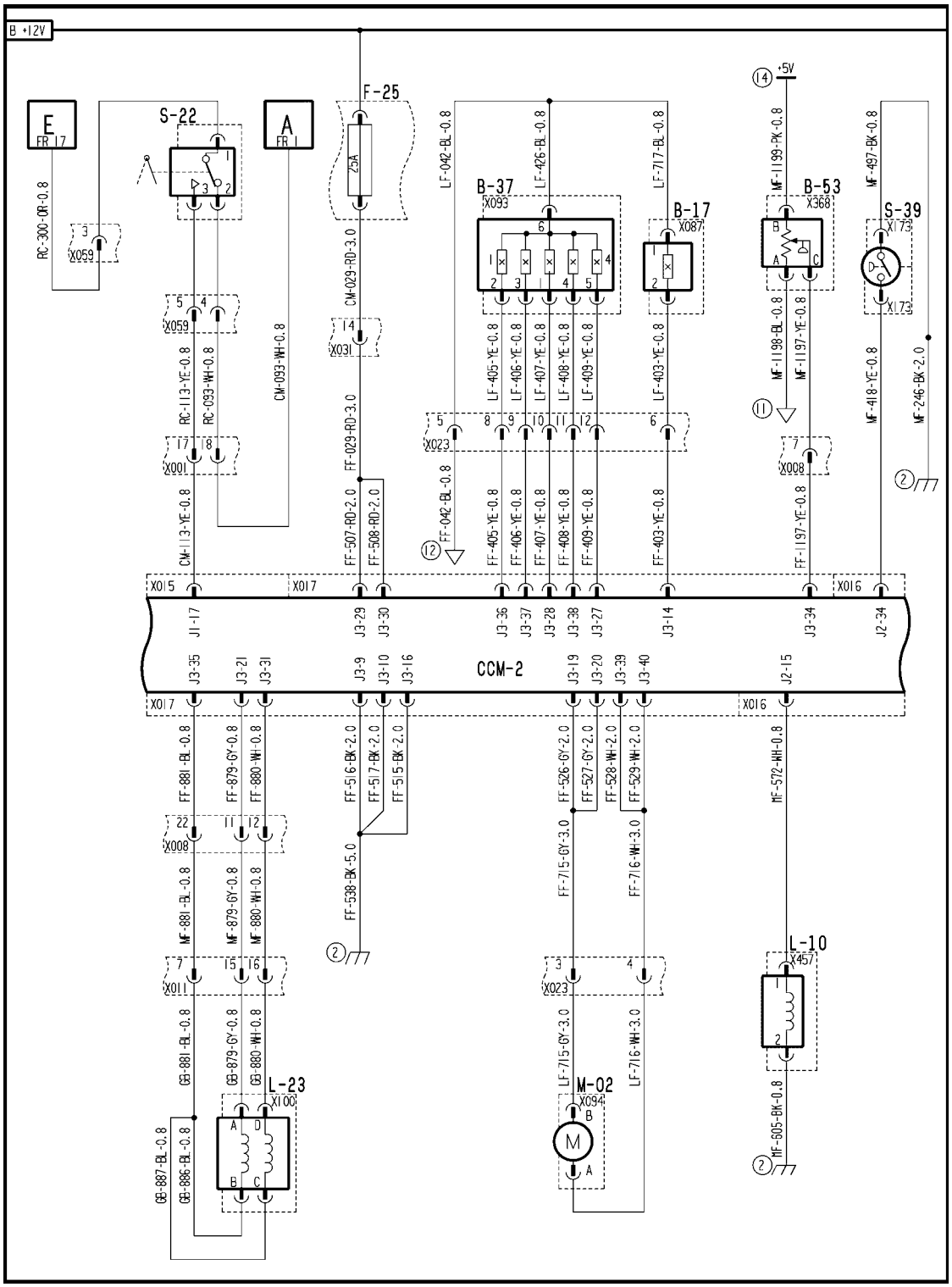
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



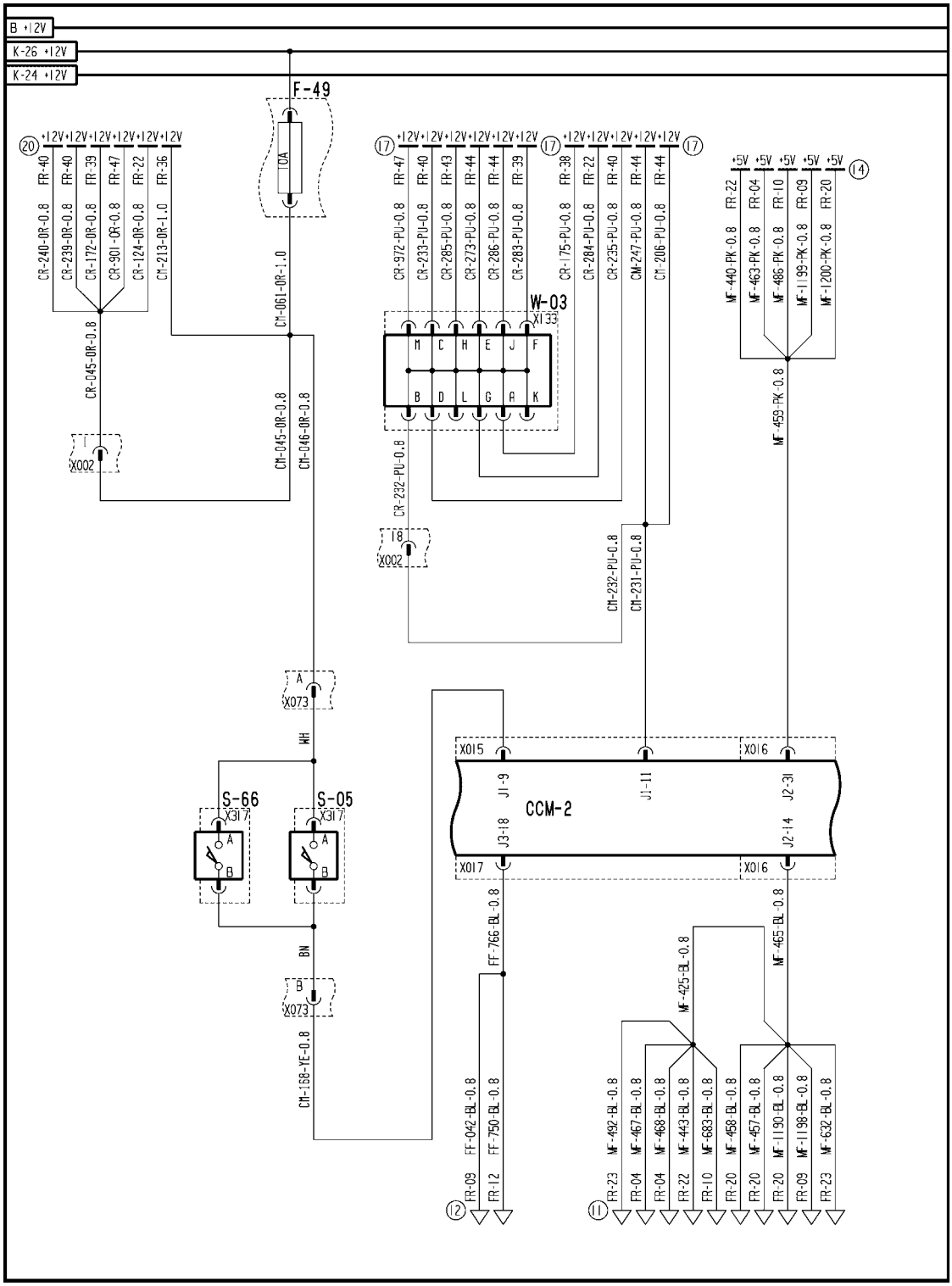
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53)

AFX8010

E0129-04 - Trans Shift Position 3 Sensor

Cause:
The transmission shift position sensor B-37 "3" circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 3 SEN" to check the voltage range. The proper voltage when in shift position 3 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 3 is **0.5 - 5.6 volts**.

   A. If the voltage reading is low (<**0.5 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (<**0.5 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 11 and connector **X093** pin 4 wire 408 yellow. Locate the short and repair.

   B. If the voltage remains low (<**0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 11 and connector **X017** pin J3-38 wire 408 yellow. Locate the short and repair.

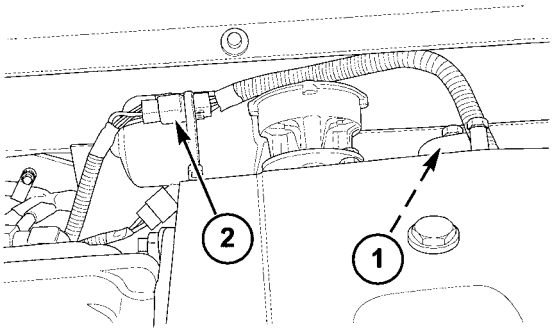
4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 3 SEN" voltage readings on the Universal Display Plus.

   A. If a low (<**0.5 volts**) out of range voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a low (<**0.5 volts**) out of range voltage reading cannot be generated, clear the fault code and continue operation.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

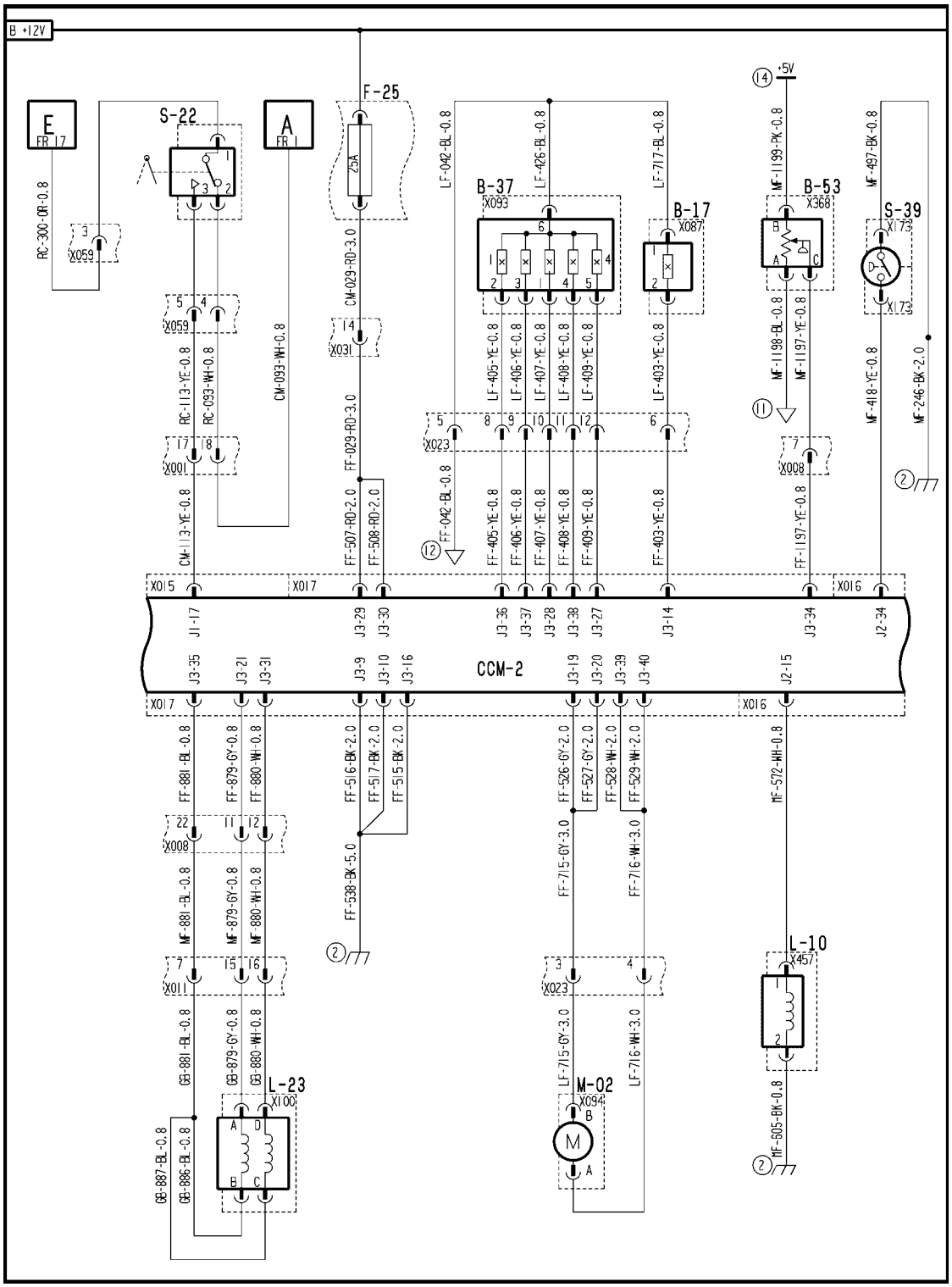
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



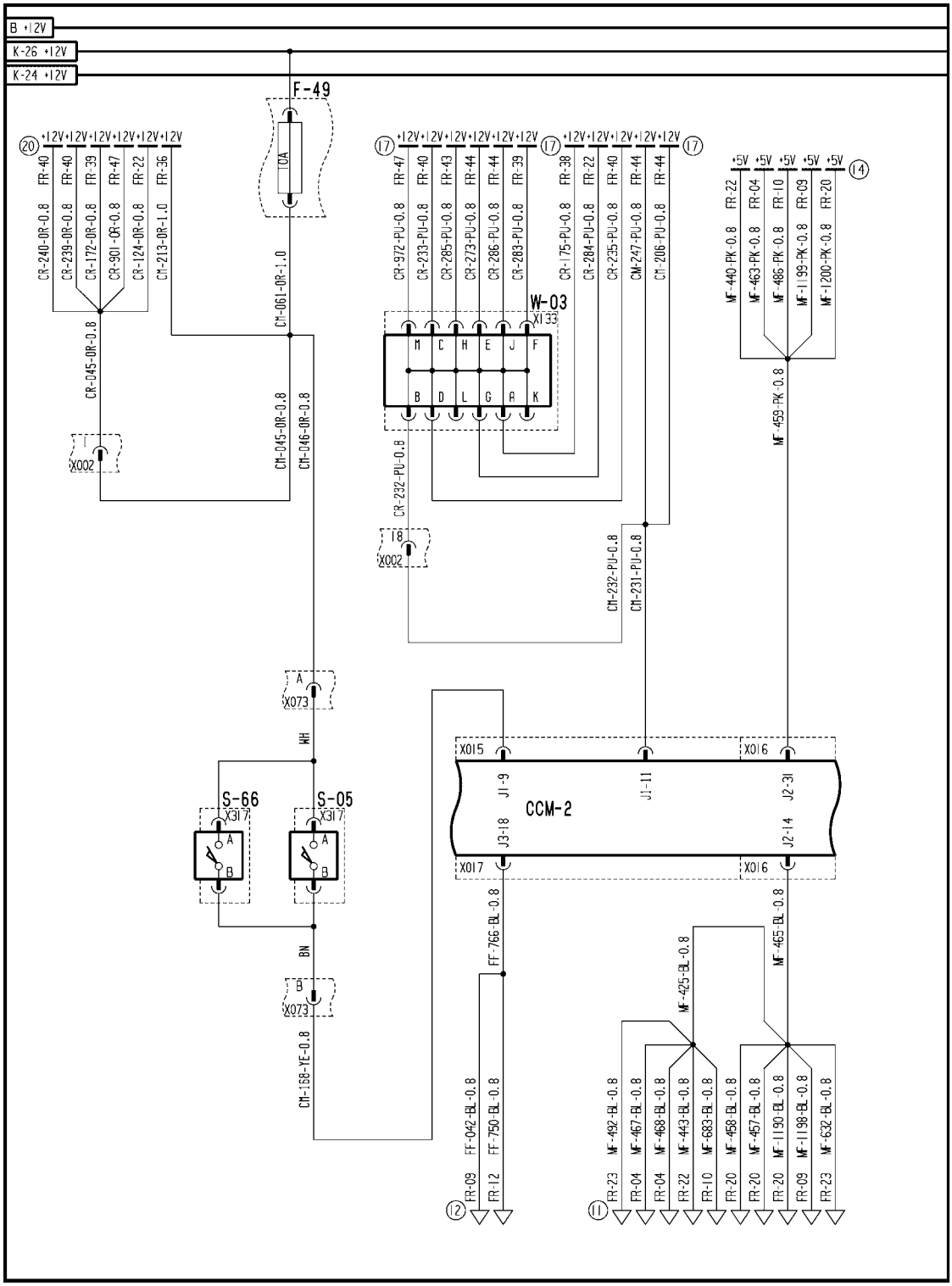
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50)

AFX8010

E0129-05 - Trans Shift Position 3 Sensor

Cause:
The transmission shift position sensor B-37 "3" circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 3 SEN" to check the voltage range. The proper voltage when in shift position 3 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 3 is **0.5 - 5.6 volts**.

   A. If the voltage reading is **7.3 - 9.0 volts**, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a jumper wire to short connector **X093** pin 4 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, the open circuit is not in the supply side of the circuit. Continue with step **4**.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a jumper wire to short connector **X023** pin 11 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 11 and connector **X093** pin 4 wire 408 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** pin 11 and connector **X017** pin J3-38 wire 408 yellow. Locate the open and repair.

4. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a multimeter to check for continuity between the harness end of connector **X093** pin 6 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step **5**.

5. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 5 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 5 and connector **X093** pin 6 wire 426 blue or wire 042 blue. Locate the open and repair.

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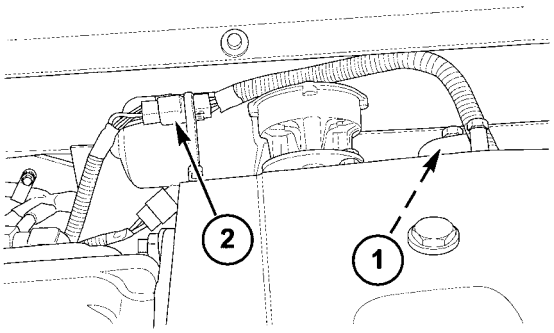
B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 5 and connector **X017** pin J3-18 wire 042 blue or wire 766 blue. Locate the open and repair.

6. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 3 SEN" voltage readings on the Universal Display Plus.

   A. If a high (**7.3 - 9.0 volts**) voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a high (**7.3 - 9.0 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor

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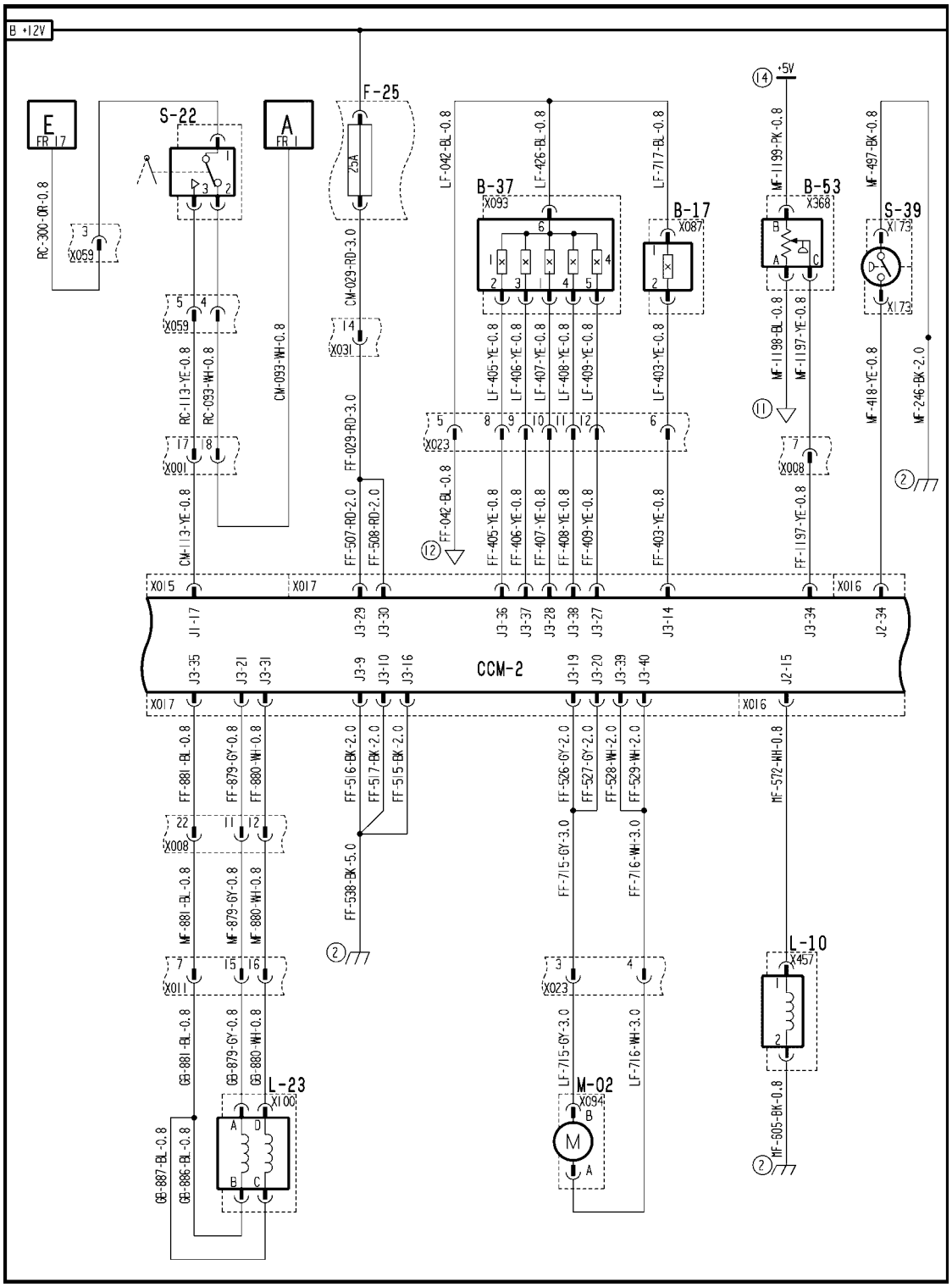
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.
- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



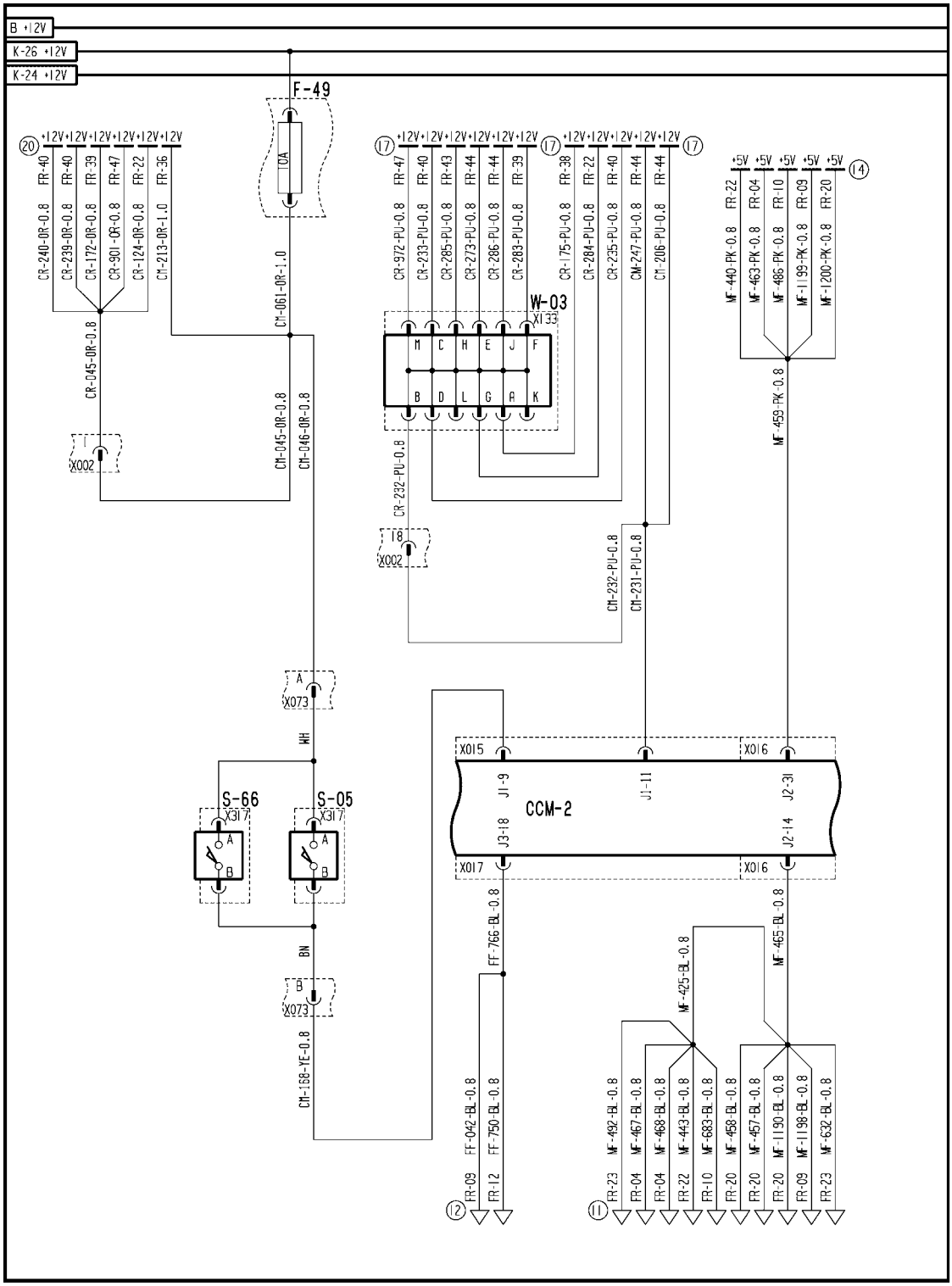
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54)

AFX8010

E0130-03 - Trans Shift Position 2 Sensor

Cause:
The transmission shift position sensor B-37 "2" circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure)

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 2 SEN" to check the voltage range. The proper voltage when in shift position 2 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 2 is **0.5 - 5.6 volts**.

   A. If the voltage reading is high (>**9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the sensor or sensor wiring. Replace the sensor. To temporarily bypass the sensor, continue with step **5**.

   B. If the voltage remains high (>**9 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the lower frame (LF) harness between connector **X023** pin 9 and connector **X093** pin 3 wire 406 yellow. Locate the short and repair.

   B. If the voltage remains high (>**9 volts**) out of range, there is a short in the front frame (FF) harness between connector **X023** pin 9 and connector **X017** pin J3-37 wire 406 yellow. Locate the short and repair.

4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 2 SEN" voltage readings on the Universal Display Plus.

   A. If a high (>**9 volts**) voltage reading is now viewed, note which gear position generated the high voltage. Continue the troubleshooting at step **2**.

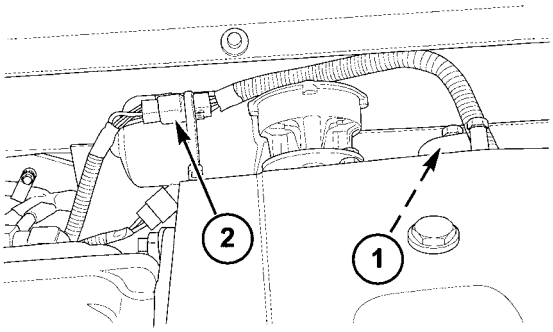
   B. If a high (>**9 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

5. If one sensor in the transmission shift position sensor has failed, it is possible to temporarily bypass that circuit to restore partial operation until the sensor can be replaced.

   A. Use a jumper wire to create a short circuit between connector **X093** pin 3 ("POS 2 SEN") and pin 6 (common circuit ground). The fault code
   E0130-04 - Trans Shift Position 2 Sensor
   should now be displayed, and the operator can continue operation without this gear.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

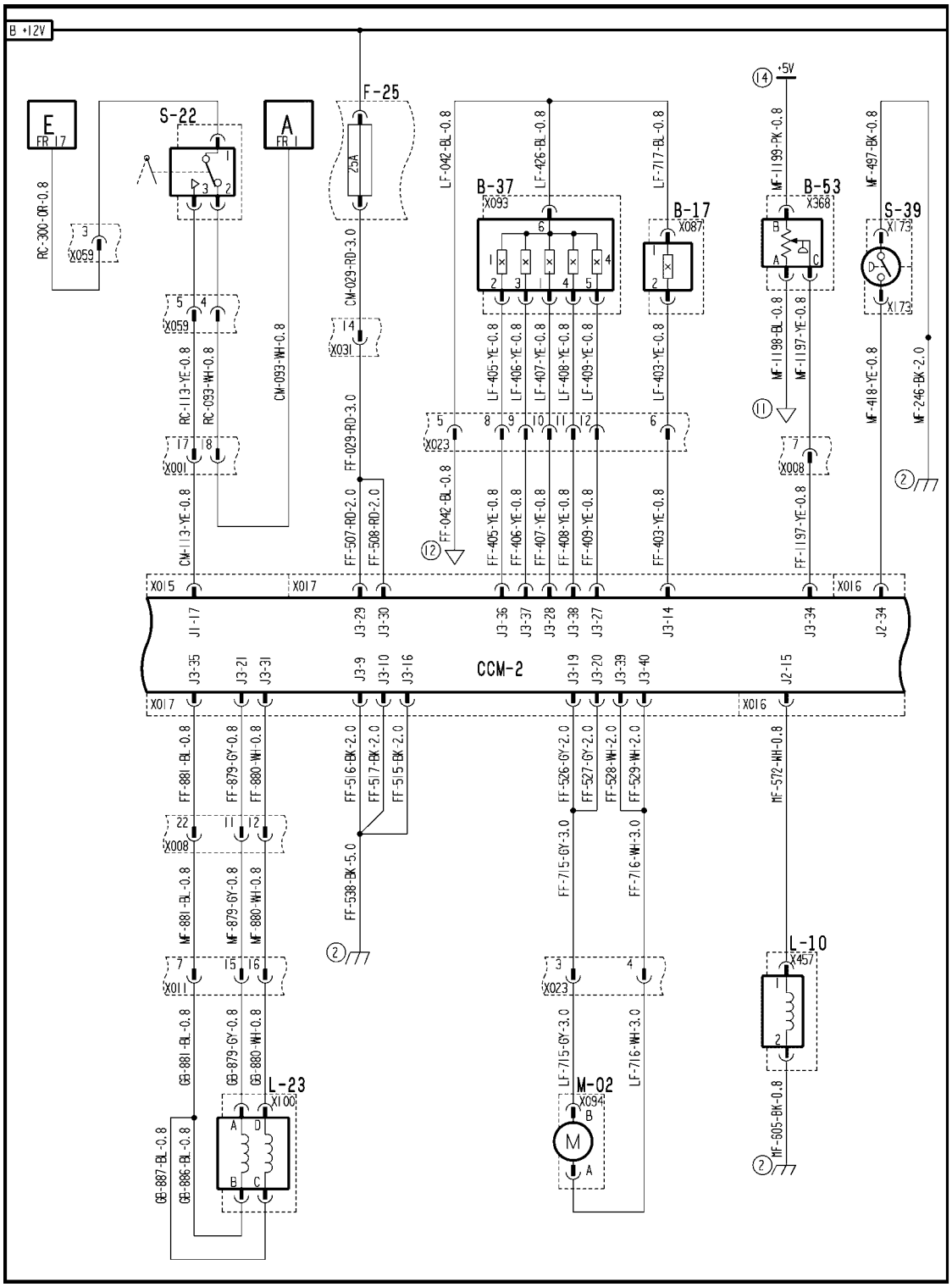
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



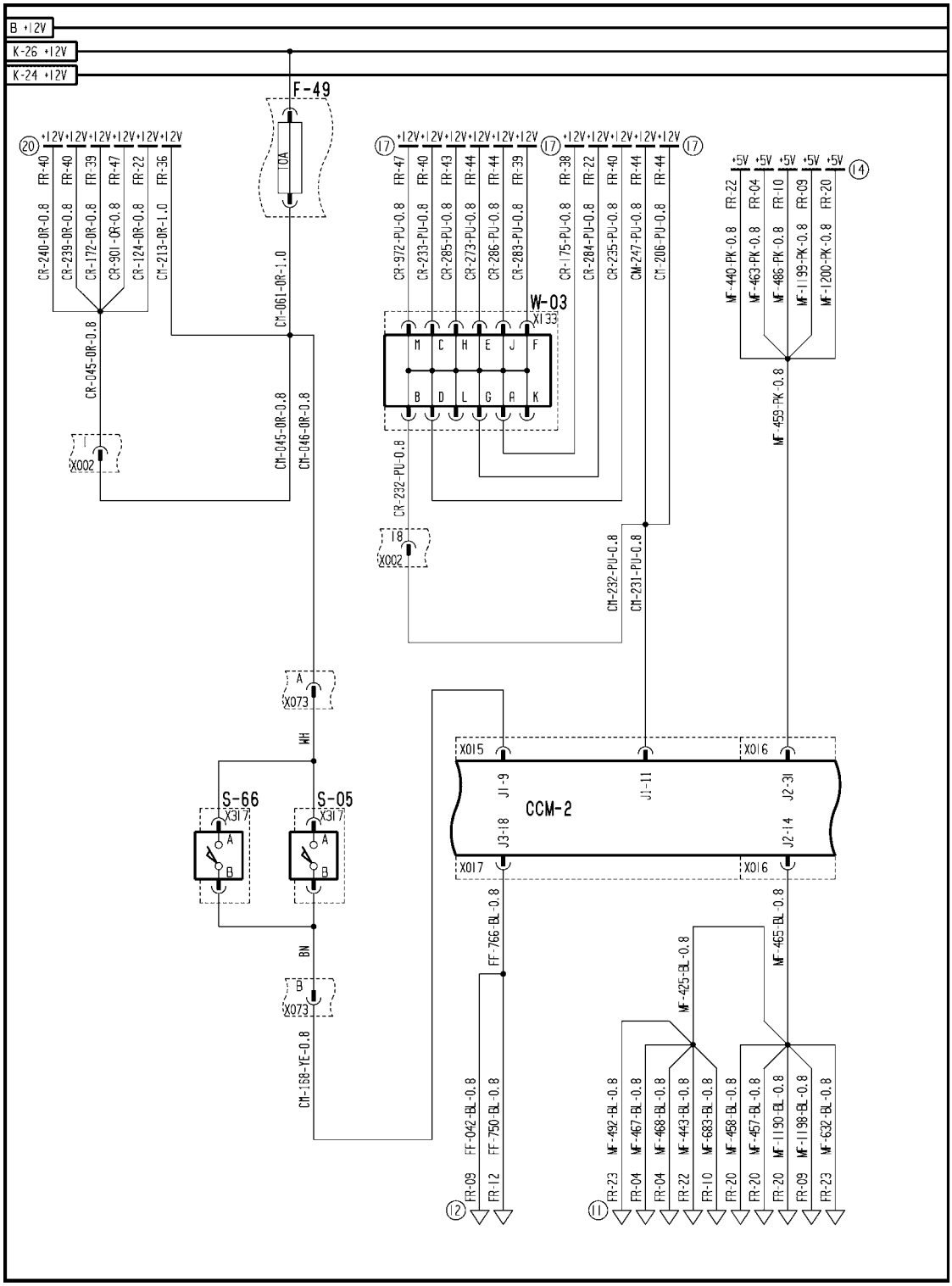
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53)

AFX8010

E0130-04 - Trans Shift Position 2 Sensor

Cause:
The transmission shift position sensor B-37 "2" circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 2 SEN" to check the voltage range. The proper voltage when in shift position 2 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 2 is **0.5 - 5.6 volts**.

   A. If the voltage reading is low (<**0.5 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (<**0.5 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 9 and connector **X093** pin 3 wire 406 yellow. Locate the short and repair.

   B. If the voltage remains low (<**0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 9 and connector **X017** pin J3-37 wire 406 yellow. Locate the short and repair.

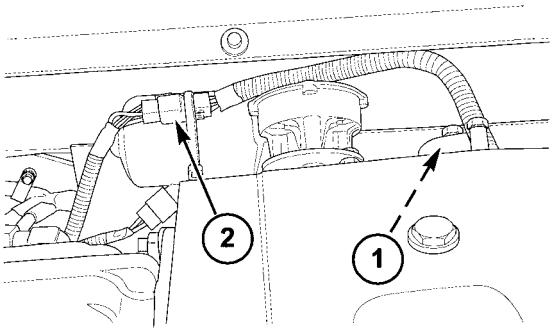
4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 2 SEN" voltage readings on the Universal Display Plus.

   A. If a low (<**0.5 volts**) out of range voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a low (<**0.5 volts**) out of range voltage reading cannot be generated, clear the fault code and continue operation.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

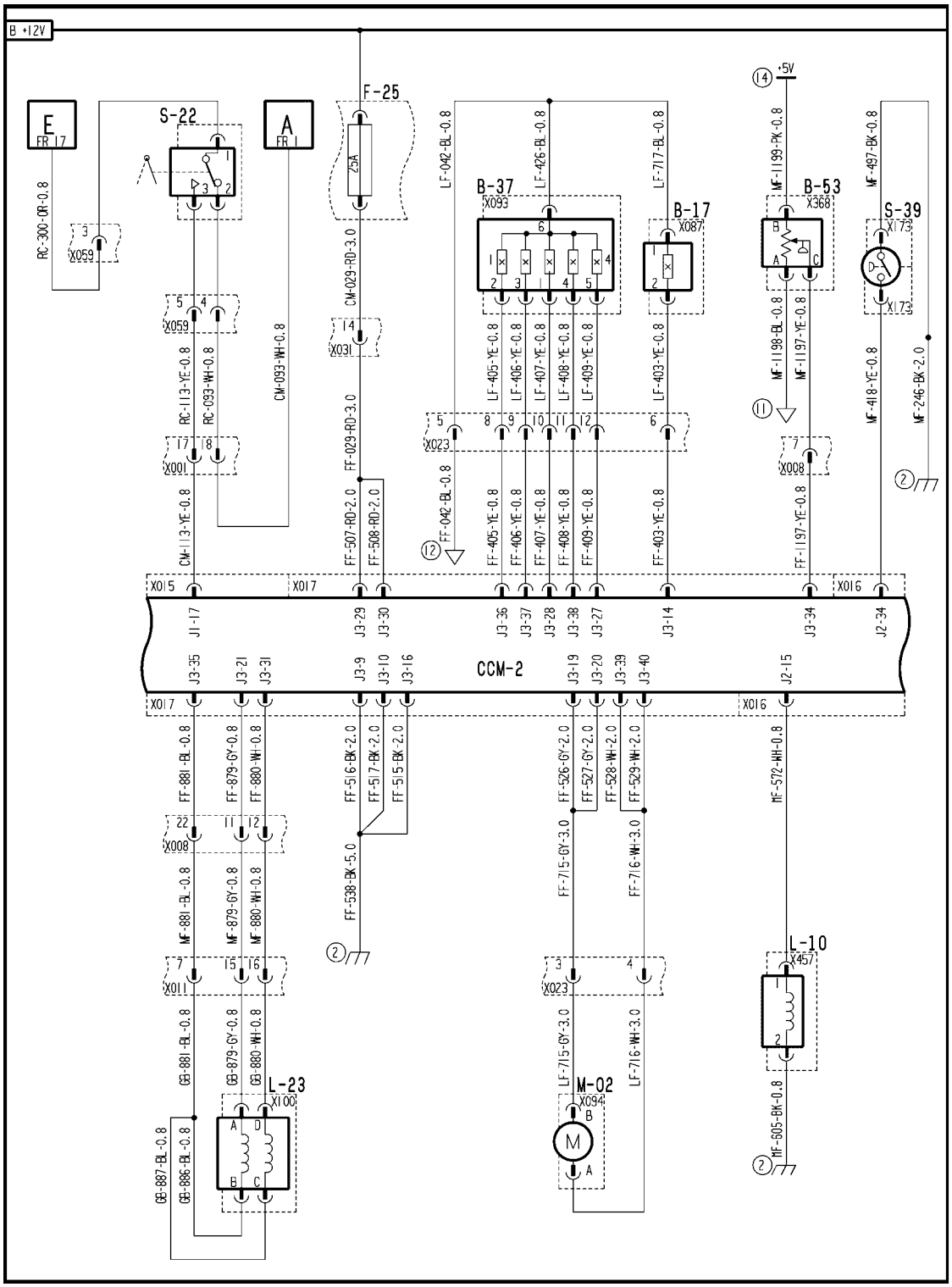
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



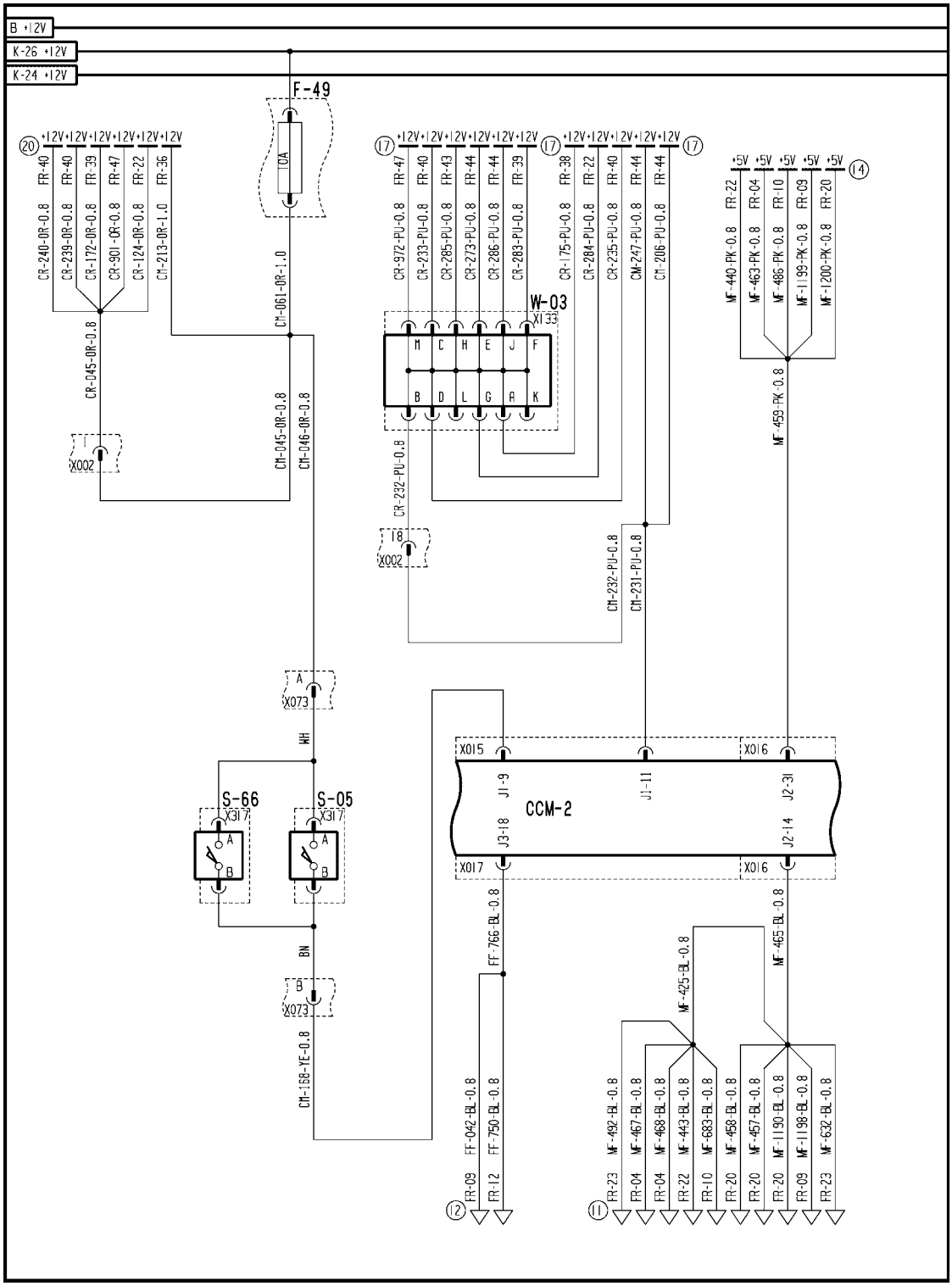
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50)

AFX8010

E0130-05 - Trans Shift Position 2 Sensor

Cause:
The transmission shift position sensor B-37 "2" circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 2 SEN" to check the voltage range. The proper voltage when in shift position 2 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 2 is **0.5 - 5.6 volts**.

   A. If the voltage reading is **7.3 - 9.0 volts**, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a jumper wire to short connector **X093** pin 3 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, the open circuit is not in the supply side of the circuit. Continue with step **4**.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a jumper wire to short connector **X023** pin 9 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 9 and connector **X093** pin 3 wire 406 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** pin 9 and connector **X017** pin J3-37 wire 406 yellow. Locate the open and repair.

4. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a multimeter to check for continuity between the harness end of connector **X093** pin 6 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step **5**.

5. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 5 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 5 and connector **X093** pin 6 wire 426 blue or wire 042 blue. Locate the open and repair.

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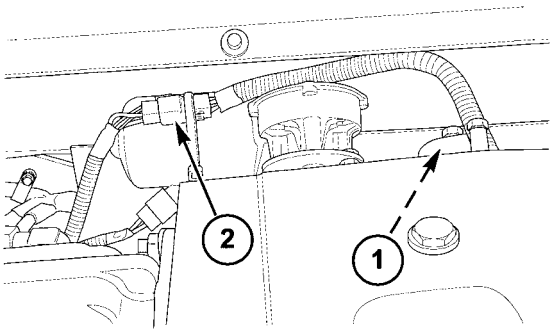
B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 5 and connector **X017** pin J3-18 wire 042 blue or wire 766 blue. Locate the open and repair.

6. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 2 SEN" voltage readings on the Universal Display Plus.

   A. If a high (**7.3 - 9.0 volts**) voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a high (**7.3 - 9.0 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor

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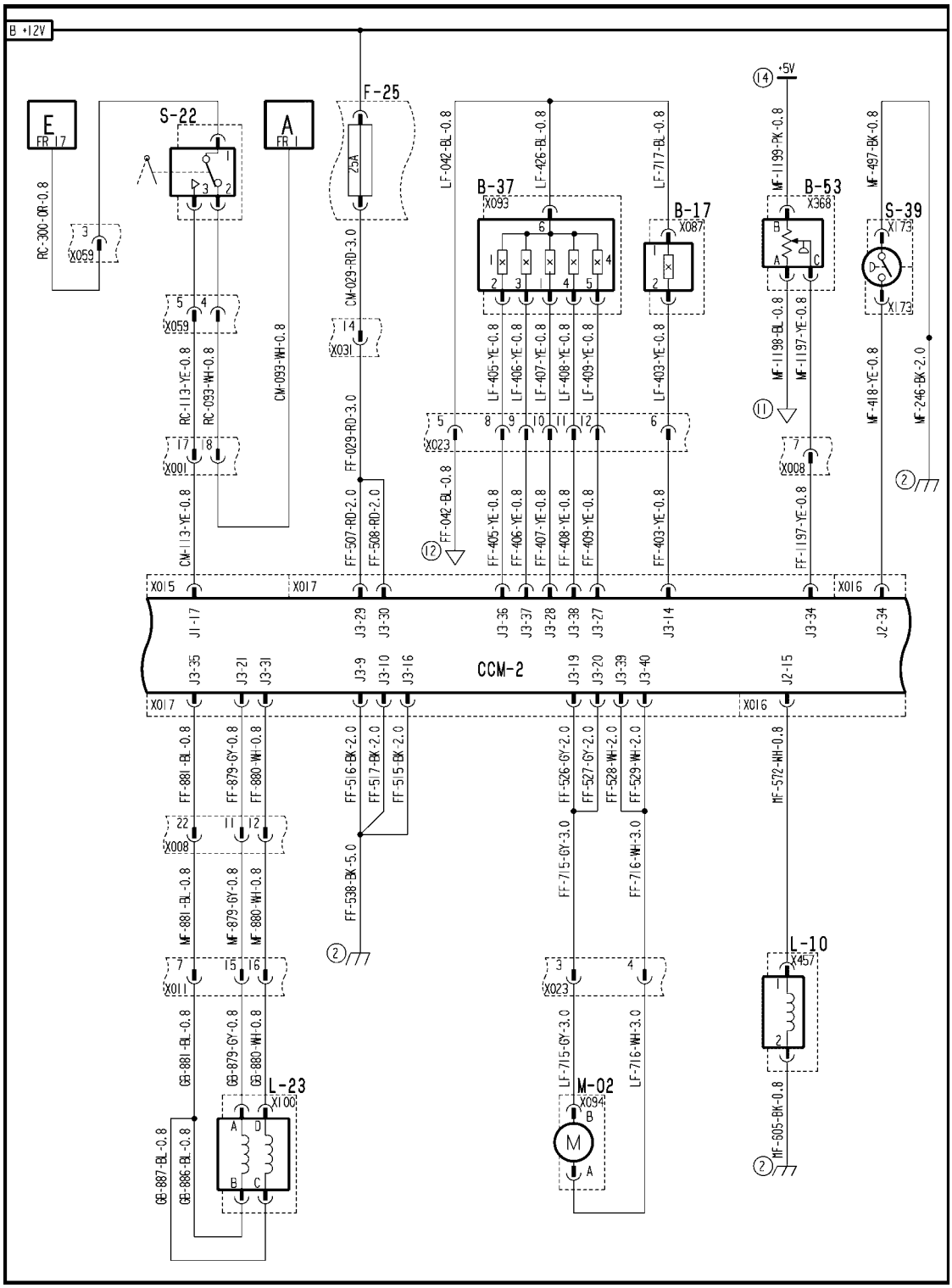
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.
- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)

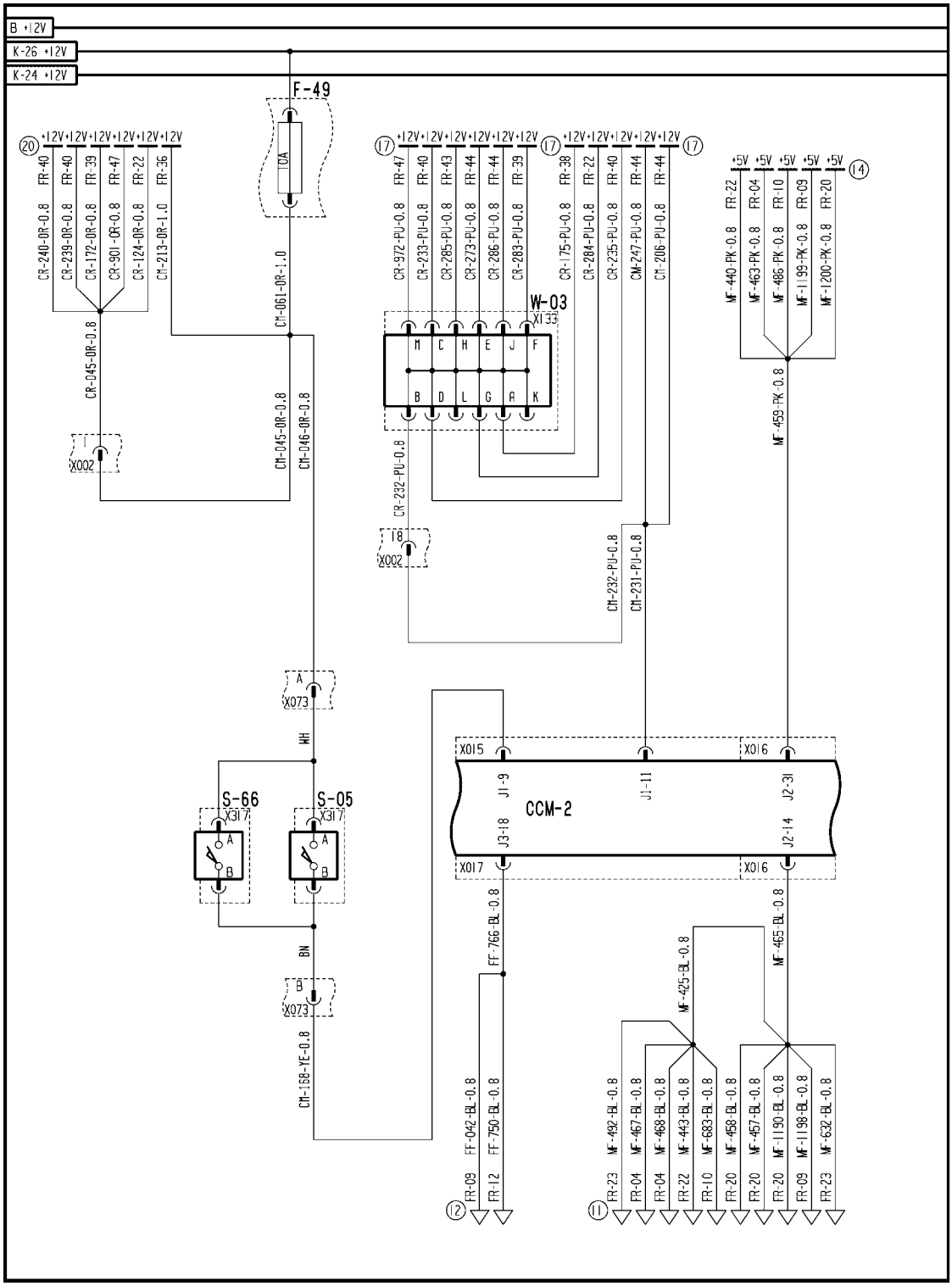


FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54)

AFX8010

E0131-03 - Trans Shift Position 1 Sensor

Cause:
The transmission shift position sensor B-37 "1" circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure)

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 1 SEN" to check the voltage range. The proper voltage when in shift position 1 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 1 is **0.5 - 5.6 volts**.

   A. If the voltage reading is high (>**9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the sensor or sensor wiring. Replace the sensor. To temporarily bypass the sensor, continue with step **5**.

   B. If the voltage remains high (>**9 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the lower frame (LF) harness between connector **X023** pin 8 and connector **X093** pin 2 wire 405 yellow. Locate the short and repair.

   B. If the voltage remains high (>**9 volts**) out of range, there is a short in the front frame (FF) harness between connector **X023** pin 8 and connector **X017** pin J3-36 wire 405 yellow. Locate the short and repair.

4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 1 SEN" voltage readings on the Universal Display Plus.

   A. If a high (>**9 volts**) voltage reading is now viewed, note which gear position generated the high voltage. Continue the troubleshooting at step **2**.

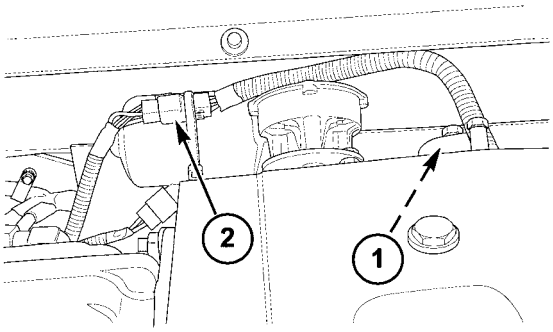
   B. If a high (>**9 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

5. If one sensor in the transmission shift position sensor has failed, it is possible to temporarily bypass that circuit to restore partial operation until the sensor can be replaced.

   A. Use a jumper wire to create a short circuit between connector **X093** pin 2 ("POS 1 SEN") and pin 6 (common circuit ground). The fault code
   E0131-04 - Trans Shift Position 1 Sensor
   should now be displayed, and the operator can continue operation without this gear.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

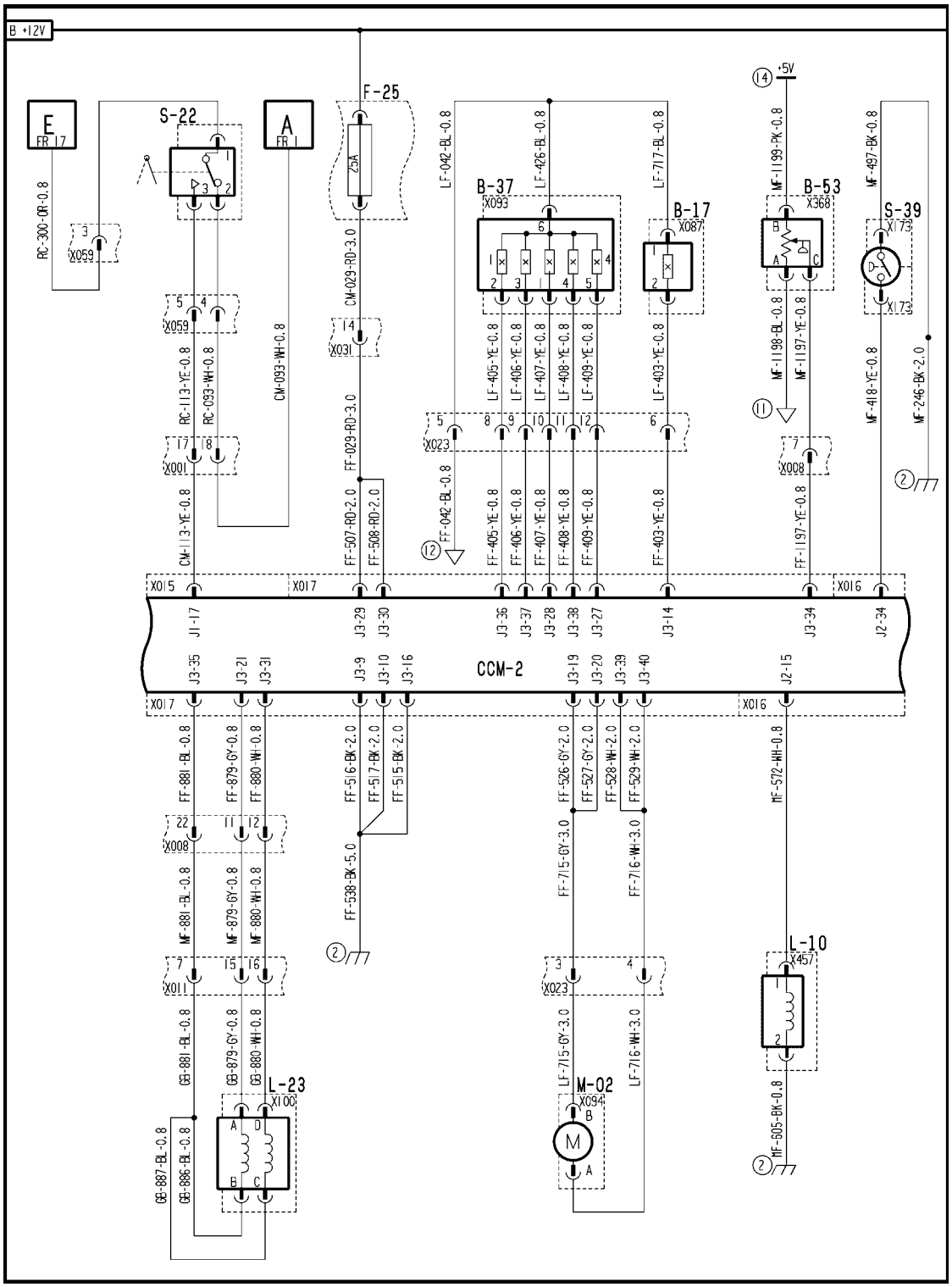
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



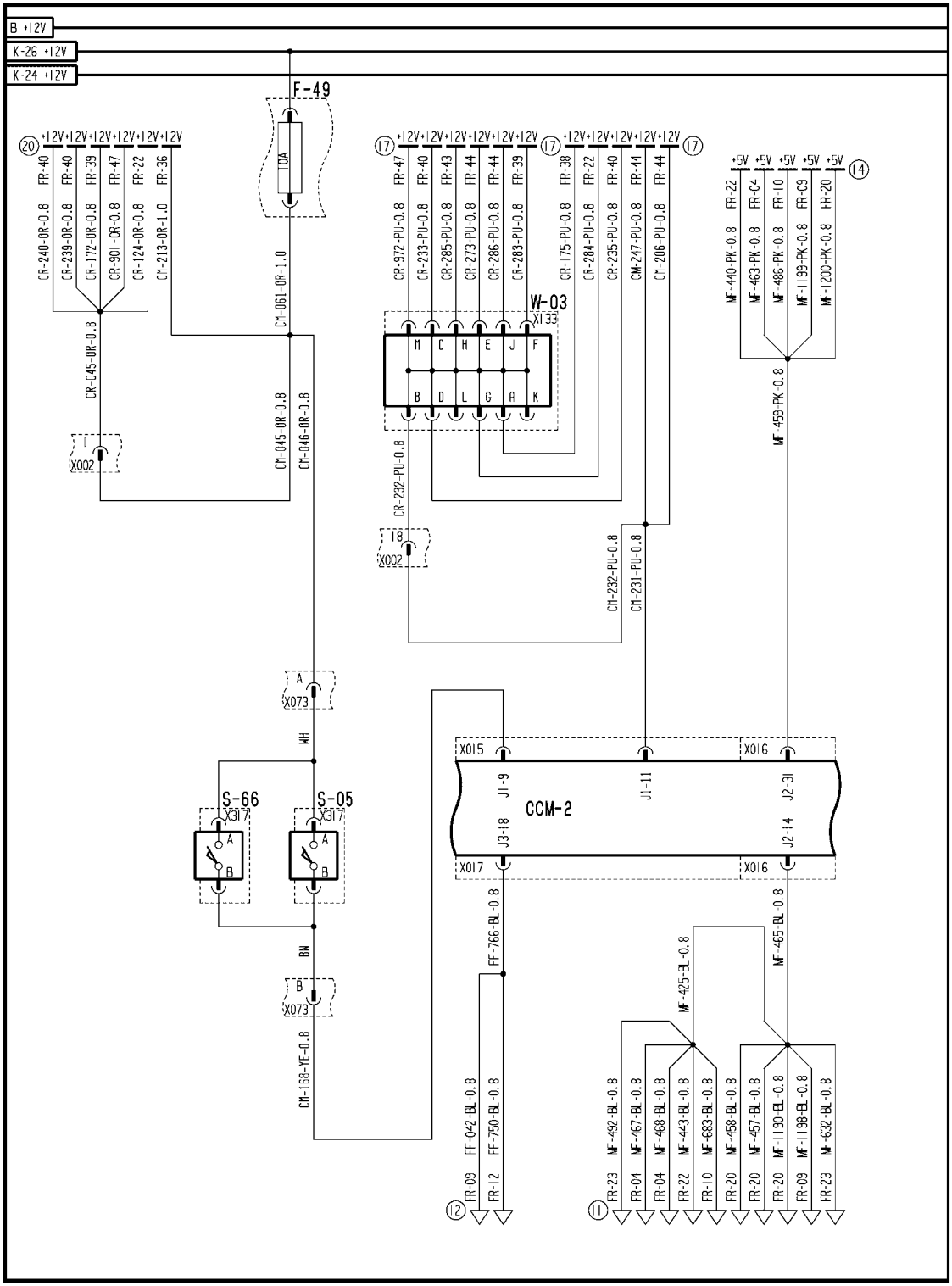
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53)

AFX8010

E0131-04 - Trans Shift Position 1 Sensor

Cause:
The transmission shift position sensor B-37 "1" circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 1 SEN" to check the voltage range. The proper voltage when in shift position 1 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 1 is **0.5 - 5.6 volts**.

   A. If the voltage reading is low (<**0.5 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (<**0.5 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 8 and connector **X093** pin 2 wire 405 yellow. Locate the short and repair.

   B. If the voltage remains low (<**0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 8 and connector **X017** pin J3-36 wire 405 yellow. Locate the short and repair.

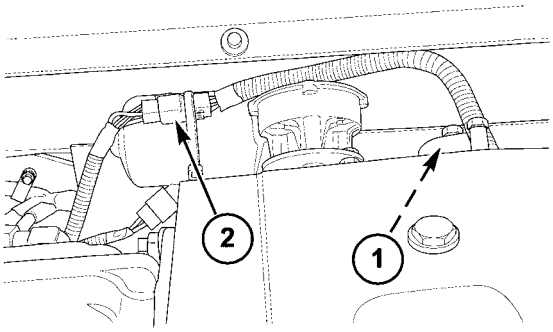
4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 1 SEN" voltage readings on the Universal Display Plus.

   A. If a low (<**0.5 volts**) out of range voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a low (<**0.5 volts**) out of range voltage reading cannot be generated, clear the fault code and continue operation.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

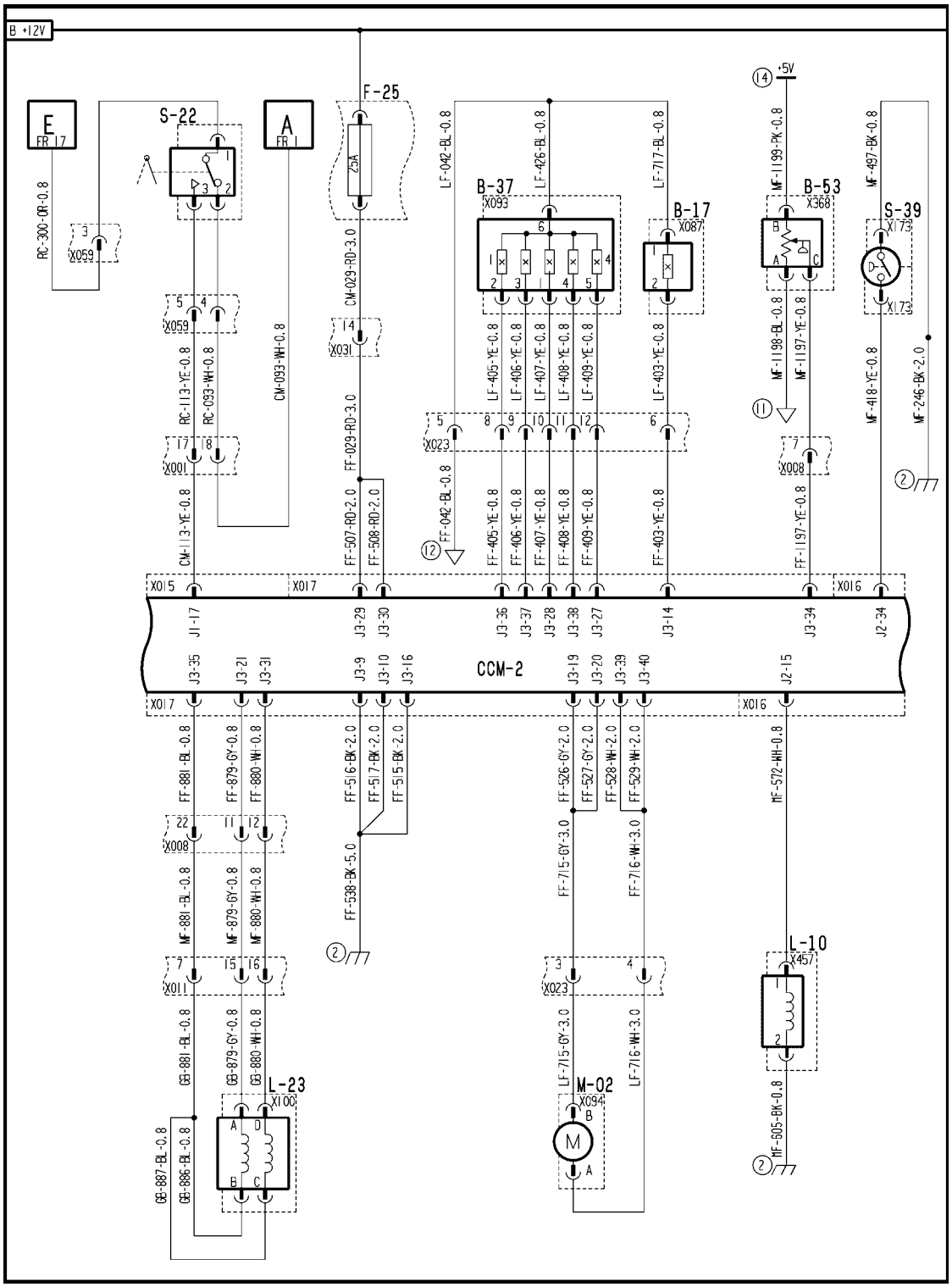
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



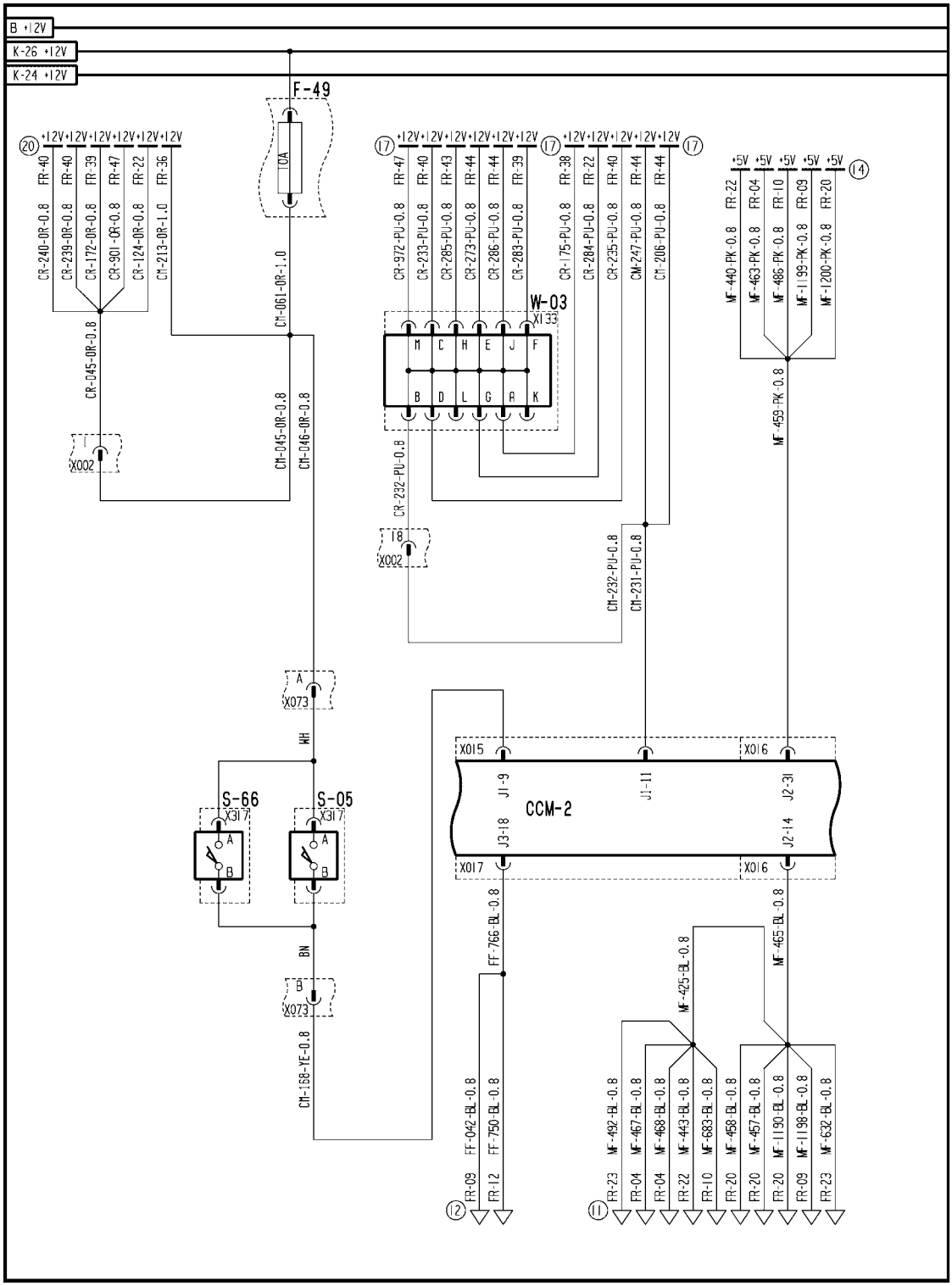
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50)

AFX8010

E0131-05 - Trans Shift Position 1 Sensor

Cause:
The transmission shift position sensor B-37 "1" circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 1 SEN" to check the voltage range. The proper voltage when in shift position 1 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 1 is **0.5 - 5.6 volts**.

   A. If the voltage reading is **7.3 - 9.0 volts**, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a jumper wire to short connector **X093** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, the open circuit is not in the supply side of the circuit. Continue with step **4**.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a jumper wire to short connector **X023** pin 8 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 8 and connector **X093** pin 2 wire 405 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** pin 8 and connector **X017** pin J3-36 wire 405 yellow. Locate the open and repair.

4. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a multimeter to check for continuity between the harness end of connector **X093** pin 6 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step **5**.

5. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 5 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 5 and connector **X093** pin 6 wire 426 blue or wire 042 blue. Locate the open and repair.

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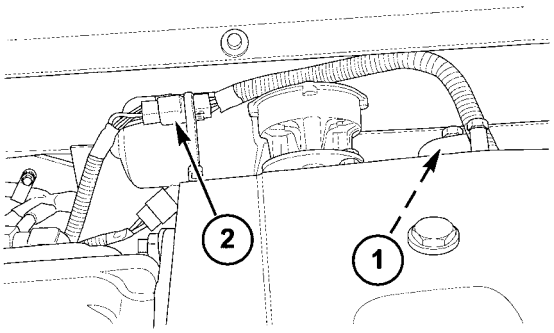
B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 5 and connector **X017** pin J3-18 wire 042 blue or wire 766 blue. Locate the open and repair.

6. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 1 SEN" voltage readings on the Universal Display Plus.

   A. If a high (**7.3 - 9.0 volts**) voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a high (**7.3 - 9.0 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor

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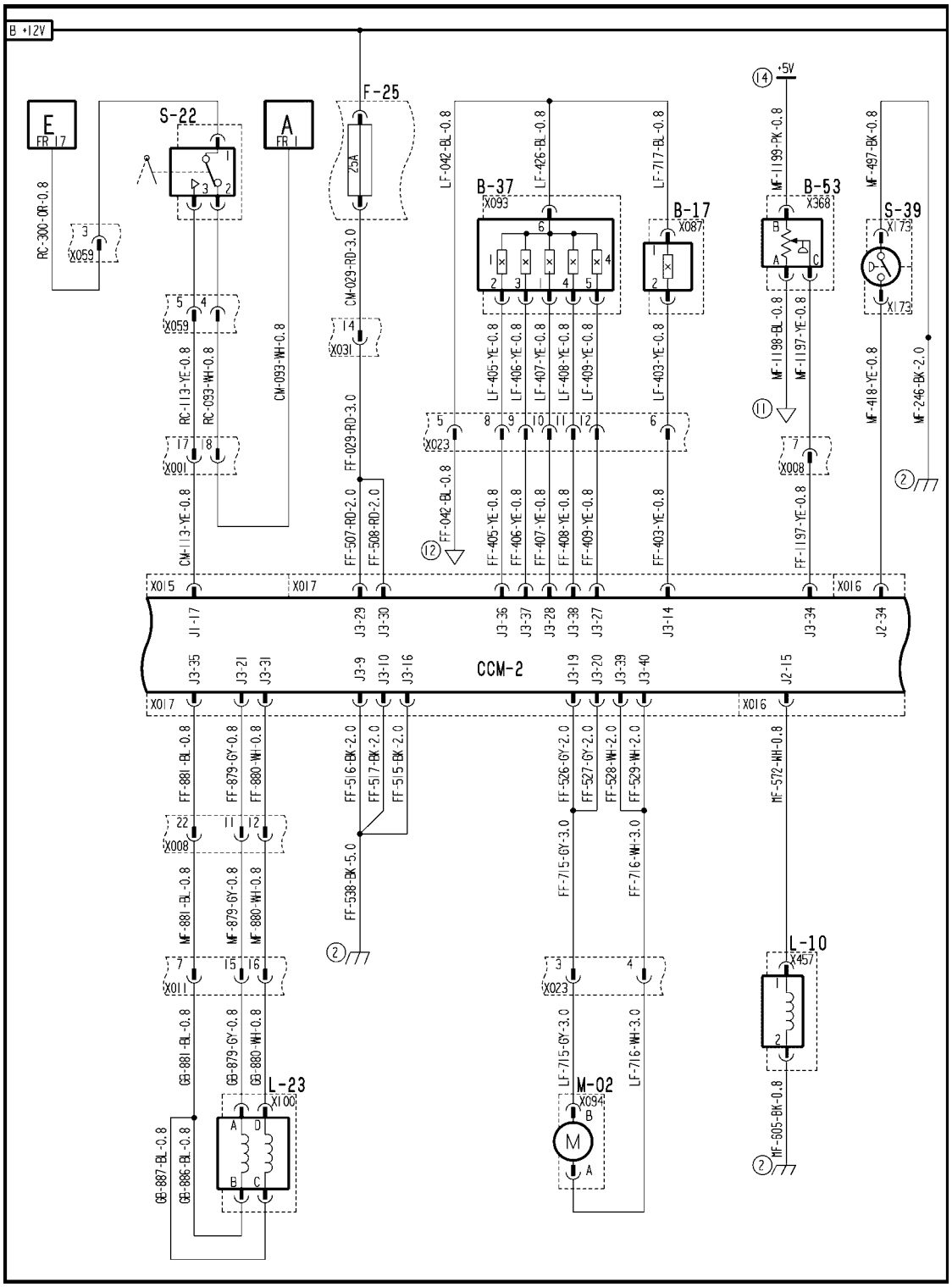
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.
- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



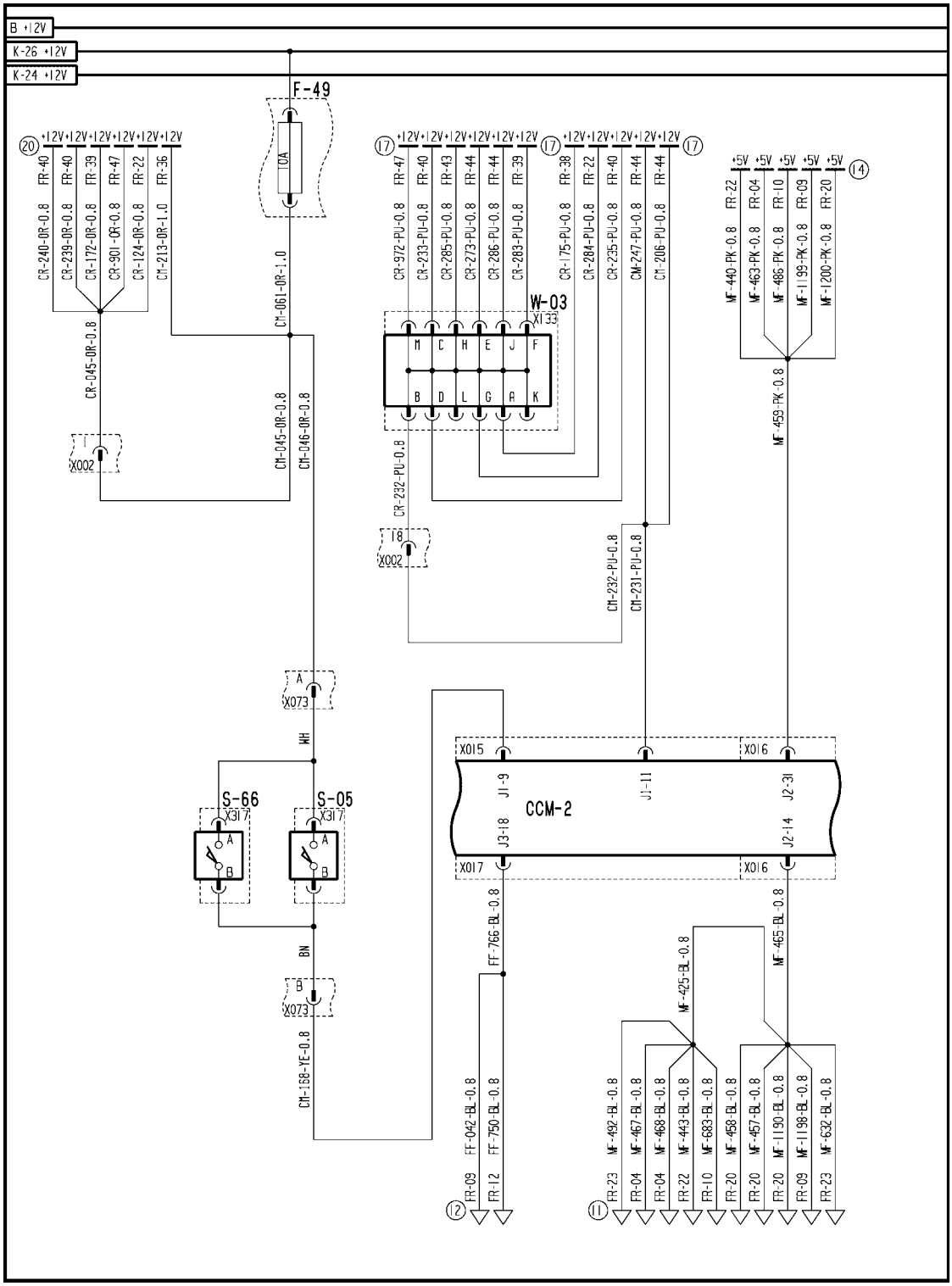
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54)

AFX8010

E0132-03 - Trans Shift Position 4 Sensor

Cause:
The transmission shift position sensor B-37 "4" circuit is shorted to 12 volts.

Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure)

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 4 SEN" to check the voltage range. The proper voltage when in shift position 4 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 4 is **0.5 - 5.6 volts**.

   A. If the voltage reading is high (>**9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the sensor or sensor wiring. Replace the sensor. To temporarily bypass the sensor, continue with step **5**.

   B. If the voltage remains high (>**9 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the lower frame (LF) harness between connector **X023** pin 12 and connector **X093** pin 5 wire 409 yellow. Locate the short and repair.

   B. If the voltage remains high (>**9 volts**) out of range, there is a short in the front frame (FF) harness between connector **X023** pin 12 and connector **X017** pin J3-27 wire 409 yellow. Locate the short and repair.

4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 4 SEN" voltage readings on the Universal Display Plus.

   A. If a high (>**9 volts**) voltage reading is now viewed, note which gear position generated the high voltage. Continue the troubleshooting at step **2**.

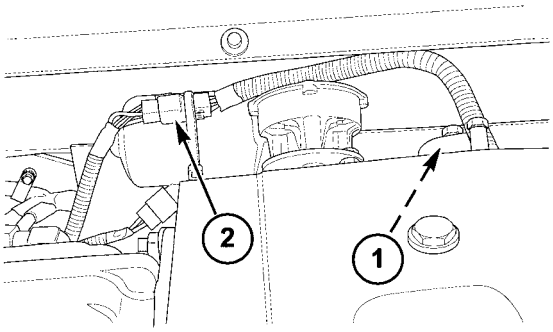
   B. If a high (>**9 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

5. If one sensor in the transmission shift position sensor has failed, it is possible to temporarily bypass that circuit to restore partial operation until the sensor can be replaced.

   A. Use a jumper wire to create a short circuit between connector **X093** pin 5 ("POS 4 SEN") and pin 6 (common circuit ground). The fault code
   E0132-04 - Trans Shift Position 4 Sensor
   should now be displayed, and the operator can continue operation without this gear.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

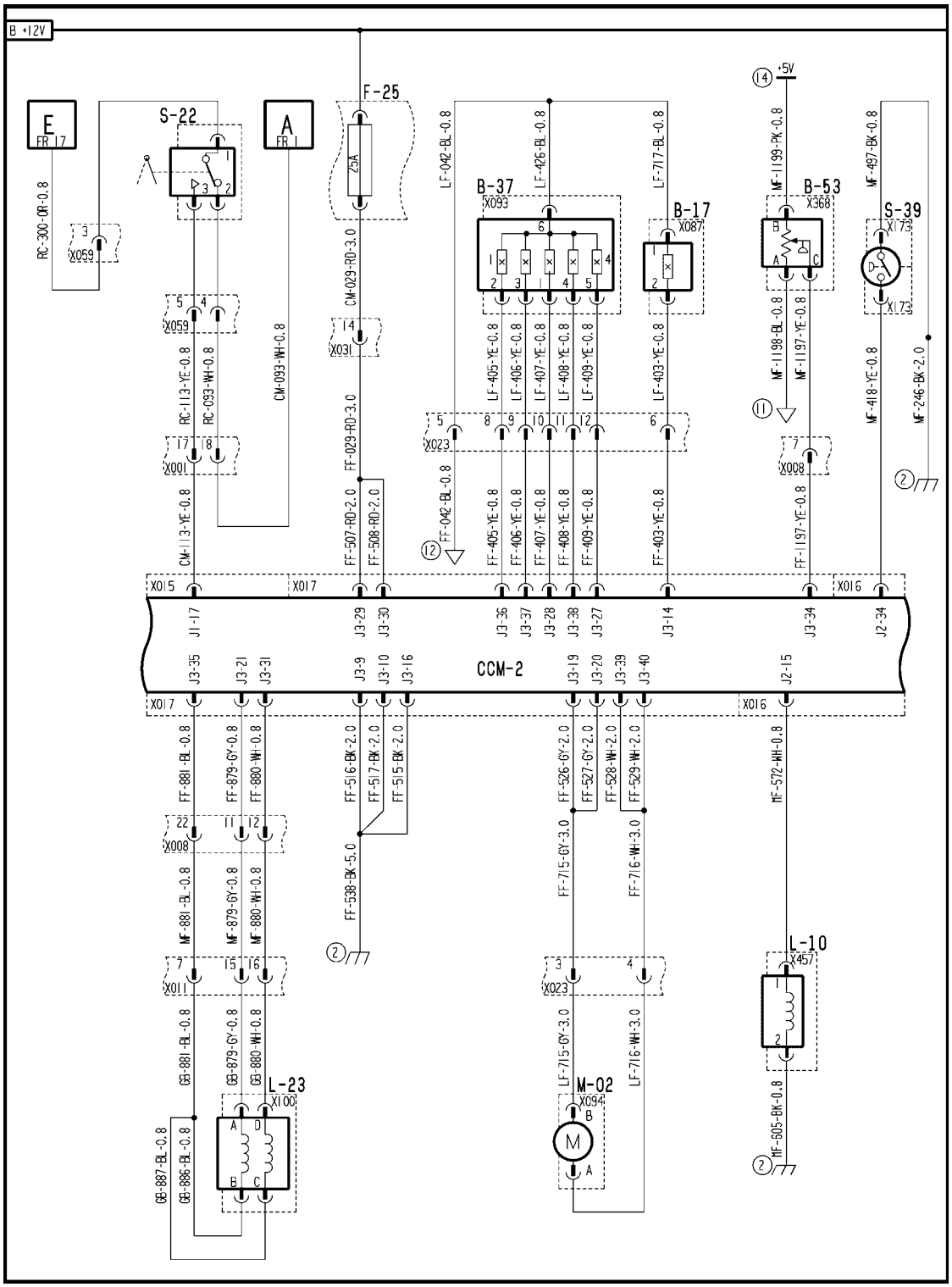
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)

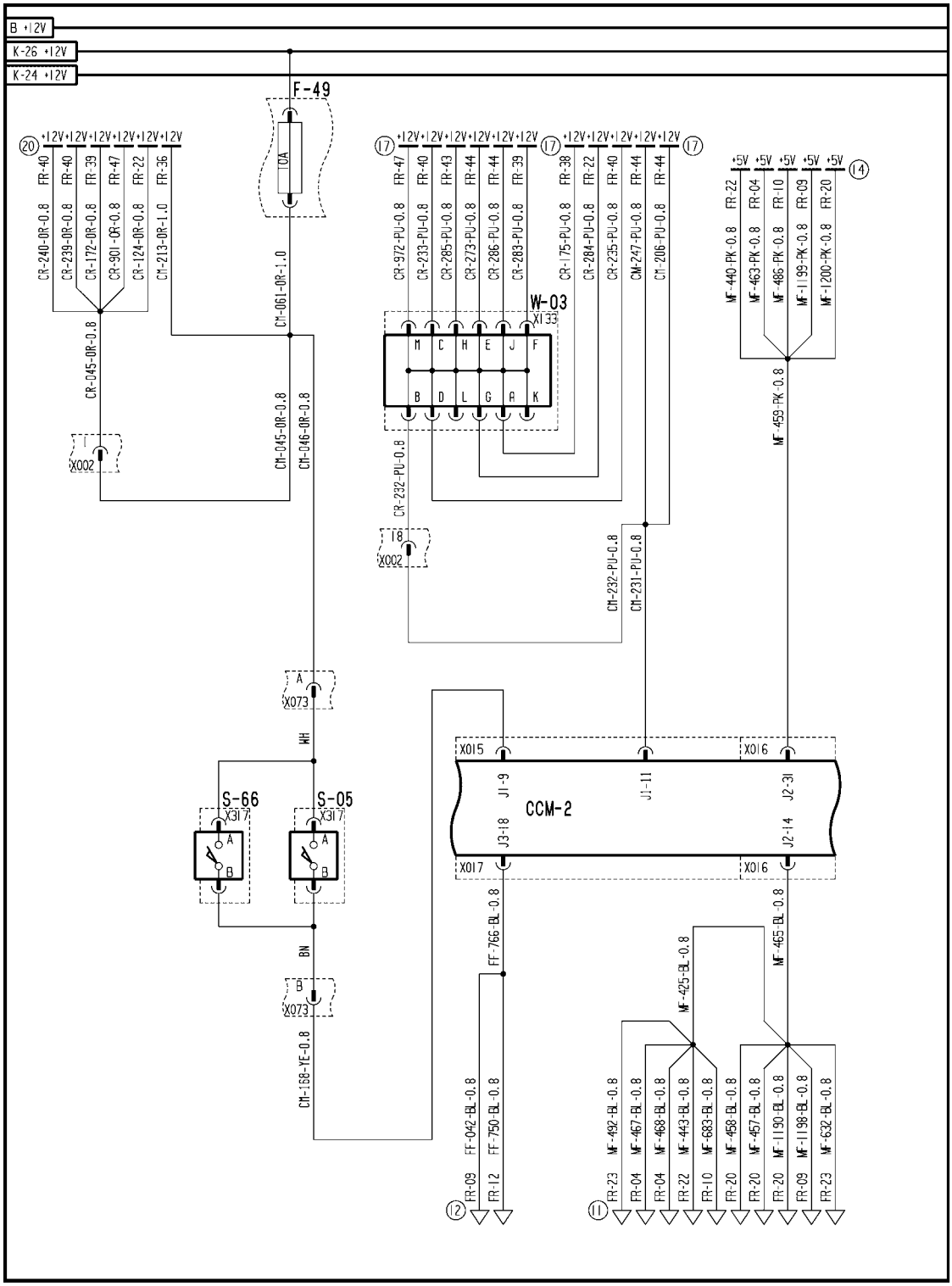


FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53)

AFX8010

E0132-04 - Trans Shift Position 4 Sensor

Cause:
The transmission shift position sensor B-37 "4" circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 4 SEN" to check the voltage range. The proper voltage when in shift position 4 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 4 is **0.5 - 5.6 volts**.

   A. If the voltage reading is low (<**0.5 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (<**0.5 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 12 and connector **X093** pin 5 wire 409 yellow. Locate the short and repair.

   B. If the voltage remains low (<**0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 12 and connector **X017** pin J3-27 wire 409 yellow. Locate the short and repair.

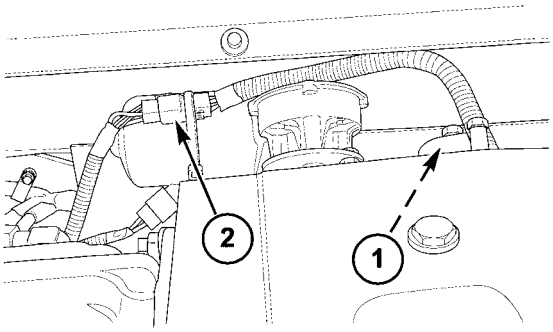
4. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 4 SEN" voltage readings on the Universal Display Plus.

   A. If a low (<**0.5 volts**) out of range voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a low (<**0.5 volts**) out of range voltage reading cannot be generated, clear the fault code and continue operation.

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Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



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The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

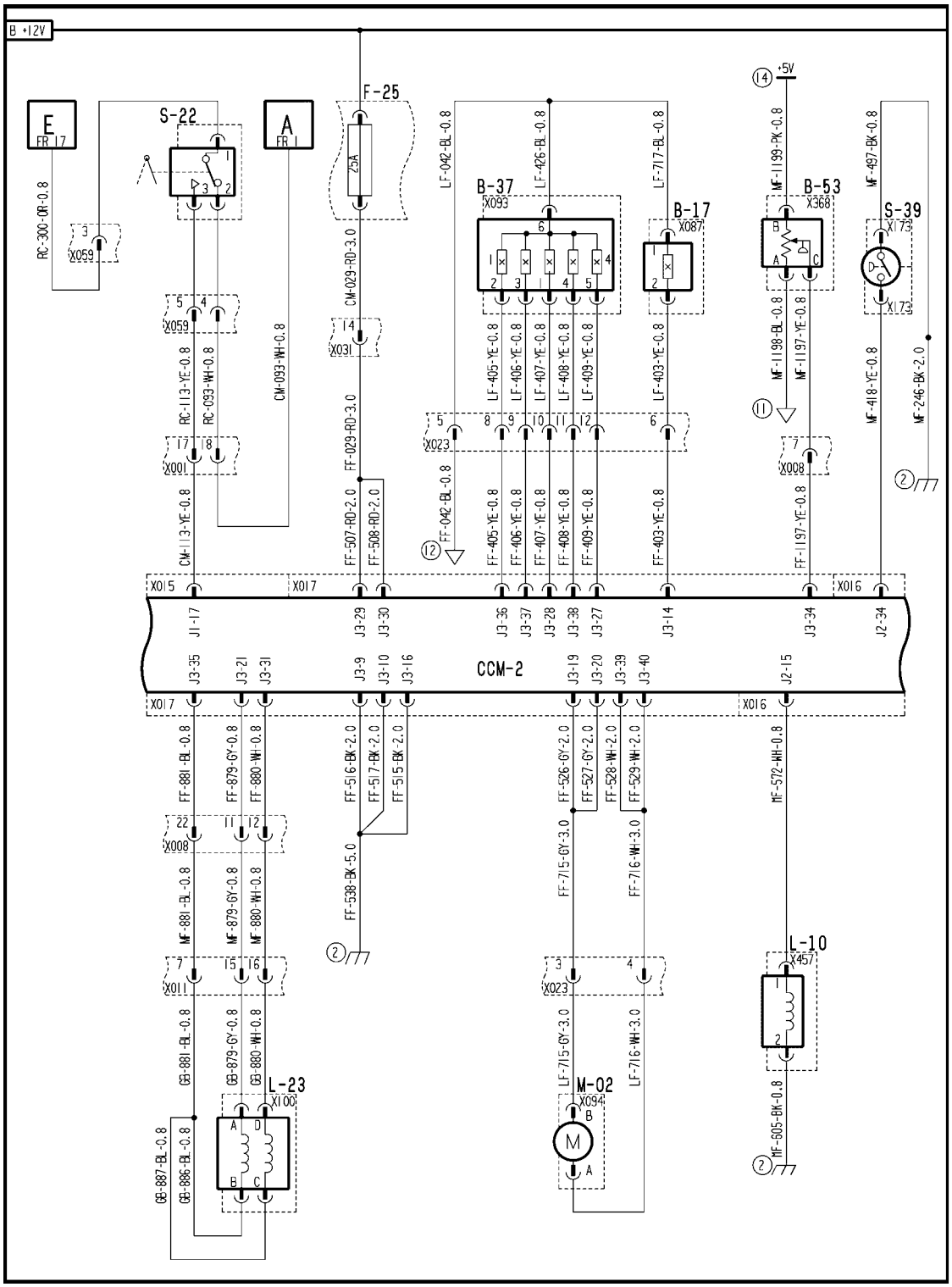
The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.

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- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



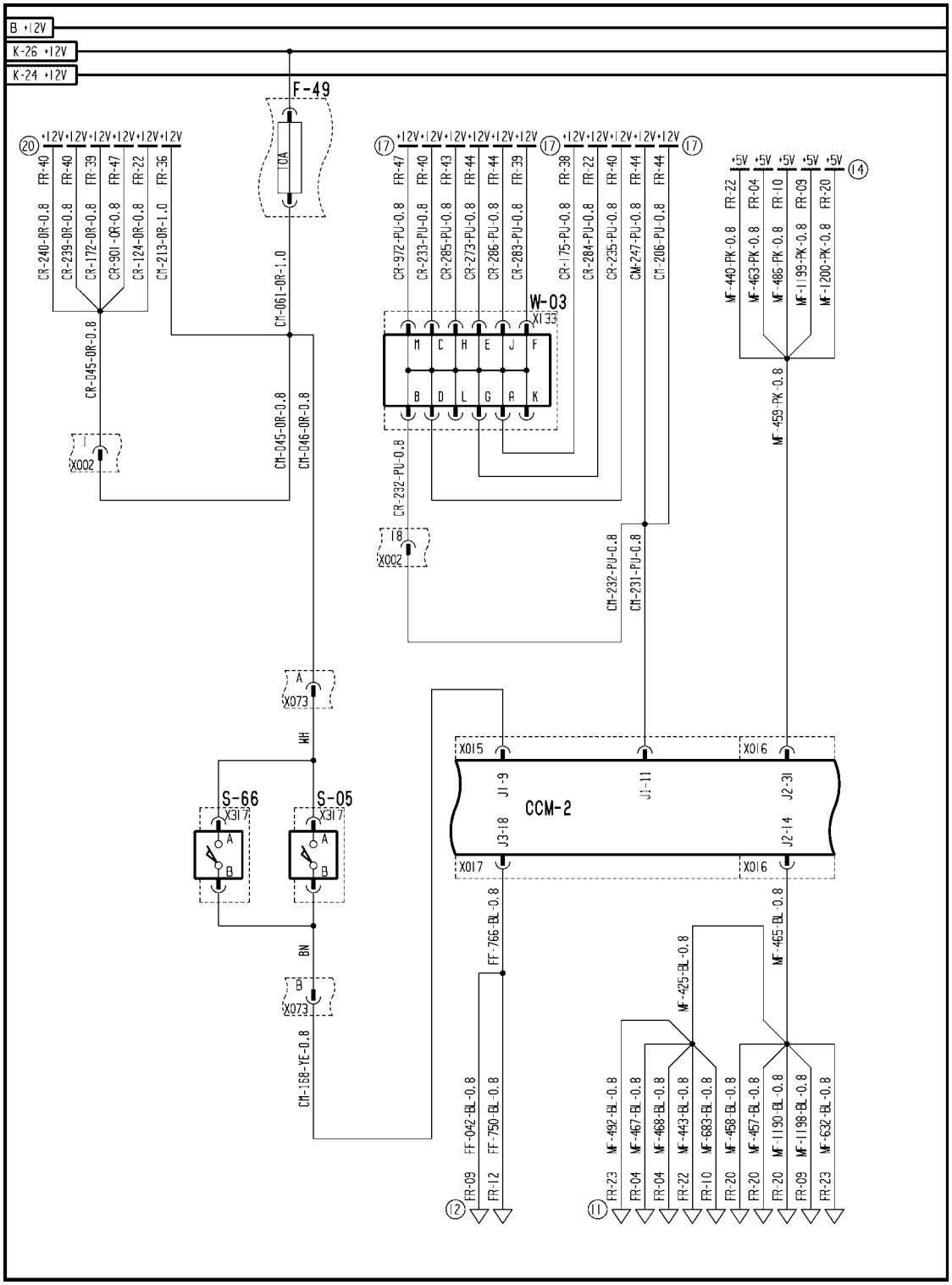
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FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



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FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50)

AFX8010

E0132-05 - Trans Shift Position 4 Sensor

Cause:
The transmission shift position sensor B-37 "4" circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "TRANSMISSION" sort menu, and select "POS 4 SEN" to check the voltage range. The proper voltage when in shift position 4 is **5.6 - 7.3 volts**. The proper voltage when not in shift position 4 is **0.5 - 5.6 volts**.

   A. If the voltage reading is **7.3 - 9.0 volts**, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a jumper wire to short connector **X093** pin 5 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, the open circuit is not in the supply side of the circuit. Continue with step **4**.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a jumper wire to short connector **X023** pin 12 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 12 and connector **X093** pin 5 wire 409 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** pin 12 and connector **X017** pin J3-27 wire 409 yellow. Locate the open and repair.

4. Disconnect the transmission shift position sensor connector **X093** at the transmission. Use a multimeter to check for continuity between the harness end of connector **X093** pin 6 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step **5**.

5. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 5 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 5 and connector **X093** pin 6 wire 426 blue or wire 042 blue. Locate the open and repair.

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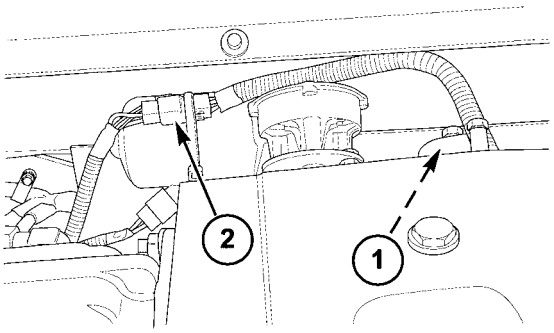
B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 5 and connector **X017** pin J3-18 wire 042 blue or wire 766 blue. Locate the open and repair.

6. Operate the transmission shift gear switch to change the transmission gears, and monitor the "POS 4 SEN" voltage readings on the Universal Display Plus.

   A. If a high (**7.3 - 9.0 volts**) voltage reading is now viewed, continue the troubleshooting at step **2**.

   B. If a high (**7.3 - 9.0 volts**) voltage reading cannot be generated, clear the fault code and continue operation.

Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10)



10004664A5 1

The transmission shift position sensor B-37 **(1)** is located on the top rear of the transmission housing, directly above the shifting disc. The transmission shift position sensor contains 5 position sensors internally, arranged in a horseshoe pattern, which are used to determine the position of the shifting disc. The shifting disc has a pin that is positioned to travel under the transmission shift position sensor as the shifting disc is rotated to select a gear in the transmission. The transmission shift position sensor is connected (**X093**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** as follows:

Gear	Pin Number
1	J3-36
2	J3-37
N	J3-28
3	J3-38
4	J3-27

When a gear can not be engaged because of either mechanical reason or failure of one of the internal sensors in the transmission shift position sensor B-37, the software in CCM2 will allow another gear to be selected.

NOTE: *Refer to the Operator's manual for information on the manual gear shifting procedure.*
The transmission shift position sensor B-37 circuit is also monitored by the CCM2 module; in the event that a fault occurs with one of the internal sensors or the wiring to the sensor, a fault code will be displayed to the operator.
E0128-03 - Trans Shift Position N Sensor
E0128-04 - Trans Shift Position N Sensor
E0128-05 - Trans Shift Position N Sensor
E0129-03 - Trans Shift Position 3 Sensor
E0129-04 - Trans Shift Position 3 Sensor
E0129-05 - Trans Shift Position 3 Sensor
E0130-03 - Trans Shift Position 2 Sensor
E0130-04 - Trans Shift Position 2 Sensor
E0130-05 - Trans Shift Position 2 Sensor
E0131-03 - Trans Shift Position 1 Sensor
E0131-04 - Trans Shift Position 1 Sensor
E0131-05 - Trans Shift Position 1 Sensor
E0132-03 - Trans Shift Position 4 Sensor

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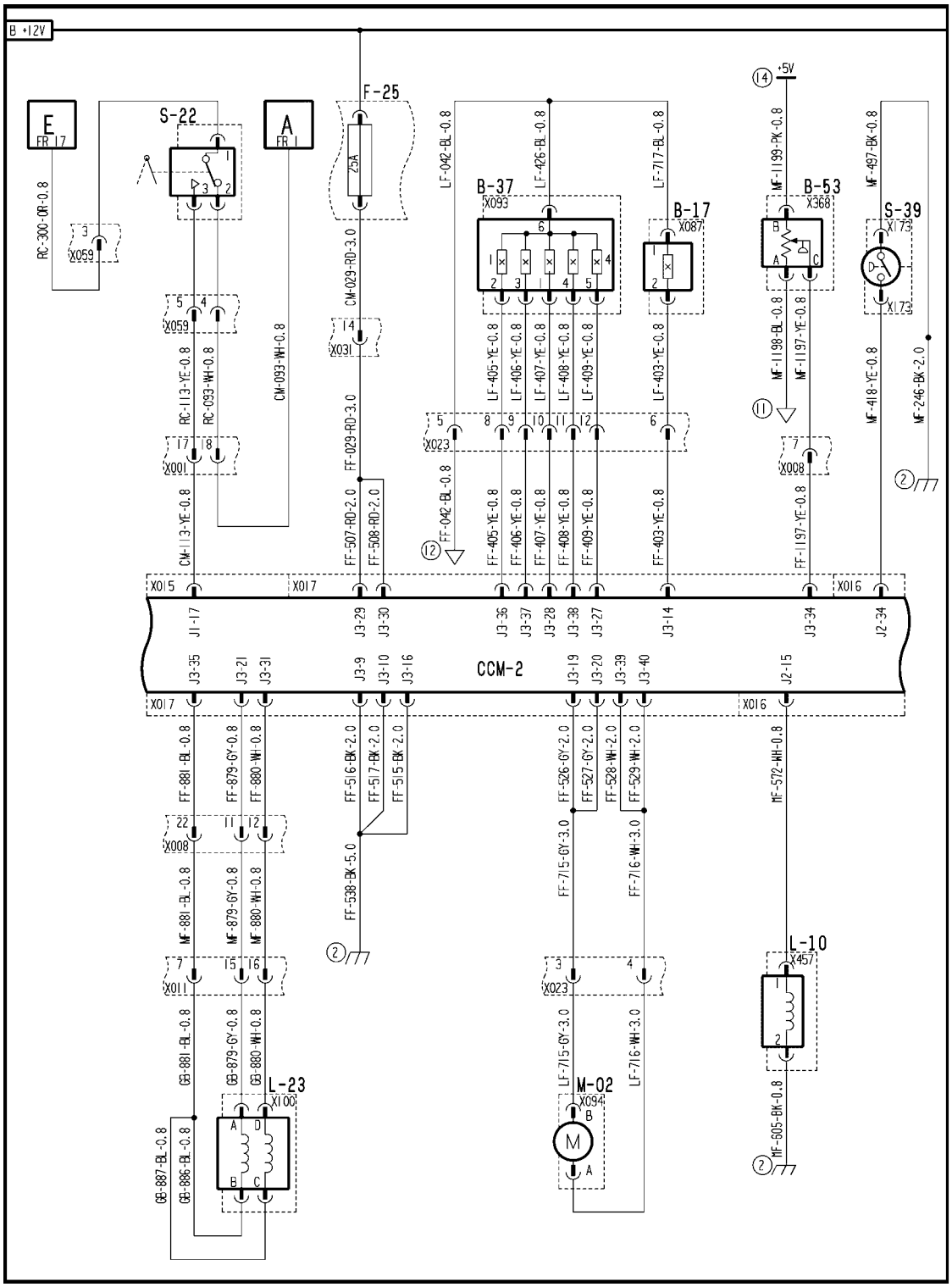
E0132-04 - Trans Shift Position 4 Sensor
E0132-05 - Trans Shift Position 4 Sensor

The inputs from the transmission shift position sensor B-37 supports several functions, such as:

- selected gear readout on display.
- when shifting gears in the transmission, the transmission shift motor M-02 will stop rotating the shifting disc when the selected gear is engaged, as determined by the shift position sensor.
- CCM2 limits the reverse speed of the combine when the shift position sensor indicates engagement of 3rd or 4th gear.
- the rear wheel assist solenoid L-26 is disabled when the shift position sensor indicates engagement of 4th gear.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



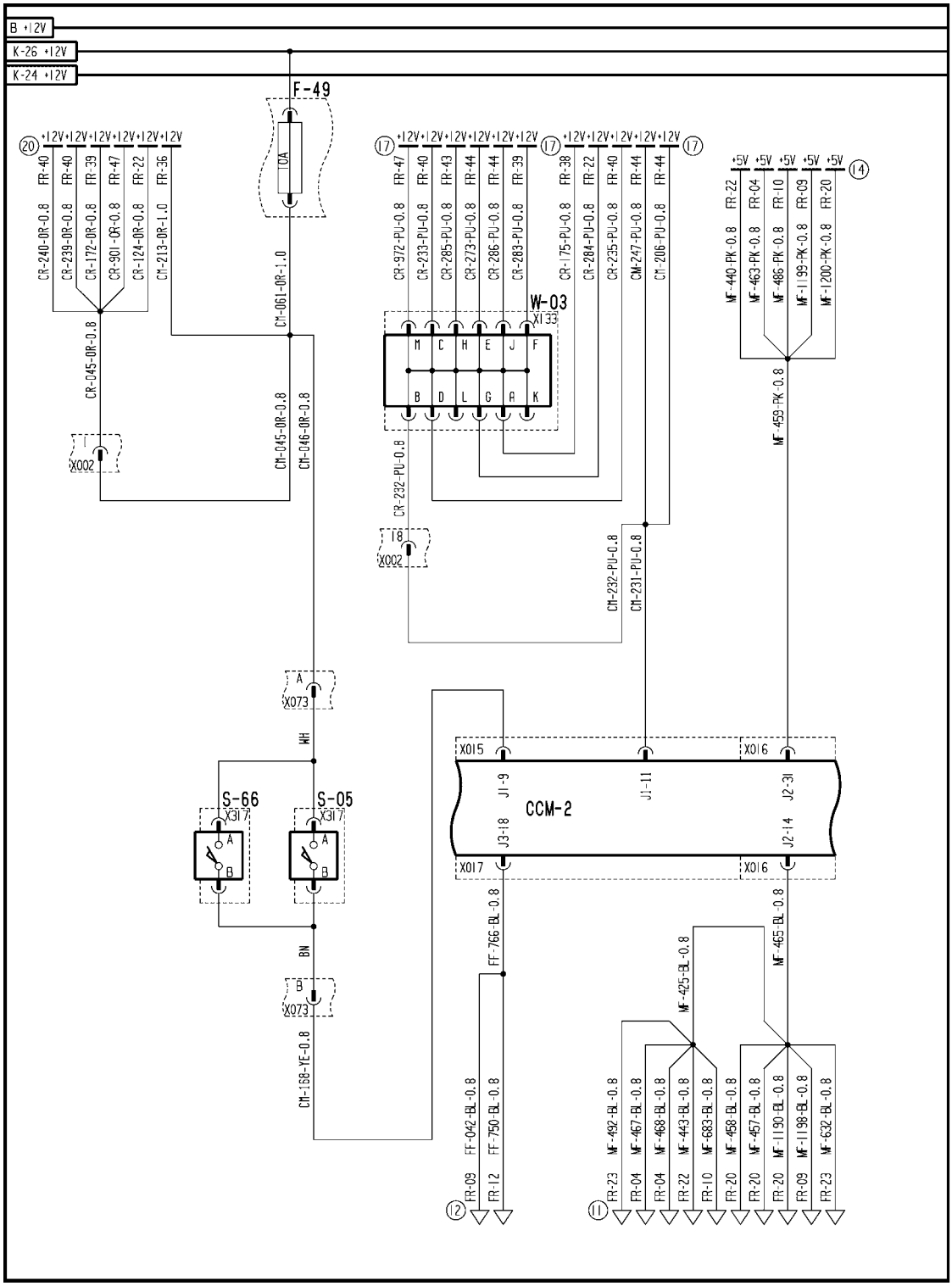
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Sensing system Ground speed sensor - Short circuit to B+ (C.20.B.95.80 - G.30.B.54)

AFX8010

E0142-03 - Ground Speed Sensor

Cause:
The ground speed RPM sensor B-17 circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure)

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "GROUND SPD SEN" to check the voltage range. The proper voltage for the sensor when blocked by ferrous metal is **5.6 - 7.3 volts**. The proper voltage for the sensor when not blocked by ferrous metal is **0.5 - 5.6 volts**.

   A. If the voltage reading is high (>**9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the ground speed RPM sensor connector**X087** at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains high (>**9 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage drops to **7.3 - 9 volts**, there is a short in the lower frame (LF) harness between connector **X023** pin 6 and connector **X087** pin B wire 403 yellow. Locate the short and repair.

   B. If the voltage remains high (>**9 volts**) out of range, there is a short in the front frame (FF) harness between connector **X023** pin 6 and connector **X017** pin J3-14 wire 403 yellow. Locate the short and repair.

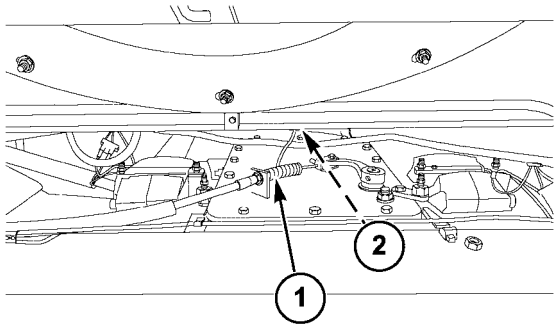
4. Turn the key to the "ON" position. Remove the ground speed RPM sensor B-17 from the transmission top cover. Observing the LED on the sensor, place ferrous metal in front of the sensor, and then remove.

   A. If the LED does not change state (turn on and off), the sensor is not functioning. Replace the sensor and continue the troubleshooting at step **1**.

   B. If the LED changes state (turns on and off), the sensor is functioning properly. Clear the fault code and continue operation.

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Sensing system Ground speed sensor - Overview (C.20.B.95.80 - C.10.A.10)



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The ground speed sensor B-17 **(1)** is located on the top cover of the transmission, positioned above the differential ring gear. The sensor is connected (**X087**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** pin J3-14. The ground speed sensor B-17 circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

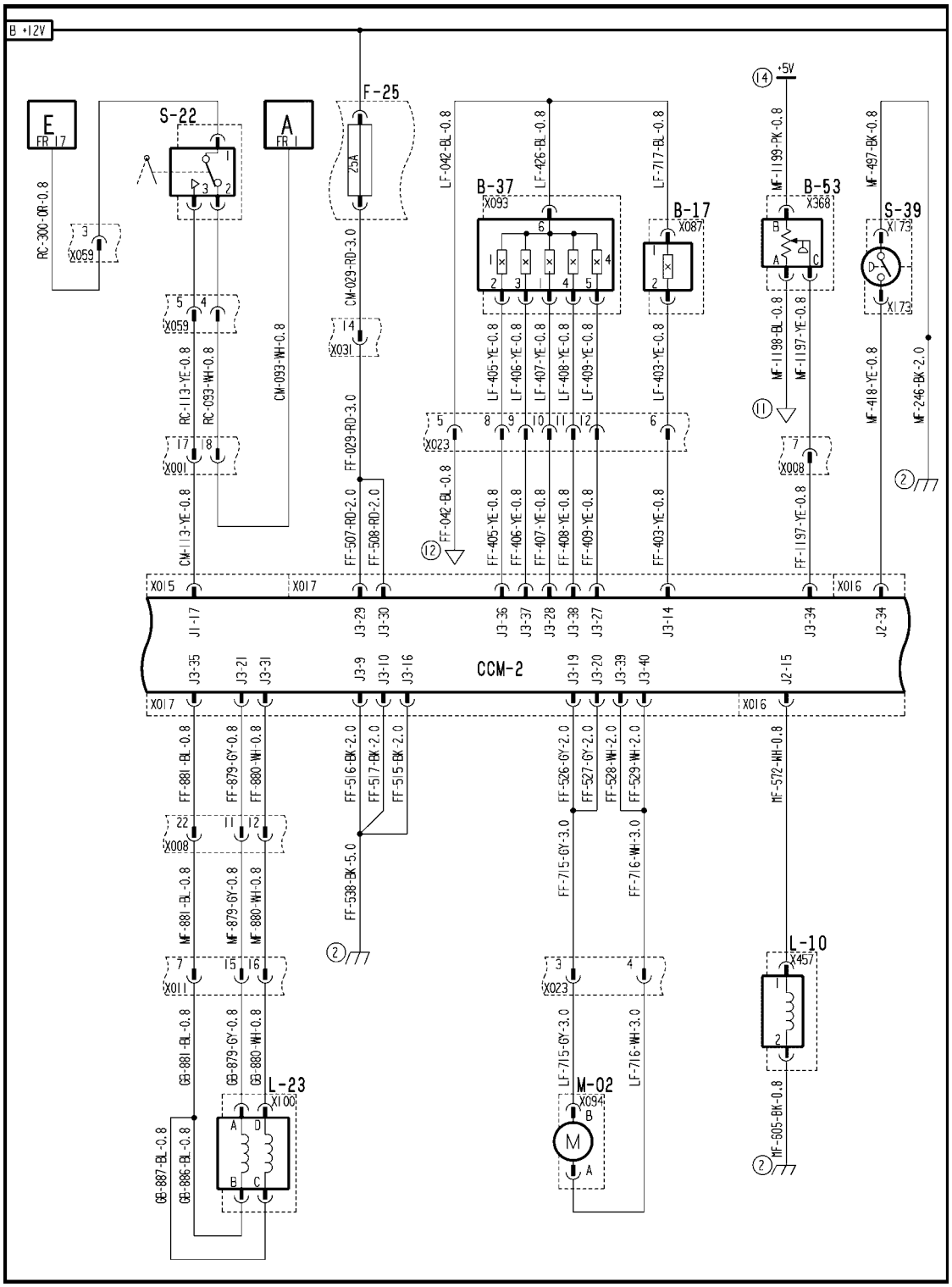
E0142-03 - Ground Speed Sensor
E0142-04 - Ground Speed Sensor
E0142-05 - Ground Speed Sensor

The input from the ground speed sensor B-17 supports several functions, such as:

- ground speed readout on display.
- prevents activation of the transmission shift motor M-02 when the value from the sensor is above the threshold value. This avoids gear shifting when the gearbox has components that are in motion.
- automatic reel speed synchronization with ground speed.
- automatic feeder speed synchronization with ground speed.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



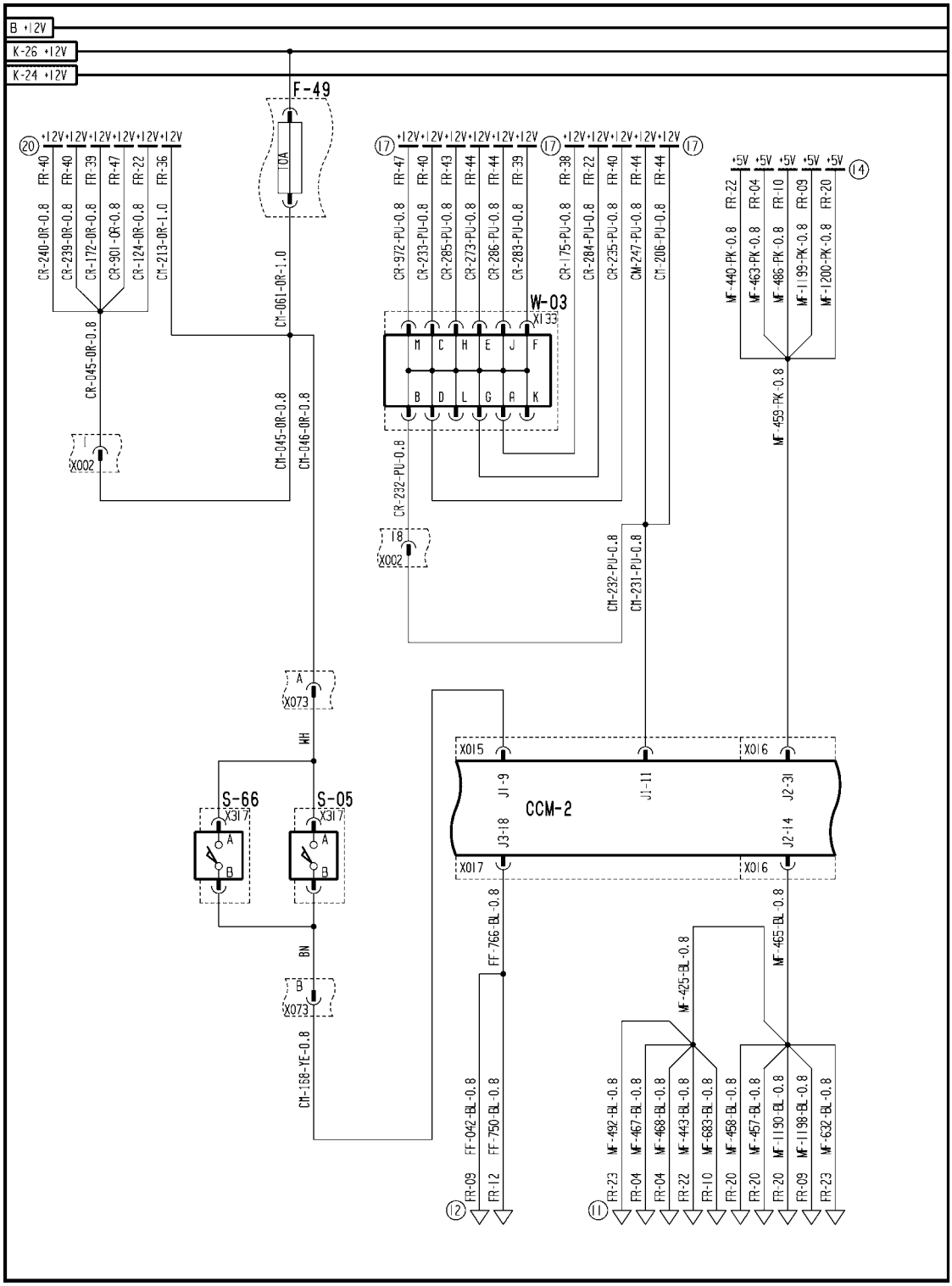
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Ground speed sensor - Short circuit to ground (C.20.B.95.80 - G.30.B.53)

AFX8010

E0142-04 - Ground Speed Sensor

Cause:
The ground speed RPM sensor B-17 circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "GROUND SPD SEN" to check the voltage range. The proper voltage for the sensor when blocked by ferrous metal is**5.6 - 7.3 volts**. The proper voltage for the sensor when not blocked by ferrous metal is **0.5 - 5.6 volts**.

   A. If the voltage reading is low (<**0.5 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the ground speed RPM sensor connector **X087**at the transmission. The voltage indicated should be **7.3 - 9 volts**.

   A. If the voltage increases to **7.3 - 9 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low (<**0.5 volts**) out of range, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.

   A. If the voltage increases to **7.3 - 9 volts**, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 6 and connector **X087** pin B wire 403 yellow. Locate the short and repair.

   B. If the voltage remains low (<**0.5 volts**) out of range, there is a short to ground in the front frame (FF) harness between connector **X023** pin 6 and connector **X017** pin J3-14 wire 403 yellow. Locate the short and repair.

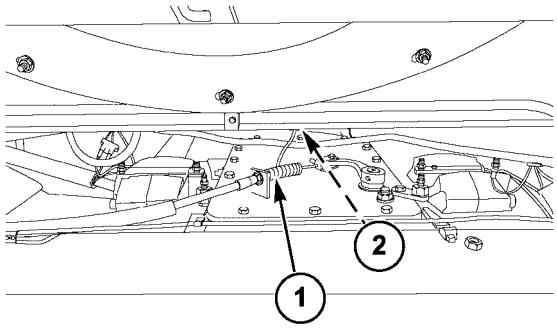
4. Turn the key to the "ON" position. Remove the ground speed RPM sensor B-17 from the transmission top cover. Observing the LED on the sensor, place ferrous metal in front of the sensor, and then remove.

   A. If the LED does not change state (turn on and off), the sensor is not functioning. Replace the sensor and continue the troubleshooting at step **1**.

   B. If the LED changes state (turns on and off), the sensor is functioning properly. Clear the fault code and continue operation.

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Sensing system Ground speed sensor - Overview (C.20.B.95.80 - C.10.A.10)



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The ground speed sensor B-17 **(1)** is located on the top cover of the transmission, positioned above the differential ring gear. The sensor is connected (**X087**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** pin J3-14. The ground speed sensor B-17 circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

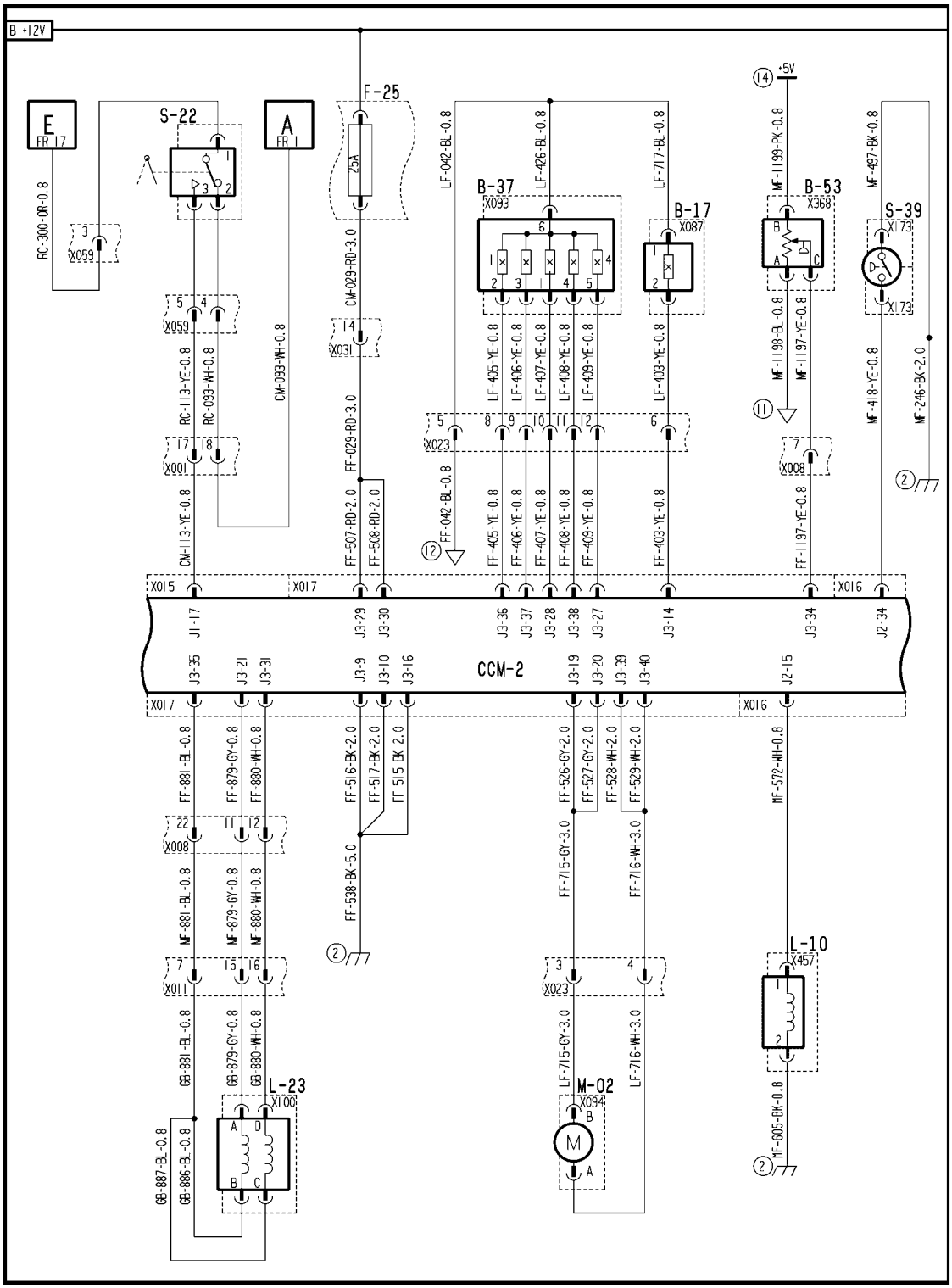
E0142-03 - Ground Speed Sensor
E0142-04 - Ground Speed Sensor
E0142-05 - Ground Speed Sensor

The input from the ground speed sensor B-17 supports several functions, such as:

- ground speed readout on display.
- prevents activation of the transmission shift motor M-02 when the value from the sensor is above the threshold value. This avoids gear shifting when the gearbox has components that are in motion.
- automatic reel speed synchronization with ground speed.
- automatic feeder speed synchronization with ground speed.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



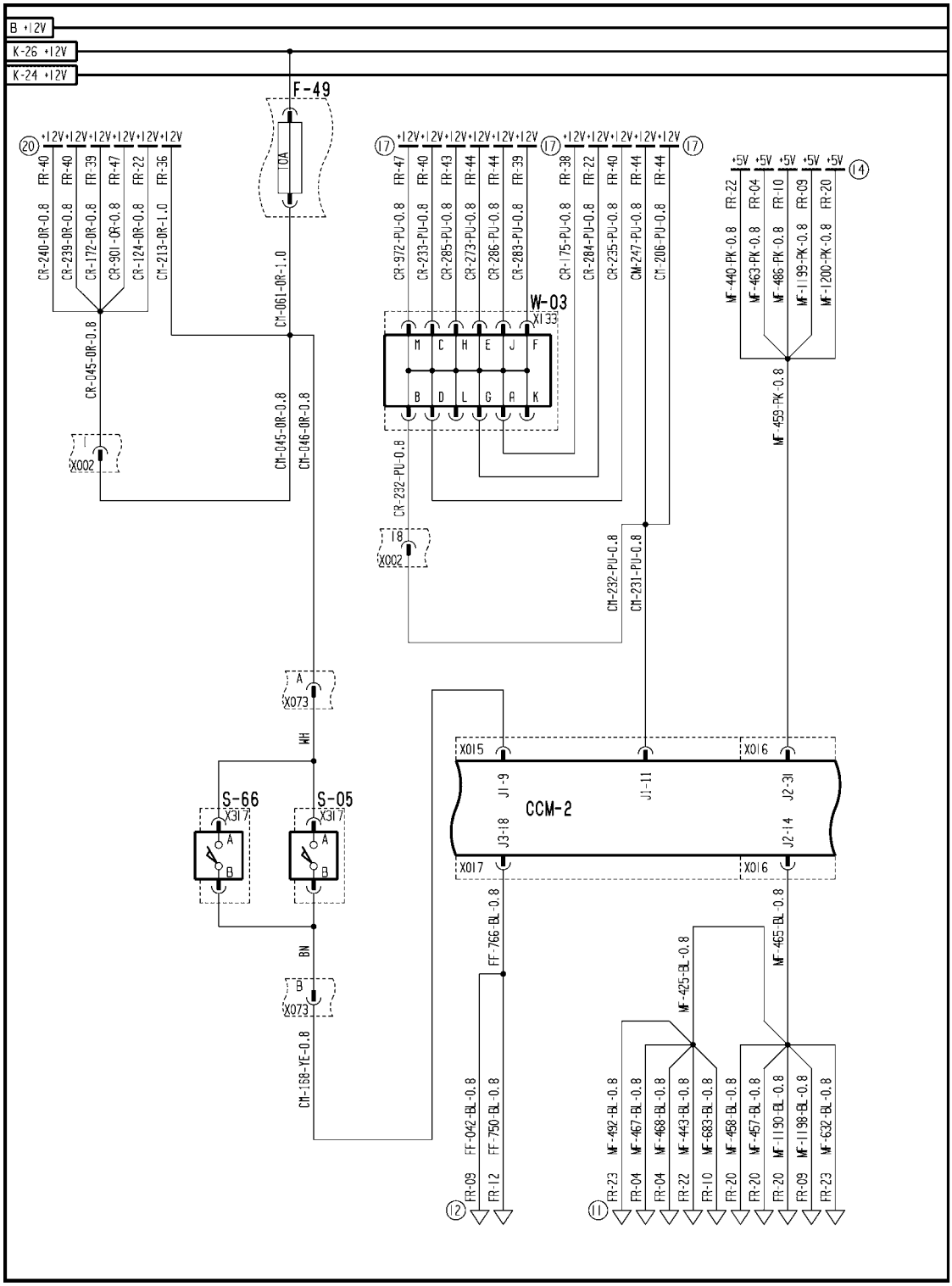
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Ground speed sensor - Open circuit (C.20.B.95.80 - G.30.B.50)

AFX8010

E0142-05 - Ground Speed Sensor

Cause:
The ground speed RPM sensor B-17 circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "GROUND SPD SEN" to check the voltage range. The proper voltage for the sensor when blocked by ferrous metal is **5.6 - 7.3 volts**. The proper voltage for the sensor when not blocked by ferrous metal is **0.5 - 5.6 volts**.

   A. If the voltage reading is **7.3 - 9.0 volts**, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector is fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the ground speed RPM sensor connector **X087** at the transmission. Use a jumper wire to short connector **X087** pin B to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, the open circuit is not in the supply side of the circuit. Continue with step **4**.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with step **3**.

3. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a jumper wire to short connector **X023** pin 6 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a short to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 6 and connector **X087** pin B wire 403 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** pin 6 and connector **X017** pin J3-14 wire 403 yellow. Locate the open and repair.

4. Disconnect the ground speed RPM sensor connector **X087** at the transmission. Use a multimeter to check for continuity between the harness end of connector **X087** pin A to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity to ground, the ground path for the sensor is open. Continue with step **5**.

5. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 5 to chassis ground. There should be continuity to ground.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 5 and connector **X087** pin A wire 717 blue or wire 042 blue. Locate the open and repair.

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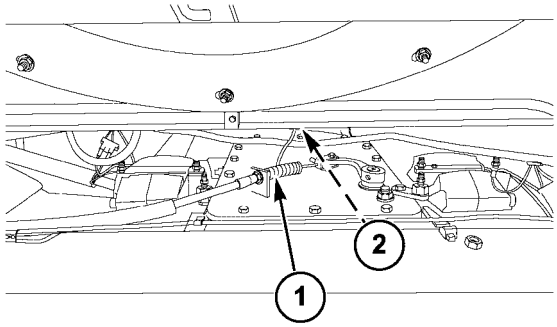
B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 5 and connector **X017** pin J3-18 wire 042 blue or wire 766 blue. Locate the open and repair.

6. Turn the key to the "ON" position. Remove the ground speed RPM sensor B-17 from the transmission top cover. Observing the LED on the sensor, place ferrous metal in front of the sensor, and then remove.

   A. If the LED does not change state (turn on and off), the sensor is not functioning. Replace the sensor and continue the troubleshooting at step **1**.

   B. If the LED changes state (turns on and off), the sensor is functioning properly. Clear the fault code and continue operation.

Sensing system Ground speed sensor - Overview (C.20.B.95.80 - C.10.A.10)



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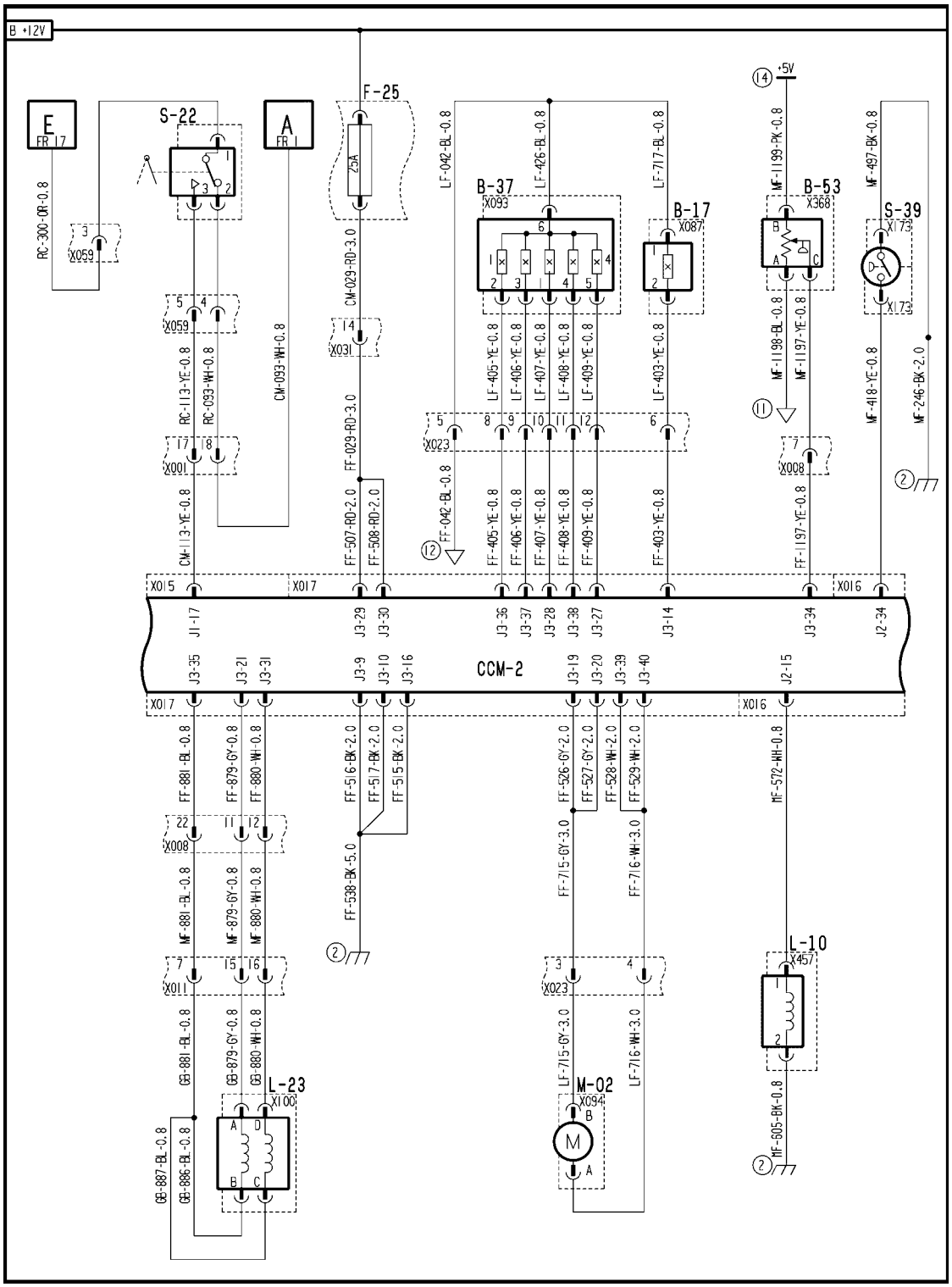
The ground speed sensor B-17 **(1)** is located on the top cover of the transmission, positioned above the differential ring gear. The sensor is connected (**X087**) to the lower frame (LF) harness at **(2)**, and provides an input to the CCM2 module at connector **X017** pin J3-14. The ground speed sensor B-17 circuit is also monitored by the CCM2 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0142-03 - Ground Speed Sensor
E0142-04 - Ground Speed Sensor
E0142-05 - Ground Speed Sensor

The input from the ground speed sensor B-17 supports several functions, such as:

- ground speed readout on display.
- prevents activation of the transmission shift motor M-02 when the value from the sensor is above the threshold value. This avoids gear shifting when the gearbox has components that are in motion.
- automatic reel speed synchronization with ground speed.
- automatic feeder speed synchronization with ground speed.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



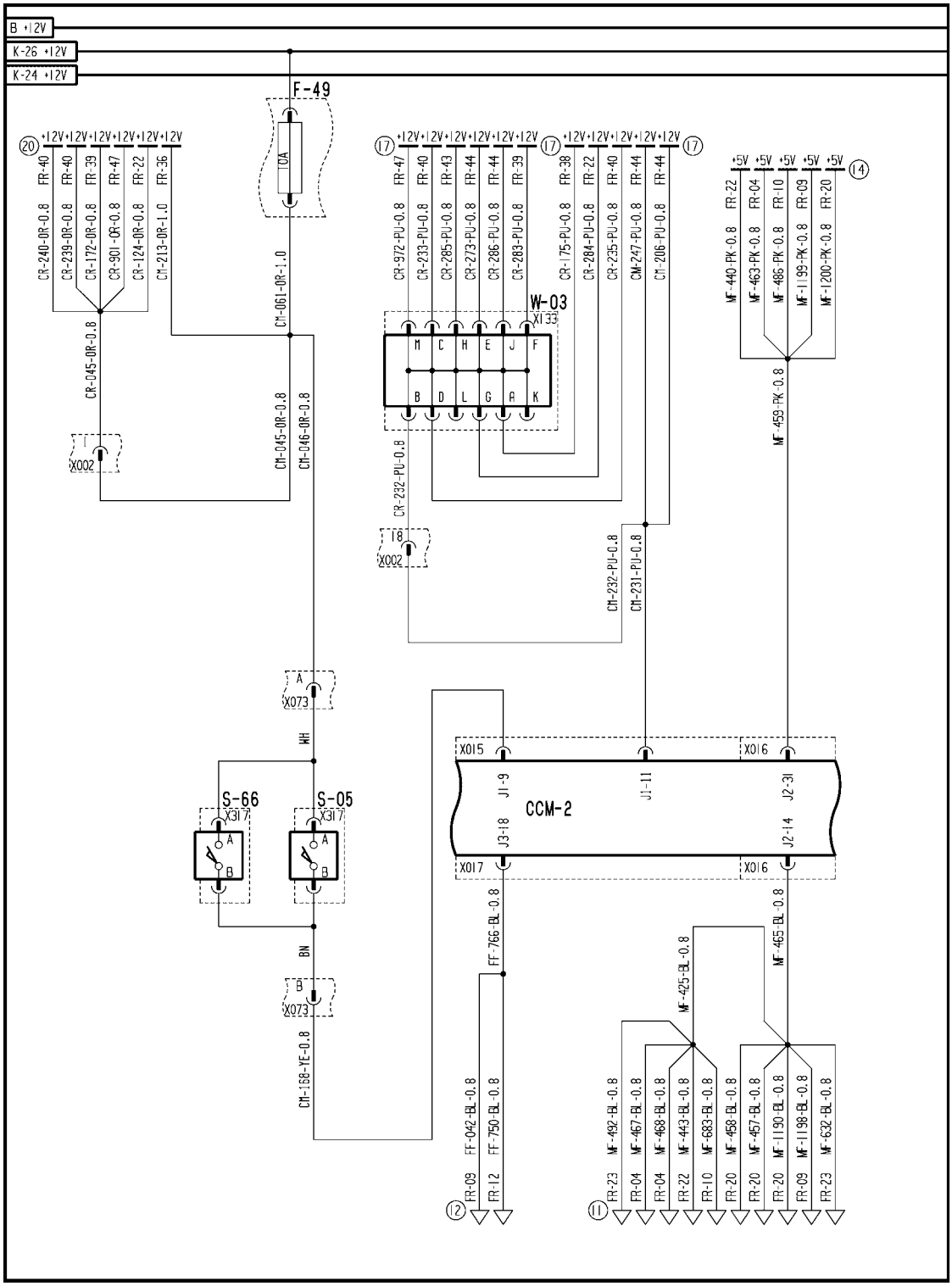
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FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Index

POWER TRAIN - C

TRANSMISSION Mechanical - 20.B

Differential - Assemble (C.20.B.50 - F.10.A.20) 61
AFX8010

Differential - Disassemble (C.20.B.50 - F.10.A.25) 59
AFX8010

Differential - Exploded view (C.20.B.50 - C.10.A.20) 18
AFX8010

Differential - Install (C.20.B.50 - F.10.A.15) 63
AFX8010

Differential - Remove (C.20.B.50 - F.10.A.10) 56
AFX8010

Differential - Sectional view (C.20.B.50 - C.10.A.30) 17
AFX8010

Differential lock command - Overhaul (C.20.B.51 - F.10.A.40) 66
AFX8010

Electrical motor - Dynamic description (C.20.B.82 - C.30.A.10) 21
AFX8010

Electrical motor - Overview (C.20.B.82 - C.10.A.10) 20
AFX8010

Electrical motor - Short circuit (C.20.B.82 - G.30.B.52) 72
AFX8010

Electrical motor - Unidentified failure (C.20.B.82 - G.30.B.46) 78
AFX8010

Fork and shift rail - Install (C.20.B.56 - F.10.A.15) 69
AFX8010

Fork and shift rail - Remove (C.20.B.56 - F.10.A.10) 68
AFX8010

Housing - Assemble (C.20.B.74 - F.10.A.20) 71
AFX8010

Housing - Disassemble (C.20.B.74 - F.10.A.25) 70
AFX8010

Sensing system Ground speed sensor - Open circuit (C.20.B.95.80 - G.30.B.50) 174
AFX8010

Sensing system Ground speed sensor - Overview (C.20.B.95.80 - C.10.A.10) 23
AFX8010

Sensing system Ground speed sensor - Short circuit to B+ (C.20.B.95.80 - G.30.B.54) 164
AFX8010

Sensing system Ground speed sensor - Short circuit to ground (C.20.B.95.80 - G.30.B.53) 169
AFX8010

Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 94
AFX8010

Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 110
AFX8010

Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 126
AFX8010

Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 142
AFX8010

Sensing system Shift position sensor - Open circuit (C.20.B.95.81 - G.30.B.50) 158
AFX8010
Sensing system Shift position sensor - Overview (C.20.B.95.81 - C.10.A.10) 24
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 84
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 100
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 116
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 132
AFX8010
Sensing system Shift position sensor - Short circuit to B+ (C.20.B.95.81 - G.30.B.54) 148
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 89
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 105
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 121
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 137
AFX8010
Sensing system Shift position sensor - Short circuit to ground (C.20.B.95.81 - G.30.B.53) 153
AFX8010
Shaft - Assemble (C.20.B.43 - F.10.A.20) 53
AFX8010
Shaft - Disassemble (C.20.B.43 - F.10.A.25) 49
AFX8010
Shaft - Exploded view (C.20.B.43 - C.10.A.20) 13
AFX8010
Shaft - Install (C.20.B.43 - F.10.A.15) 44
AFX8010
Shaft - Overview (C.20.B.43 - C.10.A.10) 15
AFX8010
Shaft - Remove (C.20.B.43 - F.10.A.10) 40
AFX8010
Shaft - Sectional view (C.20.B.43 - C.10.A.30) 11
AFX8010
Transmission command - Detailed view (C.20.B.05 - C.10.A.50) 10
AFX8010
Transmission command - Exploded view (C.20.B.05 - C.10.A.20) 9
AFX8010
Transmission command - Install (C.20.B.05 - F.10.A.15) 37
AFX8010
Transmission command - Remove (C.20.B.05 - F.10.A.10) 34
AFX8010
Transmission command - Sectional view (C.20.B.05 - C.10.A.30) 8
AFX8010
TRANSMISSION Mechanical - Assemble (C.20.B - F.10.A.20) 30
AFX8010
TRANSMISSION Mechanical - Disassemble (C.20.B - F.10.A.25) 29
AFX8010
TRANSMISSION Mechanical - General specification (C.20.B - D.40.A.10) 5
AFX8010
TRANSMISSION Mechanical - Install (C.20.B - F.10.A.15) 31
AFX8010

https://truckmanualshub.com/

TRANSMISSION Mechanical - Overview (C.20.B - C.10.A.10) 7
AFX8010

TRANSMISSION Mechanical - Remove (C.20.B - F.10.A.10) 26
AFX8010

TRANSMISSION Mechanical - Special tools (C.20.B - D.20.A.40) 6
AFX8010

TRANSMISSION Mechanical - Torque (C.20.B - D.20.A.10) 5
AFX8010

https://truckmanualshub.com/

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POWER TRAIN - C

TRANSMISSION Hydrostatic - 20.F

AFX8010

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Contents

POWER TRAIN - C

TRANSMISSION Hydrostatic - 20.F

TECHNICAL DATA

TRANSMISSION Hydrostatic - General specification (C.20.F - D.40.A.10) 4
AFX8010

TRANSMISSION Hydrostatic - Capacity (C.20.F - D.40.A.20) 4
AFX8010

Pump

Pump - General specification (C.20.F.20 - D.40.A.10) 4
AFX8010

Motor

Motor - General specification (C.20.F.28 - D.40.A.10) 5
AFX8010

FUNCTIONAL DATA

TRANSMISSION Hydrostatic - Overview (C.20.F - C.10.A.10) 6
AFX8010

TRANSMISSION Hydrostatic - Hydraulic schema (C.20.F - C.20.A.20) 10
AFX8010

Sensing system

Sensing system Temperature sensor - Overview (C.20.F.95.90 - C.10.A.10) 12
AFX8010

SERVICE

TRANSMISSION Hydrostatic - Filling (C.20.F - F.60.A.10) 13
AFX8010

Command

Command - Pressure test (C.20.F.05 - F.40.A.30) 19
AFX8010

Relief valve

Relief valve - Pressure test (C.20.F.16 - F.40.A.30) 21
AFX8010

Pump

Pump - Check (C.20.F.20 - F.40.A.11) 22
AFX8010

Motor

Motor - Check (C.20.F.28 - F.40.A.11) 23
AFX8010

DIAGNOSTIC

https://truckmanualshub.com/

Control valve

Control valve - Open circuit (C.20.F.13 - G.30.B.50) 24
AFX8010

Control valve - Unidentified failure (C.20.F.13 - G.30.B.46) 28
AFX8010

Pressure release valve

Pressure release valve - Unidentified failure (C.20.F.17 - G.30.B.46) 32
AFX8010

Sensing system

Sensing system Temperature sensor - Short circuit to B+ (C.20.F.95.90 - G.30.B.54) 36
AFX8010

Sensing system Temperature sensor - Short circuit to ground (C.20.F.95.90 - G.30.B.53) 42
AFX8010

Sensing system Temperature sensor - Open circuit (C.20.F.95.90 - G.30.B.50) 48
AFX8010

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TRANSMISSION Hydrostatic - General specification (C.20.F - D.40.A.10)

AFX8010

Hydrostatic Oil

Specification	**CASE AKCELA HY-TRAN ULTRA**

TRANSMISSION Hydrostatic - Capacity (C.20.F - D.40.A.20)

AFX8010

Hydraulic Oil

PTO Reservoir Capacity	Approximately **55 L** (**14.5 US gal**)
Total System Capacity (Hydrostatic)	Approximately **65 L** (**17 US gal**) [w/Powered Rear Axle]

Pump - General specification (C.20.F.20 - D.40.A.10)

AFX8010

Manufacturer	Sauer Danfoss
Type	90 Series Variable Displacement, Closed Circuit
Control	Electric Displacement Control (EDC)
Frame Size	130
Direction of Rotation	Counterclockwise
Displacement	**130 cc/rev (7.9 in³/rev)**
Minimum Speed	**500 RPM**
Rated Speed	**3100 RPM**
Maximum Speed	**3400 RPM**
System Pressure - Rated	**420 bar (6090 psi)**
System Pressure - Maximum	**480 bar (6960 psi)**
Charge Pump Displacement	**34 cc/rev (2.07 in³/rev)**
Charge Pump Pressure	**20 bar (290 psi)**

Servo Pressure		
Position	Forward Servo	Reverse Servo
Neutral	**10 bar** **145 psi**	**10 bar** **145 psi**
Forward	**14 bar** **203 psi**	**5 bar** **73 psi**
Reverse	**7 bar** **102 psi**	**10.5 bar** **152 psi**

High Pressure - Forward Pressure		
	Low Idle	High Idle
Neutral	**35 bar** **508 psi**	**38 bar** **551 psi**
Forward	**65 bar** **943 psi**	**90 bar** **1035 psi**

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High Pressure - Forward Pressure		
Reverse	**25 bar 363 psi**	**30 bar 435 psi**
Forward Brakes On	**450 bar 6525 psi**	**456 bar 6612 psi**

High Pressure - Reverse Pressure		
	Low Idle	High Idle
Neutral	**35 bar 508 psi**	**35 bar 508 psi**
Forward	**20 bar 290 psi**	**20 bar 290 psi**
Reverse	**65 bar 943 psi**	**80 bar 1160 psi**
Reverse Brakes On	**450 bar 6525 psi**	**456 bar 6612 psi**

Motor - General specification (C.20.F.28 - D.40.A.10)

AFX8010

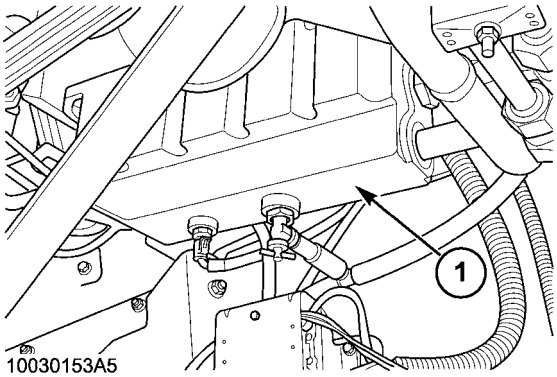
Manufacturer	Sauer Danfoss
Type	90 Series Fixed Displacement, Closed circuit
Frame Size	130
Direction of Rotation	Bi-Directional
Displacement	**130 cc/rev (7.9 in^3/rev)**
Rated Speed	**3100 RPM**
Maximum Speed	**3400 RPM**
Flow Rate - At Speed	**442 L/min (117 US gpm)**
Case Pressure - Continuous	**3 bar (43.5 psi)**
Case Pressure - Maximum (Cold Start)	**5 bar (72.5 psi)**
Flushing Valve	**21 L/min (5.5 US gpm@21 bar (305 psi)**

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TRANSMISSION Hydrostatic - Overview (C.20.F - C.10.A.10)

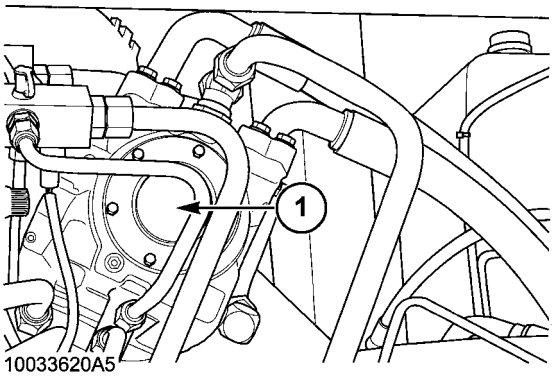
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The AFX Combine Hydrostatic System contains four main components; an oil reservoir, hydrostatic pump, drive motor and oil cooler. Some machines are equipped with an optional powered rear axle (PRA).



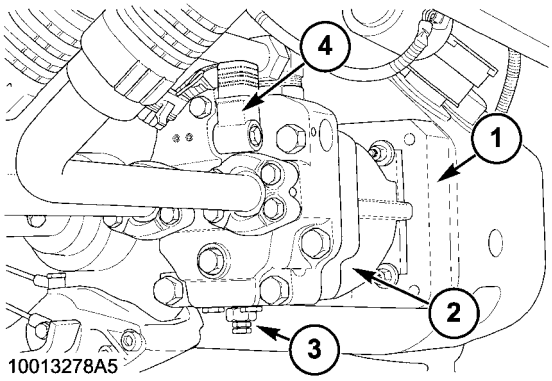
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The PTO gearbox serves as the oil reservoir **(1)** for the hydrostatic system. This system draws oil from the gearbox, and the oil goes through a separate filtering system.



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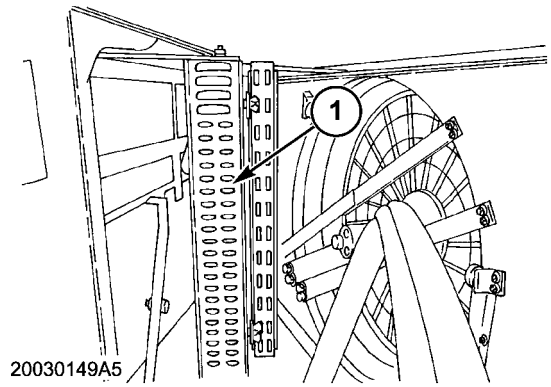
The hydrostatic pump **(1)** is mounted to and driven by the PTO gearbox. The hydrostatic pump assembly includes the charge pump, which provides lube oil to the PTO gearbox components, charge relief valve, servo displacement valve, and multi function valves.



10013278A5 3

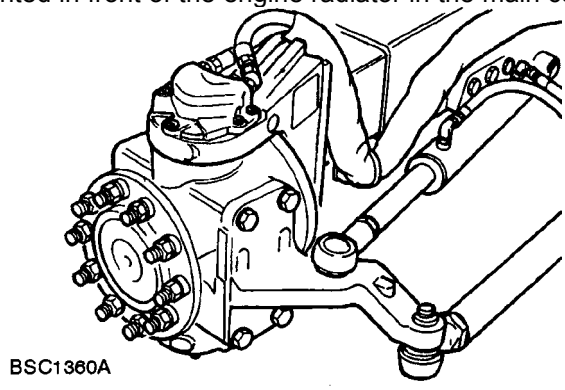
The hydrostatic motor, 1, is mounted to the main transmission and is driven hydraulically by the hydrostatic pump. The hydrostatic motor supplies the drive input to the main transmission. The shuttle spool valve, 2, flushing relief valve, 3, and pressure release solenoid valve, 4, are all located in the backplate of the motor.

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The hydraulic oil cooler, 1, is mounted in front of the engine radiator in the main cooler assembly.

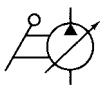
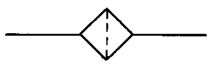
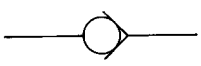
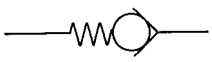
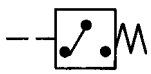
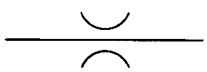


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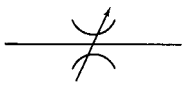
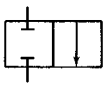
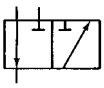
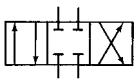
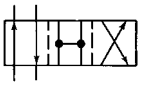
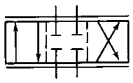
Each wheel of the powered rear axle is driven independently by its own hydrostatic motor. Each motor is driven hydraulically by the hydrostatic pump and controlled by a single control valve.

Symbol	Description
	Hydraulic Line, Tube, Hose or any conductor that carries oil between components.
	Oil flows in one direction only.
	Oil can flow in either direction
	This symbol indicates that a group of components make up an assembly.
	Lines that are not connected.
	Lines that are not connected.
	Lines that are connected.
	Vented Reservoir

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Symbol	Description
	Suction Line Reservoir
	Fixed Displacement Pump
	Fixed Displacement Reversible
	Variable Displacement Pump
	Variable Displacement Pressure Compensated
	Lever Controlled
	Pump With Drive Shaft and Directional Arrows.
	Filter or Strainer
	Oil Cooler
	One Way Valve
	Bypass Valve
	Manual Shutoff
	Spring
	Pressure Switch
	Test Point
	Non-Adjustable Restrictor

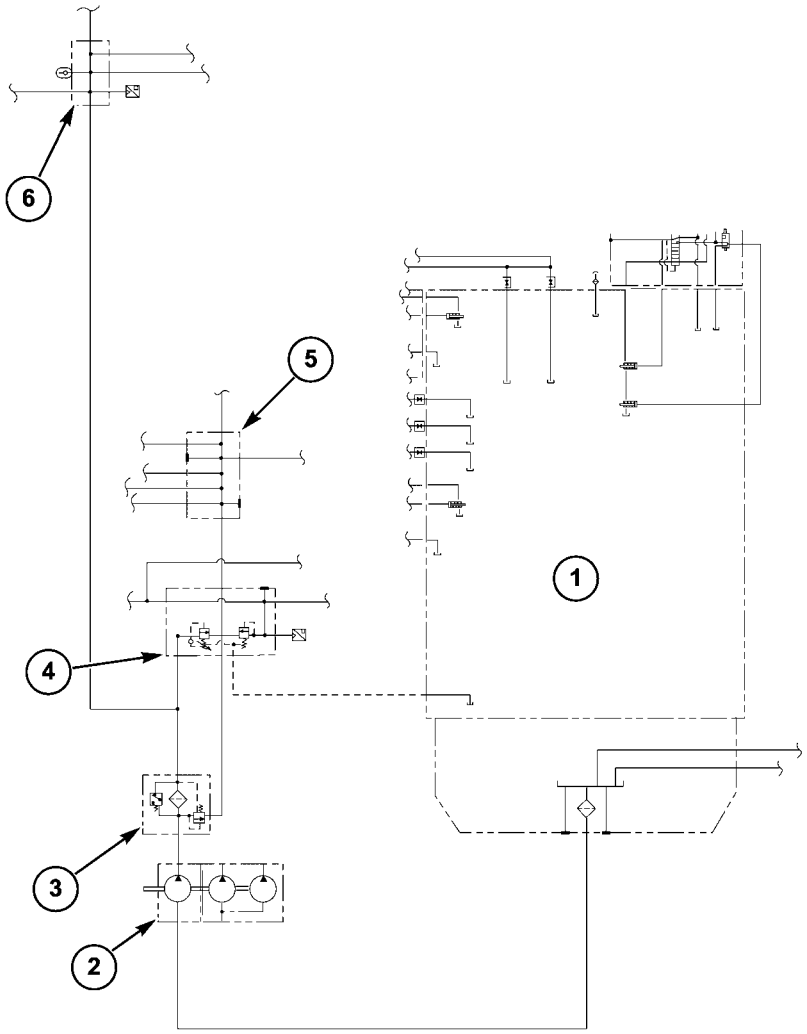
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Symbol	Description
	Adjustable Restrictor
	2 Position - 2-Way Valve
	2 Position - 3-Way Valve
	2 Position - 4-Way Valve
	3 Position - 4 way Valve
	2 Position - 4 Way Open to Center Cross.
	Valve Capable of Infinite Positioning
	Pressure Relief Valve
	Solenoid

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TRANSMISSION Hydrostatic - Hydraulic schema (C.20.F - C.20.A.20)

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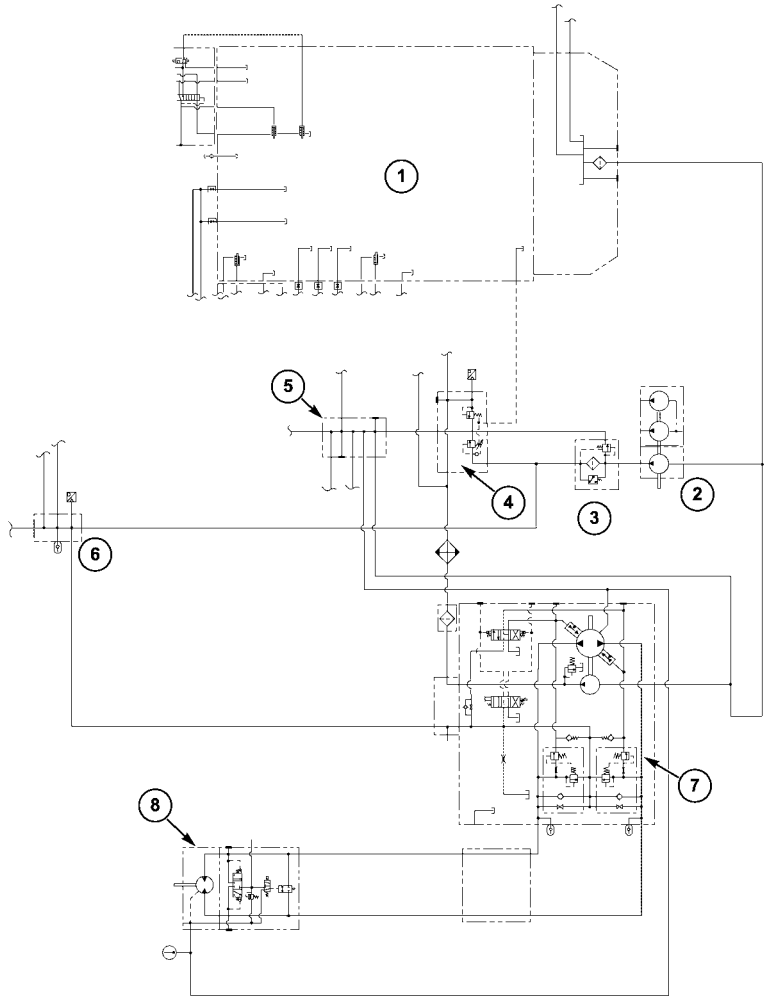


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Control Pressure Systems

1. PTO Gearbox
2. Triple Gear Pump
3. Hydro Pressure Filter
4. PTO Regulator Valve
5. Drain Return Valve
6. Control Pressure Manifold

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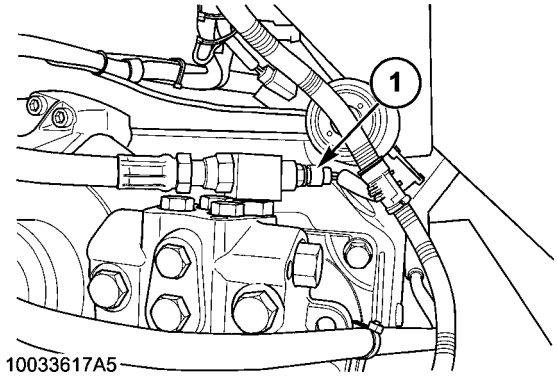
Hydrostatic Drive System

1. PTO Gearbox
2. Triple Gear Pump
3. Hydro Pressure Filter
4. PTO Regulator Valve
5. Drain Return Valve
6. Control Pressure Manifold
7. Ground Drive Pump
8. Ground Drive Motor

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Sensing system Temperature sensor - Overview (C.20.F.95.90 - C.10.A.10)

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The hydrostatic motor temperature sensor B-46 **(1)** is located at the case drain tee at the top of the hydrostatic motor, and monitors the temperature of the case drain oil exiting the motor. The sensor is connected (**X091**) to the lower frame (LF) harness, and provides an input to the CCM1 module at connector **X020** pin J3-33. The hydrostatic motor temperature sensor B-46 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

E0023-03 - Hydrostat Motor Temperature Sensor

E0023-04 - Hydrostat Motor Temperature Sensor

E0023-05 - Hydrostat Motor Temperature Sensor

The input from the hydrostatic motor temperature sensor B-46 is used to support the Temperature Control System (TCS). CCM1 monitors the temperature of the case drain oil at 10 second intervals; if the temperature of the case drain oil exceeds **105 °C**, the hydrostatic pump will be de-stroked at increments of **5 - 10 %**, depending on the level of cooling required, until the oil temperature is reduced to **100 °C** for at least 10 seconds.

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TRANSMISSION Hydrostatic - Filling (C.20.F - F.60.A.10)

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NOTE: *Before installing a new motor or a new pump, shipment oil should be drained from the new pump or motor case.*

1. Place wheel chocks in front and behind the front wheels to prevent movement of the combine. For machines not equipped with powered rear axles, also put blocks in front and behind the rear wheels. For machines equipped with a powered rear axle, the rear axle must be jacked up and placed on suitable jack stands to raise the rear tires from the ground. Turn the powered rear axle off using the switch in the cab.

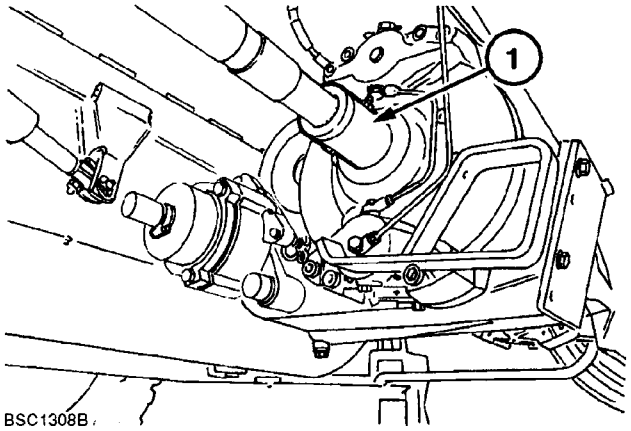
⚠ WARNING ⚠

M947 - Make sure the powered rear axle is securely suspended off the ground and turned off to prevent unexpected movement of the machine.

2. Remove the transmission drive shaft couplings **(1)** on both sides of the transmission. Make sure the couplings are secured to the drive shafts.

⚠ CAUTION ⚠

M948 - Before disconnecting the drive shafts, secure the machine in place by using adequate wheel chocks against the front and rear of both traction and steering wheels.

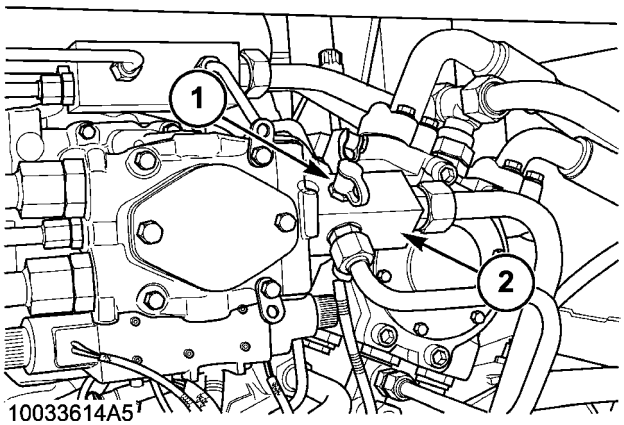


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IMPORTANT: *Only use Case IH AKCELA hydraulic oil.*

IMPORTANT: *Oil quality and cleanliness is of utmost importance for the reliability and life of the hydraulic and hydrostatic system. Deviation from the prescribed oil specification may lead to severe damage and void warranty.*

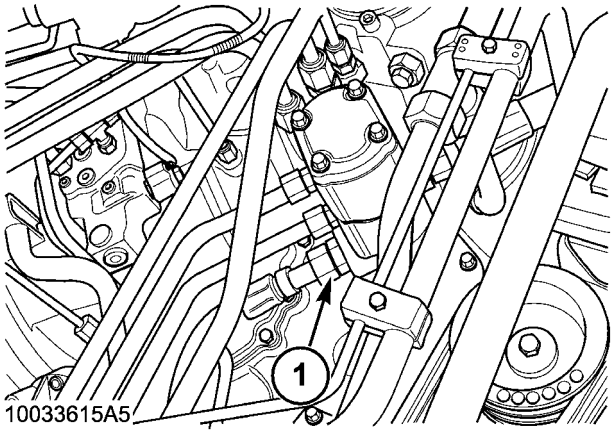
3. Remove fitting **(1)** from the control pressure manifold **(2)**.



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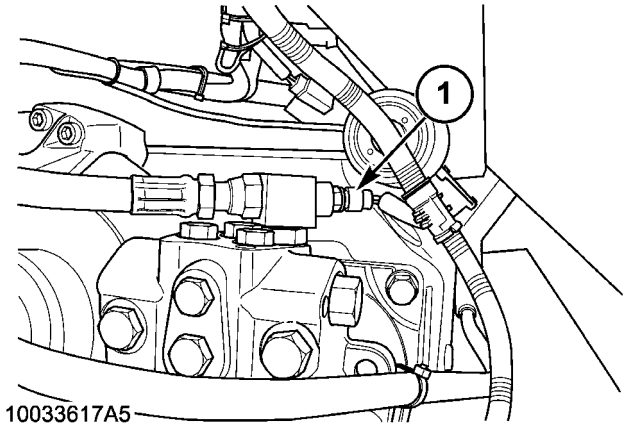
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4. Loosen hose **(1)** from the outlet side of the inner pump #1 on the triple gear pump. Add oil at **(1)** fig. 2 until oil seeps from the hose. Reconnect both fittings.



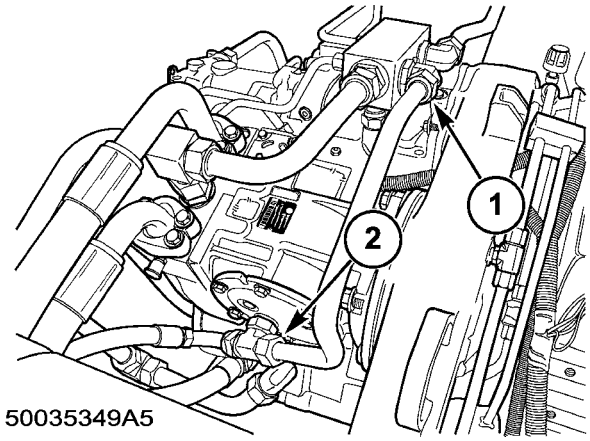
10033615A5 3

5. Loosen the temperature sensor **(1)** at the ground drive motor to allow air to escape from the oil lines during filling. Do not remove the sensor.



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6. Disconnect the fitting **(1)** from the drain return manifold. Loosen the fitting **(2)** at the elbow enough to rotate the tube upward for filling. Fill the tube until oil seeps from the temperature sensor located at the ground drive motor.

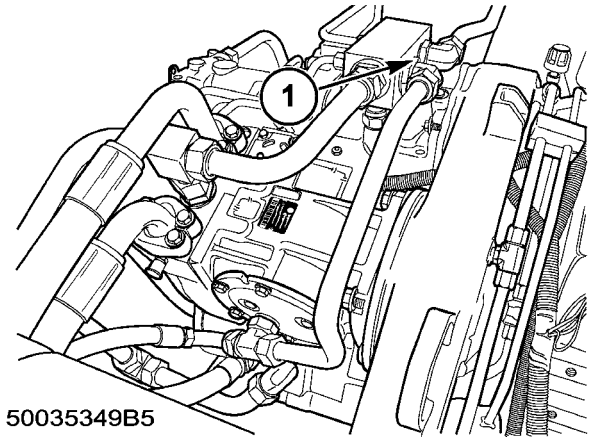


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7. Tighten the temperature sensor to stop oil flow.
8. Fill the tube with as much oil as possible. Connect the fitting to the drain return manifold. Tighten the elbow coupler.

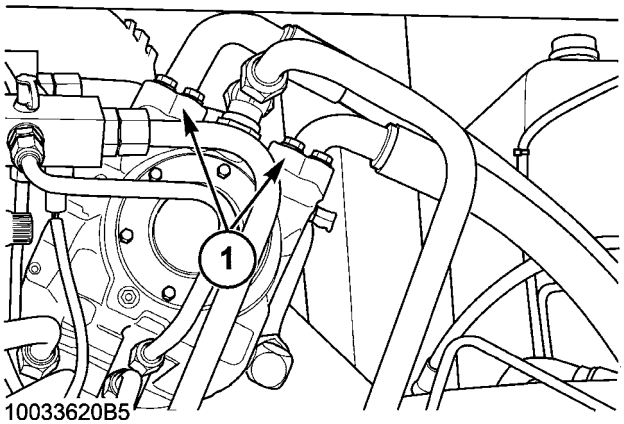
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9. If the combine is equipped with a powered rear axle, disconnect the fitting plumbed into port **(1)** and fill the hose with as much oil as possible.



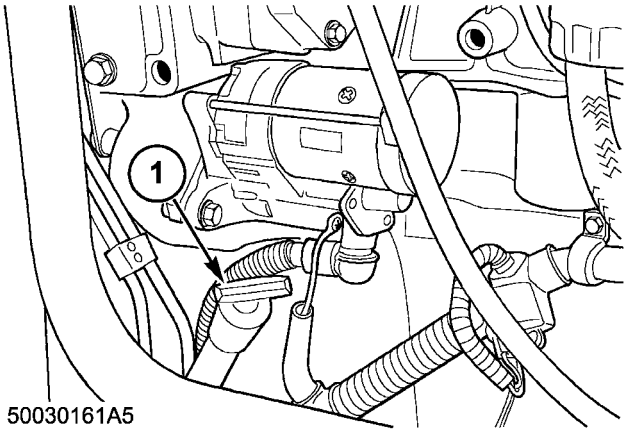
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10. Disconnect the hose fittings **(1)** and fill both lines with hydraulic oil.



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11. Fill the PTO gearbox with oil. Use the dipstick **(1)** to determine how much oil is needed.

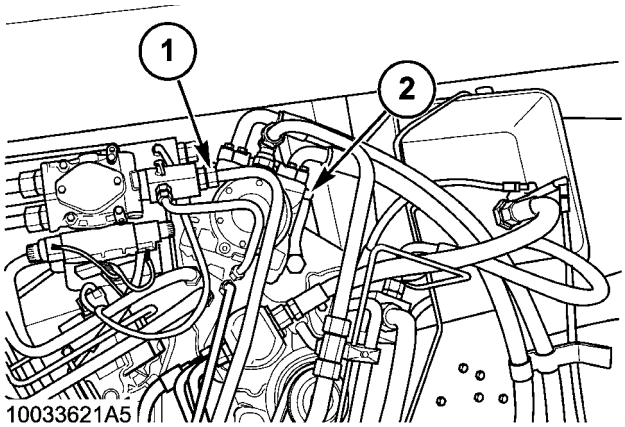


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12. Connect the **40 bar(600 psi)** pressure gauge to the test fitting **(1)** Fig.2, on the control pressure manifold.

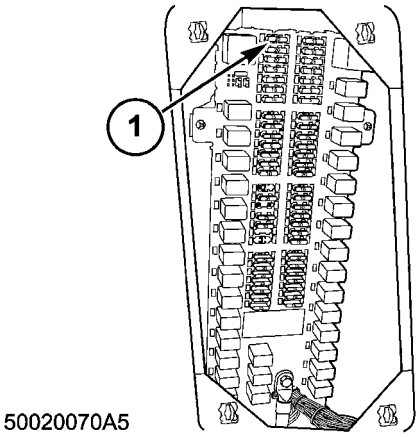
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13. Install pressure gauges ranges **0 - 600 bar** (**0 - 9000 psi**) to the hydrostatic pump test ports M1 **(1)** and m2 **(2)**.



10033621A5 9

14. Remove fuse F01 **(1)** from the fuse panel.



50020070A5 10

15. Turn the key to the start position, to crank the engine 15 seconds or until **2 - 7 bar** (**30 - 100 psi**) is seen on the gauge. If pressure does not reach these levels, check and fill the PTO oil level.

IMPORTANT: *Only crank the engine for a maximum of 30 seconds at a time. Wait at least 1 minute before recranking to avoid damaging the starter motor.*

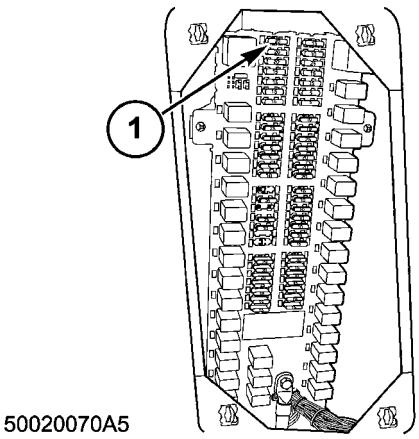
16. Shift the transmission in neutral and crank the engine with the starter motor until a pressure gauge reading of **2.0 bar (29 psi)** is obtained.

17. Fill the PTO gearbox to maximum level.

18. Install fuse F01 **(1)** into the fuse panel.

⚠ CAUTION ⚠
M583 - Make sure everyone is clear of the machine before starting the engine.

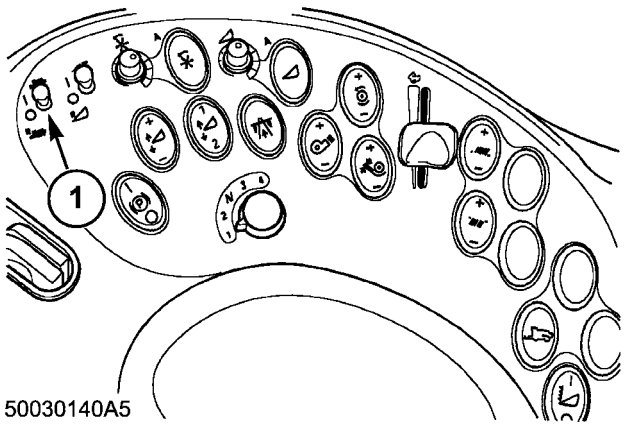
⚠ CAUTION ⚠
M142A - Never operate the engine in a closed building. Proper ventilation is required under all circumstances.



50020070A5 11

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19. Start and run the engine at low idle until a minimum pressure gauge reading of **20 bar (290 psi)** is obtained.
20. Release the parking brake.
21. Slowly stroke the hydro to 1/2 stroke forward. Check to make sure that the transmission output shafts are turning properly.
22. Engage the rear wheel assist, if equipped. Make sure rear wheels are turning forward. Stroke the hydro and run the wheels forward for three minutes and then rearward for another three minutes.
23. Shift the combine into fourth gear and hold the brake pedals down.
24. Move the hydrostatic lever slightly rearward until the pressure gauge plumbed into the forward (M1) port reads a minimum of **30 bar (4350 psi)**. Do this for approximately 1 minute.
25. Move the hydrostatic lever slightly rearward until the pressure gauge plumbed into the forward (M2) ports reads a minimum of **30 bar (4350 psi)**. Do this for approximately 1 minute.
26. Shut off the combine engine and check for oil leaks. Check the PTO gearbox oil level, and add as necessary.
27. Check for oil leaks.
28. Restart the combine engine. With the gearshift in neutral and engine speed at low RPM, place the hydrostatic lever at half stroke for one minute in forward and reverse.
29. With the gearshift still in the neutral position, increase the throttle to full engine RPM. Move the hydro handle to maximum stroke for two minutes in both forward and reverse.
30. Move the gearshift to 4th gear and set engine speed to high idle. Apply maximum stroke on the control lever in forward position for a maximum of 10 seconds. Pressure should be **420 - 460 bar (6092 - 6672 psi)**; repeat the procedure for reverse.
31. Press the switch **(1)** to engage the separator (perform only if shields are closed). Verify cleaning fan and spreader direction. Disengage the separator and operate the feeder reverser and rotor reverser for 10 seconds.



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32. Shift the hydro into neutral, disengage the rear wheel assist and shut off engine.
33. Check oil level in PTO gearbox and make sure all connections are secure.
34. For machines equipped with powered rear axles, refer to Start-Up Procedure for Powered Rear Axle at: **Hydrostatic motor - Bleed (D.12.A.28 - F.35.A.25)**
35. For machines not equipped with a powered rear axle, install the transmission drive shafts and tighten the retaining bolts.
36. Disconnect all testing equipment.

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Command - Pressure test (C.20.F.05 - F.40.A.30)

AFX8010

The following testing procedure requires the use of the special tools listed below:

CAS-10257 - Pressure Gauge **0 - 40 bar (0 - 600 psi)**

(or) CAS-10095 - Quad Gauge

(or) CAS-10757 - Hydrostatic Test Set

(or) CAS-1803-1 - Quick Release (Female)

FITTINGS - PARKER HANNIFIN PART NUMBER PD361 - Coupler, Male (9/16"- 18 UNF)[part#86596853]

Prior operation: Relief valve - Pressure test (C.20.F.16 - F.40.A.30) - Various Pressure and vacuum gauge readings are necessary for troubleshooting problems with the main hydrostatic drive system.
To check the high pressure settings of the multi function valves it will be necessary to connect high pressure gauges to the system.
Measuring the charge pump inlet vacuum assists in locating restrictions in the return lines, oil cooler and filter screen.
The pump and motor charge pressure readings are obtained, the system must be at normal operating temperature and at full rated engine speed.

⚠ WARNING ⚠

M953 - Gauges, fittings and hoses MUST have operating pressure ratings of a least 25 percent higher than the highest pressure of the circuit being tested.

⚠ CAUTION ⚠

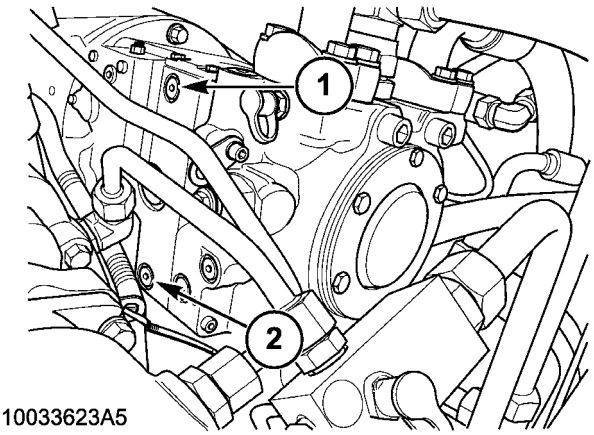
46-77A - Before you do service under the machine, put the machine on a level surface, engage the parking brake and stop the engine. Put blocks at the front and rear of the tires. Failure to follow these instructions can cause injury.

⚠ CAUTION ⚠

M142A - Never operate the engine in a closed building. Proper ventilation is required under all circumstances.

IMPORTANT: *The interior of all test equipment must be exceptionally clean before being used to test the hydrostatic drive system. Make sure the test equipment is purged of all oil and foreign material to avoid contamination of the hydrostatic drive system.*

1. Testing the servo pressure requires gauges to be installed into the X1 **(1)** and X2 **(2)** ports of the control unit, located on the front side of the hydrostatic pump. Remove the plugs and install the male quick coupler.



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2. In neutral the pressure should be equal indicating approximately **10 bar (145 psi)**. As the forward or reverse is activated a pressure rise on one gauge should be countered with corresponding pressure drop on the other gauge.

3. This test may determine the reason for a unit that creeps while the lever is in neutral. Joining the ports together should stop creeping; if this is the case, adjust the neutral position within the control unit. If the unit still creeps when the ports are joined, the pump will require replacement.

NOTE: *Refer to* ***Pump - General specification (C.20.F.20 - D.40.A.10)*** *"Servo Pressure" for more information.*

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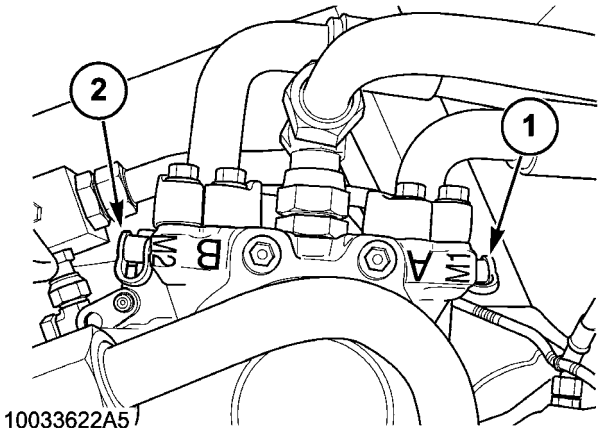
Relief valve - Pressure test (C.20.F.16 - F.40.A.30)

AFX8010

Relief valve - Pressure test (C.20.F.16 - F.40.A.30)

1. The hydrostatic system high pressure is determined by the two multifunction valves. The relief valve setting is **450 bar (6525 psi)**. The pressure limiter will start to destroke the pump servo cylinders at **420 bar (6090 psi)**.
2. The high pressure can be checked at pump test ports M1, **(1)**, for forward, and test port M2, **(2)**, for reverse. A test coupler is installed in both ports from the factory.

   The pressure can also be checked at the drive motor; forward high pressure at test port M1 and reverse high pressure at test port M2.



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⚠ CAUTION ⚠

46-77A - Before you do service under the machine, put the machine on a level surface, engage the parking brake and stop the engine. Put blocks at the front and rear of the tires. Failure to follow these instructions can cause injury.

3. With the gauges installed put the transmission in 4th gear, start and run the engine at high idle, hold the brake pedals down and move the hydrostatic control lever forward, then rearward. Record pressure gauge readings. Only hold the system in the overpressure situation for a few seconds and return to neutral as soon as possible. Both forward and reverse should indicate a reading of approximately **456 bar (6612 psi)**.

NOTE: *Refer to* ***Pump - General specification (C.20.F.20 - D.40.A.10)*** *"High Pressure - Forward Pressure" and "High Pressure - Reverse Pressure" for more information.*

⚠ CAUTION ⚠

M142A - Never operate the engine in a closed building. Proper ventilation is required under all circumstances.

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Pump - Check (C.20.F.20 - F.40.A.11)

AFX8010

1. Major repairs are those which require the removal of the end cap or side cover. Repairs of this type are to be performed by Sauer-Sundstrand Authorized Service Centers and or original equipment manufacturers who have the personnel adequately trained to perform such repairs. Performing major repairs on the Sauer Series 90, **130 cc/rev** Hydrostatic Transmission may affect the unit warranty status. Contact a branch manager of Sauer Sundstrand before attempting to service a Series 90 pump.
2. Cleanliness is a primary means of assuring satisfactory hydraulic life on either new or repaired units. Cleaning parts by using clean solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign materials and chemicals. Protect all exposed sealing surfaces and open cavities from damage and foreign material.
3. During the assembly of the Sauer Series 90 pump, all surfaces, which have relative motion between two parts, should be coated with a film of clean hydraulic oil. this will assure that these surfaces will be lubricated during start-up.
4. Replace all O-rings and gaskets. Lightly lubricate all O-rings with clean petroleum jelly prior to assembly. All gasket sealing surfaces must be cleaned prior to installing new gaskets.

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Motor - Check (C.20.F.28 - F.40.A.11)

AFX8010

1. Major repairs are those which require the removal of the end cap or side cover. Repairs of this type are to be performed by Sauer-Sundstrand Authorized Service Centers and or original equipment manufacturers who have the personnel adequately trained to perform such repairs. Performing major repairs on the Sauer Series 90 Hydrostatic Transmission may affect the unit warranty status. Contact a branch manager of Sauer Sundstrand before attempting to service a Series 90 motor.
2. Cleanliness is a primary means of assuring satisfactory hydraulic life on either new or repaired units. Cleaning parts by using clean solvent wash and air drying is usually adequate. As with any precision equipment, all parts must be kept free of foreign materials and chemicals. Protect all exposed sealing surfaces and open cavities from damage and foreign material.
3. During the assembly of the Sauer Series 90 variable motor, all surfaces, which have relative motion between two parts, should be coated with a film of clean hydraulic oil. this will assure that these surfaces will be lubricated during start-up.
4. Replace all O-rings and gaskets. Lightly lubricate all O-rings with clean petroleum jelly prior to assembly. All gasket sealing surfaces must be cleaned prior to installing new gaskets.

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Control valve - Open circuit (C.20.F.13 - G.30.B.50)

AFX8010

E0179-05 - Ground Drive Hydro Current Sense

Cause:
The ground speed hydrostat solenoid L-23 circuit is open.

Possible failure modes:

1. Failed solenoid.
2. Circuit return side wiring is open.
3. Controller internal failure (internal regulator failure).

Solution:

1. The ground drive hydro current sense circuit is the ground path for the ground speed hydrostat solenoid circuit. By monitoring current flow on the return path of the ground speed hydrostat solenoid, the CCM-2 module can provide precise control of the solenoid engagement. When this error message is reported, this is an indication of very low current draw on the circuit, or an open circuit on the return line.

   Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "HYDRO ISENSE" to check the voltage range. Move the propulsion handle to the full forward position, the full rearward position, and back to the neutral position while monitoring the voltage.

   With the propulsion handle in neutral, the voltage indicated should be **0 volts**.

   With the propulsion handle in the full forward position, the voltage indicates should be approximately **4.4 volts**.

   With the propulsion handle in the full rearward position, the voltage indicated should be approximately **2.5 volts**.

   The fault code is generated if the current flow is less than **5 mA** (**0.2 volts** indicated on bar graph) at any time when the propulsion handle is out of neutral.

   A. If one or both of the readings are less than **0.2 volts**, continue with step **2**.

   B. If the readings are normal, continue the troubleshooting at step **7**.

2. Turn the key switch to the OFF position, and disconnect the ground speed hydrostat solenoid connector **X100**. Use a multimeter to check the resistance of the ground speed solenoid L-23 between connector **X100** pins A & B (rev) and connector **X100** pins C & D (fwd). The proper resistance range for the ground speed solenoid is **16k - 20k ohms**.

   A. If out of specification, replace the solenoid.

   B. If the solenoid is within specification, continue with step **3**.

3. Use a multimeter to check for continuity between the harness end of connector **X100** pins B & C and chassis ground. There should be approximately **50 ohms** resistance measured between each pin and chassis ground.

   A. If there is continuity to ground on connector **X100** pin B, but not pin C, there is an open circuit in the gearbox (GB) harness between connector **X100** pin C and the harness splice wire 887 blue. Locate the open and repair.

   B. If there is continuity to ground on connector **X100** pin C, but not pin B, there is an open circuit in the gearbox (GB) harness between connector **X100** pin B and the harness splice wire 886 blue. Locate the open and repair.

   C. If there is no continuity on either pin, continue with step **4**.

4. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 7 and chassis ground. There should be approximately **50 ohms** resistance to chassis ground.

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A. If there is continuity, there is an open circuit in the gearbox (GB) harness between the harness splice with wires 886 blue and 887 blue, and connector **X011** pin 7 wire 881 blue. Locate the open and repair.

B. If there is no continuity, continue with step **5**.

5. Disconnect connector **X008** behind the cab. Use a multimeter to check for continuity between the front frame harness end of connector **X008** pin 22 and chassis ground. There should be approximately **50 ohms** resistance to chassis ground.

   A. If there is continuity, there is an open circuit in the main frame (MF) harness between connector **X011** pin 7 and connector **X008** pin 22 wire 881 blue. Locate the open and repair.

   B. If there is no continuity, continue with step **6**.

6. Carefully disconnect connector **X017** from the bottom of the CCM2 module. Use a multimeter to check for continuity between connector **X017** pin J3-35 on the module and chassis ground. There should be approximately **50 ohms** resistance to chassis ground.

   A. If there is continuity, there is an open circuit in the front frame (FF) harness between connector **X008** pin 22 and connector **X017** pin J3-35 wire 881 blue. Locate the open and repair.

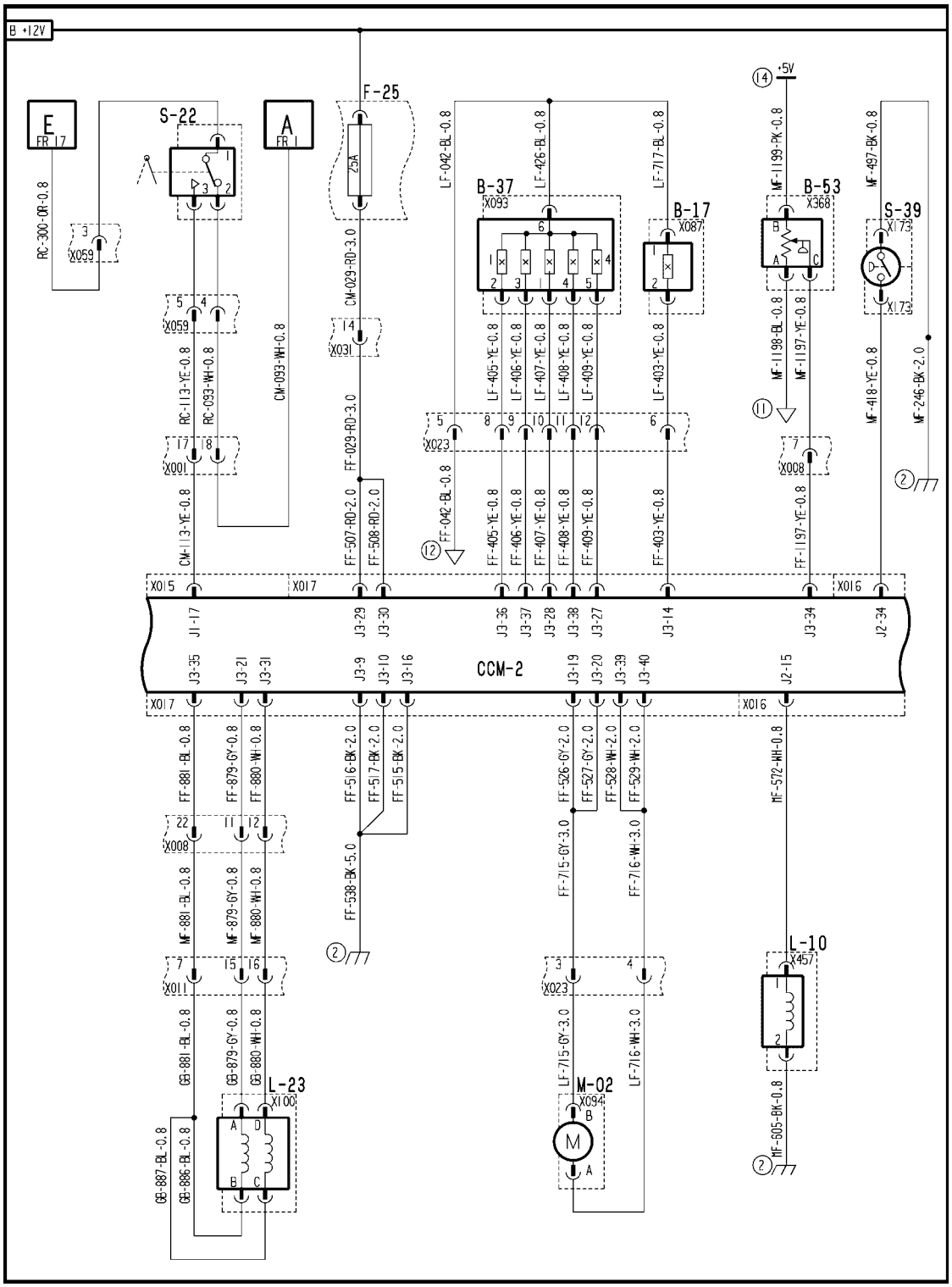
   B. If there is no continuity, the sense resistor in the CCM2 module has failed. Replace the module.

7. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "HYDRO ISENSE" voltage.

   A. If no low (<**0.2 volts**) out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

https://truckmanualshub.com/

Control valve - Unidentified failure (C.20.F.13 - G.30.B.46)

AFX8010

E0202-11 - Ground Drive Hydro

Cause:
The ground speed hydrostat valve L-23 circuit is shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Solenoid failed.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "HYDRO" to check the voltage range. Move the propulsion handle to the full forward position, the full rearward position, and back to the neutral position while monitoring the voltage.

   With the propulsion handle in neutral, the voltage indicated should be **0 volts**.

   With the propulsion handle in the full forward position, the voltage indicates should be approximately **4.4 volts**.

   With the propulsion handle in the full rearward position, the voltage indicated should be approximately **2.5 volts**.

   The voltage should increase progressively with handle position. When moving the handle out of neutral, if the voltage spikes to maximum (>**4.7 volts**), and then abruptly drops to **0 volts**, there is a short to ground on the output lead to the control valve.

   A. If the voltage spikes to maximum (>**4.7 volts**), and then abruptly drops to **0 volts**, continue with step **2**.

   B. If the voltage readings are within the proper ranges, continue with step **10**.

2. Turn the key switch to the "OFF" position. Disconnect the ground speed hydrostat valve connector **X100**. Use a multimeter to check the resistance of the ground speed hydrostat valve coil between terminals D & C, and then between terminals A & B. The proper resistance range for the ground speed hydrostat valve coils is **16k - 20k ohms**.

   A. If either of the solenoid coils is out of specification, replace the solenoid.

   B. If the solenoid coils are within specifications, continue with step **3**.

3. Use a multimeter to check for continuity between the ground speed hydrostat valve coil terminals D or C and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, replace the solenoid.

   B. If there is no continuity to ground, continue with step **4**.

4. Use a multimeter to check for continuity between the harness end of connector **X100** pin D and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **5**.

   B. If there is no continuity to ground, continue with step **7**.

5. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 16 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the gearbox (GB) harness between connector **X011** and connector **X100** wire 880 white.Locate the short and repair.

   B. If there is continuity to ground, continue with step **6**.

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6. Disconnect connector **X008**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X008** pin 12 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** and connector **X008** wire 880 white. Locate the short and repair.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X008** and connector **X017** pin J3-31 wire 880 white. Locate the short and repair.

7. Use a multimeter to check for continuity between the harness end of connector **X100** pin A and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **8**.

   B. If there is no continuity to ground, continue with step **10**.

8. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 15 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the gearbox (GB) harness between connector **X011** and connector **X100** wire 879 grey.Locate the short and repair.

   B. If there is continuity to ground, continue with step **9**.

9. Disconnect connector **X008**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X008** pin 11 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** and connector **X008** wire 879 grey. Locate the short and repair.

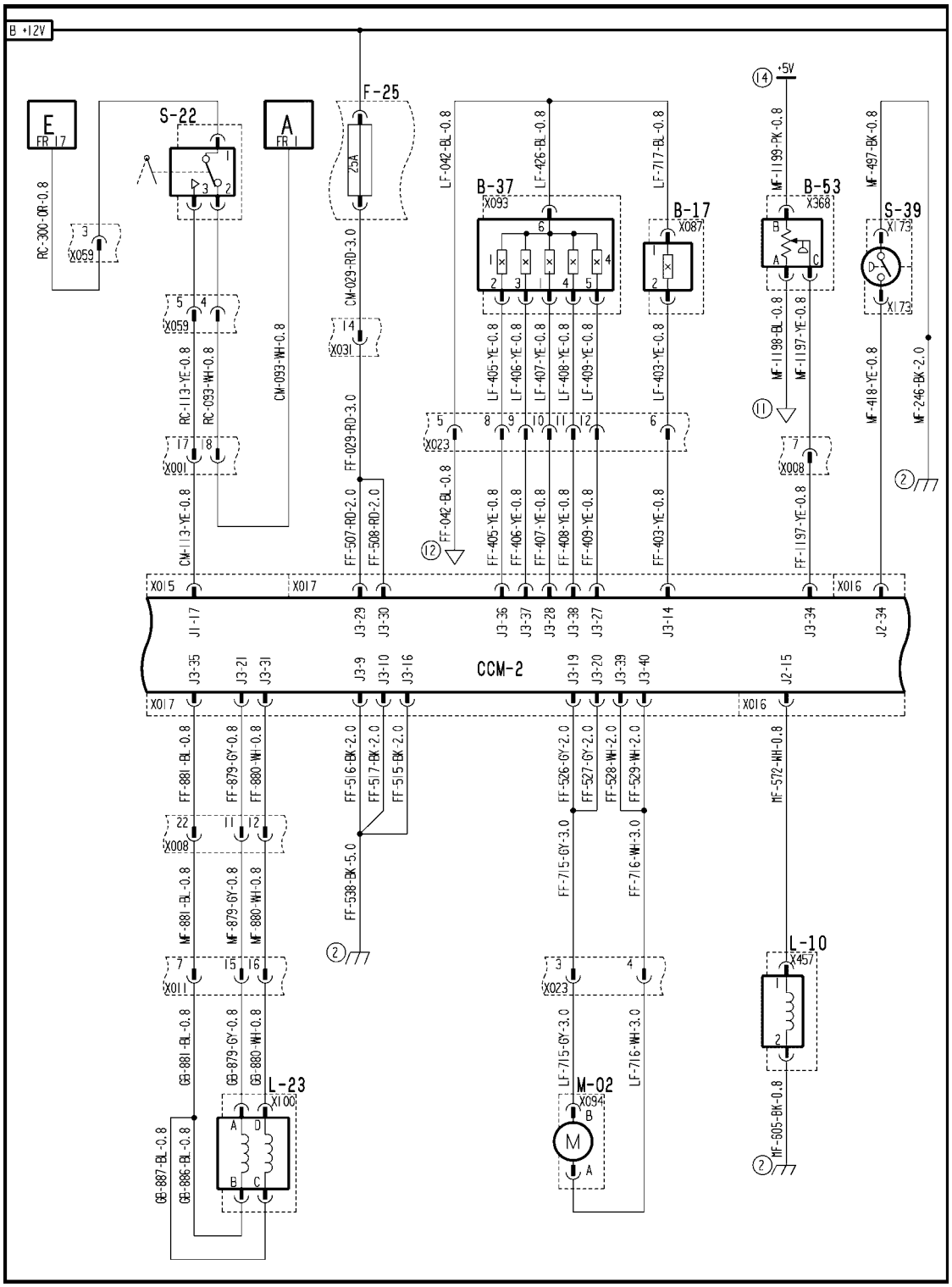
   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X008** and connector **X017** pin J3-21 wire 879 grey. Locate the short and repair.

10. Visually inspect the harness and connectors for damage, bent or dislocated, corroded terminals, or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

https://truckmanualshub.com/

Pressure release valve - Unidentified failure (C.20.F.17 - G.30.B.46)

AFX8010

E0195-11 - Pressure Release Valve

Cause:
The pressure release valve (L-05) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" sort menu, and select "PARK VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X092**. Use a multimeter to check the resistance of the pressure release valve coil (L05). The proper resistance range is **8 - 12 ohms**.

   A. If there is zero resistance, the pressure release solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the pressure release solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X092** pin A (harness side) and chassis ground. Flex the lower frame (LF) harness while making this check.

   A. If there is continuity to ground, continue with Step **4**.

   B. If there is no continuity to ground, continue with Step **5**.
4. Disconnect connector **X023**. Use a multimeter to check for continuity between connector **X023** pin 13 and chassis ground. Flex the front frame (FF) harness between the connector **X023** and connector **X017** while making this check.

   A. If there is no continuity to ground, the short to ground is in the lower frame (LF) harness between connector **X023** and connector **X092** wire 575 white. Locate the short and repair.

   B. If there is continuity to ground, the short to ground is in the front frame (FF) harness between connector **X023** and connector **X017** J3-15 wire 575 white. Locate the short and repair.
5. Use a multimeter to check for continuity between connector **X092** pin B (harness side) and chassis ground. Flex the lower frame (LF) harness while making this check.

   A. If there is no continuity to ground, continue with Step **6**.

   B. If there is continuity to ground, continue with Step **7**.
6. Disconnect connector **X023**. Use a multimeter to check for continuity between connector **X023** pin 25 (harness side) and chassis ground. Flex the front frame (FF) harness between connector **X023** and the front frame ground #2 while making this check.

   A. If there is continuity to ground, there is an open circuit in the lower frame (LF) harness between connector **X092** and connector **X023** wire 606 or 765 black. Locate the open and repair.

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B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X023** pin 25 and the front frame ground #2 wire 765 black. Locate the open and repair.

7. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the pressure release valve. Use a multimeter to check for **12 volts** between connector **X092** pin A and chassis ground.

   A. If **12 volts** is not present, continue with Step **8**.

   B. If **12 volts** is found, continue with Step **9**.

8. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the pressure release valve. Use a multimeter to check for **12 volts** between connector **X023** pin 13 and chassis ground.

   A. If **12 volts** is present, the open circuit is in the lower frame (LF) harness between connector **X092** pin A and connector **X023** pin 13 wire 575 white. Locate the open circuit and repair.

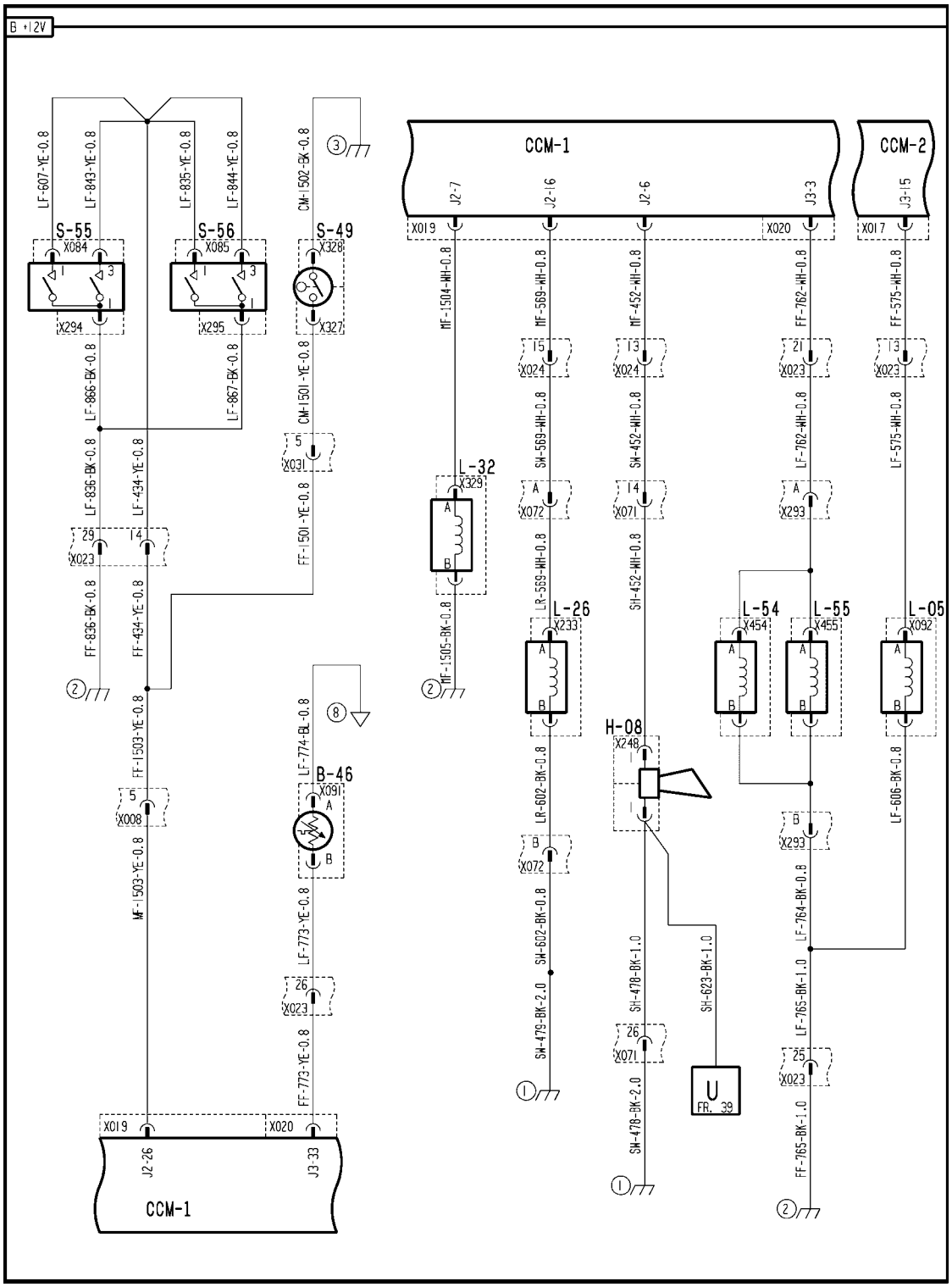
   B. If **12 volts** is not present there is an open circuit in the front frame (FF) harness between connector **X023** pin 13 and connector **X017** pin J3-15 wire 575 white. Locate the open and repair.

9. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



AFXSCHEM08-04 1

FRAME 8 - DRIVES

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B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

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Sensing system Temperature sensor - Short circuit to B+ (C.20.F.95.90 - G.30.B.54)

AFX8010

E0023-03 - Hydrostat Motor Temperature Sensor

Cause:
The hydrostat motor temperature sensor B-46 is shorted to a high source.

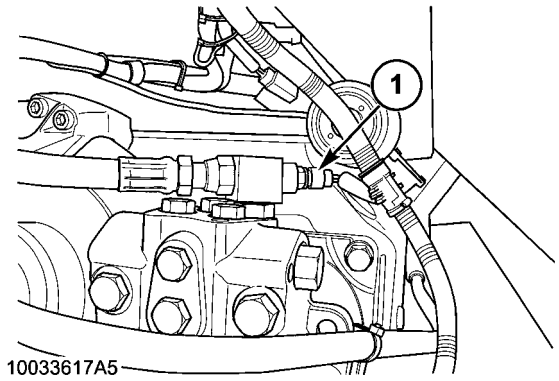
Possible failure modes:

1. Sensor supply wiring shorted to 12 volts.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "MTR TEMP SEN" to check the voltage range. The normal operating voltage range is **0.5 - 4.9 volts**.
   A. If the voltage reading is above **5.2 volts**, continue with Step **2**.
   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue with Step **4**.
2. The voltage reading is high. Disconnect the hydrostat motor temperature sensor connector **X091**.
   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.
   B. If the voltage remains high, continue with Step **3**.
3. The voltage reading is high. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.
   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the lower frame (LF) harness between connector **X023** and connector **X091** wire 773 yellow. Locate the short and repair.
   B. If the voltage remains high, the short is in the front frame (FF) harness between connector **X023** and connector **X020** J3-33 wire 773 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.
   A. If no damage is found, erase fault code and continue operation.

Sensing system Temperature sensor - Overview (C.20.F.95.90 - C.10.A.10)



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The hydrostatic motor temperature sensor B-46 **(1)** is located at the case drain tee at the top of the hydrostatic motor, and monitors the temperature of the case drain oil exiting the motor. The sensor is connected (**X091**) to the lower frame (LF) harness, and provides an input to the CCM1 module at connector **X020** pin J3-33. The hydrostatic motor temperature sensor B-46 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

E0023-03 - Hydrostat Motor Temperature Sensor

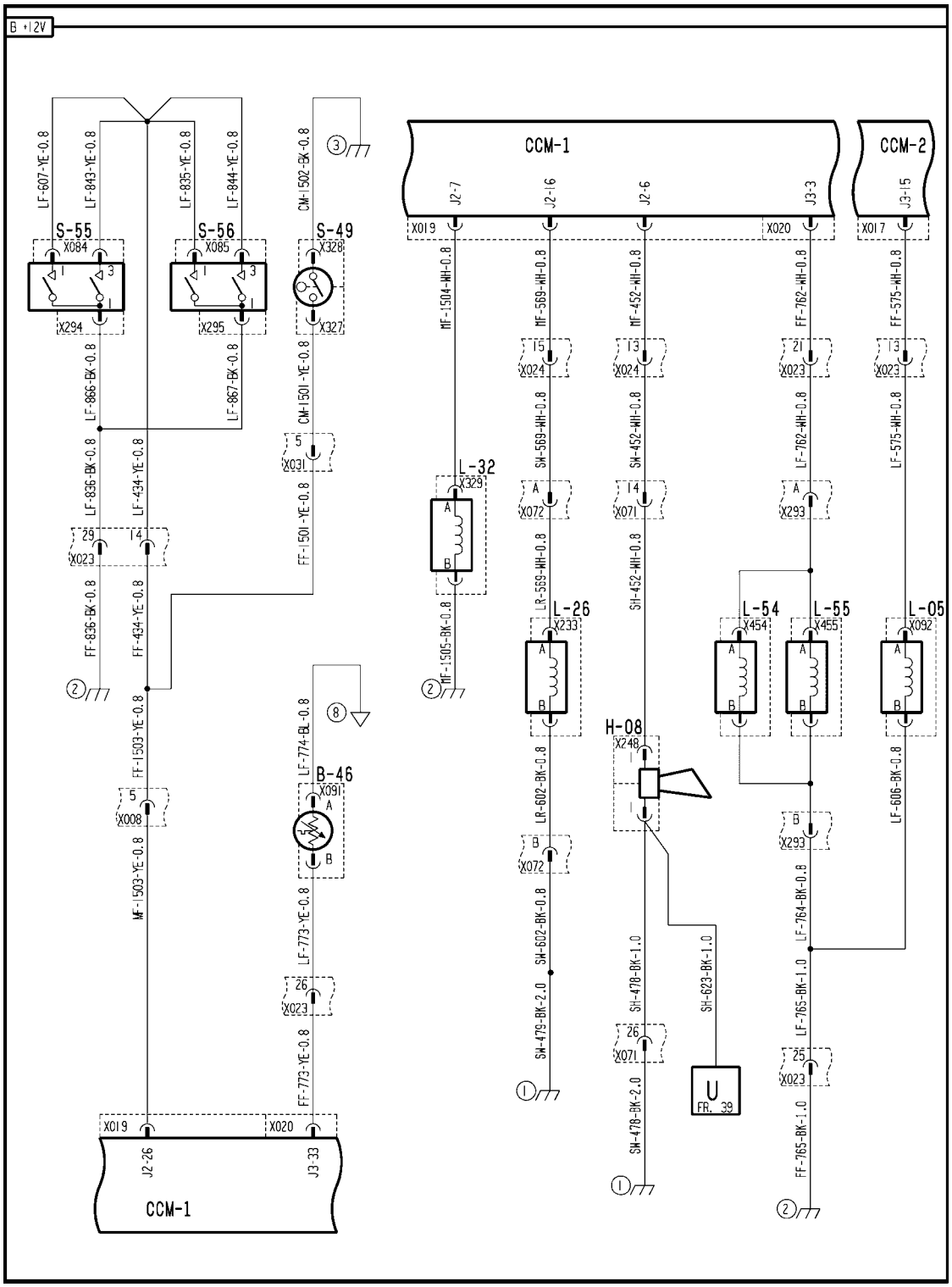
E0023-04 - Hydrostat Motor Temperature Sensor

E0023-05 - Hydrostat Motor Temperature Sensor

The input from the hydrostatic motor temperature sensor B-46 is used to support the Temperature Control System (TCS). CCM1 monitors the temperature of the case drain oil at 10 second intervals; if the temperature of the case drain oil exceeds **105 °C**, the hydrostatic pump will be de-stroked at increments of **5 - 10 %**, depending on the level of cooling required, until the oil temperature is reduced to **100 °C** for at least 10 seconds.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



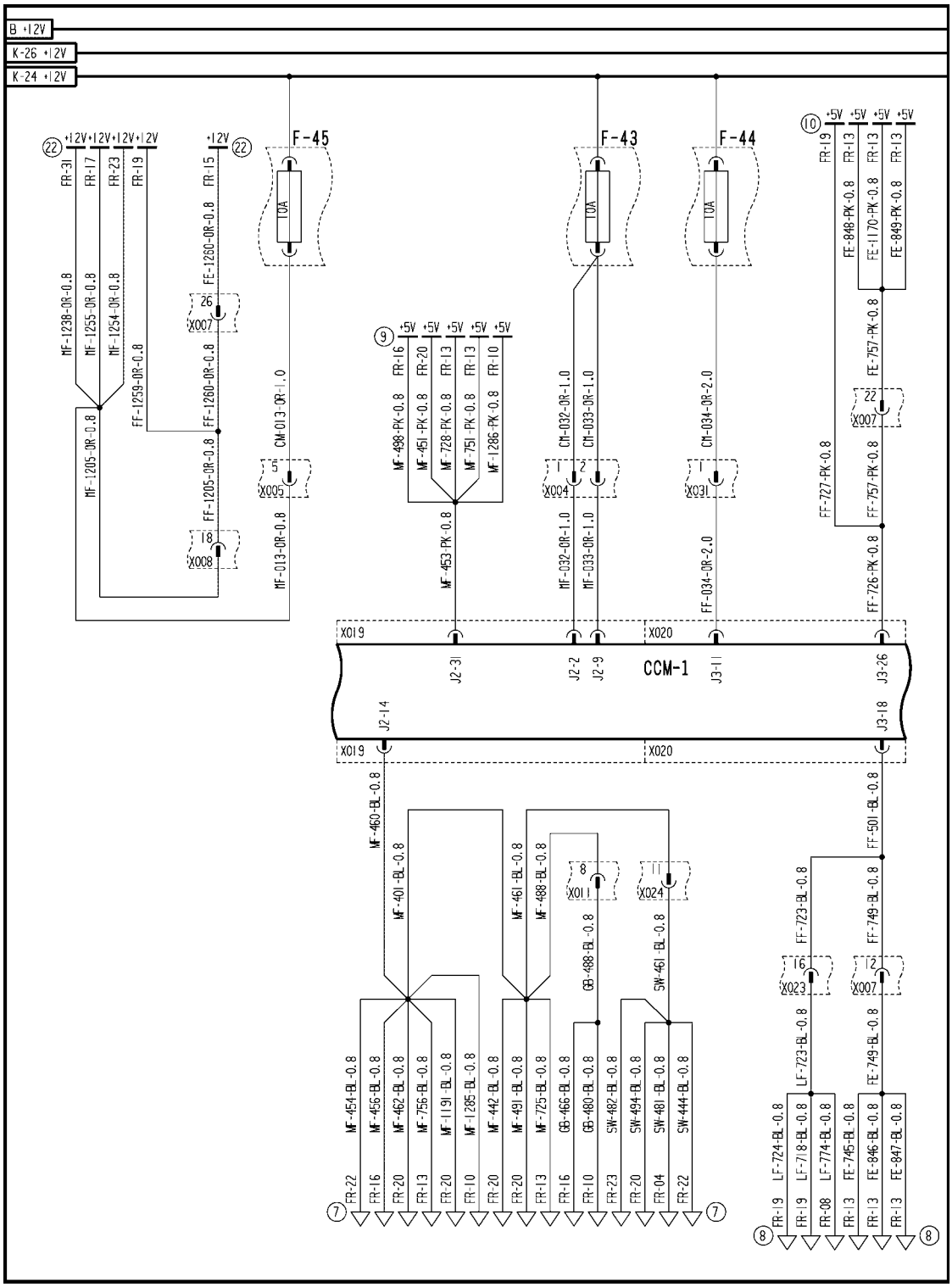
AFXSCHEM08-04 1

FRAME 8 - DRIVES

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B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

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FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Temperature sensor - Short circuit to ground (C.20.F.95.90 - G.30.B.53)

AFX8010

E0023-04 - Hydrostat Motor Temperature Sensor

Cause:
The hydrostat motor temperature sensor B-46 is shorted to a low source.

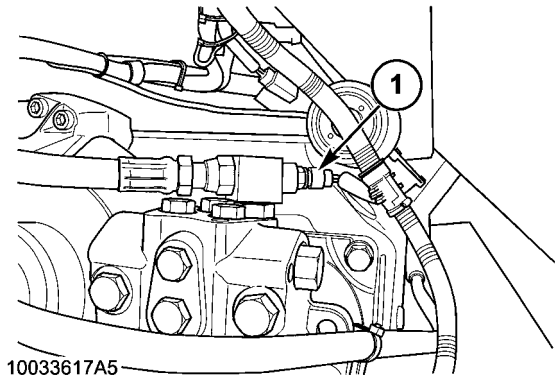
Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "MTR TEMP SEN" to check the voltage range. The normal operating voltage range is **0.5 - 4.9 volts**.
   A. If the voltage reading is **0 - 0.5 volts**, continue with Step **2**.
   B. If the voltage reading is within the proper limits, the shorted wire may not be grounded at this time. Continue with Step **4**.
2. The voltage reading is low. Disconnect the hydrostat motor temperature sensor connector **X091**.
   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.
   B. If the voltage remains low, continue with Step **3**.
3. The voltage reading is low. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**.
   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the lower frame (LF) harness between connector **X023** and connector **X091** wire 773 yellow. Locate the short and repair.
   B. If the voltage remains low, the short is in the front frame (FF) harness between connector **X023** and connector **X020** J3-33 wire 773 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.
   A. If no damage is found, erase fault code and continue operation.

Sensing system Temperature sensor - Overview (C.20.F.95.90 - C.10.A.10)



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The hydrostatic motor temperature sensor B-46 **(1)** is located at the case drain tee at the top of the hydrostatic motor, and monitors the temperature of the case drain oil exiting the motor. The sensor is connected (**X091**) to the lower frame (LF) harness, and provides an input to the CCM1 module at connector **X020** pin J3-33. The hydrostatic motor temperature sensor B-46 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

E0023-03 - Hydrostat Motor Temperature Sensor

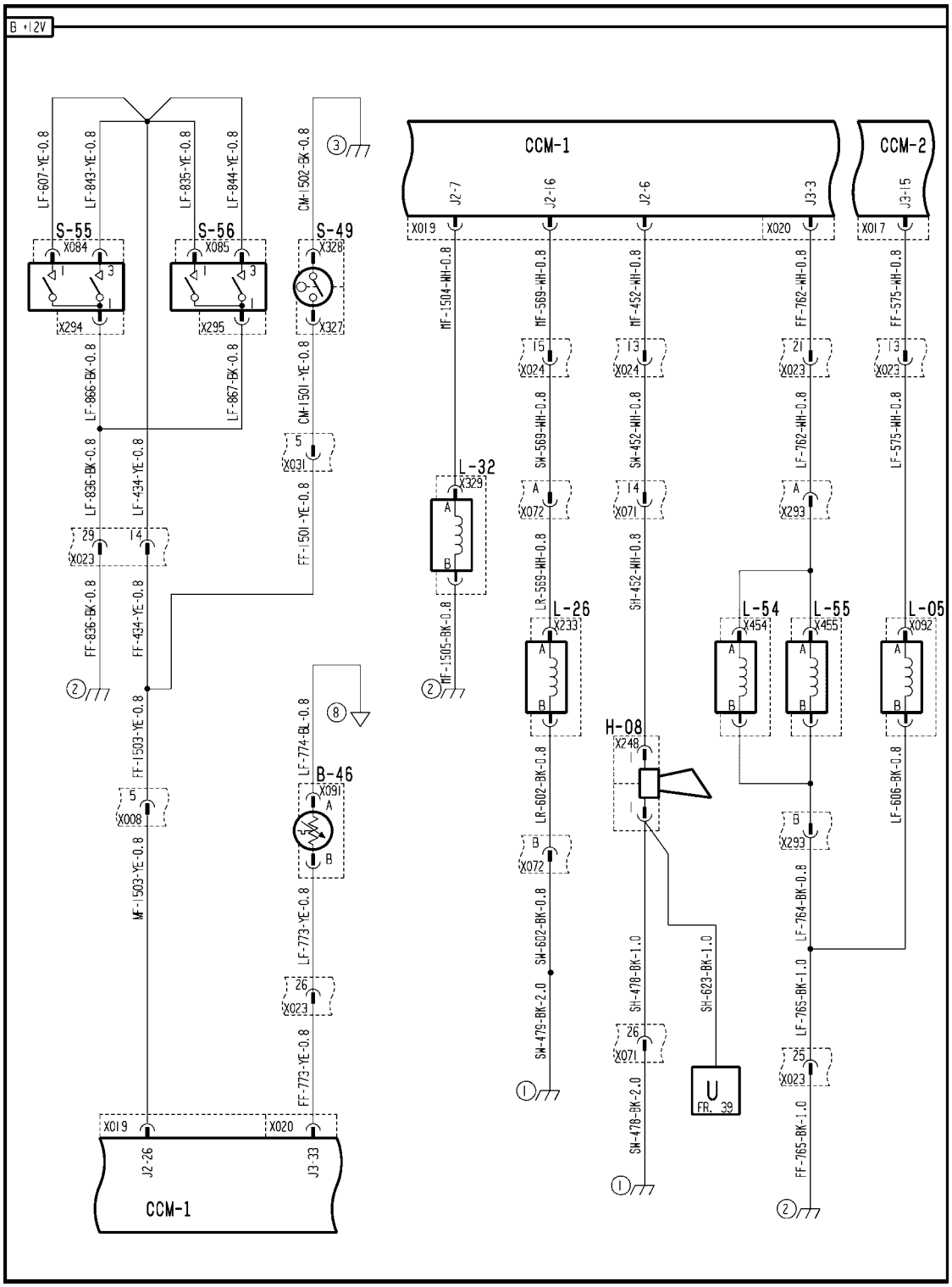
E0023-04 - Hydrostat Motor Temperature Sensor

E0023-05 - Hydrostat Motor Temperature Sensor

The input from the hydrostatic motor temperature sensor B-46 is used to support the Temperature Control System (TCS). CCM1 monitors the temperature of the case drain oil at 10 second intervals; if the temperature of the case drain oil exceeds **105 °C**, the hydrostatic pump will be de-stroked at increments of **5 - 10 %**, depending on the level of cooling required, until the oil temperature is reduced to **100 °C** for at least 10 seconds.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



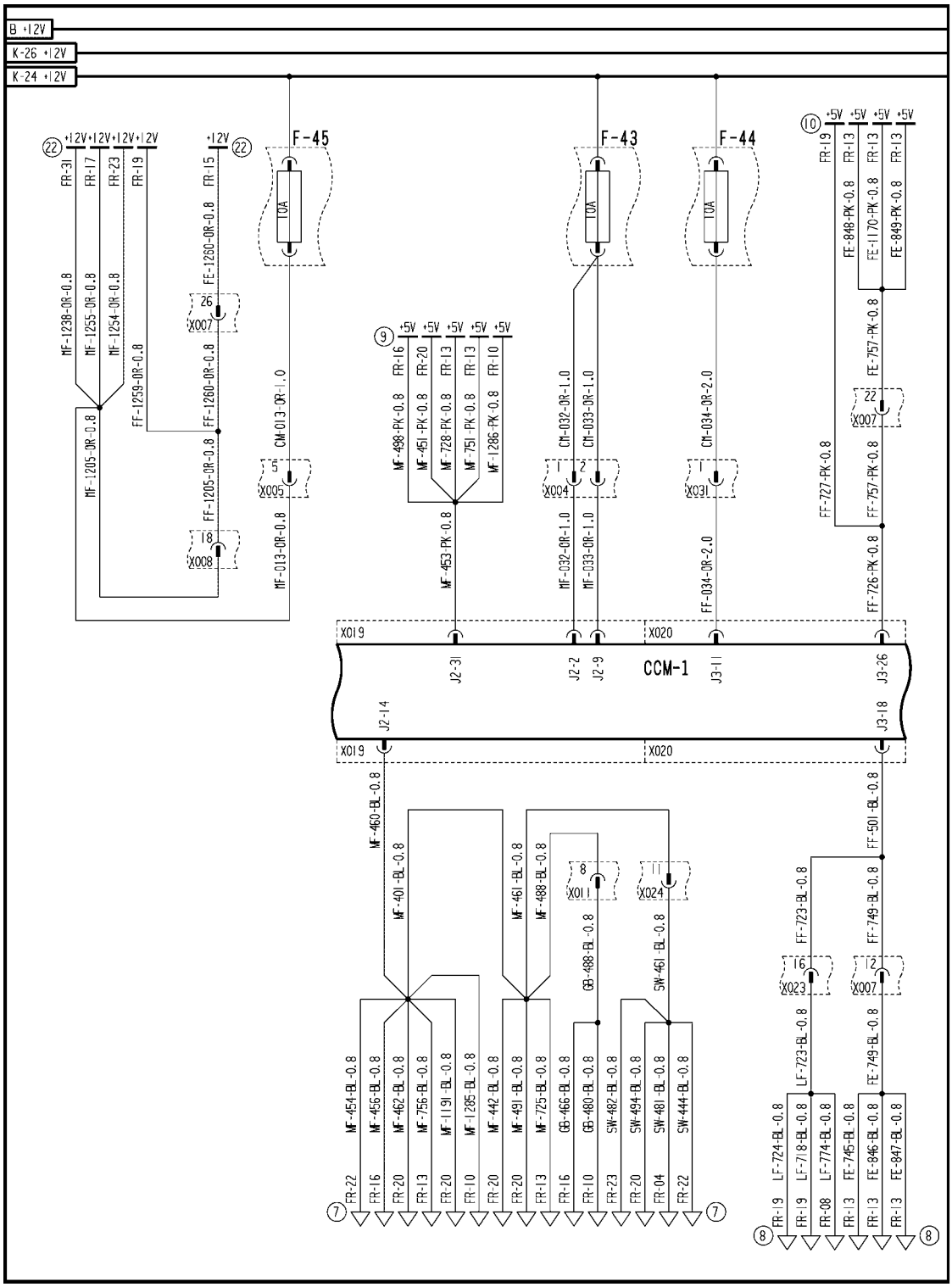
AFXSCHEM08-04 1

FRAME 8 - DRIVES

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B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Temperature sensor - Open circuit (C.20.F.95.90 - G.30.B.50)

AFX8010

E0023-05 - Hydrostat Motor Temperature Sensor

Cause:
The hydrostat motor temperature sensor B-46 is disconnected, or the circuit is open.

Possible failure modes:

1. Sensor failed open.
2. Sensor circuit wiring is open.
3. Controller internal failure.

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "MTR TEMP SEN" to check the voltage range. The normal operating voltage range is **0.5 - 4.9 volts**.

   A. If the voltage reading is **4.9 - 5.2 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue with Step **6**.

2. The voltage reading is **4.9 - 5.2 volts**. Disconnect the hydrostat motor temperature sensor connector **X091**, and install a jumper wire between pins A and B.

   A. If the voltage drops to **0 - 0.5 volts**, the open circuit is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage reading remains at **4.9 - 5.2 volts**, continue with Step **3**.

3. The voltage reading is **4.9 - 5.2 volts**. Remove the jumper wire from connector **X091**. Use a multimeter to check for continuity between connector **X091** pin A and chassis ground.

   A. If no continuity is found, continue with Step **4**.

   B. If continuity is found, continue with Step **5**.

4. The voltage reading is **4.9 - 5.2 volts**. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Use a multimeter to check for continuity between connector **X023** pin 16 and chassis ground.

   A. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** and connector **X020** J3-18 wires 723 or 501 blue. Locate the open and repair.

   B. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X023** and connector **X091** wires 723 or 774 blue. Locate the open and repair.

5. The voltage reading is **4.9 - 5.2 volts**. Disconnect the lower frame (LF) harness from the front frame (FF) harness at connector **X023**. Install a jumper wire between pins 26 and 16 on connector **X023**.

   A. If the voltage drops to **0 - 0.5 volts**, the open circuit is in the lower frame (LF) harness between connector **X023** and connector **X091** wire 773 yellow. Locate the open and repair.

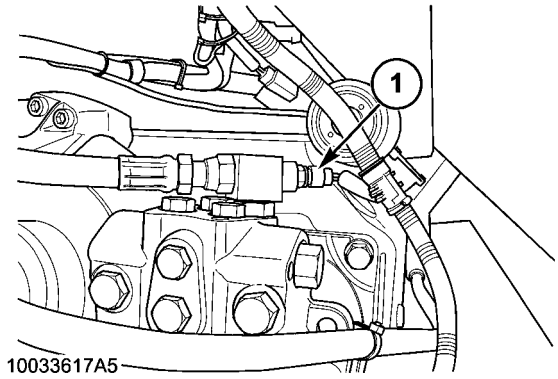
   B. If the voltage remains at **4.9 - 5.2 volts**, the open circuit is in the front frame (FF) harness between connector **X023** and connector **X020** J3-33 wire 773 yellow. Locate the open and repair.

6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

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Sensing system Temperature sensor - Overview (C.20.F.95.90 - C.10.A.10)



10033617A5 1

The hydrostatic motor temperature sensor B-46 **(1)** is located at the case drain tee at the top of the hydrostatic motor, and monitors the temperature of the case drain oil exiting the motor. The sensor is connected (**X091**) to the lower frame (LF) harness, and provides an input to the CCM1 module at connector **X020** pin J3-33. The hydrostatic motor temperature sensor B-46 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

E0023-03 - Hydrostat Motor Temperature Sensor

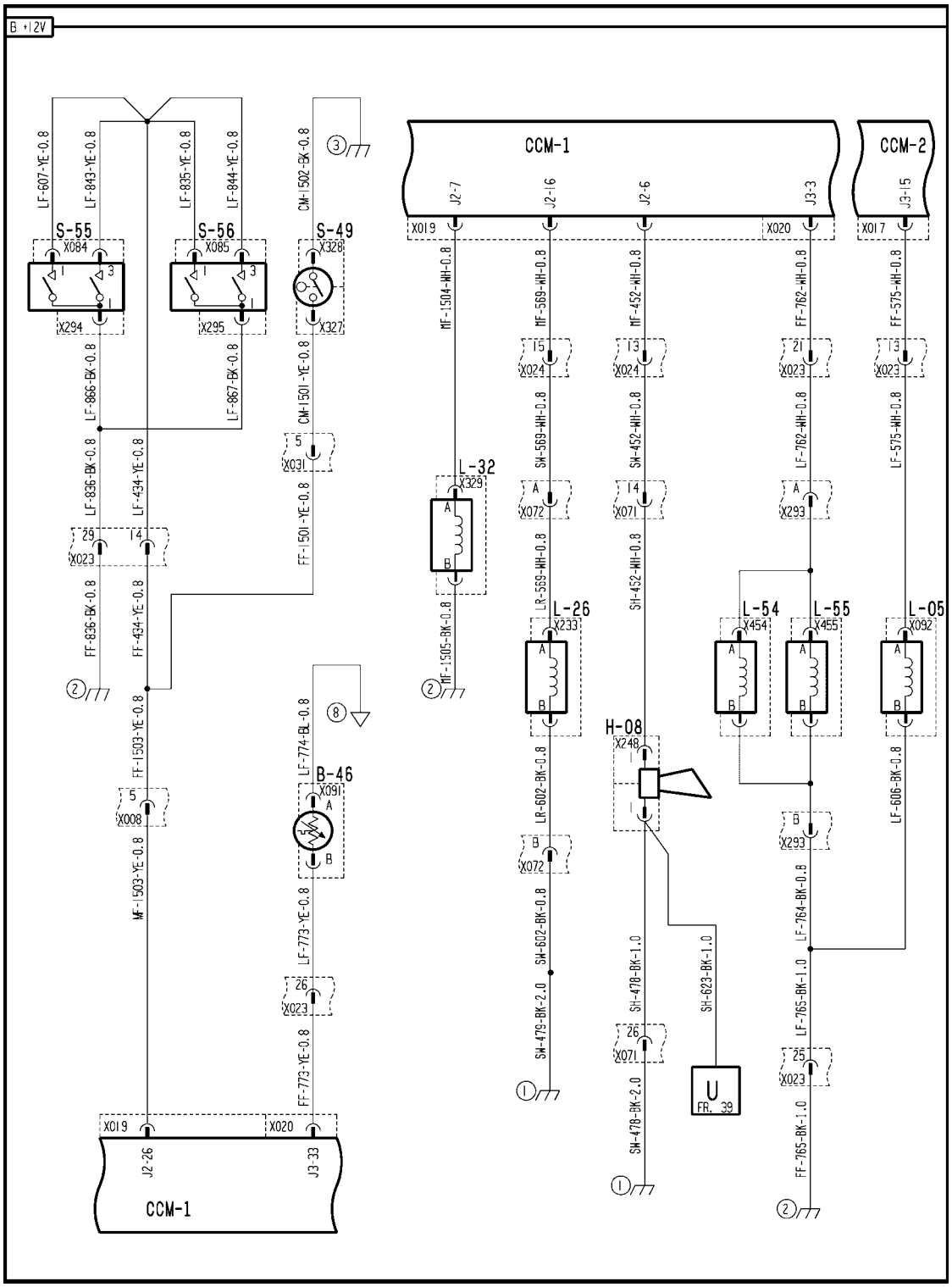
E0023-04 - Hydrostat Motor Temperature Sensor

E0023-05 - Hydrostat Motor Temperature Sensor

The input from the hydrostatic motor temperature sensor B-46 is used to support the Temperature Control System (TCS). CCM1 monitors the temperature of the case drain oil at 10 second intervals; if the temperature of the case drain oil exceeds **105 °C**, the hydrostatic pump will be de-stroked at increments of **5 - 10 %**, depending on the level of cooling required, until the oil temperature is reduced to **100 °C** for at least 10 seconds.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



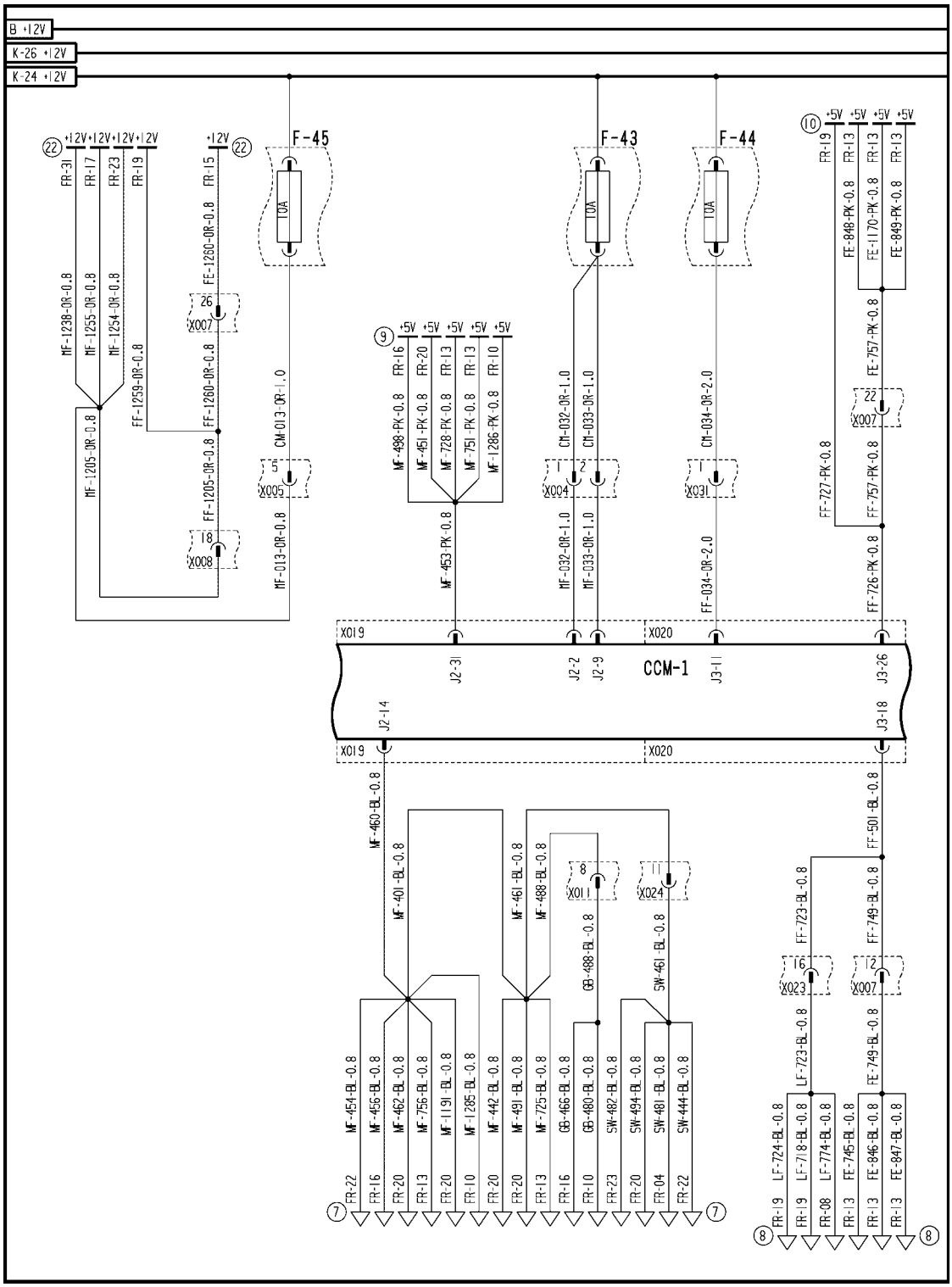
AFXSCHEM08-04 1

FRAME 8 - DRIVES

https://truckmanualshub.com/

B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

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FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Index

POWER TRAIN - C

TRANSMISSION Hydrostatic - 20.F

Command - Pressure test (C.20.F.05 - F.40.A.30) 19
AFX8010

Control valve - Open circuit (C.20.F.13 - G.30.B.50) 24
AFX8010

Control valve - Unidentified failure (C.20.F.13 - G.30.B.46) 28
AFX8010

Motor - Check (C.20.F.28 - F.40.A.11) 23
AFX8010

Motor - General specification (C.20.F.28 - D.40.A.10) 5
AFX8010

Pressure release valve - Unidentified failure (C.20.F.17 - G.30.B.46) 32
AFX8010

Pump - Check (C.20.F.20 - F.40.A.11) 22
AFX8010

Pump - General specification (C.20.F.20 - D.40.A.10) 4
AFX8010

Relief valve - Pressure test (C.20.F.16 - F.40.A.30) 21
AFX8010

Sensing system Temperature sensor - Open circuit (C.20.F.95.90 - G.30.B.50) 48
AFX8010

Sensing system Temperature sensor - Overview (C.20.F.95.90 - C.10.A.10) 12
AFX8010

Sensing system Temperature sensor - Short circuit to B+ (C.20.F.95.90 - G.30.B.54) 36
AFX8010

Sensing system Temperature sensor - Short circuit to ground (C.20.F.95.90 - G.30.B.53) 42
AFX8010

TRANSMISSION Hydrostatic - Capacity (C.20.F - D.40.A.20) 4
AFX8010

TRANSMISSION Hydrostatic - Filling (C.20.F - F.60.A.10) 13
AFX8010

TRANSMISSION Hydrostatic - General specification (C.20.F - D.40.A.10) 4
AFX8010

TRANSMISSION Hydrostatic - Hydraulic schema (C.20.F - C.20.A.20) 10
AFX8010

TRANSMISSION Hydrostatic - Overview (C.20.F - C.10.A.10) 6
AFX8010

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POWER TRAIN - C

FRONT PTO Mechanical - 42.B

AFX8010

https://truckmanualshub.com/

Contents

POWER TRAIN - C

FRONT PTO Mechanical - 42.B

SERVICE

Shaft

Shaft - Remove (C.42.B.43 - F.10.A.10) 3
AFX8010

Shaft - Install (C.42.B.43 - F.10.A.15) 4
AFX8010

Shaft - Replace (C.42.B.43 - F.10.A.30) 5
AFX8010

Gearbox

Gearbox - Remove (C.42.B.45 - F.10.A.10) 10
AFX8010

Gearbox - Install (C.42.B.45 - F.10.A.15) 12
AFX8010

Gearbox - Disassemble (C.42.B.45 - F.10.A.25) 14
AFX8010

Gearbox - Assemble (C.42.B.45 - F.10.A.20) 17
AFX8010

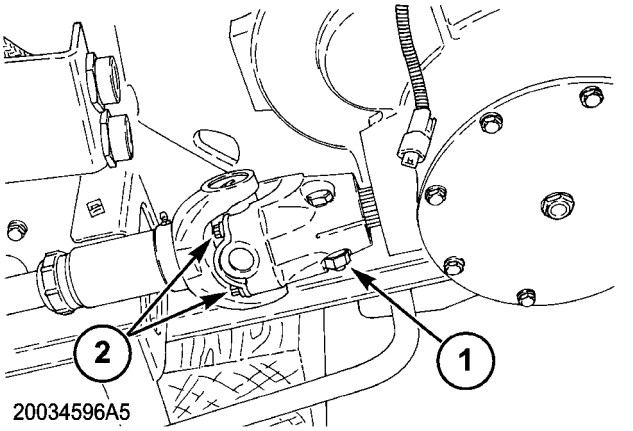
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Shaft - Remove (C.42.B.43 - F.10.A.10)

AFX8010

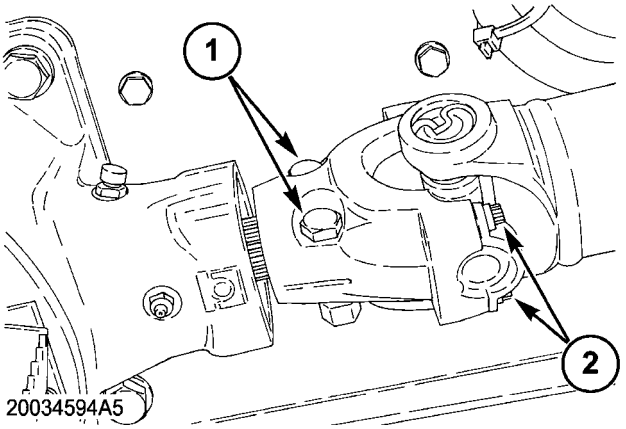
1. Remove the two bolts in the yoke at the end of the shaft **(1)**. Remove the four cap screws with the 12 point head **(2)**. Use a 10 mm 12 point socket or wrench. Once the bolts are removed, separate the cross and yoke at the drive shaft end. Now remove the remaining yoke end from the gearbox shaft.

NOTE: *It may be necessary to hold the shaft from turning.*



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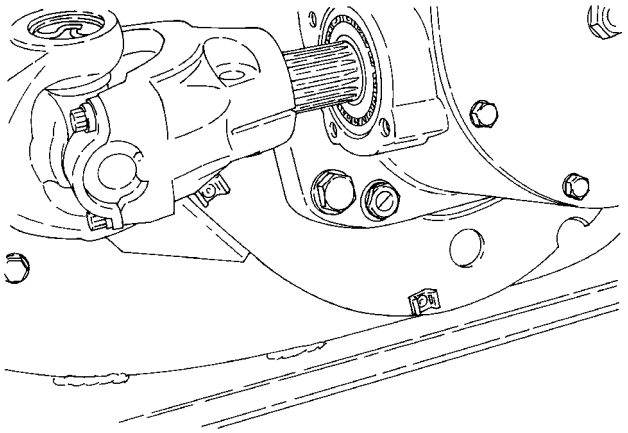
2. On the bottom gearbox, remove the two bolts on the yoke end **(1)**.



20034594A5 2

3. Once the two bolts are removed, the driveshaft can now be slid off the lower gearbox shaft and removed from the feeder.

NOTE: *Remember the orientation of the drive shaft coming off the feeder, it must be installed the same way it came off.*



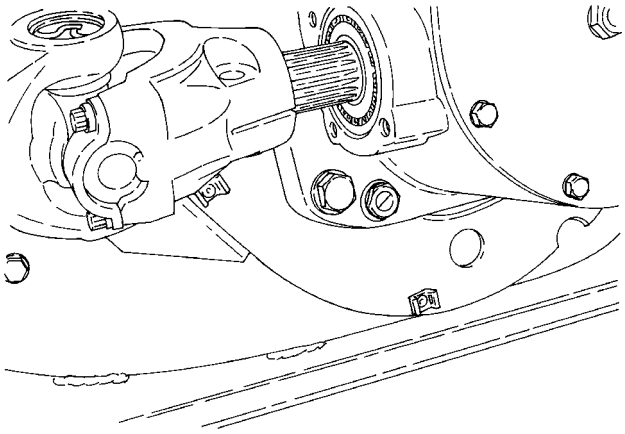
20034597 3

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Shaft - Install (C.42.B.43 - F.10.A.15)

AFX8010

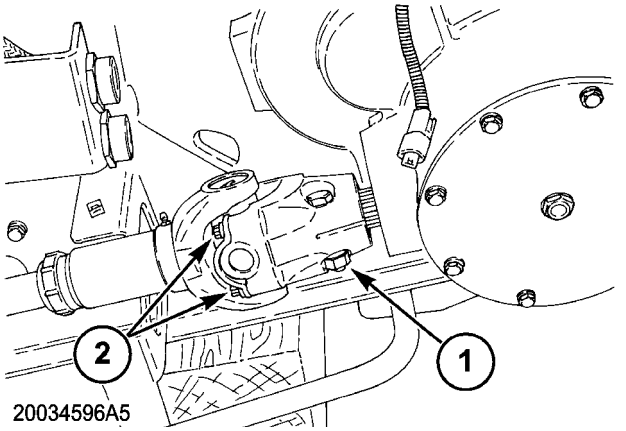
1. Slide the yoke over the lower gearbox shaft. Slide the yoke halve over the top gearbox shaft. Position the drive shaft and the yoke halve correctly so they mate.



20034597 1

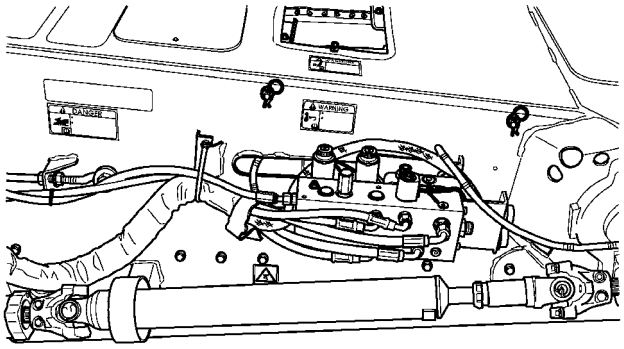
2. Install the universal joint bearing cap covers, and 4 cap screws with the 12 point heads **(2)**. The two bolts **(1)** on the yoke end can be installed, and torqued to **47 Nm** (**35 lb ft**). Torque the four 12 point cap screws to **58 - 65 Nm** (**43 - 48 lb ft**).

NOTE: *The shaft will need to be held from turning when the bolts are torqued.*



20034596A5 2

3. Keep the crosses on the driveshaft in phase.



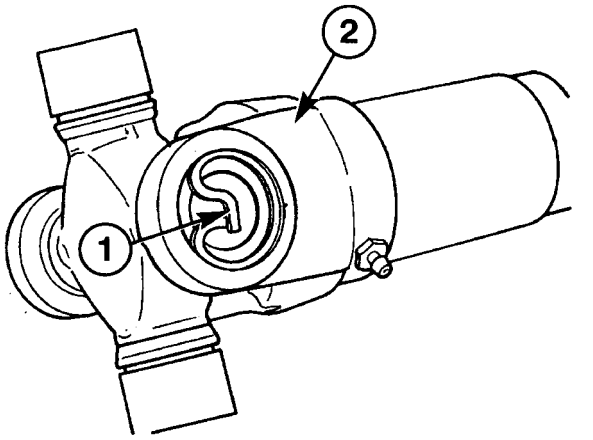
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Shaft - Replace (C.42.B.43 - F.10.A.30)

AFX8010

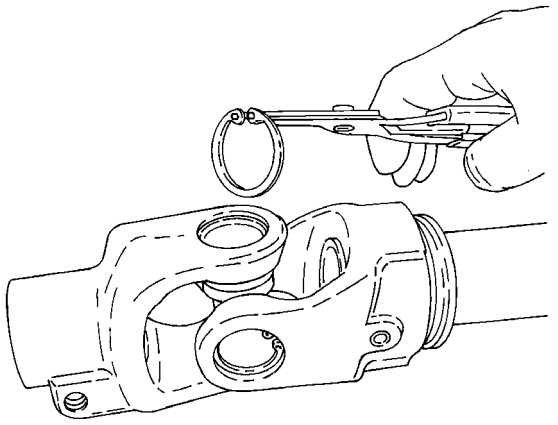
1. To replace the cross and bearing, clamp the tube in a vise, being careful not to distort the tube. Using a soft drift, tap the outside of the bearing assembly to loosen the snap ring **(1)**. Remove the snap ring from the yoke **(2)**.



20034659B 1

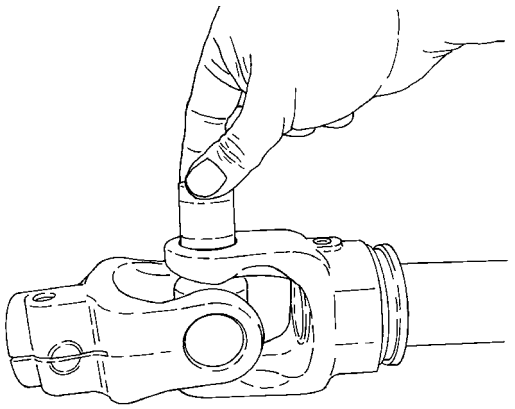
2. Remove the opposite snap ring in the same manner.

NOTE: *There are various types of retaining rings. Some require special tools such as snap-ring pliers to be removed, others can be removed by basic pliers.*



20034651 2

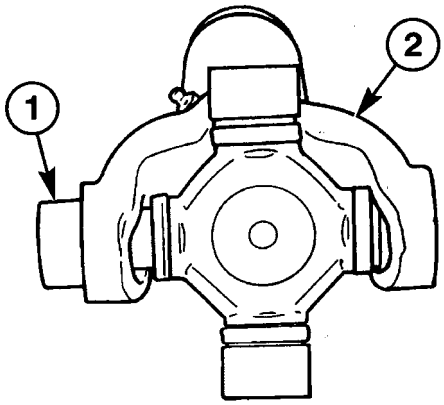
3. Set the yoke in a press with a piece of tube stock against one side of the yoke so that the bearing cap can slide inside the tube stock. Place a solid plug on the opposite bearing cap assembly. Press on the solid plug to drive the opposite bearing cap out of the yoke and into the hollow center of the tube stock. Remove the cap from the yoke.



20034653 3

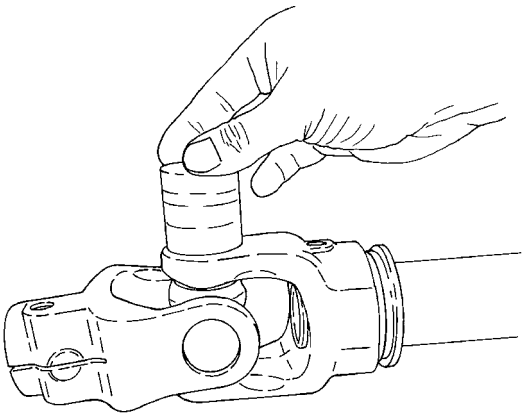
https://truckmanualshub.com/

4. Continue to press until the body of the universal joint contacts the inside of the yoke. Grip the protruding bearing cap assembly **(1)** and tap the yoke **(2)** with a hammer. Remove the cap from the yoke.



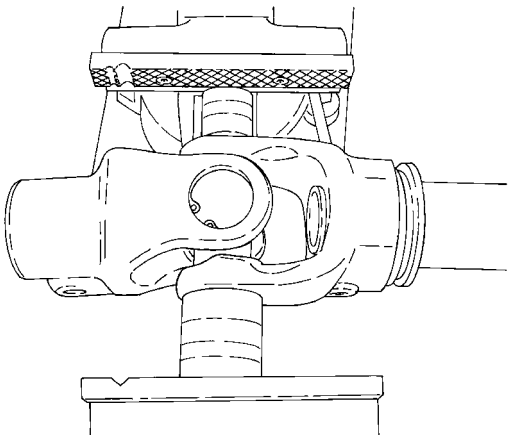
20034660B 4

5. To remove the opposite cap, place the tube stock over the top of the cap in the yoke and place the spacer on the journal end of the universal joint. Press on the solid plug to drive the opposite bearing cap out of the yoke and into the hollow center of the tube stock. Continue to press until the body of the universal joint contacts the inside of the yoke. Grip the protruding bearing cap assembly in a vise and tap the yoke with a hammer. Remove the cap from the yoke.



20034655 5

6. Be sure your setup in the vise is square, and aligned properly.

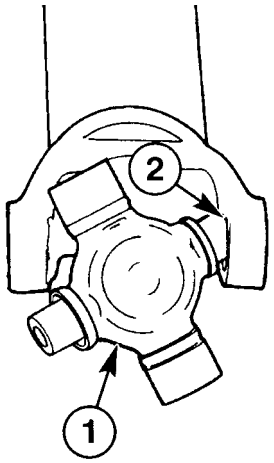


20034657 6

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7. With both bearing caps removed, tilt the universal joint **(1)** on end and remove it from the yoke.

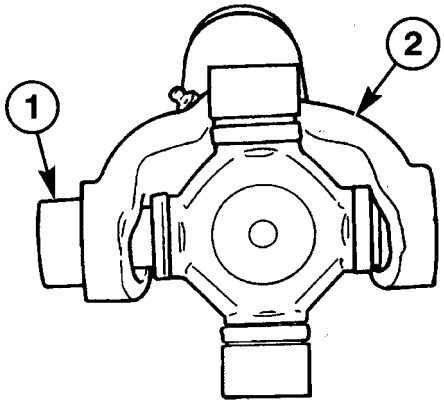
NOTE: *During manufacture of the yoke, excess material may have been added to the inside of the bearing cap bore* ***(2)*** *. This material can make removal of the universal joint difficult. It is acceptable to file this material away from the yoke to improve the removal of the universal joint.*



20034661B 7

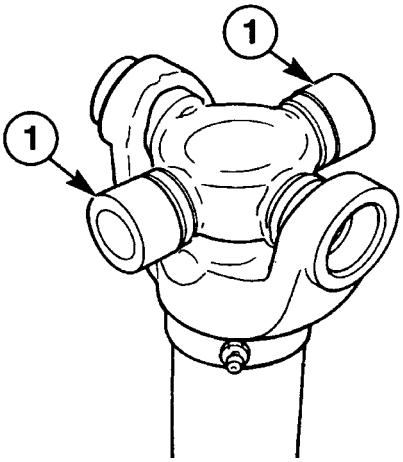
8. Check to see if the universal joint bearing caps have adequate grease. If grease is needed use a extreme temperature, extreme pressure lithium base grease.

9. Be sure the OD of the bearing caps are clean and free of rust. Lightly lubricate the bores of the yoke with grease. Use a press and a solid plug to install a bearing cap **(1)** into the yoke bore **(2)** about halfway. Install the cross into the yoke and fit the cross trunnion into the partially installed cap. Make sure that all the needles of the bearing cap are aligned by rotating the cross in the cap.



20034660B 8

10. Install the bearing caps **(1)** onto the open trunnions that fit into the mating yoke. This will protect the trunnions from accidental damage during assembly of the universal joint.



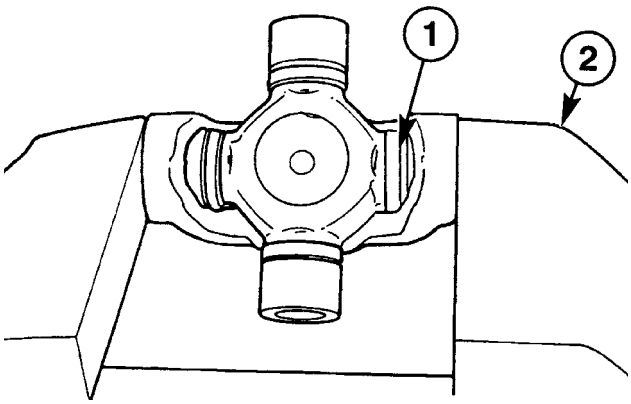
20034664B 9

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11. Install the opposite bearing cap **(1)** into the yoke bore. Place the assembly into a vise **(2)** so that the bearing caps can be squeezed inward. Apply steady pressure on the vise and press the caps onto the trunnion until the caps are flush with yoke bores on each side.

IMPORTANT: *The bearing caps must be properly aligned in the yoke bores or they will bind. The caps should slide into the yoke with only moderate force. If excessive force is needed to move the caps, they are misaligned - remove from the vise and realign the caps in the bores.*

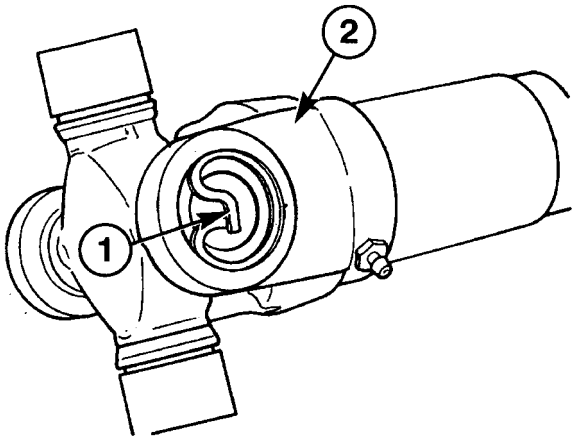
IMPORTANT: *While the bearing caps are moving into the yoke, rotate the cross to maintain alignment of the needles in the cap. At no point should the cross bind in the caps. If it does bind, this indicates that a needle is out of alignment or the cap is crooked in the yoke bore. Remove from the vise and check the cap and needle alignment. On occasion, the caps may stick in the bores even though they are aligned properly. It is acceptable to tap the yoke with a soft face hammer to ease the caps into the bores as pressure is applied by the vise.*



20034665B 10

12. Loosen the vise and install a solid plug over one bearing cap. Place the yoke and plug back into the vise and tighten to push one cap in far enough to expose the retaining ring groove in the yoke bore.

13. Remove the yoke from the vise and install the retaining ring **(1)** into the yoke bore **(2)**. Be sure that the ring is fully seated in the groove.



20034659B 11

14. Put a solid plug over the opposite bearing cap end and place the yoke and plug into a vise. Apply pressure to the vise to push the cap in far enough to expose the retaining ring groove in the yoke bore.

IMPORTANT: *While the bearing cap is moving into the yoke, rotate the cross to maintain alignment of the needles in the cap. At no point should the cross bind in the caps. If it does bind, this indicates that a needle is out of alignment or the cap is crooked in the yoke bore. Remove from the vise and check the cap and needle alignment.*

15. Remove the yoke from the vise and install the retaining ring into the yoke bore. Be sure that the ring is fully seated in the groove.

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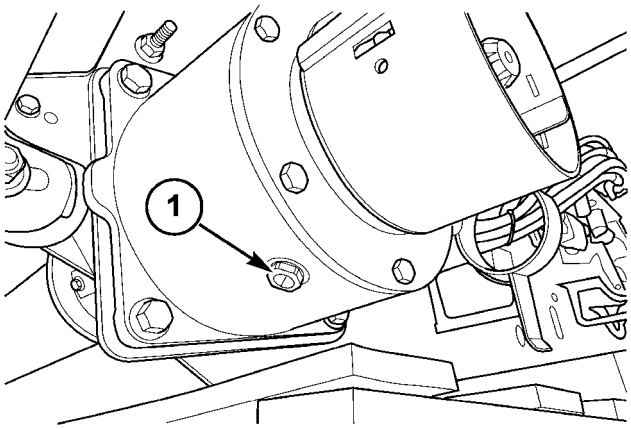
16. Check the operation of the assembled universal joint by rotating it in the bearing caps it should move freely with no binding. An acceptable practice is to strike the sides of the yoke with a soft face hammer to "set" the yoke on the bearing caps (the yoke may have tension on it from being compressed in the vise).

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Gearbox - Remove (C.42.B.45 - F.10.A.10)

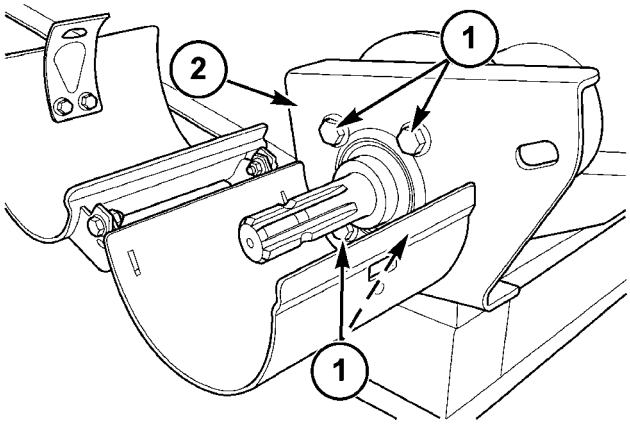
AFX8010

1. With the feeder completely lowered, remove the magnetic drain plug, **(1)** and drain the oil from the gearbox.



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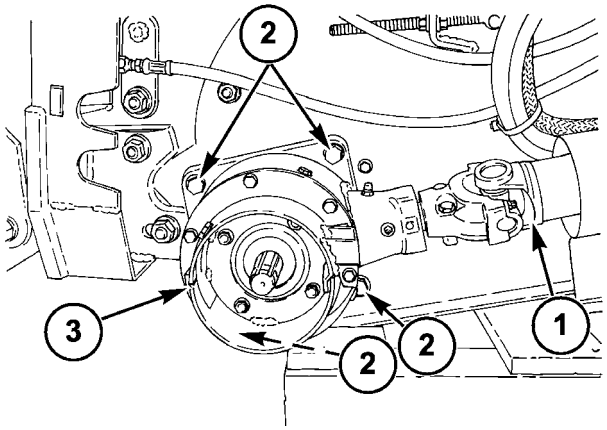
2. Remove the bolts **(1)** then remove the shielding and bearing, **(2)** on the right side of the feeder.



10033819A5 2

3. Remove the Drive Shaft **(1)** as described in **Shaft - Remove (C.42.B.43 - F.10.A.10)**.

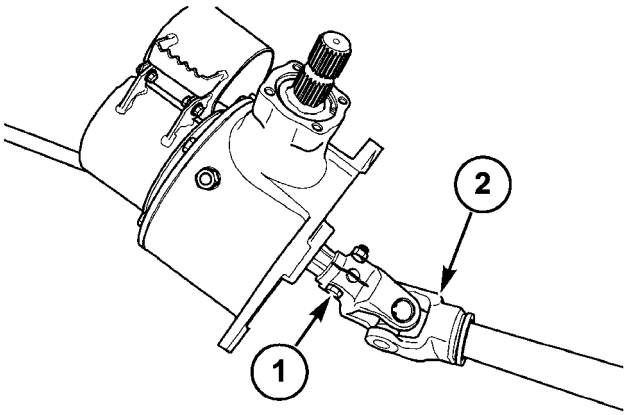
4. Remove the four bolts **(2)** and remove the gearbox **(3)** and crossover shaft from the feeder.



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5. Remove the bolts and nuts, **(1)** and remove the crossover shaft universal joint, **(2)** from the gearbox.



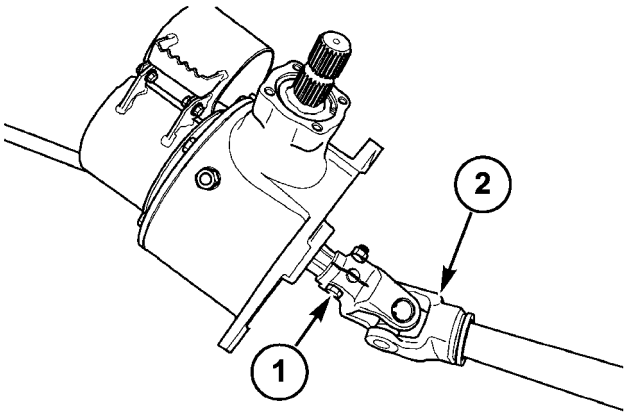
10034600A5 4

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Gearbox - Install (C.42.B.45 - F.10.A.15)

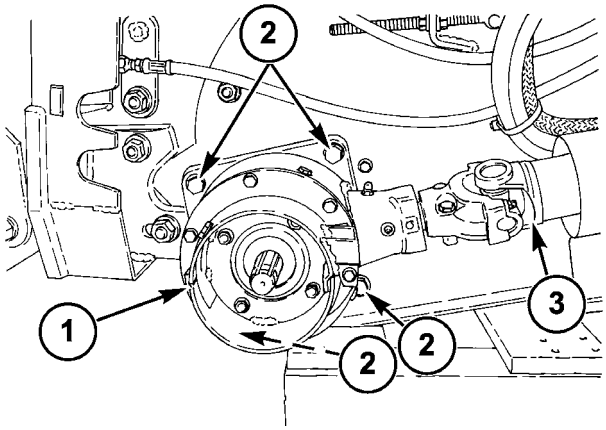
AFX8010

1. Insert the crossover shaft yoke **(2)** on the gearbox shaft and secure in place using the bolts and nuts **(1)**.



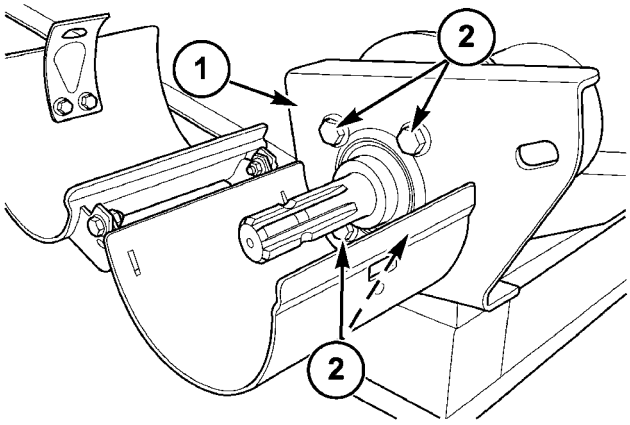
10034600A5 1

2. Insert the crossover shaft through the feeder and install the gearbox **(1)** using the four bolts **(2)**. Attach the drive shaft **(3)** as described in **Shaft - Install (C.42.B.43 - F.10.A.15)**.



20034593C5 2

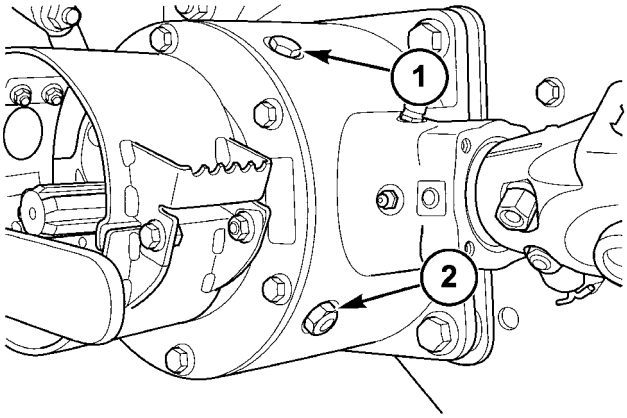
3. On the right side of the feeder, install shield and bearing **(1)** on the crossover shaft using the four bolts **(2)**.



10033819B5 3

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4. Clean the area around the gearbox fill plug **(1)** and remove the fill plug. Fill the gearbox with **CASE AKCELA HY-TRAN ULTRA** until oil reaches the middle of the sight glass **(2)** with the feeder lowered. Oil capacity is 2.4 L (0.63 Gal). Grease zerk on input shaft.



10032029A5 4

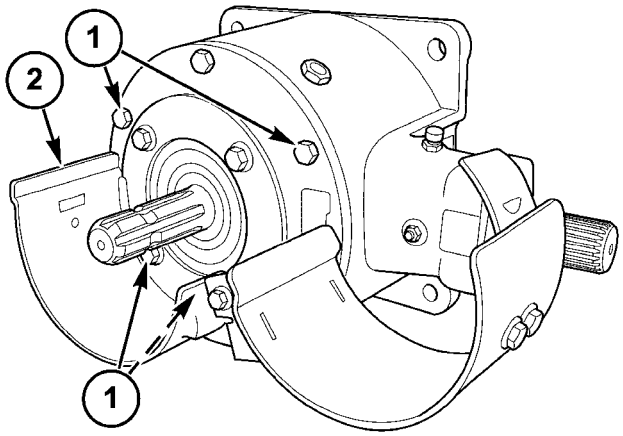
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Gearbox - Disassemble (C.42.B.45 - F.10.A.25)

AFX8010

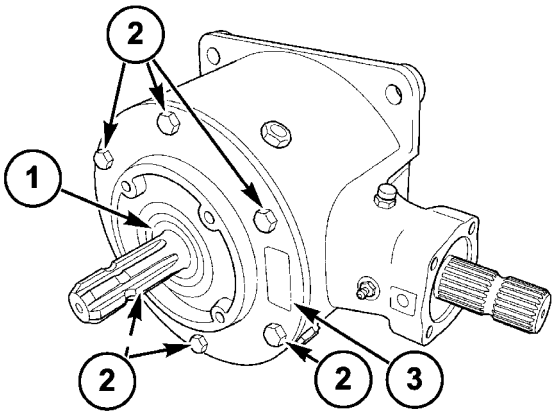
Prior operation: Gearbox - Remove (C.42.B.45 - F.10.A.10).

1. Remove four bolts **(1)** and remove the shield **(2)**.



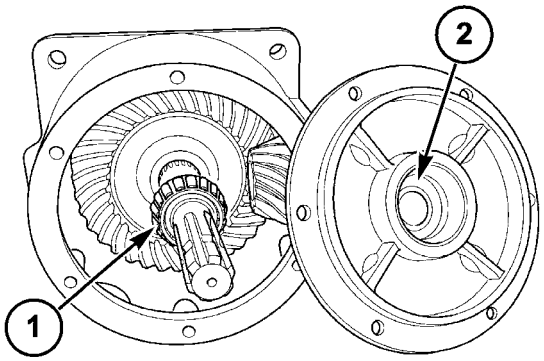
10033804A5 1

2. Remove the seal ring **(1)**, snap ring, spacer and shims. Note the number and orientation of the shims. Remove the six bolts **(2)** and remove the cover **(3)**.



10033805A5 2

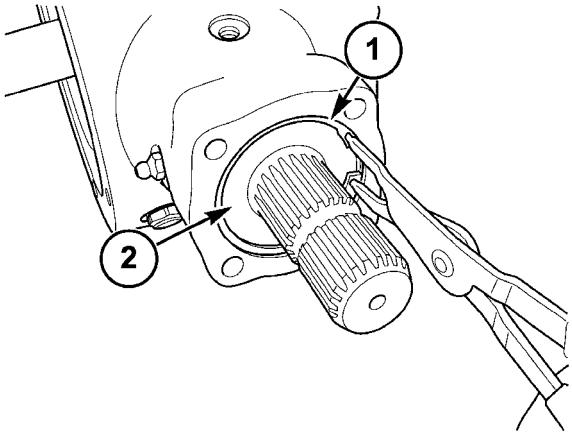
3. Remove the inner race of the bearing **(1)** and the outer race of the bearing **(2)**.



10033806B5 3

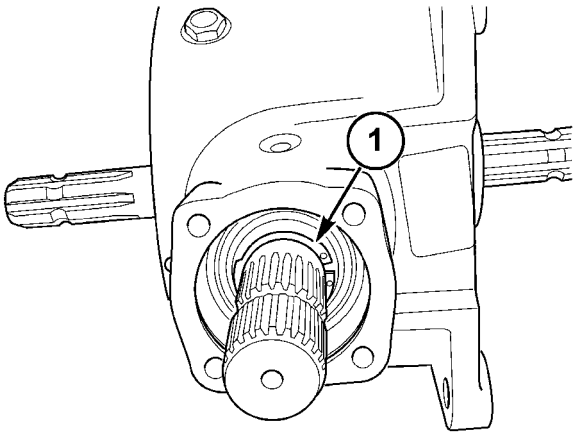
https://truckmanualshub.com/

4. Remove snap ring **(1)** and the spacer **(2)** and seal ring.



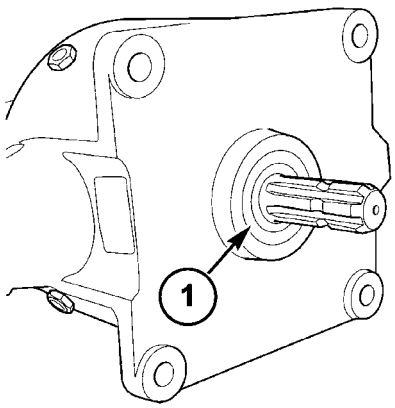
10033809B5 4

5. Remove the snap ring **(1)**, spacer and shims. Note the number and orientation of the shims.



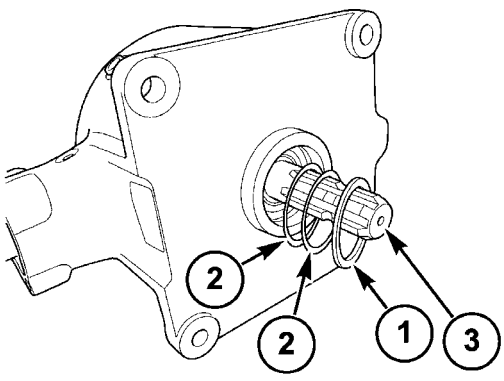
10033813A5 5

6. Remove the seal **(1)** and snap ring.



10033808A5 6

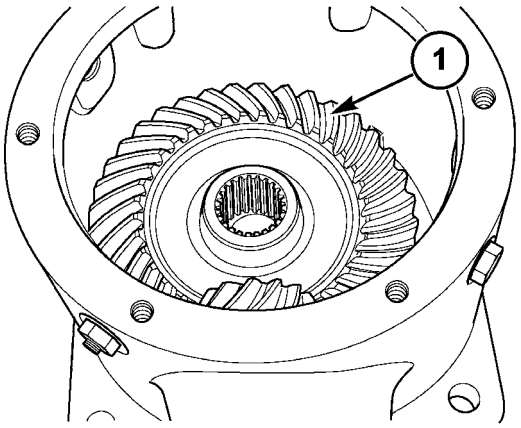
7. Remove the spacer **(1)** and shims **(2)**. Note the number and orientation of the shims. Remove the shaft **(3)** by striking the end of the shaft with a rubber mallet.



10033812A5 7

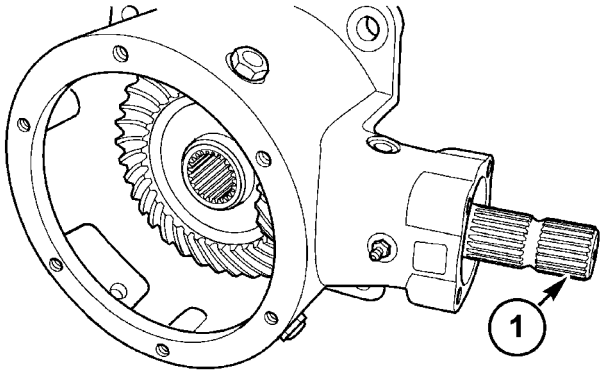
https://truckmanualshub.com/

8. Lift the crown gear **(1)** from housing.



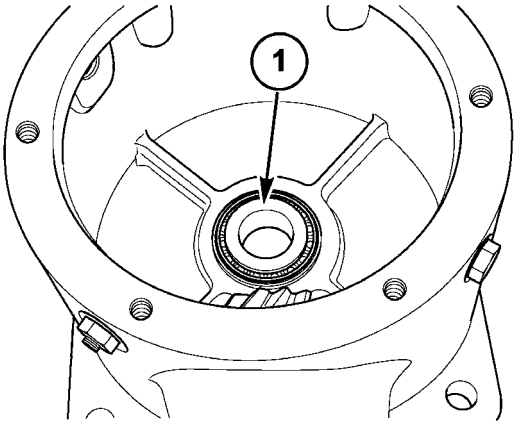
10040111A5 8

9. Remove shaft **(1)** by striking the end with a rubber mallet. Remove the bearing outer races.



20040106A5 9

10. Remove the bearing **(1)**, spacer, shims, and snap ring. Note the number and orientation of the shims.



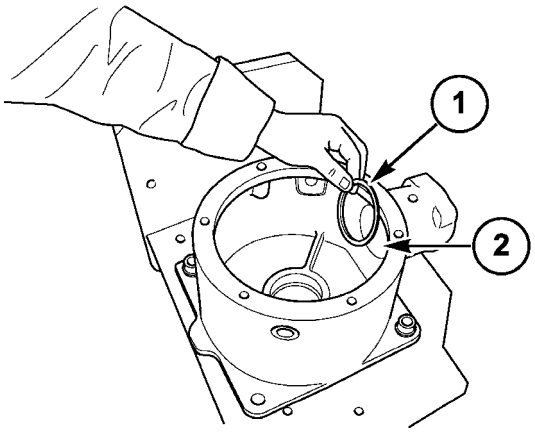
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Gearbox - Assemble (C.42.B.45 - F.10.A.20)

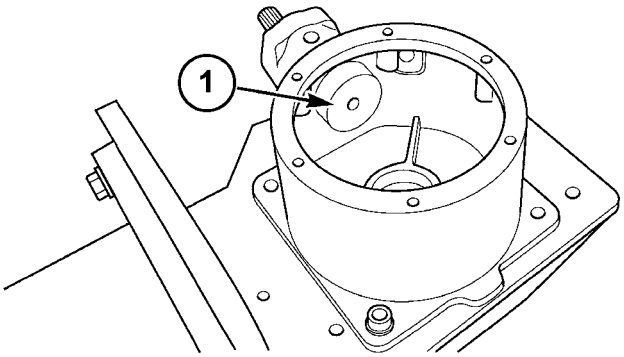
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1. Insert shims **(1)** into the housing **(2)**.



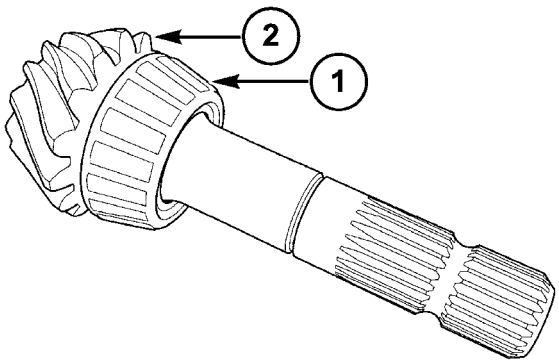
10040114A5 1

2. Press the outer race of the taper roller bearing into the housing **(1)**.



10040107A5 2

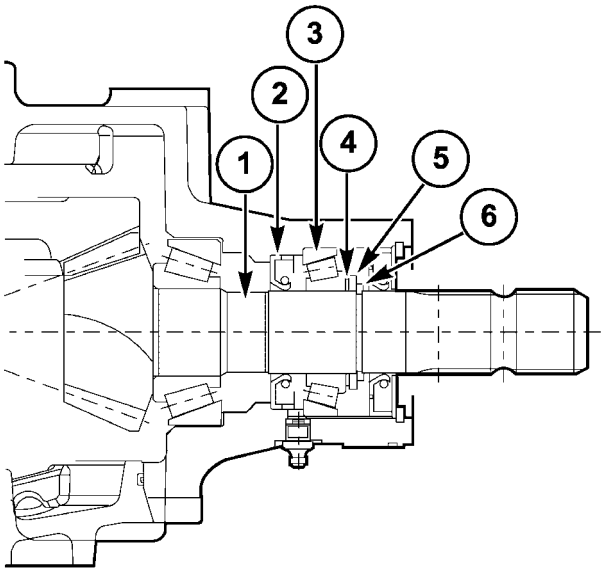
3. Place the inner race of the roller bearing **(1)** under the head of the pinion **(2)**.



10033816A5 3

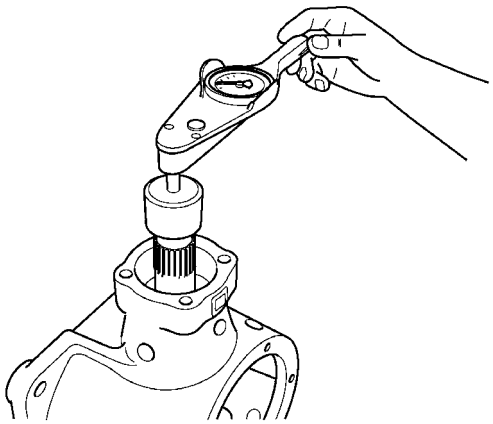
https://truckmanualshub.com/

4. Insert the pinion shaft **(1)** into the housing. Install the seal ring **(2)** and the bearing **(3)**. Place shims **(4)**, spacer **(5)** and snap ring **(6)** on the shaft.



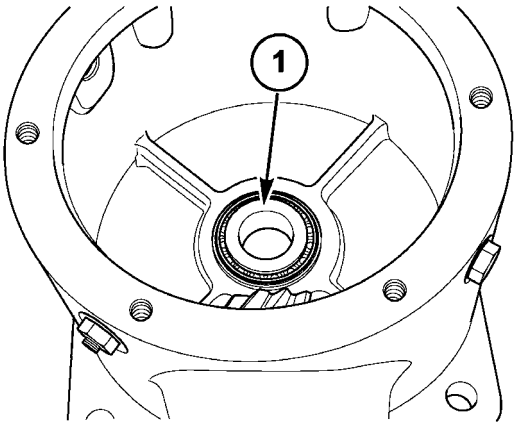
50040145A5 4

5. Check the rolling torque. Nominal range should be **0.58 - 0.88 Nm** (**5.2 - 7.8 lb in**).



10040109 5

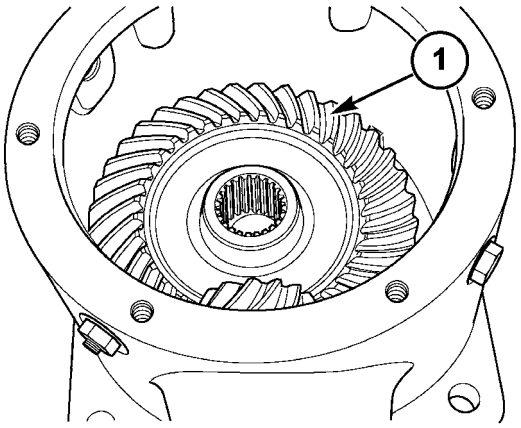
6. Install snap ring, spacer, and shims. Install the bearing **(1)**.



10040110A5 6

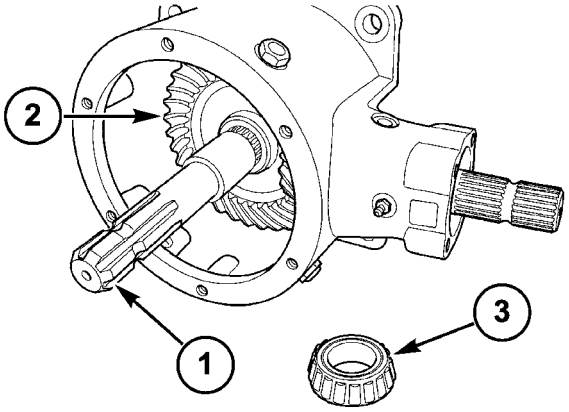
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7. Place the crown gear **(1)** on the bearing.



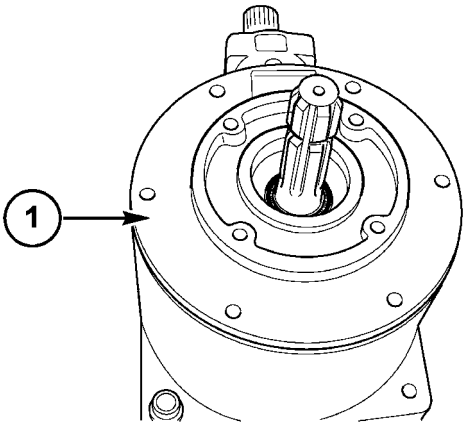
10040111A5 7

8. Place the output shaft **(1)** in the crown gear **(2)** using a mallet. Place the bearing **(3)** on the output shaft.



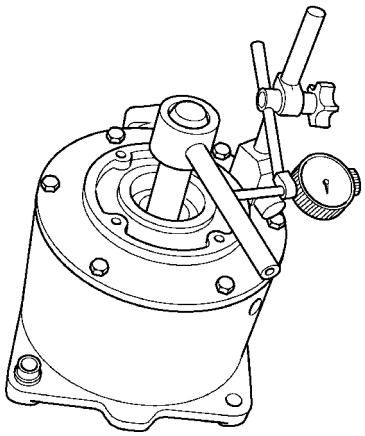
10033807A5 8

9. Place the O-ring on the cover **(1)**. Place the cover **(1)** on the gearbox. Install the M10x35 bolts and lock washers on the cover. Torque to **44 - 49 Nm** (**32.5 - 36.25 lb ft**). Install the outer race of the bearing, shims, spacer and the snap ring. Adjust number of shims to remove any play of the shaft.



10040112A5 9

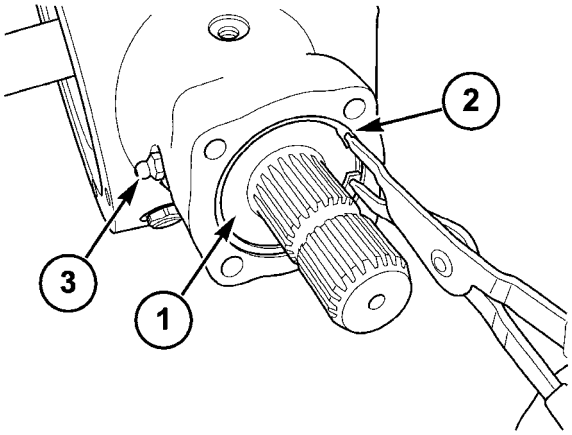
10. Check the gear backlash using a dial gauge. Add or remove shims under the crown gear as necessary to achieve a backlash of **0.15 - 0.25 mm** (**0.006 - 0.010 in**).



10040113 10

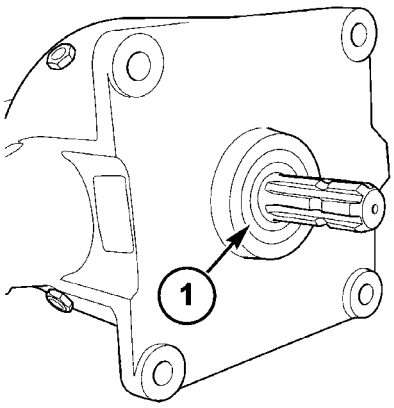
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11. Install the outer seal ring, spacer **(1)** and snap ring **(2)**. Pump Moly grease in the lube fitting **(3)** until grease comes out the seal. Wipe clean.



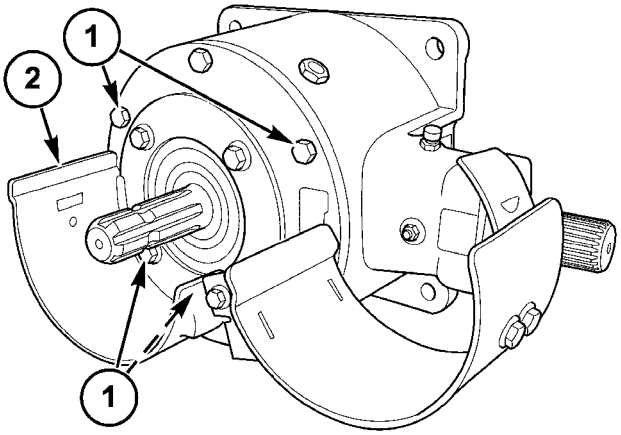
10033809A5 11

12. Install the output shaft seal rings **(1)** on both output shafts.



10033808A5 12

13. Install the shield **(2)** using four M10x20 bolts **(1)**.



10033804A5 13

Next operation: Gearbox - Install (C.42.B.45 - F.10.A.15).

https://truckmanualshub.com/

Index

POWER TRAIN - C

FRONT PTO Mechanical - 42.B

Gearbox - Assemble (C.42.B.45 - F.10.A.20) 17
AFX8010

Gearbox - Disassemble (C.42.B.45 - F.10.A.25) 14
AFX8010

Gearbox - Install (C.42.B.45 - F.10.A.15) 12
AFX8010

Gearbox - Remove (C.42.B.45 - F.10.A.10) 10
AFX8010

Shaft - Install (C.42.B.43 - F.10.A.15) 4
AFX8010

Shaft - Remove (C.42.B.43 - F.10.A.10) 3
AFX8010

Shaft - Replace (C.42.B.43 - F.10.A.30) 5
AFX8010

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POWER TRAIN - C

PROCESS DRIVE Primary process drive - 50.B

AFX8010

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Contents

POWER TRAIN - C

PROCESS DRIVE Primary process drive - 50.B

SERVICE

Clutch

Clutch - Remove (C.50.B.46 - F.10.A.10) 3
AFX8010

Clutch - Disassemble (C.50.B.46 - F.10.A.25) 6
AFX8010

Clutch - Assemble (C.50.B.46 - F.10.A.20) 9
AFX8010

Clutch - Install (C.50.B.46 - F.10.A.15) 14
AFX8010

DIAGNOSTIC

Clutch

Clutch - Short circuit to B+ (C.50.B.46 - G.30.B.54) 20
AFX8010

Clutch - Unidentified failure (C.50.B.46 - G.30.B.46) 24
AFX8010

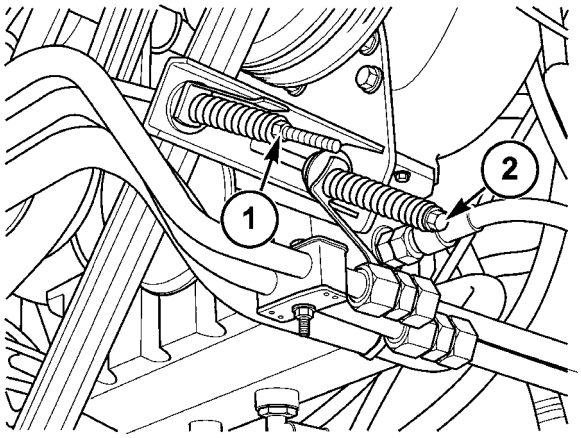
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Clutch - Remove (C.50.B.46 - F.10.A.10)

AFX8010

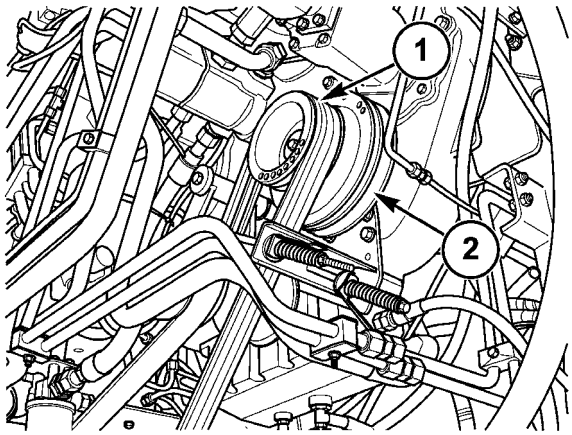
Prior operation: Remove the strawhood engine access door for better access.

1. Loosen the belt tension on drive belts **(1)** and **(2)**.



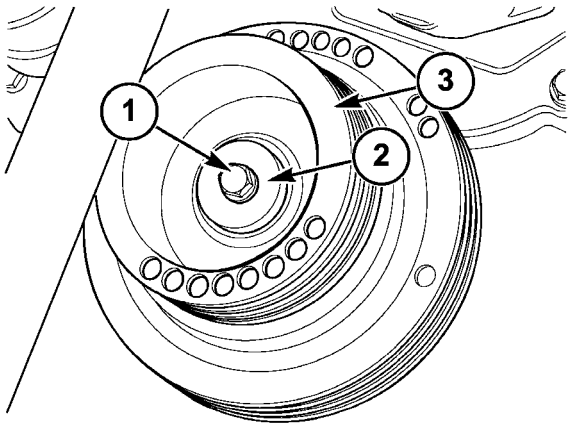
10036394A5 1

2. Remove drive belts **(1)** and **(2)** from the pulley.



10036393A5 2

3. Remove the bolt **(1)** and washer **(2)** in pulley on the end of the shaft.

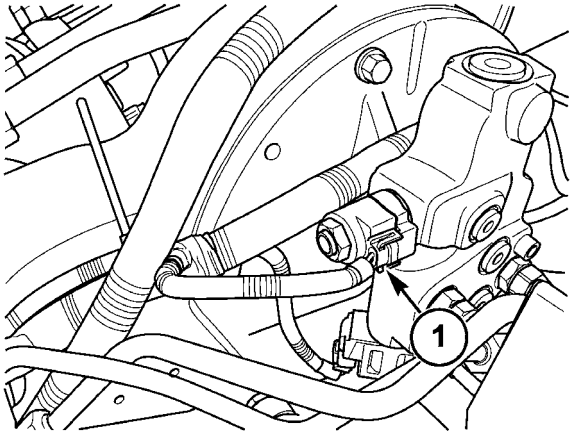


50041890A5 3

4. Using gear pullers, remove the pulley **(3)** from the shaft.

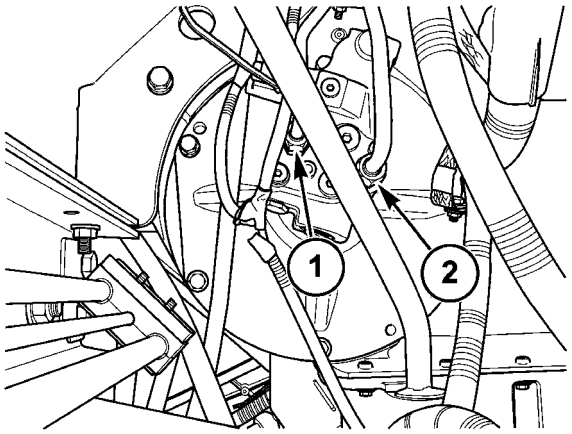
https://truckmanualshub.com/

5. On the inboard side of the gearbox remove the electrical connection **(1)** from the solenoid valve.



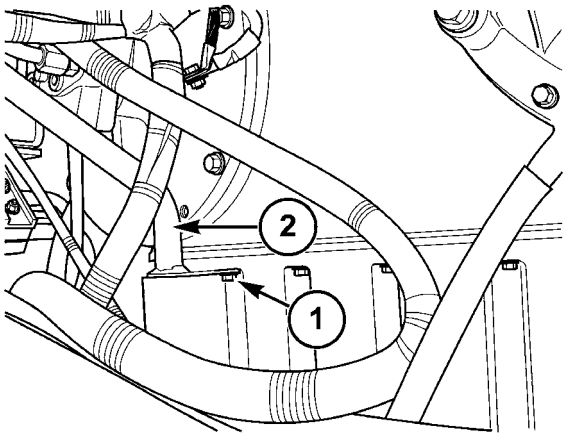
10036391A5 4

6. Remove the hydraulic lines from the valve.



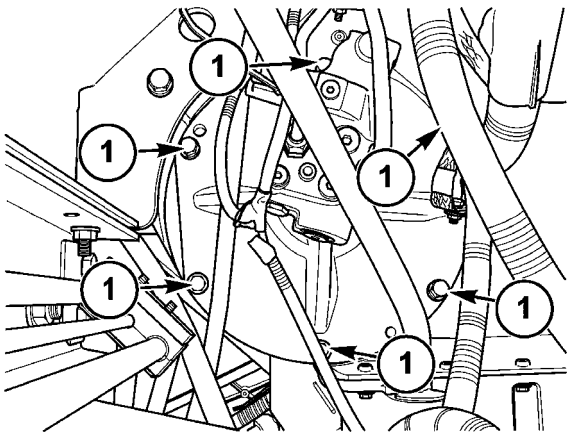
10036398B5 5

7. Remove the one bolt **(1)** fastening the dipstick **(2)** mounting flange to the gearbox. Remove the dipstick tube assembly by simply pulling out from the gearbox reservoir housing.



10036395A5 6

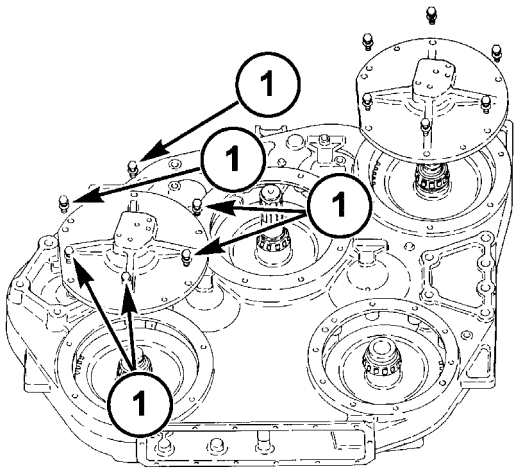
8. Remove the six bolts **(1)** from the mounting flange cover.



10036398C5 7

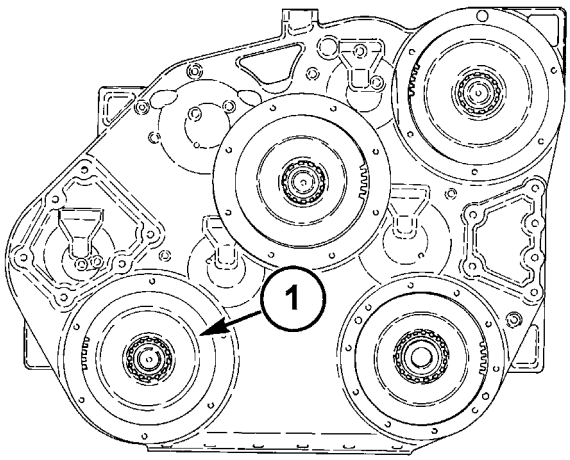
https://truckmanualshub.com/

9. When the bolts **(1)** are removed, remove the cover from the machine.



20035859C5 8

10. The gear and clutch shaft assembly **(1)** can now be removed by simply pulling it from the gearbox.



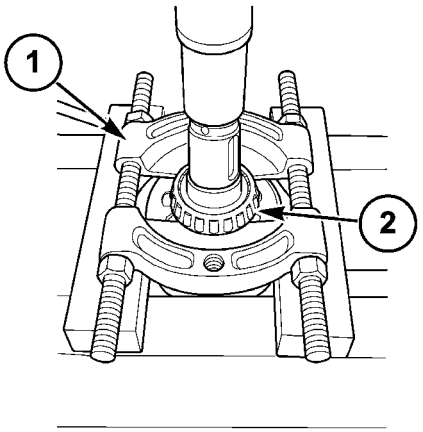
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Clutch - Disassemble (C.50.B.46 - F.10.A.25)

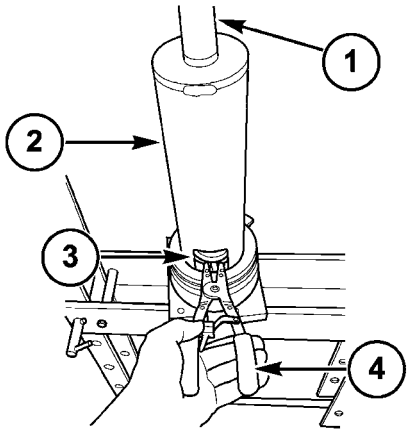
AFX8010

1. Using a puller **(1)** remove the bearing cone **(2)** from the brake end of the shaft.



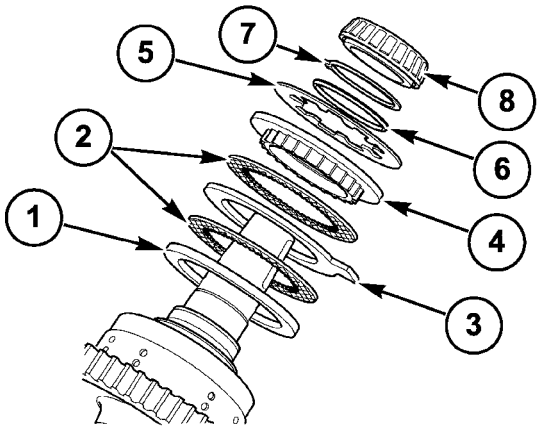
10041902A5 1

2. Using a press **(1)** and the tool with two notches **(2)**, carefully remove the snap ring **(3)** using snap ring pliers **(4)** from the brake end of the shaft.



10041900A5 2

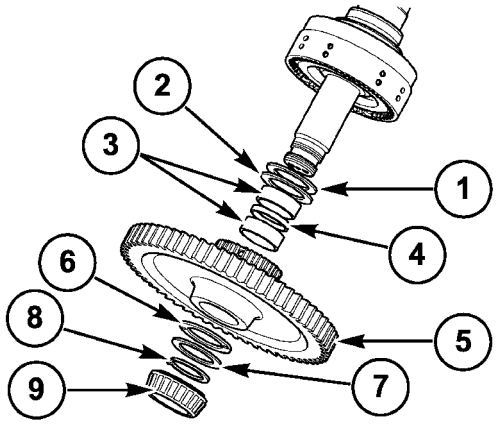
3. Remove the rest of the brake components including the ring **(6)**, return spring **(5)** , piston **(4)** , frictions disks **(2)** , and plates **(3)** **(1)** from the shaft.



10035846A5 3

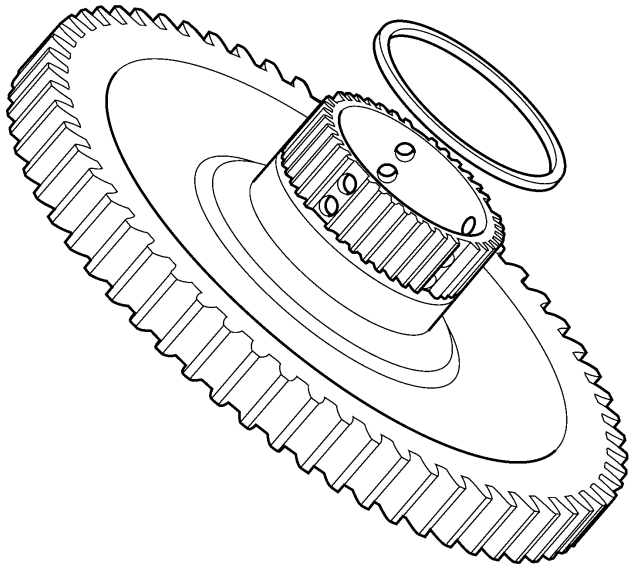
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4. Remove the bearing cone **(9)** from the gear side of the shaft. Remove the retaining ring **(8)** , thrust bearing **(7)** and thrust race **(6)** from the shaft. Remove the gear **(5)** from the shaft.



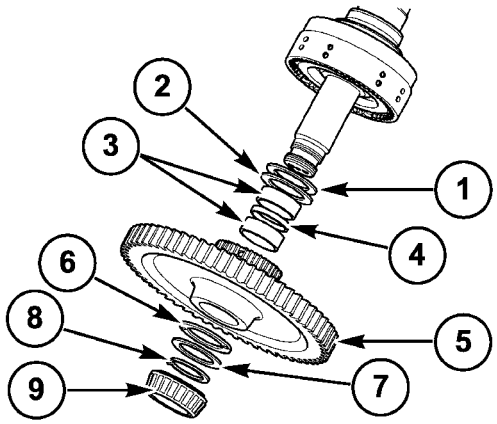
10035843A5 4

5. When the gear is removed, also remove the clutch lube ring seal on the spline side of the gear.



10035844 5

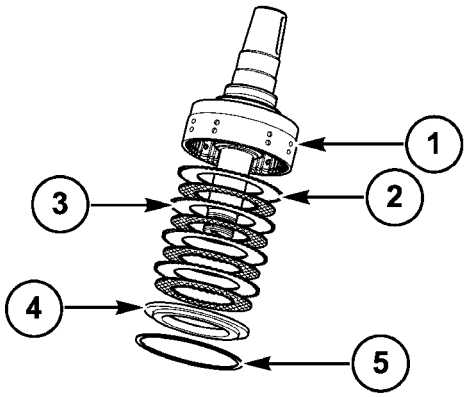
6. Remove the needle roller bearings **(3)** , inner ring **(4)** , thrust bearing **(2)** , and thrust bearing race **(1)** from the shaft.



10035843A5 6

https://truckmanualshub.com/

7. Remove the backing plate retaining ring **(5)** , the clutch backing plate **(4)** , the clutch friction plates **(3)** and separator plates **(2)**.

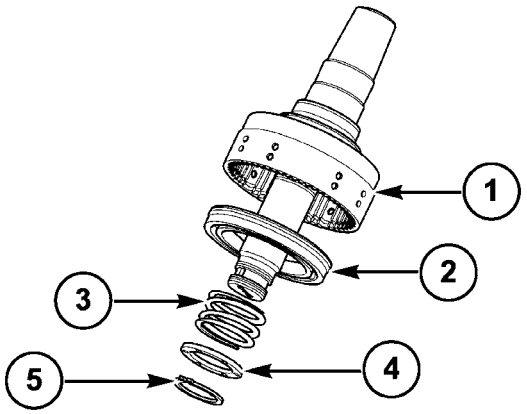


10035842A5 7

8. Remove the retaining ring **(5)** , piston return spring retainer **(4)** , piston return spring **(3)** and the piston **(2)** assembly.

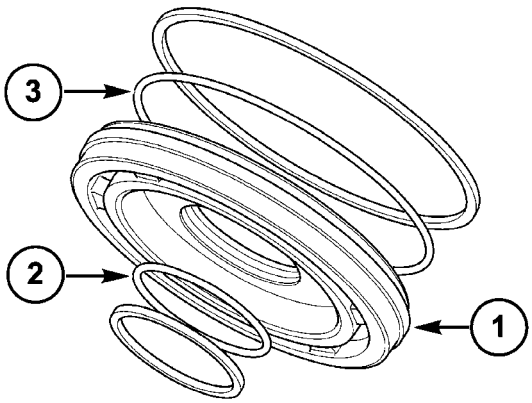
NOTE: *When removing the snap ring be careful of the force from the spring pressure. You will need to place the assembly in a press to hold down the spring while removing the snap ring. Once the snap ring is removed, slowly release the press.*

NOTE: *To remove the piston use compressed air inserted in the shaft hole between the two seals on the end of the shaft.*



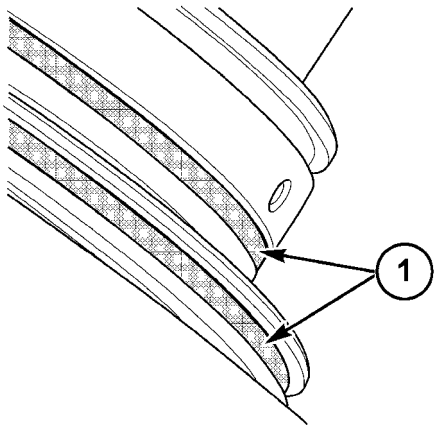
10035841A5 8

9. Remove all the seals **(1)**, **(2)**, **(3)** from the clutch piston.



10035840A5 9

10. Remove the two seals **(1)** from the brake end of the shaft as well.



10035847A5 10

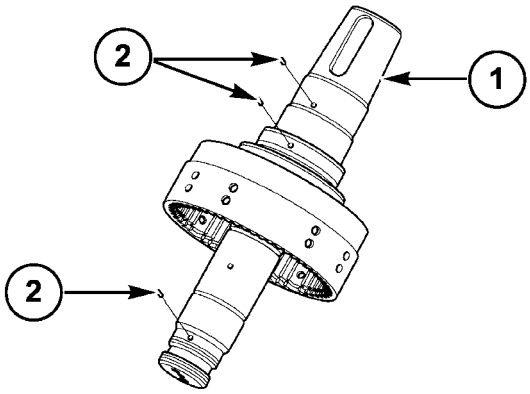
https://truckmanualshub.com/

Clutch - Assemble (C.50.B.46 - F.10.A.20)

AFX8010

1. Press spring pins into holes in shaft.

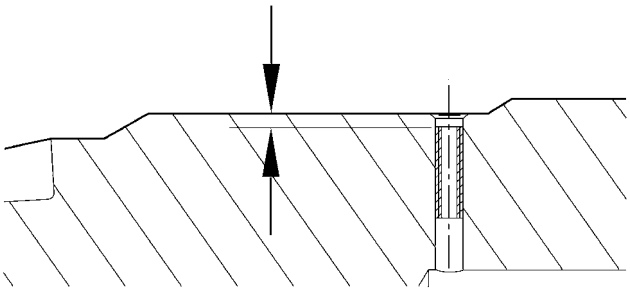
NOTE: *Ends of pins must be 1.3 +/- 0.5mm below OD.*



50040355A5 1

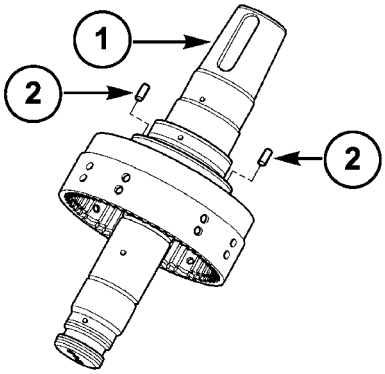
2. Press spring pins into hole in back side of shaft.

NOTE: *Ends of pins must be 1.3 +/- 0.5mm below OD.*



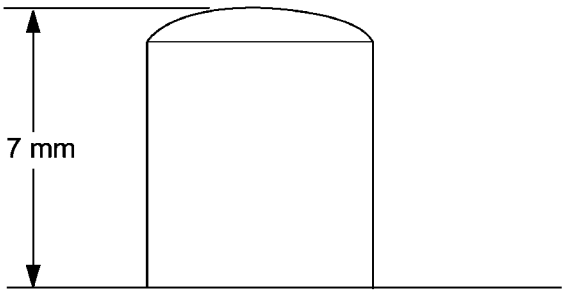
10035838 2

3. Coat tapered end of dowel pins **(2)** with a small amount of Loctite 609 and install into holes in the first step flange above drum.



50040357A5 3

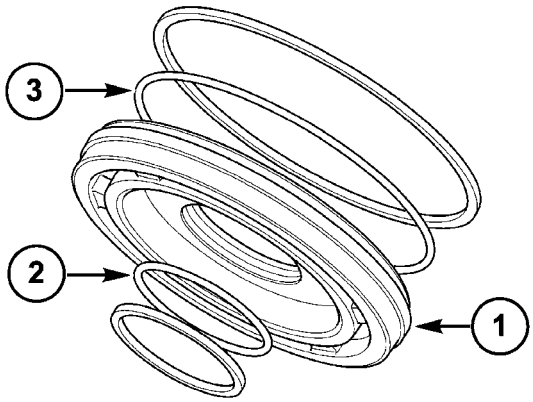
4. The dowel pin height should be 7mm.



50040358 4

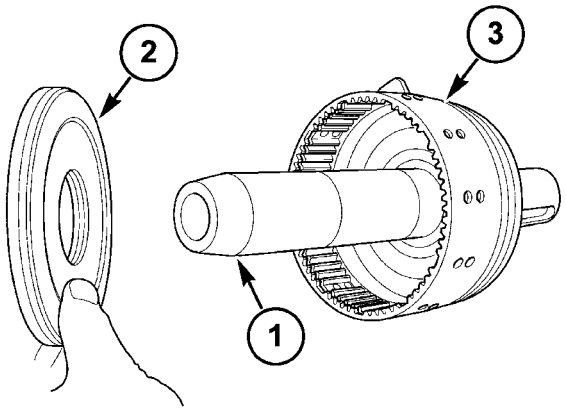
https://truckmanualshub.com/

5. Subassemble the clutch piston **(1)** by inserting the smaller o-ring and small seal **(2)** into the groove in the ID of the piston. Install the larger o-ring and larger seal **(3)** into the groove on the piston OD.



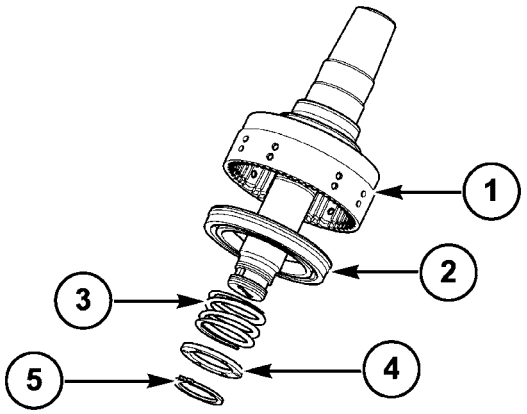
10035840A5 5

6. Size the inner seal and outer seal on the clutch piston **(2)** , lube both seals. Press the piston onto the clutch shaft with the tool installed **(1)** until the piston is fully seated into the clutch housing **(3)**.



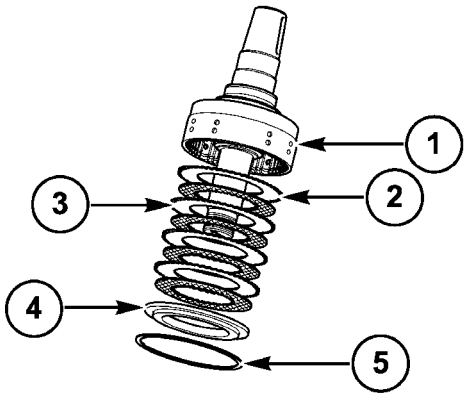
10041891A5 6

7. Place the return spring **(3)** over the shaft and into the piston. Drop the spring retainer **(4)** (lip towards spring) and retain on shaft with external snap ring **(5)** (narrow side up). This will require pressure to be applied to the spring.



10035841A5 7

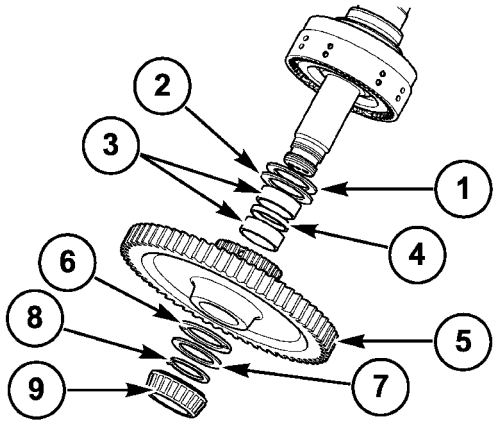
8. Assemble the clutch pack using four each of the following; separator plate **(3)** , friction plate **(2)** and in this order until all are used. After all separator plates and friction plates are in place, seated and aligned place the clutch backing plate **(4)** on stack and retain with backing plate retaining ring **(5)** (narrow side up). Be sure retaining ring **(5)** is fully seated into the groove.



10035842A5 8

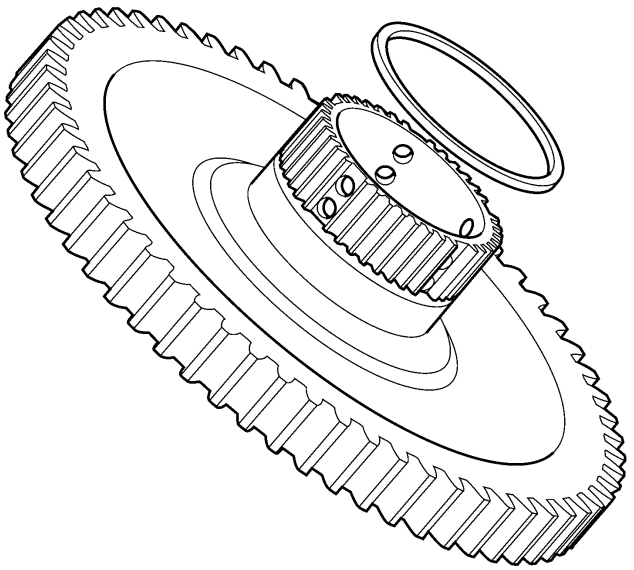
https://truckmanualshub.com/

9. Place thrust bearing race (washer) **(1)** over shaft against retaining ring. Place bearing **(2)** side of thrust bearing on washer.



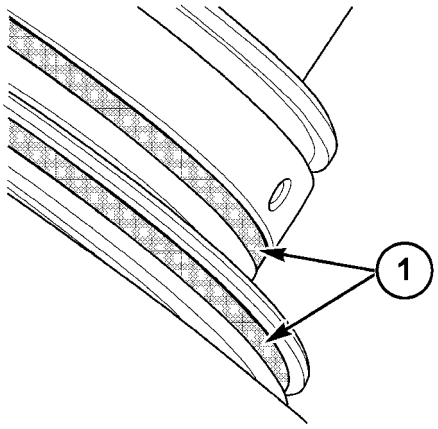
10035843A5 9

10. Install ring clutch lube seal on gear in groove on spline side. Lube the seal. Place gear assembly on shaft, spline into clutch stack. Remove wedge pins. Slide needle roller bearing **(3)** , inner ring **(4)** , and another needle bearing **(3)** over shaft and press down into gear **(5)** hub. Assemble thrust bearing **(7)** (smooth side toward gear) thrust bearing race (washer) **(6)** and retaining ring **(8)** (narrow side up) onto shaft. Be sure retaining ring **(8)** seats fully into groove. Press cone **(9)** onto shaft end using a driver. Check to see if cone is fully seated.



10035844 10

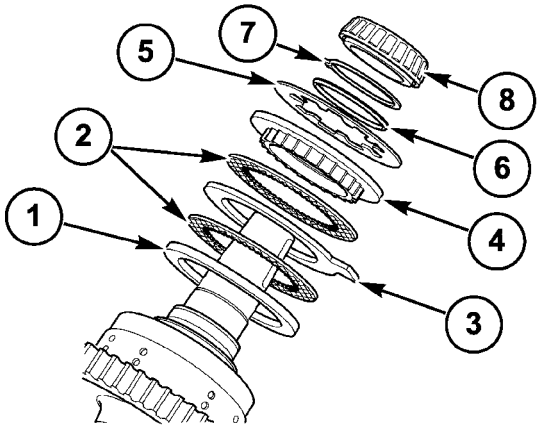
11. Subassemble shaft brake. Dab petroleum jelly into seal grooves. Apply a large seal and a small seal **(1)** into indicated grooves on the brake end of the shaft. Make sure seals **(1)** are not twisted and are fully seated into the grooves.



10035847A5 11

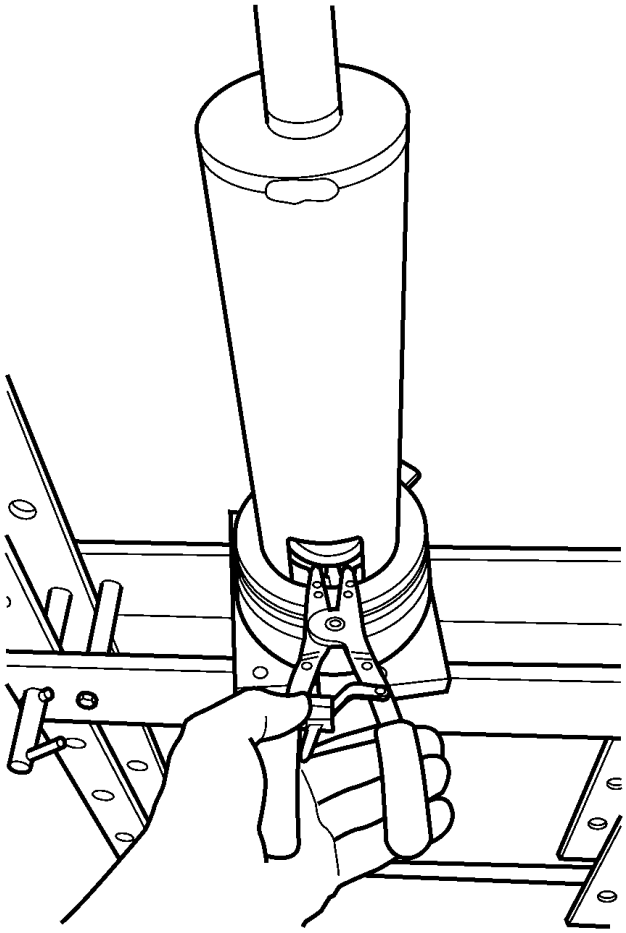
https://truckmanualshub.com/

12. Place plate **(1)** on top of can, flat side up. Put a friction disk **(1)** , plate **(3)** , and another friction disk **(2)** over the shaft. Carefully assemble piston **(4)** over shaft. Piston must be aligned over dowel pins and through disks and plates. When in place, the ear on the middle plate will be held when pressing on the top of the piston. Place the return spring **(5)** over the shaft with the lip down and inserted in the spring fingers.



10035846A5 12

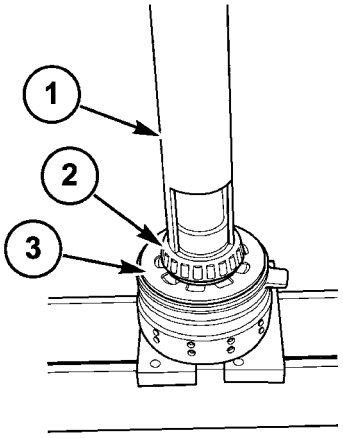
13. Compress the return spring and ring. Install retaining ring on shaft. Be sure snap ring is fully seated before releasing press.



10041900 13

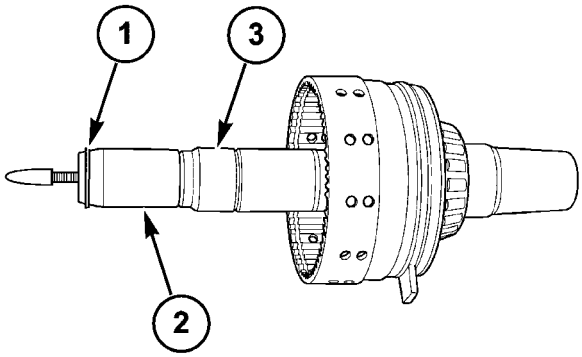
https://truckmanualshub.com/

14. Using the press tool with the notch, assemble the bearing cone **(2)** onto brake end of shaft. Check to be sure bearing is fully seated against the snap ring holding the spring **(3)**.



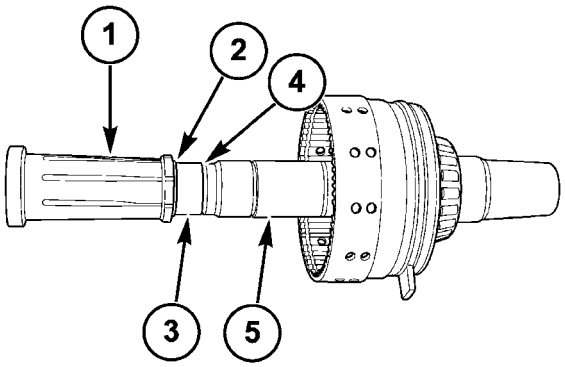
10041901A5 14

15. To install the shaft **(3)** end seals, use the seal expander tool **(2)** to first expand the seal **(1)**.



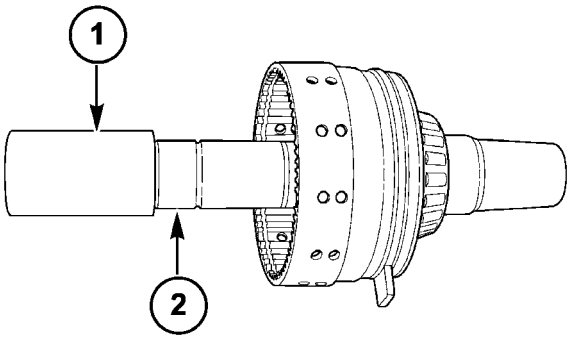
10041894A5 15

16. Use the seal pusher tool **(1)** to evenly slide the seal **(2)** into the groove **(4)** on the shaft **(5)**.



10041893A5 16

17. Use the seal compressor tool **(1)** to be sure the seal is fully compressed in the groove on the shaft **(2)**.



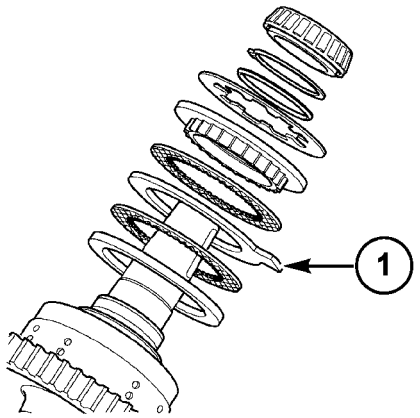
10041898A5 17

https://truckmanualshub.com/

Clutch - Install (C.50.B.46 - F.10.A.15)

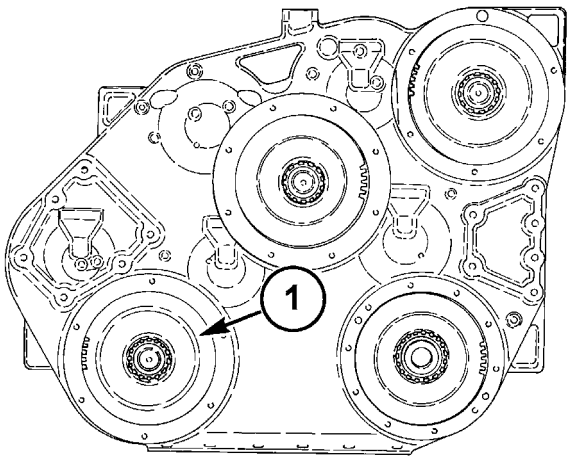
AFX8010

1. Install the shaft/clutch assembly into the gearbox. Be sure the tab **(1)** from the shaft brake fits into the groove in the gearbox housing.



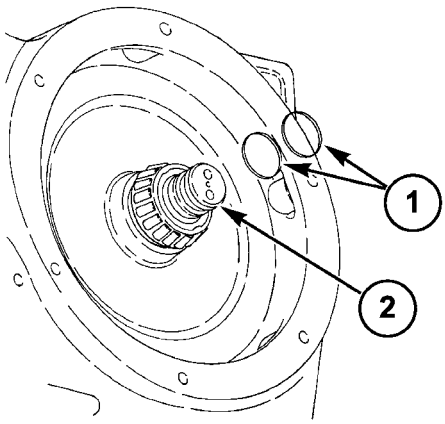
10035846B5 1

2. Be sure to mesh the teeth on the gears correctly when installing the shaft/clutch assembly **(1)** into the housing. Replace the lip seals on the outboard side of the gearbox for unload shaft if necessary.



20035849A5 2

3. Before the plate can be installed, replace the two ring seals **(1)** on the end of the shaft **(2)** using the expander, seal pusher, and compression tools. Once the seals are installed and compressed, install the plate onto the shaft.

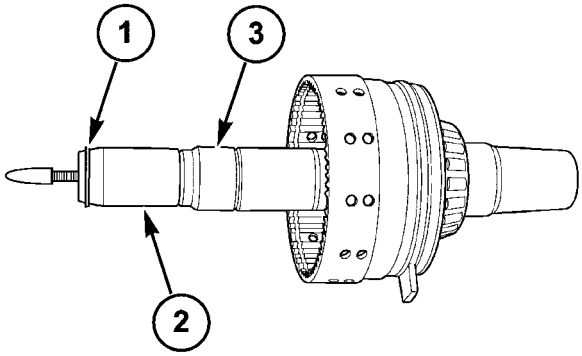


20035858A5 3

https://truckmanualshub.com/

4. To install the shaft **(3)** end seals, use the seal expander tool **(2)** to first expand the seal 3**(1)**.

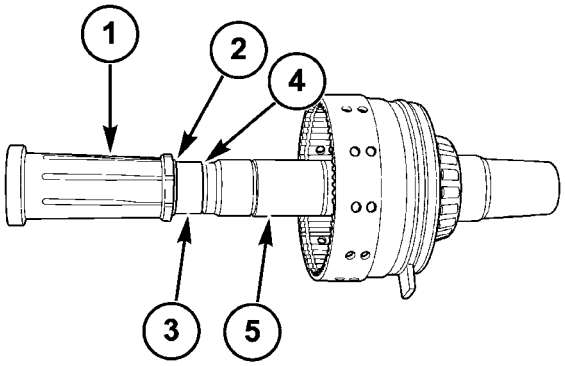
NOTE: *Be sure to use the proper tools to install the ring seals. If the seals are not installed properly, they may leak or fail.*



10041894A5 4

5. Use the seal pusher tool **(1)** to evenly slide the seal **(2)** into the groove **(4)** on the shaft **(5)**.

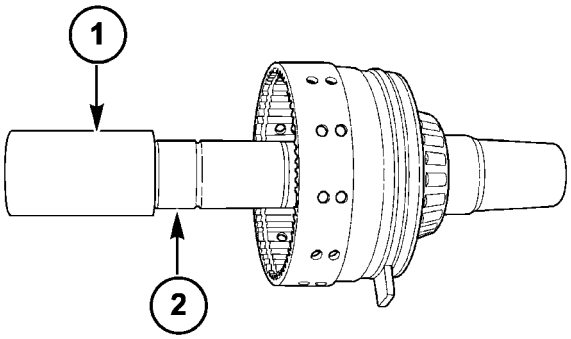
NOTE: *Be sure to use the proper tools to install the ring seals. If the seals are not installed properly, they may leak or fail.*



10041893A5 5

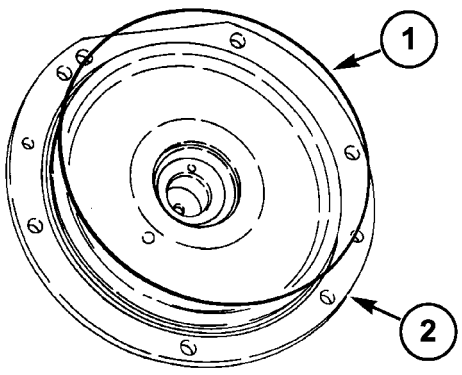
6. Use the seal compressor tool **(1)** to be sure the seal is fully compressed into the groove on the shaft **(2)**.

NOTE: *Be sure to use the proper tools to install the ring seals. If the seals are not installed properly, they may leak or fail.*



10041898A5 6

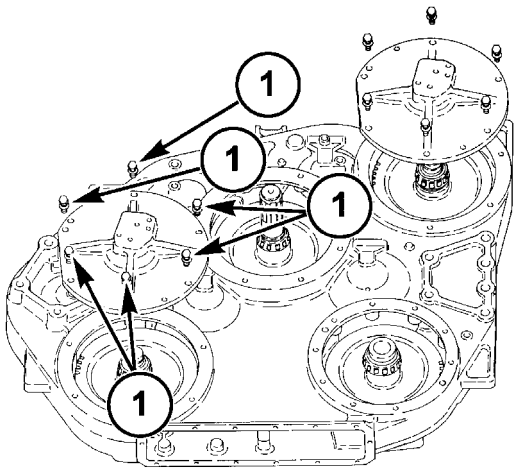
7. Before installing the cover **(2)** be sure to check the O ring **(1)** and lube with hydraulic oil or petroleum jelly.



20035857A5 7

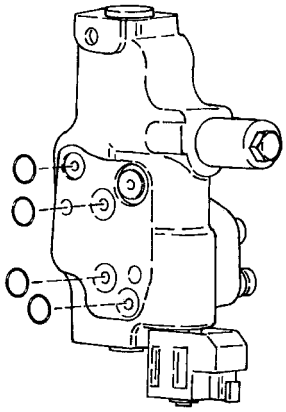
https://truckmanualshub.com/

8. Install the cover onto the shaft using the six bolts **(1)**.



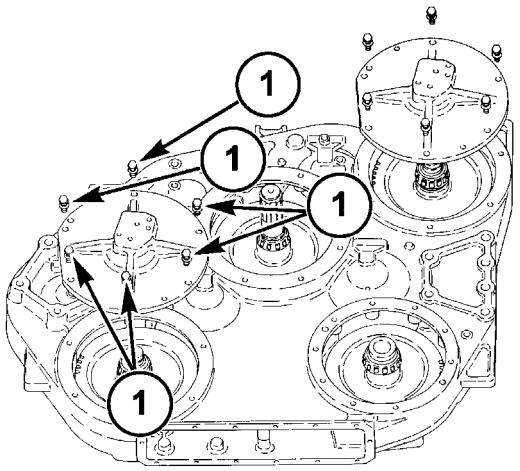
20035859C5 8

9. If the valve was removed be sure to install new O ring seals and lube them with hydraulic oil.



20035867 9

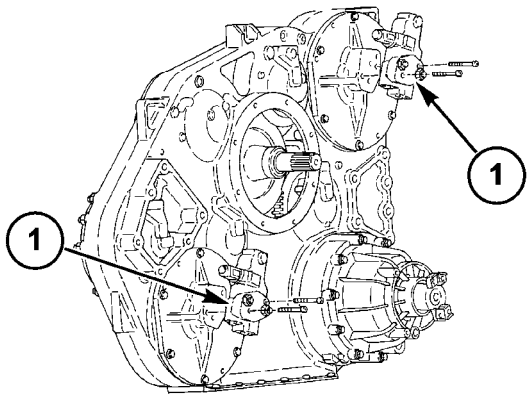
10. With the plate installed, torque the bolts **(1)** to **89 - 100 Nm (66 - 74 lb ft)**



20035859C5 10

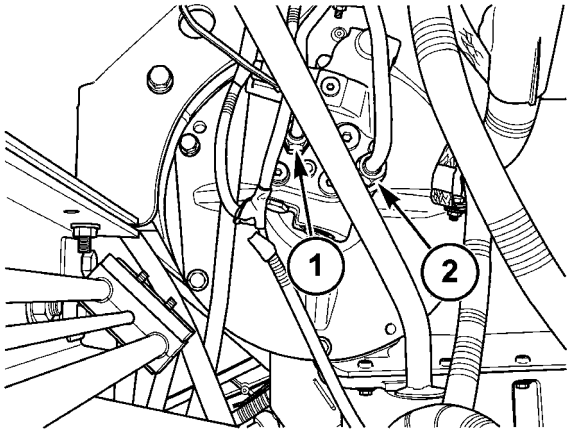
https://truckmanualshub.com/

11. Torque the valve bolts **(1)** to **51 - 58 Nm (38 - 43 lb ft)** .



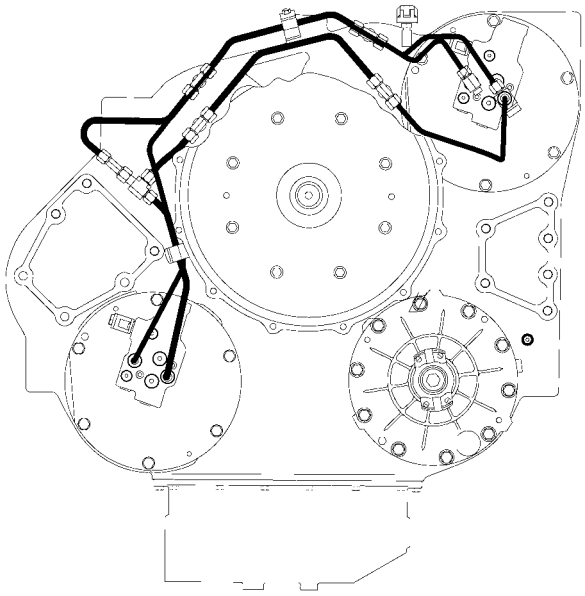
20035868A5 11

12. Install the hydraulic lines **(1)** and **(2)** to the valve.



10036398B5 12

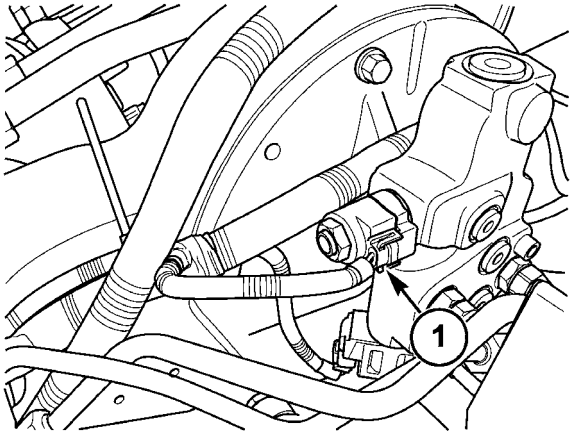
13. Be sure the hydraulic lines are routed correctly.



50040394 13

https://truckmanualshub.com/

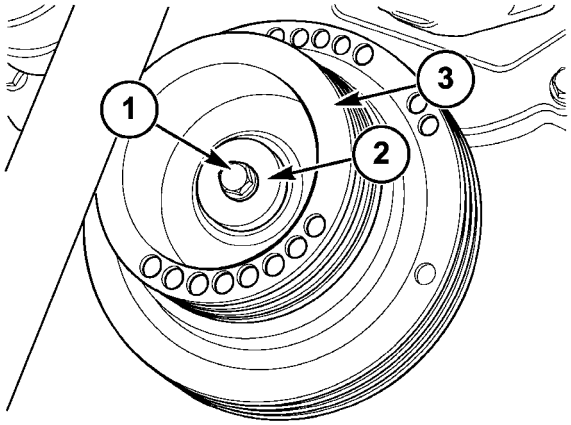
14. Install the electrical connector **(1)** to the valve, and any place else if they were removed for access.



10036391A5 14

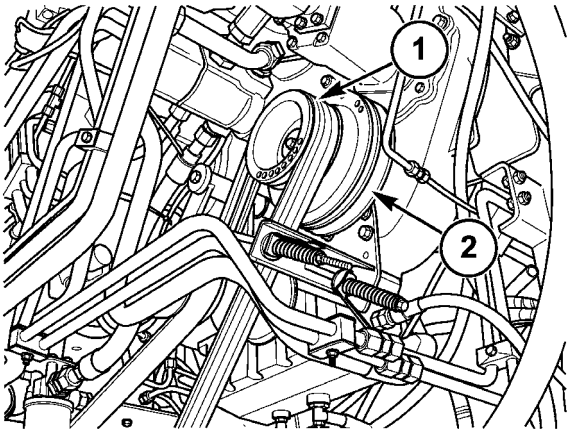
15. Install the key into the shaft.

16. Use Loctite Brand 767 anti-sieze on the shaft before installing the pulley. Install the pulley **(3)** onto the shaft with the washer **(2)** and bolt **(1)**. Torque the M12 bolt to **98 Nm (72 lb ft)** .



50041890A5 15

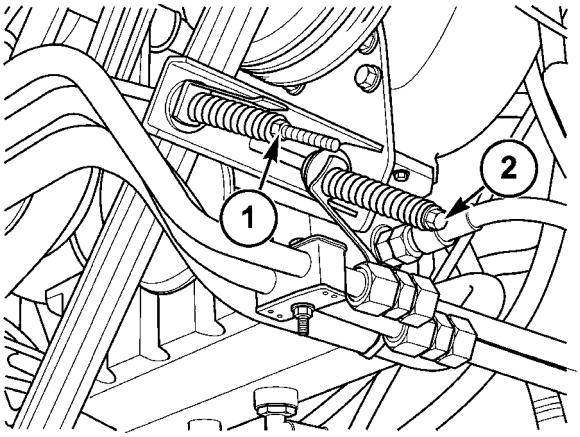
17. Install the belts **(1)** and **(2)** on the pulley.



10036393A5 16

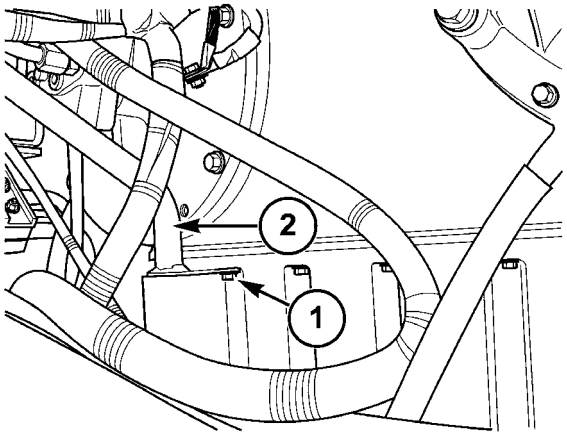
https://truckmanualshub.com/

18. Tighten the nuts **(1)** and **(2)** until the correct tension is met on the spring gauge and the belts are tight.



10036394A5 17

19. Install the dipstick assembly **(2)** into the gearbox and fasten the mounting flange using one bolt **(1)**.



10036395A5 18

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Clutch - Short circuit to B+ (C.50.B.46 - G.30.B.54)

AFX8010

E0178-03 - Beater / Chopper Current Sense

Context:
The Beater/Chopper Clutch Current Sense circuit is the ground path for the Beater/Chopper PWM solenoid L-22. By monitoring current flow on the return path of the Beater/Chopper solenoid, the module can provide precise control of the solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The Beater/Chopper clutch solenoid (L-22) circuit has excessive current draw, or is shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" or "GRAIN HANDLING" sort menu, and select "BEAT/CHOP ISENSE" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper Beater/Chopper clutch solenoid current should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps**, continue with Step **2**.

   B. If the reading is normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **5**.

   NOTE: *If the current reading is high, immediately shut off the circuit by pressing the "ENGAGE" key after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the Beater/Chopper clutch solenoid connector **X450**. Use a multimeter to check the resistance of the Beater/Chopper solenoid L-47 between connector **X450** pins A & B. The proper resistance range for the Beater/Chopper clutch solenoid is **7.2 - 11.2 ohms**.

   A. If out of specification, replace the solenoid. Continue with Step **7**.

   B. If the coil is within specification, continue with Step **3**.

3. Disconnect connector **X011**. Use a multimeter to check the resistance of the Beater/Chopper clutch solenoid circuit between connector **X011** pins 13 & 14. The resistance should be the same as, or slightly higher than the resistance of the solenoid as measured in Step 2

   A. If the resistance is lower than the previously measured resistance, there is a short in the gearbox (GB) harness between connector **X450** and connector **X011** wires 878 white and 877 blue. Locate the short and repair. Continue with Step **7**.

   B. If the resistance is the same as previously measured, continue with Step **4**.

4. Carefully disconnect connector **X016** on the bottom of CCM2 module. Use a multimeter to check the resistance of the Beater/Chopper clutch solenoid circuit between connector **X016** pins J2-30 & J2-40.

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A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X011** and connector **X016** wires 878 white and 877 blue. Locate the short and repair. Continue with Step **7**.

B. If the resistance is the same as previously measured, reattach all connectors and continue with Step **5**.

5. Key on. Disconnect connector **X450**. Use a multimeter to check for voltage at connector **X450** pin B (harness end). There should be no voltage on this wire.

   A. If there is no voltage present on the wire, continue with Step **7**.

   B. If there is voltage present on the wire, continue with Step **6**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

6. Key on. Disconnect connector **X011**. Use a multimeter to check for voltage at connector **X011** pin 13 (module side of connector). There should be no voltage on this wire.

   A. If there is no voltage on the wire, the short to voltage is between connector **X450** and connector **X011** wire 877 blue. Locate the short and repair. Continue with Step **7**.

   B. If there is voltage on the wire, the short to voltage is between connector **X011** and connector **X016** wire 877 blue. Locate the short and repair. Continue with Step **7**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

7. The sense resistor in the module for the Beater/Chopper Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Disconnect connector **X011**. Use a multimeter to check resistance between connector **X011** pin 13 and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM2 module has failed. Replace the module.

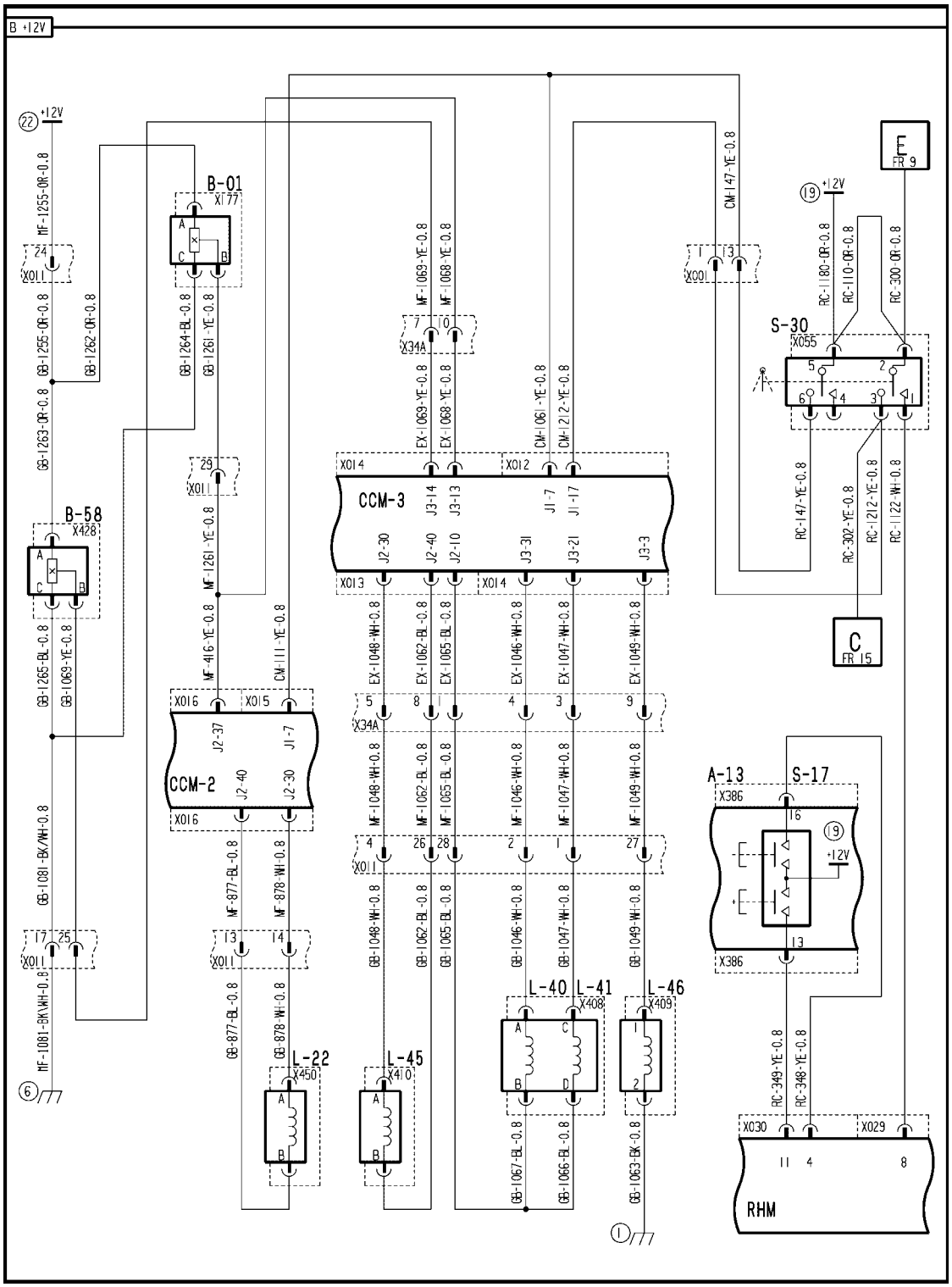
   B. If the resistance is correct, the sense resistor in the CCM2 module is okay, and the circuit should function correctly. Continue with Step **8**.

8. Operate the combine while monitoring the Beater/Chopper Current Sense circuit current on the Universal Display Plus "DIAG" screen.

   A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Clutch - Unidentified failure (C.50.B.46 - G.30.B.46)

AFX8010

E0180-11 - Beater / Chopper Valve

Cause:
The Beater / Chopper Valve (L-22) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" or "GRAIN HANDLING" sort menu, and select "BEAT/CHOP VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **5**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **11**.
2. Disconnect connector **X450**. Use a multimeter to check between connector **X450** pin A (valve side) and chassis ground.

   A. If there is continuity, the thresher clutch solenoid is shorted to ground. Replace the solenoid.

   B. If there is no continuity, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X450** pin A (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

   A. If there is continuity to ground, continue with Step **4**.

   B. If there is no continuity to ground, erase the fault code and continue operation.
4. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 14 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X016** while making this check.

   A. If there is no continuity to ground, the short to ground is in the gearbox (GB) harness between connector **X011** and connector **X450** wire 878 white. Locate the short and repair.

   B. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X011** and connector **X016** J2-30 wire 878 white. Locate the short and repair.
5. Disconnect connector **X450**. Use a multimeter to check the resistance of the thresher clutch valve coil between connector **X450** pins A & B. The proper resistance range is **7.2 - 11.2 ohms**.

   A. If there is no continuity, replace solenoid.

   B. If the coil is within specification, continue with Step **6**.
6. Use a multimeter to check for continuity between connector **X450** pin B (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

   A. If there is no continuity to ground, continue with Step **7**.

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B. If there is continuity to ground, continue with Step **9**.

7. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 13 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X016** while making this check.

   A. If there is continuity to ground, the open circuit is in the gearbox (GB) harness between connector **X011** and connector **X450** wire 877 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **8**.

8. Carefully disconnect connector **X016** on the bottom of CCM2 module. Use a multimeter to check for continuity between connector **X016** pin J2-40 on the module and chassis ground.

   A. If there is infinite resistance, the sense resistor in the CCM2 module has failed. Replace the module.

   B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM2 module is okay. The open circuit is in the main frame (MF) harness between connector **X011** and connector **X016** pin J2-40 wire 877 blue. Locate the open and repair.

   NOTE: *The sense resistor in the module for the Beater / Chopper Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

9. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the beater/chopper clutch valve. Use a multimeter to check for **12 volts** between connector **X450** pin A and chassis ground.

   A. If **12 volts** is not present, continue with Step **10**.

   B. If **12 volts** is found, continue with Step **11**.

   NOTE: *The thresher engage switch S-30 must be engaged to supply power to the circuit.*

10. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the beater/chopper clutch valve. Use a multimeter to check for **12 volts** between connector **X011** pin 14 and chassis ground.

    A. If **12 volts** is present, the open circuit is in the gearbox (GB) harness between connector **X450** pin A and connector **X011** pin 14 wire 878 white. Locate the open circuit and repair.

    B. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X011** pin 14 and connector **X016** pin J2-30 wire 878 white. Locate the open and repair.

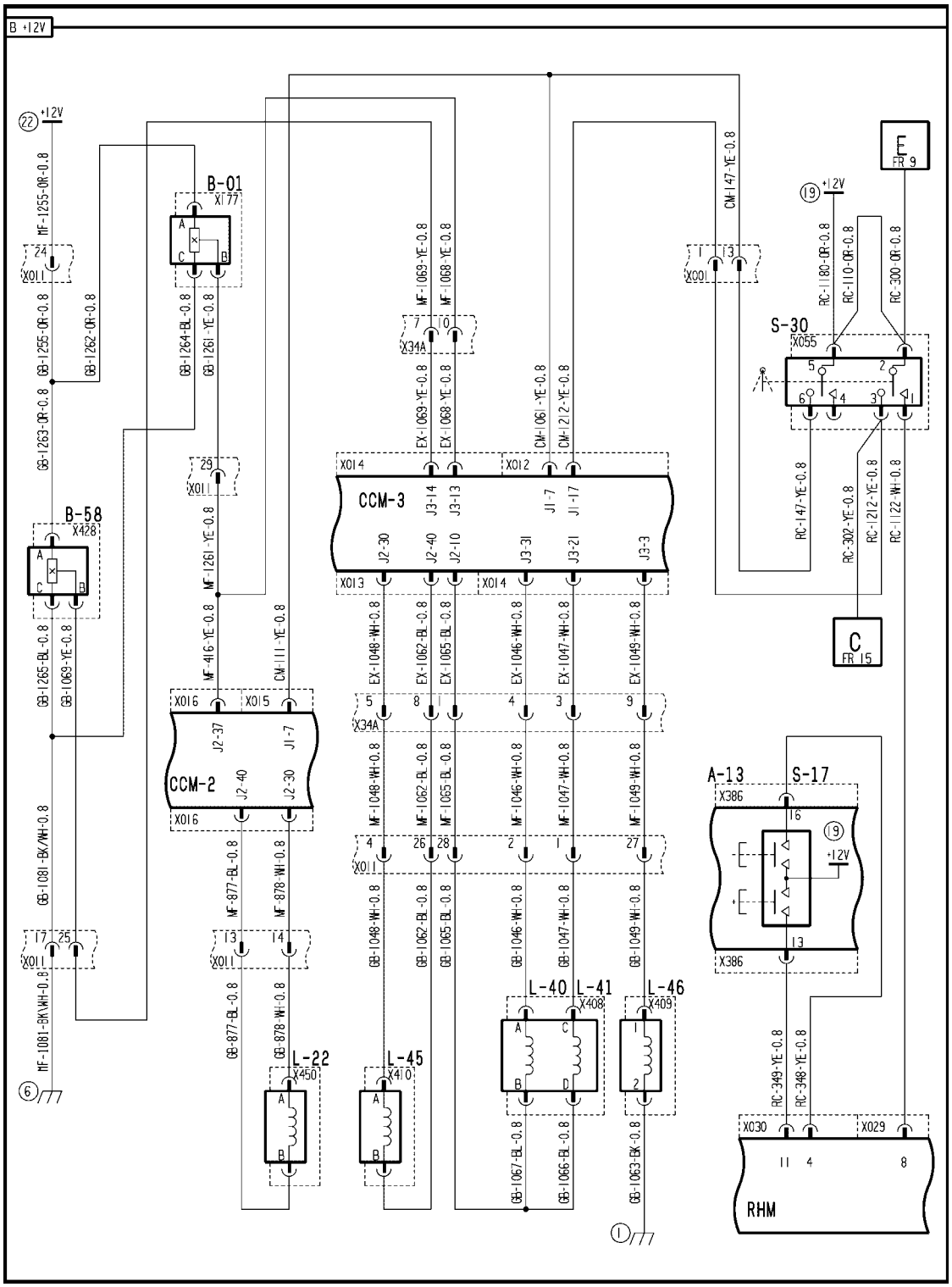
    NOTE: *The thresher engage switch S-30 must be engaged to supply power to the circuit.*

11. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

https://truckmanualshub.com/

Index

POWER TRAIN - C

PROCESS DRIVE Primary process drive - 50.B

Clutch - Assemble (C.50.B.46 - F.10.A.20) 9
AFX8010

Clutch - Disassemble (C.50.B.46 - F.10.A.25) 6
AFX8010

Clutch - Install (C.50.B.46 - F.10.A.15) 14
AFX8010

Clutch - Remove (C.50.B.46 - F.10.A.10) 3
AFX8010

Clutch - Short circuit to B+ (C.50.B.46 - G.30.B.54) 20
AFX8010

Clutch - Unidentified failure (C.50.B.46 - G.30.B.46) 24
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

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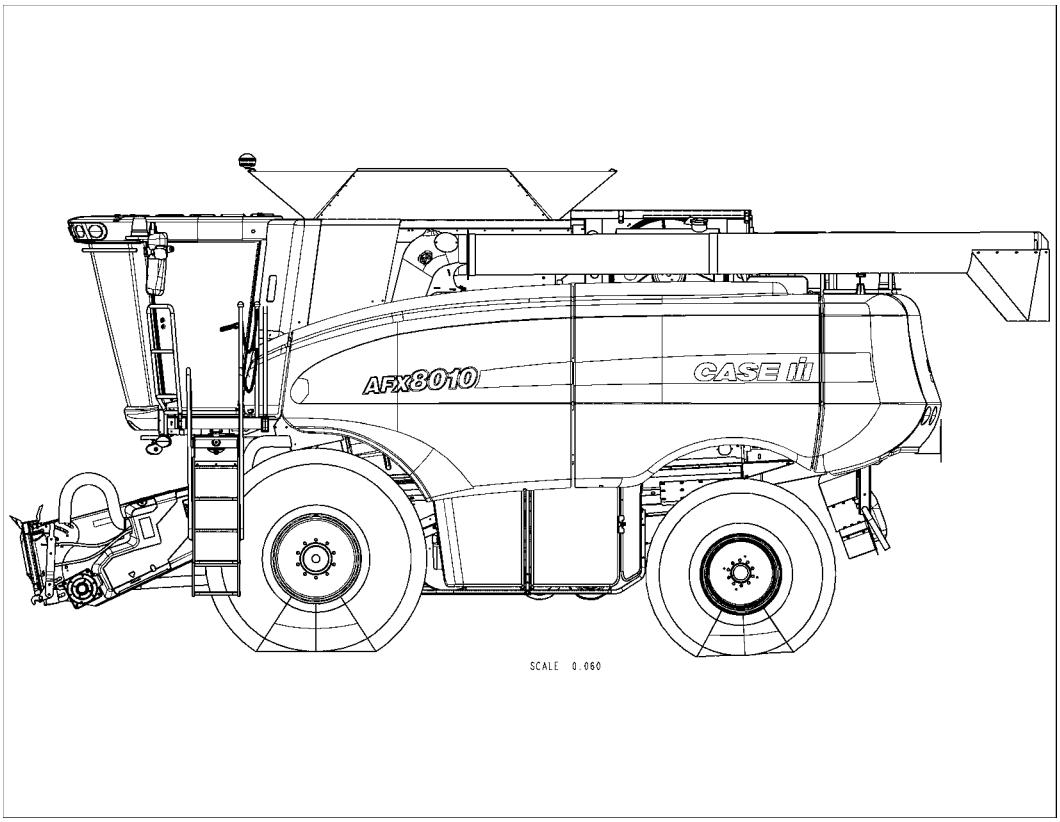
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REPAIR MANUAL

TRAVELLING



AFX8010

https://truckmanualshub.com/

Contents

TRAVELLING - D

FRONT AXLE D.10.A
AFX8010

REAR AXLE D.12.A
AFX8010

2WD-4WD SYSTEM Hydraulic D.14.C
AFX8010

STEERING Hydraulic D.20.C
AFX8010

SERVICE BRAKE Hydraulic D.30.C
AFX8010

PARKING BRAKE Hydraulic D.32.C
AFX8010

WHEELS AND TRACKS Wheels D.50.C
AFX8010

https://truckmanualshub.com/

TRAVELLING - D

FRONT AXLE - 10.A

AFX8010

https://truckmanualshub.com/

Contents

TRAVELLING - D

FRONT AXLE - 10.A

TECHNICAL DATA

Final drive

Final drive - General specification (D.10.A.42 - D.40.A.10) 4
AFX8010

Final drive - Torque (D.10.A.42 - D.20.A.10) 4
AFX8010

FUNCTIONAL DATA

Final drive

Final drive - Sectional view (D.10.A.42 - C.10.A.30) 5
AFX8010

Final drive - Exploded view (D.10.A.42 - C.10.A.20) 6
AFX8010

Final drive Reducer, spur gear - Sectional view (D.10.A.42.44 - C.10.A.30) 7
AFX8010

Final drive Reducer, spur gear - Exploded view (D.10.A.42.44 - C.10.A.20) 8
AFX8010

Final drive Shaft - Exploded view (D.10.A.42.43 - C.10.A.20) 9
AFX8010

Final drive Shaft - Overview (D.10.A.42.43 - C.10.A.10) 10
AFX8010

Final drive Reducer, satelite and planetary - Exploded view (D.10.A.42.50 - C.10.A.20) 11
AFX8010

SERVICE

Final drive

Final drive - Remove (D.10.A.42 - F.10.A.10) 12
AFX8010

Final drive - Disassemble (D.10.A.42 - F.10.A.25) 13
AFX8010

Final drive Reducer, spur gear - Disassemble (D.10.A.42.44 - F.10.A.25) 16
AFX8010

Final drive Reducer, spur gear - Assemble (D.10.A.42.44 - F.10.A.20) 17
AFX8010

Final drive Shaft - Assemble (D.10.A.42.43 - F.10.A.20) 19
AFX8010

Final drive Output shaft - Assemble (D.10.A.42.45 - F.10.A.20) 20
AFX8010

https://truckmanualshub.com/

Final drive Reducer, satelite and planetary - Disassemble (D.10.A.42.50 - F.10.A.25) 21
AFX8010
Final drive Reducer, satelite and planetary - Assemble (D.10.A.42.50 - F.10.A.20) 22
AFX8010
Final drive - Assemble (D.10.A.42 - F.10.A.20) 25
AFX8010
Final drive - Install (D.10.A.42 - F.10.A.15) 32
AFX8010
Final drive Wheel stud - Replace (D.10.A.42.60 - F.10.A.30) 33
AFX8010

Half-shaft

Half-shaft - Remove (D.10.A.43 - F.10.A.10) 34
AFX8010
Half-shaft - Install (D.10.A.43 - F.10.A.15) 35
AFX8010

https://truckmanualshub.com/

Final drive - General specification (D.10.A.42 - D.40.A.10)

AFX8010

SPECIFICATIONS

Gear ratio	1/13.09
Max. input rpm (30 km/hr - 18.6 mph)	**1300 RPM**
Max. output rpm (30 km/hr - 18.6 mph)	**100 RPM**
Nominal input torque	**1550 Nm** (**1140 lb ft**)
Nominal output torque	**20500 Nm** (**15120 lb ft**)
Output shaft pre-load	**0.35 mm** (**0.014 in**)
Input shaft axial end play	**0.01 - 0.06 mm** (**0.0004 - 0.0025 in**)
Approx. total weight	**340 kg** (**750 lb**)
Oil capacity	**6.70 L** (**1.77 US gal**)

Final drive - Torque (D.10.A.42 - D.20.A.10)

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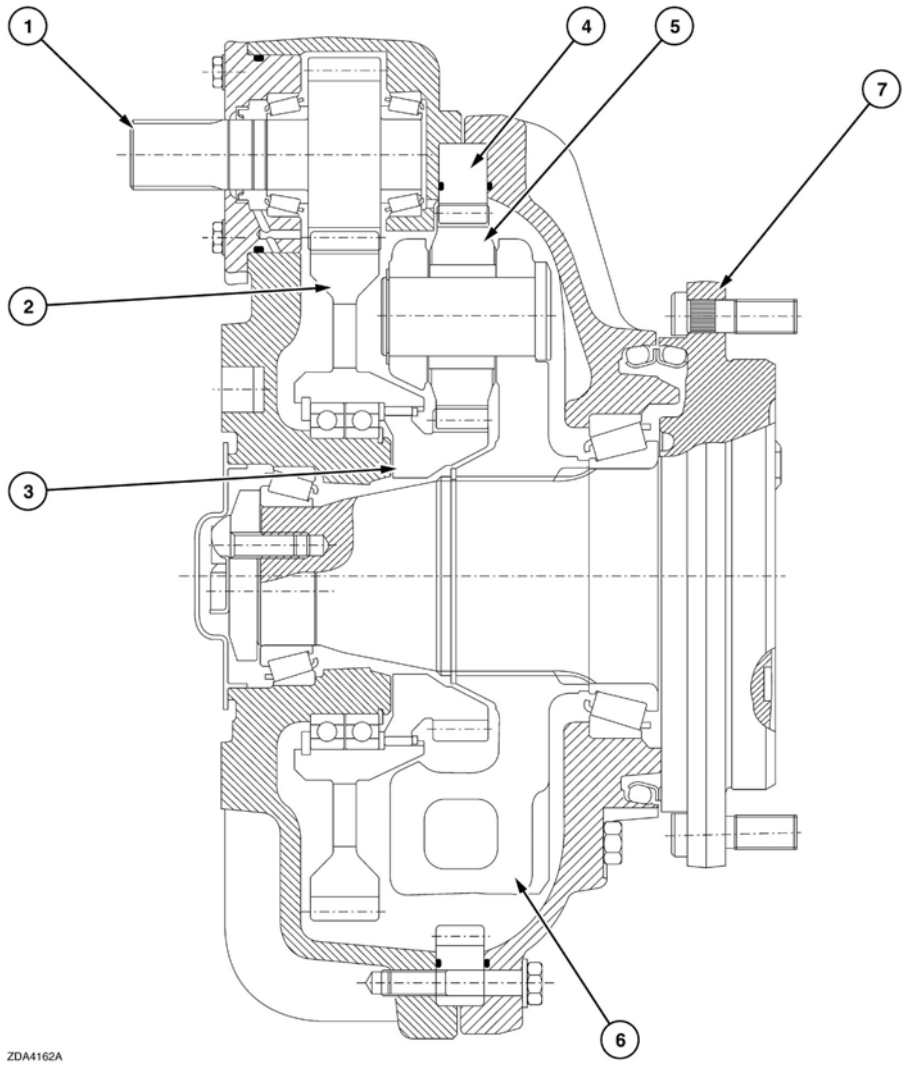
TIGHTENING TORQUES

Bolts input shaft cove	**50 Nm** (**37 lb ft**)
Bolts in output shaft	**320 Nm** (**236 lb ft**)
Gearbox housing	**320 Nm** (**236 lb ft**)
Maintenance plug	**110 Nm** (**81 lb ft**)
Lever plug	**5 - 15 Nm** (**4 - 11 lb ft**)
Magnetic plug	**70 Nm** (**52 lb ft**)
Filler/Breather plug	**70 Nm** (**52 lb ft**)
Dowel pin hold screw	**30 Nm** (**22 lb ft**)
Wheel nuts torque	**710 - 790 Nm** (**525 - 580 lb ft**)

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Final drive - Sectional view (D.10.A.42 - C.10.A.30)

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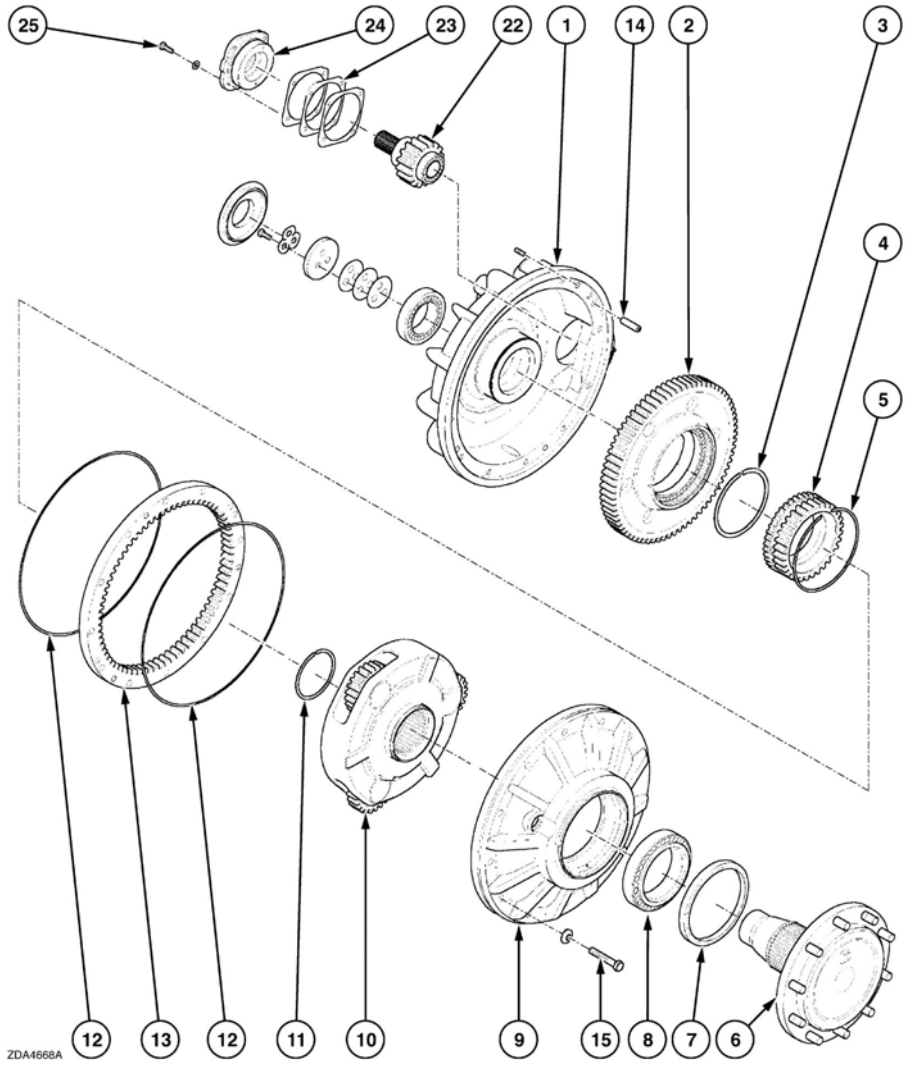
Gearbox Shafts

1. Input Shaft	5. Planet Gear
2. Reducer	6. Planet Gear Carrier
3. Sun Gear	7. Output Shaft
4. Ring Gear	

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Final drive - Exploded view (D.10.A.42 - C.10.A.20)

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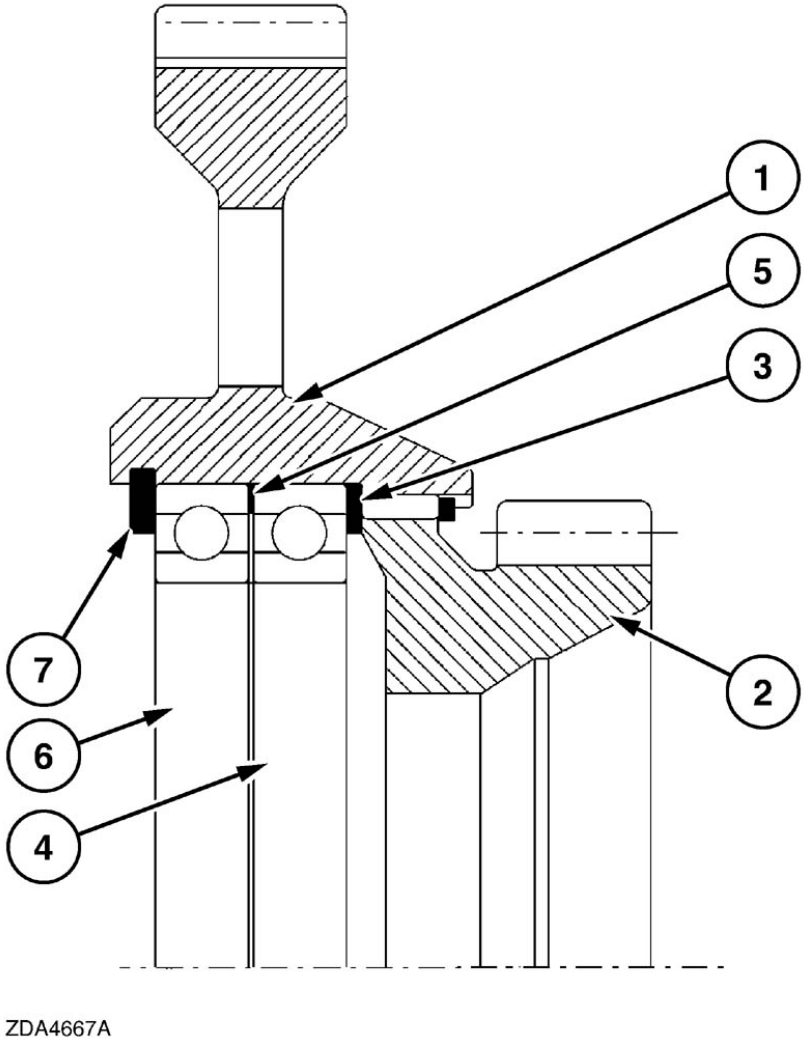
Planetary Final Drive - Assembly

1. Inner Housing	10. Planet Gear Carrier	19. Lock Plate
2. Pre-assembled Reducer Spur Gear	11. Retaining Ring	20. Bolt
3. Retaining Ring	12. O-ring	21. Cover
4. Sun Gear	13. Ring Gear	22. Input Shaft
5. Retaining Ring	14. Dowel Pin	23. Shim Pack
6. Output Shaft	15. Bolt	24. Cover
7. Seal	16. Bearing	25. Bolt
8. Bearing	17. Shim Pack	
9. Outer Housing	18. Washer	

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Final drive Reducer, spur gear - Sectional view (D.10.A.42.44 - C.10.A.30)

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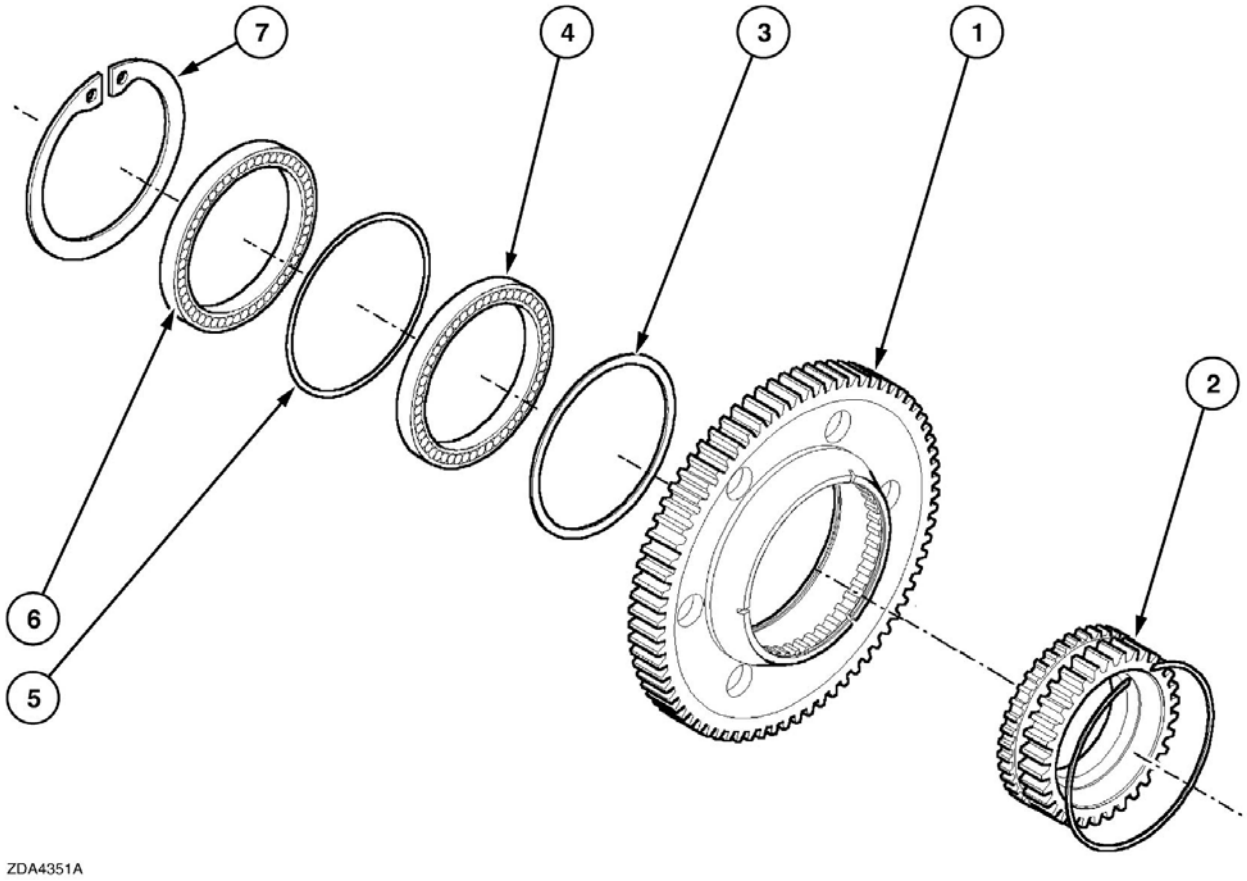
Reducer, Spur Gear

1.Input Gear	5.Shim Spacer
2. Sun Gear	6.Bearing
3.Spacer Ring	7.Retaining Ring
4.Bearing	

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Final drive Reducer, spur gear - Exploded view (D.10.A.42.44 - C.10.A.20)

AFX8010



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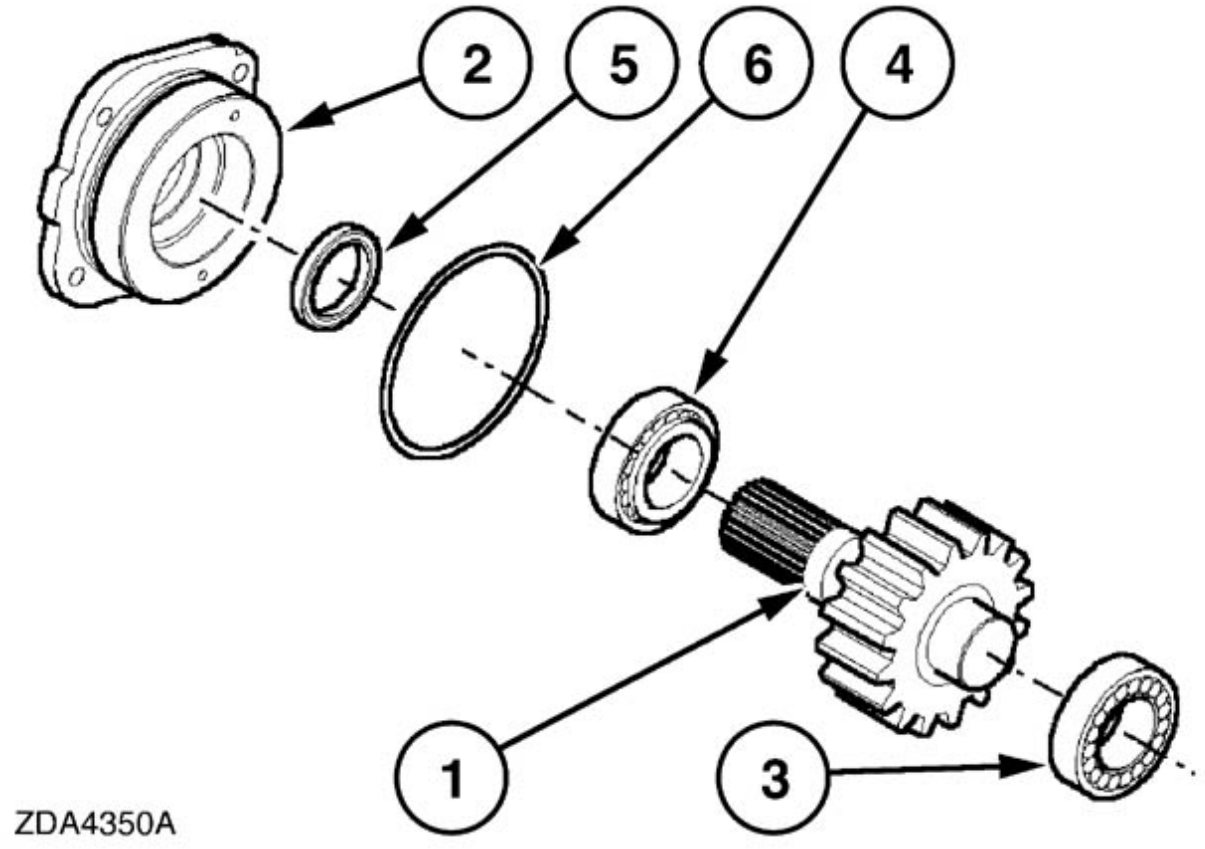
Reducer Spur Gear

1. Input Gear	5. Shim Spacer
2. Sun Gear	6. Bearing
3. Spacer Ring	7. Retaining Ring
4. Bearing	

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Final drive Shaft - Exploded view (D.10.A.42.43 - C.10.A.20)

AFX8010



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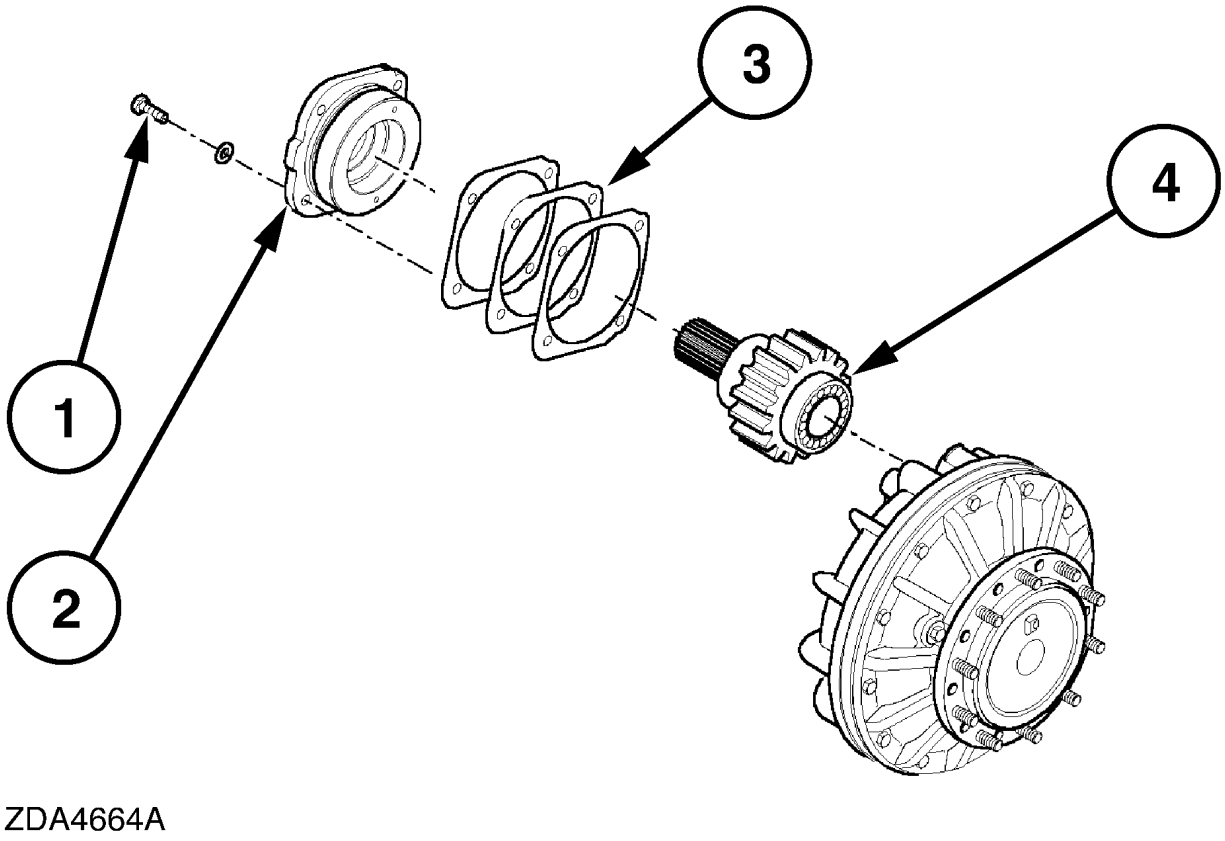
Input Shaft

1. Input Shaft	4. Bearing
2. Housing	5. Seal
3. Bearing	6. O-ring

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Final drive Shaft - Overview (D.10.A.42.43 - C.10.A.10)

AFX8010



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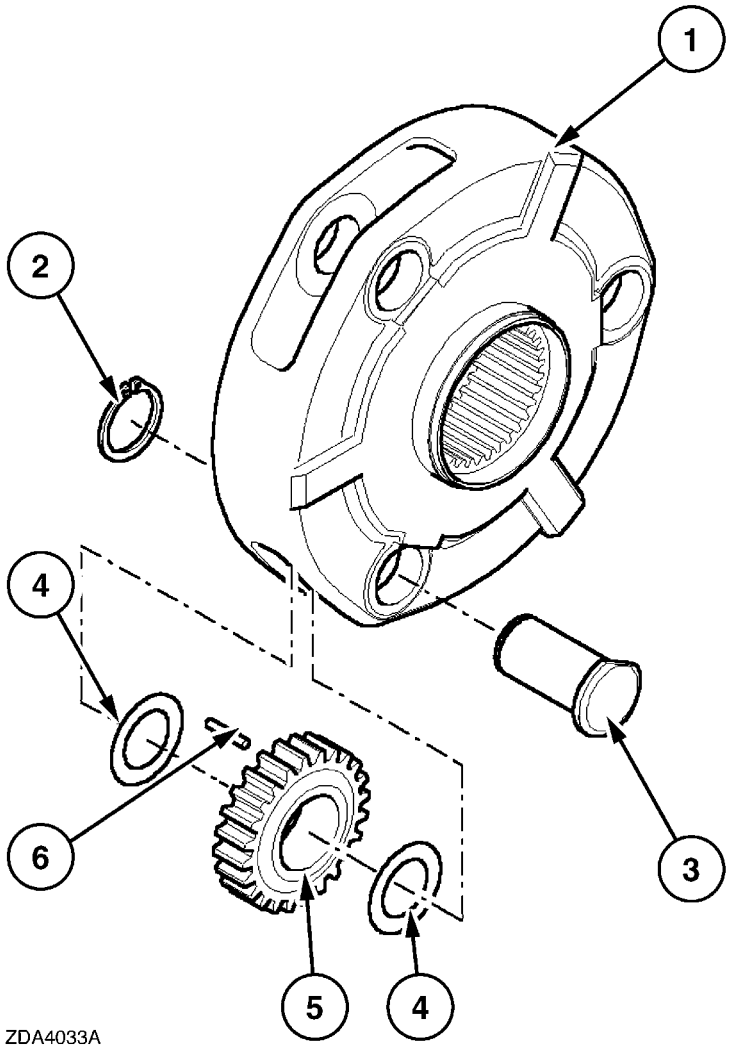
Input Shaft

1.Bolt
2.Cover with Seals
3.Shim Pack
4.Input Shaft with Bearings

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Final drive Reducer, satelite and planetary - Exploded view (D.10.A.42.50 - C.10.A.20)

AFX8010



4033a 1

Reducer, Planetary

1. Planet Gear Carrier	4. Spacer
2. Retaining Ring	5. Planet Gear
3. Shaft	6. Needle Roller

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Final drive - Remove (D.10.A.42 - F.10.A.10)

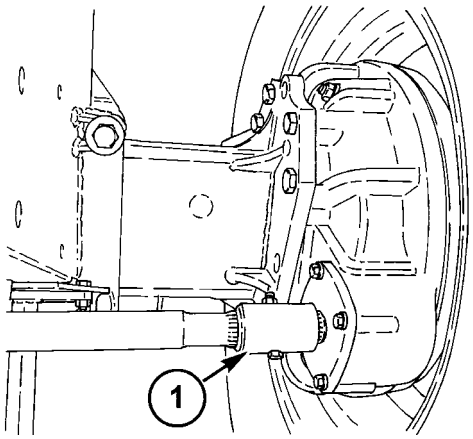
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To remove a planetary final drive, proceed as follows:

⚠ WARNING ⚠

M625 - Unexpected machine motion or moving parts can cut and crush. Apply parking brake and shut down the engine before working on the machine. Put the machine on blocks only if the surface is solid, even, and level. Make sure that any blocks used to support the machine are solid, one-piece units. Put blocks next to the tires that are not being raised to prevent movement of the machine.

1. Remove the drive tire from the combine.
2. Remove half-shaft **(1)**. **Half-shaft - Remove (D.10.A.43 - F.10.A.10)**. Support the final drive with a hoist.



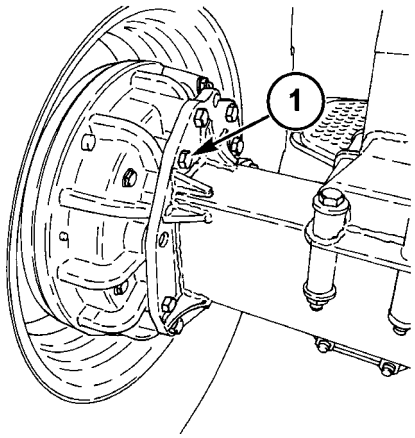
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3. Loosen the bolts **(1)** from the flange and remove the final drive. The final drive is piloted onto the axle by two dowel pins. When all the bolts are removed, you will need to pry the final drive away from the axle flange.

NOTE: *If the planetary final drive needs to be disassembled, drain the oil before the final drive is removed from the combine (Refer to the Operators Manual, Section 4 Lubrication and Maintenance)*

⚠ CAUTION ⚠

M501 - Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in the Service Manual.



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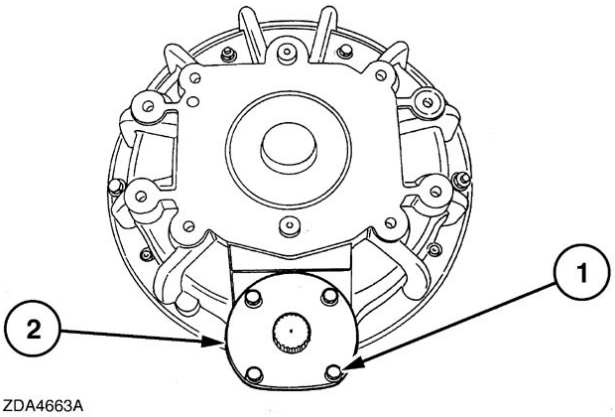
Final drive - Disassemble (D.10.A.42 - F.10.A.25)

AFX8010

To disassemble a planetary final drive, proceed as follows:

1. Drain the oil from the planetary final drive (Refer to the Operator's Manual, Section 4 "Lubrication and Maintenance").
2. Remove bolts **(1)** and lockwashers and remove cover **(2)**.

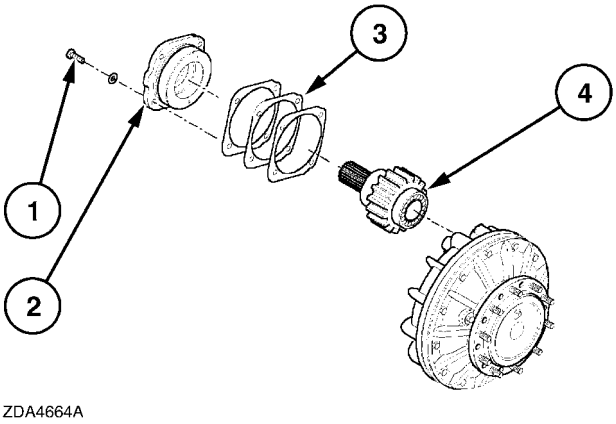
NOTE: *The seal in the cover will be damaged when it is removed.*



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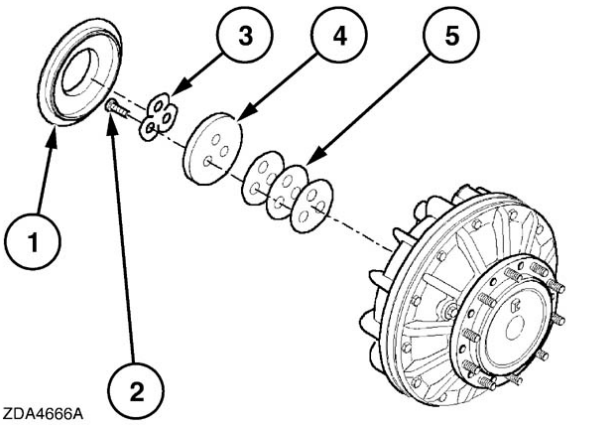
3. Keep shim pack **(3)** together with the cover **(2)** and remove input shaft **(4)**.

NOTE: *The bearings on the input shaft will be damaged when they are removed.*



zda4664a 2

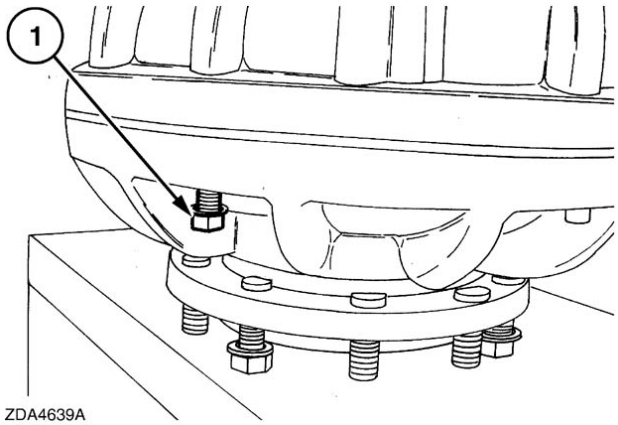
4. Remove cover **(1)**. Unlock lock plate **(3)** and remove bolts **(2)**, washer **(4)** and shim pack **(5)**.



zda4666a1 3

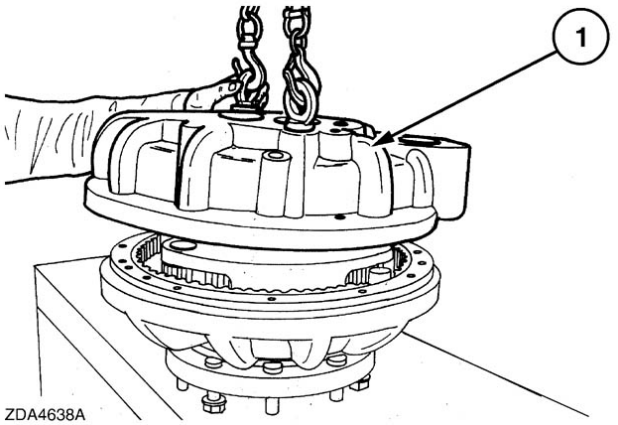
https://truckmanualshub.com/

5. Place the final drive as shown and remove bolts **(1)** and lock washers.



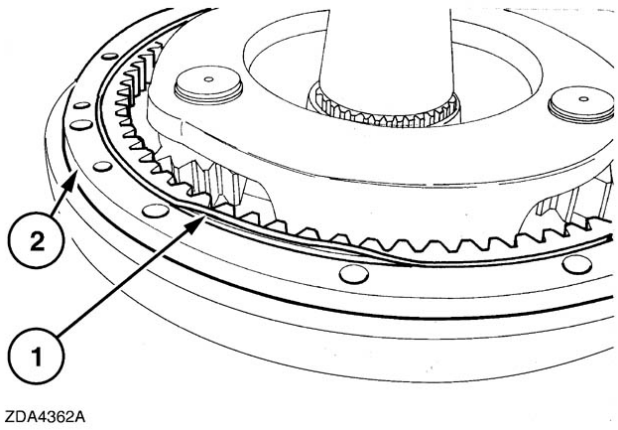
zda4639a 4

6. Open the final drive by lifting inner housing **(1)**. Be careful to not damage output shaft bearing. Remove bearing cone from inner housing.



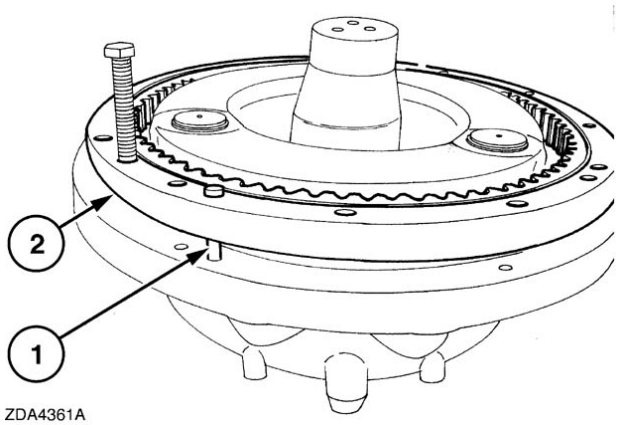
zda4638a 5

7. Remove O-ring **(1)** from ring gear **(2)**.



zda4362a 6

8. Remove ring gear **(2)**, insert bolts in the two threaded holes to aid in the removal of the ring gear. Remove the dowel pins from the inner or outer half of the final drive housing. Remove the O-ring underneath the ring gear.

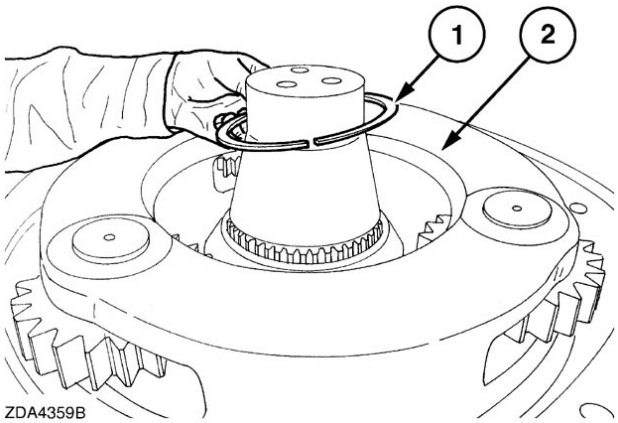


zda4361a 7

https://truckmanualshub.com/

9. Remove retaining ring **(1)**. Remove planet gear carrier **(2)** with the planet gears.

NOTE: *Refer to* ***Final drive Reducer, satelite and planetary - Disassemble (D.10.A.42.50 - F.10.A.25)*** *to disassemble the planet gears.*

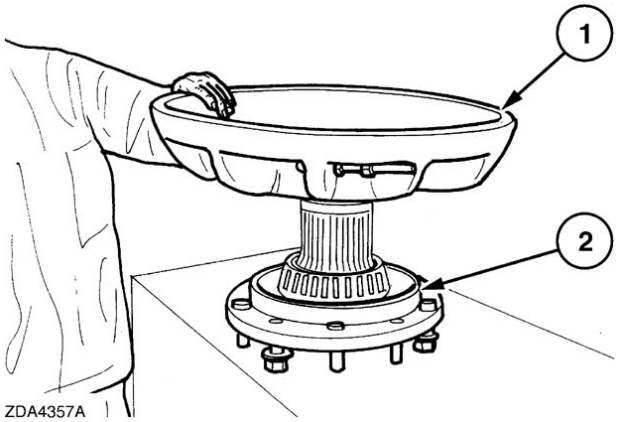


zda4359a 8

10. Remove outer housing **(1)** from output shaft **(2)**.

NOTE: *The bearing on the output shaft will be damaged when it is removed.*

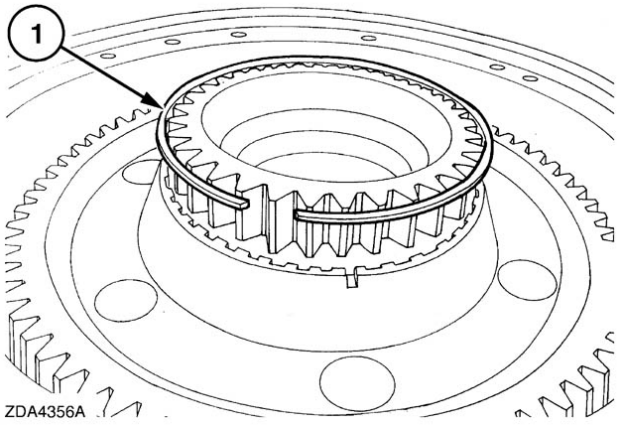
NOTE: *The seal in the planetary final drive housing will be damaged when it is removed.*



zda4357a 9

11. On the inner final drive housing, remove retaining ring **(1)** and the small sun gear.

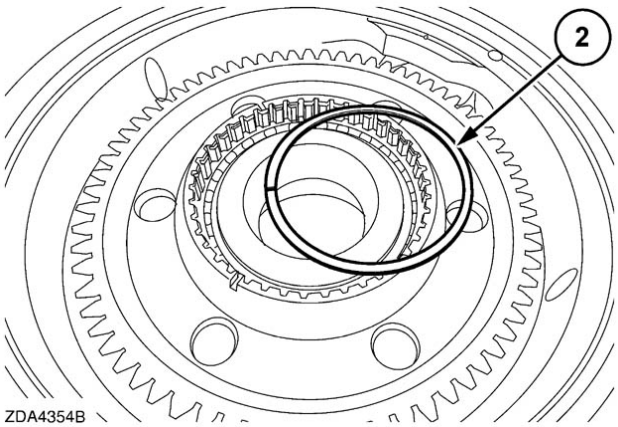
NOTE: *The sun gear and the output gear are marked. If for any reason the marks are not visible, apply a mark on both gears before taking them apart.*



zda4356a 10

12. Remove retaining ring **(2)** and the output gear with the bearings.

NOTE: *Refer to* ***Final drive Reducer, spur gear - Disassemble (D.10.A.42.44 - F.10.A.25)*** *to disassemble the output and sun gears.*



zda4354a 11

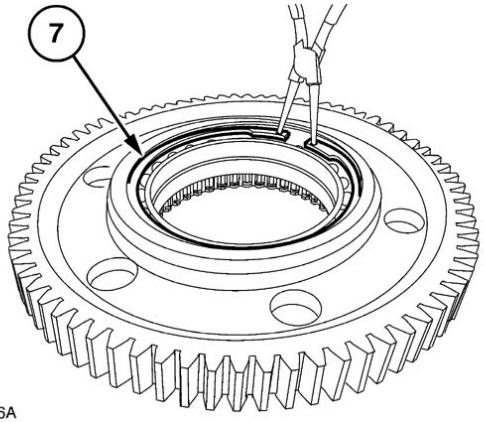
https://truckmanualshub.com/

Final drive Reducer, spur gear - Disassemble (D.10.A.42.44 - F.10.A.25)

AFX8010

To disassemble the Output Gear, proceed as follows:

1. Remove retaining ring **(7)**. Turn the Output Gear over and remove the two bearings.



ZDA4346A

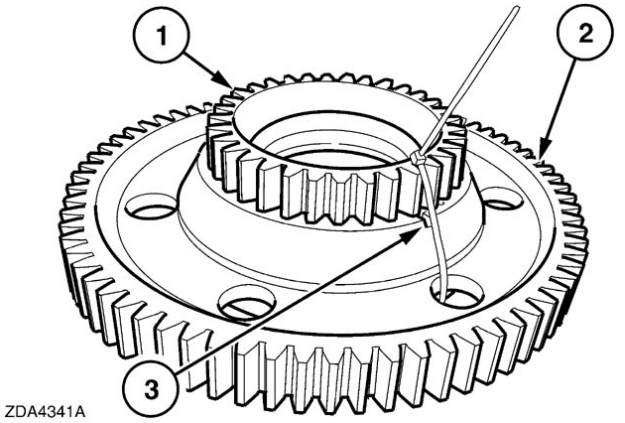
zda4346a 1

https://truckmanualshub.com/

Final drive Reducer, spur gear - Assemble (D.10.A.42.44 - F.10.A.20)

AFX8010

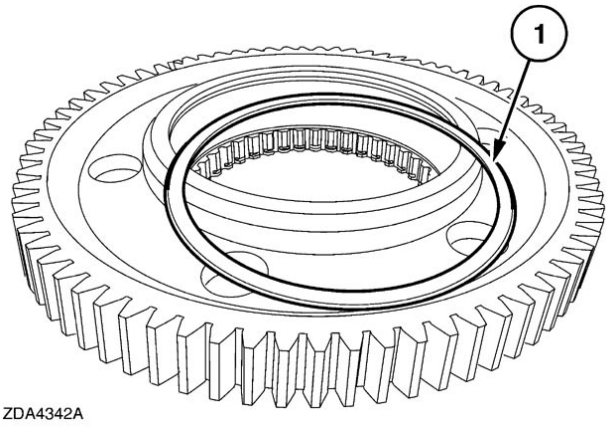
1. Sun Gear **(1)** and Output Gear **(2)** are supplied as a set, and are marked at **(3)**.



zda4341a 1

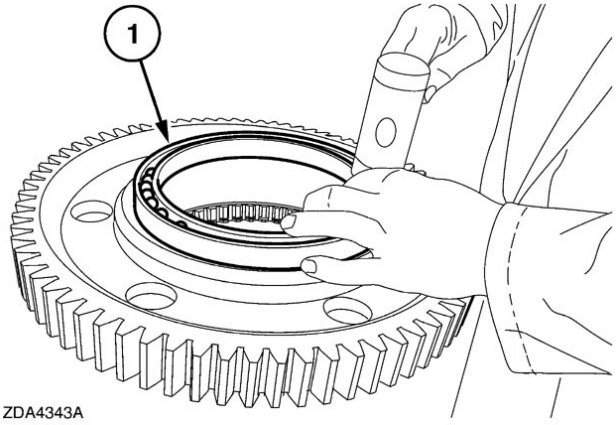
2. Place Output Gear as shown and install ring **(1)**.

IMPORTANT: *The chamfered side of ring **(1)** should be against splines.*



zda4342a 2

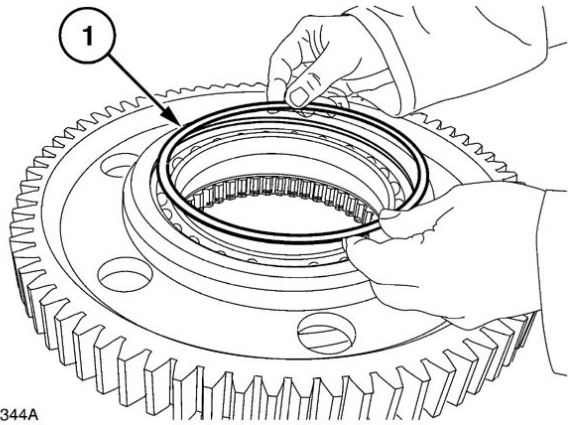
3. Install bearing **(1)**.



zda4343a 3

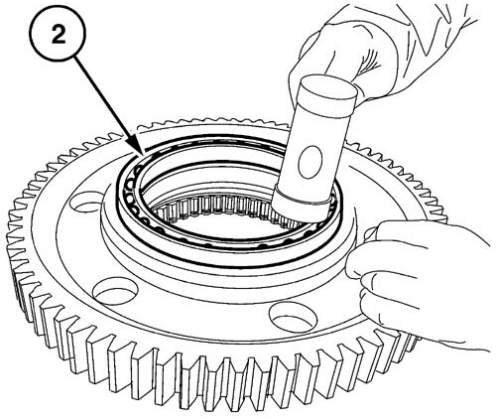
https://truckmanualshub.com/

4. Install shim spacer **(1)**.



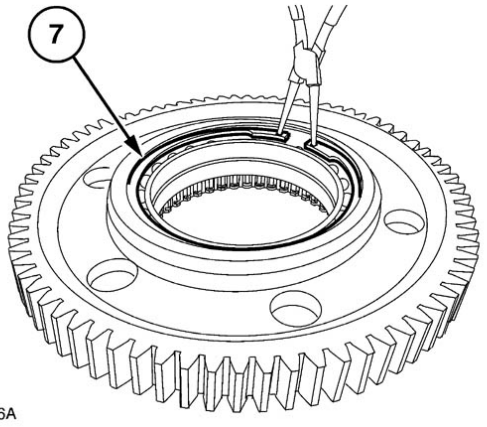
zda4344a 4

5. Install second bearing **(2)**.



zda4345a 5

6. Install retaining ring **(7)** and ensure it is properly seated



zda4346a1 6

https://truckmanualshub.com/

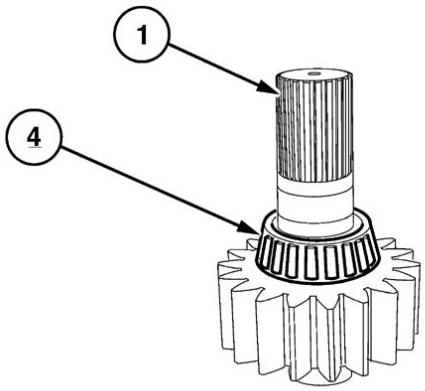
Final drive Shaft - Assemble (D.10.A.42.43 - F.10.A.20)

AFX8010

1. Heat bearing **(4)** to **80 °C** (**176 °F**) and install on input shaft **(1)**.

⚠ WARNING ⚠

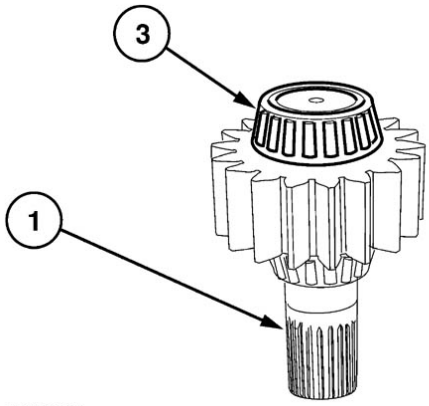
M943 - ALWAYS wear protective gloves when handling heated parts. Failure can cause injury.



ZDA4347A

zda4347a 1

2. Heat bearing **(3)** to **80 °C** (**176 °F**) and install on input shaft **(1)**.



ZDA4348A

zda4348a 2

https://truckmanualshub.com/

Final drive Output shaft - Assemble (D.10.A.42.45 - F.10.A.20)

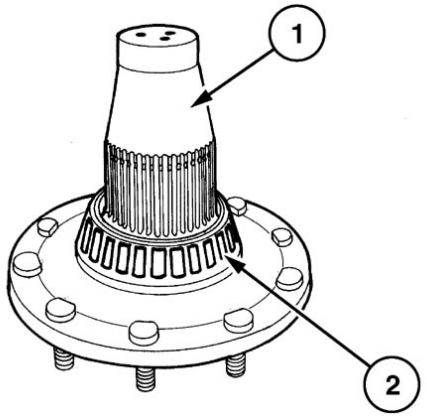
AFX8010

⚠ WARNING ⚠

M943 - ALWAYS wear protective gloves when handling heated parts. Failure can cause injury.

1. Heat bearing **(2)** to **80 °C**(**176 °F**) and install on output shaft **(1)**.

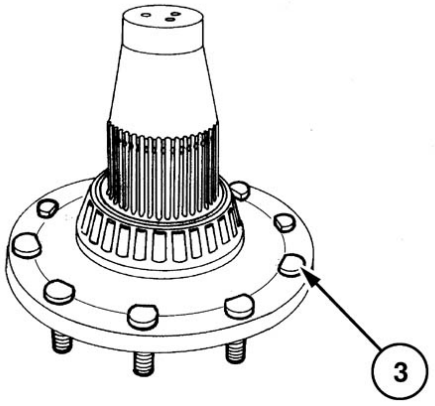
IMPORTANT: *Bearing cone **(2)** must be fully seated on output shaft.*



ZDA4631A

ZDA4631a 1

2. Install 10 wheel studs **(3)**.



ZDA4631B

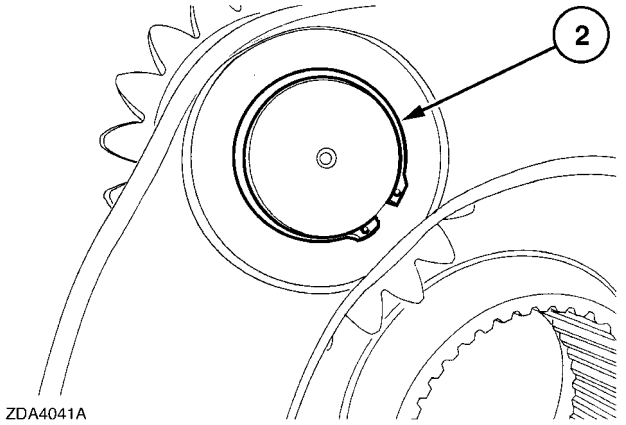
zda4631b 2

https://truckmanualshub.com/

Final drive Reducer, satelite and planetary - Disassemble (D.10.A.42.50 - F.10.A.25)

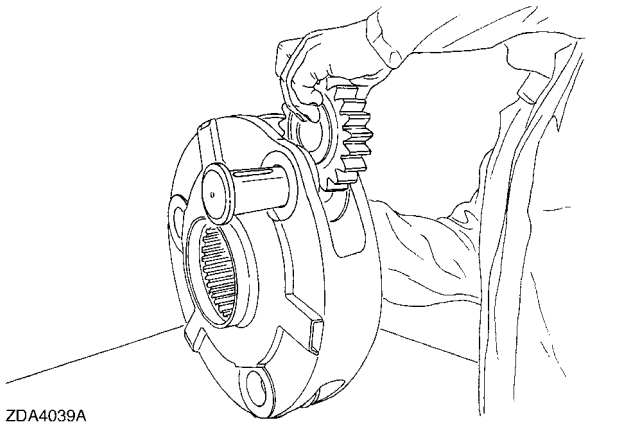
AFX8010

1. Remove retaining ring **(2)**.



4041a 1

2. Push out the shaft and remove the planet gear, the needle rollers and the spacers on both sides of the planet gear. Proceed the same way for the other two planet gears.



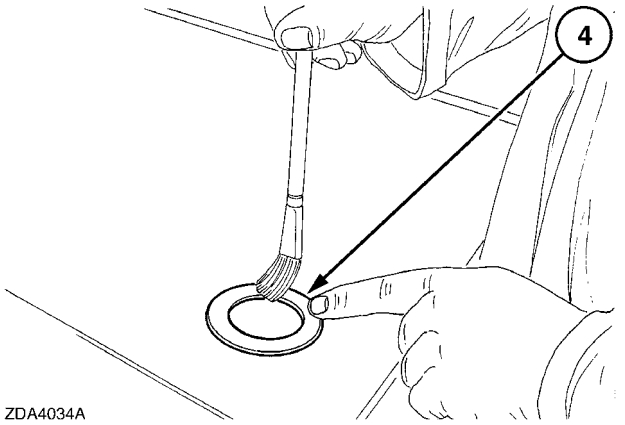
ZDA4039A 2

https://truckmanualshub.com/

Final drive Reducer, satelite and planetary - Assemble (D.10.A.42.50 - F.10.A.20)

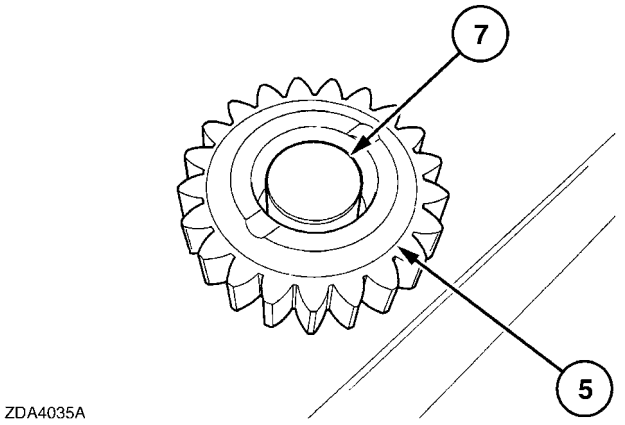
AFX8010

1. Apply oil to the spacer **(4)**.



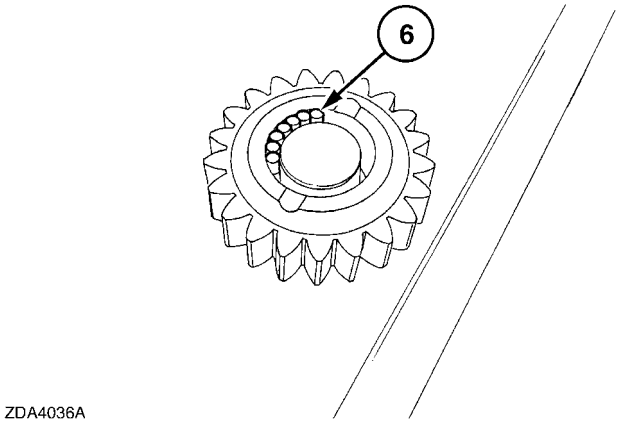
4034a 1

2. Apply oil to the inner side of the gear **(5)** and place it onto spacer **(4)**. Place tool **(7)** shaft diameter **50.5 mm (1.98 in)** OD x **47 mm (1.85 in)** in the middle of gear **(5)**.



4035a 2

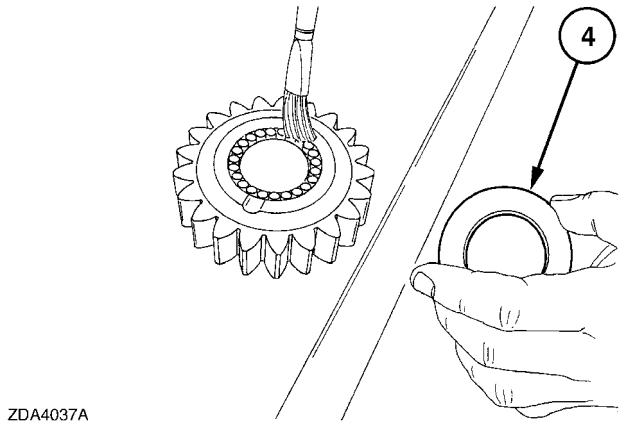
3. Insert 23 needle rollers **(6)**.



4036a 3

https://truckmanualshub.com/

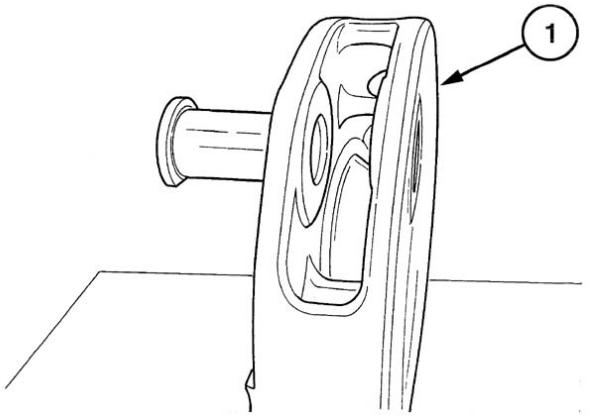
4. Apply oil to the spacer **(4)** and place it onto gear **(5)**.



4037a 4

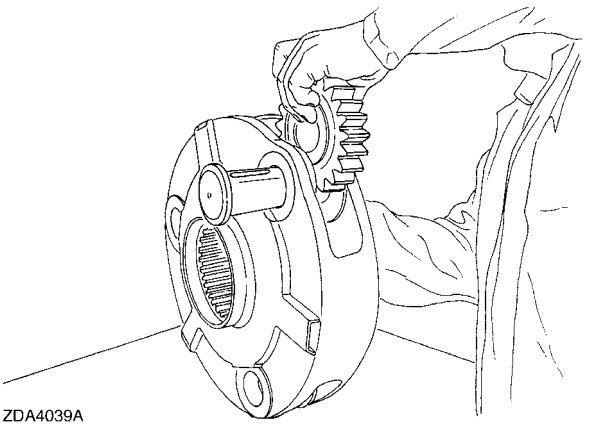
5. Insert shaft in planet gear carrier **(1)** as shown.

IMPORTANT: *The shaft must be inserted from the side of the carrier with the flat shoulder.*



50020124 5

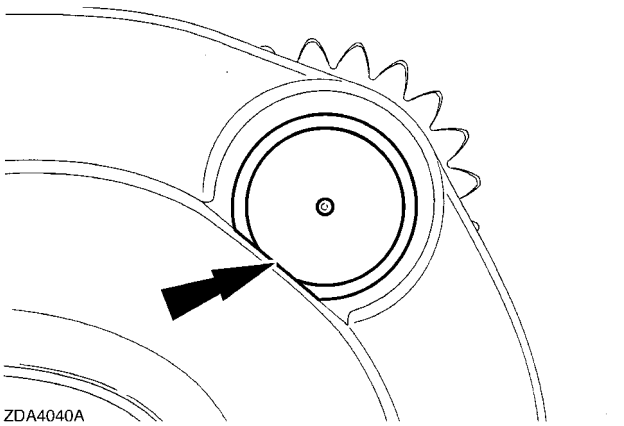
6. Insert the planet gear with spacers and needle rollers.



4039a 6

7. Insert the shaft and remove the tool.

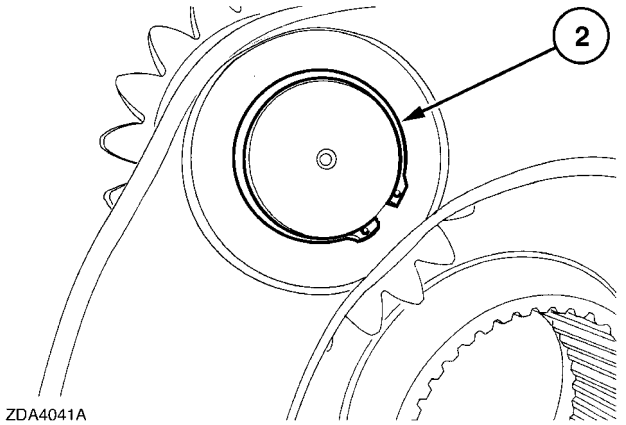
IMPORTANT: *Make sure the notch on the shaft is in line with the notch on the planet gear carrier.*



4040a 7

https://truckmanualshub.com/

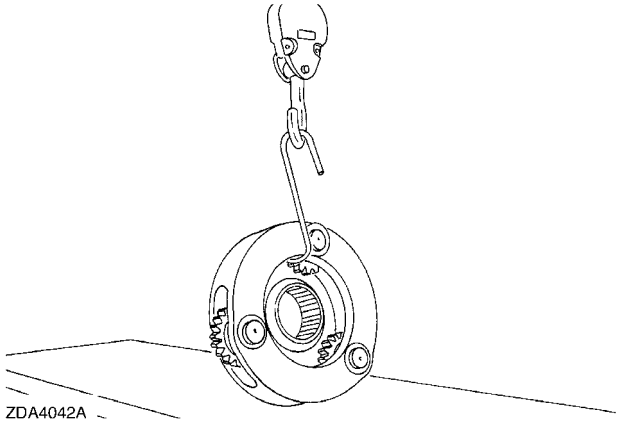
8. Install retaining ring **(2)**.



4041a 8

9. Repeat steps 1 - 8 for the other two planet gears.

10. The pre-assembled planet gear carrier is heavy, use a lifting device to handle it.



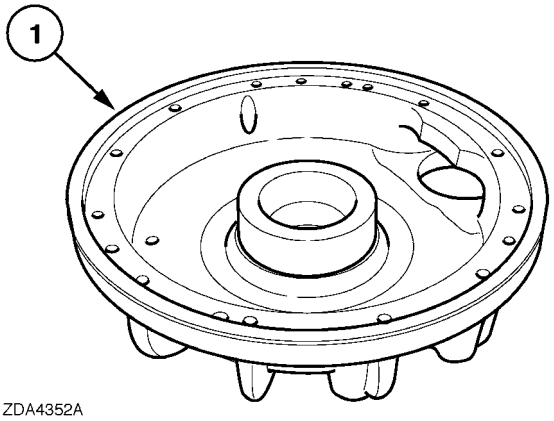
4042a 9

https://truckmanualshub.com/

Final drive - Assemble (D.10.A.42 - F.10.A.20)

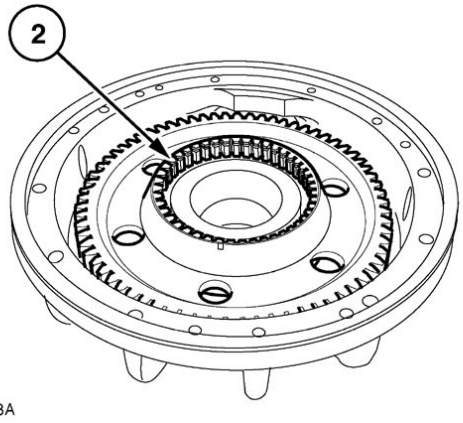
AFX8010

1. Install bearing cup into inner final drive housing. Bearing cup must be fully seated in the housing.
2. Place inner final drive housing **(1)** as shown.



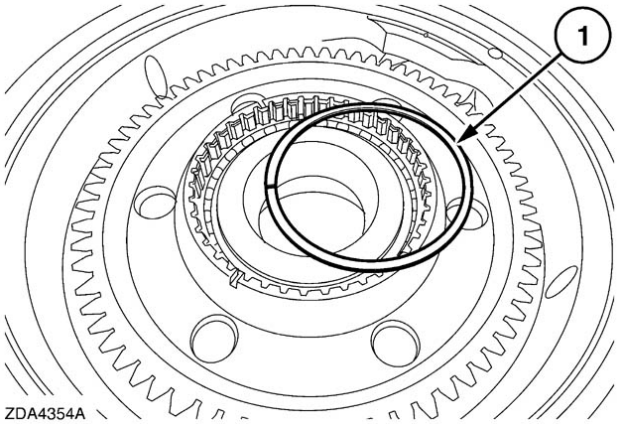
zda1352a 1

3. Install pre-assembled Output Gear **(2)** in final drive housing.



zda4353a 2

4. Install retaining ring **(1)**. Make sure it is properly seated.

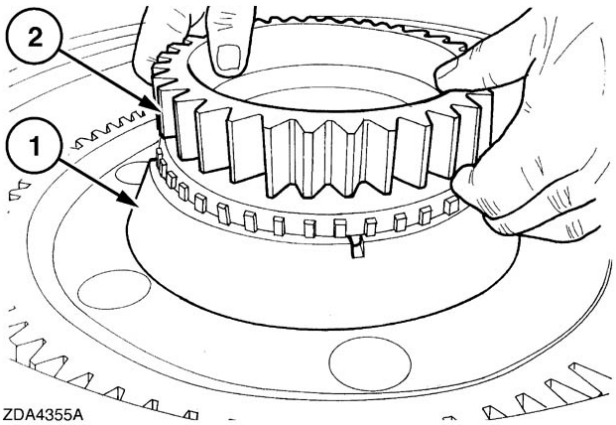


zda4354a1 3

https://truckmanualshub.com/

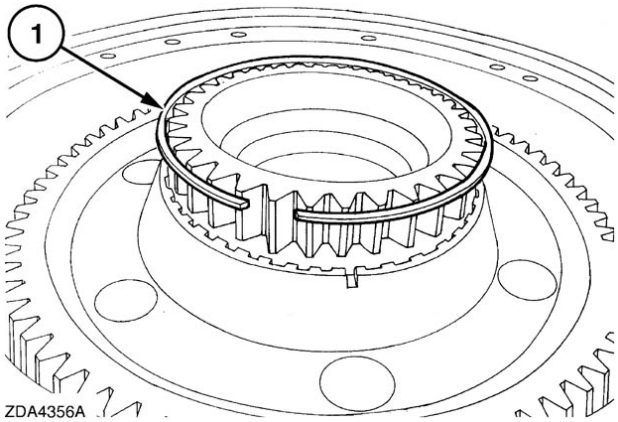
5. Install Sun Gear **(2)** in output gear **(1)**.

IMPORTANT: *Both output and Sun Gears are marked. Marks must be aligned.*



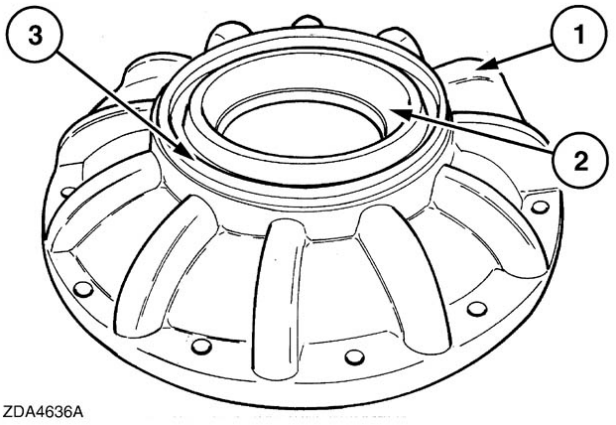
zda4355a 4

6. Install retaining ring **(1)**.



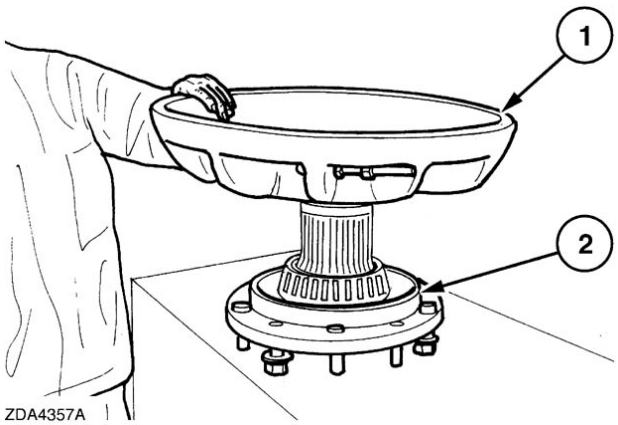
zda4356a1 5

7. Install bearing cup **(2)** in the housing **(1)**. Bearing cup must be fully seated in housing in the outer final drive housing. Install seal **(3)** in outer housing **(1)**.



zda4636a 6

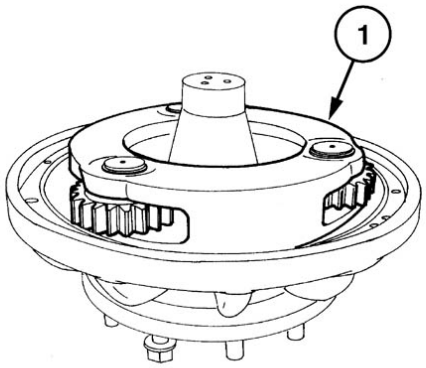
8. Apply oil to the seal and to the output shaft where the seal makes contact. Install final drive outer housing **(1)** on pre-assembled output shaft **(2)**.



zda43572 7

https://truckmanualshub.com/

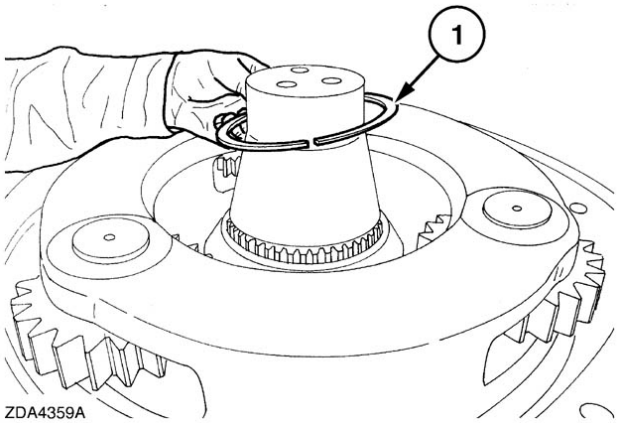
9. Install pre-assembled planet gear **(1)**.



ZDA4358A

zda4358a 8

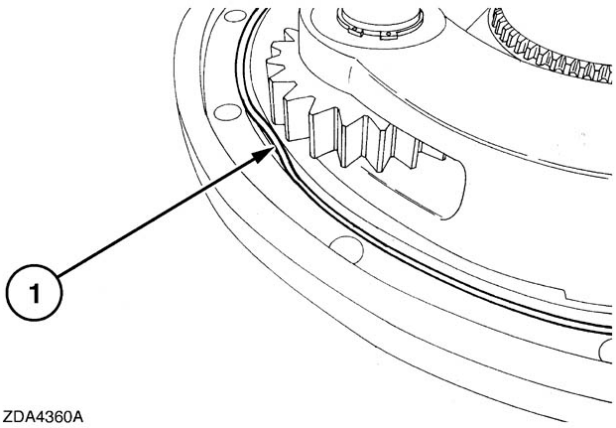
10. Install retaining ring **(1)**.



ZDA4359A

zda4359a2 9

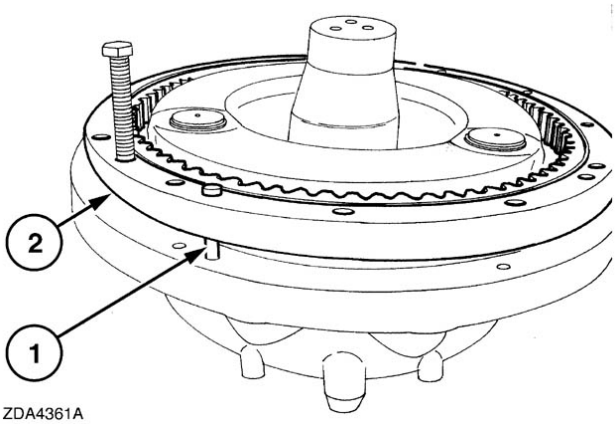
11. Apply a light coating grease on O-ring **(1)** and install O-ring **(1)** in outer final drive housing **(2)**.



ZDA4360A

zda4360a 10

12. Insert two dowel pins **(1)** in ring gear **(2)** and install ring gear **(2)** with the seal groove facing upward.

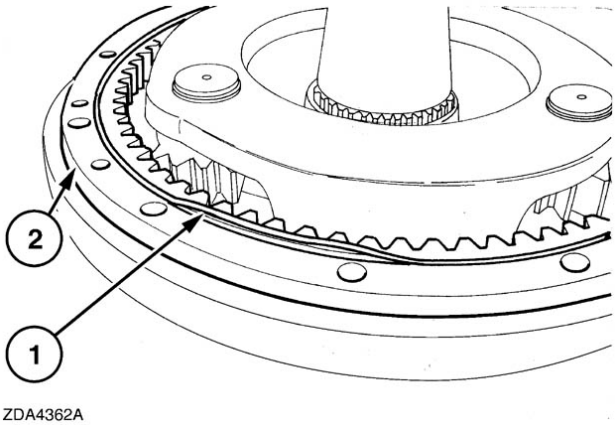


ZDA4361A

zda4361a 11

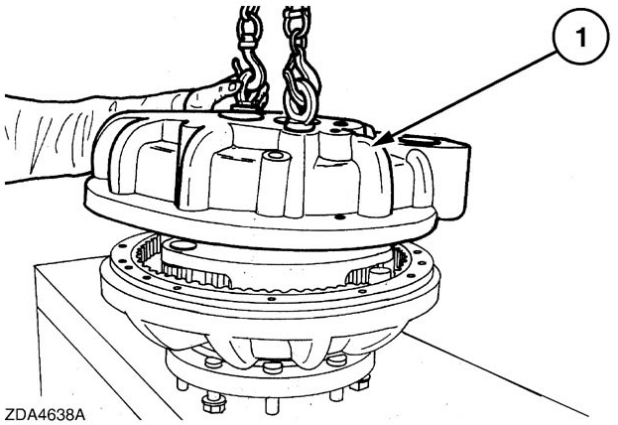
https://truckmanualshub.com/

13. Apply a light coating of grease on O-ring **(1)** and install O-ring **(1)** in ring gear **(2)**.



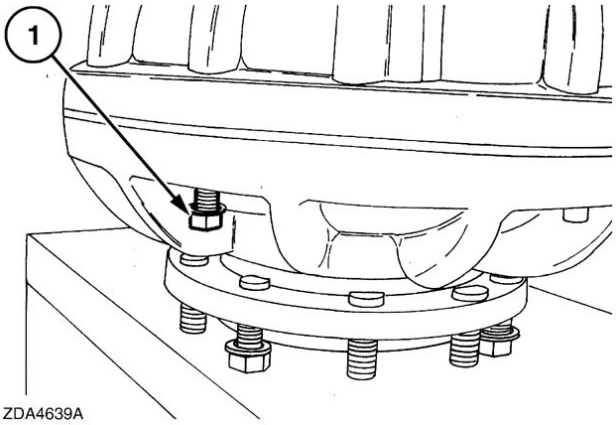
zda43622a 12

14. Install inner final drive housing **(1)** onto ring gear.



zda46382a 13

15. Apply thread locking compound type 1 (Loctite 242) to bolts **(1)**. Screw in twelve bolts **(1)** and lock washers. Torque to **320 Nm** (**236 lb ft**).

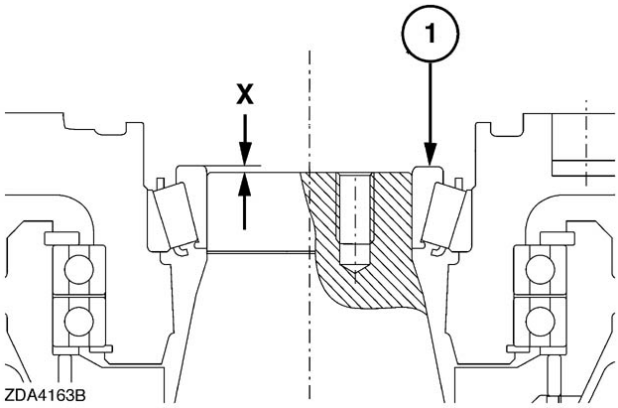


zda46392a 14

16. Install bearing **(1)**. Apply a load of **150 kg** (**330 lb**) on the bearing cone back face **(1)** and turn final drive around the output shaft to correctly seat the bearing cone. Measure distance X between the cone back face of bearing **(1)** and the upper flat surface of the output shaft.

IMPORTANT: *Be sure the 12 bolts* ***(1)*** *are tightened to specified torque before measuring distance X. Measure distance X with the load applied on the bearing cone back face.*

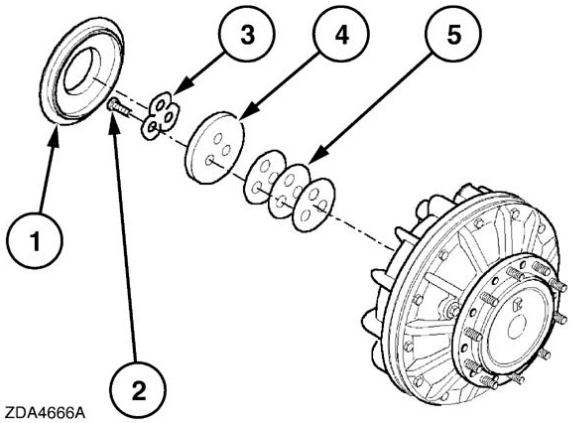
NOTE: *The required shim pack can be defined as follows: Shim pack = X - 0.35 mm (X - 0.014").*



zda4163b 15

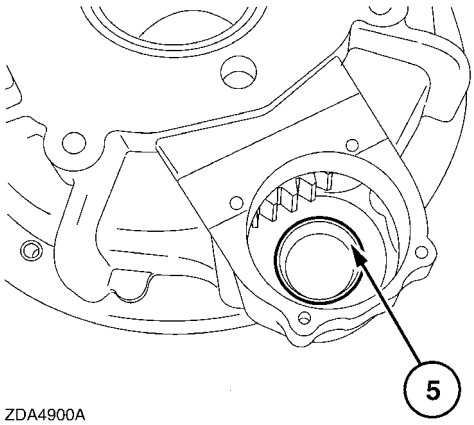
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17. Install shim pack **(5)**. Install washer **(4)**, locking plate **(3)** and bolts **(2)**. Torque bolts to **320 Nm** (**236 lb ft**). Turn up corners of the locking plate to prevent bolt heads from turning. Apply sealing compound type 6 (Loctite 638) to cover **(1)** and install cover **(1)**.



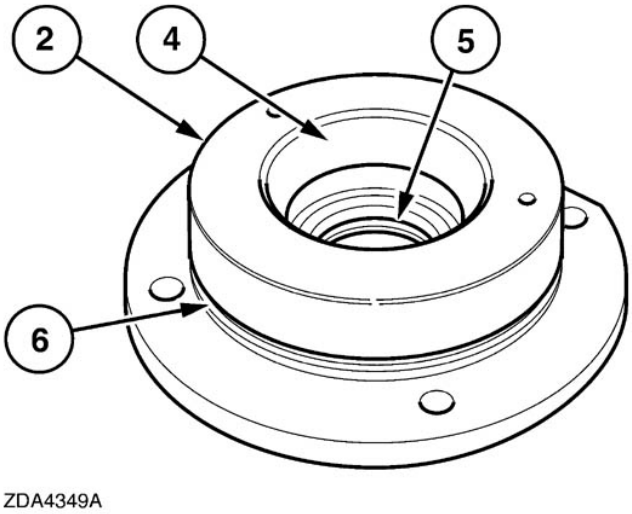
zda46661a 16

18. Install bearing cup **(5)** into outer final drive gearbox housing. Bearing cup must be fully seated into outer housing.



4900a 17

19. Install seal **(5)** in bearing cover **(2)**.

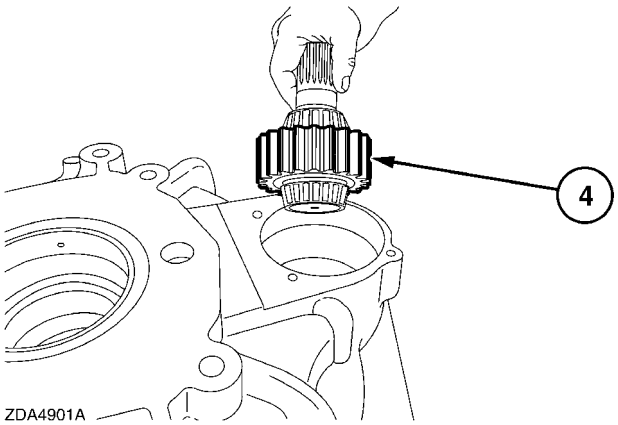


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20. Install bearing cup **(4)** in bearing cover **(2)**. Bearing cup must be fully seated in cover. Install O-ring **(6)**.

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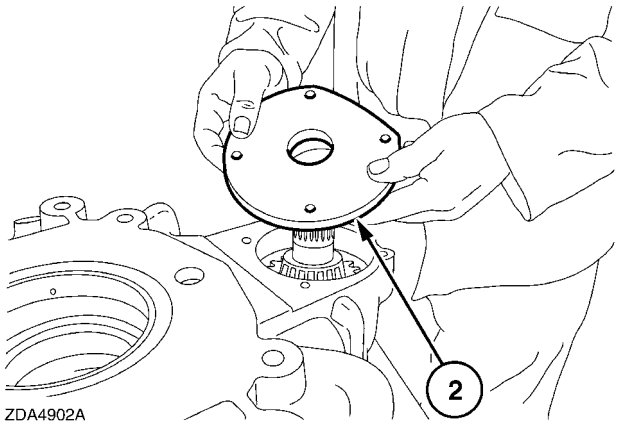
21. Install pre-assembled input shaft **(4)**.



4901a 19

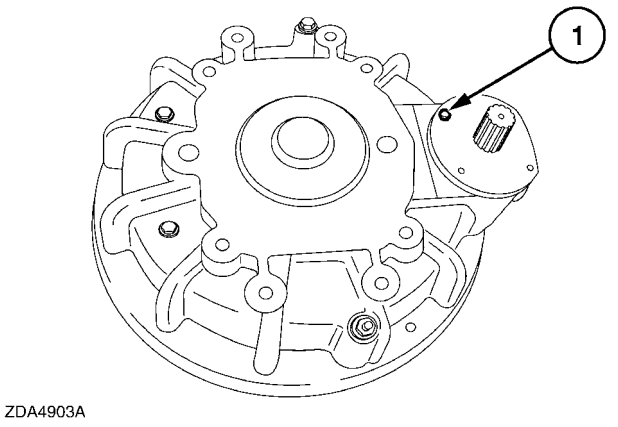
22. Install the shim pack and bearing cover **(2)** with seal O-ring and bearing cup.

NOTE: *The thickness of the shim pack should allow axial end play on the input shaft.*



4902a 20

23. Assemble bolts **(1)** and lock washers. Torque to **50 Nm** (**37 lb ft**).



4903a 21

24. Install a dial gauge on the housing and locate the probe on top of the shaft.
25. Apply a load in one direction and oscillate the shaft several times while the load is applied.
26. Set the dial gauge to zero.
27. Apply the load in the opposite direction, oscillate and read the axial movement of the shaft.
28. Make three measurements at 120 degrees of the shaft. average of the three readings. The axial end play should be **0.01 - 0.06 mm** (**0.0004 - 0.0024 in**).

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29. If required, adjust the thickness of the shim pack. To decrease the axial end play, decrease the number of shims.

30. When the thickness of the shim pack is determined, apply thread locking compound type 1 (Loctite 242) to bolts **(1)** and tighten to a torque of **50 Nm** (**37 lb ft**).

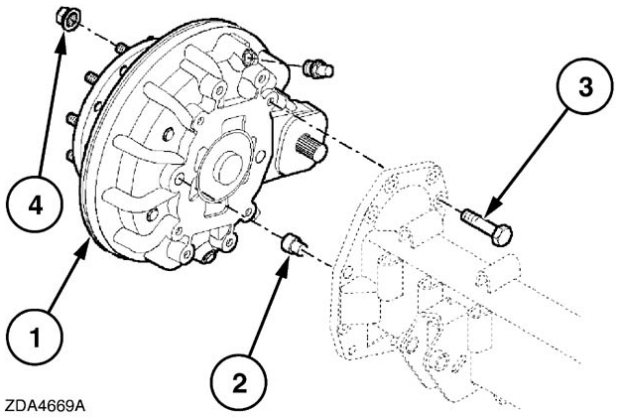
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Final drive - Install (D.10.A.42 - F.10.A.15)

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To install a planetary final drive, proceed as follows:

1. Insert two dowel pins **(2)** in the planetary final drive housing **(1)**. Install the planetary final onto the traction axle of the combine. Apply thread locking compound Loctite 646 on bolts **(3)** to prevent them from loosening. Tighten bolts **(3)** to a torque of **670 Nm** (**495 lb ft**). Fill the planetary final drive with **6.7 L** (**1.77 US gal**) of **CASE AKCELA 135H EP GEAR LUBE SAE 80W-90**



zda4669a 1

⚠ CAUTION ⚠

M501 - Some components of this machine are very heavy. Use suitable lifting equipment or additional help as instructed in the Service Manual.

2. Install the traction wheel and tighten wheel nuts **(4)** to a torque of **710 - 790 Nm** (**525 - 580 lb ft**).

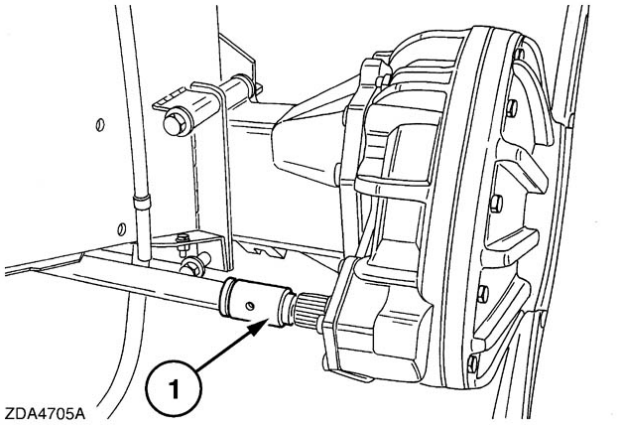
Next operation: Install the half shaft lock couplers. **Half-shaft - Install (D.10.A.43 - F.10.A.15)**

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Final drive Wheel stud - Replace (D.10.A.42.60 - F.10.A.30)

AFX8010

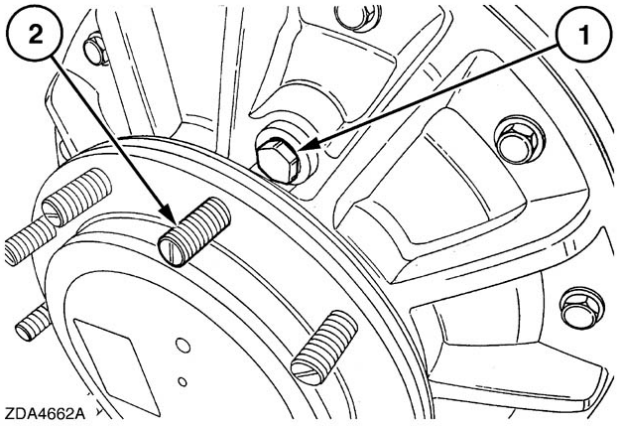
1. Remove the traction wheel.
2. Remove sleeve, **(1)**, at the planetary final drive.Use consideration that safety snap rings retain the sleeve to the shaft, these will have to be removed.



ZDA4705A 1

3. Turn the output shaft of the planetary final drive until wheel bolt,**(2)** (the bolt to be replaced) is in front of maintenance plug, **(1)**. Remove maintenance plug,**(1)**Drive out wheel bolt,**(2)**Insert new wheel bolt,**(2)**,and pull it into its place with a wheel nut. Re-install maintenance plug,**(1)**.

NOTE: *Make sure the notch on the wheel bolt is in line with the step on the output shaft.*



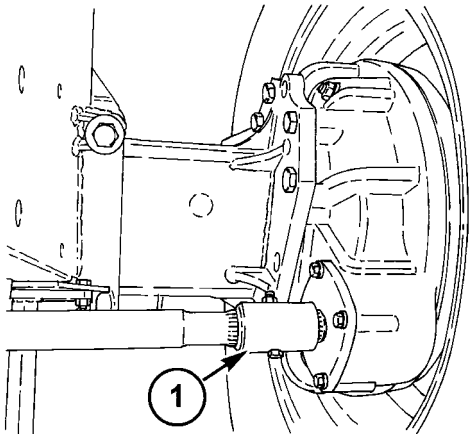
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Half-shaft - Remove (D.10.A.43 - F.10.A.10)

AFX8010

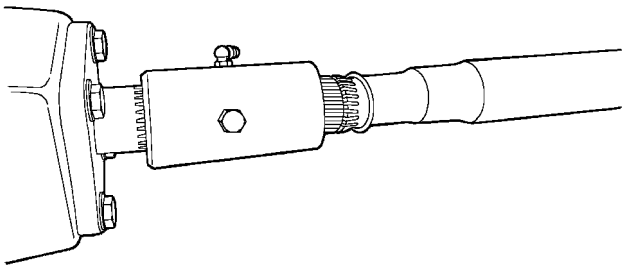
1. Remove the bolts and nuts from the outer and inner drive shaft couplers . Slide both couplers **(1)** completely outward, over the transmission and final drive shafts.



20036405A5 1

2. Slide the drive shaft completely toward the final drives, and slide the retaining ring from the groove to the smallest shaft diameter at the transmission end.

NOTE: *Be careful to not over expand retaining ring during remove, to avoid excessive yielding and ring damage.*



50021343 2

3. Slide the drive shaft completely towards the transmission and slide the snap-ring from the groove to the smallest diameter at the final drive end.

NOTE: *Be careful to not over expand retaining ring during remove, to avoid excessive yielding and ring damage.*

4. Push both couplers, fully onto the drive shaft.
5. Remove the drive shaft assembly.
6. Remove the coupler and rings over the splined end of shaft. Do not remove retaining rings unless they will be replaced.
7. Repeat for the opposite side.

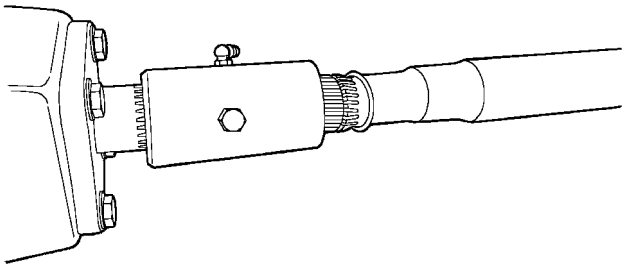
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Half-shaft - Install (D.10.A.43 - F.10.A.15)

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IMPORTANT: *Do not expand the retaining rings more than necessary to avoid excessive yielding and ring damage.*

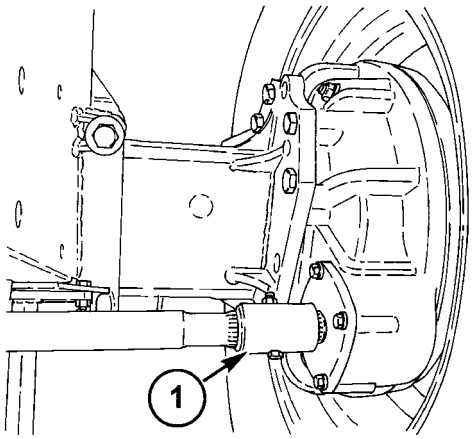
1. Slide both snap rings over the splines, beyond the groove and position on the smallest diameter part of the drive shaft.
2. Slide the couplers completely over the splines with the undercut towards the snap ring.
3. Place the pre-assembled drive shaft assembly between the output shaft of the transmission and input shaft of the final drive.
4. Slide both couplers completely outwards over the transmission and final drive shafts.
5. Slide the drive shaft completely towards the transmission and install the retaining ring at the final drive side in its groove.



50021343 1

6. Slide the drive shaft completely towards the final drive and install the retaining ring at the transmission side in its groove.
7. Slide the drive shaft coupler **(1)** in its middle position. Install the bolts and nuts . Tighten and torque the bolts and nuts to **5 Nm** (**3.7 lb ft**).

IMPORTANT: *Do not over torque the coupler bolts, as the bolts may yield and cause coupler failure.*



20036405A5 2

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Index

TRAVELLING - D

FRONT AXLE - 10.A

Final drive - Assemble (D.10.A.42 - F.10.A.20) 25
AFX8010

Final drive - Disassemble (D.10.A.42 - F.10.A.25) 13
AFX8010

Final drive - Exploded view (D.10.A.42 - C.10.A.20) 6
AFX8010

Final drive - General specification (D.10.A.42 - D.40.A.10) 4
AFX8010

Final drive - Install (D.10.A.42 - F.10.A.15) 32
AFX8010

Final drive - Remove (D.10.A.42 - F.10.A.10) 12
AFX8010

Final drive - Sectional view (D.10.A.42 - C.10.A.30) 5
AFX8010

Final drive - Torque (D.10.A.42 - D.20.A.10) 4
AFX8010

Final drive Output shaft - Assemble (D.10.A.42.45 - F.10.A.20) 20
AFX8010

Final drive Reducer, satelite and planetary - Assemble (D.10.A.42.50 - F.10.A.20) 22
AFX8010

Final drive Reducer, satelite and planetary - Disassemble (D.10.A.42.50 - F.10.A.25) 21
AFX8010

Final drive Reducer, satelite and planetary - Exploded view (D.10.A.42.50 - C.10.A.20) 11
AFX8010

Final drive Reducer, spur gear - Assemble (D.10.A.42.44 - F.10.A.20) 17
AFX8010

Final drive Reducer, spur gear - Disassemble (D.10.A.42.44 - F.10.A.25) 16
AFX8010

Final drive Reducer, spur gear - Exploded view (D.10.A.42.44 - C.10.A.20) 8
AFX8010

Final drive Reducer, spur gear - Sectional view (D.10.A.42.44 - C.10.A.30) 7
AFX8010

Final drive Shaft - Assemble (D.10.A.42.43 - F.10.A.20) 19
AFX8010

Final drive Shaft - Exploded view (D.10.A.42.43 - C.10.A.20) 9
AFX8010

Final drive Shaft - Overview (D.10.A.42.43 - C.10.A.10) 10
AFX8010

Final drive Wheel stud - Replace (D.10.A.42.60 - F.10.A.30) 33
AFX8010

Half-shaft - Install (D.10.A.43 - F.10.A.15) 35
AFX8010

Half-shaft - Remove (D.10.A.43 - F.10.A.10) 34
AFX8010

https://truckmanualshub.com/

TRAVELLING - D

REAR AXLE - 12.A

AFX8010

https://truckmanualshub.com/

Contents

TRAVELLING - D

REAR AXLE - 12.A

TECHNICAL DATA

Hydrostatic motor

Hydrostatic motor - General specification (D.12.A.28 - D.40.A.10) 3
AFX8010

Hydrostatic motor - Torque (D.12.A.28 - D.20.A.10) 3
AFX8010

FUNCTIONAL DATA

REAR AXLE - Overview (D.12.A - C.10.A.10) 4
AFX8010

REAR AXLE - Detailed view (D.12.A - C.10.A.50) 5
AFX8010

Hydrostatic motor

Hydrostatic motor - Exploded view (D.12.A.28 - C.10.A.20) 7
AFX8010

Hydrostatic motor - Dynamic description (D.12.A.28 - C.30.A.10) 10
AFX8010

SERVICE

Hydrostatic motor

Hydrostatic motor - Bleed (D.12.A.28 - F.35.A.25) 20
AFX8010

Hydrostatic motor - Remove (D.12.A.28 - F.10.A.10) 22
AFX8010

Hydrostatic motor - Disassemble (D.12.A.28 - F.10.A.25) 25
AFX8010

Hydrostatic motor - Assemble (D.12.A.28 - F.10.A.20) 32
AFX8010

Hydrostatic motor - Install (D.12.A.28 - F.10.A.15) 41
AFX8010

https://truckmanualshub.com/

Hydrostatic motor - General specification (D.12.A.28 - D.40.A.10)

AFX8010

Basic Motor Specifications (MG18)

Displacement	**2100 cc**
Number of Pistons	10
Type of piston (Standard or Stepped)	Standard
Rated Speed (RPM)	**60 RPM**
Maximum Operating Pressure	**6500 psi (450 bar)**
Maximum Disengaged Speed (RPM) [Dependent on drain pressure in motor]	**195 RPM**

Hydrostatic motor - Torque (D.12.A.28 - D.20.A.10)

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Item	Specification	Torque
Top and Bottom Pins to C-frame	M10	**75 - 91 Nm** (**55 - 67 lb ft**)
Top and Bottom Seal Cover to C-frame	M6	**9 - 11 Nm** (**6.6 - 8 lb ft**)
Valve (Single/Two Speed) Block Fasten Bolts	M6	**12.5 - 15.5 Nm** (**9.3 - 11.3 lb ft**)
Valve Cover capscrews	M6	**22.5 - 27.5 Nm** (**16 - 19 lb ft**)
Solenoid Valve Cartridge Valve	Cartridge Valve lube with hydraulic oil.	**24 - 30 Nm** (**18.8 - 22.2 lb ft**)
Magnetic Winding Hex Nut	Nut.	**2.7 - 3.3 Nm** (**2.0 - 1.8 lb ft**)
Spool Valve Plug	Plug.	**285 - 380 Nm** (**210 - 280 lb ft**)
Motor Bolts	M16 x 100mm	**320 - 390 Nm** (**236 - 288 lb ft**)
Rotational Rolling Torque of the Bearing Support Assembly	Use Special Tool.	**49 - 91 Nm** (**36 - 67 lb ft**)

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REAR AXLE - Overview (D.12.A - C.10.A.10)

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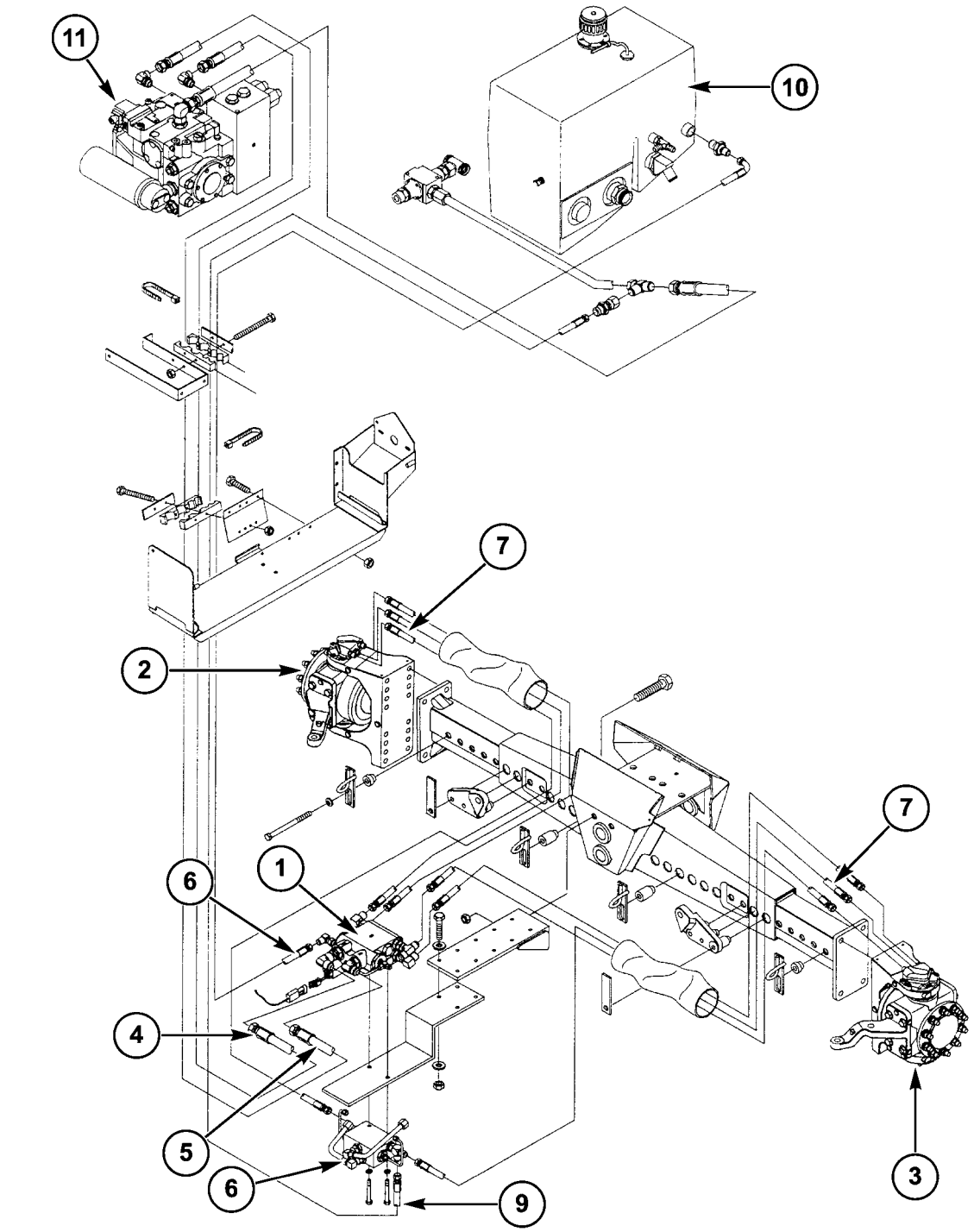
The powered rear axle is available as a factory installed or field installed option. This system will provide additional traction when the machine is operated in tough field conditions. The system can be engaged or disengaged electronically by a switch in the operators cab. Both rear wheels are driven by hydraulic motors and the system receives its oil supply directly from the hydrostatic pump. The high pressure lines from the hydrostatic pump (brake manifold) supply the wheel motors through a control valve mounted near the rear axle. The powered rear axle system operates as a function of the main hydrostatic drive system. A standard hydrostatic system utilizes one pump and one drive motor (transmission mounted), whereas the powered rear axle system utilizes one pump and three motors (one transmission mounted and two wheel mounted).The wheel motors are cam lobe type units with a fixed displacement. The amount of wheel torque obtained from the wheel motors is directly related to the hydrostatic system pressure. The higher the system pressure the greater the wheel torque will be.

NOTE: *It is not necessary to synchronize the front wheels (transmission mounted pump driven) with the rear wheels (wheel motor driven) as the system pressure and hydraulic fluid flow hydraulic will do this automatically.*
It is very important to maintain traction to the front wheels. If a front wheel loses traction and begins to slip, the system pressure will lower. The spinning wheel requires less pressure to rotate. The oil in the pressure lines will take the least path of resistance, therefore the amount of power assistance from the rear wheels will be reduced because of the lower pressure. Shifting to a higher gear (if possible) will reduce the amount of torque at the front wheels to stop the wheel slippage. Also, lightly touching the brakes will help.

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REAR AXLE - Detailed view (D.12.A - C.10.A.50)

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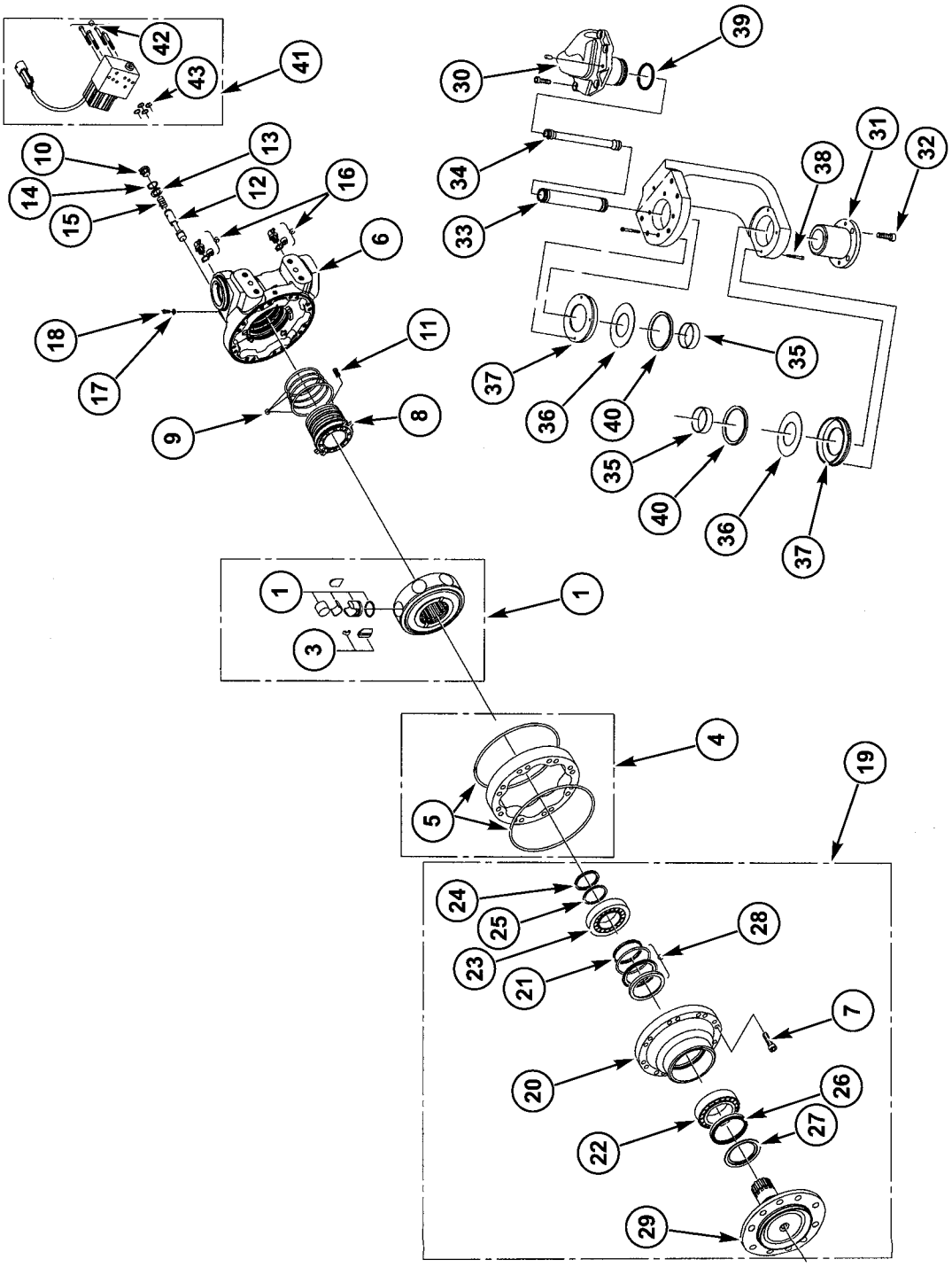
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Hydrostatic motor - Exploded view (D.12.A.28 - C.10.A.20)

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20042858 1

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Item	Quantity	Description
1	1	Cylinder Block Assembly
2	8	Piston Kit
3	1	Piston Retainer Kit
4	1	Cam Ring Plus O-Rings
5	2	O-Ring - Cam Ring
8	1	Distributor Valve
9	1	Distributor Seal Kit
10	1	Plug
11	12	Spring
12	1	Spool, 2 Speed
13	1	Washer
14	1	Snap Ring
15	1	Spring
16	2	Grease Zerk, 90
17	3	Seal Washer
18	3	Socket Head Cap Screw, M8 x 10
19	1	Bearing Support Assembly
20	1	Bearing Support
21	1	Shaft Seal (inner)
22	1	Bearing (outer)
23	1	Bearing (inner)
28	1	Shaft Seal Kit
24	1	Retainer Ring
25	1	Split Ring
26	1	Outer Shaft Seal
27	1	Deflector
6	1	Valve Housing Cover, LH
6	1	Valve Housing Cover, RH
7	16	Socket Head Cap Screw, M16 x 100
29	1	Shaft
30	1	Pin (top)
31	1	Pin (bottom)
32	9	Socket Head Cap Screw, M10 x 25
33	1	Outer Pipe (with seals)
34	1	Inner Pipe (with seals)
35	2	Bushing
36	2	Thrust Washer
37	2	Seal Cover, Protector
38	8	Socket Head Cap Screw, M6 x 35
39	1	Seal (Top Pin)
40	2	Environmental Seal
41	1	Valve Block Single Speed
41	1	Valve Block Two Speed

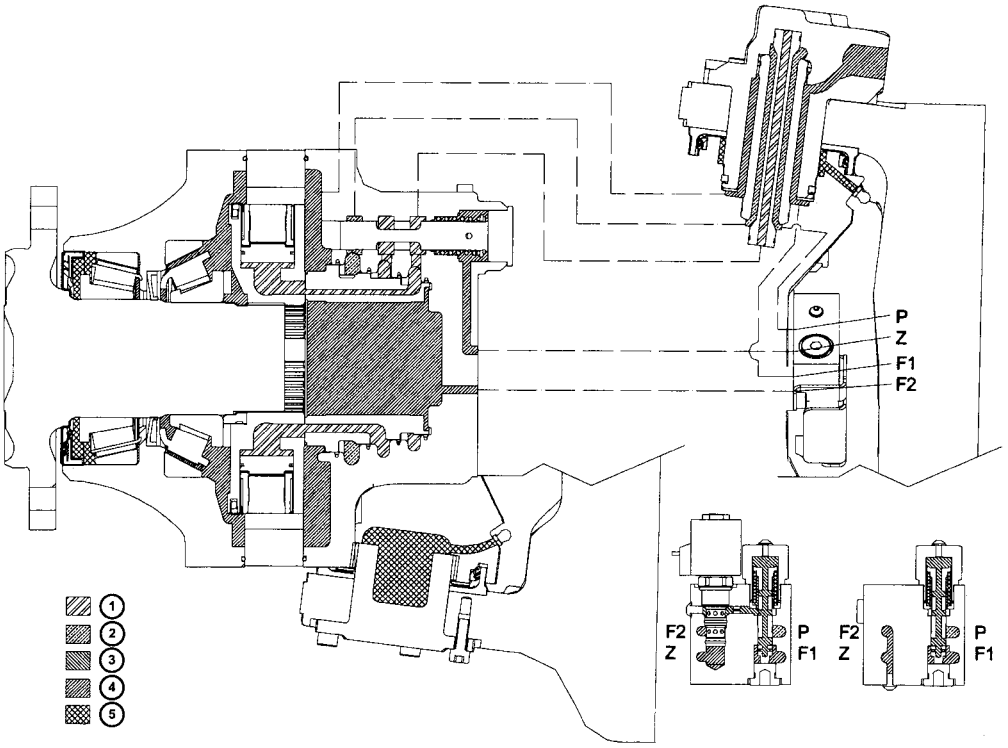
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42	4	Socket Head Cap Screw, M6 x 40
43	4	O-Ring

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Hydrostatic motor - Dynamic description (D.12.A.28 - C.30.A.10)

AFX8010



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Forward Full Torque (Half Speed)

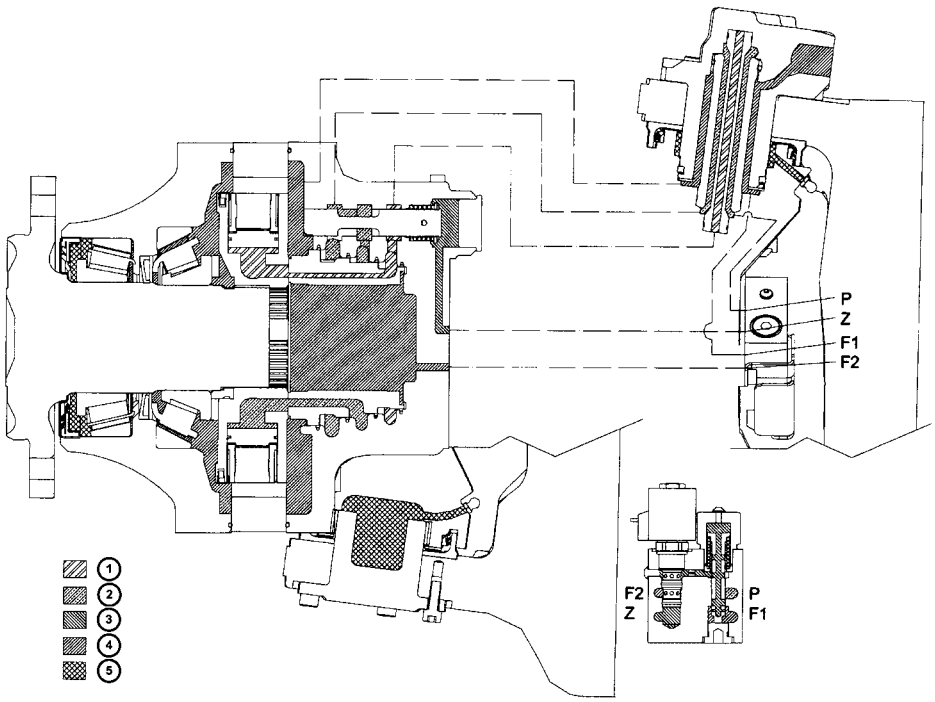
•

The inlet flow crosses the upper pivot, passes through the valves and supplies half of the pistons. The other half of the pistons are connected through the valves to the return line. The two speed spool is at rest (non-controlled).

Forward Full Torque (Half Speed)

1. High Pressure
2. Charge Pressure
3. Pilot Pressure
4. Tank Return
5. Grease

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20042898 2

Forward Full Speed (Half Torque)

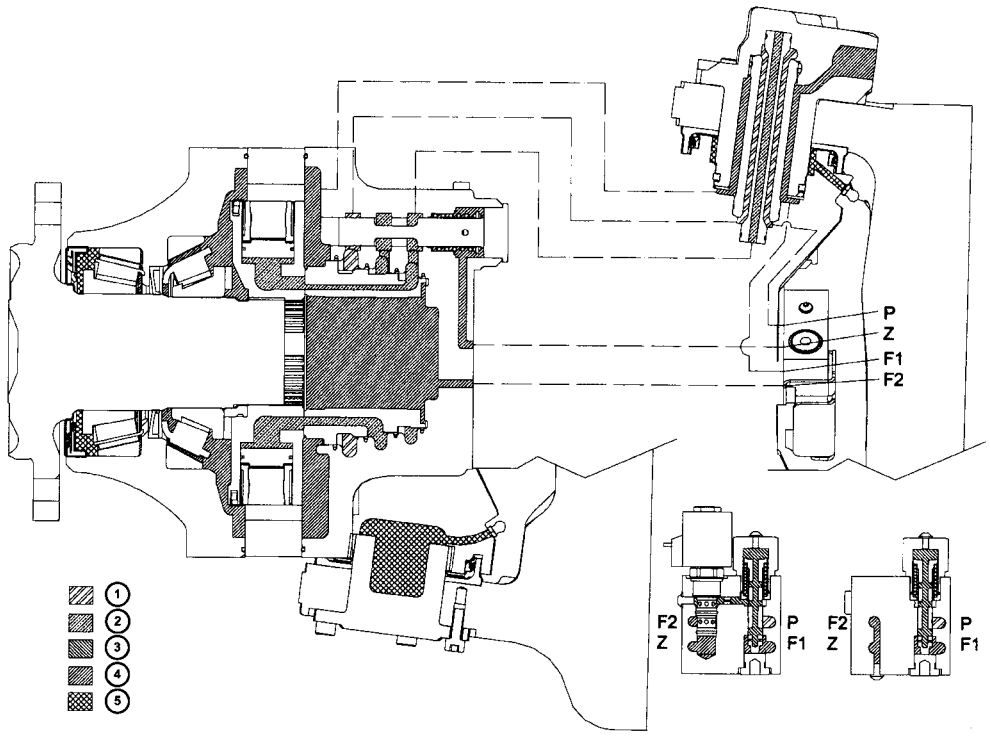
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The two speed spool is piloted to the full speed position (controlled). The inlet flow crosses the upper pivot, passes through the valves and supplies a quarter of the pistons, another quarter of the pistons communicate through the valves with the return line. The remaining pistons communicate between themselves through the two speed spool valve.

Forward Full Speed (Half Torque)

1. High Pressure
2. Charge Pressure
3. Pilot Pressure
4. Tank Return
5. Grease

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20042899 3

Reverse Full Torque (Half Speed)

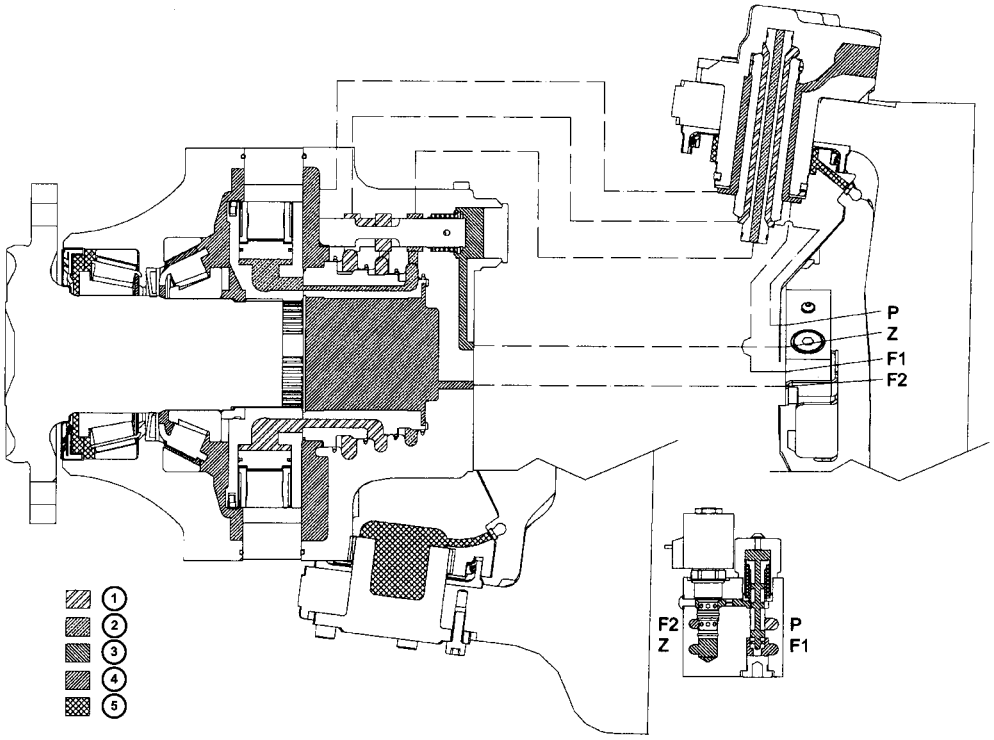
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The inlet flow crosses the upper pivot, passes through the valves and supplies half of the pistons that were formerly the pistons in the forward configuration return circuit.

Reverse Full Torque (Half Speed)

1. High Pressure
2. Charge Pressure
3. Pilot Pressure
4. Tank Return
5. Grease

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Reverse Full Speed (Half Torque)

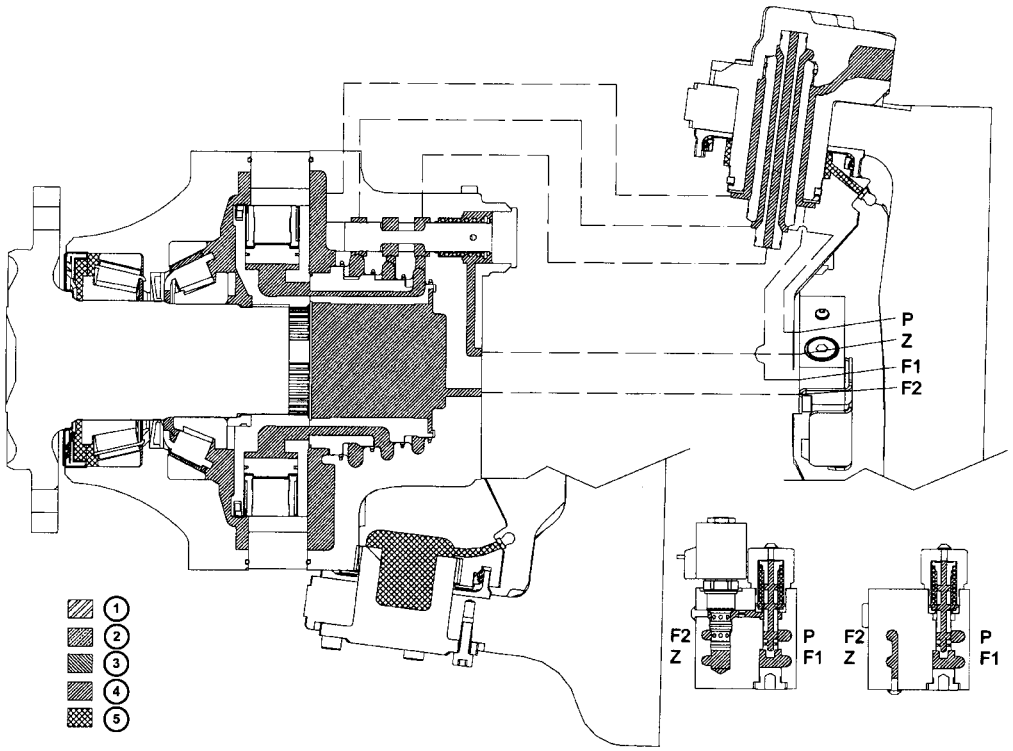
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The two speed spool is in the full speed position (controlled). The inlet flow crosses the upper pivot, passes through the valves and supplies the quarter of pistons that were formerly the forward configuration return circuit. The other pistons communicate between themselves through the two speed selector spool valve.

Reverse Full Speed (Half Torque)

1. High Pressure
2. Charge Pressure
3. Pilot Pressure
4. Tank Return
5. Grease

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20042901 5

Axle Off (Free Wheeling Mode)

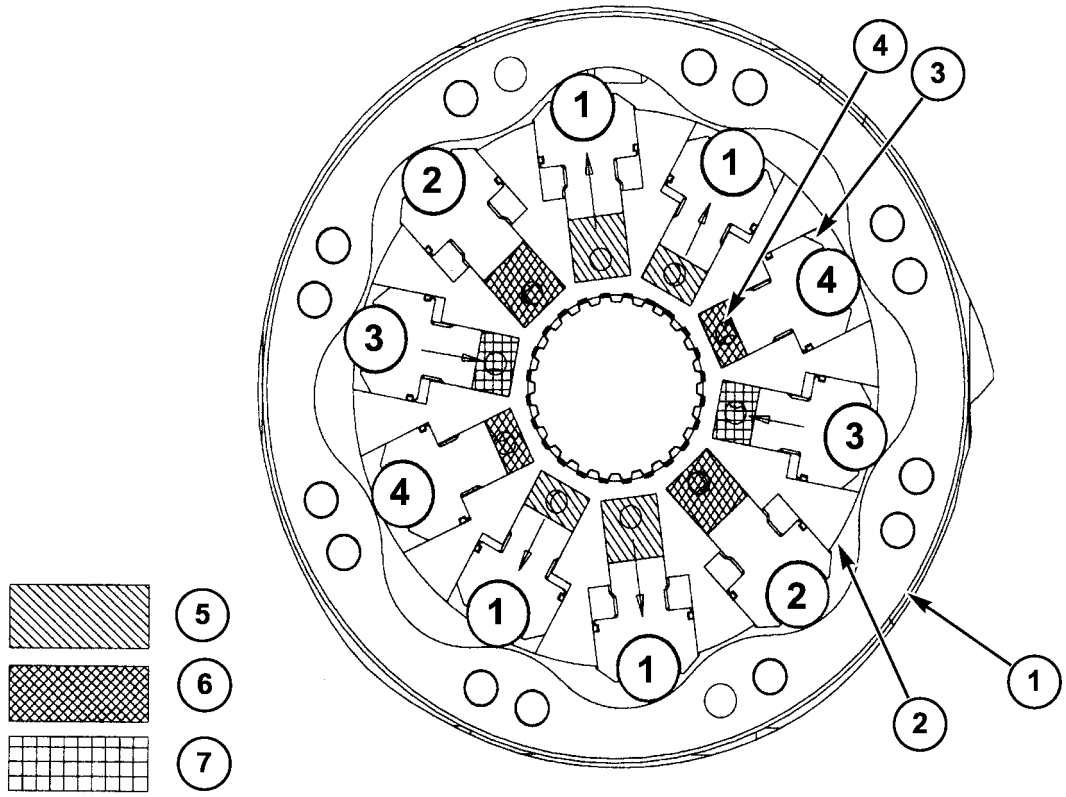
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The high pressure lines of the motor are connected to the tank through the control valve (not part of the steerable motor), pistons of the motor are pushed into the cylinder block by delta pressure between the drain line and the high pressure lines (1.5 bar) to avoid hard contact between the piston rollers and the motor cam ring due to centrifugal force while driving.

MUD HOG Axle Off (Free Wheeling Mode)

1. High Pressure
2. Charge Pressure
3. Pilot Pressure
4. Tank Return
5. Grease

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20042895 6

Operation and Tests

Cam Lobe Motor Operation

1. Power Stroke	4. Transition to Power	7. Piston	10. Oil in Transition
2. Transition to Return	5. Cam	8. Manifold	11. Return Oil
3. Return Stroke	6. Carrier	9. Pressure Oil	

Pressure oil **(9)** is routed through the inner cover to the manifold **(8)**. Each of the 16 passages in the manifold is timed to one ramp on the cam **(5)**.

The oil manifold is pressed against the piston carrier **(6)** with only a thin film of oil separating the manifold and the carrier surfaces. The piston carrier is splined to the axle. Pressure oil is fed from the pressure passages in the manifold through passages in the carrier and into the piston bores.

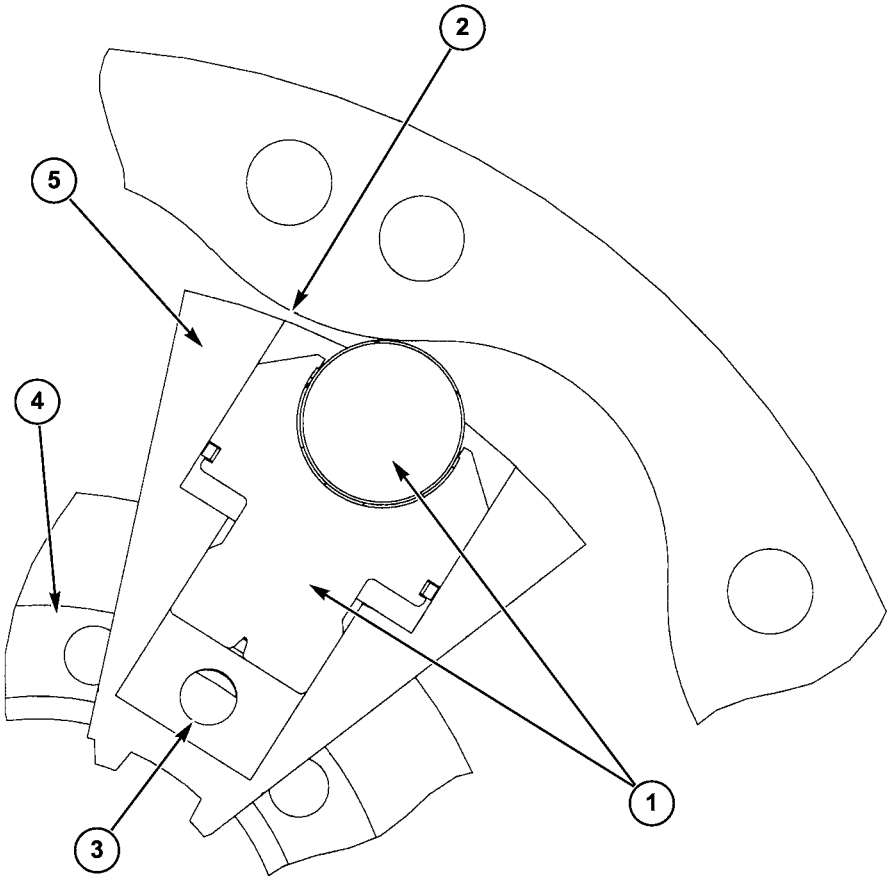
Return oil **(11)** is routed from piston bores, through the carrier passages and into the manifold return passages.

The cam lobe motor is designed so there are two pistons (in a 10 piston motor) doing the same thing at equal (180 degrees) distances around the motor. This gives a force balance on the carrier and axle assembly.

With motor engaged, one group of pistons **(1)** is in power stroke. As the piston follower is forced down the cam ramp, the carrier is forced to turn. Group **(3)** pistons push return oil **(11)** back through the manifold. Pressure **(10)** indicates oil in transition from one port to another. As carrier turns, pistons **(4)** at the top of the lobes begin their power stroke and the pistons **(2)** at the bottom begin their return stroke.

As one group ends its power stroke another group has begun. This overlapping of strokes, both power and return, serve to smooth the power (torque) applied to the axle.

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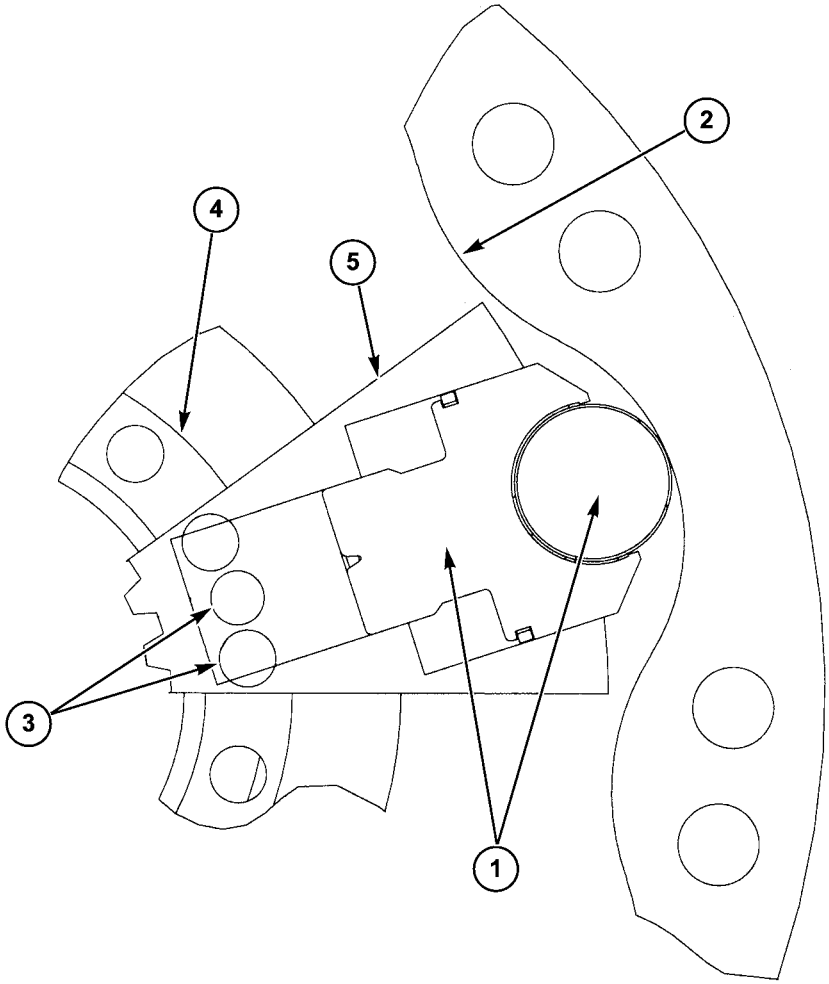
20042891 7

Cam Lobe Motor Operation (Full Supply Position)

•

As the piston and roller **(1)** makes its way toward the bottom (valley) of the cam lobe **(2)**, the Maximum (full) supply of high pressure hydraulic oil momentarily is directed through the aligned ports **(3)** of the distributor **(4)** (remaining stationary) and cylinder block **(5)** rotating, with continuation on to the piston **(1)**. The oil supply then begins to taper off as the piston approaches the bottom of the cam lobe **(2)** toward the neutral (no drive power) position.

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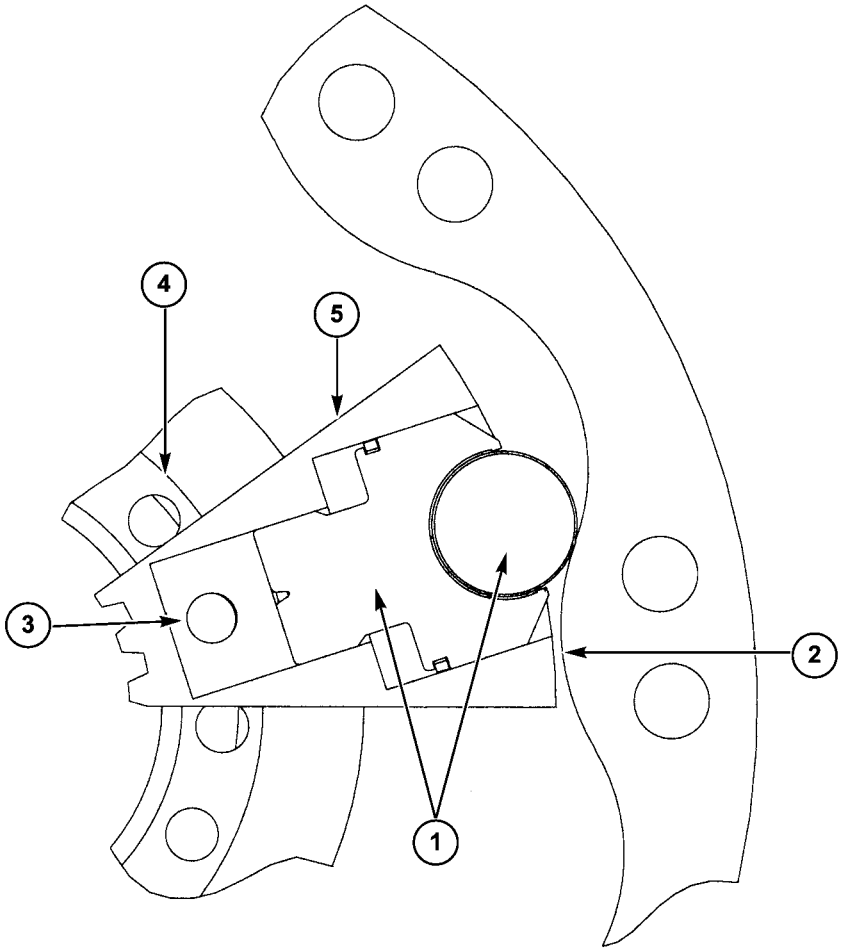
20042892 8

Bottom Neutral Position

•

When the piston **(1)** is at the bottom of the cam lobe **(2)**, the oil supply is cut off. The ports **(3)** in the distributor **(4)** and the cylinder block **(5)** are NOT in alignment with each other. In this neutral piston the piston does NOT provide power to the cylinder block, however, the piston (and roller) remains in the contact with the cam surface.
In order to continue driving power, another piston must take over for the first one to drive the cylinder block in the direction shown, enabling the first to climb the next cam lobe in a smooth and uninterrupted manner.

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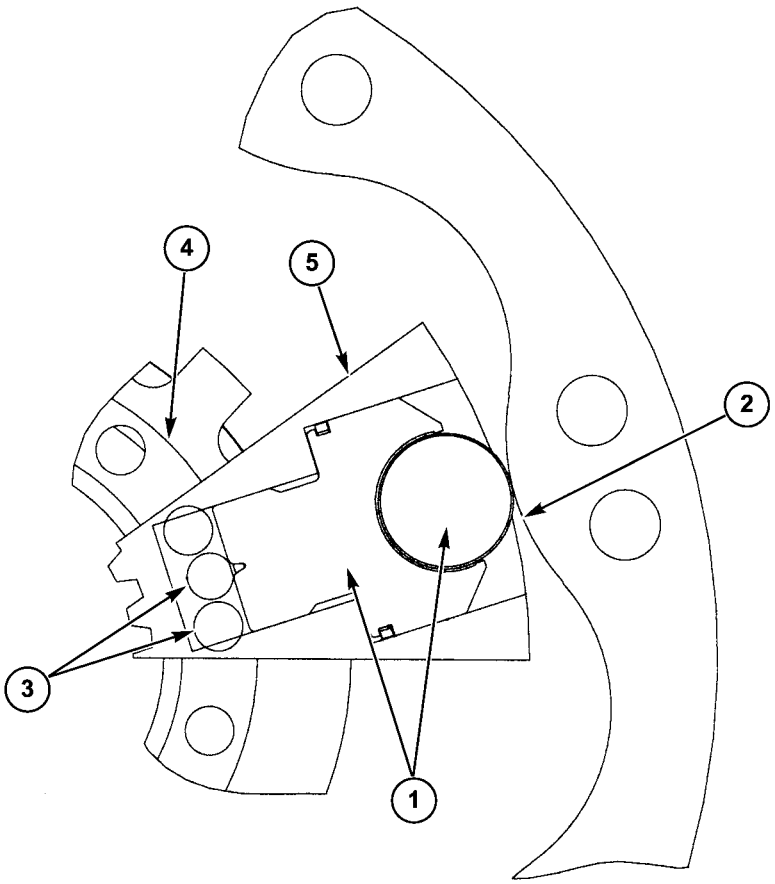
20042893 9

Discharge Position

•

As the piston **(1)** starts to climb the next cam lobe **(2)**, ports (passages) **(3)** in the distributor **(4)** and cylinder block **(5)** begin to align with each other, thus starting the discharge cycle. This allows the hydraulic oil (under charge pressure) to return to the pump as another piston takes over to continue the drive cycle.

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20042894 10

Top Neutral Position

•

During the final cycle of the piston **(1)**, the piston continues to climb another cam lobe **(2)**. As this happens, ports **(3)** in the distributor **(4)** and the cylinder block **(5)** progressively close off return oil flow as the piston (and roller) reaches the top (neutral) position.
When the roller is at the top of the cam lobe, the ports are no longer in alignment, thus ending a full drive cycle. The piston and its roller will then repeat the cycle starting with a gradual supply of high-pressure oil, while other pistons continue their cycles in a similar manner.

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Hydrostatic motor - Bleed (D.12.A.28 - F.35.A.25)

AFX8010

A specific start up procedure must be performed after servicing the powered rear axle system. This ensures adequate flushing or bleeding after a component of the powered rear axle system has been serviced or replaced. The following procedure serves to bleed air out of the powered rear axle system and flush any contamination of the system out. Air in the powered rear axle system is pushed out of the hydrostatic system through the hydrostatic fluid reservoir. It is imperative to follow the exact procedure described; otherwise, the purpose of the procedure will be defeated. Steps 1 through 7 of the procedure are to be performed with the rear wheels off the ground and the front wheels of the machine securely blocked.

IMPORTANT: *If air is introduced into the powered rear axle system at any time during the following procedure, restart the procedure at step one.*

⚠ WARNING ⚠

M625 - Unexpected machine motion or moving parts can cut and crush. Apply parking brake and shut down the engine before working on the machine. Put the machine on blocks only if the surface is solid, even, and level. Make sure that any blocks used to support the machine are solid, one-piece units. Put blocks next to the tires that are not being raised to prevent movement of the machine.

⚠ WARNING ⚠

M950 - Pressurized hydraulic fluid can penetrate the skin and cause severe injuries. Tighten all of the connections before starting the engine. If hydraulic fluid has penetrated the skin, seek medical assistance immediately.

⚠ WARNING ⚠

M951 - Use care not to exceed the 13 mm (1/2 inch) movement of the hydrostatic control lever in order to avoid excessive oil flow from the Powered Rear Axle system.

⚠ WARNING ⚠

M952 - Make sure the hydraulic fluid in the reservoir is at the proper level at all times. Failure to maintain the proper fluid level may cause damage to the machine hydrostatic components.

IMPORTANT: *If air is introduced into the system at any time during the following procedure, restart the procedure at step 1.*

1. Raise the rear wheels from the ground and support with jack stands.
2. BLEED AIR FROM ENTIRE SYSTEM - Raise the rear wheels from the ground and support with jack stands. Run the engine at half throttle. Select NEUTRAL on the gear selector. Activate the powered rear axle. Move the Hydro control lever to NEUTRAL. Run the combine for a duration of 3 minutes.
3. FLUSH FORWARD MAIN SYSTEM - Run the engine at HIGH idle. Select NEUTRAL on the gear selector. Deactivate the powered rear axle. Move the Hydro control lever **13 mm(1/2 in)** FORWARD. Run the combine for a duration of 2 minutes.

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4. FLUSH REVERSE MAIN SYSTEM - Run the engine at HIGH idle. Select NEUTRAL on the gear selector. Deactivate the powered rear axle. Move the Hydro control lever **13 mm(1/2 in)** REVERSE. Run the combine for a duration of 2 minutes.

5. CHECK CORRECT ROTATION OF POWERED REAR AXLE WHEELS (See Note) - Run the engine at HIGH idle. Select NEUTRAL on the gear selector. Activate the powered rear axle. Move the Hydro control lever **13 mm(1/2 in)** REVERSE. Run the combine for a maximum of 30 seconds.

NOTE: *1. If wheel(s) rotate in reverse - go to Step 6.*

NOTE: *2. If no rotation - go to Step 5 (Do NOT repeat - check valve)*

NOTE: *3. If wrong rotation - correct forward/reverse circuit - go to Step 1.*

6. CHECK CORRECT ROTATION OF POWERED REAR AXLE WHEELS (See Note) - Run the engine at LOW idle. Select HIGH gear and hold brakes. Activate the powered rear axle. Move the Hydro control lever **13 mm(1/2 in)** REVERSE MAXIMUM. Run the combine for a maximum of 15 seconds.

7. FLUSH FORWARD POWERED REAR AXLE SYSTEM - Run the engine at HIGH idle. Select HIGH gear and hold brakes. Activate the powered rear axle. Move the Hydro control lever **13 mm(1/2 in)** FORWARD. Run the combine for 4 minutes.

8. FLUSH REVERSE POWERED REAR AXLE SYSTEM - Run the engine at HIGH idle. Select HIGH gear and hold brakes. Activate the powered rear axle. Move the Hydro control lever **13 mm(1/2 in)** REVERSE. Run the combine for 4 minutes.

9. Lower the rear wheels onto the ground.

10. FORWARD PRESSURE CHECK FOR LEAKS - Run the engine at 1/2 throttle. Select HIGH gear and hold brakes. Activate the powered rear axle. Move the Hydro control lever **6 mm(1/4 in)** FORWARD. Run the combine for a maximum of 15 seconds.

11. REVERSE PRESSURE CHECK FOR LEAKS - Run the engine at 1/2 throttle. Select HIGH gear and hold brakes. Activate the powered rear axle. Move the Hydro control lever **6 mm(1/4 in)** REVERSE. Run the combine for a maximum of 15 seconds.

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Hydrostatic motor - Remove (D.12.A.28 - F.10.A.10)

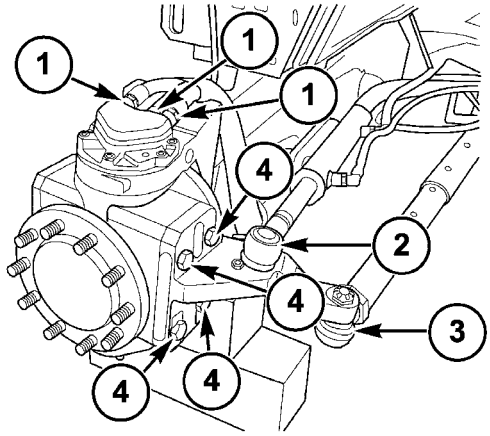
AFX8010

IMPORTANT: *The steering C-frame is heavy. Use proper lifting equipment to prevent injury.*

NOTE: *The motor can be removed from the axle with or without the C-frame attached. It is recommended that the C-frame be removed from the axle with the motor for easier disassemble on a bench. The motor can also be removed with or without the steering knuckle.*

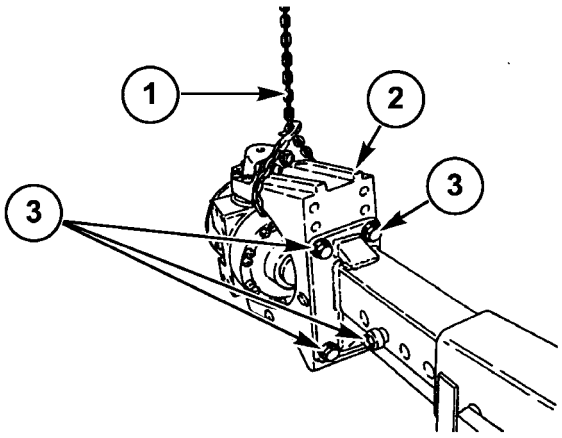
1. To remove the motor and steering knuckle, disconnect and cap the hydraulic lines **(1)** leading to the motor. Remove the steering cylinder **(2)** , and the steering cross tube **(3)** from the steering knuckle on the motor. Remove the steering knuckle from the wheel motor by removing the four bolts **(4)**.

NOTE: *Be sure to remember hose routing and use a marker or paint pen to label to hoses and ports.*



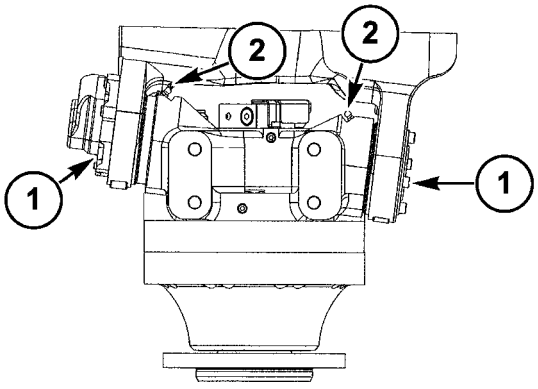
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2. Use a hoist and a chain **(1)** to support the motor from the C-frame **(2)** when removing it. To remove the motor from the axle remove the four M24 bolts **(3)** attaching it.



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3. With the motor on a solid work surface, support the C-frame with a chain hoist so that it cannot drop or rollover when pins are removed. Remove the M10 capscrews **(1)** and grease zerks **(2)**.

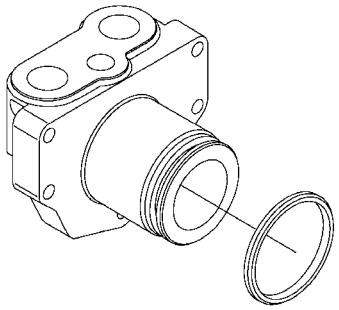


20041977 3

4. Use M10 bolts in threaded hole to separate or back away the pins from the C-frame.

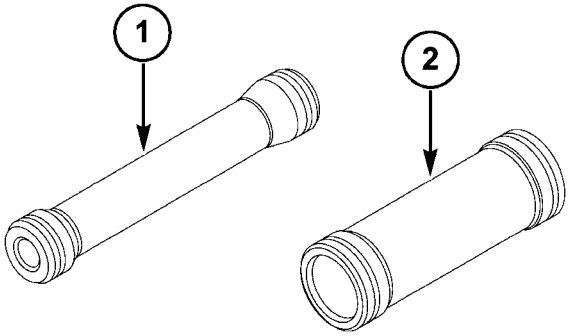
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5. Remove top pin and bottom pin from inner cover.



20041979 4

6. Remove the inner **(1)** and outer pipes **(2)** with seals.

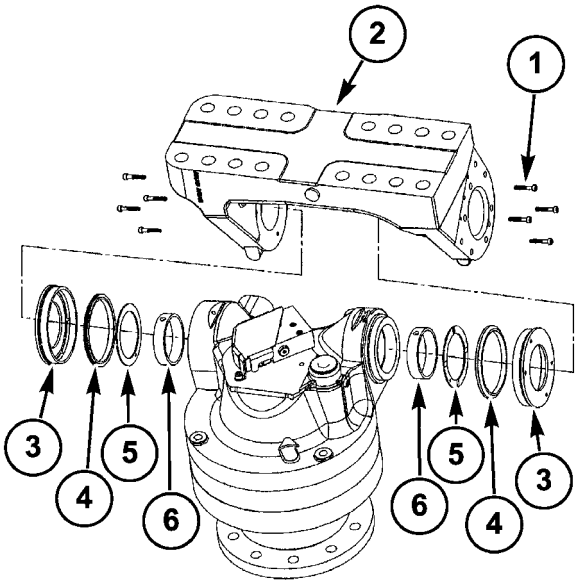


20041980 5

7. Remove four M6 capscrews **(1)** from top and bottom of C-frame **(2)** .Remove C-frame **(2)**, Seal Cover **(3)**, environmental seal **(4)** thrust washer **(5)**, and bushing **(6)** .

IMPORTANT: *Do not damage the bushing bores in the housing*

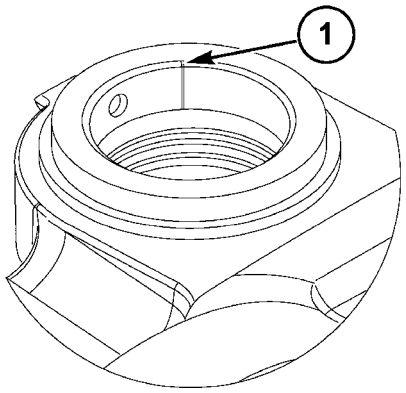
IMPORTANT: *Do not damage the thrust washer contact surface.*



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8. Remove the bushing **(1)** from bore by peeling the bushing at seam with chisel.



20041983 7

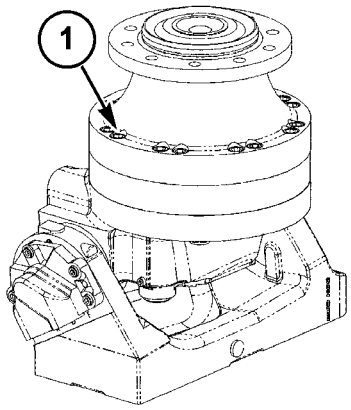
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Hydrostatic motor - Disassemble (D.12.A.28 - F.10.A.25)

AFX8010

IMPORTANT: *Cleanliness is most important when servicing cam lobe motors. Always use clean tools and work in a clean environment. Wash all internal parts in clean solvent and dry thoroughly with compressed air. DO NOT use rags or paper towels. Wrap parts in clean paper and keep them in a clean area prior to assembly. If more than one motor is being serviced, work on each one separately. DO NOT mix parts.*

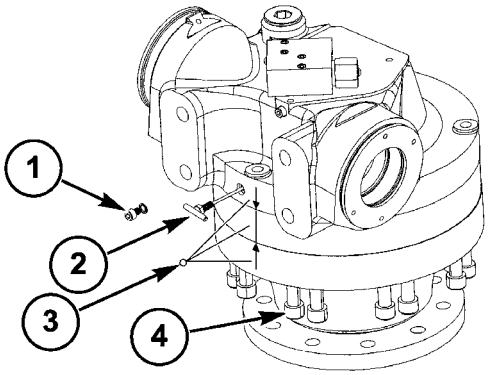
1. Place motor on a work bench resting on the C-frame. Be sure all hydraulic oil is drained from the motor. Loosen but do not yet remove the sixteen M16 socket head cap screws **(1)**. Remove C-frame on steerable motor **Hydrostatic motor - Remove (D.12.A.28 - F.10.A.10)**.



20042859 1

2. Remove the sixteen M16 x 100mm socket head cap screws **(4)** from the motor. Remove the M8 cap screw and washer **(1)** and install the valve retainer tool **(2)**.

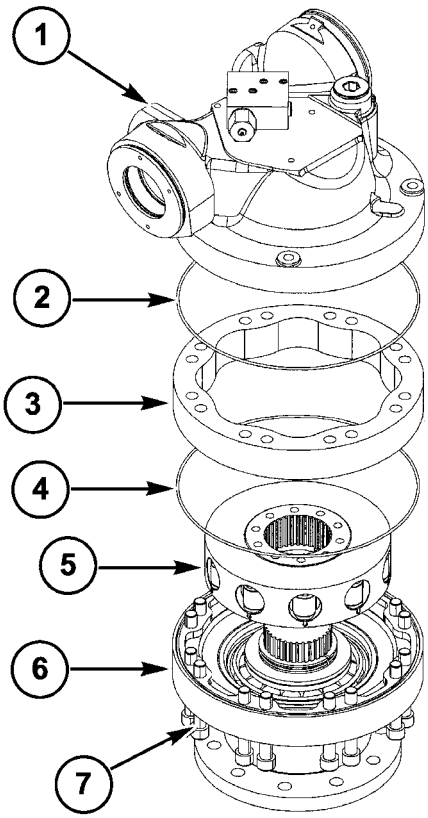
ATTENTION: *Before separating the motor components mark the outside of the components with an alignment mark **(3)** for re-assembly.*



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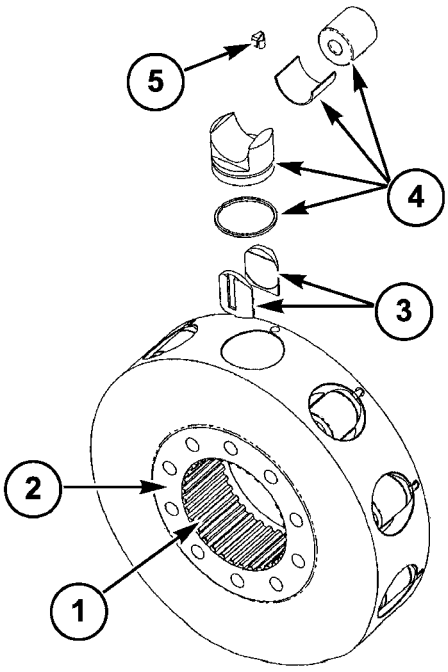
3. Remove the valve cover **(1)** and O-ring **(2)**. Remove the cam ring **(3)**. Lift the cylinder block **(5)** from the bearing support shaft **(6)** and remove the O-ring **(4)**.



20042861 3

4. To disassemble the cylinder block first inspect the splines **(1)** in the cylinder block for excessive wear or damage. Inspect lapped surface **(2)** of block for damage. Remove retaining clip **(5)**, piston retainers **(3)** and piston assembly **(4)**. In the event that a retainer clip breaks while removing it from the cylinder block use a 10-32 tap, small ball peen hammer and adjustable wrench to remove it.

IMPORTANT: *Do not reuse piston retaining clip. Inspect pistons for excessive wear pattern.*

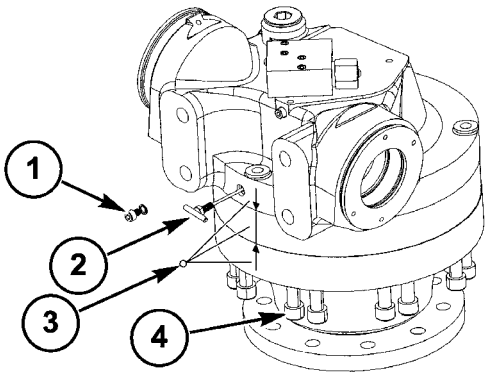


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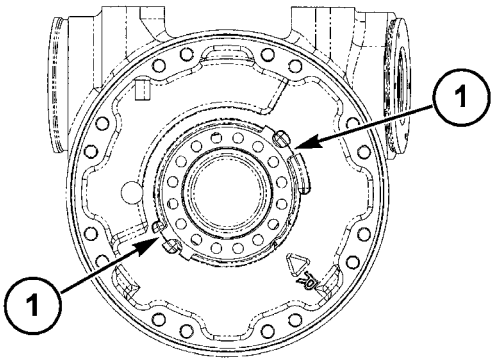
5. To disassemble the distributor valve first remove the special tool **(2)** (Valve retainer tool) and note the position of the distributor valve in relation to the valve cover.

NOTE: *Be sure the reference marks **(3)** correspond with each other for both Left and Right wheel motors.*



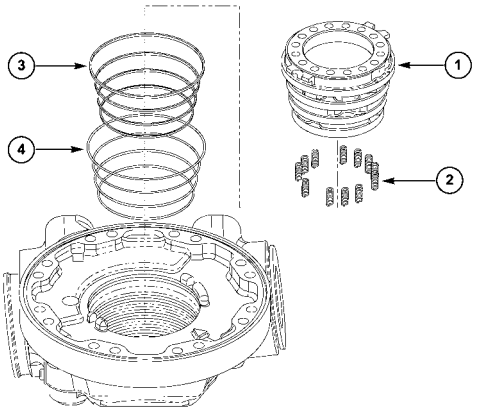
20042860 5

6. Remove the distributor valve by prying carefully (to not damage mating surfaces or O-ring grooves) at the locating tabs **(1)**.



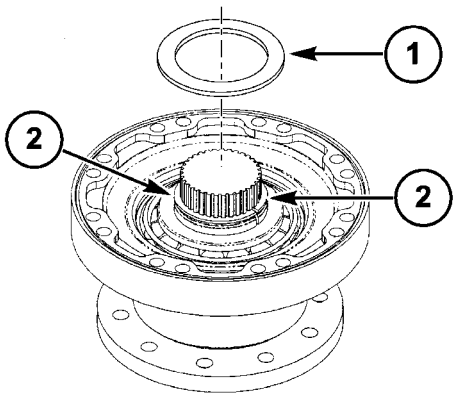
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7. Remove the distributor valve **(1)** and springs **(2)** from the valve cover. Remove backup rings **(3)** and O-rings **(4)** from the valve cover.



20042863 7

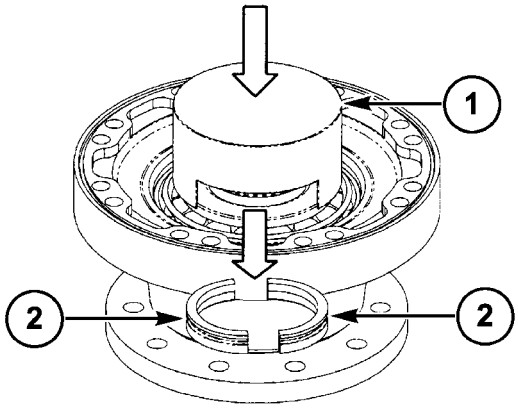
8. Remove the thrust washer **(1)** by prying it up off the split rings **(2)**.



20042868 8

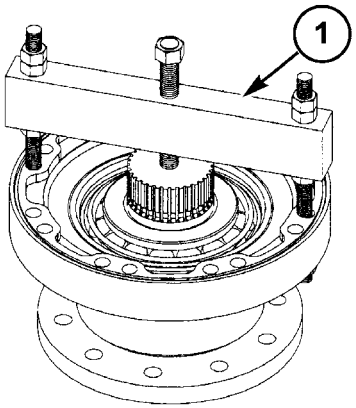
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9. Use the special tool (split ring assembly hood)**(1)** to press down on the inner bearing and remove the split rings**(2)**.



20042869 9

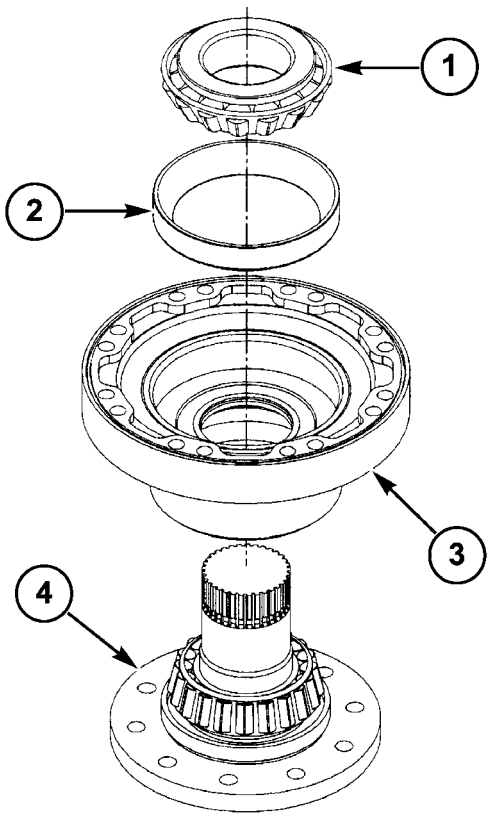
10. Use the special tool (shaft removal tool) **(1)** to press the shaft and outer bearing out of the bearing support.



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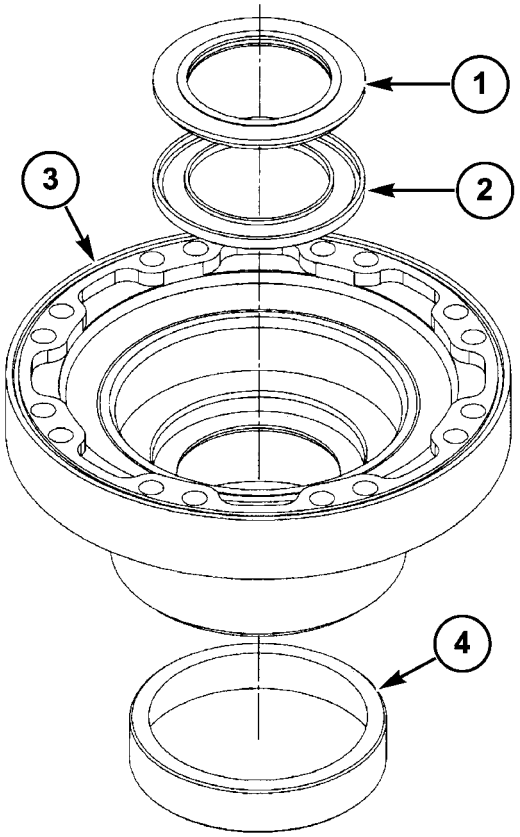
11. After pressing out the shaft **(4)**, remove the bearing **(1)** and bearing race **(2)** from the bearing support **(3)**.



20042871 11

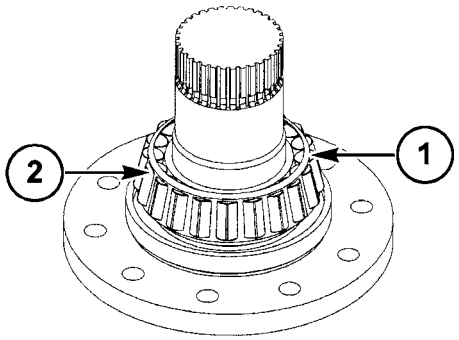
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12. Press out the seal support **(1)** and lip seal **(2)** from the bearing support **(3)**. Remove outer race **(4)**.



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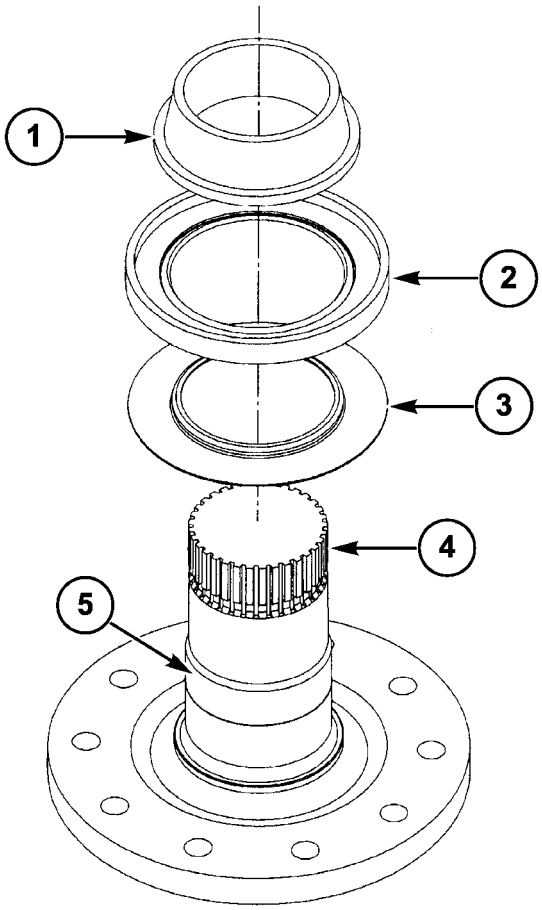
13. Cut bearing cage **(1)** and **(2)**, separate and remove from shaft. Do not cut into shaft or flange.



20042873 13

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14. Pull the inner race **(1)** off the shaft. Pull the seal **(2)** and remove the deflector **(3)**. Check the contact surface of the inner seal on the shaft **(6)** and the condition of the splines **(4)**.



20042874 14

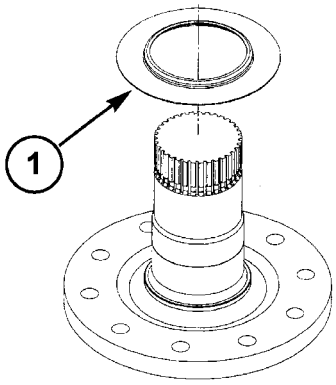
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Hydrostatic motor - Assemble (D.12.A.28 - F.10.A.20)

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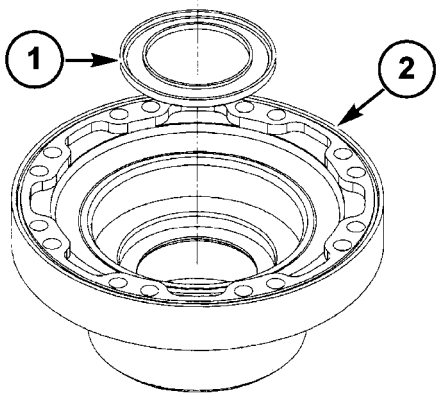
NOTE: *Be sure all parts are clean before assembly.*

1. Start with the pre-assemble of the bearing support. Install the deflector **(1)** onto the shaft.



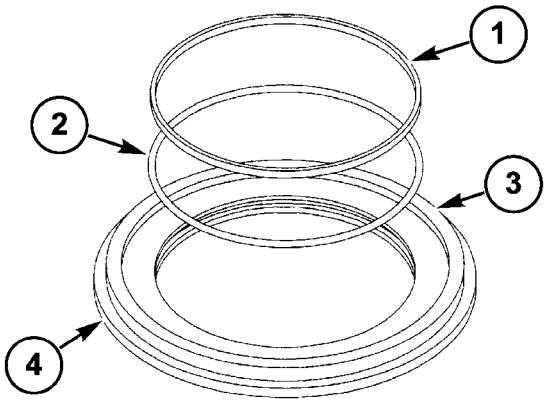
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2. Install seal **(1)** into bearing support **(2)**.



20042876 2

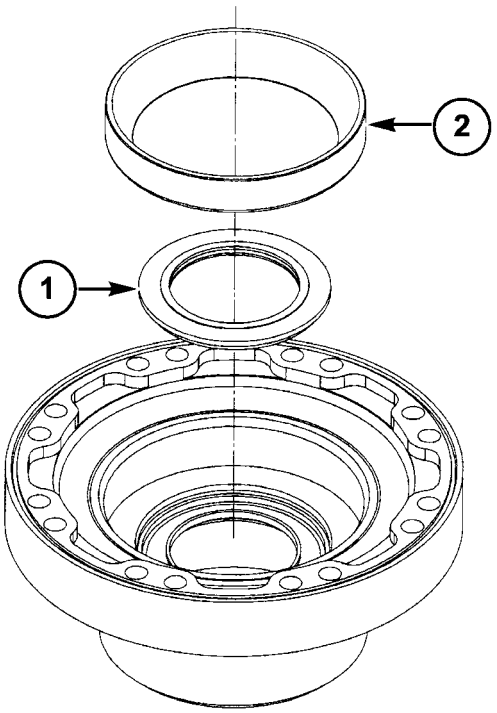
3. Remove old backup ring and o-ring from seal support **(3)**. Install new O-ring **(2)**and backup ring **(1)** into seal support **(3)**. Apply Loctite Brand 454 to surface indicated on seal support **(4)**.



20042877 3

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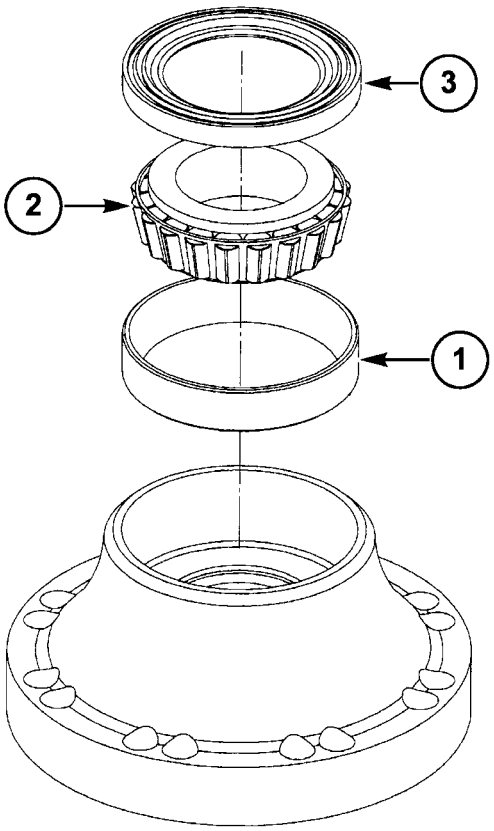
4. Press seal support **(1)** and inner bearing outer race**(2)** into bearing support.



20042878 4

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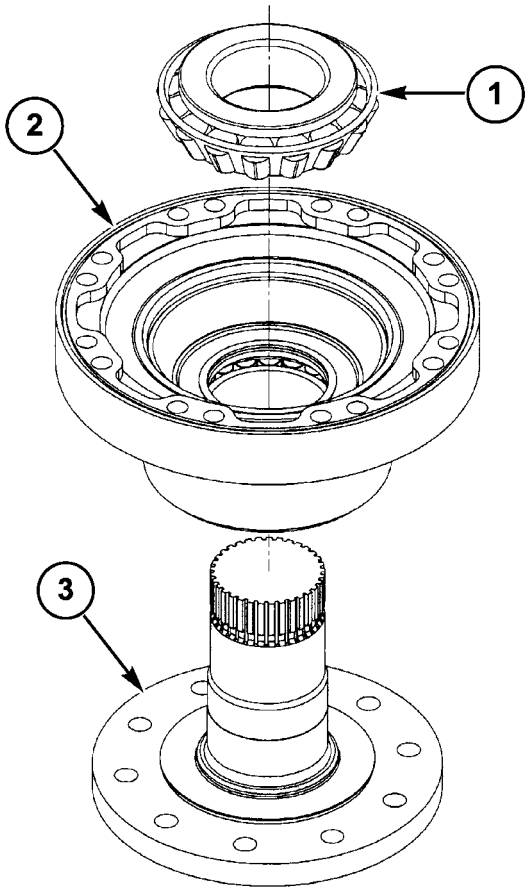
5. Press outer race **(1)** of outer bearing into bearing support. Coat the bearing surface of the outer race with grease. Pack the outer bearing with grease and install in the outer race. Coat the outer surface of the seal **(3)** with grease and press into the bearing support **(2)**. Coat the lips of the seal **(3)**with grease.



20042879 5

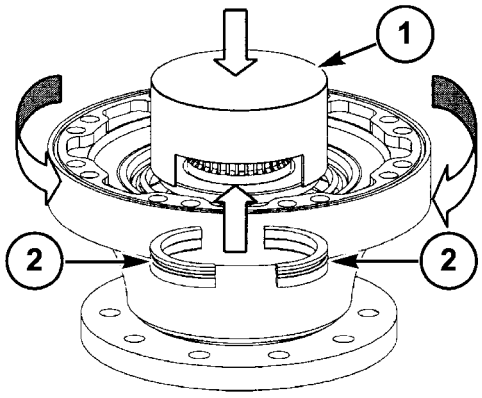
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6. Install bearing support **(2)** onto shaft **(3)**. Be careful not to damage shaft seals. Install bearing into outer race **(1)**.



20042880 6

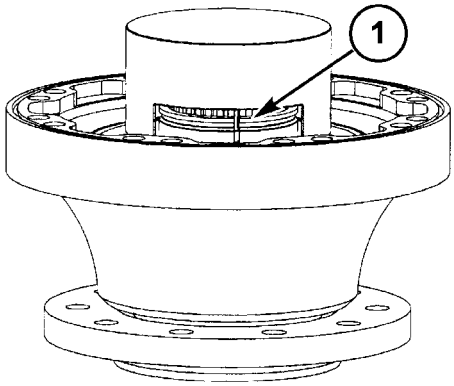
7. Use the special tool (split ring assembly hood) **(1)** and a press. Pre-load inner bearing to **170,000 N (38,220 lb)** of force. Reduce force to **20,000 N (4,500 lb)** of force. Check bearing position by rotating bearing housing a minimum of 5 revolutions clockwise and 5 revolutions counter-clockwise. While maintaining **20,000 N (4,500 lb)** of force, install the split rings **(2)**.



20042881 7

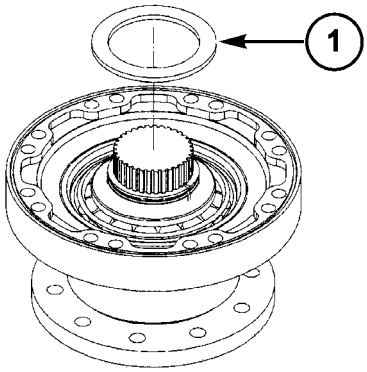
https://truckmanualshub.com/

8. Increase force on bearing to **170,000 N (38,220 lb)**. Use a feeler gauge to measure the distance between top of the split ring and the shaft spline. Reduce force to **20,000 N (4,500 lb)** and remove split rings. Increase force to **170,000 N (38,220 lb).** Install new split rings that are closest to the measured distance. Release the force and remove the split ring assembly hood tool **(1)**. Insure the gaps between the split rings are the same on each side of the shaft.



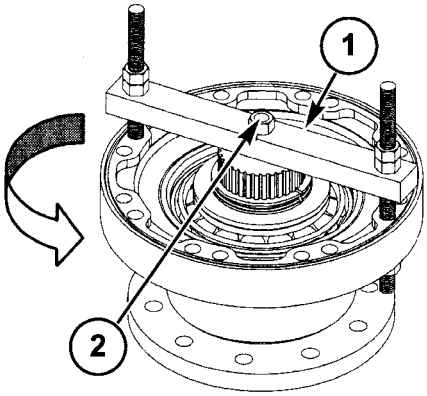
20042882 8

9. Install thrust washer **(1)** over split rings, make sure the thrust washer is pressed securely against the bearing.



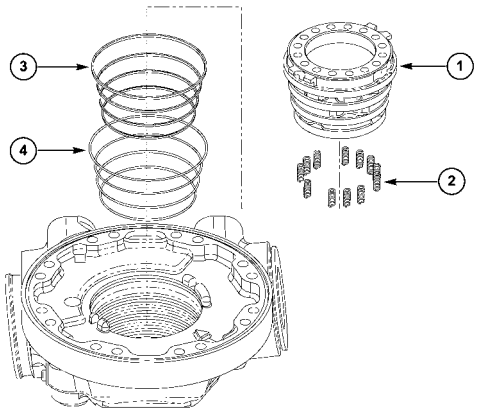
20042883 9

10. Use a torque wrench on nut **(2)** of special tool (Rotational torque tool) **(1)** to check the final rotational torque of the bearing support assembly. The torque should be within **49 - 91 Nm (36 - 67 lb ft)**. If the torque is correct then continue assembly. If it is not correct then readjust the bearing support to obtain correct torque.



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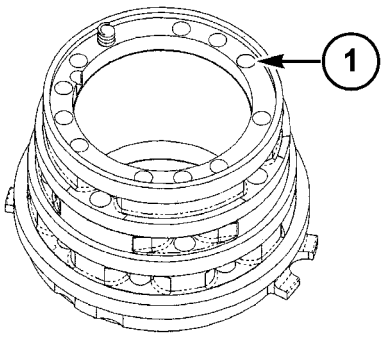
11. Re-assemble the distributor valve **(1)** and springs **(2)** by lubricating the grooves in the valve cover. Install the O-rings **(4)** in the valve cover. Install the backup rings **(3)** in the valve cover.



20042863 11

https://truckmanualshub.com/

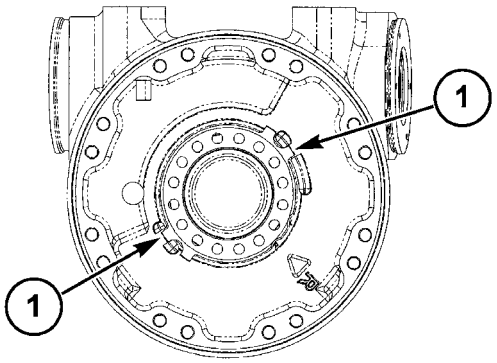
12. Fill the spring cavities in the distributor valve cover with grease **(1)**, and install the springs.



20042864 12

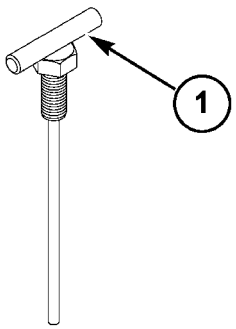
13. Lubricate the distributor valve backup ring contact surface.

14. Align locating tabs **(1)** with slots in valve cover and press distributor into valve cover.



20042862 13

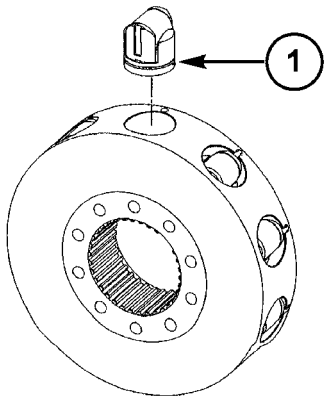
15. Install special tool **(1)** (Valve retainer tool) into valve cover.



20041987 14

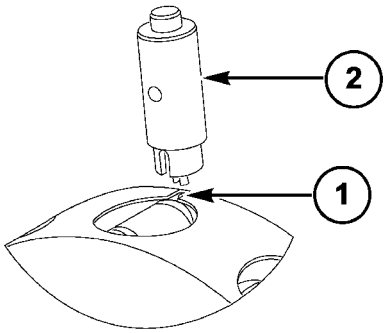
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16. To install a piston **(1)** back into the cylinder block coat the piston with clean hydraulic oil before installing into the bore. Compress wiper ring to be able to insert piston assembly into cylinder bore.



20042866 15

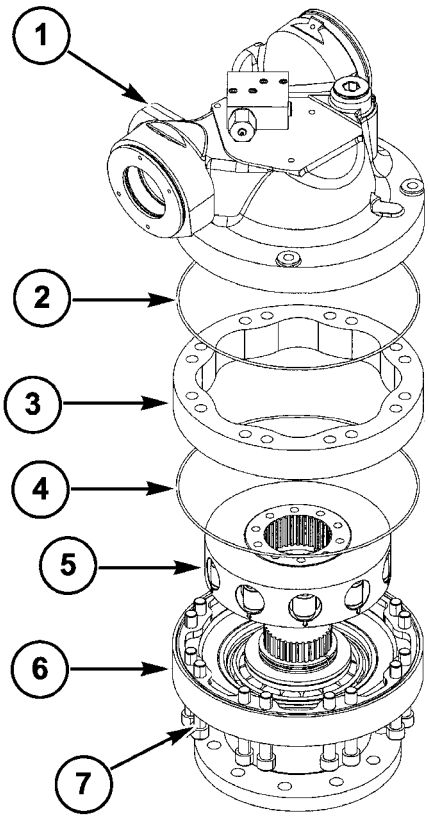
17. Once piston is in the cylinder block with the retaining assembly use special tool **(2)** (Retaining clip installation tool) to install the new retaining clip **(1)**.



20042867 16

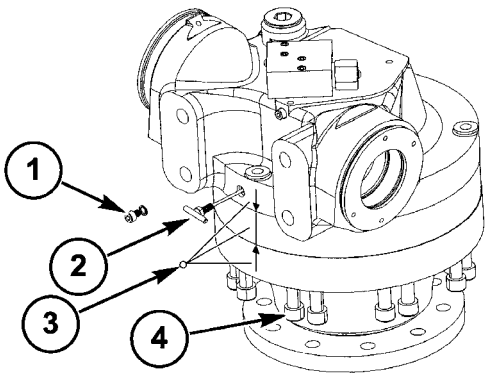
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18. Install new O-ring **(2)** coated with grease in groove of valve cover **(1)**. Install the cylinder block **(5)** onto bearing support **(6)**. Install new O-ring **(4)** coated with grease into groove of bearing support **(6)**.



20042861 17

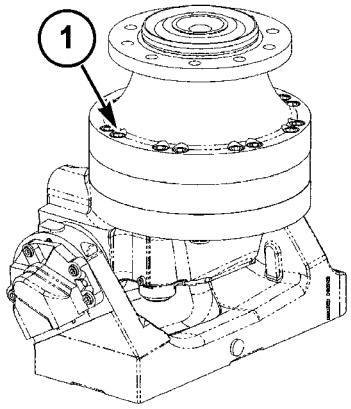
19. Align marks **(3)** made prior to disassembly and install cam ring and valve cover onto the bearing support. Install sixteen M16 x 100mm socket head capscrews **(4)**. Tighten but do not torque. Remove valve retainer tool **(2)**. Replace and torque M8 socket head capscrew and washer **(1)**. Torque the M8 capscrew **(1)** to **18 - 25 Nm (13 - 18 lb ft)**.



20042860 18

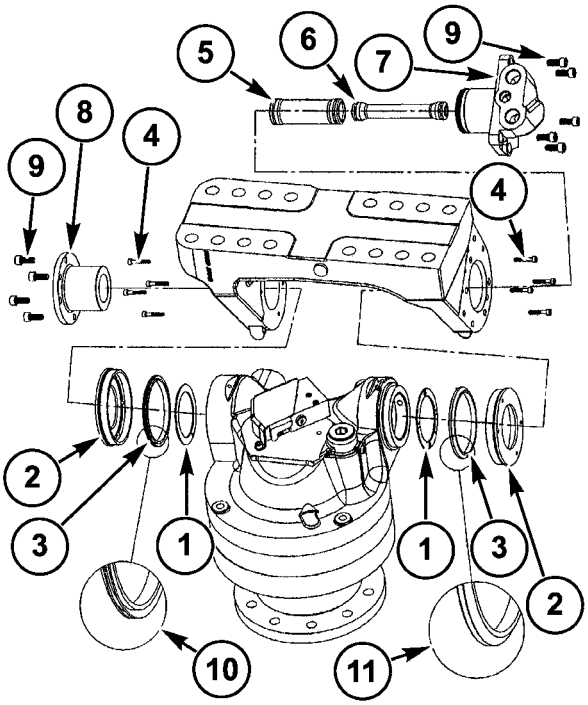
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20. Torque the M16 x 100mm socket head capscrews **(1)** to **320 - 390 Nm (236 - 288 lb ft)** .



20042859 19

21. Install the wheel motor to the C-frame as described in **Hydrostatic motor - Install (D.12.A.28 - F.10.A.15)**.



20041981 20

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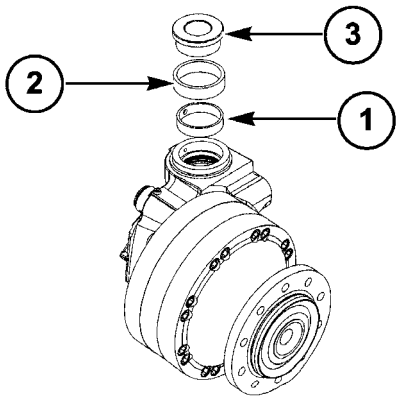
Hydrostatic motor - Install (D.12.A.28 - F.10.A.15)

AFX8010

1. To install new pivot pin bushings**(1)** in the motor use special tool (Bushing Installer) **(2) (3)** until the bushing is pressed flush into the housing.

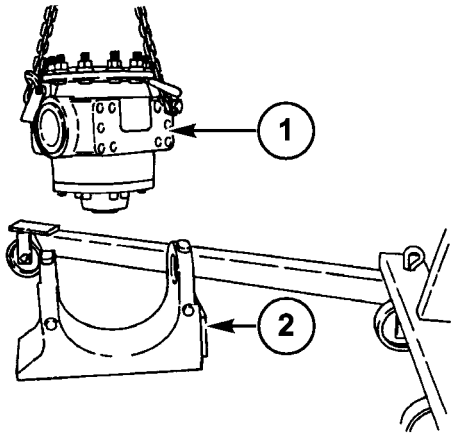
IMPORTANT: *Be sure the holes in the bushing align with the holes in the housing.*

IMPORTANT: *Be sure not to damage the bushing bores or the bushing when installing.*



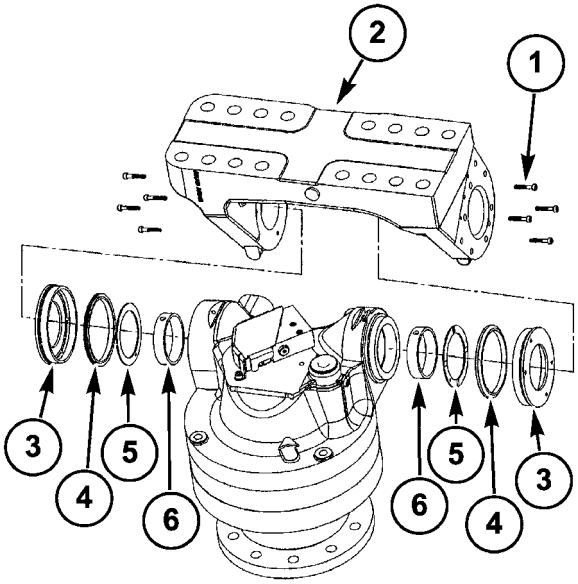
20041984 1

2. With the bushings installed place the C-frame **(2)** on a flat surface. Prepare the motor wheel flange**(1)** in a sling using a hoist to lift the motor over the C-frame.



20015310A5 2

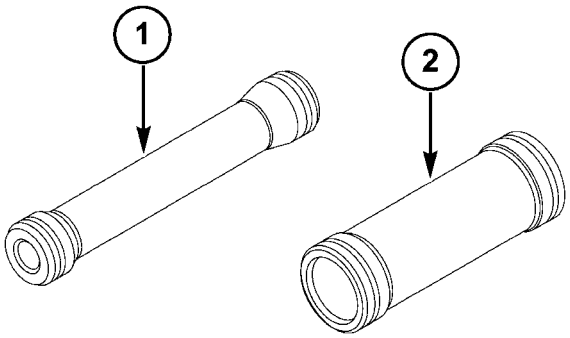
3. Apply Loctite Brand 454 to smooth side of thrust washer **(5)** and install on motor. Install environmental seal **(4)** on motor housing with seal lips toward motor. Coat the seals with grease. Install seal covers **(3)** over environmental seals. Apply Loctite Brand 515 around holes and threads on top and bottom ears of C-frame. Install C-frame **(2)** onto motor. Install and torque M6 capscrews **(1)** to **9 - 11 Nm (7 - 14 lb ft)** to hold seal covers to top and bottom ears of C-frame.



20041978 3

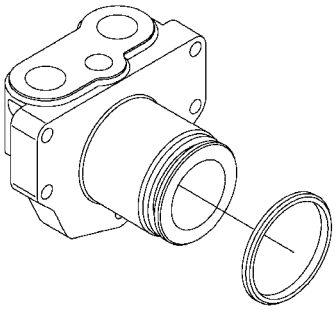
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4. Install new inner rings and seals on inner pipe **(1)** and outer pipe **(2)**. Lubricate seals with petroleum jelly. Install the outer tube **(2)**. Install the inner tube **(1)**. Apply Loctite Brand 515 to top pin mounting surface of C-frame, and lubricate the seals on the top pin with petroleum jelly.



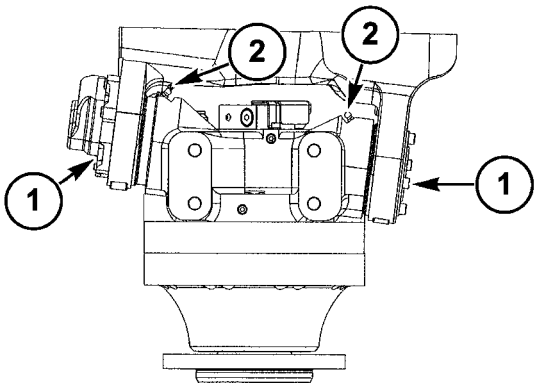
20041980 4

5. Install the top pin and bottom pin.



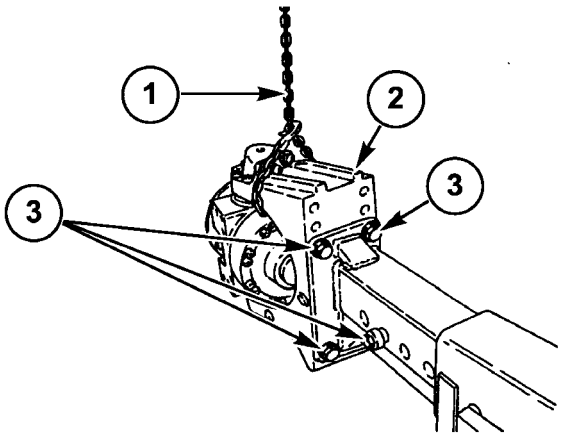
20041979 5

6. Apply Loctite Brand 271 to the M10 socket head cap screws. Install and torque to **75 - 91 Nm (55 - 67 lb ft)** With the C-frame mounted to the motor use Multi-purpose grease to lubricate the bushings through the grease zerks until grease protrudes from the seal area.



20041977 6

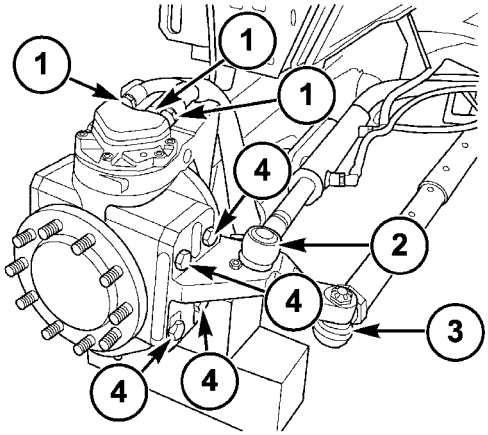
7. Use a hoist and a chain **(1)** to lift the motor to the axle flange. Mount the motor and C-frame **(2)** to the axle with four M24 bolts **(3)** and torque to **1255 Nm (926 lb ft)**



20015305A5 7

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8. . Attach the steering knuckle to the wheel motor and torque bolts **(4)** to **435 Nm (321 lb ft)**. Connect the hydraulic lines **(1)** to the wheel motor. Install the steering cylinder **(2)** and crossover tube **(3)** if they were removed.



20042919B5 8

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Index

TRAVELLING - D

REAR AXLE - 12.A

Hydrostatic motor - Assemble (D.12.A.28 - F.10.A.20) 32
AFX8010

Hydrostatic motor - Bleed (D.12.A.28 - F.35.A.25) 20
AFX8010

Hydrostatic motor - Disassemble (D.12.A.28 - F.10.A.25) 25
AFX8010

Hydrostatic motor - Dynamic description (D.12.A.28 - C.30.A.10) 10
AFX8010

Hydrostatic motor - Exploded view (D.12.A.28 - C.10.A.20) 7
AFX8010

Hydrostatic motor - General specification (D.12.A.28 - D.40.A.10) 3
AFX8010

Hydrostatic motor - Install (D.12.A.28 - F.10.A.15) 41
AFX8010

Hydrostatic motor - Remove (D.12.A.28 - F.10.A.10) 22
AFX8010

Hydrostatic motor - Torque (D.12.A.28 - D.20.A.10) 3
AFX8010

REAR AXLE - Detailed view (D.12.A - C.10.A.50) 5
AFX8010

REAR AXLE - Overview (D.12.A - C.10.A.10) 4
AFX8010

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TRAVELLING - D

2WD-4WD SYSTEM Hydraulic - 14.C

AFX8010

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Contents

TRAVELLING - D

2WD-4WD SYSTEM Hydraulic - 14.C

FUNCTIONAL DATA

Control valve

Control valve - Exploded view (D.14.C.14 - C.10.A.20) 3
AFX8010

Control valve - Sectional view (D.14.C.14 - C.10.A.30) 5
AFX8010

Control valve - Static description (D.14.C.14 - C.30.A.20) 6
AFX8010

Control valve - Dynamic description (D.14.C.14 - C.30.A.10) 10
AFX8010

SERVICE

Command valve

Command valve - Replace (D.14.C.12 - F.10.A.30) 18
AFX8010

Command valve - Overhaul (D.14.C.12 - F.10.A.40) 20
AFX8010

Control valve

Control valve Two speed valve - Replace (D.14.C.14.11 - F.10.A.30) 24
AFX8010

DIAGNOSTIC

Command valve

Command valve - Unidentified failure (D.14.C.12 - G.30.B.46) 25
AFX8010

Control valve

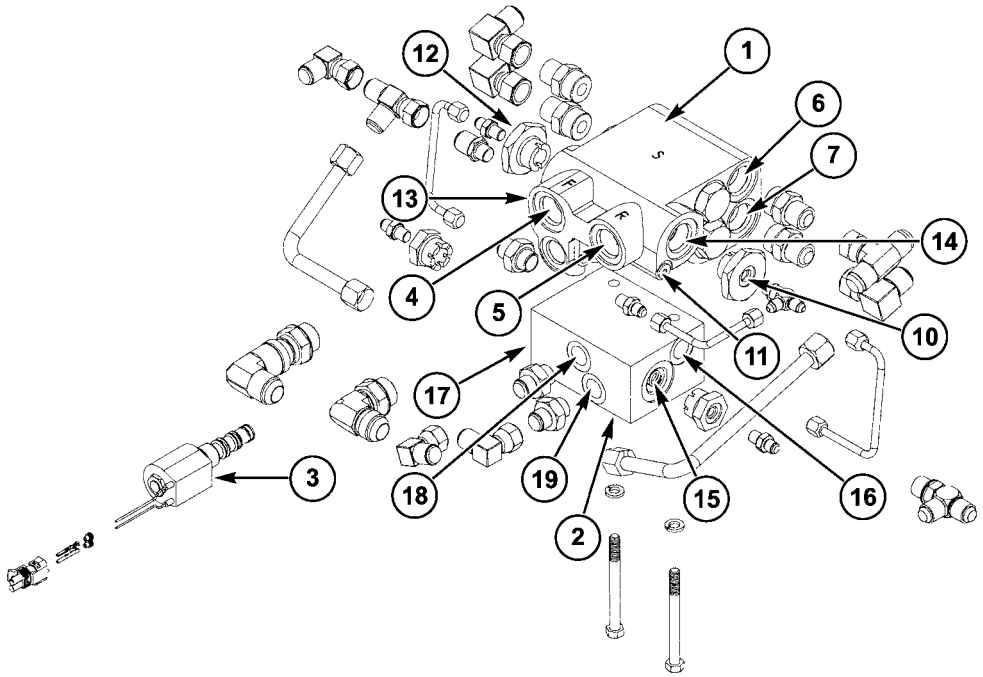
Control valve Two speed valve - Unidentified failure (D.14.C.14.11 - G.30.B.46) 29
AFX8010

https://truckmanualshub.com/

Control valve - Exploded view (D.14.C.14 - C.10.A.20)

AFX8010

The control valve block assembly is mounted near the rear axle and is a two tier valve. A drain valve is mounted below the control valve and is considered part of the valve assembly. The upper tier contains the forward and reverse inlet pressure ports, selector spool valve, reverse flow divider, reverse check valve and reverse drive pressure outlet ports.
The lower tier contains the low pressure shuttle valve, solenoid valve, forward flow divider, forward check valve and forward drive pressure outlet ports. The low pressure shuttle valve, solenoid valve and selector spool supply and control the oil supply to both upper and lower tier valves of the assembly, as well as supply and control oil flow to the drain valve.



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Control Valve Assembly

1. Valve Block
2. Drain Valve Block
3. Solenoid Valve
4. Forward Pressure Inlet
5. Reverse Pressure Inlet
6. Left Wheel Motor Reverse Pressure Port
7. Left Wheel Motor Forward Pressure Port
8. Right Wheel Motor Reverse Pressure Port
9. Right Wheel Motor Forward Pressure Port
10. Pilot Pressure to Engage Port
11. Reverse System Pressure Test Port
12. Pilot Pressure to Disengage Port
13. Forward System Pressure Port
14. Valve Selector Spool Location
15. Drain Valve Selector Spool Location
16. Left Wheel Motor Drain Port
17. Right Wheel Motor Drain Port
18. Inlet Drain Port from Reverse Pressure Port

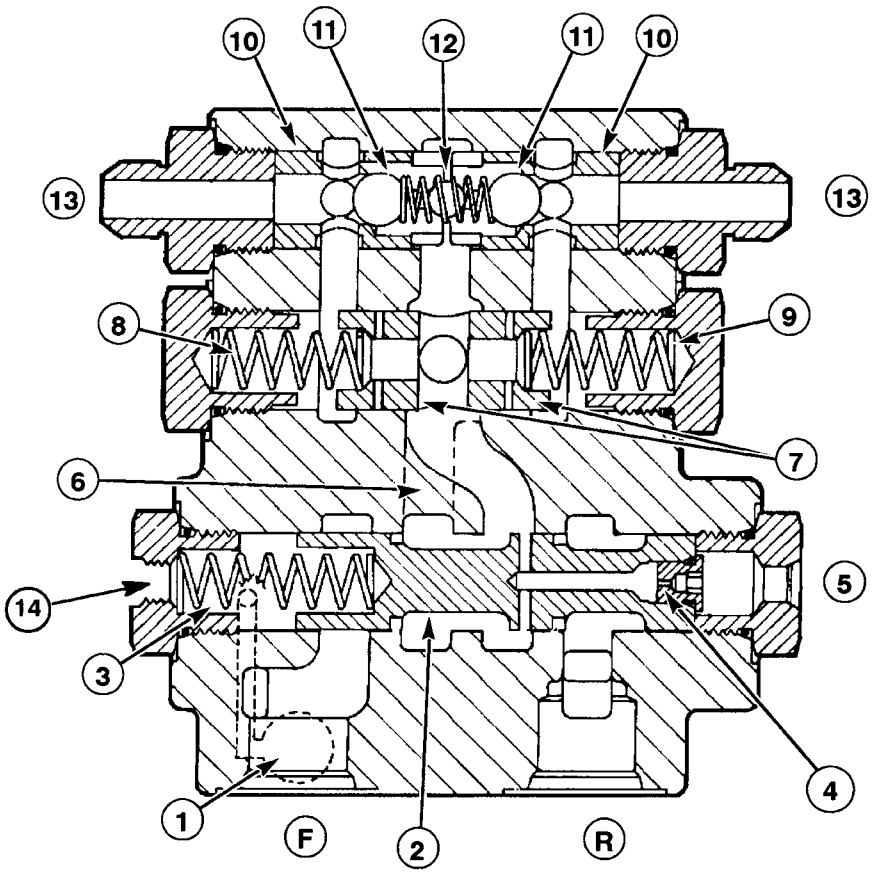
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19. Valve Drain Port to Hydraulic Fluid Tank

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Control valve - Sectional view (D.14.C.14 - C.10.A.30)

AFX8010



DS00M074

DS00M074 1

Cross Section of Control Valve Upper Tier

1. Solenoid Valve Passage
2. Selector Spool
3. Spring
4. Case Drain Orifice
5. Pilot Pressure to Engage Port
6. Lower Tier Supply Passage
7. Flow Dividers
8. Spring
9. Spring
10. Check Valve Ball Seat
11. Check Valve Ball
12. Check Valve Spring
13. Reverse Outlet Pressure Ports
14. Pilot Pressure to Disengage Port
15. Forward Inlet Pressure Port
16. Reverse Pressure Port

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Control valve - Static description (D.14.C.14 - C.30.A.20)

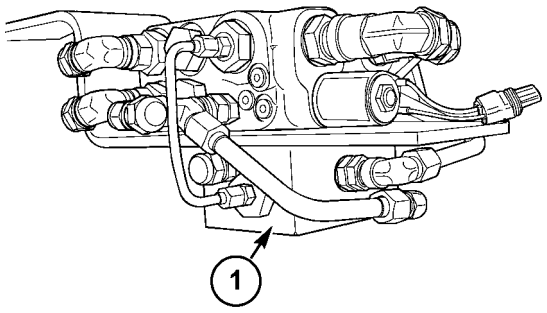
AFX8010

The control valve assembly for the powered rear axle contains several different hydraulic components, including the following:

- Drain valve
- Low pressure Shuttle valve
- Forward and Reverse Flow Divider valves
- Forward and Reverse Check valves

DRAIN VALVE

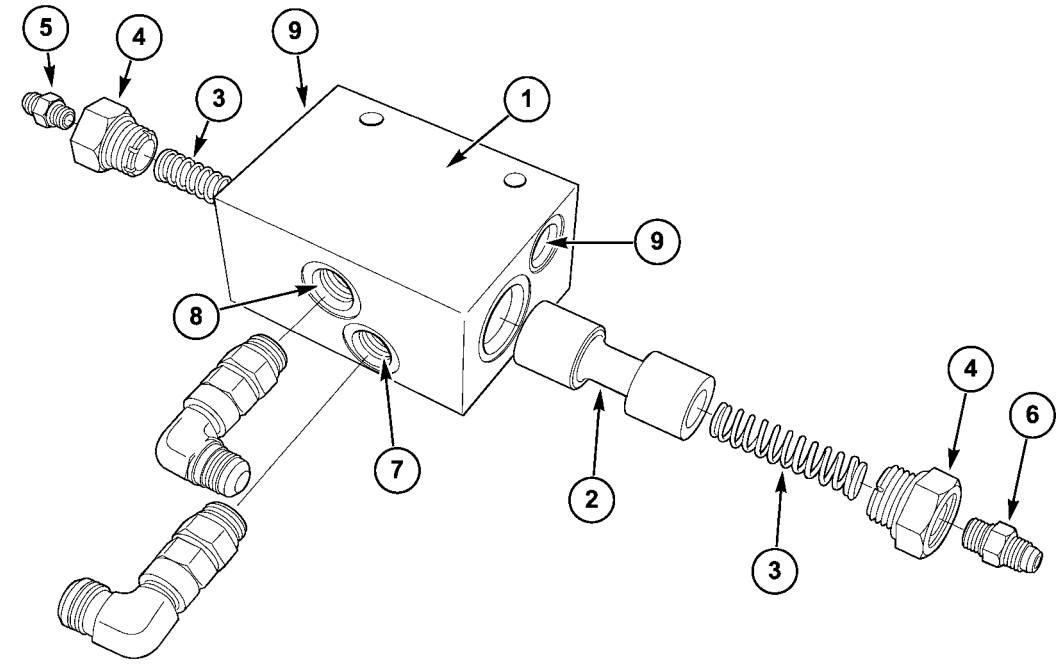
NOTE: *Reference to directions are as if viewing the valve from the rear, facing the front of the combine.*



50016117A5

50016117A5 1

The drain valve **(1)**, which is considered part of the valve, helps to drain the hydraulic fluid that is pushed from the wheel motor pistons when the powered rear axle is switched off. The drain valve also contains a galley that allows the left and right wheel motor case drain lines to be connected together to a common line back to the hydrostatic system cooling circuit. The drain valve is mounted below the main portion of the valve and is bolted to the same mounting bracket. Several hydraulic lines connect the two portions of the valves together.



50016118A5

50016118A5 2

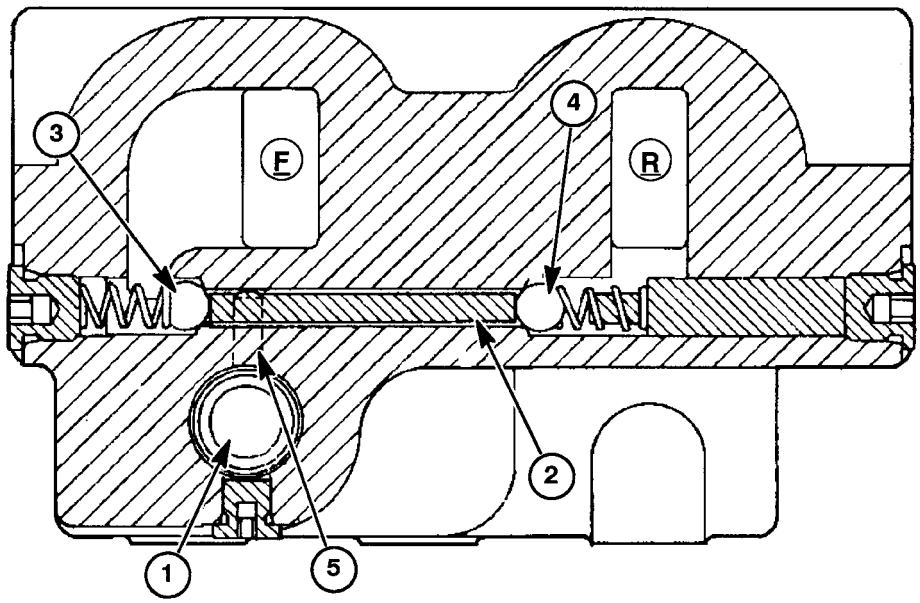
Exploded View of Drain Valve

1. Drain Valve Body

https://truckmanualshub.com/

2. Valve Spool
3. Spring
4. End Plug
5. Pressure to Disengage Port Fitting
6. Pressure to Engage Port Fitting
7. Drain Supply Port
8. Return to Tank Port
9. Motor Case Drain Port

The drain valve is operated by hydraulic fluid under charge pressure. A spool inside the valve will shift left or right, depending upon what side of the spool charge pressure is applied to. When the Powered Rear Axle is "OFF", hydraulic fluid from the pressure to disengage side of the valve is directed to the right side of the spool, which moves the spool to the left. This opens a path for the hydraulic fluid draining from the wheel motors to the hydraulic fluid reservoir (tank) Hydraulic fluid will flow through an external line, from the "tee' at the reverse pressure supply/return port to a port on the front of the drain valve. Hydraulic fluid will then flow past the drain valve spool land, and out to the valve case drain connection through an external tube. The fluid then is returned to tank. When the Powered Rear Axle is "ON", hydraulic fluid from the pressure to engage side of the valve is directed to the left side of the drain valve spool, which moves the spool to the right. This closes the path for hydraulic fluid to return to tank.



DS00M058

DS00M058 3

Low Pressure Shuttle Valve

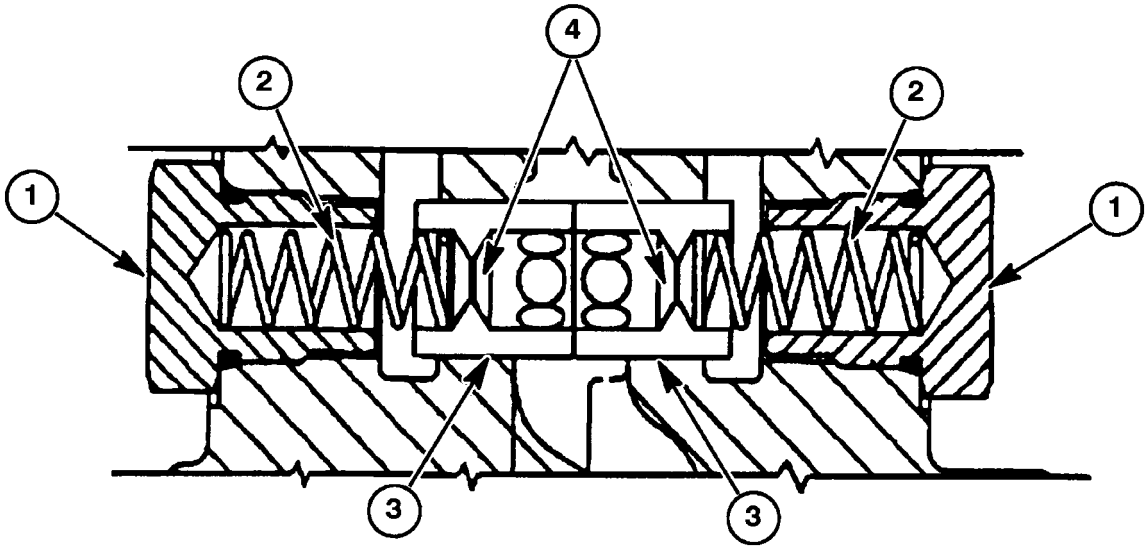
1. Solenoid Valve Location
2. Spacer
3. Forward Check Ball
4. Reverse Check Ball
5. Oil Passage

LOW PRESSURE SHUTTLE VALVE

The low pressure shuttle valve provides hydraulic fluid under charge (pilot) pressure to the solenoid valve to engage or disengage the Powered Rear Axle system. The solenoid valve, in turn, supplies hydraulic fluid under charge pressure to either end of the selector spool to move the spool. Depending upon what direction the spool moves, hydraulic fluid to the wheel motors will be switched "ON" or "OFF". This fluid also controls the spool in the drain

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valve, opening (disengaged) or closing (engaged) a path for hydraulic fluid to flow back to the hydraulic fluid reservoir. The charge pressure is available from the return side of the Powered Rear Axle hydrostatic system. The spacer **(2)** always holds one of the check balls **(3) (4)** off the seat in the valve cavity. This ensures charge pressure is always available, even if the combine's main hydrostatic system is in neutral. When the combine is driven forward, the forward side **(F)** receives high pressure flow and the reverse side **(R)** is low pressure (charge pressure). The high pressure on the forward side will seat the check ball **(3)** which will move the spacer **(2)** to unseat the opposite check ball, on the forward side will seat the forward check ball **(3)** which will move the spacer **(2)** to unseat the reverse check ball **(4)** on the reverse side of the valve. The pressure will flow past the check ball**(4)** and spacer **(2)** through the passage **(5)** to the solenoid valve **(1)**.
When the combine is in reverse, the reverse side **(R)** receives the high pressure flow and the forward **(F)** side becomes low pressure (charge pressure). The reverse check ball **(4)** will seat, and will move the spacer **(2)** unseating the forward check ball **(3)**. This allows hydraulic fluid under charge pressure to flow past the check ball **(3)** and spacer **(2)** into the passage **(5)** to the solenoid valve.
The solenoid valve determines which side of the selector spool charge pressure is directed to, depending upon whether or not current is being supplied to the solenoid.



DS00M069

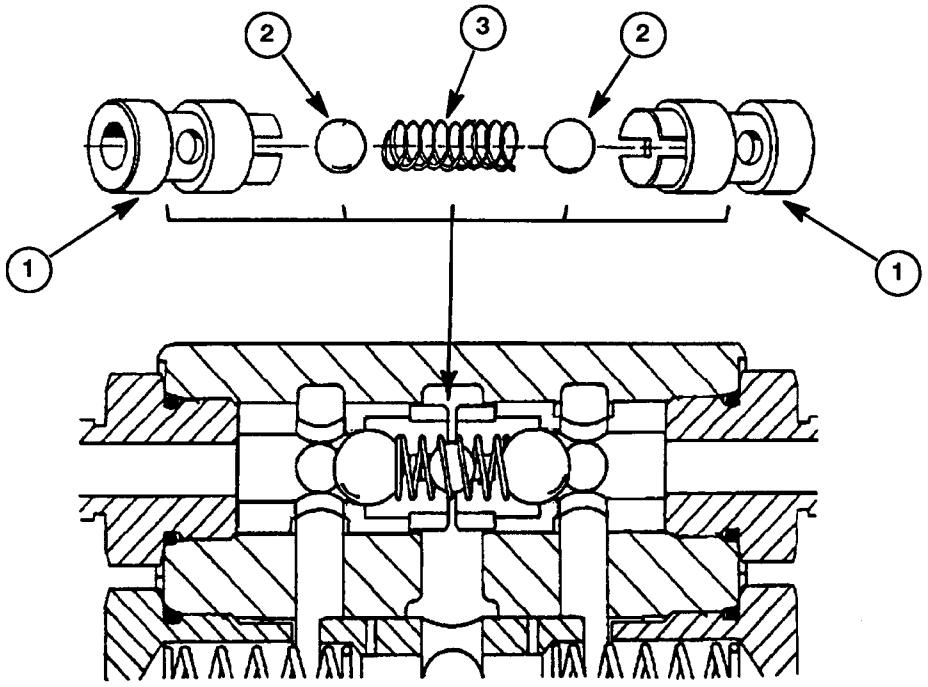
DS00M069 4

Forward and Reverse Flow Divider Valves

1. End Cap
2. Spring (2 per valve)
3. Flow Divider Valve (2 per valve)
4. 0.406" Orifice

FORWARD AND REVERSE FLOW DIVIDER VALVES
There are two flow divider valve assemblies in the valve block; one for the forward drive and one for the reverse drive. Each flow divider valve assembly is a split spool valve and contains two separate flow dividers. If traction is lost to one rear wheel (wheel slip), the drive pressure to that wheel will have the least resistance and the pressure will fall, making the wheel spin faster. To compensate for this the higher pressure on the non-slipping wheel side of the flow divider will move the flow divider valve assembly towards the lower pressure (slipping wheel) side, limiting the hydraulic fluid flow to the slipping wheel at the same time maintaining the pressure on the non-slipping wheel. When the drive pressure equalizes in both wheel motor drive lines, the flow divider will move back to the center position. The flow divider also limits the maximum hydraulic fluid flow to each wheel motor. If both wheel motors should begin to spin, the split flow dividers will separate due to the pressure acting on the 10.3 mm (0.406″) orifice, 4, in each half of the spool. As the spools move apart the pressure to each drive motor will be limited to approximately 77.2 lpm (20.4 gpm). The rear wheel drive system is therefore limited to a total of 154.4 lpm (40.8 gpm).

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DS00M070

DS00M070 5

Forward and Reverse Check Valves

1. Check Valve Seat (2 per valve)
2. Check Valve Ball (2 per valve)
3. Spring (1 per valve)

FORWARD AND REVERSE CHECK VALVE

There are two check valve assemblies in the valve block, one for the forward drive and one for the reverse drive. Each check valve assembly contains two check ball seats, two check balls and one spring.

The check valves prevent the full amount of return hydraulic fluid (at charge pressure) from the wheel motors from flowing back through the check valve seats and flow divider orifice(s). Hydraulic fluid flow would create a large pressure drop. The return hydraulic fluid pressure from the wheel motors will move the check balls off their seats allowing some oil to flow through the check valve and through the center passage. The remaining oil will flow into each end of the flow divider, past the selector spool to the return side of the hydrostatic pump.

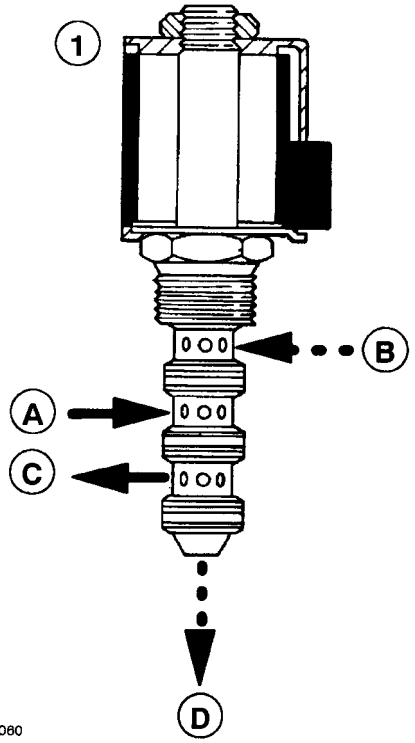
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Control valve - Dynamic description (D.14.C.14 - C.30.A.10)

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VALVE OPERATION "OFF" POSITION
(Reference Figures 1 and 2)

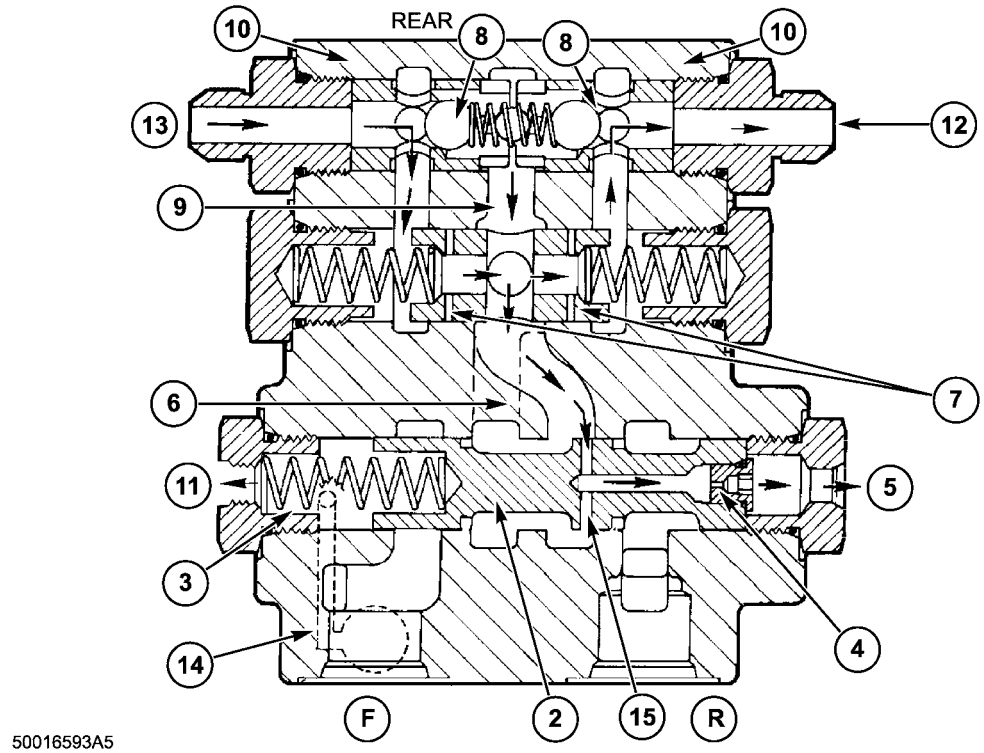
NOTE: *Reference to directions are as if viewing the valve from the rear, facing the front of the combine.*



DS00M060A 1

When the Powered Rear Axle switch in the combine cab is in the "Off" position, current is no longer supplied to the solenoid valve **(1)**, Figure 1 . This causes the spring-loaded spool in the solenoid to move away from the solenoid coil. When this happens, hydraulic fluid flow from the low pressure spool will be closed off from port **(A)** to port **(B)** (which flows to the pressure to engage side of the selector spool **(2)**, Figure 2, in the "On" position) and allows fluid to flow from port **(A)** to port **(C)**, Figure 1 (pressure to disengage side of the selector spool).

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Cross Section of Control Valve - "Off" Position

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The return spring **(3)**, Figure 2, and charge pressure directed from the low pressure spool, through port **(C)** of the solenoid valve, and through the drilled passage **(14)**, Figure 2, will move and keep the spool **(2)**, Figure 2, to the left side of the spool bore. This is the "disengaged" position for the spool and the forward and reverse high pressure ports are closed off.

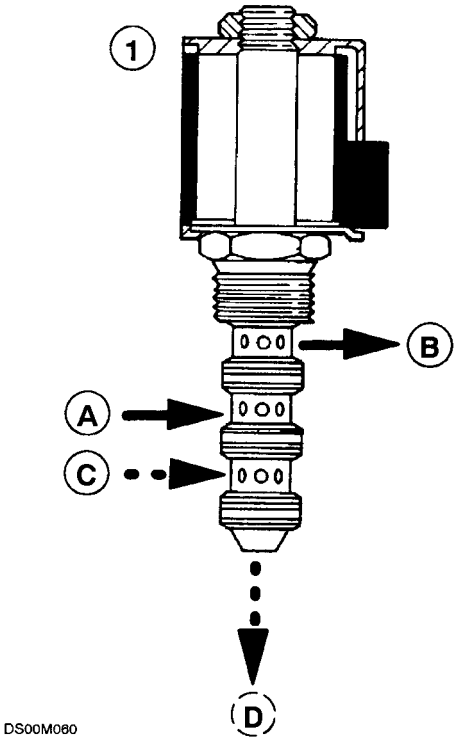
The rear wheels of the combine will now "freewheel". As the wheels rotate, the wheel motor pistons are pushed back into their bores. The hydraulic fluid behind the pistons is directed back to the wheel motor supply/return ports **(12, 13)**, Figure 2, of the valve. From there, the fluid from the right wheel motor flows through the flow dividers **(7)** and the right check valve **(8)** and center passage **(9)**. Hydraulic fluid then flows to the left side wheel motor reverse supply/return port **(12)** and to the selector spool **(2)**. Hydraulic fluid that exits the valve at the reverse supply/return port **(12)** and from the left wheel motor is directed to the drain valve by a "tee" connection at the reverse supply/return port **(12)** Hydraulic fluid flows from the "tee" to the drain valve through an external tube. A drilled passage **(15)** in the selector spool allows hydraulic fluid that does not flow out of the valve through the reverse supply/return port **(12)** to flow through the spool **(2)** through the case drain orifice **(4)** and out of the valve at the pressure to engage port **(5)**. From there, fluid is directed back to the solenoid valve via an external tube where the fluid drains back to tank.

When the Powered Rear Axle is off, charge pressure that is directed from the solenoid valve to the selector spool is also directed to the drain valve out of the pressure to disengage port **(11)**, through an external tube. This pressure shifts the spool in the drain valve that allows hydraulic fluid from the wheel motors (from the "tee" at the reverse supply/return port **(12)**) to flow through the drain valve and out. From the drain valve, hydraulic fluid is directed back to tank through an external tube that connects to the valve drain.

VALVE OPERATION "INTERMEDIATE" POSITION
(Reference Figures 3, 4, and 5)

NOTE: *Reference to directions are as if viewing the valve from the rear, facing the front of the combine.*

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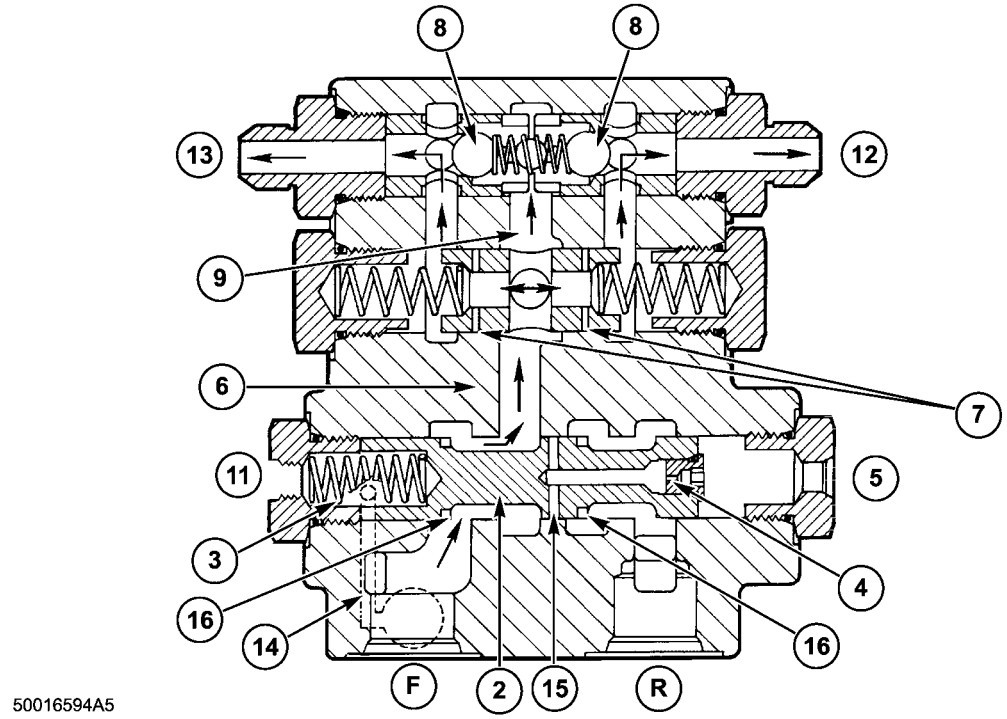
Solenoid Valve

- A. Oil Supply from Low Pressure Spool
  B. From Right Hand Side of Selector Spool Via External Line
  C. From Right Side of Selector Spool
  D. To Case Drain

When the rear wheel drive is switched "On", the system will momentarily go into an "Intermediate" position. The "Intermediate" position allows hydraulic fluid under charge pressure to fill the system and wheel motors before full drive pressure is achieved. This reduces the shock load exerted on the pistons and motor housing.

When the Powered Rear Axle switch in the combine cab is turned to the "On" position, current is supplied to the solenoid valve **(1)**, Figure 3. This energizes the coil and causes the spring-loaded spool to move towards the coil. Hydraulic fluid under charge pressure will flow through the solenoid valve from port **(A)** to port **(B)** and to the pressure to engage (left) side **(5)** of the selector spool, **(2)**, Figure 4, in the valve through an external tube.

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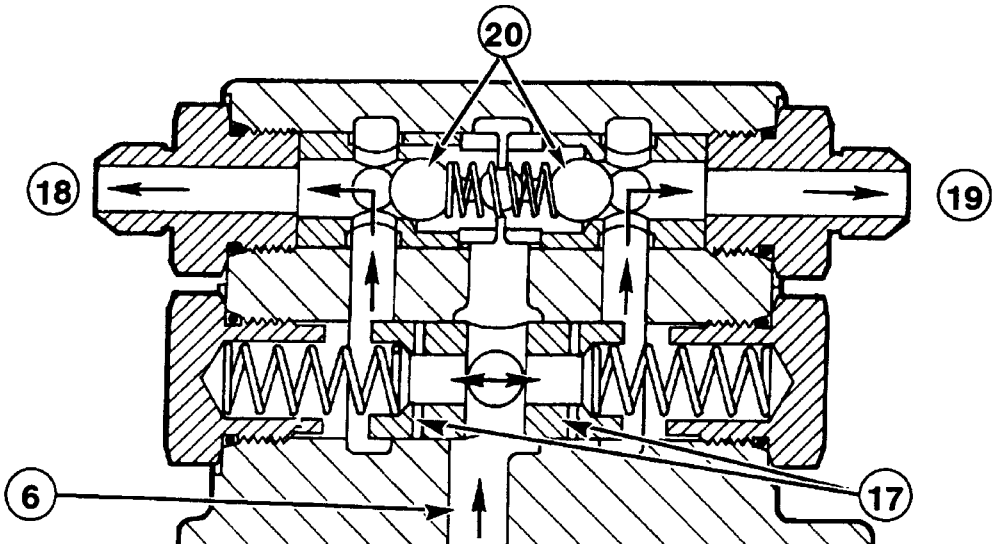


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Cross Section of Control Valve Upper Tier - "Intermediate" Position

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As the selector spool **(2)**, Figure 4, moves left, against the pressure of the spring **(3)** and will momentarily allow hydraulic fluid under charge pressure to enter both forward and reverse flow dividers **(7)**, Figure 4, and **(17)**, Figure 5, through the feathering lands **(16)**, Figure 4, on the selector spool. Hydraulic fluid flowing through the upper **(9)**, Figure 4, and lower **(6)**, Figure 4, center channels will keep the check valves **(8)**, Figure 4, and **(20)**, Figure 5, closed. The hydraulic fluid will then flow through the forward **(18, 19)**, Figure 5, and reverse **(12, 13)**, Figure 4, pressure supply/return ports to the wheel motors.



DS00M068 5

Cross Section of Control Valve Lower Tier - "Intermediate" Position

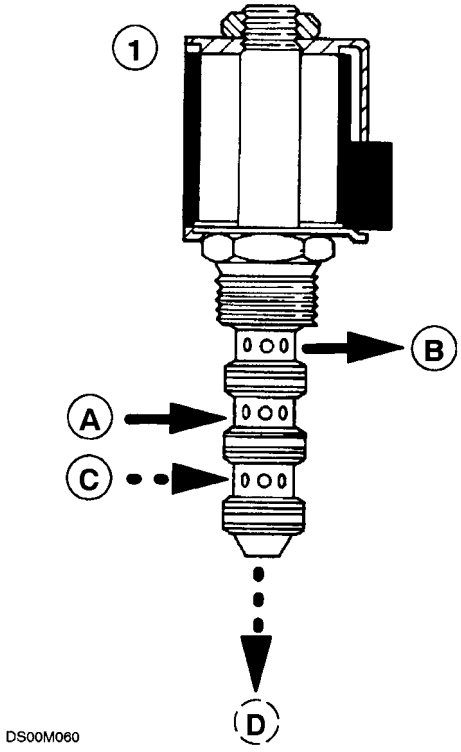
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The hydraulic fluid on the pressure to disengage (right) side of the selector spool **(2)**, Figure 4, will flow through the drilled passage **(14)**, Figure 4, to port **(C)** of the solenoid valve **(1)**, Figure 3. The hydraulic fluid will flow through the valve and exit at port **(D)** and out of the valve through the case drain. The hydraulic fluid then returns to tank. When hydraulic fluid under charge pressure flows into the pressure to engage port on the valve, a "tee" fitting at the port allows hydraulic fluid to flow to the drain valve as well. The charge pressure shifts the spool in the drain valve so hydraulic fluid from the wheel motors is no longer allowed to drain back to tank through the drain valve.

VALVE OPERATION "ON" POSITION
(Reference Figures 6, 7, and 8)

NOTE: *References to directions are as if viewing the valve from the rear, facing the front of the combine.*



Solenoid Valve

- A. Oil Supply from Low Pressure Spool
  B. From Right Hand Side of Selector Spool Via External Line
  C. From Right Side of Selector Spool
  D. To Case Drain

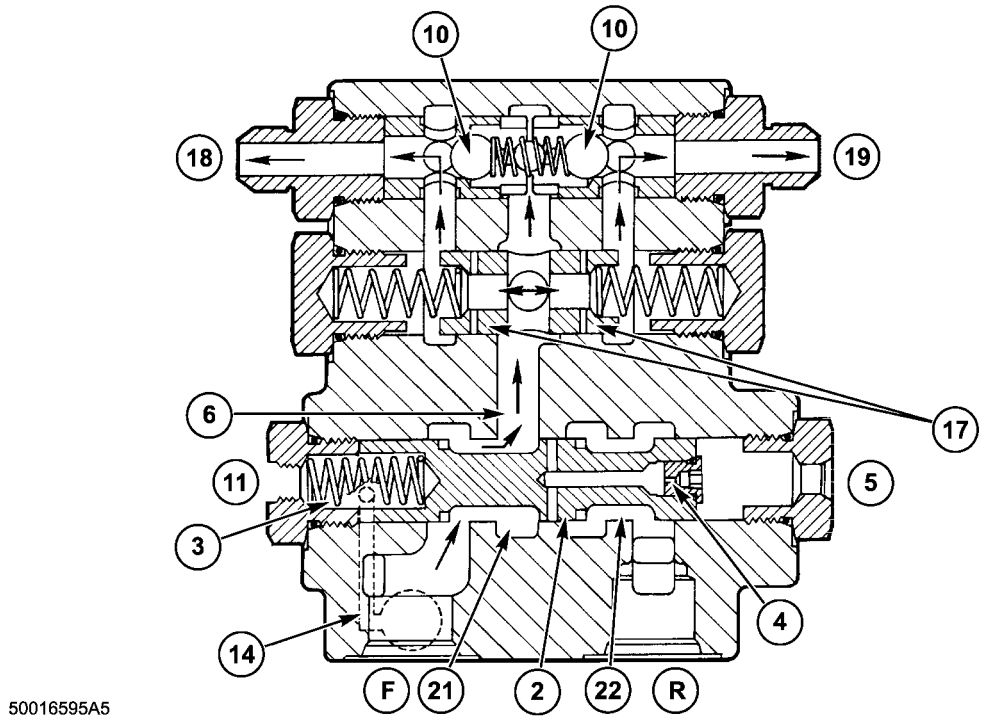
When the powered rear axle is switched "On", the system will momentarily go into an "Intermediate" position to fill the wheel motors with hydraulic fluid. When the system is full, the selector spool will move completely to the right in the valve, to the "On" position, allowing the wheel motors to be driven.

When the Powered Rear Axle switch in the combine cab is turned to the "On" position, current is supplied to the solenoid valve **(1)**, Figure 6. This energizes the coil and causes the spring-loaded spool to move towards the coil. Hydraulic fluid under charge pressure will flow through the solenoid valve from port **(A)** to port **(B)** and to the pressure to engage (left) side **(5)** of the selector spool **(2)**, Figure 7, in the valve through an external tube. The hydraulic fluid shifts the selector spool to the right and once the system is full of hydraulic fluid, the spool will shift fully to the right against the spring **(3)**.

FORWARD

NOTE: *The selector spool controls whether or not hydraulic fluid flows to the wheel motors, but does not control forward or reverse movement in the wheel motors.*

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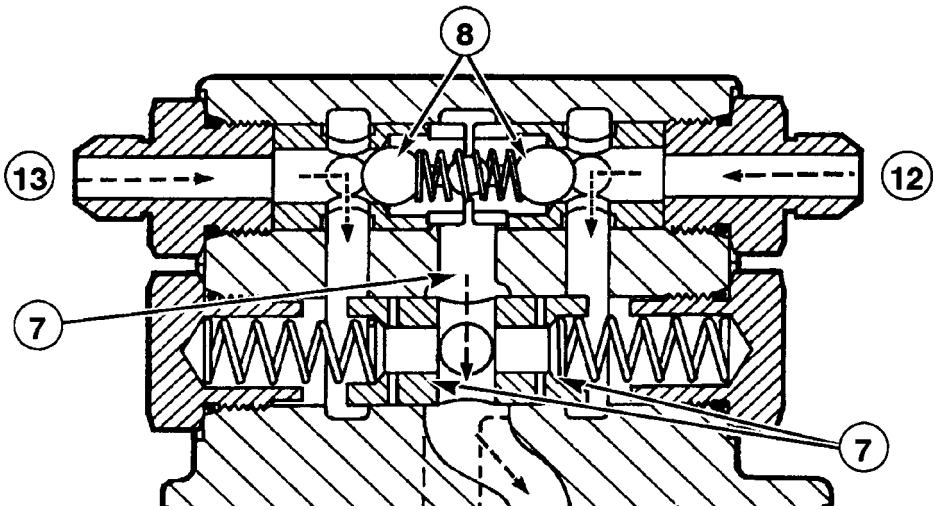


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Cross Section of Control Valve Forward Lower Tier Valves and Upper Tier Selector Spool - "On" - "Forward" Position

•

When high pressure hydraulic fluid is supplied to the forward pressure port **("F")**, Figure 7, the selector spool allows the hydraulic fluid to flow past the spool land **(21)**, Figure 7, through the center passage **(6)**, Figure 7, on lower tier of the valve, to the flow dividers **(17)**, Figure 7. Hydraulic fluid also flows to the forward check valves **(10)**, Figure 7, keeping the valves closed. This assures hydraulic flow is directed out of the valve to the wheel motors. From the flow dividers high pressure fluid is directed out of the forward pressure supply/return ports **(18, 19)**, Figure 7, to the wheel motors. The high pressure oil will drive the motors forward. If the flow of drive oil should differ from one motor to the other (loss of traction to one wheel), the flow dividers **(17)**, Figure 7, will compensate for the differential by shifting in the valve. For more information on flow divider description of operation, refer to: **Control valve - Static description (D.14.C.14 - C.30.A.20)**.



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Cross Section of Control Valve (Reverse Valves Upper Tier) - "On" - "Forward" Position

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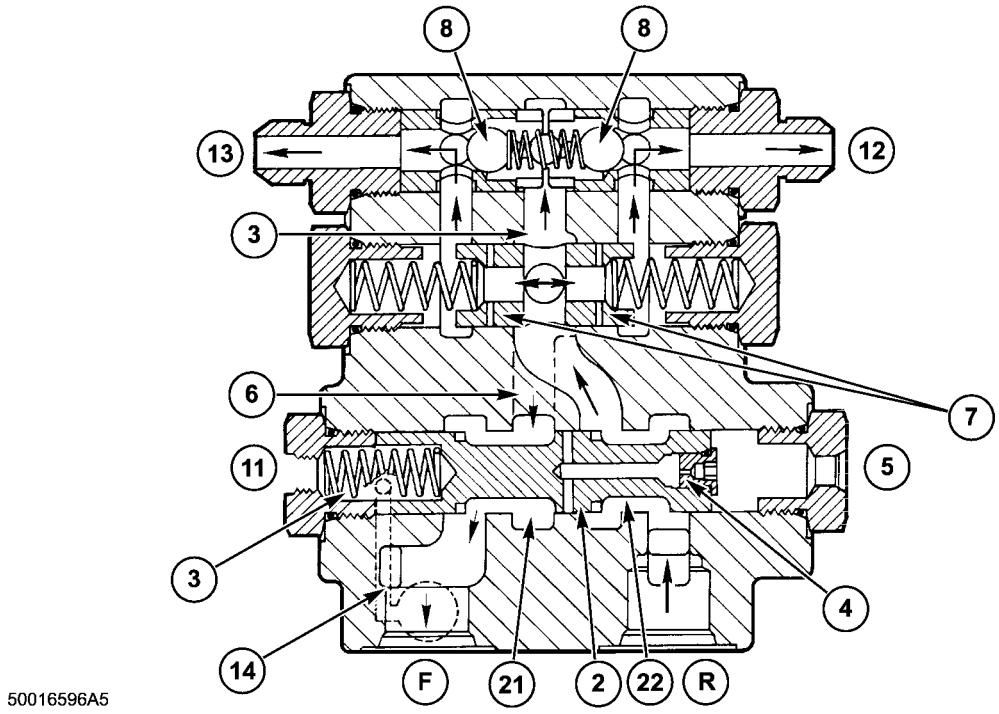
Return hydraulic fluid from the wheel motors will flow into the reverse pressure supply/return ports **(12, 13)** Figure 8. The fluid is then directed to the flow dividers **(7)** and reverse check valves **(8)**, Figure 8. The check valves will open when hydraulic flow exceeds the amount of fluid allowed to flow through the **10.3 mm (0.406 in)** orifice in each flow divider. The hydraulic fluid will flow through the center passage **(9)**, Figure 8, past the selector spool land **(22)**, Figure 7, and out of the reverse high pressure port **("R")**, Figure 7.

The hydraulic fluid on the pressure to disengage (right) side of the selector spool **(2)**, Figure 7, will flow through the drilled passage **(6)**, Figure 7, to port **(C)** of the solenoid valve **(1)**, Figure 6. The hydraulic fluid will flow through the valve and exit at port **(D)** and out of the valve through the case drain. The hydraulic fluid then returns to tank. When hydraulic fluid under charge pressure flows into the pressure to engage port**(5)**, Figure 7 on the valve, a "tee" fitting at the port allows hydraulic fluid to flow to the drain valve. The charge pressure shifts the spool in the drain valve so hydraulic fluid from the wheel motors is no longer allowed to drain back to tank through the drain valve.

REVERSE
(Reference Figures 6, 9, and 10)

NOTE: *Reference to directions are as if viewing the valve from the rear, facing the front of the combine.*

NOTE: *The selector spool controls whether or not hydraulic fluid flows to the wheel motors, but does not control forward or reverse movement in the wheel motors.*



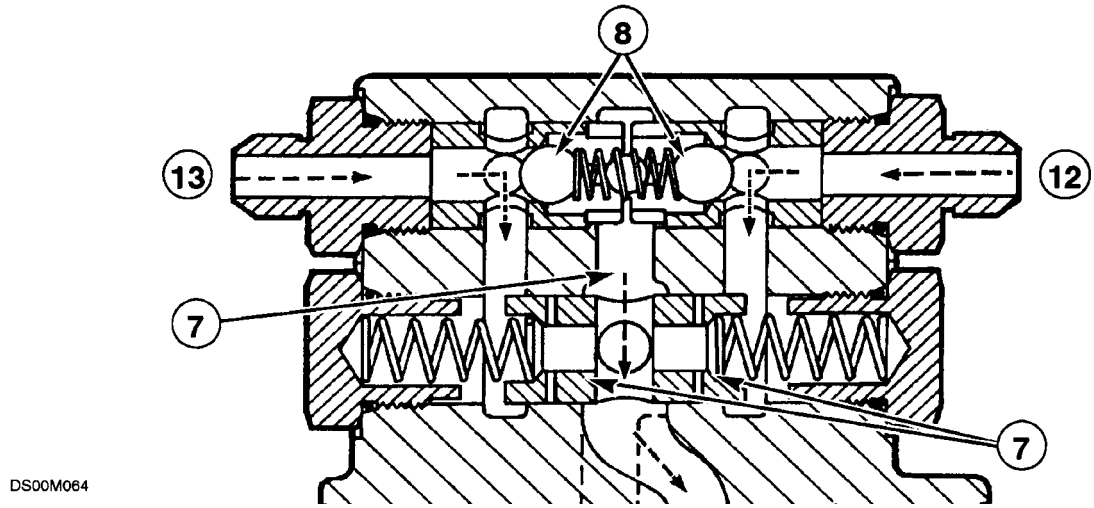
Cross Section of Control Valve Forward Lower Tier Valves and Upper Tier Selector Spool - "On" - "Reverse" Position

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When high pressure hydraulic fluid is supplied to the reverse pressure port, **("R")**, Figure 9, the selector spool **(2)**, Figure 9, allows the hydraulic fluid to flow past the spool land **(22)**, Figure 9, through the center passage **(9)**, Figure 9, on lower tier of the valve, to the flow dividers **(7)**, Figure 9. Hydraulic fluid also flows to the reverse check valves **(8)**, Figure 9, keeping the valves closed. This assures hydraulic flow is directed out of the valve to the wheel motors. From the flow dividers high pressure fluid is directed out of the forward pressure supply/return ports **(12, 13)**, Figure 9, to the wheel motors. The high pressure oil will drive the motors in reverse. If the flow of drive oil should differ from one motor to the other (loss of traction to one wheel), the flow dividers **(7)**, Figure 9, will compensate for the

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differential by shifting in the valve. For more information on flow divider description of operation, refer to: **Control valve - Static description (D.14.C.14 - C.30.A.20)**.



Cross Section of Control Valve (Reverse Valves Upper Tier) - On- "Reverse" Position

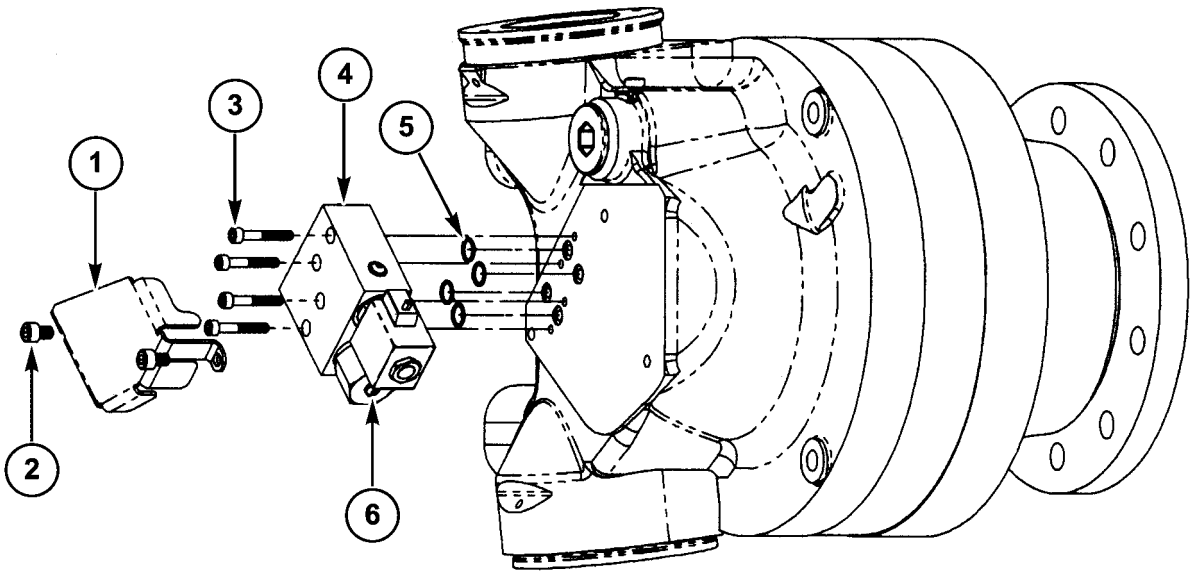
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Return hydraulic fluid from the wheel motors will flow into the forward pressure supply/return ports **(18, 19)**, Figure 10. The fluid is then directed to the flow dividers **(17)** and forward check valves **(8)**, Figure 10. The check valves will open when hydraulic flow exceeds the amount of fluid allowed to flow through the **10.3 mm (0.406 in)** orifice in each flow divider. The hydraulic fluid will flow through the center passage **(6)**, Figure 10, past the selector spool and **(21)**, Figure 9, and out of the forward high pressure port **("F")**, Figure 9. The hydraulic fluid on the pressure to disengage (right) side of the selector spool **(2)**, Figure 9, will flow through the drilled passage **(14)**, Figure 9, to port **(C)** of the solenoid valve **(1)**, Figure 6. The hydraulic fluid will flow through the valve and exit at port **(D)**, Figure 6, and out of the valve through the case drain. The hydraulic fluid then returns to tank. When hydraulic fluid under charge pressure flows into the pressure to engage port **(5)**, Figure 9, on the valve, a "tee" fitting at the port allows hydraulic fluid to flow to the drain valve. The charge pressure shifts the spool in the drain valve so hydraulic fluid from the wheel motors is no longer allowed to drain back to tank through the drain valve.

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Command valve - Replace (D.14.C.12 - F.10.A.30)

AFX8010



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1. To remove and install the Single Speed and Two Speed control valve from the machine it can be done without removing the motor from the C-frame.

⚠ CAUTION ⚠

46-77A - Before you do service under the machine, put the machine on a level surface, engage the parking brake and stop the engine. Put blocks at the front and rear of the tires. Failure to follow these instructions can cause injury.

2. Turn the wheel to the steering stop to gain access to the valve.
3. Release the pressure in the supply circuit.
4. Disconnect the drain line at the tank level to avoid siphoning.
5. Remove two cap screws **(2)** and cover **(1)**. Disconnect the electrical connection (Two Speed Valve Only)
6. Remove the four M6 capscrews **(3)**.
7. Remove the valve assembly **(4)**.
8. Remove and discard the four O-rings **(5)**.
9. Make sure the valve and motor mounting surfaces are clean. Install new O-rings **(5)**.
10. Install the new valve assembly **(4)**.
11. Torque four capscrews **(3)** to **12.5 - 15.5 Nm (9.3 - 11.3 lb ft)**.

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12. Reconnect the drain line and pressurize the supply system.

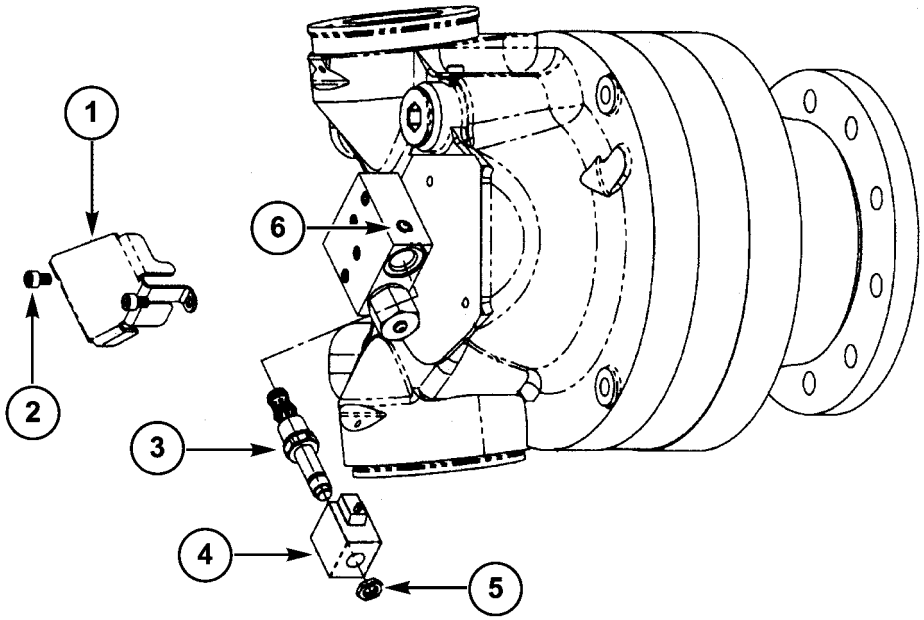
13. Bleed air from system by loosening bleed screw **(6)** approximately one turn. Re-tighten after all air is bled from the system.

14. Re-connect the electrical connection. Add cover **(1)** and two capscrews **(2)**. Torque capscrews to **22.5 - 27.5 Nm (16.6 - 20.2 lb ft)** (Two Speed Valve Only)

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Command valve - Overhaul (D.14.C.12 - F.10.A.40)

AFX8010



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NOTE: *The solenoid valve can be replaced without removing the motor from the C-frame.*

1. Turn the wheel to the steering stop to gain access to the valve.

⚠ CAUTION ⚠

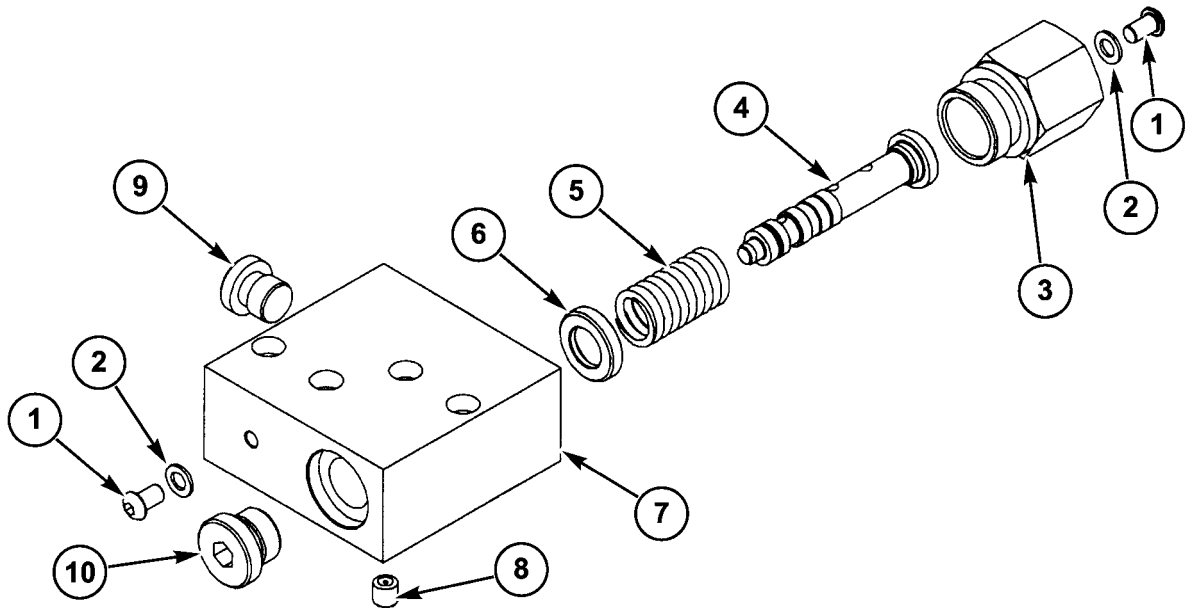
46-77A - Before you do service under the machine, put the machine on a level surface, engage the parking brake and stop the engine. Put blocks at the front and rear of the tires. Failure to follow these instructions can cause injury.

2. Release the pressure in the supply circuit.
3. Disconnect the drain line at the tank level to avoid siphoning.
4. Disconnect the electrical connection.
5. Remove the two capscrews **(2)** and cover **(1)**.
6. Remove the Hex nut **(5)**, magnetic winding **(4)** and cartridge valve **(3)**.
7. Make sure new cartridge valve is clean. Lubricate O-rings with hydraulic fluid. Install new cartridge valve **(3)** and torque to **24 - 30 Nm (17.8 - 22.2 lb ft)**.
8. Install new magnetic winding **(4)** and Hex nut **(5)**. Torque nut to **2.7 - 3.3 Nm (2.0 - 2.4 lb ft)** .
9. Re-clamp electrical leads and reconnect the electrical connection.
10. Reconnect the drain line and pressurize the supply line.

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11. Bleed air from system by loosening bleed screw **(6)** approximately one turn. Tighten after all air is bled from the system.

12. Re-install cover **(1)** with capscrews **(2)**. Torque the capscrews **(2)** to **22.5 - 27.5 Nm (16.6 - 20.2 lb ft)**.

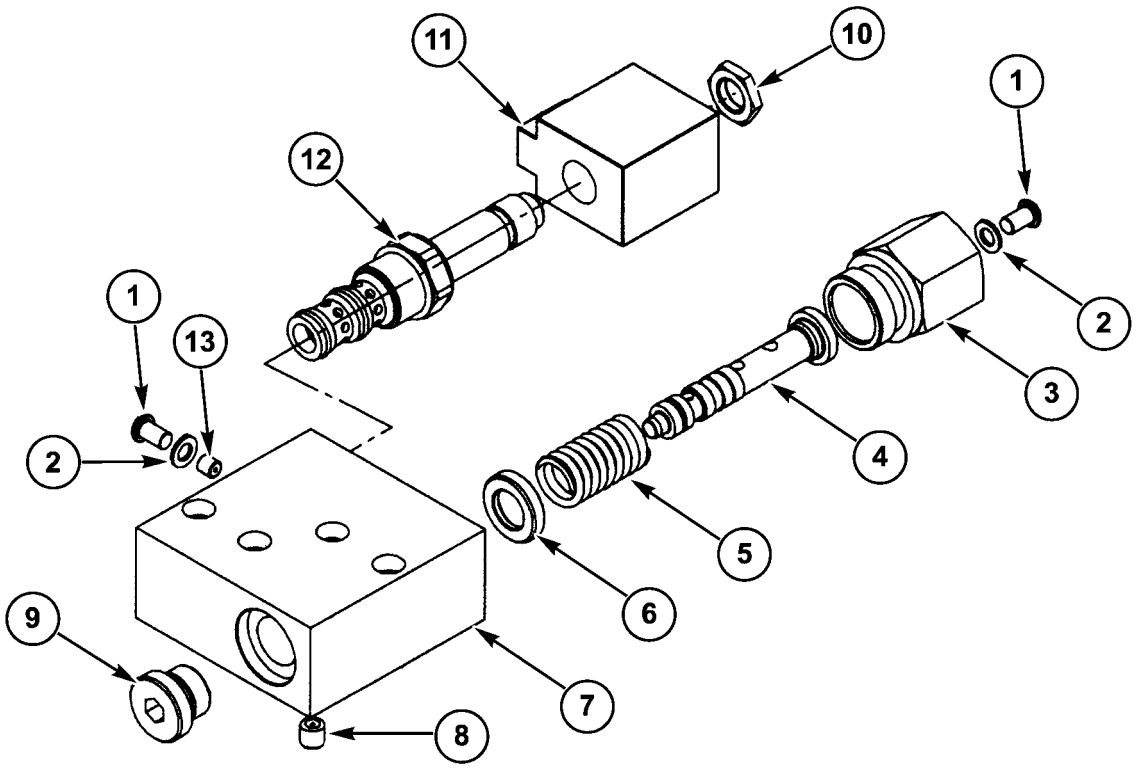


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Single Speed Valve Replacement -

1. Bleed Screw	6. Spring Seat
2. Bleed Screw Seal	7. Valve Block
3. Spool Cap	8. Metered Set Screw
4. Cartridge Valve	9. M14 Plug
5. Spool Spring	10. M18 Plug

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Two Speed Valve Replacement -

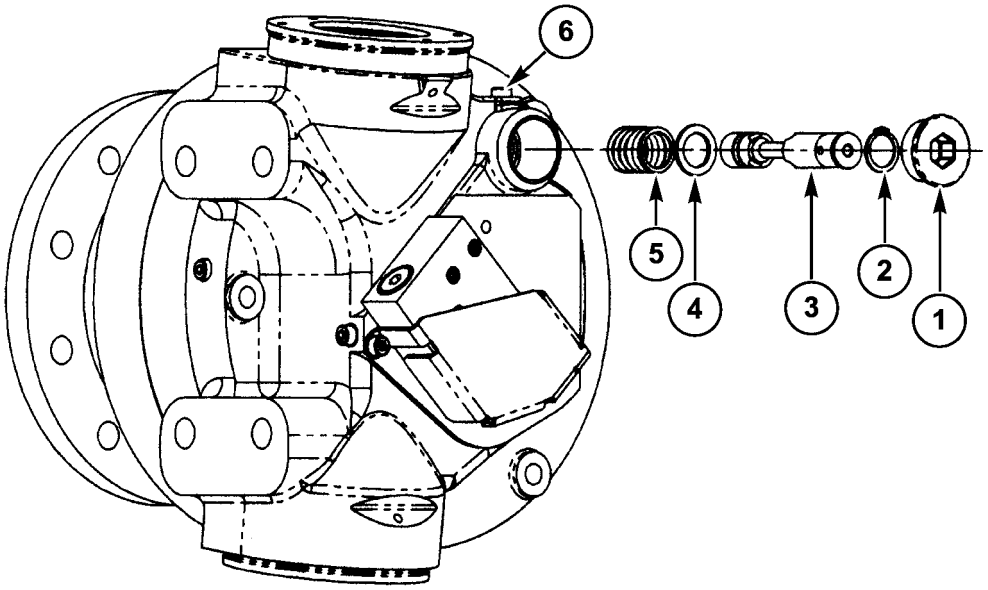
1. Bleed Screw	8. Metered Set Screw
2. Bleed Screw Seal	9. M18 Plug
3. Spool Cap	10. Solenoid Hex Pug
4. Cartridge Valve	11. Solenoid Magnetic Winding
5. Spool Spring	12. Solenoid Valve
6. Spring Seat	13. Small Metered Set Screw
7. Valve Block	

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Control valve Two speed valve - Replace (D.14.C.14.11 - F.10.A.30)

AFX8010



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NOTE: *The two speed spool can be replaced without removing the motor from the C-frame*

1. Turn the wheel to the steering stop to gain access to the spool.
2. Release the pressure in the supply circuit.
3. Disconnect the drain line at the tank level to avoid siphoning.
4. Remove the plug **(1)**.
5. Extract the spool **(3)** with snap ring **(2)**, washer **(4)** and spring **(5)**.
6. Remove the spring **(5)**, washer **(4)**, and snap ring **(2)** from spool **(3)**.
7. Install the snap ring **(2)**, washer **(4)**, and spring **(5)**onto the new spool **(3)**.
8. Oil, then install new spool assembly.
9. Re-install plug **(1)**. Torque to **285 - 380 Nm (210 - 280 lb ft)**.
10. Reconnect the drain line and pressurize the supply system.
11. Bleed air from system by loosening bleed screw **(6)** approximately one turn. Re-tighten after all air is bled from the system.

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Command valve - Unidentified failure (D.14.C.12 - G.30.B.46)

AFX8010

E0066-11 - Rear Wheel Assist Valve

Cause:
The rear wheel assist (L-26) circuit open, or is shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and rear wheel assist solenoid.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "REAR ASSIST VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **11**.

2. Turn the key switch to the OFF position. Disconnect the rear wheel assist connector **X233**. Use a multimeter to check the resistance of the rear wheel assist coil. The proper resistance range for the coil is **1.0 - 8.0 ohms**.

   A. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **3**.

3. Use a multimeter to check for continuity between connector **X233** pin A and chassis ground. Flex the harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, continue with Step **7**.

4. Disconnect connector **X233**. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rear wheel assist. Use a multimeter to check for **12 volts** between connector **X233** pin A and chassis ground.

   A. If **12 volts** is not present, continue with Step **5**.

   B. If **12 volts** is found, continue with Step **9**.

5. Disconnect connector **X072**. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rear wheel assist. Use a multimeter to check for **12 volts** between connector **X072** pin A and chassis ground.

   A. If **12 volts** is not present, continue with Step **6**.

   B. If there is **12 volts**, there is an open circuit in the lower frame rear (LR) harness between connector **X072** and connector **X233** wire 569 white. Locate the open and repair.

6. Disconnect connector **X024**. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rear wheel assist. Use a multimeter to check for **12 volts** between connector **X024** pin 15 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X024** and connector **X019** J2-16 wire 569 white.

   B. If there is **12 volts**, there is an open circuit in the straw hood front (SW) harness between connector **X024** and connector **X072** wire 569 white. Locate the open and repair.

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7. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin A and chassis ground.

   A. If continuity is found, continue with Step **8**.

   B. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X072** and connector **X233** wire 569 white. Locate the short and repair.

8. Disconnect connector **X024**. Use a multimeter to check for continuity between connector **X024** pin 15 and chassis ground.

   A. If continuity is found, the short to ground is in the main frame (MF) harness between connector **X024** and connector **X019** J2-16 wire 569 white. Locate the short and repair.

   B. If no continuity is found, the short to ground is in the straw walker (SW) harness between connector **X024** and connector **X072** wire 569 white. Locate the short and repair.

9. Disconnect connector **X233**. Use a multimeter to check for continuity between connector **X233** pin B and chassis ground.

   A. If there is continuity to ground, the circuit is functioning properly. Continue with Step **11**.

   B. If there is no continuity to ground, continue with Step **10**.

10. Disconnect connector **X072**. Use a multimeter to check for continuity between the straw hood front (SW) harness end of connector **X072** pin B and chassis ground.

    A. If there is continuity to ground, there is an open circuit in the lower frame rear (LR) harness between connector **X233** and connector **X072** wire 602 black. Locate the open and repair.

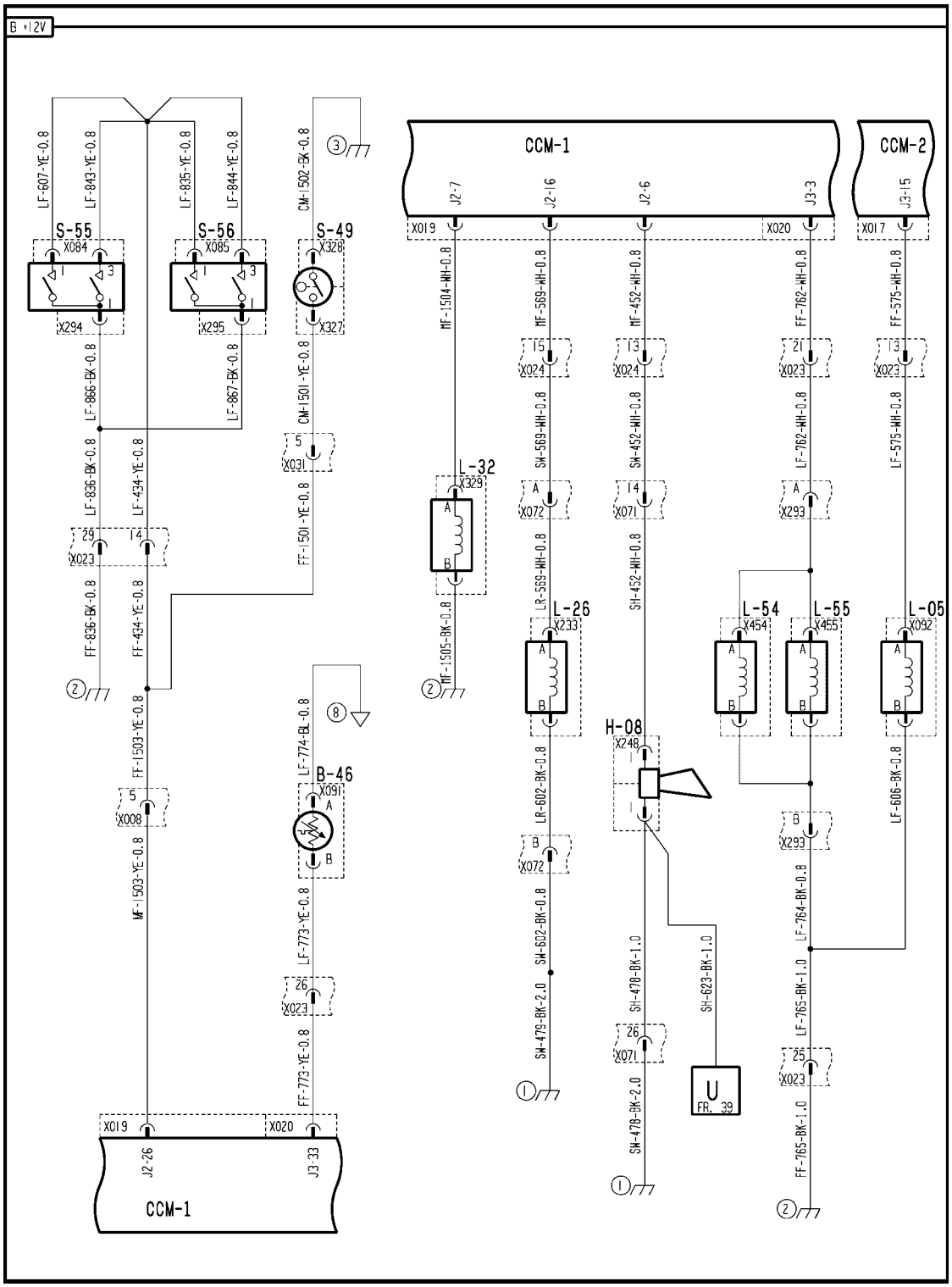
    B. If there is no continuity to ground, there is an open circuit in the straw hood front (SW) harness between connector **X072** and rear frame ground #1 wire 602 black or 479 black. Locate the open and repair.

11. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



AFXSCHEM08-04 1

FRAME 8 - DRIVES

https://truckmanualshub.com/

B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

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Control valve Two speed valve - Unidentified failure (D.14.C.14.11 - G.30.B.46)

AFX8010

E0059-11 - 2-Speed Front Hydro Valve

Cause:
The two speed powered rear axle solenoids (L-54/55) circuit open or is shorted to ground.

Possible failure modes:

1. Supply wiring shorted to ground or open circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GROUND DRIVE" sort menu, and select "DUAL RANGE VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position. Disconnect connector X454 at the 2 speed powered rear axle RH solenoid L-54 and connector X455 at the 2 speed powered rear axle LH solenoid L-55. Use a multimeter to check the resistance of each 2 speed solenoid coil. The proper resistance range for each coil is **1.0 - 8.0 ohms**.

   A. If either coil is out of specification, replace coil.

   B. If each coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between connector X454 or X455 pin A and chassis ground. Flex the 2 speed PRA jumper harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, continue with Step **6**.
4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the 2 speed PRA solenoids. Use a multimeter to check for **12 volts** between connector X454 pin A and chassis ground. Repeat the voltage check between connector X455 pin A and chassis ground.

   A. If **12 volts** is not found at one of the connectors, there is an open circuit in the 2 speed PRA jumper harness between the harness splice and the affected connector. Locate the open and repair.

   B. If **12 volts** is not found, continue with Step **5**.

   C. If **12 volts** is found, continue with Step **7**.
5. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the 2 speed PRA solenoids. Use a multimeter to check for **12 volts** between connector **X293** pin A and chassis ground.

   A. If **12 volts** is not present, continue with step **8**.

   B. If **12 volts** is found, there is an open circuit in the 2 speed PRA jumper harness between connector **X293** and the 2 speed PRA jumper harness splice wire 762 white. Locate the open and repair.
6. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the 2 speed PRA solenoids. Use a multimeter to check for **12 volts** between connector **X023** pin 21 and chassis ground.

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A. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X023** and connector **X020** J3-3 wire 762 white. Locate the open and repair.

B. If **12 volts** is found, there is an open circuit in the lower frame (LF) harness between connector **X023** and connector **X293** wire 762 white. Locate the open and repair.

7. Disconnect connector **X293**. Use the multimeter to check for continuity between connector **X293** pin A and chassis ground.

A. If continuity is found, continue with step **8**.

B. If no continuity is found, the short to ground is in the 2 speed PRA jumper harness between connector **X293**, connector X454 and connector X455 wire 762 white. Locate the short and repair.

8. Disconnect connector **X023**. Use the multimeter to check for continuity between connector **X023** pin 21 and chassis ground.

A. If continuity is found the short to ground is in the front frame (FF) harness between connector **X023** and connector **X020** J3-3 wire 762 white. Locate the short and repair.

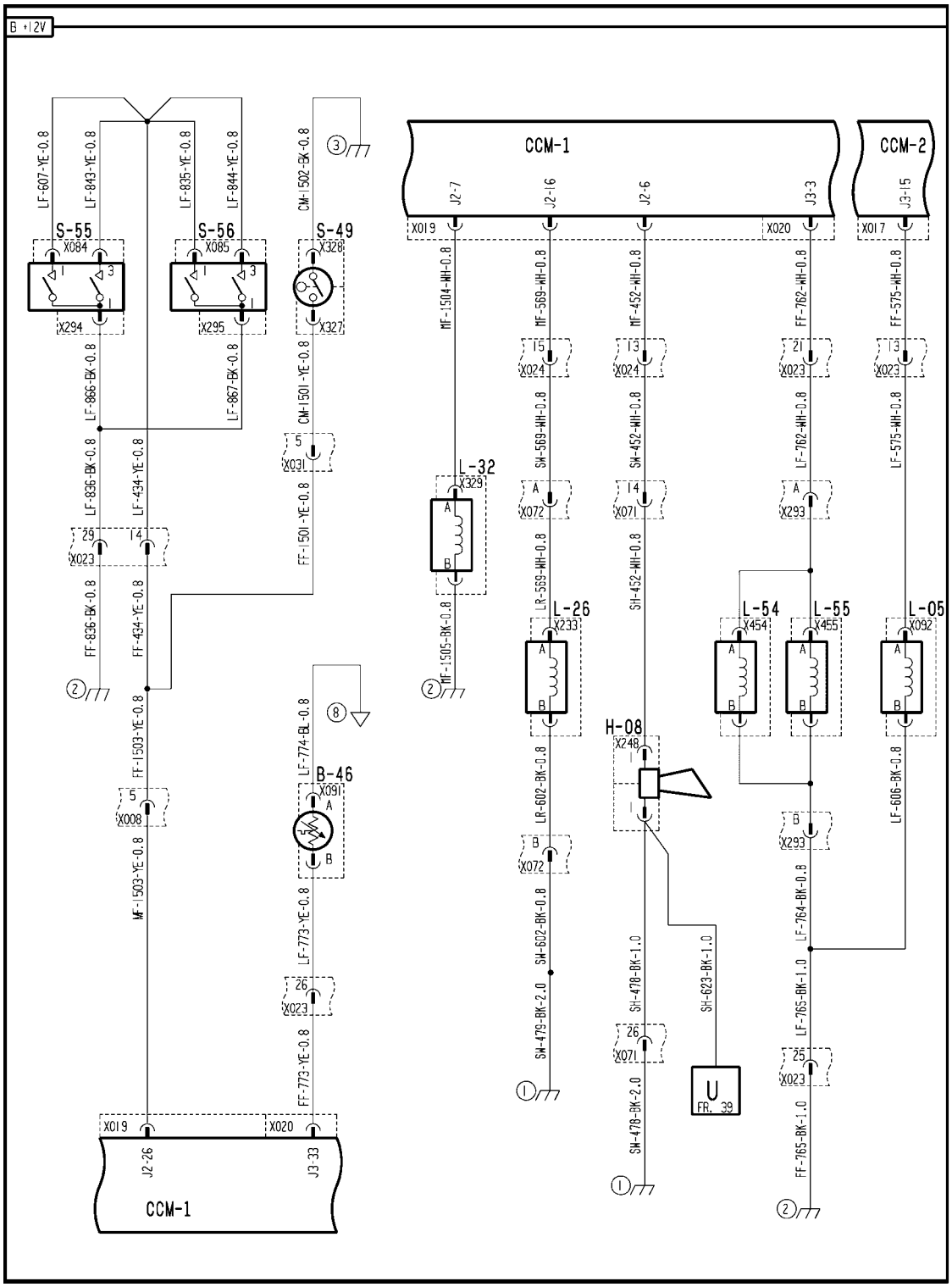
B. If no continuity is found the short to ground is in the lower frame (LF) harness between connector **X023** and connector **X293** wire 762 white. Locate the short and repair.

9. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



AFXSCHEM08-04 1

FRAME 8 - DRIVES

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B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

https://truckmanualshub.com/

Index

TRAVELLING - D

2WD-4WD SYSTEM Hydraulic - 14.C

Command valve - Overhaul (D.14.C.12 - F.10.A.40) 20
AFX8010

Command valve - Replace (D.14.C.12 - F.10.A.30) 18
AFX8010

Command valve - Unidentified failure (D.14.C.12 - G.30.B.46) 25
AFX8010

Control valve - Dynamic description (D.14.C.14 - C.30.A.10) 10
AFX8010

Control valve - Exploded view (D.14.C.14 - C.10.A.20) 3
AFX8010

Control valve - Sectional view (D.14.C.14 - C.10.A.30) 5
AFX8010

Control valve - Static description (D.14.C.14 - C.30.A.20) 6
AFX8010

Control valve Two speed valve - Replace (D.14.C.14.11 - F.10.A.30) 24
AFX8010

Control valve Two speed valve - Unidentified failure (D.14.C.14.11 - G.30.B.46) 29
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

TRAVELLING - D

STEERING Hydraulic - 20.C

AFX8010

https://truckmanualshub.com/

Contents

TRAVELLING - D

STEERING Hydraulic - 20.C

SERVICE

Steering column

Steering column - Remove (D.20.C.40 - F.10.A.10) 3
AFX8010

Steering column - Disassemble (D.20.C.40 - F.10.A.25) 4
AFX8010

Steering column - Assemble (D.20.C.40 - F.10.A.20) 5
AFX8010

Steering column - Install (D.20.C.40 - F.10.A.15) 7
AFX8010

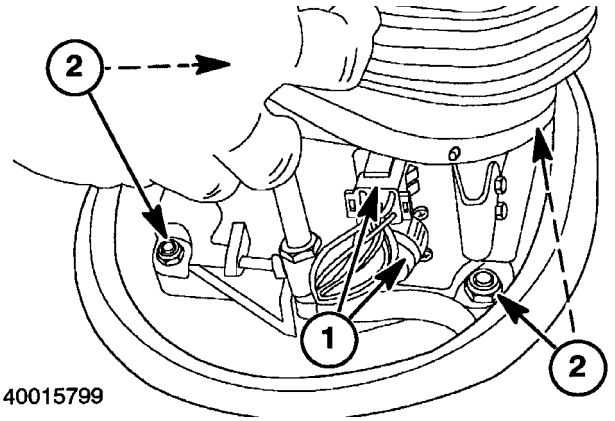
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Steering column - Remove (D.20.C.40 - F.10.A.10)

AFX8010

When removing the steering column, you should manipulate the steering tires to be straight. This will allow for the steering wheel to remain calibrated.

1. Pull the boot up from the cab floor mat.
2. Detach the two electrical connectors **(1)**. Turn off the four lock nuts **(2)**.



40015799 1

3. Remove the steering column from the combine.

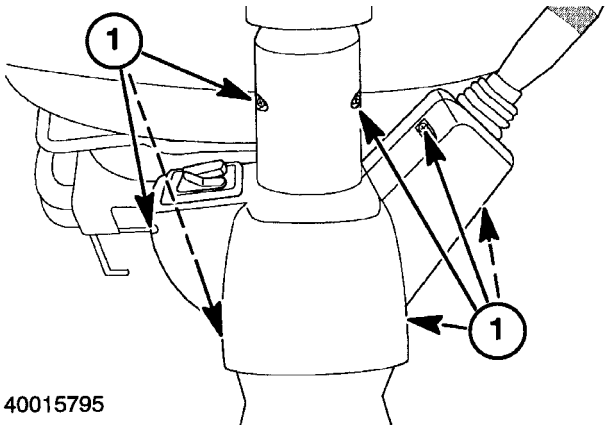
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Steering column - Disassemble (D.20.C.40 - F.10.A.25)

AFX8010

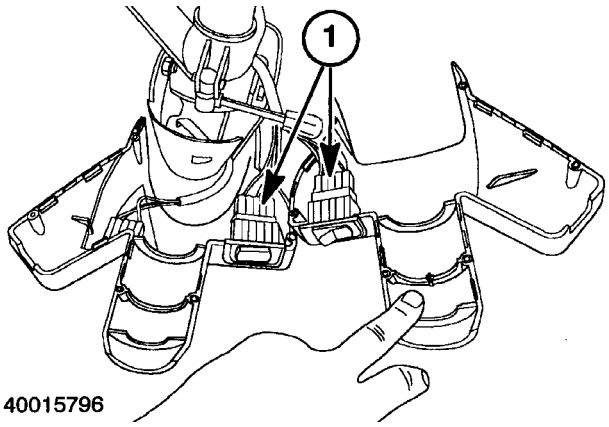
Raise the steering wheel to gain access to the top screws.

1. Turn out seven screws **(1)** and pull the two halves of the cover from the steering column.



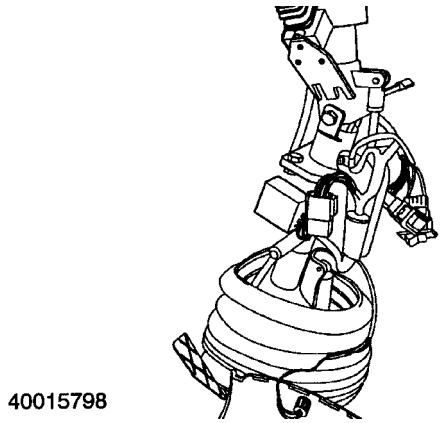
40015795 1

2. Pull the switches **(1)** from the cover halves. Remove screws **(2)**and take the cover halves from the steering column.



40015796 2

3. With the covers removed, all internal steering column components can be accessed.



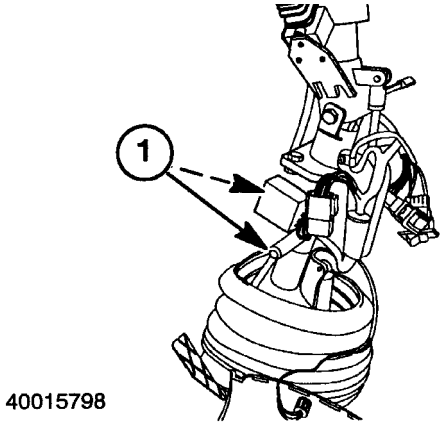
40015798 3

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Steering column - Assemble (D.20.C.40 - F.10.A.20)

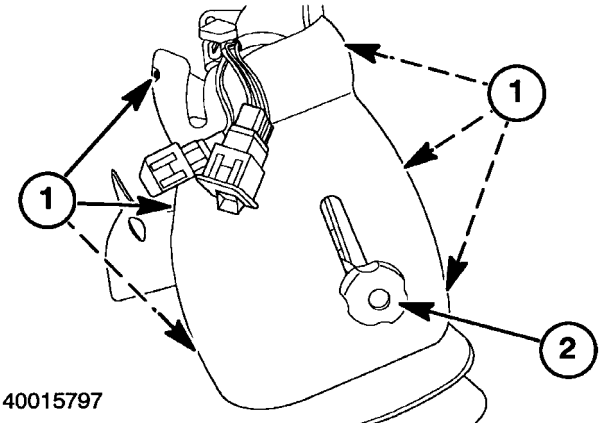
AFX8010

1. Position the two lower halves of the steering column covers just above the boot so that pins **(1)** are inside the covers.



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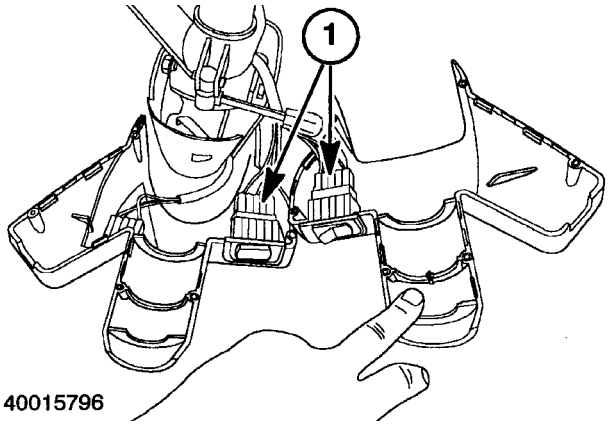
2. Secure the lower covers to the columns using six screws **(1)** .



40015797a 2

3. Install the switches **(1)** into the cover halves.

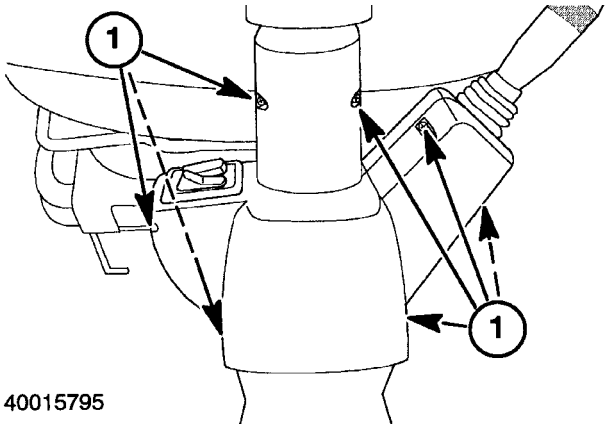
NOTE: *Raise the steering wheel to gain access to the top screws.*



40015796 3

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4. Install the upper cover halves using seven screws **(1)**.



40015795 4

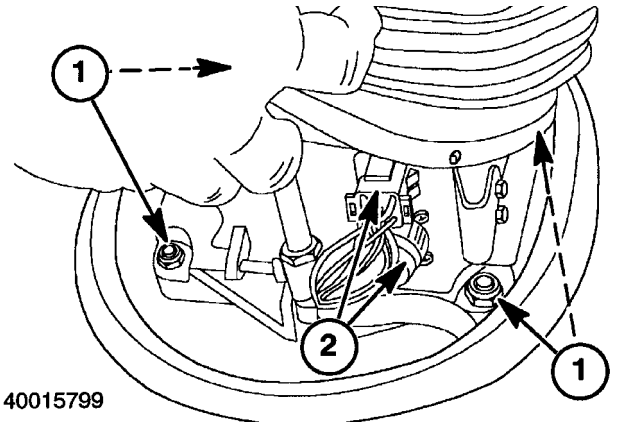
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Steering column - Install (D.20.C.40 - F.10.A.15)

AFX8010

Prior operation: Steering column - Assemble (D.20.C.40 - F.10.A.20)

1. Slide the column onto its mount.
2. Secure the column to the combine cab floor with four lock nuts **(1)**. Attach the two electrical connectors **(2)**.



40015799a 1

3. Secure the boot to the cab floor mat.

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Index

TRAVELLING - D

STEERING Hydraulic - 20.C

Steering column - Assemble (D.20.C.40 - F.10.A.20) 5
AFX8010

Steering column - Disassemble (D.20.C.40 - F.10.A.25) 4
AFX8010

Steering column - Install (D.20.C.40 - F.10.A.15) 7
AFX8010

Steering column - Remove (D.20.C.40 - F.10.A.10) 3
AFX8010

https://truckmanualshub.com/

TRAVELLING - D

SERVICE BRAKE Hydraulic - 30.C

AFX8010

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Contents

TRAVELLING - D

SERVICE BRAKE Hydraulic - 30.C

TECHNICAL DATA

SERVICE BRAKE Hydraulic - General specification (D.30.C - D.40.A.10) 3
AFX8010

SERVICE BRAKE Hydraulic - Torque (D.30.C - D.20.A.10) 3
AFX8010

SERVICE

SERVICE BRAKE Hydraulic - Bleed (D.30.C - F.35.A.25) 4
AFX8010

Brake

Brake - Replace (D.30.C.58 - F.10.A.30) 6
AFX8010

Brake - Remove (D.30.C.58 - F.10.A.10) 9
AFX8010

Brake - Install (D.30.C.58 - F.10.A.15) 11
AFX8010

https://truckmanualshub.com/

SERVICE BRAKE Hydraulic - General specification (D.30.C - D.40.A.10)

AFX8010

Brake disc diameter	400mm
Parking brake piston travel	**3 - 5 mm** (**1/8 - 3/16 in**)

SERVICE BRAKE Hydraulic - Torque (D.30.C - D.20.A.10)

AFX8010

Allen Head Bolts,Brake shoe	**260 - 270 Nm** (**192 - 200 lb ft**)
Brake Bleeder Screws	**15 - 20 Nm** (**11 - 19 lb ft**)
Bolts, parking brake shoe	**190 - 210 Nm** (**140 - 155 lb ft**)
Bolts, parking brake housing	**97 Nm** (**72 lb ft**)

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SERVICE BRAKE Hydraulic - Bleed (D.30.C - F.35.A.25)

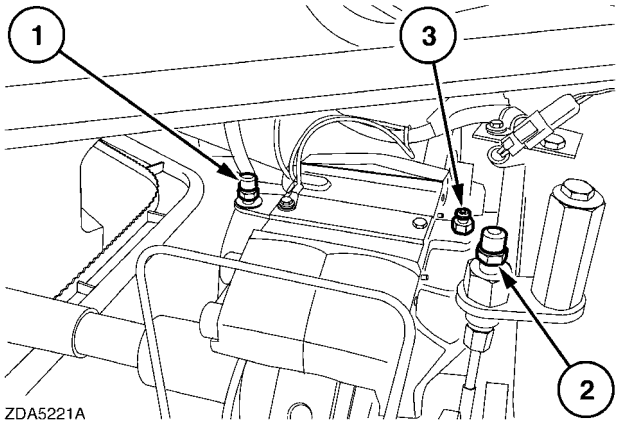
AFX8010

To bleed brakes, proceed as follows:

1. Block the wheels adequately to prevent runaway of the combine.
2. Raise the header and engage the header safety latch. Stop the engine.

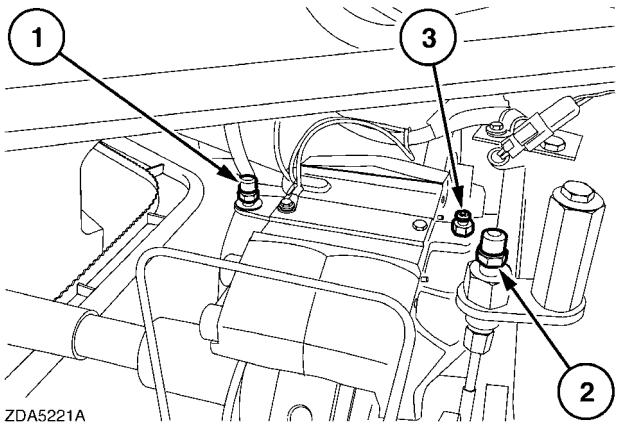
NOTE: *As the brake pedals must be depressed several times while bleeding, this job has to be done with two persons.*

3. Bleed the left- hand side circuit.
4. (Remove rubber caps from the left-hand side bleed screws, **(1)**. Slide a transparent hose over bleed screw **(1)** to catch the oil while bleeding.
   Open bleed screw **(1)** and depress the left-hand side brake pedal until fluid escapes.
   Close bleed screw **(1)** .



ZDA5221A 1

5. Depress the left-hand side brake pedal several times to build up pressure.
   Keep the pedal depressed. Open bleed screw **(1)** slightly to allow air and fluid to escape.
   Close bleed screw **(1)** and release the brake pedal.
6. Repeat step 5 until fluid free of air bubbles escapes through screw **(1)**.
7. Remove the transparent hose from bleed screw **(1)** and install the rubber cap. .
8. Bleed the right-hand side circuit.
9. (Remove rubber caps from the right-hand side bleed screws, **(2)**. Slide a transparent hose over bleed screw **(21)** to catch the oil while bleeding.
   Open bleed screw **(2)** and depress the right-hand side brake pedal until fluid escapes.
   Close bleed screw **(2)** .



ZDA5221A 2

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10. Depress the right-hand side brake pedal several times to build up pressure.
    Keep the pedal depressed. Open bleed screw **(2)** slightly to allow air and fluid to escape.
    Close bleed screw **(2)** and release the brake pedal.
11. Repeat step 10 until fluid free of air bubbles escapes through screw **(2)**.
12. Remove the transparent hose from bleed screw **(2)** and install the rubber cap. .

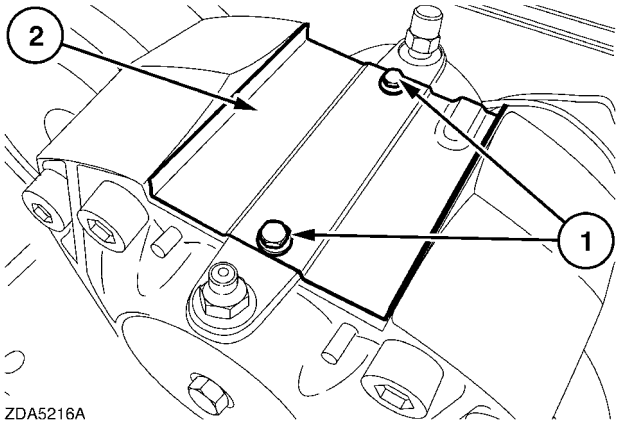
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Brake - Replace (D.30.C.58 - F.10.A.30)

AFX8010

To replace the RH side or LH side brake linings, proceed as follows:

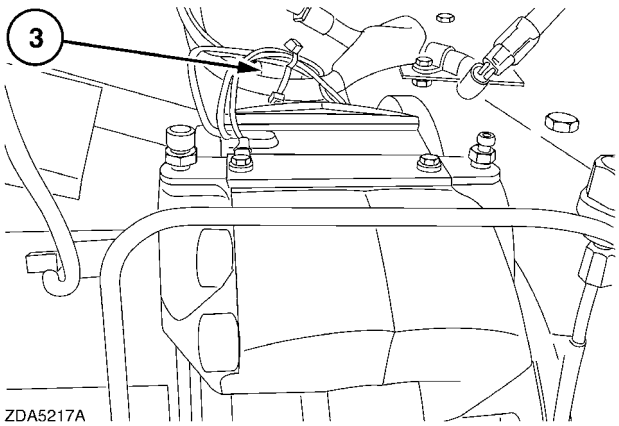
1. Block the wheels adequately to prevent runaway of the combine.
2. Raise the header and engage the header safety latch. Stop the engine.
3. On the upper brake caliper, remove two bolts, **(1)** and cover **(2)**.



ZDA5216A 1

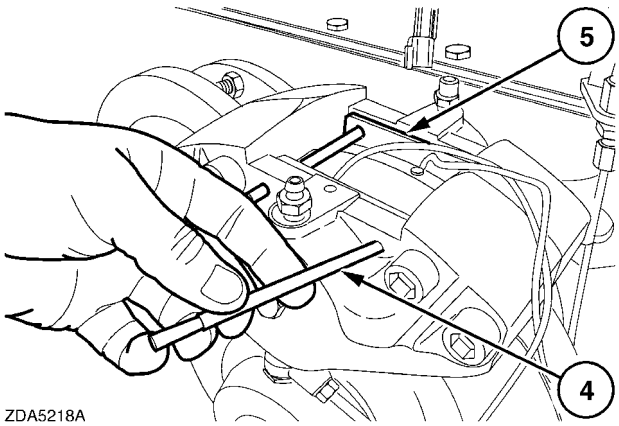
4. Disconnect the electric wires at **(3)**.

NOTE: *Only the upper brake shoe linings have electrical connectors.*



ZDA5217A 2

5. Remove pins **(4)** out of the brake caliper and take out the brake pads **(5)**.

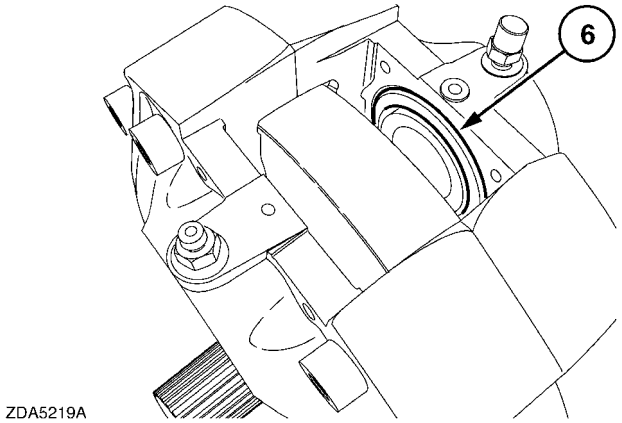


ZDA5218A 3

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6. Check the conditions of seals **(6)**. If necessary, replace them.

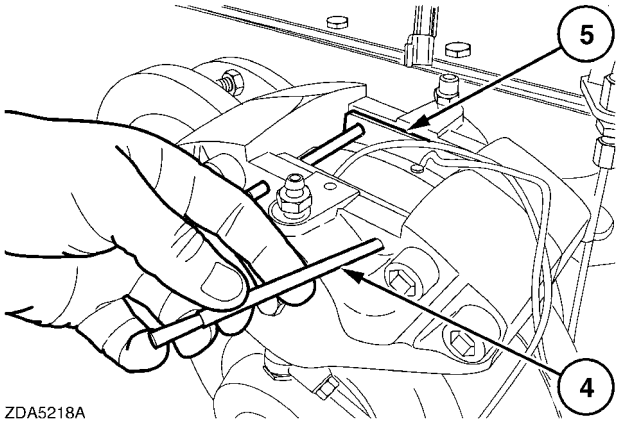
NOTE: *In case the seals are replaced, bleed the brakes described in* ***SERVICE BRAKE Hydraulic - Bleed (D.30.C - F.35.A.25)*** *after replacing the pads.*



ZDA5219A 4

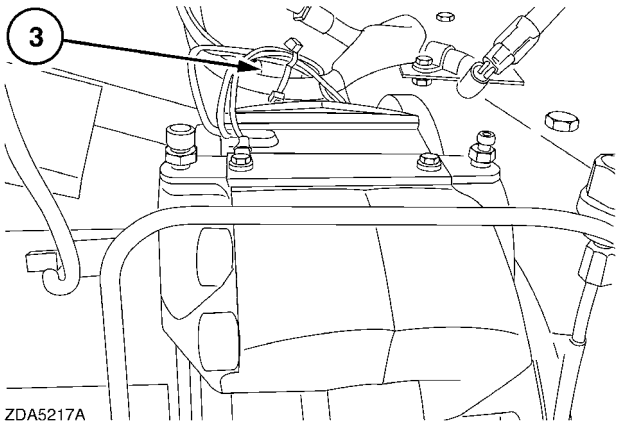
7. Push the brake pistons in their housing to allow the installation of new brake pads.
   Install new brake pads.

8. Secure brake pads with pins **(4)**.



ZDA5218A 5

9. Connect electric wires at **(3)**. Install cover and bolts. Torque bolts **4 - 6 Nm** (**3 - 4.5 lb ft**).



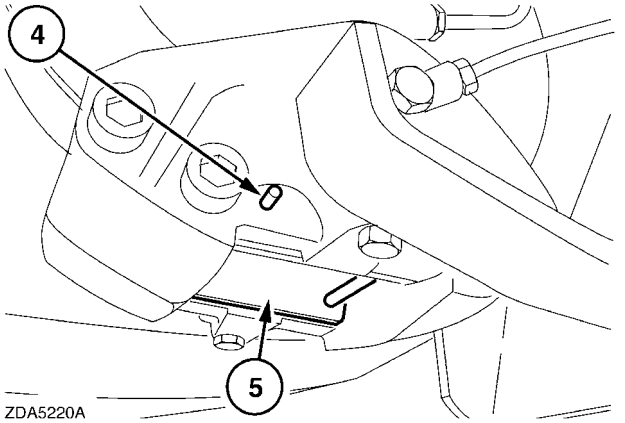
ZDA5217A 6

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10. On the lower brake caliper, remove pins **(4)**, and take out the brake pads **(5)**.

NOTE: *On the lower brake caliper , there is no cover installed.*

IMPORTANT: *Always replace the upper and the lower brake pads at the same time.*



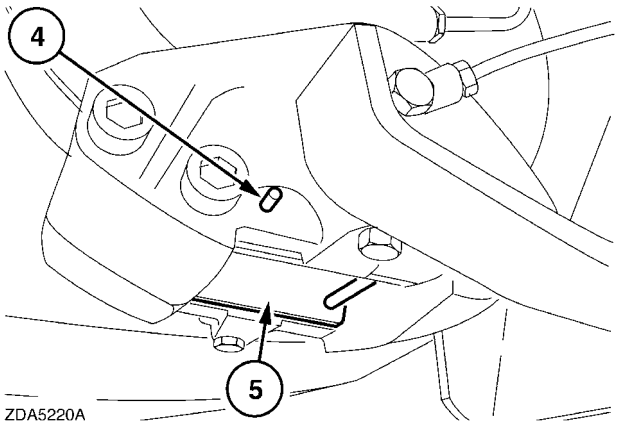
ZDA5220A 7

11. Check the conditions of the seals. If necessary, replace them.

NOTE: *In case the seals are replaced, bleed the brakes as described in* ***SERVICE BRAKE Hydraulic - Bleed (D.30.C - F.35.A.25)*** *after replacing the pads.*

12. Push the brake pistons in their housing to allow the installation of new brake pads. Install new brake pads.

13. Secure the brake pads with pins **(4)**.



ZDA5220A 8

14. Proceed the same way on the other side.

15. Check the brake fluid level If necessary, remove brake fluid (refer to the Operators Manual section 4 - "Lubrication and Maintenance", paragraph headed "Brake System".

16. Check the brakes operation.

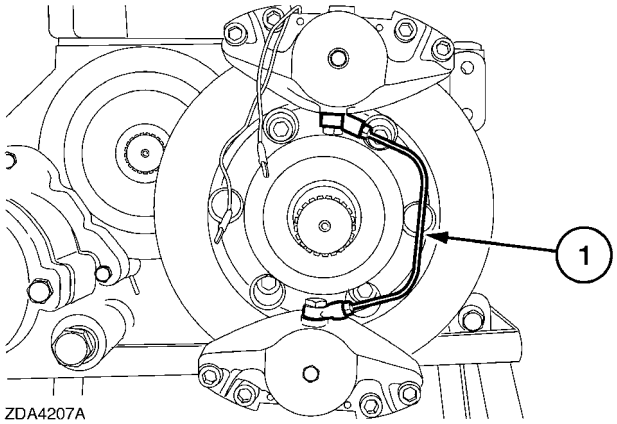
https://truckmanualshub.com/

Brake - Remove (D.30.C.58 - F.10.A.10)

AFX8010

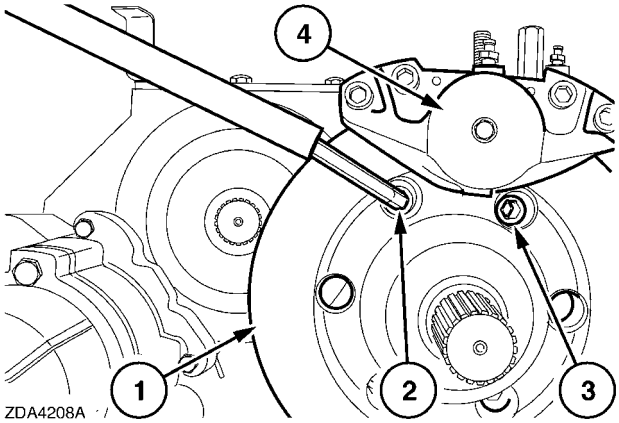
To remove the brake calipers and brake discs on both sides of the traction gearbox, proceed as follows:

1. Remove brake line **(1)** between the upper and lower brake calipers.



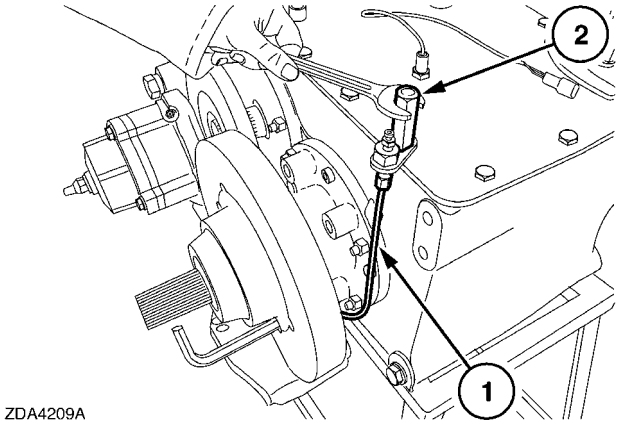
ZDA4207A 1

2. Turn the brake disc **(1)**, until the holes in the disc align with Hex Socket Head screws **(2)**, and **(3)**. Remove two Hex Socket Head screws **(2)**, and **(3)**. Remove upper brake caliper, **(4)**.



ZDA4208A 2

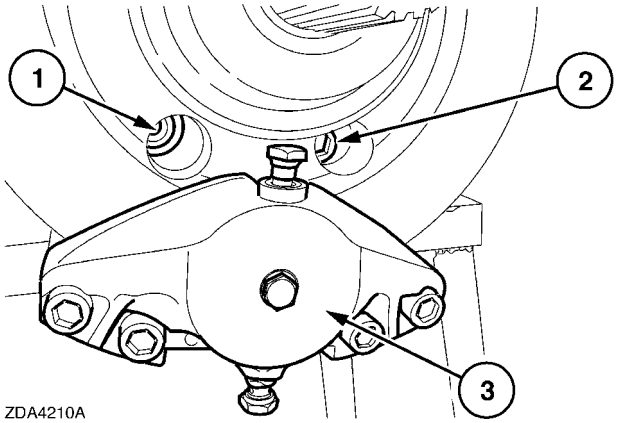
3. Remove bolt, **(2)** attaching lower caliper bleed line **(1)** .



ZDA4209A 3

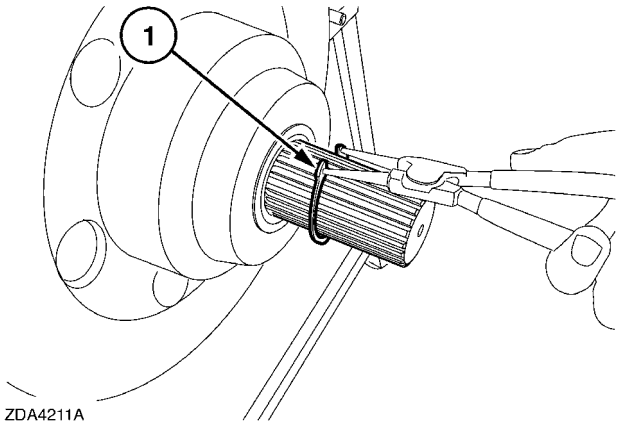
https://truckmanualshub.com/

4. Removed two Hex Socket Head screws **(1)**, and **(2)**. Remove lower brake caliper **(3)**.



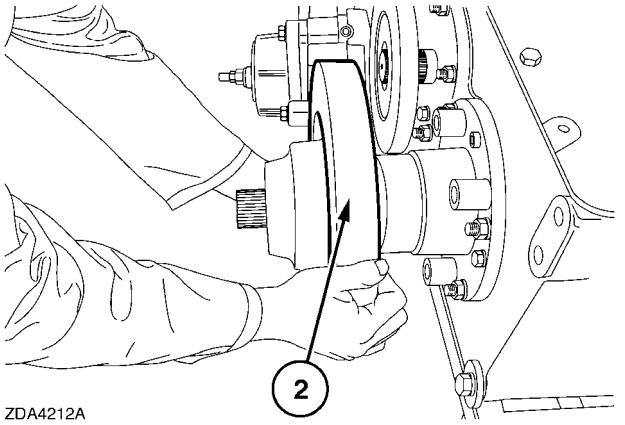
ZDA4210A 4

5. Remove retaining ring **(1)**.



ZDA4211A 5

6. Remove brake disc **(2)**.



ZDA4212A 6

7. Proceed the same on the other side.

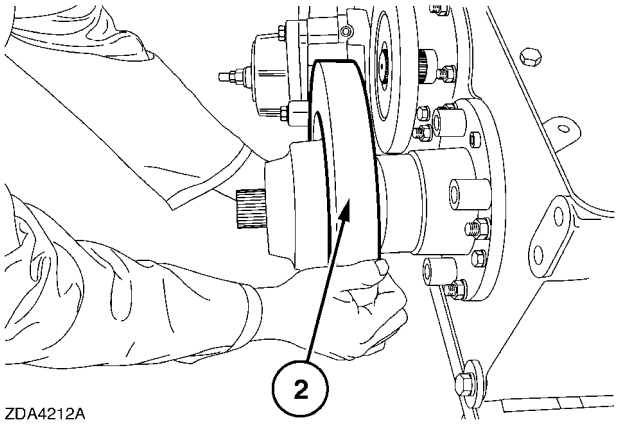
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Brake - Install (D.30.C.58 - F.10.A.15)

AFX8010

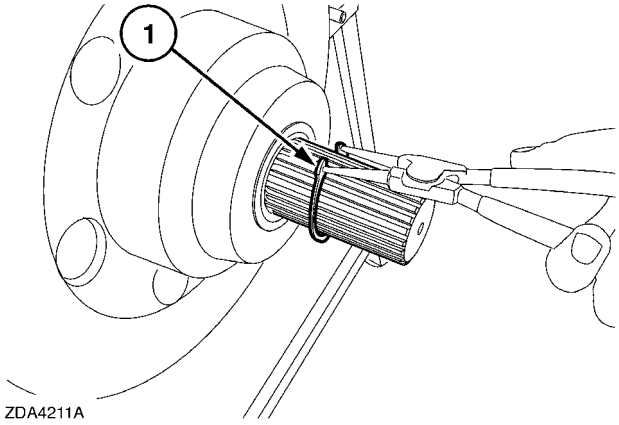
To install the brake shoes and brake discs on both sides of the transmission, proceed as follows:

1. Install brake disc, **(2)** on the output shaft of the transmission.



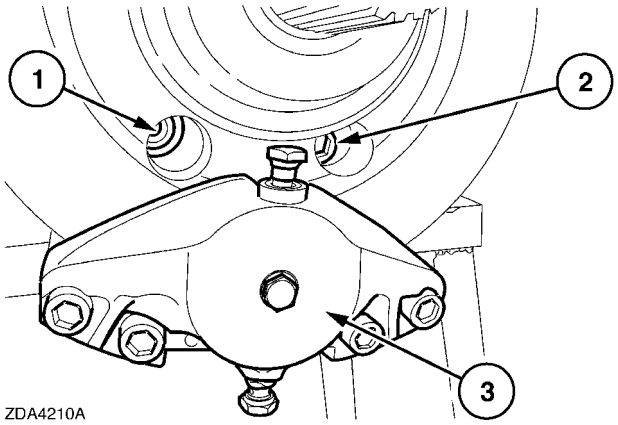
ZDA4212A 1

2. Secure the brake disc on the output shaft with the retaining ring **(1)**.



ZDA4211A 2

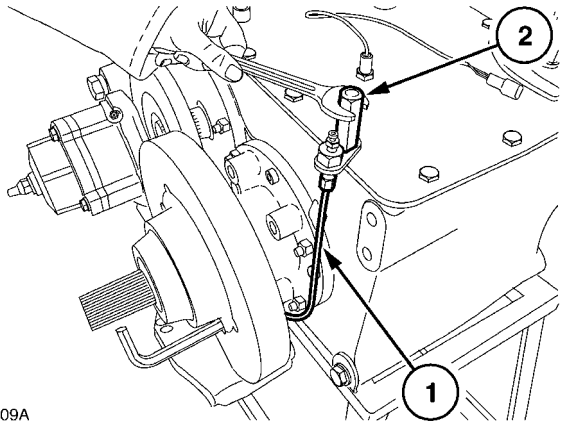
3. Apply thread locking compound type 1 (Loctite 242) on Hex Head Socket Screws **(1)**, and **(2)**. Install lower brake caliper **(3)**, and tighten Hex Socket Head Screws , **(1)**, and **(2)** to a torque of **260 - 270 Nm**(**192 - 200 lb ft**).



ZDA4210A 3

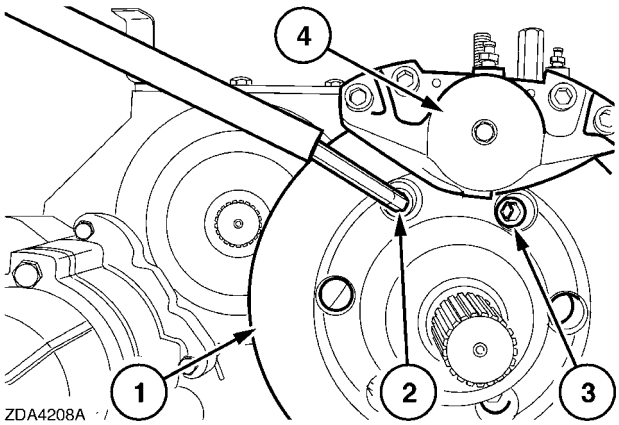
https://truckmanualshub.com/

4. Install bleed line **(1)** and tighten the bolt to a torque of **15 - 20 Nm** (**11 - 19 lb ft**).



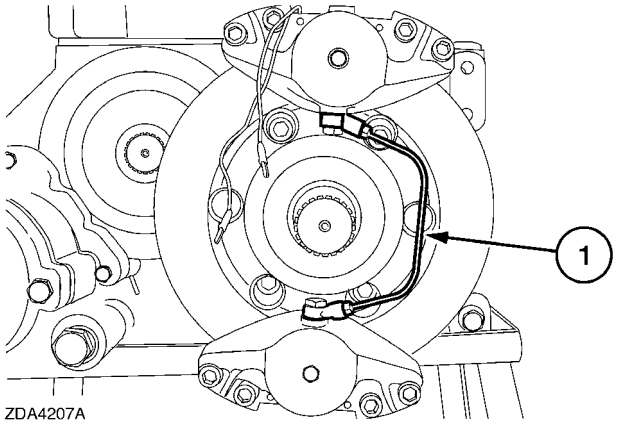
ZDA4209A 4

5. Apply a thread locking compound type 1 (Loctite 242) on Hex Socket Head Screws, **(2)**, and **(3)**. Install upper brake caliper **(4)** and tighten Hex Socket Head Screws, **(2)**, and **(3)** to a torque of **260 - 270 Nm** (**192 - 200 lb ft**).



ZDA4208A 5

6. Install brake line **(1)** between upper and lower brake calipers and tighten the nipples to a torque of **15 - 20 Nm** (**11 - 19 lb ft.**)



ZDA4207A 6

7. Proceed the same on the other side.

https://truckmanualshub.com/

Index

TRAVELLING - D

SERVICE BRAKE Hydraulic - 30.C

Brake - Install (D.30.C.58 - F.10.A.15) 11
AFX8010

Brake - Remove (D.30.C.58 - F.10.A.10) 9
AFX8010

Brake - Replace (D.30.C.58 - F.10.A.30) 6
AFX8010

SERVICE BRAKE Hydraulic - Bleed (D.30.C - F.35.A.25) 4
AFX8010

SERVICE BRAKE Hydraulic - General specification (D.30.C - D.40.A.10) 3
AFX8010

SERVICE BRAKE Hydraulic - Torque (D.30.C - D.20.A.10) 3
AFX8010

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TRAVELLING - D

PARKING BRAKE Hydraulic - 32.C

AFX8010

https://truckmanualshub.com/

Contents

TRAVELLING - D

PARKING BRAKE Hydraulic - 32.C

TECHNICAL DATA

PARKING BRAKE Hydraulic - General specification (D.32.C - D.40.A.10) 4
AFX8010

PARKING BRAKE Hydraulic - Torque (D.32.C - D.20.A.10) 4
AFX8010

FUNCTIONAL DATA

Braking device

Braking device - Sectional view (D.32.C.58 - C.10.A.30) 5
AFX8010

Parking brake override

Parking brake override - Static description (D.32.C.59 - C.30.A.20) 6
AFX8010

SERVICE

PARKING BRAKE Hydraulic - Bleed (D.32.C - F.35.A.25) 8
AFX8010

Braking device

Braking device - Travel adjust (D.32.C.58 - F.45.A.45) 9
AFX8010

Braking device - Replace (D.32.C.58 - F.10.A.30) 12
AFX8010

Braking device - Remove (D.32.C.58 - F.10.A.10) 13
AFX8010

Braking device - Disassemble (D.32.C.58 - F.10.A.25) 15
AFX8010

Braking device - Assemble (D.32.C.58 - F.10.A.20) 17
AFX8010

Braking device - Install (D.32.C.58 - F.10.A.15) 20
AFX8010

DIAGNOSTIC

Control valve

Control valve - Unidentified failure (D.32.C.14 - G.30.B.46) 22
AFX8010

Limit valve

Limit valve - Unidentified failure (D.32.C.15 - G.30.B.46) 25
AFX8010

https://truckmanualshub.com/

Sensing system

Sensing system Pressure sensor - Short circuit to B+ (D.32.C.95.81 - G.30.B.54) 28
AFX8010

Sensing system Pressure sensor - Open circuit (D.32.C.95.81 - G.30.B.50) 32
AFX8010

https://truckmanualshub.com/

PARKING BRAKE Hydraulic - General specification (D.32.C - D.40.A.10)

AFX8010

Brake disc diameter	**400 mm** (**15.75 in**)
Parking brake piston travel	**3 - 5 mm** (**1/8 - 3/16 in**)
Allen screw torque, brake caliper	**260 - 270 Nm** (**192 - 200 lb ft**)
Brake nipple torque	**15 - 20 Nm** (**11 - 19 lb ft**)
Mounting bolts torque, parking brake caliper	**190 - 210 Nm** (**140 - 155 lb ft**)
Bolt torque, brake housing	**97 Nm** (**72 lb ft**)

PARKING BRAKE Hydraulic - Torque (D.32.C - D.20.A.10)

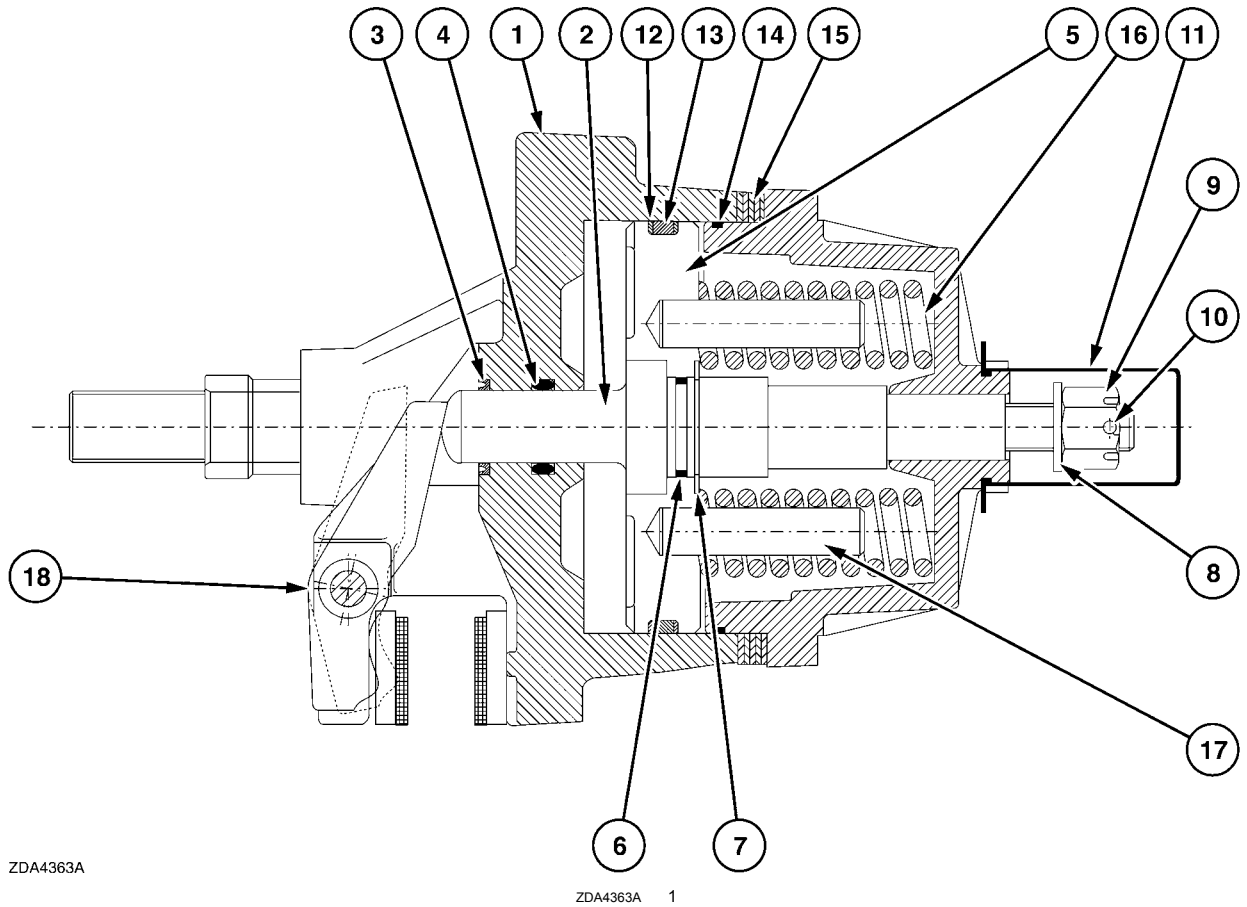
AFX8010

Bolts, parking brake shoe	**190 - 210 Nm** (**140 - 155 lb ft**)
Bolts, parking brake housing	**97 Nm** (**72 lb ft**)

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Braking device - Sectional view (D.32.C.58 - C.10.A.30)

AFX8010



ZDA4363A 1

Parking Brake

1. Housing	7. Retaining Ring	13. O-ring
2. Shaft	8. Washer	14. O-ring
3. Seal	9. Nut	15. Shims
4. O-ring	10. Cotter Pin	16. Spring
5. Piston	11. Rubber Boot	17. Spring Guide
6. O-ring	12. Piston Seal	18. Lever

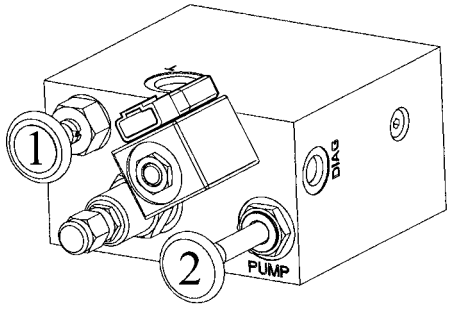
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Parking brake override - Static description (D.32.C.59 - C.30.A.20)

AFX8010

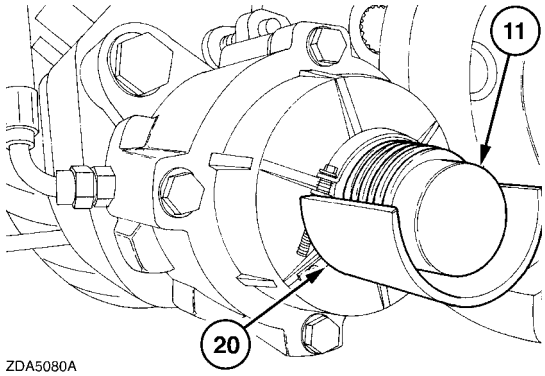
If it is not possible to release the parking brake electrically, it can be released hydraulically . To release the parking brake hydraulically, proceed as follows: (NOTE: The hydraulic override is the preferred method to safely override the parking brake. If the hydraulic method fails, the brakes can be released mechanically using great care.)

1. Raise the header and engage the header safety latch. Stop the engine.
2. Block the wheels adequately to prevent runaway of the combine. (NOTE: It is critical the machine be blocked safely)
3. A tow valve is located behind the trim panel between the front ladder deck and the grain tank. This valve allows manual release of the bark brake using hydraulics. Block the combine front to rear. Turn key switch to on position. Turn park brake to off position. Alarm will come on saying park brake is not engaging. To operate, turn knob **(1)** to the detent position. Use hand pump **(2)** to release park brake (approximately 60 pumps). Return valve **(1)** to the detent position to set park brake and for normal operation. Park brake is fully released when park brake lamp on shaft speed monitor goes off.



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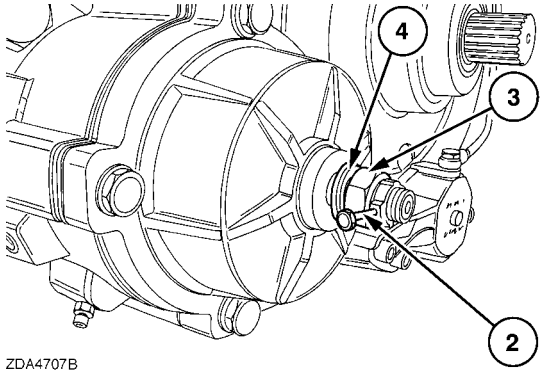
4. To release the park brake manually if the hydraulic method fails proceed as follows:
5. Remove safety plate **(20)** and rubber boot **(11)**.



ZDA5080A

ZDA5080A 2

6. Remove cotter pin **(2)** and rotate nut clockwise **(3)** until the parking brake piston is completely pulled backwards to release the pressure on the parking brake disc.



ZDA4707B

ZDA4707B 3

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⚠ DANGER ⚠

46-77A - Before you do service under the machine, put the machine on a level surface, engage the parking brake and stop the engine. Put blocks at the front and rear of the tires. Failure to follow these instructions can cause injury.

⚠ DANGER ⚠

SA053 - The parking brake will not hold this machine from moving if one drive wheel is raised above the ground. Before raising one drive wheel above the ground, always block the front and rear of the other three wheels.

https://truckmanualshub.com/

PARKING BRAKE Hydraulic - Bleed (D.32.C - F.35.A.25)

AFX8010

To bleed the hydraulic parking brake assembly, proceed as follows:

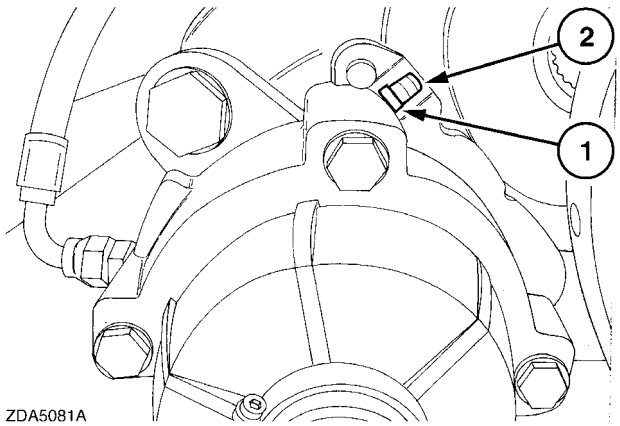
1. Park the combine on level ground and block the wheels adequately to prevent the combine form moving.

NOTE: *As the parking brake must be opened and closed while bleeding, this job has to be done with two persons.*

⚠ WARNING ⚠

M575 - If machine is on a slope and the above procedure is performed, the machine will roll. Perform the above procedure only when machine is on a flat surface or completely restrained by blocking the wheels.

2. Remove rubber cap **(2)** from bleed screw **(1)**.



ZDA5081A 1

3. Slide a transparent hose over the bleed screw to catch the oil into a cup when bleeding to reduce the amount of air bubbles going back into the system.
4. Start the combine engine.
5. Disengage and engage the parking brake a few times.
6. At the same time open the bleed screw until the oil free of air bubbles escapes through the bleed screw.
7. Close the bleed screw.
8. Engage the parking brake and stop the engine.
9. Remove transparent hose and reinstall rubber cap **(1)**.
10. Check the Hydraulic Reservoir for correct oil level. Refer to Operator’s Manual in "Lubrication and Maintenance" for this procedure.

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Braking device - Travel adjust (D.32.C.58 - F.45.A.45)

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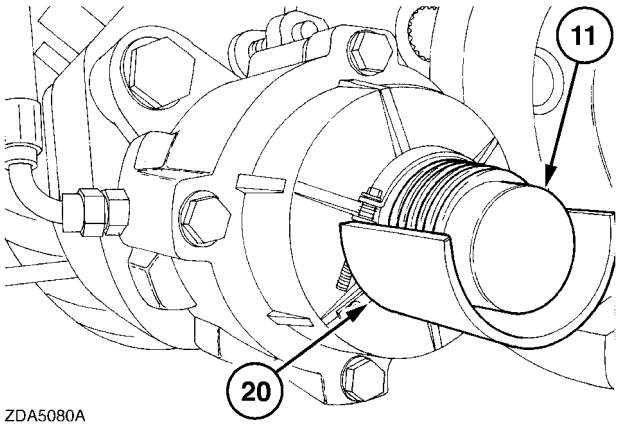
To obtain a correct and constant braking force, a clearance check and possible adjustment of the parking brake must be performed every 500 hours or annually.
Proceed as follows:

1. Park the combine on level ground and block the wheels adequately to prevent the combine from moving. Raise the header and engage the header safety latch. Stop the engine.

⚠ WARNING ⚠

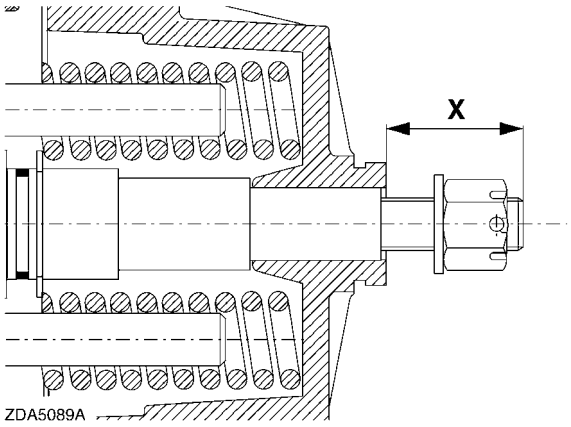
M575 - If machine is on a slope and the above procedure is performed, the machine will roll. Perform the above procedure only when machine is on a flat surface or completely restrained by blocking the wheels.

2. Remove safety plate **(20)** and rubber boot **(11)**.



ZDA5080A 1

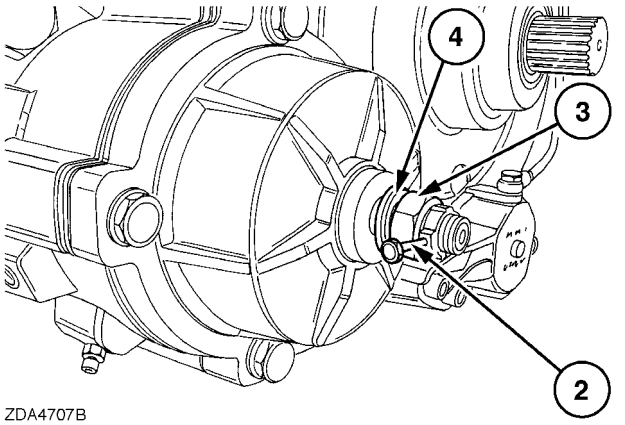
3. Measure distance X.



ZDA5089A 2

https://truckmanualshub.com/

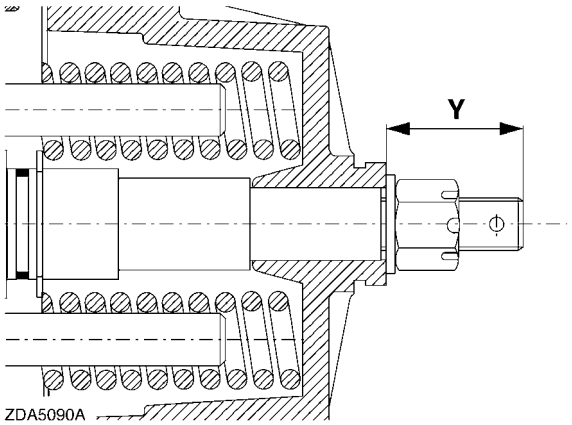
4. Remove cotter pin **(2)**. Rotate on nut **(3)** clockwise until the parking brake piston is completely pulled backwards.



ZDA4707B

ZDA4707B 3

5. Measure distance Y.



ZDA5090A

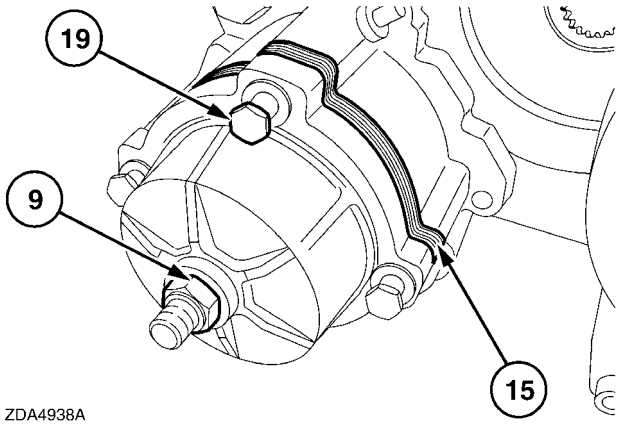
ZDA5090A 4

6. The difference between X and Y is the piston travel and should be 3 - 5 mm (1/8" -3/16").

7. If the piston travel exceeds 5mm (3/16"), the piston travel must be adjusted by removing one or more shims.

8. Loosen bolts **(19)** and remove as many shims as necessary.

NOTE: *It is not necessary to remove the bolts completely to remove a shim.* ***(15)*** *Removing one shim will reduce the piston travel by 2mm (5/64").*



ZDA4938A

ZDA4938A 5

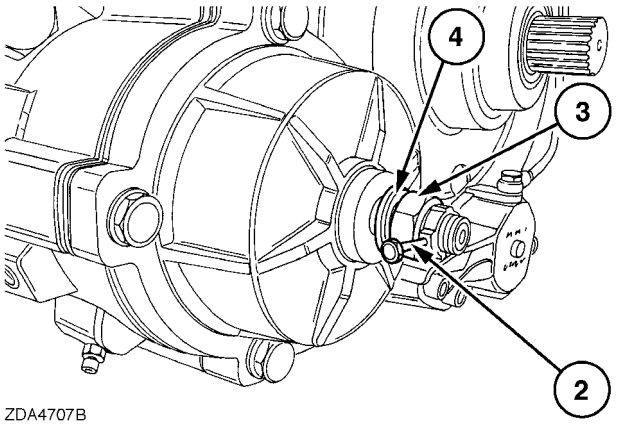
9. Tighten bolts **(19)** to **97 Nm (72 lb ft)**.

NOTE: *Install the removed shims between bolts and housing to prevent the shims from getting lost. The shims will be needed again when installing new park brake pads.*

10. Check piston travel. Readjust if necessary.

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11. Unscrew nut **(3)** to the end of the shaft and secure nut **(3)** with cotter pin **(2)**.

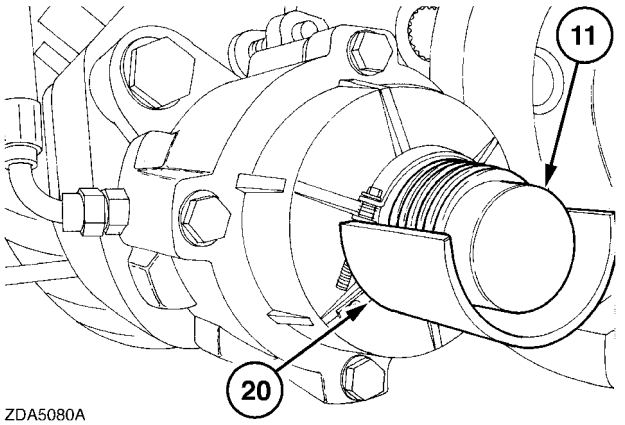


ZDA4707B

ZDA4707B 6

12. Reinstall rubber boot **(11)** and safety plate **(20)**.

IMPORTANT: *This procedure does not cover the checking of the parking brake pad wear. It is the operator's responsibility to check this on a regular basis. The brake pads must be replaced if the remaining thickness is less than 1mm.*



ZDA5080A

ZDA5080A 7

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Braking device - Replace (D.32.C.58 - F.10.A.30)

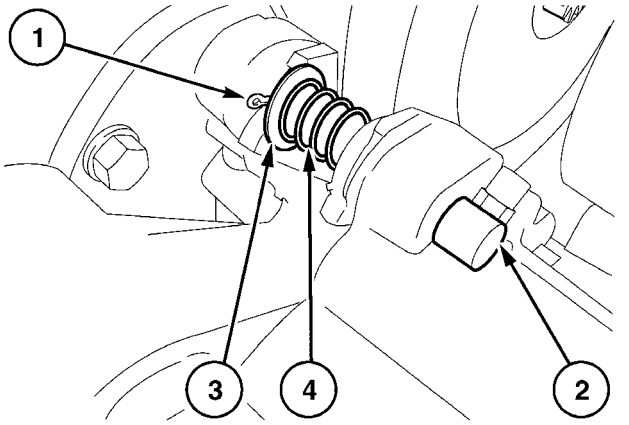
AFX8010

The parking brake pads must be replaced if the remaining thickness is less than 1 mm.

Prior operation: Release the hydraulic parking brake, use mechanical release procedure. **Parking brake override - Static description (D.32.C.59 - C.30.A.20)**.

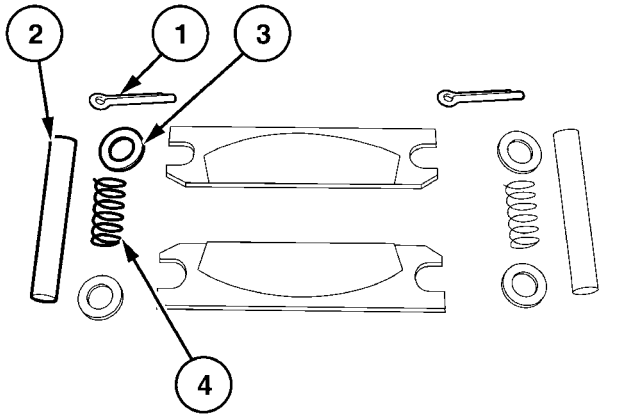
IMPORTANT: *Use genuine CNH brake pads as they will give the best performance.*

1. Remove retaining clip **(1)** and shaft **(2)** together with washers **(3)** and spring **(4)** on both sides of the parking brake shoe. Remove the park brake pads.



50040352 1

2. Install a new set of pads. Reinstall washers **(3)** spring **(4)** and shaft **(2)**. Secure with retaining clip **(1)**.



50040353 2

Next operation: Check for correct piston travel and adjustment **Braking device - Travel adjust (D.32.C.58 - F.45.A.45)**.

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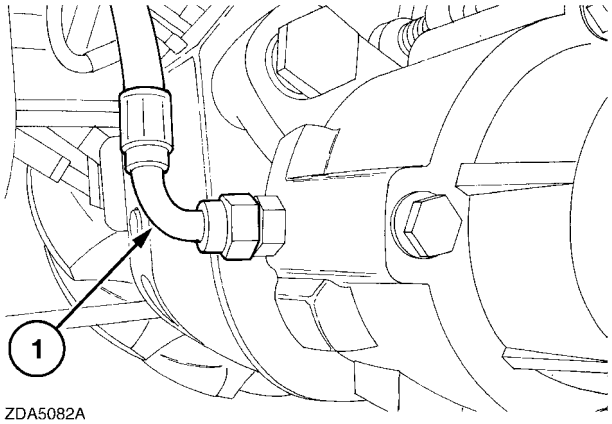
Braking device - Remove (D.32.C.58 - F.10.A.10)

AFX8010

Prior operation: To remove the parking brake disc, the right side service brake calipers and service brake disc must be removed. **Brake - Remove (D.30.C.58 - F.10.A.10)**

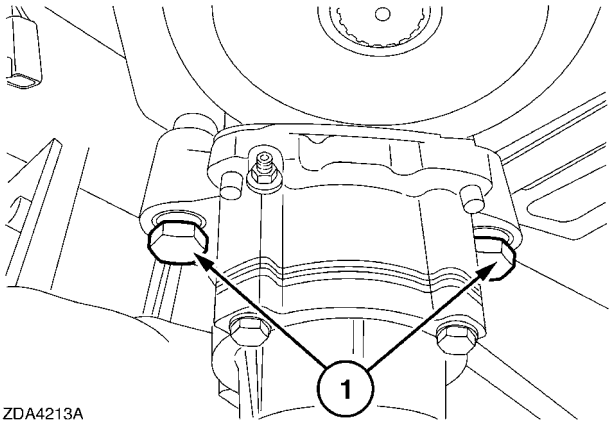
NOTE: *The parking brake assembly can be removed without removal of the service brake calipers and disc.*

1. Remove hydraulic line **(1)**.



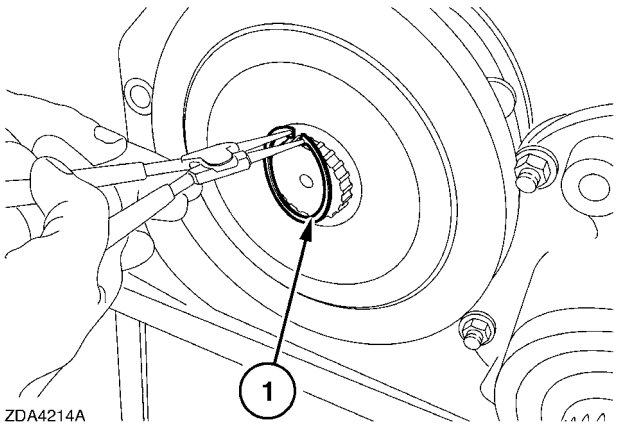
ZDA5082A 1

2. Remove two bolts **(1)** and bushings and the parking brake assembly.



ZDA4213A 2

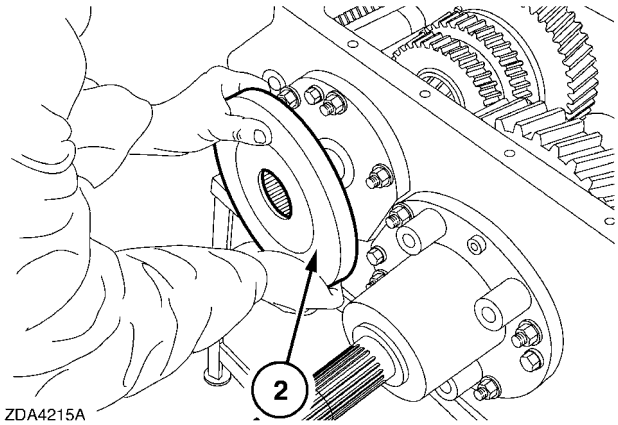
3. Remove retaining ring **(1)**.



ZDA4214A 3

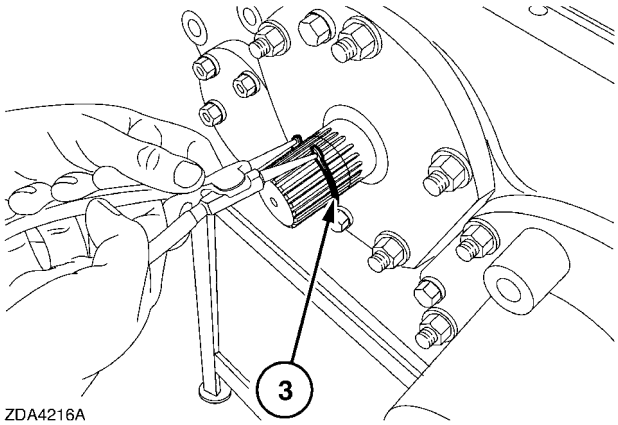
https://truckmanualshub.com/

4. Remove parking brake disc **(2)**.



ZDA4215A 4

5. Remove retaining ring **(3)**.



ZDA4216A 5

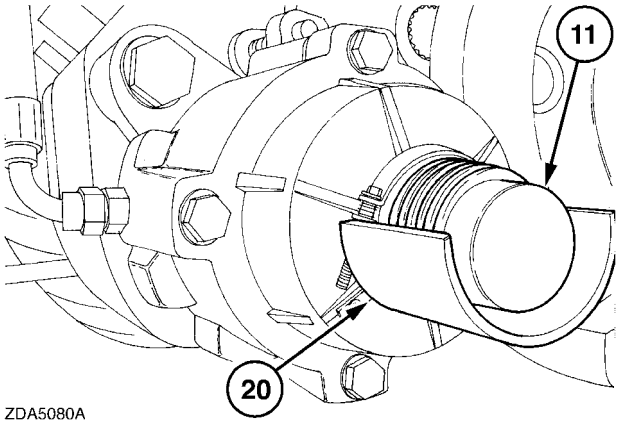
https://truckmanualshub.com/

Braking device - Disassemble (D.32.C.58 - F.10.A.25)

AFX8010

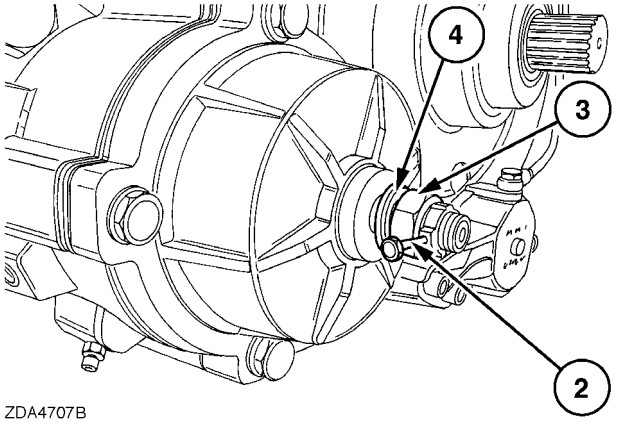
To disassemble the parking cylinder, proceed as follows:

1. Remove safety plate **(20)** and rubber cap **(11)**.



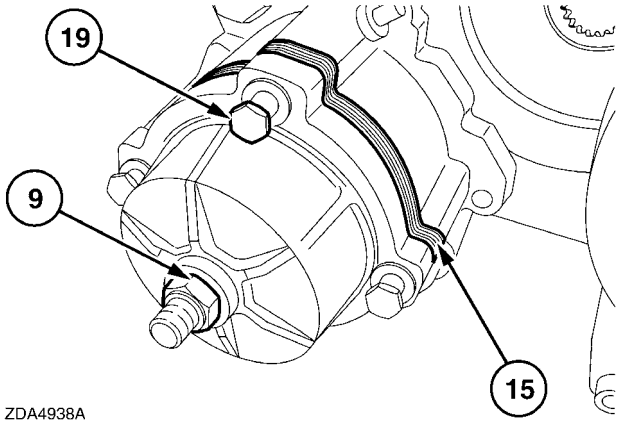
ZDA5080A 1

2. Remove cotter pin **(2)** add shims **(4)** and screw on nut **(3)** until the parking brake piston is completely pulled backwards.



ZDA4707B 2

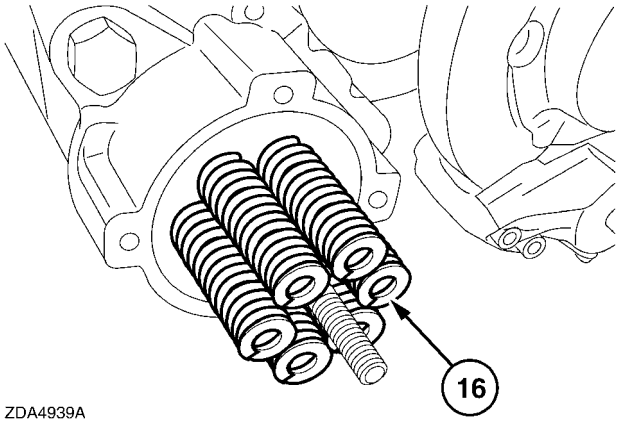
3. Loosen bolts **(19)** and remove shims **(15)**. Completely remove bolts **(19)**. Remove bolt **(9)** the washer and the housing.



ZDA4938A 3

https://truckmanualshub.com/

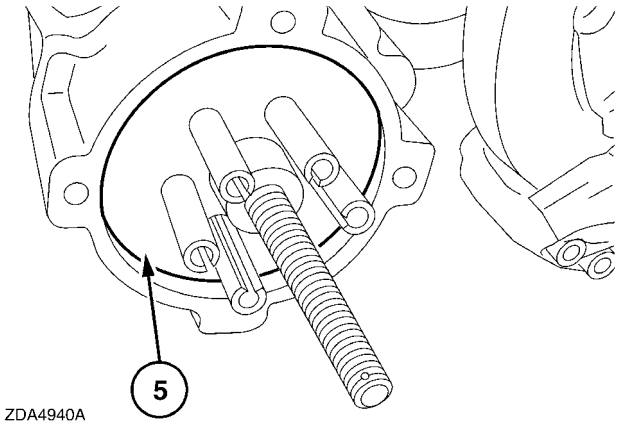
4. Remove springs **(16)**.



ZDA4939A

ZDA4939A 4

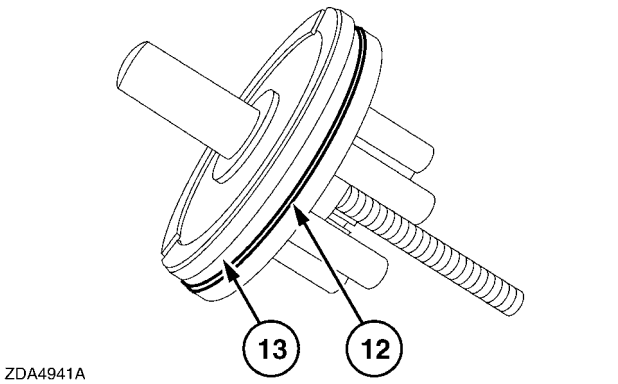
5. Remove piston **(5)**.



ZDA4940A

ZDA4940A 5

6. Replace O-Ring **(13)**, and seal reinforcement **(12)**.

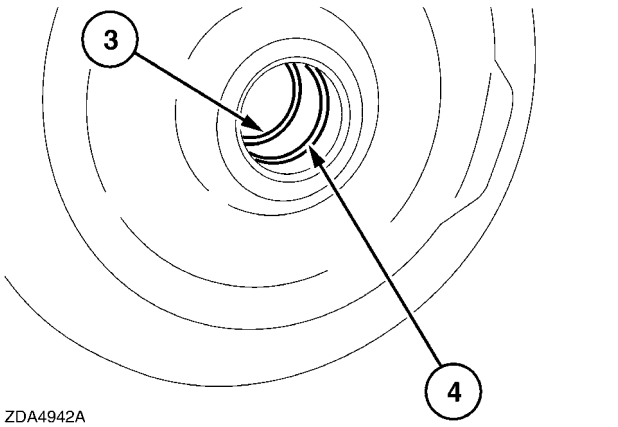


ZDA4941A

ZDA4941A 6

7. In the housing, replace seal **(3)** and O-Ring **(4)**.

NOTE: *To have better access to the seal, remove the housing from the transmission as described in* ***Braking device - Remove (D.32.C.58 - F.10.A.10)Braking device - Install (D.32.C.58 - F.10.A.15)****.*



ZDA4942A

ZDA4942A 7

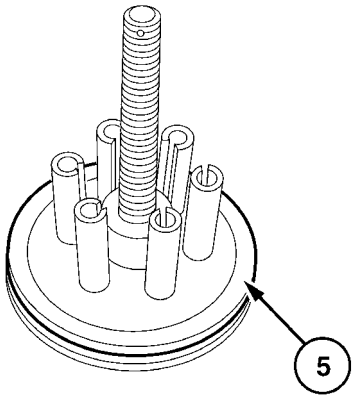
https://truckmanualshub.com/

Braking device - Assemble (D.32.C.58 - F.10.A.20)

AFX8010

To assemble the parking brake assembly, proceed as follows:

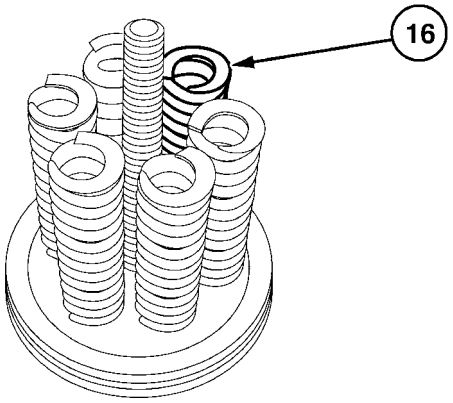
1. Place piston **(5)** as shown.



ZDA4943A

ZDA4943A 1

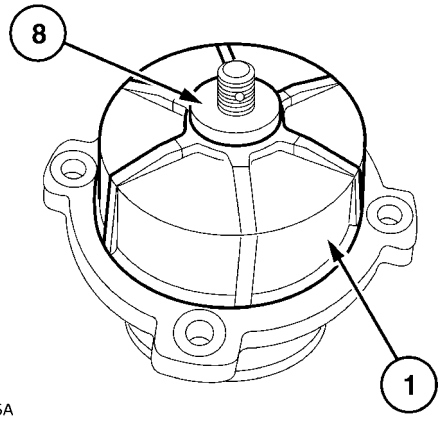
2. Install springs **(16)**.



ZDA4944A

ZDA4944A 2

3. Install outer housing **(1)** and washer **(8)**.



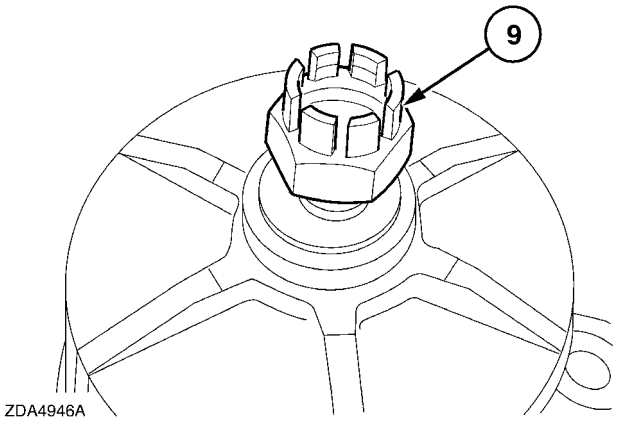
ZDA4945A

ZDA4945A 3

https://truckmanualshub.com/

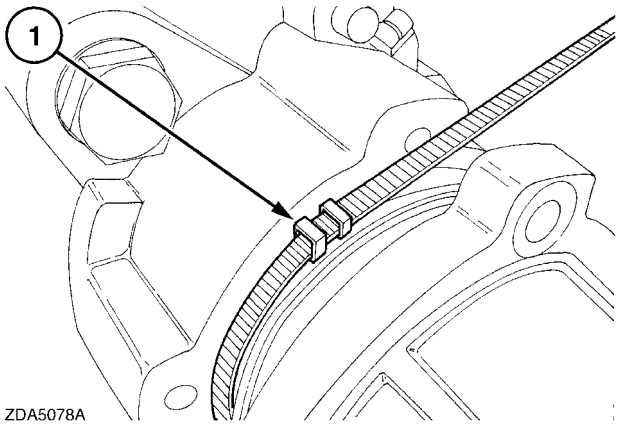
4. Screw on nut **(9)** and tighten it until the piston is against the housing **(1)**.

NOTE: *Be careful not to damage the piston seal and O - ring.*



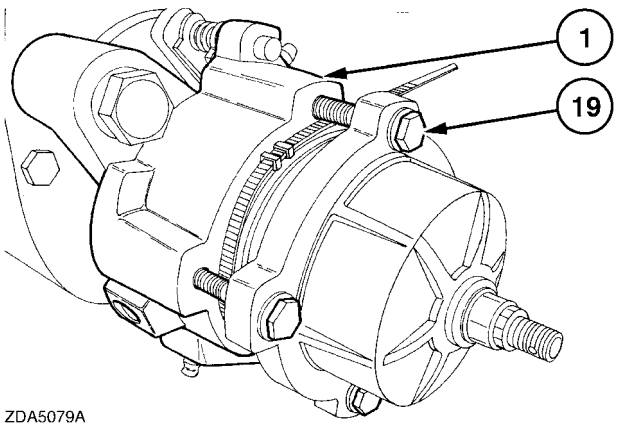
ZDA4946A 4

5. Apply a cable tie **(1)** around the piston seal and the O - ring and position the piston in the inner housing **(1)**.



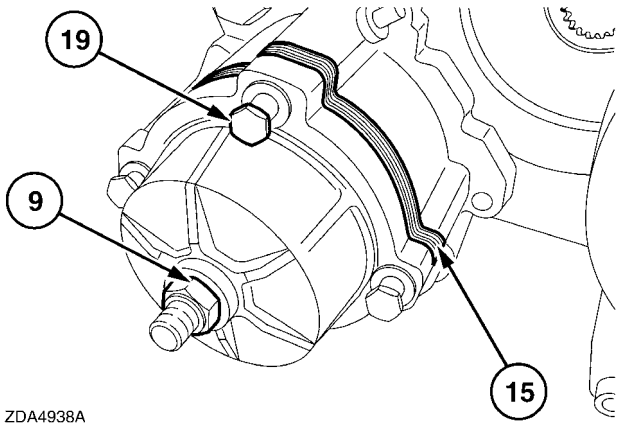
ZDA5078A 5

6. Insert four bolts **(19)**with washers and tighten them alternately until the seals are in housing **(1)**. Remove the cable tie.



ZDA5079A 6

7. Install shims **(15)** and tighten four bolts **(19)**.



ZDA4938A 7

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Next operation: Check for correct piston travel and adjustment **Braking device - Travel adjust (D.32.C.58 - F.45.A.45)**
Next operation: Bleed the parking brake as described in **PARKING BRAKE Hydraulic - Bleed (D.32.C - F.35.A.25)**.

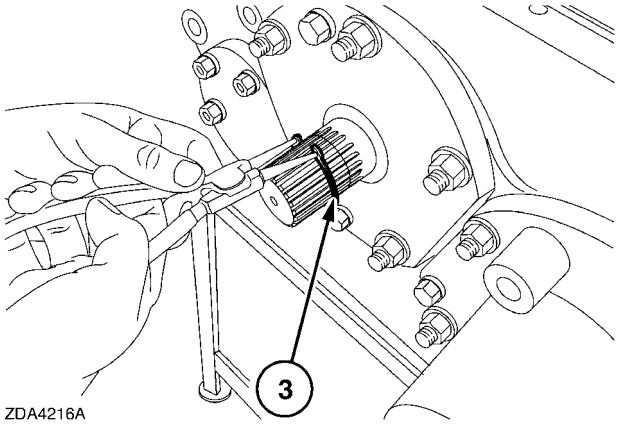
https://truckmanualshub.com/

Braking device - Install (D.32.C.58 - F.10.A.15)

AFX8010

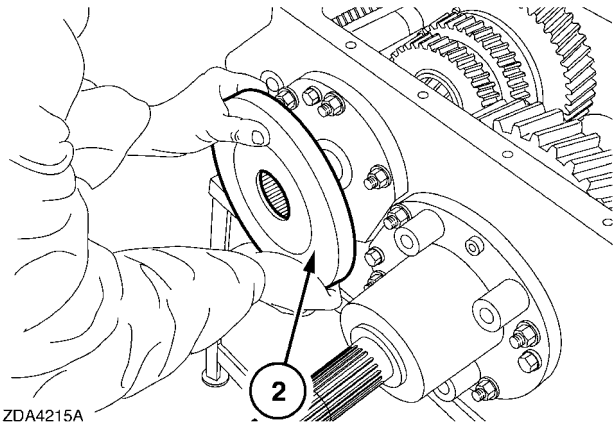
To install the parking brake assembly, proceed as follows:

1. To install the parking brake disc, proceed as follows: Install retaining ring **(3)**.



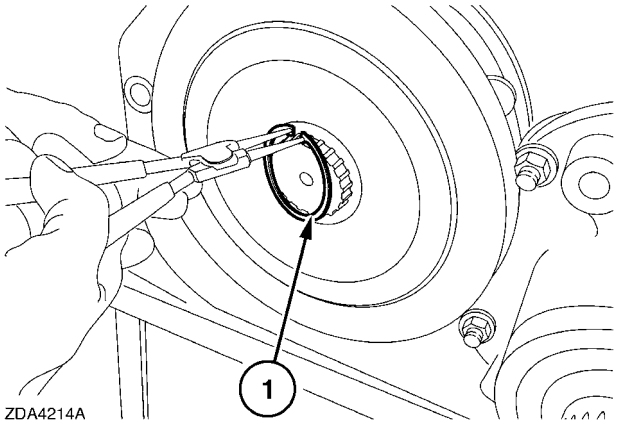
ZDA4216A 1

2. Install parking brake disc **(2)**.



ZDA4215A 2

3. Install retaining ring **(1)**.



ZDA4214A 3

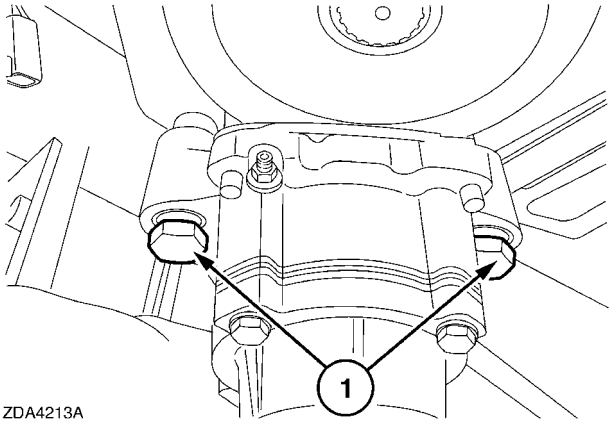
4. Apply grease to the bushings and fill the bushing bores on the park brake housing with grease.
5. Install the bushings into the park brake housing.

NOTE: *Take care the grease seals are correctly installed.*

6. .

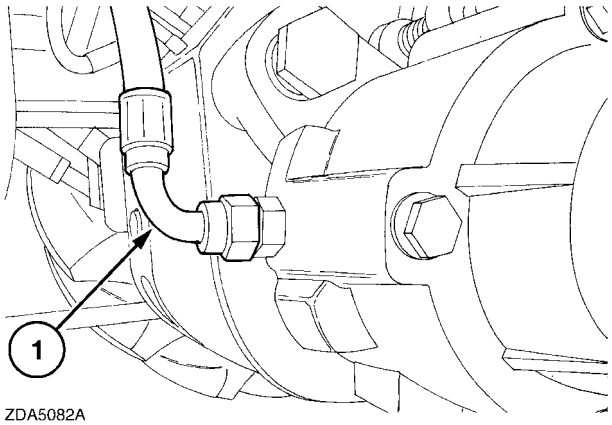
https://truckmanualshub.com/

7. Apply thread locking compound type 1 (Loctite 242) to bolts **(1)**. Install the parking brake assembly and tighten bolts, **(1)** to a torque of **190 - 210 Nm** (**140 - 155 lb ft**).



ZDA4213A 4

8. Install the parking brake line **(1)** and bleed the parking brake cylinder as described in **PARKING BRAKE Hydraulic - Bleed (D.32.C - F.35.A.25)** in this chapter.



zda5082a 5

https://truckmanualshub.com/

Control valve - Unidentified failure (D.32.C.14 - G.30.B.46)

AFX8010

E0181-11 - Park Brake Valve

Cause:
The park brake valve (L-10) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" sort menu, and select "PARK VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X457**. Use a multimeter to check between connector **X457** pin 1 (valve side) and chassis ground.

   A. If there is continuity, the park brake disengage solenoid is shorted to ground. Replace the solenoid.

   B. If there is no continuity, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X457** pin 1 (harness side) and chassis ground.

   A. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X457** and connector **X016** J2-15 wire 572 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Disconnect connector **X457**. Use a multimeter to check the resistance of the park brake disengage valve coil between connector **X457** pins 1 & 2. The proper resistance range is **7.2 - 11.2 ohms**.

   A. If there is no continuity, replace solenoid.

   B. If the coil is within specification, continue with Step **6**.
5. Use a multimeter to check for continuity between connector **X457** pin 2 (harness side) and chassis ground.

   A. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X457** pin 2 and the front frame ground #2 wire 605 black. Locate the open and repair.

   B. If there is continuity to ground, continue with Step **7**.
6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the park brake valve. Use a multimeter to check for **12 volts** between connector **X457** pin 1 and chassis ground.

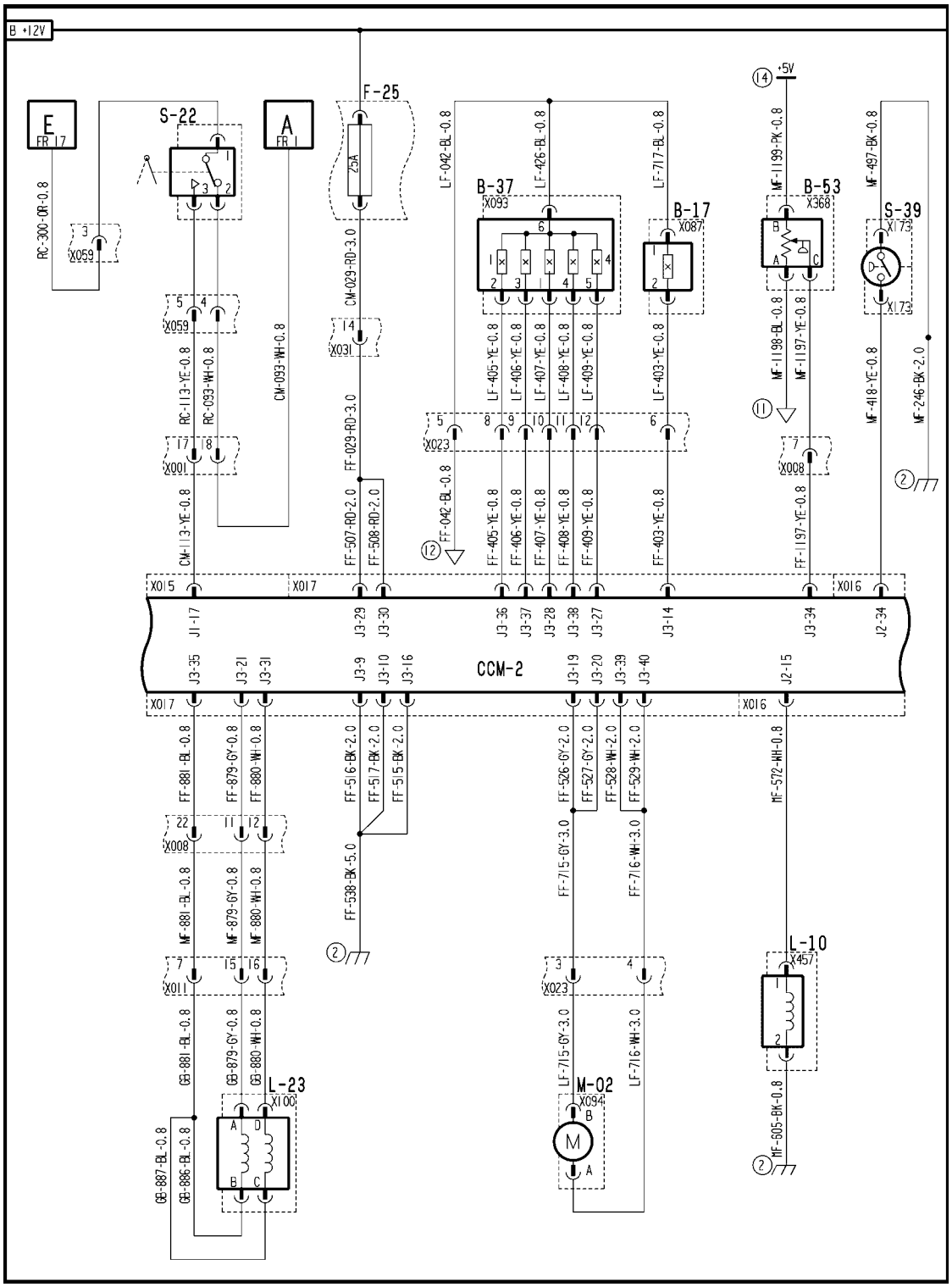
   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X457** and connector **X016** pin J2-15 wire 572 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **9**.
7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

https://truckmanualshub.com/

A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

https://truckmanualshub.com/

Limit valve - Unidentified failure (D.32.C.15 - G.30.B.46)

AFX8010

E0191-11 - Brake Limiting Valve

Cause:
The brake limiting valve (L-32) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" sort menu, and select "LIMIT VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X329**. Use a multimeter to check the resistance of the brake limiting valve coil (L32). The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the brake limiting solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the brake limiting solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X329** pin A (harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X329** and connector **X019** pin J2-7 wire 1504 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Use a multimeter to check for continuity between connector **X329** pin B (harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X329** pin B and the front frame ground #2 wire 1505 black. Locate the open and repair.

   B. If there is continuity to ground, continue with Step **7**.
5. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the brake limiting valve. Use a multimeter to check for **12 volts** between connector **X329** pin A and chassis ground.

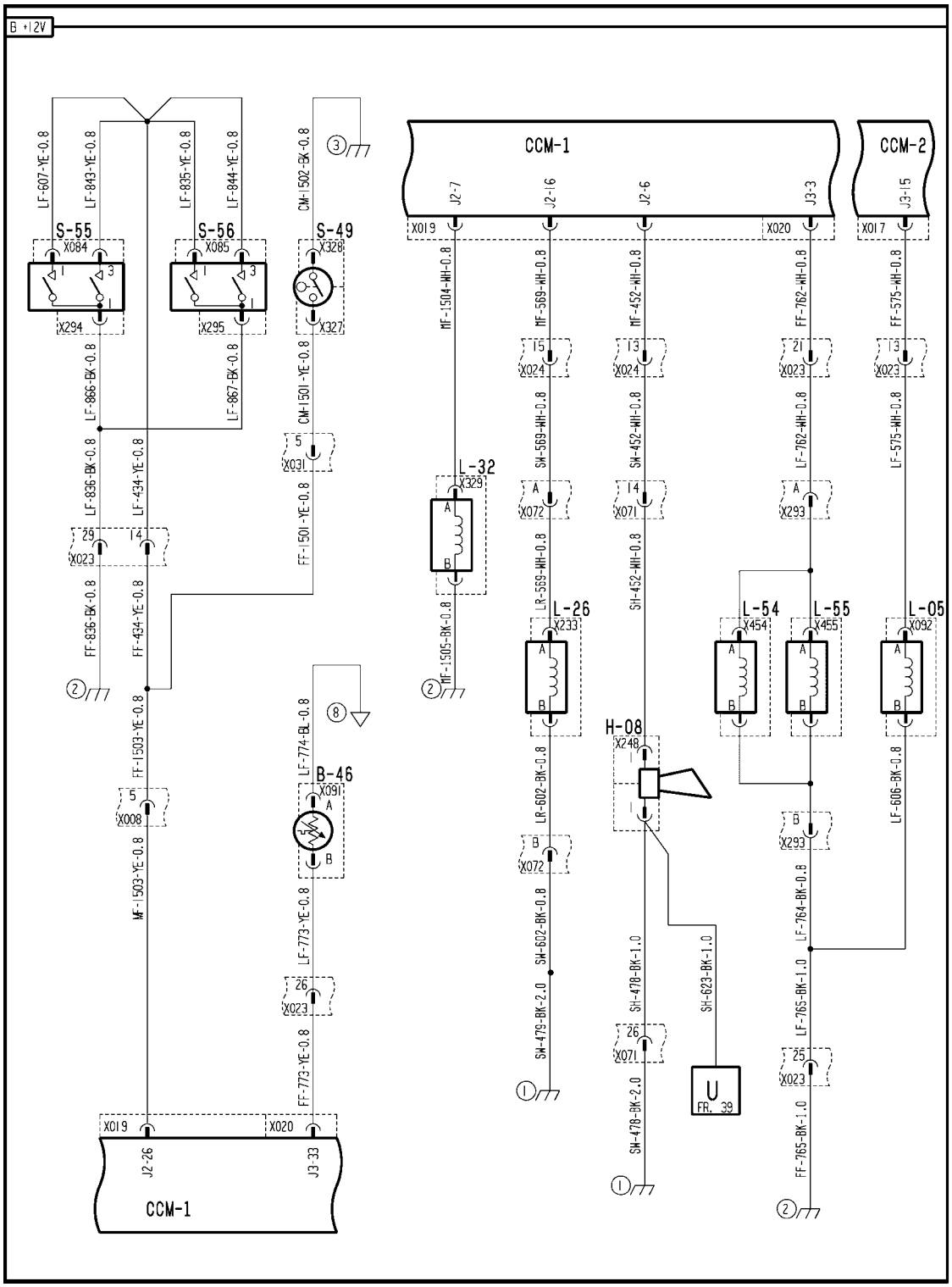
   A. If **12 volts** is not present there is an open circuit in the main frame (MF) harness between connector **X329** pin A and connector **X019** pin J2-7 wire 567 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **9**.
6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



AFXSCHEM08-04 1

FRAME 8 - DRIVES

https://truckmanualshub.com/

B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

https://truckmanualshub.com/

Sensing system Pressure sensor - Short circuit to B+ (D.32.C.95.81 - G.30.B.54)

AFX8010

E0155-03 - Park Brake Pressure Sensor

Cause:
The park brake pressure sensor (B-53) circuit is shorted to 12 volts.

Possible failure modes:

1. Switch supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" sort menu, and select "PARK PRESS SEN" to check the voltage range.

   The proper voltage range for the park brake pressure sensor (key ON, engine OFF) is - **0.5 - 0.8 volts**.

   The proper voltage range for the park brake pressure sensor (key ON, engine Running, park brake OFF) is - **0.8 - 4.9 volts**.

   A. If the voltage reading is high out of range (>**5.2 volts**), continue with Step **2**.

   B. If voltage is normal, the shorted wire may not be energized at this time. Continue with Step **9**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the park brake pressure sensor connector **X368**. Use a multimeter to check for voltage on connector **X368** pin B. There should be **5 volts** present.

   A. If high (>**5.5 volts**) voltage is found, the regulated voltage supply is incorrect. The error "**E0165-03 - CCM2 J2 5V Reference**" should be listed in the Universal Display Plus "ERROR" screen. Correct that error, and then check to determine if this error has been resolved.

   B. If correct voltage is found, continue with Step **3**.

3. Disconnect the park brake pressure sensor connector **X368**. Use a multimeter to check for continuity between connector **X368** pin A and chassis ground.

   A. If continuity is found, continue with Step **4**.

   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X368** pin A and connector **X016** pin J2-14 wire 1198 blue or 465 blue. Locate the open and repair.

4. Disconnect the park brake pressure sensor connector **X368**. Use a multimeter to check for voltage on connector **X368** pin C.

   A. If no voltage is found, continue with Step **9**.

   B. If high (>**5.2 volts**) voltage is found, continue with Step **5**.

5. Disconnect the front frame (FF) harness from the main frame (MF) harness at connector **X008**. Use a multimeter to check for voltage on connector **X008** pin 7.

   A. If no voltage is found, there is a short in the main frame (MF) harness between connector **X368** pin C and connector **X008** pin 7 wire 1197 yellow. Locate the short and repair.

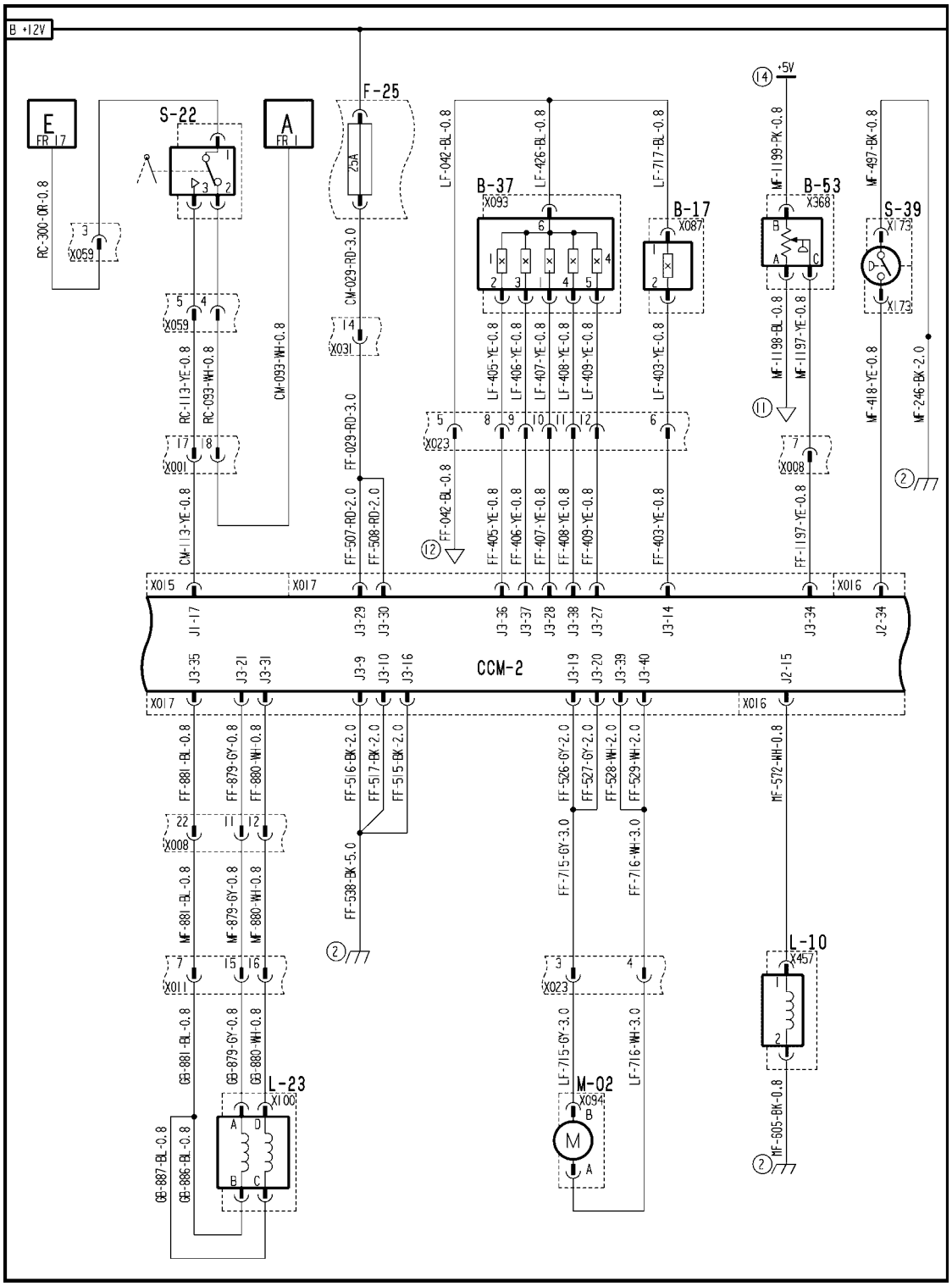
https://truckmanualshub.com/

B. If high (>**5.2 volts**) voltage is found, there is a short in the front frame (FF) harness between connector **X008** pin 6 and connector **X017** pin J3-34 wire 1197 yellow. Locate the short and repair.

6. Operate the machine while monitoring Universal Display Plus "DIAG" screen.

A. If no high out of range readings are indicated, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



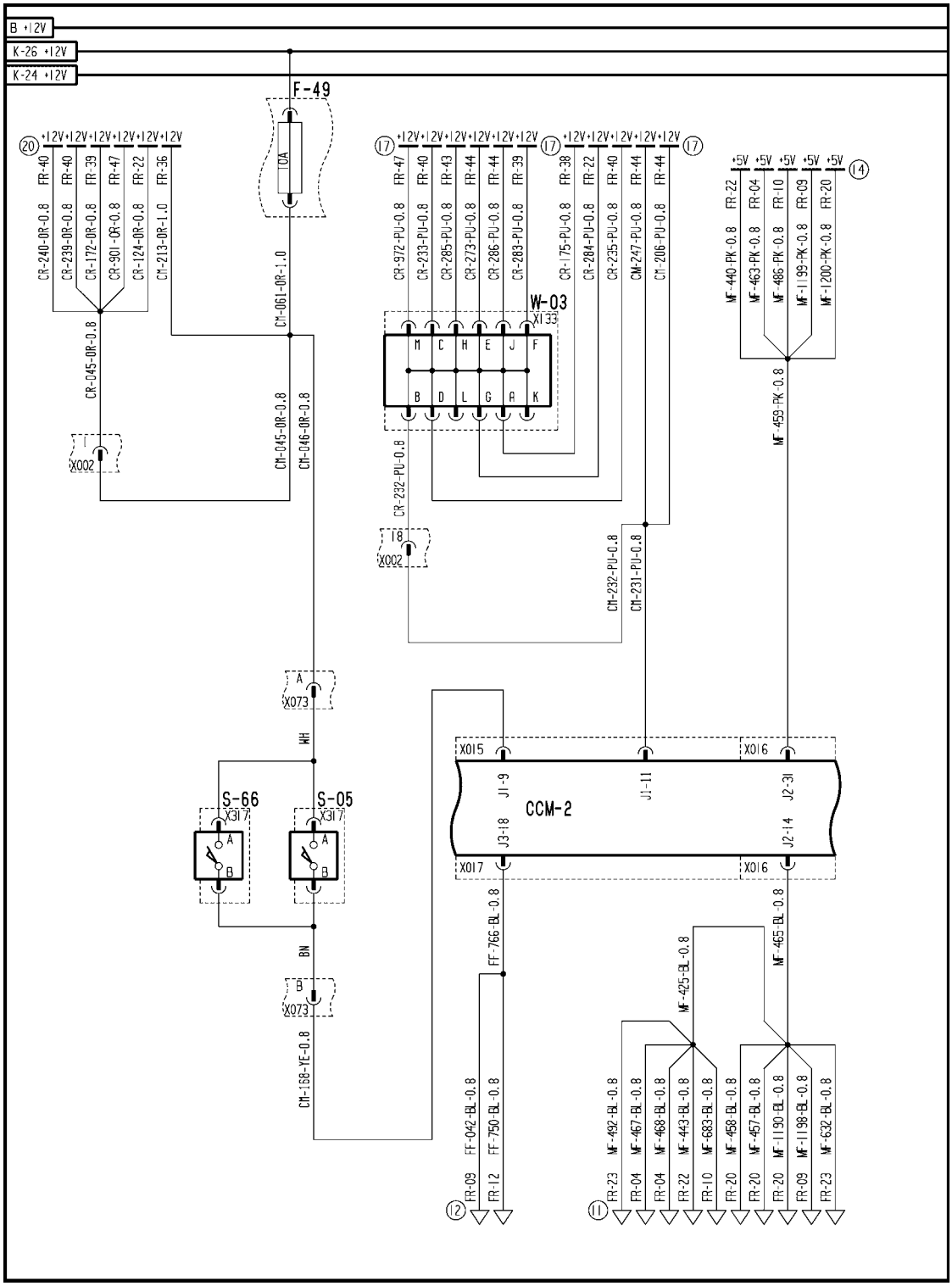
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Pressure sensor - Open circuit (D.32.C.95.81 - G.30.B.50)

AFX8010

E0155-05 - Park Brake Pressure Sensor

Cause:
The park brake pressure sensor (B-53) circuit signal wire is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring open or shorted to ground.
2. Loss of power to the sensor.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "BRAKES" sort menu, and select "PARK PRESS SEN" to check the voltage range.

   The proper voltage range for the park brake pressure sensor (key ON, engine OFF) is **0.5 - 0.8 volts**.

   The proper voltage range for the park brake pressure sensor (key ON, engine Running, park brake OFF) is **0.8 - 4.9 volts**.

   A. If the voltage reading is low out of range (<**0.3 volts**), continue with Step **2**.

   B. If the voltage is normal, the shorted wire may not be open or grounded at this time. Continue with Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the park brake pressure sensor connector **X368**. Use a multimeter to check for voltage on connector **X368** pin B. There should be **5 volts** present.

   A. If no voltage is found, continue with Step **3**.

   B. If correct voltage is found, continue with Step **4**.
3. Carefully disconnect the main frame harness from the CCM2 module at connector **X016**. Use a multimeter to check for voltage on the CCM2 module connector **X016** pin J2-31. There should be **5 volts** present.

   A. If voltage is found, there is an open circuit in the main frame (MF) harness between connector **X368** pin B and connector **X016** pin J2-31 wire 459 pink or 1199 pink. Locate the open and repair.

   B. If no voltage is found, there is an internal fault with the CCM2 module. Replace the module.
4. Disconnect the park brake pressure sensor connector **X368**. Use a multimeter to check for continuity between connector **X368** pin C and chassis ground.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, continue with Step **6**.
5. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**. Use a multimeter to check for continuity between the harness end of connector **X008** pin 7 and chassis ground.

   A. If there is no continuity, there is a short to ground in the main frame (MF) harness between connector **X008** pin 7 and connector **X368** pin C wire 1197 yellow. Locate the short and repair.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X008** pin 7 and connector **X017** pin J3-34 wire 1197 yellow. Locate the short and repair.

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6. Carefully disconnect the main frame harness from the CCM2 module at connector **X017**. Install a jumper wire between the harness end of connector **X017** pin J3-34 and chassis ground. Use a multimeter to check for continuity between connector **X368** pin C and chassis ground.

   A. If continuity is found, continue with Step **8**.

   B. If no continuity is found, continue with Step **7**.

7. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**. Use a multimeter to check for continuity between the front frame (MF) harness end of connector **X008** pin 7 and chassis ground.

   A. If there is continuity, there is an open circuit in the main frame (MF) harness between connector **X008** pin 7 and connector **X368** pin C wire 1197 yellow. Locate the open and repair.

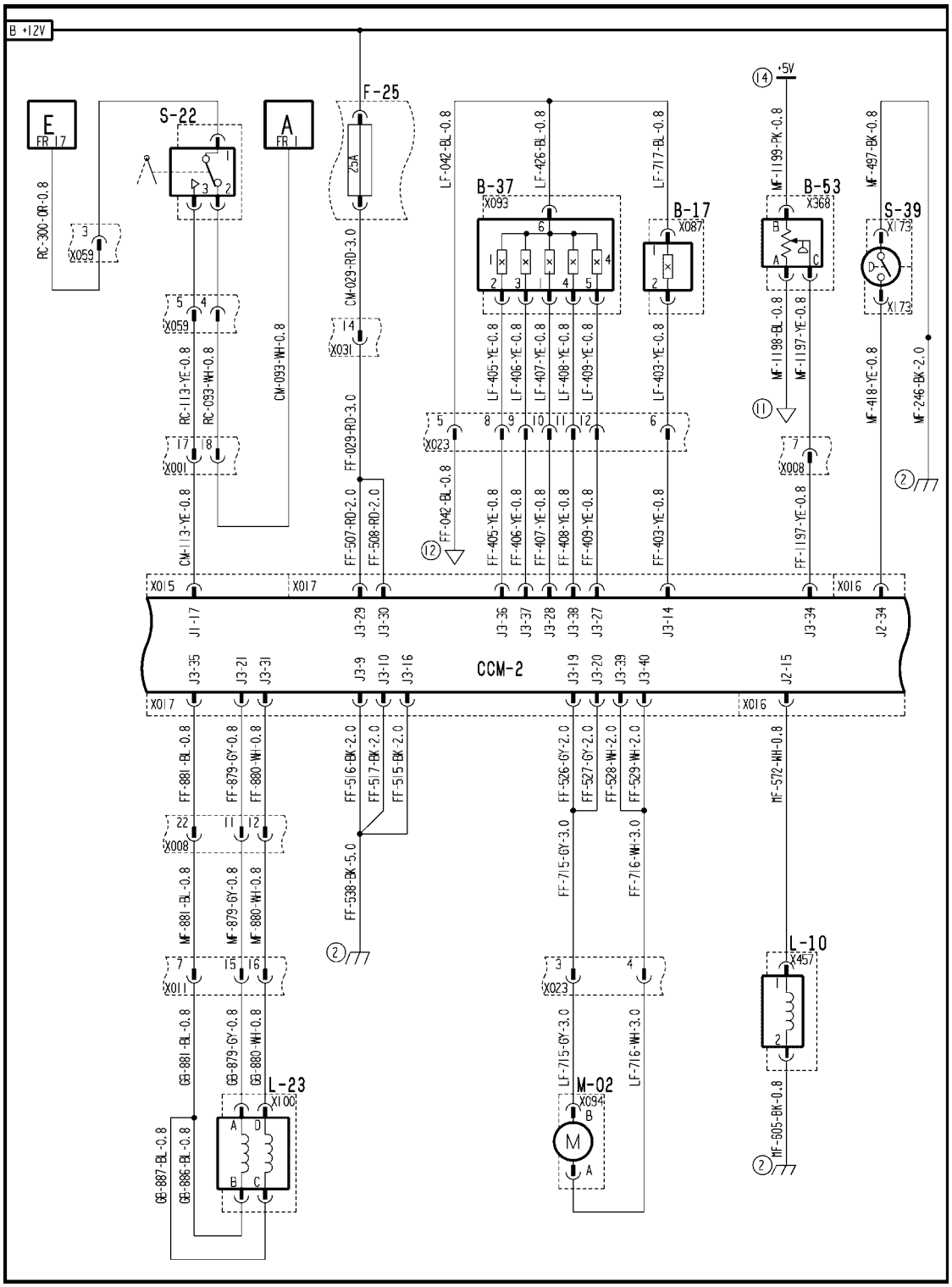
   B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X008** pin 7 and connector **X017** pin J3-34 wire 1197 yellow. Locate the open and repair.

8. Operate the machine while monitoring Universal Display Plus "DIAG" screen..

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



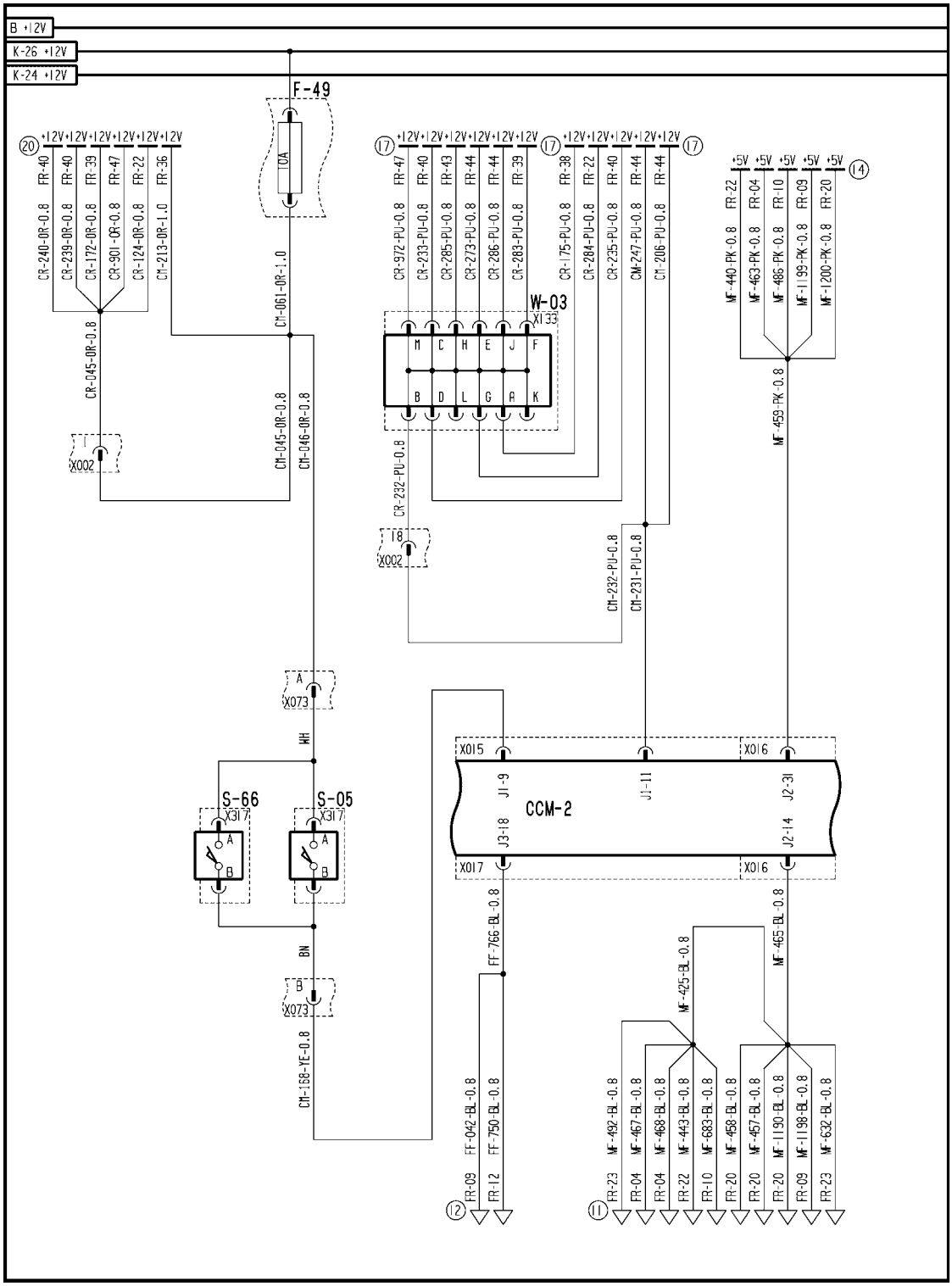
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Index

TRAVELLING - D

PARKING BRAKE Hydraulic - 32.C

Braking device - Assemble (D.32.C.58 - F.10.A.20) 17
AFX8010

Braking device - Disassemble (D.32.C.58 - F.10.A.25) 15
AFX8010

Braking device - Install (D.32.C.58 - F.10.A.15) 20
AFX8010

Braking device - Remove (D.32.C.58 - F.10.A.10) 13
AFX8010

Braking device - Replace (D.32.C.58 - F.10.A.30) 12
AFX8010

Braking device - Sectional view (D.32.C.58 - C.10.A.30) 5
AFX8010

Braking device - Travel adjust (D.32.C.58 - F.45.A.45) 9
AFX8010

Control valve - Unidentified failure (D.32.C.14 - G.30.B.46) 22
AFX8010

Limit valve - Unidentified failure (D.32.C.15 - G.30.B.46) 25
AFX8010

PARKING BRAKE Hydraulic - Bleed (D.32.C - F.35.A.25) 8
AFX8010

PARKING BRAKE Hydraulic - General specification (D.32.C - D.40.A.10) 4
AFX8010

PARKING BRAKE Hydraulic - Torque (D.32.C - D.20.A.10) 4
AFX8010

Parking brake override - Static description (D.32.C.59 - C.30.A.20) 6
AFX8010

Sensing system Pressure sensor - Open circuit (D.32.C.95.81 - G.30.B.50) 32
AFX8010

Sensing system Pressure sensor - Short circuit to B+ (D.32.C.95.81 - G.30.B.54) 28
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

TRAVELLING - D

WHEELS AND TRACKS Wheels - 50.C

AFX8010

https://truckmanualshub.com/

Contents

TRAVELLING - D

WHEELS AND TRACKS Wheels - 50.C

TECHNICAL DATA

Front wheel

Front wheel - Torque (D.50.C.60 - D.20.A.10) 3
AFX8010

Rear wheel

Rear wheel - Torque (D.50.C.61 - D.20.A.10) 3
AFX8010

SERVICE

Front wheel

Front wheel - Install (D.50.C.60 - F.10.A.15) 4
AFX8010 Dual Wheel

https://truckmanualshub.com/

Front wheel - Torque (D.50.C.60 - D.20.A.10)

AFX8010

	MINIMUM	MAXIMUM
Traction Wheel Hardware	**710 Nm** (**525 lb ft**)	**790 Nm** (**580 lb ft**)

Rear wheel - Torque (D.50.C.61 - D.20.A.10)

AFX8010

	MINIMUM	MAXIMUM
Steering Wheel Nut	**410 Nm** (**302 lb ft**)	**492 Nm** (**363 lb ft**)
Steering Wheel Bolt	**550 Nm** (**406 lb ft**)	**610 Nm** (**450 lb ft**)

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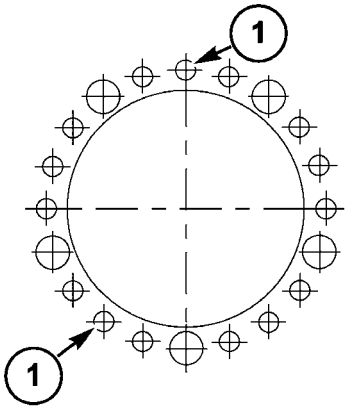
Front wheel - Install (D.50.C.60 - F.10.A.15)

AFX8010 Dual Wheel

1. Empty the grain tank and remove the header. Park the combine on a hard, level surface. Engage the parking brake and remove the key. Raise the combine until the tire clears the ground and block up the combine as required.

NOTE: *When wheels are removed or repositioned, mounting surfaces, washers and all threads must be clean.*

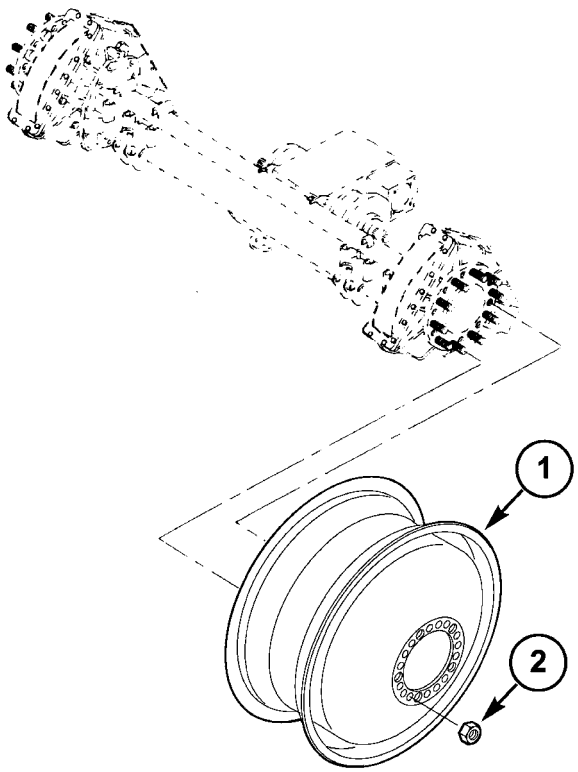
2. Install two starter studs **144 °** opposite each other on the final drive flange. Align the wheel so that center small holes **(1)** align with the starter studs.



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3. Install the inner wheel **(1)** (dish in) onto the final drive, with small holes over the studs. Secure the inner wheel to the studs using five M22 nuts **(2)**.

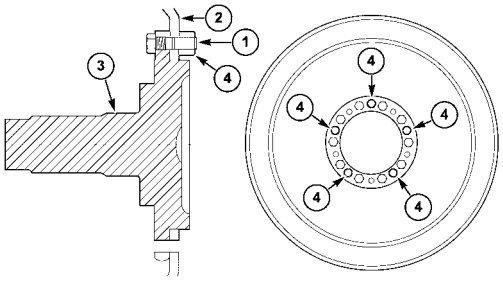
NOTE: *Do not use standard wheel nuts. Use only nuts supplied in dual wheel mounting hardware kit.*



20030328A5 2

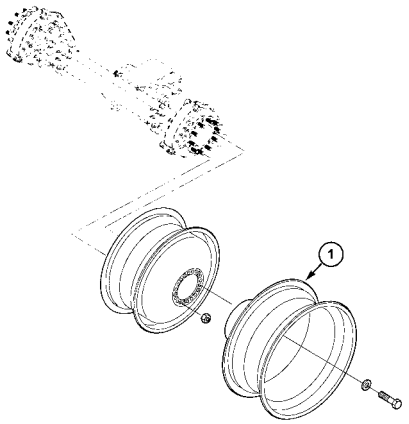
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4. Position the five M22 nuts in the pattern shown. Mounting Stud **(1)**; Inner Wheel **(2)**; Final Drive **(3)**; M22 Nut **(4)**. Tighten and torque the five M22 nuts **(4)** to **710 - 790 Nm** (**525 - 580 lb ft**).



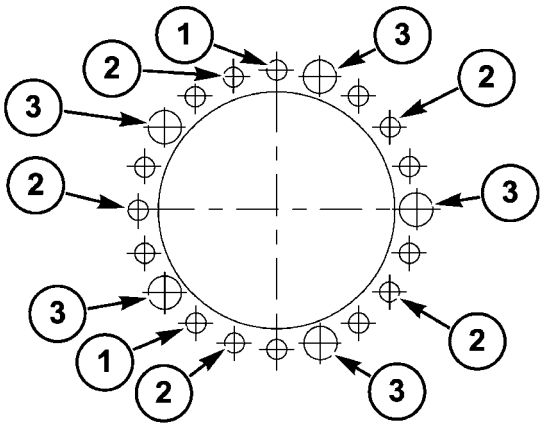
50040160A5 3

5. Install the outer wheel **(1)** (dish out) with the large holes over the studs and nuts, against the inner wheel.



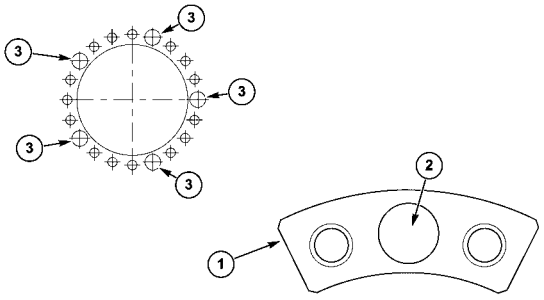
20030327A5 4

6. Position the outer wheel on the studs as shown. Starter Stud **(1)**; Mounting Stud **(2)**; Inner Wheel Mounting Stud w/Nuts **(3)**.
Position the five M22 nuts on the five studs **(2)**. Tighten and torque to **710 - 790 Nm** (**525 - 580 lb ft**). Remove the two starter studs **(1)**.



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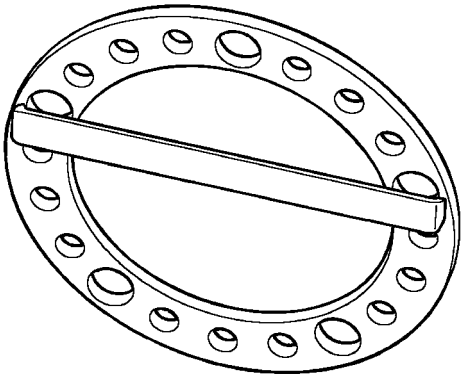
7. Install five spacer plates **(1)** with clearance hole **(2)** over the inner wheel mounting nuts **(3)**. Attach with ten M22x1.5x95 bolts. Tighten and torque the wheel mounting bolts to **710 - 790 Nm** (**525 - 580 lb ft**). Repeat wheel mounting procedure for opposite side wheels.



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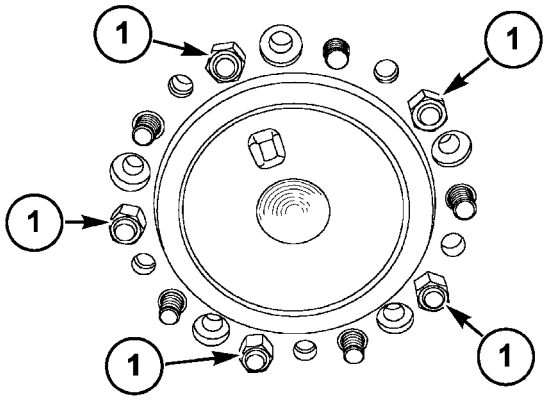
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8. SINGLE WHEEL MODE FOR TRANSPORT
(Road Use, 20.8R42 155A8 R1W or R2 Tires with **2.0 bar** (**30 psi**) inflation only)
In some circumstances the outer wheel on each side of the dual wheel configuration, may need to be removed for use of the combine in road mode, during travel on public roads.
If the operating situation requires removal of the outer wheel, a spacer is provided to compensate for the thickness of the removed outer wheel. This allows the mounting hardware to function within the design tolerances and maintain secure mounting of the inner wheel in the single configuration.
Under no circumstances should the machine be operated with the inner wheels secured only with the five inner wheel nuts. These nuts are designed for use in conjunction with the outer wheel mounting bolts. Serious equipment damage or personal injury could result.



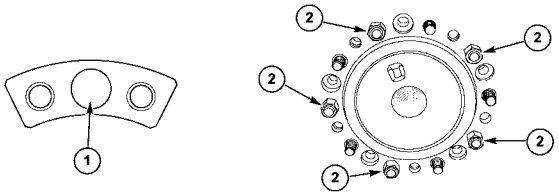
20040155 7

9. Remove the outer wheel. Retorque the five inner wheel nuts **(1)** to **710 - 790 Nm** (**525 - 580 lb ft**).



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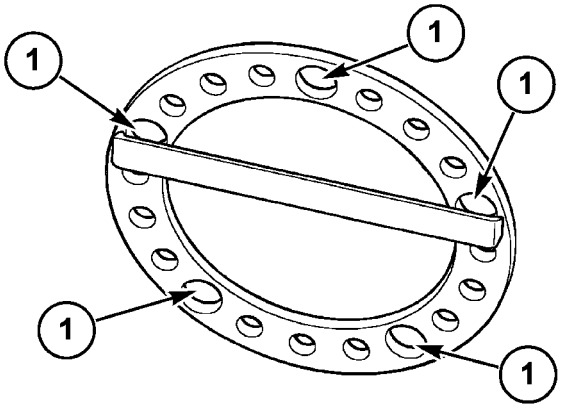
10. Place the large hole of the five spacer plates **(1)** onto the inner wheel mounting nuts **(2)**.



50040162A5 9

11. Position the spacer ring over the wheel mounting studs, aligning the large holes **(1)** in the spacer ring over the inner wheel mounting nuts. Align the holes in the spacer plates with the holes on the spacer ring and install the ten M22x1.5x95 bolts. Tighten and torque the wheel mounting bolts to **710 - 790 Nm** (**525 - 580 lb ft**). Repeat procedure to remove opposite side dual wheel.

NOTE: *The spacer ring has a bracket welded to the front to eliminate the possibility of the spacer ring being used between the inner and outer duals.*



20040155A5 10

https://truckmanualshub.com/

Index

TRAVELLING - D

WHEELS AND TRACKS Wheels - 50.C

Front wheel - Install (D.50.C.60 - F.10.A.15) 4
AFX8010 Dual Wheel
Front wheel - Torque (D.50.C.60 - D.20.A.10) 3
AFX8010
Rear wheel - Torque (D.50.C.61 - D.20.A.10) 3
AFX8010

https://truckmanualshub.com/

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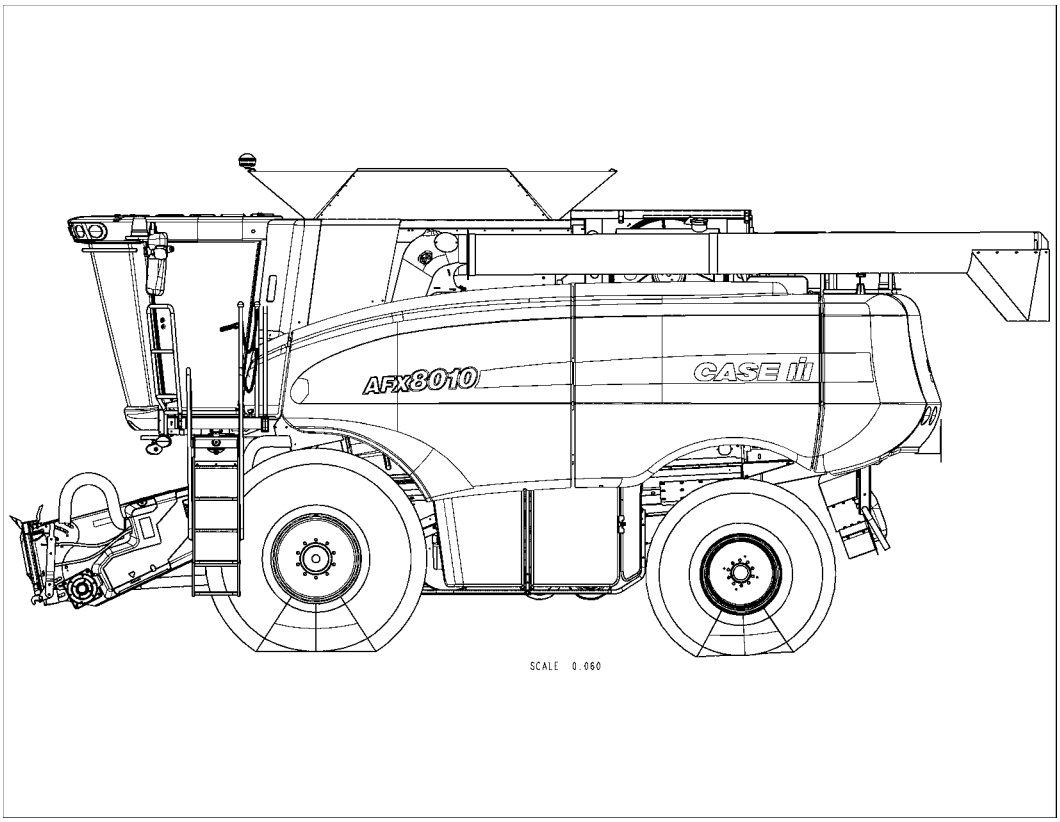
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REPAIR MANUAL

BODY AND STRUCTURE



AFX8010

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Contents

BODY AND STRUCTURE - E

SHIELD E.20.A
AFX8010

USER CONTROLS AND SEAT E.32.A
AFX8010

ENVIRONMENT CONTROL Heating, ventilation and air-conditioning E.40.D
AFX8010

SAFETY SECURITY ACCESSORIES Safety E.50.B
AFX8010

https://truckmanualshub.com/

BODY AND STRUCTURE - E

SHIELD - 20.A

AFX8010

https://truckmanualshub.com/

Contents

BODY AND STRUCTURE - E

SHIELD - 20.A

SERVICE

Side shield

Side shield - Remove (E.20.A.70 - F.10.A.10) 3
AFX8010

Side shield - Install (E.20.A.70 - F.10.A.15) 5
AFX8010

Engine hood

Engine hood - Remove (E.20.A.72 - F.10.A.10) 7
AFX8010

Engine hood - Install (E.20.A.72 - F.10.A.15) 12
AFX8010

Engine and radiator door

Engine and radiator door - Remove (E.20.A.74 - F.10.A.10) 17
AFX8010

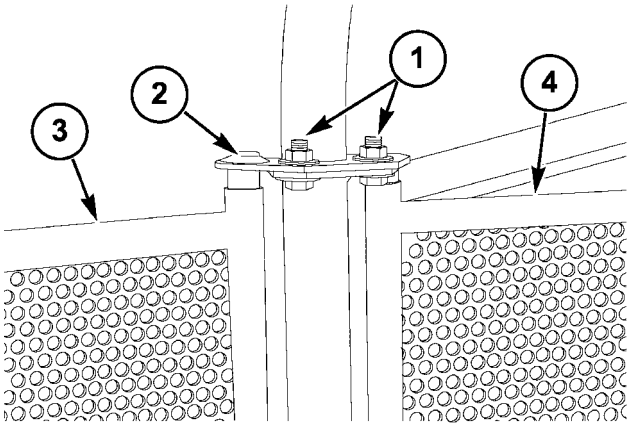
Engine and radiator door - Install (E.20.A.74 - F.10.A.15) 18
AFX8010

https://truckmanualshub.com/

Side shield - Remove (E.20.A.70 - F.10.A.10)

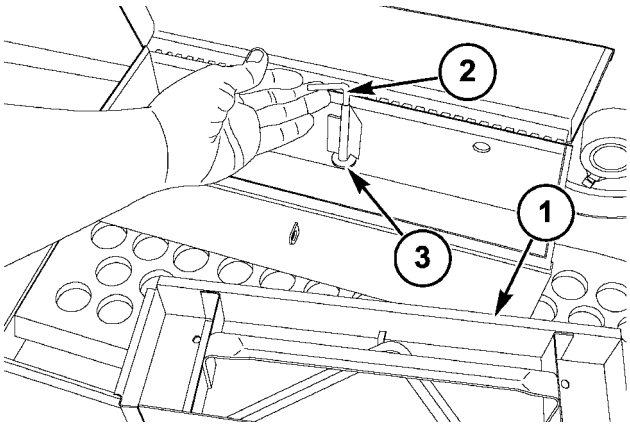
AFX8010

1. To remove left hand lower shielding and service platform, proceed as follows:
   Remove cap screws and nuts **(1)**. Lift hinge pivot plate **(2)** to release screened service shields **(3)** and **(4)** and set aside.



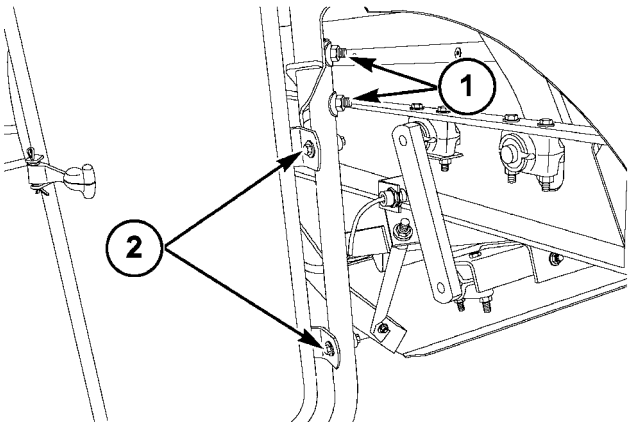
40033215A5 1

2. Remove toolbox tray **(1)**. Lift key **(2)** to disengage tab **(3)** on toolbox support bracket. Pull bottom of box away from tab and then lift box off of bracket.



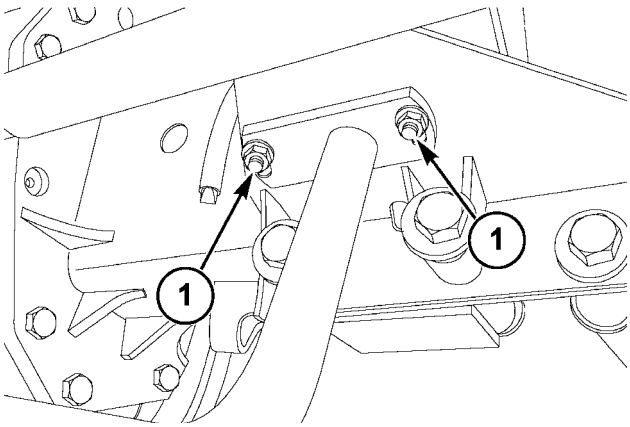
40033216A5 2

3. Remove two cap screws **(1)** with curved washers and lock nuts from the rear platform support pipe. Remove two cap screws with regular nuts and lock washers **(2)** that fasten the solid shield to the same pipe.



40033217A5 3

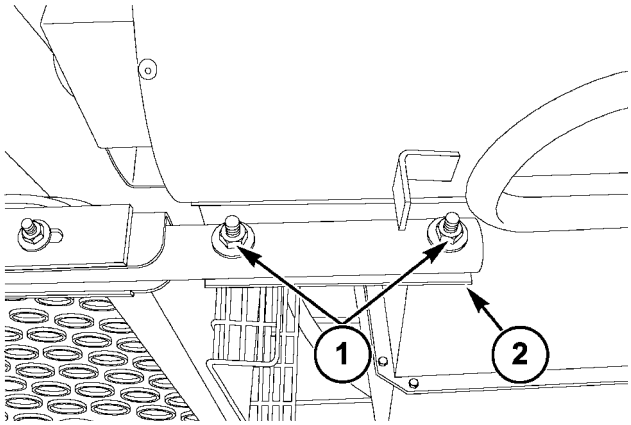
4. Remove two cap screws with lock washers and nuts **(1)** from front end of platform support pipe at main frame attachment to front axle.



40033218A5 4

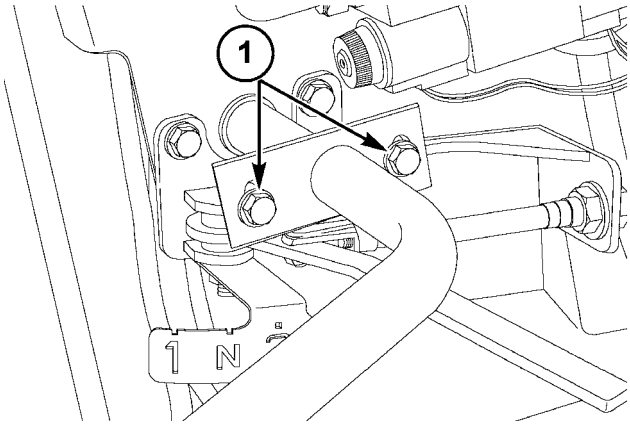
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5. Remove two cap screws with lock washers, curved washers and lock nuts **(1)** from pipe at the bracket **(2)** under the cross auger tube.



40033219A5 5

6. Support complete platform assembly from below with a floor jack. Remove two cap screws **(1)** with lock washers and nuts from the end flange of center support pipe. Move platform assembly out and away from the combine.



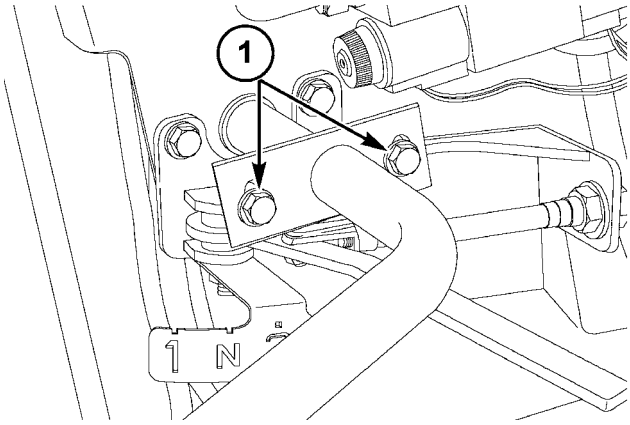
40033220A5 6

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Side shield - Install (E.20.A.70 - F.10.A.15)

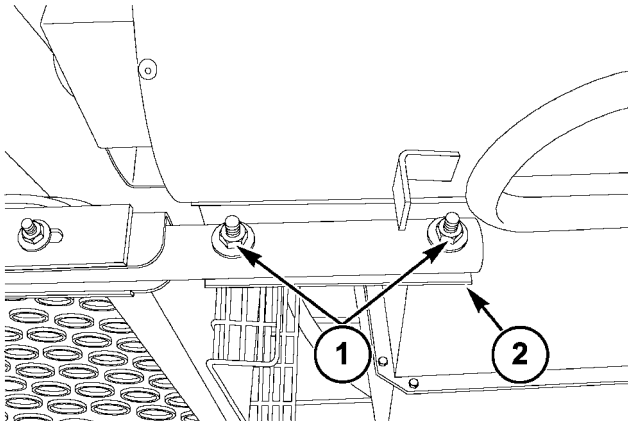
AFX8010

1. To install left-hand lower shielding & service platform, proceed as follows:
   Move shield assembly into position with a suitable lifting device and insert M10X30 cap screws **(1)** with lock washers on both sides, and lock nuts. Leave loose until all other attaching points are connected.



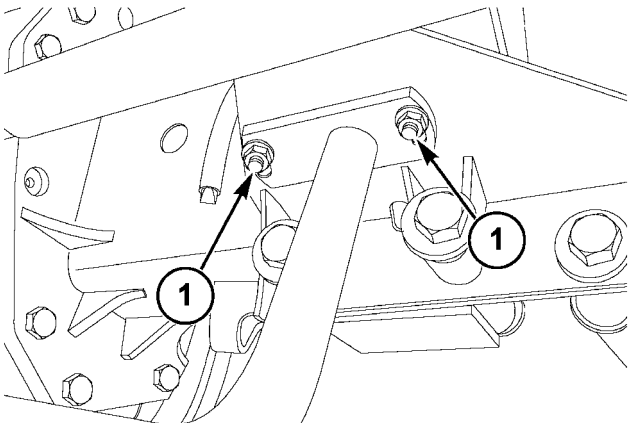
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2. Install two M10X70 cap screws **(1)** with lock washers under the head and curved washers and lock nuts against the pipe. With weight of assembly supported, tighten.



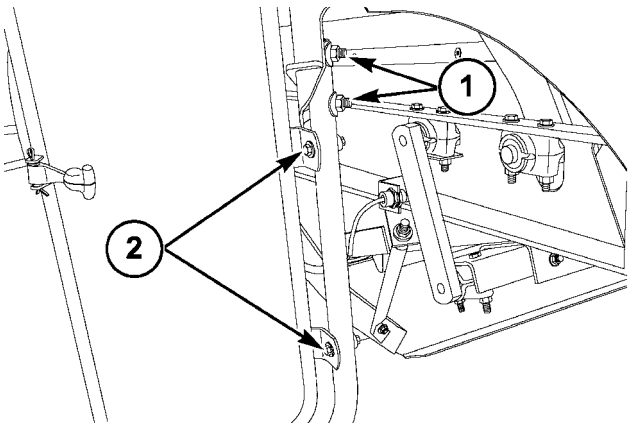
40033219A5 2

3. Install two M10X35 cap screws with lock washers under the heads to the frame bracket at the rear of the drive axle and the front end of the platform support pipe. Assemble lock washers and lock nuts **(1)**.



40033218A5 3

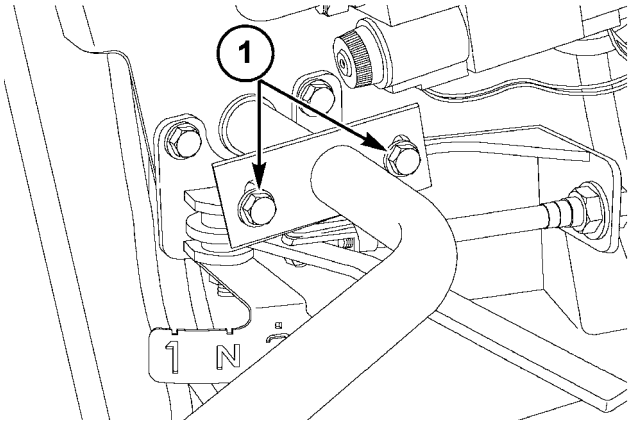
4. Attach rear end of platform to support bracket with M10X60 cap screws with lock washers under head and curved washers and lock nuts **(1)** against the pipe. Attach tabs of solid shield to support pipe with M8X50 cap screws, lock washers on both ends, and nuts **(2)**.



40033217A5 4

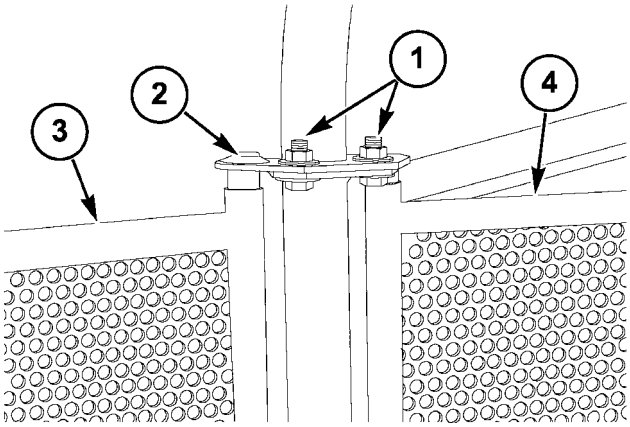
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5. Tighten bolts **(1)** while making sure the combine side door panels latch properly.



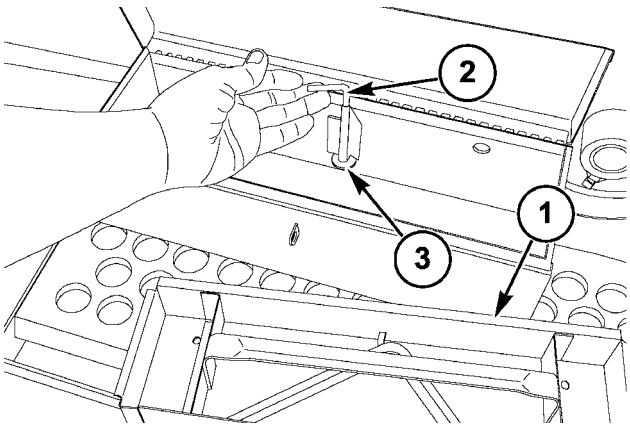
40033220A5 5

6. Install two service shields **(1)** and **(2)** by first coating the upper and lower pivot pins with **CASE AKCELA PREMIUM GREASE EP-2**. Then set the shields down on the lower pivots and insert the pins of plate **(3)** down into the top of the shield pivot tubes. Fasten the plate to the shield support pipe flange with two M8X25 cap screws **(4)** with lock washers at both ends, and nuts. Wipe off excess lube to avoid attracting dirt.



40033215A5 6

7. Install toolbox on bracket, engaging lip on box with top of bracket. Then push the bottom of the box inward until tab **(1)** on bracket fully enters the box. Lock in place by lowering key **(2)** fully into tab. Replace tray **(3)**.



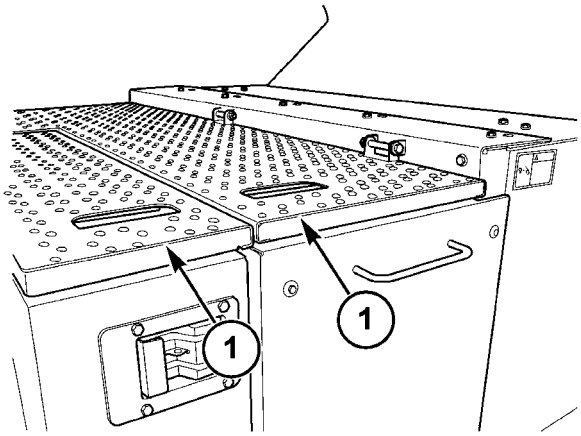
40033216A5 7

https://truckmanualshub.com/

Engine hood - Remove (E.20.A.72 - F.10.A.10)

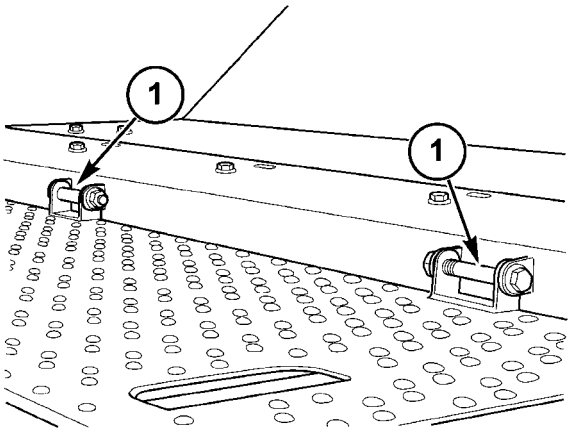
AFX8010

1. To remove the engine shielding start with the 3 top folding covers **(1)**.



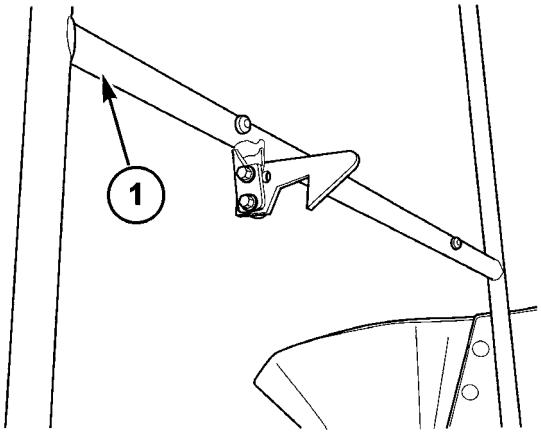
10034917A5 1

2. Remove the bolts **(1)** that attach the covers to the frame.



10034918A5 2

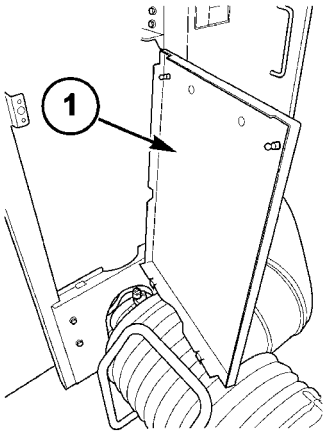
3. After removing the top three folding covers remove the hand railing **(1)**. The railing can be removed by two bolts.



10034713A5 3

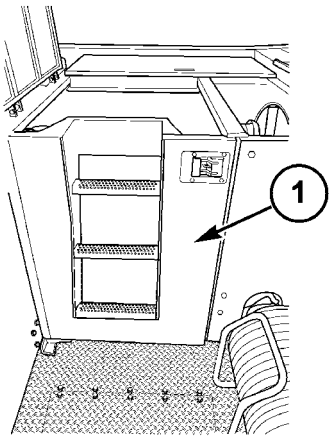
https://truckmanualshub.com/

4. Also remove the access panel above the air filter. The access panel **(1)** is removed by a quick tug releasing it from the catches.



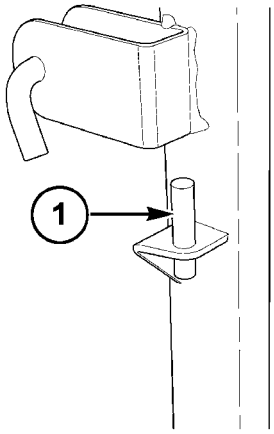
10034927A5 4

5. The access door with the steps **(1)** can be removed by simply opening the door, and lifting up removing it from the hinges.



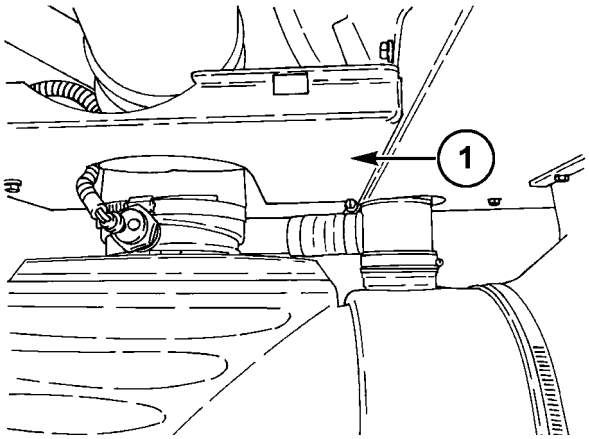
10034933A5 5

6. The door will lift right off the hinges **(1)**.



10034922A5 6

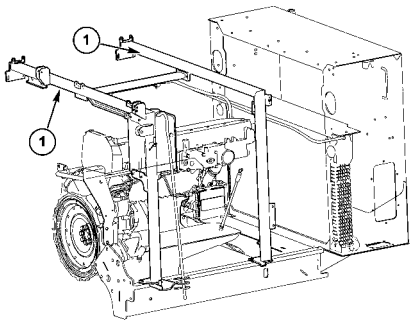
7. Remove the lower shield section **(1)** located near the air filter. To remove this piece disconnect the electrical connection, then the four bolts that secure it.



20034850A5 7

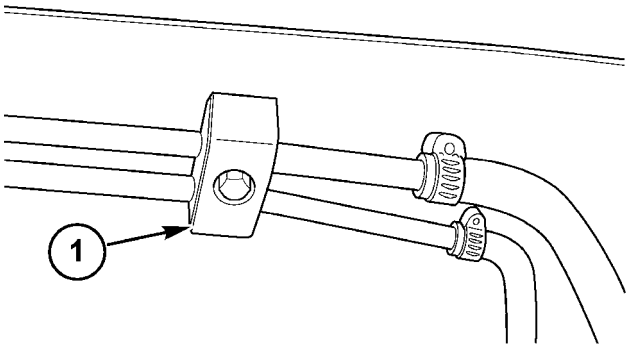
https://truckmanualshub.com/

8. The frame rails **(1)** are now accessible.



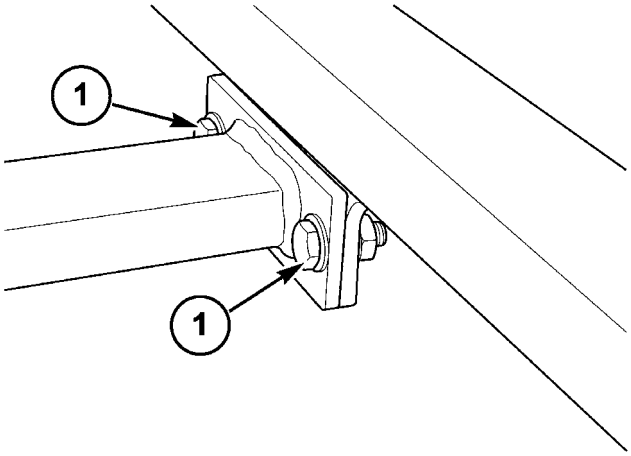
50034946A5 8

9. Disconnect the hose clamp **(1)** from the center crossmember between the frame rails.



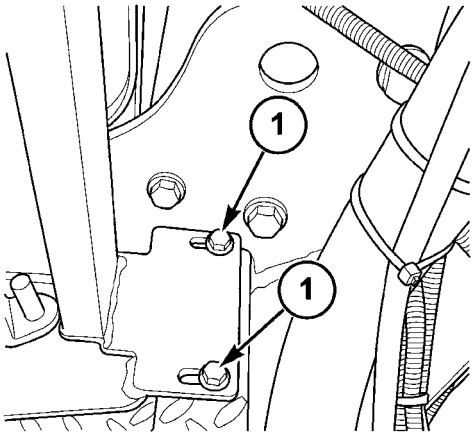
10034914A5 9

10. Remove the two bolts **(1)** from the left side of the crossmember at the graintank.



10034920A5 10

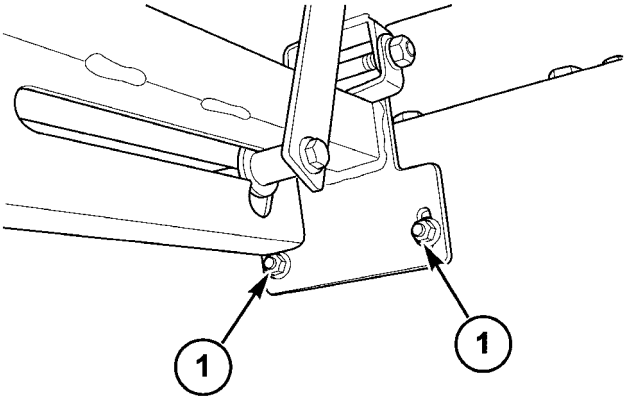
11. To remove the left frame rail, you must first loosen or remove the De-aeration tank. To remove the tank refer to the instructions on tank removal. **De-aeration tank - Remove (B.50.A.23 - F.10.A.10)**To loosen the tank just remove the attaching bolts and secure the tank with an elastic cord. The rail can now be removed. Remove the bolts **(1)** which connect the Left rail to the floor.



10034926A5 11

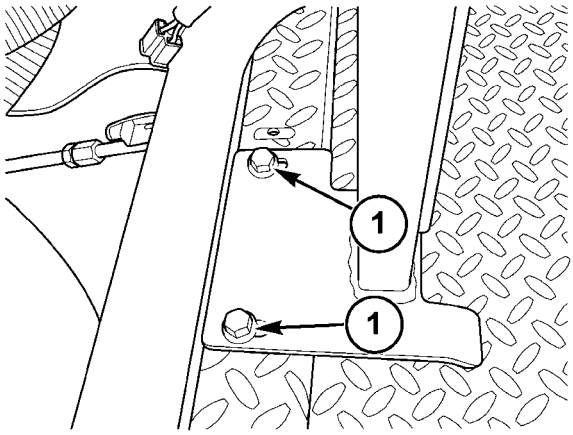
https://truckmanualshub.com/

12. Remove the bolts **(1)** which secure the Left rail to the grain tank.



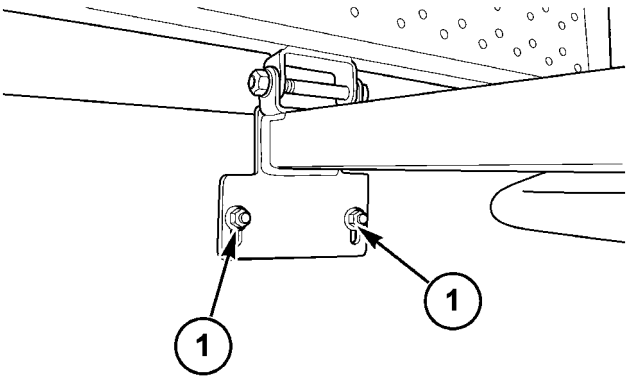
10034923A5 12

13. Remove the bolts **(1)** from the bottom of the Right frame rail.



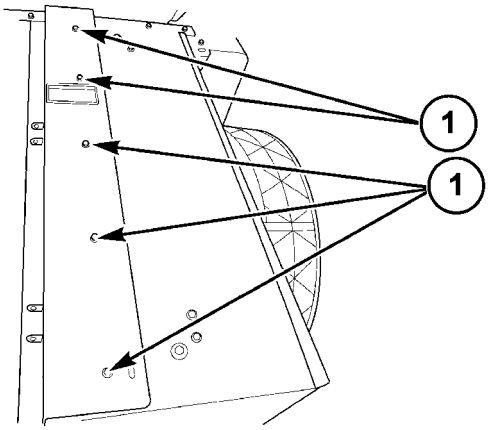
10034925A5 13

14. Remove the two bolts **(1)** from the grain tank on the Right frame rail.



10034924A5 14

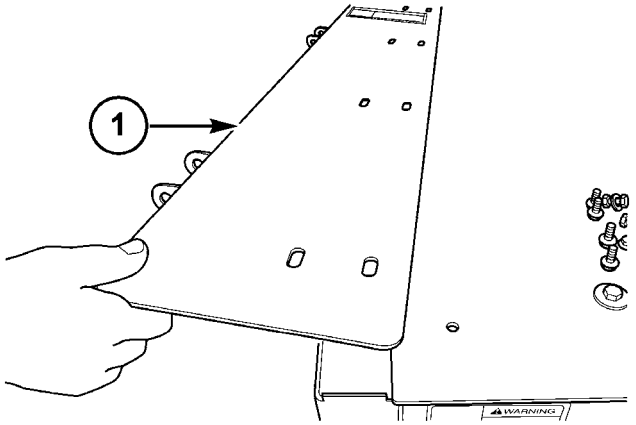
15. Remove the bolts attaching the hinged plate to the top of the cooler housing. There are 5 bolts **(1)** securing the plate to the top of the cooler housing and 4 bolts securing it to front of the plate.



10034930A5 15

https://truckmanualshub.com/

16. With the hinged plate **(1)** removed you now have access to the engine area.



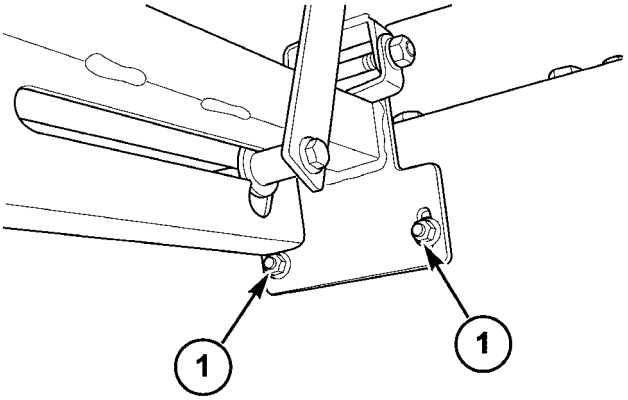
10034932A5 16

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Engine hood - Install (E.20.A.72 - F.10.A.15)

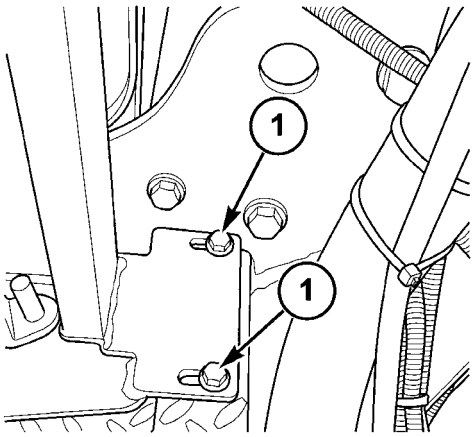
AFX8010

1. Install the left frame rail by securing it to the grain tank with two bolts **(1)**.



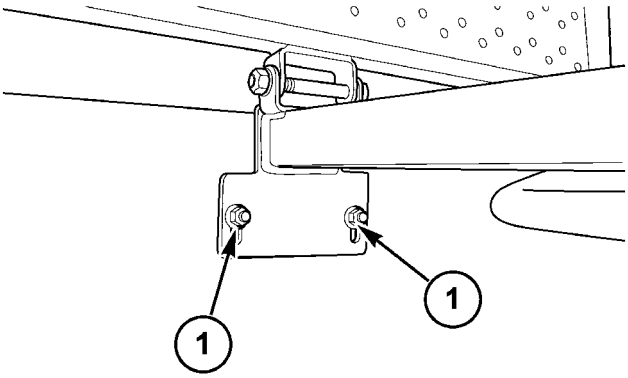
10034923A5 1

2. Secure the left frame rail to the rear deck also with two bolts **(1)**.



10034926A5 2

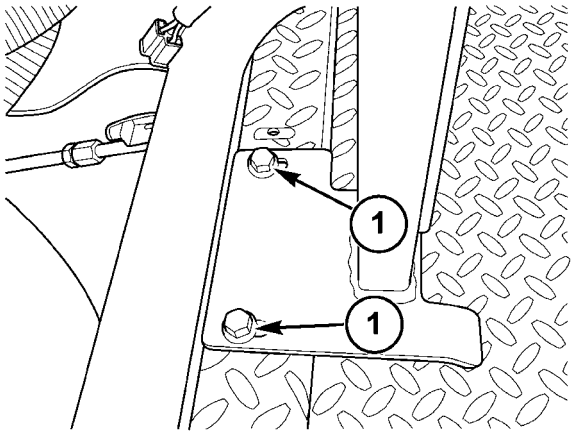
3. Install the De-aeration tank.**De-aeration tank - Install (B.50.A.23 - F.10.A.15)**
4. Install the right side frame rail by securing it to the grain tank with two bolts **(1)**.



10034924A5 3

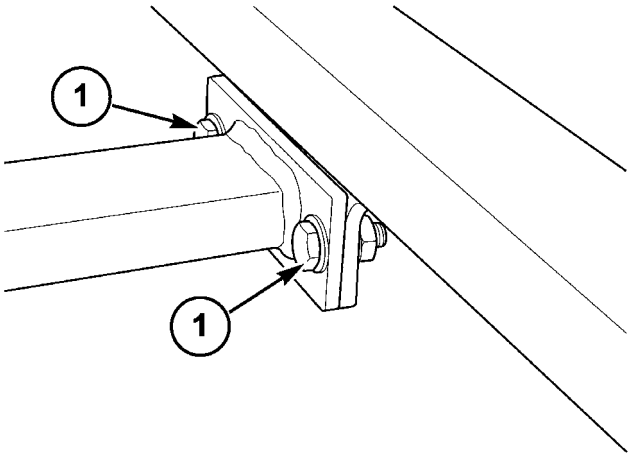
https://truckmanualshub.com/

5. Fasten the right frame rail to the deck floor with two bolts **(1)**.



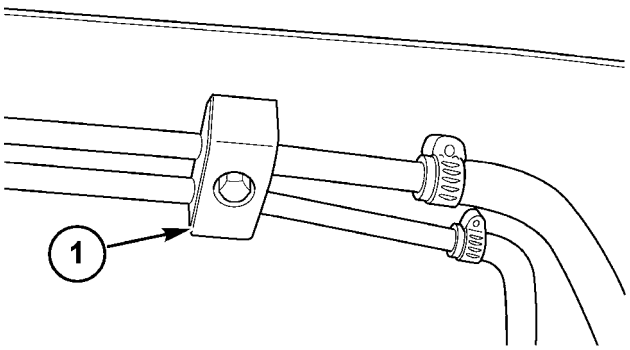
10034925A5 4

6. Install the cross member between the left and right frame rails with two bolts **(1)** on each side.



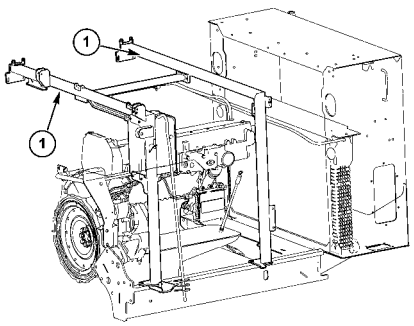
10034920A5 5

7. Also install the hose clamp **(1)** and lines to the underneath of the cross member.



10034914A5 6

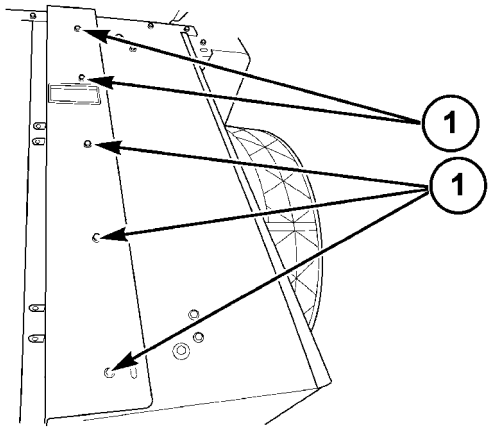
8. With the frame rails **(1)** installed, you can now install the shielding.



50034946A5 7

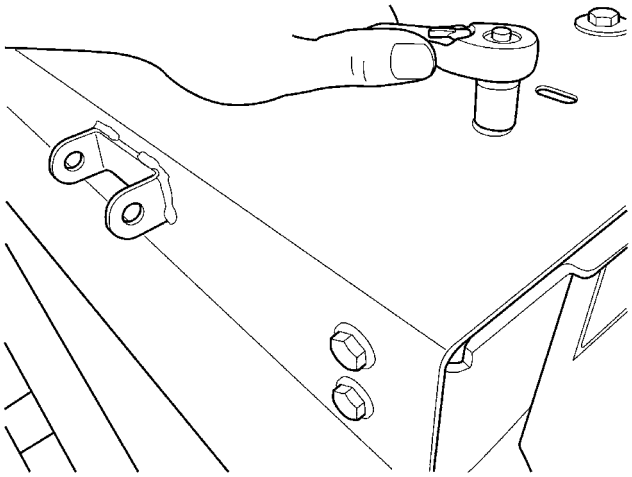
https://truckmanualshub.com/

9. Install the hinge plate using 5 bolts **(1)** on the top of the plate to the cooler housing.



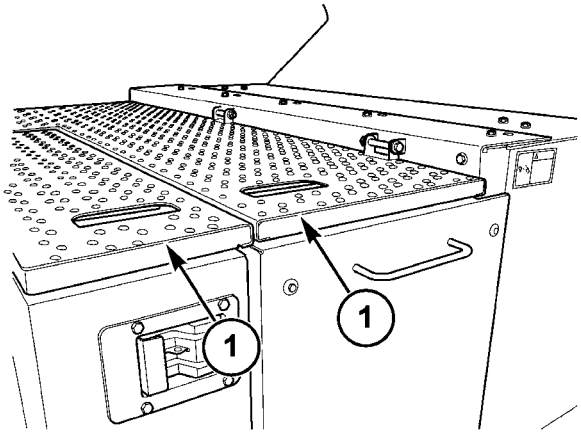
10034930A5 8

10. Install the hinge plate to the cooler housing using 4 bolts on the front lip.



10034931 9

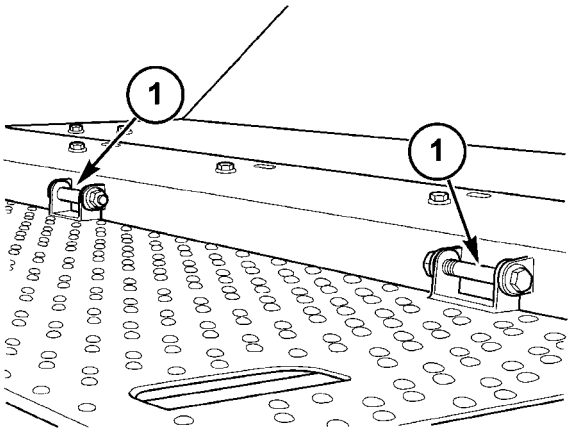
11. Install the three top folding shields **(1)**.



10034917A5 10

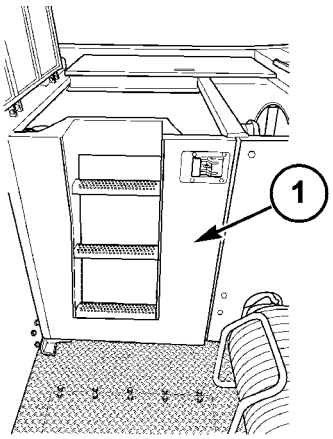
https://truckmanualshub.com/

12. Use two bolts **(1)** per shield, and the shield next to the grain tank install the safety catch.



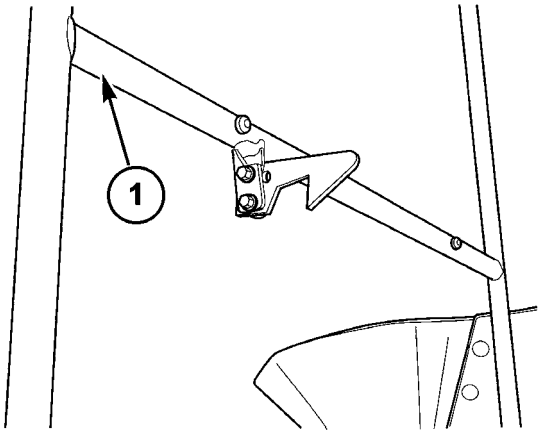
10034918A5 11

13. Install the access door **(1)** with the steps by hanging it on its hinges.



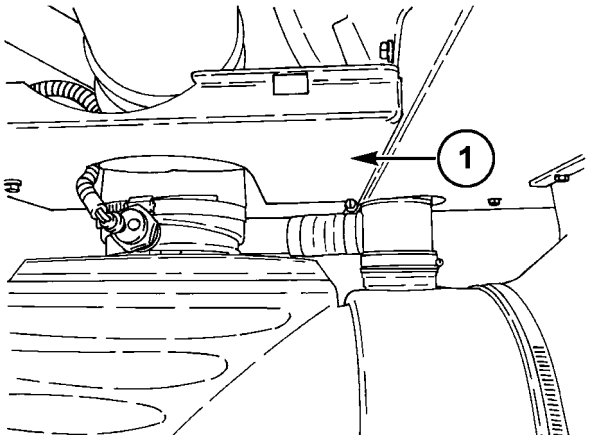
10034933A5 12

14. Install the safety railing **(1)** and shield catch.



10034713A5 13

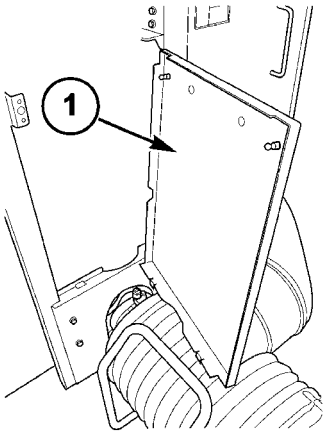
15. Install the lower shield **(1)** next to the air filter with four bolts. Also attach the electrical connector to the auxiliary port.



20034850A5 14

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16. Install the upper access panel **(1)** by snapping it into place.



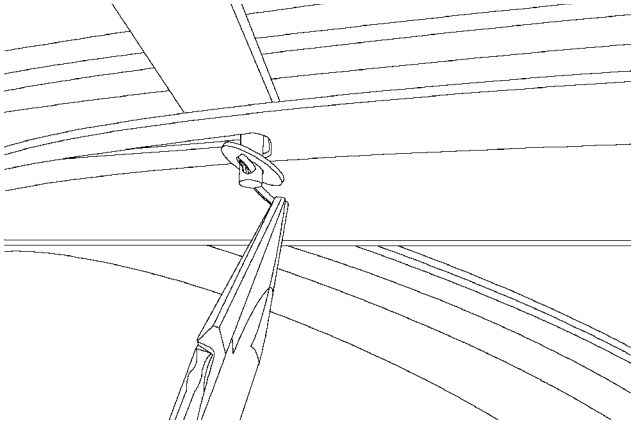
10034927A5 15

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Engine and radiator door - Remove (E.20.A.74 - F.10.A.10)

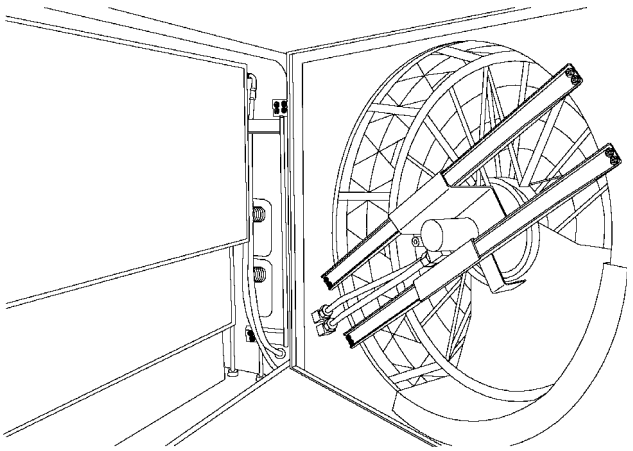
AFX8010

1. To gain full access to the radiator door remove the cotter pin from the safety latch. This will allow the door to be removed without a catch.



40034894 1

2. Once the safety latch is disconnected, shut the door, but do not close the latches.



40034893 2

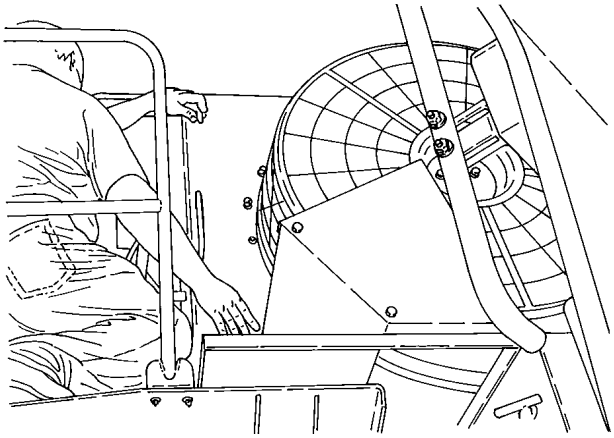
3. Disconnect and plug the two hydraulic lines leading to the rotary screen motor.
4. Using a safety/lifting strap securely latch to the door using an overhead hoist.
5. With the door secure, remove the two bolts from the hinges.
6. The door can now be removed from the machine.

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Engine and radiator door - Install (E.20.A.74 - F.10.A.15)

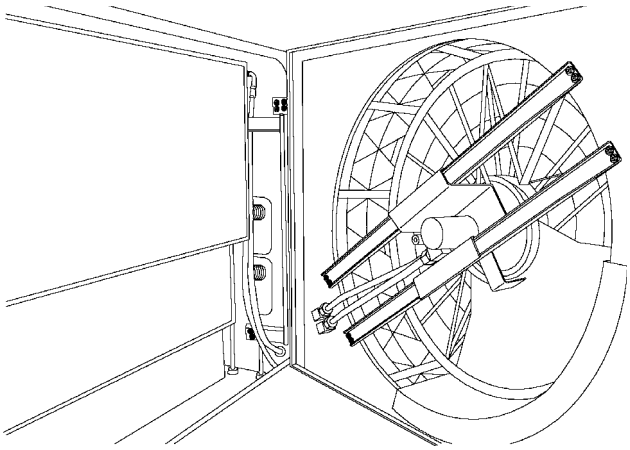
AFX8010

1. Using lift straps, lift the door to the hinges on the cooler housing and insert the two M12 hinge bolts and tighten.



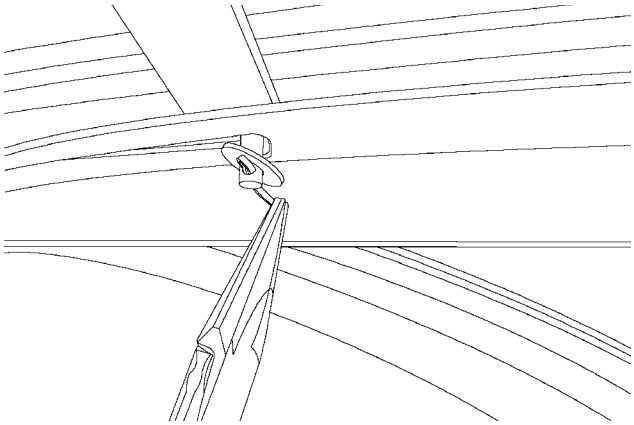
20030148 1

2. Be sure the door opens and closes without any binding.



40034893 2

3. Install the safety catch back onto the door using a cotter pin to secure it in place.



40034894 3

4. Connect the two hydraulic lines leading to the rotary screen motor, and tighten the fittings.

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Index

BODY AND STRUCTURE - E

SHIELD - 20.A

Engine and radiator door - Install (E.20.A.74 - F.10.A.15) 18
AFX8010

Engine and radiator door - Remove (E.20.A.74 - F.10.A.10) 17
AFX8010

Engine hood - Install (E.20.A.72 - F.10.A.15) 12
AFX8010

Engine hood - Remove (E.20.A.72 - F.10.A.10) 7
AFX8010

Side shield - Install (E.20.A.70 - F.10.A.15) 5
AFX8010

Side shield - Remove (E.20.A.70 - F.10.A.10) 3
AFX8010

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BODY AND STRUCTURE - E

USER CONTROLS AND SEAT - 32.A

AFX8010

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Contents

BODY AND STRUCTURE - E

USER CONTROLS AND SEAT - 32.A

SERVICE

Seat

Seat - Remove (E.32.A.70 - F.10.A.10) 3
AFX8010

Seat - Install (E.32.A.70 - F.10.A.15) 5
AFX8010

Seat suspension system

Seat suspension system - Remove (E.32.A.72 - F.10.A.10) 7
AFX8010

Seat suspension system - Disassemble (E.32.A.72 - F.10.A.25) 9
AFX8010

Seat suspension system - Assemble (E.32.A.72 - F.10.A.20) 13
AFX8010

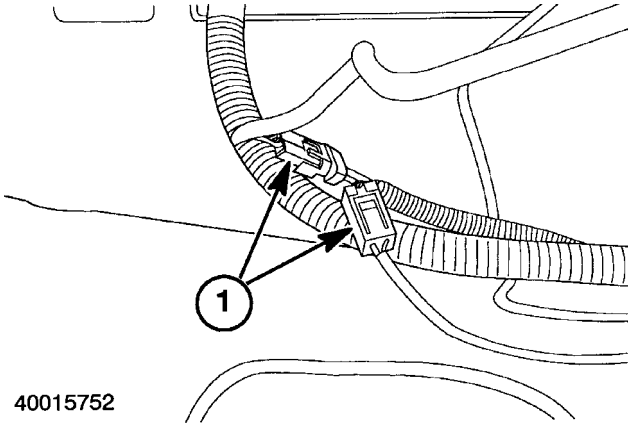
Seat suspension system - Install (E.32.A.72 - F.10.A.15) 16
AFX8010

https://truckmanualshub.com/

Seat - Remove (E.32.A.70 - F.10.A.10)

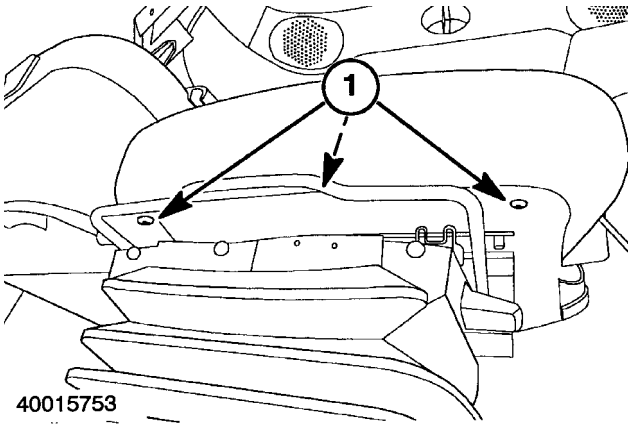
AFX8010

1. Detach the two seat control electrical connectors **(1)**.



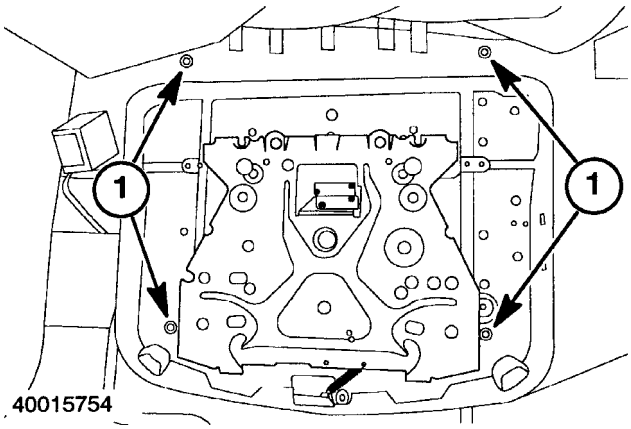
40015752 1

2. Turn out the three screws **(1)** and lift the cushion from the seat frame.



40015753 2

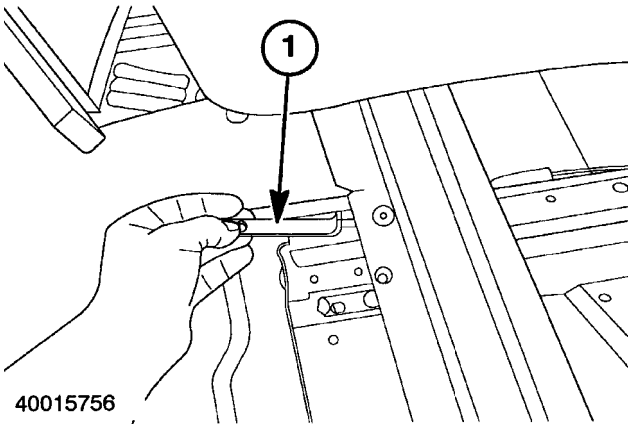
3. Remove the four Allen head cap screws **(1)**. Lift the seat frame from the combine.



40015754 3

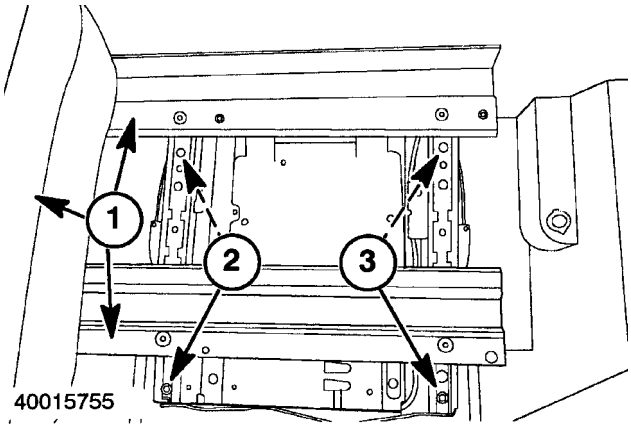
https://truckmanualshub.com/

4. Observe the orientation of stop **(1)** when removing the right front cap screw.



40015756 4

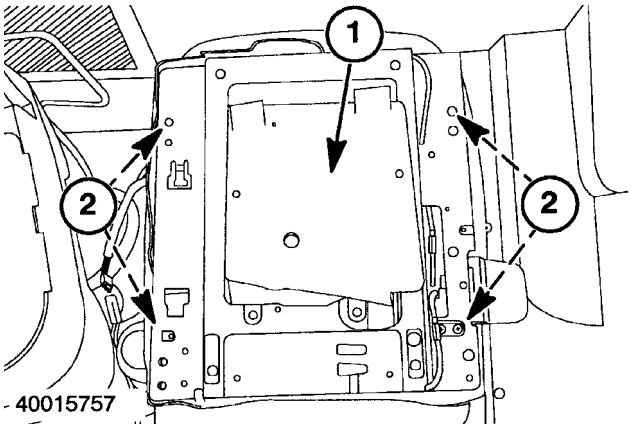
5. Slide the console and mounting rails **(1)** front to back as required to gain access to four cap screws **(2)** and **(3)**. Remove cap screws **(2)** before cap screws **(3)**.



40015755 5

6. Set the console on the cab floor so that it is out of the way.

7. Remove the plastic cover **(1)** now if desired. Turn out cap screws **(2)** holding the air ride seat pedestal. Remove the pedestal from the combine.



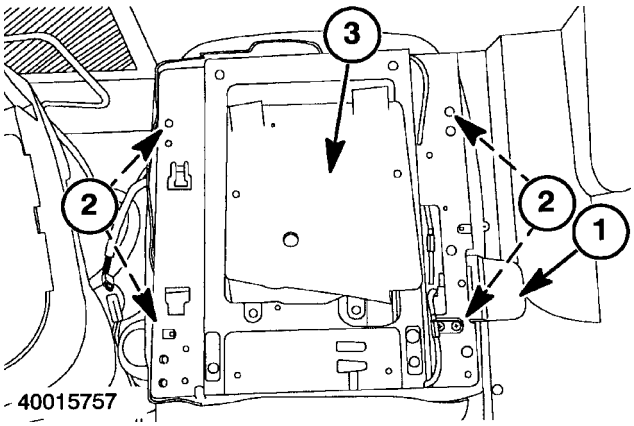
40015757 6

https://truckmanualshub.com/

Seat - Install (E.32.A.70 - F.10.A.15)

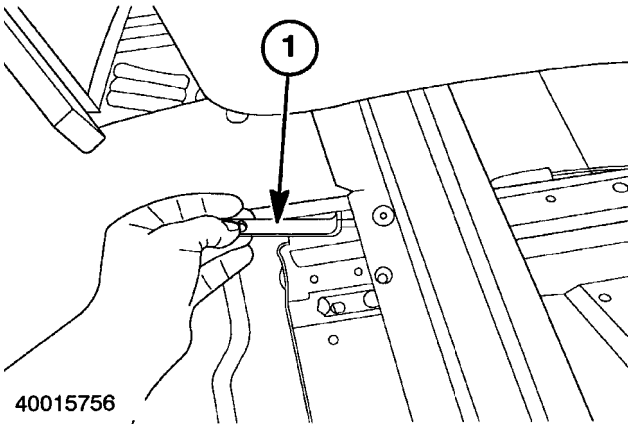
AFX8010

1. Set the air ride seat pedestal in place with the operating handle **(1)** on the left. Secure the pedestal to the foundation with four cap screws **(2)**. Install the plastic cover **(3)** if it had been removed.



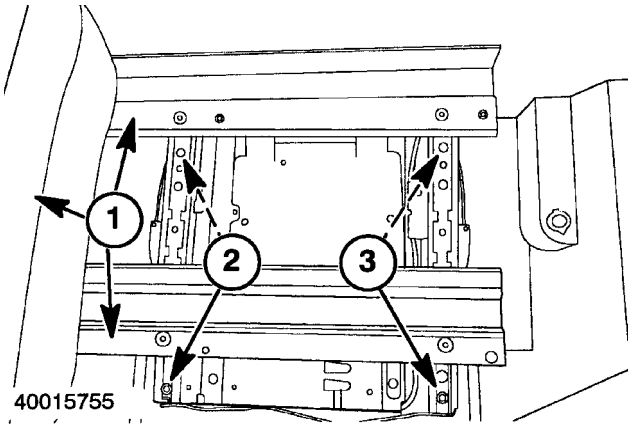
40015757a 1

2. Observe the orientation of stop **(1)** when installing the right front cap screw.



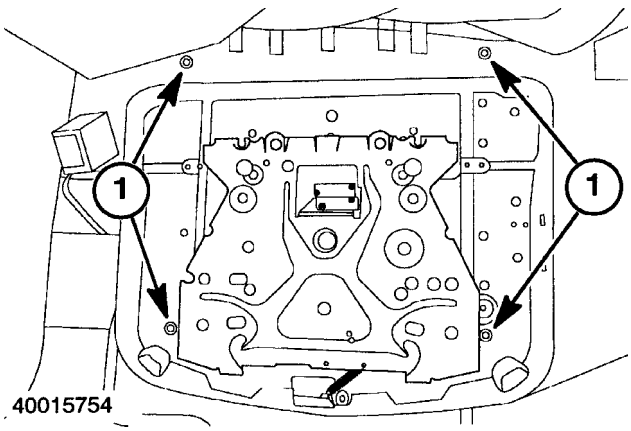
40015756 2

3. Position the console and mounting rails **(1)** on the seat pedestal. Secure the console to the pedestal with four Allen head cap screws **(2)** and **(3)**. Install the cap screws at **(2)** before the cap screws at **(3)**.



40015755 3

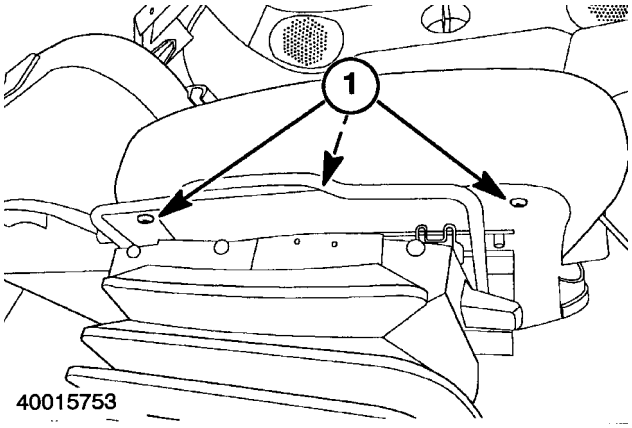
4. Attach the seat frame to the pedestal with four cap screws **(1)**.



40015754 4

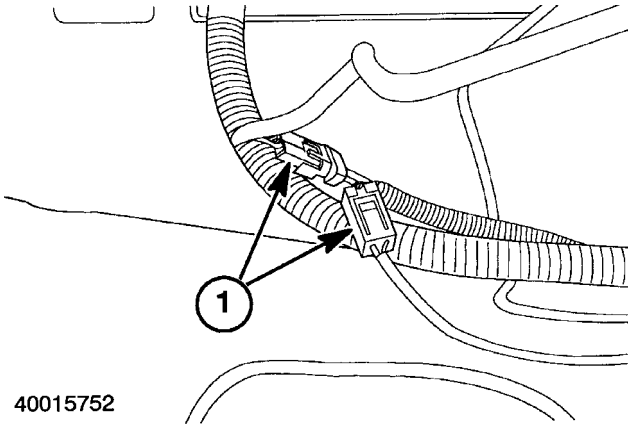
https://truckmanualshub.com/

5. Install the seat cushion with three screws **(1)**.



40015753 5

6. Attach the two seat control electrical connectors **(1)**.



40015752 6

https://truckmanualshub.com/

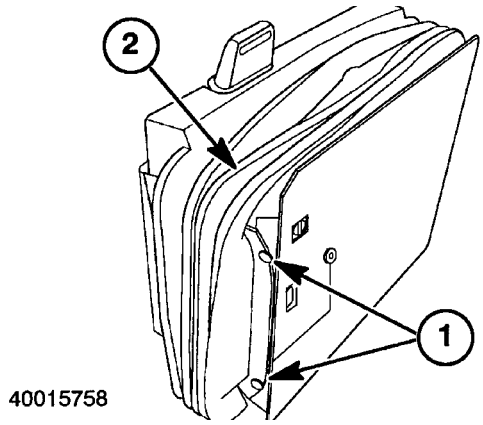
Seat suspension system - Remove (E.32.A.72 - F.10.A.10)

AFX8010

The air ride seat compressor and air bellows can be removed from the seat suspension without further disassembly.

Prior operation: Remove the air ride seat pedestal in accordance with **Seat - Remove (E.32.A.70 - F.10.A.10)**.

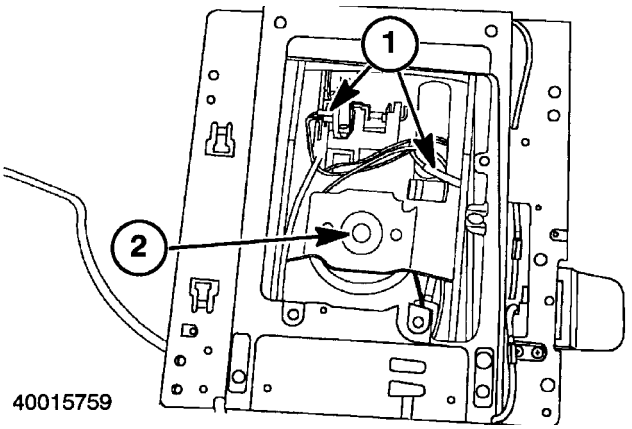
1. Remove all plastic plugs **(1)**and work the bellows **(2)** from the pedestal.



40015758 1

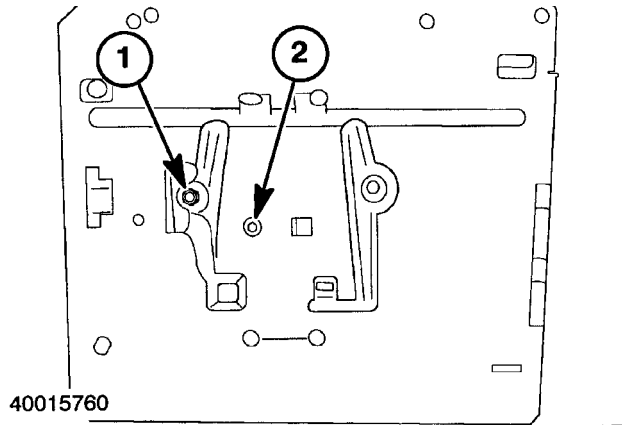
2. Unplug the compressor electrical connectors **(1)**. Turn out the top bellows attaching cap screw **(2)**.

NOTE: *Trace the wires from the compressor to ensure the correct connectors are being pulled.*



40015759 2

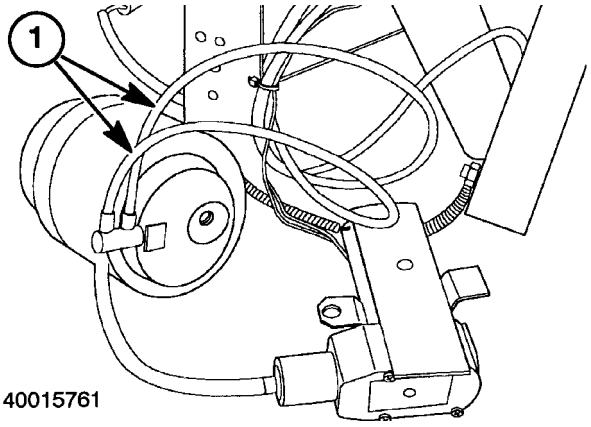
3. Remove attaching hardware for the compressor **(1)** and bellows **(2)**.



40015760 3

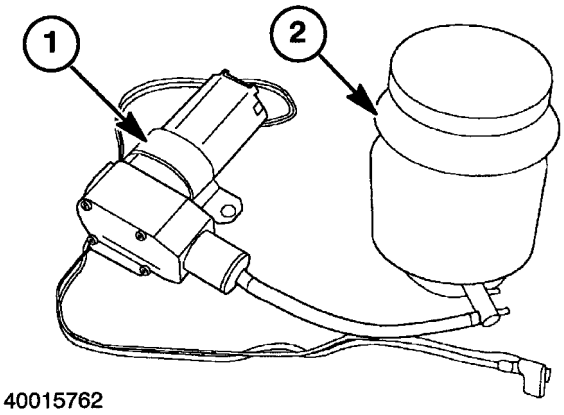
https://truckmanualshub.com/

4. Take the compressor and bellows from the pedestal. Cut cable ties as required to allow the components to be removed. Carefully pull or pry air lines **(1)** from the manifold at the bottom of the bellows.



40015761 4

5. Remove the desired component, compressor **(1)** or bellows **(2)**.



40015762 5

Next operation: Seat suspension system - Install (E.32.A.72 - F.10.A.15)

https://truckmanualshub.com/

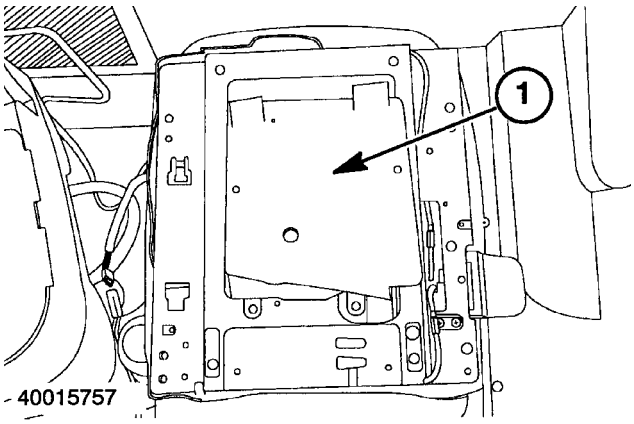
Seat suspension system - Disassemble (E.32.A.72 - F.10.A.25)

AFX8010

Some illustrations show the pedestal removed from the foundation. It is not necessary to remove the pedestal in order to replace the shock absorber. This instruction includes two procedures that can be performed separately. Shock absorber removal in steps 1 - 5, and adjuster removal steps 6 - 14.

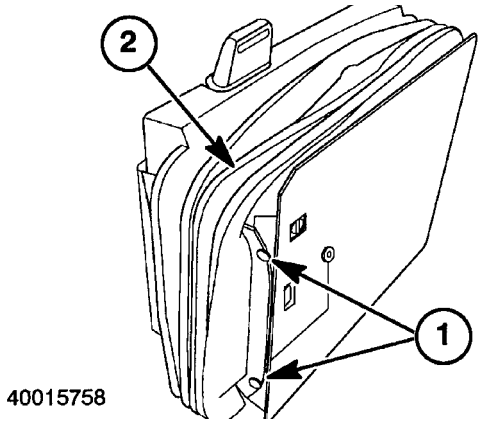
Prior operation: Seat - Remove (E.32.A.70 - F.10.A.10)

1. To remove the shock absorber proceed with steps 1 - 4. Remove the plastic cover **(1)**.



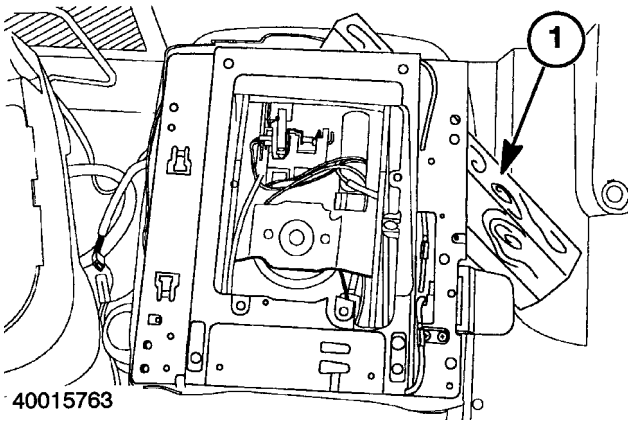
40015757b 1

2. Remove all plastic plugs **(1)** and work the bellows **(2)** from the pedestal.



40015758 2

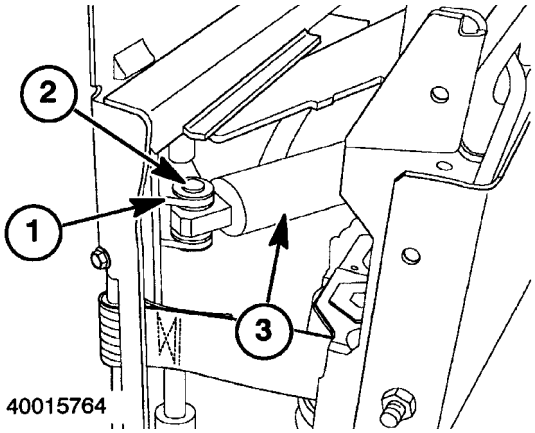
3. Insert a piece of wood **(1)** or other blocking material to prevent the pedestal from collapsing during maintenance.



40015763 3

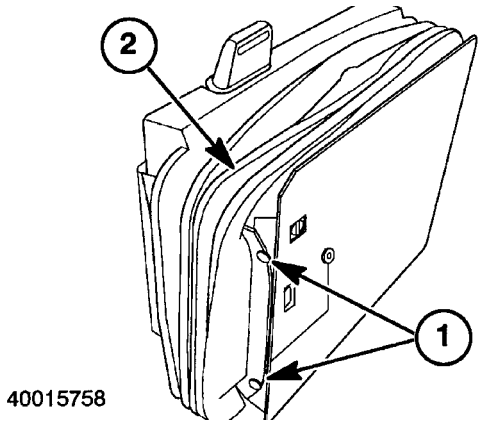
https://truckmanualshub.com/

4. Remove clip **(1)** and pin **(2)** from the barrel end of the shock absorber **(3)**. Remove the clip and pin from the rod end. Take the shock absorber from the pedestal.



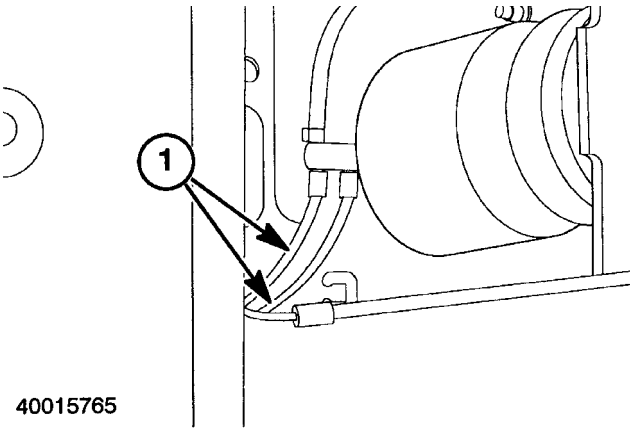
40015764 4

5. To remove the adjuster proceed with steps 5 - 14. Remove the air ride seat pedestal per **Seat - Remove (E.32.A.70 - F.10.A.10)**. Remove all plastic plugs **(1)** and work the bellows **(2)** from the pedestal.



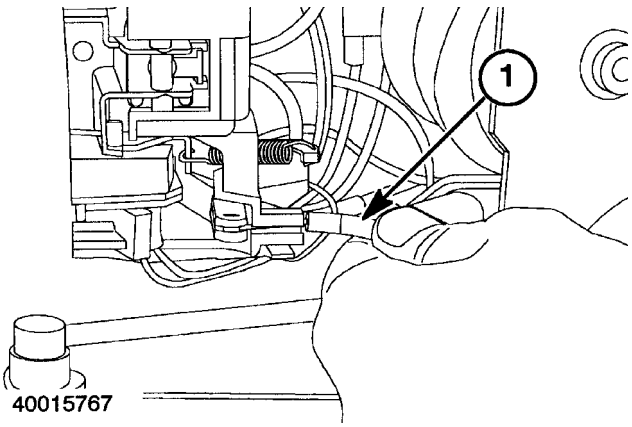
40015758 5

6. Pull or pry the air lines **(1)** attached to the manifold at the bottom of the bellows.



40015765 6

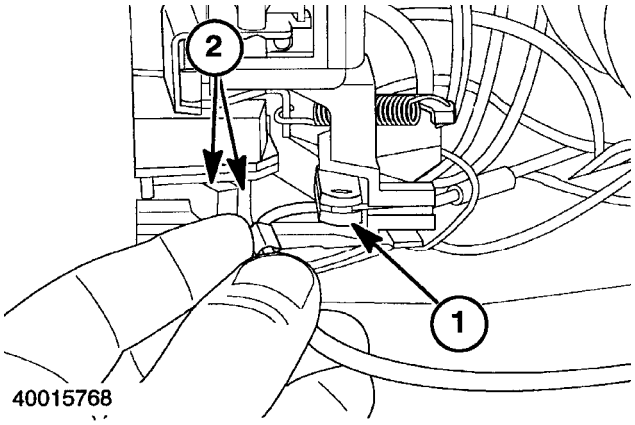
7. Pull cable **(1)** from the plastic sleeve.



40015767 7

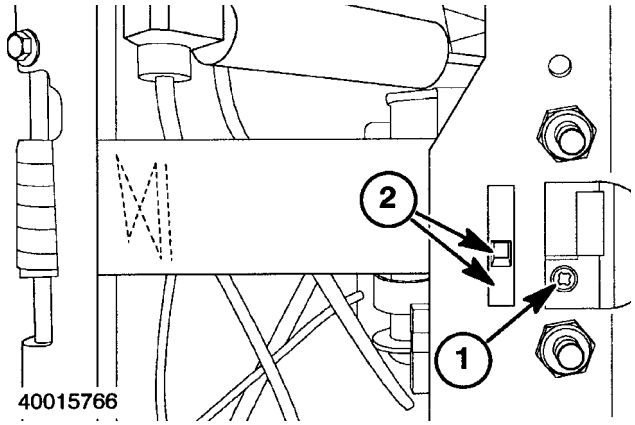
https://truckmanualshub.com/

8. Rotate the cable around, then down, releasing the keeper from the lever **(1)**. Pull the electrical connectors **(2)** from the micro switch.



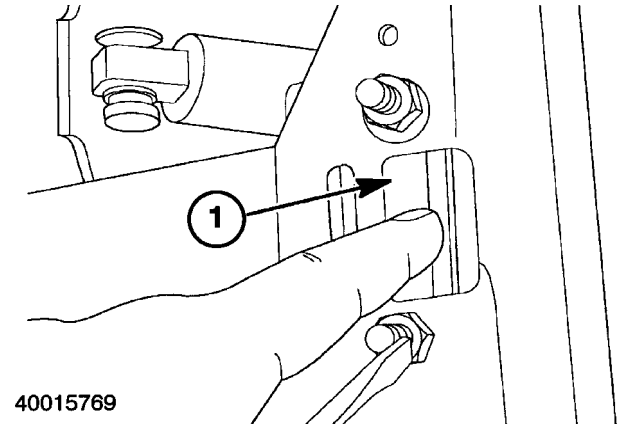
40015768 8

9. Remove screw **(1)**. Using a screwdriver, push in tabs at **(2)**.



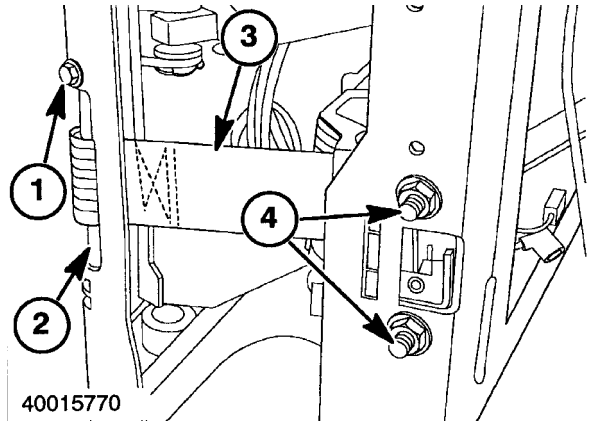
40015766 9

10. Using a finger or a screwdriver, push in cable clip **(1)**.



40015769 10

11. Turn out screw **(1)**. Push the pin and rubber grommets **(2)** from the belt **(3)**.

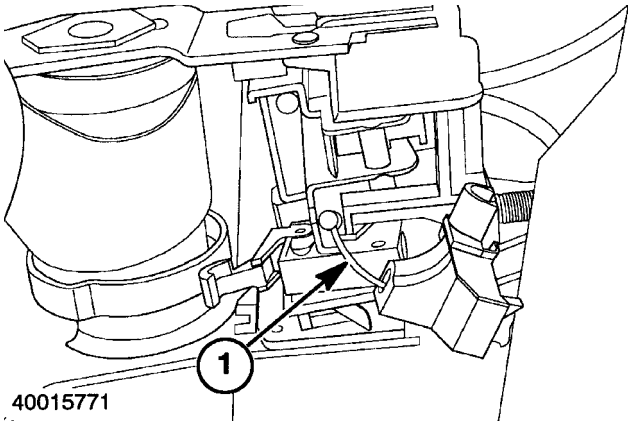


40015770 11

12. Remove lock nuts **(4)**. Pull the adjuster part way from the pedestal.

https://truckmanualshub.com/

13. Pass the cable **(1)** through the opening on the side and remove the cable and keeper from the adjuster.



40015771 12

14. Cut the cable ties as required to remove the component from the pedestal.

Next operation: Seat suspension system - Assemble (E.32.A.72 - F.10.A.20)

https://truckmanualshub.com/

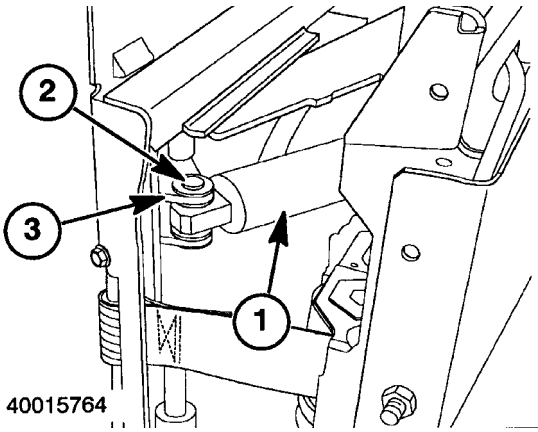
Seat suspension system - Assemble (E.32.A.72 - F.10.A.20)

AFX8010

Some illustrations show the pedestal removed from the foundation. It is not necessary to remove the pedestal in order to replace the shock absorber. This instruction includes two procedures that can be performed separately. Shock absorber assembly iin steps 1 - 3, and adjuster assembly steps4 - 10.

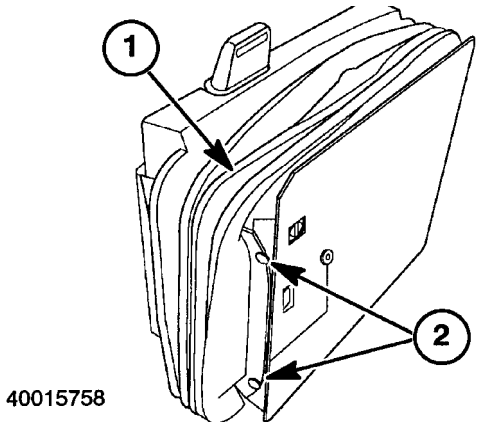
Prior operation: Seat suspension system - Disassemble (E.32.A.72 - F.10.A.25)

1. Set the shock absorber **(1)** into place. Attach the barrel end of the shock absorber with pin **(2)** and clip **(3)**. Attach the rod end of the shock absorber with a pin and clip. Remove the blocking material from the pedestal.



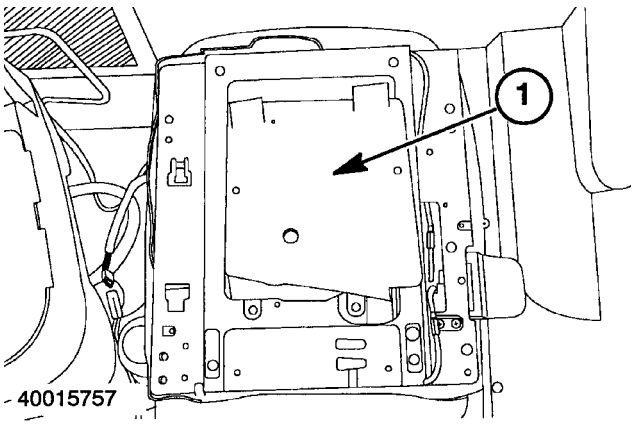
40015764a 1

2. Work the bellows **(1)** over the pedestal and attach using plastic plugs **(2)**.



40015758a 2

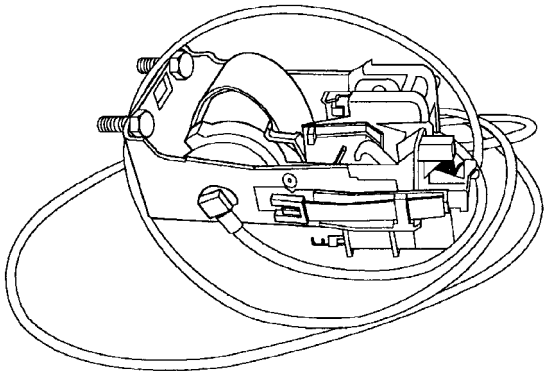
3. Install the plastic cover **(1)**. Install seat per **Seat - Install (E.32.A.70 - F.10.A.15)**



40015757b 3

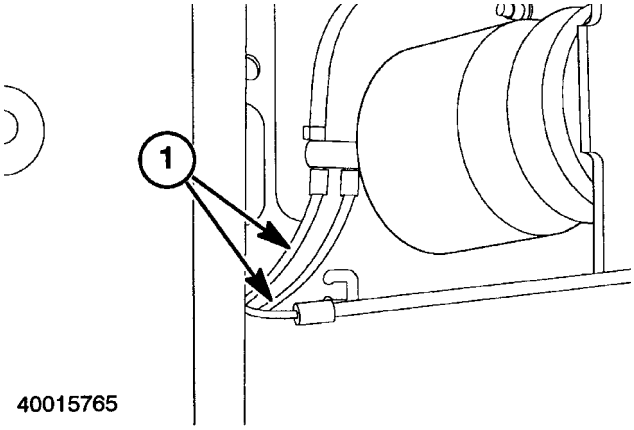
https://truckmanualshub.com/

4. To install the adjuster proceed with steps 4 - 10. Attach the appropriate air lines to the adjusters as required.



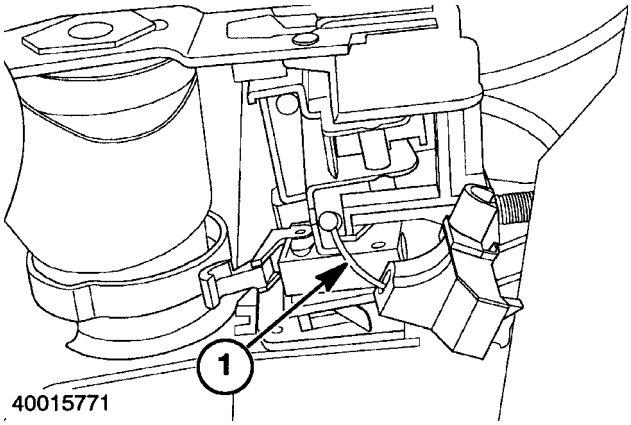
40015772 4

5. Attach the two air lines **(1)** from the adjusters to the manifold at the bottom of the bellows.



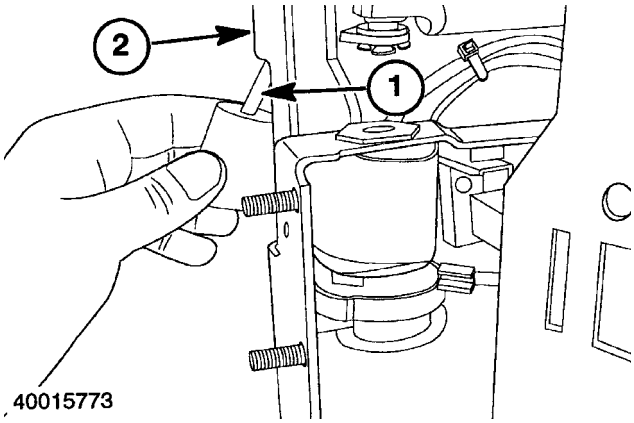
40015765 5

6. Pass the cable **(1)** through the opening on the side to install the keeper and cable into the adjuster.



40015771 6

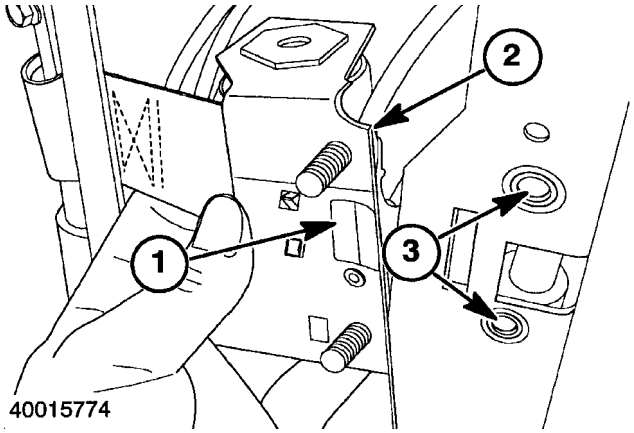
7. Pass the pin and grommets **(1)** through the looped end of the adjuster strap. Install the pin into the bottom of the pedestal and secure in place with screw that had been previously removed at **(2)**.



40015773 7

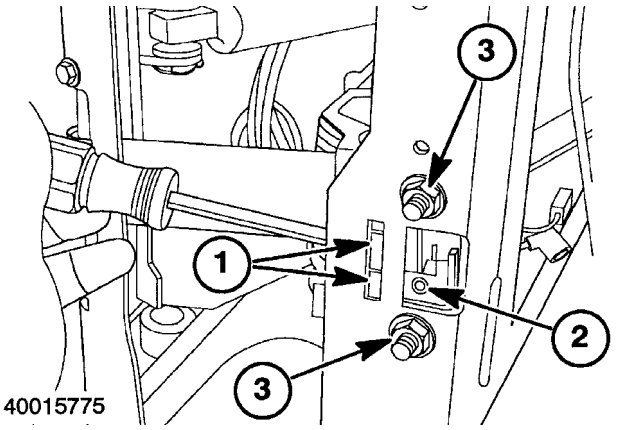
https://truckmanualshub.com/

8. Insert cable clip **(1)** into the slotted hole in the adjuster. Move the cable until the end sits securely in the sleeve of the clip at **(2)**. Install the adjuster into the pedestal so that the studs have passed through the holes **(3)**.



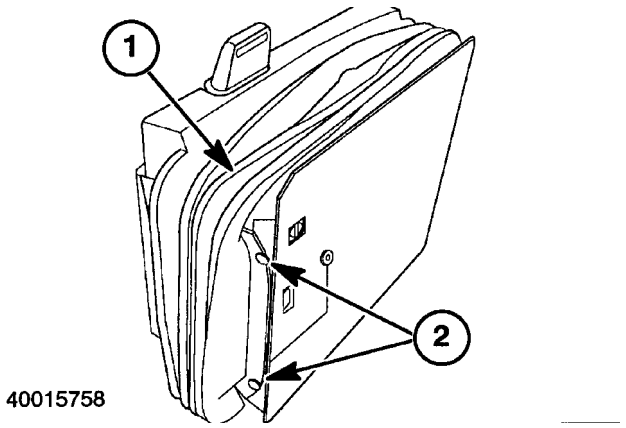
40015774 8

9. Complete the installation of the cable clip with a screw driver if required. Turn in screw at **(2)** securing the cable clip to the adjuster. Secure the adjuster to the pedestal with lock nuts at **(3)**. Coil and apply cable ties to the air lines as required to hold the lines in position and away from any moving parts.



40015775 9

10. Work the bellows **(1)** over the pedestal and attach using plastic plugs **(2)**.



40015758a 10

Next operation: Install the air ride seat in accordance with **Seat - Install (E.32.A.70 - F.10.A.15)**.

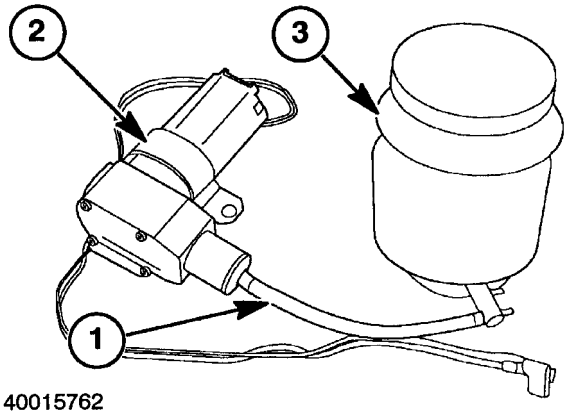
https://truckmanualshub.com/

Seat suspension system - Install (E.32.A.72 - F.10.A.15)

AFX8010

NOTE: *Ensure that when replacing air line **(1)** the same length is maintained.*

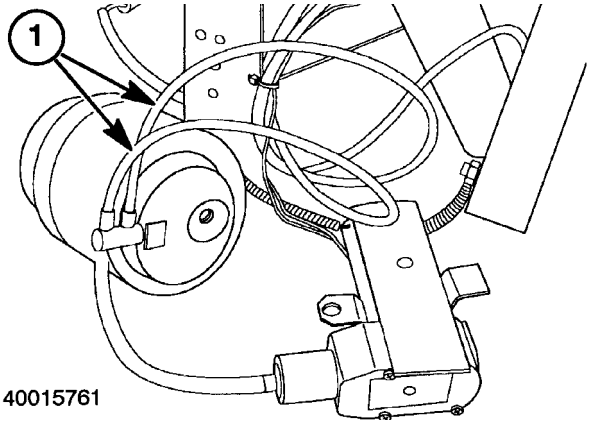
1. Attach the compressor **(2)** to the bellows **(3)** with the air line **(1)**.



40015762

40015762a 1

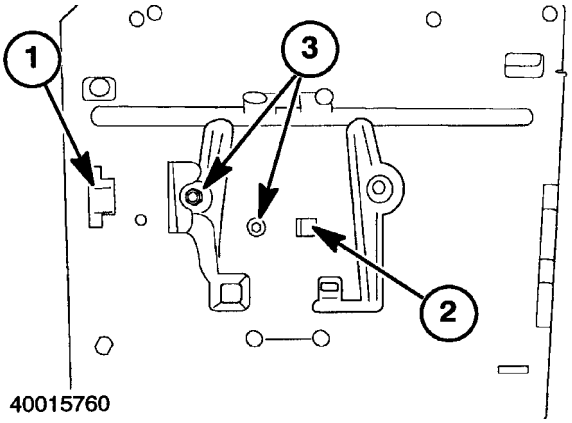
2. Attach air lines **(1)** to the manifold located on the bottom of the bellows.



40015761

40015761 2

3. Set the compressor and bellows in the pedestal with compressor tab **(1)** and bellows tab **(2)** in their appropriate positions. Secure the components to the bottom of the pedestal with hardware at **(3)**. Coil and apply cable ties to the air lines as required to hold the lines in position and away from any moving parts.



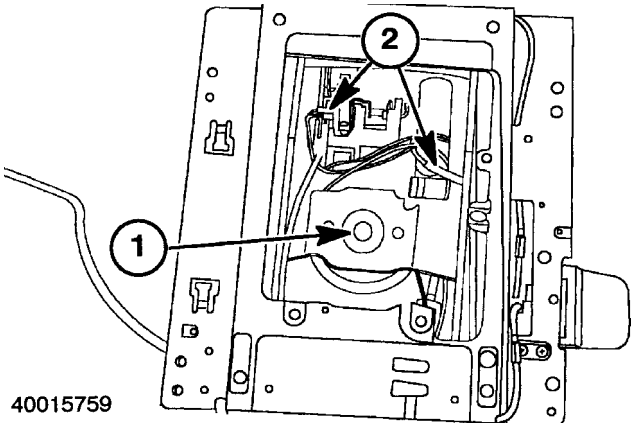
40015760

40015760a 3

https://truckmanualshub.com/

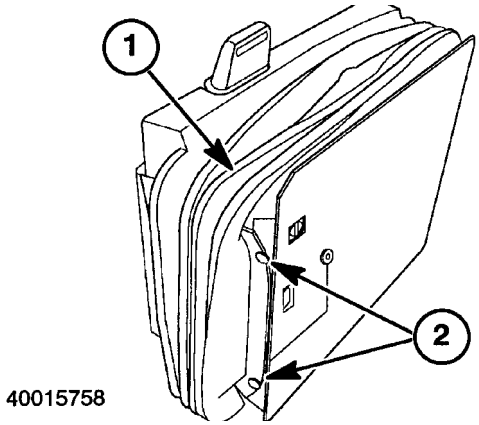
4. Turn in the upper bellows cap screw **(1)**. Attach the compressor power wires to the appropriate connectors at **(2)**.

NOTE: *The wires can only be connected one way.*



40015759a 4

5. Work the bellows **(1)** over the pedestal and attach using the plastic plugs **(2)**.



40015758a 5

Next operation: Install the air ride seat in accordance with **Seat - Install (E.32.A.70 - F.10.A.15)**.

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Index

BODY AND STRUCTURE - E

USER CONTROLS AND SEAT - 32.A

Seat - Install (E.32.A.70 - F.10.A.15) 5
AFX8010

Seat - Remove (E.32.A.70 - F.10.A.10) 3
AFX8010

Seat suspension system - Assemble (E.32.A.72 - F.10.A.20) 13
AFX8010

Seat suspension system - Disassemble (E.32.A.72 - F.10.A.25) 9
AFX8010

Seat suspension system - Install (E.32.A.72 - F.10.A.15) 16
AFX8010

Seat suspension system - Remove (E.32.A.72 - F.10.A.10) 7
AFX8010

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BODY AND STRUCTURE - E

USER PLATFORM - 34.A

AFX8010

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BODY AND STRUCTURE - E

User Platform - 34

CONTENTS

Description	Page
Cab Systems	3
Power Seat System	3
Power Seat Circuit	4
Power Seat System Circuit Troubleshooting	5
Power Seat System Diagnostic Tests	6
Cab Roof Controls	7
Wiper/Washer System Circuit Troubleshooting	10
Wiper/Washer System Symptom Chart	10
Power Mirror System	14
Power Mirror Circuit Troubleshooting	18
Power Mirror System Symptom Chart	19
Power Mirror System Diagnostic Tests	20
Horn Circuit	31
Horn System Circuit Troubleshooting	31
Horn	31
Horn System Diagnostic Tests	32
Horn System Circuit Test	32
Audio System	33
Connectors	34
Audio System Circuit Troubleshooting	35
Audio System Symptom Chart	35
Audio System Diagnostic Tests	37

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CAB SYSTEMS

This section describes the following electrical systems:

- Power Seat System
- Wiper Washer System
- Power Mirror System
- Climate Control System
- Audio System

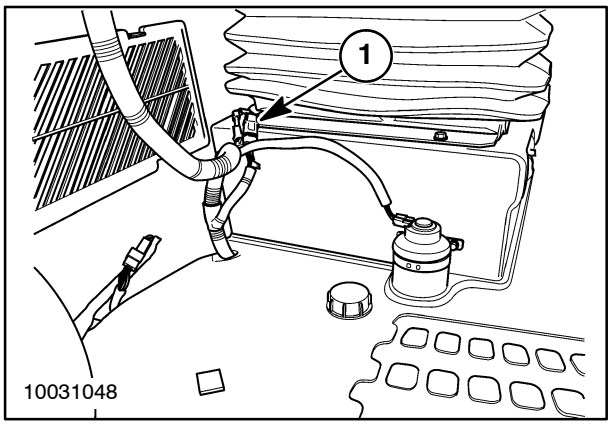
These electrical systems are located in or near the combine cab. This section explains the overall description of the components, connectors, current flow, and proper testing for each of the cab electrical systems.

POWER SEAT SYSTEM

Seat Height Adjustment System

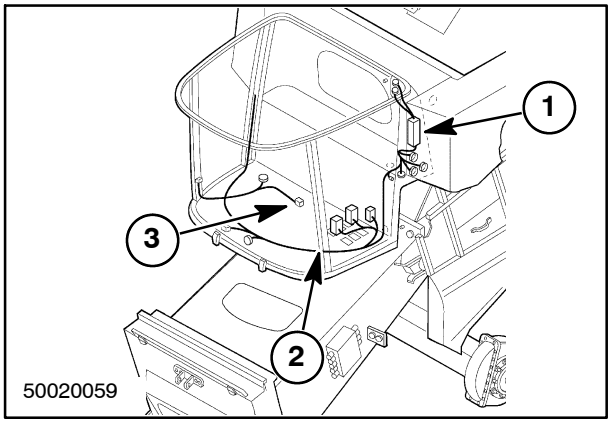
The seat system has a power seat adjustment that uses air pressure to raise and lower the seat. A switch controls the air pressure. An unswitched battery circuit allows height adjustment at all times.

Cab Main Harness to Seat Pump
Connector X074 – Seat Pump, 1.



1

1. Fuse Panel
2. Main Cab Harness
3. Connector X074



2

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POWER SEAT CIRCUIT

Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)

Current travels across the fuse panel system buss bar to fuse F16.

Current passes through fuse F16 and connector X074 pin A to connector X312 pin 1 of the seat adjustment switch S45. When the seat adjustment switch is moved to the “ON” position, current is sent from pin 2 of connector X312 to connector X313 pin A of the seat pump motor M26. The ground path to the motor is completed through connector X074 pin B to reach the cab floor ground location #3. This causes the motor to energize and pump air into the seat reservoir (raising the seat). Releasing a check valve, which is controlled mechanically, lowers the seat assembly.

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POWER SEAT SYSTEM CIRCUIT TROUBLESHOOTING

Before troubleshooting the seat system make sure that the following operating conditions are met:

A. The batteries are fully charged and all connections are clean and tight.

B. Transmission in neutral or park.

C. Check all connectors for full installation, loose, corroded, pushed out, or bent terminals.

D. Check fuse F16.

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

Symptom	Possible Cause	Reference/Test
Height adjustment not operating	Power and ground supply	B - Height Adjustment Circuit Test
	Seat Pump Motor	
	Seat Solenoid	
	Air system leaking	Check air lines for leakage

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POWER SEAT SYSTEM DIAGNOSTIC TESTS

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

A - SEAT SYSTEM POWER AND GROUND SUPPLY TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Check for 12 volts at the Seat Pump Motor M26 connector X313 (pin A).	12 volts If good reading, the wiring has good continuity.	Open circuit 80 (OR) between Fuse F16 and Seat Pump Motor M26 connector X313 (pin A).
2	Check for 12 volts between Seat Pump Motor M26 connector X313 (pin B) and Seat Adjust Switch S45 connector X312 (pin 1).	12 volts If good reading, go to next test point.	Open circuit between Seat Pump Motor M26 connector X313 (pin B) and Seat Adjust Switch S45 connector X312 (pin 1).
3	Check the resistance between Seat Adjust Switch S45 connector X312 (pin 2) and Ground. Open Seat Adjust Switch S45 during measurement.	Less than 1 ohm. If good reading, the wiring has good continuity.	If the resistance is less than 1 ohm with the switch open, or greater than 1 ohm with the switch closed, replace the Seat Adjust Switch S45.

B - HEIGHT ADJUSTMENT CIRCUIT TEST

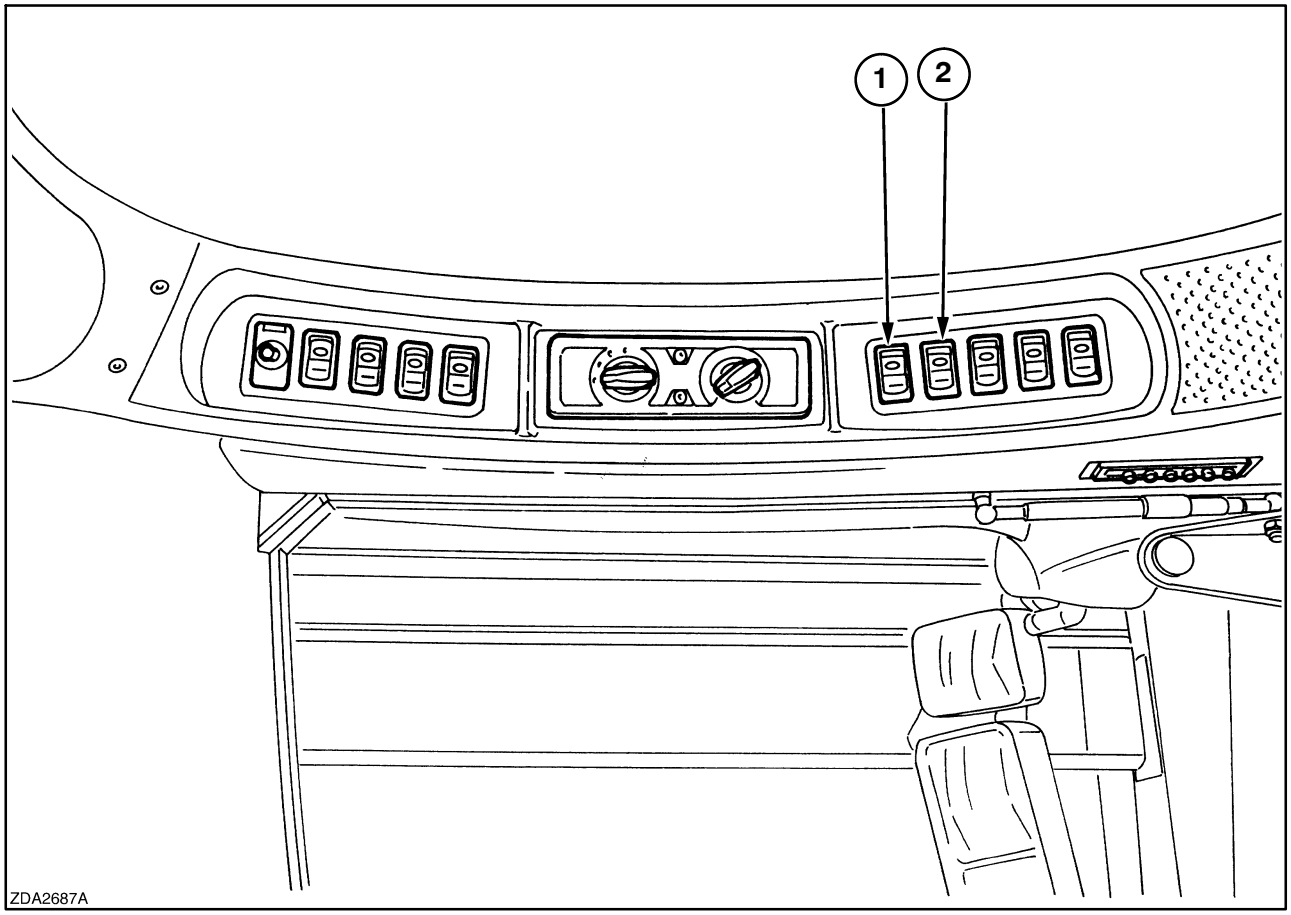
	Test Point	Good Reading	Possible Cause of Bad Reading
1	Press Seat Adjust Switch S-45 to up position.	Seat Pump Motor M-26 runs. If compression runs but seat does not adjust, check for air leakage. Go to next step.	Power and ground supply. Seat Pump Motor M-26. Perform Test A - Seat System Power and Ground Supply Test, steps 1-3 and 6-8. If you did not find any condition, replace Seat Pump Motor M-26.
2	Press Seat Adjust Switch S-45 to down position. .	Air is released. System OK.	Power and ground supply. Seat Solenoid. Perform Test A - Seat System Power and Ground Supply Test, steps 4/5 and 9/11. If you did not find any condition, replace Seat Solenoid.

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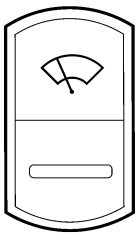
Wiper Washer System
The wiper washer system consists of a two-stage motor and a separate washer motor and reservoir.

The system is energized by switched power and will operate in a continuous or fixed interval speeds.

CAB ROOF CONTROLS

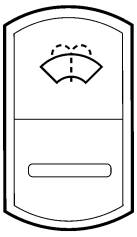


3

1. 

Windscreen wiper tumbler switch

- Wiper ON (continuous)
- Wiper ON (intermittent)
- Wiper OFF

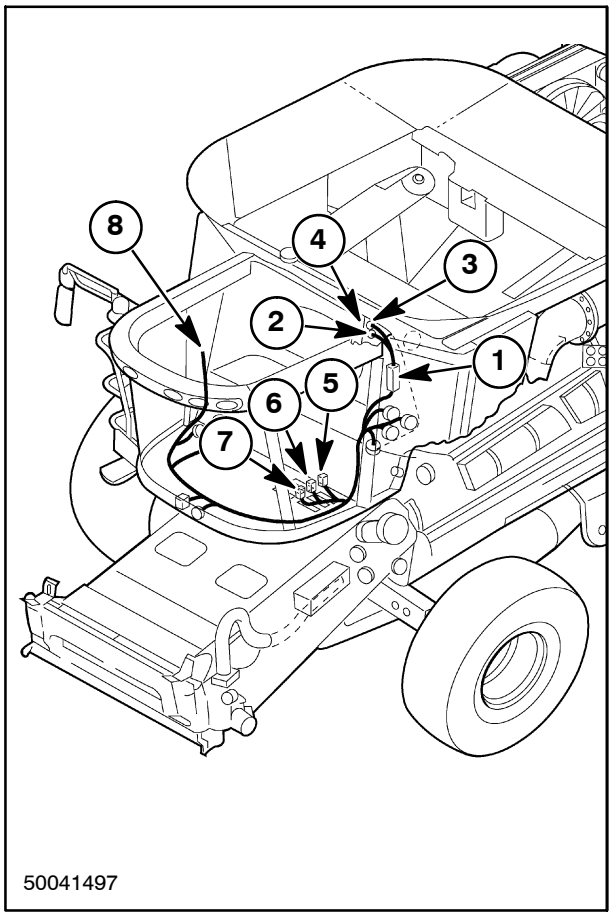
2. 

Windscreen washer rocker switch

- ON
- OFF

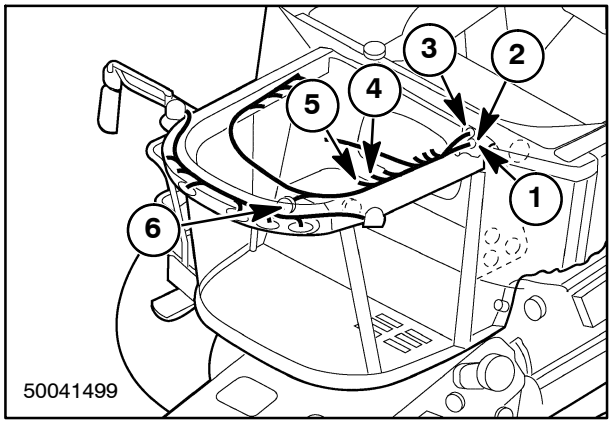
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1. Fuse Panel
2. Connector X002 to Cab Roof harness
3. Connector X003 to Cab Roof harness
4. Cab Roof Ground
5. Connector X018, CCM1 – J1
6. Connector X015, CCM2 – J1
7. Connector X012, CCM3 – J1
8. To Start Panel



4

1. Connector X002 to Cab Roof harness
2. Connector X003 to Cab Roof harness
3. Cab Roof Ground
4. Connector X135 Wiper Switch
5. Connector X134 Washer Switch
6. Connector X036 Outer Roof harness



5

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Wiper Motor Circuit

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)

Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)

Current travels across the fuse panel buss bar and passes through fuse F38 to pin1 of the key switch S02. When the key switch is in the ACC/Run position, current travels from pin 4 of the key switch to pin 1 of the wiper relay K06. The relay energizes and latches pins 3 and 5. Current travels from the fuse panel buss bar and passes through fuse F04 to pin 3 of the wiper relay K-06. When the wiper relay is energized, power crosses to pin 5. Current exits pin 5 and passes through connector X002 pin 14 to the wiper switch S20. The wiper switch controls current flow to the wiper motor.

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WIPER/WASHER SYSTEM CIRCUIT TROUBLESHOOTING

Before troubleshooting the Wiper/Washer system make sure that the following operating conditions are met:

A. The batteries are fully charged and all connections are clean and tight.

B. Transmission in neutral or park.

C. Check all connectors for full installation, loose, corroded or pushed out terminals.

D. Check Fuse F52 and Circuit Breaker 51.

E. Check Power Distribution section if fuse and circuit breaker are good.

WIPER/WASHER SYSTEM SYMPTOM CHART

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

Symptom	Possible Cause	Reference/Test
Wiper Motor is inoperative	Wiper Relay	A - Wiper Relay Test
	Wiper Switch	B - Wiper Switch Test
	Wiper Motor	C - Wiper Motor Test
Wiper Motor works in low speed only	Wiper Switch	B - Wiper Switch Test
	Wiper Motor	C - Wiper Motor Test
Wiper Motor works in high speed only	Wiper Switch	B - Wiper Switch Test
	Wiper Motor	C - Wiper Motor Test
Wiper Motor does not park, stops when switch is turned OFF	Wiper Switch	B - Wiper Switch Test
	Wiper Motor	C - Wiper Motor Test
Front washer inoperative	Washer Switch	D - Washer Switch and Motor Test
	Washer Motor	
	Washer Fluid Supply	Check reservoir and fluid lines.

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NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

A - WIPER RELAY TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Key Switch S-02 “ON”. Check for 12 volts at Wiper Relay K-06 (pin 1).	12 volts Go to next test point.	Open circuit 123 (OR) between Key Switch S-02 connector X068 (pin 4) and Wiper Relay K-06 (pin 1).
2	Check for 12 volts at Wiper Relay K-06 (pin 3).	12 volts Go to next test point.	Open circuit 70 (RD) between Fuse F04 and Wiper Relay K-06 (pin 3). Blown Fuse F04.
3	Key Switch S-02 “OFF” Check for continuity to Ground at Wiper Relay K-06 (pin 2).	Less than 1 ohm. Go to next test point.	Open circuit 242 (BK) between Wiper Relay K-06 (pin 2) and Ground.
4	Check for 12 volts at Wiper Relay K-06 (pin 5).	12 volts Go to next test point.	Wiper Relay K-06. Go to next test point. Short circuit 272 (OR) between Wiper Relay K-06 (pin 5) and Wiper Switch S-20 connector X135 (pin 2). A short will cause Fuse F04 to blow.
5	Check for 12 volts at Wiper Switch S-20 connector X135 (pin 2).	12 volts If good reading, power feed to Wiper Switch S-20 is operating properly.	Open or short circuit 272 (OR) between Wiper Relay K-06 (pin 5) and Wiper Switch S-20 connector X135 (pin 2). Check in-line connector X002 (pin 14) for connection.

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B - WIPER SWITCH TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Key Switch S-02 “ON” Wiper Switch S-20 in “OFF”. Check for 12 volts at Wiper Switch S-20 connector X135 (pin 2).	12 volts Go to next test point (2).	If there is no voltage, there is an open circuit between Wiper Switch S-20 and Wiper Relay K-06 wire 272 orange. Locate open and repair.
2	Wiper Switch S-20 in “RUN” position. Check for 12 volts at Wiper Switch S-20 connector X135 (pin 3).	12 volts Go to next test point (3).	If there is no voltage, replace bad switch.
3	Wiper Switch S-20 in “RUN” position. Check for 12 volts at Wiper Switch S-20 “ON” indicator connector X135 (pin 7).	12 volts If good reading, power feed to illumination lamp operating correctly. Go to next test point (4).	If there is no voltage, there is an open circuit between wiper switch S-20 and splice block C, W-03, wire 273 purple. Locate open and repair.
4	Key Switch S-02 “OFF”. Wiper Switch S-20 in “RUN” position. Check for continuity to ground on Wiper Switch S-20 connector X135 (pin 9).	Continuity found. If good reading, check for blown indicator lamp or bad switch.	Open circuit 296 (BK) between Wiper Switch S-20 connector X135 (pin 9) and Cab Roof Ground #4. Locate open and repair.

C - WIPER MOTOR TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Key Switch S-02 “ON” Wiper Switch S-20 in “ON” position. Check for 12 volts at Wiper Motor M-25 connector X116 (pin 3).	12 volts Go to next test point (2).	Open circuit 275 (WH) between Wiper Switch S-20 connector X135 (pin 3) and Wiper Motor M-25 connector X116 (pin 3). Check in-line connector X036 (pin 15) for connection.
2	Key Switch S-02 “OFF” Check for continuity to ground at Wiper Motor M-25 connector X116 (pin 1).	Continuity found. If good reading, replace motor.	Open circuit 280 (BK) between Wiper Motor M-25 connector X116 (pin 1) and Can Roof Ground #4. Locate open and repair. Check in-line connector X036 (pin 14) for connection.

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D - WASHER SWITCH AND MOTOR TEST

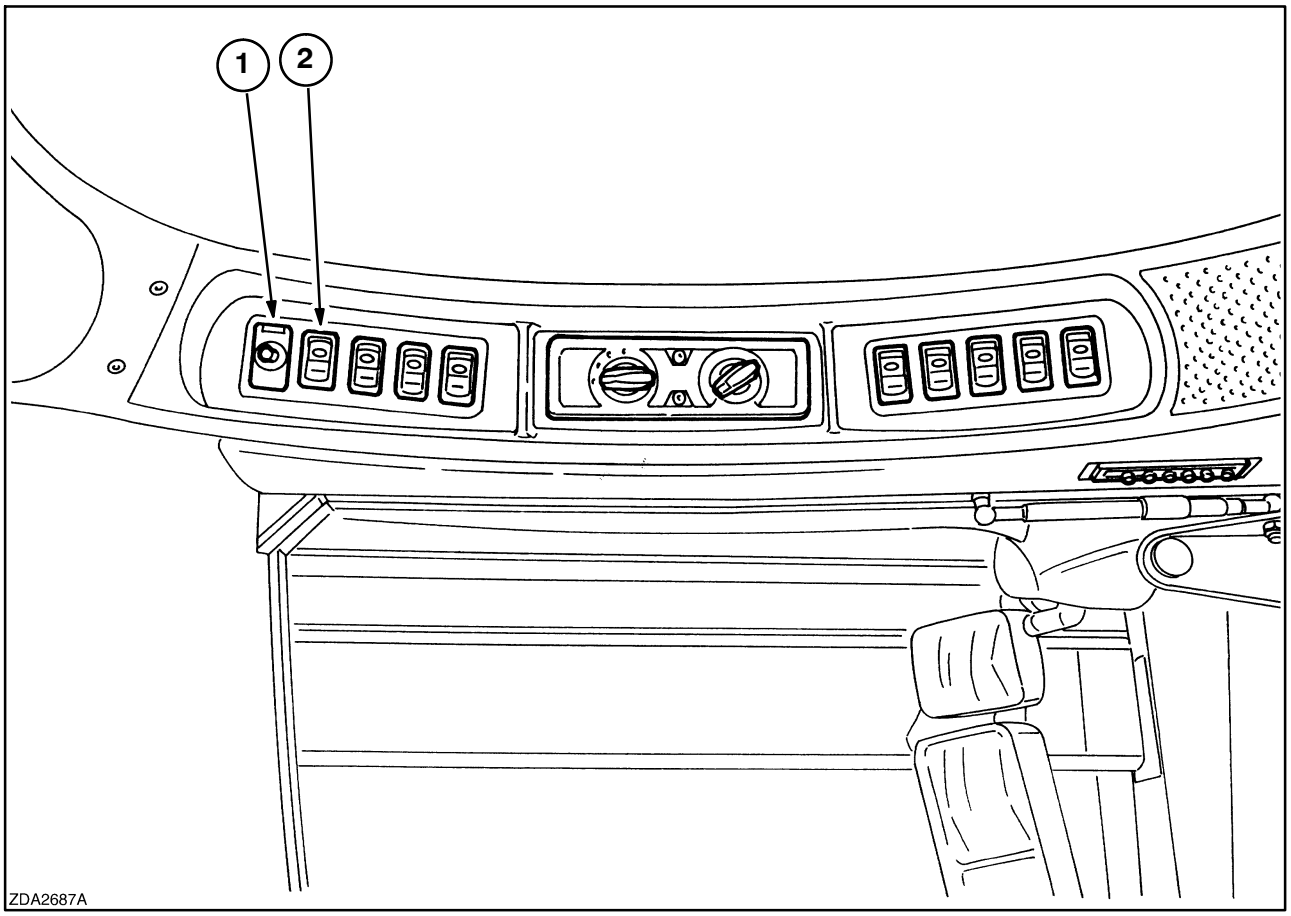
	Test Point	Good Reading	Possible Cause of Bad Reading
1	Key Switch S-02 “ON” Washer Switch S-38 in “ON” position. Check for 12 volts at Washer Switch S-38 connector X134 (pin 3).	12 volts Go to test point (3).	Go to test point (2).
2	Check for 12 volts at Washer Switch S-38 connector X134 (pin 2).	12 volts Replace switch.	Open or short to ground in circuit 279 (OR) or 079 (OR) between Washer Switch S-20 connector X134 (pin 2) and Fuse F09. Check in-line connector X002 (pin 8) for connection. Blown Fuse F09. A short to ground will blow Fuse F09.
3	Washer Switch S-38 in “ON” position. Check for 12 volts at Washer Motor M-24 connector X171 (pin 2).	12 volts Go to test point (4).	Open or short to ground in circuit 278 (WH) between Washer Switch S-38 connector X134 (pin 3) and Washer Motor M-24 connector X171 (pin 2). Check in-line connector X002 (pin 17) and X005 (pin 14) for connection.
4	Key Switch S-02 “OFF”. Check for continuity to ground at Washer Motor M-24 connector X171 (pin 1).	Continuity found. Replace Washer Motor M-24.	Open circuit 449 (BK) between Washer Motor M-24 connector X171 (pin 1) and ground.

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POWER MIRROR SYSTEM

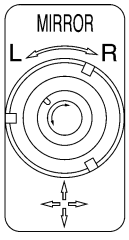
There are three types of mirrors found on the Combines: The LH, RH and German mirror (If Equipped).

Cab Roof Controls



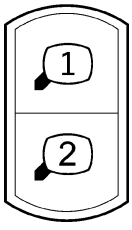
6

Power Mirror Circuit Operation

1. 

Mirror Adjustment Switch (if installed)

- Arrow to the left: left-hand mirror
- Arrow to the right: right-hand mirror

2. 

Mirror select tumbler switch (if installed)

- Main mirror adjustment
- Additional mirror adjustment (Germany)

ONLY ONE MIRROR CAN BE OPERATED AT A TIME.

There are two motors in each mirror assembly. Power and ground are supplied to the motors through three wires for each mirror assembly, one wire for each motor and one wire in common, therefore the motors can only be operated in one mode at a time; up only, down only, in only, or out only.

A change in mirror motor direction is accomplished by reversing current flow through the motors.

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Power Mirror Circuit

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)

Wiring harness - Electrical schematic frame 42 (A.30.A.88 - C.20.E.42)

Wiring harness - Electrical schematic frame 43 (A.30.A.88 - C.20.E.43)

Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)

Current travels across the fuse panel buss bar and through fuse F38 to pin 1 of the key switch S02.

When the key switch is in the ACC/Run position, current travels from pin 4 of the key switch to pin 1 of the wiper relay K06.

A jumper wire sends current from pin 1 of the wiper relay to pin 1 of the Accessory 1 relay K08.

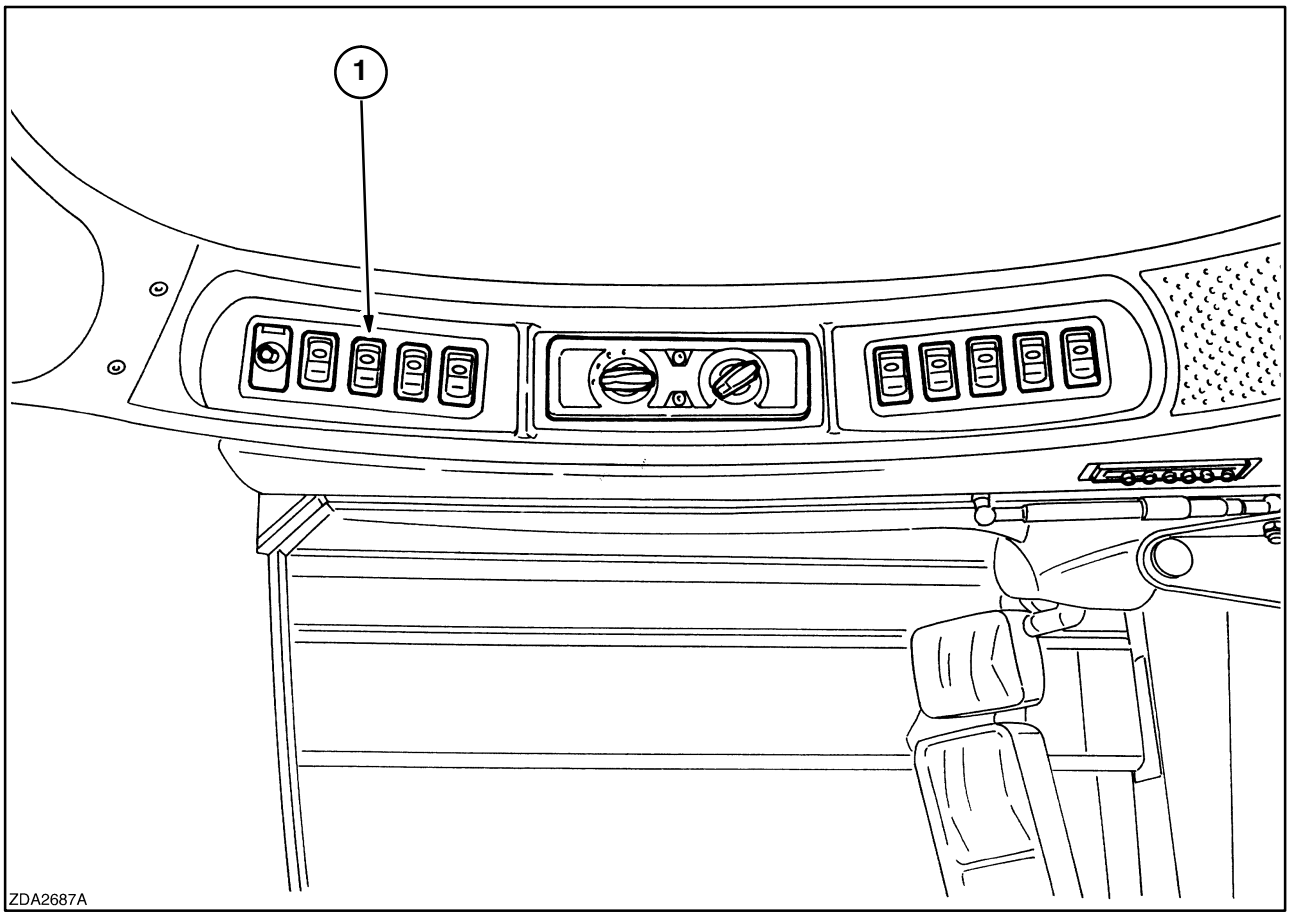
The Accessory 1 Relay energizes and latches pins 3 and 5. Current sent from pin 5 of the Accessory 1 relay passes through fuse F09 and connector X002 pin 8 to the mirror adjust switch S27. Depending on the switch position, current is sent to the motors within the mirror assemblies.

Use the chart below to determine current flow:

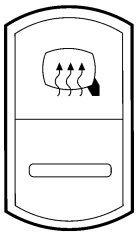
Switch Position	**Left**	**Right**	**Up**	**Down**
Mirror Select Switch in the LH position	Left Hand Mirror Moves left	Left Hand Mirror Moves Right	Left Hand Mirror Moves up	Left Hand Mirror Moves down
Mirror Select Switch in the RH position	Right Hand Mirror Moves left	Right Hand Mirror Moves Right	Right Hand Mirror Moves up	Right Hand Mirror Moves down

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Heated Mirror Circuit Operation



7

1. 

Mirror heating tumbler switch (if equipped)

- ON
- OFF

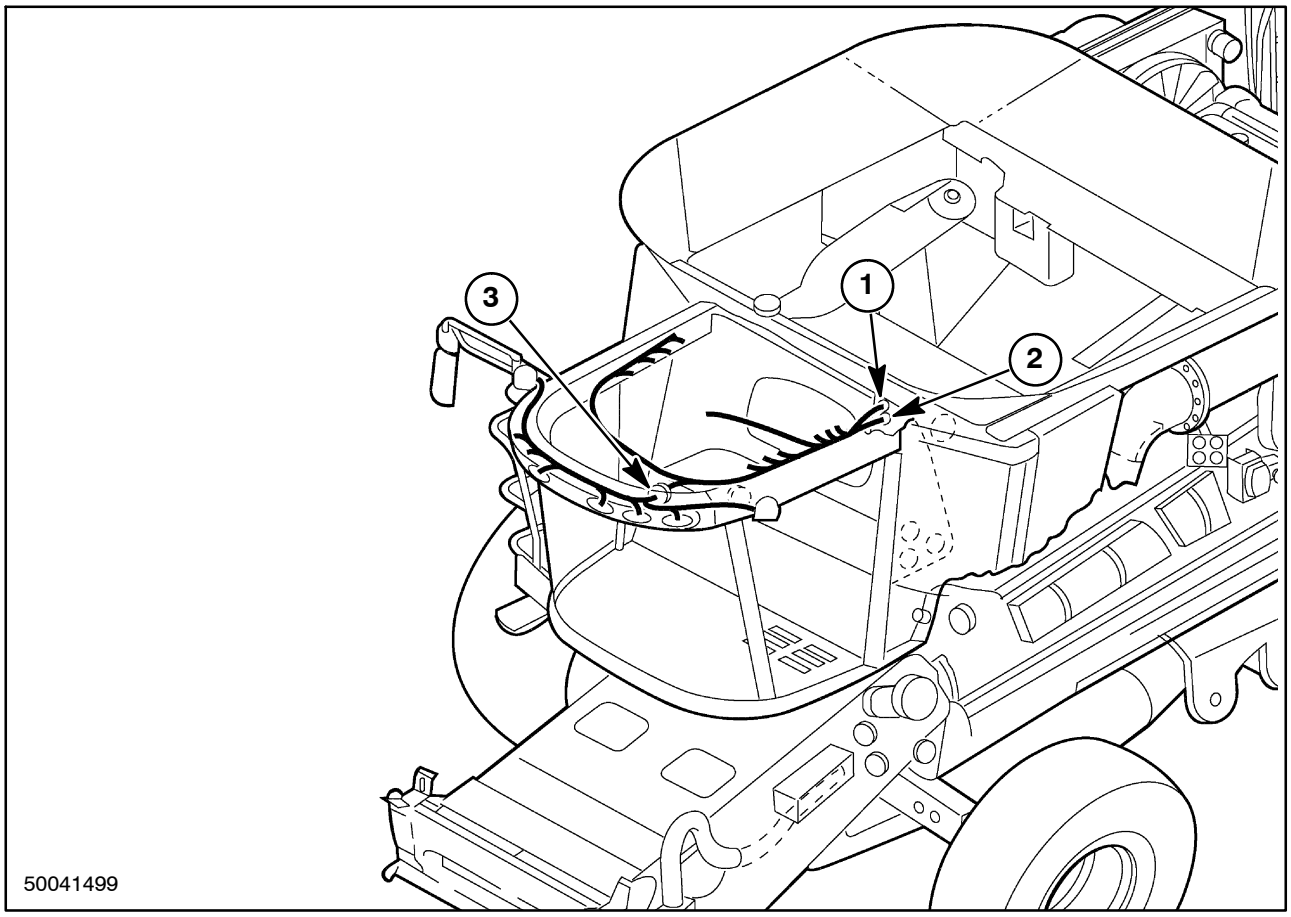
Switched power is supplied to the mirror heat switch through fuse F09 from the Accessory 1 relay.

Chassis ground is supplied to the LH, RH, and German Mirror heaters through connectors X111, X121, and X287.

The mirror heat switch controls the LH, RH, and German Mirror Heaters simultaneously and allows the operator to determine the length of the heating cycle required to defrost the power mirrors.

When the ignition switch is in the RUN position and the mirror heat switch is in the closed position, current flows through the heating elements, in each mirror, to chassis ground.

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8

Cab Roof (CR) Wire Harness

1. Cab Roof Ground
2. Connector X002 to Cab Main Harness
3. Connector X036 to Outer Roof Harness

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POWER MIRROR CIRCUIT TROUBLESHOOTING

Before troubleshooting the starting system make sure that the following operating conditions are met:

A. The batteries are fully charged and all connections are clean and tight.

B. Check Fuse F09.

C. Check operation of the Accessory 1 Relay.

D. Transmission in neutral or park.

E. Check all connectors for full installation, loose, corroded, pushed out, or bent terminals.

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POWER MIRROR SYSTEM SYMPTOM CHART

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

Symptom	Possible Cause	Reference/Test
All Power Mirrors inoperable	No power or ground to Mirror Adjust Switch S-27	A - Mirror Adjust Switch Test
	Mirror Adjust Switch S-27	
RH and German Power Mirrors inoperable	Mirror Adjust Switch S-27	A - Mirror Adjust Switch Test
	Mirror Select Switch S-27	B - Mirror Select Switch Test
Left Power Mirror inoperable	Mirror Adjust Switch S-27	A - Mirror Adjust Switch Test steps 4-7 and 12-15.
	Left Mirror Assembly	C - LH Power Mirror Test
Right Power Mirror inoperable	Right Mirror Assembly	D - RH Power Mirror Test
	Adjacent circuits	
German Power Mirror inoperable	German Mirror Assembly	E - German Power Mirror Test
	Adjacent circuits	
All Heated Mirrors inoperable	Mirror Heat Switch S-19	F - Mirror Heat Switch Test
	No general power or ground supply for heating mirrors	G - Heating Mirrors Test steps 1 and 2
LH Heated Mirror inoperable	Heating element for LH Mirror	G - Heating Mirrors Test steps 1 and 2
	Adjacent circuits	
RH Heated Mirror inoperable	Heating element for RH Mirror	G - Heating Mirrors Test steps 3 and 4
	Adjacent circuits	
German Heated Mirror inoperable	Heating element for German Mirror	G - Heating Mirrors Test steps 5 and 6
	Adjacent circuits	

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POWER MIRROR SYSTEM DIAGNOSTIC TESTS

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

A - MIRROR ADJUST SWITCH TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON with the engine OFF. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin H).	12 volts If good reading, go to test point 3.	Open circuit 274 (OR) or 79 (OR) between Fuse F09 and Mirror Adjust Switch S-27 (pin H). Check in-line connector X002 (pin 8) for connection. Short to ground in circuit 274 (OR) or 79 (OR). A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Go to next test point.
2	Disconnect the Mirror Adjust Switch S-27 connector X126. Check the voltage at (pin H).	12 volts If good reading, Go to next test point.	Open or short circuit 274 (OR) or 79 (OR) between Fuse F09 and Mirror Adjust Switch S-27 connector X126 (pin H).
3	Check the resistance on circuit 949 (BK) between Mirror Adjust Switch S-27 connector X126 (pin A) and ground.	Less than 1 ohm If good reading, go to next test point.	Open circuit 949 (BK) between Mirror Adjust Switch S-27 connector X126 (pin A) and ground.
4	Set Mirror Adjust Switch S-27 selector to Left mirror. Hold Mirror Adjust Switch S-27 in “IN” position. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin C).	12 volts If good reading, go to next test point.	Mirror Adjust Switch S-27. Short to ground which affects circuit 961 (GY). Check the X036 in-line connector (pin 25) for connection. A short to ground will blow Fuse F09.
5	Hold Mirror Adjust Switch S-27 in OUT position. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin B).	12 volts If good reading, go to next test point.	Mirror Adjust Switch S-27. Short to ground which affects circuit 959 (WH). Check the X036 in-line connector (pin 23) for connection. A short to ground will blow Fuse F09.
6	Hold Mirror Adjust Switch S-27 in DOWN position. Check the voltage at Mirror Adjust Switch S-27 (pin D).	12 volts If good reading, go to next test point.	Mirror Adjust Switch S-27. Short to ground which affects circuit 958 (WH). Check the X036 in-line connector (pin 22) for connection. A short to ground will blow Fuse F09.

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	Test Point	Good Reading	Possible Cause of Bad Reading
7	Hold Mirror Adjust Switch S-27 in UP position. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin C).	12 volts If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
8	Set mirror selector to Right/German mirror. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin F).	12 volts If good reading, go to next test point.	Mirror Adjust Switch S-27. Short to ground which affects circuit 954 (GY). A short to ground will blow Fuse F09.
9	Hold Mirror Adjust Switch S-27 in OUT position. Check the voltage at Mirror Adjust Switch S-27 (pin G).	12 volts If good reading, go to next test point.	Mirror Adjust Switch S-27. Short to ground which affects circuit 960 (WH). Check the X036 in-line connector (pin 24) for connection. A short to ground will blow Fuse F09.
10	Hold Mirror Adjust Switch S-27 in DOWN position. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin E).	12 volts If good reading, go to next test point.	Mirror Adjust Switch S-27. Short to ground which affects circuit 957 (WH). Check the X036 in-line connector (pin 19) for connection. A short to ground will blow Fuse F09.
11	Hold Mirror Adjust Switch S-27 in UP position. Check the voltage at Mirror Adjust Switch S-27 connector X126 (pin F).	12 volts If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
12	Set Mirror Adjust Switch S-27 selector to Left mirror. Hold Mirror Adjust Switch S-27 in IN position. Check resistance between Mirror Adjust Switch S-27 connection X126 (pin B) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
13	Hold Mirror Adjust Switch S-27 in OUT position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin C) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
14	Hold Mirror Adjust Switch S-27 in DOWN position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin C) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.

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	Test Point	Good Reading	Possible Cause of Bad Reading
15	Hold Mirror Adjust Switch S-27 in UP position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin D) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
16	Set mirror selector to Right/German mirror. Hold Mirror Adjust Switch S-27 in IN position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin G) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
17	Hold Mirror Adjust Switch S-27 in OUT position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin F) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
18	Hold Mirror Adjust Switch S-27 in DOWN position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin F) and ground.	Less than 1 ohm If good reading, go to next test point.	Replace the Mirror Adjust Switch S-27.
19	Hold Mirror Adjust Switch S-27 in UP position. Check resistance between Mirror Adjust Switch S-27 connector X126 (pin E) and ground.	Less than 1 ohm If good reading, system OK.	Replace the Mirror Adjust Switch S-27.

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B - MIRROR SELECT SWITCH TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON, with the engine OFF. Select Mirror Adjust Switch S-27 selector to Right/German Mirror. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at Mirror Select Switch S-57 connector X178 (pin 2).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 954 (GY) or open in circuit 954 (GY) between Mirror Select Switch S-57 connector X178 (pin 2) and Mirror Adjust Switch S-27 connector X126 (pin F). A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2, and 8.
2	Set Mirror Select Switch S-57 to German Mirror. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at Mirror Select Switch S-57 connector X178 (pin 1).	12 volts If good reading, go to next test point.	Mirror Select Switch S-57. Short to ground which affects circuit 966 (GY), between Mirror Select Switch S-57 connector X178 (pin 1) and German Mirror (pins 2 and 5). Check the X036 (pin 19) and X287 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09.
3	Set Mirror Select Switch S-57 to RH Mirror. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at Mirror Select Switch S-57 connector X178 (pin 3).	12 volts If good reading, system OK.	Mirror Select Switch S-57. Short to ground which affects circuit 956 (GY), between Mirror Select Switch S-57 connector X178 (pin 3) and RH Mirror (pins 2 and 5). Check the X036 (pin 20) and X121 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09.

C - LH POWER MIRROR TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON, with the engine OFF. Select Mirror Adjust Switch S-27 selector to Left mirror. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at LH Mirror M-22 (pin 5).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 961 (GY) or open in circuit 961 (GY) between Mirror Adjust Switch S-27 connector X126 (pin C) and LH Mirror M-22 (pin 5). Check the X036 (pin 25) and X111 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 4.
2	Hold Mirror Adjust Switch S-27 in IN position. Check the resistance between LH Mirror M-22 (pin 1) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 959 (WH) between Mirror Adjust Switch S-27 connector X126 (pin B) and LH Mirror M-22 (pin 1). Check the X036 (pin 23) and X111 (pin 1) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 12.

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	Test Point	Good Reading	Possible Cause of Bad Reading
3	Hold Mirror Adjust Switch S-27 in OUT position. Check the voltage at LH Mirror M-22 (pin 1).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 959 (WH) or open in circuit 959 (WH) between Mirror Adjust Switch S-27 connector X126 (pin B) and LH Mirror M-22 (pin 1). Check the X036 (pin 23) and X111 (pin 1) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 5.
4	Hold Mirror Adjust Switch S-27 in OUT position. Check the resistance between LH Mirror M-22 (pin 5) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 961 (GY) between Mirror Adjust Switch S-27 connector X126 (pin C) and LH Mirror M-22 (pin 5). Check the X036 (pin 25) and X111 (pin 2) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 13.
5	Hold Mirror Adjust Switch S-27 in DOWN position. Check the voltage at LH Mirror M-21 (pin 4).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 958 (WH) or open in circuit 958 (WH) between Mirror Adjust Switch S-27 connector X126 (pin D) and LH Mirror M-21 (pin 4). Check the X036 (pin 22) and X111 (pin 4) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 6.
6	Hold Mirror Adjust Switch S-27 in DOWN position. Check the resistance between LH Mirror M-21 (pin 2) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 961 (GY) between Mirror Adjust Switch S-27 connector X128 (pin C) and LH Mirror M-21 (pin 2). Check the X036 (pin 25) and X111 (pin 2) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 18.
7	Hold Mirror Adjust Switch S-27 in UP position. Check the voltage at LH Mirror M-21 (pin 2).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 961 (GY) or open in circuit 961 (GY) between Mirror Adjust Switch S-27 connector X126 (pin C) and LH Mirror M-21 (pin 2). Check the X036 (pin 25) and X111 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 7.
8	Hold Mirror Adjust Switch S-27 in UP position. Check the resistance between LH Mirror M-21 (pin 4) and ground.	Less than 1 ohm If good reading, and left mirror does not operate properly, replace left mirror assembly.	Open in circuit 958 (WH) between Mirror Adjust Switch S-27 connector X126 (pin D) and LH Mirror M-21 (pin 4). Check the X036 (pin 22) and X111 (pin 4) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 15.

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D - RH POWER MIRROR TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON, with the engine OFF. Select Mirror Adjust Switch S-27 selector to Right/German mirror. Select Mirror Select Switch S-57 to Right Mirror. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at RH Mirror M-20 (pin 5).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 956 (GY) or open in circuit 956 (GY) between Mirror Select Switch S-57 connector X178 (pin 3) and RH Mirror M-20 (pin 5). Check the X036 (pin 20) and X121 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Select Switch S-57. Perform B - Mirror Select Switch Test.
2	Hold Mirror Adjust Switch S-27 in IN position. Check the resistance between RH Mirror M-20 (pin 1) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuits 962 (WH) or 960 (WH) between Mirror Adjust Switch S-27 connector X126 (pin G) and RH Mirror M-20 (pin 1). Check the X036 (pin 24) and X121 (pin 1) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 16.
3	Hold Mirror Adjust Switch S-27 in OUT position. Check the voltage at RH Mirror M-20 (pin 1).	12 volts If good reading, go to next test point.	Short to ground which affects circuits 962 (WH) or 960 (WH) or open in circuits 962 (WH) or 960 (WH) between Mirror Adjust Switch S-27 connector X126 (pin G) and RH Mirror M-20 (pin 1). Check the X036 (pin 24) and X121 (pin 1) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 9.
4	Hold Mirror Adjust Switch S-27 in OUT position. Check the resistance between RH Mirror M-20 (pin 5) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 956 (GY) between Mirror Select Switch S-57 connector X178 (pin 3) and RH Mirror M-20 (pin 5). Check the X036 (pin 20) and X121 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Select Switch S-57. Perform B - Mirror Select Switch Test.
5	Hold Mirror Adjust Switch S-27 in DOWN position. Check the voltage at RH Mirror M-19 (pin 4).	12 volts If good reading, go to next test point.	Short to ground which affects circuits 955 (WH) and 957 (WH), or open in circuits 955 (WH) and 957 (WH), between Mirror Adjust Switch S-27 connector X126 (pin E) and RH Mirror M-19 (pin 4). Check the X036 (pin 21) and X121 (pin 4) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 10.

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	Test Point	Good Reading	Possible Cause of Bad Reading
6	Hold Mirror Adjust Switch S-27 in DOWN position. Check the resistance between RH Mirror M-19 (pin 2) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 956 (GY) between Mirror Select Switch S-57 connector X178 (pin 3) and RH Mirror M-19 (pin 2). Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 14.
7	Hold Mirror Adjust Switch S-27 in UP position. Check the voltage at RH Mirror M-19 (pin 2).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 956 (GY) or open in circuit 956 (GY) between Mirror Select Switch S-57 connector X178 (pin 3) and RH Mirror M-19 (pin 2). Check the X036 (pin 20) and X121 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Select Switch S-57. Perform B - Mirror Select Switch Test.
8	Hold Mirror Adjust Switch S-27 in UP position. Check the resistance between RH Mirror M-19 (pin 4) and ground.	Less than 1 ohm If good reading, and right mirror does not operate properly, replace right mirror assembly.	Open in circuits 955 (WH) or 957 (WH) between Mirror Adjust Switch S-27 connector X126 (pin E) and RH Mirror M-19 (pin 4). Check the X036 (pin 21) and X121 (pin 4) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 19.

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E - GERMAN POWER MIRROR TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON, with the engine OFF. Select Mirror Adjust Switch S-27 selector to Right/German mirror. Select Mirror Select Switch S-57 to German Mirror M-31. Hold Mirror Adjust Switch S-27 in IN position. Check the voltage at German Mirror M-31 (pin 5).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 966 (GY) or open in circuit 966 (GY) between Mirror Select Switch S-57 connector X178 (pin 1) and German Mirror M-31 (pin 5). Check the X036 (pin 19) and X287 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Select Switch S-27. Perform B - Mirror Select Switch Test.
2	Hold Mirror Adjust Switch S-27 in IN position. Check the resistance between German Mirror M-31 (pin 1) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuits 964 (WH) or 960 (WH) between Mirror Adjust Switch S-27 connector X126 (pin G) and German Mirror M-31 (pin 1). Check the X036 (pin 24) and X287 (pin 1) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 16.
3	Hold Mirror Adjust Switch S-27 in OUT position. Check the voltage at German Mirror M-31 (pin 1).	12 volts If good reading, go to next test point.	Short to ground which affects circuits 964 (WH) or 960 (WH) or open in circuits 964 (WH) or 960 (WH) between Mirror Adjust Switch S-27 connector X126 (pin G) and German Mirror M-31 (pin 1). Check the X036 (pin 24) and X287 (pin 1) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 9.
4	Hold Mirror Adjust Switch S-27 in OUT position. Check the resistance between German Mirror M-31 (pin 5) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 966 (GY) between Mirror Select Switch S-57 connector X178 (pin1) and German Mirror M-31 (pin 5). Check the X036 (pin 19) and X287 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Select Switch S-57. Perform B - Mirror Select Switch Test.
5	Hold Mirror Adjust Switch S-27 in DOWN position. Check the voltage at German Mirror M-30 (pin 4).	12 volts If good reading, go to next test point.	Short to ground which affects circuits 963 (GY) and 957 (WH), or open in circuits 963 (GY) and 957 (WH), between Mirror Adjust Switch S-27 connector X126 (pin E) and German Mirror M-30 (pin 4). Check the X036 (pin 19) and X287 (pin 2) in-line connectors for connection. A short to ground will blow Fuse F09. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 1, 2 and 10.

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	Test Point	Good Reading	Possible Cause of Bad Reading
6	Hold Mirror Adjust Switch S-27 in DOWN position. Check the resistance between German Mirror M-30 (pin 2) and ground.	Less than 1 ohm If good reading, go to next test point.	Open in circuit 966 (GY) between Mirror Select Switch S-57 connector X178 (pin 1) and German Mirror M-30 (pin 2). Check the X036 (pin 19) and X287 (pin 2) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 14.
7	Hold Mirror Adjust Switch S-27 in DOWN position. Check the voltage at German Mirror M-30 (pin 2).	12 volts If good reading, go to next test point.	Short to ground which affects circuit 966 (GY) or open in circuit 966 (GY) between Mirror Select Switch S-57 connector X178 (pin 1) and German Mirror M-30 (pin 2). A short to ground will blow Fuse F09. Check the X036 (pin 19) and X287 (pin 2) in-line connectors for connection. Mirror Select Switch S-57. Perform B - Mirror Select Switch Test.
8	Hold Mirror Adjust Switch S-27 in UP position. Check the resistance between German Mirror M-30 (pin 4) and ground.	Less than 1 ohm If good reading, and German mirror does not operate properly, replace German mirror assembly.	Open in circuits 963 (GY) or 957 (WH) between Mirror Adjust Switch S-27 connector X126 (pin E) and German Mirror M-30 (pin 4). Check the X036 (pin 21) and X287 (pin 4) in-line connectors for connection. Mirror Adjust Switch S-27. Perform A - Mirror Adjust Switch Test, steps 3 and 19.

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F - MIRROR HEAT SWITCH TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON with the engine OFF. Check that Mirror Heat Switch S-19 is open. Check the voltage at Mirror Heat Switch S-19 connector X127 (pin 2).	12 volts If good reading, go to next test point.	Open circuit 953 (OR) or 79 (OR) between Fuse F09 and Mirror Heat Switch S-19 (pin 2). Check the X002 (pin H) in-line connectors for connection. Short to ground in circuit 953 (OR) or 79 (OR). A short to ground will blow Fuse F09.
2	Close Mirror Heat Switch S-19. Check the voltage at the Mirror Heat Switch S-19 connector X127 (pin 3).	12 volts If good reading, system OK.	Mirror Heat Switch S-19. Short to ground which affects circuit 931 (OR). Check the X036 (pin 18) in-line connectors for connection. A short to ground will blow Fuse F09.

G - HEATING MIRRORS TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Turn the Key Switch S-02 ON with the engine OFF. Close Mirror Heat Switch S-19. Check the voltage at LH Mirror R-11 (pin 3).	12 volts If good reading, go to next test point.	Open circuit 935 (OR) or 931 (OR) between LH Mirror R-11 (pin 3) and Mirror Heat Switch S-19 connector X127 (pin 3). Check the X036 (pin 18) and X111 (pin 3) in-line connectors for connection. Short to ground which affects circuit 931 (OR) or 935 (OR). A short to ground will blow Fuse F09. Mirror Heat Switch S-19. Perform F - Mirror Heat Switch Test.
2	Check the resistance between LH Mirror R-11 (pin 6) and ground.	Less than 1 ohm If good reading, and LH Mirror Heat R-11 doesn't work replace the LH Mirror assembly. Go to next test point if LH Mirror Heat R-11 was not defective.	Open in circuit 671 (BK) or 295 (BK) between LH Mirror R-11 (pin 6) and ground. Check the X111 (pin 6) and X036 (pin 12) in-line connectors for connection.
3	Check the voltage at RH Mirror R-10 (pin 3).	12 volts If good reading, go to next test point.	Open in circuit 932 (OR) or 931 (OR) between RH Mirror R-10 (pin 3) and Mirror Heat Switch S-19 connector X127 (pin 3). Check the X036 (pin 18) and X121 (pin 3) in-line connectors for connection.

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	Test Point	Good Reading	Possible Cause of Bad Reading
4	Check the resistance between RH Mirror R-10 (pin 6) and ground.	Less than 1 ohm If good reading, and RH Mirror Heat R-10 doesn't work replace the RH Mirror assembly. Go to next test point if RH Mirror Heat R-10 was not defective.	Open in circuit 670 (BK) or 295 (BK) between RH Mirror R-10 (pin 6) and ground. Check the X121 (pin 6) and X036 (pin 12) in-line connectors for connection.
5	Check the voltage at German Mirror R-14 (pin 3).	12 volts If good reading, go to next test point.	Open in circuit 862 (OR) or 931 (OR) between German Mirror R-14 (pin 3) and Mirror Heat Switch S-19 connector X127 (pin 3).
6	Check the resistance between German Mirror R-14 (pin 6) and ground.	Less than 1 ohm If good reading, and German Mirror Heat R-14 doesn't work replace the German Mirror assembly.	Open in circuit 863 (BK) or 295 (BK) between German Mirror R-14 (pin 6) and ground. Check the X287 (pin 6) and X036 (pin 12) in-line connectors for connection.

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Description
The horn circuit is shown with the horn activated (control stalk pushed inward, toward the steering column).

Wiring harness - Electrical schematic frame 36 (A.30.A.88 - C.20.E.36)

Power is supplied to the Horn Switch at all times. The Horn Switch is integrated into the Road Light Switch. When the operator closes the Horn Switch contact, current flows through the Horn Switch to operate the horn.

Current flows from the positive (+) battery terminals, and through the start relay (if equipped), to the fuse panel located inside the cab of the combine.

Current travels across the fuse panel buss bar to fuse F51.

Current passes through fuse F51 to connector X256 pin 8. When the horn portion of the road light switch (S26) is pushed inward to the “ON” position, current crosses from pin 8 to pin 9. Current exits pin 9 of connector X256 to connector X004 pin 18. Current passes through connector X004 to connector X172 pin 1. Current passes through the connector to the horn. The ground path to the horn travels from connector X172 to the front frame ground location #2. This causes the horn to operate.

HORN SYSTEM CIRCUIT TROUBLESHOOTING

Before troubleshooting the Horn System, make sure that the following operating conditions are met:

A. The batteries are fully charged, and all connections are clean and tight.

B. Transmission is in neutral or park.

C. Check all connectors for full installation, loose, corroded, pushed out or bent terminals.

D. Verify that fuse F51 is not blown.

HORN

Symptom	Possible Cause	Reference/Test
Horn does not operate	Horn	Horn System Circuit Test
	Circuit	Horn System Circuit Test
	Road Light Switch	Horn System Circuit Test, test points 1 thru 3.

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests.*

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HORN SYSTEM DIAGNOSTIC TESTS

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

HORN SYSTEM CIRCUIT TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Close Horn Switch located in the Road Light Switch. Check for 12 volts at horn connector X172 (pin 1).	12 volts If good reading, go to test point 5.	Open in B+ circuit 193 (WH) between Road Light Switch connector X256 (pin 9) and Horn connector X172 (pin 1). Go to next test point.
2	Close Horn Switch located in the Road Light Switch. Check for 12 volts at Road Light Switch connector X256 (pin 9).	12 volts If good reading, repair open in circuit 193 (WH). Check in-line connector X004 (pin 18) for connection.	Horn Switch. Go to next test point.
3	Check for 12 volts at Road Light Switch connector X256 (pin 8).	12 volts If good reading, replace Road Light Switch.	Open B+ circuit 214 (RD) between Road Light Switch connector X256 (pin 8) and Fuse F51. Go to next test point.
4	Check for 12 volts at Fuse F51.	12 volts If good reading, repair open in circuit 214 (RD).	Blown Fuse F51. Open in B+ circuit. See Power Distribution for testing.
5	Check resistance of circuit 631 (BK) between horn connector X172 (pin 2) and ground.	Less than 1 ohm If good reading, horn power and ground circuits okay. If horn does not work, replace horn.	Open circuit 631 (BK) between horn and ground.

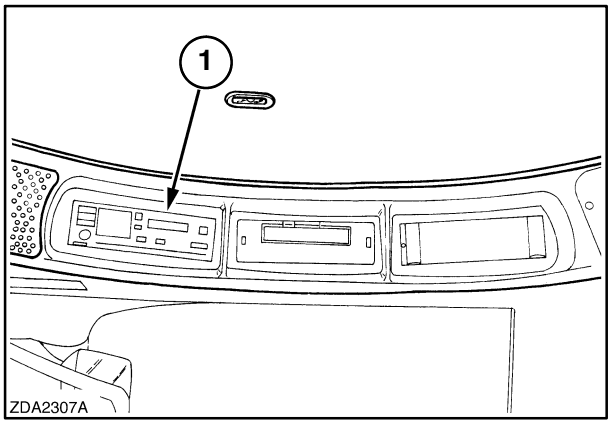
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AUDIO SYSTEM

The audio system is energized by switched power and has a Transceiver Power Outlet connector so that the operator may add additional audio equipment.

Radio, 1, Location with:

- 12 Volts DC connection
- Loudspeaker connections
- Antenna connection: AM/FM Universal Motorola 3/4″ NMO mount (cable pre installed).



9

Wiring harness - Electrical schematic frame 29 (A.30.A.88 - C.20.E.29)

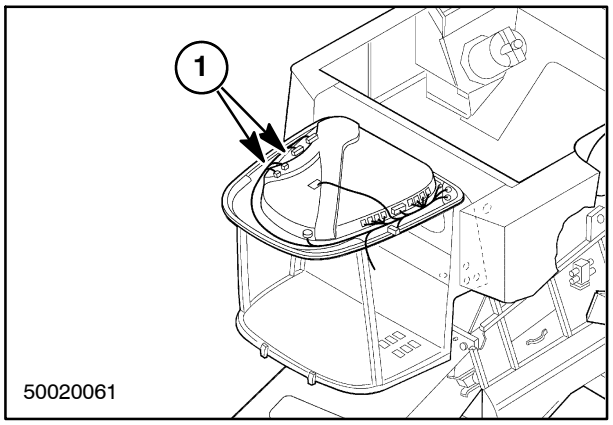
Wiring harness - Electrical schematic frame 44 (A.30.A.88 - C.20.E.44)

Wiring harness - Electrical schematic frame 45 (A.30.A.88 - C.20.E.45)

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CONNECTORS

Connector X314 and connector X315, 1, To AM/FM Radio.



10

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AUDIO SYSTEM CIRCUIT TROUBLESHOOTING

Before troubleshooting the Audio system make sure that the following operating conditions are met:

A. The batteries are fully charged and all connections are clean and tight.

B. Transmission in neutral or park.

C. Check all connectors for full installation, loose, corroded, pushed out, or bent terminals.

D. Check Fuses F02, F11, F13, F35.

AUDIO SYSTEM SYMPTOM CHART

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests. For battery testing and service, see the battery section in the service manual.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

Symptom	Possible Cause	Reference/Test
Audio unit or Transceiver Power Outlet is inoperative	Fuse/Power Supply	A - Audio System Power and Ground Supply Test
	Audio Unit	If A - Audio System Power and Ground Supply Test results are good, Audio unit is bad.
Blank display, radio/tape player operates	Audio unit	
Audio operates, tape player does not operate	Audio unit	
Noisy reception	Antenna	F - Antenna Test
	Audio Unit	If F - Antenna Test is good, audio unit is bad.
Noisy reception, FM only	Antenna	F - Antenna Test
	Audio unit	If F - Antenna Test is good, audio unit is bad.
	Poor reception area	
Poor quality/distorted sound-One or more speakers	Audio speaker	B, C, D, E - Speaker Resistance Test Substitute known good speaker(s).
	Circuit	Perform relevant speaker circuit test(s).
	Audio unit	If speaker(s) and circuit(s) are good, audio unit is bad.

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Symptom	Possible Cause	Reference/Test
Poor quality/distorted sound from all speakers	Audio speakers	B, C, D, E - Speaker Resistance Test Substitute known good speaker(s).
	Circuit	Perform relevant speaker circuit test(s).
	Audio unit	If speaker(s) and circuit(s) are good, audio unit is bad.
No sound from speakers	Speakers	B, C, D, E - Speaker Resistance Test Substitute known good speaker(s).
	Circuit	Perform relevant speaker circuit test(s).
	Audio unit	If speaker(s) and circuit(s) are good, audio unit is bad.
Transceiver Power Outlet not operating	Circuit	A - Audio system power and ground supply test.

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AUDIO SYSTEM DIAGNOSTIC TESTS

NOTE: *The batteries must be fully charged and all connections clean and tight. Use a multimeter (DVOM) for these tests.*

⚠ CAUTION ⚠

DO NOT use a self-powered test light for any of these tests. Use of a self-powered test light can cause damage to components in this system.

⚠ WARNING ⚠

Before performing any of the electrical tests, be sure all operating controls are in neutral or park lock position. This will eliminate accidental movement of the machine or start-up of power driven equipment.

NOTE: *Refer to Radio Owner's Manual for operation and removal instructions.*

A – AUDIO SYSTEM POWER AND GROUND SUPPLY TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Key Switch S02, in "OFF" position. Measure resistance between Radio connector X314 (Pin 8) and ground.	Less than 1ohm If good reading, go to next test point 2.	Open circuit 973 (BK) between Radio connector X314 (pin 8) and ground. Continue to next test point.
2	Key Switch S02, in "OFF" position. Measure 12 volts at Radio connector X314 (pin 4, KAPWR).	12 volts If good reading, go to test point 5.	Blown Fuse F35 Open circuit 830 (RD) or 048 (RD) between Radio connector X314 (pin 4) and in–line connector X002 (pin 6). Continue to next test point.
3	Measure for 12 volts at in-line connector X002 (pin 6).	12 volts If good reading, repair open circuit in 830 (RD) or 048 (RD). Go to test point 5.	Open circuit 048(RD) between In–line connector X002 (Pin 6) and Fuse F35.
4	Measure for 12 volts at Fuse F35.	12 volts If good reading, repair open circuit 048 (RD). Continue to next test point.	Open circuit between Fuse F35 and unswitched power. See Power Distribution for testing.
5	Key Switch S02 in "IGN" or "ACC" position. Measure 12 volts at Radio connector X314 (pin7).	12 volts If good reading, power and grounds to Audio System are operating properly.	Open circuit 081 (OR) between Radio connector X314 (pin 7) and Fuse F11. Check for connection at in–line connector X002 (Pin 9). Continue to next test point.

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	Test Point	Good Reading	Possible Cause of Bad Reading
6	Measure for 12 volts at Fuse F11.	12 volts If good reading, repair open circuit 081 (OR) between Radio connector X314 (Pin 7) and Fuse F11.	Open circuit 081 (OR) between Fuse F11 and Accessory 2 Relay K03. Blown fuse F11 or Accessory 2 Relay K03. Refer to Power Distribution for Accessory 2 Relay K03 testing.
7	Key Ignition Switch S02 in “IGN” position. Measure for 12 volts at Transceiver Outlet connector X141 (pin 2).	12 volts If good reading, go to test point 9.	Open 083 (RD) circuit between Transceiver Outlet connector X141 (pin 2) and Fuse F13. Check for connection at in–line connector X002 (pin11). Continue to next test point.
8	Measure 12 volts at Fuse F13.	12 volts If good reading, repair open circuit 083 (OR) between Transceiver Outlet connector X141 (pin 2) and Fuse F13.	Blown Fuse F13. Open circuit 008 (OR) between Accessory 2 Relay K03 (pin 5) and Fuse F13. Refer to Power Distribution for Accessory 2 Relay K03 testing.
9	Measure resistance between Transceiver Outlet connector X141 (pin 1).	Less than 1 ohm If good reading, power and ground to Transceiver Outlet connector X141 (pin 1) are working properly.	Open circuit 281 (BK) between Transceiver Outlet connector X141 (pin 1) and ground.

B – LEFT FRONT SPEAKER CIRCUIT TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Disconnect connector X315 from Radio A04.	Approximately 4 ohms.	Open/short to ground in circuit 977 (WH) between Left Front Speaker H05 connector X136 (pin B) and Radio A04 connector X315 (pin 5).
	Measure resistance between Radio A04 connector X315 (pin 6) and Radio A04 connector X315 (pin 5).	If good reading, Left Front Speaker H05 and wiring are okay.	Open/short to ground in circuit 983 (BL) between Left Front Speaker H05 connector X136 (pin A) and Radio A04 connector X315 (pin 6).
2	Disconnect connector X136 from Left Front Speaker H05.	Approximately 4 ohms.	Broken wire from Speaker H05 to connector X136, either to Pin A or to Pin B.
	Measure resistance between Pin A and Pin B on the lead from the Speaker H05.	If good reading, continue with next step.	Broken solder connection at Speaker H05. Bad Speaker H05.

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	Test Point	Good Reading	Possible Cause of Bad Reading
3	Disconnect connector X136 from Left Front Speaker H05. Measure resistance between Radio A04 connector X315 (pin 6) and Left Front Speaker H05 connector X136 (pin A).	Less than 1 ohm If good reading, continue with next step.	Open/short to ground in circuit 977 (WH) between Left Front Speaker H05 connector X136 (pin B) and Radio A04 connector X315 (pin 5).
4	Measure resistance between Left front Speaker H05 connector X136 (pin A) and Radio A04 connector X315 (pin 6).	Less than 1 ohm If good reading, Left Front Speaker H05 wiring is okay.	Open/short to ground in circuit 983 (BL) between Left Front Speaker H05 connector X136 (pin A) and Radio A04 connector X315 (pin 6).

C – RIGHT FRONT SPEAKER CIRCUIT TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Disconnect connector X315 from Radio A04. Measure resistance between Radio A04 connector X315 (pin 3) and Radio A04connector X315 (pin 4).	Approximately 4 ohms. If good reading, Right Front Speaker H07 and wiring are okay.	Open/short to ground in circuit 976 (WH) between Right Front Speaker H07 connector X139 (pin B) and Radio A04 connector X315 (pin 3). Open/short to ground in circuit 980 (BL) between Right Front Speaker H05 connector X139 (pin A) and Radio A04 connector X315 (pin 4).
2	Disconnect connector X319 from Right Front Speaker H07. Measure resistance between Pin A and Pin B on the lead from Speaker H07.	Approximately 4 ohms. If good reading, continue with next step.	Broken wire from Speaker H07 to connector X139, either to Pin A or to Pin B. Broken solder connection at Speaker H07. Bad Speaker H07.
3	Disconnect connector X139 from Right Front Speaker H07. Measure resistance between Radio A04 connector X315 (pin 3) and Right Front Speaker H07 connector X139 (pin B).	Less than 1 ohm If good reading, continue with next step.	Open/short to ground in circuit 976 (WH) between Right Front Speaker H07 connector X139 (pin B) and Radio A04 connector X315 (pin 3).
4	Measure resistance between Right front Speaker H07 connector X139 (pin A) and Radio A04 connector X315 (pin 4).	Less than 1 ohm If good reading, Right Front Speaker H07 wiring is okay.	Open/short to ground in circuit 980 (BL) between Right Front Speaker H07 connector X139 (pin A) and Radio A04 connector X315 (pin 4).

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D – RIGHT REAR SPEAKER CIRCUIT TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Disconnect connector X315 from Radio A04. Measure resistance between Radio A04 connector X315 (pin 1) and Radio A04connector X315 (pin 2).	Approximately 8 ohms. If good reading, Right Rear Speaker H06 and wiring are okay.	Open/short to ground in circuit 974 (WH) between Right Rear Speaker H06 connector X122 (pin B) and Radio A04 connector X315 (pin 1). Open/short to ground in circuit 979 (BL) between Right Rear Speaker H06 connector X122 (pin A) and Radio A04 connector X315 (pin 2).
2	Disconnect connector X122 from Right Rear Speaker H06. Measure resistance between Pin A and Pin B on the lead from Speaker H06.	Approximately 8 ohms. If good reading, continue with next step.	Broken wire from Speaker H06 to connector X122, either to Pin A or to Pin B. Broken solder connection at Speaker H06. Bad Speaker H06.
3	Disconnect connector X122 from Right Rear Speaker H06. Measure resistance between Radio A04 connector X315 (pin 1) and Right Rear Speaker H06 connector X122 (pin B).	Less than 1 ohm If good reading, continue with next step.	Open/short to ground in circuit 974 (WH) between Right Rear Speaker H06 connector X122 (pin B) and Radio A04 connector X315 (pin 1).
4	Measure resistance between Right Rear Speaker H06 connector X122 (pin A) and Radio A04 connector X315 (pin 2).	Less than 1 ohm If good reading, Right Rear Speaker H06 wiring is okay.	Open/short to ground in circuit 979 (BL) between Right Rear Speaker H06 connector X122 (pin A) and Radio A04 connector X315 (pin 2).

E – LEFT REAR SPEAKER CIRCUIT TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Disconnect connector X315 from Radio A04. Measure resistance between Radio A04 connector X315 (pin 8) and Radio A04connector X315 (pin 7).	Approximately 8 ohms. If good reading, Left Rear Speaker H04 and wiring are okay.	Open/short to ground in circuit 975 (WH) between Left Rear Speaker H04 connector X123 (pin B) and Radio A04 connector X315 (pin 7). Open/short to ground in circuit 982 (BL) between Left Rear Speaker H04 connector X123 (pin A) and Radio A04 connector X315 (pin 8).
2	Disconnect connector X123 from Left Rear Speaker H04. Measure resistance between Pin A and Pin B on the lead from Speaker H04.	Approximately 8 ohms. If good reading, continue with next step.	Broken wire from Speaker H04 to connector X123, either to Pin A or to Pin B. Broken solder connection at Speaker H04. Bad Speaker H04.

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	Test Point	Good Reading	Possible Cause of Bad Reading
3	Disconnect connector X123 from Left Rear Speaker H04. Measure resistance between Radio A04 connector X315 (pin 7) and Left Rear Speaker H04 connector X123 (pin B).	Less than 1 ohm If good reading, continue with next step.	Open/short to ground in circuit 975 (WH) between Left Rear Speaker H04 connector X123 (pin B) and Radio A04 connector X315 (pin 7).
4	Measure resistance between Left Rear Speaker H04 connector X123 (pin A) and Radio A04 connector X315 (pin 8).	Less than 1 ohm If good reading, Left Rear Speaker H04 wiring is okay.	Open/short to ground in circuit 979 (BL) between Left Rear Speaker H04 connector X123 (pin A) and Radio A04 connector X315 (pin 8).

F - ANTENNA TEST

	Test Point	Good Reading	Possible Cause of Bad Reading
1	Disconnect Antenna from Radio A04. Measure resistance between center terminal of Antenna (radio end) and Antenna Mast.	Less than 1 ohm If good reading, go to next test point.	Antenna.
2	Measure resistance from Antenna ground wire to chassis ground.	Less than 1 ohm Antenna is good.	Open circuit between Antenna and chassis ground.

BODY AND STRUCTURE - E

User Platform - 34

INDEX

Description	Page
Audio System	33
Audio System Circuit Troubleshooting	35
Audio System Diagnostic Tests	37
Audio System Symptom Chart	35
Cab Roof Controls	7
Cab Systems	3
Connectors	34
Horn	31
Horn Circuit	31
Horn System Circuit Test	32
Horn System Circuit Troubleshooting	31
Horn System Diagnostic Tests	32
Power Mirror Circuit Troubleshooting	18
Power Mirror System	14
Power Mirror System Diagnostic Tests	20
Power Mirror System Symptom Chart	19
Power Seat Circuit	4
Power Seat System	3
Power Seat System Circuit Troubleshooting	5
Power Seat System Diagnostic Tests	6
Wiper/Washer System Circuit Troubleshooting	10
Wiper/Washer System Symptom Chart	10

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BODY AND STRUCTURE - E

ENVIRONMENT CONTROL Heating, ventilation and air-conditioning - 40.D

AFX8010

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Contents

BODY AND STRUCTURE - E

ENVIRONMENT CONTROL Heating, ventilation and air-conditioning - 40.D

TECHNICAL DATA

Compressor

Compressor - Torque (E.40.D.31 - D.20.A.10) 4
AFX8010

FUNCTIONAL DATA

Compressor

Compressor - Static description (E.40.D.31 - C.30.A.20) 5
AFX8010

Condenser

Condenser - Static description (E.40.D.32 - C.30.A.20) 6
AFX8010

Evaporator

Evaporator - Static description (E.40.D.33 - C.30.A.20) 7
AFX8010

Expansion valve

Expansion valve - Dynamic description (E.40.D.34 - C.30.A.10) 8
AFX8010

Heater

Heater - Static description (E.40.D.35 - C.30.A.20) 9
AFX8010

Receiver/drier

Receiver/drier - Static description (E.40.D.36 - C.30.A.20) 10
AFX8010

SERVICE

Heater valve

Heater valve - Remove (E.40.D.17 - F.10.A.10) 11
AFX8010

Heater valve - Install (E.40.D.17 - F.10.A.15) 12
AFX8010

Air filter

Air filter - Remove (E.40.D.25 - F.10.A.10) 14
AFX8010

Air filter - Install (E.40.D.25 - F.10.A.15) 17
AFX8010

Compressor

https://truckmanualshub.com/

Compressor - Remove (E.40.D.31 - F.10.A.10) 19
AFX8010
Compressor - Install (E.40.D.31 - F.10.A.15) 20
AFX8010
Compressor Magnetic clutch - Remove (E.40.D.31.80 - F.10.A.10) 21
AFX8010
Compressor Magnetic clutch - Install (E.40.D.31.80 - F.10.A.15) 24
AFX8010

Condenser
Condenser - Remove (E.40.D.32 - F.10.A.10) 27
AFX8010
Condenser - Install (E.40.D.32 - F.10.A.15) 28
AFX8010

Evaporator
Evaporator - Remove (E.40.D.33 - F.10.A.10) 29
AFX8010
Evaporator - Install (E.40.D.33 - F.10.A.15) 32
AFX8010

Expansion valve
Expansion valve - Remove (E.40.D.34 - F.10.A.10) 35
AFX8010
Expansion valve - Install (E.40.D.34 - F.10.A.15) 36
AFX8010

Heater
Heater - Remove (E.40.D.35 - F.10.A.10) 37
AFX8010
Heater - Install (E.40.D.35 - F.10.A.15) 40
AFX8010

Receiver/drier
Receiver/drier - Remove (E.40.D.36 - F.10.A.10) 43
AFX8010
Receiver/drier - Install (E.40.D.36 - F.10.A.15) 44
AFX8010

Ventilation system
Ventilation system Motor - Remove (E.40.D.60.90 - F.10.A.10) 45
AFX8010
Ventilation system Motor - Install (E.40.D.60.90 - F.10.A.15) 47
AFX8010

https://truckmanualshub.com/

Compressor - Torque (E.40.D.31 - D.20.A.10)

AFX8010

Screw securing air-conditioner compressor drive belt automatic tightener to crankcase	M8x1.25	**24 - 28 Nm**	**212 - 247 lb in**
Screw securing air-conditioner compressor mount to engine block	M8x1.25	**22 - 27 Nm**	**194 - 238 lb in**
Screws (4) securing air-conditioning compressor to mount.	M8 x 100	**20 - 26 Nm**	**177 - 230 lb in**

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Compressor - Static description (E.40.D.31 - C.30.A.20)

AFX8010

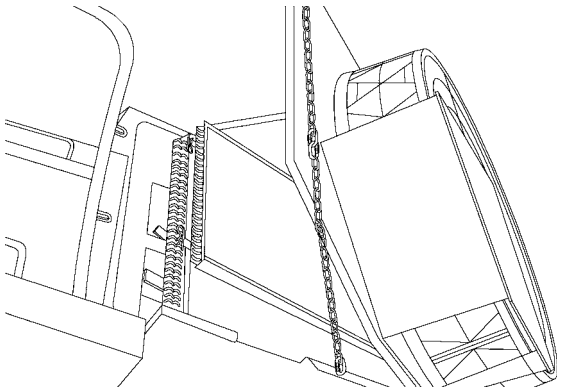
The compressor , mounted inside the engine compartment is driven by the crankshaft pulley. Refrigerant and oil is moved through the air conditioning system by the compressor, which lubricates and cools the unit during operation. An electromagnetic clutch is used to engage or disengage the compressor as required when operating the air conditioning system. The clutch is of a stationary coil type and forms an integral part of the compressor pulley assembly. When the coil is energized, the clutch plate is pulled against the rotating pulley. De-energizing the coil will allow the plate to return to a standby position.

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Condenser - Static description (E.40.D.32 - C.30.A.20)

AFX8010

The condenser is located inside the cooler box. The condenser consists of a number of turns of continuous coil mounted in a series of thin cooling fins to provide maximum heat transfer in a minimum amount of space. The condenser receives the hot, high pressure refrigerant vapor from the compressor. As the hot vapor passes through the coil, outside air is drawn around the coils by the engine fan. Heat is transferred from the hot refrigerant vapor into the cooler outside air flowing across the coils and fins. The refrigerant condenses inside the unit and becomes a high pressure liquid.



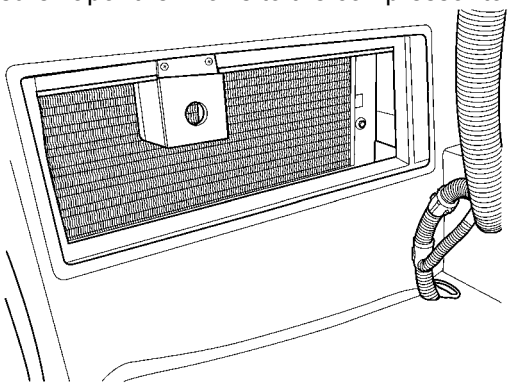
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Evaporator - Static description (E.40.D.33 - C.30.A.20)

AFX8010

The evaporator is located in the ventilation housing behind the cab. Similar to the condensor, the evaporator core consists of numerous tubes mounted in a series of thin aluminum cooling fins. The fins and tubing are designed to transfer heat from the cab air to the cold refrigerant liquid as it moves through the evaporator tubing. The low pressure liquid inside the tubes remove heat from air passing around them. As the refrigerant absorbs heat, it boils and flashes to a vapor The low pressure vapor then flows to the compressor to repeat the refrigerant cycle.



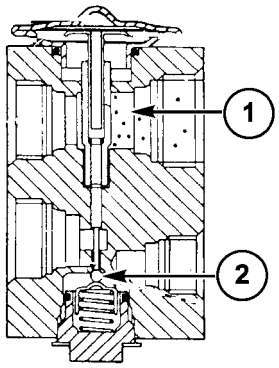
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Expansion valve - Dynamic description (E.40.D.34 - C.30.A.10)

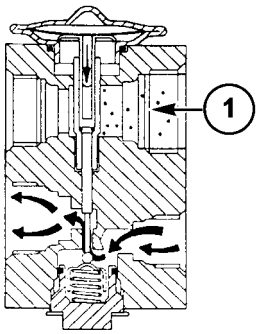
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The thermal expansion valve is on the pressure line leading from the drier/receiver into the evaporator. The valve changes the liquid refrigerant from high to low pressure without a change from liquid to vapor. A thermostatically controlled valve within the expansion valve body controls the volume of liquid refrigerant passing through the orifice and makes sure the refrigerant is fully vaporized within the evaporator by sensing the amount of superheat of the vapor leaving the evaporator. Liquid refrigerant would damage the compressor. The valve responds to changes in the cooling requirements of the system. When increased cooling is required, the valve opens to increase the refrigerant flow. When less cooling is required, the valve closes and decreases the refrigerant flow. All of the needed temperature and pressure sensing functions are consolidated into this unit. No other external tubes are required for its operation. When the compressor is off, pressure, (system plus spring pressure), below the actuating diaphragm **(1)** is greater than the pressure above it. The metering ball **(2)** is held tightly against the seat by the spring, and no flow is present through the valve.



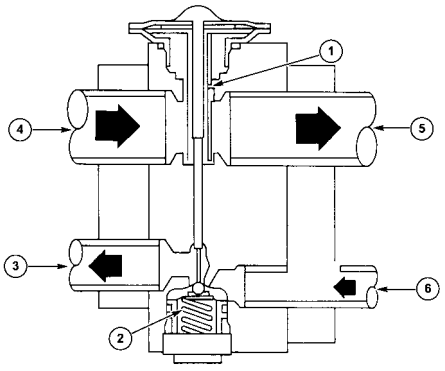
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Upon initial startup of the compressor, the pressure drops rapidly in area **(1)**. The pressure above the diaphragm is now greater than that below. The actuating rod pushes down, unseating the ball and allowing refrigerant to flow to the evaporator. During operation, the pressure below the diaphragm will change and adjust valve position to maintain eight degrees superheat of the refrigerant flowing from the evaporator.



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Temperature Sensor **(1)**, Ball and Spring **(2)**, To Evaporator **(3)**, From Evaporator **(4)**, To Compressor **(5)**, From Condenser **(6)**.



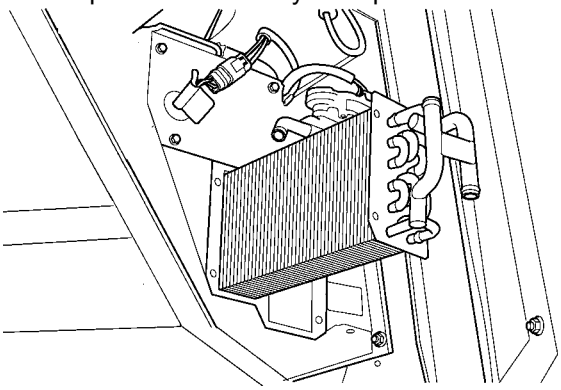
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https://truckmanualshub.com/

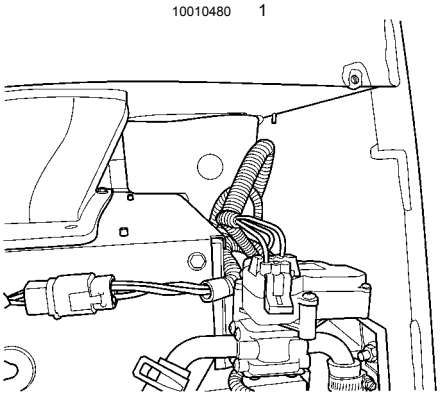
Heater - Static description (E.40.D.35 - C.30.A.20)

AFX8010

The heater core is located in the ventilation housing behind the cab on the lower right hand side. Similar to the evaporator, the heater core consists of numerous tubes mounted in a series of thin aluminum cooling fins. The fins and tubing are designed to transfer heat from the heated engine coolant to the cab air as it moves across the tubing. A water valve is located in the ventilation housing behind the combine cab. The valve is installed to control the flow of hot engine coolant through the core. Combines equipped with the automatic temperature control system operate the water valve to satisfy the temperature as set by the operator.



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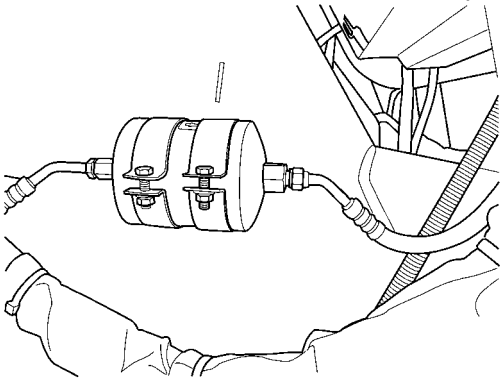
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Receiver/drier - Static description (E.40.D.36 - C.30.A.20)

AFX8010

The receiver/dryer located on the right side of the frame, is a storage tank that receives the high pressure liquid refrigerant from the condenser through an inlet line. The dryer section contains a desiccant to absorb moisture but can only absorb a limited amount of moisture before reaching a saturation point. The ability to retain moisture absorbed is dependent upon temperature. As the outside temperature increases, the ability to retain absorbed moisture decreases. This is why an air conditioning system with a saturated dryer may operate satisfactorily when outside temperatures are low, but stop cooling when the temperature increases. The refrigerant exits the receiver/dryer through an outlet connection and flows to the thermostatic expansion valve.



10036358 1

NOTE: *Any moisture in the air conditioning system is extremely harmful. Moisture not absorbed by the dryer will circulate with the refrigerant. Droplets may collect and freeze in the thermostatic expansion valve restricting refrigerant flow. The moisture circulating in the system may also react with the refrigerant to form hydrochloric acid.*

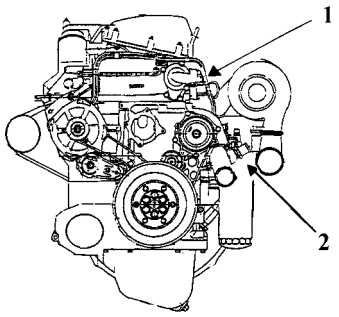
NOTE: *In general, the receiver/dryer should be replaced any time the system is opened for service.*

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Heater valve - Remove (E.40.D.17 - F.10.A.10)

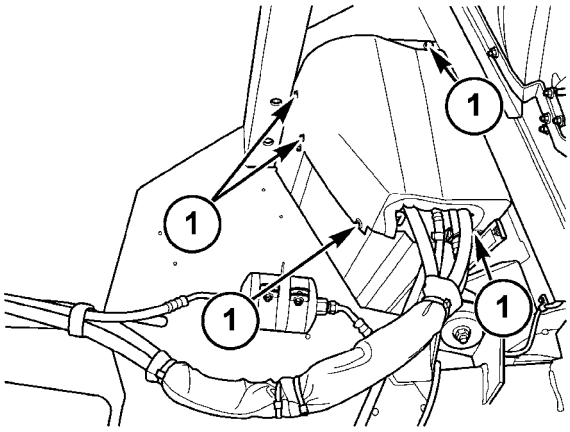
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1. Shut the heater core supply and return valves located at the engine.



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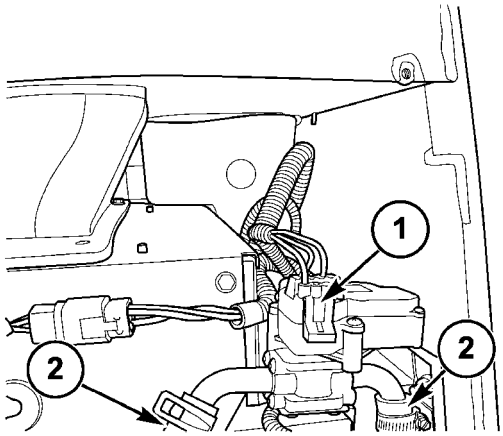
2. Turn out the five cap screws **(1)** holding the ventilation system shield in place. Lift the shield from the combine.



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3. Detach electrical connector **(1)**. Disconnect hoses **(2)**. Turn out mounting cap screws. Lift the water valve from the unit.

NOTE: *When removing heater hoses, residual coolant will drain.*



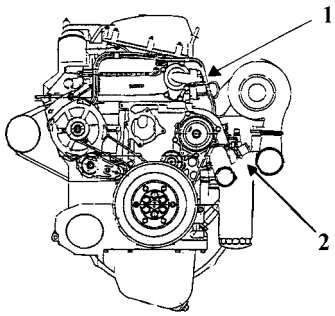
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Heater valve - Install (E.40.D.17 - F.10.A.15)

AFX8010

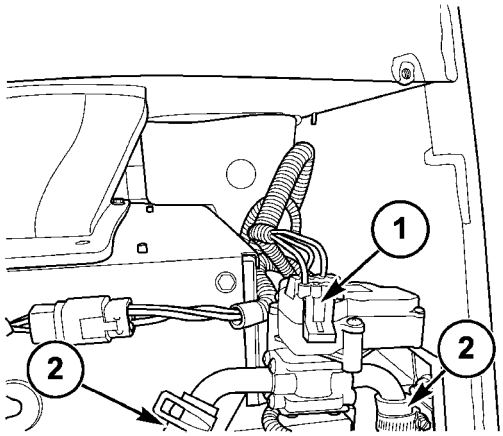
Prior operation: Shut the heater core supply and return valves located at the engine.



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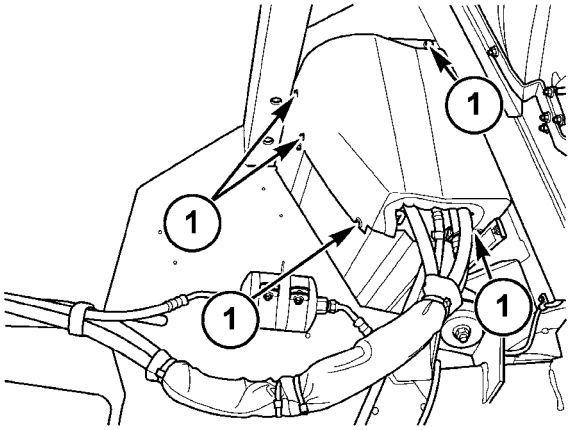
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1. Mount the water valve to the housing using two cap screws. Attach electrical connector **(1)**.



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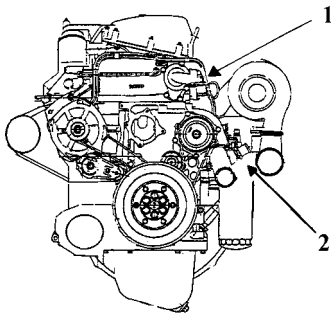
2. Connect heater hoses **(2)**.
3. Set the ventilation system shield into place and secure using five cap screws **(1)**.



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4. Open the water supply and return valves. Refill the coolant reservoir as required.



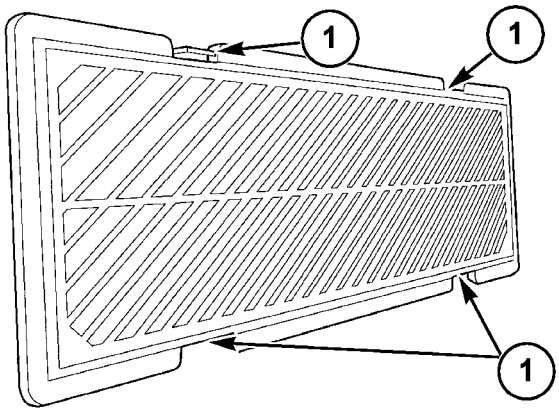
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Air filter - Remove (E.40.D.25 - F.10.A.10)

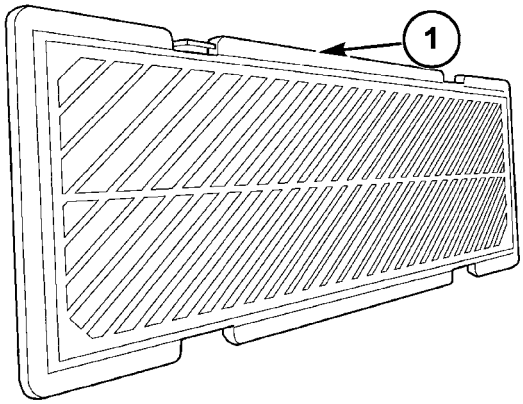
AFX8010

1. Locate the recirculation air filter inside the cab, behind the operators console. Move the operators seat all the way forward for better access. Simultaneously push down while pulling out on the locking tabs **(1)**. A prying device may need to be used to help aid in the removal.



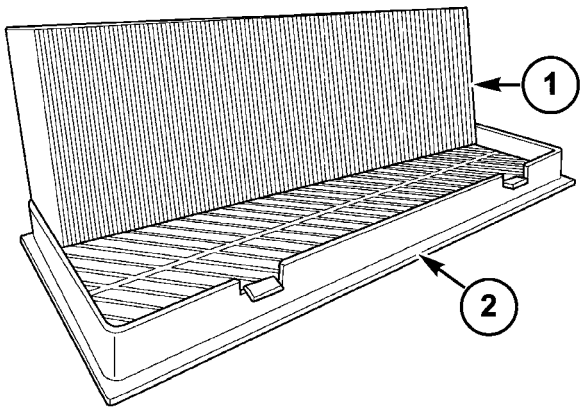
10008336A5 1

2. Pull the grate **(1)** from the cavity.



10008336B5 2

3. Remove the filter **(1)** from the grate **(2)**.

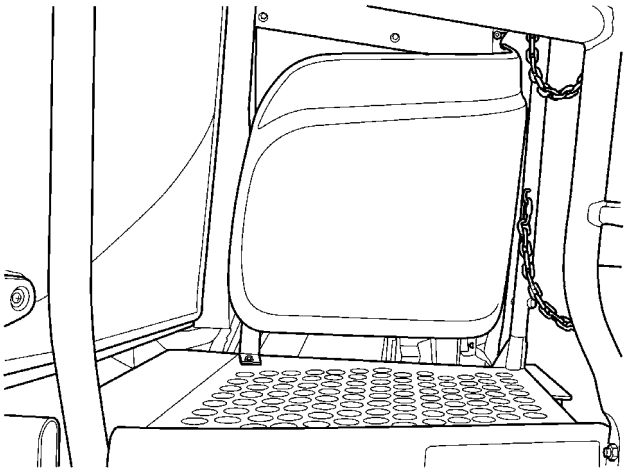


10008337A5 3

4. To remove the separator air filter proceed as follows:

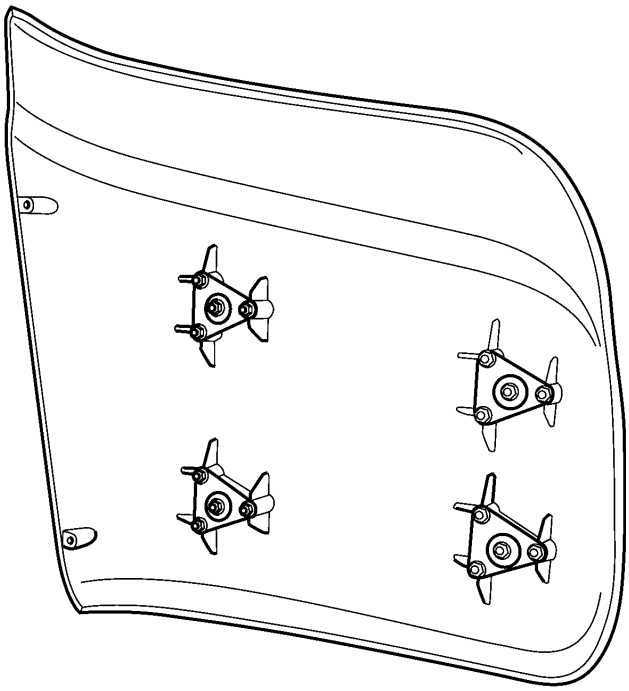
https://truckmanualshub.com/

5. First remove the shield by the left cab door by pulling up on it removing it from its detent position, and then pulling it out towards you when the holes line up with the pins.



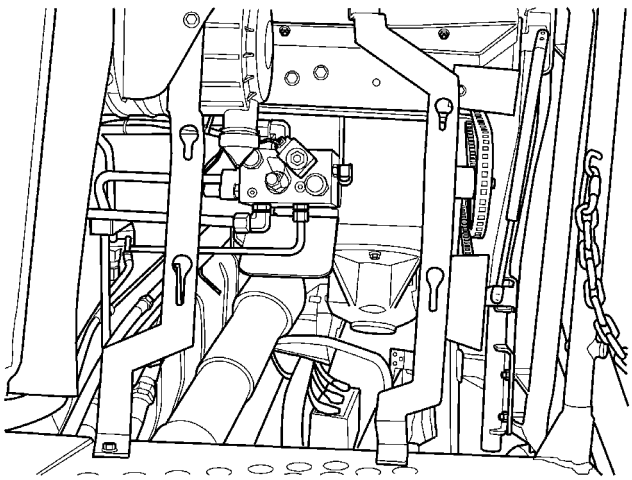
10036365 4

6. The locks on the back side of the shield are spring loaded.



10036369 5

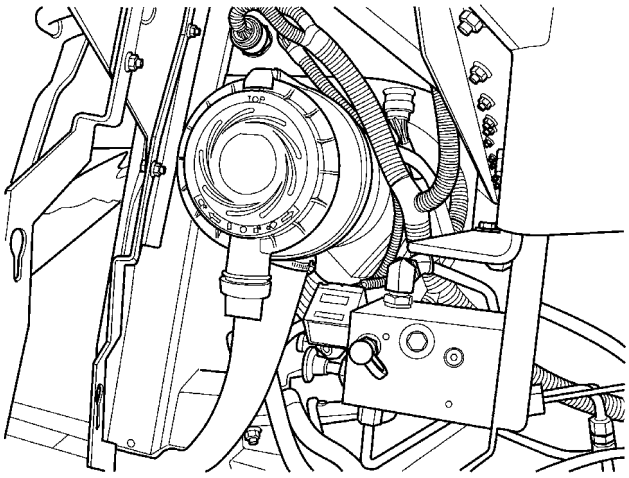
7. Once the shield is removed locate the separator/filter housing.



10036366 6

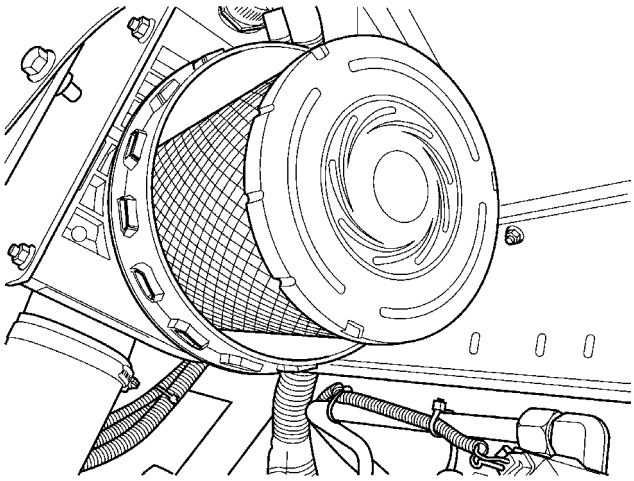
https://truckmanualshub.com/

8. Locate the separator/air filter housing inside the cavity next to the left cab door.



10036362 7

9. Release the housing end cap lock by pulling it away from the filter. Rotate the housing end cap counterclockwise until it can be removed.



10036363 8

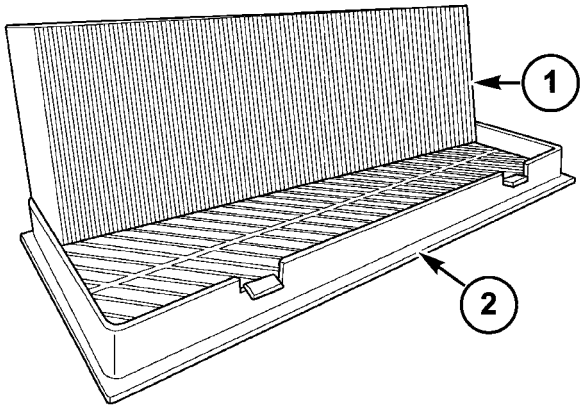
10. Pull the filter element out of the filter housing.

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Air filter - Install (E.40.D.25 - F.10.A.15)

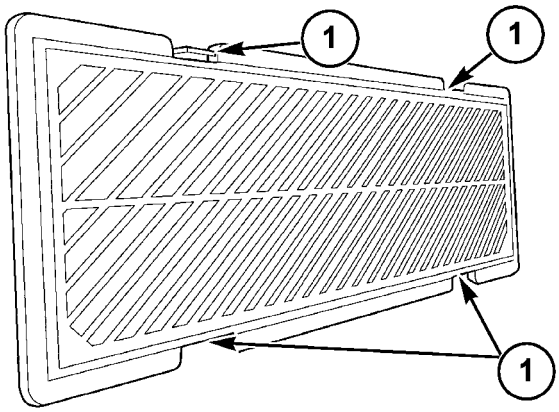
AFX8010

1. To install the recirculation air filter you will first need to clean the evaporator core of any accumulated dust.
2. Insert the filter **(1)** into the grate **(2)** with the gasket positioned toward the cores.



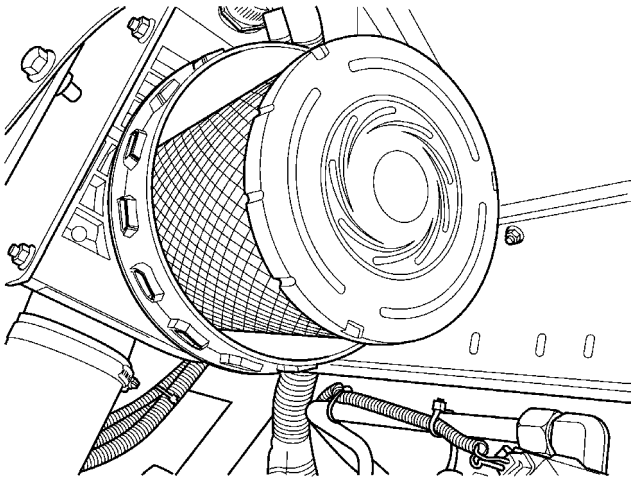
10008337A5 1

3. Set the grate and filter into place in the cavity. Push the grate until the locking tabs **(1)** snap into place.



10008336A5 2

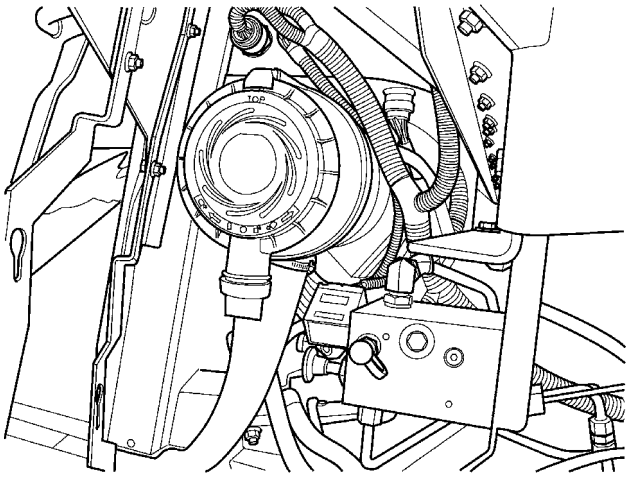
4. To install the separator filter proceed as follows:
5. Clean the inside of the filter housing to prevent foreign material from entering the clean air side of the filter element. Insert the air filter into the housing base.



10036363 3

https://truckmanualshub.com/

6. Set the end cap onto the filter housing and rotate clockwise until the two components are held tightly together. Secure the end cap into place by pushing in the lock.



10036362 4

https://truckmanualshub.com/

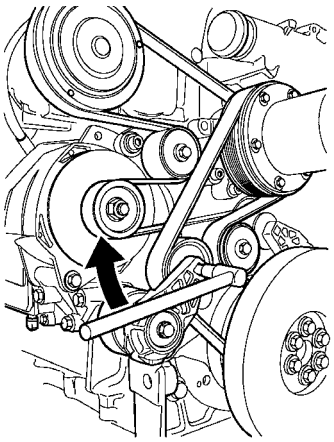
Compressor - Remove (E.40.D.31 - F.10.A.10)

AFX8010

1. Recover refrigerant in accordance with local regulations.

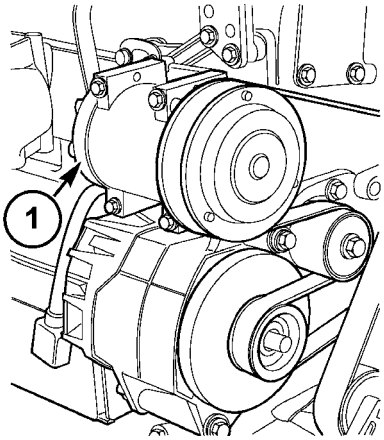
NOTE: *A 1/2" drive cutout square is provided in the arm of the idler pulley. By using a long handled 1/2" drive breaker bar you can release the tension on the belt..*

2. Use a 1/2" drive long handle breaker bar to release the tension on the belt. Remove the belt from the compressor pulley when the tension is relieved.



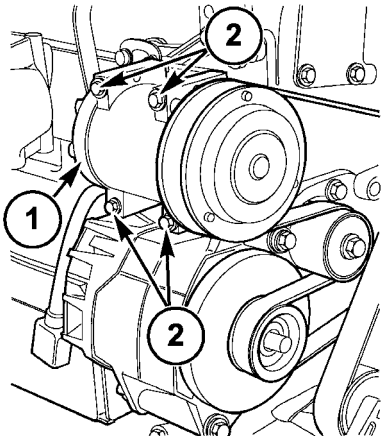
50034738 1

3. Detach the compressor clutch electrical connector **(1)**.



50034748C5 2

4. Disconnect the suction and discharge lines.
5. Cap the lines to prevent moisture or foreign material from entering the system.
6. Remove the compressor mounting bolts **(2)** and lift the compressor **(1)** from the combine.



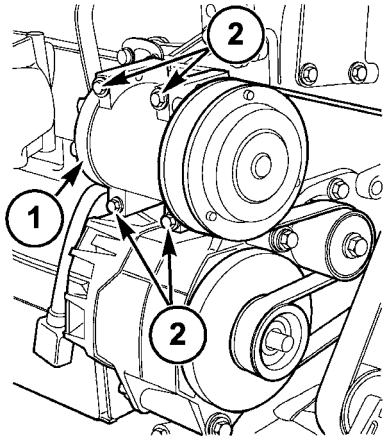
50034748B5 3

https://truckmanualshub.com/

Compressor - Install (E.40.D.31 - F.10.A.15)

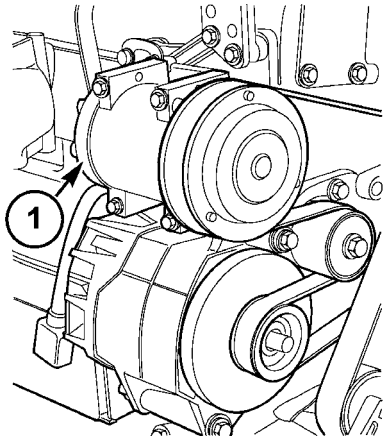
AFX8010

1. Set the compressor **(1)** on its mount and secure into place using four cap screws **(2)** . Replace the O-rings and lubricate them with PAG oil.



50034748B5 1

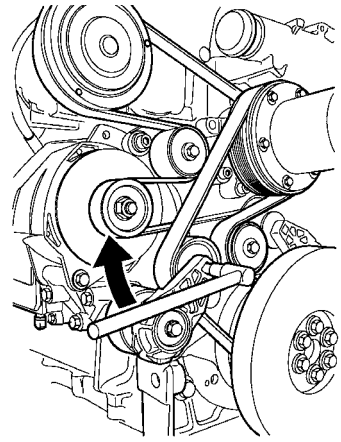
2. Connect the refrigerant suction and discharge lines, and torque the tube nuts.
3. Attach the clutch electrical connector.



50034748C5 2

4. Insert a long handle 1/2" drive breaker bar into the idler pulley bracket and rotate it enough to route the belt around the pulley.

NOTE: *Be sure belt is seated onto the pulley grooves correctly, or else when tension is applied belt stretch can occur causing premature failure of the belt.*



50034738 3

5. Recharge the refrigerant system in accordance with the SAE recharge/refilling procedure.

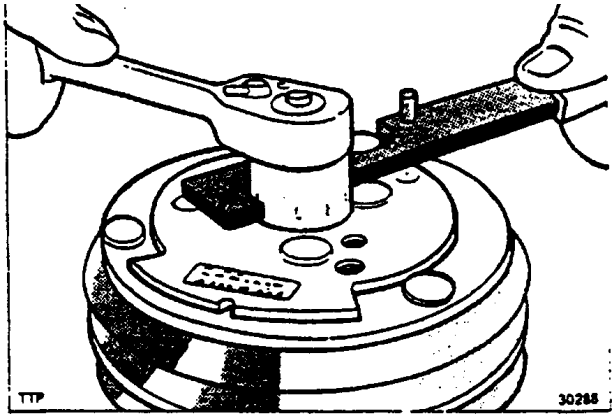
https://truckmanualshub.com/

Compressor Magnetic clutch - Remove (E.40.D.31.80 - F.10.A.10)

AFX8010

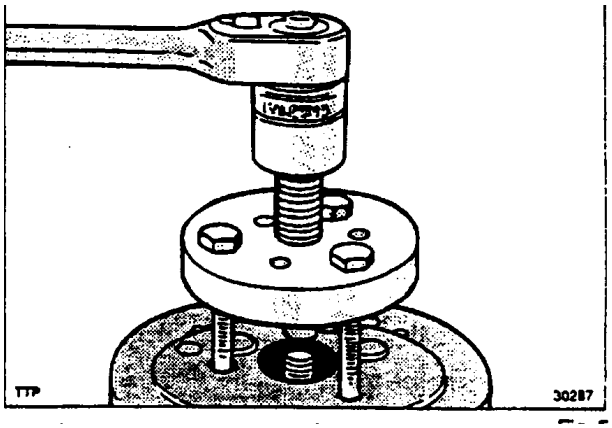
1. Insert the two pins of the front plate wrench into any two threaded holes of the clutch front plate. Hold the clutch plate stationary.Remove the hex nut with a 19 mm socket.

NOTE: *It is highly recommended to remove the compressor from the machine to repair the compressor.*



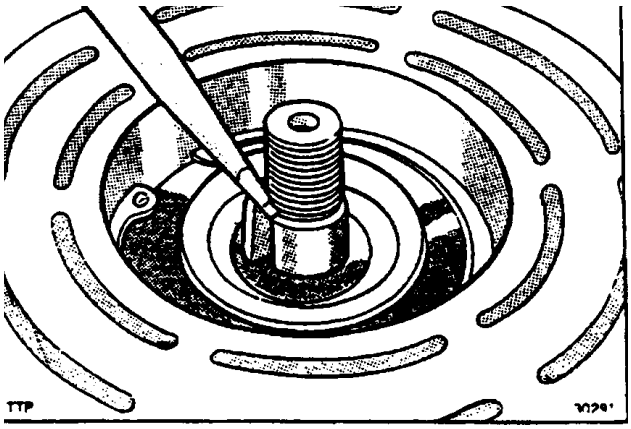
20018359 1

2. Remove the clutch plate using a puller.
   Align the puller center bolt to the compressor shaft. Thumb tighten the three puler bolts into the threaded holes.
   Turn the center bolt clockwise until the front plate is loosened.



20018360 2

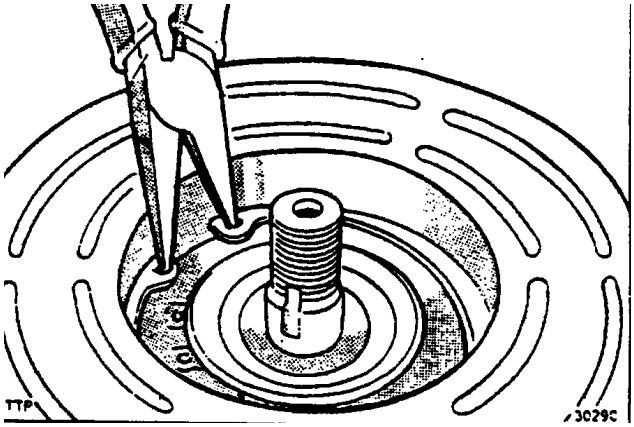
3. Remove the shaft key by lightly tapping it loose with a slot screwdriver and hammer.



20018361 3

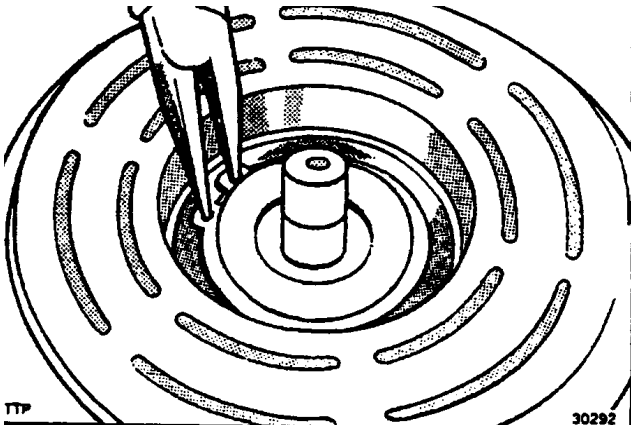
https://truckmanualshub.com/

4. Remove the internal bearing snap ring.



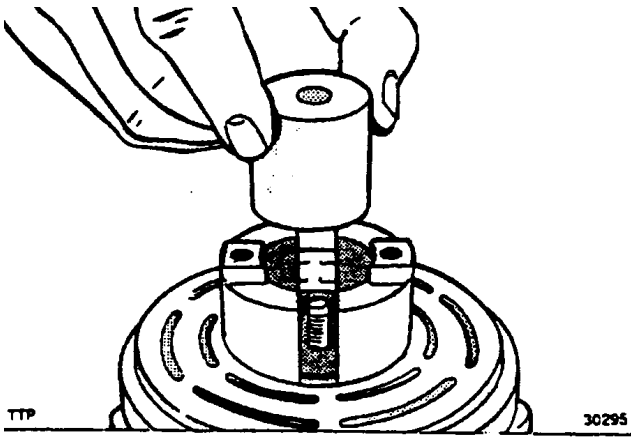
20018362 4

5. Remove the front housing external snap ring.



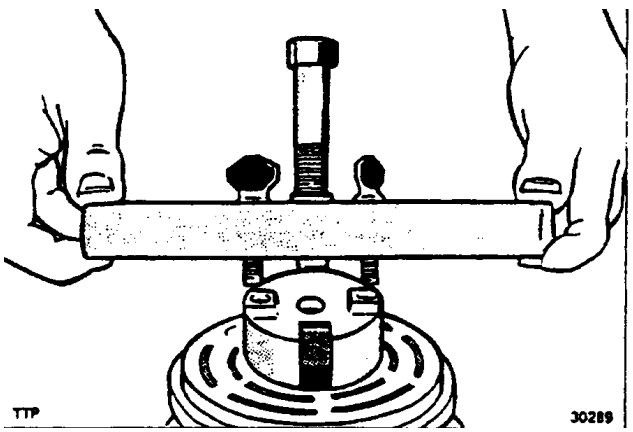
20018363 5

6. Insert the lips of the jaws into the internal bearing snap ring groove. Place the rotor puller shaft protector over the exposed shaft.



20018364 6

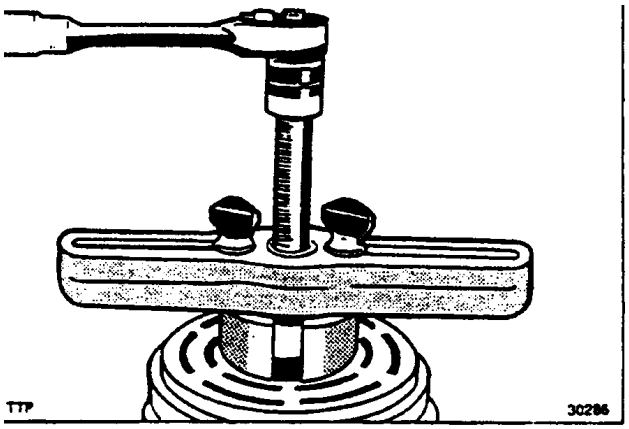
7. Align the thumb head bolts to the puller jaws and turn until finger tight.



20018365 7

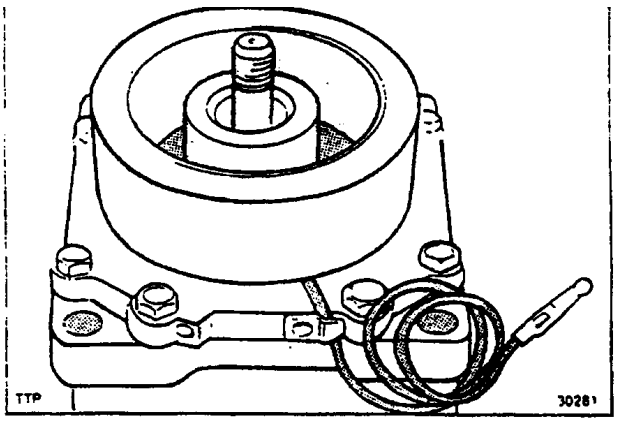
https://truckmanualshub.com/

8. Turn the puller center bolt clockwise until the rotor pulley is free.



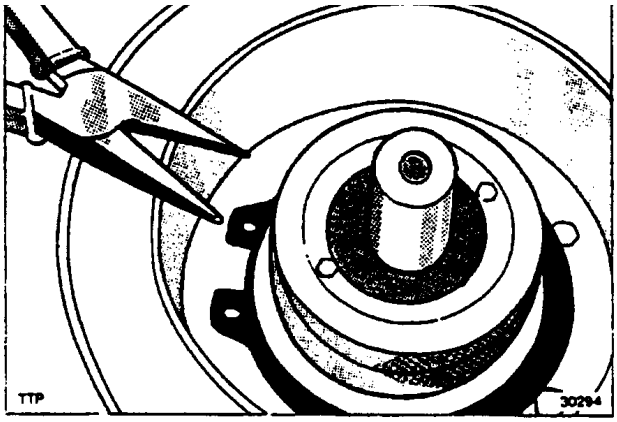
20018366 8

9. Loosen the core lead wire from the clip on top of the compressor front housing.



20018367 9

10. Remove the snap ring and the field coil.



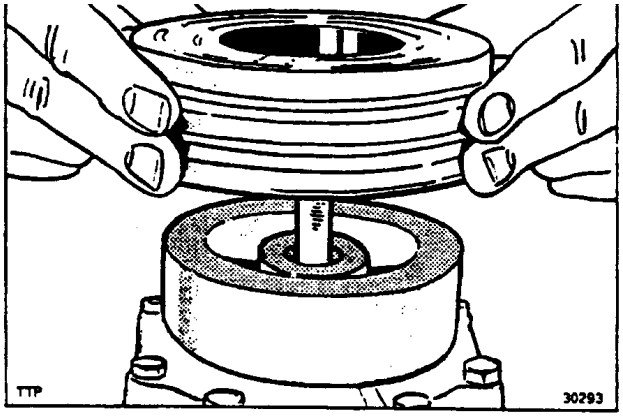
20018368 10

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Compressor Magnetic clutch - Install (E.40.D.31.80 - F.10.A.15)

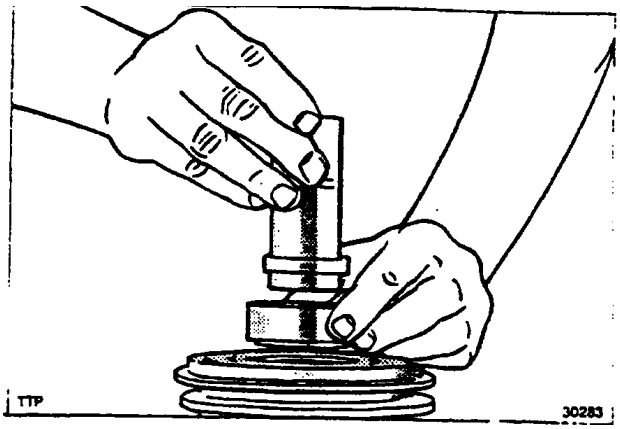
AFX8010

1. Install the field coil. The coil flange protrusion must match the hole in the front housing to prevent coil movement and the lead wire must be correctly located.



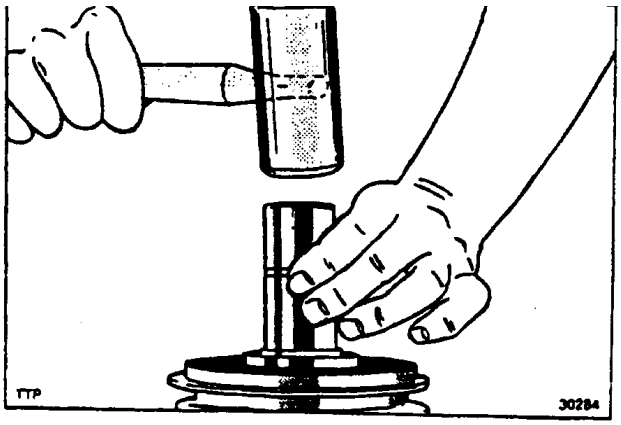
20018369 1

2. Replace the rotor pulley.
3. Support the compressor on the four mounting ears at the compressor rear side. If using a vise, clamp only the mounting ears, never compress the body itself.
4. Align the rotor assembly squarely on the front housing hub.



20018370 2

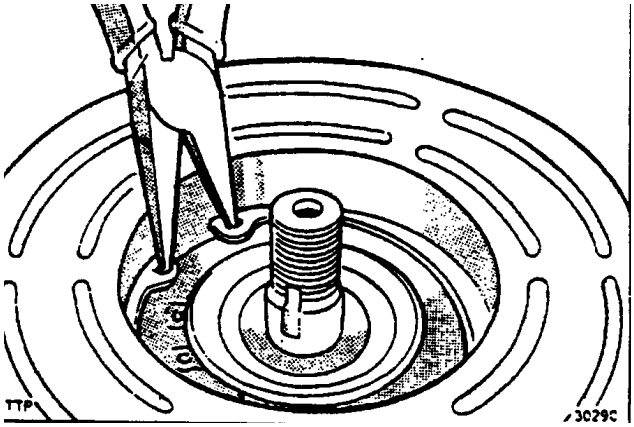
5. Using a hammer and a special tool, tap until the rotor bottoms to the compressor front housing hub.



20018371 3

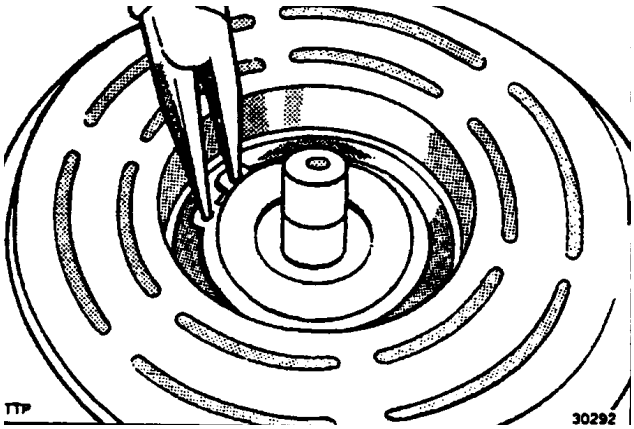
https://truckmanualshub.com/

6. Reinstall the internal bearing snap ring.



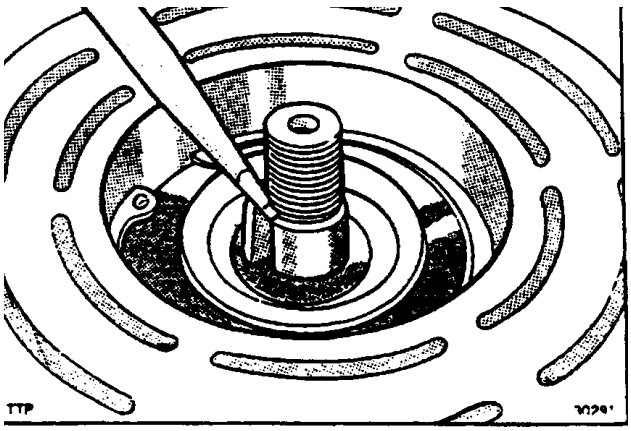
20018362 4

7. Reinstall the front housing external snap ring.



20018363 5

8. Check that the original clutch shims are in place on the compressor shaft.
9. Replace the compressor shaft key.

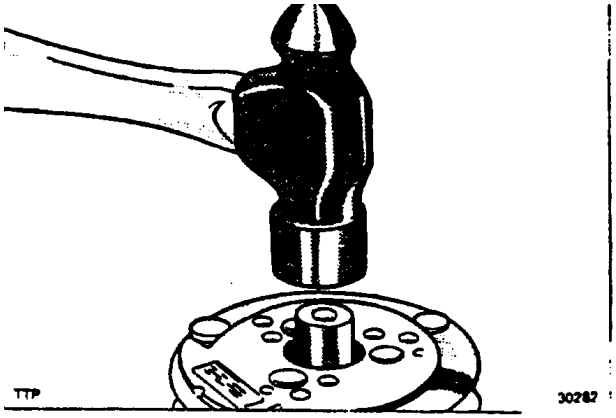


20018361 6

10. Align the front plate key way to the compressor shaft key.

https://truckmanualshub.com/

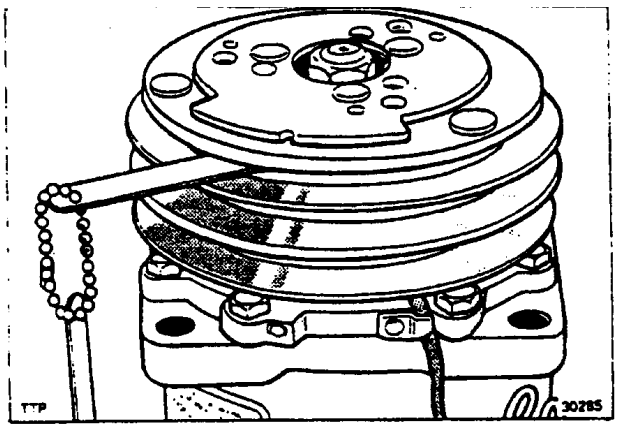
11. Using a shaft protector, tap the front plate to the shaft until it has bottomed to the clutch shims.



20018372 7

12. Replace the shaft hex nut and torque to **35 - 4 Nm** (**26 - 30 lb ft**).

13. Check the air gap with a feeler gauge **0.4 - 0.8 mm** (**0.016 - 0.032 in**). If the air gap is not consistent around the circumference, lightly pry up at the minimum variations. Lightly tap down at points of maximum variation.



20018373 8

Next operation: Install the compressor. **Compressor - Install (E.40.D.31 - F.10.A.15)**

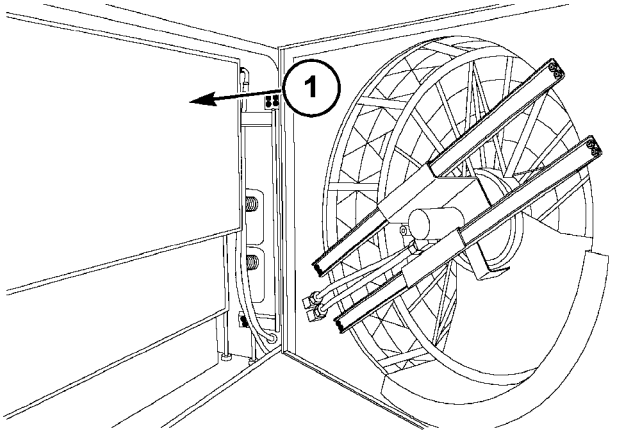
https://truckmanualshub.com/

Condenser - Remove (E.40.D.32 - F.10.A.10)

AFX8010

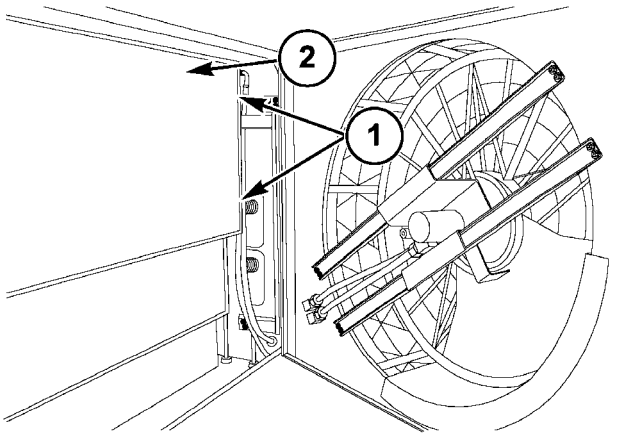
1. Recover refrigerant in accordance with local regulations.
2. Open the rotary screen door to gain access to the air conditioning condenser.
3. Disconnect and cap the refrigerant lines from the condenser **(1)**. The fittings are different sizes, labeling should not be required.

NOTE: *Use the proper tools to remove the lines correctly and prevent the condenser lines twisting.*



40034893A5 1

4. Remove the condenser **(2)** by removing the two pins **(1)** from the hinges.



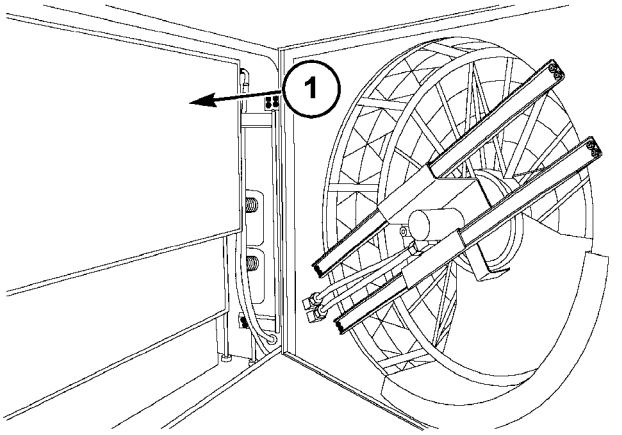
40034893B5 2

https://truckmanualshub.com/

Condenser - Install (E.40.D.32 - F.10.A.15)

AFX8010

1. Open the rotary screen door to gain access to the mounting area for the air conditioning condenser **(1)**.

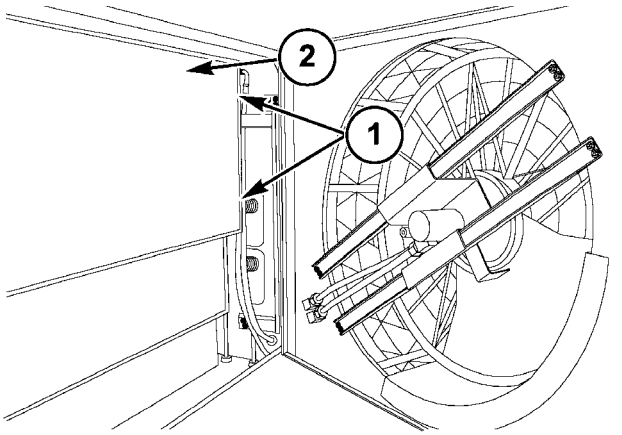


40034893A5 1

2. Secure the condenser **(1)** to the hinge by using the two hinge pins **(1)**, and securing the pins with cotter pins. Replace the o rings and lubricate them with PAG oil. Attach the hoses to the condenser and tighten.

NOTE: *The fittings are different sizes.*

NOTE: *Use the correct wrenches on the tube fittings to prevent tube damage.*



40034893B5 2

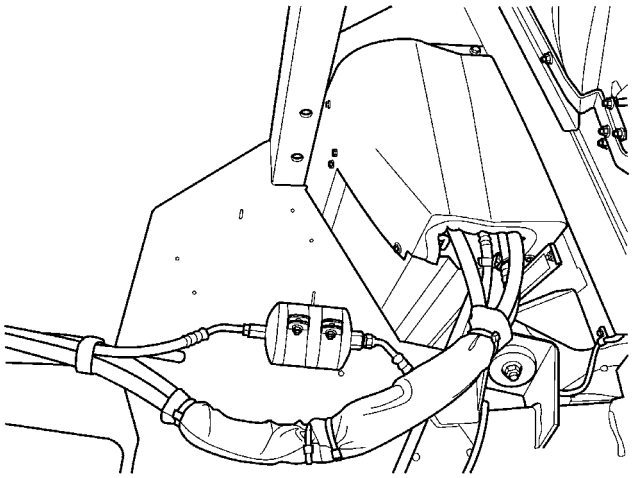
3. Recharge the refrigerant system in accordance with the Recharge/Refilling procedure.

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Evaporator - Remove (E.40.D.33 - F.10.A.10)

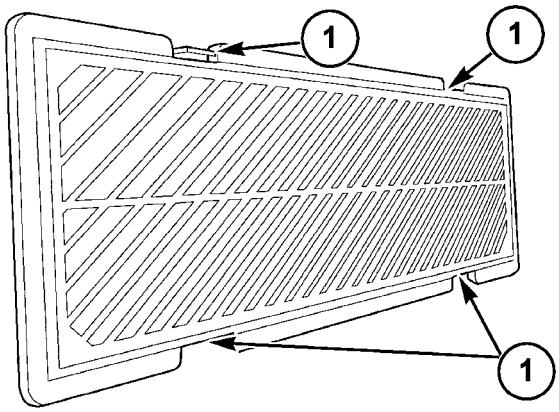
AFX8010

1. Turn out the five cap screws holding the ventilation system shield in place. Lift the shield from the combine.



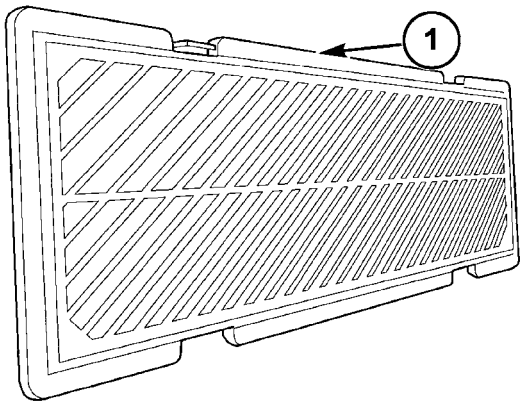
10036357 1

2. Remove the recirculation filter by simultaneously push down while pulling out on the locking tabs **(1)**.



10008336A5 2

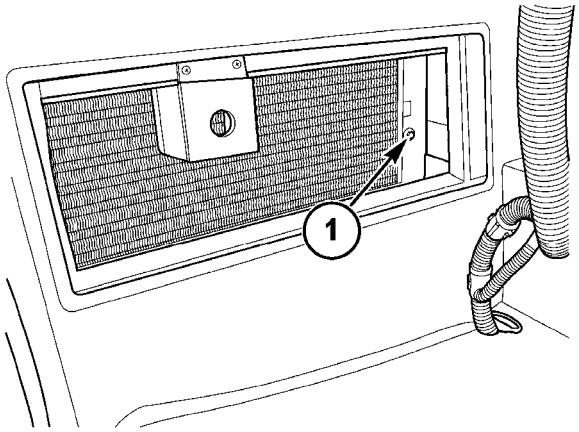
3. Pull the grate **(1)** and filter from the cavity.



10008336B5 3

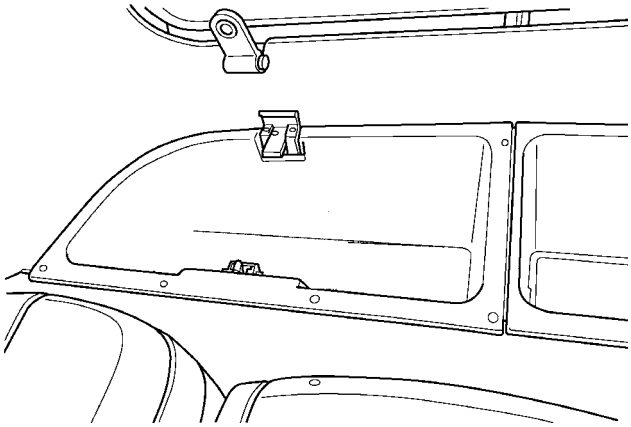
https://truckmanualshub.com/

4. Turn out the mounting cap screw **(1)**.



10036370A5 4

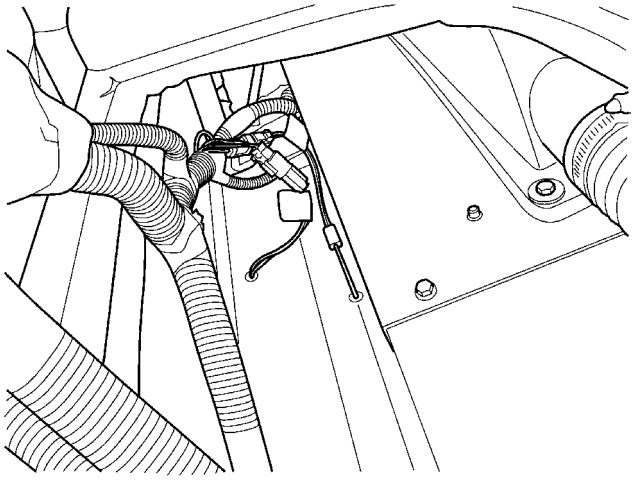
5. Remove the bench top behind the drivers seat at the hinges. Turn out the eight machine screws holding the right side storage compartment in place. Lift the compartment away and store in a suitable location.



10008339 5

6. Lift the thermal sensing bulb from the evaporator core. If it is planned to completely remove the evaporator core from the unit, recover refrigerant in accordance with the Refrigerant Recovery Procedure.

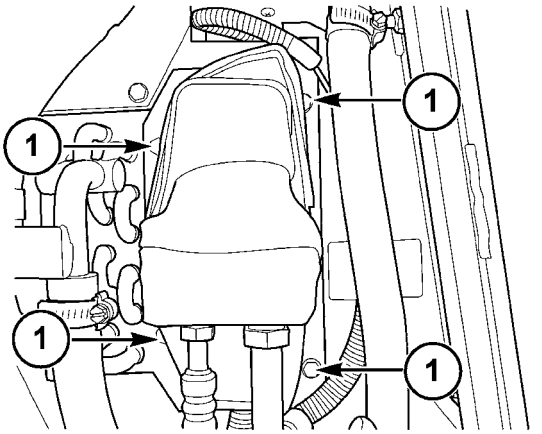
NOTE: *The evaporator core may be slid out of the ventilation housing without disconnecting the refrigerant hoses.*



10036371 6

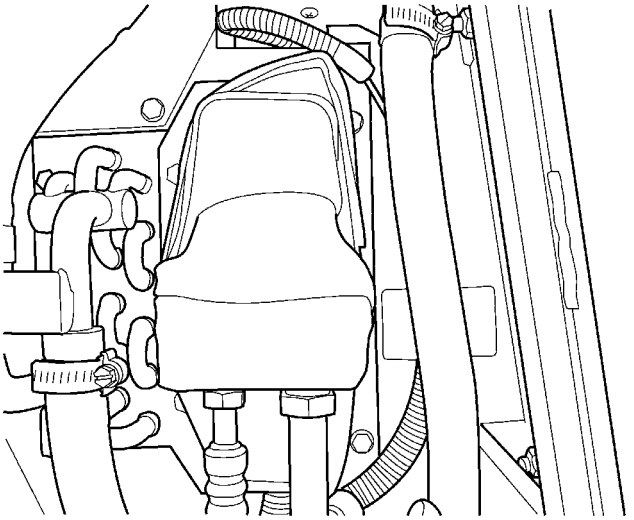
https://truckmanualshub.com/

7. Disconnect the refrigerant lines from the evaporator. Cap the ends to prevent foreign material and moisture from entering the system. Remove the four capscrews **(1)**.



10036360A5 7

8. Carefully pull the evaporator core from the housing.



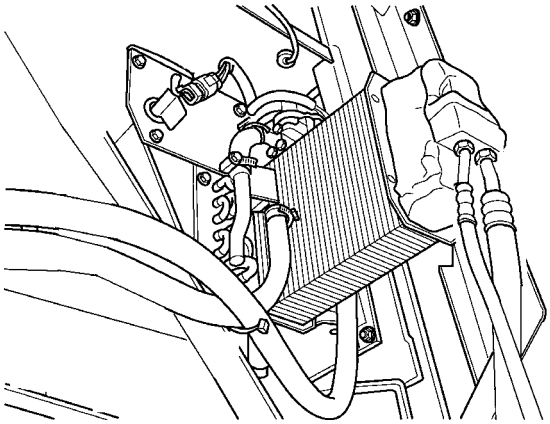
10036360 8

https://truckmanualshub.com/

Evaporator - Install (E.40.D.33 - F.10.A.15)

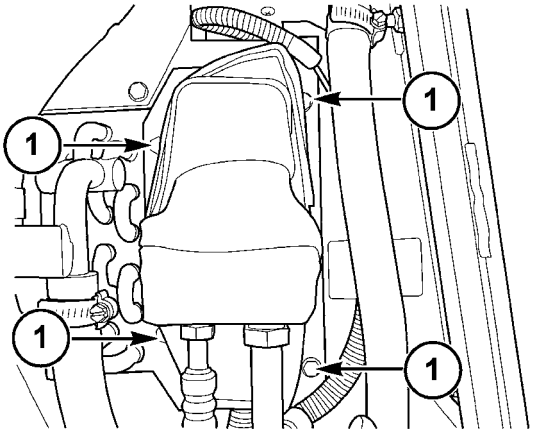
AFX8010

1. Install a new seal, and slide the evaporator core into the ventilation housing with the ports of the thermal expansion valve facing down.



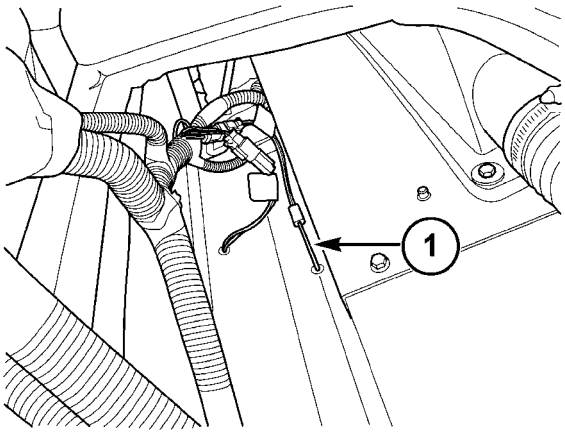
10008342A 1

2. Turn in four cap screws **(1)** holding the core to the housing. Lubricate the O-rings with refrigerant oil and connect the supply and return lines if they had been previously removed. Tighten the lines to the correct torque.



10036360A5 2

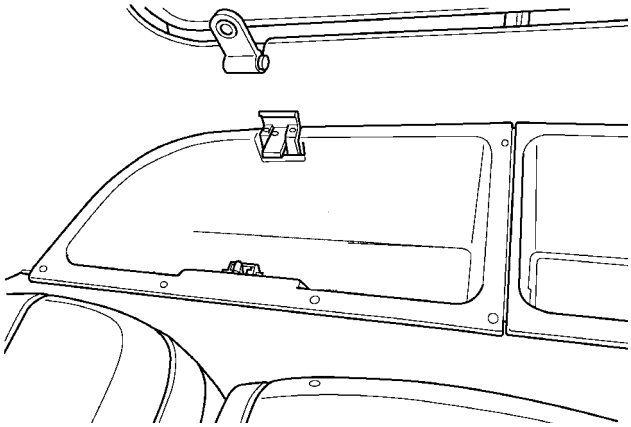
3. Carefully insert the thermal sensing probe **(1)** into the evaporator core. Attach the electrical connector if it had been unplugged.



10036371A5 3

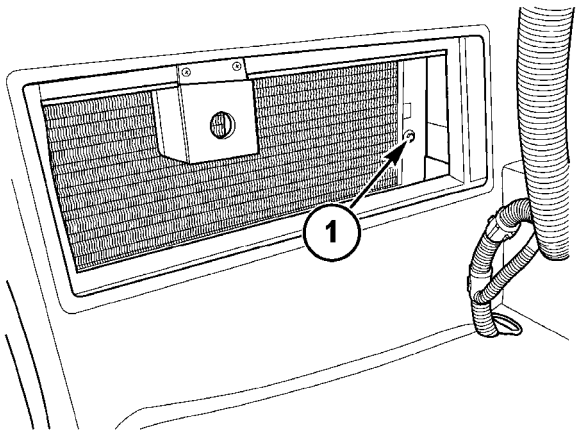
https://truckmanualshub.com/

4. Install new seals, and install the storage compartment and secure in place with eight machine screws. Secure the bench top behind the drivers seat at the hinges.



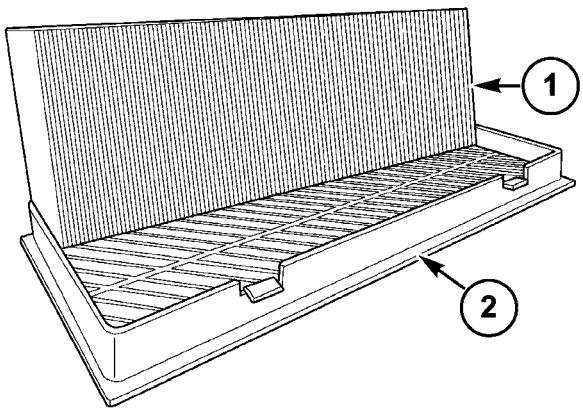
10008339 4

5. Secure the core into position using a cap screw **(1)**.



10036370A5 5

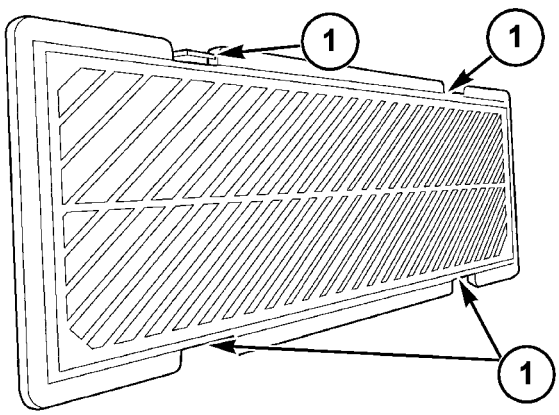
6. Set the grate **(2)** and filter **(2)** into place in the cavity.



10008337A5 6

7. Push the grate until the locking tabs **(1)** snap into place.

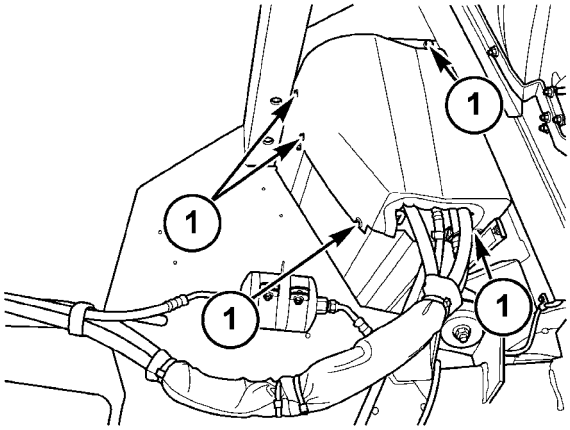
NOTE: *If the evaporator core had been completely removed from the combine, charge the refrigerant system in accordance with the Recharge/Refilling procedure in this section.*



10008336A5 7

https://truckmanualshub.com/

8. Set the ventilation system shield into place and secure using five cap screws **(1)**.



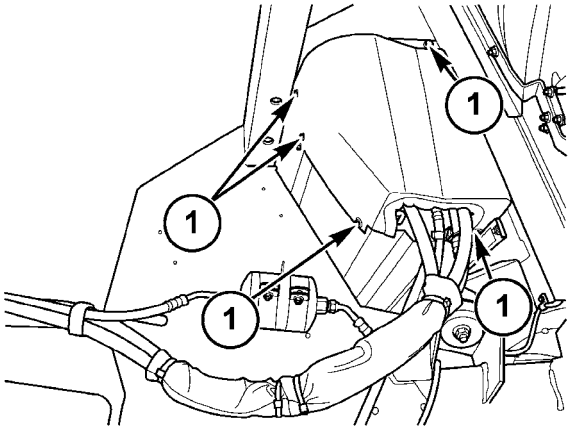
10036357A5 8

https://truckmanualshub.com/

Expansion valve - Remove (E.40.D.34 - F.10.A.10)

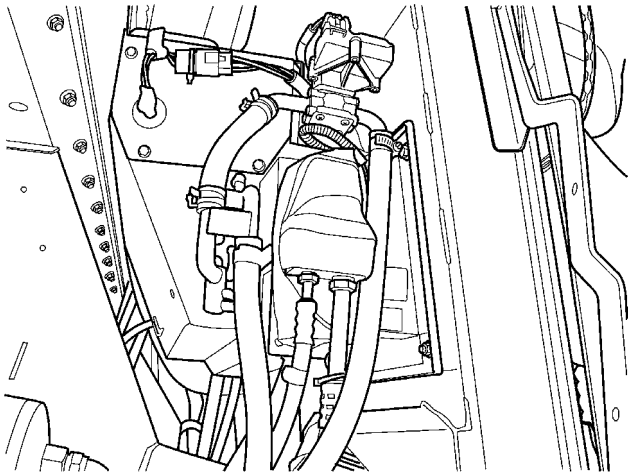
AFX8010

1. Turn out the five cap screws **(1)** holding the ventilation system shield in place. Lift the shield from the combine.



10036357A5 1

2. Recover refrigerant in accordance with local regulations.
3. Fold back the insulation from the thermal expansion valve. Disconnect refrigerant lines and cap them to prevent moisture or foreign material from entering the system. Turn out cap screws.



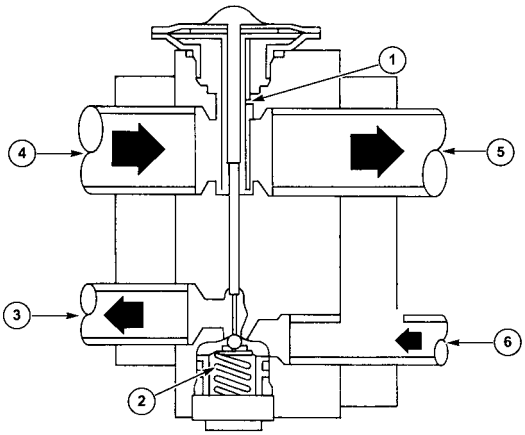
10036359 2

https://truckmanualshub.com/

Expansion valve - Install (E.40.D.34 - F.10.A.15)

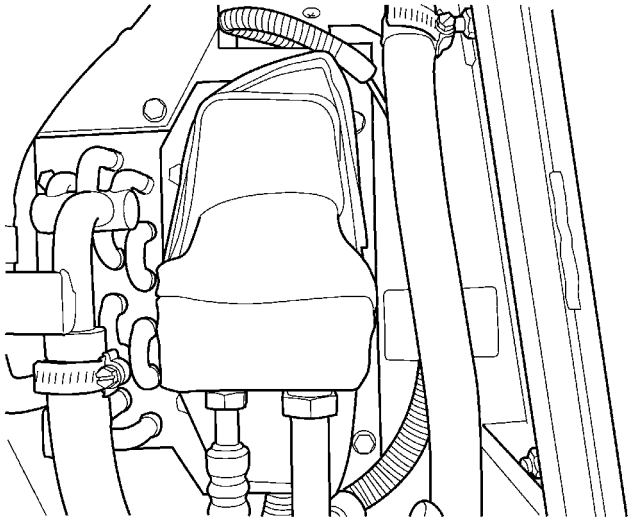
AFX8010

1. Set the thermal expansion valve into position and secure it with two cap screws. Apply refrigerant oil to the o-rings and connect the four refrigerant lines, temperature sensor **(1)**, ball and spring **(2)**, on to evaporator **(3)**, from evaporator **(4)**, on to compressor **(5)**, from condenser **(6)**.



20036386A5 1

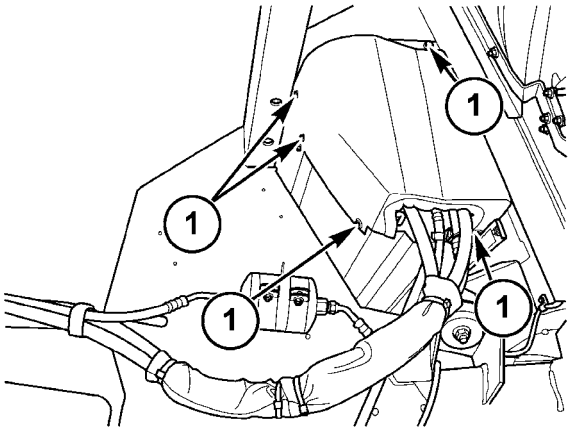
2. Wrap the valve and the attached lines with insulation.



10036360 2

3. Recharge the refrigerant system in accordance with the Recharge/Refilling procedure in this section.

4. Set the ventilation system shield into place and secure using five cap screws **(1)** .



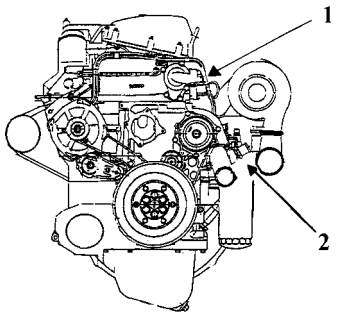
10036357A5 3

https://truckmanualshub.com/

Heater - Remove (E.40.D.35 - F.10.A.10)

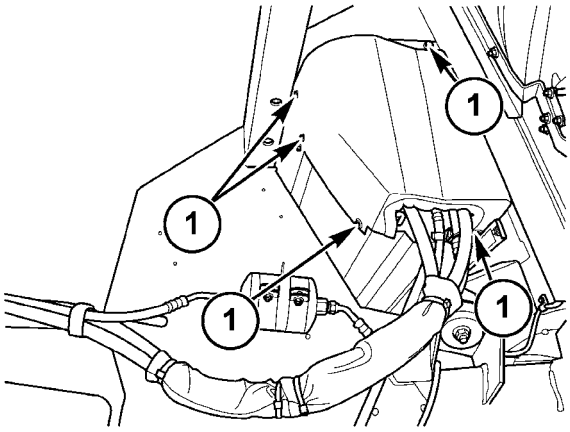
AFX8010

1. It is possible to completely remove the heater core from the ventilation housing without removing the coolant and lines. If the heater core is to be removed from the combine, shut the heater core supply and return valves located at the engine. The supply to the cab is located at **(1)** and the return from the cab is located at **(2)** .



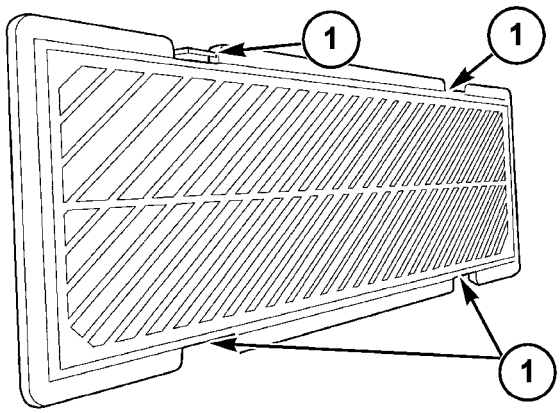
20018349 1

2. Turn out the five cap screws **(1)** holding the ventilation system shield in place. Lift the shield from the combine.



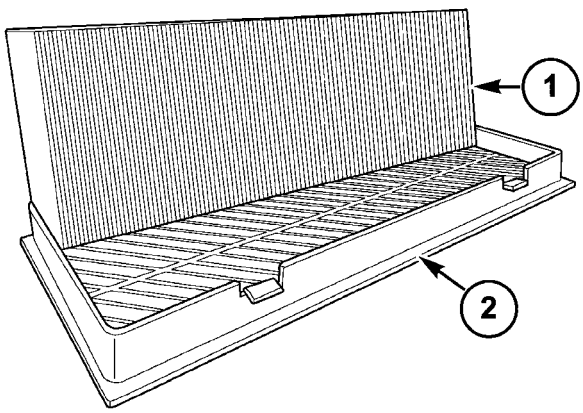
10036357A5 2

3. Remove the recirculation filter by simultaneously push down while pulling out on the locking tabs **(1)** .



10008336A5 3

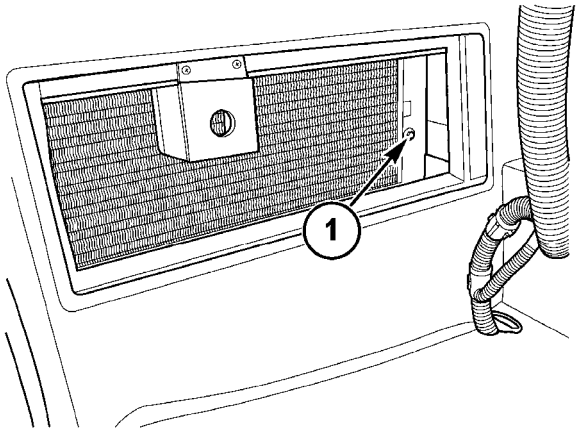
4. Pull the grate **(2)** and filter **(1)** from the cavity.



10008337A5 4

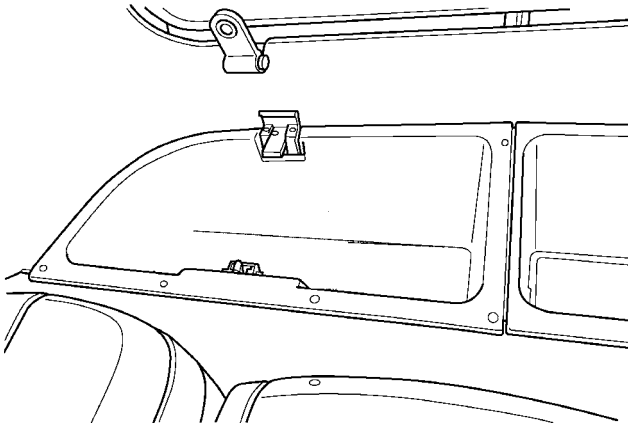
https://truckmanualshub.com/

5. Turn out mounting cap screw **(1)** for the evaporator core.



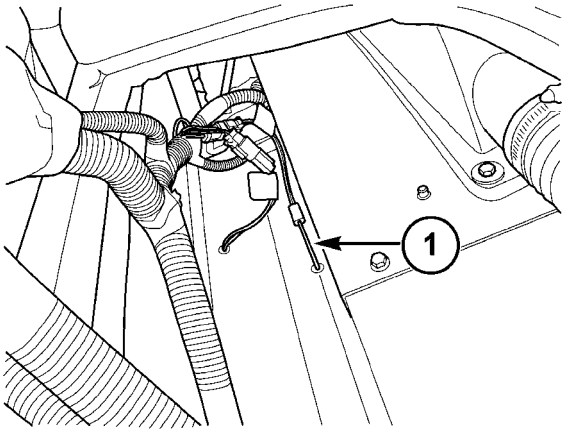
10036370A5 5

6. Remove the lid top from behind the drivers seat by turning out the screws from the hinges. To remove both plastic containers remove the machine screws from each. Remove the plastic bins.



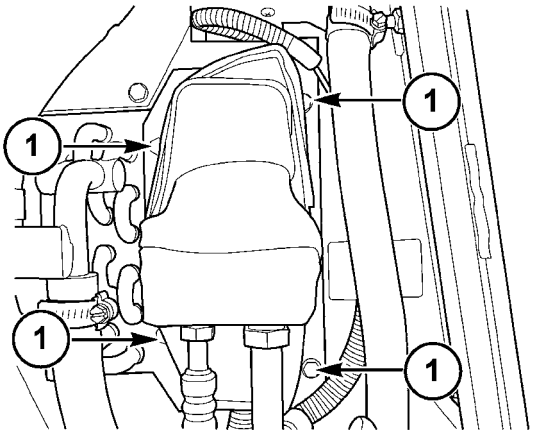
10008339 6

7. Lift out the thermal sensing probe **(1)** from the evaporator.



10036371A5 7

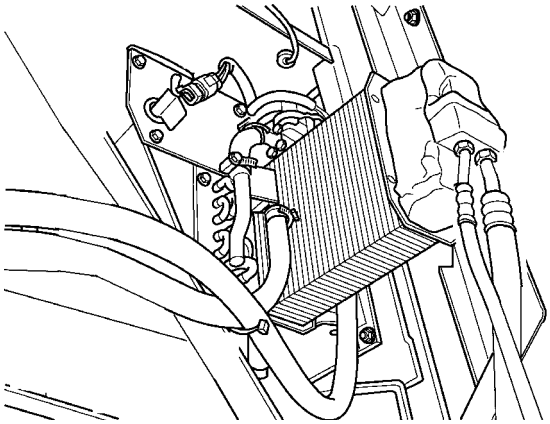
8. Turn out the four cap screws holding the evaporator to the ventilation housing.



10036360A5 8

https://truckmanualshub.com/

9. Carefully pull the evaporator core from the housing with the refrigerant lines still attached.

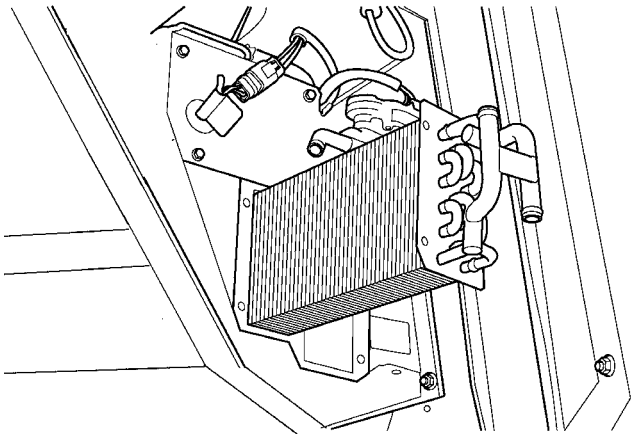


10008342A 9

10. Take out the mounting cap screw for the heater core from the inside of the ventilation housing.

11. If the heater core is to be completely removed from the combine, remove hoses from the heater core. Turn out mounting cap screws. Pull the core from the housing.

NOTE: *When removing heater hoses, residual coolant will drain.*



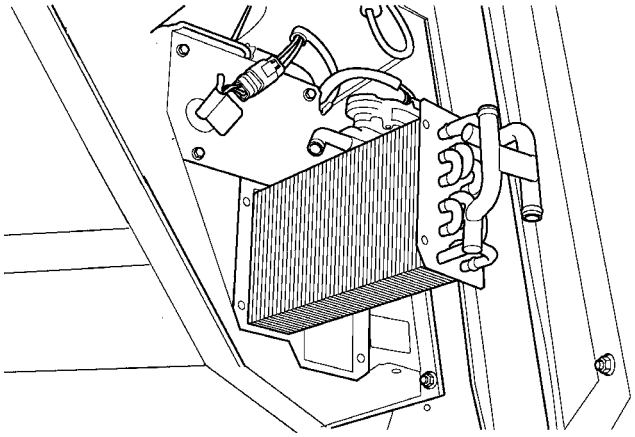
10010480 10

https://truckmanualshub.com/

Heater - Install (E.40.D.35 - F.10.A.15)

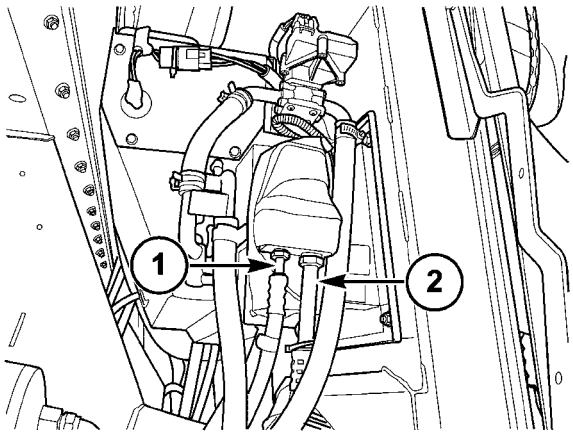
AFX8010

1. Install new seals, and slide the heater core into place. Orient the core so that the notched corner is on the bottom. Turn in cap screws. Attach hoses if they were previously removed.



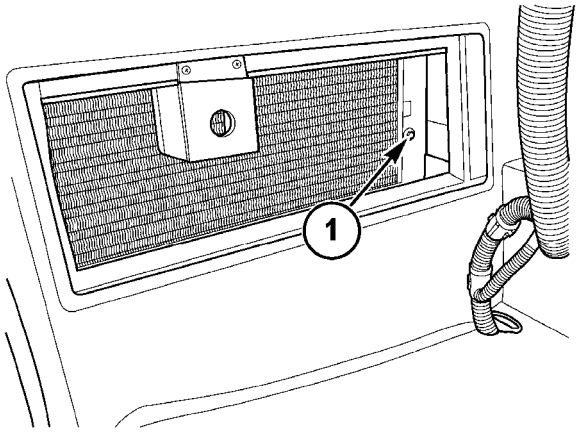
10010480 1

2. Secure the core into place with cap screw.
3. Install new seals, and slide the evaporator core into the housing with the refrigerant supply and return lines **(1)(2)** oriented down.



10036359A5 2

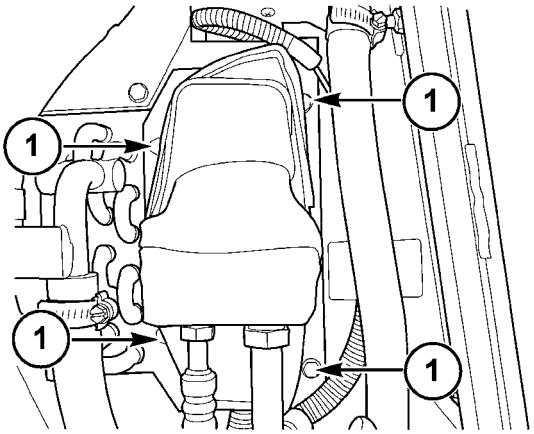
4. Secure the core into place with cap screw **(1)**.



10036370A5 3

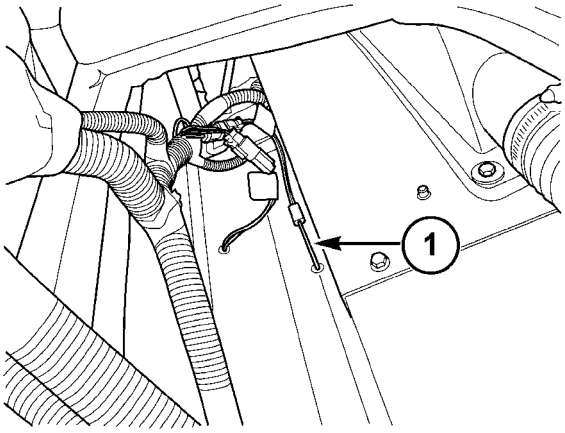
https://truckmanualshub.com/

5. Turn in four cap screws **(1)**.



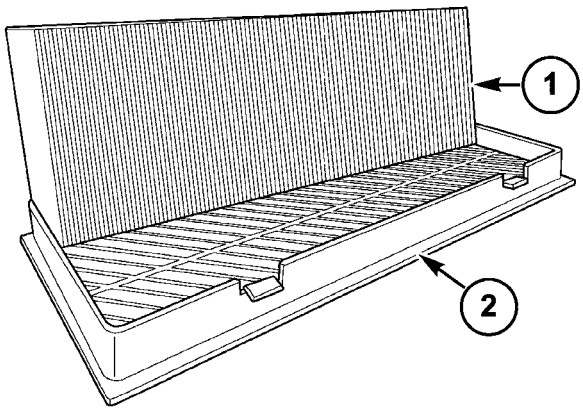
10036360A5 4

6. Carefully insert the thermal sensing probe **(1)** into the evaporator core. Attach the electrical connector if it had been changed.



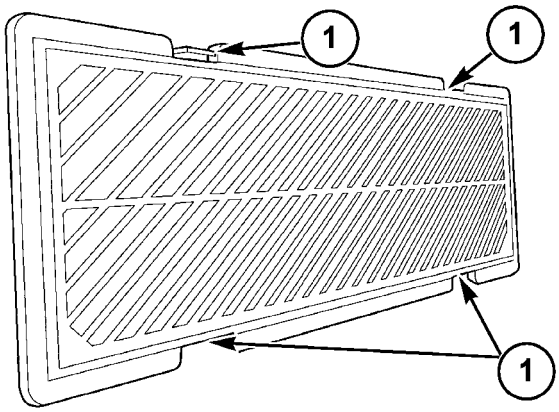
10036371A5 5

7. Set the grate **(2)** and filter **(1)** into place in the cavity.



10008337A5 6

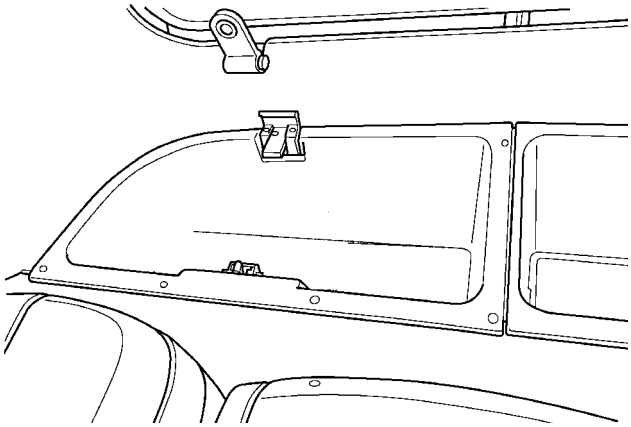
8. Push the grate until the locking tabs **(1)** snap into place.



10008336A5 7

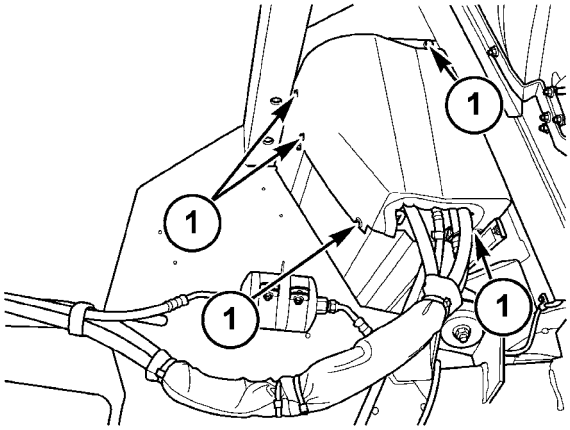
https://truckmanualshub.com/

9. Install new seals, and install the storage compartment and secure in place with eight machine screws. Secure the lid top behind the drivers seat at the hinges.



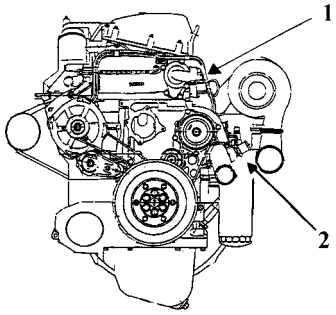
10008339 8

10. Set the ventilation system shield into place and secure using five cap screws.



10036357A5 9

11. Open the water supply and return valves. Refill the coolant reservoir as required.



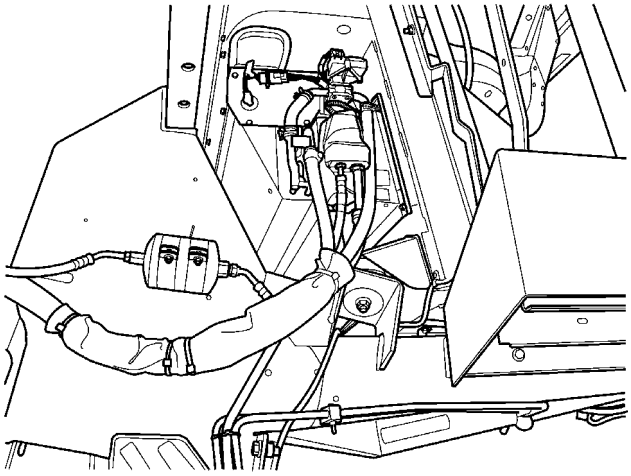
20018349 10

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Receiver/drier - Remove (E.40.D.36 - F.10.A.10)

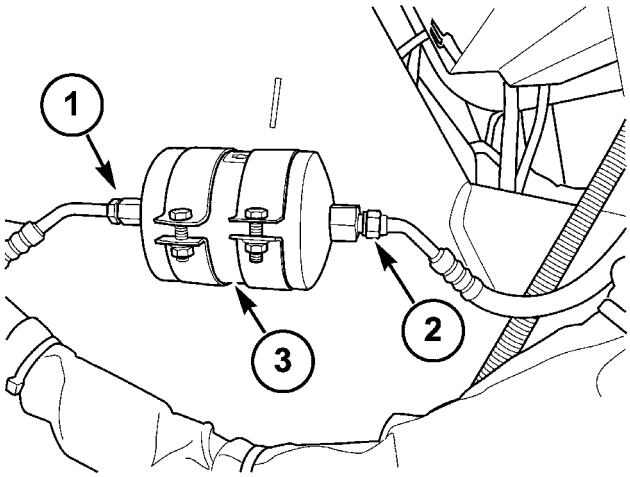
AFX8010

1. Have a certified technician recover the refrigerant in accordance with local regulations.



10036356 1

2. Disconnect and cap the refrigerant lines **(1)(2)** from the receiver/dryer. Loosen the clamp **(3)** holding the unit in place. Remove the unit from the combine.



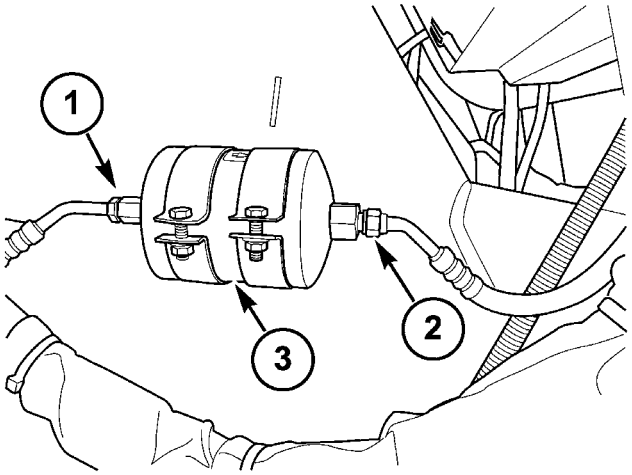
10036358A5 2

https://truckmanualshub.com/

Receiver/drier - Install (E.40.D.36 - F.10.A.15)

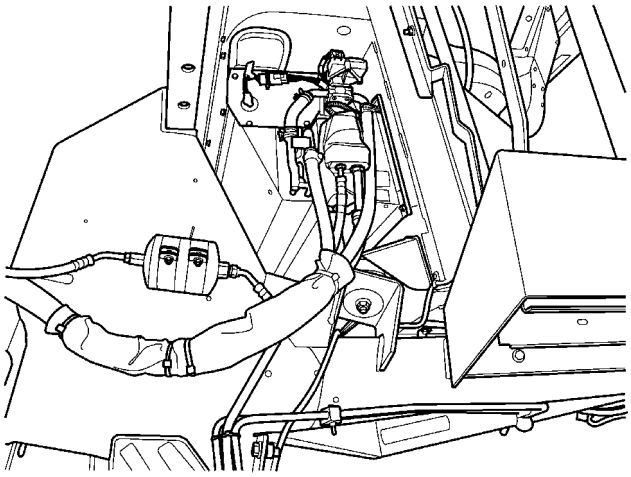
AFX8010

1. Set the receiver/dryer in place and secure by tightening the clamp **(3)**. Inspect the O-rings and replace if necessary. Lubricate the O-rings with PAG oil, and uncap and connect refrigerant lines. Tighten the lines to the receiver/dryer **(1)(2)**.



10036358A5 1

2. Have a certified technician recharge the refrigerant system in accordance with the recharge/refilling procedure provided by SAE standards.



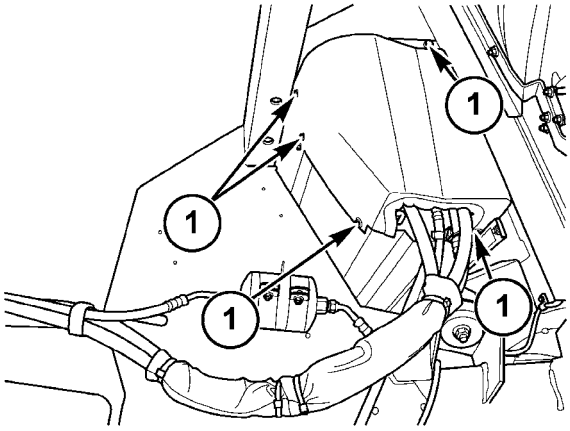
10036356 2

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Ventilation system Motor - Remove (E.40.D.60.90 - F.10.A.10)

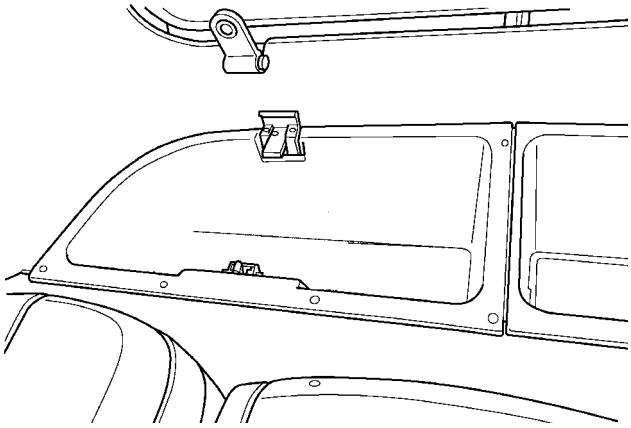
AFX8010

1. Turn out the five cap screws **(1)** holding the ventilation system shield in place. Lift the shield from the combine.



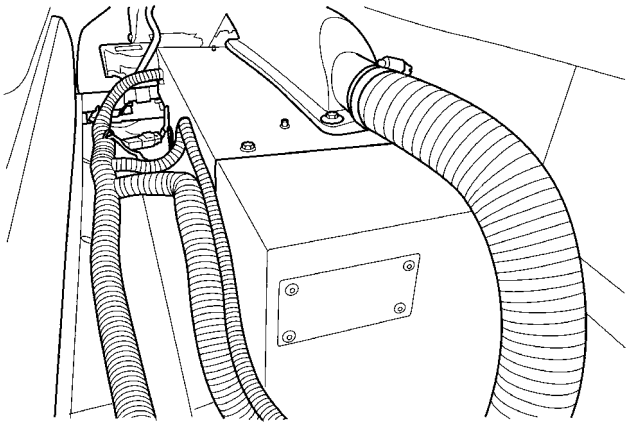
10036357A5 1

2. Remove the bench top behind the operator's seat at the hinges. Turn out the eight machine screws holding the right side storage compartment in place. Lift the compartment and store in a suitable location.



10008339 2

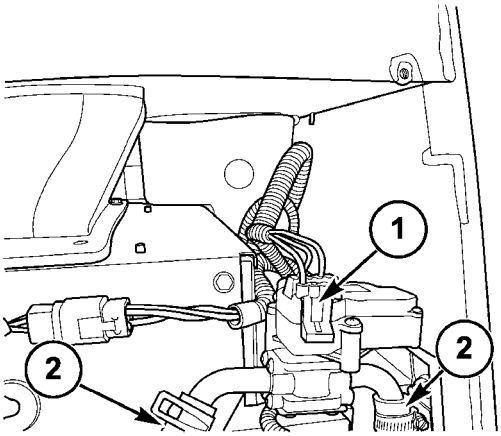
3. Take off under seat ventilation duct. Turn out cap screws. Detach electrical connector.



10036375 3

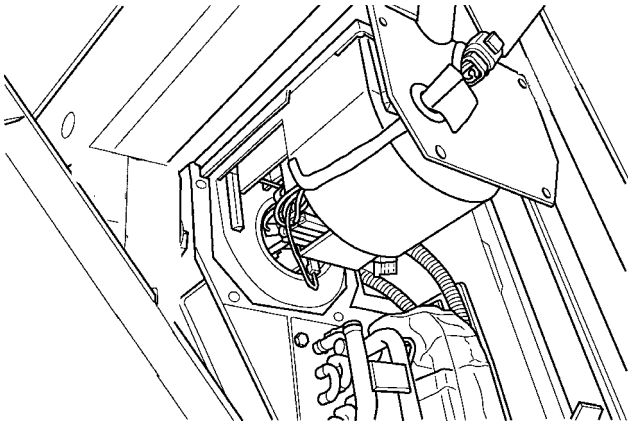
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4. Turn out water valve mounting cap screws. Disconnect the electrical connection **(1)**. Disconnect the hoses **(2)** from the valve. Carefully move the water valve out of the way of the blower housing.



10036361A5 4

5. Disconnect ventilation duct. Turn out plenum cap screw. Detach electrical connector. Remove the four blower motor mounting cap screws.
6. Carefully slide the blower motor assembly from the ventilation housing.



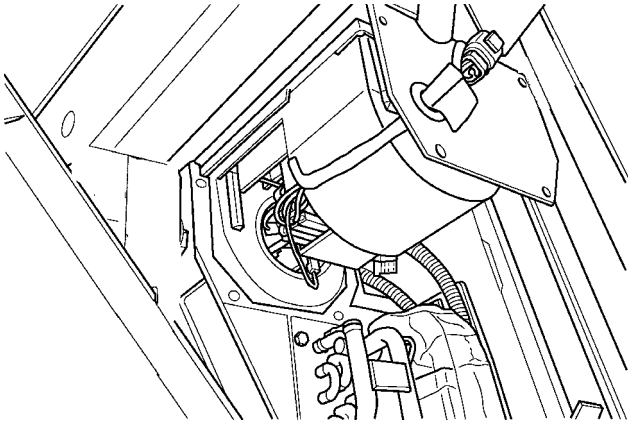
10008347 5

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Ventilation system Motor - Install (E.40.D.60.90 - F.10.A.15)

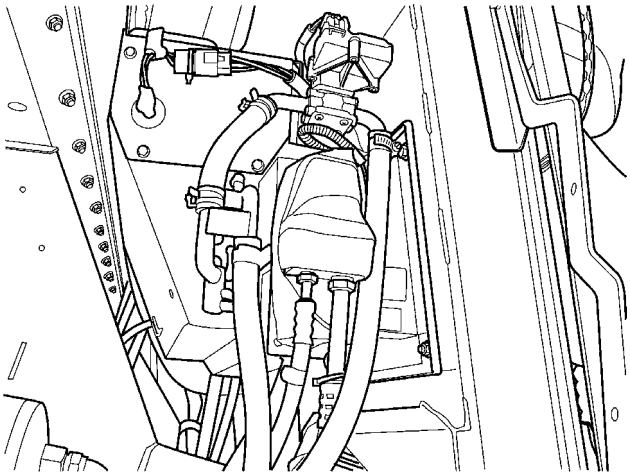
AFX8010

1. Install new seals, and slide the blower motor assembly into the ventilation housing.



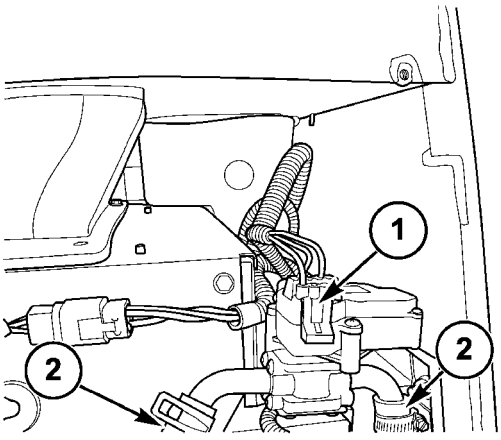
10008347 1

2. Secure the blower using four cap screws. Turn in plenum cap screw. Install a new seal, and connect ventilation duct.



10036359 2

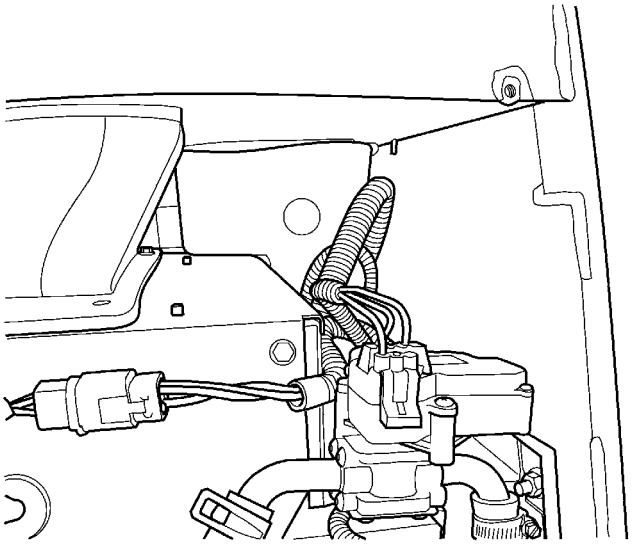
3. Attach electrical connector **(1)**, and hoses **(2)**.



10036361A5 3

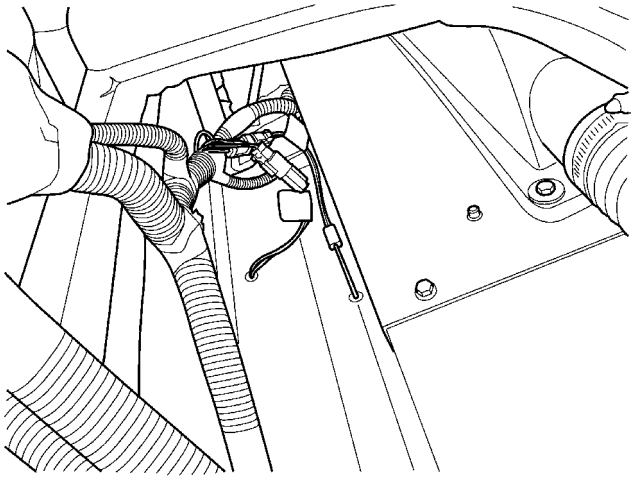
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4. Mount the water control valve using two cap screws.



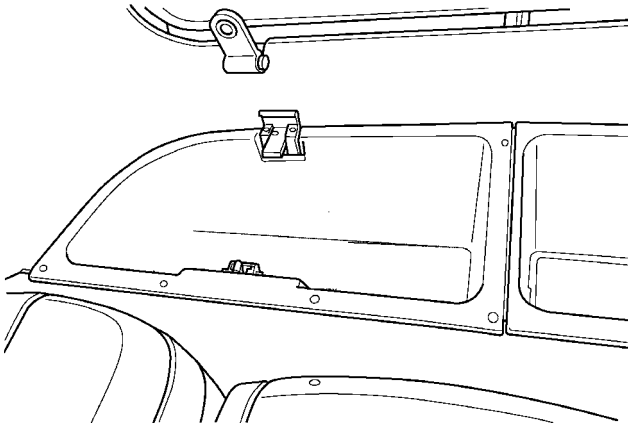
10036361 4

5. Turn in cap screws. Connect the ventilation duct. Attach the electrical connector.



10036371 5

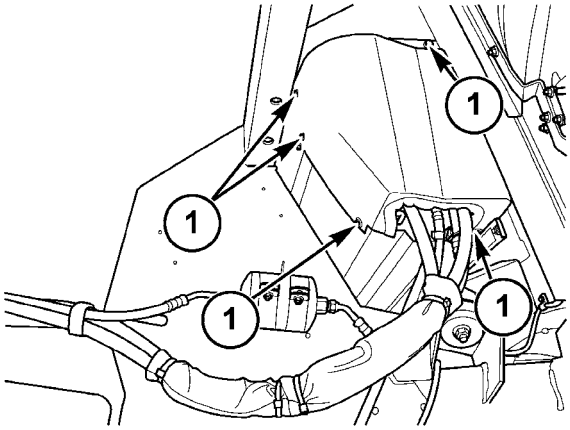
6. Install new seals, and install the storage compartment. Secure in place with eight machine screws. Secure the bench top behind the drivers seat at the hinges.



10008339 6

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7. Set the ventilation system shield into place and secure using five cap screws **(1)**.



10036357A5 7

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Index

BODY AND STRUCTURE - E

ENVIRONMENT CONTROL Heating, ventilation and air-conditioning - 40.D

Air filter - Install (E.40.D.25 - F.10.A.15) 17
AFX8010

Air filter - Remove (E.40.D.25 - F.10.A.10) 14
AFX8010

Compressor - Install (E.40.D.31 - F.10.A.15) 20
AFX8010

Compressor - Remove (E.40.D.31 - F.10.A.10) 19
AFX8010

Compressor - Static description (E.40.D.31 - C.30.A.20) 5
AFX8010

Compressor - Torque (E.40.D.31 - D.20.A.10) 4
AFX8010

Compressor Magnetic clutch - Install (E.40.D.31.80 - F.10.A.15) 24
AFX8010

Compressor Magnetic clutch - Remove (E.40.D.31.80 - F.10.A.10) 21
AFX8010

Condenser - Install (E.40.D.32 - F.10.A.15) 28
AFX8010

Condenser - Remove (E.40.D.32 - F.10.A.10) 27
AFX8010

Condenser - Static description (E.40.D.32 - C.30.A.20) 6
AFX8010

Evaporator - Install (E.40.D.33 - F.10.A.15) 32
AFX8010

Evaporator - Remove (E.40.D.33 - F.10.A.10) 29
AFX8010

Evaporator - Static description (E.40.D.33 - C.30.A.20) 7
AFX8010

Expansion valve - Dynamic description (E.40.D.34 - C.30.A.10) 8
AFX8010

Expansion valve - Install (E.40.D.34 - F.10.A.15) 36
AFX8010

Expansion valve - Remove (E.40.D.34 - F.10.A.10) 35
AFX8010

Heater - Install (E.40.D.35 - F.10.A.15) 40
AFX8010

Heater - Remove (E.40.D.35 - F.10.A.10) 37
AFX8010

Heater - Static description (E.40.D.35 - C.30.A.20) 9
AFX8010

Heater valve - Install (E.40.D.17 - F.10.A.15) 12
AFX8010

Heater valve - Remove (E.40.D.17 - F.10.A.10) 11
AFX8010

Receiver/drier - Install (E.40.D.36 - F.10.A.15) 44
AFX8010

https://truckmanualshub.com/

Receiver/drier - Remove (E.40.D.36 - F.10.A.10) 43
AFX8010

Receiver/drier - Static description (E.40.D.36 - C.30.A.20) 10
AFX8010

Ventilation system Motor - Install (E.40.D.60.90 - F.10.A.15) 47
AFX8010

Ventilation system Motor - Remove (E.40.D.60.90 - F.10.A.10) 45
AFX8010

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https://truckmanualshub.com/

BODY AND STRUCTURE - E

SAFETY SECURITY ACCESSORIES Safety - 50.B

AFX8010

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Contents

BODY AND STRUCTURE - E

SAFETY SECURITY ACCESSORIES Safety - 50.B

DIAGNOSTIC

Back up alarm

Back up alarm - Unidentified failure (E.50.B.82 - G.30.B.46) 3
AFX8010

Sensing system

Sensing system Rear ladder sensor - Short circuit to B+ (E.50.B.95.80 - G.30.B.54) 7
AFX8010

Sensing system Rear ladder sensor - Short circuit to ground (E.50.B.95.80 - G.30.B.53) 10
AFX8010

Sensing system Rear ladder sensor - Open circuit (E.50.B.95.80 - G.30.B.50) 13
AFX8010

https://truckmanualshub.com/

Back up alarm - Unidentified failure (E.50.B.82 - G.30.B.46)

AFX8010

E0065-11 - Ground Drive Backup Alarm

Cause:
The backup alarm (H-08) circuit open or shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and backup alarm.
2. Controller internal failure (internal regulator failure).

Solution:

1. Turn the key switch to the OFF position and disconnect the backup alarm connector **X248**. Use a multimeter to check the resistance of the backup alarm coil. The proper resistance range for the coil is **1.0 - 8.0 ohms**.
   A. If out of specification, replace coil.
   B. If the coil is within specification, continue with Step **2**.
2. Disconnect connector **X248**. Use a multimeter to check for continuity between connector **X248** pin 1 (white wire) and chassis ground. Flex the harness while making this check.
   A. If no continuity to ground is found, continue with Step **3**.
   B. If there is continuity to ground, continue with Step **6**.
3. Disconnect connector **X248**. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the backup alarm. Use a multimeter to check for **12 volts** between connector **X248** pin 1 and chassis ground.
   A. If **12 volts** is not present, continue with Step **4**.
   B. If **12 volts** is found, continue with Step **8**.
4. Disconnect connector **X071**. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the backup alarm. Use a multimeter to check for **12 volts** between connector **X071** pin 14 and chassis ground.
   A. If **12 volts** is not present, continue with Step **5**.
   B. If there is **12 volts**, there is an open circuit in the straw hood rear (SH) harness between connector **X071** and connector **X248** wire 452 white. Locate the open and repair.
5. Disconnect connector **X024**. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the backup alarm. Use a multimeter to check for **12 volts** between connector **X024** pin 13 and chassis ground.
   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X024** and connector **X019** J2-6 wire 452 white.
   B. If there is **12 volts**, there is an open circuit in the straw hood front (SW) harness between connector **X024** and connector **X071** wire 452 white. Locate the open and repair.
6. Disconnect connector **X071**. Use a multimeter to check for continuity between connector **X071** pin 14 and chassis ground.
   A. If continuity is found, continue with Step **7**.
   B. If no continuity is found, the short to ground is in the straw hood rear (SH) harness between connector **X071** and connector **X248** wire 452 white. Locate the short and repair.
7. Disconnect connector **X024**. Use a multimeter to check for continuity between connector **X024** pin 13 and chassis ground.

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A. If continuity is found, the short to ground is in the main frame (MF) harness between connector **X024** and connector **X019** J2-6 wire 452 white. Locate the short and repair.

B. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X024** and connector **X071** wire 452 white. Locate the short and repair.

8. Use a multimeter to check for continuity between connector **X248** pin 1 (black wire) and chassis ground. Flex the harness while making this check.

   A. If no continuity to ground is found, continue with Step **9**.

   B. If there is continuity to ground, the circuit is functional. Continue with Step **10**.

9. Disconnect connector **X071**. Use a multimeter to check for continuity between the straw hood front (SW) harness end of connector **X071** pin 26 and chassis ground.

   A. If there is continuity to ground, there is an open circuit in the straw hood rear (SH) harness between connector **X248** and connector **X071** wire 455 black or 478 black. Locate the open and repair.

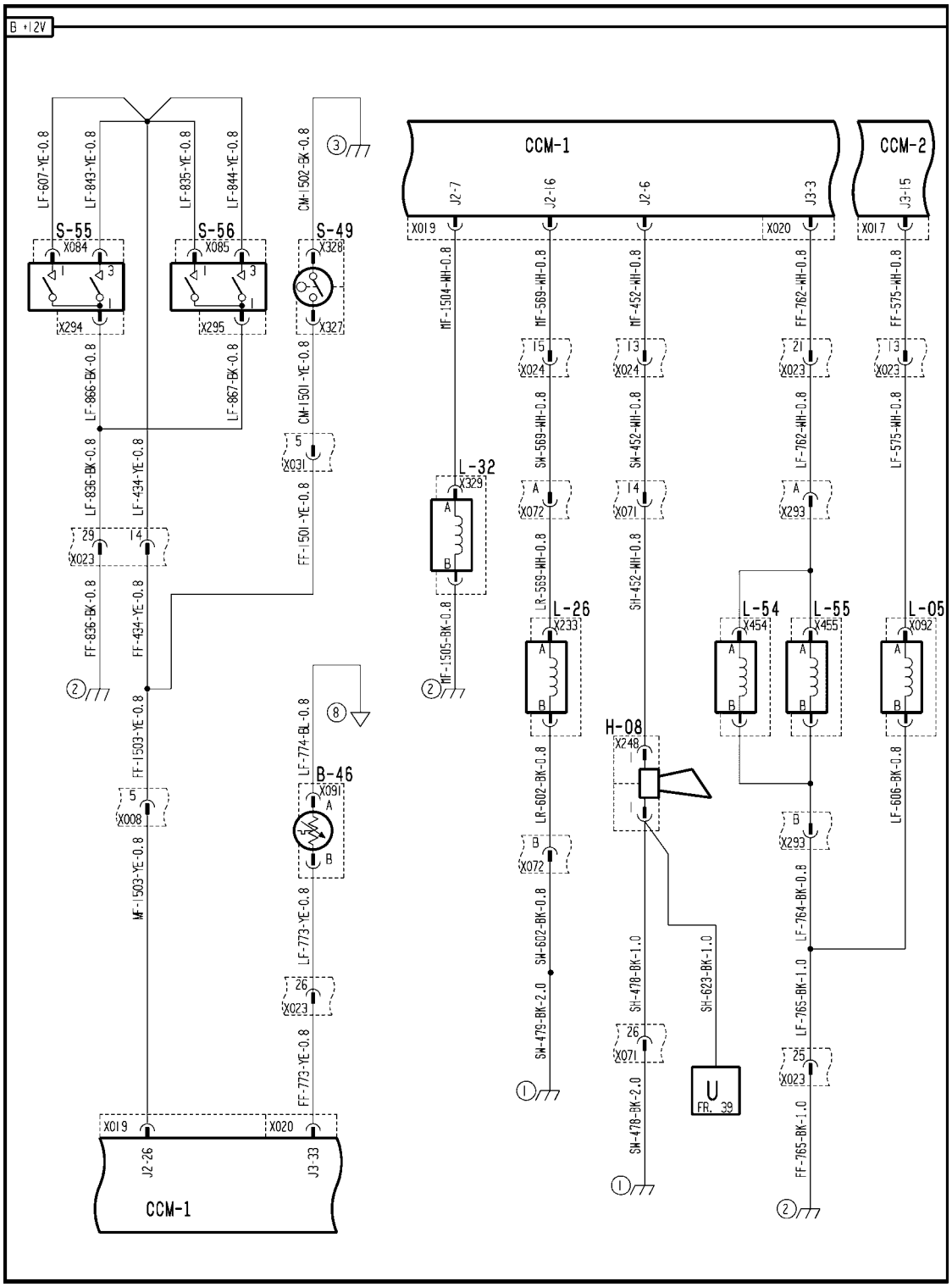
   B. If there is no continuity to ground, there is an open circuit in the straw hood front (SW) harness between connector **X071** and rear frame ground #1 wire 478 black. Locate the open and repair.

10. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 08 (A.30.A.88 - C.20.E.08)



AFXSCHEM08-04 1

FRAME 8 - DRIVES

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B-46 Hydrostat Motor Temperature	H-08 Back Up Alarm	L-05 Pressure Release
L-26 Rear Wheel Assist	L-32 Brake Limiting	L-54 2 Speed Powered Rear Axle RH
L-55 2 Speed Powered Rear Axle LH	S-49 Brake Fluid Level Switch	S-55 LH Brake Wear Switch
	S-56 RH Brake Wear Switch	

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Sensing system Rear ladder sensor - Short circuit to B+ (E.50.B.95.80 - G.30.B.54)

AFX8010

E0026-03 - Rear Ladder Sensor

Cause:
The rear ladder sensor (B-22) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" or "THRESHING" sort menu, and select "REAR LADDER SEN" to check the voltage range.

   The proper voltage for sensor when rear ladder is up is **0.5 - 3.9 volts**

   The proper voltage for sensor when rear ladder is down is **3.9 - 4.9 volts**

   The proper voltage with sensor disconnected is **4.9 - 5.2 volts**.

   A. If the voltage reading is high out of range (>**5.2 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*

2. Disconnect the rear ladder sensor connector **X251**.

   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.

3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**.

   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the straw hood (SH) harness between connector **X071** pin 11 and connector **X251** pin 2 wire 570 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.

4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

   A. If the voltage drops to **4.9 - 5.2 volts**, the short is in the straw hood front (SW) harness between connector **X024** pin 16 and connector **X071** pin 11 wire 570 yellow. Locate the short and repair.

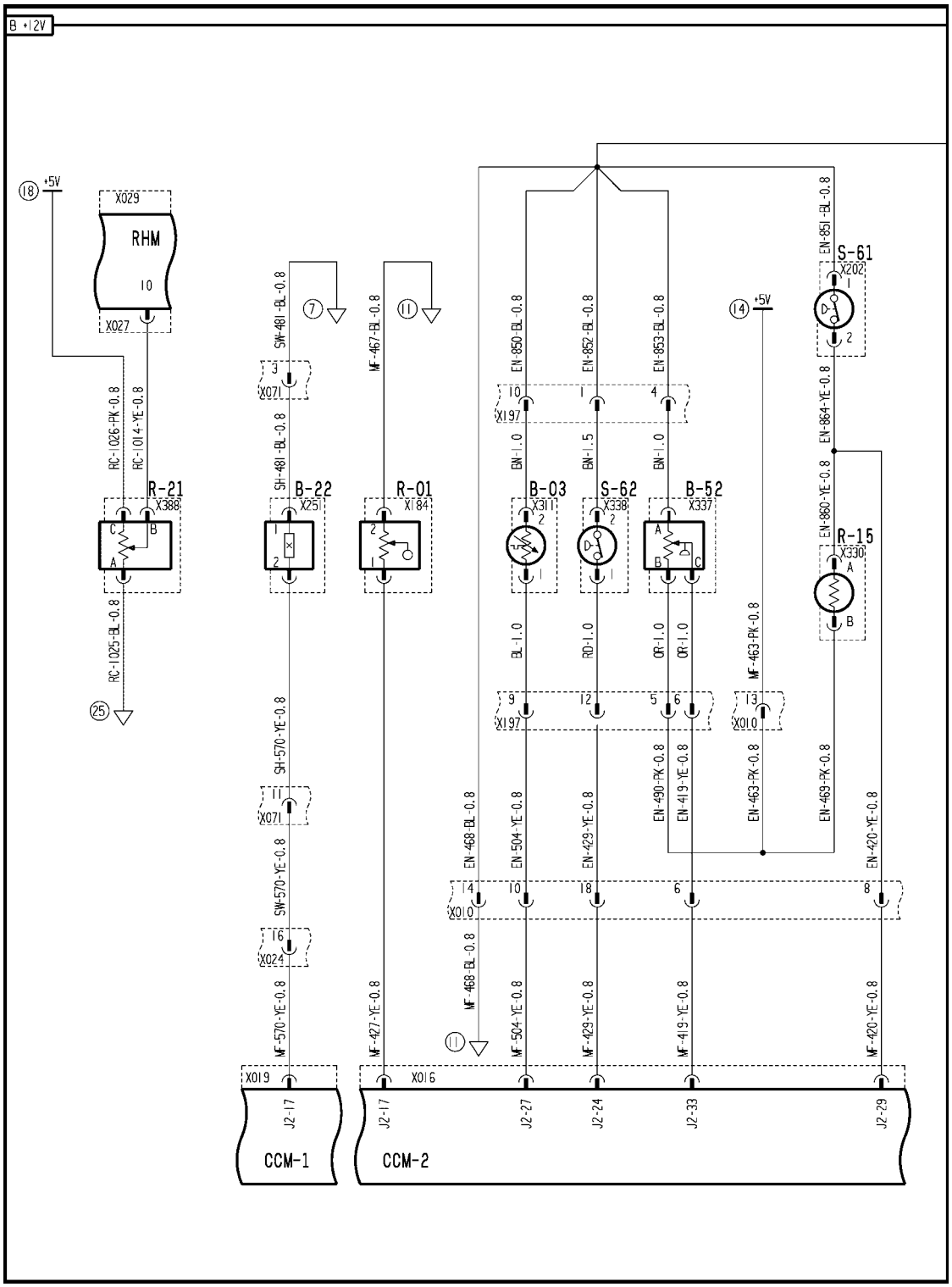
   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X024** pin 16 and connector **X019** pin J2-17 wire 570 yellow. Locate the short and repair.

5. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

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Sensing system Rear ladder sensor - Short circuit to ground (E.50.B.95.80 - G.30.B.53)

AFX8010

E0026-04 - Rear Ladder Sensor

Cause:
The rear ladder sensor (B-22) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" or "THRESHING" sort menu, and select "REAR LADDER SEN" to check the voltage range.

   The proper voltage for sensor when rear ladder is up is **0.5 - 3.9 volts**

   The proper voltage for sensor when rear ladder is down is **3.9 - 4.9 volts**

   The proper voltage with sensor disconnected is **4.9 - 5.2 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits,. continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*
2. Disconnect the rear ladder sensor connector **X251**.

   A. If the voltage increases to **4.9 - 5.2 volts**, the short to ground is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**.

   A. If the voltage increases to **4.9 - 5.2 volts**, the short to ground is in the straw hood rear (SH) harness between connector **X071** pin 11 and connector **X251** pin 2 wire 570 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

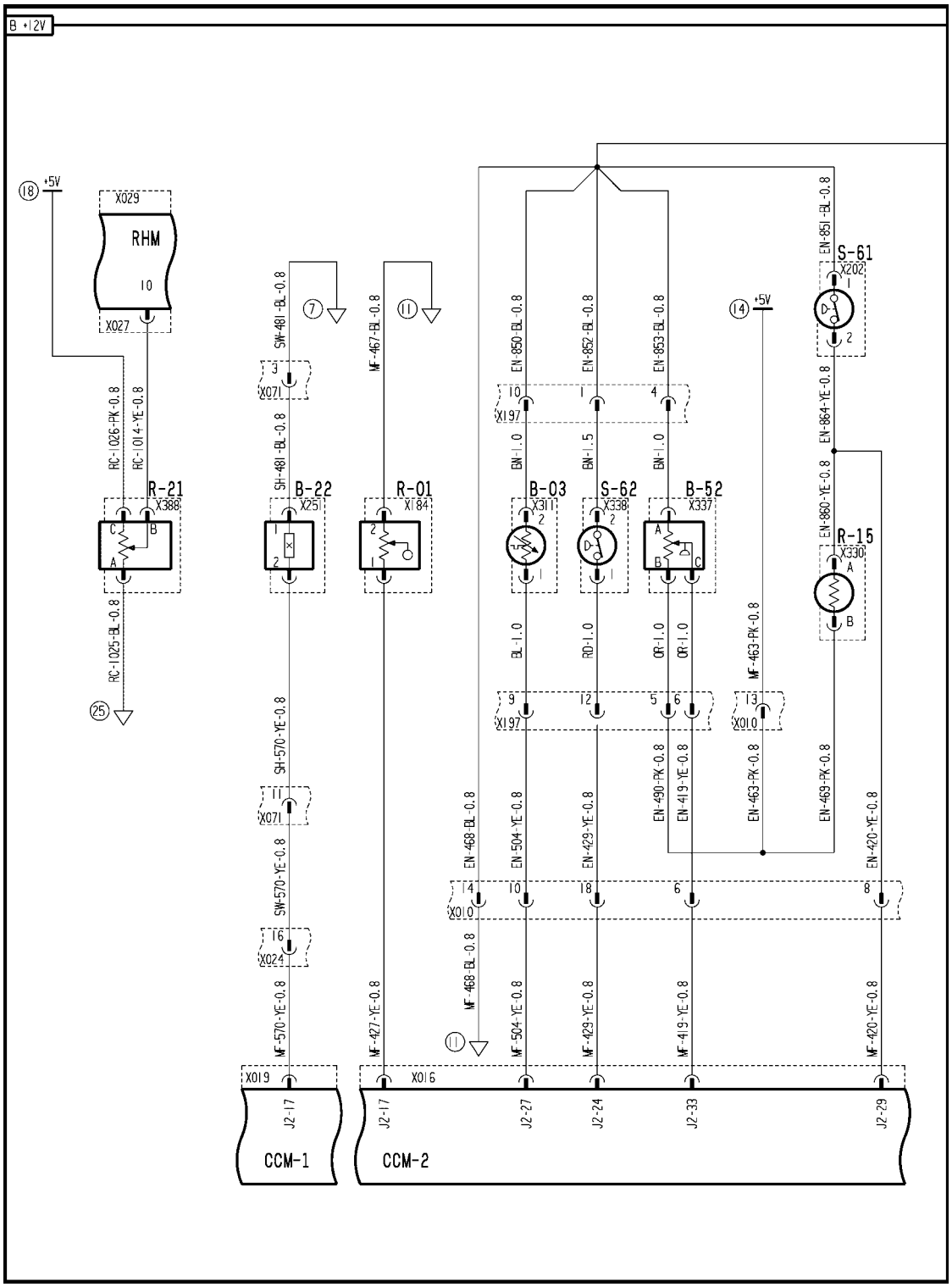
   A. If the voltage increases to **4.9 - 5.2 volts**, the short is in the straw hood front (SW) harness between connector **X024** pin 16 and connector **X071** pin 11 wire 570 yellow. Locate the short and repair.

   B. If the voltage remains low, the short to ground is in the main frame (MF) harness between connector **X024** pin 16 and connector **X019** pin J2-17 wire 570 yellow. Locate the short and repair.
5. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



AFXSCHEM04A-04 1

FRAME 4 - ENGINE

https://truckmanualshub.com/

B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

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Sensing system Rear ladder sensor - Open circuit (E.50.B.95.80 - G.30.B.50)

AFX8010

E0026-05 - Rear Ladder Sensor

Cause:
The rear ladder sensor (B-22) circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" or "THRESHING" sort menu, and select "REAR LADDER SEN" to check the voltage range.

   The proper voltage for sensor when rear ladder is up is **0.5 - 3.9 volts**

   The proper voltage for sensor when rear ladder is down is **3.9 - 4.9 volts**

   The proper voltage with sensor disconnected is **4.9 - 5.2 volts**.

   A. If the voltage reading is high **4.9 - 5.2 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the open is not present at this time. Continue the troubleshooting at Step **9**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rear ladder sensor connector **X251**. Use a jumper wire to short the harness end of connector **X251** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **5**.

   B. If the monitor still displays **4.9 - 5.2 volts**, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a jumper wire to short connector **X071** pin 11 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the straw hood rear (SH) harness between connector **X071** pin 11 and connector **X251** pin 2 wire 570 yellow. Locate the open and repair.

   B. If the monitor still displays **4.9 - 5.2 volts**, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a jumper wire to short connector **X024** pin 16 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the straw hood front (SW) harness between connector **X024** pin 16 and connector **X071** pin 11 wire 570 yellow. Locate the open and repair.

   B. If the monitor still displays **4.9 - 5.2 volts**, the open circuit is in the main frame (MF) harness between connector **X024** pin 16 and connector **X019** pin J2-17 wire 570 yellow. Locate the open and repair.
5. Disconnect the rear ladder sensor connector **X251**. Use a multimeter to check for continuity between the harness end of connector **X251** pin 1 and chassis ground.

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A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

B. If there is no continuity to ground, the ground path for the sensor is open. Continue with Step **6**.

6. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a multimeter to check for continuity between the harness end of connector **X071** pin 3 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood rear (SH) harness between connector **X071** pin 3 and connector **X251** pin 1 wire 481 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **7**.

7. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a multimeter to check for continuity between the harness end of connector **X024** pin 11 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood front (SW) harness between connector **X024** pin 11 and connector **X071** pin 3 wire 481 blue or 461 blue. Locate the open and repair.

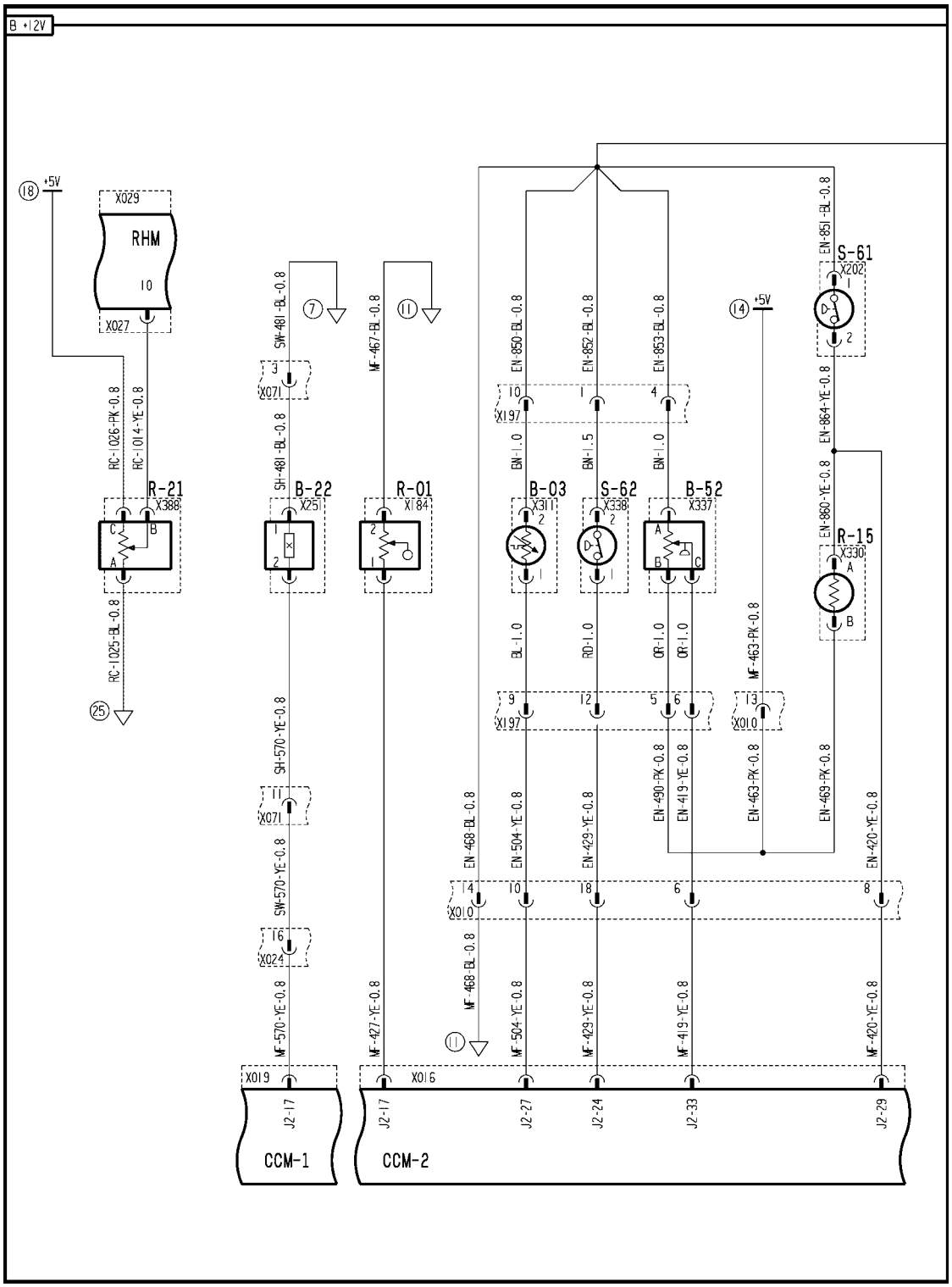
   B. If there is no continuity, the open circuit is in the main frame (MF) harness between connector **X024** pin 11 and connector **X019** pin J2-14 wire 461 blue, 401 blue or 460 blue. Locate the open and repair.

8. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 04 (A.30.A.88 - C.20.E.04)



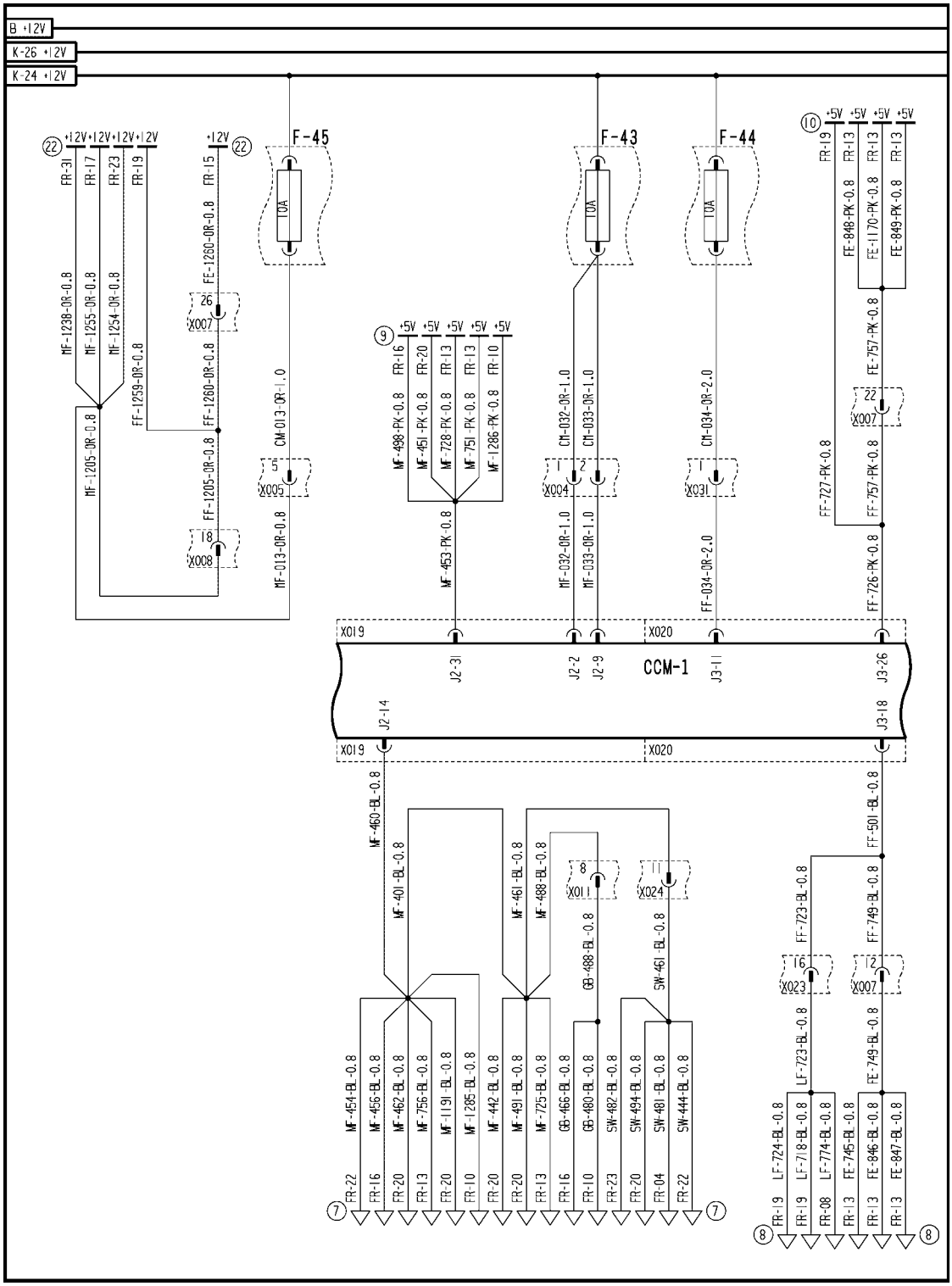
AFXSCHEM04A-04 1

FRAME 4 - ENGINE

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B-03 Engine Oil Temperature	B-22 Rear Ladder	B-52 Engine Oil Pressure
R-01 Fuel Level	R-15 Air Filter Resistor	R-21 Engine Throttle Potentiometer
S-61 Air Filter Switch	S-62 Fuel Filter Switch	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Index

BODY AND STRUCTURE - E

SAFETY SECURITY ACCESSORIES Safety - 50.B

Back up alarm - Unidentified failure (E.50.B.82 - G.30.B.46) 3
AFX8010

Sensing system Rear ladder sensor - Open circuit (E.50.B.95.80 - G.30.B.50) 13
AFX8010

Sensing system Rear ladder sensor - Short circuit to B+ (E.50.B.95.80 - G.30.B.54) 7
AFX8010

Sensing system Rear ladder sensor - Short circuit to ground (E.50.B.95.80 - G.30.B.53) 10
AFX8010

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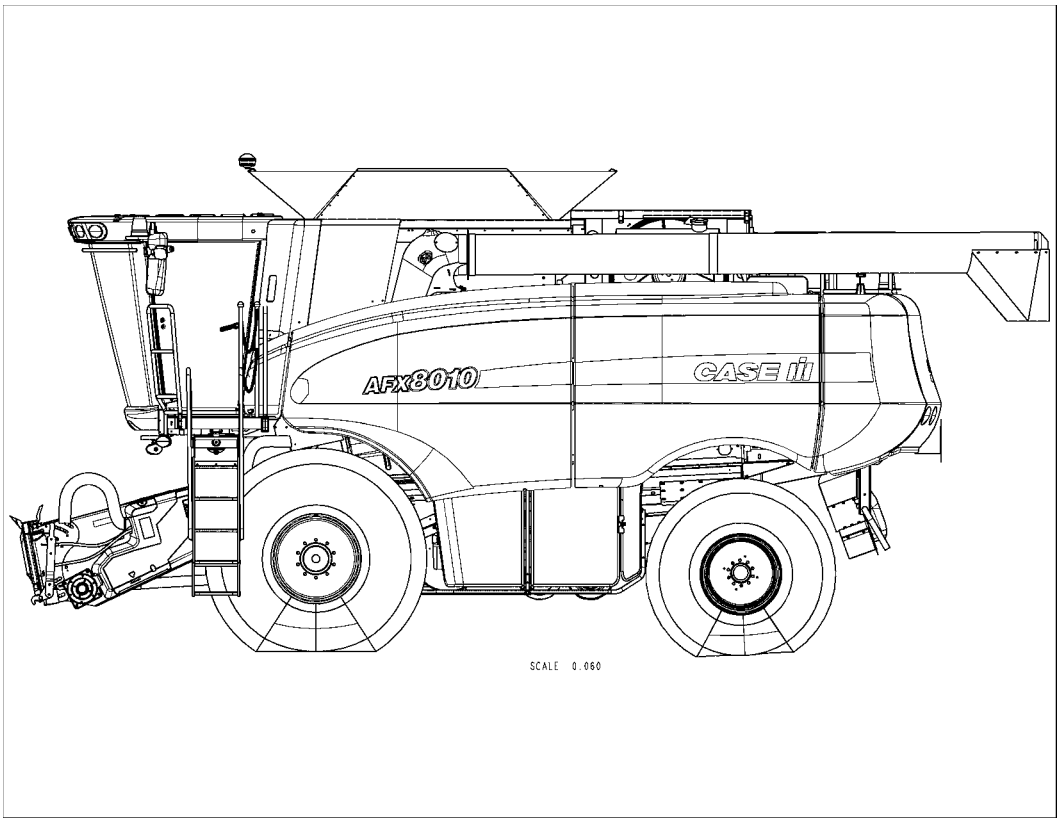
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REPAIR MANUAL

TOOL POSITIONING



AFX8010

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Contents

TOOL POSITIONING - G

LIFTING G.10.A
AFX8010

TILTING G.20.A
AFX8010

LEVELLING G.30.A
AFX8010

https://truckmanualshub.com/

TOOL POSITIONING - G

LIFTING - 10.A

AFX8010

https://truckmanualshub.com/

Contents

TOOL POSITIONING - G

LIFTING - 10.A

DIAGNOSTIC

Command valve

Command valve Header lift valve - Short circuit to B+ (G.10.A.12.20 - G.30.B.54) 3
AFX8010

Command valve Header lift valve - Short circuit to ground (G.10.A.12.20 - G.30.B.53) 7
AFX8010

Command valve Header lift valve - Unidentified failure (G.10.A.12.20 - G.30.B.46) 10
AFX8010

Command valve Header lift valve - Unidentified failure (G.10.A.12.20 - G.30.B.46) 14
AFX8010

Accumulator valve

Accumulator valve - Unidentified failure (G.10.A.31 - G.30.B.46) 18
AFX8010

Sensing system

Sensing system Right tool position sensor - Short circuit to B+ (G.10.A.95.84 - G.30.B.54) 21
AFX8010

Sensing system Right tool position sensor - Short circuit to ground (G.10.A.95.84 - G.30.B.53) 27
AFX8010

Sensing system Right tool position sensor - Open circuit (G.10.A.95.84 - G.30.B.50) 30
AFX8010

Sensing system Right tool position sensor - Out of range (G.10.A.95.84 - G.30.C.24) 35
AFX8010

Sensing system Left tool position sensor - Short circuit to B+ (G.10.A.95.82 - G.30.B.54) 36
AFX8010

Sensing system Left tool position sensor - Short circuit to ground (G.10.A.95.82 - G.30.B.53) 42
AFX8010

Sensing system Left tool position sensor - Open circuit (G.10.A.95.82 - G.30.B.50) 45
AFX8010

Sensing system Left tool position sensor - Out of range (G.10.A.95.82 - G.30.C.24) 50
AFX8010

Sensing system Centre tool position sensor - Short circuit to B+ (G.10.A.95.83 - G.30.B.54) 51
AFX8010

Sensing system Centre tool position sensor - Short circuit to ground (G.10.A.95.83 - G.30.B.53) 57
AFX8010

Sensing system Centre tool position sensor - Open circuit (G.10.A.95.83 - G.30.B.50) 60
AFX8010

Sensing system Centre tool position sensor - Out of range (G.10.A.95.83 - G.30.C.24) 65
AFX8010

https://truckmanualshub.com/

Command valve Header lift valve - Short circuit to B+ (G.10.A.12.20 - G.30.B.54)

AFX8010

E0049-03 - Header Raise / Lower Current Sense

Context:
The Header Raise/Lower Current Sense circuit is the ground path for the header raise and header lower PWM solenoids. By monitoring current flow on the return path of the solenoids, the module can provide precise control of solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The header raise (L-11) or header lower (L-12) circuits have excessive current draw, or are shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RAISE VLV" or "LOWER VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output. Test both header raise and lower circuits.

   The proper current for both header raise and header lower should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps** on either circuit, continue with Step **3**.

   B. If the readings are normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading on either circuit, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **6**.

   NOTE: *If the current reading is high, immediately shut off the circuit after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the main valves connector **X022**. Use a multimeter to check the resistance of the header raise solenoid L-11 between connector **X022** pins 4 & 6. Repeat this resistance check for the header lower solenoid L-12 between connector **X022** pins 5 & 7. The proper resistance range for the solenoids is **7.2 - 11.2 ohms**.

   A. If either solenoid is out of specification, replace the solenoid. Continue with Step **8**.

   B. If both solenoids are within specification, continue with Step **5**.

3. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check the resistance of the header raise solenoid circuit between connector **X019** pins J2-4 & J2-20. Repeat this resistance check for the header lower solenoid L-12 between connector **X019** pins J2-5 & J2-20.

   A. If the resistance is lower than the previously measured resistance, there is a short in the main frame (MF) harness between connector **X022** and connector **X019** wires 1112 white (raise) or 1113 white (lower) and 1117 black, 1118 black or 1114 black. Locate the short and repair. Continue with Step **8**.

   B. If the resistance is the same as previously measured, continue with Step **6**.

4. Key on. Disconnect connector **X022**. Use a multimeter to check for voltage at connector **X022** pin 6 or 7 (harness end). There should be no voltage on either wire.

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A. If there is no voltage present on the wires, continue with Step **8**.

B. If there is voltage on the wire, the short to voltage is in the main frame (MF) harness between connector **X022** and connector **X019** pin J2-20 wire 1117 black, 1118 black or 1114 black. Locate the short and repair. Continue with Step **8**.

NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

5. The sense resistor in the module for the Header Raise/Lower Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Carefully disconnect connector **X019** from the bottom of the CCM1 module. Use a multimeter to check resistance between connector **X019** pin J2-20 on the module and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM1 module has failed. Replace the module.

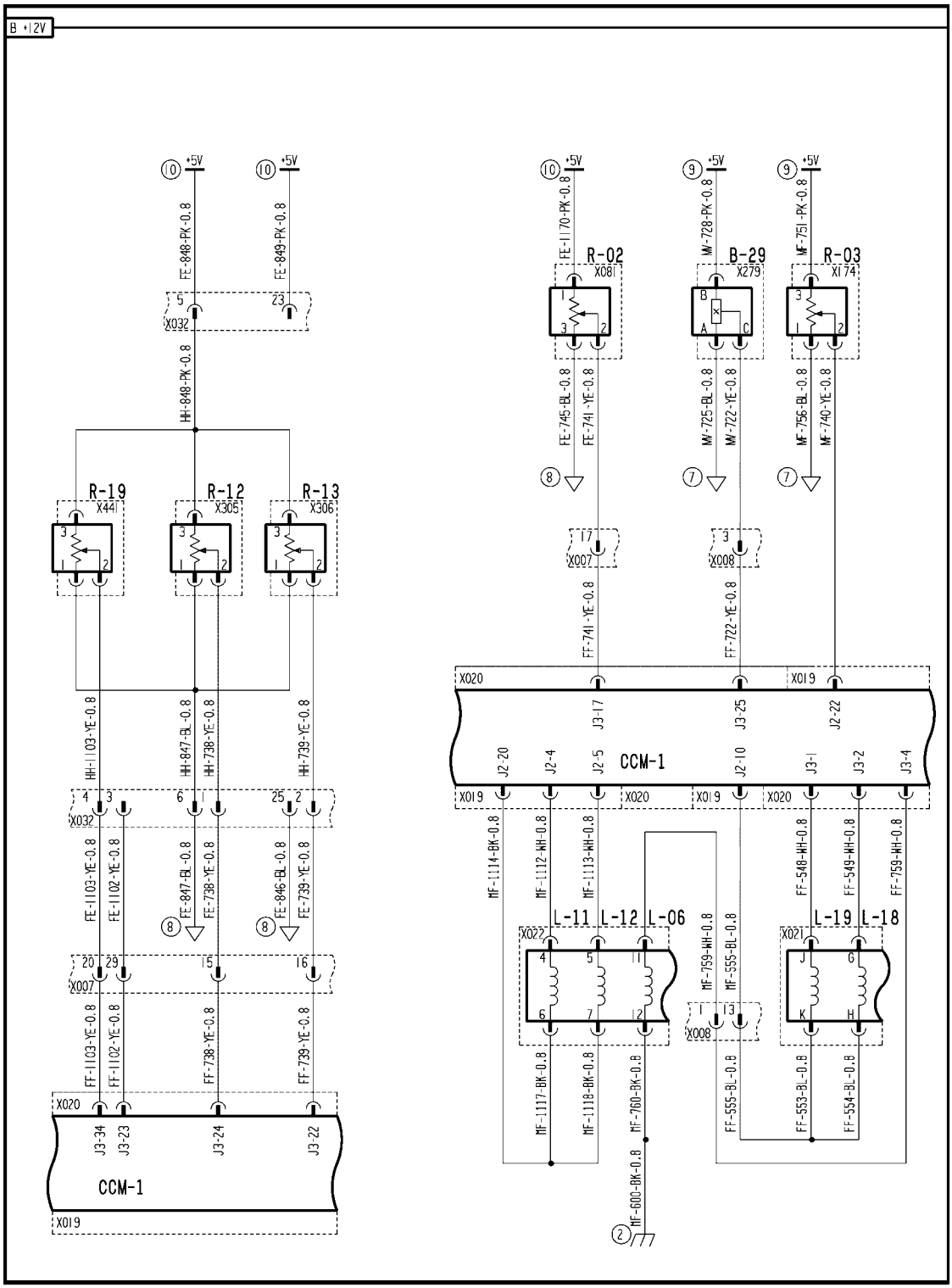
   B. If the resistance is correct, the sense resistor in the CCM1 module is okay, and the circuit should function correctly. Continue with Step **9**.

6. Operate the combine while monitoring the Header Raise/Lower Current Sense circuit current on the Universal Display Plus "DIAG" screen.

   A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Command valve Header lift valve - Short circuit to ground (G.10.A.12.20 - G.30.B.53)

AFX8010

E0049-04 - Header Raise / Lower Current Sense

Context:
The Header Raise/Lower Current Sense circuit is the ground path for the header raise and header lower PWM solenoids. By monitoring current flow on the return path of the solenoids, the module can provide precise control of solenoid engagement. When this error message is reported, this is an indication that the output is engaged, but the sense line does not detect any current flow - the circuit is grounded externally from the module.

Cause:
The header raise (L-11) or header lower (L-12) circuits are grounded at an external point.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to ground.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RAISE VLV" or "LOWER VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output. Test both header raise and lower circuits.

   The proper current for both header raise and header lower should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If there is no current reading on either circuit, the circuit is grounded externally from the module. Continue with Step **2**.

   B. If the readings are normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **4**.

   NOTE: *If the current reading is high, immediately shut off the circuit after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the main valves connector **X022**. Use a multimeter to check for continuity between the header raise solenoid L-11 connector **X022** pins 4 or 6 and chassis ground. Repeat this continuity check between the header lower solenoid L-12 connector **X022** pins 5 or 7 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground on either solenoid, replace the solenoid.

   B. If there is no continuity to ground on either solenoid, continue with Step **3**.

3. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between the harness end of connector **X022** pin 6 and chassis ground. Repeat this continuity check between the harness end of connector **X022** pin 7 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X008** and connector **X019** pin J2-20 wire 1117 black, 1118 black or 1114 black. Locate the short and repair.

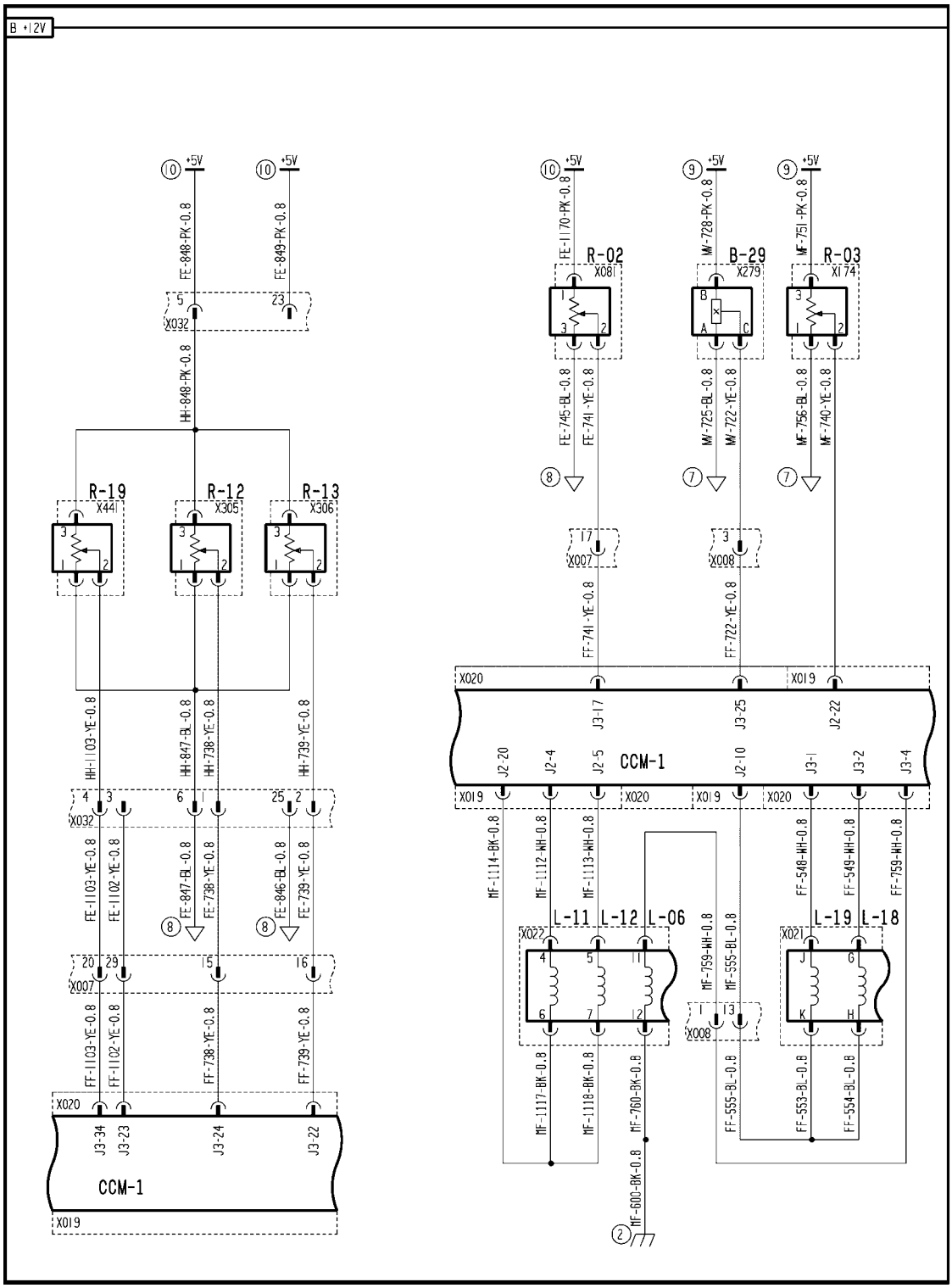
   B. If there is no continuity to ground, continue with Step **4**.

4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Command valve Header lift valve - Unidentified failure (G.10.A.12.20 - G.30.B.46)

AFX8010

E0055-11 - Header Lower Valve

Cause:
The header lower valve (L-12) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LOWER VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **7**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X022**. Use a multimeter to check the resistance of the header lower valve coil (L-12) between connector **X022** pins 5 & 7. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header lower solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header lower solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X022** pin 5 (MF harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X022** and connector **X019** pin J2-5 wire 1113 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Use a multimeter to check for continuity between connector **X022** pin 7 (harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, continue with step **6**.

   B. If there is continuity to ground, continue with Step **7**.
5. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X019** pin J2-20 on the module and chassis ground.

   A. There is infinite resistance. The sense resistor in the CCM1 module has failed. Replace the module.

   B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM2 module is okay. There is an open circuit in the main frame (MF) harness between connector **X022** pin 6 and connector **X019** pin J2-20 wire 1117 black or 1114 black. Locate the open and repair.

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NOTE: *The sense resistor in the module for the Header Raise/Lower Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the header lower valve. Use a multimeter to check for **12 volts** between connector **X022** pin 5 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X022** pin 5 and connector **X019** pin J2-5 wire 1113 white. Locate the open and repair.

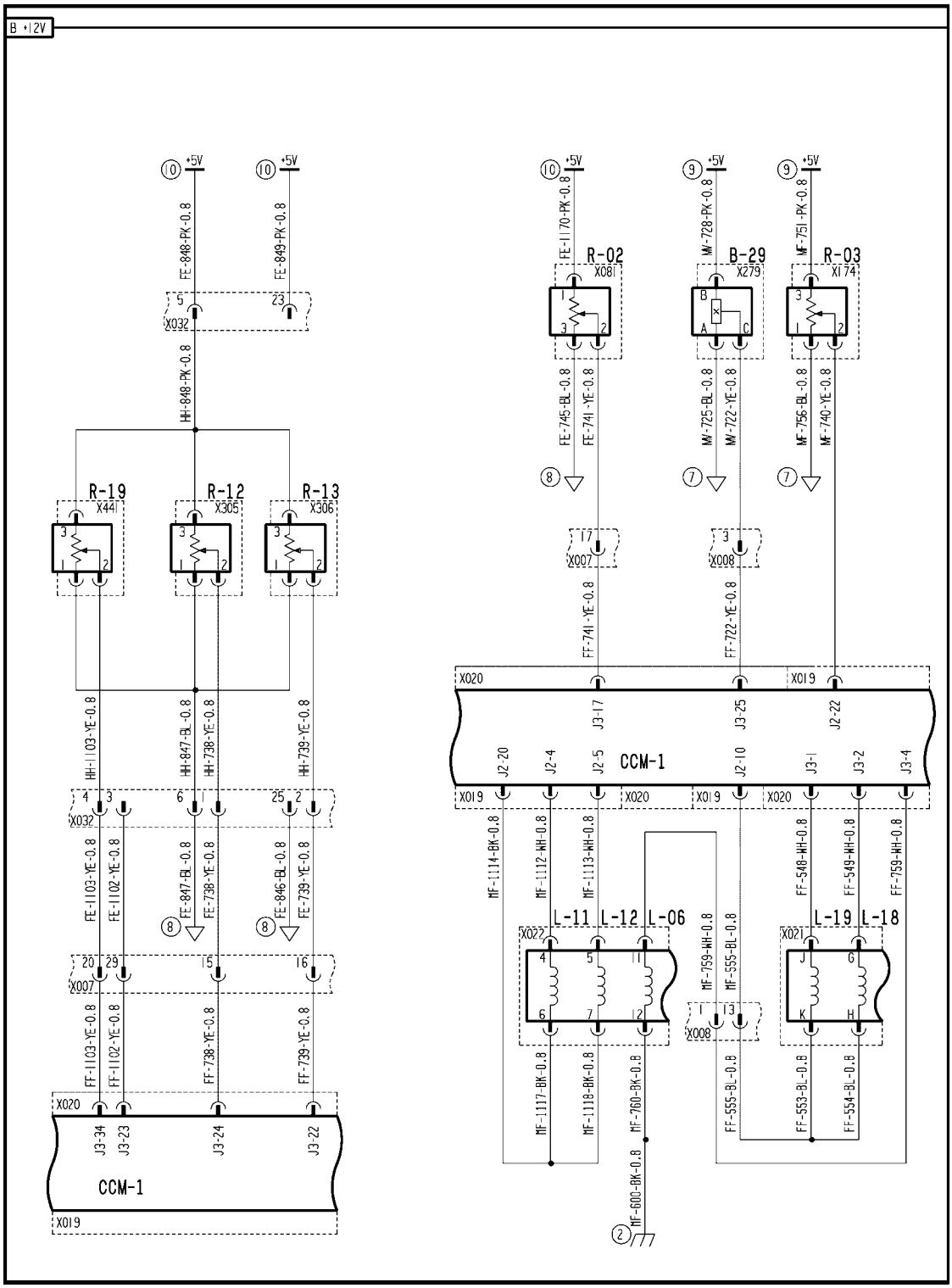
   B. If **12 volts** is found, continue with Step **9**.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Command valve Header lift valve - Unidentified failure (G.10.A.12.20 - G.30.B.46)

AFX8010

E0056-11 - Header Raise Valve

Cause:
The header raise valve (L-11) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RAISE VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **7**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **9**.

2. Disconnect connector **X022**. Use a multimeter to check the resistance of the header raise valve coil (L-11) between connector **X022** pins 4 & 6. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header raise solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header raise solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.

3. Use a multimeter to check for continuity between connector **X022** pin 4 (MF harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X022** and connector **X019** pin J2-4 wire 1112 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.

4. Use a multimeter to check for continuity between connector **X022** pin 6 (harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, continue with step **6**.

   B. If there is continuity to ground, continue with Step **7**.

5. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X019** pin J2-20 on the module and chassis ground.

   A. There is infinite resistance. The sense resistor in the CCM1 module has failed. Replace the module.

   B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM2 module is okay. There is an open circuit in the main frame (MF) harness between connector **X022** pin 6 and connector **X019** pin J2-20 wire 1117 black or 1114 black. Locate the open and repair.

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NOTE: *The sense resistor in the module for the Header Raise/Lower Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the header raise valve. Use a multimeter to check for **12 volts** between connector **X022** pin 4 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X022** pin 4 and connector **X019** pin J2-4 wire 1112 white. Locate the open and repair.

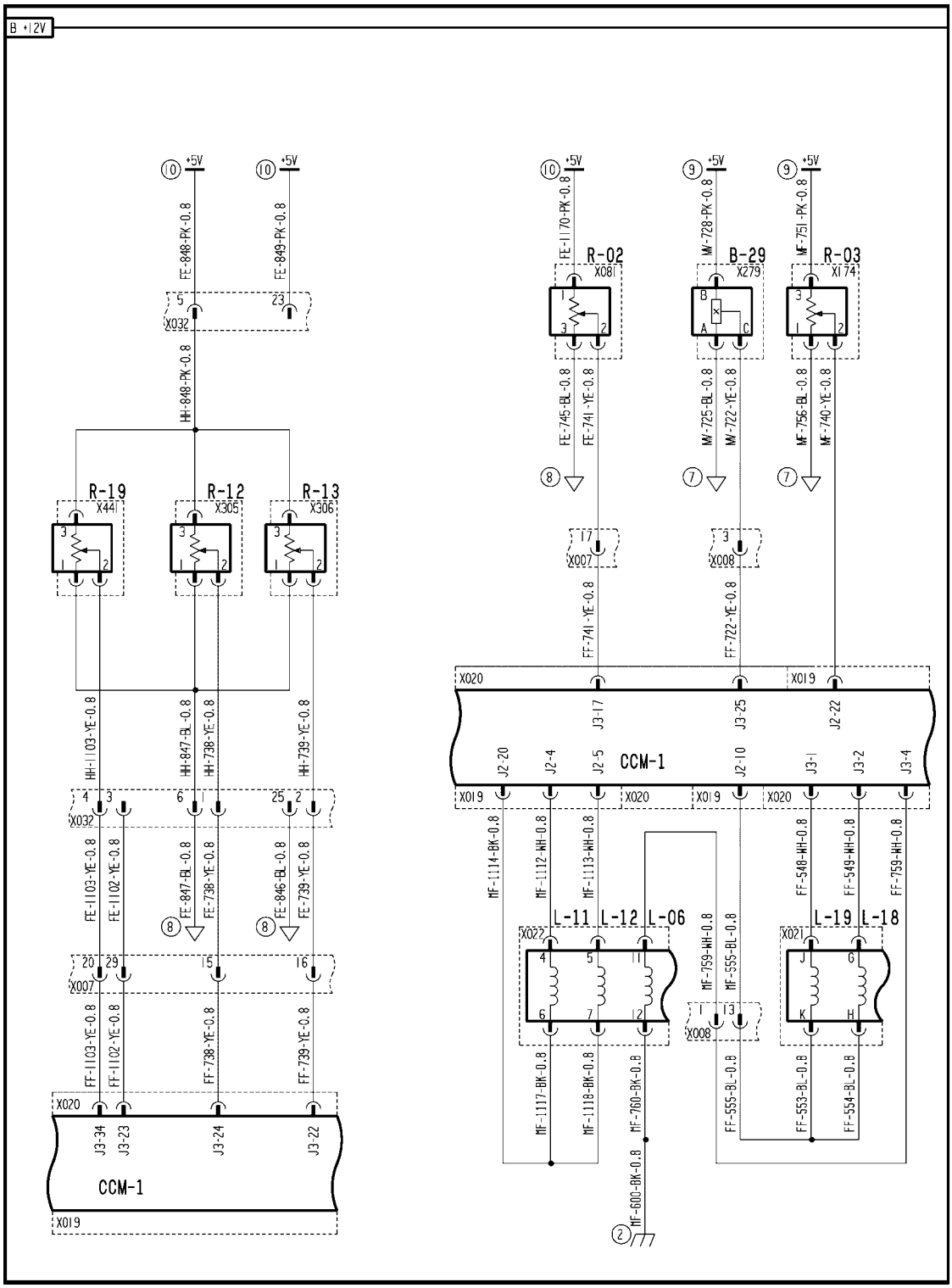
   B. If **12 volts** is found, continue with Step **9**.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Accumulator valve - Unidentified failure (G.10.A.31 - G.30.B.46)

AFX8010

E0060-11 - Header Height Accumulator Valve

Cause:
The header height accumulator solenoid (L-06) circuit open or is shorted to ground.

Possible failure modes:

1. Supply wiring shorted to ground or open circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "ACCUMULATOR VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.

2. Turn the key switch to the OFF position and disconnect the main valve stack connector **X022**. Use a multimeter to check the resistance of the header height accumulator solenoid. The proper resistance range for the coil is **1.0 - 8.0 ohms**.

   A. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **3**.

3. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X022** pin 11 and chassis ground. Flex the front frame (FF) harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, continue with Step **6**.

4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the header height accumulator solenoid. Use a multimeter to check for **12 volts** between connector **X022** pin 11 and chassis ground.

   A. If **12 volts** is not present, continue with Step **5**.

   B. If **12 volts** is found, continue with Step **7**.

5. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the header height accumulator solenoid. Use a multimeter to check for **12 volts** between connector **X008** pin 1 and chassis ground.

   A. If **12 volts** is not present, the open is between connector **X008** and connector **X020** J3-4 wire 759 white.

   B. If **12 volts** is read the open is between connector **X008** and connector **X022** wire 759 white. Locate the open and repair.

6. Disconnect connector **X008**. Use the multimeter to check for continuity between connector **X008** pin 1 and chassis ground.

   A. If continuity is found the short to ground is in the front frame (FF) harness between connector **X008** and connector **X020** J3-4 wire 759 white. Locate the short and repair.

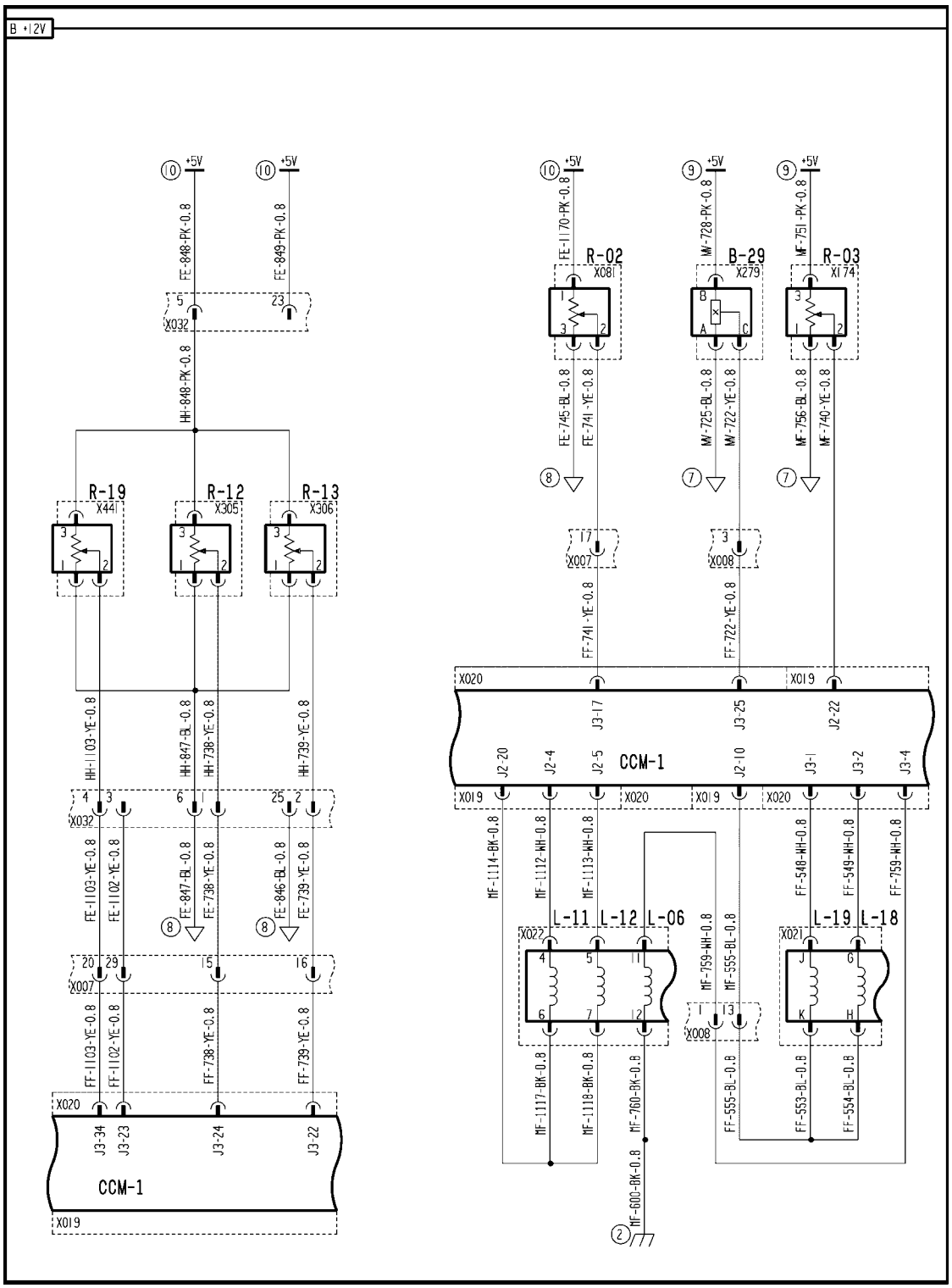
   B. If no continuity is found the short to ground is in the lower frame (LF) harness between connector **X008** and connector **X022** wire 759 white. Locate the short and repair.

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7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Sensing system Right tool position sensor - Short circuit to B+ (G.10.A.95.84 - G.30.B.54)

AFX8010

E0019-03 - Right Header Height / Tilt Sensor

Cause:
The right height/tilt sensor (R-13) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RIGHT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is high (>**4.7 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **11**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect connector X306, and use a multimeter to test for continuity to ground on connector X306 pin 1. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), continue with Step **6**.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

3. Key off. Disconnect connector **X032**, and use a multimeter to test for continuity to ground on connector **X032** pin 6. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), there is an open circuit in the header (HH) harness between connector **X032** and connector X306 wire 847 blue. Locate the open and repair.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

4. Key off. Disconnect connector **X007**. Use a multimeter to test for continuity between connector **X007** pin 12 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **4**.

   B. If continuity is found, there is an open circuit in feeder (FE) harness between connector **X032** pin 6 and connector **X007** pin 12 wire 847 blue or 749 blue. Locate the open and repair.

5. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X007** pin 12 and connector **X020** pin J3-18.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, there is an open circuit in front frame (FF) harness between connector **X007** pin 12 and connector **X020** pin J3-18 wire 749 blue or 501 blue. Locate the open and repair.

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6. Key off. Use a multimeter to test for continuity between connector **X020** pin J3-18 on CCM1 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.

7. Disconnect connector X306, and use a multimeter to test for voltage on connector X306 pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **8**.

   B. If high (>**4.7 volts**) voltage is found, continue with Step **7**.

8. Disconnect connector **X032**, and use a multimeter to test for voltage on the feeder (FE) harness end of connector **X032** pin 2. There should not be any voltage present.

   A. If no voltage is found, there is a short to voltage in the header (HH) harness between connector X306 and connector **X032** wire 739 yellow. Locate the short and repair.

   B. If high (>**4.7 volts**) voltage is found, continue with Step **7**.

9. Disconnect connector **X007**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X007** pin 16. There should not be any voltage present.

   A. If high (>**4.7 volts**) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X007** pin 16 and connector **X020** pin J3-22 wire 739 yellow. Locate the short and repair.

   B. If no voltage is found, there is a short to high voltage in the feeder (FE) harness between connector **X032** pin 2 and connector **X007** pin 16 wire 739 yellow. Locate the short and repair.

10. Disconnect connector X306, and use a multimeter to test for voltage on connector X306 pin 3. There should be **5 volts** present.

    A. If **5 volts** is found, continue with Step **11**.

    B. If high (>**5 volts**) voltage is found, continue with Step **11**.

    NOTE: *This supply circuit is also used to supply power to the lateral tilt potentiometer R-02 and the shoe leveling sensor in the shoe leveling actuator M03, so a short to* ***12 volts*** *anywhere on the supply circuit will activate this error code.*

11. Disconnect connector **X032**, and use a multimeter to test for voltage on the feeder (FE) harness end of connector **X032** pin 5. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the header (HH) harness between connector X306 and connector **X032** wire 848 pink. Locate the short and repair.

    B. If high (>**5 volts**) voltage is found, continue with Step **9**.

12. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the feeder (FE) harness between connector **X032** pin 5 and connector **X007** pin 22 wire 848 pink or 757 pink. Locate the short and repair.

    B. If high (>**5 volts**) voltage is found, continue with Step **10**.

13. Disconnect connector **X023**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X023** pin 17.

    A. If **5 volts** is found, there is a short to high voltage in the lower frame (LF) harness between connector **X088** pin A on the shoe leveling actuator M03 and connector **X023** pin 17 wire 727 pink. Locate the short and repair.

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B. If high (>5V) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X023** pin 17, connector **X007** pin 22 and connector **X020** pin J3-26 on one of the following wires:
wire 757 pink, connector **X007** pin 22 to FF harness splice
wire 727 pink, connector **X023** pin 17 to FE harness splice
wire 726 pink, FE harness splice to connector **X020** pin J3-26. Locate the short and repair.

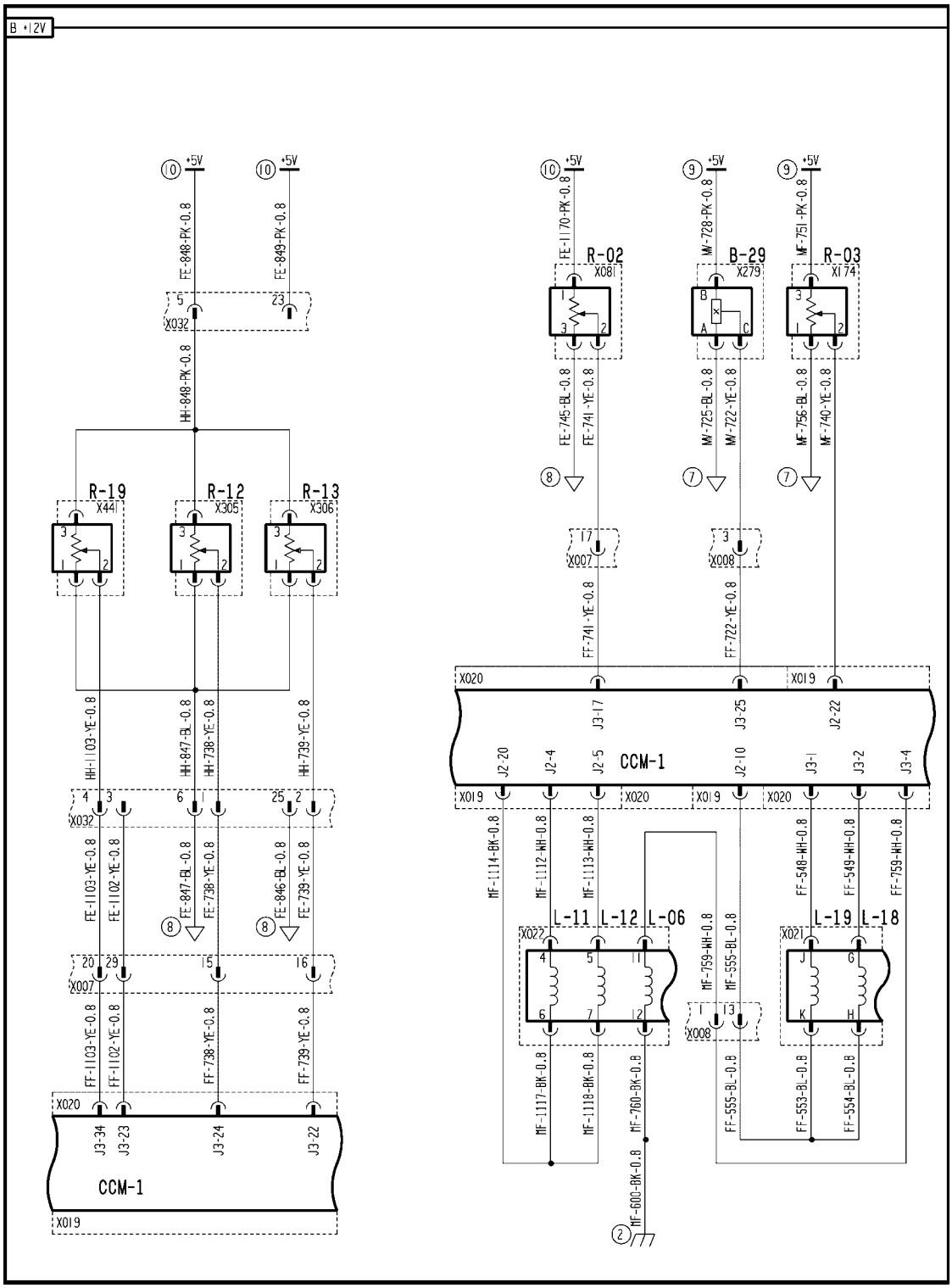
14. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are indicated, erase the fault code and continue operation.

B. If the fault code immediately resets, determine which **12 volts** circuit (such as the shoe leveling actuator) was activated to cause the short.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



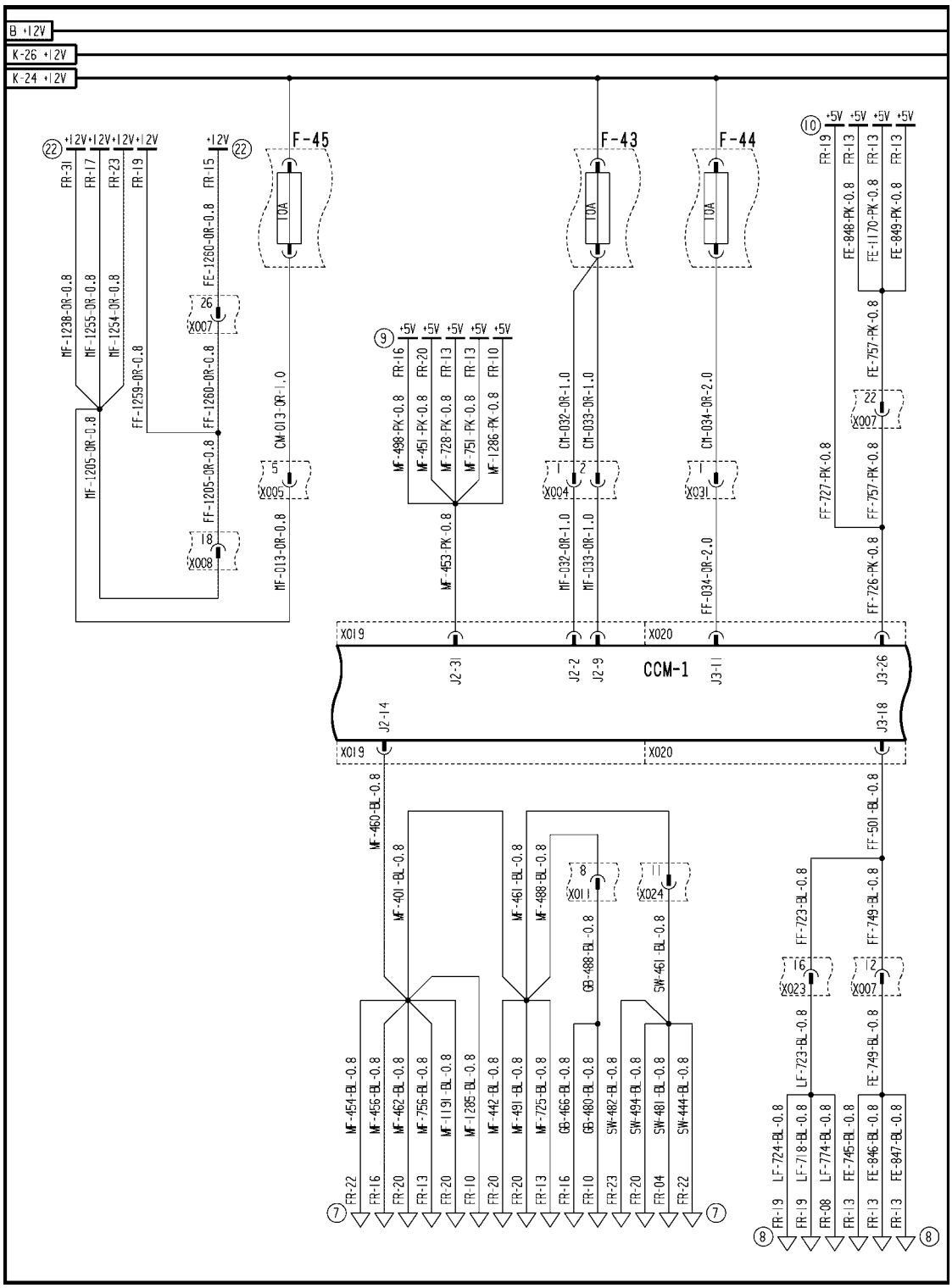
AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Right tool position sensor - Short circuit to ground (G.10.A.95.84 - G.30.B.53)

AFX8010

E0019-04 - Right Header Height / Tilt Sensor

Cause:
The right height/tilt sensor (R-13) circuit is shorted to ground.

Possible failure modes:

1. Sensor signal wiring is shorted to ground.
2. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RIGHT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector X306, and use a multimeter to test for continuity between connector X306 pin 2 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, continue with Step **5**.

   B. If there is continuity to ground, continue with Step **3**.

3. Disconnect connector **X032**, and use a multimeter to test for continuity between the feeder (FE) harness end of connector **X032** pin 2 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the header (HH) harness between connector X306 and connector **X032** wire 739 yellow. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **4**.

4. Disconnect connector **X007**, and use a multimeter to test for continuity between the front frame (FF) harness end of connector **X007** pin 16 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X007** pin 16 and connector **X020** pin J3-22 wire 739 yellow. Locate the short and repair.

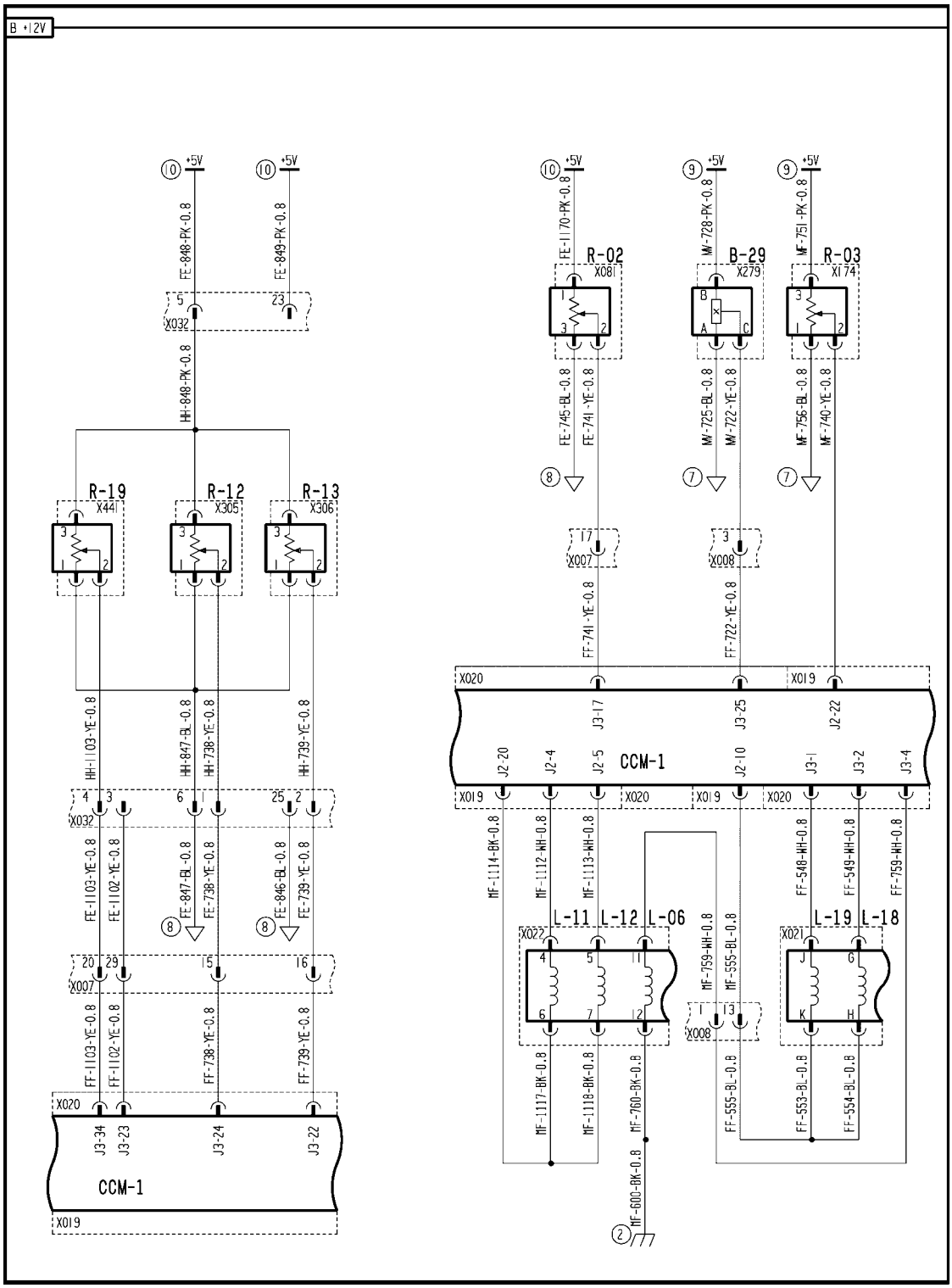
   B. If there is no continuity to ground, there is a short to ground in the feeder (FE) harness between connector **X032** pin 2 and connector **X007** pin 16 wire 739 yellow. Locate the short and repair.

5. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Sensing system Right tool position sensor - Open circuit (G.10.A.95.84 - G.30.B.50)

AFX8010

E0019-05 - Right Header Height / Tilt Sensor

Cause:
The right height/tilt sensor (R-13) circuit is open or has lost supply voltage.

Possible failure modes:

1. Sensor signal wiring is open.
2. Loss of power to the sensor.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RIGHT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The proper voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector X306, and use a multimeter to test for voltage on connector X306 pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **4**.

   B. If no voltage is found, continue with Step **3**.

3. Disconnect connector **X032**, and use a multimeter to test for voltage on connector **X032** pin 5. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the header (HH) harness between connector X306 and connector **X032** wire 848 pink. Locate the open and repair.

   B. If no voltage is found, continue with Step **3**.

4. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the feeder (FE) harness between connector **X032** pin 5 and connector **X007** pin 22 wire 848 pink or 757 pink. Locate the open and repair.

   B. If no voltage is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 22 and connector **X020** pin J3-26 wire 757 pink or 726 pink. Locate the open and repair.

5. Disconnect connector X306 and connector **X032**. Use a multimeter to check for continuity between connector X306 pin 2 and connector **X032** pin 2.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the header (HH) harness between connector X306 pin 2 and connector **X032** pin 2 wire 739 yellow. Locate the open and repair.

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6. Disconnect connector **X032** and connector **X007**. Use a multimeter to check for continuity between connector **X032** pin 2 and connector **X007** pin 16.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the feeder (FE) harness between connector **X032** pin 2 and connector **X007** pin 16 wire 739 yellow. Locate the open and repair.

7. Carefully disconnect connector **X020** from the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X007** pin 16 and connector **X020** pin J3-22.

   A. If continuity is found, the open is in the sensor. Replace the sensor.

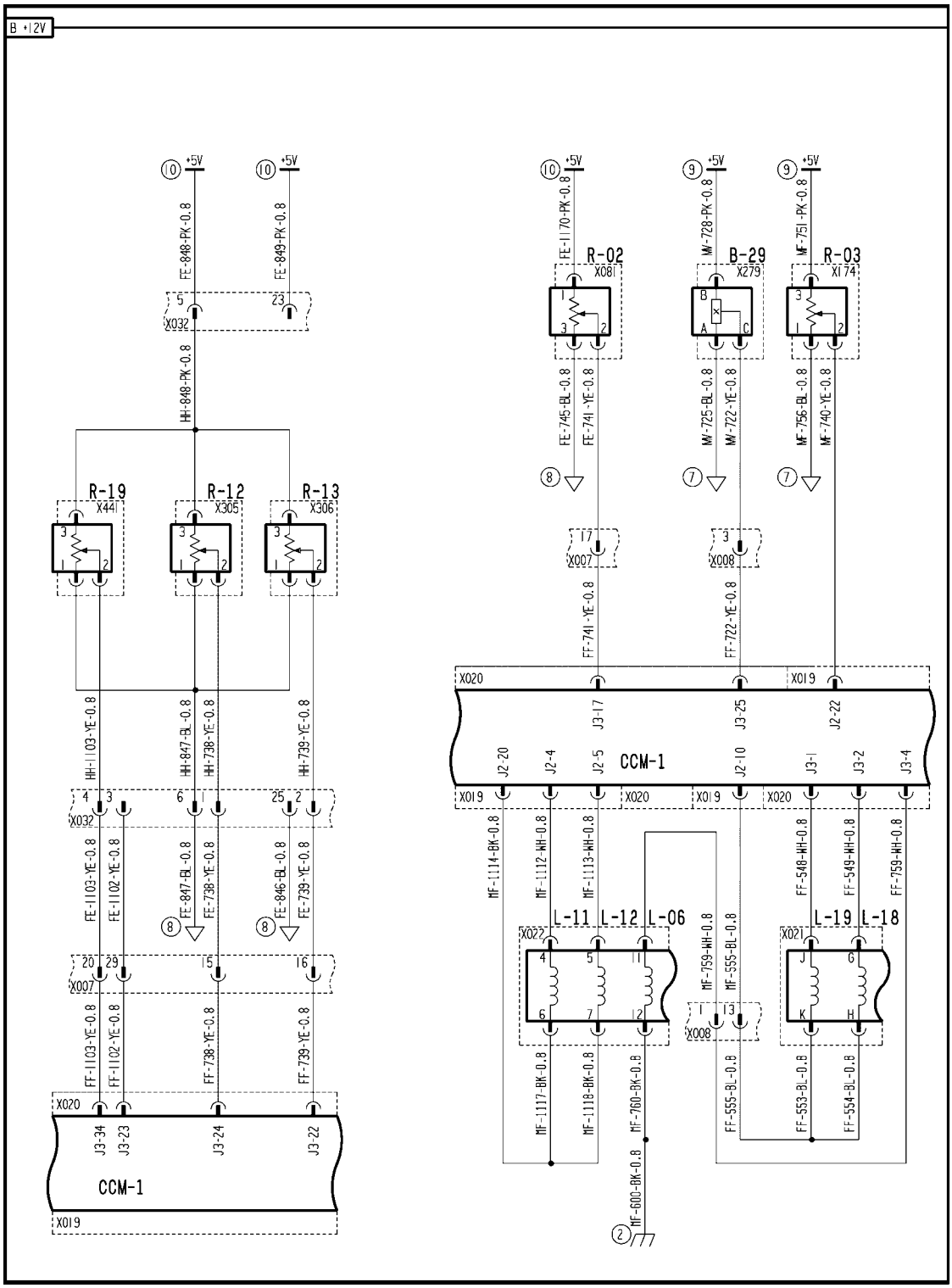
   B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 16 and connector **X020** pin J3-22 wire 739 yellow. Locate the open and repair.

8. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



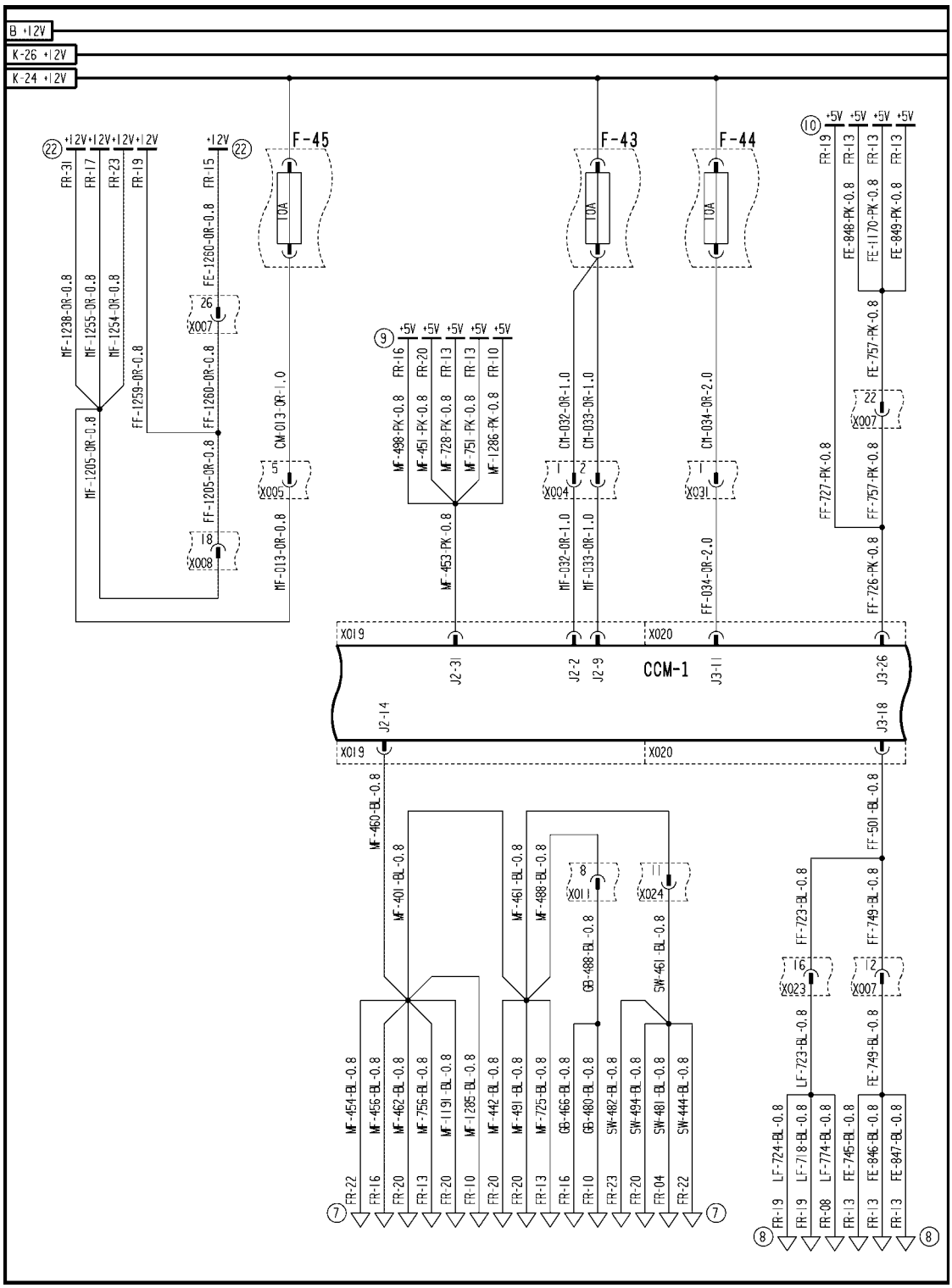
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FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Right tool position sensor - Out of range (G.10.A.95.84 - G.30.C.24)

AFX8010

E0019-07 - Right Header Height / Tilt Sensor

Cause:
The right height/tilt sensor (R-13) circuit is not moving when the feeder is moving.

Possible failure modes:

1. The right height/tilt sensor is mechanically bound up.

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "RIGHT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading does not change, the header protection plates are locked up, the sensor mechanical linkage is unhooked, or the sensor is mechanically bound up. Inspect the header plates and sensor linkage, and free up as necessary.

   B. If the voltage reading changes with feeder and header movement, erase the fault code and continue operation.

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Sensing system Left tool position sensor - Short circuit to B+ (G.10.A.95.82 - G.30.B.54)

AFX8010

E0020-03 - Left Header Height / Tilt Sensor

Cause:
The left height/tilt sensor (R-12) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LEFT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is high (>**4.7 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **11**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect connector X305, and use a multimeter to test for continuity to ground on connector X305 pin 1. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), continue with Step **6**.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

3. Key off. Disconnect connector **X032**, and use a multimeter to test for continuity to ground on connector **X032** pin 6. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), there is an open circuit in the header (HH) harness between connector **X032** and connector X305 wire 847 blue. Locate the open and repair.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

4. Key off. Disconnect connector **X007**. Use a multimeter to test for continuity between connector **X007** pin 12 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **4**.

   B. If continuity is found, there is an open circuit in feeder (FE) harness between connector **X032** pin 6 and connector **X007** pin 12 wire 847 blue or 749 blue. Locate the open and repair.

5. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X007** pin 12 and connector **X020** pin J3-18.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, there is an open circuit in front frame (FF) harness between connector **X007** pin 12 and connector **X020** pin J3-18 wire 749 blue or 501 blue. Locate the open and repair.

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6. Key off. Use a multimeter to test for continuity between connector **X020** pin J3-18 on CCM1 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.

7. Disconnect connector X305, and use a multimeter to test for voltage on connector X305 pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **8**.

   B. If high (>**4.7 volts**) voltage is found, continue with Step **7**.

8. Disconnect connector **X032**, and use a multimeter to test for voltage on the feeder (FE) harness end of connector **X032** pin 1. There should not be any voltage present.

   A. If no voltage is found, there is a short to voltage in the header (HH) harness between connector X305 and connector **X032** wire 738 yellow. Locate the short and repair.

   B. If high (>**4.7 volts**) voltage is found, continue with Step **7**.

9. Disconnect connector **X007**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X007** pin 15. There should not be any voltage present.

   A. If high (>**4.7 volts**) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X007** pin 15 and connector **X020** pin J3-24 wire 738 yellow. Locate the short and repair.

   B. If no voltage is found, there is a short to high voltage in the feeder (FE) harness between connector **X032** pin 1 and connector **X007** pin 15 wire 738 yellow. Locate the short and repair.

10. Disconnect connector X305, and use a multimeter to test for voltage on connector X305 pin 3. There should be **5 volts** present.

    A. If **5 volts** is found, continue with Step **11**.

    B. If high (>**5 volts**) voltage is found, continue with Step **11**.

    NOTE: *This supply circuit is also used to supply power to the lateral tilt potentiometer R-02 and the shoe leveling sensor in the shoe leveling actuator M03, so a short to* ***12 volts*** *anywhere on the supply circuit will activate this error code.*

11. Disconnect connector **X032**, and use a multimeter to test for voltage on the feeder (FE) harness end of connector **X032** pin 5. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the header (HH) harness between connector X305 and connector **X032** wire 848 pink. Locate the short and repair.

    B. If high (>**5 volts**) voltage is found, continue with Step **9**.

12. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the feeder (FE) harness between connector **X032** pin 5 and connector **X007** pin 22 wire 848 pink or 757 pink. Locate the short and repair.

    B. If high (>**5 volts**) voltage is found, continue with Step **10**.

13. Disconnect connector **X023**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X023** pin 17.

    A. If **5 volts** is found, there is a short to high voltage in the lower frame (LF) harness between connector **X088** pin A on the shoe leveling actuator M03 and connector **X023** pin 17 wire 727 pink. Locate the short and repair.

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B. If high (>5V) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X023** pin 17, connector **X007** pin 22 and connector **X020** pin J3-26 on one of the following wires:
wire 757 pink, connector **X007** pin 22 to FF harness splice
wire 727 pink, connector **X023** pin 17 to FE harness splice
wire 726 pink, FE harness splice to connector **X020** pin J3-26. Locate the short and repair.

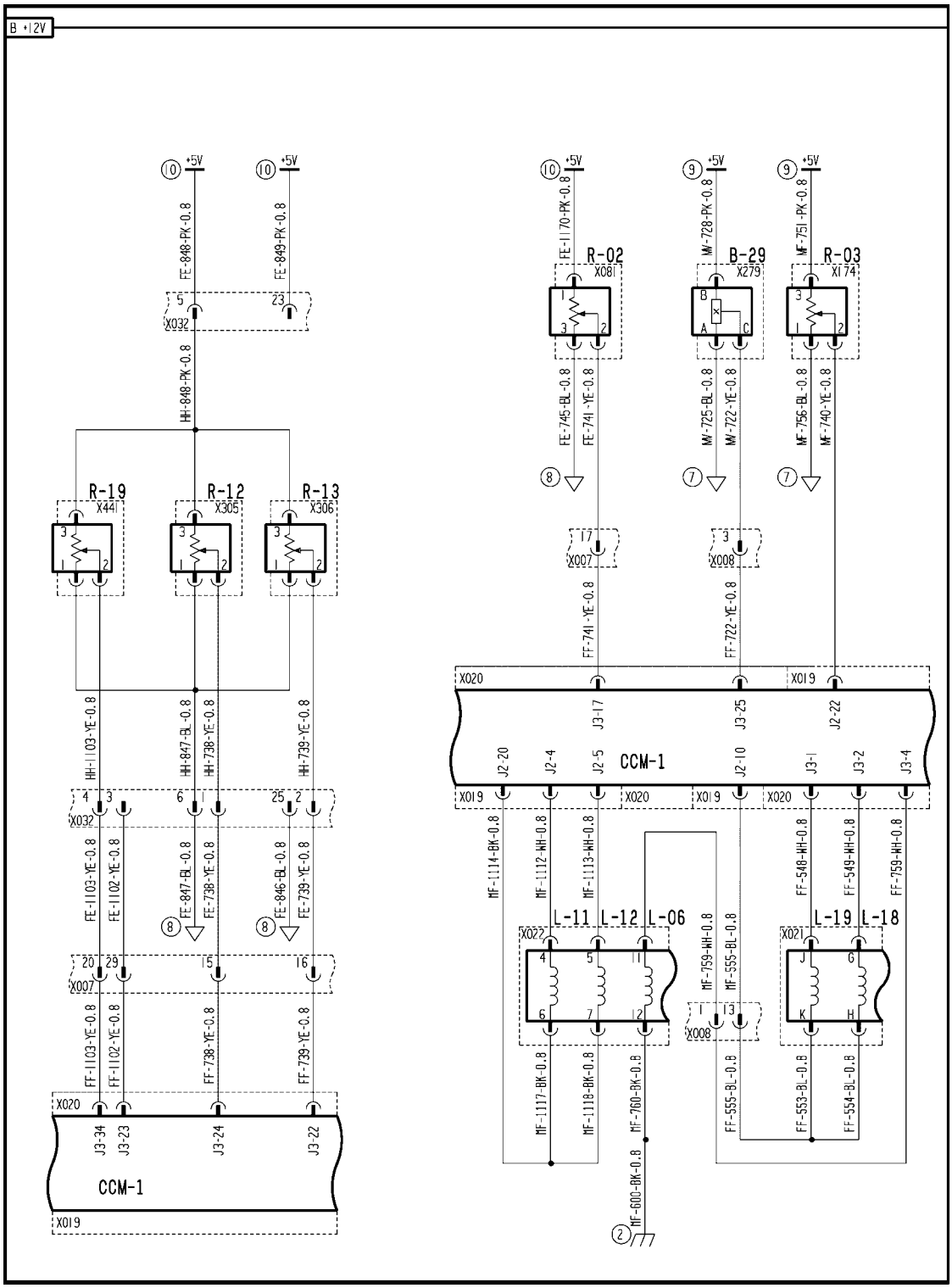
14. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are indicated, erase the fault code and continue operation.

B. If the fault code immediately resets, determine which **12 volts** circuit (such as the shoe leveling actuator) was activated to cause the short.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



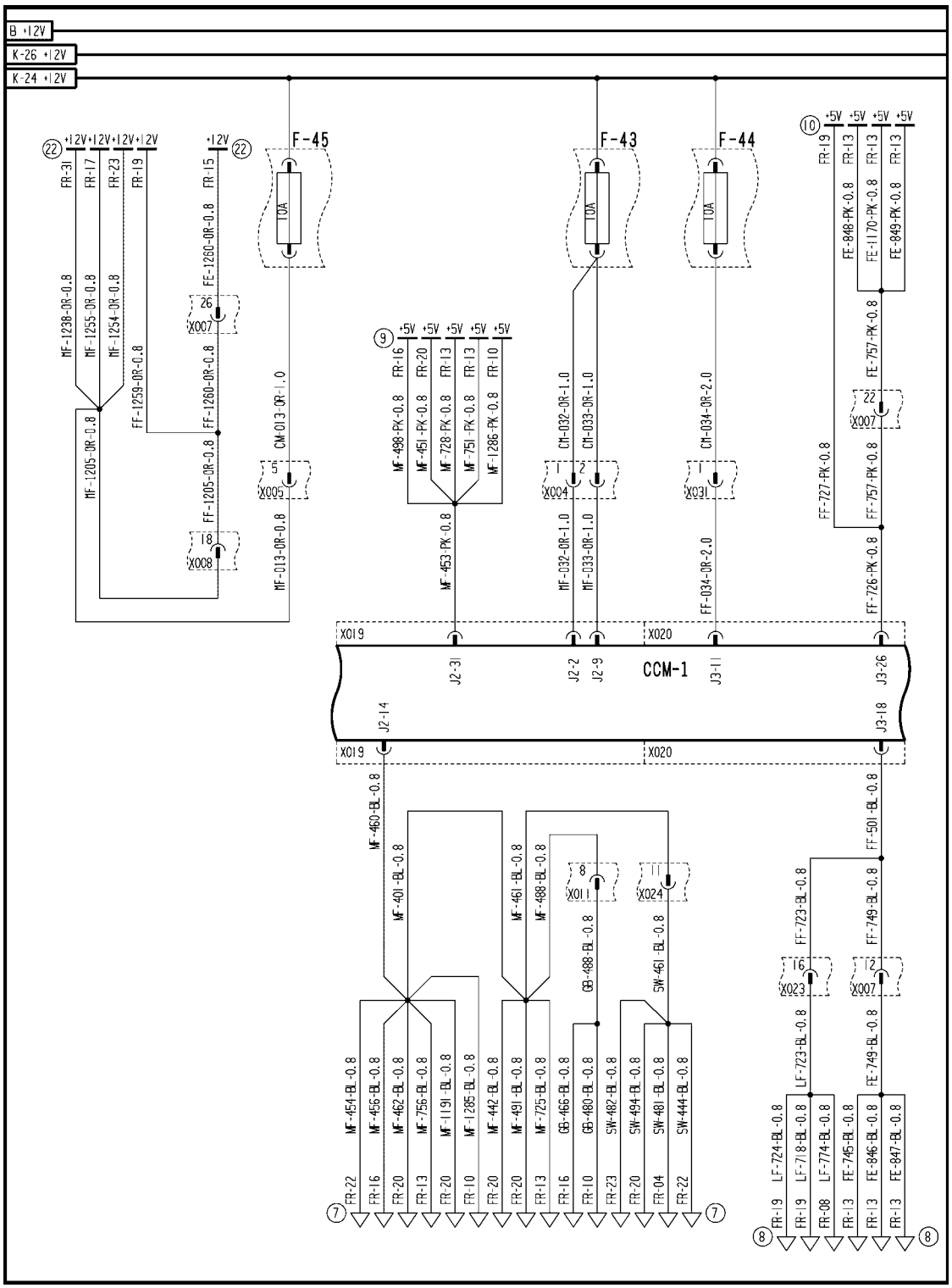
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FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Left tool position sensor - Short circuit to ground (G.10.A.95.82 - G.30.B.53)

AFX8010

E0020-04 - Left Header Height / Tilt Sensor

Cause:
The left height/tilt sensor (R-12) circuit is shorted to ground.

Possible failure modes:

1. Sensor signal wiring is shorted to ground.
2. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LEFT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector X305, and use a multimeter to test for continuity between connector X305 pin 2 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, continue with Step **5**.

   B. If there is continuity to ground, continue with Step **3**.

3. Disconnect connector **X032**, and use a multimeter to test for continuity between the feeder (FE) harness end of connector **X032** pin 1 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the header (HH) harness between connector X305 and connector **X032** wire 738 yellow. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **4**.

4. Disconnect connector **X007**, and use a multimeter to test for continuity between the front frame (FF) harness end of connector **X007** pin 15 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X007** pin 15 and connector **X020** pin J3-24 wire 738 yellow. Locate the short and repair.

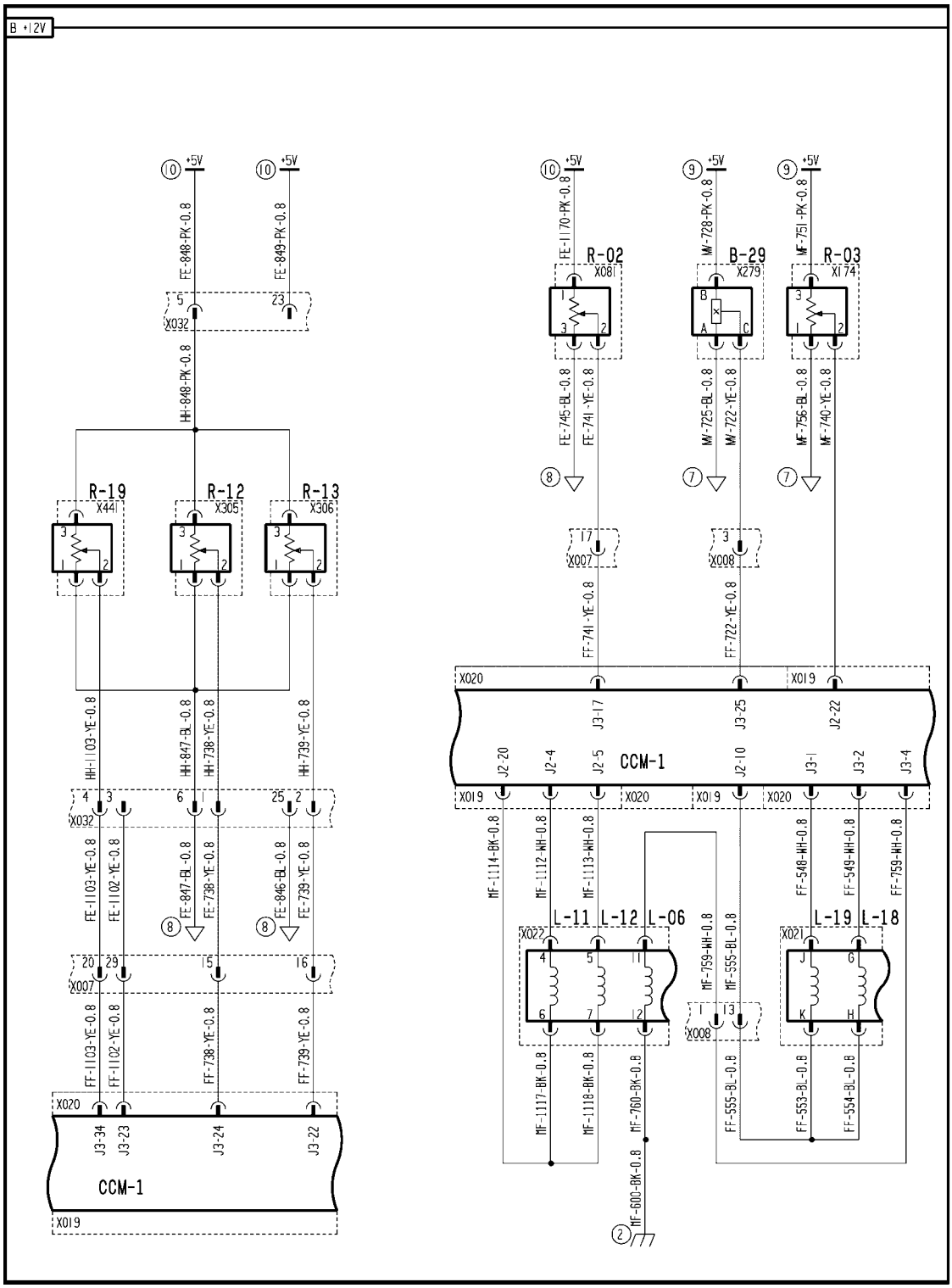
   B. If there is no continuity to ground, there is a short to ground in the feeder (FE) harness between connector **X032** pin 1 and connector **X007** pin 15 wire 738 yellow. Locate the short and repair.

5. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Sensing system Left tool position sensor - Open circuit (G.10.A.95.82 - G.30.B.50)

AFX8010

E0020-05 - Left Header Height / Tilt Sensor

Cause:
The left height/tilt sensor (R-12) circuit is open or has lost supply voltage.

Possible failure modes:

1. Sensor signal wiring is open.
2. Loss of power to the sensor.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LEFT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The proper voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector X305, and use a multimeter to test for voltage on connector X305 pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **4**.

   B. If no voltage is found, continue with Step **3**.

3. Disconnect connector **X032**, and use a multimeter to test for voltage on connector **X032** pin 5. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the header (HH) harness between connector X305 and connector **X032** wire 848 pink. Locate the open and repair.

   B. If no voltage is found, continue with Step **3**.

4. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the feeder (FE) harness between connector **X032** pin 5 and connector **X007** pin 22 wire 848 pink or 757 pink. Locate the open and repair.

   B. If no voltage is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 22 and connector **X020** pin J3-26 wire 757 pink or 726 pink. Locate the open and repair.

5. Disconnect connector X305 and connector **X032**. Use a multimeter to check for continuity between connector X305 pin 2 and connector **X032** pin 1.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the header (HH) harness between connector X305 pin 2 and connector **X032** pin 1 wire 738 yellow. Locate the open and repair.

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6. Disconnect connector **X032** and connector **X007**. Use a multimeter to check for continuity between connector **X032** pin 1 and connector **X007** pin 15.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the feeder (FE) harness between connector **X032** pin 1 and connector **X007** pin 15 wire 738 yellow. Locate the open and repair.

7. Carefully disconnect connector **X020** from the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X007** pin 15 and connector **X020** pin J3-24.

   A. If continuity is found, the open is in the sensor. Replace the sensor.

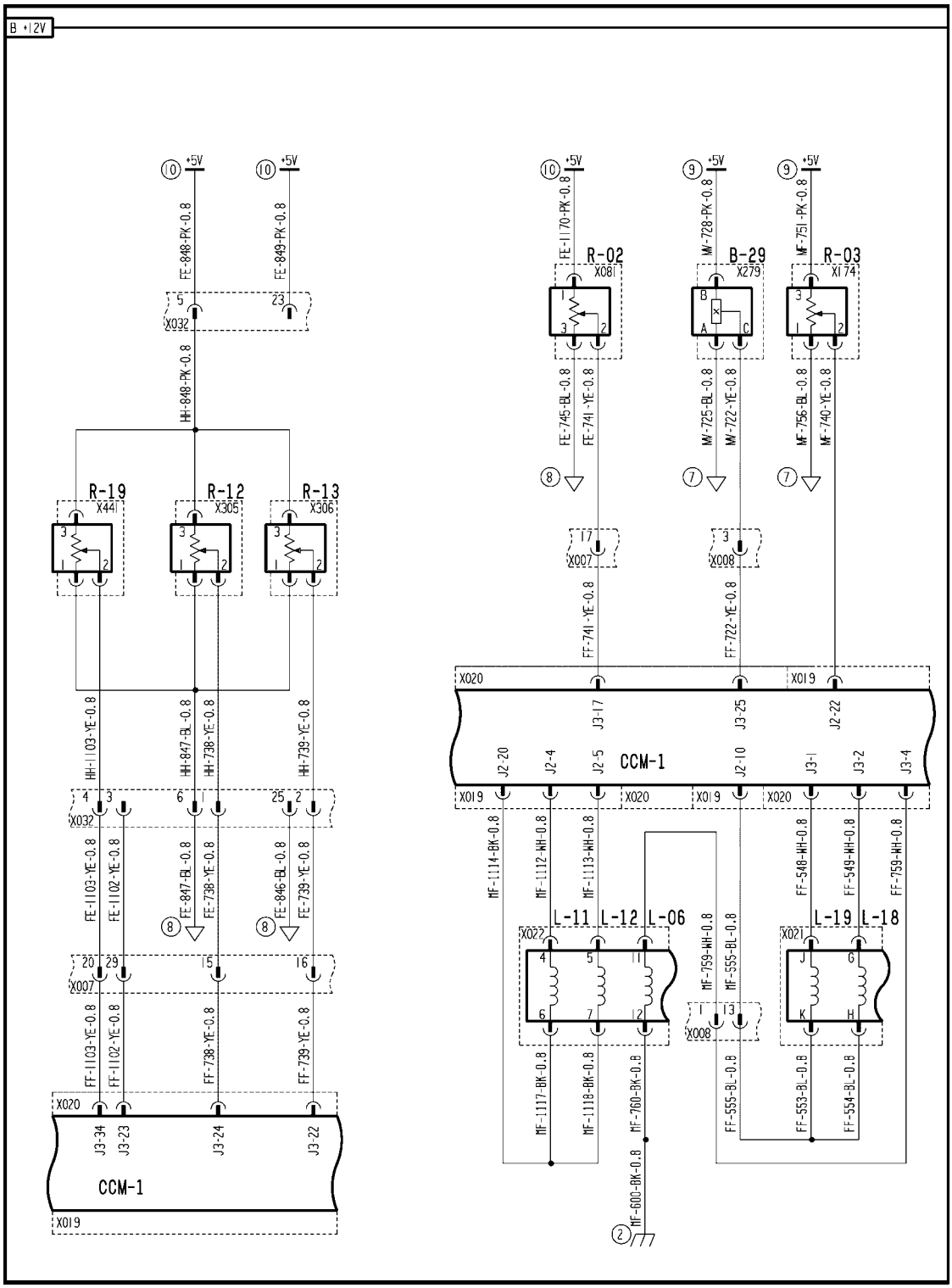
   B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 15 and connector **X020** pin J3-24 wire 738 yellow. Locate the open and repair.

8. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



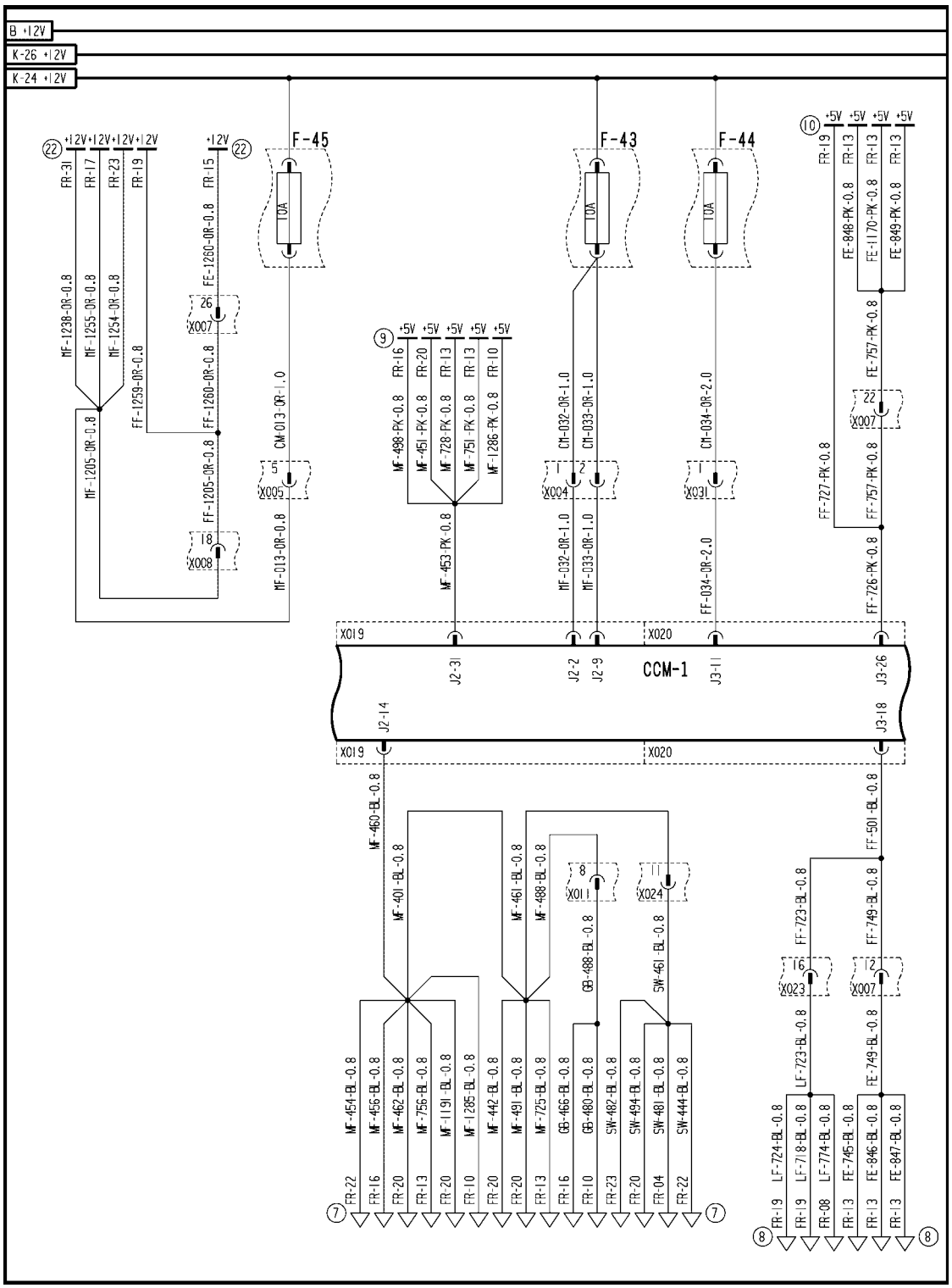
AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Left tool position sensor - Out of range (G.10.A.95.82 - G.30.C.24)

AFX8010

E0020-07 - Left Header Height / Tilt Sensor

Cause:
The left height/tilt sensor (R-12) circuit is not moving when the feeder is moving.

Possible failure modes:

1. The left height/tilt sensor is mechanically bound up.

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LEFT SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading does not change, the header protection plates are locked up, the sensor mechanical linkage is unhooked, or the sensor is mechanically bound up. Inspect the header plates and sensor linkage, and free up as necessary.

   B. If the voltage reading changes with feeder and header movement, erase the fault code and continue operation.

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Sensing system Centre tool position sensor - Short circuit to B+ (G.10.A.95.83 - G.30.B.54)

AFX8010

E0027-03 - Left Center Header Height Sensor

Cause:
The center height/tilt sensor (R-19) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LFT CENTER SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is high (>**4.7 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **11**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect connector X441, and use a multimeter to test for continuity to ground on connector X441 pin 1. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), continue with Step **6**.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

3. Key off. Disconnect connector **X032**, and use a multimeter to test for continuity to ground on connector **X032** pin 6. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), there is an open circuit in the header (HH) harness between connector **X032** and connector X441 wire 847 blue. Locate the open and repair.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

4. Key off. Disconnect connector **X007**. Use a multimeter to test for continuity between connector **X007** pin 12 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **4**.

   B. If continuity is found, there is an open circuit in feeder (FE) harness between connector **X032** pin 6 and connector **X007** pin 12 wire 847 blue or 749 blue. Locate the open and repair.

5. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X007** pin 12 and connector **X020** pin J3-18.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, there is an open circuit in front frame (FF) harness between connector **X007** pin 12 and connector **X020** pin J3-18 wire 749 blue or 501 blue. Locate the open and repair.

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6. Key off. Use a multimeter to test for continuity between connector **X020** pin J3-18 on CCM1 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.

7. Disconnect connector X441, and use a multimeter to test for voltage on connector X441 pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **8**.

   B. If high (>**4.7 volts**) voltage is found, continue with Step **7**.

8. Disconnect connector **X032**, and use a multimeter to test for voltage on the feeder (FE) harness end of connector **X032** pin 4. There should not be any voltage present.

   A. If no voltage is found, there is a short to voltage in the header (HH) harness between connector X441 and connector **X032** wire 1103 yellow. Locate the short and repair.

   B. If high (>**4.7 volts**) voltage is found, continue with Step **7**.

9. Disconnect connector **X007**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X007** pin 20. There should not be any voltage present.

   A. If high (>**4.7 volts**) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X007** pin 20 and connector **X020** pin J3-34 wire 1103 yellow. Locate the short and repair.

   B. If no voltage is found, there is a short to high voltage in the feeder (FE) harness between connector **X032** pin 4 and connector **X007** pin 20 wire 1103 yellow. Locate the short and repair.

10. Disconnect connector X441, and use a multimeter to test for voltage on connector X441 pin 3. There should be **5 volts** present.

    A. If **5 volts** is found, continue with Step **11**.

    B. If high (>**5 volts**) voltage is found, continue with Step **11**.

    NOTE: *This supply circuit is also used to supply power to the lateral tilt potentiometer R-02 and the shoe leveling sensor in the shoe leveling actuator M03, so a short to* ***12 volts*** *anywhere on the supply circuit will activate this error code.*

11. Disconnect connector **X032**, and use a multimeter to test for voltage on the feeder (FE) harness end of connector **X032** pin 5. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the header (HH) harness between connector X441 and connector **X032** wire 848 pink. Locate the short and repair.

    B. If high (>**5 volts**) voltage is found, continue with Step **9**.

12. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the feeder (FE) harness between connector **X032** pin 5 and connector **X007** pin 22 wire 848 pink or 757 pink. Locate the short and repair.

    B. If high (>**5 volts**) voltage is found, continue with Step **10**.

13. Disconnect connector **X023**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X023** pin 17.

    A. If **5 volts** is found, there is a short to high voltage in the lower frame (LF) harness between connector **X088** pin A on the shoe leveling actuator M03 and connector **X023** pin 17 wire 727 pink. Locate the short and repair.

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B. If high (>5V) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X023** pin 17, connector **X007** pin 22 and connector **X020** pin J3-26 on one of the following wires:
wire 757 pink, connector **X007** pin 22 to FF harness splice
wire 727 pink, connector **X023** pin 17 to FE harness splice
wire 726 pink, FE harness splice to connector **X020** pin J3-26. Locate the short and repair.

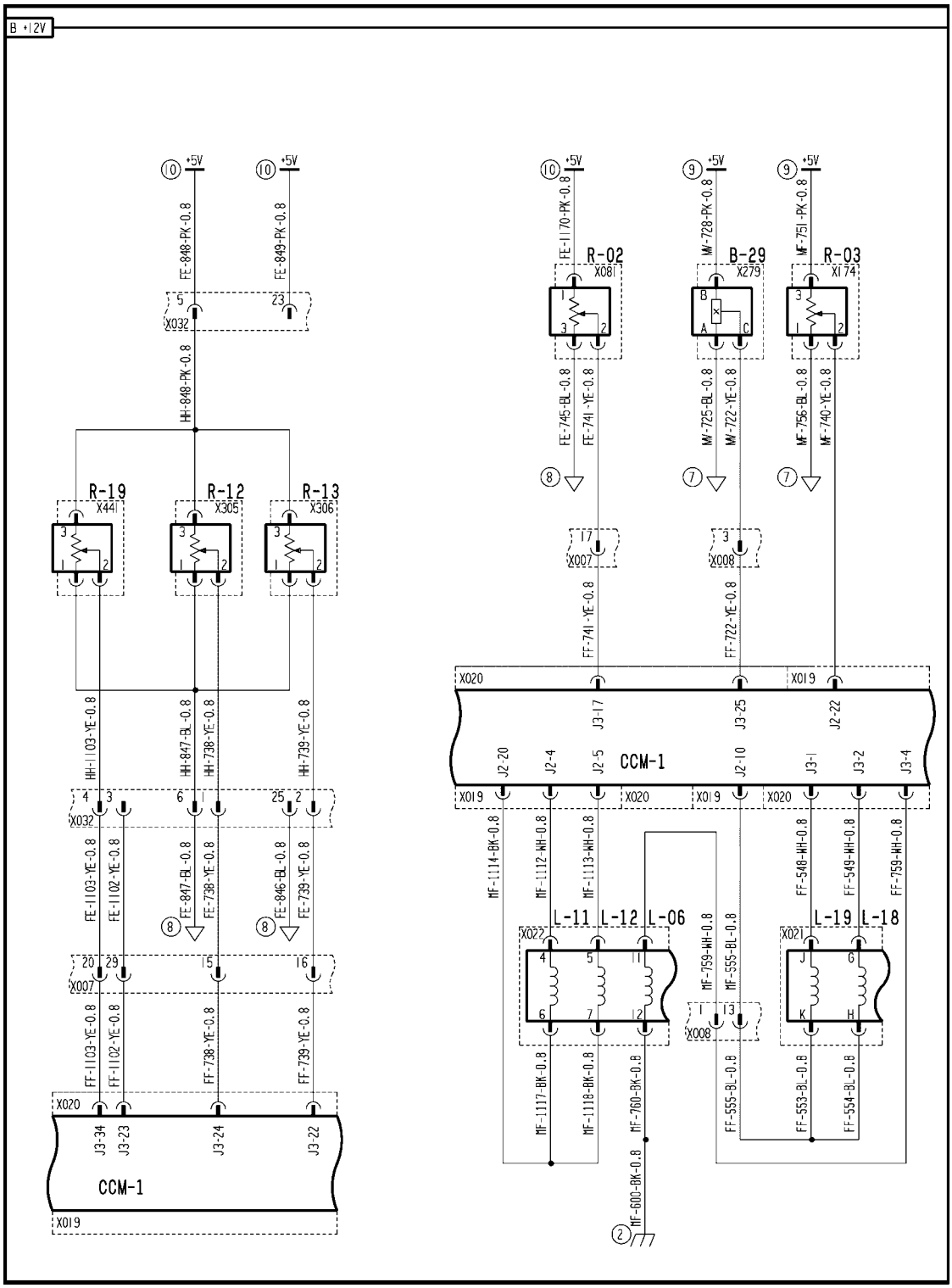
14. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are indicated, erase the fault code and continue operation.

B. If the fault code immediately resets, determine which **12 volts** circuit (such as the shoe leveling actuator) was activated to cause the short.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



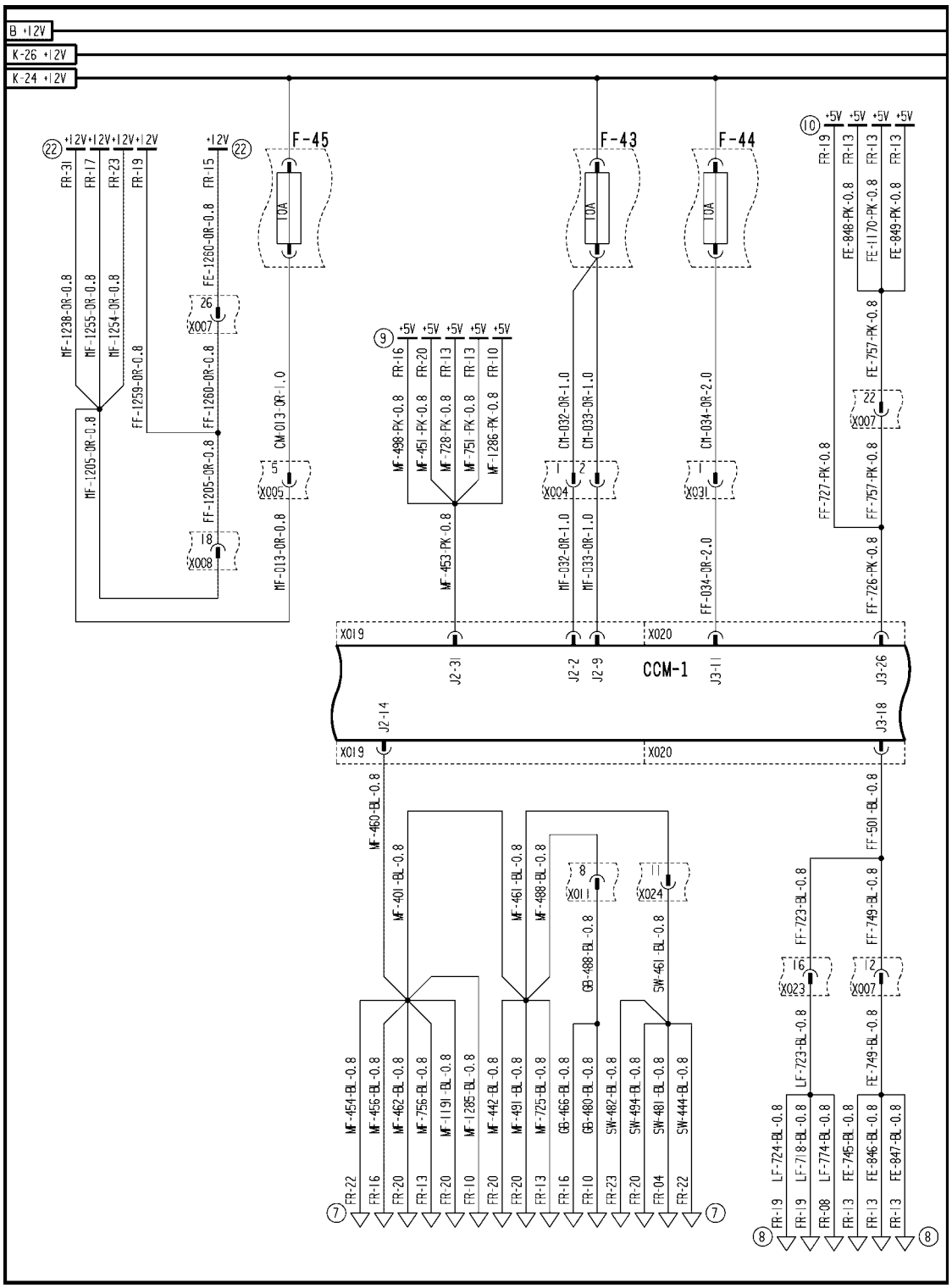
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FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Centre tool position sensor - Short circuit to ground (G.10.A.95.83 - G.30.B.53)

AFX8010

E0027-04 - Left Center Header Height Sensor

Cause:
The center height/tilt sensor (R-19) circuit is shorted to ground.

Possible failure modes:

1. Sensor signal wiring is shorted to ground.
2. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LFT CENTER SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector X441, and use a multimeter to test for continuity between connector X441 pin 2 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, continue with Step **5**.

   B. If there is continuity to ground, continue with Step **3**.

3. Disconnect connector **X032**, and use a multimeter to test for continuity between the feeder (FE) harness end of connector **X032** pin 4 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the header (HH) harness between connector X441 and connector **X032** wire 1103 yellow. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **4**.

4. Disconnect connector **X007**, and use a multimeter to test for continuity between the front frame (FF) harness end of connector **X007** pin 20 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X007** pin 20 and connector **X020** pin J3-34 wire 1103 yellow. Locate the short and repair.

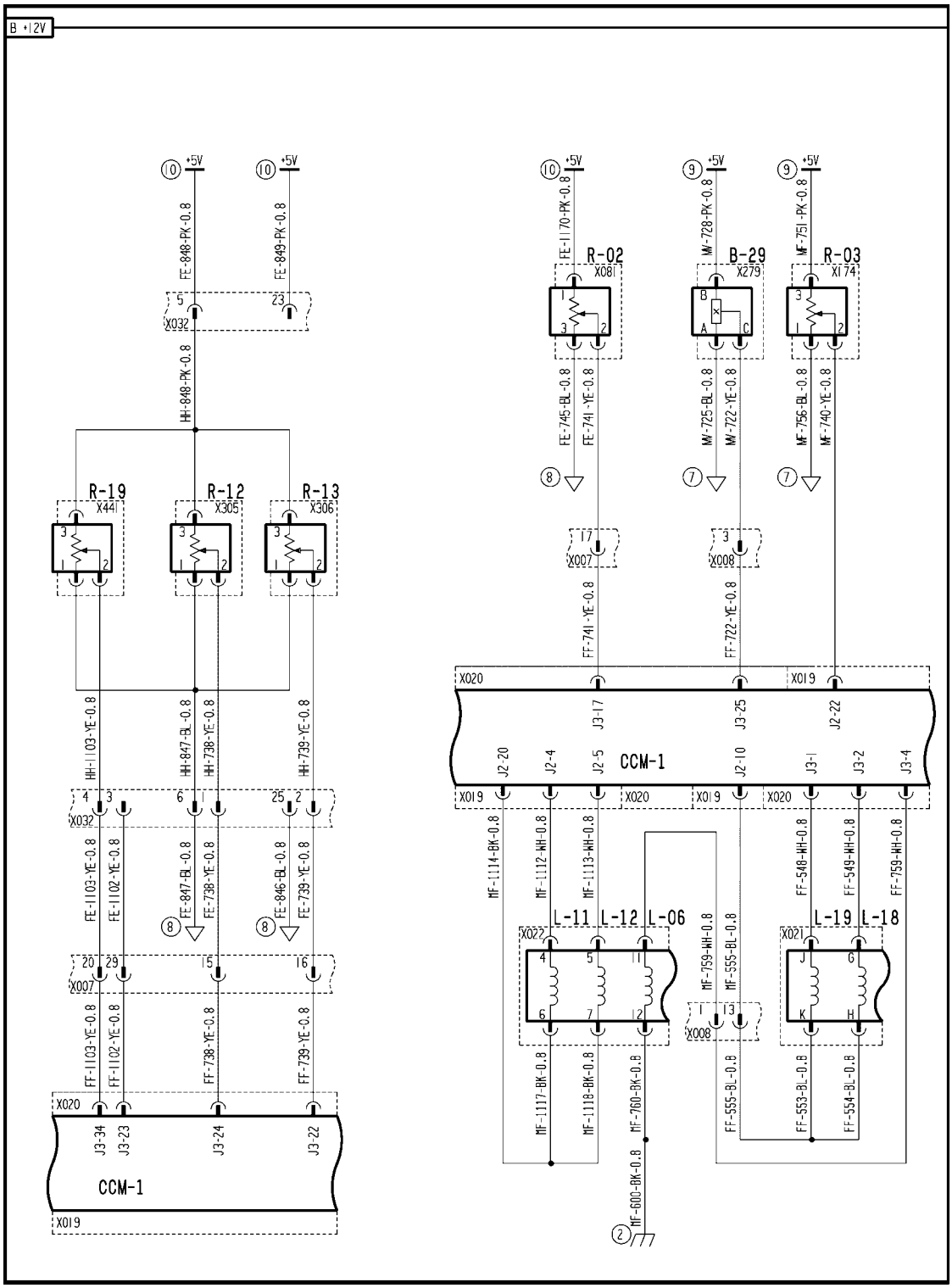
   B. If there is no continuity to ground, there is a short to ground in the feeder (FE) harness between connector **X032** pin 4 and connector **X007** pin 20 wire 1103 yellow. Locate the short and repair.

5. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Sensing system Centre tool position sensor - Open circuit (G.10.A.95.83 - G.30.B.50)

AFX8010

E0027-05 - Left Center Header Height Sensor

Cause:
The center height/tilt sensor (R-19) circuit is open or has lost supply voltage.

Possible failure modes:

1. Sensor signal wiring is open.
2. Loss of power to the sensor.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LFT CENTER SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The proper voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector X441, and use a multimeter to test for voltage on connector X441 pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **4**.

   B. If no voltage is found, continue with Step **3**.

3. Disconnect connector **X032**, and use a multimeter to test for voltage on connector **X032** pin 5. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the header (HH) harness between connector X441 and connector **X032** wire 848 pink. Locate the open and repair.

   B. If no voltage is found, continue with Step **3**.

4. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the feeder (FE) harness between connector **X032** pin 5 and connector **X007** pin 22 wire 848 pink or 757 pink. Locate the open and repair.

   B. If no voltage is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 22 and connector **X020** pin J3-26 wire 757 pink or 726 pink. Locate the open and repair.

5. Disconnect connector X441 and connector **X032**. Use a multimeter to check for continuity between connector X441 pin 2 and connector **X032** pin 4.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the header (HH) harness between connector X441 pin 2 and connector **X032** pin 4 wire 1103 yellow. Locate the open and repair.

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6. Disconnect connector **X032** and connector **X007**. Use a multimeter to check for continuity between connector **X032** pin 4 and connector **X007** pin 20.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the feeder (FE) harness between connector **X032** pin 4 and connector **X007** pin 20 wire 1103 yellow. Locate the open and repair.

7. Carefully disconnect connector **X020** from the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X007** pin 20 and connector **X020** pin J3-34.

   A. If continuity is found, the open is in the sensor. Replace the sensor.

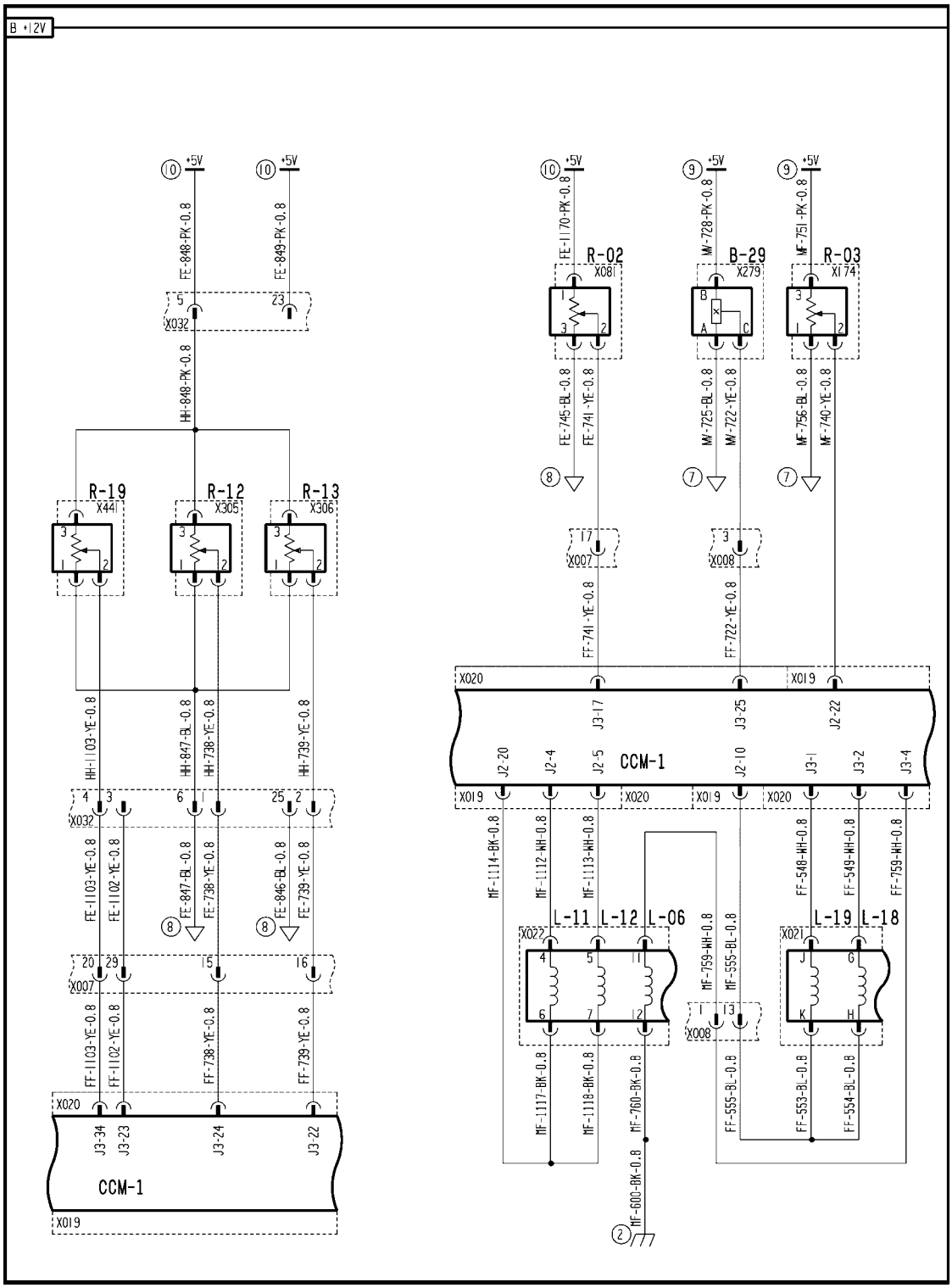
   B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 20 and connector **X020** pin J3-34 wire 1103 yellow. Locate the open and repair.

8. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



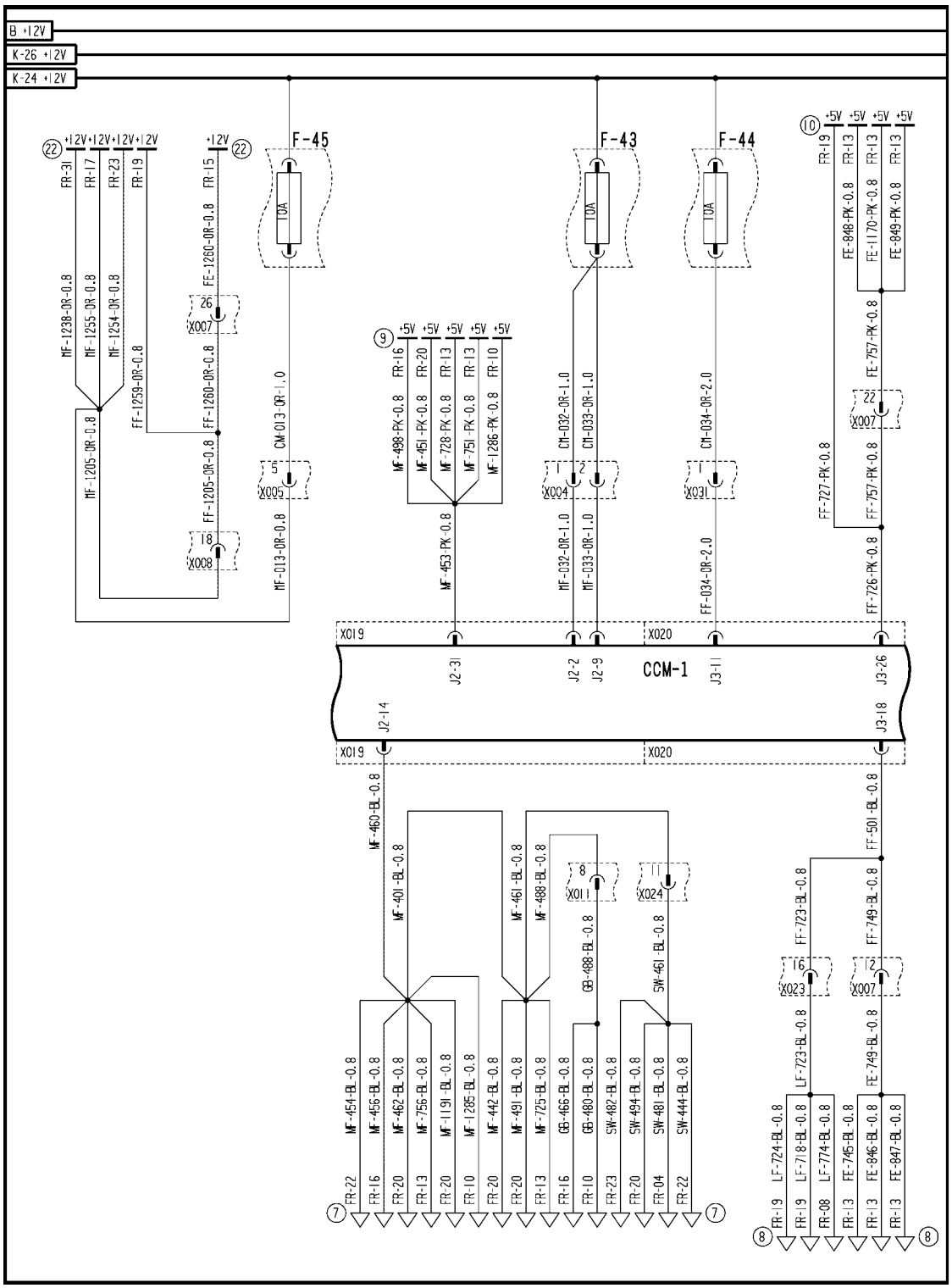
AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Centre tool position sensor - Out of range (G.10.A.95.83 - G.30.C.24)

AFX8010

E0027-07 - Left Center Header Height Sensor

Cause:
The center height/tilt sensor (R-19) circuit is not moving when the feeder is moving.

Possible failure modes:

1. The center height/tilt sensor is mechanically bound up.

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "LFT CENTER SEN" to check the voltage range. Manually raise and lower the header against the ground several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with header sense plate movement.

   The voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading does not change, the header protection plates are locked up, the sensor mechanical linkage is unhooked, or the sensor is mechanically bound up. Inspect the header plates and sensor linkage, and free up as necessary.

   B. If the voltage reading changes with feeder and header movement, erase the fault code and continue operation.

https://truckmanualshub.com/

Index

TOOL POSITIONING - G

LIFTING - 10.A

Accumulator valve - Unidentified failure (G.10.A.31 - G.30.B.46) 18
AFX8010

Command valve Header lift valve - Short circuit to B+ (G.10.A.12.20 - G.30.B.54) 3
AFX8010

Command valve Header lift valve - Short circuit to ground (G.10.A.12.20 - G.30.B.53) 7
AFX8010

Command valve Header lift valve - Unidentified failure (G.10.A.12.20 - G.30.B.46) 10
AFX8010

Command valve Header lift valve - Unidentified failure (G.10.A.12.20 - G.30.B.46) 14
AFX8010

Sensing system Centre tool position sensor - Open circuit (G.10.A.95.83 - G.30.B.50) 60
AFX8010

Sensing system Centre tool position sensor - Out of range (G.10.A.95.83 - G.30.C.24) 65
AFX8010

Sensing system Centre tool position sensor - Short circuit to B+ (G.10.A.95.83 - G.30.B.54) 51
AFX8010

Sensing system Centre tool position sensor - Short circuit to ground (G.10.A.95.83 - G.30.B.53) 57
AFX8010

Sensing system Left tool position sensor - Open circuit (G.10.A.95.82 - G.30.B.50) 45
AFX8010

Sensing system Left tool position sensor - Out of range (G.10.A.95.82 - G.30.C.24) 50
AFX8010

Sensing system Left tool position sensor - Short circuit to B+ (G.10.A.95.82 - G.30.B.54) 36
AFX8010

Sensing system Left tool position sensor - Short circuit to ground (G.10.A.95.82 - G.30.B.53) 42
AFX8010

Sensing system Right tool position sensor - Open circuit (G.10.A.95.84 - G.30.B.50) 30
AFX8010

Sensing system Right tool position sensor - Out of range (G.10.A.95.84 - G.30.C.24) 35
AFX8010

Sensing system Right tool position sensor - Short circuit to B+ (G.10.A.95.84 - G.30.B.54) 21
AFX8010

Sensing system Right tool position sensor - Short circuit to ground (G.10.A.95.84 - G.30.B.53) 27
AFX8010

https://truckmanualshub.com/

TOOL POSITIONING - G

TILTING - 20.A

AFX8010

https://truckmanualshub.com/

Contents

TOOL POSITIONING - G

TILTING - 20.A

TECHNICAL DATA

TILTING - General specification (G.20.A - D.40.A.10) 3
AFX8010

SERVICE

Support

Support - Remove (G.20.A.77 - F.10.A.10) 4
AFX8010

Support - Install (G.20.A.77 - F.10.A.15) 5
AFX8010

DIAGNOSTIC

Control valve

Control valve Lateral tilt valve - Short circuit to B+ (G.20.A.13.20 - G.30.B.54) 6
AFX8010

Control valve Lateral tilt valve - Short circuit to ground (G.20.A.13.20 - G.30.B.53) 10
AFX8010

Control valve Lateral tilt valve - Unidentified failure (G.20.A.13.20 - G.30.B.46) 13
AFX8010

Control valve Lateral tilt valve - Unidentified failure (G.20.A.13.20 - G.30.B.46) 17
AFX8010

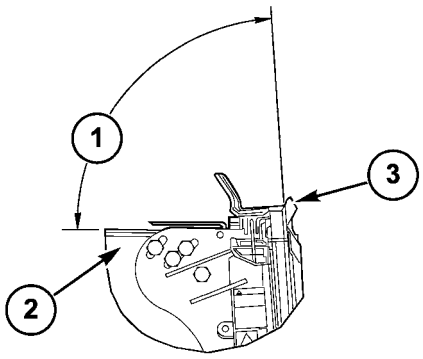
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TILTING - General specification (G.20.A - D.40.A.10)

AFX8010

NOTE: *Use the following table to determine the proper adapter angle, 1, between the feeder, 2, and the cradle, 3.*

•



50032073A5 1

North America

TIRE SIZE	ADAPTER ANGLE (Degrees)
30.5L 32 14 PR R1	94.2
30.5L 32 16 PR LS2	95.3
800/65R32 172A8 R1W	94.2
900/60R32 176A8 R1W	94.2
900/60R32 176A8 R1	94.2
900/65R32 172A8 R2	95.3
76X50.00-32 16PR HF3	96.4
18.4R42 153A8 R1W	95.3
20.8R42 155A8 R1W	95.3
20.8R42 155A8 R2	96.4
380/90R46 149A8 R1W	95.3
420/80R46 159A8 R1	95.3

Europe

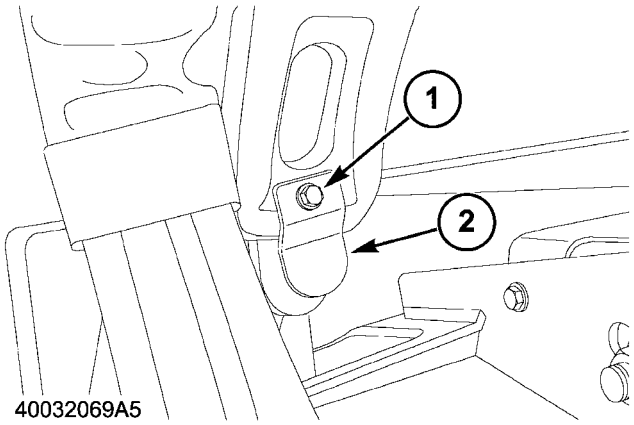
TIRE SIZE	ADAPTER ANGLE (Degrees)
650/75R32 172A8 R1W	94.2
710/70R38 171A8 R1W	95.3
800/65R32 172A8 R1W	94.2
900/60R32 176A8 R1W	94.2
1050/50R32 178A8 HF3	95.3

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Support - Remove (G.20.A.77 - F.10.A.10)

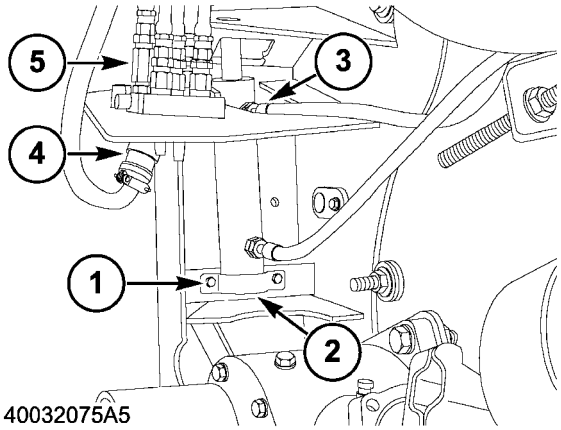
AFX8010

1. Remove the bolt, 1, and plate, 2, and remove the pin holding the hydraulic cylinder in place.



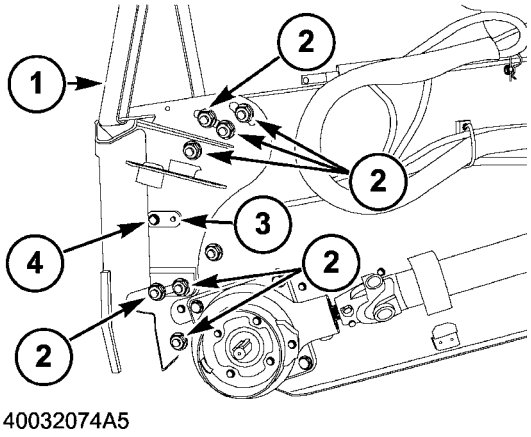
40032069A5 1

2. Remove the bolts, 1, and the bracket, 2. Disconnect the upper hose connection, 3, and remove the cylinder from the face plate. Reconnect the hose to prevent loss of hydraulic fluid. Remove the electrical connector, 4, and the hydraulic coupling, 5, from the face plate.



40032075A5 2

3. Attach a lifting device, 1, to the face plate. Remove the 7 carriage bolts, washers and nuts, 2, on both sides of the face plate. Remove the bolt and washer, 3, and remove the pin, 4, from each side of the face plate.



40032074A5 3

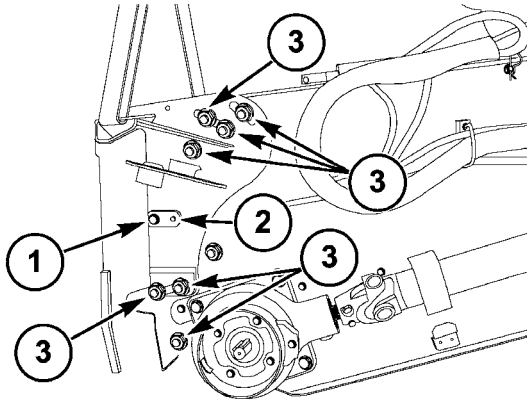
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Support - Install (G.20.A.77 - F.10.A.15)

AFX8010

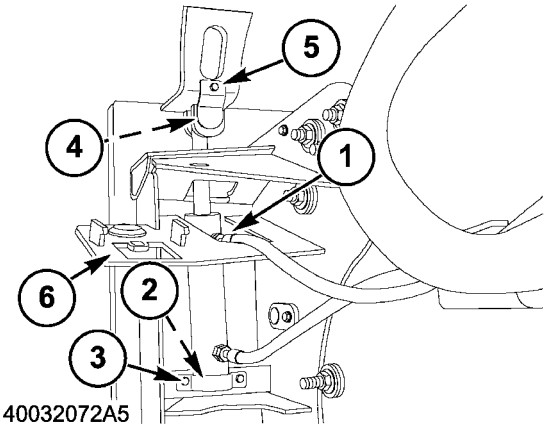
Prior operation: TILTING - Remove (G.20.A - F.10.A.10)

1. Lift the face plate into position and insert the pin **(1)**. Secure the pin with the bolt and washer **(2)**. Repeat on other side of feeder.
   Insert the carriage bolts and loosely install the washers and nuts **(3)**.
   Refer to **TILTING - Check (G.20.A - F.45.A.10)** to set the tilt angle based on the combine tire size.
   Torque the nuts **(3)** to **555 - 620 Nm** (**408 - 460 lb ft**) .



40032074B5 1

2. Disconnect the upper hose **(1)** from the hydraulic cylinder and install the cylinder on the face plate. Reconnect the hydraulic hose. Insert the pin, 2, and bracket, 3, and bolts. Install the pin **(4)**. Hold in place with the bracket and bolt **(5)**. Set the hydraulic coupling and electrical connector on their mounts **(6)** on the face plate.



40032072A5 2

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Control valve Lateral tilt valve - Short circuit to B+ (G.20.A.13.20 - G.30.B.54)

AFX8010

E0048-03 - Header Tilt Current Sense

Context:
The Header Tilt Current Sense circuit is the ground path for the header tilt CW and header tilt CCW PWM solenoids. By monitoring current flow on the return path of the solenoids, the module can provide precise control of solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The header tilt CW (L-18) or header tilt CCW (L-19) circuits have excessive current draw, or are shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "TILT CCW VLV" or "TILT CW VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output. Test both header tilt CW and tilt CCW circuits.

   The proper current for both header tilt CW and header tilt CCW should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps** on either circuit, continue with Step **3**.

   B. If the readings are normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading on either circuit, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **6**.

   NOTE: *If the current reading is high, immediately shut off the circuit after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the feeder valves connector **X021**. Use a multimeter to check the resistance of the header tilt CW solenoid L-18 between connector **X021** pins G & H. Repeat this resistance check for the header tilt CCW solenoid L-19 between connector **X021** pins J & K. The proper resistance range for the solenoids is **7.2 - 11.2 ohms**.

   A. If either solenoid is out of specification, replace the solenoid. Continue with Step **8**.

   B. If both solenoids are within specification, continue with Step **4**.

3. Disconnect the main frame (MF) harness at connector **X008**. Carefully remove connector **X020** from the bottom of the CCM1 module. Use a multimeter to check the resistance between the front frame (FF) harness end of connector **X008** pin 13 and connector **X020** pin J3-1 (tilt CCW). Repeat this resistance check between the front frame (FF) harness end of connector **X008** pin 13 and connector **X020** pin J3-2 (tilt CW).

   A. If the resistance is lower than the previously measured resistance, there is a short in the front frame (FF) harness between connector **X020**, connector **X021** and connector **X008** wires 548 white (tilt CCW) or 549 white (tilt CCW) and 553 blue, 554 blue or 555 blue. Locate the short and repair. Continue with Step **8**.

   B. If the resistance is the same as previously measured, continue with Step **6**.

4. Carefully remove connectors **X019** and **X020** from the bottom of the CCM1 module. Use a multimeter to check the resistance between the harness ends of connector **X019** pin J2-10 and connector **X020** pin J3-1 (tilt

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CCW). Repeat this resistance check between the front frame (FF) harness end of connector **X019** pin J2-10 and connector **X020** pin J3-2 (tilt CW).

A. If the resistance is lower than the previously measured resistance, there is a short in the main frame (MF) harness between connector **X008** and connector **X019** wire 555 blue. Locate the short and repair. Continue with Step **8**.

B. If the resistance is the same as previously measured, continue with Step **6**.

5. Key on. Disconnect connector **X021**. Use a multimeter to check for voltage at connector **X021** pin H or K (harness end). There should be no voltage on either wire.

   A. If there is no voltage present on the wires, continue with Step **8**.

   B. If there is voltage on the wire, continue with Step **7**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

6. Key on. Disconnect connector **X008**. Use a multimeter to check for voltage at the main frame (MF) harness end of connector **X008** pin 13. There should be no voltage.

   A. If there is no voltage present on the wires, there is a short to voltage in the front frame (FF) harness between connector **X021** and connector **X008** wires 553 blue, 554 blue or 555 blue. Locate the short and repair. Continue with Step **8**.

   B. If there is voltage on the wire, there is a short to voltage in the main frame (MF) harness between connector **X008** and connector **X019** pin J2-10 wire 555 blue. Locate the short and repair. Continue with Step **8**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

7. The sense resistor in the module for the Header Tilt Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Carefully disconnect connector **X019** from the bottom of the CCM1 module. Use a multimeter to check resistance between connector **X019** pin J2-10 on the module and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM1 module has failed. Replace the module.

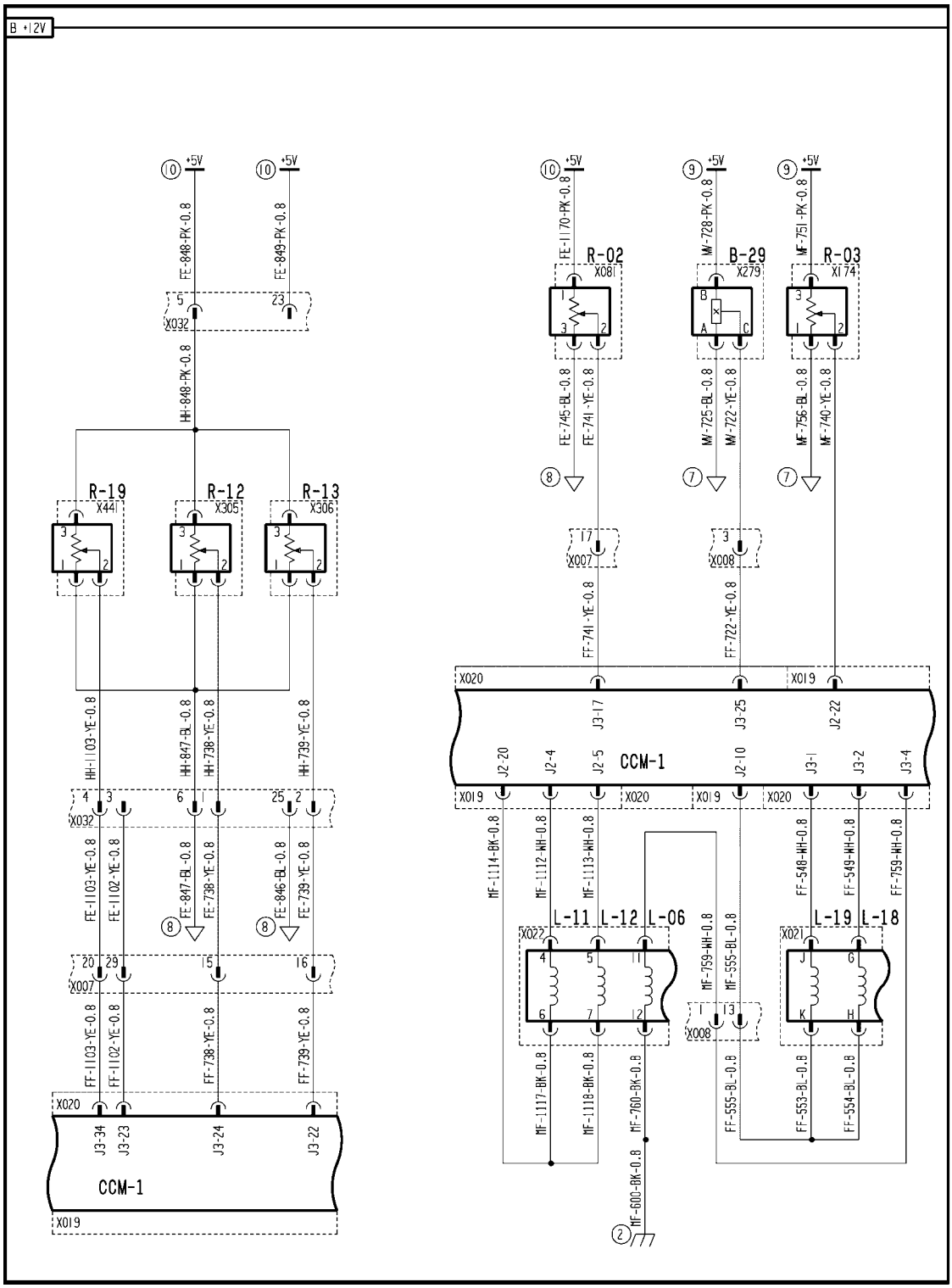
   B. If the resistance is correct, the sense resistor in the CCM1 module is okay, and the circuit should function correctly. Continue with Step **9**.

8. Operate the combine while monitoring the Header Tilt Current Sense circuit current on the Universal Display Plus "DIAG" screen.

   A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Control valve Lateral tilt valve - Short circuit to ground (G.20.A.13.20 - G.30.B.53)

AFX8010

E0048-04 - Header Tilt Current Sense

Context:
The Header Tilt Current Sense circuit is the ground path for the header tilt CW and header tilt CCW PWM solenoids. By monitoring current flow on the return path of the solenoids, the module can provide precise control of solenoid engagement. When this error message is reported, this is an indication that the output is engaged, but the sense line does not detect any current flow - the circuit is grounded externally from the module.

Cause:
The header tilt CW (L-18) or header tilt CCW (L-19) circuits are grounded at an external point.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to ground.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "TILT CCW VLV" or "TILT CW VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output. Test both header tilt CW and tilt CCW circuits.

   The proper current for both header tilt CW and header tilt CCW should be approximately **1.0 - 1.5 amps**.

   A. If there is no current reading on either circuit, the circuit is grounded externally from the module. Continue with Step **2**.

   B. If the readings are normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **4**.

   NOTE: *If the current reading is high, immediately shut off the circuit after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the feeder valves connector **X021**. Use a multimeter to check for continuity between the header tilt CW solenoid L-18 connector **X021** pins G or H and chassis ground. Repeat this continuity check between the header tilt CCW solenoid L-19 connector **X021** pins J or K and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground on either solenoid, replace the solenoid.

   B. If there is no continuity to ground on either solenoid, continue with Step **3**.

3. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between the harness end of connector **X021** pin H and chassis ground. Repeat this continuity check between the harness end of connector **X021** pin K and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **4**.

   B. If there is no continuity to ground, continue with Step **4**.

4. Disconnect connector **X008**. Use a multimeter to check for continuity between connector **X008** pin 13 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X008** wires 553 blue, 554 blue or 555 blue. Locate the short and repair.

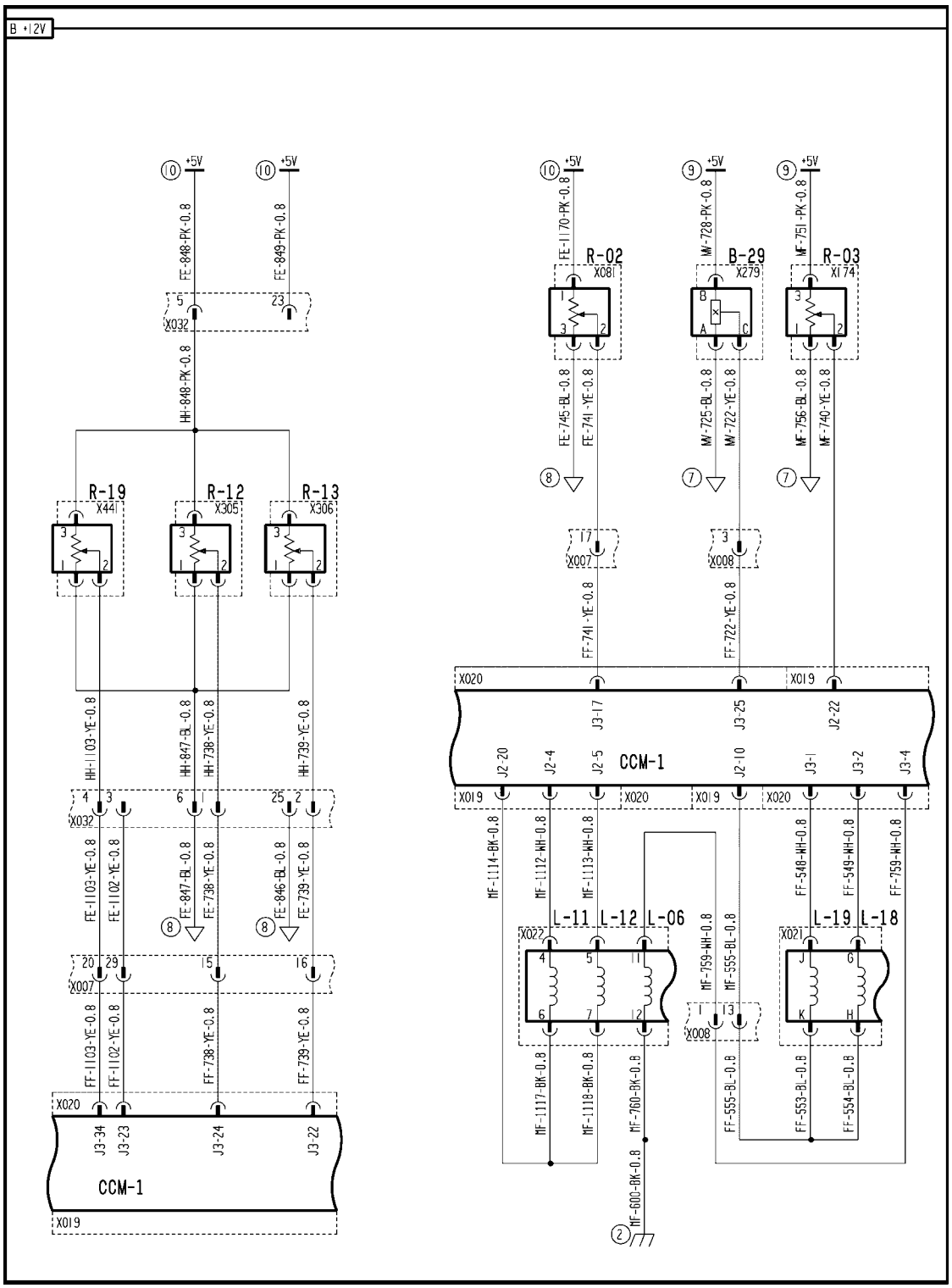
   B. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X008** and connector **X019** pin J2-10 wire 555 blue. Locate the short and repair.

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5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Control valve Lateral tilt valve - Unidentified failure (G.20.A.13.20 - G.30.B.46)

AFX8010

E0057-11 - Header Tilt CCW Valve

Cause:
The lateral tilt CCW valve (L-19) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "TILT CCW VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **7**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the lateral tilt CCW valve coil (L-19) between connector **X021** pins J & K. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the lateral tilt CCW solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the lateral tilt CCW solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X021** pin J (FF harness side) and chassis ground. Flex the front frame (FF) harness while making this check.

   A. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X020** pin J3-1 wire 548 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Use a multimeter to check for continuity between connector **X021** pin K (harness side) and chassis ground. Flex the front frame (FF) harness while making this check.

   A. If there is no continuity to ground, continue with step **8**.

   B. If there is continuity to ground, continue with Step **7**.
5. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X008** pin 13 and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, continue with step **6**.

   B. If there is continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** and connector **X008** wire 553 blue or 555 blue. Locate the open and repair.
6. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X019** pin J2-10 on the module and chassis ground.

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A. There is infinite resistance. The sense resistor in the CCM1 module has failed. Replace the module.

B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM2 module is okay. There is an open circuit in the main frame (MF) harness between connector **X008** pin 13 and connector **X019** pin J2-10 wire 555 black. Locate the open and repair.

NOTE: *The sense resistor in the module for the Header Tilt Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

7. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the lateral tilt CCW valve. Use a multimeter to check for **12 volts** between connector **X021** pin J and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin J and connector **X020** pin J3-1 wire 548 white. Locate the open and repair.

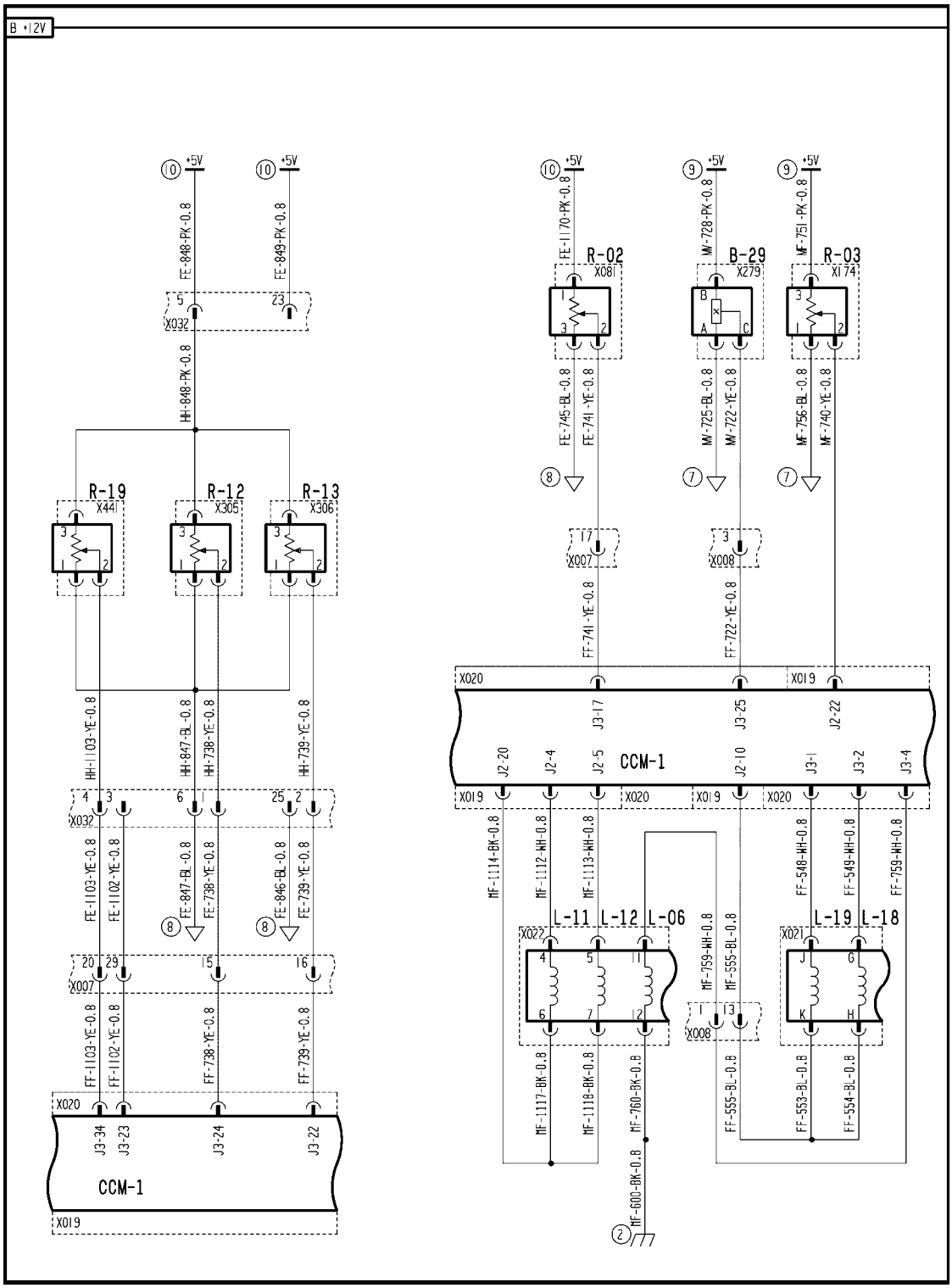
   B. If **12 volts** is found, continue with Step **9**.

8. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

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Control valve Lateral tilt valve - Unidentified failure (G.20.A.13.20 - G.30.B.46)

AFX8010

E0058-11 - Header Tilt CW Valve

Cause:
The lateral tilt CW valve (L-18) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "TILT CW VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **7**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the lateral tilt CW valve coil (L-18) between connector **X021** pins G & H. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the lateral tilt CW solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the lateral tilt CW solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X021** pin G (FF harness side) and chassis ground. Flex the front frame (FF) harness while making this check.

   A. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X020** pin J3-2 wire 549 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Use a multimeter to check for continuity between connector **X021** pin H (harness side) and chassis ground. Flex the front frame (FF) harness while making this check.

   A. If there is no continuity to ground, continue with step **8**.

   B. If there is continuity to ground, continue with Step **7**.
5. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X008** pin 13 and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, continue with step **6**.

   B. If there is continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** and connector **X008** wire 554 blue or 555 blue. Locate the open and repair.
6. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X019** pin J2-10 on the module and chassis ground.

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A. There is infinite resistance. The sense resistor in the CCM1 module has failed. Replace the module.

B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM2 module is okay. There is an open circuit in the main frame (MF) harness between connector **X008** pin 13 and connector **X019** pin J2-10 wire 555 black. Locate the open and repair.

NOTE: *The sense resistor in the module for the Header Tilt Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

7. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the lateral tilt CW valve. Use a multimeter to check for **12 volts** between connector **X021** pin G and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin G and connector **X020** pin J3-2 wire 549 white. Locate the open and repair.

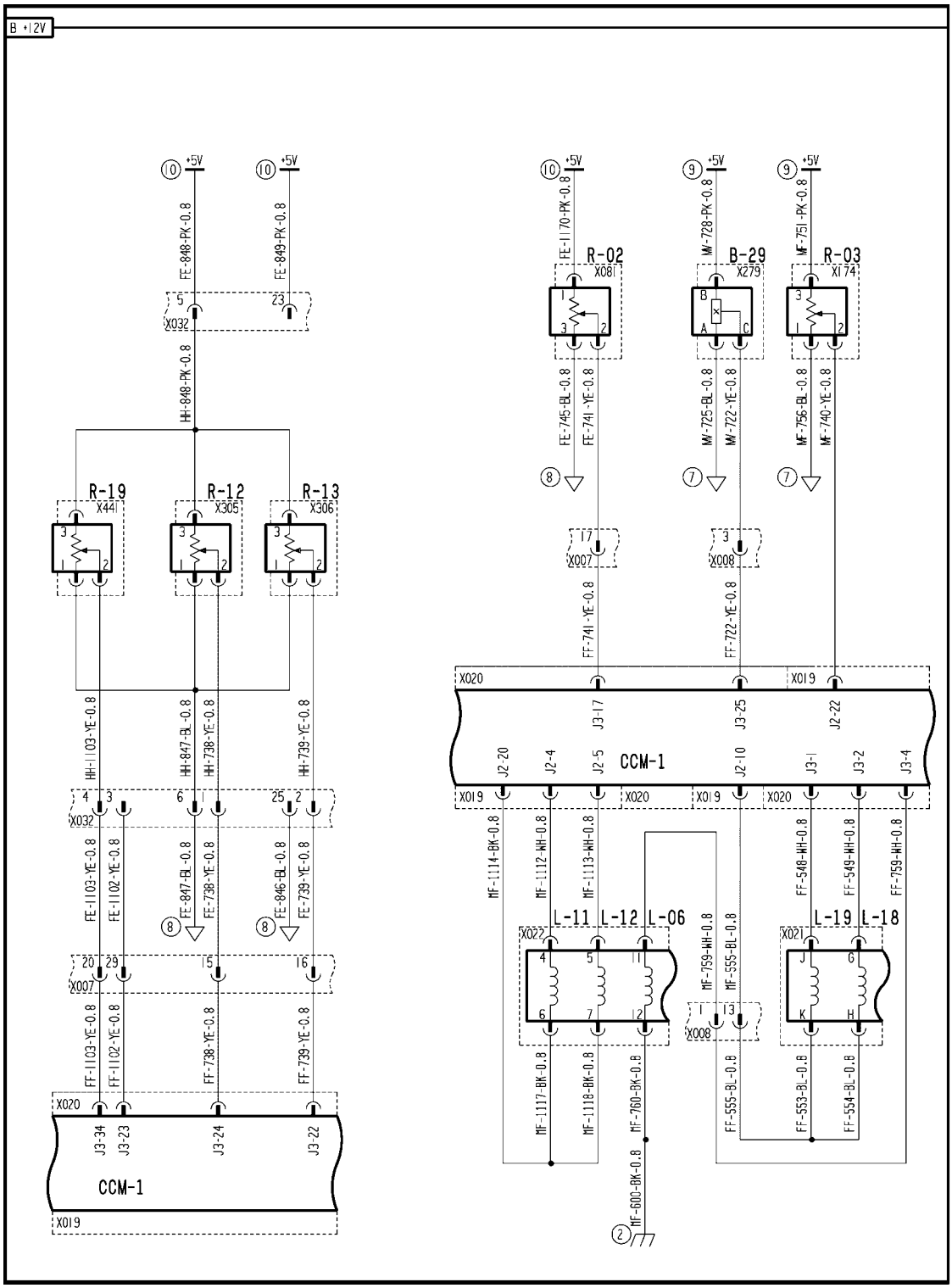
   B. If **12 volts** is found, continue with Step **9**.

8. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

https://truckmanualshub.com/

Index

TOOL POSITIONING - G

TILTING - 20.A

Control valve Lateral tilt valve - Short circuit to B+ (G.20.A.13.20 - G.30.B.54) 6
AFX8010

Control valve Lateral tilt valve - Short circuit to ground (G.20.A.13.20 - G.30.B.53) 10
AFX8010

Control valve Lateral tilt valve - Unidentified failure (G.20.A.13.20 - G.30.B.46) 13
AFX8010

Control valve Lateral tilt valve - Unidentified failure (G.20.A.13.20 - G.30.B.46) 17
AFX8010

Support - Install (G.20.A.77 - F.10.A.15) 5
AFX8010

Support - Remove (G.20.A.77 - F.10.A.10) 4
AFX8010

TILTING - General specification (G.20.A - D.40.A.10) 3
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

TOOL POSITIONING - G

LEVELLING - 30.A

AFX8010

https://truckmanualshub.com/

Contents

TOOL POSITIONING - G

LEVELLING - 30.A

SERVICE

Support

Support Tool support - Remove (G.30.A.77.77 - F.10.A.10) 3
AFX8010

Support Tool support - Install (G.30.A.77.77 - F.10.A.15) 4
AFX8010

DIAGNOSTIC

Sensing system

Sensing system Position sensor - Short circuit to B+ (G.30.A.95.81 - G.30.B.54) 6
AFX8010

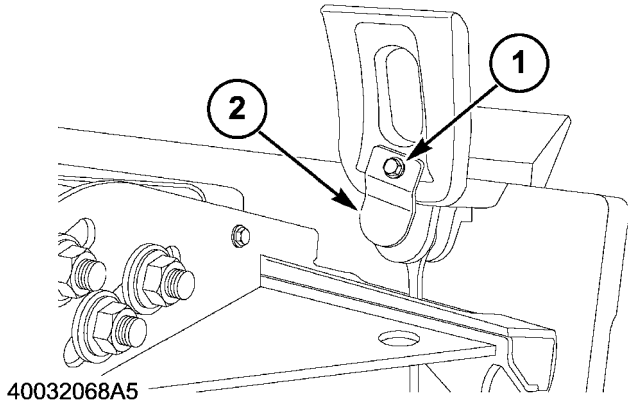
Sensing system Position sensor - Open circuit (G.30.A.95.81 - G.30.B.50) 11
AFX8010

https://truckmanualshub.com/

Support Tool support - Remove (G.30.A.77.77 - F.10.A.10)

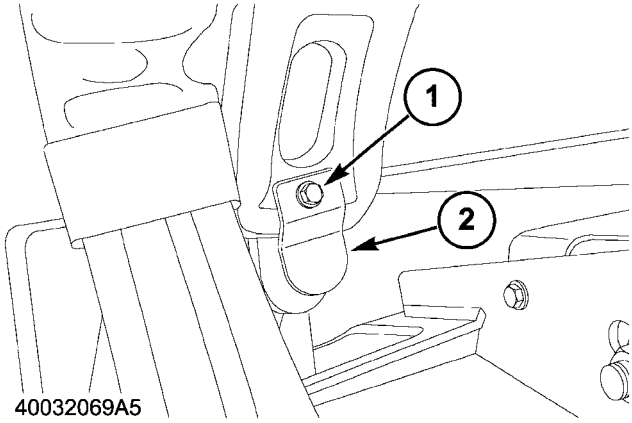
AFX8010

1. Remove the bolt **(1)** and plate **(2)** and remove the pin holding the position sensor arm in place.



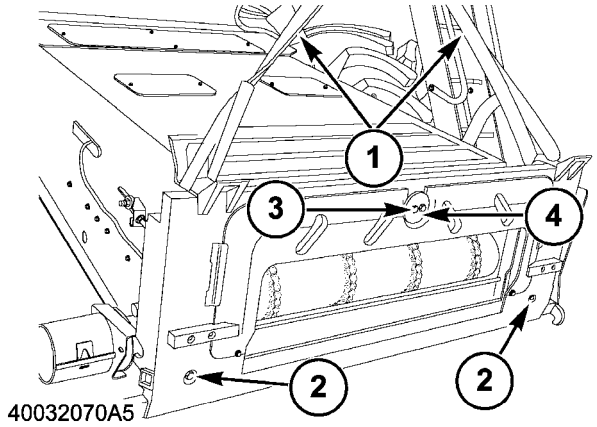
40032068A5 1

2. Remove the bolt **(1)** and plate **(2)** and remove the pin holding the hydraulic cylinder in place.



40032069A5 2

3. Start the combine and tilt the head left to retract the cylinder out of the way.
4. Attach a lifting device **(1)** to the face plate. Remove the bolts **(2)** washers, spacers and nuts. Remove the two bolts **(3)** washers, center retaining plate **(4)** and thrust washer. Slide the face plate off the center pin and lower the face plate to the ground.



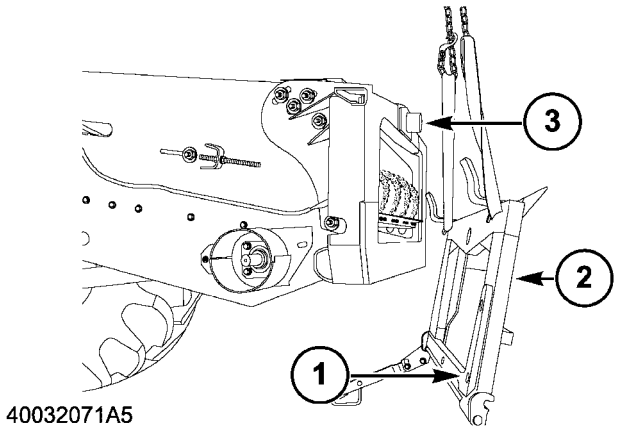
40032070A5 3

https://truckmanualshub.com/

Support Tool support - Install (G.30.A.77.77 - F.10.A.15)

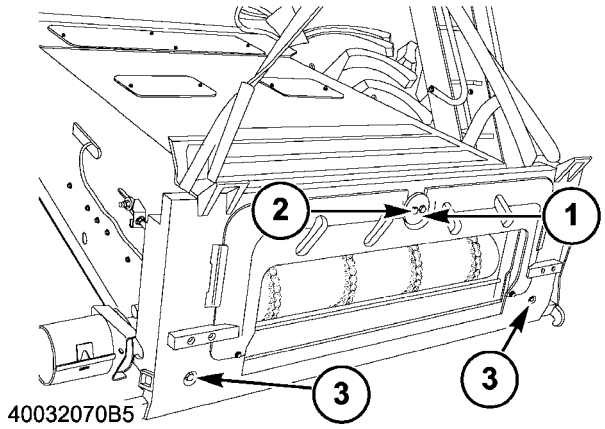
AFX8010

1. Position the wear plate **(1)** on the rear of the cradle **(2)**. Coat the center pin **(3)** with anti-seize. Lift the cradle **(2)** onto the center pin **(3)**.



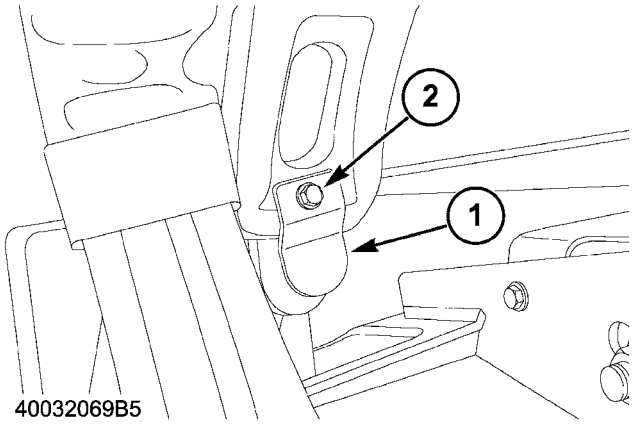
40032071A5 1

2. Install the thrust washer, center retaining plate **(1)** and bolts **(2)**. Install the spacers, bolts **(3)** washers, and nuts.



40032070B5 2

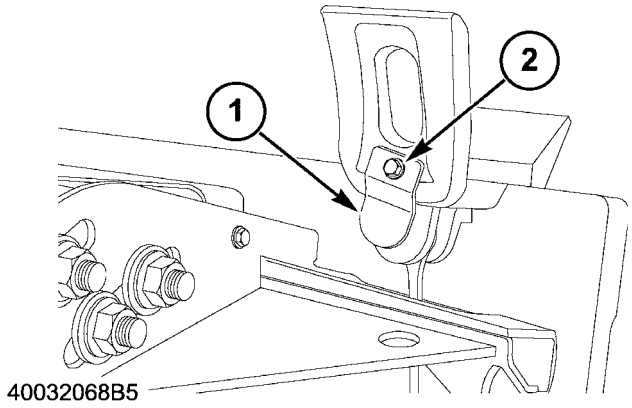
3. Start the combine and rotate the head right to extend the cylinder slightly until upper mounting hole can be aligned.
4. Insert the retaining pin through the mounting hole and the cylinder rod. Secure in place with the plate **(1)** and bolt **(2)**.



40032069B5 3

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5. Insert the retaining pin through the mounting hole and the position sensor arm. Secure in place with the plate **(1)** and bolt **(2)**.



40032068B5 4

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Sensing system Position sensor - Short circuit to B+ (G.30.A.95.81 - G.30.B.54)

AFX8010

E0029-03 - Header Tilt Angle Sensor

Cause:
The lateral float sensor (R-02) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "TILT ANGLE SEN" to check the voltage range. Tilt the feeder cradle side to side several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with feeder cradle movement.

   The proper voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is high (>**4.7 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **11**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect connector **X081**, and use a multimeter to test for continuity to ground on connector **X081** pin 3. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), continue with Step **6**.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

3. Key off. Disconnect connector **X007**. Use a multimeter to test for continuity between connector **X007** pin 12 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **4**.

   B. If continuity is found, there is an open circuit in feeder (FE) harness between connector **X081** pin 3 and connector **X007** pin 12 wire 745 blue or 749 blue. Locate the open and repair.

4. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X007** pin 12 and connector **X020** pin J3-18.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, there is an open circuit in front frame (FF) harness between connector **X007** pin 12 and connector **X020** pin J3-18 wire 749 blue or 501 blue. Locate the open and repair.

5. Key off. Use a multimeter to test for continuity between connector **X020** pin J3-18 on CCM1 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.

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6. Disconnect connector **X081**, and use a multimeter to test for voltage on connector **X081** pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **8**.

   B. If high (>4.7V) voltage is found, continue with Step **7**.

7. Disconnect connector **X007**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X007** pin 17. There should not be any voltage present.

   A. If high (>4.7V) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X007** pin 17 and connector **X020** pin J3-17 wire 741 yellow. Locate the short and repair.

   B. If no voltage is found, there is a short to high voltage in the feeder (FE) harness between connector **X081** pin C and connector **X007** pin 17 wire 741 yellow. Locate the short and repair.

8. Disconnect connector **X081**, and use a multimeter to test for voltage on connector **X081** pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **11**.

   B. If high (>5V) voltage is found, continue with Step **9**.

   NOTE: *This supply circuit is also used to supply power to the shoe leveling sensor in the shoe leveling actuator M03, so a short to* ***12 volts*** *anywhere on the supply circuit will activate this error code.*

9. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

   A. If **5 volts** is found, there is a short to high voltage in the feeder (FE) harness between connector **X081** pin 1 and connector **X007** pin 22 wire 1170 pink or 757 pink. Locate the short and repair.

   B. If high (>5V) voltage is found, continue with Step **10**.

10. Disconnect connector **X023**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X023** pin 17.

    A. If **5 volts** is found, there is a short to high voltage in the lower frame (LF) harness between connector **X088** pin A on the shoe leveling actuator M03 and connector **X023** pin 17 wire 727 pink. Locate the short and repair.

    B. If high (>5V) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X023** pin 17, connector **X007** pin 22 and connector **X020** pin J3-26 on one of the following wires:
    wire 757 pink, connector **X007** pin 22 to FF harness splice
    wire 727 pink, connector **X023** pin 17 to FE harness splice
    wire 726 pink, FE harness splice to connector **X020** pin J3-26. Locate the short and repair.

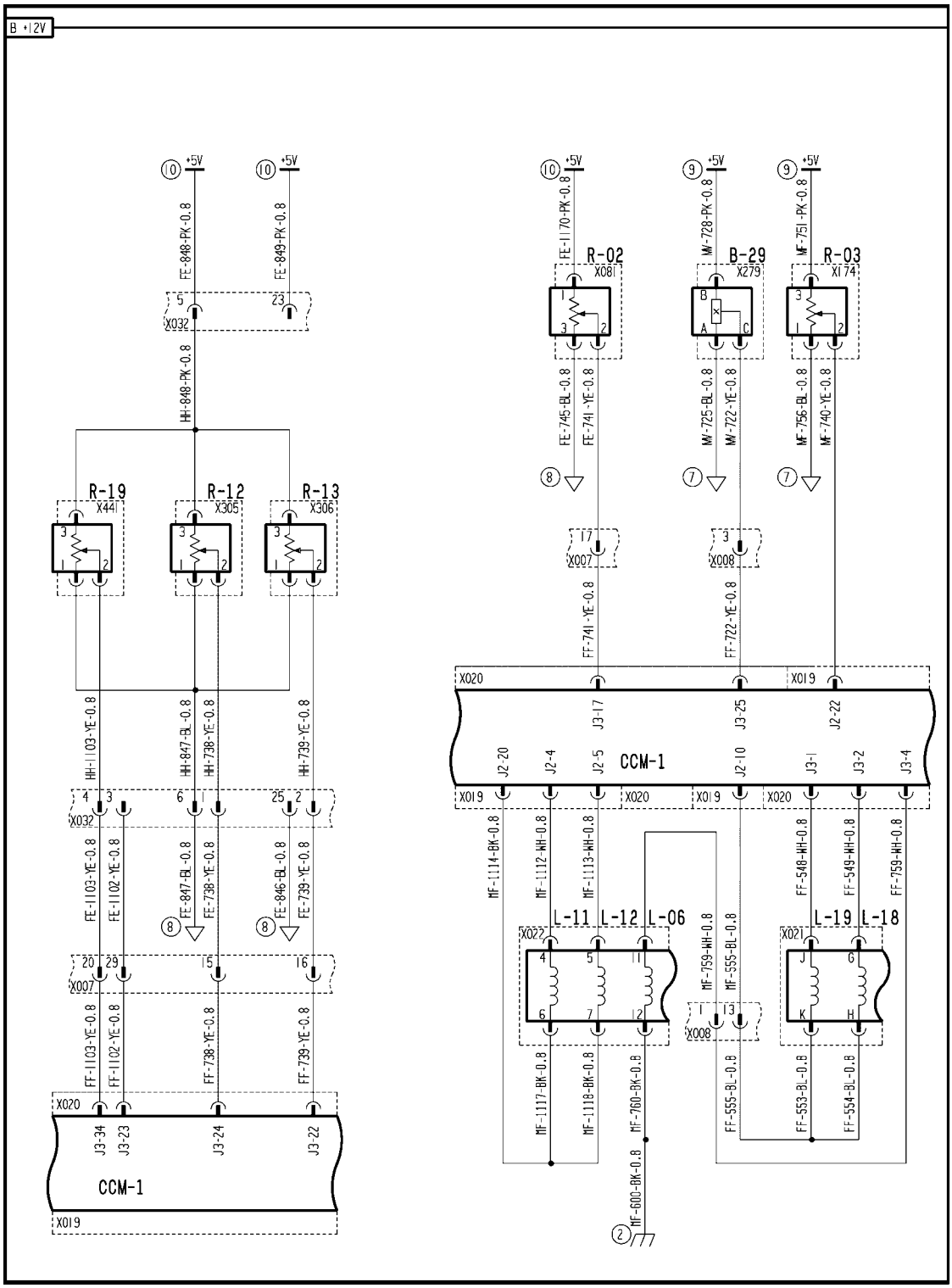
11. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

    A. If no high out of range readings are indicated, erase the fault code and continue operation.

    B. If the fault code immediately resets, determine which **12 volts** circuit (such as the shoe leveling actuator) was activated to cause the short.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



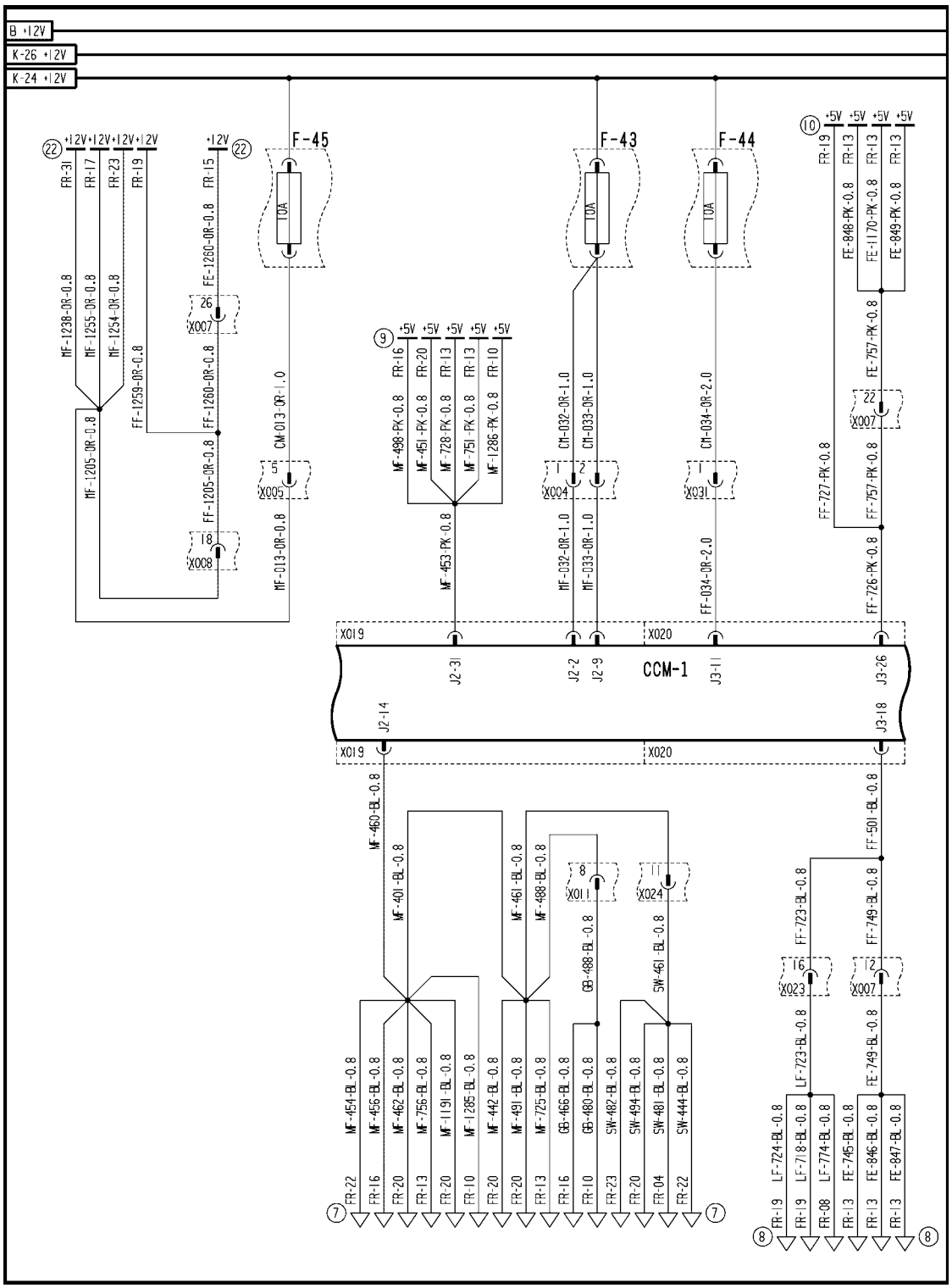
AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Position sensor - Open circuit (G.30.A.95.81 - G.30.B.50)

AFX8010

E0029-05 - Header Tilt Angle Sensor

Cause:
The lateral float sensor (R-02) circuit is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring is open or shorted to ground.
2. Loss of power to the sensor.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" sort menu, and select "TILT ANGLE SEN" to check the voltage range. Tilt the feeder cradle side to side several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with feeder cradle movement.

   The proper voltage range for a properly adjusted sensor is **0.2 - 4.7 volts**.

   A. If the voltage reading is low (<**0.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at Step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect connector **X081**, and use a multimeter to test for voltage on connector **X081** pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **4**.

   B. If no voltage is found, continue with Step **3**.
3. Disconnect connector **X007**, and use a multimeter to test for voltage on connector **X007** pin 22. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the feeder (FE) harness between connector **X081** pin A and connector **X007** pin 22 wire 1170 pink or 757 pink. Locate the open and repair.

   B. If no voltage is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 22 and connector **X020** pin J3-26 wire 757 pink or 726 pink. Locate the open and repair.
4. Disconnect connector **X081**. Use a multimeter to check for continuity between connector **X081** pin 2 and ground.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, continue with Step **6**.
5. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 17 and ground.

   A. If no continuity is found, there is a short to ground in the feeder (FE) harness between connector **X081** pin 2 and connector **X007** pin 17 wire 741 yellow. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X007** pin 17 and connector **X020** pin J3-17 wire 741 yellow. Locate the short and repair.

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6. Disconnect connector **X081** and connector **X007**. Use a multimeter to check for continuity between connector **X081** pin 2 and connector **X007** pin 17.

   A. If continuity is found, continue with Step **7**.

   B. If no continuity is found, there is an open circuit in the feeder (FE) harness between connector **X081** pin C and connector **X007** pin 17 wire 741 yellow. Locate the open and repair.

7. Carefully disconnect connector **X020** from the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X007** pin 17 and connector **X020** pin J3-17.

   A. If continuity is found, the open is in the sensor. Replace the sensor.

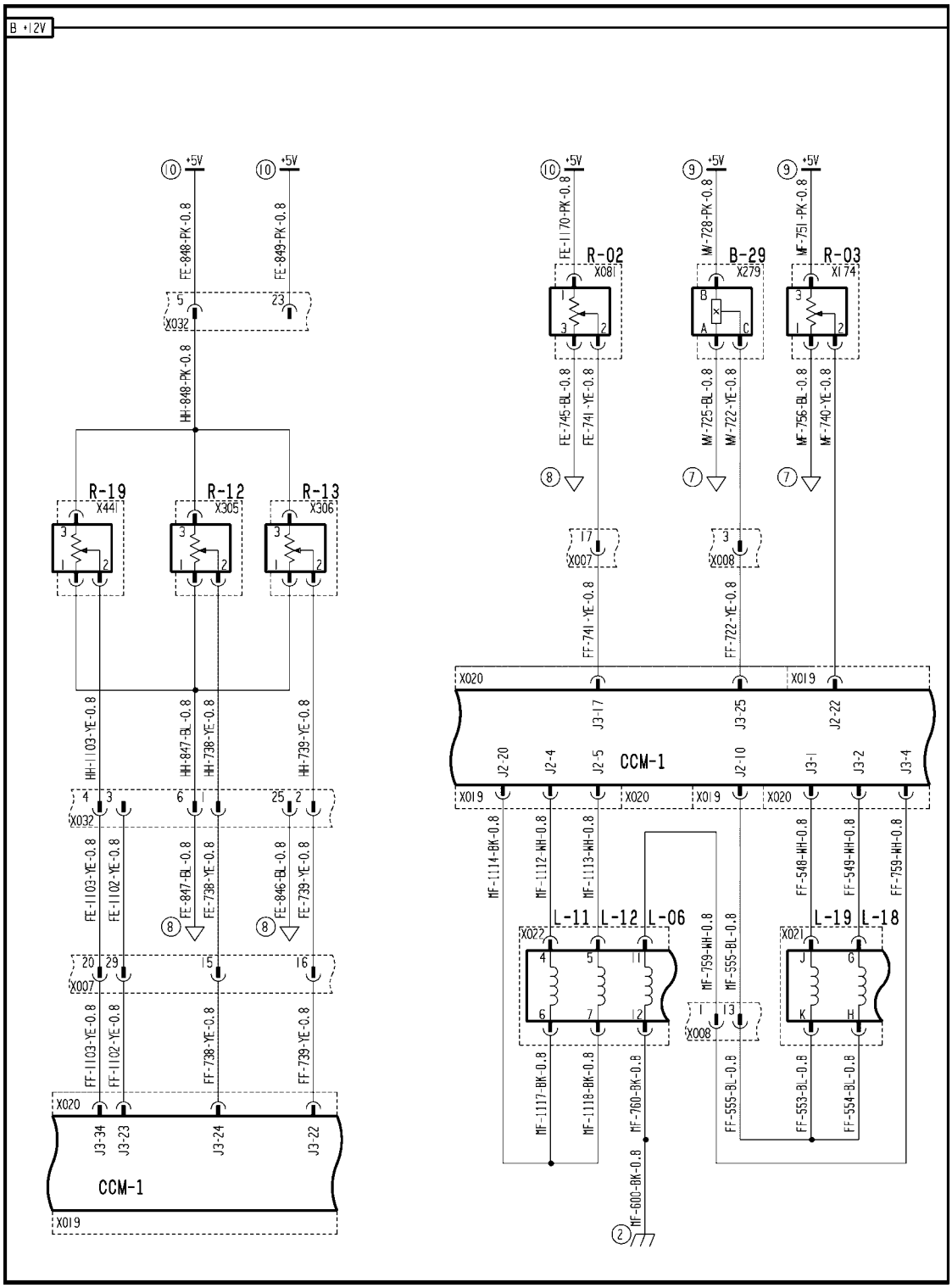
   B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X007** pin 17 and connector **X020** pin J3-17 wire 741 yellow. Locate the open and repair.

8. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



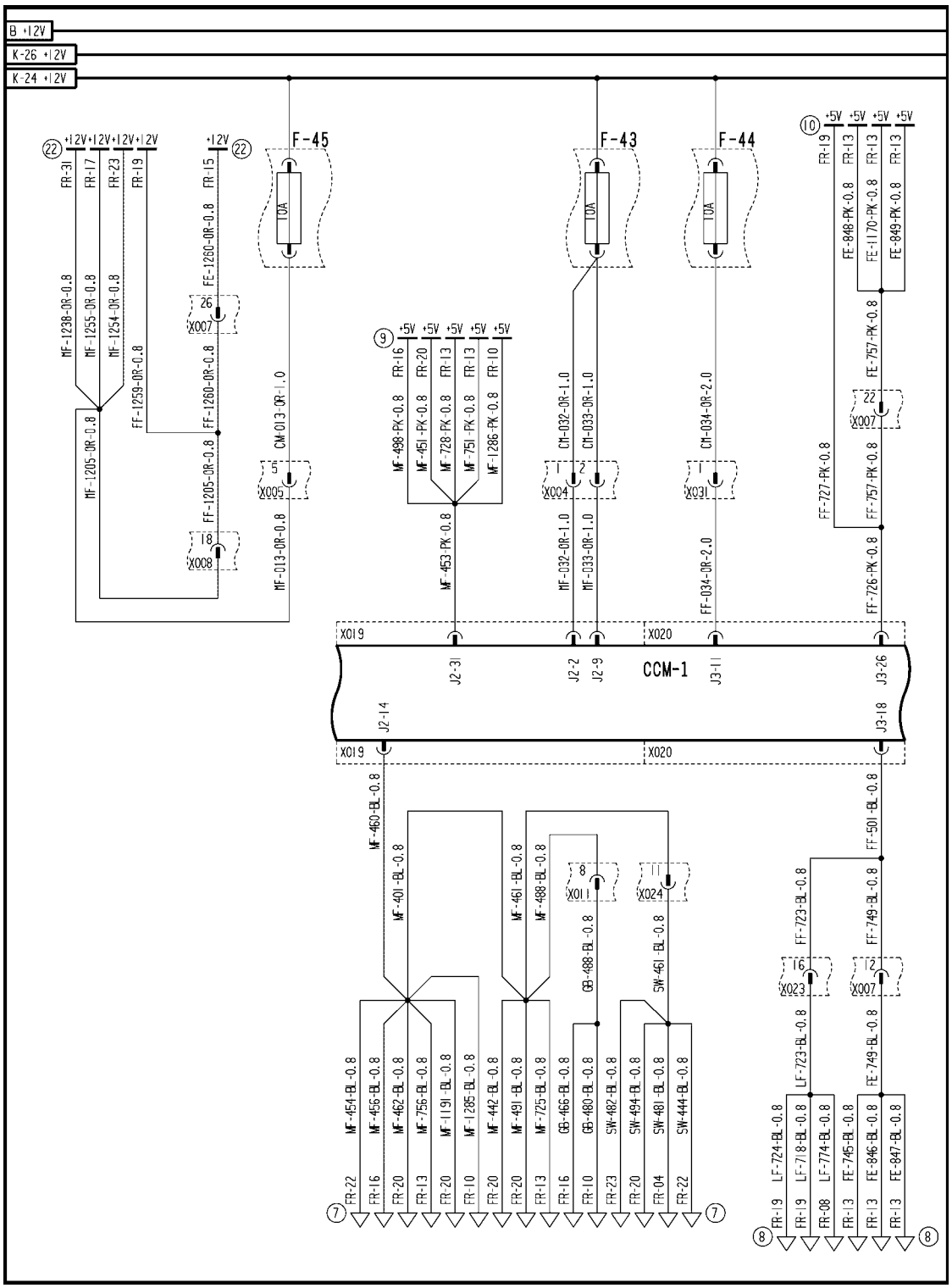
AFXSCHEM13-04 1

FRAME 13 - HEADER

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B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Index

TOOL POSITIONING - G

LEVELLING - 30.A

Sensing system Position sensor - Open circuit (G.30.A.95.81 - G.30.B.50) 11
AFX8010

Sensing system Position sensor - Short circuit to B+ (G.30.A.95.81 - G.30.B.54) 6
AFX8010

Support Tool support - Install (G.30.A.77.77 - F.10.A.15) 4
AFX8010

Support Tool support - Remove (G.30.A.77.77 - F.10.A.10) 3
AFX8010

https://truckmanualshub.com/

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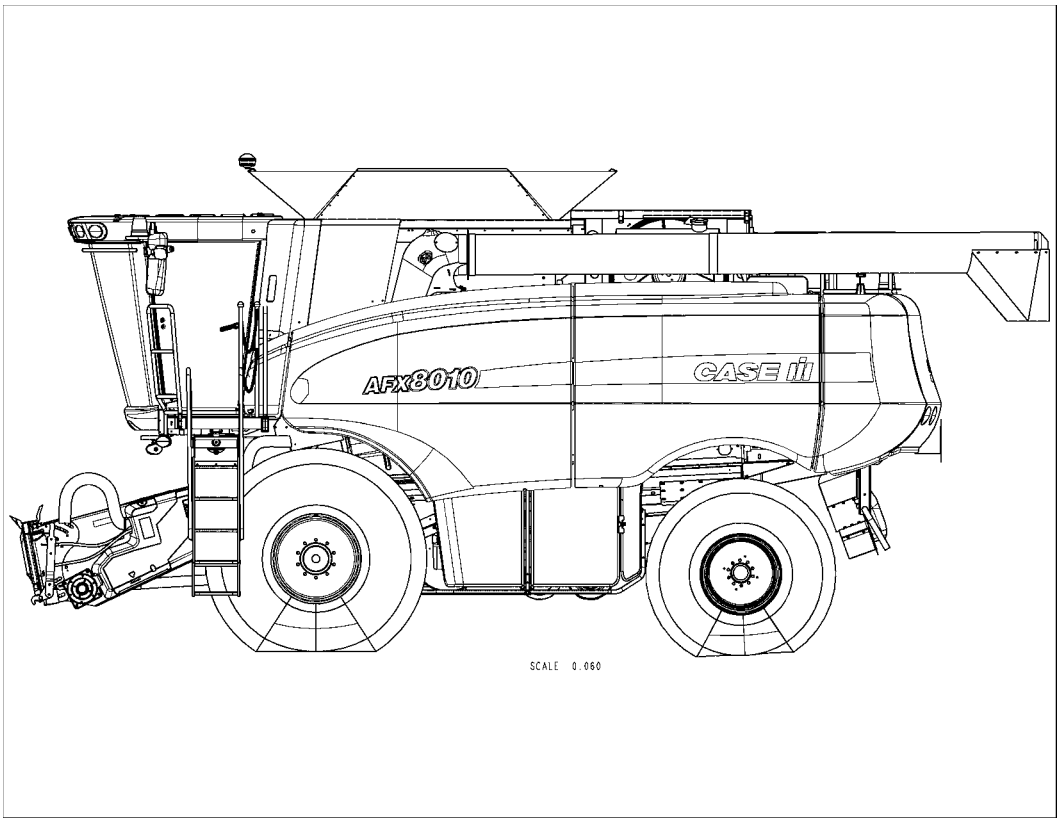
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REPAIR MANUAL

CROP PROCESSING



AFX8010

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Contents

CROP PROCESSING - K

FEEDING Reel feeding K.25.B
AFX8010

FEEDING Header feeding K.25.D
AFX8010

FEEDING Feeder housing K.25.E
AFX8010

THRESHING Axial flow threshing K.40.C
AFX8010

STORING AND HANDLING Grain storing K.60.B
AFX8010

CLEANING Primary cleaning K.62.B
AFX8010

CLEANING Tailings return system K.62.C
AFX8010

CLEANING Self-levelling frame K.62.D
AFX8010

RESIDUE HANDLING Straw chopper K.64.C
AFX8010

RESIDUE HANDLING Spreader K.64.D
AFX8010

UNLOADING Grain unloading K.72.B
AFX8010

PROTECTION SYSTEMS Stone trapping K.90.E
AFX8010

https://truckmanualshub.com/

CROP PROCESSING - K

FEEDING Reel feeding - 25.B

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

FEEDING Reel feeding - 25.B

DIAGNOSTIC

Control valve

Control valve For and Aft - Unidentified failure (K.25.B.13.06 - G.30.B.46) 3
AFX8010

Control valve For and Aft - Unidentified failure (K.25.B.13.06 - G.30.B.46) 7
AFX8010

Control valve Raise and Lower - Unidentified failure (K.25.B.13.05 - G.30.B.46) 11
AFX8010

Control valve Raise and Lower - Unidentified failure (K.25.B.13.05 - G.30.B.46) 15
AFX8010

Control valve Drive - Unidentified failure (K.25.B.13.07 - G.30.B.46) 19
AFX8010

https://truckmanualshub.com/

Control valve For and Aft - Unidentified failure (K.25.B.13.06 - G.30.B.46)

AFX8010

E0185-11 - Reel Fore Valve

Cause:
The header reel fore valve (L-16) circuit open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "REEL FORE VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the header reel fore valve coil (L16) at connector **X021** pin P & Q. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header reel fore solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header reel fore solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Disconnect connector **X021**. Use a multimeter to check the resistance between the header reel fore valve coil (L16) at connector **X021** pin P or Q and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short ot ground in the feeder valves harness between connector **X021** and the header reel fore solenoid. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **4**.
4. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin P and chassis ground. Flex the front frame (FF) harness between the connector **X021** and connector **X017** while making this check.

   A. If there is no continuity to ground, continue with step **5**.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X017** pin J3-1 wire 560 white. Locate the short and repair.
5. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin Q (harness side) and chassis ground. Flex the front frame (FF) harness between connector **X021** and the front frame ground 2 while making this check.

   A. If there is continuity to ground, continue with step **6**.

   B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** pin Q and the front frame ground 2 wire 589 or 592 black. Locate the open and repair.
6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen to manually power the header reel fore valve. Use a multimeter to check for **12 volts** between connector **X021** pin P and chassis ground.

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A. If **12 volts** is present, continue with step **7**.

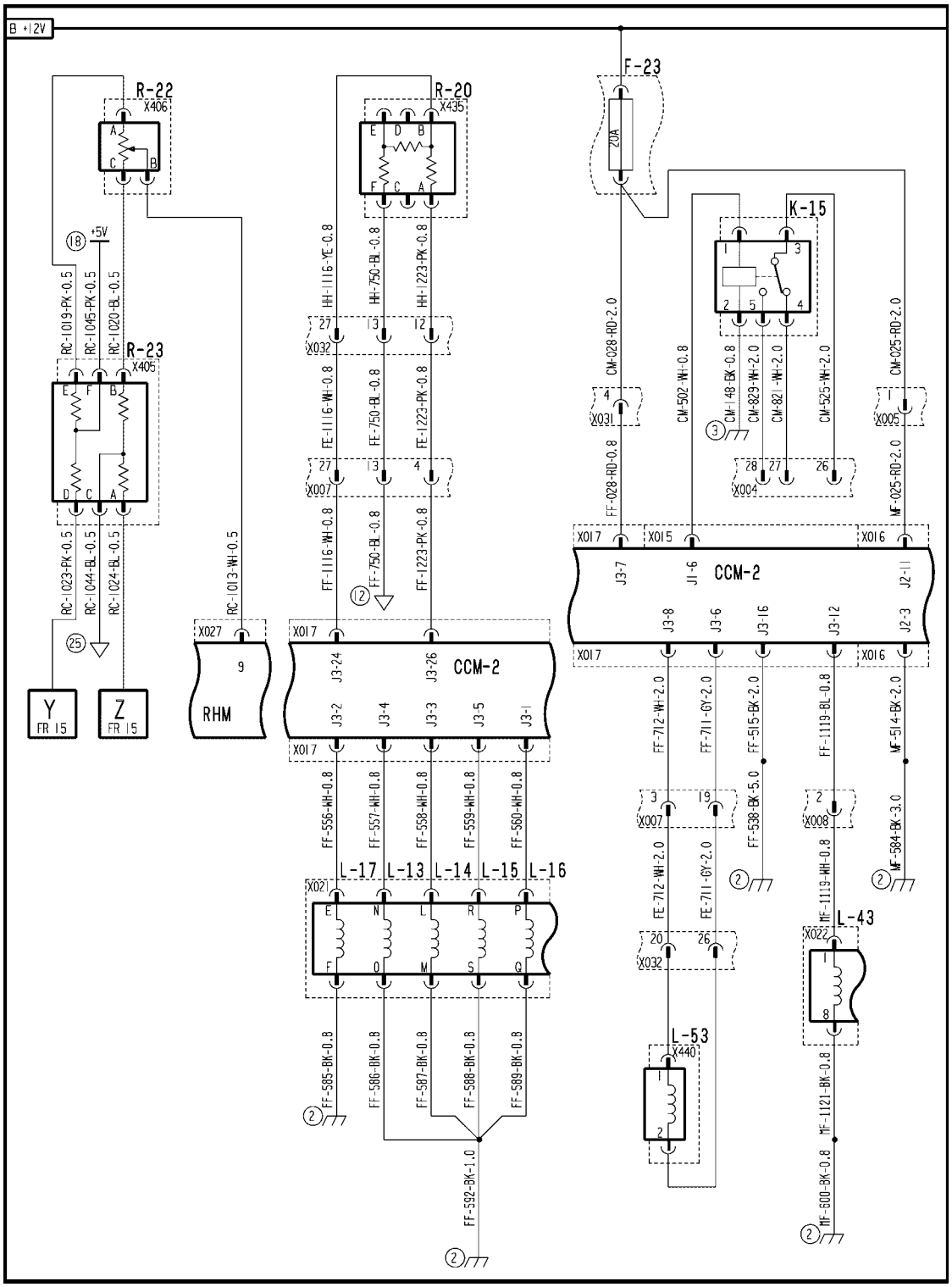
B. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin P and connector **X017** pin J3-1 wire 560 white. Locate the open and repair.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Control valve For and Aft - Unidentified failure (K.25.B.13.06 - G.30.B.46)

AFX8010

E0189-11 - Reel Aft Valve

Cause:
The header reel aft valve (L-15) circuit open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "REEL AFT VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the header reel aft valve coil (L15) at connector **X021** pin R & S. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header reel aft solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header reel aft solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Disconnect connector **X021**. Use a multimeter to check the resistance between the header reel aft valve coil (L15) at connector **X021** pin R or S and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the feeder valves harness between connector **X021** and the header reel aft solenoid. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **4**.
4. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin R and chassis ground. Flex the front frame (FF) harness between the connector **X021** and connector **X017** while making this check.

   A. If there is no continuity to ground, continue with step **5**.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X017** pin J3-5 wire 559 white. Locate the short and repair.
5. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin S and chassis ground. Flex the front frame (FF) harness between connector **X021** and the front frame ground 2 while making this check.

   A. If there is continuity to ground, continue with step **6**.

   B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** pin S and the front frame ground 2 wire 588 or 592 black. Locate the open and repair.
6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen to manually power the header reel aft valve. Use a multimeter to check for **12 volts** between connector **X021** pin R and chassis ground.

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A. If **12 volts** is present, continue with step **7**.

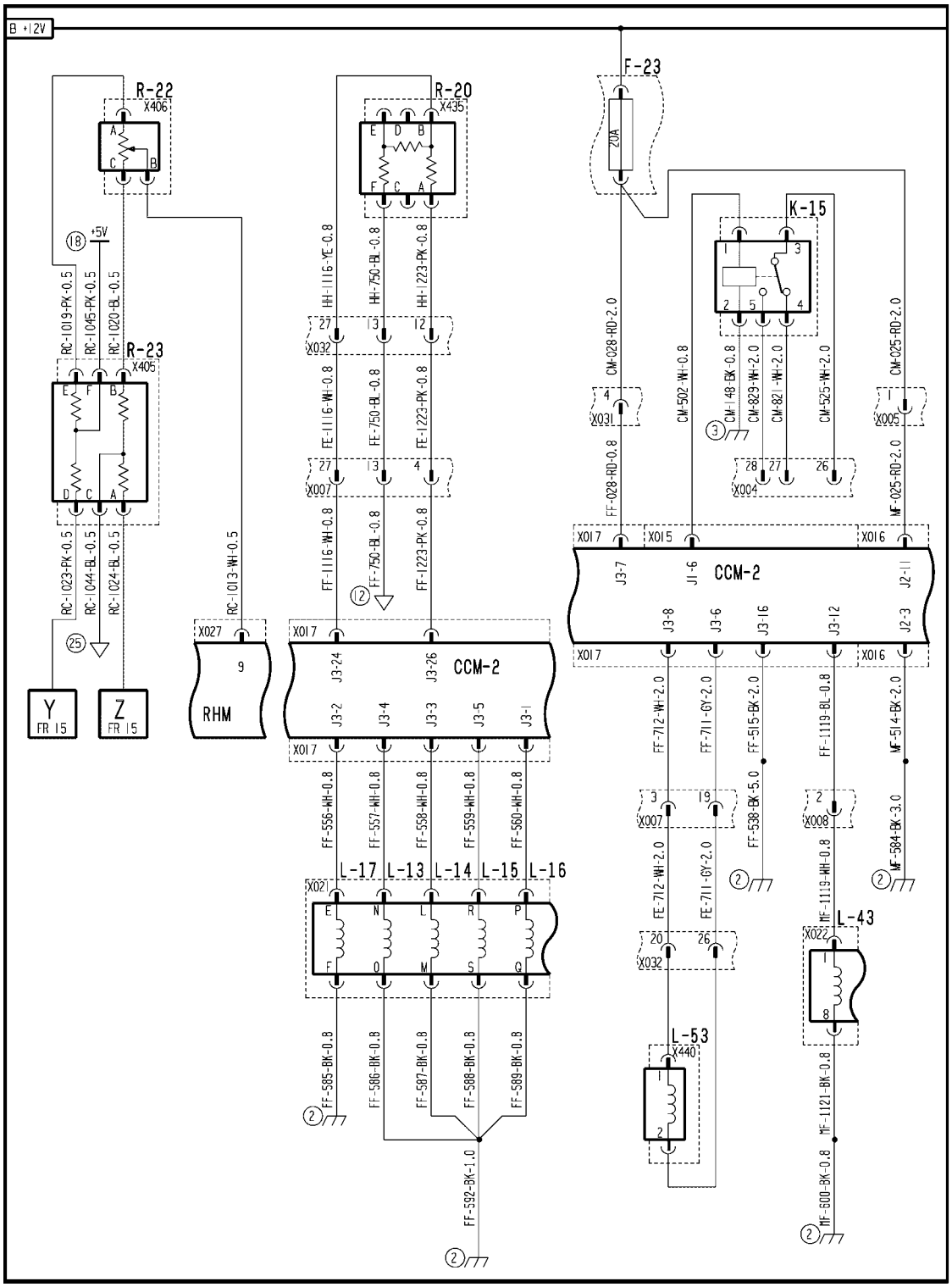
B. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin P and connector **X017** pin J3-5 wire 559 white. Locate the open and repair.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Control valve Raise and Lower - Unidentified failure (K.25.B.13.05 - G.30.B.46)

AFX8010

E0187-11 - Reel Raise Valve

Cause:
The header reel up valve (L-14) circuit open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "REEL RAISE VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the header reel up valve coil (L14) at connector **X021** pin L & M. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header reel up solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header reel up solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Disconnect connector **X021**. Use a multimeter to check the resistance between the header reel up valve coil (L14) at connector **X021** pin L or M and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the feeder valves harness between connector **X021** and the header reel up solenoid. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **4**.
4. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin L and chassis ground. Flex the front frame (FF) harness between the connector **X021** and connector **X017** while making this check.

   A. If there is no continuity to ground, continue with step **5**.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X017** pin J3-3 wire 558 white. Locate the short and repair.
5. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin M (harness side) and chassis ground. Flex the front frame (FF) harness between connector **X021** and the front frame ground 2 while making this check.

   A. If there is continuity to ground, continue with step **6**.

   B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** pin M and the front frame ground 2 wire 587 or 592 black. Locate the open and repair.
6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen to manually power the header reel up valve. Use a multimeter to check for **12 volts** between connector **X021** pin L and chassis ground.

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A. If **12 volts** is present, continue with step **7**.

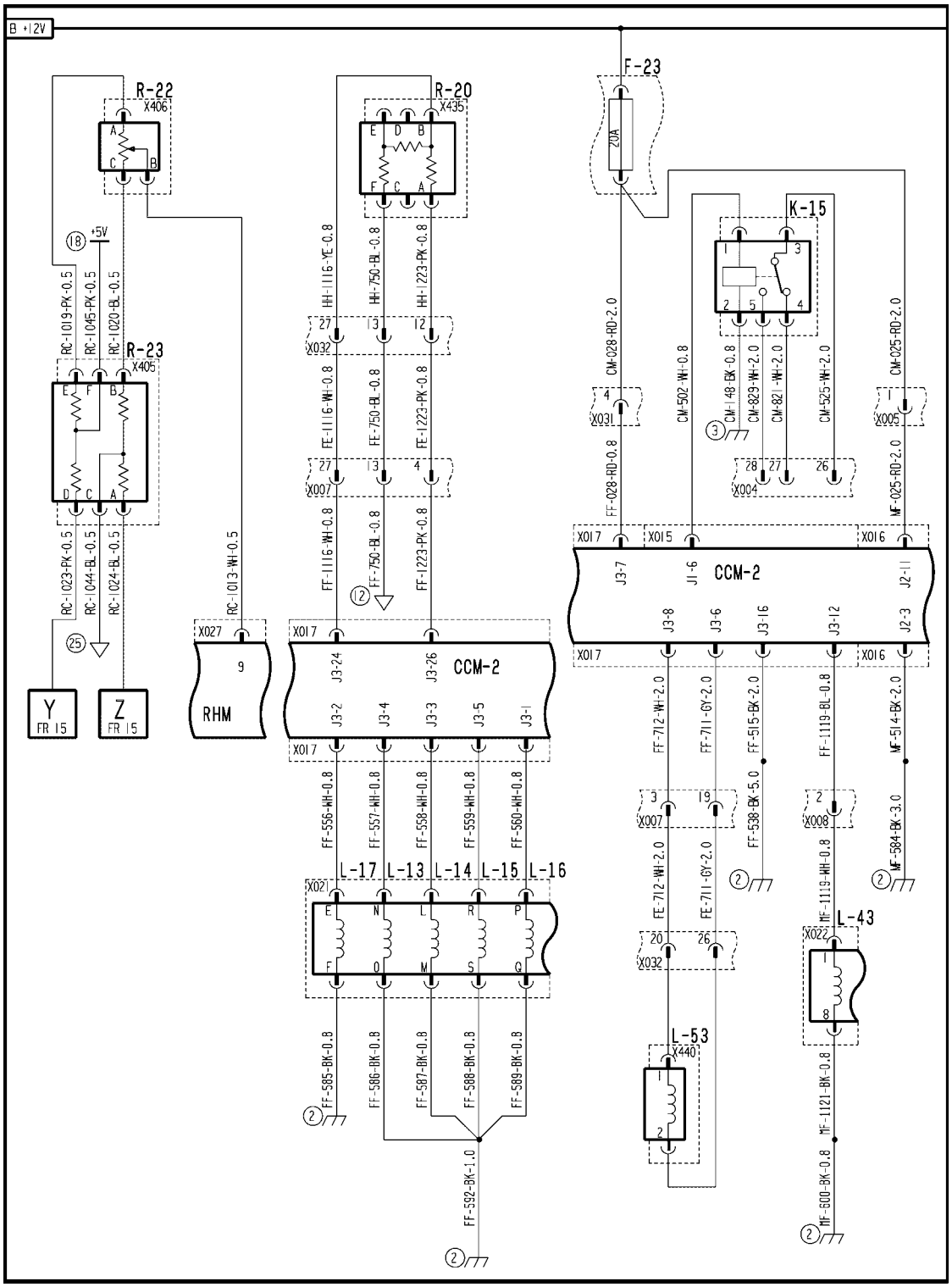
B. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin L and connector **X017** pin J3-3 wire 558 white. Locate the open and repair.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Control valve Raise and Lower - Unidentified failure (K.25.B.13.05 - G.30.B.46)

AFX8010

E0188-11 - Reel Lower Valve

Cause:
The header reel down valve (L-13) circuit open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "REEL LOWER VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the header reel down valve coil (L13) at connector **X021** pin N & O. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header reel down solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header reel down solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Disconnect connector **X021**. Use a multimeter to check the resistance between the header reel down valve coil (L13) at connector **X021** pin N or O and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short ot ground in the feeder valves harness between connector **X021** and the header reel down solenoid. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **4**.
4. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin N and chassis ground. Flex the front frame (FF) harness between the connector **X021** and connector **X017** while making this check.

   A. If there is no continuity to ground, continue with step **5**.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X017** pin J3-4 wire 557 white. Locate the short and repair.
5. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin O (harness side) and chassis ground. Flex the front frame (FF) harness between connector **X021** and the front frame ground 2 while making this check.

   A. If there is continuity to ground, continue with step **6**.

   B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** pin O and the front frame ground 2 wire 586 or 592 black. Locate the open and repair.
6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen to manually power the header reel down valve. Use a multimeter to check for **12 volts** between connector **X021** pin N and chassis ground.

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A. If **12 volts** is present, continue with step **7**.

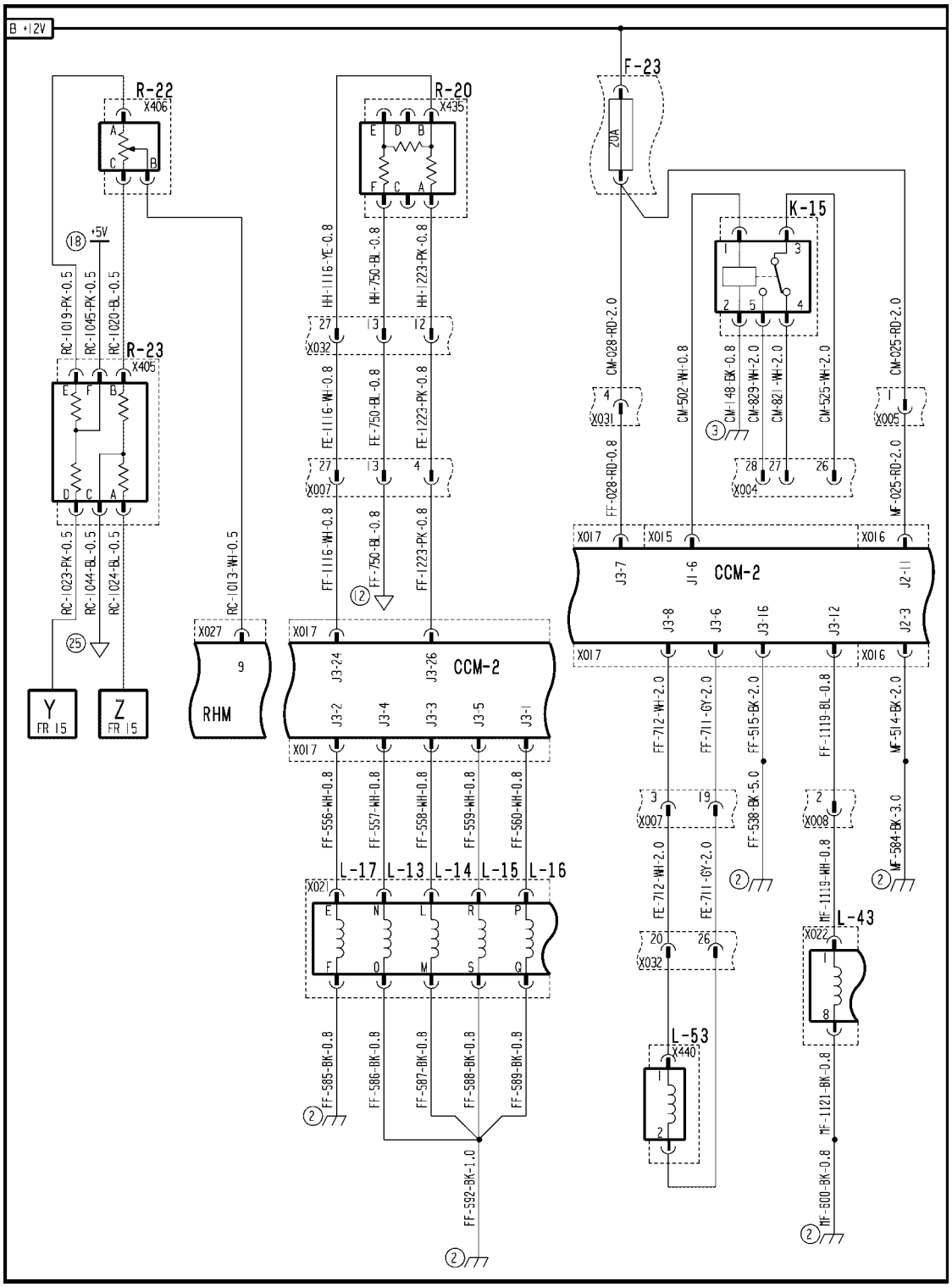
B. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin N and connector **X017** pin J3-4 wire 557 white. Locate the open and repair.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Control valve Drive - Unidentified failure (K.25.B.13.07 - G.30.B.46)

AFX8010

E0186-11 - Reel Drive Valve

Cause:
The header reel drive valve (L-17) circuit open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "REEL DRIVE VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Disconnect connector **X021**. Use a multimeter to check the resistance of the header reel drive valve coil (L17) at connector **X021** pin E & F. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the header reel drive solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the header reel drive solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Disconnect connector **X021**. Use a multimeter to check the resistance between the header reel drive valve coil (L17) at connector **X021** pin E or F and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the feeder valves harness between connector **X021** and the header reel drive solenoid. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **4**.
4. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin E and chassis ground. Flex the front frame (FF) harness between the connector **X021** and connector **X017** while making this check.

   A. If there is no continuity to ground, continue with step **5**.

   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X021** and connector **X017** pin J3-2 wire 556 white. Locate the short and repair.
5. Disconnect connector **X021**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X021** pin F (harness side) and chassis ground. Flex the front frame (FF) harness between connector **X021** and the front frame ground 2 while making this check.

   A. If there is continuity to ground, continue with step **6**.

   B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X021** pin F and the front frame ground 2 wire 585 black. Locate the open and repair.
6. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen to manually power the header reel drive valve. Use a multimeter to check for **12 volts** between connector **X021** pin E and chassis ground.

   A. If **12 volts** is present, continue with step **7**.

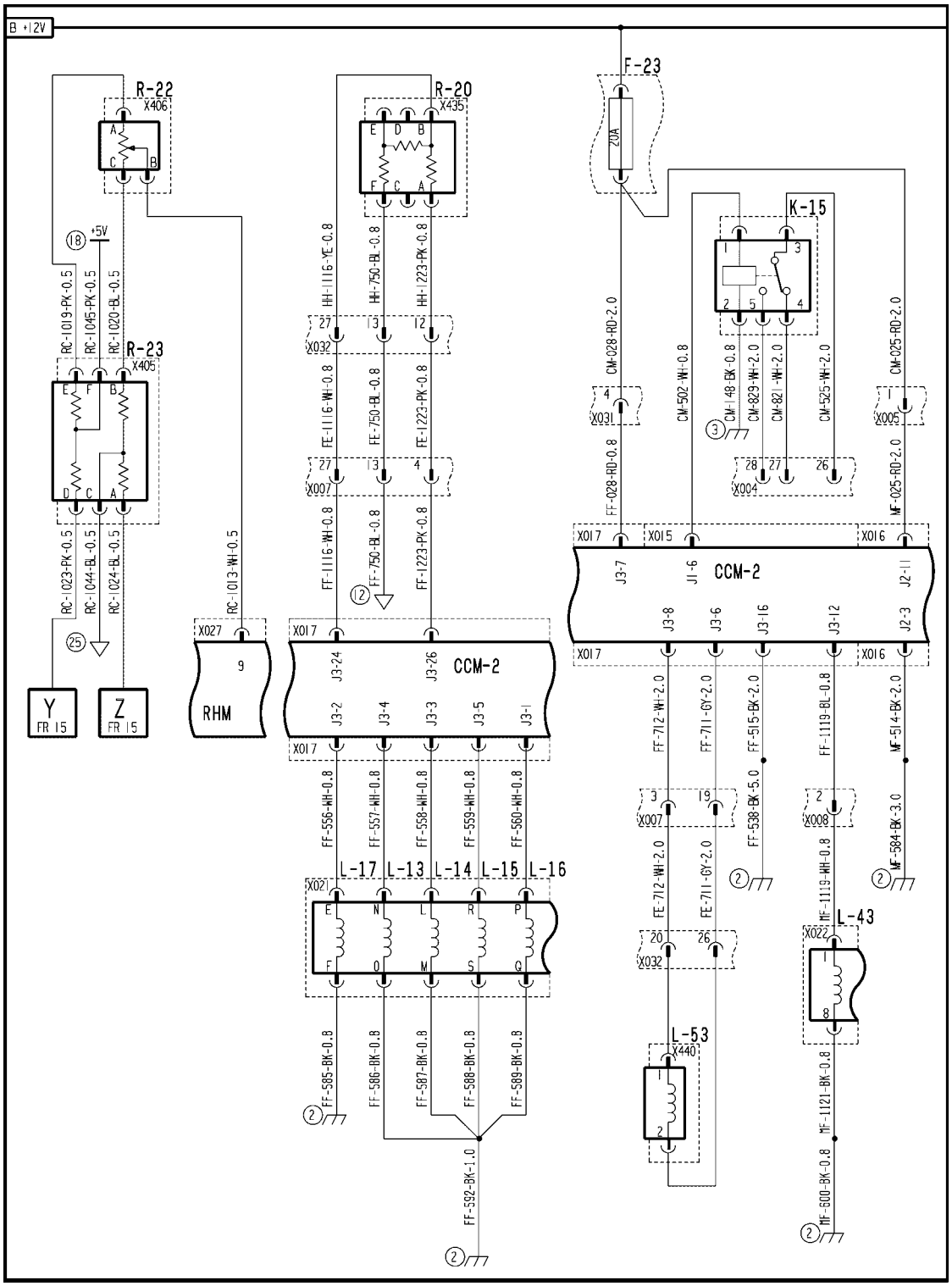
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B. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X021** pin E and connector **X017** pin J3-2 wire 556 white. Locate the open and repair.

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

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FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

https://truckmanualshub.com/

Index

CROP PROCESSING - K

FEEDING Reel feeding - 25.B

Control valve Drive - Unidentified failure (K.25.B.13.07 - G.30.B.46) 19
AFX8010

Control valve For and Aft - Unidentified failure (K.25.B.13.06 - G.30.B.46) 3
AFX8010

Control valve For and Aft - Unidentified failure (K.25.B.13.06 - G.30.B.46) 7
AFX8010

Control valve Raise and Lower - Unidentified failure (K.25.B.13.05 - G.30.B.46) 11
AFX8010

Control valve Raise and Lower - Unidentified failure (K.25.B.13.05 - G.30.B.46) 15
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

CROP PROCESSING - K

FEEDING Header feeding - 25.D

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

FEEDING Header feeding - 25.D

DIAGNOSTIC

Control valve

Control valve - Short circuit (K.25.D.14 - G.30.B.52) 3
AFX8010

Control valve - Unidentified failure (K.25.D.14 - G.30.B.46) 9
AFX8010

Sensing system

Sensing system Header type module - Short circuit to B+ (K.25.D.95.80 - G.30.B.54) 15
AFX8010

https://truckmanualshub.com/

Control valve - Short circuit (K.25.D.14 - G.30.B.52)

AFX8010

E0169-06 - Deck Plate Current Sense

Cause:
The draper header solenoid (L-53) circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted to ground.
2. Excessive mechanical load on system.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which can reverse the power and ground connections to the draper header solenoid L-53 in order to move it in either direction. The CCM module monitors both sides of the circuit during operation, and issues one or several fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM2 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "DECK PLT MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually operate the circuit. Record in which directions the circuit operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0169-06 - Deck Plate Current Sense** **E0204-11 - Deck Plate Motor** .
5	Use the appropriate result below to determine the location of the fault.

   A. If the circuit operates in one direction only, and the fault code
   E0169-06 - Deck Plate Current Sense
   is displayed, continue with step **2**.

   B. If the circuit operates in one direction only, and both fault codes
   E0169-06 - Deck Plate Current Sense
   and
   E0204-11 - Deck Plate Motor
   are displayed, continue with step **3**.

   C. If the circuit does not operate in either direction, and the fault code
   E0169-06 - Deck Plate Current Sense
   is displayed, continue with step **2**.

   D. If the circuit does not operate in either direction, and the fault code
   E0204-11 - Deck Plate Motor
   is displayed, continue with step **10**.

   E. If the circuit does not operate in either direction, and there are no fault codes displayed, continue with step **17**.

2. Inspect the mechanical components on the header for damage, wear, crop build-up that is preventing proper movement of the linkages.

   A. The header linkages are mechanically bound up, resulting in high current draw. Refer to the appropriate header repair manual chapter for repair and adjustment of the linkage.

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3. Fault codes indicate circuit fault due to short to ground. Disconnect the draper header solenoid connector X440. Use a multimeter to check for continuity between terminals 1 or 2 on the solenoid connector and a known good ground. There should be no continuity to ground.

   A. There is continuity to ground, indicating a short to ground in the solenoid. Replace the solenoid.

   B. If there is no continuity to ground, continue with Step **4**.

4. Disconnect the batteries by removing the negative battery cables. Use a multimeter to check for continuity between connector X440 pin 2 and chassis ground.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, continue with Step **7**.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the circuit in position. Power must be removed from the module prior to testing for short to ground condition on the circuit to remove this ground path.*

5. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 26 and chassis ground.

   A. If no continuity is found, the short to ground is in the header (HH) harness between connector **X032** pin 26 and connector X440 pin 2. Locate the short and repair.

   B. If continuity is found, continue with Step **6**.

6. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 19 and chassis ground.

   A. If no continuity is found, the short to ground is in the feeder (FE) harness between connector **X032** pin 26 and connector **X007** pin 19 wire 711 gray. Locate the short and repair.

   B. If continuity is found, the short to ground is in the front frame (FF) harness between connector **X007** pin 19 and connector **X017** pin J3-6 wire 711 gray. Locate the short and repair.

7. Use a multimeter to check for continuity between connector X440 pin 1 and chassis ground.

   A. If continuity is found, continue with Step **8**.

   B. If no continuity is found, recheck the circuit for continuity to ground at Step **3**.

8. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 20 and chassis ground.

   A. If no continuity is found, the short to ground is in the header (HH) harness between connector X440 pin 1 and **X032** pin 20. Locate the short and repair.

   B. If continuity is found, continue with Step **9**.

9. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 3 and chassis ground.

   A. If no continuity is found, the short to ground is in the front frame (FF) harness between connector **X007** pin 3 and connector **X017** pin J3-8 wire 712 white. Locate the short and repair.

   B. If continuity is found, the short to ground is in the feeder (FE) harness between connector **X032** pin 20 and connector **X007** pin 3 wire 712 white. Locate the short and repair.

10. Fault codes indicate circuit fault due to open circuit condition. Disconnect draper header solenoid connector X440. Measure the resistance of the motor between terminals 1 and 2. The correct resistance is **XX - XX ohms**.

    A. The resistance is infinite, indicating an open condition in the solenoid. Replace the solenoid.

    B. The resistance is in specification. Continue with Step **11**.

11. Ensure that the batteries are properly connected, and that fuse F23 is good. Use a multimeter to check for continuity between connector X440 pin 2 and chassis ground.

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A. If continuity is found, continue with Step **14**.

B. If no continuity is found, continue with Step **12**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the circuit in position, irregardless of key switch position, as long as it receives power through fuse F23. This ground path may be used to test for an open circuit condition.*

12. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 26 and chassis ground.

    A. If continuity is found, the open circuit is in the header (HH) harness between connector **X032** pin 26 and connector X440 pin 2. Locate the open and repair.

    B. If no continuity is found, continue with Step **13**.

13. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 19 and chassis ground.

    A. If continuity is found, the open circuit is in the feeder (FE) harness between connector **X032** pin 26and connector **X007** pin 19 wire 711 gray. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the front frame (FF) harness between connector **X007** pin 19 and connector **X017** pin J3-6 wire 711 gray. Locate the open and repair.

14. Use a multimeter to check for continuity between connector X440 pin 1 and chassis ground.

    A. If no continuity is found, continue with Step **15**.

    B. If continuity is found, recheck the motor for continuity at Step **10**.

15. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 20 and chassis ground.

    A. If continuity is found, the open circuit is in the header (HH) harness between connector X440 pin 1 and **X032** pin 20. Locate the open and repair.

    B. If no continuity is found, continue with Step **16**.

16. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 3 and chassis ground.

    A. If continuity is found, the open circuit is in the front frame (FF) harness between connector **X007** pin 3 and connector **X017** pin J3-8 wire 712 white. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the feeder (FE) harness between connector **X032** pin 20 and connector **X007** pin 3 wire 712 white. Locate the open and repair.

17. If the circuit does not operate in either direction, and there are no error codes indicated, the supply power for the circuit may not be present. Remove fuse F23 and inspect.

    A. Fuse has failed. Go to Step **18**.

    B. Fuse is okay. Go to Step **19**.

18. If fuse has failed, replace the fuse.

    A. If the fuse immediately fails, a short to ground exists on one of the two following wires:
    - wire 025 red, from the fuse panel through connector **X005** pin 1 to connector **X016** pin J2-11 on CCM2 module
    - wire 028 red, from the fuse panel through connector **X031** pin 4 to connector **X017** pin J3-7 on CCM2 module. Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

    B. Fuse is okay. Go to Step **19**.

19. Test for 12V power at connector **X017** pin J3-7 on the CCM2 module under the cab.

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A. If there is no power, there is an open circuit on wire 028 red, from the fuse panel through connector **X031** pin 4 to connector **X017** pin J3-7 on CCM2 module. Locate the open and repair. After repair, go to Step **20**.

B. If there is power, go to Step **20**.

20. Test for continuity to ground at connector **X017** pin J3-16 on the CCM2 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X017** pin J3-16 and the front frame ground #2 wire 515 black or 538 black. Locate the open and repair. After repair, go to Step **21**.

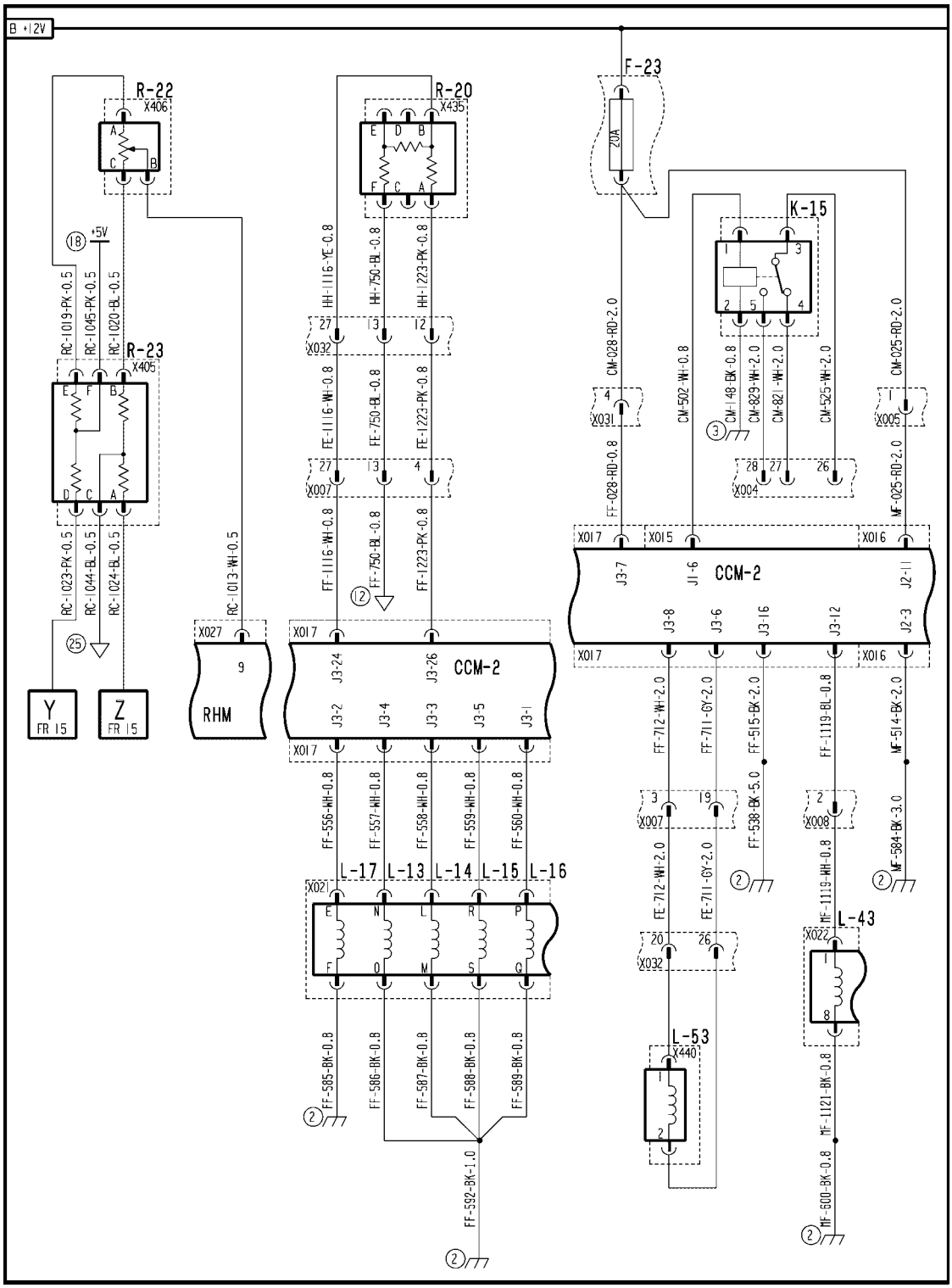
B. If there is continuity to ground, go to Step **21**.

21. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1.

A. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step **3** to locate the short to ground.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Control valve - Unidentified failure (K.25.D.14 - G.30.B.46)

AFX8010

E0204-11 - Deck Plate Motor

Cause:
The draper header solenoid (L-53) circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted to ground.
2. Excessive mechanical load on system.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which can reverse the power and ground connections to the draper header solenoid L-53 in order to move it in either direction. The CCM module monitors both sides of the circuit during operation, and issues one or several fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM2 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "HEADER" sort menu, and select "DECK PLT MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually operate the circuit. Record in which directions the circuit operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0169-06 - Deck Plate Current Sense** **E0204-11 - Deck Plate Motor** .
5	Use the appropriate result below to determine the location of the fault.

   A. If the circuit operates in one direction only, and the fault code
   E0169-06 - Deck Plate Current Sense
   is displayed, continue with step **2**.

   B. If the circuit operates in one direction only, and both fault codes
   E0169-06 - Deck Plate Current Sense
   and
   E0204-11 - Deck Plate Motor
   are displayed, continue with step **3**.

   C. If the circuit does not operate in either direction, and the fault code
   E0169-06 - Deck Plate Current Sense
   is displayed, continue with step **2**.

   D. If the circuit does not operate in either direction, and the fault code
   E0204-11 - Deck Plate Motor
   is displayed, continue with step **10**.

   E. If the circuit does not operate in either direction, and there are no fault codes displayed, continue with step **17**.

2. Inspect the mechanical components on the header for damage, wear, crop build-up that is preventing proper movement of the linkages.

   A. The header linkages are mechanically bound up, resulting in high current draw. Refer to the appropriate header repair manual chapter for repair and adjustment of the linkage.

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3. Fault codes indicate circuit fault due to short to ground. Disconnect the draper header solenoid connector X440. Use a multimeter to check for continuity between terminals 1 or 2 on the solenoid connector and a known good ground. There should be no continuity to ground.

   A. There is continuity to ground, indicating a short to ground in the solenoid. Replace the solenoid.

   B. If there is no continuity to ground, continue with Step **4**.

4. Disconnect the batteries by removing the negative battery cables. Use a multimeter to check for continuity between connector X440 pin 2 and chassis ground.

   A. If continuity is found, continue with Step **5**.

   B. If no continuity is found, continue with Step **7**.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the circuit in position. Power must be removed from the module prior to testing for short to ground condition on the circuit to remove this ground path.*

5. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 26 and chassis ground.

   A. If no continuity is found, the short to ground is in the header (HH) harness between connector **X032** pin 26 and connector X440 pin 2. Locate the short and repair.

   B. If continuity is found, continue with Step **6**.

6. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 19 and chassis ground.

   A. If no continuity is found, the short to ground is in the feeder (FE) harness between connector **X032** pin 26 and connector **X007** pin 19 wire 711 gray. Locate the short and repair.

   B. If continuity is found, the short to ground is in the front frame (FF) harness between connector **X007** pin 19 and connector **X017** pin J3-6 wire 711 gray. Locate the short and repair.

7. Use a multimeter to check for continuity between connector X440 pin 1 and chassis ground.

   A. If continuity is found, continue with Step **8**.

   B. If no continuity is found, recheck the circuit for continuity to ground at Step **3**.

8. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 20 and chassis ground.

   A. If no continuity is found, the short to ground is in the header (HH) harness between connector X440 pin 1 and **X032** pin 20. Locate the short and repair.

   B. If continuity is found, continue with Step **9**.

9. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 3 and chassis ground.

   A. If no continuity is found, the short to ground is in the front frame (FF) harness between connector **X007** pin 3 and connector **X017** pin J3-8 wire 712 white. Locate the short and repair.

   B. If continuity is found, the short to ground is in the feeder (FE) harness between connector **X032** pin 20 and connector **X007** pin 3 wire 712 white. Locate the short and repair.

10. Fault codes indicate circuit fault due to open circuit condition. Disconnect draper header solenoid connector X440. Measure the resistance of the motor between terminals 1 and 2. The correct resistance is **XX - XX ohms**.

    A. The resistance is infinite, indicating an open condition in the solenoid. Replace the solenoid.

    B. The resistance is in specification. Continue with Step **11**.

11. Ensure that the batteries are properly connected, and that fuse F23 is good. Use a multimeter to check for continuity between connector X440 pin 2 and chassis ground.

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A. If continuity is found, continue with Step **14**.

B. If no continuity is found, continue with Step **12**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the circuit in position, irregardless of key switch position, as long as it receives power through fuse F23. This ground path may be used to test for an open circuit condition.*

12. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 26 and chassis ground.

    A. If continuity is found, the open circuit is in the header (HH) harness between connector **X032** pin 26 and connector X440 pin 2. Locate the open and repair.

    B. If no continuity is found, continue with Step **13**.

13. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 19 and chassis ground.

    A. If continuity is found, the open circuit is in the feeder (FE) harness between connector **X032** pin 26and connector **X007** pin 19 wire 711 gray. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the front frame (FF) harness between connector **X007** pin 19 and connector **X017** pin J3-6 wire 711 gray. Locate the open and repair.

14. Use a multimeter to check for continuity between connector X440 pin 1 and chassis ground.

    A. If no continuity is found, continue with Step **15**.

    B. If continuity is found, recheck the motor for continuity at Step **10**.

15. Disconnect connector **X032**. Use a multimeter to check for continuity between connector **X032** pin 20 and chassis ground.

    A. If continuity is found, the open circuit is in the header (HH) harness between connector X440 pin 1 and **X032** pin 20. Locate the open and repair.

    B. If no continuity is found, continue with Step **16**.

16. Disconnect connector **X007**. Use a multimeter to check for continuity between connector **X007** pin 3 and chassis ground.

    A. If continuity is found, the open circuit is in the front frame (FF) harness between connector **X007** pin 3 and connector **X017** pin J3-8 wire 712 white. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the feeder (FE) harness between connector **X032** pin 20 and connector **X007** pin 3 wire 712 white. Locate the open and repair.

17. If the circuit does not operate in either direction, and there are no error codes indicated, the supply power for the circuit may not be present. Remove fuse F23 and inspect.

    A. Fuse has failed. Go to Step **18**.

    B. Fuse is okay. Go to Step **19**.

18. If fuse has failed, replace the fuse.

    A. If the fuse immediately fails, a short to ground exists on one of the two following wires:
    - wire 025 red, from the fuse panel through connector **X005** pin 1 to connector **X016** pin J2-11 on CCM2 module
    - wire 028 red, from the fuse panel through connector **X031** pin 4 to connector **X017** pin J3-7 on CCM2 module. Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

    B. Fuse is okay. Go to Step **19**.

19. Test for 12V power at connector **X017** pin J3-7 on the CCM2 module under the cab.

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A. If there is no power, there is an open circuit on wire 028 red, from the fuse panel through connector **X031** pin 4 to connector **X017** pin J3-7 on CCM2 module. Locate the open and repair. After repair, go to Step **20**.

B. If there is power, go to Step **20**.

20. Test for continuity to ground at connector **X017** pin J3-16 on the CCM2 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X017** pin J3-16 and the front frame ground #2 wire 515 black or 538 black. Locate the open and repair. After repair, go to Step **21**.

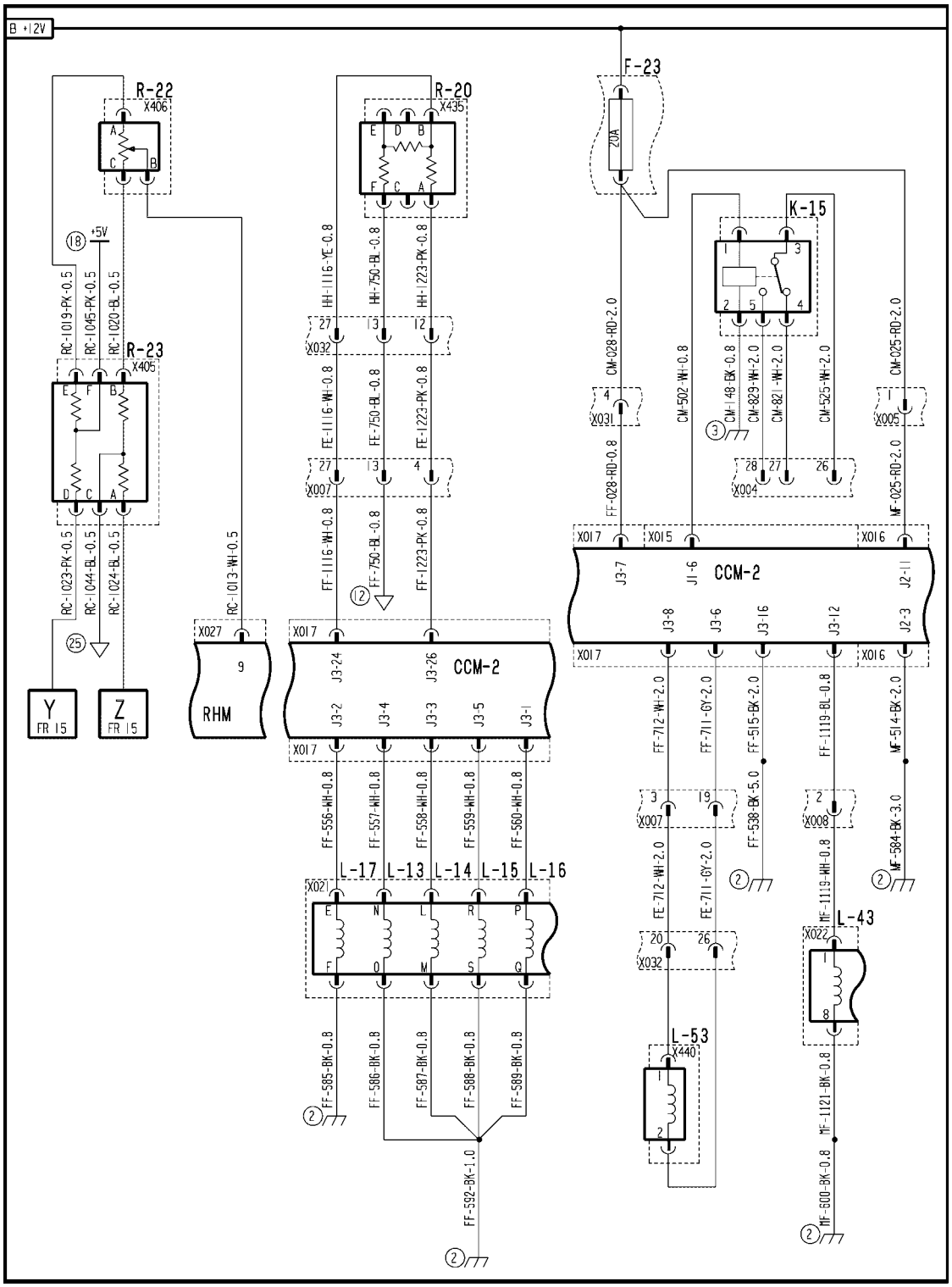
B. If there is continuity to ground, go to Step **21**.

21. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1.

A. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step **3** to locate the short to ground.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

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Sensing system Header type module - Short circuit to B+ (K.25.D.95.80 - G.30.B.54)

AFX8010

E0148-03 - Header Type Module

Context:
Headers used on the AFX combine may be equipped with a header type module, which is used to identify the header type to the combine. This allows the operator to store configuration information in memory that may be recalled when the header is attached.

Cause:
The header type module (R-20) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply or signal wiring shorted to **12 volts**.
2. Sensor ground wiring is open.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "HDR HEIGHT/TILT" or "HEADER" sort menu, and select "TYPE SEN" to check the voltage range.

   The normal operating range for the header type module circuit is **0.3 - 4.72 volts**.

   The normal voltage readings for the different header types are as follows:

Header Type	Sensor Voltage
Corn header	**3.72 - 4.72 volts**
Grain header	**2.93 - 3.72 volts**
Draper header	**2.02 - 2.93 volts**
Pick up header	**1.22 - 2.02 volts**
Programmable header	**0.3 - 1.22 volts**
No header installed	**0 - 0.3 volts**

   A. If the voltage reading is **4.72 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **5**.

2. Disconnect the header type module connector X435. Locate the wire 1223 pink in the connector using the following table:

Header Type	Connector X435 5 volts Power Wire
Corn header	Pin A
Grain header	Pin A
Draper header	Pin A
Pick up header	Pin F
Programmable header	Pin F

   Use a multimeter to check the voltage between connector X435 wire 1223 pink and chassis ground. There should be **5 volts**.

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A. If there is greater than **5 volts** on the pink wire, there is a short to high voltage on the**5 volts** supply wire. The fault code
E0167-03 - CCM2 J3 5V Reference
should be displayed in the Universal Display Plus "ERROR" screen. Correct that fault code condition, and then return to step **1** to determine if this fault condition has been corrected.

B. If the voltage is **5 volts**, continue with Step **3**.

3. Disconnect the header type module connector X435. Locate the wire 750 blue in the connector using the following table:

Header Type	Connector X435 Ground Wire
Corn header	Pin F
Grain header	Pin F
Draper header	Pin E
Pick up header	Pin A
Programmable header	Pin A

Use a multimeter to check for continuity between connector X435 wire 750 blue and chassis ground. There should be continuity to ground.

A. If there is no continuity to ground, . continue with step **4**.

B. If there is continuity to ground, continue with Step **4**.

4. Disconnect the header (HH) harness to feeder (FE) harness connector **X032**. Use a multimeter to check for continuity between the feeder (FE) harness end of connector **X032** pin 13 and chassis ground. There should be continuity to ground.

A. If there is continuity to ground, there is an open circuit in the header (HH) harness between connector **X032** and connector X435 wire 750 blue. Locate the open and repair.

B. If there is no continuity to ground, continue with step **5**.

5. Disconnect the feeder (FE) harness to front frame (FF) harness connector **X007**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X007** pin 13 and chassis ground. There should be continuity to ground.

A. If there is continuity to ground, there is an open circuit in the feeder (FE) harness between connector **X032** and connector **X007** wire 750 blue. Locate the open and repair.

B. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X007** and connector **X017** pin J3-18 wire 750 blue or 766 blue. Locate the open and repair.

6. Disconnect the header type module connector X435. Locate the wire 1116 yellow in the connector using the following table:

Header Type	Connector X435 Signal Wire
Corn header	Pin B
Grain header	Pin E
Draper header	Pin B
Pick up header	Pin E
Programmable header	Pin B

Use a multimeter to check for voltage between connector X435 wire 1116 yellow and chassis ground. There should not be any voltage.

A. If there is no voltage, the module has failed internally. Replace the header type module.

B. If there is voltage (>**4.72 volts**), continue with Step **6**.

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7. Disconnect the header (HH) harness to feeder (FE) harness connector **X032**. Use a multimeter to check for voltage between the feeder (FE) harness end of connector **X032** pin 27 and chassis ground. There should not be any voltage.

   A. If there is no voltage, there is a short circuit in the header (HH) harness between connector **X032** and connector X435 wire 1116 yellow. Locate the short and repair.

   B. If there is voltage (>**4.72 volts**), continue with step **5**.

8. Disconnect the feeder (FE) harness to front frame (FF) harness connector **X007**. Use a multimeter to check for voltage between the front frame (FF) harness end of connector **X007** pin 27 and chassis ground. There should not be any voltage.

   A. If there is no voltage, there is a short circuit in the feeder (FE) harness between connector **X032** and connector **X007** wire 1116 yellow. Locate the short and repair.

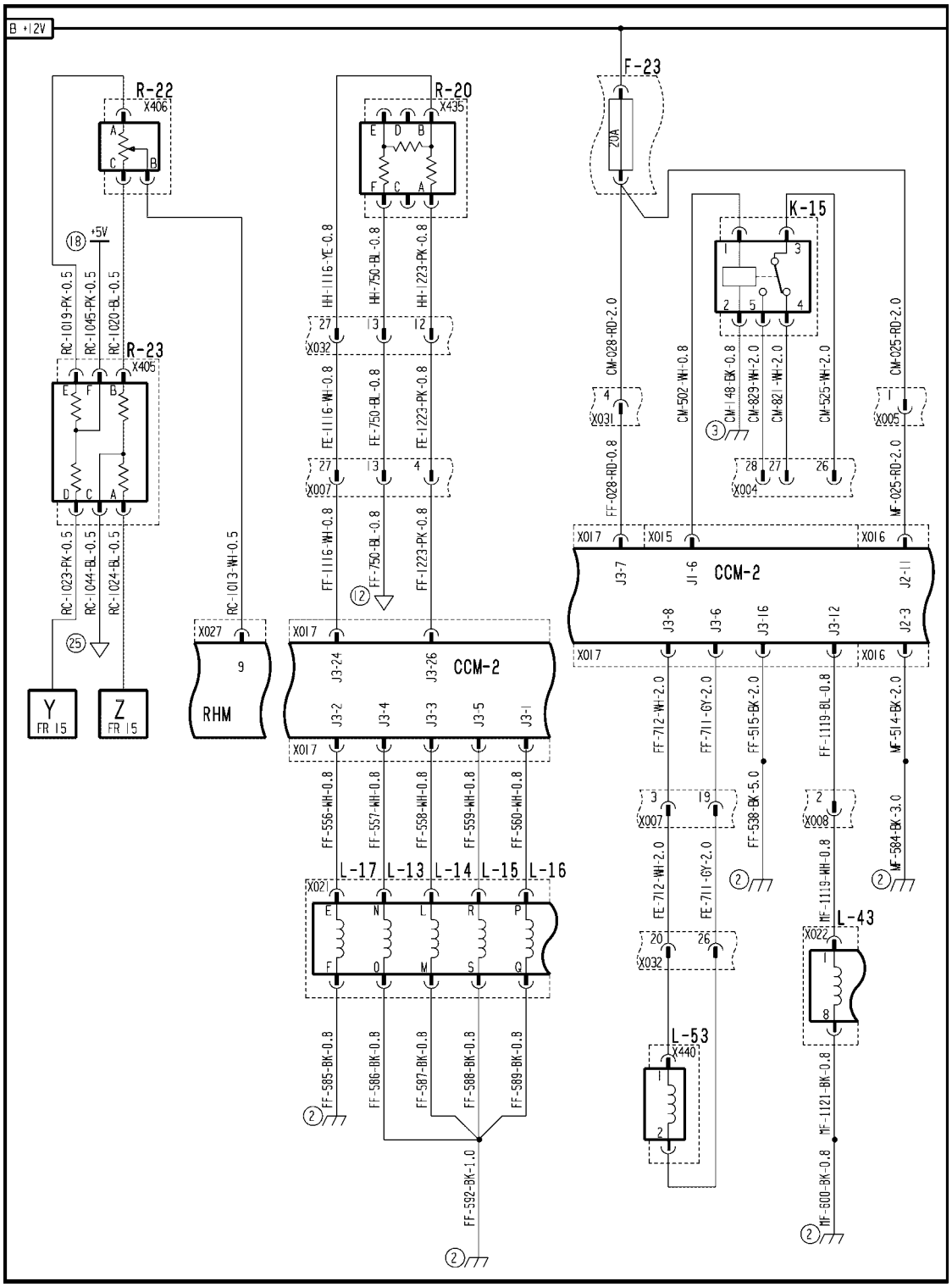
   B. If there is voltage (>**4.72 volts**), there is a short circuit in the front frame (FF) harness between connector **X007** and connector **X017** pin J3-24 wire 1116 yellow. Locate the short and repair.

9. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 12 (A.30.A.88 - C.20.E.12)



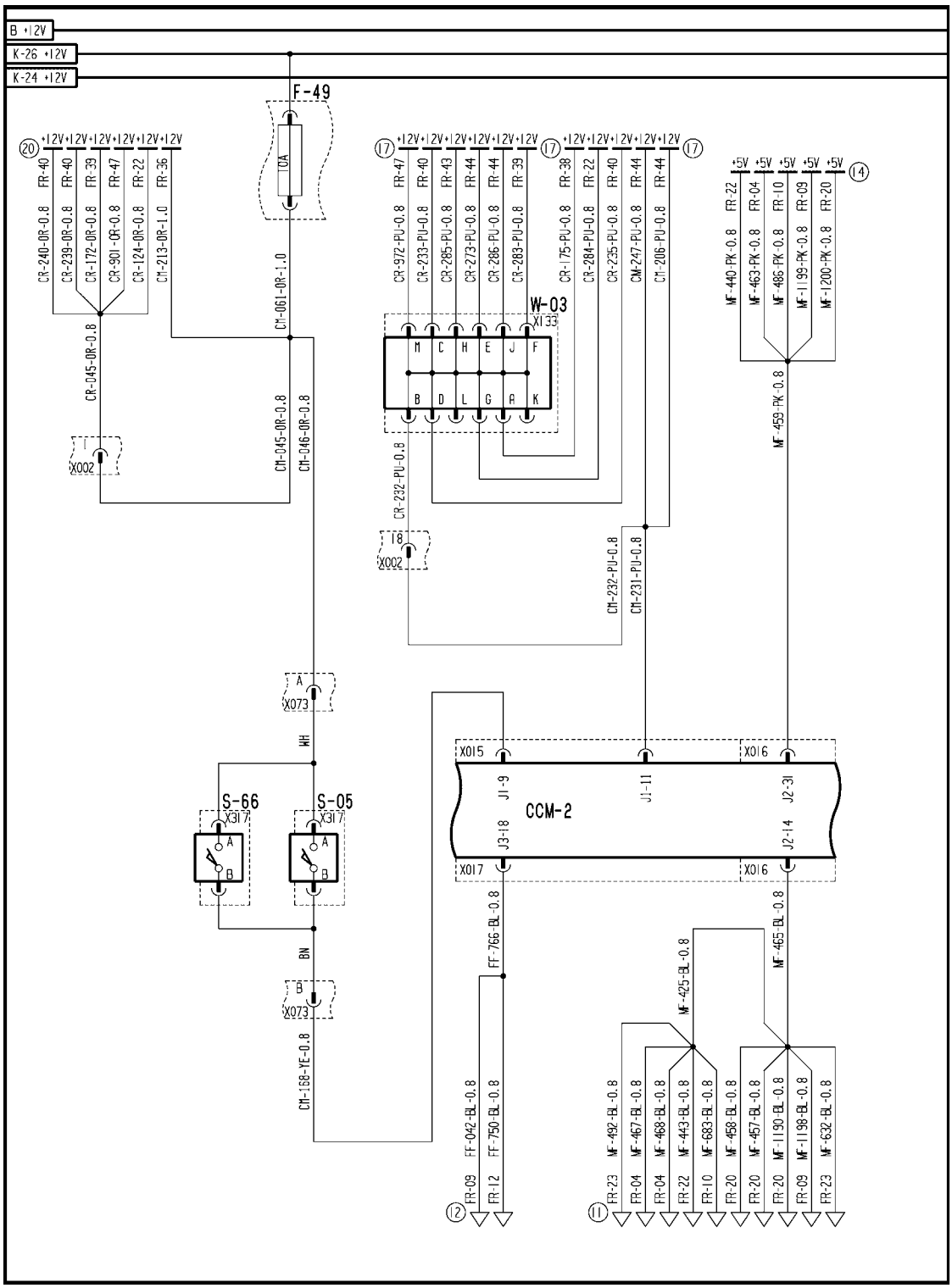
AFXSCHEM12-04 1

FRAME 12 - HEADER

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F-23 Not Used	K-15 Not Used	L-13 Reel Down
L-14 Reel Up	L-15 Reel Aft	L-16 Reel Fore
L-17 Reel Drive	L-43 Jammer Valve	L-53 Draper Header Solenoid
R-20 Header Type Module	R-22 Reel Speed Potentiometer	R-23 Resistor Module

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Index

CROP PROCESSING - K

FEEDING Header feeding - 25.D

Control valve - Short circuit (K.25.D.14 - G.30.B.52) 3
AFX8010

Control valve - Unidentified failure (K.25.D.14 - G.30.B.46) 9
AFX8010

Sensing system Header type module - Short circuit to B+ (K.25.D.95.80 - G.30.B.54) 15
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

CROP PROCESSING - K

FEEDING Feeder housing - 25.E

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

FEEDING Feeder housing - 25.E

FUNCTIONAL DATA

Drive system

Drive system - Overview (K.25.E.40 - C.10.A.10) 4
AFX8010

SERVICE

FEEDING Feeder housing - Remove (K.25.E - F.10.A.10) 6
AFX8010

FEEDING Feeder housing - Install (K.25.E - F.10.A.15) 10
AFX8010

Drive system

Drive system - Remove (K.25.E.40 - F.10.A.10) 16
AFX8010 With stone trap

Drive system - Install (K.25.E.40 - F.10.A.15) 18
AFX8010 With stone trap

Drive system - Remove (K.25.E.40 - F.10.A.10) 20
AFX8010 Without stone trap

Drive system - Install (K.25.E.40 - F.10.A.15) 22
AFX8010 Without stone trap

Gearbox

Gearbox - Remove (K.25.E.44 - F.10.A.10) 25
AFX8010

Gearbox - Disassemble (K.25.E.44 - F.10.A.25) 27
AFX8010

Gearbox - Assemble (K.25.E.44 - F.10.A.20) 35
AFX8010

Feed chain

Feed chain - Tension adjust (K.25.E.48 - F.45.A.40) 42
AFX8010

Feed chain - Replace (K.25.E.48 - F.10.A.30) 43
AFX8010

Feed chain - Remove (K.25.E.48 - F.10.A.10) 44
AFX8010

Feed chain - Install (K.25.E.48 - F.10.A.15) 45
AFX8010

Idler roller

Idler roller - Remove (K.25.E.57 - F.10.A.10) 46
AFX8010

Idler roller - Install (K.25.E.57 - F.10.A.15) 47
AFX8010

https://truckmanualshub.com/

Idler roller - Clearance (K.25.E.57 - F.45.A.12) 48
AFX8010

DIAGNOSTIC

Command

Command Engage switch - Short circuit to B+ (K.25.E.05.83 - G.30.B.54) 49
AFX8010

Command Engage switch - Short circuit to ground (K.25.E.05.83 - G.30.B.53) 56
AFX8010

Command Engage switch - Short circuit to B+ (K.25.E.05.83 - G.30.B.54) 62
AFX8010

Control valve

Control valve Clutch control valve - Short circuit to B+ (K.25.E.14.20 - G.30.B.54) 70
AFX8010

Control valve Clutch control valve - Unidentified failure (K.25.E.14.20 - G.30.B.46) 74
AFX8010

Control valve Clutch control valve - Unidentified failure (K.25.E.14.20 - G.30.B.46) 78
AFX8010

Control valve Speed control valve - Unidentified failure (K.25.E.14.10 - G.30.B.46) 82
AFX8010

Sensing system

Sensing system Speed sensor - Short circuit to B+ (K.25.E.95.80 - G.30.B.54) 86
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.25.E.95.80 - G.30.B.53) 89
AFX8010

Sensing system Speed sensor - Open circuit (K.25.E.95.80 - G.30.B.50) 92
AFX8010

https://truckmanualshub.com/

Drive system - Overview (K.25.E.40 - C.10.A.10)

AFX8010

FEEDER DRIVE

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)

- The feeder drive system consists of electrical, electronic, hydraulic and mechanical components which work together to enable several different modes of operation. This may make diagnosing a feeder system problem quite difficult. To better explain how the feeder system operates, each mode of operation is explained from the moment of activation to the resulting action. The feeder drive has very specific operating requirements which may prevent the feeder from functioning properly. The system is in control of all feeder operations, maintaining RPM, monitoring, troubleshooting and issuing warnings.

FEEDER - MODES OF OPERATION

Idle

- Immediately after the operator has started the engine, electrical power is applied to the CCM1 module and the feeder should be at rest. The CCM1 module receives signal from the Feeder Speed Sensor B-14 at connector **X020** pin J3-14. Providing the detected feeder speed is below 5 RPM, current is sent from connector **X020** pin J3-15 to energize the Ring-to-Frame clutch L-50. The Ring-to-Frame clutch L-50 is engaged to hold the feeder speed at zero.

Calibration

- This mode is accessible from the IDLE state, via the Universal Display Plus monitor, requiring operator initiation. Calibration is used to define minimum and maximum pump and Engine-to-Ring clutch coil current values. These values are stored in nonvolatile memory. Calibration should be done at least once every harvest season and immediately following pump or clutch replacement.

Feeder Engagement

- When the operator places the feeder control switch S-31 in the forward detented position, the feeder will be started by activating an acceleration mode to start and bring the feeder up to the requested RPM. The electrical system deactivate the Ring to Frame clutch L-50, and will activate the Engine-to-Ring clutch L-47 to start the feeder turning. The clutch will be modulated to provide smooth engagement, bringing the feeder speed up to the desired speed within 5 seconds. The electronics will monitor the actual feeder gear case output speed and make adjustments to the feeder pump as required to match the actual feeder speed to the requested feeder speed.

Feeder Drive Control

- There are essentially three phases of the mechanical portion of the feeder system. Mechanical Power, Hydro Power, and Combined (Mechanical and Hydro) Power.
- Mechanical Power - Mechanical Power is used during feeder startup and normal operation of the feeder. Power is directed from the engine through the PTO gearbox to drive the Engine-to-Ring, ring planetary carrier, feeder gearbox and feeder. This provides the main flow of power to operate the feeder.
- Hydro Power - Hydro Power is used speed control when in forward mode, and for reversing the feeder chain for clearing the feeder of debris. Power from the engine is directed through the PTO gearbox to drive the feeder hydro pump, drive motor, sun gear, planetary carrier, feeder gear box and feeder.
- Combined Power - Combined operation of both the mechanical power and hydro power modes allows for speed adjustment of the feeder drive. Power from the engine is directed through the PTO gearbox to drive the Engine-to-Ring, ring, planetary carrier, feeder gearbox and feeder. The hydro pump and motor will control the speed of the sun gear to change the speed of the planetary carrier which drives the feeder. This provides for an Over-Speed or Under-Speed condition relative to the Engine and PTO gearbox speed.

To engage the feeder in a forward direction, the following conditions must be met:

1. Rear ladder must be in the "UP" position.
2. Operator seated.
3. Engine Running

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4. Separator in normal engagement w/feeder switch off.
5. Feeder switch turned to forward (latched) position.

Forward Manual

- Forward manual state is accessible from the IDLE state and is initiated by placing the feeder switch S-31 into the forward (latched) position, assuming all constraints have been met. The feeder accelerates to commanded speed (set by header speed potentiometer R-18) when the Engine-to-Ring clutch L-47 is fully engaged. Rotating the header speed potentiometer R-18 will manually adjust the output speed of the feeder drive.

Forward Automatic

- Forward automatic state is engaged when all applicable presets have been defined (minimum and maximum feeder speed in terms of ground speed units), the feeder switch is engaged, all feeder engagement constraints have been met and the feeder auto mode rocker switch is in the "AUTO" position. The feeder speed will be at minimum until the ground speed exceeds the minimum preset, and will then vary as a function of ground speed while below the maximum preset. Feeder speed will be at maximum should ground speed exceed the maximum limit. These settings are header sensitive.

To engage the feeder in Forward Automatic mode, the following conditions must be met:

1. Define the upper and lower ground speed limits via the Universal Display Plus monitor.
2. Define upper and lower feeder RPM limits by defining the header type.
3. Engage the feeder via the feeder engage switch S-31 (above procedure).
4. Engage the Header Mode Switch S-69.

Reverse

- Feeder reverse is activated when the feeder switch S-31 is placed and held in the rearward momentary position. At high engine idle (2100 RPM) the feeder speed will be 130 RPM in the reverse direction. This speed is reduced in proportion to engine RPM.

Passive Deceleration

- When the feeder is operating at "X" RPM and the feeder switch is placed into the "OFF" position, the Engine-to-Ring clutch L-47 is disengaged placing the feeder in the passive deceleration state.

Off

- With the feeder engage switch S-31 in the OFF (center detented) position, the feeder should not be powered and should be at rest. Providing the feeder speed is below 5 RPM, the CCM1 module sends current from connector **X020** pin J3-15 to engage the Ring to Frame clutch L-50. This prevents the feeder from moving.

Feeder Cutoff

- The feeder will automatically stop if any of the following conditions are met:

Feeder Shutoff

1. Feeder speed is <80 RPM when the feeder cutoff is enabled. Feeder cutoff can be enabled or disabled on the SETUP>COMBINE>VEHICLE>FEEDER screen.
2. Operator fails to remain seated when feeder engaged.
3. Rear ladder is sensed to be in "down" position when feeder engaged.
4. Separator switch is disengaged while feeder is engaged.
5. Feeder clutch slippage is sensed and auto cutoff is enabled.
6. Feeder RPM falls below set minimum and feeder low speed cutoff is enabled.

Feeder Drive Gearbox

- The feeder drive gearbox drives the upper feeder shaft to power the feeder chains. If the unit is equipped with a rock trap, the gearbox will have a second output shaft to operate the rock trap. The gearbox is equipped with the feeder slip clutch and speed sensor B-14 that will be used to control the speed of the feeder house, shaft speed monitor and provide a display on the Universal Display Plus monitor in the cab.

https://truckmanualshub.com/

FEEDING Feeder housing - Remove (K.25.E - F.10.A.10)

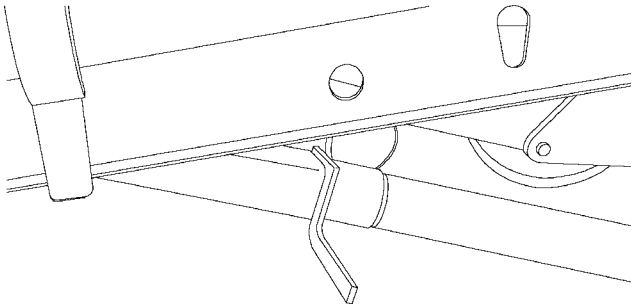
AFX8010

The feeder house can be removed from the combine as a complete unit to gain access to the threshing rotor or other components located behind the feeder house. Most components on the feeder house can be serviced or replaced without removing the feeder house, with the exception of the pivot shaft.

1. Raise the feeder housing and secure the safety lock on the feeder lift cylinders.

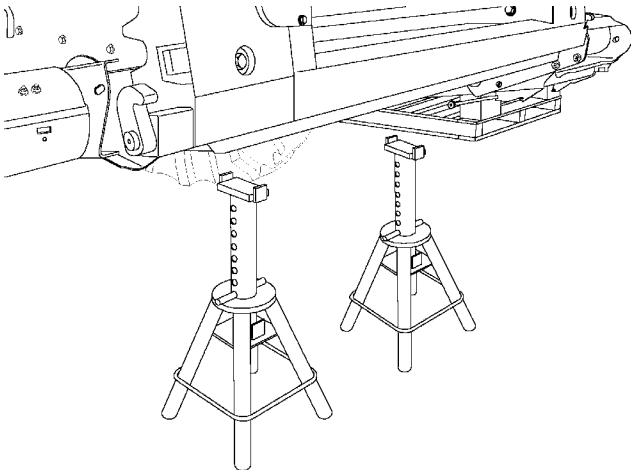
⚠ WARNING ⚠

M421 - Always raise the feeder all the way up and set the lift cylinder safety stand before working under the feeder or header.



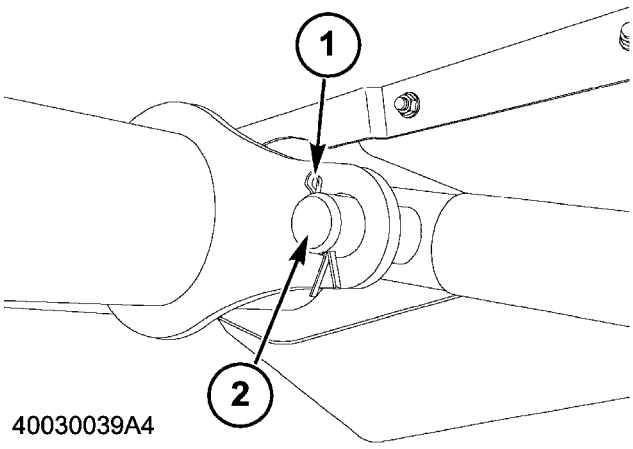
40030317 1

2. Place suitable jack stands under the front of the feeder housing, to support the assembly while disconnecting the cylinders.



40030040 2

3. Disengage the safety lock on the feeder lift cylinder. Lower the feeder housing onto the jack stands.
4. Working from the side of the feeder house, remove the cotter pins **(1)** securing the front retaining pin **(2)** for each lift cylinder in the feeder house. Remove each pin and lower the lift cylinders to the ground.

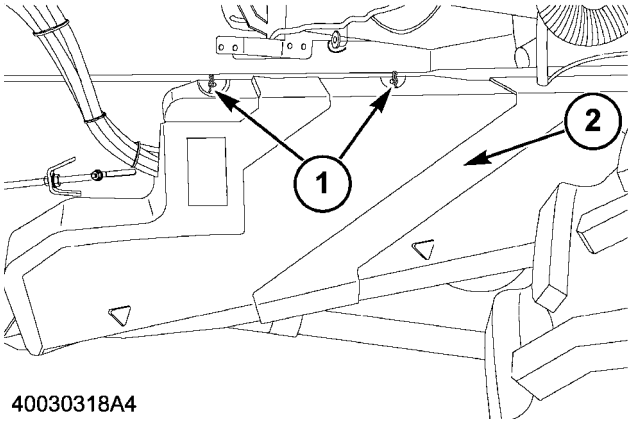


40030039A4 3

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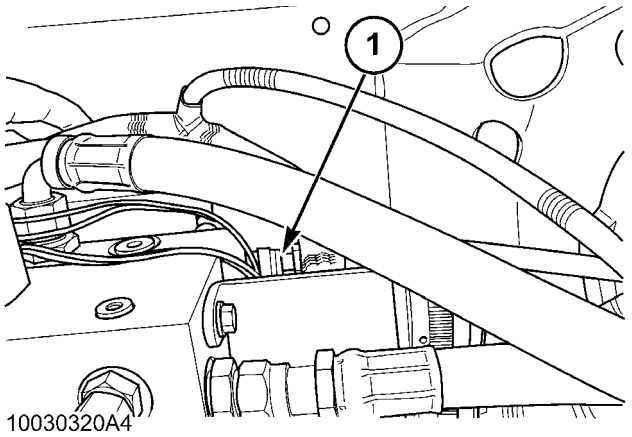
5. Remove the hairpin clips **(1)** and nuts from the left side shield **(2)**. Remove the shield from the feeder housing.

NOTE: *Hydraulic fluid will drain from the hydraulic lines once they have been disconnected. Have a suitable container ready to catch the draining fluid.*



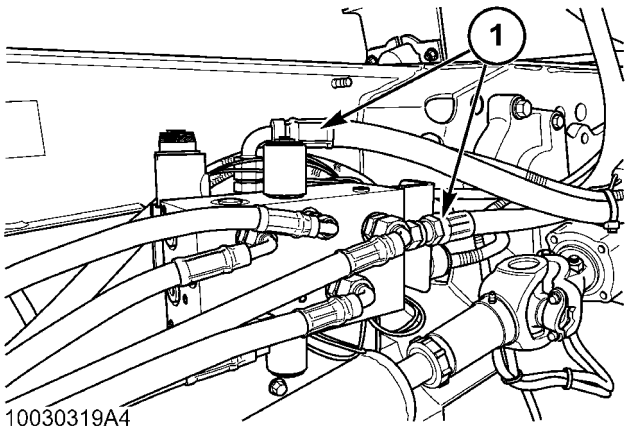
40030318A4 4

6. Disconnect the small hydraulic line **(1)** from the feeder manifold. Plug the hose and cap the fitting tightly.



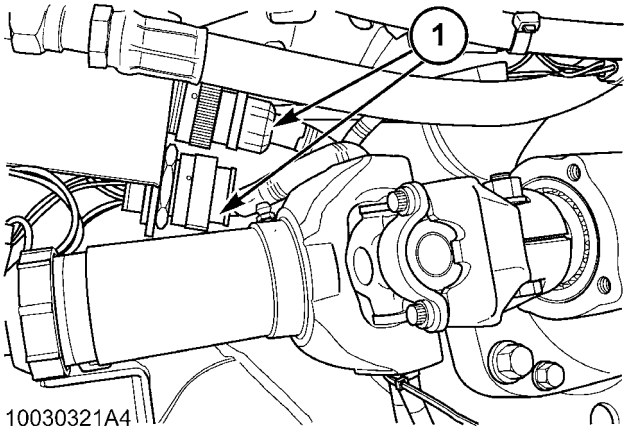
10030320A4 5

7. Disconnect the two large hydraulic lines, **(1)**from the feeder manifold. Plug these hoses and cap the fittings tightly. Disconnect the hose from the bottom of the feeder manifold and cap the line.



10030319A4 6

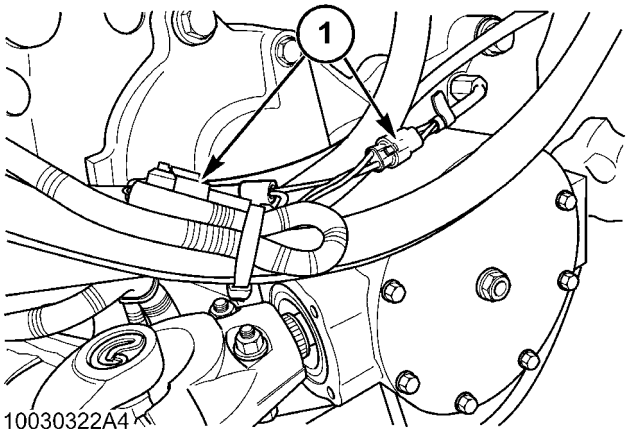
8. Disconnect the two main electrical plugs **(1)** from the feeder manifold block.



10030321A4 7

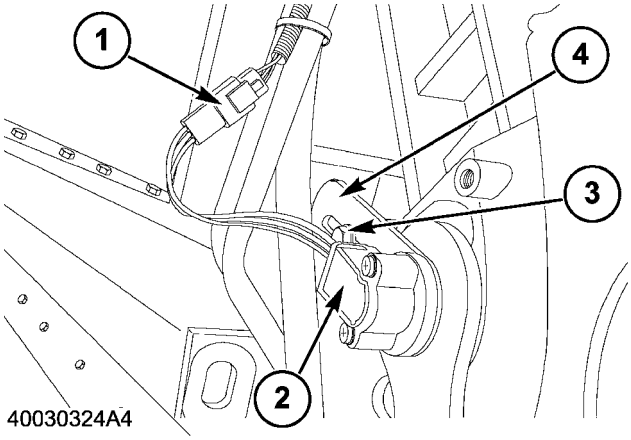
https://truckmanualshub.com/

9. Disconnect the plug connectors **(1)** from the wire harness.



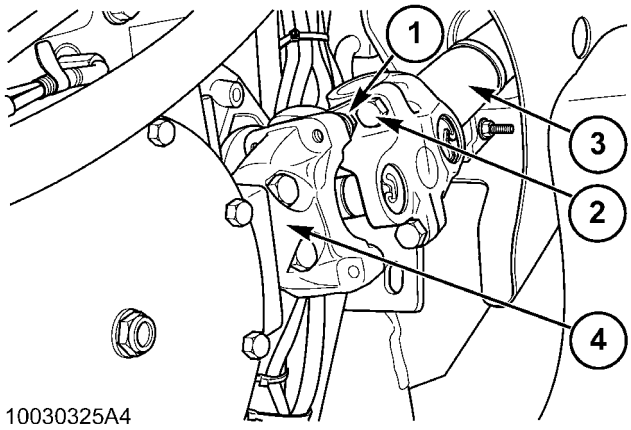
10030322A4 8

10. Disconnect the connector **(1)** for the feeder position sensor **(2)**. Remove the bolt **(3)**from the position sensor bracket **(4)**. Remove the position sensor **(2)**from the feeder housing.



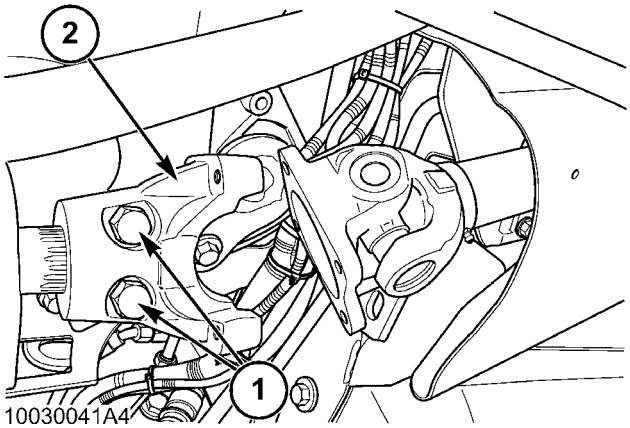
40030324A4 9

11. Remove the four smaller bolts **(1)** that connect the universal joint to the feeder input shaft yoke. Remove the four larger bolts **(2)**from the universal joint connecting the main feeder drive shaft **(3)**and the feeder input shaft **(4)**. Remove the universal joint.



10030325A4 10

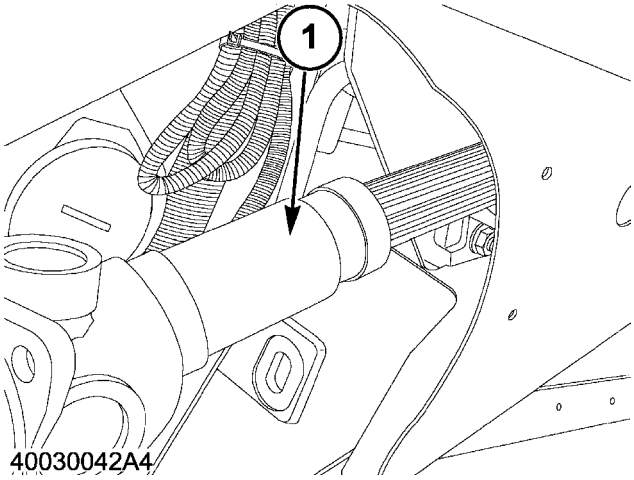
12. Remove the two bolts **(1)** from the yoke. Remove yoke **(2)** from the shaft.



10030041A4 11

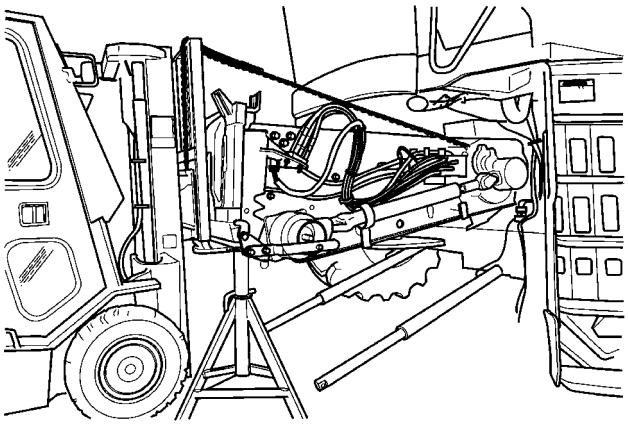
https://truckmanualshub.com/

13. Slide the main feeder pivot shaft **(1)** completely off.



40030042A4 12

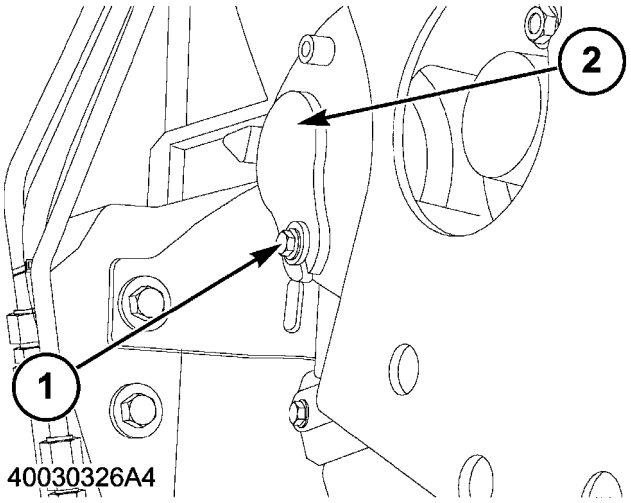
14. Position a suitable forklift with fork extensions under the feeder housing. To prevent plastic crop deflector damage on the front of the feeder house it can either be removed, or spaced away by using a block between the feeder and the lifting device. Attach a chain from the forklift to the rear of the feeder housing.



10030323 13

15. Remove the bolt and washer **(1)**from the feeder pivot pin **(2)**.

NOTE: *The universal joint assembly may need to be removed completely to gain access to the left side feeder pivot pin for removal.*



40030326A4 14

16. Remove pivot pin from feeder housing and combine frame.

17. Repeat for opposite side.

18. Once the pins have been removed, the feeder house is no longer attached to the combine. Carefully back the forklift away from the combine to remove the feeder. Have an assistant make sure that no components remain attached to the combine.

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FEEDING Feeder housing - Install (K.25.E - F.10.A.15)

AFX8010

1. Before installing the feeder house onto the combine, generously lubricate the pivot points on the combine frame. The feeder weighs approximately **1195 - 1285 kg** (**2634 - 2833 lb**) use care when installing the feeder to the combine.

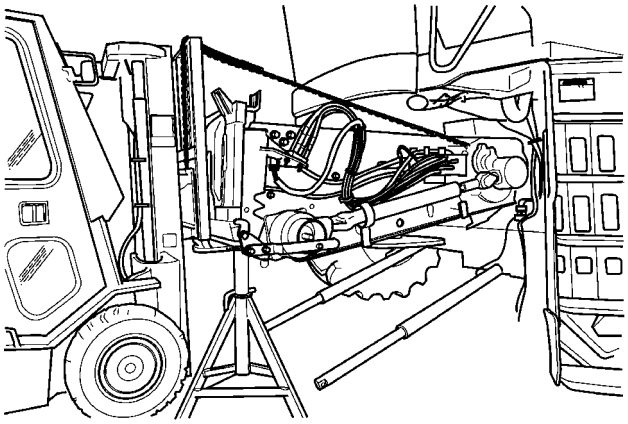
⚠ DANGER ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

2. Attach a chain from the forklift to the rear of the feeder housing. With the feeder attached to the forklift, install the feeder back to the front of the combine. Have an assistant make sure the feeder is properly aligned.

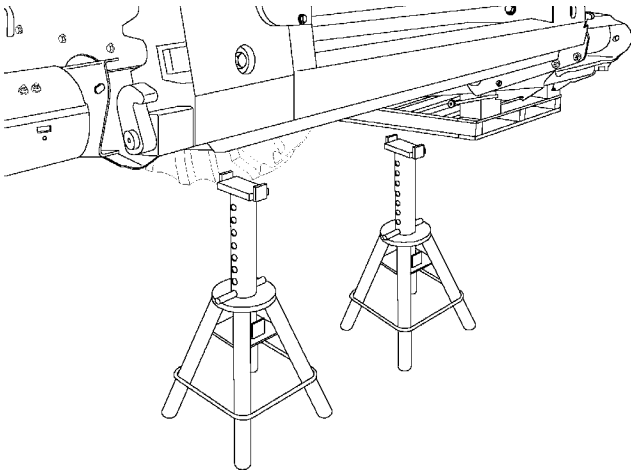
⚠ DANGER ⚠

84-102 - Improper service or repair can cause injury or death. If you do not understand the service procedures for this machine, see your dealer or the Service manual.



10030323 1

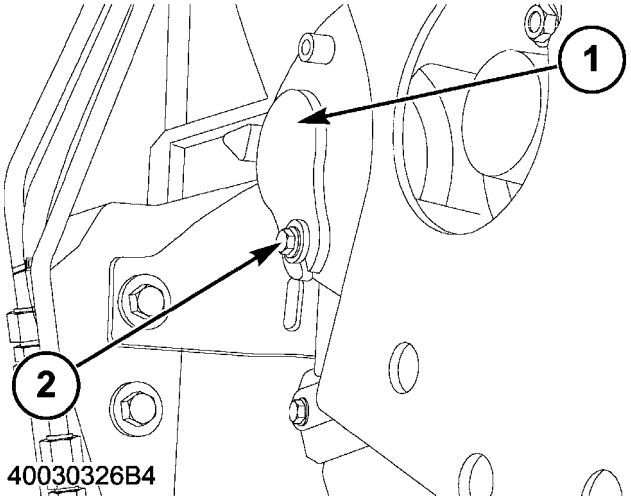
3. Place suitable jackstands under the front of the feeder housing.



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4. Grease and install the pivot pin **(1)**. Install the bolt and washer **(2)** through the feeder house.



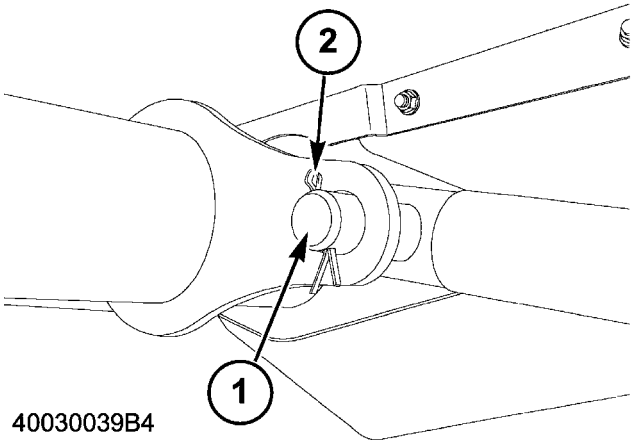
40030326B4 3

5. Repeat for opposite side.

⚠ WARNING ⚠

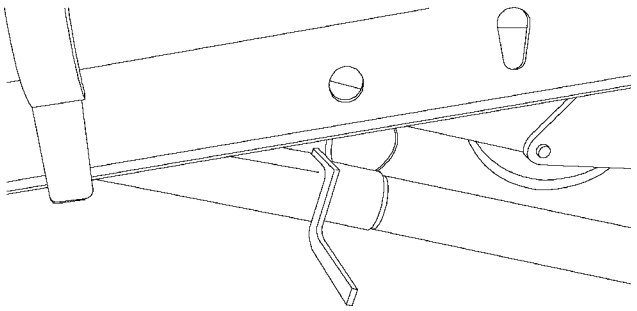
M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

6. Working from the side of the feeder house, raise each lift cylinder up to the feeder house and install the front retaining pin **(1)** for each lift cylinder in the feeder house. Secure the retaining pins in the feeder frame with the cotter pins **(2)**.



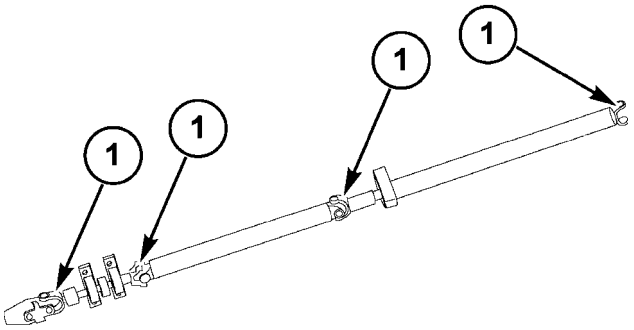
40030039B4 4

7. Use the hydraulics to raise the feeder high enough to engage the feeder safety lock. If the feeder safety lock cannot be engaged, lower the feeder house completely to the ground.


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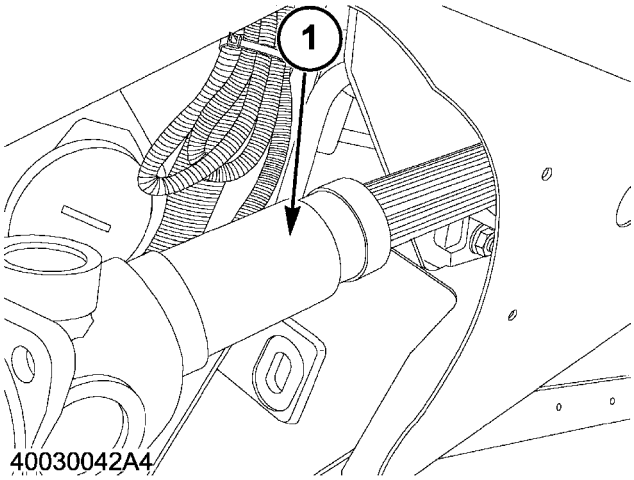
8. Align all phases of joints 0 degrees as shown. These four points **(1)** should all line up when assembled. There are alignment arrows on the shafts which can be assembled correctly with the arrows aligned.



40033732A4

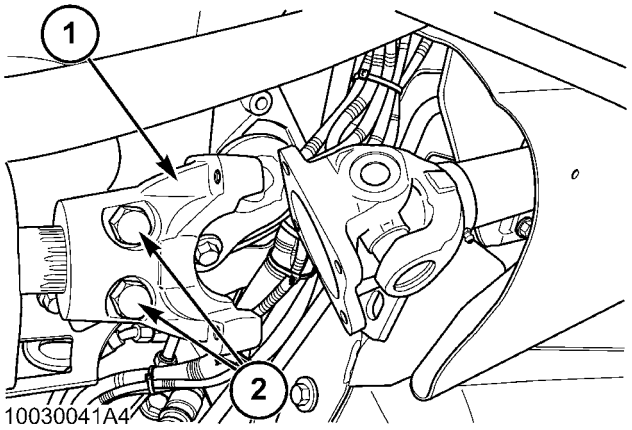
40033732A4 6

9. Grease and slide the main feeder pivot shaft **(1)** completely on.



40030042A4 7

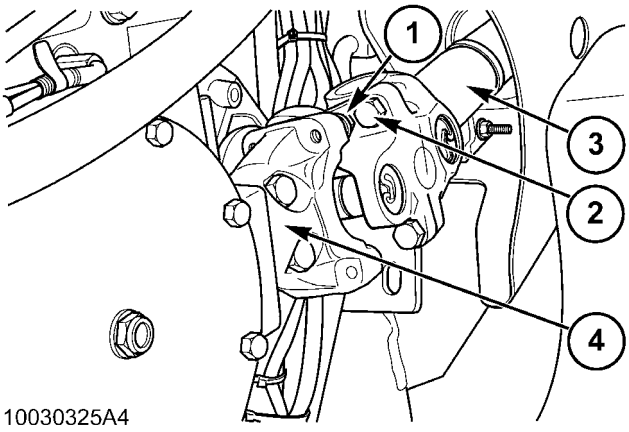
10. Install the yoke **(1)** onto the shaft. Install the two bolts **(2)** through the yoke from opposite sides. Torque to **101 - 113 Nm**. (**74 - 83 lb ft**). Install the universal joint.



10030041B4 8

https://truckmanualshub.com/

11. Install the four smaller bolts **(1)** that connect the universal joint to the feeder input shaft yoke. Torque to **61 - 81 Nm** (**45 - 60 lb ft**).



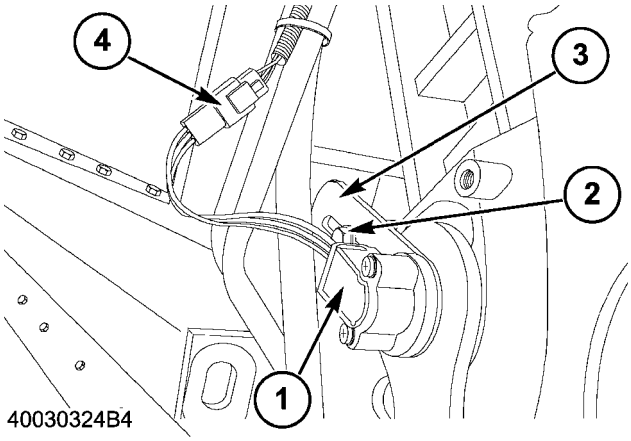
10030325A4 9

12. Install the four larger bolts **(2)** through the universal joint connecting the main feeder drive shaft **(3)** and the feeder input shaft **(4)**. Torque to **132 - 157 Nm** (**97 - 116 lb ft**).

13. Install the feeder position sensor **(1)** found on the right side of the feeder housing.

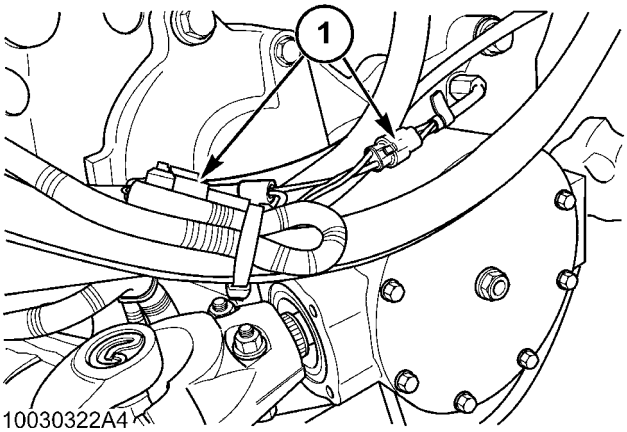
    Install the bolt **(2)** into the position sensor bracket **(3)**. Insure the sensor wiper is not binding. If it is, shim as necessary.

    Reconnect the connector **(4)** for the feeder position sensor **(1)**.



40030324B4 10

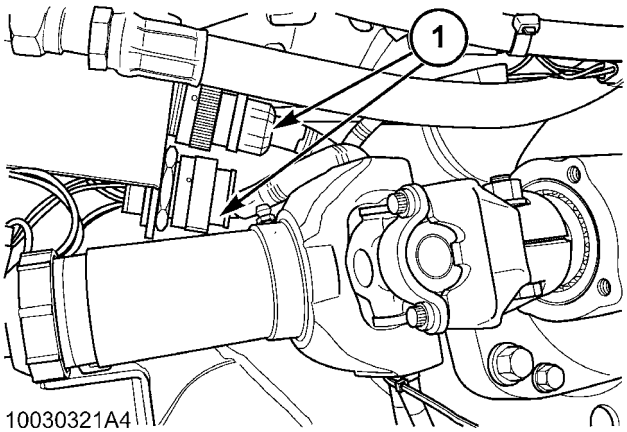
14. Reconnect the two plug connectors **(1)** to the wire harness.



10030322A4 11

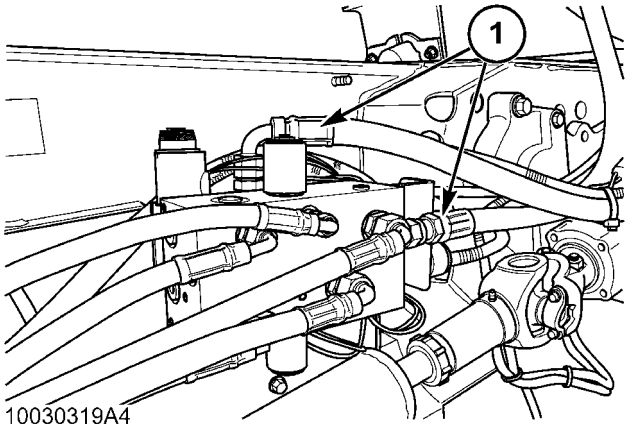
https://truckmanualshub.com/

15. Reconnect the two main electrical plugs **(1)** to the feeder manifold block.



10030321A4 12

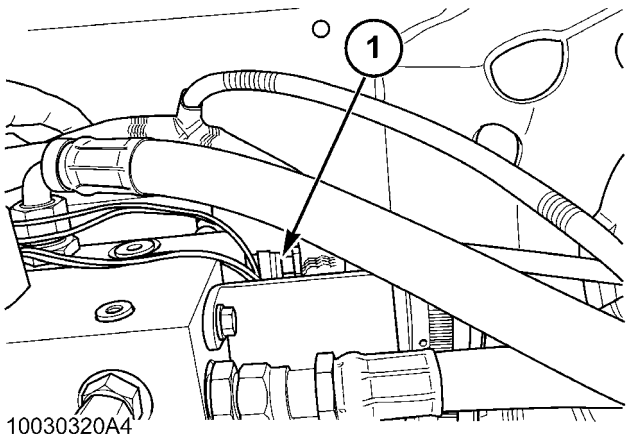
16. Reconnect the two large hydraulic lines **(1)** to the feeder manifold.



10030319A4 13

17. Reconnect the small hydraulic line **(1)**to the feeder manifold.

    Install the hose on the bottom of the feeder manifold.

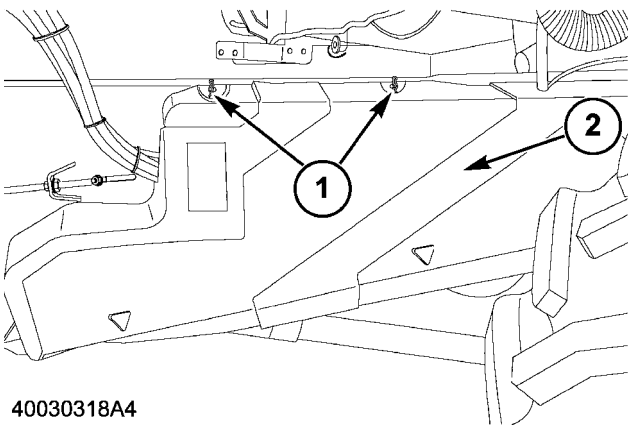


10030320A4 14

18. Install the left side shield to the feeder housing. Install the hairpin clips **(1)** and nuts to the left side shield **(2)**.

⚠ WARNING ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.



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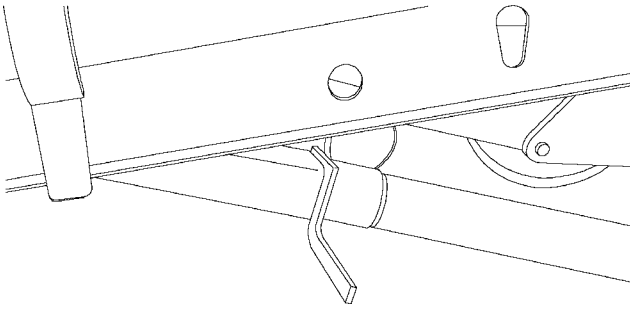
19. Be sure the weight of the feeder house is removed from the forklift. Disconnect the chain from the feeder house and carefully back the forklift away from the feeder house.

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Drive system - Remove (K.25.E.40 - F.10.A.10)

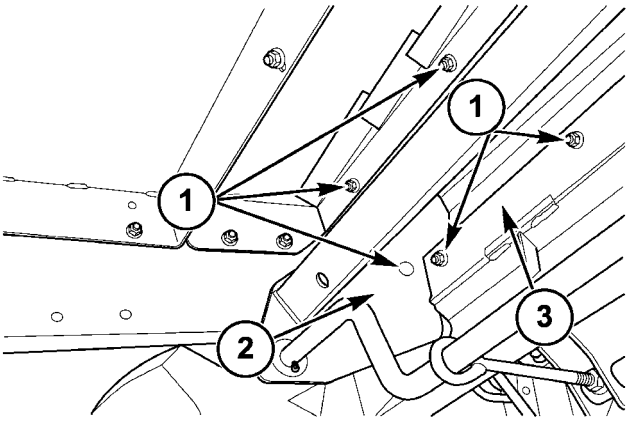
AFX8010 With stone trap

1. Raise the feeder completely and engage the cylinder safety stop.



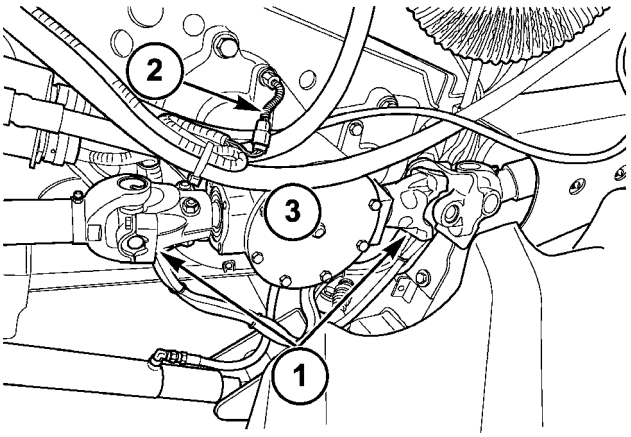
40030317 1

2. Remove the feed chain as described in **Feed chain - Remove (K.25.E.48 - F.10.A.10)**.
3. Remove the bolts, washers and nuts **(1)** and lower the stone trap **(2)** and front floor section **(3)**.



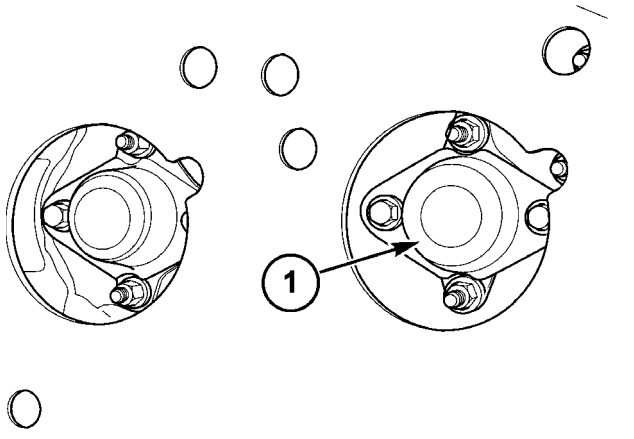
10032094B5 2

4. Support the end of the drive shaft and stone beater. Disconnect the drive lines **(1)** and the speed sensor **(2)** and remove gearbox **(3)** from the feeder.



50032030A5 3

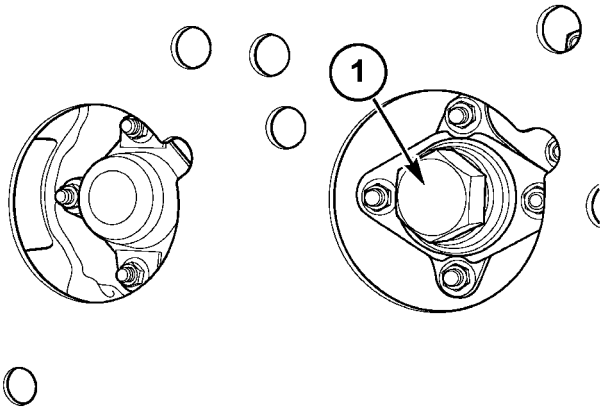
5. Remove the front cap **(1)**.



10032092B5 4

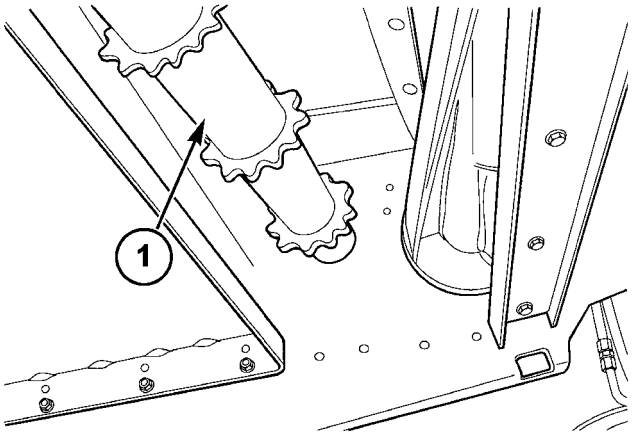
https://truckmanualshub.com/

6. Remove the washer and bolt **(1)**.



50040158A5 5

7. Remove the drive shaft **(1)**.



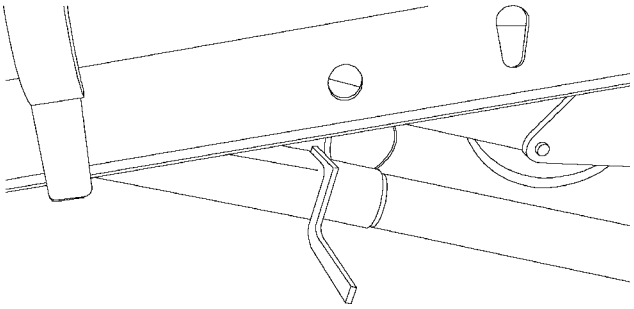
50040148A5 6

https://truckmanualshub.com/

Drive system - Install (K.25.E.40 - F.10.A.15)

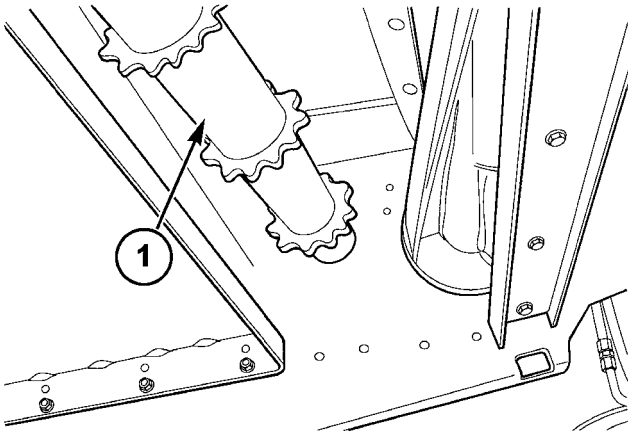
AFX8010 With stone trap

1. Raise the feeder completely and engage the cylinder safety stop.



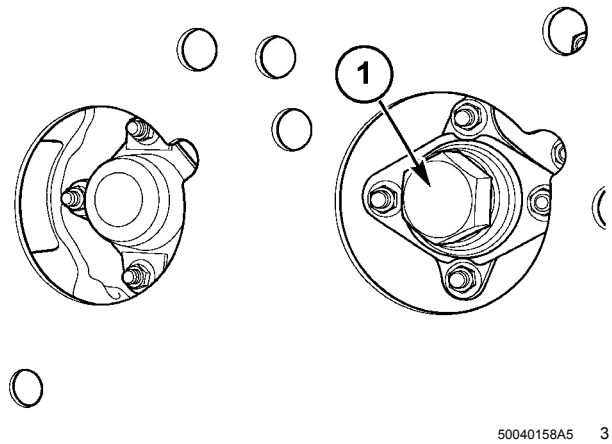
40030317 1

2. Install the drive shaft **(1)** into the feeder with the threaded end toward the right hand side.



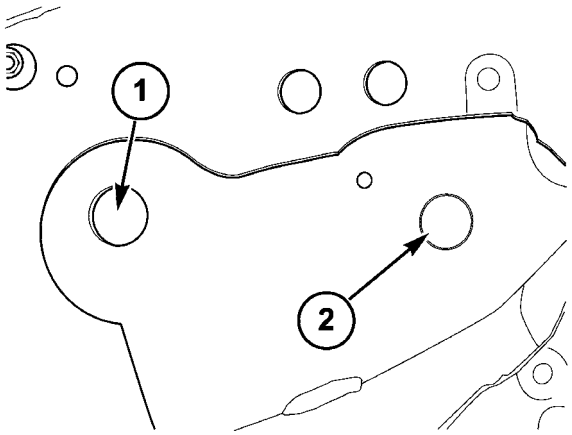
50040148A5 2

3. Insert 1-1/2" washer and 1-1/2" bolt **(1)** into the end of the drive shaft.



50040158A5 3

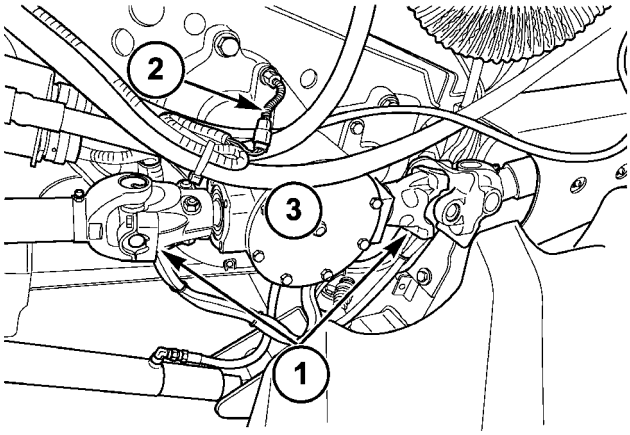
4. Line up the drive shaft **(1)** and the beater drum **(2)**. Coat the splines with #2 moly disulfide grease, then install the gearbox.



10032093A5 4

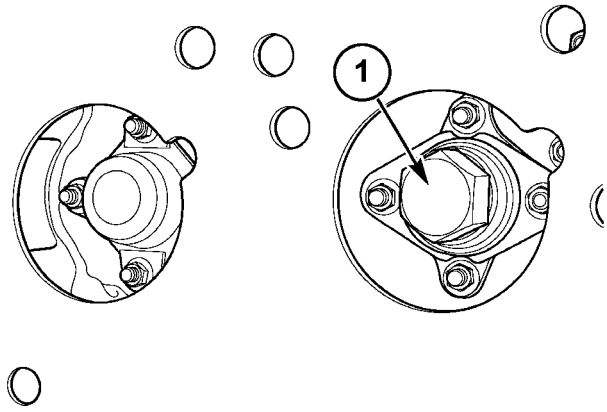
https://truckmanualshub.com/

5. Connect the drive lines **(1)** and the speed sensor **(2)** to the gearbox **(3)**.



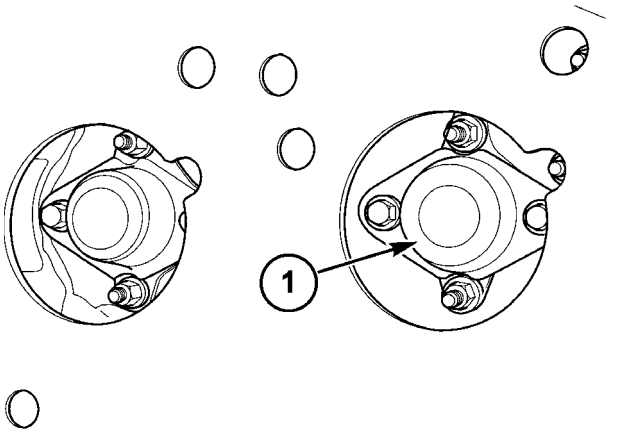
50032030A5 5

6. Torque the 1-1/2" bolts **(1)** to **1054 Nm** (**775 lb ft**).



50040158A5 6

7. Install the cap **(1)**.



10032092B5 7

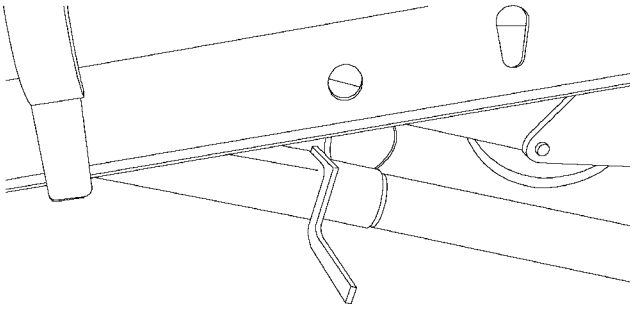
8. Install the Stone trap as described in **Stone trap - Install (K.90.E.70 - F.10.A.15)**.
9. Install the chain as described in **Feed chain - Install (K.25.E.48 - F.10.A.15)**.

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Drive system - Remove (K.25.E.40 - F.10.A.10)

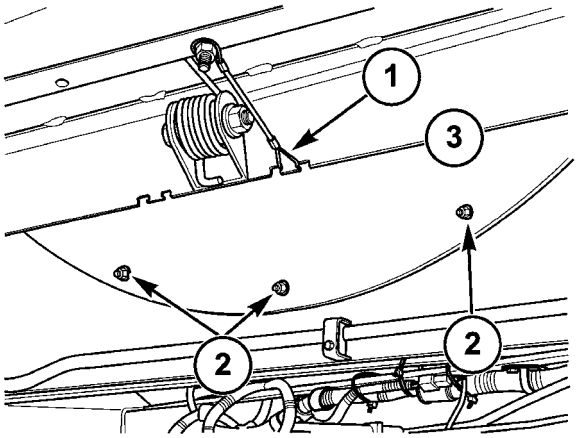
AFX8010 Without stone trap

1. Raise the feeder completely and engage the cylinder safety stop.



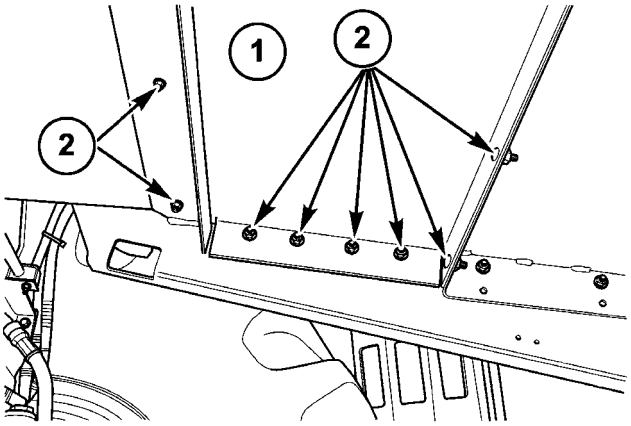
40030317 1

2. Remove the feed chain as described in **Feed chain - Remove (K.25.E.48 - F.10.A.10)**.
3. Hook the strap **(1)** to hold the flap seal away from the feeder. Remove the bolts **(2)** and remove the front rotor cover **(3)**.



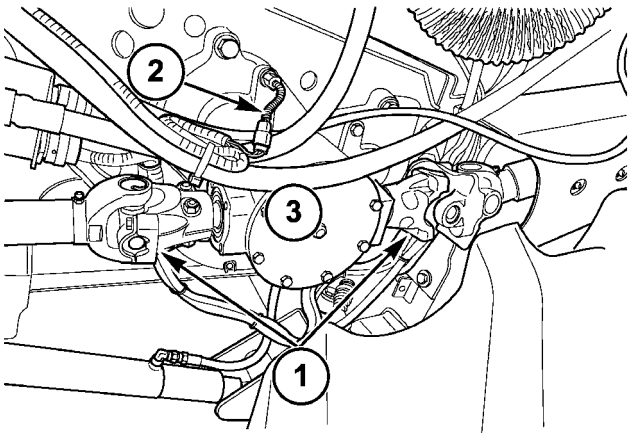
10032087A5 2

4. Remove the floor section **(1)** by removing the bolts, washers and nuts **(2)**. Push the floor up, then back, then bring the front end down and out.



10032083A5 3

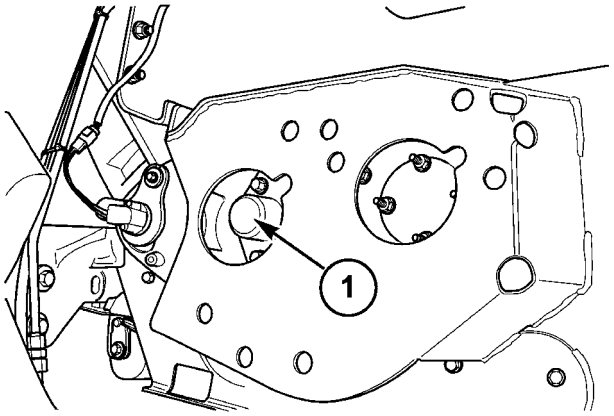
5. Support the end of the drive shaft. Disconnect the drive lines **(1)** and the speed sensor **(2)** and remove gearbox **(3)** from the feeder.



50032030A5 4

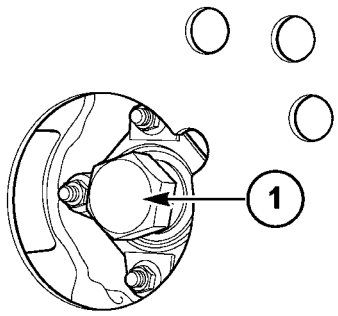
https://truckmanualshub.com/

6. Remove the cap **(1)**.



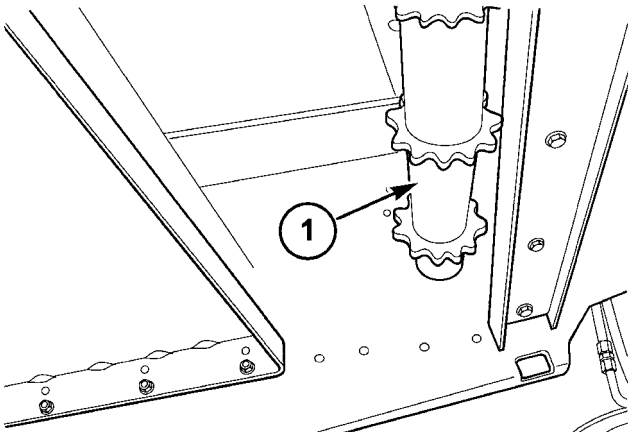
10032085A5 5

7. Remove the washer and bolt **(1)**.



50040157A5 6

8. Remove the drive shaft **(1)**.



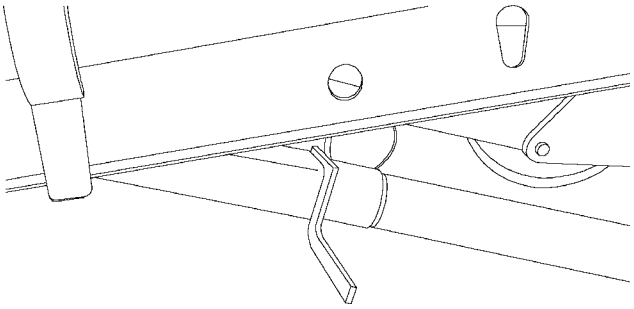
50040156A5 7

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Drive system - Install (K.25.E.40 - F.10.A.15)

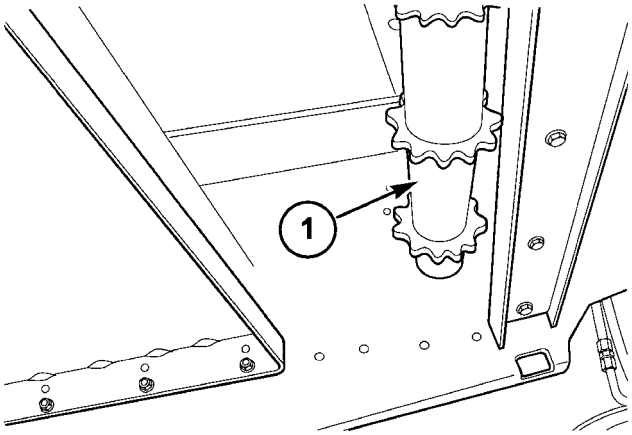
AFX8010 Without stone trap

1. Raise the feeder completely and engage the cylinder safety stop.



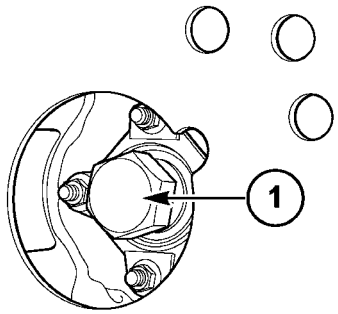
40030317 1

2. Install the drive shaft **(1)** into the feeder with the threaded end toward the right hand side.



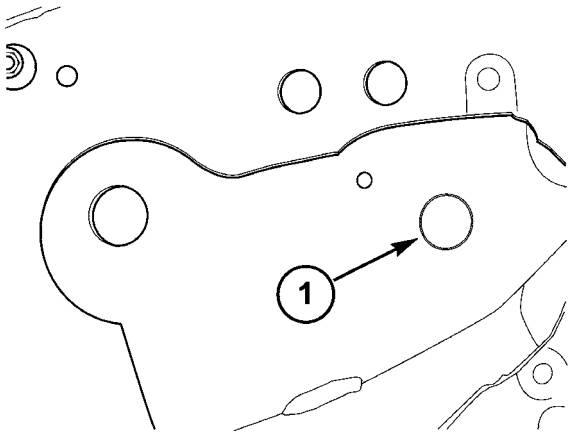
50040156A5 2

3. Insert 1-1/2" washer and 1-1/2" bolt **(1)** into the end of the drive shaft.



50040157A5 3

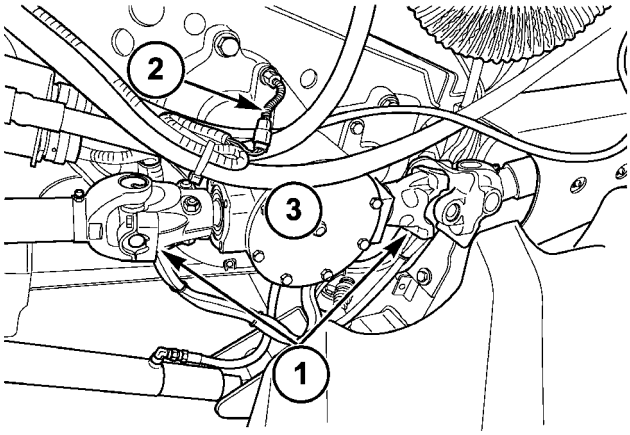
4. Line up the drive shaft **(1)**. Coat the splines with #2 moly disulfide grease, then install the gearbox.



10032093B5 4

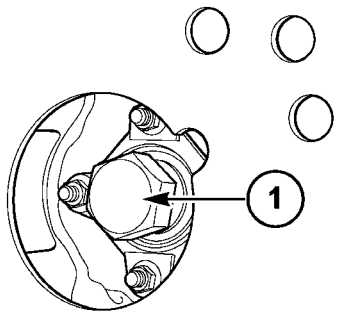
https://truckmanualshub.com/

5. Connect the drive lines **(1)** and the speed sensor **(2)** to the gearbox **(3)**.



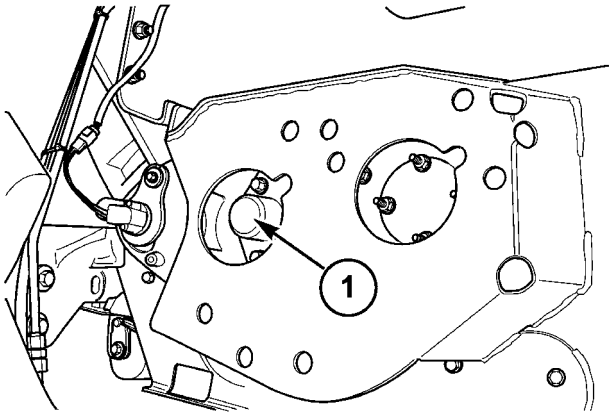
50032030A5 5

6. Torque the 1-1/2" bolt **(1)** to **1054 Nm** (**775 lb ft**).



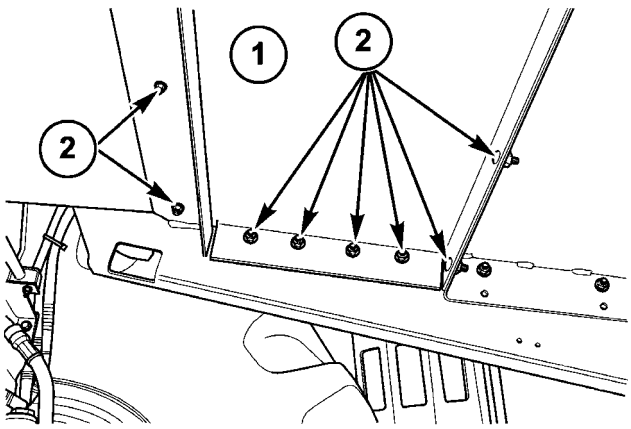
50040157A5 6

7. Install the cap **(1)**.



10032085A5 7

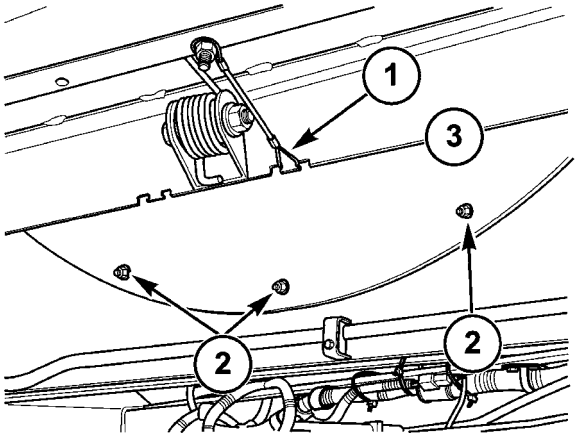
8. Install the floor section **(1)** by lifting the back end into the feeder first. Once the entire floor is in the feeder, slide it forward, and bring the back down, then slide it into position. Secure in place with the bolts, washers and nuts **(2)**.



10032083A5 8

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9. Install the front rotor cover **(3)** with the washers and bolts **(2)**. Unhook the strap **(1)** to release the flap seal.



10032087A5 9

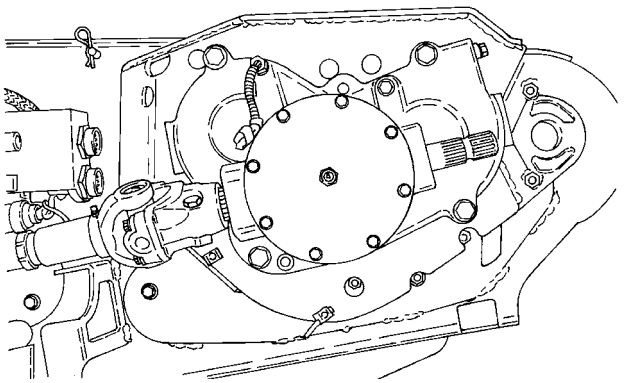
10. Install the chain as described in **Feed chain - Install (K.25.E.48 - F.10.A.15)**.

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Gearbox - Remove (K.25.E.44 - F.10.A.10)

AFX8010

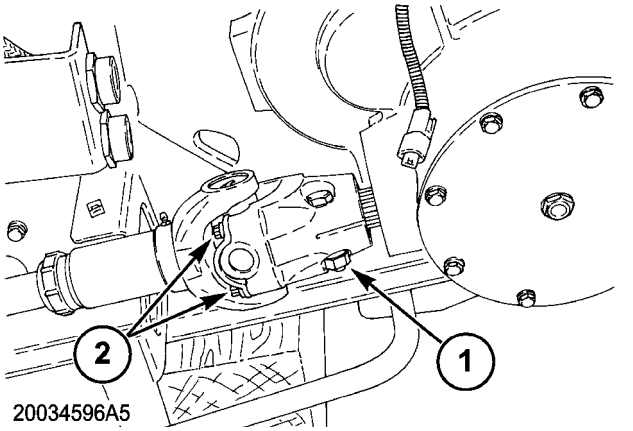
1. To remove the conveyor/rocktrap gearbox proceed as follows.



20034592 1

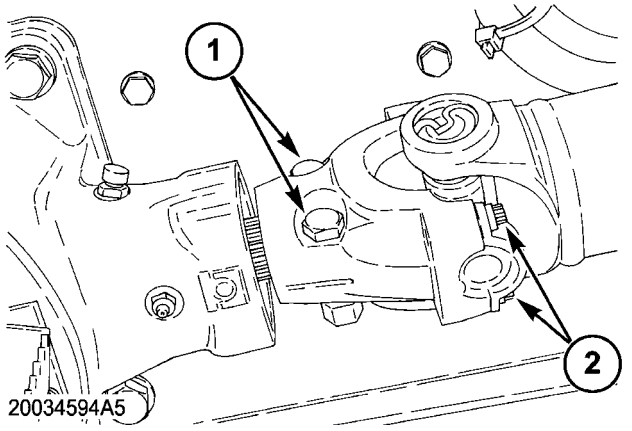
2. Remove the spline yoke bolts **(1)** and the bearing caps **(2)**at the upper gearbox.

NOTE: *The driveshaft may need to be pryed off the splined shaft. Be careful in doing so.*



20034596A5 2

3. remove the spline yoke bolts **(1)** and the bearing cap bolts **(2)** from the lower gearbox.

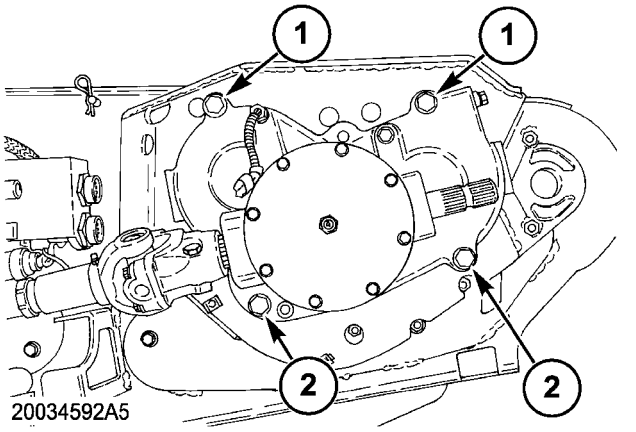


20034594A5 3

4. Remove the drive shaft away from the feeder.

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5. Remove the two upper bolts **(1)** and the two lower bolts **(2)** from the gearbox.



20034592A5 4

6. Use a hoist with a lift strap or another person to help remove the gearbox from the feeder. The gearbox will most likely need to be pryed away from the feeder house because of the splined shafts. Pry away the gearbox evenly.

NOTE: *The gearbox is heavy and requires the use of another person or a hoist. Injury could occur if not properly supported when removing.*

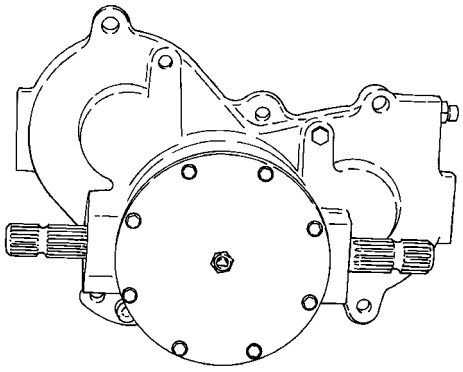
https://truckmanualshub.com/

Gearbox - Disassemble (K.25.E.44 - F.10.A.25)

AFX8010

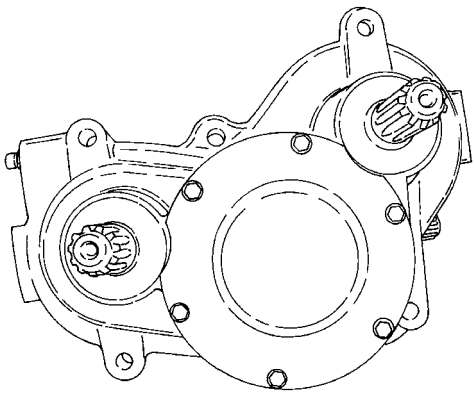
Prior operation: Drain Oil from the gearbox by removing the drain plug.
Prior operation: Disconnect the sensor electrical connection.
Prior operation: Drive system - Remove (K.90.E.40 - F.10.A.10)

1. Remove the 8 bolts which retain the cover to the gearbox on the input shaft side.



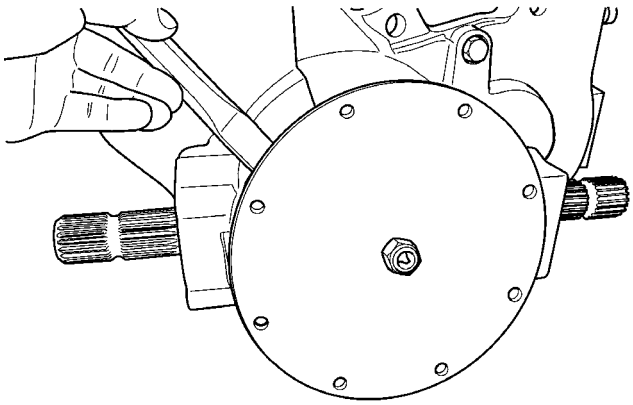
20034604 1

2. Remove the 6 bolts which retain the opposite cover on the output shaft side.



20034607 2

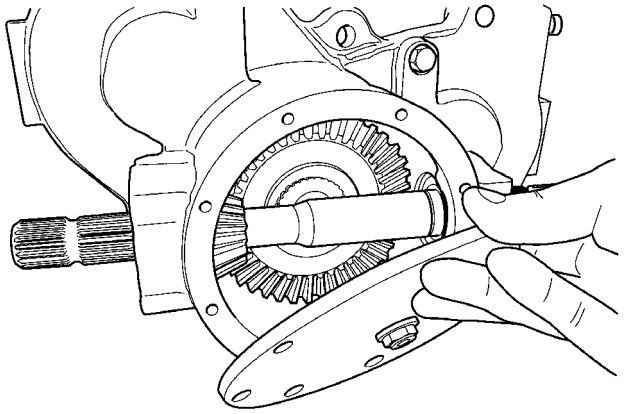
3. To remove the covers, use a flat chisel and slowly drive it between the housing and the plate.



10034612 3

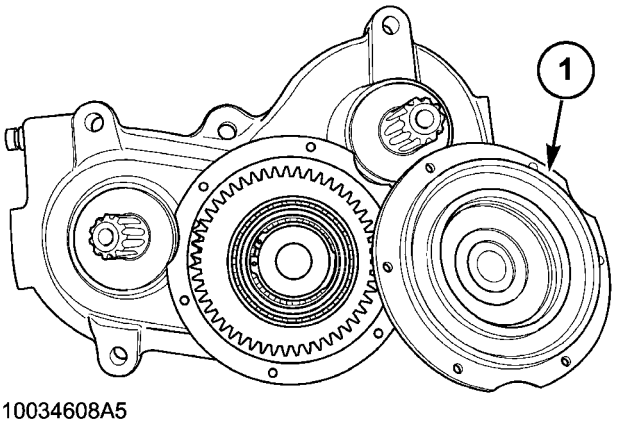
https://truckmanualshub.com/

4. The plate on the input shaft side will remove from its gasket fairly easily.



10034613 4

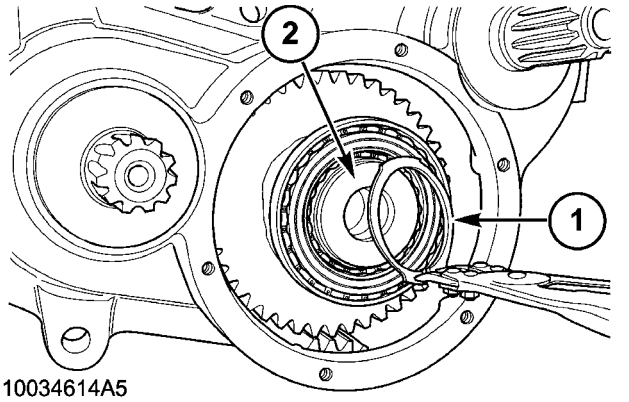
5. The cover **(1)** on the output shaft side will be sealed tight to the housing because of its O ring seal. To remove the bearing in the cover **(1)** use a slide hammer or small pry bar and work your way around the bearing evenly.



10034608A5

10034608A5 5

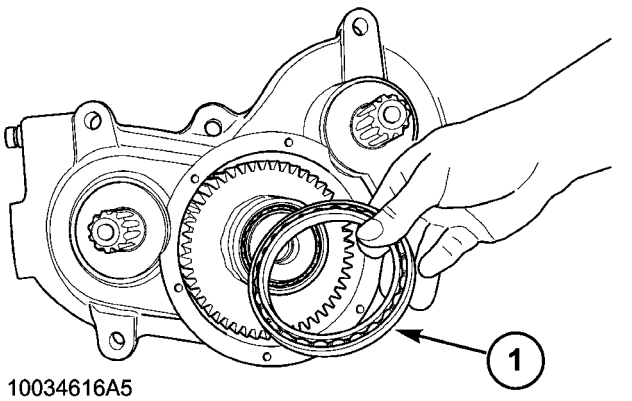
6. With both covers off remove the snap ring **(1)** from the center shaft **(2)** on the output shaft side.



10034614A5

10034614A5 6

7. Remove the bearing **(1)** behind the snap ring using a set of pullers.

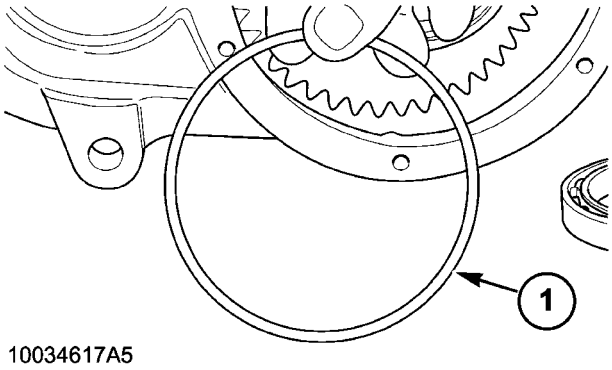


10034616A5

10034616A5 7

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8. Remove the retaining ring **(1)** from behind the bearing.

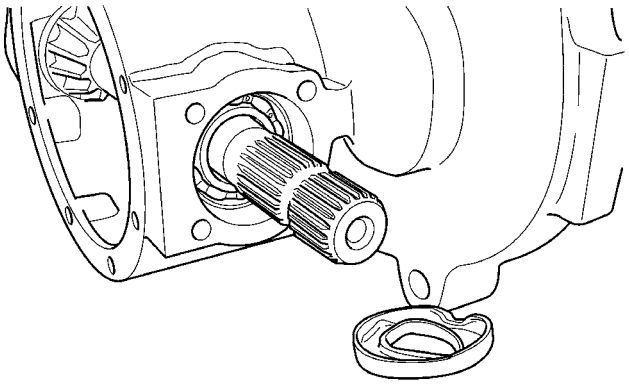


10034617A5

10034617A5 8

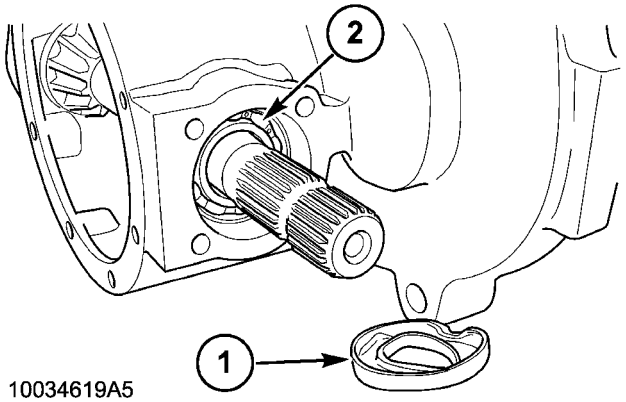
9. On the straight through input shaft you must remove the oil seals on both sides using a seal puller.

NOTE: *The seals will need to be replaced. Do not try to reuse the removed seals or leakage could occur causing gearbox damage and failure.*



10034619 9

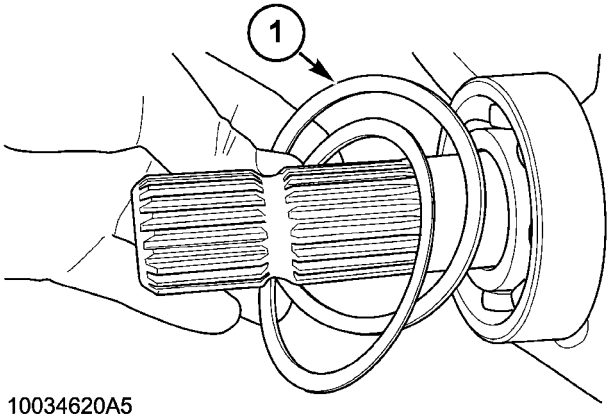
10. Behind the seals **(1)** remove the snap ring **(2)** and shims from both ends of the shaft.



10034619A5

10034619A5 10

11. Note to keep track of the number of shims **(1)** and the orientation of where you removed them.

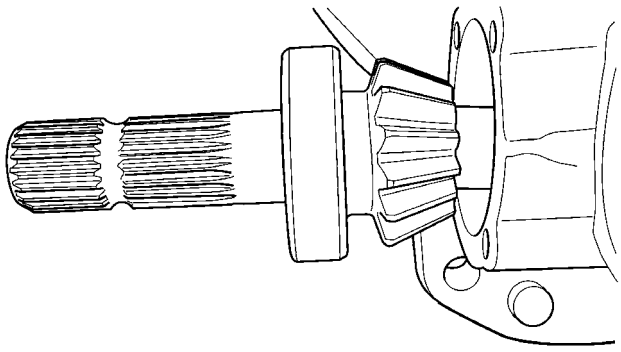


10034620A5

10034620A5 11

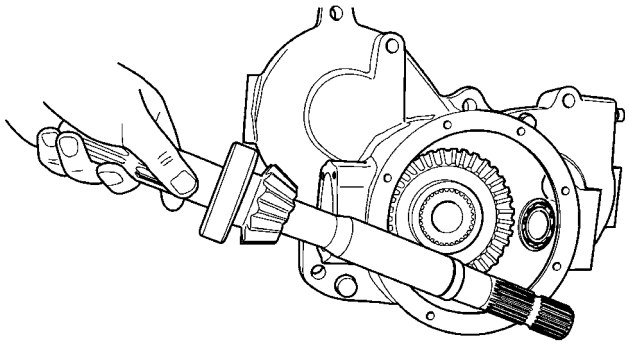
https://truckmanualshub.com/

12. To remove the straight through input shaft you can either use a press if one is available, or a large soft face dead blow hammer.



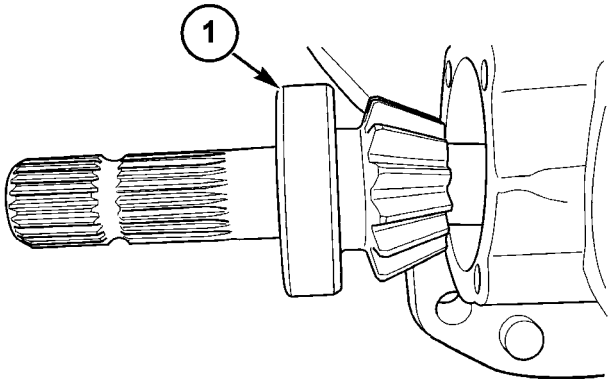
10034622 12

13. The shaft must be removed with the beveled spur gear end out first from the housing.



10034623 13

14. With the shaft out, the bearing **(1)** on the shaft can be removed using a set of pullers or the press.

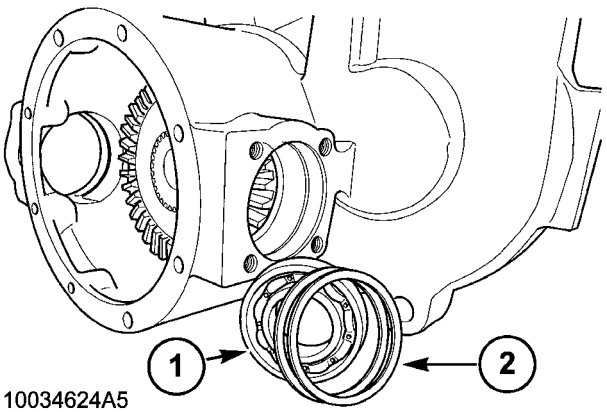


10034622A5

10034622A5 14

15. The remaining bearing **(1)** in the housing may be removed in a press or by using a long soft drift and a dead blow hammer driving it from the inside of the housing out.

NOTE: *Keep track of the number and orientation of shims* ***(2)*** *.*

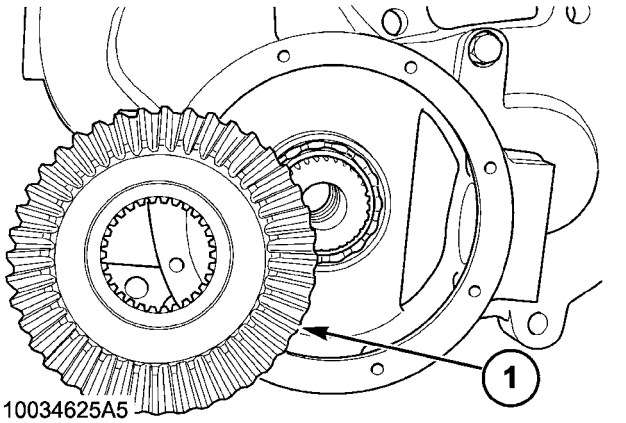


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10034624A5 15

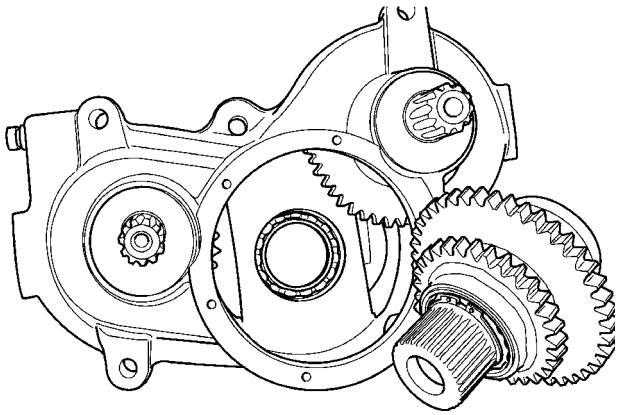
https://truckmanualshub.com/

16. You may now remove the large beveled gear **(1)** from the center shaft.



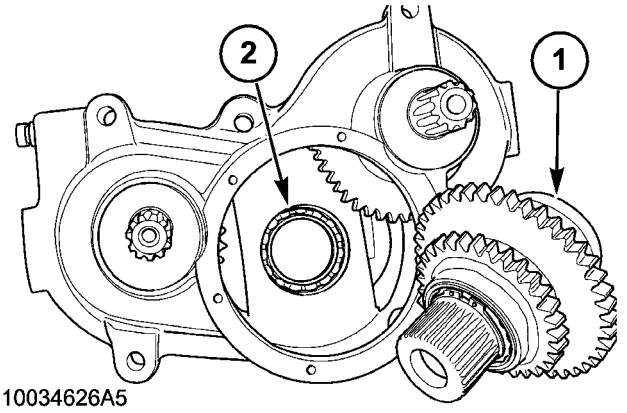
10034625A5 16

17. When the beveled gear is removed, you may remove the entire torque limiter shaft and remaining gear cluster from the housing.



10034626 17

18. Once the torque limiting shaft **(1)** with the gear cluster is removed, it can be dismantled by simply removing snap rings.

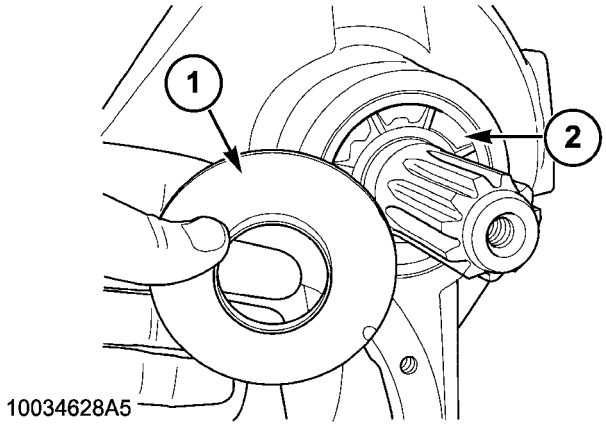


10034626A5 18

19. The bearing **(2)** remaining in the housing from the center shaft **(1)** can easily be removed by a soft drift and a dead blow hammer, or a press. The bearing must be driven from the output shaft side to the input shaft side.

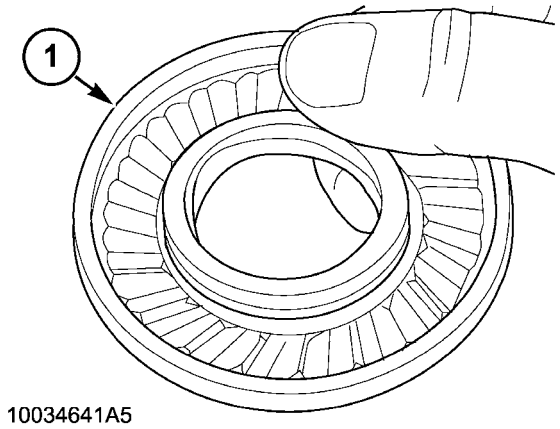
https://truckmanualshub.com/

20. Remove the metal seal protectors **(1)** from the shafts **(2)** on the output side of the gearbox.



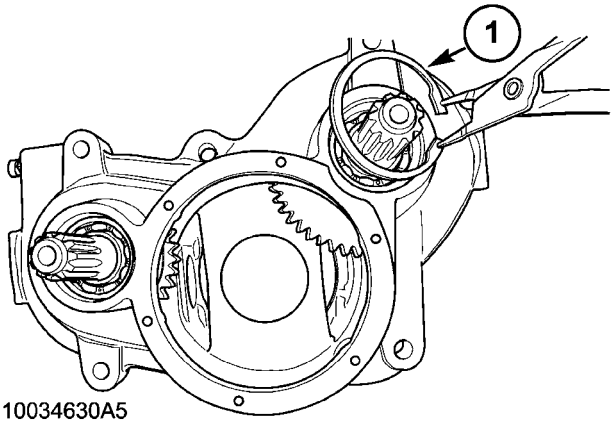
10034628A5 19

21. Remove the oil seals **(1)** from the output shafts using a seal puller. Note the seals will have to be replaced.



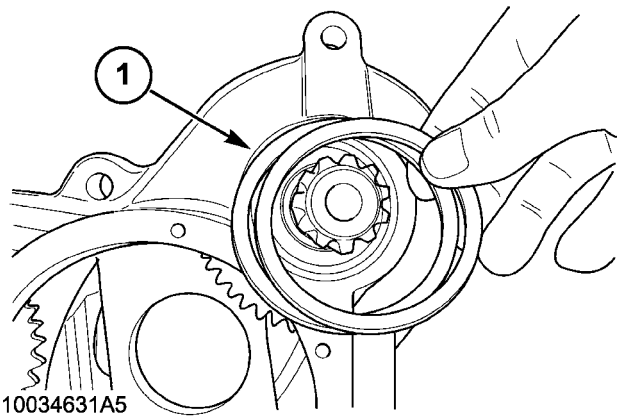
10034641A5 20

22. Remove the snap rings **(1)** from the shafts.



10034630A5 21

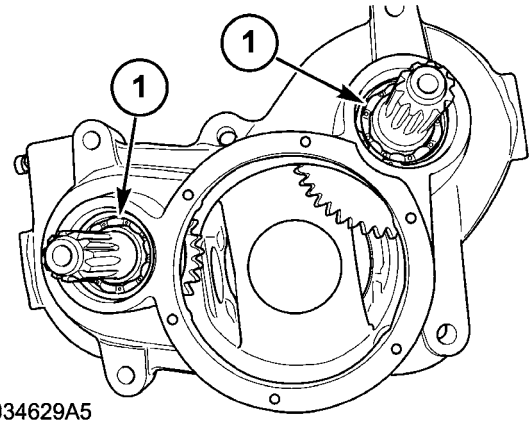
23. Be sure to keep track of the shim **(1)** count and orientation used.



10034631A5 22

https://truckmanualshub.com/

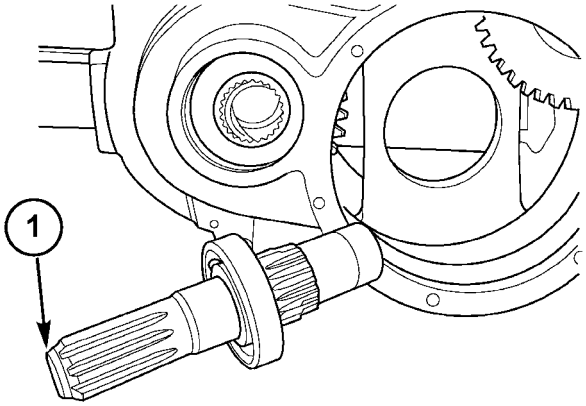
24. Using a slide hammer with a threaded 10mm attachment remove both shafts **(1)** from the gearbox.



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10034629A5 23

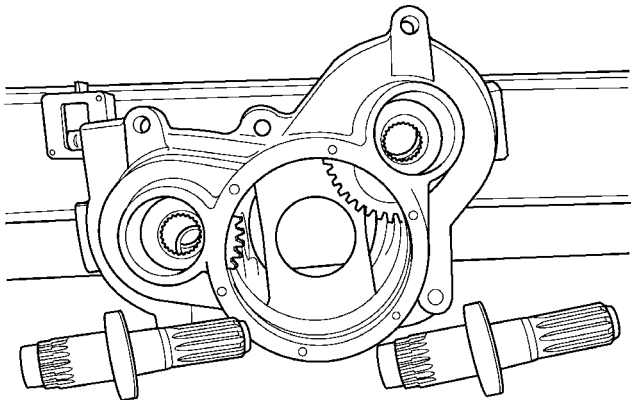
25. Be sure to rotate the shaft **(1)** a few degrees every time you pull to ensure there is no binding of the bearing in the housing.



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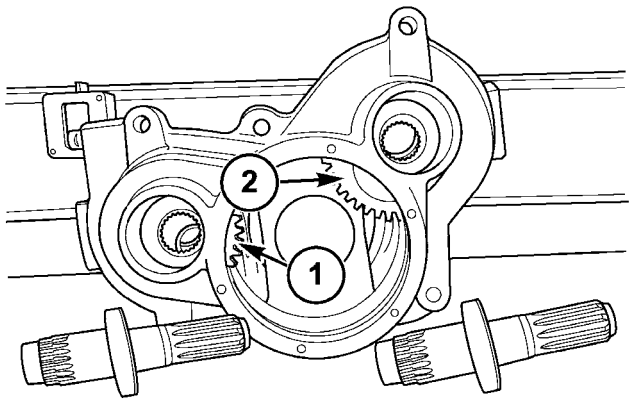
10034632A5 24

26. Once the shafts are removed you can use a press to remove the bearings from the shafts.



10034634 25

27. Before removing the conveyor **(2)** and rock trap **(1)** drive gears from the housing, be sure to mark the orientation from which they were set in the housing.

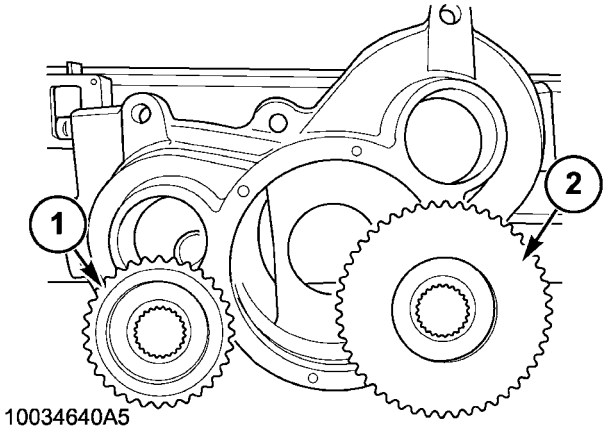


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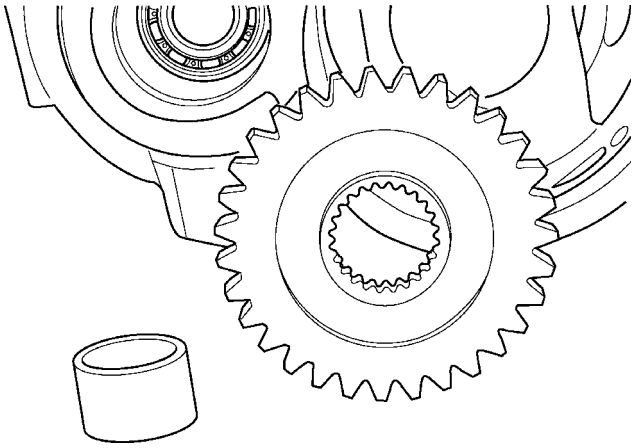
https://truckmanualshub.com/

28. With the shafts out of the housing remove the rock trap **(1)** and conveyor **(2)** drive gears and spacers from inside the housing.



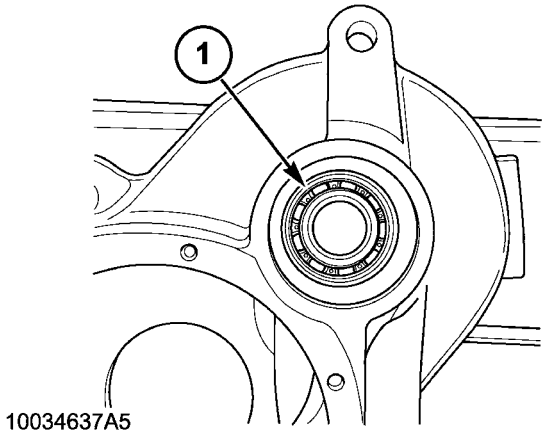
10034640A5 27

29. The drive gears and spacers may bind when coming out, slightly jiggle the gears to pull them out of the housing.



10034636 28

30. To remove the remaining bearings **(1)** from the housing use a slide hammer with a bent catch attachment on the end. Be sure to move the catch from side to side every time you pull to ensure no binding of the bearing in the housing.



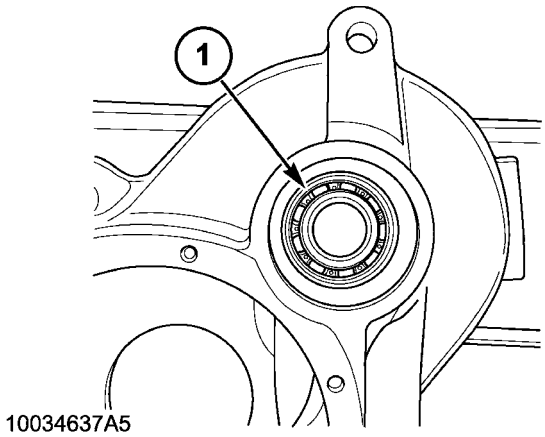
10034637A5 29

https://truckmanualshub.com/

Gearbox - Assemble (K.25.E.44 - F.10.A.20)

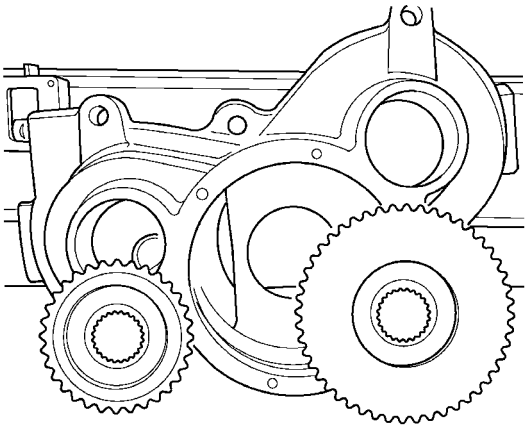
AFX8010

1. Place the bearings **(1)** in the inner seats of the housing for the conveyor & rocktrap output shafts.



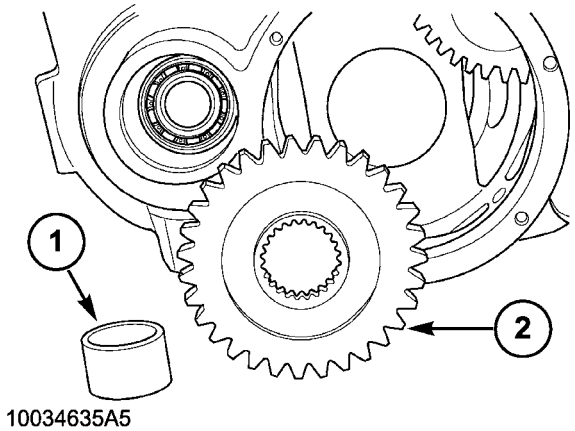
10034637A5 1

2. Using the proper slug, tap or press the bearings **(1)** until they are fully seated in the housing.
3. Be sure to use the proper orientation of drive gears for installation.



10034640 2

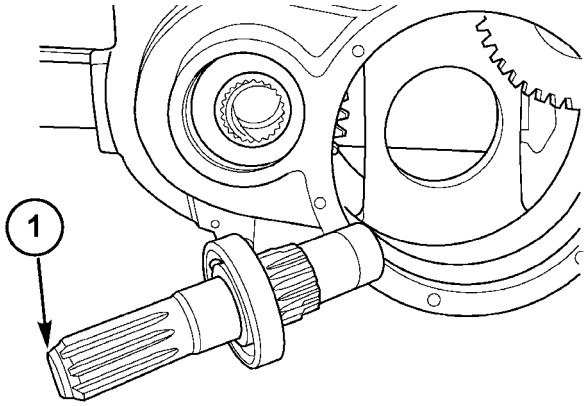
4. Install the output shaft drive gears **(2)** and spacers **(1)** into the housing.



10034635A5 3

https://truckmanualshub.com/

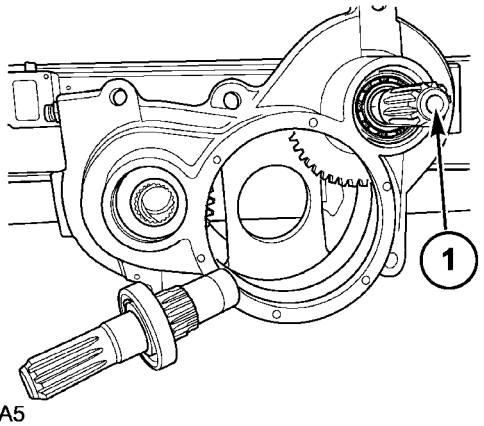
5. Install the bearings onto the output shafts **(1)** for the conveyor and rock trap drives. This is done by a press using the correct tube to fit over the shaft. Be sure tube contacts the inner race of the bearing only when pressing onto the shaft so bearing damage will not occur.



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10034632A5 4

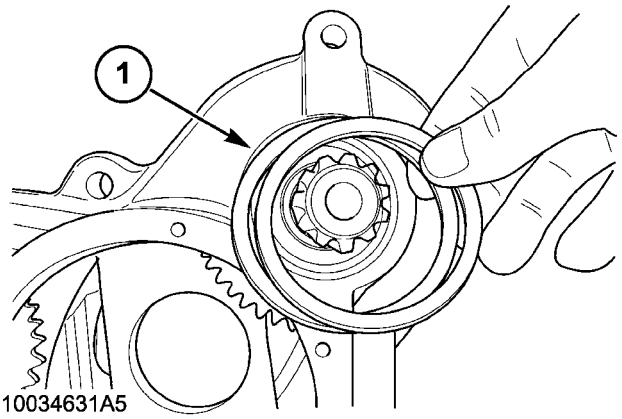
6. With the drive gears in place install the output shafts **(1)** by first aligning the splines, and then pressing until they are seated in the housing.



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10034633A5 5

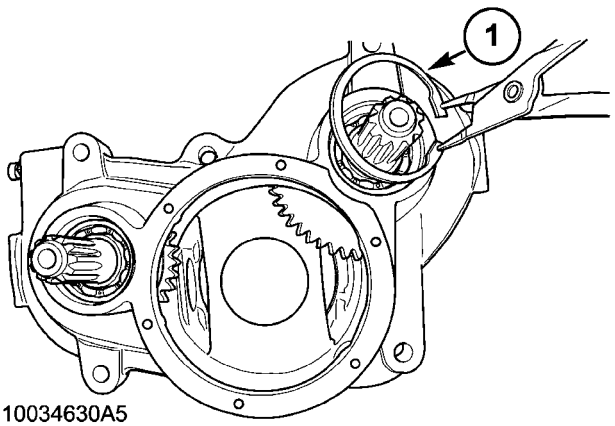
7. Install the shims. **(1)**



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10034631A5 6

8. Install the retaining ring. **(1)**

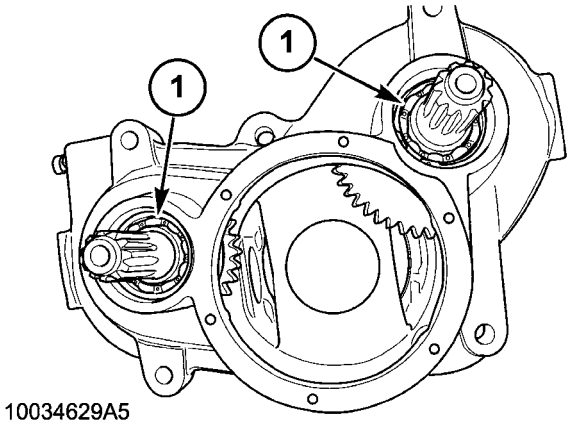


10034630A5

10034630A5 7

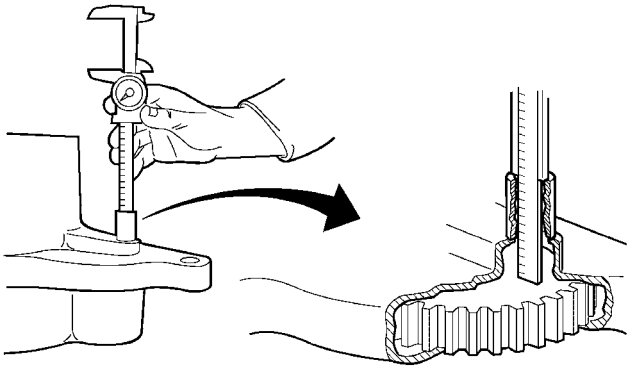
https://truckmanualshub.com/

9. Rotate the shafts **(1)** by hand to assure no binding before proceeding further.



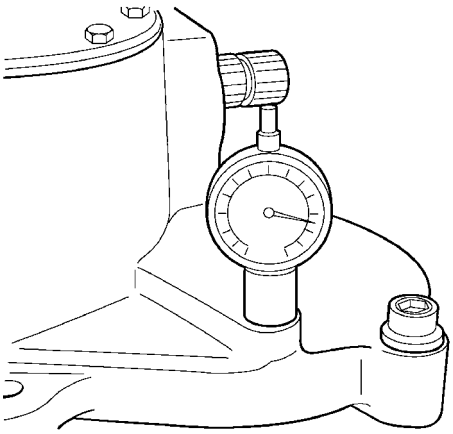
10034629A5 8

10. Using a caliper or dial gauge and check the position of the gear with reference to the speed sensor spot-facing in the housing. The dimension should be 26. 3 mm (+0.10/-0.30mm).



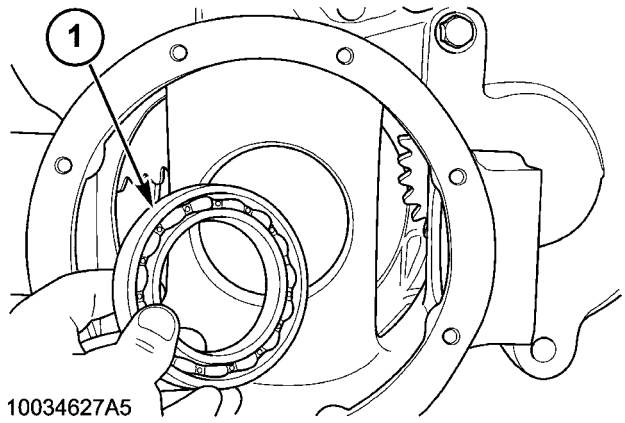
50034947 9

11. A dial indicator can also be used instead of the caliper.



50034948 10

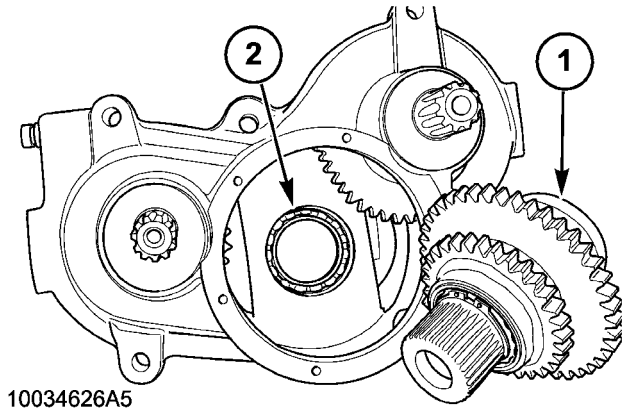
12. Install the ball bearing **(1)** into the support in the housing for the torque limiter center shaft and gear cluster. Press the bearing into the housing until it is seated.



10034627A5 11

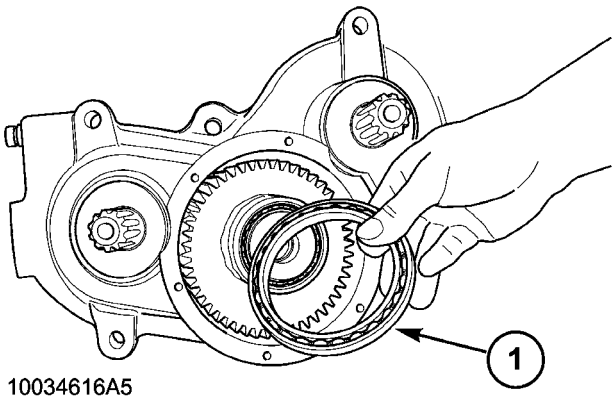
https://truckmanualshub.com/

13. Install the torque limiter **(1)** into the housing. Be sure to align the gear mesh. Be sure to turn the torque limiter shaft by hand once it is pressed into the bearing **(2)** to assure no binding.



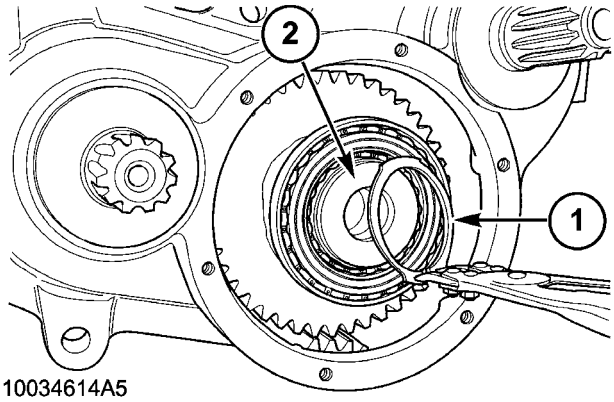
10034626A5 12

14. Install the bearing **(1)** onto the torque limiter shaft.



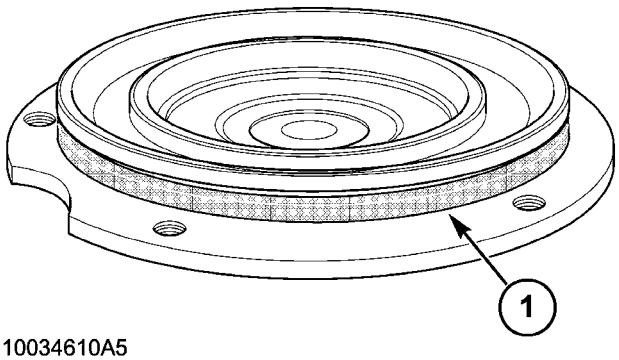
10034616A5 13

15. Install the snap ring **(1)** on the shaft **(2)** .



10034614A5 14

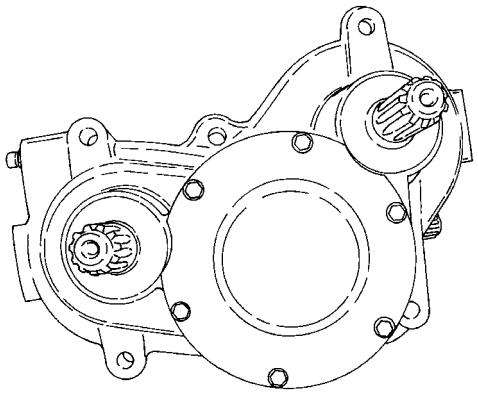
16. Install the ball bearing into the O ring cover **(1)** .



10034610A5 15

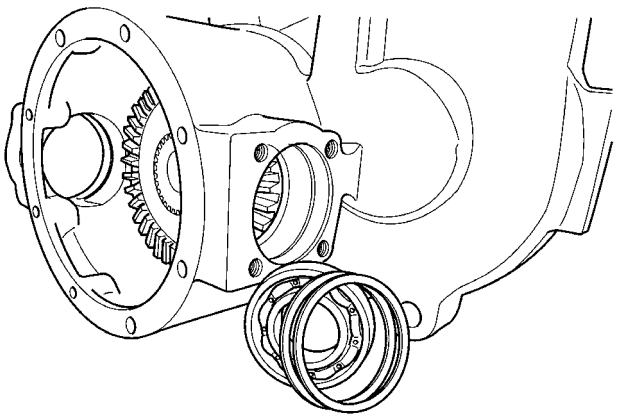
https://truckmanualshub.com/

17. Install and bolt the cover. Torque bolts to **217 lb in**



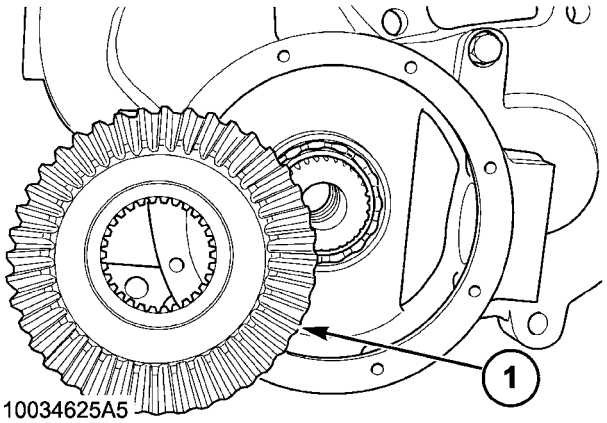
20034607 16

18. Install the ball bearing opposite to the pinion of input shaft. Install the shims and retaining ring.



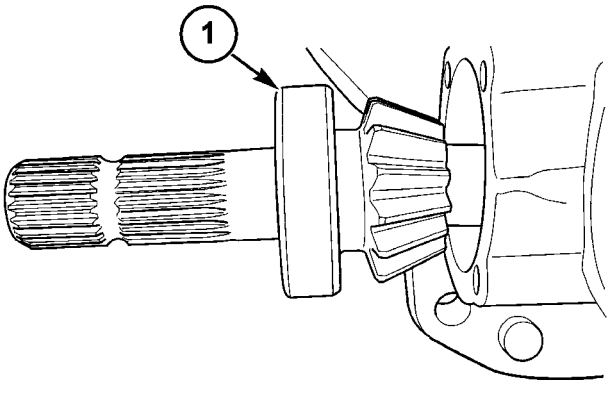
10034624 17

19. Place the crown gear **(1)** on the torque limiter shaft.



10034625A5 18

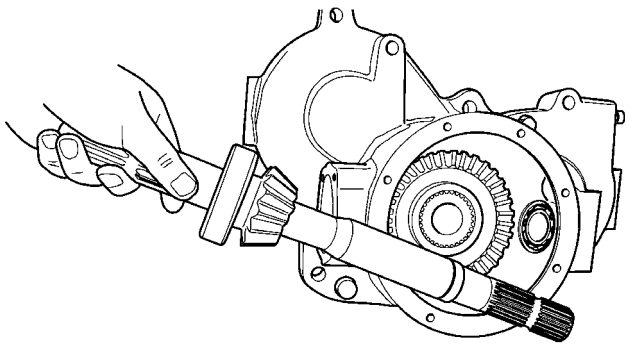
20. Install the bearing **(1)** on the input shaft.



10034622A5 19

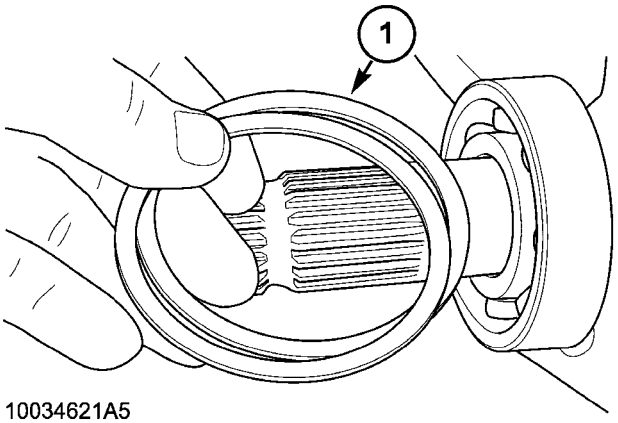
https://truckmanualshub.com/

21. Press the input shaft into the bearing while supporting the rear of the bearing in the press.



10034623 20

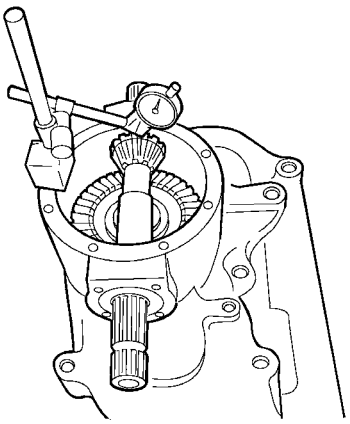
22. Install the bearing under the pinion gear in a press with the proper plug. Install shims **(1)** and retaining ring.



10034621A5

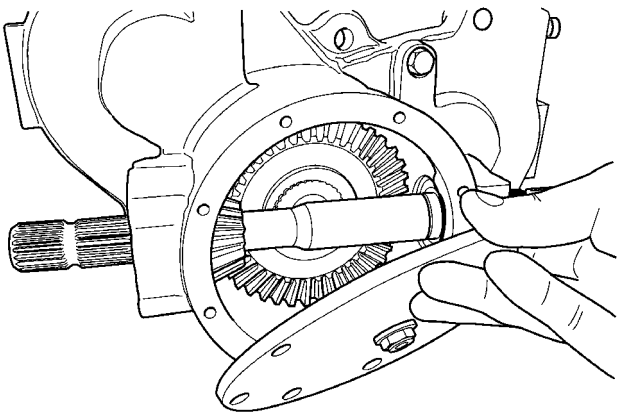
10034621A5 21

23. Check the gear backlash using a dial indicator: 0.15/0.30 mm.



50034949 22

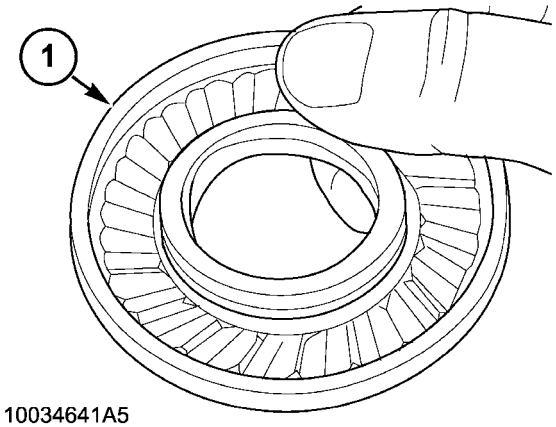
24. Use gasket compound on the access cover. Torque bolts to **217 lb in** .



10034613 23

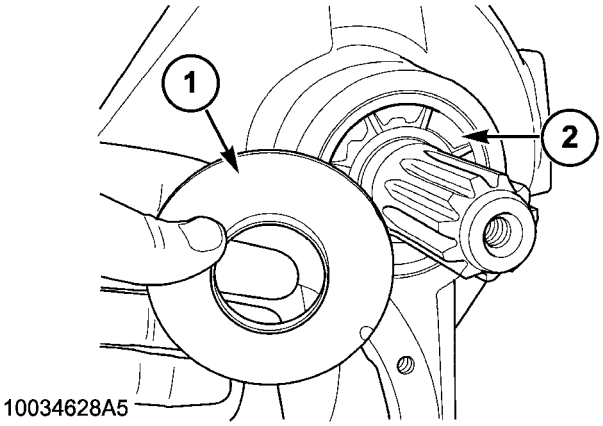
https://truckmanualshub.com/

25. Install oil seal rings **(1)** to both input and output shafts.



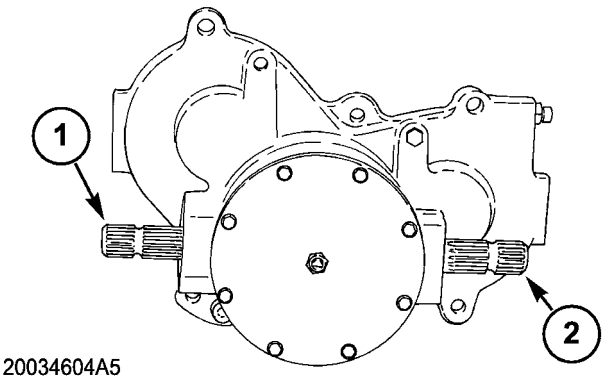
10034641A5 24

26. Install seal protectors **(1)** to output shafts only.



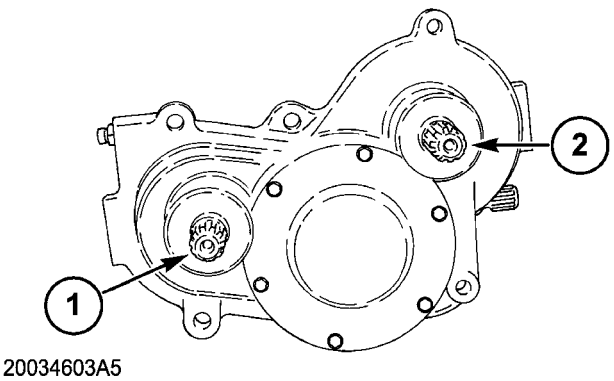
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27. Input shafts **(1) (2)** .



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28. Output shafts **(1) (2)** .



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https://truckmanualshub.com/

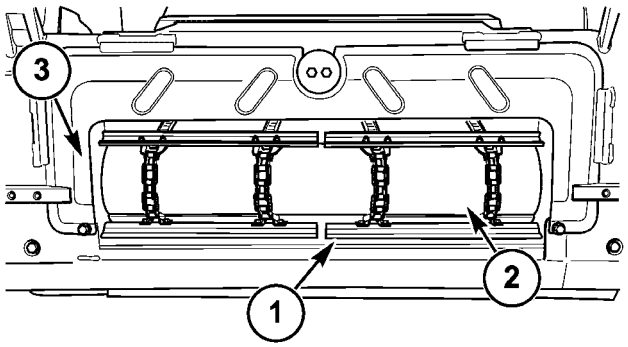
Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)

AFX8010

1. Completely lower the feeder to the ground.

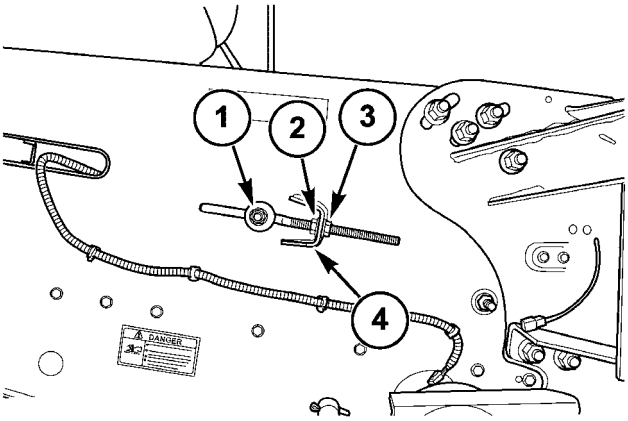
2. Rotate the chain so that a feed slat **(1)** is aligned with the bottom of the drum **(2)**. If the feeder drum is in the low position, measure the clearance between slat and floor at the first slat behind the feeder drum. If the feeder drum is in the mid position, measure the clearance between slat and floor at the second slat behind the drum. If the feeder drum is in the high position, measure the clearance between slat and floor at the third slat behind the drum. Adjust the clearance to **0.8 - 3.2 mm** (**1/32 - 1/8 in**).

NOTE: *When adjusting the feeder chain, make sure the feed slats will not come in contact with the front shield **(3)**. If contact is made remove links from chains and readjust.*



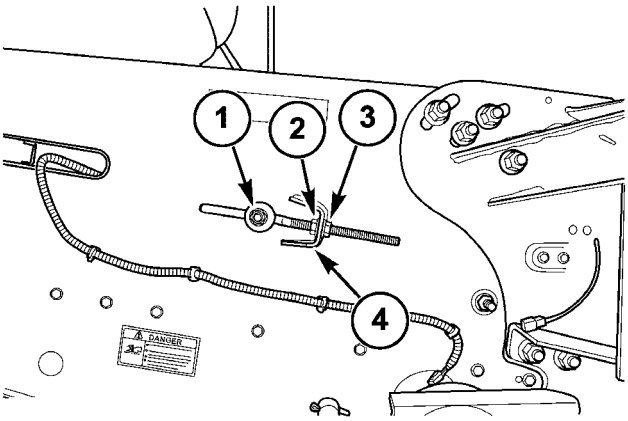
10032078D5 1

3. To tighten the chain, loosen nuts, **(1)** on each side of the feeder and jam nuts **(2)**. Turn nuts, **(3)** against supports **(4)** evenly on each side until proper tension is obtained, then tighten jam nuts **(2)** and nuts **(1)**.



10034667C5 2

4. To loosen the chain, loosen nuts **(1)** on each side of the feeder and jam nuts **(3)**. Turn nuts, **(2)** against supports **(4)** evenly on each side until proper tension is obtained, then tighten jam nuts **(3)** and nuts **(1)**.



10034667C5 3

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Feed chain - Replace (K.25.E.48 - F.10.A.30)

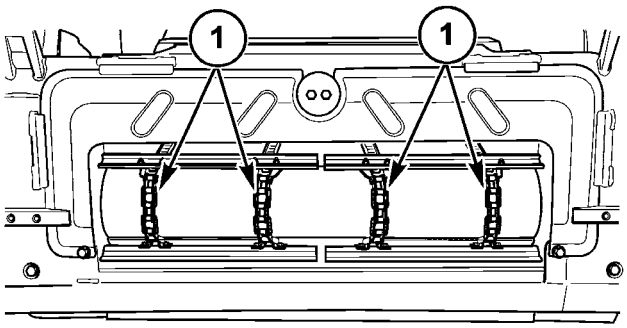
AFX8010

⚠ DANGER ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

1. Rotate the chain until the connection links are visible at the front of the feeder.
2. Loosen the chain as described in **Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)**.
3. Remove the connection links **(1)**. Connect the new chain to the old chain at the bottom of the drum and pull the old chain out from the top of the drum, while feeding in the new chain. When the old chain is removed from the feeder, disconnect the other end of the old chain and connect both ends of the new chain together with the connection link **(1)**.

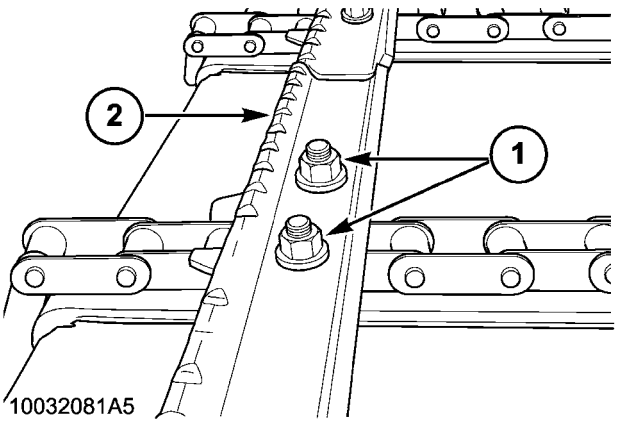
IMPORTANT: *Be sure that chains engage both rear sprockets evenly to assure the feeder slats are square to the cross shaft.*



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4. Tighten the chain as described in **Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)**.
5. To replace a feed slat **(1)**, remove the bolts and nuts **(1)**. Remove the feed slat **(2)**. Install the new feed slat **(2)** making sure that the taller edge (or serrated edge if equipped) is on the leading side of the chain. Secure with bolts and nuts**(1)**. Torque bolts to **77 - 87 Nm** (**56 - 64 lb ft**).



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Feed chain - Remove (K.25.E.48 - F.10.A.10)

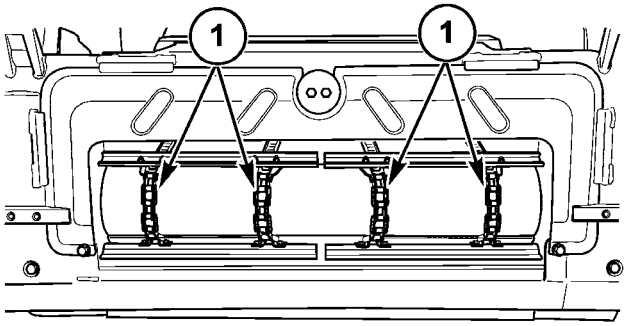
AFX8010

⚠ DANGER ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

1. Rotate the chain until the connection links are visible at the front of the feeder.
2. Loosen the chain as described in **Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)**.
3. Remove the connection links, 1. Manually rotate the feeder and pull the chain out the front of the feeder .

NOTE: *Attach a rope to the end of the chain that will be pulled through the feeder to aid in installation of new chain.*



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Feed chain - Install (K.25.E.48 - F.10.A.15)

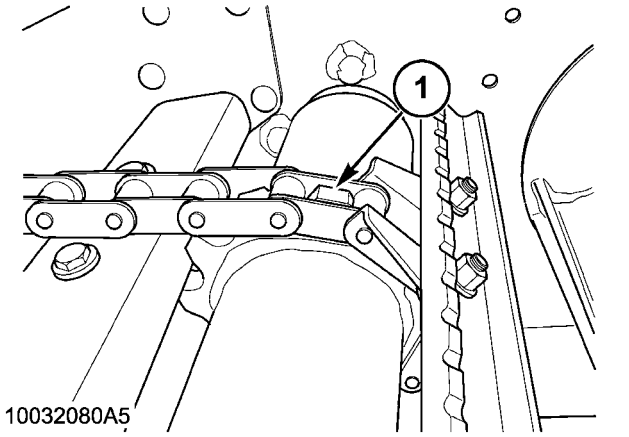
AFX8010

⚠ DANGER ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

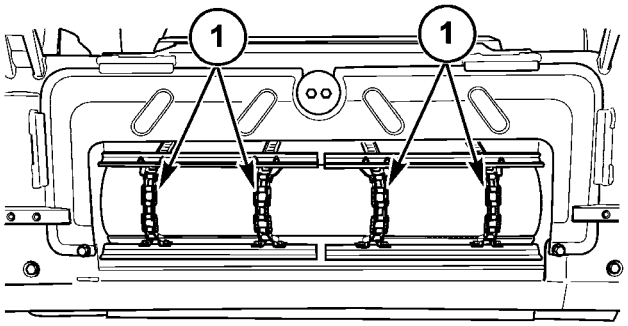
1. Route a rope through the bottom of the feeder, around the feeder drive sprocket, and back out through the top of the feeder. Attach the bottom end of the rope to the new chain so that the taller edge of the feed slat is the leading edge. Pull the chain through the feeder.
2. When the chain reaches the rear of the feeder, place the chain on the teeth of the feeder drive sprocket **(1)**. Manually rotate the feeder to assist in feeding the chain.

IMPORTANT: *Be sure that chains engage both rear sprockets evenly to assure the feeder slats are square to the cross shaft.*



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3. Connect both ends of the chain together with the connection links **(1)**.



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Next operation: Adjust the tension as described in **Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)**.

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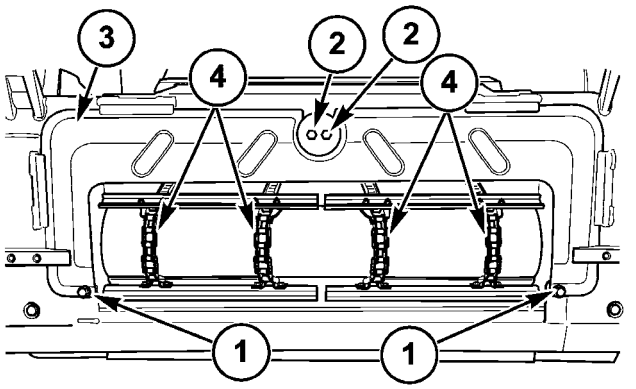
Idler roller - Remove (K.25.E.57 - F.10.A.10)

AFX8010

⚠ DANGER ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

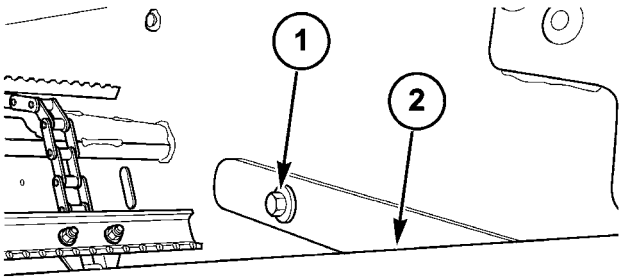
1. Remove bolts **(1)** washers and nuts. Loosen the two bolts **(2)**. Slide the front shield **(3)** down and off the cradle. Disconnect the feed chain connection links **(4)**.



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2. Remove bolts **(1)** washers, bushings, and nuts. Slide feeder drum **(2)** out the front of the feeder.



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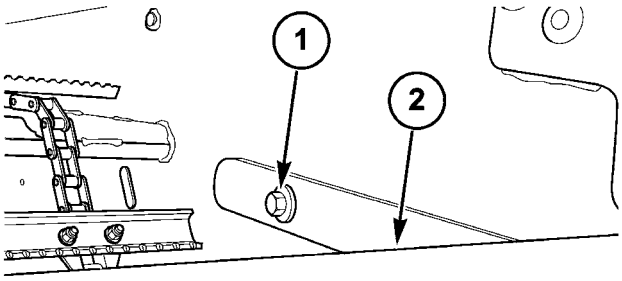
Idler roller - Install (K.25.E.57 - F.10.A.15)

AFX8010

⚠ DANGER ⚠

M184D - ALWAYS shut OFF engine, remove the key and engage feeder safety lock in position on lift cylinder before working under header or feeder. Failure to engage feeder safety lock may cause injury or death.

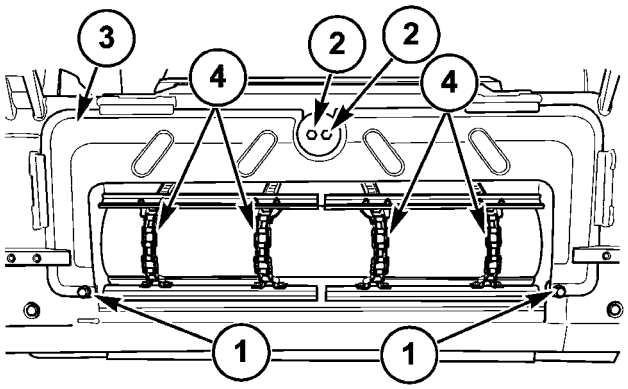
1. Install the feed drum **(2)** in the front of the feeder housing. Place a flat washer on the bolt **(1)** and feed through the support arm and the feeder housing. Install a bushing on the bolt between the feeder housing and the feed chain tensioning eye bolt. Secure with nut.



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2. Connect the feed chain using the connection links **(4)**. Install front shield **(3)** using bolts, washers, and nuts **(1)**. Tighten the two center bolts **(2)**.



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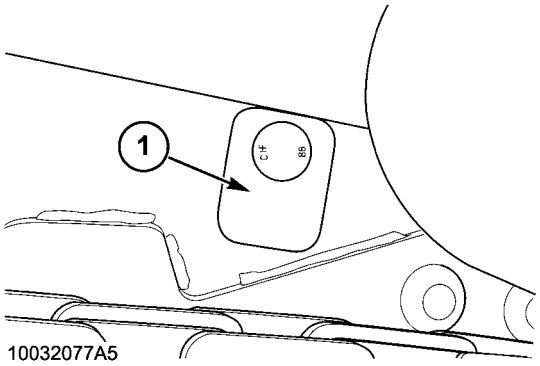
10032078C5 2

Next operation: Adjust the feed chain tension as described in **Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)**

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Idler roller - Clearance (K.25.E.57 - F.45.A.12)

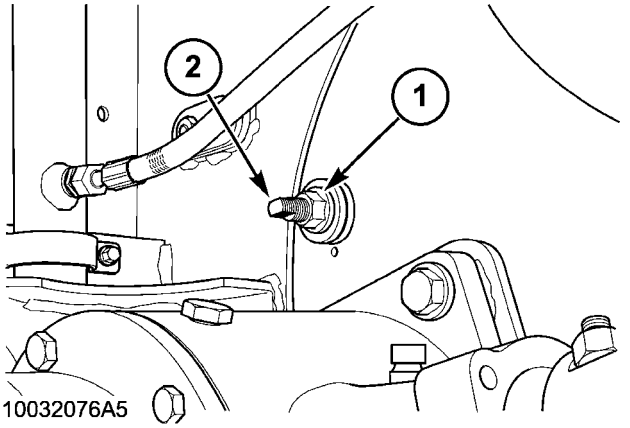
AFX8010



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The feeder drum height support plate **(1)** has three positions: low position - down (shown) for small grains; high position - up for corn and other large grain; and mid position - sideways for edible beans, etc.

1. Loosen nut **(1)** approximately one turn. Rotate the bolt **(2)** to the desired position on both sides of the feeder, then tighten the nut **(1)**. Torque to **200 - 220 Nm** (**149 - 161 lb ft**).



10032076A5 2

Next operation: Feed chain - Tension adjust (K.25.E.48 - F.45.A.40)

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Command Engage switch - Short circuit to B+ (K.25.E.05.83 - G.30.B.54)

AFX8010

E0036-03 - Feeder CVT Pump Voltage Supply

Cause:
The Feeder CVT Pump Voltage Supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Feeder CVT Pump Voltage Supply wiring shorted to a high source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key ON, engine running. Move the separator engage switch S-30 and feeder engage switch S-31 to the ON positions. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "CVT PMP VOLT" to check the voltage range.

   The proper voltage is **10.0 - 18.0 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between 10 and **18 volts**, go to Step **5**.

2. Shut the combine OFF, and then turn the key switch back ON. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with Step **3**.

3. Key switch in the "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with Step **4**.

4. Key switch in the "On" position. Move the separator engage switch S-30 and feeder engage switch S-31 to the ON positions. Remove the instructional seat and storage bin to gain access to connector **X018** on CCM1. Check the voltage at connector **X018** pin J1-17.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   - wires 147 yellow, 111 yellow & 1061 yellow, separator engage switch connector **X055** pin 6 to CCM2 connector **X015** pin J1-7 and connector **X012** pin J1-7
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5

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- wire 1243 yellow, feeder engage switch connector **X056** pin 6 to feeder engage diodes connector **X400** pin A
- wire 225 yellow, feeder engage diodes connector **X400** pin B through connector **X001** pin 15 to connector **X018** pin J1-17
- wire 112 yellow, feeder engage switch connector **X056** pin 6 through connector **X001** pin 19 to connector **X018** pin J1-7

Locate the short and repair.

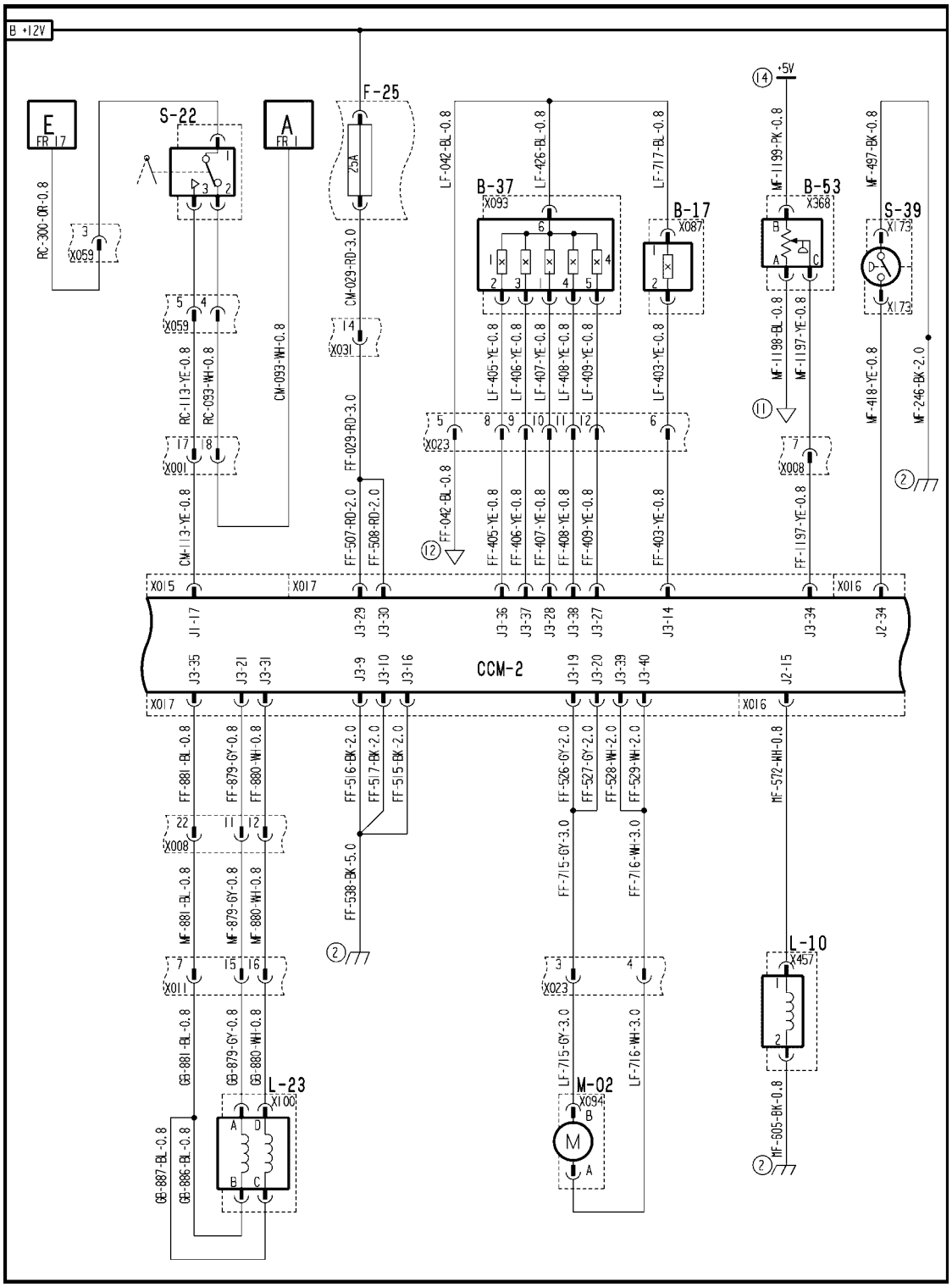
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM1. Reload the software for CCM1. If that does not correct the concern, replace the module.

5. Operate the machine while observing the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



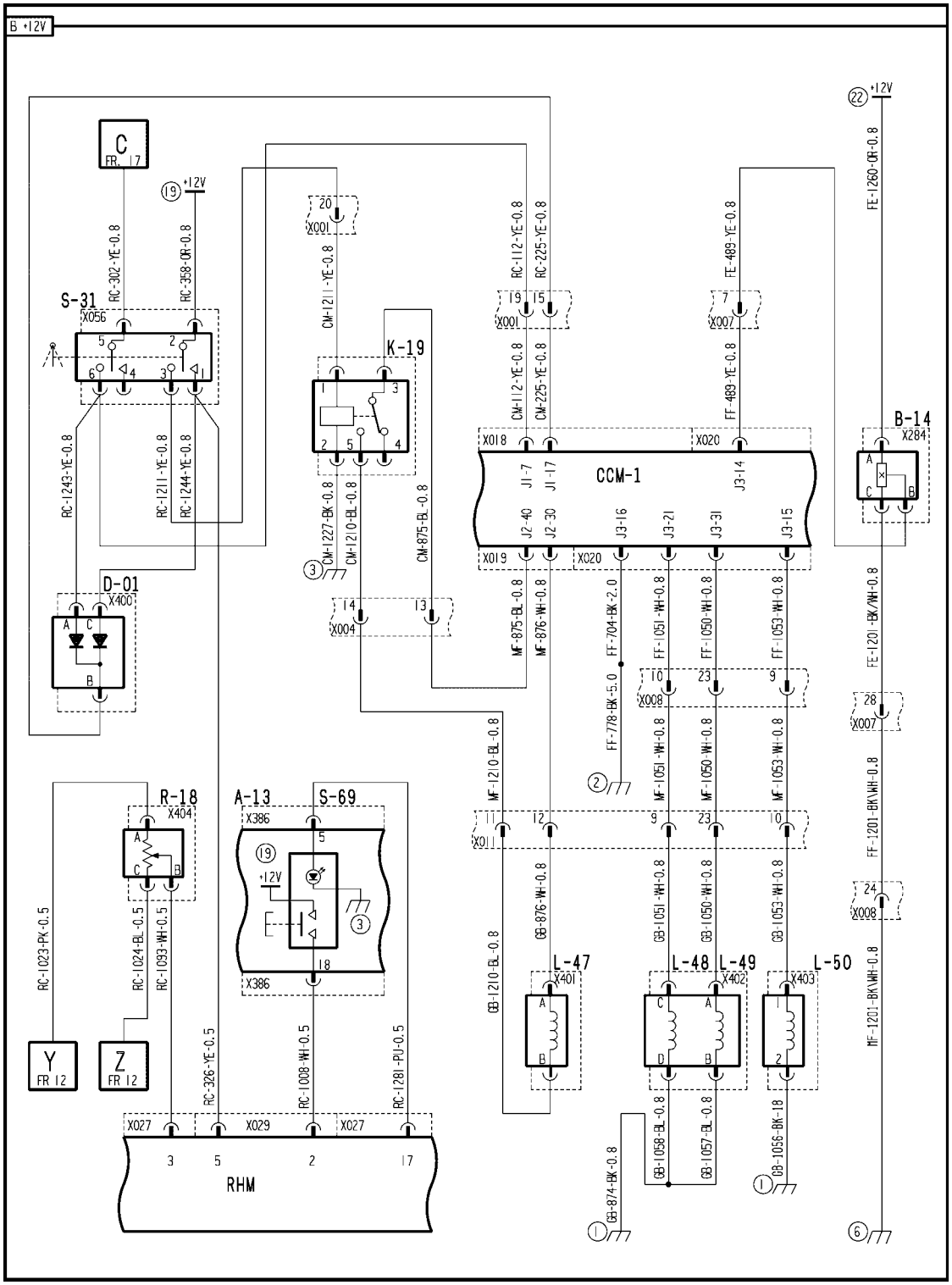
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



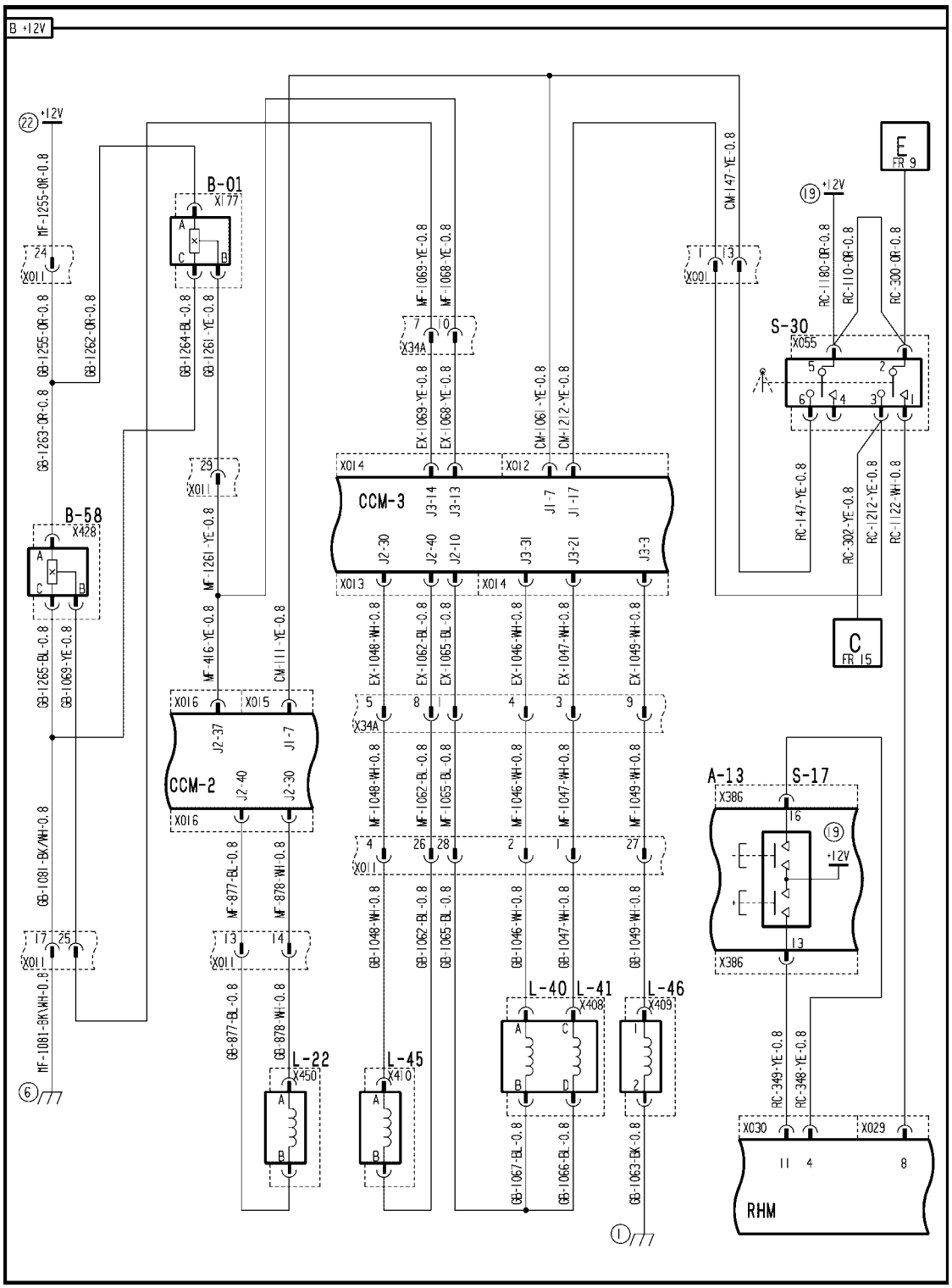
AFXSCHEM15-04 1

FRAME 15 - FEEDER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



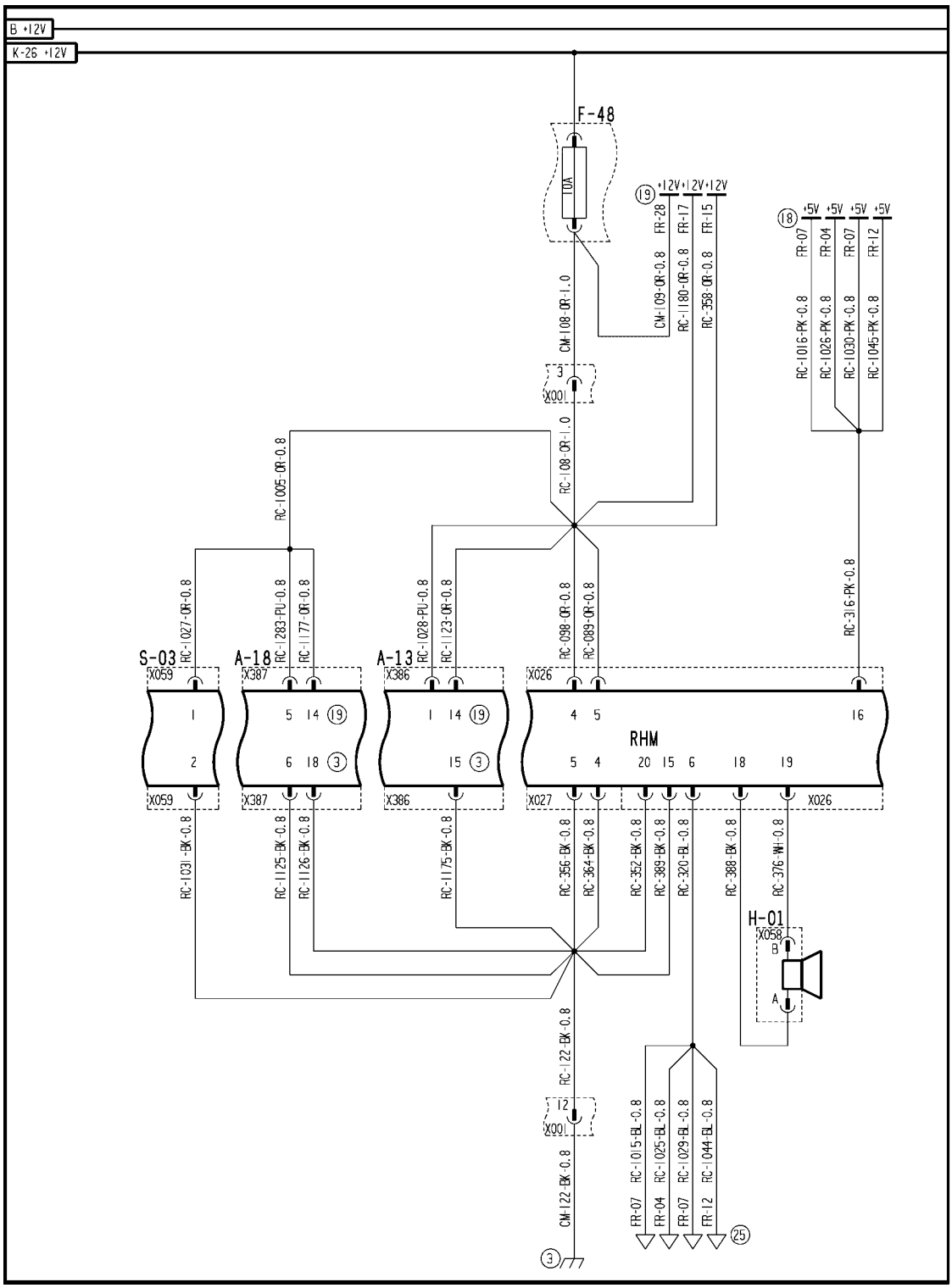
AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



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FRAME 25 - DISTRIBUTION

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A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

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Command Engage switch - Short circuit to ground (K.25.E.05.83 - G.30.B.53)

AFX8010

E0036-04 - Feeder CVT Pump Voltage Supply

Cause:
Low battery voltage to CCM1 through the feeder engage switch S-31, or the Feeder CVT Pump Voltage Supply circuit is shorted to a ground.

Possible failure modes:

1. Loose or corroded connections, or damaged wires.
2. Batteries are discharged, and/or alternator/regulator failure.
3. Supply wiring shorted to ground.
4. Controller internal failure (internal regulator failure).

Solution:

1. Key switch in "Off" position. Check fuse F42.
   A. If fuse F42 is okay, continue with Step **3**.
   B. If the fuse is blown, go to Step **2**.
2. Replace the failed fuse F42.
   A. If the fuse is okay, continue with Step **3**.
   B. If the fuse immediately fails again, a short to ground exists in wire 010 red to Cab Power Relay K26 pin 3. Locate short and repair.
3. Key switch in "On" position. Check fuse F48.
   A. If fuse F48 is okay, continue with Step **5**.
   B. If the fuse is blown, go to Step **4**.
4. Replace the failed fuse F48.
   A. If the fuse is okay, continue with Step **5**.
   B. If the fuse immediately fails again, a short to ground exists in one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RH harness splice
   - wire 358 orange, RH harness splice to feeder engage switch S-31 connector **X056** pin 2
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   Locate the short and repair.
5. Move the separator engage switch S-30 to the ON position, and observe the fuse F48.
   A. If the fuse is okay, continue with Step **8**.
   B. If the fuse immediately fails, a short to ground exists in on one of the following wires:
   - wires 147 yellow, 111 yellow & 1061 yellow, separator engage switch connector **X055** pin 6 to CCM2 connector **X015** pin J1-7 and connector **X012** pin J1-7
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5
   Locate short and repair.

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6. Move the feeder engage switch S-31 to the ON position, and observe fuse F48.

   A. If the fuse is okay, continue with Step **6**.

   B. If the fuse immediately fails, a short to ground exists in on one of the following wires:
   - wire 1243 yellow, feeder engage switch connector **X056** pin 6 to feeder engage diodes connector **X400** pin A
   - wire 225 yellow, feeder engage diodes connector **X400** pin B through connector **X001** pin 15 to connector **X018** pin J1-17
   - wire 112 yellow, feeder engage switch connector **X056** pin 6 through connector **X001** pin 19 to connector **X018** pin J1-7
   Locate short and repair.

7. Key switch in "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **7**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the batteries and the cab fuse panel, due to loose or corroded connections, or the batteries have discharged excessively, and are not capable of supplying the minimum voltage requirement for CCM1. Inspect the wiring from the batteries to the engine compartment, and from there to the cab. Recharge or replace the batteries.

8. Key switch ON. Move the separator switch S-30 and feeder engage switch S-31 to the ON positions. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "CVT PMP VOLT" to check the voltage range.

   The proper voltage supply is **10.0 - 18.0 volts**.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **8**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the fuse panel and CCM1.
   Inspect the following for loose or corroded connections, or damage to the wires.
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - wires 110 orange & 1180 orange, RH harness splice to separator switch S-30 connector **X055** pin 2
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5
   - wire 1243 yellow, feeder engage switch connector **X056** pin 6 to feeder engage diodes connector **X400** pin A
   - wire 225 yellow, feeder engage diodes connector **X400** pin B through connector **X001** pin 15 to connector **X018** pin J1-17

9. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM1 BAT" to check the voltage range.

   With the engine RPM at low idle, engage road and work lights. Check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, continue with Step **9**.

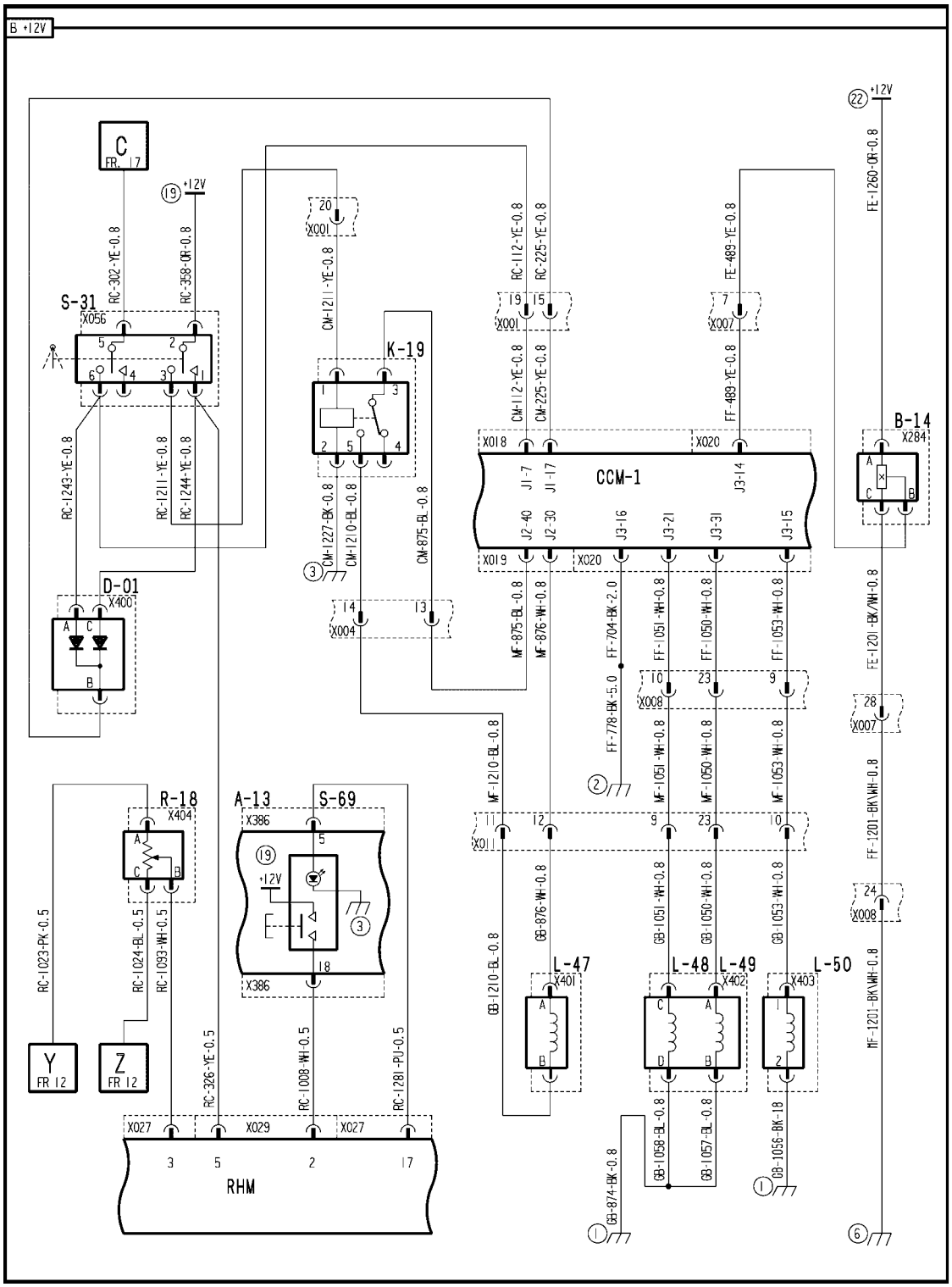
   B. If the voltage reading is less than **10 volts**, the alternator and/or regulator may have failed, and the charging system is not producing sufficient voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

10. Operate the machine while observing the Universal Display Plus "DIAG" screen.

    A. If no low out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



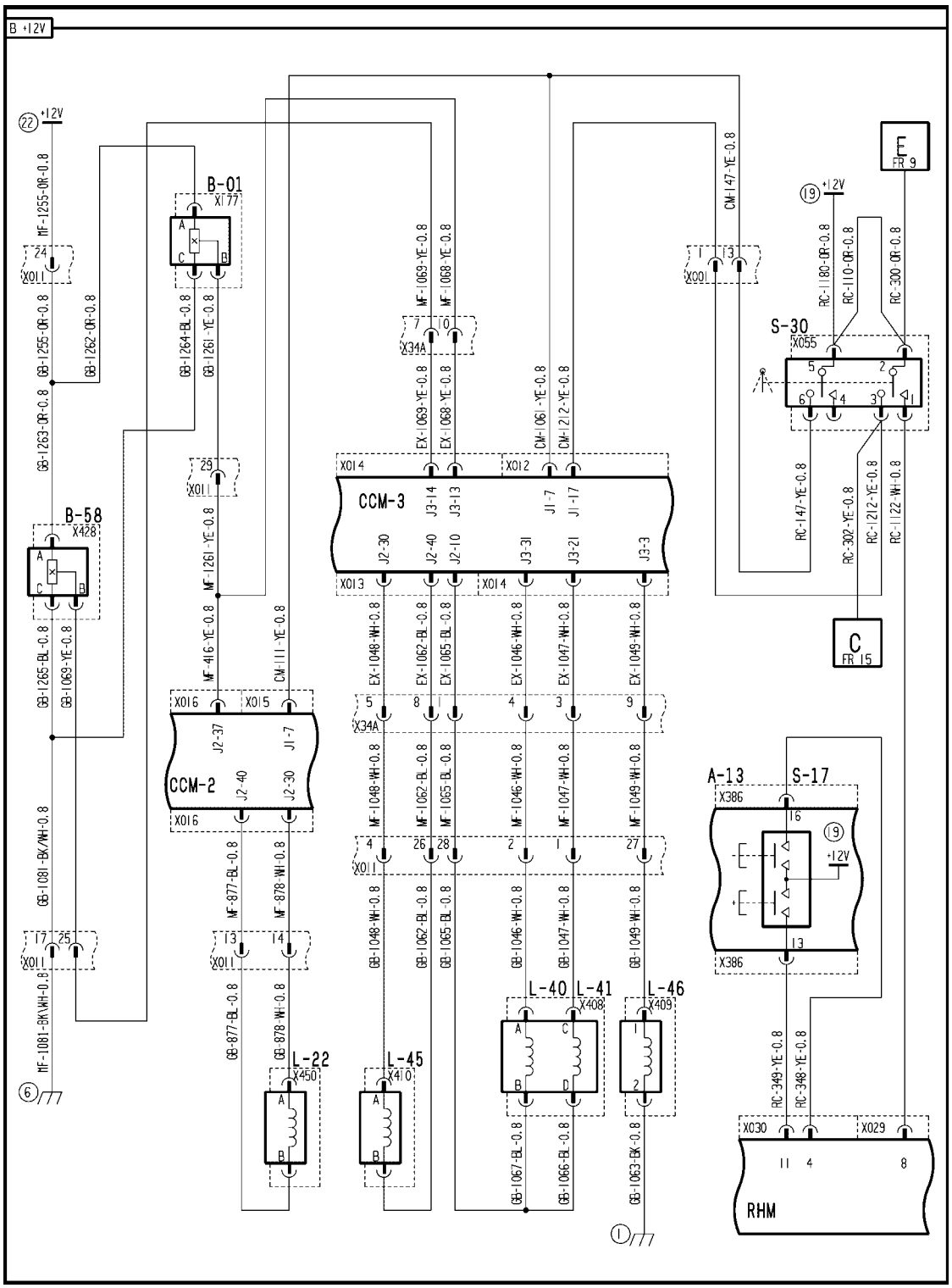
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FRAME 15 - FEEDER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



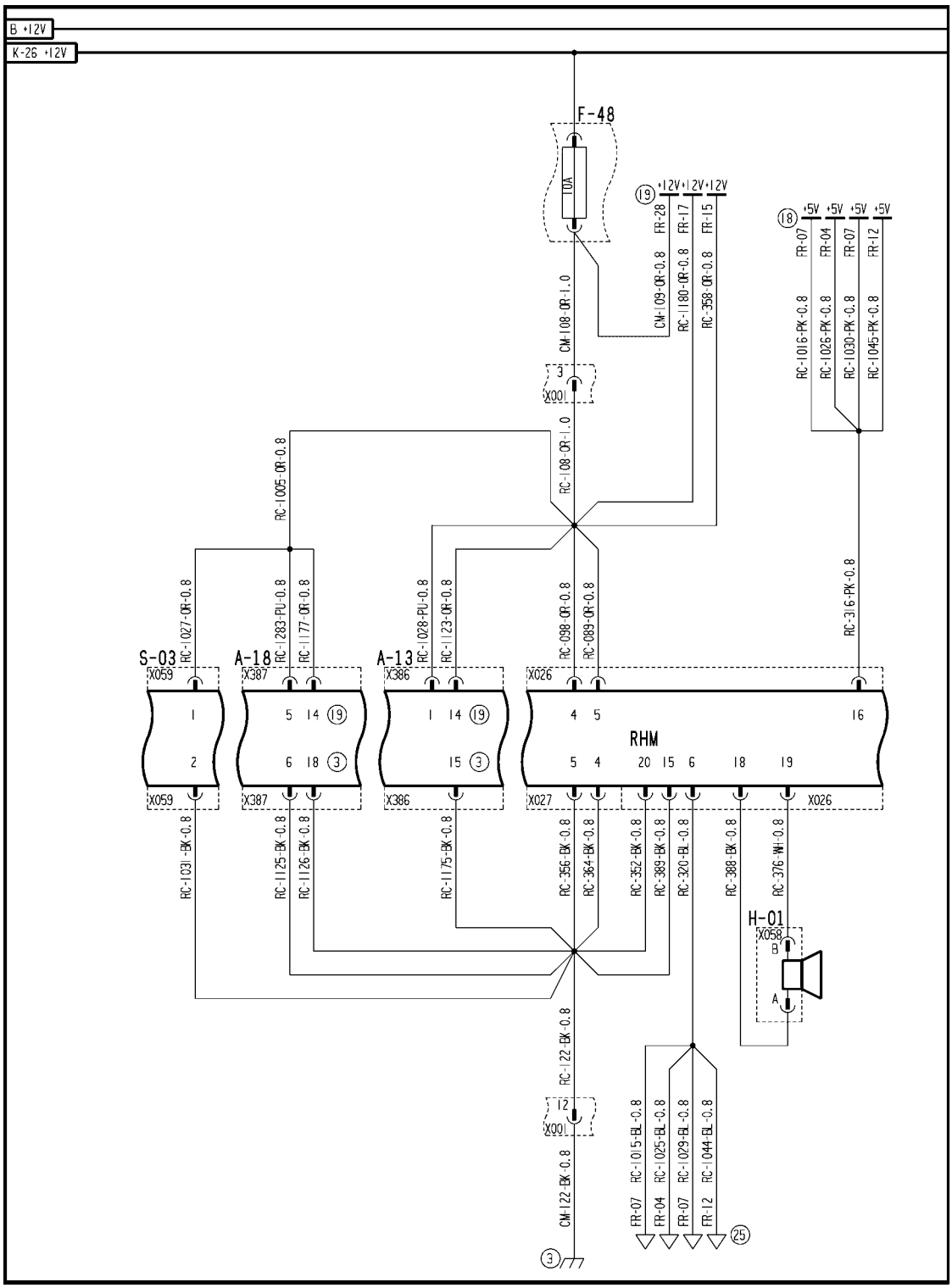
AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

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Command Engage switch - Short circuit to B+ (K.25.E.05.83 - G.30.B.54)

AFX8010

E0047-03 - Feeder ETR Clutch Voltage Supply

Cause:
The feeder engine to ring clutch power supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Circuit wiring shorted to high voltage source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "ETR CTCH VOLT" to check the voltage range.

   Increase the engine RPM to high idle (maximum) and check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **5**.

2. Shut off the combine engine . Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "ETR CTCH VOLT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with step **3**.

3. Turn off the key switch to power down the system. Use a multimeter to check the voltage at fuse F-42.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with step **4**.

4. Turn the key switch S-02 ON. Engage the separator engage switch S-30 and feeder engage switch S-31. Remove the instructional seat and storage bin to gain access to the CCM1 connector **X018**. Turn the key switch ON. Use a multimeter to check the voltage at connector **X018** pin J1-7.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires in the right console (RC) harness:
   - wire 109 orange, fuse F48 to K-28 relay pin 3 (fuse panel)
   - wire 108 orange, fuse F48 to through connector **X001** pin 3 to RC harness splice
   - wire 1005 orange, RC harness splice to RC harness splice
   - wire 1027 orange, RC harness splice to propulsion handle connector **X059** pin 1
   - wire 1283 purple, RC harness splice to rear switch panel connector **X387** pin 5
   - wire 1177 orange, RC harness splice to rear switch panel connector **X387** pin 14
   - wire 1028 purple, RC harness splice to front switch panel connector **X386** pin 1
   - wire 1123 orange, RC harness splice to front switch panel connector **X386** pin 14
   - wire 098 orange, RC harness splice to RHM connector **X026** pin 4
   - wire 089 orange, RC harness splice to RHM connector **X026** pin 5
   - wire 1180 orange, RC harness splice to separator engage switch S-30 **X055** pin 5

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- wire 110 orange, separator switch S-30 **X055** pin 5 to pin 2
- wire 300 orange, separator switch S-30 **X055** pin 2 through connector **X059** pin 3 to neutral switch S-22 pin 1
- wire 358 orange, RC harness splice to feeder engage switch S-31 connector **X056** pin 2Locate the source of high voltage and repair.

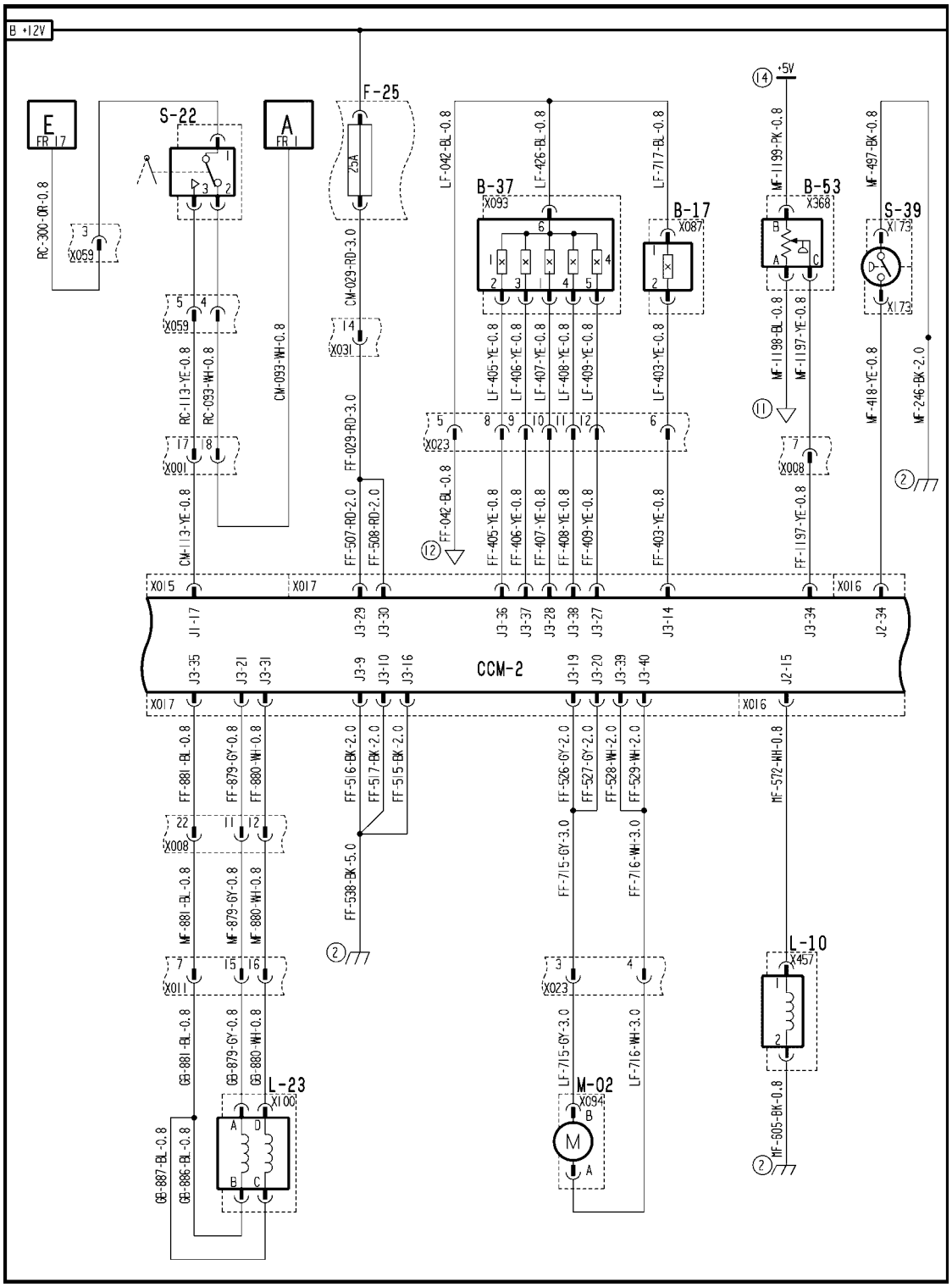
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM1.Reload the software for CCM1. If that does not correct the concern, replace the module.

5. Operate the combine while monitoring the voltage on the Universal Display Plus "DIAG" screen.

A. If no high out of range voltage readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



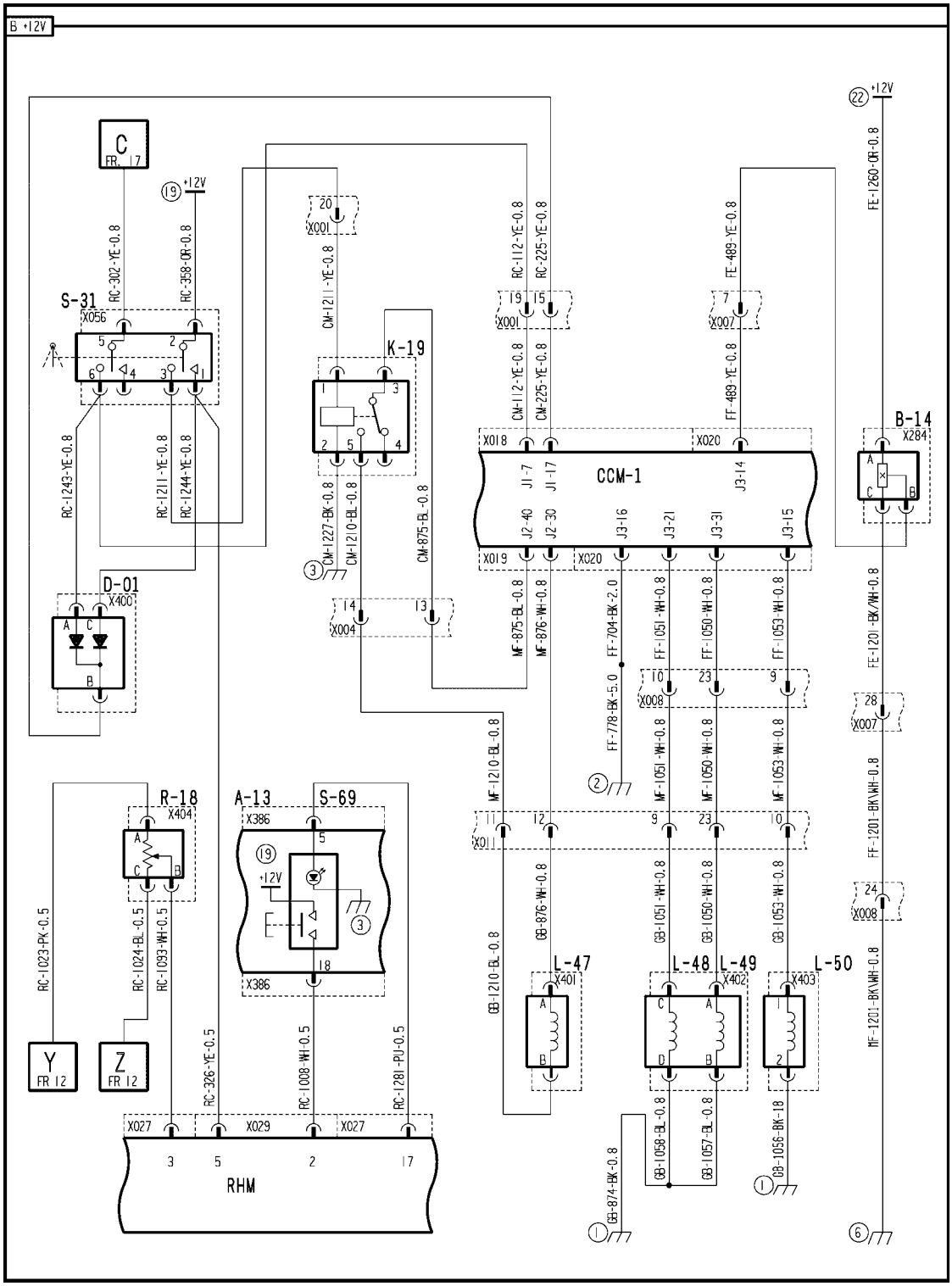
AFXSCHEM09-04 1

FRAME 9 - DRIVES

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B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



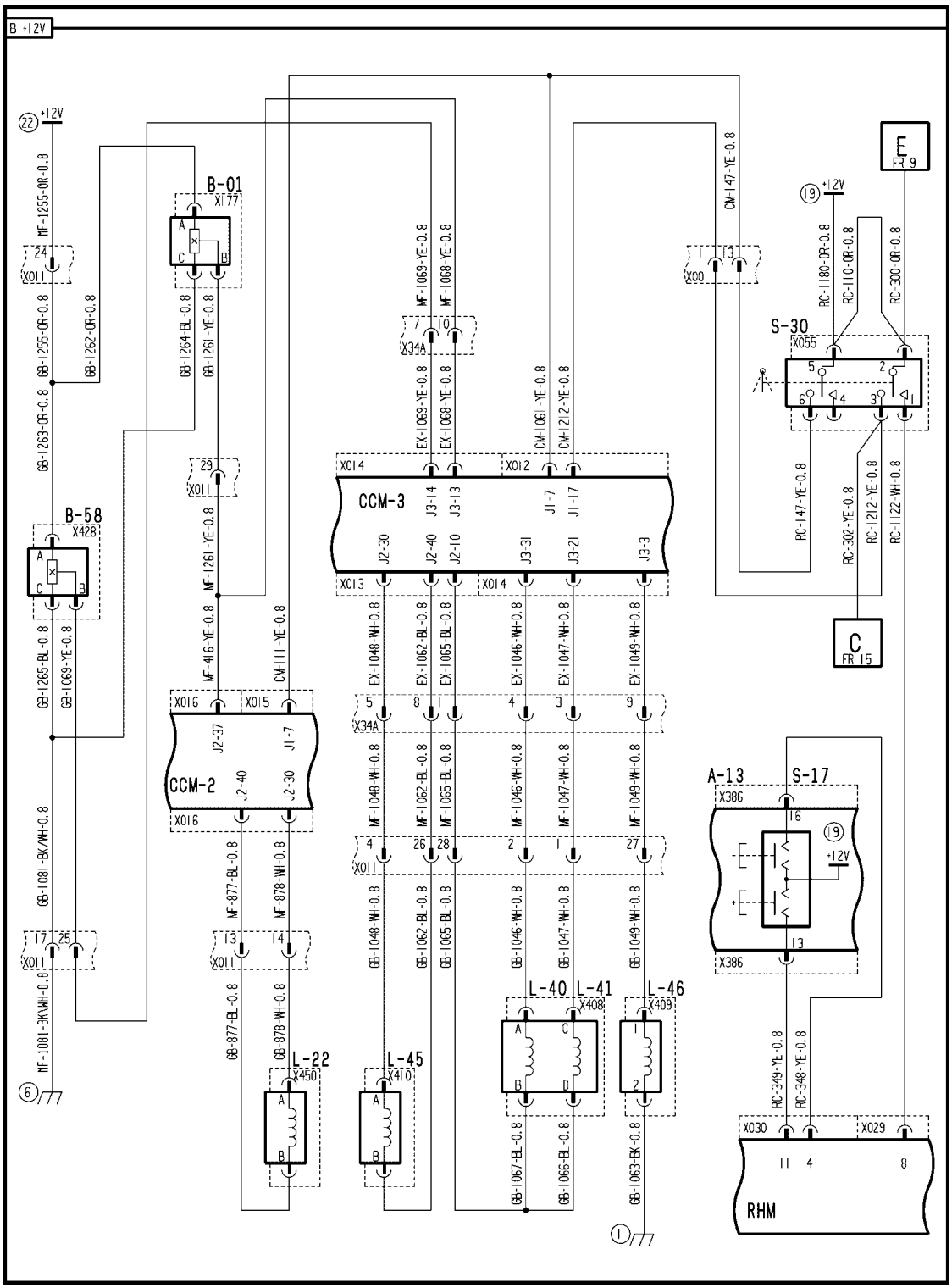
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FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



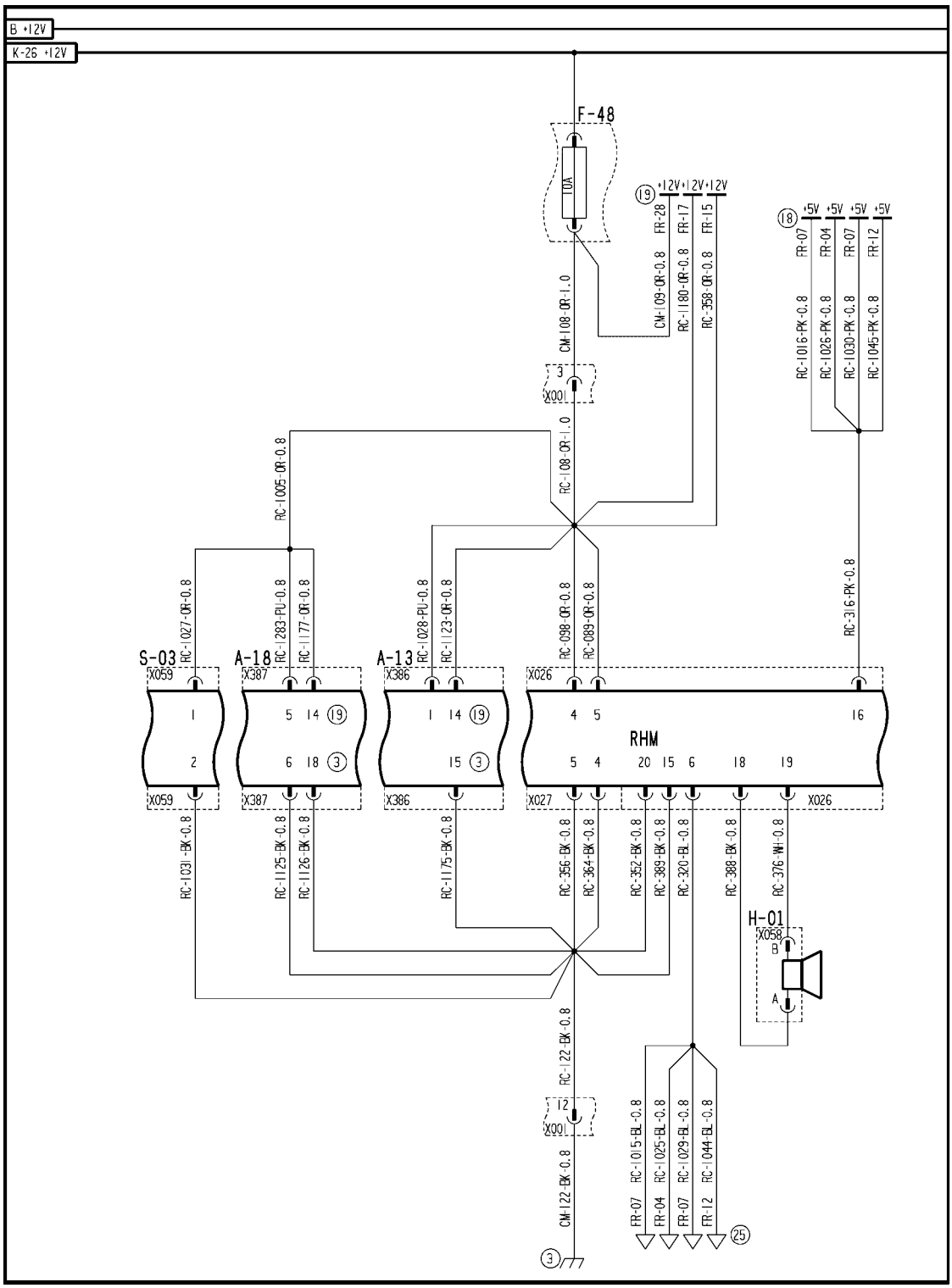
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FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



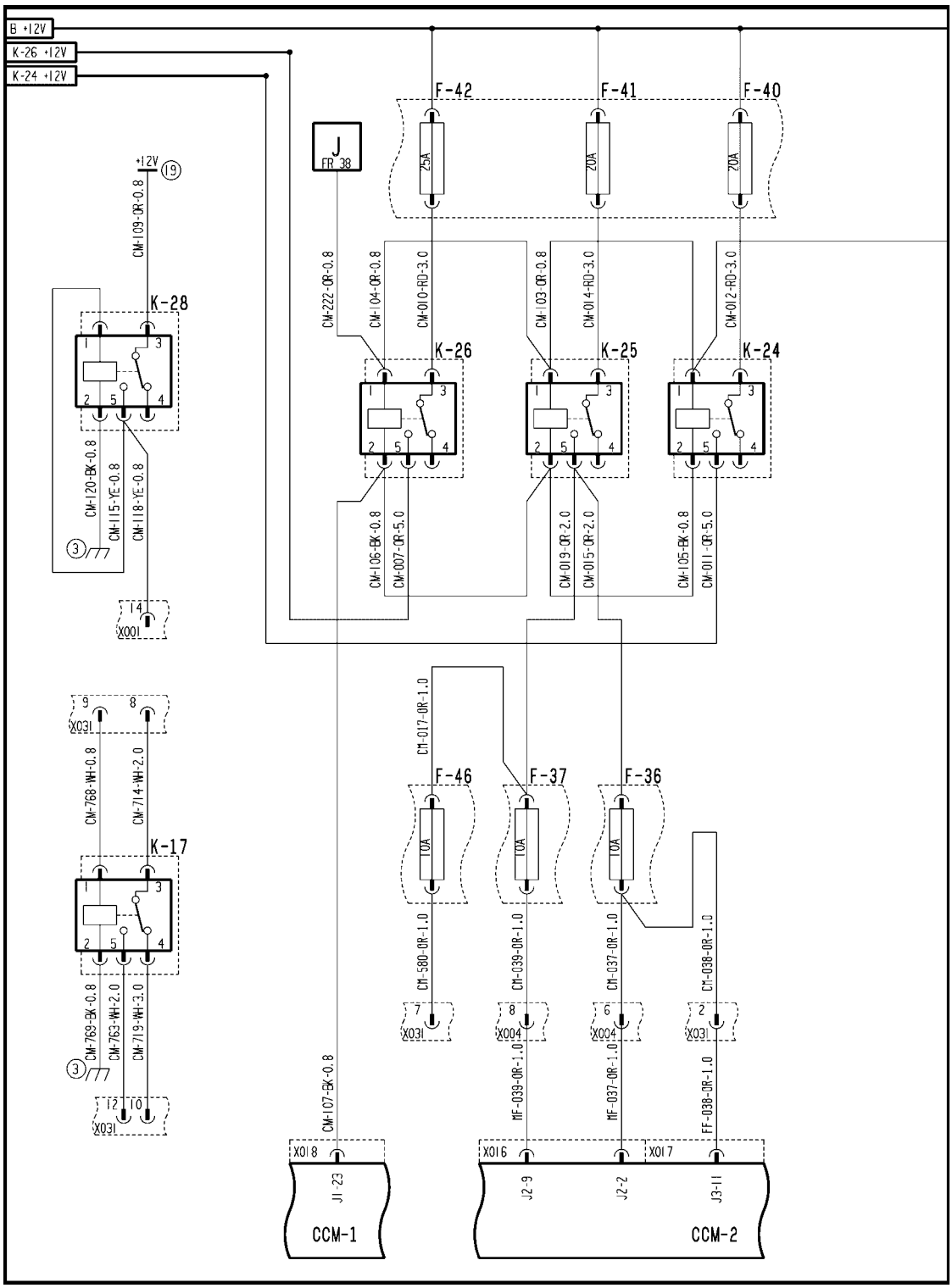
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FRAME 25 - DISTRIBUTION

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A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

Wiring harness - Electrical schematic frame 28 (A.30.A.88 - C.20.E.28)



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FRAME 28 - DISTRIBUTION

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F-36 CCM2a Fuse	F-37 CCM2b Fuse	F-40 CCM1 Power Fuse
F-41 CCM2 Power Fuse	F-42 CCM3, Cab Power Fuse	F-46 Not Used
K-17 Not Used	K-24 CCM1 Power Relay	K-25 CCM2 Power Relay
K-26 CCM3, Cab Power Relay	K-28 Not Used	

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Control valve Clutch control valve - Short circuit to B+ (K.25.E.14.20 - G.30.B.54)

AFX8010

E0050-03 - Feeder ETR Clutch Current Sense

Context:
The Feeder ETR Clutch Current Sense circuit is the ground path for the feeder ETR clutch PWM solenoid L-47. By monitoring current flow on the return path of the feeder ETR clutch solenoid, the module can provide precise control of the solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The Feeder ETR clutch solenoid (L-47) circuit has excessive current draw, or is shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "ETR CTCH ISENSE" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper feeder ETR clutch solenoid current should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps**, continue with Step **2**.

   B. If the reading is normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **5**.

   NOTE: *If the current reading is high, immediately shut off the circuit by pressing the "ENGAGE" key after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the feeder ETR clutch solenoid connector **X401**. Use a multimeter to check the resistance of the feeder ETR clutch solenoid L-47 between connector **X401** pins A & B. The proper resistance range for the feeder ETR clutch solenoid is **7.2 - 11.2 ohms**.

   A. If out of specification, replace the solenoid. Continue with Step **7**.

   B. If the coil is within specification, continue with Step **3**.

3. Disconnect connector **X011**. Use a multimeter to check the resistance of the feeder ETR clutch solenoid circuit between connector **X011** pins 11 & 12. The resistance should be the same as, or slightly higher than the resistance of the solenoid as measured in Step 2

   A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X401** and connector **X011** wires 876 white and 1210 blue. Locate the short and repair. Continue with Step **7**.

   B. If the resistance is the same as previously measured, continue with Step **4**.

4. Remove the feeder disengage relay K-17 from the fuse panel, and install a jumper wire between the relay base terminals 3 & 5. Carefully disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check the resistance of the feeder ETR clutch solenoid circuit between connector **X019** pins J2-30 & J2-40.

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A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X011** and connector **X019** wires 876 white and 1210 blue or 875 blue. Locate the short and repair. Continue with Step **7**.

B. If the resistance is the same as previously measured, reattach all connectors and continue with Step **5**.

5. Key on. Disconnect connector **X401**. Use a multimeter to check for voltage at connector **X401** pin B (harness end). There should be no voltage on this wire.

   A. If there is no voltage present on the wire, continue with Step **7**.

   B. If there is voltage present on the wire, continue with Step **6**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

6. Key on. Disconnect connector **X011**. Use a multimeter to check for voltage at connector **X011** pin 11 (module side of connector). There should be no voltage on this wire.

   A. If there is no voltage on the wire, the short to voltage is between connector **X401** and connector **X011** wire 1210 blue. Locate the short and repair. Continue with Step **7**.

   B. If there is voltage on the wire, the short to voltage is between connector **X011**, connector **X004** and connector **X019** wire 1210 blue or 875 blue. Locate the short and repair. Continue with Step **7**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

7. The sense resistor in the module for the Feeder ETR Clutch Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Disconnect connector **X011**. Use a multimeter to check resistance between connector **X011** pin 11 and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM1 module has failed. Replace the module.

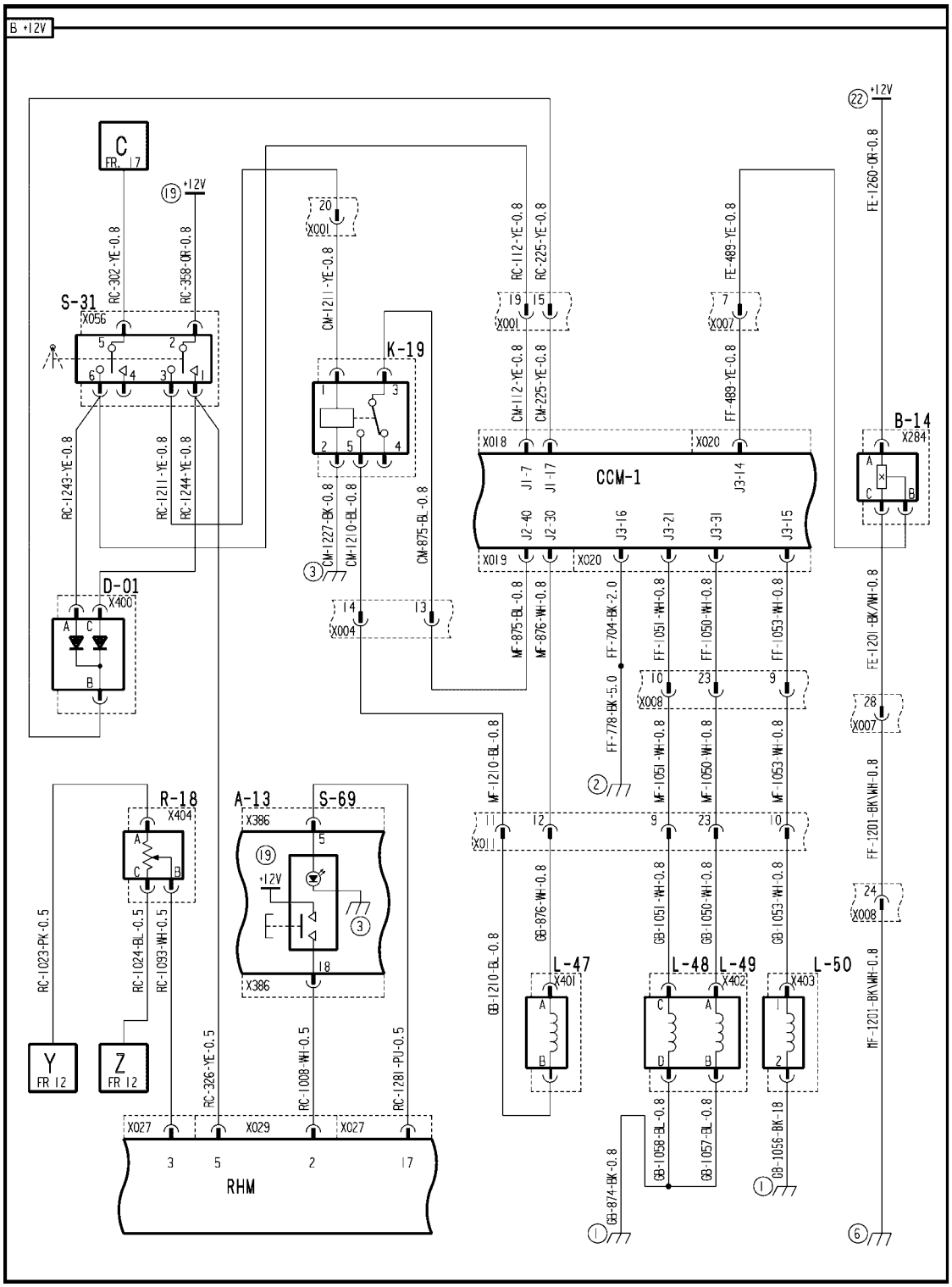
   B. If the resistance is correct, the sense resistor in the CCM1 module is okay, and the circuit should function correctly. Continue with Step **8**.

8. Operate the combine while monitoring the Feeder ETR Clutch Current Sense circuit current on the Universal Display Plus "DIAG" screen.

   A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



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FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Control valve Clutch control valve - Unidentified failure (K.25.E.14.20 - G.30.B.46)

AFX8010

E0052-11 - Feeder ETR Clutch Valve

Cause:
The Feeder ETR Clutch Valve (L-47) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "ETR CTCH VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **5**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **11**.
2. Disconnect the feeder ETR clutch connector **X401**. Use a multimeter to check between connector **X401** pin A (valve side) and chassis ground.

   A. If there is continuity, the feeder ETR clutch solenoid is shorted to ground. Replace the solenoid.

   B. If there is no continuity, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X401** pin A (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

   A. If there is continuity to ground, continue with Step **4**.

   B. If there is no continuity to ground, continue with step **9**.
4. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 12 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X019** while making this check.

   A. If there is no continuity to ground, the short to ground is in the gearbox (GB) harness between connector **X011** and connector **X401** wire 876 white. Locate the short and repair.

   B. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X011** and connector **X019** wire 876 white. Locate the short and repair.
5. Disconnect connector **X401**. Use a multimeter to check the resistance of the feeder ETR clutch valve coil between connector **X401** pins A & B. The proper resistance range is **7.2 - 11.2 ohms**.

   A. If there is no continuity, replace solenoid.

   B. If the coil is within specification, continue with Step **6**.
6. Use a multimeter to check for continuity between connector **X401** pin B (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

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A. If there is no continuity to ground, continue with Step **7**.

B. If there is continuity to ground, continue with Step **9**.

7. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 11 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X019** while making this check.

   A. If there is continuity to ground, the open circuit is in the gearbox (GB) harness between connector **X011** and connector **X401** wire 1210 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **8**.

8. Disconnect connector **X004**, and install a jumper wire between connector **X004** pins 13 & 14. Use a multimeter to check for continuity between connector **X011** pin 11 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X019** while making this check.

   A. If there is continuity to ground, there is an open circuit in the cab main (CM) harness between connector **X004** pins 13 & 14 and the feeder disengage relay K-19 wires 1210 blue or 875 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **8**.

9. Disconnect connector **X019** on the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X019** pin J2-40 on the module and chassis ground.

   A. There is infinite resistance. The sense resistor in the CCM1 module has failed. Replace the module.

   B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM1 module is okay. The open circuit is in the main frame (MF) harness between connector **X011**, connector **X004** and connector **X019** wire 1210 blue or 875 blue. Locate the open and repair.

   NOTE: *The sense resistor in the module for the Isense Feeder ETR Clutch circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

10. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the feeder ETR clutch valve. Use a multimeter to check for **12 volts** between connector **X401** pin A and chassis ground.

    A. If **12 volts** is not present, continue with Step **10**.

    B. If **12 volts** is found, continue with Step **11**.

11. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the Feeder ETR clutch valve. Use a multimeter to check for **12 volts** between connector **X011** pin 12 and chassis ground.

    A. If **12 volts** is present, the open circuit is in the gearbox (GB) harness between connector **X401** pin A and connector **X011** pin 12 wire 876 white. Locate the open circuit and repair.

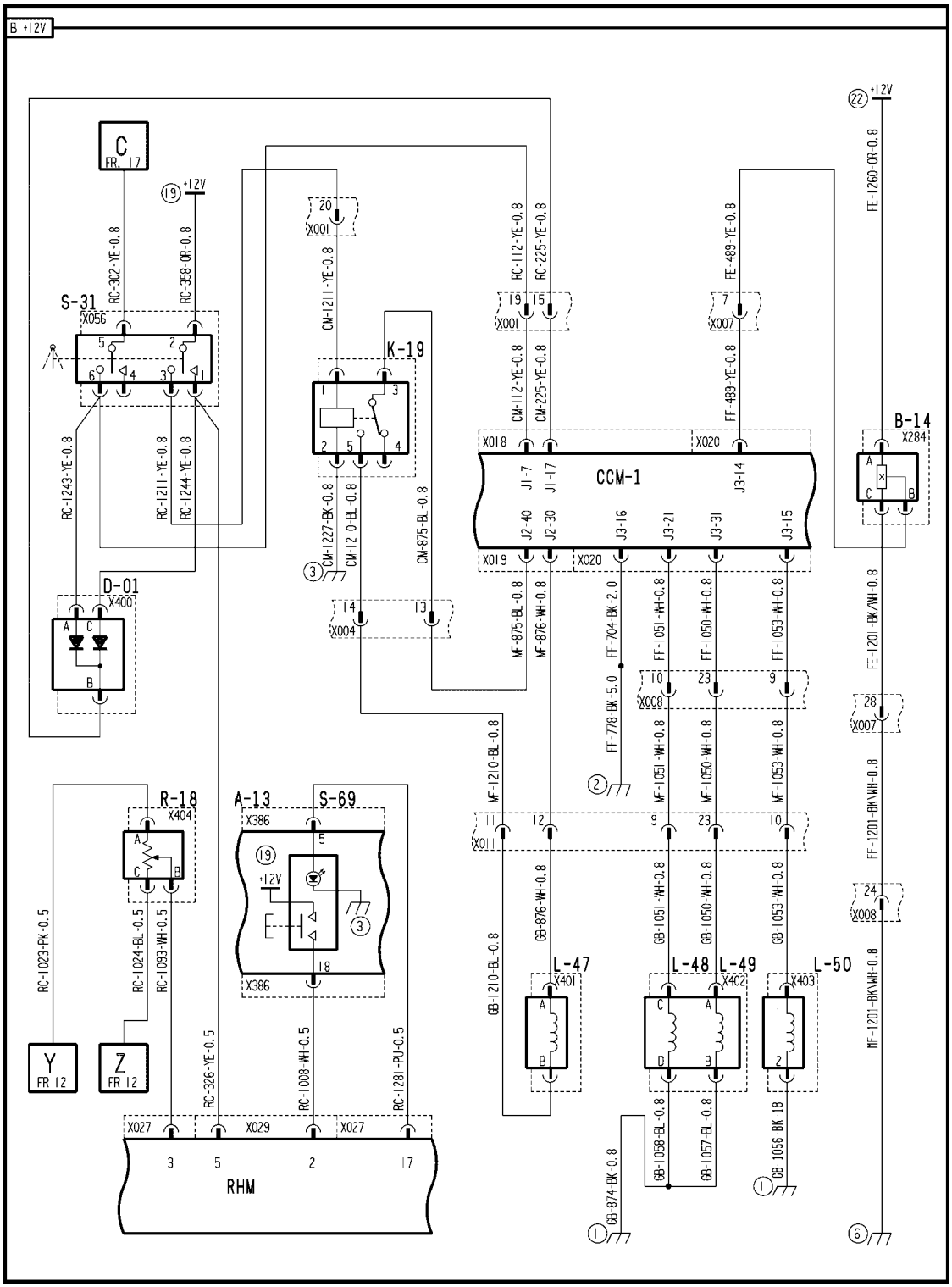
    B. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X011** pin 12 and connector **X019** pin J2-30 wire 876 white. Locate the open and repair.

12. Operate the combine while monitoring the Feeder ETR Clutch circuit current on the Universal Display Plus "DIAG" screen.

    A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



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FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Control valve Clutch control valve - Unidentified failure (K.25.E.14.20 - G.30.B.46)

AFX8010

E0067-11 - Feeder RTF Clutch Valve

Cause:
The feeder RTF clutch valve (L-50) circuit open or is shorted to ground.

Possible failure modes:

1. Supply wiring shorted to ground or open circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "RTF CTCH VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position and disconnect the feeder RTF clutch connector **X403**. Use a multimeter to check the resistance of the feeder RTF clutch solenoid. The proper resistance range for the coil is **1.0 - 8.0 ohms**.

   A. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between the gearbox (GB) harness end of connector **X403** pin 1 and chassis ground. Flex the gearbox (GB) harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, continue with Step **6**.
4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the feeder RTF clutch solenoid. Use a multimeter to check for **12 volts** between connector **X403** pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **5**.

   B. If **12 volts** is found, continue with Step **7**.
5. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the feeder RTF clutch solenoid. Use a multimeter to check for **12 volts** between connector **X011** pin 10 and chassis ground.

   A. If **12 volts** is not present, continue with step **8**.

   B. If **12 volts** is read the open is between connector **X011** and connector **X403** wire 1053 white. Locate the open and repair.
6. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the feeder RTF clutch solenoid. Use a multimeter to check for **12 volts** between connector **X008** pin 9 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the front frame (FF) harness between connector **X008** and connector **X020** J3-15 wire 1053 white. Locate the open and repair.

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B. If **12 volts** is read, there is an open circuit in the main frame (MF) harness between connector **X008** and connector **X011** wire 1053 white. Locate the open and repair.

7. Disconnect connector **X011**. Use the multimeter to check for continuity between connector **X011** pin 10 and chassis ground.

   A. If continuity is found, continue with step **8**.

   B. If no continuity is found, the short to ground is in the lower frame (LF) harness between connector **X011** and connector **X403** wire 1053 white. Locate the short and repair.

8. Disconnect connector **X008**. Use the multimeter to check for continuity between connector **X008** pin 9 and chassis ground.

   A. If continuity is found, the short to ground is in the front frame (FF) harness between connector **X008** and connector **X020** J3-15 wire 1053 white. Locate the short and repair.

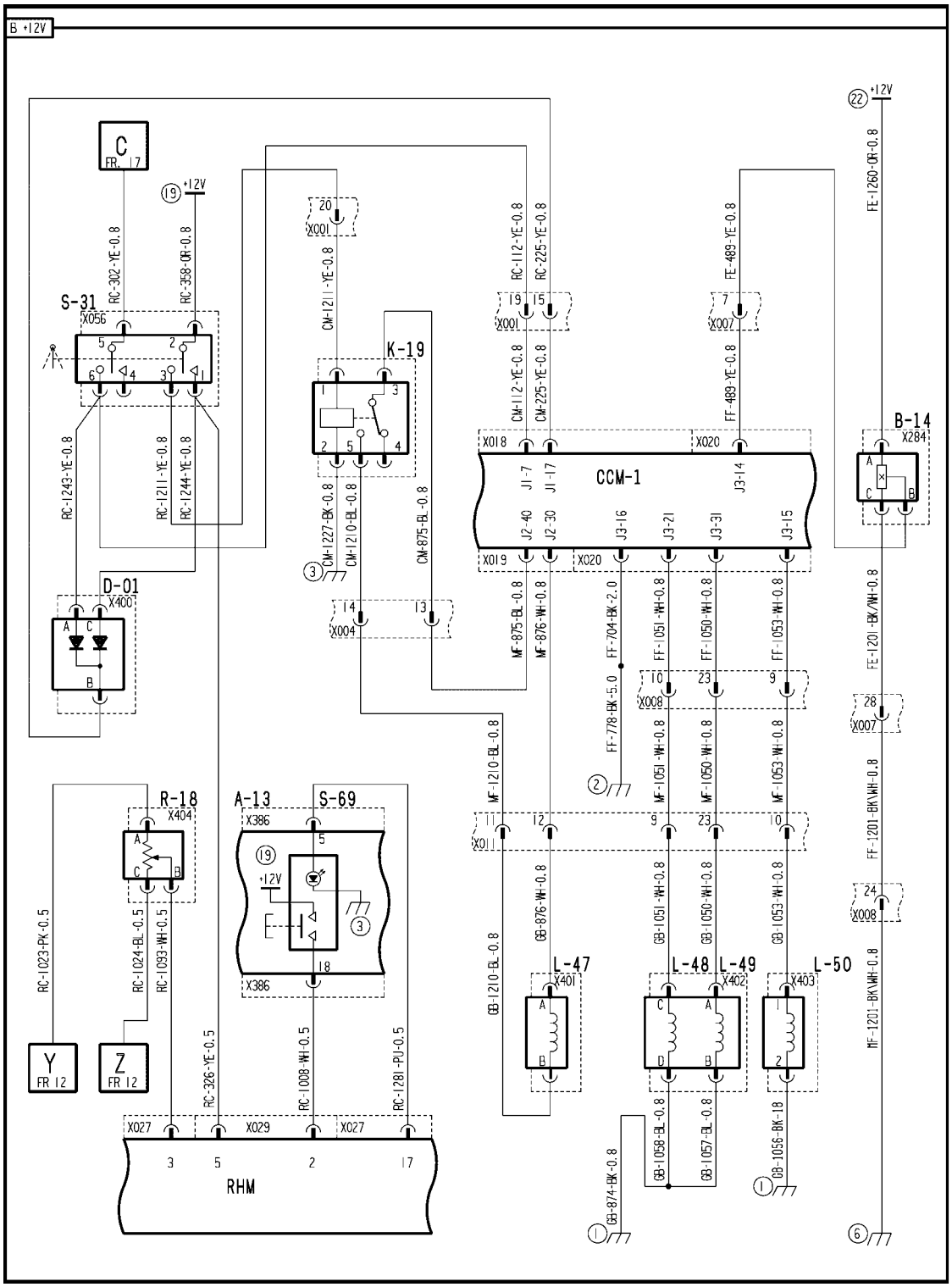
   B. If no continuity is found, the short to ground is in the lower frame (LF) harness between connector **X008** and connector **X011** wire 1053 white. Locate the short and repair.

9. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



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FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Control valve Speed control valve - Unidentified failure (K.25.E.14.10 - G.30.B.46)

AFX8010

E0074-11 - Feeder CVT Pump Valve

Cause:
The Feeder Pump Swash Minus (L-48) and/or Feeder Pump Swash Plus (L-49) circuits are shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Solenoid failed.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key switch ON, combine engine running. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "CVT PMP VLV" to check the current. Engage the separator switch S-30 and feeder engage switch S-31, and rotate the header speed potentiometer R-18 to increase and decrease header speed while monitoring the current.

   The current should vary gradually between **0 - 90 mA** (**0 - 4.4 volts**), depending on header speed.
   If the current spikes to a maximum of **100 mA**(>**4.7 volts**), and then abruptly drops to zero, there is a short to ground on the output lead to the control valve.

   A. If the current spikes to maximum , and then abruptly drops to zero, continue with step **2**.

   B. If the voltage readings are within the proper ranges, continue with step **10**.

2. Turn the key switch to the "OFF" position. Disconnect the feeder pump swash solenoids connector **X402**. Use a multimeter to check the resistance of the feeder pump swash solenoid coils between terminals D & C, and then between terminals A & B. The proper resistance range for the solenoid coils is **16k - 20k ohms**.

   A. If either of the solenoid coils is out of specification, replace the solenoid.

   B. If the solenoid coils are within specifications, continue with step **3**.

3. Use a multimeter to check for continuity between the feeder pump swash minus solenoid coil terminals D or C and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, replace the solenoid.

   B. If there is no continuity to ground, continue with step **4**.

4. Use a multimeter to check for continuity between the harness end of connector **X402** pin C and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **5**.

   B. If there is no continuity to ground, continue with step **7**.

5. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 9 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the gearbox (GB) harness between connector **X011** and connector **X402** wire 1051 white.Locate the short and repair.

   B. If there is continuity to ground, continue with step **6**.

6. Disconnect connector **X008**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X008** pin 10 and chassis ground. There should not be continuity to ground.

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A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** and connector **X008** wire 1051 white. Locate the short and repair.

B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-21 wire 1051 white. Locate the short and repair.

7. Use a multimeter to check for continuity between the harness end of connector **X402** pin A and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **8**.

   B. If there is no continuity to ground, continue with step **10**.

8. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 23 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the gearbox (GB) harness between connector **X011** and connector **X402** wire 1050 white.Locate the short and repair.

   B. If there is continuity to ground, continue with step **9**.

9. Disconnect connector **X008**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X008** pin 23 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** and connector **X008** wire 1050 white. Locate the short and repair.

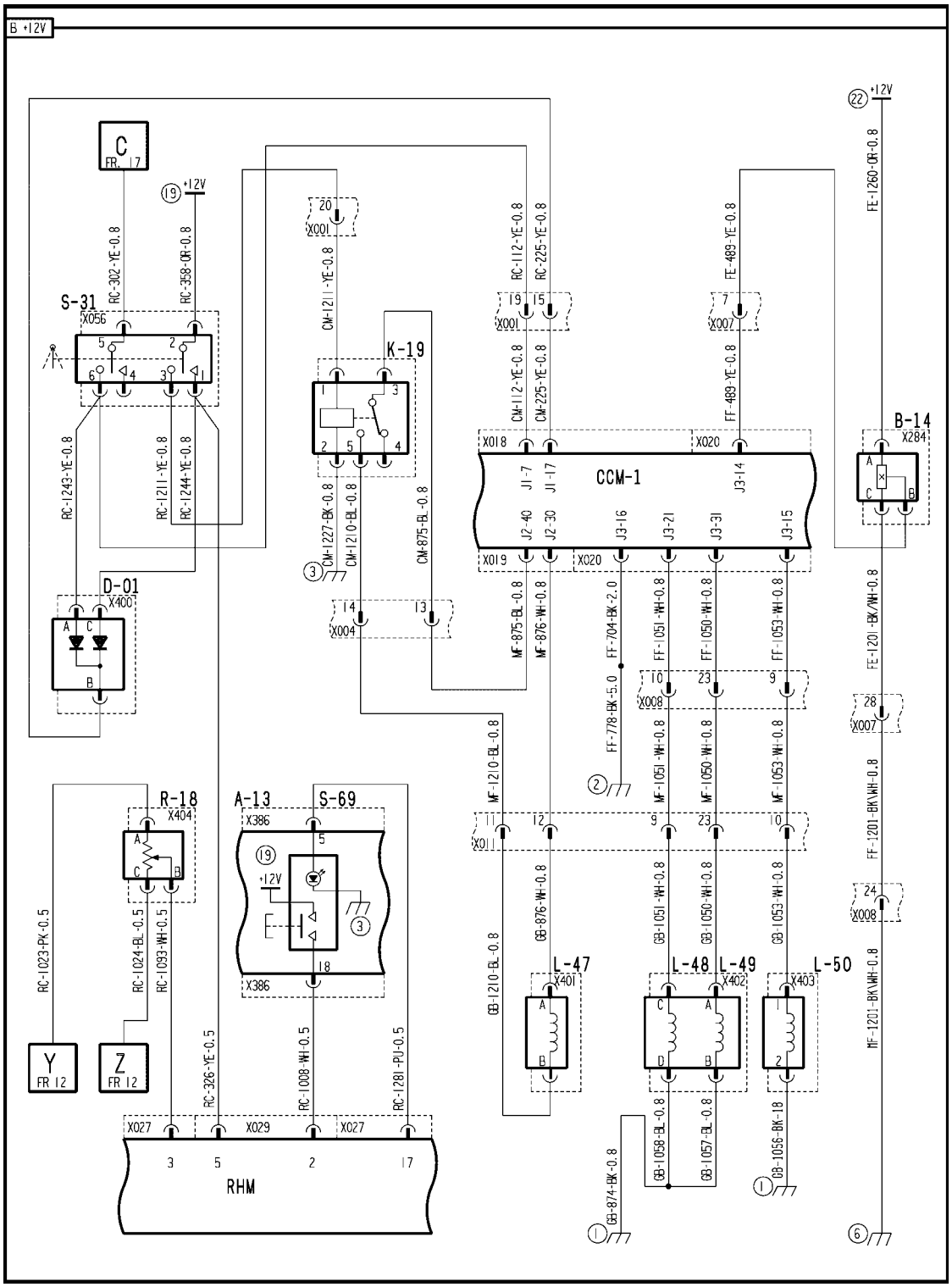
   B. If there is continuity to ground, there is a short to ground in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-31 wire 1050 white. Locate the short and repair.

10. Visually inspect the harness and connectors for damage, bent or dislocated, corroded terminals, or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



AFXSCHEM15-04 1

FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Sensing system Speed sensor - Short circuit to B+ (K.25.E.95.80 - G.30.B.54)

AFX8010

E0014-03 - Feeder Speed Sensor

Cause:
The feeder RPM sensor (B14) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "SPD SEN" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the feeder RPM sensor connector **X284**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with step **3**.
3. Disconnect the feeder (FE) harness connector **X007**.

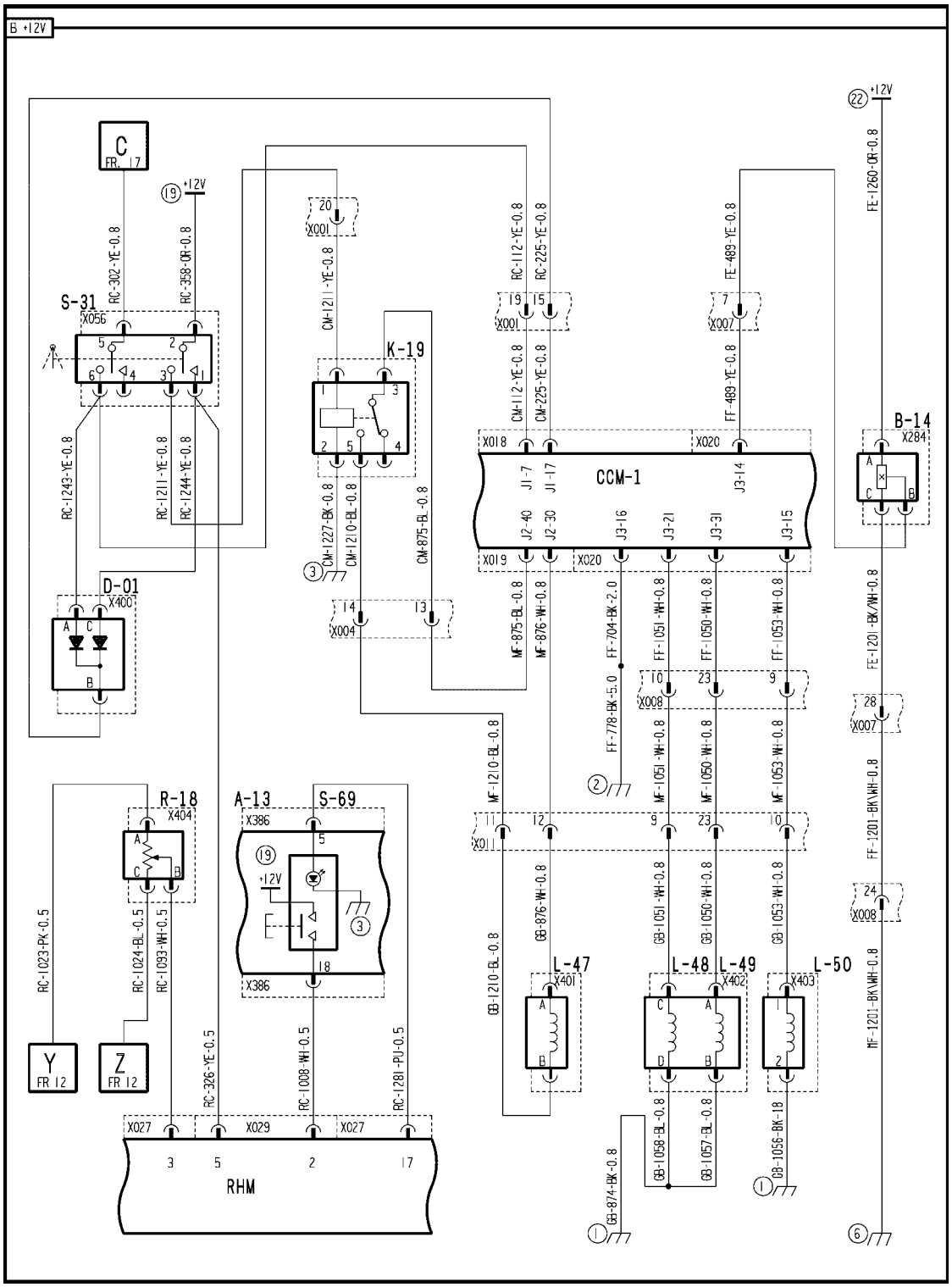
   A. If the voltage drops to **7.3 - 9.0 volts**, there is a short in the feeder (FE) harness between connector **X284** and connector **X007** wire 489 yellow. Locate the short and repair.

   B. If the voltage remains high, there is a short in the front frame (FF) harness between connector **X007** and connector **X020** pin J3-14 wire 489 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



AFXSCHEM15-04 1

FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Sensing system Speed sensor - Short circuit to ground (K.25.E.95.80 - G.30.B.53)

AFX8010

E0014-04 - Feeder Speed Sensor

Cause:
The feeder RPM sensor (B14) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the feeder RPM sensor connector **X284**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with step **3**.
3. Disconnect the feeder (FE) harness connector **X007**.

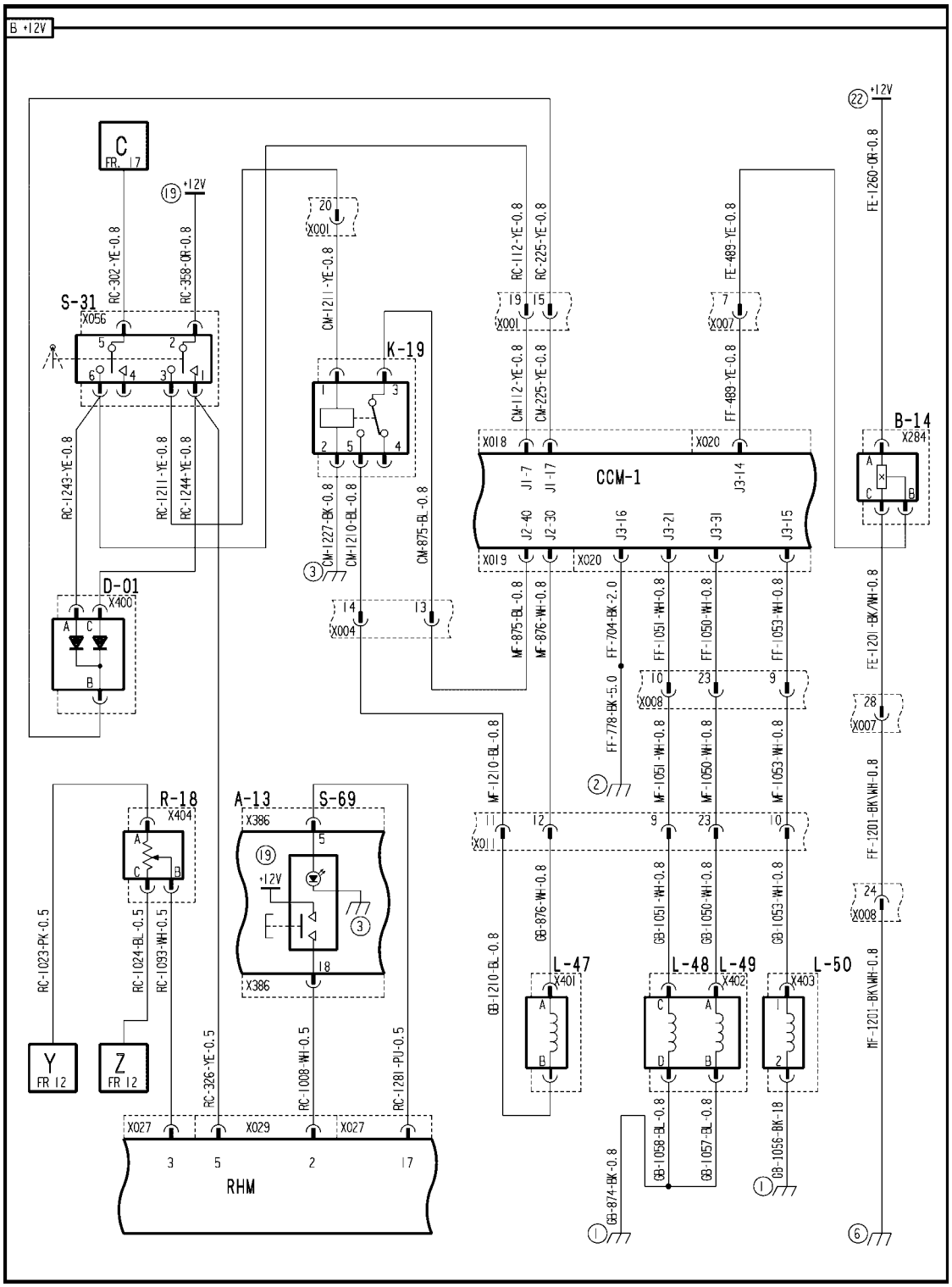
   A. If the voltage increases to **7.3 - 9.0 volts**, there is a short to ground in the feeder (FE) harness between connector **X284** and connector **X007** wire 489 yellow. Locate the short and repair.

   B. If the voltage remains low, there is a short to ground in the front frame (FF) harness between connector **X007** and connector **X020** pin J3-14 wire 489 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



AFXSCHEM15-04 1

FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

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Sensing system Speed sensor - Open circuit (K.25.E.95.80 - G.30.B.50)

AFX8010

E0014-05 - Feeder Speed Sensor

Cause:
The feeder RPM sensor (B14) circuit is disconnected.

Possible failure modes:

1. Sensor supply, signal or ground wiring is disconnected.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "FEEDER" sort menu, and select "SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   If there is an open in the supply, signal or ground wiring the voltage will read **7.3 - 9.0 volts**.

   A. If the voltage reading is high indicating an open, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **6**.
2. Disconnect the feeder RPM sensor connector **X284**. Install a jumper wire between pins A (orange) and B (yellow) on connector **X284**.

   A. If the voltage rises to **> 9 volts**, continue with step **3**.

   B. If the voltage remains **7.3 - 9.0 volts**, continue with Step **7**.
3. Disconnect the feeder RPM sensor connector **X284**. Install a jumper wire between pins B (yellow) and C (blue) on connector **X284**.

   A. If the voltage drops to **0 - 0.5 volts** the open is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains out of range, continue with Step **3**.
4. Remove the jumper wire from connector **X284**. Use a multimeter to check for continuity between pin C (blue) on connector **X284** and chassis ground.

   A. If no continuity is found, continue with Step **4**.

   B. If continuity is found, continue with Step **5**.
5. Disconnect connector **X007**. Use a multimeter to check for continuity between pin 28 on connector **X007** and chassis ground.

   A. If no continuity is found, continue with step **6**.

   B. If continuity is found, there is an open circuit in the feeder (FE) harness between connector **X007** and **X284** wire 1201 black/white. Locate the open and repair.
6. Disconnect connector **X008**. Use a multimeter to check for continuity between pin 28 on connector **X008** and chassis ground.

   A. If continuity is found, there is an open circuit in the front frame (FF) harness between connector **X007** and connector **X008** wire 1201 black/white. Locate the open and repair.

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B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X008** and clean battery ground #6 wire 1201 black/white. Locate the open and repair.

7. Remove the jumper wire from connector **X284**. Check and confirm that fuse F-45 is good. Use a multimeter to check for **12 volts** at connector **X089** pin A (orange).

   A. If no voltage is found, continue with Step **8**.

   B. If **12 volts** is found, continue with Step **5**.

8. Disconnect connector **X007**. Use a multimeter to check for voltage at connector **X007** pin 26.

   A. If no voltage is found, continue with Step **9**.

   B. If **12 volts** is found, there is an open circuit in the feeder (FE) harness between connector **X007** and connector **X284** wire 1260 orange. Locate the open and repair.

9. Disconnect connector **X008**. Use a multimeter to check for voltage on the main frame (MF) harness end of connector **X008** pin 18.

   A. If no voltage is found, continue with Step **10**.

   B. If **12 volts** is found, there is an open circuit in the front frame (FF) harness between connector **X007** and connector **X008** wire 1260 orange or 1205 orange. Locate the open and repair.

10. Disconnect connector **X005**. Use a multimeter to check for voltage on the cab main (CM) harness end of connector **X005** pin 5.

    A. If no voltage is found, there is an open circuit in the cab main (CM) harness between connector **X005** and fuse F45 wire 013 orange. Locate the open and repair.

    B. If **12 volts** is found, there is an open circuit in the main frame (MF) harness between connector **X005** and connector **X008** wire 1205 orange or 013 orange. Locate the open and repair.

11. Disconnect connector **X007**. Install a jumper wire between pins 7 and 28 on connector **X007**.

    A. If the voltage drops to **0 - 0.5 volts** there is an open circuit in the feeder (FE) harness between connector **X007** and **X284** wire 489 yellow. Locate the open and repair.

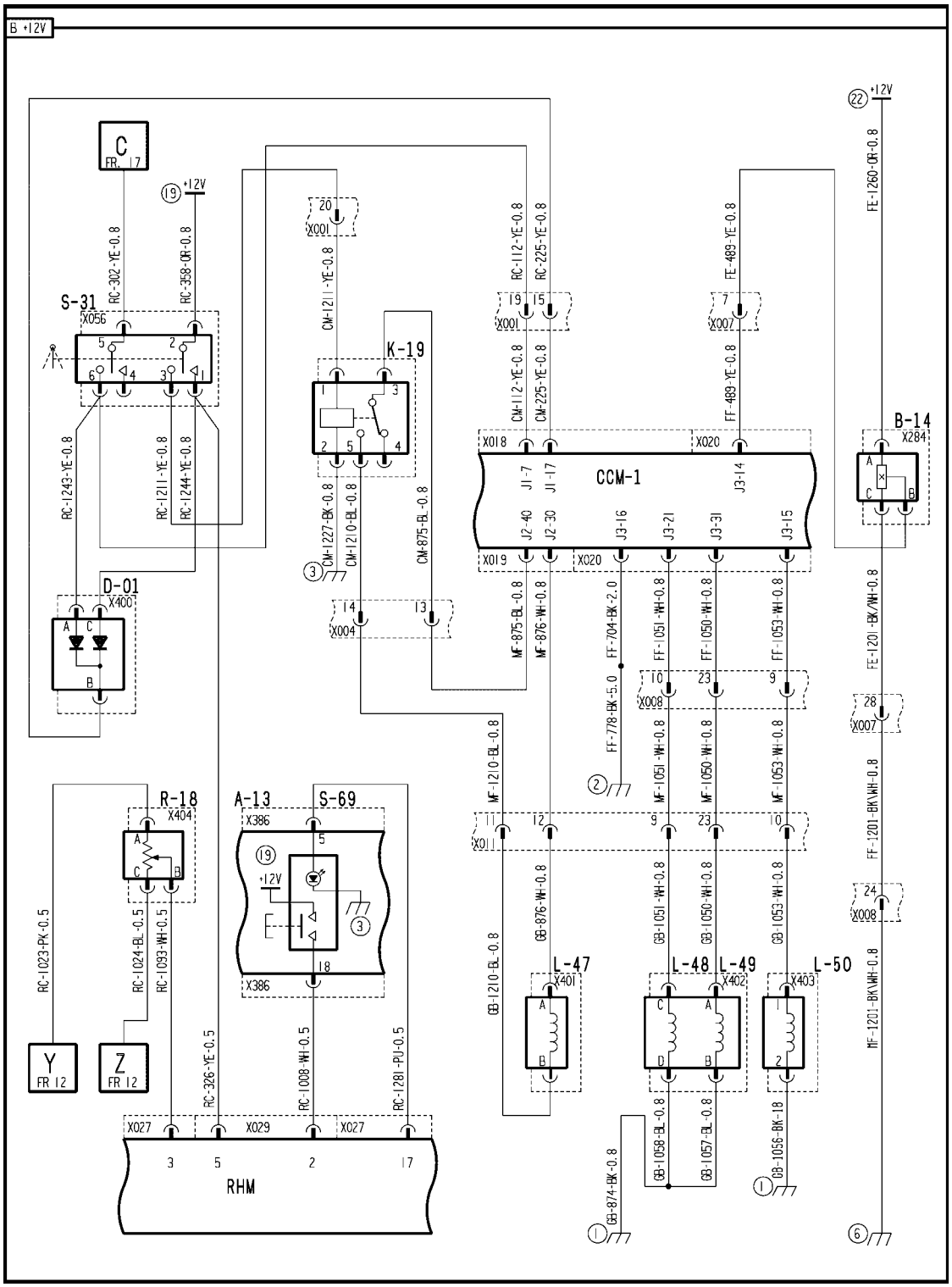
    B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X007** and connector **X020** J3-14 wire 489 yellow. Locate the open and repair.

12. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

    A. If no damage is found erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



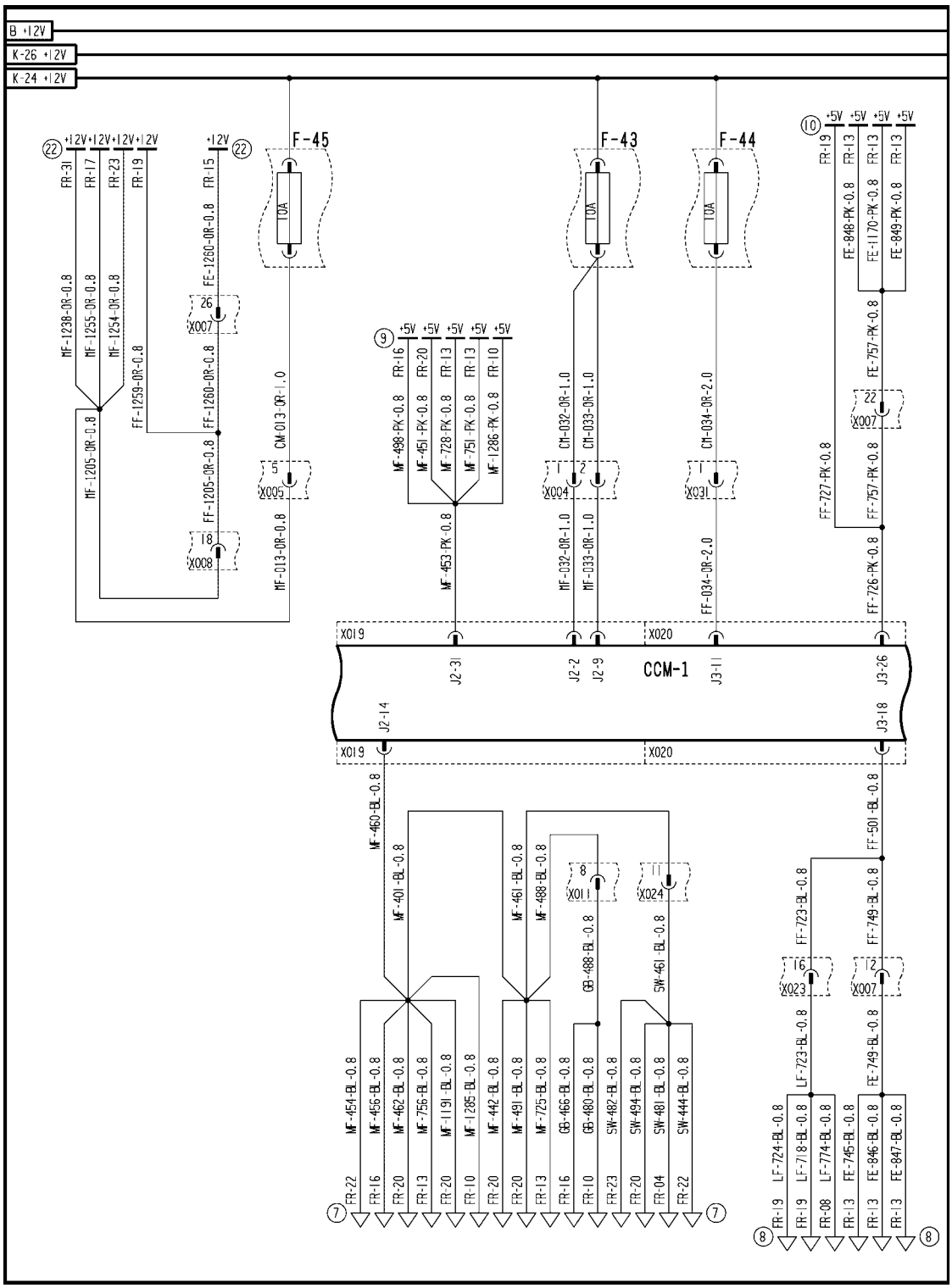
AFXSCHEM15-04 1

FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Index

CROP PROCESSING - K

FEEDING Feeder housing - 25.E

Command Engage switch - Short circuit to B+ (K.25.E.05.83 - G.30.B.54) 49
AFX8010

Command Engage switch - Short circuit to B+ (K.25.E.05.83 - G.30.B.54) 62
AFX8010

Command Engage switch - Short circuit to ground (K.25.E.05.83 - G.30.B.53) 56
AFX8010

Control valve Clutch control valve - Short circuit to B+ (K.25.E.14.20 - G.30.B.54) 70
AFX8010

Control valve Clutch control valve - Unidentified failure (K.25.E.14.20 - G.30.B.46) 74
AFX8010

Control valve Clutch control valve - Unidentified failure (K.25.E.14.20 - G.30.B.46) 78
AFX8010

Control valve Speed control valve - Unidentified failure (K.25.E.14.10 - G.30.B.46) 82
AFX8010

Drive system - Install (K.25.E.40 - F.10.A.15) 18
AFX8010 With stone trap

Drive system - Install (K.25.E.40 - F.10.A.15) 22
AFX8010 Without stone trap

Drive system - Overview (K.25.E.40 - C.10.A.10) 4
AFX8010

Drive system - Remove (K.25.E.40 - F.10.A.10) 16
AFX8010 With stone trap

Drive system - Remove (K.25.E.40 - F.10.A.10) 20
AFX8010 Without stone trap

Feed chain - Install (K.25.E.48 - F.10.A.15) 45
AFX8010

Feed chain - Remove (K.25.E.48 - F.10.A.10) 44
AFX8010

Feed chain - Replace (K.25.E.48 - F.10.A.30) 43
AFX8010

Feed chain - Tension adjust (K.25.E.48 - F.45.A.40) 42
AFX8010

FEEDING Feeder housing - Install (K.25.E - F.10.A.15) 10
AFX8010

FEEDING Feeder housing - Remove (K.25.E - F.10.A.10) 6
AFX8010

Gearbox - Assemble (K.25.E.44 - F.10.A.20) 35
AFX8010

Gearbox - Disassemble (K.25.E.44 - F.10.A.25) 27
AFX8010

Gearbox - Remove (K.25.E.44 - F.10.A.10) 25
AFX8010

Idler roller - Clearance (K.25.E.57 - F.45.A.12) 48
AFX8010

Idler roller - Install (K.25.E.57 - F.10.A.15) 47
AFX8010

https://truckmanualshub.com/

Idler roller - Remove (K.25.E.57 - F.10.A.10) 46
AFX8010

Sensing system Speed sensor - Open circuit (K.25.E.95.80 - G.30.B.50) 92
AFX8010

Sensing system Speed sensor - Short circuit to B+ (K.25.E.95.80 - G.30.B.54) 86
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.25.E.95.80 - G.30.B.53) 89
AFX8010

https://truckmanualshub.com/

CROP PROCESSING - K

THRESHING Axial flow threshing - 40.C

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

THRESHING Axial flow threshing - 40.C

TECHNICAL DATA

Drive system

Drive system - General specification (K.40.C.40 - D.40.A.10) 4
AFX8010

FUNCTIONAL DATA

Drive system

Drive system - Overview (K.40.C.40 - C.10.A.10) 5
AFX8010

SERVICE

Drive system

Drive system Drive and gear - Remove (K.40.C.40.44 - F.10.A.10) 14
AFX8010

Drive system Drive and gear - Disassemble (K.40.C.40.44 - F.10.A.25) 17
AFX8010

Drive system Drive and gear - Leakage test (K.40.C.40.44 - F.40.A.40) 21
AFX8010

Drive system Drive and gear - Install (K.40.C.40.44 - F.10.A.15) 22
AFX8010

Threshing rotor

Threshing rotor AFX (auger front) rotor - Remove (K.40.C.52.52 - F.10.A.10) 25
AFX8010

Threshing rotor AFX (auger front) rotor - Visual inspection (K.40.C.52.52 - F.40.A.10) 29
AFX8010

Threshing rotor AFX (auger front) rotor - Place on stand (K.40.C.52.52 - F.35.A.10) 30
AFX8010

Threshing rotor AFX (auger front) rotor - Balancing (K.40.C.52.52 - F.45.A.25) 32
AFX8010

Threshing rotor AFX (auger front) rotor - Disassemble (K.40.C.52.52 - F.10.A.25) 33
AFX8010

Threshing rotor AFX (auger front) rotor - Assemble (K.40.C.52.52 - F.10.A.20) 34
AFX8010

Threshing rotor AFX (auger front) rotor - Install (K.40.C.52.52 - F.10.A.15) 35
AFX8010

DIAGNOSTIC

Command

https://truckmanualshub.com/

Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54) 40
AFX8010

Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54) 47
AFX8010

Command Threshing engage switch - Short circuit to ground (K.40.C.05.80 - G.30.B.53) 54
AFX8010

Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54) 60
AFX8010

Control valve

Control valve Speed control valve - Short circuit to B+ (K.40.C.14.10 - G.30.B.54) 67
AFX8010

Control valve Speed control valve - Unidentified failure (K.40.C.14.10 - G.30.B.46) 71
AFX8010

Control valve Clutch control valve - Short circuit to B+ (K.40.C.14.20 - G.30.B.54) 75
AFX8010

Control valve Clutch control valve - Unidentified failure (K.40.C.14.20 - G.30.B.46) 79
AFX8010

Control valve Clutch control valve - Unidentified failure (K.40.C.14.20 - G.30.B.46) 84
AFX8010

Electrical motor

Electrical motor - Short circuit (K.40.C.82 - G.30.B.52) 88
AFX8010

Electrical motor - Unidentified failure (K.40.C.82 - G.30.B.46) 96
AFX8010

Electrical control

Electrical control Relay - Unidentified failure (K.40.C.90.80 - G.30.B.46) 104
AFX8010

Sensing system

Sensing system Concave position sensor - Short circuit to B+ (K.40.C.95.82 - G.30.B.54) 107
AFX8010

Sensing system Concave position sensor - Open circuit (K.40.C.95.82 - G.30.B.50) 115
AFX8010

Sensing system Rotor speed sensor - Short circuit to B+ (K.40.C.95.80 - G.30.B.54) 120
AFX8010

Sensing system Rotor speed sensor - Short circuit to ground (K.40.C.95.80 - G.30.B.53) 124
AFX8010

Sensing system Rotor speed sensor - Open circuit (K.40.C.95.80 - G.30.B.50) 127
AFX8010

Sensing system Hydrostat motor speed sensor - Short circuit to B+ (K.40.C.95.81 - G.30.B.54) 130
AFX8010

Sensing system Hydrostat motor speed sensor - Short circuit to ground (K.40.C.95.81 - G.30.B.53) 134
AFX8010

Sensing system Hydrostat motor speed sensor - Open circuit (K.40.C.95.81 - G.30.B.50) 137
AFX8010

https://truckmanualshub.com/

Drive system - General specification (K.40.C.40 - D.40.A.10)

AFX8010

Output Speed - RPM *

Gear	Speed Reduction	Available	Available	Software Controlled	Software Controlled
		MIN	MAX	MIN	MAX
1	5.155	217	444	220	450
2	2.929	381	781	430	780
3	1.943	575	1178	730	1180

NOTE: **For above chart engine is at rated 2100 RPM*

Rated input RPM	Rated input power (HP)	Rated input power (kW)
1144	190.0	139.7
2342	-	-

NOTE: *The 3-speed gearbox operates with oil lubrication. The recommended oil type is* ***CASE AKCELA HY-TRAN ULTRA****. The capacity is* ***7 L (1.85 US gal)****. The first oil change is recommended after the first 50 hours of service, and then 600 hours or once per year. If gearbox is rebuilt or taken apart for any reason it is recommended to perform the Leakage test* ***Drive system Drive and gear - Leakage test (K.40.C.40.44 - F.40.A.40)****.*

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Drive system - Overview (K.40.C.40 - C.10.A.10)

AFX8010

ROTOR DRIVE

- **Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)**

  The rotor drive system consists of electrical, electronic, hydraulic and mechanical components which work together to enable several different modes of operation. This may make diagnosing a rotor drive system problem quite difficult. This section will show how the threshing system components work together under normal operation. The rotor drive has very specific operating requirements which may prevent the rotor from functioning properly. The system is in control of all rotor operations, maintaining RPM, monitoring, troubleshooting and issuing warnings.

ROTOR - MODES OF OPERATION

OFF

- The operator will have placed the separator engage switch S-30 into the OFF (center-detented) position, the rotor should not be powered and should be at rest.

CALIBRATION

- The calibration mode provides the ability for the electronics to learn clutch fill times and current required to activate the rotor drive pump and clutch solenoids. Calibration is only accessible when the rotor is in idle state. Calibration is performed by using the Universal Display Plus monitor. The status of the calibration process is displayed on the Universal Display Plus monitor. The rotor calibration process should not take more than 2-3 minutes to complete and should be re-calibrated as follows:
  1. At least once per harvest season.
  2. If the rotor pump coil L-40/41 or Engine-to-Ring clutch coil L-45 is replaced.
  3. If significant operating and/or weather temperature changed since the last calibration.

ROTOR ENGAGEMENT

- When the operator places the separator engage switch S-30 into the forward detented position, the rotor will be started by activating an acceleration mode to start and bring the rotor up to the requested RPM. Steps of Operation:
  1. The electrical system will activate the ring to frame brake L-46 and rotor drive pump to start the rotor turning. The electrical system will be monitoring the rotor drive motor speed sensor B-58 and rotor gear case output speed B-01 to determine what gear range the rotor gear case is in and to determine when the rotor is at approximately engine drive RPM.
  2. The electrical system will deactivate the ring to frame brake L-46 and engage the engine to ring clutch L-45.
  3. The electronics will monitor the actual rotor gear case output speed and make adjustments to the rotor drive pump as required to match the actual rotor speed to the requested rotor speed.

ROTOR OPERATING

- Rotor speed can be controlled in any of the 3 speed ranges. Upon the CCM3 module receiving a command speed via the CAN bus, the rotor shall accelerate hydrostatically via the pump/motor/planetary/gearbox path, disengage the Ring-to-Frame brake and engage Engine-to-Ring clutch / planetary / gearbox path. Adjustments to rotor speed, within the same speed range, may be made "on the go" either with the rotor increase/decrease rocker switch or via the Universal Display Plus monitor. An alarm instructs the operator to "shift up" or "shift down" if the rotor is commanded to a higher or lesser speed than the current range offers. Speed range changes require the rotor to return to zero speed. Turning the separator engage switch S-30 to the OFF position disengages the Engine-to-Ring clutch and Ring-to-Frame brake, allowing the rotor to gradually return to zero RPM. Rotor speed and the command speed (Set-Point) are measured and displayed in RPMs. When the operator engages the rotor, the rotor will simply accelerate to the set-point (command speed). If the set-point speed is not attainable in the current gear range, the set speed will automatically be reset to the closest speed the current gear range can achieve.

ROTOR DE-SLUG

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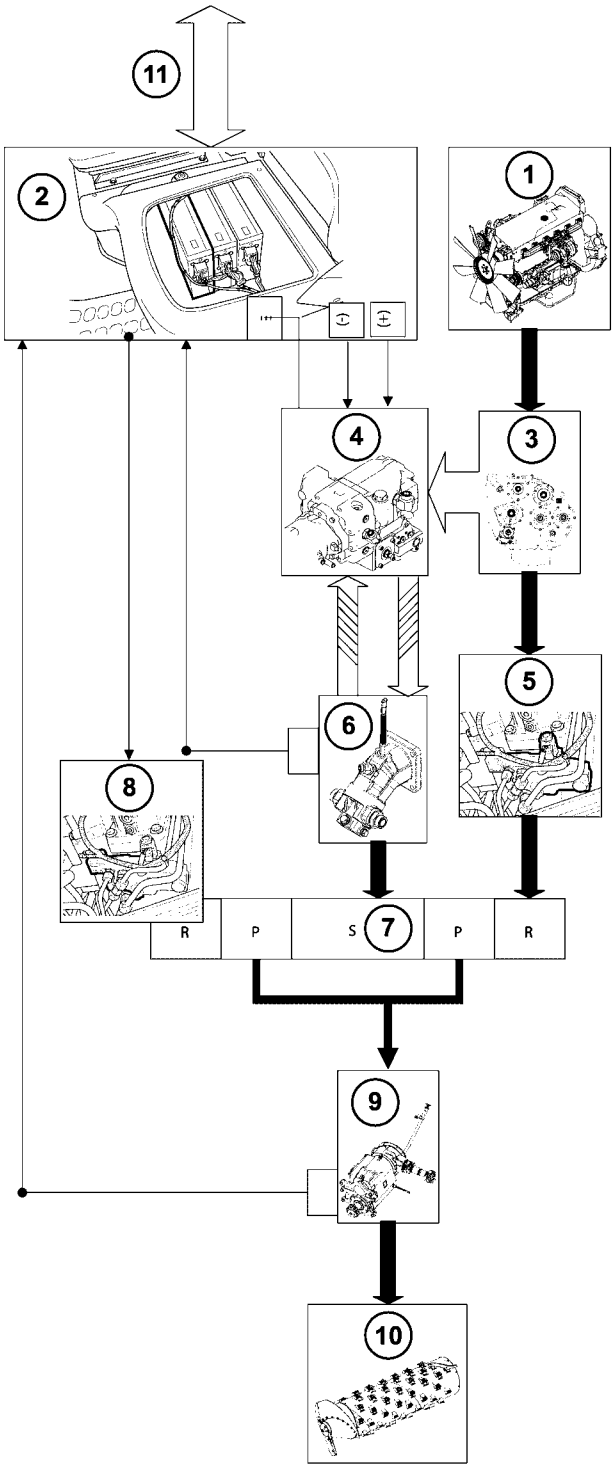
- The rotor de-slug is used by the operator to rotate the rotor in forward and reverse to free a stalled rotor. All driving force is provided by the rotor drive motor. Rotor De-Slug mode is activated by the separator engage switch S-30 (momentary then maintained). The operator would:
    1. Open the threshing modules completely.
    2. Move the separator switch into the reverse position, (rearward momentary position).
    3. Move the separator switch into the forward detented position.
    4. Press the rotor speed increase switch to operate the rotor in forward mode and speed decrease switch to operate the rotor in reverse mode.
    5. Return the separator engagement switch to the OFF position, (center-detented position) to exit the de-slug state.

IMPORTANT: *When activating the rotor "De-slug" mode the operator should also activate the feeder reverser.*

IMPORTANT: *When using the rotor “De-Slug” mode, the rotor drive gear box must be shifted into 1st or 2nd range only, do not use “De-Slug” while operating in 3rd range.*
The system will remain in the de-slug state until the separator switch S-30 is placed into the OFF position.

ROTOR DRIVE POWER FLOW - Power flow to the rotor may take one of two paths, or a combination of both. Hydro, Mechanical, or a combination of both.

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Hydrostat Power Flow

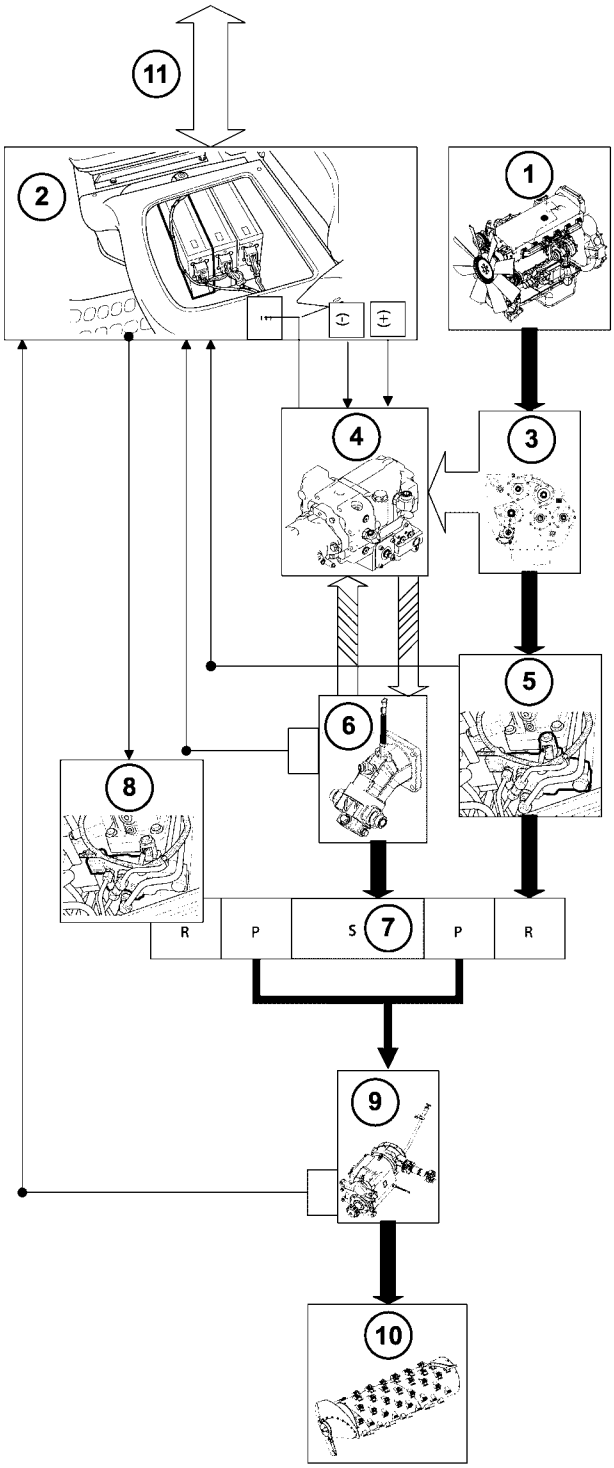
https://truckmanualshub.com/

1. Engine	6. Rotor Drive Motor
2. Control Module CCM-3	7. Planetary Gear Assembly. (R-Ring, P-Planetary, S - Sun Gear)
3. PTO Gearbox	8. Ring-to-Frame Brake
4. Rotor Drive Pump	9. Rotor Gearbox
5. Engine-to-Ring Clutch	10. Rotor

Power from the engine is directed through the PTO gearbox to drive the rotor hydro pump, drive motor, sun gear, planetary carrier, rotor gearbox and rotor. This mode is used to accelerate the rotor to a minimum speed prior to engaging the engine to ring clutch.

NOTE: *Objects shown in Gray are Stationary in this mode.*

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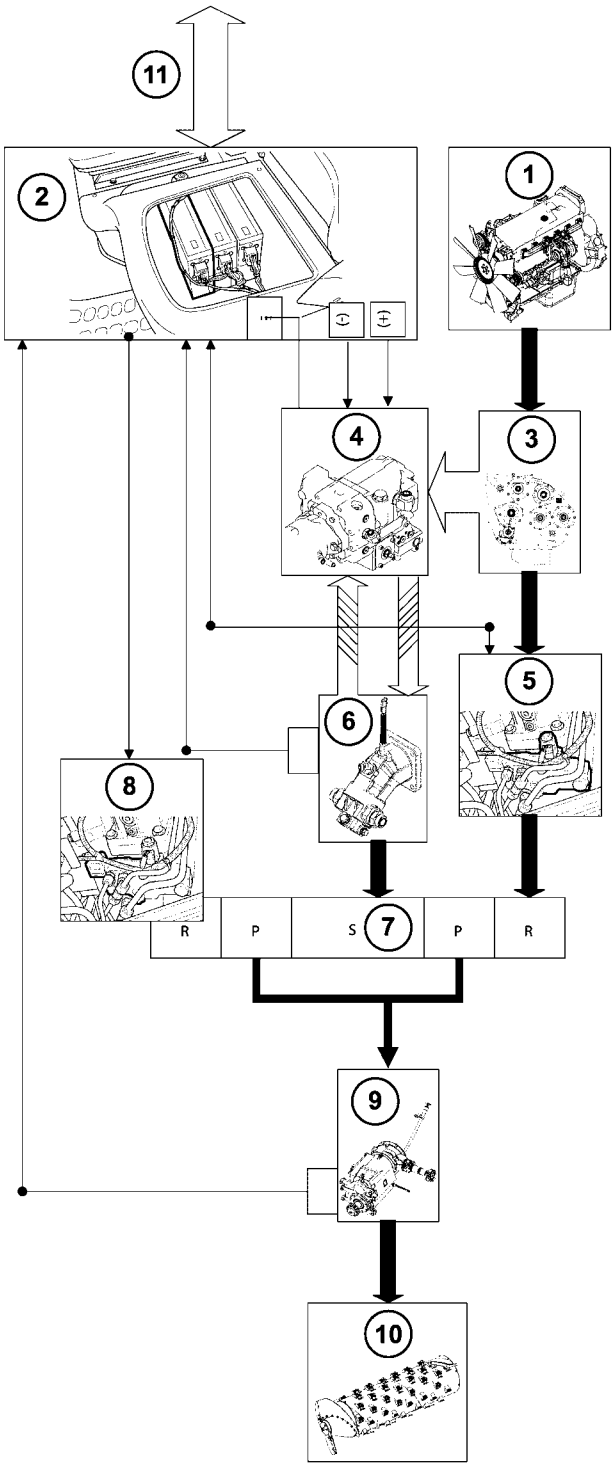
Mechanical Power Flow

https://truckmanualshub.com/

1. Engine	6. Rotor Drive Motor
2. Control Module CCM-3	7. Planetary Gear Assembly. (R-Ring, P-Planetary, S - Sun Gear)
3. PTO Gearbox	8. Ring-to-Frame Brake
4. Rotor Drive Pump	9. Rotor Gearbox
5. Engine-to-Ring Clutch	10. Rotor

Power from the engine is directed through the PTO gearbox to drive the engine clutch, ring, planetary carrier, rotor gearbox and rotor. This provides the path of main power to drive the rotor during field operation.

NOTE: *Objects shown in Gray are Stationary in this mode.*



50043026 3

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Combined Power Flow

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1. Engine	6. Rotor Drive Motor
2. Control Module CCM-3	7. Planetary Gear Assembly. (R-Ring, P-Planetary, S - Sun Gear)
3. PTO Gearbox	8. Ring-to-Frame Brake
4. Rotor Drive Pump	9. Rotor Gearbox
5. Engine-to-Ring Clutch	10. Rotor

Power from the engine is directed through the PTO gearbox to drive the engine clutch, ring, planetary carrier, rotor gearbox and rotor. The hydro pump and motor will control the speed of the sun gear to change the speed at which the planetary carrier is walking around it. This is the typical operating mode in the field, where the engine drive is used to power the rotor drive, and the hydrostat drive is used to control the rotor speed.

ELECTRICAL COMPONENTS

- Universal Display Plus monitor - The Universal Display Plus monitor, located adjacent to the right hand console, is used to for two way communication between the combine and the operator.
- Separator Switch, S-30 - the separator switch, located in the right hand console, is a three-position switch to provide:
    1. Forward detented position; is used to provide a signal to the CCM3 to request for separator engagement. It also provides the power that will be used by the CCM3 to power the rotor drive solenoids. This provides for a positive disengagement.
    2. Center detented position; is used to disengaged the separator and return it to an idle state.
    3. Rearward momentary position; is used to direct a signal to the RHM to activate the rotor De-Slug mode of operation.
- Rotor Speed Increase/Decrease Control, S-17 - The rotor speed switch, located on the right hand console, provides the operator with a method of changing and controlling the desired rotor speed. If the switch is momentarily pressed the rotor speed will be changed at the rate of 10 RPM per toggle, if continually pressed the rotor will change 10 RPM/second. The switch is also used to provide rotor rotating directional control during de-slug operation; rotor increase causes forward (normal clockwise) rotor rotation and rotor decrease causes reverse (counter clockwise) rotor rotation.
- CCM1 Controller - The CCM1 controller, located under the instructor’s seat, controls the concave operation by receiving CAN bus signals from the RHM, display and sensors, and motor.
- CCM3 Controller - The CCM3 controller, located under the instructor’s seat, controls the rotor operation by receiving CAN bus signals from the RHM, display and sensors, and controlling solenoids.
- Feeder Switch, S-31 - The feeder switch is supplied power once the separator switch is placed into the RUN (forward) position.
- Rotor Pump Solenoid, L-48 & L-49 - The pump solenoid is a double solenoid used to control the position of the pump swash plate in order to provide variable pump displacement and rotation direction. The pump swash plate is defaulted to the Neutral position when both solenoids are deactivated. The CCM3 controls both solenoids. Located: Hydro pump mounted on the PTO gearbox.
- Rotor Drive Motor RPM Sensor, B-58 - The rotor drive motor RPM sensor, located on the rotor motor housing, mounted on the PTO gear box, is used by the CCM3 to calculate input RPM to the POWER PLUS drive by the hydrostatic motor. This RPM is used for five functions: The rotor drive motor RPM sensor is a Hall-effect sensor and requires no adjustments. It is threaded in until the O-ring is tight; torque not to exceed **15 Nm** (**11 lb ft**).
    1. During rotor acceleration, it is used in conjunction with rotor speed sensor to calculate which gear range the rotor gearbox is currently in.
    2. It is used to signal a motor over-speed condition during a rotor slug event.
    3. It is used to assure speed match between planetary ring and engine RPM for rotor re-engagement.
    4. It is used with the rotor and engine speed information to help control rotor deceleration, minimizing the time it takes to bring the rotor speed to zero after disengagement.
    5. It is used with engine speed information to help the CCM-3 calculate the rotor speed in the event that the rotor speed sensor fails during operation.

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- Rotor RPM Sensor, B-01 - The rotor RPM sensor, located in the rotor gear case housing, is used by the CCM3 module to calculate the rotor's actual speed.
- Ring-to-Frame Solenoid, L-46 - The ring-to-frame brake, mounted on the side of the rotor control valve body, is used to connect the rotor motor drive to the POWER PLUS output shaft, permitting the rotor to be driven by the rotor motor independent of the engine-input shaft. The Ring-to-Frame is used:
    1. While starting the rotor from a disengaged mode, to bring it up to a speed that will match the current engine speed. Also during rotor de-slug mode for reversing.
    2. To assist during a controlled deceleration of the rotor when the separator is disengaged.
    3. To prevent rotor rotation due to viscous drag when the separator is disengaged (idle state).
- Engine-to-Ring Solenoid, L-45 - The engine-to-ring clutch, mounted on the end of the rotor control valve body, is used to connect the engine input to the POWER PLUS output shaft, permitting the rotor to be driven by the engine. This permits only one preset output speed from the POWER PLUS drive.
- Concave Increase/Decrease Control, S-16 - The Concave control switch, located on the right-hand console, provides the operator with a method of changing the clearance between the rotor and the concave grates. The range is from 0, against the stop bolts, to 24, fully open.
- Concave Position Sensor, R-07 - The Concave Position sensor, located on the left side of the upper chassis in front of and attached to the torsion bar of the concave cage, used to inform the operator through the UD+ the clearance of the concave. The sensor is also used to position the concave when a Harvest Preset is used.
- Concave Motor, M-04 - The Concave motor, located on the left side of the upper chassis over the torsion bar of the concave cage, is the actuator that moves the concave grates to provide the concave clearance.

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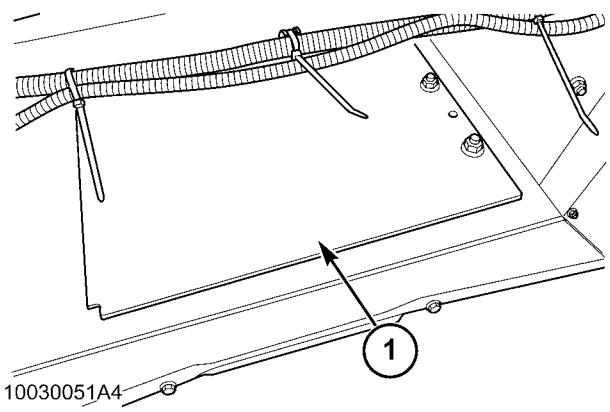
Drive system Drive and gear - Remove (K.40.C.40.44 - F.10.A.10)

AFX8010

Prior operation: Engine hood - Remove (E.20.A.72 - F.10.A.10)

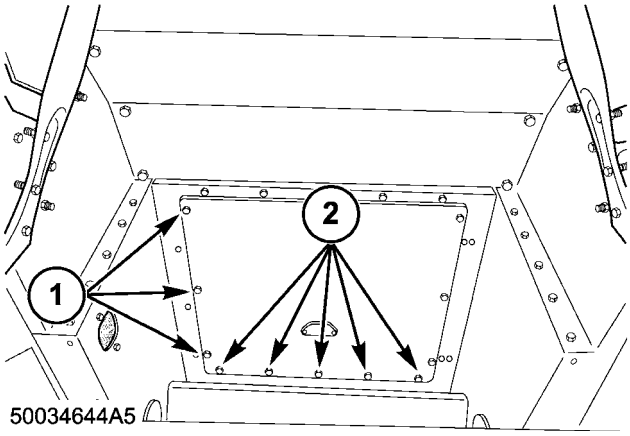
1. Block the rear of the rotor with a block of wood so the rotor does not drop down when the gearbox is removed.

NOTE: *Through the access door in the grain tank, the rotor access panel **(1)** can be removed and used for aid in the removal process if needed.*



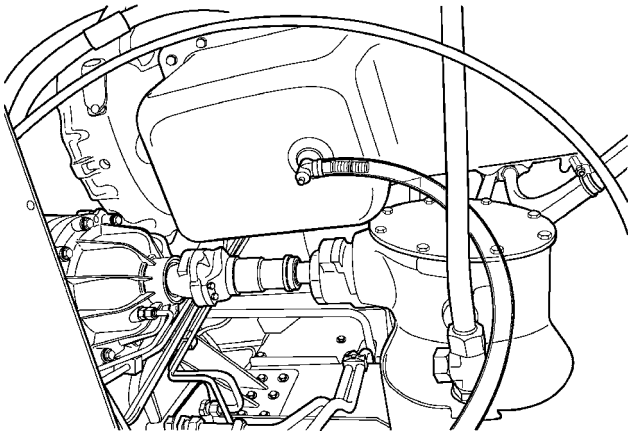
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2. Remove the strawhood access panel to gain better access to the gearbox. Remove the bolts on each side **(1)**, and the bolts on the front and rear **(2)** of the panel.



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3. Drain the gearbox fluids and remove the drain line.

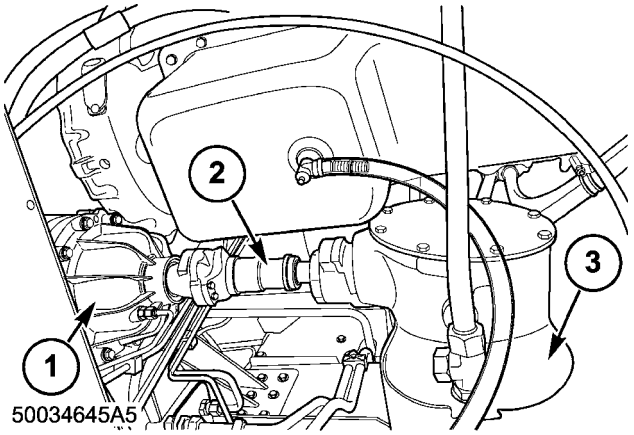


50034645 3

4. Disconnect the sensor electrical connection.
5. Disconnect the shift cable linkage from the gearbox.
6. Disconnect the dipstick tube.

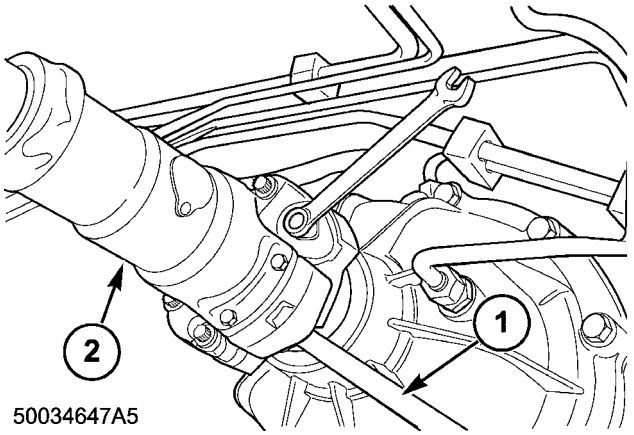
https://truckmanualshub.com/

7. Remove the driveshaft **(2)**from the CVT gearbox **(1)**.



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8. To remove the driveshaft **(2)** you will need to hold it from moving when breaking free the bolts by placing a small bar **(1)** between the cross.

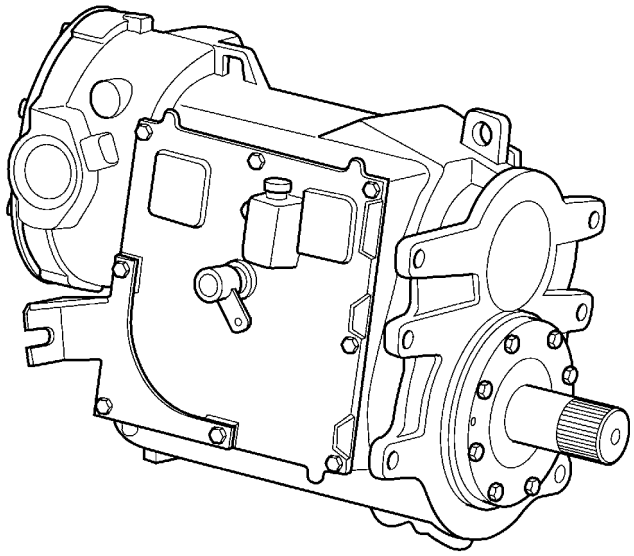


50034647A5 5

9. The steps on the rear of the grain tank may have to be removed.
10. Using an overhead hoist and a chain or safety strap capable of lifting the gearbox hook into the cast loop on the housing.
11. Exert tension on the gearbox so when the bolts securing it are removed it does not drop.
12. Remove the six bolts attaching the gearbox to the machine.
13. Pry the gearbox out of the rotor coupler and turn it sideways.

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14. Slowly hoist the gearbox from the machine.



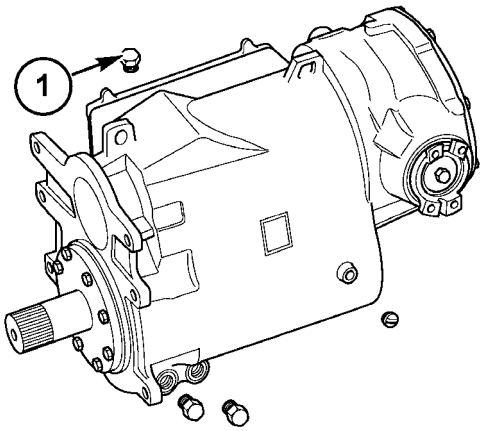
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Drive system Drive and gear - Disassemble (K.40.C.40.44 - F.10.A.25)

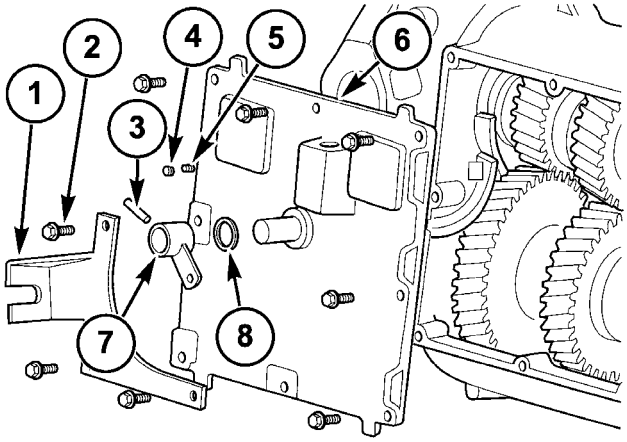
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1. Unlock the plugs **(1)**. Drain the oil from the gearbox.



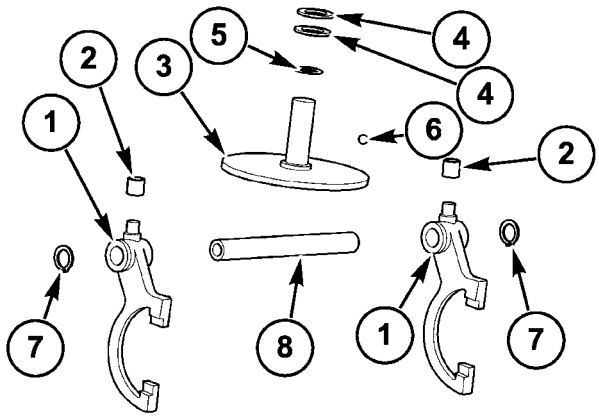
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2. Unlock the bolts **(2)**. Take away bracket **(1)**. Take away cover **(6)**. Disassemble spring pin **(3)** using driver. Unlock the bolt **(4)** and take away spring **(5)**. Disassemble shift lever **(7)** and snap ring **(8)**.



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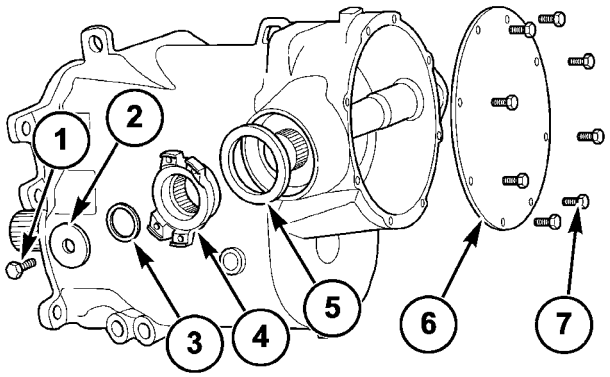
3. Take away shims **(4)**, O-ring **(5)** and ball **(6)** from the cam **(3)** if necessary. Remove snap rings **(7)** and disassemble shaft **(8)**. Take away bushings **(2)** from forks **(1)**.



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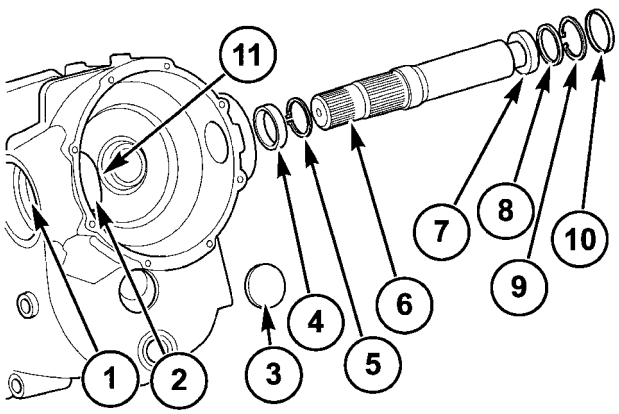
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4. Unlock the bolts **(7)** and take away cover **(6)**. Unlock bolt **(1)** and take away washer**(2)**, O-ring **(3)** and yoke **(4)**. Disassemble double lip seal **(5)** using a chisel and hammer.



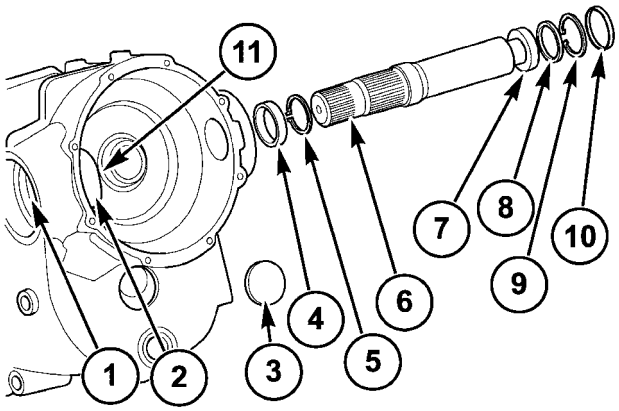
10041868A5 4

5. Disassemble caps **(3)(10)** using a hammer and chisel. Take away snap ring **(9)** from the housing and take away shim **(8)**. Put the tool into position **(11)** in order to fix the pinion. Hit the shaft **(6)**, take away the outer ring **(7)**, the shaft **(6)**, the spacer **(4)**.



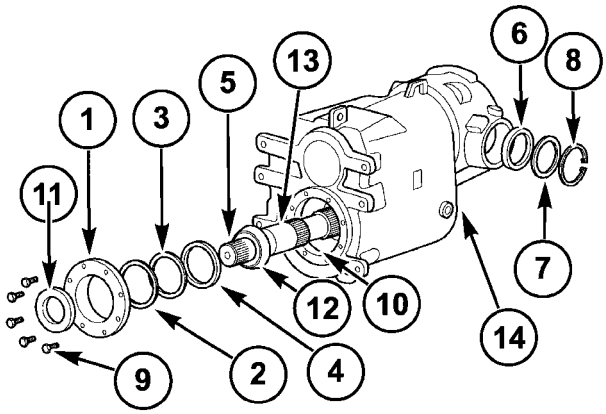
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6. Disassemble inner ring **(7)** from the shaft using a press. Disassemble snap ring **(5)** from the shaft **(6)**. Take away tool and remove pinion **(2)** and inner ring **(1)**.



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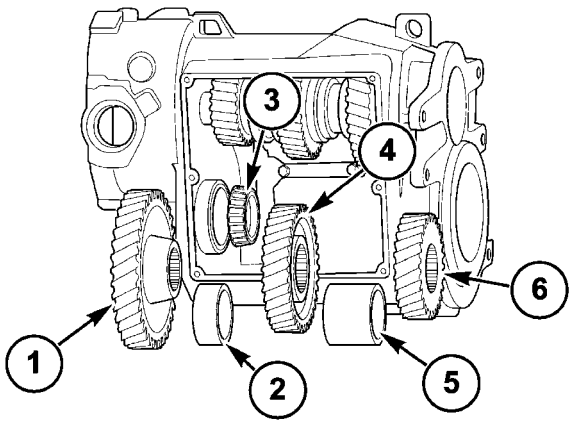
7. Disassemble snap ring **(8)**, shim **(7)** and outer ring **(6)** from the housing. Unlock bolts **(9)** and take away cover **(1)**. Disassemble oil seal **(11)**, snap ring **(2)**, shim **(3)** and outer ring **(4)** from the cover **(1)**. Put the tool into position **(10)**. Tap on shaft position **(14)** in order to extract shaft **(5)** inner ring **(12)** and snap ring **(13)**.



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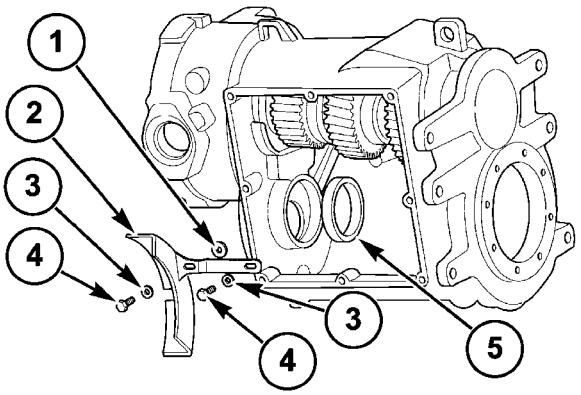
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8. Disassemble and take away the gears **(1)(4)(6)**, spacers **(2)**, **(5)** and, inner ring **(3)** from housing.



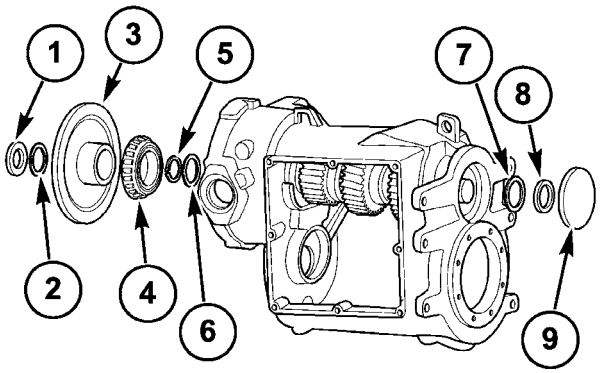
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9. Unlock bolts **(4)** take away washers **(3)**, wrapper **(2)** and spacer **(1)**. Disassemble outer ring **(5)** using a chisel and hammer.



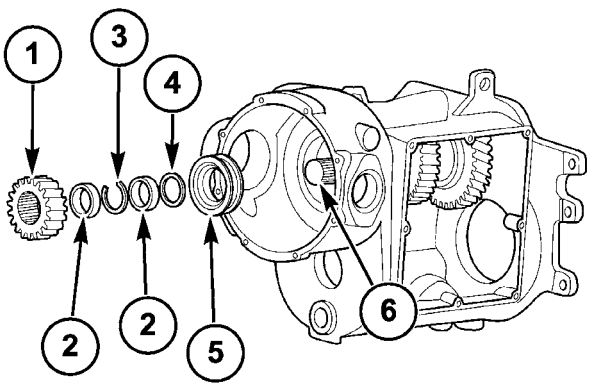
10041872A5 9

10. Remove the punched area on the stakenut **(1)**, take away washer **(2)**, and crown wheel **(3)**. Disassemble inner ring **(4)** from the crown wheel **(3)** using a bearing separator. Disassemble snap ring **(5)** and shim **(6)** from the shaft. Disassemble cap **(9)** using a chisel and hammer. Remove punched area on stakenut **(8)**, unlock the stakenut and take away washer **(7)**.



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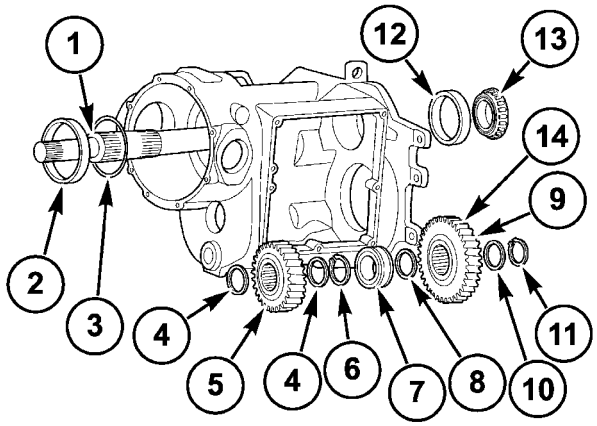
11. Extract gear **(1)** from the shaft **(6)**. Extract needle bearings **(2)** from the gear **(1)** and snap ring **(3)**. Take away spacer **(4)** and shift collar **(5)** from the shaft.



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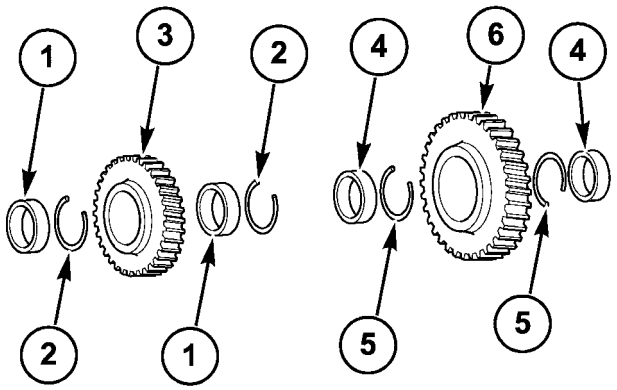
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12. Tap back of shaft and extract it from housing using driver. Disassemble outer ring **(12)** from the housing, using driver and hammer. Disassemble snap ring **(11)**, shim **(10)**, gear **(14)**, shim **(8)**, shift collar **(7)**, snap ring **(6)**, shim **(4)**, gear **(5)** and shim **(4)**from the shaft **(1)**. Disassemble outer ring **(2)** and shim **(3)** from the housing.



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13. Disassemble needle bearings **(1)** and snap ring **(2)** from the gear **(3)**. Disassemble needle bearings **(4)** and snap ring **(5)** from the gear **(6)**.

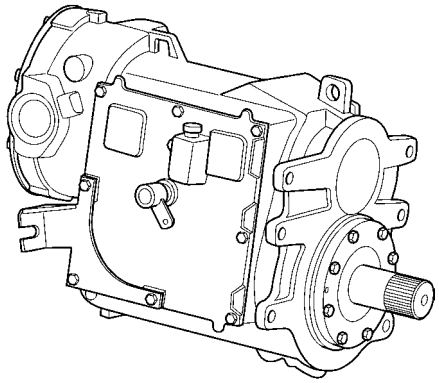


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Drive system Drive and gear - Leakage test (K.40.C.40.44 - F.40.A.40)

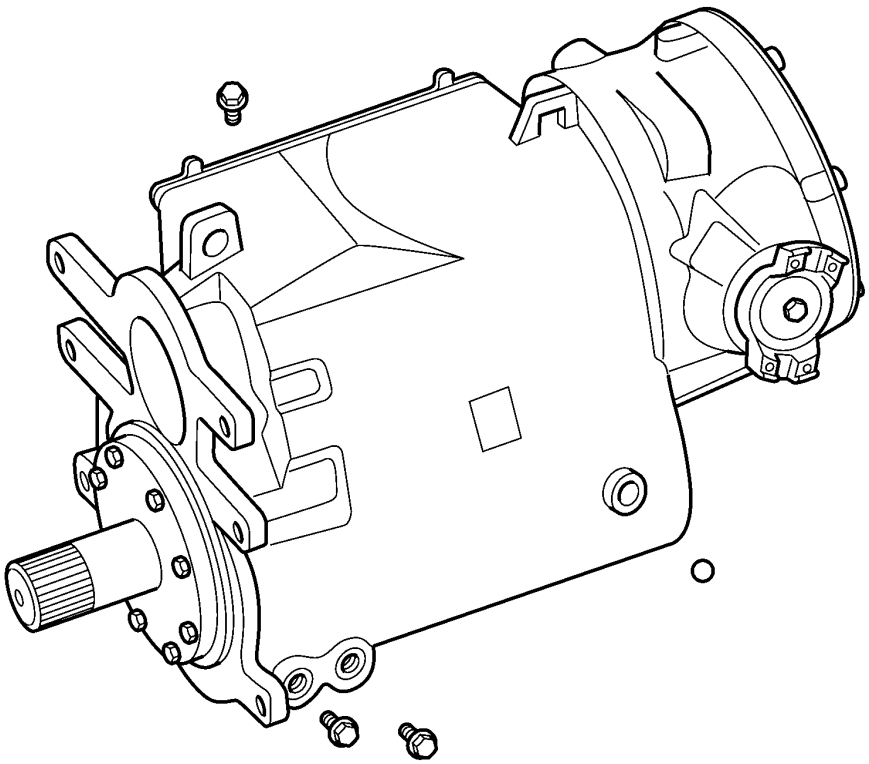
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1. In order to prevent any leak of oil perform the following test: Using a plug on the input shaft side of the gearbox place a pressure gauge. Be sure the gauge is sealed good around the threads with thread sealant. Use a gauge capable of reading **0 - 207 kPa (0 - 30 psi)** increments accurately. Using the plug in the housing on the shift fork side of the gearbox induce service air into the gearbox to pressurize it to **0.35 bar (5 psi)**. By watching the gauge or by using a manometer (scale about 0.6 bar) watch for a pressure drop over a ten minute period, this will verify seal integrity of the gearbox for leaks.



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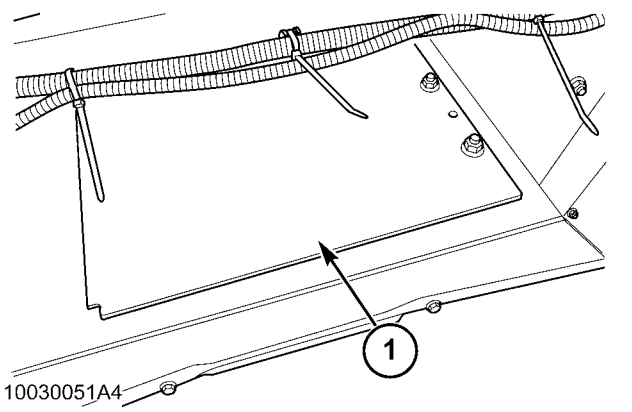
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Drive system Drive and gear - Install (K.40.C.40.44 - F.10.A.15)

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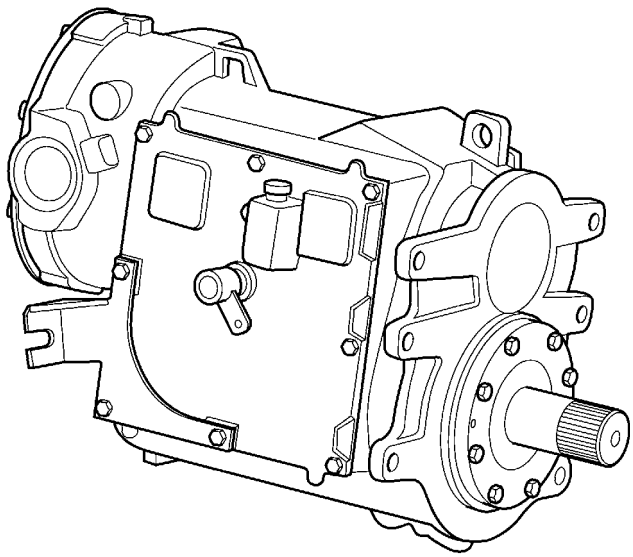
1. Block the rear of the rotor so that the coupler is in the center of the hole where the rotor gearbox shaft goes.

NOTE: *Through the access door in the grain tank, the rotor access panel **(1)** can be removed and used for aid in the install process if needed.*



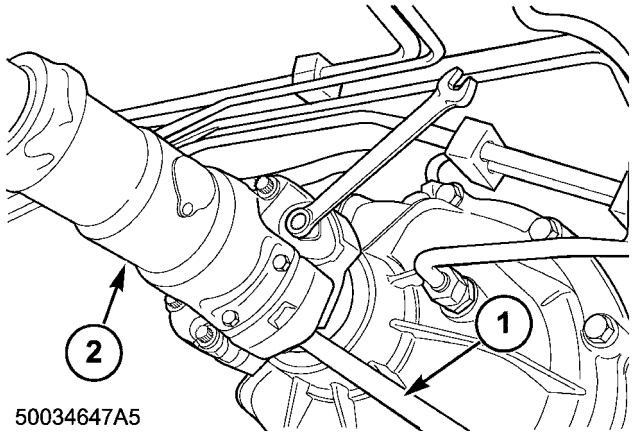
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2. Lower the gearbox into the cavity between the engine and the grain tank sideways on an overhead hoist.



10041864 2

3. Install the gearbox so the shaft and coupler splines mesh.
4. Line up the mounting holes and install the six M16 x 60 rotor gearbox bolts. Torque the bolts to **354 Nm** (**261 lb ft**).
5. Install the driveshaft **(2)** to the gearbox and use a small bar **(1)** to hold the shaft from turning when tightening the eight M10 x 45 bolts. Torque the bolts to **57.3 Nm** (**42.3 lb ft**)

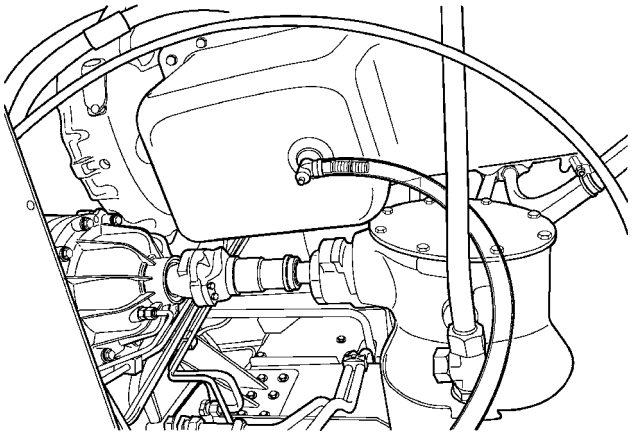


50034647A5 3

6. Install the drain tube.
7. Install the gearbox shift cable and linkage.

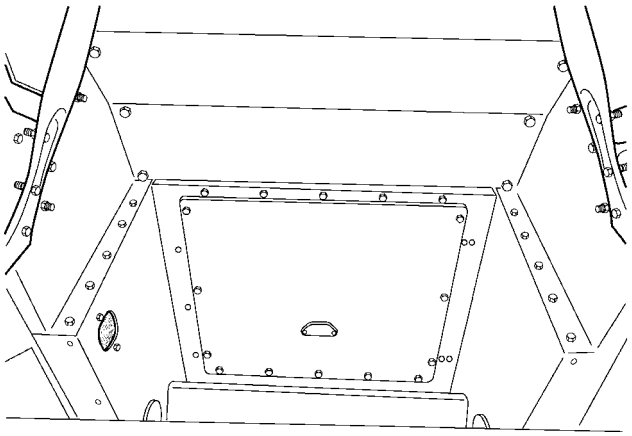
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8. Install the dipstick tube.



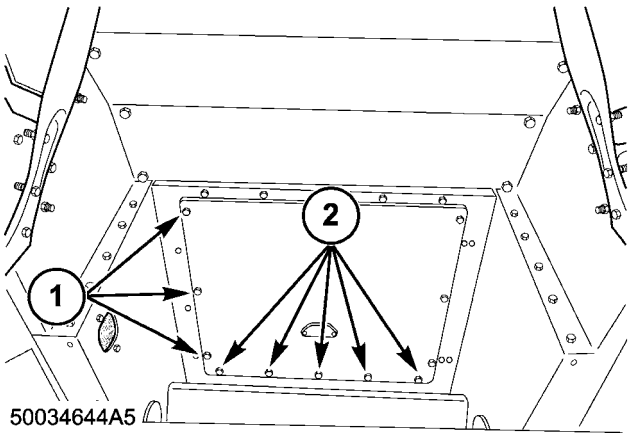
50034645 4

9. Connect the sensor electrical connection.
10. Fill the gearbox with oil.**Drive system - General specification (K.40.C.40 - D.40.A.10)**
11. Install the steps on the rear of the grain tank if they were removed.
12. Install the engine hood shielding. **Engine hood - Install (E.20.A.72 - F.10.A.15)**
13. Install the strawhood access door back into the machine.



50034644 5

14. Install and tighten the bolts in the access panel on each side **(1)** and also the front and rear of the panel **(2)**.

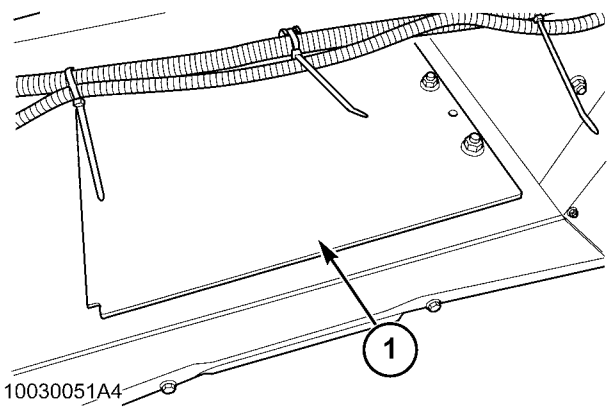


50034644A5 6

15. Remove the block of wood from the rear of the rotor.

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16. Install the rotor access panel if it was previously removed for access.



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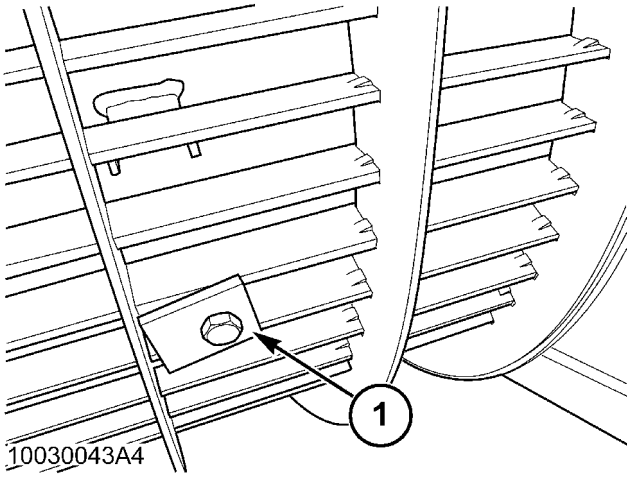
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Threshing rotor AFX (auger front) rotor - Remove (K.40.C.52.52 - F.10.A.10)

AFX8010

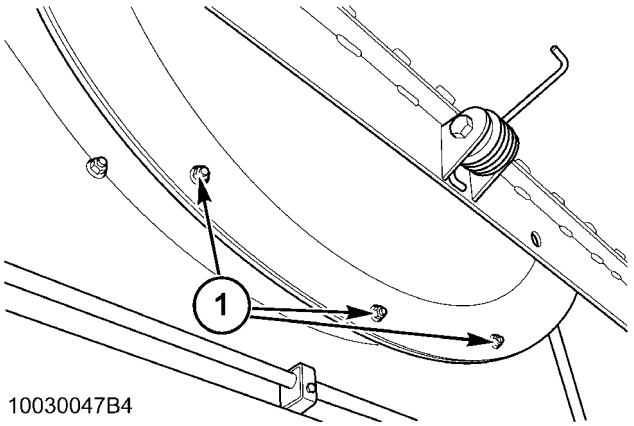
Prior operation: FEEDING Feeder housing - Remove (K.25.E - F.10.A.10)

1. Remove the separator grate covers from each side of the combine.
2. Install the tool **(1)** used to secure the rotor (#380000973) by threading the bolt through the separator grate into a hole where a rasp bar bolt has been removed. Be sure the bolt has been threaded into the rotor securely, and the tool is resting against the separator grate.



10030043A4 1

3. For added security lower the concaves all the way down, and wedge a small block of wood between the rotor and the concaves. With the block of wood in place, raise the concaves until the block is tight between the two.
4. Remove the five mounting bolts **(1)** and remove the front cover.

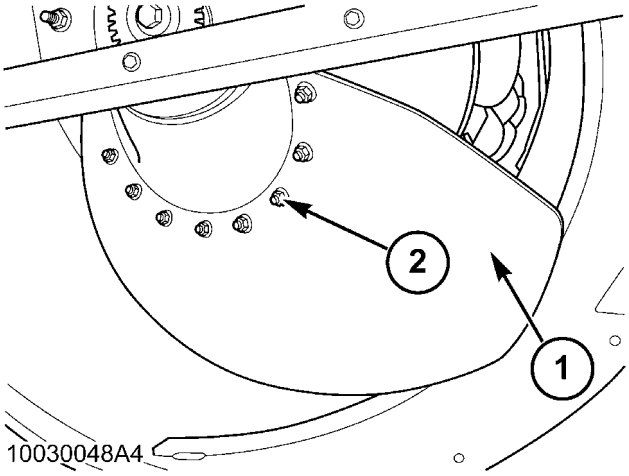


10030047B4 2

5. Mark each auger plate and rotor to insure that they are installed at the same locations.

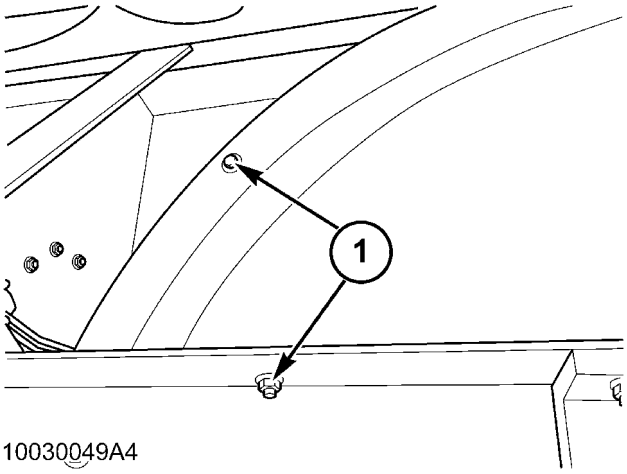
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6. Remove the auger plate **(1)** on the front of the rotor by removing the eight bolts and nuts **(2)**.



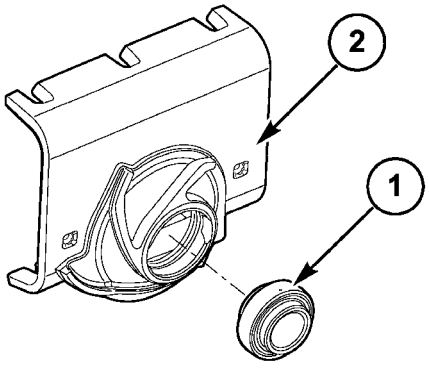
10030048A4 3

7. Remove the upper cover by removing hardware **(1)**.



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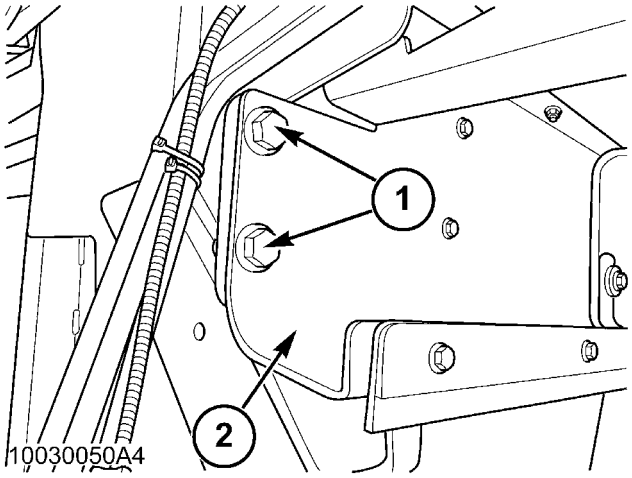
8. Remove the front bearing support plate **(2)** and bearing **(1)**.



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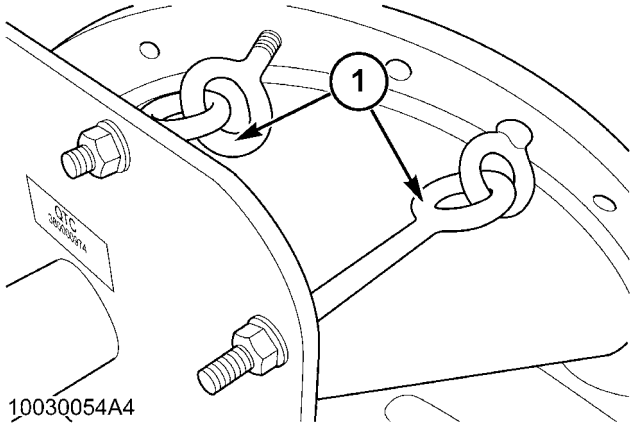
9. Remove the bolts **(1)** securing the bearing plate **(2)**. Remove the bearing plate securing the rotor.



10030050A4 6

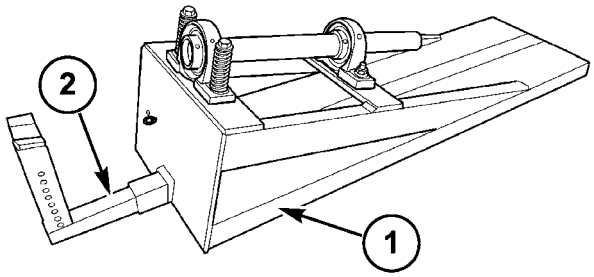
10. Attach the tool mounting plate to the front of the rotor first by using the eyebolts **(1)** to secure it.

IMPORTANT: *Be sure the eyebolts are tight and the plate is secure to the rotor! If stress is placed on the rotor stub shaft it will result in damage to the rotor.*



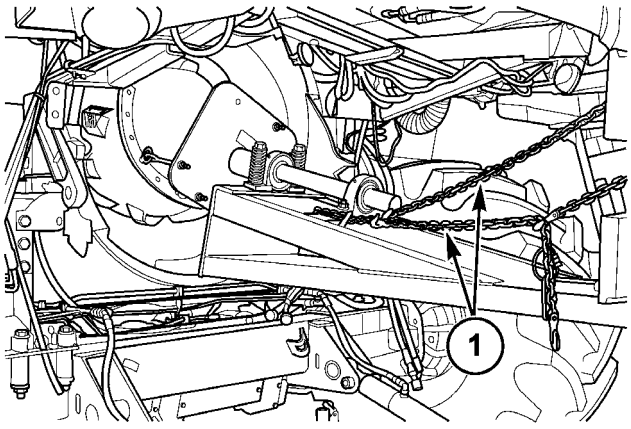
10030054A4 7

11. Install the rotor removal tool **(1)** (tool #380000806) onto a forklift. Remove the rear support brace **(2)** from the tool.



10030055A4 8

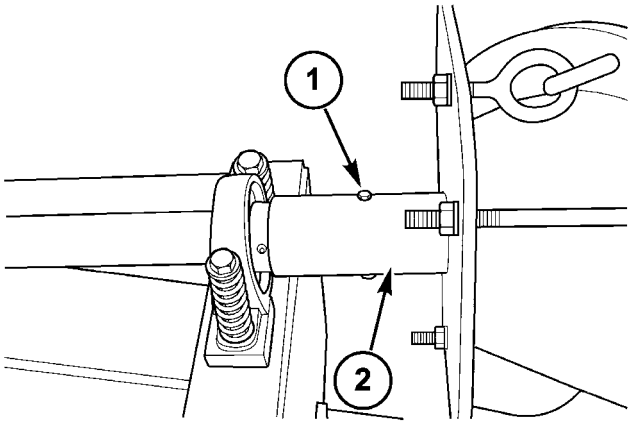
12. Attach the tool to the forklift using chains **(1)**. This is to ensure the tool will not slide off of the forklift.



10033724A4 9

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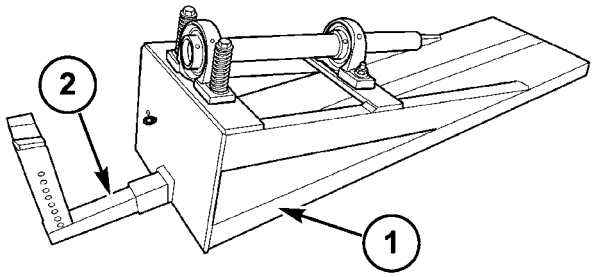
13. Install bolt **(1)** through the flange **(2)** and through the tool. Tighten the bolt so the rotor is firmly attached to the tools mounting flange.



10033725A4 10

14. Use the forklift to align the rotor mounting flange on the tool with the rotor that is to be removed.
15. Remove the retaining bolt used in step 2, and the block of wood used in step 3 for the rotor to be removed.
16. Using the help of an assistant, remove the rotor from the combine. For every few inches the rotor is removed from the front of the combine, the rotor must be lowered a few inches. Install the rear support brace **(2)** on the removal tool **(1)** once the rotor has been removed enough from the combine to allow installation to help aid in the support of the rotor.

NOTE: *Use care not to damage the cab platform with the rotor or forklift.*



10030055A4 11

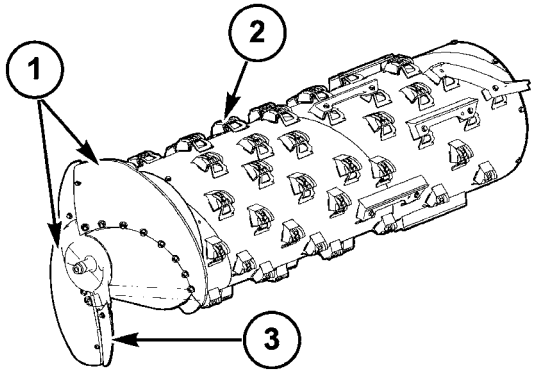
https://truckmanualshub.com/

Threshing rotor AFX (auger front) rotor - Visual inspection (K.40.C.52.52 - F.40.A.10)

AFX8010

1. Inspect the front auger flights **(1)** of the rotor for damage or excessive wear. Replace any flights that are worn or damaged. Inspect the rasp bars **(2)** for damage or excessive wear. Replace rasp bars as a matched set, if damaged so rotor balance is maintained. Inspect the rotor body for dents, cracks, and wear from foreign objects. Repair or replace as necessary. Inspect the rotor blades **(3)** for damage or excessive wear. Replace the blades as necessary.

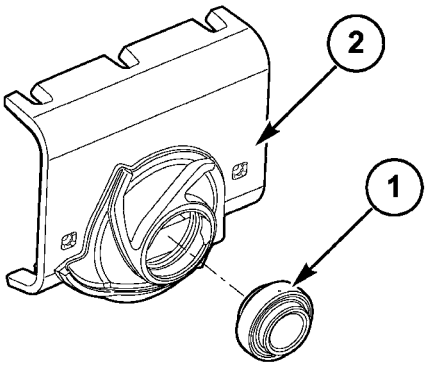
   Inspect the shaft to the rotor. Check for scoring, pitting or any other damage or excessive wear to the shaft. Replace the rotor as necessary.



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50033730A5 1

2. Inspect the bearing **(1)** in the front rotor housing **(2)** for smooth rotation. There should be no lateral play in the bearing. Replace bearings which do not rotate smoothly or have lateral play in them.



50033731A5

50033731A5 2

3. Inspect the front rotor plate for damage or wear. Check the seals on the plate and combine frame. Replace the plate seals if damaged.

4. Inspect the coupler on the rear of the rotor for damage or excessive wear. Replace the coupler if the teeth are damaged or worn. If the outer coupler is worn, be sure to check the inner coupler located on the rotor gearbox.

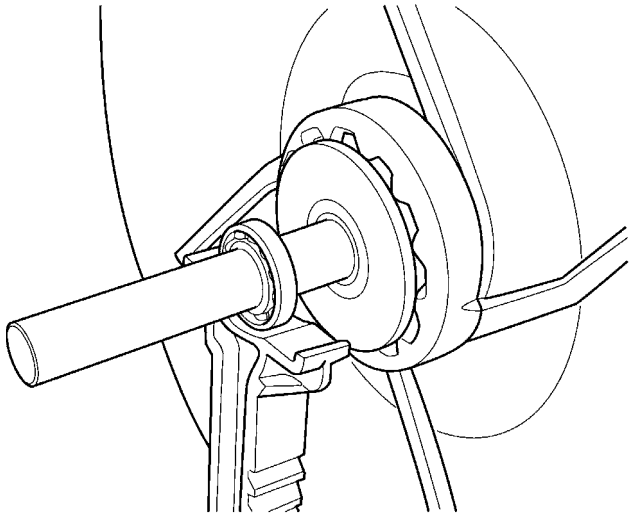
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Threshing rotor AFX (auger front) rotor - Place on stand (K.40.C.52.52 - F.35.A.10)

AFX8010

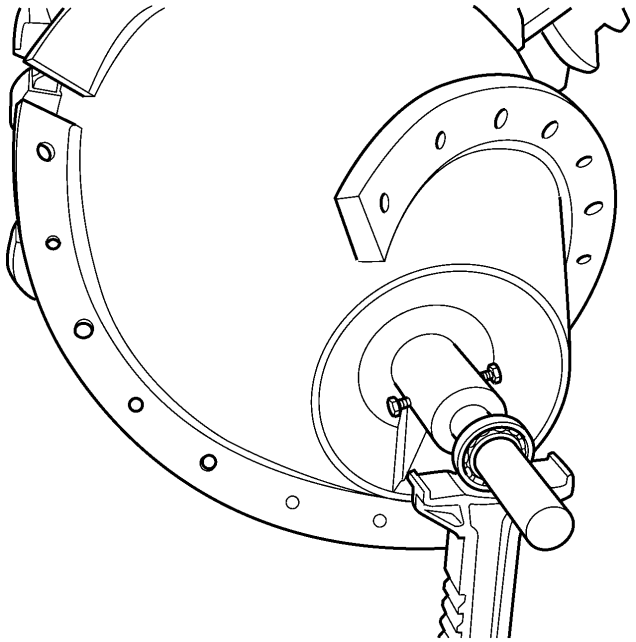
To ensure proper, vibration free operation, the rotor must be balanced. The rotor should be balanced when repairs have been made to the rotor body, such as repairs due to foreign object damage or if the front auger portion of the rotor has been repaired or replaced. Use the following procedure to balance the rotor:

1. Install special tool number #380001106 and bearing onto the rear rotor that is to be balanced.



10033726 1

2. Install special tool number #380001107 and bearing onto the front of the rotor that is to be balanced.

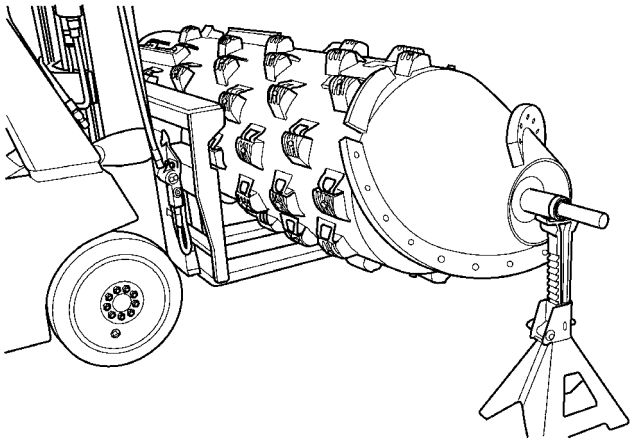


10033727 2

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3. Use a forklift or overhead hoist and lifting straps to place the rotor into a set of jack stands which have V-groove in the center of the support. Make sure the bearings are located in the center of this groove.

NOTE: *The rotor should turn freely on the bearings. If the rotor does not turn freely, the tool bearings may be damaged and in need of replacement.*



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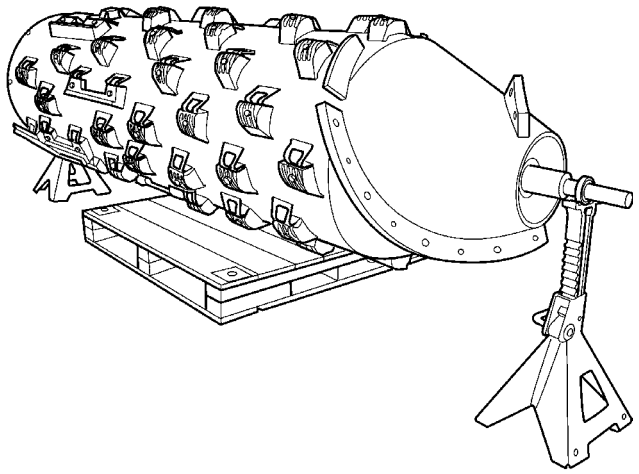
Threshing rotor AFX (auger front) rotor - Balancing (K.40.C.52.52 - F.45.A.25)

AFX8010

To ensure proper, vibration free operation, the rotor must be balanced. The rotor should be balanced when repairs have been made to the rotor body, such as repairs due to foreign object damage or if the front auger portion of the rotor has been repaired or replaced.

Prior operation: Threshing rotor - Place on stand (K.40.C.52 - F.35.A.10)

1. Once the rotor is in the holding fixtures, spin the rotor slowly several times, noting where the rotor stops after each spin. If the rotor stops at the same point after each spin, the rotor is out of balance.



10033729 1

2. If the rotor needs balanced, weld weights to the rear of the rotor. The weight should be added to the top (opposite) side of the rotor from where the rotor stopped. If more weight is necessary, weld weights to the front of the rotor.
3. Balance the rotor assembly complete with all parts bolted on. Use balance weights as required.

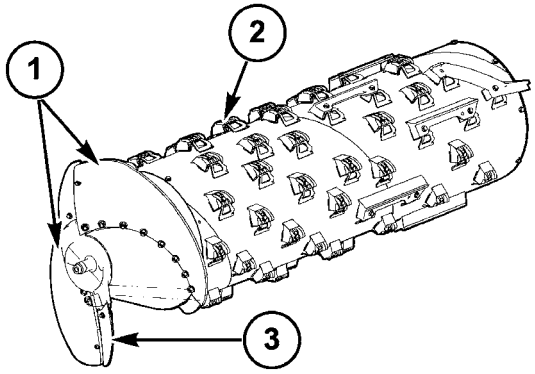
NOTE: *Balancing weights are not permitted between pairs of rasp bars where straight bars can be installed.*

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Threshing rotor AFX (auger front) rotor - Disassemble (K.40.C.52.52 - F.10.A.25)

AFX8010

1. To remove the auger flighting extensions **(3)** remove the two M12 bolts from each extension. To remove the auger flighting **(1)** remove the seven bolts from each piece. To remove the rasp bars **(2)** remove the bolt attaching the rasp bar to the rotor housing. Remove the bolts attaching the separator bars to the rotor housing.



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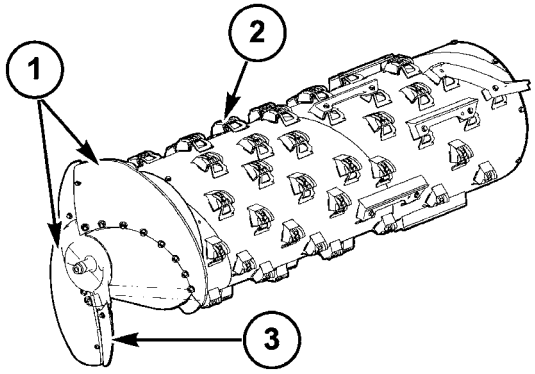
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Threshing rotor AFX (auger front) rotor - Assemble (K.40.C.52.52 - F.10.A.20)

AFX8010

1. When installing the rasp bars **(2)** and separator bars torque the bolts to **115 - 129 Nm(85 - 95 lb ft)**. To install the rotor auger flighting **(1)** torque the bolts to **285 - 320 Nm (208 - 235 lb ft)**. To install the rotor auger flighting extension **(3)** torque the bolts to **80 - 90 Nm (59 - 66 lb ft)** .



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Threshing rotor AFX (auger front) rotor - Install (K.40.C.52.52 - F.10.A.15)

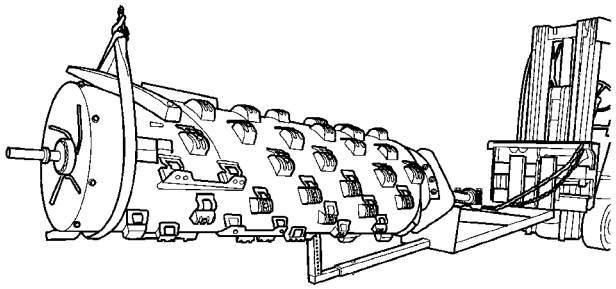
AFX8010

⚠ WARNING ⚠

84-102 - Improper service or repair can cause injury or death. If you do not understand the service procedures for this machine, see your dealer or the Service manual.

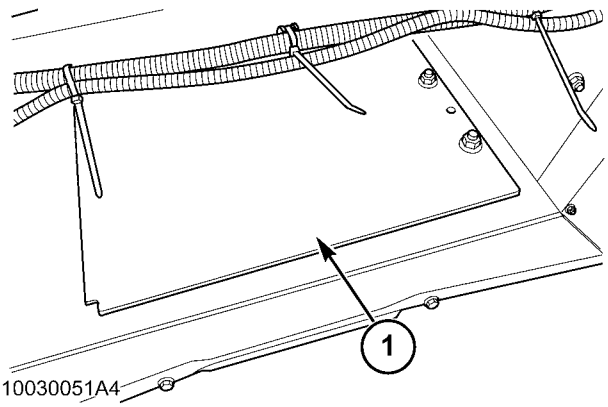
1. If the rotor was removed from the rotor tool, use a forklift or an overhead hoist to lift and attach the rotor to the tool.

IMPORTANT: *Be sure that the bolts that secure the front of the rotor to the tool are tightened evenly so the rotor is firmly attached to the tool's mounting flange. Failure to the rotor stub shaft can occur if the eybolts are not tightly securing the plate to the rotor.*



10030052 1

2. Attach the tool to the forklift and secure using a chain.
3. Remove the access panel in the combine grain tank.
4. Remove the upper rotor cover **(1)** for the rotor being installed. This will provide visual help aligning the rotor with the rotor gearbox.



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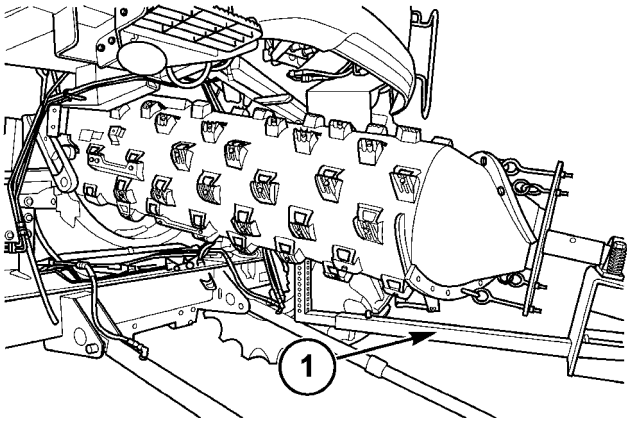
5. Place the rotor gearbox in the neutral gear position.

NOTE: *Use the help of an assistant to drive the forklift or guide the rotor into the combine.*

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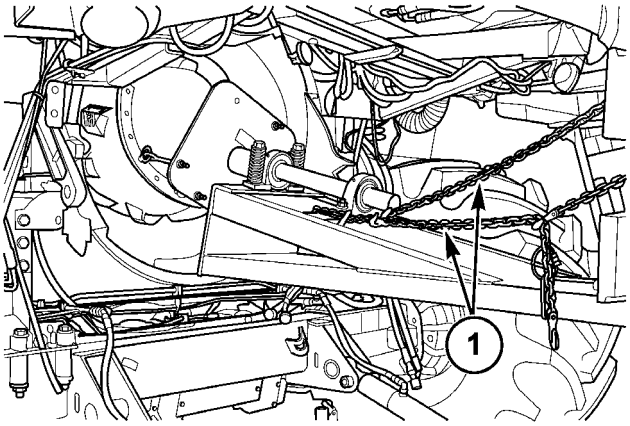
6. Carefully raise the rotor up and into the combine. The rotor must be stepped into the combine, the same method as removed. For every few inches the rotor is installed into the combine, the rotor must be raised a few inches. Remove the rear support brace **(1)** from the rotor removal tool when the rotor is fully inserted into the tube.

NOTE: *Use care not to damage the cab platform with the rotor or forklift mast.*



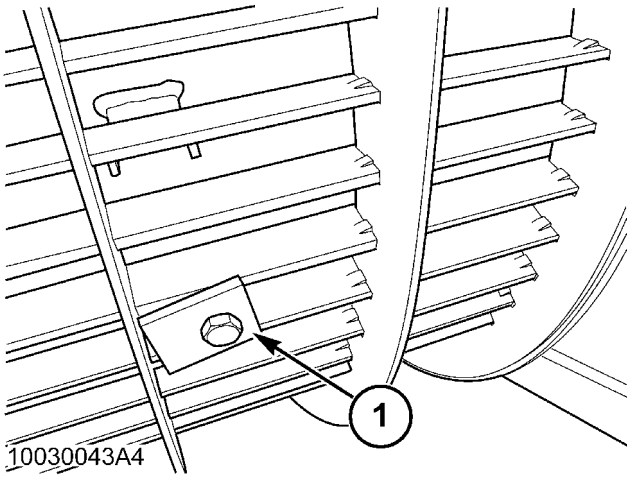
10030053A4 3

7. Install the outer coupler on the rotor with the inner coupler on the rotor gearbox. Be sure the rotor is seated in the coupler. Use a safety chain **(1)** when removing the tool from the rotor.



10033724A4 4

8. Once the rotor is properly positioned in the combine, install the special tool #380000973 **(1)** used to secure the rotor during removal. Thread the bolt into one of the threaded holes in the rotor at the separator grates. Be sure the bolt is threaded completely into the rotor and the upper portion of the bolt is resting against the separator grate.



10030043A4 5

9. For added security lower the concaves all the way down, and wedge a small block of wood between the rotor and the concaves. With the block of wood in place, raise the concaves until the block is tight between the two.

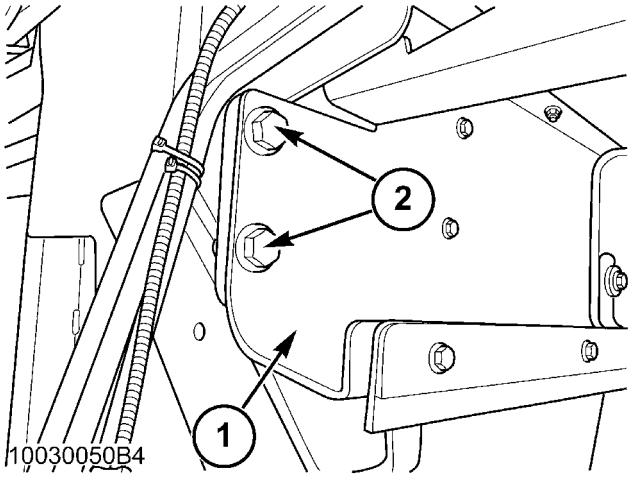
10. Once the rotor has been secured, remove the rotor tool.

NOTE: *The concave may need to be adjusted to allow the bearing plate to fit onto the rotor*

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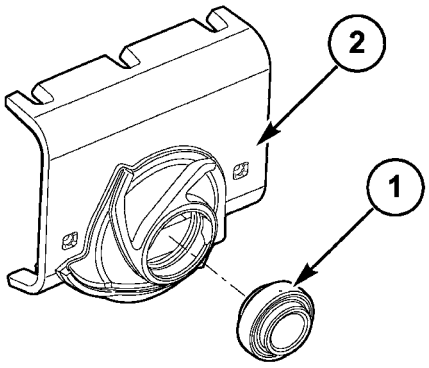
11. Install the bearing plate **(1)** to secure the rotor. Install the bolts **(2)** for securing the bearing plate.

NOTE: *The rotor retaining tool bolt used to secure the rotor may need to be removed to allow the rotor to be moved away from the bearing plate, to free it from rubbing.*



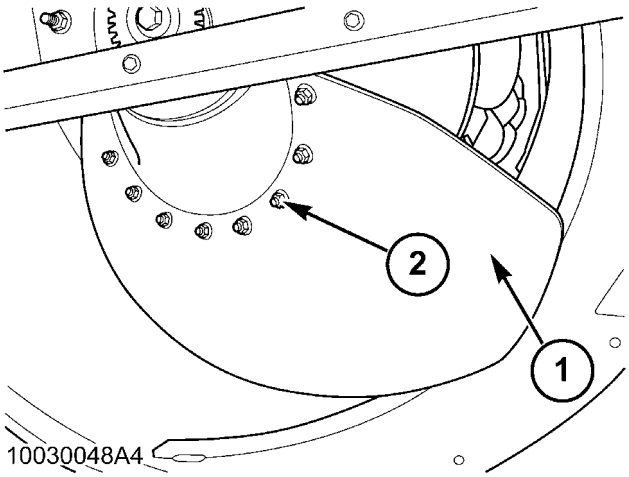
10030050B4 6

12. Install the front bearing plate support **(2)** and bearing **(1)** . Lock the bearing to the shaft with collar.



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13. Install the auger plate **(1)** on the front of the rotor by installing the eight bolts and nuts **(2)**.

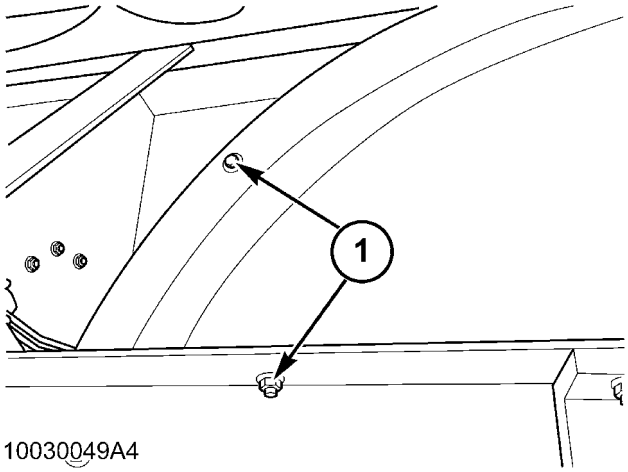


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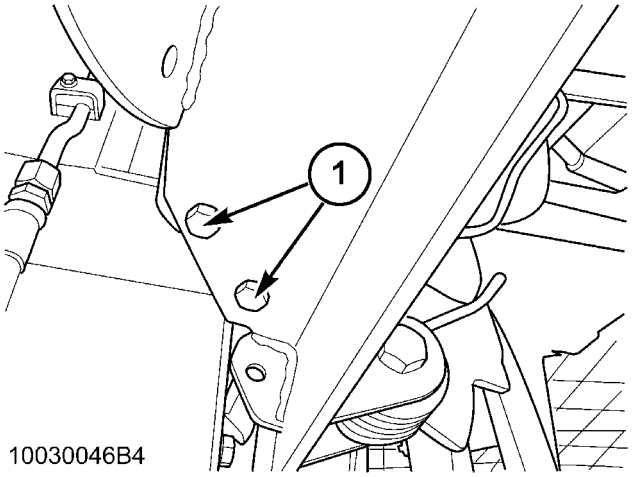
14. Install the upper cover by installing hardware **(1)**. Repeat for the second auger.

NOTE: *An assistant is required to install the two auger plates.*



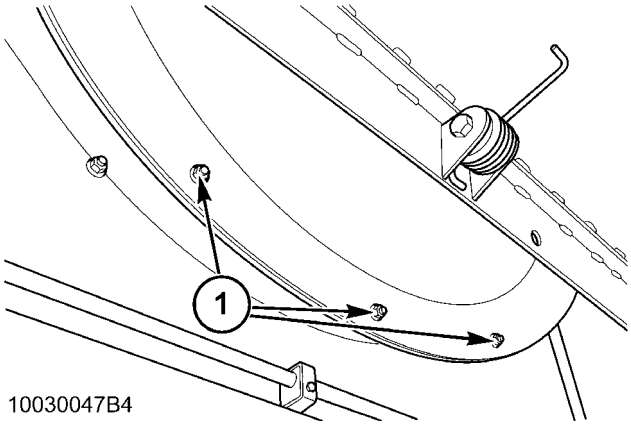
10030049A4 9

15. Install the feeder plate assembly. Install the four mounting bolts **(1)**.



10030046B4 10

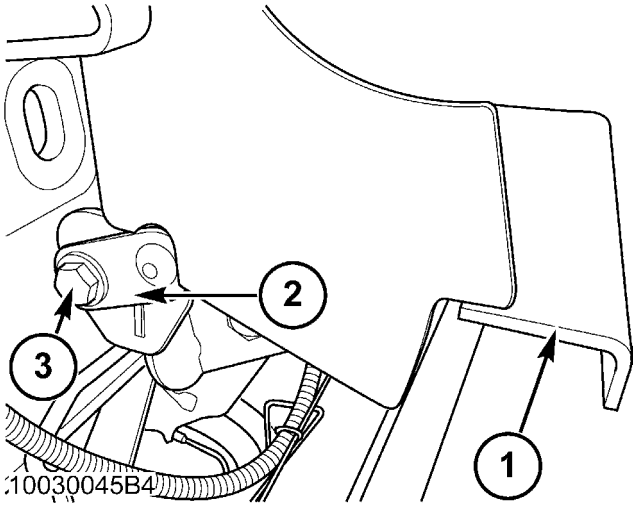
16. Install the five remaining bolts **(1)**.



10030047B4 11

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17. Install the feeder plate **(1)**. Install pivot pin **(2)** into the feeder plate. Install the bolt and washer **(3)** through the feeder plate pivot pin **(2)**. Repeat for opposite side.



10030045B4 12

18. Remove the block of wood by lowering the concaves, and also remove the rotor retaining tool from the rotor if it has not been done already in a previous step. Install the rotor access cover, and the grain tank access door.

Next operation: FEEDING Feeder housing - Install (K.25.E - F.10.A.15)

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Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54)

AFX8010

E0175-03 - Beater / Chopper Voltage Supply

Cause:
The Beater / Chopper Voltage Supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Beater / Chopper Voltage Supply wiring shorted to a high source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key ON, engine running. Move the separator switch S-30 to the ON position. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" or "GRAIN HANDLING" sort menu, and select "BEAT/CHOP VOLT" to check the voltage range.

   The proper voltage is **10.0 - 18.0 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between 10 and **18 volts**, go to Step **5**.

2. Shut the combine OFF, and then turn the key switch back ON. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with Step **3**.

3. Key switch in the "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with Step **4**.

4. Key switch in the "On" position. Move the separator engage switch S-30 to the ON position. Remove the instructional seat and storage bin to gain access to connector **X015** on CCM2. Check the voltage at connector **X015** pin J1-7.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   - wires 147 yellow, 111 yellow & 1061 yellow, separator engage switch connector **X055** pin 6 to CCM2 connector **X015** pin J1-7 and connector **X012** pin J1-7
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5

https://truckmanualshub.com/

Locate the short and repair.

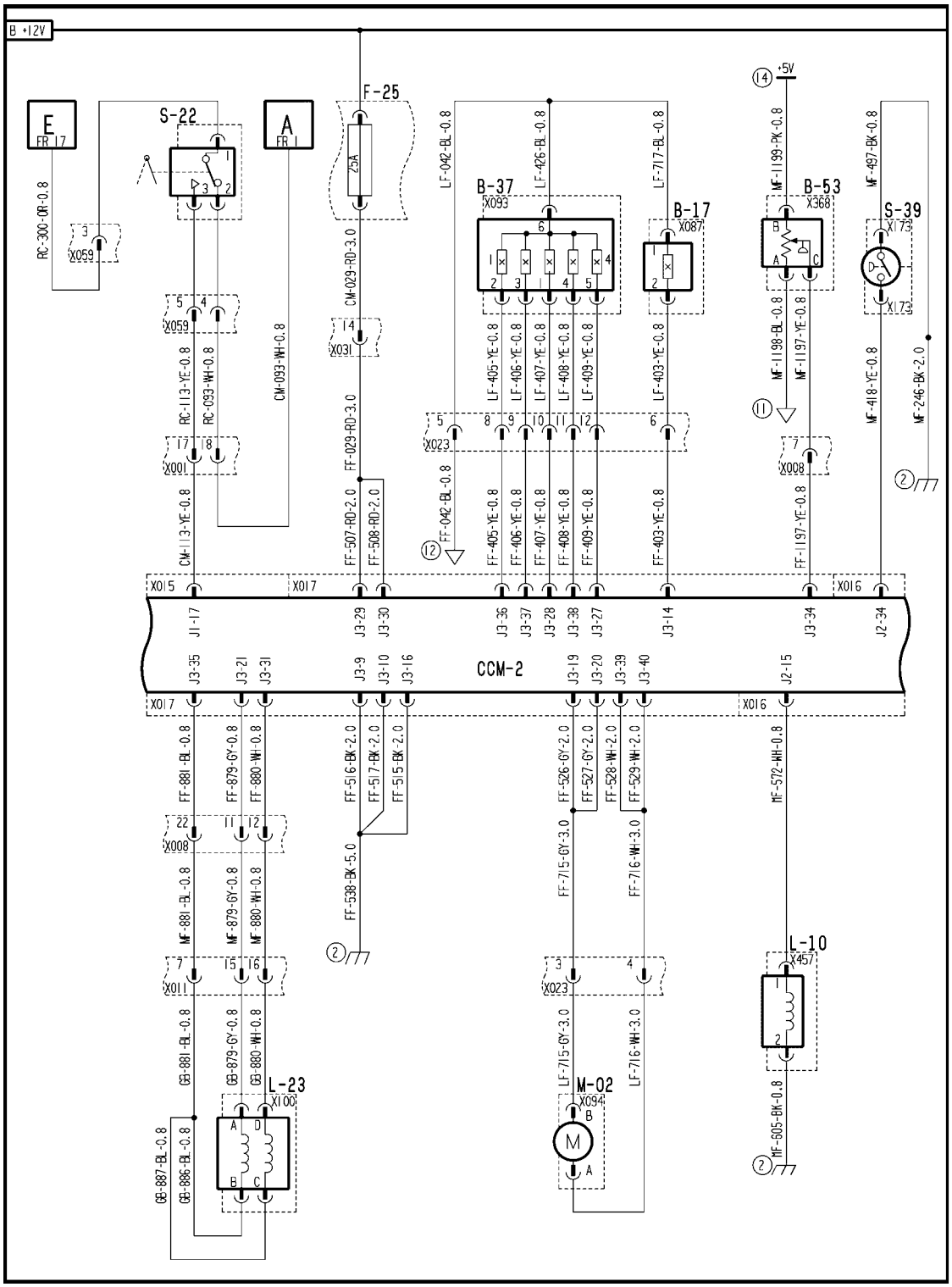
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM2. Reload the software for CCM2. If that does not correct the concern, replace the module.

5. Operate the machine while observing the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



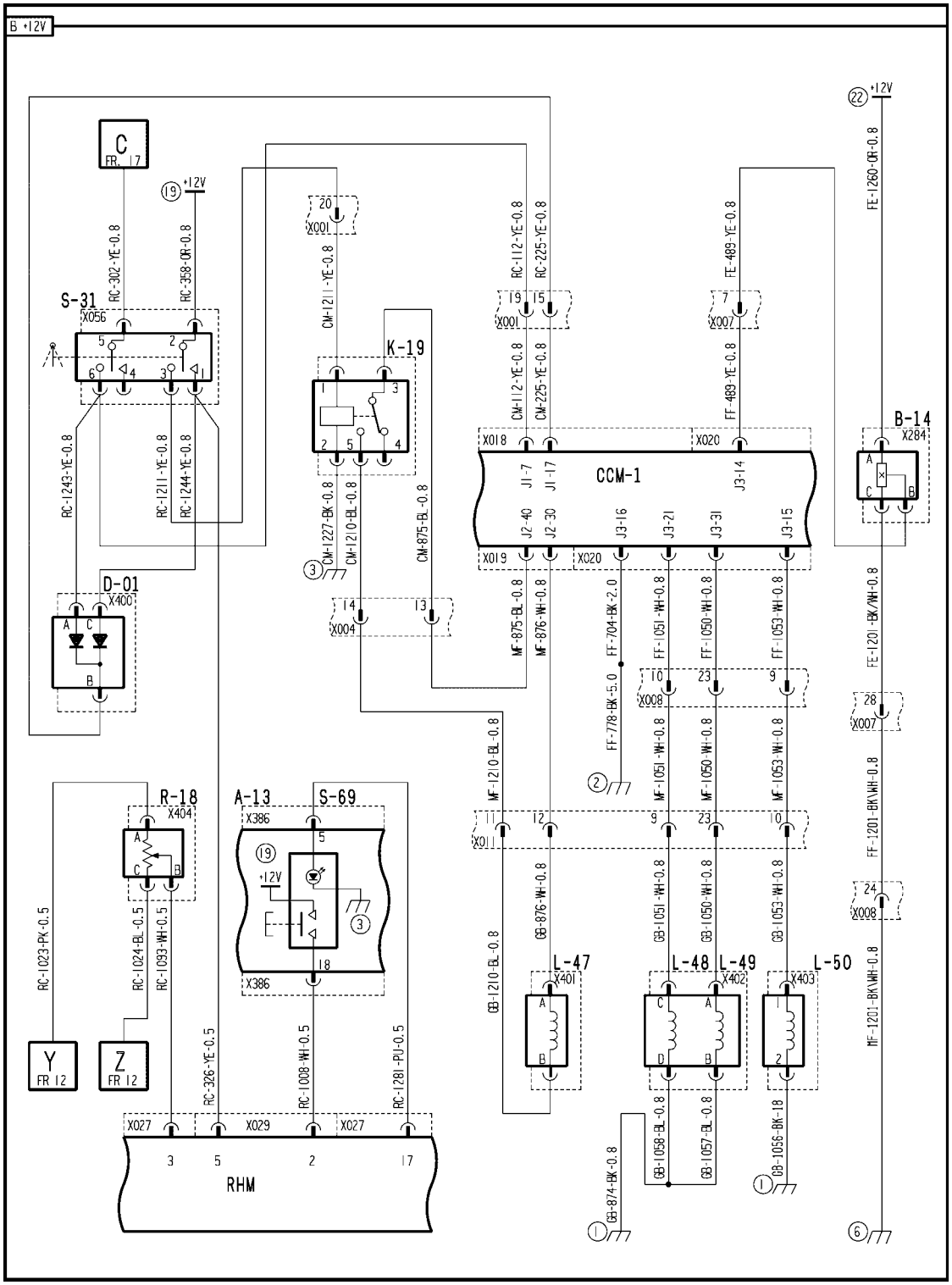
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



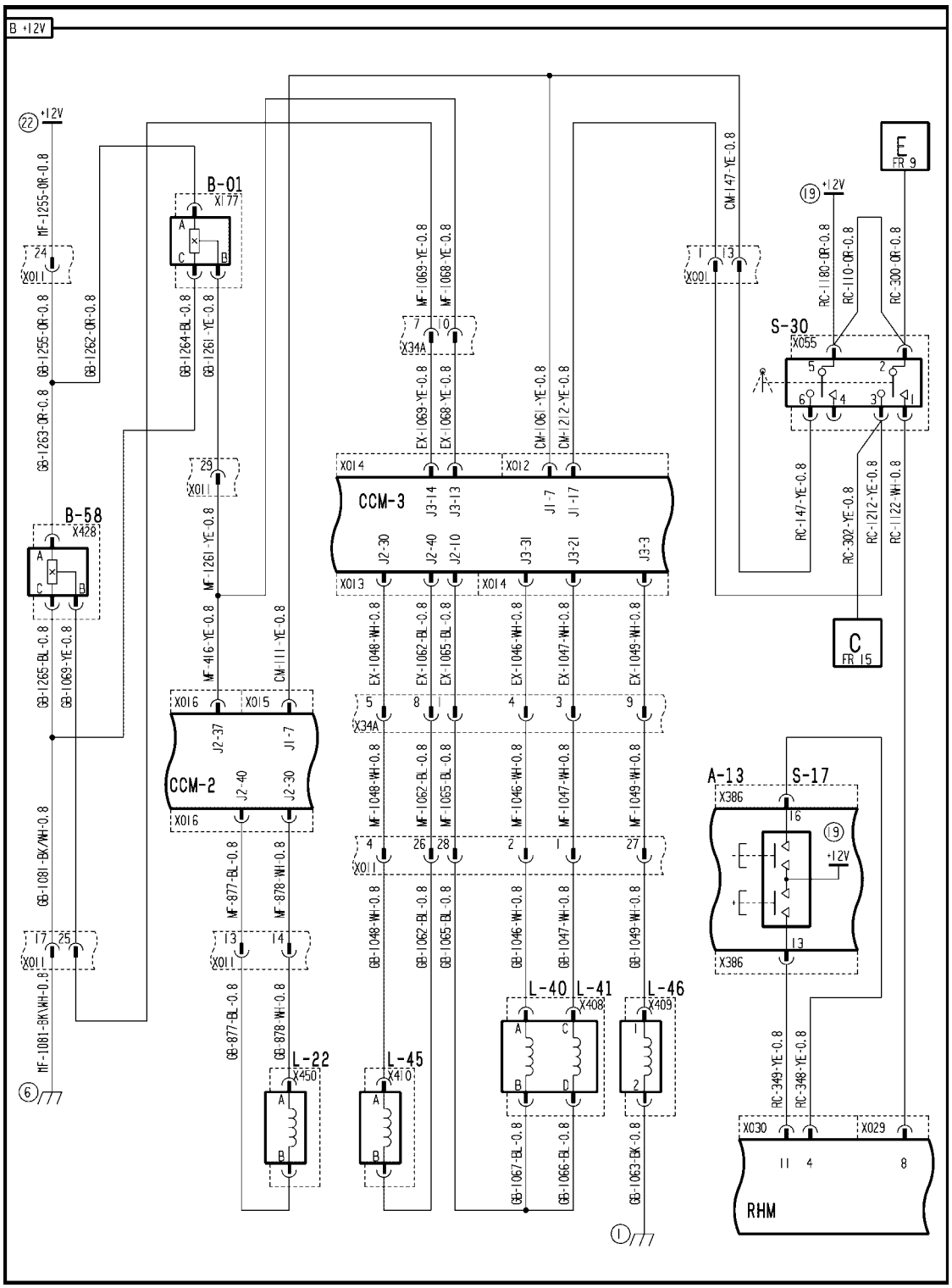
AFXSCHEM15-04 1

FRAME 15 - FEEDER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



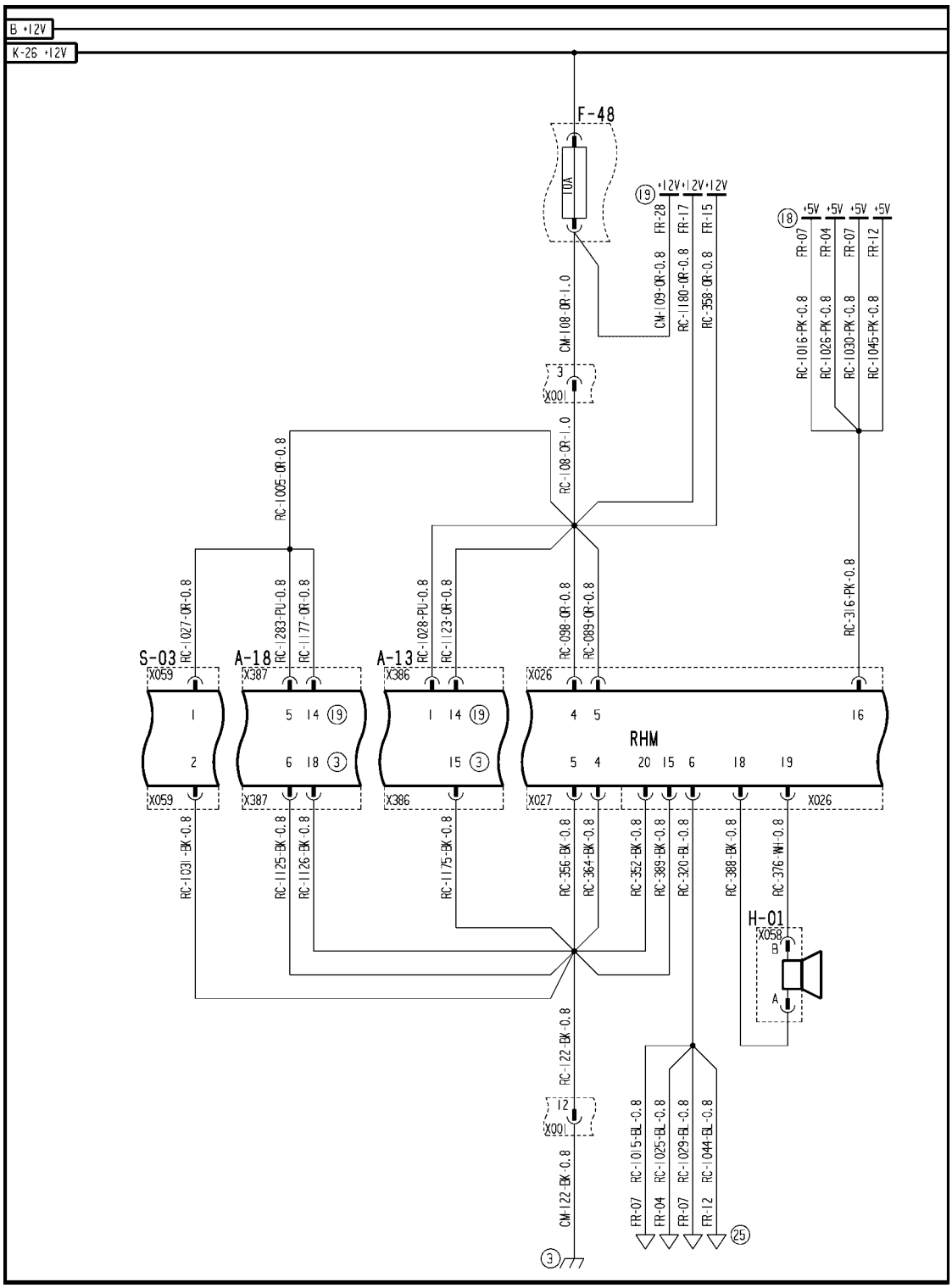
AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

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Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54)

AFX8010

E0292-03 - Rotor CVT Pump Voltage Supply

Cause:
The Rotor CVT Pump Voltage Supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Rotor CVT Pump Voltage Supply wiring shorted to a high source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key ON, engine running. Move the separator switch S-30 to the ON position. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "CVT PUMP VOLT" to check the voltage range.

   The proper voltage is **10.0 - 18.0 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between 10 and **18 volts**, go to Step **5**.

2. Shut the combine OFF, and then turn the key switch back ON. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with Step **3**.

3. Key switch in the "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with Step **4**.

4. Key switch in the "On" position. Move the separator engage switch S-30 to the ON position. Remove the instructional seat and storage bin to gain access to connector **X012** on CCM3. Check the voltage at connector **X012** pin J1-17.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   - wires 147 yellow, 111 yellow & 1061 yellow, separator engage switch connector **X055** pin 6 to CCM2 connector **X015** pin J1-7 and connector **X012** pin J1-7
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5

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Locate the short and repair.

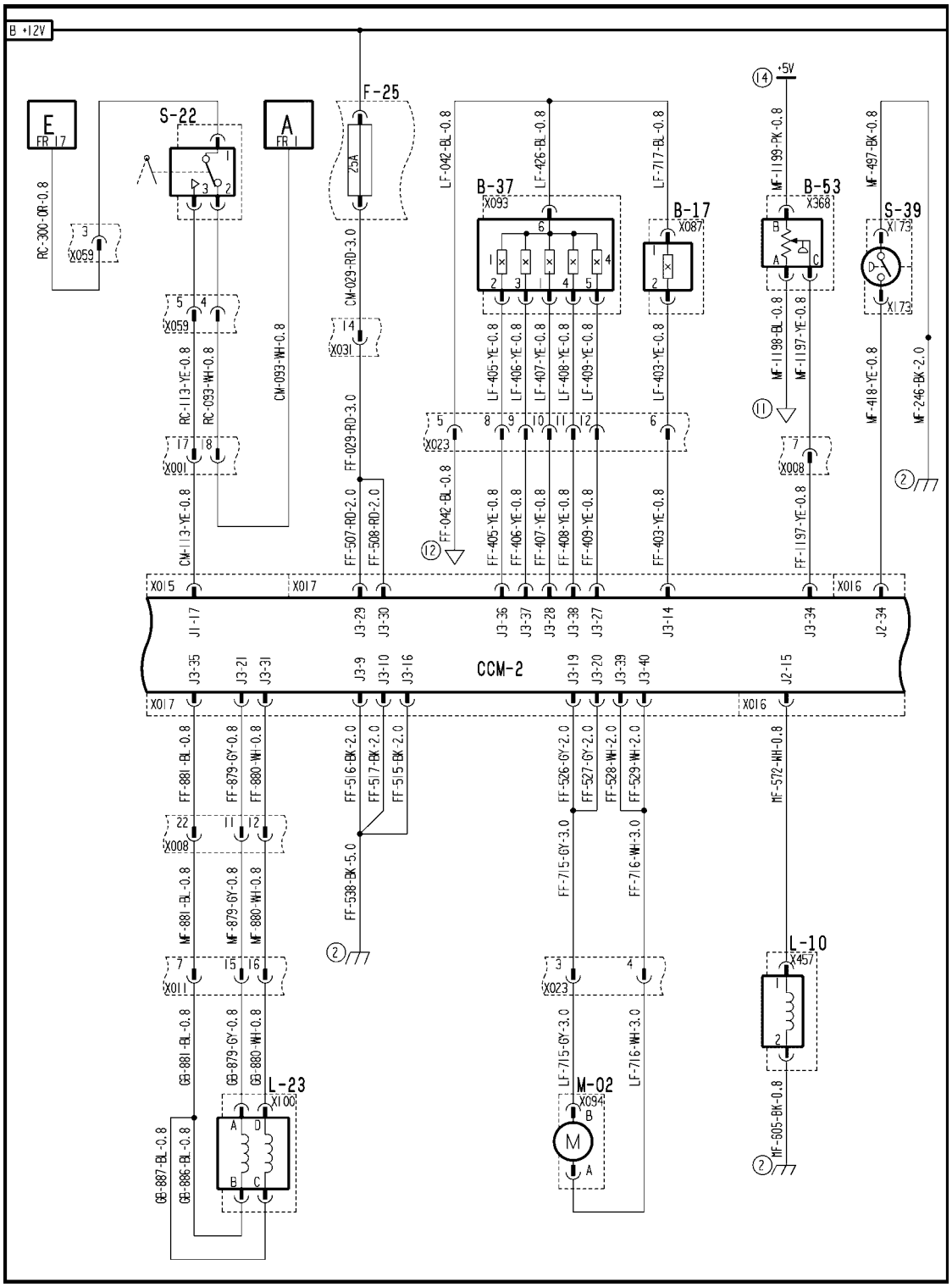
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM3. Reload the software for CCM3. If that does not correct the concern, replace the module.

5. Operate the machine while observing the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



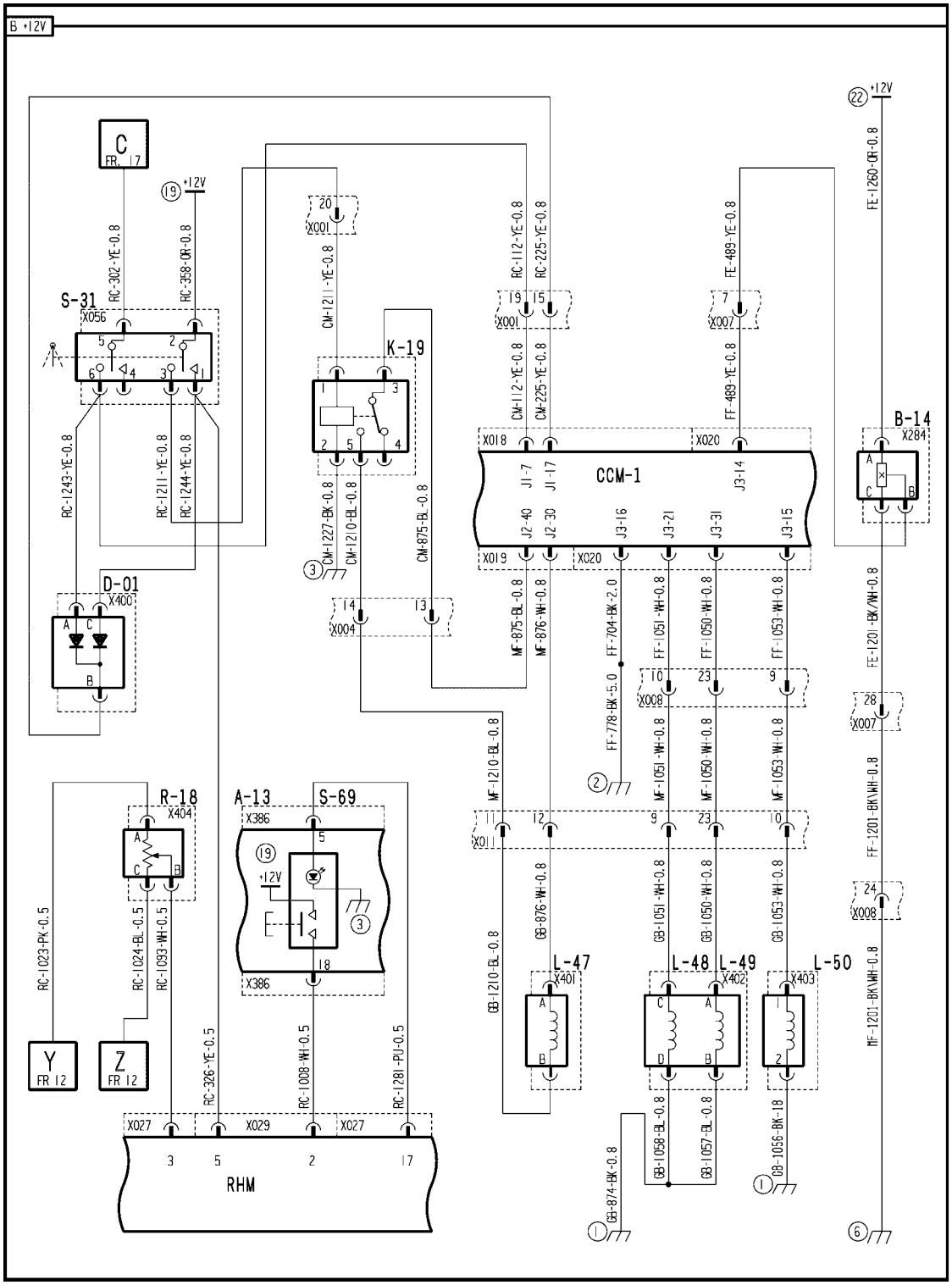
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



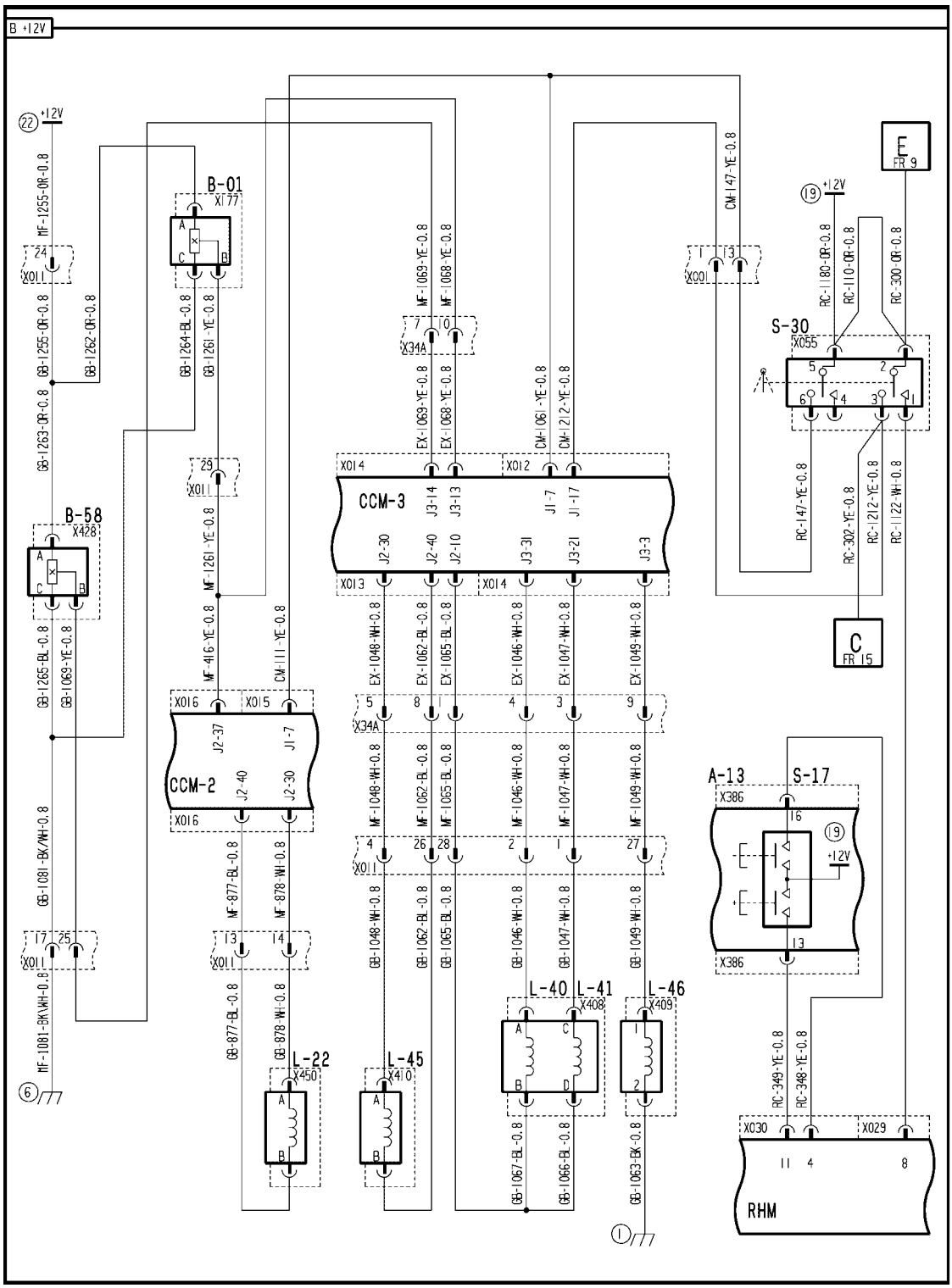
AFXSCHEM15-04 1

FRAME 15 - FEEDER

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A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



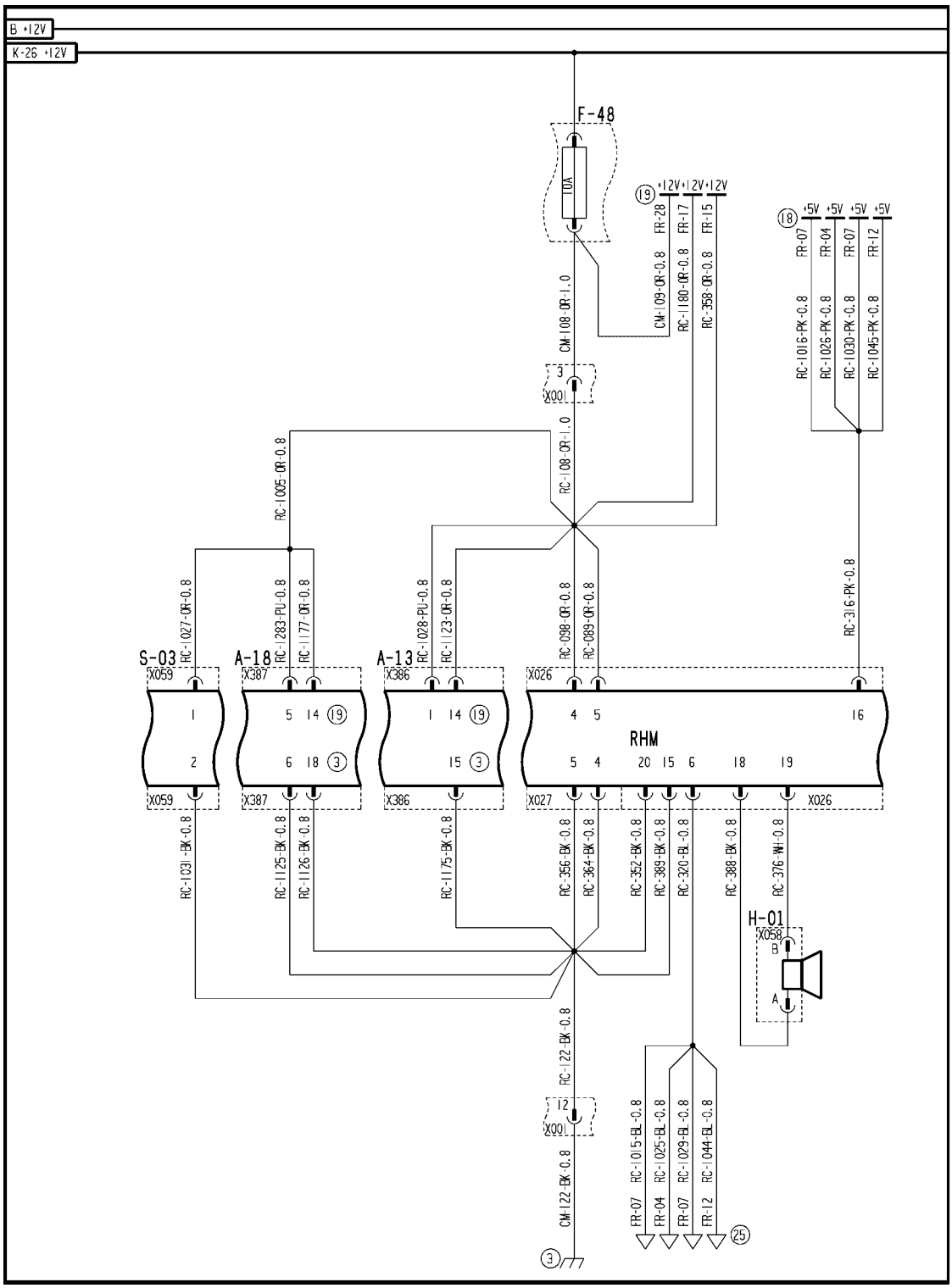
AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

https://truckmanualshub.com/

Command Threshing engage switch - Short circuit to ground (K.40.C.05.80 - G.30.B.53)

AFX8010

E0292-04 - Rotor CVT Pump Voltage Supply

Cause:
Low battery voltage to CCM3 through the separator engage switch S-30, or the Rotor CVT Pump Voltage Supply circuit is shorted to a ground.

Possible failure modes:

1. Loose or corroded connections, or damaged wires.
2. Batteries are discharged, and/or alternator/regulator failure.
3. Supply wiring shorted to ground.
4. Controller internal failure (internal regulator failure).

Solution:

1. Key switch in "Off" position. Check fuse F42.
   A. If fuse F42 is okay, continue with Step **3**.
   B. If the fuse is blown, go to Step **2**.
2. Replace the failed fuse F42.
   A. If the fuse is okay, continue with Step **3**.
   B. If the fuse immediately fails again, a short to ground exists in wire 010 red to Cab Power Relay K26 pin 3. Locate short and repair.
3. Key switch in "On" position. Check fuse F48.
   A. If fuse F48 is okay, continue with Step **5**.
   B. If the fuse is blown, go to Step **4**.
4. Replace the failed fuse F48.
   A. If the fuse is okay, continue with Step **5**.
   B. If the fuse immediately fails again, a short to ground exists in one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RH harness splice
   - wire 358 orange, RH harness splice to feeder engage switch S-31 connector **X056** pin 2
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   Locate the short and repair.
5. Move the separator engage switch S-30 to the ON position, and observe the fuse F48.
   A. If the fuse is okay, continue with Step **8**.
   B. If the fuse immediately fails, a short to ground exists in on one of the following wires:
   - wires 147 yellow, 111 yellow & 1061 yellow, separator engage switch connector **X055** pin 6 to CCM2 connector **X015** pin J1-7 and connector **X012** pin J1-7
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5
   Locate short and repair.

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6. Move the feeder engage switch S-31 to the ON position, and observe fuse F48.

   A. If the fuse is okay, continue with Step **6**.

   B. If the fuse immediately fails, a short to ground exists in on one of the following wires:
   - wire 1243 yellow, feeder engage switch connector **X056** pin 6 to feeder engage diodes connector **X400** pin A
   - wire 225 yellow, feeder engage diodes connector **X400** pin B through connector **X001** pin 15 to connector **X018** pin J1-17
   - wire 112 yellow, feeder engage switch connector **X056** pin 6 through connector **X001** pin 19 to connector **X018** pin J1-7
   Locate short and repair.

7. Key switch in "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **7**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the batteries and the cab fuse panel, due to loose or corroded connections, or the batteries have discharged excessively, and are not capable of supplying the minimum voltage requirement for CCM3. Inspect the wiring from the batteries to the engine compartment, and from there to the cab. Recharge or replace the batteries.

8. Key switch ON. Move the separator switch S-30 to the ON position. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "CVT PMP VOLT" to check the voltage range.

   The proper voltage supply is **10.0 - 18.0 volts**.

   A. If the voltage reading is between 10 and **18 volts**, continue with Step **8**.

   B. If the voltage reading is less than **10 volts**, there is excessive resistance between the fuse panel and CCM3.
   Inspect the following for loose or corroded connections, or damage to the wires.
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - wires 110 orange & 1180 orange, RH harness splice to separator switch S-30 connector **X055** pin 2
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17

9. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM3 BAT" to check the voltage range.

   With the engine RPM at low idle, engage road and work lights. Check voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, continue with Step **9**.

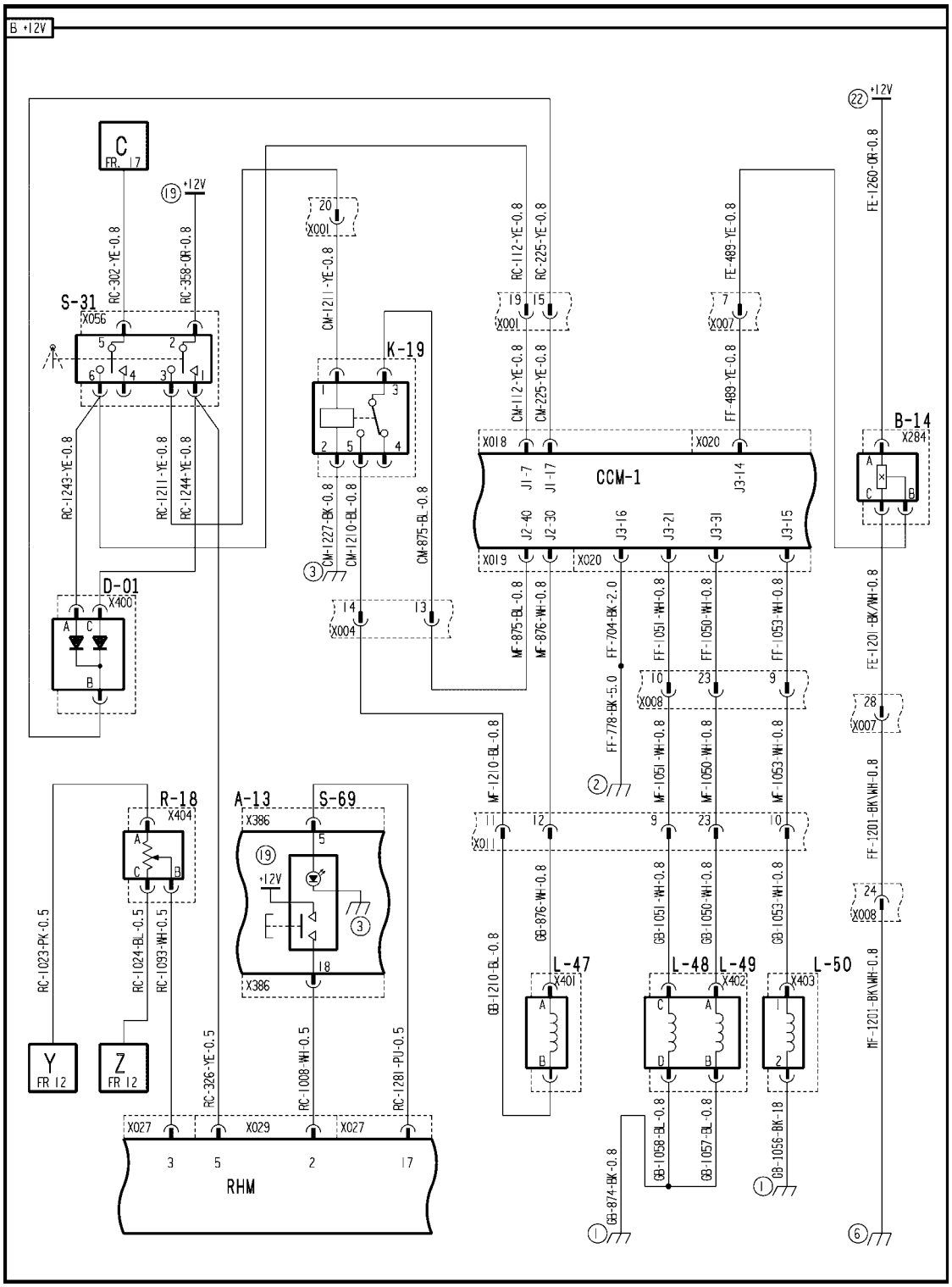
   B. If the voltage reading is less than **10 volts**, the alternator and/or regulator may have failed, and the charging system is not producing sufficient voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

10. Operate the machine while observing the Universal Display Plus "DIAG" screen.

    A. If no low out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



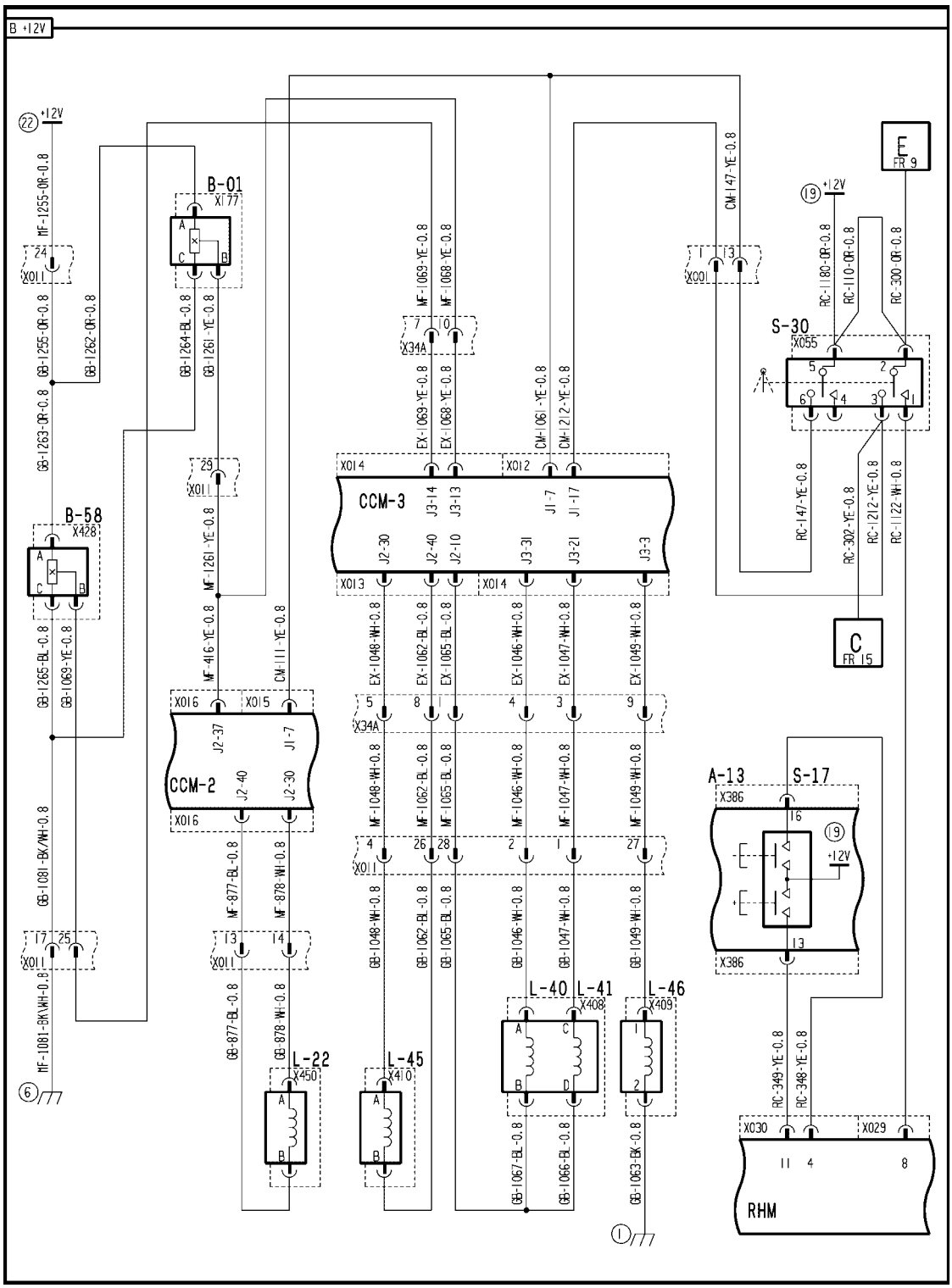
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FRAME 15 - FEEDER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



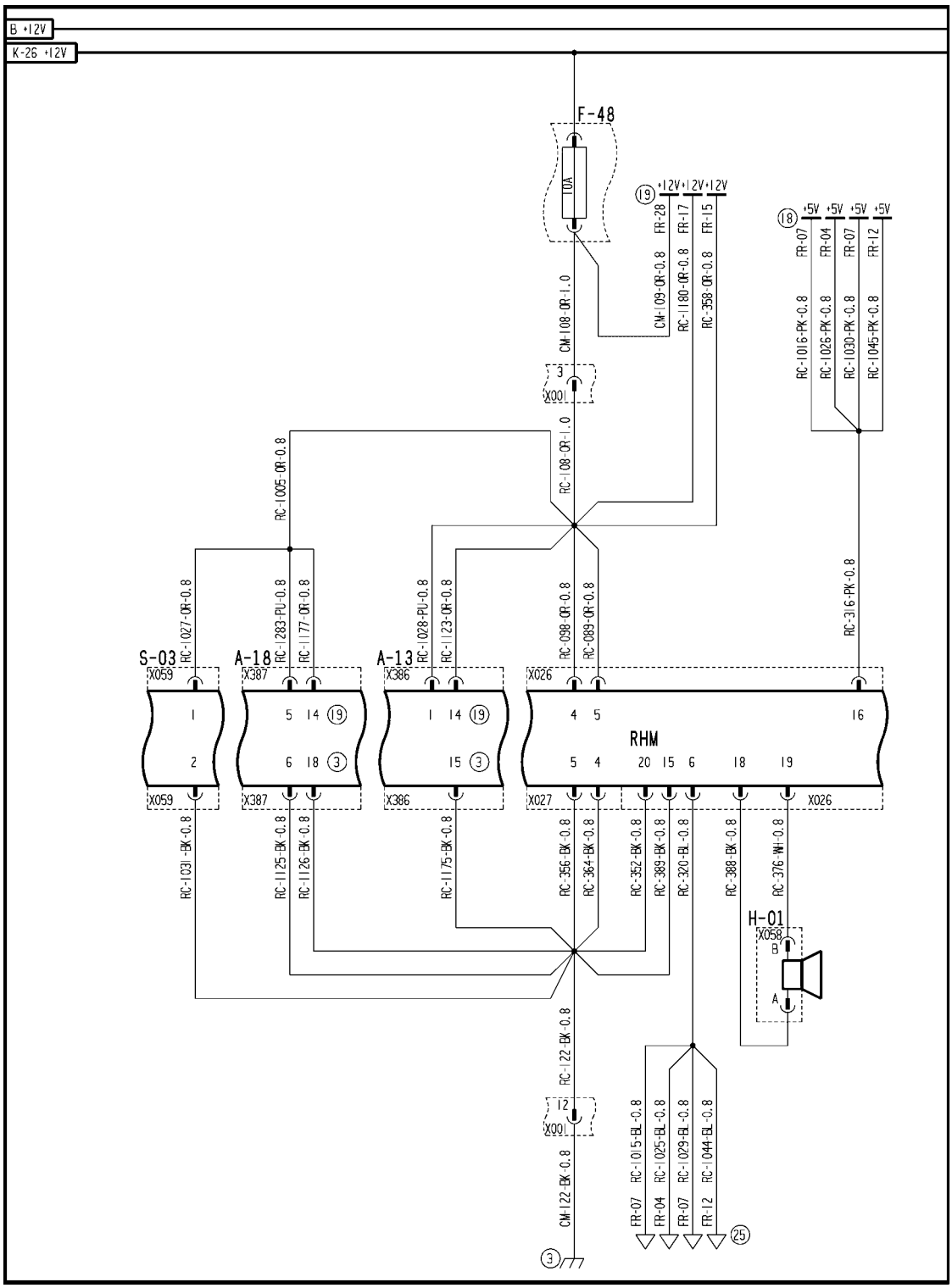
AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

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Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54)

AFX8010

E0303-03 - Rotor ETR Clutch Voltage Supply

Cause:
The Rotor ETR Clutch Voltage Supply circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Rotor ETR Clutch Voltage Supply wiring shorted to a high source.
2. Faulty alternator/regulator.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key ON, engine running. Move the separator switch S-30 to the ON position. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "ETR CTCH VOLT" to check the voltage range.

   The proper voltage is **10.0 - 18.0 volts**.

   A. If the voltage reading is greater than **18 volts**, continue with Step **2**.

   B. If the voltage reading is between 10 and **18 volts**, go to Step **5**.

2. Shut the combine OFF, and then turn the key switch back ON. Enter the Universal Display Plus "DIAG" screen. Select the "VOLTAGE" sort menu, and select "CCM2 BAT" to check the voltage range.

   The acceptable voltage range for the module is **10 - 18 volts**.

   A. If the voltage reading is between **10 - 18 volts**, the alternator and/or regulator has failed, and is producing excessive voltage. Refer to **Alternator - Problem solving (A.30.A.82 - G.40.A.30)** for additional alternator testing information.

   B. If the voltage reading is greater than **18 volts**, continue with Step **3**.

3. Key switch in the "Off" position. Check the voltage at fuse F42 using a multi-meter.

   A. If the voltage reading is greater than **18 volts**, then there is a fault in the wiring of the 24V starting system. Refer to **STARTING SYSTEM - Problem solving (B.80.A - G.40.A.30)** for additional information.

   B. If the voltage reading is between **10 - 18 volts**, continue with Step **4**.

4. Key switch in the "On" position. Move the separator engage switch S-30 to the ON position. Remove the instructional seat and storage bin to gain access to connector **X012** on CCM3. Check the voltage at connector **X012** pin J1-7.

   A. If the voltage reading is greater than **18 volts**, then a high voltage source has been connected to one of the following wires:
   - wire 109 orange, fuse F48 to relay K28, terminal 3
   - wire 108 orange, fuse F48 through connector **X001** pin 3 to RC harness splice
   - RH console power wires to propulsion handle S-03, front switch panel A-13, rear switch panel A-18 and RHM connector **X026** pins 4 & 5
   - wires 300 orange, 110 orange & 1180 orange, RH harness splice across separator switch S-30 to neutral switch S-02 connector **X059** pin 3
   - wires 147 yellow, 111 yellow & 1061 yellow, separator engage switch connector **X055** pin 6 to CCM2 connector **X015** pin J1-7 and connector **X012** pin J1-7
   - wire 1212 yellow, separator engage switch connector **X055** pin 3 to connector **X012** pin J1-17
   - wire 302 yellow, separator engage switch connector **X055** pin 3 to feeder engage switch connector **X056** pin 5

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Locate the short and repair.

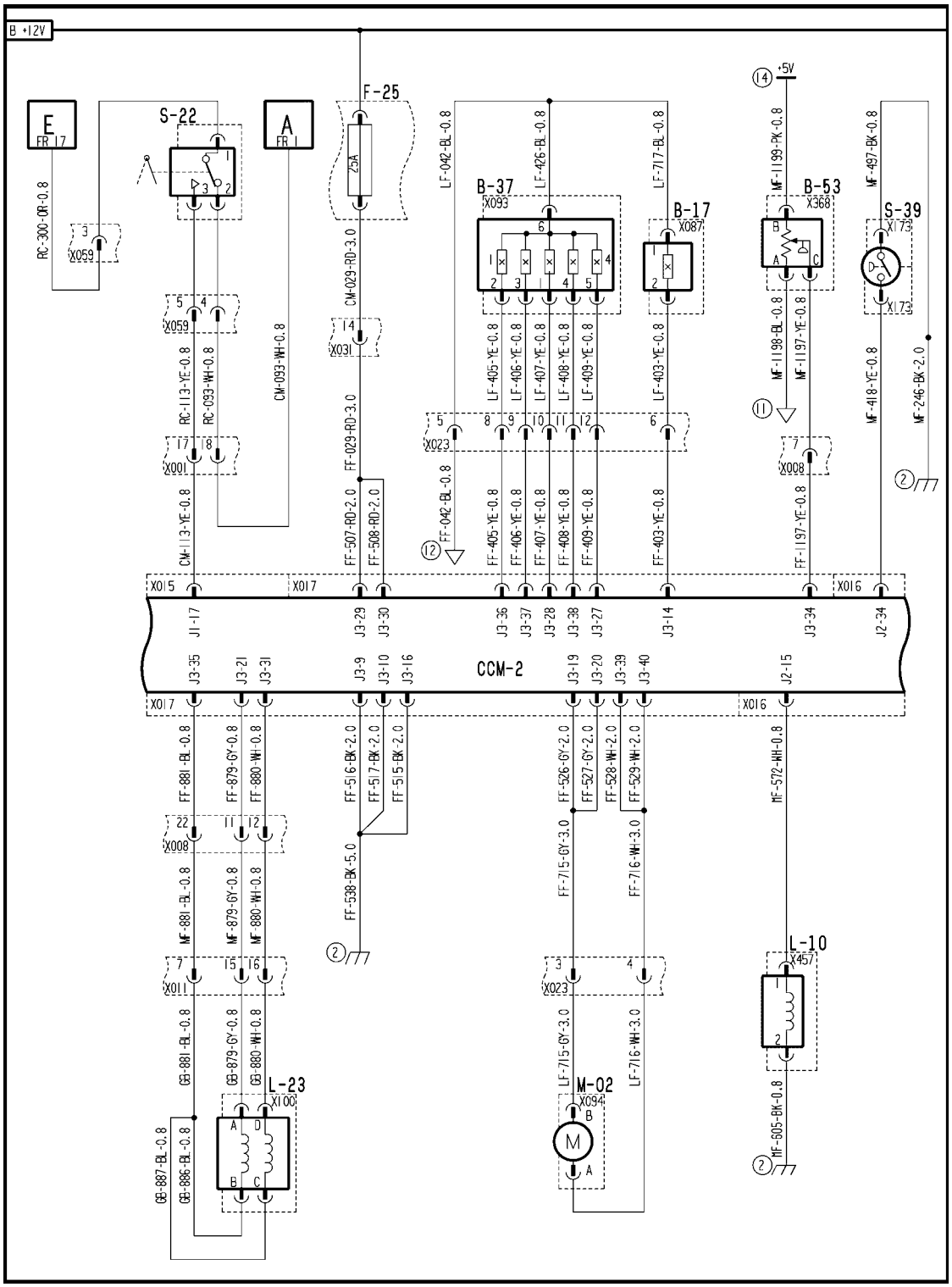
B. If the voltage reading is **10 - 18 volts**, and the diagnostic screen is still indicating voltage in excess of **18 volts**, there is an internal fault in CCM3. Reload the software for CCM3. If that does not correct the concern, replace the module.

5. Operate the machine while observing the Universal Display Plus "DIAG" screen.

A. If no high out of range readings are detected, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 09 (A.30.A.88 - C.20.E.09)



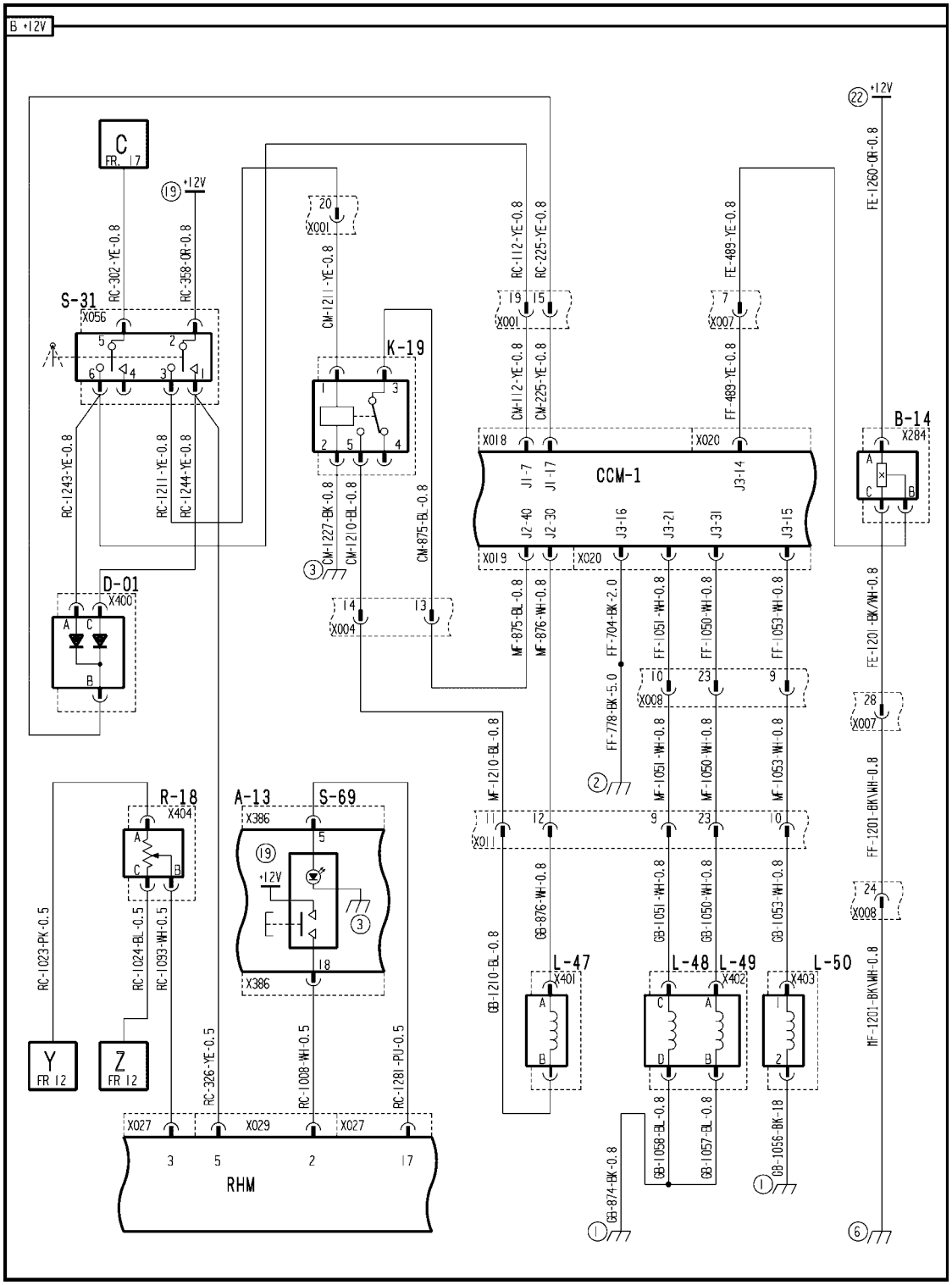
AFXSCHEM09-04 1

FRAME 9 - DRIVES

https://truckmanualshub.com/

B-17 Ground Speed RPM	B-37 Transmission Shift Position	B-53 Park Brake Pressure
F-25 Transmission Shift Fuse	L-10 Park Brake Disengage	L-23 Ground Speed Hydrostat
M-02 Transmission Shift Motor	S-22 Neutral Switch	S-39 Brake Pressure

Wiring harness - Electrical schematic frame 15 (A.30.A.88 - C.20.E.15)



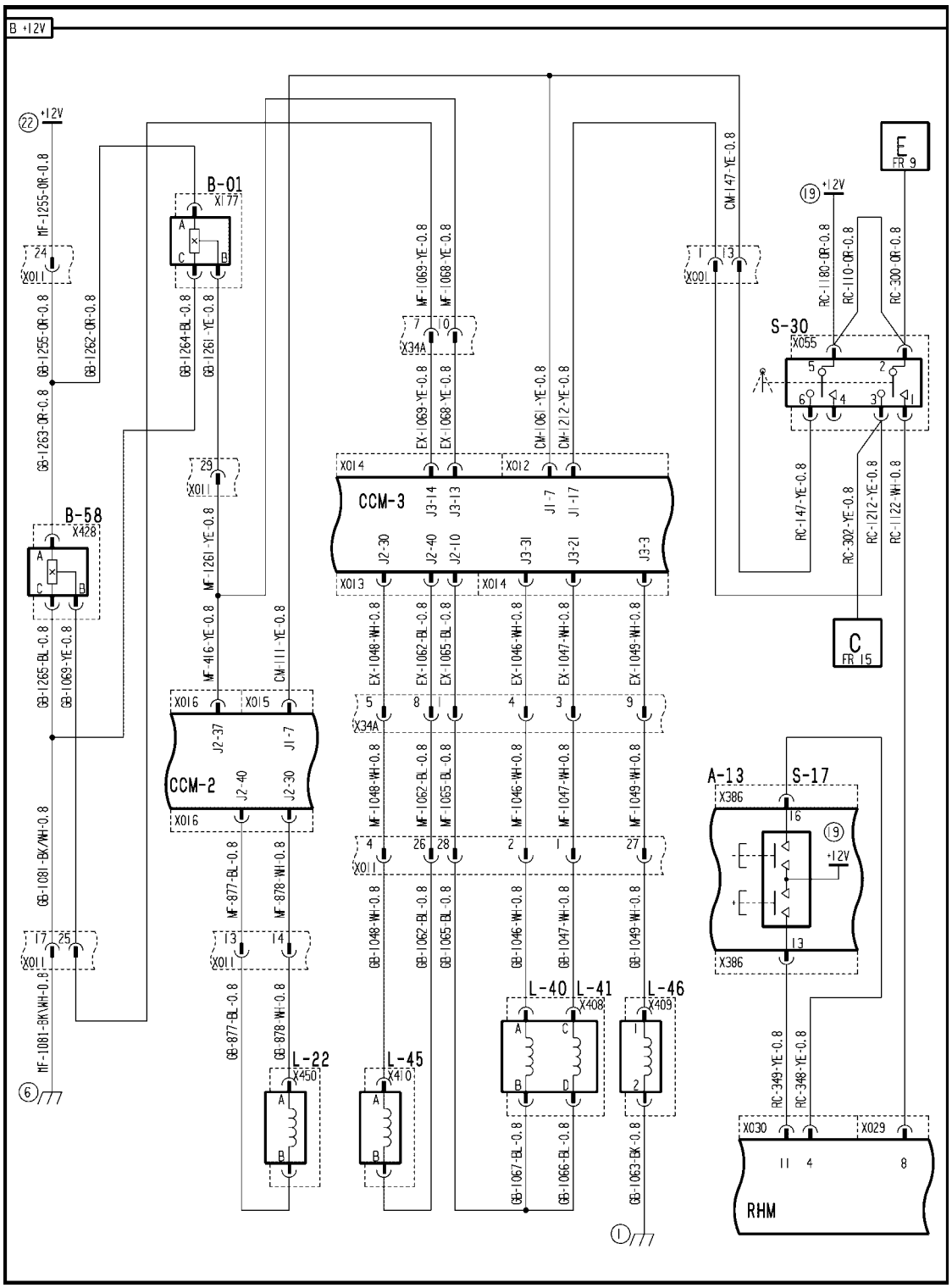
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FRAME 15 - FEEDER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-14 Feeder RPM	D-01 Feeder Engage Diodes
K-19 Feeder Disengage	L-47 Feeder Engine To Ring Clutch	L-48 Feeder Pump Swash Minus
L-49 Feeder Pump Swash Plus	L-50 Feeder Ring To Frame Brake	R-18 Header Speed Potentiometer
S-31 Feeder Engage	S-69 Header Mode Switch	

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



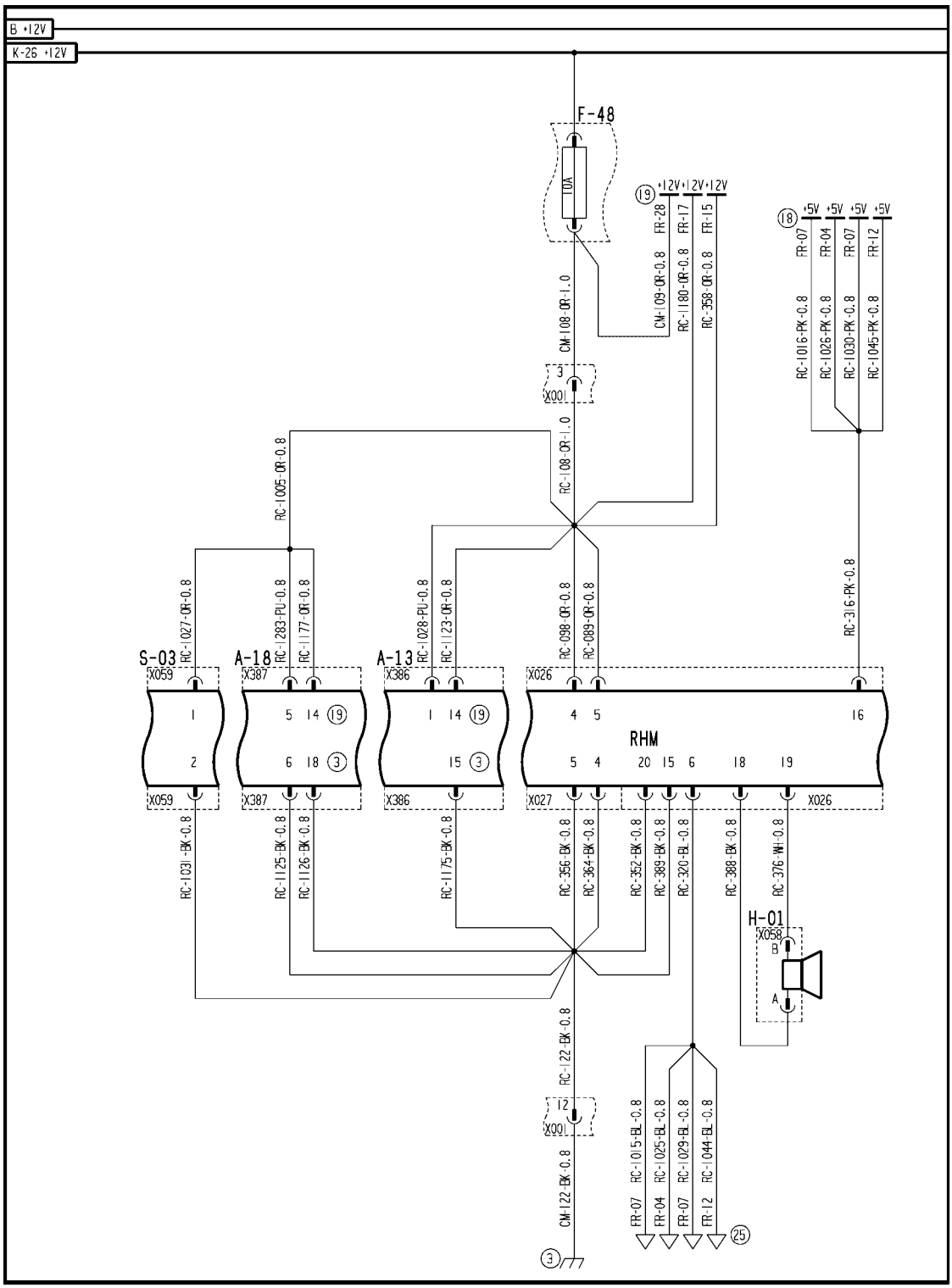
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FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

Wiring harness - Electrical schematic frame 25 (A.30.A.88 - C.20.E.25)



AFXSCHEM25-04 1

FRAME 25 - DISTRIBUTION

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	F-48 RH Console Fuse
H-01 Audio Alarm	S-03 Propulsion Handle	

https://truckmanualshub.com/

Control valve Speed control valve - Short circuit to B+ (K.40.C.14.10 - G.30.B.54)

AFX8010

E0304-03 - Rotor CVT Pump Current Sense

Context:
The Rotor CVT Pump Current Sense circuit is the ground path for the Rotor Pump Swash Minus (L-41) and/or Rotor Pump Swash Plus (L-40) PWM solenoids. By monitoring current flow on the return path of the solenoids, the module can provide precise control of solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The Rotor Pump Swash Minus (L-41) and/or Rotor Pump Swash Plus (L-40) circuits have excessive current draw, or are shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key switch ON, combine engine running. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "CVT PMP VLV" to check the current. Engage the separator switch S-30, and use the rotor speed switch S-17 to increase and decrease rotor speed while monitoring the current.

   The proper current for both rotor pump solenoids should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps** on either circuit, continue with Step **3**.

   B. If the readings are normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading on either circuit, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **6**.

   NOTE: *If the current reading is high, immediately shut off the circuit after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the rotor pump swash solenoid connector **X408**. Use a multimeter to check the resistance of the rotor pump swash plus solenoid between connector **X408** pins A & B. Repeat this resistance check for the rotor pump swash minus solenoid between connector **X408** pins C & D. The proper resistance range for the solenoids is **16k - 20k ohms**.

   A. If either solenoid is out of specification, replace the solenoid. Continue with Step **8**.

   B. If both solenoids are within specification, continue with Step **5**.

3. Disconnect connector **X011**. Use a multimeter to check the resistance of the rotor pump swash plus solenoid circuit between connector **X011** pins 28 & 2. Repeat this resistance check for the rotor pump swash minus solenoid between connector **X011** pins 28 & 1.

   A. If the resistance is lower than the previously measured resistance, there is a short in the gearbox (GB) harness between connector **X022** and connector **X011** wires 1046 white (swash plus) or 1047 white (swash minus) and 1066 blue, 1067 blue or 1065 blue. Locate the short and repair. Continue with Step **8**.

   B. If the resistance is the same as previously measured, continue with Step **8**.

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4. Disconnect connector **X034A**. Use a multimeter to check the resistance of the rotor pump swash plus solenoid circuit between connector **X034A** pins 1 & 4. Repeat this resistance check for the rotor pump swash minus solenoid between connector **X034A** pins 1 & 3.

   A. If the resistance is lower than the previously measured resistance, there is a short in the main frame (MF) harness between connector **X034A** and connector **X011** wires 1046 white (swash plus) or 1047 white (swash minus) and 1066 blue, 1067 blue or 1065 blue. Locate the short and repair. Continue with Step **8**.

   B. If the resistance is the same as previously measured, continue with Step **5**.

5. Carefully disconnect connectors **X013** and **X014** on the bottom of CCM3 module. Use a multimeter to check the resistance of the rotor pump swash plus solenoid circuit between connector **X013** pin J2-10 and connector **X014** pin J3-31. Repeat this resistance check for the rotor pump swash minus solenoid between connector **X013** pin J2-10 and connector **X014** pin J3-21.

   A. If the resistance is lower than the previously measured resistance, there is a short in the expansion (EX) harness between connector **X014**, connector **X034A** and connector **X013** wires 1046 white (swash plus) or 1047 white (swash minus) and 1066 blue, 1067 blue or 1065 blue. Locate the short and repair. Continue with Step **8**.

   B. If the resistance is the same as previously measured, continue with Step **6**.

6. Key on. Disconnect connector **X408**. Use a multimeter to check for voltage at connector **X408** pin B or D (harness end). There should be no voltage on either wire.

   A. If there is no voltage present on the wires, continue with Step **8**.

   B. If there is voltage on the wire, continue with Step **8**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

7. Key on. Disconnect connector **X011**. Use a multimeter to check for voltage at the main frame (MF) harness end of connector **X011** pin 28. There should be no voltage.

   A. If there is voltage present, continue with Step **8**.

   B. If there is no voltage on the wire, the short to voltage is in the gearbox (GB) harness between connector **X408** and connector **X011** wires 1066 blue, 1067 blue or 1065 blue. Locate the short and repair. Continue with Step **8**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

8. Key on. Disconnect connector **X034A**. Use a multimeter to check for voltage at the expansion (EX) harness end of connector **X034A** pin 1. There should be no voltage.

   A. If there is no voltage present, there is a short to voltage in the main frame (MF) harness between connector **X011** and connector **X034A** wire 1065 blue. Locate the short and repair. Continue with Step **8**.

   B. If there is voltage on the wire, the short to voltage is in the expansion (EX) harness between connector **X034A** and connector **X013** pin J2-10 wire 1065 blue. Locate the short and repair. Continue with Step **8**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

9. The sense resistor in the module for the Rotor Pump CVT Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Carefully disconnect connector **X013** from the bottom of the CCM3 module. Use a multimeter to check resistance between connector **X013** pin J2-10 on the module and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM3 module has failed. Replace the module.

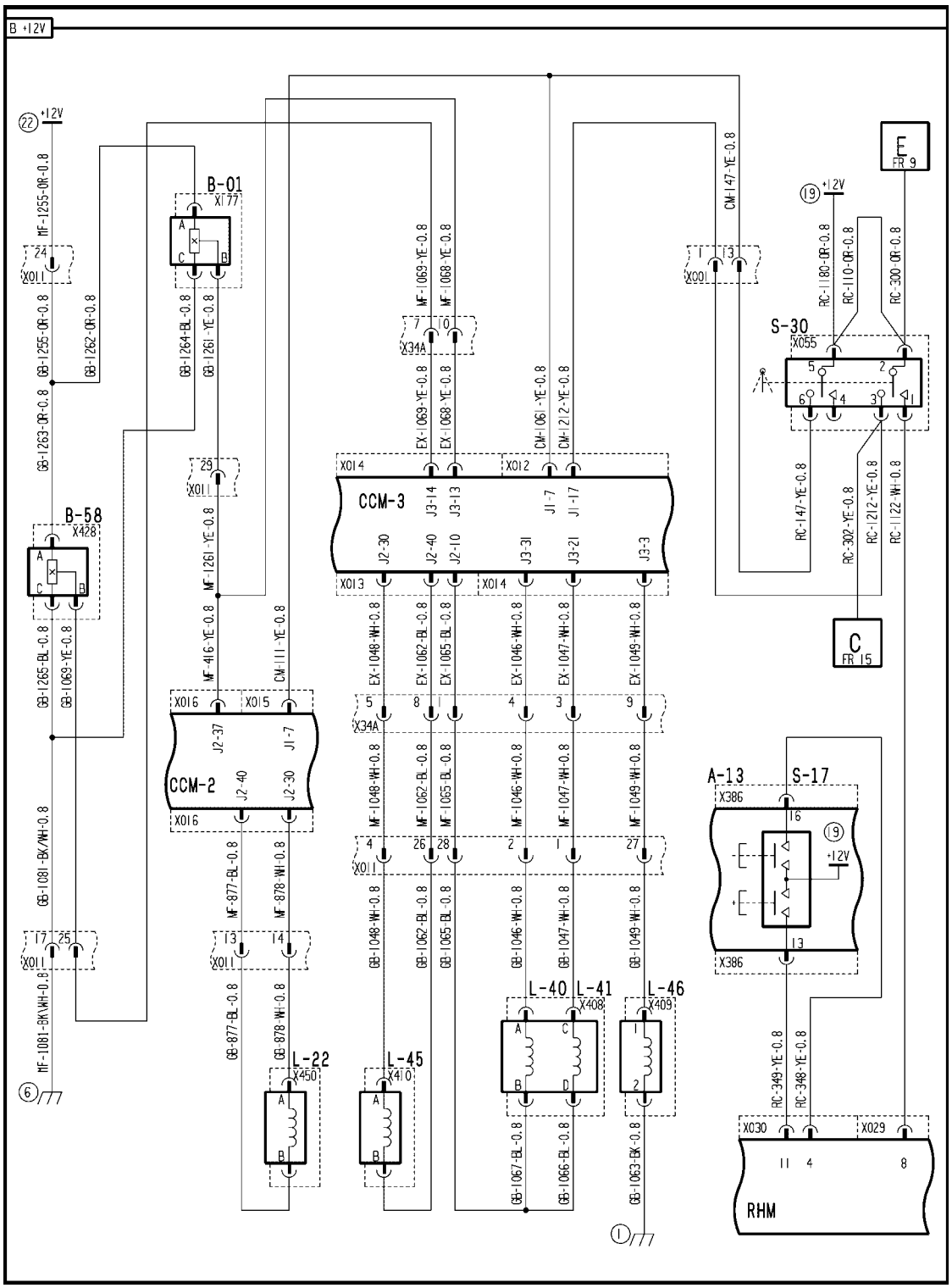
   B. If the resistance is correct, the sense resistor in the CCM3 module is okay, and the circuit should function correctly. Continue with Step **9**.

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10. Operate the combine while monitoring the Rotor Pump CVT Current Sense circuit current on the Universal Display Plus "DIAG" screen.

    A. If no high out of range current readings are seen, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

https://truckmanualshub.com/

Control valve Speed control valve - Unidentified failure (K.40.C.14.10 - G.30.B.46)

AFX8010

E0330-11 - Rotor CVT Pump Valve

Cause:
The Rotor Pump Swash Minus (L-41) and/or Rotor Pump Swash Plus (L-40) circuits are shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Solenoid failed.
3. Controller internal failure (internal regulator failure).

Solution:

1. Key switch ON, combine engine running. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "CVT PMP VLV" to check the current. Engage the separator switch S-30, and use the rotor speed switch S-17 to increase and decrease rotor speed while monitoring the current.

   The current should vary gradually between **0 - 90 mA** (**0 - 4.4 volts**), depending on rotor speed.
   If the current spikes to a maximum of **100 mA**(>**4.7 volts**), and then abruptly drops to zero, there is a short to ground on the output lead to the control valve.

   A. If the current spikes to maximum , and then abruptly drops to zero, continue with step **2**.

   B. If the voltage readings are within the proper ranges, continue with step **10**.

2. Turn the key switch to the "OFF" position. Disconnect the rotor pump swash solenoids connector **X408**. Use a multimeter to check the resistance of the rotor pump swash solenoid coils between terminals D & C, and then between terminals A & B. The proper resistance range for the solenoid coils is **16k - 20k ohms**.

   A. If either of the solenoid coils is out of specification, replace the solenoid.

   B. If the solenoid coils are within specifications, continue with step **3**.

3. Use a multimeter to check for continuity between the rotor pump swash minus solenoid coil terminals D or C and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, replace the solenoid.

   B. If there is no continuity to ground, continue with step **4**.

4. Use a multimeter to check for continuity between the harness end of connector **X408** pin C and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **5**.

   B. If there is no continuity to ground, continue with step **7**.

5. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 1 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the gearbox (GB) harness between connector **X011** and connector **X402** wire 1047 white.Locate the short and repair.

   B. If there is continuity to ground, continue with step **6**.

6. Disconnect connector **X034A**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X034A** pin 3 and chassis ground. There should not be continuity to ground.

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A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** and connector **X034A** wire 1047 white. Locate the short and repair.

B. If there is continuity to ground, there is a short to ground in the expansion (EX) harness between connector **X034A** and connector **X014** pin J3-21 wire 1047 white. Locate the short and repair.

7. Use a multimeter to check for continuity between the harness end of connector **X408** pin A and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, continue with step **8**.

   B. If there is no continuity to ground, continue with step **10**.

8. Disconnect connector **X011**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X011** pin 2 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the gearbox (GB) harness between connector **X011** and connector **X402** wire 1046 white.Locate the short and repair.

   B. If there is continuity to ground, continue with step **9**.

9. Disconnect connector **X034A**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X034A** pin 4 and chassis ground. There should not be continuity to ground.

   A. If there is no continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X011** and connector **X034A** wire 1046 white. Locate the short and repair.

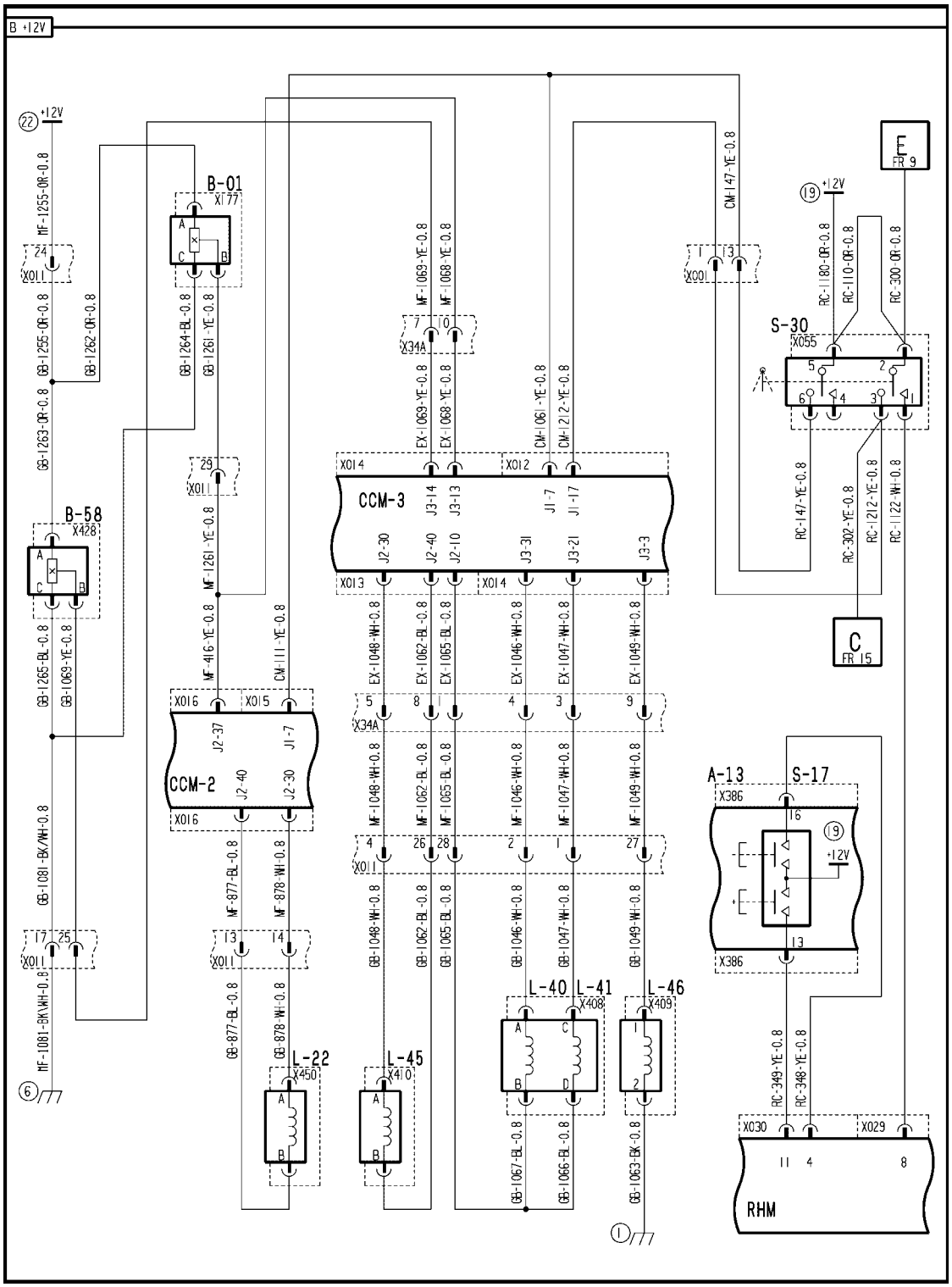
   B. If there is continuity to ground, there is a short to ground in the expansion (EX) harness between connector **X034A** and connector **X014**pin J3-31 wire 1046 white. Locate the short and repair.

10. Visually inspect the harness and connectors for damage, bent or dislocated, corroded terminals, or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

https://truckmanualshub.com/

Control valve Clutch control valve - Short circuit to B+ (K.40.C.14.20 - G.30.B.54)

AFX8010

E0306-03 - Rotor ETR Clutch Current Sense

Context:
The Rotor ETR Clutch Current Sense circuit is the ground path for the Rotor ETR clutch PWM solenoid L-45. By monitoring current flow on the return path of the Rotor ETR clutch solenoid, the module can provide precise control of the solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The Rotor ETR clutch solenoid (L-45) circuit has excessive current draw, or is shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "ETR CTCH ISENSE" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper Rotor ETR clutch solenoid current should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps**, continue with Step **2**.

   B. If the reading is normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **5**.

   NOTE: *If the current reading is high, immediately shut off the circuit by pressing the "ENGAGE" key after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the Rotor ETR clutch solenoid connector **X410**. Use a multimeter to check the resistance of the Rotor ETR clutch solenoid L-45 between connector **X410** pins A & B. The proper resistance range for the Rotor ETR clutch solenoid is **7.2 - 11.2 ohms**.

   A. If out of specification, replace the solenoid. Continue with Step **7**.

   B. If the coil is within specification, continue with Step **3**.

3. Disconnect connector **X011**. Use a multimeter to check the resistance of the Rotor ETR clutch solenoid circuit between connector **X011** pins 4 & 26. The resistance should be the same as, or slightly higher than the resistance of the solenoid as measured in Step 2

   A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X410** and connector **X011** wires 1048 white and 1062 blue. Locate the short and repair. Continue with Step **7**.

   B. If the resistance is the same as previously measured, continue with Step **4**.

4. Disconnect connector **X034A**. Use a multimeter to check the resistance of the Rotor ETR clutch solenoid circuit between connector **X034A** pins 5 & 8. The resistance should be the same as, or slightly higher than the resistance of the solenoid as measured in Step 2.

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A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X034A** and connector **X011** wires 1048 white and 1062 blue. Locate the short and repair. Continue with Step **7**.

B. If the resistance is the same as previously measured, continue with Step **4**.

5. Carefully disconnect connector **X013** on the bottom of CCM3 module. Use a multimeter to check the resistance of the Rotor ETR clutch solenoid circuit between connector **X013** pins J2-30 & J2-40.

   A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X034A** and connector **X013** wires 1048 white and 1062 blue. Locate the short and repair. Continue with Step **7**.

   B. If the resistance is the same as previously measured, reattach all connectors and continue with Step **5**.

6. Key on. Disconnect connector **X410**. Use a multimeter to check for voltage at connector **X410** pin B (harness end). There should be no voltage on this wire.

   A. If there is no voltage present on the wire, continue with Step **7**.

   B. If there is voltage present on the wire, continue with Step **6**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

7. Key on. Disconnect connector **X011**. Use a multimeter to check for voltage at connector **X011** pin 26 (module side of connector). There should be no voltage on this wire.

   A. If there is no voltage on the wire, the short to voltage is between connector **X410** and connector **X011** wire 1062 blue. Locate the short and repair. Continue with Step **7**.

   B. If there is voltage on the wire, continue with Step **8**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

8. Key on. Disconnect connector **X034A**. Use a multimeter to check for voltage at connector **X034A** pin 8 (module side of connector). There should be no voltage on this wire.

   A. If there is no voltage on the wire, the short to voltage is between connector **X034A** and connector **X011** wire 1062 blue. Locate the short and repair. Continue with Step **7**.

   B. If there is voltage on the wire, the short to voltage is between connector **X034A** and connector **X013** pin J2-40 wire 1062 blue. Locate the short and repair. Continue with Step **7**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

9. The sense resistor in the module for the Rotor ETR Clutch Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Disconnect connector **X034A**. Use a multimeter to check resistance between connector **X034A** pin 8 and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM3 module has failed. Replace the module.

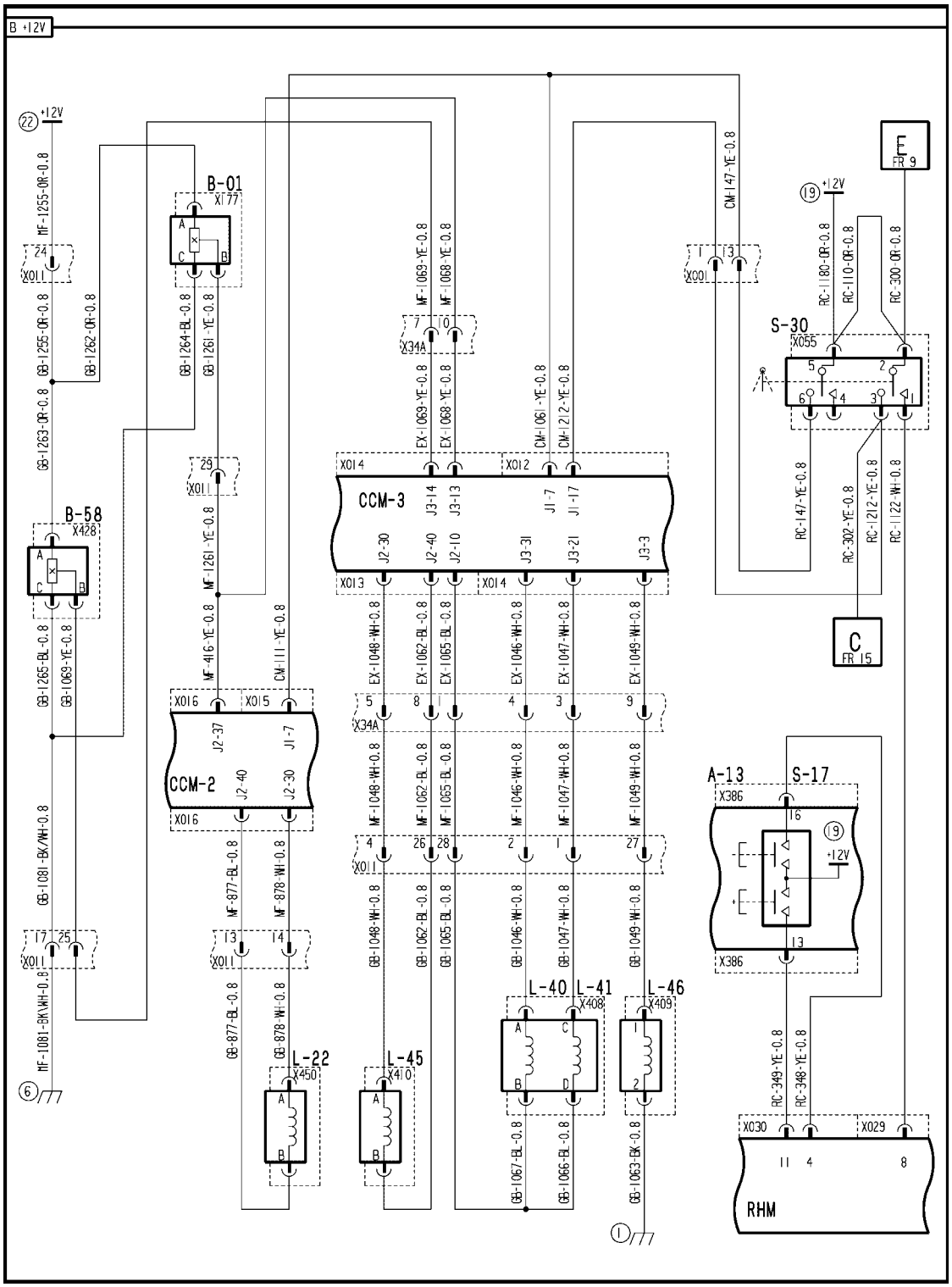
   B. If the resistance is correct, the sense resistor in the CCM3 module is okay, and the circuit should function correctly. Continue with Step **8**.

10. Operate the combine while monitoring the Rotor ETR Clutch Current Sense circuit current on the Universal Display Plus "DIAG" screen.

    A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Control valve Clutch control valve - Unidentified failure (K.40.C.14.20 - G.30.B.46)

AFX8010

E0308-11 - Rotor ETR Clutch Valve

Cause:
The Rotor ETR Clutch Valve (L-45) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Start the combine engine. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "ETR CTCH VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **5**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **11**.
2. Disconnect the Rotor ETR clutch connector **X410**. Use a multimeter to check between connector **X410** pin A (valve side) and chassis ground.

   A. If there is continuity, the Rotor ETR clutch solenoid is shorted to ground. Replace the solenoid.

   B. If there is no continuity, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X410** pin A (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

   A. If there is continuity to ground, continue with Step **4**.

   B. If there is no continuity to ground, continue with step **9**.
4. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 4 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X013** while making this check.

   A. If there is no continuity to ground, the short to ground is in the gearbox (GB) harness between connector **X011** and connector **X410** wire 1048 white. Locate the short and repair.

   B. If there is continuity to ground, continue with step **6**.
5. Disconnect connector **X034A**. Use a multimeter to check for continuity between connector **X034A** pin 5 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X013** while making this check.

   A. If there is no continuity to ground, the short to ground is in the main frame (MF) harness between connector **X011** and connector **X034A** wire 1048 white. Locate the short and repair.

   B. If there is continuity to ground, the short to ground is in the expansion (EX) harness between connector **X034A** and connector **X013** pin J2-30 wire 1048 white. Locate the short and repair.

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6. Disconnect connector **X410**. Use a multimeter to check the resistance of the Rotor ETR clutch valve coil between connector **X410** pins A & B. The proper resistance range is **7.2 - 11.2 ohms**.

   A. If there is no continuity, replace solenoid.

   B. If the coil is within specification, continue with Step **6**.

7. Use a multimeter to check for continuity between connector **X410** pin B (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

   A. If there is no continuity to ground, continue with Step **7**.

   B. If there is continuity to ground, continue with Step **9**.

8. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 26 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X034A** while making this check.

   A. If there is continuity to ground, the open circuit is in the gearbox (GB) harness between connector **X011** and connector **X410** wire 1062 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **8**.

9. Disconnect connector **X034A**. Use a multimeter to check for continuity between connector **X034A** pin 8 and chassis ground. Flex the main frame (MF) harness between the connector **X034A** and connector **X013** while making this check.

   A. If there is continuity to ground, the open circuit is in the main frame (MF) harness between connector **X011** and connector **X034A** wire 1062 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **8**.

10. Disconnect connector **X013** on the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X013** pin J2-40 on the module and chassis ground.

    A. There is infinite resistance. The sense resistor in the CCM1 module has failed. Replace the module.

    B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM1 module is okay. The open circuit is in the expansion (EX) harness between connector **X034A** and connector **X013** wire 1062 blue. Locate the open and repair.

    NOTE: *The sense resistor in the module for the Isense Rotor ETR Clutch circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

11. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the Rotor ETR clutch valve. Use a multimeter to check for **12 volts** between connector **X410** pin A and chassis ground.

    A. If **12 volts** is not present, continue with Step **10**.

    B. If **12 volts** is found, continue with Step **11**.

12. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the Rotor ETR clutch valve. Use a multimeter to check for **12 volts** between connector **X011** pin 4 and chassis ground.

    A. If **12 volts** is present, the open circuit is in the gearbox (GB) harness between connector **X410** pin A and connector **X011** pin 4 wire 1048 white. Locate the open circuit and repair.

    B. If **12 volts** is not present, continue with step **13**.

13. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the Rotor ETR clutch valve. Use a multimeter to check for **12 volts** between connector **X034A** pin 5 and chassis ground.

    A. If **12 volts** is present, the open circuit is in the main frame (MF) harness between connector **X034A** and connector **X011** pin 12 wire 1048 white. Locate the open circuit and repair.

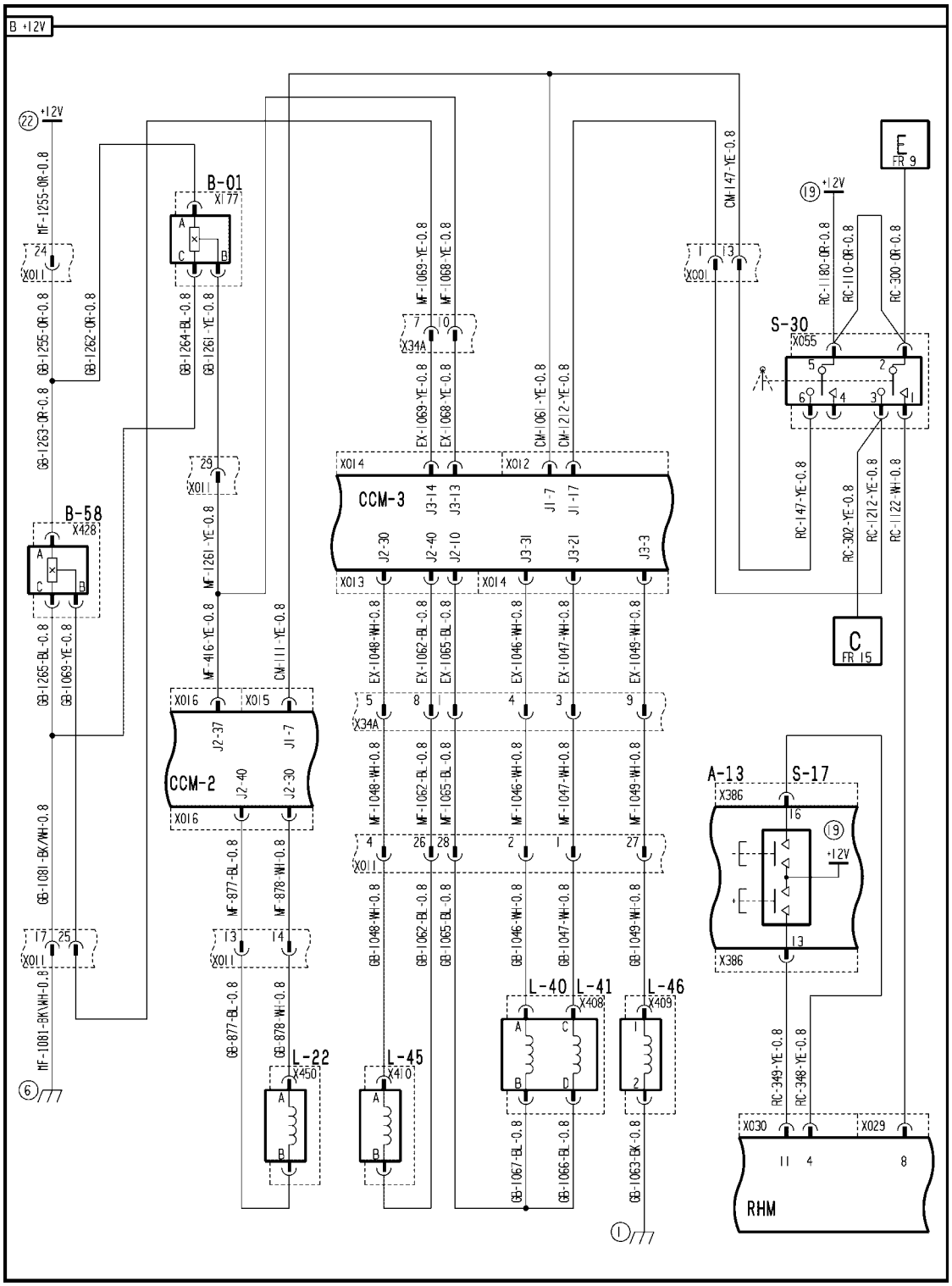
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B. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X034A** and connector **X013** pin J2-30 wire 1048 white. Locate the open and repair.

14. Operate the combine while monitoring the Rotor ETR Clutch circuit current on the Universal Display Plus "DIAG" screen.

A. If no high out of range current readings are seen, erase the error code and continue operation.

Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

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FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Control valve Clutch control valve - Unidentified failure (K.40.C.14.20 - G.30.B.46)

AFX8010

E0315-11 - Rotor RTF Clutch Valve

Cause:
The rotor RTF clutch valve (L-46) circuit open or is shorted to ground.

Possible failure modes:

1. Supply wiring shorted to ground or open circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "RTF CTCH VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position and disconnect the rotor RTF clutch connector **X409**. Use a multimeter to check the resistance of the rotor RTF clutch solenoid. The proper resistance range for the coil is **1.0 - 8.0 ohms**.

   A. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between the gearbox (GB) harness end of connector **X409** pin 1 and chassis ground. Flex the gearbox (GB) harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, continue with Step **6**.
4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rotor RTF clutch solenoid. Use a multimeter to check for **12 volts** between connector **X409** pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **5**.

   B. If **12 volts** is found, continue with Step **7**.
5. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rotor RTF clutch solenoid. Use a multimeter to check for **12 volts** between connector **X011** pin 27 and chassis ground.

   A. If **12 volts** is not present, continue with step **8**.

   B. If **12 volts** is read, there is an open circuit in the gearbox (GB) harness between connector **X011** and connector **X409** wire 1049 white. Locate the open and repair.
6. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the rotor RTF clutch solenoid. Use a multimeter to check for **12 volts** between connector **X034A** pin 9 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the expansion (EX) harness between connector **X034A** and connector **X020** J3-3 wire 1049 white. Locate the open and repair.

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B. If **12 volts** is read, there is an open circuit in the main frame (MF) harness between connector **X034A** and connector **X011** wire 1049 white. Locate the open and repair.

7. Disconnect connector **X011**. Use the multimeter to check for continuity between connector **X011** pin 27 and chassis ground.

   A. If continuity is found, continue with step **8**.

   B. If no continuity is found, the short to ground is in the gearbox (GB) harness between connector **X011** and connector **X409** wire 1049 white. Locate the short and repair.

8. Disconnect connector **X034A**. Use the multimeter to check for continuity between connector **X034A** pin 9 and chassis ground.

   A. If continuity is found, the short to ground is in the expansion (EX) harness between connector **X034A** and connector **X020** J3-3 wire 1049 white. Locate the short and repair.

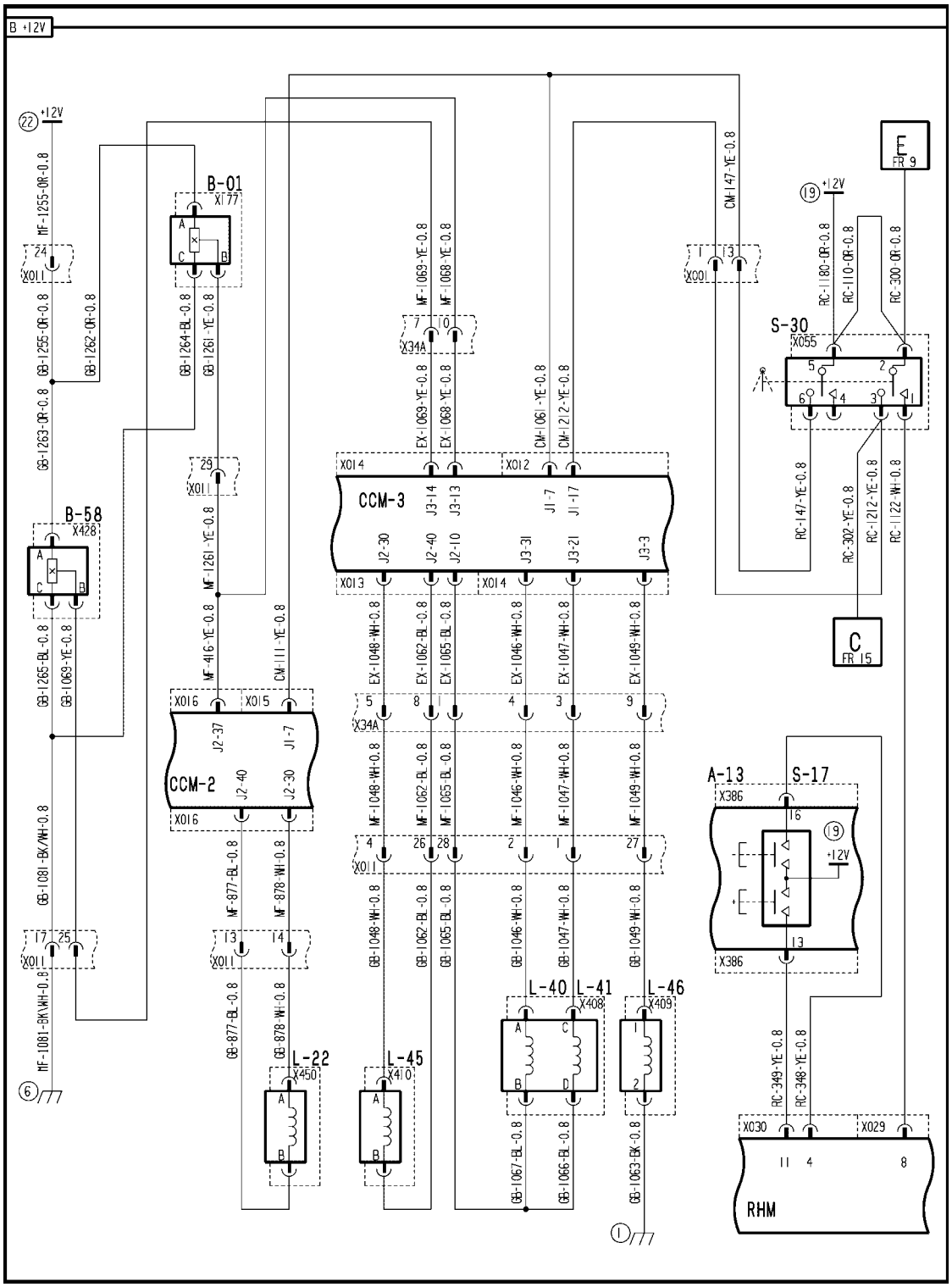
   B. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X034A** and connector **X011** wire 1049 white. Locate the short and repair.

9. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Electrical motor - Short circuit (K.40.C.82 - G.30.B.52)

AFX8010

E0044-06 - Concave Current Sense

Cause:
The concave clearance motor (M-04) circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the concave clearance motor M-04 and grain tank covers motor M-12 in order to move them in either direction. A relay is used to switch operation between the two motors. The CCM module monitors both sides of the circuit during operation, and issues one or several fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" sort menu, and select "CONCAVE MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually raise and lower the concaves. Record in which directions the concave motor operates.
3	Select the "GRAIN HANDLING" sort menu, and select "COVERS MTR" (if combine is equipped with grain tank covers). Use the "COMMAND" and "ENGAGE" functions to manually raise and lower the grain tank covers. Record in which directions the covers motor operates.
4	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0044-06 - Concave Current Sense** **E0045-06 - Covers Current Sense** **E0078-11 - Concave Motor** **E0079-11 - Grain Tank Covers Motor** .
5	Use the appropriate result below to determine the location of the fault.

A. If the concave motor operates in one direction only, and the fault code
E0044-06 - Concave Current Sense
is displayed, continue with step **2**.

B. If the concave motor operates in one direction only, and both fault codes
E0044-06 - Concave Current Sense
and
E0078-11 - Concave Motor
are displayed, continue with step **3**.

C. If the concave motor and grain tank covers motor operate in one direction only, and the following fault codes are displayed:
E0044-06 - Concave Current Sense
E0045-06 - Covers Current Sense
E0078-11 - Concave Motor
E0079-11 - Grain Tank Covers Motor
continue with step **6**.

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D. If the concave motor does not operate in either direction, and the fault code **E0078-11 - Concave Motor** is displayed, continue with step **9**.

E. If the concave motor does not operate in either direction, and both fault codes **E0044-06 - Concave Current Sense** and **E0078-11 - Concave Motor** are displayed, continue with step **14**.

F. If the grain tank covers motor operates in one direction only, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **15**.

G. If the grain tank covers motor operates in one direction only, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **16**.

H. If the grain tank covers motor does not operate in either direction, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **20**.

I. If the grain tank covers motor does not operate in either direction, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **31**.

J. If both the concave motor and grain tank covers motor do not operate in either direction, and the fault codes **E0078-11 - Concave Motor** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **32**.

K. If both the concave motor and grain tank covers motor do not operate in either direction, and there are no fault codes displayed, continue with step **34**.

2. Manually operate the concave motor using the "DIAG" screen controls, while having an observer inspect the concave linkage movement for binding.

   A. The concave clearance adjustment motor is bound up. See the appropriate repair manual chapter for repair.

3. The concave clearance motor operates in one direction only. Fault codes indicate a short to ground. Disconnect the concave clearance motor connector **X190**. Measure the resistance on concave motor connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

   A. If out of specification, replace concave motor.

   B. If the motor coil resistance is within specification, continue with Step **4**.

4. Use a multimeter to check for continuity on the harness end of connector **X190** pin 2 and chassis ground. Flex the concave extension (CC) harness while making this check. There should not be any continuity to ground.

   A. If there is no continuity to ground, erase the fault code and continue operation.

   B. If there is continuity to ground, continue with Step **6**.

5. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 2 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the short and repair.

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B. If there is continuity to ground, continue with step **5**.

6. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 30 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X004** and relay base K16 terminal 4 wire 695 white. Locate the short and repair.

   B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X190** wire 695 white. Locate the short and repair.

7. Concave and covers operate in one direction only. Fault codes indicate a short to ground. Disconnect both the concave motor connector **X190** and covers motor connector **X289**. Use a multimeter to measure the resistance of the concave motor connector **X190** between pin 1 and pin 2, and the covers motor connector **X289** between pin A and pin B. The proper resistance range for both motors is **1.0 - 5.0 ohms**.

   A. If the concave motor is out of specification, replace concave motor.

   B. If the grain tank covers motor is out of specification, replace covers motor.

   C. If both motors are within specification, continue with Step **7**.

8. Check for continuity between concave motor connector **X190** pin 1 and chassis ground. Flex the main frame (MF) harness while making this check.

   Next check for continuity between connector **X289** pin B and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check. There should not be continuity to ground.

   A. If no continuity to ground is found, erase fault code and continue operation.

   B. If there is continuity to ground, continue with Step **8**.

9. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 1 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 694 gray. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **8**.

10. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 3 and chassis ground.

    A. If continuity is found, there is a short to ground in the main frame (MF) harness between connector **X456**, connector **X195** and connector **X019** pin J2-1 wires 694 gray, 693 gray and 522 gray. Locate the short and repair.

    B. If no continuity is found, there is a short to ground in the grain tank jumper harness between connector **X195** and connector **X289** wire 693 gray. Locate the short and repair.

11. Concave does not operate in either direction. Fault code indicates an open circuit. Disconnect the concave motor connector **X190**. Measure the resistance on connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

    A. If out of specification, replace concave motor.

    B. If the motor coil resistance is within specification, continue with Step **10**.

12. Replace the concave/covers relay K-16 with a known good relay. Reattach connector **X176** and operate the concaves.

    A. If the concaves are now working, the concave/covers relay K-16 has failed. Replace the relay.

    B. If the concaves still do not work, continue with Step **11**.

13. Disconnect concave motor connector **X190**. Turn key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 2 and chassis ground.

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A. If **12 volts** is found, continue with Step **12**.

B. If **12 volts** is not found, continue with Step **13**.

14. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 1 and chassis ground.

A. If **12 volts** is not found, continue with step **15**.

B. If **12 volts** is found, replace the concave motor.

15. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 1 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X190** and connector **X456** wire 694 gray. Locate the open and repair.

B. If **12 volts** is not found, there is an open circuit in the main frame (MF) harness between connector **X456** and connector **X019** J2-1 wires 694 gray or 522 gray. Locate the open and repair.

16. Disconnect connector **X456**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 2 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, continue with step **17**.

17. Disconnect connector **X004**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 30 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the main frame (MF) harness between connector **X004** and connector **X456** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, there is an open circuit in the cab main (CM) harness between connector **X004** and relay base terminal 4 on relay K16, wire 695 white. Locate the open and repair.

18. Disconnect connector **X190** at the concave clearance motor. Use a multimeter to check for continuity between concave motor connector **X190**pin 1 or 2 and chassis ground. There should not be any continuity to ground..

A. If there is continuity to ground, replace concave motor.

B. If there is no continuity to ground, return to step **1** and repeat the concave motor circuit test.

19. Manually operate the grain tank covers motor using the "DIAG" screen controls, while having an observer inspect the grain tank covers linkage for binding.

A. The grain tank covers motor is bound up. See the appropriate repair manual chapter for repair.

20. The covers operates in one direction only. Fault codes indicate a short to ground. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **17**.

21. Measure the resistance on connector **X289** between pin A and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check.

A. If no continuity to ground is found, erase the fault code and continue operation.

B. If there is continuity to ground, continue with Step **18**.

22. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 4 and chassis ground.

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A. If continuity is found, continue with Step **19**.

B. If no continuity is found, the short to ground is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the short and repair.

23. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 31 and chassis ground.

A. If continuity is found, there is a short to ground in the cab main (CM) harness between connector **X004** and the relay base for relay K-16 terminal 4 wire 695 white. Locate the short and repair.

B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the short and repair.

24. Covers do not operate in either direction. Fault code indicates an open in circuit. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **21**.

25. Replace the concave/covers relay K-16 with a known good relay. Connect **X289** and operate the grain tank covers.

A. If the grain tank covers function properly, the concave/covers relay has failed. Replace the relay.

B. If the covers still do not work, continue with Step **26**.

26. Disconnect the covers motor connector **X289**. Turn key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X289** pin A and chassis ground.

A. If **12 volts** is found, continue with Step **27**.

B. If **12 volts** is not found, continue with Step **29**.

27. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X289** pin B and chassis ground.

A. If **12 volts** is not found, continue with Step **28**.

B. If **12 volts** is found, recheck the motor for continuity at Step **20**. Erase the fault codes and continue operation.

28. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X195** pin 3 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X289** and connector **X195** wire 693 gray. Locate the open and repair.

B. If **12 volts** is not found, the open is in the main frame (MF) harness between connector **X195** pin 3 and the MF wire splice wire 693 gray. Locate the open and repair.

29. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X195** pin 4 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the open and repair.

B. If **12 volts** is not found, continue with Step **30**.

30. Disconnect connector **X004**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 31 and chassis ground.

A. If **12 volts** is found, the open is in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the open and repair.

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B. If **12 volts** is not found, the open is in the cab main (CM) harness between connector **X004** and relay base terminal 3 on relay K16, wire 696 white. Locate the open and repair.

31. Disconnect connector **X289** at the grain tank covers motor. Use a multimeter to check for continuity between covers motor connector **X289** pin A or B and chassis ground. There should not be any continuity to ground..

A. If there is continuity to ground, replace covers motor.

B. If there is no continuity to ground, return to step **1** and repeat the covers motor circuit test.

32. Both concave and covers do not operate in either direction. Fault code indicates an open circuit. Remove the concave/covers relay K-16 from the relay base. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between relay base K-16 terminal 3 and chassis ground.

A. If **12 volts** is found, the open circuit is in the main frame (MF) harness between CCM1 connector **X019** J2-1 and the MF wire splice wire 522 gray. Locate the open and repair.

B. If **12 volts** is not found, continue with Step **33**.

33. Disconnect connector **X004**. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 29 and chassis ground.

A. If **12 volts** is found, the open is in the cab main (CM) harness between connector **X004** and relay base K16 terminal 3. Locate the open and repair.

B. If **12 volts** is not found, the open is in main frame (MF) harness between connector **X004** and CCM1 connector **X019** J2-21 wire 523 white. Locate the open and repair.

34. If both the concave or grain tank covers do not operate in either direction, and there are no error codes indicated, the supply power for the circuits may not be present. Remove fuse F24 and inspect.

A. Fuse has failed. Go to Step **35**.

B. Fuse is okay. Go to Step **36**.

35. If fuse has failed, replace the fuse.

A. If fuse immediately fails, a short to ground exists in the cab main (CM) or main frame (MF) harnesses on one of the following wires;
- wire 026 red, fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11
- wire 027 red, fuse F24 to connector **X031** pin 3
Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

B. Fuse is okay. Go to Step **36**.

36. Test for 12V power at connector **X019** pin J2-11 on the CCM1 module under the cab.

A. If there is no power, there is an open circuit in the cab main (CM) or main frame (MF) harnesses between fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11 wire 026 red. Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the open and repair. After repair, go to Step **37**.

B. If there is power, go to Step **37**.

37. Test for continuity to ground at connector **X019** pin J2-3 on the CCM1 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X019** pin J2-3 and the front frame ground #2 wire 513 black. Locate the open and repair. After repair, go to Step **38**.

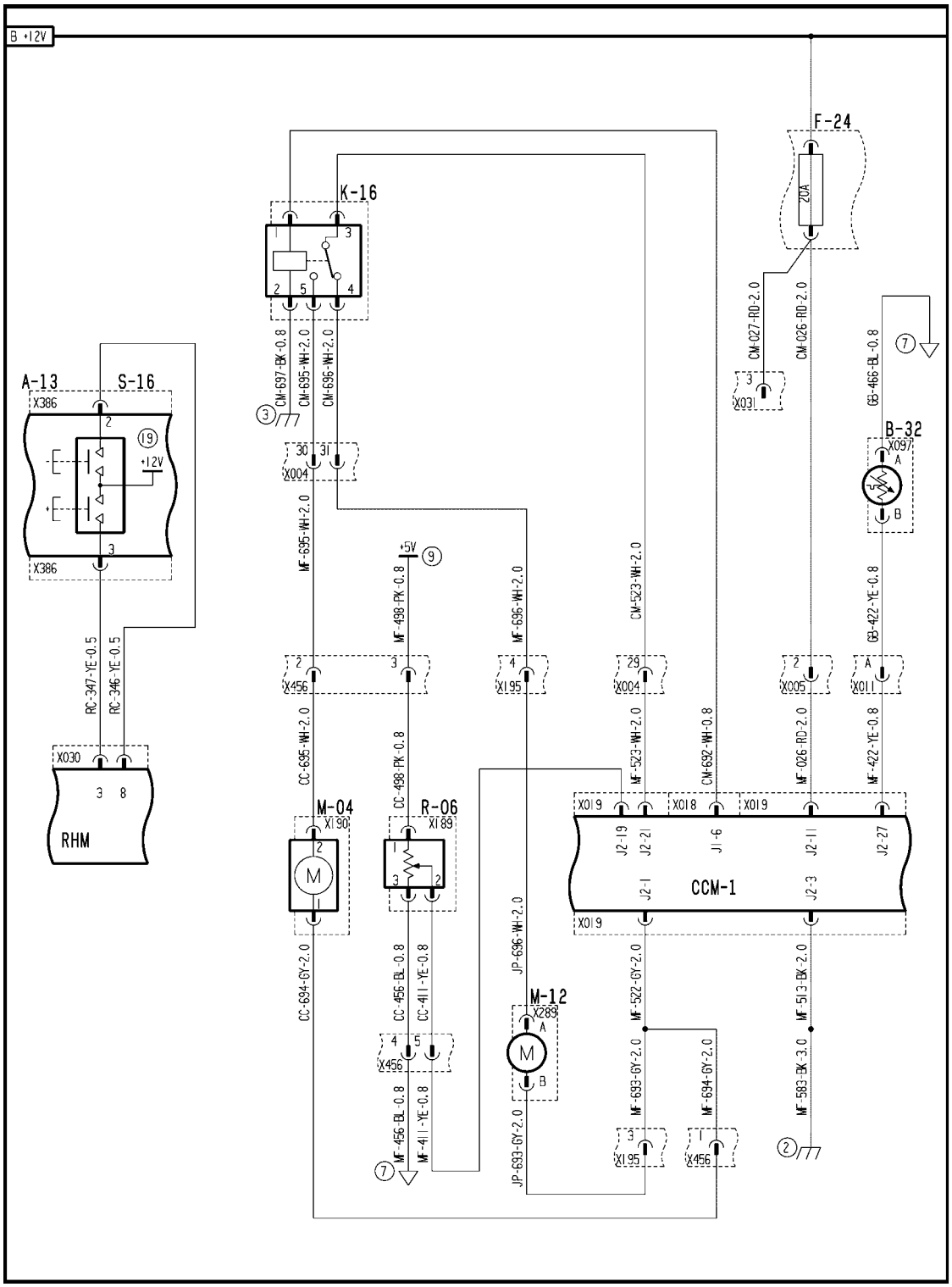
B. If there is continuity to ground, go to Step **38**.

38. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls.

A. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step **1** to locate the short to ground.

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



AFXSCHEM16-04 1

FRAME 16 - THRESHER

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A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

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Electrical motor - Unidentified failure (K.40.C.82 - G.30.B.46)

AFX8010

E0078-11 - Concave Motor

Cause:
The concave clearance motor (M-04) circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the concave clearance motor M-04 and grain tank covers motor M-12 in order to move them in either direction. A relay is used to switch operation between the two motors. The CCM module monitors both sides of the circuit during operation, and issues one or several fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" sort menu, and select "CONCAVE MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually raise and lower the concaves. Record in which directions the concave motor operates.
3	Select the "GRAIN HANDLING" sort menu, and select "COVERS MTR" (if combine is equipped with grain tank covers). Use the "COMMAND" and "ENGAGE" functions to manually raise and lower the grain tank covers. Record in which directions the covers motor operates.
4	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0044-06 - Concave Current Sense** **E0045-06 - Covers Current Sense** **E0078-11 - Concave Motor** **E0079-11 - Grain Tank Covers Motor** .
5	Use the appropriate result below to determine the location of the fault.

A. If the concave motor operates in one direction only, and the fault code
E0044-06 - Concave Current Sense
is displayed, continue with step **2**.

B. If the concave motor operates in one direction only, and both fault codes
E0044-06 - Concave Current Sense
and
E0078-11 - Concave Motor
are displayed, continue with step **3**.

C. If the concave motor and grain tank covers motor operate in one direction only, and the following fault codes are displayed:
E0044-06 - Concave Current Sense
E0045-06 - Covers Current Sense
E0078-11 - Concave Motor
E0079-11 - Grain Tank Covers Motor
continue with step **6**.

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D. If the concave motor does not operate in either direction, and the fault code **E0078-11 - Concave Motor** is displayed, continue with step **9**.

E. If the concave motor does not operate in either direction, and both fault codes **E0044-06 - Concave Current Sense** and **E0078-11 - Concave Motor** are displayed, continue with step **14**.

F. If the grain tank covers motor operates in one direction only, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **15**.

G. If the grain tank covers motor operates in one direction only, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **16**.

H. If the grain tank covers motor does not operate in either direction, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **20**.

I. If the grain tank covers motor does not operate in either direction, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **31**.

J. If both the concave motor and grain tank covers motor do not operate in either direction, and the fault codes **E0078-11 - Concave Motor** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **32**.

K. If both the concave motor and grain tank covers motor do not operate in either direction, and there are no fault codes displayed, continue with step **34**.

2. Manually operate the concave motor using the "DIAG" screen controls, while having an observer inspect the concave linkage movement for binding.

   A. The concave clearance adjustment motor is bound up. See the appropriate repair manual chapter for repair.

3. The concave clearance motor operates in one direction only. Fault codes indicate a short to ground. Disconnect the concave clearance motor connector **X190**. Measure the resistance on concave motor connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

   A. If out of specification, replace concave motor.

   B. If the motor coil resistance is within specification, continue with Step **4**.

4. Use a multimeter to check for continuity on the harness end of connector **X190** pin 2 and chassis ground. Flex the concave extension (CC) harness while making this check. There should not be any continuity to ground.

   A. If there is no continuity to ground, erase the fault code and continue operation.

   B. If there is continuity to ground, continue with Step **6**.

5. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 2 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the short and repair.

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B. If there is continuity to ground, continue with step **5**.

6. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 30 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X004** and relay base K16 terminal 4 wire 695 white. Locate the short and repair.

   B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X190** wire 695 white. Locate the short and repair.

7. Concave and covers operate in one direction only. Fault codes indicate a short to ground. Disconnect both the concave motor connector **X190** and covers motor connector **X289**. Use a multimeter to measure the resistance of the concave motor connector **X190** between pin 1 and pin 2, and the covers motor connector **X289** between pin A and pin B. The proper resistance range for both motors is **1.0 - 5.0 ohms**.

   A. If the concave motor is out of specification, replace concave motor.

   B. If the grain tank covers motor is out of specification, replace covers motor.

   C. If both motors are within specification, continue with Step **7**.

8. Check for continuity between concave motor connector **X190** pin 1 and chassis ground. Flex the main frame (MF) harness while making this check.

   Next check for continuity between connector **X289** pin B and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check. There should not be continuity to ground.

   A. If no continuity to ground is found, erase fault code and continue operation.

   B. If there is continuity to ground, continue with Step **8**.

9. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 1 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 694 gray. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **8**.

10. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 3 and chassis ground.

    A. If continuity is found, there is a short to ground in the main frame (MF) harness between connector **X456**, connector **X195** and connector **X019** pin J2-1 wires 694 gray, 693 gray and 522 gray. Locate the short and repair.

    B. If no continuity is found, there is a short to ground in the grain tank jumper harness between connector **X195** and connector **X289** wire 693 gray. Locate the short and repair.

11. Concave does not operate in either direction. Fault code indicates an open circuit. Disconnect the concave motor connector **X190**. Measure the resistance on connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

    A. If out of specification, replace concave motor.

    B. If the motor coil resistance is within specification, continue with Step **10**.

12. Replace the concave/covers relay K-16 with a known good relay. Reattach connector **X176** and operate the concaves.

    A. If the concaves are now working, the concave/covers relay K-16 has failed. Replace the relay.

    B. If the concaves still do not work, continue with Step **11**.

13. Disconnect concave motor connector **X190**. Turn key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 2 and chassis ground.

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A. If **12 volts** is found, continue with Step **12**.

B. If **12 volts** is not found, continue with Step **13**.

14. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 1 and chassis ground.

A. If **12 volts** is not found, continue with step **15**.

B. If **12 volts** is found, replace the concave motor.

15. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 1 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X190** and connector **X456** wire 694 gray. Locate the open and repair.

B. If **12 volts** is not found, there is an open circuit in the main frame (MF) harness between connector **X456** and connector **X019** J2-1 wires 694 gray or 522 gray. Locate the open and repair.

16. Disconnect connector **X456**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 2 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, continue with step **17**.

17. Disconnect connector **X004**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 30 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the main frame (MF) harness between connector **X004** and connector **X456** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, there is an open circuit in the cab main (CM) harness between connector **X004** and relay base terminal 4 on relay K16, wire 695 white. Locate the open and repair.

18. Disconnect connector **X190** at the concave clearance motor. Use a multimeter to check for continuity between concave motor connector **X190**pin 1 or 2 and chassis ground. There should not be any continuity to ground..

A. If there is continuity to ground, replace concave motor.

B. If there is no continuity to ground, return to step **1** and repeat the concave motor circuit test.

19. Manually operate the grain tank covers motor using the "DIAG" screen controls, while having an observer inspect the grain tank covers linkage for binding.

A. The grain tank covers motor is bound up. See the appropriate repair manual chapter for repair.

20. The covers operates in one direction only. Fault codes indicate a short to ground. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **17**.

21. Measure the resistance on connector **X289** between pin A and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check.

A. If no continuity to ground is found, erase the fault code and continue operation.

B. If there is continuity to ground, continue with Step **18**.

22. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 4 and chassis ground.

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A. If continuity is found, continue with Step **19**.

B. If no continuity is found, the short to ground is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the short and repair.

23. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 31 and chassis ground.

A. If continuity is found, there is a short to ground in the cab main (CM) harness between connector **X004** and the relay base for relay K-16 terminal 4 wire 695 white. Locate the short and repair.

B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the short and repair.

24. Covers do not operate in either direction. Fault code indicates an open in circuit. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **21**.

25. Replace the concave/covers relay K-16 with a known good relay. Connect **X289** and operate the grain tank covers.

A. If the grain tank covers function properly, the concave/covers relay has failed. Replace the relay.

B. If the covers still do not work, continue with Step **26**.

26. Disconnect the covers motor connector **X289**. Turn key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X289** pin A and chassis ground.

A. If **12 volts** is found, continue with Step **27**.

B. If **12 volts** is not found, continue with Step **29**.

27. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X289** pin B and chassis ground.

A. If **12 volts** is not found, continue with Step **28**.

B. If **12 volts** is found, recheck the motor for continuity at Step **20**. Erase the fault codes and continue operation.

28. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X195** pin 3 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X289** and connector **X195** wire 693 gray. Locate the open and repair.

B. If **12 volts** is not found, the open is in the main frame (MF) harness between connector **X195** pin 3 and the MF wire splice wire 693 gray. Locate the open and repair.

29. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X195** pin 4 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the open and repair.

B. If **12 volts** is not found, continue with Step **30**.

30. Disconnect connector **X004**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 31 and chassis ground.

A. If **12 volts** is found, the open is in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the open and repair.

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B. If **12 volts** is not found, the open is in the cab main (CM) harness between connector **X004** and relay base terminal 3 on relay K16, wire 696 white. Locate the open and repair.

31. Disconnect connector **X289** at the grain tank covers motor. Use a multimeter to check for continuity between covers motor connector **X289** pin A or B and chassis ground. There should not be any continuity to ground..

    A. If there is continuity to ground, replace covers motor.

    B. If there is no continuity to ground, return to step **1** and repeat the covers motor circuit test.

32. Both concave and covers do not operate in either direction. Fault code indicates an open circuit. Remove the concave/covers relay K-16 from the relay base. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between relay base K-16 terminal 3 and chassis ground.

    A. If **12 volts** is found, the open circuit is in the main frame (MF) harness between CCM1 connector **X019** J2-1 and the MF wire splice wire 522 gray. Locate the open and repair.

    B. If **12 volts** is not found, continue with Step **33**.

33. Disconnect connector **X004**. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 29 and chassis ground.

    A. If **12 volts** is found, the open is in the cab main (CM) harness between connector **X004** and relay base K16 terminal 3. Locate the open and repair.

    B. If **12 volts** is not found, the open is in main frame (MF) harness between connector **X004** and CCM1 connector **X019** J2-21 wire 523 white. Locate the open and repair.

34. If both the concave or grain tank covers do not operate in either direction, and there are no error codes indicated, the supply power for the circuits may not be present. Remove fuse F24 and inspect.

    A. Fuse has failed. Go to Step **35**.

    B. Fuse is okay. Go to Step **36**.

35. If fuse has failed, replace the fuse.

    A. If fuse immediately fails, a short to ground exists in the cab main (CM) or main frame (MF) harnesses on one of the following wires;
    - wire 026 red, fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11
    - wire 027 red, fuse F24 to connector **X031** pin 3
    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

    B. Fuse is okay. Go to Step **36**.

36. Test for 12V power at connector **X019** pin J2-11 on the CCM1 module under the cab.

    A. If there is no power, there is an open circuit in the cab main (CM) or main frame (MF) harnesses between fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11 wire 026 red. Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the open and repair. After repair, go to Step **37**.

    B. If there is power, go to Step **37**.

37. Test for continuity to ground at connector **X019** pin J2-3 on the CCM1 module under the cab.

    A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X019** pin J2-3 and the front frame ground #2 wire 513 black. Locate the open and repair. After repair, go to Step **38**.

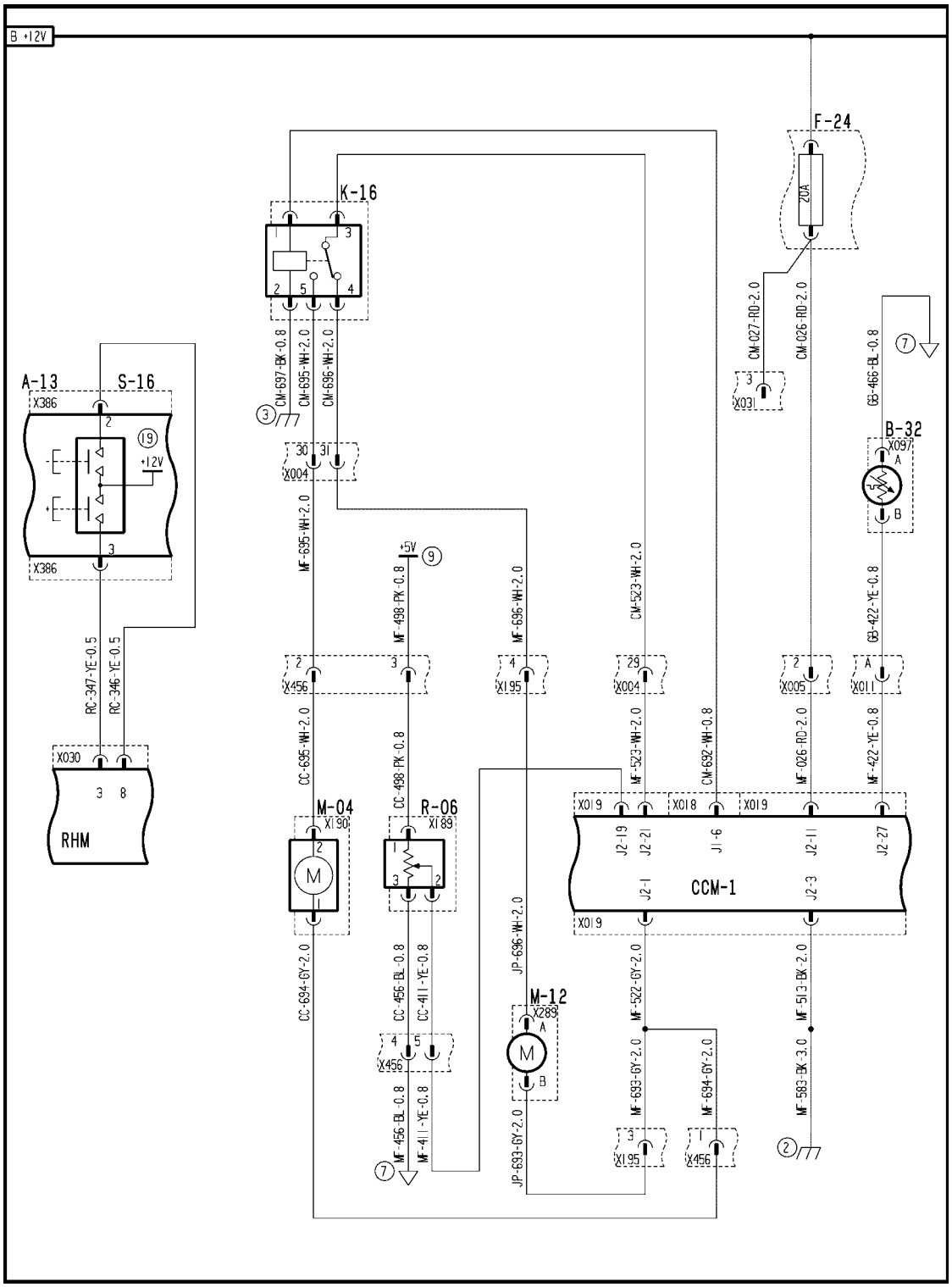
    B. If there is continuity to ground, go to Step **38**.

38. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls.

    A. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step **1** to locate the short to ground.

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



AFXSCHEM16-04 1

FRAME 16 - THRESHER

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A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

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Electrical control Relay - Unidentified failure (K.40.C.90.80 - G.30.B.46)

AFX8010

E0069-11 - Covers / Concave Select Relay

Cause:
The covers/concave clearance relay (K-16) circuit open or shorted to ground.

Possible failure modes:

1. Circuit connection/wiring damaged between CCM1 and relay.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" or "THRESHING" sort menu, and select "COVERCONCAVE RLY". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **5**.
2. Turn the key switch to the OFF position and remove the covers/concave clearance relay K-16 from relay base in cab. Use a multimeter to check for continuity between relay base (K-16) pin 1 and chassis ground. Flex the cab main (CM) harness while making this check.

   A. If no continuity to ground is found, continue with Step **3**.

   B. If there is continuity to ground, the short to ground is in the cab main (CM) harness between relay base and connector **X018** J1-6 wire 692 white. Locate the short and repair.
3. Use a multimeter to check for continuity between relay base (K-16) pin 2 and chassis ground.

   A. If there is continuity to ground, continue with Step **4**.

   B. If no continuity to ground is found, there is an open circuit in the cab main (CM) harness between relay base pin 2 and cab ground #3 wire 697 black. Locate the open and repair.
4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the covers/concave clearance relay K-16. Use the multimeter to check for **12 volts** between relay base (K-16) pin 1 and chassis ground.

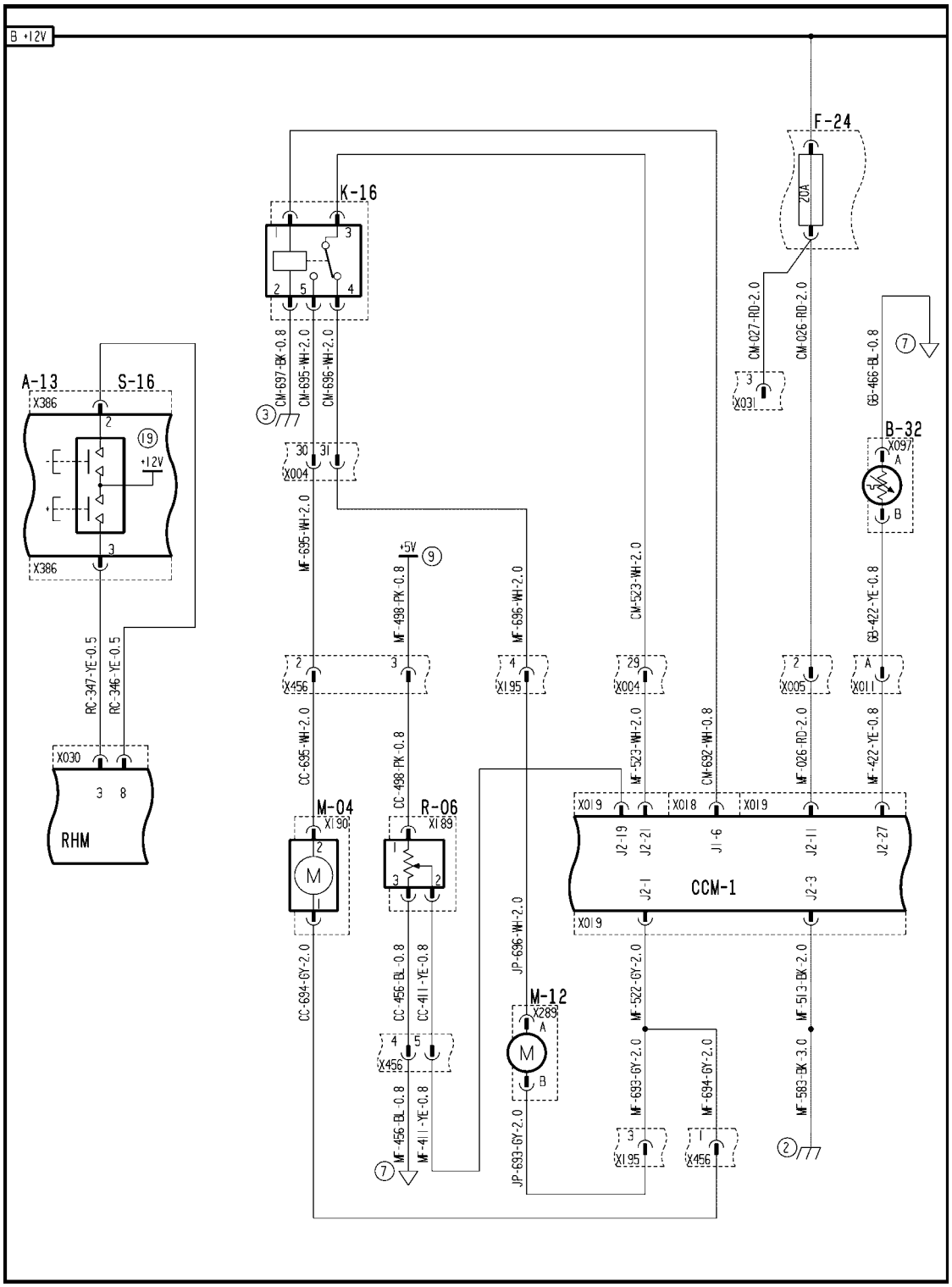
   A. If **12 volts** is not present, there is an open circuit in the cab main (CM) harness between the relay base K-16 and connector **X018** J1-6 wire 692 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **5**.
5. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



AFXSCHEM16-04 1

FRAME 16 - THRESHER

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A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

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Sensing system Concave position sensor - Short circuit to B+ (K.40.C.95.82 - G.30.B.54)

AFX8010

E0034-03 - Concave Position Sensor

Cause:
The concave position sensor (R-06) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" sort menu, and select "CONCAVE POS SEN" to check the voltage range. Raise and lower the concaves several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with concave movement.

   The proper voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is high (>**5.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **7**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect connector **X189**, and use a multimeter to test for continuity to ground on connector **X189** pin 3. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity is found (<**1 ohms**), continue with Step **5**.

   B. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, continue with Step **3**.

3. Key off. Disconnect connector **X456**. Use a multimeter to test for continuity between connector **X189** pin 3 and connector **X456** pin 4.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, there is an open circuit in the concave (CC) harness between connector **X189** pin 3 and connector **X456** pin 4 wire 456 blue. Locate the open and repair.

4. Key off. Carefully remove connector **X019** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X456** pin 4 and connector **X019** pin J2-14.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X456** pin 4 and connector **X019** pin J2-14 wire 456 blue or 460 blue. Locate the open and repair.

5. Key off. Use a multimeter to test for continuity between connector **X019** pin J2-14 on CCM1 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.

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6. Disconnect connector **X189**, and use a multimeter to test for voltage on connector **X189** pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **6**.

   B. If high (>**5.2 volts**) voltage is found, continue with step **8**.

7. Disconnect connector **X456**, and use a multimeter to test for voltage on connector **X456** pin 5. There should not be any voltage present.

   A. If no voltage is found, there is a short to high voltage in the concave (CC) harness between connector **X456** and connector **X189** wire 411 yellow. Locate the short and repair.

   B. If high (>**5.2 volts**) voltage is found, there is a short to high voltage in the main frame (MF) harness between connector **X456** pin 5 and connector **X019** pin J2-19 wire 411 yellow. Locate the short and repair.

8. Disconnect connector **X189**, and use a multimeter to test for voltage on connector **X189** pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **7**.

   B. If high (>**5.2 volts**) voltage is found, continue with step **8**.

   NOTE: *This supply circuit is also used to supply power to the lateral inclination sensor B02,header lift pressure sensor B-29, feeder angle R-03, and PTO box lube pressure sensor B-60, so a short to **12 volts** anywhere on the supply circuit will activate this error code.*

9. Disconnect connector **X456**, and use a multimeter to test for voltage on connector **X456** pin 3. There should be **5 volts** present.

   A. If **5 volts** is found, there is a short to high voltage in the concave (CC) harness between connector **X456** and connector **X189** wire 489 pink. Locate the short and repair.

   B. If high (>**5.2 volts**) voltage is found, there is a short to high voltage in the main frame (MF) harness between connector **X456** pin 3, connector **X170** pin A (B-02), connector **X174** pin 3 (R-03), connector **X279** pin B (B-29), connector **X399** pin B (B-60) and connector **X019** pin J2-31 on one of the following wires:
   - wire 498 pink, connector **X456** pin 3 to MF harness splice
   - wire 451 pink, connector **X170** pin A to MF harness splice
   - wire 751 pink, connector **X174** pin 3 to MF harness splice
   - wire 728 pink, connector **X279** pin B to MF harness splice
   - wire 1286 pink, connector **X399** pin B to MF harness splice
   - wire 453 pink, MF harness splice to connector **X019** pin J2-31.

   Locate the short and repair.

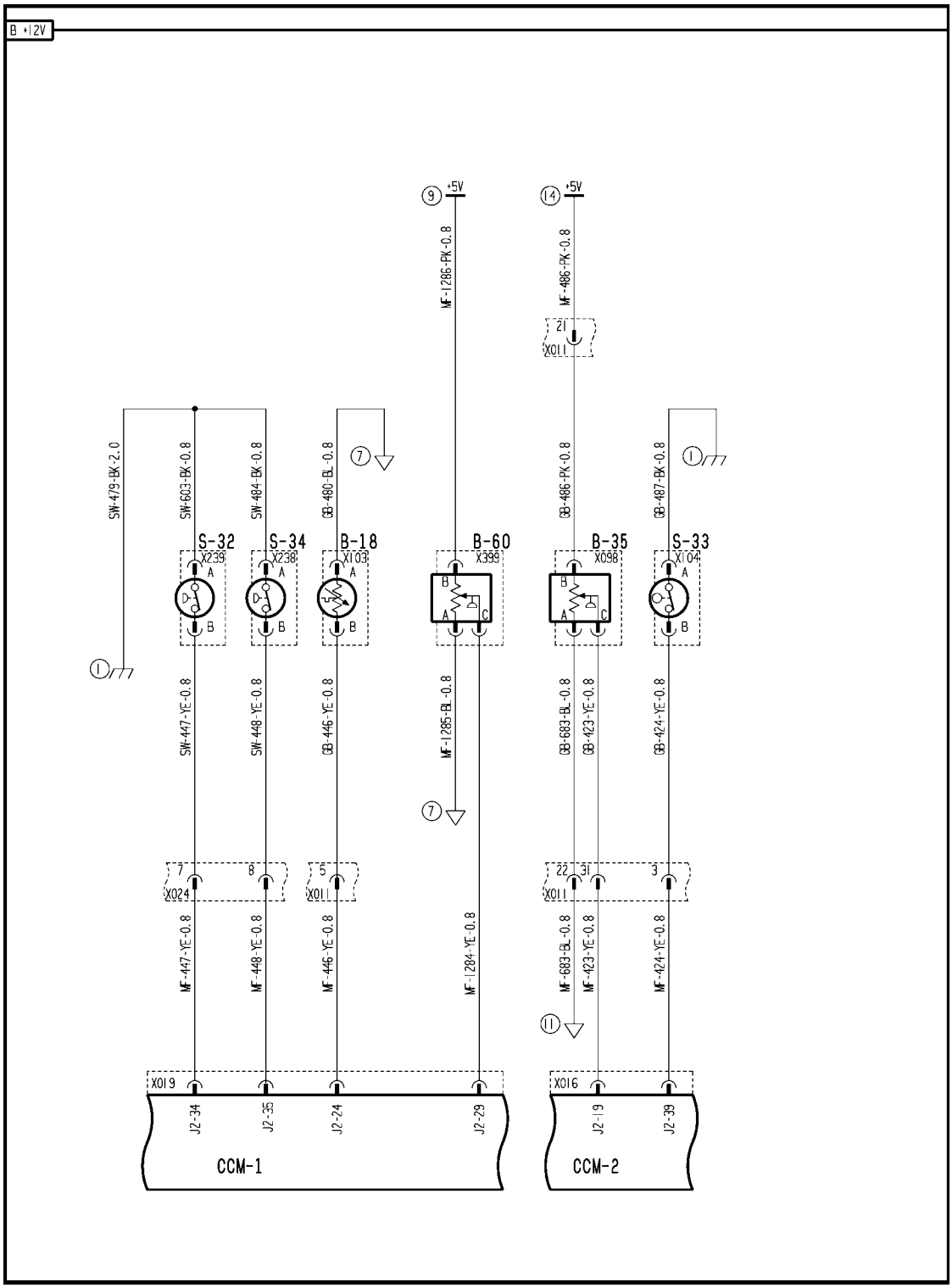
10. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

    A. If no high out of range readings are indicated, erase the fault code and continue operation.

    B. If the fault code immediately resets, determine which **12 volts** circuit (such as the concave clearance motor) was activated to cause the short.

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Wiring harness - Electrical schematic frame 10 (A.30.A.88 - C.20.E.10)



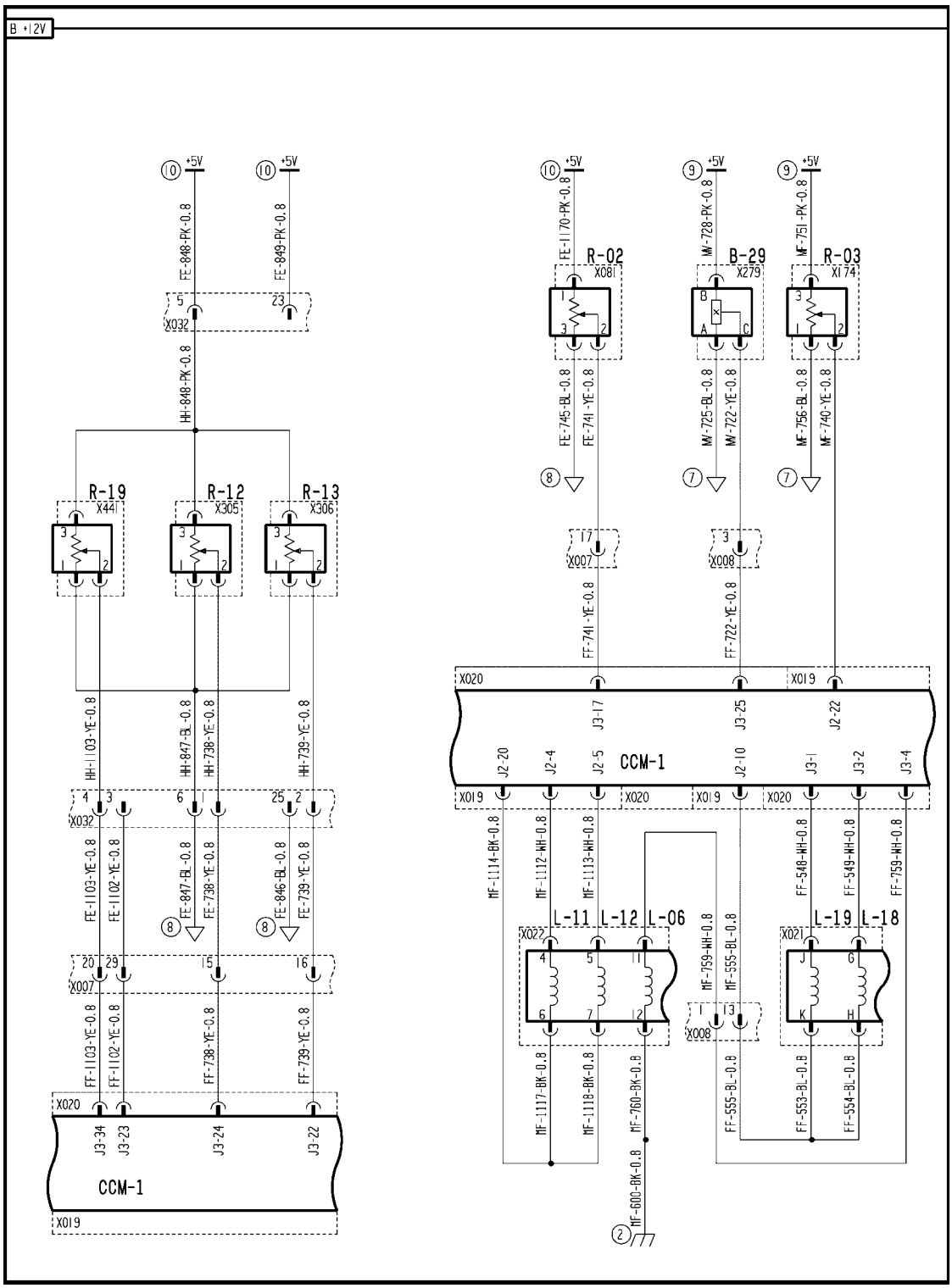
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FRAME 10 - HYDRAULIC

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B-18 Hydraulic Oil Reservoir Temperature	B-35 Low Control Pressure	B-60 PTO Box Lube Pressure
S-32 Returns Filter Bypass	S-33 Hydraulic Reservoir Level	S-34 PTO Box Filter Bypass

Wiring harness - Electrical schematic frame 13 (A.30.A.88 - C.20.E.13)



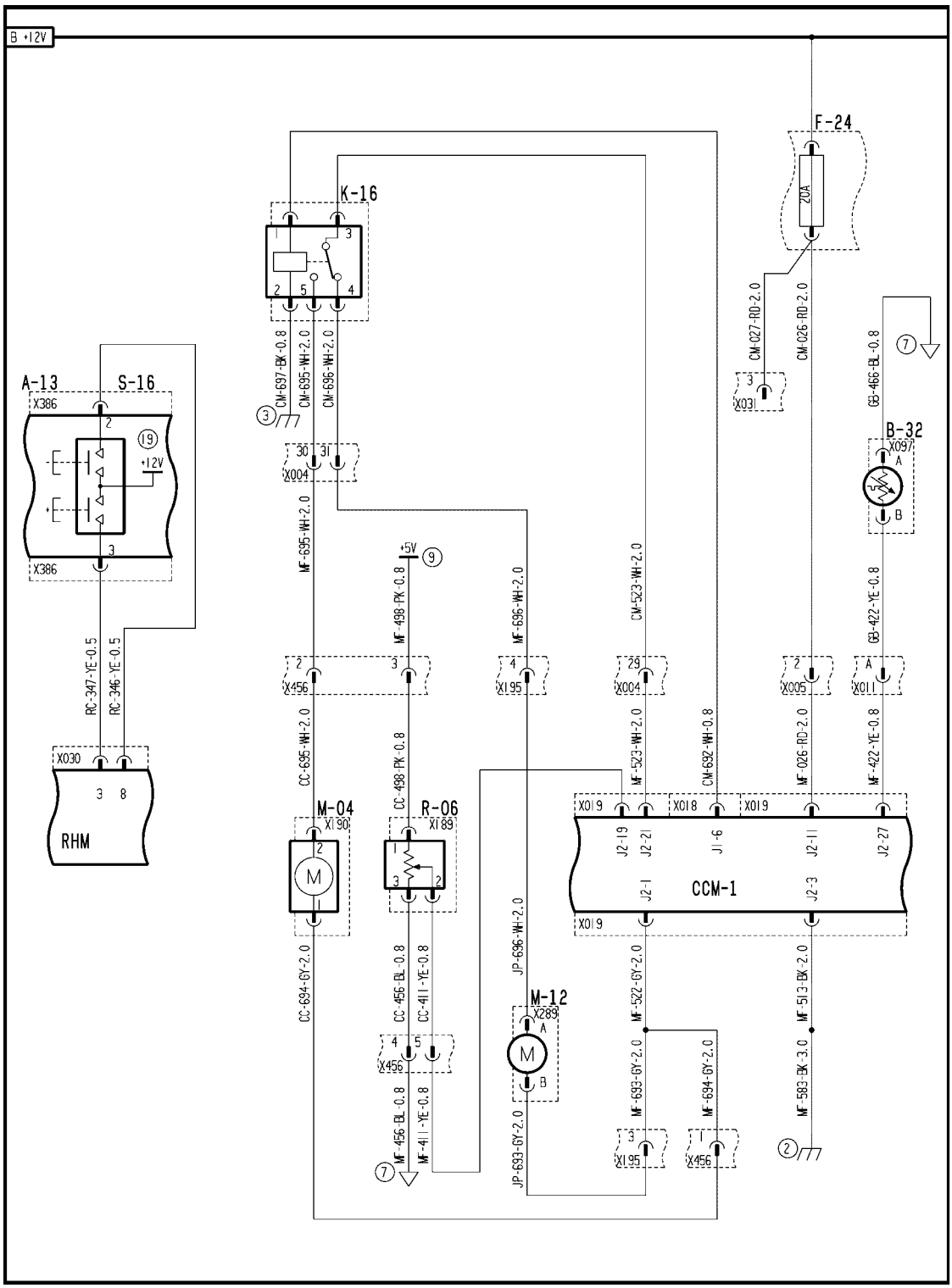
AFXSCHEM13-04 1

FRAME 13 - HEADER

https://truckmanualshub.com/

B-29 Header Lift Pressure	L-06 Header Height Accumulator	L-11 Header Raise
L-12 Header Lower	L-18 Lateral Tilt CW	L-19 Lateral Tilt CCW
R-02 Lateral Tilt Potentiometer	R-03 Feeder Angle	R-12 Left Height/Tilt
R-13 Right Height/Tilt	R-19 Center Height/Tilt	

Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



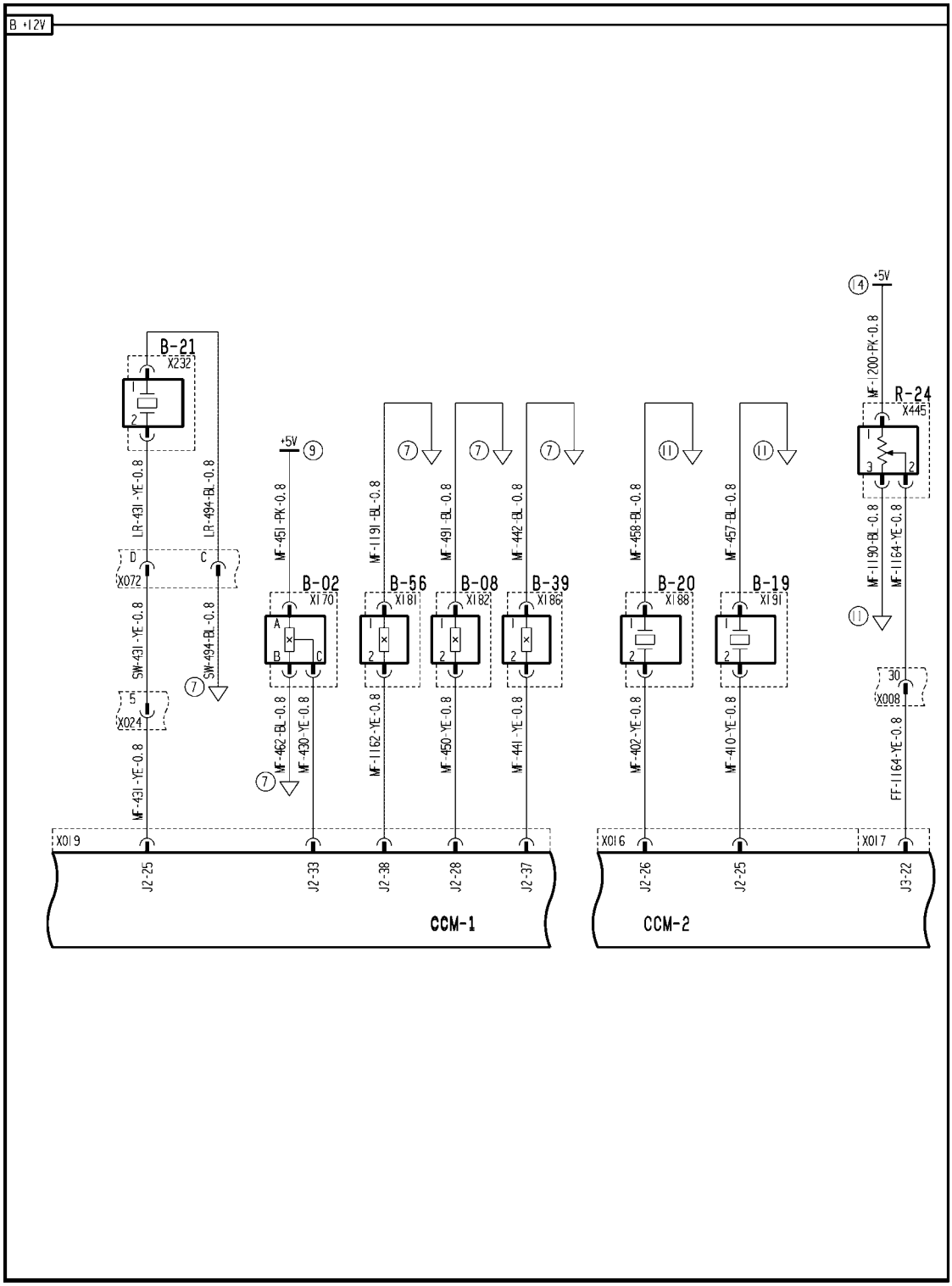
AFXSCHEM16-04 1

FRAME 16 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



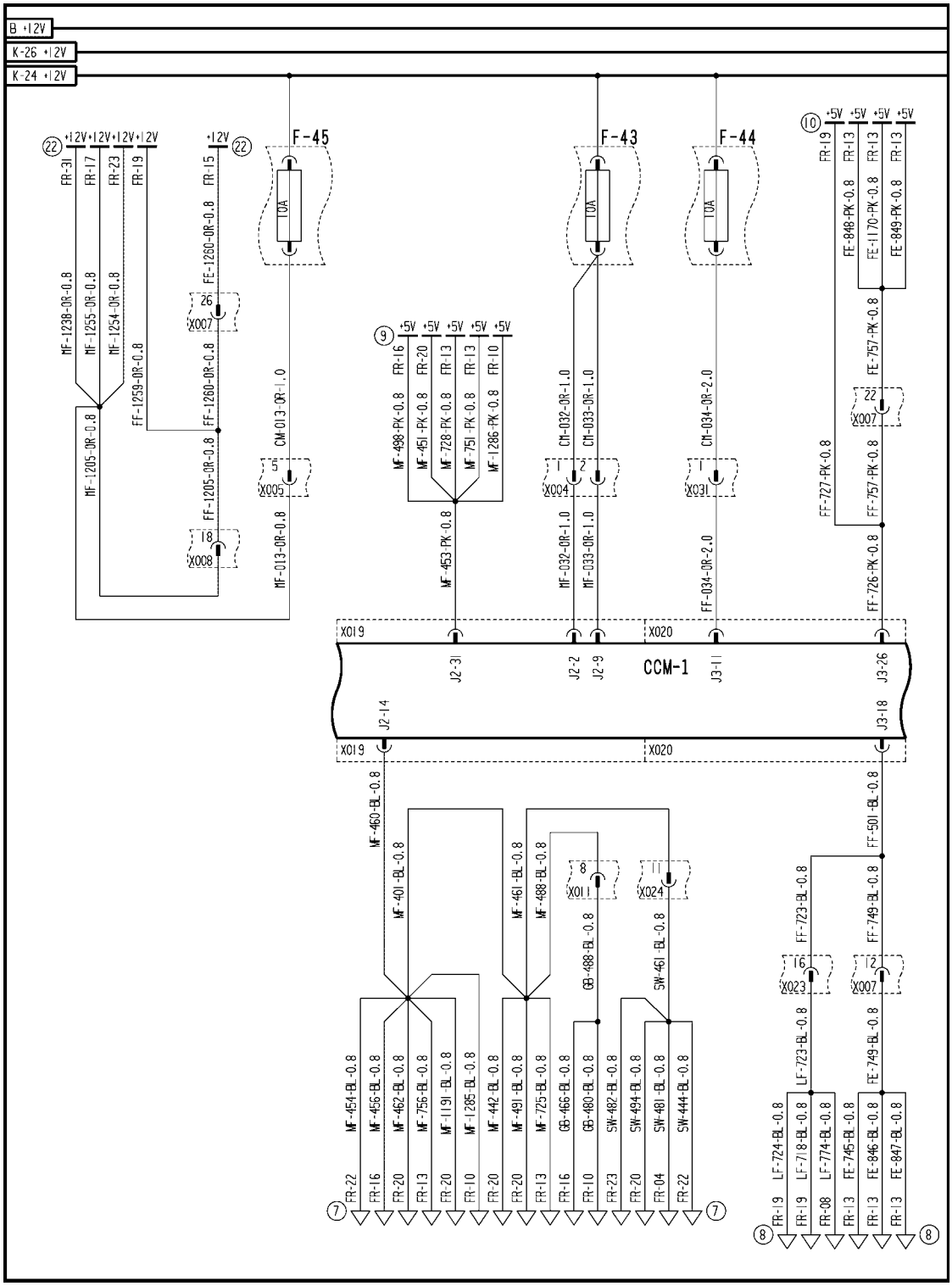
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Concave position sensor - Open circuit (K.40.C.95.82 - G.30.B.50)

AFX8010

E0034-05 - Concave Position Sensor

Cause:
The concave position sensor (R-06) circuit is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring is open or shorted to ground.
2. Loss of power to the sensor.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" sort menu, and select "CONCAVE POS SEN" to check the voltage range. Raise and lower the concaves several times while monitoring the voltage; the voltage should stay within range, and should change smoothly with concave movement.

   The proper voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is low (<**0.3 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect connector **X189**, and use a multimeter to test for voltage on connector **X189** pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **3**.

   B. If no voltage is found, continue with step **3**.
3. Disconnect connector **X456**, and use a multimeter to test for voltage on connector **X456** pin 3. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the concave (CC) harness between connector **X456** and connector **X189** wire 489 pink. Locate the open and repair.

   B. If no voltage is found, there is an open circuit in the main frame (MF) harness between connector **X456** pin 3 and connector **X019** pin J2-31 wire 498 pink or 453 pink. Locate the open and repair.
4. Disconnect connector **X189**. Use a multimeter to check for continuity between connector **X189** pin 2 and ground.

   A. If no continuity is found, continue with Step **4**.

   B. If continuity is found, continue with step **4**.
5. Disconnect connector **X456**. Use a multimeter to check for continuity between connector **X456** pin 5 and ground.

   A. If no continuity is found, there is a short to ground in the concave (CC) harness between connector **X456** and connector **X189** wire 411 yellow. Locate the open and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector**X456** pin 5 and connector **X019** pin J2-19 wire 411 yellow. Locate the short and repair.

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6. Disconnect connector **X456**. Use a multimeter to check for continuity between connector **X189** pin 2 and connector **X456** pin 5.

   A. If continuity is found, continue with step **6**.

   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X189** pin 2 and connector **X456** pin 5 wire 411 yellow. Locate the open and repair.

7. Carefully disconnect connector **X019** from the bottom of CCM1 module. Use a multimeter to check for continuity between connector **X456** pin 5 and connector **X019** pin J2-19.

   A. If continuity is found, the open is in the sensor. Replace the sensor.

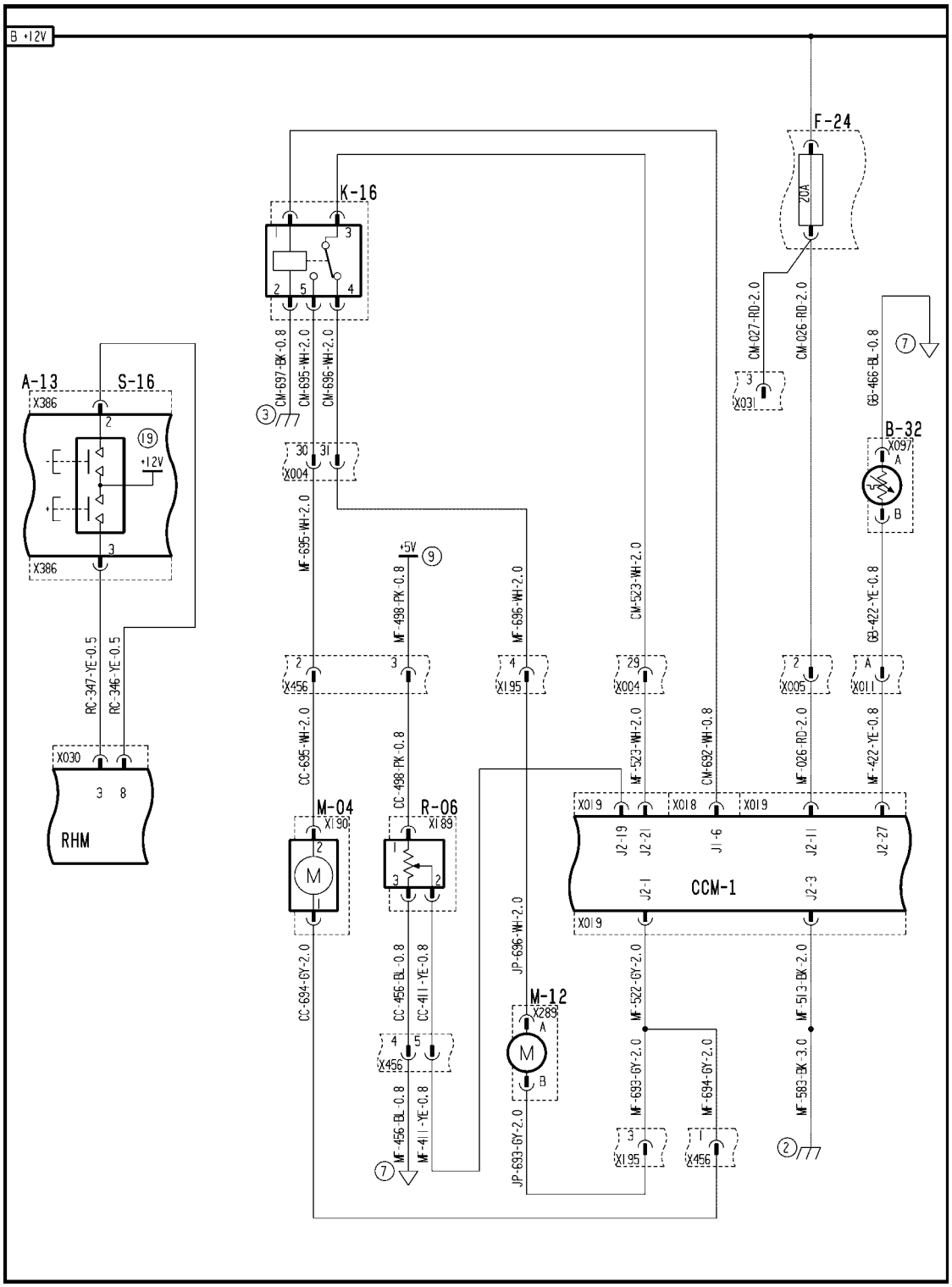
   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X456** pin 5 and connector **X019** pin J2-19 wire 411 yellow. Locate the open and repair.

8. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



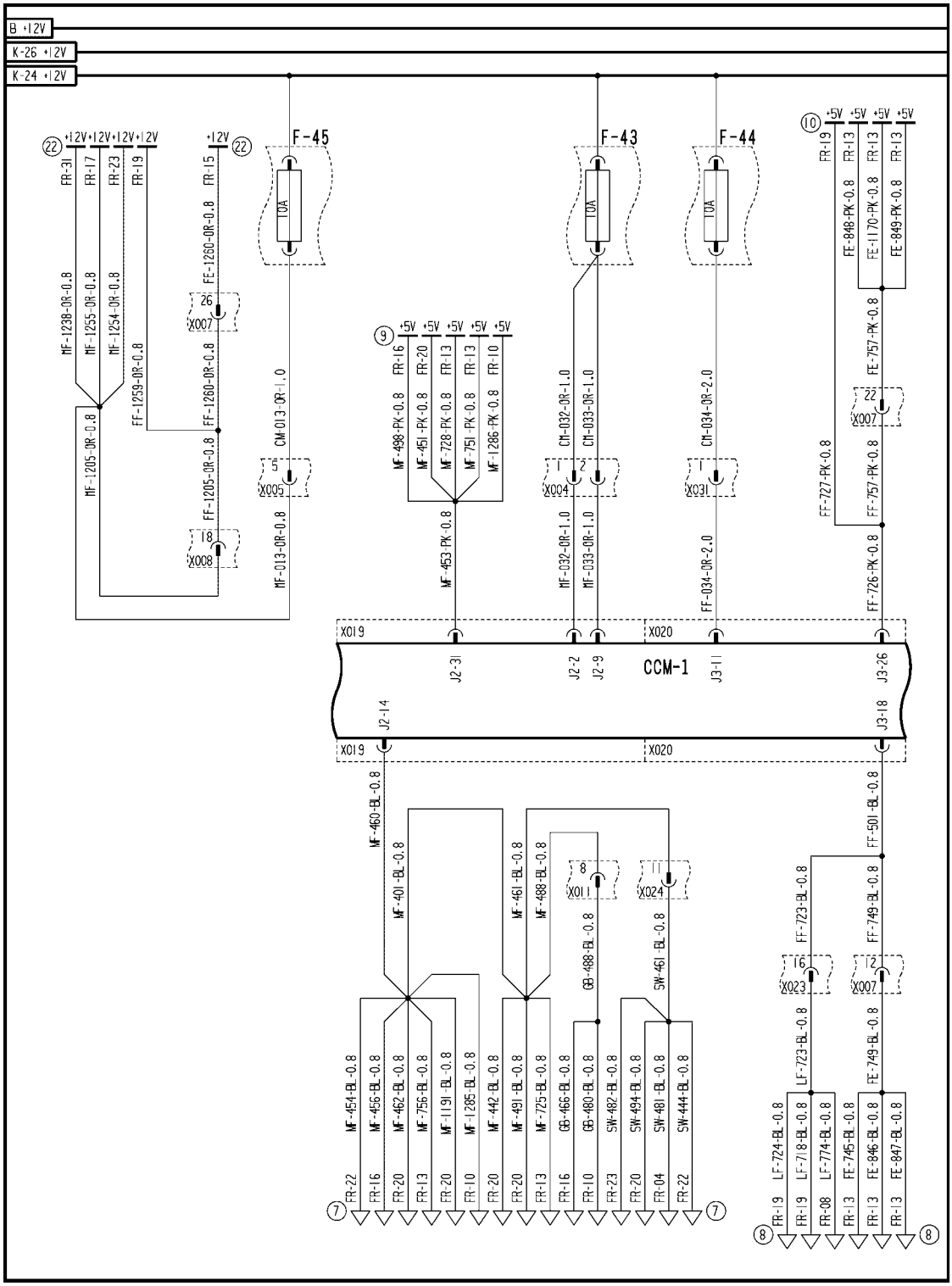
AFXSCHEM16-04 1

FRAME 16 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Rotor speed sensor - Short circuit to B+ (K.40.C.95.80 - G.30.B.54)

AFX8010

E0269-03 - Rotor Speed Sensor

Cause:
The Rotor RPM sensor (B-01) circuit signal wire is shorted to a higher than normal voltage source, or the ground wire is open.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Sensor ground wire is open.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "SPD SEN" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor disconnected **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts** continue with Step **2**.

   B. If the voltage reading is within the proper limits, since the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rotor RPM sensor connector **X177**.

   A. If the voltage drops to **7.3 - 9.0 volts**, continue with step **5**.

   B. If the voltage remains high, continue with step **3**.
3. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**.

   A. If the voltage drops to **7.3 - 9.0 volts**, there is a short in the gearbox (GB) harness between connector **X011** and connector **X177** wire 1261 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with step **4**.
4. Disconnect the expansion (EX) harness from the main frame (MF) harness at connector **X034A**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short circuit is in the main frame (MF) harness between connector **X011** pin 29, connector **X016** pin J2-37, and connector **X034A** pin 10 wire 1261 yellow, 416 yellow or 1068 yellow. Locate short and repair.

   B. If the voltage remains high, the short circuit is in the expansion (EX) harness between connector **X034A** pin 10 and connector **X014** pin J3-13 wire 1068 yellow. Locate short and repair.
5. Disconnect the rotor RPM sensor connector **X177**. Use a multimeter to check for continuity between connector **X177** pin C and chassis ground.

   A. If there is continuity to ground, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If there is no continuity to ground, continue with step **6**.

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6. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 17 and chassis ground.

   A. If there is continuity to ground, there is an open circuit in the gearbox (GB) harness between connector **X011** and connector **X177** wire 1264 blue or 1081 black/white. Locate the open and repair.

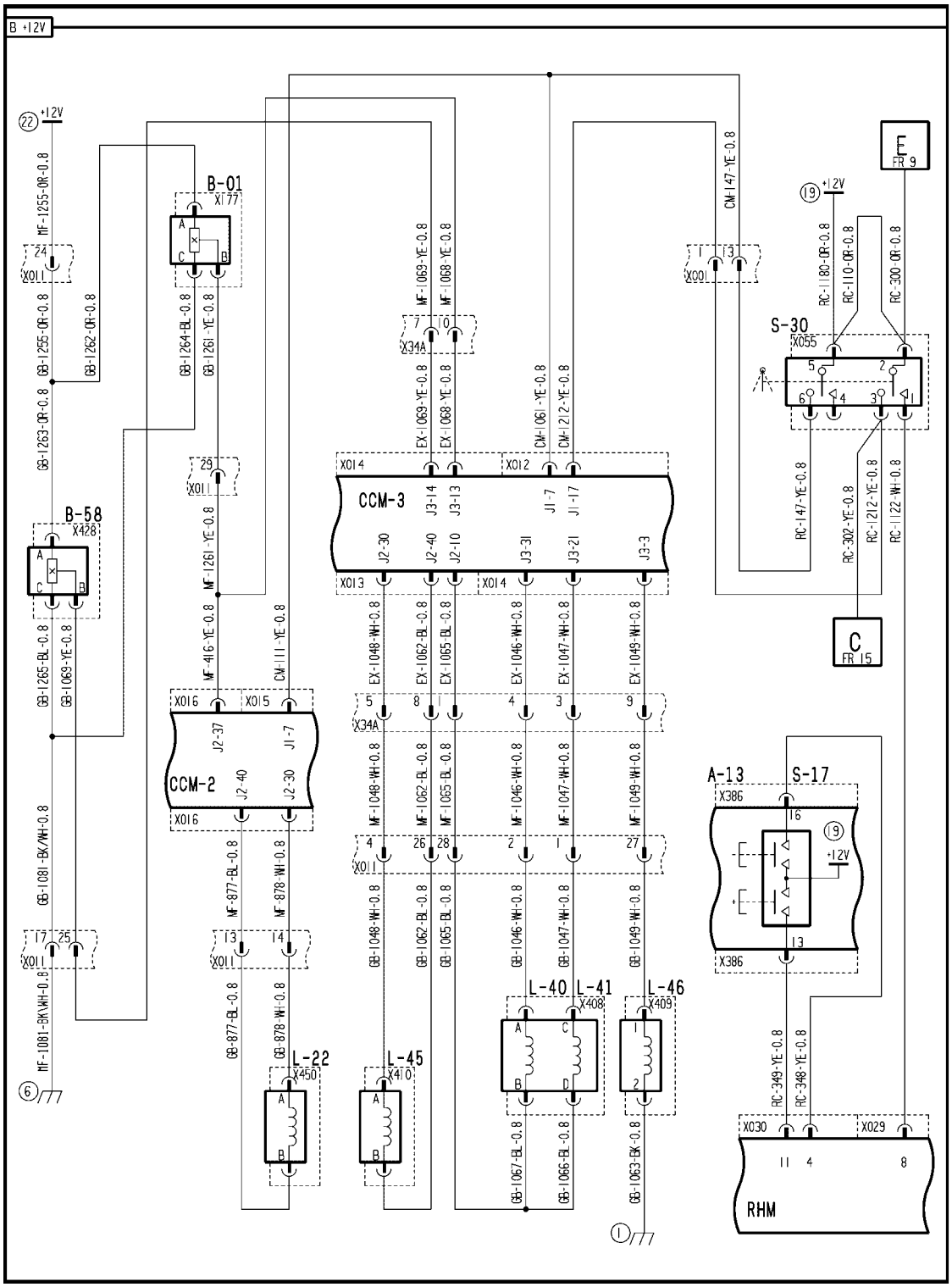
   B. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X011** and battery clean ground #6 wire 1081 black/white. Locate the open and repair.

7. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals for broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Sensing system Rotor speed sensor - Short circuit to ground (K.40.C.95.80 - G.30.B.53)

AFX8010

E0269-04 - Rotor Speed Sensor

Cause:
The Rotor RPM sensor (B-01) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage with sensor disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**) continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rotor RPM sensor connector **X177**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with step **3**.
3. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**.

   A. If the voltage increases to **7.3 - 9.0 volts**, there is a short in the gearbox (GB) harness between connector **X011** and connector **X177** wire 1261 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with step **4**.
4. Disconnect the expansion (EX) harness from the main frame (MF) harness at connector **X034A**.

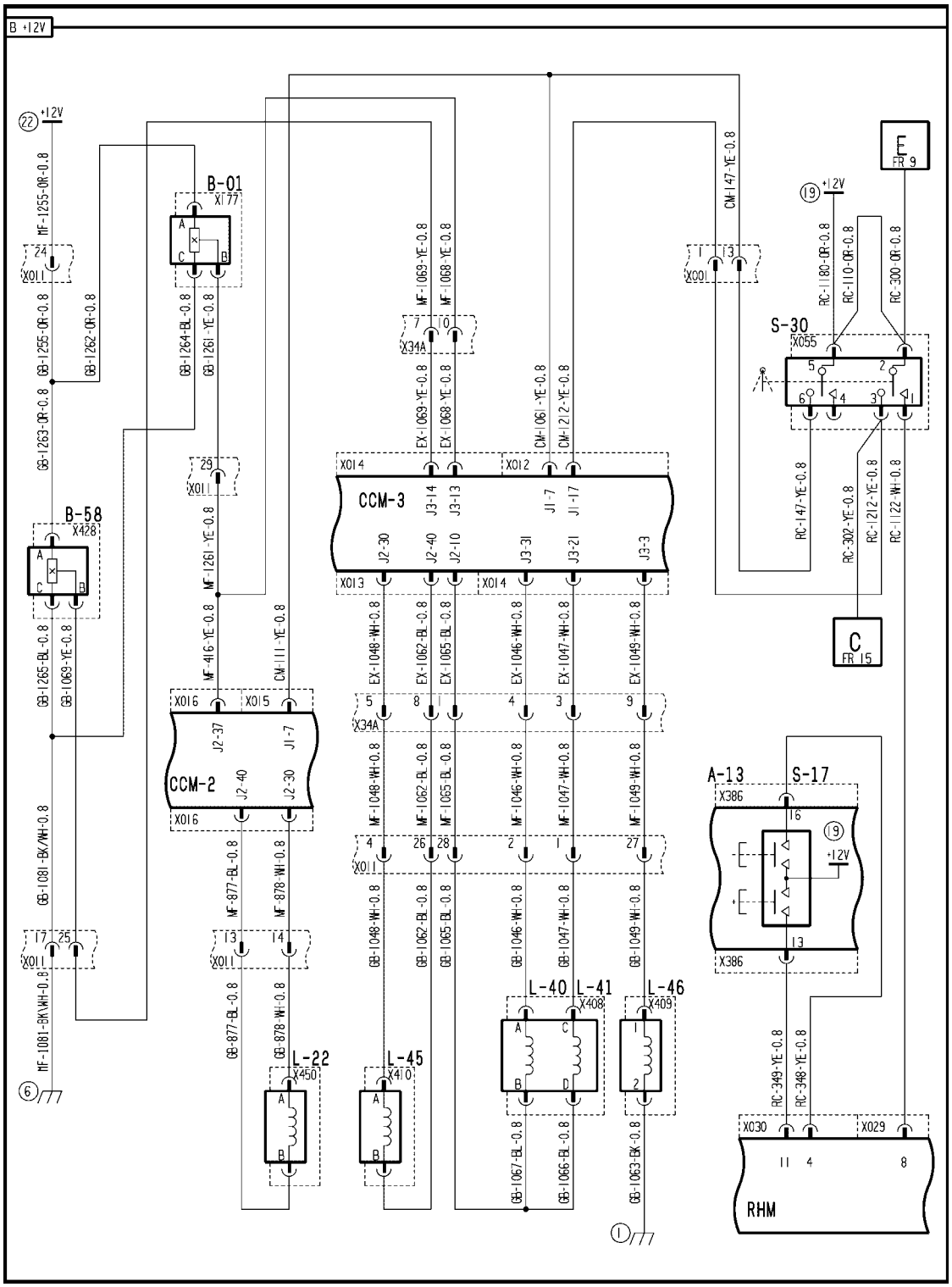
   A. If the voltage increases to **7.3 - 9.0 volts**, there is a short circuit in the main frame (MF) harness between connector **X011** pin 29, connector **X016** pin J2-37, and connector **X034A** pin 10 wire 1261 yellow, 416 yellow or 1068 yellow. Locate short and repair.

   B. If the voltage remains low, there is a short circuit in the expansion (EX) harness between connector **X034A** pin 10 and connector **X014** pin J3-13 wire 1068 yellow. Locate short and repair.
5. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals for broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



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FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Sensing system Rotor speed sensor - Open circuit (K.40.C.95.80 - G.30.B.50)

AFX8010

E0269-05 - Rotor Speed Sensor

Cause:
The Rotor RPM sensor (B-01) circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal is **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal is **0.5 - 5.6 volts**

   The proper voltage sensor disconnected is **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rotor RPM sensor connector **X177**. Use a jumper wire to short the harness end of connector **X177** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the sensor, or sensor wiring. Replace the sensor.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with step **3**.
3. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**. Use a jumper wire to short the harness end of connector **X011** pin 29 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, there is an open circuit in the gearbox (GB) harness between connector **X011** and connector **X177** wire 1261 yellow. Locate the short and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with step **4**.
4. Disconnect the expansion (EX) harness from the main frame (MF) harness at connector **X034A**. Use a jumper wire to short the harness end of connector **X034A** pin 10 to chassis ground.

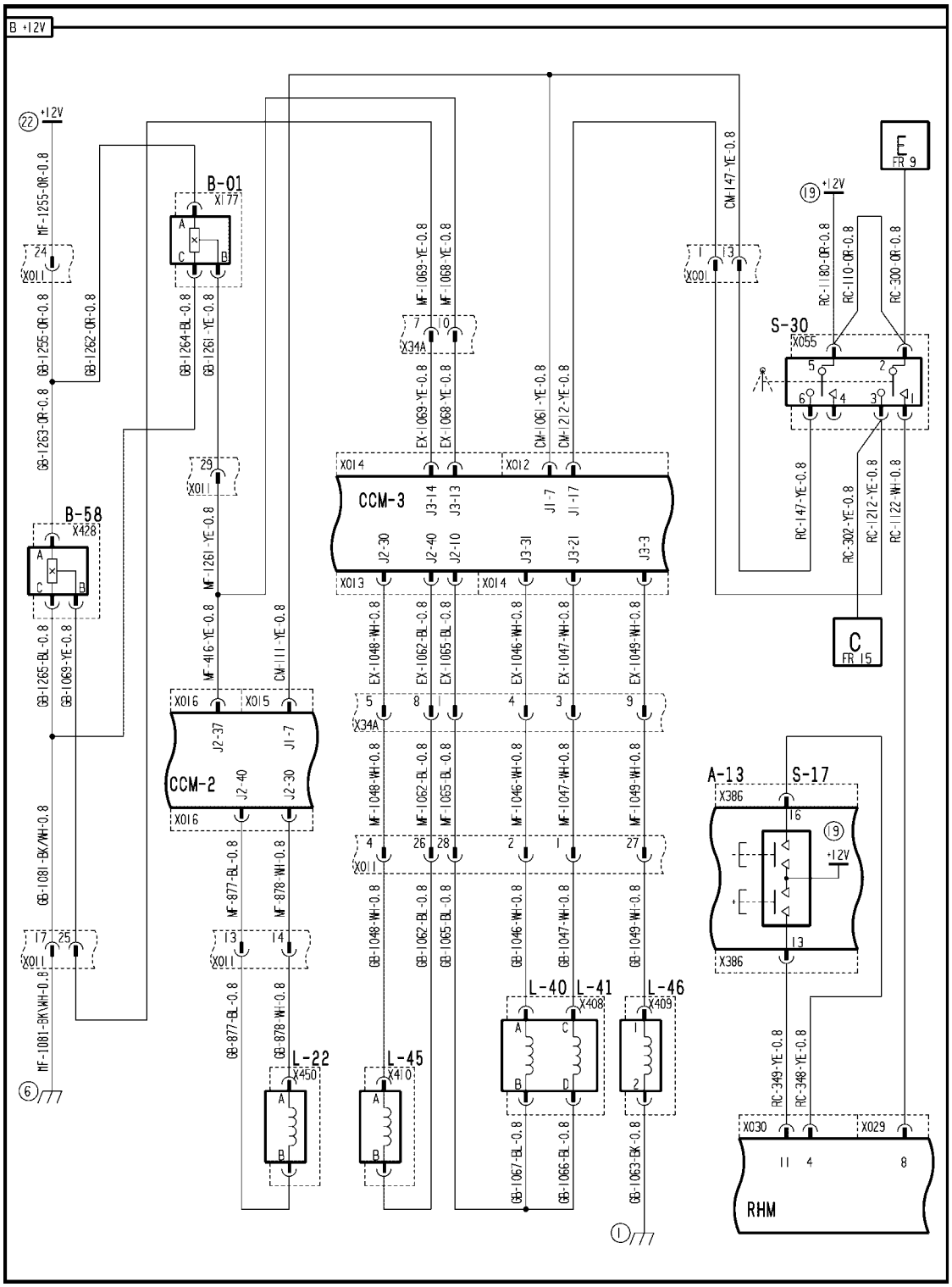
   A. If the voltage drops to **0 - 0.5 volts** indicating a ground,, there is an open circuit in the main frame (MF) harness between connector **X011** pin 29 and connector **X034A** pin 10 wire 1261 yellow or 1068 yellow. Locate short and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, there is an open circuit in the expansion (EX) harness between connector **X034A** pin 10 and connector **X014** pin J3-13 wire 1068 yellow. Locate short and repair.
5. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals for broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



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FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Sensing system Hydrostat motor speed sensor - Short circuit to B+ (K.40.C.95.81 - G.30.B.54)

AFX8010

E0270-03 - Rotor Motor Speed Sensor

Cause:
The Rotor hydrostat RPM sensor (B-58) circuit signal wire is shorted to a higher than normal voltage source, or the ground wire is open.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Sensor ground wire is open.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "MTR SPD SEN" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor disconnected **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts** continue with Step **2**.

   B. If the voltage reading is within the proper limits, since the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rotor hydrostat RPM sensor connector **X428**.

   A. If the voltage drops to **7.3 - 9.0 volts**, continue with step **5**.

   B. If the voltage remains high, continue with step **3**.
3. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**.

   A. If the voltage drops to **7.3 - 9.0 volts**, there is a short in the gearbox (GB) harness between connector **X011** pin 25 and connector **X428** pin B wire 1069 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with step **4**.
4. Disconnect the expansion (EX) harness from the main frame (MF) harness at connector **X034A**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short circuit is in the main frame (MF) harness between connector **X011** pin 25 and connector **X034A** pin 7 wire 1069 yellow. Locate short and repair.

   B. If the voltage remains high, the short circuit is in the expansion (EX) harness between connector **X034A** pin 10 and connector **X014** pin J3-14 wire 1068 yellow. Locate short and repair.
5. Disconnect the rotor hydrostat RPM sensor connector **X428**. Use a multimeter to check for continuity between connector **X428** pin C and chassis ground.

   A. If there is continuity to ground, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If there is no continuity to ground, continue with step **6**.

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6. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 17 and chassis ground.

   A. If there is continuity to ground, there is an open circuit in the gearbox (GB) harness between connector **X011** and connector **X428** wire 1265 blue or 1081 black/white. Locate the open and repair.

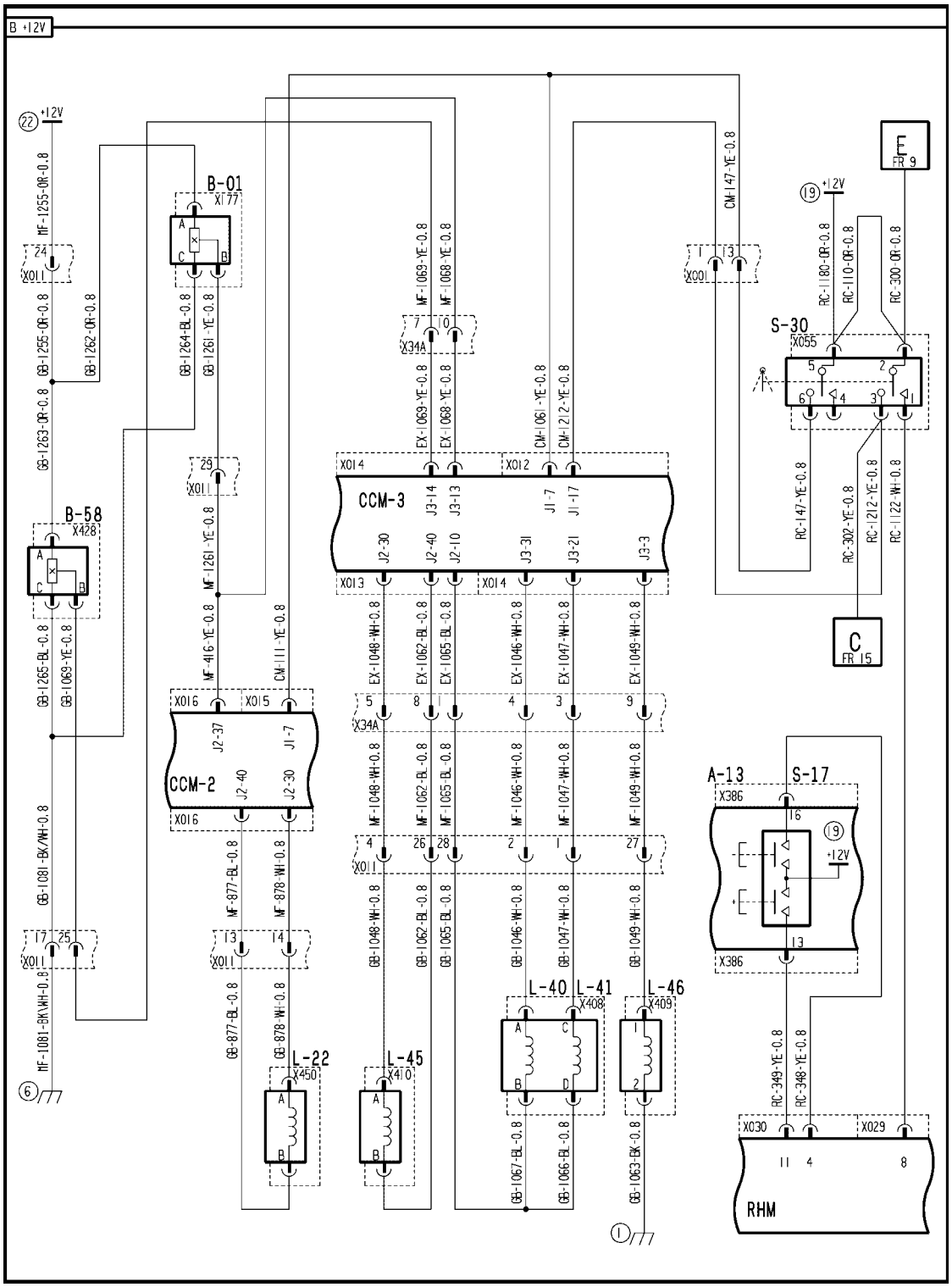
   B. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X011** and battery clean ground #6 wire 1081 black/white. Locate the open and repair.

7. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals for broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Sensing system Hydrostat motor speed sensor - Short circuit to ground (K.40.C.95.81 - G.30.B.53)

AFX8010

E0270-04 - Rotor Motor Speed Sensor

Cause:
The Rotor hydrostat RPM sensor (B-58) circuit is shorted to ground.

Possible failure modes:

1. Sensor signal wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "MTR SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor disconnected **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**) continue with Step **2**.

   B. If the voltage reading is within the proper limits. Continue the troubleshooting at Step **3**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rotor hydrostat RPM sensor connector **X428**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with step **3**.
3. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**.

   A. If the voltage increases to **7.3 - 9.0 volts**, there is a short in the gearbox (GB) harness between connector **X011** pin 25 and connector **X428** pin B wire 1069 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with step **4**.
4. Disconnect the expansion (EX) harness from the main frame (MF) harness at connector **X034A**.

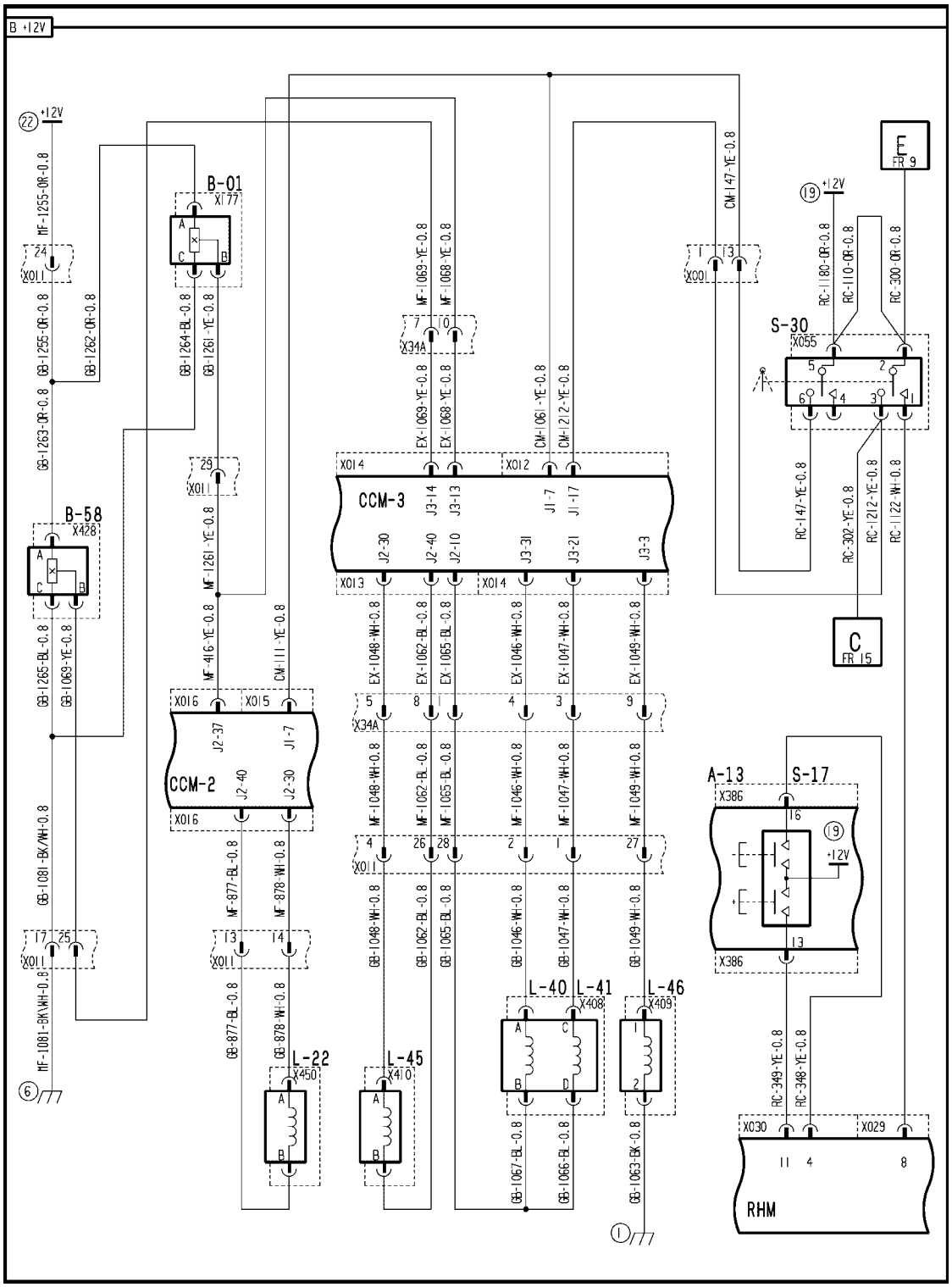
   A. If the voltage increases to **7.3 - 9.0 volts**, the short circuit is in the main frame (MF) harness between connector **X011** pin 25 and connector **X034A** pin 7 wire 1069 yellow. Locate short and repair.

   B. If the voltage remains low, the short circuit is in the expansion (EX) harness between connector **X034A** pin 10 and connector **X014** pin J3-14 wire 1068 yellow. Locate short and repair.
5. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals for broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

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Sensing system Hydrostat motor speed sensor - Open circuit (K.40.C.95.81 - G.30.B.50)

AFX8010

E0270-05 - Rotor Motor Speed Sensor

Cause:
The Rotor hydrostat RPM sensor (B-58) circuit is open.

Possible failure modes:

1. Sensor signal wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" or "ROTOR" sort menu, and select "MTR SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal is **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal is **0.5 - 5.6 volts**

   The proper voltage sensor disconnected is **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the rotor hydrostat RPM sensor connector **X428**. Use a jumper wire to short the harness end of connector **X428** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the sensor, or sensor wiring. Replace the sensor.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with step **3**.
3. Disconnect the main frame (MF) harness from the gearbox (GB) harness at connector **X011**. Use a jumper wire to short the main frame (MF) harness end of connector **X011** pin 25 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, there is an open circuit in the gearbox (GB) harness between connector **X011** pin 25 and connector **X428** pin B wire 1069 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with step **4**.
4. Disconnect the expansion (EX) harness from the main frame (MF) harness at connector **X034A**. Use a jumper wire to short the harness end of connector **X034A** pin 7 to chassis ground.

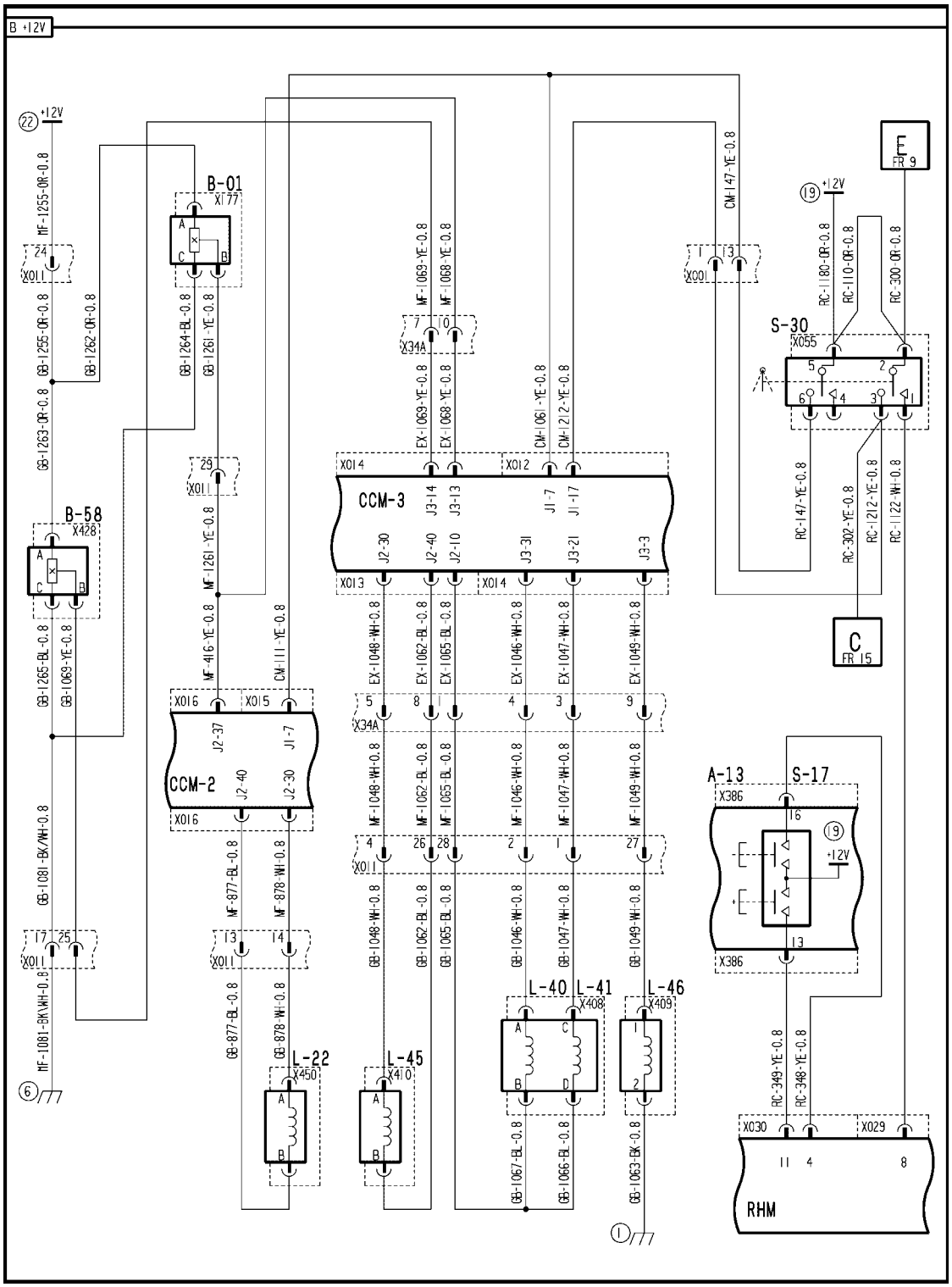
   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, there is an open circuit in the main frame (MF) harness between connector **X011** pin 25 and connector **X034A** pin 7 wire 1069 yellow. Locate open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, there is an open circuit in the expansion (EX) harness between connector **X034A** pin 10 and connector **X014** pin J3-14 wire 1068 yellow. Locate open and repair.
5. Inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals for broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 17 (A.30.A.88 - C.20.E.17)



AFXSCHEM17-04 1

FRAME 17 - THRESHER

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A-13 Front Switch Panel	B-01 Rotor RPM	B-58 Rotor Hydrostat RPM
L-22 Beater / Chopper Clutch	L-40 Rotor Pump Swash Plus	L-41 Rotor Pump Swash Minus
L-45 Engine to Ring Clutch	L-46 Ring to Frame Brake	S-17 Rotor Speed
S-30 Separator Engage		

https://truckmanualshub.com/

Index

CROP PROCESSING - K

THRESHING Axial flow threshing - 40.C

Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54) 40
AFX8010

Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54) 47
AFX8010

Command Threshing engage switch - Short circuit to B+ (K.40.C.05.80 - G.30.B.54) 60
AFX8010

Command Threshing engage switch - Short circuit to ground (K.40.C.05.80 - G.30.B.53) 54
AFX8010

Control valve Clutch control valve - Short circuit to B+ (K.40.C.14.20 - G.30.B.54) 75
AFX8010

Control valve Clutch control valve - Unidentified failure (K.40.C.14.20 - G.30.B.46) 79
AFX8010

Control valve Clutch control valve - Unidentified failure (K.40.C.14.20 - G.30.B.46) 84
AFX8010

Control valve Speed control valve - Short circuit to B+ (K.40.C.14.10 - G.30.B.54) 67
AFX8010

Control valve Speed control valve - Unidentified failure (K.40.C.14.10 - G.30.B.46) 71
AFX8010

Drive system - General specification (K.40.C.40 - D.40.A.10) 4
AFX8010

Drive system - Overview (K.40.C.40 - C.10.A.10) 5
AFX8010

Drive system Drive and gear - Disassemble (K.40.C.40.44 - F.10.A.25) 17
AFX8010

Drive system Drive and gear - Install (K.40.C.40.44 - F.10.A.15) 22
AFX8010

Drive system Drive and gear - Leakage test (K.40.C.40.44 - F.40.A.40) 21
AFX8010

Drive system Drive and gear - Remove (K.40.C.40.44 - F.10.A.10) 14
AFX8010

Electrical control Relay - Unidentified failure (K.40.C.90.80 - G.30.B.46) 104
AFX8010

Electrical motor - Short circuit (K.40.C.82 - G.30.B.52) 88
AFX8010

Electrical motor - Unidentified failure (K.40.C.82 - G.30.B.46) 96
AFX8010

Sensing system Concave position sensor - Open circuit (K.40.C.95.82 - G.30.B.50) 115
AFX8010

Sensing system Concave position sensor - Short circuit to B+ (K.40.C.95.82 - G.30.B.54) 107
AFX8010

Sensing system Hydrostat motor speed sensor - Open circuit (K.40.C.95.81 - G.30.B.50) 137
AFX8010

Sensing system Hydrostat motor speed sensor - Short circuit to B+ (K.40.C.95.81 - G.30.B.54) 130
AFX8010

Sensing system Hydrostat motor speed sensor - Short circuit to ground (K.40.C.95.81 - G.30.B.53) 134
AFX8010

https://truckmanualshub.com/

Sensing system Rotor speed sensor - Open circuit (K.40.C.95.80 - G.30.B.50) 127
AFX8010

Sensing system Rotor speed sensor - Short circuit to B+ (K.40.C.95.80 - G.30.B.54) 120
AFX8010

Sensing system Rotor speed sensor - Short circuit to ground (K.40.C.95.80 - G.30.B.53) 124
AFX8010

Threshing rotor AFX (auger front) rotor - Assemble (K.40.C.52.52 - F.10.A.20) 34
AFX8010

Threshing rotor AFX (auger front) rotor - Balancing (K.40.C.52.52 - F.45.A.25) 32
AFX8010

Threshing rotor AFX (auger front) rotor - Disassemble (K.40.C.52.52 - F.10.A.25) 33
AFX8010

Threshing rotor AFX (auger front) rotor - Install (K.40.C.52.52 - F.10.A.15) 35
AFX8010

Threshing rotor AFX (auger front) rotor - Place on stand (K.40.C.52.52 - F.35.A.10) 30
AFX8010

Threshing rotor AFX (auger front) rotor - Remove (K.40.C.52.52 - F.10.A.10) 25
AFX8010

Threshing rotor AFX (auger front) rotor - Visual inspection (K.40.C.52.52 - F.40.A.10) 29
AFX8010

https://truckmanualshub.com/

https://truckmanualshub.com/

CROP PROCESSING - K

STORING AND HANDLING Grain storing - 60.B

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

STORING AND HANDLING Grain storing - 60.B

FUNCTIONAL DATA

Sensing system

Sensing system Level sensor - Overview (K.60.B.95.80 - C.10.A.10) 4
AFX8010

SERVICE

Bubble-up auger drive system

Bubble-up auger drive system - Disassemble (K.60.B.40 - F.10.A.25) 5
AFX8010

Bubble-up auger drive system - Assemble (K.60.B.40 - F.10.A.20) 7
AFX8010

Bubble-up auger

Bubble-up auger - Remove (K.60.B.50 - F.10.A.10) 10
AFX8010

Bubble-up auger - Install (K.60.B.50 - F.10.A.15) 13
AFX8010

Clean grain cross auger

Clean grain cross auger - Remove (K.60.B.51 - F.10.A.10) 16
AFX8010

Clean grain cross auger - Install (K.60.B.51 - F.10.A.15) 20
AFX8010

Grain elevator

Grain elevator - Remove (K.60.B.52 - F.10.A.10) 23
AFX8010

Grain elevator - Install (K.60.B.52 - F.10.A.15) 27
AFX8010

Grain elevator Chain - Remove (K.60.B.52.48 - F.10.A.10) 30
AFX8010

Grain elevator Chain - Install (K.60.B.52.48 - F.10.A.15) 32
AFX8010

Grain elevator housing

Grain elevator housing - Disassemble (K.60.B.74 - F.10.A.25) 34
AFX8010

Grain elevator housing - Assemble (K.60.B.74 - F.10.A.20) 40
AFX8010

DIAGNOSTIC

Electrical motor

https://truckmanualshub.com/

Electrical motor - Short circuit (K.60.B.82 - G.30.B.52) 46
AFX8010

Electrical motor - Unidentified failure (K.60.B.82 - G.30.B.46) 54
AFX8010

Sensing system

Sensing system Level sensor - Short circuit to B+ (K.60.B.95.80 - G.30.B.54) 62
AFX8010

Sensing system Level sensor - Open circuit (K.60.B.95.80 - G.30.B.50) 68
AFX8010

Sensing system Grain tank covers sensor - Short circuit to B+ (K.60.B.95.82 - G.30.B.54) 74
AFX8010

Sensing system Grain tank covers sensor - Short circuit to ground (K.60.B.95.82 - G.30.B.53) 78
AFX8010

Sensing system Grain tank covers sensor - Open circuit (K.60.B.95.82 - G.30.B.50) 82
AFX8010

Sensing system Speed sensor - Short circuit to B+ (K.60.B.95.81 - G.30.B.54) 86
AFX8010

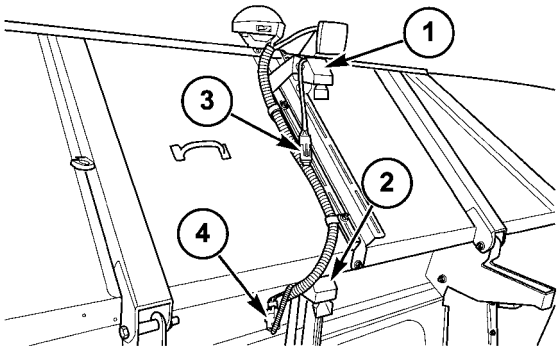
Sensing system Speed sensor - Short circuit to ground (K.60.B.95.81 - G.30.B.53) 89
AFX8010

Sensing system Speed sensor - Open circuit (K.60.B.95.81 - G.30.B.50) 92
AFX8010

https://truckmanualshub.com/

Sensing system Level sensor - Overview (K.60.B.95.80 - C.10.A.10)

AFX8010



10030023A5 1

Grain Bin Level Sensors

1. Grain bin full switch S-29
2. Grain bin 3/4 full switch S-28
3. Connector **X109**
4. Connector **X107**

Two grain bin switches are used to monitor the level of material in the grain bin. The grain bin 3/4 full switch S-28 **(2)** is located in the center of the front grain tank wall, just above the cab window, while the grain bin full switch S-29 **(1)** is located in the center of the front grain bin extension. Both switches may be adjusted up or down on their mounting brackets to ensure that they are triggered by the material being harvested before the grain bin overflows.
The two switches are connected in series through the grain tank (GT) harness, and an input is provided from the grain bin 3/4 full switch S-28 to the CCM2 module at connector **X016** pin J2-22. The CCM2 module monitors the change in resistance that occurs as the grain bin switches are closed by the increasing level of material in the grain bin. In the event that a fault occurs with one of the switches or the wiring to the switches, a fault code will be displayed to the operator.

E0159-03 - Grain Tank Full Sensor
E0159-05 - Grain Tank Full Sensor

When the threshing system is engaged, and the grain bin 3/4 full switch S-28 is closed, the "Bin Full" light will illuminate on the shaft speed monitor, and the rotating beacons (if equipped) will flash to alert a grain truck operator to prepare for unloading the grain bin, and will continue to flash until the grain bin is emptied.

NOTE: *If the work lights are activated, the rotating beacons will only flash for approximately 10 seconds when the grain bin 3/4 full switch is closed, and will flash again for approximately 10 seconds when the grain bin full switch is closed.*

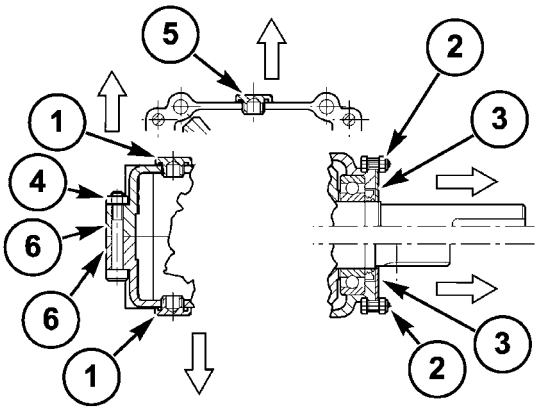
When the material level closes the grain bin full switch S-29, the "Bin Full" light on the shaft speed monitor will flash, and a buzzer will sound. The alarm message "A0030 Grainbin FULL" will also be displayed to the operator.

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Bubble-up auger drive system - Disassemble (K.60.B.40 - F.10.A.25)

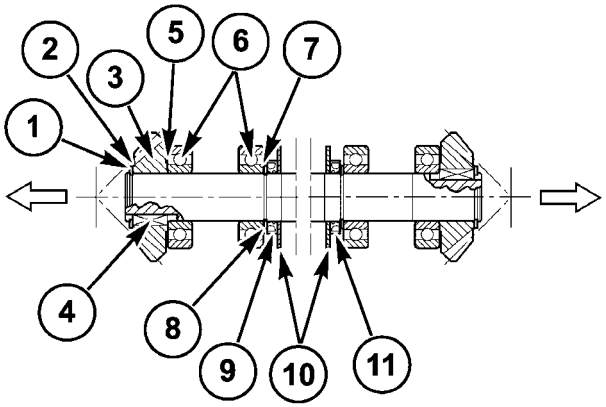
AFX8010

1. The gearbox assembly consists of two very similar 90 degree bevel gear boxes. Many operations for the second box are identical to that for the first box. To disassemble the gearbox, proceed as follows: Remove oring plugs **(1)** to drain oil from both boxes. Remove nuts and bolts **(2)** and remove plate **(3)**. Remove eight bolts and nuts **(4)**. Remove the oring plug **(5)** on the centerline seam taking care not to damage oring. Separate gearbox housing halves **(6)** and remove connecting shaft.



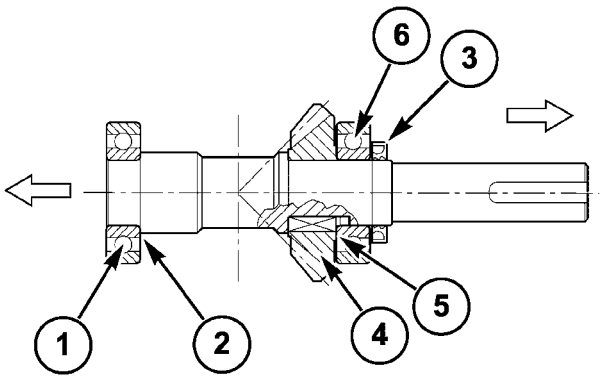
20041751A5 1

2. Remove snap ring **(1)**. Remove shim **(2)** and gear **(3)** with hammer and soft punch and mark parts and appropriate shaft end. Remove parallel key **(4)** then shim **(5)**. Pull or press off bearings **(6)** marking these parts as well. Remove shim **(7)** and snap ring **(8)** oil seal **(9)** and two plates **(10)** and seal **(11)**. Repeat process from other end, again marking parts as to original location.



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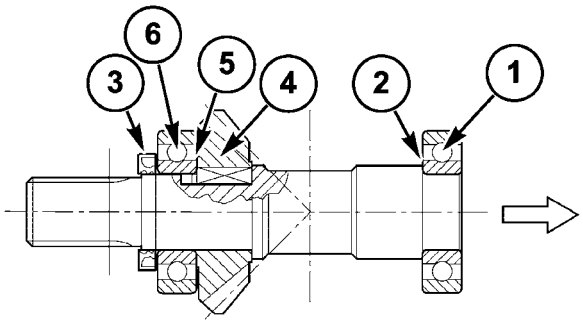
3. Pull bearing **(1)** from input shaft and remove shim **(2)**. Remove oil seal **(3)**. Press gear **(4)** shim **(5)** and bearing **(6)** off of shaft.



20041753A5 3

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4. Pull bearing **(1)** from output shaft and remove shim **(2)**. Remove oil seal **(3)**. Press gear **(4)**, shim **(5)** and bearing **(6)** off of shaft.



20041754A5 4

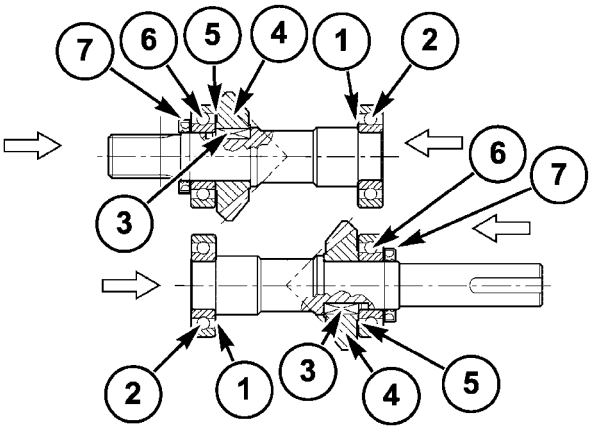
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Bubble-up auger drive system - Assemble (K.60.B.40 - F.10.A.20)

AFX8010

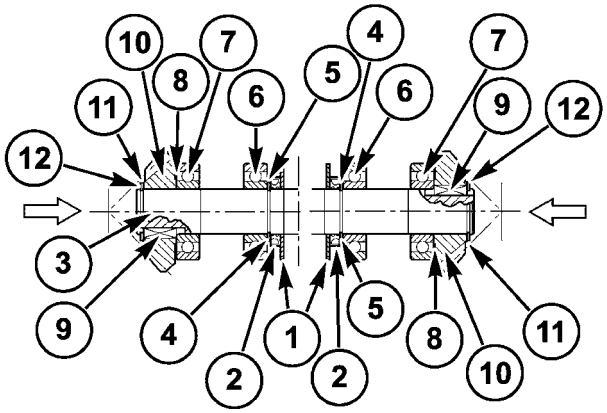
When pressing bearings on to shafts, press on bearing inner races only, to avoid damaging the bearings.

1. The gearbox assembly consists of two very similar **90 °** bevel gear boxes. Many operations for the second box are identical to that for the first box. Input and output shafts are assembled with the same parts and procedures. Each gear set requires its own shimming, however. Assemble previously removed shims **(1)** to inboard end of shaft and press bearing **(2)** on. Assemble key **(3)** in shaft keyseat and press on gear **(4)**. Assemble previously removed shims **(5)** and press on bearing **(6)**. Apply a film of grease to seal **(7)** lip and slide on shaft with lip pointing toward bearing. Clean all grease off O.D. of seal.



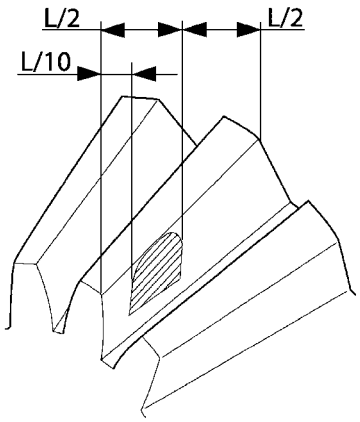
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2. Assemble cover plates **(1)** and oil seals **(2)** on shaft **(3)** having first coated seal lips with grease. Seal lips must point away from each other, toward the center of each box. Keep seal O.D. free of grease. Assemble retaining rings **(4)** and shims **(5)**. Press bearings **(6)** in position against shims and retaining ring, having first put a film of Loctite 603 between bearing and shaft. Assemble another bearing **(7)** and shims **(8)**, place keys **(9)** in keyseat and press gears **(10)** on. Assemble shims **(11)** and retaining rings **(12)** and lightly press bearing, shim and gear back against retaining ring to remove all clearance.



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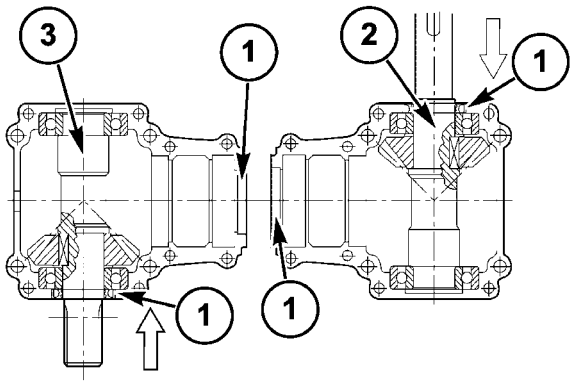
3. Place shafts in housing halves and shim as required to achieve required backlash of **0.15 - 0.49 mm** (**0.006 - 0.019 in**) and tooth contact patterns as shown in shaded area on all gear sets. In the figure, “L” is the length of the gear tooth.



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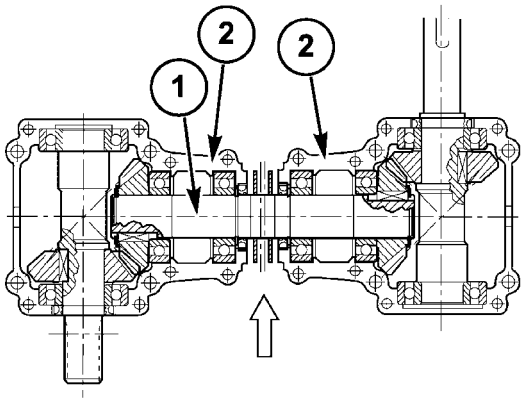
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4. After the shimming is finalized, apply a film of silicone sealant around the housing borders, including the bores **(1)** for the shaft seals. Assemble the pre-assembled input **(2)** and output **(3)** shafts in a housing half.



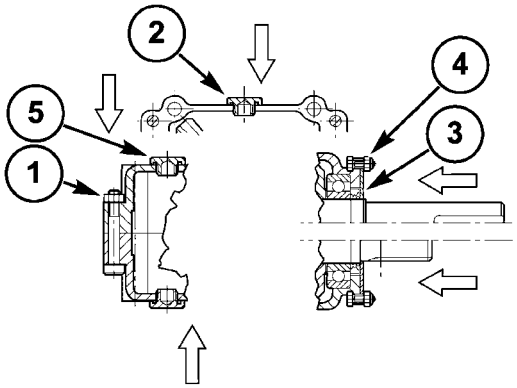
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5. Assemble the pre-assembled shaft **(1)** into the housing halves **(2)**. Apply a light film of silicone sealant to the O.D. of exposed halves of the four oil seals.



20041757A5 5

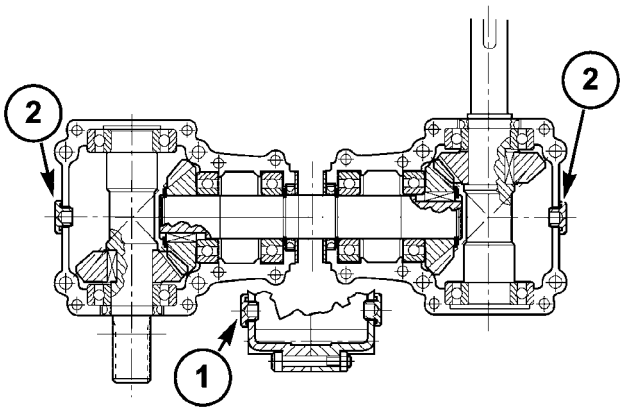
6. Assemble the top halves of the housings after applying a film of silicone sealant to the shaft seal bores. Install sixteen bolts and nuts **(1)** loosely. To ensure alignment of the halves, install the two oring plugs **(2)** three threads deep before tightening the sixteen housing bolts to **24 - 31 Nm** (**18 - 23 lb ft**). Assemble plates **(3)** on input and output shafts and fasten with bolts and nuts **(4)**. Tighten to **10 - 13 Nm** (**90 - 115 lb in**). Tighten the two plugs **(2)** to **9.8 Nm** (**87 lb in**). Install two of the fill and drain plugs **(5)** and tighten to **9.8 Nm** (**87 lb in**).



20041758A5 6

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7. Pressure check the gearbox assemblies by pressurizing them with air through a fitting **(1)** applied to the remaining open plug hole to **0.35 bar** (**5 psi**) and submerge in a water tank. Use a gauge with full-scale reading of **100 - 200 kPa** (**15 - 30 psi**) to be able to read small changes in pressure that would indicate a leak. Be sure the gauge and fitting threads are well sealed to avoid a false indication of a leak. By watching the gauge or by using a manometer (scale of about **0.6 bar** [**8.6 psi**]), watch for a pressure drop over a ten minute period. This will verify the sealing integrity of the gearbox. Dry the gearboxes and remove the level plugs (on the seam) **(2)** and fill the gearboxes with approximately **0.5 L** (**0.53 US qt**) of **CASE AKCELA HY-TRAN ULTRA** oil. Install all plugs and tighten to **9.6 Nm** (**87 lb in**).



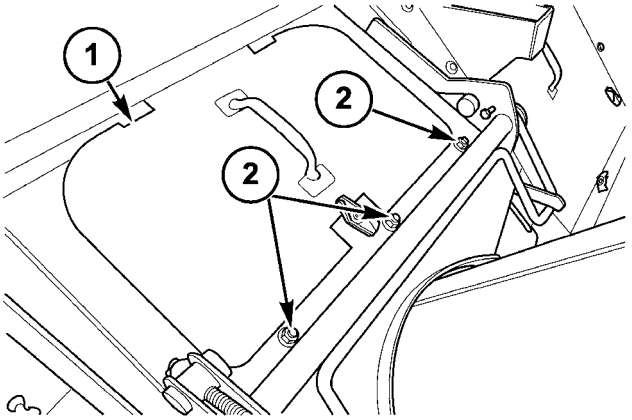
20041759A5 7

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Bubble-up auger - Remove (K.60.B.50 - F.10.A.10)

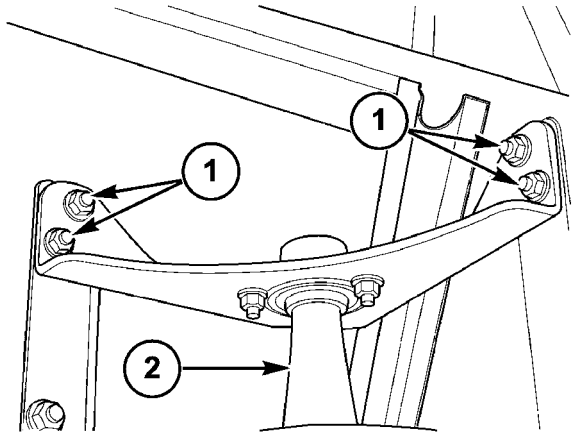
AFX8010

1. To remove the bubble-up assembly, proceed as follows:
   Remove cover **(1)**. Remove three cap screws, lock washers and nuts **(2)** from auger tube cover hinge to provide access to chamber at base of auger.



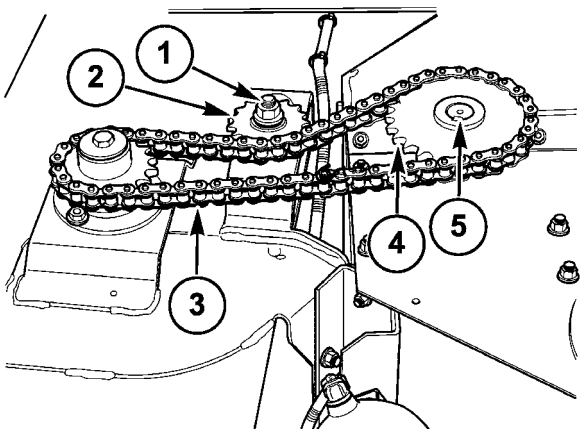
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2. Loosen four nuts **(1)** and remove bolts. Using a suitable hoist, lift auger **(2)** with bearing and bearing support plate attached, out of the auger tube and store for inspection and possible re-use.



10037337A5 2

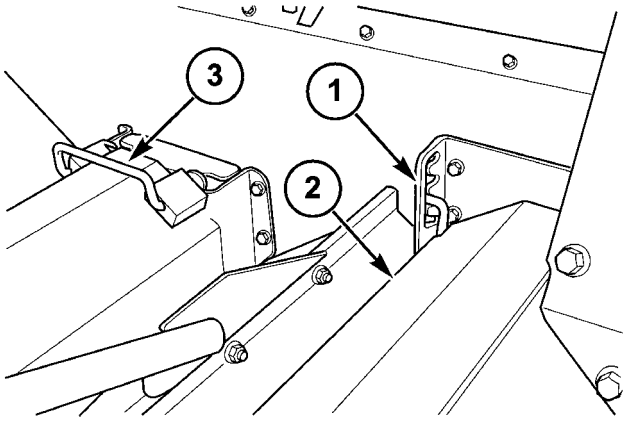
3. Loosen nut **(1)** to raise the idler **(2)** and remove chain **(3)** from bubble-up auger drive. Loosen set screws in sprocket and pull off sprocket **(4)**. Remove key **(5)** from gearbox shaft and retain for later use.



10034840A5 3

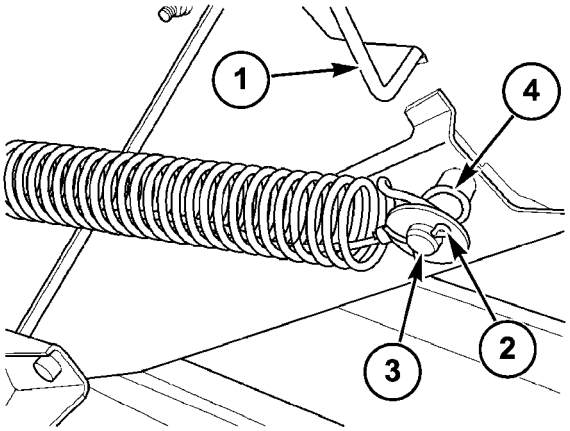
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4. Remove two cotter pins and washers **(1)** from hangar at right hand end of cross auger cover plate **(2)**. Remove the cover plate **(2)** by pulling handle at left end like that as shown at front auger **(3)** towards the right, releasing cover plate.



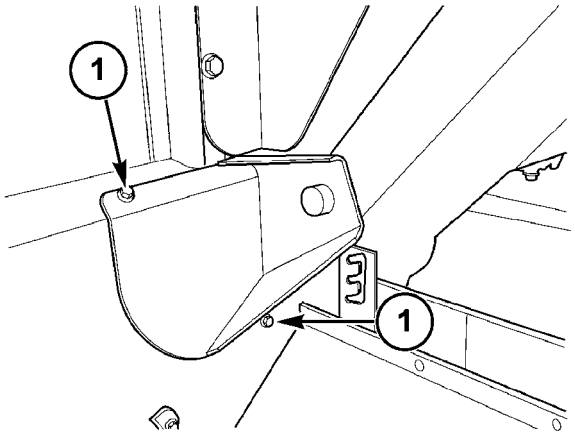
10021837A5 4

5. With auger in raised position and latch **(1)** engaged, remove cotter pin and washer **(2)**. Using a cable, rope or wire, add tension to spring hook so it can be slid off pin **(3)**. Relax spring tension slowly, and then remove safety cable **(4)** from pin.



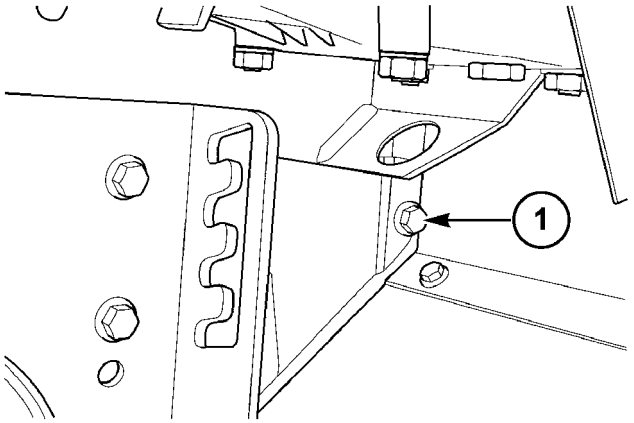
10041745A5 5

6. Remove M8 cap screws, lock washers and nuts **(1)**.



10041746A5 6

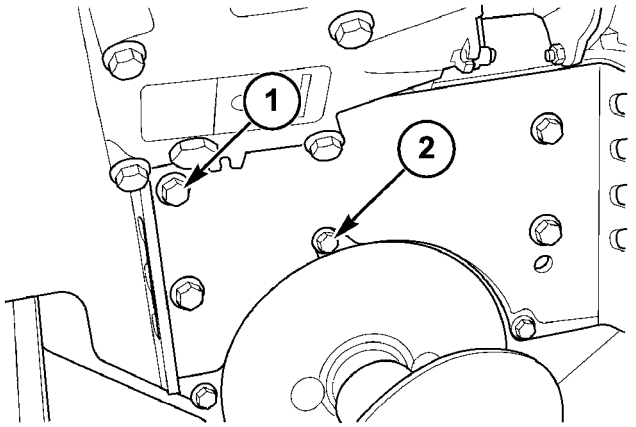
7. Remove M10 cap screw, lock washers and nut **(1)**.



10041747A5 7

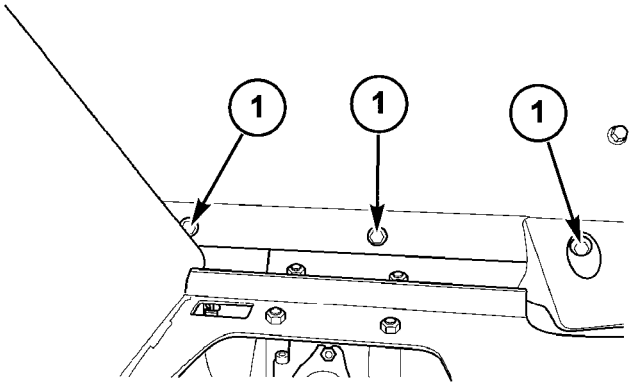
https://truckmanualshub.com/

8. Remove four M10 cap screws, lock washers and nuts **(1)** and threeM8 cap screws, lock washers and nuts **(2)**.



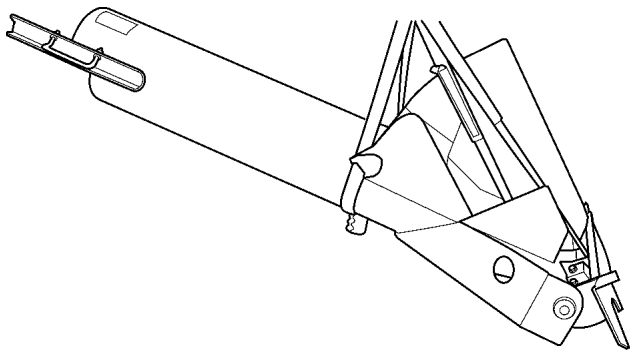
10041748A5 8

9. Unlatch and lower auger tube and remove three M8 cap screws, lock washers and nuts **(1)**.



10041749A5 9

10. Auger tube assembly with gearboxes and mounting plate can now be lifted out of grain tank. Suggested slinging is illustrated.



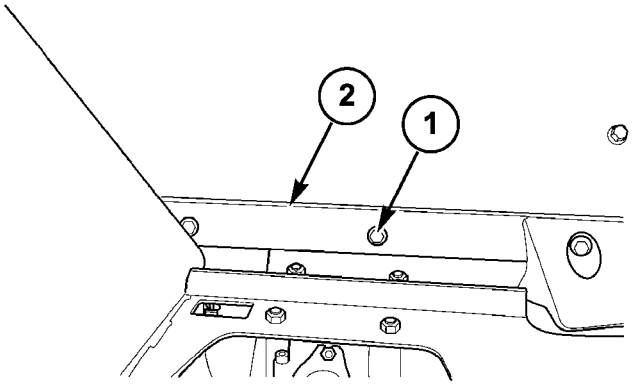
10041750 10

https://truckmanualshub.com/

Bubble-up auger - Install (K.60.B.50 - F.10.A.15)

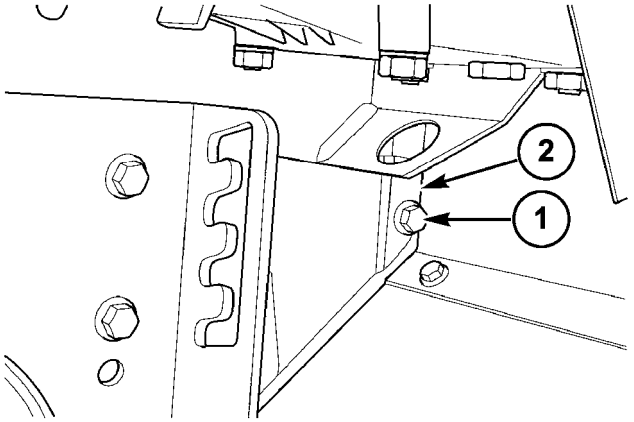
AFX8010

1. To install the bubble-up auger assembly, follow this procedure:
   Install foam seal over end of gearbox input shaft. Align so that the input shaft will pass through the holes in grain tank. Install four M8x20 cap screws with lock washers and nuts **(1)** through upper lip of mounting plate **(2)** and right side of grain tank. Do not tighten until all fasteners are in place in mounting plate.



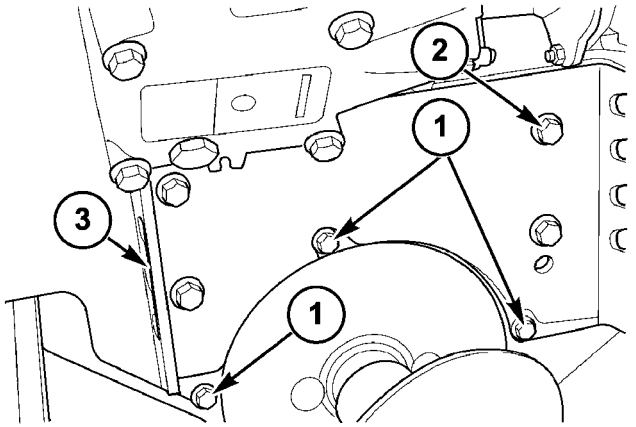
10041749B5 1

2. Raise auger tube up to its upper position and latch. Install one M10x25 cap screw with lock washers and nut **(1)** through rear tip of mounting plate **(2)**.



10041747B5 2

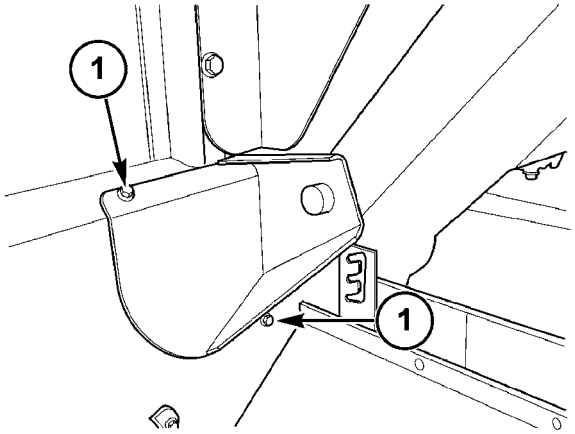
3. Install three M8x25 cap screws, lock washers and nuts **(1)** through the mounting plate and the grain tank wall. Install four M10x25 cap screws, lock washers and nuts **(2)** through the auger cover support **(3)** the mounting plate and the grain tank wall.



10041748B5 3

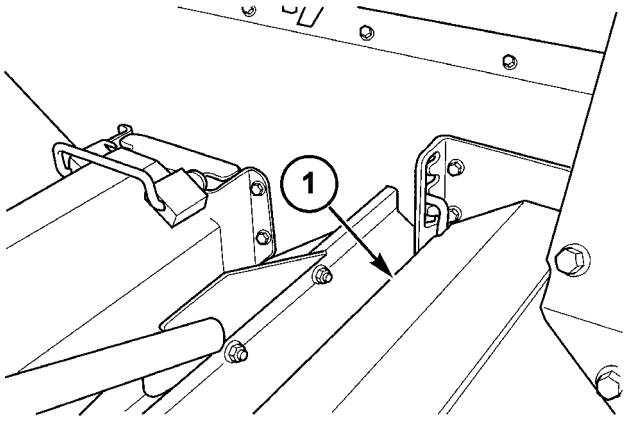
https://truckmanualshub.com/

4. Install two M8x20 cap screws, lock washers and nuts **(1)**.



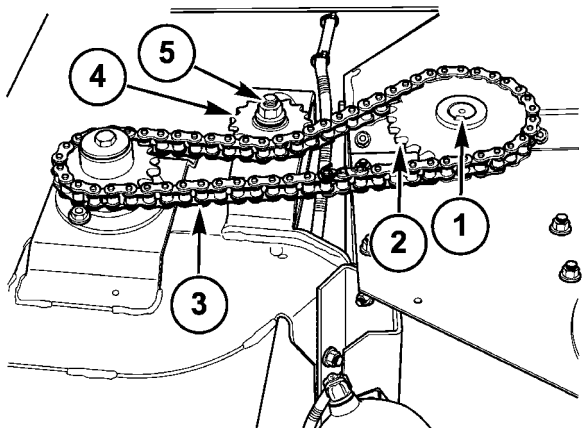
10041746A5 4

5. Install cross auger cover plate **(1)** to appropriate position as needed.



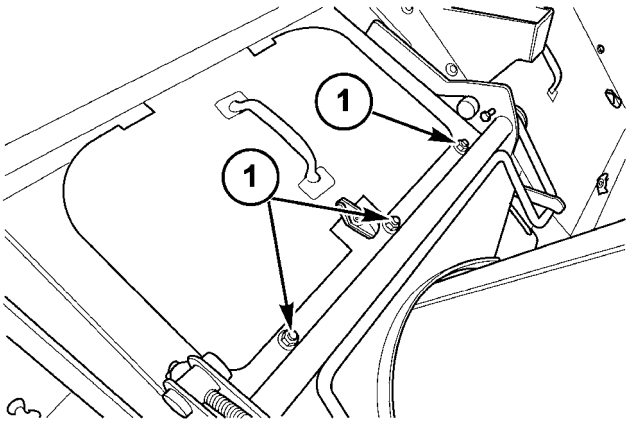
10021837B5 5

6. Install **50 mm** (**1.97 in**) key **(1)** in shaft of gearbox and install sprocket **(2)**. Align with drive sprocket on elevator and tighten two set screws. Assemble chain **(3)** and adjust idler **(4)** with nut **(5)**.



10034840B5 6

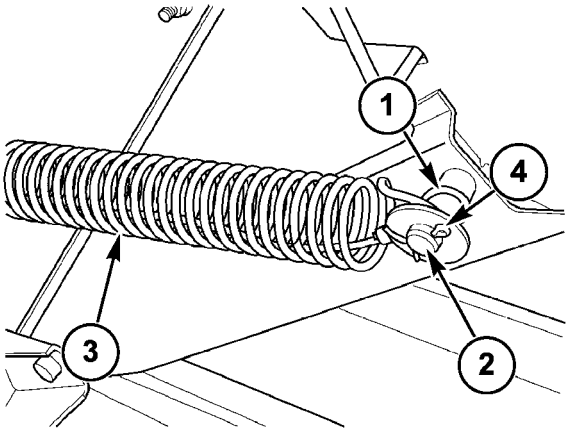
7. Install three M8x20 cap screws, lock washers and nuts **(1)** to retain the hinged covers over the auger tube. Raise the auger tube to the raised position and retain with latch.



10034685C5 7

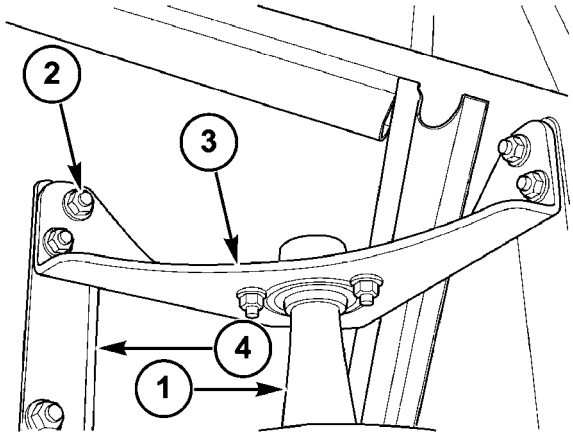
https://truckmanualshub.com/

8. Install the cable **(1)** on the pin **(2)** and extend the spring **(3)** so that it also hooks onto the pin. Install the washer and a **.188X1.75 in** (**5X40 mm**) cotter pin **(4)**.



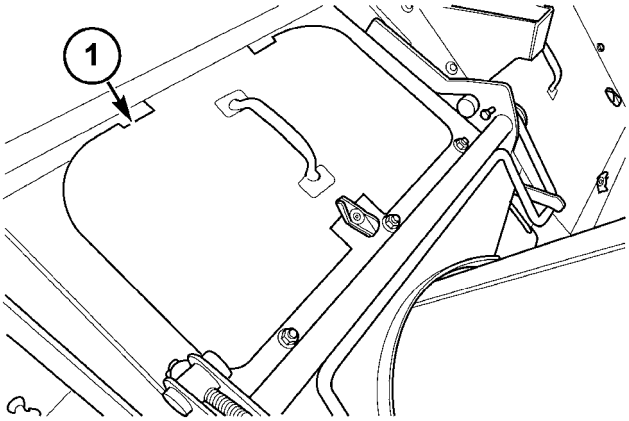
10041745B5 8

9. Grease the splines on the gearbox output shaft with **CASE AKCELA PREMIUM GREASE EP-2**. Using an appropriate hoist, lower the bubble-up auger **(1)** into the auger tube and engage the splines on the output shaft. Install four M10x25 cap screws with lock washers and nuts **(2)** to retain the bearing support **(3)** to the auger tube **(4)**.



10037337B5 9

10. Install cover **(1)** and retain with thumb latch.



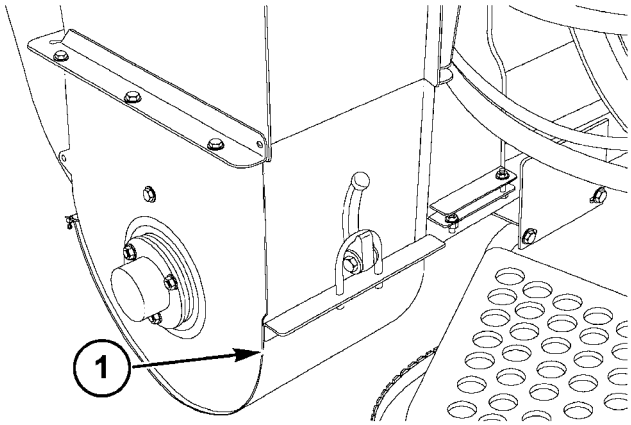
10034685A5 10

https://truckmanualshub.com/

Clean grain cross auger - Remove (K.60.B.51 - F.10.A.10)

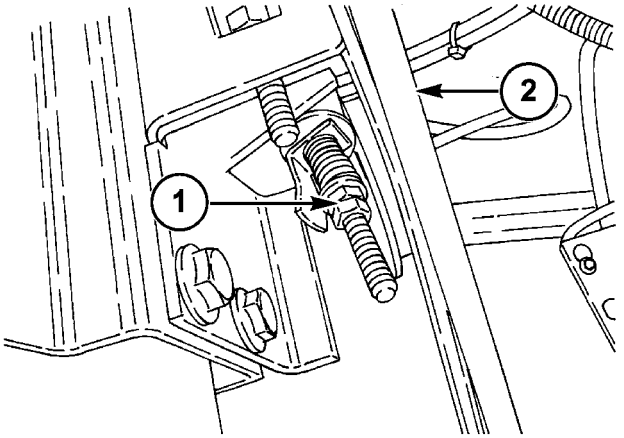
AFX8010

1. To remove the clean grain cross auger, proceed as follows:
   Open cover **(1)**.



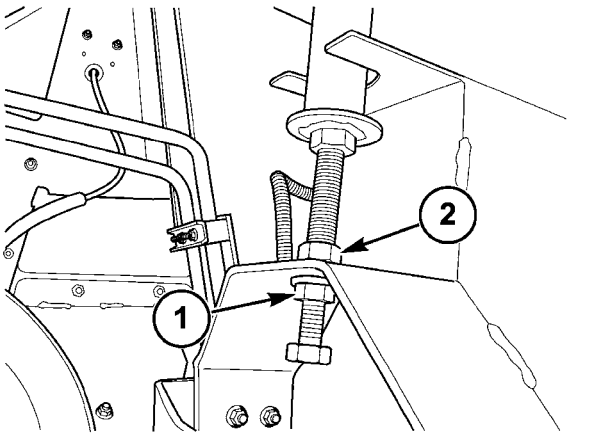
40033209A5 1

2. Loosen nuts **(1)** and remove the grain elevator intermediate shaft drive belt **(2)**.



20034728A5 2

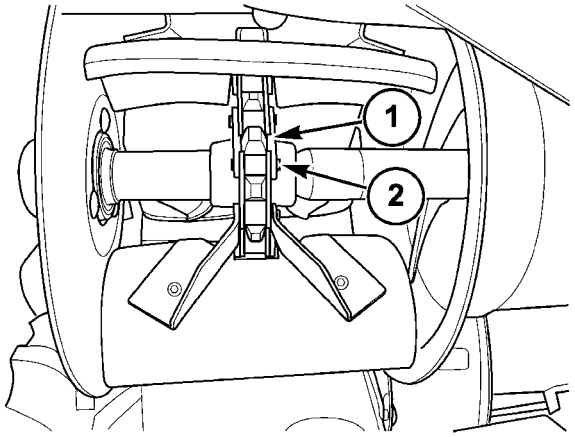
3. Rotate the elevator chain until the coupler links are accessible on the bottom sprocket.
4. Release the chain tension with nuts **(1)** and **(2)** at the rear of the grain elevator.



10031282A5 3

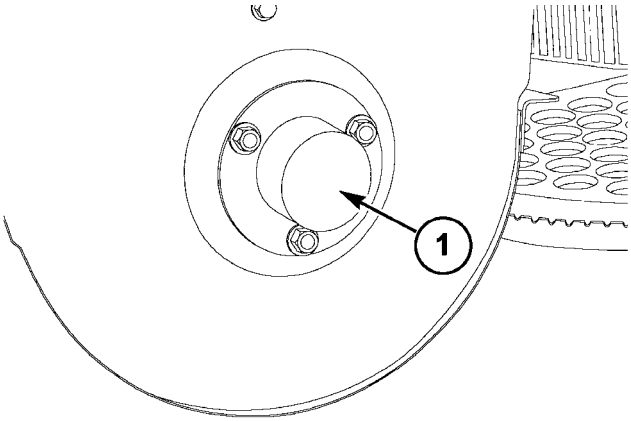
https://truckmanualshub.com/

5. To open the chain, remove “S” pins **(2)** to remove coupler link **(1)**. To prevent the chain from slipping out of the elevator, fit a rope on both ends of the chain.



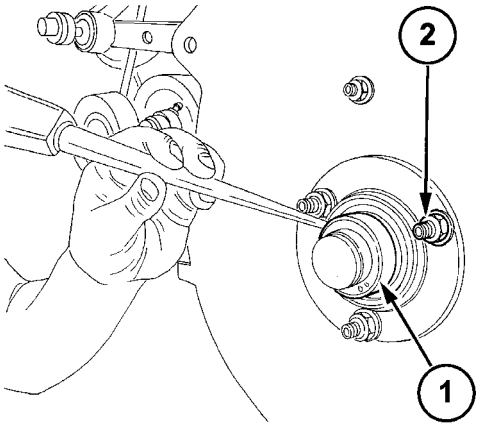
10031281A5 4

6. Remove nuts to remove cover **(1)**.



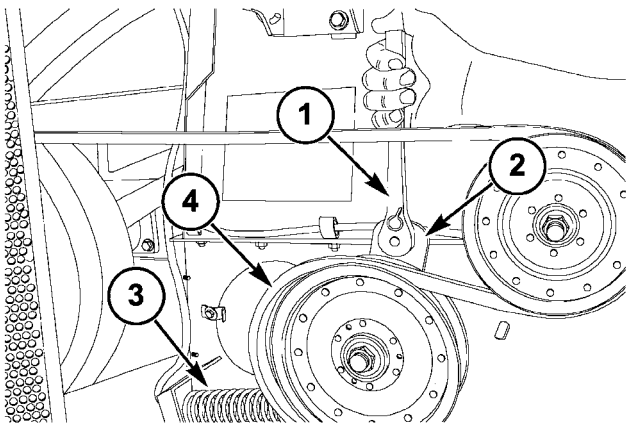
40033213A5 5

7. Remove lock collar **(1)**. Loosen nuts **(2)** and remove the outer bearing flange. Remove LH Service Platform and Shielding per **Side shield - Remove (E.20.A.70 - F.10.A.10)**.



50037327A5 6

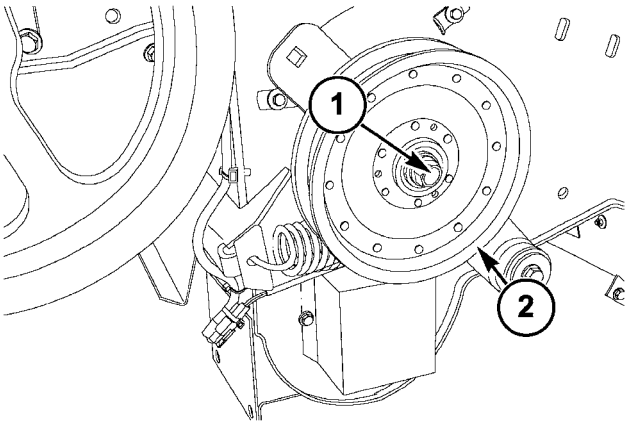
8. To clear the area at the left end of the auger for removal, the cleaning system drive belt must be removed. To remove the belt, insert the square end of a ½ inch drive ratchet handle **(1)** into the square hole in the top of the idler arm **(2)**. Pull rearward to extend the spring **(3)** and to produce slack in the belt **(4)**. Remove belt from the idler pulley and allow idler to move forward to relax the spring.



40033210B5 7

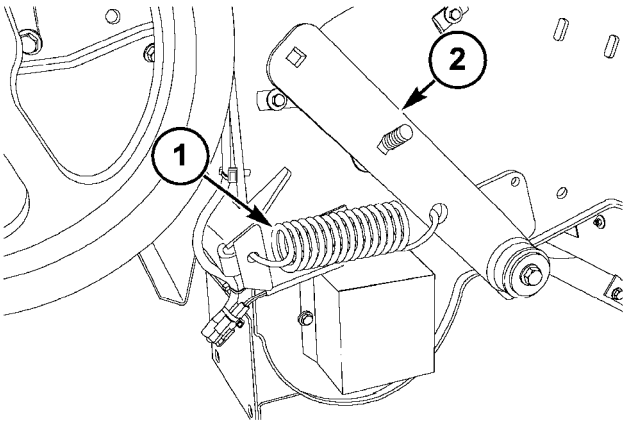
https://truckmanualshub.com/

9. Remove lock nut and washer **(1)** remove pulley **(2)** and spacer and washer from idler arm.



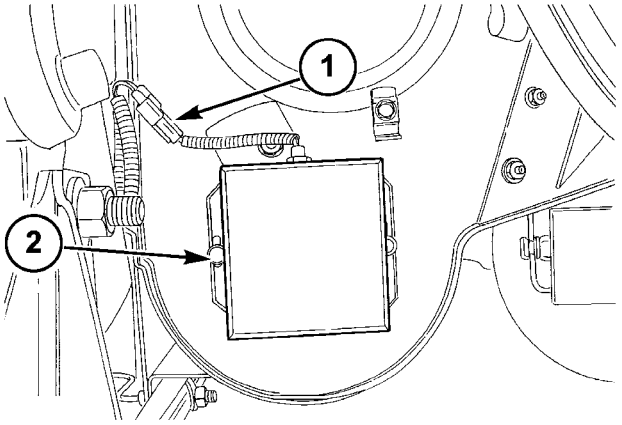
40033211A5 8

10. Remove spring **(1)** and rotate idler arm **(2)** rearward out of the way.



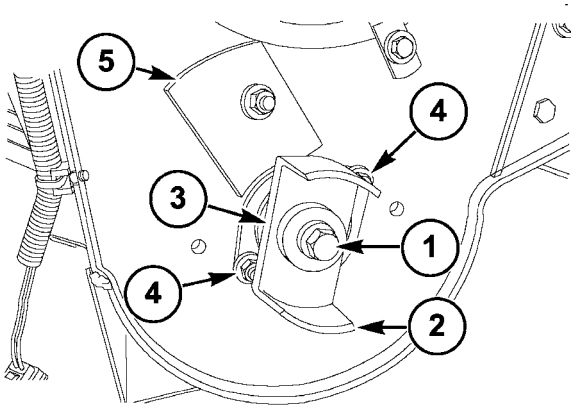
40033212A5 9

11. Disconnect the wires for the auger shaft sensor **(1)** at the left hand side. Loosen two bolts **(2)** to remove sensor and cover.



50037325A5 10

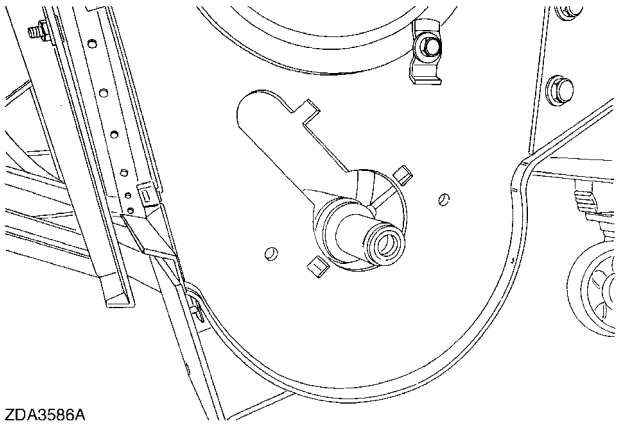
12. Remove the central bolt **(1)** of the sensor plate and remove plate **(2)**. Remove bearing lock collar **(3)**. Loosen two nuts **(4)** and remove the bearing flange. Loosen the nut to remove cover **(5)**.



40033202A5 11

https://truckmanualshub.com/

13. Remove the sprocket and the bearing at the right hand side. Turn out the auger through the long key-hole slot at the left side.



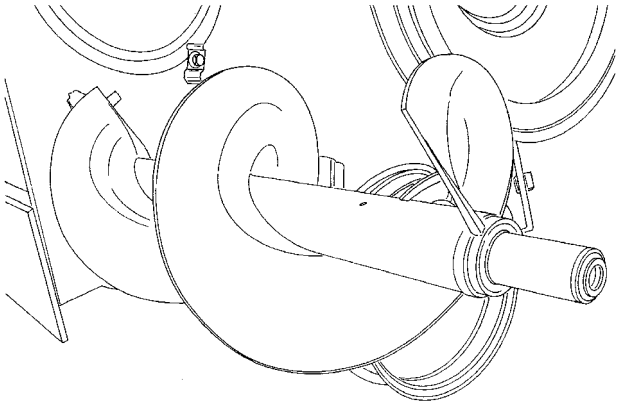
ZDA3586A 12

https://truckmanualshub.com/

Clean grain cross auger - Install (K.60.B.51 - F.10.A.15)

AFX8010

1. To install the auger, proceed as follows:
   Install the auger from the left hand side by rotating the auger until it is part way into the lower elevator housing.



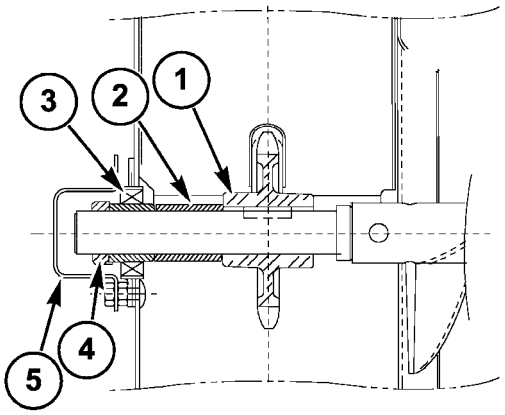
ZDA3582A

ZDA3582A 1

2. Install sprocket and key **(1)** and spacer **(2)** on right hand end. As auger is advanced fully to the right, install right-hand side bearing **(3)** and tighten the nuts (do not tighten lock collar **(4)** at this time).

NOTE: *Lubricate the spherical outer race with* ***CASE AKCELA PREMIUM GREASE EP-2*** *and lubricate the locking collar track of the inner race of the bearing and the lock collar with Loctite product 767 antiseize grease to ease future disassembly.*

IMPORTANT: *Install the auger concentric with the auger housing.*

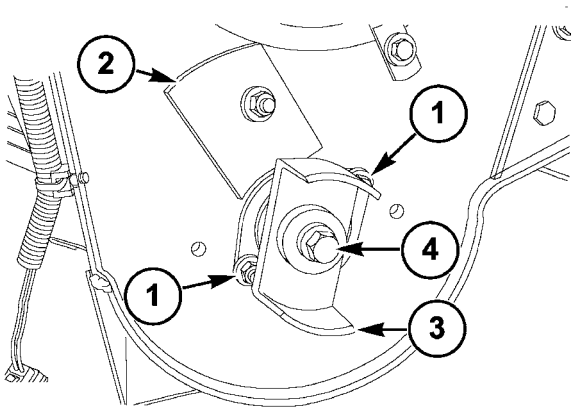


40033201A5 2

3. Adjust the auger so that the sprocket clears the divider plate in the elevator and the auger flighting clears at both ends. Tighten lock collar **(4)**. Install cover **(5)**.

4. Install the bearing and tighten nuts **(1)** at the left hand end.

NOTE: *Lubricate the spherical outer race with* ***CASE AKCELA PREMIUM GREASE EP-2*** *and lubricate the locking collar track of the inner race of the bearing and the lock collar with Loctite product 767 antiseize grease to ease future disassembly.*



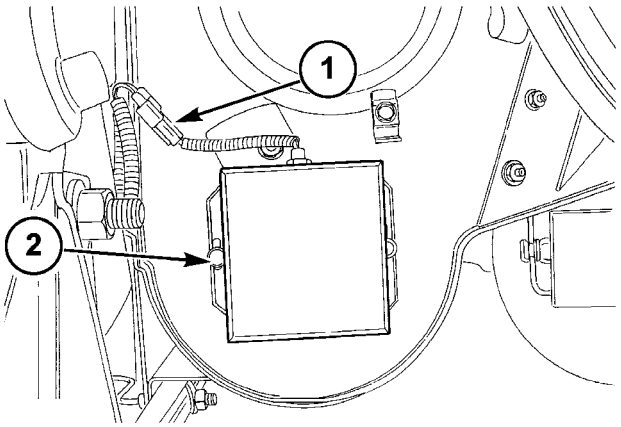
40033202B5 3

5. Install and tighten lock collar. Install cover **(2)**. Install sensor target **(3)** as shown or flipped over as needed to allow for clearance within sensor cover.

NOTE: *Legs of target may not contact bolts or cover.*

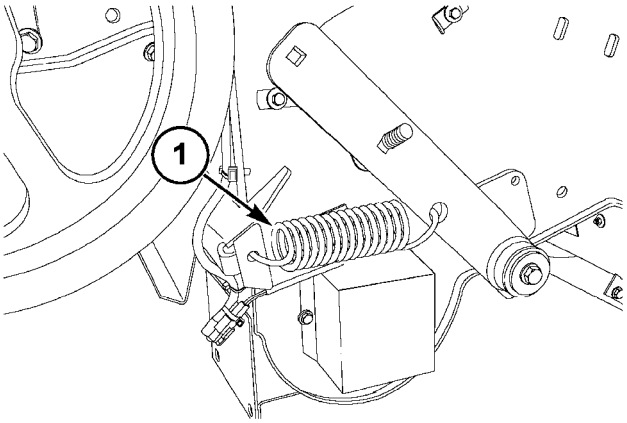
https://truckmanualshub.com/

6. Install sensor cover with two bolts **(2)** and connect the wires **(1)**.



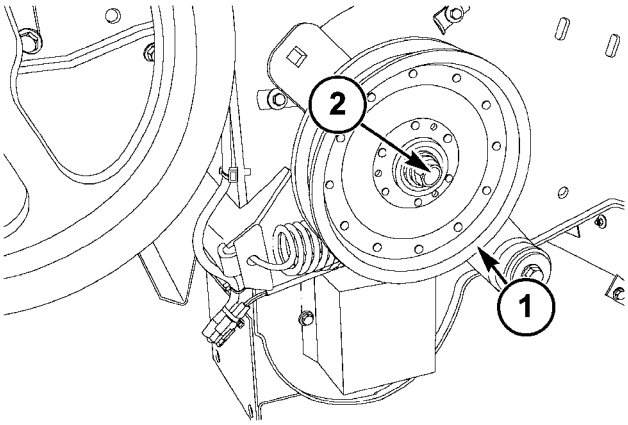
50037325A5 4

7. Install spring **(1)**.



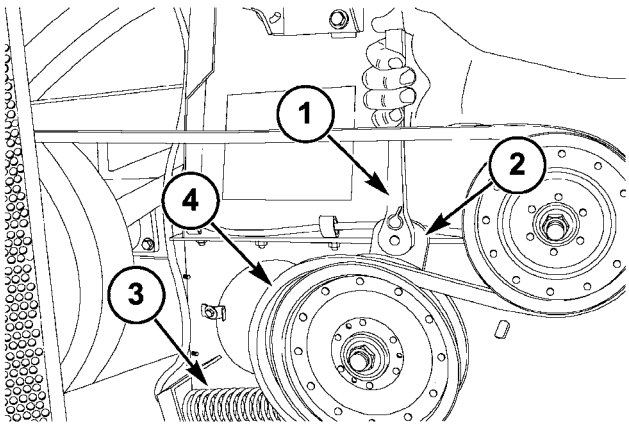
40033212B5 5

8. Install washer and spacer to bolt in idler arm. Then install idler pulley **(1)**, washer and lock nut **(2)**.



40033211B5 6

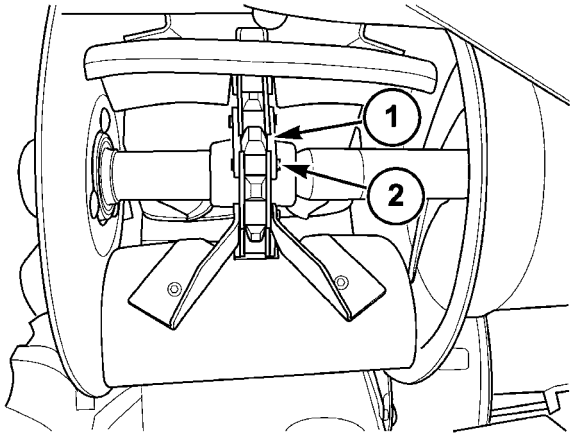
9. To install the drive belt, use a ½ inch drive ratchet handle **(1)** inserted into the square hole in the idler arm **(2)** to stretch the spring **(3)** sufficiently to allow the belt **(4)** to be installed.



40033210B5 7

https://truckmanualshub.com/

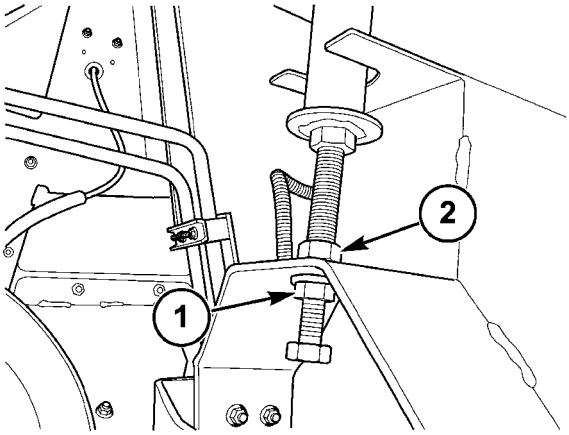
10. Close the grain elevator chain with coupler links **(1)**. Install “S” pins **(2)** to secure the coupler links.



10031281A5 8

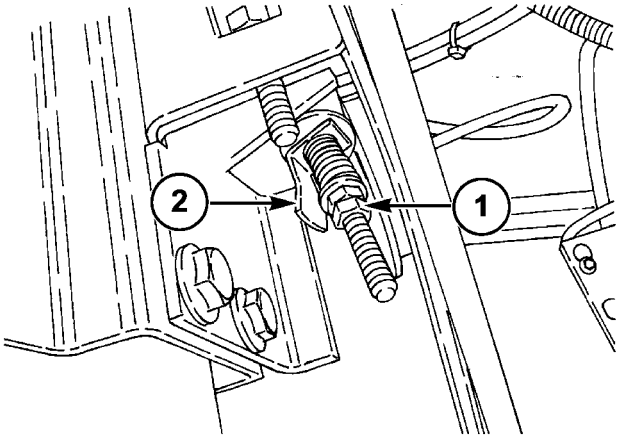
11. Adjust the elevator chain tension with nuts **(1)** & **(2)**.

NOTE: *The tension is correct when the chain can be moved axially across the lower sprocket by hand when at its tightest spot.*



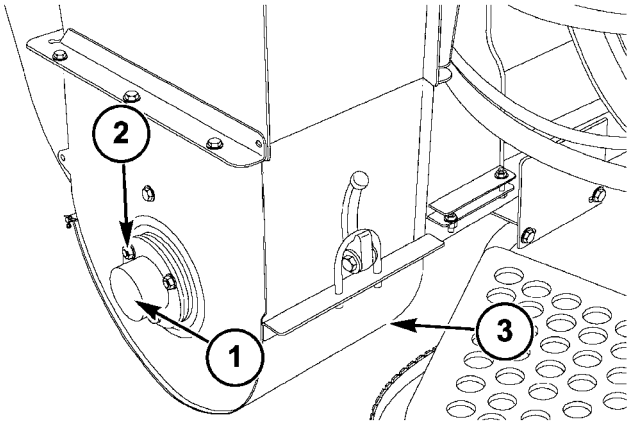
10031282A5 9

12. Install and adjust the grain elevator intermediate shaft drive belt with nuts **(1)** so that spring is compressed to **56 mm** (**2.2 in**) length as indicated by guide **(2)**.



20034728B5 10

13. Install bearing cap **(1)** with nuts **(2)**. Close the bottom of the grain elevator with the cover **(3)**.



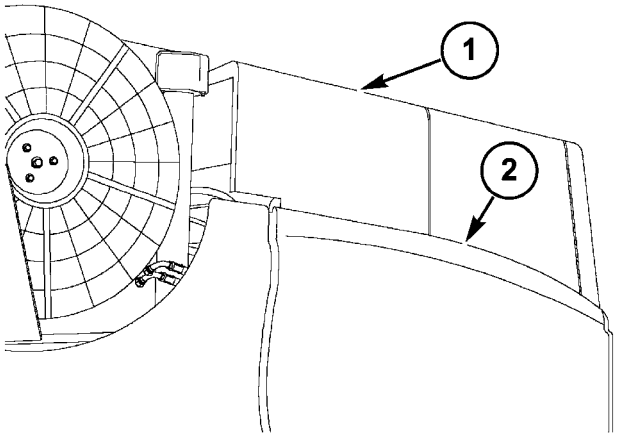
40033209E5 11

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Grain elevator - Remove (K.60.B.52 - F.10.A.10)

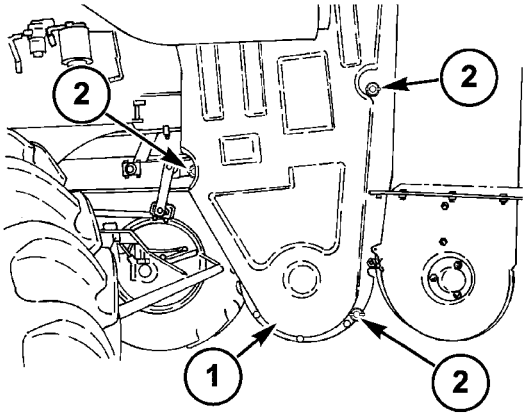
AFX8010

1. To remove the grain elevator, proceed as follows:
2. Remove the right hand side shields **(1)** and **(2)**.



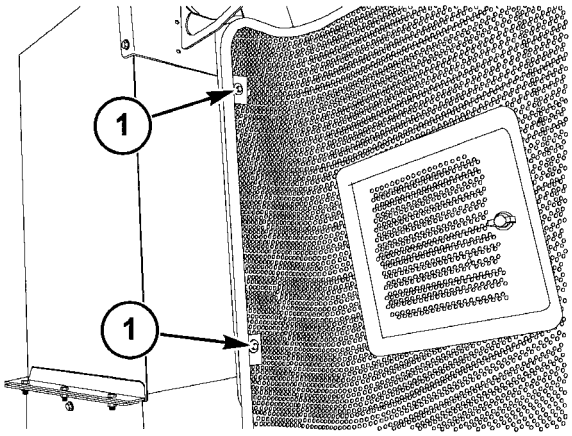
40033203B5 1

3. Remove the tailings processor cover **(1)** from the right side of the combine by removing the three klik pins **(2)**.



20034730A5 2

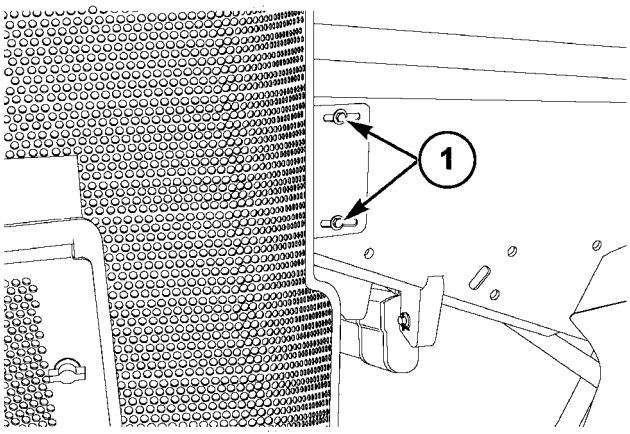
4. Remove two cap screws, lock washers and nuts **(1)** from right hand fan drives screen and bracket on front of elevator.



40033204A5 3

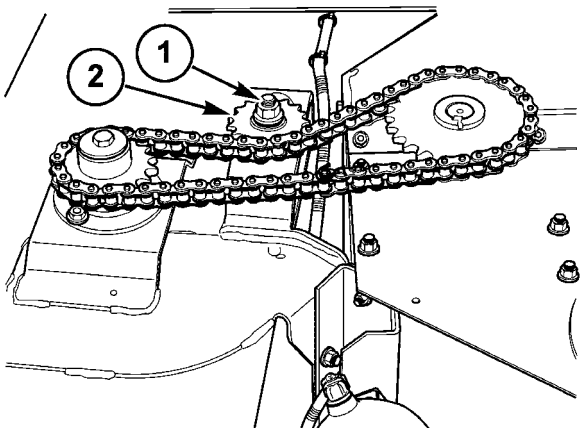
https://truckmanualshub.com/

5. Remove two cap screws and lock washers **(1)** from front of right hand fan drives area screen. Set screen aside for use in re-assembly.



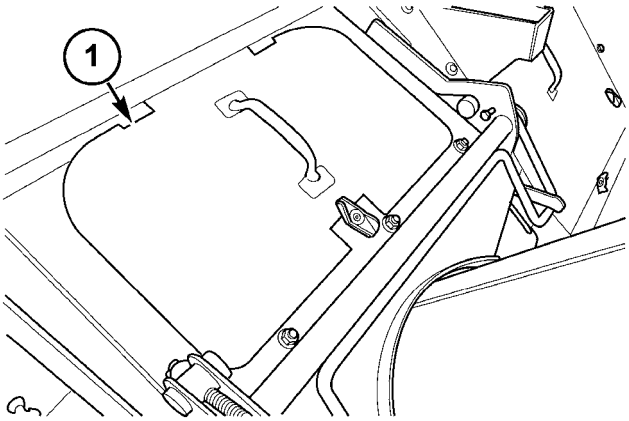
40033205A5 4

6. Loosen the nut **(1)** to raise the idler **(2)** and remove chain from bubble-up auger drive.



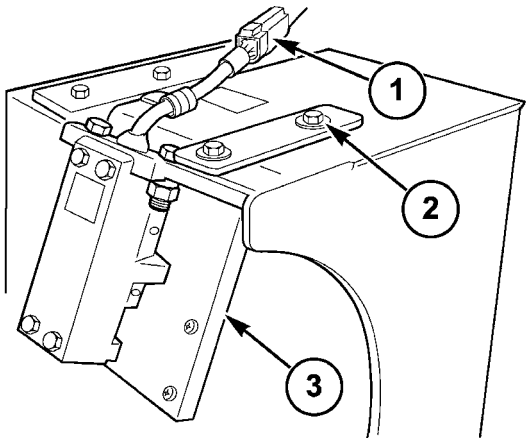
10034840C5 5

7. Remove cover **(1)**.



10034685A5 6

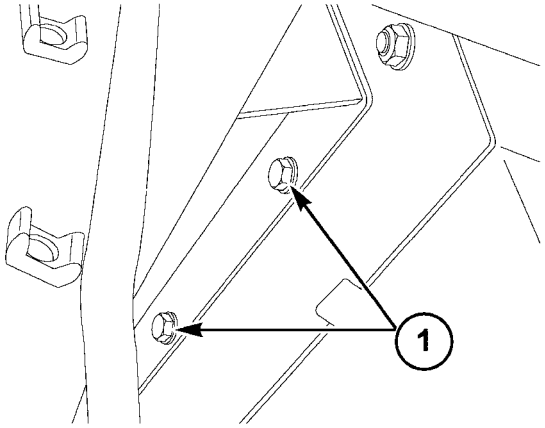
8. If equipped, disconnect wire harness **(1)**. Remove four (4) cap screws, lock washers and nuts **(2)** and remove sensor plate assembly. Feed wire harness out through the grommet hole in grain tank to the rear of this connection.



50030166A5 7

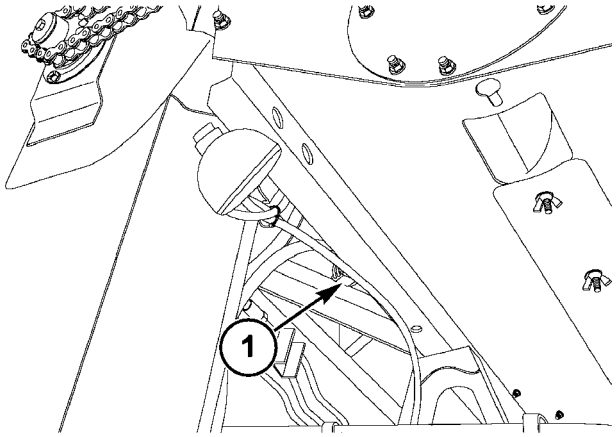
https://truckmanualshub.com/

9. Remove two cap screws, lock washers, and nuts **(1)** that attach the top front lip of the elevator housing to the grain tank.



40037324A5 8

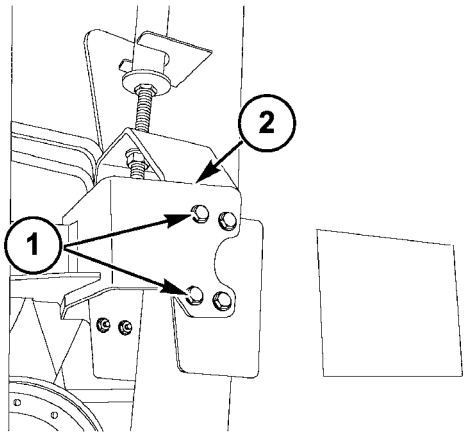
10. Disconnect harness **(1)** to monitors on elevator body, if so equipped.



40031054A5 9

11. Remove eight (8) cap screws with lock washers and nuts **(1)** to remove the right hand center side panel lower hinge support **(2)** from elevator.

NOTE: *It may be desirable to provide temporary vertical support for the side panel while the lower hinge support is disconnected.*

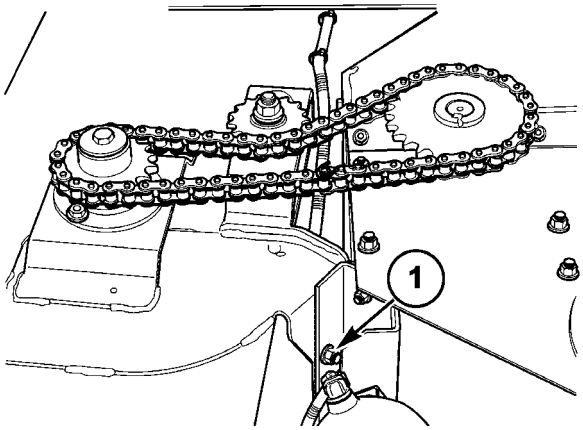


40033208A5 10

12. Refer to **Grain elevator Chain - Remove (K.60.B.52.48 - F.10.A.10)** for instructions to remove the chain from the elevator.

https://truckmanualshub.com/

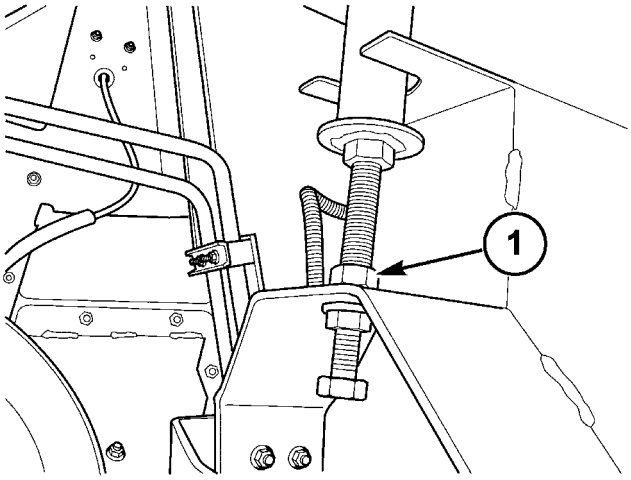
13. With elevator adequately supported with a hoist, remove two cap screws **(1)**.



10034840D5 11

14. Remove lower elevator body. Refer to**Grain elevator housing - Disassemble (K.60.B.74 - F.10.A.25)**.

15. Lower elevator head assembly with adjustment nut **(1)**. Move top of assembly rearward to disengage the elevator head from the grain tank as the whole assembly is lowered slightly. Remove elevator completely.



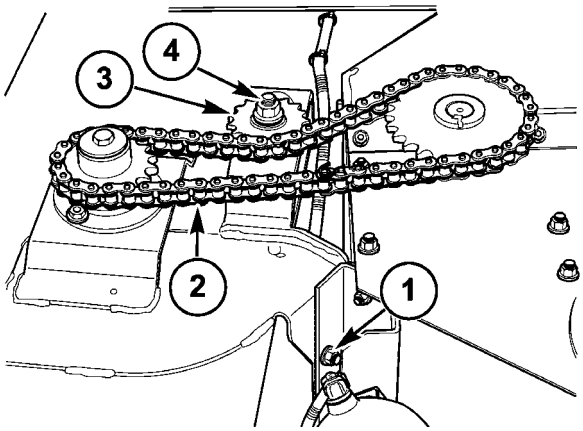
10031282B5 12

https://truckmanualshub.com/

Grain elevator - Install (K.60.B.52 - F.10.A.15)

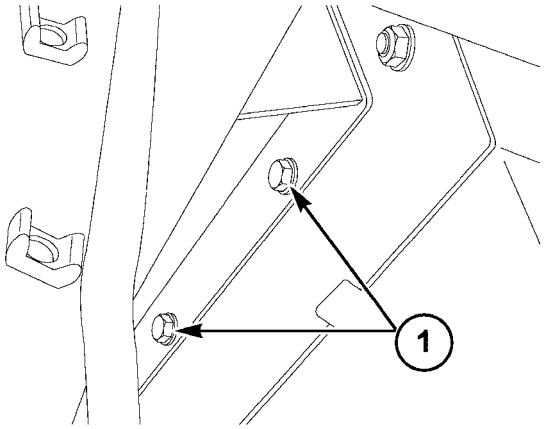
AFX8010

1. To install the elevator assembly, proceed as follows:
2. Move elevator into position at right side of combine with a suitable hoist. Guide the front of the elevator head into the grain tank opening as the top of the elevator is moved forward and up slightly. Install two M10X30 cap screws **(1)** with lock washers and nuts to retain elevator to main support angle on rear of grain tank. Install bubble-up auger drive chain **(2)** and adjust idler **(3)** with nut **(4)**.



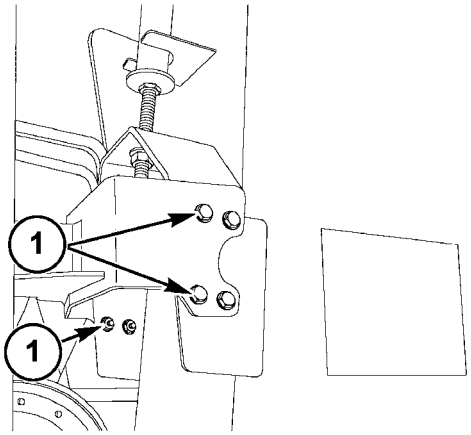
10034840E5 1

3. Install two M8X20 cap screws, lock washers, and nuts **(1)** that attach the top front lip of the elevator housing to the grain tank.



40037324A5 2

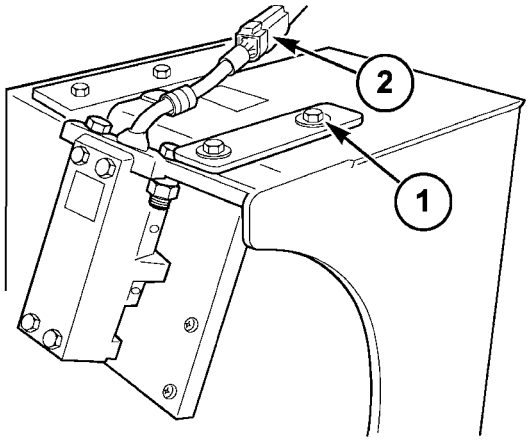
4. Install lower elevator body and elevator chain. Refer to **Grain elevator housing - Assemble (K.60.B.74 - F.10.A.20)** and **Grain elevator - Install (K.60.B.52 - F.10.A.15)**.
5. Install eight (8) M8X25 cap screws **(1)** with lock washers and nuts to attach the center side panel hinge support to the elevator housing.



40033208B5 3

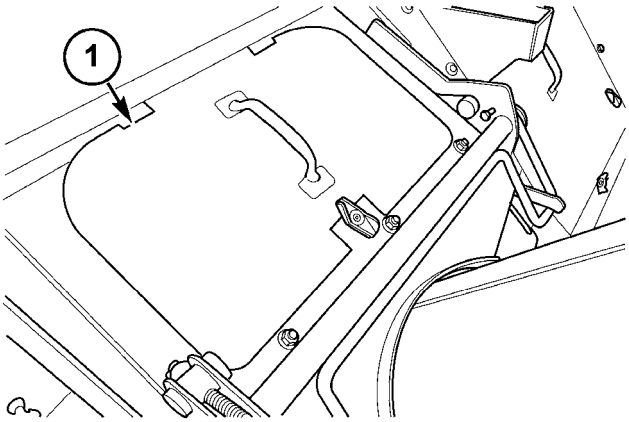
https://truckmanualshub.com/

6. Connect elevator monitors harness **(1)** if so equipped. If top of elevator is equipped for grain flow sensor, install with four (4) M8X20 cap screws with lock washers and lock nuts **(1)**. Connect harness connector **(2)** after feeding it through the grommet just to the rear of the connector.



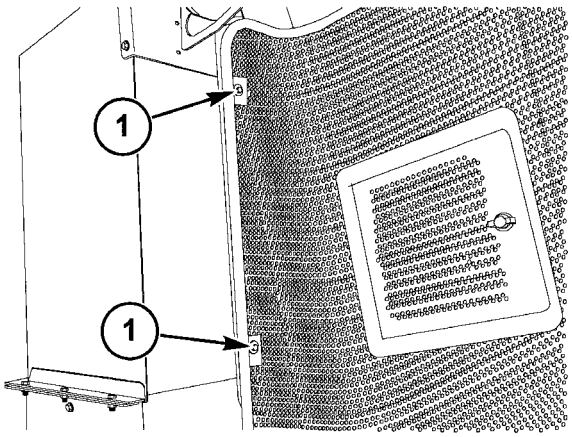
50030166B5 4

7. Install cover **(1)**.



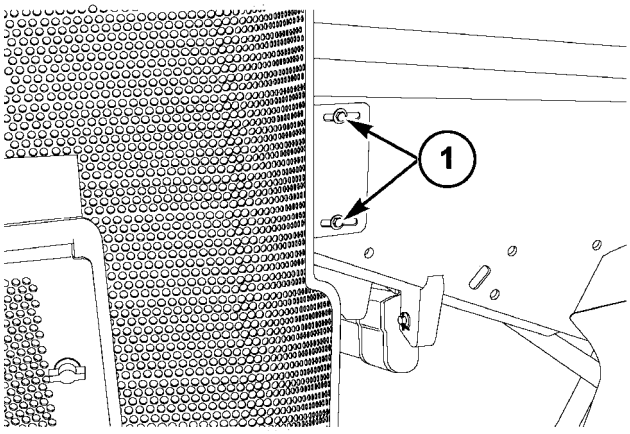
10034685A5 5

8. Install right hand fan drives area screen and retain with two M8X20 cap screws, lock washers and nuts **(1)**.



40033204A5 6

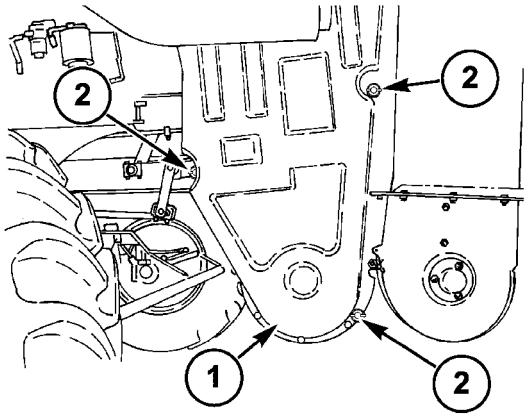
9. Retain front of right hand fan drives area screen with two M8X20 cap screws and lock washers **(1)**.



40033205A5 7

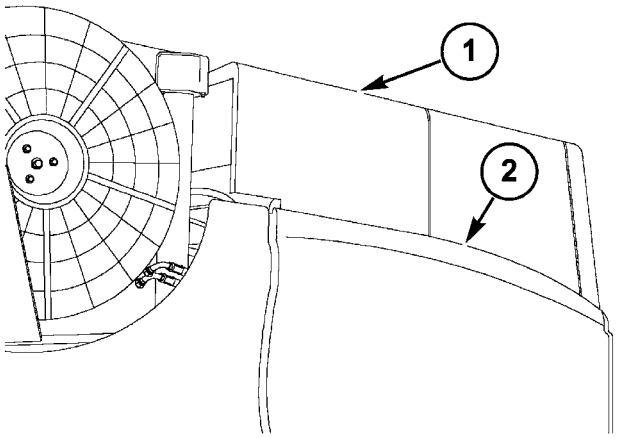
https://truckmanualshub.com/

10. Install the tailings processor cover **(1)** on the right side of the combine by installing the three klik pins **(2)**.



20034730A5 8

11. Install shield **(1)** with six (6) M8X20 cap screws with lock washers into weld nuts; five (5) are on top and one is at the bottom of the front flange. Also three (3) M8X20 cap screws are used with nuts and two lock washers each through the side of the shield. Install the large side panel **(2)** with M8X30 cap screws with nuts and two lock washers each at the hinge points. Reconnect the gas struts and check for proper latching.



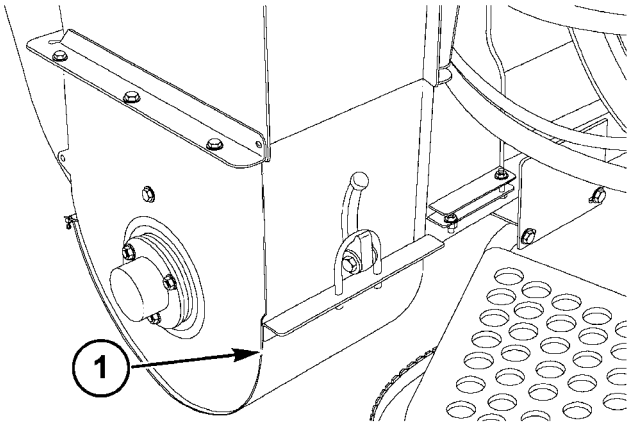
40033203B5 9

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Grain elevator Chain - Remove (K.60.B.52.48 - F.10.A.10)

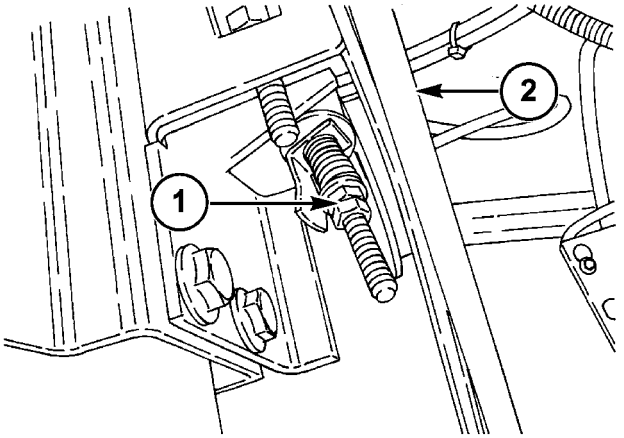
AFX8010

1. To remove the grain elevator chain, proceed as follows:
   Open cover **(1)**.



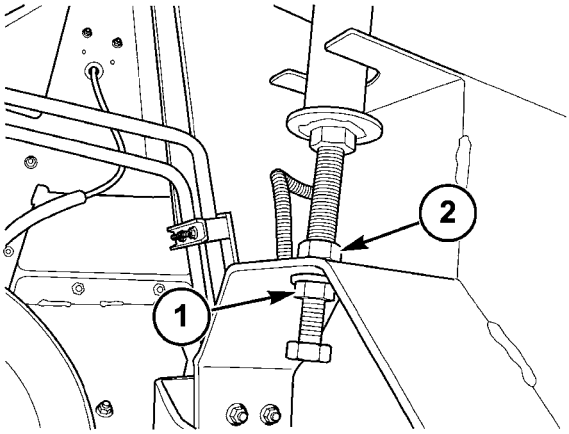
40033209A5 1

2. Loosen nuts **(1)** and remove the grain elevator intermediate shaft drive belt **(2)**.



20034728A5 2

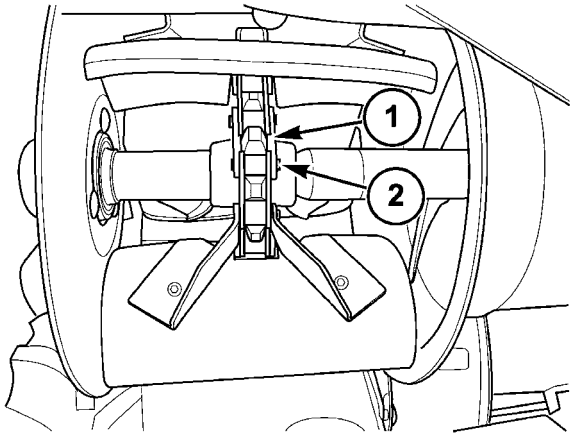
3. Release the chain tension with nuts **(1)** and **(2)** at the rear of the grain elevator.



10031282A5 3

https://truckmanualshub.com/

4. Rotate the elevator chain until the coupler links are accessible on the bottom sprocket. To open the chain, remove “S” pins **(2)** to remove coupler link **(1)**. Attach a rope or fit a new chain to one side of the grain elevator chain. Turn the old chain out.



10031281A5 4

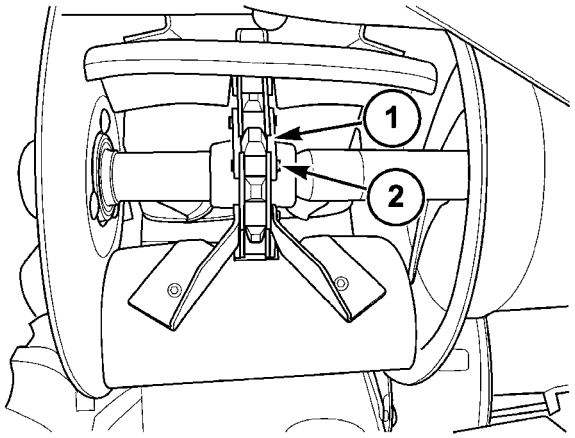
https://truckmanualshub.com/

Grain elevator Chain - Install (K.60.B.52.48 - F.10.A.15)

AFX8010

1. To install the grain elevator chain, proceed as follows:
   Attach the new elevator chain to the rope or to the old elevator chain and pull new chain into housing.

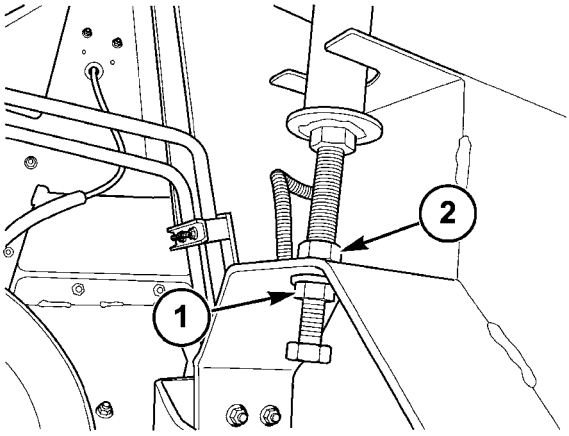
IMPORTANT: *Check if the chain is installed in the correct direction. Paddle supports must be on front of bottom paddle. See figure.*



10031281A5 1

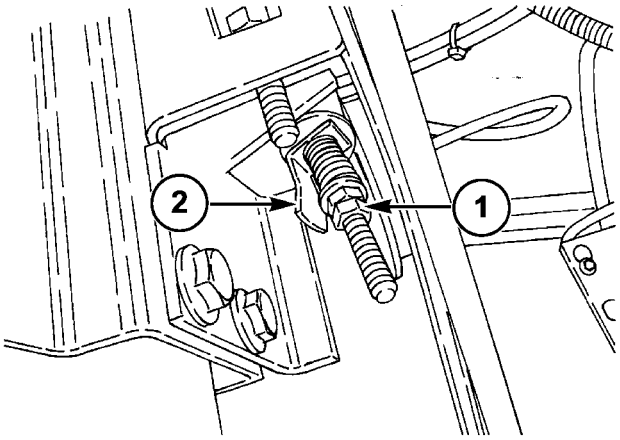
2. Connect the ends of the chain with connector links **(1)** and retain with “S” pins **(2)**.
3. Adjust chain tension with nuts **(1)** and **(2)** at the rear of the elevator.

NOTE: *The chain tension is correct when the chain can be moved axially across the lower sprocket by hand.*



10031282A5 2

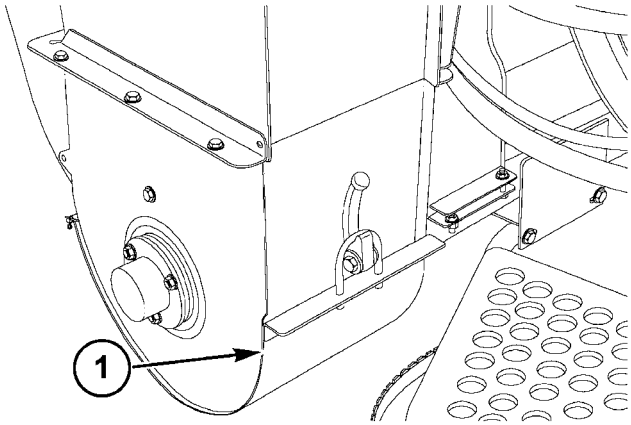
4. Install and adjust the intermediate shaft drive belt with nuts **(1)** so that spring is compressed to **56 mm** (**2.2 in**) length as indicated by guide **(2)**.



20034728B5 3

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5. Close cover **(1)**.



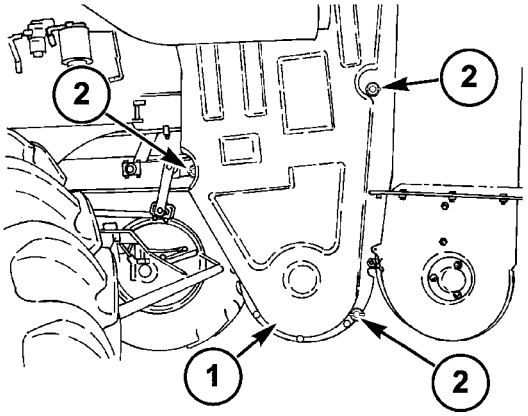
40033209A5 4

https://truckmanualshub.com/

Grain elevator housing - Disassemble (K.60.B.74 - F.10.A.25)

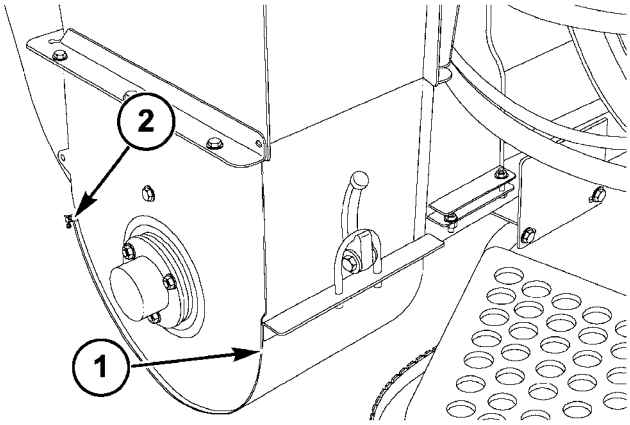
AFX8010

1. To remove the lower grain elevator body, remove the tailings processor cover **(1)** from the right side of the combine by removing the three klik pins **(2)**.



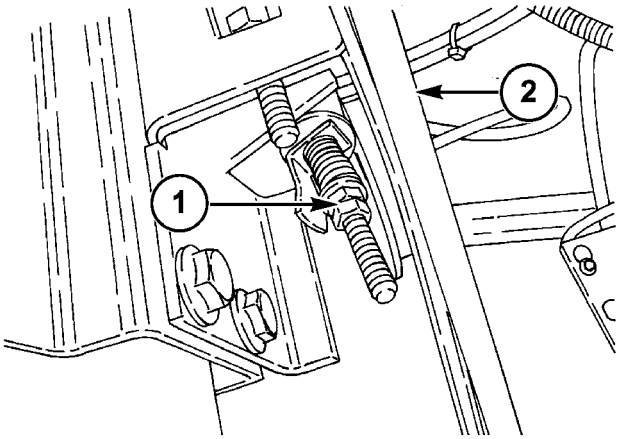
20034730A5 1

2. Open cover **(1)**. Remove cotter pin and hinge pin **(2)** and remove cover.



40033209B5 2

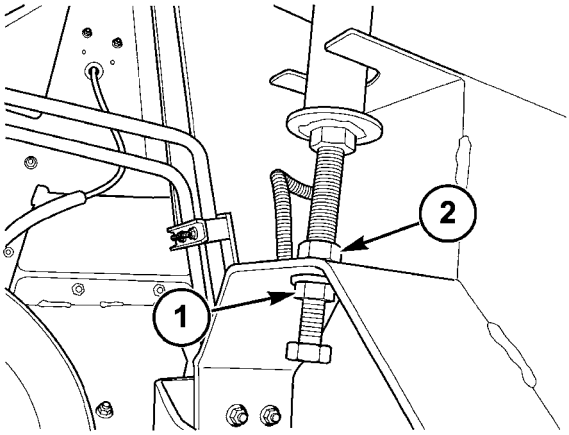
3. Loosen nuts **(1)** and remove the grain elevator intermediate shaft drive belt **(2)**.



20034728A5 3

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4. Release the chain tension with nuts **(1)** and **(2)** at the rear of the grain elevator.

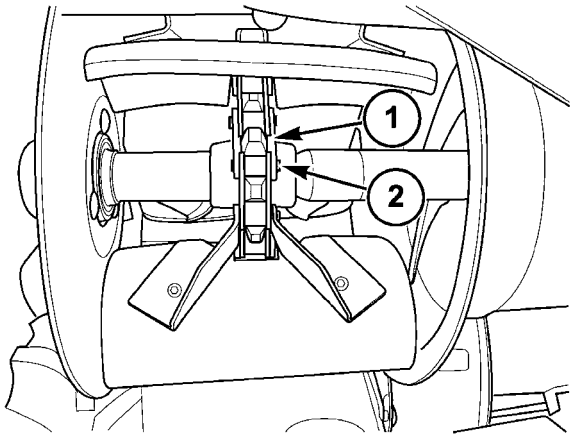


10031282A5 4

5. Rotate the elevator chain until the coupler links are accessible on the bottom sprocket.

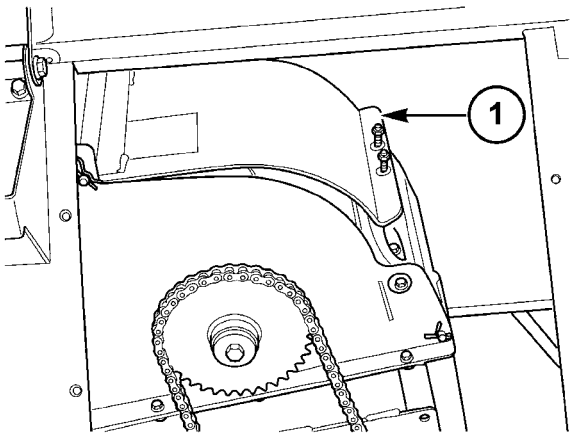
6. Attach a rope to the chain at one side of the coupler link. The rope should be long enough to go fully around the elevator. Roll the chain around the sprockets until the end of the rope appears. Tie the other end of the rope to the chain on the other side of the coupler link to be opened. To open the chain, remove the “S” pins **(2)** to remove coupler link **(1)**.

NOTE: *If an offset link is chosen, only one “S” pin will need to be removed.*



10031281A5 5

7. Open and remove cover **(1)**.

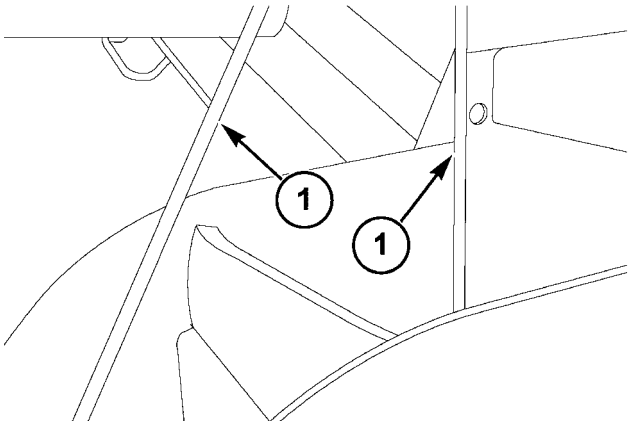


10030024A5 6

https://truckmanualshub.com/

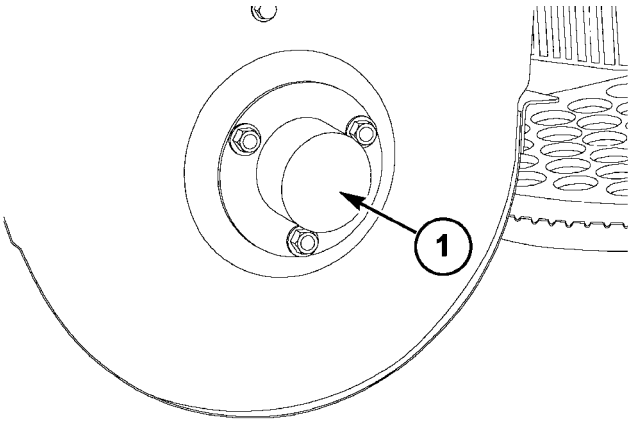
8. Pull upwards on center of rope **(1)** to raise both ends of chain up above the bolted flange joint of the lower body and the main elevator housing.

NOTE: *If the main elevator housing or the upper shaft is to be removed as well, perform step 6 and then turn the chain out of the bottom while holding the rope to control chain speed.*



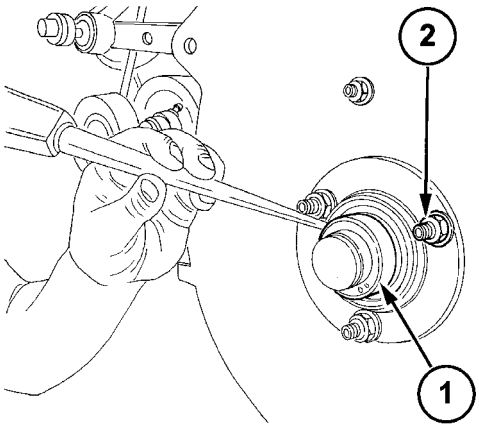
40037320A5 7

9. Remove nuts to remove cover **(1)**.



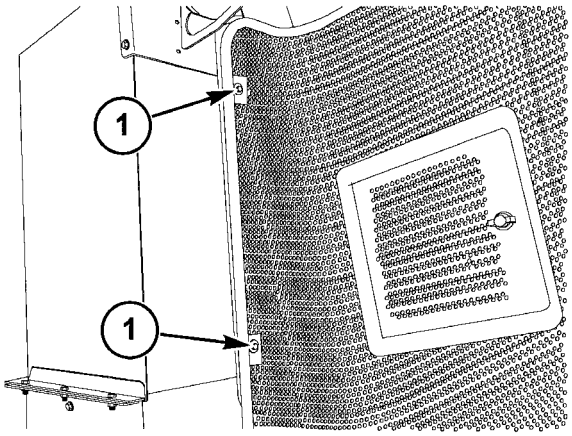
40033213A5 8

10. Remove lock collar **(1)**. Loosen nuts **(2)** and remove the outer bearing flange, the bearing, and the inner flange.



50037327A5 9

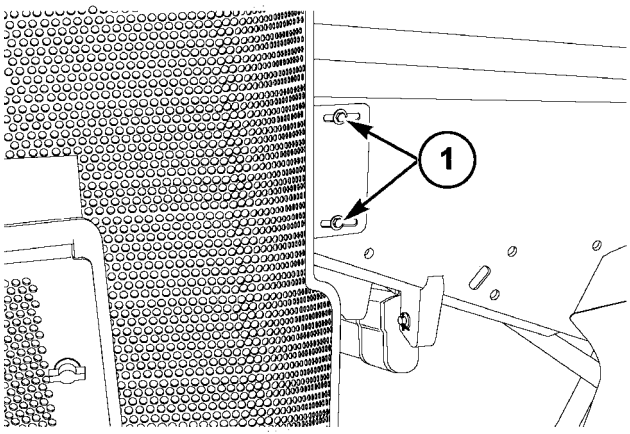
11. Remove two cap screws, lock washers and nuts **(1)** from right hand drives screen and the bracket on front of the elevator.



40033204A5 10

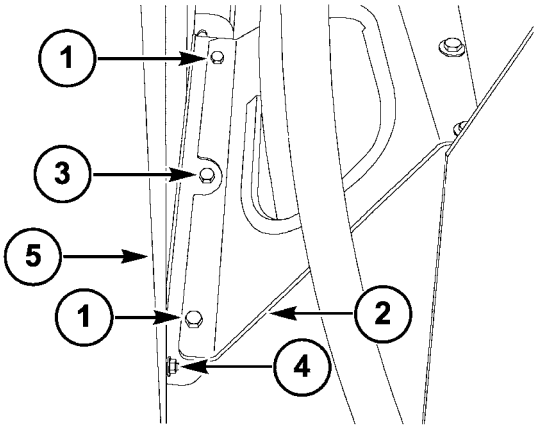
https://truckmanualshub.com/

12. Remove two cap screws and lock washers **(1)** from front of right hand drives area screen. Set screen aside for use in re-assembly.



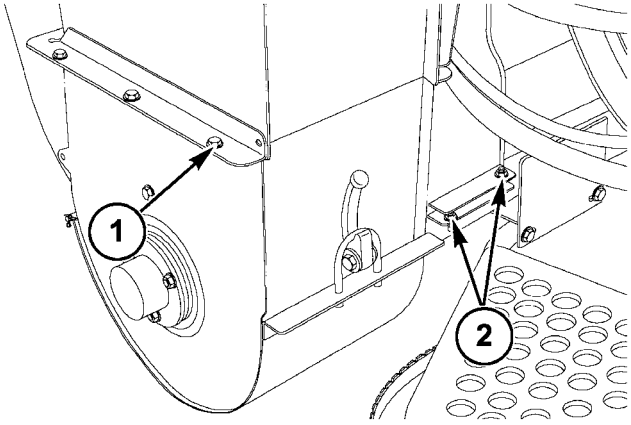
40033205A5 11

13. Remove two cap screws **(1)** from bracket **(2)** near the bottom of the elevator and cap screw **(3)**. Remove cap screw **(4)** and loosen two others at top of angle bracket **(5)** from elevator housing. Swing bottom of bracket away to disengage notch in bracket from flanges of elevator housing and lower body.



40033226A5 12

14. Remove three cap screws, lock washers, and nuts **(1)** on right hand side and three of same on rear flange. Loosen four cap screws with nuts and washers **(2)** to loosen clean grain cross auger tube halves. Lower body housing can now be pulled outward, away from the cross auger, the sprocket and spacer sliding off the shaft as the housing is moved outward.

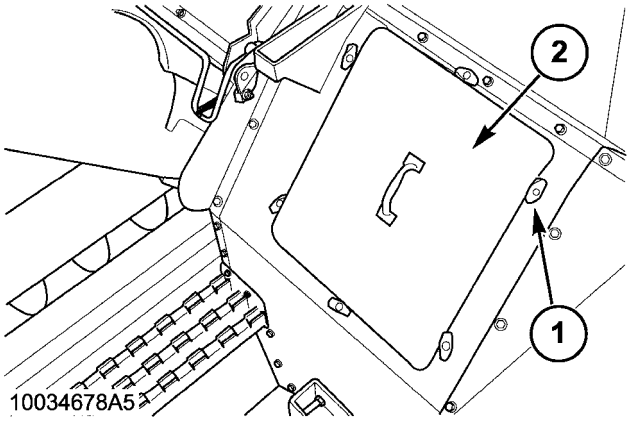


40033209C5 13

15. To Remove the Upper Shaft of the grain elevator, proceed as follows:

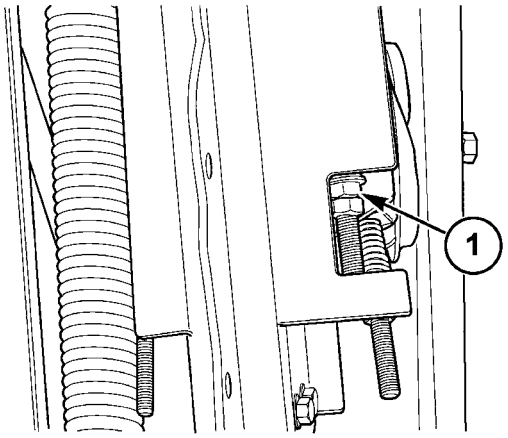
https://truckmanualshub.com/

16. Turn tabs **(1)** to remove cover **(2)**. Remove the grain elevator chain, refer to **Grain elevator Chain - Remove (K.60.B.52.48 - F.10.A.10)**.



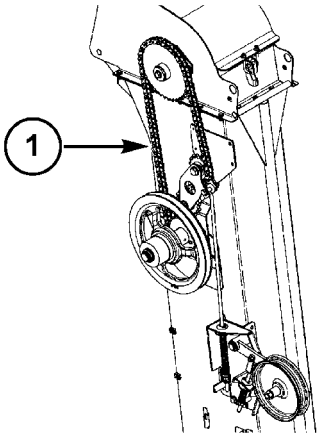
10034678A5 14

17. Loosen nuts **(1)** to reduce chain tension.



50031298B5 15

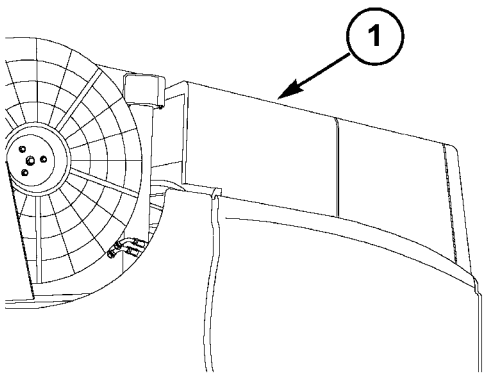
18. Remove chain **(1)**.



50033221A5 16

19. Remove shield **(1)** to have access to the top of the right hand side of the elevator, using a ladder. There are six (6) cap screws going into weld nuts and three (3) cap screws with nuts and washers used to retain this shield.

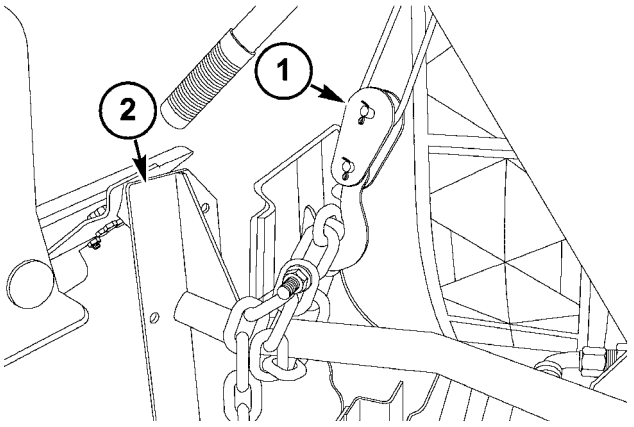
IMPORTANT: *The shield being removed provides support for the rear hinge of the large styled side panel. Auxiliary support should be used while this shield is off.*



40033203A5 17

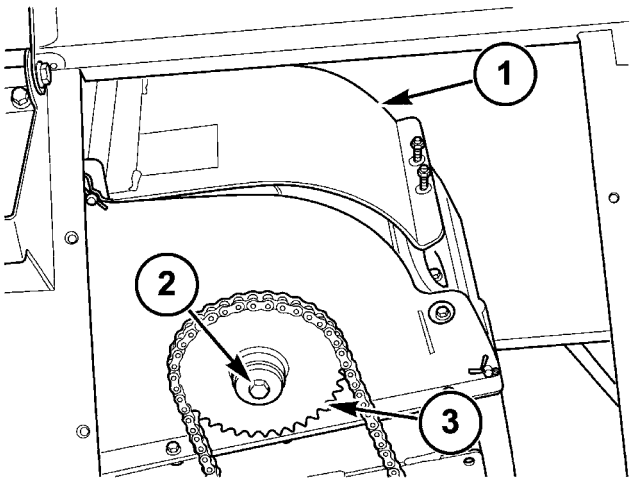
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20. Provide support **(1)** to right hand door panel hinge **(2)** if the door panel is not removed.



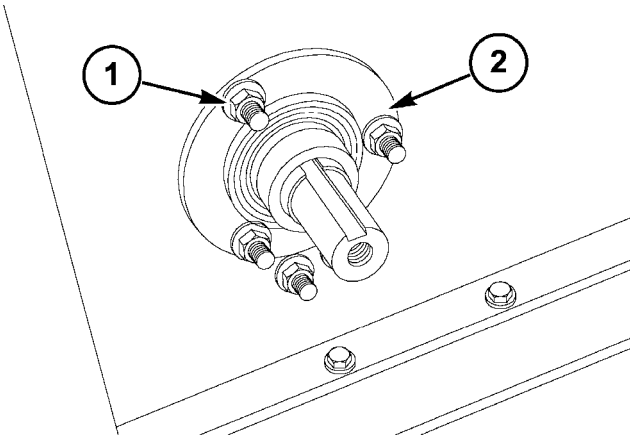
40033223A5 18

21. Open and remove cover **(1)**. Remove cap screw and washers **(2)** in left hand end of shaft. Pull off sprocket **(3)** and remove key from shaft. Save these parts for use on re-assembly, if condition permits.



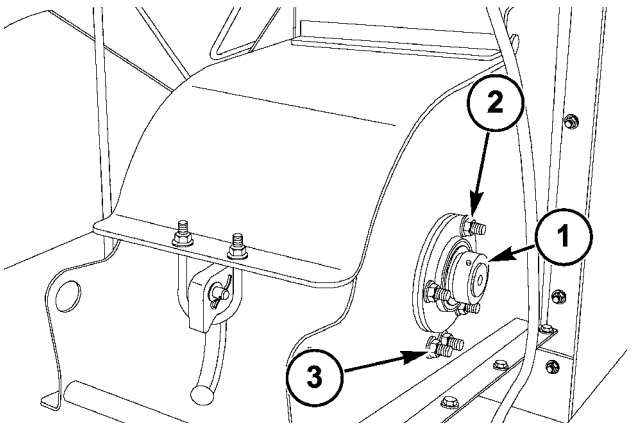
10030024B5 19

22. Remove three nuts and lock washers **(1)** to remove bearing flange **(2)**.



40033222A5 20

23. Remove locking collar **(1)** and three nuts and lock washers **(2)** to remove bearing flange. Remove four bolts **(3)** to remove strip-off plate from inside the elevator head. Pull the right hand bearing with its flange off the shaft. Slide the spacer that centers the sprocket off of the same end. Pull the sprocket far enough to the right to remove the key. Using a soft punch, drive the shaft through the sprocket and out the left hand side bearing.



40033225A5 21

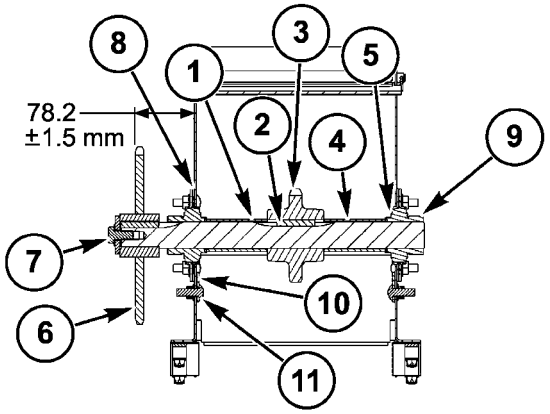
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Grain elevator housing - Assemble (K.60.B.74 - F.10.A.20)

AFX8010

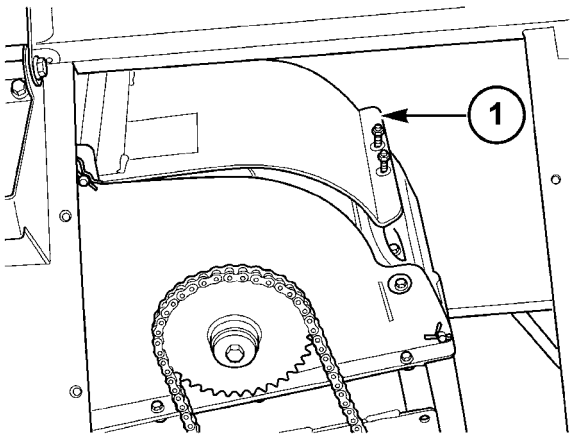
1. To install the grain elevator upper shaft, proceed as follows:

2. Insert shaft through the left side sheet and into one of the sprocket spacers **(1)**. Insert a **50 mm** (**1.97 in**) long key **(2)** into the shaft keyseat and slide the 9 tooth sprocket **(3)** on the shaft over the key. Slide the second spacer **(4)** on the shaft and insert the shaft into the outer bearing **(5)**. Install the 37 tooth sprocket **(6)** and **50 mm** (**1.97 in**) long key on the shaft, and retain with the two washers and cap screw **(7)** removed earlier. Drive the shaft into the outer bearing using a dead-blow hammer until the inner bearing flange **(8)** is against the side sheet of the housing. Install three (3) M10X30 short square neck bolts in the bearing flange and fix with lock washers and nuts. Check the dimension shown and adjust shaft position in the two bearings to achieve it. Install the locking collar **(9)** on the right hand bearing and tighten both collars in direction of shaft rotation. Tighten hex socket set screws of lock collars with a 5mm hex Allen wrench. Install the strip-off plate **(10)** under the shaft and sprocket with four (4) M10X30 short square neck bolts, lock washers and nuts **(11)**. The legs with bolt holes point toward the front. Install the grain elevator chain. Refer to **Grain elevator Chain - Install (K.60.B.52.48 - F.10.A.15)**.



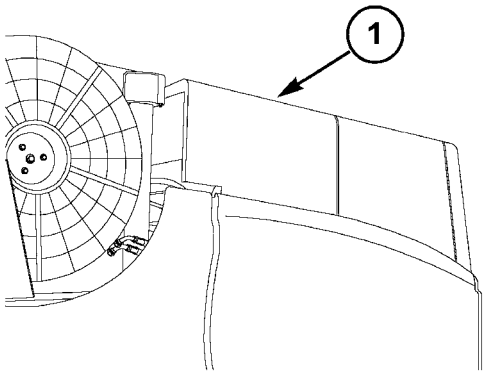
50037328A5 1

3. Install and close the cover **(1)**.



10030024A5 2

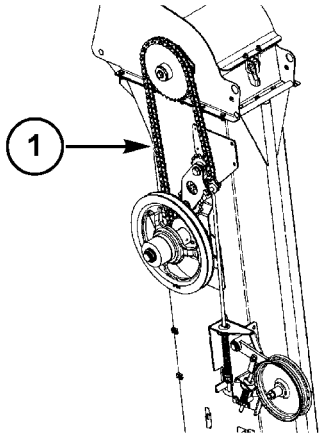
4. Install shield **(1)** with six (6) M8X20 cap screws with lock washers into weld nuts; five (5) are on top and one (1) is at the bottom of the front flange. Also, three (3) M8X20 cap screws are used with nuts and two lock washers each through the side of the shield. Remove auxiliary support at the rear hinge support for the large side panel.



40033203A5 3

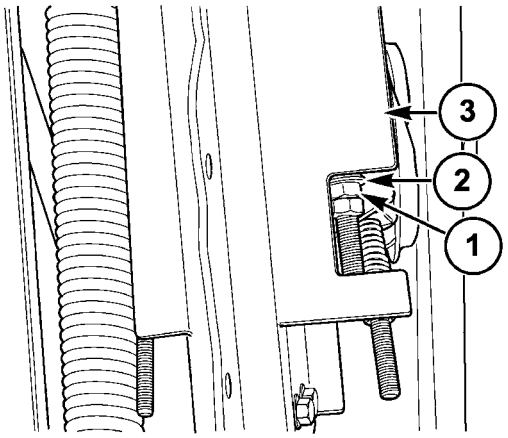
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5. Install drive chain **(1)**.



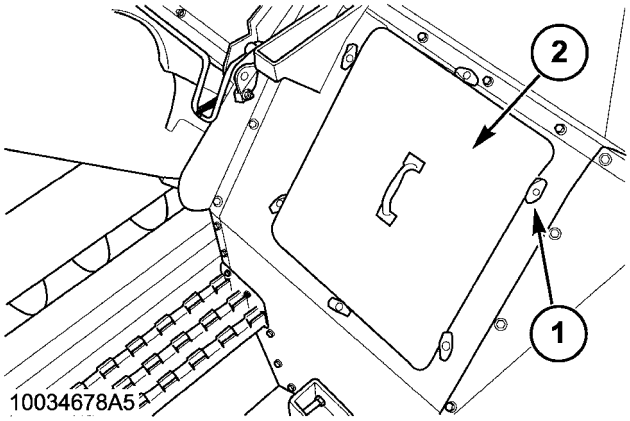
50033221A5 4

6. Tighten nuts **(1)** to adjust chain tension so that washer **(2)** on top of the nuts is visible at the top of cut-out of the bracket **(3)**.



50031298A5 5

7. Turn six tabs **(1)** to retain cover **(2)**.

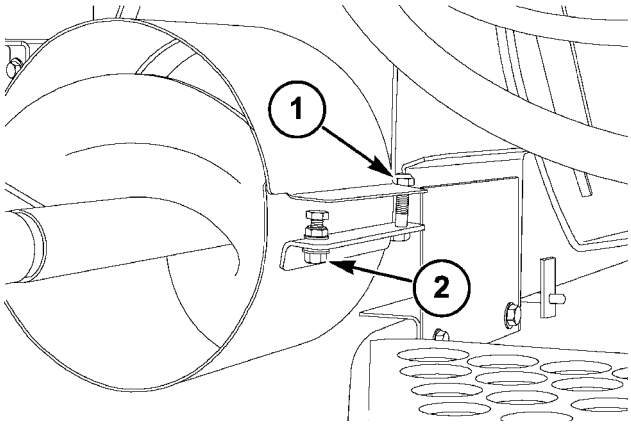


10034678A5 6

8. To install the Clean Grain Elevator Lower Body, perform the following steps:

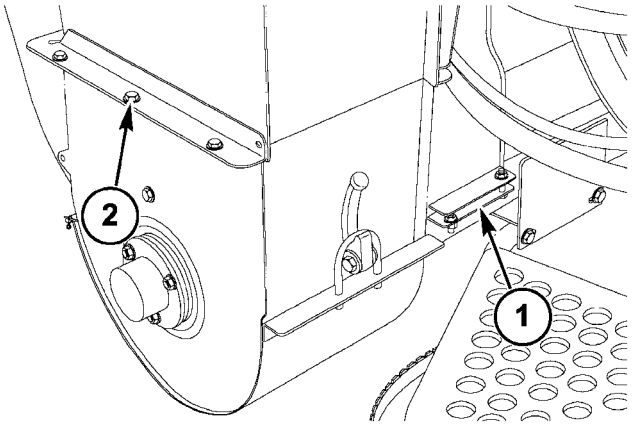
https://truckmanualshub.com/

9. Assemble the two clean grain cross auger tube halves to each other with two M8X50 cap screws, lock washers and lock nuts **(1)** at full extension at the left hand end. Slide this assembly over the tubular extension of the auger housing outlet with the legs about horizontal. Assemble two M8X30 cap screws with two lock washers and two nuts on each **(2)** in right hand end of the flange. These are used to force the tube halves to separate and close the gaps where they enter the elevator lower body. Leave them loose until a later step.



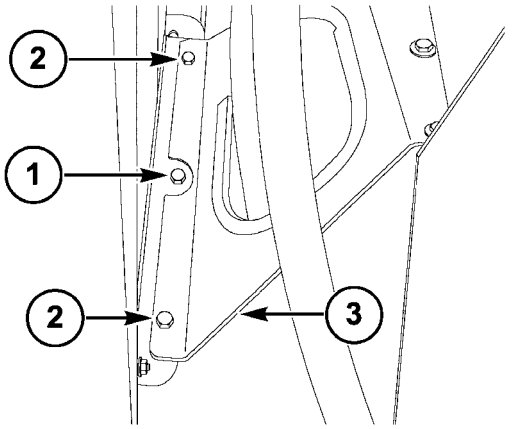
40037321A5 7

10. Slide lower body housing over the auger shaft, installing the sprocket over the **50 mm** (**1.97 in**) key in the shaft at the proper time. Make sure the cross auger tube halves **(1)** enter the hole in the left hand side. Loosely install three (3) M8X20 cap screws with lock washers on both ends and nuts **(2)** in right hand flange and three of same in rear flange.



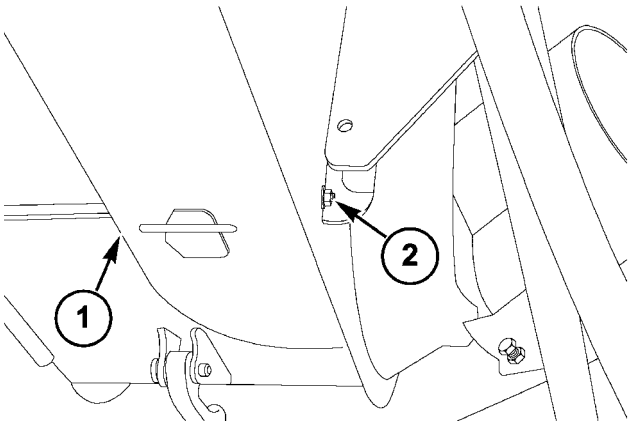
40033209D5 8

11. Assemble one M8X20 cap screw **(1)** with lock washer and nut in the center hole of the left hand flange. Install two (2) M8X20 cap screws with lock washers and nuts **(2)** through the flanges and the bracket **(3)**. Tighten all flange bolts. Tighten the **50 mm** (**1.97 in**) long bolts in the cross auger tube half flanges, and lengthen the **30 mm** (**1.97 in**) bolts to remove all gap at both ends of the tube halves.



40033226B5 9

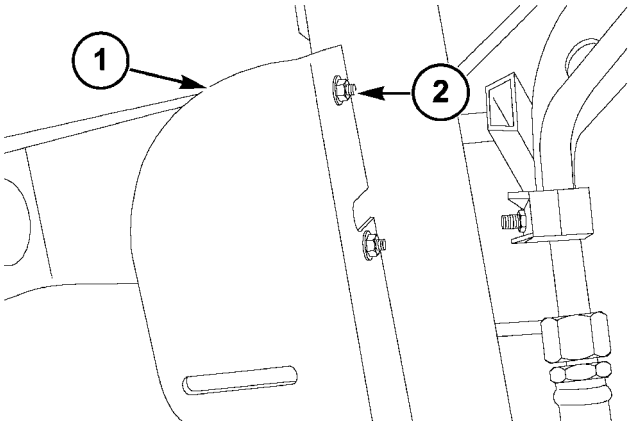
12. Install angle bracket **(1)** to front of elevator housing with M6X20 cap screw, lock washers and nut **(2)**.



40037322A5 10

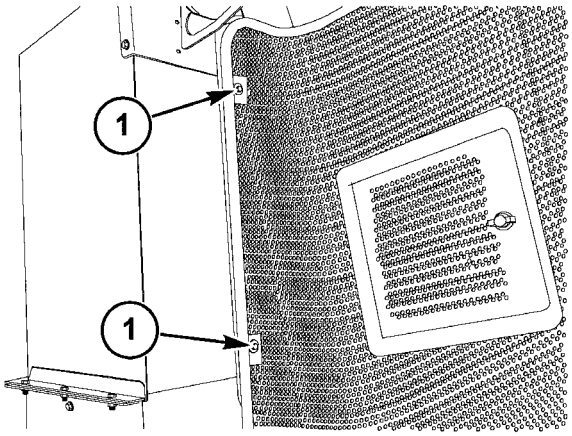
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13. Attach upper end of angle bracket **(1)** to elevator housing and side panel latch bracket with two (2) M6X20 cap screws, lock washers and nuts **(2)**.



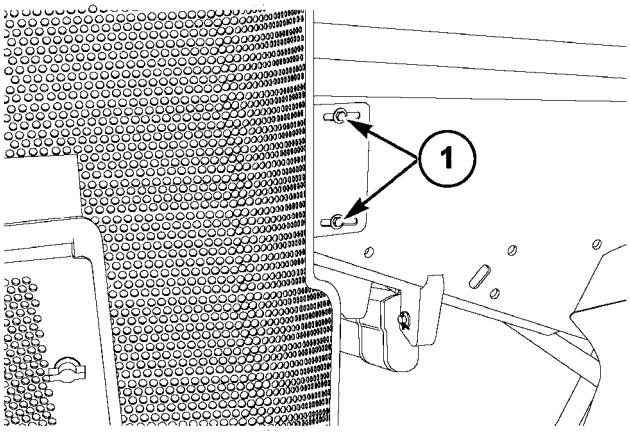
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14. Install right hand drives area screen with two (2) M8X20 cap screws, lock washers, and nuts **(1)**.



40033204A5 12

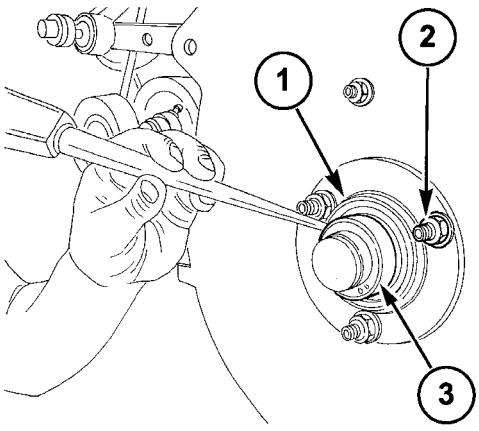
15. Fasten right hand drives area screen with two (2) M8X20 cap screws and lock washers **(1)** into weld nuts in the frame.



40033205A5 13

16. Slide tubular spacer over auger shaft to locate sprocket. Install bearing flanges and bearing **(1)** and retain with carriage bolts, lock washers and nuts **(2)**. Tighten lock collar **(3)** in clockwise direction and lock set screw with 5mm hex Allen wrench.

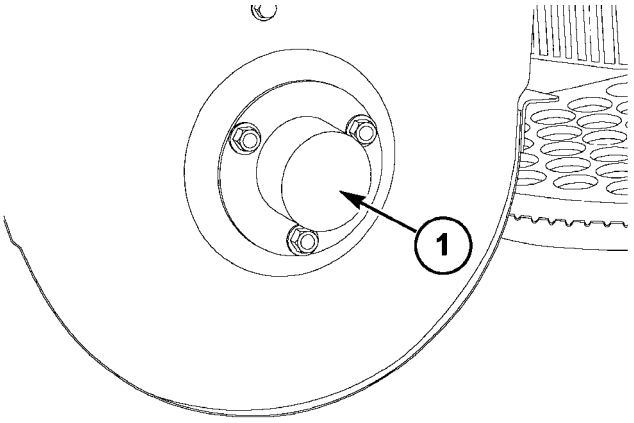
NOTE: *Lubricate the spherical outer race with* ***CASE AKCELA PREMIUM GREASE EP-2*** *and lubricate the locking collar track of the inner race of the bearing and the lock collar with Loctite product 767 antiseize grease to ease future disassembly.*



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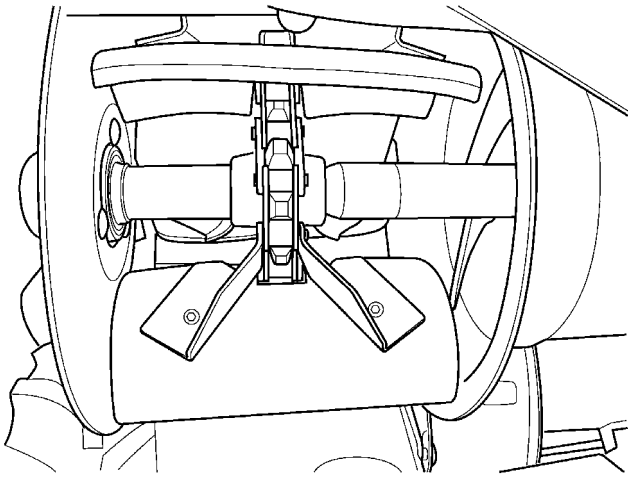
17. Install cover **(1)** and retain with nuts.



40033213A5 15

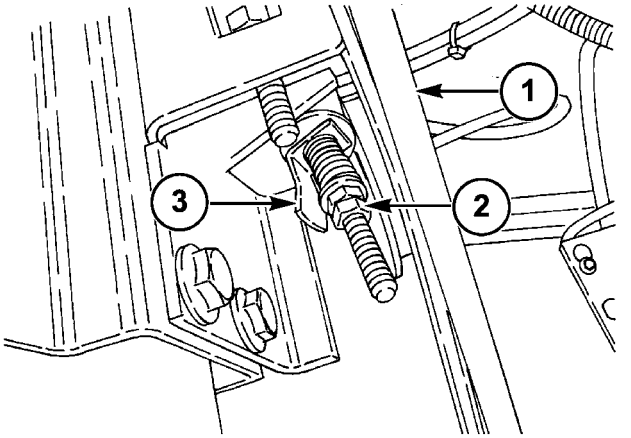
18. Install and adjust elevator chain. Refer to **Grain elevator Chain - Install (K.60.B.52.48 - F.10.A.15)**

NOTE: *Make sure that paddles face as shown, i.e. the link to which the paddle is fastened is on the front side of the bottom-most paddle.*



10031281 16

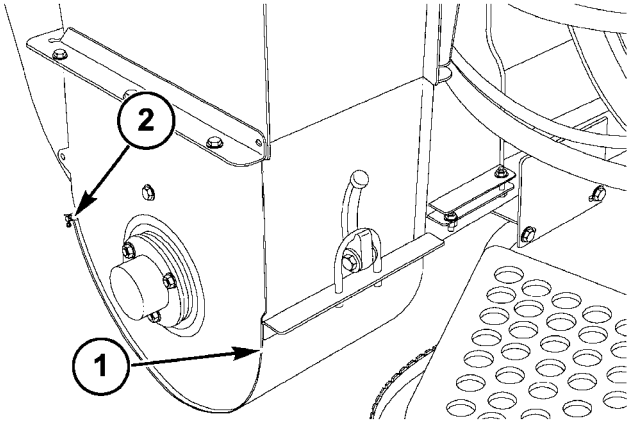
19. Install grain elevator intermediate shaft drive belt **(1)** and adjust to proper tension by nuts **(2)** so that spring is compressed to **56 mm** (**2.2 in**) length of the indicator **(3)**.



20034728C5 17

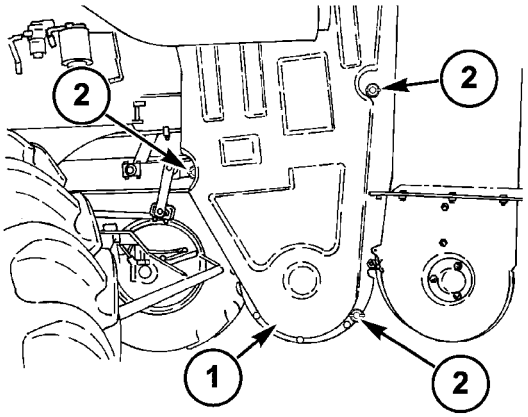
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20. Install cover **(1)** with pin and cotter pin **(2)**. Close cover and latch.



40033209B5 18

21. Install the tailings processor cover **(1)** and retain with three klik pins **(2)**.



20034730A5 19

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Electrical motor - Short circuit (K.60.B.82 - G.30.B.52)

AFX8010

E0045-06 - Covers Current Sense

Cause:
The concave clearance motor (M-04) circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the concave clearance motor M-04 and grain tank covers motor M-12 in order to move them in either direction. A relay is used to switch operation between the two motors. The CCM module monitors both sides of the circuit during operation, and issues one or several fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" sort menu, and select "CONCAVE MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually raise and lower the concaves. Record in which directions the concave motor operates.
3	Select the "GRAIN HANDLING" sort menu, and select "COVERS MTR" (if combine is equipped with grain tank covers). Use the "COMMAND" and "ENGAGE" functions to manually raise and lower the grain tank covers. Record in which directions the covers motor operates.
4	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0044-06 - Concave Current Sense** **E0045-06 - Covers Current Sense** **E0078-11 - Concave Motor** **E0079-11 - Grain Tank Covers Motor** .
5	Use the appropriate result below to determine the location of the fault.

   A. If the concave motor operates in one direction only, and the fault code
   E0044-06 - Concave Current Sense
   is displayed, continue with step **2**.

   B. If the concave motor operates in one direction only, and both fault codes
   E0044-06 - Concave Current Sense
   and
   E0078-11 - Concave Motor
   are displayed, continue with step **3**.

   C. If the concave motor and grain tank covers motor operate in one direction only, and the following fault codes are displayed:
   E0044-06 - Concave Current Sense
   E0045-06 - Covers Current Sense
   E0078-11 - Concave Motor
   E0079-11 - Grain Tank Covers Motor
   continue with step **6**.

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D. If the concave motor does not operate in either direction, and the fault code **E0078-11 - Concave Motor** is displayed, continue with step **9**.

E. If the concave motor does not operate in either direction, and both fault codes **E0044-06 - Concave Current Sense** and **E0078-11 - Concave Motor** are displayed, continue with step **14**.

F. If the grain tank covers motor operates in one direction only, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **15**.

G. If the grain tank covers motor operates in one direction only, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **16**.

H. If the grain tank covers motor does not operate in either direction, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **20**.

I. If the grain tank covers motor does not operate in either direction, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **31**.

J. If both the concave motor and grain tank covers motor do not operate in either direction, and the fault codes **E0078-11 - Concave Motor** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **32**.

K. If both the concave motor and grain tank covers motor do not operate in either direction, and there are no fault codes displayed, continue with step **34**.

2. Manually operate the concave motor using the "DIAG" screen controls, while having an observer inspect the concave linkage movement for binding.

   A. The concave clearance adjustment motor is bound up. See the appropriate repair manual chapter for repair.

3. The concave clearance motor operates in one direction only. Fault codes indicate a short to ground. Disconnect the concave clearance motor connector **X190**. Measure the resistance on concave motor connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

   A. If out of specification, replace concave motor.

   B. If the motor coil resistance is within specification, continue with Step **4**.

4. Use a multimeter to check for continuity on the harness end of connector **X190** pin 2 and chassis ground. Flex the concave extension (CC) harness while making this check. There should not be any continuity to ground.

   A. If there is no continuity to ground, erase the fault code and continue operation.

   B. If there is continuity to ground, continue with Step **6**.

5. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 2 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the short and repair.

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B. If there is continuity to ground, continue with step **5**.

6. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 30 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X004** and relay base K16 terminal 4 wire 695 white. Locate the short and repair.

   B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X190** wire 695 white. Locate the short and repair.

7. Concave and covers operate in one direction only. Fault codes indicate a short to ground. Disconnect both the concave motor connector **X190** and covers motor connector **X289**. Use a multimeter to measure the resistance of the concave motor connector **X190** between pin 1 and pin 2, and the covers motor connector **X289** between pin A and pin B. The proper resistance range for both motors is **1.0 - 5.0 ohms**.

   A. If the concave motor is out of specification, replace concave motor.

   B. If the grain tank covers motor is out of specification, replace covers motor.

   C. If both motors are within specification, continue with Step **7**.

8. Check for continuity between concave motor connector **X190** pin 1 and chassis ground. Flex the main frame (MF) harness while making this check.

   Next check for continuity between connector **X289** pin B and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check. There should not be continuity to ground.

   A. If no continuity to ground is found, erase fault code and continue operation.

   B. If there is continuity to ground, continue with Step **8**.

9. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 1 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 694 gray. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **8**.

10. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 3 and chassis ground.

    A. If continuity is found, there is a short to ground in the main frame (MF) harness between connector **X456**, connector **X195** and connector **X019** pin J2-1 wires 694 gray, 693 gray and 522 gray. Locate the short and repair.

    B. If no continuity is found, there is a short to ground in the grain tank jumper harness between connector **X195** and connector **X289** wire 693 gray. Locate the short and repair.

11. Concave does not operate in either direction. Fault code indicates an open circuit. Disconnect the concave motor connector **X190**. Measure the resistance on connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

    A. If out of specification, replace concave motor.

    B. If the motor coil resistance is within specification, continue with Step **10**.

12. Replace the concave/covers relay K-16 with a known good relay. Reattach connector **X176** and operate the concaves.

    A. If the concaves are now working, the concave/covers relay K-16 has failed. Replace the relay.

    B. If the concaves still do not work, continue with Step **11**.

13. Disconnect concave motor connector **X190**. Turn key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 2 and chassis ground.

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A. If **12 volts** is found, continue with Step **12**.

B. If **12 volts** is not found, continue with Step **13**.

14. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 1 and chassis ground.

A. If **12 volts** is not found, continue with step **15**.

B. If **12 volts** is found, replace the concave motor.

15. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 1 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X190** and connector **X456** wire 694 gray. Locate the open and repair.

B. If **12 volts** is not found, there is an open circuit in the main frame (MF) harness between connector **X456** and connector **X019** J2-1 wires 694 gray or 522 gray. Locate the open and repair.

16. Disconnect connector **X456**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 2 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, continue with step **17**.

17. Disconnect connector **X004**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 30 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the main frame (MF) harness between connector **X004** and connector **X456** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, there is an open circuit in the cab main (CM) harness between connector **X004** and relay base terminal 4 on relay K16, wire 695 white. Locate the open and repair.

18. Disconnect connector **X190** at the concave clearance motor. Use a multimeter to check for continuity between concave motor connector **X190**pin 1 or 2 and chassis ground. There should not be any continuity to ground..

A. If there is continuity to ground, replace concave motor.

B. If there is no continuity to ground, return to step **1** and repeat the concave motor circuit test.

19. Manually operate the grain tank covers motor using the "DIAG" screen controls, while having an observer inspect the grain tank covers linkage for binding.

A. The grain tank covers motor is bound up. See the appropriate repair manual chapter for repair.

20. The covers operates in one direction only. Fault codes indicate a short to ground. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **17**.

21. Measure the resistance on connector **X289** between pin A and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check.

A. If no continuity to ground is found, erase the fault code and continue operation.

B. If there is continuity to ground, continue with Step **18**.

22. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 4 and chassis ground.

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A. If continuity is found, continue with Step **19**.

B. If no continuity is found, the short to ground is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the short and repair.

23. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 31 and chassis ground.

A. If continuity is found, there is a short to ground in the cab main (CM) harness between connector **X004** and the relay base for relay K-16 terminal 4 wire 695 white. Locate the short and repair.

B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the short and repair.

24. Covers do not operate in either direction. Fault code indicates an open in circuit. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **21**.

25. Replace the concave/covers relay K-16 with a known good relay. Connect **X289** and operate the grain tank covers.

A. If the grain tank covers function properly, the concave/covers relay has failed. Replace the relay.

B. If the covers still do not work, continue with Step **26**.

26. Disconnect the covers motor connector **X289**. Turn key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X289** pin A and chassis ground.

A. If **12 volts** is found, continue with Step **27**.

B. If **12 volts** is not found, continue with Step **29**.

27. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X289** pin B and chassis ground.

A. If **12 volts** is not found, continue with Step **28**.

B. If **12 volts** is found, recheck the motor for continuity at Step **20**. Erase the fault codes and continue operation.

28. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X195** pin 3 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X289** and connector **X195** wire 693 gray. Locate the open and repair.

B. If **12 volts** is not found, the open is in the main frame (MF) harness between connector **X195** pin 3 and the MF wire splice wire 693 gray. Locate the open and repair.

29. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X195** pin 4 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the open and repair.

B. If **12 volts** is not found, continue with Step **30**.

30. Disconnect connector **X004**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 31 and chassis ground.

A. If **12 volts** is found, the open is in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the open and repair.

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B. If **12 volts** is not found, the open is in the cab main (CM) harness between connector **X004** and relay base terminal 3 on relay K16, wire 696 white. Locate the open and repair.

31. Disconnect connector **X289** at the grain tank covers motor. Use a multimeter to check for continuity between covers motor connector **X289** pin A or B and chassis ground. There should not be any continuity to ground..

    A. If there is continuity to ground, replace covers motor.

    B. If there is no continuity to ground, return to step **1** and repeat the covers motor circuit test.

32. Both concave and covers do not operate in either direction. Fault code indicates an open circuit. Remove the concave/covers relay K-16 from the relay base. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between relay base K-16 terminal 3 and chassis ground.

    A. If **12 volts** is found, the open circuit is in the main frame (MF) harness between CCM1 connector **X019** J2-1 and the MF wire splice wire 522 gray. Locate the open and repair.

    B. If **12 volts** is not found, continue with Step **33**.

33. Disconnect connector **X004**. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 29 and chassis ground.

    A. If **12 volts** is found, the open is in the cab main (CM) harness between connector **X004** and relay base K16 terminal 3. Locate the open and repair.

    B. If **12 volts** is not found, the open is in main frame (MF) harness between connector **X004** and CCM1 connector **X019** J2-21 wire 523 white. Locate the open and repair.

34. If both the concave or grain tank covers do not operate in either direction, and there are no error codes indicated, the supply power for the circuits may not be present. Remove fuse F24 and inspect.

    A. Fuse has failed. Go to Step **35**.

    B. Fuse is okay. Go to Step **36**.

35. If fuse has failed, replace the fuse.

    A. If fuse immediately fails, a short to ground exists in the cab main (CM) or main frame (MF) harnesses on one of the following wires;
    - wire 026 red, fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11
    - wire 027 red, fuse F24 to connector **X031** pin 3
    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

    B. Fuse is okay. Go to Step **36**.

36. Test for 12V power at connector **X019** pin J2-11 on the CCM1 module under the cab.

    A. If there is no power, there is an open circuit in the cab main (CM) or main frame (MF) harnesses between fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11 wire 026 red. Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the open and repair. After repair, go to Step **37**.

    B. If there is power, go to Step **37**.

37. Test for continuity to ground at connector **X019** pin J2-3 on the CCM1 module under the cab.

    A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X019** pin J2-3 and the front frame ground #2 wire 513 black. Locate the open and repair. After repair, go to Step **38**.

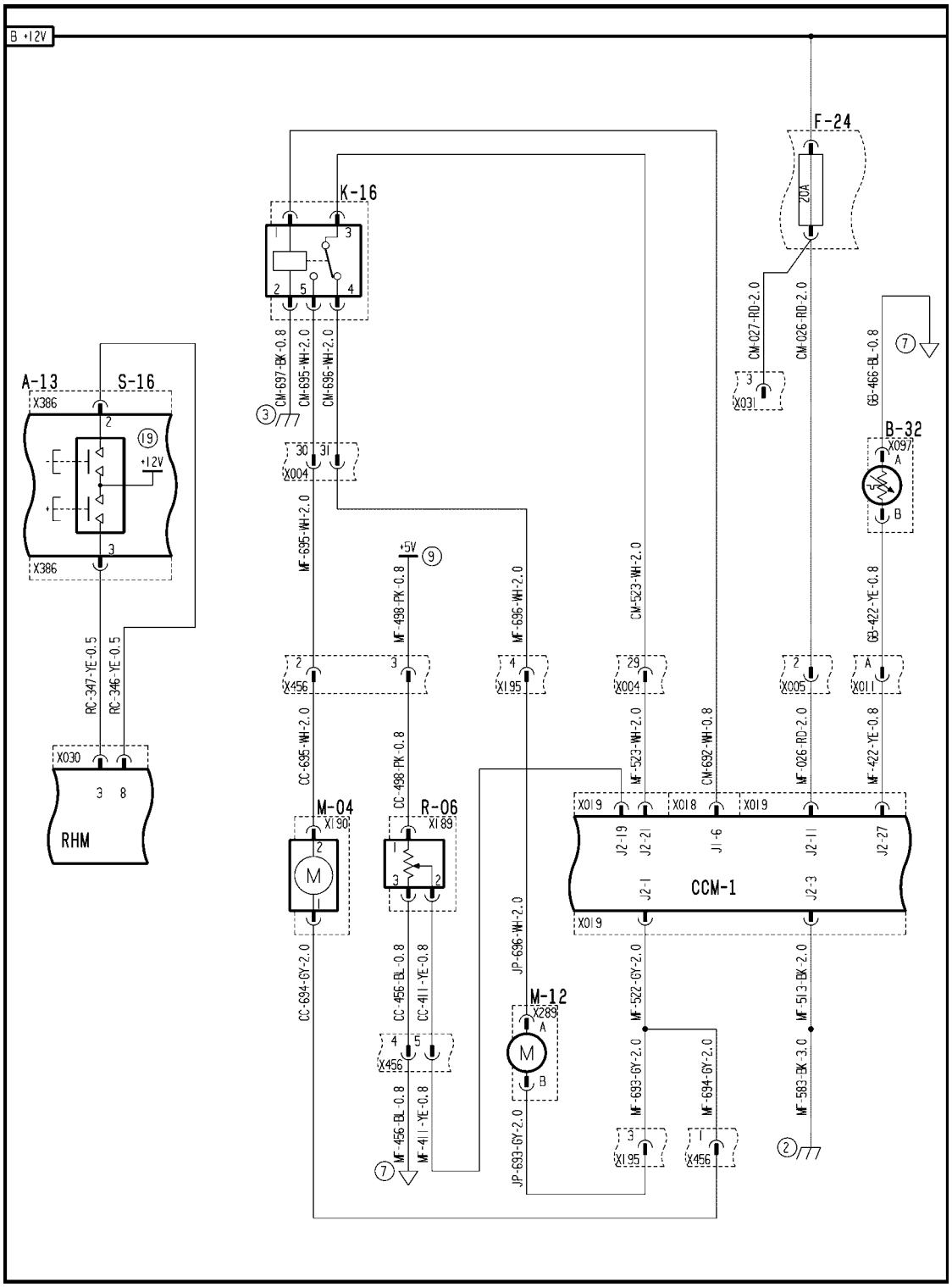
    B. If there is continuity to ground, go to Step **38**.

38. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls.

    A. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step **1** to locate the short to ground.

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



AFXSCHEM16-04 1

FRAME 16 - THRESHER

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A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

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Electrical motor - Unidentified failure (K.60.B.82 - G.30.B.46)

AFX8010

E0079-11 - Grain Tank Covers Motor

Cause:
The concave clearance motor (M-04) circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the concave clearance motor M-04 and grain tank covers motor M-12 in order to move them in either direction. A relay is used to switch operation between the two motors. The CCM module monitors both sides of the circuit during operation, and issues one or several fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "THRESHING" sort menu, and select "CONCAVE MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually raise and lower the concaves. Record in which directions the concave motor operates.
3	Select the "GRAIN HANDLING" sort menu, and select "COVERS MTR" (if combine is equipped with grain tank covers). Use the "COMMAND" and "ENGAGE" functions to manually raise and lower the grain tank covers. Record in which directions the covers motor operates.
4	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0044-06 - Concave Current Sense** **E0045-06 - Covers Current Sense** **E0078-11 - Concave Motor** **E0079-11 - Grain Tank Covers Motor** .
5	Use the appropriate result below to determine the location of the fault.

A. If the concave motor operates in one direction only, and the fault code
E0044-06 - Concave Current Sense
is displayed, continue with step **2**.

B. If the concave motor operates in one direction only, and both fault codes
E0044-06 - Concave Current Sense
and
E0078-11 - Concave Motor
are displayed, continue with step **3**.

C. If the concave motor and grain tank covers motor operate in one direction only, and the following fault codes are displayed:
E0044-06 - Concave Current Sense
E0045-06 - Covers Current Sense
E0078-11 - Concave Motor
E0079-11 - Grain Tank Covers Motor
continue with step **6**.

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D. If the concave motor does not operate in either direction, and the fault code **E0078-11 - Concave Motor** is displayed, continue with step **9**.

E. If the concave motor does not operate in either direction, and both fault codes **E0044-06 - Concave Current Sense** and **E0078-11 - Concave Motor** are displayed, continue with step **14**.

F. If the grain tank covers motor operates in one direction only, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **15**.

G. If the grain tank covers motor operates in one direction only, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **16**.

H. If the grain tank covers motor does not operate in either direction, and the fault code **E0045-06 - Covers Current Sense** is displayed, continue with step **20**.

I. If the grain tank covers motor does not operate in either direction, and both fault codes **E0045-06 - Covers Current Sense** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **31**.

J. If both the concave motor and grain tank covers motor do not operate in either direction, and the fault codes **E0078-11 - Concave Motor** and **E0079-11 - Grain Tank Covers Motor** are displayed, continue with step **32**.

K. If both the concave motor and grain tank covers motor do not operate in either direction, and there are no fault codes displayed, continue with step **34**.

2. Manually operate the concave motor using the "DIAG" screen controls, while having an observer inspect the concave linkage movement for binding.

   A. The concave clearance adjustment motor is bound up. See the appropriate repair manual chapter for repair.

3. The concave clearance motor operates in one direction only. Fault codes indicate a short to ground. Disconnect the concave clearance motor connector **X190**. Measure the resistance on concave motor connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

   A. If out of specification, replace concave motor.

   B. If the motor coil resistance is within specification, continue with Step **4**.

4. Use a multimeter to check for continuity on the harness end of connector **X190** pin 2 and chassis ground. Flex the concave extension (CC) harness while making this check. There should not be any continuity to ground.

   A. If there is no continuity to ground, erase the fault code and continue operation.

   B. If there is continuity to ground, continue with Step **6**.

5. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 2 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the short and repair.

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B. If there is continuity to ground, continue with step **5**.

6. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 30 and chassis ground. There should not be continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between connector **X004** and relay base K16 terminal 4 wire 695 white. Locate the short and repair.

   B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X190** wire 695 white. Locate the short and repair.

7. Concave and covers operate in one direction only. Fault codes indicate a short to ground. Disconnect both the concave motor connector **X190** and covers motor connector **X289**. Use a multimeter to measure the resistance of the concave motor connector **X190** between pin 1 and pin 2, and the covers motor connector **X289** between pin A and pin B. The proper resistance range for both motors is **1.0 - 5.0 ohms**.

   A. If the concave motor is out of specification, replace concave motor.

   B. If the grain tank covers motor is out of specification, replace covers motor.

   C. If both motors are within specification, continue with Step **7**.

8. Check for continuity between concave motor connector **X190** pin 1 and chassis ground. Flex the main frame (MF) harness while making this check.

   Next check for continuity between connector **X289** pin B and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check. There should not be continuity to ground.

   A. If no continuity to ground is found, erase fault code and continue operation.

   B. If there is continuity to ground, continue with Step **8**.

9. Disconnect connector **X456**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X456** pin 1 and chassis ground. There should not be any continuity.

   A. If there is no continuity to ground, there is a short to ground in the concave extension (CC) harness between connector **X456** and connector **X190** wire 694 gray. Locate the short and repair.

   B. If there is continuity to ground, continue with Step **8**.

10. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 3 and chassis ground.

    A. If continuity is found, there is a short to ground in the main frame (MF) harness between connector **X456**, connector **X195** and connector **X019** pin J2-1 wires 694 gray, 693 gray and 522 gray. Locate the short and repair.

    B. If no continuity is found, there is a short to ground in the grain tank jumper harness between connector **X195** and connector **X289** wire 693 gray. Locate the short and repair.

11. Concave does not operate in either direction. Fault code indicates an open circuit. Disconnect the concave motor connector **X190**. Measure the resistance on connector **X190** between pin 1 and pin 2. The proper resistance range for the motor is **1.0 - 5.0 ohms**.

    A. If out of specification, replace concave motor.

    B. If the motor coil resistance is within specification, continue with Step **10**.

12. Replace the concave/covers relay K-16 with a known good relay. Reattach connector **X176** and operate the concaves.

    A. If the concaves are now working, the concave/covers relay K-16 has failed. Replace the relay.

    B. If the concaves still do not work, continue with Step **11**.

13. Disconnect concave motor connector **X190**. Turn key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 2 and chassis ground.

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A. If **12 volts** is found, continue with Step **12**.

B. If **12 volts** is not found, continue with Step **13**.

14. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X190** pin 1 and chassis ground.

A. If **12 volts** is not found, continue with step **15**.

B. If **12 volts** is found, replace the concave motor.

15. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 1 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X190** and connector **X456** wire 694 gray. Locate the open and repair.

B. If **12 volts** is not found, there is an open circuit in the main frame (MF) harness between connector **X456** and connector **X019** J2-1 wires 694 gray or 522 gray. Locate the open and repair.

16. Disconnect connector **X456**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X456** pin 2 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the concave extension (CC) harness between connector **X456** and connector **X190** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, continue with step **17**.

17. Disconnect connector **X004**. Key switch ON. Operate the concave motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 30 and chassis ground.

A. If **12 volts** is found, there is an open circuit in the main frame (MF) harness between connector **X004** and connector **X456** wire 695 white. Locate the open and repair.

B. If **12 volts** is not read, there is an open circuit in the cab main (CM) harness between connector **X004** and relay base terminal 4 on relay K16, wire 695 white. Locate the open and repair.

18. Disconnect connector **X190** at the concave clearance motor. Use a multimeter to check for continuity between concave motor connector **X190**pin 1 or 2 and chassis ground. There should not be any continuity to ground..

A. If there is continuity to ground, replace concave motor.

B. If there is no continuity to ground, return to step **1** and repeat the concave motor circuit test.

19. Manually operate the grain tank covers motor using the "DIAG" screen controls, while having an observer inspect the grain tank covers linkage for binding.

A. The grain tank covers motor is bound up. See the appropriate repair manual chapter for repair.

20. The covers operates in one direction only. Fault codes indicate a short to ground. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **17**.

21. Measure the resistance on connector **X289** between pin A and chassis ground. Flex the grain tank jumper and main frame (MF) harnesses while making this check.

A. If no continuity to ground is found, erase the fault code and continue operation.

B. If there is continuity to ground, continue with Step **18**.

22. Disconnect connector **X195**. Use a multimeter to check for continuity between connector **X195** pin 4 and chassis ground.

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A. If continuity is found, continue with Step **19**.

B. If no continuity is found, the short to ground is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the short and repair.

23. Disconnect connector **X004**. Use a multimeter to check for continuity between connector **X004** pin 31 and chassis ground.

A. If continuity is found, there is a short to ground in the cab main (CM) harness between connector **X004** and the relay base for relay K-16 terminal 4 wire 695 white. Locate the short and repair.

B. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the short and repair.

24. Covers do not operate in either direction. Fault code indicates an open in circuit. Disconnect the covers motor connector **X289**. Measure the resistance on connector **X289** between pin A and pin B. The proper resistance range for the coil is **1.0 - 5.0 ohms**.

A. If out of specification, replace covers motor.

B. If the motor coil resistance is within specification, continue with Step **21**.

25. Replace the concave/covers relay K-16 with a known good relay. Connect **X289** and operate the grain tank covers.

A. If the grain tank covers function properly, the concave/covers relay has failed. Replace the relay.

B. If the covers still do not work, continue with Step **26**.

26. Disconnect the covers motor connector **X289**. Turn key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X289** pin A and chassis ground.

A. If **12 volts** is found, continue with Step **27**.

B. If **12 volts** is not found, continue with Step **29**.

27. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X289** pin B and chassis ground.

A. If **12 volts** is not found, continue with Step **28**.

B. If **12 volts** is found, recheck the motor for continuity at Step **20**. Erase the fault codes and continue operation.

28. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use multimeter to measure the voltage between connector **X195** pin 3 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X289** and connector **X195** wire 693 gray. Locate the open and repair.

B. If **12 volts** is not found, the open is in the main frame (MF) harness between connector **X195** pin 3 and the MF wire splice wire 693 gray. Locate the open and repair.

29. Disconnect connector **X195**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X195** pin 4 and chassis ground.

A. If **12 volts** is found, the open is in the grain tank jumper harness between connector **X195** and connector **X289** wire 696 white. Locate the open and repair.

B. If **12 volts** is not found, continue with Step **30**.

30. Disconnect connector **X004**. Key switch ON. Operate the covers motor using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 31 and chassis ground.

A. If **12 volts** is found, the open is in the main frame (MF) harness between connector **X004** and connector **X195** wire 696 white. Locate the open and repair.

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B. If **12 volts** is not found, the open is in the cab main (CM) harness between connector **X004** and relay base terminal 3 on relay K16, wire 696 white. Locate the open and repair.

31. Disconnect connector **X289** at the grain tank covers motor. Use a multimeter to check for continuity between covers motor connector **X289** pin A or B and chassis ground. There should not be any continuity to ground..

    A. If there is continuity to ground, replace covers motor.

    B. If there is no continuity to ground, return to step **1** and repeat the covers motor circuit test.

32. Both concave and covers do not operate in either direction. Fault code indicates an open circuit. Remove the concave/covers relay K-16 from the relay base. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between relay base K-16 terminal 3 and chassis ground.

    A. If **12 volts** is found, the open circuit is in the main frame (MF) harness between CCM1 connector **X019** J2-1 and the MF wire splice wire 522 gray. Locate the open and repair.

    B. If **12 volts** is not found, continue with Step **33**.

33. Disconnect connector **X004**. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls. Use a multimeter to measure the voltage between connector **X004** pin 29 and chassis ground.

    A. If **12 volts** is found, the open is in the cab main (CM) harness between connector **X004** and relay base K16 terminal 3. Locate the open and repair.

    B. If **12 volts** is not found, the open is in main frame (MF) harness between connector **X004** and CCM1 connector **X019** J2-21 wire 523 white. Locate the open and repair.

34. If both the concave or grain tank covers do not operate in either direction, and there are no error codes indicated, the supply power for the circuits may not be present. Remove fuse F24 and inspect.

    A. Fuse has failed. Go to Step **35**.

    B. Fuse is okay. Go to Step **36**.

35. If fuse has failed, replace the fuse.

    A. If fuse immediately fails, a short to ground exists in the cab main (CM) or main frame (MF) harnesses on one of the following wires;
    - wire 026 red, fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11
    - wire 027 red, fuse F24 to connector **X031** pin 3
    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

    B. Fuse is okay. Go to Step **36**.

36. Test for 12V power at connector **X019** pin J2-11 on the CCM1 module under the cab.

    A. If there is no power, there is an open circuit in the cab main (CM) or main frame (MF) harnesses between fuse F24 through connector **X005** pin 2 to connector **X019** pin J2-11 wire 026 red. Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the open and repair. After repair, go to Step **37**.

    B. If there is power, go to Step **37**.

37. Test for continuity to ground at connector **X019** pin J2-3 on the CCM1 module under the cab.

    A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness between connector **X019** pin J2-3 and the front frame ground #2 wire 513 black. Locate the open and repair. After repair, go to Step **38**.

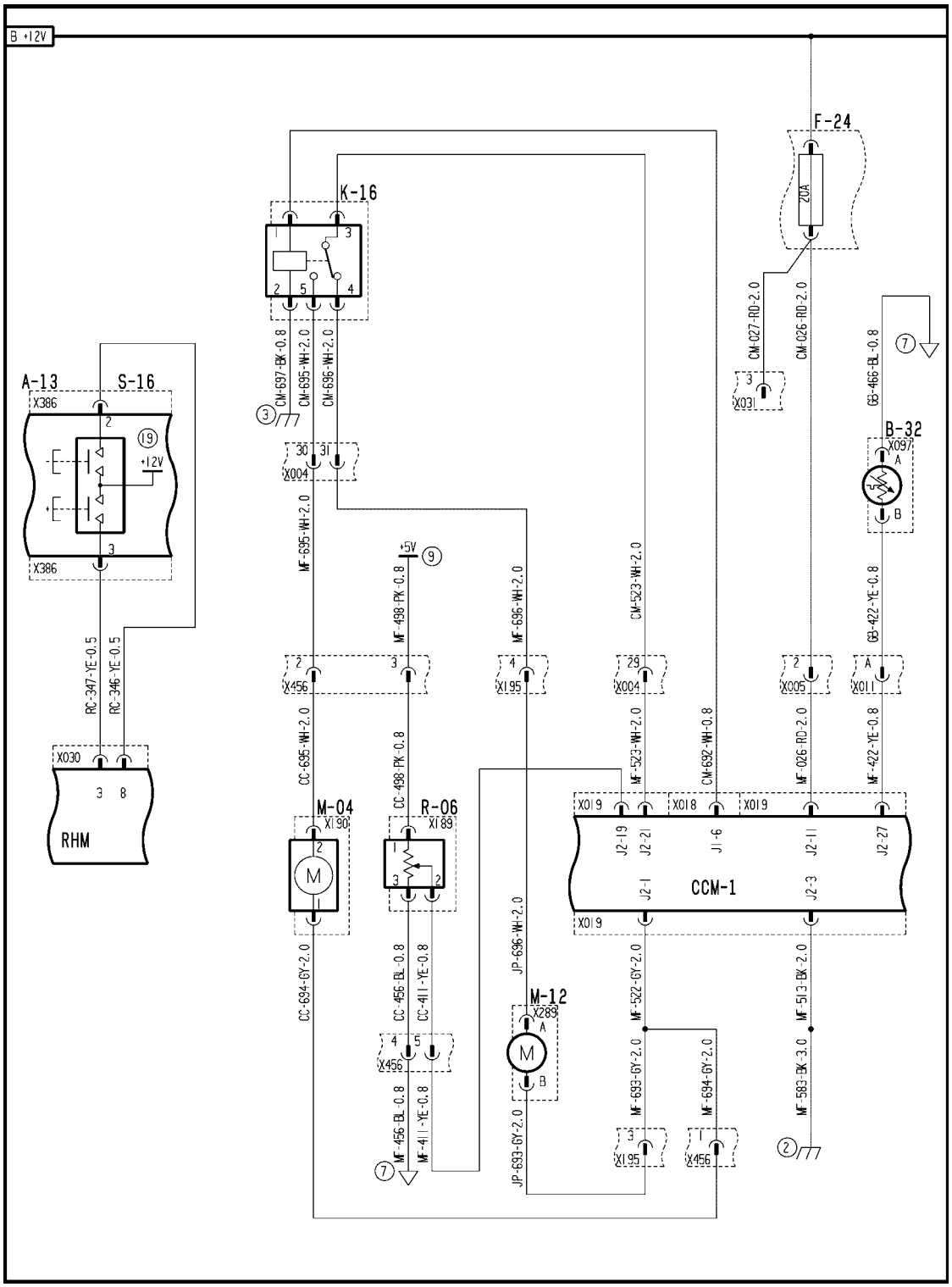
    B. If there is continuity to ground, go to Step **38**.

38. Operate the concave or grain tank covers using the Universal Display Plus "DIAG" screen controls.

    A. If the fuse fails during the testing, a short to ground on the circuit is causing the fuse to fail. Start the troubleshooting at Step **1** to locate the short to ground.

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Wiring harness - Electrical schematic frame 16 (A.30.A.88 - C.20.E.16)



AFXSCHEM16-04 1

FRAME 16 - THRESHER

https://truckmanualshub.com/

A-13 Front Switch Panel	B-32 PTO Box Temperature	F-24 Concave / Covers Fuse
K-16 Concave / Covers Relay	M-04 Concave Clearance Motor	M-12 Covers Motor
R-06 Concave Position	S-16 Concave Clearance	

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Sensing system Level sensor - Short circuit to B+ (K.60.B.95.80 - G.30.B.54)

AFX8010

E0159-03 - Grain Tank Full Sensor

Cause:
The grain bin switch (S-28 & S-29) circuit is shorted to high voltage, or the ground path is open.

Possible failure modes:

1. Switch supply or ground wiring shorted to **12 volts**.
2. Open circuit on switch ground path.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "TANK FULL SEN" to check the voltage range. The normal voltage range is **0 - 4.9 volts**. The proper voltage range with both switches neutral (tank empty) is approximately **2.5 volts**. The proper voltage range with the grain bin 3/4 full switch S-28 depressed is approximately **3.3 volts**. The proper voltage range with both grain bin switches depressed is approximately **3.7 volts**.

   A. If the voltage reading is high (>**4.9 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting with step **10**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connectors are fully installed. Inspect the terminals and wires in each connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the grain bin full switch S-29 connector **X109**.

   A. If the voltage drops to **0 - 4.9 volts**, the short is in the reference ground wire for the circuit. Continue with step **3**.

   B. If the voltage remains high (>**4.9 volts**) out of range, continue with step **4**.

3. Disconnect the main frame (MF) harness from the grain tank (GT) harness at connector **X009**. Use a multimeter to check for voltage on the main frame (MF) harness end of connector **X009** pin H.

   A. If there is no voltage present, there is a short in the grain tank (GT) harness between connector **X009** pin H and connector **X109** pin A wire 443 blue. Locate the short and repair.

   B. If there is voltage present, there is a short in the main frame (MF) harness between connector **X009** pin H and connector **X016** pin J2-14 wire 443 blue or wire 465 blue. Locate the short and repair.

4. Disconnect the grain bin full switch S-29 connector **X109**. Use a multimeter to check for continuity between connector **X109** pin A and chassis ground. There should be continuity.

   A. If continuity is found, continue with step **6**.

   B. If no continuity is found, continue with step **5**.

5. Disconnect the main frame (MF) harness from the grain tank (GT) harness at connector **X009**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X009** pin H and chassis ground. There should be continuity.

   A. If there is continuity, there is an open circuit in the grain tank (GT) harness between connector **X009** pin H and connector **X109** pin A wire 443 blue. Locate the open and repair.

   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X009** pin H and connector **X016** pin J2-14 wire 443 blue or wire 465 blue. Locate the open and repair.

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6. Disconnect the grain bin 3/4 full switch S-28 connector **X107**.

   A. If the voltage drops to **0 - 4.9 volts**, continue with step **7**.

   B. If the voltage remains high (>**4.9 volts**) out of range, continue with step **8**.

7. Disconnect the grain bin 3/4 full switch S-28 connector **X107**. Use a multimeter to check for voltage on connector **X107** pins A and B.

   A. If there is high (>**5 volts**) voltage on connector **X107** pin A, the regulated voltage supply is incorrect. The fault code
   E0165-03 - CCM2 J2 5V Reference
   should be listed in the "ERROR" screen on the Universal Display Plus. Correct that fault code, and then check to determine if this error has been resolved.

   B. If there is voltage on connector **X107** pin B, there is a short to high voltage in the grain tank (GT) harness between connector **X109** pin B and connector **X107** pin B wire 445 yellow. Locate the short and repair.

8. Disconnect the grain bin 3/4 full switch S-28 connector **X107**. Use a multimeter to check for voltage on connector **X107** pin C. There should not be any voltage.

   A. If no voltage is found, continue with step **10**.

   B. If high (>**4.9 volts**) voltage is found, continue with step **9**.

9. Disconnect the main frame (MF) harness from the grain tank (GT) harness at connector **X009**. Use a multimeter to check for voltage on the main frame (MF) harness end of connector **X009** pin E. There should not be any voltage.

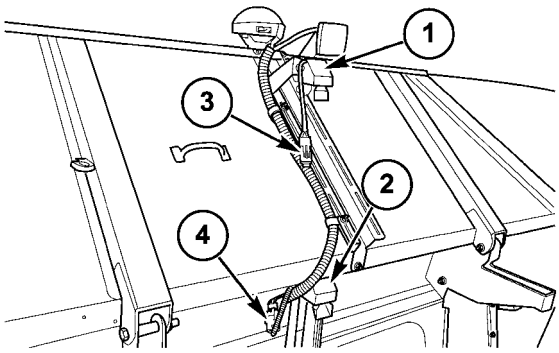
   A. If no voltage is found, there is a short in the grain tank (GT) harness between connector **X107** pin C and connector **X009** pin E wire 400 yellow. Locate the short and repair.

   B. If high (>**4.9 volts**) voltage is found, there is a short in the main frame (MF) harness between connector **X009** pin E and connector **X016** pin J2-22 wire 400 yellow. Locate the short and repair.

10. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "TANK FULL SEN" voltage.

    A. If no high (>**4.9 volts**) out of range readings are indicated, erase the fault code and continue operation.

Sensing system Level sensor - Overview (K.60.B.95.80 - C.10.A.10)



10030023A5 1

Grain Bin Level Sensors

1. Grain bin full switch S-29
2. Grain bin 3/4 full switch S-28
3. Connector **X109**
4. Connector **X107**

Two grain bin switches are used to monitor the level of material in the grain bin. The grain bin 3/4 full switch S-28 **(2)** is located in the center of the front grain tank wall, just above the cab window, while the grain bin full switch S-29 **(1)**

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is located in the center of the front grain bin extension. Both switches may be adjusted up or down on their mounting brackets to ensure that they are triggered by the material being harvested before the grain bin overflows.
The two switches are connected in series through the grain tank (GT) harness, and an input is provided from the grain bin 3/4 full switch S-28 to the CCM2 module at connector **X016** pin J2-22. The CCM2 module monitors the change in resistance that occurs as the grain bin switches are closed by the increasing level of material in the grain bin. In the event that a fault occurs with one of the switches or the wiring to the switches, a fault code will be displayed to the operator.

E0159-03 - Grain Tank Full Sensor

E0159-05 - Grain Tank Full Sensor

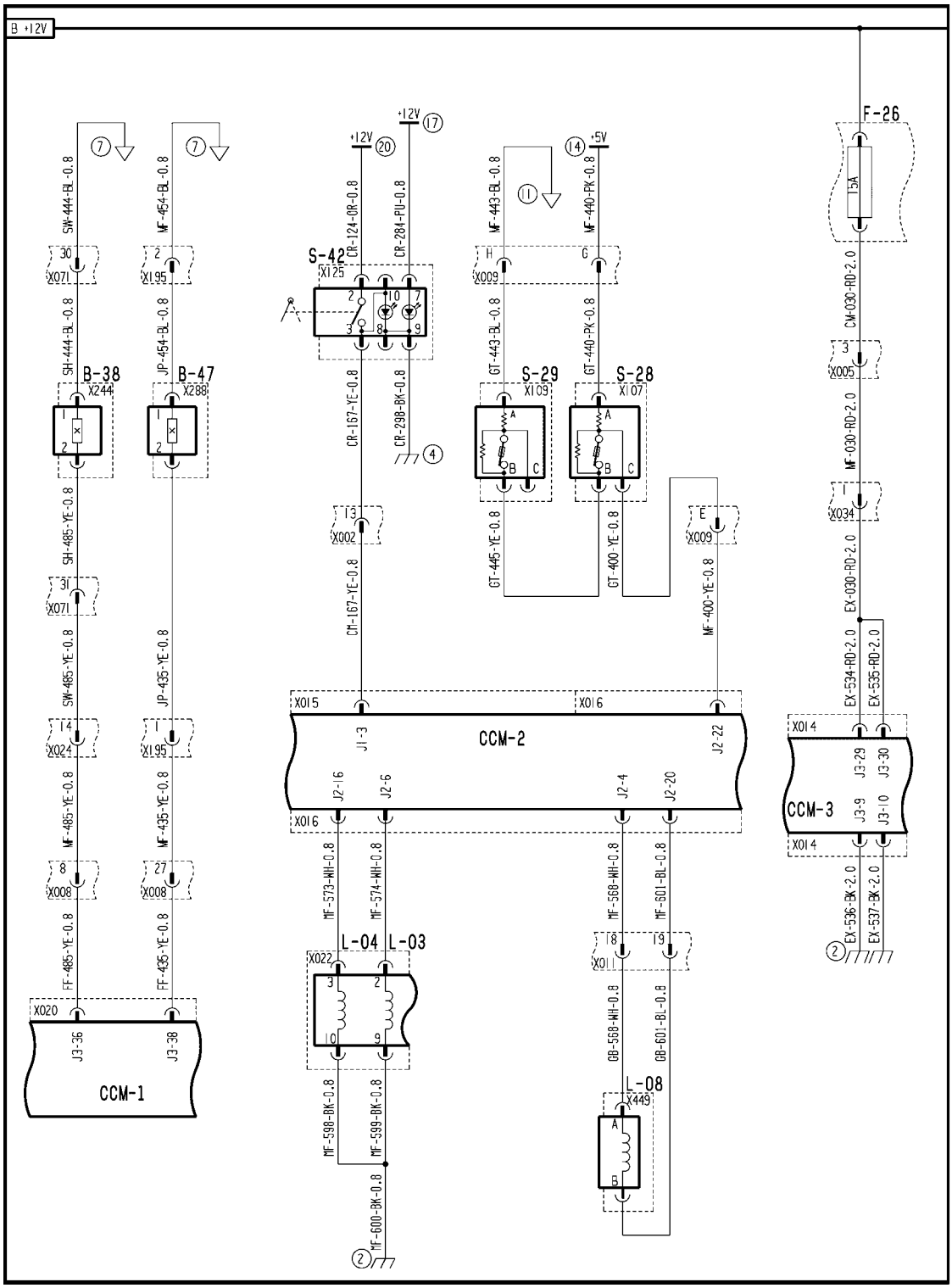
When the threshing system is engaged, and the grain bin 3/4 full switch S-28 is closed, the "Bin Full" light will illuminate on the shaft speed monitor, and the rotating beacons (if equipped) will flash to alert a grain truck operator to prepare for unloading the grain bin, and will continue to flash until the grain bin is emptied.

NOTE: *If the work lights are activated, the rotating beacons will only flash for approximately 10 seconds when the grain bin 3/4 full switch is closed, and will flash again for approximately 10 seconds when the grain bin full switch is closed.*

When the material level closes the grain bin full switch S-29, the "Bin Full" light on the shaft speed monitor will flash, and a buzzer will sound. The alarm message "A0030 Grainbin FULL" will also be displayed to the operator.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



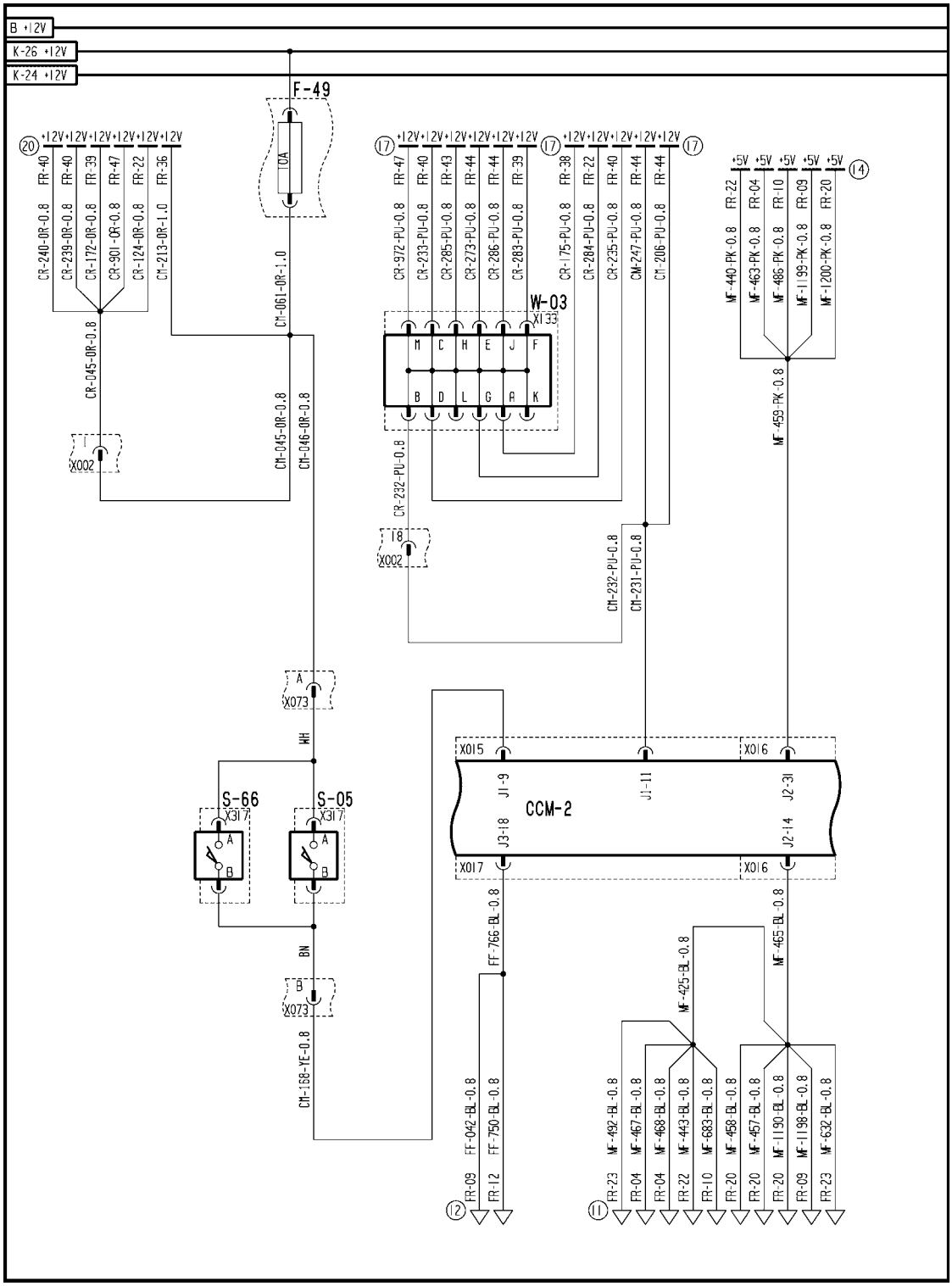
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Sensing system Level sensor - Open circuit (K.60.B.95.80 - G.30.B.50)

AFX8010

E0159-05 - Grain Tank Full Sensor

Cause:
The grain bin switch (S-28 & S-29) circuit is open, or shorted to ground.

Possible failure modes:

1. Switch supply wiring is open.
2. Switch signal wiring is open, or shorted to ground.
3. Grain bin 3/4 full switch S-28 is shorted to ground.
4. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "TANK FULL SEN" to check the voltage range. The normal voltage range is **0 - 4.9 volts**. The proper voltage range with both switches neutral (tank empty) is approximately **2.5 volts**. The proper voltage range with the grain bin 3/4 full switch S-28 depressed is approximately **3.3 volts**. The proper voltage range with both grain bin switches depressed is approximately **3.7 volts**.

   A. If the voltage reading is low (<**0.3 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting with step **9**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connectors are fully installed. Inspect the terminals and wires in each connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Manually move the paddle on the grain bin 3/4 full switch S-28 while monitoring the Universal Display Plus "DIAG" screen, "TANK FULL SEN" voltage.

   A. If the voltage remains low (<**0.3 volts**) out of range, continue with step **3**.

   B. If the voltage increases to approximately **2.5 volts**, there is a short to ground in the grain tank (GT) harness between connector **X107** pin B and connector **X109** pin B wire 445 yellow. Locate the short and repair.

3. Disconnect the grain bin 3/4 full switch S-28 connector **X107**. Use a multimeter to check for voltage on the harness end of connector **X107** pin A. There should be **5 volts** present.

   A. If there is no voltage, continue with step **4**.

   B. If there is **5 volts** present, continue with step **5**.

4. Disconnect the main frame (MF) harness from the grain tank (GT) harness at connector **X009**. Use a multimeter to check for voltage on connector **X009** pin G. There should be **5 volts** present.

   A. If there is **5 volts** present, there is an open circuit in the grain tank (GT) harness between connector **X009** pin G and connector **X107** pin A wire 440 pink. Locate the open and repair.

   B. If there is no voltage, there is an open circuit in the main frame (MF) harness between connector **X009** pin G and connector **X016** pin J2-31 wire 440 pink or wire 459 pink. Locate the open and repair.

5. Disconnect the grain bin 3/4 full switch S-28 connector **X107**. Use a multimeter to check for continuity between connector **X107** pin C and chassis ground. There should be not be any continuity.

   A. If continuity is found, continue with step **6**.

   B. If no continuity is found, continue with step **7**.

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6. Disconnect the main frame (MF) harness from the grain tank (GT) harness at connector **X009**. Use a multimeter to check for continuity between connector **X009** pin E and chassis ground. There should not be any continuity.

   A. If there is no continuity, there is a short to ground in the grain tank (GT) harness between connector **X009** pin E and connector **X107** pin C wire 400 yellow. Locate the short and repair.

   B. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X009** pin E and connector **X016** pin J2-22 wire 400 yellow. Locate the short and repair.

7. Disconnect the main frame (MF) harness from the grain tank (GT) harness at connector **X009**. Use a multimeter to check for continuity between connector **X009** pin E and connector **X107** pin C. There should be continuity.

   A. If there is no continuity, there is an open circuit in the grain tank (GT) harness between connector **X009** pin E and connector **X107** pin C wire 400 yellow. Locate the open and repair.

   B. If there is continuity, continue with step **8**.

8. Key off. Carefully disconnect connector **X016** from the bottom of the CCM2 module. Use a jumper wire to short connector **X009** pin E to chassis ground. Use a multimeter to check for continuity between connector **X016** pin J2-22 and chassis ground.

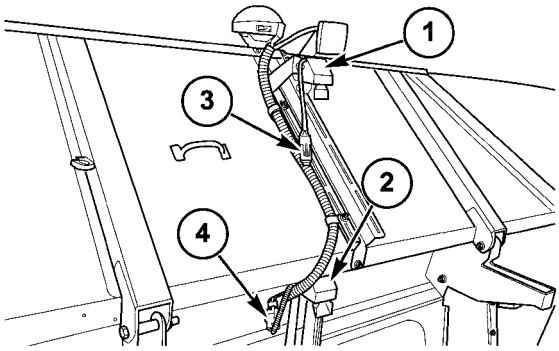
   A. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X009** pin E and connector **X016** pin J2-22 wire 400 yellow. Locate the open and repair.

   B. If there is continuity, continue with step **9**.

9. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "TANK FULL SEN" voltage.

   A. If no low (<**0.3 volts**) out of range readings are indicated, erase the fault code and continue operation.

Sensing system Level sensor - Overview (K.60.B.95.80 - C.10.A.10)



10030023A5 1

Grain Bin Level Sensors

1. Grain bin full switch S-29
2. Grain bin 3/4 full switch S-28
3. Connector **X109**
4. Connector **X107**

Two grain bin switches are used to monitor the level of material in the grain bin. The grain bin 3/4 full switch S-28 **(2)** is located in the center of the front grain tank wall, just above the cab window, while the grain bin full switch S-29 **(1)** is located in the center of the front grain bin extension. Both switches may be adjusted up or down on their mounting brackets to ensure that they are triggered by the material being harvested before the grain bin overflows.
The two switches are connected in series through the grain tank (GT) harness, and an input is provided from the grain bin 3/4 full switch S-28 to the CCM2 module at connector **X016** pin J2-22. The CCM2 module monitors the change in resistance that occurs as the grain bin switches are closed by the increasing level of material in the grain bin. In the event that a fault occurs with one of the switches or the wiring to the switches, a fault code will be displayed to the operator.

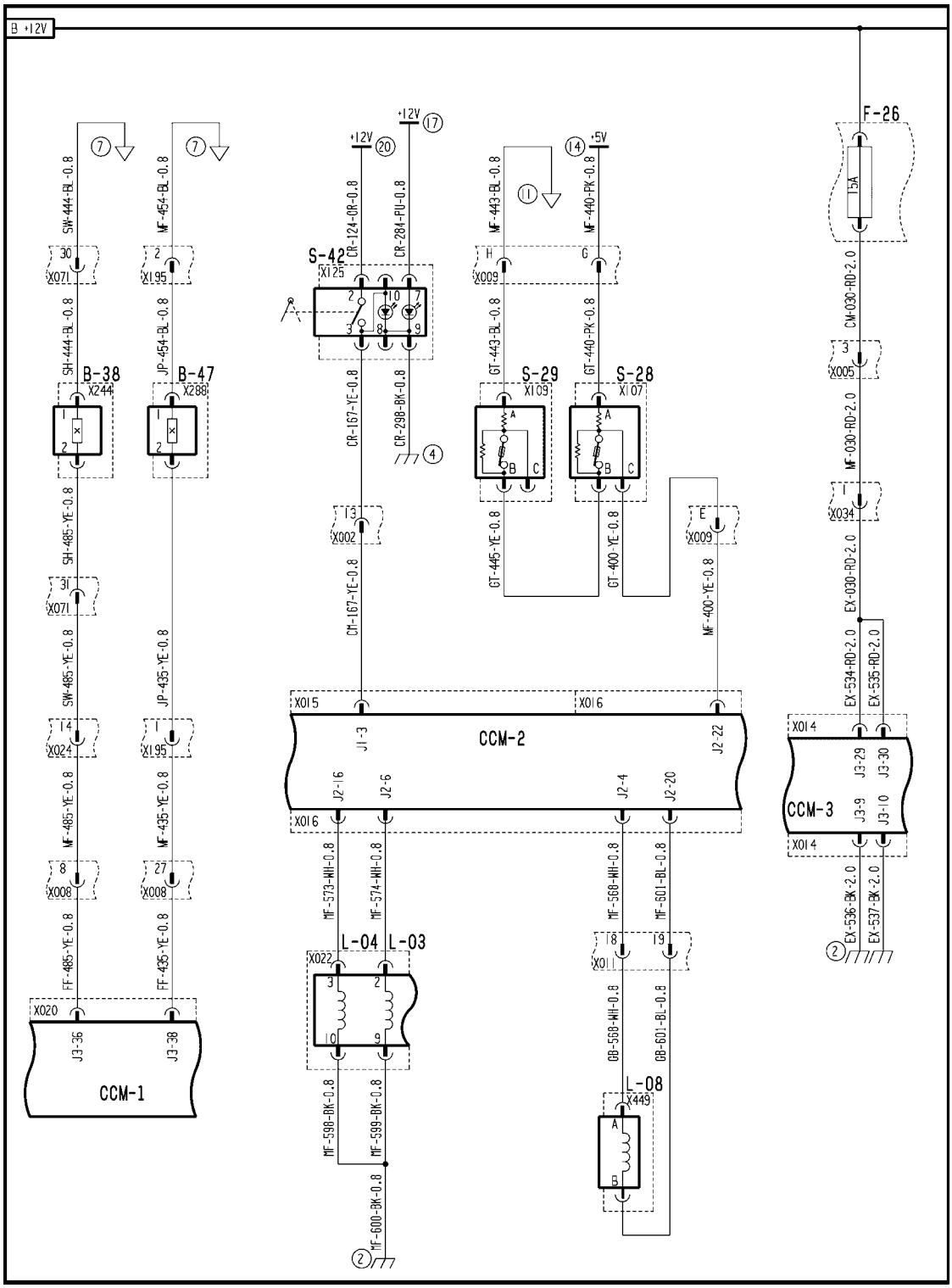
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E0159-03 - Grain Tank Full Sensor
E0159-05 - Grain Tank Full Sensor
When the threshing system is engaged, and the grain bin 3/4 full switch S-28 is closed, the "Bin Full" light will illuminate on the shaft speed monitor, and the rotating beacons (if equipped) will flash to alert a grain truck operator to prepare for unloading the grain bin, and will continue to flash until the grain bin is emptied.

NOTE: *If the work lights are activated, the rotating beacons will only flash for approximately 10 seconds when the grain bin 3/4 full switch is closed, and will flash again for approximately 10 seconds when the grain bin full switch is closed.*
When the material level closes the grain bin full switch S-29, the "Bin Full" light on the shaft speed monitor will flash, and a buzzer will sound. The alarm message "A0030 Grainbin FULL" will also be displayed to the operator.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



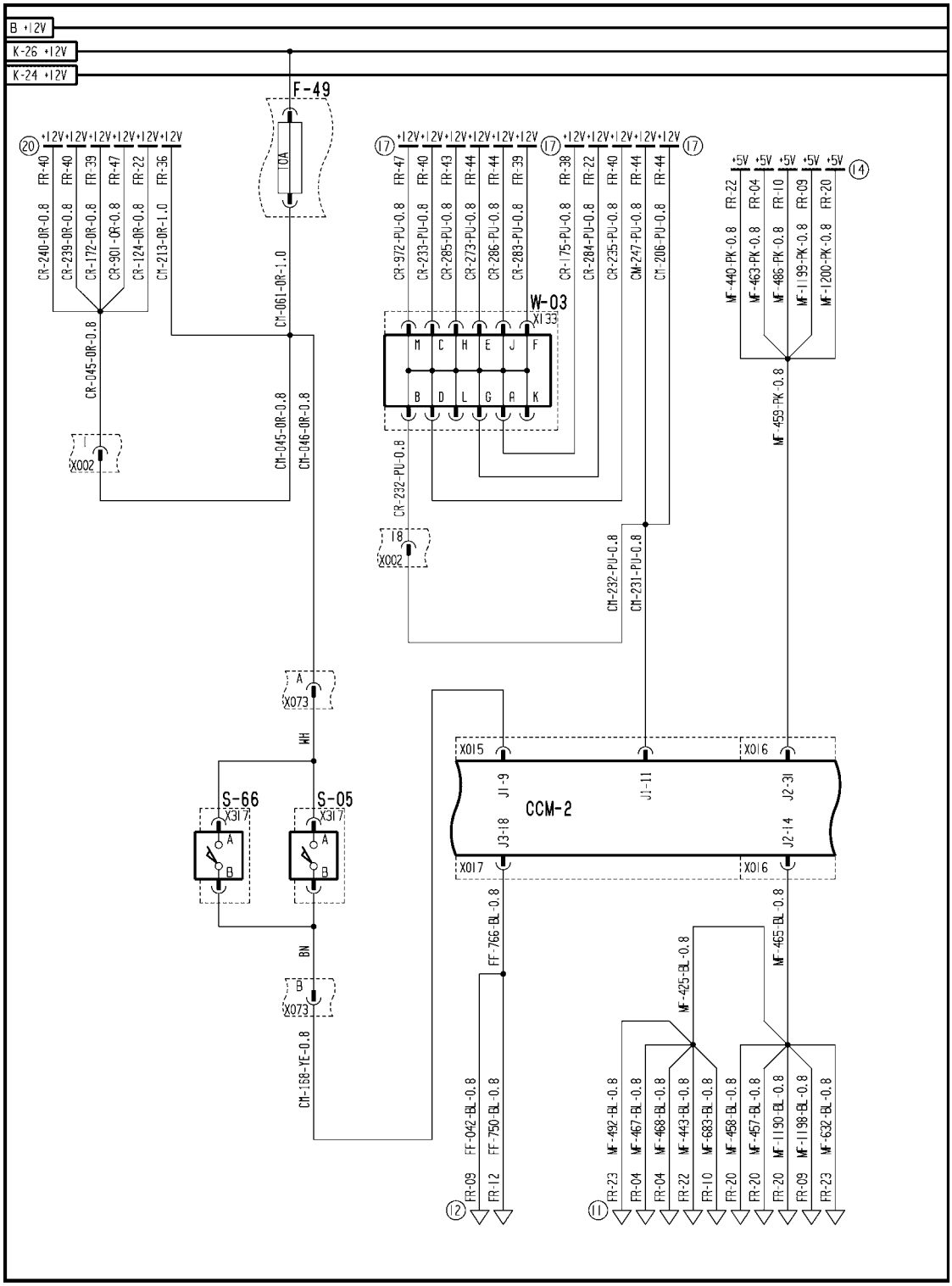
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Grain tank covers sensor - Short circuit to B+ (K.60.B.95.82 - G.30.B.54)

AFX8010

E0001-03 - Grain Tank Covers Open Sensor

Cause:
The bin covers open sensor (B47) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "COVERS OPEN SEN" to check the voltage range.

   The proper voltage for covers open - **5.6 - 7.3 volts**

   The proper voltage for covers closed - **0.5 - 5.6 volts**

   A. If the voltage reading is high out of range continue with Step **2**.

   B. If the voltage reading is within the proper limits, since the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **5**.
2. Disconnect the covers closed proximity sensor connector **X288** in the grain bin.

   A. If the voltage drops to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the connector **X195** behind the grain bin.

   A. If the voltage drops to **7.3 - 9.0 volts** the short is in between connector **X195** and connector **X288** wire 435 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X008** and connector **X195** wire 435 yellow. Locate the short and repair.

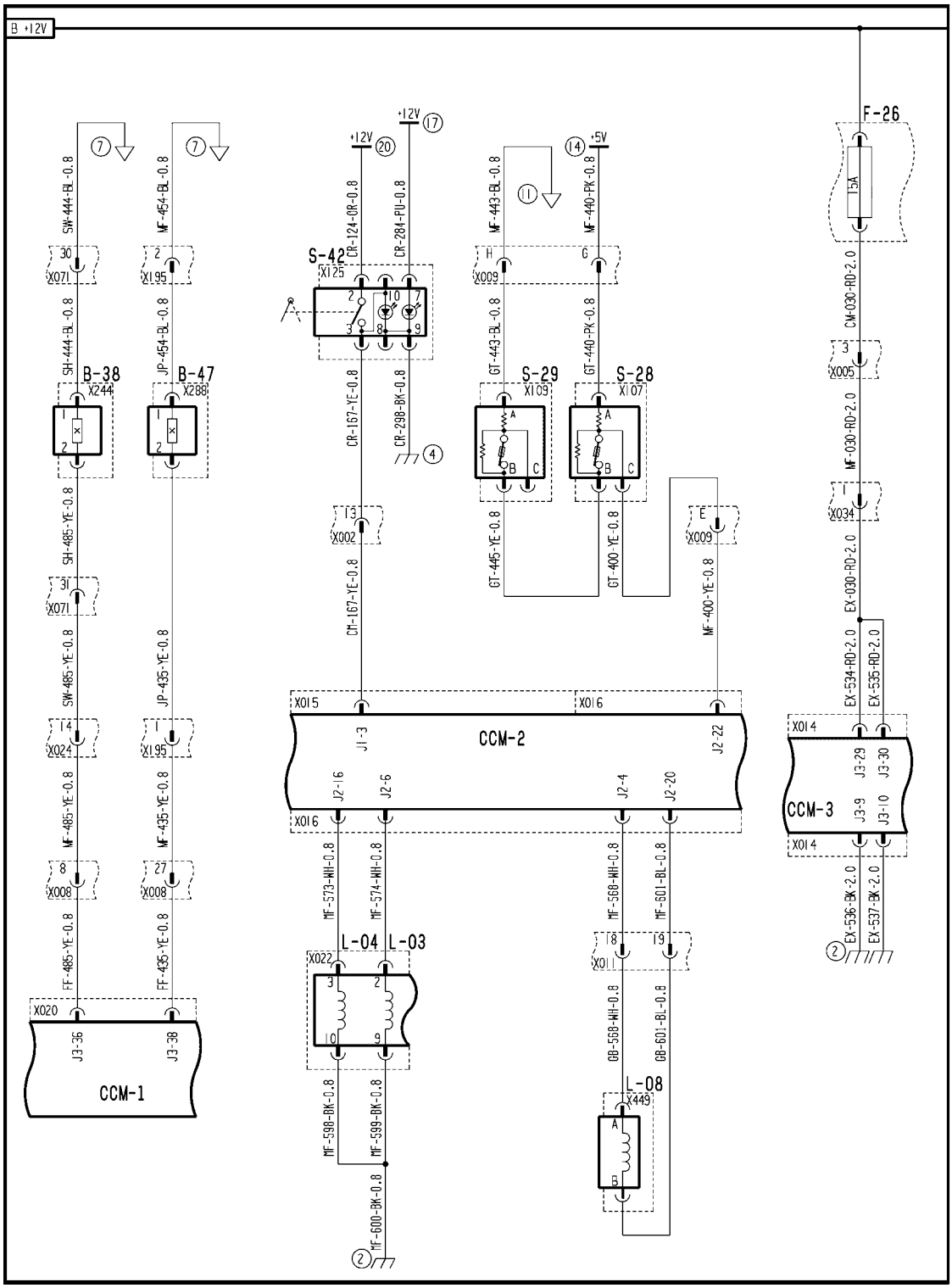
   B. If the voltage remains high, the short circuit is in the front frame (FF) harness between connector **X008** and connector **X020** J3-38 wire 435 yellow. Locate the short and repair.
5. Operate the grain bin doors in both directions and monitor the Universal Display Plus monitor voltage readings.

   A. If high voltage reading is viewed continue with Step **2** while operating grain bin doors.

   B. If a high voltage reading cannot be generated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



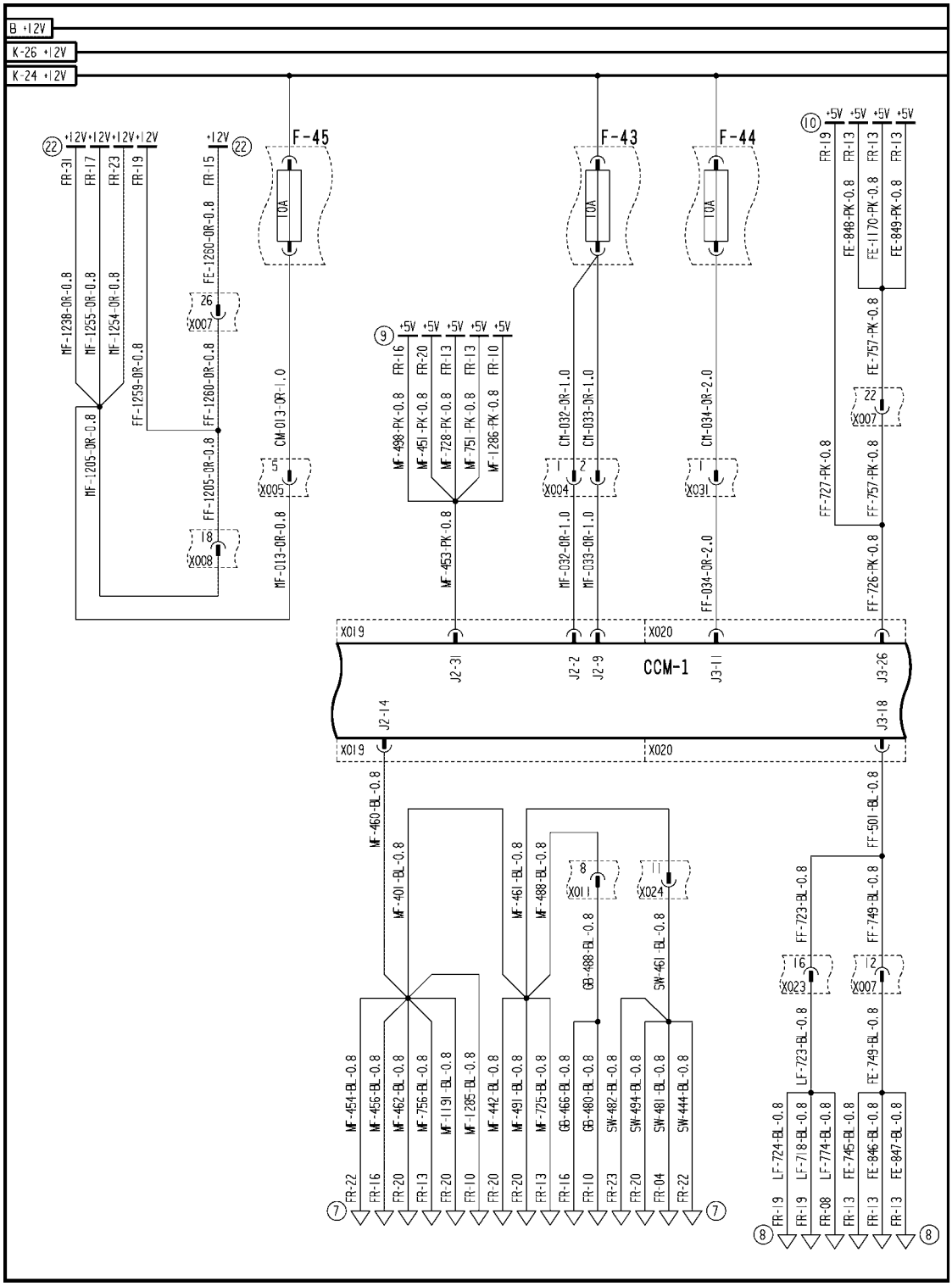
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Grain tank covers sensor - Short circuit to ground (K.60.B.95.82 - G.30.B.53)

AFX8010

E0001-04 - Grain Tank Covers Open Sensor

Cause:
The bin covers open sensor (B47) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "COVERS OPEN SEN" to check the voltage range.

   The proper voltage for covers open - **5.6 - 7.3 volts**

   The proper voltage for covers closed - **0.5 - 5.6 volts**

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **5**.
2. Disconnect the covers closed proximity sensor connector **X288** in the grain bin.

   A. If the voltage increases to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the connector **X195**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short to ground is in the jumper harness between connector **X195** and connector **X288** wire 435 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **3**.
4. Disconnect the connector **X008**.

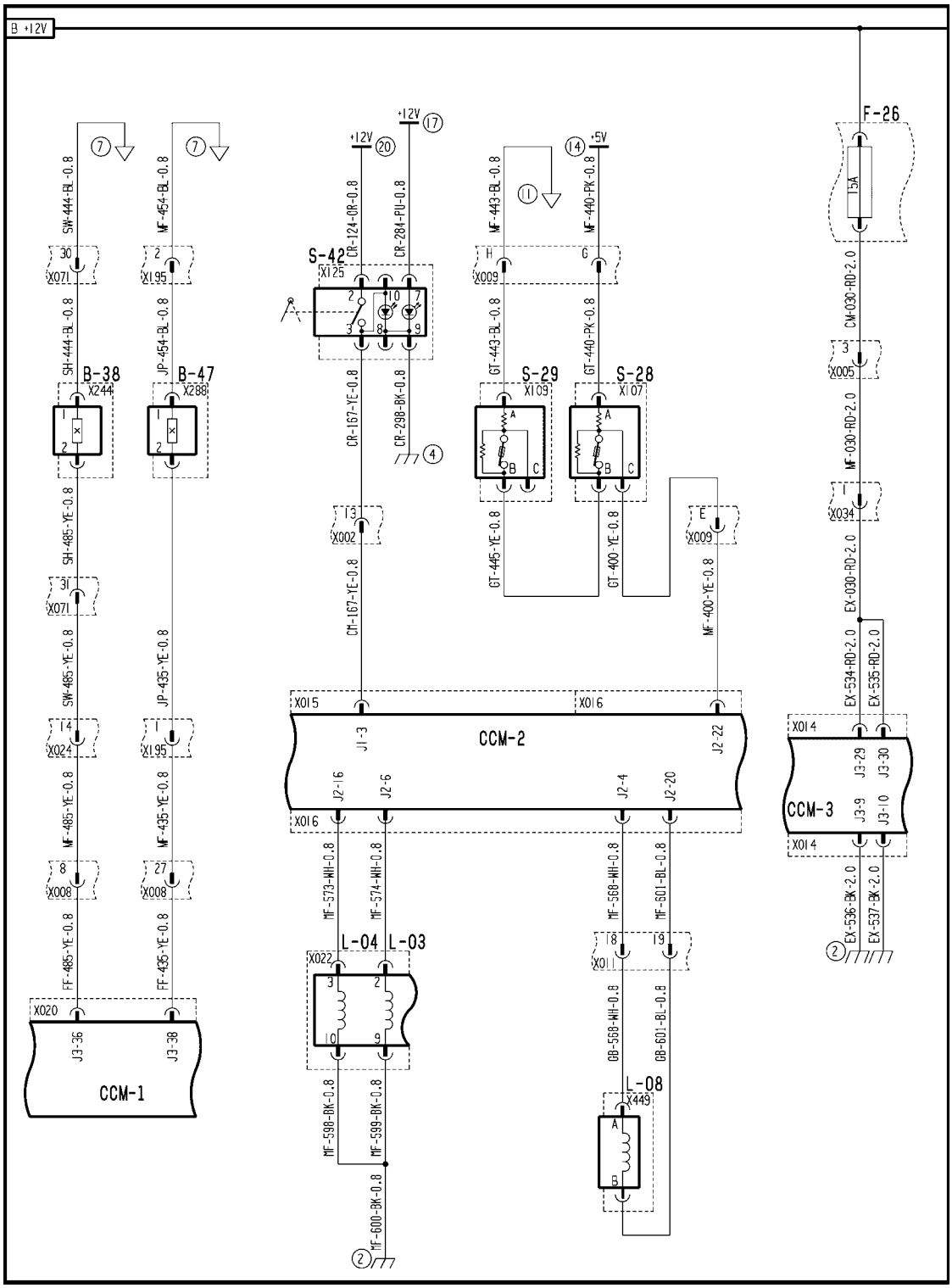
   A. If the voltage increases to **7.3 - 9.0 volts**, the short to ground is in the main frame (MF) harness between connector **X008** and connector **X195** wire 435 yellow. Locate the short and repair.

   B. If the voltage remains low, the short to ground is in the front frame (FF) harness between connector **X008** and connector **X020** J3-38 wire 435 yellow. Locate the short and repair.
5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



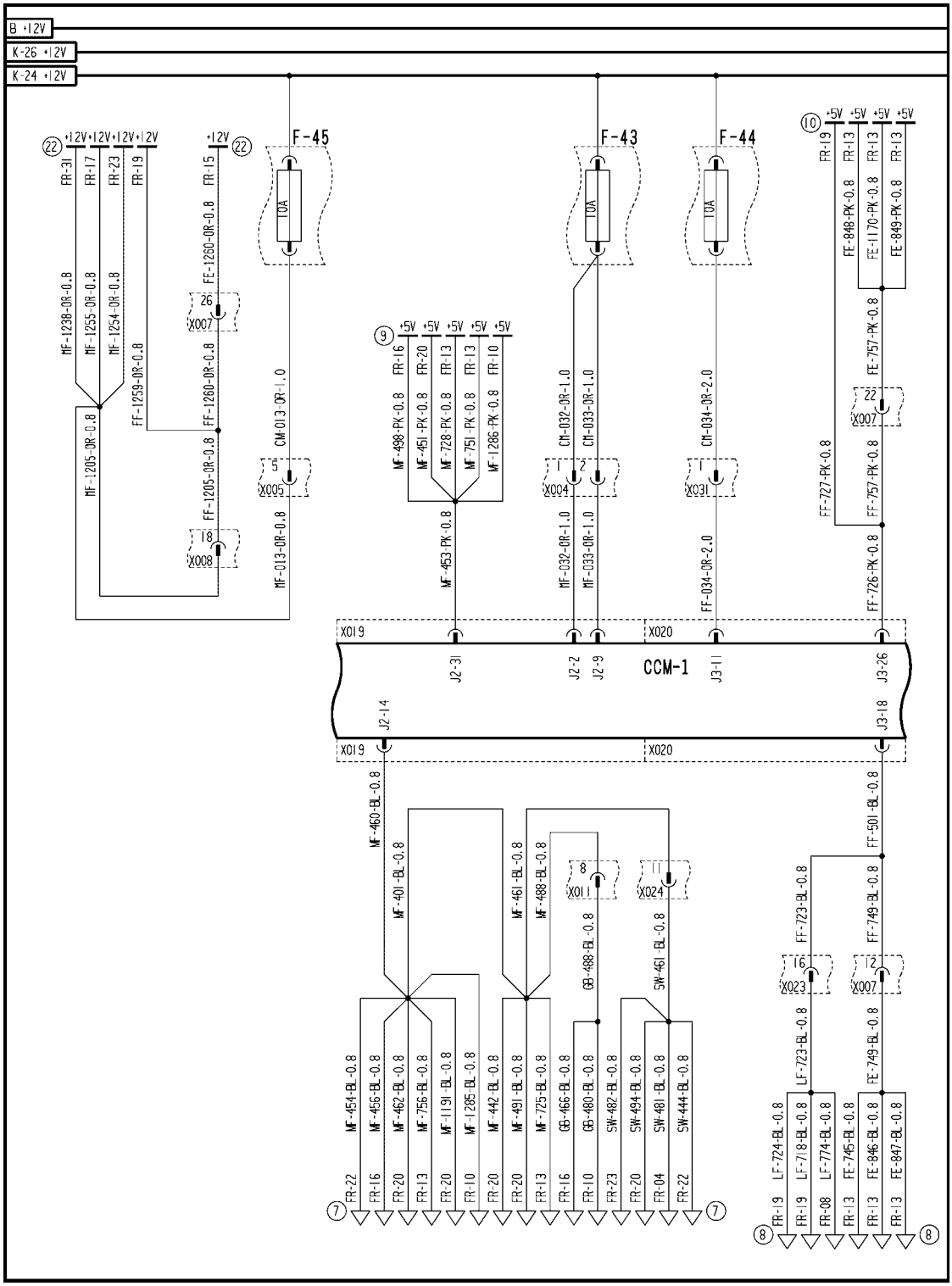
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Grain tank covers sensor - Open circuit (K.60.B.95.82 - G.30.B.50)

AFX8010

E0001-05 - Grain Tank Covers Open Sensor

Cause:
The bin covers open sensor (B47) has an open circuit.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "COVERS OPEN SEN" to check the voltage range.

   The proper voltage for covers open - **5.6 - 7.3 volts**

   The proper voltage for covers closed - **0.5 - 5.6 volts**

   If there is an open in the supply the voltage will read **7.3 - 9.0 volts**.

   A. If the voltage reading is high indicating an open continue with Step **2**.

   B. If the voltage reading is within the proper limits continue the troubleshooting at Step **7**.
2. Disconnect the covers closed proximity sensor connector **X288** in the grain bin. Install a jumper wire between pins 1 and 2 on connector **X288**.

   A. If the voltage drops to **0 - 0.5 volts**, the open is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with Step **3**.
3. Check for continuity between pin 1 on connector **X288** and chassis ground.

   A. If no continuity is found, continue with Step **4**.

   B. If continuity is found, continue with Step **5**.
4. Disconnect connector **X195**. Check for continuity between connector **X195** pin 2 and chassis ground.

   A. If continuity is found, the open is in the jumper harness between connector **X195** and **X288** wire 454 blue. Locate the open and repair.

   B. If no continuity is found, the open is in the main frame (MF) harness between connector **X195** and connector **X019** pin J2-14 wires 454 or 460 blue. Locate the open and repair.
5. Disconnect the connector **X195**. Install a jumper wire between pins 1 and 2 on connector **X195**.

   A. If the voltage drops to **0 - 0.5 volts**, the open is in the jumper harness between connector **X195** and connector **X288** wire 435 yellow. Locate the open and repair.

   B. If the voltage remains at **7.3 - 9.0 volts**, continue with Step **6**.
6. Disconnect the connector **X008**. Install a jumper wire between connector **X008** pin 27 and chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** the open is in the main frame (MF) harness between connector **X008** and connector **X195** wire 435 yellow. Locate the open and repair.

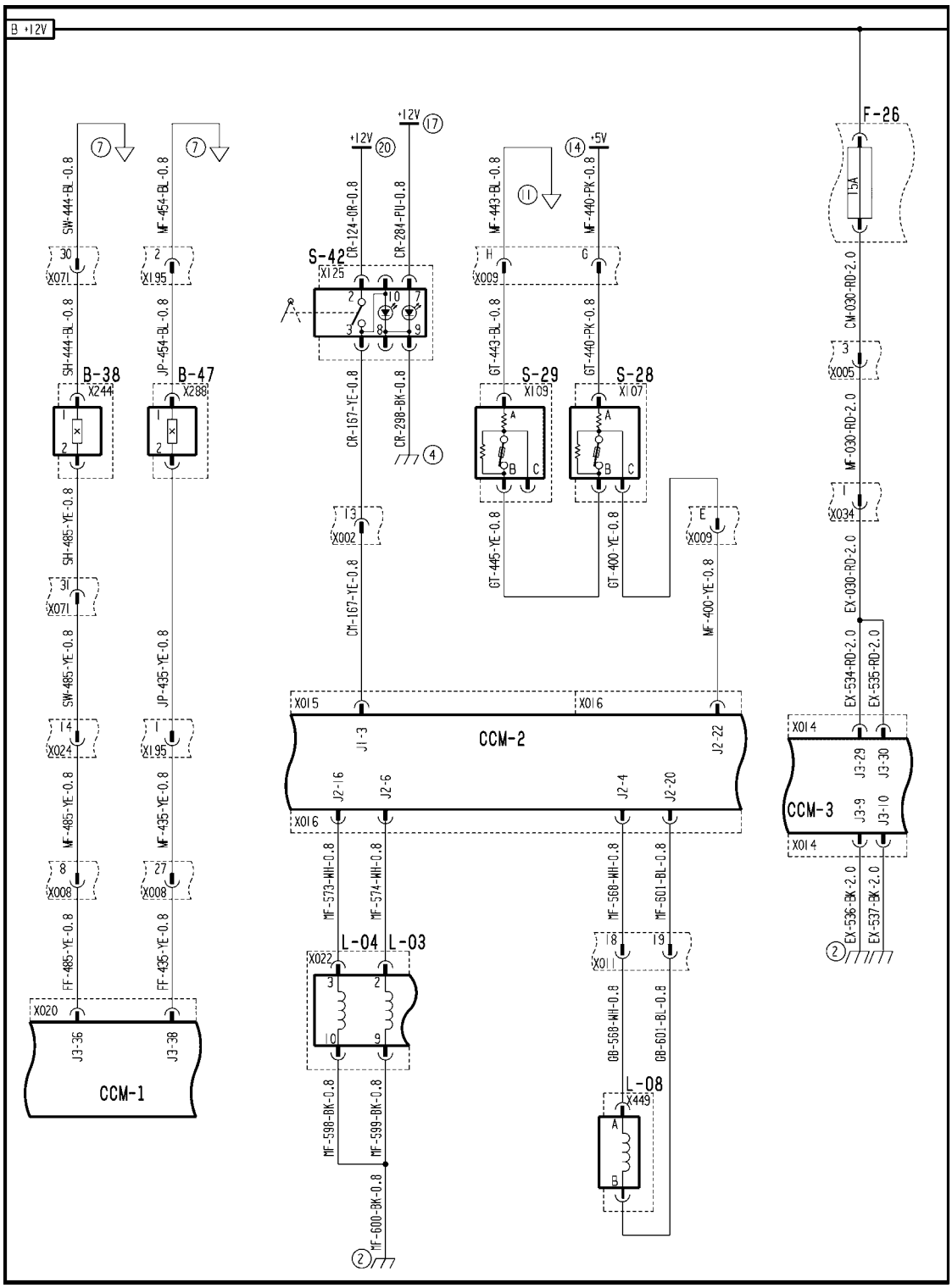
   B. If the voltage remains at **7.3 - 9.0 volts**, the open is in the front frame (FF) harness between connector **X008** and connector **X020** J3-38 wire 435 yellow. Locate the open and repair.

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7. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase fault code and continue operation.

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



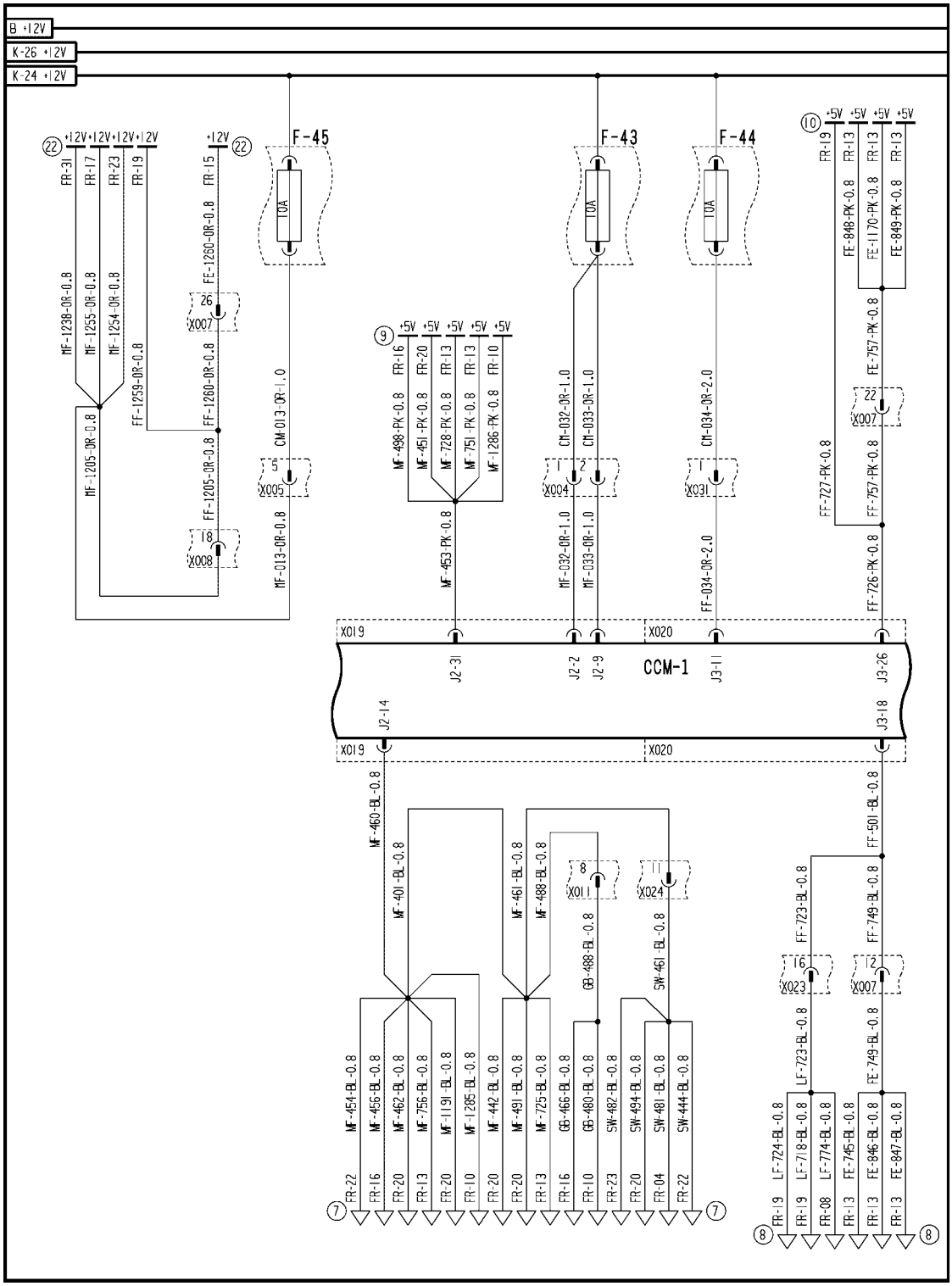
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

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B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Speed sensor - Short circuit to B+ (K.60.B.95.81 - G.30.B.54)

AFX8010

E0016-03 - Clean Grain Elevator Speed Sensor

Cause:
The clean grain elevator RPM sensor (B08) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "ELEVATOR SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is high (> **9 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **3**.
2. Disconnect the clean grain elevator RPM sensor connector **X182**.

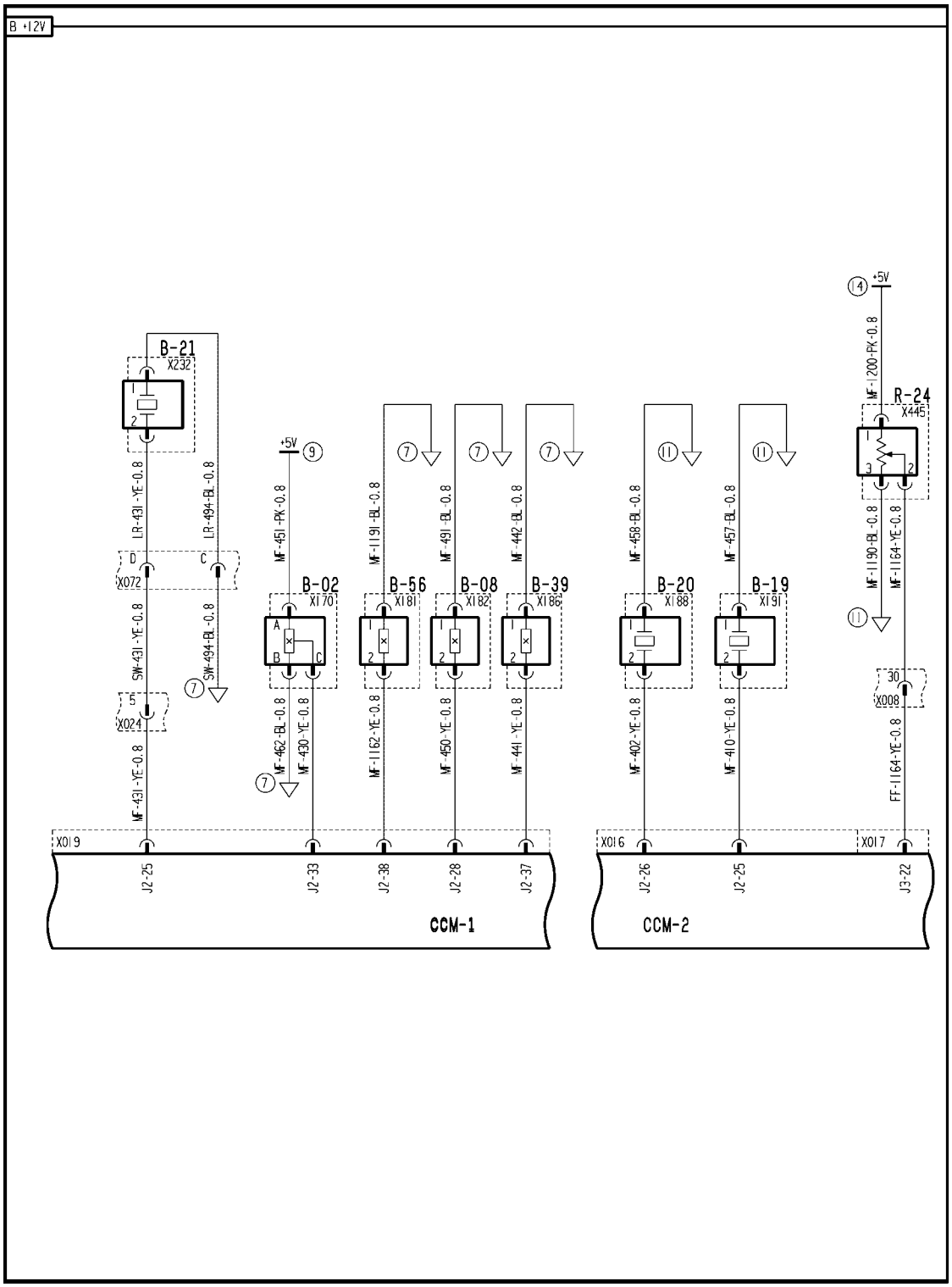
   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X182** and connector **X019** J2-28 wire 450 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



AFXSCHEM20-04 1

FRAME 20 - CLEANING

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B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

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Sensing system Speed sensor - Short circuit to ground (K.60.B.95.81 - G.30.B.53)

AFX8010

E0016-04 - Clean Grain Elevator Speed Sensor

Cause:
The clean grain elevator RPM sensor (B08) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "ELEVATOR SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is low **0 - 0.5 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.
2. Disconnect the clean grain RPM sensor connector **X182**.

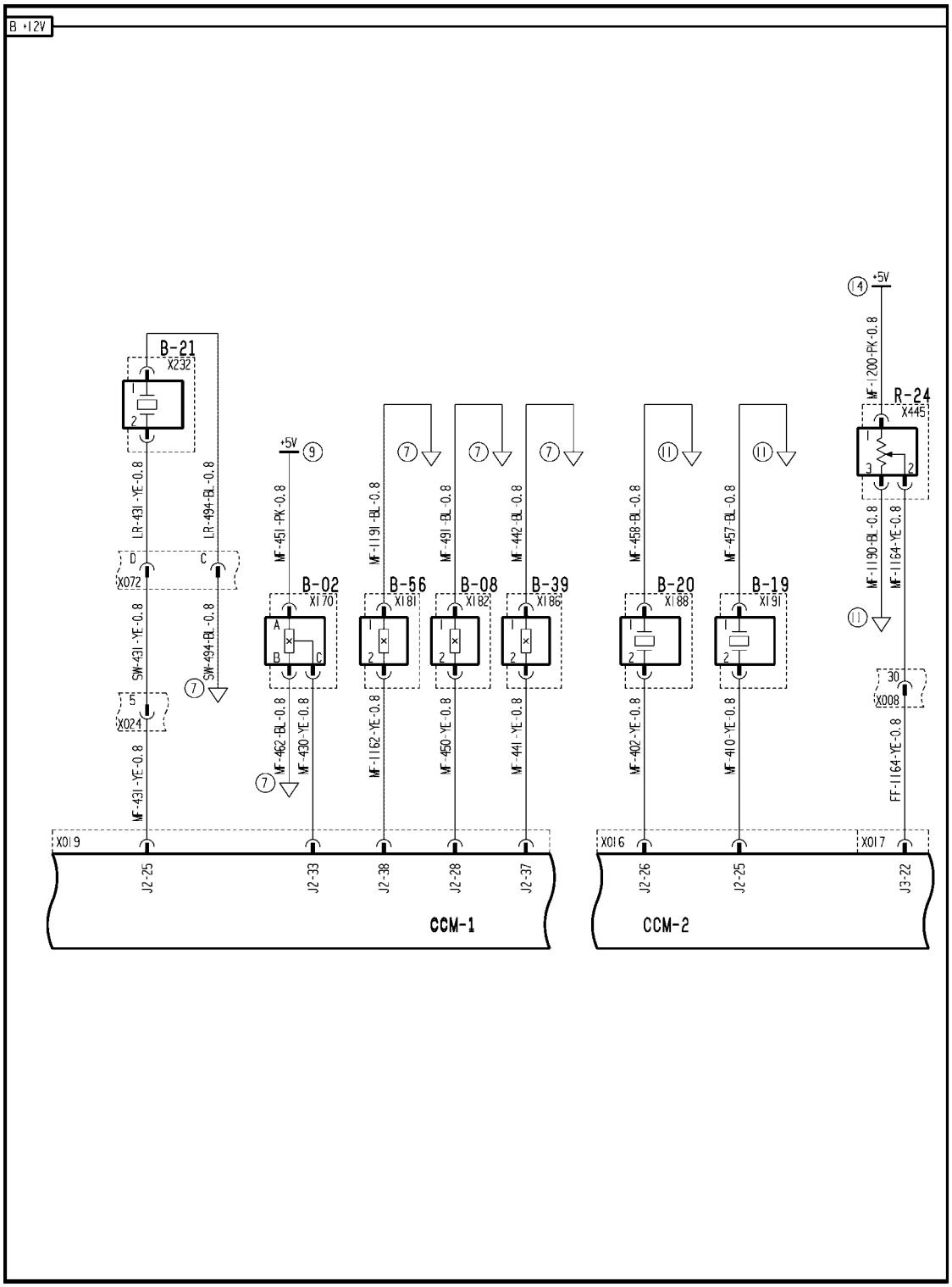
   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, the short circuit is in the main frame (MF) harness between connector **X182** and connector **X019** J2-28 wire 450 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



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FRAME 20 - CLEANING

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B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

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Sensing system Speed sensor - Open circuit (K.60.B.95.81 - G.30.B.50)

AFX8010

E0016-05 - Clean Grain Elevator Speed Sensor

Cause:
The clean grain elevator RPM sensor (B08) circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "GRAIN HANDLING" sort menu, and select "ELEVATOR SPD SEN" to check the voltage range.

   The proper voltage for sensor unblocked by ferrous metal is **0.5 - 5.6 volts**

   The proper voltage for sensor blocked by ferrous metal is **5.6 - 7.3 volts**

   The proper voltage with sensor disconnected is **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the open is not present at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the clean grain elevator RPM sensor connector **X182**. Use a jumper wire to short the harness end of connector **X182** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **3**.

   B. If the monitor still displays **7.3 - 9.0 volts**, the open circuit is in the main frame (MF) harness between connector **X182** pin 2 and connector **X019** pin J2-28 wire 450 yellow. Locate the open and repair.

3. Disconnect the clean grain elevator RPM sensor connector **X182**. Use a multimeter to check for continuity between the harness end of connector **X182** pin 1 and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

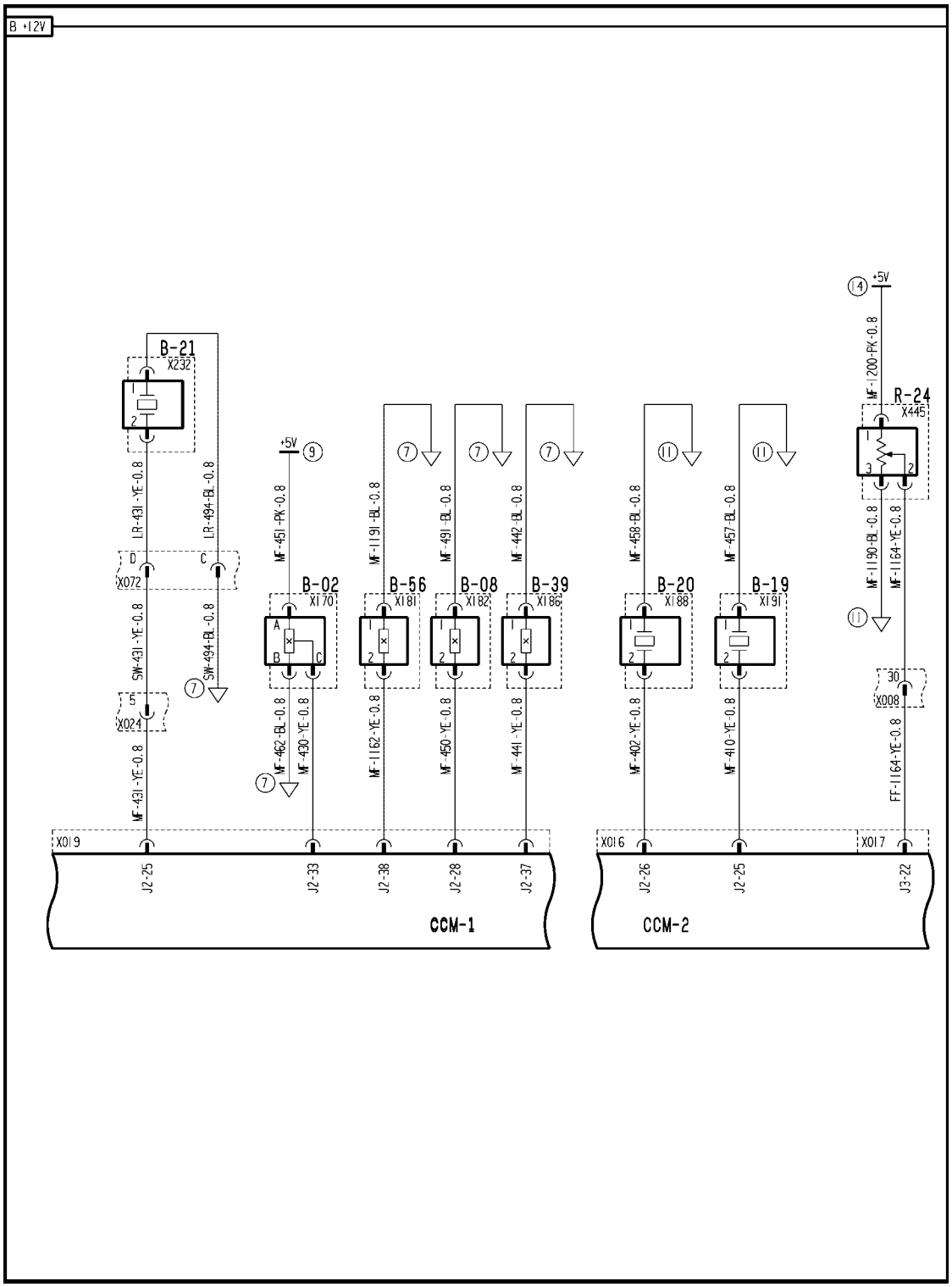
   B. If there no is continuity, there is an open circuit in the main frame (MF) harness between connector **X181** pin 1 and connector **X019** pin J2-14 wire 491 blue, 401 blue or 460 blue.. Locate the open and repair.

4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



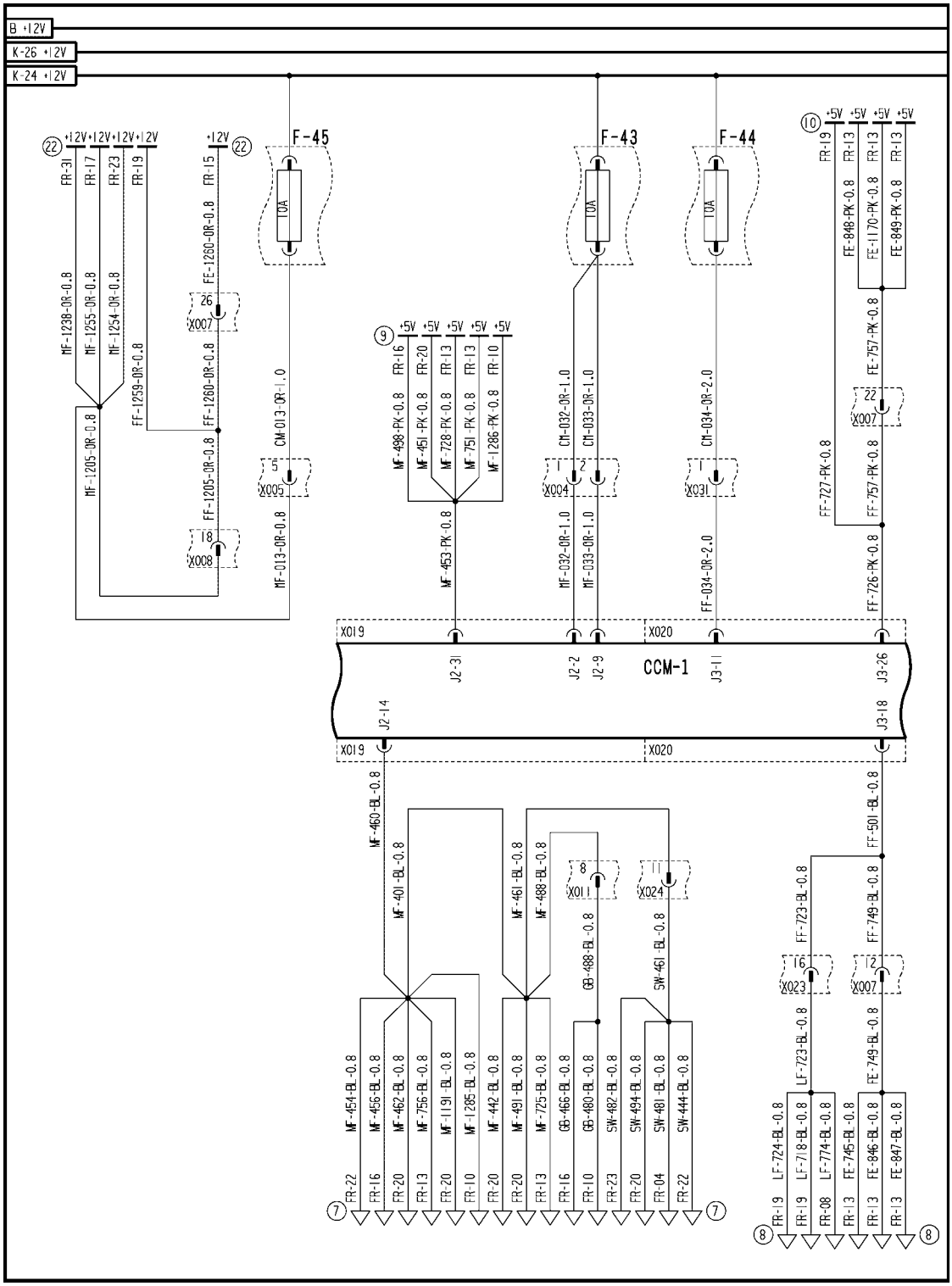
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FRAME 20 - CLEANING

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B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Index

CROP PROCESSING - K

STORING AND HANDLING Grain storing - 60.B

Bubble-up auger - Install (K.60.B.50 - F.10.A.15) 13
AFX8010

Bubble-up auger - Remove (K.60.B.50 - F.10.A.10) 10
AFX8010

Bubble-up auger drive system - Assemble (K.60.B.40 - F.10.A.20) 7
AFX8010

Bubble-up auger drive system - Disassemble (K.60.B.40 - F.10.A.25) 5
AFX8010

Clean grain cross auger - Install (K.60.B.51 - F.10.A.15) 20
AFX8010

Clean grain cross auger - Remove (K.60.B.51 - F.10.A.10) 16
AFX8010

Electrical motor - Short circuit (K.60.B.82 - G.30.B.52) 46
AFX8010

Electrical motor - Unidentified failure (K.60.B.82 - G.30.B.46) 54
AFX8010

Grain elevator - Install (K.60.B.52 - F.10.A.15) 27
AFX8010

Grain elevator - Remove (K.60.B.52 - F.10.A.10) 23
AFX8010

Grain elevator Chain - Install (K.60.B.52.48 - F.10.A.15) 32
AFX8010

Grain elevator Chain - Remove (K.60.B.52.48 - F.10.A.10) 30
AFX8010

Grain elevator housing - Assemble (K.60.B.74 - F.10.A.20) 40
AFX8010

Grain elevator housing - Disassemble (K.60.B.74 - F.10.A.25) 34
AFX8010

Sensing system Grain tank covers sensor - Open circuit (K.60.B.95.82 - G.30.B.50) 82
AFX8010

Sensing system Grain tank covers sensor - Short circuit to B+ (K.60.B.95.82 - G.30.B.54) 74
AFX8010

Sensing system Grain tank covers sensor - Short circuit to ground (K.60.B.95.82 - G.30.B.53) 78
AFX8010

Sensing system Level sensor - Open circuit (K.60.B.95.80 - G.30.B.50) 68
AFX8010

Sensing system Level sensor - Overview (K.60.B.95.80 - C.10.A.10) 4
AFX8010

Sensing system Level sensor - Short circuit to B+ (K.60.B.95.80 - G.30.B.54) 62
AFX8010

Sensing system Speed sensor - Open circuit (K.60.B.95.81 - G.30.B.50) 92
AFX8010

Sensing system Speed sensor - Short circuit to B+ (K.60.B.95.81 - G.30.B.54) 86
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.60.B.95.81 - G.30.B.53) 89
AFX8010

https://truckmanualshub.com/

CROP PROCESSING - K

CLEANING Primary cleaning - 62.B

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

CLEANING Primary cleaning - 62.B

TECHNICAL DATA

CLEANING Primary cleaning - General specification (K.62.B - D.40.A.10) 5
AFX8010

FUNCTIONAL DATA

CLEANING Primary cleaning - Dynamic description (K.62.B - C.30.A.10) 6
AFX8010

Motor

Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10) 7
AFX8010

Sensing system

Sensing system Lateral inclination sensor - Overview (K.62.B.95.50 - C.10.A.10) 8
AFX8010

SERVICE

Lower sieve drive system

Lower sieve drive system - Remove (K.62.B.41 - F.10.A.10) 9
AFX8010

Lower sieve drive system - Install (K.62.B.41 - F.10.A.15) 14
AFX8010

Lower sieve drive system - Assemble (K.62.B.41 - F.10.A.20) 17
AFX8010

Upper sieve drive system

Upper sieve drive system - Remove (K.62.B.42 - F.10.A.10) 23
AFX8010

Upper sieve drive system - Install (K.62.B.42 - F.10.A.15) 26
AFX8010

Fan

Fan - Remove (K.62.B.52 - F.10.A.10) 29
AFX8010

Fan - Disassemble (K.62.B.52 - F.10.A.25) 35
AFX8010

Fan - Assemble (K.62.B.52 - F.10.A.20) 37
AFX8010

Fan - Install (K.62.B.52 - F.10.A.15) 41
AFX8010

Upper sieve

Upper sieve - Remove (K.62.B.57 - F.10.A.10) 46
AFX8010

https://truckmanualshub.com/

Grain pan

Grain pan - Remove (K.62.B.58 - F.10.A.10) 47
AFX8010

Grain pan - Install (K.62.B.58 - F.10.A.15) 48
AFX8010

Lower shoe levelling system

Lower shoe levelling system - Remove (K.62.B.61 - F.10.A.10) 49
AFX8010

Lower shoe levelling system - Install (K.62.B.61 - F.10.A.15) 51
AFX8010

Upper shoe levelling system

Upper shoe levelling system - Remove (K.62.B.63 - F.10.A.10) 53
AFX8010

Upper shoe levelling system - Install (K.62.B.63 - F.10.A.15) 56
AFX8010

DIAGNOSTIC

Command

Command Lower sieve remote switch - Short circuit to B+ (K.62.B.05.61 - G.30.B.54) 62
AFX8010

Command Upper sieve remote switch - Short circuit to B+ (K.62.B.05.56 - G.30.B.54) 65
AFX8010

Command Lower sieve remote switch - Short circuit to B+ (K.62.B.05.61 - G.30.B.54) 68
AFX8010

Command Upper sieve remote switch - Short circuit to B+ (K.62.B.05.56 - G.30.B.54) 71
AFX8010

Motor

Motor Shoe leveling motor - Short circuit to B+ (K.62.B.28.60 - G.30.B.54) 74
AFX8010

Motor Shoe leveling motor - Open circuit (K.62.B.28.60 - G.30.B.50) 80
AFX8010

Motor Shoe leveling motor - Short circuit (K.62.B.28.60 - G.30.B.52) 85
AFX8010

Motor Shoe leveling motor - Unidentified failure (K.62.B.28.60 - G.30.B.46) 91
AFX8010

Motor Lower sieve motor - Short circuit (K.62.B.28.56 - G.30.B.52) 97
AFX8010

Motor Upper sieve motor - Short circuit (K.62.B.28.55 - G.30.B.52) 108
AFX8010

Motor Lower sieve motor - Unidentified failure (K.62.B.28.56 - G.30.B.46) 119
AFX8010

Motor Upper sieve motor - Unidentified failure (K.62.B.28.55 - G.30.B.46) 130
AFX8010

Fan drive system

Fan drive system - Unidentified failure (K.62.B.40 - G.30.B.46) 141
AFX8010

Electrical control

Electrical control Relay - Unidentified failure (K.62.B.90.80 - G.30.B.46) 144
AFX8010

Sensing system

Sensing system Lateral inclination sensor - Short circuit to B+ (K.62.B.95.50 - G.30.B.54) 147
AFX8010

https://truckmanualshub.com/

Sensing system Lateral inclination sensor - Open circuit (K.62.B.95.50 - G.30.B.50) 151
AFX8010

Sensing system Fan speed sensor - Short circuit to B+ (K.62.B.95.52 - G.30.B.54) 156
AFX8010

Sensing system Fan speed sensor - Short circuit to ground (K.62.B.95.52 - G.30.B.53) 159
AFX8010

Sensing system Fan speed sensor - Open circuit (K.62.B.95.52 - G.30.B.50) 162
AFX8010

Sensing system Sieve shake speed sensor - Short circuit to B+ (K.62.B.95.56 - G.30.B.54) 167
AFX8010

Sensing system Sieve shake speed sensor - Short circuit to ground (K.62.B.95.56 - G.30.B.53) 170
AFX8010

Sensing system Sieve shake speed sensor - Open circuit (K.62.B.95.56 - G.30.B.50) 173
AFX8010

https://truckmanualshub.com/

CLEANING Primary cleaning - General specification (K.62.B - D.40.A.10)

AFX8010

Specifications AFX 8010

CLEANING SHOE	
Frame Width	**1580 mm** (**62 3/16 in**)
Cleaning Shoe Type	Self Leveling
Drive	1 HC Belt
Standard Speed	**310 RPM**
Upper Shaker Shoe	
Horizontal Stroke	**45 mm** (**1 3/4 in**)
Throwing Angle, Front	27 degrees
Throwing Angle, Rear	27 degrees
Grain Pan Width	**1580 mm** (**62 3/16 in**)
Grain Pan Length	**1570 mm** (**61.8 in**)
Grain Pan + Rake Surface	2.733 sq m (4236 sq in)
Pre-sieve Width	**1580 mm** (**62 3/16 in**)
Pre-sieve Length	**901 mm** (**35 1/2 in**)
Pre-sieve Area (with rake)	1.424 sq m (2207 sq in)
Upper Sieve Width	2 x **790 mm** (**31 in**)
Upper Sieve Length	**1445 mm** (**56 7/8 in**)
Upper Sieve Area	2.284 sq m (3540 sq in)
Upper Sieve Grate Surface	0.237 sq m (367 sq in)
Upper Sieve Graepel Surface	0.253 sq m (392 sq in)
Lower Shaker Shoe	
Horizontal Stroke	**40 mm** (**1 1/2 in**)
Throwing Angle	15 degrees
Lower Sieve Length	**1445 mm** (**56 7/8 in**)
Lower Sieve Width	2 x **790 mm** (**31 in**)
Lower Sieve Area	2.284 sq m (3540 sq in)
Total Sieve Area Under Wind Control	6.25 sq m (9687 sq in)
CLEANING FAN	
Type	Cross Flow
Drive	Hydraulic
Fan Speed Range	**300 - 1150 RPM**
Speed Control	Closed loop
Number of Blades	40

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CLEANING Primary cleaning - Dynamic description (K.62.B - C.30.A.10)

AFX8010

The grain and chaff on the grain pan are transported to the rear by the reciprocating action of the cleaning shoe. An electrical actuator ensures that the cleaning shoe automatically remains horizontal in the transverse axis of the machine, even when operating on side slopes up to 13.7%. This innovation increases the capacity of the cleaning sieve considerably when operating in hilly conditions.

The cleaning shoe is composed of an upper sieve and a lower shoe which move in opposite directions. A first separation takes place on the grain pan as the lighter chaff forms the top layer and the heavier grain the bottom layer. The material falls through the finger grate installed at the rear of the grain pan, onto the pre-sieve. The air coming from the secondary air duct of the cleaning fan blows the chaff over the pre-sieve so that the grain, with a reasonably high degree of cleanliness falls through the pre-sieve. This action will be repeated a second time between the pre-sieve and upper sieve.

The air coming from the main air duct of the cleaning fan blows the chaff over the upper sieve out of the machine, while the grain, un-threshed heads and small volumes of chaff fall onto the lower sieve. In addition, the grain separated by the pre-sieve is guided by the small grain pan to the lower sieve. The installation of a pre-sieve considerably increases the cleaning shoe capacity as the main separation of grain and chaff occurs at both finger grates. The lower sieve or cleaning sieve, provides the final cleaning operation. Grain that passes through the cleaning sieve is carried over the grain plate to the clean grain cross auger. Un-threshed heads which do not fall through the lower sieve are transported by the returns auger to the tailings processor for re-threshing. The processor discharges the processed tailings on the upper sieve for cleaning.

The cleaning shoe assembly is constructed of six major parts. The cleaning self-leveling frame. All components that make up the cleaning shoe are connected to the self-leveling frame. The frame attaches to the combine at the front through a pivot pin in the center. The rear of the frame rests on a sealed roller bearing mounted to the combine. Plastic rollers at the back corners, hold the lateral position of the frame inside the combine while allowing the cleaning shoe assembly to rotate.

The grain pan is forward of the upper cleaning shoe. The front of the pan attaches to the cleaning shoe frame with two support arms. The arms provide a semi rigid connection to the shoe frame enabling the grain pan to move back and forth during normal operation of the system. The rear of the grain pan is connected to the upper cleaning shoe. An adjustment is provided on the right side allowing the upper and lower shoe and the pan to be set square with each other.

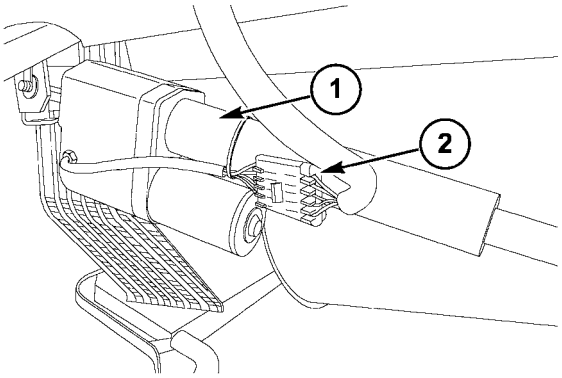
The upper cleaning shoe is attached at the front with drive arms, and at the rear with two support arms. Three sieves are secured at the upper shoe. A lever at the right rear corner manually positions the pre-sieve, mounted on the front part of the shoe. The two remaining sieves may be positioned remotely from the cab (optional) and are mounted side by side on the back portion of the upper shoe. A rocker arm connects the upper and lower shoe to move them in opposite directions during normal operation.

The lower cleaning shoe is connected to the frame and upper cleaning shoe at the front with the rocker arm. Two support arms fasten the lower shoe to the frame while allowing back and forth motion as the shoe is driven by the rocker arm. Two sieves are mounted side by side on the lower shoe and positioned remotely from the cab (optional). The rotating cams of the eccentric shaft move the drive arms in a back and forth motion. Two drive arms attach the upper cleaning shoe to the eccentric shaft on both sides of the combine. The neutral position of the shoe assembly is obtained by setting the keyway of the eccentric shaft perpendicular to the drive arm. Anytime a rubber bushing is replaced, the arm must be in a neutral position prior to tightening the clamp. Two rocker arms provide the pivot point for the back and forth motion of the upper and lower cleaning shoe. The left arm is attached to the shoe frame at a fixed point, the right arm is adjustable fore and aft so that the timing of the drive arms will match.

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Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10)

AFX8010



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The shoe leveling actuator M-03 **(1)** is located in front of the cleaning fan on the right side, and is attached between the right side frame and the cleaning shoe. The shoe leveling actuator contains an electrical motor, used to extend and retract the actuator in order to tilt the cleaning shoe, and a linear potentiometer to monitor the angle at which the cleaning shoe is tilted. The shoe leveling actuator is connected (**X088**) to the lower frame (LF) harness at **(2)**, and is connected to the CCM1 module at connector **X020** as follows:

Shoe leveling actuator function	Pin number at CCM1 connector X020
Motor, extend	J3-39, J3-40 = power; J3-19, J3-20 = ground
Motor, retract	J3-19, J3-20 = power; J3-39, J3-40 = ground
Potentiometer	J3-32

The CCM1 module uses two pairs of pins to send current to the shoe leveling actuator motor. This allows the CCM1 module to reverse the polarity and change the direction of the actuator. The CCM1 module software detects when the self-leveling cleaning shoe makes contact with the frame by detecting when the actuator motor is stalled (sudden amperage increase), and establishes the limit of travel based on input from the potentiometer in the actuator. These limits are NOT stored in non-volatile memory, so they are established at least once (each direction) for every key-on cycle.

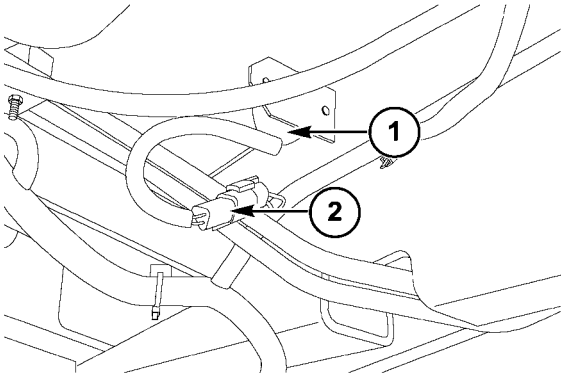
The shoe leveling actuator M-03 circuit (both motor and potentiometer) is also monitored by the CCM1 module; in the event that a fault occurs with the actuator or wiring to the actuator, a fault code will be displayed to the operator.

E0032-03 - Sieve Angle Sensor
E0032-05 - Sieve Angle Sensor
E0043-06 - Sieve Angle Current Sense
E0075-11 - Leveling Sieve

https://truckmanualshub.com/

Sensing system Lateral inclination sensor - Overview (K.62.B.95.50 - C.10.A.10)

AFX8010



40033772A5 1

The lateral inclination sensor B-02 **(1)** is located under the right side of the cab, inside the frame rail, and is connected (**X170**) to the main frame (MF) harness at **(2)**. The lateral inclination sensor monitors the side-to-side tilt of the combine chassis, and provides an input to the CCM1 module at connector **X019** pin J2-33. The lateral inclination sensor B-02 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

E0033-03 - Lateral Inclination Sensor

E0033-05 - Lateral Inclination Sensor

The input from the lateral inclination sensor B-02 is used to support the self leveling cleaning shoe system; CCM1 uses this input to determine which direction and how far to tilt the cleaning shoe in order to keep it level.

https://truckmanualshub.com/

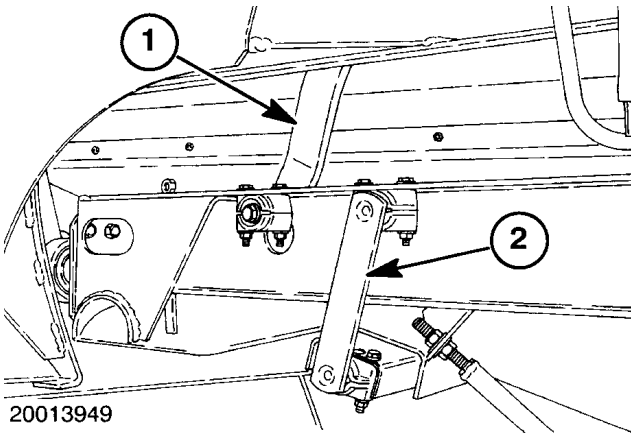
Lower sieve drive system - Remove (K.62.B.41 - F.10.A.10)

AFX8010

Cleaning shoe support arm

1. The upper cleaning shoe uses two movable support arms to attach the shoe to the frame. The support arms **(1)** are located toward the rear of the combine, close to the lower shoe support arms **(2)**. The grain pan support arms are located toward the front end of the combine. The lower cleaning shoe uses two support arms, **(2)** to attach the shoe to the frame. All six support arms are similar in construction, only one set of removal instructions is given.

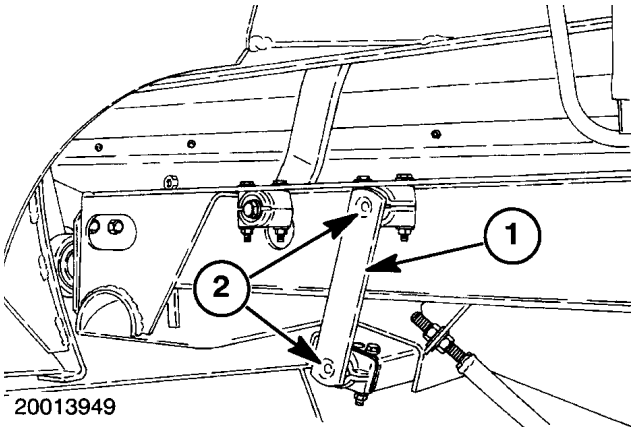
NOTE: *Lower cleaning shoe support arm removal is shown, the others are similar.*



20013949a 1

2. Disconnect the support arm **(1)** by removing clamps and hardware at **(2)**.

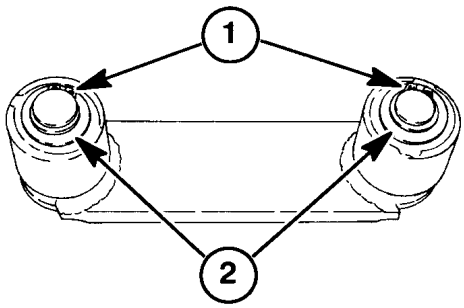
NOTE: *Depending on the support arm being removed, it may be necessary to rotate the leveling frame to obtain access to the clamping hardware. Disengage the shoe positioning motor and rotate the frame as required.*



20013949b 2

3. Remove the snap rings **(1)** and **(2)** from the support arm.

NOTE: *The upper shoe support arms do not have washers and snap rings.*



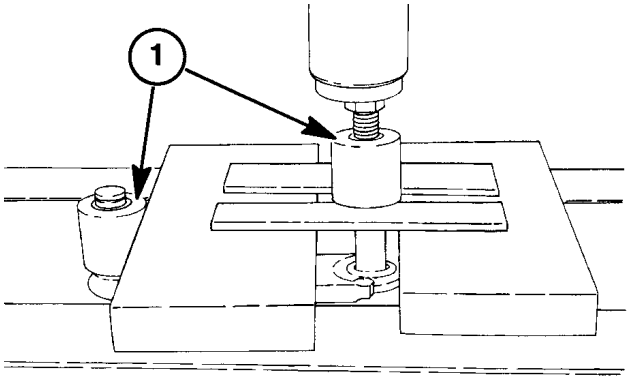
20013963

20013963 3

https://truckmanualshub.com/

4. Remove the bushings **(1)** from the support arm by pressing or cutting them from the journals.

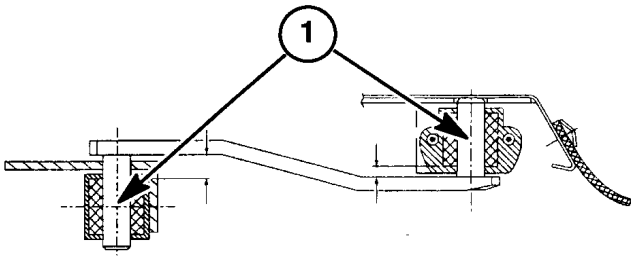
NOTE: *Connecting Arm Pivot Bushings. Journals with diameters less than specified should be replaced. The pins typically don't wear as much as the rubber bushings do. The rubber bushings should be checked for wear, tear or cracks. If they are damaged or worn, replace them.*



20013959

20013959 4

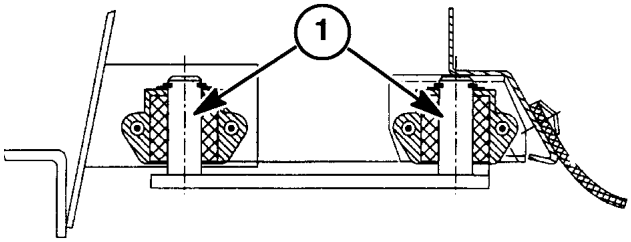
5. Inspect the supports for wear or damage. The upper shoe support arm journals **(1)** are to be**18.870 - 19.00 mm** (**0.743 - 0.748 in**) .



20013962

20013962 5

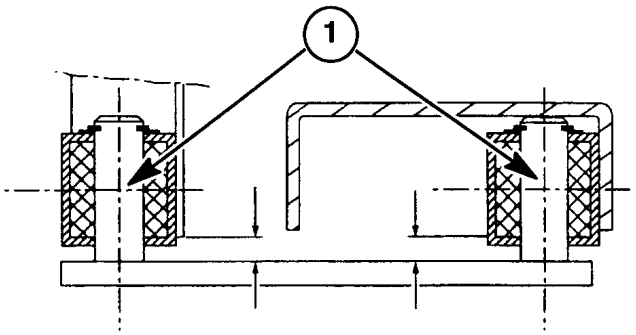
6. Journals with diameters less than that specified should be replaced. Grain pan support arm journals **(1)** are the same as the upper shoe supports.



20013961

20013961 6

7. The lower shoe support arm journals **(1)**are to be**17.890 - 18.00 mm** (**0.704 - 0.709 in**)



20015692

20015692 7

https://truckmanualshub.com/

8. **Upper sieve - Remove (K.62.B.57 - F.10.A.10)** Reference this section to help you remove the upper sieves and components.

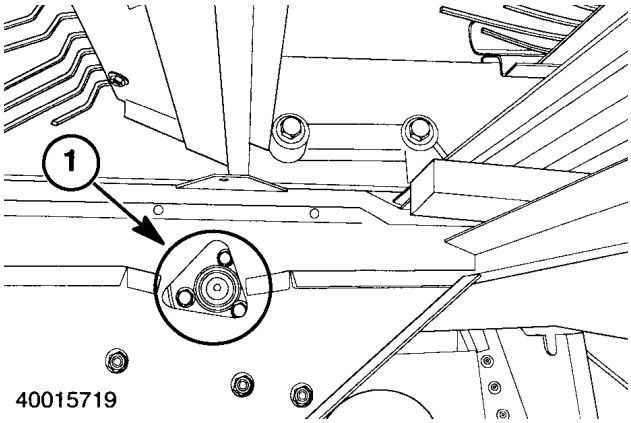
9. Place jacks under the cleaning shoe on the side to be repaired. Support the weight of the shoe with the jacks.

⚠ CAUTION ⚠

M246A - Do not depend on the lifting jacks when servicing or repairing a combine that is not attached to the tractor. Use blocks of wood to support the combine.

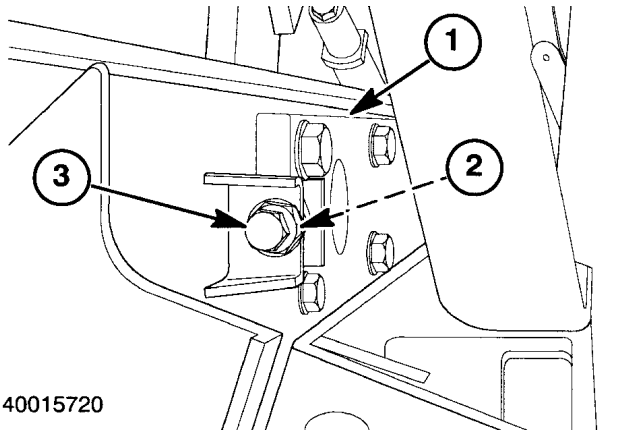
10. Carefully turn out the three cap screws **(1)** To gain access to these bolts the upper and lower sieves will need to be removed **Lower sieve - Remove (K.62.B.56 - F.10.A.10)Upper sieve - Remove (K.62.B.57 - F.10.A.10)**.

NOTE: *This step is applicable to the right side only.*



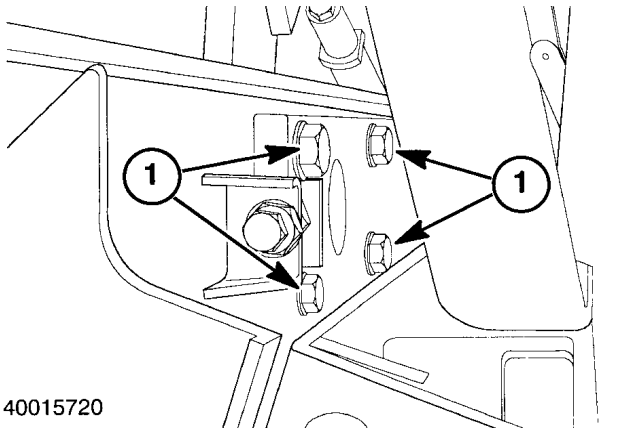
40015719g 8

11. Mark both ends of the plate **(1)** so that it can be put back into its original position. Loosen the inside jam nut **(2)**. Turn out the adjusting cap screw **(3)**.



40015720g 9

12. Turn out four cap screws and lock washers **(1)**. Lift the plate from the frame.

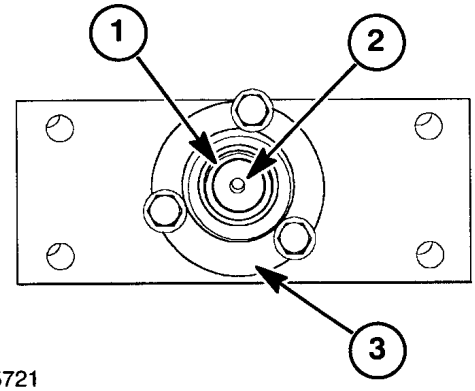


40015720x 10

https://truckmanualshub.com/

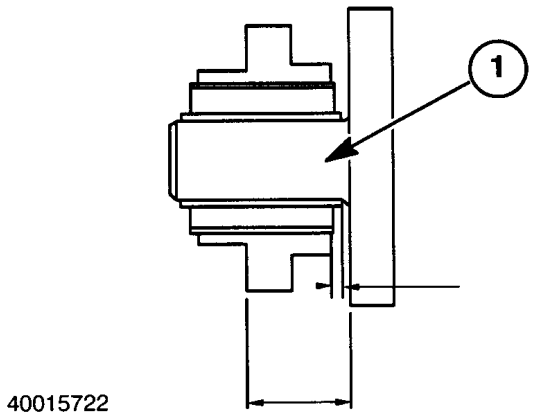
13. Using a press, remove the steel cased rubber bushing **(1)** from the rocker arm pivot pin **(2)**. Press the rocker arm mounting flange **(3)** from the bushing.

ATTENTION: *Lower Connecting Arm Bushings*



40015721g 11

14. Inspect the journal **(1)** for wear or damage. The diameter of the journal is to be **28.064 - 28.085 mm** (**1.105 - 1.106 in**). Journals with diameters less than that specified should be replaced. The rubber bushings are more likely to wear or crack. Inspect the rubber bushings and replace if worn or cracked.



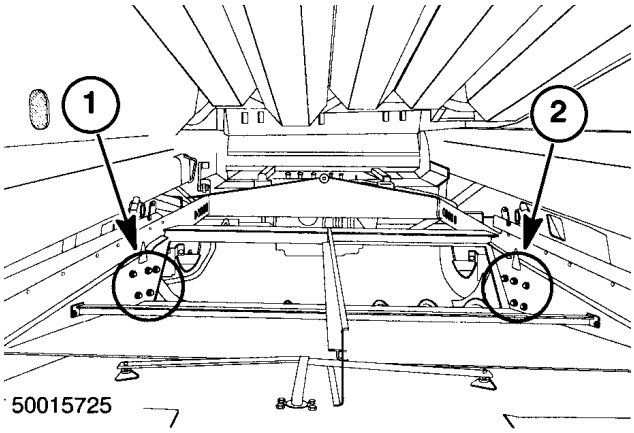
40015722 12

15. Repeat the earlier steps of removing the upper sieves and their components **Upper sieve - Remove (K.62.B.57 - F.10.A.10)**.

16. Place blocks and jacks under the shoe to support it. Use caution when proceeding with these steps as the components are heavy and unstable.

17. Carefully turn out the five cap screws at **(1)** and **(2)**.

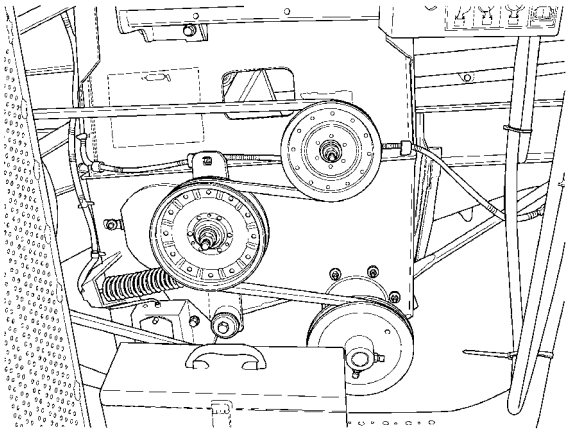
NOTE: *Additional items may be removed to better illustrate this step.*



50015725x 13

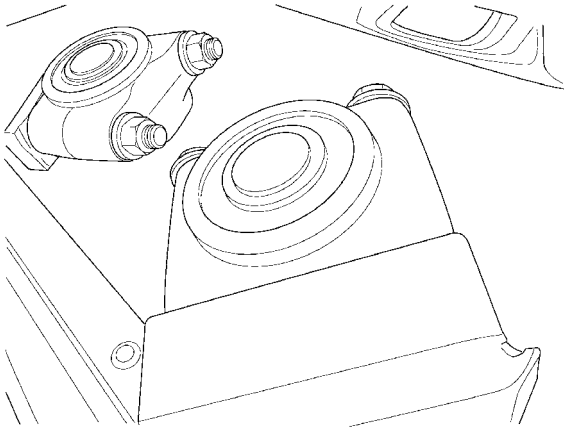
https://truckmanualshub.com/

18. Turn out two cap screws **(1)**. Remove the lower connecting arm bushing cap **(2)** and mounting plate **(3)** from the right side of the combine. Repeat this step for the left side of the combine



10036376 14

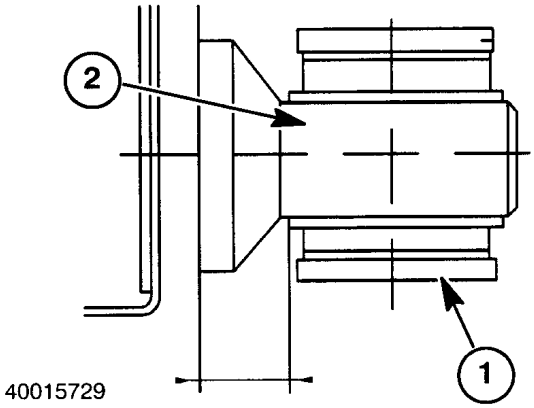
19. Bushings are inside the access hole on the left hand side of the machine.



10036373 15

20. Using a press, remove the steel cased rubber bushing **(1)** from the mounting plate journal **(2)**.

NOTE: *Inspect the journal **(1)** for wear or damage. The diameter of the journal is to be **28.064 - 28.085 mm** (**1.105 - 1.106 in**) . Journals with diameters less than that specified should be replaced.*



40015729x 16

https://truckmanualshub.com/

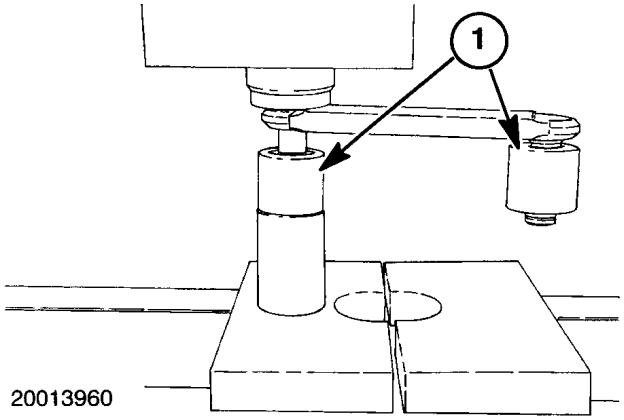
Lower sieve drive system - Install (K.62.B.41 - F.10.A.15)

AFX8010

Cleaning shoe support arm bushings

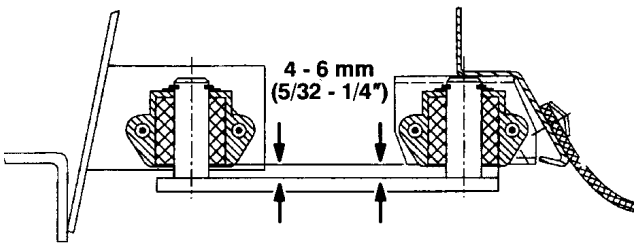
NOTE: *Depending on the support arm being repaired, a specific distance is required between the bottom of the bushing and surface of the support arm. The following steps describe this measurement for the particular support arm being repaired.*

1. Press on new bushings **(1)**.



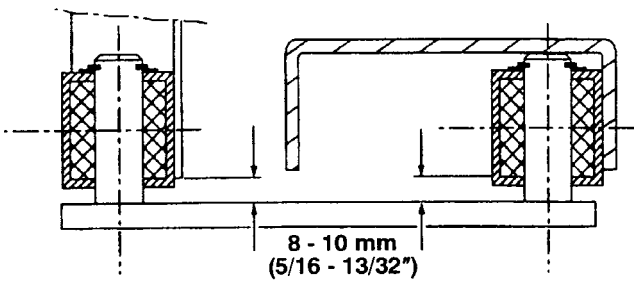
20013960 1

2. For grain pan support arm, maintain a distance of **4 - 6 mm** (**5/32 - 1/4 in**) between the bottom of the bushing and the surface of the support arm.



20013961x 2

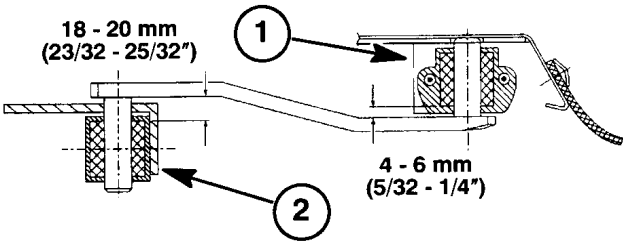
3. For lower shoe support arm, maintain a distance of **8 - 10 mm** (**5/16 - 13/32 in**) between the bottom of the bushing and the surface of the support arm.



20015692j 3

https://truckmanualshub.com/

4. For the upper support arm, shoe connection**(1)** maintain a distance of **4 - 6 mm** (**5/32 - 1/4 in**) between the bottom of the bushing and surface of the support arm.



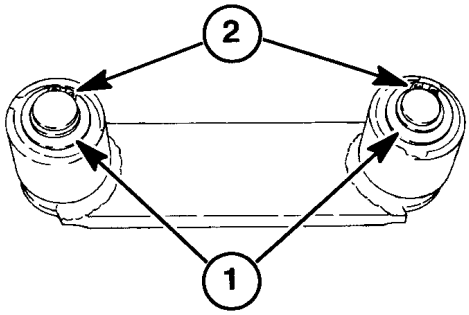
20013962

20013962x 4

5. For the upper shoe support arm, frame connection **(2)** maintain a distance of **18 - 20 mm** (**23/32 - 25/32 in**) between the bottom of the bushing and surface of the support arm.

6. Set the washers **(1)** into place on the journals. Install the snap rings **(2)**to secure the washers on the support arms.

NOTE: *The upper shoe support arms do not have washers and snap rings.*

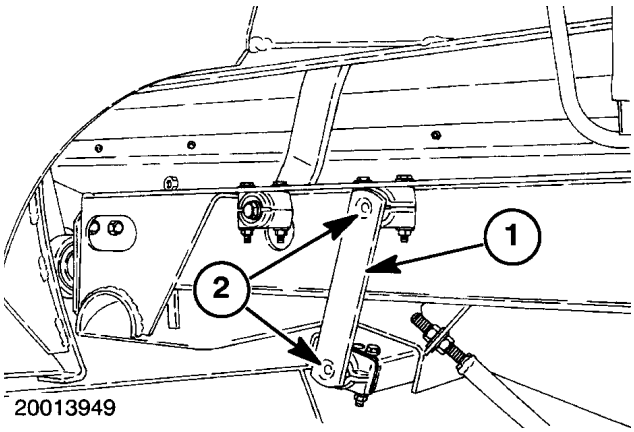


20013963

20013963b 5

7. Attach the support arm **(1)** using the hardware and clamps **(2)**previously removed. Rotate the leveling frame as required to gain access to the support arm attachment points. Do not tighten the hardware until instructed to do so.

NOTE: *Anytime a rubber bushing is replaced, the drive arm must be in the neutral position prior to tightening the clamp.*

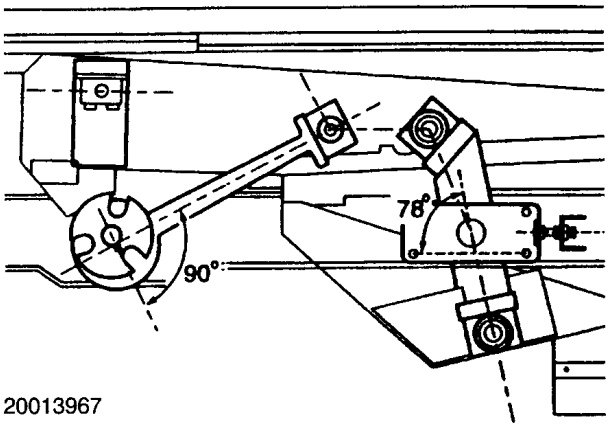


20013949

20013949b 6

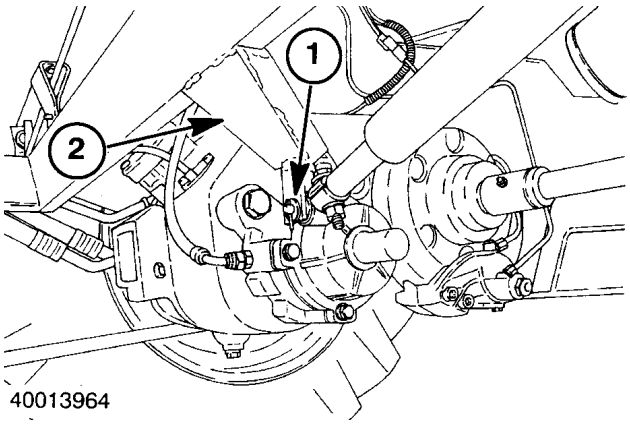
https://truckmanualshub.com/

8. Position the drive arms so that the keyway is perpendicular tot he arm, this is known as the neutral position. Tighten the bushing clamp hardware while holding the drive arm in the neutral position.



20013967a-2 7

9. If the leveling frame positioning motor had been disconnected, attach the motor at **(1)** to the frame**(2)**.



40013964z 8

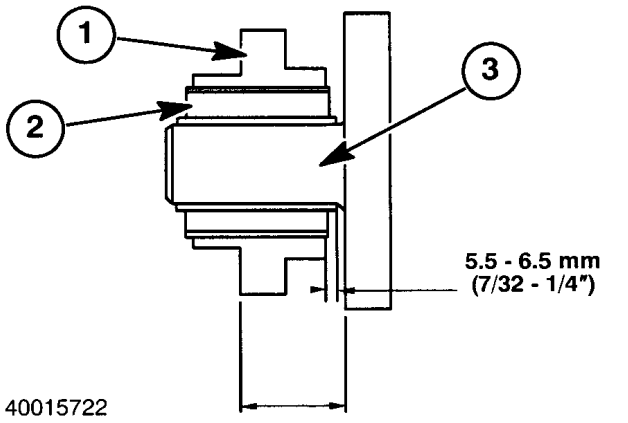
https://truckmanualshub.com/

Lower sieve drive system - Assemble (K.62.B.41 - F.10.A.20)

AFX8010

1. Press the rocker arm mounting flange **(1)** onto a new metal cased rubber bushing **(2)** until the bottom of the flange is **5.5 - 6.5 mm** (**7/32 - 1/4 in**) from the bottom of the center metal insert of the bushing.

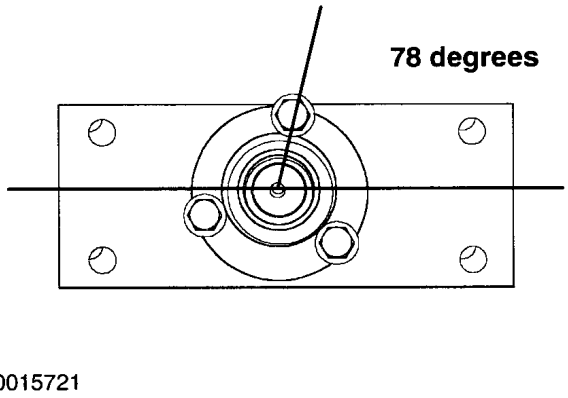
ATTENTION: *Remember to use jacks and blocks under the cleaning shoe for support, if not used, personal injury can result.*



40015722x 1

2. Orient the flange bushing assembly so that the rocker arm will be at a 78 degree angle when attached.

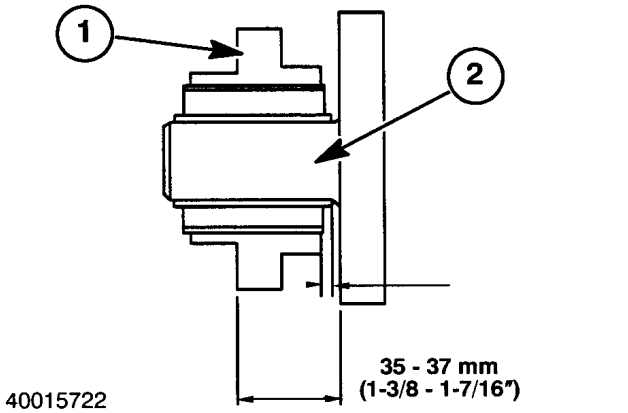
NOTE: *The left side is shown, the right side will be opposite.*



40015721x 2

3. Press the flange bushing assembly **(1)** onto the pivot pin **(2)** until the top of the flange is **35 - 37 mm** (**1-3/8 - 1-7/16 in**) from the top of the mounting plate.

NOTE: *Right side shown. Left side is similar.*

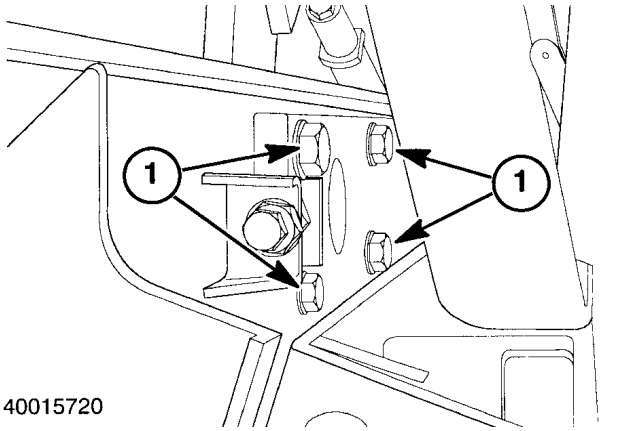


40015722z 3

4. Set the pivot plate against the frame.

https://truckmanualshub.com/

5. If installing the left pivot plate, secure the plate using four previously removed cap screws and lock washers **(1)**.



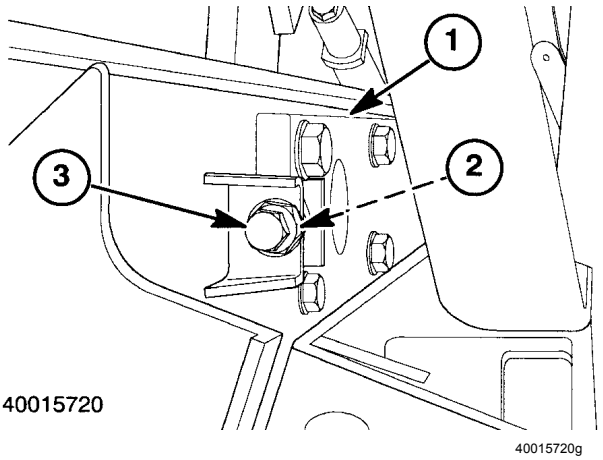
6. If installing the right pivot plate, tighten the hardware only enough to hold the plate steady.

NOTE: *Right side shown.*

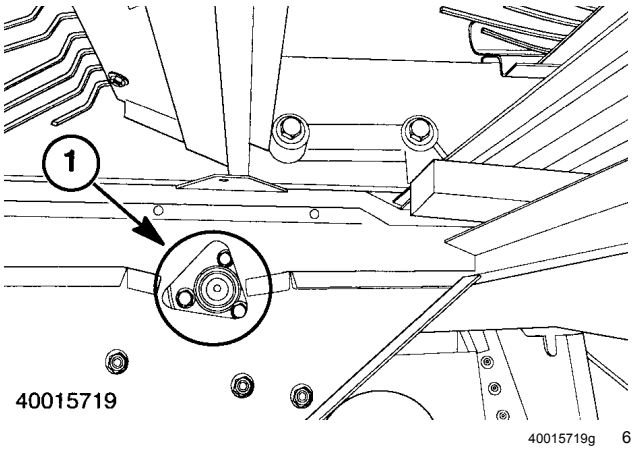
7. Turn in adjusting cap screw **(1)** until it is seated tight in the plate **(2)**. Set the plate into its previously known position by turning nuts **(3)** and **(4)**. Tighten all hardware.

⚠ CAUTION ⚠

M469 - The jack stands are installed for safety. Do not remove the jack stands at this time.



8. Install the previously removed cap screws and lock washers **(1)**.

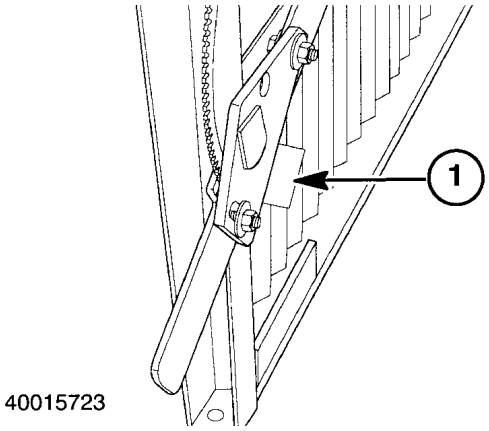


9. Remove the jacks that were supporting the cleaning shoe.

NOTE: *Optional remotely operated sieves only.*

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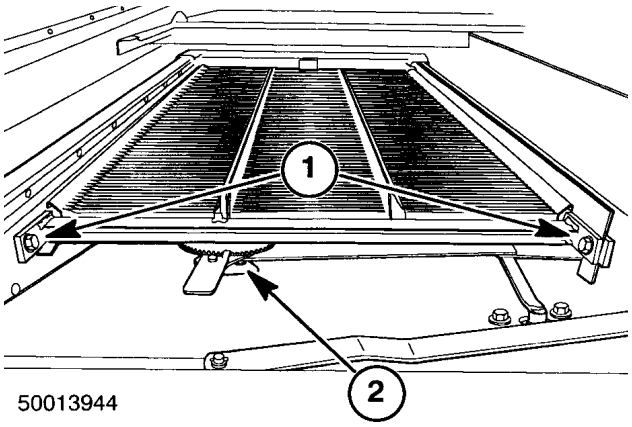
10. The sieves with welded tabs **(1)** are manufactured to be installed on the left side of the shoes.



40015723 7

11. Slide the appropriate sieves onto the lower shoe. Secure the sieves onto place using the previously removed hardware **(1)**.

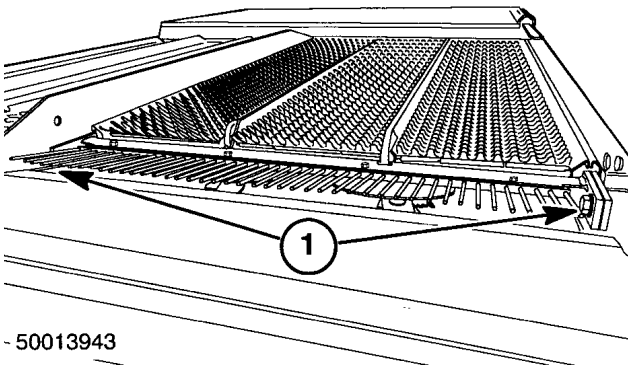
NOTE: *Optional remotely operated sieves only.*



50013944a 8

12. Attach the positioning mechanism **(2)**.

13. Slide the appropriate sieves onto the upper shoe. Secure the sieves into place using the previously removed hardware. **(1)**



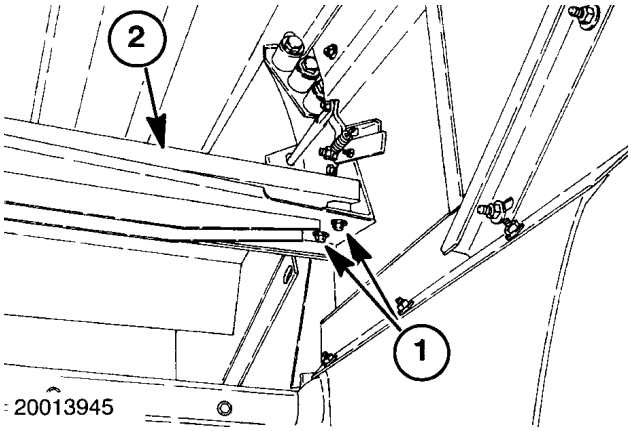
50013943a 9

14. Attach the positioning mechanism.

https://truckmanualshub.com/

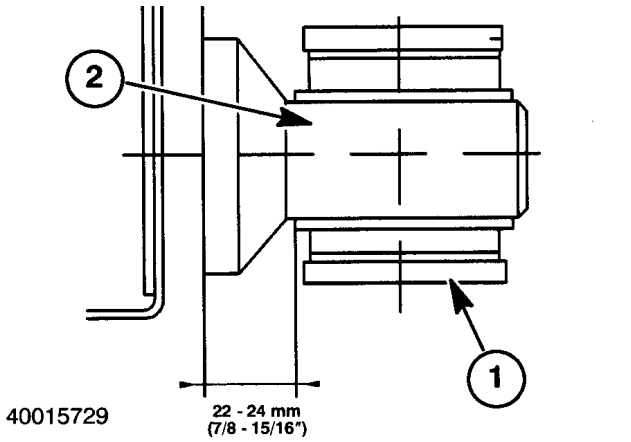
15. Set the grain sensing pad **(1)** into position and secure using the four locknuts **(2)** previously removed. Plug in the sensing pad electrical connector.

ATTENTION: *Lower Connecting Arm Bushings Install*



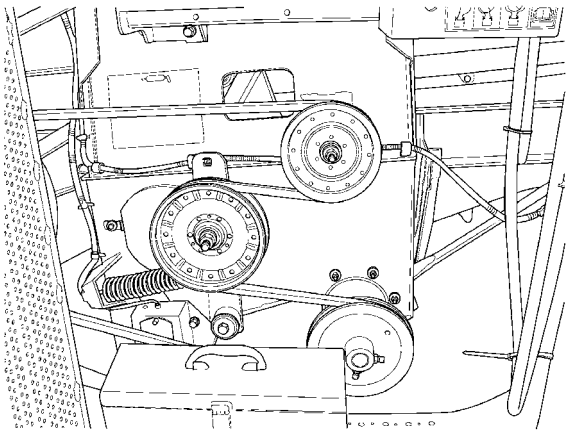
20013945 10

16. Press the new bushing **(1)** onto the journal **(2)** until the bottom of the center metal insert is **22 - 24 mm** (**7/8 - 15/16 in**) from the surface of the mounting plate.



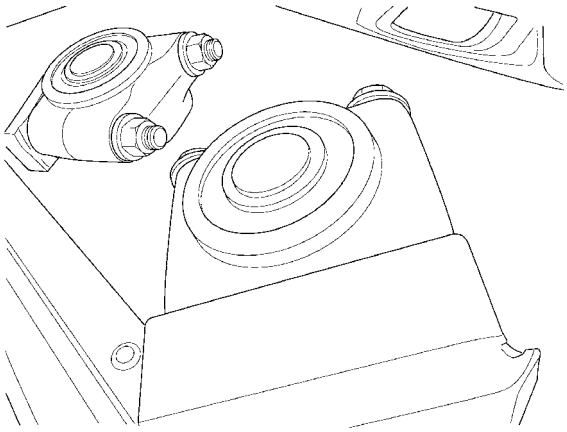
40015729z 11

17. Attach the mounting plate **(1)** to the lower cleaning shoe with the previously removed hardware.



10036376 12

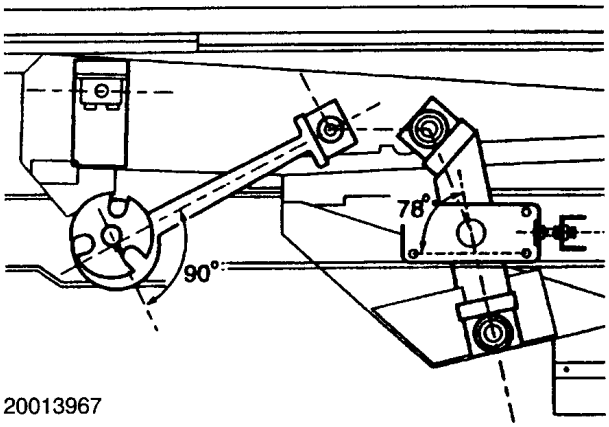
18. Install bushing cap **(2)** on both sides of the combine. Do not tighten the hardware.



10036373 13

https://truckmanualshub.com/

19. Position the drive arms so that the keyway is perpendicular to the arm, this is known as the neutral position. Tighten the bushing clamp hardware while holding the drive arm in the neutral position.

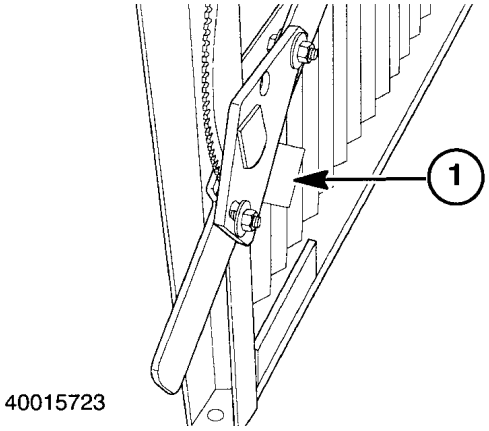


20013967A 14

20. Release the drive arm from the neutral position.

NOTE: *Optional remotely operated sieves only.*

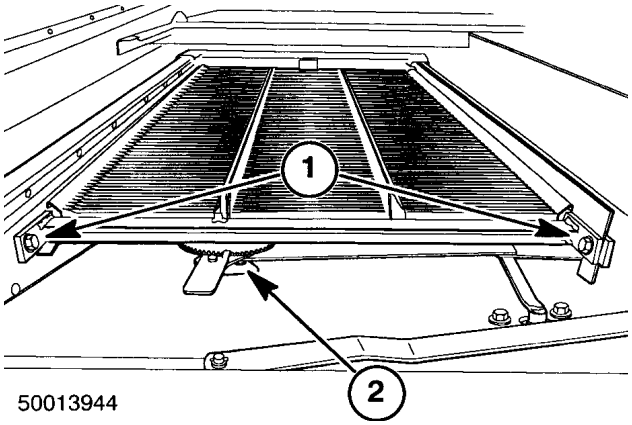
21. The sieves with welded tabs **(1)** are manufactured to be installed on the left side of the shoes.



40015723 15

22. Slide the appropriate sieves onto the lower shoe. Secure the sieves into place using the previously removed hardware **(1)**.

NOTE: *Optional remotely operated sieves only.*



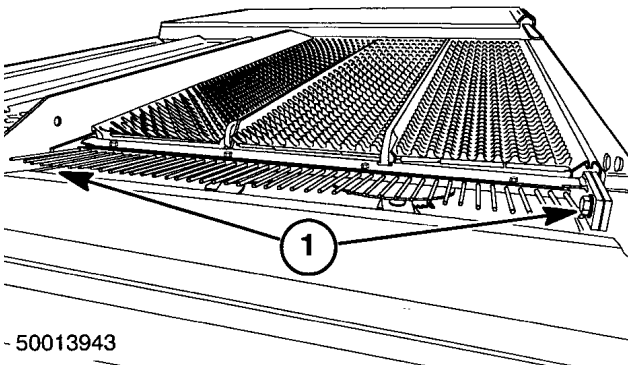
50013944a 16

23. Attach the positioning mechanism **(2)**.

https://truckmanualshub.com/

24. Slide the appropriate sieves onto the upper shoe. Secure the sieves into place using the previously removed hardware **(1)**.

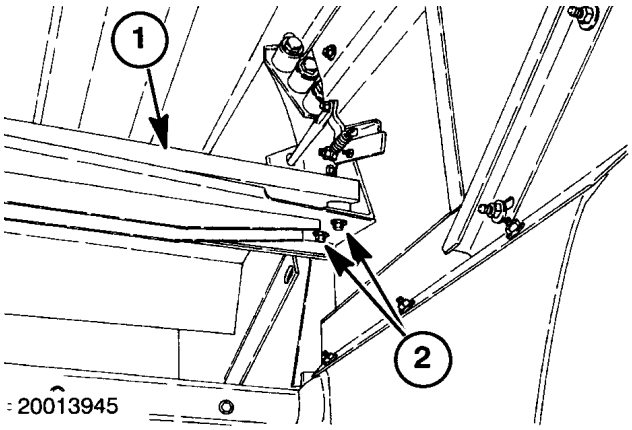
NOTE: *Optional remotely operated sieves only.*



50013943a 17

25. Attach the positioning mechanism.

26. Set the grain sensing pad **(1)** into position and secure using the four locknuts **(2)** previously removed. Plug in the sensing pad electrical connector.



20013945a 18

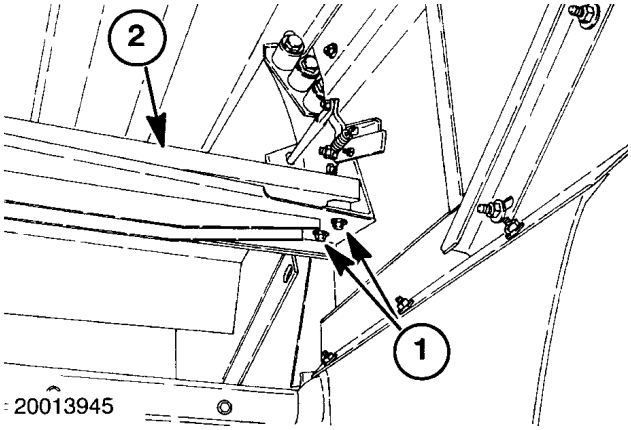
https://truckmanualshub.com/

Upper sieve drive system - Remove (K.62.B.42 - F.10.A.10)

AFX8010

1. Unplug the grain sensing pad electrical connector. Turn off four locknuts **(1)**. Lift the sensing pad **(2)** from the combine.

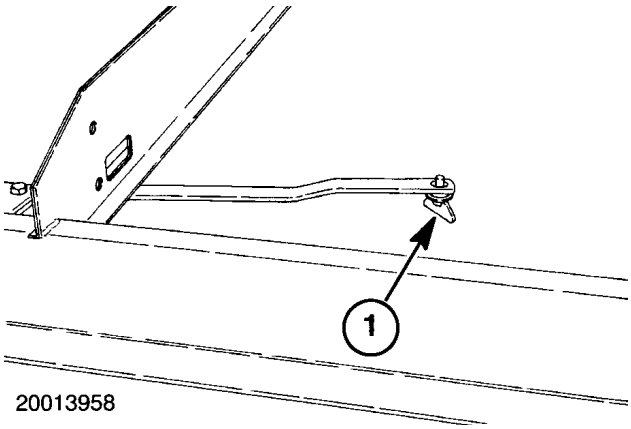
NOTE: *Optional remotely operated sieves only.*



20013945 1

2. Disengage the adjusting arms at **(1)** from the left and right sieves.

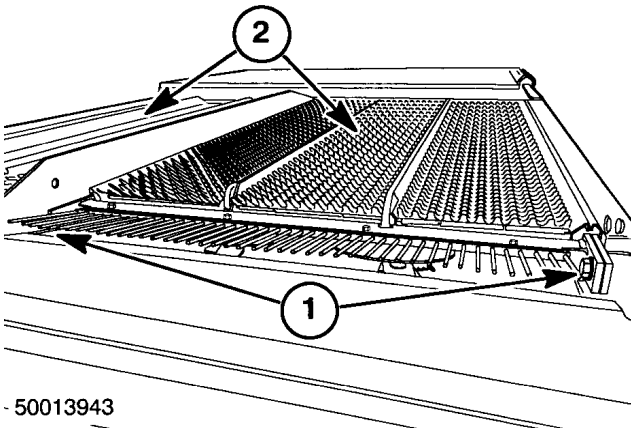
NOTE: *The sieves are shown removed to be better illustrate the attaching mechanism.*



20013958 2

3. Turn out three cap screws **(1)** and slide the upper sieves **(2)** from the combine.

NOTE: *Optional remotely operated sieves only.*

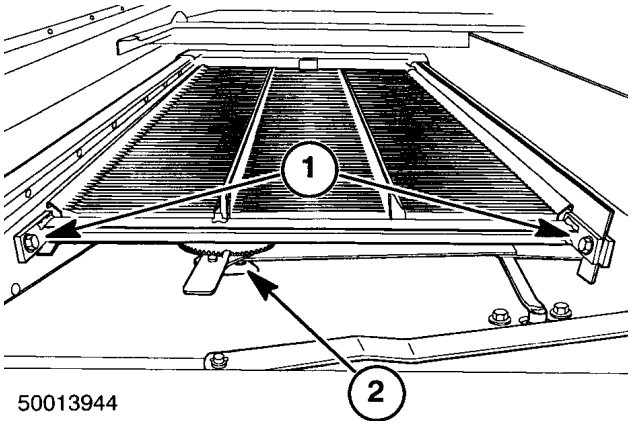


50013943 3

https://truckmanualshub.com/

4. Disengage the adjusting arms from the left and right sieves at **(1)** (left side shown).

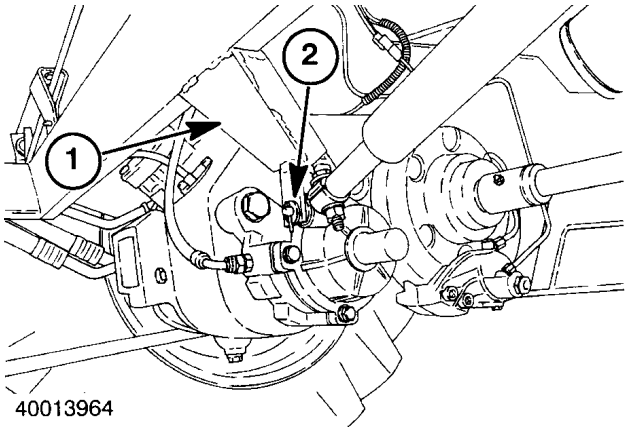
NOTE: *All models*



50013944a 4

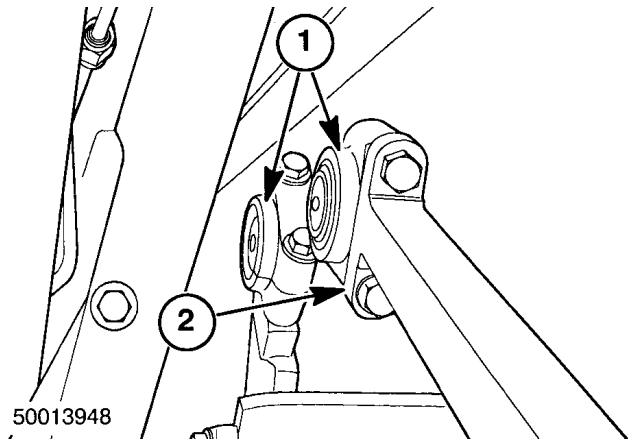
5. Turn out three cap screw **(2)** and slide the lower sieves from the combine.

6. Disengage the leveling frame **(1)** from the positioning motor at **(2)**.



40013964 5

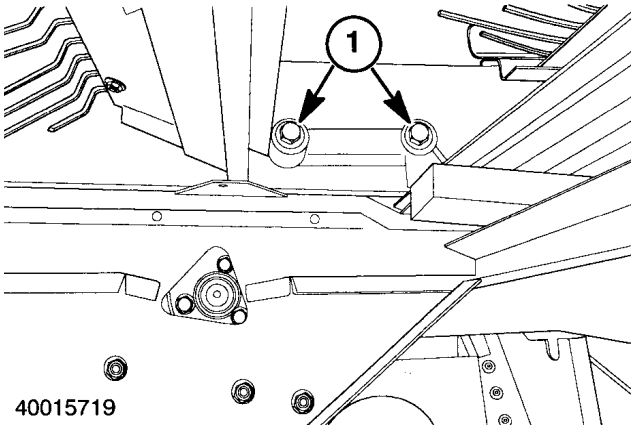
7. Rotate the leveling frame to make the appropriate side accessible. Turn out cap screws **(1)** or **(2)**, and remove the bushing cap from the arm.



50013948a 6

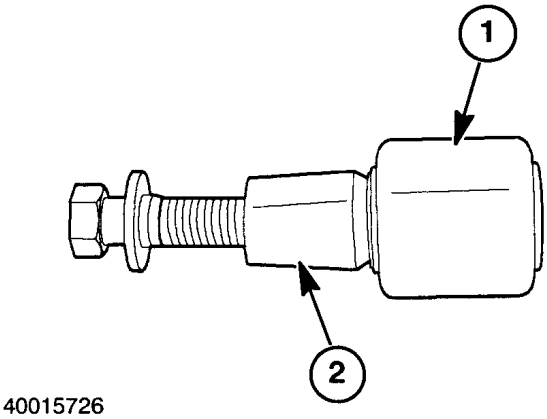
https://truckmanualshub.com/

8. Turn out the appropriate cap screw **(1)** several turns. Apply blows using a mallet to the head of the cap screw to force the bushing and pin from the upper shoe frame. Continue until the pin can be removed from the frame.



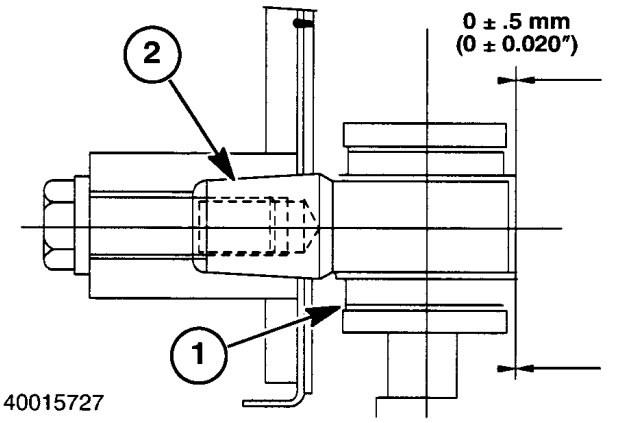
40015719 7

9. Press the bushing **(1)** from the pin **(2)**.



40015726 8

10. Inspection. Inspect the journal **(2)** for wear or damage. The diameter of the journal is to be **28.064 - 28.085 mm** (**1.105 - 1.106 in**) . Journals with diameters less than specified should be replaced.



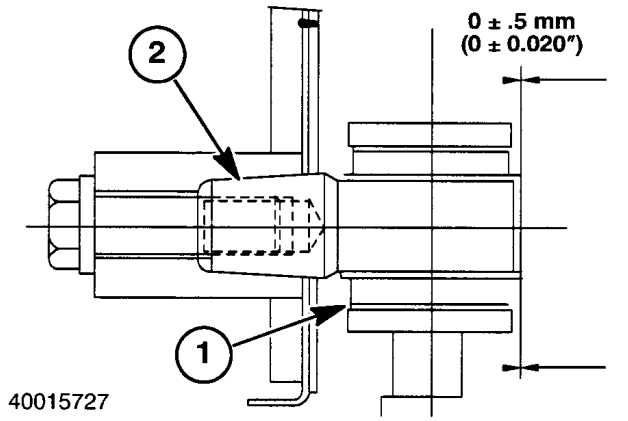
40015727 9

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Upper sieve drive system - Install (K.62.B.42 - F.10.A.15)

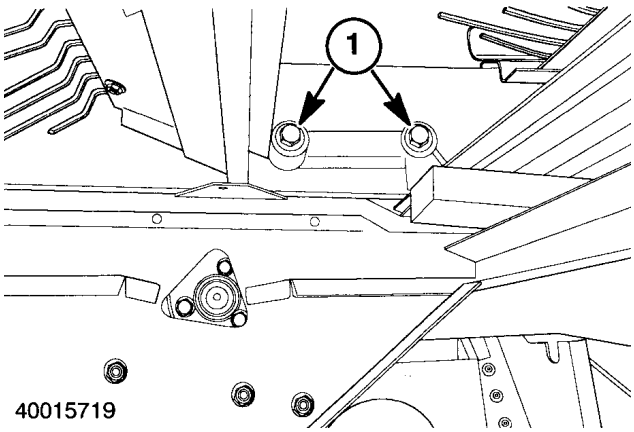
AFX8010

1. Press the new bushing **(1)** onto the pin **(2)** until the center metal insert of the bushing is flush plus or minus +/- .5 mm (+/- 0.020") with the top pin.



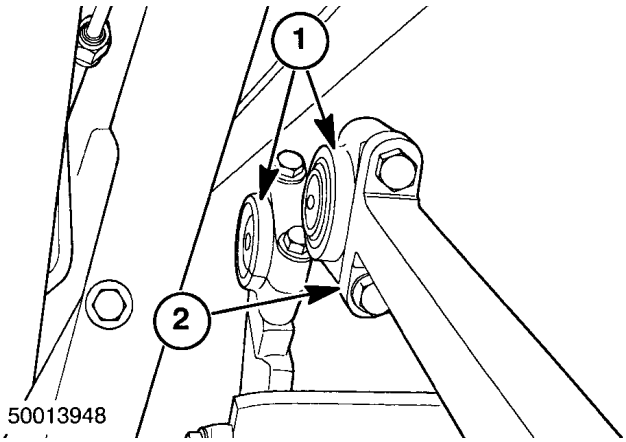
40015727 1

2. Install the bushing assembly with the previously removed cap screw at **(1)**. Torque the cap screw to **150 - 170 Nm(111 - 125 lb ft)**.



40015719 2

3. Rotate the leveling frame to make the appropriate side accessible. Install the arm clamp**(1)** onto the bushing.



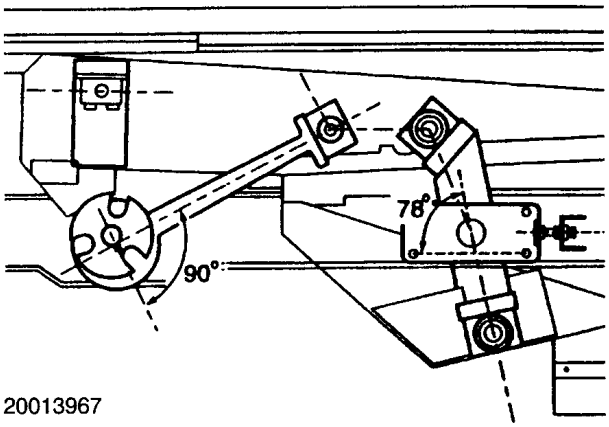
50013948a 3

4. Do not tighten the hardware until instructed.

NOTE: *a spacer is to be installed between the drive arm and clamp at* ***(2)****.*

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5. Turn the eccentric drive shaft until the drive arm is on the lowest leg of travel. Position the shaft key and center line of the drive arm perpendicular (90 degree angle) to each other. This is known as the neutral position.

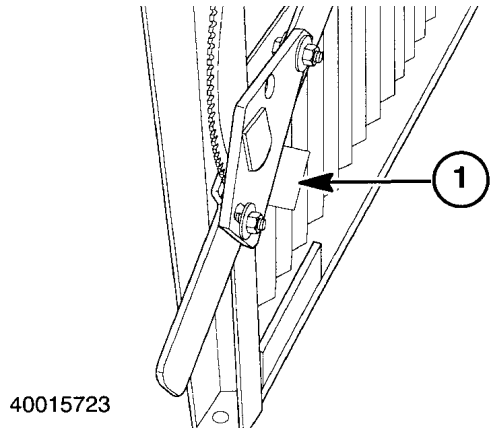


20013967a-2 4

6. Lock or hold the shaft in the neutral position until instructed to release it.
7. Tighten the hardware for the drive or connecting arm bushing caps.
8. Release the lock or hold from the eccentric drive shaft.

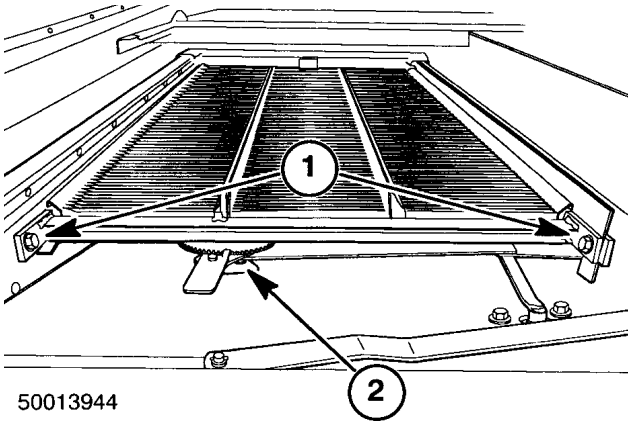
NOTE: *Optional remotely operated sieves only.*

9. The sieves with welded tabs **(1)** are manufactured to be installed on the left side of the shoe.



40015723 5

10. Slide the appropriate sieves onto the lower shoe. Secure the sieves into place using the previously removed hardware **(1)**.



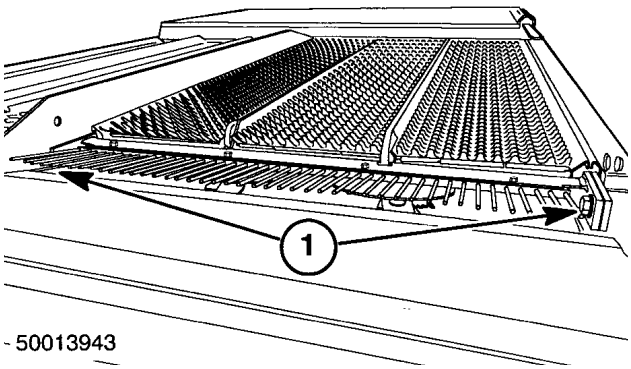
50013944a 6

11. Attach the positioning mechanism **(2)**.

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12. Slide the appropriate sieves onto the upper shoe. Secure the sieves into place using the previously removed hardware **(1)**.

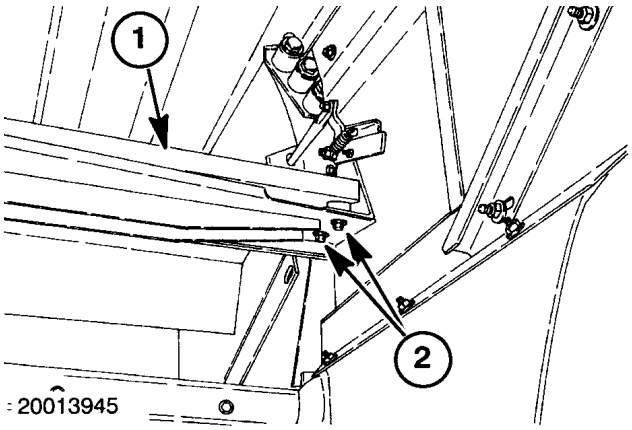
NOTE: *Optional remotely operated sieves only.*



50013943a 7

13. Attach the positioning mechanism.

14. Set the grain sensing pad **(1)** into position and secure using the four locknuts **(2)** previously removed. Plug in the sensing pad electrical connector.



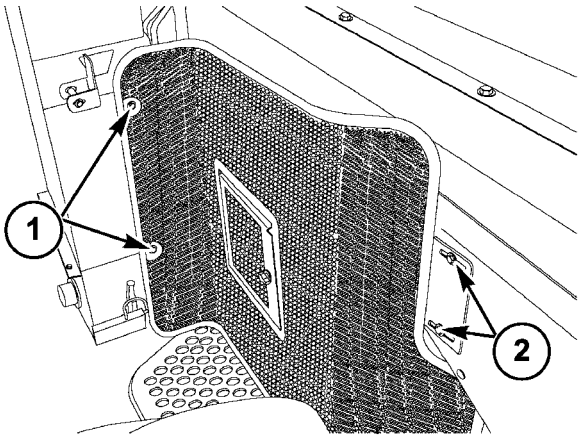
20013945a 8

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Fan - Remove (K.62.B.52 - F.10.A.10)

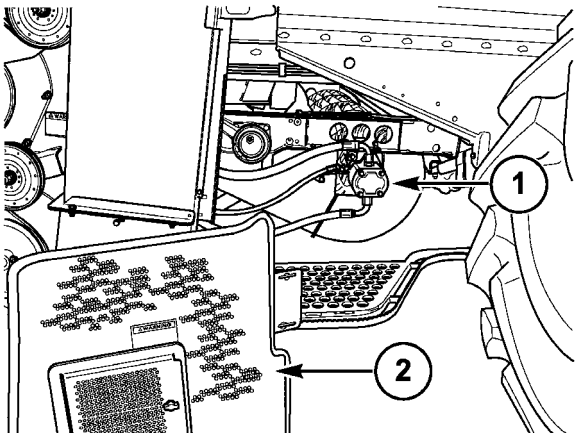
AFX8010

1. Remove the shield on the right hand side of the machine by removing the bolts **(1)** and **(2)**.



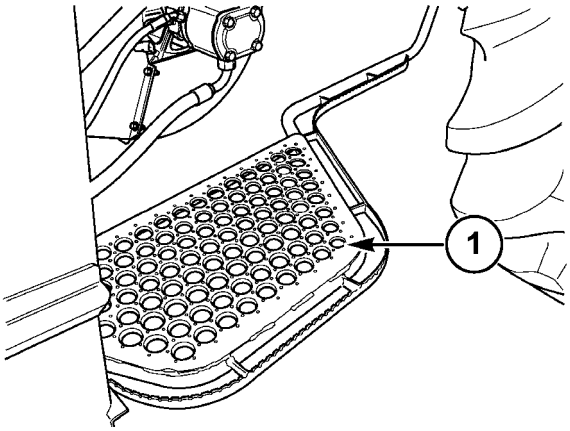
40036380A5 1

2. Once the shield **(2)** is removed you have access to the cleaning fan motor **(1)**.



10042950A5 2

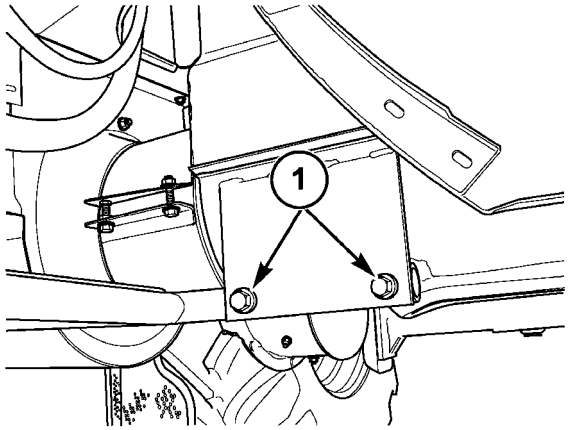
3. Remove the platform **(1)** from the machine for access when removing the fan.



10042951A5 3

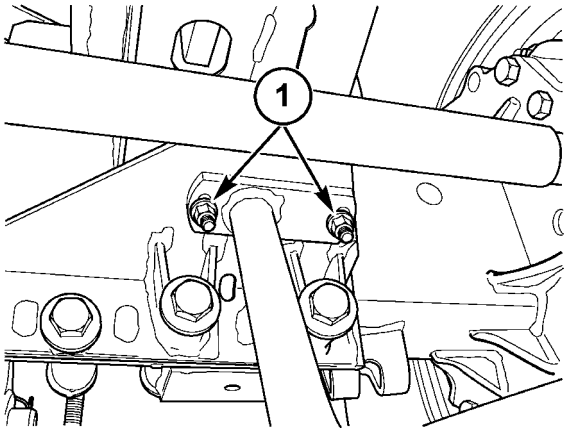
https://truckmanualshub.com/

4. Remove the two bolts **(1)** from the rear of the platform support.



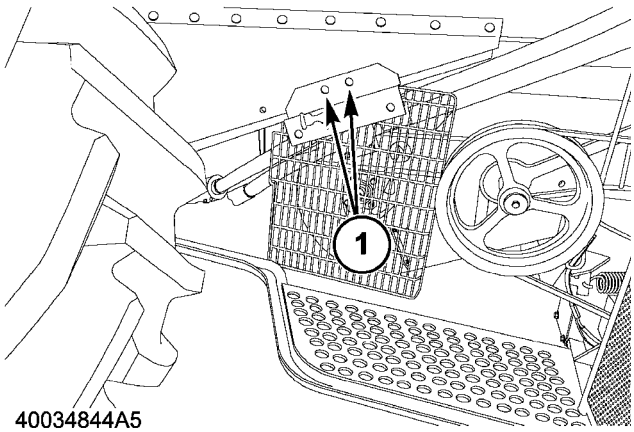
10042952A5 4

5. Remove the two bolts **(1)** from the front of the platform.



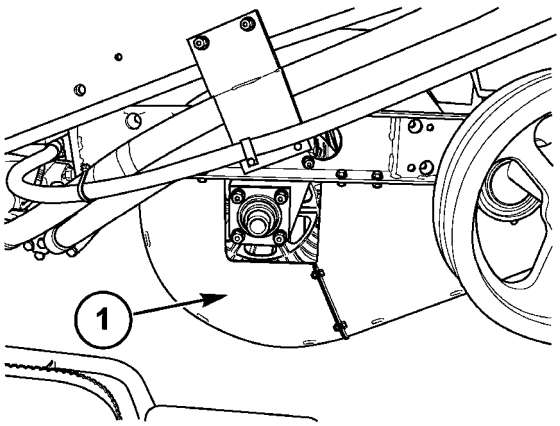
10042953A5 5

6. Remove the shield on the left hand side of the machine by removing the two bolts **(1)**.



40034844A5 6

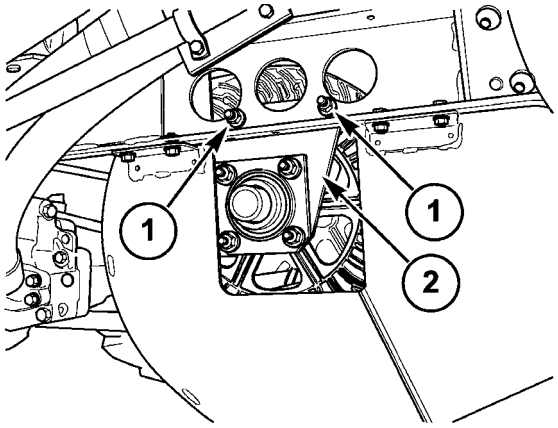
7. Once the left hand side shield is removed you have access to the fan **(1)**.



10042954A5 7

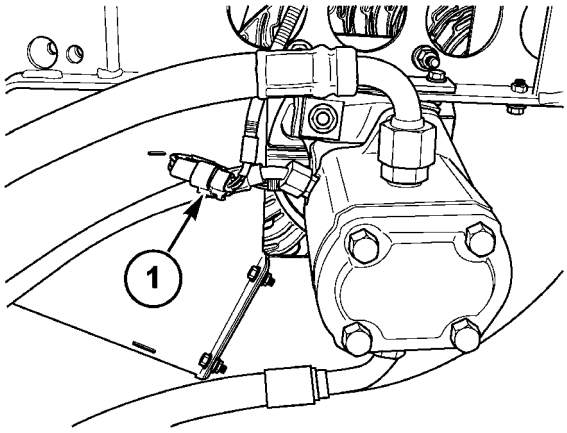
https://truckmanualshub.com/

8. Remove the two bolts **(1)** from the shaft bearing flange support **(2)** on the left hand side.



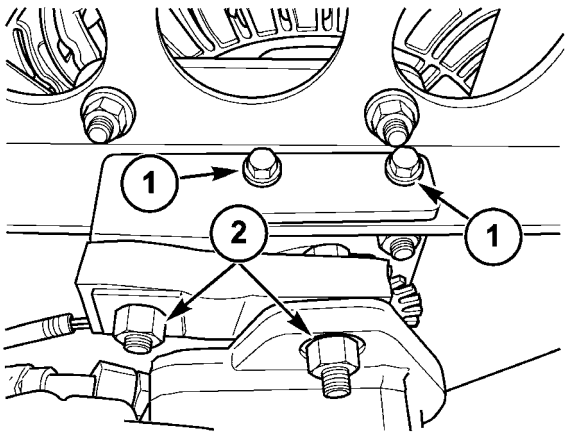
10042955A5 8

9. Disconnect the electrical sensor connection **(1)** to the motor.



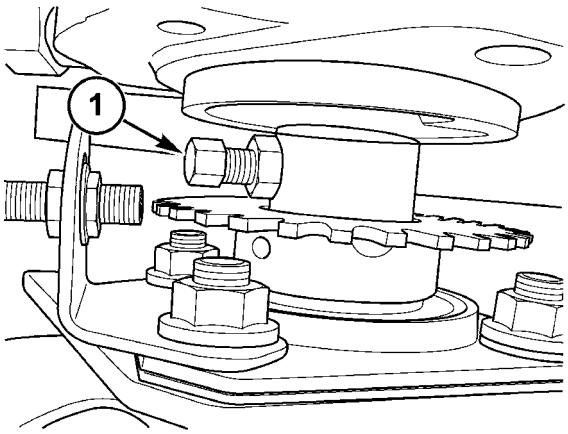
10042956A5 9

10. Remove the bolts **(1)**, and **(2)** attaching the isolator to the motor and the frame.



10042957A5 10

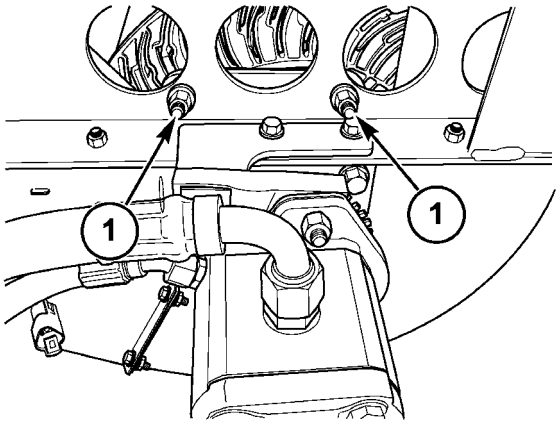
11. Remove the set screw **(1)** from the motor shaft.



10042958A5 11

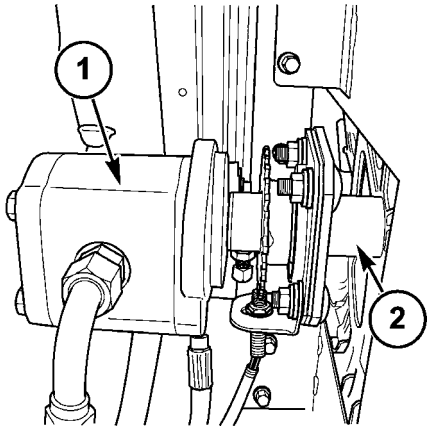
https://truckmanualshub.com/

12. Remove the two bolts **(1)** from the shaft bearing support flange.



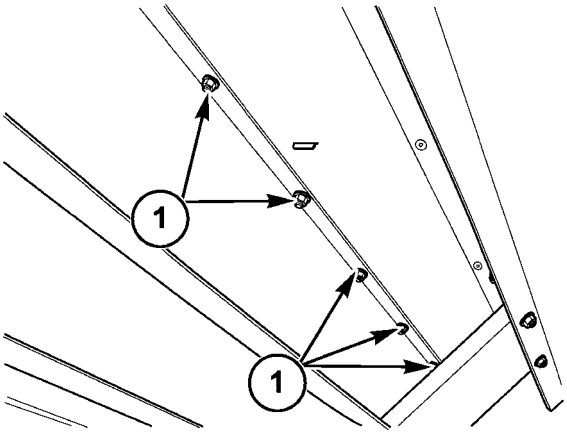
10042959A5 12

13. Remove the hydraulic motor **(1)** from the fan shaft **(2)**.



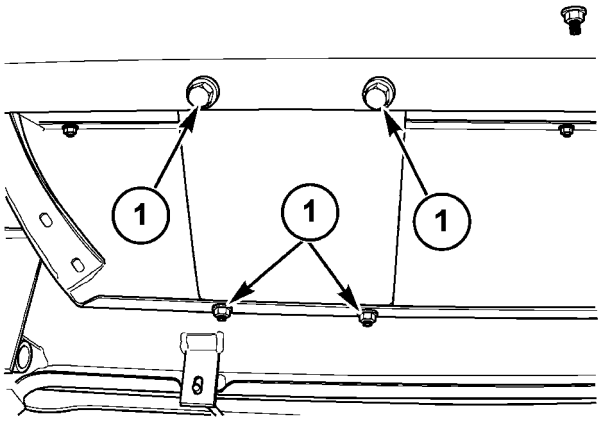
10042960A5 13

14. Remove the eight bolts **(1)** from the rear of the housing.



10042961A5 14

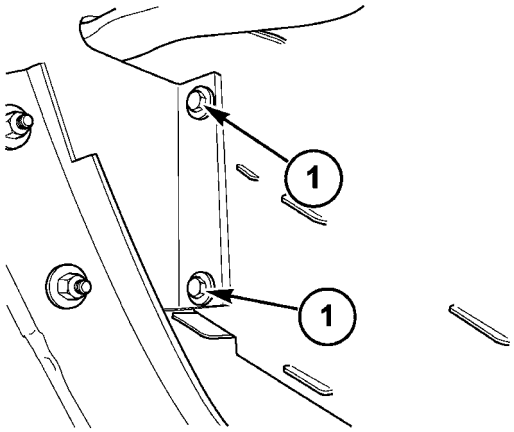
15. Remove the four bolts **(1)** from each of the two support brackets.



10042962A5 15

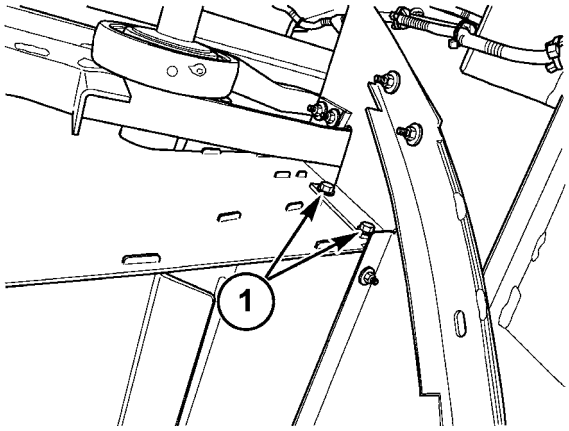
https://truckmanualshub.com/

16. Remove the two bolts **(1)** from the right hand side rear of the fan housing.



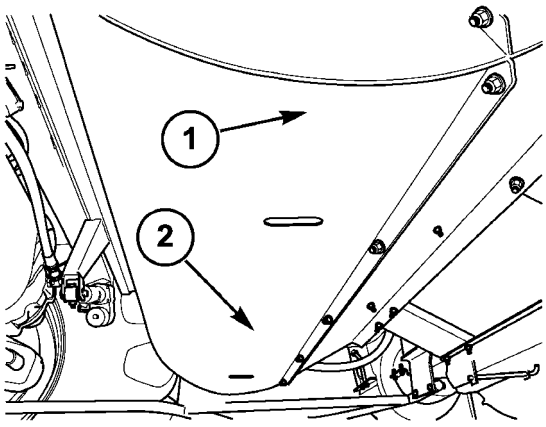
10042963A5 16

17. Remove the two bolts **(1)** from the left hand side rear of the fan housing.



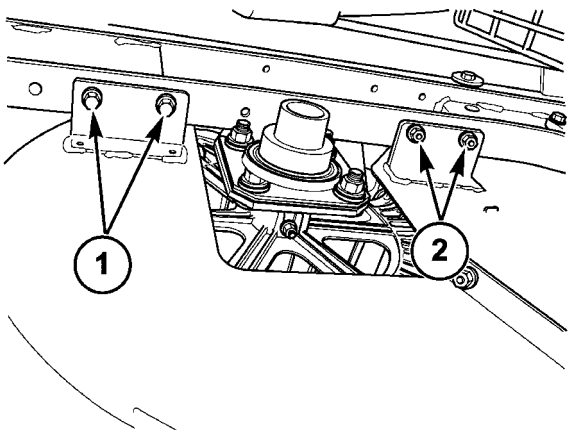
10042964A5 17

18. Place a floor jack on each side of the fan housing, in positions **(1)** and **(2)**. Use the help of an assistant to lower the fan evenly when the remaining bolts are removed in the following steps.



10042965A5 18

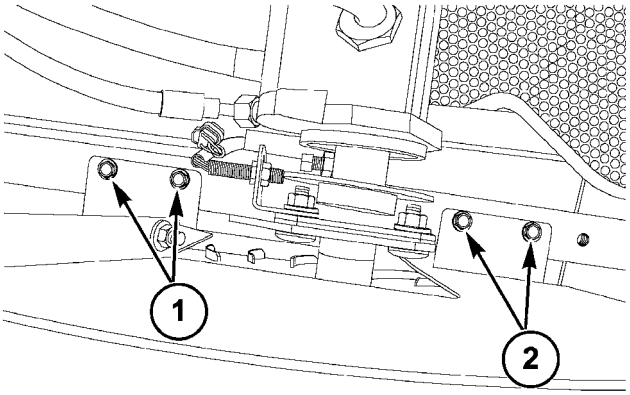
19. Remove the remaining four bolts **(1)**, and **(2)** from the left hand side of the fan housing from the front and rear brackets.



10042966A5 19

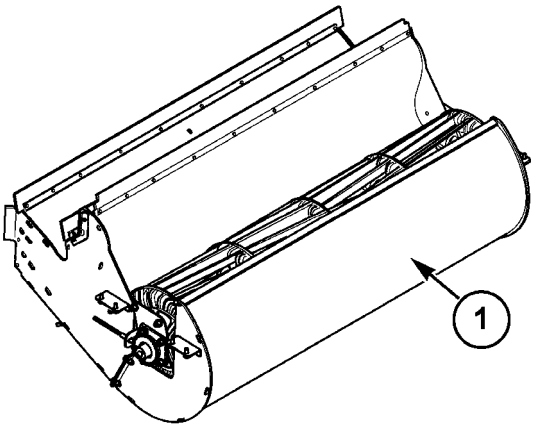
https://truckmanualshub.com/

20. Remove the remaining four bolts **(1)**, and **(2)** from the right hand side of the fan housing from the front and rear brackets.



40036382A5 20

21. Lower the fan housing **(1)** from the machine evenly on the floor jacks. Once the fan is lowered, slide it out from under the machine on the right hand side of the machine where the platform was removed.



10041926A5 21

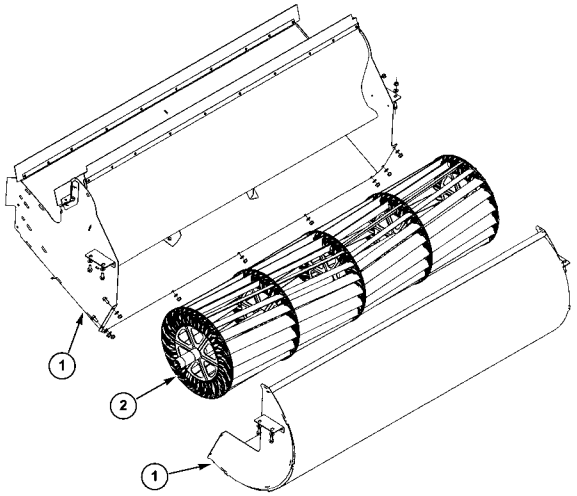
https://truckmanualshub.com/

Fan - Disassemble (K.62.B.52 - F.10.A.25)

AFX8010

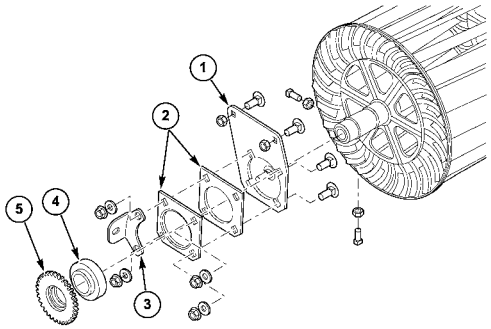
Prior operation: Fan - Remove (K.62.B.52 - F.10.A.10)

1. Remove the nine M8 x 20mm bolts from the two piece fan housing **(1)** to separate the halves from the fan **(2)**.



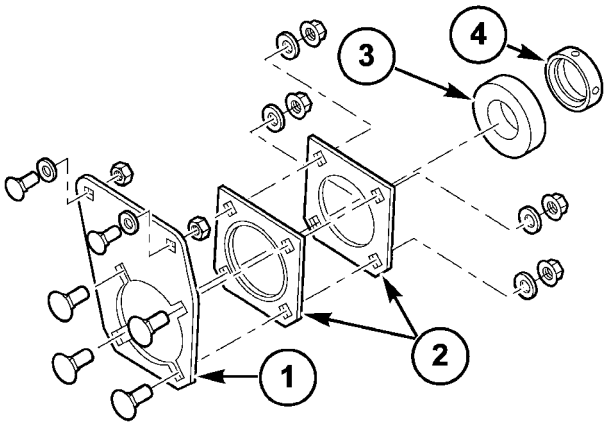
50042974A5 1

2. When the fan assembly is out of the housing remove the speed sensor, pickup lock collar **(5)**, and sensor bracket **(3)** from the right hand side of the fan assembly. Remove the four M12 x 35mm bolts securing the flangettes **(2)** to the bearing **(4)** and support bracket **(1)** on the right hand side.



50042972A5 2

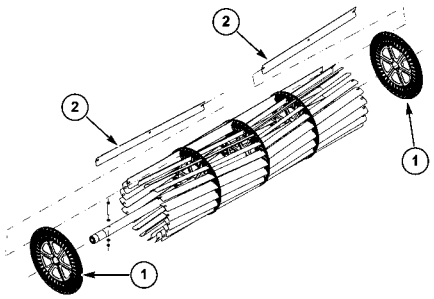
3. Remove the bearing lock collar **(4)**, bearing **(3)**, flangettes **(2)**, and bearing support bracket **(1)** from the fan assembly shaft on the left hand side.



50042973A5 3

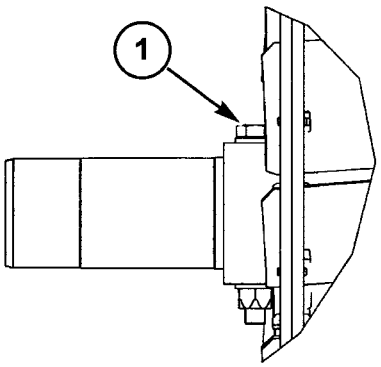
https://truckmanualshub.com/

4. To remove the fan blades **(2)** from the discs **(1)**, unlatch the blades from the disc catch, and slide out.



50042967A5 4

5. To remove the discs from the shaft remove the M8 x 75mm bolts **(1)** from each disc, and slide them off the shaft.



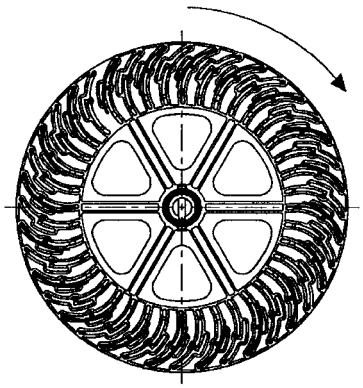
50042969 5

https://truckmanualshub.com/

Fan - Assemble (K.62.B.52 - F.10.A.20)

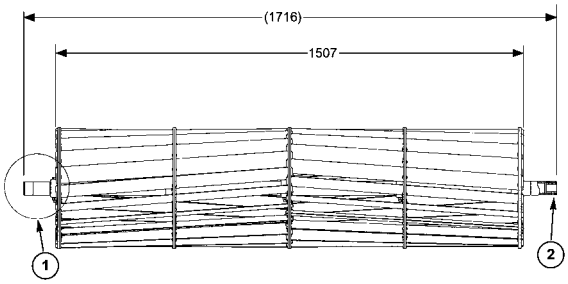
AFX8010

1. The discs must be assembled on the shaft with blade retaining holes inclined in the direction of rotation as shown.



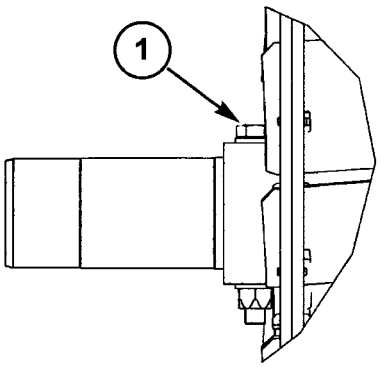
50042970 1

2. The discs must be spaced on the shaft **361 mm** (**14.2 in**) apart from the inside edges of the discs to install the M8 x 75mm bolt to secure them to the shaft.



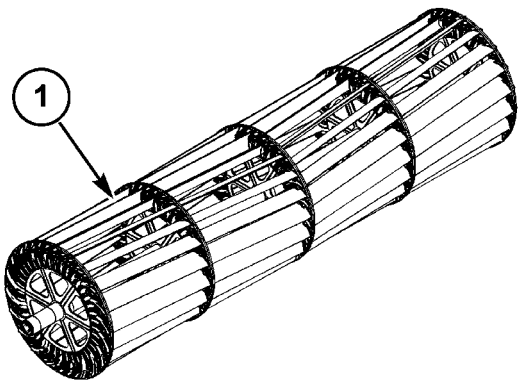
50042971 2

3. Torque the lock nut **(1)** to **10 - 15 Nm** (**7 - 11 lb ft**) .



50042969 3

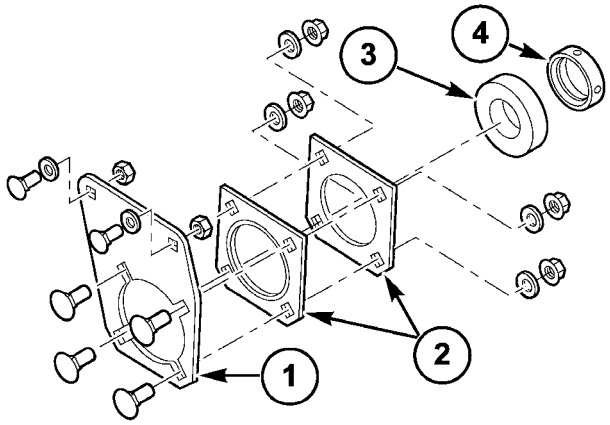
4. The blades **(1)** are not to be installed straight. Blades are to be installed in a chevron pattern with center advanced in direction of rotation by two openings. The blades will snap into place when they are fully inserted into the openings.



50042968A5 4

https://truckmanualshub.com/

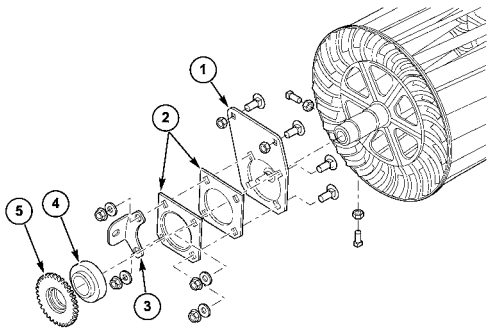
5. Starting with the left hand side of the fan assembly install the flange bracket **(1)**, bearing **(3)**, and flangettes **(2)** with the four M12 x 35mm bolts to clamp the bearing in place. Install the lock collar **(4)** and tighten in the direction of rotation.



50042973A5 5

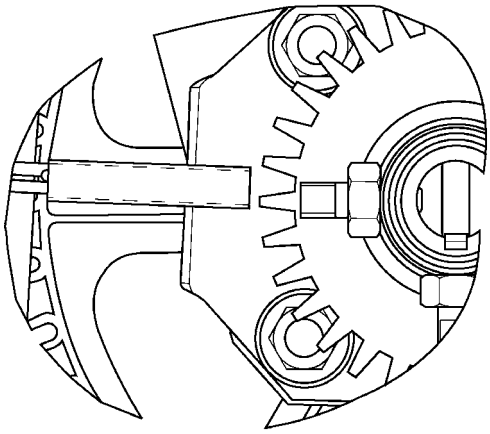
6. On the right hand side of the fan assembly install the flange bracket **(1)**, bearing **(4)** and flangettes **(2)**. Install the sensor bracket **(3)** to the bearing flangette **(2)**, and then the four M12 x 35mm bolts and the pickup gear lock collar **(5)**.

NOTE: *From the end of the pickup lock collar **(5)** to the flange bracket **(1)** the dimension should be **68 - 70 mm** (**2.68 - 2.75 in**) .*



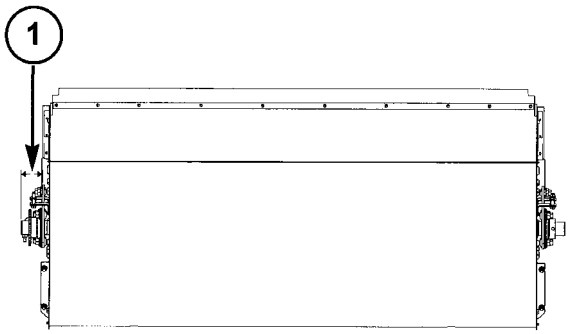
50042972A5 6

7. Install the lock collar with the speed sensor pickup, and tighten in the direction of travel. Adjust the speed sensor with a **1 - 2 mm** (**.039 - .078 in**) air gap.



10041929 7

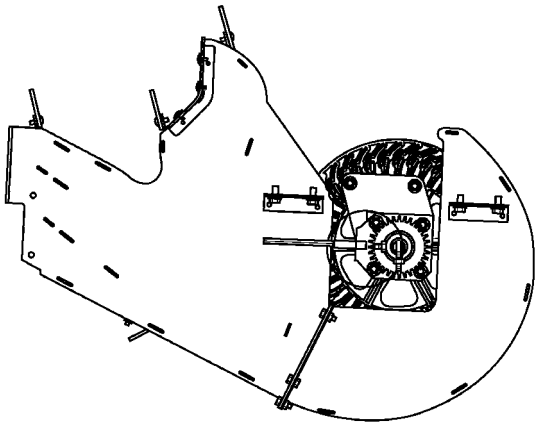
8. The pickup gear must be placed on the shaft with a **68 - 70 mm** (**2.68 - 2.75 in**) gap **(1)** from the end of the pickup gear to the outside of the bearing support bracket.



50043062A5 8

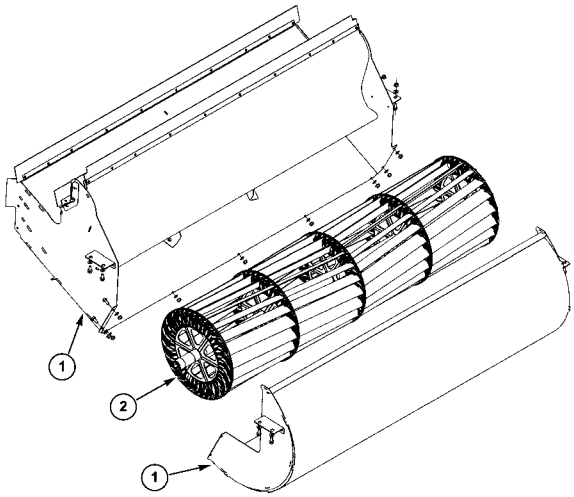
https://truckmanualshub.com/

9. Place the assembly into the housing, and center the assembly in the housing.



10041930 9

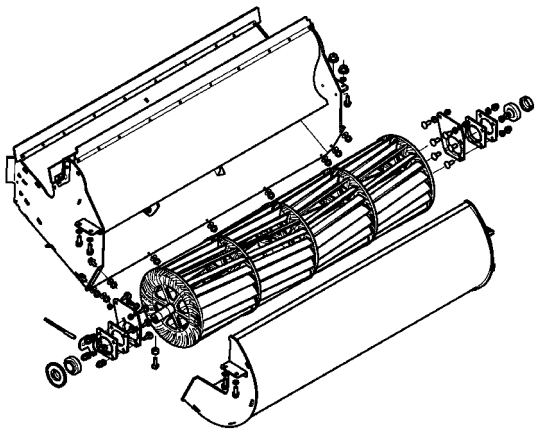
10. Clamp the two halves **(1)** of the housing together over the fan **(2)**.



50042974A5 10

11. Secure the halves using nine M8 x 20mm bolts.

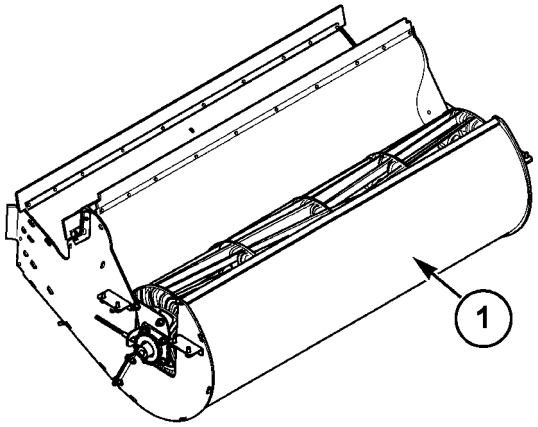
IMPORTANT: *When the fan is installed into the machine, be sure it is free wheeling and free of rubbing before the motor is installed. If the fan catches adjust as necessary by loosening hardware and adjusting fan centering in housing. Damage can occur if fan is not properly centered in the housing.*



10041928 11

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12. When the fan is **(1)** assembled and adjusted properly it can be installed back into the machine



10041926A5 12

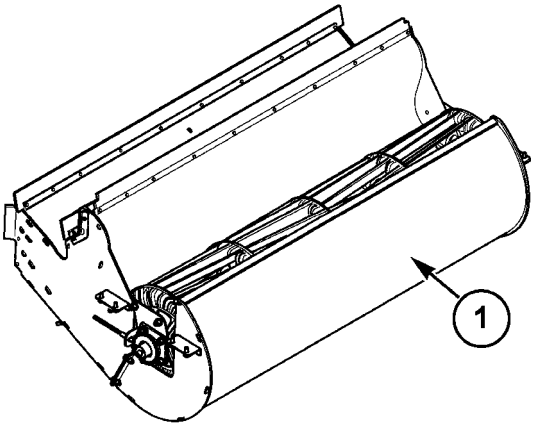
Next operation: Fan - Install (K.62.B.52 - F.10.A.15)

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Fan - Install (K.62.B.52 - F.10.A.15)

AFX8010

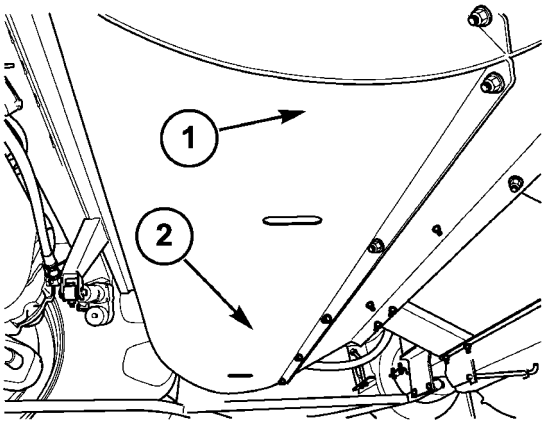
1. Slide the fan housing assembly **(1)** under the machine from the right hand side where the platform was removed.



10041926A5 1

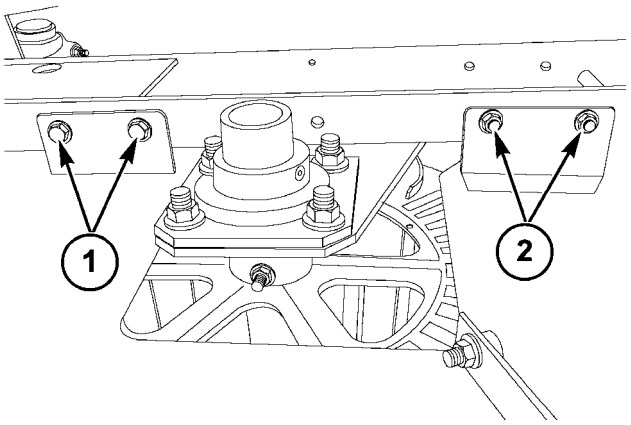
2. Raise the fan housing using two floor jacks in position **(1)** and position **(2)** with an assistant to evenly raise it into position.

NOTE: *Before installing fan back into machine, be sure seals are in good condition. Replace as necessary.*



10042965A5 2

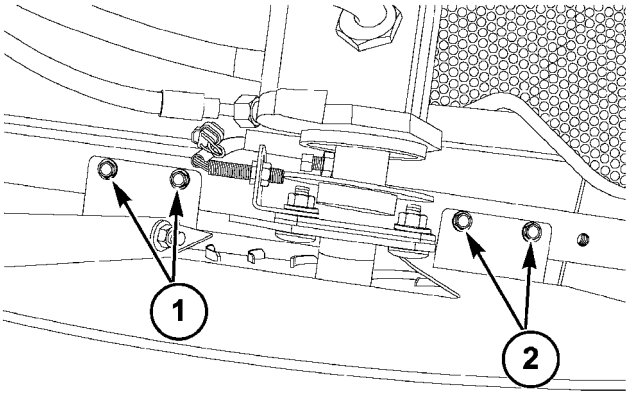
3. Install the four bolts loosely into the front **(2)** and middle **(1)** fan brackets on the left hand side of the housing.



40036385A5 3

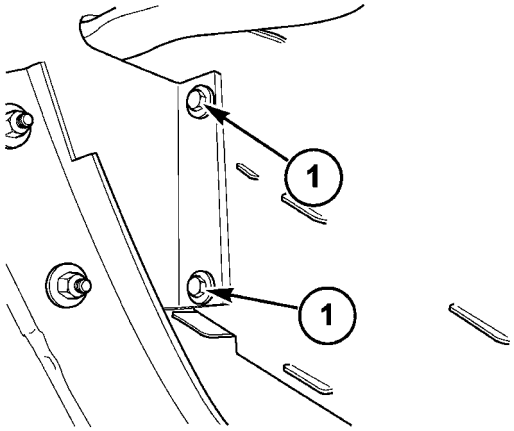
https://truckmanualshub.com/

4. Install four bolts loosely on the right hand side of the fan housing into the front **(2)** and middle **(1)** brackets.



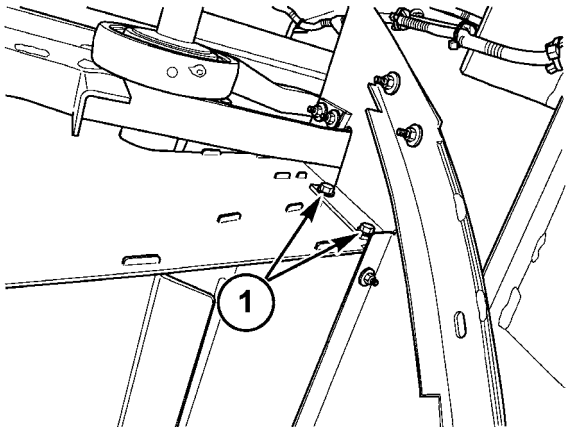
40036382A5 4

5. Install loosely the two bolts **(1)** on the right hand side rear flange.



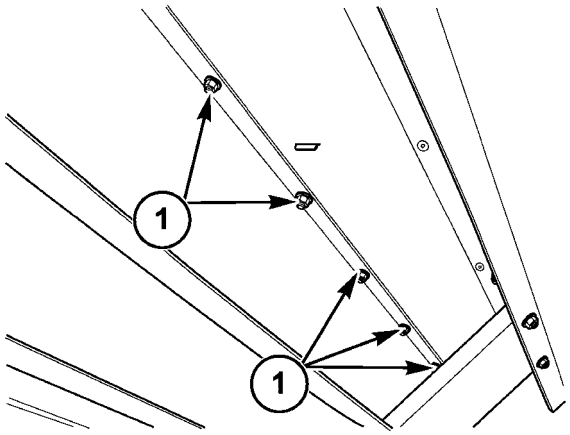
10042963A5 5

6. Install loosely the two bolts **(1)** on the left hand side rear flange.



10042964A5 6

7. Install the eight bolts **(1)** securing the rear of the fan housing, and tighten.

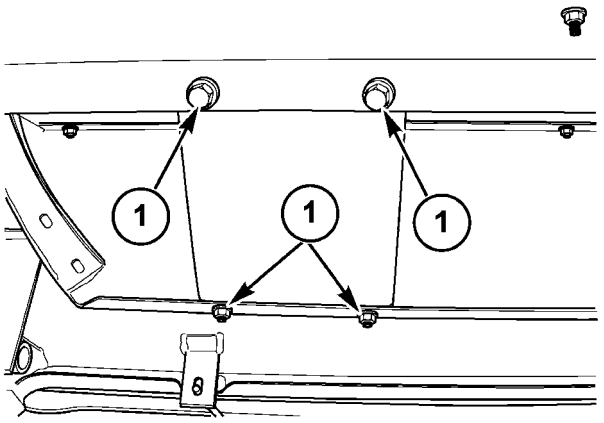


10042961A5 7

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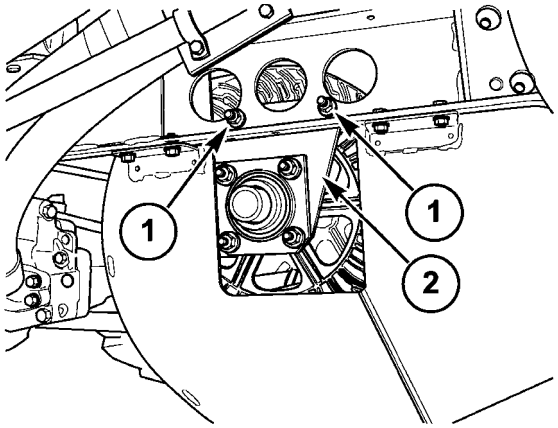
8. Go back and tighten all other hardware that was left loose.

9. Install and tighten the four bolts **(1)** onto the two housing support brackets.



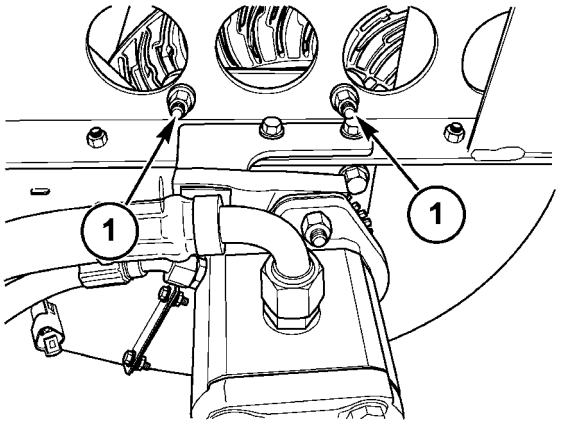
10042962A5 8

10. Install the two bolts **(1)** securing the bearing support plate bracket **(2)** on the left hand side.



10042955A5 9

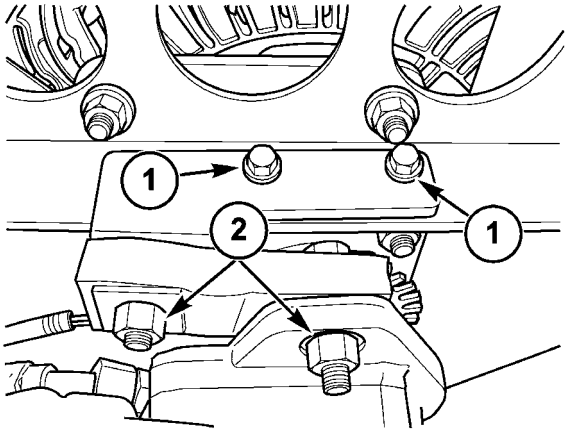
11. Attach the bearing support plate bracket with two bolts **(1)**.



10042959A5 10

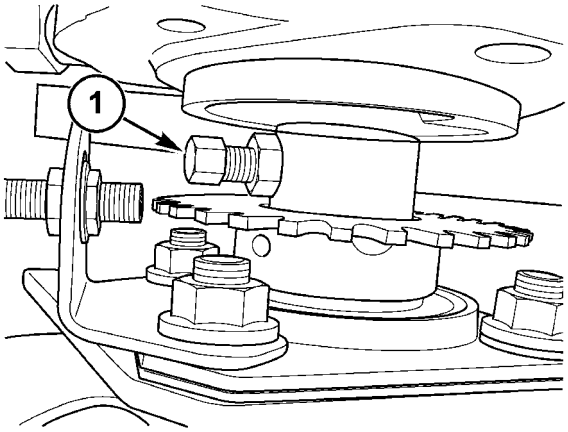
https://truckmanualshub.com/

12. Attach the motor isolator and bracket with two bolts to the frame **(1)**, and two bolts to the motor **(2)**.



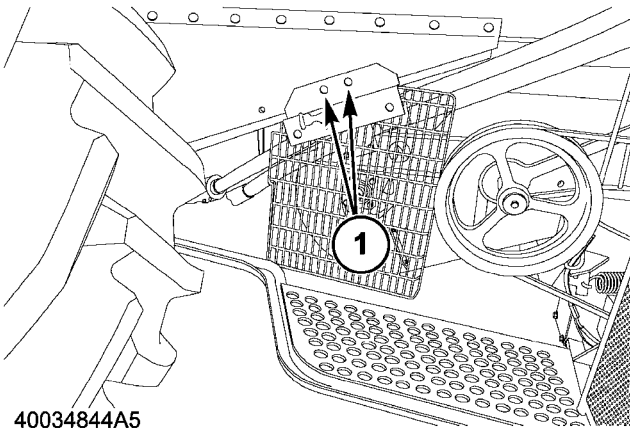
10042957A5 11

13. When the motor is in place and aligned, install and tighten the set screw **(1)** into the shaft. Torque the two set screws to **46 - 52 Nm** (**34 - 38 lb ft**)



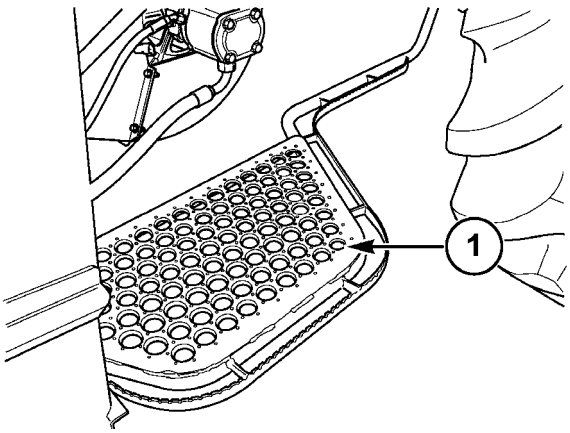
10042958A5 12

14. Install the shield on the left hand side of the machine using two nuts **(1)**.



40034844A5 13

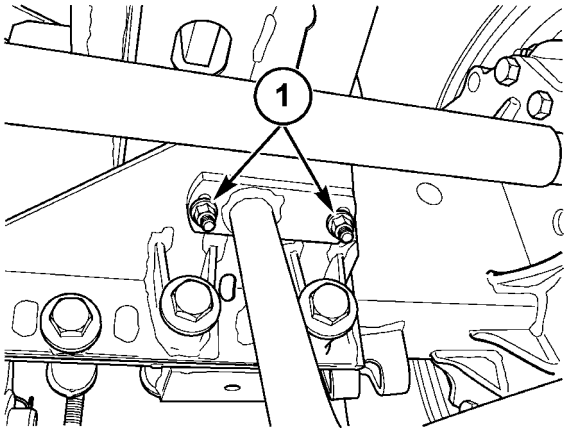
15. Install the platform **(1)** on the right hand side of the machine.



10042951A5 14

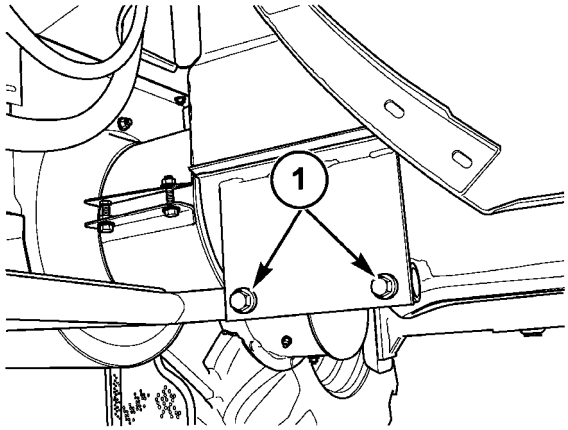
https://truckmanualshub.com/

16. Install loose the two bolts **(1)** on the front of the platform rail.



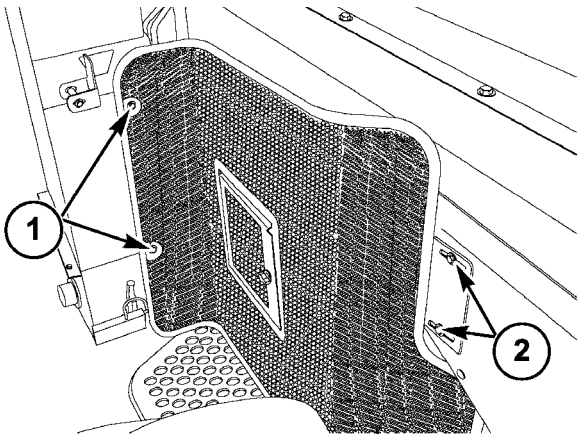
10042953A5 15

17. Install loose the two bolts **(1)** on the rear of the platform rail.



10042952A5 16

18. Tighten all four platform bolts.
19. Install the right hand side shield using four bolts on the front **(2)** and rear **(1)** brackets to secure it.



40036380A5 17

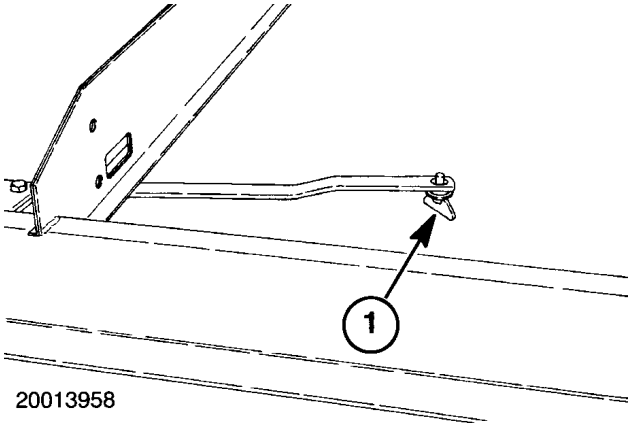
https://truckmanualshub.com/

Upper sieve - Remove (K.62.B.57 - F.10.A.10)

AFX8010

1. Disengage the adjusting arms at **(1)** from the left and right sieves.

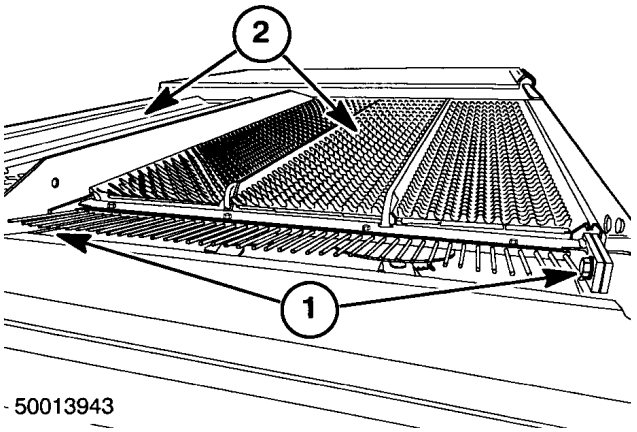
NOTE: *The sieves are shown removed to better illustrate the attaching mechanism.*



20013958 1

2. Turn out three cap screws **(1)** and slide the upper sieves **(2)** from the combine.

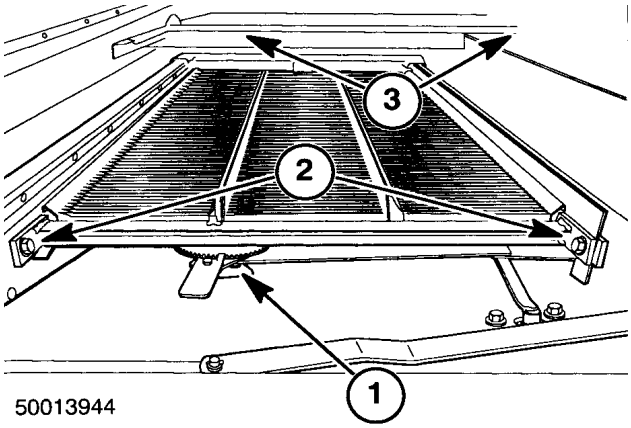
NOTE: *Optional remotely operated sieves only.*



50013943 2

3. Disengage the adjusting arms from the left and right sieves at **(1)** (left side shown).

NOTE: *All models*



50013944 3

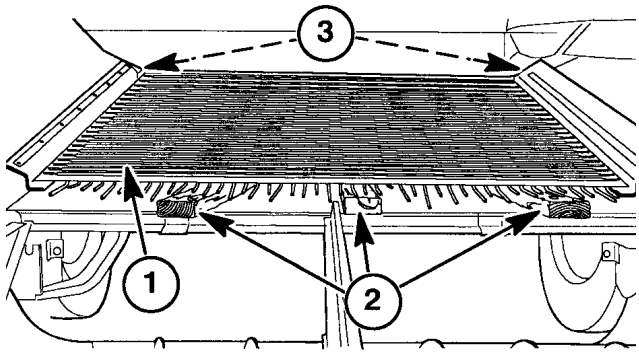
4. Turn out three cap screws **(2)** and slide the lower sieves from the combine. Turn out two cap screws **(3)**. Remove the pre-sieve from the combine.

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Grain pan - Remove (K.62.B.58 - F.10.A.10)

AFX8010

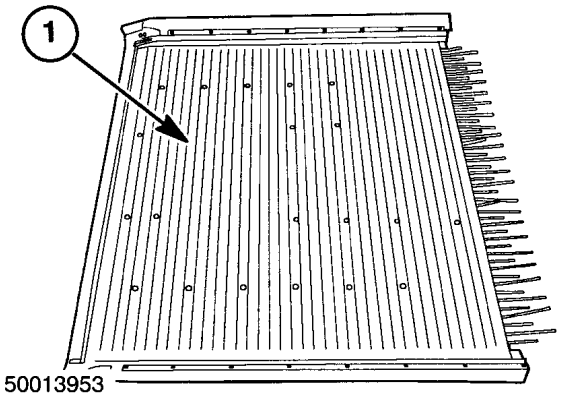
1. Remove the upper cleaning shoe using the procedure described in this manual.
2. Lower the grain pan **(1)** onto wood blocks **(2)**.



50013952

50013952 1

3. Rotate the leveling frame as necessary to make the grain pan support arms accessible. Turn out the cap screws from the grain pan left and right support arm upper bushing caps **(3)**.
4. Use the help of several assistants to remove the grain pan from the combine.
5. With all points disconnected, lift and pull the grain pan **(1)** from the machine.



50013953

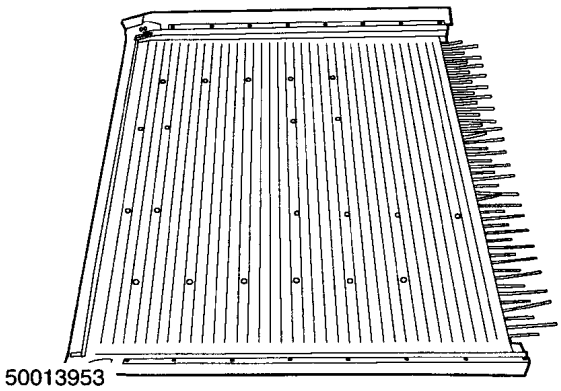
50013953 2

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Grain pan - Install (K.62.B.58 - F.10.A.15)

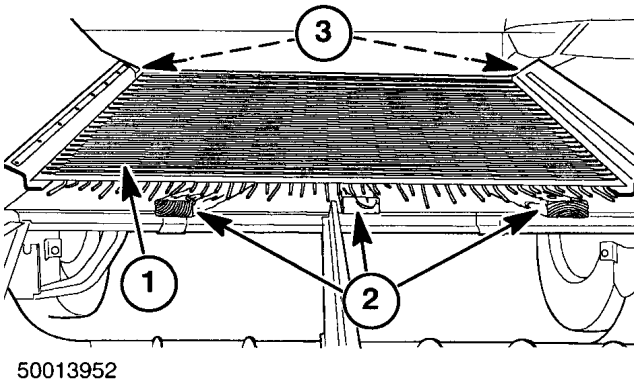
AFX8010

1. Use the help of several assistants to install the grain pan.



50013953B 1

2. Orient the grain pan so that the rake is toward the rear of the machine. Install the pan into the combine.
3. Rotate the leveling frame as necessary to make the grain pan support arms accessible. Attach the grain pan **(1)** to the forward support arms **(3)**.



50013952 2

4. Do not tighten the hardware.
5. Lift the back end of the grain pan up and insert wood blocks **(2)**.

https://truckmanualshub.com/

Lower shoe levelling system - Remove (K.62.B.61 - F.10.A.10)

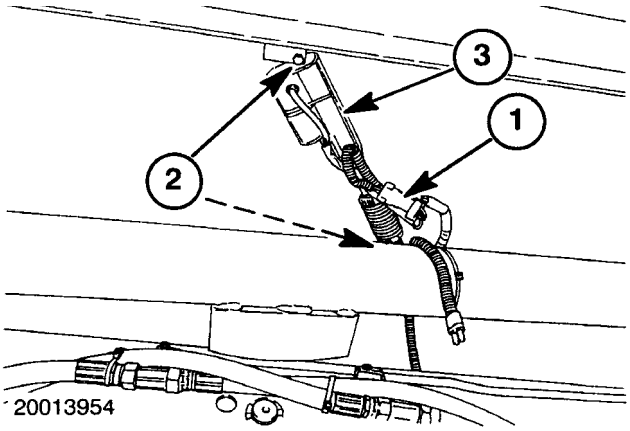
AFX8010

NOTE: *It is not necessary to remove the grain pan in order to get the lower cleaning shoe from the combine.*

1. Remove the upper cleaning shoe using the procedure in: **Upper shoe levelling system - Remove (K.62.B.63 - F.10.A.10)**

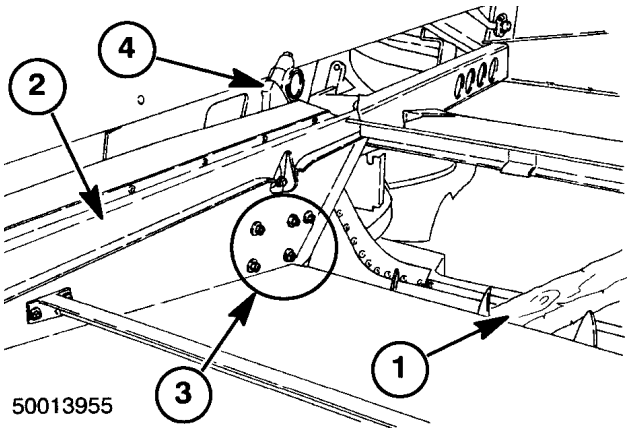
NOTE: *Optional remotely operated sieves only.*

2. Unplug the electrical connector **(1)**. Remove the two cap screws and nuts **(2)**. Take the sieve positioning motor **(3)** from the lower shoe and store in a suitable location.



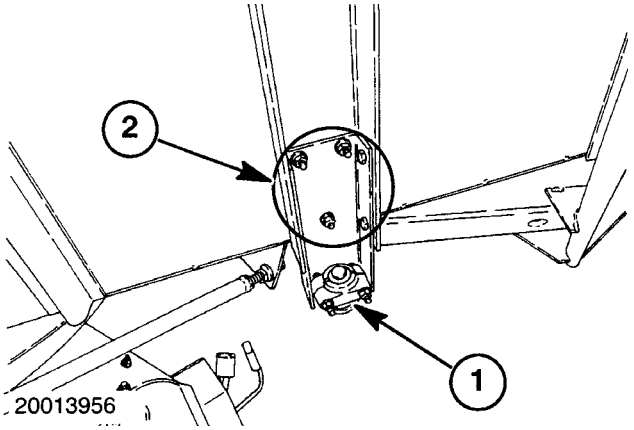
20013954j 1

3. Position wood blocks **(1)** under the lower cleaning shoe **(2)**. Remove the five cap screws and nuts **(3)** from both sides to detach the lower shoe from the connecting arm **(4)**.



50013955x 2

4. Remove the lower support arm bushing caps **(1)** from both sides of the lower shoe. Remove all of the brace hardware **(2)**. Carefully lift the lower shoe and pull the brace from the machine on both sides.

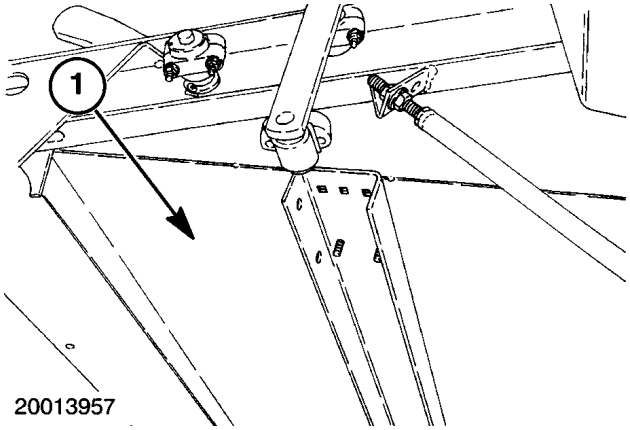


20013956j 3

5. Use the help of several assistants to remove the lower cleaning shoe from the combine.

https://truckmanualshub.com/

6. With all points disconnected, lift and pull the lower cleaning shoe **(1)** from the machine.



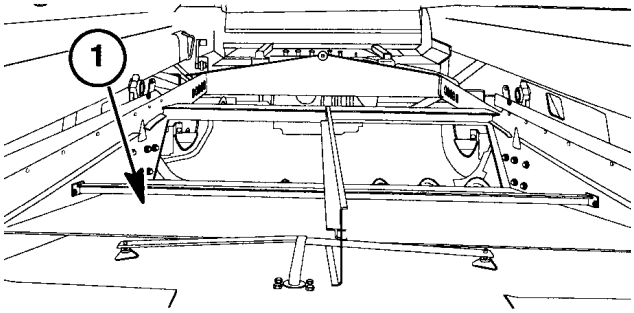
20013957r 4

https://truckmanualshub.com/

Lower shoe levelling system - Install (K.62.B.61 - F.10.A.15)

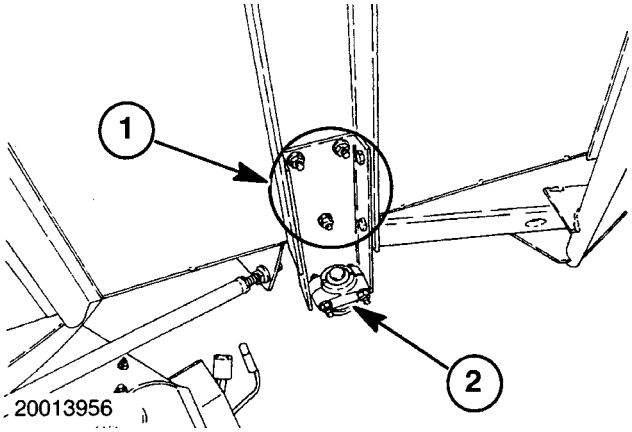
AFX8010

1. Use the help of several assistants to install the lower cleaning shoe.
2. Set the lower cleaning shoe **(1)** into position in the combine.



50015725 1

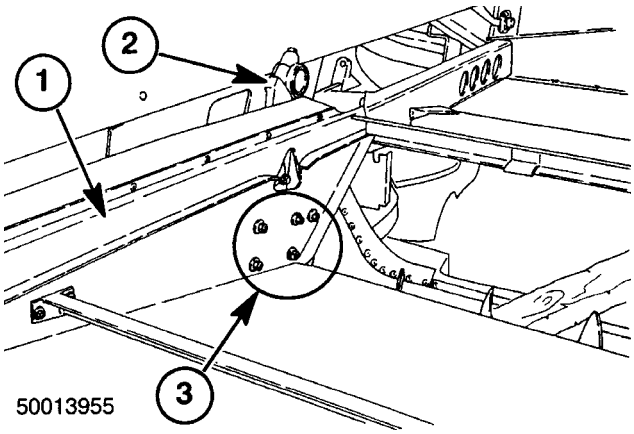
3. Attach the braces on both sides using previously removed hardware at **(1)**. Tighten this hardware.



20013956k 2

4. Install the support arm bushing caps **(2)** on both sides. Do not tighten this hardware.
5. Attach the lower grain pan **(1)** to the connecting arm **(2)** using previously removed hardware at **(3)** on both sides. Tighten this hardware to standard torque.

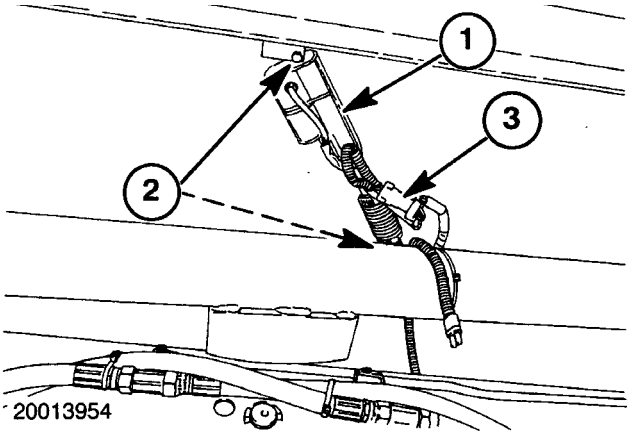
NOTE: *Optional remotely operated sieves only.*



50013955j 3

https://truckmanualshub.com/

6. Attach the sieve positioning motor **(1)** at **(2)** with the previously removed hardware.



20013954k 4

7. Plug in the motor electrical connector **(3)**.

NOTE: *All models*

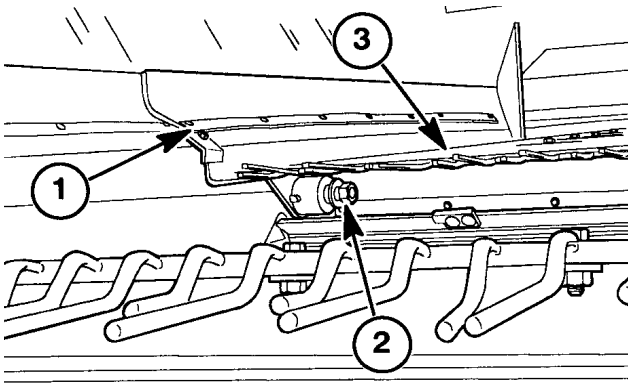
8. Adjust the horizontal position of the lower cleaning shoe until it is centered within **3.18 mm** (**1/8 in**) of the leveling frame.

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Upper shoe levelling system - Remove (K.62.B.63 - F.10.A.10)

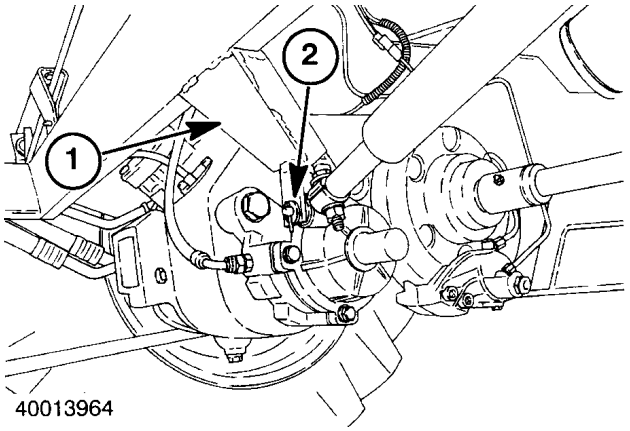
AFX8010

1. Remove cap screws and clamps **(1)** from the grain pan. Turn off nuts **(2)** and push the cap screws out toward the outside of the combine. Raise the back end of the grain pan **(3)** and tie it up securely.



50013946 1

2. Disconnect the leveling frame **(1)** from the positioning motor at **(2)**.

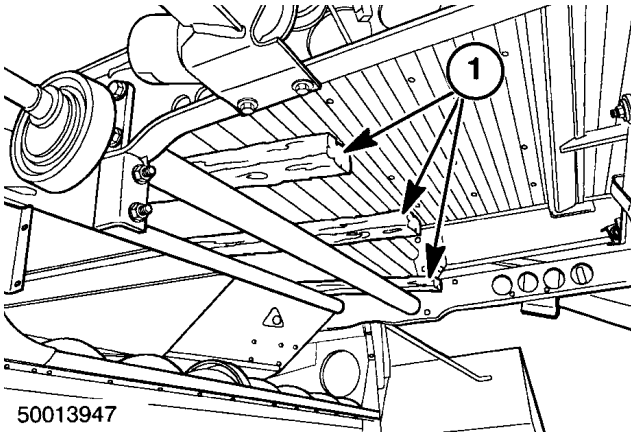


40013964 2

3. Insert two or three wood blocks **(1)** under the upper cleaning shoe frame.

NOTE: *The blocks are used to support the upper cleaning shoe when the drive and connecting arms are removed.*

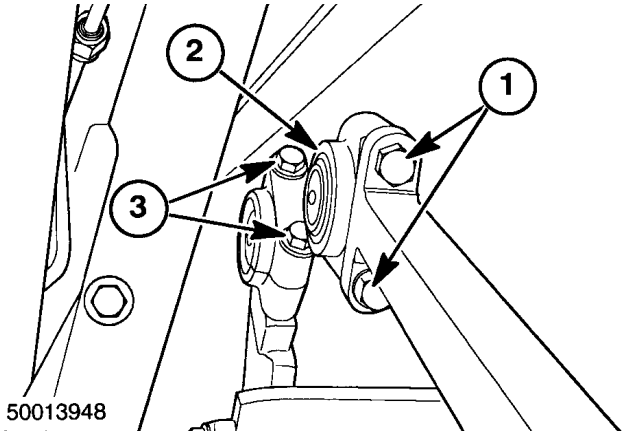
NOTE: *Picture shown without cleaning fan. It is not necessary to remove the cleaning fan for this procedure. The fan was only removed to show more detail for this photo.*



50013947 3

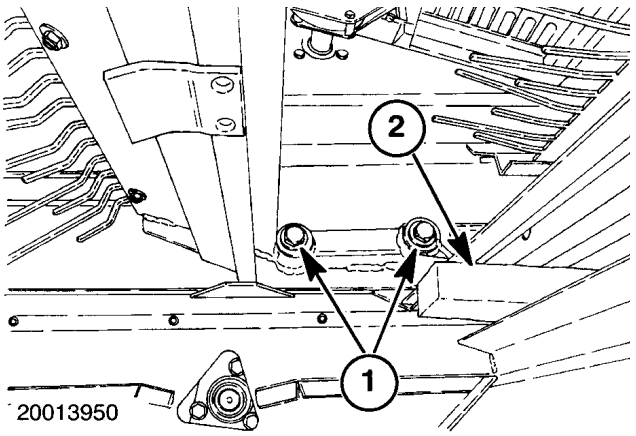
https://truckmanualshub.com/

4. Rotate the leveling frame to make the right side accessible. Turn out cap screws **(1)** and remove the drive arm bushing cap **(2)** from the right drive arm. Turn out cap screws **(3)** and remove the connecting arm bushing cap. Rotate the leveling frame to make the left side accessible. Remove the left side drive and connecting arm bushing caps.



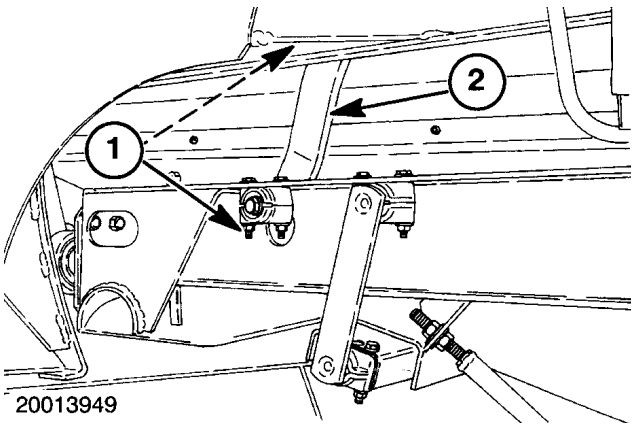
50013948 4

5. Turn out cap screws **(1)** several turns. Apply blows using a mallet to the head of the cap screws to force the bushings and pins from the upper shoe frame. Continue until the pins can be removed from the frame.
6. At this point, the front of the cleaning shoe is supported by the wood blocks **(2)** previously set in place.



20013950 5

7. Rotate the leveling frame to make the right side accessible. Turn out the cap screws from the upper shoe frame left support arm bushing cap.
8. Rotate the leveling frame to make the left side accessible. Turn out the cap screws from the upper shoe frame left support arm bushing cap.

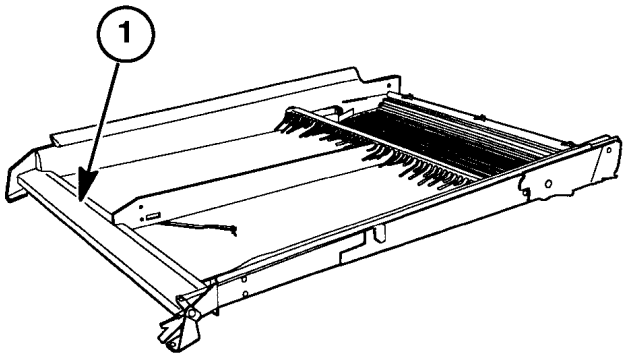


20013949 6

9. Use the help of several assistants to remove the upper cleaning shoe frame from the combine.

https://truckmanualshub.com/

10. With all points disconnected, lift and pull the upper cleaning shoe frame **(1)** from the machine.



50013951

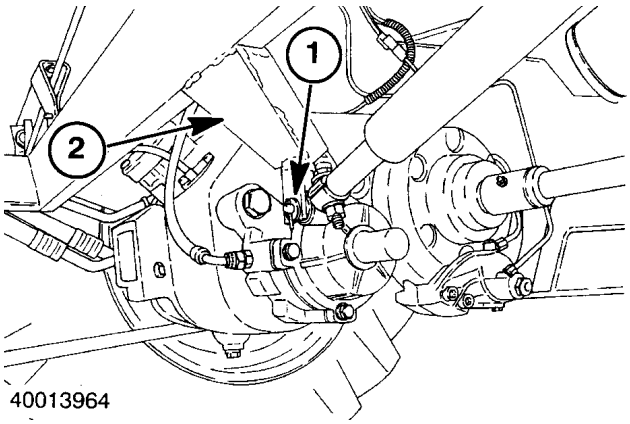
50013951 7

https://truckmanualshub.com/

Upper shoe levelling system - Install (K.62.B.63 - F.10.A.15)

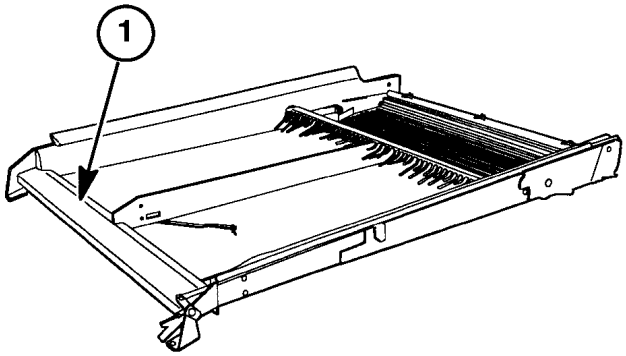
AFX8010

1. Install the grain pan, using the procedure described later in this section, if it had been removed.
2. Install the lower cleaning shoe, using the procedure later described in this section, if it had been removed.
3. Attach the leveling frame positioning motor at **(1)** to the leveling frame **(2)**.



40013964z 1

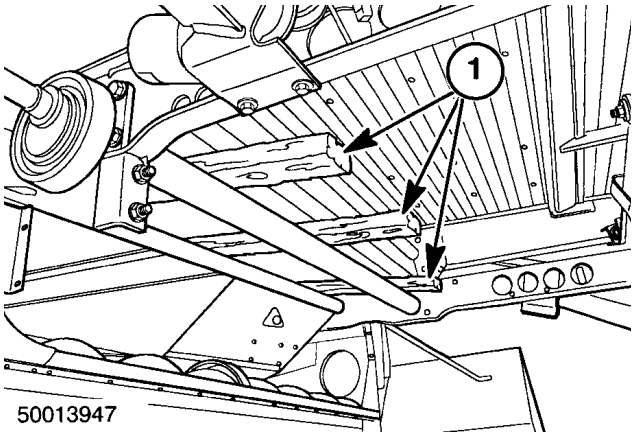
4. Use the help of several assistants to set the upper cleaning shoe frame into place.
5. Lift and pull the upper cleaning shoe frame **(1)** into the machine.



50013951 2

6. Insert two or three wood blocks **(1)** under the upper cleaning shoe frame.

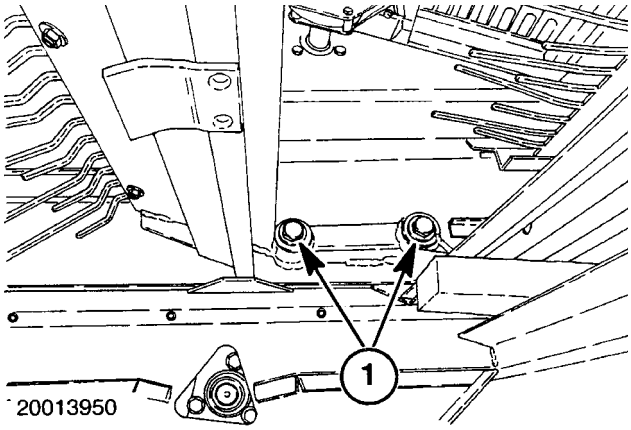
NOTE: *The blocks are used to support the upper cleaning shoe while attaching the drive and connecting arms*



50013947 3

https://truckmanualshub.com/

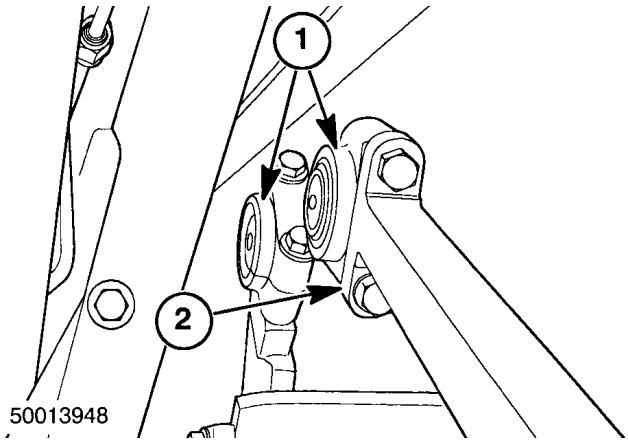
7. Set the pin and bushing assemblies in the upper shoe frame. Turn in the four cap screws and lock washers **(1)**. Torque the cap screws to **150-160 Nm(111-125 lb ft)**.



20013950j 4

8. Disengage the leveling frame from the positioning motor.
9. Rotate the leveling frame to make the right side accessible. Lift the shoe as necessary and install the arm clamps **(1)** onto the bushings.

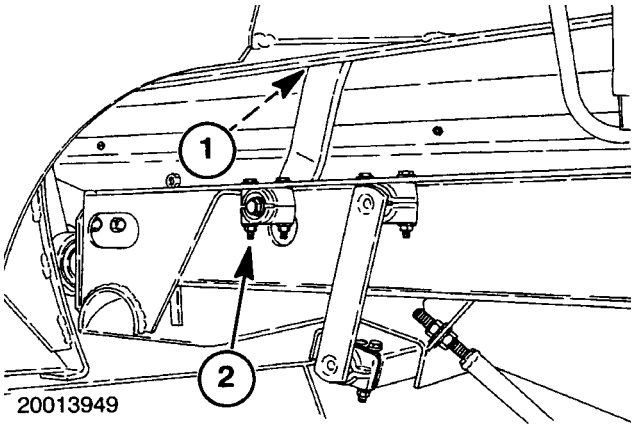
NOTE: *A spacer is to be installed between the drive arm and clamp at* ***(2)****.*



50013948a 5

10. Rotate the leveling frame to make the left side accessible. Repeat this procedure for the left side.
11. Do not tighten the hardware until instructed.

NOTE: *The correct orientation of the support arm is: The end with the smaller distance between the bushing and arm surface is attached to the shoe at the top* ***(1)****. The end with the larger distance between the bushing and arm surface is attached to the frame at* ***(2)****.*

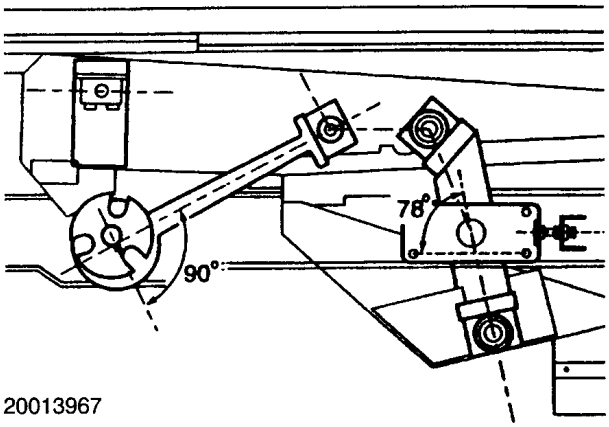


20013949j 6

12. Lift the shoe as required and install the support arm.
13. Rotate the leveling frame to make the right side accessible. Repeat this procedure for the right side.
14. Do not tighten the hardware until instructed.

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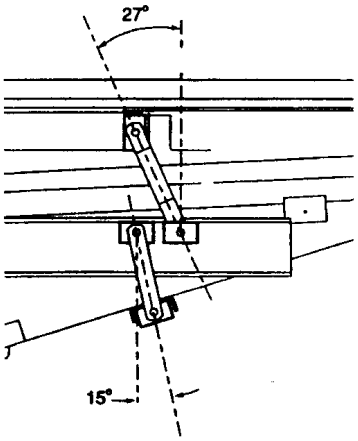
15. Turn the eccentric drive shaft until the drive arm is on the lowest leg of travel. Position the shaft key and center line of the drive arm perpendicular (90 degree angle) to each other. This is known as the neutral position.



20013967

20013967A 7

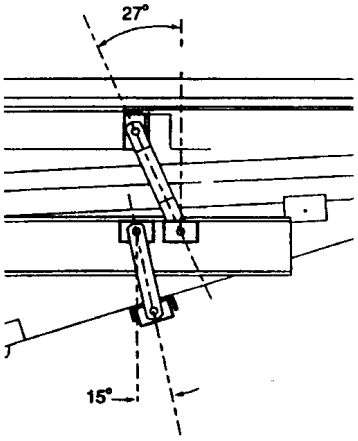
16. Lock or hold the shaft in the neutral position until instructed to release it.
17. Adjust the horizontal position of the upper cleaning shoe until it is centered within 3.18 mm (1/8") of the leveling frame and lower shoe.
18. Tighten the hardware for the drive and rocker arms.
19. Lift or lower the back end of the upper cleaning shoe until a 27 degree angle is obtained on a rear support arm.



20013967

20013967C 8

20. Tighten the hardware for the rear support arm.
21. Lift or lower the back end of the lower cleaning shoe until a 15 degree angle is obtained on the rear support arm.



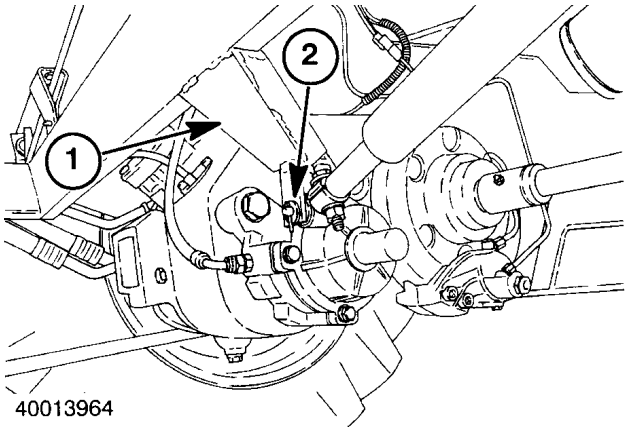
20013967

20013967C 9

22. Tighten the hardware for the rear support arm.

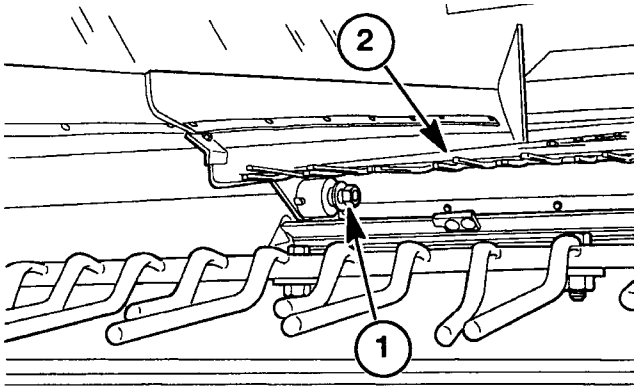
https://truckmanualshub.com/

23. Connect the leveling frame **(1)** to the positioning motor at **(2)**.



40013964 10

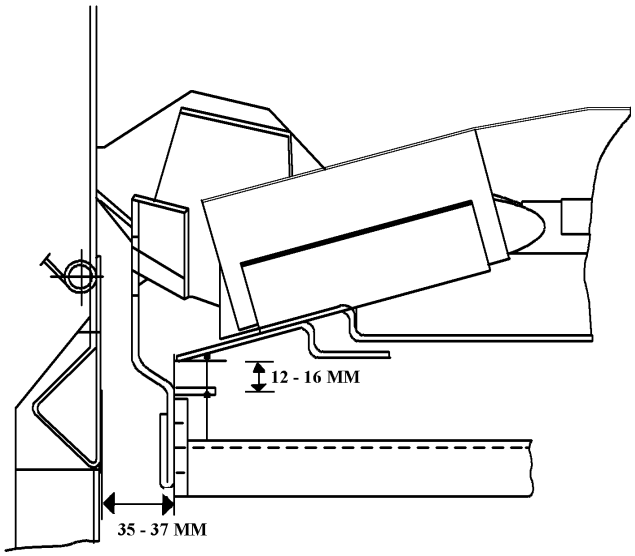
24. Install cap screws, two washers and a locknut at **(1)** on both sides of the grain pan **(2)**.



50013946k 11

25. Do not tighten the hardware until instructed to do so.

26. Release the lock on the eccentric shaft. Rotate the shaft until the grain pan is at it's front dead point. Adjust the right side of the pan until a distance of **12 - 16 mm** (**.472 - .630 in**) is obtained between the tab on the leveling frame at **(1)** and the forward most point of the grain pan **(2)**. Bolts **(1)** and **(2)** should be tightened with eccentric shaft in the neutral position. To achieve the **12 - 16 mm** dimension, you will need to move the front seal plate up or down in its slots. The support arms can be moved fore and aft to set the **35 - 37 mm** dimension.



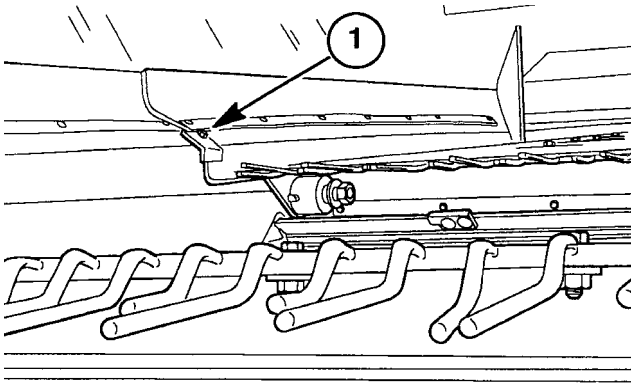
40015724Z 12

27. Tighten all grain pan hardware.

https://truckmanualshub.com/

28. Install the cap screws and clamps **(1)** on both sides of the grain pan.

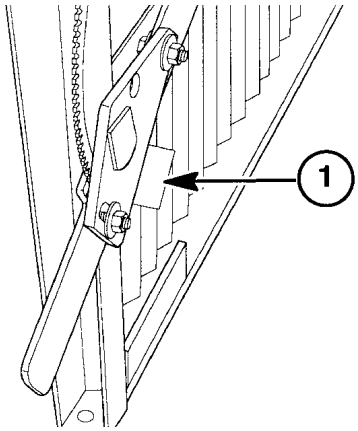
NOTE: *Optional remotely operated sieves only.*



50013946

50013946j 13

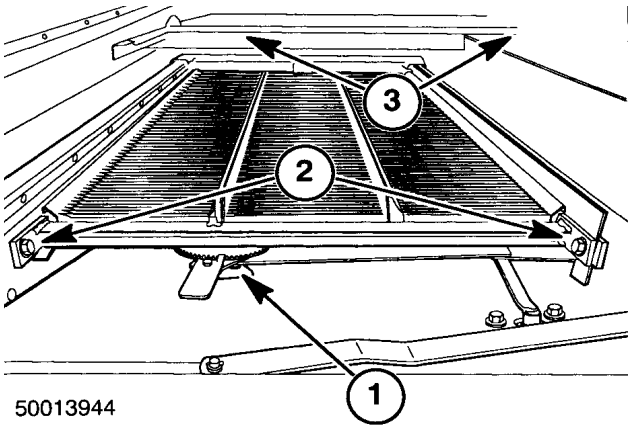
29. The sieves with welded tabs **(1)** are manufactured to be installed on the left side of the shoe.



40015723

40015723 14

30. Slide the pre-sieve into position on the upper cleaning shoe and secure with two cap screws and lock washers **(1)**.



50013944

50013944 15

31. Slide the appropriate sieves onto the lower shoe. Secure the sieves into place using the previously removed hardware **(2)**.

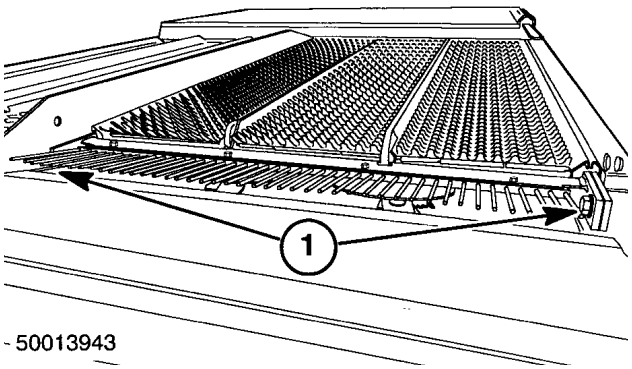
NOTE: *Optional remotely operated sieves only.*

32. Attach the positioning mechanism **(3)**.

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33. Slide the appropriate sieves onto the upper shoe. Secure the sieves into place using the previously removed hardware **(1)**.

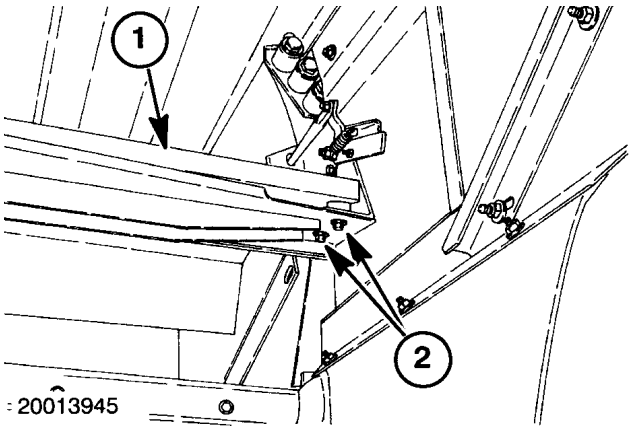
NOTE: *Optional remotely operated sieves only.*



50013943a 16

34. Attach the positioning mechanism.

35. Set the grain sensing pad **(1)** into the position and secure using the four locknuts **(2)** previously removed. Plug in the sensing pad electrical connector.



20013945a 17

36. Install the cleaning shoe fan **(1)** into the combine in accordance with the appropriate section.

37. Install any crop residue components removed using the procedures described earlier.

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Command Lower sieve remote switch - Short circuit to B+ (K.62.B.05.61 - G.30.B.54)

AFX8010

E0261-03 - Lower Sieve Decrease - Rear Switch

Cause:
The lower sieve rear adjust switch (S-46) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "LOW REAR DEC SW" to check the voltage range.

   The normal operating range for the lower sieve rear adjust circuit is **1.8 - 10.0 volts** when the switch is not depressed.

   The normal operating range for the lower sieve rear adjust circuit is **0 - 1.8 volts** when the switch is depressed.

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the lower sieve rear adjust switch connector **X226**.

   A. If the voltage drops below **10 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the straw hood front (SW) harness from the expansion (EX) harness at connector **X025**.

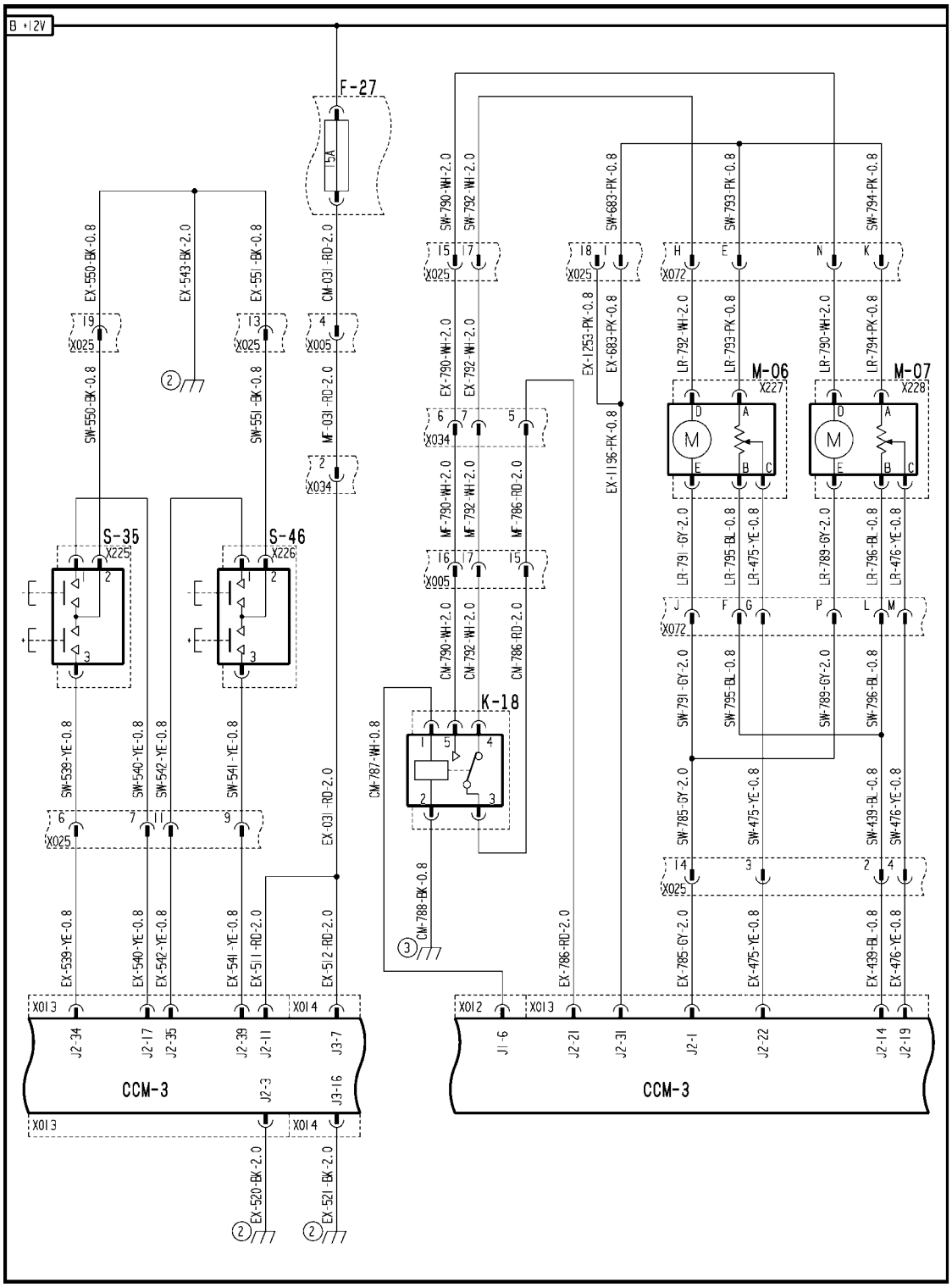
   A. If the voltage drops back within range, the short is in the straw hood front (SW) harness between connector **X025** and connector **X226** wire 541 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X025** and connector **X013** pin J2-39 wire 541 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

https://truckmanualshub.com/

F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

https://truckmanualshub.com/

Command Upper sieve remote switch - Short circuit to B+ (K.62.B.05.56 - G.30.B.54)

AFX8010

E0262-03 - Upper Sieve Decrease - Rear Switch

Cause:
The upper sieve rear adjust switch (S-35) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "UP REAR DEC SW" to check the voltage range.

   The normal operating range for the upper sieve rear adjust circuit is **1.8 - 10.0 volts** when the switch is not depressed.

   The normal operating range for the upper sieve rear adjust circuit is **0 - 1.8 volts** when the switch is depressed.

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the upper sieve rear adjust switch connector **X225**.

   A. If the voltage drops below **10 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the straw hood front (SW) harness from the expansion (EX) harness at connector **X025**.

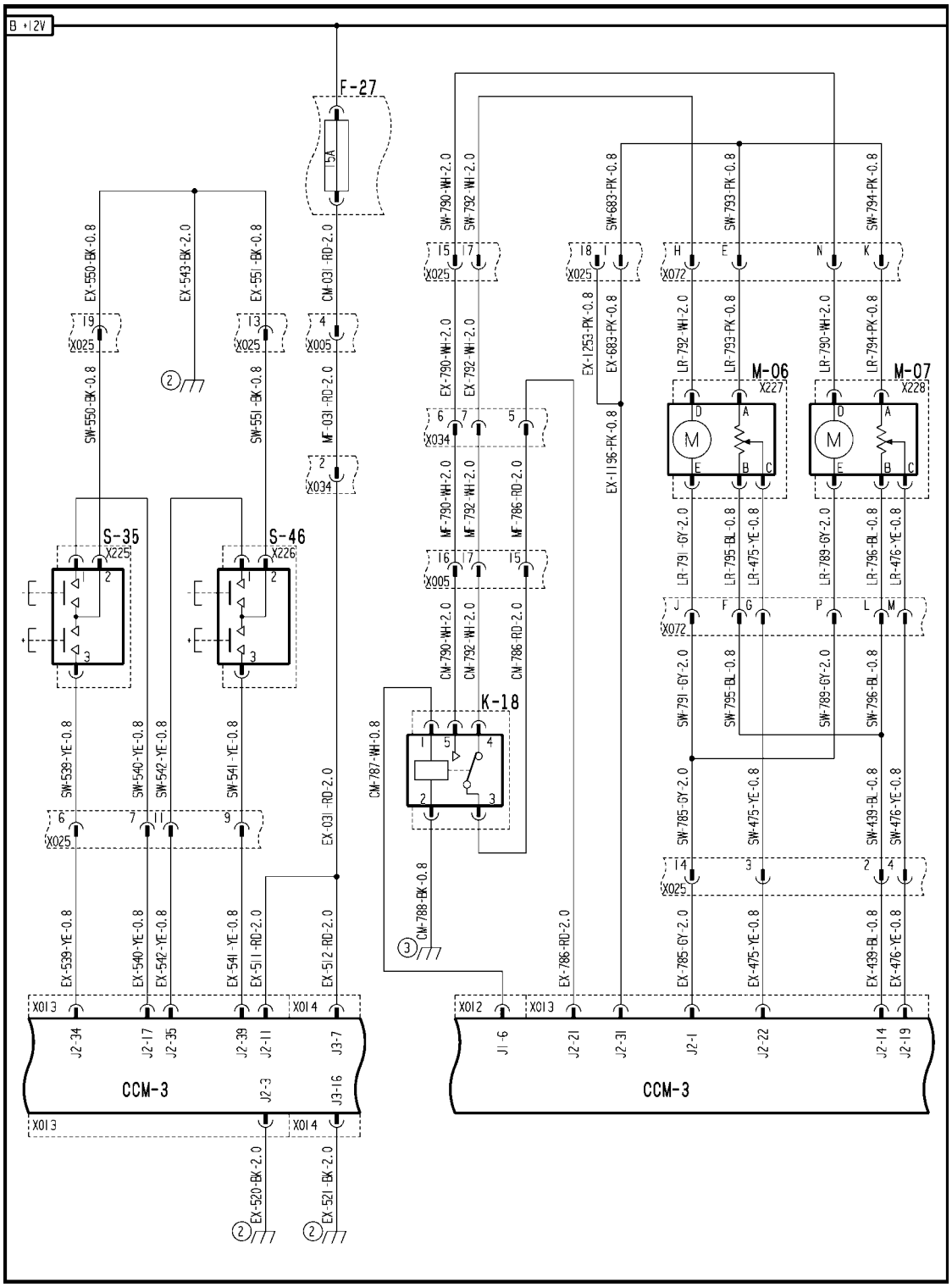
   A. If the voltage drops back within range, the short is in the straw hood front (SW) harness between connector **X025** and connector **X225** wire 539 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X025** and connector **X013** pin J2-34 wire 539 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

https://truckmanualshub.com/

F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Command Lower sieve remote switch - Short circuit to B+ (K.62.B.05.61 - G.30.B.54)

AFX8010

E0263-03 - Lower Sieve Increase - Rear Switch

Cause:
The lower sieve rear adjust switch (S-46) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "LOW REAR INC SW" to check the voltage range.

   The normal operating range for the lower sieve rear adjust circuit is **1.8 - 10.0 volts** when the switch is not depressed.

   The normal operating range for the lower sieve rear adjust circuit is **0 - 1.8 volts** when the switch is depressed.

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the lower sieve rear adjust switch connector **X226**.

   A. If the voltage drops below **10 volts**, the short is in the switch. Replace the switch.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the straw hood front (SW) harness from the expansion (EX) harness at connector **X025**.

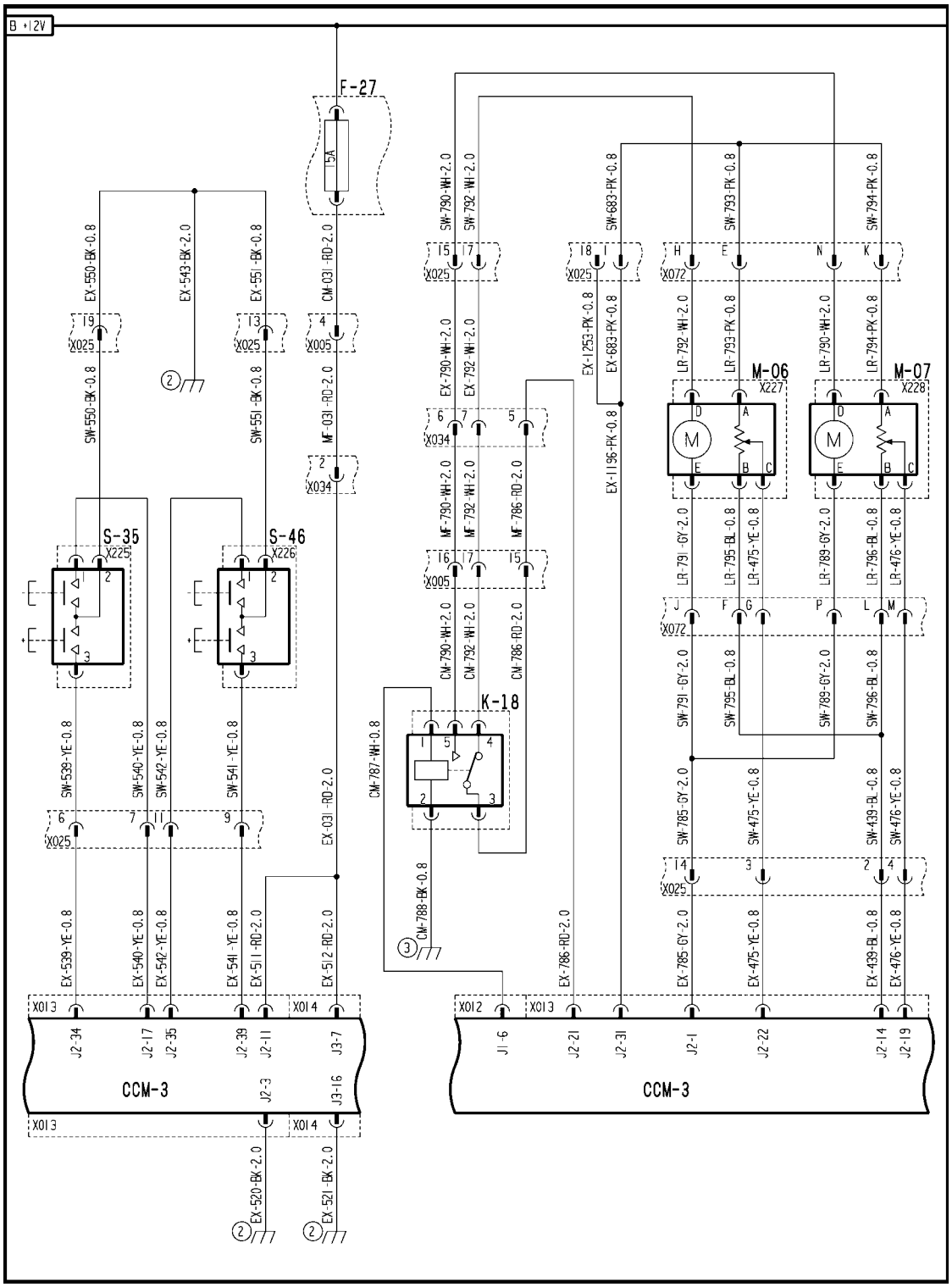
   A. If the voltage drops back within range, the short is in the straw hood front (SW) harness between connector **X025** and connector **X226** wire 542 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X025** and connector **X013** pin J2-35 wire 542 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

https://truckmanualshub.com/

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

https://truckmanualshub.com/

F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Command Upper sieve remote switch - Short circuit to B+ (K.62.B.05.56 - G.30.B.54)

AFX8010

E0282-03 - Upper Sieve Increase - Rear Switch

Cause:
The upper sieve rear adjust switch (S-35) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "UP REAR INC SW" to check the voltage range.

   The normal operating range for the upper sieve rear adjust circuit is **1.8 - 10.0 volts** when the switch is not depressed.

   The normal operating range for the upper sieve rear adjust circuit is **0 - 1.8 volts** when the switch is depressed.

   A. If the voltage reading is **10.0 volts** or greater, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the upper sieve rear adjust switch connector **X225**.

   A. If the voltage drops below **10 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage is above **10.0 volts**, continue with Step **3**.
3. Disconnect the straw hood front (SW) harness from the expansion (EX) harness at connector **X025**.

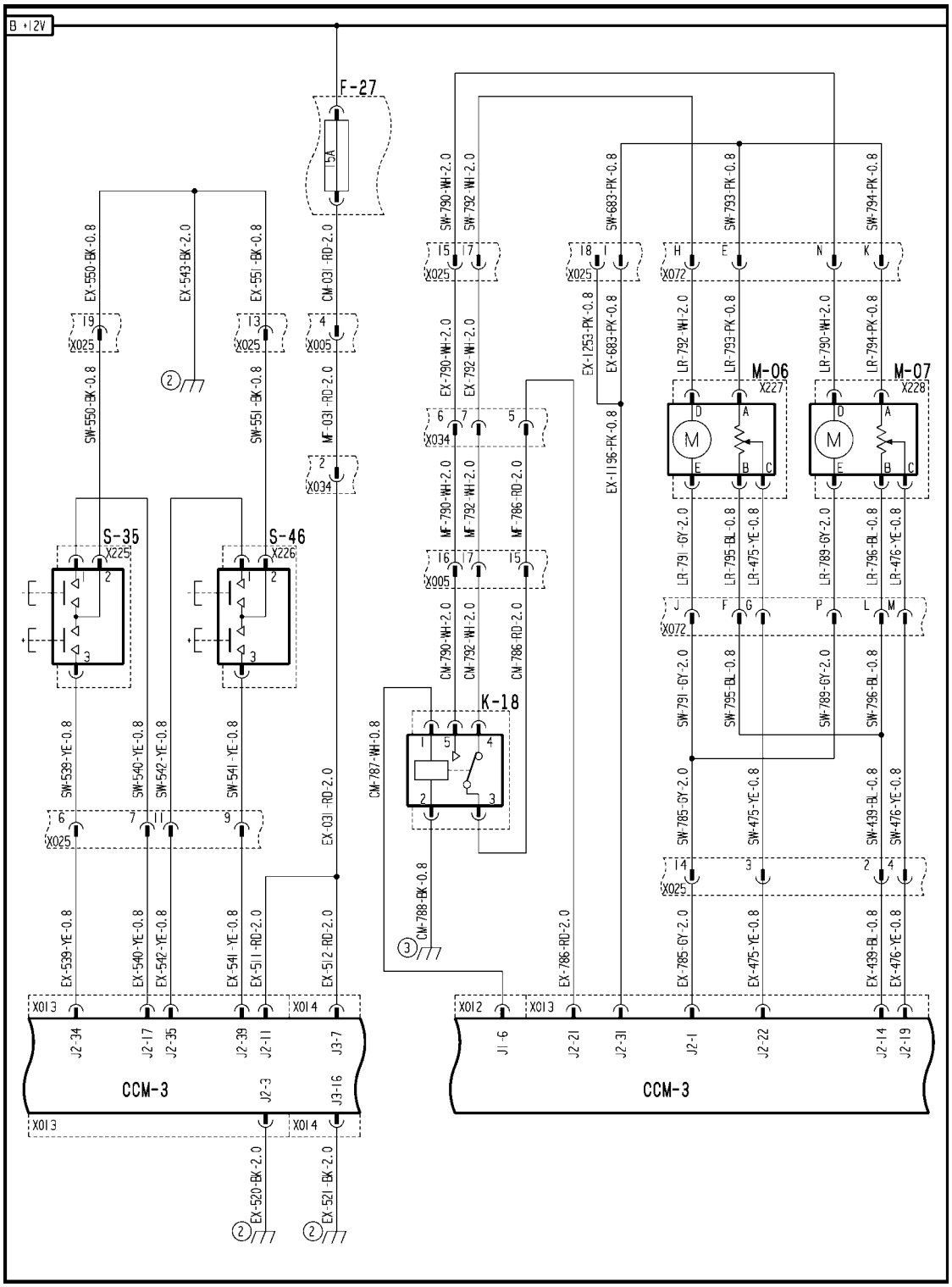
   A. If the voltage drops back within range, the short is in the straw hood front (SW) harness between connector **X025** and connector **X225** wire 540 yellow. Locate the short and repair.

   B. If the voltage remains above **10.0 volts**, the short is in the main frame (MF) harness between connector **X025** and connector **X013** pin J2-17 wire 540 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

https://truckmanualshub.com/

F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Motor Shoe leveling motor - Short circuit to B+ (K.62.B.28.60 - G.30.B.54)

AFX8010

E0032-03 - Sieve Angle Sensor

Cause:
The shoe leveling actuator M-03 position sensor circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (**12 volts**).
2. Sensor ground wiring is open.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "SIEVE ANG SEN" to check the voltage range. The normal operating voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is high (>**5.2 volts**), continue with step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at step **11**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connectors are fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key off. Disconnect connector **X088**, and use a multimeter to test for continuity to ground on connector **X088** pin B. There should be low resistance (< **1 ohms**) to ground.

   A. If continuity is found (< **1 ohms**), continue with step **6**.

   B. If no continuity is found, or if there is high resistance to ground, continue with step **3**.

3. Key off. Disconnect connector **X023**. Use a multimeter to test for continuity between connector **X023** pin 16 and chassis ground. There should be low resistance (< **1 ohms**) to ground.

   A. If no continuity is found, or if there is high resistance to ground, continue with step **4**.

   B. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X088** pin B and connector **X023** pin 16 wire 724 or 723 blue. Locate the open and repair.

4. Key off. Carefully remove connector **X020** from the bottom of CCM1. Use a multimeter to test for continuity between connector **X023** pin 16 and connector **X020** pin J3-18. There should be low resistance (< **1 ohms**).

   A. If continuity is found, continue with step **5**.

   B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 16 and connector **X020** pin J3-18 wire 723 blue or 501 blue. Locate the open and repair.

5. Key off. Use a multimeter to test for continuity between connector **X020** pin J3-18 on CCM1 and chassis ground. There should be low resistance (< **1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance to ground, the CCM1 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM1 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at step **2**.

6. Disconnect connector **X088**, and use a multimeter to test for voltage on connector **X088** pin C. There should not be any voltage present.

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A. If no voltage is found, continue with step **8**.

B. If high (>**5.2 volts**) is found, continue with step **7**.

7. Disconnect connector **X023**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X023** pin 15. There should not be any voltage present.

   A. If high (>**5.2 volts**) is found, there is a short to high voltage in the front frame (FF) harness between connector **X023** pin 15 and connector **X020** pin J3-32 wire 721 yellow. Locate the short and repair.

   B. If no voltage is found, there is a short to high voltage in the lower frame (LF) harness between connector **X088** pin C and connector **X023** pin 15 wire 721 yellow. Locate the short and repair.

8. Disconnect connector **X088**, and use a multimeter to test for voltage on connector **X088** pin A. There should be **5 volts** present.

   A. If **5 volts** is found, continue with step **11**.

   B. If high (>**5.2 volts**) is found, continue with step **9**.

   NOTE: *This supply circuit is also used to supply power to the header tilt angle sensor, so a short to* ***12 volts*** *anywhere on the supply circuit will also activate error code* ***E0029-03 - Header Tilt Angle Sensor***
   .

9. Disconnect connector **X023**, and use a multimeter to test for voltage on connector **X023** pin 17. There should be **5 volts** present.

   A. If **5 volts** is found, there is a short to high voltage in the lower frame (LF) harness between connector **X088** pin A and connector **X023** pin 17 wire 727 pink. Locate the short and repair.

   B. If high (>**5.2 volts**) is found, continue with step **10**.

10. Disconnect connector **X007**, and use a multimeter to test for voltage on the front frame (FF) harness end of connector **X007** pin 22. There should be **5 volts** present.

    A. If **5 volts** is found, there is a short to high voltage in the feeder (FE) harness to between connector **X081** pin A on the lateral float sensor R-02 and connector **X007** pin 22 wire 757 pink. Locate the short and repair.

    B. If high (>**5.2 volts**) is found, there is a short to high voltage in the front frame (FF) harness between connector **X023** pin 17, connector **X007** pin 22 and connector **X020** pin J3-26 on one of the following wires; wire 757 pink, connector **X007** pin 22 to FF harness splice, wire 727 pink, connector **X023** pin 17 to FF harness splice, or wire 726 pink, FF harness splice to connector **X020** pin J3-26. Locate the short and repair.

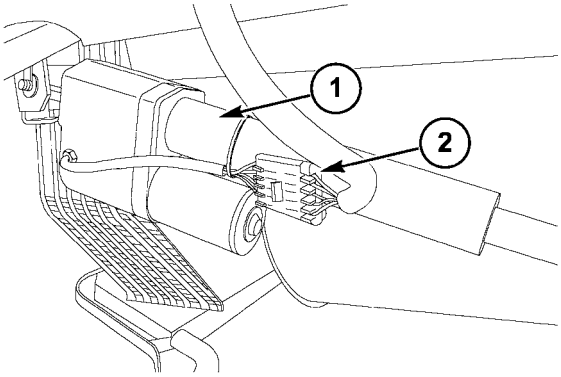
11. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "SIEVE ANG SEN" voltage.

    A. If no high out of range readings are indicated, erase the fault code and continue operation.

    B. If the fault code immediately resets, determine which **12 volts** circuit (such as the shoe leveling actuator) was activated to cause the short.

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Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10)



40033773A5 1

The shoe leveling actuator M-03 **(1)** is located in front of the cleaning fan on the right side, and is attached between the right side frame and the cleaning shoe. The shoe leveling actuator contains an electrical motor, used to extend and retract the actuator in order to tilt the cleaning shoe, and a linear potentiometer to monitor the angle at which the cleaning shoe is tilted. The shoe leveling actuator is connected (**X088**) to the lower frame (LF) harness at **(2)**, and is connected to the CCM1 module at connector **X020** as follows:

Shoe leveling actuator function	Pin number at CCM1 connector X020
Motor, extend	J3-39, J3-40 = power; J3-19, J3-20 = ground
Motor, retract	J3-19, J3-20 = power; J3-39, J3-40 = ground
Potentiometer	J3-32

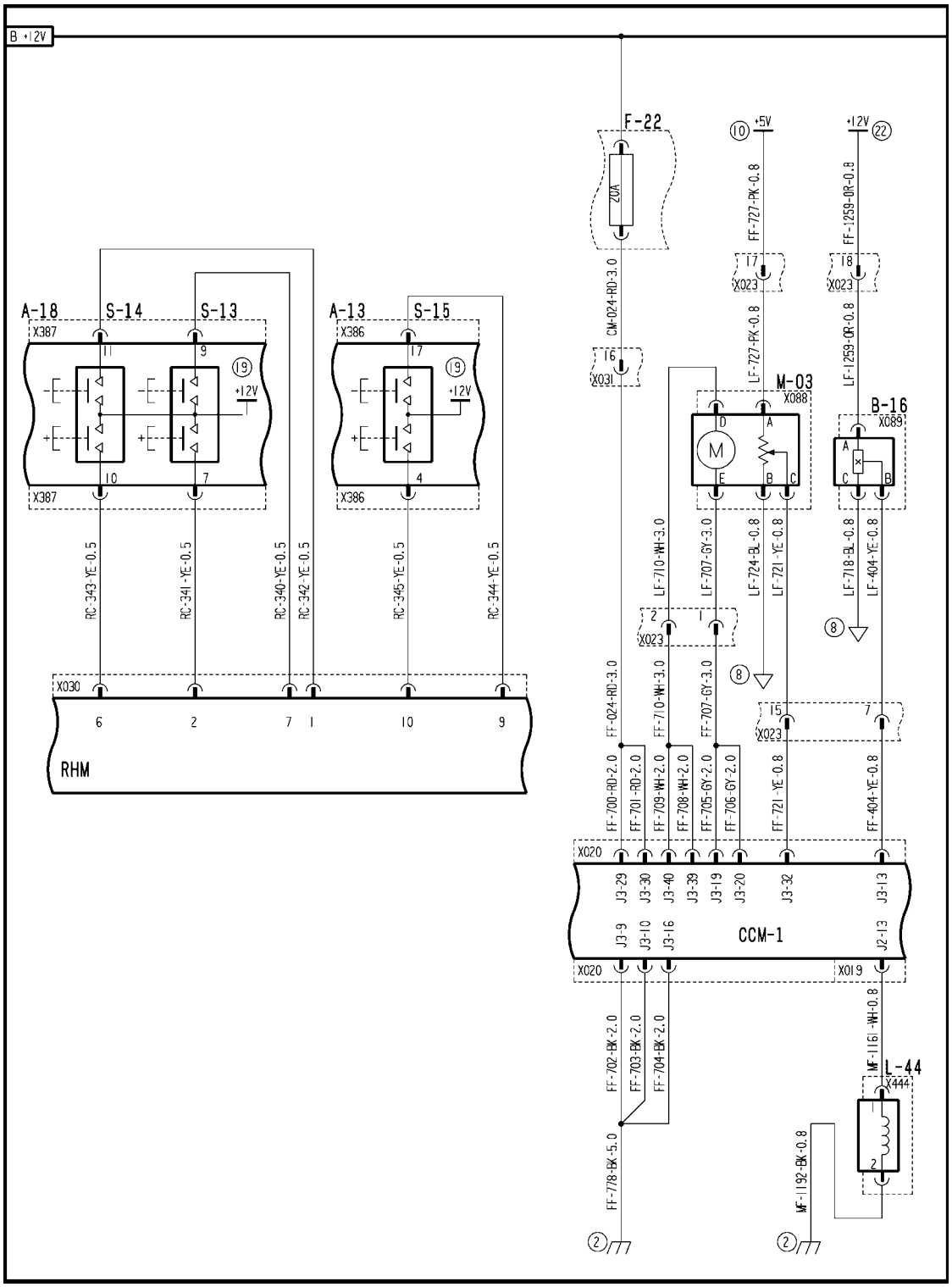
The CCM1 module uses two pairs of pins to send current to the shoe leveling actuator motor. This allows the CCM1 module to reverse the polarity and change the direction of the actuator. The CCM1 module software detects when the self-leveling cleaning shoe makes contact with the frame by detecting when the actuator motor is stalled (sudden amperage increase), and establishes the limit of travel based on input from the potentiometer in the actuator. These limits are NOT stored in non-volatile memory, so they are established at least once (each direction) for every key-on cycle.

The shoe leveling actuator M-03 circuit (both motor and potentiometer) is also monitored by the CCM1 module; in the event that a fault occurs with the actuator or wiring to the actuator, a fault code will be displayed to the operator.

E0032-03 - Sieve Angle Sensor
E0032-05 - Sieve Angle Sensor
E0043-06 - Sieve Angle Current Sense
E0075-11 - Leveling Sieve

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



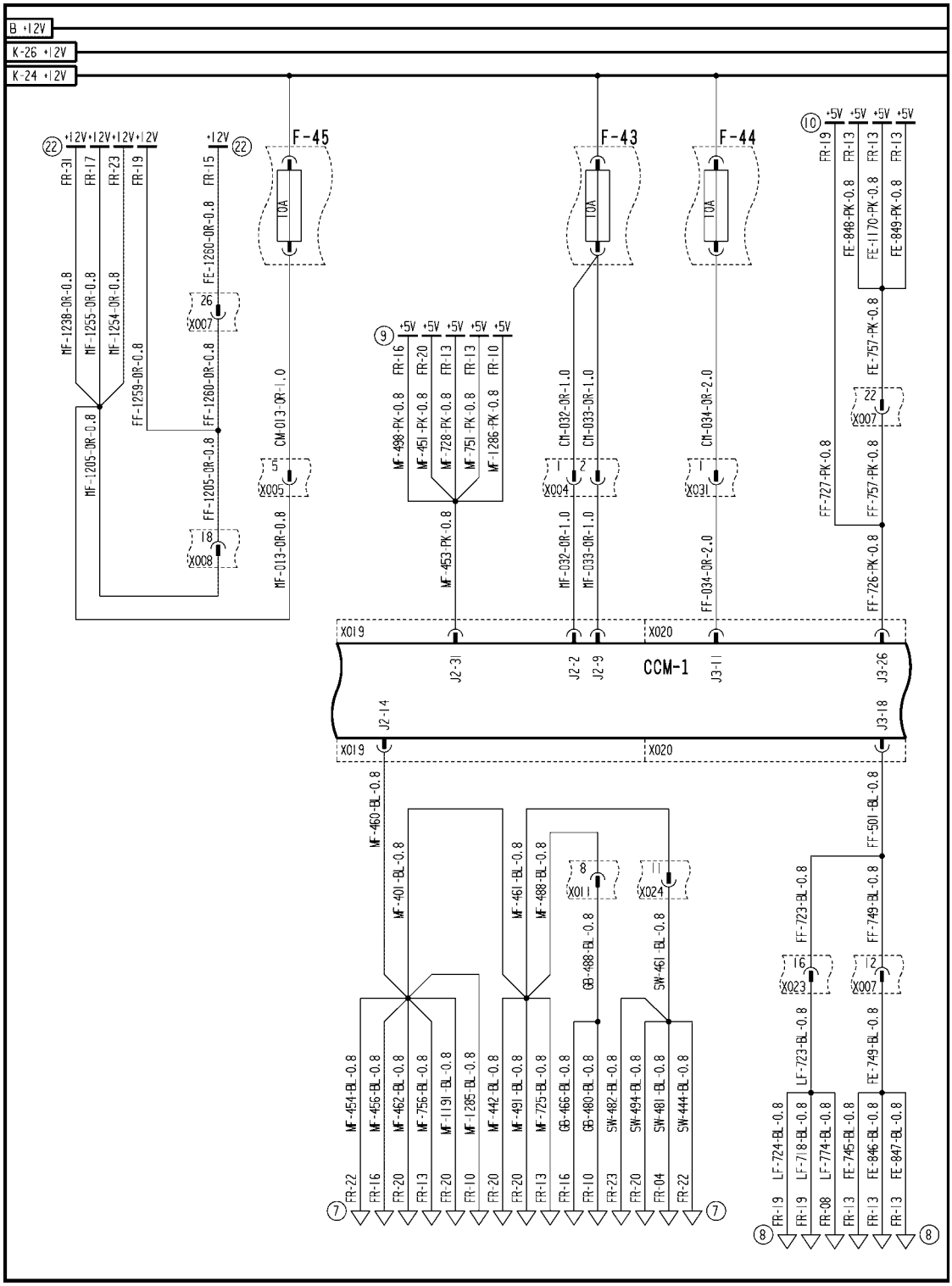
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FRAME 19 - CLEANING

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Motor Shoe leveling motor - Open circuit (K.62.B.28.60 - G.30.B.50)

AFX8010

E0032-05 - Sieve Angle Sensor

Cause:
The shoe leveling actuator M-03 position sensor circuit is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring is open or shorted to ground.
2. Loss of power to the sensor.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "SIEVE ANG SEN" to check the voltage range. The normal operating voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is low (<**0.3 volts** out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at step **8**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connectors are fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect connector **X088**, and use a multimeter to test for voltage on connector **X088** pin A. There should be **5 volts** present.

   A. If **5 volts** is found, continue with step **4**.

   B. If no voltage is found, continue with step **3**.

3. Disconnect connector **X023**, and use a multimeter to test for voltage on connector **X023** pin 17. There should be **5 volts** present.

   A. If **5 volts** is found, there is an open circuit in the lower frame (LF) harness between connector **X088** pin A and connector **X023** pin 17 wire 727 pink. Locate the open and repair.

   B. If no voltage is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 17 and connector **X020** pin J3-26 wire 727 pink or 726 pink. Locate the open and repair.

4. Disconnect connector **X088**. Use a multimeter to check for continuity between connector **X088** pin C and chassis ground. There should not be any continuity.

   A. If continuity is found, continue with step **5**.

   B. If no continuity is found, continue with step **6**.

5. Disconnect connector **X023**. Use a multimeter to check for continuity between connector **X023** pin 15 and chassis ground. There should not be any continuity.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X088** pin C and connector **X023** pin 15 wire 721 yellow. Locate the short and repair.

   B. if continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 15 and connector **X020** pin J3-32 wire 721 yellow. Locate the short and repair.

6. Disconnect connector **X088** and connector **X023**. Use a multimeter to check for continuity between connector **X088** pin C and connector **X023** pin 15. There should be continuity.

   A. If continuity is found, continue with step **7**.

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B. If no continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X088** pin C and connector **X023** pin 15 wire 721 yellow. Locate the open and repair.

7. Carefully disconnect connector **X020** from the bottom of the CCM1 module. Use a multimeter to check for continuity between connector **X023** pin 15 and connector **X020** pin J3-32. There should be continuity.

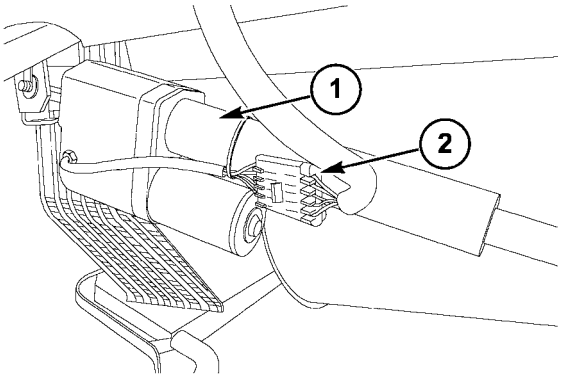
   A. If continuity is found, the open is in the sensor. Replace the sensor.

   B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 15 and connector **X020** pin J3-32 wire 721 yellow. Locate the open and repair.

8. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "SIEVE ANG SEN" voltage.

   A. If no low out of range reading are indicated, erase the fault code and continue operation.

Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10)



40033773A5 1

The shoe leveling actuator M-03 **(1)** is located in front of the cleaning fan on the right side, and is attached between the right side frame and the cleaning shoe. The shoe leveling actuator contains an electrical motor, used to extend and retract the actuator in order to tilt the cleaning shoe, and a linear potentiometer to monitor the angle at which the cleaning shoe is tilted. The shoe leveling actuator is connected (**X088**) to the lower frame (LF) harness at **(2)**, and is connected to the CCM1 module at connector **X020** as follows:

Shoe leveling actuator function	Pin number at CCM1 connector X020
Motor, extend	J3-39, J3-40 = power; J3-19, J3-20 = ground
Motor, retract	J3-19, J3-20 = power; J3-39, J3-40 = ground
Potentiometer	J3-32

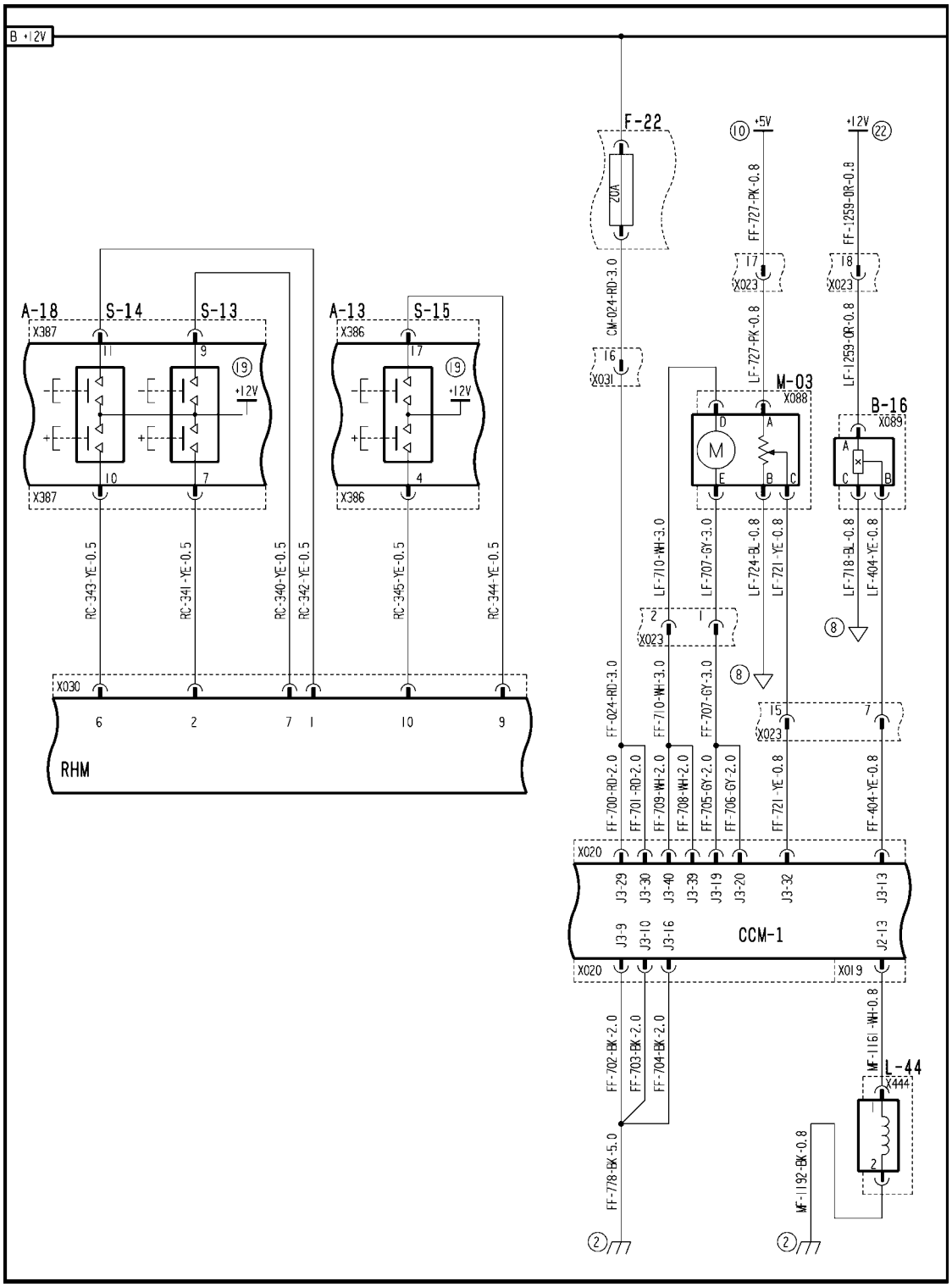
The CCM1 module uses two pairs of pins to send current to the shoe leveling actuator motor. This allows the CCM1 module to reverse the polarity and change the direction of the actuator. The CCM1 module software detects when the self-leveling cleaning shoe makes contact with the frame by detecting when the actuator motor is stalled (sudden amperage increase), and establishes the limit of travel based on input from the potentiometer in the actuator. These limits are NOT stored in non-volatile memory, so they are established at least once (each direction) for every key-on cycle.

The shoe leveling actuator M-03 circuit (both motor and potentiometer) is also monitored by the CCM1 module; in the event that a fault occurs with the actuator or wiring to the actuator, a fault code will be displayed to the operator.

E0032-03 - Sieve Angle Sensor
E0032-05 - Sieve Angle Sensor
E0043-06 - Sieve Angle Current Sense
E0075-11 - Leveling Sieve

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



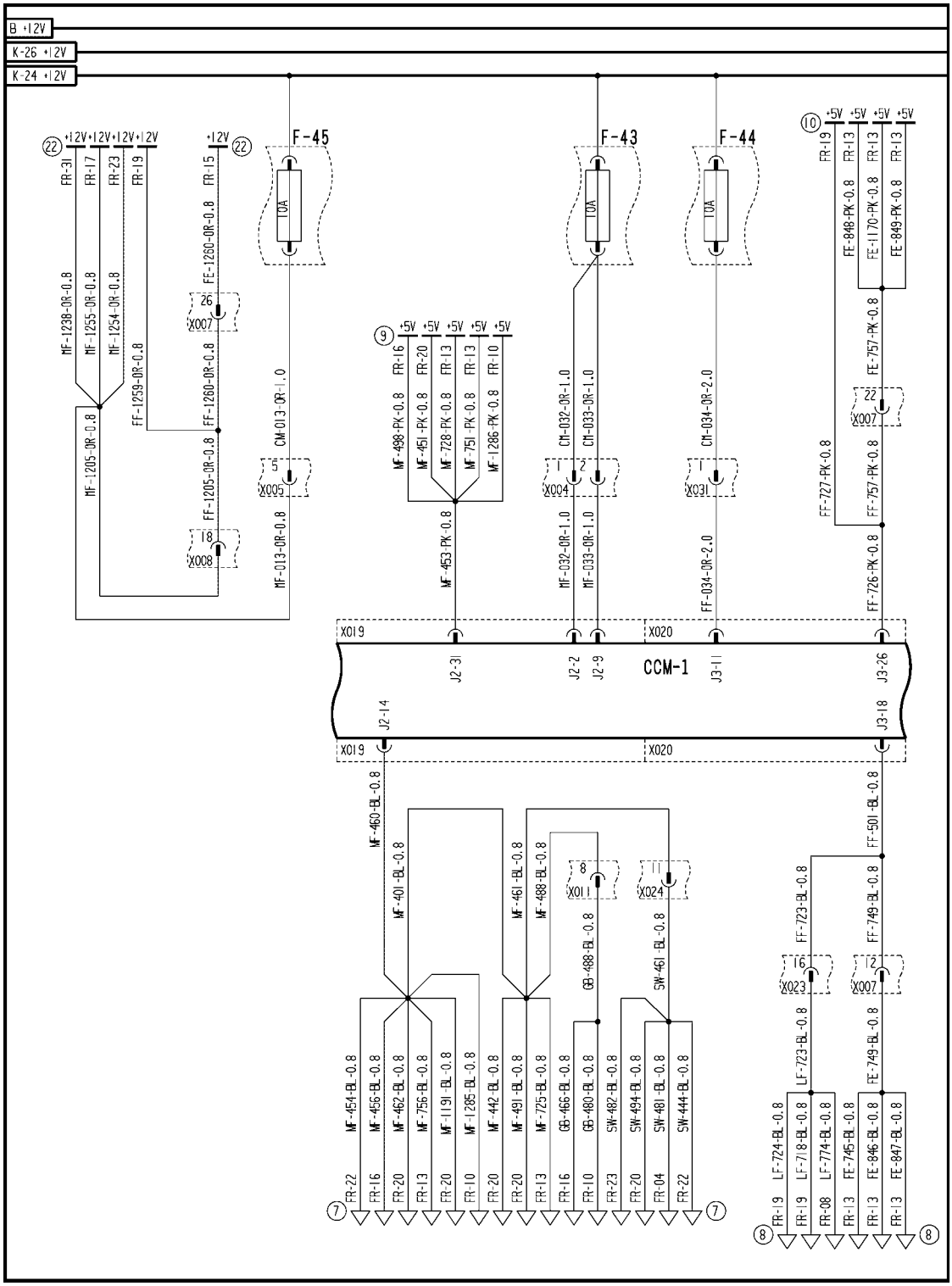
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FRAME 19 - CLEANING

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A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

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F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Motor Shoe leveling motor - Short circuit (K.62.B.28.60 - G.30.B.52)

AFX8010

E0043-06 - Sieve Angle Current Sense

Cause:
The shoe leveling actuator M-03 circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted to ground.
2. Excessive mechanical load on actuator.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the shoe leveling actuator in order to move it in either direction. The CCM module monitors both sides of the circuit during operation, and issues one or both fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "LEVELING SIEVE". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually tilt the cleaning shoe in each direction. Record in which directions the shoe leveling actuator operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for fault codes **E0043-06 - Sieve Angle Current Sense** and **E0075-11 - Leveling Sieve** .
4	Use the appropriate result below to determine the location of the fault.

   A. If the shoe leveling actuator operates in one direction only, and the fault code
   E0043-06 - Sieve Angle Current Sense
   is displayed, continue with step **2**.

   B. If the shoe leveling actuator operates in one direction only, and both fault codes
   E0043-06 - Sieve Angle Current Sense
   and
   E0075-11 - Leveling Sieve
   are displayed, continue with step **3**.

   C. If the shoe leveling actuator does not operate in either direction, and the fault code
   E0043-06 - Sieve Angle Current Sense
   is displayed, continue with step **2**.

   D. If the shoe leveling actuator does not operate in either direction, and both fault codes
   E0043-06 - Sieve Angle Current Sense
   and
   E0075-11 - Leveling Sieve
   are displayed, continue with step **8**.

   E. If the shoe leveling actuator does not operate in either direction, and no fault codes are displayed, continue with step **13**.

2. The self leveling shoe assembly is mechanically bound up, resulting in high current draw.

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A. Refer to the appropriate repair manual chapter for repair and adjustment of the self leveling shoe assembly.

3. Fault codes indicate circuit fault due to short to ground. Disconnect the shoe leveling actuator connector **X088**. Use a multimeter to check for continuity between the actuator side of connector **X088** pins D and E and chassis ground. There should not be any continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the actuator. Replace the shoe leveling actuator.

   B. If there is no continuity to ground, continue with step **4**.

4. Disconnect the batteries by removing the negative battery cables. Use a multimeter to check for continuity between the harness end of connector **X088** pin E and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **5**.

   B. If no continuity is found, continue with step **6**.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the actuator in position. Power must be removed from the module prior to testing for short to ground condition on the actuator circuit to remove this ground path.*

5. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 1 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 1 and connector **X088** pin E wire 707 grey. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 1 and connector **X020** pins J3-19 and J3-20 on one of the following wires; wire 707 grey, connector **X023** pin 1 to FF harness splice, wire 705 grey, harness splice to connector **X020** pin J3-19, and wire 706 grey, connector **X020** pin J3-20. Locate the short and repair.

6. Disconnect connector **X088**. Use a multimeter to check for continuity between the harness end of connector **X088** pin D and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **7**.

   B. If no continuity is found, recheck the actuator for continuity to ground at step **3**.

7. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 2 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 2 and connector **X088** pin D wire 710 white. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 2 and connector **X020**pins J3-39 and J3-40 on one of the following wires; wire 710 white, connector **X023** pin 2 to FF harness splice, wire 708 white, harness splice to connector **X020** pin J3-39, and wire 709 white, connector **X020** pin J3-40. Locate the short and repair.

8. Fault codes indicate circuit fault due to open circuit condition. Disconnect the shoe leveling actuator connector **X088**. Use a multimeter to measure the resistance between the actuator end of connector **X088** pins D and E. The correct resistance is **1 - 5 ohms**.

   A. If the resistance is infinite, there is an open condition in the actuator. Replace the shoe leveling actuator.

   B. If the resistance is within specification, continue with step **9**.

9. Ensure that the batteries cables are securely connected, and that fuse F-22 is good. Use a multimeter to check for continuity between the harness end of connector **X088** pin E and chassis ground. There should be continuity to ground.

   A. If continuity is found, continue with step **11**.

   B. If no continuity is found, continue with step **10**.

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NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the actuator in position, irregardless of key switch position, as long as it receives power through fuse F-22. This ground path may be used to test for an open circuit condition.*

10. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 1 and chassis ground. There should be continuity.

    A. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 1 and connector **X088** pin E wire 707 grey. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 1 and connector **X020** pins J3-19 and J3-20 on one of the following wires; wire 707 grey, connector **X023** pin 1 to FF harness splice, wire 705 grey, harness splice to connector **X020** pin J3-19, or wire 706 grey, harness splice to connector **X020** pin J3-20. Locate the open and repair.

11. Disconnect connector **X088**. Use a multimeter to check from continuity between connector **X088** pin D and chassis ground. There should be continuity to ground.

    A. If no continuity is found, continue with step **12**.

    B. If continuity is found, recheck the motor for continuity as indicated at step **8**.

12. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 2 and chassis ground. There should be continuity.

    A. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 2 and connector **X088** pin D wire 710 white. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 2 and connector **X020** pins J3-39 and J3-40 on one of the following wires; wire 710 white, connector **X023** pin 2 to FF harness splice, wire 708 white, harness splice to connector **X020** pin J3-39, or wire 709 white, harness splice to connector **X020** pin J3-40. Locate the open and repair.

13. If the shoe leveling actuator does not operate in either direction, and there are no fault codes indicated, the supply power for the circuit may not be present. Remove and inspect fuse F-22.

    A. If the fuse has failed, continue with step **14**.

    B. If the fuse is okay, continue with step **15**.

14. If fuse F-22 has failed, replace the fuse.

    A. If the fuse immediately fails, there is a short to ground in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 024 red, from the fuse panel through connector **X031** pin 16 to front frame (FF) harness splice, wire 700 red, harness splice to connector **X020** pin J3-29 on CCM1 module, or wire 701 red, harness splice to connector **X020** pin J3-30 on CCM1 module. Locate the short to ground and repair.

    B. If the fuse is okay, continue with step **15**.

15. Carefully remove connector **X020** from the bottom of the CCM1 module. Use a multimeter to check for voltage on the harness end of connector **X020** pins J3-29 and J3-30. There should be **12 volts**.

    A. If there is no voltage, there is an open circuit in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 024 red, from the fuse panel through connector **X031** pin 16 to front frame (FF) harness splice, wire 700 red, harness splice to connector **X020** pin J3-29 on CCM1 module, or wire 701 red, harness splice to connector **X020** pin J3-30 on CCM1 module. Locate the open and repair. After repair, continue with step **16**.

    B. If there is **12 volts**, continue with step **16**.

16. Carefully remove connector **X020** from the bottom of the CCM1 module. Use a multimeter to check for continuity between the harness end of connector **X020** pins J3-9 and J3-10 and chassis ground. There should be continuity to ground.

    A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness in one of the following wires; wire 702 black, connector **X020** pin J3-9 to front frame (FF) harness splice, wire 703

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black, connector **X020** pin J3-10 to front frame (FF) harness splice, or wire 778 black, FF harness splice to front frame ground #2.Locate the open and repair. After repair, continue with step **17**.

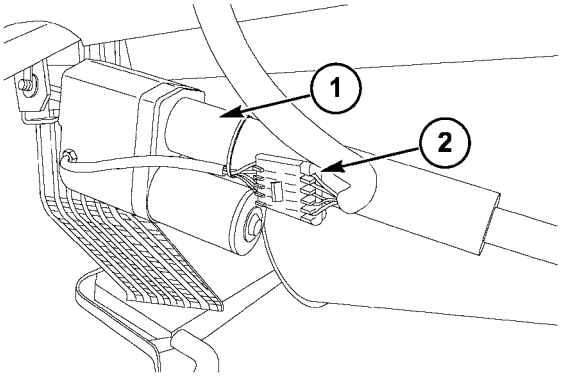
B. If there is continuity to ground, continue with step **17**.

17. Once it has been verified that power is being supplied to the module, recheck circuit operation as described in step 1.

A. If the fuse fails during testing, a short to ground on the circuit to the shoe leveling actuator is causing the fuse to fail. Start the troubleshooting at step **3** to locate the short to ground.

B. If the circuit operates properly, erase the fault codes and continue operation.

Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10)



40033773A5 1

The shoe leveling actuator M-03 **(1)** is located in front of the cleaning fan on the right side, and is attached between the right side frame and the cleaning shoe. The shoe leveling actuator contains an electrical motor, used to extend and retract the actuator in order to tilt the cleaning shoe, and a linear potentiometer to monitor the angle at which the cleaning shoe is tilted. The shoe leveling actuator is connected (**X088**) to the lower frame (LF) harness at **(2)**, and is connected to the CCM1 module at connector **X020** as follows:

Shoe leveling actuator function	Pin number at CCM1 connector X020
Motor, extend	J3-39, J3-40 = power; J3-19, J3-20 = ground
Motor, retract	J3-19, J3-20 = power; J3-39, J3-40 = ground
Potentiometer	J3-32

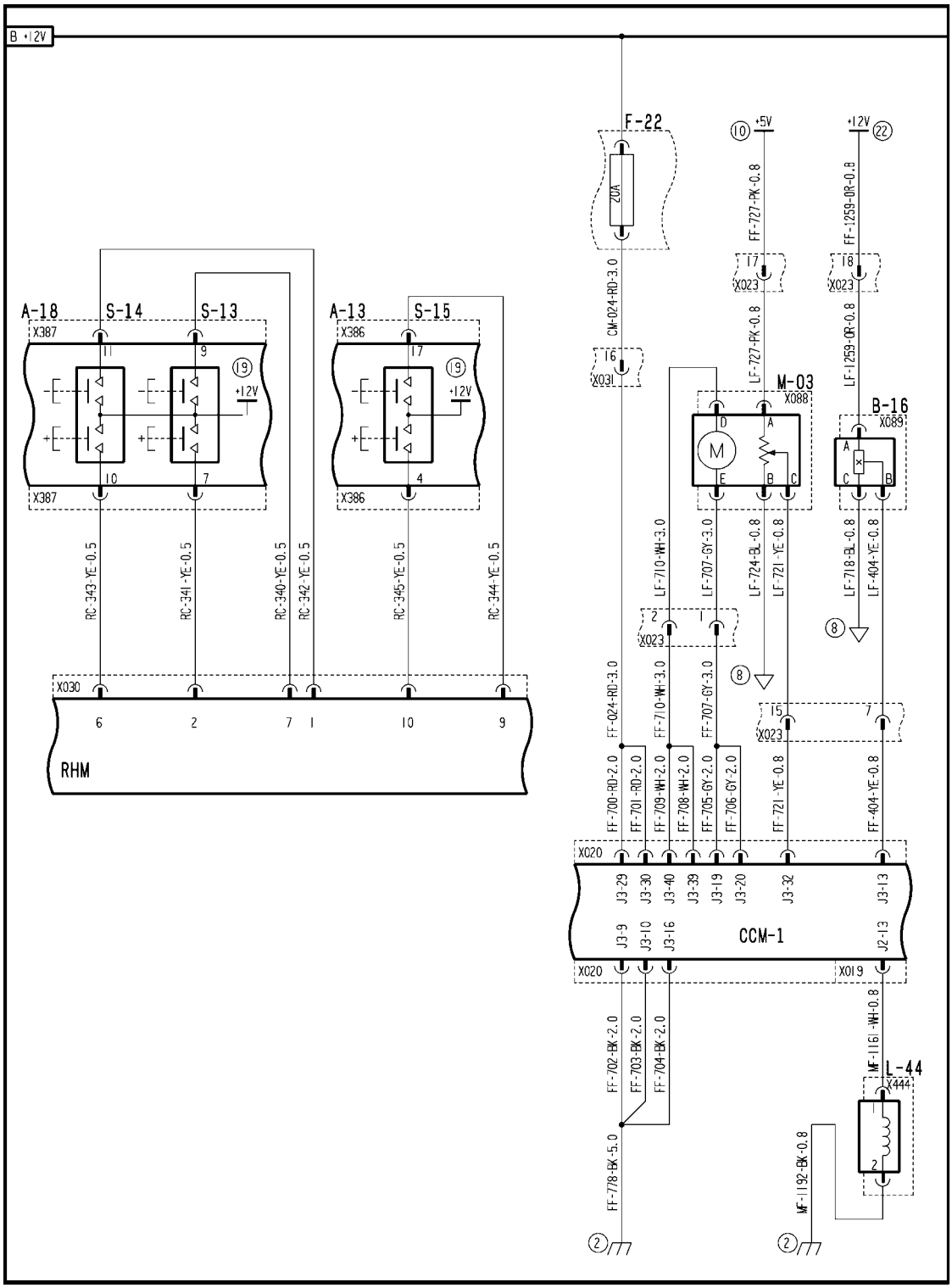
The CCM1 module uses two pairs of pins to send current to the shoe leveling actuator motor. This allows the CCM1 module to reverse the polarity and change the direction of the actuator. The CCM1 module software detects when the self-leveling cleaning shoe makes contact with the frame by detecting when the actuator motor is stalled (sudden amperage increase), and establishes the limit of travel based on input from the potentiometer in the actuator. These limits are NOT stored in non-volatile memory, so they are established at least once (each direction) for every key-on cycle.

The shoe leveling actuator M-03 circuit (both motor and potentiometer) is also monitored by the CCM1 module; in the event that a fault occurs with the actuator or wiring to the actuator, a fault code will be displayed to the operator.

E0032-03 - Sieve Angle Sensor
E0032-05 - Sieve Angle Sensor
E0043-06 - Sieve Angle Current Sense
E0075-11 - Leveling Sieve

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



AFXSCHEM19-04 1

FRAME 19 - CLEANING

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A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

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Motor Shoe leveling motor - Unidentified failure (K.62.B.28.60 - G.30.B.46)

AFX8010

E0075-11 - Leveling Sieve

Cause:
The shoe leveling actuator M-03 circuit indicates high current draw.

Possible failure modes:

1. Circuit connection shorted to ground.
2. Excessive mechanical load on actuator.
3. Controller internal failure (internal regulator failure).

Solution:

1. This is an H-bridge controlled circuit, which reverses the power and ground connections to the shoe leveling actuator in order to move it in either direction. The CCM module monitors both sides of the circuit during operation, and issues one or both fault codes, depending on the failure type detected. Use the following procedure to determine the location of the fault.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "LEVELING SIEVE". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually tilt the cleaning shoe in each direction. Record in which directions the shoe leveling actuator operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for fault codes **E0043-06 - Sieve Angle Current Sense** and **E0075-11 - Leveling Sieve** .
4	Use the appropriate result below to determine the location of the fault.

   A. If the shoe leveling actuator operates in one direction only, and the fault code **E0043-06 - Sieve Angle Current Sense** is displayed, continue with step **2**.

   B. If the shoe leveling actuator operates in one direction only, and both fault codes **E0043-06 - Sieve Angle Current Sense** and **E0075-11 - Leveling Sieve** are displayed, continue with step **3**.

   C. If the shoe leveling actuator does not operate in either direction, and the fault code **E0043-06 - Sieve Angle Current Sense** is displayed, continue with step **2**.

   D. If the shoe leveling actuator does not operate in either direction, and both fault codes **E0043-06 - Sieve Angle Current Sense** and **E0075-11 - Leveling Sieve** are displayed, continue with step **8**.

   E. If the shoe leveling actuator does not operate in either direction, and no fault codes are displayed, continue with step **13**.

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2. The self leveling shoe assembly is mechanically bound up, resulting in high current draw.

   A. Refer to the appropriate repair manual chapter for repair and adjustment of the self leveling shoe assembly.

3. Fault codes indicate circuit fault due to short to ground. Disconnect the shoe leveling actuator connector **X088**. Use a multimeter to check for continuity between the actuator side of connector **X088** pins D and E and chassis ground. There should not be any continuity to ground.

   A. If there is continuity to ground, there is a short to ground in the actuator. Replace the shoe leveling actuator.

   B. If there is no continuity to ground, continue with step **4**.

4. Disconnect the batteries by removing the negative battery cables. Use a multimeter to check for continuity between the harness end of connector **X088** pin E and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **5**.

   B. If no continuity is found, continue with step **6**.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the actuator in position. Power must be removed from the module prior to testing for short to ground condition on the actuator circuit to remove this ground path.*

5. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 1 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 1 and connector **X088** pin E wire 707 grey. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 1 and connector **X020** pins J3-19 and J3-20 on one of the following wires; wire 707 grey, connector **X023** pin 1 to FF harness splice, wire 705 grey, harness splice to connector **X020** pin J3-19, and wire 706 grey, connector **X020** pin J3-20. Locate the short and repair.

6. Disconnect connector **X088**. Use a multimeter to check for continuity between the harness end of connector **X088** pin D and chassis ground. There should not be any continuity to ground.

   A. If continuity is found, continue with step **7**.

   B. If no continuity is found, recheck the actuator for continuity to ground at step **3**.

7. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 2 and chassis ground. There should not be any continuity to ground.

   A. If no continuity is found, there is a short to ground in the lower frame (LF) harness between connector **X023** pin 2 and connector **X088** pin D wire 710 white. Locate the short and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector **X023** pin 2 and connector **X020**pins J3-39 and J3-40 on one of the following wires; wire 710 white, connector **X023** pin 2 to FF harness splice, wire 708 white, harness splice to connector **X020** pin J3-39, and wire 709 white, connector **X020** pin J3-40. Locate the short and repair.

8. Fault codes indicate circuit fault due to open circuit condition. Disconnect the shoe leveling actuator connector **X088**. Use a multimeter to measure the resistance between the actuator end of connector **X088** pins D and E. The correct resistance is **1 - 5 ohms**.

   A. If the resistance is infinite, there is an open condition in the actuator. Replace the shoe leveling actuator.

   B. If the resistance is within specification, continue with step **9**.

9. Ensure that the batteries cables are securely connected, and that fuse F-22 is good. Use a multimeter to check for continuity between the harness end of connector **X088** pin E and chassis ground. There should be continuity to ground.

   A. If continuity is found, continue with step **11**.

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B. If no continuity is found, continue with step **10**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the actuator in position, irregardless of key switch position, as long as it receives power through fuse F-22. This ground path may be used to test for an open circuit condition.*

10. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 1 and chassis ground. There should be continuity.

    A. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 1 and connector **X088** pin E wire 707 grey. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 1 and connector **X020** pins J3-19 and J3-20 on one of the following wires; wire 707 grey, connector **X023** pin 1 to FF harness splice, wire 705 grey, harness splice to connector **X020** pin J3-19, or wire 706 grey, harness splice to connector **X020** pin J3-20. Locate the open and repair.

11. Disconnect connector **X088**. Use a multimeter to check from continuity between connector **X088** pin D and chassis ground. There should be continuity to ground.

    A. If no continuity is found, continue with step **12**.

    B. If continuity is found, recheck the motor for continuity as indicated at step **8**.

12. Disconnect connector **X023**. Use a multimeter to check for continuity between the front frame (FF) harness end of connector **X023** pin 2 and chassis ground. There should be continuity.

    A. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X023** pin 2 and connector **X088** pin D wire 710 white. Locate the open and repair.

    B. If no continuity is found, there is an open circuit in the front frame (FF) harness between connector **X023** pin 2 and connector **X020** pins J3-39 and J3-40 on one of the following wires; wire 710 white, connector **X023** pin 2 to FF harness splice, wire 708 white, harness splice to connector **X020** pin J3-39, or wire 709 white, harness splice to connector **X020** pin J3-40. Locate the open and repair.

13. If the shoe leveling actuator does not operate in either direction, and there are no fault codes indicated, the supply power for the circuit may not be present. Remove and inspect fuse F-22.

    A. If the fuse has failed, continue with step **14**.

    B. If the fuse is okay, continue with step **15**.

14. If fuse F-22 has failed, replace the fuse.

    A. If the fuse immediately fails, there is a short to ground in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 024 red, from the fuse panel through connector **X031** pin 16 to front frame (FF) harness splice, wire 700 red, harness splice to connector **X020** pin J3-29 on CCM1 module, or wire 701 red, harness splice to connector **X020** pin J3-30 on CCM1 module. Locate the short to ground and repair.

    B. If the fuse is okay, continue with step **15**.

15. Carefully remove connector **X020** from the bottom of the CCM1 module. Use a multimeter to check for voltage on the harness end of connector **X020** pins J3-29 and J3-30. There should be **12 volts**.

    A. If there is no voltage, there is an open circuit in the cab main (CM) or front frame (FF) harnesses in one of the following wires; wire 024 red, from the fuse panel through connector **X031** pin 16 to front frame (FF) harness splice, wire 700 red, harness splice to connector **X020** pin J3-29 on CCM1 module, or wire 701 red, harness splice to connector **X020** pin J3-30 on CCM1 module. Locate the open and repair. After repair, continue with step **16**.

    B. If there is **12 volts**, continue with step **16**.

16. Carefully remove connector **X020** from the bottom of the CCM1 module. Use a multimeter to check for continuity between the harness end of connector **X020** pins J3-9 and J3-10 and chassis ground. There should be continuity to ground.

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A. If there is no continuity to ground, there is an open circuit in the front frame (FF) harness in one of the following wires; wire 702 black, connector **X020** pin J3-9 to front frame (FF) harness splice, wire 703 black, connector **X020** pin J3-10 to front frame (FF) harness splice, or wire 778 black, FF harness splice to front frame ground #2.Locate the open and repair. After repair, continue with step **17**.

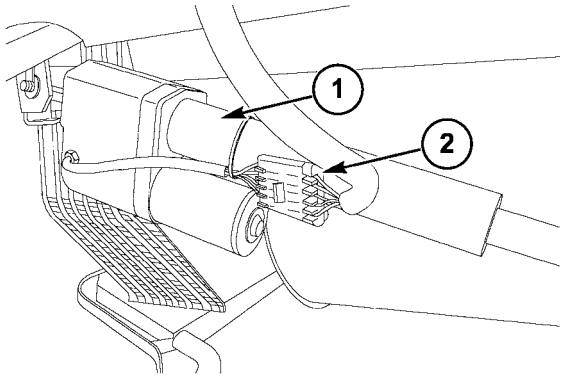
B. If there is continuity to ground, continue with step **17**.

17. Once it has been verified that power is being supplied to the module, recheck circuit operation as described in step 1.

A. If the fuse fails during testing, a short to ground on the circuit to the shoe leveling actuator is causing the fuse to fail. Start the troubleshooting at step **3** to locate the short to ground.

B. If the circuit operates properly, erase the fault codes and continue operation.

Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10)



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The shoe leveling actuator M-03 **(1)** is located in front of the cleaning fan on the right side, and is attached between the right side frame and the cleaning shoe. The shoe leveling actuator contains an electrical motor, used to extend and retract the actuator in order to tilt the cleaning shoe, and a linear potentiometer to monitor the angle at which the cleaning shoe is tilted. The shoe leveling actuator is connected (**X088**) to the lower frame (LF) harness at **(2)**, and is connected to the CCM1 module at connector **X020** as follows:

Shoe leveling actuator function	Pin number at CCM1 connector X020
Motor, extend	J3-39, J3-40 = power; J3-19, J3-20 = ground
Motor, retract	J3-19, J3-20 = power; J3-39, J3-40 = ground
Potentiometer	J3-32

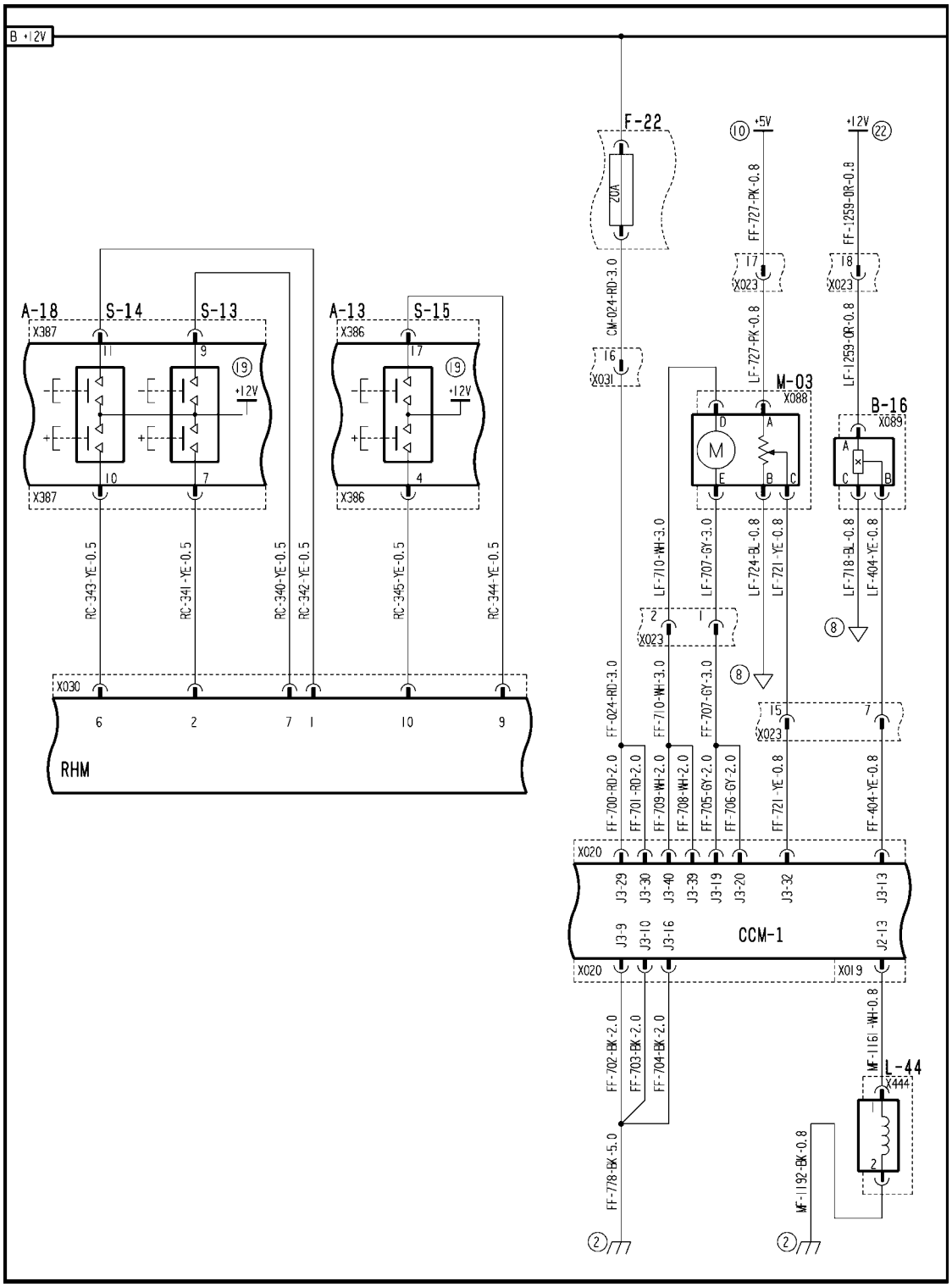
The CCM1 module uses two pairs of pins to send current to the shoe leveling actuator motor. This allows the CCM1 module to reverse the polarity and change the direction of the actuator. The CCM1 module software detects when the self-leveling cleaning shoe makes contact with the frame by detecting when the actuator motor is stalled (sudden amperage increase), and establishes the limit of travel based on input from the potentiometer in the actuator. These limits are NOT stored in non-volatile memory, so they are established at least once (each direction) for every key-on cycle.

The shoe leveling actuator M-03 circuit (both motor and potentiometer) is also monitored by the CCM1 module; in the event that a fault occurs with the actuator or wiring to the actuator, a fault code will be displayed to the operator.

E0032-03 - Sieve Angle Sensor
E0032-05 - Sieve Angle Sensor
E0043-06 - Sieve Angle Current Sense
E0075-11 - Leveling Sieve

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



AFXSCHEM19-04 1

FRAME 19 - CLEANING

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A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

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Motor Lower sieve motor - Short circuit (K.62.B.28.56 - G.30.B.52)

AFX8010

E0300-06 - Lower Sieve Current Sense

Context:
This is an H-bridge-controlled circuit which reverses the power and ground connections to the sieve motors in order to move them in either direction. The lower sieve motor (M07) circuit is paired with the upper sieve motor (M06) circuit, and the module switches between these two circuits using the Upper/Lower sieve relay K-18. Because these circuits are connected and driven from the same module outputs, the troubleshooting procedure must consider both circuits at the same time.

Cause:
The lower sieve motor (M-07) circuit indicates high current draw.

Possible failure modes:

1. Circuit wiring short to ground.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "LOW MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually operate the lower sieve in each direction. Record in which directions the lower sieve actuator operates.
3	Select "UP MTR", and use the "COMMAND" and "ENGAGE" functions to manually operate the upper sieve in each direction. Record in which directions the upper sieve actuator operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0300-06 - Lower Sieve Current Sense** **E0301-06 - Upper Sieve Current Sense** **E0334-11 - Lower Sieve** **E0335-11 - Upper Sieve** .
4	Use the appropriate result below to determine the location of the fault.

A. If the lower sieve operates in one direction only, and the fault code
E0300-06 - Lower Sieve Current Sense
is displayed, continue with step **2**.

B. If the lower sieve operates in one direction only, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **3**.

C. If the lower sieve and upper sieve both operate in one direction only, and the fault codes
E0300-06 - Lower Sieve Current Sense
,
E0301-06 - Upper Sieve Current Sense
,
E0334-11 - Lower Sieve

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and
E0335-11 - Upper Sieve
are displayed, continue with step **8**.

D. If the lower sieve does not operate in either direction, and the fault code
E0334-11 - Lower Sieve
is displayed, continue with step **14**.

E. If the lower sieve does not operate in either direction, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **30**.

F. If the upper sieve operates in one direction only, and the fault code
E0301-06 - Upper Sieve Current Sense
is displayed, continue with step **31**.

G. If the upper sieve operates in one direction only, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **32**.

H. If the upper sieve does not operate in either direction, and the fault code
E0335-11 - Upper Sieve
is displayed, continue with step **37**.

I. If the upper sieve does not operate in either direction, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **45**.

J. If both the lower sieve and upper sieve do not operate in either direction, and the fault codes
E0334-11 - Lower Sieve
and
E0335-11 - Upper Sieve
are displayed, continue with step **46**.

K. If both the lower sieve and upper sieve do not operate in either direction, and there are no fault codes displayed, continue with step **52**.

2. The lower sieve mechanism is mechanically bound up, resulting in high current draw.

   A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the lower sieve and control linkage.

3. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228**. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

4. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

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A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the short and repair.

B. If continuity is found, continue with Step **5**.

5. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

   A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin N and connector **X025** pin 15 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **6**.

6. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

   A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 15 and connector **X219** pin 2 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **7**.

7. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 16 and chassis ground.

   A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 2 and connector **X005** pin 16 wire 790 white. Locate the short and repair.

   B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 16 and the Upper/lower sieve relay K18 pin 5 on the fuse panel. Locate the short and repair.

8. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and/or the upper sieve motor and the CCM3 module. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228** and the upper sieve motor connector **X227**. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

   A. If continuity is found, continue with Step **9**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

9. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

   A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the short and repair.

   B. If continuity is found, continue with Step **10**.

10. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the short and repair.

    B. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin J & P on one of the following wires:
    - wire 785 gray, connector **X025** pin 14 to harness splice
    - wire 791 gray, harness splice to connector **X072** pin J
    - wire 789 gray, harness splice to connector **X072** pin P

    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

11. Remove the Upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between the relay terminal 3 and chassis ground.

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A. If continuity is found, continue with Step **12**.

B. If no continuity is found, erase the fault codes and continue operation.

12. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

A. If continuity is found, continue with Step **13**.

B. If no continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 15 and the Upper/lower sieve relay K18 pin 3 on the fuse panel wire 786 red. Locate the short and repair.

13. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

A. If continuity is found the short to ground is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the short and repair.

B. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the short and repair.

14. Fault codes indicate circuit fault due to open circuit condition. Disconnect the lower sieve motor connector **X228**. Measure the resistance of the motor between terminals D and E. The correct resistance is **3 - 12 ohms**.

A. The resistance is infinite, indicating an open condition in the motor. Replace the lower sieve motor.

B. The resistance is in specification. Continue with Step **15**.

15. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper sieve circuit function.

A. If the lower sieve circuit now functions properly, the relay was faulty, and was not providing continuity between terminals 3 & 5 when energized. Replace the relay.

B. If the lower sieve circuit still does not work, continue with Step **16**.

16. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

A. If continuity is found, continue with Step **19**.

B. If no continuity is found, continue with Step **17**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

17. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the open and repair.

B. If no continuity is found, continue with Step **18**.

18. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin P wire 789 gray or 785 gray. Locate the open and repair.

B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 785 gray. Locate the open and repair.

19. Remove the Upper/lower sieve relay K18 on the fuse panel, and install a jumper wire between terminals 3 & 5. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

A. If no continuity is found, continue with Step **20**.

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B. If continuity is found, recheck the motor for continuity at Step **14**. Erase the fault codes and continue operation.

20. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **21**.

21. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 15 and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **26**.

22. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X219** pin 2 and connector **X025** pin 15 wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **27**.

23. Remove the jumper wire between terminals 3 & 5 for relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 5 and chassis ground.

    A. If no continuity is found, the open circuit is in wire 790 white from the fuse panel through connector **X005** pin 16 to connector **X219** pin 2. Locate the open and repair.

    B. If no continuity is found, continue with Step **28**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than* ***10 ohms*** *above the motor resistance measured in Step 14.*

24. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **29**.

25. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

26. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect lower sieve motor connector **X228**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the lower sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

27. The upper sieve mechanism is mechanically bound up, resulting in high current draw.

    A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the upper sieve linkage.

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28. Fault codes indicate circuit fault due to short to ground between the upper sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the upper sieve motor connector **X227**. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If continuity is found, continue with Step **33**.

    B. If no continuity is found, erase the fault codes and continue operation.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

29. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **34**.

30. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **35**.

31. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **36**.

32. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 3 and connector **X005** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 17 and the Upper/lower sieve relay K18 pin 4 on the fuse panel wire 792 white. Locate the short and repair.

33. Fault codes indicate circuit fault due to open circuit condition. Disconnect the upper sieve motor connector **X227**. Measure the resistance of the motor between terminals A and B. The correct resistance is **3 - 12 ohms**.

    A. The resistance is infinite, indicating an open condition in the motor. Replace the upper sieve motor.

    B. The resistance is in specification. Continue with Step **38**.

34. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X227** pin E and chassis ground.

    A. If continuity is found, continue with Step **37**.

    B. If no continuity is found, continue with Step **35**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

35. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin J and connector **X227** pin E wire 791 gray. Locate the open and repair.

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B. If no continuity is found, continue with Step **36**.

36. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin J and connector **X025** pin 14 wires 791 gray or 785 gray. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the open and repair.

37. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If no continuity is found, continue with Step **38**.

    B. If continuity is found, recheck the motor for continuity at Step **37**. Erase the fault codes and continue operation.

38. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **39**.

39. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **40**.

40. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **41**.

41. Remove the upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 4 and chassis ground.

    A. If no continuity is found, the open circuit is in the cab main (CM) or main frame (MF) harness wire 792 white from the fuse panel through connector **X005** pin 17 to connector **X219** pin 3. Locate the open and repair.

    B. If continuity is found, continue with Step **42**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than **10 ohms** above the motor resistance measured in Step 33.*

42. Reconnect connector **X005**. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If continuity is found, the relay has failed open between terminals 3 and 4. Replace the relay.

    B. If no continuity is found, continue with Step **43**.

43. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **44**.

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44. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X219** pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

45. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect upper sieve motor connector **X227**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the upper sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

46. Fault codes and operating condition indicates that there is an open circuit on shared wiring between the upper sieve motor and lower sieve motor circuits. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper and lower sieve circuit function.

    A. If both circuits now function properly, the relay was faulty, and was not providing continuity between the work terminal 3 and terminals 4 & 5. Replace the relay.

    B. If both circuits still do not work, continue with Step **47**.

47. Ensure that the batteries are connected, and that fuse F23 is good. Remove the Upper/lower sieve relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If no continuity is found, continue with Step **48**.

    B. If continuity is found, continue with Step **50**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F23. This ground path may be used to test for an open circuit condition.*

48. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **49**.

49. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector 219 pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X016** pin J2-21 wire 786 red. Locate the open and repair.

50. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J or P and chassis ground.

    A. If continuity is found, erase the fault code and continue operation.

    B. If no continuity is found, continue with Step **51**.

51. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and the harness splice on wire 785 gray. Locate the open and repair.

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B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 791 gray. Locate the open and repair.

52. If the upper sieve motor and lower sieve motor do not operate in either direction, and there are no error codes indicated, the supply power for the circuit may not be present. Remove fuse F27 and inspect.

A. Fuse has failed. Go to Step **53**.

B. Fuse is okay. Go to Step **56**.

53. If fuse has failed, replace the fuse.

A. If fuse immediately fails, a short to ground exists on the wires to the CCM3 module connectors. Continue with Step **54**.

B. Fuse is okay. Go to Step **56**.

54. Disconnect connector **X005**. Use a multimeter to check for continuity between the harness end of connector **X005** pin 4 and chassis ground.

A. If no continuity is found, there is a short to ground in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, continue with Step **55**.

55. Disconnect connector **X034**. Use a multimeter to check for continuity between the harness end of connector **X034** pin 2 and chassis ground.

A. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, there is a short to ground in the expansion (EX) harness between connector **X034** pin 2, connector **X013** pin J2-11 and connector **X014** pin J3-7 on one of the following wires:
- wire 031 red, connector **X034** pin 2 to harness splice
- wire 511 red, harness splice to connector **X013** pin J2-11
- wire 512 red, harness splice to connector **X014** pin J3-7
Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

56. Test for 12V power at connector **X013** pin J2-11 on the CCM3 module under the cab.

A. If there is no power, there is an open circuit on the power wires to the CCM3 module. Continue with Step **57**.

B. If there is power, go to Step **59**.

57. Disconnect connector **X005**. Use a multimeter to check for 12V at connector **X005** pin 4.

A. If there is no power, there is an open circuit in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If power is found, continue with Step **58**.

58. Disconnect connector **X034**. Use a multimeter to check for 12V at connector **X034** pin 2.

A. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If continuity is found, there is an open circuit in the expansion (EX) harness between connector **X034** pin 2 and connector **X013** pin J2-11 wire 031 red or 511 red. Locate the open and repair.

59. Test for continuity to ground at connector **X013** pin J2-3 on the CCM3 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the expansion (EX) harness from connector **X013** pin J2-3 on CCM3 module to the front frame ground #2 wire 520 black. Locate the open and repair. After repair, go to Step **60**.

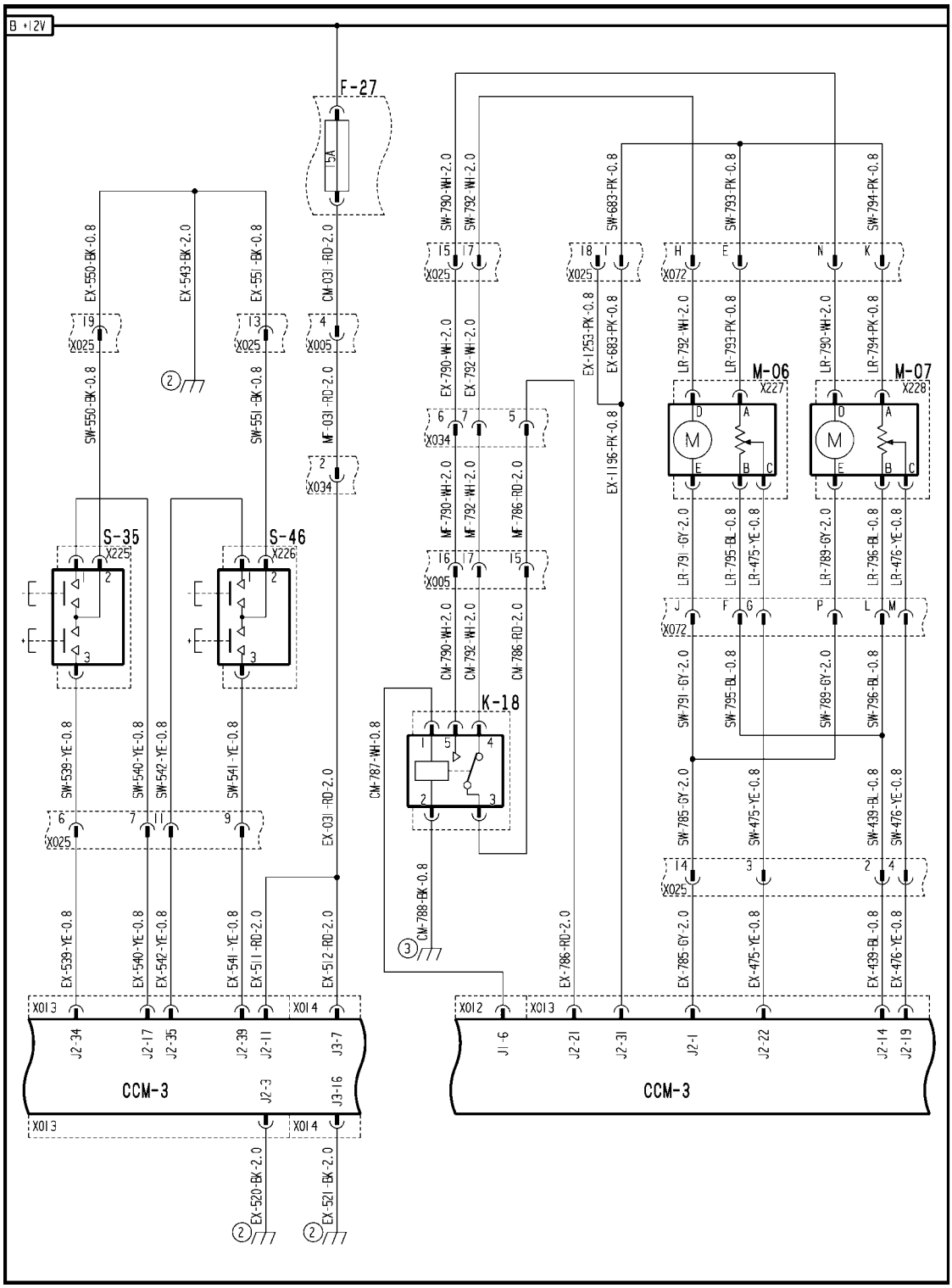
B. If there is continuity to ground, go to Step **60**.

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60. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1.

    A. If the fuse fails during the testing, a short to ground on the circuit being operated at the time of failure is causing the fuse to fail. Use the options located in step **1** to locate the shorted circuit.

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

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F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Motor Upper sieve motor - Short circuit (K.62.B.28.55 - G.30.B.52)

AFX8010

E0301-06 - Upper Sieve Current Sense

Context:
This is an H-bridge-controlled circuit which reverses the power and ground connections to the sieve motors in order to move them in either direction. The lower sieve motor (M07) circuit is paired with the upper sieve motor (M06) circuit, and the module switches between these two circuits using the Upper/Lower sieve relay K-18. Because these circuits are connected and driven from the same module outputs, the troubleshooting procedure must consider both circuits at the same time.

Cause:
The upper sieve motor (M-06) circuit indicates high current draw.

Possible failure modes:

1. Circuit wiring short to ground.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "LOW MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually operate the lower sieve in each direction. Record in which directions the lower sieve actuator operates.
3	Select "UP MTR", and use the "COMMAND" and "ENGAGE" functions to manually operate the upper sieve in each direction. Record in which directions the upper sieve actuator operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0300-06 - Lower Sieve Current Sense** **E0301-06 - Upper Sieve Current Sense** **E0334-11 - Lower Sieve** **E0335-11 - Upper Sieve** .
4	Use the appropriate result below to determine the location of the fault.

A. If the lower sieve operates in one direction only, and the fault code
E0300-06 - Lower Sieve Current Sense
is displayed, continue with step **2**.

B. If the lower sieve operates in one direction only, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **3**.

C. If the lower sieve and upper sieve both operate in one direction only, and the fault codes
E0300-06 - Lower Sieve Current Sense
,
E0301-06 - Upper Sieve Current Sense
,
E0334-11 - Lower Sieve

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and
E0335-11 - Upper Sieve
are displayed, continue with step **8**.

D. If the lower sieve does not operate in either direction, and the fault code
E0334-11 - Lower Sieve
is displayed, continue with step **14**.

E. If the lower sieve does not operate in either direction, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **30**.

F. If the upper sieve operates in one direction only, and the fault code
E0301-06 - Upper Sieve Current Sense
is displayed, continue with step **31**.

G. If the upper sieve operates in one direction only, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **32**.

H. If the upper sieve does not operate in either direction, and the fault code
E0335-11 - Upper Sieve
is displayed, continue with step **37**.

I. If the upper sieve does not operate in either direction, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **45**.

J. If both the lower sieve and upper sieve do not operate in either direction, and the fault codes
E0334-11 - Lower Sieve
and
E0335-11 - Upper Sieve
are displayed, continue with step **46**.

K. If both the lower sieve and upper sieve do not operate in either direction, and there are no fault codes displayed, continue with step **52**.

2. The lower sieve mechanism is mechanically bound up, resulting in high current draw.

   A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the lower sieve and control linkage.

3. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228**. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

4. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

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A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the short and repair.

B. If continuity is found, continue with Step **5**.

5. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

   A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin N and connector **X025** pin 15 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **6**.

6. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

   A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 15 and connector **X219** pin 2 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **7**.

7. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 16 and chassis ground.

   A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 2 and connector **X005** pin 16 wire 790 white. Locate the short and repair.

   B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 16 and the Upper/lower sieve relay K18 pin 5 on the fuse panel. Locate the short and repair.

8. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and/or the upper sieve motor and the CCM3 module. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228** and the upper sieve motor connector **X227**. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

   A. If continuity is found, continue with Step **9**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

9. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

   A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the short and repair.

   B. If continuity is found, continue with Step **10**.

10. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the short and repair.

    B. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin J & P on one of the following wires:
    - wire 785 gray, connector **X025** pin 14 to harness splice
    - wire 791 gray, harness splice to connector **X072** pin J
    - wire 789 gray, harness splice to connector **X072** pin P

    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

11. Remove the Upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between the relay terminal 3 and chassis ground.

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A. If continuity is found, continue with Step **12**.

B. If no continuity is found, erase the fault codes and continue operation.

12. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

A. If continuity is found, continue with Step **13**.

B. If no continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 15 and the Upper/lower sieve relay K18 pin 3 on the fuse panel wire 786 red. Locate the short and repair.

13. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

A. If continuity is found the short to ground is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the short and repair.

B. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the short and repair.

14. Fault codes indicate circuit fault due to open circuit condition. Disconnect the lower sieve motor connector **X228**. Measure the resistance of the motor between terminals D and E. The correct resistance is **3 - 12 ohms**.

A. The resistance is infinite, indicating an open condition in the motor. Replace the lower sieve motor.

B. The resistance is in specification. Continue with Step **15**.

15. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper sieve circuit function.

A. If the lower sieve circuit now functions properly, the relay was faulty, and was not providing continuity between terminals 3 & 5 when energized. Replace the relay.

B. If the lower sieve circuit still does not work, continue with Step **16**.

16. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

A. If continuity is found, continue with Step **19**.

B. If no continuity is found, continue with Step **17**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

17. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the open and repair.

B. If no continuity is found, continue with Step **18**.

18. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin P wire 789 gray or 785 gray. Locate the open and repair.

B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 785 gray. Locate the open and repair.

19. Remove the Upper/lower sieve relay K18 on the fuse panel, and install a jumper wire between terminals 3 & 5. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

A. If no continuity is found, continue with Step **20**.

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B. If continuity is found, recheck the motor for continuity at Step **14**. Erase the fault codes and continue operation.

20. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **21**.

21. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 15 and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **26**.

22. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X219** pin 2 and connector **X025** pin 15 wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **27**.

23. Remove the jumper wire between terminals 3 & 5 for relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 5 and chassis ground.

    A. If no continuity is found, the open circuit is in wire 790 white from the fuse panel through connector **X005** pin 16 to connector **X219** pin 2. Locate the open and repair.

    B. If no continuity is found, continue with Step **28**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than* ***10 ohms*** *above the motor resistance measured in Step 14.*

24. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **29**.

25. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

26. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect lower sieve motor connector **X228**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the lower sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

27. The upper sieve mechanism is mechanically bound up, resulting in high current draw.

    A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the upper sieve linkage.

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28. Fault codes indicate circuit fault due to short to ground between the upper sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the upper sieve motor connector **X227**. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If continuity is found, continue with Step **33**.

    B. If no continuity is found, erase the fault codes and continue operation.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

29. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **34**.

30. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **35**.

31. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **36**.

32. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 3 and connector **X005** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 17 and the Upper/lower sieve relay K18 pin 4 on the fuse panel wire 792 white. Locate the short and repair.

33. Fault codes indicate circuit fault due to open circuit condition. Disconnect the upper sieve motor connector **X227**. Measure the resistance of the motor between terminals A and B. The correct resistance is **3 - 12 ohms**.

    A. The resistance is infinite, indicating an open condition in the motor. Replace the upper sieve motor.

    B. The resistance is in specification. Continue with Step **38**.

34. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X227** pin E and chassis ground.

    A. If continuity is found, continue with Step **37**.

    B. If no continuity is found, continue with Step **35**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

35. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin J and connector **X227** pin E wire 791 gray. Locate the open and repair.

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B. If no continuity is found, continue with Step **36**.

36. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin J and connector **X025** pin 14 wires 791 gray or 785 gray. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the open and repair.

37. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If no continuity is found, continue with Step **38**.

    B. If continuity is found, recheck the motor for continuity at Step **37**. Erase the fault codes and continue operation.

38. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **39**.

39. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **40**.

40. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **41**.

41. Remove the upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 4 and chassis ground.

    A. If no continuity is found, the open circuit is in the cab main (CM) or main frame (MF) harness wire 792 white from the fuse panel through connector **X005** pin 17 to connector **X219** pin 3. Locate the open and repair.

    B. If continuity is found, continue with Step **42**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than **10 ohms** above the motor resistance measured in Step 33.*

42. Reconnect connector **X005**. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If continuity is found, the relay has failed open between terminals 3 and 4. Replace the relay.

    B. If no continuity is found, continue with Step **43**.

43. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **44**.

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44. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X219** pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

45. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect upper sieve motor connector **X227**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the upper sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

46. Fault codes and operating condition indicates that there is an open circuit on shared wiring between the upper sieve motor and lower sieve motor circuits. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper and lower sieve circuit function.

    A. If both circuits now function properly, the relay was faulty, and was not providing continuity between the work terminal 3 and terminals 4 & 5. Replace the relay.

    B. If both circuits still do not work, continue with Step **47**.

47. Ensure that the batteries are connected, and that fuse F23 is good. Remove the Upper/lower sieve relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If no continuity is found, continue with Step **48**.

    B. If continuity is found, continue with Step **50**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F23. This ground path may be used to test for an open circuit condition.*

48. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **49**.

49. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector 219 pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X016** pin J2-21 wire 786 red. Locate the open and repair.

50. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J or P and chassis ground.

    A. If continuity is found, erase the fault code and continue operation.

    B. If no continuity is found, continue with Step **51**.

51. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and the harness splice on wire 785 gray. Locate the open and repair.

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B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 791 gray. Locate the open and repair.

52. If the upper sieve motor and lower sieve motor do not operate in either direction, and there are no error codes indicated, the supply power for the circuit may not be present. Remove fuse F27 and inspect.

A. Fuse has failed. Go to Step **53**.

B. Fuse is okay. Go to Step **56**.

53. If fuse has failed, replace the fuse.

A. If fuse immediately fails, a short to ground exists on the wires to the CCM3 module connectors. Continue with Step **54**.

B. Fuse is okay. Go to Step **56**.

54. Disconnect connector **X005**. Use a multimeter to check for continuity between the harness end of connector **X005** pin 4 and chassis ground.

A. If no continuity is found, there is a short to ground in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, continue with Step **55**.

55. Disconnect connector **X034**. Use a multimeter to check for continuity between the harness end of connector **X034** pin 2 and chassis ground.

A. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, there is a short to ground in the expansion (EX) harness between connector **X034** pin 2, connector **X013** pin J2-11 and connector **X014** pin J3-7 on one of the following wires:
- wire 031 red, connector **X034** pin 2 to harness splice
- wire 511 red, harness splice to connector **X013** pin J2-11
- wire 512 red, harness splice to connector **X014** pin J3-7
Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

56. Test for 12V power at connector **X013** pin J2-11 on the CCM3 module under the cab.

A. If there is no power, there is an open circuit on the power wires to the CCM3 module. Continue with Step **57**.

B. If there is power, go to Step **59**.

57. Disconnect connector **X005**. Use a multimeter to check for 12V at connector **X005** pin 4.

A. If there is no power, there is an open circuit in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If power is found, continue with Step **58**.

58. Disconnect connector **X034**. Use a multimeter to check for 12V at connector **X034** pin 2.

A. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If continuity is found, there is an open circuit in the expansion (EX) harness between connector **X034** pin 2 and connector **X013** pin J2-11 wire 031 red or 511 red. Locate the open and repair.

59. Test for continuity to ground at connector **X013** pin J2-3 on the CCM3 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the expansion (EX) harness from connector **X013** pin J2-3 on CCM3 module to the front frame ground #2 wire 520 black. Locate the open and repair. After repair, go to Step **60**.

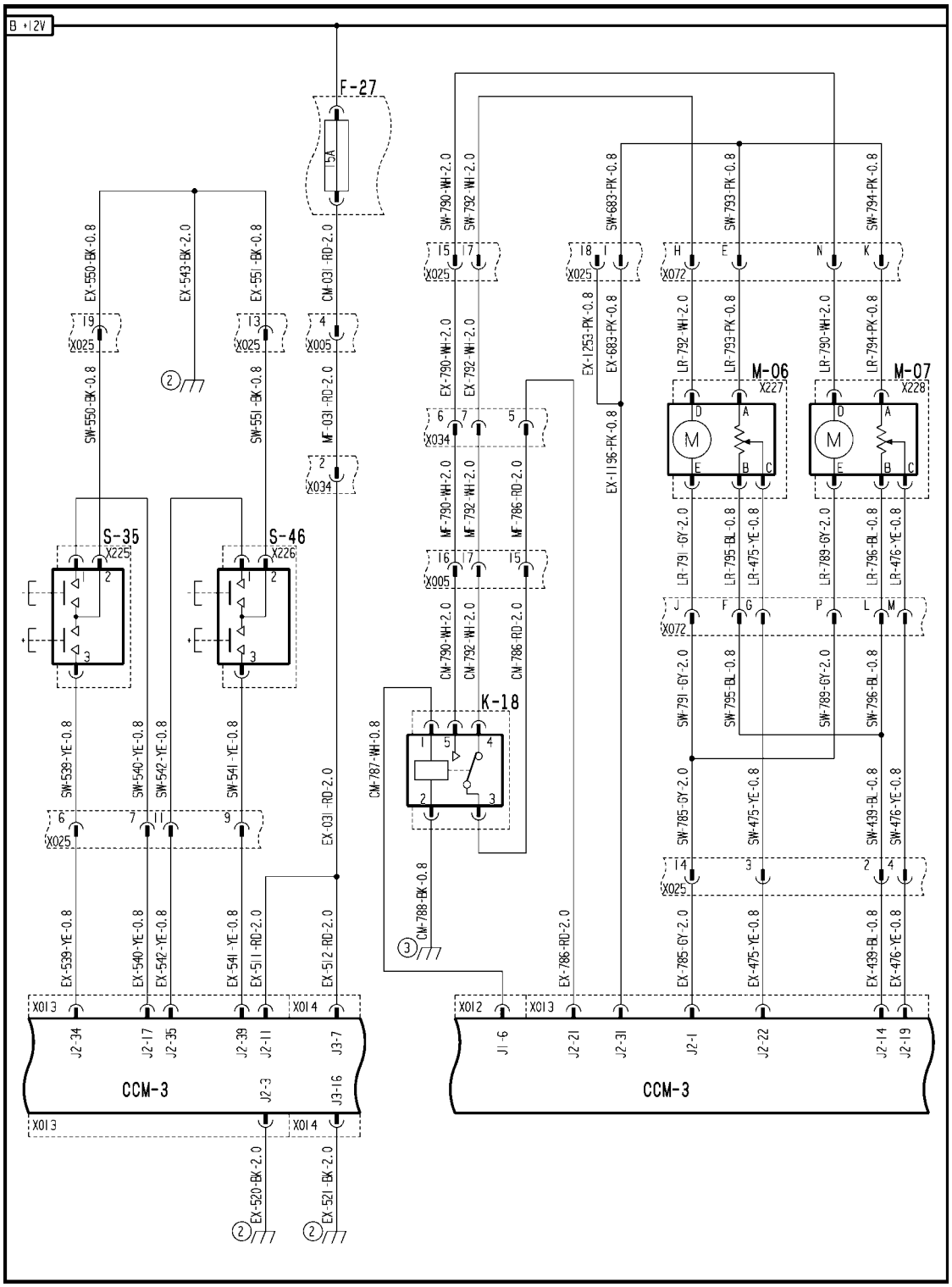
B. If there is continuity to ground, go to Step **60**.

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60. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1.

    A. If the fuse fails during the testing, a short to ground on the circuit being operated at the time of failure is causing the fuse to fail. Use the options located in step **1** to locate the shorted circuit.

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

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F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Motor Lower sieve motor - Unidentified failure (K.62.B.28.56 - G.30.B.46)

AFX8010

E0334-11 - Lower Sieve

Context:
This is an H-bridge-controlled circuit which reverses the power and ground connections to the sieve motors in order to move them in either direction. The lower sieve motor (M07) circuit is paired with the upper sieve motor (M06) circuit, and the module switches between these two circuits using the Upper/Lower sieve relay K-18. Because these circuits are connected and driven from the same module outputs, the troubleshooting procedure must consider both circuits at the same time.

Cause:
The lower sieve motor (M-07) circuit is open, or shorted to ground.

Possible failure modes:

1. Circuit wiring open, or shorted to ground.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "LOW MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually operate the lower sieve in each direction. Record in which directions the lower sieve actuator operates.
3	Select "UP MTR", and use the "COMMAND" and "ENGAGE" functions to manually operate the upper sieve in each direction. Record in which directions the upper sieve actuator operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0300-06 - Lower Sieve Current Sense** **E0301-06 - Upper Sieve Current Sense** **E0334-11 - Lower Sieve** **E0335-11 - Upper Sieve** .
4	Use the appropriate result below to determine the location of the fault.

A. If the lower sieve operates in one direction only, and the fault code
E0300-06 - Lower Sieve Current Sense
is displayed, continue with step **2**.

B. If the lower sieve operates in one direction only, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **3**.

C. If the lower sieve and upper sieve both operate in one direction only, and the fault codes
E0300-06 - Lower Sieve Current Sense
,
E0301-06 - Upper Sieve Current Sense
,

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E0334-11 - Lower Sieve
and
E0335-11 - Upper Sieve
are displayed, continue with step **8**.

D. If the lower sieve does not operate in either direction, and the fault code
E0334-11 - Lower Sieve
is displayed, continue with step **14**.

E. If the lower sieve does not operate in either direction, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **30**.

F. If the upper sieve operates in one direction only, and the fault code
E0301-06 - Upper Sieve Current Sense
is displayed, continue with step **31**.

G. If the upper sieve operates in one direction only, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **32**.

H. If the upper sieve does not operate in either direction, and the fault code
E0335-11 - Upper Sieve
is displayed, continue with step **37**.

I. If the upper sieve does not operate in either direction, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **45**.

J. If both the lower sieve and upper sieve do not operate in either direction, and the fault codes
E0334-11 - Lower Sieve
and
E0335-11 - Upper Sieve
are displayed, continue with step **46**.

K. If both the lower sieve and upper sieve do not operate in either direction, and there are no fault codes displayed, continue with step **52**.

2. The lower sieve mechanism is mechanically bound up, resulting in high current draw.

   A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the lower sieve and control linkage.

3. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228**. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

4. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

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A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the short and repair.

B. If continuity is found, continue with Step **5**.

5. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

   A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin N and connector **X025** pin 15 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **6**.

6. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

   A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 15 and connector **X219** pin 2 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **7**.

7. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 16 and chassis ground.

   A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 2 and connector **X005** pin 16 wire 790 white. Locate the short and repair.

   B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 16 and the Upper/lower sieve relay K18 pin 5 on the fuse panel. Locate the short and repair.

8. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and/or the upper sieve motor and the CCM3 module. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228** and the upper sieve motor connector **X227**. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

   A. If continuity is found, continue with Step **9**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

9. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

   A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the short and repair.

   B. If continuity is found, continue with Step **10**.

10. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the short and repair.

    B. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin J & P on one of the following wires:
    - wire 785 gray, connector **X025** pin 14 to harness splice
    - wire 791 gray, harness splice to connector **X072** pin J
    - wire 789 gray, harness splice to connector **X072** pin P

    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

11. Remove the Upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between the relay terminal 3 and chassis ground.

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A. If continuity is found, continue with Step **12**.

B. If no continuity is found, erase the fault codes and continue operation.

12. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

A. If continuity is found, continue with Step **13**.

B. If no continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 15 and the Upper/lower sieve relay K18 pin 3 on the fuse panel wire 786 red. Locate the short and repair.

13. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

A. If continuity is found the short to ground is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the short and repair.

B. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the short and repair.

14. Fault codes indicate circuit fault due to open circuit condition. Disconnect the lower sieve motor connector **X228**. Measure the resistance of the motor between terminals D and E. The correct resistance is **3 - 12 ohms**.

A. The resistance is infinite, indicating an open condition in the motor. Replace the lower sieve motor.

B. The resistance is in specification. Continue with Step **15**.

15. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper sieve circuit function.

A. If the lower sieve circuit now functions properly, the relay was faulty, and was not providing continuity between terminals 3 & 5 when energized. Replace the relay.

B. If the lower sieve circuit still does not work, continue with Step **16**.

16. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

A. If continuity is found, continue with Step **19**.

B. If no continuity is found, continue with Step **17**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

17. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the open and repair.

B. If no continuity is found, continue with Step **18**.

18. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin P wire 789 gray or 785 gray. Locate the open and repair.

B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 785 gray. Locate the open and repair.

19. Remove the Upper/lower sieve relay K18 on the fuse panel, and install a jumper wire between terminals 3 & 5. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

A. If no continuity is found, continue with Step **20**.

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B. If continuity is found, recheck the motor for continuity at Step **14**. Erase the fault codes and continue operation.

20. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **21**.

21. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 15 and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **26**.

22. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X219** pin 2 and connector **X025** pin 15 wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **27**.

23. Remove the jumper wire between terminals 3 & 5 for relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 5 and chassis ground.

    A. If no continuity is found, the open circuit is in wire 790 white from the fuse panel through connector **X005** pin 16 to connector **X219** pin 2. Locate the open and repair.

    B. If no continuity is found, continue with Step **28**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than* ***10 ohms*** *above the motor resistance measured in Step 14.*

24. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **29**.

25. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

26. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect lower sieve motor connector **X228**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the lower sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

27. The upper sieve mechanism is mechanically bound up, resulting in high current draw.

    A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the upper sieve linkage.

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28. Fault codes indicate circuit fault due to short to ground between the upper sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the upper sieve motor connector **X227**. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If continuity is found, continue with Step **33**.

    B. If no continuity is found, erase the fault codes and continue operation.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

29. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **34**.

30. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **35**.

31. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **36**.

32. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 3 and connector **X005** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 17 and the Upper/lower sieve relay K18 pin 4 on the fuse panel wire 792 white. Locate the short and repair.

33. Fault codes indicate circuit fault due to open circuit condition. Disconnect the upper sieve motor connector **X227**. Measure the resistance of the motor between terminals A and B. The correct resistance is **3 - 12 ohms**.

    A. The resistance is infinite, indicating an open condition in the motor. Replace the upper sieve motor.

    B. The resistance is in specification. Continue with Step **38**.

34. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X227** pin E and chassis ground.

    A. If continuity is found, continue with Step **37**.

    B. If no continuity is found, continue with Step **35**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

35. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin J and connector **X227** pin E wire 791 gray. Locate the open and repair.

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B. If no continuity is found, continue with Step **36**.

36. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin J and connector **X025** pin 14 wires 791 gray or 785 gray. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the open and repair.

37. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If no continuity is found, continue with Step **38**.

    B. If continuity is found, recheck the motor for continuity at Step **37**. Erase the fault codes and continue operation.

38. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **39**.

39. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **40**.

40. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **41**.

41. Remove the upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 4 and chassis ground.

    A. If no continuity is found, the open circuit is in the cab main (CM) or main frame (MF) harness wire 792 white from the fuse panel through connector **X005** pin 17 to connector **X219** pin 3. Locate the open and repair.

    B. If continuity is found, continue with Step **42**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than **10 ohms** above the motor resistance measured in Step 33.*

42. Reconnect connector **X005**. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If continuity is found, the relay has failed open between terminals 3 and 4. Replace the relay.

    B. If no continuity is found, continue with Step **43**.

43. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **44**.

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44. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X219** pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

45. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect upper sieve motor connector **X227**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the upper sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

46. Fault codes and operating condition indicates that there is an open circuit on shared wiring between the upper sieve motor and lower sieve motor circuits. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper and lower sieve circuit function.

    A. If both circuits now function properly, the relay was faulty, and was not providing continuity between the work terminal 3 and terminals 4 & 5. Replace the relay.

    B. If both circuits still do not work, continue with Step **47**.

47. Ensure that the batteries are connected, and that fuse F23 is good. Remove the Upper/lower sieve relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If no continuity is found, continue with Step **48**.

    B. If continuity is found, continue with Step **50**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F23. This ground path may be used to test for an open circuit condition.*

48. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **49**.

49. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector 219 pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X016** pin J2-21 wire 786 red. Locate the open and repair.

50. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J or P and chassis ground.

    A. If continuity is found, erase the fault code and continue operation.

    B. If no continuity is found, continue with Step **51**.

51. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and the harness splice on wire 785 gray. Locate the open and repair.

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B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 791 gray. Locate the open and repair.

52. If the upper sieve motor and lower sieve motor do not operate in either direction, and there are no error codes indicated, the supply power for the circuit may not be present. Remove fuse F27 and inspect.

A. Fuse has failed. Go to Step **53**.

B. Fuse is okay. Go to Step **56**.

53. If fuse has failed, replace the fuse.

A. If fuse immediately fails, a short to ground exists on the wires to the CCM3 module connectors. Continue with Step **54**.

B. Fuse is okay. Go to Step **56**.

54. Disconnect connector **X005**. Use a multimeter to check for continuity between the harness end of connector **X005** pin 4 and chassis ground.

A. If no continuity is found, there is a short to ground in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, continue with Step **55**.

55. Disconnect connector **X034**. Use a multimeter to check for continuity between the harness end of connector **X034** pin 2 and chassis ground.

A. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, there is a short to ground in the expansion (EX) harness between connector **X034** pin 2, connector **X013** pin J2-11 and connector **X014** pin J3-7 on one of the following wires:
- wire 031 red, connector **X034** pin 2 to harness splice
- wire 511 red, harness splice to connector **X013** pin J2-11
- wire 512 red, harness splice to connector **X014** pin J3-7
Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

56. Test for 12V power at connector **X013** pin J2-11 on the CCM3 module under the cab.

A. If there is no power, there is an open circuit on the power wires to the CCM3 module. Continue with Step **57**.

B. If there is power, go to Step **59**.

57. Disconnect connector **X005**. Use a multimeter to check for 12V at connector **X005** pin 4.

A. If there is no power, there is an open circuit in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If power is found, continue with Step **58**.

58. Disconnect connector **X034**. Use a multimeter to check for 12V at connector **X034** pin 2.

A. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If continuity is found, there is an open circuit in the expansion (EX) harness between connector **X034** pin 2 and connector **X013** pin J2-11 wire 031 red or 511 red. Locate the open and repair.

59. Test for continuity to ground at connector **X013** pin J2-3 on the CCM3 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the expansion (EX) harness from connector **X013** pin J2-3 on CCM3 module to the front frame ground #2 wire 520 black. Locate the open and repair. After repair, go to Step **60**.

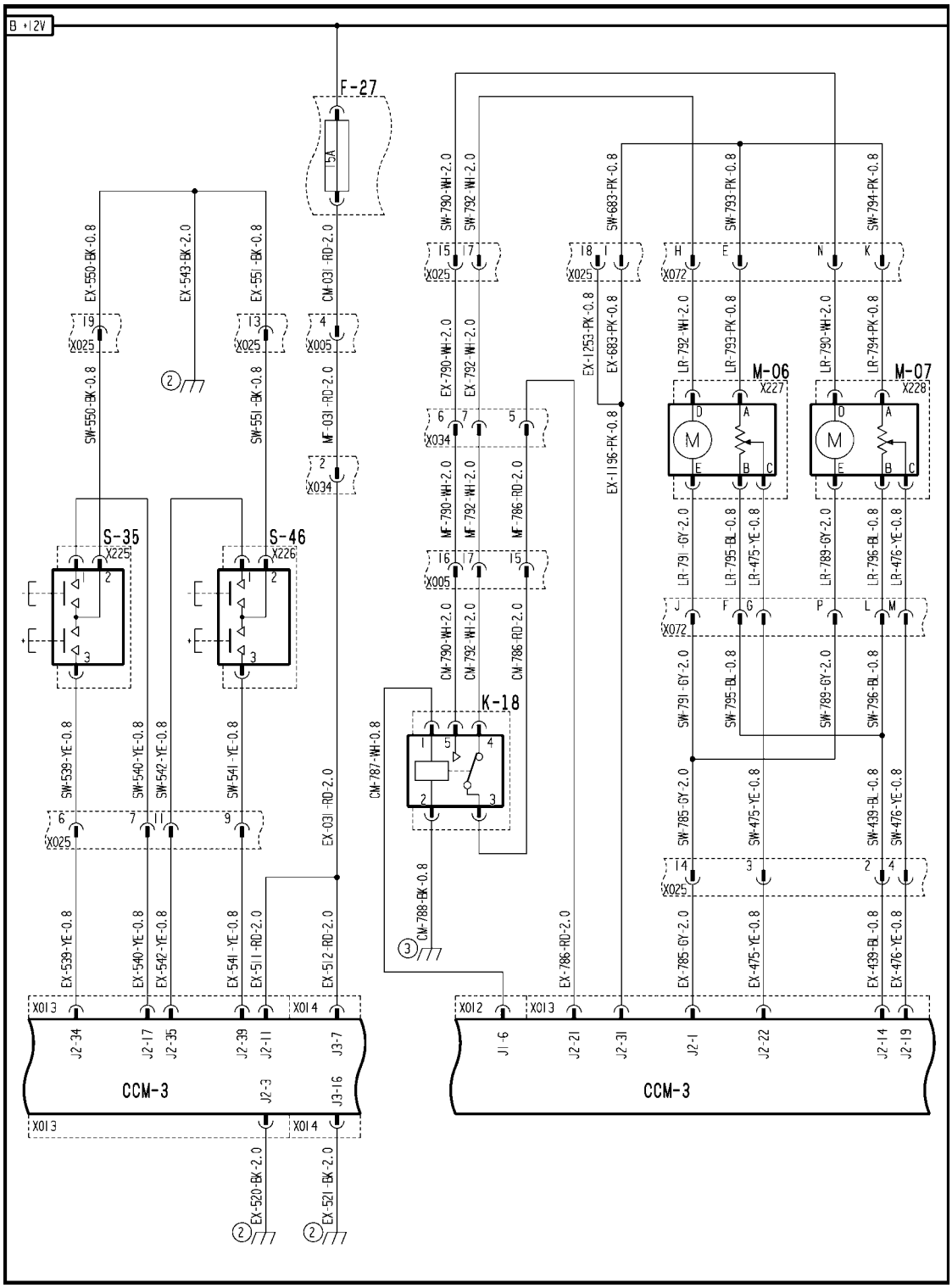
B. If there is continuity to ground, go to Step **60**.

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60. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1.

    A. If the fuse fails during the testing, a short to ground on the circuit being operated at the time of failure is causing the fuse to fail. Use the options located in step **1** to locate the shorted circuit.

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

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F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Motor Upper sieve motor - Unidentified failure (K.62.B.28.55 - G.30.B.46)

AFX8010

E0335-11 - Upper Sieve

Context:
This is an H-bridge-controlled circuit which reverses the power and ground connections to the sieve motors in order to move them in either direction. The lower sieve motor (M07) circuit is paired with the upper sieve motor (M06) circuit, and the module switches between these two circuits using the Upper/Lower sieve relay K-18. Because these circuits are connected and driven from the same module outputs, the troubleshooting procedure must consider both circuits at the same time.

Cause:
The upper sieve motor (M-06) circuit is open, or shorted to ground.

Possible failure modes:

1. Circuit wiring open or shorted to ground.
2. Excessive mechanical load on motor.
3. Controller internal failure (internal regulator failure).

Solution:

1.

Step	Description
1	Enter the Universal Display Plus "ERROR" screen. Record the error list, and then select "CLEAR". Clear all errors from the CCM1 module.
2	Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "LOW MTR". Start the combine, and use the "COMMAND" and "ENGAGE" functions to manually operate the lower sieve in each direction. Record in which directions the lower sieve actuator operates.
3	Select "UP MTR", and use the "COMMAND" and "ENGAGE" functions to manually operate the upper sieve in each direction. Record in which directions the upper sieve actuator operates.
3	Enter the Universal Display Plus "ERROR" screen, and depress the "REFRESH" button to update the error history. Check for the following fault codes: **E0300-06 - Lower Sieve Current Sense** **E0301-06 - Upper Sieve Current Sense** **E0334-11 - Lower Sieve** **E0335-11 - Upper Sieve** .
4	Use the appropriate result below to determine the location of the fault.

A. If the lower sieve operates in one direction only, and the fault code
E0300-06 - Lower Sieve Current Sense
is displayed, continue with step **2**.

B. If the lower sieve operates in one direction only, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **3**.

C. If the lower sieve and upper sieve both operate in one direction only, and the fault codes
E0300-06 - Lower Sieve Current Sense
,
E0301-06 - Upper Sieve Current Sense
,

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E0334-11 - Lower Sieve
and
E0335-11 - Upper Sieve
are displayed, continue with step **8**.

D. If the lower sieve does not operate in either direction, and the fault code
E0334-11 - Lower Sieve
is displayed, continue with step **14**.

E. If the lower sieve does not operate in either direction, and both fault codes
E0300-06 - Lower Sieve Current Sense
and
E0334-11 - Lower Sieve
are displayed, continue with step **30**.

F. If the upper sieve operates in one direction only, and the fault code
E0301-06 - Upper Sieve Current Sense
is displayed, continue with step **31**.

G. If the upper sieve operates in one direction only, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **32**.

H. If the upper sieve does not operate in either direction, and the fault code
E0335-11 - Upper Sieve
is displayed, continue with step **37**.

I. If the upper sieve does not operate in either direction, and both fault codes
E0301-06 - Upper Sieve Current Sense
and
E0335-11 - Upper Sieve
are displayed, continue with step **45**.

J. If both the lower sieve and upper sieve do not operate in either direction, and the fault codes
E0334-11 - Lower Sieve
and
E0335-11 - Upper Sieve
are displayed, continue with step **46**.

K. If both the lower sieve and upper sieve do not operate in either direction, and there are no fault codes displayed, continue with step **52**.

2. The lower sieve mechanism is mechanically bound up, resulting in high current draw.

   A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the lower sieve and control linkage.

3. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228**. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

4. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

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A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the short and repair.

B. If continuity is found, continue with Step **5**.

5. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

   A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin N and connector **X025** pin 15 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **6**.

6. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

   A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 15 and connector **X219** pin 2 wire 790 white. Locate the short and repair.

   B. If continuity is found, continue with Step **7**.

7. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 16 and chassis ground.

   A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 2 and connector **X005** pin 16 wire 790 white. Locate the short and repair.

   B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 16 and the Upper/lower sieve relay K18 pin 5 on the fuse panel. Locate the short and repair.

8. Fault codes indicate circuit fault due to short to ground between the lower sieve motor and/or the upper sieve motor and the CCM3 module. Disconnect the batteries by removing the negative battery cables. Unplug the lower sieve motor connector **X228** and the upper sieve motor connector **X227**. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

   A. If continuity is found, continue with Step **9**.

   B. If no continuity is found, erase the fault codes and continue operation.

   NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

9. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

   A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the short and repair.

   B. If continuity is found, continue with Step **10**.

10. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the short and repair.

    B. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin J & P on one of the following wires:
    - wire 785 gray, connector **X025** pin 14 to harness splice
    - wire 791 gray, harness splice to connector **X072** pin J
    - wire 789 gray, harness splice to connector **X072** pin P

    Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

11. Remove the Upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between the relay terminal 3 and chassis ground.

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A. If continuity is found, continue with Step **12**.

B. If no continuity is found, erase the fault codes and continue operation.

12. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

A. If continuity is found, continue with Step **13**.

B. If no continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 15 and the Upper/lower sieve relay K18 pin 3 on the fuse panel wire 786 red. Locate the short and repair.

13. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

A. If continuity is found the short to ground is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the short and repair.

B. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the short and repair.

14. Fault codes indicate circuit fault due to open circuit condition. Disconnect the lower sieve motor connector **X228**. Measure the resistance of the motor between terminals D and E. The correct resistance is **3 - 12 ohms**.

A. The resistance is infinite, indicating an open condition in the motor. Replace the lower sieve motor.

B. The resistance is in specification. Continue with Step **15**.

15. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper sieve circuit function.

A. If the lower sieve circuit now functions properly, the relay was faulty, and was not providing continuity between terminals 3 & 5 when energized. Replace the relay.

B. If the lower sieve circuit still does not work, continue with Step **16**.

16. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X228** pin E and chassis ground.

A. If continuity is found, continue with Step **19**.

B. If no continuity is found, continue with Step **17**.

NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

17. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin P and chassis ground.

A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin P and connector **X228** pin E wire 789 gray. Locate the open and repair.

B. If no continuity is found, continue with Step **18**.

18. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and connector **X072** pin P wire 789 gray or 785 gray. Locate the open and repair.

B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 785 gray. Locate the open and repair.

19. Remove the Upper/lower sieve relay K18 on the fuse panel, and install a jumper wire between terminals 3 & 5. Use a multimeter to check for continuity between connector **X228** pin D and chassis ground.

A. If no continuity is found, continue with Step **20**.

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B. If continuity is found, recheck the motor for continuity at Step **14**. Erase the fault codes and continue operation.

20. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin N and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X228** pin D and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **21**.

21. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 15 and connector **X072** pin N wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **26**.

22. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 2 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X219** pin 2 and connector **X025** pin 15 wire 790 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **27**.

23. Remove the jumper wire between terminals 3 & 5 for relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 5 and chassis ground.

    A. If no continuity is found, the open circuit is in wire 790 white from the fuse panel through connector **X005** pin 16 to connector **X219** pin 2. Locate the open and repair.

    B. If no continuity is found, continue with Step **28**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than* ***10 ohms*** *above the motor resistance measured in Step 14.*

24. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **29**.

25. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X005** pin 15 and connector **X219** pin 1 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

26. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect lower sieve motor connector **X228**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the lower sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

27. The upper sieve mechanism is mechanically bound up, resulting in high current draw.

    A. Disconnect the motor from the sieve, and manually open the louvers to fully clean the sieve. Inspect the control linkage for wear or binding. See the appropriate repair manual chapter for repair and adjustment of the upper sieve linkage.

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28. Fault codes indicate circuit fault due to short to ground between the upper sieve motor and the Upper/lower sieve relay K18. Disconnect the batteries by removing the negative battery cables. Unplug the upper sieve motor connector **X227**. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If continuity is found, continue with Step **33**.

    B. If no continuity is found, erase the fault codes and continue operation.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position. Power must be removed from the module prior to testing for short to ground condition on the motor circuit to remove this ground path.*

29. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If no continuity is found, the short to ground is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **34**.

30. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **35**.

31. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If no continuity is found, the short to ground is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the short and repair.

    B. If continuity is found, continue with Step **36**.

32. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 17 and chassis ground.

    A. If no continuity is found, the short to ground is in the main frame (MF) harness between connector **X219** pin 3 and connector **X005** pin 17 wire 792 white. Locate the short and repair.

    B. If continuity is found, the short to ground is in the cab main (CM) harness between connector **X005** pin 17 and the Upper/lower sieve relay K18 pin 4 on the fuse panel wire 792 white. Locate the short and repair.

33. Fault codes indicate circuit fault due to open circuit condition. Disconnect the upper sieve motor connector **X227**. Measure the resistance of the motor between terminals A and B. The correct resistance is **3 - 12 ohms**.

    A. The resistance is infinite, indicating an open condition in the motor. Replace the upper sieve motor.

    B. The resistance is in specification. Continue with Step **38**.

34. Ensure that the batteries are connected, and that fuse F27 is good. Use the multimeter to check for continuity between connector **X227** pin E and chassis ground.

    A. If continuity is found, continue with Step **37**.

    B. If no continuity is found, continue with Step **35**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F27. This ground path may be used to test for an open circuit condition.*

35. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X072** pin J and connector **X227** pin E wire 791 gray. Locate the open and repair.

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B. If no continuity is found, continue with Step **36**.

36. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin J and connector **X025** pin 14 wires 791 gray or 785 gray. Locate the open and repair.

    B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 wire 785 gray. Locate the open and repair.

37. Use a multimeter to check for continuity between connector **X227** pin D and chassis ground.

    A. If no continuity is found, continue with Step **38**.

    B. If continuity is found, recheck the motor for continuity at Step **37**. Erase the fault codes and continue operation.

38. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin H and chassis ground.

    A. If continuity is found, the open circuit is in the lower frame rear (LR) harness between connector **X227** pin D and connector **X072** pin H wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **39**.

39. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 17 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X072** pin H and connector **X025** pin 17 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **40**.

40. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 3 and chassis ground.

    A. If continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 17 and connector **X219** pin 3 wire 792 white. Locate the open and repair.

    B. If no continuity is found, continue with Step **41**.

41. Remove the upper/lower sieve relay K18 from the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 4 and chassis ground.

    A. If no continuity is found, the open circuit is in the cab main (CM) or main frame (MF) harness wire 792 white from the fuse panel through connector **X005** pin 17 to connector **X219** pin 3. Locate the open and repair.

    B. If continuity is found, continue with Step **42**.

    NOTE: *Continuity check is being done back through circuit through the motor. The resistance will read significantly higher than previous tests, but should not be higher than* ***10 ohms*** *above the motor resistance measured in Step 33.*

42. Reconnect connector **X005**. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If continuity is found, the relay has failed open between terminals 3 and 4. Replace the relay.

    B. If no continuity is found, continue with Step **43**.

43. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **44**.

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44. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector **X219** pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X013** pin J2-21 wire 786 red. Locate the open and repair.

45. Fault codes and operating condition indicate that the motor has shorted to ground. Disconnect upper sieve motor connector **X227**. Measure between terminals D or E on the motor connector and a known good ground. There should be no continuity to ground.

    A. There is continuity to ground, indicating a short to ground in the motor. Replace the upper sieve motor.

    B. There is no continuity to ground. Erase the fault codes and continue operation.

46. Fault codes and operating condition indicates that there is an open circuit on shared wiring between the upper sieve motor and lower sieve motor circuits. Replace the Upper/lower sieve relay K18 on the fuse panel with a known good relay, and retest the upper and lower sieve circuit function.

    A. If both circuits now function properly, the relay was faulty, and was not providing continuity between the work terminal 3 and terminals 4 & 5. Replace the relay.

    B. If both circuits still do not work, continue with Step **47**.

47. Ensure that the batteries are connected, and that fuse F23 is good. Remove the Upper/lower sieve relay K18 on the fuse panel. Use a multimeter to check for continuity between Upper/lower sieve relay K18 terminal 3 and chassis ground.

    A. If no continuity is found, continue with Step **48**.

    B. If continuity is found, continue with Step **50**.

    NOTE: *The CCM module connects both sides of the circuit to ground when in neutral to "lock" the motor in position, irregardless of key switch position, as long as it receives power through fuse F23. This ground path may be used to test for an open circuit condition.*

48. Disconnect connector **X005**. Use a multimeter to check for continuity between connector **X005** pin 15 and chassis ground.

    A. If continuity is found, the open circuit is in the cab main (CM) harness between the Upper/lower sieve relay K18 terminal 3 on the fuse panel connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, continue with Step **49**.

49. Disconnect connector **X219**. Use a multimeter to check for continuity between connector **X219** pin 1 and chassis ground.

    A. If continuity is found, the open circuit is in the main frame (MF) harness between connector 219 pin 1 and connector **X005** pin 15 wire 786 red. Locate the open and repair.

    B. If no continuity is found, , the open circuit is in the expansion (EX) harness between connector **X219** pin 1 and connector **X016** pin J2-21 wire 786 red. Locate the open and repair.

50. Disconnect connector **X072**. Use a multimeter to check for continuity between connector **X072** pin J or P and chassis ground.

    A. If continuity is found, erase the fault code and continue operation.

    B. If no continuity is found, continue with Step **51**.

51. Disconnect connector **X025**. Use a multimeter to check for continuity between connector **X025** pin 14 and chassis ground.

    A. If continuity is found, the open circuit is in the straw hood front (SW) harness between connector **X025** pin 14 and the harness splice on wire 785 gray. Locate the open and repair.

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B. If no continuity is found, the open circuit is in the expansion (EX) harness between connector **X025** pin 14 and connector **X013** pin J2-1 on wire 791 gray. Locate the open and repair.

52. If the upper sieve motor and lower sieve motor do not operate in either direction, and there are no error codes indicated, the supply power for the circuit may not be present. Remove fuse F27 and inspect.

A. Fuse has failed. Go to Step **53**.

B. Fuse is okay. Go to Step **56**.

53. If fuse has failed, replace the fuse.

A. If fuse immediately fails, a short to ground exists on the wires to the CCM3 module connectors. Continue with Step **54**.

B. Fuse is okay. Go to Step **56**.

54. Disconnect connector **X005**. Use a multimeter to check for continuity between the harness end of connector **X005** pin 4 and chassis ground.

A. If no continuity is found, there is a short to ground in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, continue with Step **55**.

55. Disconnect connector **X034**. Use a multimeter to check for continuity between the harness end of connector **X034** pin 2 and chassis ground.

A. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the short and repair.

B. If continuity is found, there is a short to ground in the expansion (EX) harness between connector **X034** pin 2, connector **X013** pin J2-11 and connector **X014** pin J3-7 on one of the following wires:
- wire 031 red, connector **X034** pin 2 to harness splice
- wire 511 red, harness splice to connector **X013** pin J2-11
- wire 512 red, harness splice to connector **X014** pin J3-7
Visually inspect the harnesses for damage, bent or dislocated pins, corroded terminals or broken wires. Locate the short to ground and repair.

56. Test for 12V power at connector **X013** pin J2-11 on the CCM3 module under the cab.

A. If there is no power, there is an open circuit on the power wires to the CCM3 module. Continue with Step **57**.

B. If there is power, go to Step **59**.

57. Disconnect connector **X005**. Use a multimeter to check for 12V at connector **X005** pin 4.

A. If there is no power, there is an open circuit in the cab main (CM) harness between fuse F27 on the fuse panel and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If power is found, continue with Step **58**.

58. Disconnect connector **X034**. Use a multimeter to check for 12V at connector **X034** pin 2.

A. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X034** pin 2 and connector **X005** pin 4 wire 031 red. Locate the open and repair.

B. If continuity is found, there is an open circuit in the expansion (EX) harness between connector **X034** pin 2 and connector **X013** pin J2-11 wire 031 red or 511 red. Locate the open and repair.

59. Test for continuity to ground at connector **X013** pin J2-3 on the CCM3 module under the cab.

A. If there is no continuity to ground, there is an open circuit in the expansion (EX) harness from connector **X013** pin J2-3 on CCM3 module to the front frame ground #2 wire 520 black. Locate the open and repair. After repair, go to Step **60**.

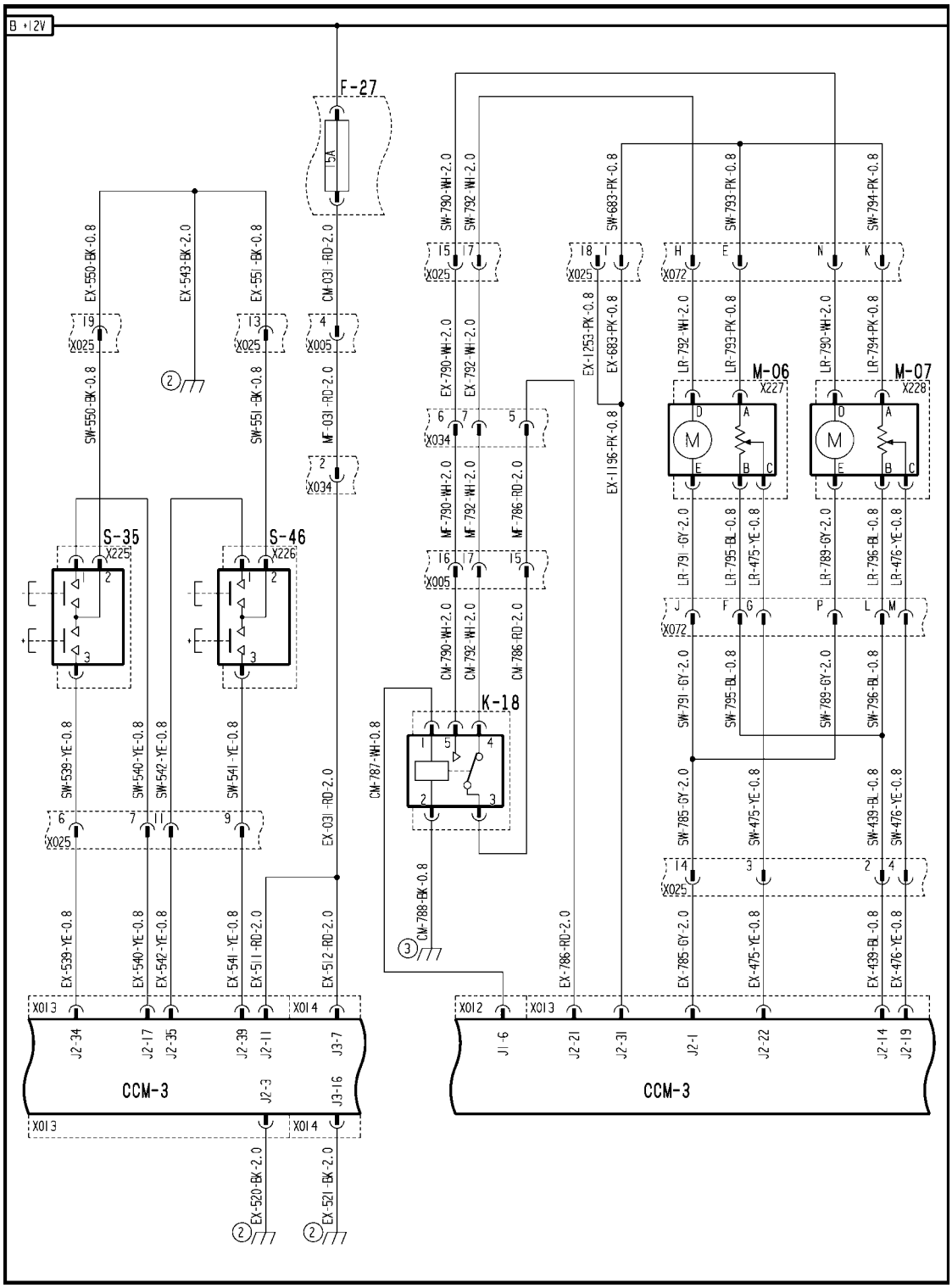
B. If there is continuity to ground, go to Step **60**.

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60. Once it has been verified that power is being supplied to the module, recheck the circuit operation as described in Step 1.

    A. If the fuse fails during the testing, a short to ground on the circuit being operated at the time of failure is causing the fuse to fail. Use the options located in step **1** to locate the shorted circuit.

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

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F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Fan drive system - Unidentified failure (K.62.B.40 - G.30.B.46)

AFX8010

E0054-11 - Cleaning Fan Valve

Cause:
The fan drive solenoid (L-44) circuit is open or shorted to ground.

Possible failure modes:

1. Supply wiring shorted to ground or open circuit.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "FAN VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position and disconnect the fan drive solenoid connector **X444**. Use a multimeter to check the resistance of the fan drive solenoid. The proper resistance range for the coil is **1.0 - 8.0 ohms**.

   A. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X444** pin 1 and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, there is a short to ground in the main frame (MF) harness between connector **X444** and connector **X019** pin J2-13 wire 1161 white. Locate the short and repair.
4. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X444** pin 2 and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If continuity to ground is found, continue with Step **4**.

   B. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X444** and front frame ground #2 wire 1192 black. Locate the open and repair.
5. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the fan drive solenoid. Use a multimeter to check for **12 volts** between connector **X444** pin 1 and chassis ground.

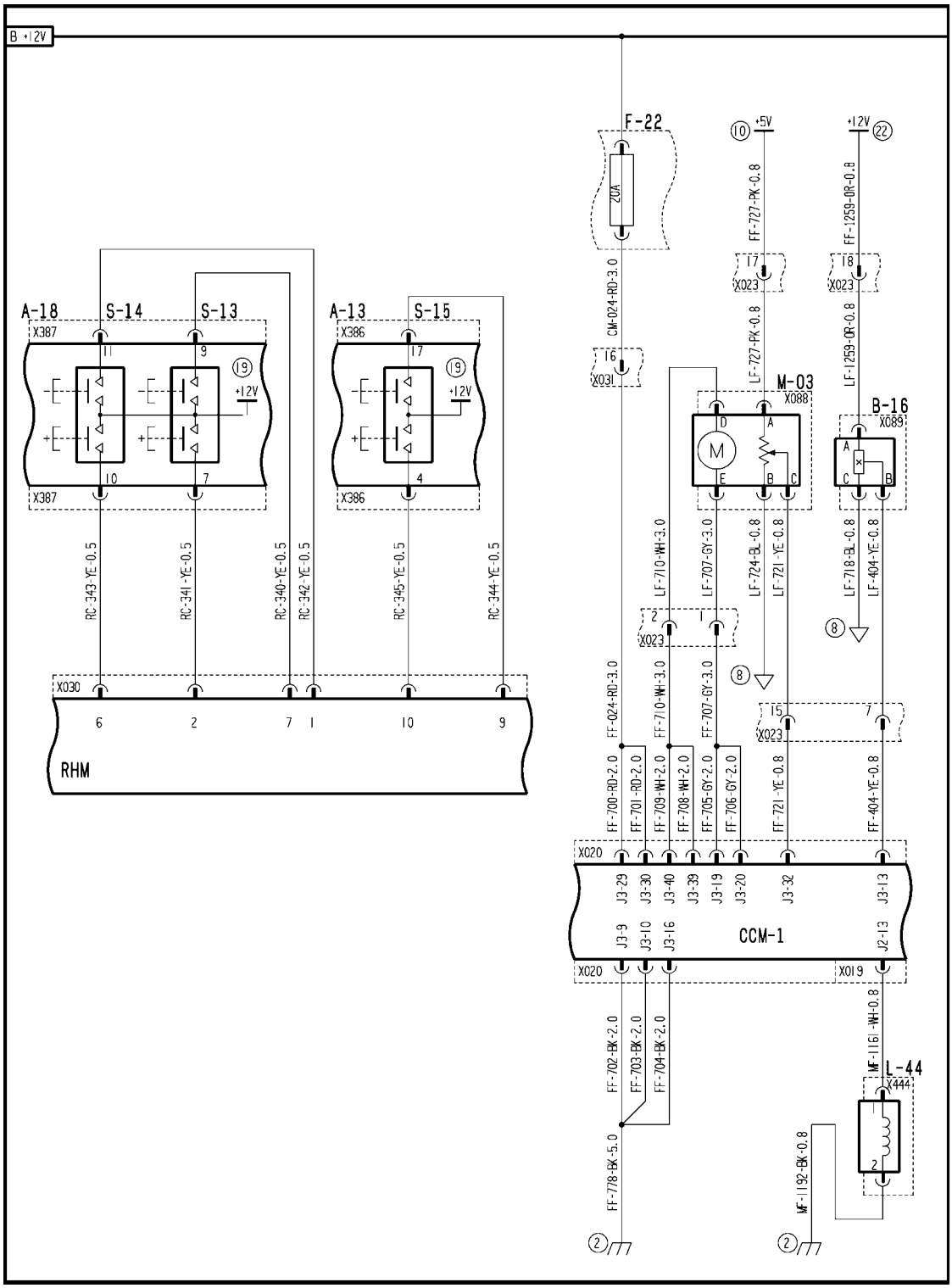
   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X444** and connector **X019** pin J2-13 wire 1161 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **7**.
6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



AFXSCHEM19-04 1

FRAME 19 - CLEANING

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A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

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Electrical control Relay - Unidentified failure (K.62.B.90.80 - G.30.B.46)

AFX8010

E0325-11 - Upper / Lower Sieve Select Relay

Cause:
The Upper/Lower Sieve Select Relay (K-18) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad relay.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "SIEVE" sort menu, and select "UP/LOW RLY". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position and remove the Upper/Lower Sieve Select Relay K-18. Use a multimeter to check the resistance of the upper/lower sieve relay coil. The proper resistance range for the Upper/Lower Sieve Select relay coil is **74.3 - 78.3 ohms**.

   A. If out of specification, replace relay.

   B. If the coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between relay socket pin 1 and chassis ground.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, there is a short to ground in the cab main (CM) harness between the fuse panel and connector **X012** pin J1-6 wire 787 white. Locate the short and repair.
4. Use a multimeter to check for continuity between relay socket pin 2 and chassis ground.

   A. If continuity to ground is found, continue with Step **5**.

   B. If there is no continuity to ground, there is an open circuit in the cab main (CM) harness between the fuse panel and cab ground #3 wire 788 black. Locate the open and repair.
5. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the upper/lower sieve relay. Use the multimeter to check for **12 volts** between relay socket pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **6**.

   B. If **12 volts** is found, continue with Step **7**.
6. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the upper/lower sieve relay. Use the multimeter to check for **12 volts** between connector **X012** J1-6 and chassis ground.

   A. If **12 volts** is not present, replace the CCM3 with a known good controller.

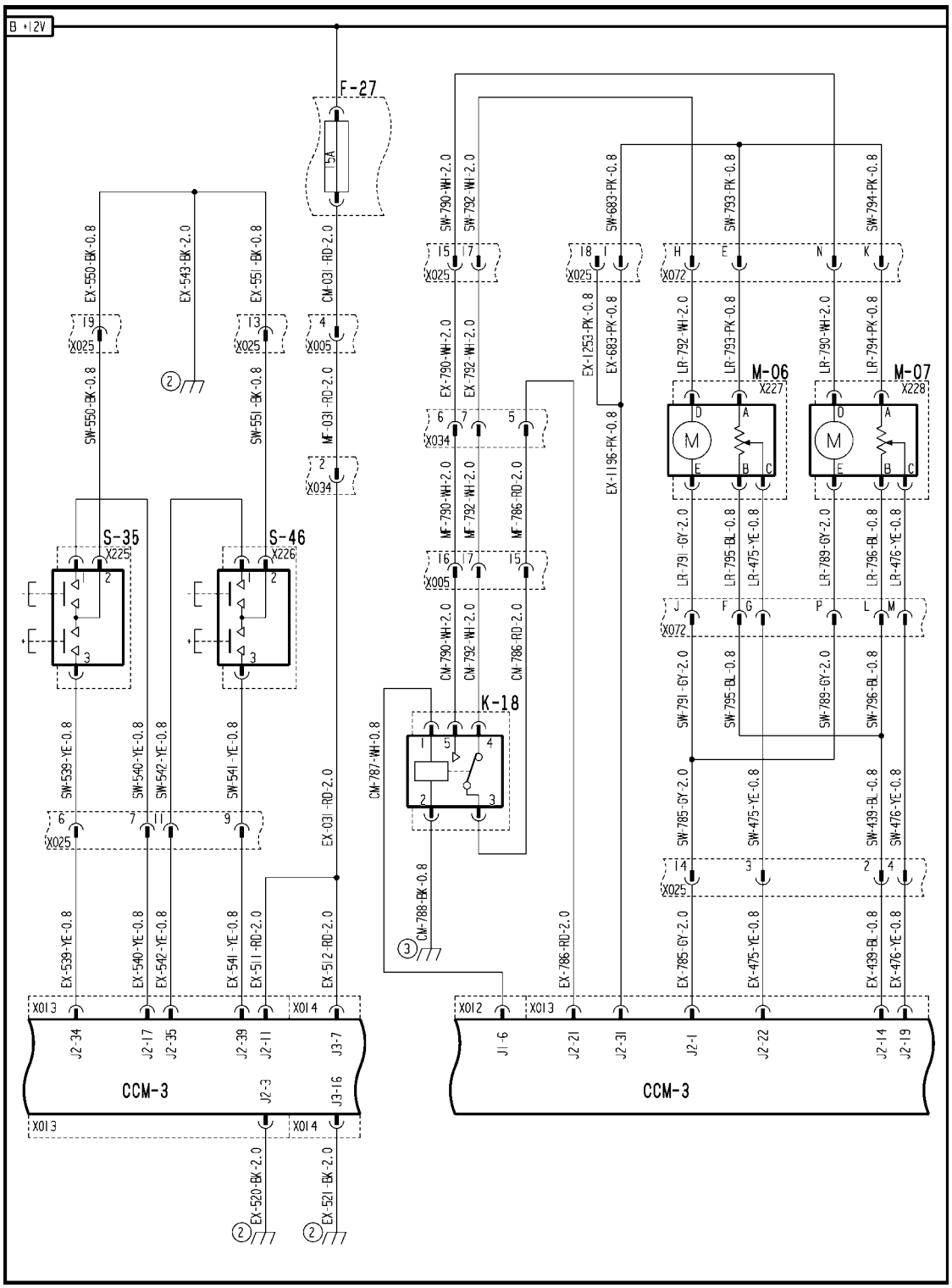
   B. If **12 volts** is present, there is an open circuit in the cab main (CM) harness between connector **X012** J1-6 and relay socket pin 1 wire 787 white. Locate the open and repair.

https://truckmanualshub.com/

7. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 21 (A.30.A.88 - C.20.E.21)



AFXSCHEM21-04 1

FRAME 21 - CLEANING

https://truckmanualshub.com/

F-27 Sieve Fuse	K-18 Upper / Lower Sieve Relay	M-06 Upper Sieve Actuator
M-07 Lower Sieve Actuator	S-35 Upper Sieve Rear Adjust	S-46 Lower Sieve Rear Adjust

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Sensing system Lateral inclination sensor - Short circuit to B+ (K.62.B.95.50 - G.30.B.54)

AFX8010

E0033-03 - Lateral Inclination Sensor

Cause:
The lateral inclination sensor B-02 circuit is shorted to a higher than normal voltage source.

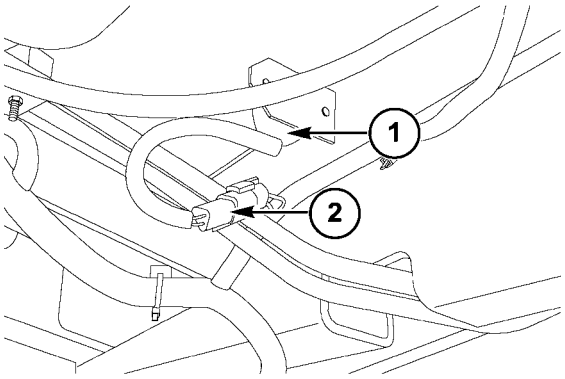
Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "LATERAL TILT SEN" to check the voltage range. The normal operating voltage range is **0.3 - 5.2 volts**.
   A. If the voltage reading is high (>**5.2 volts**) out of range, continue with step **2**.
   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at step **3**.
2. The voltage reading on the Universal Display Plus is high. Disconnect the lateral inclination sensor connector **X170**.
   A. If the voltage drops to **0.3 - 5.2 volts**, the short is in the sensor or sensor wiring. Replace the sensor.
   B. If the voltage remains high, then the short circuit is in the main frame (MF) harness between connector **X170** and connector **X019** pin J2-33 wire 430 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.
   A. If no damage is found, erase the fault code and continue operation.

Sensing system Lateral inclination sensor - Overview (K.62.B.95.50 - C.10.A.10)



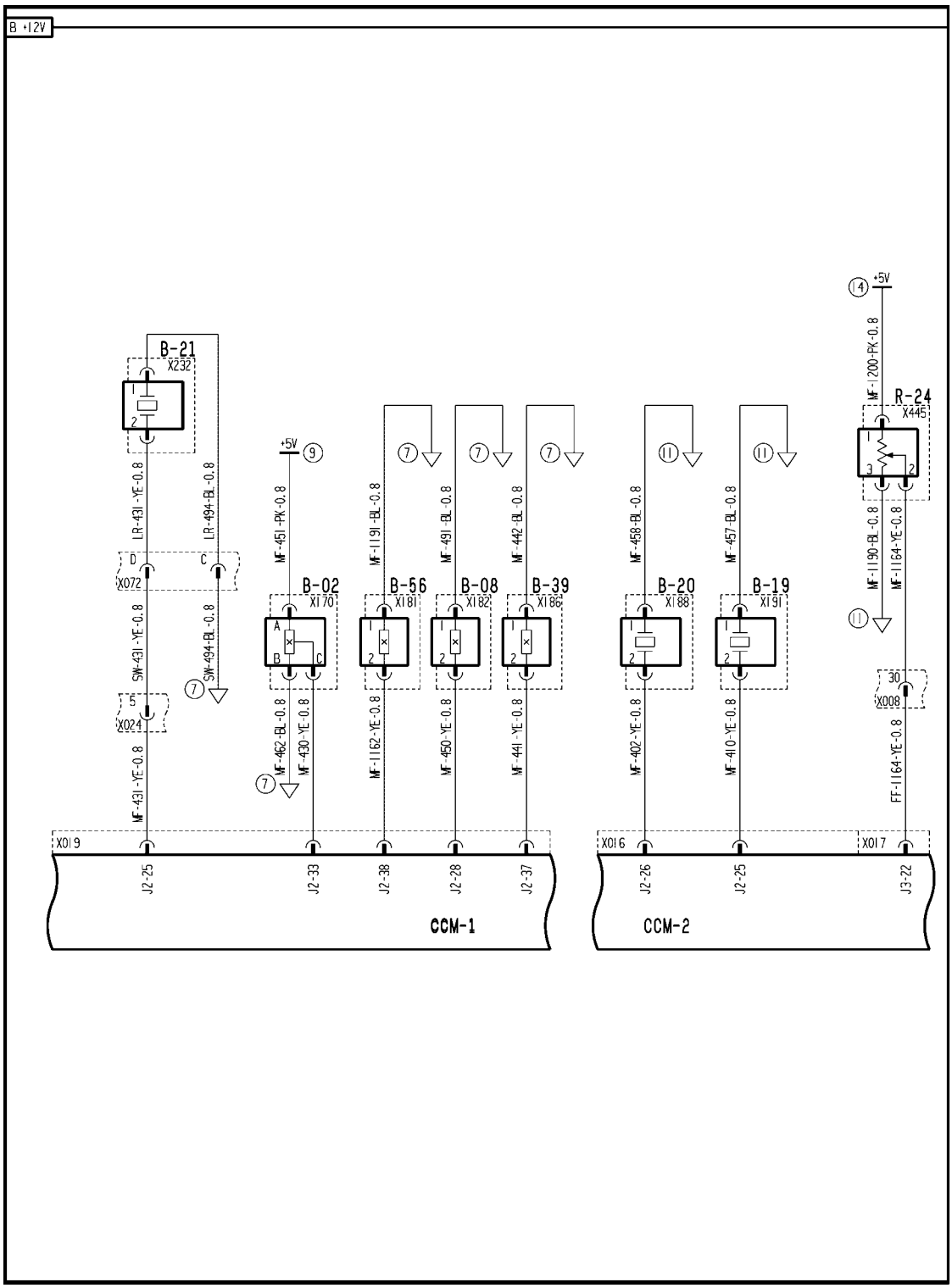
40033772A5 1

The lateral inclination sensor B-02 **(1)** is located under the right side of the cab, inside the frame rail, and is connected (**X170**) to the main frame (MF) harness at **(2)**. The lateral inclination sensor monitors the side-to-side tilt of the combine chassis, and provides an input to the CCM1 module at connector **X019** pin J2-33. The lateral inclination sensor B-02 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.
E0033-03 - Lateral Inclination Sensor
E0033-05 - Lateral Inclination Sensor

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The input from the lateral inclination sensor B-02 is used to support the self leveling cleaning shoe system; CCM1 uses this input to determine which direction and how far to tilt the cleaning shoe in order to keep it level.

Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



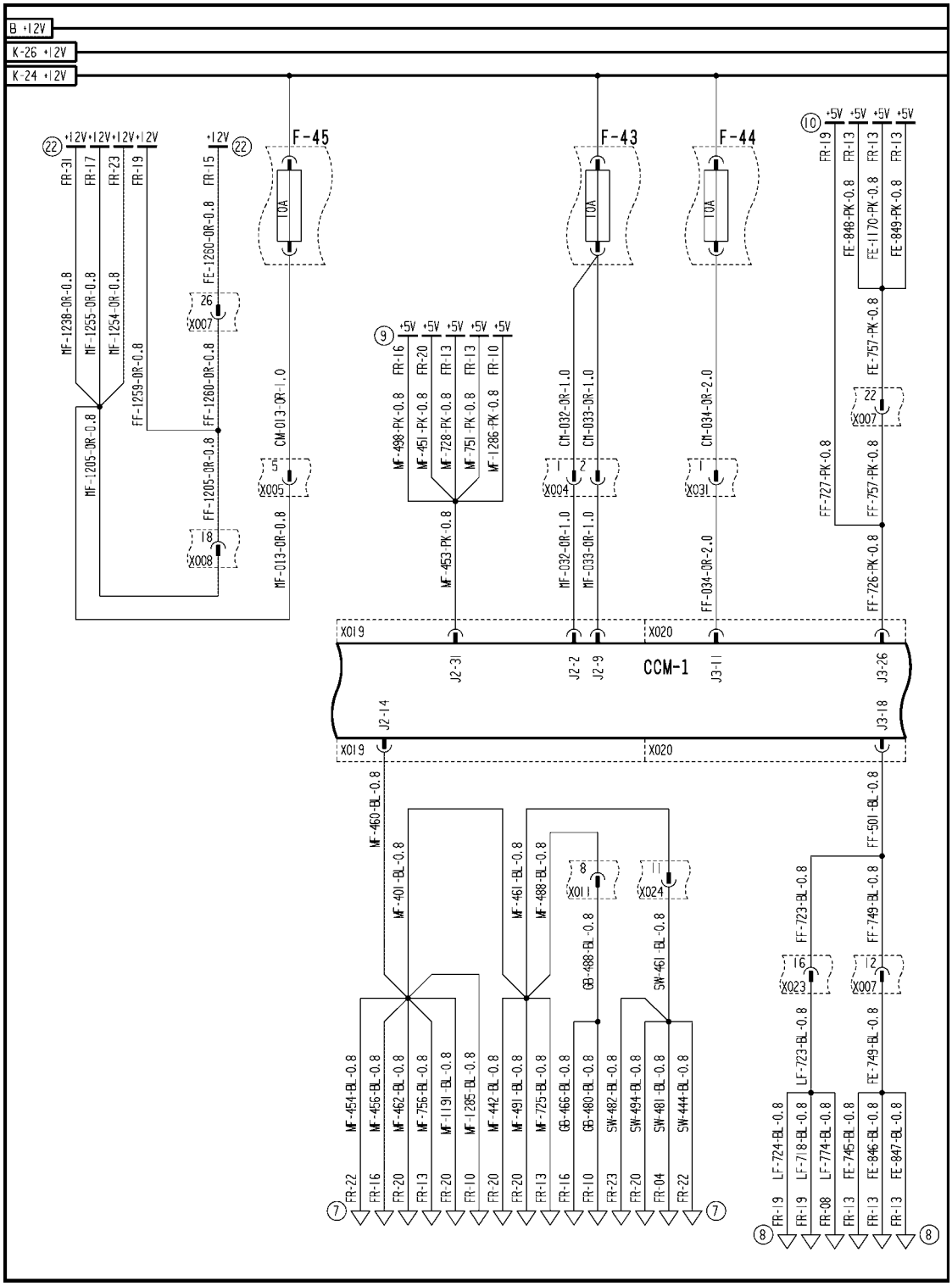
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Lateral inclination sensor - Open circuit (K.62.B.95.50 - G.30.B.50)

AFX8010

E0033-05 - Lateral Inclination Sensor

Cause:
The lateral inclination sensor B-02 circuit is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring is open or shorted to ground.
2. Loss of power to the sensor.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "LATERAL TILT SEN" to check the voltage range. The normal operating voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is low (<**0.3 volts**) out of range, continue with step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Key on. Disconnect connector **X170**, and use a multimeter to check for voltage on connector **X170** pin A. There should be **5 volts** present.

   A. If **5 volts** is found, continue with step **3**.

   B. If no voltage is found, there is an open circuit in the main frame (MF) harness between connector **X170** pin A and connector **X019** pin J2-31 wire 451 pink or 453 pink. Locate the open and repair. Locate the open and repair.

3. Key off. Disconnect connector **X170**. Use a multimeter to check for continuity between connector **X170** pin C and chassis ground. There should not be any continuity.

   A. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X170** pin C and connector **X019** pin J2-33 wire 430 yellow. Locate the short and repair.

4. Key off. Carefully disconnect connector **X019** from the bottom of the CCM1 module. Use a multimeter to check for continuity between **X170** pin C and connector **X019** pin J2-33. There should be continuity.

   A. If continuity is found, the open circuit is in the sensor. Replace the sensor.

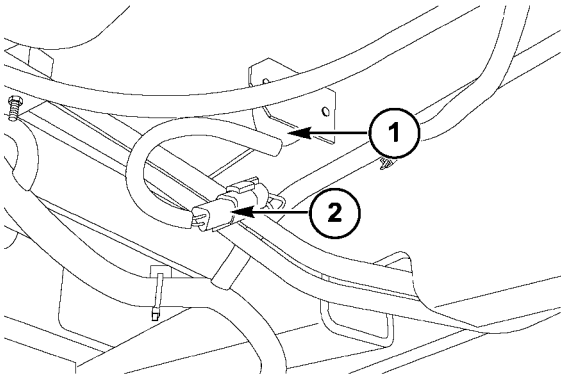
   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X170** pin C and connector **X019** pin J2-33 wire 430 yellow. Locate the open and repair.

5. Operate the machine while monitoring the Universal Display Plus "DIAG" screen, "LATERAL TILT SEN" voltage range.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Sensing system Lateral inclination sensor - Overview (K.62.B.95.50 - C.10.A.10)



40033772A5 1

The lateral inclination sensor B-02 **(1)** is located under the right side of the cab, inside the frame rail, and is connected (**X170**) to the main frame (MF) harness at **(2)**. The lateral inclination sensor monitors the side-to-side tilt of the combine chassis, and provides an input to the CCM1 module at connector **X019** pin J2-33. The lateral inclination sensor B-02 circuit is also monitored by the CCM1 module; in the event that a fault occurs with the sensor itself or the wiring to the sensor, a fault code will be displayed to the operator.

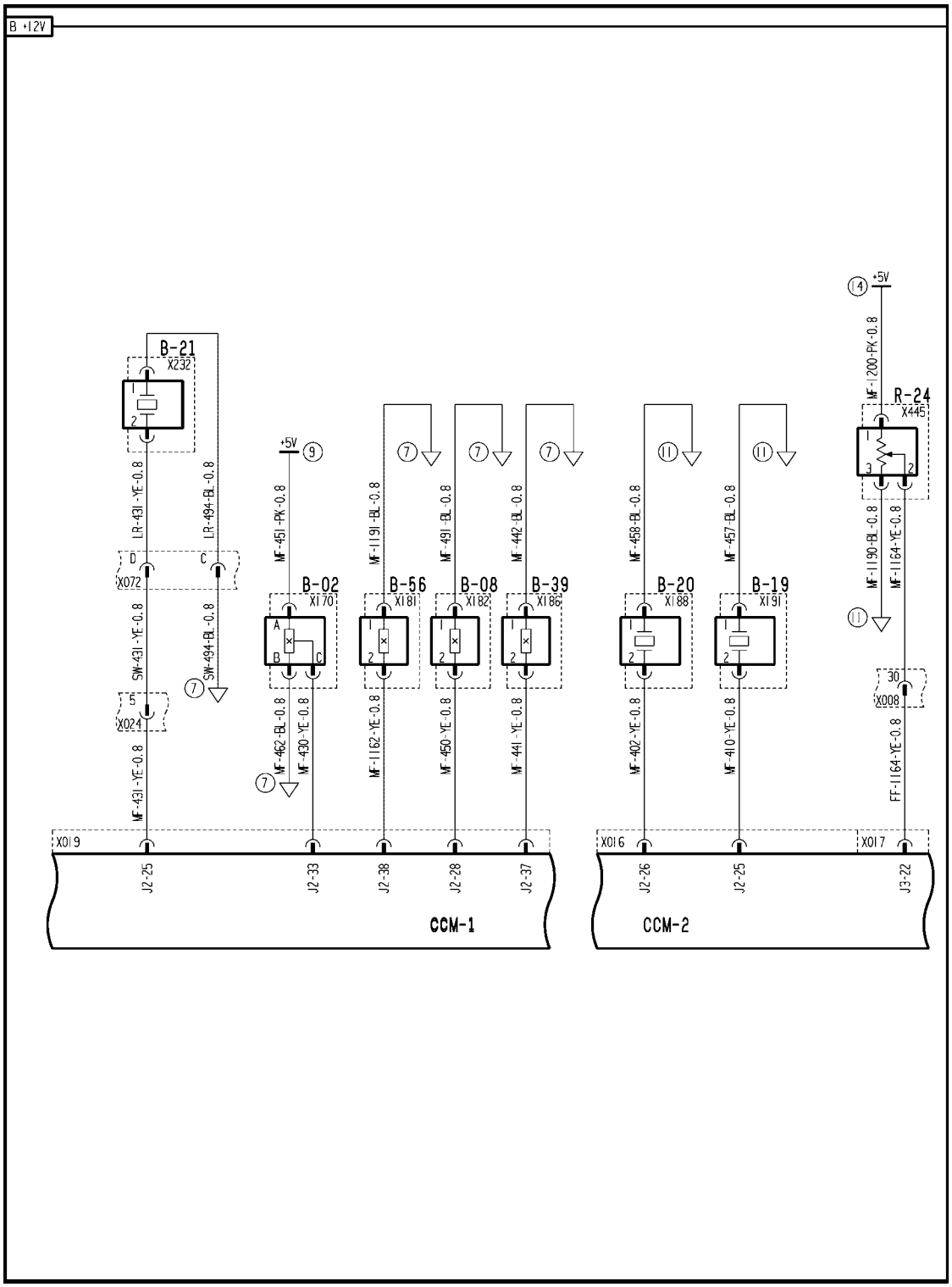
E0033-03 - Lateral Inclination Sensor

E0033-05 - Lateral Inclination Sensor

The input from the lateral inclination sensor B-02 is used to support the self leveling cleaning shoe system; CCM1 uses this input to determine which direction and how far to tilt the cleaning shoe in order to keep it level.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



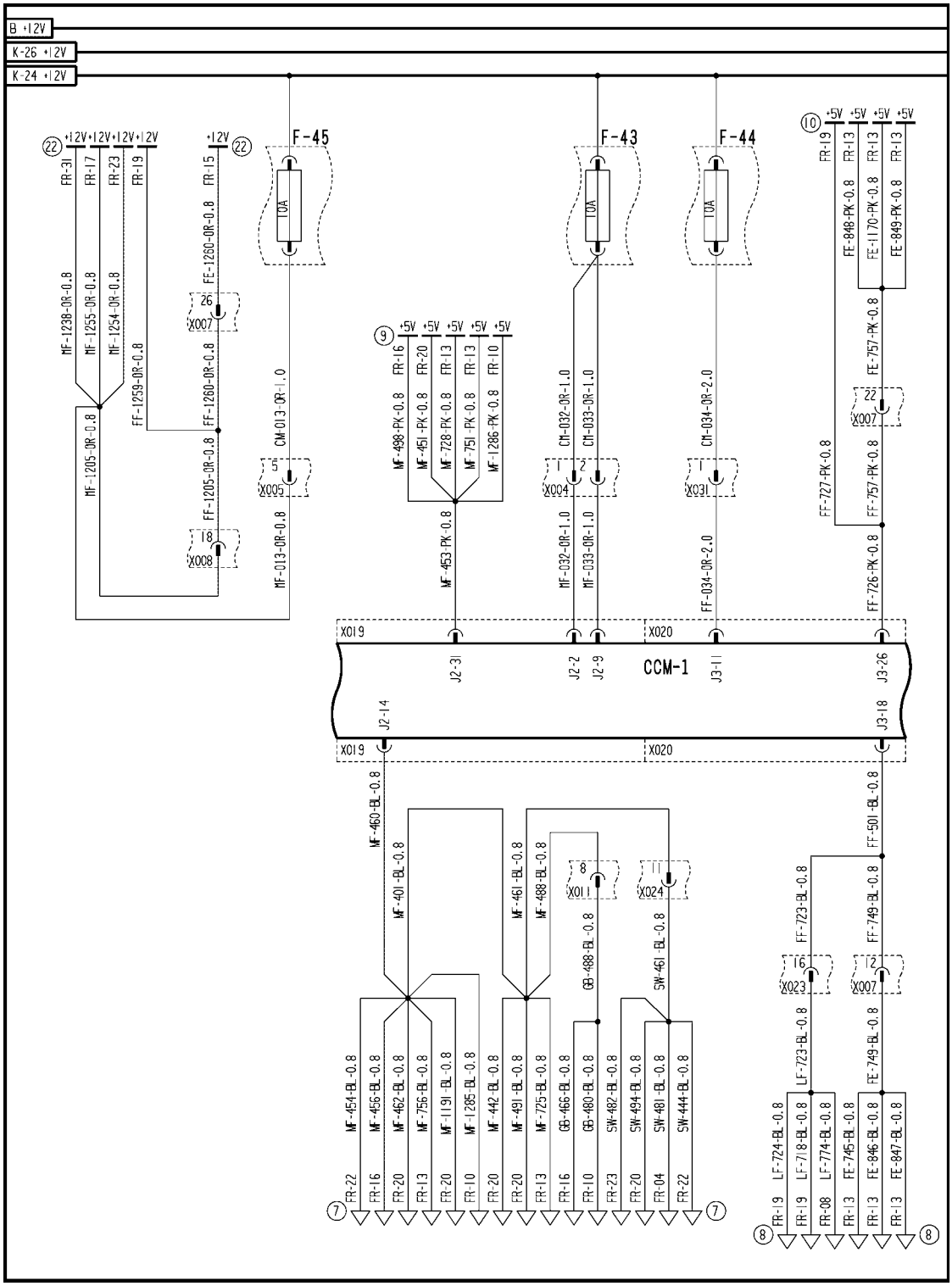
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Fan speed sensor - Short circuit to B+ (K.62.B.95.52 - G.30.B.54)

AFX8010

E0013-03 - Cleaning Fan Speed Sensor

Cause:
The cleaning fan RPM sensor (B16) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "FAN SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal- **0.5 - 5.6 volts**

   A. If the voltage reading is high out of range continue with Step **2**.

   B. If the voltage reading is within the proper limits, since the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.
2. Disconnect the cleaning fan RPM sensor connector **X089**.

   A. If the voltage drops to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the front frame (FF) harness from the lower frame (LF) harness at connector **X023**.

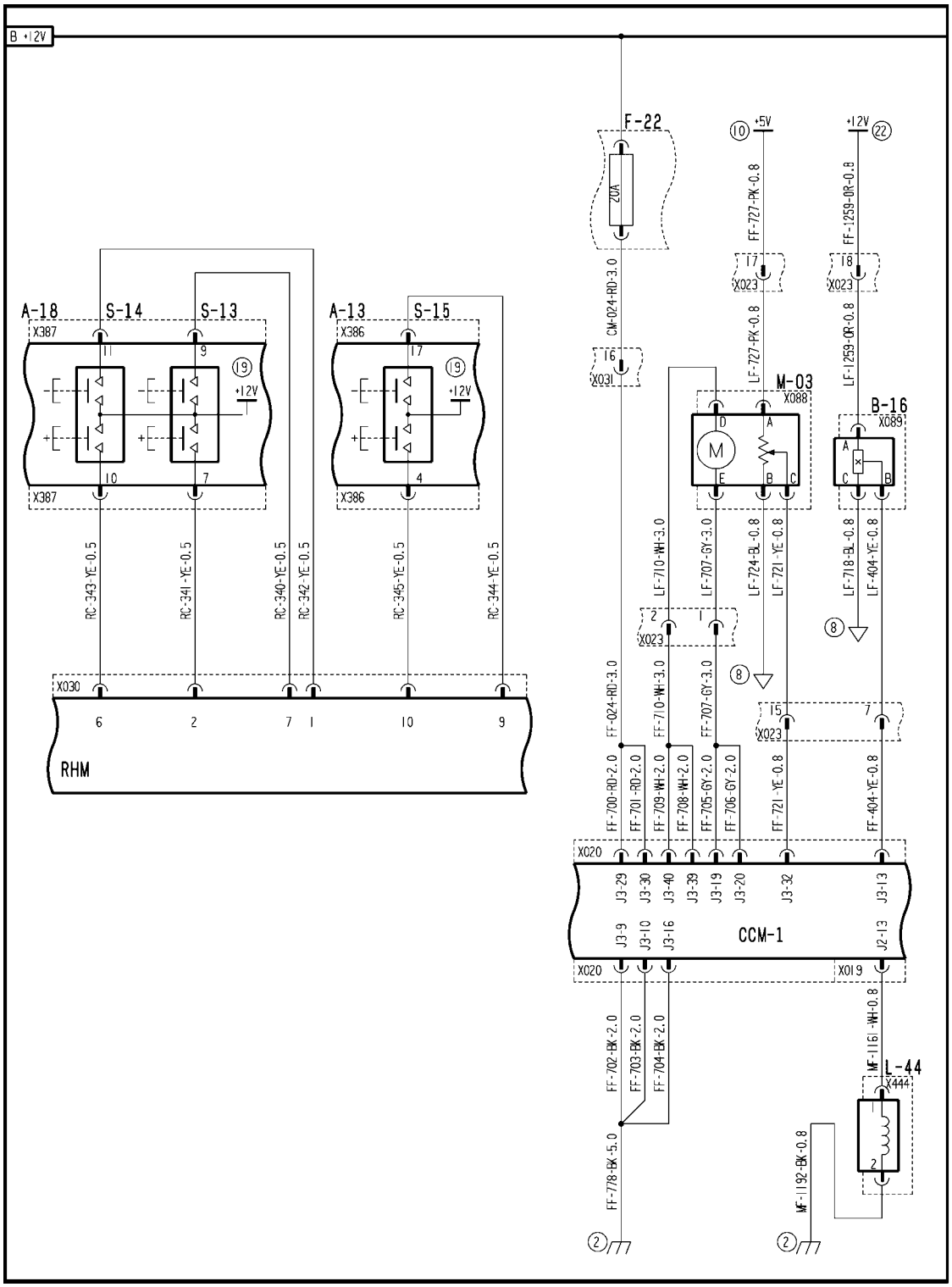
   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the lower frame (LF) harness between connector **X023** and connector **X089** wire 404 yellow. Locate the short and repair.

   B. If the voltage remains high, the short circuit is in the front frame (FF) harness between connector **X023** and connector **X020** pin J3-13 wire 404 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



AFXSCHEM19-04 1

FRAME 19 - CLEANING

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

https://truckmanualshub.com/

Sensing system Fan speed sensor - Short circuit to ground (K.62.B.95.52 - G.30.B.53)

AFX8010

E0013-04 - Cleaning Fan Speed Sensor

Cause:
The cleaning fan RPM sensor (B16) circuit is shorted to ground.

Possible failure modes:

1. Sensor signal wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "FAN SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is **0 - 0.5 volts** continue with Step **2**.

   B. If the voltage reading is within the proper limits. Continue the troubleshooting at Step **4**.
2. Disconnect the cleaning fan RPM sensor connector **X089**.

   A. If the voltage increases to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the lower frame (LF) harness from the front frame harness (FF) at connector **X023**.

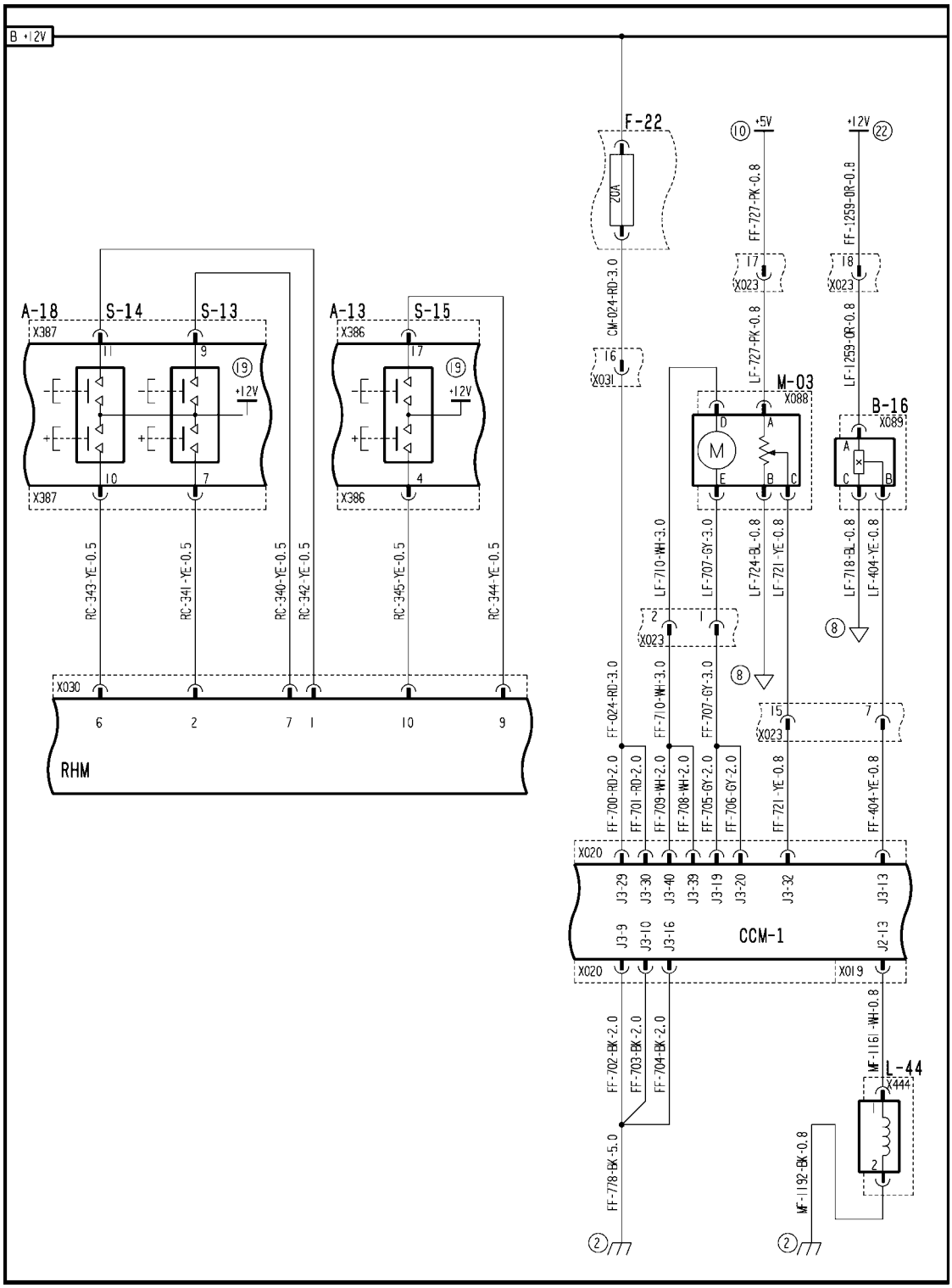
   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the lower frame (LF) harness between connector **X023** and connector **X089** wire 404 yellow. Locate the short and repair.

   B. If the voltage remains low, the short circuit is in the front frame (FF) harness between connector **X023** and connector **X020** J3-13 wire 404 yellow. Locate the short and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



AFXSCHEM19-04 1

FRAME 19 - CLEANING

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

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Sensing system Fan speed sensor - Open circuit (K.62.B.95.52 - G.30.B.50)

AFX8010

E0013-05 - Cleaning Fan Speed Sensor

Cause:
The cleaning fan RPM sensor (B16) circuit is disconnected.

Possible failure modes:

1. Sensor supply, signal or ground wiring is disconnected.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "FAN SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   If there is an open in the supply, signal or ground wiring the voltage will read **7.3 - 9.0 volts**.

   A. If the voltage reading is high indicating an open, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **6**.
2. Disconnect the cleaning fan RPM sensor connector **X089**. Install a jumper wire between pins A (orange) and B (yellow) on connector **X089**.

   A. If the voltage rises to **> 9 volts**, continue with step **3**.

   B. If the voltage remains **7.3 - 9.0 volts**, continue with Step **7**.
3. Disconnect the cleaning fan RPM sensor connector **X089**. Install a jumper wire between pins B (yellow) and C (blue) on connector **X089**.

   A. If the voltage drops to **0 - 0.5 volts** the open is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains out of range, continue with Step **3**.
4. Remove the jumper wire from connector **X089**. Use a multimeter to check for continuity between pin C (blue) on connector **X089** and chassis ground.

   A. If no continuity is found, continue with Step **4**.

   B. If continuity is found, continue with Step **5**.
5. Disconnect connector **X023**. Use a multimeter to check for continuity between pin 16 on connector **X023** and chassis ground.

   A. If no continuity is found, there is an open in the front frame (FF) harness between connector **X023** and connector **X020** J3-18 wire 723 blue or 501 blue. Locate the open and repair.

   B. If continuity is found, there is an open circuit in the lower frame (LF) harness between connector **X023** and **X089** wire 723 or 718 blue. Locate the open and repair.
6. Remove the jumper wire from connector **X089**. Check and confirm that fuse F-45 is good. Use a multimeter to check for **12 volts** at connector **X089** pin A (orange).

   A. If no voltage is found, continue with Step **8**.

   B. If **12 volts** is found, continue with Step **5**.

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7. Disconnect connector **X023**. Use a multimeter to check for voltage at connector **X023** pin 18.

   A. If no voltage is found, continue with Step **9**.

   B. If **12 volts** is found, there is an open circuit in the lower frame (LF) harness between connector **X023** and connector **X089** wire 1259 orange. Locate the open and repair.

8. Disconnect connector **X008**. Use a multimeter to check for voltage on the main frame (MF) harness end of connector **X008** pin 18.

   A. If no voltage is found, continue with Step **10**.

   B. If **12 volts** is found, there is an open circuit in the front frame (FF) harness between connector **X023** and connector **X008** wire 1259 orange or 1205 orange. Locate the open and repair.

9. Disconnect connector **X005**. Use a multimeter to check for voltage on the cab main (CM) harness end of connector **X005** pin 5.

   A. If no voltage is found, there is an open circuit in the cab main (CM) harness between connector **X005** and fuse F45 wire 013 orange. Locate the open and repair.

   B. If **12 volts** is found, there is an open circuit in the main frame (MF) harness between connector **X005** and connector **X008** wire 1205 orange or 013 orange. Locate the open and repair.

10. Disconnect connector **X023**. Install a jumper wire between pins 7 and 16 on connector **X023**.

    A. If the voltage drops to **0 - 0.5 volts** there is an open circuit in the lower frame (LF) harness between connector **X023** and **X089** wire 404 yellow. Locate the open and repair.

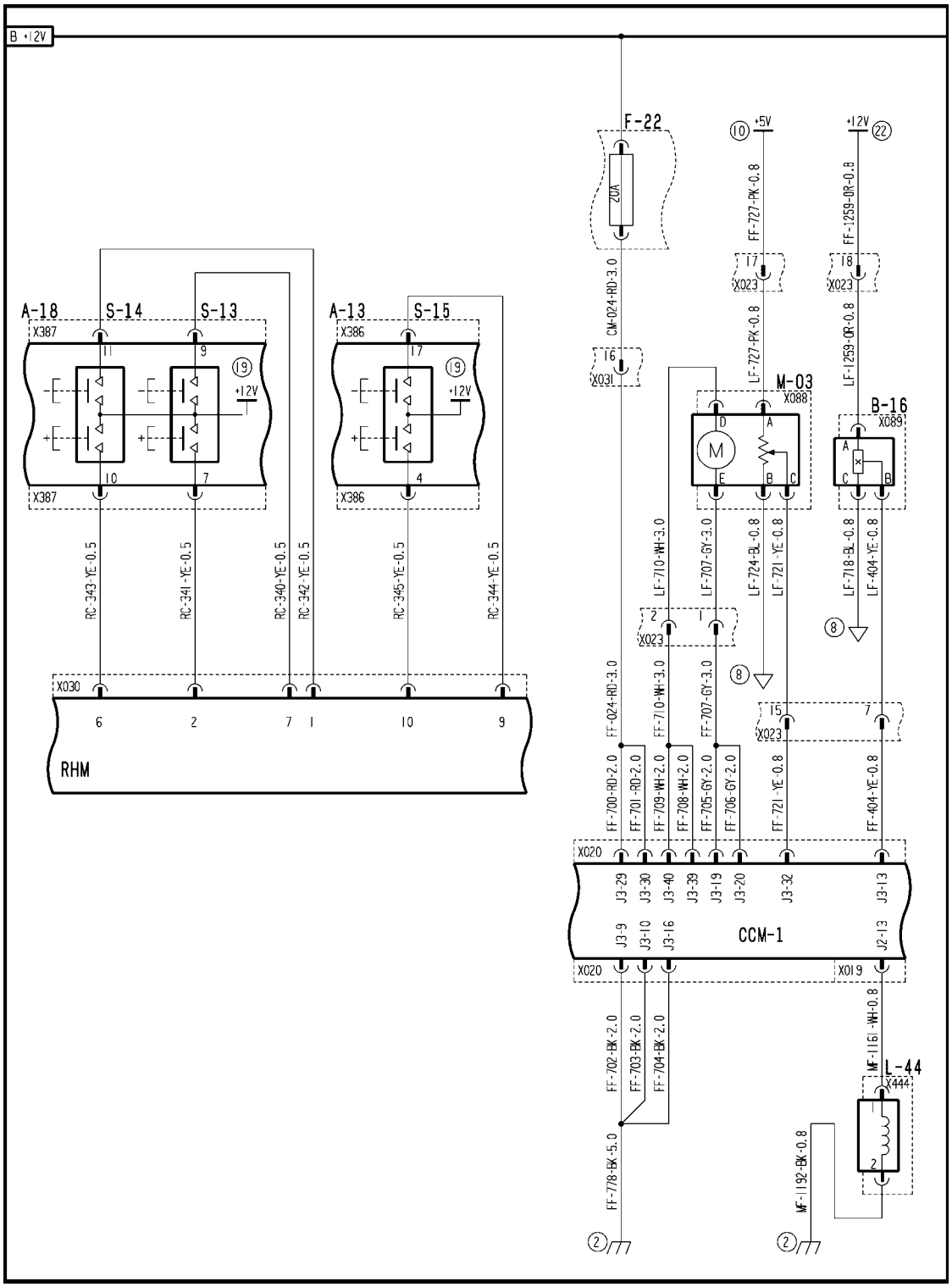
    B. If the voltage remains at **7.3 - 9.0 volts**, there is an open circuit in the front frame (FF) harness between connector **X023** and connector **X020** J3-13 wire 404 yellow. Locate the open and repair.

11. Visually inspect harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

    A. If no damage is found erase fault code and continue operation.

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Wiring harness - Electrical schematic frame 19 (A.30.A.88 - C.20.E.19)



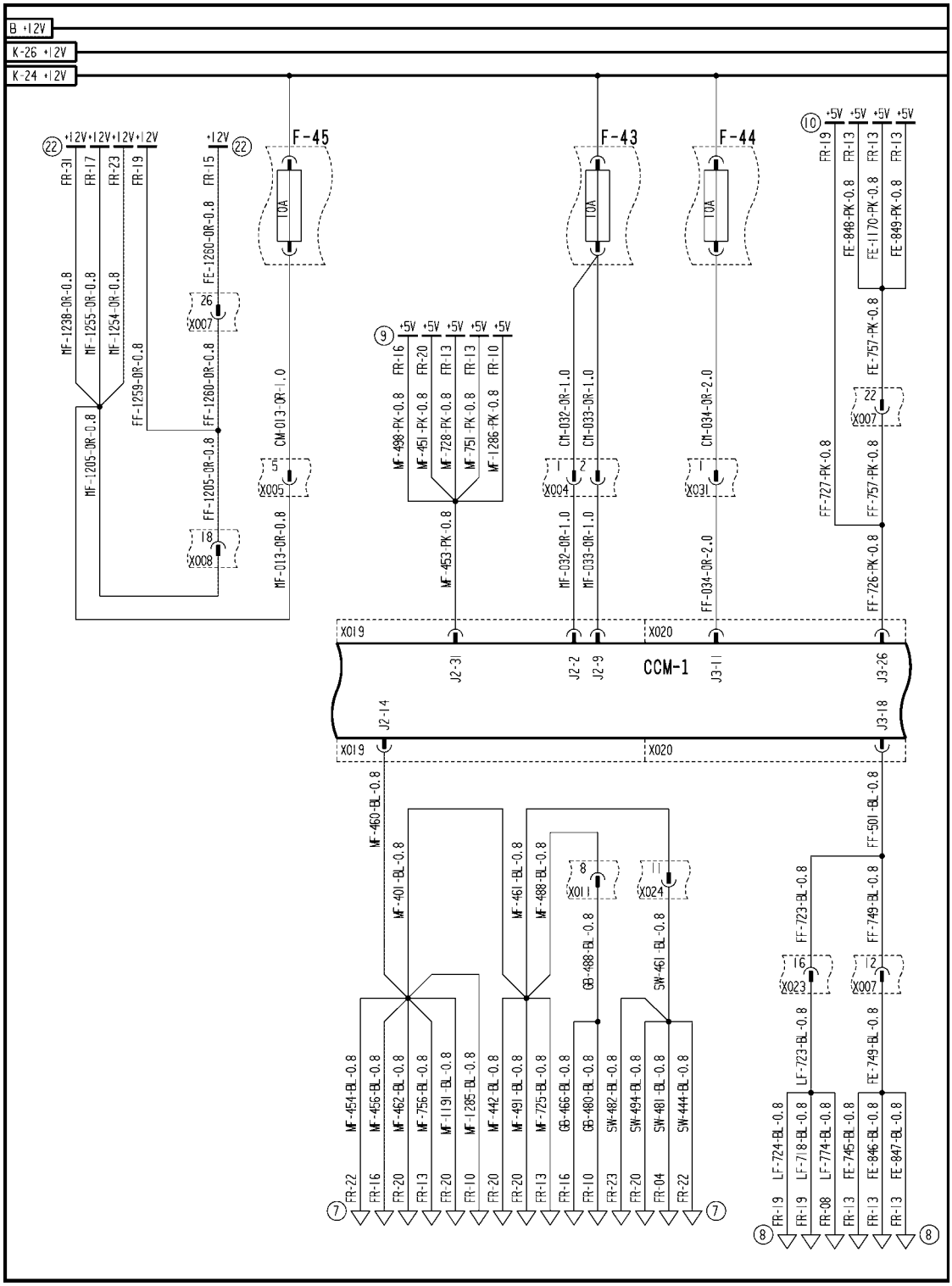
AFXSCHEM19-04 1

FRAME 19 - CLEANING

https://truckmanualshub.com/

A-13 Front Switch Panel	A-18 Rear Switch Panel	B-16 Cleaning Fan RPM
F-22 Shoe Levelling Motor Fuse	M-03 Shoe Levelling Actuator	L-44 Fan Drive Solenoid
S-13 Upper Sieve	S-14 Lower Sieve	S-15 Fan Speed

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Sieve shake speed sensor - Short circuit to B+ (K.62.B.95.56 - G.30.B.54)

AFX8010

E0015-03 - Sieve Shaker Speed Sensor

Cause:
The sieve shake RPM sensor (B-56) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "SHAKER SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is high out of range continue with Step **2**.

   B. If the voltage reading is within the proper limits, since the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **3**.
2. Disconnect the sieve shake RPM sensor connector **X181**.

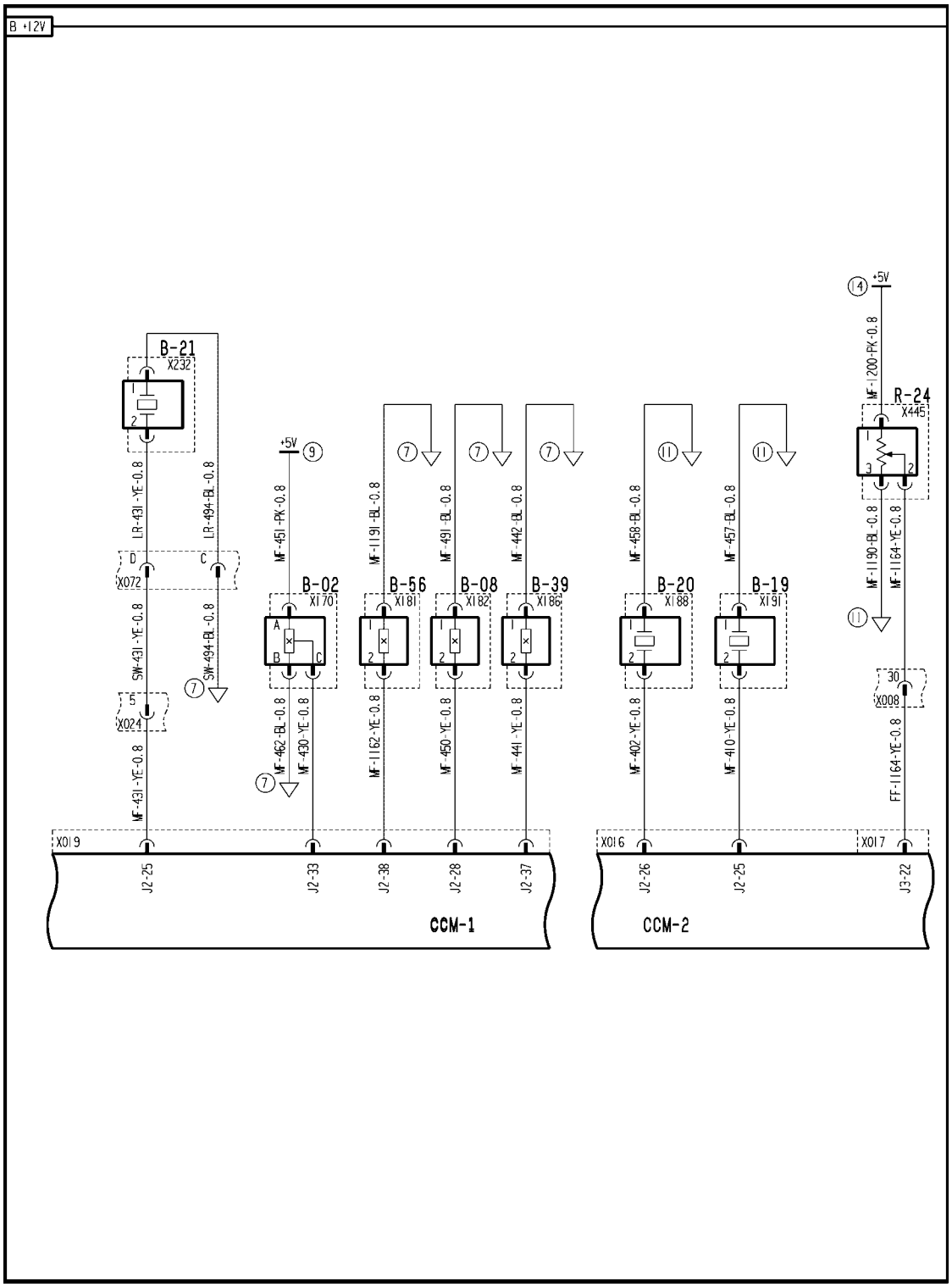
   A. If the voltage drops to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X181** and connector **X019** J2-38 wire 1162 yellow.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

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Sensing system Sieve shake speed sensor - Short circuit to ground (K.62.B.95.56 - G.30.B.53)

AFX8010

E0015-04 - Sieve Shaker Speed Sensor

Cause:
The sieve shake RPM sensor (B-56) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "SHAKER SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is low **0 - 0.5 volts** continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.
2. Disconnect the sieve shake RPM sensor connector **X181**.

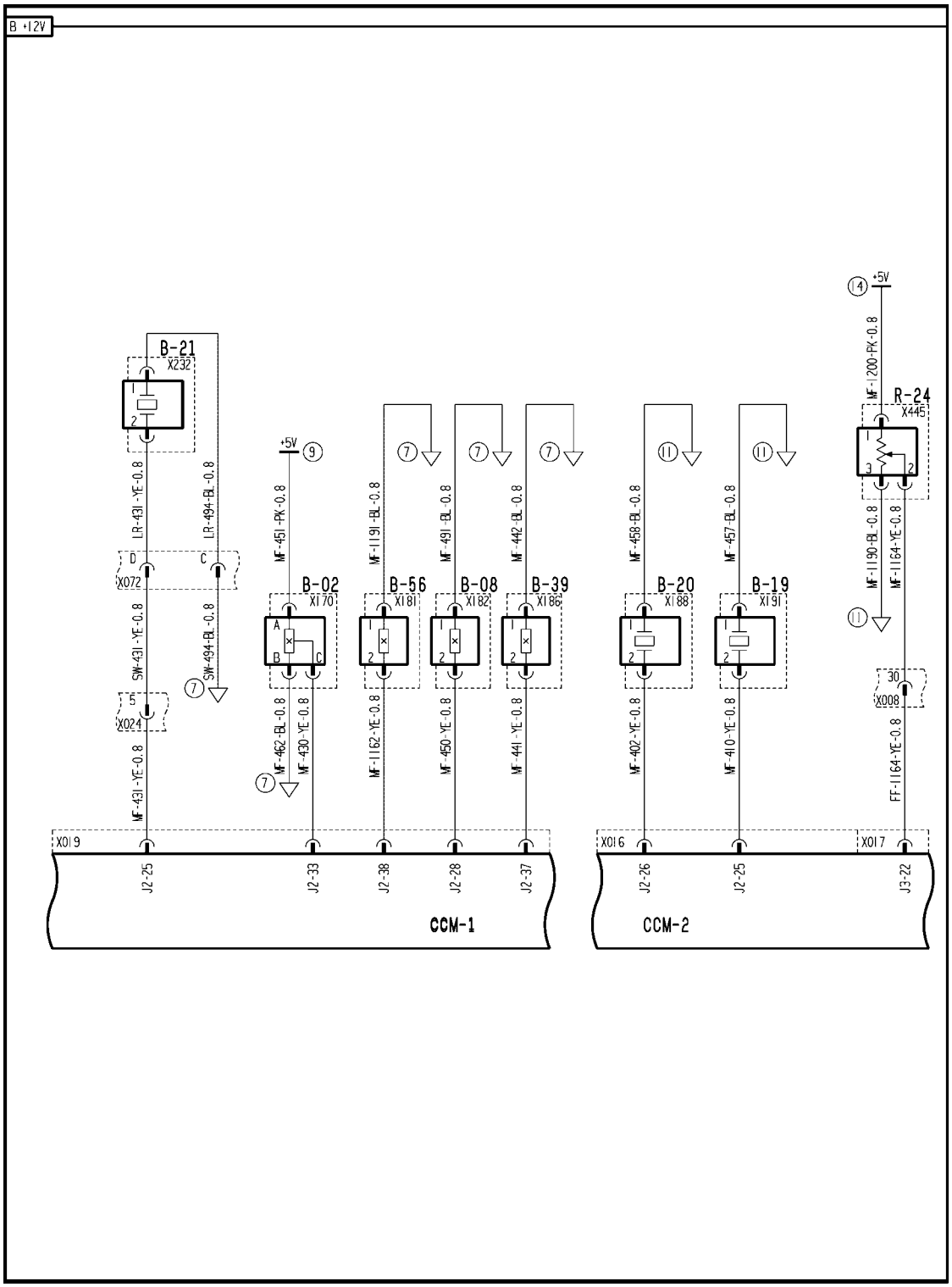
   A. If the voltage increases to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, the short circuit is in the main frame (MF) harness between connector **X181** and connector **X019** J2-38 wire 1162 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

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Sensing system Sieve shake speed sensor - Open circuit (K.62.B.95.56 - G.30.B.50)

AFX8010

E0015-05 - Sieve Shaker Speed Sensor

Cause:
The sieve shake RPM sensor (B-56) circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "SHAKER SPD SEN" to check the voltage range.

   The proper voltage for sensor unblocked by ferrous metal is **0.5 - 5.6 volts**

   The proper voltage for sensor blocked by ferrous metal is **5.6 - 7.3 volts**

   The proper voltage with sensor disconnected is **7.3 - 9.0 volts**.

   A. If the voltage reading is high, **7.3 - 9.0 volts** continue with Step **2**.

   B. If the voltage reading is within the proper limits, the open is not present at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the sieve shake RPM sensor connector **X181**. Use a jumper wire to short the harness end of connector **X181** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **3**.

   B. If the monitor still displays **7.3 - 9.0 volts**, the open circuit is in the main frame (MF) harness between connector **X181** pin 2 and connector **X019** pin J2-38 wire 1162 yellow. Locate the open and repair.

3. Disconnect the sieve shake RPM sensor connector **X181**. Use a multimeter to check for continuity between the harness end of connector **X181** pin 1 and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

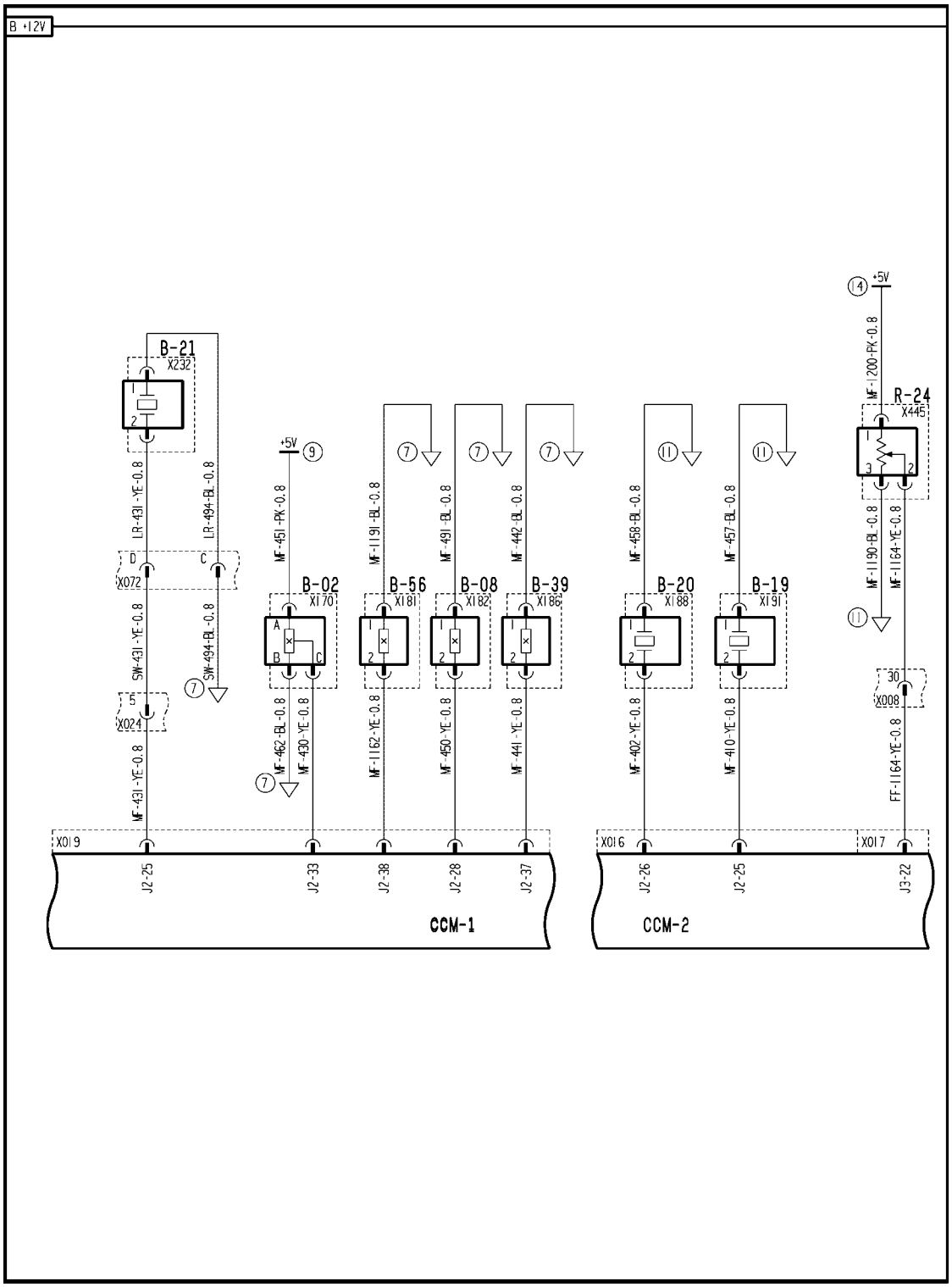
   B. If there is no continuity, the open circuit is in the main frame (MF) harness between connector **X181** pin 1 and connector **X019** pin J2-14 wire 1191 blue or 460 blue. Locate the open and repair.

4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



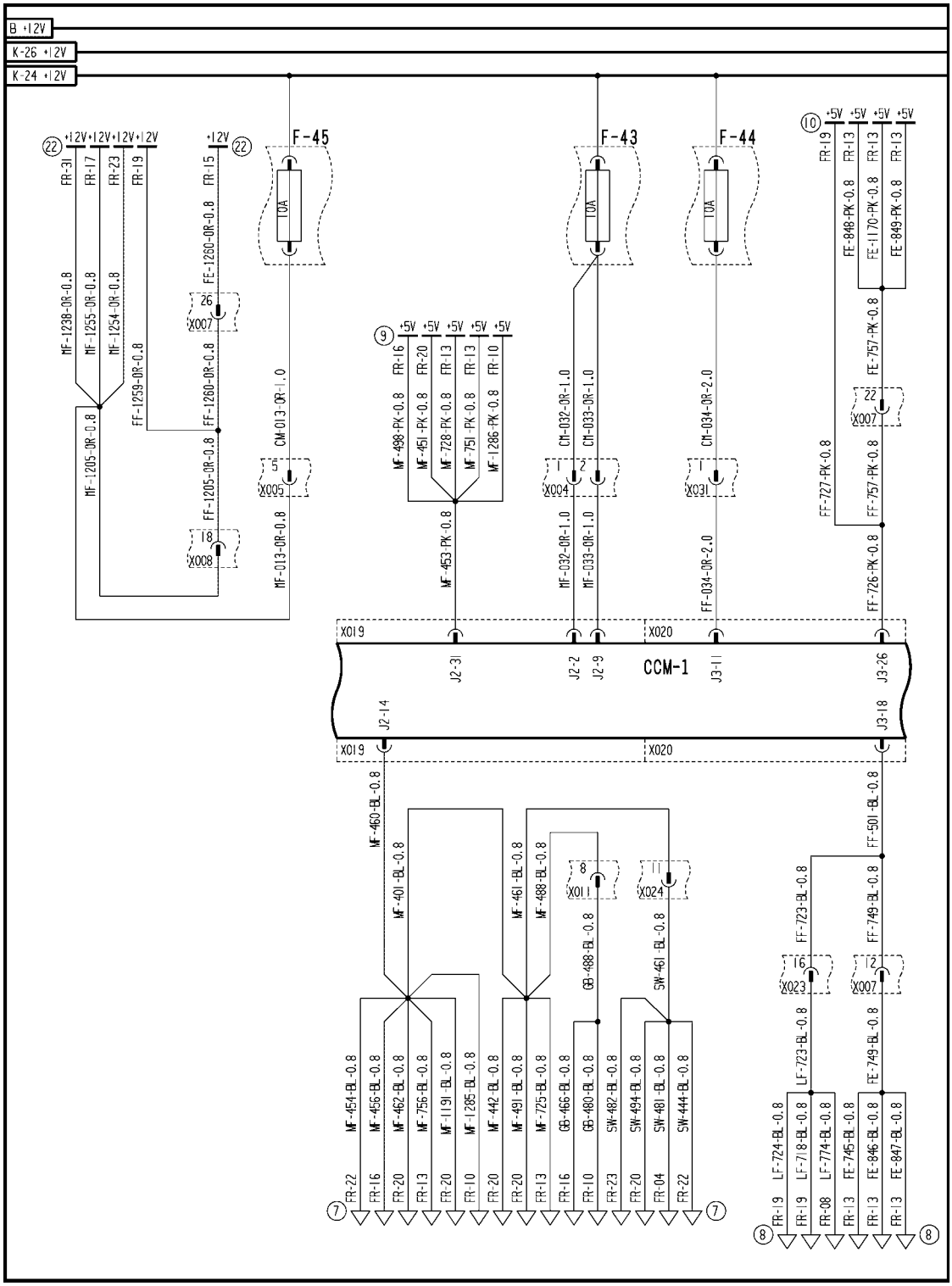
AFXSCHEM20-04 1

FRAME 20 - CLEANING

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B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Index

CROP PROCESSING - K

CLEANING Primary cleaning - 62.B

CLEANING Primary cleaning - Dynamic description (K.62.B - C.30.A.10) 6
AFX8010

CLEANING Primary cleaning - General specification (K.62.B - D.40.A.10) 5
AFX8010

Command Lower sieve remote switch - Short circuit to B+ (K.62.B.05.61 - G.30.B.54) 62
AFX8010

Command Lower sieve remote switch - Short circuit to B+ (K.62.B.05.61 - G.30.B.54) 68
AFX8010

Command Upper sieve remote switch - Short circuit to B+ (K.62.B.05.56 - G.30.B.54) 65
AFX8010

Command Upper sieve remote switch - Short circuit to B+ (K.62.B.05.56 - G.30.B.54) 71
AFX8010

Electrical control Relay - Unidentified failure (K.62.B.90.80 - G.30.B.46) 144
AFX8010

Fan - Assemble (K.62.B.52 - F.10.A.20) 37
AFX8010

Fan - Disassemble (K.62.B.52 - F.10.A.25) 35
AFX8010

Fan - Install (K.62.B.52 - F.10.A.15) 41
AFX8010

Fan - Remove (K.62.B.52 - F.10.A.10) 29
AFX8010

Fan drive system - Unidentified failure (K.62.B.40 - G.30.B.46) 141
AFX8010

Grain pan - Install (K.62.B.58 - F.10.A.15) 48
AFX8010

Grain pan - Remove (K.62.B.58 - F.10.A.10) 47
AFX8010

Lower shoe levelling system - Install (K.62.B.61 - F.10.A.15) 51
AFX8010

Lower shoe levelling system - Remove (K.62.B.61 - F.10.A.10) 49
AFX8010

Lower sieve drive system - Assemble (K.62.B.41 - F.10.A.20) 17
AFX8010

Lower sieve drive system - Install (K.62.B.41 - F.10.A.15) 14
AFX8010

Lower sieve drive system - Remove (K.62.B.41 - F.10.A.10) 9
AFX8010

Motor Lower sieve motor - Short circuit (K.62.B.28.56 - G.30.B.52) 97
AFX8010

Motor Lower sieve motor - Unidentified failure (K.62.B.28.56 - G.30.B.46) 119
AFX8010

Motor Shoe leveling motor - Open circuit (K.62.B.28.60 - G.30.B.50) 80
AFX8010

Motor Shoe leveling motor - Overview (K.62.B.28.60 - C.10.A.10) 7
AFX8010

https://truckmanualshub.com/

Motor Shoe leveling motor - Short circuit (K.62.B.28.60 - G.30.B.52) 85
AFX8010

Motor Shoe leveling motor - Short circuit to B+ (K.62.B.28.60 - G.30.B.54) 74
AFX8010

Motor Shoe leveling motor - Unidentified failure (K.62.B.28.60 - G.30.B.46) 91
AFX8010

Motor Upper sieve motor - Short circuit (K.62.B.28.55 - G.30.B.52) 108
AFX8010

Motor Upper sieve motor - Unidentified failure (K.62.B.28.55 - G.30.B.46) 130
AFX8010

Sensing system Fan speed sensor - Open circuit (K.62.B.95.52 - G.30.B.50) 162
AFX8010

Sensing system Fan speed sensor - Short circuit to B+ (K.62.B.95.52 - G.30.B.54) 156
AFX8010

Sensing system Fan speed sensor - Short circuit to ground (K.62.B.95.52 - G.30.B.53) 159
AFX8010

Sensing system Lateral inclination sensor - Open circuit (K.62.B.95.50 - G.30.B.50) 151
AFX8010

Sensing system Lateral inclination sensor - Overview (K.62.B.95.50 - C.10.A.10) 8
AFX8010

Sensing system Lateral inclination sensor - Short circuit to B+ (K.62.B.95.50 - G.30.B.54) 147
AFX8010

Sensing system Sieve shake speed sensor - Open circuit (K.62.B.95.56 - G.30.B.50) 173
AFX8010

Sensing system Sieve shake speed sensor - Short circuit to B+ (K.62.B.95.56 - G.30.B.54) 167
AFX8010

Sensing system Sieve shake speed sensor - Short circuit to ground (K.62.B.95.56 - G.30.B.53) 170
AFX8010

Upper shoe levelling system - Install (K.62.B.63 - F.10.A.15) 56
AFX8010

Upper shoe levelling system - Remove (K.62.B.63 - F.10.A.10) 53
AFX8010

Upper sieve - Remove (K.62.B.57 - F.10.A.10) 46
AFX8010

Upper sieve drive system - Install (K.62.B.42 - F.10.A.15) 26
AFX8010

Upper sieve drive system - Remove (K.62.B.42 - F.10.A.10) 23
AFX8010

https://truckmanualshub.com/

CROP PROCESSING - K

CLEANING Tailings return system - 62.C

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

CLEANING Tailings return system - 62.C

DIAGNOSTIC

Sensing system

Sensing system Tailing speed sensor - Short circuit to B+ (K.62.C.95.80 - G.30.B.54) 3
AFX8010

Sensing system Tailing speed sensor - Short circuit to ground (K.62.C.95.80 - G.30.B.53) 6
AFX8010

Sensing system Tailing speed sensor - Open circuit (K.62.C.95.80 - G.30.B.50) 9
AFX8010

Sensing system Tailing volume sensor - Short circuit to B+ (K.62.C.95.81 - G.30.B.54) 13
AFX8010

Sensing system Tailing volume sensor - Open circuit (K.62.C.95.81 - G.30.B.50) 18
AFX8010

https://truckmanualshub.com/

Sensing system Tailing speed sensor - Short circuit to B+ (K.62.C.95.80 - G.30.B.54)

AFX8010

E0018-03 - Tailings Speed Sensor

Cause:
The tailing RPM sensor (B-39) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "TAILINGS SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is high out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **3**.
2. Disconnect the tailing RPM sensor connector **X186**.

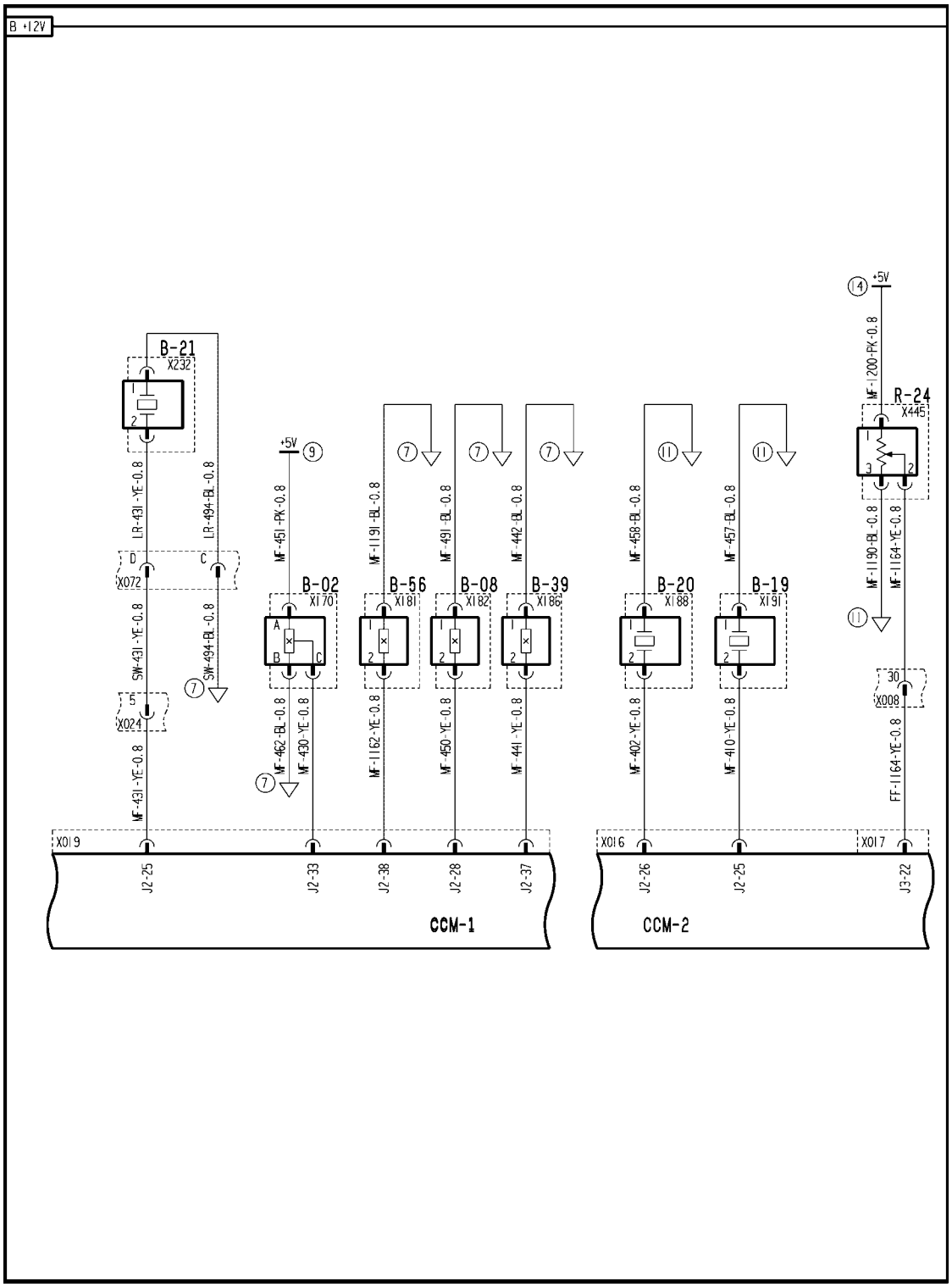
   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X186** and connector **X019** J2-37 wire 441 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

https://truckmanualshub.com/

Sensing system Tailing speed sensor - Short circuit to ground (K.62.C.95.80 - G.30.B.53)

AFX8010

E0018-04 - Tailings Speed Sensor

Cause:
The tailing RPM sensor (B-39) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "TAILINGS SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   A. If the voltage reading is high out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **3**.
2. Disconnect the tailing RPM sensor connector **X186**.

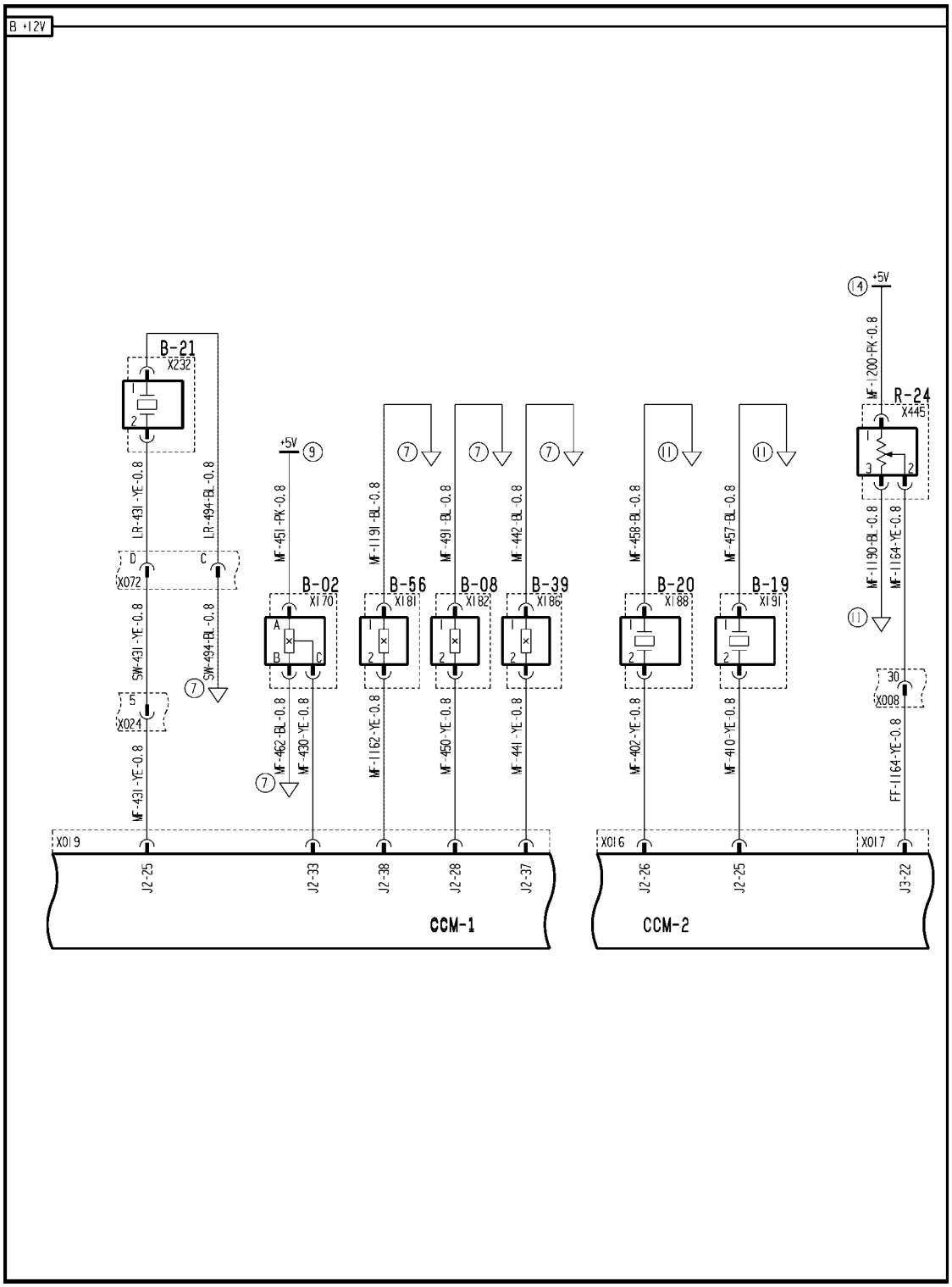
   A. If the voltage increases to **7.3 - 9.0 volts** the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, the short circuit is in the main frame (MF) harness between connector **X186** and connector **X019** J2-37 wire 441 yellow. Locate the short and repair.
3. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

https://truckmanualshub.com/

Sensing system Tailing speed sensor - Open circuit (K.62.C.95.80 - G.30.B.50)

AFX8010

E0018-05 - Tailings Speed Sensor

Cause:
The tailing RPM sensor (B-39) circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "TAILINGS SPD SEN" to check the voltage range.

   The proper voltage for sensor unblocked by ferrous metal is **0.5 - 5.6 volts**

   The proper voltage for sensor blocked by ferrous metal is **5.6 - 7.3 volts**

   The proper voltage with sensor disconnected is **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the open is not present at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*

2. Disconnect the tailing RPM sensor connector **X186**. Use a jumper wire to short the harness end of connector **X186** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **3**.

   B. If the monitor still displays **7.3 - 9.0 volts**, the open circuit is in the main frame (MF) harness between connector **X186** pin 2 and connector **X019** pin J2-37 wire 441 yellow. Locate the open and repair.

3. Disconnect the tailing RPM sensor connector **X186**. Use a multimeter to check for continuity between the harness end of connector **X186** pin 1 and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

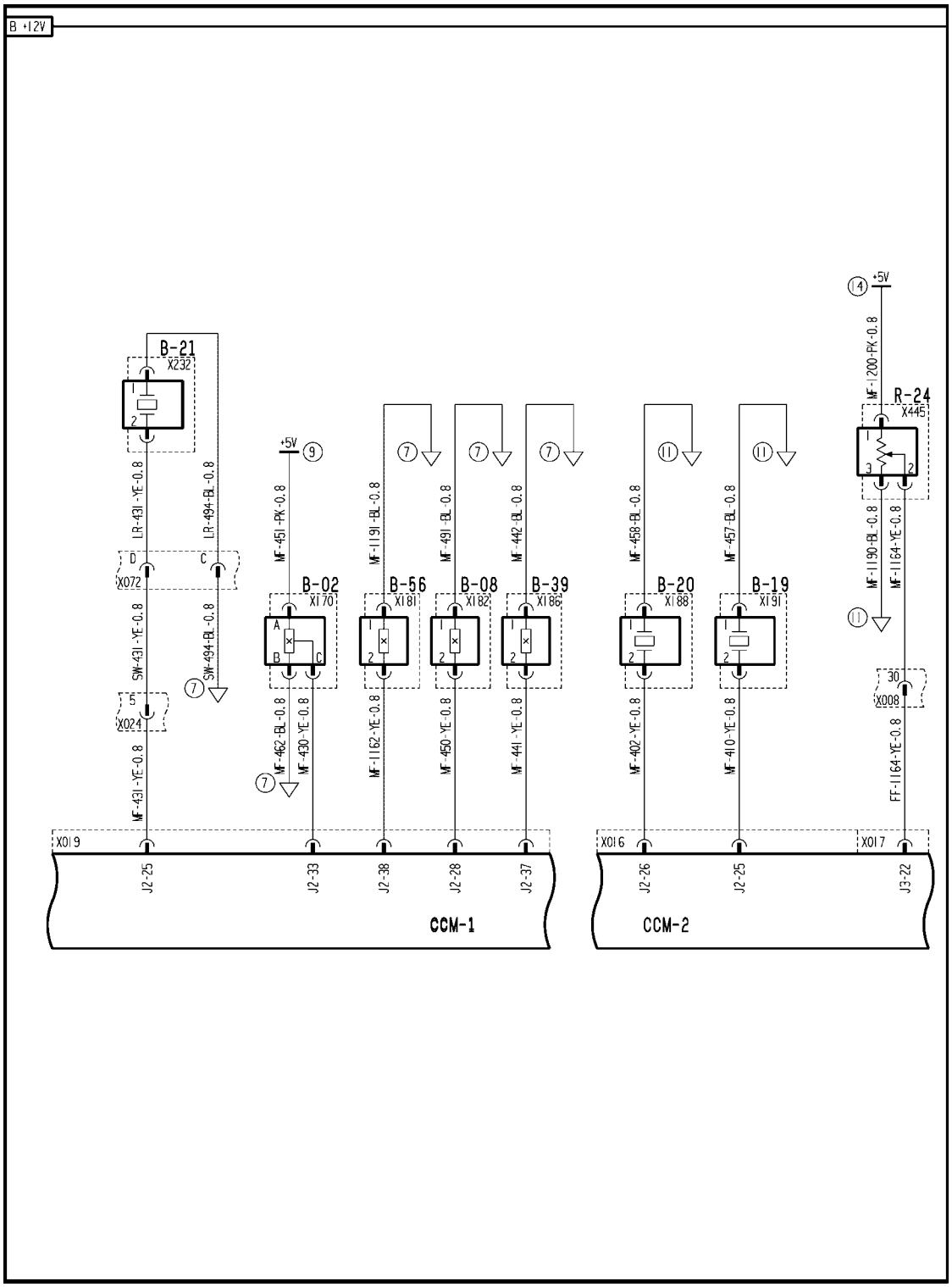
   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X186** pin 1 and connector **X019** pin J2-14 wire 442 blue, 401 blue or 460 blue. Locate the open and repair.

4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



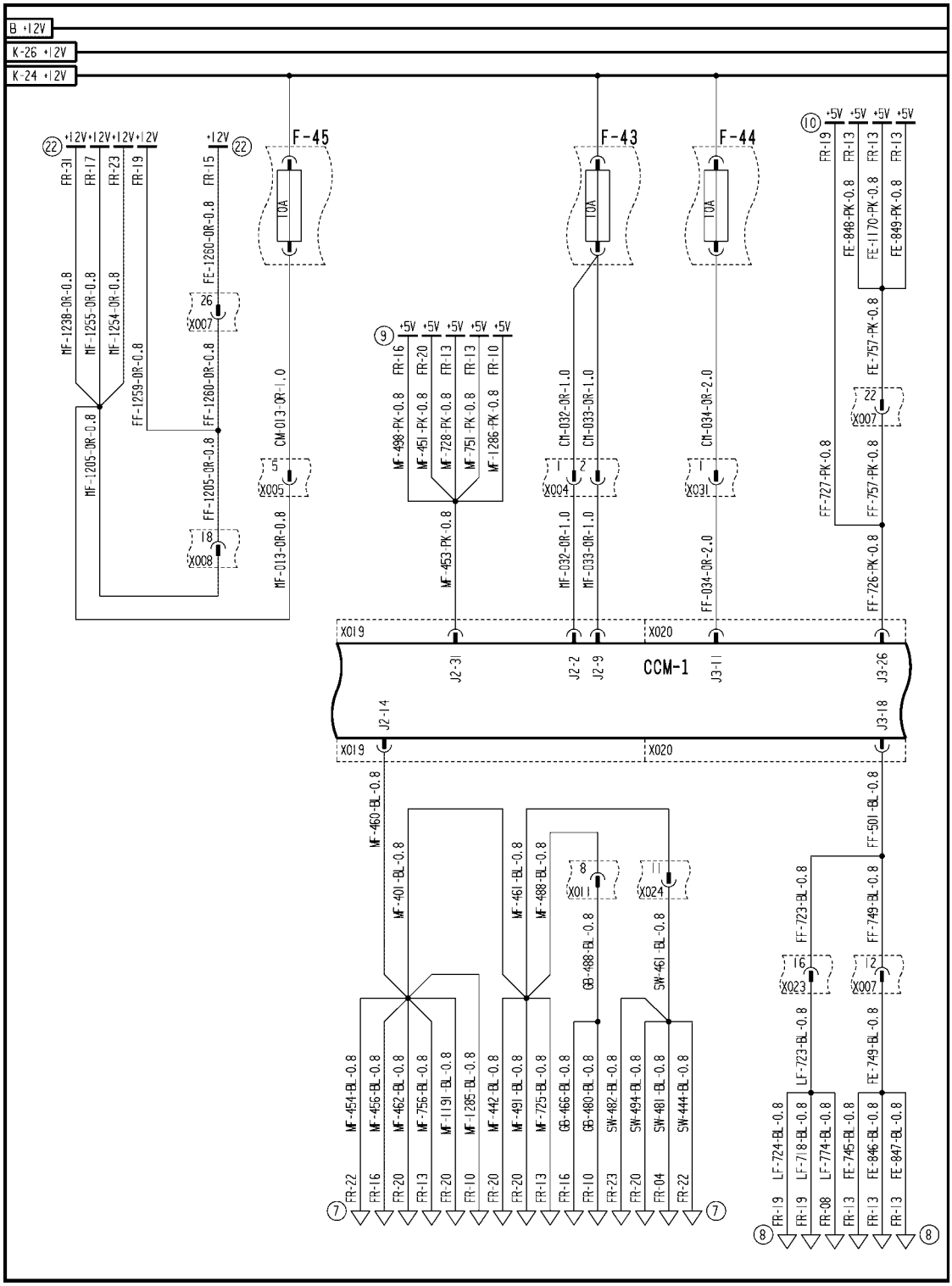
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FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Tailing volume sensor - Short circuit to B+ (K.62.C.95.81 - G.30.B.54)

AFX8010

E0147-03 - Tailings Volume Sensor

Cause:
The tailings volume sensor (R-24) circuit is shorted to high voltage, or the sensor ground is open.

Possible failure modes:

1. Sensor supply or signal wiring is shorted to high voltage (12V).
2. Sensor ground wiring is open.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "TAILINGS VOL SEN" to check the voltage range. Remove the cover from the bottom of the returns cross auger tube, and carefully move the arm on the tailings volume sensor while monitoring the voltage; the voltage should stay within range, and should change smoothly with movement of the sensor arm.

   The proper voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is high (>**5.2 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be shorted at this time. Continue the troubleshooting at Step **7**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Key off. Disconnect connector **X445**, and use a multimeter to test for continuity to ground on connector **X445** pin 3. There should be low resistance (<**1 ohms**) to ground.

   A. If continuity to ground is found (<**1 ohms**), continue with Step **5**.

   B. If no continuity is found, continue with step **3**.
3. Key off. Carefully remove connector **X016** from the bottom of CCM2. Use a multimeter to test for continuity between connector **X445** pin 3 and connector **X016** pin J2-14.

   A. If continuity is found, continue with Step **4**.

   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X445** pin 3 and connector **X016** pin J2-14 wire 1190 blue, 425 blue or 465 blue. Locate the open and repair.
4. Key off. Use a multimeter to test for continuity between connector **X016** pin J2-14 on CCM2 and chassis ground. There should be low resistance (<**1 ohms**) to ground.

   A. If no continuity is found, or there is high resistance (>**1 ohms**) to ground, the CCM2 module is not supplying a ground path for the sensor due to an internal failure. Replace the CCM2 module.

   B. If continuity is found, the ground path for the sensor tests okay. Reconnect all connectors and retest for continuity to ground at Step **2**.
5. Key ON. Disconnect connector **X445**, and use a multimeter to test for voltage on connector **X445** pin 2. There should not be any voltage present.

   A. If no voltage is found, continue with Step **6**.

   B. If high (>**5.2 volts**) voltage is found, continue with step **8**.

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6. Disconnect connector **X008**, and use a multimeter to test for voltage on connector **X008** pin 30. There should not be any voltage present.

   A. If no voltage is found, there is a short to high voltage in the main frame (MF) harness between connector **X008** and connector **X445** wire 1164 yellow. Locate the short and repair.

   B. If high (>**5.2 volts**) voltage is found, there is a short to high voltage in the front frame (FF) harness between connector **X008** pin 30 and connector **X017** pin J3-22 wire 1164 yellow. Locate the short and repair.

7. Key ON. Disconnect connector **X445**, and use a multimeter to test for voltage on connector **X445** pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **7**.

   B. If high (>**5.2 volts**) voltage is found, there is a short to high voltage in the main frame (MF) harness. The should be displayed in the ERROR history screen.
   Refer to fault code
   E0165-03 - CCM2 J2 5V Reference
   to locate the short and repair.

   NOTE: *This supply circuit is also used to supply power to the grain bin level switches S-28 & S-29, oil pressure sensor B-52, air filter switch S-61, parking brake pressure sensor B-53 and low control pressure sensor B-35, so a short to* ***12 volts*** *anywhere on the supply circuit will activate this error code.*

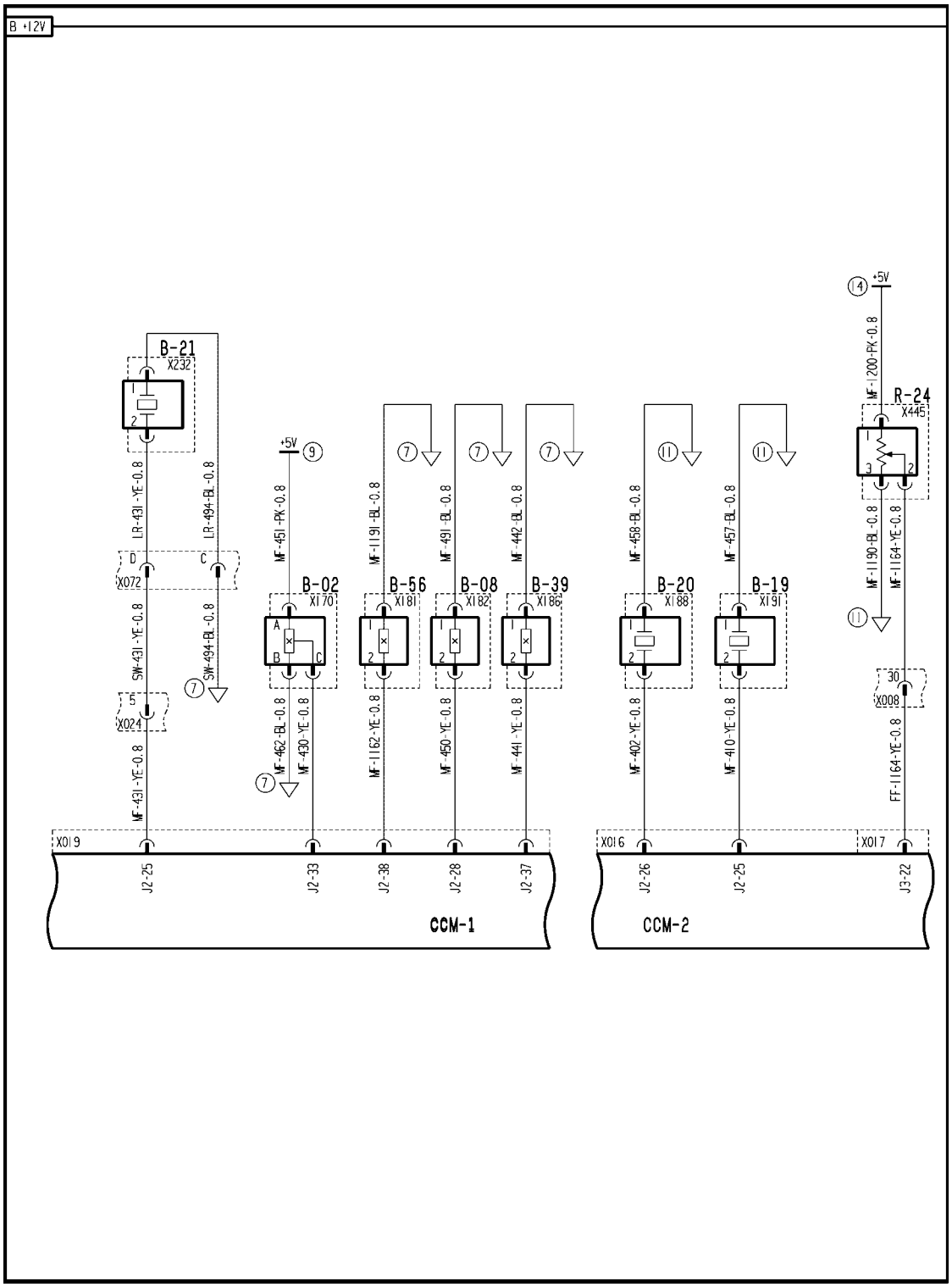
8. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no high out of range readings are indicated, erase the fault code and continue operation.

   B. If the fault code immediately resets, determine which **12 volts** circuit (such as the concave clearance motor) was activated to cause the short.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



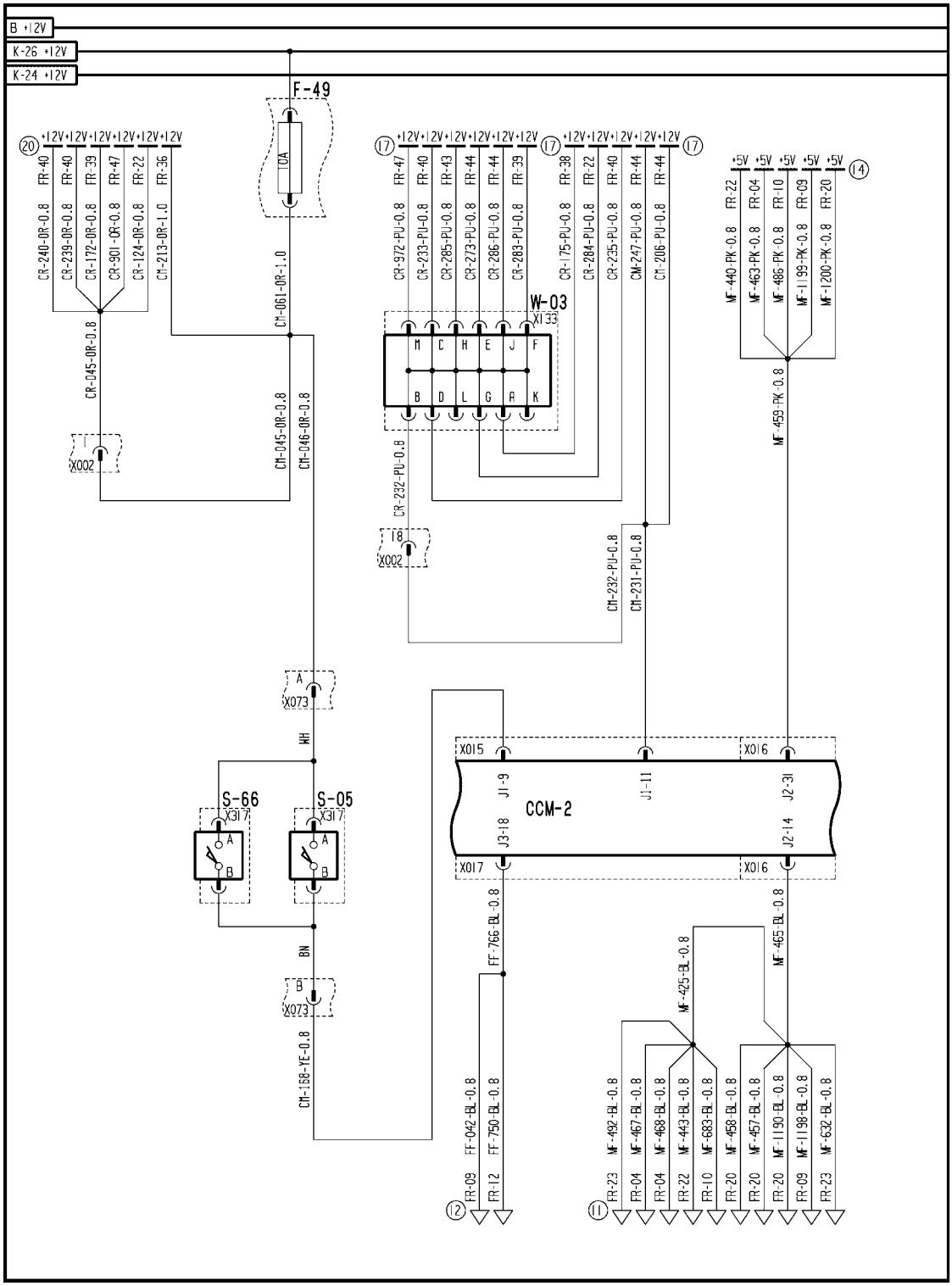
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FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Tailing volume sensor - Open circuit (K.62.C.95.81 - G.30.B.50)

AFX8010

E0147-05 - Tailings Volume Sensor

Cause:
The tailings volume sensor (R-24) circuit is open or shorted to ground.

Possible failure modes:

1. Sensor signal wiring is open or shorted to ground.
2. Loss of power to the sensor.
3. Module internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "CLEANING" sort menu, and select "TAILINGS VOL SEN" to check the voltage range. Remove the cover from the bottom of the returns cross auger tube, and carefully move the arm on the tailings volume sensor while monitoring the voltage; the voltage should stay within range, and should change smoothly with movement of the sensor arm.

   The proper voltage range is **0.3 - 5.2 volts**.

   A. If the voltage reading is low (<**0.3 volts**) out of range, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the circuit may not be open or shorted to ground at this time. Continue the troubleshooting at Step **5**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect connector **X445**, and use a multimeter to test for voltage on connector **X445** pin 1. There should be **5 volts** present.

   A. If **5 volts** is found, continue with Step **3**.

   B. If no voltage is found, there is an open circuit in the main frame (MF) harness between connector **X445** pin 1 and connector **X016** pin J2-31 wire 459 pink or 1200 pink. Locate the open and repair.
3. Disconnect connector **X445**. Use a multimeter to check for continuity between connector **X445** pin 2 and ground.

   A. If no continuity is found, continue with Step **4**.

   B. If continuity is found, continue with step **4**.
4. Disconnect connector **X008**. Use a multimeter to check for continuity between connector **X008** pin 30 and ground.

   A. If no continuity is found, there is a short to ground in the main frame (MF) harness between connector **X445** and connector **X008** wire 1164 yellow. Locate the open and repair.

   B. If continuity is found, there is a short to ground in the front frame (FF) harness between connector**X008** pin 30 and connector **X017** pin J3-22 wire 1164 yellow. Locate the short and repair.
5. Disconnect connector **X008**. Use a multimeter to check for continuity between connector **X445** pin 2 and connector **X008** pin 30.

   A. If continuity is found, continue with step **6**.

   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X445** pin 2 and connector **X008** pin 30 wire 1164 yellow. Locate the open and repair.

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6. Carefully disconnect connector **X017** from the bottom of CCM2 module. Use a multimeter to check for continuity between connector **X008** pin 30 and connector **X017** pin J3-22.

   A. If continuity is found, the open is in the sensor. Replace the sensor.

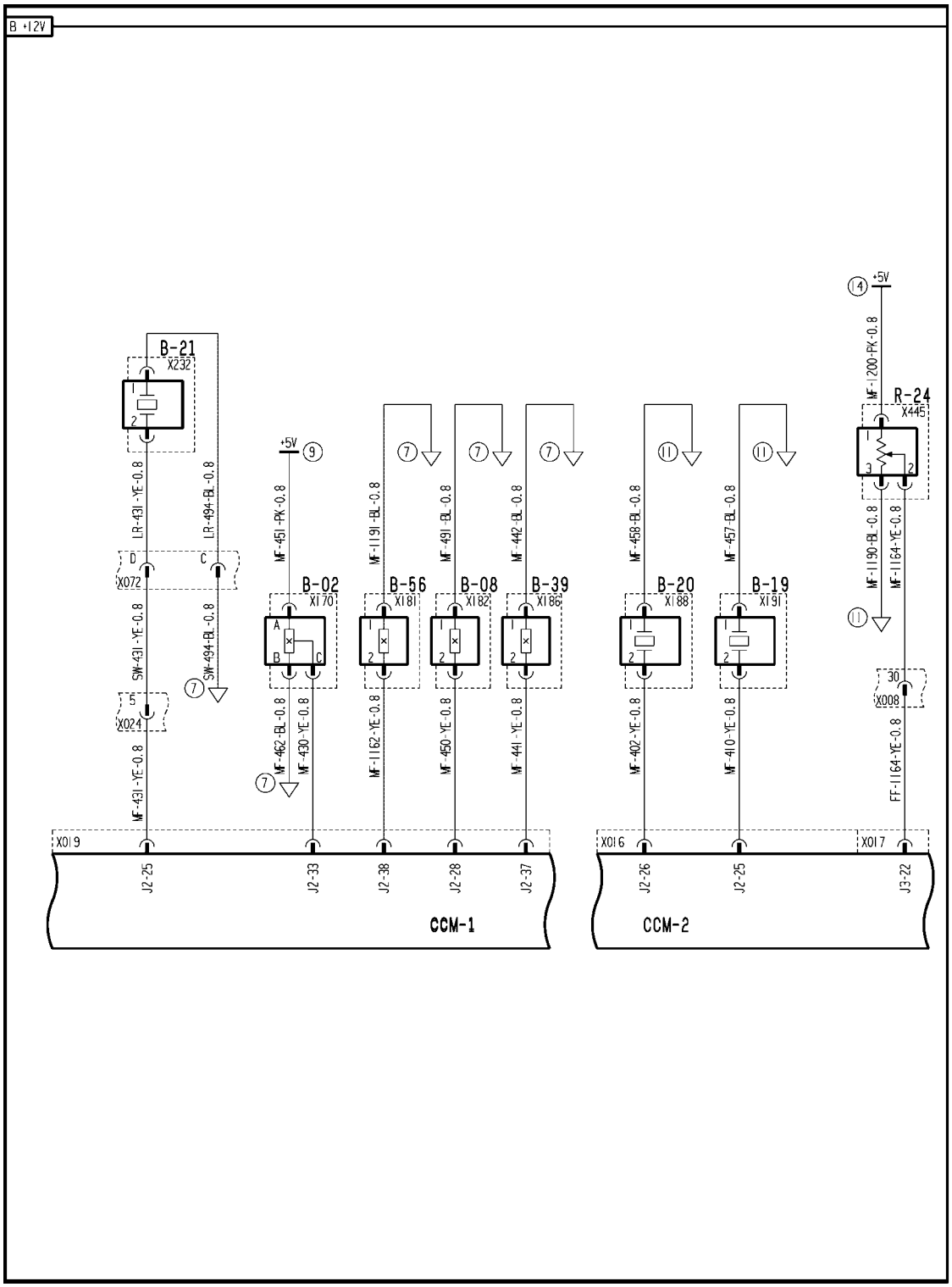
   B. If no continuity is found, there is an open circuit in the main frame (MF) harness between connector **X008** pin 30 and connector **X017** pin J3-22 wire 1164 yellow. Locate the open and repair.

7. Operate the machine while monitoring the Universal Display Plus "DIAG" screen.

   A. If no low out of range readings are indicated, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 20 (A.30.A.88 - C.20.E.20)



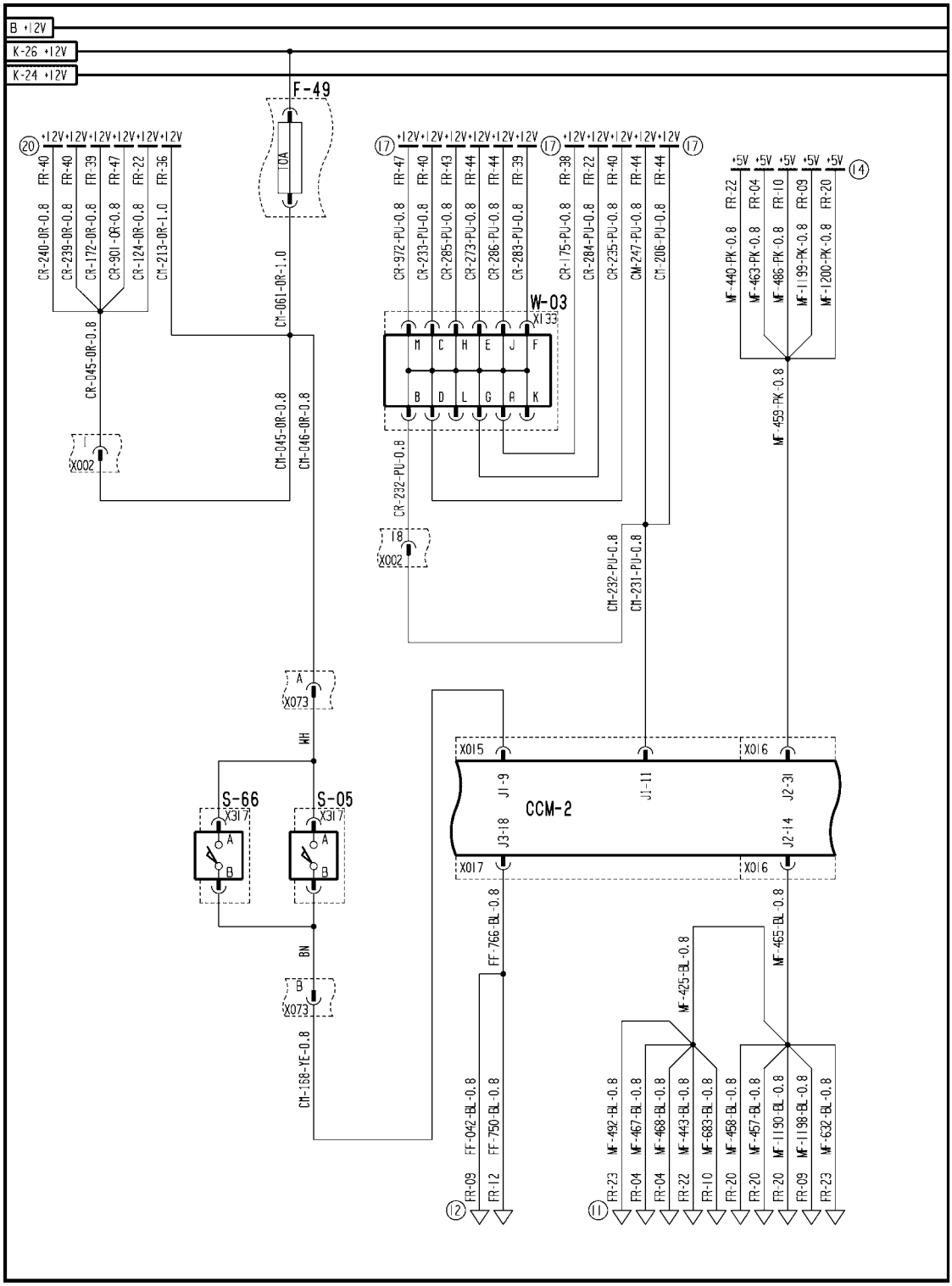
AFXSCHEM20-04 1

FRAME 20 - CLEANING

https://truckmanualshub.com/

B-02 Lateral Inclination	B-08 Clean Grain Elevator RPM	B-19 Left Rotor Loss
B-20 Right Rotor Loss	B-21 Sieves Loss	B-39 Tailings RPM
B-56 Sieve Shake RPM	R-24 Tailings Volume	

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Index

CROP PROCESSING - K

CLEANING Tailings return system - 62.C

Sensing system Tailing speed sensor - Open circuit (K.62.C.95.80 - G.30.B.50) 9
AFX8010

Sensing system Tailing speed sensor - Short circuit to B+ (K.62.C.95.80 - G.30.B.54) 3
AFX8010

Sensing system Tailing speed sensor - Short circuit to ground (K.62.C.95.80 - G.30.B.53) 6
AFX8010

Sensing system Tailing volume sensor - Open circuit (K.62.C.95.81 - G.30.B.50) 18
AFX8010

Sensing system Tailing volume sensor - Short circuit to B+ (K.62.C.95.81 - G.30.B.54) 13
AFX8010

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https://truckmanualshub.com/

CROP PROCESSING - K

CLEANING Self-levelling frame - 62.D

AFX8010

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Contents

CROP PROCESSING - K

CLEANING Self-levelling frame - 62.D

SERVICE

CLEANING Self-levelling frame - Overhaul (K.62.D - F.10.A.40) 3
AFX8010

CLEANING Self-levelling frame - Clearance (K.62.D - F.45.A.12) 13
AFX8010

https://truckmanualshub.com/

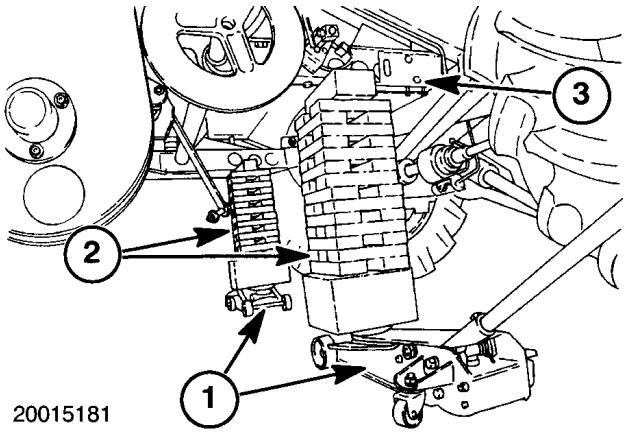
CLEANING Self-levelling frame - Overhaul (K.62.D - F.10.A.40)

AFX8010

Pivot Bushings, Rear Roller, Rear Pivot Bearing

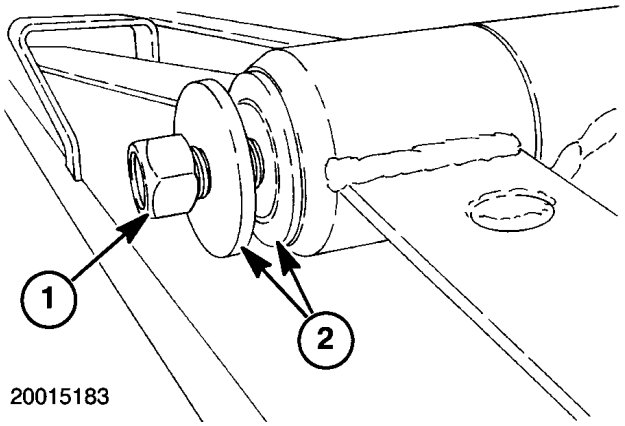
Prior operation: Remove cleaning fan per **Fan - Remove (K.62.B.52 - F.10.A.10)**

1. Use two suitable floor jacks **(1)** and blocks **(2)** to support the leveling frame **(3)** on the left and right sides of the frame.



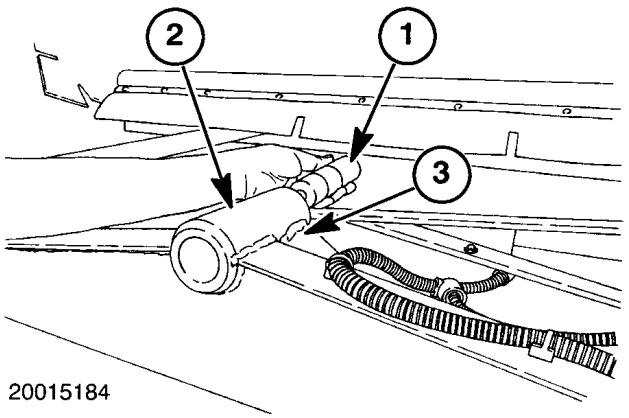
20015181 1

2. Loosen and remove the locknut **(1)** and washers **(2)** from the pivot shaft.



20015183 2

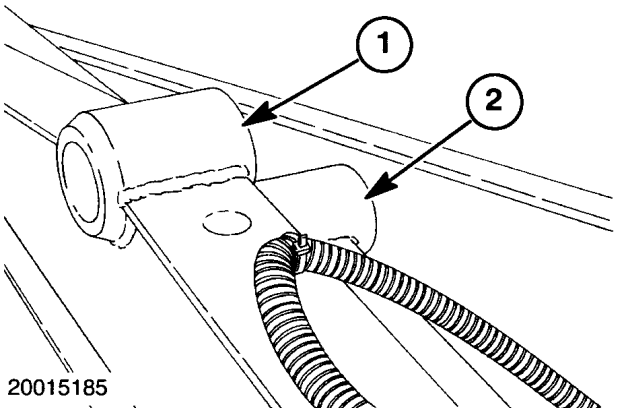
3. Use a hammer and a soft non-steel drift to drive the pivot shaft **(1)** from the leveling frame **(2)** and combine frame.



20015184 3

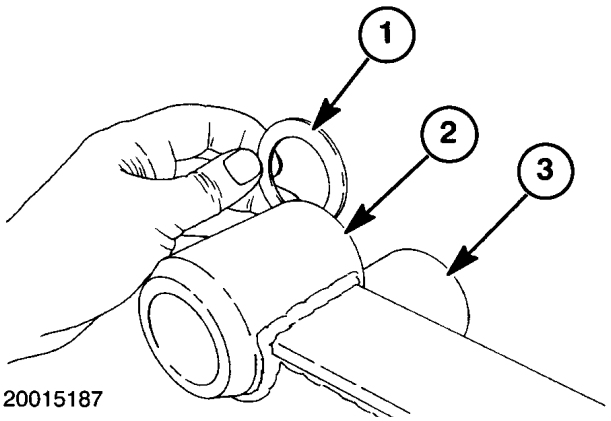
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4. Raise the floor jacks evenly to allow the leveling frame **(1)** to be positioned above the combine frame **(2)** just enough to allow bushing removal.



20015185 4

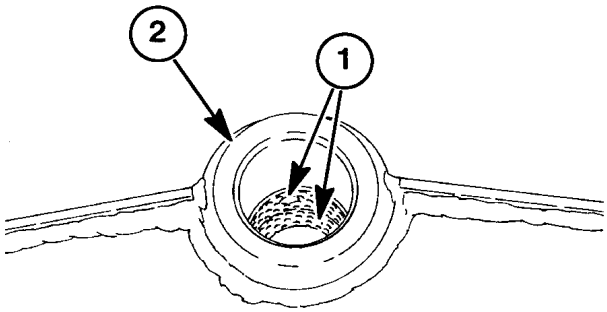
5. Remove the shim washer **(1)** positioned between the leveling frame **(2)** and combine frame **(3)**..



20015187a 5

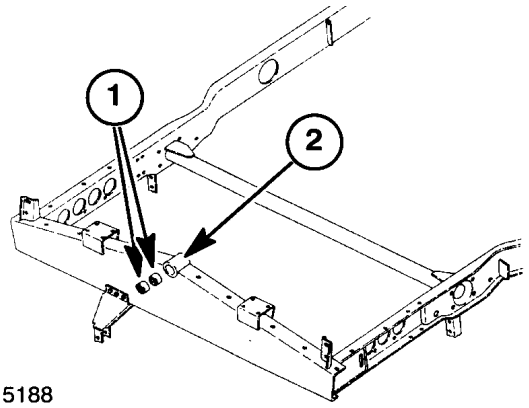
6. Remove the two bushings **(1)** from the leveling frame **(2)**

NOTE: *Clean all parts in a suitable solvent and allow to air dry. Inspect the pivot shaft for wear or damage. Repair or replace as necessary. Inspect the leveling frame and combine frame pivot housings for wear or damage. Repair or replace as necessary.*



20015186 6

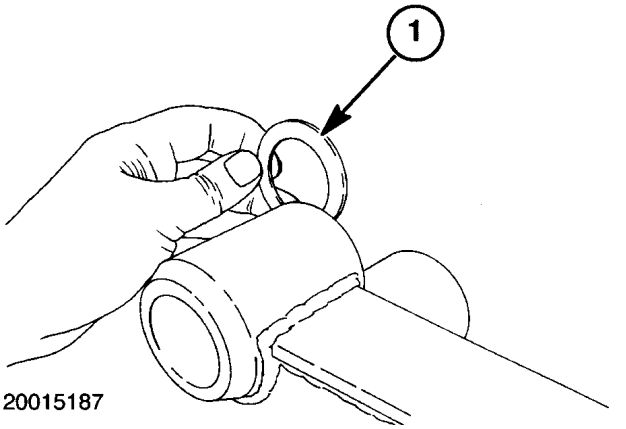
7. Install two new bushings **(1)** into the pivot bore **(2)** of the leveling frame.



20015188 7

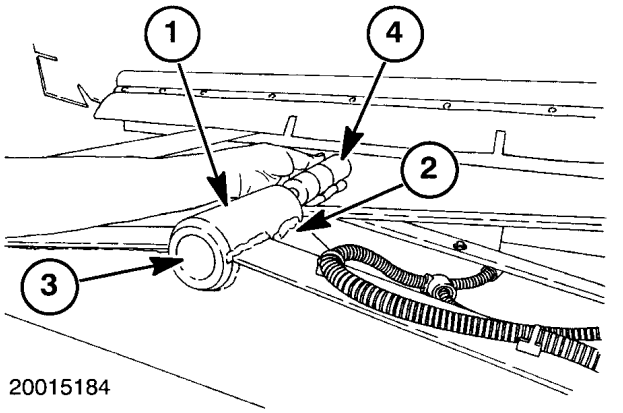
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8. Insert the shim washer **(1)** between the leveling frame and combine frame.



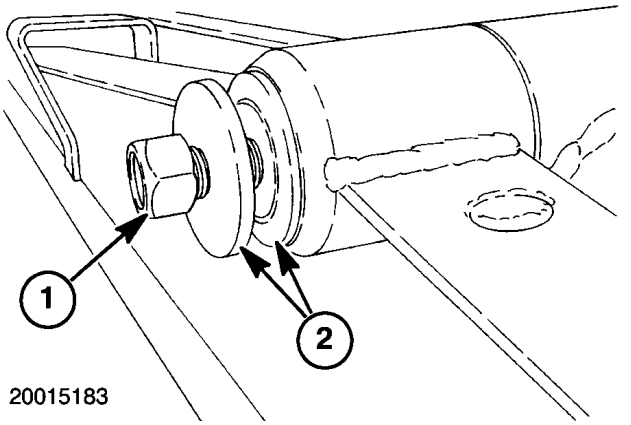
20015187 8

9. Lower the floor jacks to align the pivot bores in the leveling frame **(1)** and combine frame **(2)**. Insert 50 grams (1.75 oz.) of Molycote grease Long-Term grease in the pivot bore **(3)**. Coat the pivot shaft **(4)** with Molycote grease. Insert the pivot shaft **(4)** through the pivot bore **(3)**.



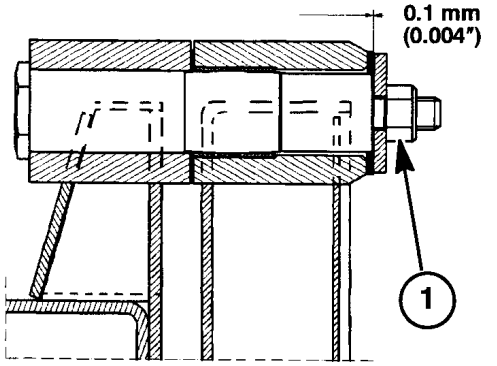
20015184a 9

10. Install the washers **(1)** and nut **(2)** onto the pivot shaft. Tighten the nut securely.



20015183 10

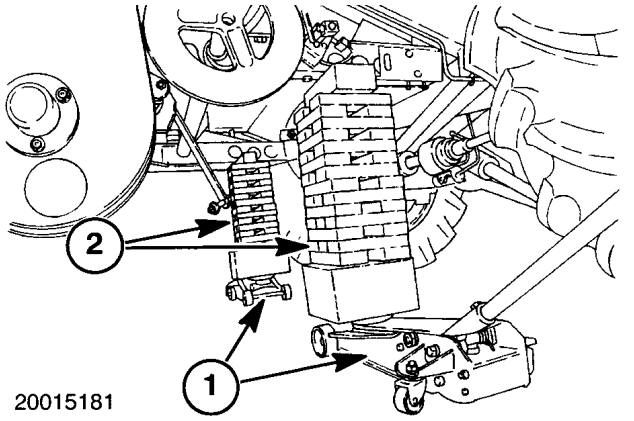
11. Adjust the locknut **(1)** to gain **0.1 - 0.6 mm** (**0.004 - 0.023 in**) clearance between the two washers.



20015189 11

https://truckmanualshub.com/

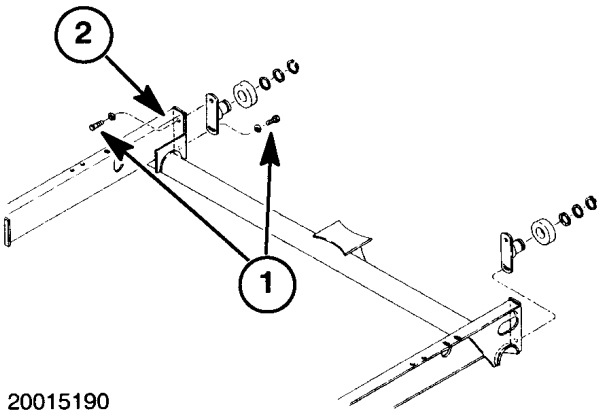
12. Lower the floor jacks **(1)**. Remove the wood blocks **(2)**.



20015181a 12

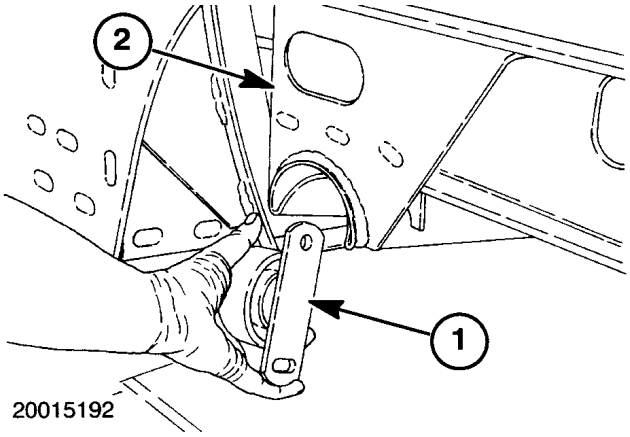
13. Install the cleaning fan. **Fan - Install (K.62.B.52 - F.10.A.15)**

14. Loosen and remove the cap screws **(1)** and washers securing the roller assembly to the leveling frame **(2)**.



20015190a 13

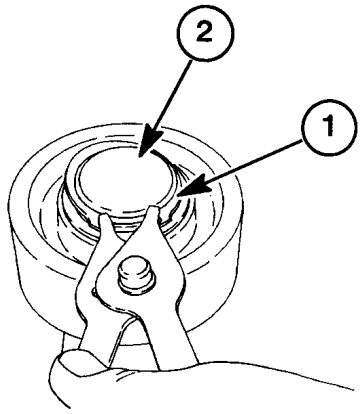
15. Remove the roller assembly, **(1)** from the leveling frame **(2)**.



20015192 14

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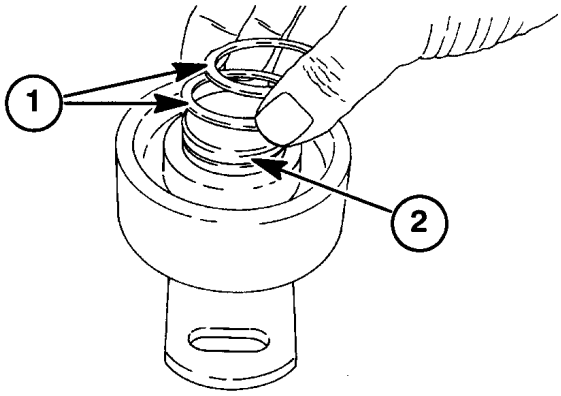
16. Remove the snap ring **(1)** from the roller shaft **(2)**.



20015193

20015193 15

17. Remove the two washers **(1)** from the roller shaft **(2)**.

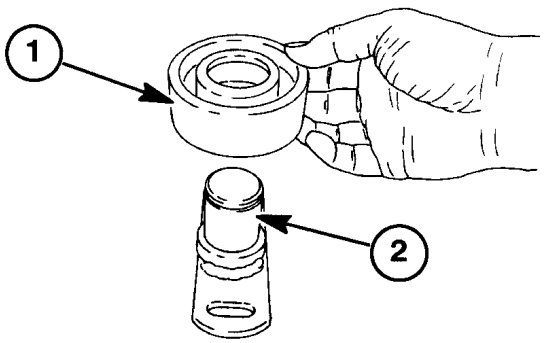


20015194

20015194a 16

18. Remove the roller **(1)** from the roller shaft **(2)**.

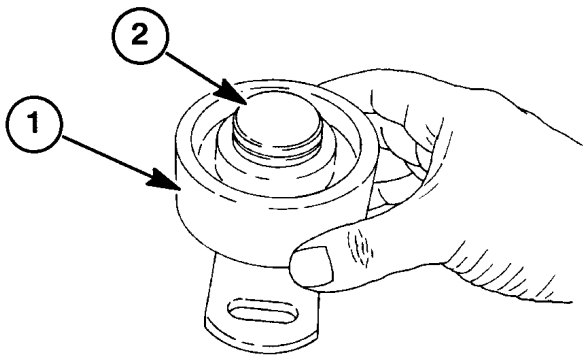
NOTE: *Inspection. Wash all parts in a suitable solvent and allow to air dry. Inspect the roller shaft for wear or burrs, nicks, or other damage. Replace as necessary.*



20015195

20015195 17

19. Install a new roller **(1)** onto the roller shaft **(2)**.

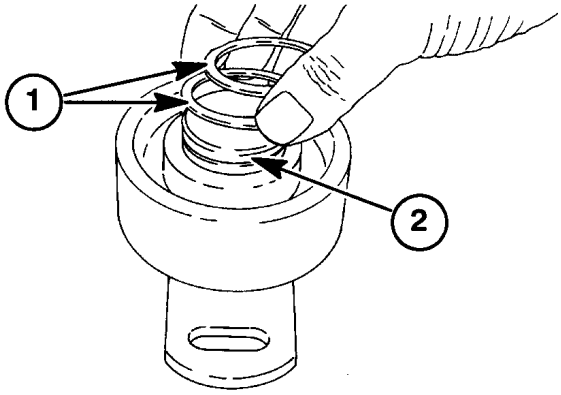


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20015196 18

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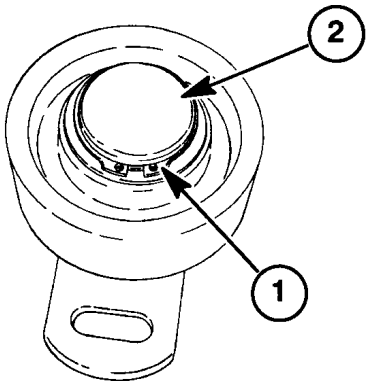
20. Install two washers **(1)** onto the roller shaft **(2)**.



20015194

20015194a 19

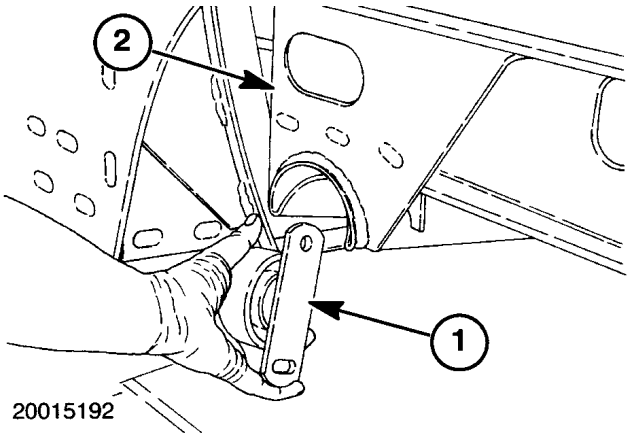
21. Install the snap ring **(1)** onto the roller shaft **(2)** to secure the roller assembly.



20015197

20015197 20

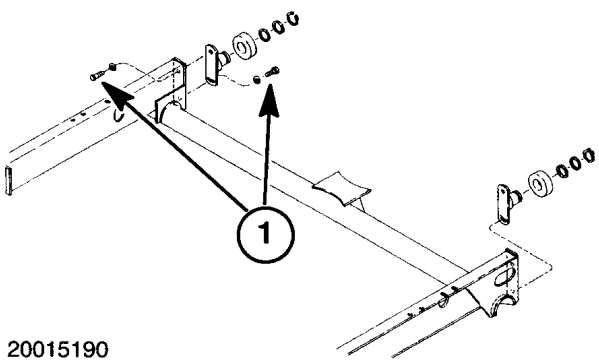
22. Install the roller assembly **(1)** onto the leveling frame **(2)** with the slotted hole positioned at the bottom mounting location.



20015192

20015192 21

23. Secure the roller assembly with cap screws, **(1)** and washers. Leave cap screws hand tight until adjustment is completed.

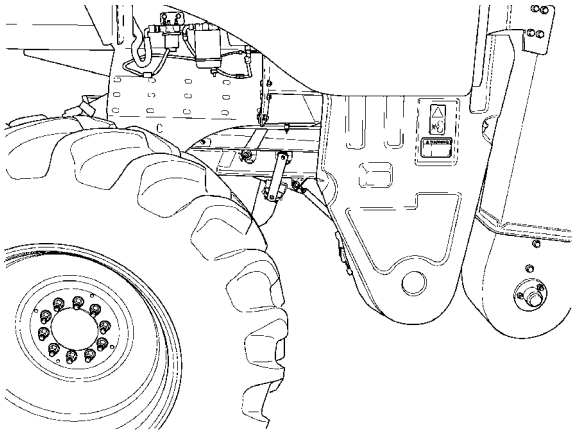


20015190

20015190 22

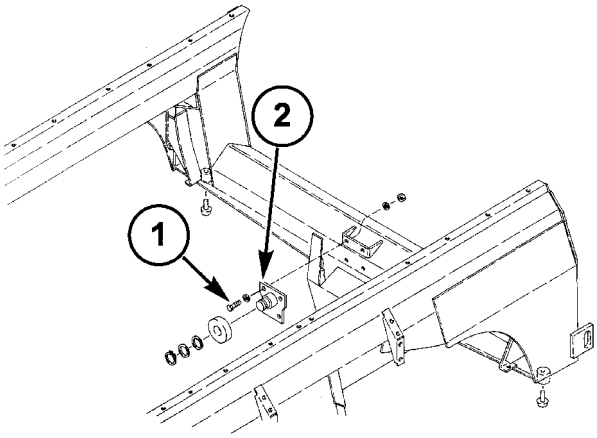
https://truckmanualshub.com/

24. Support the cleaning shoe with suitable floor jacks under the leveling frame on both sides of the combine.



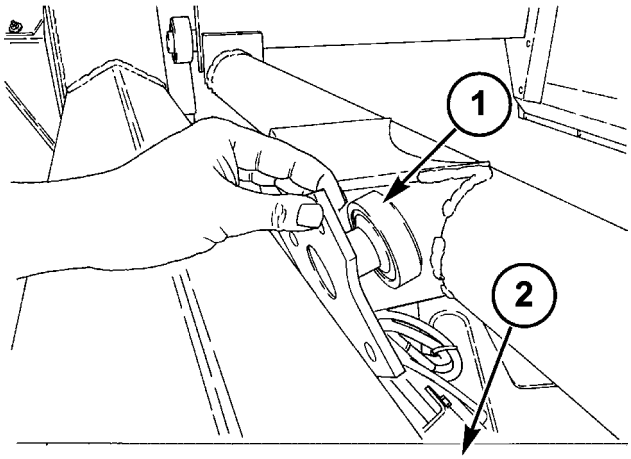
10036378 23

25. Remove the two mounting bolts and two cap screws **(1)** from the rear pivot bearing shaft **(2)**.



50041931A5 24

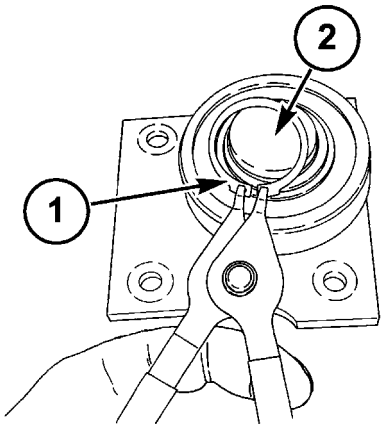
26. Remove the rear pivot bearing assembly **(1)** from the lower combine frame **(2)**.



50041932A5 25

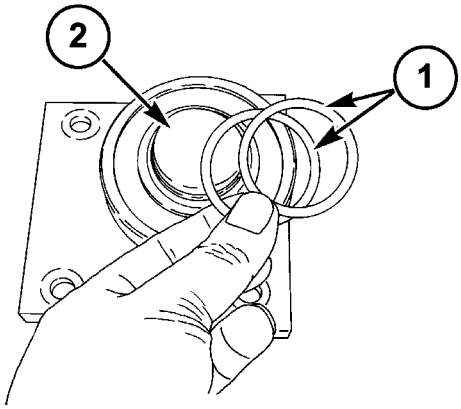
https://truckmanualshub.com/

27. Remove the snap ring **(1)** from the bearing shaft **(2)**



50041933A5 26

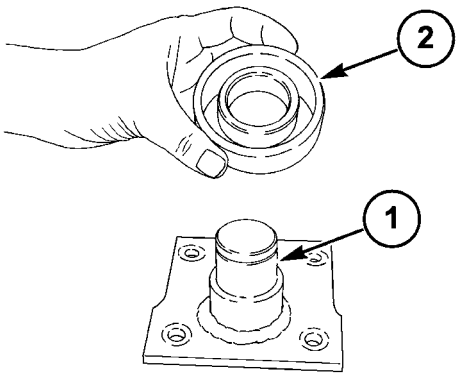
28. Remove the two washers **(1)** from the bearing shaft **(2)**.



50041934A5 27

29. Press the bearing shaft **(1)** from the bearing **(2)**.

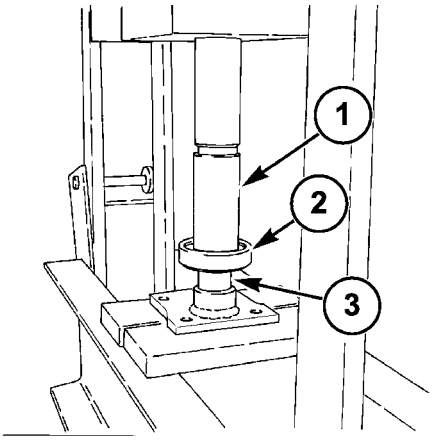
NOTE: *Wash all parts in a suitable solvent and allow to air dry. Rotate bearing by hand to check for roughness or binding . Replace as necessary. Inspect roller shaft for wear, burrs, nicks or other damage. Replace as necessary.*



50041935A5 28

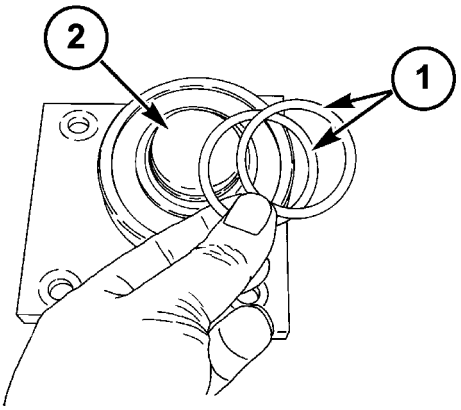
https://truckmanualshub.com/

30. Press a new sealed bearing **(1)** onto the bearing shaft **(2)**.



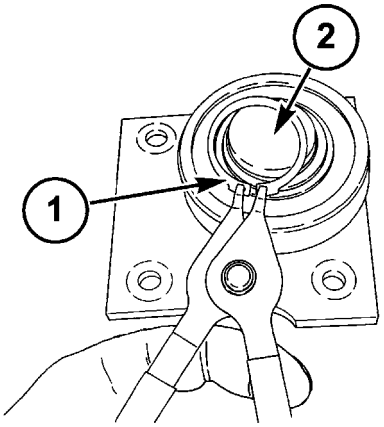
50041936A5 29

31. Install two washers **(1)** onto the bearing shaft **(2)**.



50041934A5 30

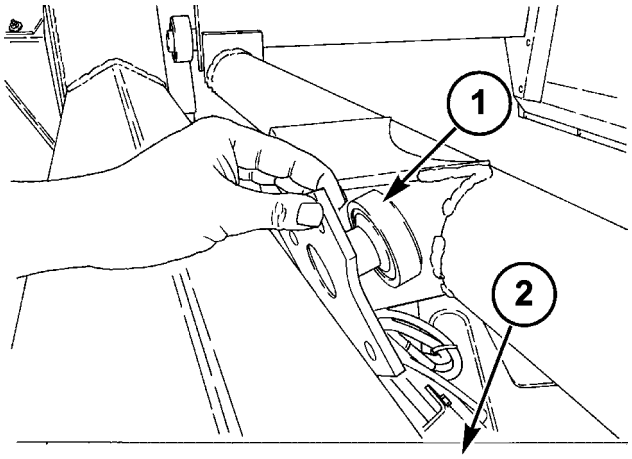
32. Install the snap ring **(1)** onto the bearing shaft **(2)** to secure the pivot bearing assembly.



50041933A5 31

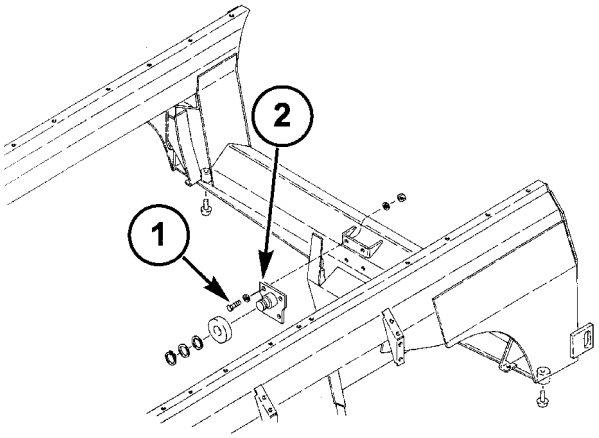
https://truckmanualshub.com/

33. Install the rear pivot bearing assembly **(1)** onto the lower combine frame **(2)**.



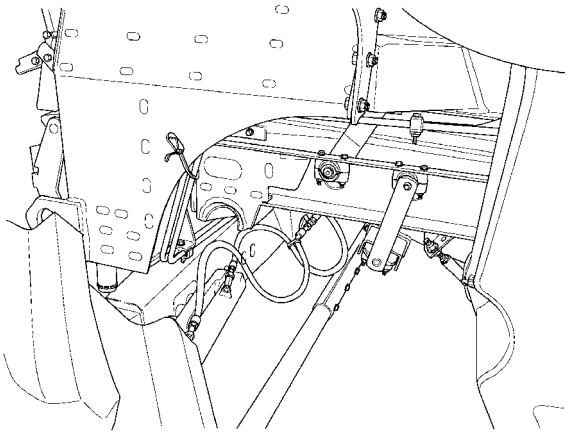
50041932A5 32

34. Install the two mounting bolts and two cap screws **(1)** through the rear pivot bearing shaft **(2)** into the lower combine frame. Tighten the hardware securely.



50041931A5 33

35. Lower and remove the floor jacks from both sides of the combine.



10036377 34

Next operation: Adjust rear rollers. **CLEANING Self-levelling frame - Clearance (K.62.D - F.45.A.12)**

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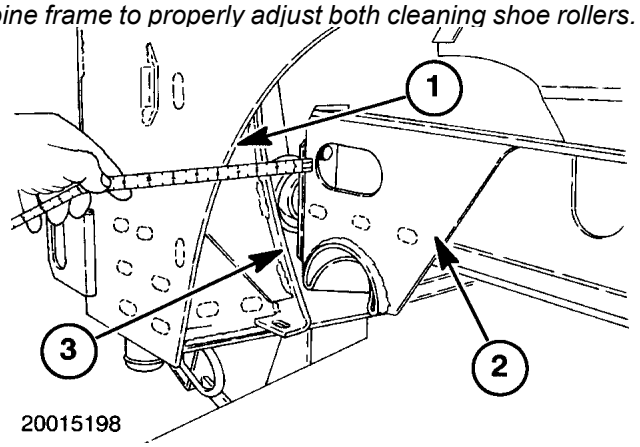
CLEANING Self-levelling frame - Clearance (K.62.D - F.45.A.12)

AFX8010

NOTE: *The leveling frame must be centered in the lower combine frame to properly adjust both cleaning shoe rollers.*

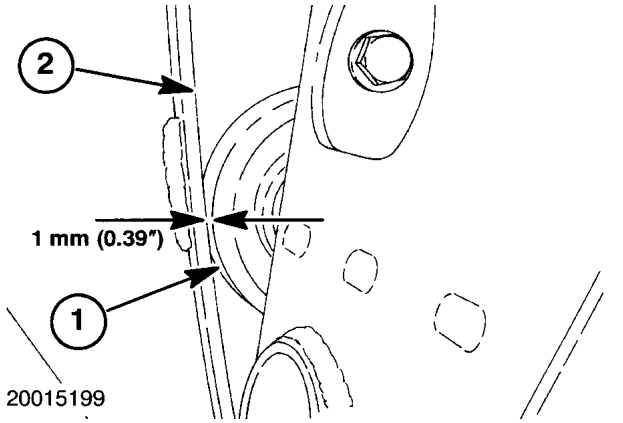
1. Measure the distance between the lower combine frame **(1)** and leveling frame **(2)** on both sides of the combine. Position the leveling frame until both measurements are equal. This will center the leveling frame in the lower combine frame. With the leveling frame centered, move both rollers out against the rolling surface **(3)** on the lower combine frame **(1)**.

IMPORTANT: *Maximum combined roller clearance must not exceed **3.5 mm** (**0.138 in**)*



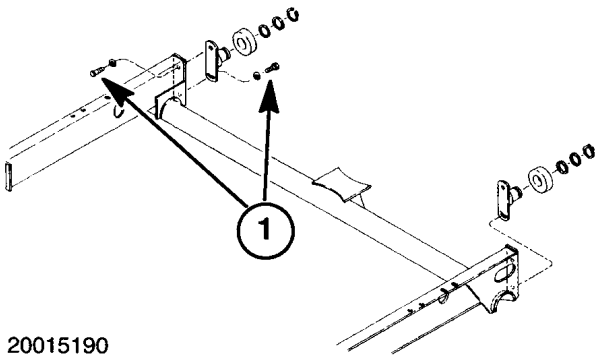
20015198 1

2. Pivot the roller assembly to obtain **1 mm** (**0.039 in**) clearance between the roller **(1)** and the rolling surface **(2)**. Repeat for the opposite side.



20015199 2

3. Tighten the cap screws **(1)** securely on the roller assemblies.



20015190 3

4. Re-check the clearance of each roller.

IMPORTANT: *At least one roller must be free to turn at all times in any position or orientation of the cleaning shoe. Roller clearance must be increased if both rollers are tight. Do not exceed the maximum combined clearance of **3.5 mm** (**0.138 in**)*

https://truckmanualshub.com/

Index

CROP PROCESSING - K

CLEANING Self-levelling frame - 62.D

CLEANING Self-levelling frame - Clearance (K.62.D - F.45.A.12) 13
AFX8010

CLEANING Self-levelling frame - Overhaul (K.62.D - F.10.A.40) 3
AFX8010

https://truckmanualshub.com/

CROP PROCESSING - K

RESIDUE HANDLING Straw chopper - 64.C

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

RESIDUE HANDLING Straw chopper - 64.C

DIAGNOSTIC

Sensing system

Sensing system Speed sensor - Short circuit to B+ (K.64.C.95.80 - G.30.B.54) 3
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.64.C.95.80 - G.30.B.53) 6
AFX8010

Sensing system Speed sensor - Open circuit (K.64.C.95.80 - G.30.B.50) 9
AFX8010

https://truckmanualshub.com/

Sensing system Speed sensor - Short circuit to B+ (K.64.C.95.80 - G.30.B.54)

AFX8010

E0143-03 - Chopper RPM Sensor

Cause:
The chopper RPM sensor (B-10) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "CHOPPER SPD SEN" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor disconnected **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts**, continue with Step **3**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*

2. Disconnect the chopper RPM sensor from the main frame harness at connector **X411**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, the short circuit is in the main frame (MF) harness between connector **X411** pin 2 and connector **X016** pin J2-38 wire 413 yellow.

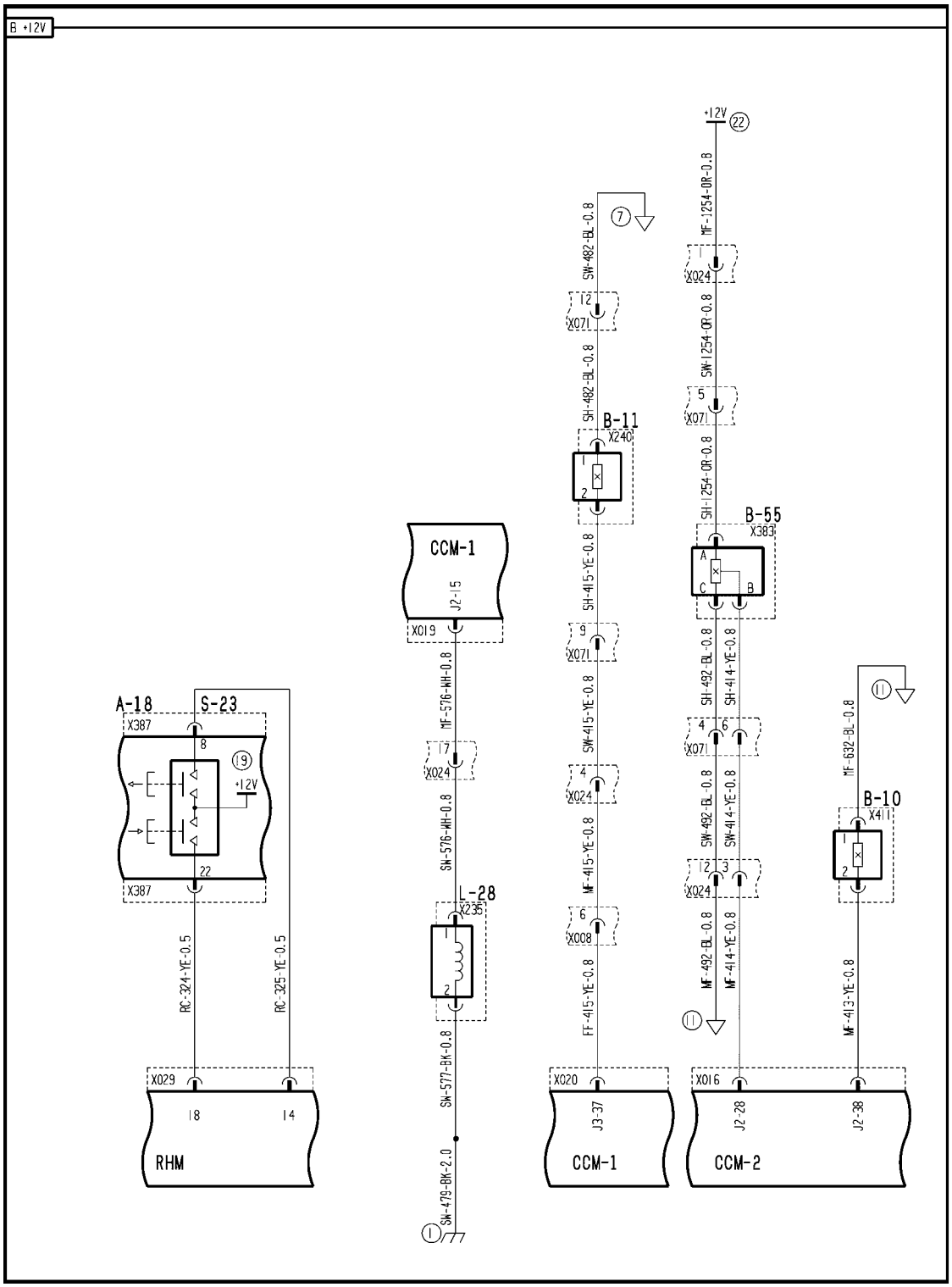
3. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove. The sensor is functioning if LED changes state.

   A. If the LED does not change state (turn on and off), replace the sensor.

   B. If the LED changes state (turns on and off), erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



AFXSCHEM23-04 1

FRAME 23 - TRASH

https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

https://truckmanualshub.com/

Sensing system Speed sensor - Short circuit to ground (K.64.C.95.80 - G.30.B.53)

AFX8010

E0143-04 - Chopper RPM Sensor

Cause:
The chopper RPM sensor (B-10) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "CHOPPER SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor disconnected **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **4**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*

2. Disconnect the chopper RPM sensor connector **X411**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor or sensor wiring. Replace the sensor.

   B. If the voltage remains low, there is a short to ground in the main frame (MF) harness between connector **X411** pin 2 and connector **X016** pin J2-38 wire 413 yellow. Locate the short and repair.

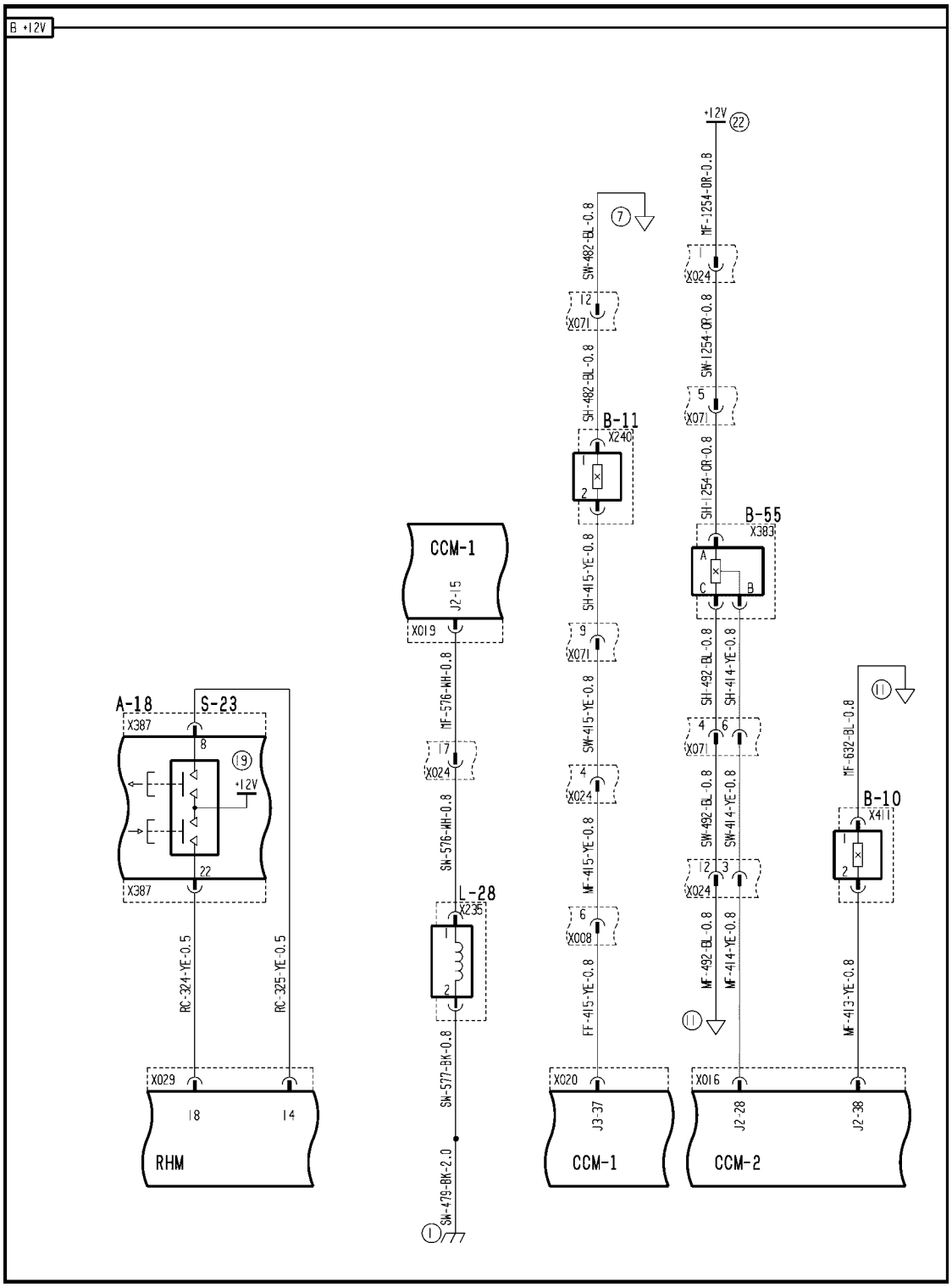
3. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove. The sensor is functioning if LED changes state.

   A. If the LED does not change state (turn on and off), replace the sensor.

   B. If the LED changes state (turns on and off), erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



AFXSCHEM23-04 1

FRAME 23 - TRASH

https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

https://truckmanualshub.com/

Sensing system Speed sensor - Open circuit (K.64.C.95.80 - G.30.B.50)

AFX8010

E0143-05 - Chopper RPM Sensor

Cause:
The chopper RPM sensor (B-10) circuit is open.

Possible failure modes:

1. Sensor supply or ground wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "CHOPPER SPD SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor disconnected **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **7**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the chopper RPM sensor connector **X411**. Use a jumper wire to short the harness end of connector **X411** pin 2 to chassis ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **4**.

   B. If the monitor still displays **7.3 - 9.0 volts**, there is an open circuit in the main frame (MF) harness between connector **X411** pin 2 and connector **X016** pin J2-38 wire 413 yellow. Locate the open and repair.
3. Disconnect the chopper RPM sensor connector **X411**. Use a multimeter to check for continuity between the harness end of connector **X411** pin 1 and chassis ground.

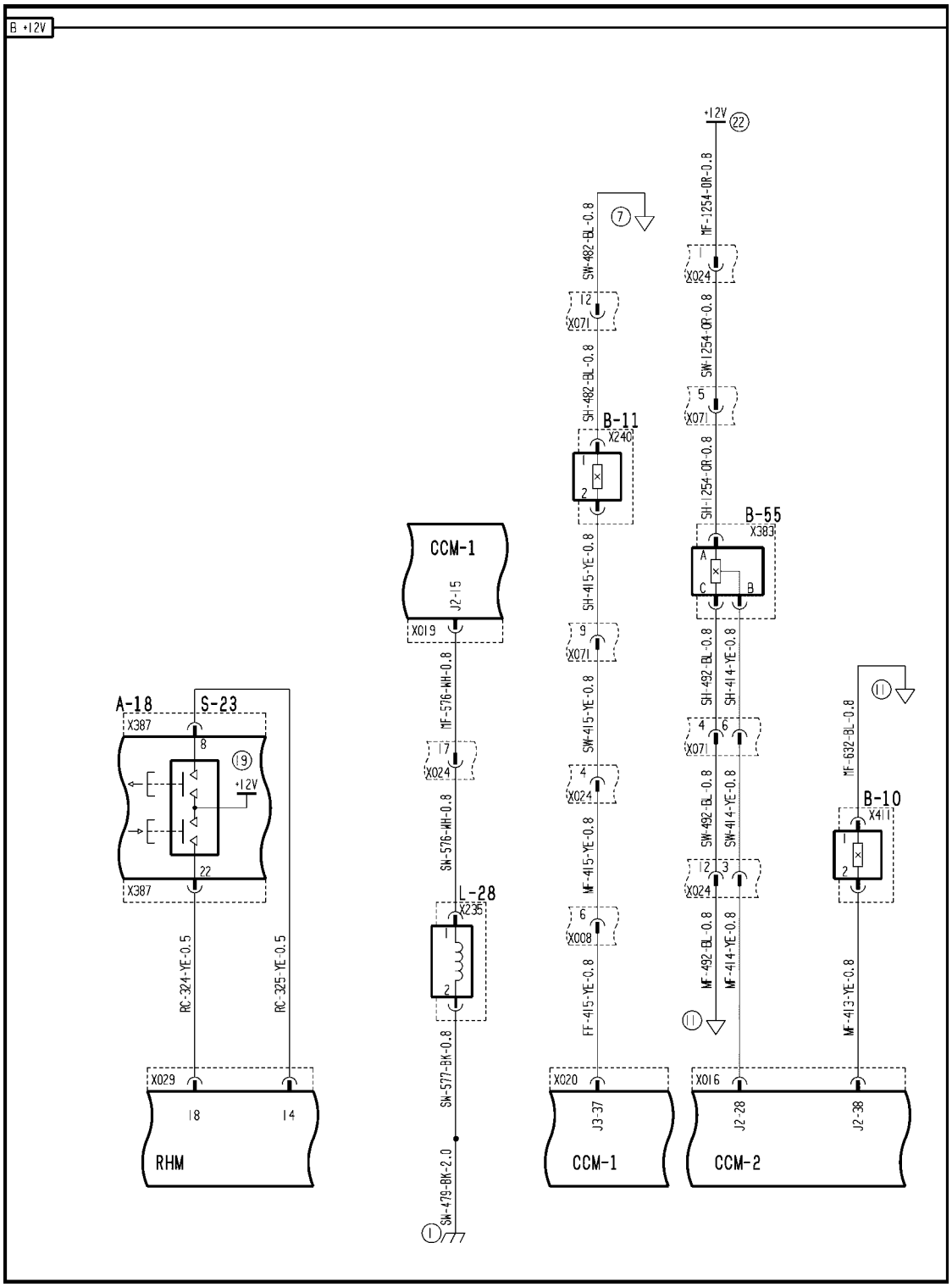
   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity, there is an open circuit in the main frame (MF) harness between connector **X411** pin 1 and connector **X016** pin J2-14 wire 632 blue, 425 blue or 465 blue. Locate the open and repair.
4. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



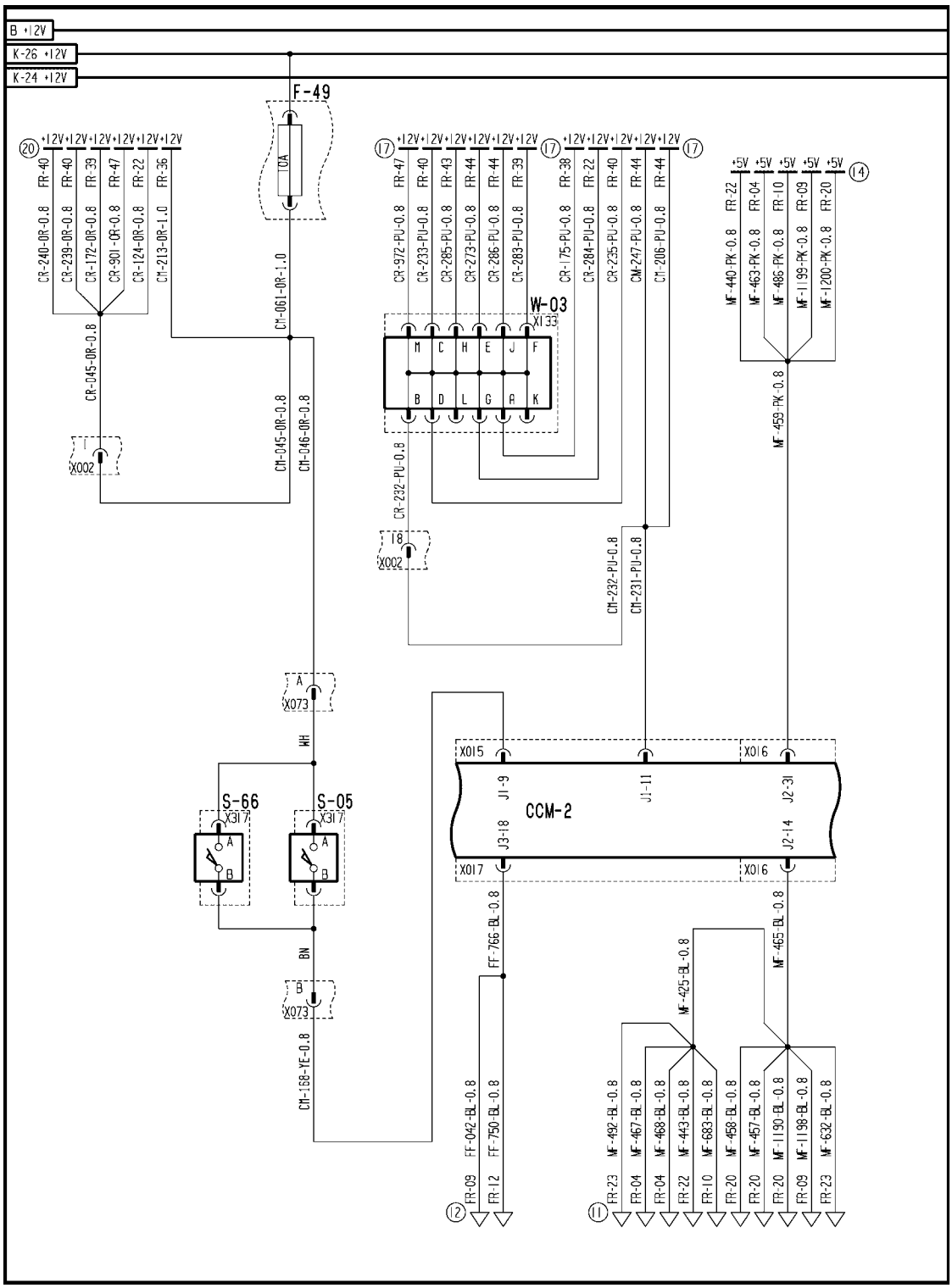
AFXSCHEM23-04 1

FRAME 23 - TRASH

https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

https://truckmanualshub.com/

F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

https://truckmanualshub.com/

Index

CROP PROCESSING - K

RESIDUE HANDLING Straw chopper - 64.C

Sensing system Speed sensor - Open circuit (K.64.C.95.80 - G.30.B.50) 9
AFX8010

Sensing system Speed sensor - Short circuit to B+ (K.64.C.95.80 - G.30.B.54) 3
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.64.C.95.80 - G.30.B.53) 6
AFX8010

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https://truckmanualshub.com/

CROP PROCESSING - K

RESIDUE HANDLING Spreader - 64.D

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

RESIDUE HANDLING Spreader - 64.D

DIAGNOSTIC

Command valve

Command valve - Unidentified failure (K.64.D.12 - G.30.B.46) 3
AFX8010

Sensing system

Sensing system Position sensor - Short circuit to B+ (K.64.D.95.81 - G.30.B.54) 6
AFX8010

Sensing system Position sensor - Short circuit to ground (K.64.D.95.81 - G.30.B.53) 10
AFX8010

Sensing system Position sensor - Open circuit (K.64.D.95.81 - G.30.B.50) 14
AFX8010

Sensing system Speed sensor - Short circuit to B+ (K.64.D.95.80 - G.30.B.54) 19
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.64.D.95.80 - G.30.B.53) 23
AFX8010

Sensing system Speed sensor - Open circuit (K.64.D.95.80 - G.30.B.50) 27
AFX8010

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Command valve - Unidentified failure (K.64.D.12 - G.30.B.46)

AFX8010

E0053-11 - Chaff Spreader Valve

Cause:
The chaff spreader valve L-28 control voltage circuit open, or short to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Controller internal failure (internal regulator failure).
3. Bad solenoid.

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "CHAFF SPREAD VLV". Change the drop-down list to "STATUS", and use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **7**.
2. Turn the key switch to the OFF position and disconnect the chaff spreader connector **X235**.

   A. Use a multimeter to check the resistance of the chaff spreader coil. The proper resistance range for the coil is **3.0 - 7.0 ohms**. If out of specification, replace coil.

   B. If the coil is within specification, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X235** pin 1 and chassis ground. Flex the straw hood front (SW) harness while making this check.

   A. If no continuity to ground is found, continue with Step **4**.

   B. If there is continuity to ground, continue with Step **6**.
4. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the chaff spreader. Use a multimeter to check for **12 volts** between connector **X235** pin 1 and chassis ground.

   A. If **12 volts** is not present, continue with Step **5**.

   B. If **12 volts** is found, continue with Step **7**.
5. Key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the chaff spreader. Use a multimeter to check for **12 volts** between connector **X024** pin 17 and chassis ground.

   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X024** and connector **X019** J2-15 wire 576 white.

   B. If **12 volts** is found, there is an open circuit in the straw hood front (SW) harness between connector **X024** and connector **X235** wire 576 white. Locate the open and repair.
6. Disconnect connector **X024**. Use the multimeter to check for continuity between connector **X024** pin 17 and chassis ground.

   A. If continuity is found, there is a short to ground in the main frame (MF) harness between connector **X024** and connector **X019** J2-15 wire 576 white. Locate the short and repair.

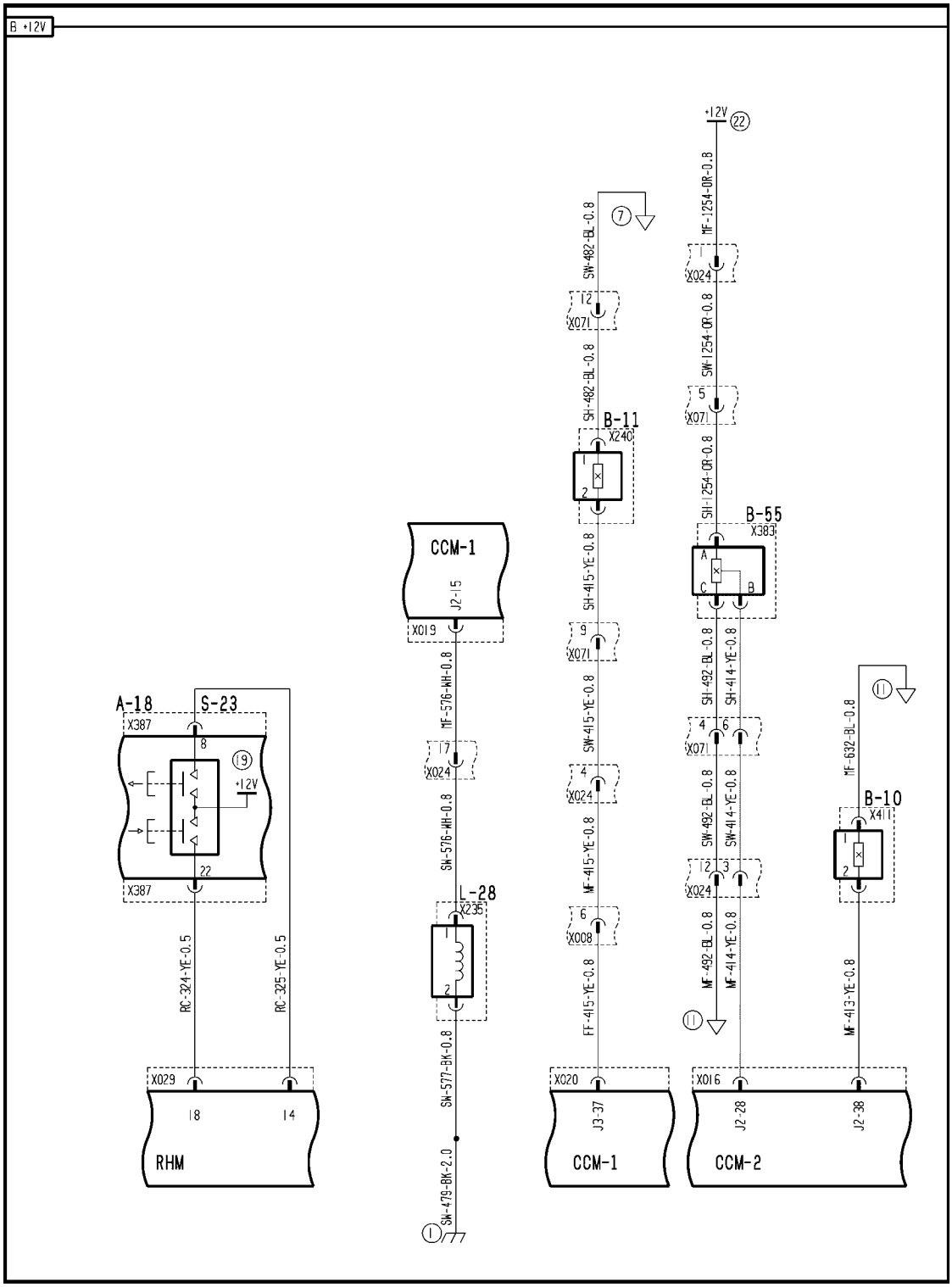
   B. If no continuity is found, there is a short to ground in the straw hood front (SW) harness between connector **X024** and connector **X235** wire 576 white. Locate the open and repair.

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7. Visually inspec the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



AFXSCHEM23-04 1

FRAME 23 - TRASH

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A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

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Sensing system Position sensor - Short circuit to B+ (K.64.D.95.81 - G.30.B.54)

AFX8010

E0002-03 - Spreader Position Sensor

Cause:
The spreader position sensor (B11) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "WINDROW POS SEN" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the spreader position sensor connector **X240**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness and straw hood front (SW) harness at connector **X071**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the straw hood (SH) harness between connector **X071** and connector **X240** wire 415 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness and main frame (MF) harness at connector **X024**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the straw hood front (SW) harness between connector **X071** and connector **X024** wire 415 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **5**.
5. Disconnect the main frame (MF) harness and front frame (FF) harness at connector **X008**.

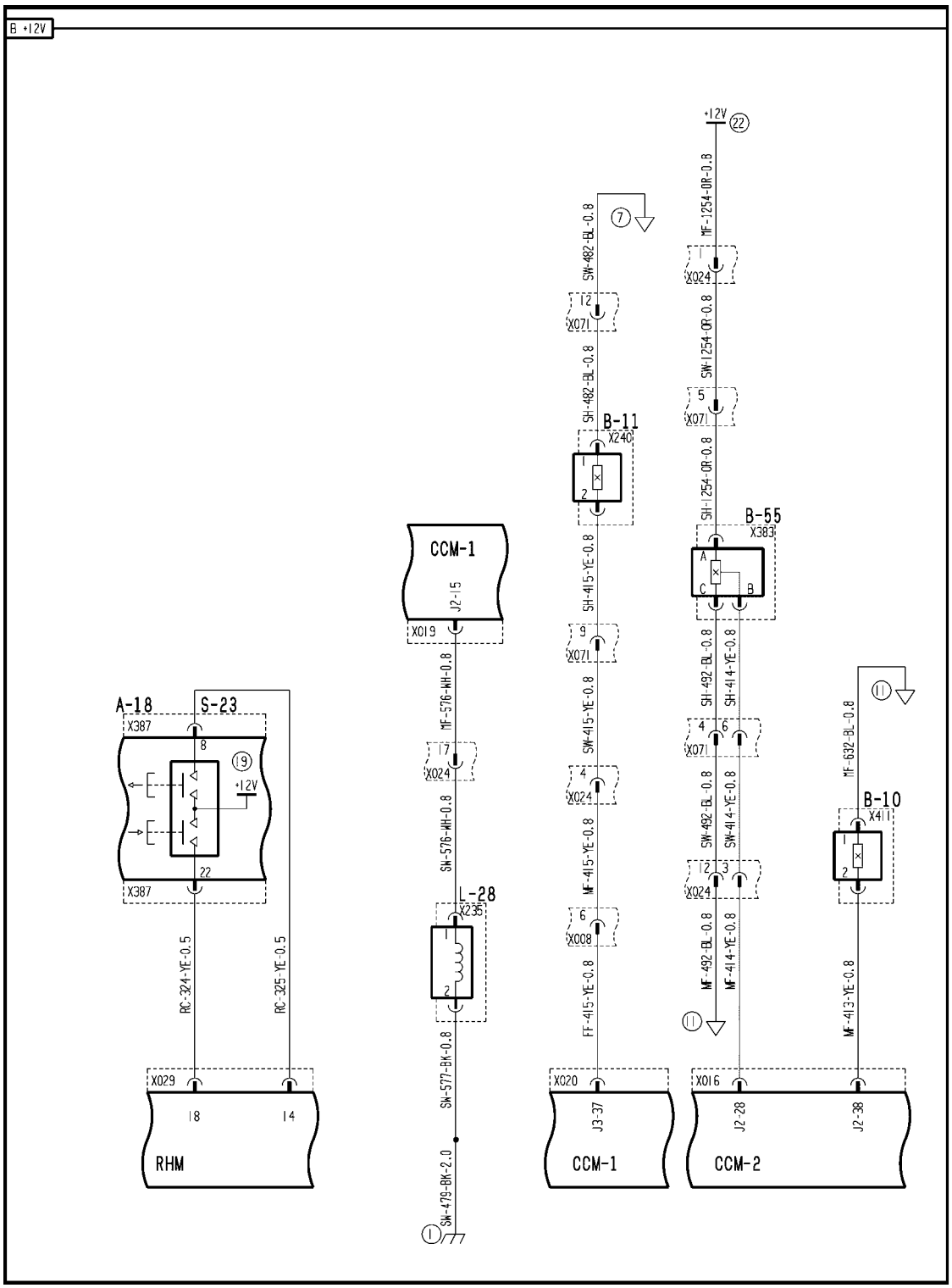
   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X008** and connector **X024** wire 415 yellow. Locate the short and repair.

   B. If the voltage remains high, the short circuit is in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-37 wire 415 yellow. Locate the short and repair.
6. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

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A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



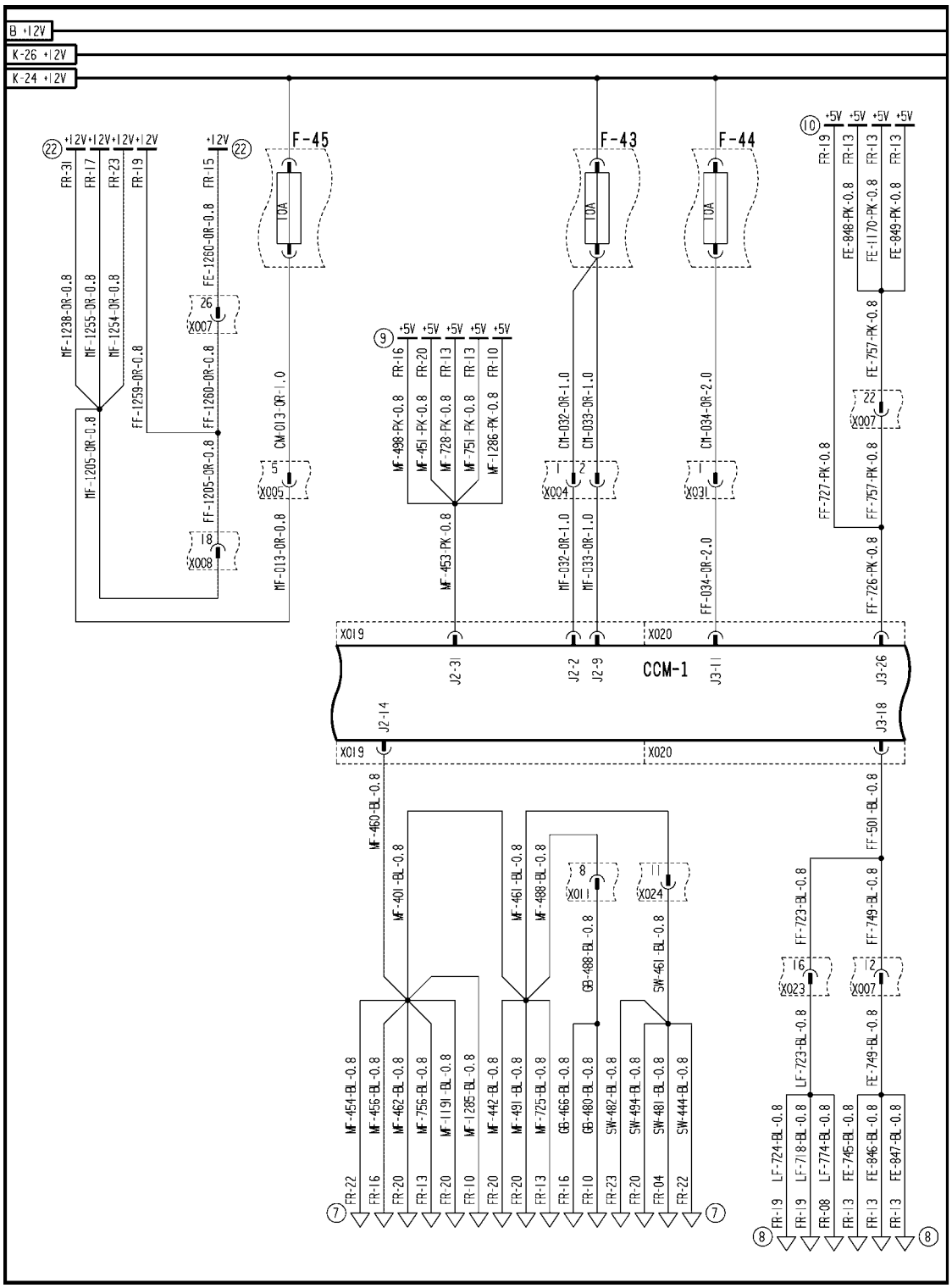
AFXSCHEM23-04 1

FRAME 23 - TRASH

https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Position sensor - Short circuit to ground (K.64.D.95.81 - G.30.B.53)

AFX8010

E0002-04 - Spreader Position Sensor

Cause:
The spreader position sensor (B11) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "WINDROW POS SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the spreader position sensor connector **X240**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the straw hood rear (SH) harness between connector **X071** and connector **X240** wire 415 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the straw hood front (SW) harness between connector **X071** and connector **X024** wire 415 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **5**.
5. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**.

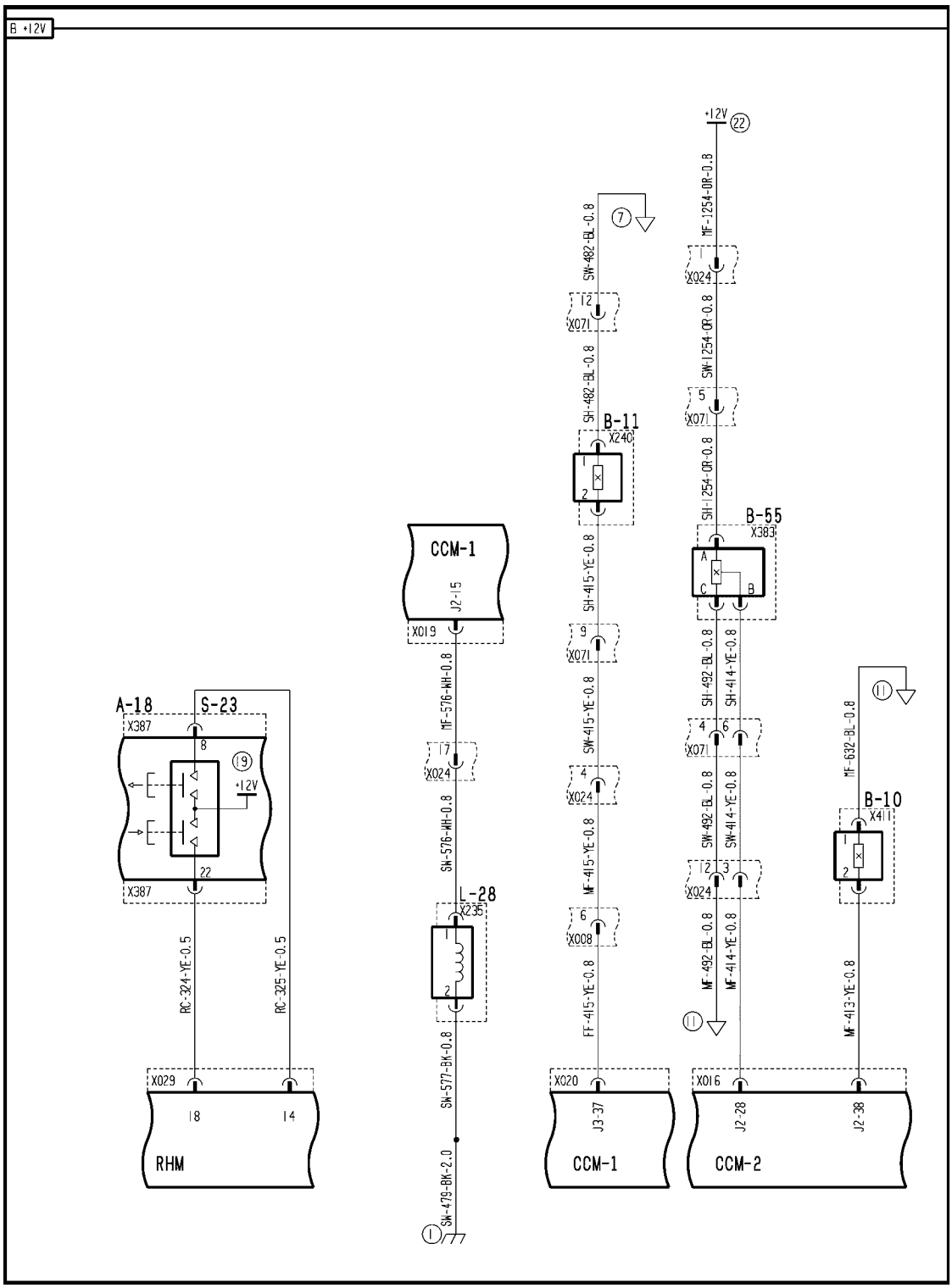
   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X024** and connector **X008** wire 415 yellow. Locate the short and repair.

   B. If the voltage remains low, the short circuit is in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-37 wire 415 yellow. Locate the short and repair.
6. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

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A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



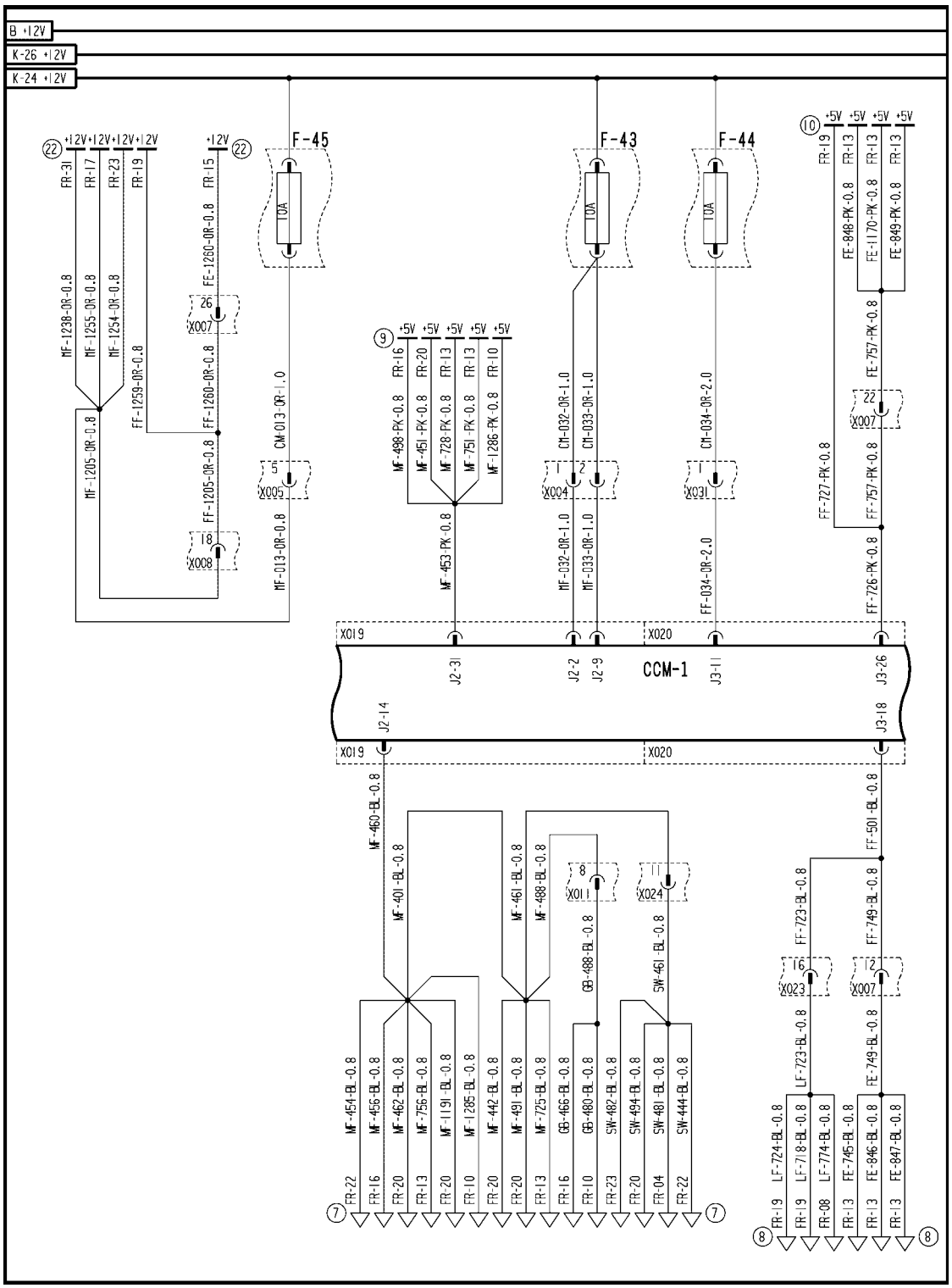
AFXSCHEM23-04 1

FRAME 23 - TRASH

https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Position sensor - Open circuit (K.64.D.95.81 - G.30.B.50)

AFX8010

E0002-05 - Spreader Position Sensor

Cause:
The spreader position sensor (B11) circuit has an open.

Possible failure modes:

1. Sensor supply wiring has an open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "WINDROW POS SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **10**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*
2. Disconnect the spreader position sensor connector **X240**. Use a jumper wire to short the harness end of connector **X240** pin 2 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **6**.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a jumper wire to short connector **X071** pin 9 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the straw hood rear (SH) harness between connector **X071** and the connector **X240** pin 2 wire 415 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a jumper wire to short connector **X024** pin 4 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the straw hood front (SW) harness between connector **X071** and the connector **X024** wire 415 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **5**.
5. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**. Use a jumper wire to short connector **X008** pin 6 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the main frame (MF) harness between connector **X008** and the connector **X024** wire 415 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, the open circuit is in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-37 wire 415 yellow. Locate the open and repair.

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6. Disconnect the unload tube cradled sensor connector **X240**. Use a multimeter to check for continuity between the harness end of connector **X240** pin 1 and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity, continue with Step **7**.

7. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a multimeter to check for continuity between the straw hood front (SW) harness end of connector **X071** pin 12 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood rear (SH) harness between connector **X071** and the connector **X240** pin 1, wire 482 blue. Locate the open and repair.

   B. If there is no continuity, continue with Step **8**.

8. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X024** pin 11 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood front (SW) harness between connector **X071** and the connector **X024** wire 482 blue or 461 blue. Locate the open and repair.

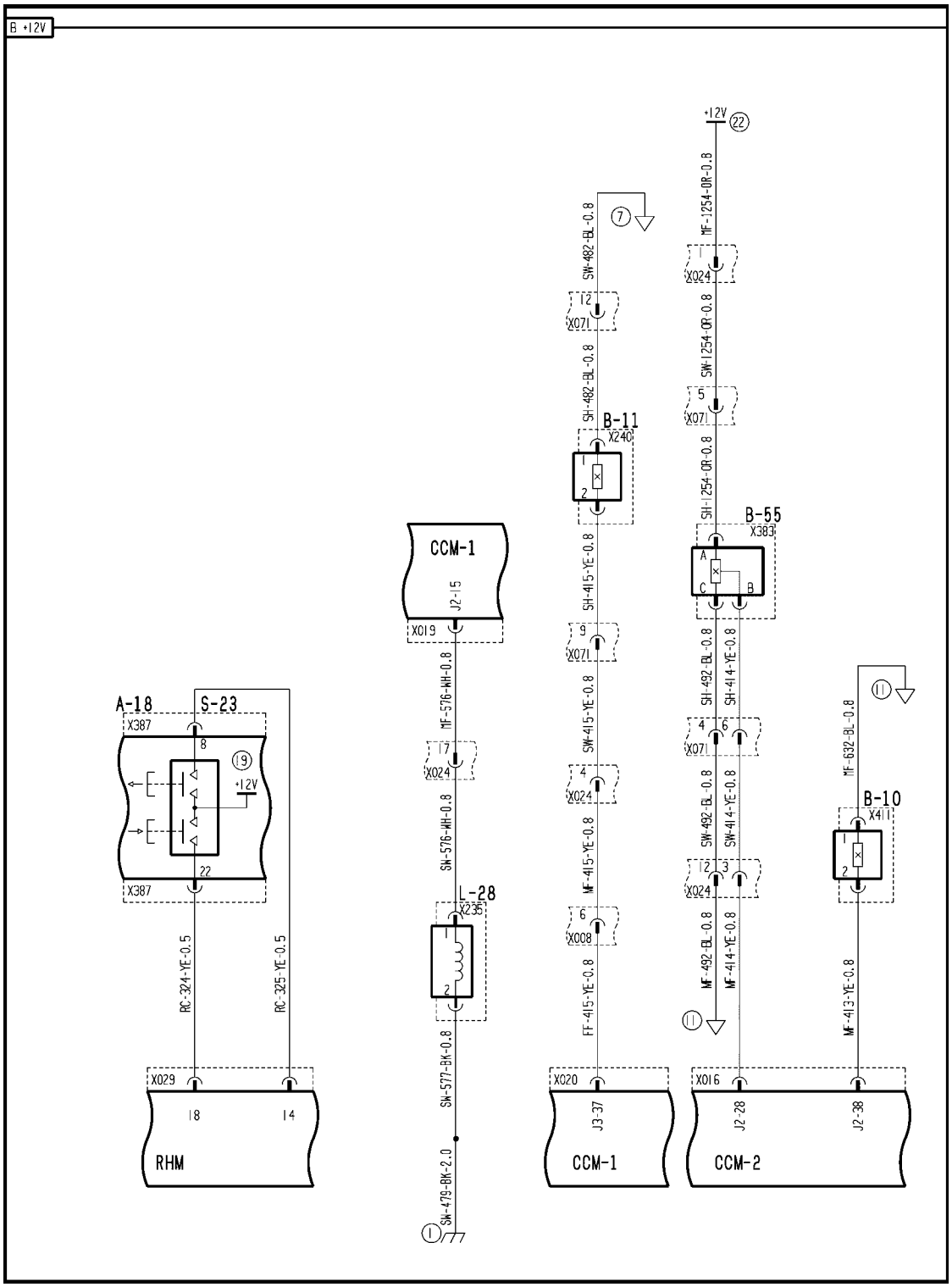
   B. If there is no continuity, the open circuit is in the main frame (MF) harness between connector **X024** and connector **X019** pin J2-14 wire 461 blue, 401 blue or 460 blue. Locate the open and repair.

9. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

   A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



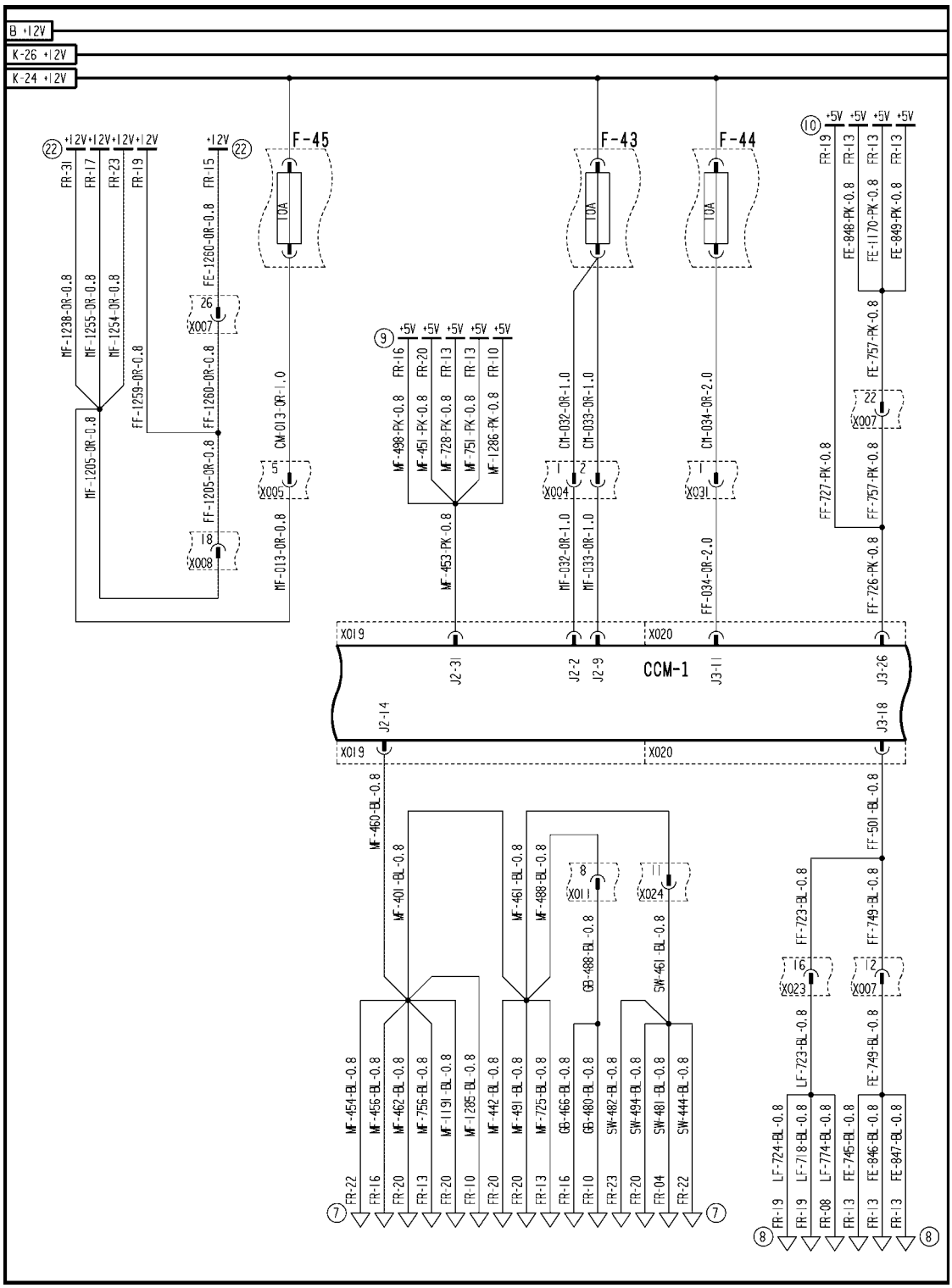
AFXSCHEM23-04 1

FRAME 23 - TRASH

https://truckmanualshub.com/

A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



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FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

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Sensing system Speed sensor - Short circuit to B+ (K.64.D.95.80 - G.30.B.54)

AFX8010

E0144-03 - Spreader Speed Sensor

Cause:
The spreader RPM sensor (B-55) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "SPREADER SPD SE" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the spreader RPM sensor connector **X383**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness and straw hood front (SW) harness at connector **X071**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the straw hood (SH) harness between connector **X071** and connector **X383** wire 414 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness and main frame (MF) harness at connector **X024**.

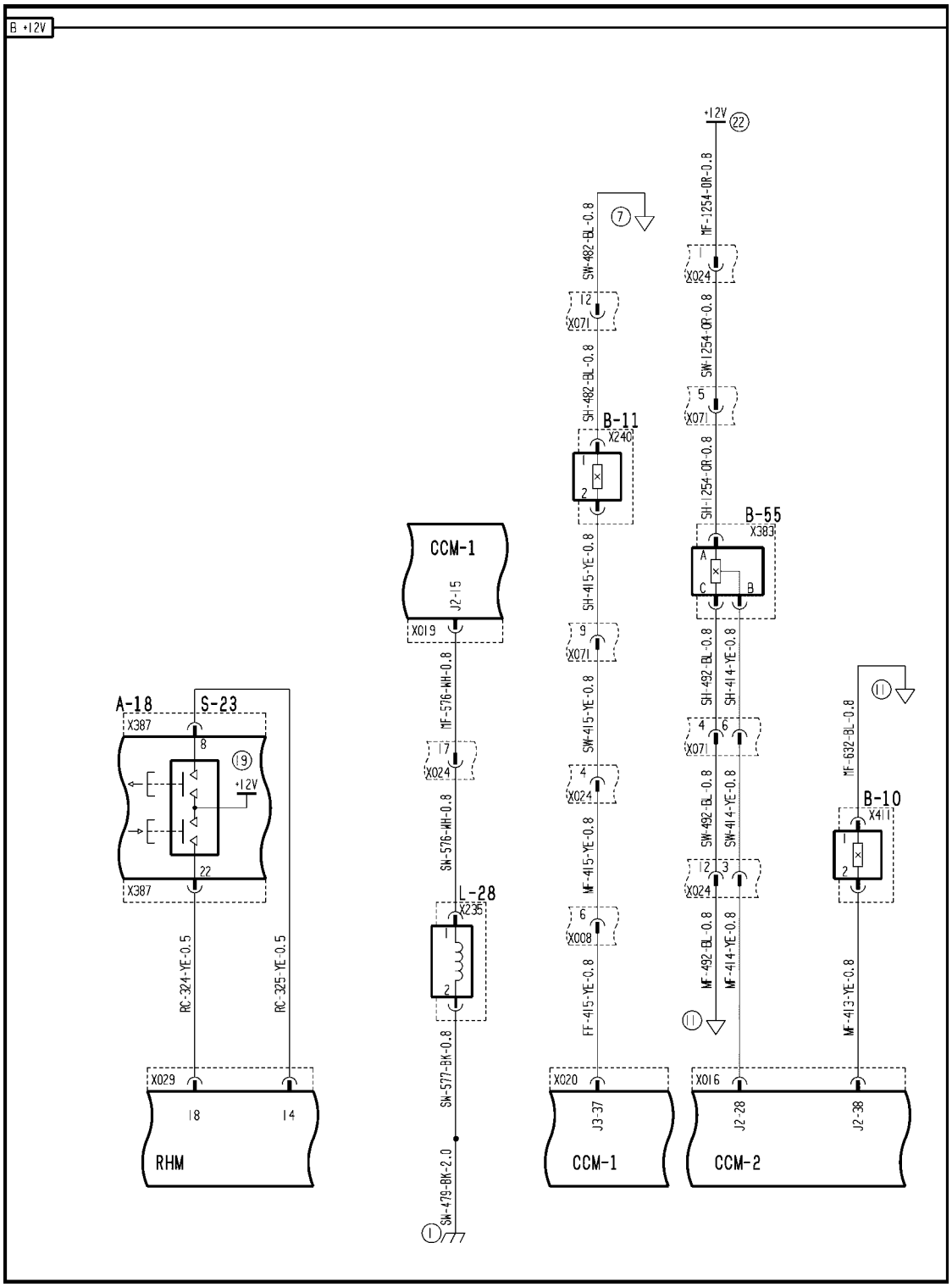
   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the straw hood front (SW) harness between connector **X071** and connector **X024** wire 414 yellow. Locate the short and repair.

   B. If the voltage drops to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X024** and connector **X016** wire 414 yellow. Locate the short and repair.
5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



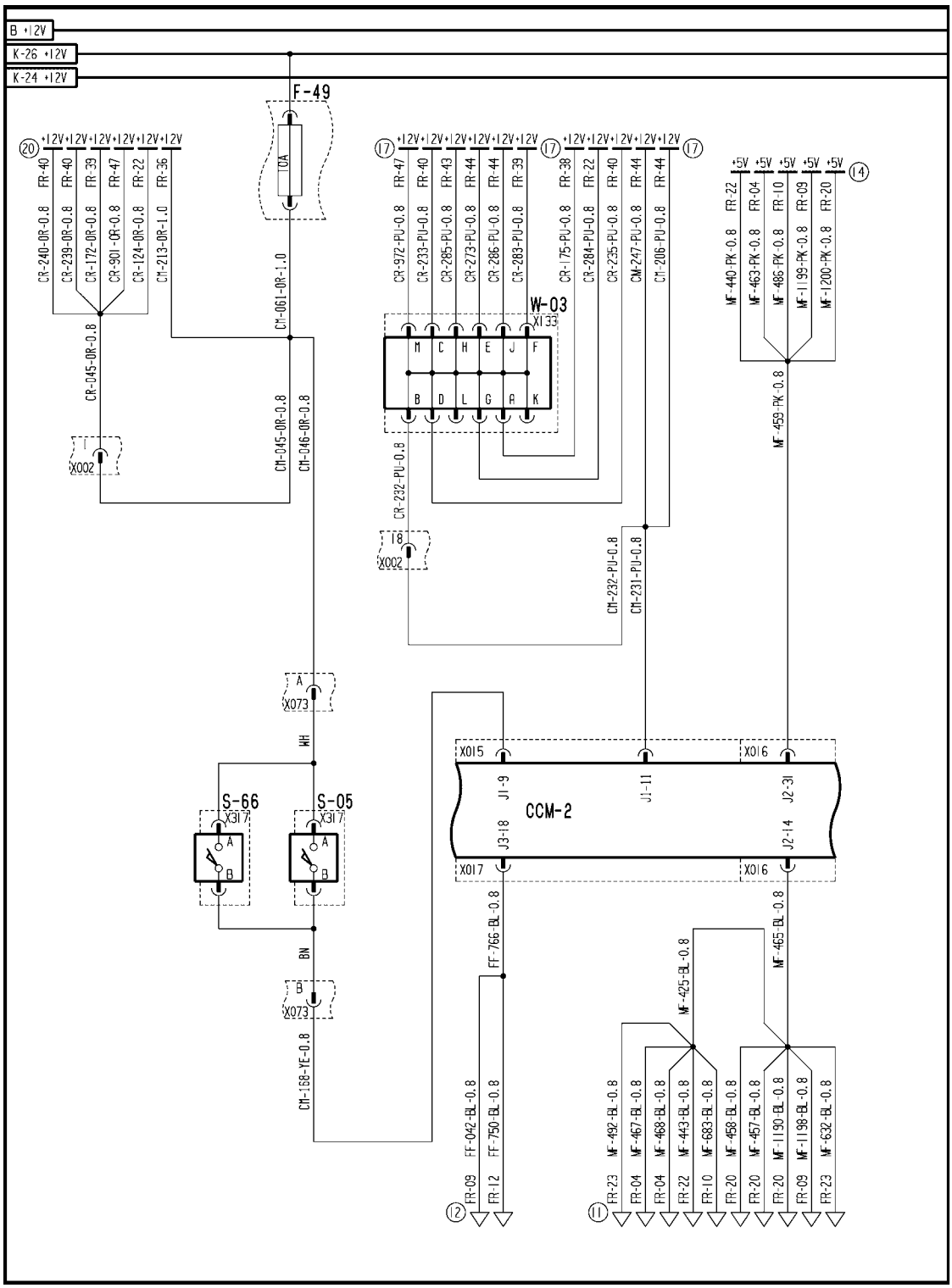
AFXSCHEM23-04 1

FRAME 23 - TRASH

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A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Speed sensor - Short circuit to ground (K.64.D.95.80 - G.30.B.53)

AFX8010

E0144-04 - Spreader Speed Sensor

Cause:
The spreader RPM sensor (B-55) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "SPREADER SPD SE" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the spreader RPM sensor connector **X383**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the straw hood rear (SH) harness between connector **X071** and connector **X383** wire 414 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

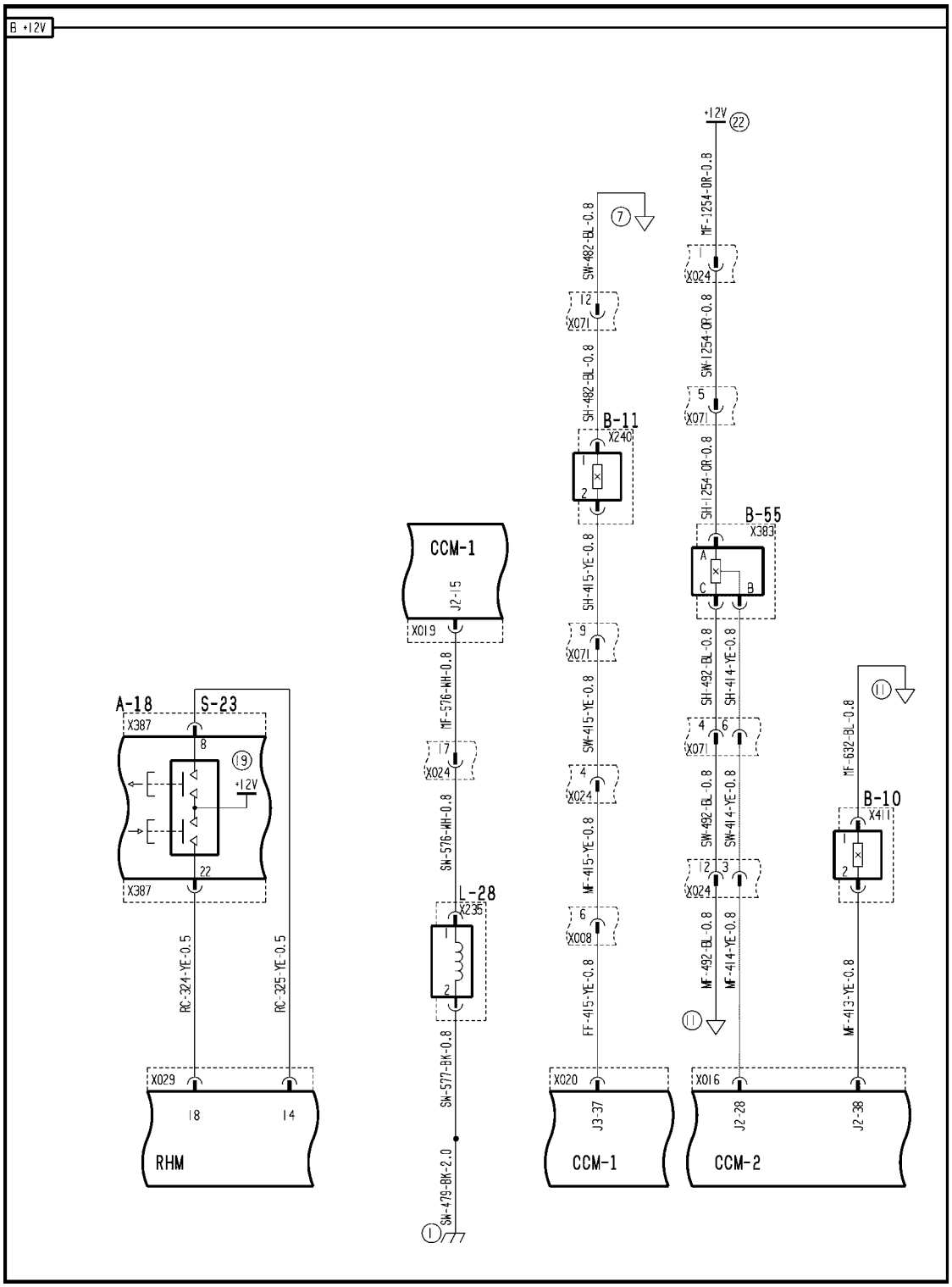
   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the straw hood front (SW) harness between connector **X071** and connector **X024** wire 414 yellow. Locate the short and repair.

   B. If the voltage increases to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X024** and connector **X016** wire 414 yellow. Locate the short and repair.
5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



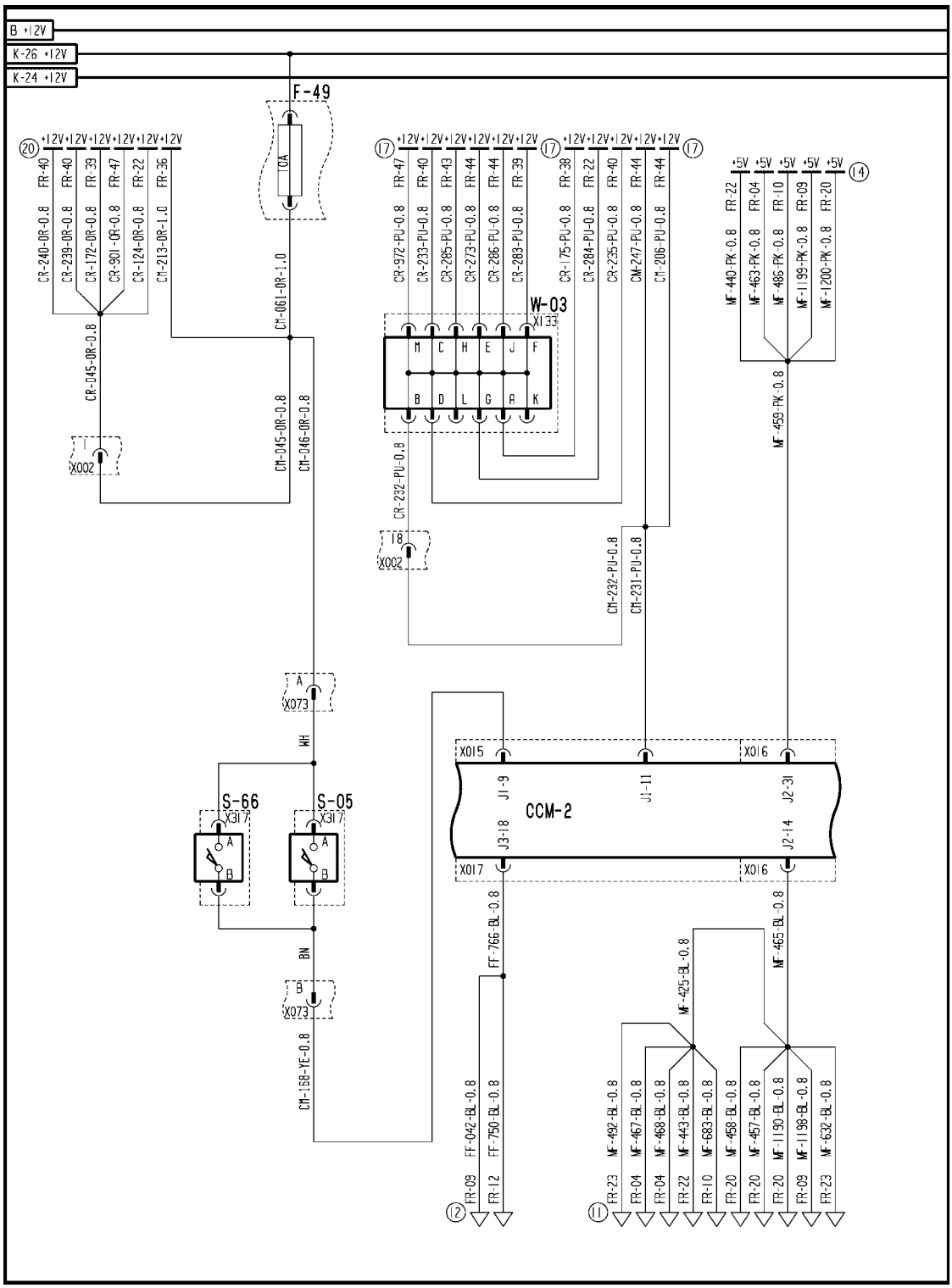
AFXSCHEM23-04 1

FRAME 23 - TRASH

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A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

Wiring harness - Electrical schematic frame 27 (A.30.A.88 - C.20.E.27)



AFXSCHEM27-04 1

FRAME 27 - DISTRIBUTION

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F-49 Cab Fuse	S-05 Seat Switch	S-66 Second Seat Switch
	W-03 Splice Block C (backlighting)	

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Sensing system Speed sensor - Open circuit (K.64.D.95.80 - G.30.B.50)

AFX8010

E0144-05 - Spreader Speed Sensor

Cause:
The spreader RPM sensor (B-55) circuit is open.

Possible failure modes:

1. Sensor supply wiring is open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "RESIDUE" sort menu, and select "SPREADER SPD SE" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **10**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*

2. Disconnect the spreader RPM sensor connector **X383**. Use a jumper wire to short the harness end of connector **X383** pin B to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the sensor or sensor wiring has failed. Replace the sensor.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **3**.

3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a jumper wire to short connector **X071** pin 6 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, there is an open circuit in the straw hood rear (SH) harness between connector **X071** and the connector **X383** pin B wire 414 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **4**.

4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a jumper wire to short connector **X024** pin 3 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, there is an open circuit in the straw hood front (SW) harness between connector **X071** and the connector **X024** wire 414 yellow. Locate the open and repair.

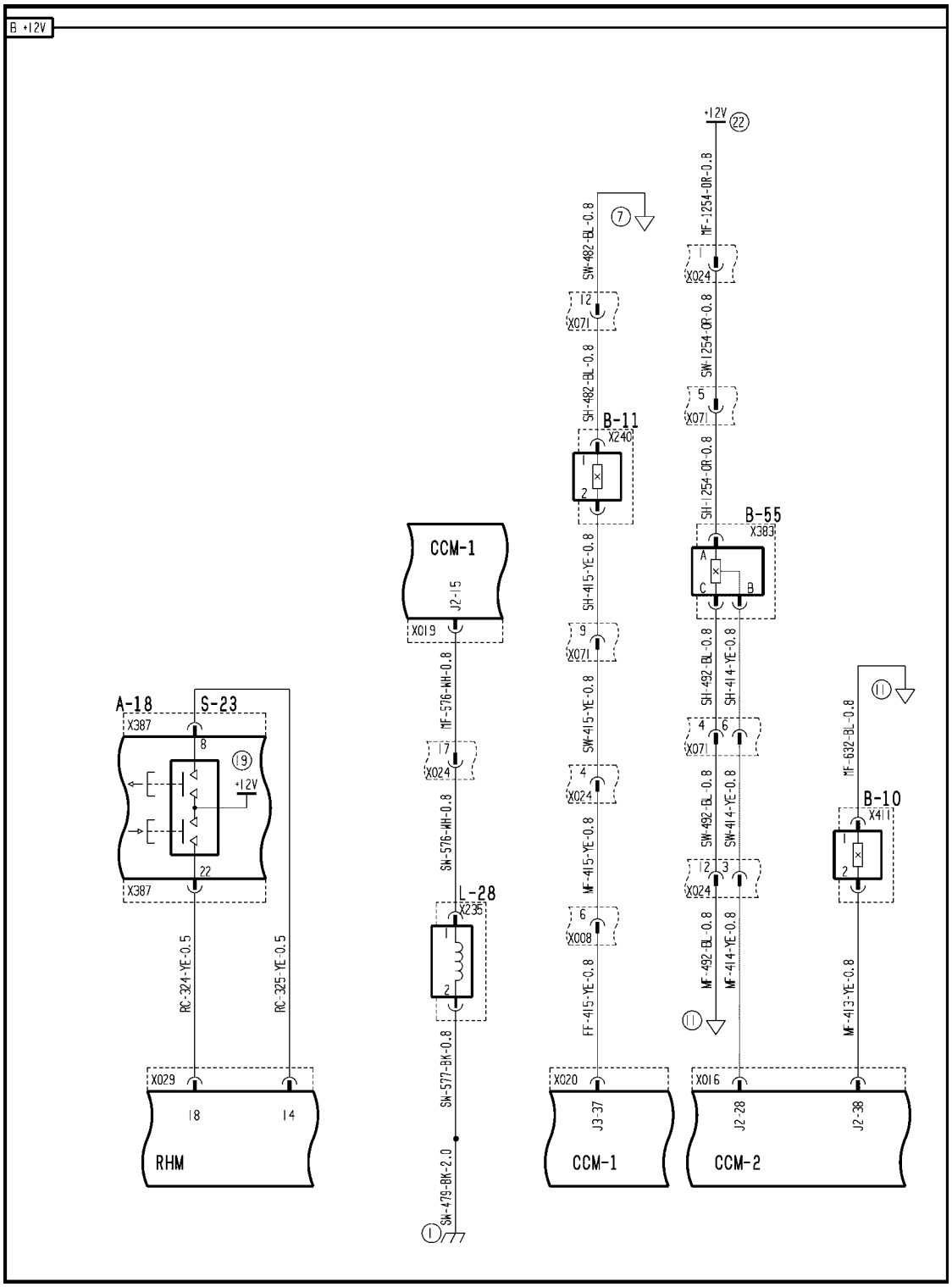
   B. If the voltage drops to **0 - 0.5 volts** indicating a ground, there is an open circuit in the main frame (MF) harness between connector **X024** and connector **X016** pin J2-28 wire 414 yellow. Locate the short and repair.

5. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

   A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 23 (A.30.A.88 - C.20.E.23)



AFXSCHEM23-04 1

FRAME 23 - TRASH

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A-18 Rear Switch Panel	B-10 Chopper RPM	B-11 Spreader Position
B-55 Spreader RPM	L-28 Chaff Spreader	S-23 Spread Pattern

https://truckmanualshub.com/

Index

CROP PROCESSING - K

RESIDUE HANDLING Spreader - 64.D

Command valve - Unidentified failure (K.64.D.12 - G.30.B.46) 3
AFX8010

Sensing system Position sensor - Open circuit (K.64.D.95.81 - G.30.B.50) 14
AFX8010

Sensing system Position sensor - Short circuit to B+ (K.64.D.95.81 - G.30.B.54) 6
AFX8010

Sensing system Position sensor - Short circuit to ground (K.64.D.95.81 - G.30.B.53) 10
AFX8010

Sensing system Speed sensor - Open circuit (K.64.D.95.80 - G.30.B.50) 27
AFX8010

Sensing system Speed sensor - Short circuit to B+ (K.64.D.95.80 - G.30.B.54) 19
AFX8010

Sensing system Speed sensor - Short circuit to ground (K.64.D.95.80 - G.30.B.53) 23
AFX8010

https://truckmanualshub.com/

CROP PROCESSING - K

UNLOADING Grain unloading - 72.B

AFX8010

https://truckmanualshub.com/

Contents

CROP PROCESSING - K

UNLOADING Grain unloading - 72.B

SERVICE

Clutch

Clutch - Remove (K.72.B.16 - F.10.A.10) 4
AFX8010

Clutch - Disassemble (K.72.B.16 - F.10.A.25) 7
AFX8010

Clutch - Assemble (K.72.B.16 - F.10.A.20) 10
AFX8010

Clutch - Install (K.72.B.16 - F.10.A.15) 15
AFX8010

Drive system

Drive system - Remove (K.72.B.40 - F.10.A.10) 20
AFX8010

Drive system - Install (K.72.B.40 - F.10.A.15) 21
AFX8010

Drive system Unload gearbox - Remove (K.72.B.40.45 - F.10.A.10) 24
AFX8010

Drive system Unload gearbox - Disassemble (K.72.B.40.45 - F.10.A.25) 25
AFX8010

Drive system Unload gearbox - Assemble (K.72.B.40.45 - F.10.A.20) 29
AFX8010

Drive system Unload gearbox - Install (K.72.B.40.45 - F.10.A.15) 36
AFX8010

Drive system Unloading tube gearbox - Remove (K.72.B.40.46 - F.10.A.10) 38
AFX8010

Drive system Unloading tube gearbox - Disassemble (K.72.B.40.46 - F.10.A.25) 39
AFX8010

Drive system Unloading tube gearbox - Assemble (K.72.B.40.46 - F.10.A.20) 42
AFX8010

Drive system Unloading tube gearbox - Install (K.72.B.40.46 - F.10.A.15) 48
AFX8010

Unloading auger

Unloading auger Vertical auger - Remove (K.72.B.53.50 - F.10.A.10) 49
AFX8010

Unloading auger Vertical auger - Install (K.72.B.53.50 - F.10.A.15) 50
AFX8010

Unloading auger Cross auger - Remove (K.72.B.53.52 - F.10.A.10) 52
AFX8010

Unloading auger Cross auger - Install (K.72.B.53.52 - F.10.A.15) 54
AFX8010

Unloading tube

https://truckmanualshub.com/

Unloading tube - Remove (K.72.B.71 - F.10.A.10) 58
AFX8010

Unloading tube - Install (K.72.B.71 - F.10.A.15) 59
AFX8010

DIAGNOSTIC

Command valve

Command valve Unload engage - Short circuit to B+ (K.72.B.12.21 - G.30.B.54) 61
AFX8010

Command valve Unload engage - Unidentified failure (K.72.B.12.21 - G.30.B.46) 65
AFX8010

Command valve Unload swing - Unidentified failure (K.72.B.12.20 - G.30.B.46) 69
AFX8010

Command valve Unload swing - Unidentified failure (K.72.B.12.20 - G.30.B.46) 72
AFX8010

Sensing system

Sensing system Unload cradle sensor - Short circuit to B+ (K.72.B.95.80 - G.30.B.54) 75
AFX8010

Sensing system Unload cradle sensor - Short circuit to ground (K.72.B.95.80 - G.30.B.53) 79
AFX8010

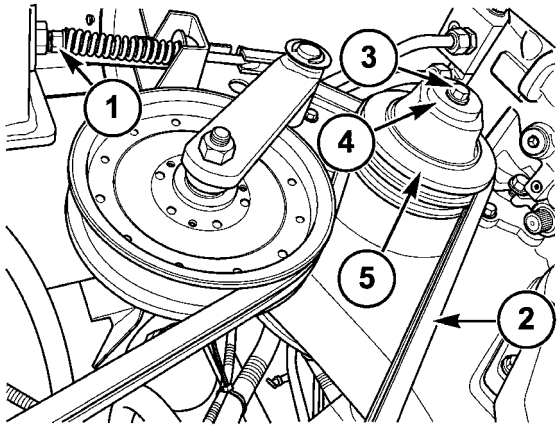
Sensing system Unload cradle sensor - Open circuit (K.72.B.95.80 - G.30.B.50) 83
AFX8010

https://truckmanualshub.com/

Clutch - Remove (K.72.B.16 - F.10.A.10)

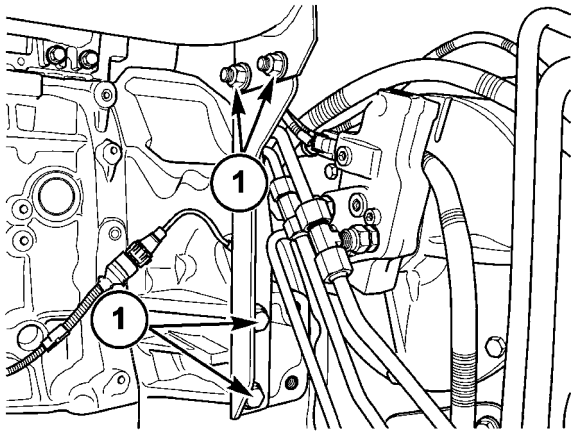
AFX8010

1. Loosen the belt tension **(1)** on the drive belt **(2)**. Remove the belt **(2)** from the pulley **(5)**. To remove the pulley **(5)** from the shaft remove the bolt **(3)** and washer **(4)**, and use a puller to remove the pulley **(5)**. Remove the key from the shaft.



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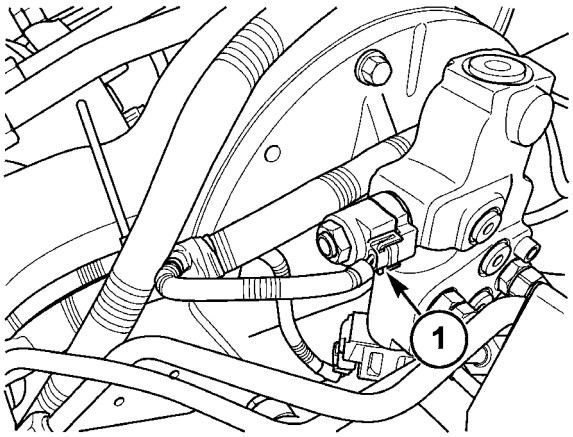
2. On the inboard side of the gearbox, remove the four bolts **(1)** from the muffler bracket bolted to the engine.



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3. Disconnect the electrical solenoid connector **(1)** from the unload valve.

NOTE: *Disconnect any other connectors temporarily to gain access if so needed.*

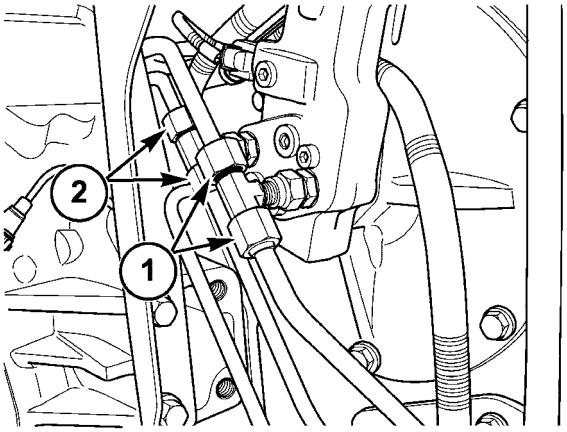


10036391A5 3

https://truckmanualshub.com/

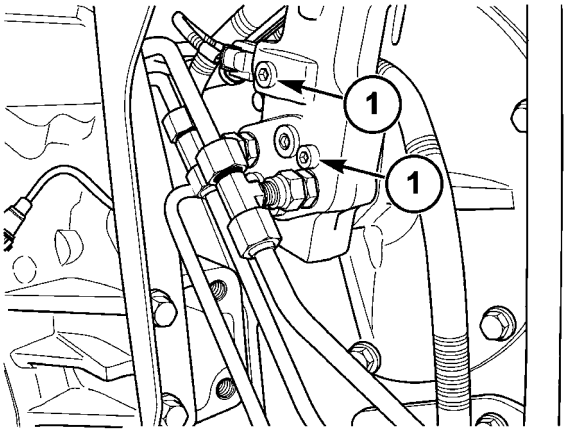
4. Disconnect the hydraulic lines **(1)** and **(2)** from the valve.

NOTE: *The lines themselves have to be removed for access when removing the shaft assembly.*



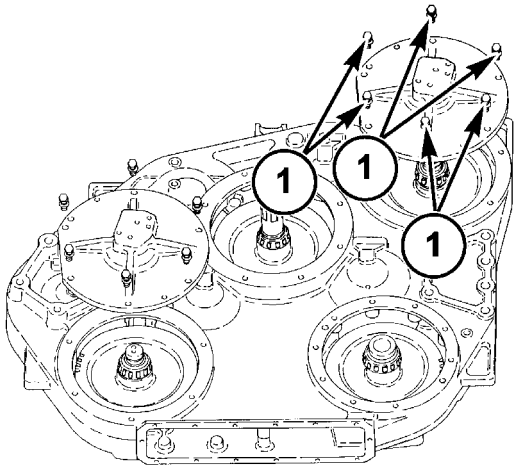
10036389A5 4

5. The valve can be removed with the cover, or be removed separately by removing the two bolts **(1)** from the valve. If the valve does not need to be serviced, it can stay with the cover. By removing the two socket head cap screws, remove the valve from the cover.



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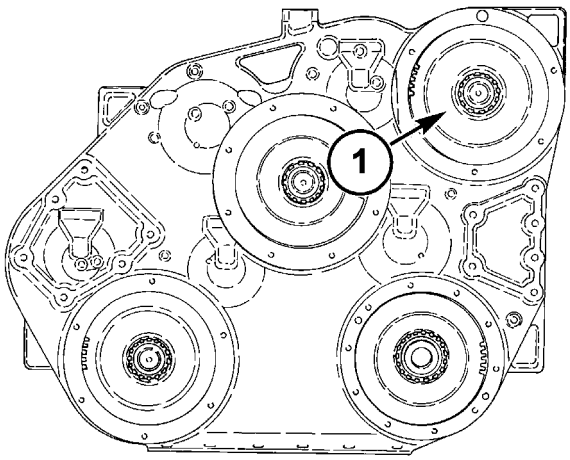
6. Remove the six bolts **(1)** from the cover.



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7. Once the cover is removed, the shaft with clutch assembly **(1)** can than be removed from the gearbox.



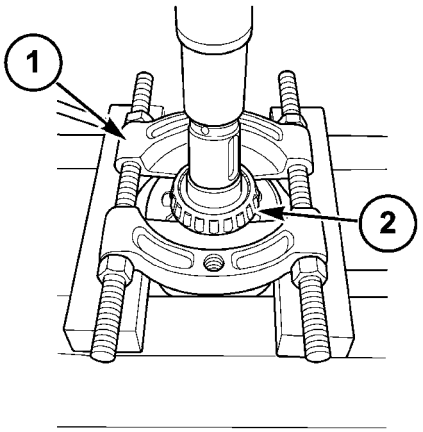
20035849B5 7

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Clutch - Disassemble (K.72.B.16 - F.10.A.25)

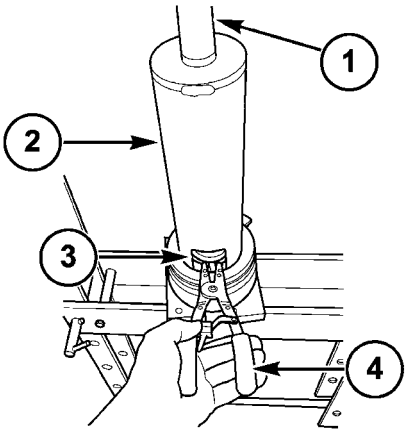
AFX8010

1. Using a puller **(1)** remove the bearing cone **(2)** from the brake end of the shaft.



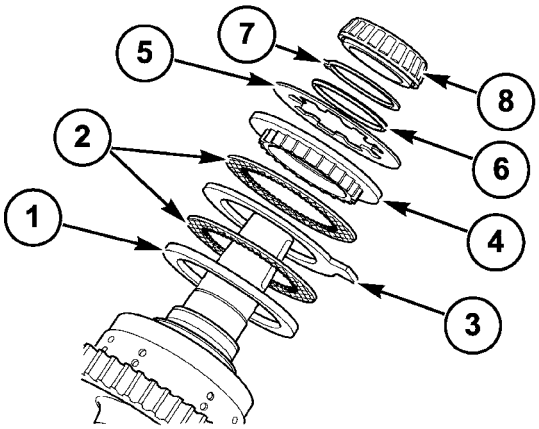
10041902A5 1

2. Using a press **(1)** and the tool with two notches **(2)**, carefully remove the snap ring **(3)** using snap ring pliers **(4)** from the brake end of the shaft.



10041900A5 2

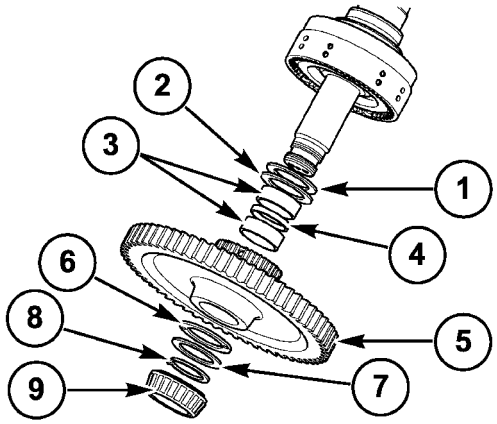
3. Remove the rest of the brake components including the ring **(6)**, return spring **(5)** , piston **(4)** , frictions disks **(2)** , and plates **(3)** **(1)** from the shaft.



10035846A5 3

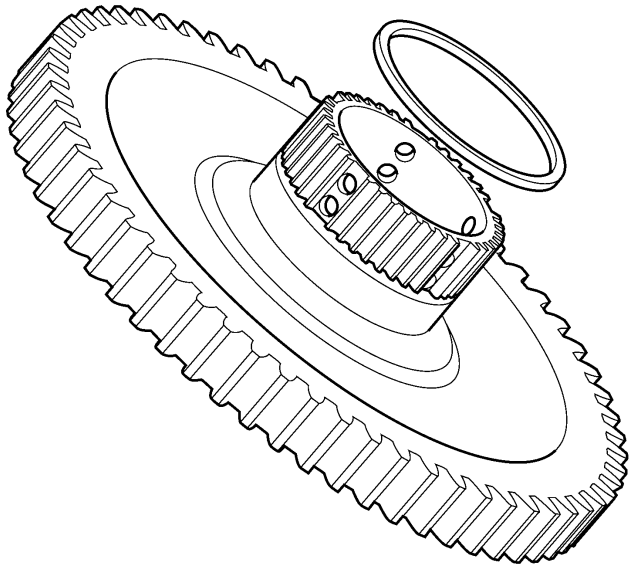
https://truckmanualshub.com/

4. Remove the bearing cone **(9)** from the gear side of the shaft. Remove the retaining ring **(8)** , thrust bearing **(7)** and thrust race **(6)** from the shaft. Remove the gear **(5)** from the shaft.



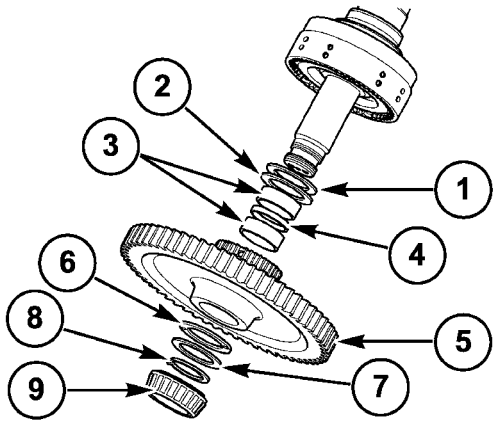
10035843A5 4

5. When the gear is removed, also remove the clutch lube ring seal on the spline side of the gear.



10035844 5

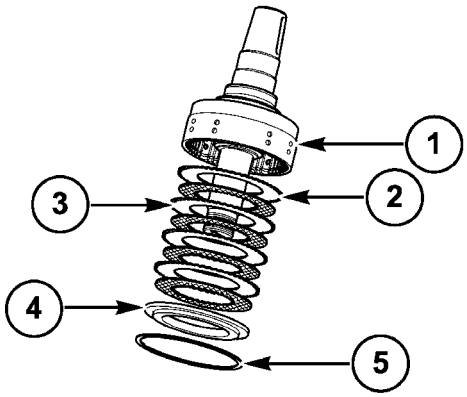
6. Remove the needle roller bearings **(3)** , inner ring **(4)** , thrust bearing **(2)** , and thrust bearing race **(1)** from the shaft.



10035843A5 6

https://truckmanualshub.com/

7. Remove the backing plate retaining ring **(5)** , the clutch backing plate **(4)** , the clutch friction plates **(3)** and separator plates **(2)**.

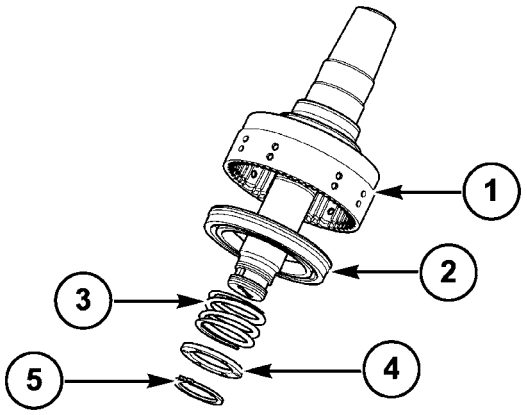


10035842A5 7

8. Remove the retaining ring **(5)** , piston return spring retainer **(4)** , piston return spring **(3)** and the piston **(2)** assembly.

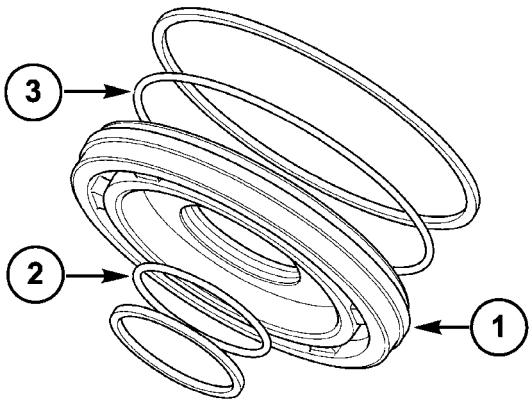
NOTE: *When removing the snap ring be careful of the force from the spring pressure. You will need to place the assembly in a press to hold down the spring while removing the snap ring. Once the snap ring is removed, slowly release the press.*

NOTE: *To remove the piston use compressed air inserted in the shaft hole between the two seals on the end of the shaft.*



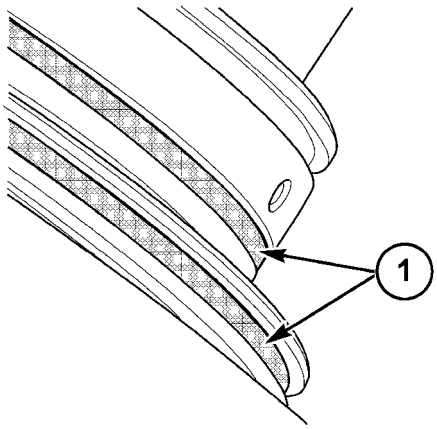
10035841A5 8

9. Remove all the seals **(1)**, **(2)**, **(3)** from the clutch piston.



10035840A5 9

10. Remove the two seals **(1)** from the brake end of the shaft as well.



10035847A5 10

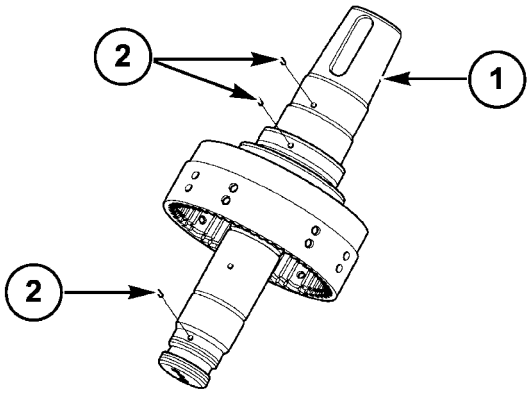
https://truckmanualshub.com/

Clutch - Assemble (K.72.B.16 - F.10.A.20)

AFX8010

1. Press spring pins into holes in shaft.

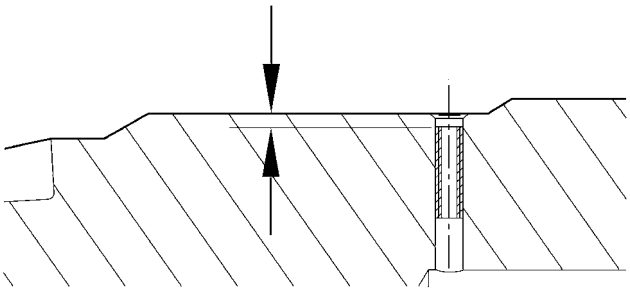
NOTE: *Ends of pins must be 1.3 +/- 0.5mm below OD.*



50040355A5 1

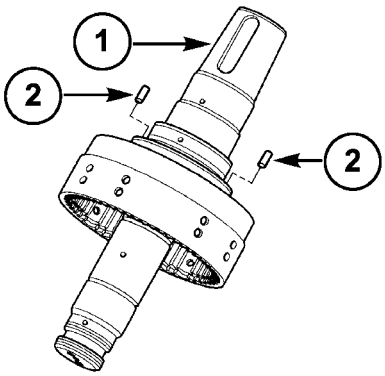
2. Press spring pins into hole in back side of shaft.

NOTE: *Ends of pins must be 1.3 +/- 0.5mm below OD.*



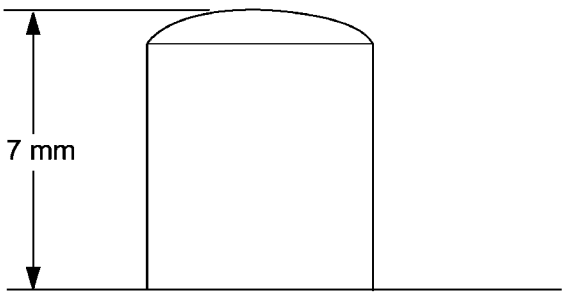
10035838 2

3. Coat tapered end of dowel pins **(2)** with a small amount of Loctite 609 and install into holes in the first step flange above drum.



50040357A5 3

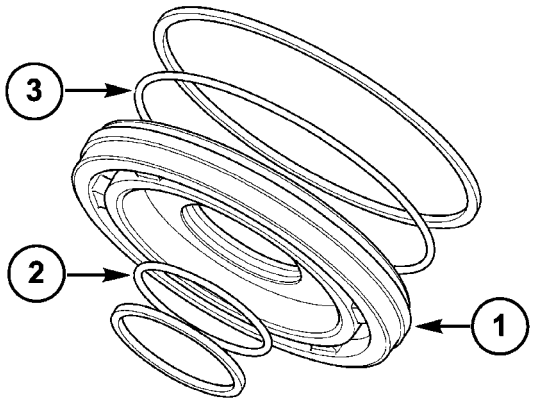
4. The dowel pin height should be 7mm.



50040358 4

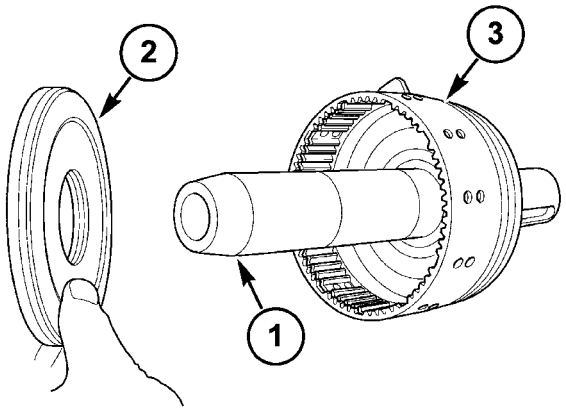
https://truckmanualshub.com/

5. Subassemble the clutch piston **(1)** by inserting the smaller o-ring and small seal **(2)** into the groove in the ID of the piston. Install the larger o-ring and larger seal **(3)** into the groove on the piston OD.



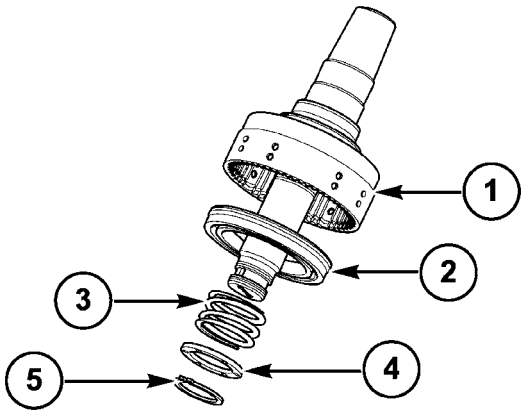
10035840A5 5

6. Size the inner seal and outer seal on the clutch piston **(2)** , lube both seals. Press the piston onto the clutch shaft with the tool installed **(1)** until the piston is fully seated into the clutch housing **(3)**.



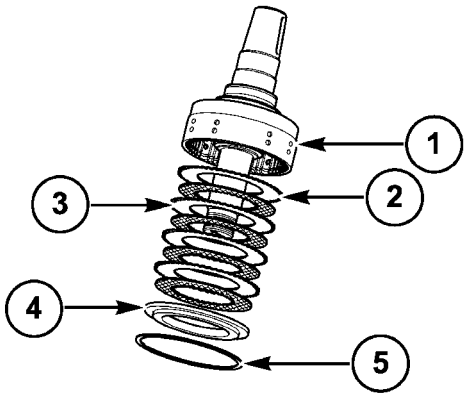
10041891A5 6

7. Place the return spring **(3)** over the shaft and into the piston. Drop the spring retainer **(4)** (lip towards spring) and retain on shaft with external snap ring **(5)** (narrow side up). This will require pressure to be applied to the spring.



10035841A5 7

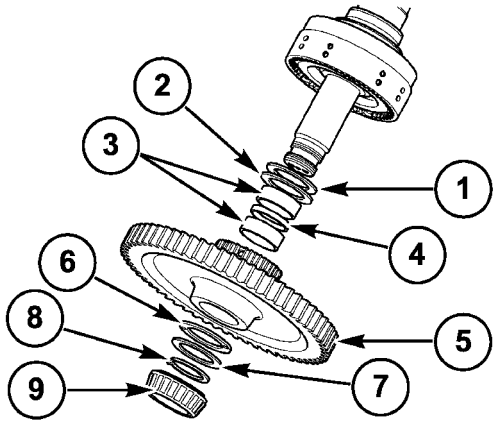
8. Assemble the clutch pack using four each of the following; separator plate **(3)** , friction plate **(2)** and in this order until all are used. After all separator plates and friction plates are in place, seated and aligned place the clutch backing plate **(4)** on stack and retain with backing plate retaining ring **(5)** (narrow side up). Be sure retaining ring **(5)** is fully seated into the groove.



10035842A5 8

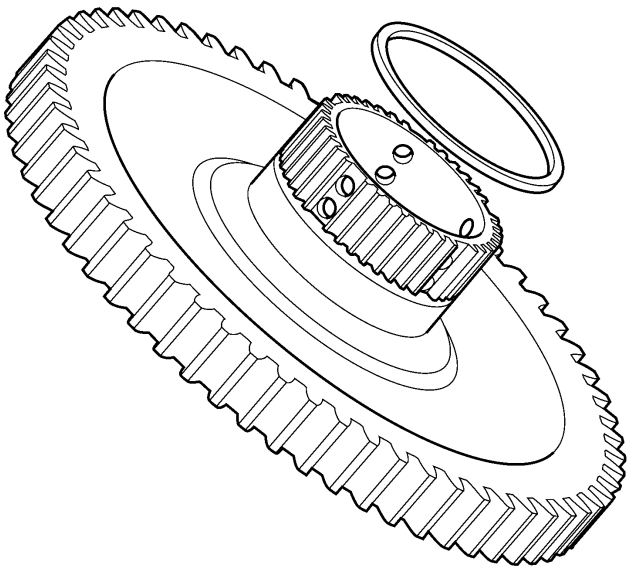
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9. Place thrust bearing race (washer) **(1)** over shaft against retaining ring. Place bearing **(2)** side of thrust bearing on washer.



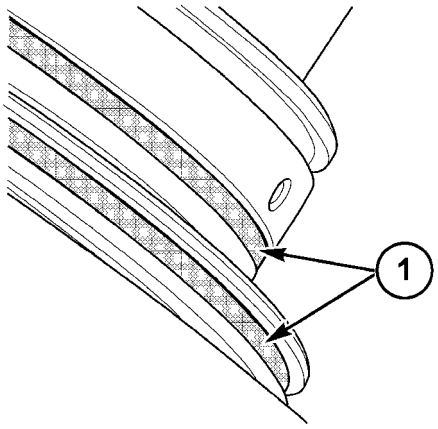
10035843A5 9

10. Install ring clutch lube seal on gear in groove on spline side. Lube the seal. Place gear assembly on shaft, spline into clutch stack. Remove wedge pins. Slide needle roller bearing **(3)** , inner ring **(4)** , and another needle bearing **(3)** over shaft and press down into gear **(5)** hub. Assemble thrust bearing **(7)** (smooth side toward gear) thrust bearing race (washer) **(6)** and retaining ring **(8)** (narrow side up) onto shaft. Be sure retaining ring **(8)** seats fully into groove. Press cone **(9)** onto shaft end using a driver. Check to see if cone is fully seated.



10035844 10

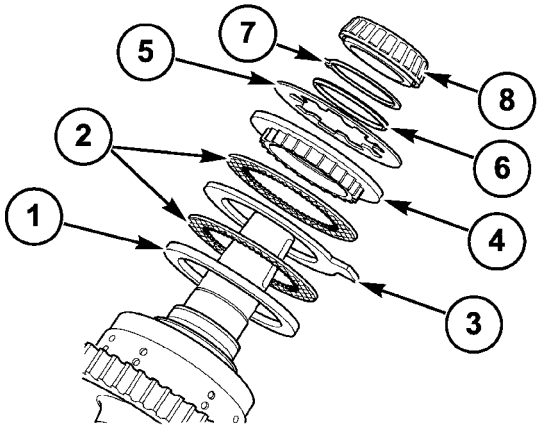
11. Subassemble shaft brake. Dab petroleum jelly into seal grooves. Apply a large seal and a small seal **(1)** into indicated grooves on the brake end of the shaft. Make sure seals **(1)** are not twisted and are fully seated into the grooves.



10035847A5 11

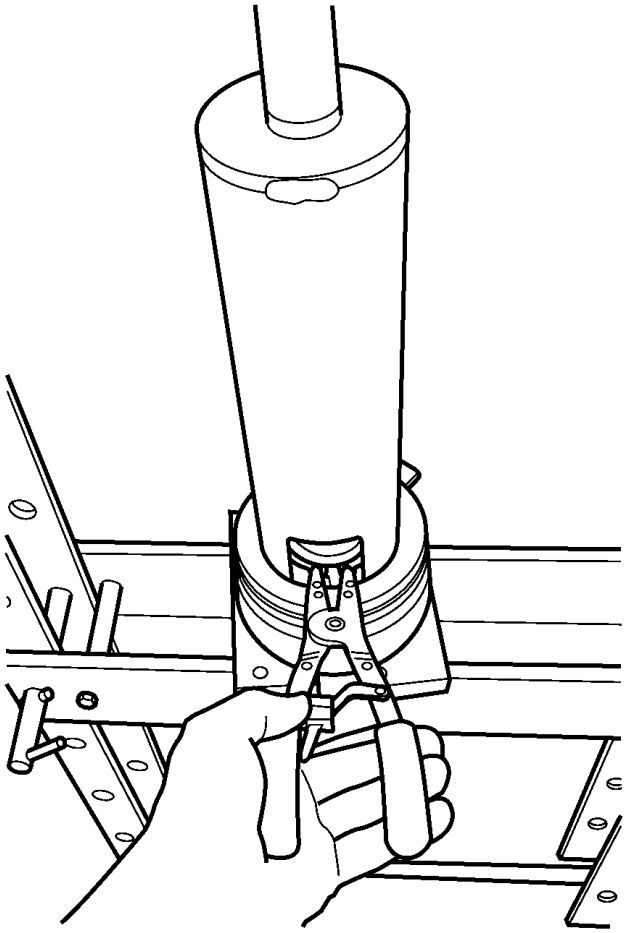
https://truckmanualshub.com/

12. Place plate **(1)** on top of can, flat side up. Put a friction disk **(1)** , plate **(3)** , and another friction disk **(2)** over the shaft. Carefully assemble piston **(4)** over shaft. Piston must be aligned over dowel pins and through disks and plates. When in place, the ear on the middle plate will be held when pressing on the top of the piston. Place the return spring **(5)** over the shaft with the lip down and inserted in the spring fingers.



10035846A5 12

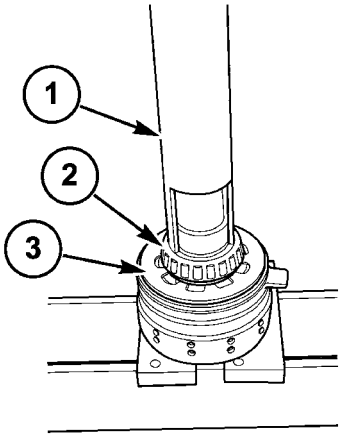
13. Compress the return spring and ring. Install retaining ring on shaft. Be sure snap ring is fully seated before releasing press.



10041900 13

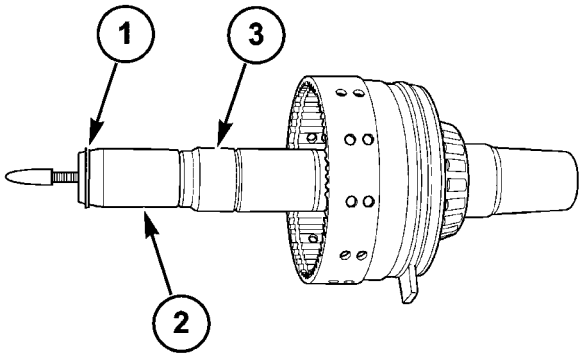
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14. Using the press tool with the notch, assemble the bearing cone **(2)** onto brake end of shaft. Check to be sure bearing is fully seated against the snap ring holding the spring **(3)**.



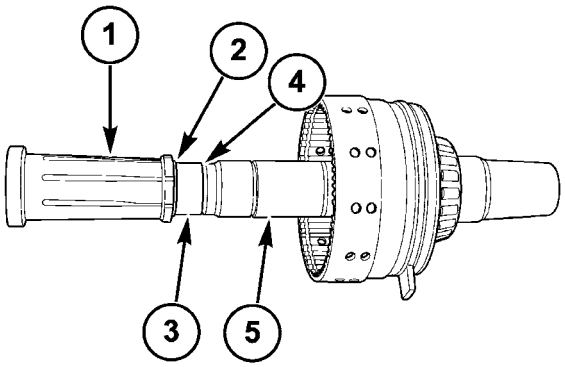
10041901A5 14

15. To install the shaft **(3)** end seals, use the seal expander tool **(2)** to first expand the seal **(1)**.



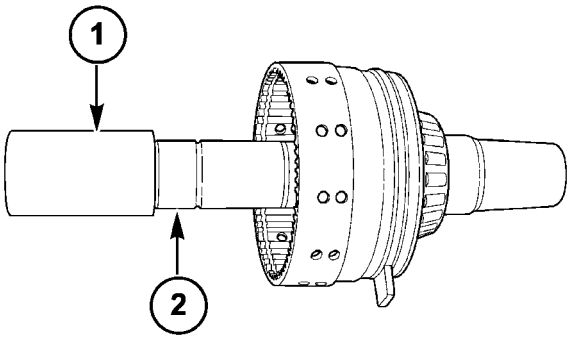
10041894A5 15

16. Use the seal pusher tool **(1)** to evenly slide the seal **(2)** into the groove **(4)** on the shaft **(5)**.



10041893A5 16

17. Use the seal compressor tool **(1)** to be sure the seal is fully compressed in the groove on the shaft **(2)**.



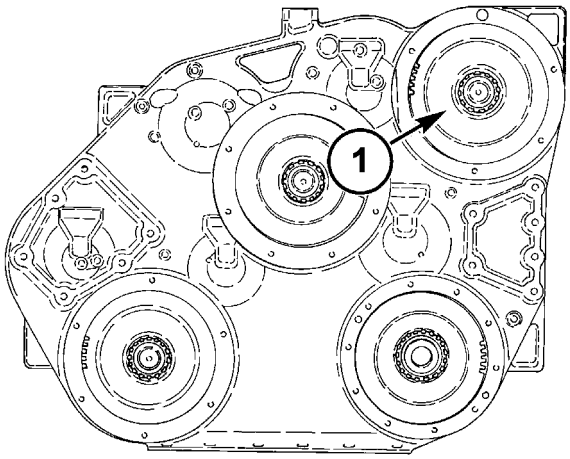
10041898A5 17

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Clutch - Install (K.72.B.16 - F.10.A.15)

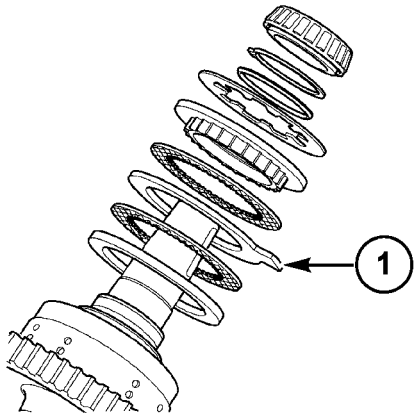
AFX8010

1. Install the shaft/clutch assembly **(1)** into the gearbox. Be sure to mesh the teeth on the gears correctly.



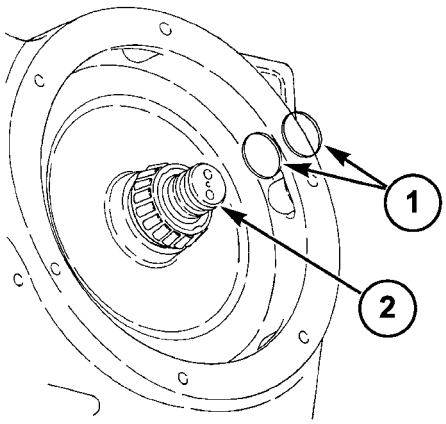
20035849B5 1

2. Be sure the tab **(1)** from the shaft brake fits into the groove in the gearbox housing.



10035846B5 2

3. Replace the lip seals on the outboard side of the gearbox for unload shaft if necessary. Before the plate can be installed, replace the two ring seals **(1)** on the end of the shaft **(2)** using the expander, seal pusher, and compression tools. Once the seals are installed and compressed, install the plate onto the shaft.

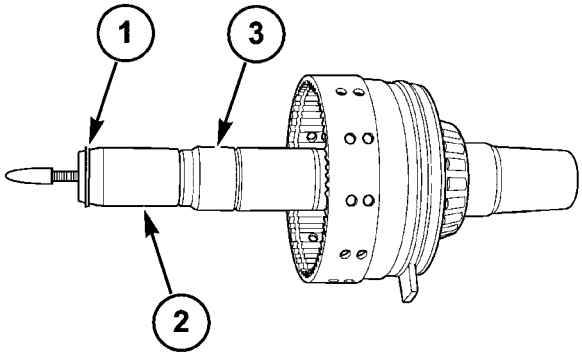


20035858A5 3

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4. To install the shaft **(3)** end seals, use the seal expander tool **(2)** to first expand the seal 3**(1)**.

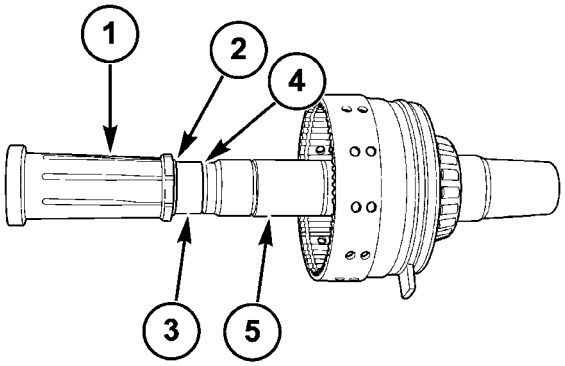
NOTE: *Be sure to use the proper tools to install the ring seals. If the seals are not installed properly, they may leak or fail.*



10041894A5 4

5. Use the seal pusher tool **(1)** to evenly slide the seal **(2)** into the groove **(4)** on the shaft **(5)**.

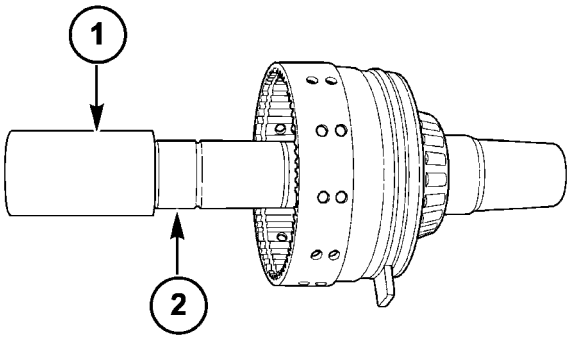
NOTE: *Be sure to use the proper tools to install the ring seals. If the seals are not installed properly, they may leak or fail.*



10041893A5 5

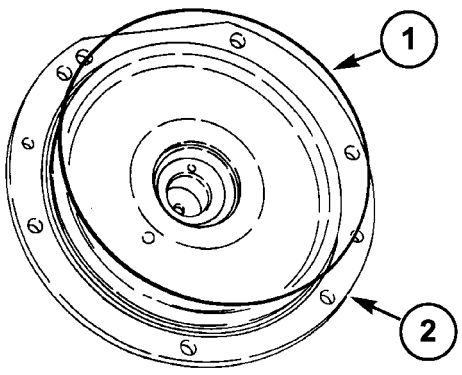
6. Use the seal compressor tool **(1)** to be sure the seal is fully compressed into the groove on the shaft **(2)**.

NOTE: *Be sure to use the proper tools to install the ring seals. If the seals are not installed properly, they may leak or fail.*



10041898A5 6

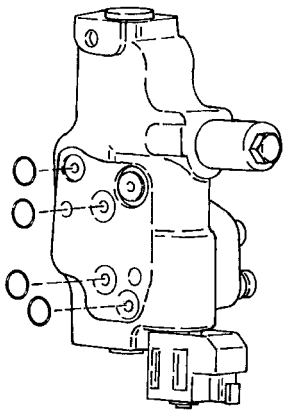
7. Before installing the cover **(2)** to the housing be sure the O ring **(1)** cover seal is good and lube with oil or petroleum jelly.



20035857A5 7

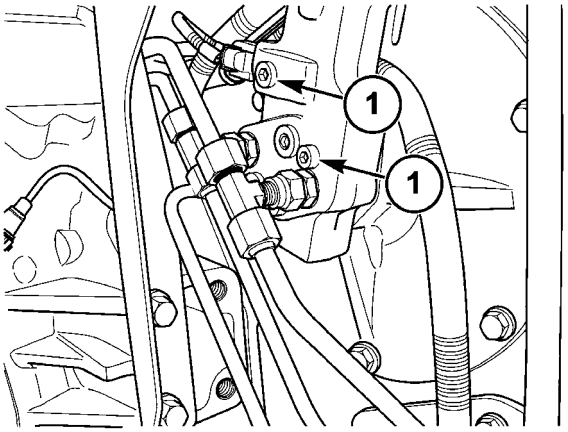
https://truckmanualshub.com/

8. With the cover installed onto the shaft attach the valve now if it was removed. If the valve was removed be sure to install new o ring seals and lube them with oil or petroleum jelly.



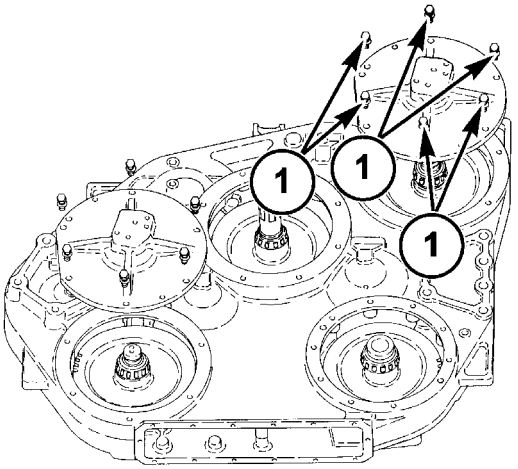
20035867 8

9. Torque the valve bolts **(1)** to **51 - 58 Nm (38 - 43 lb ft)** .



10036389C5 9

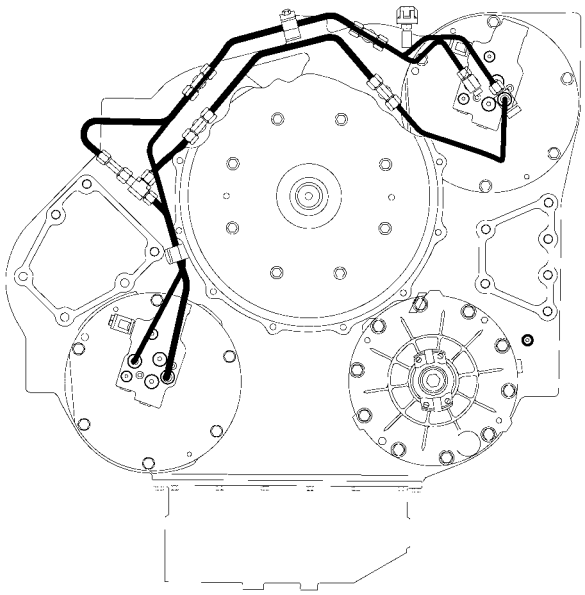
10. With the plate installed, torque the bolts **(1)** to **89 - 100 Nm (66 - 74 lb ft)**



20035859B5 10

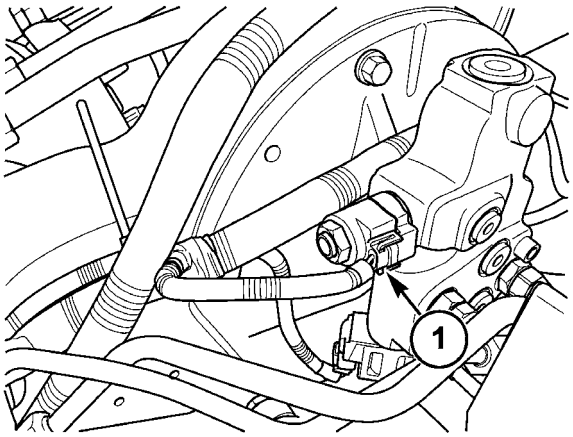
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11. Install the hydraulic lines to the valve.



50040394 11

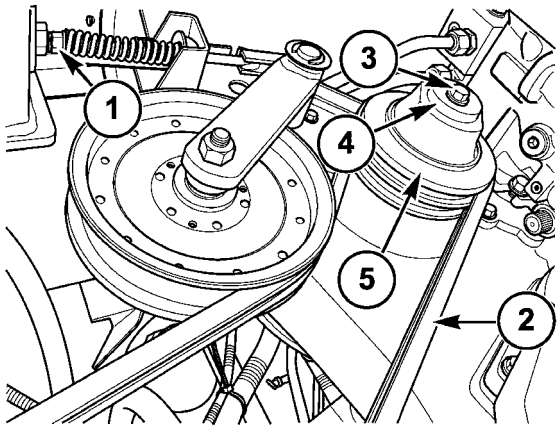
12. Install the electrical connectors **(1)** to the valve, and any place else if they were removed for access.



10036391A5 12

13. Install the key into the shaft.

14. Use Loctite Brand 767 anti-sieze on the shaft before installing the pulley. Install the pulley **(5)** onto the shaft with the washer **(4)** and bolt **(3)** . Torque the M12 bolt **(3)** to **98 Nm (72 lb ft)** .

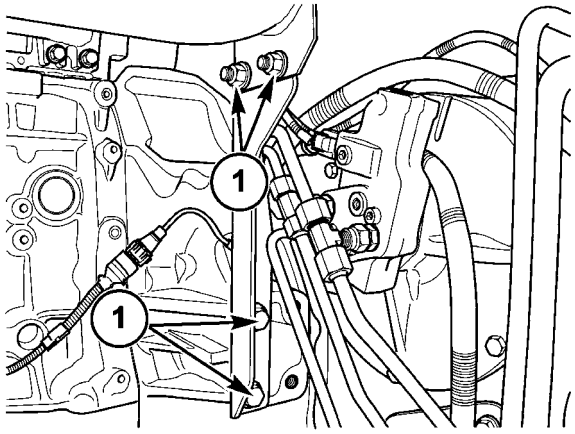


10036392A5 13

15. Install the belt **(2)** on the pulley **(5)**, and tighten the belt until the correct tension is met on the spring gauge **(1)**.

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16. Install the muffler bracket with the four bolts **(1)**. Tighten the bolts.



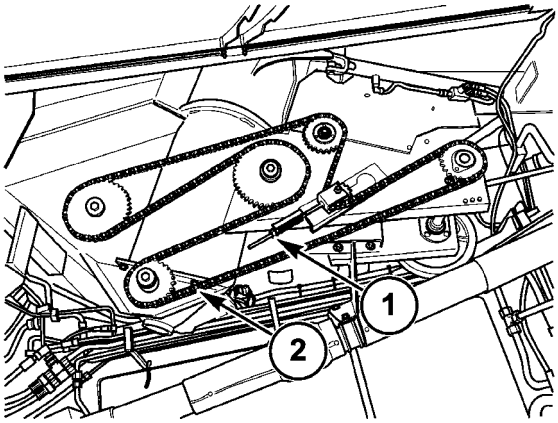
10036390A5 14

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Drive system - Remove (K.72.B.40 - F.10.A.10)

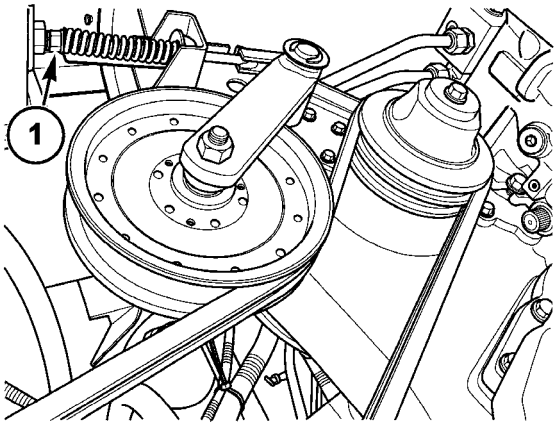
AFX8010

1. Loosen nut **(1)** and remove the drive chain **(2)**.



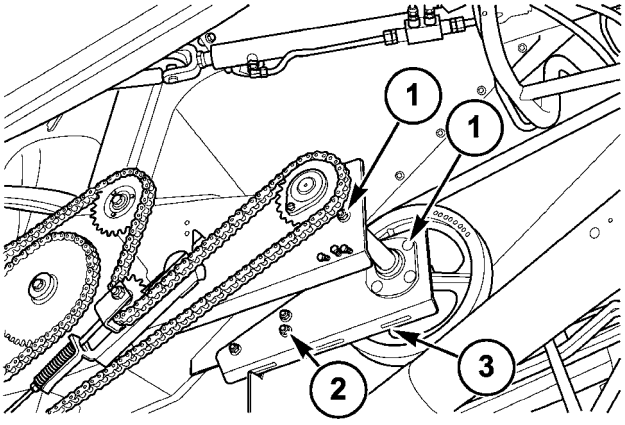
10034706A5 1

2. Loosen nut **(1)** and remove the unloading drive belt.



10036392B5 2

3. Remove eight bolts **(1)** to release bearing flanges from the support plates. Loosen three bolts **(2)** to allow support **(3)** to move laterally. Shaft assembly with sprocket, bearings and belt sheave can now be lifted up and out through the slots in the bearing supports.

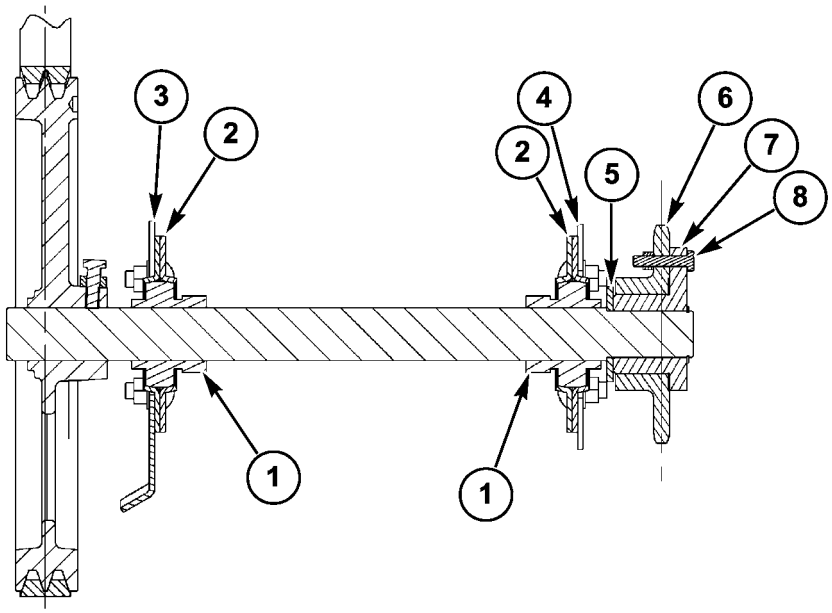


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Drive system - Install (K.72.B.40 - F.10.A.15)

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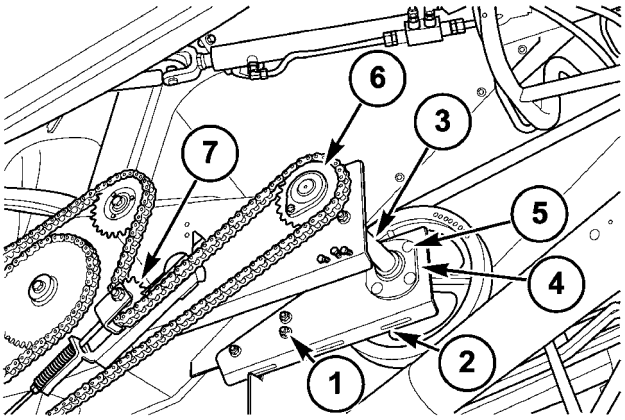
1. Locking collars	4. Left bearing support	7. Shear bolt hub
2. Bearing flanges	5. Washer	8. Shear bolt
3. Right bearing support	6. Drive sprocket	

1. Assemble the shaft with bearing locking collars **(1)** toward each other.

IMPORTANT: *Do not forget the washer **(5)** between the shear bolt hub **(7)** and the shoulder of the shaft.*

2. Loosen bolts **(1)** to allow support **(2)** to move laterally. Set the shaft assembly **(3)** down in the slots of bearing supports with the flanges **(4)** to the inside. Install eight (8) carriage bolts with lock washers and nuts **(5)**. Tighten to **70 - 90 Nm** (**52 - 66 lb ft**). Loosen both locking collars to allow bearings to slide on shaft. Tighten three bolts **(1)** to **70 - 90 Nm** (**52 - 66 lb ft**). Adjust shaft axially so drive sprocket **(6)** lines up with sliding idler **(7)** within **1.5 mm** (**0.06 in**) and tighten both lock collars.

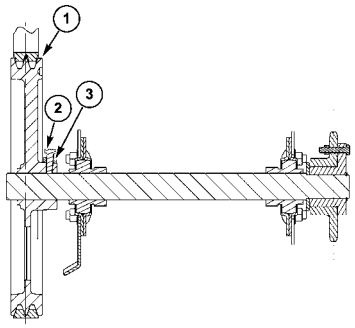
NOTE: *If bearings or shear bolt hub are replaced, coat inside of inner race or hub with antiseize (Loctite product 767).*



10030017B5 2

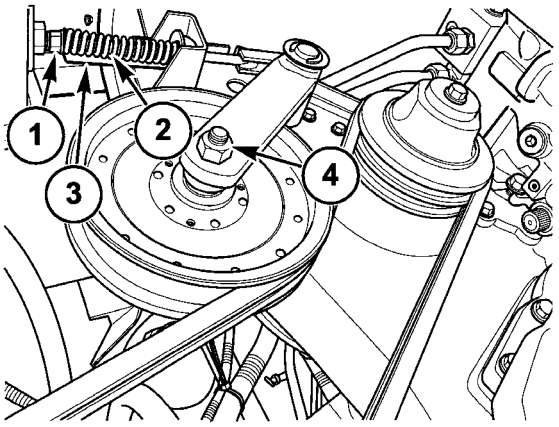
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3. Apply Loctite anti-seize product 767 to bore of double-groove sheave **(1)** and adjust to align with drive sheave within **3 mm** (**0.125 in**) and retain with M10X30 cap screw **(2)** and nut **(3)**. Tighten cap screw to **46 - 52 Nm** (**34 - 38 lb ft**) and then tighten nut to same value.

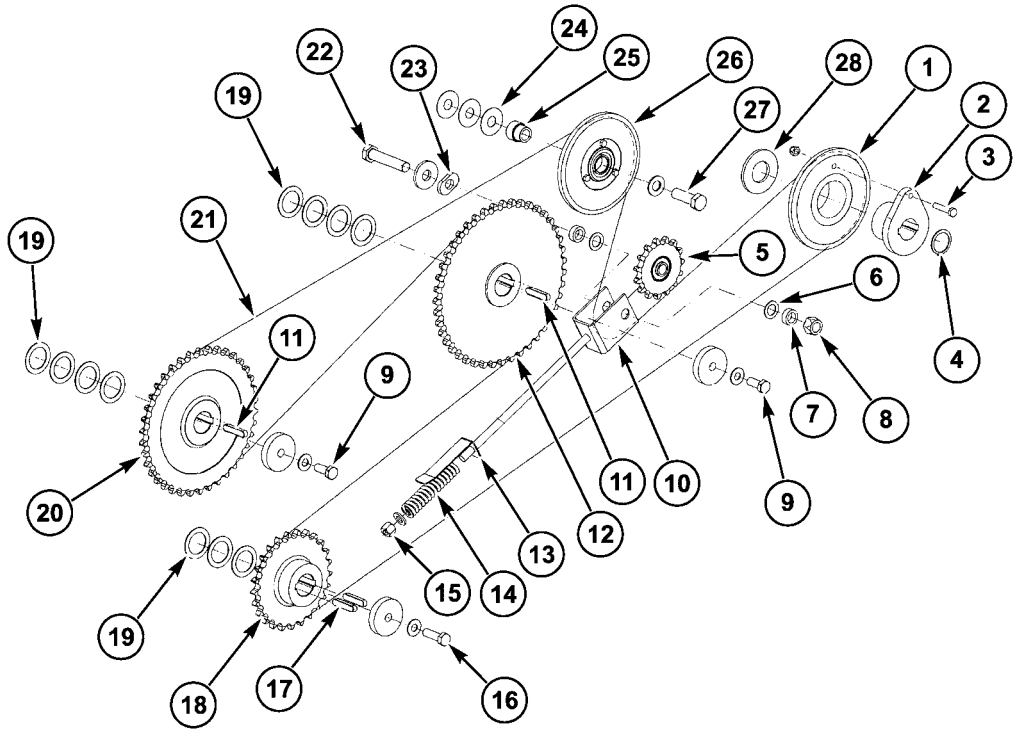


20041767B5 3

4. Install drive belt and tighten nut **(1)** so that spring **(2)** is compressed to **116 mm** (**4.56 in**) length as shown by indicator **(3)**. If tensioner idler pulley has been disassembled from idler arm and re-assembled, torque nut **(4)** on M16X90 bolt to **145 - 260 Nm** (**110 - 190 lb ft**).



10036392C5 4



20041768A5 5

1	Drive sprocket	11	Key 10X8X50	21	Chain
2	Shear bolt hub	12	Sprocket-rear tank auger	22	Cap screw - M16X80
3	Shear bolt - M8X40	13	Indicator	23	Washer - slot
4	Retaining ring	14	Spring	24	Washer
5	Sprocket - tensioner	15	Lock nut - M12	25	Hub

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6	Washer	16	Cap screw - M12X40	26	Sprocket - idler
7	Spacer	17	Key 10X8X50	27	Cap screw - M16X50
8	Lock nut - M16	18	Sprocket-unload auger	28	Washer
9	Cap screw - M12X30	19	Washer - hard		
10	Clevis	20	Sprocket-front tank auger		

5. To begin assembly of the unloading system chain drive, first coat the surface of the tensioner idler mounting bracket with **CASE AKCELA 251H EP MULTI-PURPOSE GREASE**. Install flat washer and slot washer **(23)** on bolt **(22)**. Install into clevis **(10)**, then into a spacer, a washer, 15-tooth sprocket **(5)**, another washer and spacer, then through the other leg of the clevis **(10)** into lock nut **(8)**.

6. With nut loose, feed threaded end of clevis **(10)** into tab at tail of bracket and engage washer at head end of bolt into key slot of bracket. Torque to **174 - 220 Nm** (**130 - 160 lb ft**). Install indicator **(13)**, spring **(14)**, washer and lock nut **(15)**.

NOTE: *All other sprockets are to be aligned with this first sprocket as they are installed.*

7. Apply Loctite antiseize product 767 to bores of sprockets **(12)**, **(18)**, and **(20)**. Install 25-tooth sprocket **(18)** on unloading auger gearbox input shaft with two keys **(17)** and aligning by selecting quantity of washers **(19)**. Retain with cap screw **(16)**, lock washer and flat washer. Install 43-tooth sprocket **(12)** on rear grain tank floor auger and 38-tooth sprocket **(20)** on front auger shaft with washers **(19)** and key **(11)**, retaining with cap screw **(9)**, lock washer and flat washer. Torque these last three to **82 - 106 Nm** (**60 - 80 lb ft**) after rechecking alignment with **(5)**. Install 25-tooth idler sprocket **(26)** on hub **(25)**, aligning with **(5)** by use of washers **(24)**, and retaining with bolt **(27)** and lock washer. Torque to **205 - 260 Nm** (**150 - 190 lb ft**). Install chain **(21)**. Tighten nut **(15)** to compress spring **(14)** to **110 mm** (**4.33 in**) length as shown by indicator **(13)**.

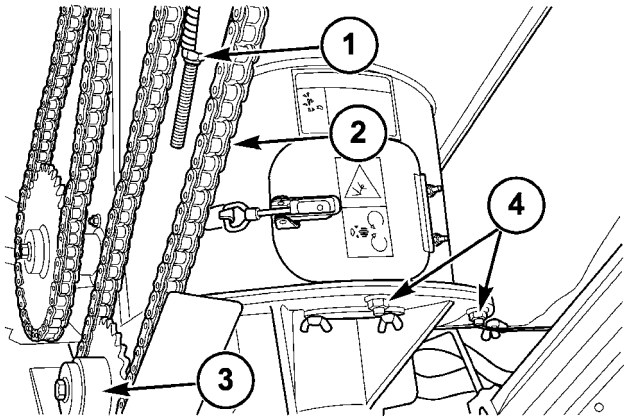
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Drive system Unload gearbox - Remove (K.72.B.40.45 - F.10.A.10)

AFX8010

1. Loosen nut **(1)** and remove drive chain **(2)** from the gearbox sprocket **(3)**. Open inspection cover and turn auger so that bottom end of flighting is directly over the plate at the right hand side of the bottom edge of the housing. This keeps the auger engaged with the sprocket on the elbow gearbox at the top end of the auger. Remove six nuts and lock washers **(4)** and remove the gearbox.

NOTE: *The weight of the gearbox is about* ***40 kg*** *(****88 lb****) Use appropriate lifting equipment.*



10030016A5 1

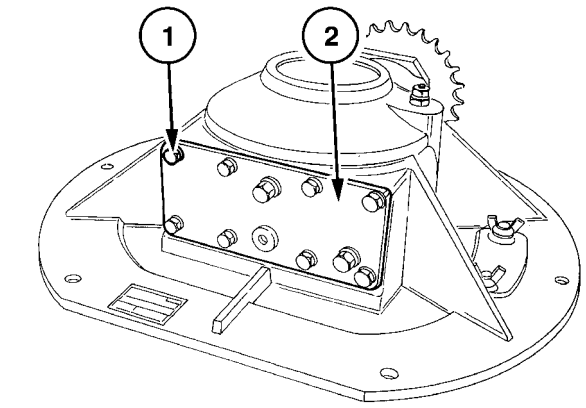
https://truckmanualshub.com/

Drive system Unload gearbox - Disassemble (K.72.B.40.45 - F.10.A.25)

AFX8010

NOTE: *During disassembly keep track of location and number of all shim packs. Use the same shim packs during re-assembly if possible.*

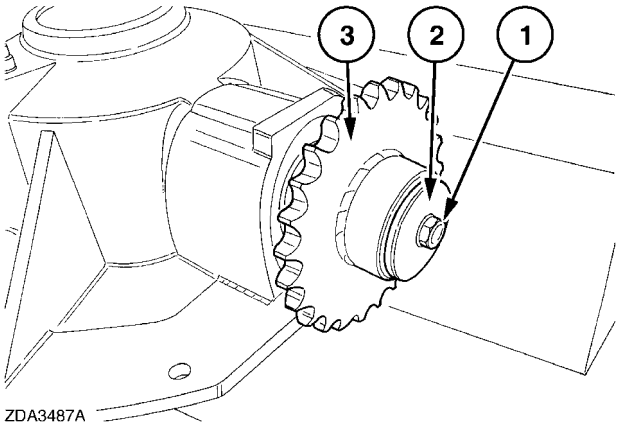
1. Remove the unloading gearbox, refer to **Drive system Unload gearbox - Remove (K.72.B.40.45 - F.10.A.10)**. Drain the oil from the gearbox. Remove eight bolts **(1)** and remove cover **(2)**.



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2. Remove bolt **(1)** and washer **(2)**. Pull off sprocket **(3)**.

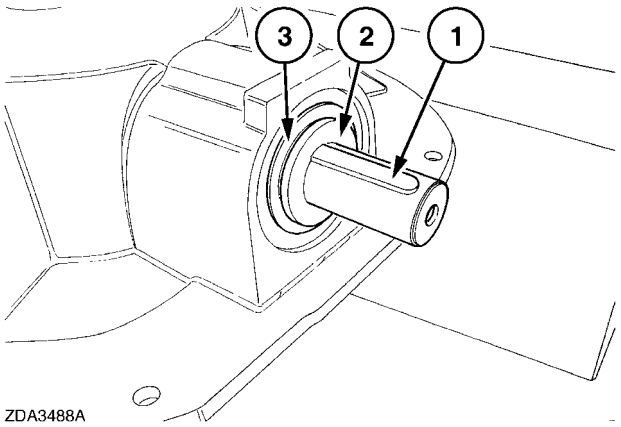


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ZDA3487A 2

3. Remove two keys **(1)** and washer **(2)**. Remove oil seal **(3)** using a screw driver.

NOTE: *Oil seal **(3)** will be damaged when it is removed, and should not be re-used.*

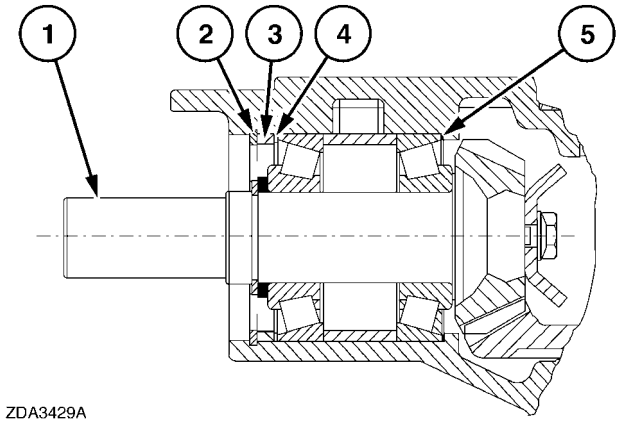


ZDA3488A

ZDA3488A 3

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4. Remove retaining ring **(2)**, spacer **(3)**, and shims **(4)**. Pull out shaft **(1)** together with the bearings. Remove shims **(5)** from the housing.

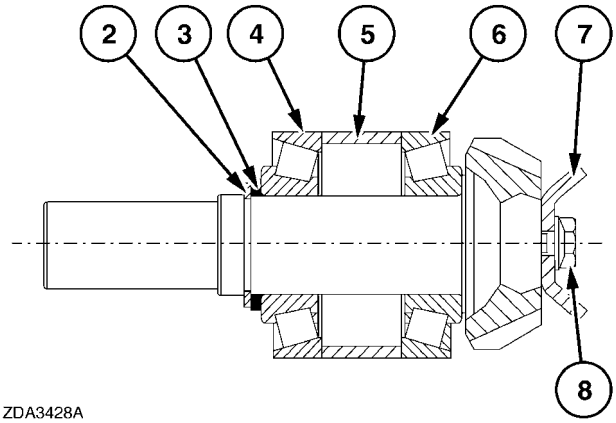


ZDA3429A

ZDA3429A 4

5. Remove retaining ring **(2)** and shims **(3)**. Remove bearing **(4)** and spacer **(5)** and outer race of bearing **(6)**. Carefully remove the bearing **(6)**, making sure not to damage the shaft. Remove bolt **(8)** and blade **(7)**.

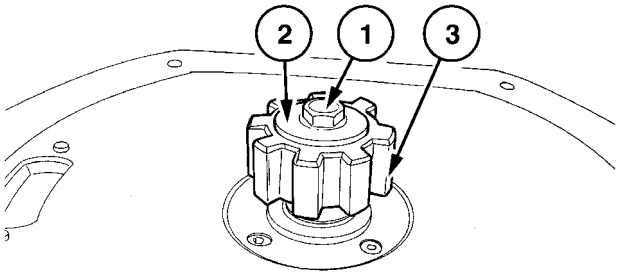
NOTE: *Threads of bolt may have had thread-locking compound applied.*



ZDA3428A

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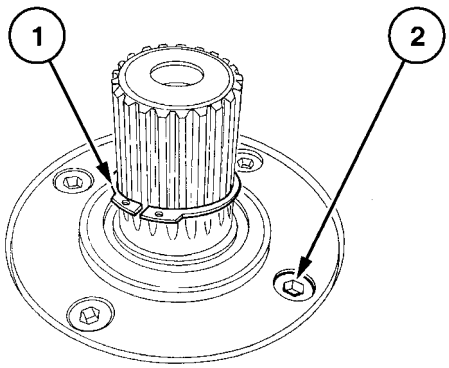
6. Remove bolt **(1)** and washer **(2)**. Remove sprocket **(3)**.



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7. Remove retaining ring **(1)**. Remove four Allen screws **(2)**.

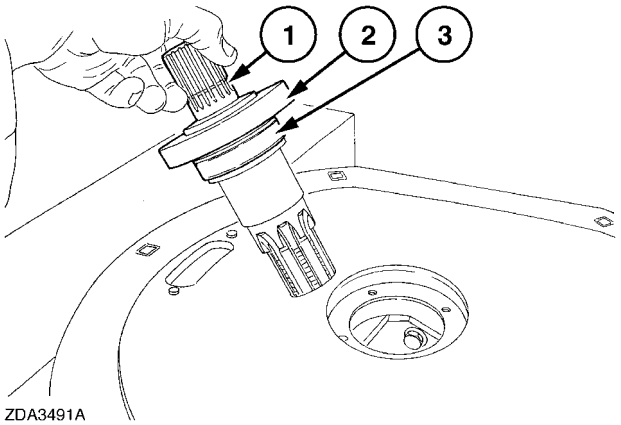


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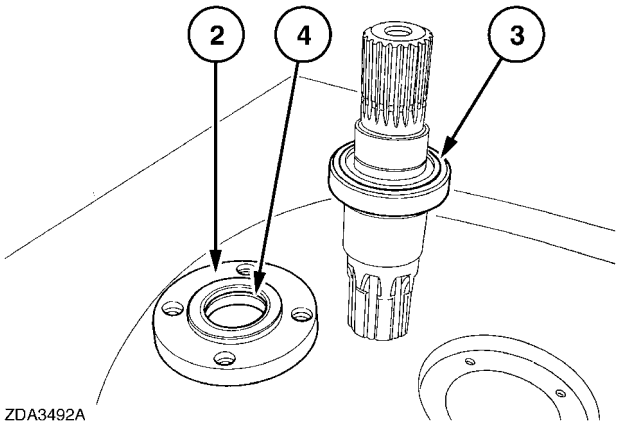
8. Pull out shaft **(1)** together with cover **(2)** and bearing **(3)**.



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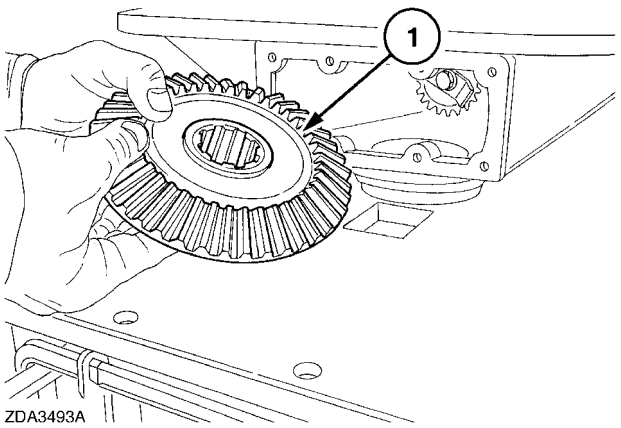
9. Remove cover **(2)** from the shaft. Remove seal **(4)**. Remove shims between cover **(2)** and bearing **(3)**. Remove bearing **(3)** from shaft.



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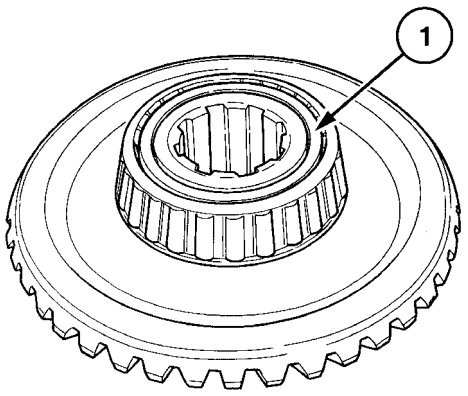
10. Remove crown gear **(1)** from the housing.



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11. Remove bearing **(1)** from the crown gear.

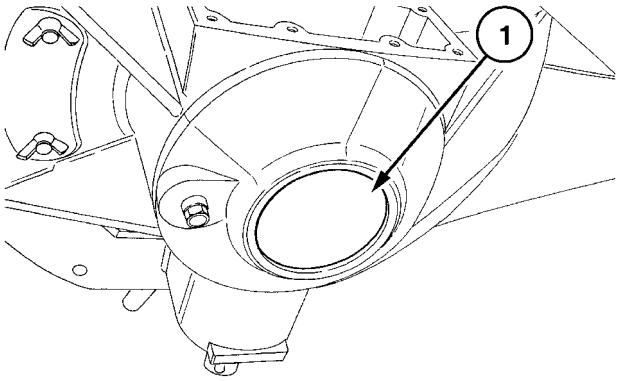


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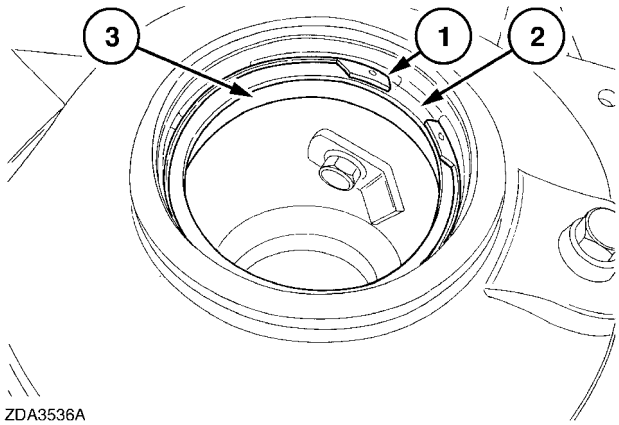
12. Remove cap seal **(1)**.



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ZDA3495A 12

13. Remove retaining ring **(1)**, shims **(2)**, and bearing outer race **(3)**.



ZDA3536A

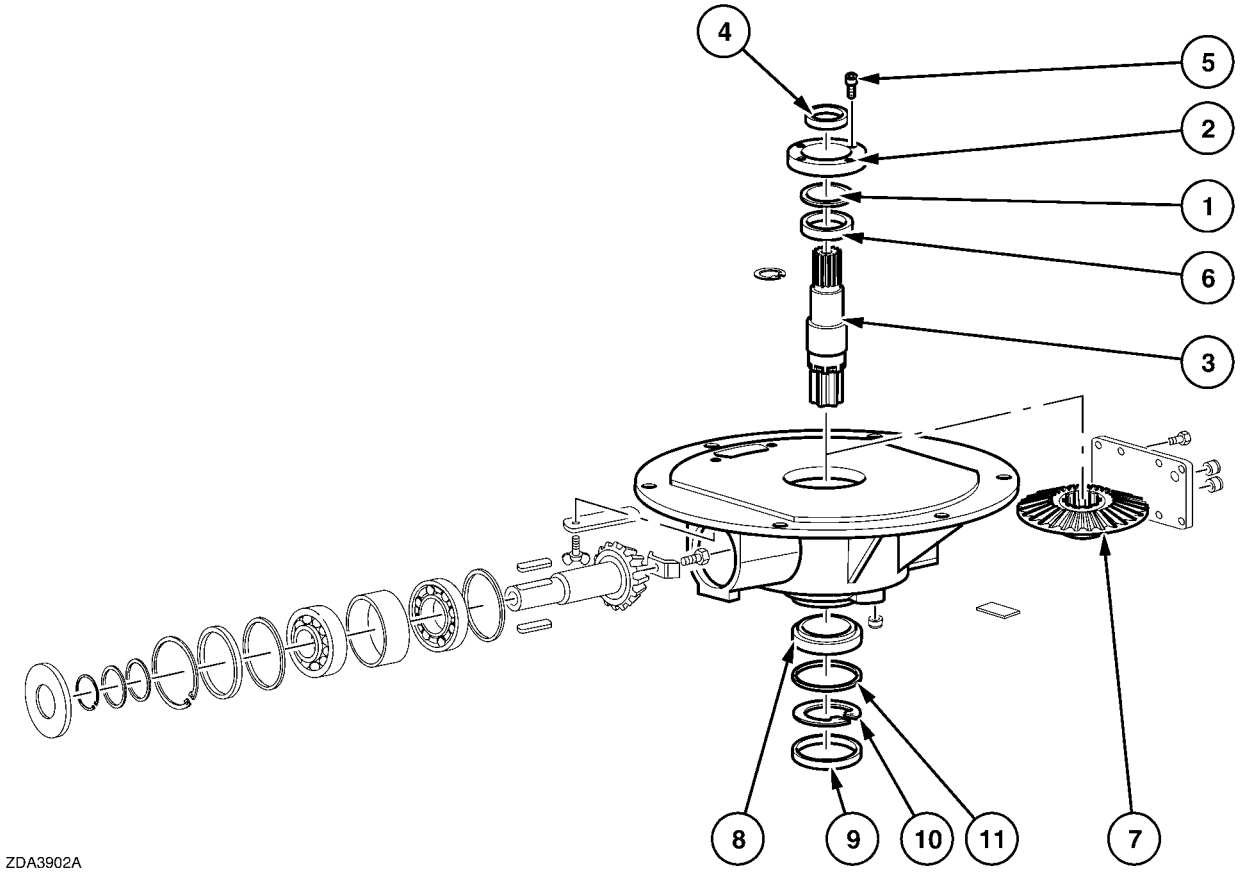
ZDA3536A 13

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Drive system Unload gearbox - Assemble (K.72.B.40.45 - F.10.A.20)

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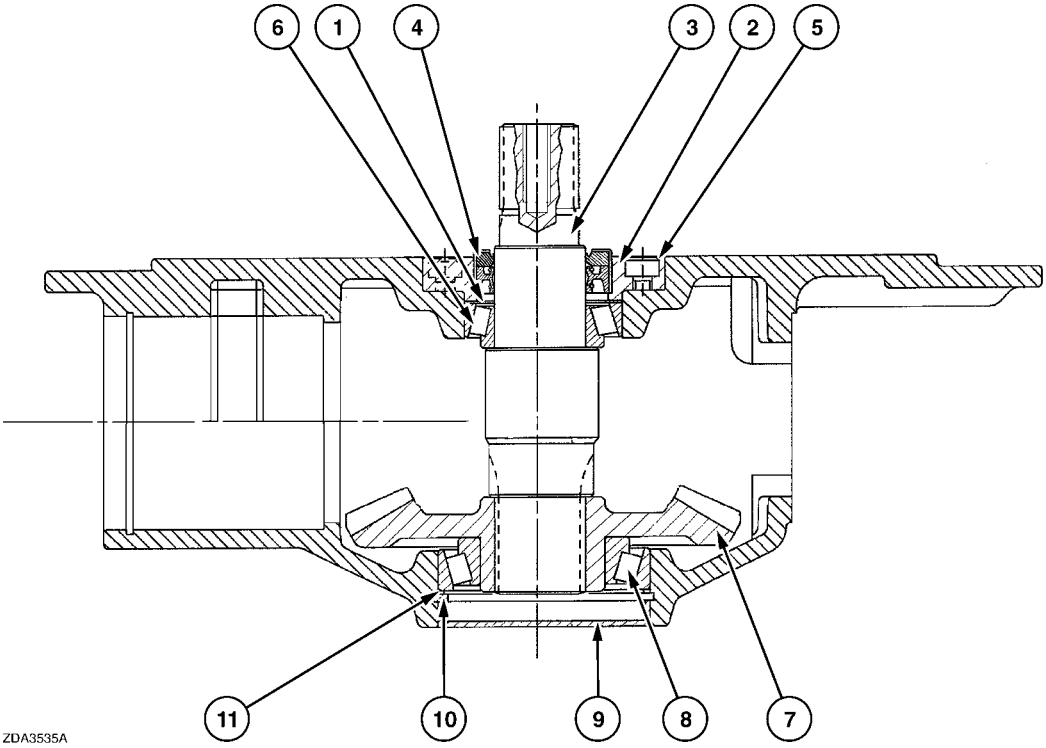
1.



ZDA3902A 1

1. Shims	4. Seal	7. Bevel Gear	10. Retaining Ring
2. Cover	5. Allen Screw	8. Bearing	11. Shims
3. Shaft	6. Bearing	9. Seal	

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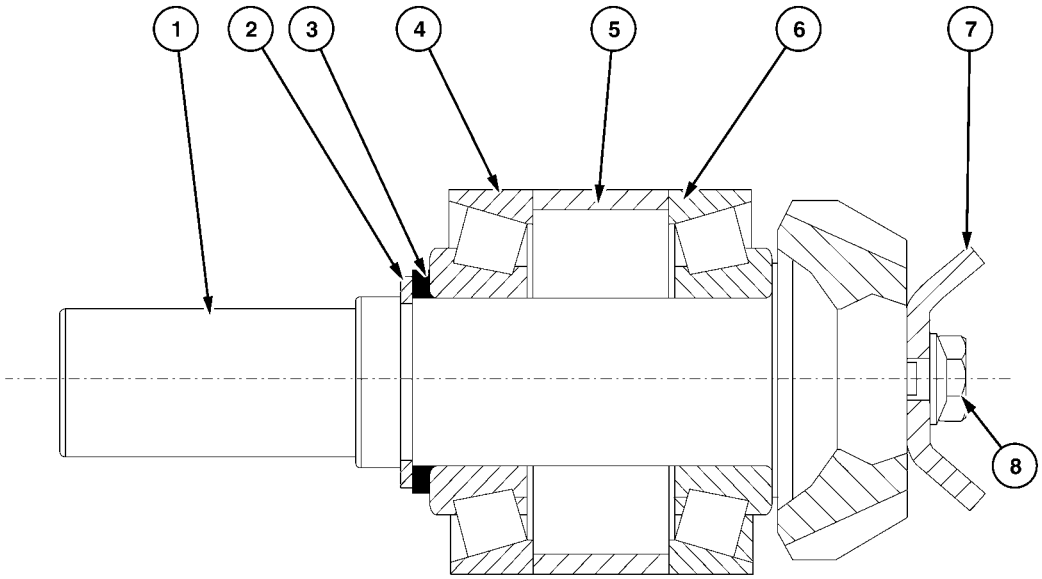


ZDA3535A 2

1. Shims	4. Seal	7. Bevel Gear	10. Retaining Ring
2. Cover	5. Allen Screw	8. Bearing	11. Shims
3. Shaft	6. Bearing	9. Seal	

2. To assemble the output shaft, proceed as follows: Install retaining ring **(10)**, original shim packs **(11)**, and outer race of bearing **(8)**. Install inner race of bearing **(8)** on bevel gear **(7)**. Apply a bluing compound to the gear teeth of the bevel gear and install bevel gear **(7)** with bearing in the gearbox housing. Install inner race of bearing **(6)** on output shaft **(3)**, and assemble the shaft in the gearbox housing. Install inner race of bearing **(6)** and shims **(1)**. Install cover **(2)** and tighten Allen screws **(5)** to torque of **25 - 32 Nm** (**19 - 24 lb ft**). In order to set the two bearings **(6)** and **(8)**, hit the shaft on both ends, and rotate the shaft two full revolutions to seat the bearing rollers. Check the preload on the bearings with a torque meter. This preload should cause a rolling torque of **0.4 - 0.8 Nm** (**3 - 7 lb in**). Re-set shimming **(1)** if preload is not between the tolerance range shown.

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ZDA3507A

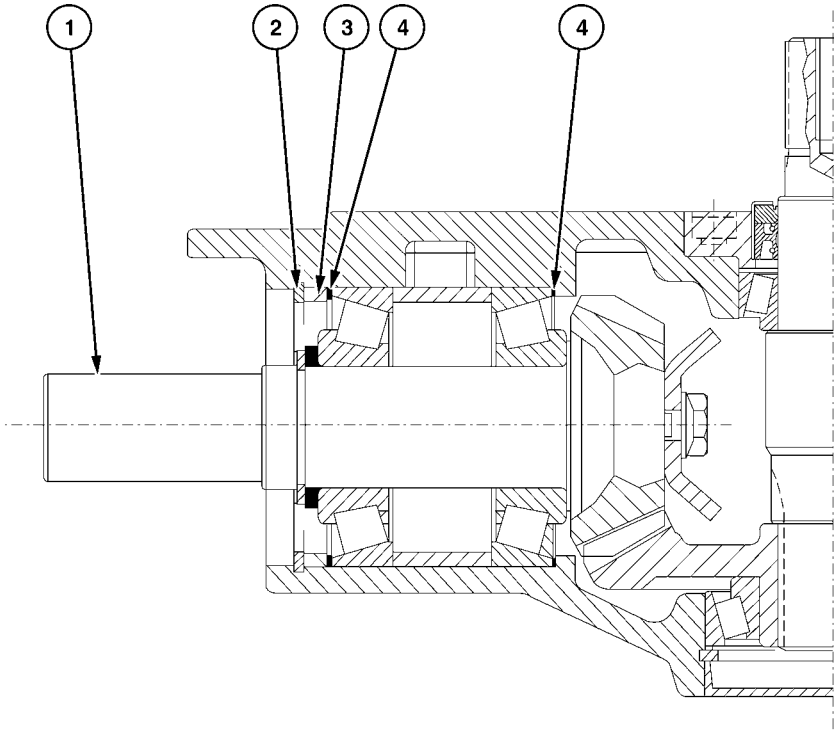
ZDA3507A 3

1. Input shaft	3. Shims	5. Spacer	7. Blade
2. Retaining ring	4. Bearing	6. Bearing	8. Bolt

3. To pre-assemble the input shaft, first install the inner race of bearing **(6)** on input shaft **(1)**, pushing on the inner race only. Install the outer race of bearing **(6)** and spacer **(5)**. Install bearing **(4)**. Install shims **(3)** and retaining ring **(2)**. Hold up the assembly and hit the input shaft on both ends in order to set bearings **(4)** and **(6)** and rotate the bearing two full revolutions to seat the bearing rollers. Check the preload on the bearings with a torque meter. This preload should cause a rolling torque of **0.8 - 1.2 Nm** (**7 - 11 lb in**). Adjust shimming **(3)** if preload is out of the range shown. Install blade **(7)** and bolt **(8)**.

NOTE: *Apply some thread locking compound to the bolt threads to prevent loosening. Tighten bolt* ***(8)*** *to a torque of* ***15 Nm*** *(****11 lb ft****).*

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ZDA3534A 4

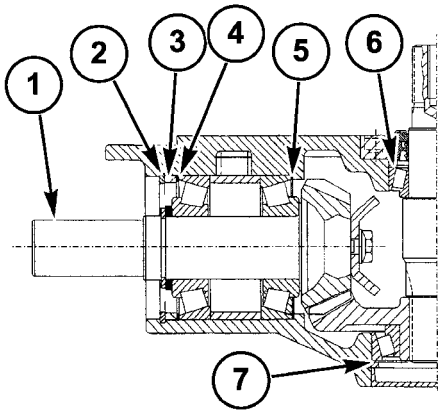
1. Pre-assembled input shaft	3. Spacer
2. Retaining ring	4. Shims

4. To assemble the pre-assembled shaft **(1)** in the gearbox, proceed as follows: Install original inner shim pack **(4)** in the housing. Apply a bluing compound to the gear teeth of the input shaft, and install the pre-assembled input shaft partially into the gearbox housing, by pushing only on the outer race of the bearing. Check if the preload of the input shaft is still within the tolerance range shown. If so, push the shaft completely into the housing until tight against the inner shims **(4)** at the shoulder. Install outer shims **(4)** and spacer **(3)**. Install retaining ring **(2)**, checking and adjusting shims so that there is no clearance between the retaining ring and spacer, **(3)**. While holding the output shaft to apply a light load to it, rotate the input shaft counter-clockwise several revolutions, as viewed from the end of the shaft. This will seat the bearing rollers, and will also mark the gear contact pattern in the bluing compound on the gear teeth. Check the gear backlash. The backlash should be between **0.12 - 0.32 mm** (**0.005 - 0.013 in**).

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5. To adjust backlash, move shims from one end of the output shaft to the other. To increase backlash, remove shims from **(7)** and add shims at **(6)**. To decrease backlash, remove shims from **(6)** and add shims at **(7)**. Shifting the output shaft **0.1 mm** (**0.004 in**) will change the backlash between the gears approximately **0.05 mm** (**0.002 in**).

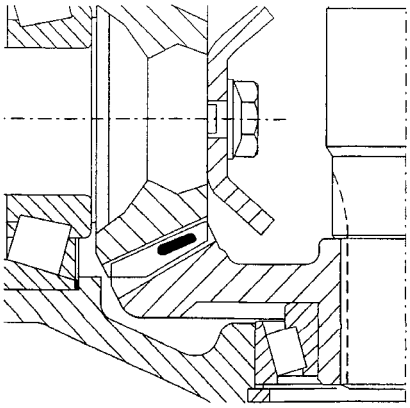
NOTE: *The shims used at **(6)** and **(7)** are different diameters. Keep track of the shims used, so that the shaft bearing preload adjustment does not change. The shims **(7)** used on the output shaft are available in **0.3 mm**, **0.35 mm**, **0.4 mm**, **0.5 mm**, (**0.012 in**, **0.014 in**, **0.016 in**, & **0.020 in**) thicknesses. The shims **(6)** are available in the same four sizes as above plus **1 mm**, **1.5 mm**, & **3 mm** (**0.039 in**, **0.059 in**, & **0.118 in**).*



20041766 5

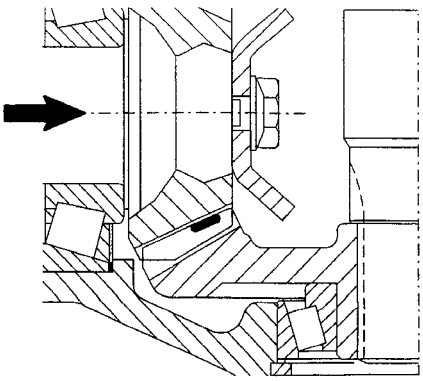
6. To shift the shaft **0.1 mm** (**0.004 in**) inwards (to decrease backlash), remove a **0.4 mm** or **0.5 mm** (**0.016 in** or **0.020 in**) shim at **(6)**, and substitute the next size smaller shim [**0.3 mm** or **0.4 mm** (**0.012 in** or **0.016 in**)]. Then remove a **0.3 mm** or **0.4 mm** (**0.012 in** or **0.016 in**) shim from **(7)** and install the next bigger size [**0.4 mm** or **0.5 mm** (**0.016 in** or **0.020 in**)]. Use the opposite procedure to increase backlash.

7. Remove the input shaft from the gearbox and check the gear contact pattern on the gear teeth; the contact pattern should be **40 %** central-toe, as shown in figure. If the backlash is not within the tolerance range shown, or if the contact pattern is not located properly, the gearbox will need to be re-shimmed.



20041763 6

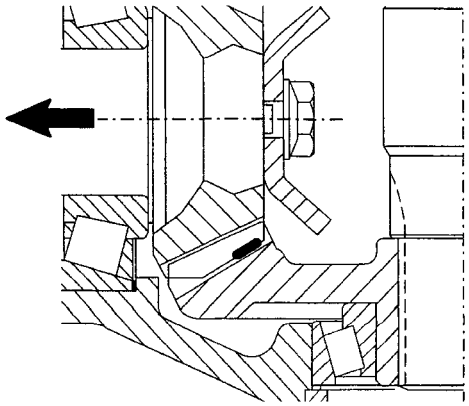
8. To adjust the gear contact pattern, move shims from one end of the input shaft to the other, to reposition the pinion gear. If the contact pattern is low (towards the root of the tooth) on the pinion, and high (towards the top of the tooth) on the bevel gear, remove shims from **(5)** in figure **5** and add them at **(4)** in figure **5**, to move the pinion further into mesh with the bevel gear.



20041765 7

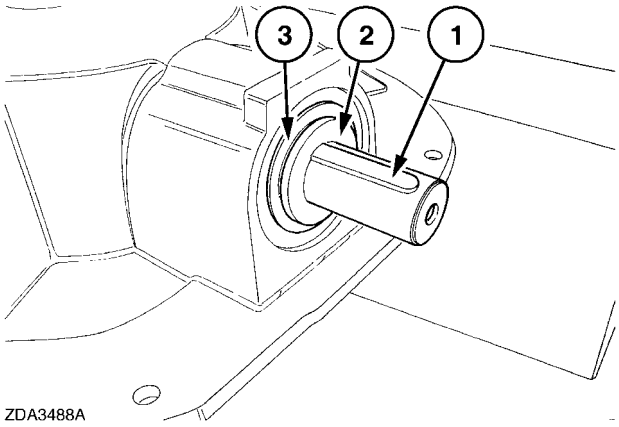
https://truckmanualshub.com/

9. If the contact pattern is high on the pinion, and low on the bevel gear, remove shims from **(4)** in figure **5** and add them at **(5)** in figure **5**, to move the pinion out of mesh with the bevel gear. Repeat steps **4** - **9** as necessary until the backlash and gear contact patterns are correct.



20041764 8

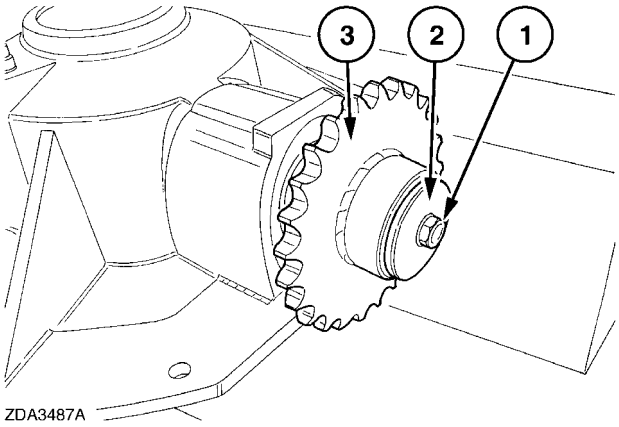
10. Install washer **(2)** and two keys **(1)**.



ZDA3488A 9

11. Install sprocket **(3)**. Install washer **(2)** and bolt **(1)**. Tighten to **82 - 106 Nm** (**60 - 78 lb ft**).

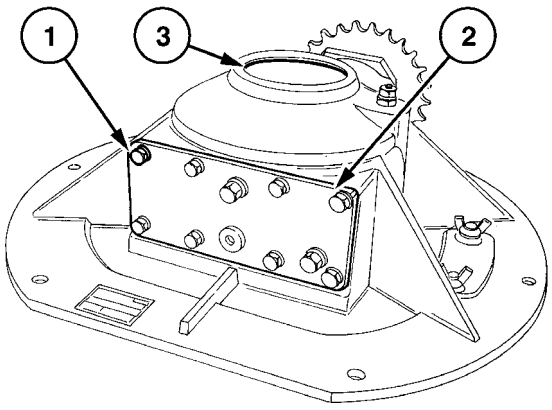
***NOTE:** : Apply some thread locking compound to the female threads in the shaft to prevent the bolt from loosening.*



ZDA3487A 10

12. Install seal **(3)**. Apply sealing compound and install cover **(2)**. Install bolts **(1)** and tighten them to a torque of **24 - 32 Nm** (**18 - 24 lb ft**).

***NOTE:** Apply some thread locking compound to the tapped holes in the housing to prevent the bolts from loosening.*

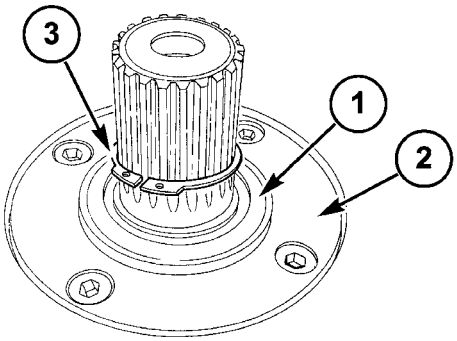


ZDA3486B 11

https://truckmanualshub.com/

13. Install oil seal **(1)** in the cover. Apply sealing compound and install cover **(2)**. Install retaining ring **(3)** on the shaft.

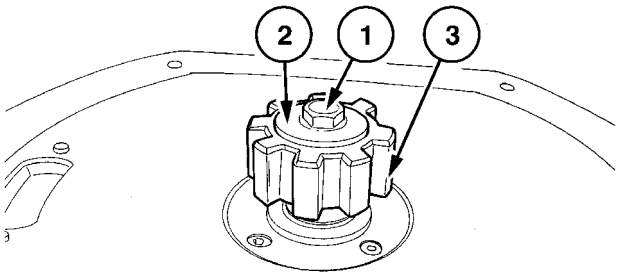
NOTE: *Apply some grease on the shaft and the seal before installation.*



20041769 12

14. Install sprocket **(3)**. Install washer **(2)** and bolt **(1)**. Torque to **82 - 106 Nm** (**60 - 78 lb ft**).

NOTE: *Apply some thread locking compound to the female threads in the shaft to prevent the bolt from loosening.*



ZDA3489A

ZDA3489A 13

15. Fill the gearbox with **0.6 L** (**20 oz**) of **CASE AKCELA 135H EP GEAR LUBE SAE 80W-90**.

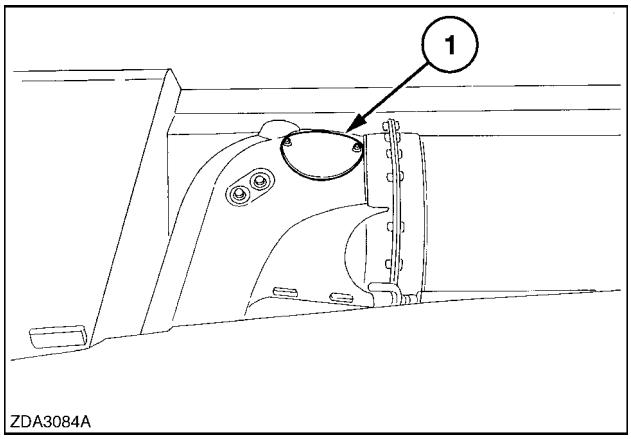
NOTE: *As this gearbox is not mounted horizontally, check the oil level after assembly on the combine. Refer to* ***Drive system Unload gearbox - Install (K.72.B.40.45 - F.10.A.15)****.*

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Drive system Unload gearbox - Install (K.72.B.40.45 - F.10.A.15)

AFX8010

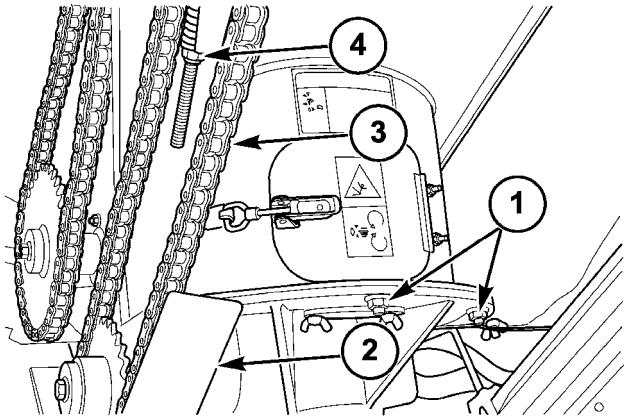
1. Open cover **(1)** to check if the vertical auger is connected to the unloading tube gearbox connector sprocket. Turn auger so that bottom auger edge is resting on plate at the side of the housing to retain auger in housing.



ZDA3084A 1

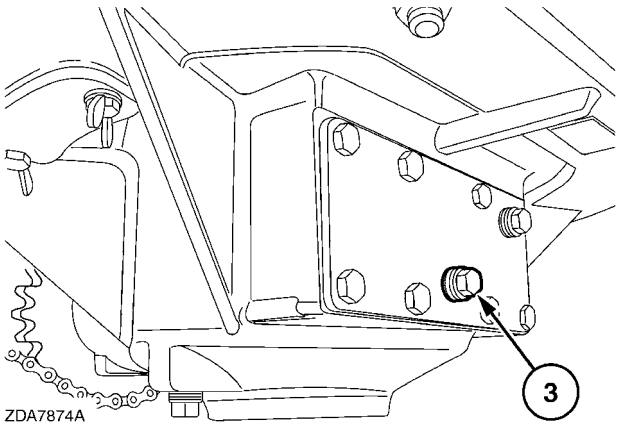
2. Install the unloading gearbox and chain shield **(2)** in place. Apply thread-locking sealant to bolt threads and retain gearbox with six bolts **(1)** and torque to **82 - 106 Nm** (**60 - 80 lb ft**).
   Install unloading drive chain **(2)** and adjust with nut **(3)**.

NOTE: *The gearbox weight is about 40 kg (88 lbs.). Use appropriate lifting equipment. Use a minimum of two persons for this task.*



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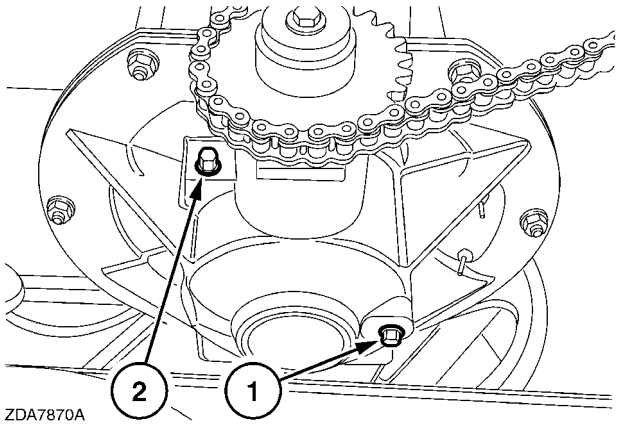
3. Check gearbox oil level at plug **(3)**. Oil should be at, but not above, this plug.



ZDA7874A 3

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4. Drain excess oil out at plug **(1)** or add needed **CASE AKCELA 135H EP GEAR LUBE SAE 80W-90** at plug **(2)** until at proper level plug hole. Torque plugs to **29 Nm** (**22 lb ft**).



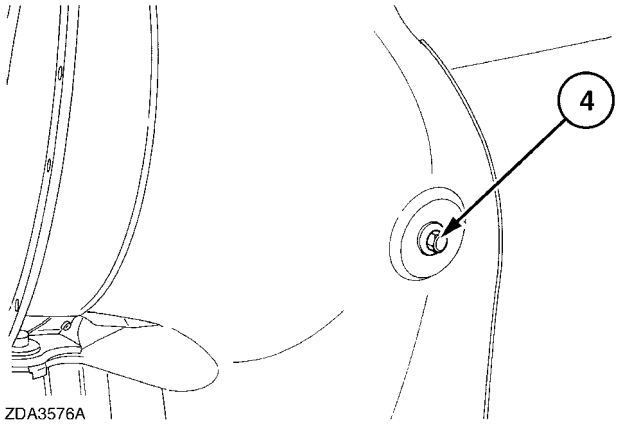
ZDA7870A 4

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Drive system Unloading tube gearbox - Remove (K.72.B.40.46 - F.10.A.10)

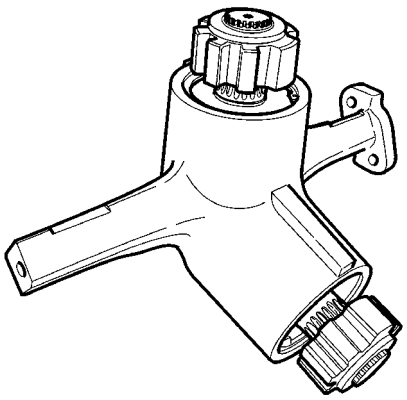
AFX8010

1. To remove the unloading tube gearbox, first remove the unloading tube and the vertical unloading auger, referring to **Unloading auger Vertical auger - Remove (K.72.B.53.50 - F.10.A.10)** and **Unloading tube - Remove (K.72.B.71 - F.10.A.10)**. Remove bolts **(4)** on both sides of the unloading tube elbow.



ZDA3576A 1

2. Remove the unloading tube gearbox.



ZDA3572A 2

https://truckmanualshub.com/

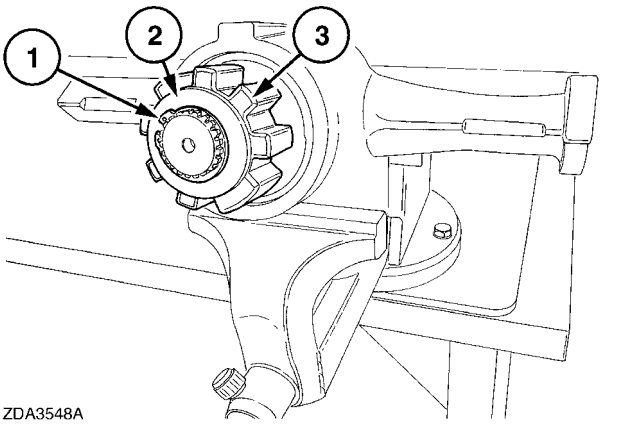
Drive system Unloading tube gearbox - Disassemble (K.72.B.40.46 - F.10.A.25)

AFX8010

During disassembly, keep track of location and number of all shim packs. Use the same shim packs during re-assembly.

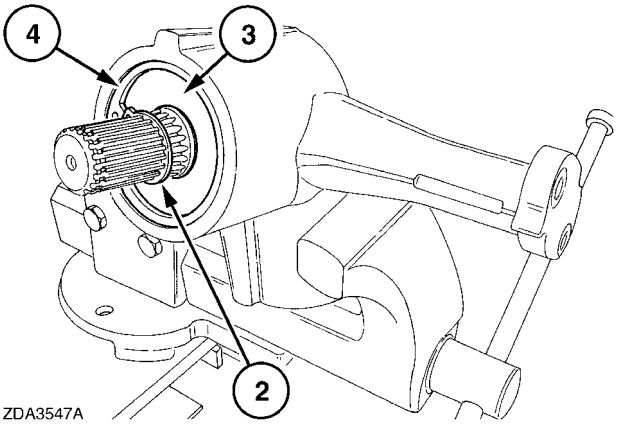
Prior operation: To disassemble the gearbox, first remove the unloading tube drive gearbox, refer to **Drive system Unloading tube gearbox - Remove (K.72.B.40.46 - F.10.A.10)**.

1. Remove retaining ring **(1)**, washer **(2)** and sprocket **(3)**.



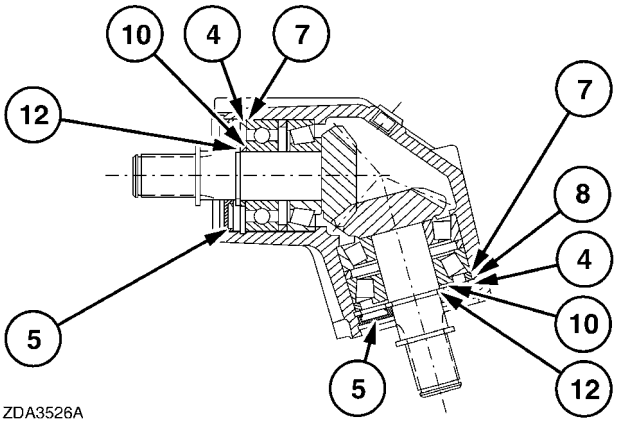
ZDA3548A 1

2. Remove retaining rings **(2)** and **(4)**. Remove washer **(3)**.



ZDA3547A 2

3. Remove oil seal **(5)** using a screwdriver. Oil seal **(5)** will be damaged when it is removed. Remove retaining rings **(12)**, shims **(10)**, retaining rings **(4)**, shims **(7)** and spacer **(8)**.

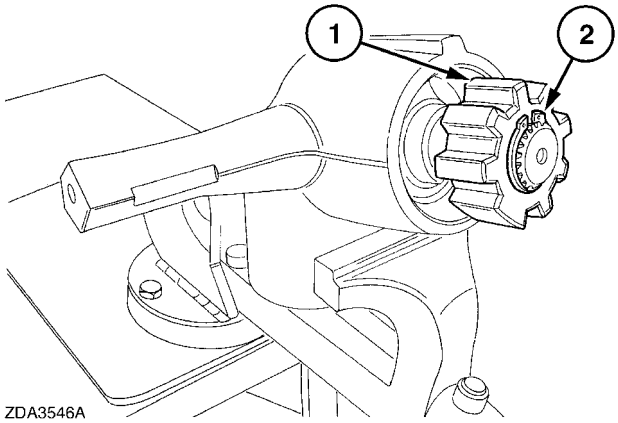


ZDA3526A 3

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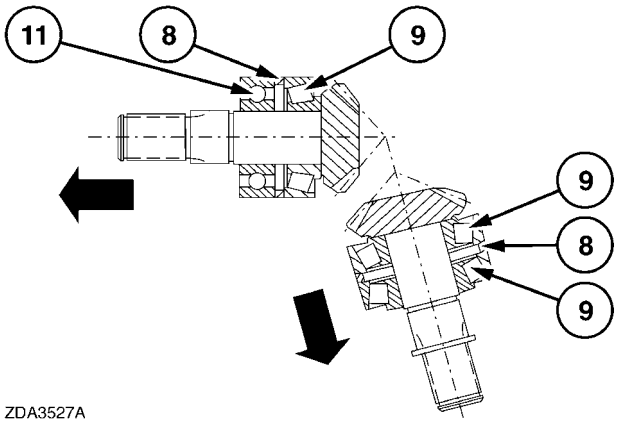
4. To remove the shaft assembly, install sprocket **(1)** with snap ring **(2)** to take the shaft out completely.

IMPORTANT: *The bearing configuration is different on the two shafts. Mark the gearbox housing to indicate which end the shaft with one ball bearing and one tapered roller bearing is installed in.*



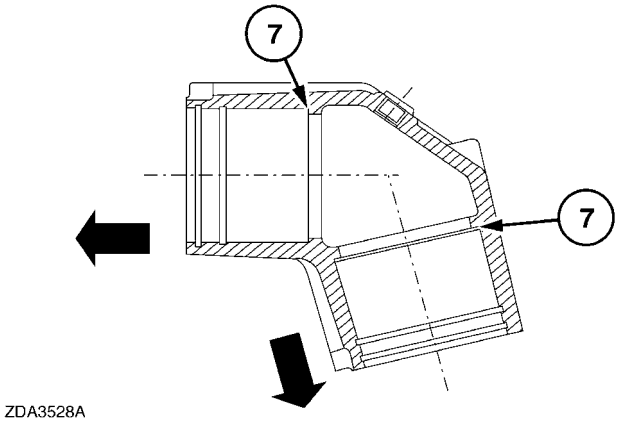
ZDA3546A 4

5. Remove bearing **(11)** using a puller. Remove spacer **(8)** and outer race of bearing **(9)**. Carefully remove the inner race of bearing **(9)** with a puller to avoid damage to the shaft.



ZDA3527A 5

6. Remove shims **(7)** keeping them with the associated shaft.



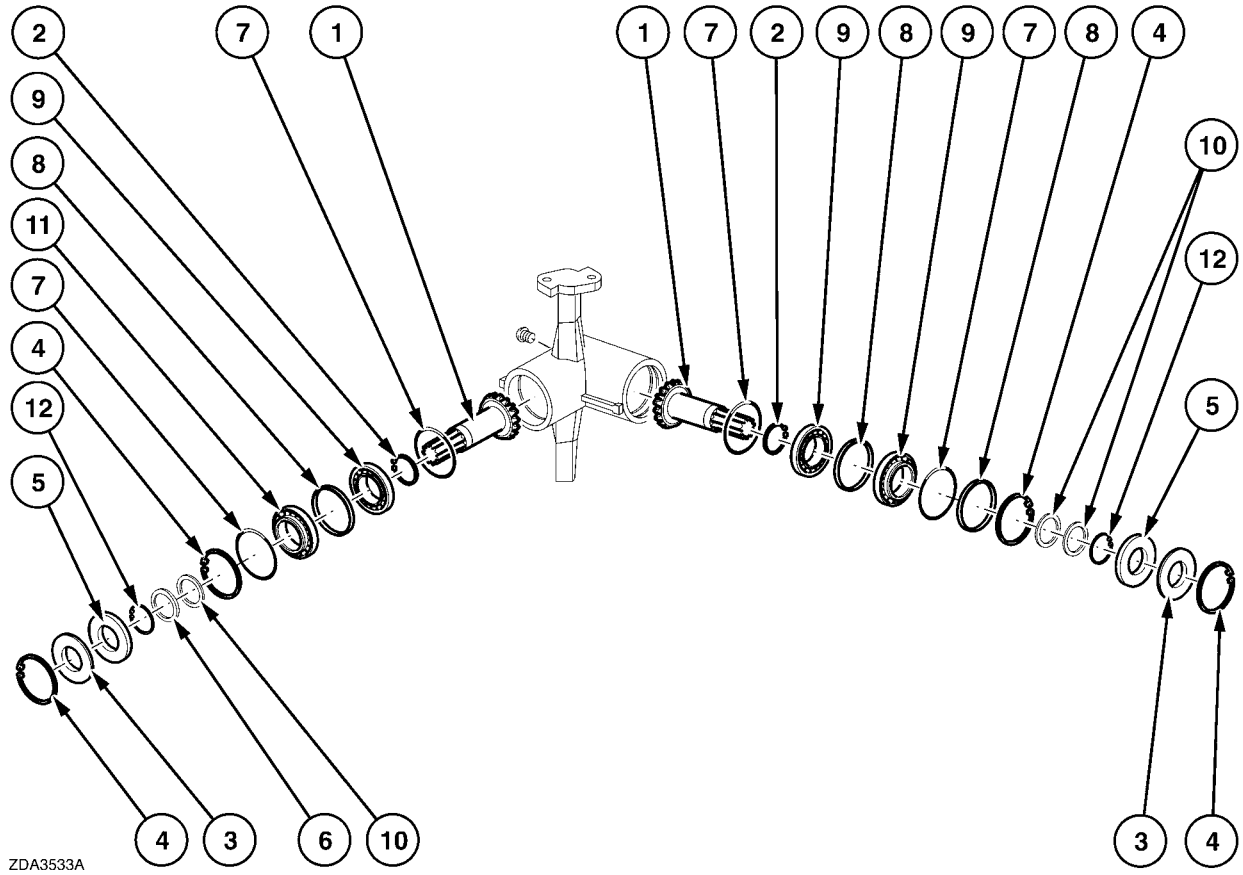
ZDA3528A 6

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Drive system Unloading tube gearbox - Assemble (K.72.B.40.46 - F.10.A.20)

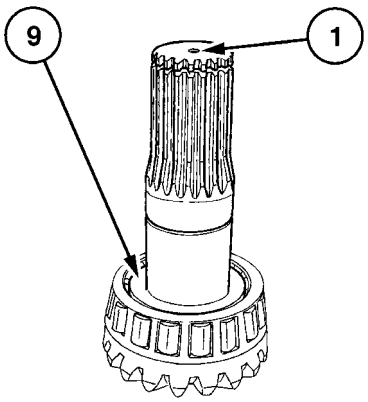
AFX8010



ZDA3533A 1

1. Shaft	5. Oil seal	9. Bearing
2. Retaining Ring	6. Spacer	10. Shim
3. Washer	7. Shim	11. Bearing
4. Retaining Ring	8. Spacer	12. Retaining Ring

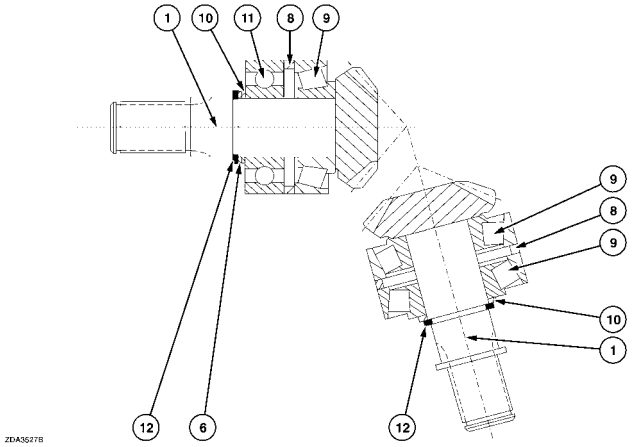
1. To pre-assemble the shafts, proceed as follows: Push inner race **(9)** of the bearing on shaft **(1)** using a piece of tubing.



ZDA3545A 2

https://truckmanualshub.com/

2. Install the bearing outer race **(9)**, spacer **(8)**, bearing **(11)**, shim **(10)**, spacer **(6)**, and retaining ring **(12)** on the input shaft **(1)**. Install the bearing outer race **(9)**, spacer **(8)**, bearing **(9)**, shims **(10)** (always a 2mm plus one variable), and retaining ring **(12)** on the output shaft **(1)**. In order to set the two bearings **(9)**, hit the shafts on both ends, and rotate the bearings two full revolutions to seat the bearing rollers. Check the preload on the bearings with a torque meter. This preload should cause a rolling torque of **0.8 - 1.2 Nm** (**7 - 11 lb in**) on the pair of bearings **(9)**, and a torque of **0.2 - 0.6 Nm** (**2 - 5 lb in**) on bearings **(9)** and **(11)**.
   Adjust shimming **(10)** to keep preload in the ranges given. This shimming consists of a spacer and a shim selected from a shim pack set. The set contains shims of the following thicknesses:
   0.3 mm (0.012 in)
   0.35 mm (0.014 in)
   0.4 mm (0.016 in)
   0.5 mm (0.020 in)
   0.6 mm (0.024 in)
   0.7 mm (0.028 in)
   0.8 mm (0.031 in)
   0.9 mm (0.035 in)
   1 mm (0.039 in)
   1.5 mm (0.059 in)
   2 mm (0.079 in)
   2.5 mm (0.098 in)

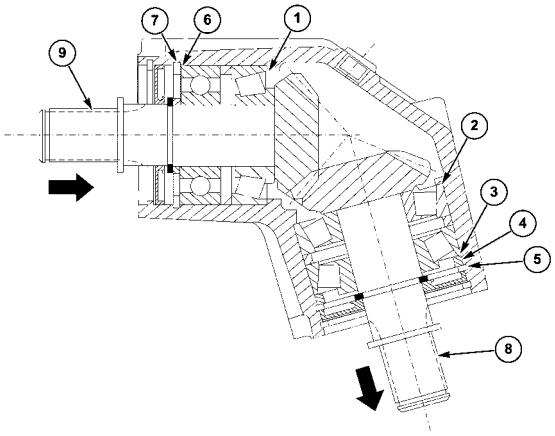


ZDA3527B 3

3. Apply bluing compound to teeth of both gears.

4. To assemble the pre-assembled shafts in the gearbox, proceed as follows: Install the original inner shim packs **(1)** & **(2)** in the housing. Install the pre-assembled shafts completely, by pushing only on the outer races of the bearings. Check if the preload of these shafts is still within the ranges shown.

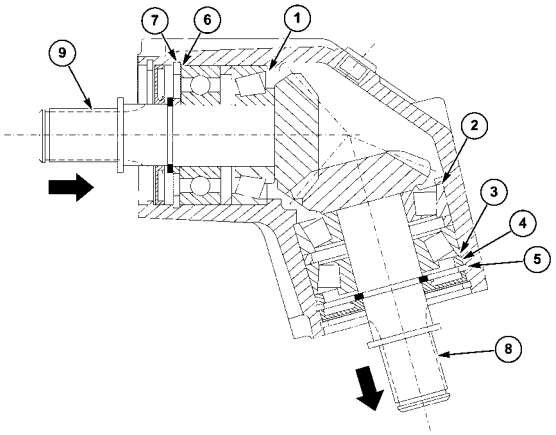
IMPORTANT: *Make sure the shaft with the tapered roller bearing and ball bearing is installed in the correct end of the housing (toward the vertical auger) as previously marked.*



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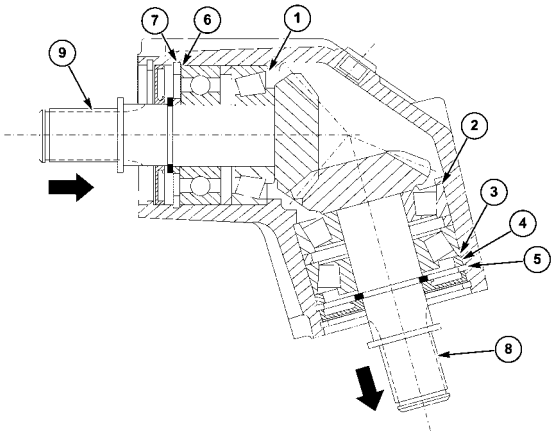
https://truckmanualshub.com/

5. On the output (double tapered roller bearing) shaft **(8)**, install the outer shim pack **(3)**, spacer **(4)**, and retaining ring **(5)**. Add shims at **(3)** as required to ensure there is no clearance (zero end play) between the spacer and retaining ring. On the input (tapered roller and ball bearing) shaft **(9)**, install the outer shim pack **(6)**, and retaining ring **(7)**. Add shims at **(6)** as required to ensure there is no clearance (zero end play) between the shaft assembly and the retaining ring.



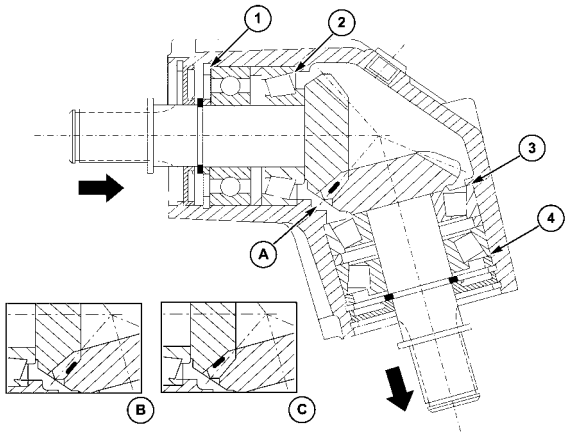
20014631A5 5

6. While holding the output shaft **(8)** to apply a light resistance to it, rotate the input shaft **(9)** clockwise several revolutions, as viewed from the end of the shaft. This will seat the bearing rollers, and will also mark the gear contact pattern in the bluing compound on the gear teeth.
Check the gear backlash. The backlash should be between **0.14 - 0.37 mm** (**0.005 - 0.014 in**). Remove the input shaft **(9)** from the gearbox, and check the gear contact pattern. It should be **40 %** central-toe, as shown in figure **8**.



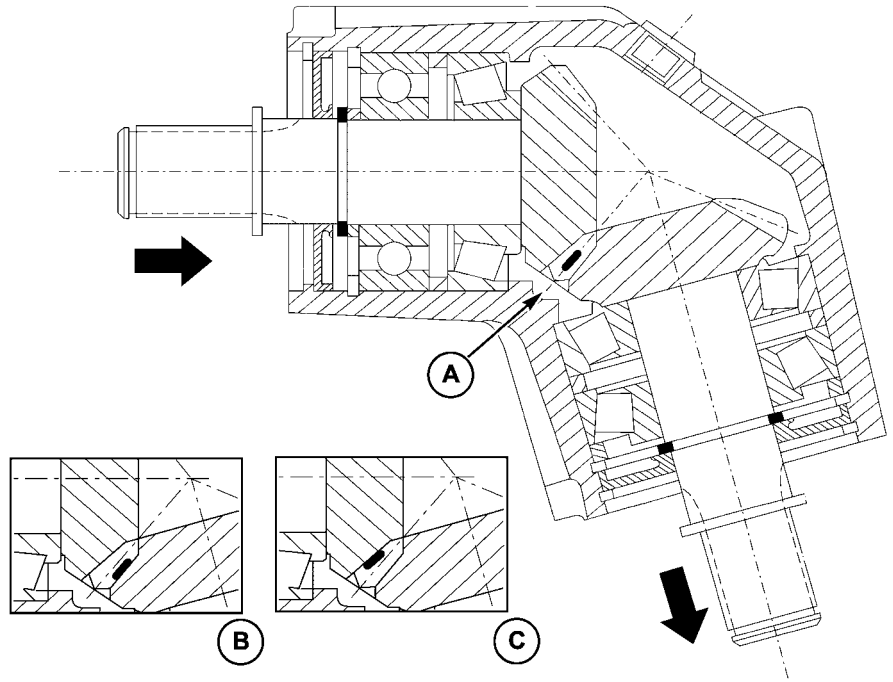
20014631A5 6

7. Backlash Adjustment
The shaft that is moved to adjust the backlash depends on whether the backlash needs to be increased or decreased, and upon the gear tooth contact pattern observed. The contact should be as represented at **(A)**. If contact pattern shows as at **(B)** the input shaft is in too far and the output shaft is out too far. If it is as in **(C)**, the input shaft is out too far and the output shaft is in too far. Refer to the following chart to determine the adjustment required. To adjust backlash, move shims from one end of the appropriate shaft to the other. To move a shaft out of the gearbox, remove shims from **(1)** or **(4)**, and add shims at **(2)** or **(3)**.



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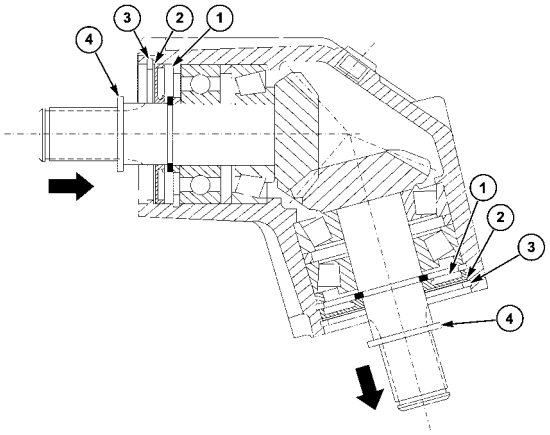
50041761 8

Gear Contact Pattern	Backlash Measured	Adjust:
High on input, low on output	OK	Input out, output in equally
Low on input, high on output	OK	Output out, input in equally
High on input, low on output	Tight; needs to be increased	Input shaft out
High on input, low on output	Loose; needs to be decreased	Input shaft out, output shaft in
Low on input, high on output	Tight; needs to be increased	Output shaft out
Low on input, high on output	Loose; needs to be decreased	Output shaft out, Input shaft in
Correct, 40% central-toe	Tight; needs to be increased	Move both shafts out an equal amount
Correct, 40% central-toe	Loose; needs to be decreased	Move both shafts out an equal amount

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9. Shifting one shaft 0.1mm (0.004in.) will change the backlash between the gears approximately 0.05mm (0.002in.) Shims are available in the following sizes:
0.3mm (0.012in)
0.35mm (0.014in)
0.4mm (0.016in)
0.5mm (0.020in)
1.0mm (0.039in)
2.0mm (0.079in)
After the backlash has been properly adjusted, re-apply bluing compound to the gears, and reinstall them in the gearbox. While holding the output shaft (furthest away from the hole plug) to apply a light load to it, rotate the input shaft (ball bearing visible) clockwise several revolutions, as viewed from the end of the shaft. This will seat the rollers, and also will mark the contact pattern in the bluing compound on the gear teeth. If the gear contact pattern is not correct, both shafts must be moved an equal amount in order to correct the contact pattern, as follows:
If the contact pattern is high on input gear tooth and low on output, move input shaft out and output shaft in. If the contact pattern is low on input gear tooth and high on output, move output shaft out and input shaft in.
Use the same procedure described in Backlash Adjustment to move the shafts in or out. After adjusting the shafts, recheck the backlash to ensure it has not changed. Continue to apply bluing compound to check and adjust gear pattern until it is correct.

10. Fill the area around the bearings with grease **CASE AKCELA PREMIUM GREASE EP-2**, and install the seal **(1)**, seal plate **(2)**, and retaining ring **(3)** on each shaft. Install the retaining rings **(4)** that locate the sprockets.

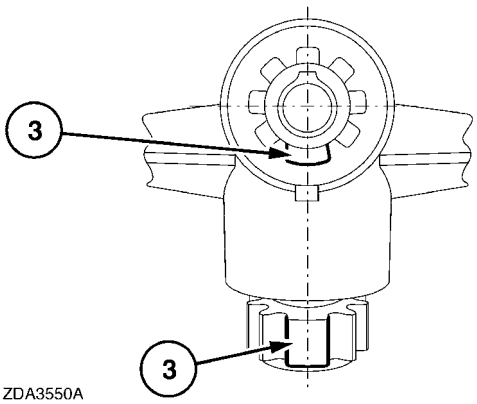


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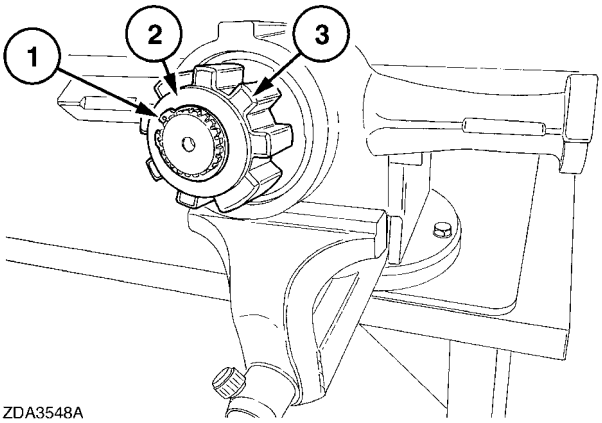
11. Install special sprocket **(3)** on both sides.

IMPORTANT: *Check to ensure the large tooth on the sprockets are aligned with respect to each other.*



ZDA3550A 10

12. Install washer **(2)** and retaining ring **(1)** on both sides. Fill the gearbox with **0.3 L** (**10 oz**) of **CASE AKCELA 135H EP GEAR LUBE SAE 80W-90**.



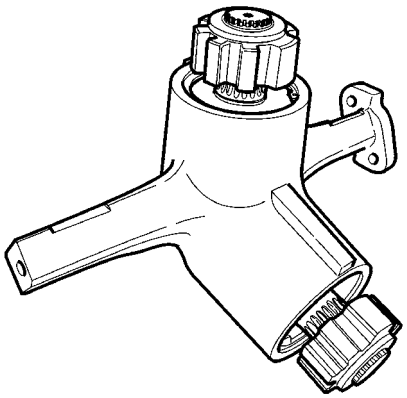
ZDA3548A 11

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Drive system Unloading tube gearbox - Install (K.72.B.40.46 - F.10.A.15)

AFX8010

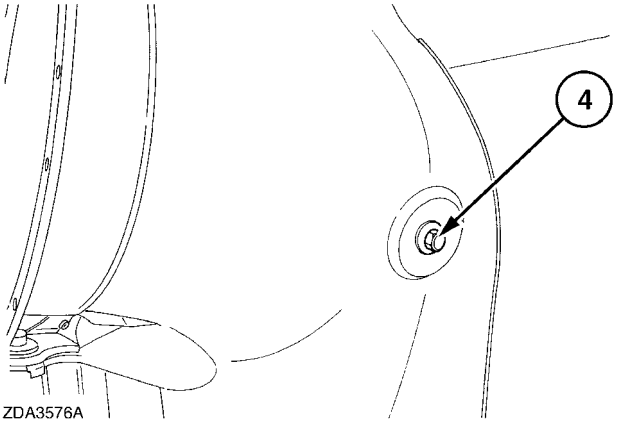
1. To install the gearbox in the unloading tube elbow, position the box, which already has the drive hubs installed on the input and output shafts, in place inside the elbow and determine how many shim washers are necessary between the single-bolt foot of the gearbox and the elbow.



ZDA3572A

ZDA3572A 1

2. Install an M12X30 cap screw **(4)** with conical spring through the elbow and shim washers into the single-bolt foot of the gearbox. Install two M12X30 cap screws with conical springs and oversized flat washers into the other foot. Do not tighten until lined up and engaged with the vertical and unloading tube augers. Install the vertical and unloading tube augers by referring to **Unloading auger Vertical auger - Install (K.72.B.53.50 - F.10.A.15)** and **Unloading tube - Install (K.72.B.71 - F.10.A.15)**.



ZDA3576A

ZDA3576A 2

3. Torque the cap screws **(4)** to **82 - 106 Nm** (**60 - 78 lb ft**).

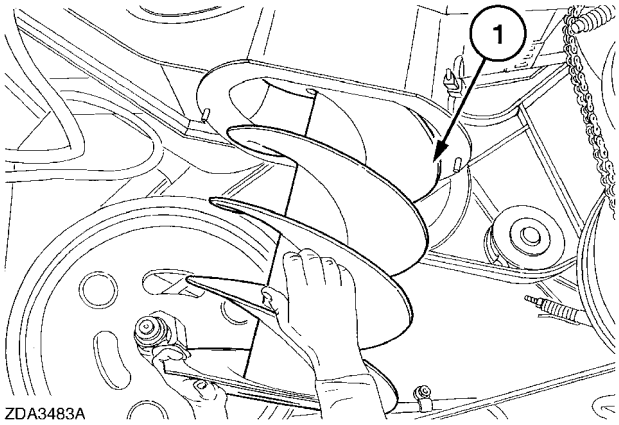
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Unloading auger Vertical auger - Remove (K.72.B.53.50 - F.10.A.10)

AFX8010

1. Remove the unloading drive gearbox, refer to **Drive system Unload gearbox - Remove (K.72.B.40.45 - F.10.A.10)**. Turn out vertical auger **(1)** to remove it.

NOTE: *In some configurations it will be necessary to remove the left traction wheel.*



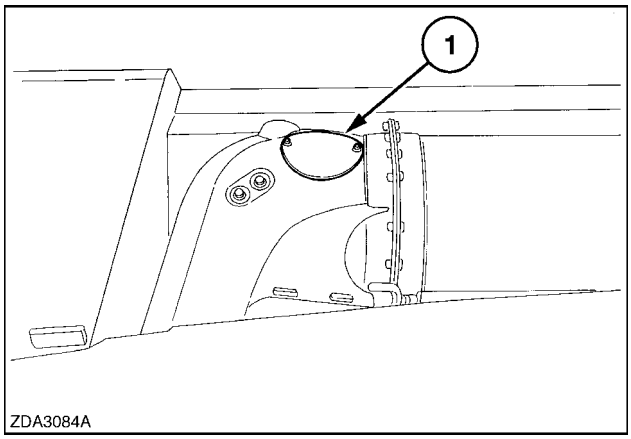
ZDA3483A 1

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Unloading auger Vertical auger - Install (K.72.B.53.50 - F.10.A.15)

AFX8010

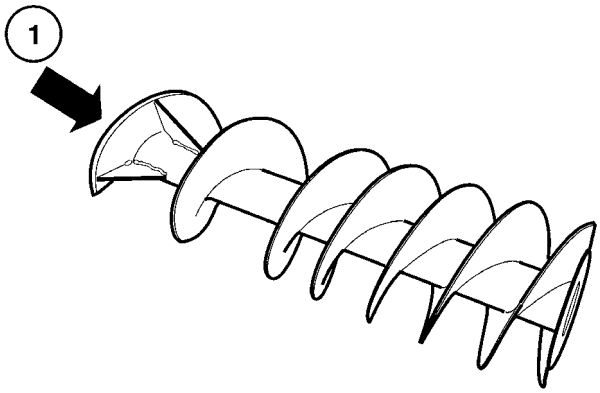
1. Open cover **(1)**.



ZDA3084A 1

2. Insert vertical unloading auger with end at **(1)** upwards into tube. Turn the auger in to bring it completely into proper position. Turn auger so bottom auger edge rests on plate at housing bottom to retain auger in housing.

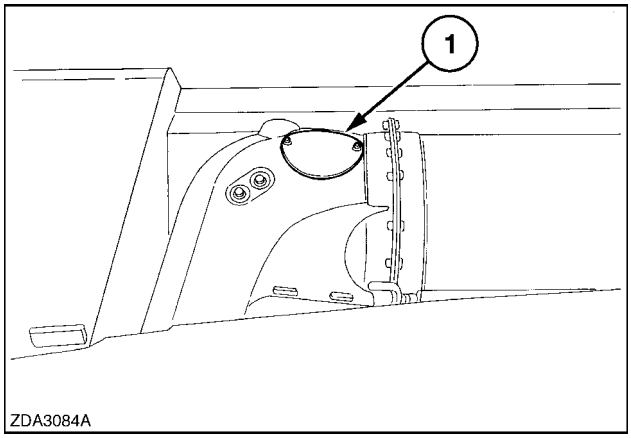
IMPORTANT: *Make sure the auger end fits over the unloading auger gearbox sprocket.*



ZDA3570A 2

3. Install the unloading drive gearbox, refer to **Drive system Unload gearbox - Install (K.72.B.40.45 - F.10.A.15)**. Install the chain drive shield at the same time.

4. Close cover **(1)**. Install the left hand side traction wheel, if removed.



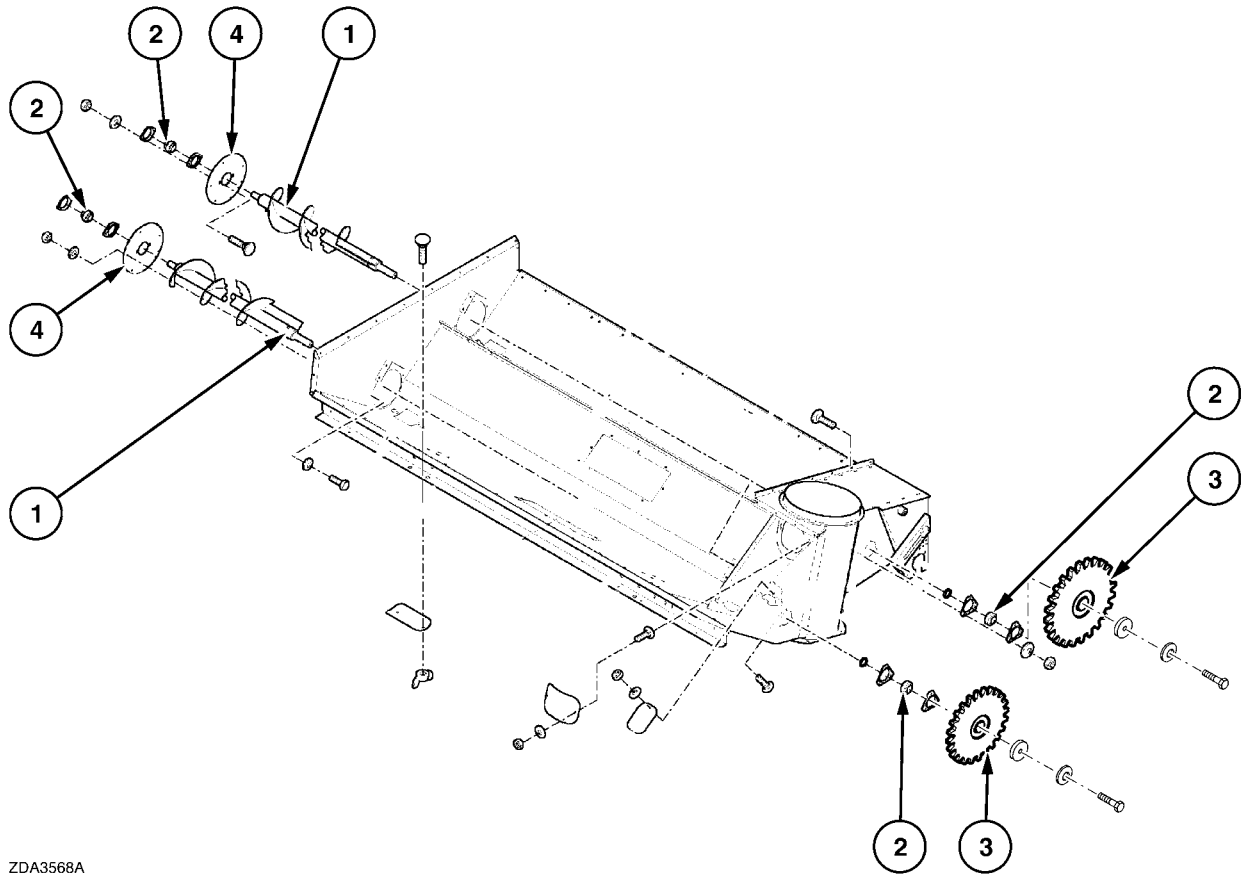
ZDA3084A 3

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Unloading auger Cross auger - Remove (K.72.B.53.52 - F.10.A.10)

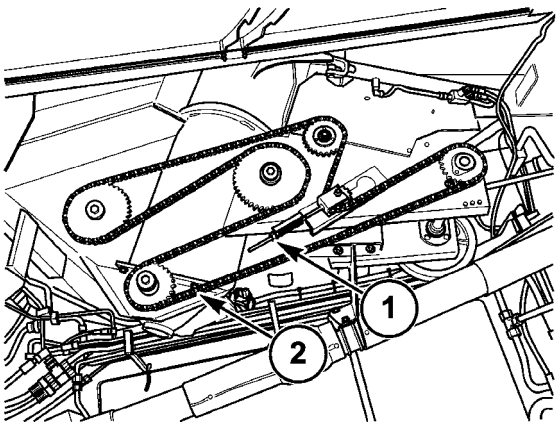
AFX8010



ZDA3568A 1

1. Grain tank bottom auger	3. Sprocket
2. Bearing	4. Bearing plate

1. To remove one or both of the grain tank bottom augers, first loosen nut **(1)** to remove unloading drive chain **(2)**.

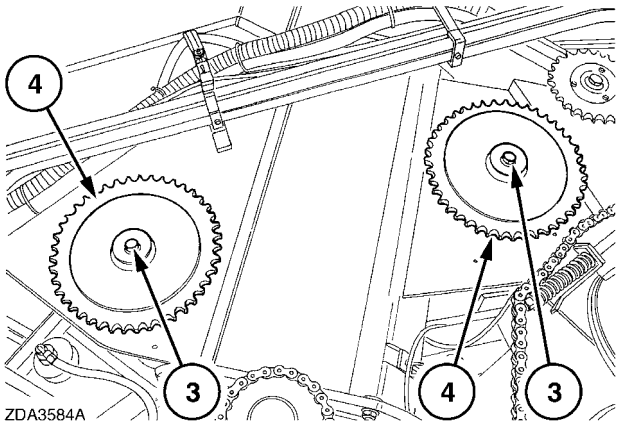


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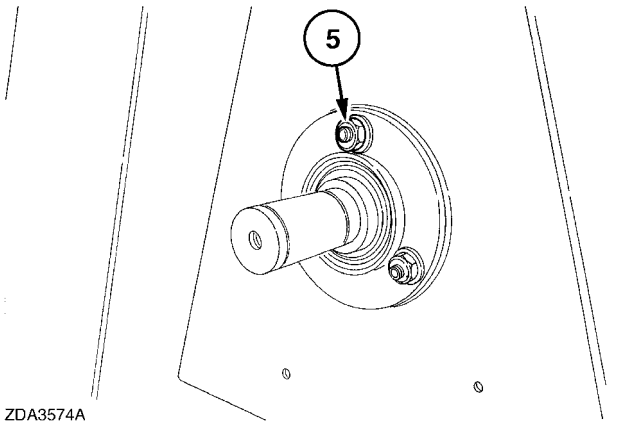
2. Remove bolts **(3)** and washers. Remove sprocket **(4)** using a puller.

NOTE: *Both augers are assembled the same way. Follow instructions given for either or both.*



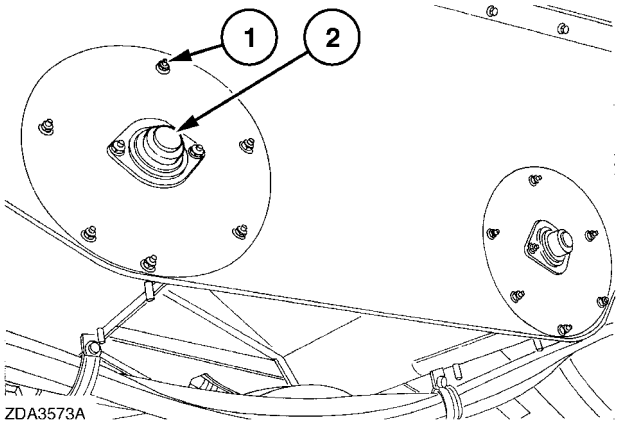
ZDA3584A 3

3. Remove the key and loosen three bolts **(5)**. Remove outer flange.



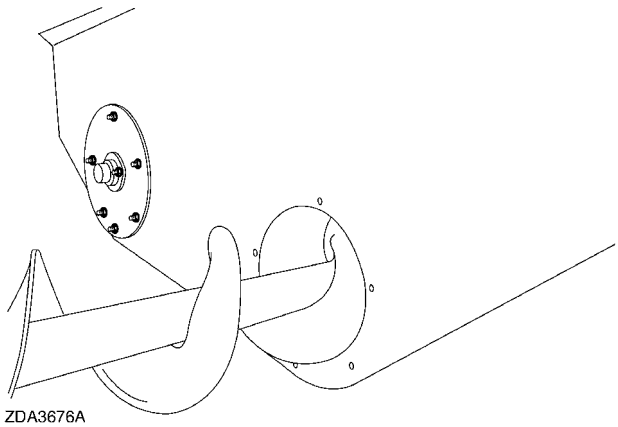
ZDA3574A 4

4. Loosen the Allen set screw to remove lock collar **(2)** at the right hand side. Remove six bolts **(1)** of the bearing plate.



ZDA3573A 5

5. Remove the bearing plate from the auger shaft and slide out the auger to the right hand side.

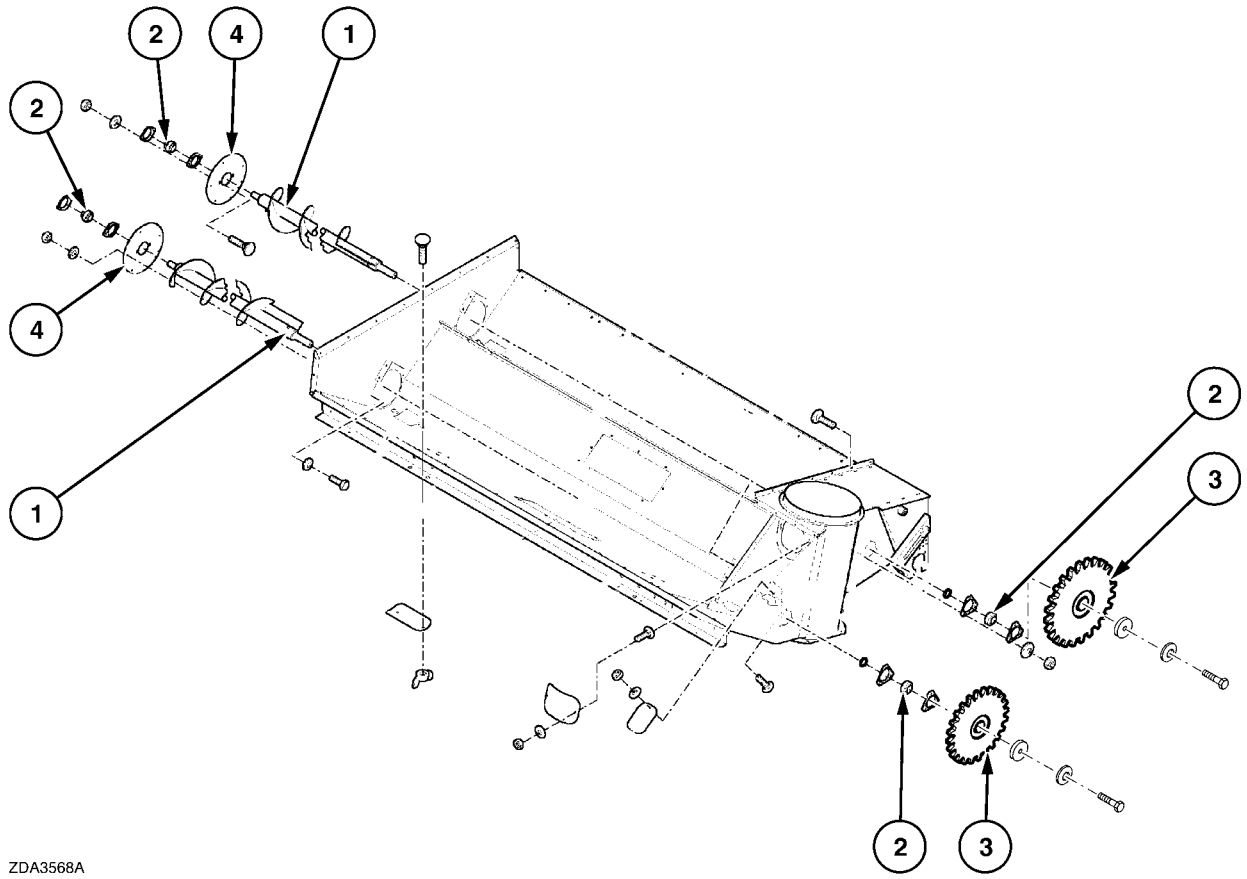


ZDA3676A 6

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Unloading auger Cross auger - Install (K.72.B.53.52 - F.10.A.15)

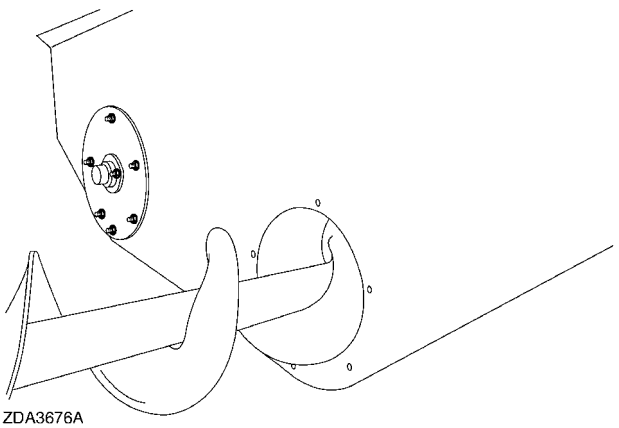
AFX8010



ZDA3568A 1

1. Grain tank bottom auger	3. Sprocket
2. Bearing	4. Bearing plate

1. Install the auger in the grain tank from the right hand side.



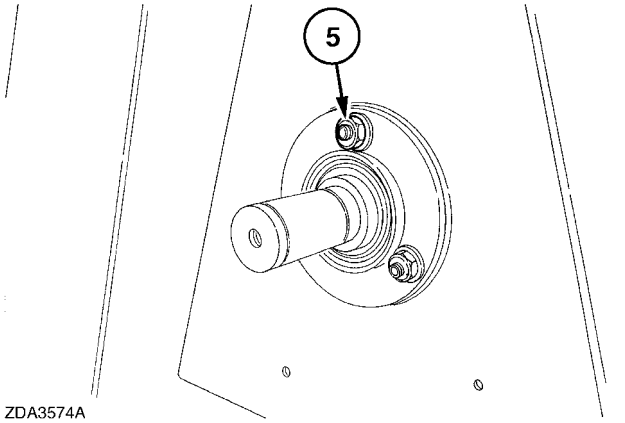
ZDA3676A 2

https://truckmanualshub.com/

2. Install the washer, the inner flange, the bearing, the outer flange with three bolts, lock washers and nuts **(5)** at the left-hand side. Install the **50 mm** (**1.97 in**) long key.

NOTE: *Do not install locking collar.*

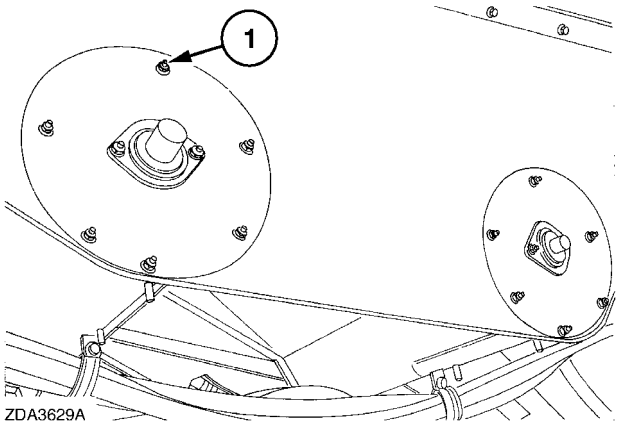
NOTE: *Lubricate the spherical outer race and bore of the inner race of the bearing with* ***CASE AKCELA 251H EP MULTI-PURPOSE GREASE****.*



ZDA3574A 3

3. Install the bearing plate with the bearing at the right-hand side and tighten nuts **(1)**.

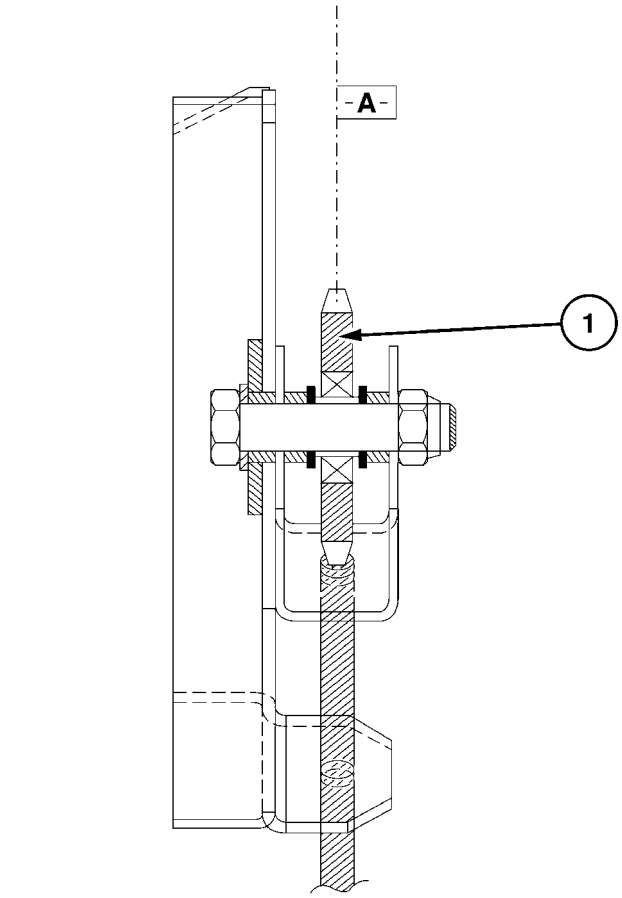
NOTE: *Lubricate the spherical outer race with* ***CASE AKCELA PREMIUM GREASE EP-2*** *and lubricate the locking collar track of the inner bearing race and the lock collar with Loctite product 767 antiseize grease to ease future disassembly.*



ZDA3629A 4

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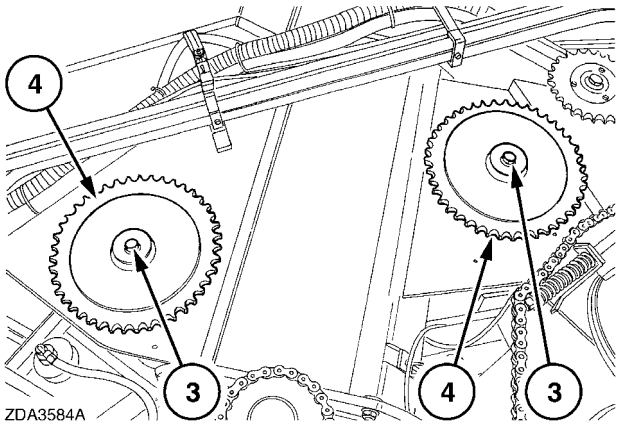
4. Install the sprockets on the left-hand side of the tank. The 38 tooth sprocket drives the front auger and the 43 tooth sprocket drives the rear. Align the sprockets using shim washers behind them within **1.5 mm** (**0.06 in**) of the sliding tensioning idler sprocket **(1)**.



ZDA3696A

ZDA3696A 5

5. Install the flat washer and lock washer on the M12X30 cap screws **(3)** and tighten to **82 - 106 Nm** (**60 - 80 lb ft**) to retain the sprockets **(4)**.

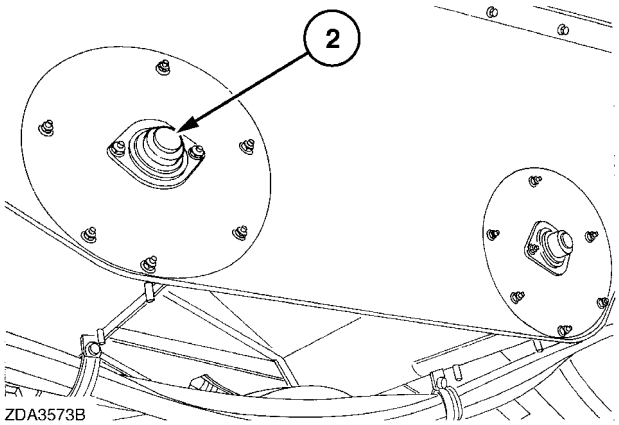


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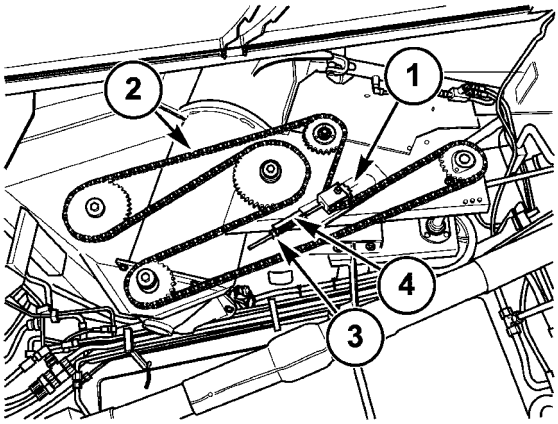
6. Making sure the sprocket on the auger shaft is tight against the sprocket shimming washers on the left hand side, install lock collar **(2)** on the right-hand side and tighten the Allen set screw.



ZDA3573B 7

7. Apply **CASE AKCELA 251H EP MULTI-PURPOSE GREASE** to face of tensioner bracket **(1)**. Install unloading drive chain **(2)** and adjust with nut **(3)** so that spring is compressed to **110 mm** (**4.33 in**) as indicated by length of indicator **(4)**.

NOTE: *After adjusting, the tensioner must be able to slide freely.*



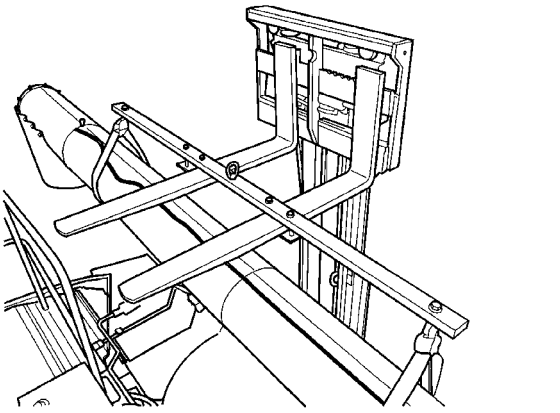
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Unloading tube - Remove (K.72.B.71 - F.10.A.10)

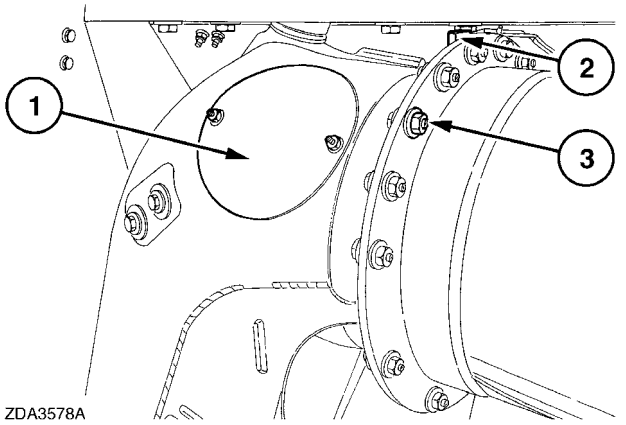
AFX8010

1. The unloading tube is heavy and appropriate lifting equipment is required. Use a minimum of two slings, separated with a minimum **2.4 m** (**8 ft**) wide spreader bar to keep the slings in position. Failure to do so may result in the auger becoming unbalanced and dropping suddenly.



50041762 1

2. To remove the unloading tube, first support the unloading tube with adequate lifting tools. Open cover **(1)**. Disconnect electric wire **(2)** of the unloading tube light. Remove fifteen bolts **(3)** to disconnect the unloading tube from the elbow. Pull the unloading tube backwards until the unloading auger is disconnected from the gearbox sprocket. Then move the auger and tube away from the combine as needed.



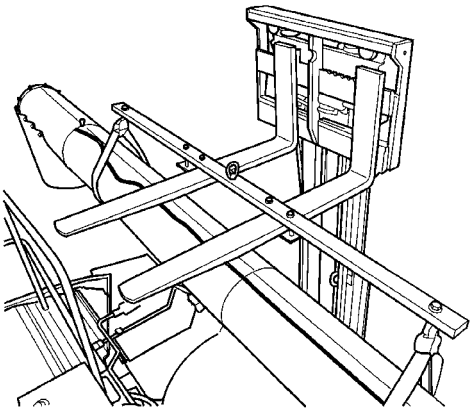
ZDA3578A 2

https://truckmanualshub.com/

Unloading tube - Install (K.72.B.71 - F.10.A.15)

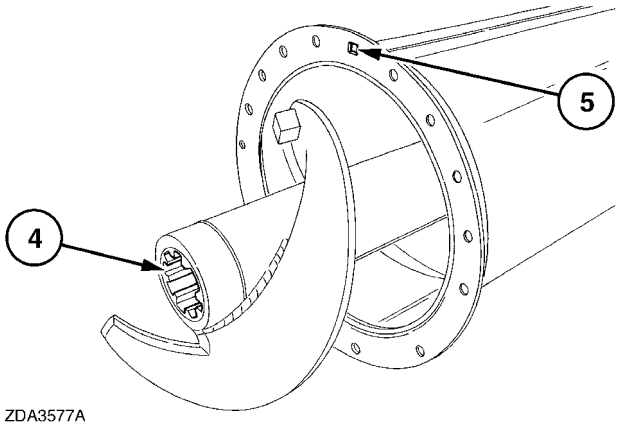
AFX8010

1. The unloading tube is heavy and appropriate lifting equipment is required. Use a minimum of two slings, separated with a minimum **2.4 m** (**8 ft**) wide spreader bar to keep the slings in position. Failure to do so may result in the auger becoming unbalanced and dropping suddenly.



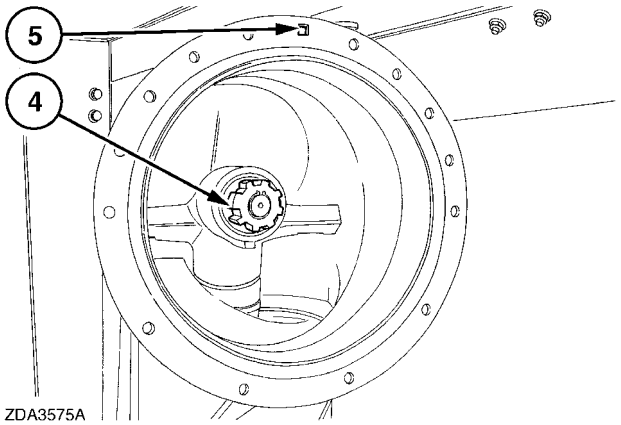
50041762 1

2. To install the unloading tube, first hoist the unload tube with auger in place on to the left side of the combine and guide the auger into the unload elbow tube and make sure auger spline **(4)** fits over gearbox sprocket **(4)** of figure **3**. Align square hole **(5)** with square hole **(5)** of the elbow, in figure **3**.



ZDA3577A 2

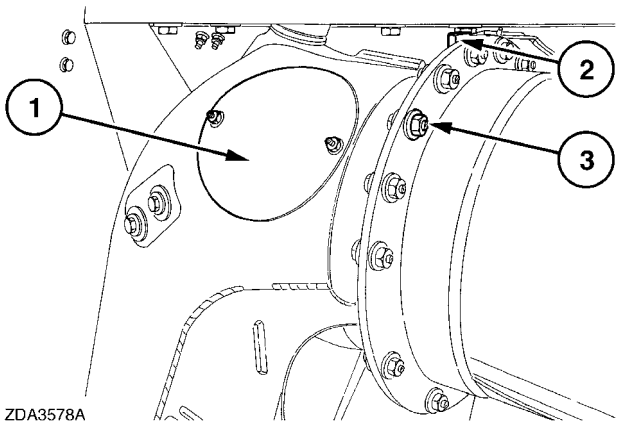
3. View of unloading tube gearbox and drive sprocket in unload tube elbow.



ZDA3575A 3

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4. Install and tighten fifteen bolts **(3)**. Connect electric wire **(2)** of the unloading light. Fasten cover **(1)** in place.



ZDA3578A 4

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Command valve Unload engage - Short circuit to B+ (K.72.B.12.21 - G.30.B.54)

AFX8010

E0177-03 - Unloader Current Sense

Context:
The Unloader Current Sense circuit is the ground path for the unload tube clutch PWM solenoid. By monitoring current flow on the return path of the unload tube clutch solenoid, the module can provide precise control of the solenoid engagement. When this error message is reported, this is an indication of excessive current draw on the circuit, or a result of a high voltage short on the return line.

Cause:
The Unload tube clutch (L-08) circuit has excessive current draw, or is shorted to a high voltage source.

Possible failure modes:

1. Bad solenoid.
2. Return side wiring shorted to **12 volts**.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "UNLOADER ISENSE" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper unload tube clutch solenoid current should be approximately **1.0 - 1.5 amps**. The fault code is triggered by current flow greater than **3.3 amps**.

   A. If the reading is greater than **3.3 amps**, continue with Step **3**.

   B. If the reading is normal (**1.0 - 1.5 amps**), continue the troubleshooting at Step **8**.

   C. If there is no current reading, the module may have failed as a result of a 12V short on the Isense circuit. Continue with Step **6**.

   NOTE: *If the current reading is high, immediately shut off the circuit by pressing the "Enter" key after verifying the reading to prevent module damage.*

2. Turn the key switch to the OFF position and disconnect the unload tube clutch solenoid connector **X449**. Use a multimeter to check the resistance of the unload cross auger solenoid L08 between connector **X449** pins A & B. The proper resistance range for the unload tube clutch solenoid is **7.2 - 11.2 ohms**.

   A. If out of specification, replace the solenoid. Continue with Step **8**.

   B. If the coil is within specification, continue with Step **4**.

3. Disconnect connector **X011**. Use a multimeter to check the resistance of the unload tube clutch solenoid circuit between connector **X011** pins 18 & 19. The resistance should be the same as, or slightly higher than the resistance of the solenoid as measured in Step 3.

   A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X449** and connector **X011** wires 568 white and 601 blue. Locate the short and repair. Continue with Step **8**.

   B. If the resistance is the same as previously measured, continue with Step **5**.

4. Carefully disconnect connector **X016** on the bottom of CCM2 module. Use a multimeter to check the resistance of the unload tube clutch solenoid circuit between connector **X016** pins J2-4 & J2-20.

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A. If the resistance is lower than the previously measured resistance, there is a short in the harness between connector **X011** and connector **X016** wires 568 white and 601 blue. Locate the short and repair. Continue with Step **8**.

B. If the resistance is the same as previously measured, continue with Step **6**.

5. Key on. Disconnect connector **X449**. Use a multimeter to check for voltage at connector **X449** pin B (harness end). There should be no voltage on this wire.

   A. If there is no voltage present on the wire, continue with Step **8**.

   B. If there is voltage present on the wire,. continue with Step **7**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

6. Key on. Disconnect connector **X011**. Use a multimeter to check for voltage at connector **X011** pin 19 (module side of connector). There should be no voltage on this wire.

   A. If there is no voltage on the wire, the short to voltage is in the gearbox (GB) harness between connector **X449** and connector **X011** wire 601 blue. Locate the short and repair. Continue with Step **8**.

   B. If there is voltage on the wire, the short to voltage is in the main frame (MF) harness between connector **X011** and connector **X016** pin J2-20 wire 601 blue. Locate the short and repair. Continue with Step **8**.

   NOTE: *The high voltage source may not be present as it may not be currently powered up. If the fault code typically appears when operating another circuit, activate that circuit while performing this check.*

7. The sense resistor in the module for the Unloader Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage. After locating the source of the problem and correcting, the module must be checked for damage.

   Disconnect connector **X011**. Use a multimeter to check resistance between connector **X011** pin 19 and chassis ground. There should be less than **1 ohms** resistance.

   A. If there is infinite resistance, the sense resistor in the CCM2 module has failed. Replace the module.

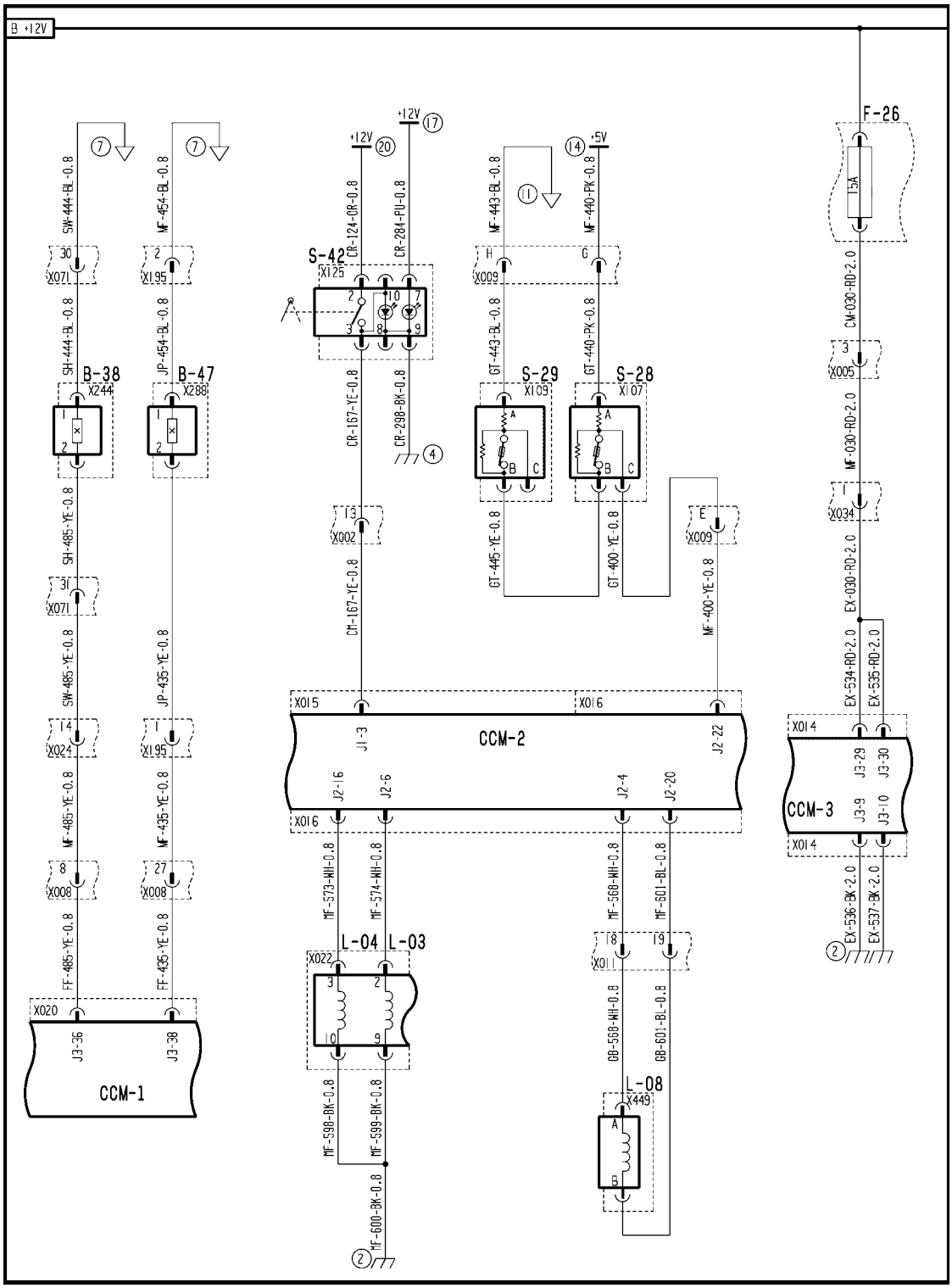
   B. If the resistance is correct, the sense resistor in the CCM2 module is okay, and the circuit should function correctly. Continue with Step **9**.

8. Operate the combine while monitoring the Unloader Current Sense circuit current on the Universal Display Plus "DIAG" screen.

   A. If no high out of range current readings are seen, erase the error code and continue operation.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



AFXSCHEM22-04 1

FRAME 22 - UNLOAD

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B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

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Command valve Unload engage - Unidentified failure (K.72.B.12.21 - G.30.B.46)

AFX8010

E0184-11 - Unloader Valve

Cause:
The unload tube clutch solenoid (L-08) circuit open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "UNLOADER VLV" to monitor the current flow. Use the "COMMAND" and "ENGAGE" functions to power the circuit at 100% output.

   The proper current is approximately **1.0 - 1.5 amps**.

   A. If the current reading goes to maximum, and then back to zero, the circuit is shorted to ground and the software has shut off the output to protect the module and wiring. Continue with Step **2**.

   B. If the reading is **0 amps**, the circuit is open. Continue with Step **5**.

   C. If the reading is within the proper range, the circuit is working properly. Continue with Step **11**.
2. Disconnect connector **X035**. Use a multimeter to check between connector **X035** pin 5 (valve side) and chassis ground.

   A. If there is continuity, the Unload cross auger valve solenoid is shorted to ground. Replace the solenoid.

   B. If there is no continuity, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X449** pin A (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

   A. If there is continuity to ground, continue with Step **4**.

   B. If there is no continuity to ground, erase the fault code and continue operation.
4. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 18 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X016** while making this check.

   A. If there is no continuity to ground, the short to ground is in the gearbox (GB) harness between connector **X011** and connector **X449** wire 568 white. Locate the short and repair.

   B. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X011** and connector **X016** wire 568 white. Locate the short and repair.
5. Disconnect connector **X449**. Use a multimeter to check the resistance of the unload tube clutch solenoid coil between connector **X449** pins A & B. The proper resistance range is **7.2 - 11.2 ohms**.

   A. If there is no continuity, replace solenoid.

   B. If the coil is within specification, continue with Step **6**.
6. Use a multimeter to check for continuity between connector **X449** pin B (harness side) and chassis ground. Flex the gearbox (GB) harness between the clutch valve and connector **X011** while making this check.

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A. If there is no continuity to ground, continue with Step **7**.

B. If there is continuity to ground, continue with Step **9**.

7. Disconnect connector **X011**. Use a multimeter to check for continuity between connector **X011** pin 19 and chassis ground. Flex the main frame (MF) harness between the connector **X011** and connector **X016** while making this check.

   A. If there is continuity to ground, the open circuit is in the gearbox (GB) harness between connector **X011** and connector **X449** wire 601 blue. Locate the open and repair.

   B. If there is no continuity to ground, continue with Step **8**.

8. Carefully disconnect connector **X016** on the bottom of CCM2 module. Use a multimeter to check for continuity between connector **X016** pin J2-20 on the module and chassis ground.

   A. There is infinite resistance. The sense resistor in the CCM2 module has failed. Replace the module.

   B. There is less than **1 ohms** resistance, indicating the sense resistor in the CCM2 module is okay. The open circuit is in the main frame (MF) harness between connector **X011** and connector **X016** wire 601 blue. Locate the open and repair.

   NOTE: *The sense resistor in the module for the Unloader Current Sense circuit is easily damaged as a result of excessive current draw or a short to high voltage.*

9. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the unload tube clutch. Use a multimeter to check for **12 volts** between connector **X449** pin A and chassis ground.

   A. If **12 volts** is not present, continue with Step **10**.

   B. If **12 volts** is found, continue with Step **11**.

10. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the unload tube clutch. Use a multimeter to check for **12 volts** between connector **X011** pin 18 and chassis ground.

    A. If **12 volts** is present, the open circuit is in the gearbox (GB) harness between connector **X449** pin A and connector **X011** pin 18 wire 568 white. Locate the open circuit and repair.

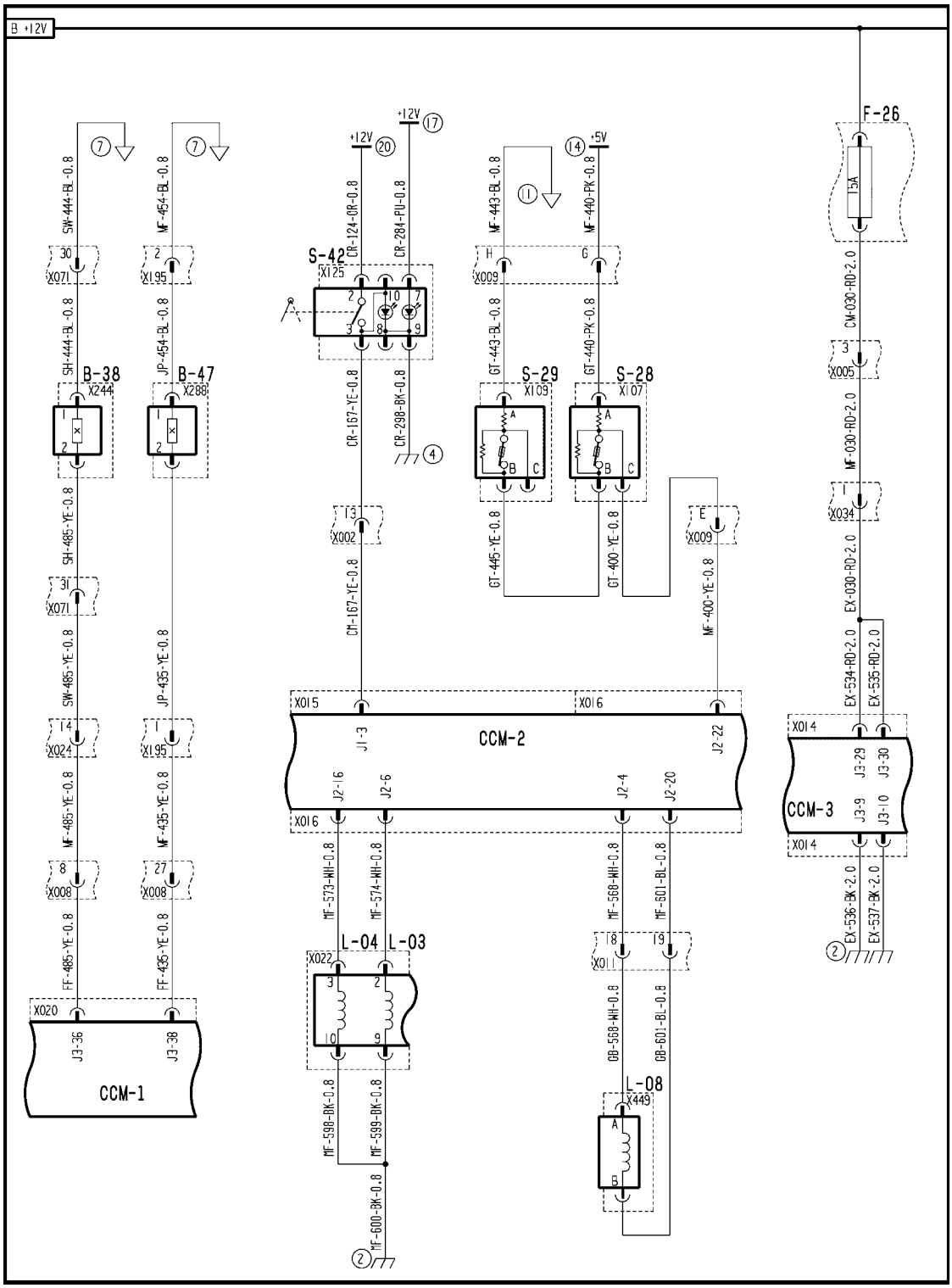
    B. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X011** pin 18 and connector **X016** pin J2-4 wire 568 white. Locate the open and repair.

11. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

    A. If no damage is found, erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

https://truckmanualshub.com/

Command valve Unload swing - Unidentified failure (K.72.B.12.20 - G.30.B.46)

AFX8010

E0193-11 - Unload Tube In Valve

Cause:
The unload tube in valve (L-03) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "TUBE IN VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X022**. Use a multimeter to check the resistance of the unload tube in valve coil (L03) between connector **X022** pins 2 & 9. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the unload tube in solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the unload tube in solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X022** pin 2 (MF harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X022** and connector **X016** pin J2-6 wire 574 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Use a multimeter to check for continuity between connector **X022** pin 9 (harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X022** pin 9 and the front frame ground #2 wire 599 black or 600 black. Locate the open and repair.

   B. If there is continuity to ground, continue with Step **7**.
5. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the unload tube in valve. Use a multimeter to check for **12 volts** between connector **X022** pin 2 and chassis ground.

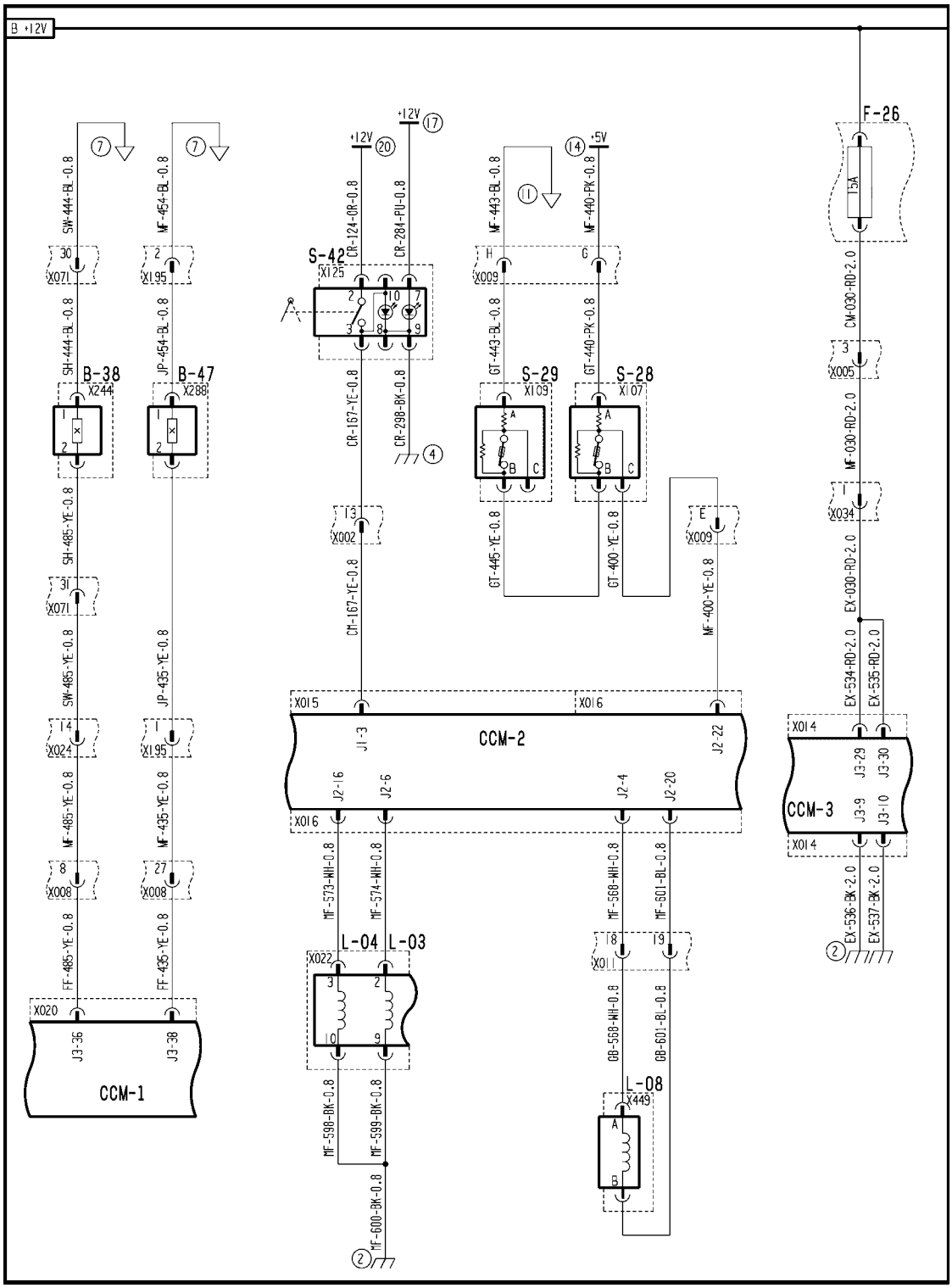
   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X022** pin 2 and connector **X016** pin J2-6 wire 574 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **9**.
6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

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A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

https://truckmanualshub.com/

Command valve Unload swing - Unidentified failure (K.72.B.12.20 - G.30.B.46)

AFX8010

E0194-11 - Unload Tube Out Valve

Cause:
The unload tube out valve (L-04) circuit is open, or shorted to ground.

Possible failure modes:

1. Supply wiring damaged.
2. Bad solenoid.
3. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "TUBE OUT VLV". Change the drop-down list to "STATUS", and press the "OFF" button to change the circuit output to "ON".

   The "STATUS" screen should indicate "OK" if the circuit is working properly.

   A. If the status screen indicates "ERROR", the circuit is open or shorted to ground. Continue with Step **2**.

   B. If the status screen indicates "OK", the circuit is working properly. Continue with Step **9**.
2. Disconnect connector **X022**. Use a multimeter to check the resistance of the unload tube out valve coil (L04) between connector **X022** pins 3 & 10. The proper resistance range is **3 - 5 ohms**.

   A. If there is zero resistance, the unload tube out solenoid is shorted internally. Replace the solenoid.

   B. If there is infinite resistance, the unload tube out solenoid is open. Replace the solenoid.

   C. If the resistance is correct, continue with Step **3**.
3. Use a multimeter to check for continuity between connector **X022** pin 3 (MF harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is continuity to ground, the short to ground is in the main frame (MF) harness between connector **X022** and connector **X016** pin J2-16 wire 573 white. Locate the short and repair.

   B. If there is no continuity to ground, continue with Step **5**.
4. Use a multimeter to check for continuity between connector **X022** pin 10 (harness side) and chassis ground. Flex the main frame (MF) harness while making this check.

   A. If there is no continuity to ground, there is an open circuit in the main frame (MF) harness between connector **X022** pin 10 and the front frame ground #2 wire 598 black or 600 black. Locate the open and repair.

   B. If there is continuity to ground, continue with Step **7**.
5. Turn the key switch to the ON position. Use the Universal Display Plus "DIAG" screen controls to manually power the unload tube out valve. Use a multimeter to check for **12 volts** between connector **X022** pin 3 and chassis ground.

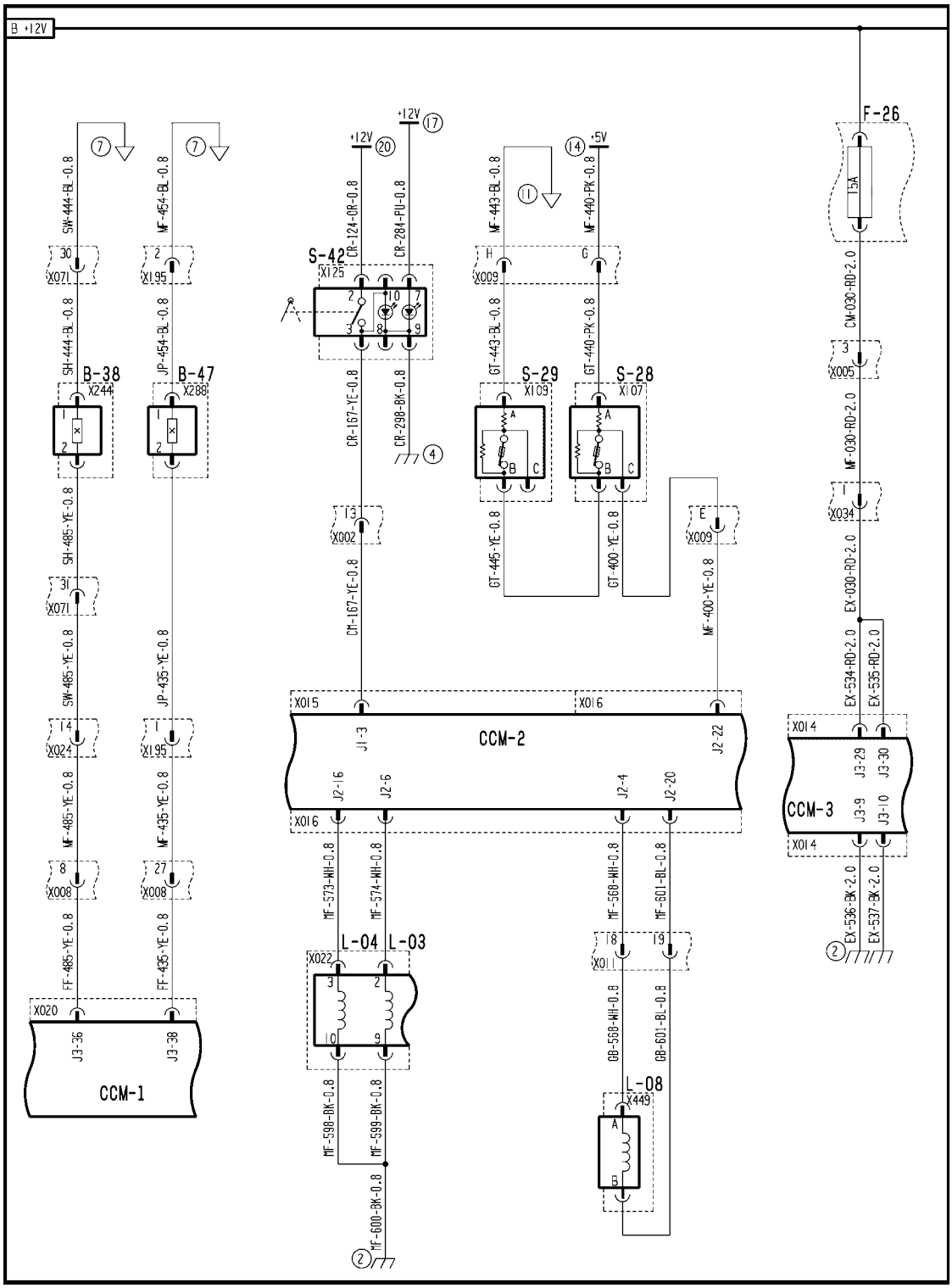
   A. If **12 volts** is not present, there is an open circuit in the main frame (MF) harness between connector **X022** pin 3 and connector **X016** pin J2-16 wire 573 white. Locate the open and repair.

   B. If **12 volts** is found, continue with Step **9**.
6. Visually inspect the harness and connectors for damage, bent or dislocated pins, corroded terminals or broken wires.

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A. If no damage is found, erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

https://truckmanualshub.com/

Sensing system Unload cradle sensor - Short circuit to B+ (K.72.B.95.80 - G.30.B.54)

AFX8010

E0003-03 - Unloader Cradled Sensor

Cause:
The unload tube cradled sensor (B38) circuit is shorted to a higher than normal voltage source.

Possible failure modes:

1. Sensor supply wiring shorted to **12 volts**.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "TUBE CRADLED SEN" to check the voltage range.

   The proper voltage for sensor when blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage for sensor when not blocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high out of range **9.0 - 10.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, the shorted wire may not be powered up at this time. Continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the unload tube cradled sensor connector **X244**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains high, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness and straw hood front (SW) harness at connector **X071**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the straw hood (SH) harness between connector **X071** and connector **X244** wire 485 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness and main frame (MF) harness at connector **X024**.

   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the straw hood front (SW) harness between connector **X071** and connector **X024** wire 485 yellow. Locate the short and repair.

   B. If the voltage remains high, continue with Step **5**.
5. Disconnect the main frame (MF) harness and front frame (FF) harness at connector **X008**.

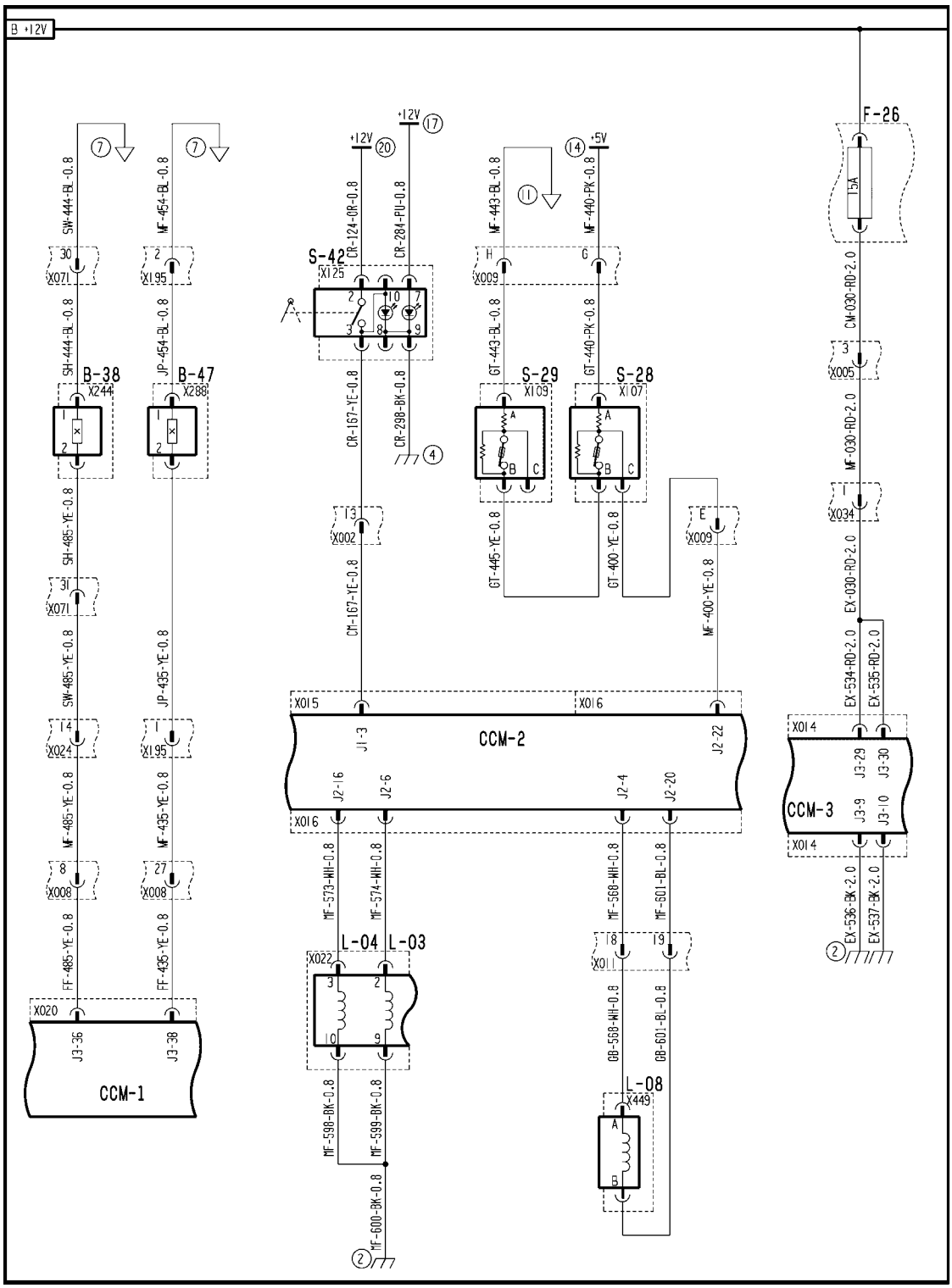
   A. If the voltage drops to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X008** and connector **X024** wire 485 yellow. Locate the short and repair.

   B. If the voltage remains high, the short circuit is in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-36 wire 485 yellow. Locate the short and repair.
6. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

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A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



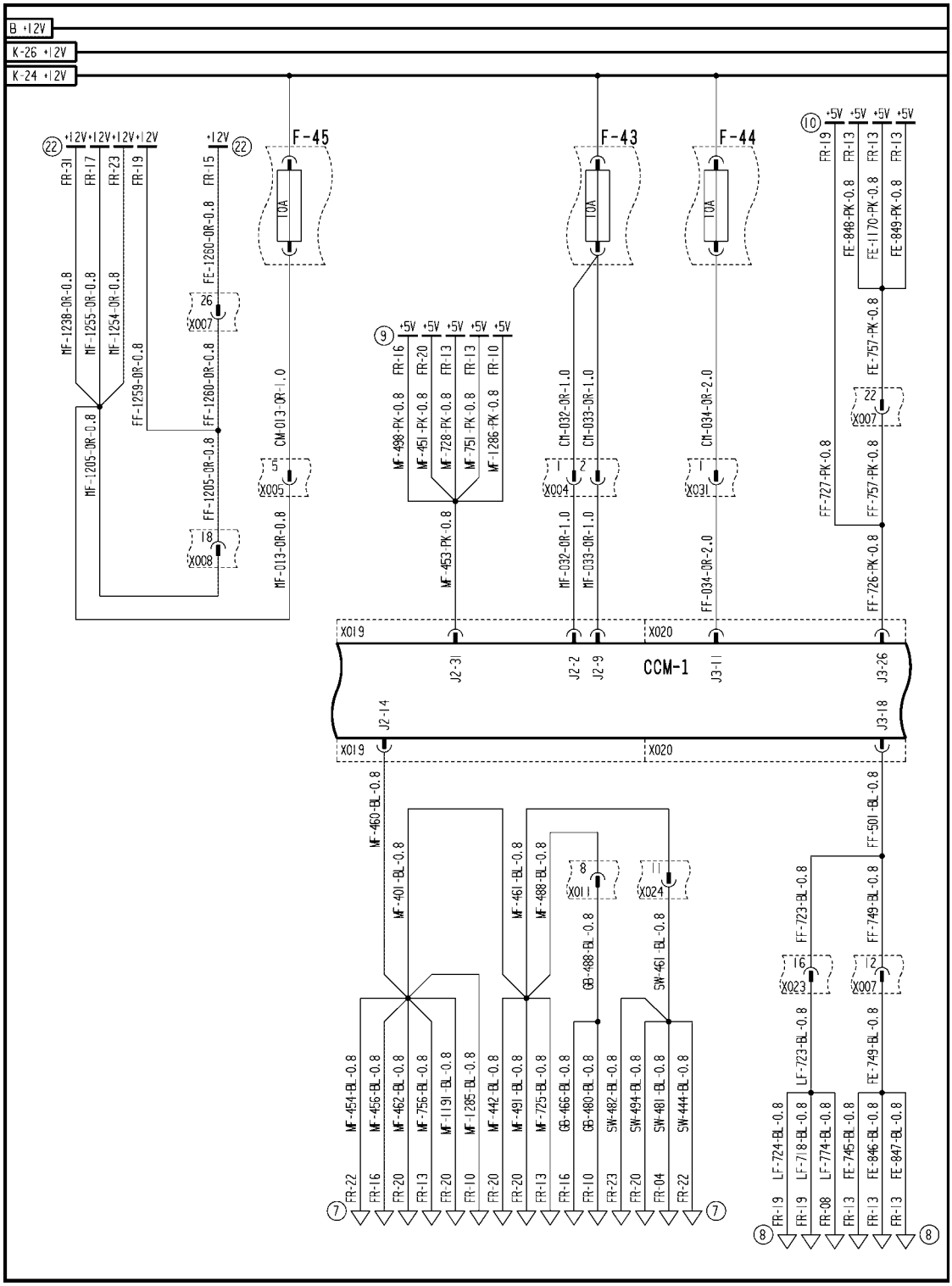
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Unload cradle sensor - Short circuit to ground (K.72.B.95.80 - G.30.B.53)

AFX8010

E0003-04 - Unloader Cradled Sensor

Cause:
The unload tube cradled sensor (B38) circuit is shorted to ground.

Possible failure modes:

1. Sensor supply wiring shorted to ground.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "TUBE CRADLED SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is low (**0 - 0.5 volts**), continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **6**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires. Flex the harnesses involved to reveal intermittent breaks or shorts in the wiring concerned.*
2. Disconnect the unload tube cradled sensor connector **X244**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the sensor, or sensor wiring. Replace the sensor.

   B. If the voltage remains low, continue with Step **3**.
3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the straw hood rear (SH) harness between connector **X071** and connector **X244** wire 485 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **4**.
4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**.

   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the straw hood front (SW) harness between connector **X071** and connector **X024** wire 485 yellow. Locate the short and repair.

   B. If the voltage remains low, continue with Step **5**.
5. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**.

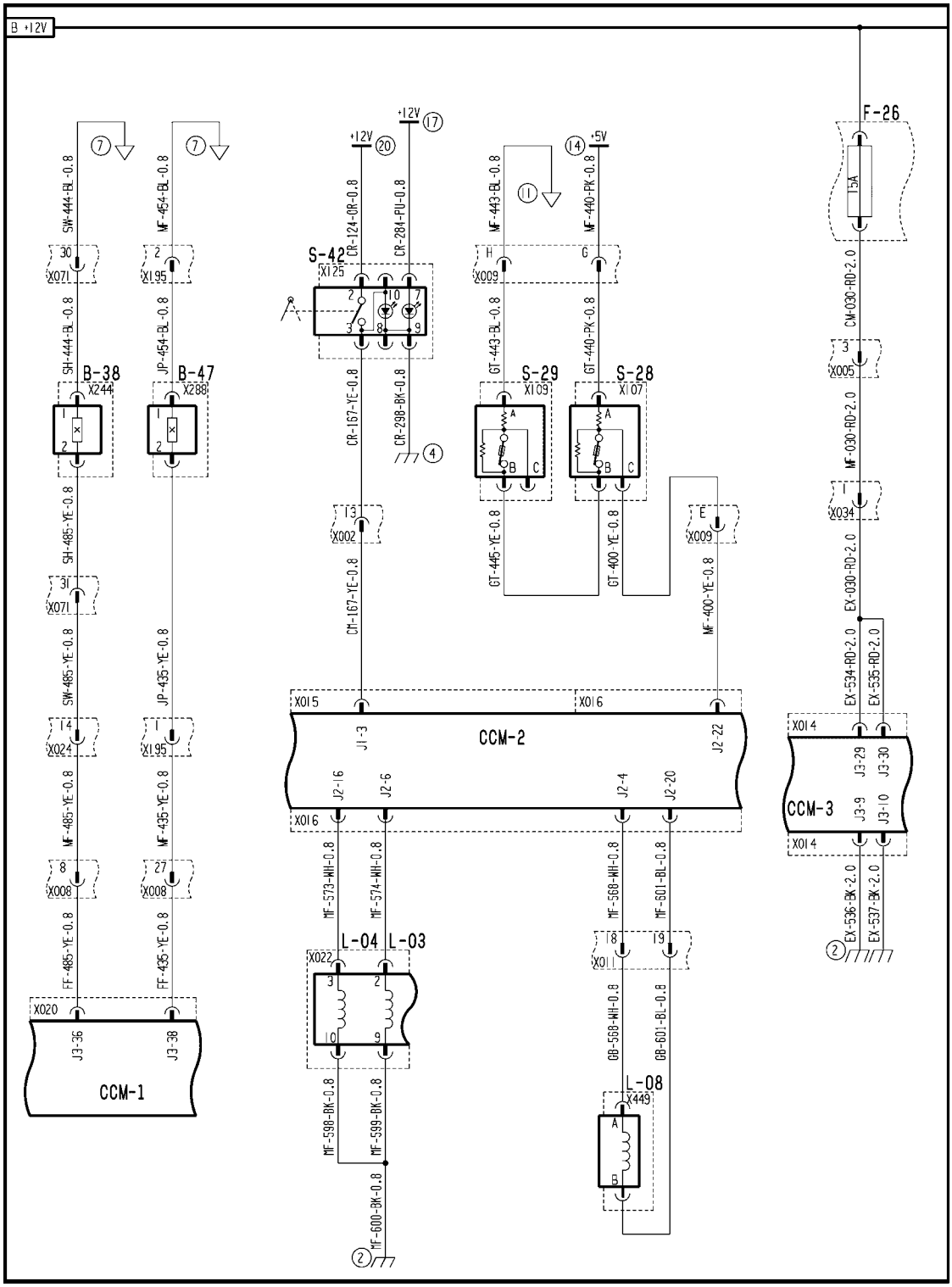
   A. If the voltage increases to **7.3 - 9.0 volts**, the short is in the main frame (MF) harness between connector **X024** and connector **X008** wire 485 yellow. Locate the short and repair.

   B. If the voltage remains low, the short circuit is in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-36 wire 485 yellow. Locate the short and repair.
6. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

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A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



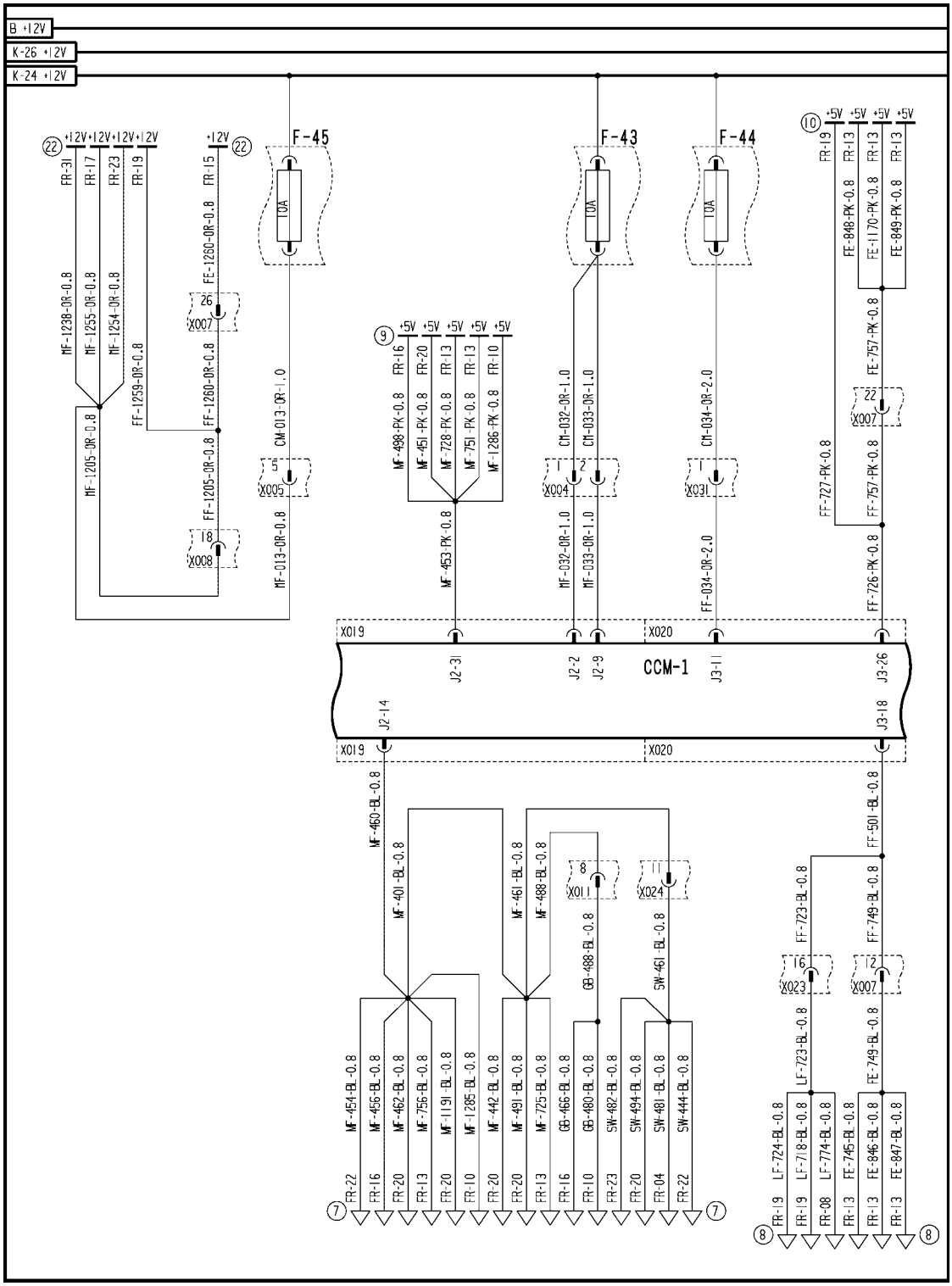
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Sensing system Unload cradle sensor - Open circuit (K.72.B.95.80 - G.30.B.50)

AFX8010

E0003-05 - Unloader Cradled Sensor

Cause:
The unload tube cradled sensor (B38) circuit has an open.

Possible failure modes:

1. Sensor supply wiring has an open.
2. Controller internal failure (internal regulator failure).

Solution:

1. Enter the Universal Display Plus "DIAG" screen. Select the "UNLOADING" sort menu, and select "TUBE CRADLED SEN" to check the voltage range.

   The proper voltage sensor blocked by ferrous metal - **5.6 - 7.3 volts**

   The proper voltage sensor unblocked by ferrous metal - **0.5 - 5.6 volts**

   The proper voltage sensor when disconnected - **7.3 - 9.0 volts**.

   A. If the voltage reading is high **7.3 - 9.0 volts**, continue with Step **2**.

   B. If the voltage reading is within the proper limits, continue the troubleshooting at Step **10**.

   NOTE: *Visually inspect the wiring harness and connectors. Verify that the connector was fully installed. Inspect the terminals and wires at the connector for pushed back or corroded terminals or damaged wires.*

2. Disconnect the unload tube cradled sensor connector **X244**. Use a jumper wire to short the harness end of connector **X244** pin 2 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is not in the supply side of the circuit. Continue with Step **6**.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **3**.

3. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a jumper wire to short connector **X071** pin 31 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the straw hood rear (SH) harness between connector **X071** and the connector **X244** pin 2 wire 485 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **4**.

4. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a jumper wire to short connector **X024** pin 14 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the straw hood front (SW) harness between connector **X071** and the connector **X024** wire 485 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, continue with Step **5**.

5. Disconnect the main frame (MF) harness from the front frame (FF) harness at connector **X008**. Use a jumper wire to short connector **X008** pin 8 to ground.

   A. If the voltage drops to **0 - 0.5 volts** indicating a ground, the open circuit is in the main frame (MF) harness between connector **X008** and the connector **X024** wire 485 yellow. Locate the open and repair.

   B. If the monitor still displays **7.3 - 9.0 volts**, the open circuit is in the front frame (FF) harness between connector **X008** and connector **X020** pin J3-36 wire 485 yellow. Locate the open and repair.

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6. Disconnect the unload tube cradled sensor connector **X244**. Use a multimeter to check for continuity between the harness end of connector **X244** pin 1 and chassis ground.

   A. If there is continuity, the ground path for the sensor is complete, and the fault is in the sensor itself. Replace the sensor.

   B. If there is no continuity, continue with Step **7**.

7. Disconnect the straw hood rear (SH) harness from the straw hood front (SW) harness at connector **X071**. Use a multimeter to check for continuity between the straw hood front (SW) harness end of connector **X071** pin 30 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood rear (SH) harness between connector **X071** and the connector **X244** pin 1, wire 444 blue. Locate the open and repair.

   B. If there is no continuity, continue with Step **8**.

8. Disconnect the straw hood front (SW) harness from the main frame (MF) harness at connector **X024**. Use a multimeter to check for continuity between the main frame (MF) harness end of connector **X024** pin 11 and chassis ground.

   A. If there is continuity, the open circuit is in the straw hood front (SW) harness between connector **X071** and the connector **X024** wire 444 blue or 461 blue. Locate the open and repair.

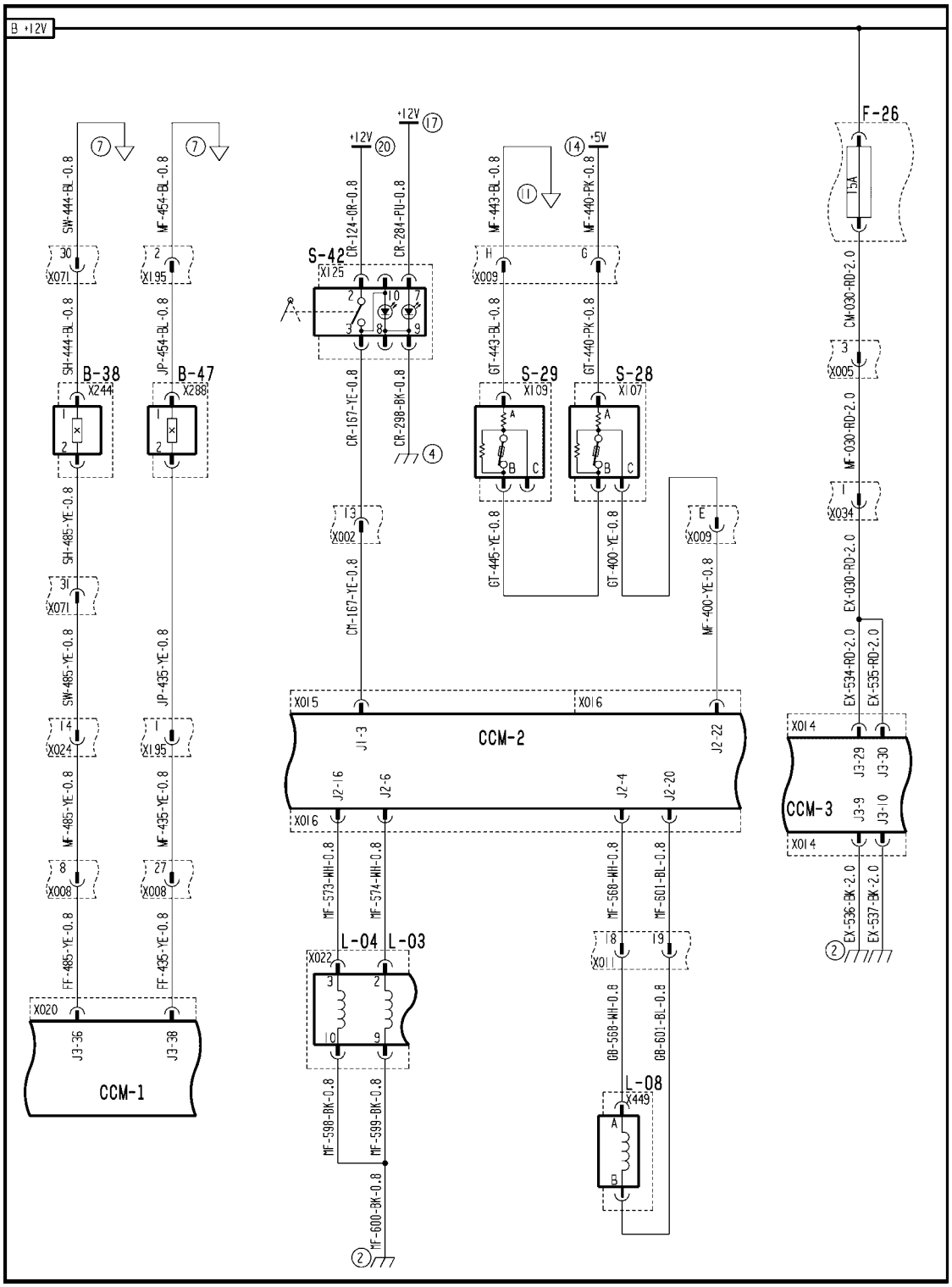
   B. If there is no continuity, the open circuit is in the main frame (MF) harness between connector **X024** and connector **X019** pin J2-14 wire 461 blue, 401 blue or 460 blue. Locate the open and repair.

9. Turn the key to ON position. Observing the LED on the harness end side of the sensor, place ferrous metal in front of sensor then remove.

   A. The sensor is functioning if LED changes state. Adjust the sensor clearance to **3 mm** (1/8"). Erase the fault code and continue operation.

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Wiring harness - Electrical schematic frame 22 (A.30.A.88 - C.20.E.22)



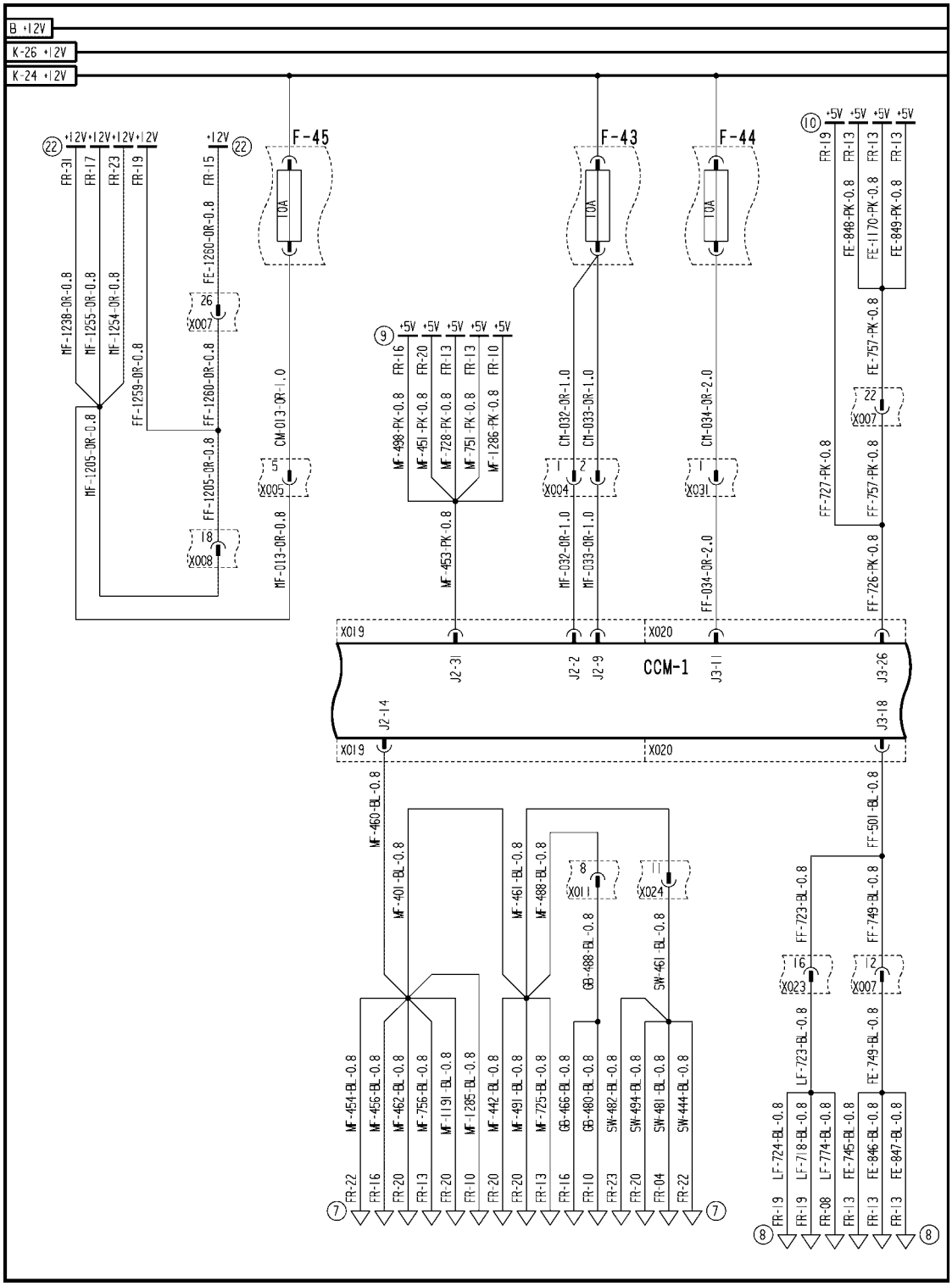
AFXSCHEM22-04 1

FRAME 22 - UNLOAD

https://truckmanualshub.com/

B-38 Unload Cradle	B-47 Covers Closed	F-26 Not Used
L-03 Unload Tube In	L-04 Unload Tube Out	L-08 Unload Tube Clutch
S-28 Grain Bin 3/4 Full	S-29 Grain Bin Full	S-42 Tank Extensions Switch

Wiring harness - Electrical schematic frame 26 (A.30.A.88 - C.20.E.26)



AFXSCHEM26-04 1

FRAME 26 - DISTRIBUTION

https://truckmanualshub.com/

F-43 CCM1a Fuse	F-44 CCM1b	F-45 GPS Antenna Fuse

https://truckmanualshub.com/

Index

CROP PROCESSING - K

UNLOADING Grain unloading - 72.B

Clutch - Assemble (K.72.B.16 - F.10.A.20) 10
AFX8010

Clutch - Disassemble (K.72.B.16 - F.10.A.25) 7
AFX8010

Clutch - Install (K.72.B.16 - F.10.A.15) 15
AFX8010

Clutch - Remove (K.72.B.16 - F.10.A.10) 4
AFX8010

Command valve Unload engage - Short circuit to B+ (K.72.B.12.21 - G.30.B.54) 61
AFX8010

Command valve Unload engage - Unidentified failure (K.72.B.12.21 - G.30.B.46) 65
AFX8010

Command valve Unload swing - Unidentified failure (K.72.B.12.20 - G.30.B.46) 69
AFX8010

Command valve Unload swing - Unidentified failure (K.72.B.12.20 - G.30.B.46) 72
AFX8010

Drive system - Install (K.72.B.40 - F.10.A.15) 21
AFX8010

Drive system - Remove (K.72.B.40 - F.10.A.10) 20
AFX8010

Drive system Unload gearbox - Assemble (K.72.B.40.45 - F.10.A.20) 29
AFX8010

Drive system Unload gearbox - Disassemble (K.72.B.40.45 - F.10.A.25) 25
AFX8010

Drive system Unload gearbox - Install (K.72.B.40.45 - F.10.A.15) 36
AFX8010

Drive system Unload gearbox - Remove (K.72.B.40.45 - F.10.A.10) 24
AFX8010

Drive system Unloading tube gearbox - Assemble (K.72.B.40.46 - F.10.A.20) 42
AFX8010

Drive system Unloading tube gearbox - Disassemble (K.72.B.40.46 - F.10.A.25) 39
AFX8010

Drive system Unloading tube gearbox - Install (K.72.B.40.46 - F.10.A.15) 48
AFX8010

Drive system Unloading tube gearbox - Remove (K.72.B.40.46 - F.10.A.10) 38
AFX8010

Sensing system Unload cradle sensor - Open circuit (K.72.B.95.80 - G.30.B.50) 83
AFX8010

Sensing system Unload cradle sensor - Short circuit to B+ (K.72.B.95.80 - G.30.B.54) 75
AFX8010

Sensing system Unload cradle sensor - Short circuit to ground (K.72.B.95.80 - G.30.B.53) 79
AFX8010

Unloading auger Cross auger - Install (K.72.B.53.52 - F.10.A.15) 54
AFX8010

Unloading auger Cross auger - Remove (K.72.B.53.52 - F.10.A.10) 52
AFX8010

https://truckmanualshub.com/

Unloading auger Vertical auger - Install (K.72.B.53.50 - F.10.A.15) 50
AFX8010

Unloading auger Vertical auger - Remove (K.72.B.53.50 - F.10.A.10) 49
AFX8010

Unloading tube - Install (K.72.B.71 - F.10.A.15) 59
AFX8010

Unloading tube - Remove (K.72.B.71 - F.10.A.10) 58
AFX8010

https://truckmanualshub.com/

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CROP PROCESSING - K

PROTECTION SYSTEMS Stone trapping - 90.E

AFX8010

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Contents

CROP PROCESSING - K

PROTECTION SYSTEMS Stone trapping - 90.E

SERVICE

Drive system

Drive system - Remove (K.90.E.40 - F.10.A.10) 3
AFX8010

Drive system - Disassemble (K.90.E.40 - F.10.A.25) 5
AFX8010

Drive system - Assemble (K.90.E.40 - F.10.A.20) 13
AFX8010

Stone beater

Stone beater - Remove (K.90.E.58 - F.10.A.10) 20
AFX8010

Stone beater - Install (K.90.E.58 - F.10.A.15) 22
AFX8010

Stone trap

Stone trap - Remove (K.90.E.70 - F.10.A.10) 24
AFX8010

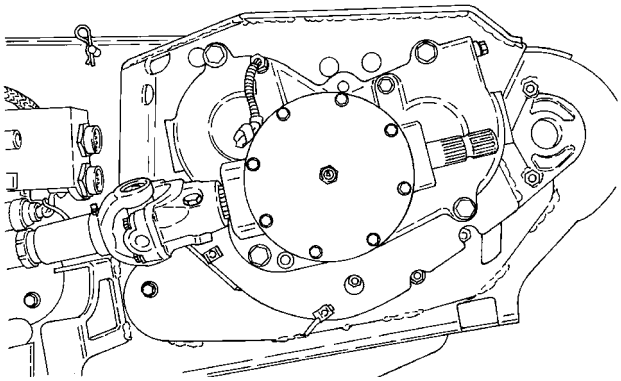
Stone trap - Install (K.90.E.70 - F.10.A.15) 25
AFX8010

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Drive system - Remove (K.90.E.40 - F.10.A.10)

AFX8010

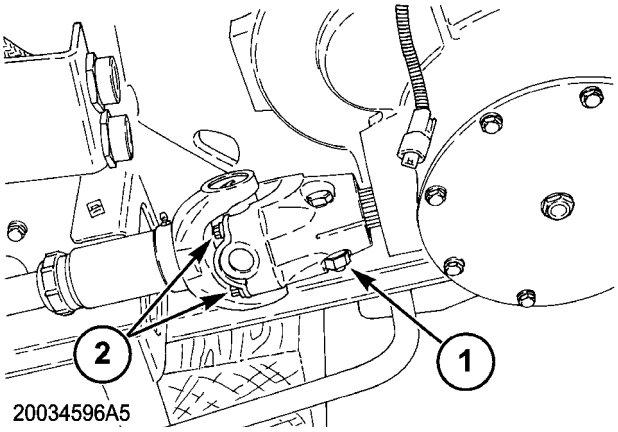
1. To remove the conveyor/rocktrap gearbox proceed as follows.



20034592 1

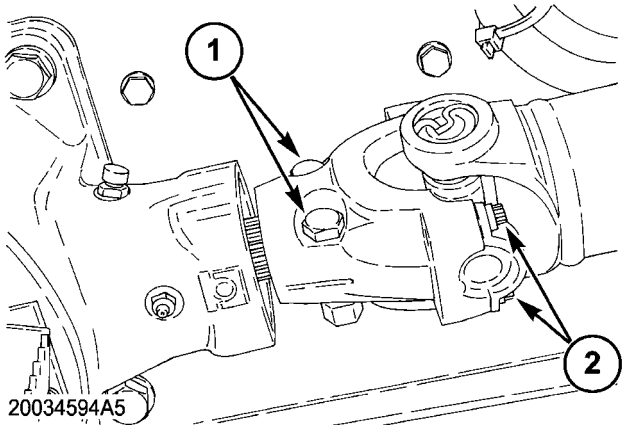
2. Remove the spline yoke bolts **(1)** and the bearing caps **(2)**at the upper gearbox.

NOTE: *The driveshaft may need to be pryed off the splined shaft. Be careful in doing so.*



20034596A5 2

3. remove the spline yoke bolts **(1)** and the bearing cap bolts **(2)** from the lower gearbox.

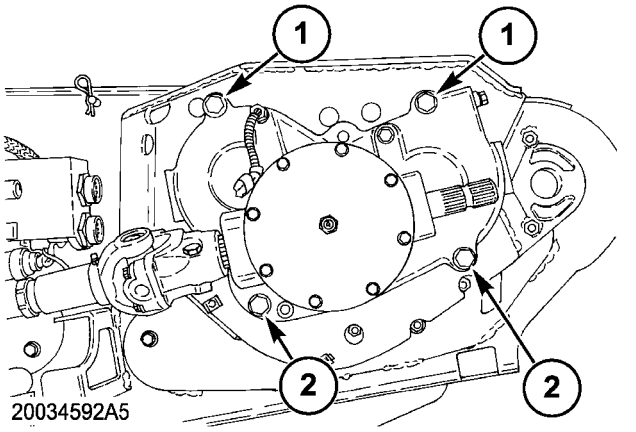


20034594A5 3

4. Remove the drive shaft away from the feeder.

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5. Remove the two upper bolts **(1)** and the two lower bolts **(2)** from the gearbox.



20034592A5 4

6. Use a hoist with a lift strap or another person to help remove the gearbox from the feeder. The gearbox will most likely need to be pryed away from the feeder house because of the splined shafts. Pry away the gearbox evenly.

NOTE: *The gearbox is heavy and requires the use of another person or a hoist. Injury could occur if not properly supported when removing.*

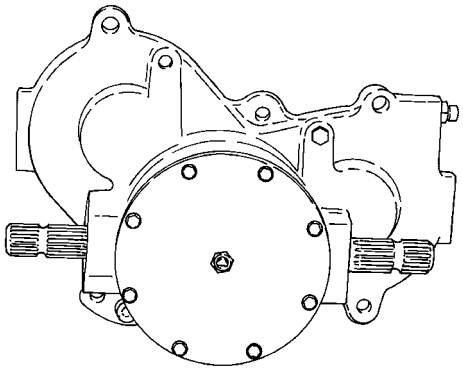
https://truckmanualshub.com/

Drive system - Disassemble (K.90.E.40 - F.10.A.25)

AFX8010

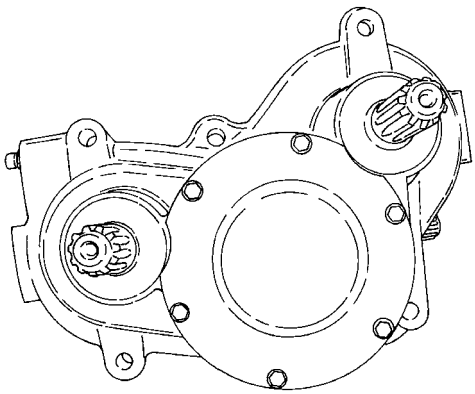
Prior operation: Drain Oil from the gearbox by removing the drain plug.
Prior operation: Disconnect the sensor electrical connection.
Prior operation: Drive system - Remove (K.90.E.40 - F.10.A.10)

1. Remove the 8 bolts which retain the cover to the gearbox on the input shaft side.



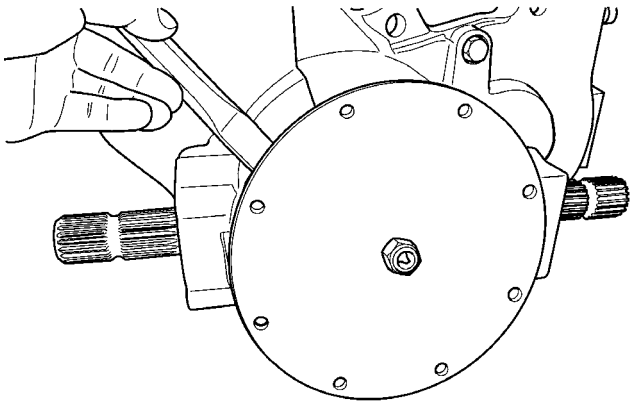
20034604 1

2. Remove the 6 bolts which retain the opposite cover on the output shaft side.



20034607 2

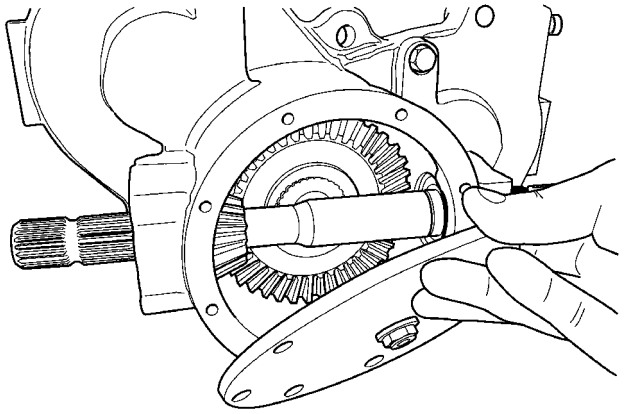
3. To remove the covers, use a flat chisel and slowly drive it between the housing and the plate.



10034612 3

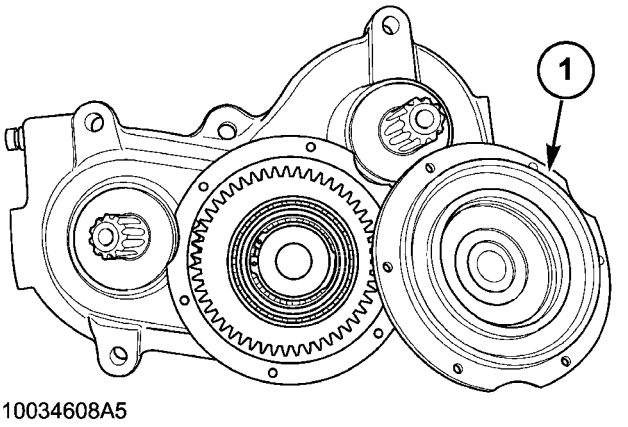
https://truckmanualshub.com/

4. The plate on the input shaft side will remove from its gasket fairly easily.



10034613 4

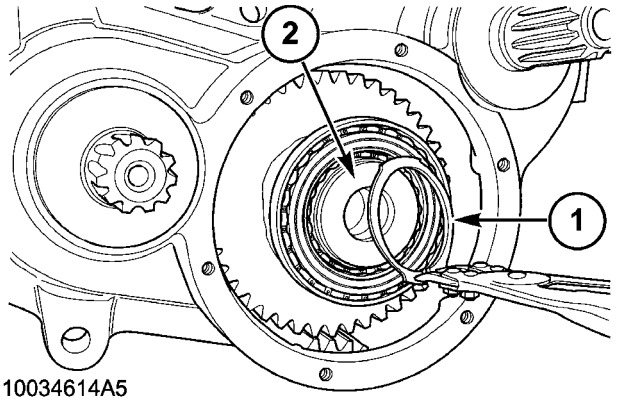
5. The cover **(1)** on the output shaft side will be sealed tight to the housing because of its O ring seal. To remove the bearing in the cover **(1)** use a slide hammer or small pry bar and work your way around the bearing evenly.



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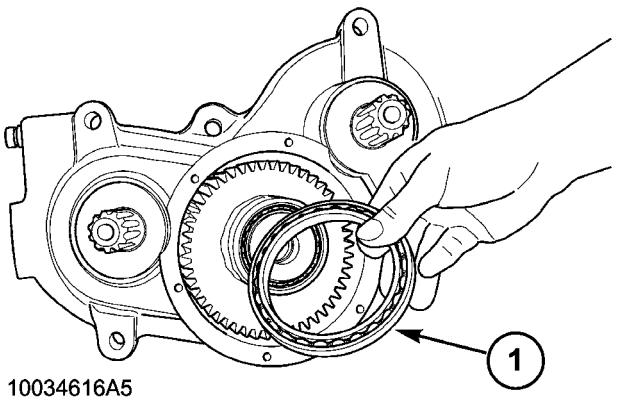
6. With both covers off remove the snap ring **(1)** from the center shaft **(2)** on the output shaft side.



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7. Remove the bearing **(1)** behind the snap ring using a set of pullers.

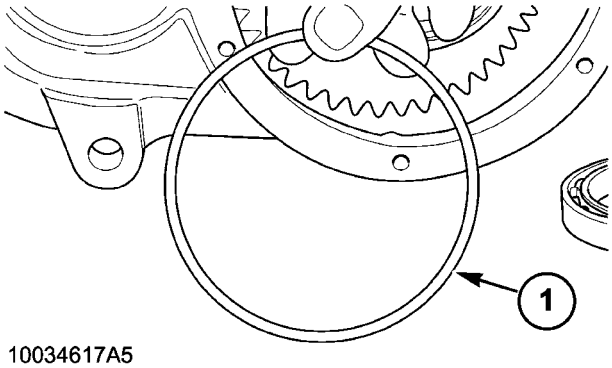


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8. Remove the retaining ring **(1)** from behind the bearing.

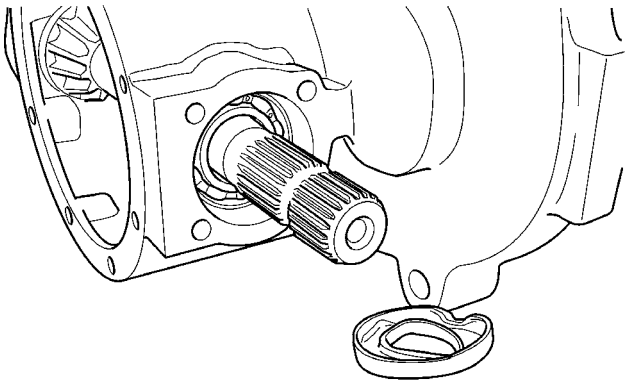


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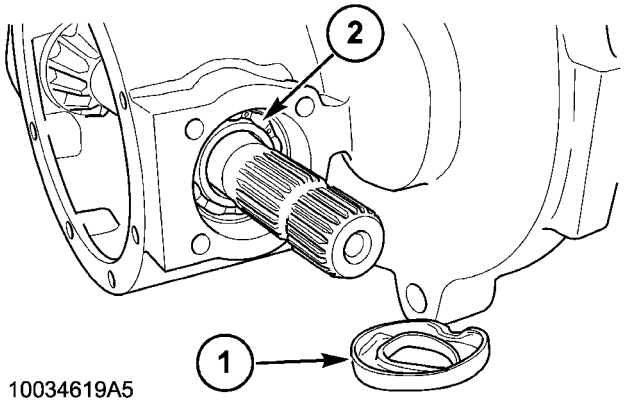
9. On the straight through input shaft you must remove the oil seals on both sides using a seal puller.

NOTE: *The seals will need to be replaced. Do not try to reuse the removed seals or leakage could occur causing gearbox damage and failure.*



10034619 9

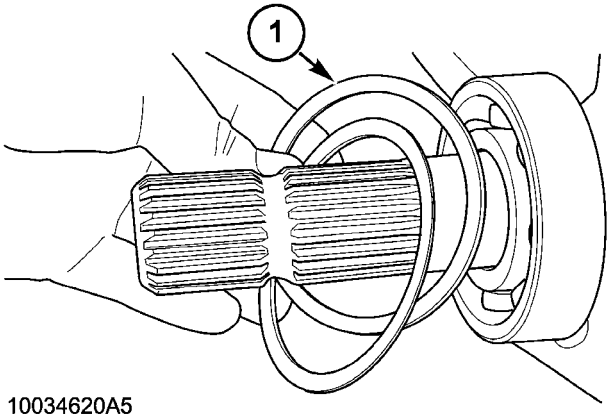
10. Behind the seals **(1)** remove the snap ring **(2)** and shims from both ends of the shaft.



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11. Note to keep track of the number of shims **(1)** and the orientation of where you removed them.

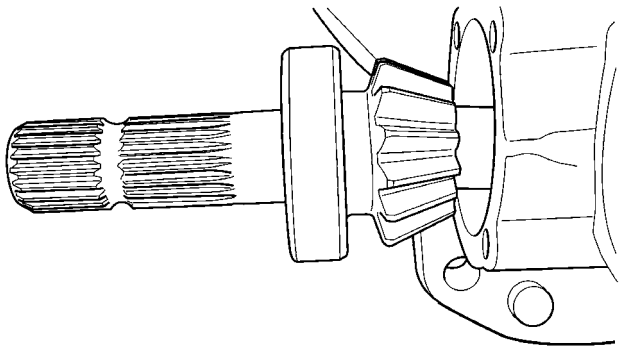


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10034620A5 11

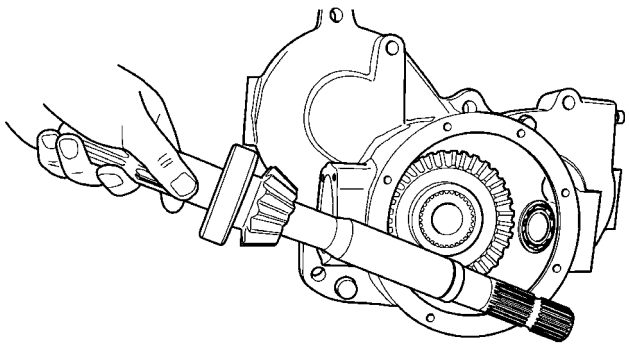
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12. To remove the straight through input shaft you can either use a press if one is available, or a large soft face dead blow hammer.



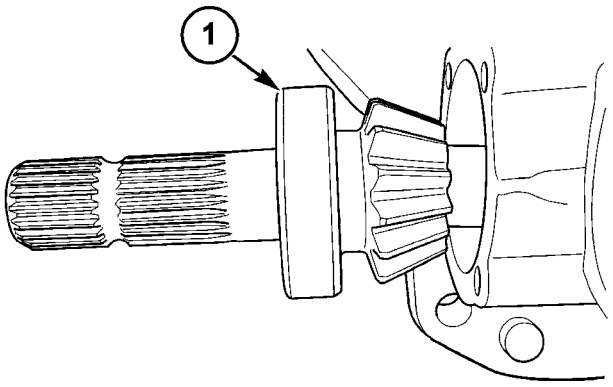
10034622 12

13. The shaft must be removed with the beveled spur gear end out first from the housing.



10034623 13

14. With the shaft out, the bearing **(1)** on the shaft can be removed using a set of pullers or the press.

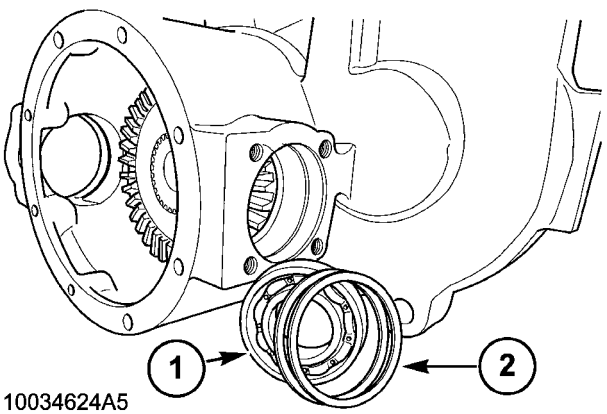


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10034622A5 14

15. The remaining bearing **(1)** in the housing may be removed in a press or by using a long soft drift and a dead blow hammer driving it from the inside of the housing out.

NOTE: *Keep track of the number and orientation of shims* ***(2)*** *.*

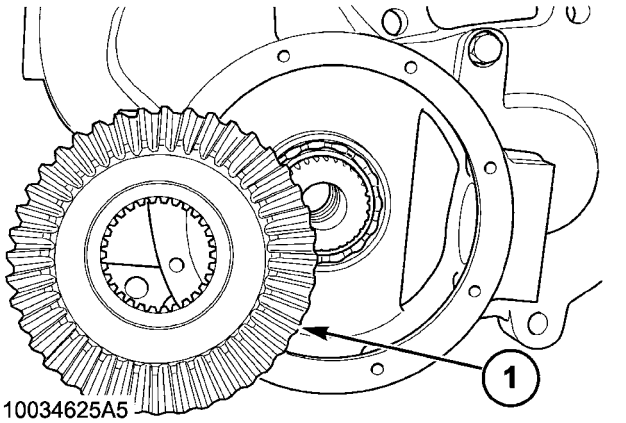


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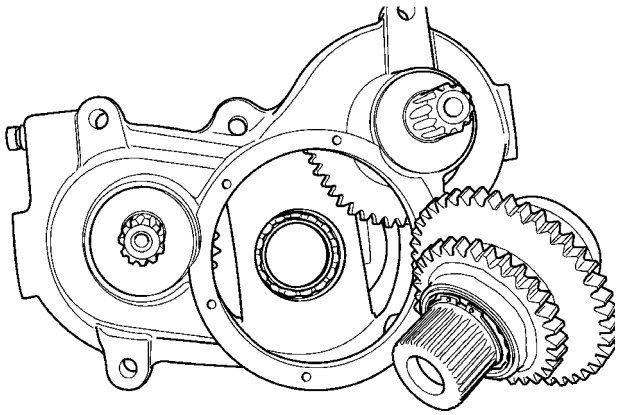
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16. You may now remove the large beveled gear **(1)** from the center shaft.



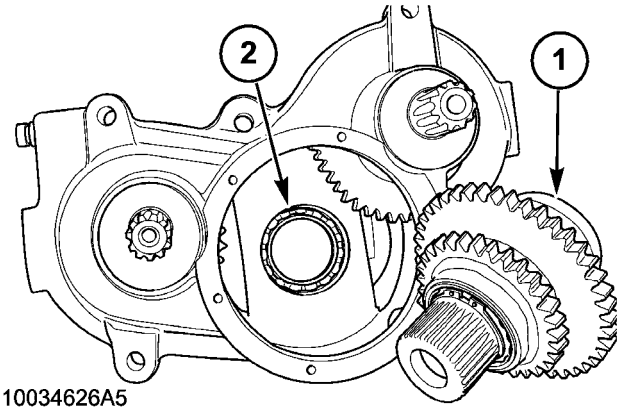
10034625A5 16

17. When the beveled gear is removed, you may remove the entire torque limiter shaft and remaining gear cluster from the housing.



10034626 17

18. Once the torque limiting shaft **(1)** with the gear cluster is removed, it can be dismantled by simply removing snap rings.

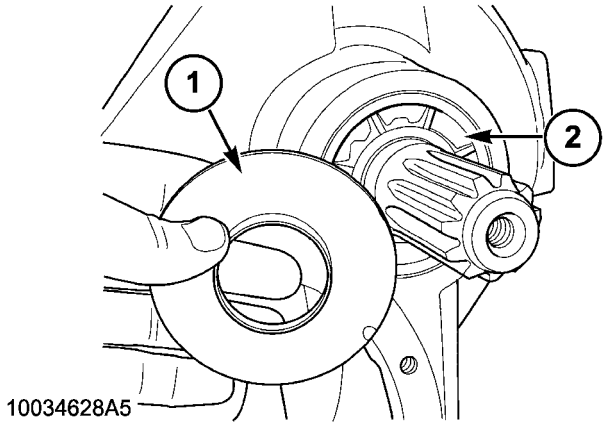


10034626A5 18

19. The bearing **(2)** remaining in the housing from the center shaft **(1)** can easily be removed by a soft drift and a dead blow hammer, or a press. The bearing must be driven from the output shaft side to the input shaft side.

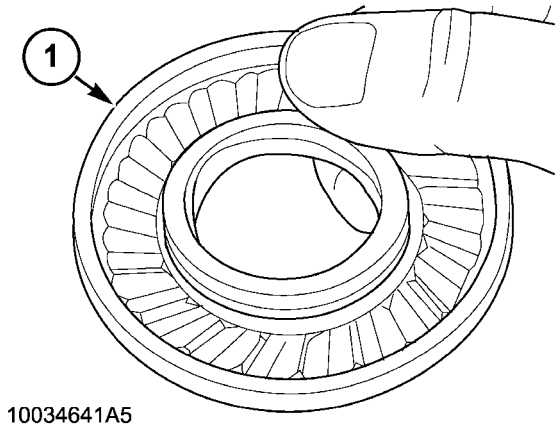
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20. Remove the metal seal protectors **(1)** from the shafts **(2)** on the output side of the gearbox.



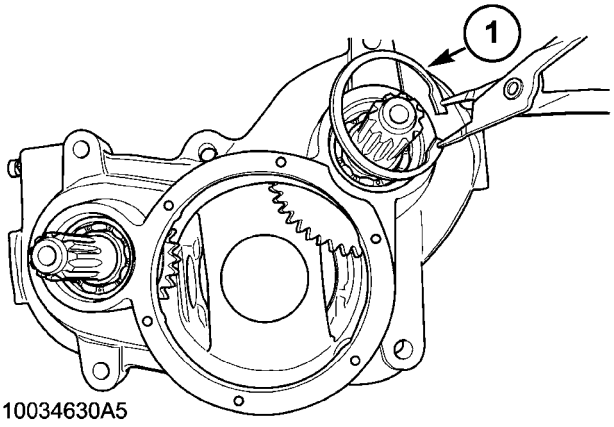
10034628A5 19

21. Remove the oil seals **(1)** from the output shafts using a seal puller. Note the seals will have to be replaced.



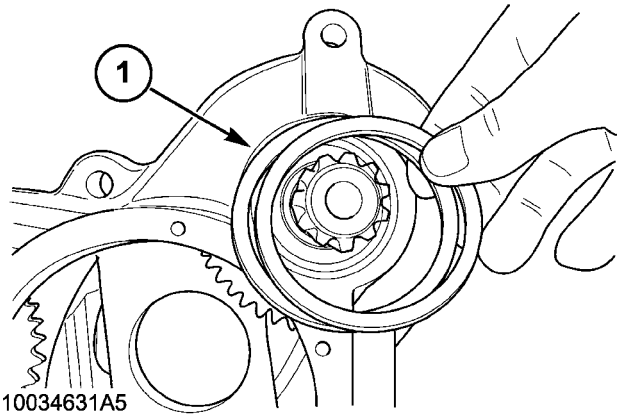
10034641A5 20

22. Remove the snap rings **(1)** from the shafts.



10034630A5 21

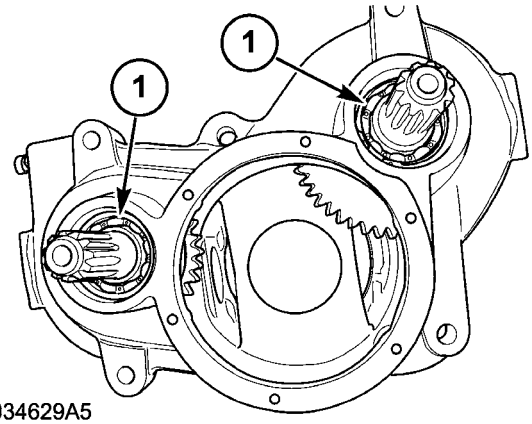
23. Be sure to keep track of the shim **(1)** count and orientation used.



10034631A5 22

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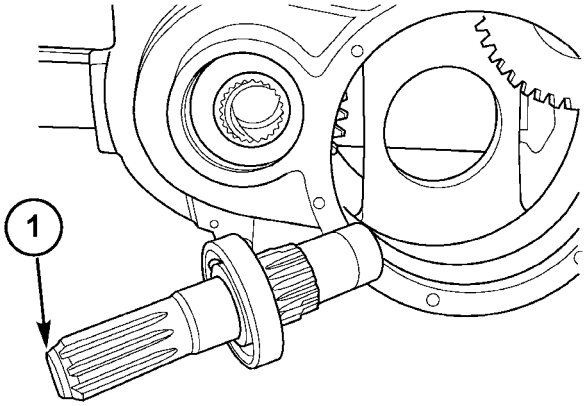
24. Using a slide hammer with a threaded 10mm attachment remove both shafts **(1)** from the gearbox.



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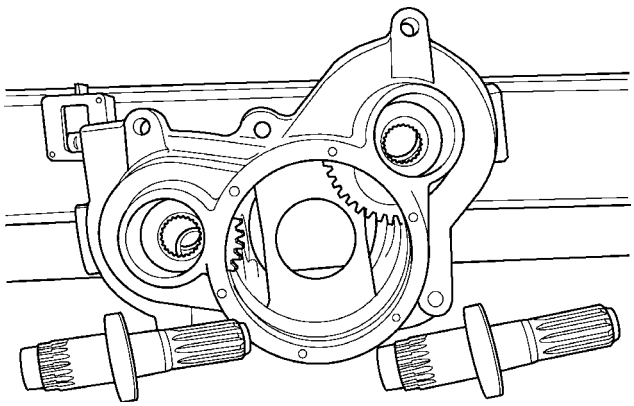
25. Be sure to rotate the shaft **(1)** a few degrees every time you pull to ensure there is no binding of the bearing in the housing.



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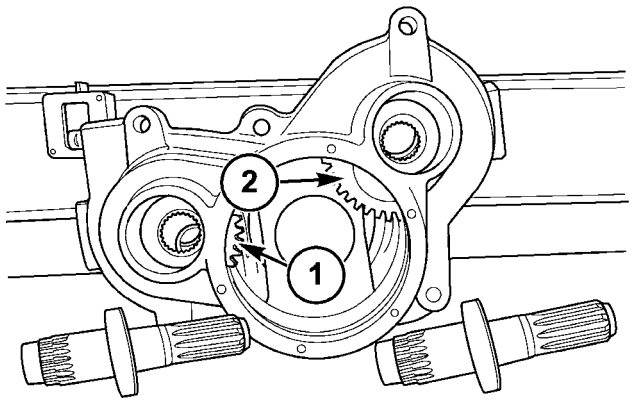
10034632A5 24

26. Once the shafts are removed you can use a press to remove the bearings from the shafts.



10034634 25

27. Before removing the conveyor **(2)** and rock trap **(1)** drive gears from the housing, be sure to mark the orientation from which they were set in the housing.

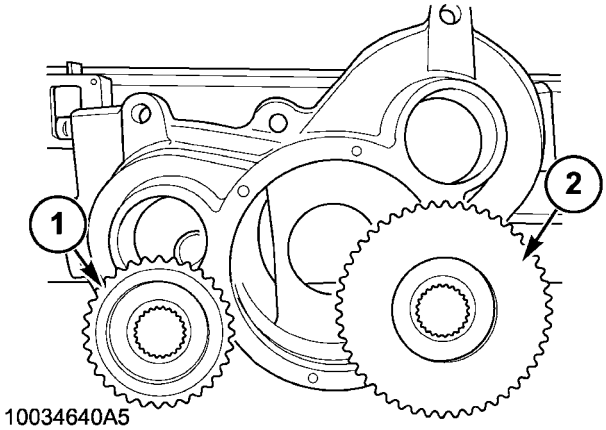


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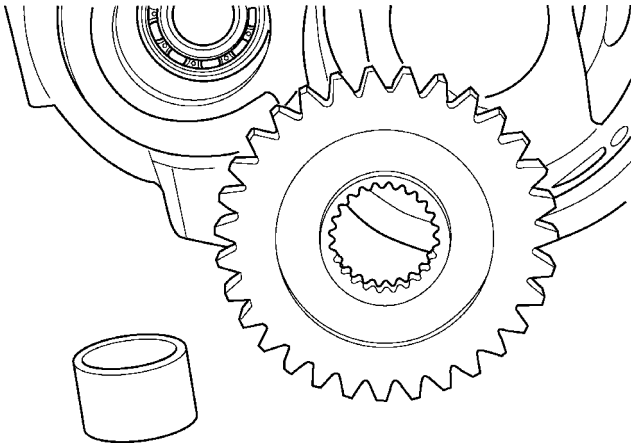
https://truckmanualshub.com/

28. With the shafts out of the housing remove the rock trap **(1)** and conveyor **(2)** drive gears and spacers from inside the housing.



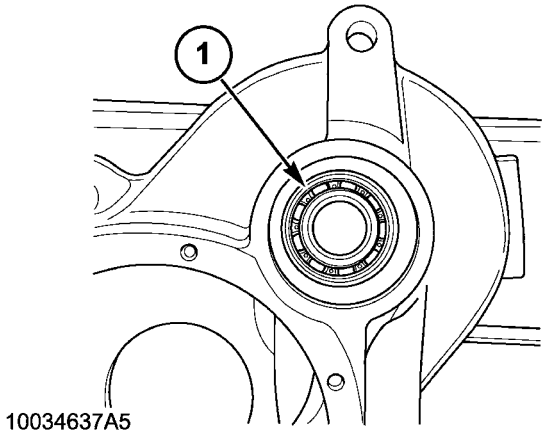
10034640A5 27

29. The drive gears and spacers may bind when coming out, slightly jiggle the gears to pull them out of the housing.



10034636 28

30. To remove the remaining bearings **(1)** from the housing use a slide hammer with a bent catch attachment on the end. Be sure to move the catch from side to side every time you pull to ensure no binding of the bearing in the housing.



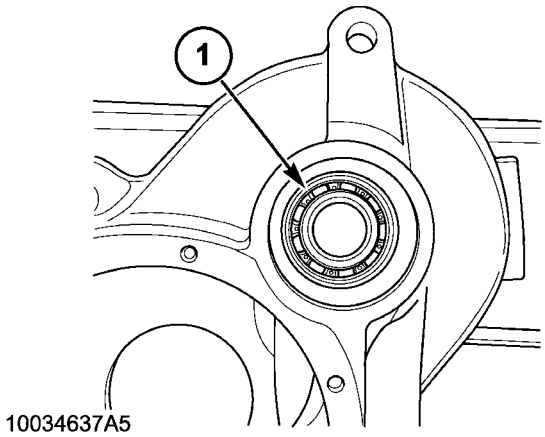
10034637A5 29

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Drive system - Assemble (K.90.E.40 - F.10.A.20)

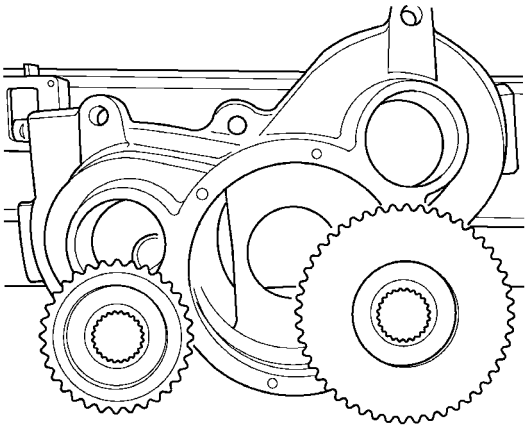
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1. Place the bearings **(1)** in the inner seats of the housing for the conveyor & rocktrap output shafts.



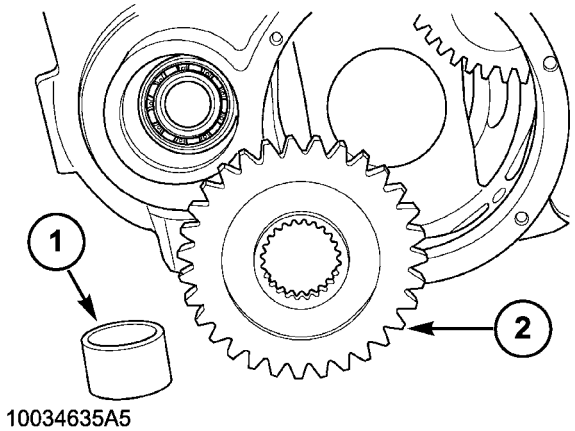
10034637A5 1

2. Using the proper slug, tap or press the bearings **(1)** until they are fully seated in the housing.
3. Be sure to use the proper orientation of drive gears for installation.



10034640 2

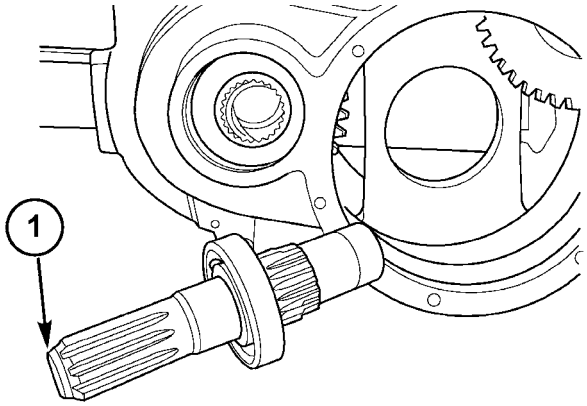
4. Install the output shaft drive gears **(2)** and spacers **(1)** into the housing.



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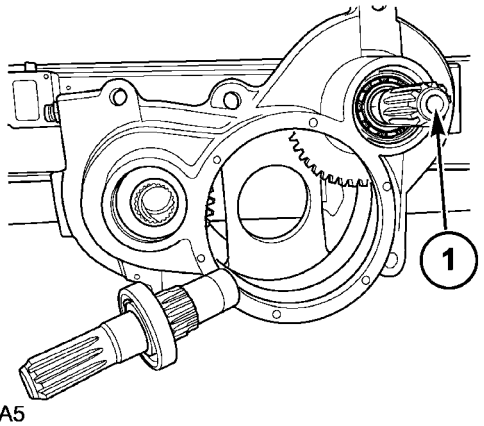
5. Install the bearings onto the output shafts **(1)** for the conveyor and rock trap drives. This is done by a press using the correct tube to fit over the shaft. Be sure tube contacts the inner race of the bearing only when pressing onto the shaft so bearing damage will not occur.



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10034632A5 4

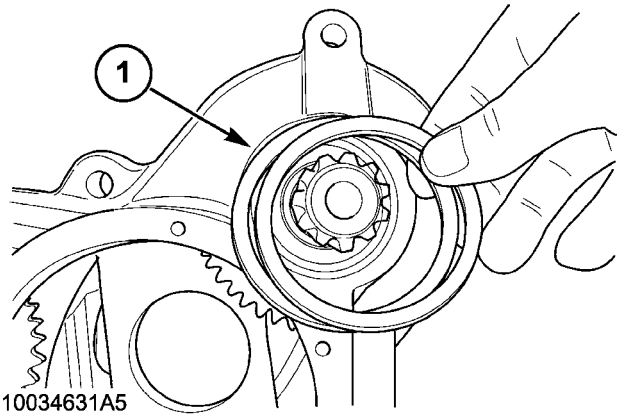
6. With the drive gears in place install the output shafts **(1)** by first aligning the splines, and then pressing until they are seated in the housing.



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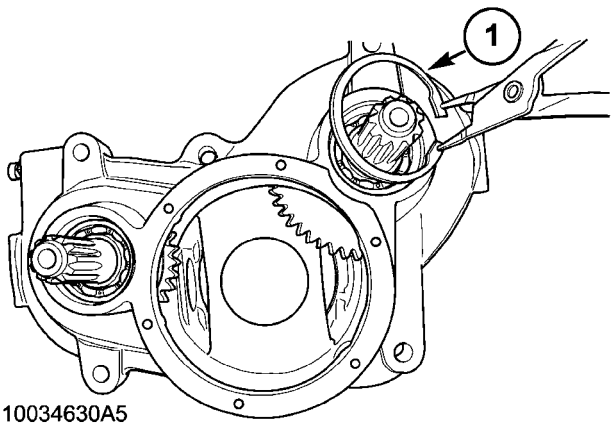
7. Install the shims. **(1)**



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8. Install the retaining ring. **(1)**

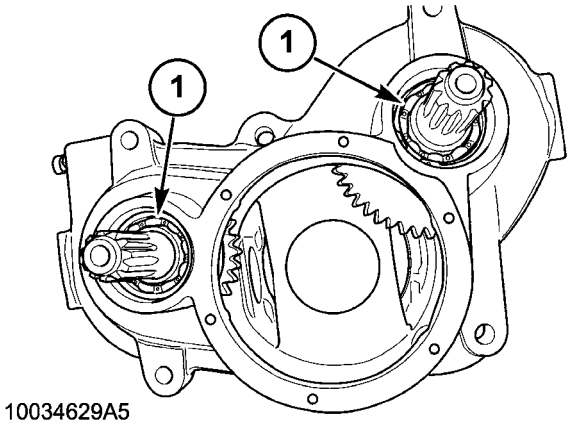


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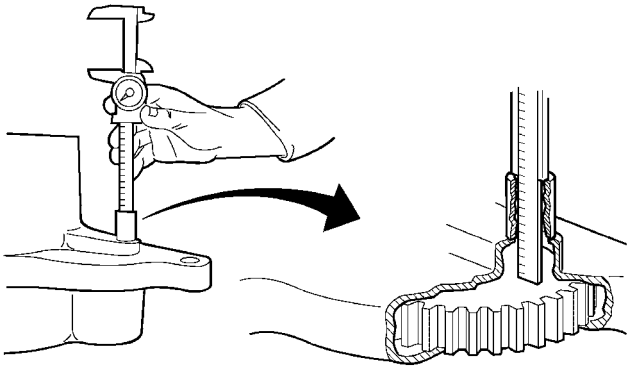
https://truckmanualshub.com/

9. Rotate the shafts **(1)** by hand to assure no binding before proceeding further.



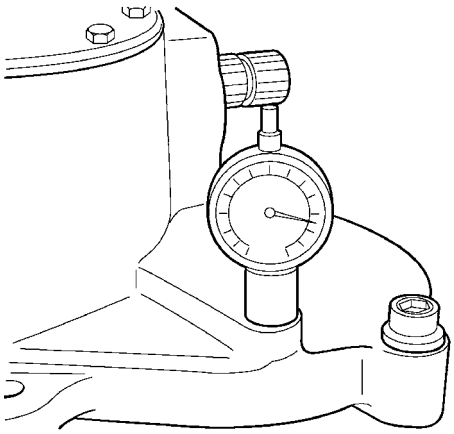
10034629A5 8

10. Using a caliper or dial gauge and check the position of the gear with reference to the speed sensor spot-facing in the housing. The dimension should be 26. 3 mm (+0.10/-0.30mm).



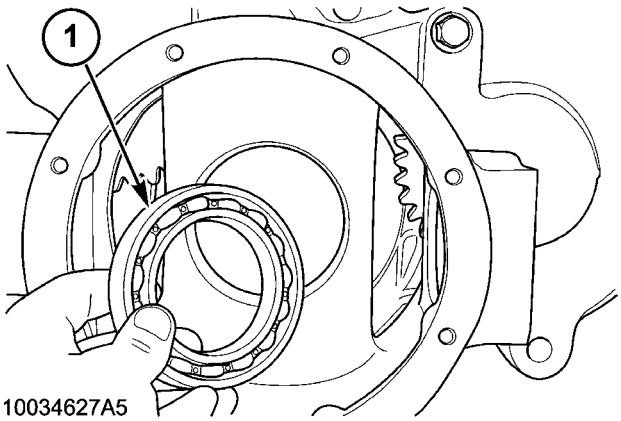
50034947 9

11. A dial indicator can also be used instead of the caliper.



50034948 10

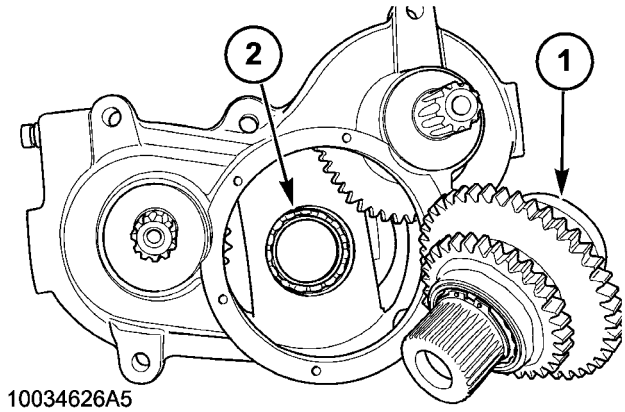
12. Install the ball bearing **(1)** into the support in the housing for the torque limiter center shaft and gear cluster. Press the bearing into the housing until it is seated.



10034627A5 11

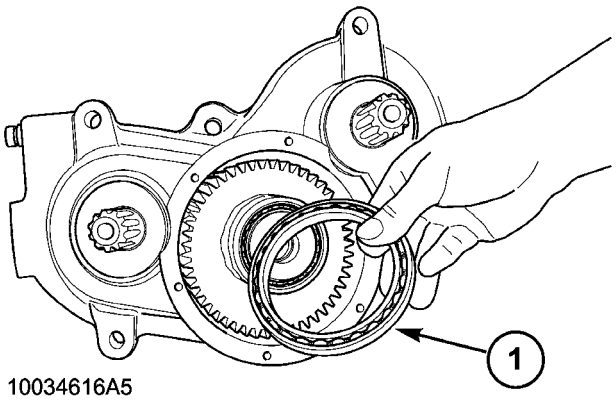
https://truckmanualshub.com/

13. Install the torque limiter **(1)** into the housing. Be sure to align the gear mesh. Be sure to turn the torque limiter shaft by hand once it is pressed into the bearing **(2)** to assure no binding.



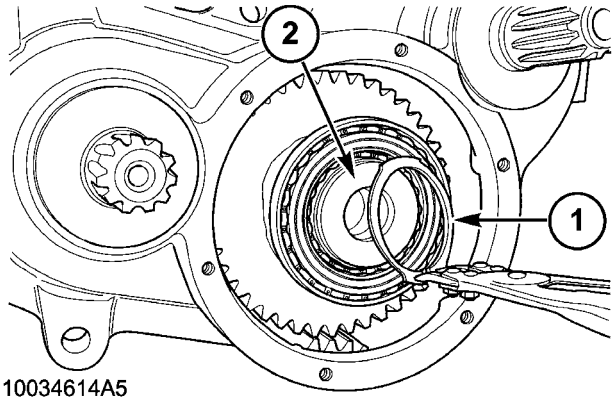
10034626A5 12

14. Install the bearing **(1)** onto the torque limiter shaft.



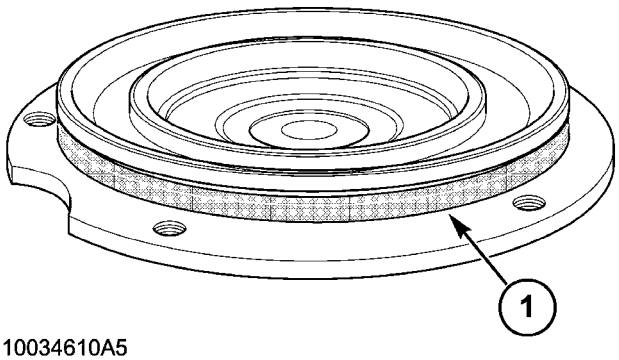
10034616A5 13

15. Install the snap ring **(1)** on the shaft **(2)** .



10034614A5 14

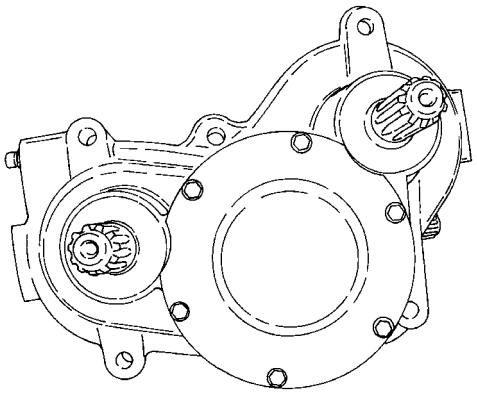
16. Install the ball bearing into the O ring cover **(1)** .



10034610A5 15

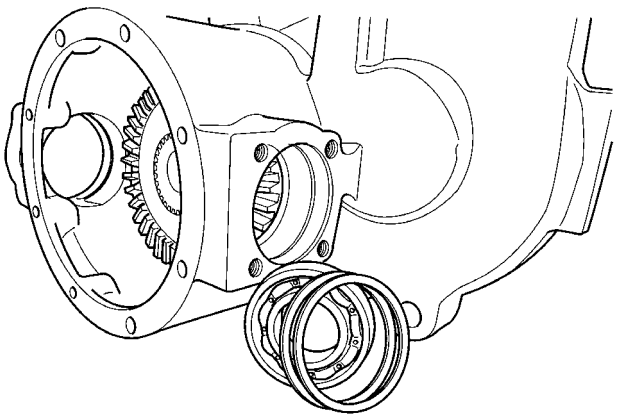
https://truckmanualshub.com/

17. Install and bolt the cover. Torque bolts to **217 lb in**



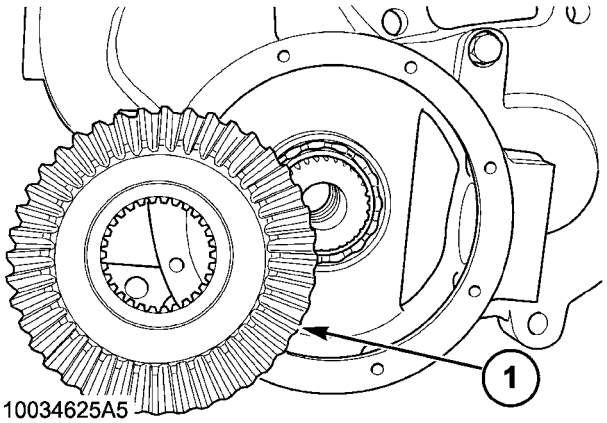
20034607 16

18. Install the ball bearing opposite to the pinion of input shaft. Install the shims and retaining ring.



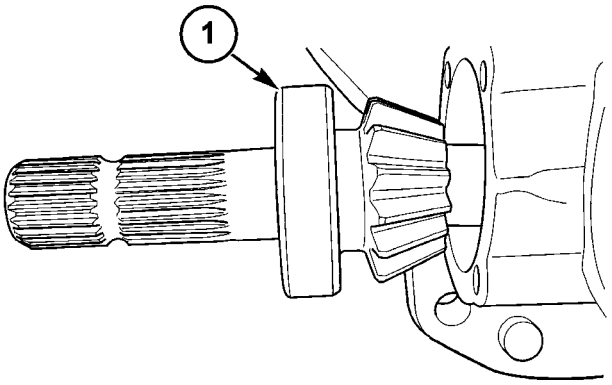
10034624 17

19. Place the crown gear **(1)** on the torque limiter shaft.



10034625A5 18

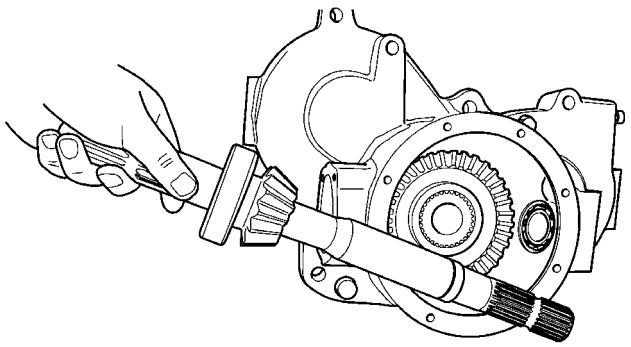
20. Install the bearing **(1)** on the input shaft.



10034622A5 19

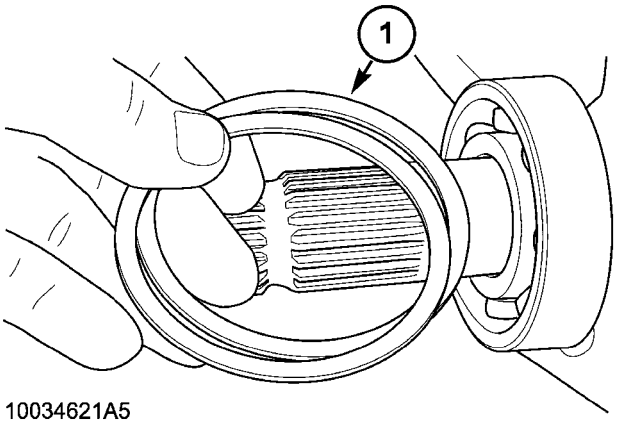
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21. Press the input shaft into the bearing while supporting the rear of the bearing in the press.



10034623 20

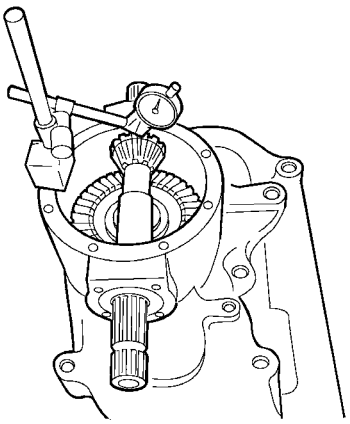
22. Install the bearing under the pinion gear in a press with the proper plug. Install shims **(1)** and retaining ring.



10034621A5

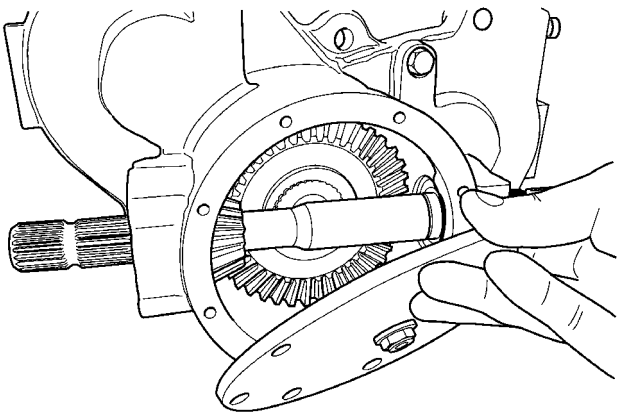
10034621A5 21

23. Check the gear backlash using a dial indicator: 0.15/0.30 mm.



50034949 22

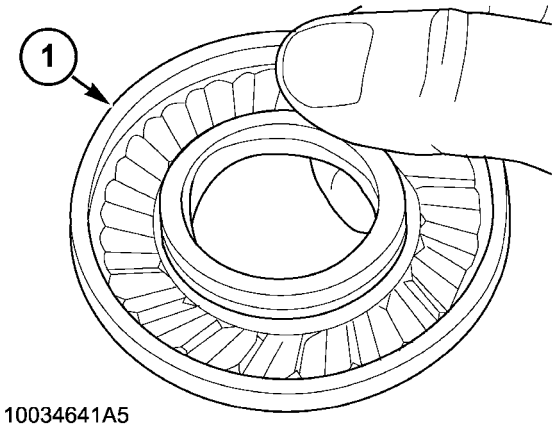
24. Use gasket compound on the access cover. Torque bolts to **217 lb in** .



10034613 23

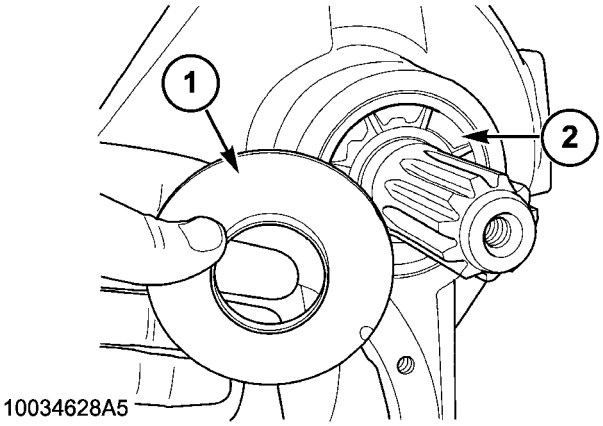
https://truckmanualshub.com/

25. Install oil seal rings **(1)** to both input and output shafts.



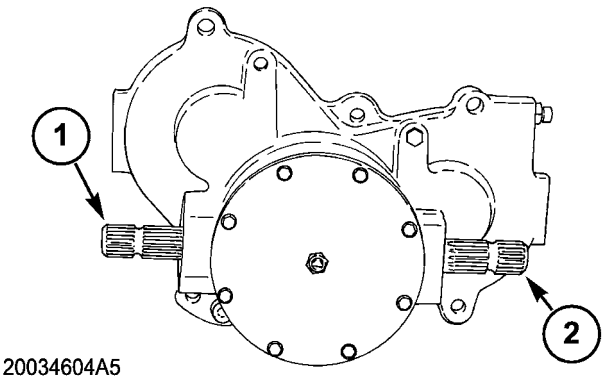
10034641A5 24

26. Install seal protectors **(1)** to output shafts only.



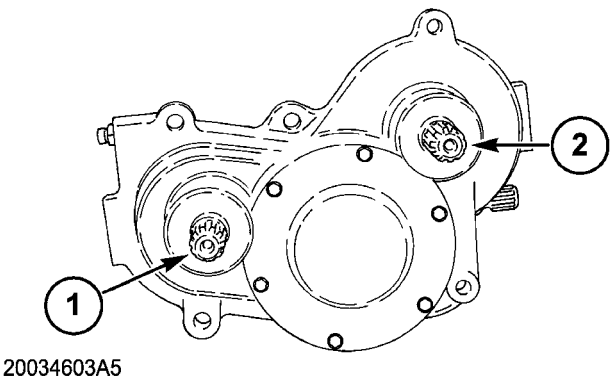
10034628A5 25

27. Input shafts **(1) (2)** .



20034604A5 26

28. Output shafts **(1) (2)** .



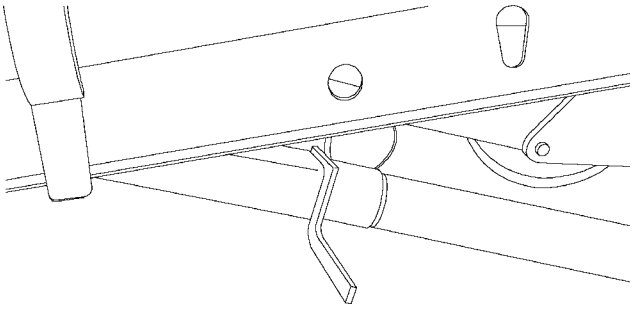
20034603A5 27

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Stone beater - Remove (K.90.E.58 - F.10.A.10)

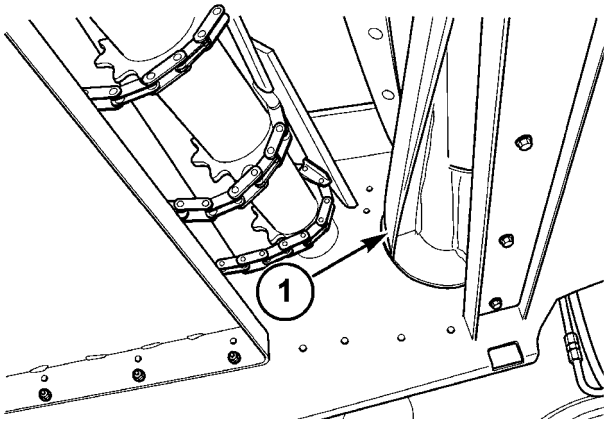
AFX8010

1. Fully raise the feeder and install the cylinder safety stop.



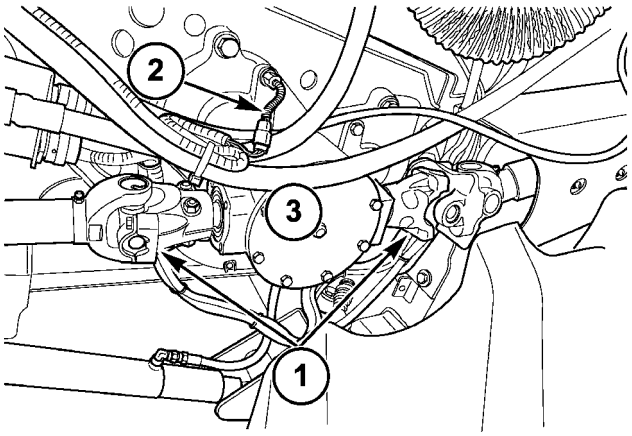
40030317 1

2. Remove the stone trap as described in **Stone trap - Remove (K.90.E.70 - F.10.A.10)**.
3. Support the ends of the beater drum **(1)** and sprocket to prevent them from dropping when the gearbox is removed.



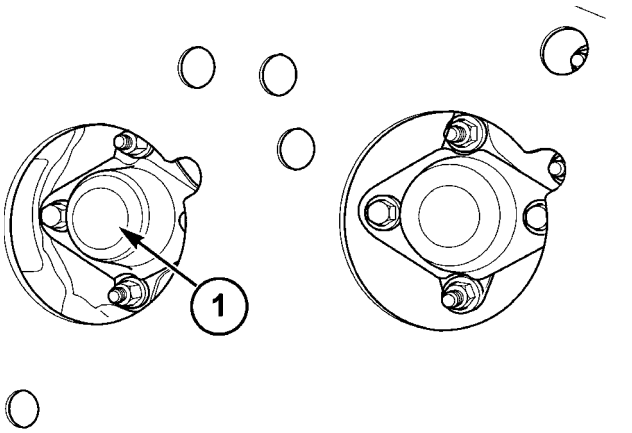
10032090A5 2

4. Disconnect the drive lines, **(1)**, and the speed sensor, **(2)**, and remove the gearbox from the feeder.



50032030A5 3

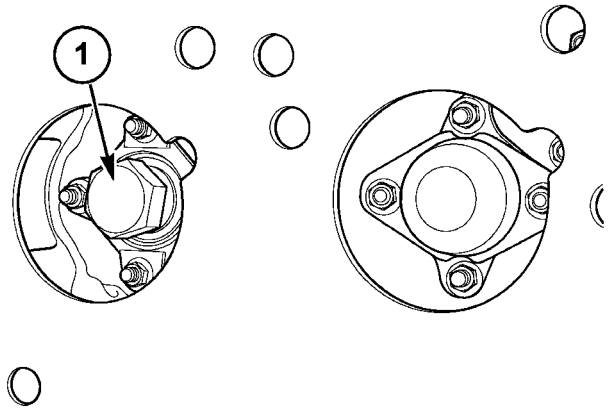
5. Remove the cap, **(1)**.



10032092A5 4

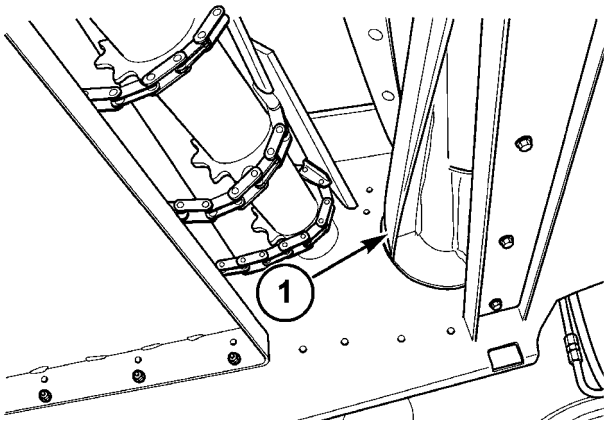
https://truckmanualshub.com/

6. Remove the washer and bolt, **(1)**.



50032103A5 5

7. Remove the stone beater, **(1)**, from the feeder.



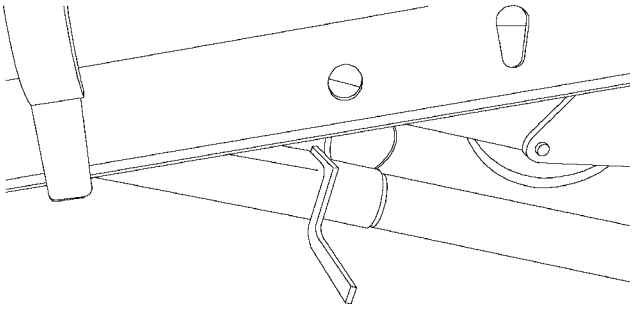
10032090A5 6

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Stone beater - Install (K.90.E.58 - F.10.A.15)

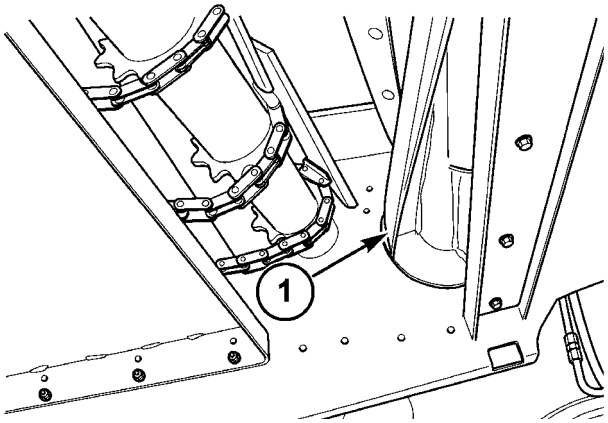
AFX8010

1. Fully raise the feeder and install the cylinder safety stop.



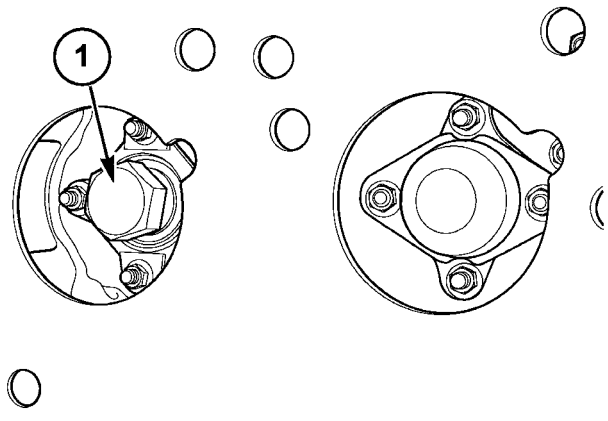
40030317 1

2. Install stone beater, **(1)**, into feeder with the threaded end toward the right hand side.



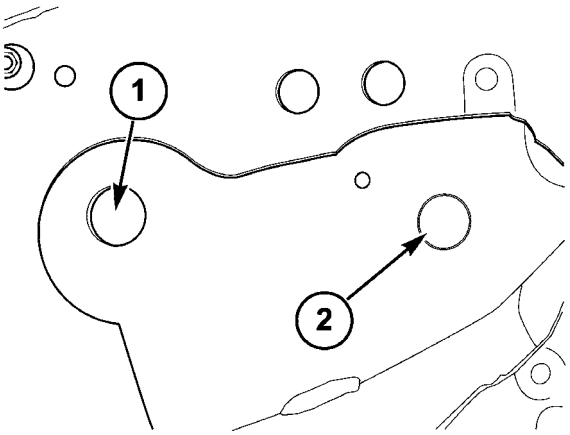
10032090A5 2

3. Insert 1-1/2" washer and 1-1/2" bolt, **(1)**, into the end of the beater drum.



50032103A5 3

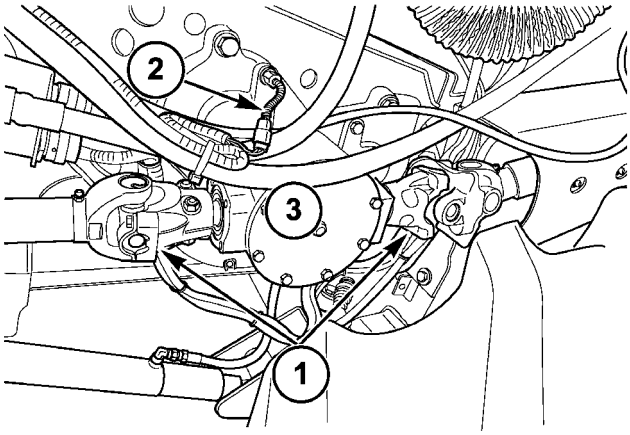
4. Line up the spline in the sprocket, **(1)**, and the beater drum, **(2)**. Coat the splines with #2 moly disulfide grease, then install the gearbox.



10032093A5 4

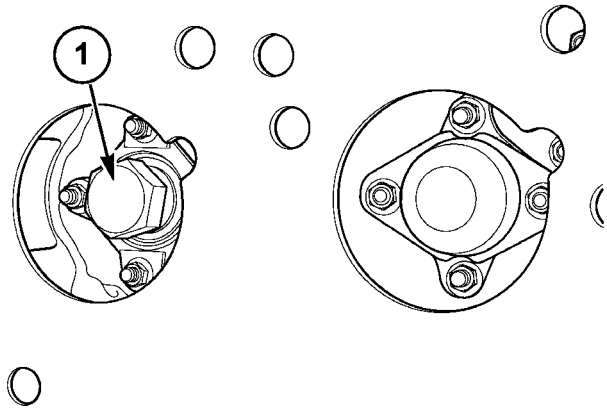
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5. Connect the drive lines, **(1)**, and the speed sensor, **(2)**, to the gearbox, **(3)**.



50032030A5 5

6. Torque the 1-1/2" bolts, **(1)**, to **1054 Nm**(**775 lb ft**).



50032103A5 6

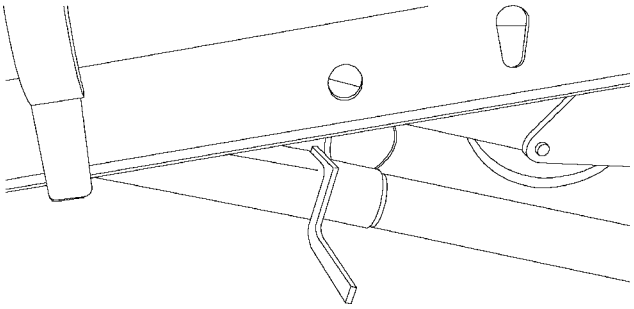
7. Install the stone trap as described in **Stone trap - Install (K.90.E.70 - F.10.A.15)**.

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Stone trap - Remove (K.90.E.70 - F.10.A.10)

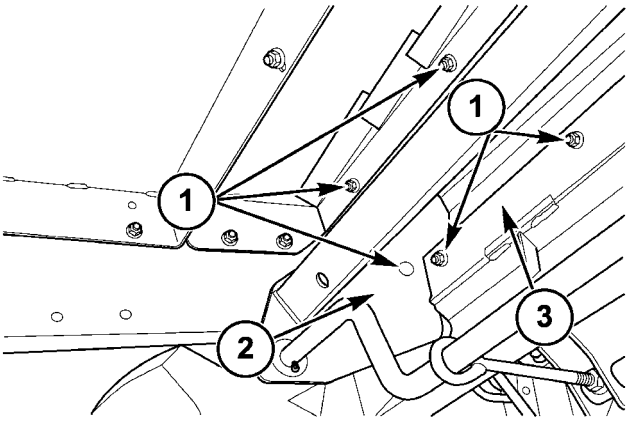
AFX8010

1. Fully raise the feeder and install the cylinder safety stop.



40030317 1

2. Remove the bolts, washers, and nuts, **(1)**, and lower the stone trap, **(2)**, and front floor section, **(3)**.



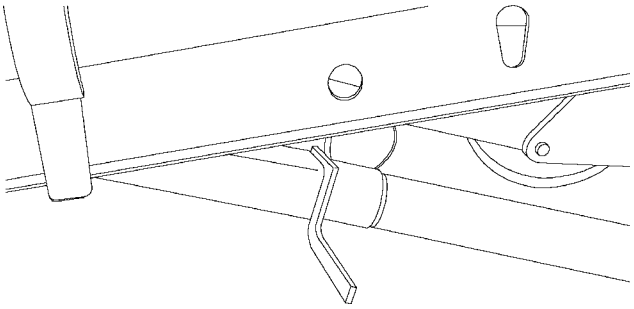
10032094B5 2

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Stone trap - Install (K.90.E.70 - F.10.A.15)

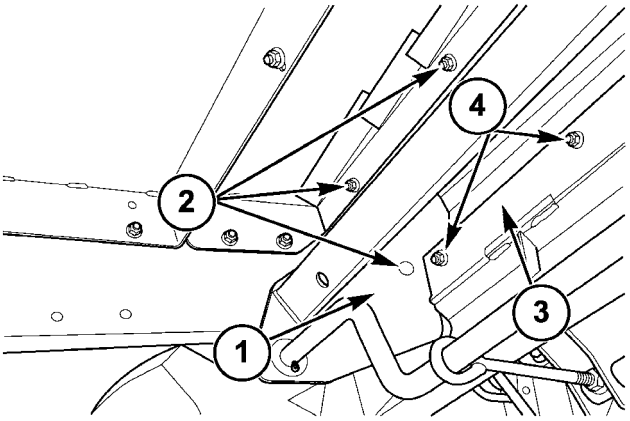
AFX8010

1. Fully raise the feeder and install the cylinder safety stop.



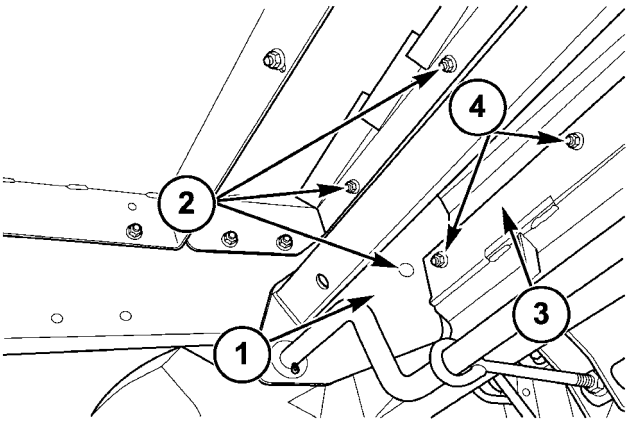
40030317 1

2. Install the stone trap sump, **(1)**, using M10-30 carriage bolts, lock washers and nuts, **(2)**.



10032094A5 2

3. Install the rear floor section, **(3)**, using M8-25 carriage bolts, lock washers and nuts along the top edge, and M10-25 carriage bolts, washers and nuts, **(4)**, to connect the floor section to the stone trap sump.



10032094A5 3

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Index

CROP PROCESSING - K

PROTECTION SYSTEMS Stone trapping - 90.E

Drive system - Assemble (K.90.E.40 - F.10.A.20) 13
AFX8010

Drive system - Disassemble (K.90.E.40 - F.10.A.25) 5
AFX8010

Drive system - Remove (K.90.E.40 - F.10.A.10) 3
AFX8010

Stone beater - Install (K.90.E.58 - F.10.A.15) 22
AFX8010

Stone beater - Remove (K.90.E.58 - F.10.A.10) 20
AFX8010

Stone trap - Install (K.90.E.70 - F.10.A.15) 25
AFX8010

Stone trap - Remove (K.90.E.70 - F.10.A.10) 24
AFX8010

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