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Genie®
A TEREX BRAND

Service and Repair Manual

Serial Number Range

GTH-1544 *(Deutz Tier 4 Final)*

From GTH15M-601

This manual includes:
Repair procedures
Fault Codes
Electrical and Hydraulic Schematics

For detailed maintenance procedures, Refer to the appropriate Maintenance Manual for your machine.

Part No. 1282264
Rev A
May 2017

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Introduction

Important

Read, understand and obey the safety rules and operating instructions in the *Genie GTH 1544 Operator's Manual* before attempting any maintenance or repair procedure.

This manual provides troubleshooting and repair procedures for qualified service professionals.

Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, tools, lifting equipment and a suitable workshop. In these instances, we strongly recommend that maintenance and repair be performed at an authorized dealer service center.

Compliance

Machine Classification
Group B/Type 3 as defined by ISO 16368

Machine Design Life
Unrestricted with proper operation, inspection and scheduled maintenance.

Technical Publications

Genie has endeavored to deliver the highest degree of accuracy possible. However, continuous improvement of our products is a Genie policy. Therefore, product specifications are subject to change without notice.

Readers are encouraged to notify Genie of errors and send in suggestions for improvement. All communications will be carefully considered for future printings of this and all other manuals.

Contact Us:

http://www.genielift.com
e-mail: awp.techpub@terex.com

Find a Manual for this Model

Go to http://www.genielift.com

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First Edition, First Printing

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Revision History

Revision	Date	Section	Procedure / Page / Description
A	05/2017		Initial Release

REFERENCE EXAMPLES:

Section 2_Specifications, Machine Specifications
Section 3_Repair Procedure, 3-2
Section 4_Fault Codes, 4-3
Section 5_Schematics, 5-3

Electronic Version

Click on any procedure or page number highlighted in blue to view the update.

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REVISION HISTORY, CONTINUED

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Section 5_Schematics, 5-3

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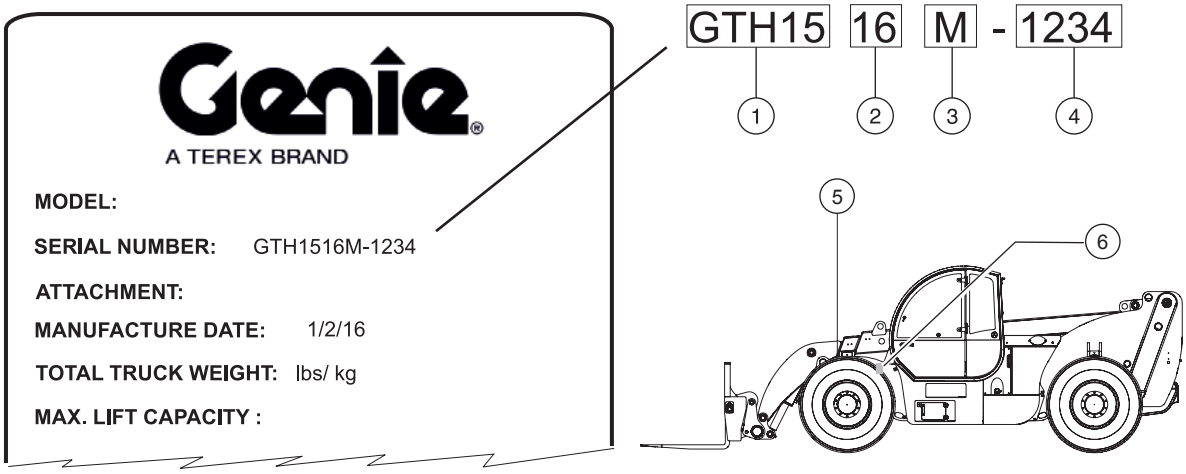
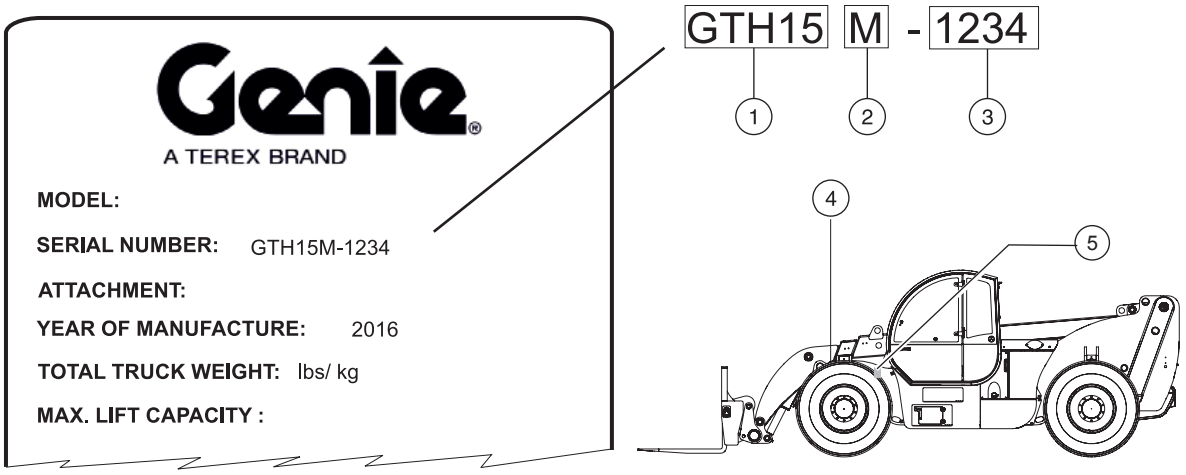
Serial Number legend

To August 31, 2016



1 Model
2 Model year
3 Facility code
4 Sequence number
5 Serial number (stamped on chassis)
6 Serial label

From September 1, 2016



1 Model
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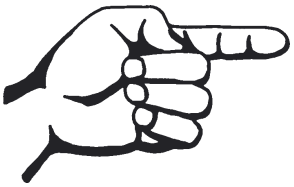

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Safety Rules

Danger

Failure to obey the instructions and safety rules in this manual and the appropriate Operator's Manual on your machine will result in death or serious injury.
Many of the hazards identified in the Operator's Manual are also safety hazards when maintenance and repair procedures are performed.

Do Not Perform Maintenance Unless:

- ☑ You are trained and qualified to perform maintenance on this machine.
- ☑ You read, understand and obey:
  - manufacturer's instructions and safety rules
  - employer's safety rules and worksite regulations
  - applicable governmental regulations
- ☑ You have the appropriate tools, lifting equipment and a suitable workshop.

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SAFETY RULES

Personal Safety

Any person working on or around a machine must be aware of all known safety hazards. Personal safety and the continued safe operation of the machine should be your top priority.

Read each procedure thoroughly. This manual and the decals on the machine, use signal words to identify the following:

Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

NOTICE Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Be sure to wear protective eye wear and other protective clothing if the situation warrants it.

Be aware of potential crushing hazards such as moving parts, free swinging or unsecured components when lifting or placing loads. Always wear approved steel-toed shoes.

Workplace Safety

Be sure to keep sparks, flames and lighted tobacco away from flammable and combustible materials like battery gases and engine fuels. Always have an approved fire extinguisher within easy reach.

Be sure that all tools and working areas are properly maintained and ready for use. Keep work surfaces clean and free of debris that could get into machine components and cause damage.

Be sure any forklift, overhead crane or other lifting or supporting device is fully capable of supporting and stabilizing the weight to be lifted. Use only chains or straps that are in good condition and of ample capacity.

Be sure that fasteners intended for one time use (i.e., cotter pins and self-locking nuts) are not reused. These components may fail if they are used a second time.

Be sure to properly dispose of old oil or other fluids. Use an approved container. Please be environmentally safe.

Be sure that your workshop or work area is properly ventilated and well lit.

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Table of Contents

Introduction

Important Information ii
Revision History iii
Serial Number Legend v

Section 1 — **Safety Rules**

General Safety Rules vii

Section 2 — **Specifications**

Machine Specifications ..... 2 - 1
Performance Specifications ..... 2 - 2
Hydraulic Specifications ..... 2 - 3
Hydraulic Component Specifications ..... 2 - 4
Function Manifold Specifications ..... 2 - 5
Air Conditioner Refrigerant Specifications ..... 2 - 5
Deutz TCD 3.6 T4FINAL L4 Engine ..... 2 - 6
Dana Gear Box 367 ..... 2 - 7
Dana 212 Axle ..... 2 - 8
Dana 223 Axle ..... 2 - 8
Hydraulic Hose and Fitting Torque Specifications ..... 2 - 9
Torque Procedure ..... 2 - 10
SAE and Metric Fasteners Torque Charts ..... 2 - 11

Section 3 — **Repair Procedures**

Introduction ..... 3 - 1

Boom Components

1-1 Boom Proximity Switch ..... 3 - 2
1-2 Boom ..... 3 - 3
1-3 Boom Lift Cylinder ..... 3 - 11

https://truckmanualshub.com/

TABLE OF CONTENTS

Section 3

Repair Procedures, continued

1-4 Boom Extend Cylinder....3 - 12
1-5 Fork Level Slave Cylinder....3 - 14
1-6 Fork Tilt Cylinder....3 - 16

Operator's compartment

2-1 Operator’s Compartment....3 - 17
2-2 Machine Controls....3 - 19

Fuel and Hydraulic Tank

3-1 Fuel tank....3 - 22
3-2 Hydraulic tank....3 - 23

Engines

4-1 Engine....3 - 24
4-2 Engine Fault Codes....3 - 24

Transmission

5-1 Gearbox....3 - 25
5-2 Axle....3 - 5

Hydraulic pumps

6-1 Boom and Steering Function Pump....3 - 27
6-2 Auxiliary Gear Pump....3 - 32
6-3 Hydrostatic Transmission Pump....3 - 35

Manifolds

7-1 Function Manifold....3 - 39
7-2 Valve coils....3 - 42

Section 4

Fault Codes

Introduction....4 - 1
Diagnostic Display....4 - 2
Engine Fault Codes - Models with Deutz TCD 3.6 L4....4 - 3

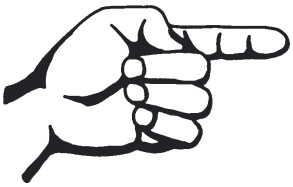
https://truckmanualshub.com/

TABLE OF CONTENTS

Section 5 **Schematics**

Introduction....5 - 1
Electrical and Hydraulic Symbol Legends....5 - 2
Electrical Schematic....5 - 3
Hydraulic Schematic - Deutz Engine....5 - 20

https://truckmanualshub.com/



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Specifications

Machine Specifications

Fluid capacities	
Fuel tank	47.6 gallons 180 liters
Hydraulic tank	48.1 gallons 182 liters
Hydraulic system (including tank)	72.7 gallons 275,2 liters

For operational specifications, refer to the Operator's Manual.

Tires and wheels	
Tire size	17.5 x 25
Tire ply rating	22
Weight, rough terrain tire (air filled)	427 lbs 194 kg
Weight, rough terrain tire (foam filled)	1275 lbs 578 kg
Tire pressure (models with air-filled tires)	87 psi 6 bar
Lug nut torque	546 ft-lbs 740 Nm
Lug pattern	10 x 13.189
Wheel diameter	53 in 135 cm
Wheel width	18 in 46.5 cm

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Performance Specifications

Drive speed, maximum	18 mph 29 km/h
Draw bar pull	23780 lbs 10786 kg
Lift capacity, maximum	15000 lbs 6804 kg

Boom function speeds, maximum	
Boom up	19 seconds
Boom down	15 seconds
Boom extend	16 seconds
Boom retract	14 seconds
Fork tilt up	5 seconds
Fork tilt down	4 seconds

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Hydraulic Specifications

Hydraulic Oil Specification	
Hydraulic oil type Viscosity grade Viscosity index	Chevron Rando HD equivalent Multi-viscosity 200
Cleanliness level, minimum	15/13
Water content, maximum	200 ppm

Chevron Rando HD oil is fully compatible and mixable with Shell Donax TG (Dexron III) oils. Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation, corrosion inhibition, seal conditioning, and foam and aeration suppression properties.

Optional fluids	
Biodegradable	Petro Canada Environ MV46 Statoil Hydra Way Bio Pa 32 BP Biohyd SE-S
Fire resistant	UCON Hydroluble HP-5046 Quintolubric 822
Mineral based	Shell Tellus S2 V 32 Shell Tellus S2 V 46 Chevron Aviation A Eni Arnica 32

NOTICE Continued use of Chevron Aviation A hydraulic fluid when ambient temperatures are consistently above 32°F / 0°C may result in component damage.

Note: Use Chevron Aviation A hydraulic fluid when ambient temperatures are consistently below 0°F / -17°C.

Note: Use Shell Tellus T46 hydraulic oil when oil temperatures consistently exceed 205°F / 96°C.

Genie specifications require additional equipment and special installation instructions for the approved optional fluids. Consult the Genie Service Department before use.

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Hydraulic Components Specifications

Boom and Steering Functions Pump	
Type:	variable displacement piston pump
Displacement	0 to 3.7 cu in 0 to 60 cc
Flow rate @ 2200 rpm	35 gpm 132 l/min
Pump pressure, maximum (measured at test port TP1)	4060 psi 280 bar
Pressure compensator (measured at test port TP1)	4060 psi 280 bar
Stand-by pressure (measured at test port TP1)	320 psi 22 bar

Auxiliary Gear Pump	
Type:	fixed displacement gear pump
Displacement	1.53 cu in 25 cc
Flow rate @ 2200 rpm	15 gpm 56 l/min
Relief valve pressure, maximum (measured at test port TP2)	2610 psi 180 bar

Hydrostatic Transmission Pump	
Type:	variable displacement piston pump
Displacement	0 to 5.5 cu in 0 to 90 cc
Flow rate @ 2200 rpm	52 gpm 198 l/min
Pump pressure, maximum (measured at test port TP4)	6450 psi 445 bar
Relief valve pressure, maximum (measured at test port TP4)	6890 psi 475 bar
Pump charge relief valve pressure, maximum (measured at test port TP3)	406 psi 28 bar

Hydrostatic Transmission Motor	
Type:	variable displacement piston motor
Displacement	0 to 6.5 cu in 0 to 107 cc
Flow rate @ 2200 rpm	52 gpm 198 l/min
Motor pressure, maximum (measured at test port TP4)	6450 psi 445 bar
Relief valve pressure, maximum (measured at test port TP4)	6890 psi 475 bar

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Function Manifold Specifications

Function Manifold	
System relief valve pressure, maximum (measured at test port TP1)	4060 psi 280 bar
Fork tilt relief valve pressure, maximum	4350 psi 300 bar

Secondary Function Valves	
Steer relief valve pressure, maximum	2610 psi 180 bar
Parking brake relief valve pressure, maximum (measured at test port TP3)	406 psi 28 bar
Diff lock relief valve pressure, maximum (measured at test port TP3)	406 psi 28 bar
Rear lock-up relief valve pressure, maximum (measured at test port TP3)	406 psi 28 bar
Sway relief valve pressure, maximum (measured at test port TP1)	4060 psi 280 bar
Auxiliary line relief valve pressure, maximum (measured at test port TP1)	4060 psi 280 bar
Transmission gearbox speed shifting relief valve pressure, maximum (measured at test port TP3)	406 psi 28 bar

Air Conditioner Refrigerant Specifications

System Full Charge	
R134a	2 lbs 3 oz

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SPECIFICATIONS

Deutz TCD 3.6 T4Final L4 Engine

Displacement	3621 cm^3
Number of cylinders	4
Bore and stroke	3.85 x 4.72 inches 98 x 120 mm
Horsepower	134 hp @ 2200 rpm 100 kW @ 2200 rpm
Peak Torque	320 lb-ft @ 1600 rpm 434 Nm @ 1600 rpm
Firing order	1 - 3 - 4 - 2
Compression ratio	17.2:1
Governor	Electronic
Low idle Frequency	990 rpm 16.5 Hz
High idle Frequency	2200 rpm 36.67 Hz
Lubrication system	
Minimum oil pressure	11.6 psi 0,8 bar
Maximum oil capacity (including filter)	8.5 quarts 8 liters
Oil viscosity requirements	
Units ship with 15W-40 API CJ4 low ash oil. Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operation and Maintenance Manual on your machine.	

Fuel requirements	
For fuel requirements, refer to the engine Operation Manual on your machine.	
Injection pump pressure	23200 psi 1600 bar
Engine coolant	
Capacity	9 gallons 33 liters
Type	TEREX PRO COOL Ethylene Glycol (ASTM D3306, ASTM D1384, FORD, G.M, FIAT)
Alternator	
Output	120 A, 14 V DC
Starter Motor	
Normal load	12 V, 4kW
Relay max	
Relay continuous	
Cranking speed	> 100 rpm
Glow Plugs	
Initial load (0-6 sec)	80 amps
Continuous load (>6 sec)	<40 amps
Battery	
Type	12V DC
Group	C31
Quantity	1
Cold cranking ampere @ 0°F	1125 A
Reserve capacity @ 25A rate	195 minutes

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Dana Gear Box 367

Transmission Type	Hydrostatic with Mechanical Gear, 2 speed
Transmission ratio - 1st speed	4.53
Transmission ratio - 2nd speed	1.62
Lubrication	
Oil capacity, gear box	1.9 quarts 1.8 liters
Oil viscosity requirements	
Units ship with SAE 85W90 API GL4. Refer to the *Dana Gear Box 367 - Attached & Indipendent Version Service Manual* (Dana part number GSM-0016).	
Dana Gear Box 367 - Attached & Indipendet Version Service Manual	
Genie part number	57.4700.0027

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SPECIFICATIONS

Dana 212 Rear Axle

Steering	Integrated steer cylinder
Joints	Heavy duty double U-joints
Steering angle, maximum	35 °
Axle Lubrication	
Differential	9 quarts 8,5 liters
Axle planetary end (each)	1.6 quarts 1,5 liters
Oil viscosity requirements	
Differential	API GL4 (MIL L-2105)
Planetary ends	API GL4 (MIL L-2105)
For additional axle information, refer to the *Dana Axle 212 Service Manual* (Dana part number ASM-0025E)	
Dana Axle Maintenance and Repair Manual	
Genie part number (axle 212) (Genie Instructions Library)	57.4700.0034

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Dana 223 Front Axle

Steering	Integrated steer cylinder
Joints	Heavy duty double U-joints
Steering angle, maximum	35 °
Axle Lubrication	
Differential	12.6 quarts 12 liters
Axle planetary end (each)	2 quarts 1.9 liters
Oil viscosity requirements	
Differential	API GL4 (MIL L-2105)
Planetary ends	API GL4 (MIL L-2105)
For additional axle information, refer to the *Dana Axle 223 Service Manual* (Dana part number ASM-0029E).	
Dana Axle Maintenance and Repair Manual	
Genie part number (axle 223) (Genie Instructions Library)	57.4700.0035

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Hydraulic Hose and Fitting Torque Specifications

Your machine is equipped with Parker Seal-Lok™ ORFS or 37° JIC fittings and hose ends. Genie specifications require that fittings and hose ends be torqued to specification when they are removed and installed or when new hoses or fittings are installed.

Seal-Lok™ Fittings
(hose end - ORFS)

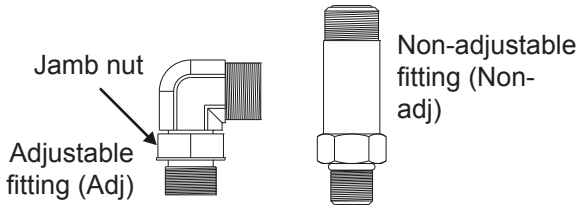
SAE Dash size	Torque
-4	10 ft-lbs / 13.6 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	140 ft-lbs / 190 Nm
-24	180 ft-lbs / 245 Nm

JIC 37° Fittings
(swivel nut or hose connection)

SAE Dash size	Thread Size	Flats
-4	7/16-20	2
-6	9/16-18	1 1/4
-8	3/4-16	1
-10	7/8-14	1
-12	1 1/16-12	1
-16	1 5/16-12	1
-20	1 5/8-12	1
-24	1 7/8-12	1

SAE O-ring Boss Port
(tube fitting - installed into Aluminum)
(all types)

SAE Dash size	Torque
-4	14 ft-lbs / 19 Nm
-6	23 ft-lbs / 31.2 Nm
-8	36 ft-lbs / 54.2 Nm
-10	62 ft-lbs / 84 Nm
-12	84 ft-lbs / 114 Nm
-16	125 ft-lbs / 169.5 Nm
-20	151 ft-lbs / 204.7 Nm
-24	184 ft-lbs / 249.5 Nm



SAE O-ring Boss Port
(tube fitting - installed into Steel)

SAE Dash size		Torque
-4	ORFS / 37° (Adj) ORFS (Non-adj) 37° (Non-adj)	15 ft-lbs / 20.3 Nm 26 ft-lbs / 35.3 Nm 22 ft-lbs / 30 Nm
-6	ORFS (Adj / Non-adj) 37° (Adj / Non-adj)	35 ft-lbs / 47.5 Nm 29 ft-lbs / 39.3 Nm
-8	ORFS (Adj / Non-adj) 37° (Adj / Non-adj)	60 ft-lbs / 81.3 Nm 52 ft-lbs / 70.5 Nm
-10	ORFS (Adj / Non-adj) 37° (Adj / Non-adj)	100 ft-lbs / 135.6 Nm 85 ft-lbs / 115.3 Nm
-12	(All types)	135 ft-lbs / 183 Nm
-16	(All types)	200 ft-lbs / 271.2 Nm
-20	(All types)	250 ft-lbs / 339 Nm
-24	(All types)	305 ft-lbs / 413.5 Nm

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Torque Procedure

Seal-Lok™ fittings

1 Replace the O-ring. The O-ring must be replaced anytime the seal has been broken. The O-ring cannot be re-used if the fitting or hose end has been tightened beyond finger tight.

Note: The O-rings used in the Parker Seal Lok™ fittings and hose ends are custom-size O-rings. They are not standard SAE size O-rings. They are available in the O-ring field service kit (Genie part number 49612).

2 Lubricate the O-ring before installation.

3 Be sure that the face seal O-ring is seated and retained properly.

4 Position the tube and nut squarely on the face seal end of the fitting and tighten the nut finger tight.

5 Tighten the nut or fitting to the appropriate torque per given size as shown in the table.

6 Operate all machine functions and inspect the hoses and fittings and related components to confirm that there are no leaks.

JIC 37° fittings

1 Align the tube flare (hex nut) against the nose of the fitting body (body hex fitting) and tighten the hex nut to the body hex fitting to hand-tight, approximately 30 in-lbs / 3.4 Nm.

2 Make a reference mark on one of the flats of the hex nut, and continue it on to the body hex fitting with a permanent ink marker. Refer to Figure 1.

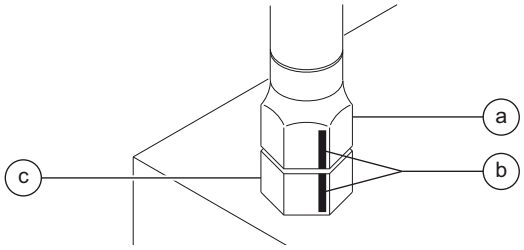

Figure 1

a hex nut
b reference mark
c body hex fitting

3 Working clockwise on the body hex fitting, make a second mark with a permanent ink marker to indicate the proper tightening position. Refer to Figure 2.

Note: Use the JIC 37° Fittings table on the previous page to determine the correct number of flats for the proper tightening position.

Note: The marks indicate that the correct tightening positions have been determined. Use the second mark on the body hex fitting to properly tighten the joint after it has been loosened.

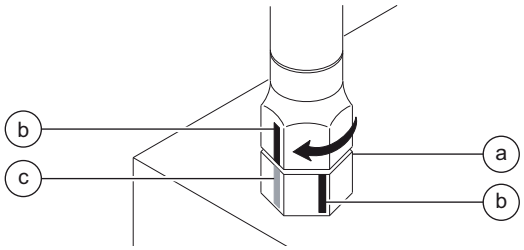

Figure 2

a body hex fitting
b reference mark
c second mark

4 Tighten the hex nut until the mark on the hex nut is aligned with the second mark on the body hex fitting.

5 Operate all machine functions and inspect the hoses and fittings and related components to confirm that there are no leaks.

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SPECIFICATIONS

SAE FASTENER TORQUE CHART

•This chart is to be used as a guide only unless noted elsewhere in this manual•

SIZE	THREAD	Grade 5				Grade 8				A574 High Strength Black Oxide Bolts	
		LUBED		DRY		LUBED		DRY		LUBED	
		in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
1/4	20	80	9	100	11.3	110	12.4	140	15.8	130	14.7
	28	90	10.1	120	13.5	120	13.5	160	18	140	15.8
		LUBED		DRY		LUBED		DRY		LUBED	
		ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
5/16	18	13	17.6	17	23	18	24	25	33.9	21	28.4
	24	14	19	19	25.7	20	27.1	27	36.6	24	32.5
3/8	16	23	31.2	31	42	33	44.7	44	59.6	38	51.5
	24	26	35.2	35	47.4	37	50.1	49	66.4	43	58.3
7/16	14	37	50.1	49	66.4	50	67.8	70	94.7	61	82.7
	20	41	55.5	55	74.5	60	81.3	80	108.4	68	92.1
1/2	13	57	77.3	75	101.6	80	108.4	110	149	93	126
	20	64	86.7	85	115	90	122	120	162	105	142
9/16	12	80	108.4	110	149	120	162	150	203	130	176
	18	90	122	120	162	130	176	170	230	140	189
5/8	11	110	149	150	203	160	217	210	284	180	244
	18	130	176	170	230	180	244	240	325	200	271
3/4	10	200	271	270	366	280	379	380	515	320	433
	16	220	298	300	406	310	420	420	569	350	474
7/8	9	320	433	430	583	450	610	610	827	510	691
	14	350	474	470	637	500	678	670	908	560	759
1	8	480	650	640	867	680	922	910	1233	770	1044
	12	530	718	710	962	750	1016	990	1342	840	1139
1 1/8	7	590	800	790	1071	970	1315	1290	1749	1090	1477
	12	670	908	890	1206	1080	1464	1440	1952	1220	1654
1 1/4	7	840	1138	1120	1518	1360	1844	1820	2467	1530	2074
	12	930	1260	1240	1681	1510	2047	2010	2725	1700	2304
1 1/2	6	1460	1979	1950	2643	2370	3213	3160	4284	2670	3620
	12	1640	2223	2190	2969	2670	3620	3560	4826	3000	4067

METRIC FASTENER TORQUE CHART

•This chart is to be used as a guide only unless noted elsewhere in this manual•

Size (mm)	Class 4.6 (4.6)				Class 8.8 (8.8)				Class 10.9 (10.9)				Class 12.9 (12.9)			
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
5	16	1.8	21	2.4	41	4.63	54	6.18	58	6.63	78	8.84	68	7.75	91	10.3
6	19	3.05	36	4.07	69	7.87	93	10.5	100	11.3	132	15	116	13.2	155	17.6
7	45	5.12	60	6.83	116	13.2	155	17.6	167	18.9	223	25.2	1.95	22.1	260	29.4
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
8	5.4	7.41	7.2	9.88	14	19.1	18.8	25.5	20.1	27.3	26.9	36.5	23.6	32	31.4	42.6
10	10.8	14.7	14.4	19.6	27.9	37.8	37.2	50.5	39.9	54.1	53.2	72.2	46.7	63.3	62.3	84.4
12	18.9	25.6	25.1	34.1	48.6	66	64.9	88	69.7	94.5	92.2	125	81	110	108	147
14	30.1	40.8	40	54.3	77.4	105	103	140	110	150	147	200	129	175	172	234
16	46.9	63.6	62.5	84.8	125	170	166	226	173	235	230	313	202	274	269	365
18	64.5	87.5	86.2	117	171	233	229	311	238	323	317	430	278	377	371	503
20	91	124	121	165	243	330	325	441	337	458	450	610	394	535	525	713
22	124	169	166	225	331	450	442	600	458	622	612	830	536	727	715	970
24	157	214	210	285	420	570	562	762	583	791	778	1055	682	925	909	1233

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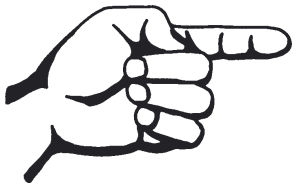

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Repair Procedures

Observe and Obey:

- ☑ Repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.

Before Repairs Start:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and parts are available and ready for use.
- ☑ Use only Genie approved replacement parts.
- ☑ Read each procedure completely and adhere to the instructions. Attempting shortcuts may produce hazardous conditions.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - · Machine parked on a firm, level surface
  - · Boom in the stowed position
  - · Key switch in the off position with the key removed
  - · Wheels chocked

About This Section

Most of the procedures in this section should only be performed by a trained service professional in a suitably equipped workshop. Select the appropriate repair procedure after troubleshooting the problem.

Perform disassembly procedures to the point where repairs can be completed. Then to re-assemble, perform the disassembly steps in reverse order.

Symbols Legend

Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠DANGER Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠WARNING Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠CAUTION Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

NOTICE Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Note: Used to indicate additional operation or procedure information.

- ⊙ Indicates that a specific result is expected after performing a series of steps.
- ⊠ Indicates that an incorrect result has occurred after performing a series of steps. 1-1

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Boom Components

1-1 Boom Proximity Switch

The boom angle switch is a proximity switch. This switch functions by sensing a change in its electromagnetic field when a metal object enters this field. A proximity switch is simply a metal detector.

The switch generates an electromagnetic field which is radiated out from the switch face. This field senses when the metal approaches the switch and when it moves away from it, which is how the switch contacts open and close.

This switch is of a fail-safe design. Should the switch or the switch wire circuit be faulty, the machine will not function outside its designed range of use.

The boom proximity switch is a component of the drive circuit and the chassis sway circuit. Both the drive and the chassis sway functions are disabled when the boom is raised to 50° or higher.

How to Test The Boom Proximity Switch

1 Remove the switch from the machine. Do not disconnect the switch wire harness from the machine.

2 Start the engine.

3 Move the switch away from any ferrous or metallic object.

⊙ Result: The light of the limit switch assembly is not illuminated.

4 Move the switch close to any ferrous or metallic object.

⊙ Result: The light of the proximity switch assembly turns on. The switch is functioning correctly.

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How to Adjust The Boom Angle Proximity Switch

The boom angle proximity switch is attached to a mounting bracket, located between the boom and the chassis directly beneath the boom pivot pin. The switch location is adjustable.

1 Start the engine.

2 Raise the boom to 50°. Confirm with a digital level.

3 At the pivot end of the boom, locate the boom angle proximity switch. Loosen the fasteners securing the proximity switch assembly to the chassis, just enough to allow the bracket to move.

4 Move the proximity switch assembly until the light of the proximity switch turns on, then move the proximity switch assembly until the light of the proximity switch turns off.

5 Securely tighten the fasteners. Do not over tighten.

6 Lower the boom to 45°.

⊙ Result: The light of the proximity switch assembly is illuminated.

7 Raise the boom to 50°. Confirm with a digital level.

⊙ Result: The light of the proximity switch assembly is not illuminated. The proximity switch is properly calibrated.

⊠ Result: The light of the proximity switch assembly is illuminated. The proximity switch is not calibrated correctly. Repeat the procedure beginning with step 4.

1-2 Boom

How to Replace the Boom Wear Pads

1 Extend the boom until the wear pads are accessible.

2 **Fork end of the boom - lower wear pads**: Using a lifting strap from an overhead crane or a fork lift of sufficient capacity, lift the boom tube just enough to remove the weight from the pads.

3 **Pivot end of the boom - lower and upper wear pads**: Use a prisebar to remove the weight of the boom inner section from the pads.

4 Remove the wear pad retainer plates and remove the wear pads from the boom.

5 Lubricate the wear surface of the new pads. Refer to Maintenance Procedure A-4, *Lubricate the Boom*.

Note: Do not lubricate the side wear pads.

6 Install the wear pads. Install and securely tighten the retainer plates. Do not over tighten.

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BOOM COMPONENTS

How to Remove the Lifting Fork Frame

1 With the boom in the stowed position, attach a lifting strap from an overhead crane to the top of the lifting fork frame at the front of the boom. Support the frame. Do not apply any lifting pressure.

2 If the machine is equipped with the lifting fork frame locking cylinder, disconnect the locking cylinder hoses from the boom.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Remove the screw securing the fork level cylinder pivot pin to the lifting fork.

4 Use a soft metal drift to remove the pivot pin.

5 Remove the screw securing the fork frame pivot pin to the boom.

6 Use a soft metal drift to remove the pivot pin.

7 Using the overhead crane, lift and remove the fork frame from the boom.

⚠CAUTION Crushing hazard. The fork frame could fall if not properly supported when the lock pin is removed from the machine.

How to Replace the Boom Retract Chains

Note: Perform this procedure on a firm, level surface with the wheels chocked.

1 Remove the boom, according to the dedicated paragraph.

2 Place the boom on a structure capable of supporting it.

3 Remove the screws “**1**” securing pin

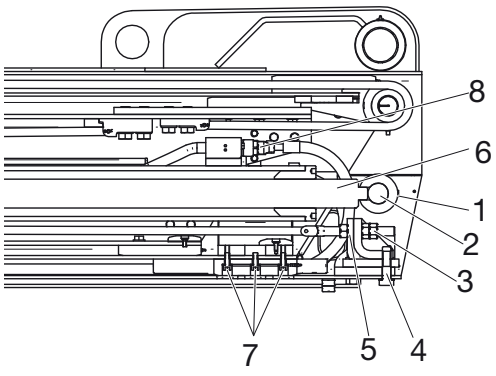
4 Use a soft metal drift and a hammer to remove pin “**2**”.

5 Remove the screws “**3**” securing chains to the boom.

6 Remove the screws “**3**” securing bracket “**4**”.

7 Remove the bracket "**4**".

8 Disconnect the hydraulic hoses "**8**" from the cylinder overcenter valve, remove the six screws "**7**" securing the boom telescope cylinder to the second boom section.



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9 Use an overhead crane to pull the boom telescope cylinder out of the second boom section by approximately 80 in / 2 m.

10 Remove the screws "f" securing the chain anchor plates "g" and remove the chains.

11 Remove the screws "a" securing the chain anchor plates "b" and remove the chains.

12 Securely attach a guide rope (length of about 395 inches / 10 m) to the chain. This will be used to install the new chain.

Note: The guide rope must be securely attached to the chain before removal. If the rope becomes disconnect from the chain during removal, the installation of the new chain will be difficult.

13 Remove the rope from the old chain and attach it to the new chain.

14 Using the assistance of a second operator, install the chain by pulling the guide rope from the fork end of the boom while the other operator guides the chain from the pivot end of the boom.

15 Remove the guide rope.

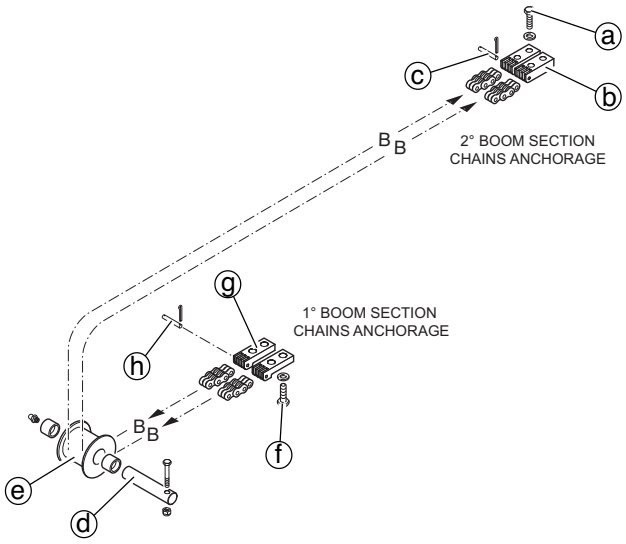
16 Install the screws "a" securing the chains.

17 Install the screws "f" securing the chains.

18 Reinstall the extension boom cylinder and secure it by screws "**7**"

19 Extend and retract the boom to insure it operates smoothly.

NOTICE Component damage hazard. Chains can be damaged if the boom is used while the chains are out of adjustment. Do not return the machine to use until the chains have been correctly adjusted.



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BOOM COMPONENTS

How to Replace the Boom Extend Chains

Note: Perform this procedure on a firm, level surface with the wheels chocked.

1 Remove the boom, according to the dedicated paragraph.

2 Place the boom on a structure capable of supporting it.

3 Remove pin "b" and pulley "a".

4 Remove the bracket “**m"**.

5 Remove the boom telescope cylinder, according to the dedicated paragraph.

6 Remove nuts "c" and counternuts "d" to free the tensioners "e" placed inside the boom.

7 Remove the tensioners "e" from the chains, by pulling out the retaining fasteners "f".

8 Remove the screws "g" securing the chain anchor plates "h" of the retract chains,.

9 At the pivot end of the boom, remove the chain by pulling it out of the boom assembly.

10 Using the assistance of a second operator, install the chain by pulling the guide rope while the other operator guides the chain.

11 Remove the guide rope.

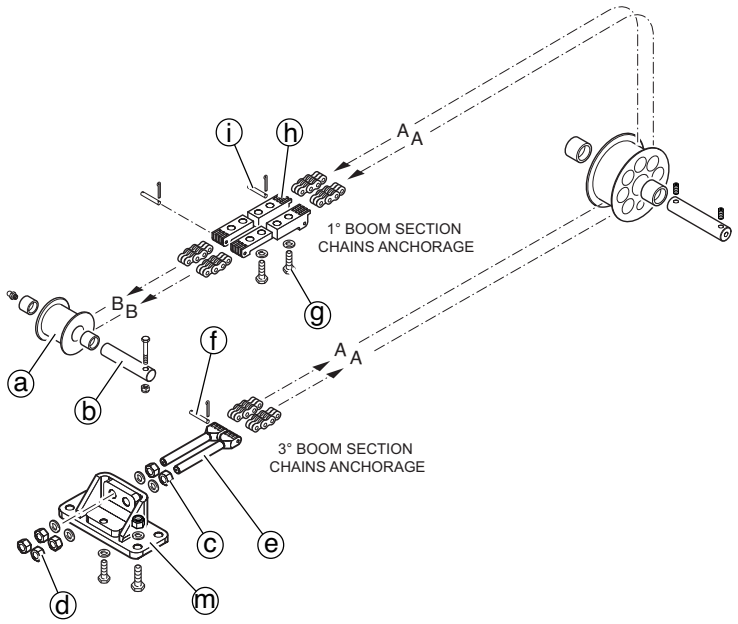
12 Connect the chains to the chain anchor plates "h" by means of the retaining fasteners "i".

13 Install the screws "g" securing the chains.

14 Connect the chains to the tensioners "e" by means of the retaining fasteners "f".

15 Install the tensioners "e" in the bracket "m", then install nuts "c" and counternuts "d" and tension the chains.

16 Install the pulley "a" and pin "b" previously removed from the pivot end of the boom.



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17 Extend and retract the boom to insure it operates smoothly.

NOTICE Component damage hazard. Chains can be damaged if the boom is used while the chains are out of adjustment. Do not return the machine to use until the chains have been correctly adjusted.

How to Remove the Boom

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Remove the forks from the boom.

2 Disconnect the electric cables from the boom.

3 Lift the boom until the pin locking the lift cylinder is in a position above the cab roof.

4 Place a stand under the lift cylinder to properly support it once the pin connecting the cylinder to the boom will be removed.

5 Attach a lifting strap from an overhead crane to the fork support and slightly lift the boom. Do not apply any lifting pressure.

6 Attach a second strap from the overhead crane to the lifting cylinder, rod side, and put some tension on it.

7 Using a soft metal drift, remove the slave cylinder locking pin from the boom support.

⚠DANGER Crushing hazard. The cylinder will fall if not properly supported when the pivot pin is removed from the machine.

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8 Using a soft metal drift, remove the lift cylinder locking pin, boom side.

9 Operate the 2 overhead cranes at the same time to lower the boom being careful to rest the lift cylinder onto the support previously placed underneath, and the boom tip onto another stand positioned to support the front part of the boom.

10 Hook the 4 lifting points and then slowly lift the boom.

11 Tag, disconnect and plug the hydraulic hoses that go to the extend, retract, fork tilt and fork leveling cylinders, and the quick coupling cylinder (if equipped).

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

12 Using a soft metal drift, remove the pin securing the boom to the machine.

⚠DANGER Crushing hazard. The boom will fall if not properly supported when the pivot pin is removed from the machine.

13 Carefully remove the boom assembly from the machine and place it on a structure capable of supporting it.

How to Disassemble the Boom

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure on a firm, level surface with the boom in the stowed position and the wheels chocked.

1 Raise the boom to a horizontal position.

2 Remove the screws “**a**” securing pin “**b**”.

3 Use a soft metal drift and a hammer to remove pin “**b**”.

4 Disconnect the flexible hoses “**c**” and “**d**” from the boom telescope cylinder, then cover the ends to prevent dirt from entering inside.

5 Reach position “**e**” under the boom.

6 Disconnect the flexible hoses “**c**” and “**d**”, then cover the ends to prevent dirt from entering inside. Pull them out from below the boom.

7 At the fork end of the boom, disconnect the flexible hoses from the fork tilt cylinder (ref. “**f**”) and the attachment lock/unlock cylinder (ref. “**g**”).

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8 Cover the ends of the flexible hoses to prevent dirt from entering inside.

9 At the pivot end of the boom, remove the clamps and brackets securing the flexible hoses “**f**” and “**g**” to the boom section.

10 Securely attach a guide rope to the flexible hoses. This will be used to install the new hoses. Pull out the previously disconnected flexible hoses from the pivot end of the boom.

11 Reach position “**e**” under the boom.
12 Disconnect the flexible hoses “**f**” and “**g**”, then cover the ends and pull them out completely.

13 At the pivot end of the boom, remove the locknuts of the extend chain tensioners.

14 Disassemble the support securing the extend chain tensioners and pull it out of the boom.

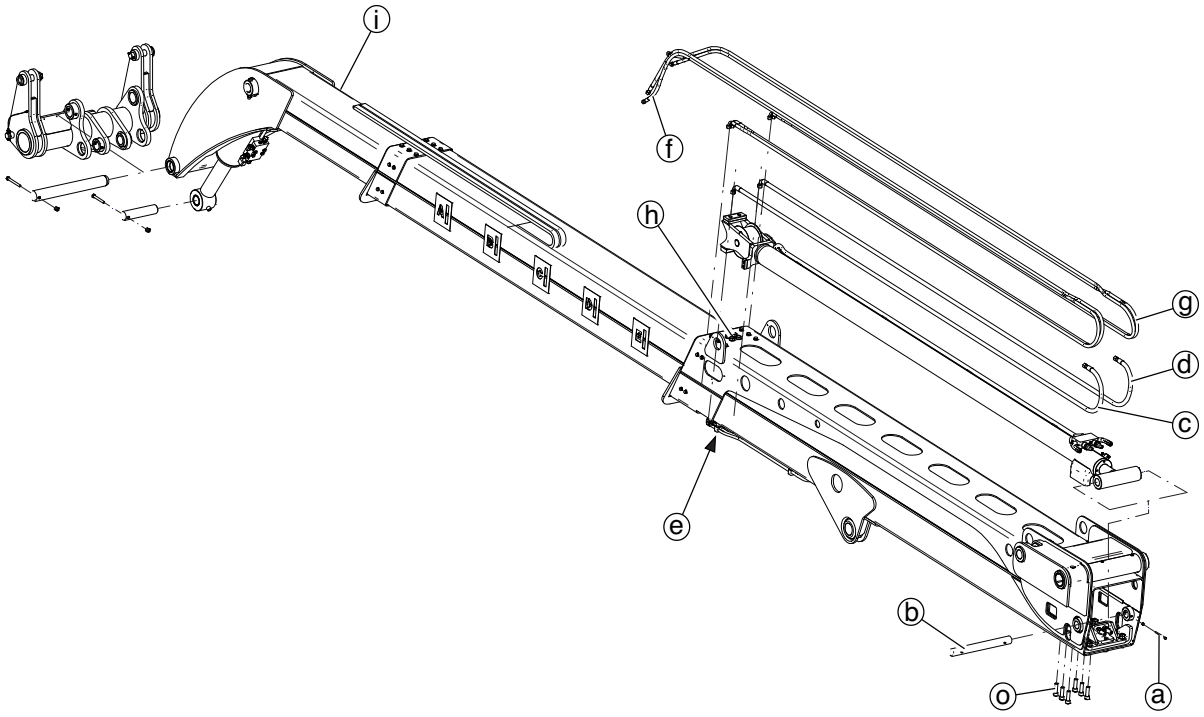
15 Reach the upper area of the boom fork end and remove the 4 screws “**h**” securing the boom retract chains, then pull out the end of the chain retaining the first boom section.

16 The second and third sections are disconnected from the first section and can be pulled out.

17 Using an overhead crane and lifting accessories compliant with the regulations in force, sling the boom in the position “**i**”, slightly lift the boom in order to take the weight out from the lower pads, then pull the second and third sections out of approximately 16-19 in / 40-50 cm simultaneously.

18 Remove all front pads in the first boom section.

19 Attach lifting straps to the second and third boom sections; handle them very slowly, paying attention to the position of the straps to make sure the boom sections are always horizontal.



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BOOM COMPONENTS

DANGER Ensure that the third section remains inside the second one and does not come out.

20 Once removed, place the second and third boom sections on two stands suitably positioned.

21 Remove the retaining screws from brackets "**m**" and "**n**" positioned at the pivot end of the boom, on top of it, and pull out the boom retract and extend chains.

22 Remove the 6 screws "**o**" securing the extend cylinder to the second boom section, and pull it out completely, by following the procedure described under "*How to remove the extend cylinder*".

23 At the fork end of the boom, attach lifting straps from an overhead crane to pull the third boom section out of the second by approximately 16-19 in / 40-50 cm.

24 Remove all the front pads in the second boom section.

25 Attach lifting straps to the third boom section. Pull the section out and handle very slowly, paying attention to the position of the straps to make sure the section is always horizontal.

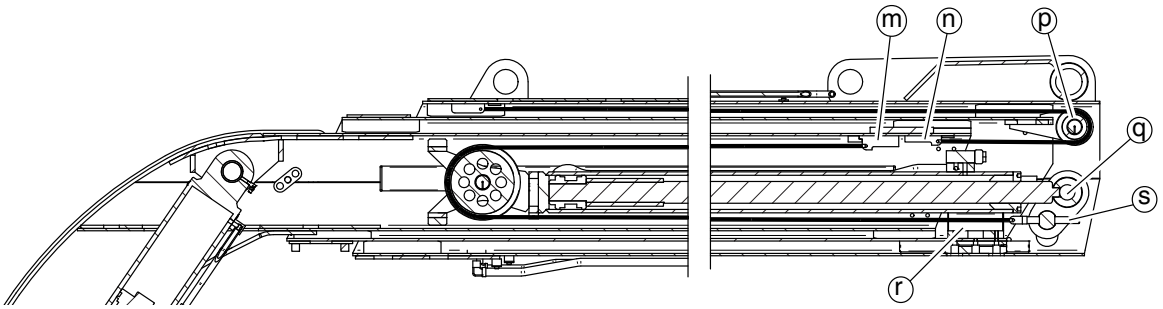
26 Once removed, place the third section on two stands suitably positioned.

27 Remove the fork level cylinder by following the procedure described under "*How to remove the fork level cylinder*".

28 Remove the lifting fork frame by following the procedure described under "*How to remove the lifting fork frame*".

29 Remove all remaining pads from their housings.

30 Remove the pulley "**p**" mounted on top of the second boom section, at the back of it.



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1-3
Boom Lift Cylinder

How to Remove the Lift Cylinder

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Attach a lifting strap from an overhead 22045 lbs / 10,000 kg crane to the fork end of the boom. Support the boom. Do not apply any lifting pressure.

2 Tag, disconnect and plug the hydraulic hoses at the lift cylinder manifold. Cap the fittings.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

NOTICE Component damage hazard. Hoses can be damaged if they are kinked or pinched.

3 Attach a lifting strap from an overhead crane to the rod end of the lift cylinder. Support the cylinder. Do not apply any lifting pressure.

4 Remove the fasteners securing the lift cylinder barrel-end pivot pin to the chassis.

5 Use a soft metal drift to remove the pivot pin.

6 Remove the fasteners securing the lift cylinder rod-end pivot pin to the boom.

7 Use a soft metal drift to remove the pivot pin.

⚠DANGER Crushing hazard. The boom will fall if not properly supported when the pivot pin is removed from the machine.

8 Using the overhead crane, raise the boom to a horizontal position. Remove the cylinder from the machine.

⚠DANGER Crushing hazard. The cylinder could fall if not properly supported when removed from the machine.

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BOOM COMPONENTS

1-4
Boom Extend Cylinder

How to Remove the Extend Cylinder

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Raise the boom to a horizontal position.

2 Verify that the retaining screws "a" are visible and can be reached from the bottom of the boom, at the back of it. The third section features some holes matching the cylinder retaining screws, when the boom is retracted.

3 Tag, disconnect and plug the hydraulic hoses from the extend cylinder. Cap the cylinder fittings.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

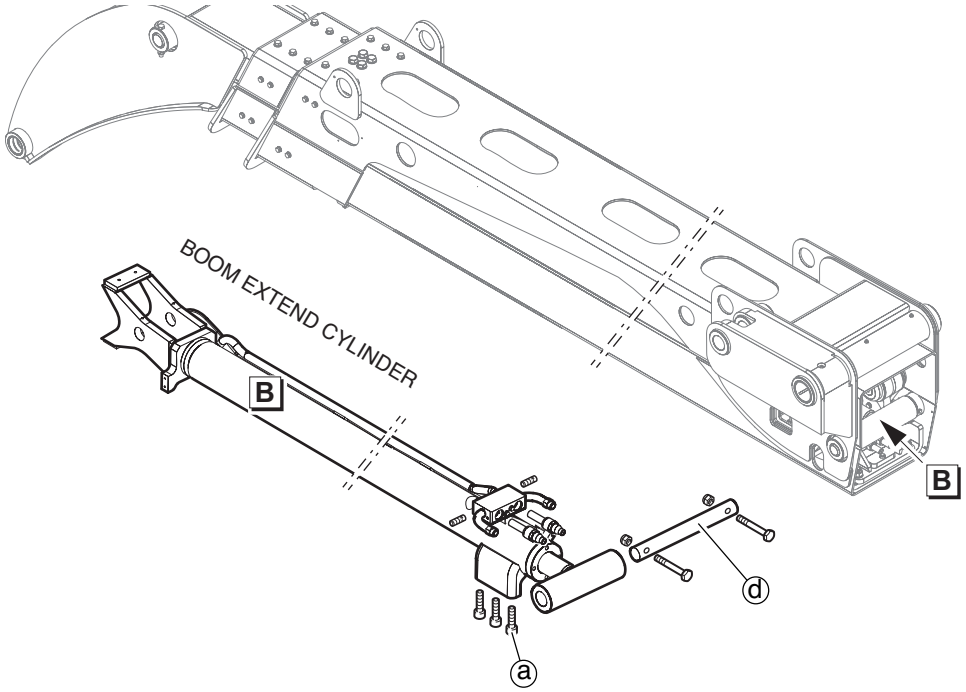
NOTICE Component damage hazard. Hoses can be damaged if they are kinked or pinched.

4 Open the fasteners "b" retaining the hoses inside the boom.

5 Remove the iron brackets "c".

6 Remove the cylinder screws, rod side.

7 Remove the retaining fasteners securing the extend cylinder barrel-end pivot pin.



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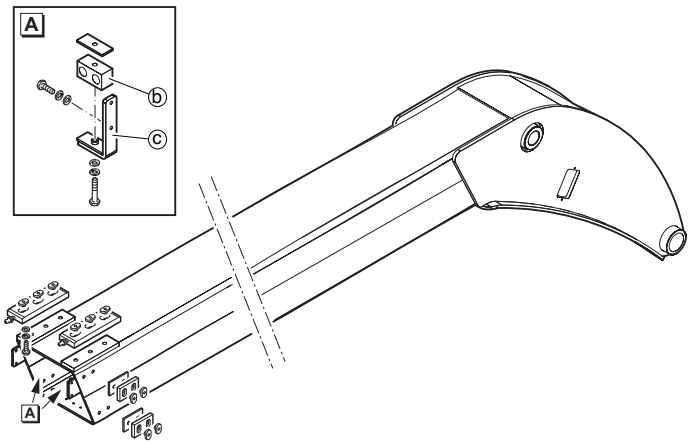
8 Using a soft metal drift and a hammer, remove the pivot pin "d".

9 Remove the rear bracket the chain tensioners are secured to.

10 Partially pull the cylinder out. Using a lifting strap and an overhead crane, remove the cylinder.

⚠ DANGER Crushing hazard. The cylinder could fall if not properly supported when removed from the machine.



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1-5
Fork Level Cylinder

How to Remove the Fork Level Cylinder

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Remove the retaining fasteners securing the level cylinder rod end pivot pin.

2 Using a soft metal drift and a hammer, remove the pivot pin.

3 Using a lifting strap and an overhead crane, support the cylinder.

4 Place a container of suitable size under the hydraulic hoses before disconnecting.

5 Tag, disconnect and plug the hydraulic hoses from the level cylinder. Cap the cylinder fittings.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

NOTICE Component damage hazard. Hoses can be damaged if they are kinked or pinched.

6 Remove the retaining fasteners securing the level cylinder barrel end pivot pin.

7 Using a soft metal drift and a hammer, remove the pivot pin.

8 Carefully lift and remove the cylinder from the machine.

⚠DANGER Crushing hazard. The cylinder could fall if not properly supported when removed from the machine.

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How to Replace the Fork Level Cylinder Hoses

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Start the engine.

2 Raise the boom to a horizontal position.

3 Fully retract the boom.

4 Turn the machine off and remove the key from the key switch.

5 Before replacing a hydraulic hose, thoroughly clean the machine.

6 Tag, disconnect and plug the hydraulic hoses from the fork level cylinder.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

7 Securely attach a guide rope (lenght about 395 inches / 10 m) to the hydraulic hoses. This will be used to install the new hoses.

8 At the pivot end of the boom, remove the lateral fasteners securing the hoses inside the first boom section, and pull the hoses out of the boom.

9 Get underneath the boom, disconnect the hoses from fittings “c”, then pull out the hoses from underneath the boom.

10 Remove the rope from the old hydraulic hoses and attach it to the new hydraulic hoses (straight end side).

11 Install the hoses "a" from underneath the boom: pull them from the rear side of the boom to connect the 90° ends to fittings “b”.

12 Install the hoses "a" from behind the boom: pull them from the front side of the boom to connect the straight ends to fittings “b”.

NOTICE Component damage hazard. Hoses can be damaged if they are kinked or pinched.

13 Install the plastic fasteners securing the hoses to the rear side of the first boom section, at the back of the machine.

14 Start the engine, and extend and retract the boom. Verify that there are no abnormal tensions on the hoses.

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1-6
Fork Tilt Cylinder

How to Remove the Fork Tilt Cylinder

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

1 Remove the forks from the frame.

2 Remove the retaining fasteners securing the fork tilt cylinder rod end pivot pin.

3 Using a soft metal drift and a hammer, remove the pivot pin.

4 Using a lifting strap and an overhead crane, support the cylinder.

5 Place a container of suitable size under the hydraulic hoses before disconnecting.

6 Tag, disconnect and plug the hydraulic hoses from the level cylinder. Cap the cylinder fittings.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

NOTICE Component damage hazard. Hoses can be damaged if they are kinked or pinched.

7 Remove the retaining fasteners securing the fork tilt cylinder barrel end pivot pin.

8 Using a soft metal drift and a hammer, remove the pivot pin.

9 Carefully lift and remove the cylinder from the machine.

⚠DANGER Crushing hazard. The cylinder could fall if not properly supported when removed from the machine.

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Operator's Compartment

2-1
Operator's Compartment

How to Remove the Operator's Compartment

The operator's compartment is used to activate machine functions while sitting in the operator's drivers seat.

Within the operator's compartment there is a transmission column shifter, steering selector, 4-way controller, accelerator pedal, brake pedal and a differential lock switch. All of these components are replaceable.

For further information or assistance, consult the Genie Service Department.

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is required.

1 Start the diesel engine and raise the boom above the cab.

2 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

3 Remove the protective cover next to the cab - inner side of the machine.

4 Cut the plastic fasteners fixing the electrical cables, then disconnect all of the electrical wires.

5 Remove the guards under the steering wheel to access the pipes of the power steering.

6 Tag, disconnect and plug the hydraulic lines of the power steering unit and of the heater.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

7 Remove the cover which is located under the cab.

8 Disconnect the electrical and hydraulic connections from the brake pump.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

9 Disconnect the ground wire.Remove the joystick guard inside the cab; remember to disconnect the electric plugs.

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OPERATOR'S COMPARTMENT

10 Remove the 4 retaining fasteners of the cabin.

11 Install and secure two eyebolts to the top the cabin in the special seats.

12 Using a sling chain and an overhead crane, slowly raise the cabin away from the machine and set it on a supporting device.

NOTICE Component damage hazard. Wrapping a strap around the cab and lifting using an overhead crane can put excessive pressure on the glass windows of the cab, causing the windows to break. Do not lift the cab using a strap from an overhead crane.

Bolt torque specification	
Operator's cab mounting bolts	155 ft-lbs 210 Nm (plus Locktite compound)

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2-2
Machine Controls

How to Remove the Steering Column

1 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

2 Remove the lower part of the dashboard.

3 Remove the upper part of the dashboard.

4 Remove the transmission control lever.

5 Remove the light control lever.

6 Remove the screws which secure the steering column to the frame.

7 Remove the steering column.

How to Remove the Steering Wheel

1 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

2 Remove the horn button from the steering wheel. Remove the nut securing the steering wheel to the column and remove the steering wheel.

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OPERATOR'S COMPARTMENT

How to Remove the Steer Rotation Actuator

1 Remove the steering column. See 2-2, *How to Remove the Steering Column*.

2 Working under the dashboard, locate the hydraulic hoses of the steer rotation actuator.

3 Tag, disconnect and cap the hydraulic hoses and steer rotation actuator holes.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

4 Remove the retaining fasteners that secure the steer rotation actuator to the frame.

5 Remove the steer rotation actuator.

How to Remove the Joystick

1 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

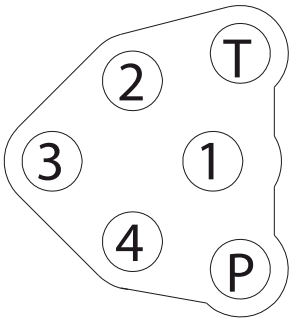
2 Remove the retaining fasteners that secure the joystick to the mount panel.

3 Tag and disconnect the joystick harness connector from the machine.

4 Tag, disconnect and plug the hoses from ports 1, 2, 3, 4, P and T of the joystick. Cap the fittings.

Note: Removing the hydraulic hose from port T of the joystick with the joystick below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not disconnect the hose from the port if the joystick is below the hydraulic oil level in the hydraulic tank.

5 Remove the fasteners securing the joystick to the mount panel. Remove the joystick.



Joystick port orientation

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How to Remove the Brake Pedal Assembly

1 Set the ignition switch to position "1".

2 Fully depress then release the brake pedal until the low brake pressure warning light comes on.

3 Go on depressing and releasing the brake pedal for about one minute in order to relieve all the pressure in the system.

4 Set the ignition switch to position "0".

5 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

6 Tag and disconnect the brake harness.

7 Tag, disconnect and plug the hydraulic hoses of the brake pedal pump.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

8 Remove the retaining fasteners securing the brake pedal. Remove the brake pedal.

How to Remove the Gauge Cluster Assembly

1 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

2 Remove the upper part of the dashboard.

3 Reach under the dashboard and gently push the gauge cluster through the opening in the dashboard.

4 Tag and disconnect the wire harness from the gauge cluster. Remove the gauge cluster from the machine.

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Fuel and Hydraulic Tanks

3-1
Fuel Tank

How to Remove the Fuel Tank

⚠DANGER Explosion and fire hazard. Engine fuels are combustible. Remove the fuel tank in an open, wellventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

⚠DANGER Explosion and fire hazard. Never drain or store fuel in an open container due to the possibility of fire.

⚠DANGER Explosion and fire hazard. When transferring fuel, connect a grounding wire between the machine and pump or container.

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

1 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

2 Remove the filler cap from the fuel tank.

3 Using an approved hand-operated pump, drain the fuel tank into a container of suitable capacity. Refer to Section 2, Specifications.

⚠WARNING Explosion and fire hazard. When transferring fuel, connect a grounding wire between the machine and pump or container.

Note: Be sure to only use a hand operated pump suitable for use with gasoline and/or diesel fuel.

4 Remove the small cover located on the top of the fuel tank.

5 Tag and disconnect the wire harness from the fuel level terminals.

6 Close the 2 taps on the tank side and disconnect the fuel hoses (Webasto burner feed hose, and delivery and return hoses of the diesel engine fuel system).

7 Insert the forks of a forklift under the tank to support it. Ensure the forks are properly spaced to maintain the tank in a balanced position.

⚠DANGER Crushing hazard. The tank could become unbalanced and fall if not properly supported when removed from the machine.

8 Remove the retaining fasteners securing the tanks to the machine.

9 Remove the tank from the machine.

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3-2 Hydraulic Tank

How to Remove the Hydraulic Tank

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

1 Lift the boom.

2 Get behind the front right wheel and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

3 Close the oil intake valves.

4 Remove the cover located on the top of the oil tank.

5 Remove the filler cap from the hydraulic tank.

6 Place a drain pan or other suitable container under the hydraulic tank. Refer to Section 2, Specifications.

7 Remove the drain plug from the hydraulic tank and completely drain the tank.

⚠CAUTION Bodily injury hazard. Beware of hot oil. Contact with hot oil may cause severe burns.

8 Remove the wire harness from the bulb on the hydraulic filter and from the low oil level indicator.

9 Place a container of suitable size under the hydraulic hoses before disconnecting.

NOTICE Used oils must be handled and disposed of according to local regulations.

10 Tag and disconnect all the hydraulic hoses from the tank.

11 Remove the hose from the oil return manifold located at the top of the tank.

12 Remove the manifold from the top of the oil tank. See 6-1, *How to Remove the Primary Function Manifold.*

13 Insert the forks of a forklift under the tank to support it. Ensure the forks are properly spaced to maintain the tank in a balanced position.

⚠DANGER Crushing hazard. The tank could become unbalanced and fall if not properly supported when removed from the machine.

14 Remove the retaining fasteners securing the tanks to the machine.

15 Remove the tank from the machine.

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Engine

4-1 Engine

How to Repair the Deutz TCD 3.6 L4 Engine

Repair procedures and additional engine information is available in the Deutz TCD 3.6 L4 *Workshop Manual*

4-2 Engine Fault Codes

How to Retrieve Engine Fault Codes

When the engine Electronic Control Module (ECM) detects an abnormal operating condition, a fault code is immediately stored in the ECM memory. At the same time, a colored warning lamp is illuminated and the fault code is shown on the engine diagnostic display, located on the dashboard in the operator's compartment.

To learn the specifications of and how to use the fault codes, refer to Section 5, *Fault Codes*.

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Transmission

5-1 Gear Box

How to Repair the Gear Box

Repair procedures and additional gear box information are available in the *Dana 367 Gear Box Service Manual* (Dana part number GSM-0016).

Dana 367 Gear Box Service Manual	
Genie part number	57.4700.0027

5-2 Axle

How to Remove the Axle

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is required.

1 Chock the wheels.

2 Remove the fasteners securing the driveshaft to the transmission. Lower the end of the driveshaft to the ground.

3 Remove the fasteners securing the driveshaft to the axle. Remove the driveshaft from the machine.

4 Tag and remove the hydraulic hoses from the axle.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

5 Loosen the lug nuts of both wheels on the axle to be removed. Do not remove the lug nuts.

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6 Raise the end of the machine until the tires are off the ground. Place blocks under the chassis for support.

⚠WARNING Crushing hazard. The chassis will fall if not properly supported.

7 Remove the lug nuts. Remove the tire and wheel assembly from both ends of the axle.

8 Support and secure the axle to an appropriate lifting device.

9 Remove the fasteners securing the sway cylinder rod-end pivot pin to the chassis.

10 Use a soft metal drift to remove the pivot pin.

11 Remove the fasteners securing the axle to the chassis. Remove the axle from the machine.

⚠WARNING Crushing hazard. The axle will fall if not properly supported when the fasteners are removed from the machine.

Bolt torque specification	
Axle mounting bolts	515 ft-lbs 700 Nm

How to Repair the 212 Axle

Repair procedures and additional axle information are available in the *Dana 212 Axle Service Manual* (Dana part number ASM-0025E).

Dana 367 Gear Box Service Manual	
Genie part number	57.4700.0034

How to Repair the 223 Axle

Repair procedures and additional axle information are available in the *Dana 223 Axle Service Manual* (Dana part number ASM-0029E).

Dana 367 Gear Box Service Manual	
Genie part number	57.4700.0035

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Hydraulic Pumps

6-1
Boom and Steering Function Pump

How to Test the Boom and Steering Function Pump

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to port TP1.

2. Completely tighten the manifold relief valve pressure.

3 Start the engine.

4 Increase the engine speed to maximum rpm.

5 Activate and hold boom retract.

6 Without releasing the joystick, keep pushing the throttle pedal.

⊙ Result: the pressure gauge reads 5655 psi / 390 bar. The pump is good.

⊠ Pressure is not within specification.
The pump needs to be adjusted OR the pump or pump coupling is faulty and needs to be serviced or replaced.

NOTICE Component damage hazard. There is no relief valve in the hydraulic pump and the pump can be damaged if the pressure is allowed to exceed specification. When testing the pump, crank the engine in one second intervals until the correct pressure is confirmed. Do not over-pressurize the pump.

7 Increase the engine speed to maximum rpm.

8 Activate and hold boom retract.

9 Without releasing the joystick, keep pushing the throttle pedal.

10. Untighten the manifold relief valve pressure

⊙ Result: the pressure gauge reads 4060 psi / 280 bar.

11 Remove the pressure gauge and install plug onto port TP1.

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HYDRAULIC PUMPS

How to Remove the Boom and Steering Function Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Get behind the front right wheel, remove the round protective flap and disconnect the battery from the machine.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

2 Close the hydraulic tank ball valves.

3 Remove the engine cover to easily reach the pumps.

4 Tag, disconnect and plug the case drain hose located at the top of the pump. Cap the fitting on the pump.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

Note: Placing the open end of the case drain hose below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not lower the open end of the case drain hose below the fluid level of the hydraulic tank until the hose is plugged.

5 Tag, disconnect and plug the hydraulic pump supply hose at the pump. Cap the fitting on the pump.

Note: Placing the open end of the case drain hose below the hydraulic oil level in the hydraulic tank will result in excessive hydraulic fluid leaking from the hose. Do not lower the open end of the case drain hose below the fluid level of the hydraulic tank until the hose is plugged.

6 Tag, disconnect and plug the high pressure hose at the pump. Cap the fitting on the pump.

7 Remove the fasteners securing the pump, then remove the pump from the machine.

⚠WARNING Crushing hazard. The pump will fall if not properly supported when the fasteners are removed from the machine.

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How to Install the Boom and Steering Function Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Install the boom function pump on the transmission pump.

2 Install the high pressure hose onto the pump outlet.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Install the low pressure hose onto the pump outlet. Install the hose retaining rings and fasteners.

4 At the case drain at the top of the pump, fill the pump with hydraulic fluid until it reaches the top of the case drain fitting.

5 Install the case drain hose onto the pump.

6 Securely install the wire harness onto the pump.

7 Open the hydraulic tank ball valve.

8 Check the hydraulic fluid level in the hydraulic tank. Add fluid if needed.

9 Start the engine and prime the pump. See 6-1, *How to Prime the Boom and Steering Function Pump*.

10 Inspect for leaks.

11 Adjust the pump pressure. See 6-1, *How to test the Boom and Steering Function Pump*.

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HYDRAULIC PUMPS

How to Prime the Boom and Steering Function Pump

1 Connect a 0 to 870 psi / 0 to 60 bar pressure gauge to port TP1.

2 Open the hydraulic tank ball valve.

3 Start the engine, allow the engine to run at low idle for 5 seconds and then shut off the engine. Wait 15 seconds, then start the engine again. Allow the engine to run at low idle for 10 seconds and then shut off the engine.

4 Start and shut off the engine again; do not accelerate and wait for the pressure gauge to read a pressure of approx. 320 psi / 22 bar. When the value becomes stable, the pump is filled.

5 With the engine running, move the joystick slowly to verify that the movements are performed correctly.

6 Shut off the engine and inspect for oil leaks.

How to Adjust the Boom and Steering Function Pump Standby Pressure

1 Connect a 0 to 1450 psi / 0 to 100 bar pressure gauge to port TP1 (pump stand-by pressure test port).

2 Start the engine and allow the engine to run at low idle.

⊙ Result: the pressure gauge reads 320 psi / 22 bar. The pump is good. Proceed to step 5.

⊠ Pressure is not within specification. The pressure setting needs to be adjusted. Proceed to step 3.

3 Loosen the set screw for the standby pressure adjustment screw.

4 Adjust the function pump standby pressure. Turn the adjustment screw clockwise to increase the pressure or counterclockwise to decrease the pressure. Tighten the set screw.

5 Turn the engine off and remove the pressure gauge.

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How to Adjust the Boom and Steering Function Pump Pressure Compensator

Note: Two people will be required to perform this procedure.

1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to port TP1.

2 Start the engine and allow the engine to run at low idle.

3 Fully retract the boom.

4 Continue to activate the boom retract function and observe the pressure reading on the pressure gauge.

5 Turn the pressure relief valve on the function manifold incrementally and ensure that the pressure gauge reading begins to increase.

6 Stop turning the valve on the function manifold when the pressure gauge reading is stable.

⊙ Result: the pressure gauge reads 4350 psi / 300 bar. The pump is good. Proceed to step 9.

⊠ Pressure is not within specification. The pressure setting needs to be adjusted. Proceed to step 7.

7 Loosen the set screw for the pressure compensator adjustment screw on the pump.

8 Adjust the pressure compensator pressure. Turn the adjustment screw clockwise to increase the pressure; turn the adjustment screw counterclockwise to decrease the pressure. Tighten the set screw.

⚠WARNING Component damage hazard. Do not adjust the pressure compensator higher than specified.

9 Turn the pressure relief valve on the function manifold again until the pressure gauge reads 4060 psi / 280 bar.

10 Turn the engine off and remove the pressure gauge.

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HYDRAULIC PUMPS

6-2
Auxiliary Gear Pump

How to Test the Auxiliary Gear Pump

1 Locate the shutoff valve positioned underneath the cab and turn it clockwise.

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to port TP2.

3 Start the engine.

4 Increase the engine speed to maximum rpm.

⊙ Result: the pressure gauge reads 2610 psi / 180 bar. The pump is good.

⊠ Pressure is not within specification. Adjust the auxiliary system relief valve on the chassis.

How to Remove the Auxiliary Gear Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Close the hydraulic tank ball valves.

2 Tag, disconnect and plug the hydraulic hoses. Cap the fittings.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Cap the auxiliary gear pump holes and the hoses ones.

4 Remove the auxiliary gear pump.

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How to Install the Auxiliary Gear Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Install the auxiliary gear pump to the engine.

2 Connect the hydraulic hoses to the pump.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Open the hydraulic tank ball valves .

4 Start the engine and prime the pump. See 6-2, *How to Prime the Auxiliary Gear Pump.*

5 Inspect for leaks.

6 Adjust the pump pressure. See 6-2, *How to test the Auxiliary Gear Pump.*

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HYDRAULIC PUMPS

How to Prime the Auxiliary Gear Pump

1 Start the engine, allow the engine to run at low idle for 15 seconds then shut off the engine.

2 Wait 15 seconds, then start the engine again.

3 Allow the engine to run at low idle for 15 seconds and then shut off the engine.

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6-3 Hydrostatic Transmission Pump

How to Test the Hydrostatic Transmission Pump

Note: Perform this procedure on a firm, level surface, with the boom in the stowed position and brake pedal engaged.

1 In the proximity of the drive pump, spot the valve deactivating the drive pump inching. Once the test is completed, open the valve.

2 Connect a 0 to 8700 psi / 0 to 600 bar pressure gauge to port TP4 (hydrostatic transmission high pressure test port).

3 Connect a 0 to 870 psi / 0 to 60 bar pressure gauge to port TP3 (hydrostatic transmission boost pressure test port).

4 Start the engine.

⊙ Result: the pressure gauge connected to test port TP3 reads 406 psi / 28 bar.

⊠ Pressure is not within specification. Adjust the boost pressure valve "c" located under the pump.

5 Increase the engine speed to 1100 rpm.

6 Release parking brake.

7 Engage forward gear.

⊙ Result: the pressure gauge connected to test port TP4 reads 725 psi / 50 bar.

⊠ Pressure is not within specification. Adjust the DA valve "a" located under the pump.

8 Increase the engine speed to maximum rpm.

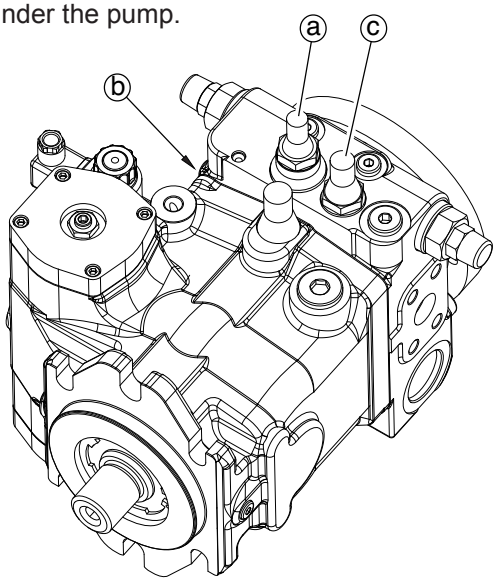
⊙ Result: the pressure gauge on test port TP4 reads 6450 psi / 445 bar.

⊠ Pressure is not within specification. Adjust the high pressure relief valve "b" located on the side of the pump.

9 While observing the pressure gauge connected to test port TP3, operate the engine between 1100 rpm and maximum rpm.

⊙ Result: the pressure gauge on test port TP3 does not go below 406 psi / 28 bar.

⊠ Pressure is not within specification. Adjust the boost pressure valve "c" located under the pump.



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HYDRAULIC PUMPS

How to Remove the Hydrostatic Transmission Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Open the engine compartment.

2 Remove the front cover of the engine housing.

3 Remove the cover that is under engine.

4 Locate the battery disconnect switch and disconnect the battery from the machine.

5 Remove the retaining fasteners that secure the battery disconnect switch mounting plate.

6 Tag, disconnect and plug the hoses that are connected to the hydrostatic transmission pump. Cap the fittings.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

7 Remove the boom function and steering piston pump from the hydrostatic transmission pump.

8 Tag and disconnect the harness from the transmission.

9 Support and secure the transmission pump to a suitable lifting device. Do not apply lighting pressure.

10 Remove the hydrostatic transmission pump.

⚠WARNING Crushing hazard. The hydrostatic transmission pump will fall if not properly supported when the fasteners are removed from the machine.

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How to Install the Hydrostatic Transmission Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Open the engine compartment.

2 Remove the front cover of the engine housing.

3 Remove the cover that is under engine.

4 Attach a lifting strap and lift the transmission pump using a overhead crane.

5 Install the hydrostatic transmission pump on the engine.

6 Remove the fitting caps from the hydrostatic transmission pump.

7 Remove the hoses caps.

8 Connect the hoses to the pump.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

9 Connect the harness to the transmission pump.

10 Install the boom function and steering piston pump on the hydrostatic transmission pump.

11 Install the retaining fasteners securing the battery disconnect switch mounting plate.

12 Start the engine and prime the pump. See 6-3, *How to Prime the Hydrostatic Transmission Pump*.

13 Inspect for leaks.

14 Adjust the pump pressure. See 6-3, *How to test the Hydrostatic Transmission Pump*.

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How to Prime the Hydrostatic Transmission Pump

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

1 Connect a 0 to 870 psi / 0 to 60 bar pressure gauge to port TP3 (hydrostatic transmission boost pressure test port).

2 Start the engine. Run at low idle for 5 seconds. Shut the engine off and wait for 15 seconds.

3 Start the engine. Run at low idle for 10 seconds. Shut the engine off and wait for 15 seconds.

4 Note: Repeat step 4 until the pressure gauge connected to TP3 reads 290 psi / 20 bar or greater.

5 Apply the brake pedal and start the engine. Shift the transmission into forward and disengage the emergency brake.

6 Release the brake pedal and slowly increase the engine rpm until the machine starts to move. Apply the brake.

7 Shift the transmission into reverse. Release the brake pedal and slowly increase the engine rpm until the machine starts to move. Apply the brake.

8 Engage the emergency brake and turn the engine off. Check for hydraulic leaks.

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Manifolds

7-1 Function Manifold

How to Remove the Function Manifold

⚠WARNING Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the fitting and/or hose end must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the engine off and cool to the touch.

1 Close the hydraulic tank ball valves.

2 Tag, disconnect and plug the hoses from the function manifold.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

3 Remove the cover above the oil tank.

4 Support and secure the function manifold to a suitable lifting device. Do not apply lighting pressure.

5 Remove the retaining fasteners securing the function manifold.

6 Remove the function manifold.

⚠WARNING Crushing hazard. The function manifold will fall if not properly supported when the fasteners are removed from the machine.

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MANIFOLDS

How to Test the Function Manifold

1 Remove the cover above the oil tank.

2 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to port TP1 (main valve hydraulic circuit test port).

3 Start the engine.

4 Increase the engine speed to maximum rpm.

5 Moving the joystick, retract the boom.

⊙ Result: the pressure gauge reads 4060 psi / 280 bar. The pump is good.

⊠ Pressure is not within specification.
Set the valve placed above the manifold.

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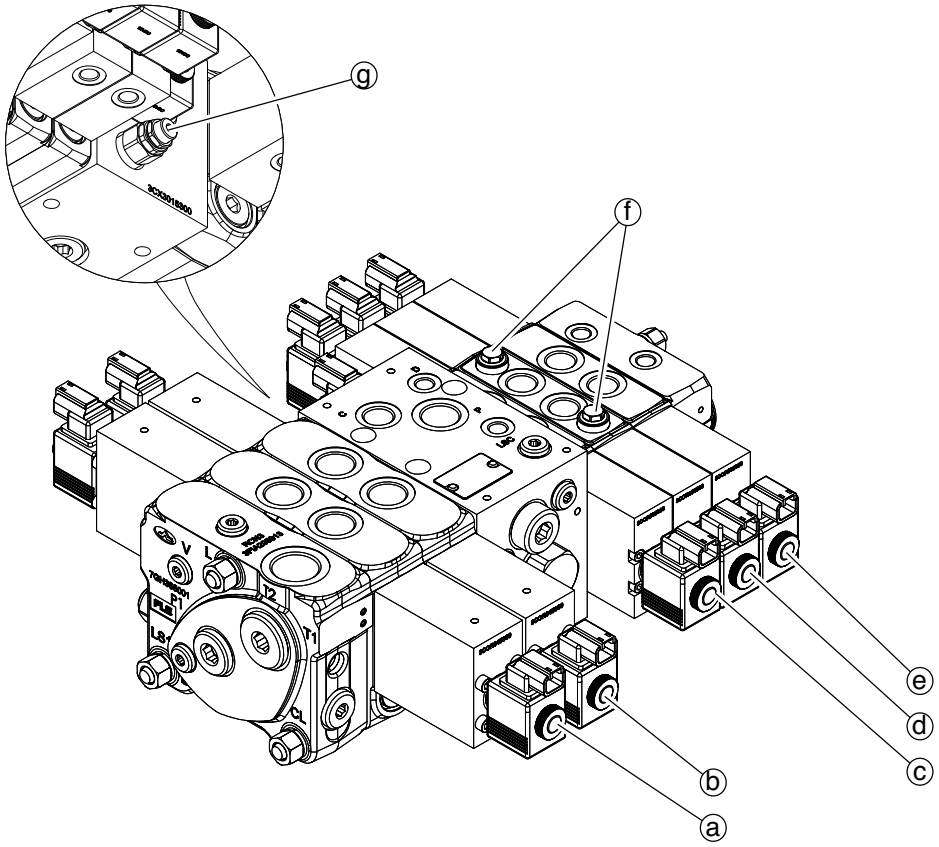
Function Manifold Components



Pos.	Function	Description	Schematic ITEM
a	Boom down/up	Hydraulic proportional control	A1 - B1
b	Boom in/out	Hydraulic proportional control	A2 - B2
c	Chassis sway functions left/right	Hydraulic proportional control	A3 - B3
d	Fork tilt down/up	Hydraulic proportional control	A4 - B4
e	Quick coupling	Hydraulic proportional control	A5 - B5
f	-	Manifold pressure setting valve	-
g	-	Anti-shock valves	-

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7-2
Valve Coils

How to Test a Coil

A properly functioning coil provides an electromagnetic force which operates the solenoid valve. Critical to normal operation is continuity within the coil. Zero resistance or infinite resistance indicates the coil has failed.

Since coil resistance is sensitive to temperature, resistance values outside specification can produce erratic operation. When coil resistance decreases below specification, amperage increases. As resistance rises above specification, voltage increases.

While valves may operate when coil resistance is outside specification, maintaining coils within specification will help ensure proper valve function over a wide range of operating temperatures.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury.
Remove all rings, watches and other jewelry.

Note: If the machine has been in operation, allow the coil to cool at least 3 hours before performing this test.

1 Tag and disconnect the wiring from the coil to be tested.

2 Test the coil resistance using a multimeter set to resistance (Ω). Refer to the Valve Coil Resistance Specification table.

⊙ Result: If the resistance is not within the adjusted specification, plus or minus 10%, replace the coil.

Valve Coil Resistance Specification

Note: The following coil resistance specifications are at an ambient temperature of 68°F / 20°C. As valve coil resistance is sensitive to changes in air temperature, the coil resistance will typically increase or decrease by 4% for each 18°F / 20°C that your air temperature increases or decreases from 68°F / 20°C.

Description	*Specification*
Steering modes selector valve, 3 position 4 way 12V DC with diode	5.6Ω
Mechanical gear speed Selector valve, 3 position 4 way 12V DC with diode	8.8Ω
Forward/Reverse Selector valve, 3 position 4 way 12V DC with diode	8.8Ω

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How to Test a Coil Diode

Genie incorporates spike suppressing diodes in all of its coils. Properly functioning coil diodes protect the electrical circuit by suppressing voltage spikes. Voltage spikes naturally occur within a function circuit following the interruption of electrical current to a coil. Faulty diodes can fail to protect the electrical system, resulting in a tripped circuit breaker or component damage.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury.
Remove all rings, watches and other jewelry.

1 Test the coil for resistance. See 7-2, *How to Test a Coil*.

2 Connect a 10Ω resistor to the negative terminal of a known good 9V DC battery. Connect the other end of the resistor to a terminal on the coil.

Resistor. 10Ω	
Genie part number	27287

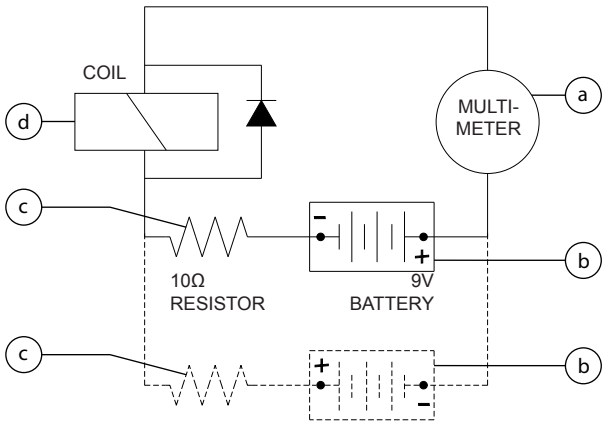
Note: The battery should read 9V DC or more when measured across the terminals.

3 Set a multimeter to read DC current.

Note: The multimeter, when set to read DC current, should be capable of reading up to 800 mA.

4 Connect the negative lead to the other terminal on the coil.

Note: If testing a single-terminal coil, connect the negative lead to the internal metallic ring at either end of the coil.



a multimeter
b 9V DC battery
c 10Ω resistor
d coil

Note: Dotted lines in illustration indicate a reversed connection as specified in step 6

5 Momentarily connect the positive lead from the multimeter to the positive terminal on the 9V battery. Note and record the current reading.

6 At the battery or coil terminals, reverse the connections. Note and record the current reading.

⊙ Result: Both current readings are greater than 0 mA and are different by a minimum of 20%. The coil is good.

⊠ Result: If one or both of the current readings are 0 mA, or if the two current readings do not differ by a minimum of 20%, the coil and/or its internal diode are faulty and the coil should be replaced.

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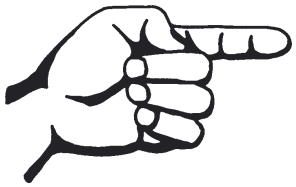

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Fault Codes

Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - · Machine parked on a firm, level surface
  - · Boom in the stowed position
  - · Key switch in the off position with the key removed
  - · Wheels chocked

Before Troubleshooting:

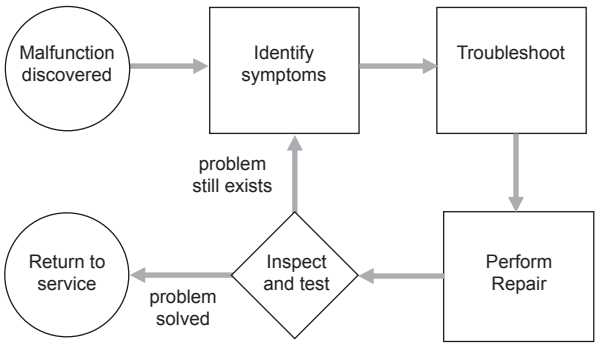
- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.
- ☑ Be aware of the following hazards and follow generally accepted safe workshop practices.

⚠DANGER Crushing hazard. When testing or replacing any hydraulic component, always support the structure and secure it from movement.

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

General Repair Process



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FAULT CODES

Diagnostic Display

When the engine Electronic Control Module (ECM) detects an abnormal operating condition, a fault code is immediately stored in the ECM memory. The presence of faults is indicated by the word “SERVICE” (replacing GENIE) on the LCD display which is located on the gauge cluster in the operator's compartment.
The gauge cluster also includes two warning lights.
They are an amber colored light which signals an abnormal engine condition which should be corrected as soon as possible and a red colored light which signals an engine condition which requires the operator to shut down the engine as soon as possible.
The ECM will, in some cases, automatically shut down the engine when the red light is displayed.

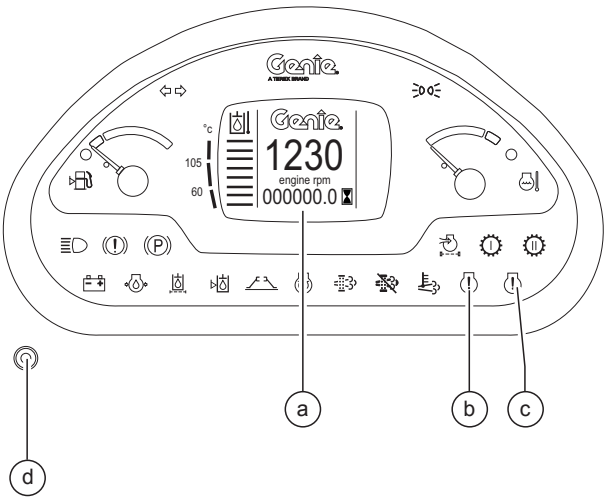
Active Fault Codes
To make the active fault codes visible, start the engine, press the diagnostic button “d” and hold it pressed for at least 5 seconds.
To quit the active fault codes page, press the diagnostic button “d” and hold it pressed for at least 5 seconds.

Active Codes vs Stored Codes
Active fault codes, indicating an engine condition or conditions which have not been corrected, are signaled on the LCD display by the word "SERVICE" replacing “GENIE”.

Stored fault codes are the cumulative history of fault codes which the ECM has detected. These fault codes may be recalled by service personnel at a later time even if the condition which caused the engine fault has ceased to exist.

Note: Additional hardware will be necessary to access stored codes.

Decoding Fault Codes
The Suspect Parameter Number (SPN) and the Failure Mode Identifier (FMI), when combined, are the basis for an engine fault code. The SPN number indicates the affected component; the FMI number reveals the type of failure that has occurred. Comparing the combination of numbers to the fault code chart on the following pages will help to determine the exact engine fault and a corrective course of action. For additional information, refer to the engine operator's manual which came with your machine.



Gauge Cluster

a LCD screen
b amber warning light
c stop engine light
d diagnostic button

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Engine Fault Codes - Models with Deutz TCD 3.6 L4

SPN	FMI	Short Text Detail
110	11	Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error
132	1	The air mass flow AFS_dm is greater than or equal to AFS_PhysRng.Min_C Physical Range Check low for air mass flow sensor No detail informationen!
172	2	Air inlet filter temperature, plausibility error
523891	14	When AirHt_ctDefSRCLoOn_mp is less than AirHt_ctMaxDef_C DFC to SRC Low error when heater is On No detail informationen!
523953	2	Healing takes place if the condition for error detection is not present. Air temprature monitoring plausibility check array No detail informationen!
523955	2	Healing takes place if the condition for error detection is not present. Air temprature monitoring plausibility check array No detail informationen!
523923	3	UB1; Short circuit to battery error of actuator relay 1
523924	3	UB2; Short circuit to battery error of actuator relay 2
523925	3	UB3; Short circuit to battery error of actuator relay 3
523927	3	UB5; Short circuit to battery error of actuator relay 5
523923	4	Short circuit to ground error No detail informationen!
523924	4	UB2; Short circuit to ground actuator relais 2
523925	4	UB3; Short circuit to ground actuator relais 3
523926	4	UB4; Short circuit to ground actuator relais 4
168	3	Sensor error battery voltage; signal range check high
168	4	Sensor error battery voltage; signal range check low
168	2	High battery voltage; warning threshold exceeded
168	2	High battery voltage; shot off threshold exceeded
523910	14	Air pump doesn´t achieve air mass flow setpoint Burner Control - burner air pump
524013	7	Burner Control; burner Flame; Burner does not start after x trials (burner flame lost detection) Burner flame unintentional deleted
524020	14	Burner Control: power reduction due to low lambda. Engine power; Not enough oxygen for regeneration

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FAULT CODES

523911	0	Burner dosing valve (DV2); overcurrent at the end of the injection phase
523911	12	Burner dosing valve (DV2); powerstage over temperature
523911	3	Burner dosing valve (DV2); short circuit to battery
523911	4	Burner dosing valve (DV2); short circuit to ground
523911	11	Burner dosing valve (DV2); short circuit high side powerstage
523912	2	Burner dosing valve (DV2) downstream pressure sensor; plausibility error
523912	0	Physical range check high for burner dosing valve (DV2) downstream pressure; shut off regeneration
523912	1	Physical range check low for burner dosing valve (DV2) downstream pressure; shut off regeneration. When burner injector is actuated, the measured pressure does not rise above ca. 1250mbar abs (expected: ca. 2400mbar).
523912	3	Sensor error burner dosing valve (DV2) downstream pressure sensor; signal range check high
523912	4	@ engines < 4l: Throttle valve error, Open Load or Short cut to Battery, blocked valve or wrong control signal for valve. @ engines with Burner T4i: Pressure Sensor error after valve (DV2), lower limit reached
523913	3	Sensor error glow plug control diagnostic line voltage; signal range check high
523913	4	Sensor error glow plug control diagnostic line voltage; signal range check low
523914	5	Glow plug control; open load water pump control (PWM)
523914	12	Glow plug control; powerstage over temperature
523914	3	Glow plug control; short circuit to battery water pump control (PWM)
523914	4	Glow plug control; short circuit to ground
1235	14	CAN-Bus 2 = CAN_C reports Bus-error (for engines <8L and CV52 it is the engine-CAN@250kbaud) CAN Bus error passive; warning CAN C - engine CAN
16	0	No detail informationen!
639	14	CAN-Bus 0 "BusOff-Status"
1231	14	CAN-Bus 1 "BusOff-Status"
1235	14	CAN-Bus 2 = engine bus "BusOff-Status"
16	0	BusOff error CAN No detail informationen!
102	2	Charged air pressure above warning threshold
102	2	Charged air pressure above shut off threshold.
110	2	Defect fault check for Absolute plausibility test No detail informationen!
110	0	Physical Range Check high for Coolant temperature
110	1	Physical Range Check low for Coolant temperature

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110	3	Sensor error coolant temperature; signal range check high
110	4	Sensor error coolant temperature; signal range check low
110	0	High coolant temperature; warning threshold exceeded
110	0	Coolant temperature; system reaction initiated
111	1	Coolant level too low
598	2	Plausibility check for Clutch No detail informationen!
1109	2	Engine shut off demand ignored
523698	11	Shut off request from supervisory monitoring function
523717	12	Timeout Error of CAN-Transmit-Frame AmbCon; Weather environments
523603	9	Timeout Error of CAN-Receive-Frame AMB; Ambient Temperature Sensor
3224	2	DLC Error of CAN-Receive-Frame AT1IG1 NOX Sensor (SCR-system upstream cat; DPF-system downstream cat); length of frame incorrect
3224	9	Timeout Error of CAN-Receive-Frame AT1IG1; NOX sensor upstream
3224	2	DLC Error of CAN-Receive-Frame AT1IG1Vol NOX Sensor
3224	9	Timeout Error of CAN-Receive-Frame AT1IG1Vol; NOX sensor
523938	9	Timeout Error (BAM to packet) for CAN-Receive-Frame AT1IGCVol1
523939	9	Broadcast Announce Message of the calibration message of the upstream catalytic NOx sensor has failed
523940	9	Timeout Error (PCK2PCK) for CAN-Receive-Frame AT1IGCVol1
3234	2	DLC Error of CAN-Receive-Frame AT1O1 No detail informationen!
3234	9	Timeout Error of CAN-Receive-Frame AT1OG1; NOX sensor (SCR-system downstream cat; DPF-system downstream cat)
3234	2	DLC Error of CAN-Receive-Frame AT1O1Vol NOX
3234	9	Timeout Error of CAN-Receive-Frame AT1OG1Vol
523941	9	Timeout Error (BAM to packet) for CAN-Receive-Frame AT1OGCVol2
523942	9	Calibration message 1 of the after catalyst NOx sensor has failed
523943	9	Timeout Error (PCK2PCK) for CAN-Receive-Frame AT1OGCVol2
523992	9	
0	0	
523211	9	Timeout Error of CAN-Receive-Frame EBC1
523704	12	Timeout Error of CAN-Transmit-Frame EEC3
523935	12	Timeout Error of CAN-Transmit-Frame EEC3VOL1; Engine send messages
523936	12	Timeout Error of CAN-Transmit-Frame EEC3VOL2; Engine send messages
523212	9	Timeout Error of CAN-Receive-Frame ComEngPrt; Engine Protection

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FAULT CODES

523741	14	Engine shut off request through CAN No detail informationen!
523213	12	Timeout Error of CAN-Transmit-Frame ERC1 No detail informationen!
523706	12	Timeout Error of CAN-Transmit-Frame FlEco No detail informationen!
523240	9	Timeout CAN-message FunModCtl; Function Mode Control
523937	9	Timeout DFC for NOxSensGlbReqTx. No detail informationen!
3227	2	DFC SAE J1939 error No detail informationen!
523216	9	Timeout Error of CAN-Receive-Frame PrHtEnCmd; pre-heat command, engine command
523793	9	Timeout Error of CAN-Receive-Frame UAA10; AGS sensor service message
523794	9	Timeout Error of CAN-Receive-Frame UAA11; AGS sensor data
523803	9	Timeout error of CAN Receive Message RxEngPres; Status Burner Air Pump
3219	2	DFC SAE J1939 error No detail informationen!
523766	9	Timeout Error of CAN-Receive-Frame Active TSC1AE
523767	9	Timeout Error of CAN-Receive-Frame Passive TSC1AE
523768	9	Timeout Error of CAN-Receive-Frame Active TSC1AR
523769	9	Timeout Error of CAN-Receive-Frame Passive TSC1AR
523776	9	Timeout Error of CAN-Receive-Frame TSC1TE - active
523777	9	Passive Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
523778	9	Timeout Error of CAN-Receive-Frame TSC1TR
523779	9	Passive Timeout Error of CAN-Receive-Frame TSC1TR
523788	12	Timeout Error of CAN-Transmit-Frame TrbCH; Status Wastegate
523605	9	Timeout Error of CAN-Receive-Frame TSC1AE; Traction Control
523606	9	Timeout Error of CAN-Receive-Frame TSC1AR; Retarder
898	9	Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
520	9	Timeout Error of CAN-Receive-Frame TSC1TR; control signal
523858	12	Timeout Error of CAN-Transmit-Frame UAA11
523867	12	Timeout Error of CAN-Transmit-Frame UAA1 on CAN A
523982	0	Powerstage diagnosis disabled; high battery voltage
523982	1	Powerstage diagnosis disabled; low battery voltage
523090	2	Engine Brake Pre-Selection switch; Plausibility Error
630	12	Access error EEPROM memory (delete)
630	12	Access error EEPROM memory (read)

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630	12	Access error EEPROM memory (write)
411	4	Physical range check low for EGR differential pressure
2791	12	Actuator EGR Valve; powerstage over temperature
523612	12	Internal software error ECU; injection cut off
190	0	Engine speed above warning threshold Overspeed detection in component engine protection
190	0	Engine speed above warning threshold (FOC-Level 1)
190	11	Engine speed above warning threshold (FOC-Level 2)
190	14	Engine speed above warning threshold (Overrun Mode)
108	11	DFC for CAN message
108	3	Sensor error ambient air pressure; signal range check high
108	4	Sensor error ambient air pressure; signal range check low
171	0	Environment temperature sensor, temperature above upper physical threshold
171	1	Environment Temperature Physical Range Check low
171	3	Sensor error SCR-System environment temperature; DPF-System air inlet temperature; signal range check high
171	4	Sensor error SCR-System environment temperature; DPF-System air inlet temperature; signal range check low
190	8	Sensor camshaft speed; disturbed signal
190	12	Sensor camshaft detection; out of range, signal disrupted; no signal
190	2	Offset angle between crank- and camshaft sensor is too large
190	8	Sensor crankshaft detection; out of range, signal disrupted; disturbed signal
190	12	Speed detection; out of range, signal disrupted Sensor crankshaft speed; no signal
975	5	PWM-Signal Fan, Open load or short-circuit ground
975	3	PWM-Signal Fan, short-circuit to plus
975	4	PWM-Signal Fan, open load or short circuit to ground
1639	12	Fan speed sensor; electrical error or signal disturbed or very low fan speed
1639	0	Sensor error fan speed; signal range check high or engine speed resp. fan speed too big
1639	1	Sensor error fan speed; signal range check low or fan speed too low
523602	0	High fan speed; warning threshold exceeded
523602	0	High fan speed; shut off threshold exceeded
97	3	Sensor error water in fuel; signal range check high
97	4	Sensor error water in fuel; signal range check low
94	3	Sensor error low fuel pressure; signal range check high
94	4	Sensor error low fuel pressure; signal range check low
94	1	Low fuel pressure; warning threshold exceeded

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FAULT CODES

94	1	Low fuel pressure; shut off threshold exceeded
174	11	DFC for fuel temperature plausibility check function No detail informationen!
523618	3	Gearbox oil temperature; Short circuit to battery or broken harness
523618	4	Gearbox oil temperature; Short circuit to ground
523619	2	Physical range check high for exhaust gas temperature upstrem (SCR-CAT)
523915	0	HCI dosing valve (DV1); overcurrent at the end of the injection phase
523915	12	HCI dosing valve (DV1); powerstage over temperature
523915	3	HCI dosing valve (DV1); short circuit to battery
523915	3	HCI dosing valve (DV1); short circuit to battery high side
523915	4	HCI dosing valve (DV1); short circuit to ground
523915	11	HCI dosing valve (DV1); short circuit high side powerstage
523916	2	Sensor HCI dosing valve (DV1) downstream pressure; plausibility error
523916	0	Physical range check high for HCI dosing valve (DV1) downstream pressure; shut off regeneration
523916	1	Physical range check low for HCI dosing valve (DV1) downstream pressure; shut off regeneration
523916	3	Sensor error HCI dosing valve (DV1) downstream pressure; signal range check high
523916	4	Sensor error HCI dosing valve (DV1) downstream pressure; signal range check low
523917	3	Sensor error DV1 & DV2 upstream pressure; signal range check high
523917	4	Sensor error DV1 & DV2 upstream pressure; signal range check low
523918	3	Sensor error DV1 & DV2 upstream temperature; signal range check high
523918	4	Sensor error DV1 & DV2 upstream temperature; signal range check low
1638	2	Hydraulic oil temperature check for Shut off condition No detail informationen!
676	11	Cold start aid relay error
676	11	Cold start aid relay open load
729	5	Cold start aid relay open load
729	12	Cold start aid relay; over temperature error
729	3	Intake Air Heater Device; Short circuit to battery
729	4	Air intake heater; Short circuit to ground error for powerstage on CJ945
523895	13	Check of missing injector adjustment value programming (IMA) injector 1 (in firing order)
523896	13	check of missing injector adjustment value programming (IMA) injector 2 (in firing order)
523897	13	check of missing injector adjustment value programming (IMA) injector 3 (in firing order)
523898	13	check of missing injector adjustment value programming (IMA) injector 4 (in firing order)
523899	13	check of missing injector adjustment value programming (IMA) injector 5 (in firing order)
523900	13	check of missing injector adjustment value programming (IMA) injector 6 (in firing order)

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523350	4	Injector cylinder-bank 1; short circuit
523352	4	Injector cylinder-bank 2; short circuit
523354	12	Injector powerstage output defect
651	5	Injector 1 (in firing order); interruption of electric connection
652	5	Injector 2 (in firing order); interruption of electric connection
653	5	Injector 3 (in firing order); interruption of electric connection
654	5	Injector 4 (in firing order); interruption of electric connection
655	5	Injector 5 (in firing order); interruption of electric connection
656	5	Injector 6 (in firing order); interruption of electric connection
523756	14	Special pattern for special cases No detail informationen!
523757	14	Special pattern for special cases No detail informationen!
523758	14	Special pattern for special cases No detail informationen!
523759	14	Special pattern for special cases No detail informationen!
523760	14	Special pattern for special cases No detail informationen!
651	3	Injector 1 (in firing order); short circuit
652	3	Injector 2 (in firing order); short circuit
653	3	Injector 3 (in firing order); short circuit
654	3	Injector 4 (in firing order); short circuit
655	3	Injector 5 (in firing order); short circuit
656	3	Injector 6 (in firing order); short circuit
655	4	High side to low side short circuit in the injector 5 (in firing order)
656	4	High side to low side short circuit in the injector 6 (in firing order)
523615	5	Metering unit (Fuel-System); open load
523615	12	Metering unit (Fuel-System); powerstage over temperature
523615	3	Metering unit (Fuel-System); short circuit to battery highside
523615	4	Metering unit (Fuel-System); short circuit to ground high side
523615	3	Metering unit (Fuel-System); short circuit to battery low side
523615	4	Metering Unit (Fuel-System); short circuit to ground low side
523615	3	Metering unit (Fuel-System); short circuit to battery
523615	4	Metering Unit (Fuel-System); short circuit to ground
1323	12	Too many recognized misfires in cylinder 1 (in firing order)

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FAULT CODES

1346	0	Misfire detection monitoring No detail informationen!
523612	12	Internal ECU monitoring detection reported error
523612	12	ECU reported internal software error Internal ECU monitoring detection reported error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	Injection system,electrical error injectors
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	ECU reported internal software error
523612	12	Diagnostic fault check to report the accelerator pedal position error
523612	12	Diagnostic fault check to report the engine speed error
523612	12	Error in the plausibility of the injection energizing time
523612	12	Error in the plausibility of the start of energising angles
523612	12	Diagnostic fault check to report the error due to non plausibility in ZFC
523612	12	Diagnosis fault check to report the demand for normal mode due to an error in the PoI2 quantity
523612	12	Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI2 shut-off
523612	12	Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI3 efficiency factor
523612	12	Internal ECU monitoring detection reported error
523612	12	Monitoring of Fuel Quantity Correction
523612	12	Diagnostic fault check to report the plausibility error in rail pressure monitoring
523612	12	Diagnostic fault check to report the error due to torque comparison
523612	12	Diagnosis of curr path limitation forced by ECU monitoring level 2
523612	12	Diagnosis of lead path limitation forced by ECU monitoring level 2
523612	12	Diagnosis of set path limitation forced by ECU monitoring level 2
523612	3	Reported Over Voltage of Supply

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523612		Reported UnderVoltage of Supply
523008	1	Manipulation control was triggered
523008	2	Timeout error in Manipulation control
2634	12	Early opening defect of main relay No detail informationen!
2634	12	DFC for stuck main relay error No detail informationen!
3226	2	Nox feed back fault detection No detail informationen!
523752	0	Plausibiliti error during Rich to Lean switch over No detail informationen!
523752	0	Monitoring of Nox signal readyness No detail informationen!
523612	12	Diagnostic fault check to report WDA active due to errors in query-/response communication
523612	12	Diagnostic fault check to report ABE active due to undervoltage detection
523612	12	Diagnostic fault check to report ABE active due to overvoltage detection
523612	12	Diagnostic fault check to report WDA/ABE active due to unknown reason
98	2	Plausibility Check No detail informationen!
100	3	Sensor error oil pressure; signal range check
100	4	Sensor error oil pressure sensor; signal range check low
100	0	High oil pressure; warning threshold exceeded
100	0	High oil pressure; shut off threshold exceeded
100	1	Low oil pressure; warning threshold exceeded
100	1	Low oil pressure; shut off threshold exceeded
175	3	Sensor error oil temperature; signal range check high
175	4	Sensor error oil temperature; signal range check low
175	0	High oil temperature; warning threshold exceeded
175	0	High oil temperature; shut off threshold exceeded
1237	2	Override switch; plausibility error
107	3	Sensor error airfilter differential pressure; short circuit to battery
107	0	Air filter differential pressure; short circuit to ground
523919	2	DPF burner air pump pressure sensor, plausibility error
523919	0	DPF burner air pump pressure sensor, pressure above upper shutoff threshold
523919	1	DPF burner air pump pressure sensor, pressure below lower shutoff threshold
523919	3	DPF burner air pump pressure sensor, short circuit to battery or open load
523919	4	DPF burner air pump pressure sensor, short circuit to ground

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FAULT CODES

523920	2	Exhaustgaspressure upstream burner, plausibility error
523920	0	Exhaustgaspressure upstream burner, pressure above upper shutoff threshold
523920	3	Exhaustgaspressure upstream burner, short circuit to battery or open load
523920	4	Exhaustgaspressure upstream burner, short circuit to ground
102	2	Pressure downstream charge air cooler, plausibility error
102	1	Pressure downstream charge air cooler, pressure below lower physical threshold
102	3	Pressure downstream charge air cooler, short circuit to battery or open load
102	4	Pressure downstream charge air cooler, short circuit to ground
523699	3	Boost pressure control; negative governor deviation below limit
523699	4	Learning valu too high No detail informationen!
523889	3	Over temperature of device driver of pressure control valve No detail informationen!
411	0	Delta pressure across venturi in EGR line above physical high limit
411	11	Plausibility Check fault for deviation of desired and actual EGR-mass flow, where the latter is calculated out of EGR Delta Pressure Sensor
411	3	Sensor error differential pressure Venturiunit (EGR), signal range check low
411	4	Sensor error differential pressure Venturiunit (EGR), signal range check high
524025	14	Particulate filter regeneration. Regeneration after time X is not successful (The error occurs when the regeneration times (3x) over the max. has been aborted allowed recovery time)
324058	2	Particulate filter; regeneration not succesful
3253	2	Differential pressure DPF, plausibility error
3251	0	Differential pressure DPF maximum value is exceeded
3251	0	Differential pressure sensor across DPF exceeds warning high limit
3251	1	Differential pressure DPF, pressure below lower shutoff threshold
3251	1	Differential pressure DPF, pressure below lower warning threshold
3253	3	Electrical error differential pressure B58 (DPF). (signal range check high)
3253	4	Electrical error differential pressure (DPF). Signal range check low
523009	9	The pressure relief valve (PRV) has reached the number of allowed activations
523470	2	Pressure relief valve is forced to open, perform pressure increase
523470	2	Pressure Relief Valve (PRV) forced to open. Performed by pressure increase
523470	12	Pressure Relief Valve (PRV) forced to open. Shutoff conditions
523470	12	Pressure Relief Valve (PRV) forced to open. Warning conditions
523470	14	Open Pressure Relief Valve (PRV)

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523470	11	Pressure Relief Valve (PRV) error; Rail pressure out of tolerance range
523470	11	Rail pressure out of tolerance range. The PRV can not be opened at this operating point with a pressure shock
523009	10	Open time of Pressure Relief Valve (PRV) for wear out monitoring had exceeded
523906	5	Electrical fuel pre - supply pump; open load
523906	12	Electrical fuel pre - supply pump. ECU powerstage over temperature
523906	3	Electrical fuel pre - supply pump; short circuit to battery
523906	4	Electrical fuel pre - supply pump. Short circuit to ground
1176	0	Pressure sensor upstream turbine, Physical Range Check high
1176	1	Pressure sensor upstream turbine, Physical Range Check low
1176	3	Pressure sensor upstream turbine, signal range check (SRC) high
1176	4	Pressure sensor upstream turbine, signal range check (SRC) low
523613	0	Rail pressure metering unit, Positive governor deviation
523613	0	Rail pressure metering unit, Rail pressure disrupted. Maximum positive deviation of rail pressure exceeded
523613	0	Rail pressure metering unit, Rail pressure disrupted. Maximum positive deviation of rail pressure in metering unit exceeded (RailMeUn1)
523613	0	Rail pressure metering unit, Rail pressure below the target range (RailMeUn2) Railsystem leakage detected.(RailMeUn10)
523613	1	Rail pressure metering unit, Minimum rail pressure exceeded (RailMeUn3) Negative deviation of rail pressure second stage (RailMeUn22)
523613	0	Rail pressure metering unit, Maximum rail pressure exceeded
523613	2	Rail pressure metering unit, Setpoint of metering unit in overrun mode not plausible
523613	0	Setpoint of metering unit in overrun mode not plausible
157	0	Rail pressure raw value is intermittent No detail informationen!
157	1	Rail pressure raw value is above maximum offset No detail informationen!
523470	7	Maximum rail pressure exceeded (PRV)
157	3	Sensor error rail pressure. Sensor voltage above upper limit
157	4	Sensor error rail pressure. Sensor voltage below lower limit
523633	11	Lonterm adaption factor below threshold
523633	11	Nox conversion rate insufficient (SCR-Cat defect, bad DEF quality)
523633	11	Nox conversion rate insufficient (SCR-Cat defect, bad DEF quality); temperature range 1
3234	11	DFC for plausibility error Min for NOx sensor downstream of SCR Cat
3224	1	DFC for plausibility error Max for NOx sensor upstream of SCR Cat

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FAULT CODES

4345	11	Sensor backflow line pressure (SCR); plausibility error
4343	11	SCR Monitoring; Pressure stabilisation error, general pressure check error (SCR)
4374	13	Pressure stabilisation error dosing valve (SCR)
523632	16	Pump pressure SCR metering unit too high
523632	18	Pump pressure SCR metering unit too low
523632	0	Pressure overload of SCR-System
523632	1	Pressure build-up error SCR-System
4365	0	DEF tank temperature too high
3241	0	Sensor SCR catalyst upstream temperature too high; plausibility error
3361	7	DEF dosing valve blocked (SCR)
523720	2	DEF supply module heater temperature; plausibility error (normal condition)
523720	2	Sensor DEF supply module heater temperature; plausibility error (cold start condition)
523721	2	Sensor DEF supply module temperature; plausibility error (normal condition)
523721	2	Sensor DEF supply module temperature; plausibility error (cold start condition)
523981	11	SCR plausibility, OBD and diagnosis; Stuck in range check of DEF tank temperature sensor DEF-tank without heating function (heating phase)
523330	14	Immobilizer status; fuel blocked
523330	14	DFC to block the fuel by Sia No detail informationen!
523330	14	DFC to indicate that TEN-code or UC-code received if ECU is learned. No detail informationen!
523330	14	DFC to indicate that no code is received via CAN. No detail informationen!
523330	14	DFC to indicate that wrong code is received. No detail informationen!
523720	8	DEF supply module heater temperature; duty cycle in failure range
523720	8	DEF supply module heater temperature; duty cycle in invalid range
523721	11	Urea supply module temperature measurement not available
523722	8	DEF supply module PWM signal; period outside valid range
523722	8	Detect faulty PWM signal from Supply Modul
523721	8	DEF supply module temperature; duty cycle in failure range
523721	8	Urea supply module temperature; duty cycle in invalid range
29	3	Handthrottle idle validation switch; short circuit to battery
91	3	Sensor error accelerator pedal. Signal range check high
29	4	Handthrottle; short circuit to ground
91	4	Sensor error accelerator pedal. Signal is below the range
523921	3	Sensor error burner temperature; signal range check high

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3532	3	Sensor error DEF tank level; signal range check high
523921	4	Sensor error burner temperature; signal range check low
3532	4	Sensor error DEF tank level; signal range check low
1079	13	Failure of sensor supply voltage 1
1080	13	Failure of sensor supply voltage 2
523601	13	Failure of sensor supply voltage 3
523580	2	Data set variant with the desired number not found Invalid variant dataset Identifier error No detail informationen!
523580	11	An error has occurred in the switch over to the desired data set variant in the code word. Variant dataset switching error No detail informationen!
523580	11	The code word could not be read correctly from the EEPROM Variant dataset switching error No detail informationen!
677	3	Starter relay high side. Short circuit to battery
677	4	Starter relay high side short circuit to ground
677	5	Starter relay low side no load error
677	12	Starter relay powerstage over temperature
677	3	Starter relay low side short circuit to battery
677	4	Starter relay low side short circuit to ground
523922	3	Burner shut of valve; short circuit to battery
624	5	SVS lamp; open load
624	12	SVS lamp; powerstage over temperature
624	3	SVS lamp; short circuit to battery
624	4	SVS lamp; short circuit to ground
523612	14	Softwarereset CPU SWReset_0
523612	14	Softwarereset CPU SWReset_1
523612	14	Softwarereset CPU SWReset_2
91	11	Plausibility error between APP1 and APP2 or APP1 and idle switch
29	2	Plausibility error between sensor and idle switch, Acceleration Pedal Detection In case of Hand Throttle with Low Idle Switch, it is the plausibility check between hand throttle and idle switch
523550	12	Terminal 50 was operated too long
172	3	Air flow temperature sensor; short circuit to battery or open load
172	4	Air flow temperature sensor; short circuit to ground
523921	0	Burner temperature, temperature above upper shutoff threshold

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FAULT CODES

523921	1	Burner temperature, temperature below lower shutoff threshold
105	1	Charged air cooler down stream temperature. Temperature below lower physical threshold
105	3	Electrical error charged air temperature. Signal range check high.(SRC)
105	4	Electrical error charged air temperature. Signal range check low
105	0	Charged air cooler temperature. System reaction initiated. High charged air cooler temperature. Warning threshold exceeded
105	0	Low charged air cooler temperature. Shut off threshold exceeded
105	11	Diagnostic fault check for charged air cooler downstream temperature sensor No detail informationen!
412	3	Electrical error EGR cooler downstream temperature. Signal range check high
412	4	Electrical error EGR cooler downstream temperature. Signal range check low
523960	0	Physical range check high for EGR cooler downstream temperature
523960	1	Physical range check low for EGR cooler downstream temperature
5673	6	Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8). Signal range check high
520521	5	Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); signal range check low
5763	7	Actuator position for EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8) not plausible
5763	6	Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); signal range check high
5763	5	Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); signal range check low
5763	3	Position sensor error of actuator EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8). Signal range check high
5763	4	Position sensor error actuator EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8). Signal range check low
4769	2	Temperature downstream DOC, plausibility error
4766	0	Temperature downstream DOC, temperature above upper shutoff threshold
4766	0	Temperature downstream DOC, temperature above upper warning threshold
4769	3	Sensor error exhaust gas temperature downstream (DOC); signal range check high
4769	4	Sensor error exhaust gas temperature downstream (DOC); signal range check low
4768	2	Temperature upstream DOC, plausibility error
4765	0	Temperature upstream DOC, temperature above upper shutoff threshold
4765	0	Temperature upstream DOC, temperature above upper warning threshold
4768	3	Electrical error exhaust gas temperature upstream (DOC); signal range check high
4768	4	Electrical error exhaust gas temperature upstream (DOC); signal range check low
3248	4	Sensor error particle filter downstream temperature; signal range check low

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1180	3	Sensor error exhaust gas temperature upstream turbine; signal range check high
1180	4	Sensor error exhaust gas temperature upstream turbine; signal range check low
4360	0	Exhaust temperature upstream SCR-Cat, temperature above upper physical threshold
4360	1	Sensed exhaust temperature before SCR-Cat is < physical low limit
4361	2	Signal error for CAN message No detail informationen!
4361	3	Sensor error DEF catalyst exhaust gas temperature upstream; signal range check high
4361	4	Sensor error DEF catalyst exhaust gas temperature upstream; signal range check low
1761	14	DEF tank level; warning threshold exceeded
3361	6	DEF dosing valve; power at the end of injection too high
3361	3	DEF dosing valve; short circuit to battery on low side
3361	3	DEF dosing valve; short circuit to battery or open load on high side
3361	4	Urea dosing valve; short circuit to ground or open load on low side
3361	4	DEF dosing valve; short circuit on high side
4345	5	SCR heater relay DEF returnline sekondary side; open load
4366	5	SCR main relay (secondary side): open load
4343	5	SCR heater relay DEF pressureline secondary side; open load
4366	5	SCR main relay (secondary side); Shortcut to battery
4366	5	SCR main relay (secondary side), heat relay (secondary side), heating elements or heating valve short to ground
4341	5	SCR heater relay DEF supplyline secondary side; open load
523719	5	SCR heater relay DEF supply modul secondary side; open load
4366	5	SCR Tank heating valve secundary side: open load
4243	11	SCR heater; Pressure line heater error and temperature condition to perform an afterrun (Group error diagnosis heater) SCR system heater diagnostic reports error; shut off SCR-system
4345	5	SCR heater relay DEF returnline primary side; open load
4345	12	Over Temperature error No detail informationen!
4345	3	SCR heater DEF returnline; short circuit to battery
4345	4	SCR heater DEF returnline; short circuit to ground
4343	5	SCR heater relay DEF pressureline primary side; open load
4343	12	Over Temperature error No detail informationen!
4343	3	SCR heater DEF pressureline; short circuit to battery
4343	4	SCR heater DEF pressureline; short circuit to ground
523718	5	SCR main relay (primary side); open load

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FAULT CODES

523718	12	SCR main relay (primary side); powerstage over temperature
523718	3	SCR main relay (primary side); short circuit to battery
523718	4	SCR main relay (primary side); short circuit to ground
4341	5	SCR heater relay DEF supply line primary side; open load
4341	3	SCR-heater DEF supplyline; short circuit to battery
4341	4	SCR-heater DEF supply line; short circuit to ground
523719	5	SCR heater relay DEF supplymodule primary side; open load
523719	12	ÜbertemperaturOver Temperature error Detailinformationen fehlen!
523719	3	SCR heater DEF supplymodule; short circuit to battery
523719	4	SCR heater DEF supplymodule; short circuit to ground
4366	5	SCR tank heating valve primary side; open load
4366	12	SCR-heater relay urea tank powerstage output; over temperature
4366	3	SCR Tank heating valve; short circuit to battery
4366	4	SCR Tank heating valve; short circuit to ground
523632	11	Pump motor not available for actuation
4375	5	Urea pump motor; open load
4375	3	Urea pump motor; short circuit to battery
4375	4	Urea pump motor; short circuit to ground
4334	0	Supply module DEF, DEF pressure above upper physical threshold
4334	1	Urea supply module pressure sensor; physical range check low (defect pressure sensor)
4334	0	Urea pump pressure sensor; high signal not plausible
4334	1	Urea pump pressure sensor; low signal not plausible
523632	2	Signal error for CAN message No detail informationen!
523632	3	Sensor error urea pump pressure; signal range check high
523632	4	Sensor error urea pump pressure; signal range check low
4376	5	SCR reversal valve; open load
4376	12	SCR reversing valve; over temperature
4376	3	SCR reversal valve; short circuit to battery
4376	4	SCR reversing valve; short circuit to ground
3031	0	DEF tank, DEF temperature in DEF tank is to high
3031	1	DEF tank, DEF temperature below lower physical threshold
4365	2	Tank temperature signal error for CAN message
4365	3	Sensor error urea tank temperature: short circuit to battery
4365	4	Sensor error urea tank temperature; short circuit to ground

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97	12	Water in fuel level prefilter; maximum value exceeded
523946	0	Zerofuel calibration injector 1 (in firing order); maximum value exceeded
523947	0	Zerofuel calibration injector 2 (in firing order); maximum value exceeded
523948	0	Zerofuel calibration injector 3 (in firing order); maximum value exceeded
523949	0	Zerofuel calibration injector 4 (in firing order); maximum value exceeded
523950	0	Zerofuel calibration injector 5 (in firing order); maximum value exceeded
523951	0	Zerofuel calibration injector 6 (in firing order); maximum value exceeded
523946	1	Zerofuel calibration injector 1 (in firing order); minimum value exceeded
523947	1	Zerofuel calibration injector 2 (in firing order); minimum value exceeded
523948	1	Zerofuel calibration injector 3 (in firing order); minimum value exceeded
523949	1	Zerofuel calibration injector 4 (in firing order); minimum value exceeded
523950	1	Zerofuel calibration injector 5 (in firing order); minimum value exceeded
523612	12	Internal software error ECU
175	2	Customer oiltemperature: signal unplausible
523973	14	SCR Tamper detection; derating timer below limit 1
523974	14	SCR Tamper detection; derating timer below limit 2
523975	14	Urea quality; derating timer below limit 1
523976	14	Urea qulaity; derating timer below limit 2
523977	14	Urea tank level; derating timer below limit 1
523978	14	Urea tank level; derating timer below limit 2
168	0	Physikal range check high for battery voltage
168	1	Physikal range check low for battery voltage
172	1	Air inlet filter sensor out of physical range check
1180	0	Physical range check high for exhaust gas temperature upstream turbine
1180	1	Physical range check low for exhaust gas temperature upstream turbine
524018	14	HMI engine derate service state DPF wasn´t regenerated, power reduction phase 1 (manuell regeneration request)
524022	14	DPF wasn´t regenerated, power reduction phase 2 (manuell regeneration request)
190	14	Camshaft- and Crankshaft speed sensor signal not available on CAN
5763	5	Actuator EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); open load
5763	6	Actuator EGR-Valve (2.9;3.6) or Throttle-Valve (6.1,7.8); over current
5763	3	EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to battery
5763	3	EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to battery
5763	4	EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to ground
5763	4	EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to ground
5763	6	Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); Overload by short-circuit

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FAULT CODES

5763	11	Power stage overtemperature due to high current
5763	4	Actuator AGR valve (2.9;3.6) throttle valve (4.1;6.1;7.8); Voltage below threshold
523984	3	UB7; Short circuit to battery error of actuator relay 6
523986	4	Relais SCR-Heater, Short Circuit to Ground (Highside Control side)
523987	4	UB6; Short circuit to ground actuator relay 6
524019	11	Burner Control; Air Line - Blocked Air Pump; air lines blocked
523910	9	Burner Control; Air Pump - CAN Lost Air Pump; CAN communication lost
523910	7	Air pump; CAN communication interrupted no purge function available
523910	12	Air Pump; internal error
523910	0	Air Pump; operating voltage error
524014	1	Air inlet EPV - pressure too low Air pressure glow plug flush line; below limit
524013	7	Burner Control; Flame lost max Burner operation is interrupted too often
523915	7	HCI dosing valve (DV1); blocked open
524016	11	Burner Control; HFM - Electrical Fault HFM sensor; electrical fault
524016	2	Burner Control; HFM - Plausibilitätsfehler 1 Amount of air is not plausible to pump speed
523910	6	Burner Control Air Pump; over current Air pump electrically overloaded
523922	7	Burner Control; Shut-off Valve - Blocked closed Burner Shut Off Valve; blocked closed
524021	11	Burner Control; Fuel line ShutOff downstream - broken Burner fuel line pipe leak behind Shut Off Valve
523922	7	Burner Shut Off Valve; blocked open
523993	9	
524038	9	Timeout error of CAN-Receive-Frame ComMS_Sys1TO (error memory Slave); Master-Slave internal CAN message
524039	9	Timeout error of CAN-Receive-Frame ComMS_Sys2TO (error memory Slave); Master-Slave internal CAN message
524040	9	Timeout error of CAN-Receive-Frame ComMS_Sys3TO (error memory Slave); Master-Slave internal CAN message
524041	9	Timeout error of CAN-Receive-Frame ComMS_Sys4TO (error memory Slave); Master-Slave internal CAN message

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524042	9	Timeout error of CAN-Receive-Frame ComMS_Sys5TO (error memory Slave); Master-Slave internal CAN message
524043	9	Timeout error of CAN-Receive-Frame ComMS_Sys6TO (error memory Slave); Master-Slave internal CAN message
524045	9	Master Slave, Error of message counter CAN receive message ComMSMoFOvR; ComMSMoFOvR1CNT
524046	9	Master-Slave CAN; Error Checksum of CAN-Receive Message
524047	9	Master-Slave CAN; Error of message length of CAN receive message ComMSMoFOvR;_ ComMSMoFOvR1DLC
524048	9	Timeout error CAN message ComMSMoFOvR1TO error memory Slave
523788	0	Wastegate plauisibility error off CAN transmit message
523788	0	Timeout Error of CAN-Receive-Frame ComTrbChActr; Wastegate
524024	11	Deviation of the exhaust gas temperature setpoint to actual value downstream (DOC) too high
523995	13	Check of missing injector adjustment value programming (IMA) injector 7 (in firing order)
523996	13	Check of missing injector adjustment value programming (IMA) injector 8 (in firing order)
523996	4	Injector cylinder bank 1 slave; short circuit
523998	4	Injector cylinder bank 2 slave; short circuit
523999	12	Injector powerstage output Slave defect
524000	5	Injector 7 (in firing order); interruption of electric connection
524001	5	Injector 8 (in firing order); interruption of electric connection
524000	3	Injector 7 (in firing order); short circuit
524001	3	Injector 8 (in firing order); short circuit
2797	4	Timeout of Short-Circuit Ground Diagnosis Cyl. Bank 0;_IVDiaShCirGndToutBnk_0
2798	4	Timeout of Short-Circuit Ground Diagnosis Cyl. Bank 1;_IVDiaShCirGndToutBnk_1
2797	4	Injector diagnostic; Short circuit to ground cylinder bank 0
2798	4	Injector diagnostic; Short circuit to ground cylinder bank 1
524035	12	Injector diagnostics; time out error in the SPI communication
524036	12	Injector diagnostics Slave; time out error in the SPI communication
524069	9	Timeout Error of CAN-Receive-Frame MSMon_FidFCCTO; Master-Slave CAN communication faulty
524052	11	Error memory Slave reports FID MSMonFC2 (collective error)
524052	11	Error memory Slave reports FID MSMonFC3 (collective error)
523919	2	Sensor air pump airpressure; plausibility error
523920	2	Sensor exhaust gas back pressure burner; plausibility error
3253	2	Sensor differential pressure (DPF); plausibility error
164	2	Rail pressure safety function is not executed correctly
523922	5	Burner Shut Off Valve; open load

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FAULT CODES

523922	12	Burner Shut Off Valve; powerstage over temperature
523922	4	Burner Shut Off Valve; short circuit to ground
523921	2	Burner temperature sensor; Plausibility Check for burner temperature sensor Sensor burner temperature; plausibility error
1136	0	Physical range check high for ECU temperature
4769	2	Sensor exhaust gas temperature OxiCat downstream (normal operation); plausibility error
4769	2	Sensor exhaust gas temperature OxiCat downstream (regeneration); plausibility error
1188	11	Wastegate actuator; internal error
1188	11	Wastegate actuator; EOL calibration not performed correctly
1188	13	Wastegate actuator calibration deviation too large, recalibration required
1188	2	Wastegate; status message from ECU missing
1188	7	Wastegate actuator; blocked
1188	11	Wastegate actuator; over temperature (> 135°C)
1188	11	Wastegate actuator; operating voltage error
5763	0	Warning threshold for an internal actuator error exceeded, < 4L EGR.actuator und >4L Air Intake Flap
5763	1	Shut off threshold for an internal actuator error exceeded, < 4L EGR.actuator und >4L Air Intake Flap
172	0	Air temperature within air filter box above maximum physical value
524028	2	CAN message PROEGRActr; plausibility error
524029	2	Timeout Error of CAN-Receive-Frame ComEGRActr - exhaust gas recirculation positioner
524034	5	Disc Separator; open load
524034	12	Disc Separator; powerstage over temperature
524034	3	Disc separator; short circuit to battery
524034	4	Disc separator; short circuit to ground
524030	7	EGR actuator; internal error
524031	13	EGR actuator, calibration error
524032	2	EGR actuator; status message "EGRCust" is missing
524033	7	EGR actuator; due to overload in Save Mode
3711	12	Temperature during stand-still main phase too low or too high
523960	0	High exhaust gas temperature EGR cooler downstream; warning threshold exceeded
524025	5	DPF system; operating voltage error
524044	9	CAN message ComMS_Sys7 not received from slave
524068	2	Master ECU and Slave ECU have been identified as the same types
524052	11	Master ECU and Slave ECU data sets or software are not identical
523718	5	SCR mainrelay; open load (only CV56B)

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523718	3	SCR mainrelay; short circuit to battery (only CV56B)
523718	4	SCR mainrelay; short circuit to ground (only CV56B)
4376	5	SCR reverting valve; open load
4376	12	SCR reversing valve; over temperature
4376	4	SCR reversing valve; short circuit to ground
524057	2	Electric fuel pump; fuel pressure build up error
2659	2	Exhaust Gas Recirculation AGS Sensor; signal not plausible
2659	0	Exhaust Gas Recirculation AGS Sensor; Sensed exhaust mass value above maximum physical value
2659	1	Exhaust Gas Recirculation AGS Sensor; Sensed exhaust mass value below miniimum physical value
2659	12	Exhaust Gas Recirculation AGS Sensor; plausibility error, AGS sensor has not passed the burn off process
2659	2	Exhaust Gas Recirculation AGS Sensor; Temperature of EGR mass not plausible
524070	2	(Upstream NOx-Sensor) Diagnostic Fault Check for invalid upstream NOx value (Sensor self diagnostic DFC set by Deutz-SW) NOx-Sensor before SCR-Cat: Invalid upstream NOx value
524071	2	(Downstream NOx-Sensor) Diagnostic Fault Check for invalid downstream lambda value (Sensor self diagnostic DFC set by Deutz-SW)
524072	2	(Upstream NOx-Sensor) Diagnostic Fault Check for invalid upstream lambda value (Sensor self diagnostic DFC set by Deutz-SW)
524073	2	(Downstream NOx-Sensor) Diagnostic Fault Check for invalid downstream NOx value (Sensor self diagnostic DFC set by Deutz-SW)
524074	9	NOx sensor downstream SCR-CAT, sensor internally open load
524075	11	NOx sensor downstream SCR-CAT, sensor internally short circuit
524076	9	NOx sensor upstream SCR-CAT, sensor internally open line
524077	11	NOx sensor upstream SCR-CAT, sensor internally short circuit
524078	9	NOx sensor downstream SCR-CAT, lambda value above upper physical threshold
524079	9	NOx sensor downstream SCR-CAT, lambda value below lower physical threshold
524080	9	NOx sensor upstream SCR-CAT, lambda value above upper physical threshold
524081	9	NOx sensor upstream SCR-CAT, lambda value below lower physical threshold
524082	9	(Downstream NOx-Sensor) Diagnostic Fault Check for downstream NOx value over maximum limit (DFC set by Deutz-SW)
524083	9	NOx-Sensor downstream SCR-CAT, NOx value below minimum value
524084	9	NOx-Sensor upstream SCR-CAT, NOx value above maximum value
524085	9	NOx sensor upstream SCR-CAT, NOx value below lower physical threshold
524149	2	Plausibility error between pressure downstream turbine (PTrbnDs) and ambient air pressure (EnvP)

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FAULT CODES

524063	5	SCR heater return line; open load
524063	5	SCR main relay not connected
524063	5	SCR heater pressureline; open load
524063	3	SCR heater mainrelay; short circuit to battery
524063	4	SCR heater main relay load side (K31) on heating valve (Y31), Short cut to ground
524063	5	SCR relay for suction line not connected
524063	5	SCR heater supply module; open load
524063	5	SCR heater tank; open load
524065	0	Pressure sensor upstream SCR-CAT, pressure above upper physical threshold
524065	1	Pressure sensor upstream SCR-CAT, pressure below lower physical threshold
524065	3	Pressure sensor upstream SCR-CAT; short circuit battery or open load
524065	4	Pressure sensor upstream SCR-CAT; short circuit ground
524066	3	SCR measurement heater output stage; short circuit battery or open load
524067	0	DEF supply module, heater temperature above upper physical threshold
524067	1	DEF supply module, heater temperature below lower physical threshold
524067	0	DEF supply module, temperature above upper physical threshold
524067	1	DEF supply module, temperature below lower physical threshold
1761	0	DEF tank, DEF level above upper physical threshold
1761	1	DEF tank, DEF level below lower physical threshold
524149	2	Pressure downstream turbine, plausibility error
524065	2	Pressure sensor upstream SCR-CAT, plausibility error
3699	2	Passive regeneration of DPF; plausibility error DPF differential pressure sensor and a further sensor or actuator CRT system defective
3699	2	Passive regeneration of DPF; DOC error Temperature sensor us. and ds. DOC simultaneously defect
524087	5	Urea Error Lamp; open load
524087	12	Urea Error Lamp; temperatur over limit
524087	3	Urea Error Lamp; short circuit battery
524087	4	Urea Error Lamp; short circuit ground
524132	2	Fuel low pressure upstream fuel low pressure pump not plausible
524132	0	Fuel low pressure upstream fuel low pressure pump, pressure above maximum warning threshold
524132	0	Fuel low pressure upstream fuel low pressure pump, pressure above maximum shut off threshold
524132	1	Fuel low pressure upstream fuel low pressure pump, pressure below minimum shut off threshold
524132	1	Fuel low pressure upstream fuel low pressure pump, pressure below minimum warning threshold
3699	0	Maximum standstill time reached; oil exchange request ignored

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524147	13	SCR System,pressure build up not possible
524063	12	DEF supply modul, time for defrosting too long
524063	12	DEF tank, time for defrosting too long
1716	14	Urea Tank Signal to HMI for indicating the Urea Tank-Level (Urea tank volume ratio low threshold 1)
1716	14	DEF tank, DEF level below first warning threshold
1716	14	DEF tank, DEF level below second warning threshold
524096	14	Control of the SCR system; If the start stop counter (EPA-Counter) exceeds the threshold SCRCtl_ctEngStrtStopThresh_C. This counter will increment only once in each driving cycle in case of an SCR error. If the counter reaches the threshold, the DFC will be set to inhibit the engine start Engine will not be started, because of EPA-Counter
524114	9	Timeout error of CAN-Transmit-Frame A1DOC
524115	9	Timeout error of CAN-Transmit-Frame AT1S
524116	9	Timeout error of CAN-Transmit-Frame SCR2
524117	9	Timeout error of CAN-Transmit-Frame SCR3
524097	9	Timeout error of CAN-Transmit-Frame DPFBrnAirPmpCtl
524098	9	Timeout error of CAN-Transmit-Frame ComDPFBrnPT
524099	9	Timeout error of CAN-Transmit-Frame ComDPFC1
524100	9	Timeout error of CAN-Transmit-Frame ComDPFHisDat
524101	9	Timeout error of CAN-Transmit-Frame ComDPFTstMon
524105	9	Timeout error of CAN-Transmit-Frame ComEGRMsFlw
524108	9	Timeout error of CAN-Transmit-Frame ComEGRTVActr
524110	9	Timeout error of CAN-Transmit-Frame ComETVActrTO
524112	9	Timeout ComIntake Throttle Valve Actr
524118	9	Timeout error of CAN-Receive-Frame ComRxCM1
524119	9	Timeout error of CAN-Receive-Frame ComRxCustSCR3
524102	9	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmpCtl
524103	9	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmp
524104	9	Timeout error of CAN-Receive-Frame ComRxDPFCtl
524106	9	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw1
524107	9	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw2
524109	9	Timeout error of CAN-Receive-Frame ComRxEGRTVActr
524111	9	Timeout error of CAN-Receive-Frame ComRxETVActr
524113	9	Timeout error of CAN-Receive-Frame ComRxITVActr
524120	9	Timeout error of CAN-Receive-Frame ComRxSCRHtDiag
524121	9	Timeout error of CAN-Receive-Frame ComRxTrbChActr

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FAULT CODES

524122	9	Timeout error of CAN-Receive-Frame ComRxUQSens
524123	9	Timeout error of CAN-Receive-Frame ComSCRHtCtl
524124	9	Timeout error of CAN-Receive-Frame ComTxAT1IMG
524125	9	Timeout error of CAN-Receive-Frame ComTxTrbChActr
524133	2	HMI system; set if restore button blocked
524134	0	DPF, ash load exceeds the shutoff threshold
524134	0	DPF, ash load exceeds the warning threshold
524135	0	DPF, soot load exceeds the shutoff threshold
524135	14	DPF, soot load exceeds the service request threshold
524135	0	DPF, soot load exceeds the warning threshold
524156	9	Timeout error of CAN-Receive-Frame ComRxEBC2
2791	7	EGR actuator, actuator blocked
2791	2	EGR actuator, CAN error
2791	13	EGR actuator, EOL calibration error
2791	12	EGR actuator, internal electrical fault
2791	13	EGR actuator, learning process aborted
2791	6	EGR actuator current is above maximum threshold
2791	3	EGR actuator supply voltage is above the maximum threshold
2791	4	EGR actuator supply voltage is below minimum threshold
2791	13	EGR actuator, learning process out of range
2791	7	EGR actuator, broken spring detected
2791	16	EGR actuator, temperature high
2791	0	EGR actuator, temperature critical high
1188	7	Turbocharger wastegate, mechanical blocking detected
1188	2	Turbocharger wastegate, CAN Error
1188	13	Turbocharger wastegate, EOL calibration error
1188	12	Turbocharger wastegate, internal electrical error
1188	13	Turbocharger wastegate, learning process aborted
1188	6	Turbocharger wastegate, current above maximum threshold
1188	3	Turbocharger wastegate, supply voltage above maximum threshold
1188	4	Turbocharger wastegate, supply voltage below minimum threshold
1188	13	Turbocharger wastegate, learning process out of range
1188	7	Turbocharger wastegate, broken spring detected
1188	0	Turbocharger wastegate, temperature critical high
524141	7	DEF dosing valve, dosing valve blocked
523612	12	Engine starter, plausibility error of starter release condition

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524147	7	SCR-System, reverting valve blocked
524175	0	SCR-CAT, Nox emissions above maximum threshold
524074	2	NOx-Sensor after SCR-Cat: Nox-Sensor dew point problem or plausibility problem
524076	2	NOx-Sensor before SCR-Cat: Nox-Sensor dew point problem or plausibility problem
524177	7	SCR System, DEF suction line blocked
524178	7	SCR System, DEF pressure out of range
4360	2	Exhaust temperature sensor upstream SCR, plausibility error
4334	2	DEF supply module pressure, plausibility error
524067	2	Supply module heater temperature, plausibility error
524067	2	Supply module temperature, plausibility error
1761	2	DEF tank level, plausibility error
3031	2	Urea tank temperature outside of plausible thresholds
524152	2	Urea Quality Sensor; Timeout CAN message
524153	2	Urea tank level & urea tank temperature via CAN bus, timeout of CAN message
1761	14	DEF tank, DEF level below third warning threshold
4768	2	Exhaust gas temperature sensors up- and downstream DOC are physically swapped
524025	14	The standstill-regeneration mode time exceeds the long-limit. Vehicle was too long or too often in standstill mode. Make oil change and reset counter
524025	14	The standstill-regeneration mode time exceeds the short-limit. Vehicle was too long or too often within a short time in standstill mode
524189	9	Master / Slave Can disturbed
524190	14	Inducement level 1 activ
524191	14	Inducement level 2 activ
524193	8	The standstill-regeneration mode time exceeds the long limit threshold. Vehicle was too long or too often in standstill mode. Change oil and reset counter
524194	8	The standstill-regeneration mode time exceeds the short-limit. Vehicle was too long or too often within a short time in standstill mode. Change oil and reset counter.
3519	12	DEF tank temperature, temperature too high
3520	3	DEF quality sensor, short circuit to battery or open load
3520	4	DEF quality sensor, short circuit to ground
3519	3	DEF quality sensor, internal temperature sensor short circuit to battery or open load
3519	4	DEF quality sensor, internal temperature sensor short circuit to ground
524195	14	Standstill request due to crystalisation ignored too long
524196	13	Variant handling, address error

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FAULT CODES

524196	2	Variant handling, Synchronisation error
3520	2	DEF quality seonsor, bad DEF quality detected or no DEF measuring possible
3520	13	Urea quality at UQS invalid
3519	13	Temperature at UQS invalid
3532	3	The DEF Level at UQS out of max. physical range
3532	4	Quality at UQS out of min. physical range
4365	3	DEF qualitysensor, tank temperatur; Short circuit to battery or open load
4365	4	DEF qualitysensor, tank temperatur; Short circuit to ground
3936	14	Standstill request ignored too long
3936	14	Standstill time based escalation requests Inducement step 2
51	5	Intake Throttle Flap, H-Bridge, wiring harness broken at connected actuator
51	6	Intake Throttle Flap, H-Bridge, current above maximum threshold
51	3	Intake Throttle Flap, H-Bridge, short circuit to battery (A02)
51	3	Intake Throttle Flap, H-Bridge, short circuit to battery (A67)
51	4	Intake Throttle Flap, H-Bridge, short circuit to ground (A02)
51	4	Intake Throttle Flap, H-Bridge, short circuit to ground (A67)
51	7	Intake Throttle Flap, H-Bridge, position of actuator not plausible (deviation from setpoint more than 7%)
51	3	Intake Throttle Flap, H-Bridge, short circuit to battery oder broken wiring harness
51	4	Intake Throttle Flap, H-Bridge, short circuit to ground
524202	11	SCR error code in master ECU active
524203	11	DEF tank level failure is in master ECU active
524204	11	SCR afterrun failure is in master ECU active
524205	11	SCR Co2Off failure is in master ECU active
524206	11	SCR disable DEF dosing failure is in master ECU active
524230	11	Inducement HW Failure Slave
524231	11	Inducement SCR Tamp. Slave
524232	11	Inducement DEF Qualitity in Slave ECU
524239	11	SCR regeneration failure is in slave ECU active
524248	11	NOX sensor downstream error in slave ECU
524249	11	DEF dosing valve error in slave ECU
524251	11	DEF pressure problems in slave ECU
524252	11	Reverting valve error in slave ECU
524253	11	DEF back flow line heater error on slave ECU
524254	11	Error NOx-Tailpipe emissions exceeded on Slave ECU
524255	11	DEF suction line heater error on slave ECU

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524256	11	DEF supply module heater error on slave ECU
524257	11	Error Exhaust pressure upstream SCR on Slave ECU
524258	11	Error Exhaust temperature upstream SCR on Slave ECU
524259	11	DEF pressure line heater error on slave ECU
524260	11	Error Urea pump temperature on Slave ECU
524261	11	Error DEF heater relais on Slave ECU
524266	14	Announcement triggers the Inducement Level 2
524267	14	Max. launch time for stand still exceeded (60min)
4171	2	Dynamic temperatur check of temp before SCR
524147	13	Set together with DFC_SCRCoBldUpLoPres. DFC_SCRCoBldUpLoPresRst is only used for inducement purposes. It ensures that legal inducement is working correctly

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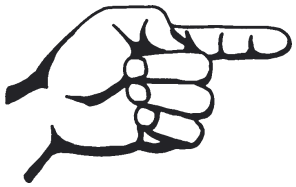

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Schematics

Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.

Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.

About This Section

There are two groups of schematics in this section. An illustration legend precedes each group of drawings.

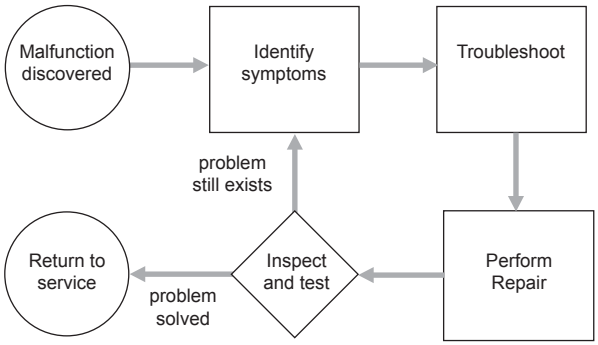
Electrical Schematics

⚠WARNING Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

Hydraulic Schematics

⚠WARNING Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

General Repair Process



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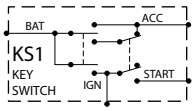
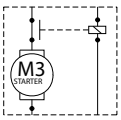
Electrical and Hydraulic Symbols Legend

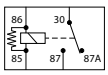
Electrical Schematic Symbols



Key switch



Engine start



Control relay

Alternator

Fuse

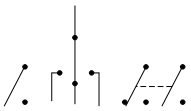
Circuit breaker

Horn or Alarm

Light

Valve coil

Valve coil with diode


Switch

Diode

Proximity switch

Limit switch

Temperature switch

Fuel level sender

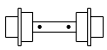
Battery

Pressure switch

Hydraulic Schematic Symbols

Pressure switch

Hydraulic cylinder


Axle

Orifice

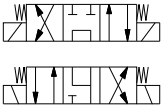
Adjustable orifice

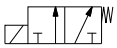
Filter

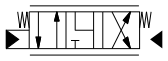
Check valve

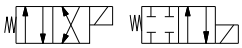
Flow regulator

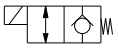
Relief valve

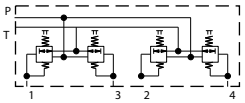

3 position 4 way solenoid valve


2 position 3 way directional valve

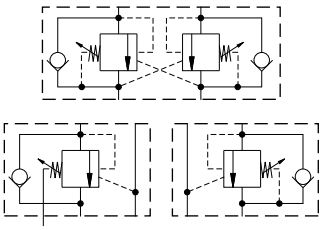

3 position 4 way proportional directional valve


2 position 4 way solenoid valve


2 position 2 way solenoid valve



Joystick


Counterbalance valve

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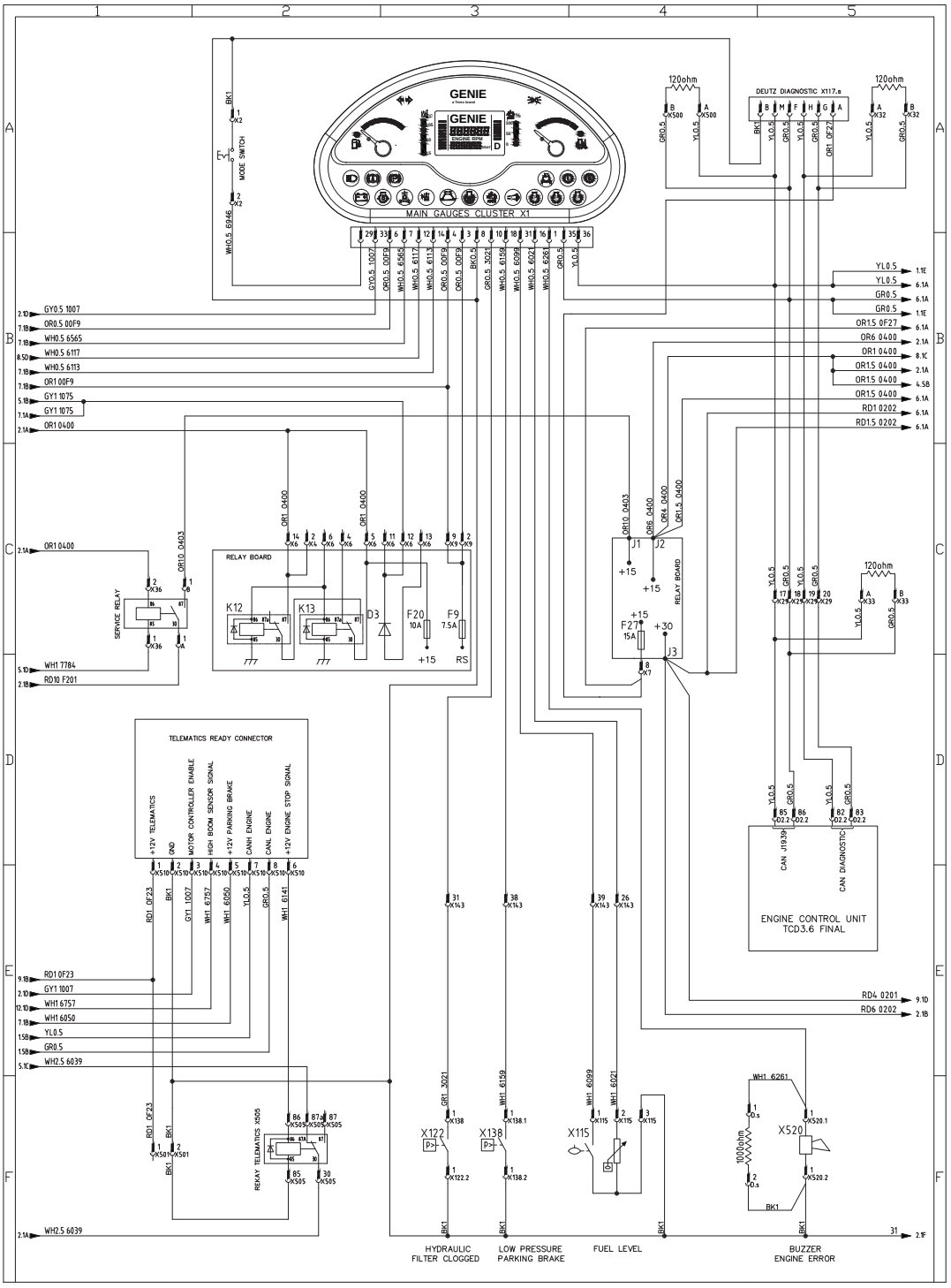
Electrical Schematic - Deutz

From SN GTH15M-601

Sheet 1 of 15



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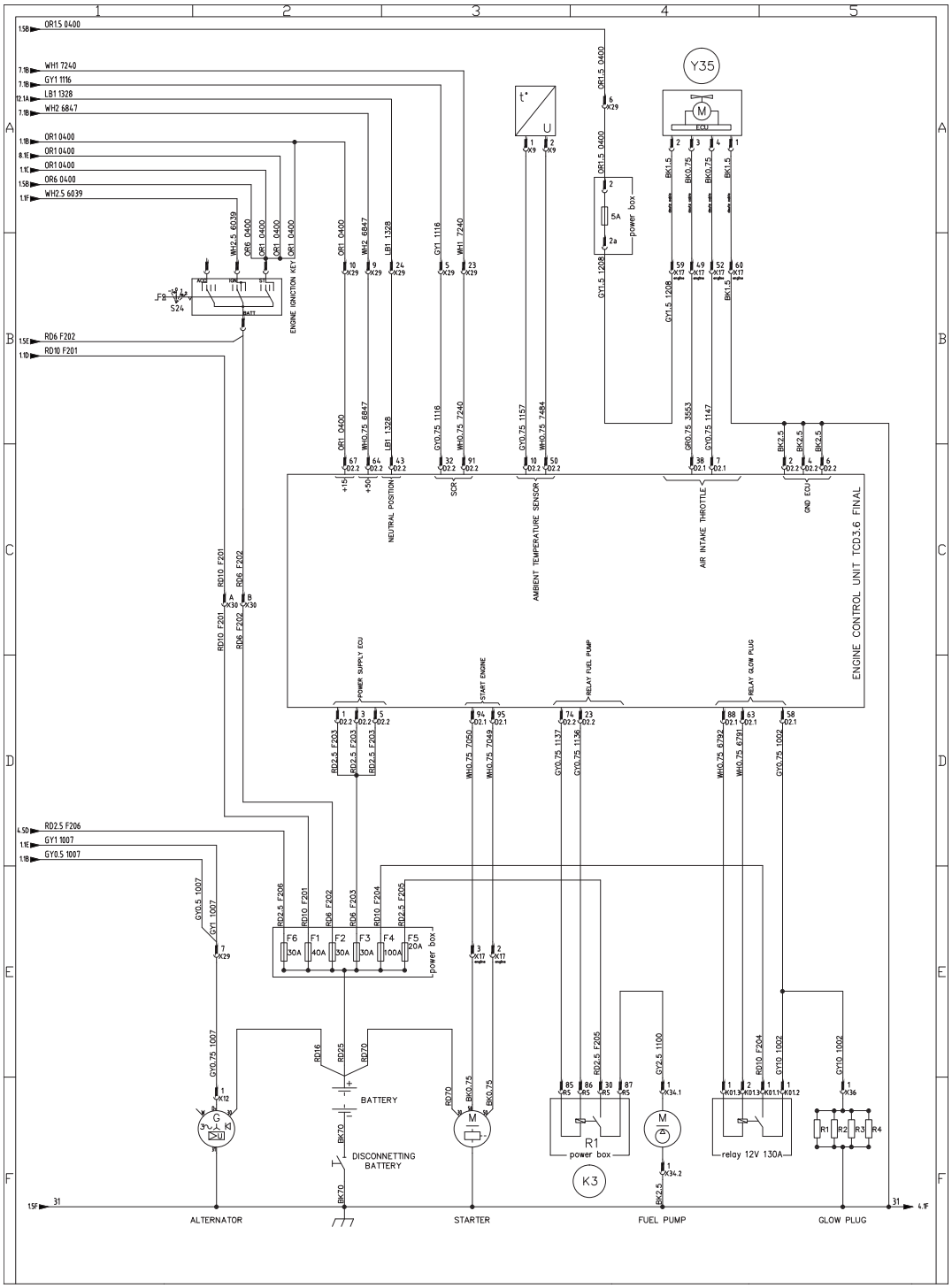
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 2 of 15



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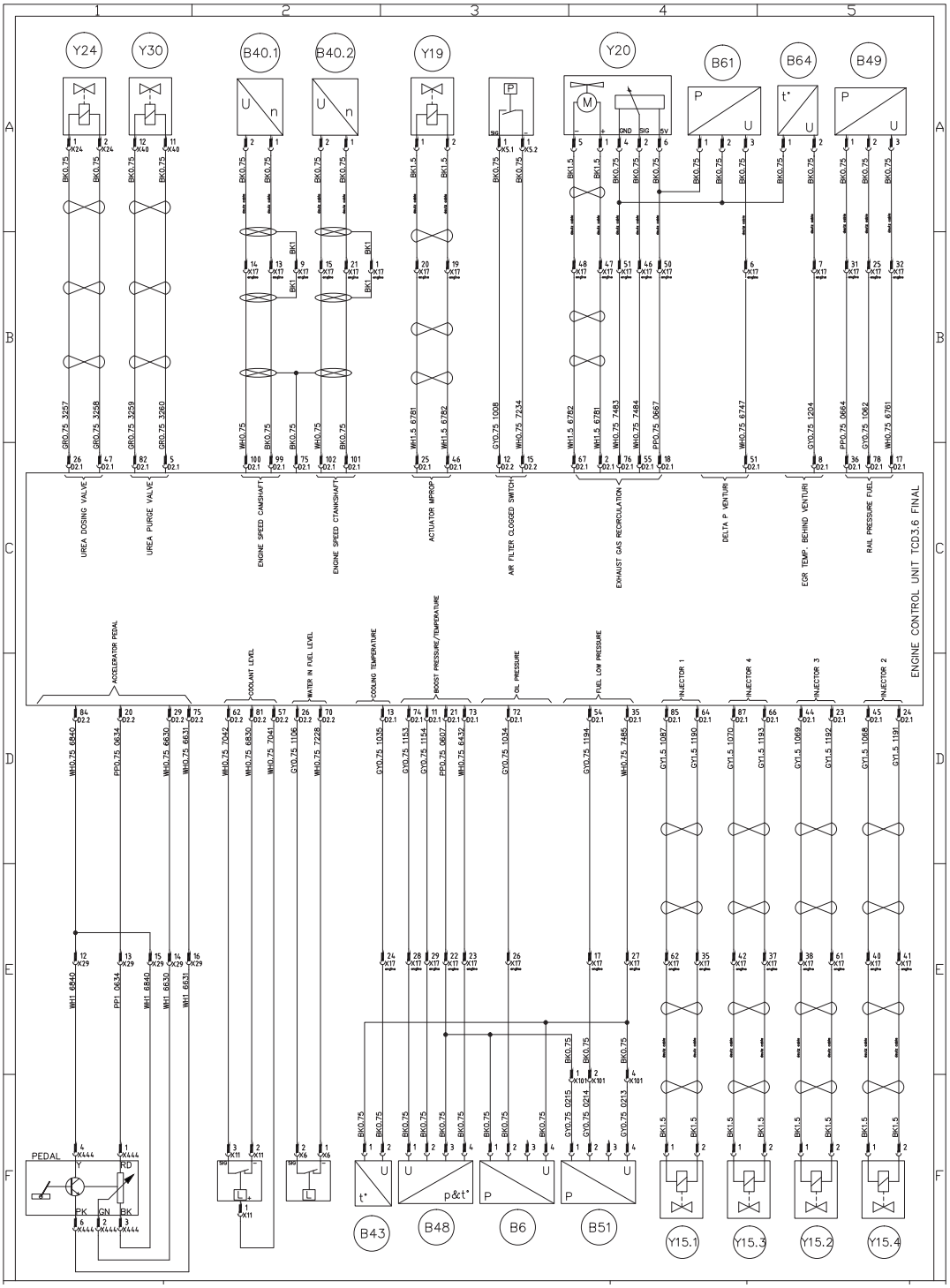
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 3 of 15



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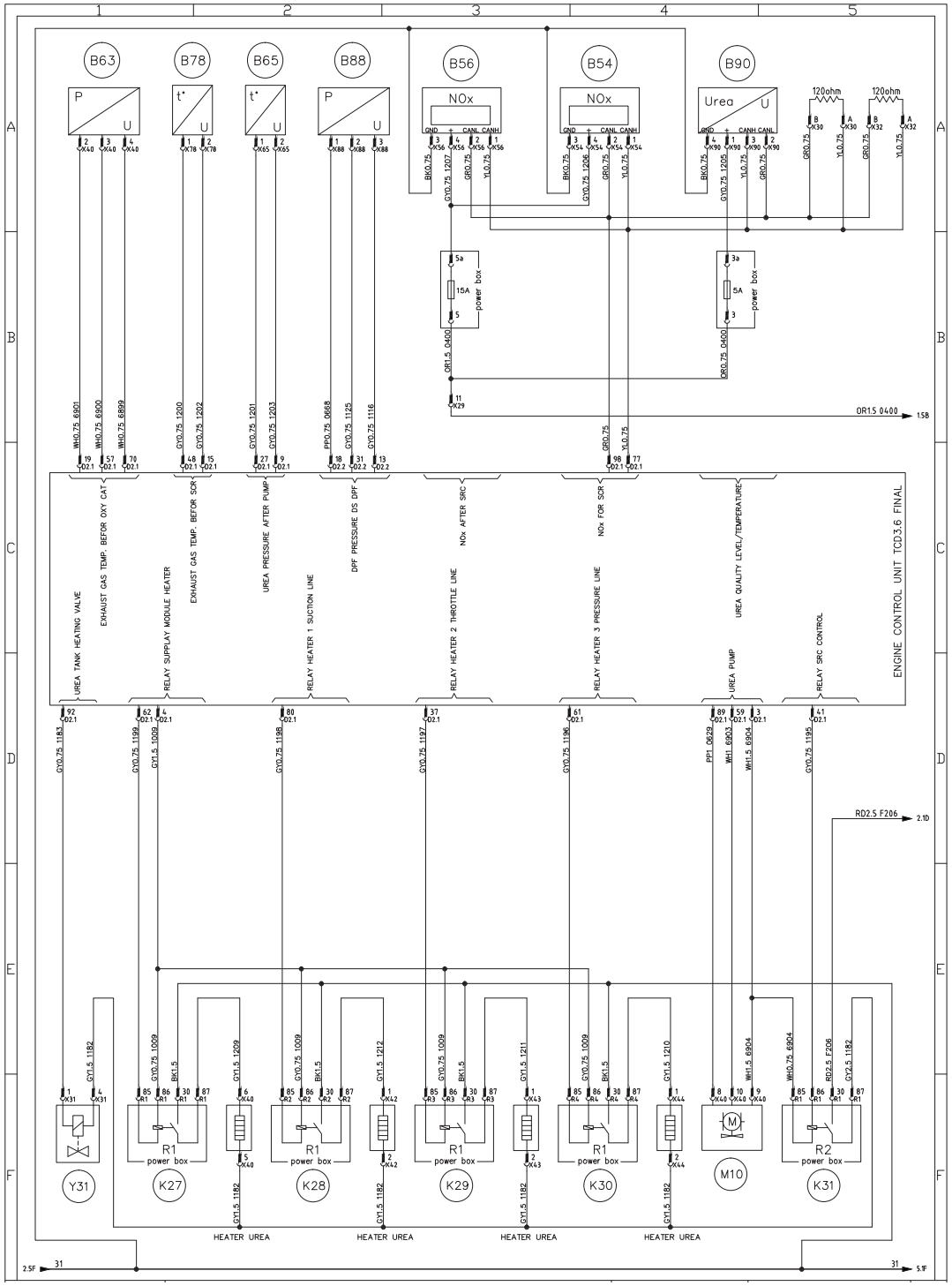
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 4 of 15



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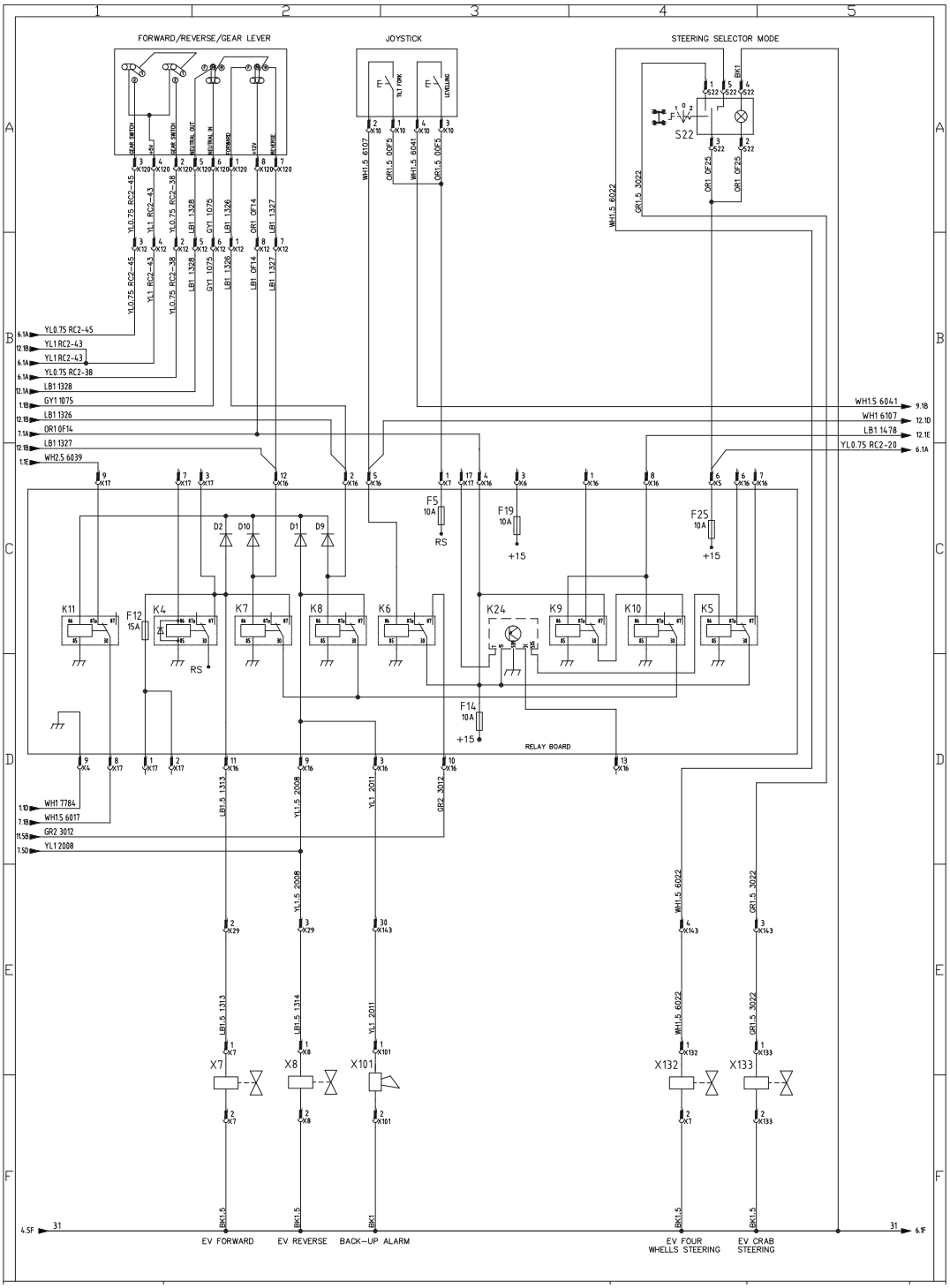
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 5 of 15



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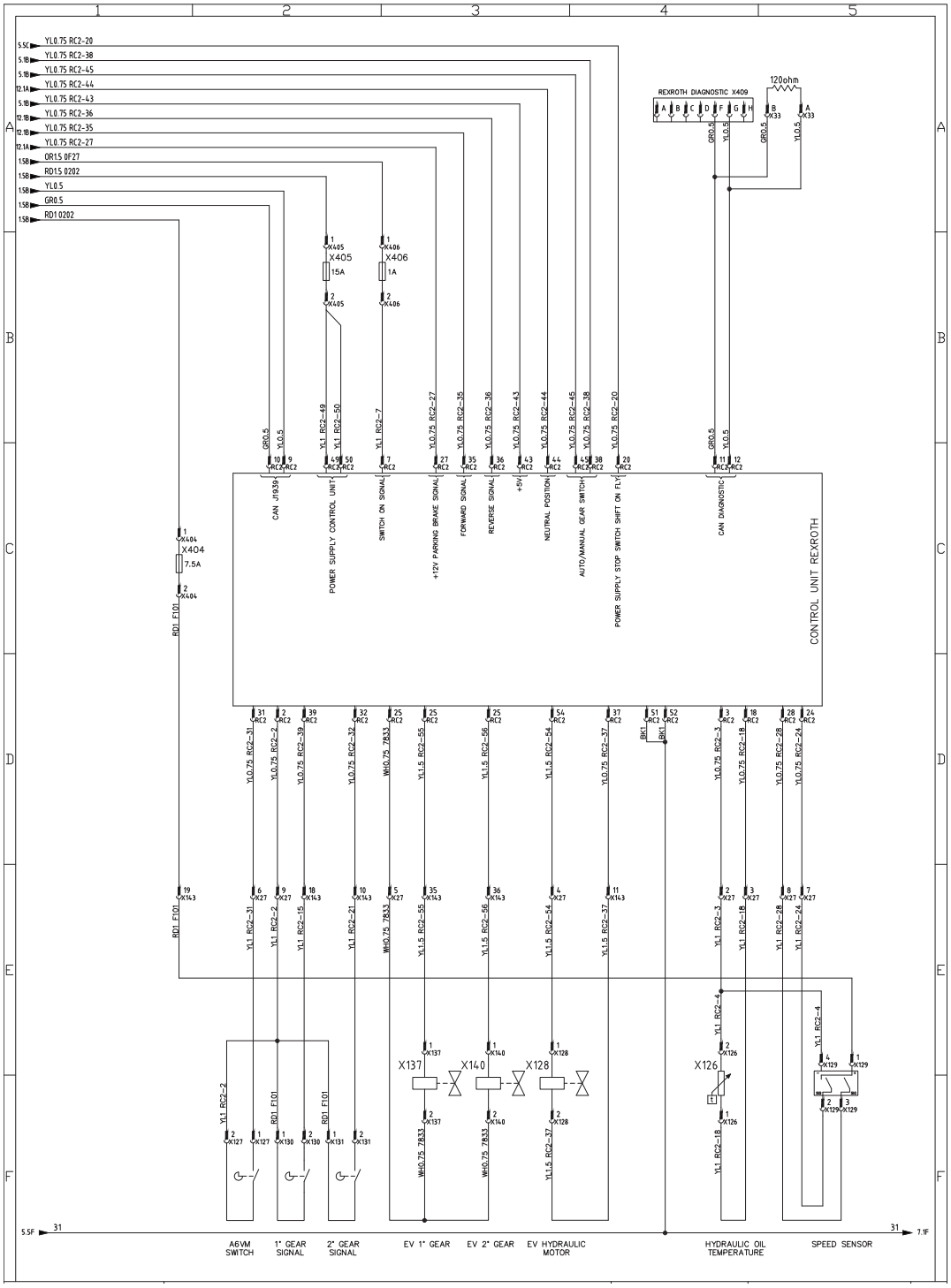
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 6 of 15



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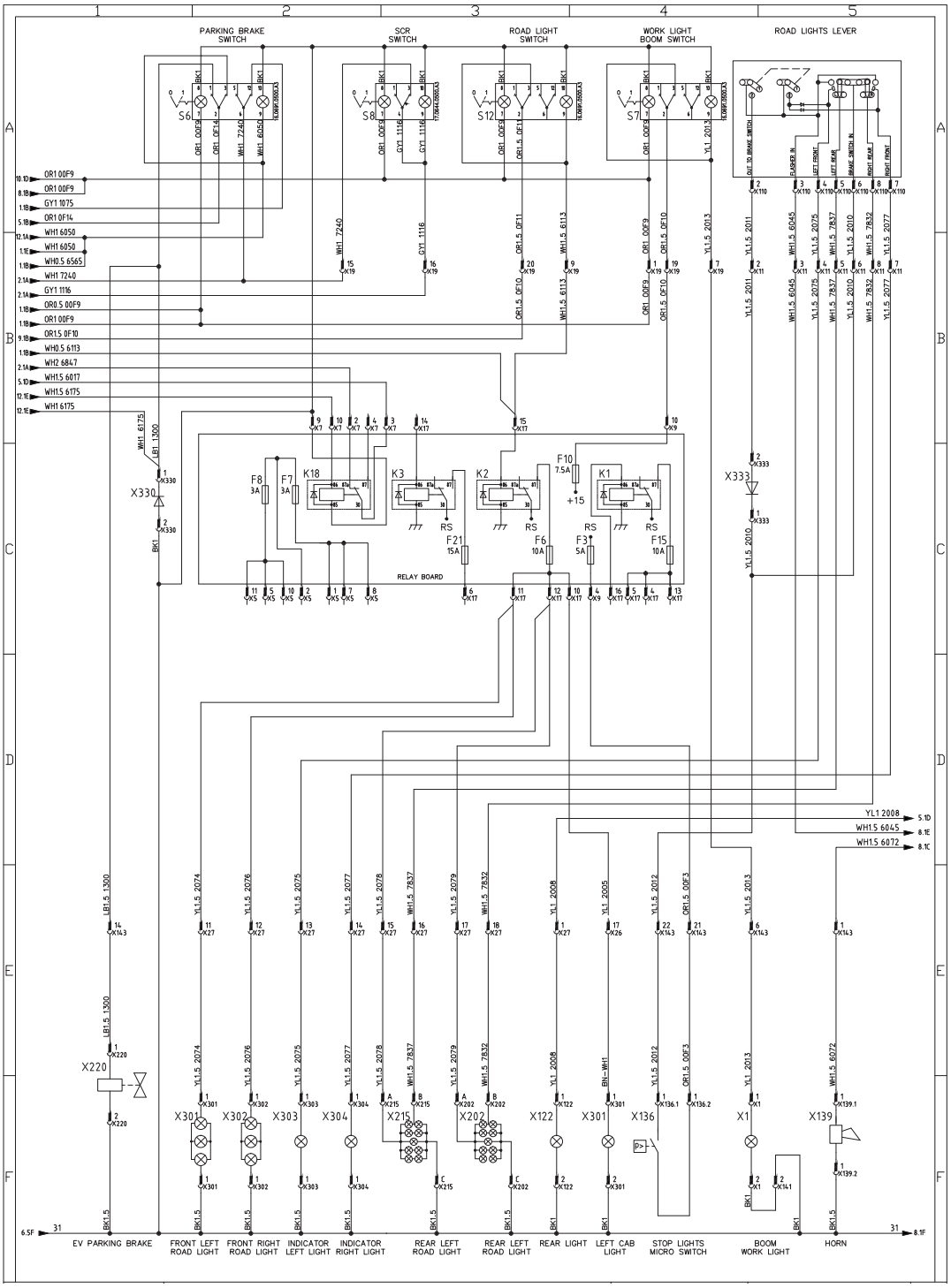
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 7 of 15



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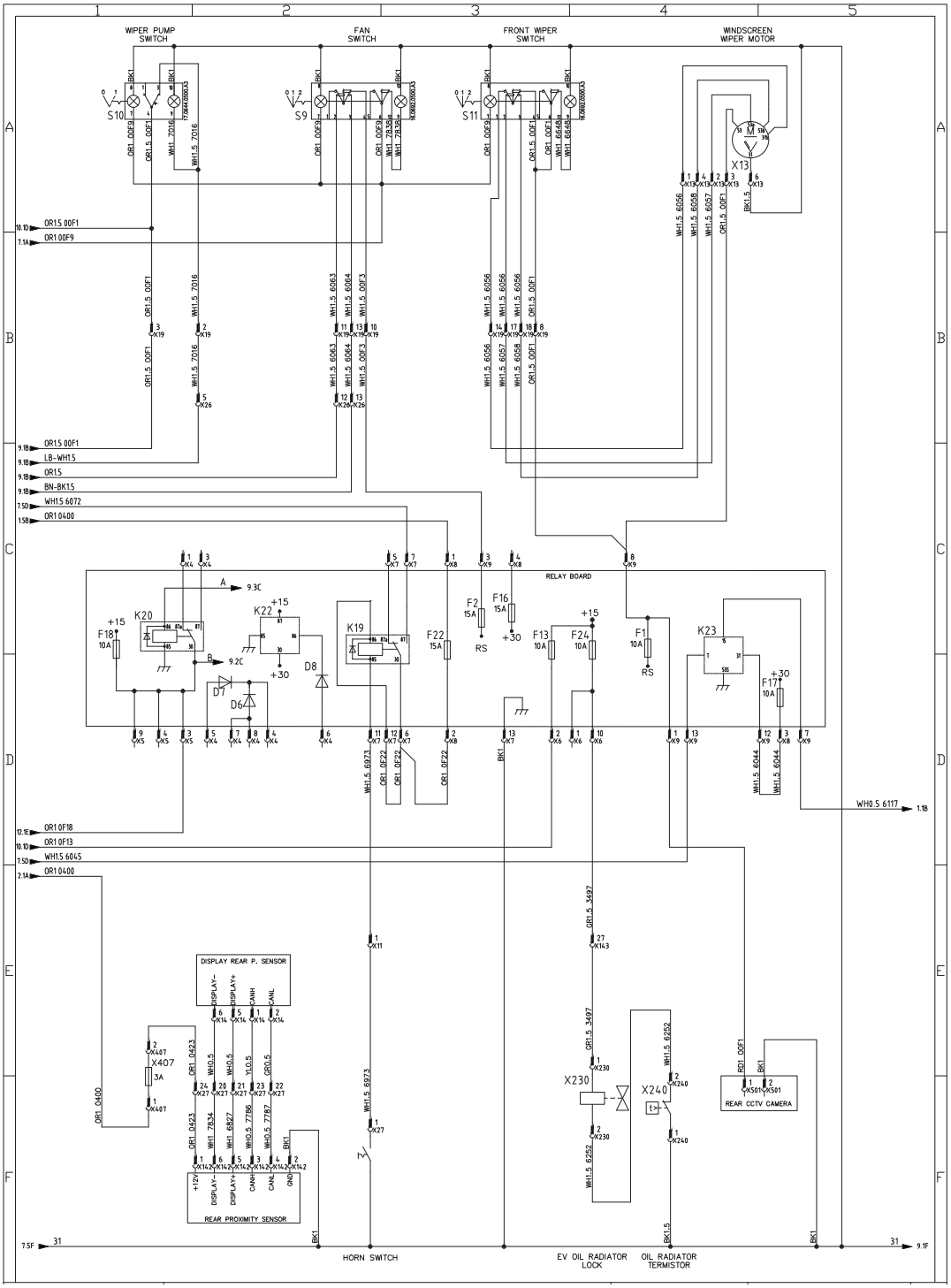
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 8 of 15



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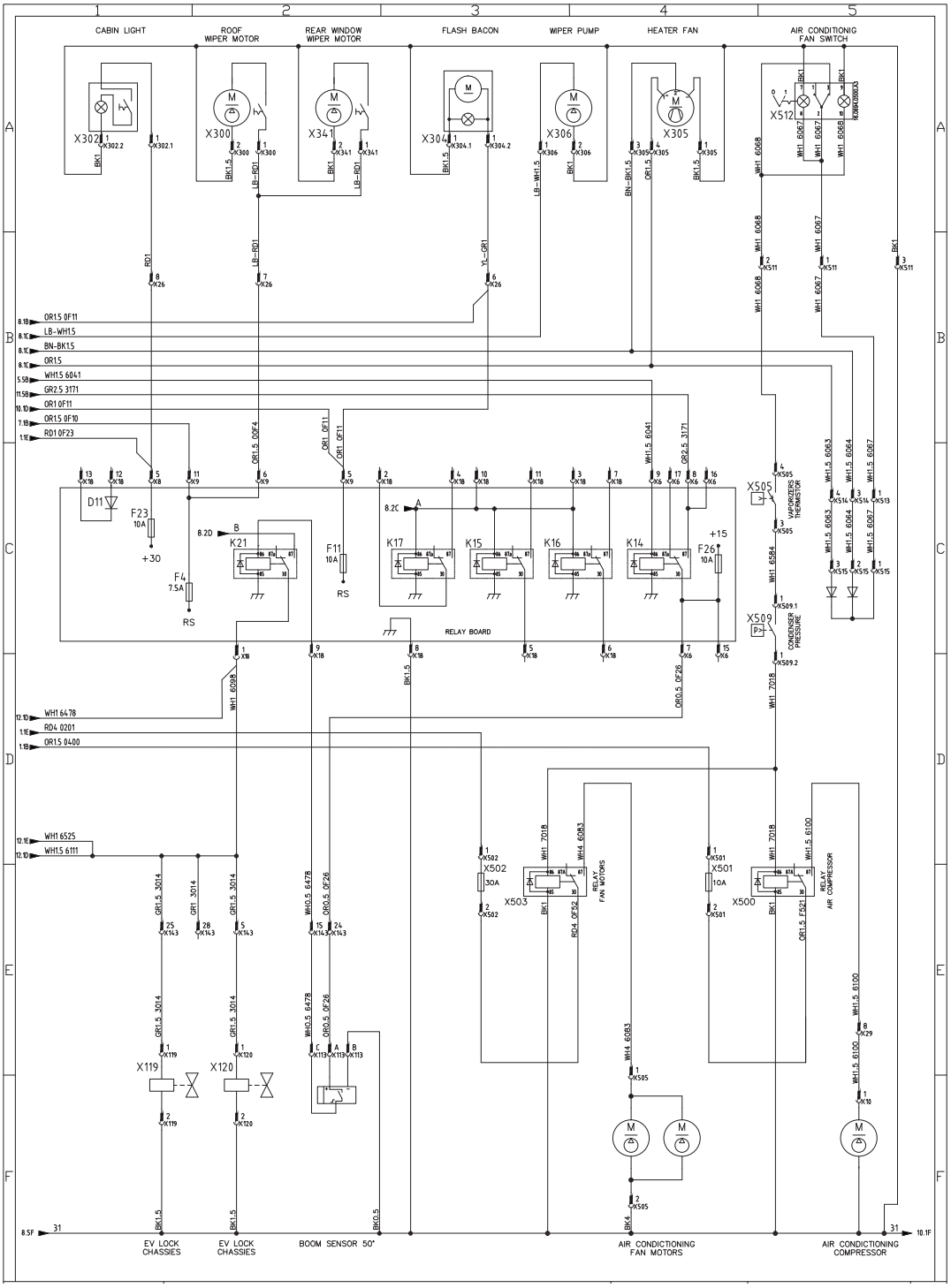
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 9 of 15



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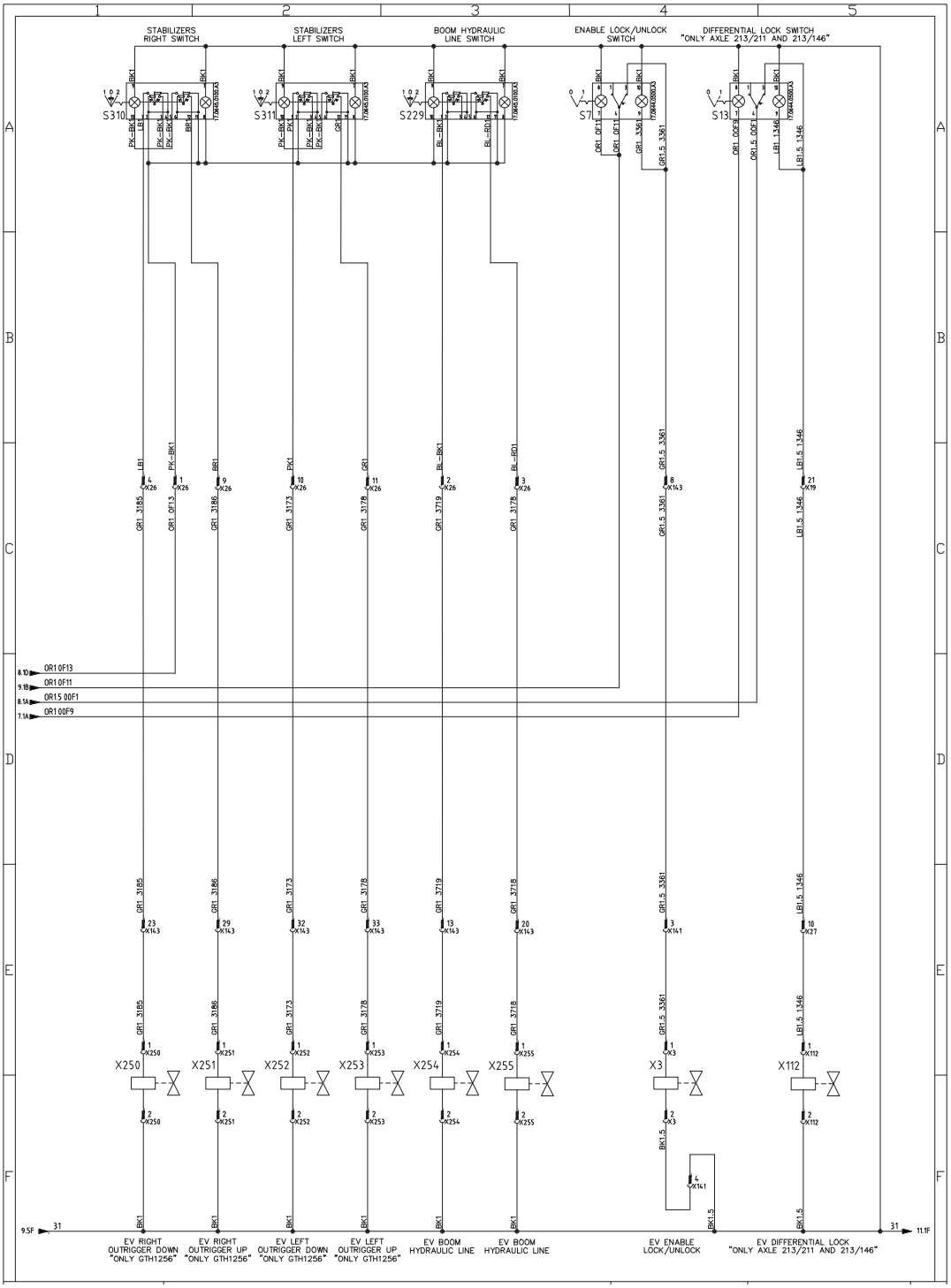
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 10 of 15



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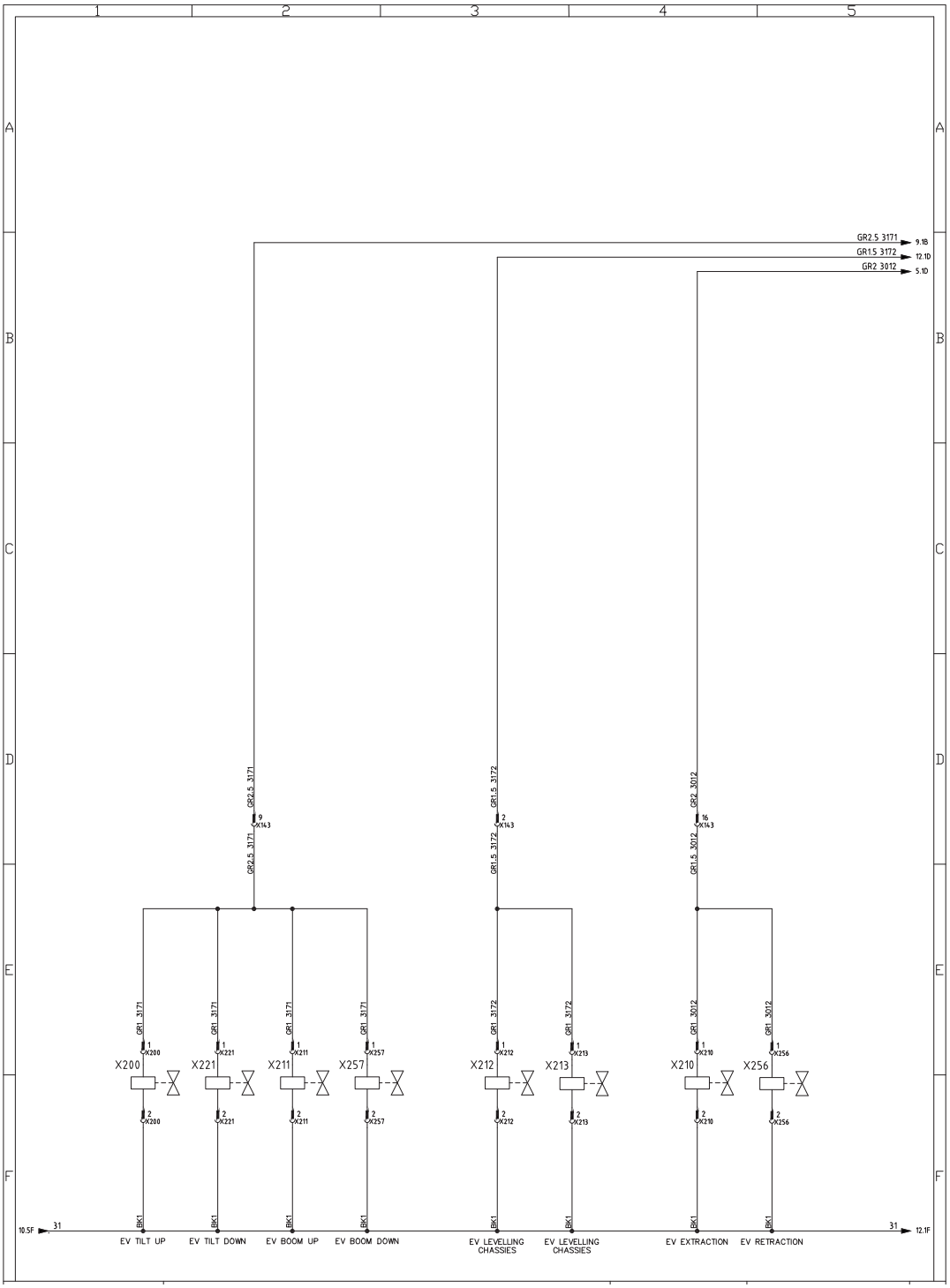
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 11 of 15



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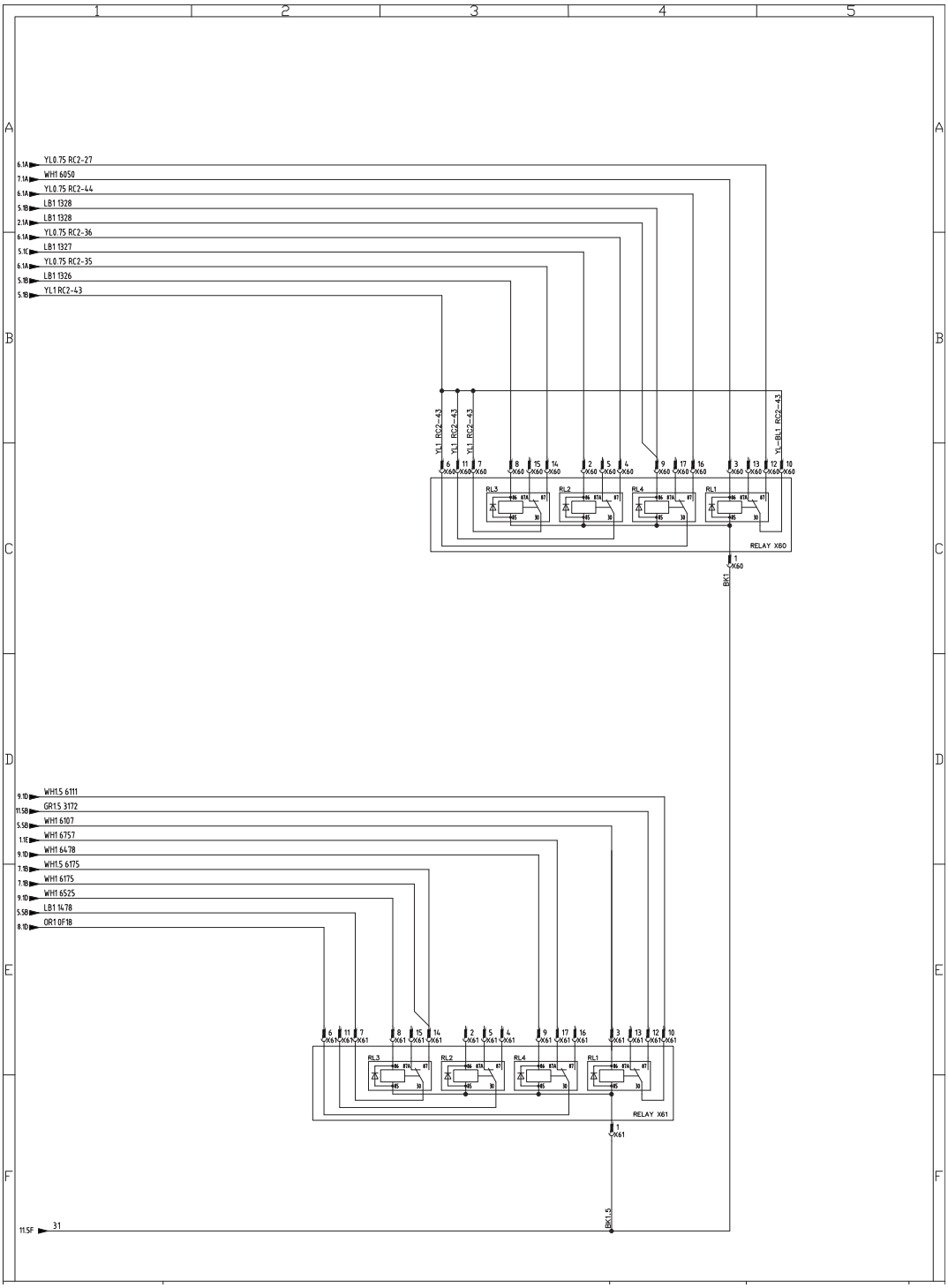
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 12 of 15



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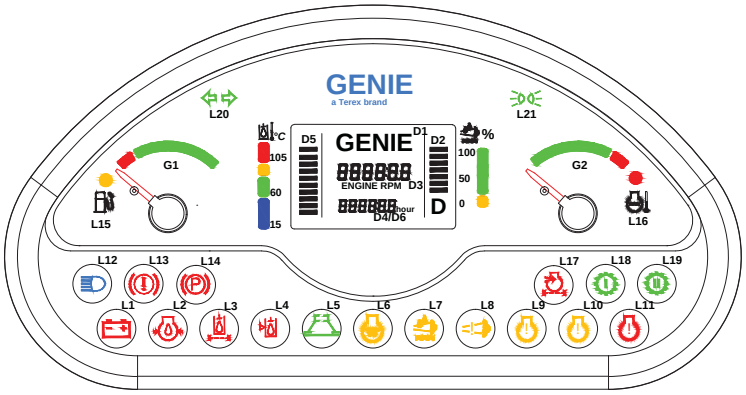
ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 13 of 15



PANEL LAMPS

LAMP–DISPLAY–GAUGE	DESCRIPTION	COLOUR	TYPE
L1	ALTERNATOR LAMP	RED	WIRING
L2	OIL PRESSURE LAMP	RED	CAN
L3	HYDRAULIC OIL FILTER CLOGGED LAMP	RED	WIRING
L4	HYDRAULIC OIL LEVEL LAMP	RED	WIRING
L5	LANDED LAMP	GREEN	WIRING
L6	ENGINE WAIT TO START LAMP	YELLOW	CAN
L7	SCR WARNING LAMP–DEF LOW LEVEL LAMP	YELLOW	CAN
L8	EMISSIONS SYSTEM MALFUCTION LAMP	YELLOW	CAN
L9	PROTECT LAMP	YELLOW	CAN
L10	WARNING LAMP	YELLOW	CAN
L11	STOP LAMP	RED	CAN
L12	HIGH BEAM LAMP	BLUE	WIRING
L13	BRAKE FAILURE LAMP	RED	WIRING
L14	PARKING BRAKE LAMP	RED	WIRING
L15	LOW LEVEL FUEL LAMP	RED	WIRING
L16	ENGINE COOLANT TEMPERATURE LAMP	RED	CAN
L17	AIR FILTER LAMP	RED	CAN
L18	FIRST GEAR LAMP	GREEN	CAN
L19	SECOND GEAR LAMP	GREEN	CAN
L20	DIRECTION INDICATORS LAMP	GREEN	CAN
L21	POSITION LIGHTS LAMP	GREEN	CAN
D1	REGENERATION–ENGINE ERRORS–TRASMISSION ERRORS	–	CAN
D2	DEF LEVEL	–	CAN
D3	ENGINE SPEED	–	CAN
D4	TOTAL ENGINE HOURS	–	CAN
D5	HYDRAULIC OIL TEMPERATURE	–	CAN
D6	VEHICLE SPEED	–	CAN
G1	FUEL LEVEL GAUGE	–	CAN
G2	ENGINE COOLANT TEMPERATURE GAUGE	–	CAN

WIRE COLOR LEGEND

LB	LIGHT BLUE	YL	YELLOW
BN	BROWN	PK	PINK
WH	WHITE	GY	GREY
BK	BLACK	GR	GREEN
OR	ORANGE	BL	BLUE
RD	RED	PP	PURPLE

REMARK: Two colorwires are indicated through a combination of the aforesaid initials as follows:
YL/GN= YELLOW/GREEN (crosswise colouring)
YL–GN= YELLOW–GREEN (lengthswise colouring)

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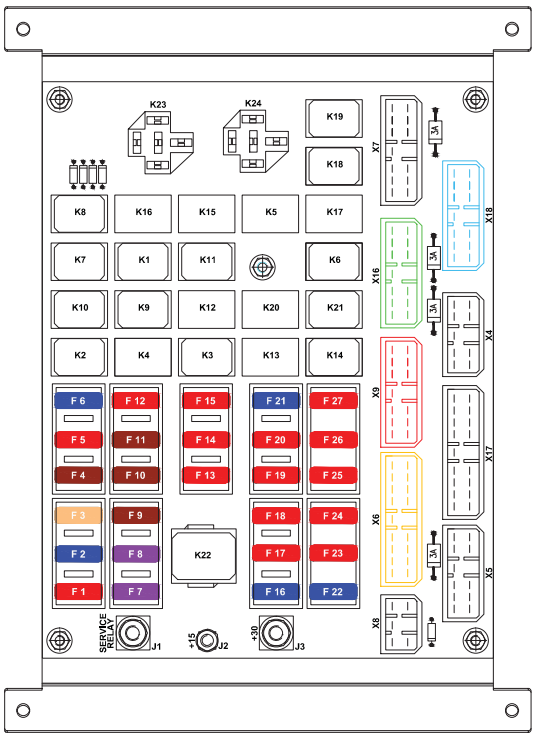
ELECTRICAL SCHEMATIC - DEUTZ

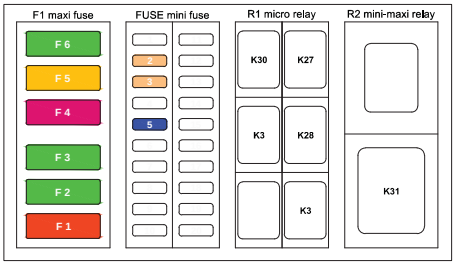
From SN GTH15M-601

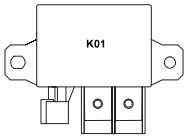
Sheet 14 of 15

FUSES AND RELAYS CABIN CARD



FUSES AND RELAYS CABIN CARD		
REF.	DESCRIPTION	AMP
F1	WINDSCREEN WIPER / REAR CCTV CAMERA	10A
F2	HEATING FAN	15A
F3	STOP LIGHTS	5A
F4	REAR-ROOF WIPER / ROAD LIGHTS SWITCH	7.5A
F5	+12V JOYSTICK	10A
F6	FRONT-REAR ROAD LIGHTS / CAB LIGHT	15A
F7	NOT USED	3A
F8	NOT USED	3A
F9	+12V CHECK LIGHTS	7.5A
F10	WORK LIGHT BOOM	7.5A
F11	WIPER PUMP / FLASH BEACON	7.5A
F12	NOT USED	10A
F13	STABILIZERS / BOOM HYDRAULIC	10A
F14	FORWARD-REVERSE LEVER	10A
F15	NOT USED	10A
F16	NOT USED	15A
F17	FLASHER INDICATOR	10A
F18	+12V RELAY X60	10A
F19	NOT USED	10A
F20	+15 ENGINE IGNITION KEY	10A
F21	NOT USED	15A
F22	HORN	15A
F23	CABIN LIGHT / TELEMATICS CONNECTOR	10A
F24	HYDRAULIC OIL RADIATOR	10A
F25	STEERING MODE / +12V ECU REXROTH	10A
F26	BOOM SENSOR 50°	10A
F27	DEUTZ DIAGNOSTIC CONNECTOR	10A
K1	NOT USED	35A/20A
K2	FRONT-REAR ROAD LIGHTS / CAB LIGHT	35A/20A
K3	NOT USED	35A/20A
K4	NOT USED	–
K5	NOT USED	–
K6	EV LEVELLING CHASSIES	35A/20A
K7	TRANSMISSION FORWARD MODE	35A/20A
K8	TRANSMISSION REVERSE MODE	35A/20A
K9	CUT OFF FORWARD-REVERSE MODE	35A/20A
K10	CUT OFF FORWARD-REVERSE MODE	35A/20A
K11	START ABILITATION	35A/20A
K12	NOT USED	–
K13	NOT USED	–
K14	EV BOOM	35A/20A
K15	NOT USED	–
K16	NOT USED	–
K17	NOT USED	–
K18	+50 ENGINE START	35A/20A
K19	HORN	35A/20A
K20	NOT USED	–
K21	REAR AXLE LOCK	35A/20A
K22	NOT USED	40A/30A
K23	WARNING LIGHTS "OPT"	FLASHER
K24	NOT USED	–





FUSES AND RELAYS ENGINE BOX		
REF.	DESCRIPTION	AMP
F1	FUSE SERVICE RELAY	40A
F2	FUSE POWER SUPPLY KEY	30A
F3	FUSE POWER SUPPLY ECU	30A
F4	FUSE GLOW PLUG	100A
F5	FUSE FUEL PUMP	20A
F6	FUSE SCR CONTRO	30A
2	FUSE AIR INTAKE THROTTLE	5A
3	FUSE UREA QUALITY LEVEL-TEMPERATURE	5A
5	FUSE NOx AFTER SRC	15A
K3	RELAY FUEL PUMP	20A/35A
K27	RELAY SUPPLAY MODULE HEATER	20A/35A
K28	RELAY HEATER 1 SUCTION LINE	20A/35A
K29	RELAY HEATER 2 THROTTLE LINE	20A/35A
K30	RELAY HEATER 3 PRESSURE LINE	20A/35A
K31	RELAY SRC CONTROL	70A
K01	RELAY GLOW PLUG	130A

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ELECTRICAL SCHEMATIC - DEUTZ

From SN GTH15M-601

Sheet 15 of 15

MODIFICATIONS HISTORY

REVISION	DATE	ECN	DESCRIPTION
Rev.0	23/01/2017	/	First Release
Rev.A	15/02/2017	/	Integrated Axle 223/126 and 212/A40

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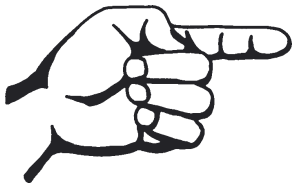

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Hydraulic Schematic - Deutz Engine

Deutz engine - Sheet 1 of 2

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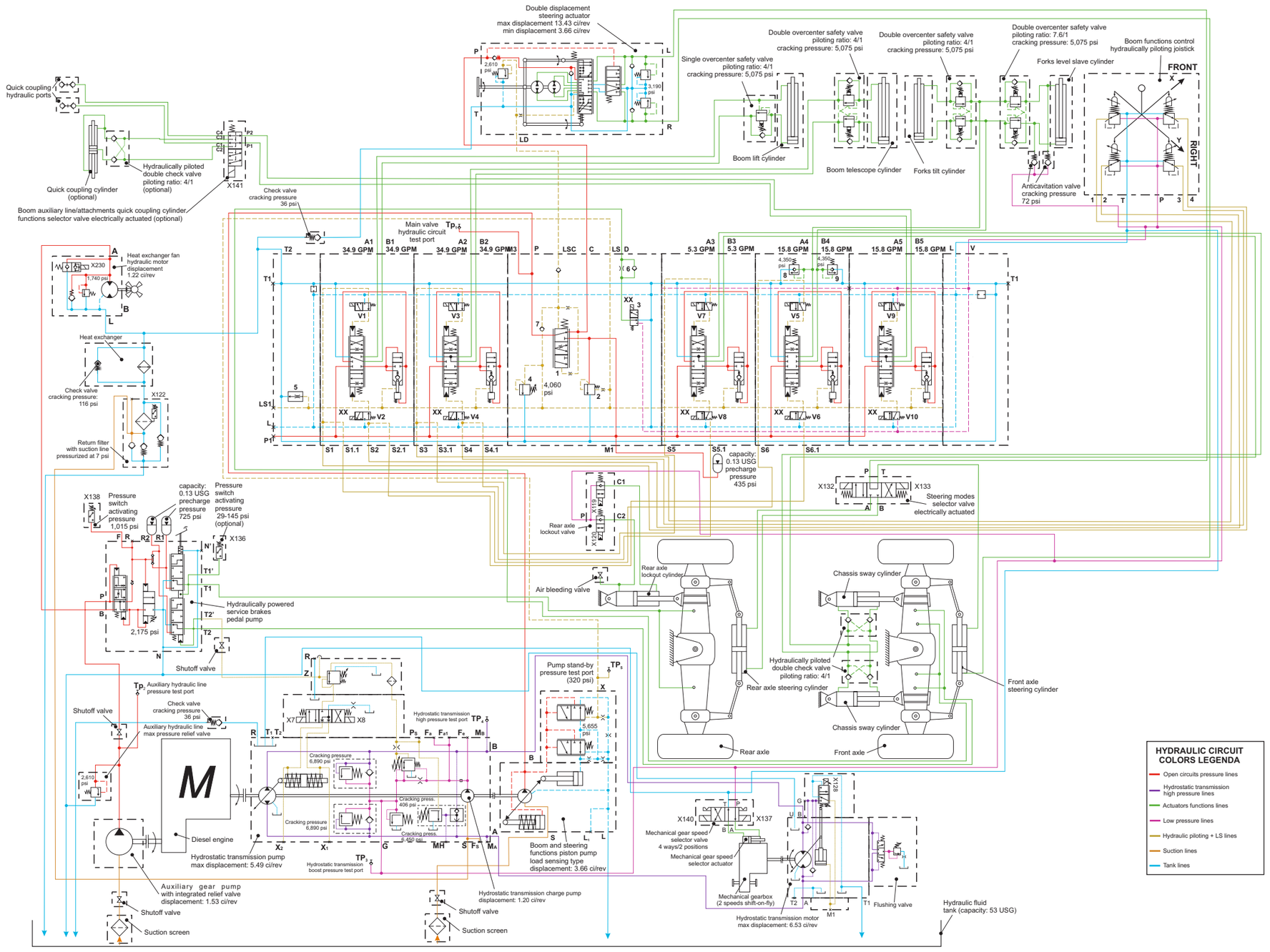
Hydraulic Schematic - Deutz Engine

Deutz engine - Sheet 2 of 2