

TEREX AMERICAS

SERVICE TRAINING



This Training Manual is for Training Purposes Only. For Operation / Maintenance / Service, proper manuals must be used for your Machine. Proper Manuals can be obtained thru your Dealer.

Terex Backhoe History Summary

Backhoes are manufactured by Terex – Fermec in Manchester, England.

- 1995- Models 750 / 760 / 860 / 965- 4WD & 4W steer, FERMEC with Kobe Steel started marketing Backhoe loaders in USA As Kobelco thru Kobelco distributors.

Major Components- Perkins Engine, Turner Transmission, Danfoss Hydraulics, Carraro front axle, AGCO rear axle.

- 1996- Models 750 / 760 / 860 / 965- 4WD & 4W steer, In October FERMEC acquired by Case corporation.

Major Components- Perkins Engine, Turner Transmission, Danfoss Hydraulics, Carraro front axle, AGCO rear axle.

- 1999- Models 750B / 760B / 860B / 965B, the P100 Series introduced with Danfoss Hydraulics & new Electrical (relay / fuse) board.

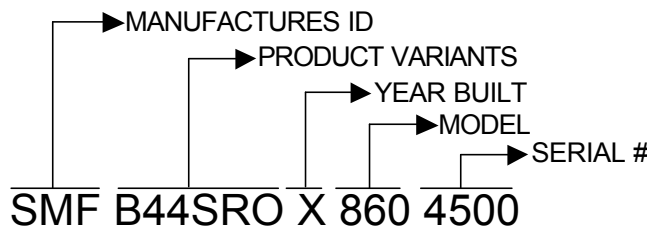
Major Components- Perkins Engine, Turner Transmission, Danfoss Hydraulics, Carraro front axle, AGCO rear axle.

- 2001- Models TX750 / TX760 / TX860 / TX860SB / TX960 / TX965, Fermec acquired by Terex corporation
In June, Husco Hydraulics and Carraro axles were installed starting at s/n3905 on TX700/800 series only.

Major Components- Perkins Engine, Turner Transmission, Danfoss Hydraulics, Carraro front axle, Carraro rear axle.

Backhoe V.I.N. Identification

TLK / Fermec

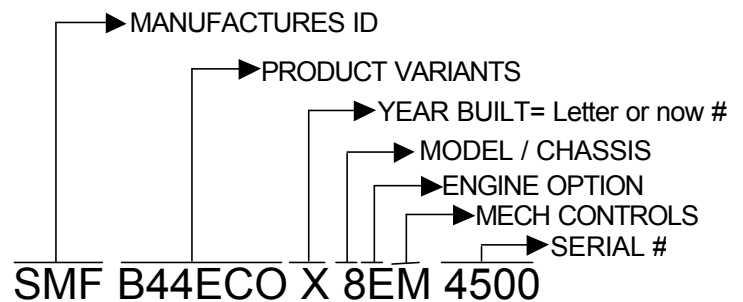


TLK/Fermec Machine Serial Log

1993 = P -0000 THRU 0973
 1994 = R -0974 THRU 3117
 1995 = S -3118 THRU 6305
 1996 = T -6306 THRU 9231
 1997 = V -0001 THRU 2121
 1998 = W -2122 THRU 4453
 1999 = X -4454 THRU 4946

Perkins "Green Engine" (start s/n #3538)

"B" Series / Terex



"B" Series Machine Serial Log

1999 = X -0001 THRU ????
 2000 = Y -???? THRU ????
 2001 = 1 -???? THRU 3884
TEREX TX750/760/860/960
 2002 = 2 - 3905 THRU 5416
 2003 = 3 - 8069 THRU -----
 2004 = 4 ----- THRU -----

<i>SECTION</i>	<i>DESCRIPTION</i>
1	MACHINE SPECIFICATIONS
2	CAB CONTROLS & BASIC ELECTRICAL
3	ENGINE
4	TRANSMISSION
5	BASIC HYDRAULIC SYSTEM
6	AXLES & STEERING
7	BRAKES
8	BACKHOE FUNCTIONS
9	LOADER FUNCTIONS
10	SCHEDULED MAINTENANCE
	HYDRAULIC SCHEMATIC
	ELECTRICAL DIAGRAM SHEET 1
	ELECTRICAL DIAGRAM SHEET 2

SECTION 1

MACHINE SPECIFICATIONS





SPECIFICATIONS ENGINE (MODEL 760)

- Make and type..... PERKINS 1004-40T
- Displacement.....4 liters
- Number of cylinders 4
- Bore and stroke 100 x 127 mm
- Injection system.....FASTRAN direct
- Compression ratio 17.25:1
- SAE J 1349 horsepower.....86 hp (64 kW) @ 2200 rpm
- ISO 9249 horsepower79 hp (59 kW) @ 2200 rpm
- **ISO 9249 maximum torque251 ft lbs (341 Nm) @ 1350 rpm**

ELECTRICAL SYSTEM

- Voltage12 volts
- Battery (single)12 volts (115 amp/h)
- Battery (double)..... 12 volts (72 amp/h)
- Alternator..... Standard - 70 amp
- Air conditioning - 100 amp

CAB

- ROPS and FOPS type (with protection against rolling over and falling objects).
- Tinted safety glass – wide glazed surface giving total visibility.
- Operator's seat with adjustable suspension. Class III as per 1980 ISO/DIS 7096.
- Fresh air heater/blower unit, full heating control including demist on front and rear windows. Optional air conditioning.

MACHINE WEIGHT

- Maximum authorized weight..... 3944lb (8700 kg)

TRANSMISSION

- **Torque converter** - Two phase, integrated with engine flywheel. Stall ratio 2.87 to 1
- **Gearbox** - TURNER **Synchroshuttle** with 4 synchronized gears, 4 forward and 4 reverse gears (Specific to certain countries, the fourth gear is not fitted). Electrical transmission cut-out using push button on gear change lever or loader control lever.
- **Travel speed**

Speeds in forward and reverse with engine speed at 2200 rpm.

Synchroshuttle

Model 750/760 16.9 x 28		
Gear	kph	m.p.h.
1	5.41	3.36
2	8.71	5.41
3	19.91	12.37
4	40.06	24.88

AXLES

- **Fixed rear axle** Manufacturer – CARRARO, differential with lock, planetary gears, epicyclical hubs and wet disc brakes.
- **Oscillating front axle** All models - Make..... CARRARO

TIRES

750/760/860 only

Location	Dimensions and type	Inflation pressure	
		bar	lbf/in ²
Front	W8Lx16, 9x16 10P F2	4.9	71
Front	9x18, 10.5/80x18 10P SGL	5.1	74
Front	W8Lx16, 11Lx16 12P	5.5	80
Front	13x20, 16/70x20 10P SGL	3.4	49
Front	12.5/80x18 10P LUG	4.4	64
Front	9x18, 10.5/80 10P 13 GDYR	5.1	74
Front	18x11, 12.5x18 10P R4 FSTNE	3.0	44
Front	18x11, 12.5/80x18 10P SGI	4.4	64
Rear	W15x28, 16.9x28 10P R4 SGI	2.2	32
Rear	DW16x26, 18.4 12P GRIPSTER	1.8	26
Rear	W15Lx24, 19.5L IT525 R4	3.0	44
Rear	W15Lx24, 16.9x24 10P R4	3.0	44
Rear	DW15Lx30, 16.9x30 10P R4	2.2	32
Rear	DW15Lx30, 16.9x30 14P R4	2.8	41

WHEEL TIGHTENING TORQUE

- Front wheel nuts (750/760/860 only)..... 220 ft lbs (300 Nm)
- Rear wheel nuts (all models)..... 220 ft lbs (300 Nm)

BRAKES

Service Brakes

- Oil-immersed disc brakes in the rear drive shafts. Hydraulic operation by brake pedal master cylinders

Parking Or Emergency Brake

- Hand-lever and cables operated through a totally separate mechanical system to directly operate a large caliper type disc brake.

STEERING

- Type Hydrostatic
- Pressure..... 2500 psi (175 bar)

Turning circle

760 only (Turning circles are the same for both 4WD and 2WD machines)

- Outside front wheels, no brakes..... 27' 7" (8.4 m)
- Outside front wheels, with brakes 23' 8" (7.2 m)
- Outside bucket, no brakes 36' 5" (11.1 m)
- Outside bucket, with brakes 32' 10" (10.0 m)



HYDRAULIC SYSTEM

Pump (750/760/860)

- Tandem gear pumps, TX750/760 Inner pump @ 21 gpm, Outer Pump @ 16.7 gpm, TX860 both pumps @ 21 gpm.
- Combined flow..TX750/760 - 38 gpm(142 L/min), TX860 42 gpm(159 L/min) @ 2200 rpm / Main Relief Valve (MRV) 3250 psi(225 bar)

Loader control valve

- Two spool open center mono block valve.
- Single lever operation of bucket and lift spools.
- An optional three spool closed center valve is available for clamshell bucket.
- Maximum working pressure 3250 –0/+100 psi (225 – 0/+7 bar)

Backhoe control valve

- The backhoe control valve is a closed center seven spool mono block.
- The seven spool Valve controls the boom, dipper, bucket, swing, stabilizer, extendable dipper and auxiliary circuits.
- Circuit relief valves protect the boom, dipper, bucket, swing, extendable dipper and auxiliary circuits.
- Optional extendable dipper / hammer (auxiliary circuit)uses a solenoid operated changeover valve is used to divert hydraulic flow to either the extendable dipper or hammer. A separate foot pedal is used to operate a spool.
- Optional sideshift backhoe has added Solenoid valves to operate the sideshift clamp.
- Optional craning valve (only on center mount backhoe) and optional digger bucket quick attach.
- Maximum working pressure 3250 –0/+100 psi (225 – 0/+7 bar)

Filtration

- A return circuit, 13-micron interchangeable cartridge filter.

VIBRATION

- The machinery safety directive 93/392/EEC requires that machinery be vibration tested. These machines were all measured in hand vibration tests to be less than 2.5 m/s². For body vibrations, these machines were all measured to be less than 0.5 m/s².

CAPACITIES

- Fuel tank 33.0 US Gal (120 ltr)
- Hydraulic reservoir12.4 US Gal (45 ltr)
- Engine (with filter) 3.0 US Gal (10.7 ltr)
- Front drive axle (750/760/765 only)2.2 US Gal (8 ltr)
- Front axle reduction gear (each) (750/760/765 only)0.27 US Gal (1.0 ltr)
- Rear axle (750/760/860 only).....6.2 US Gal (22.5 ltr)
- Transmission (Synchroshuttle only).....4.1 US Gal (15 ltr)
- Cooling system.....4.5 US Gal (16.5 ltr)

CYCLE TIMES 760 (with Multipurpose Bucket) Engine set to 2200 rpm, Hydraulic oil at 55 - 60°C.

- Raising (with self level).....4.4 seconds
- Lowering (power down) 2.9 seconds
- Lowering (float).....4.0 seconds

Dumping (at maximum height)1.1 seconds Dumping (at maximum height)

Cylinder Leak Down Rates

The Normal amount of Leak down in a 10 minute period with Hyd. Oil Temp at 140F.

- Stabilizers – 7/8 inch (20mm)
- Extendable Dipper – 1 ½ inches (40mm)
- Backhoe Bucket – 5/8 inch (15mm)
- Dipper – 5/8 inch (15mm)
- Boom – 5/8 inch (15mm)
- Loader Beam – 5/16 inch (8mm)

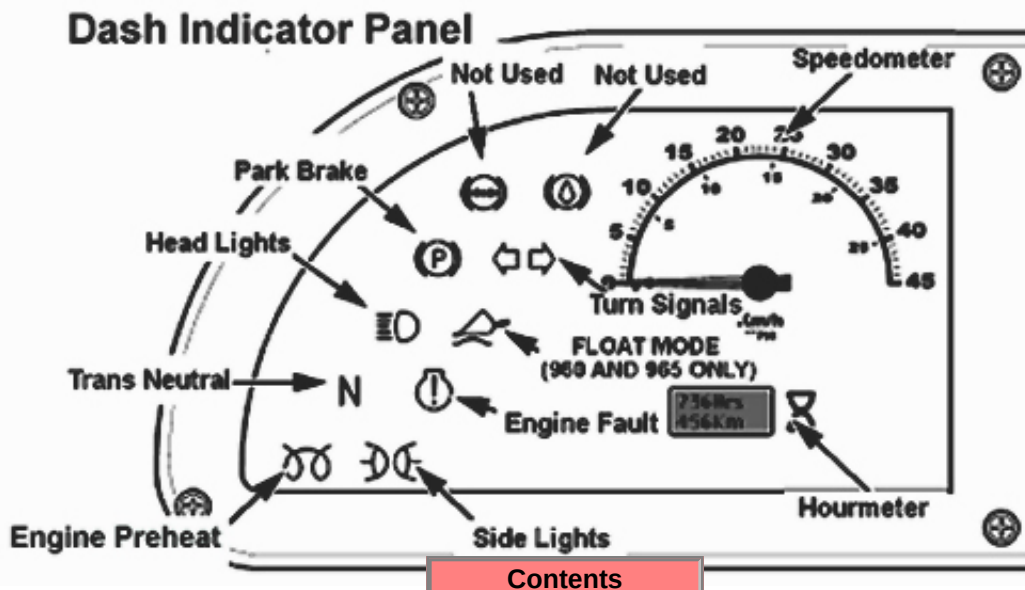
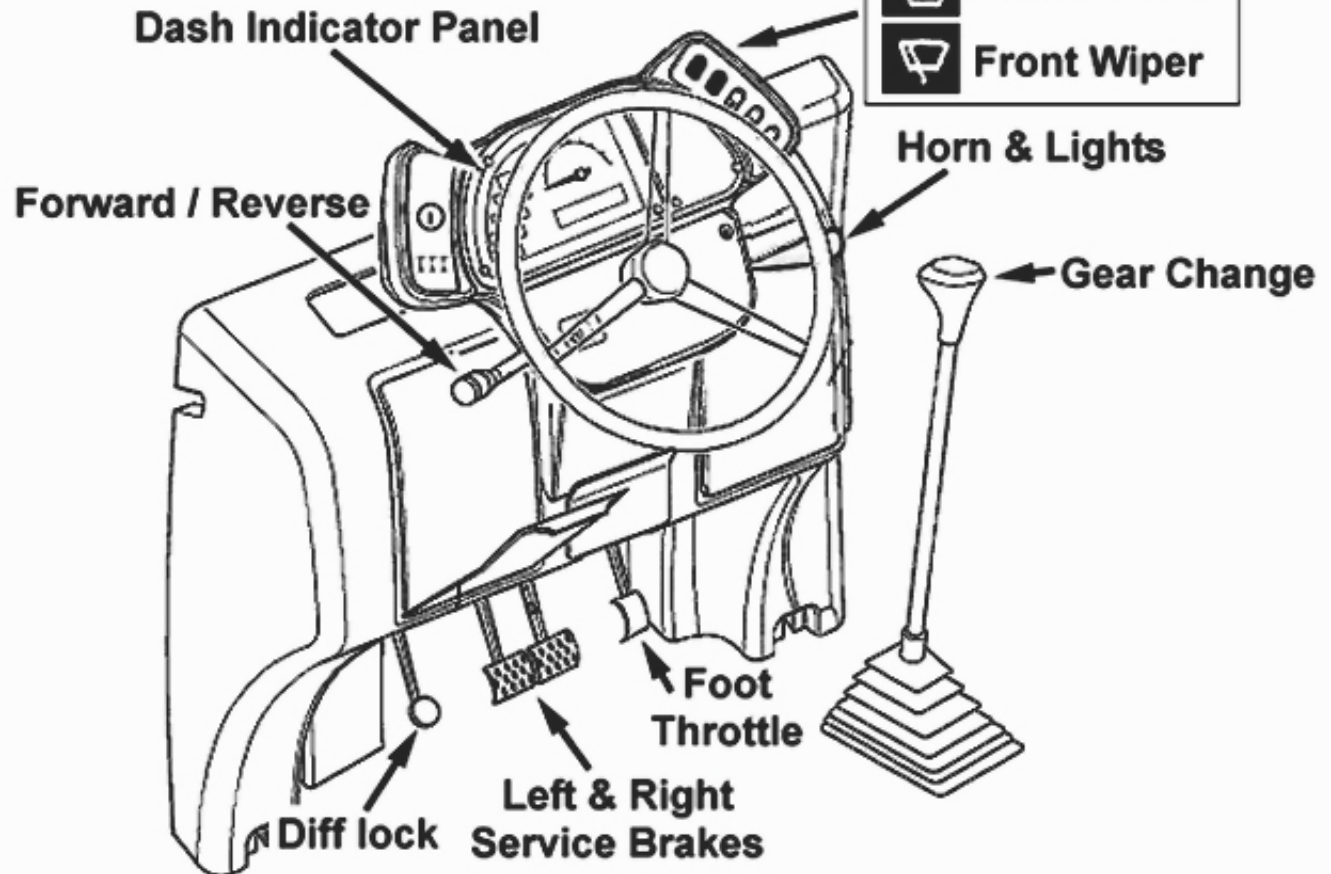
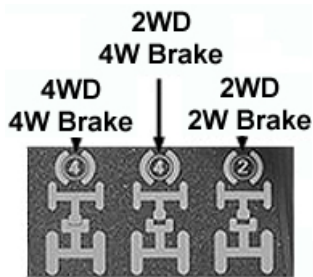
- Cylinders will leak down because there are no Counterbalance Valves.
- Leakage is at the Control Valves.

SECTION 2

CAB CONTROLS & BASIC ELECTRICAL



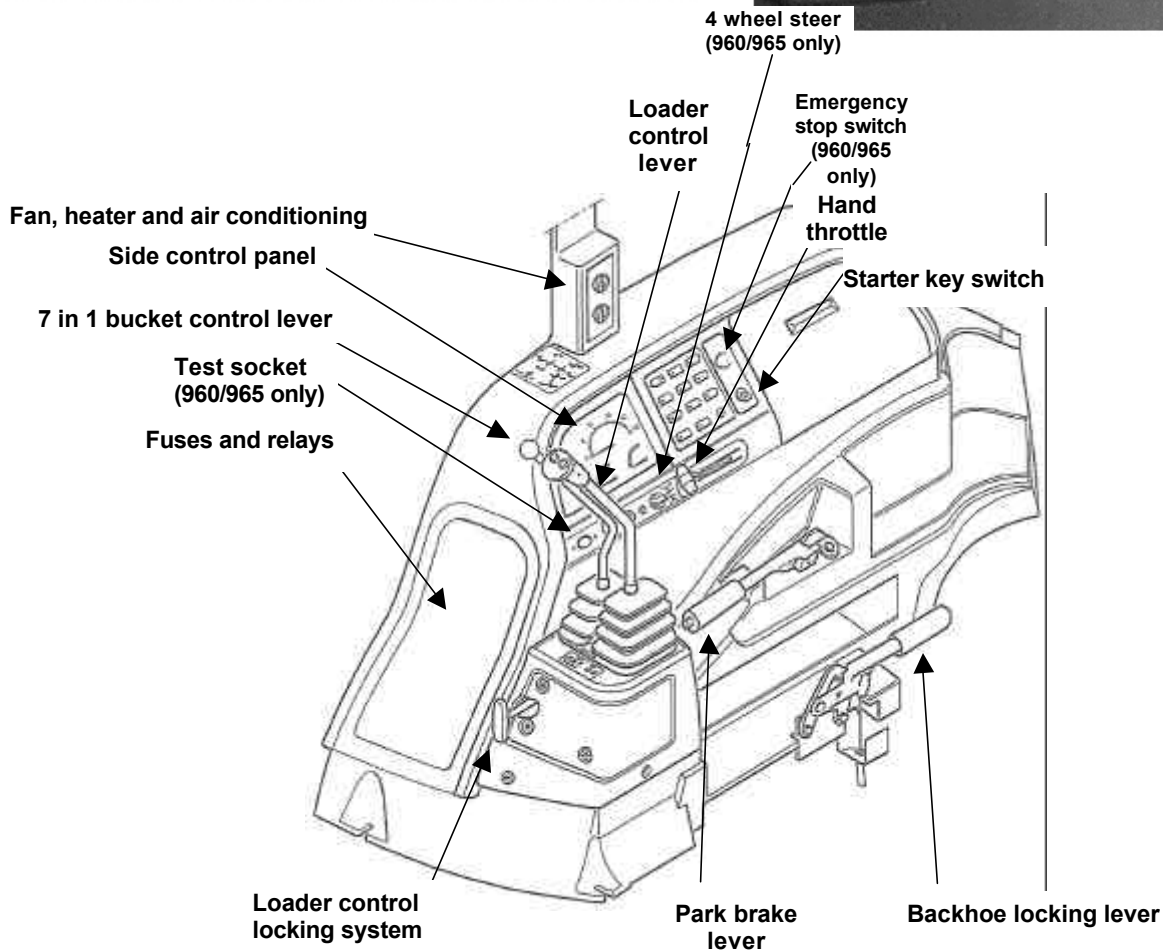
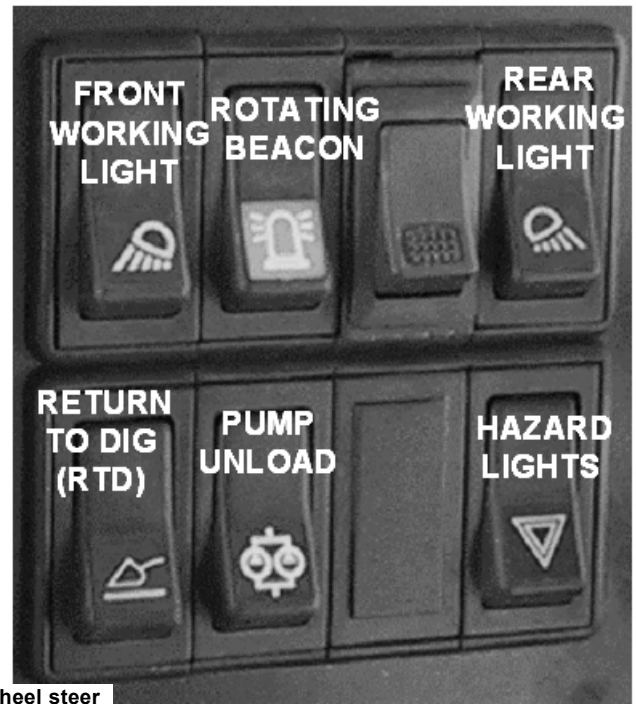
Front Dash Controls



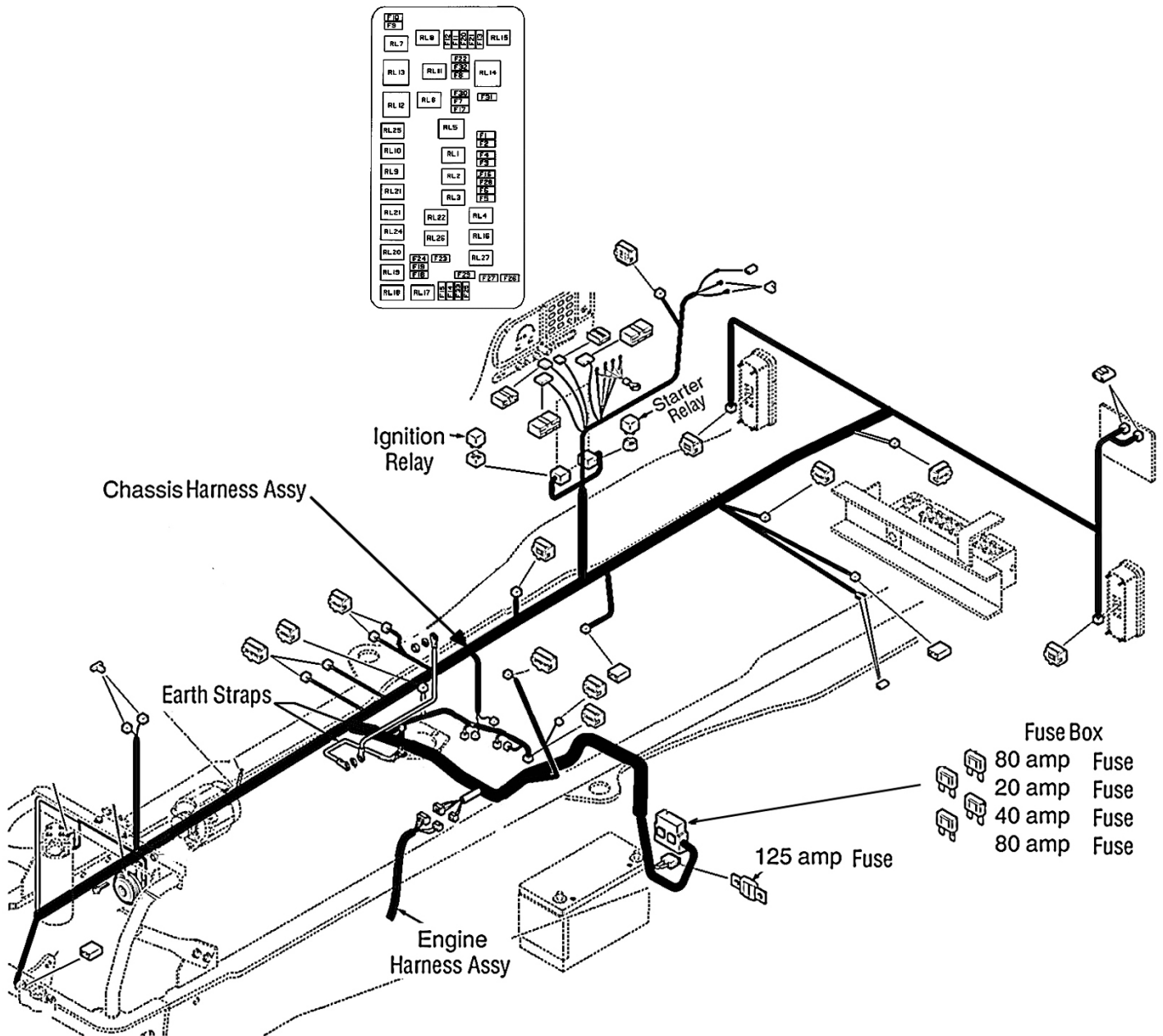
RH Console – Side Switches Environmental Cab



“Open Cab” RH Console - Side Switches



Wiring Harness



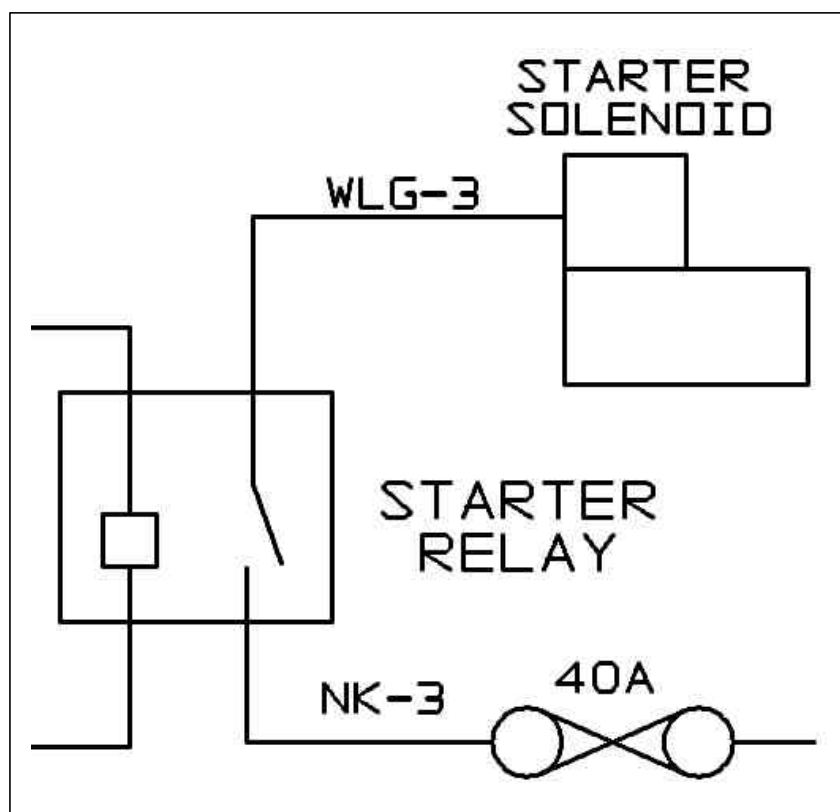
ELECTRICAL SCHEMATIC WIRE IDENTIFICATION

COLOR CODE

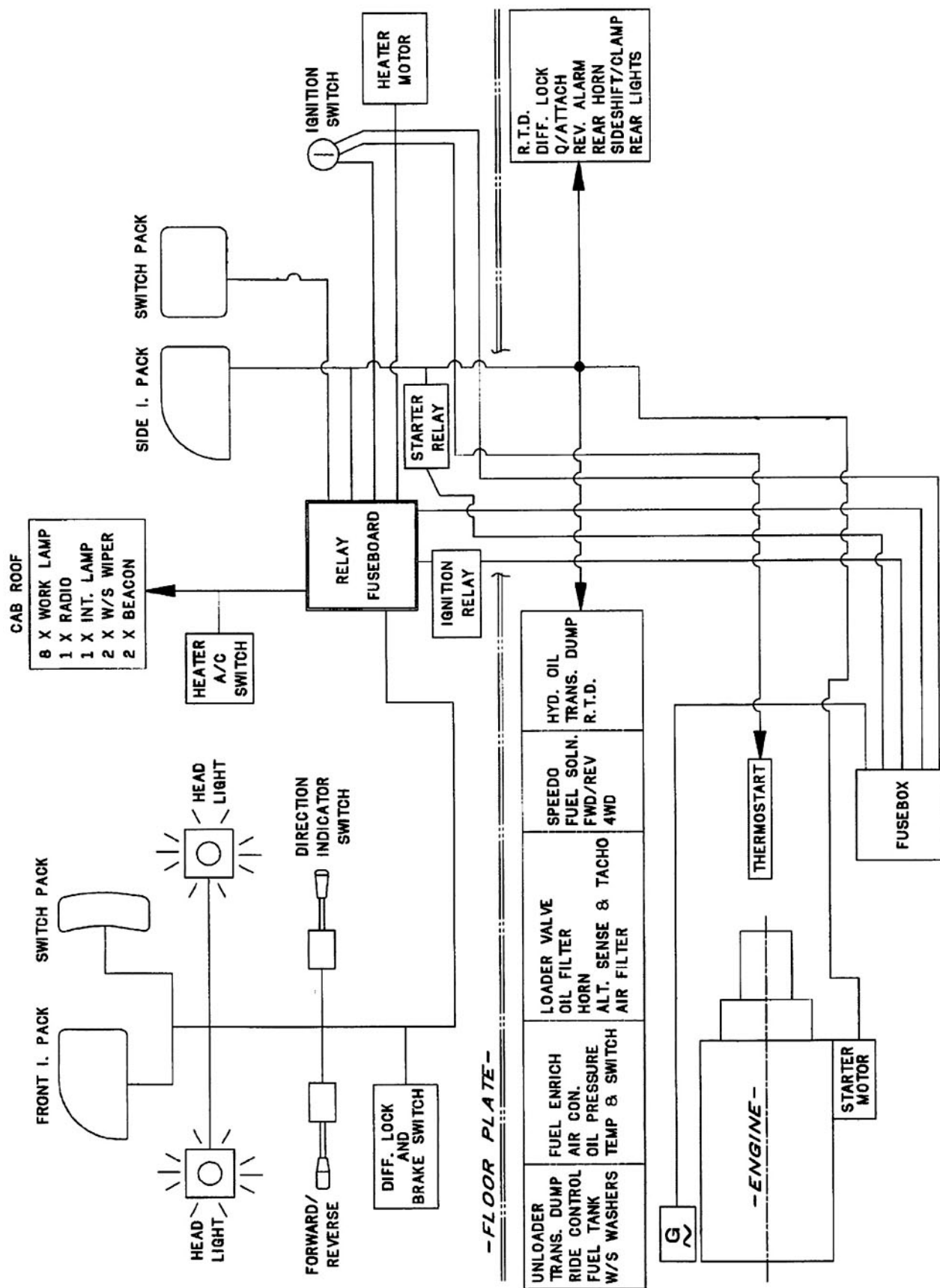
B= BLACK	P= PURPLE
G= GREEN	R= RED
K= PINK	S= SLATE
LG= LIGHT GREEN	U= BLUE
N= BROWN	W= WHITE
O= ORANGE	Y= YELLOW

CIRCUIT LOCATION CODE

C= CHASSIS
F= FRONT CONSOLE
R= ROOF
S= SIDE CONSOLE



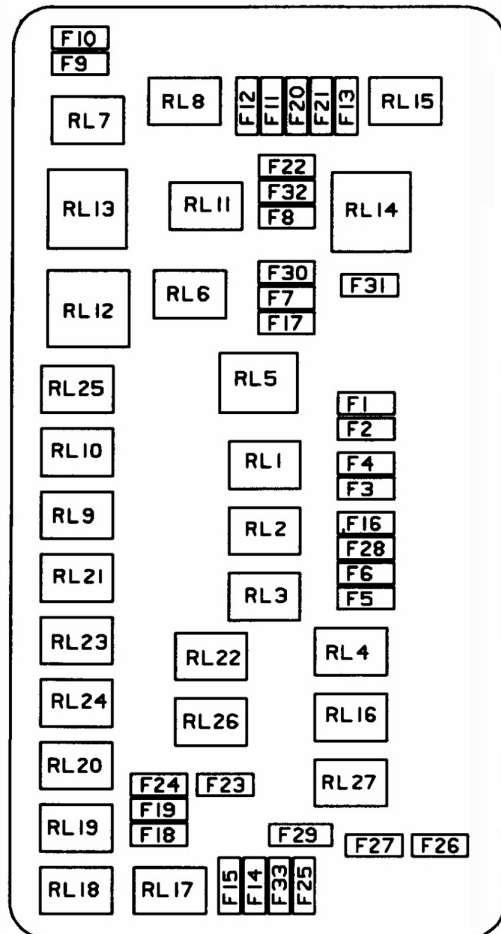
EXAMPLE: WLG -3 = WHITE 3MM DIAMETER WIRE WITH A LIGHT GREEN STRIPE



Main Fuses	Rating
1 Alternator	125
2 Cab (Ignition)	80
3 Cab (Battery)	80
4 Ignition Feed (Thermostart)	20
5 Starter Relay and Solenoid	40

Relays
1 Headlight - Main
2 Headlight - Dip
3 Sidelights / Number Plate / Illum Inst Pack
4 Brake Lights
5 Hazard enable
6 Indicator/hazard enable
7 Front Wiper
8 Rear Wiper
9 Front Washer
10 Rear Washer
11 Front Horn / Rear Horn
12 Indicators flasher unit
13 Front Worklights
14 Rear Worklights
15 Rotating Beacon
16 Float enable relay
17 Clamp
18 Digger Quick Attach
19 RTD
20 Unloader
21 Loader Quick Attach
22 Ride Control Solenoids
23 Gearbox - Forward
24 Gearbox - Reverse
25 4WD Switch
26 Hose Burst
27 Gearbox Declutch

Fuses	Rating
1 Headlight - Main – Left	7.5
2 Headlight - Main – Right	7.5
3 Headlight - Dip – Left	7.5
4 Headlight - Dip – Right	7.5
5 Sidelights - Left/Number Plate	3
6 Sidelights – Right	3
7 Indicators	5
8 Hazard	10
9 Worklights – Front	15
10 Worklights – Front	15
11 Worklights – Rear	15
12 Worklights – Rear	15
13 Rotating Beacon	15
14 Brake Light – Left	3
15 Brake Light – Right	3
16 Instrument Pack Illumination	3
17 Difflock / 4WD	7.5
18 Clamp / Q/A Digger / Q/A Loader	7.5
19 RTD / Unloader Valve	5
20 Fr Wiper / Rear Wiper / Fr Wash / Rear Wash	15
21 Interior Light / Radio	7.5
22 Front Horn / Rear Horn	10
23 Ride Control Solenoids	10
24 Gearbox - Forward/Reverse	5
25 Fuel Solenoid / Fuel Enrich	7.5
26 HMU	15
27 Air Conditioning Switch	7.5
28 Cigar Lighter	15
29 Heater	25
30 Switch Pack & I Pack – Ignition	10
31 Switch Pack & I Pack – Battery	3
32 Battery Relay Coils	5
33 Ignition Relay Coils	5



Ignition
Relay

Start
Relay

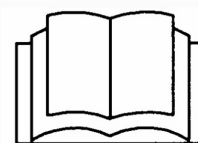
RELAYS

- | | |
|------|------|
| 1 - | 15 - |
| 2 - | 16 - |
| 3 - | 17 - |
| 4 - | 18 - |
| 5 - | 19 - |
| 6 - | 20 - |
| 7 - | 21 - |
| 8 - | 22 - |
| 9 - | 23 - |
| 10 - | 24 - |
| 11 - | 25 - |
| 12 - | 26 - |
| 13 - | 27 - |
| 14 - | |



FUSES

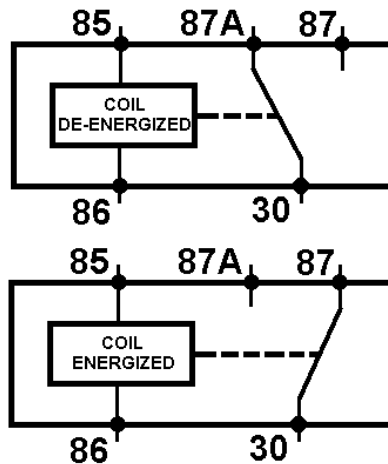
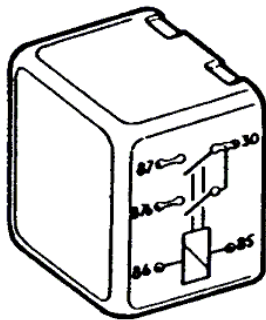
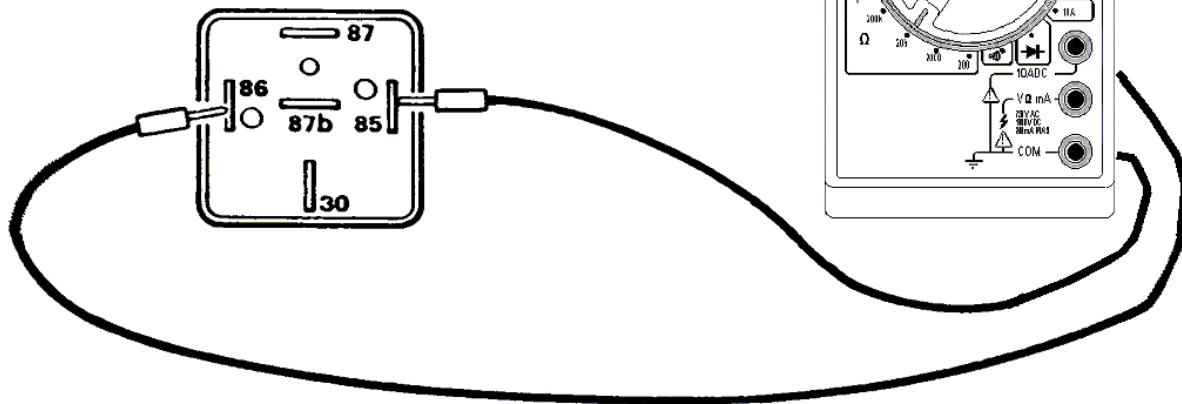
- | | | |
|---------------|----------------------|------------------|
| 1 - L - 7.5A | 15 - R - 3A | 29 - - 25A |
| 2 - R - 7.5A | 16 - - 3A | 30 - + - 10A |
| 3 - L - 7.5A | 17 - + - 7.5A | 31 - + B+ - 3A |
| 4 - R - 7.5A | 18 - + + - 7.5A | 32 - B+ - 5A |
| 5 - L - 3A | 19 - + - 5A | 33 - - 5A |
| 6 - R - 3A | 20 - + + + - 15A | |
| 7 - - 5A | 21 - + - 7.5A | |
| 8 - - 10A | 22 - - 10A | |
| 9 - - 15A | 23 - - 10A | |
| 10 - - 15A | 24 - - 5A | |
| 11 - - 15A | 25 - - 7.5A | |
| 12 - - 15A | 26 - HMU - 15A | |
| 13 - - 15A | 27 - - 7.5A | |
| 14 - L - 3A | 28 - - 15A | |



6102 783M2

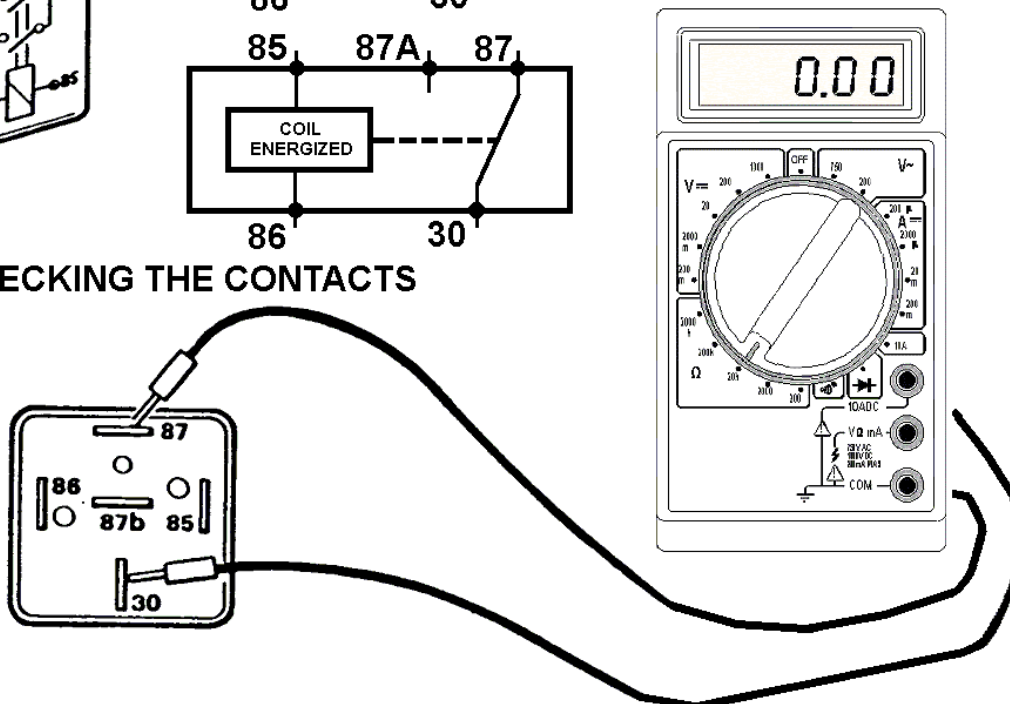
TESTING RELAYS

CHECKING THE COIL



**NORMALLY OPEN
(N.O.)**

CHECKING THE CONTACTS



SECTION 3 ENGINE





Technical Specification for Perkins 1004.40T

General Description

1004 40T (Engine Prefix AQ)

Fitted to 760, 860, 960, 965

Governed Engine Speed

Idling	700/800 rpm
Rated Speed	2,200 rpm
Flight Speed	2,310 rpm
Number of Cylinders	4
Induction System	Turbo Charged with Wastegate (760, 860, 960 & 965 only)
Injection	Fastram Direct
Bore	100mm (3.937in)
Stroke	127mm (5.00in)
Capacity	4 liters (243 ins ³)
Compression Ratio	17.25: 1
Firing Order	1, 3, 4, 2
Rated Power (ISO)	64 Kw (86hp) - 760 71.5 Kw (96hp) - 860, 960 & 965
Maximum Torque (ISO)	341Nm @ 1350 rpm - 760 371Nm @ 1400rpm – 860, 960 & 965
Lubricating Oil Pressure	280 K Pa (40 lb f/in ²)

Technical Details

Valve Tip Clearances (Hot or Cold)

Inlet 0.20 mm (0.008 ins)

Outlet 0.45mm (0.018ins)

Cylinder and Valve Number	1		2		3		4	
	1	2	3	4	5	6	7	8
Valve								
I = Inlet	I	E	I	E	I	E	I	E
E = Exhaust								

Cylinder Head Gasket

Asbestos Free, Fit Dry

NOTE The cylinder head tightening procedure for the AQ model engine remains the same as previous 1000 Series engines. However, the tightening procedure for **Model AS** (103mm Naturally Aspirated Engine) varies, the following procedure must be followed.

1. Prior to re-use, all bolts must be checked for a reduction in the diameter of the bolt, usually noticeable in the unengaged portion of the thread.

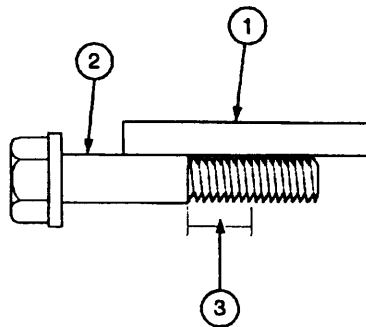


Figure 3/3

P100T008

2. All Bolts should have light lubrication on the threads and underside of the bolt head.
3. All M10 bolts should be tightened to 45Nm and the 4.5-inch UNF bolts to 110Nm following the sequence in section 12 of the Perkins Workshop Manual.

Following the same sequence, all fixings should be tightened a further angle depending on their size, see below.

The short and medium M10 bolts should be tightened by 120 degrees.

The long M10 bolts should tighten by 150 degrees.

The 0.50-inch UNF bolts should be tightened by 180 degrees.

Exhaust Manifold

If a new exhaust manifold is fitted to the cylinder head it must be aligned using two nylon bushes. The bushes must be fitted to the bolts indicated below.

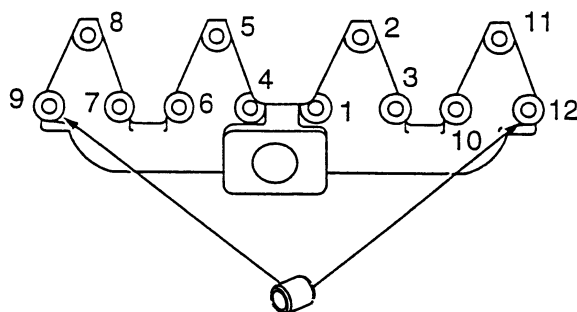


Figure 3/3

P100T011

Fuel injection pump timing

The new 1000 Series engines are fitted with a hub driven fuel injection pump which is pin timed, the manufacturer fits the hub to the pump, there is no key way locating the shaft to the hub so if the central nut in the hub is disturbed, the fuel pump timing will be lost and the hub will need to be re-fitted using specialist equipment.

If the fuel injection pump is to be removed you will first need to:

1. Remove the cover plate from the timing cover to allow access to the fuel injection pump. This will also expose the pin location for timing the fuel pump to the engine.
2. Establish No. 1 cylinder is at top dead center on the compression stroke.
3. Fit the timing pin tool (PD. 246) through the slotted hole in the front of the gear, the pin will pass through the hub and into the front face of the fuel injection pump. This has now locked the fuel injection pump. (The crankshaft must not be rotated with the timing pin installed).
4. Slacken and remove the three fuel injection pump flange nuts.
5. Slacken and remove the four-torx screws (using special tool part number 27610122) on the fuel injection pump gear, now the pump can be carefully removed.

To Re-fit the Fuel Injection Pump

1. Check that the engine is still at top dead center.
2. With the timing pin fitted to the fuel injection pump, it can now be carefully installed on the engine, ensuring that all backlash is removed from the gears before tightening.

Adjusting Fuel Pump Timing

If with no. 1 cylinder on the top dead center on the compression stroke it is not possible to insert the timing pin fully, adjustment may have to be made by slackening the four torx screws and rotating the fuel injection pump hub until the pin can be fully installed.

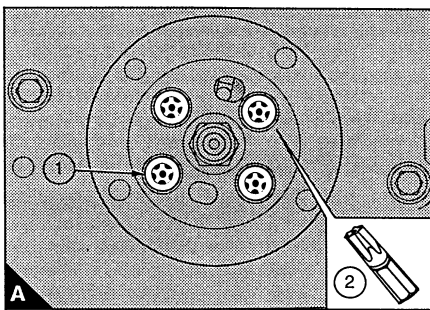


Figure 3-4

P100T009

How to Prime the fuel system

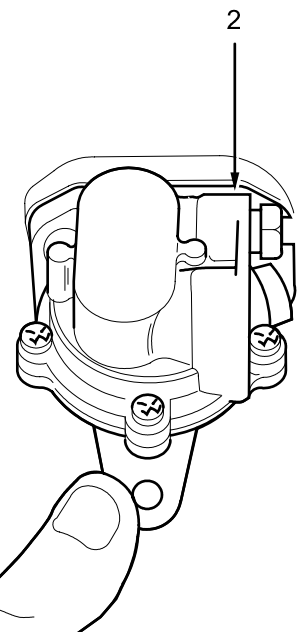
Caution: When air is to be eliminated from the fuel system, only use the starter motor to start the engine after air has been eliminated from the low-pressure side of the fuel system.

If air enters the fuel system, it must be eliminated before the engine can be started.

Air can enter the system if:

- The fuel tank is drained during normal operation.
- The low-pressure fuel pipes are disconnected.
- A part of the low-pressure fuel system leaks during engine operation.

- 1 Press the priming lever (2) of the fuel lift pump





Installing the battery

The installation of the battery is the reverse of the removal.

Install the battery in the reverse order of the removal but note the following :

1. Make sure the battery box (2) contains no stones or debris that may damage the battery (8).
2. Clean any corrosion from the terminal posts (7) and (9) and the cable clamps (6) and (10).
3. Read and obey the warning instructions on battery safety before electrical cables are connected to the battery (8).
4. Before installing the lid (1) on the battery box (2), do an open circuit voltage test of the battery. Refer to open circuit testing.
5. After installation, check the tension of the alternator belt.

Battery inspection before test or charge

Reject the battery if :

1. The electrolyte is excessively low.
2. Electrolyte levels vary by more than 20 mm (0.8 in) between cells.
3. Battery case, lid or mountings are cracked or damaged.
4. Terminals are damaged or loose in the case.

Test the open circuit voltage

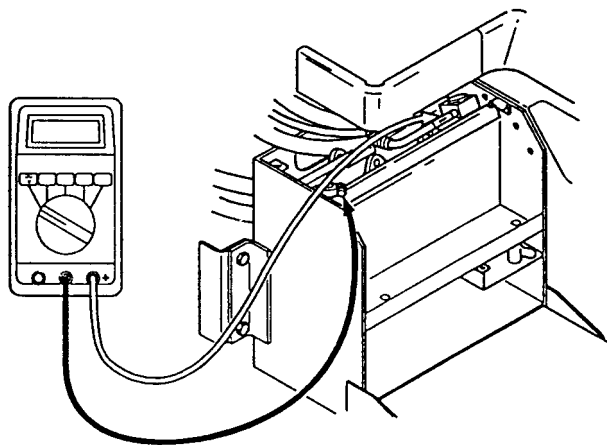
Test equipment

Digital voltmeter

Do the open circuit voltage test as follows :

1. The engine must be stopped and all electrical circuits switched off this test.
2. Measure the open circuit voltage of the battery only if it has not been charged or discharged in the past 16 hours.

If the machine has recently been started, switch on the headlights for 15 seconds then wait one minute before testing.



CS98J530

3. Connect the voltmeter directly across both battery terminals and note the voltage. 12.5V or above no action required. Below 12.5V, recharge the battery.

Slow charge the battery

Special tools

Battery charger - constant current type with an output of at least 14A and an upper voltage limit of 50V per battery.

Charge procedure



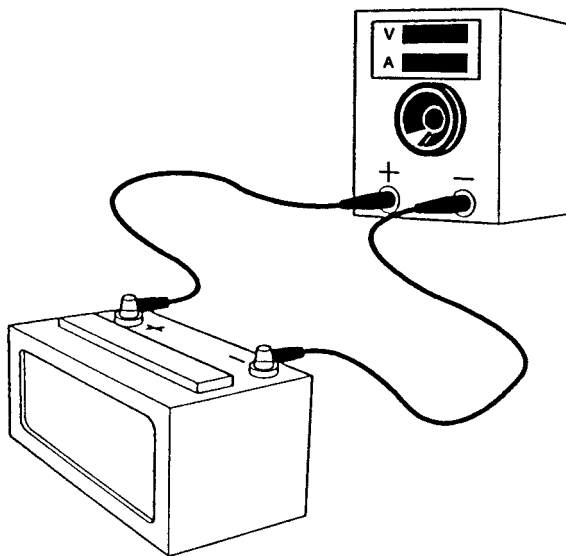
CAUTION : *Parallel charging is not recommended, therefore on machines fitted with twin batteries, charge each one individually.*

Slow charge the battery as follows :

1. Remove the battery from the machine. Refer to 4003-5.
2. If a battery has been neglected and produces an open circuit voltage of 11V or less, it will be completely discharged and the plates will have suffered sulphation. Initially the battery will draw higher than normal voltage but lower than specified current.

CURRENT FOR SINGLE BATTERY9A

CURRENT FOR TWIN BATTERY14A



CS98J531

3. Connect the battery charger to the battery. Make sure the polarity of the connections is correct and connect the (+) positive connection first.

4. After 30 minutes, check the charging voltage (the charging current may still be lower than specified).

Below 12V reject the battery.

Above 16V reject the battery.

Between 12 to 16V, continue with charging process for 15 hours.



WARNING : *Check the battery temperature regularly and if it reaches 60° C (140° F) stop the charging process.*

5. Set the battery charger to OFF. Disconnect the cables from the battery. Make sure you disconnect the (+) positive cable first.
6. Allow the battery to stand for 24 hours.
7. Load test the battery.



Standard charge of the battery

Special tools

Battery charger - constant current type with an output of at least 14A.

Charge procedure



CAUTION : *Parallel charging is not recommended, therefore on machines fitted with twin batteries, charge each one individually.*

Do a standard charge of the battery as follows :

1. Remove the battery from the machine. Refer to 4003-5.



CAUTION : *Do not use the standard charge process on a battery producing an open circuit voltage of 11V or less.*

2. Connect the battery charger to the battery. Make sure the polarity of the connections is correct and connect the (+) positive cable first.
3. Set the battery charger to ON.
4. Set the appropriate charger current :
CURRENT FOR SINGLE BATTERY9A
CURRENT FOR TWIN BATTERY14A
5. Charge the battery for the time indicated in the table below :
6. Set the battery charger to OFF. Disconnect the cables from the battery. Make sure you disconnect the (+) positive cable first.
7. Load test the battery.
8. If required, install the battery.

MINIMUM charging period

Open circuit volts	Charge period (hours)
Above 12.5	0
12.4	3
12.3	4
12.2	5
12.1	6
12.0	7
11.9	8
11.8	9
11.7	10
11.6	11
11.0 to 11.6	12
Below 11.0	Use slow charge



WARNING : *Check the battery temperature regularly and if it reaches 60°C (140° F), stop the charging process.*

Fast charge of the battery

Special tools

Battery charger - constant current type with an output of at least 35A.

Charge procedure



CAUTION : *Parallel charging is not recommended, therefore on machines fitted with twin batteries, charge each one individually.*



CAUTION : *The standard charge should always be used in preference to the fast charge procedure.*

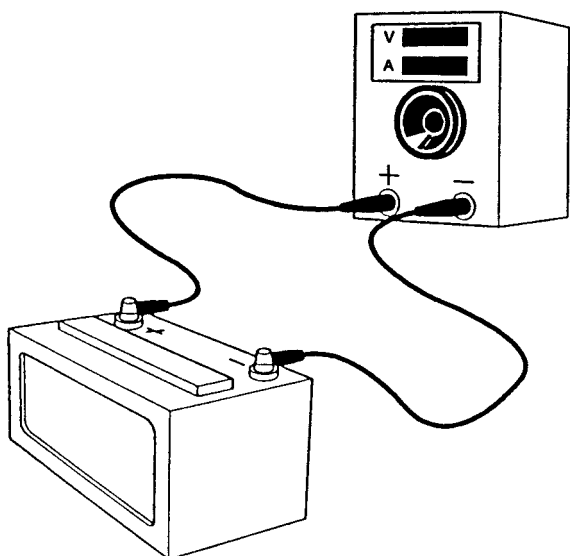
Do a fast charge of the battery as follows :

1. Remove the battery from the machine. Refer to battery removal.



CAUTION : *Never use the fast charge procedure for batteries producing an open circuit voltage of 11V or less.*

2. Connect the battery charger to the battery. Make sure the polarity of the connections is correct and connect the (+) positive cable first.
3. Set the battery charger to ON.
4. Set the appropriate charge current :
CURRENT FOR SINGLE BATTERY9A
CURRENT FOR TWIN BATTERY14A



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5. Charge the battery for the time indicated by the table below :

MAXIMUM charging period	
Open circuit volts	Charge period (hours)
Above 12.5	0
12.4	0.25
12.3	0.5
12.2	0.75
12.1	1.0
12.0	1.25
11.9	1.5
11.8	1.75
11.7	2.0
11.6	2.25
11.0 to 11.6	2.5
Below 11.0	Use slow charge



WARNING : *Check the battery frequently as the high charging current can cause a rapid rise in temperature. Stop the charging process if the temperature reaches 60°C (140° F).*



CAUTION : *To avoid deterioration of the battery, do not exceed the charging time specified in the table.*

6. Set the battery charger to OFF. Disconnect the cable from the battery. Make sure you disconnect the (+) positive cable first.
7. Load test the battery.
Voltage above 10V - refit battery to the machine. Refer to testing battery.
Voltage below 10V - charge battery using the standard charge procedure.
8. If required, install the battery.

Boost charging of the battery

Special tools

Battery charger - with an output of 60A.

Charge procedure



CAUTION : *Boost charging is not recommended. Boost charging may be carried out but the current must be limited to 60A.*



CAUTION : *Parallel charging is not recommended, therefore on machines fitted with twin batteries, charge each one individually.*

Boost charge the battery as follows :

1. Remove the battery from the machine. Refer to battery removal.
2. Remove the vent manifolds from the battery.
3. Connect the battery charger to the battery. Make sure the polarity of the connections is correct and connect the (+) positive cable first.
4. Set the battery charger to ON.
5. Limit the battery charge to the minimum period required for the battery to start the engine.



WARNING : *Check the battery temperature frequently as the high charging current can cause a rapid rise in temperature. Stop the charging process if the temperature reaches 60°C (140° F).*

6. Set the battery charger to OFF. Disconnect the cables from the battery. Make sure you disconnect the (+) positive cable first.
7. Install the vent manifolds on the battery.
8. Install the battery.

Load testing of the battery

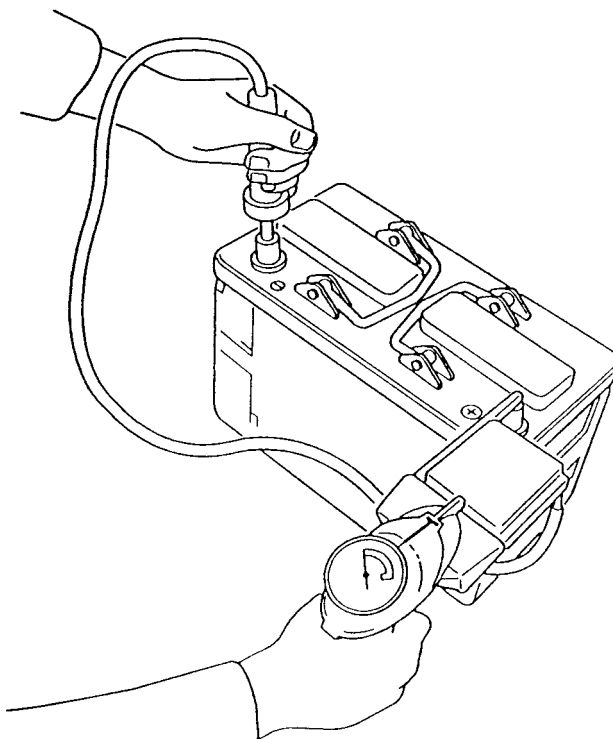
Test equipment

Current controlled, high rate discharge tester - with at least 500A capacity.

Digital voltmeter

Load test the battery as follows :

1. Remove the battery from the machine. Refer to battery removal.
2. Set the appropriate current on the discharge tester :
CURRENT FOR SINGLE BATTERY 295A
CURRENT FOR TWIN BATTERY 410A
3. Connect the voltmeter across the battery terminals.
4. Apply the load tester across the battery terminals for 15 seconds and note the voltage during the test.
Above 10V and steady battery is serviceable
Above 10V but failing rapidly replace battery
Below 10V replace battery
5. If required, install the battery.



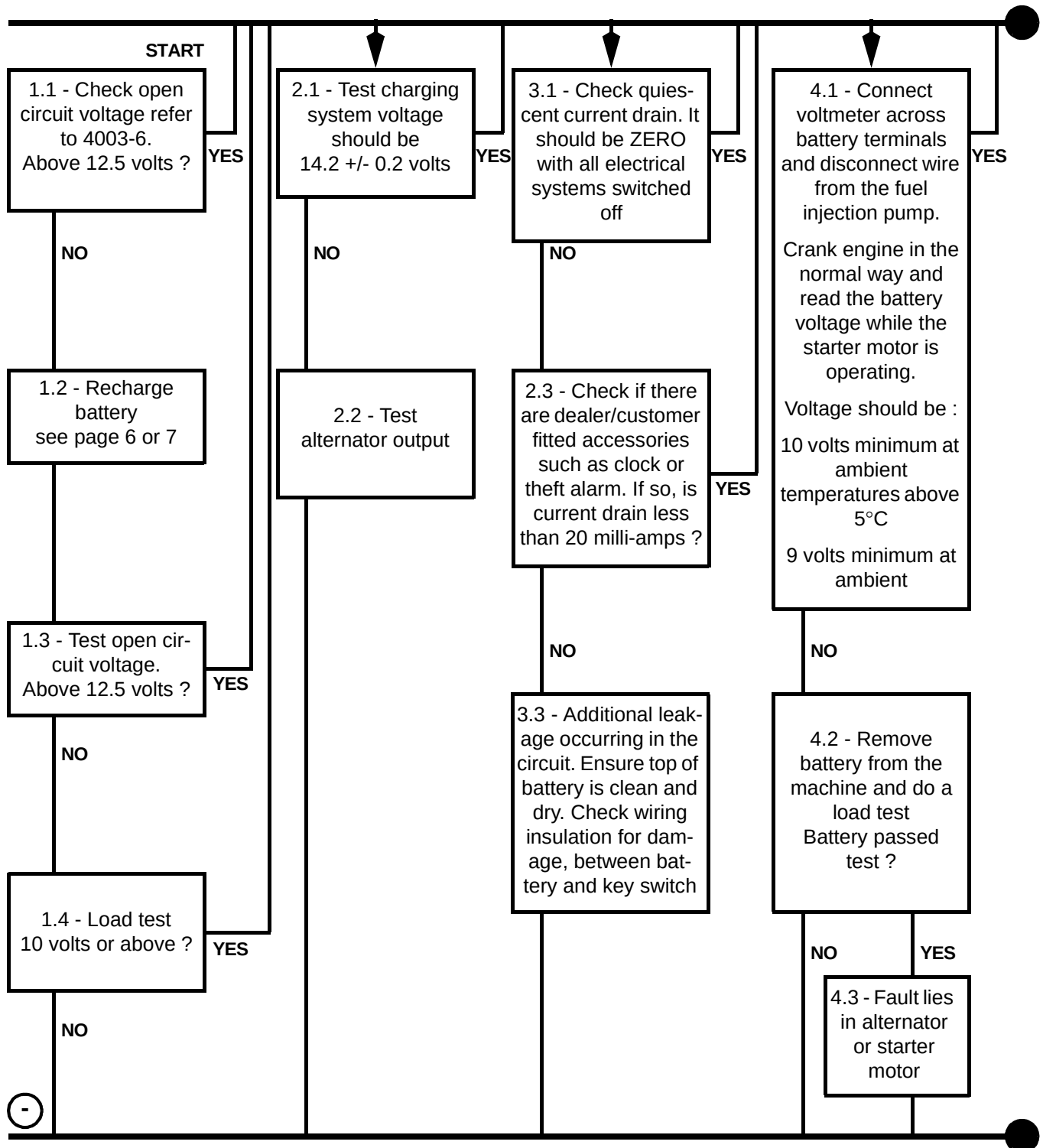
CS98J532

Diagnostic test with the battery still on the machine

Fault : Battery performance seems poor

Proceed with battery test →

Test complete. Battery OK



Stop battery test-reject the battery or test alternator/starter motor

Removing and installing the starter motor

Removing the starter motor

Remove the starter motor as follows:

1. Disconnect the battery.

NOTE : *Make sure the key is removed from the start switch on the side console.*

2. Open the hood.
3. Remove the protective cover (13), the nut (12) and the cover (14) from the solenoid (4).
4. Note the installed positions of the electrical cables (9) and (17).

5. Remove the nut (11), the washer (10) and disconnect the four electrical cables (9) from the starter motor (8).
6. Remove the two nuts (15), the two washers (16) and disconnect the three electrical cables (17) from the solenoid (4).
7. Attach the electrical cables (9) and (17) to the structure of the engine with temporary ties.
8. Support the starter motor (8) and solenoid (4). Remove the three nuts (7) and the "P-clip" mounting bracket (6) from the studs (5).
9. Slide the starter motor (8) together with the solenoid (4) from the studs (5) and remove from the engine.
10. Put a warning sign in the cab to tell persons not to start the engine.

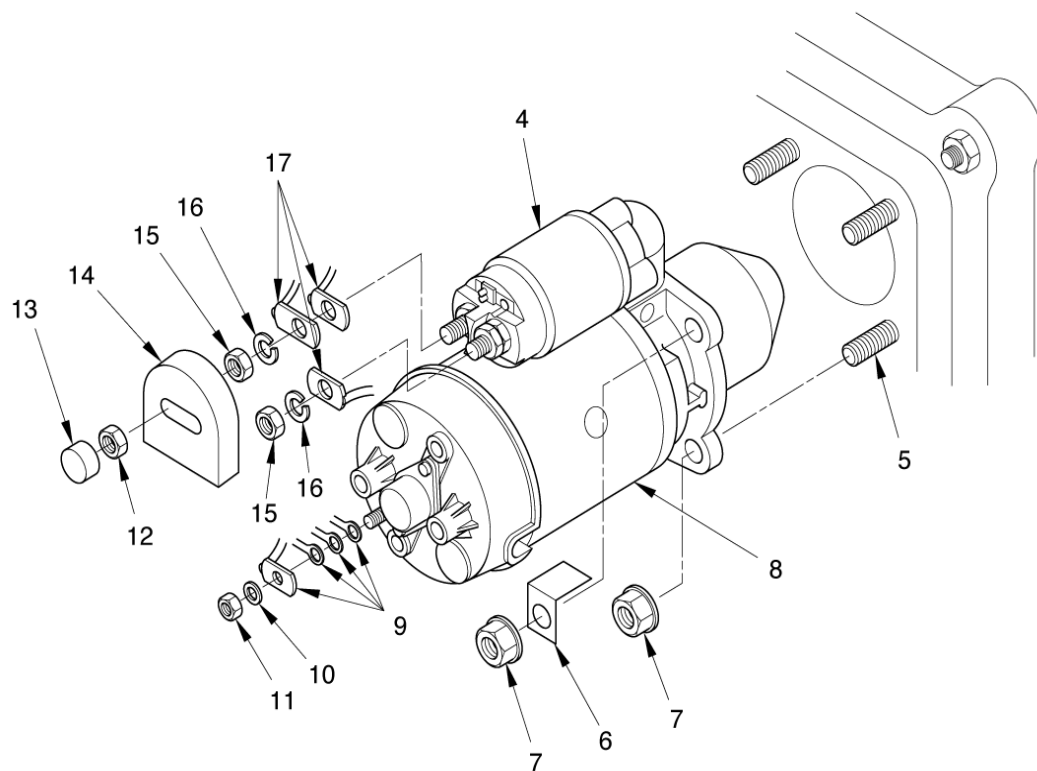
Installing the starter motor

NOTE : *The installation of the starter motor is the reverse of the removal.*

Install the starter motor in the reverse order of the removal but note the following:

1. Torque tighten the nuts (12): 12 Nm.
2. Torque tighten the nut (11): 6 Nm.
3. After installation do the following tests:
 - The battery voltage under load test, refer to page 7.
 - The starter motor terminal voltage under load test, refer to page 8.
 - The voltage drop on the insulated line test, refer to page 8.
 - The voltage drop across solenoid contact refer to page 9.

The voltage drop in earth line test, refer to page 10.



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Disassembling the starter motor

Disassemble the starter motor as follows:

1. Remove the starter motor, refer to page 4.
2. Remove the solenoid assembly, refer to page 14.
3. Remove the end-cover, refer to page 12 (steps 3 through 6).
4. Remove the field winding brushes (10) from brush plate.
5. Remove the rubber grommet (13).
6. Slacken the locknut and remove the pivot pin (4). (The pivot is eccentric to the screw thread to allow adjustment of the pinion gear end-clearance).
7. Remove housing (2) and the pinion engagement lever (1).
8. Remove the armature and pinion assembly (9) from the motor body.
9. Use a suitable tube to punch the thrust-collar (6) towards the pinion and expose the snap-ring (5).
10. Remove the snap-ring (5).
11. Remove the thrust-collar (6).

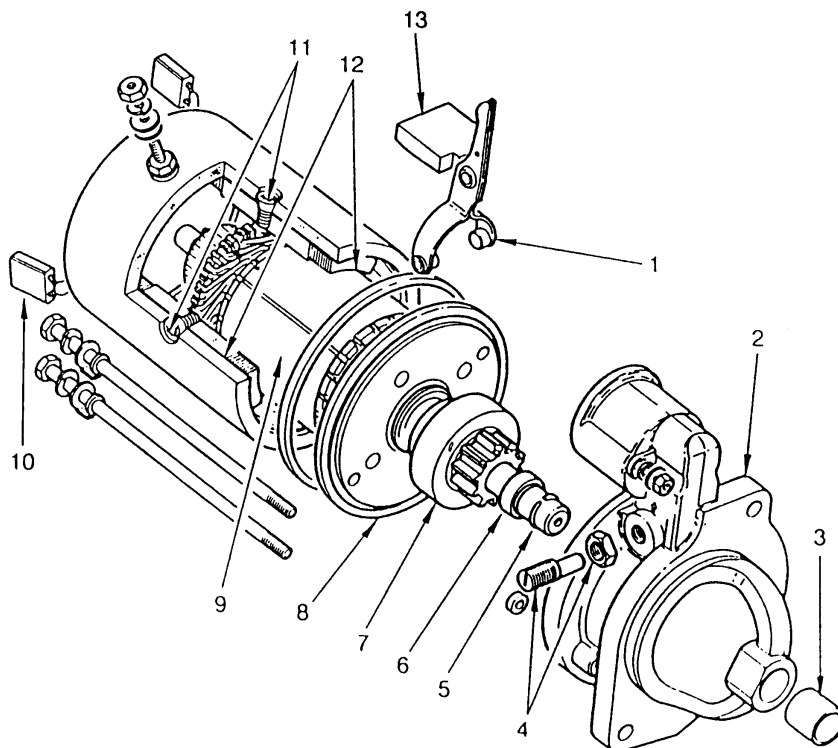
12. Pull the pinion and the roller clutch (7), off the armature shaft.
13. Pull the intermediate plate (8) off the armature shaft.
14. Remove the four screws (11) and carefully pull the field windings (12) from the motor body.
15. Inspect and test the starter motor, refer to page 14.

Assembling the starter motor

NOTE : *The assembly of the starter motor is the reverse of the disassembly.*

Assemble the starter motor in the reverse order of the disassembly but note the following:

1. Apply Shell Retinax "A" grease or its equivalent onto the drive shaft splines, the thrust-collar (6) and the engagement lever (1).



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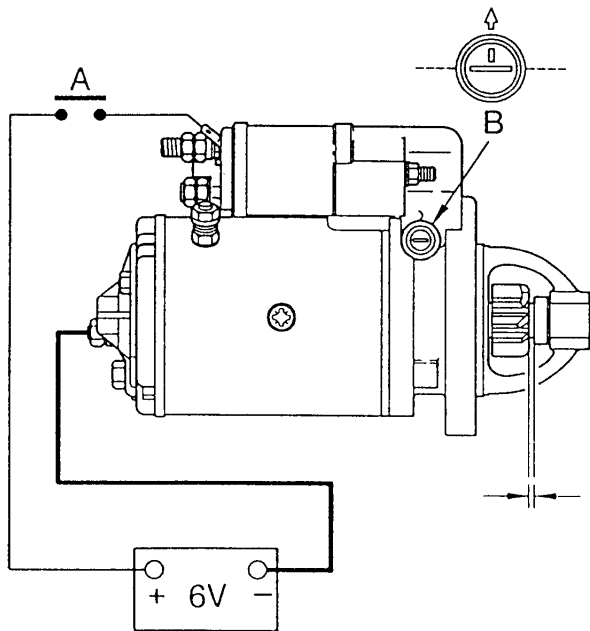
Adjusting the pinion stroke

Adjust the pinion stroke as follows:

1. Remove the starter motor, refer to page 4.
2. Screw the pivot pin (B) fully into the casting and then slacken off one full turn and position the marks on the head as shown.
3. Connect the solenoid to a 6V supply as shown, which will operate the solenoid only.
4. While the solenoid is energized push the pinion lightly, back against the yoke, to eliminate any free play and measure the gap between the pinion end face and the snap ring collar.
5. If necessary, turn the pivot pin (8) to obtain a clearance of 0.13 to 1.14 mm (0.005 to 0.045 in).
6. Tighten the locknut to 20 Nm (15 lbf ft).
7. Install the starter motor, refer to page 4.

Key

- A STARTER SWITCH
B PIVOT PIN



789M051A

Testing the battery voltage under load

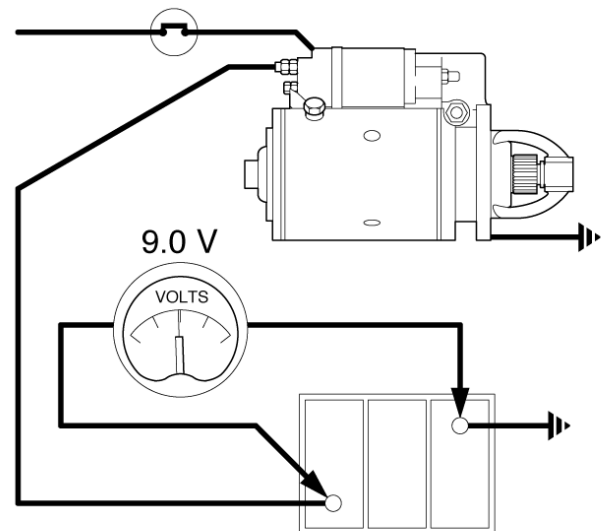
Test equipment

0 to 20 V dc voltmeter

NOTE : This test can be made with the starter motor still installed on the machine.

Do the battery voltage under load test as follows:

1. Check condition of battery or batteries, refer to battery testing.
2. Open the hood.
3. Disconnect the wire from fuel injection pump to prevent the engine from starting.
4. Connect the voltmeter across the terminals as shown and with the engine fuel supply cut off, operate the starter.
5. The voltmeter should read approximately 9 V. A low voltage reading indicates excessive current flow in the circuit due to low resistance.
6. Reconnect the wire to the fuel injection pump if no further tests are required.
7. Close the hood.



789M052A

Testing the starter motor terminal voltage under load

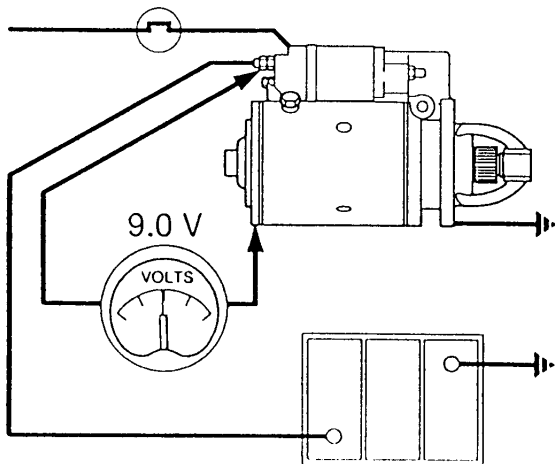
Test equipment

0 to 20 V dc voltmeter

NOTE : This test can be made with the starter motor still installed on the machine.

Do the starter motor terminal voltage under load test as follows:

1. Open the hood.
2. Remove the protective cover (13), the nut (12) and the cover (14).
3. Disconnect the wire from the fuel injection pump, to prevent the engine from starting.
4. Connect the voltmeter between the starter input terminal and earth (end bracket). Crank the engine with the fuel cut off. The voltmeter reading should not be more than 0.5 V lower than in the battery voltage under load test, refer to page Testing starter.
5. A low reading (more than 0.5 V difference between tests 1 and 2) indicates high resistance in cables or contacts.
6. High readings indicate high resistance in the starter motor itself.
7. Reconnect the wire to fuel injection pump if no further tests are required.
8. Install the cover (14), the nut (12) and the protective cover (13).
9. Close the hood.



789M053A

Testing the voltage drop on the insulated line

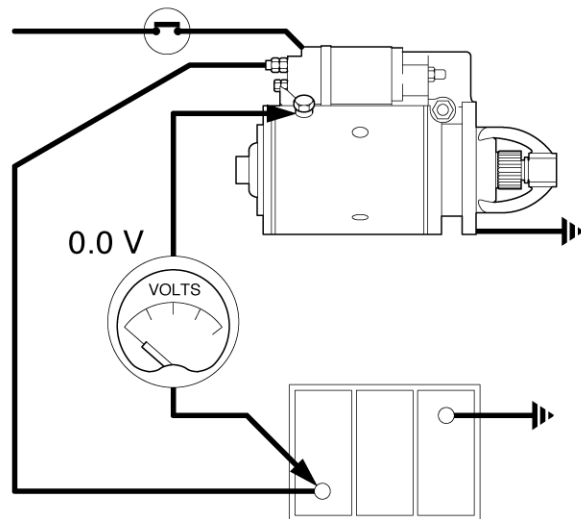
Test equipment

0 to 20 V dc voltmeter

NOTE : This test can be made with the starter motor still installed on the machine.

Do the voltage drop on the insulated line as follows:

1. Open the hood.
2. Connect the voltmeter between the starter terminal and the battery terminal.
3. When the starter switch is open, the voltmeter should register battery voltage. When the starter switch is closed, the voltmeter should read practically zero.
4. A high voltmeter reading indicates a high resistance in the starter circuit. Check all the insulated connections.
5. Do the voltage drop across the solenoid contacts test.



789M054A

Testing the voltage drop across the solenoid contacts

Test equipment

0 to 20 V dc voltmeter

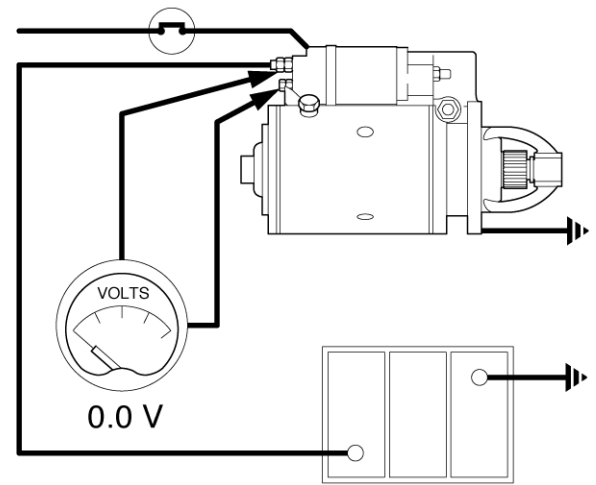
NOTE : *This test can be made with the starter motor still installed on the machine.*

Do the voltage drop across the solenoid contacts test as follows:

1. Remove the protective cover (13), the nut (12) and the cover (14).
2. Connect the voltmeter across the two main solenoid terminals.
3. When the starter switch is open, the voltmeter should register battery voltage. When the starter switch is closed the reading should be zero or fractional value.
4. A zero or fractional reading indicates that the high resistance deduced in the voltage drop on the insulated line test must be due either to high resistance in the starter cables or soldered connections. A high reading (similar to the voltage drop on the insulated line test) indicates a faulty solenoid or connection, refer to page 8.
5. Install the cover (14), the nut (12) and the protective cover (13).
6. Close the hood.

Key

- A STARTER SWITCH
- B TACHOMETER POSITION



789M055A

Testing the voltage drop in earth line

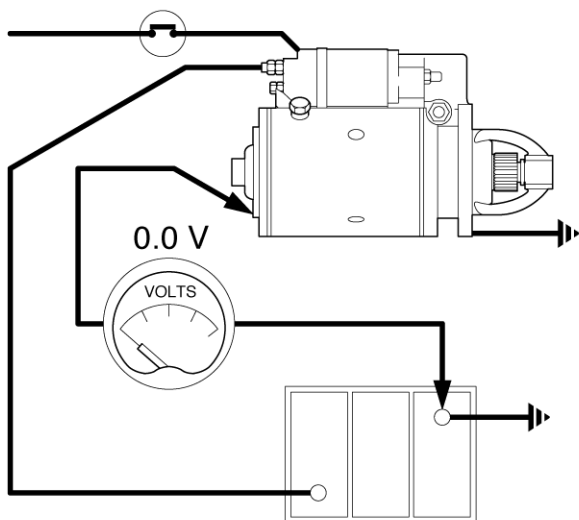
Test equipment

0 to 20 V dc voltmeter

NOTE : This test can be made with the starter motor still installed on the machine.

Do the voltage drop in earth line test as follows:

1. Open the hood.
2. Connect the voltmeter between the battery earth terminal and the starter earth (commutator end bracket).
3. When the starter switch is closed the voltmeter should read practically zero.
4. If reading is high, clean and tighten all earth connections and check bonding strap.
5. Close the hood.



789M056A

Testing the no-load current and speed

Test equipment

Test bench

Mechanical tachometer 0 to 10,000 rpm

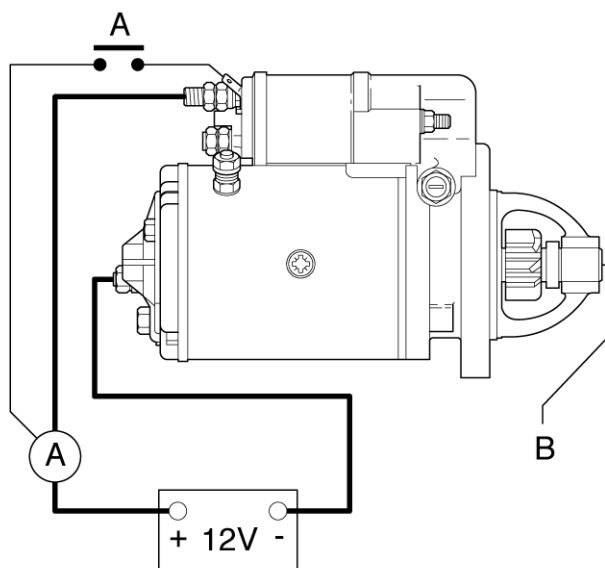
Ammeter up to 150 A capacity

Do the no-load current and speed test as follows:

1. If necessary, remove the starter motor from the machine.
2. Connect an ammeter in circuit between the starter solenoid and battery.
3. Hold the tachometer against the end of the pinion shaft and operate the starter switch.
4. Max. current: 115 A at 11 V.
Max. speed: 5500 to 8000 rpm.
Excess current indicates that starter is faulty.
5. If low current is registered, do the continuity of contacts test.
6. If starter fails to operate and there is no audible operation of solenoid, then connect the ammeter across the "STA" terminal and the battery.

Key

- A STARTER SWITCH
B TACHOMETER POSITION



789M057A

7. Operate the starter switch, the starter motor should run, indicating a faulty solenoid which must be replaced.
8. If the starter motor does not run, the motor itself is faulty.
9. If the starter motor fails to operate but the solenoid operation is audible, do the continuity of contacts test.

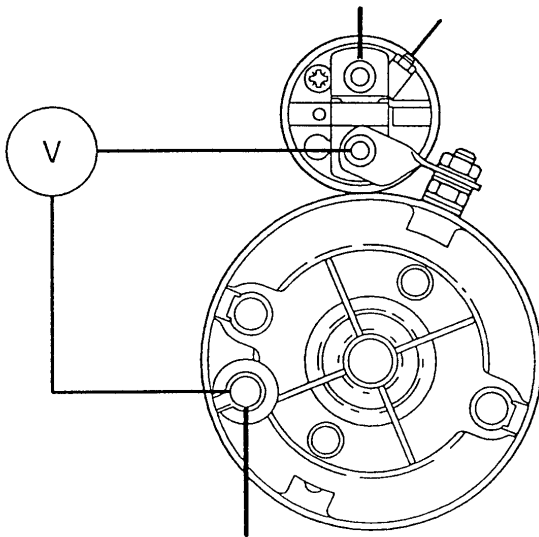
Testing the continuity of contacts

Test equipment

0 to 20 V dc voltmeter

Test the continuity of contacts as follows:

1. Open the hood.
2. Remove the protective cover (13), the nut (12) and the cover (14).
3. Connect the voltmeter between motor and solenoid negative terminals and operate starter switch.
4. No voltage indicates a faulty solenoid. Replace the solenoid.



789M058A

5. 12 V registered but motor fails to operate indicates faulty motor. Replace the starter motor.
6. 12 V registered and motor operates, test the voltage drop across the contacts.

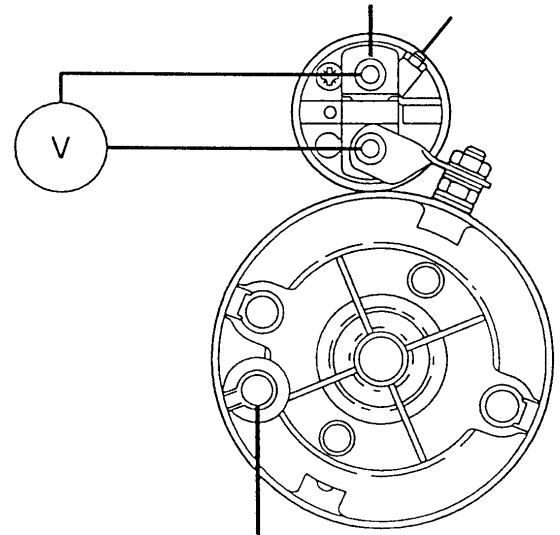
Testing the voltage drop across the contacts

Test equipment

0 to 20 V dc voltmeter

Test the voltage drop across the contacts as follows:

1. Connect the voltmeter across the solenoid terminals and operate starter switch.
2. Voltage across the terminals should be zero, if more, the solenoid is faulty and must be changed.
3. If solenoid is satisfactory, service the starter motor.



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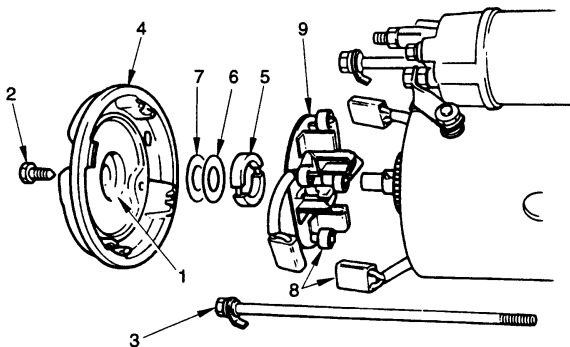
Servicing the end cover and brush carrier

Service the end cover and brush carrier as follows:

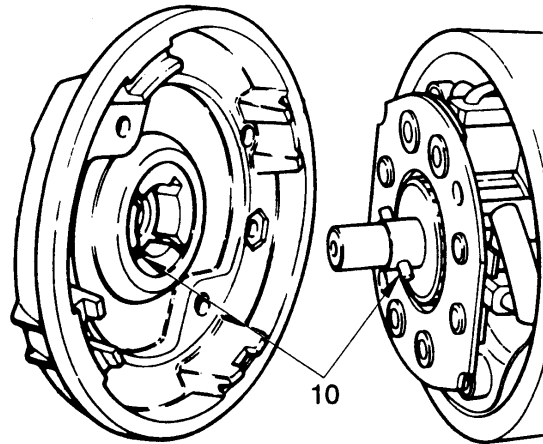
1. Open the hood.

NOTE : If space within the engine compartment permits the removal of the motor body bolts (3), the end cover can be serviced without removing the starter motor from the engine, provided that the electrical cables to the starter are disconnected.

2. If the end cover cannot be removed in situ, remove the starter motor.
3. Remove the end cover securing screws (2), and both long bolts (3).
4. Lift off the cover (4) complete with brake assembly.
5. Remove the brake shoes (5) from the cover (4).
6. Remove the steel washer (6) and fibre washer (7).
7. Lift the springs and disengage the field coil brushes (8).
8. Remove the brush carrier assembly (9).
9. Polish the commutator with 600 to 1200 grade abrasive cloth/paper.
10. Thoroughly clean all components with white spirit and dry with compressed air.
11. Measure the length of the brushes (8). Replace the brushes which are 8 mm (5/16 in) or less in length.
12. Install the brush carrier assembly (9).



789M060A



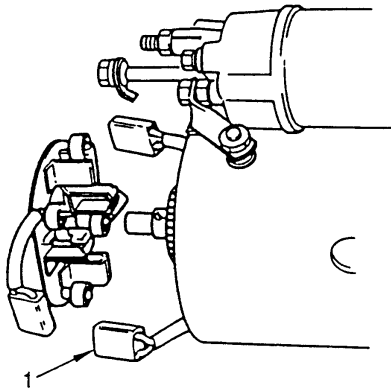
789M061A

13. Lift the springs and engage the brushes (8).
14. Test the strength of each brush spring and replace any which exert less than 11.6 N (42 oz.) with new brushes fitted.
15. Install the fibre washer (7), the steel washer (6) and the brake shoes (5) in the cover (4).
16. Turn the armature to position to drive-dogs (10) to engage the brake shoes (5).
17. Install the cover (4), the long bolts (3) and the screws (2).
18. Torque tighten the long bolts (3) to 11 Nm (8 lbf ft).
19. Check the clearance between the armature spindle and the brush (1). If the clearance is noticeable, replace the brush (1), refer to page replacing brushes.
20. If necessary, install the starter motor, refer to install starter page.
21. Close the hood.

Replacing the starter motor brushes

Replace the brushes as follows:

1. Gain access to brushes, refer to page for Servicing end cover (steps 1 through 10).
2. On earth brushes, cut the flexible wires adjacent to the old brushes (1) and solder new brushes on to the flexible wires.
3. On insulated brushes, cut the flexible wires adjacent to the old brushes (1). Open the eyelet on the new brush. Apply a thin coat of solder and crimp the eyelet onto the flexible wire and solder together.
4. Install the cover, refer to Servicing end cover (steps 12 through 21).



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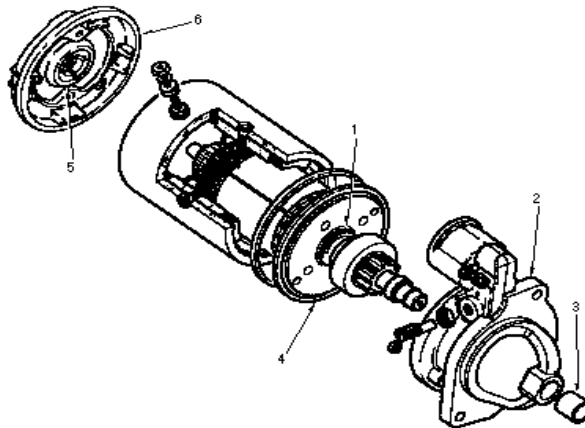
Replacing the bushes in the starter motor

Replace the bushes in the starter motor as follows:

1. Gain access, as necessary to the bush (1), (3) or (5) to be replaced.
2. If the bush (5) in the end cover (6) is to be replaced, remove the bush (5) using a 9/16 in, Whitworth tap.
3. If the bush (1) in the intermediate plate (4) is to be replaced, remove the bush (1) using a drift with a pilot diameter of 28.51 mm (1.226 in).
4. If the bush (3) in the housing (2) is to be replaced, remove the bush (3) using a drift having a pilot diameter of 17.03 mm (0.6705 in).
5. Immerse the replacement bush (1), (3) or (5) in clean engine oil for 24 hours.

NOTE : *The oil absorption time can be reduced by heating the oil to 100°C (212°F) for 2 hours and allowing it to cool before removing the brush. A thermometer is essential to prevent overheating the oil.*

6. Install the bush (5) into the end cover (6) using a drift having a pilot diameter of 12.71 mm (0.5 in).
7. Install the bush (1) into the intermediate plate (4) using a drift having a pilot diameter of 28.51 mm (1.226 in).
8. Install the bush (3) into the housing (2) using a drift having a pilot diameter of 17.03 mm (0.6705 in).
9. Assemble the starter motor as necessary, refer to Assemble page .

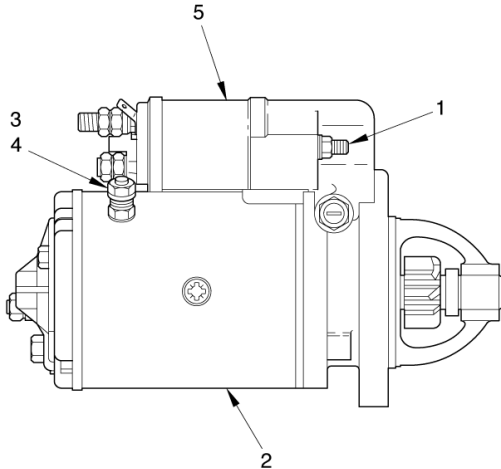


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Removing the starter motor solenoid

Remove the starter motor solenoid as follows:

1. Remove the starter motor.
2. Remove the two nuts (3) and the copper link (4).
3. Remove the two nuts (1) which secure the solenoid (5) to the starter motor (2).
4. Remove the solenoid body (5).
5. Remove the solenoid plunger from the engagement lever.



789M064A

Installing the starter motor solenoid

NOTE : The installation of the starter motor solenoid is the reverse of the removal.

Install the starter motor solenoid in the reverse order of the removal but note the following:

1. Torque tighten the nuts (1).
2. Torque tighten the nuts (3).

Inspecting and testing the starter motor

Test equipment (Diagrams on Next Page)

110 volt insulation tester or ohmmeter

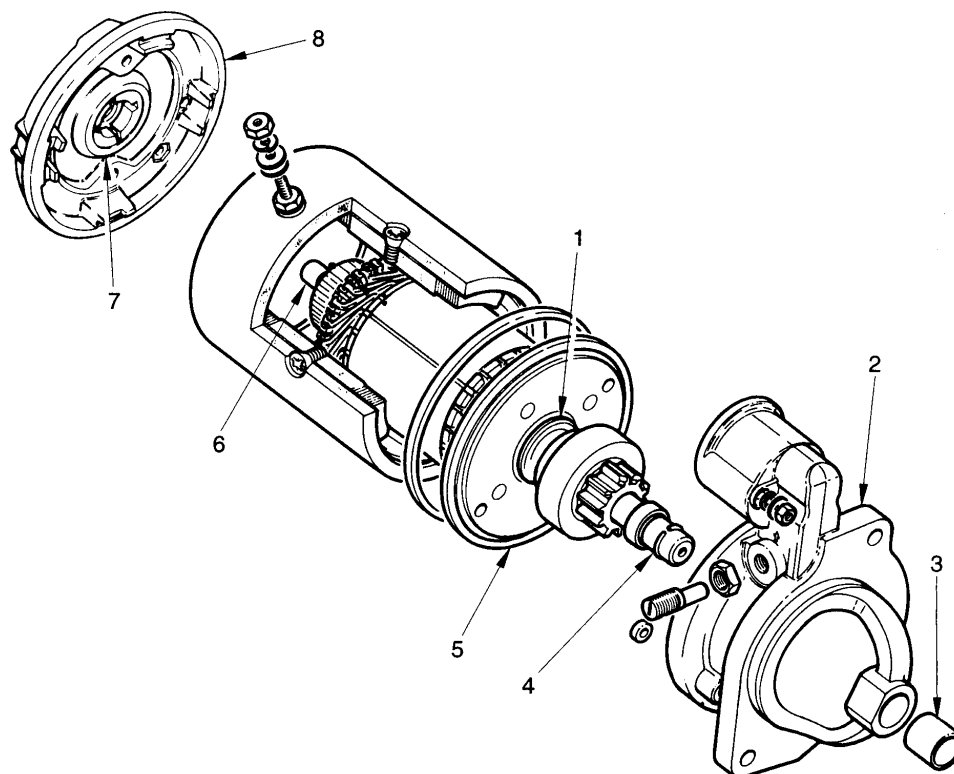
Inspect and test the starter motor as follows:

1. Inspect the bush (7) in the alternator cap (8). If the clearance between the bush (7) and the shaft (6) is noticeable, replace the bush (7), refer to next page .
2. Partially disassemble the starter motor, refer to page 6 (steps 1 through 6).
3. Inspect the bush (3) in the drive housing (2). If the clearance between the bush (3) and the shaft (4) is noticeable, replace the bush (3), refer to page 13.
4. Continue to disassemble the starter motor, refer to page 6 (steps 7 through 12).
5. Inspect the bush (1) in the intermediate plate (5). If the clearance between the bush (1) and the shaft (4) is noticeable, replace the bush (1), refer to page 13.
6. Complete the disassembly of the starter motor, refer to page 6 (steps 13 and 14).
7. Use a 110 V insulation tester or ohmmeter, to check the insulation of the electrical components (steps 8 through 10).

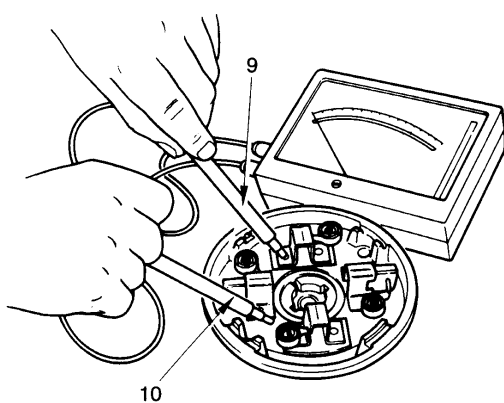


WARNING : Only trained electrical personnel must do these checks.

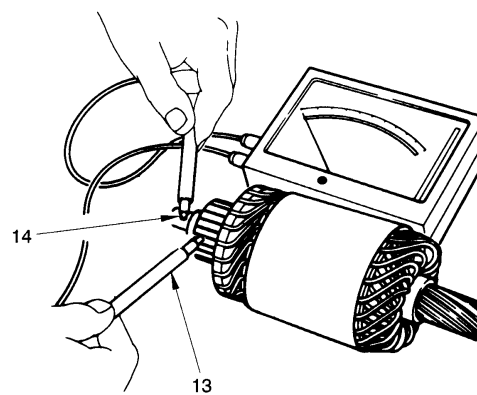
8. Touch one test probe (9) onto an insulated brush holder and the other (10) on an unpainted part of the carrier plate. The ohmmeter must read infinity, as no current should pass between the probes. If the meter reads less than infinity, replace the brush holder.
9. Touch one probe (11) on the field terminal, the other (12) on a clean part of the motor body, but ensure neither brush touches the body, refer to page 15. The ohmmeter must read infinity, if the meter indicates less than infinity the field coils are shorting and must be replaced.
10. Touch one probe (14) onto the armature shaft, the other probe (13) onto a commutator segment. The ohmmeter must read infinity. If the meter indicates less than infinity, the armature must be replaced.
11. Assemble the starter motor.



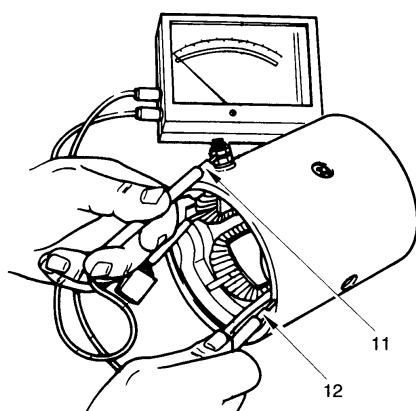
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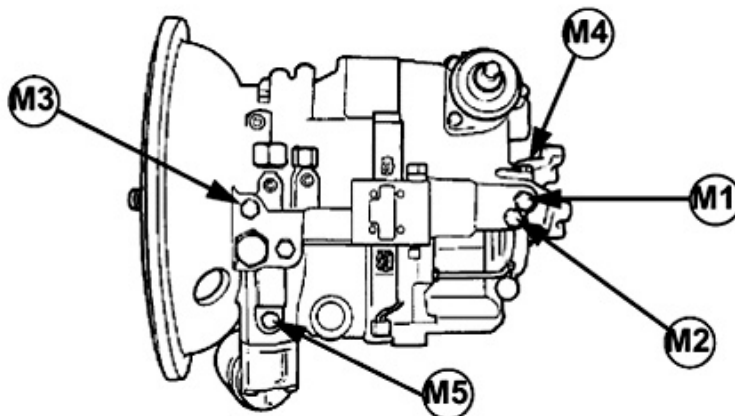
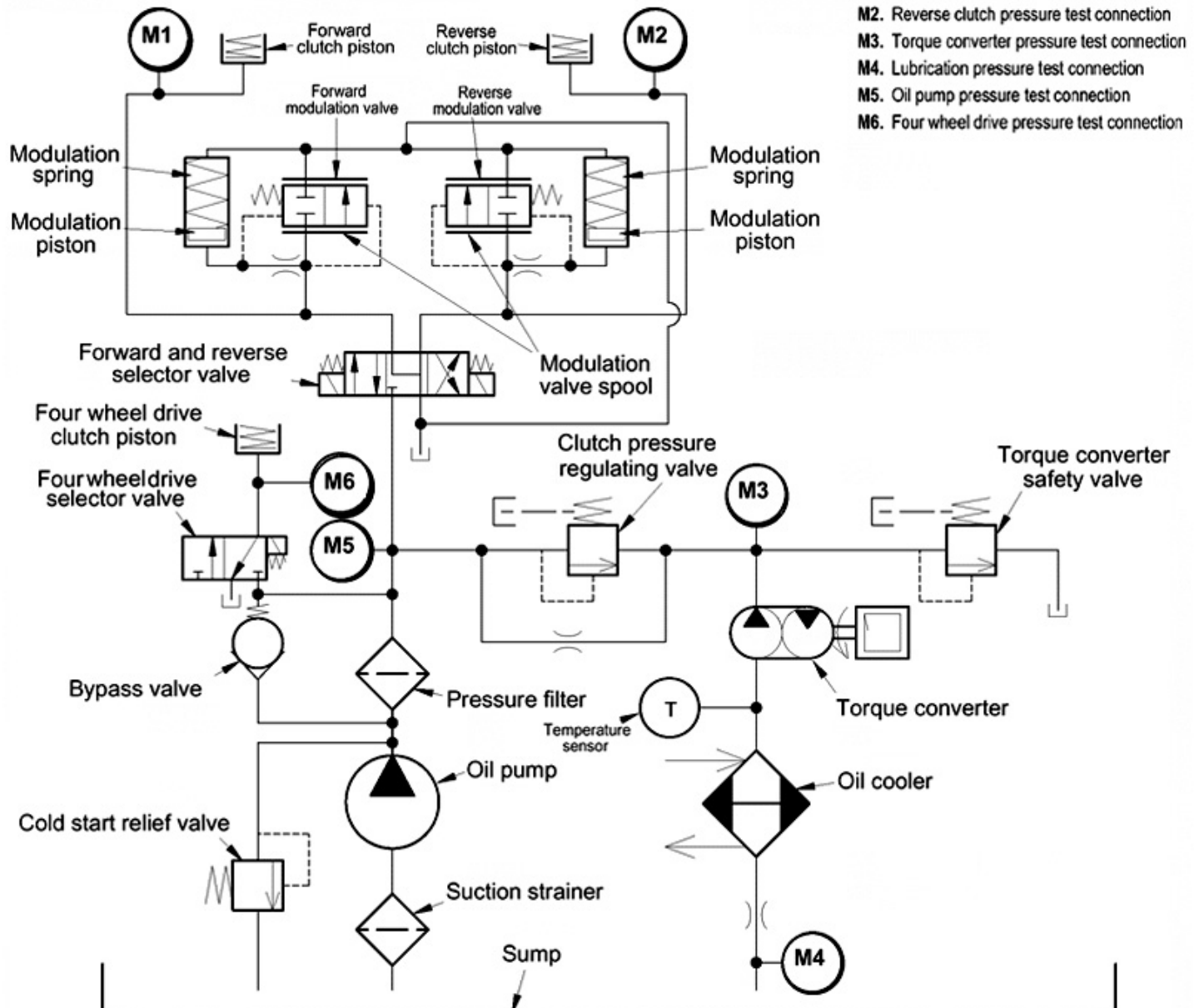


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SECTION 4 TRANSMISSION



Transmission Schematic



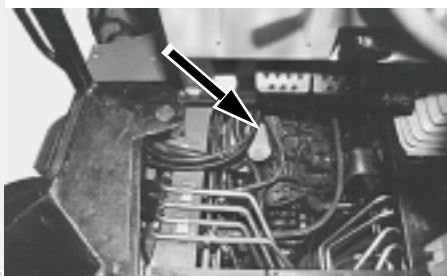
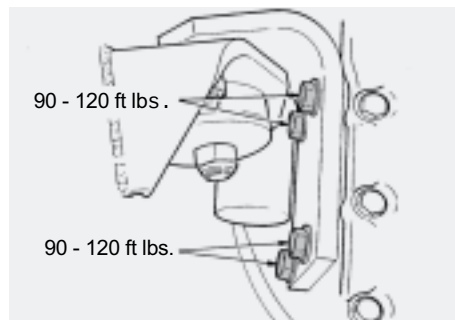
TRANSMISSION

Service specification

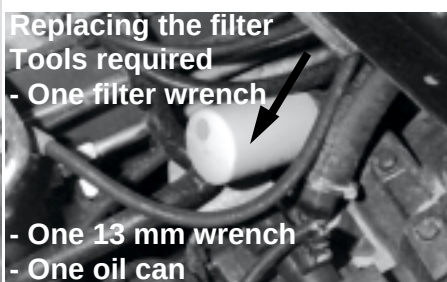
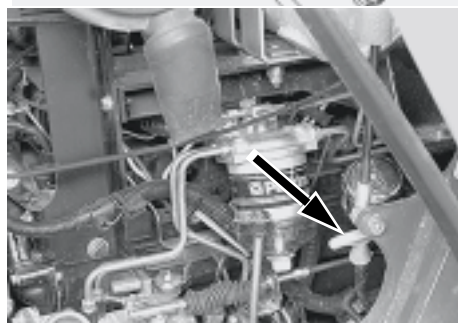
Check transmission mounting bolt torques ... Every 250 hours
(After the first 50 hours during the running in period)

Tool required -A torque wrench

Check the tightness of the eight transmission mounting bolts. (4 each side of machine)



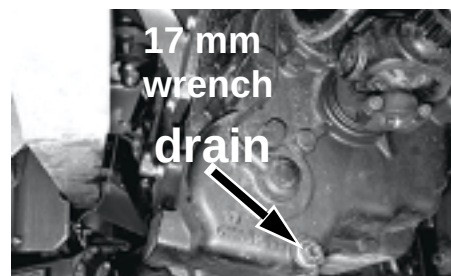
Remove the access panel in the cab to get to filter.
(synchroshuttle only).



Replacing the filter

Tools required

- One filter wrench
- One 13 mm wrench
- One oil can



17 mm
wrench
drain

TRANSMISSION (After the first 50 hours during the running-in period all services need to be performed)

Oil level check Every 50 hours

NOTE : On synchroshuttle the transmission oil level must be checked with the engine switched off.

Filter replacement (synchroshuttle and powershift)...Every 500 hours

Cleaning the screen filter (synchroshuttle only)Every 1000 hours

Oil changeEvery 1000 hours

Total system capacity (synchroshuttle only) 4.1 US gals (15 litres)

Extreme pressure oil type API CD/SE grade 10W30.

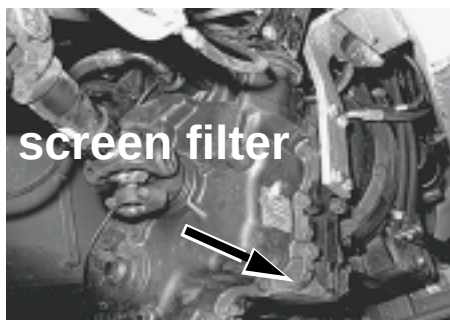
Cleaning the Screen Filter

Clean around the cover plate and remove it. Check the condition of the O-ring and replace it if necessary. Remove the screen filter and clean it in a detergent solution.

IMPORTANT : Follow the instructions for the detergent solution.

Dry the screen filter carefully with compressed air and install it.

IMPORTANT : Make sure you protect your face before using compressed air.
Install the cover plate.



screen filter

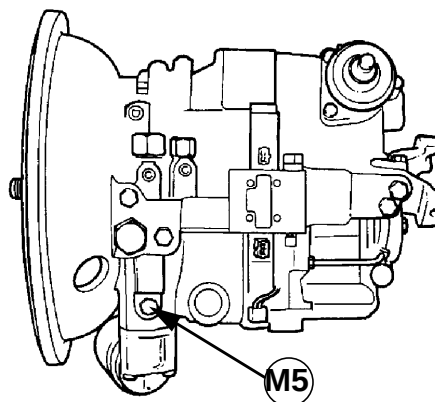
OIL PUMP PRESSURE TEST

Special tools

Pressure gauge 600 psi (50 bar) with adaptor.

Test procedure

1. Park the machine on a level surface.
2. Work the machine until the transmission reaches its working temperature of 176°F (80°C).
3. Stop the engine and set the parking brake to on.
4. Remove the test point M5 plug and connect the pressure gauge to the test point.
5. Start the engine and set the engine speed at 2200 rpm. The pressure gauge reading must be **200 to 220 psi** (14 to 15 bar).
6. Stop the engine, remove the pressure gauge and adaptor and install plug.



CI98G502

M5. Oil pump pressure test connection

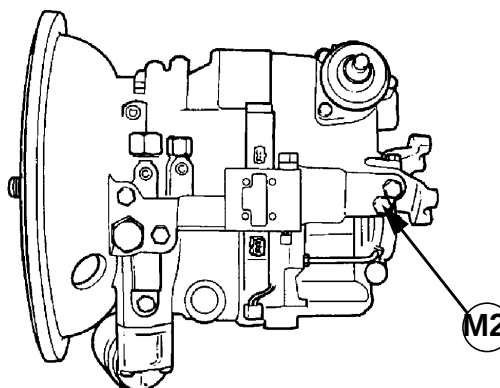
REVERSE CLUTCH PRESSURE TEST

Special tool :

Pressure gauge 600 psi (50 bar) with adaptor.

test procedure

1. Park the machine on a level surface.
2. Works the machine until the transmission reaches its working temperature of 176°F (80°C).
3. Stop the engine and set the parking brake to on.
4. Remove the test point M2 plug and connect the pressure gauge to the test point.
5. Start the engine, select reverse travel direction and set the engine speed at 2200 rpm. The pressure gauge reading must be **196 to 210 psi** (13.5to14.5 bar).
6. Stop the engine, remove the pressure gauge and adaptor and install plug.



CI98G502

M2. Reverse clutch test point

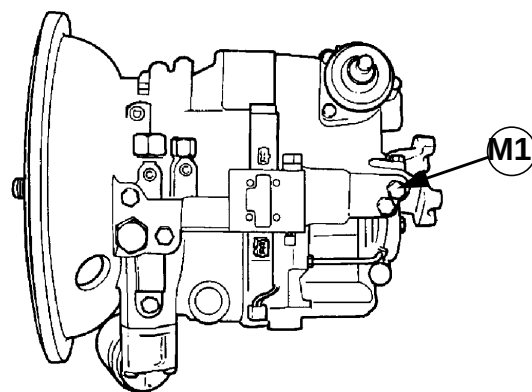
FORWARD CLUTCH PRESSURE TEST

Tools

Pressure gauge 600 psi (50 bar) with adaptor.

Test procedure

1. Park the machine on a level surface.
2. Work the machine until the transmission reaches its working temperature at 176°F (80°C).
3. Stop the engine and set the parking brake to on.
4. Remove the test point M1 plug and connect the pressure gauge to the test point.
5. Start the engine, select forward travel direction and set the engine speed at 2200 rpm. The pressure gauge reading must be **196 to 210 psi** (13.5 to 14.5 bar).
6. Stop the engine, remove the pressure gauge and adaptor and install plug.



C198G502

M1. Forward clutch test point

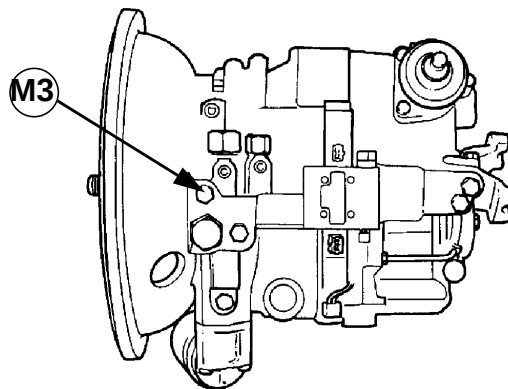
TORQUE CONVERTER RELIEF VALVE PRESSURE TEST

Tools

Pressure gauge 600 psi (50 bar) with adaptor.

Test procedure

1. Park the machine on a level surface.
2. Work the machine until the transmission reaches its working temperature of 176°F (80°C).
3. Stop the engine and set the parking brake to on.
4. Remove the test point M3 plug and connect to the pressure gauge to the test point.
5. Start the engine and set the engine speed at 2200 rpm. The pressure gauge reading must be **95 to 110 psi** (6.5 to 7.5 bar).
6. Stop the engine, remove the pressure gauge and adaptor and install plug.



C198G502

M3. Torque converter test point

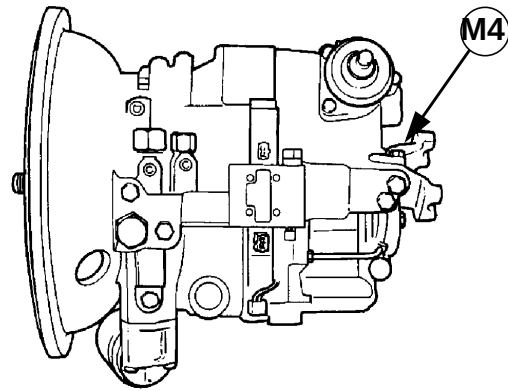
LUBRICATION CIRCUIT PRESSURE TEST

Tools

Pressure gauge 0 to 50 bar with adaptor.

Test procedure

1. Park the machine on a level surface.
2. Work the machine until the transmission reaches its working temperature of 176°F (80°C).
3. Stop the engine and set the parking brake to on.
4. Remove the test point M4 plug and connect the pressure gauge to the test point.
5. Start the engine and set the engine speed at 2200 rpm. The pressure gauge reading must be 22 to 44 psi (1.5 to 3 bar).
6. Stop the engine, remove the pressure gauge and adaptor and install plug.



CI98G502

M4. Lubrification pressure test point.

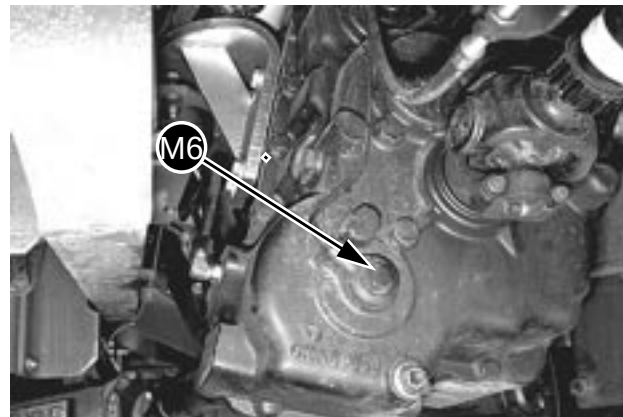
FOUR WHEEL DRIVE CLUTCH PRESSURE TEST

Tools

Pressure gauge 0 to 50 bar with adaptor.

Test procedure

1. Park the machine on a level surface.
2. Work the machine until the transmission reaches its working temperature of 176°F (80°C).
3. Stop the engine and set the parking brake to on.
4. Remove the test point M6 plug and connect the pressure gauge to the test point.
5. Start the engine and set the engine speed at 2200 rpm. The pressure gauge reading must be 200 to 218 psi (14 to 15 bar).
6. Stop the engine, remove the pressure gauge and adaptor and install plug.



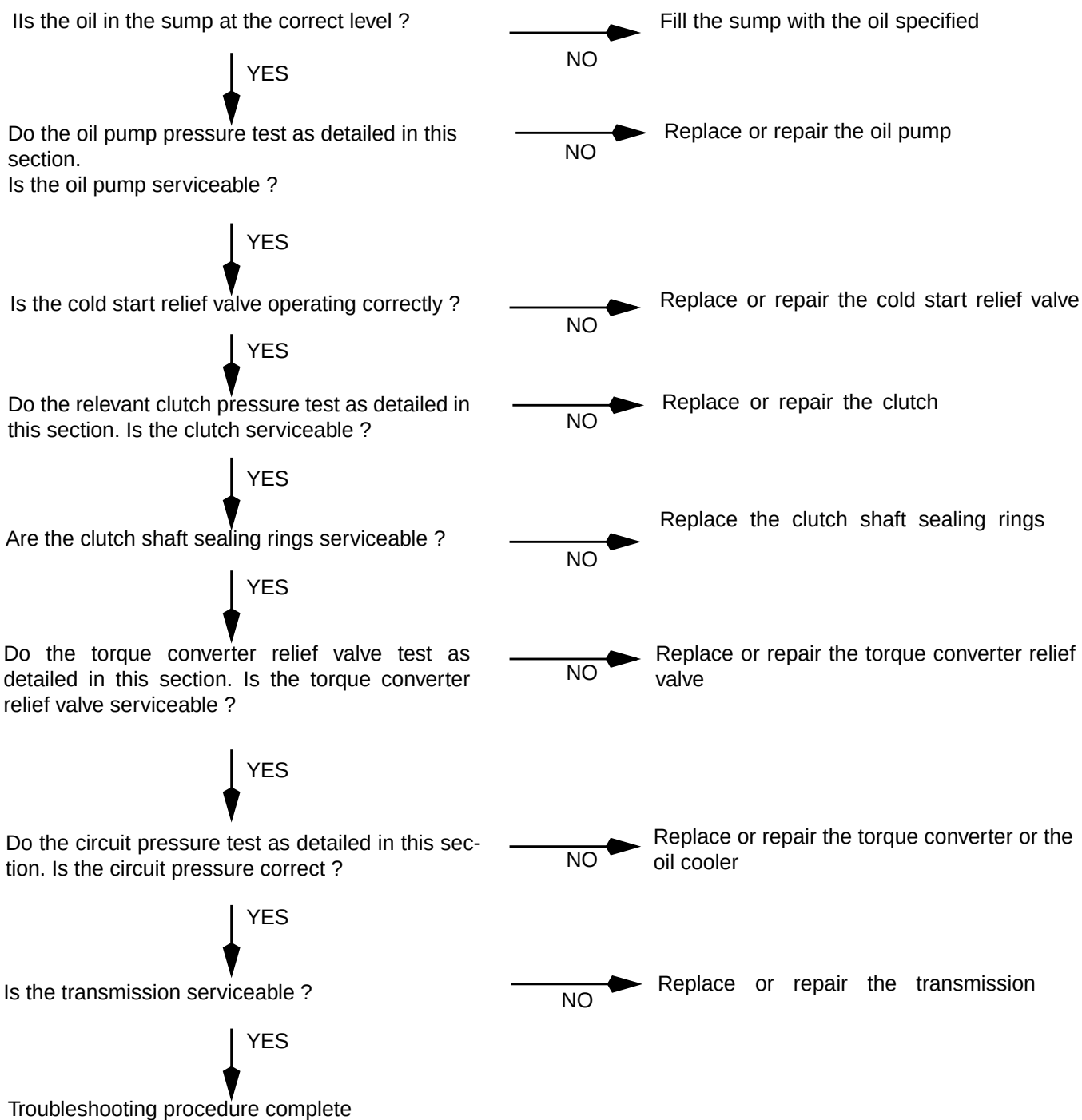
CK98G001

M6. Four wheel drive test point.

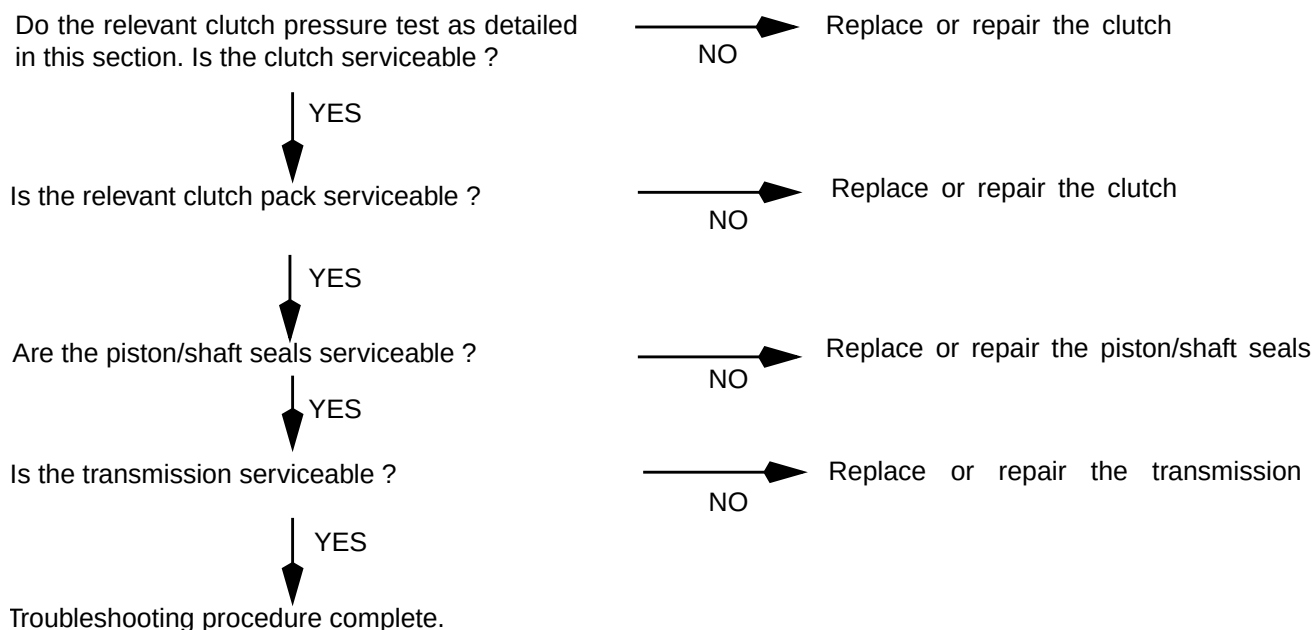
TROUBLESHOOTING PROCEDURES

Transmission fails to drive in forward or reverse

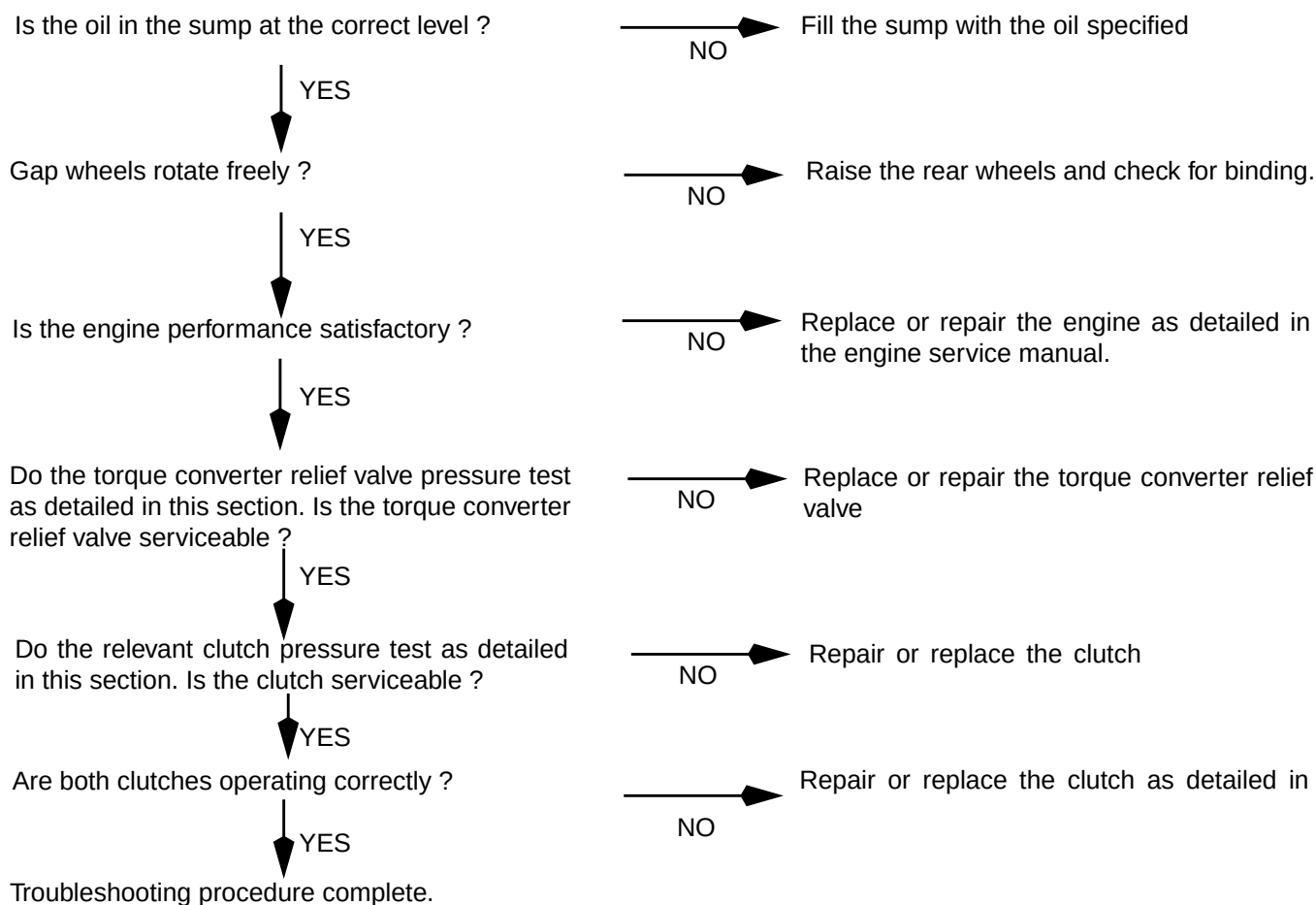
Check the machine for oil leaks and damaged or missing parts. Repair as required.



Transmission drives in one direction only



Loss of power or slow take-up drive



Transmission overheating

Is the oil in the sump at the correct level ?

YES

Is the oil cooler operating correctly ?

YES

Do the oil pump pressure test as detailed in this section. Is the oil pump serviceable ?

YES

Do the torque converter relief valve pressure test as detailed in this section. Is the torque converter relief valve serviceable ?

YES

Do the circuit pressure test as detailed in this section I. Is the circuit pressure correct ?

YES

Is the machine being operated correctly ?

YES

Troubleshooting procedure complete.

NO

Fill the sump with the oil specified or remove excess oil from the sump.

NO

Remove and flush the oil cooler.

NO

Replace or repair the oil pump

NO

Replace or repair the torque converter relief valve

NO

Replace or repair the torque converter

NO

Train the operator.

High stall speed

Is the oil in the sump at the correct level ?

YES
↓

Is the system free from air ?

YES
↓

Are the forward and reverse clutches serviceable ?

YES
↓

Is the torque converter serviceable ?

YES
↓

Troubleshooting procedure complete.

→
NO → Fill the sump with the oil specified

→
NO → Replace the line seals.

→
NO → Replace or repair the clutch

→
NO → Replace or repair the torque converter

Low stall speed

Is the engine performance satisfactory.

YES
↓

Is the torque converter clutch serviceable ?

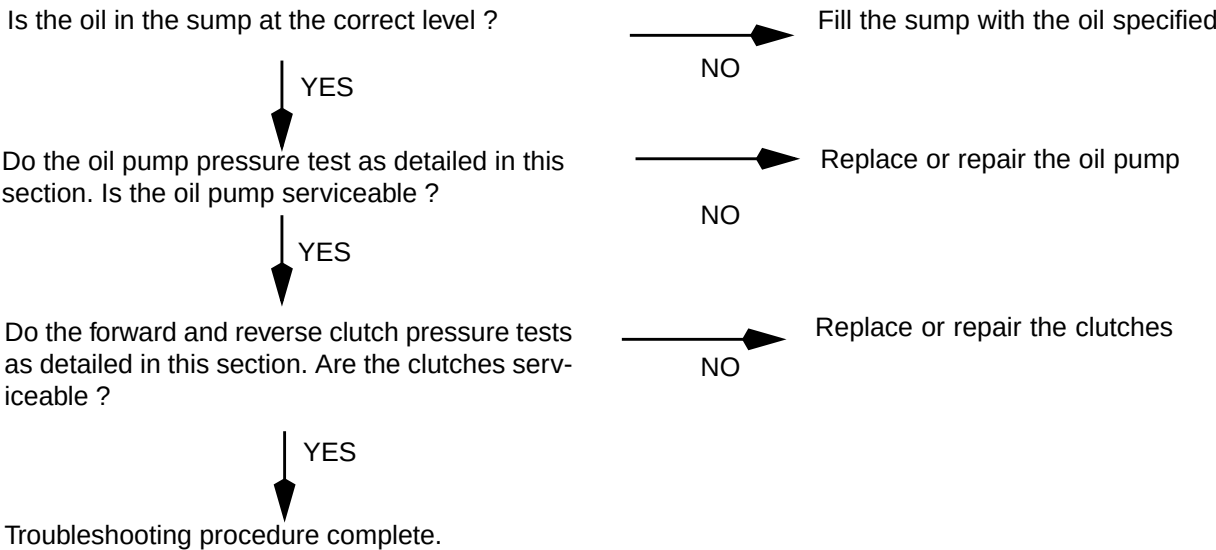
YES
↓

Troubleshooting procedure complete.

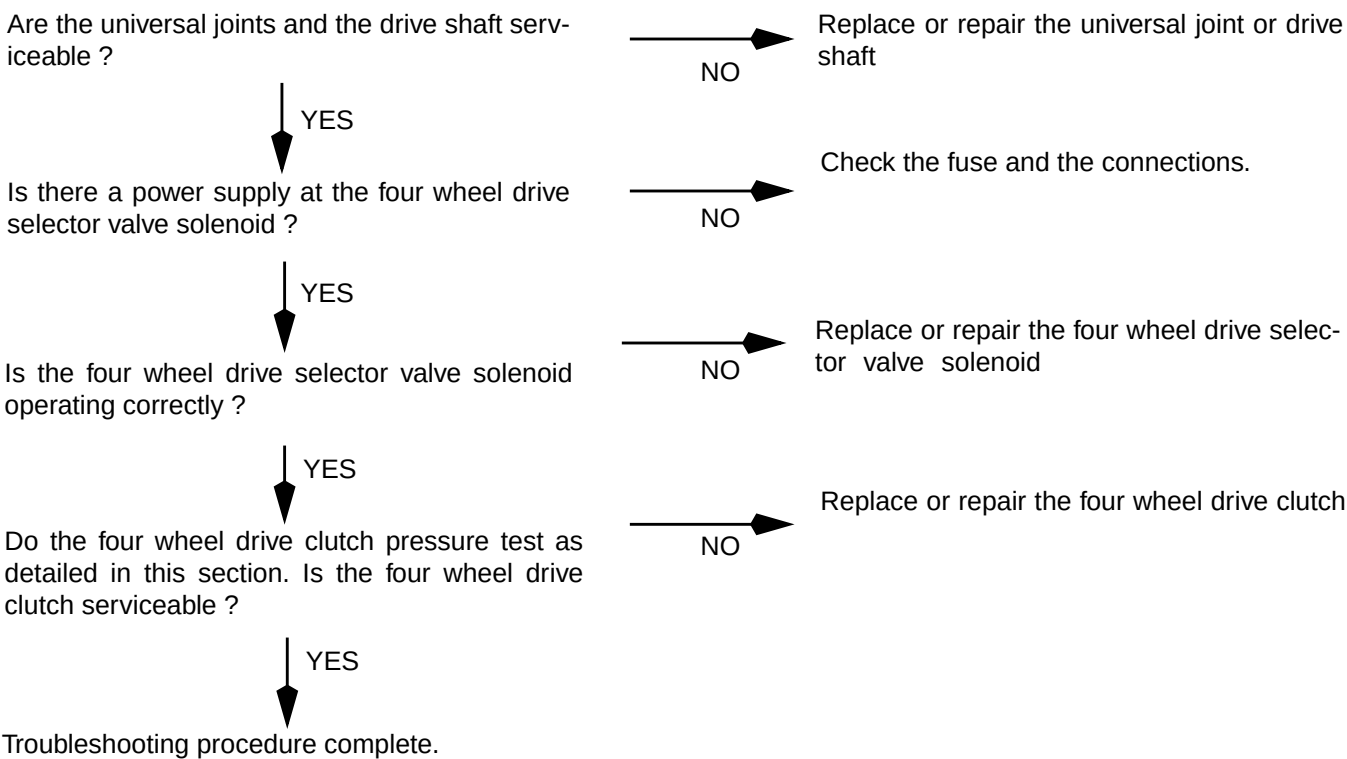
→
NO → Replace or repair the engine as detailed in the engine Service Manual.

→
NO → Replace or repair the torque converter clutch

Machine hesitates when changing between forward and reverse



Four wheel drive does not work



SECTION 5 BASIC HYDRAULIC SYSTEM



Basic Hydraulic Components

- **Hydraulic oil specification** DIN 51524

Hydraulic oil viscosity

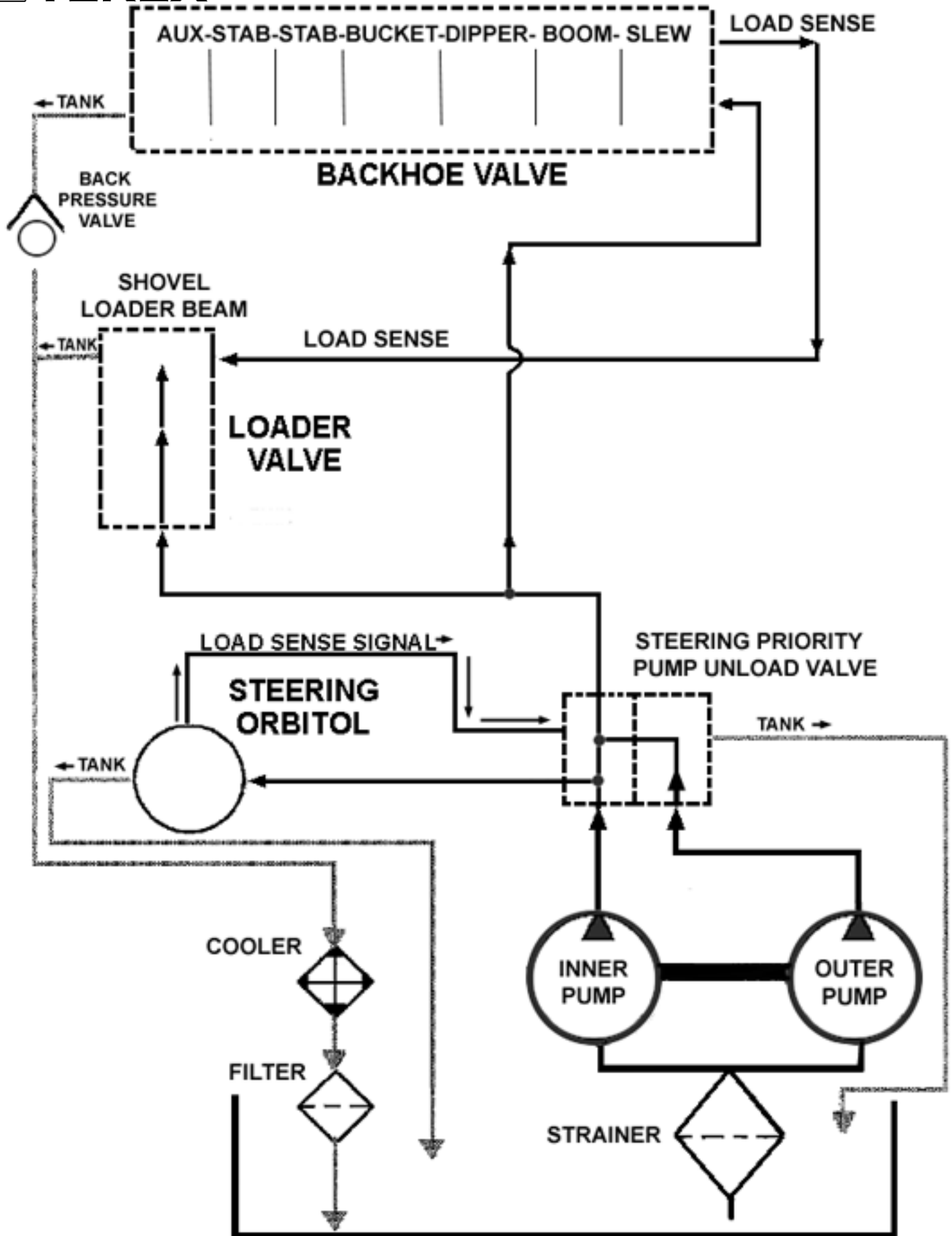
- **Below 30°C (86°C)** ISO VG46
- **Above 30°C (86°C)** ISO 68

- **Hydraulic tank**.....Capacity 12 US gallons (45 liters) Oil Change period 1000 hours
- **Suction Strainer**.....125 micron, Clean every 1000 hours
- **Tandem Gear Pump**.....Pump Output Combined flow 38 US Gal (142 L/min) at 2200 rpm /MRV 3250 psi (225 bar)
- **Priority Flow Valve**.....Priority to steering system
- **Orbitol Steering Valve**...Closed center, load sensing
Relief valve 2540 psi (175 bar) @ 2200 rpm
Shock valves 3250 psi (225 bar)
- **Unloader Valve**.....Relief valve 207 bar (3000 psi) @ 1800 rpm
- **Loader Control Valve**.... 2 spools, Controls Loader Beam and Loader Shovel
- **Backhoe Control Valve**.7 spools, Controls Slew, Boom, Dipper, Bucket, LH/RH Stabilizers & auxiliary.
Relief valve 3250 psi (225 bar) @ 1800 rpm
- **Cooler**
- **Return line filter**.....13-micron Filter - change period after 50 hours then every 1000 hours

Hydraulic Circuit TX760

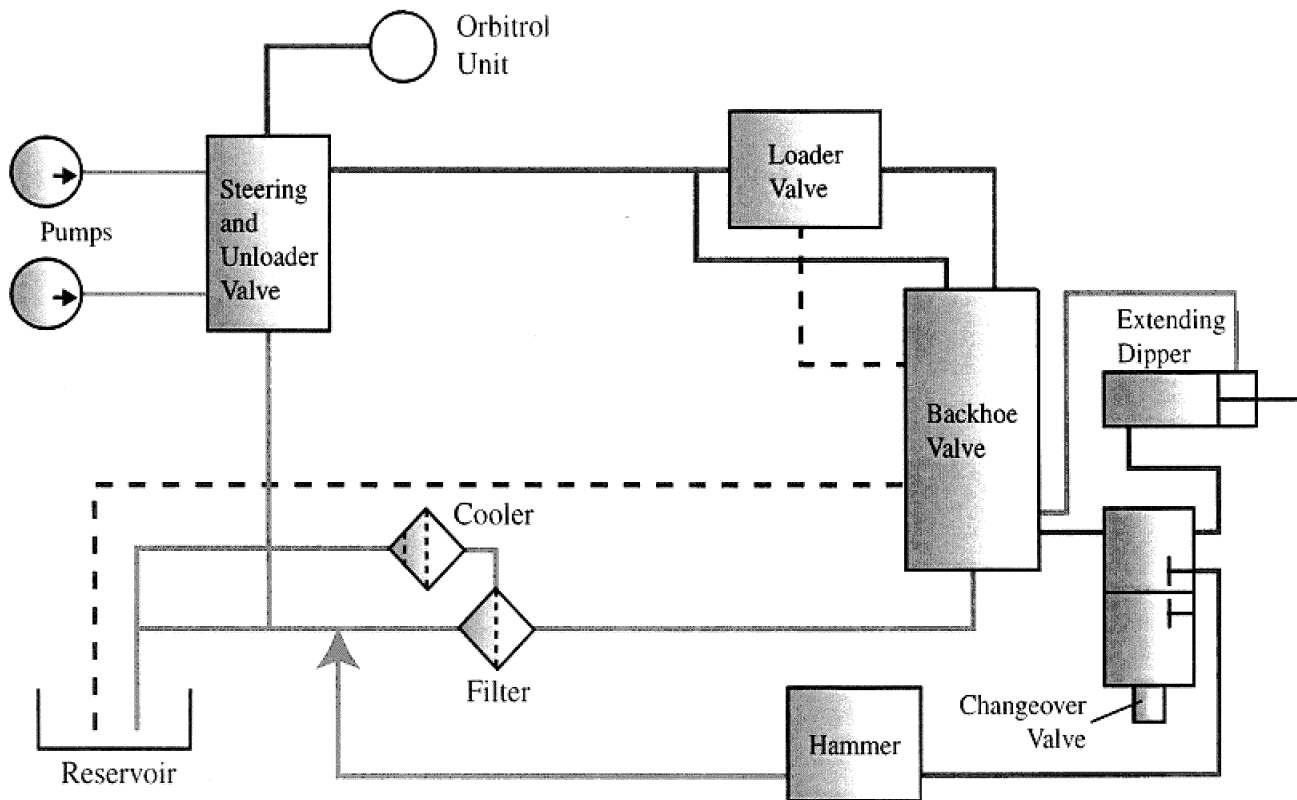
General Description

1. Oil drawn from the reservoir thru a strainer into the tandem gear pumps.
2. Oil from inner gear pump flows to steering priority flow valve.
3. If the steering orbitrol unit is in neutral the oil is directed to the loader control valve.
4. If steering wheel is turned, oil is directed to steering circuit by the priority flow valve.
5. Oil from outer pump flows thru the unloader valve and joins flow from the inner pump prior to the oil flowing to the loader control valve and the backhoe valve.
6. Without any functions operating, the oil flows thru (front attachment) loader control valve / (back attachment) backhoe control valve and thru the to the return line to the backpressure valve.
7. The backpressure valve keeps pressure in circuit for operation of backhoe / loader functions.
8. Without operating any functions, the loader and backhoe valve spools are in neutral, the oil returns to tank past the backpressure valve then cooler and return filter.
9. When a backhoe function is operated, a spool is actuated in the backhoe control valve; flow is blocked to tank. A load-sensing signal is sent to the loader control valve, which closes the loader control valve-compensating valve and allows all pump flow to the backhoe valve.
10. If loader functions are operated, oil is present at the loader valve.



TX760 HYDRAULIC DIAGRAM

Husco Hydraulic Circuit – ISO Comp

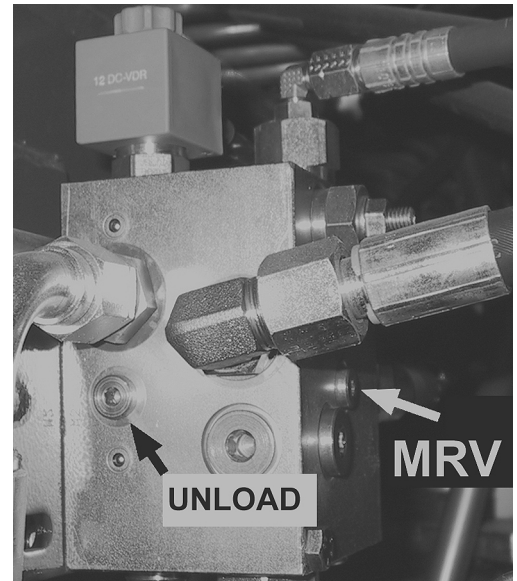


HYDRUALIC PRESSURE TESTS (Husco System)

Backhoe & Loader Main Relief Valves (MRV) & Unload Relief Valve (URV) Pressure Test

Pressure check for TX750, 760 & 860 - MRV = 3250 PSI, URV = 3000 PSI.

1. Work the machine until hyd. oil temp. is at minimum 125° F (5°C). Park the machine on a level surface.
2. Put the backhoe in the transport position and lower loader bucket to ground. Stop the engine.
3. Install test fitting into MRV port ("Parker" EMA3/10X1ED Test Fitting) & connect a 6,000 psi (300 bar) pressure gauge . 
4. Clear personnel away from machine, Start engine, run 2200 rpm. Pressure will be 300 PSI (20 Bar) No Load.
5. Operate Loader function to bottom out a cylinder (open Loader MRV). Pressure should be 3250 -0/+100 psi (225 bar).
Operate Backhoe function to bottom out a cylinder (open Backhoe MRV). Pressure should be 3250 -0/+100 psi (225 bar).
6. Remove the test fitting & gauge from test point (MRV) and install in (Unload) test port.
7. Operate the backhoe Boom Up function slowly with cylinder bottomed out (open URV - Unloader Relief).
The pressure should reach 3,000 psi (200 bar) then drop off to 0 psi.
Adjust relief valve at Unload valve if needed.
8. If pressures are not to spec:
Adjust pressures at the proper relief valves if needed.
 - a.) The MRV pressure at the Loader Valve & Backhoe Valve.
 - b.) The URV pressure at the Steer Priority/Pump Unload Valve.





REMOVAL AND INSTALLATION OF THE HYDRAULIC RESERVOIR

1. Park the machine on a level surface.
2. Raise the loader and lock the support strut to hold the machine.
3. Release the hydraulic system pressure
4. Drain the hydraulic reservoir (1).
5. Open the hood.
6. Remove the grille.
7. Remove the front coupling.
8. Remove the split pins (2) and washers (3) from the support (4).
9. Loosen the hose clips (5) and (6) and disconnect the hydraulic hoses (7) and (8) from the hydraulic reservoir (1). Put caps on the open ends of the hydraulic hoses and the hydraulic reservoir.
10. Loosen and remove the bolts (9), washers (10) and disconnect the manifold (11) and O-ring (12) from the hydraulic pump (13).

NOTE : *when installing , install a new O-ring (13) in the manifold (11).*

11. If fitted, disconnect the return pipe (14) from the filler (15). Fit the blanking caps to both connections.



WARNING: *The hydraulic reservoir is very heavy. Get help to remove the hydraulic reservoir from the machine.*

12. Support the hydraulic reservoir (1) on a suitable trestle.
13. Remove the nuts (16), washers (17) and (19) and bolt (18).
14. Carefully, remove the hydraulic reservoir (1) from the machine.
15. Only carry out 16 through 21 if you replace the hydraulic reservoir (1).

16. Loosen the hose clip (20) and remove the manifold (11) and hose (21) from the hydraulic reservoir.

17. Remove the bolts (22), O-rings (23) and remove the level indicator (24) from the hydraulic reservoir (1). Remove the O-rings (25).

NOTE : *When installing, install new O-rings (23) and (25).*

18. Remove the bolts (26) and washers (27) from the filler (15).

19. Remove the filler (15) from the hydraulic reservoir (1).

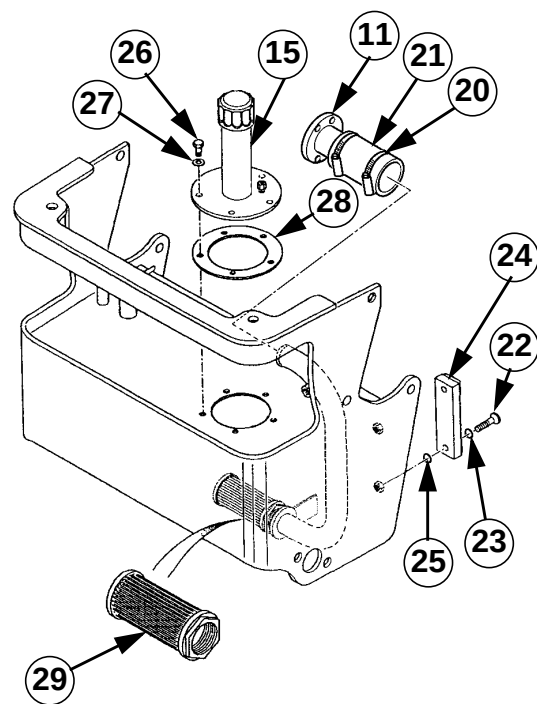
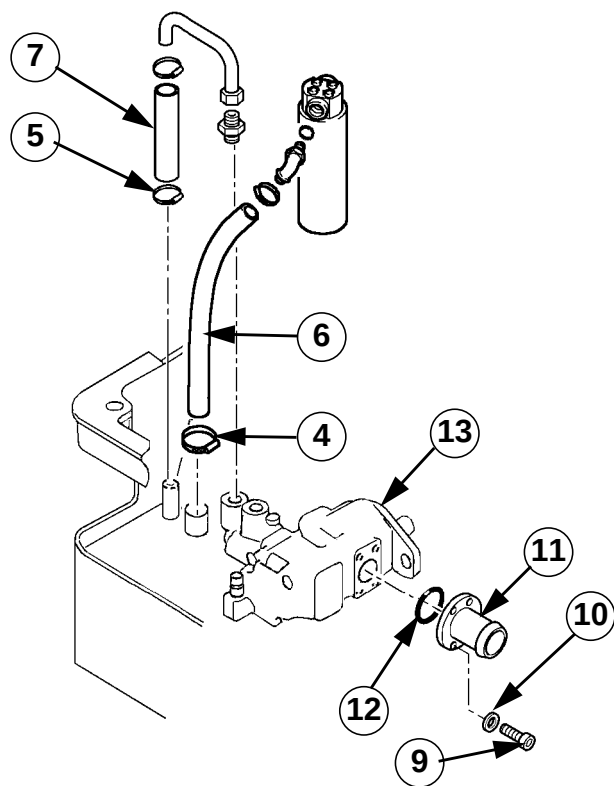
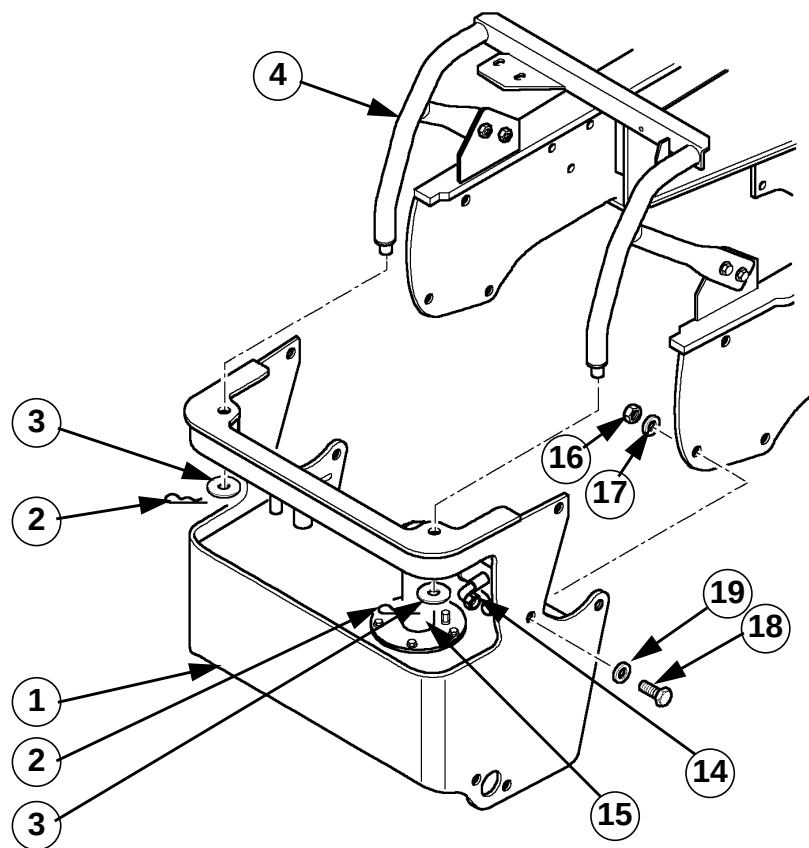
20. Remove the seal (28).

NOTE : *When assembling, install a new seal (28).*

21. Unscrew the suction strainer (29) and remove it from the hydraulic reservoir (1).

NOTE : *The installation of the hydraulic reservoir is in the reverse order from that removal.*

NOTE : *After installation, start the engine and operate the hydraulic functions of the machine. Make sure the hydraulic components and hoses which have been disturbed do not leak. check the oil level in the hydraulic reservoir, top up if necessary.*



Cylinder Leak Down Rates

The Normal amount of Leak down in a 10 minute period with Hyd. Oil Temp at 140F.

- Stabilizers – 7/8 inch (20mm)
- Extendable Dipper – 1 ½ inches (40mm)
- Backhoe Bucket – 5/8 inch (15mm)
- Dipper – 5/8 inch (15mm)
- Boom – 5/8 inch (15mm)
- Loader Beam – 5/16 inch (8mm)

- Cylinders will leak down because there are no Counterbalance Valves.
- Leakage is at the Control Valves (Proper Viscosity of Hydraulic oil must be used).

SECTION 6 AXLES & STEERING



Carraro Rear Axle General description

The axle described in this manual, designed and manufactured following the customer's requests, consists of a beam casing, housing the differential in the middle and a wheel hub unit at each end.

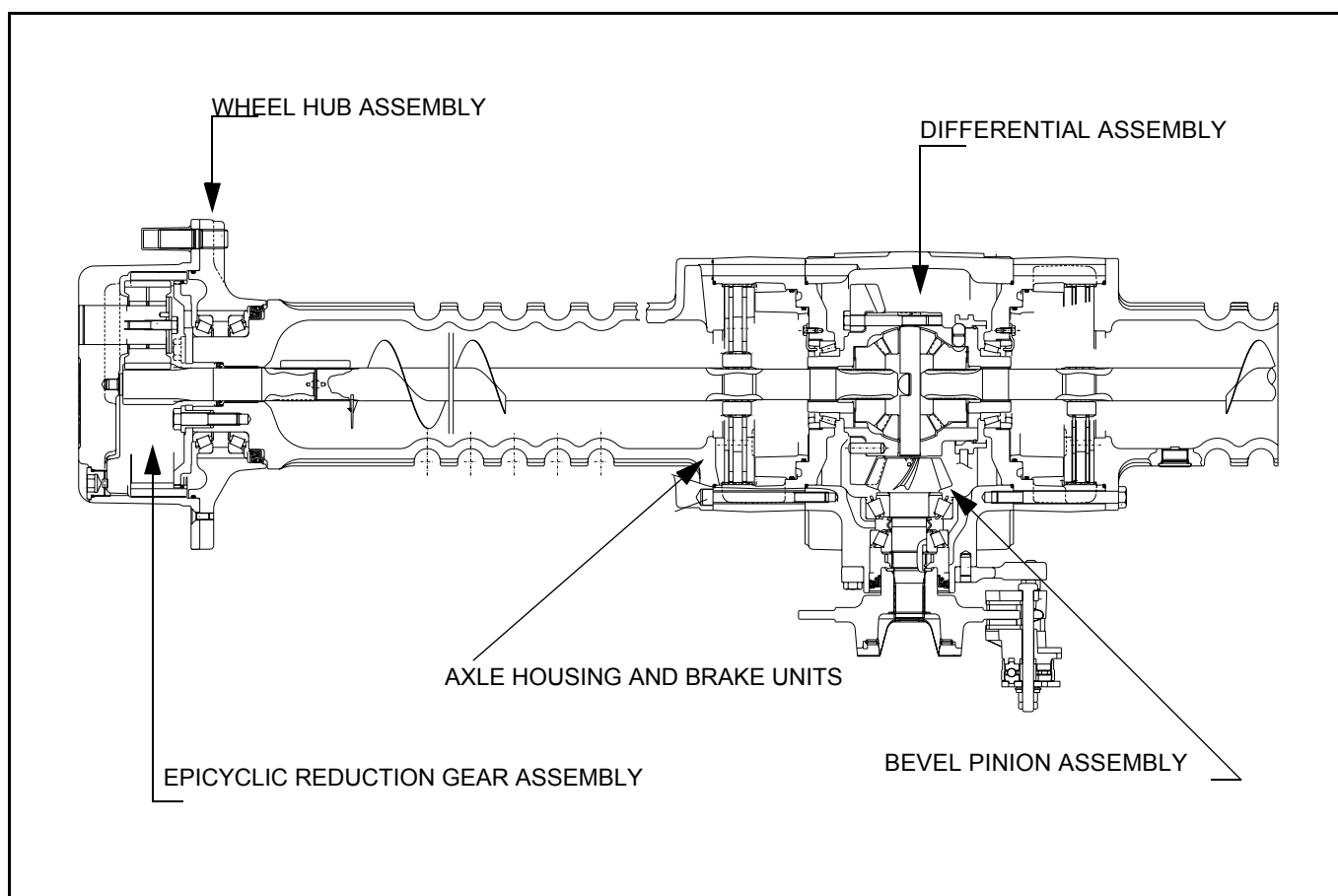
The differential - mechanical lock, hydraulically controlled - is supported by two bearings mounted on a suitable structure allowing the bevel gear set to be adjusted.

The ring bevel gear is adjusted by means of two ring nuts located opposite each other.

The position of the bevel pinion, supported by two bearings, is adjusted by inserting adjusting shims.

The wheel hubs containing the epicyclic reduction gears are supported by two tapered roller bearings.

Furthermore the axle has a braking system fitted with a hydraulic drive for service braking and mechanical control for parking brake.

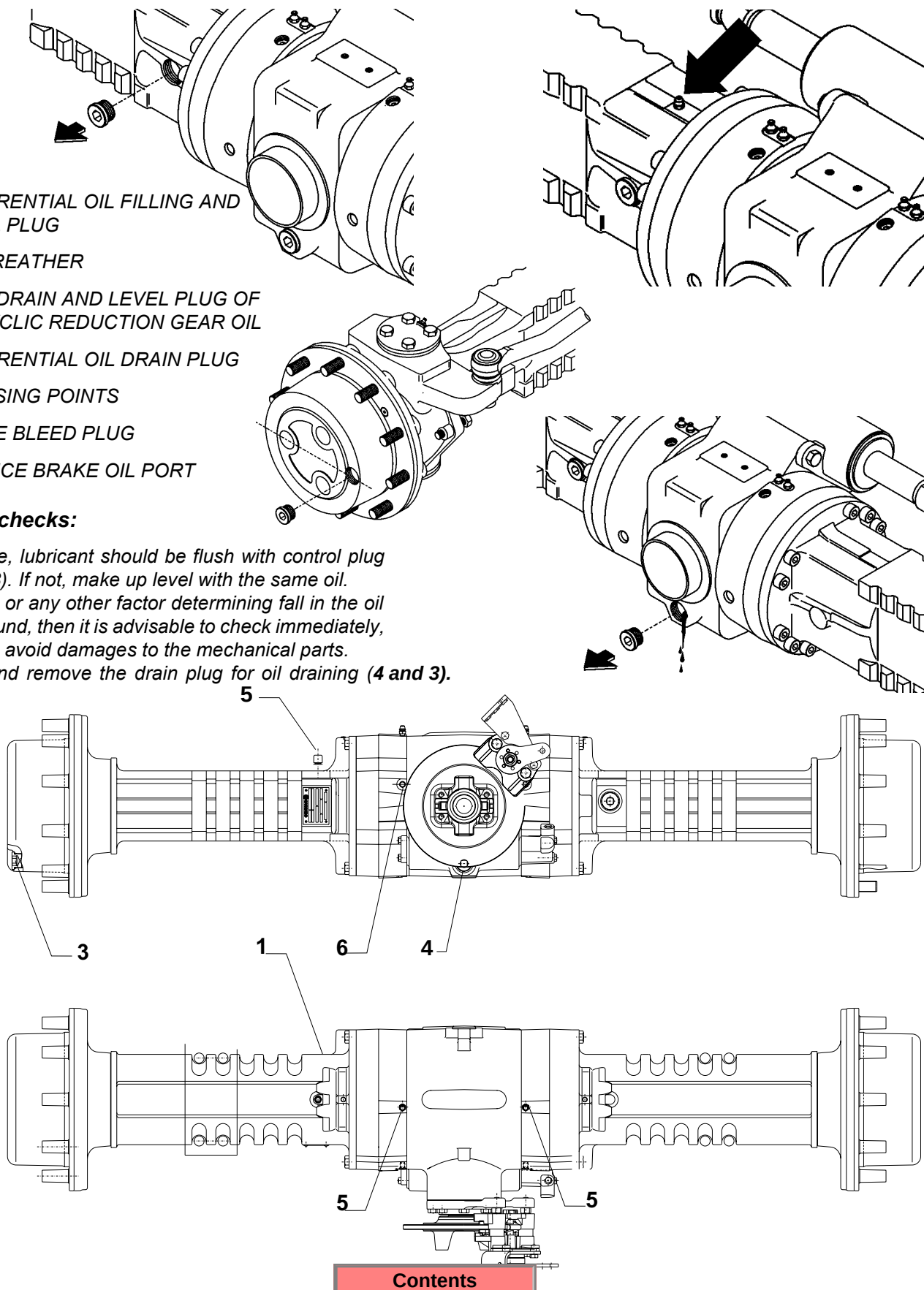


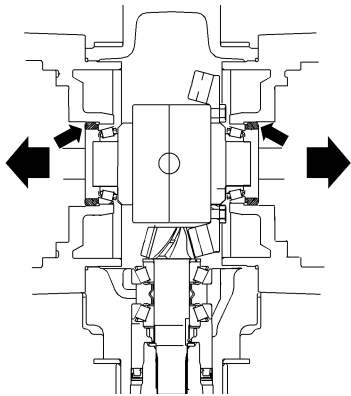
Rear Axle

- 1 DIFFERENTIAL OIL FILLING AND LEVEL PLUG
- 2 OIL BREATHER
- 3 FILL / DRAIN AND LEVEL PLUG OF EPICYCLIC REDUCTION GEAR OIL
- 4 DIFFERENTIAL OIL DRAIN PLUG
- GREASING POINTS
- 5 BRAKE BLEED PLUG
- 6 SERVICE BRAKE OIL PORT

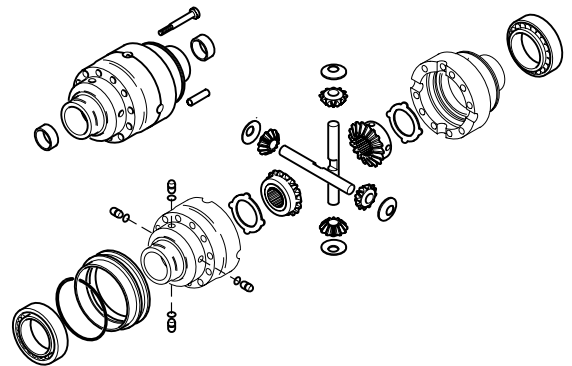
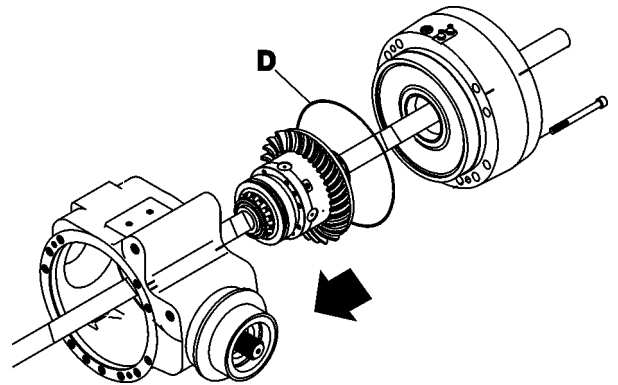
Routine checks:

In the axle, lubricant should be flush with control plug (1) and (3). If not, make up level with the same oil. If leakage or any other factor determining fall in the oil level is found, then it is advisable to check immediately, in order to avoid damages to the mechanical parts. Loosen and remove the drain plug for oil draining (4 and 3).

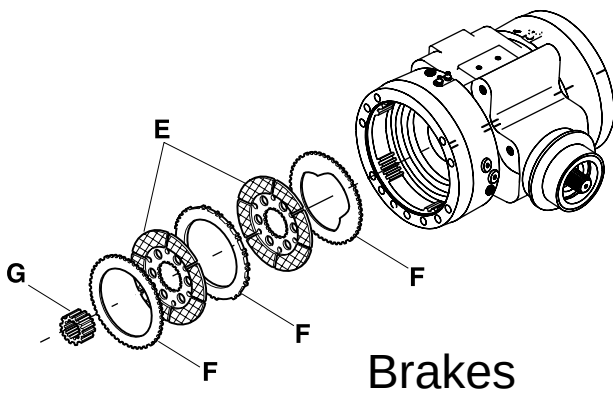




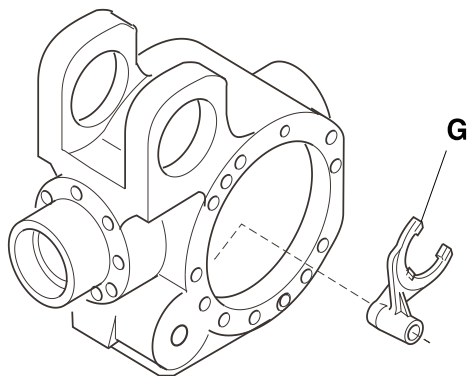
Differential



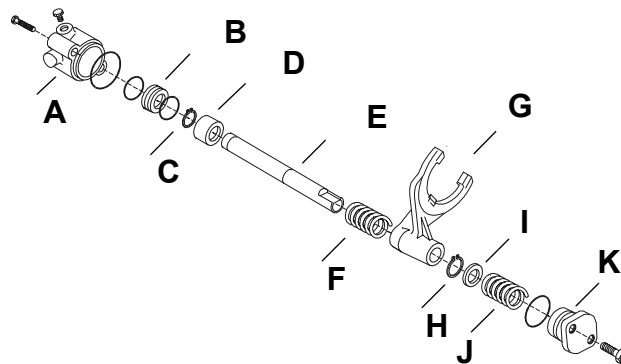
Differential



Brakes



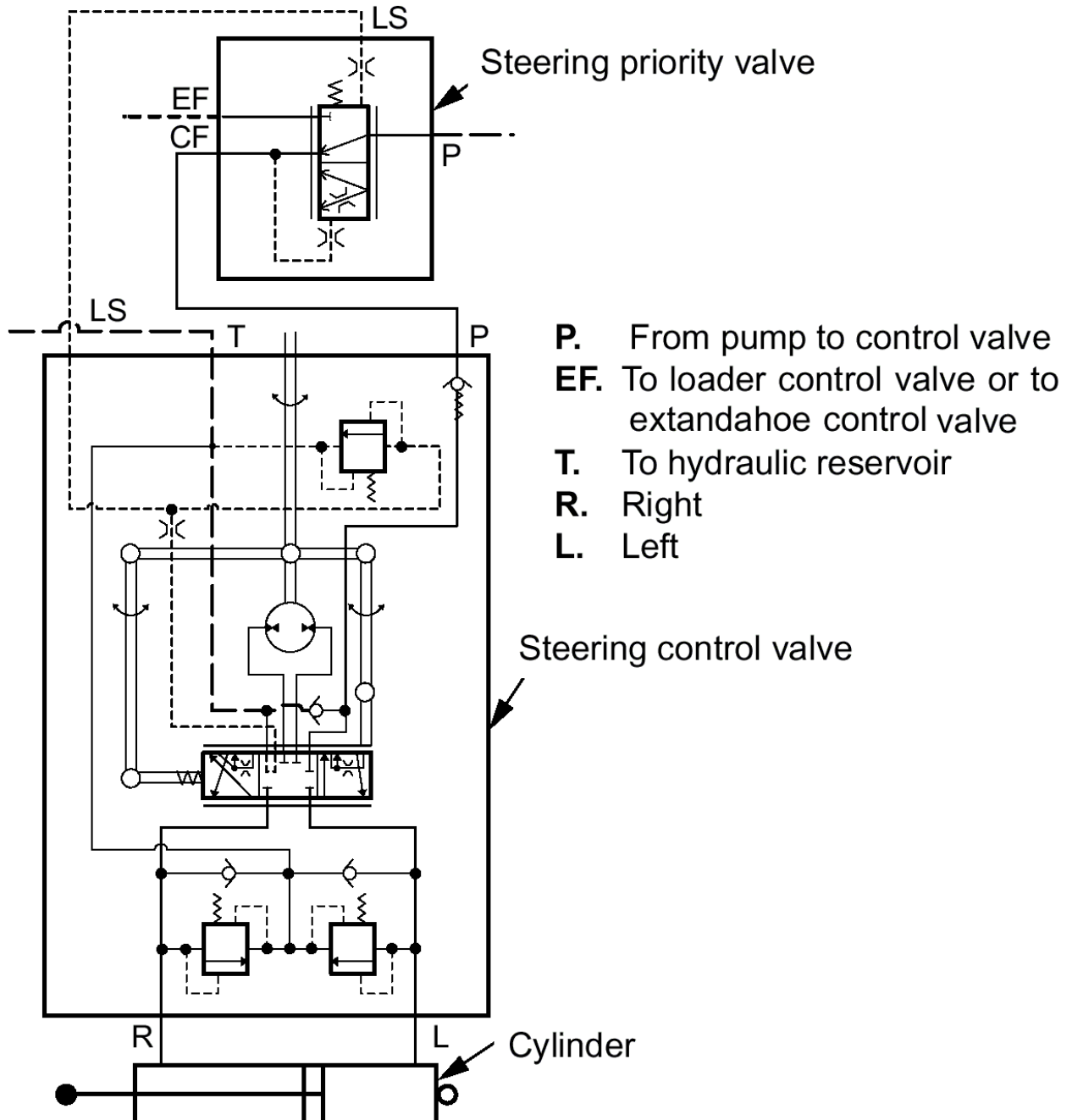
Differential Lock



Problem	Cause	Action
Ring gear tooth broken at the outer side	1. Excessive gear load compared to the one foreseen 2. Incorrect gear adjustment (excessive backlash) 3. Pinion nut loosened	Replace bevel gear set Follow carefully the recommended operations for the adjustment of bevel gear set backlash
Ring gear tooth broken side	1. Load bump 2. Incorrect gear adjustment (insufficient backlash) 3. Pinion nut loosened	Replace bevel gear set Follow carefully the recommended operations for the adjustment of bevel gear set backlash.
Pinion or ring gear teeth or worn	1. Insufficient lubrication 2. Contaminated oil 3. Incorrect lubrication or depleted additives 4. Worn out pinion bearings that cause an incorrect pinion axle backlash and wrong contact between pinion and ring.	Replace bevel gear set. Follow carefully the recommended operations for the adjustment of bevel gear set backlash. Use correct lubricants, fill up to the right levels and replace according to the recommended program.
Overheated ring and pinion teeth. See if gear teeth have faded	1. Prolong ed functioning at high temperatures 2. Incorrect lubrication 3. Low oil level 4. Contaminated oil	Replace bevel gear set. Use proper lubrication, fill up to right level and replace at recommended program.
Pinion teeth pitting	1. Excessive use 2. Insufficient lubrication	Replace bevel gear set. Use correct lubrication, fill up to the right level and substitute at recommended intervals
Axle beam body bent	1. Vehicle over loaded 2. Vehicle's accident 3. Load bump	Replace axle beam body
Worn out or pitted bearings	1. Insufficient lubrication 2. Contaminated oil 3. Excessive use 4. Normal wear out 5. Pinion nut loosened	Replace bearings. Use correct lubrication fill up, to the right level and replace at recommended intervals
Oil leakage form gaskets and seals	1. Prolonged functioning at high temperature of the oil 2. Oil gasket assembled incorrectly 3. Seal lip damaged 4. Contaminated oil	Replace the gasket or seal and matching surface if damaged. Use correct lubrication and replace at recommended intervals.
Excessive wearing out of input flange spline	1. Exhaustive use 2. Pinion nut loosened 3. Pinion axle backlash	Replace the flange. Check that the pinion spline is not excessively worn out. Replace bevel gear set if required.
Fatigue failure of pinion teeth See if the fracture line is well defined (wave lines, beach lines)	1. Exhaustive use 2. Continuous overload	Replace bevel gear set
Pinion and ring teeth breakage	1. Crash load of differential components	Check and/or replace other differential components.

Problem	Cause	Action
Side gear spline worn out. Replace all scratched washers (Excessive backlash)	Excessive use	Replace differential gear group. Replace halfshaft if required
Thrust washer surface worn out or scratched.	1. Insufficient lubrication 2. Incorrect lubrication 3. Contaminated oil	Use correct lubrication and fill up to right level. Replace at intervals recommended. Replace all scratched washers and those with 0,1mm thickness lower than the new ones.
Inner diameter of tapered roller bearing worn out.	1. Excessive use 2. Excessive pinion axial backlash 3. Insufficient lubrication 4. Contaminated oil	Replace bearing. Check pinion axial backlash. Use proper lubrication, fill up to right level and replace at recommended intervals.
Bent or broken halfshaft	Vehicle intensively operated or overloaded	Replace
Halfshaft broken at wheel side	1. Wheel support loosened 2. Beam body bent	Replace Check that wheel support is not worn out or wrongly adjusted.

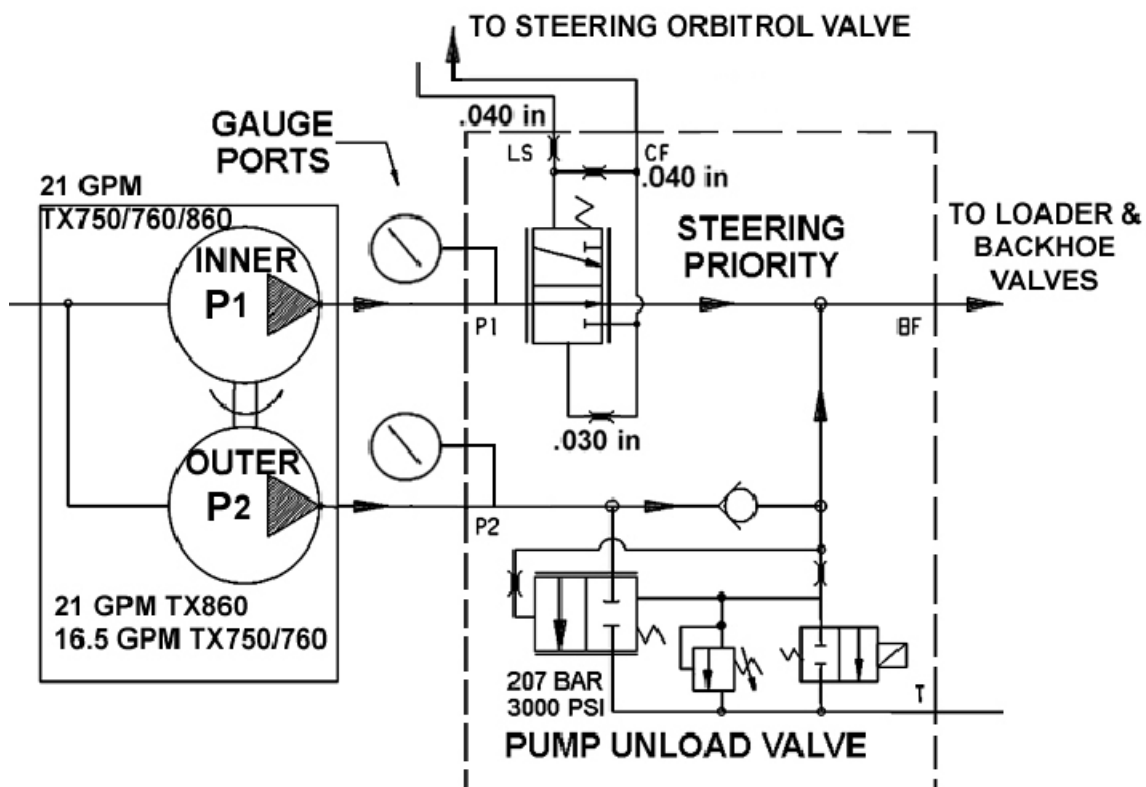
DANFOSS STEERING CONTROL VALVE



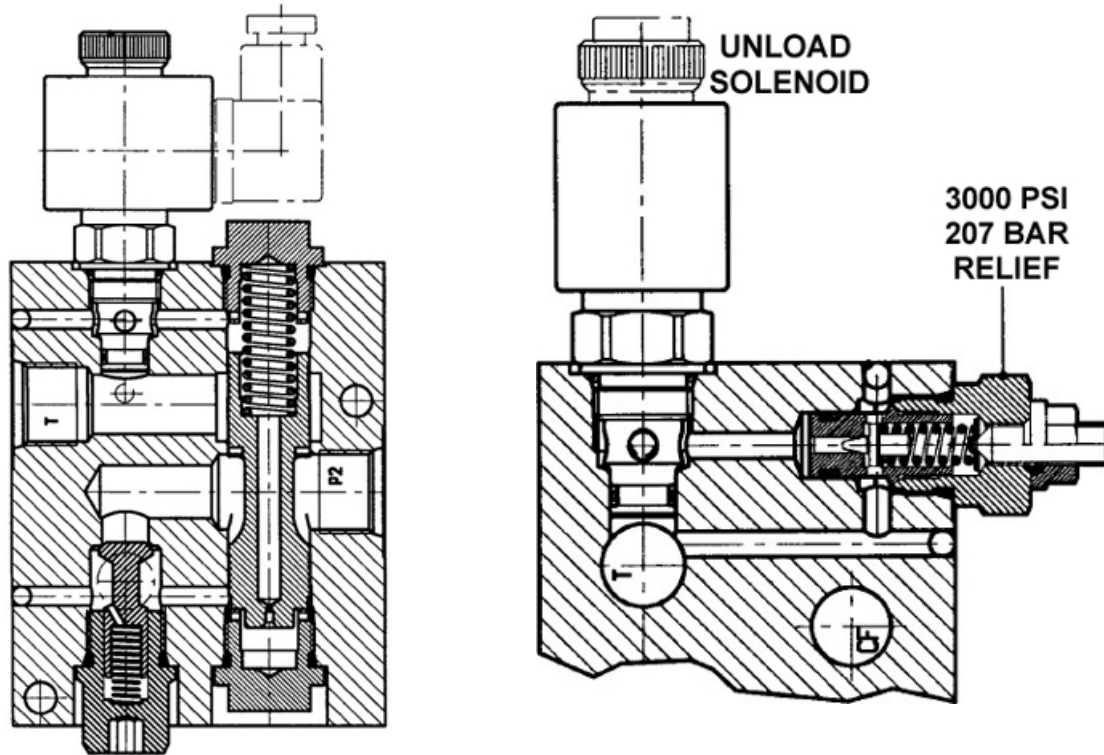
HUSCO UNLOADER & STEERING PRIORITY VALVE

The P100 Backhoe Loader fitted with the combined Oil Control Steering Priority / Unloader Manifold uses two Hydraulic Pumps both delivering 21 GPM at 2200 Engine RPM (860 Machine) or 21 / 16.5 GPM at 2200 RPM (750 / 760 Machine). The power needed to drive both Pumps up to maximum relief valve pressure of 225 Bar is more than the Engine delivers, so a Unloading Valve is used to divert all the flow from Pump P2 to Tank when the Load Pressure reaches 3000 PSI (207 Bar). The Hydraulic Services can then continue working at a reduced speed using the flow from the remaining Pump P1.

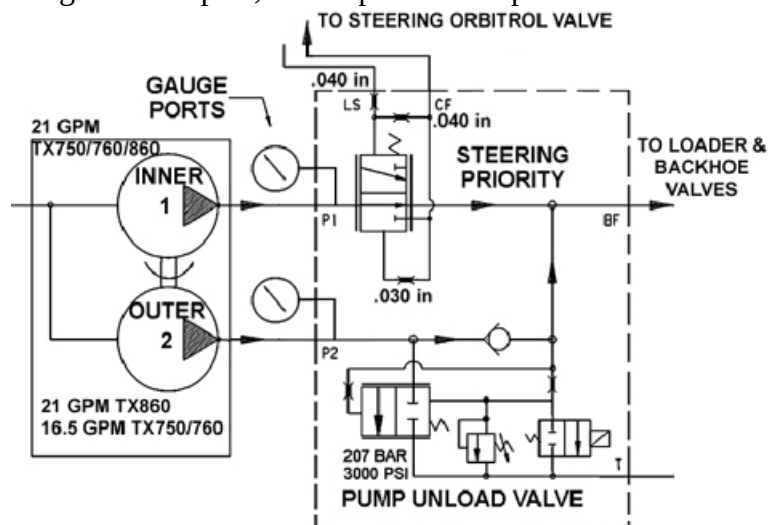
The output from P1 is delivered first to a Load sensing steering Priority Spool. This Spool delivers oil to a Steering Orbitrol Unit according to the demand of the Steering Wheel. When sufficient oil is supplied, the Spool shifts to divert excess oil to join the flow from P1 to supply the main hydraulic functions.



HUSCO UNLOADER VALVE OPERATION

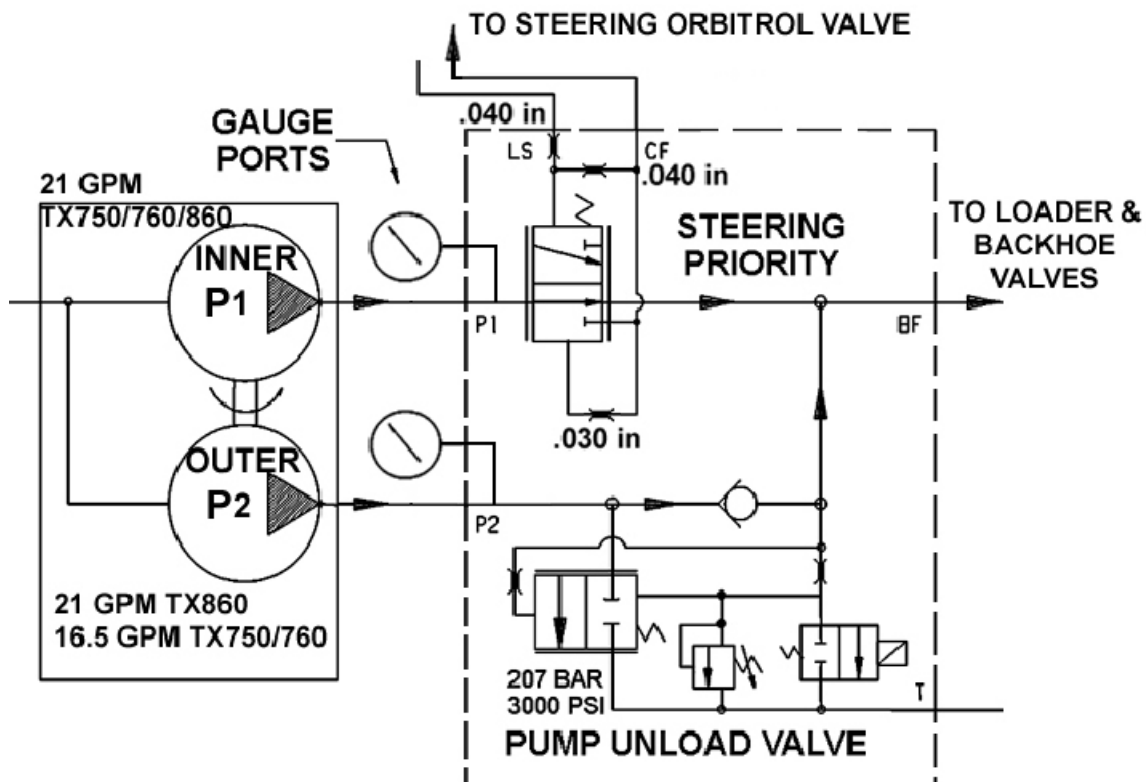
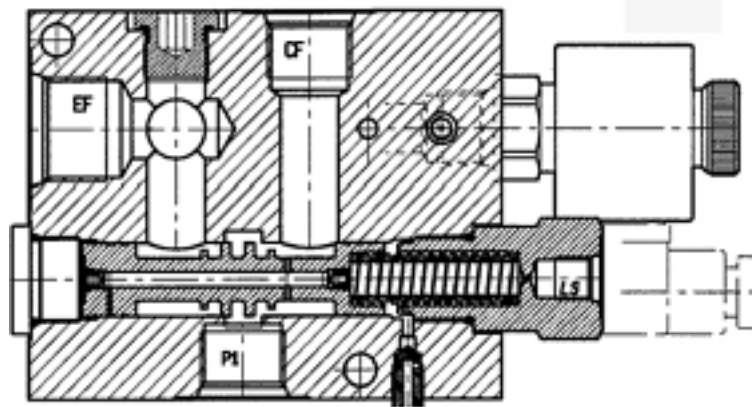


Oil from P2 enters the Valve, flows through the Check Valve & combines with the flow from the Steer Priority Spool & exits through Port EF to the Loader & Backhoe ControlValves. A drilling in the Block feeds oil from EF back to the end of the Unloader Spool, through the orifice in the center of the spool, through the Spring Chamber to the Relief Valve & Solenoid Valve. When pressure in EF Exceeds 3000 PSI (207 Bar) the Relief Valve opens & oil begins to flow from EF through the orifice in the Spool through the relief valve to tank. The pressure drop created across the orifice & acting on the end of the Spool exceeds the force of the Spring, allowing the Spool to shift, opening P2 to Tank. When pressure in EF falls below the setting of the Relief Valve, it closes, the flow through the Orifice stops, pressure equalizes at each end of the Spool, the spool is then shifted to its original position by the spring. Oil from P2 passes through the Check Valve again to combine with the flow from P1 to give full flow to the Hydraulic Control Valves. Similarly, when the Solenoid valve is energized the oil flows along the same path, causes pressure drop across the orifice and the spool shifts across & opens P2 to Tank.



STEERING PRIORITY VALVE OPERATION

Oil from P1 enters the center port of the Steer Priority Spool and is diverted to the controlled flow port CF. Pressure in CF is sensed through 2 small drillings in the Spool and is directed to the end of the Spool through a .030 in. (0.8 mm) diameter orifice. When sufficient oil is delivered to the Steering Orbitrol unit to satisfy the Steering requirement, pressure in CF rises & when it exceeds the setting of the spring, the spool begins to shift & the excess flow is diverted to EF to combine with the flow from P2 to the Hydraulic Control Valves. A Load Sense hose directs pressure from the Steering Orbitrol back in to LS. Thus regardless of the speed of the turning of the Steering Wheel, and regardless of the flow demanded by the Steering Orbitrol, the Spool always maintains the pressure at CF 130 PSI (9 Bar) higher than the load at the Steering Orbitrol Unit.



CHECKING PISTON PACKING FOR THE STEERING CYLINDER

1. Apply the parking brake and lower the loader bucket to the floor.
2. Turn the steering wheel all the way to the right and stop the engine.
3. Depressurize the hydraulic system.
4. Disconnect the hose at the left side of the steering cylinder.
5. Install a plug in the hose. The thread size 3/4-16.
6. Start the engine and run the engine at full throttle.
7. Turn the steering wheel all the way to the right and continue to turn the steering wheel to the right while another person checks for leakage at the open fitting.
8. If there is constant leakage, the piston packing is damaged and must be repaired.

NOTE: Carry out the same procedure for the rear axle steering cylinder.

ORBITROL STEERING UNIT RELIEF VALVE TEST

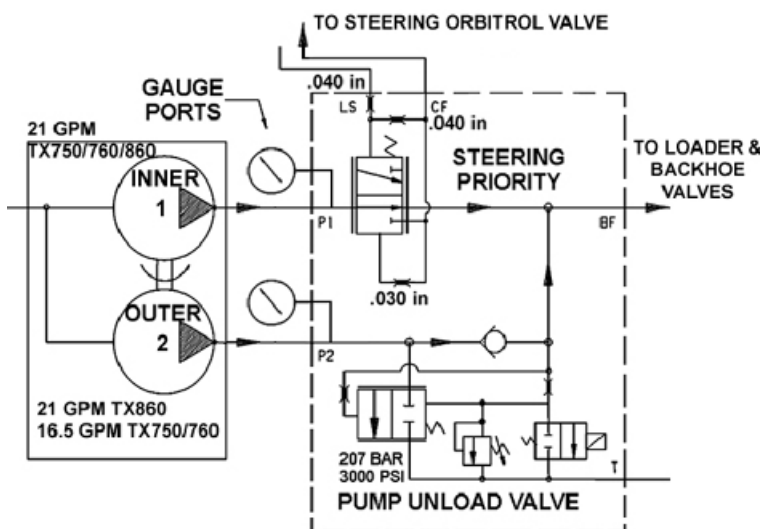
1. Work the machine until the temperature of the hydraulic oil is at least 60°C (140°F).
2. Park the machine on firm, flat ground.
3. Dump the bucket, raise the loader beam and install the safety strut.
4. Stop the engine and release the pressure from the hydraulic system.
5. Open the hood.
6. Connect the pressure gauge to test point (P1)
7. Start and run the engine at 1800 rpm.
8. Turn the steering to full lock and check the relief valve pressure setting. This should be 2500 to 2575 psi (170 to 175 bar).
9. Adjust the relief valve in the orbitrol steering unit if the pressure is not correct.

Adjustment

NOTE: The relief valve will not normally require adjustment unless the steering system pressure is not correct on test. The valve can be adjusted on the machine or on a test bench. This instruction describes setting on the machine, but the method of adjustment is the same when using a test bench.

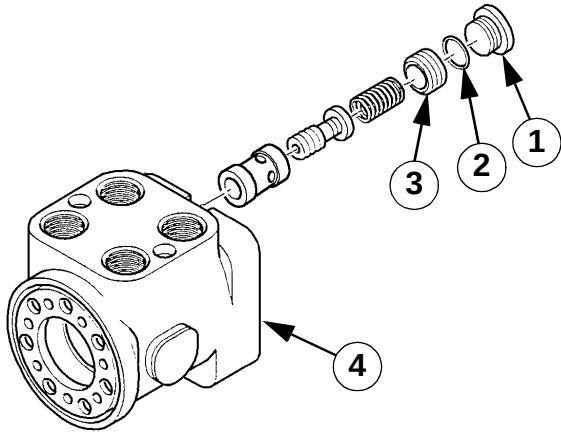
Adjust the relief valve as follows :

1. Park the machine on firm, level ground.
2. Fully crowd the bucket, raise the loader beam and fit the safety strut.
3. Lower the backhoe stabilizers to the ground. Do not raise the machine.
4. Stop the engine and depressurize the hydraulic system.
5. Fit the test equipment.



Connect the pressure gauge to the test ports

6.



CS98N505

Remove the plug (1) from the steering unit (4) and turn the setting plug (3) in or out by one turn.

NOTE: To increase system pressure, screw the setting plug (3) in. To reduce system pressure, screw the setting plug (3) out.

7. Install the plug (1) in the steering unit and carry out the relief valve test.
8. Note the change in pressure and carry out further adjustments to set the correct pressure.
9. After the final adjustment, fit a new O-ring seal (2) on the plug (1) and install the plug (1).
10. Remove the test equipment.

SECTION 7 BRAKES



SERVICE BRAKE OPERATION CHECK

Service specification

Check Every 50 hours
Check and adjustment Every 2000 hours

Service Brake Check (all models)

STEP 1

Park the machine on flat, level ground and engage parking brake.

STEP 2



CK98F031

Lock the brake pedals.

STEP 3

Model 750/760/860 Synchroshuttle only



CK98G018

Select second gear then place the direction of travel control lever in the forward position. Disengage parking brake.

Model 860/960/965 Powershift only



PSFNR

Select second gear, then place the transmission control lever in forward drive. Disengage parking brake.

STEP 4



CK98F029

Using the accelerator pedal, run the machine at maximum speed.

STEP 5



CK98F029

Press down on the brake pedals. The machine should stop smoothly, in a straight line and the tension on the pedals should remain firm. If not, consult your local dealer.

PARK BRAKE OPERATION CHECK

Service specification

Check Every 50 hours

Check and adjustment Every 2000 hours

Parking Brake Check (all models)

STEP 2 Model 860/960/965 Powershift only

STEP 1



Engage the parking brake and start the engine.



Select third gear, then place the transmission control lever in forward drive.

STEP 3

STEP 2 Model 750/760/860 Synchroshuttle only



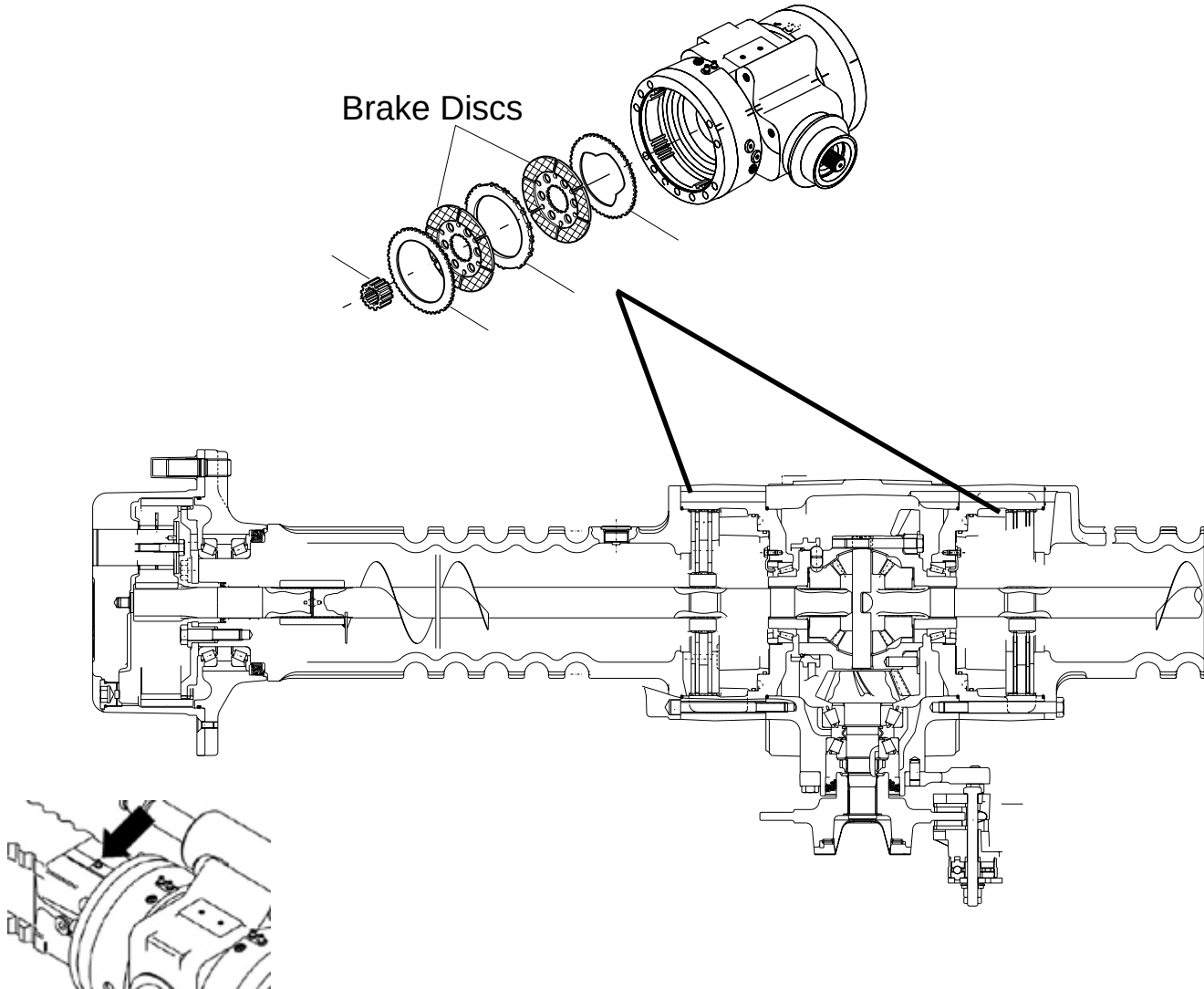
Place the gear change lever in third gear, then place the direction of travel control lever in forward drive. The audible warning device will sound.



Using the accelerator pedal, increase the engine speed to about 1800 rpm. The machine must not move. If the machine moves, adjust the brake.

See "Parking Brake Adjustment"

CARRARO (2 WHEEL) STEER SERVICE BRAKES



Bleeding Brakes One at a Time (2 Man Job)

1. Park on flat level ground & apply park brake. Fully dump loader bucket & lower it to ground. Stop the engine.
2. The bleeder screws are on top of the rear axle near the differential housing.
3. Constantly fill reservoir to ensure air does not enter system.
One person operates the brake pedal while the other is under the machine to open & close bleed screws.
4. Using a tube with a check valve or a tube, one end on the bleed screw and the other submersed in brake fluid.
5. Pump the RH brake pedal until air stops coming out of the tube. Hold the pedal down while closing the bleed screw.
6. Repeat step 3 to 5 for the LH Brake.
7. Join Brake Pedals and apply the brakes. The Brake Pedal should be firm and not go to the floor.
8. Top off the Reservoir as required then road test each brake separate and together.

MASTER CYLINDER (2-wheel steer machines AGCO Axles)

Removal

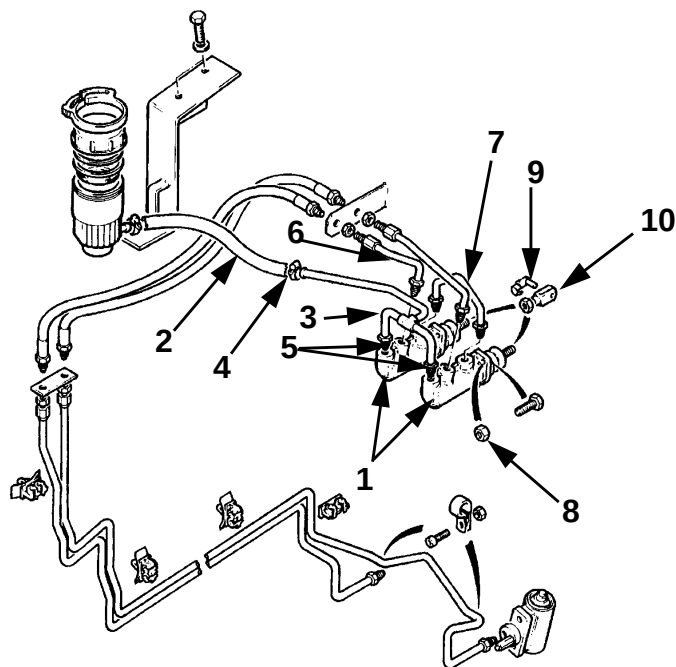
NOTE : There are two master cylinders, connected by a balance tube and compensator valves. Removal of one master cylinder is described here.

1. Park the machine on a level surface. Raise the loader and lock the support strut to hold the loader. Place blocks under the rear wells and stop the engine.
2. Open the hood.
3. Inside the cab, remove the trim panels from around the brake pedals to access the brake master cylinders (1).
4. Remove the clevis pin (9) that fastens the clevis (10) on to the master cylinder (1) to the brake pedal.
5. Clamp the flexible hose (2) between the brake reservoir and the inlet pipe assembly (3).
6. Release the hose clip (4) and pull the flexible hose (2) from the inlet pipe assembly (3).
7. Disconnect the inlet unions (5) from BOTH master cylinders (1).
8. Remove the inlet pipe assembly (3).
9. Disconnect the pipe (6) from the pressure port of the master cylinder (1) to be removed.
10. Disconnect the balance pipe (7) from BOTH master cylinders (1).
11. Remove the 2 nyloc nuts (8) and the master cylinder (1).

Installation

NOTE : The installation of the master cylinder is the reverse of the removal.

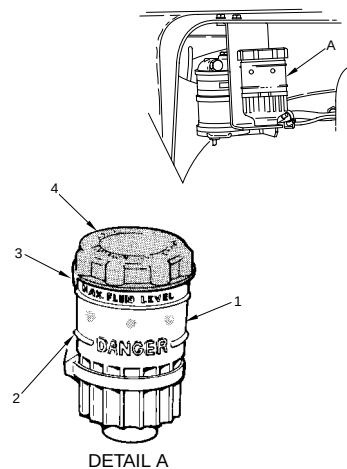
1. Set the clearance of the master cylinder push rod, so that when the brake pedal is against its return. Stop the push rod does not pre-load the brake master cylinder.
2. Replenish the brake reservoir with the correct grade of fluid.
3. Adjust the brakes.
4. Purge air from the brake system.





CHECKING THE BRAKE FLUID LEVEL (2-wheel steer machines)

1. Park the machine on firm level ground.
2. Raise the loader beam to maximum height and fit the safety support.
3. Stop the engine.
4. Open the hood.
5. Check that the fluid level is midway between the marks (2) and (3) moulded on the reservoir.
6. If required, clean the area around the cap (4) and remove the cap.
7. Fill the reservoir to midway between the marks (2) and (3) with suitable brake fluid (see section 1002). Make sure you do not overfill the reservoir (1).



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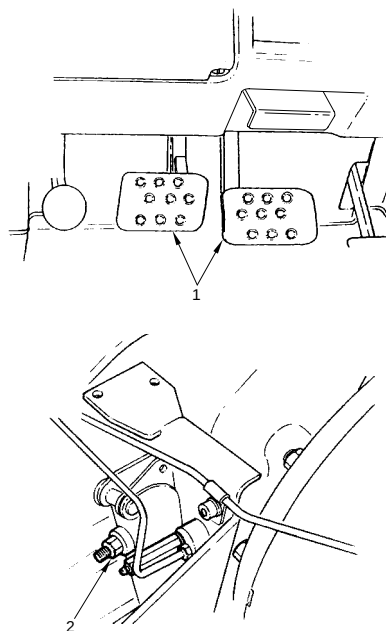
CHECKING AND ADJUSTING THE BRAKES (2-wheel steer machines AGCO Axles)

1. Park the machine on a level surface.
2. Lower the bucket until flat on the ground and loader position the shift gear lever to N (neutral) position.
3. Chock both front wheels, and release the parking brake.
4. Use the stabilizers to lift both rear wheels of the ground. Lower machine on to stands or blocks with rear wheels off clear of the ground.
5. Stop the engine.
6. Unlatch both brake pedals (1) and press firmly on each pedal in turn.
13. Use the stabilizers to lower the machine to the ground.
14. Return the stabilizer legs to the fully retracted position.
15. Do a functional test of the brakes before taking the machine on to a public highway.

NOTE : Do steps 7 through 9 if :

- The stroke of either pedal exceeds 90 mm, measured from the centre of one pedal to the centre of the other.
- Either pedal touches the trim panel.

7. Starting on one side, tighten the adjusting nut (2) by hand until the brake just locks the well.
8. Loosen the adjusting nut 1.5 turns. Make sure the well turns freely. Turn the nut clockwise to reduce brake travel and anti-clockwise to increase brake travel.
9. Repeat the procedure on the other wheel.
10. Re-latch the brake pedals.
11. Engage the handbrake.
12. Start the engine, use the stabilizers to lift the machine and remove the stands or blocks.



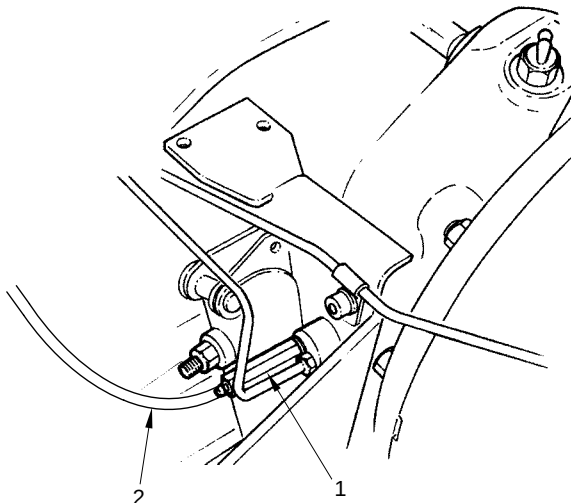
789M325A

PURGE AIR FROM THE BRAKE SYSTEM (2-wheel steer machines AGCO Axles)

NOTE : *This machine is equipped with hydraulic brakes which must be purged if any part of the brake system has been disconnected. It is important that this procedure is used to make sure of satisfactory brake operation. The brakes may be purged either manually or by using a pressurized venting kit. the procedure can only be completed by two people.*

Manual venting

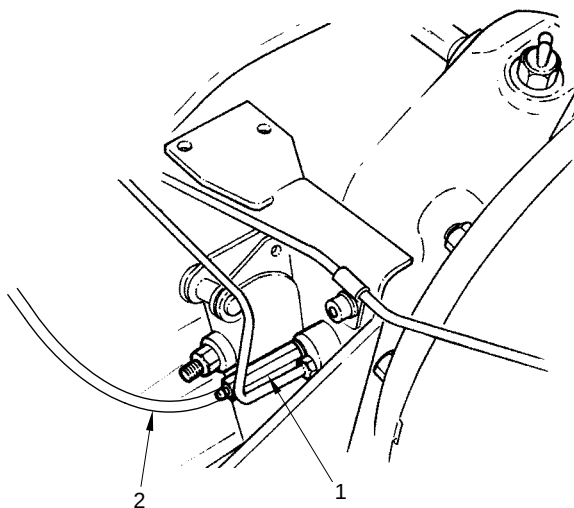
1. Park the machine on flat level ground.
2. Fully dump the loader bucket and lower it to the ground.
3. Lower the backhoe stabilizers and raise the rear wheels clear of the ground.
4. Stop the engine.
5. Ensure the brakes are adjusted correctly (see page 4).
6. Check the brake system fluid level (see page 4).
7. Fit clear plastic tubes (2) to the vent screws (1). Position the other ends of the tubes (2) to drain into suitable containers.
8. Open the left and the right vent screws (1).
9. Allow the brake fluid to drain into the containers until an air-free flow of brake fluid is obtained.
- NOTE :** *This operation may be aided by pumping the brake fluid by pressing and releasing the brake pedals. Make sure the brake pedals remain latched together and that the brake fluid in the reservoir remains above the danger mark at all times.*
10. Unlatch the brake pedals and close the left vent screw (1).
11. Press and release the right brake pedal five times.
12. Close the right vent screw (1) and open the left vent screw (1).
13. Depress the left brake pedal 12 to 15 mm and hold it in this position.
14. Press and release the right brake pedal five times or until an air-free flow of brake fluid is obtained from the left vent screw (1). Close the left vent screw (1).
15. Operate the left and the right brake pedals. Make sure the operation is firm and not "spongy".
16. Only do steps 17 through 21 if the operation of the pedals is not yet firm.
17. Press the left brake pedal.
18. Open the left vent screw (1) until the flow of brake fluid stops.
19. Close the left vent screw (1) and release the left brake pedal.
20. Do steps 17 through 19 until the left brake pedal is firm.
21. Repeat steps 17 through 20 on the right vent screw (1) and the right brake pedal.
22. Latch the left and the right brake pedals together.
23. Remove the plastic tubes (2) and the containers.
24. Check the brake system fluid level (see page 4).





Venting with pressure kit AGCO Axles

1. Park the machine on flat level ground.
2. Fully dump the loader bucket and lower it to the ground.
3. Lower the backhoe stabilizers and raise the rear wheels clear of the ground.
4. Stop the engine.
5. Ensure the brakes are adjusted correctly (see page 4).
6. Check the brake system fluid level (see page 4).
7. Fit the pressure purging kit.
8. Make sure the left vent screw (1) is closed and open the right vent screw (1). Do not operate the brake pedals.
9. Close the right vent screw (1) when the fluid exhausting vent screw is clear and free of entrapped air. Make sure the brake fluid in the reservoir remains above the danger mark at all times.
10. Depress the left brake pedal 1/2 in (12 to 15 mm).
11. Open the left vent screw (1).
12. Close the left vent screw (1) when the fluid exhausting vent screw is clear and free of entrapped air.
13. Operate the left and the right brake pedals. Make sure the operation is firm and not "spongy".
14. Only do step 12 if the operation of the brake pedals is not yet firm.
15. Repeat steps 8 through 14 until the operation of the brake pedals is firm.
16. Latch the left and the right brake pedals together.
17. Remove the plastic tubes (2) and the containers.
18. Check the brake system fluid level (see page 4).



789M297A

PARK BRAKE ADJUSTMENT PROCEDURE (Carraro Axle)

1. Loosen two Adjustment Locking Nuts (16, 17) (one full and one jam).
2. Tighten inner Adjustment Nut (16) until firm contact is made with the disc by the linings.

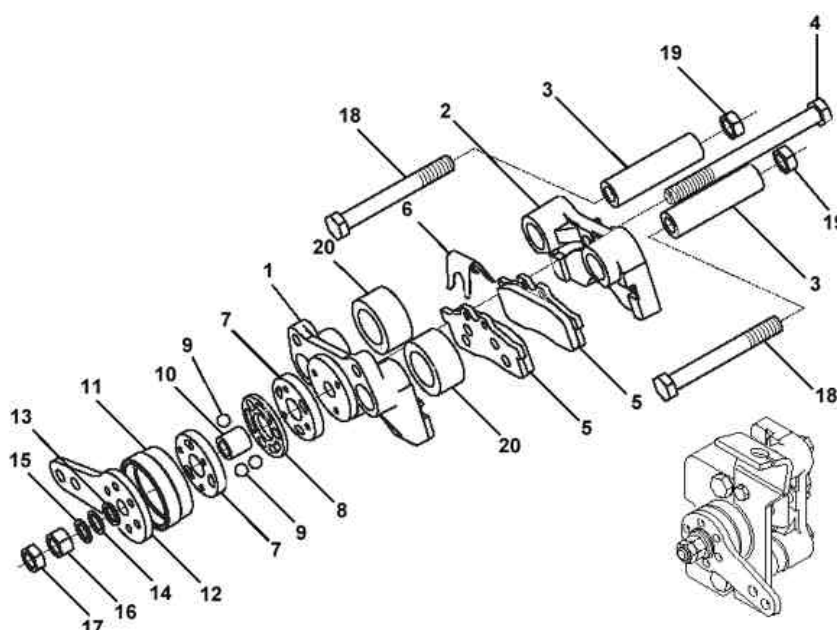
Torque to 80-120 ft lbs (110-165 Nm). Make certain lever is in proper operating position for application.

3. Back off inner Adjustment nut (16) 4 to 5 flats and check that disc is free to move.
4. Tighten outer Locking Nut (17) against inner Adjustment Nut (16) to lock Adjustment Bolt (4) in place.

Torque to 45-55 ft lbs (62-76 Nm).

ITEM NO.	DESCRIPTION
----------	-------------

- | | |
|----|------------------------------|
| 1 | TORQUE PLATE, FRONT |
| 2 | TORQUE PLATE, REAR |
| 3 | SLEEVE-MOUNTING |
| 4 | BOLT, ADJUSTING |
| 5 | LINING & CARRIER ASSEMBLY |
| 6 | SPRING |
| 7 | BI-DIRECTIONAL CAM |
| 8 | PLASTIC RETAINER |
| 9 | BALL BEARING |
| 10 | ID SEAL |
| 11 | BOOT |
| 12 | LEVER |
| 13 | THRUST WASHER |
| 14 | WASHER, STAINLESS STEEL |
| 15 | WASHER, HARDENED |
| 16 | NUT, ADJUSTMENT 1 / 2-20 |
| 17 | NUT, JAM ADJUSTMENT 1 / 2-20 |
| 18 | BOLT, MOUNTING 1 / 2-13 |
| 19 | NUT, 1 / 2-13 |
| 20 | SEAL - SLEEVE |





PARKING BRAKE ADJUSTMENT (750, 760 and 860 Versions AGCO Axle)



WARNING : Before making adjustments to the parking brake is correctly adjusted (see Section 7000).

STEP 1

Park the machine on hard level ground, lower the loader bucket to the ground and place blocks under the rear wheels.

STEP 2

Release the parking brake and stop the engine.

STEP 3

Make sure the cables (7) are correctly attached to the parking brake lever.

STEP 4

Adjust the lock nuts (1) on the cables so that the play between the end of the cable eyes (2) and the brake lever pins (3), (4) measures 1 to 2 mm.

NOTE : The cables must not be taut.

PARKING BRAKE SWITCH ADJUSTMENT (750, 760 and 860 Versions)

STEP 1

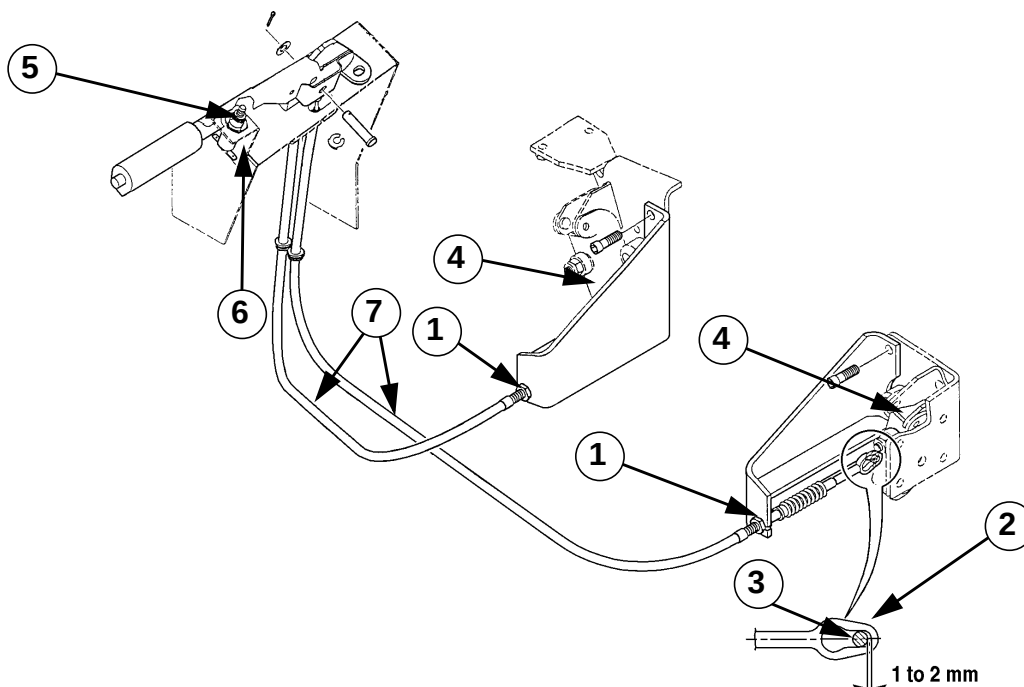
Place the parking brake in released position.

STEP 2

Tighten the contactor (5) in the plate (6) until the contactor plunger is completely compressed.

STEP 3

Loosen the contactor two complete turns and then lock it in this position.



CI98F510

- 1. Lock nut
- 2. Eyes
- 3. Pin
- 4. Brake lever

- 5. Contactor
- 6. Plate
- 7. Cable

SECTION 8 BACKHOE FUNCTIONS



Danfoss Backhoe Control Valve

End Module

The control valve module of the backhoe control valve houses the following valves:

1. Inlet compensator spool - 175-230 PSI (12-16 bar).
2. Full flow main relief valve - 3250 PSI (225 bar) @ 1800 rpm.
3. Pilot valve for main relief valve - 3250 PSI (225 bar) @ 1800 rpm.
4. Return line back pressure valve – 500-725 PSI (35-50 bar).
Back pressure fully removed when pressure in the pressure gallery is 1160-1450 PSI (80-100 bar).
5. Pilot supply valve – 175 – 230 PSI (12 – 16 bar).
6. Pilot supply valve safety valve – 265 PSI (18 bar).

4 Spool Monoblock

This controls the following functions:

Slew. Contained within the slew circuit are two relief valves set at 3500 PSI (240 Bar), two anti-cavitation valves, a compensated check valve in the pressure gallery and a load sense valve.

Boom. Contained within the boom circuit are two relief valves set at 3500 PSI (240 Bar), (piston side) 4500 PSI (310 Bar)(rod side), two anti-cavitation valves, a check valve in the pressure gallery and a load sense valve.

Dipperstick. Contained within the dipper circuit are two relief valves set at 4000 PSI (265 Bar) (piston side) 4200 PSI (280 Bar) (rod side), two anti-cavitation valves, a check valve in the pressure gallery and a load sense valve.

Bucket. Contained within the bucket circuit are two shock valves set at 4200 PSI (280 Bar), two anti-cavitation valves, a check valve in the pressure gallery and a load sense valve.

Note: All shock valves are factory set and none adjustable.

3 Spool Monoblock

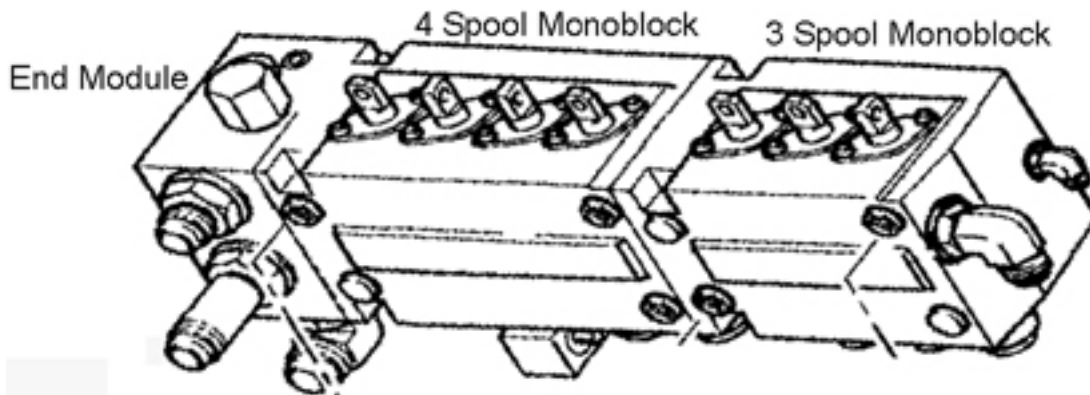
On both electronic and mechanical machines the 3-spool valve is mechanically operated.

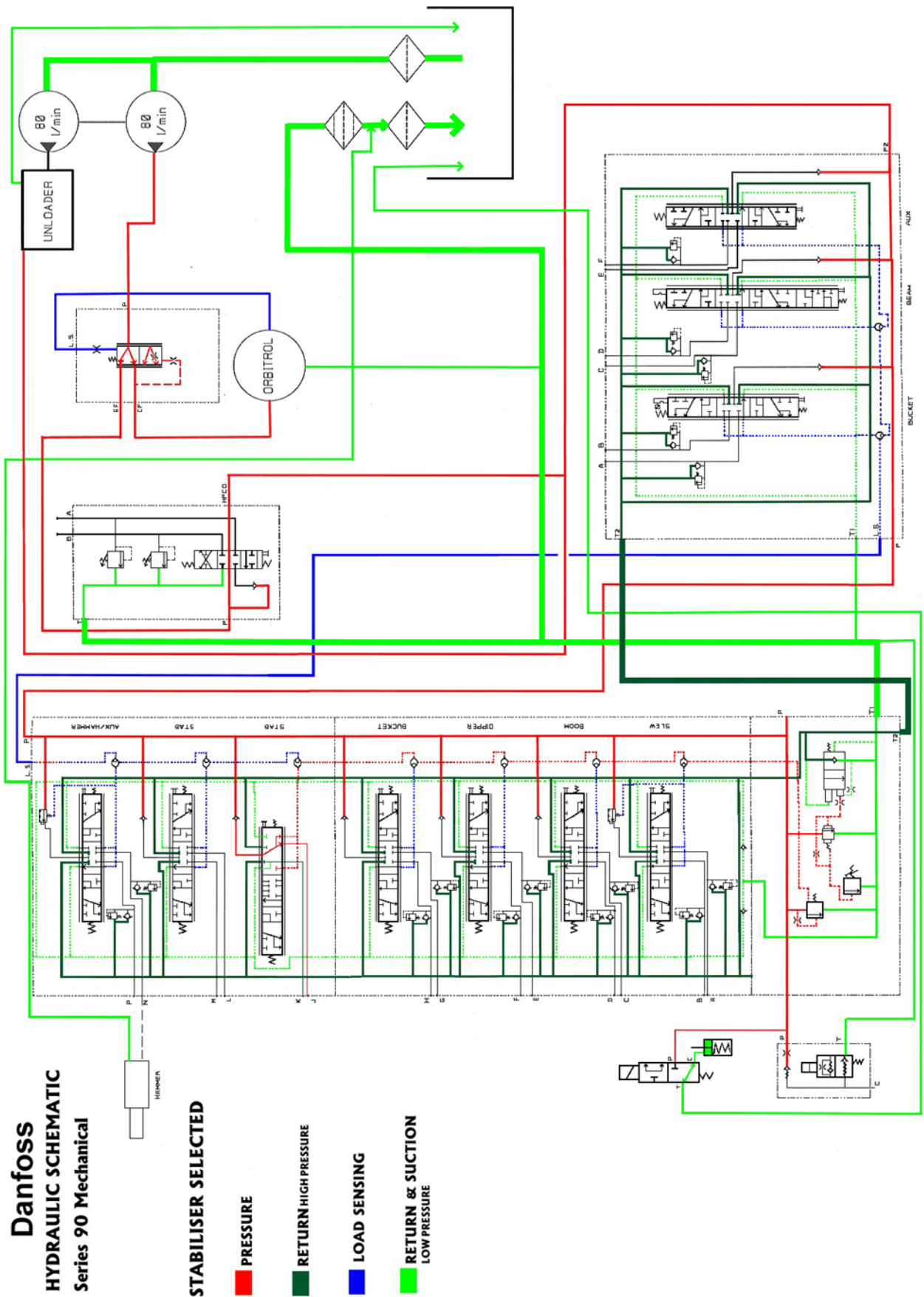
This contains the following functions:

Left hand Stabilizer. Contained within this circuit are a check valve and a load sense valve in the pressure gallery. No shock valves are fitted.

Right hand Stabilizer. Contained within this circuit are a check valve and a load sense valve in the pressure gallery. No shock valves are fitted.

Auxiliary (Dipper Extend/Retract and Hammer). Contained within this circuit are two relief valves set at 2300 PSI (190 Bar), two anti-cavitation valves, a compensated check valve in the pressure gallery and a load sense valve.





HUSCO HYDRAULIC CIRCUIT 750,760,860 BACKHOE VALVE

GENERAL DESCRIPTION. (NEUTRAL FLOW)

Oil is drawn from the Hydraulic Reservoir through a 125 Micron Suction Strainer into the Tandem Gear Type Pumps.

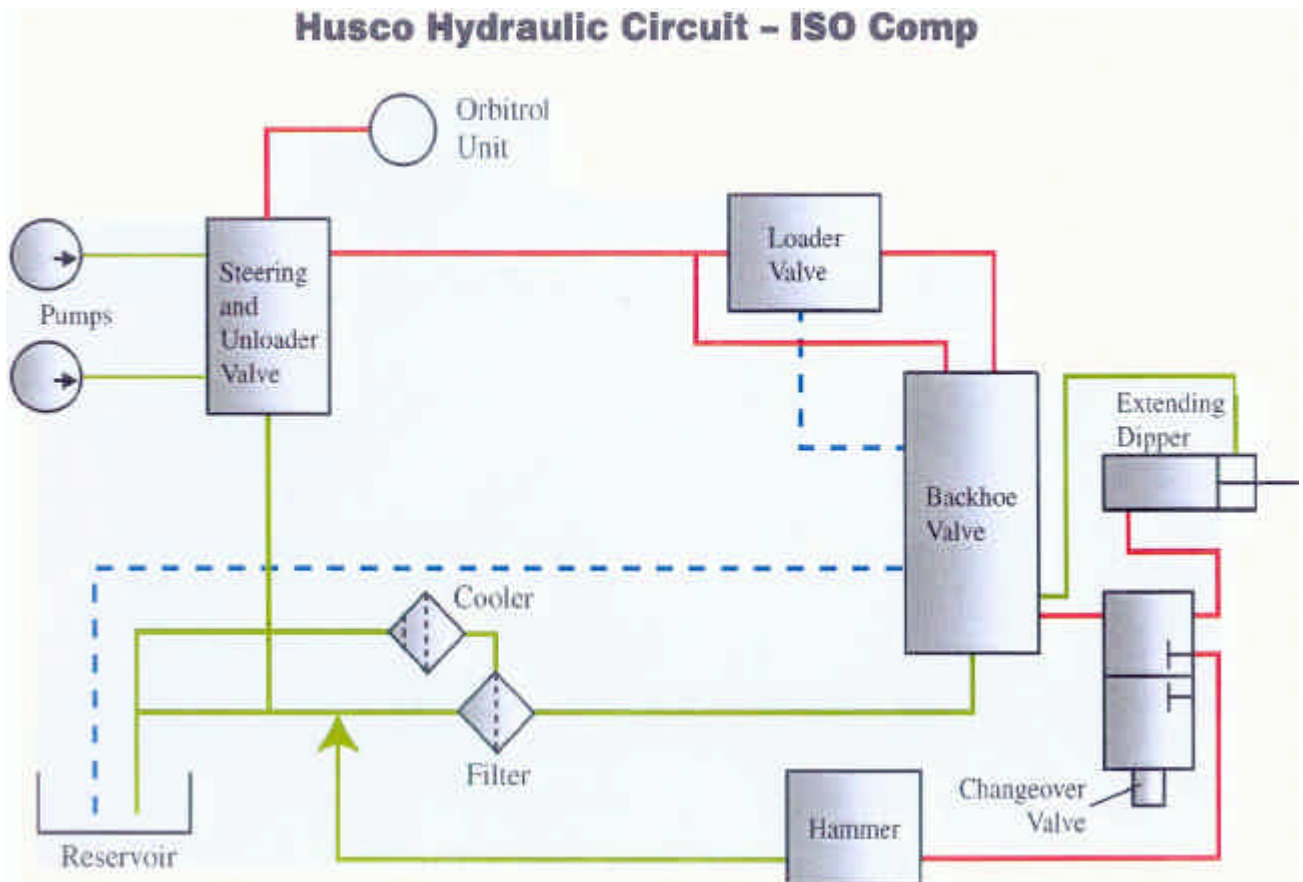
Oil from the inner Pump flows to the Steering Flow Priority Valve Mounted on the Chassis. If the closed centre Steering Orbitrol Unit is in neutral the oil is automatically directed to the Loader Control Valve. As oil enters the control Valve the flow is restricted by a bypass compensating Spool which is in the closed position, at this point the pressure begins to rise & opens the Spool against a 20 Bar rated spring allowing the oil to enter the Block.

The open centre Loader Control Valve is a three spool monobloc which supplies oil to the Loader Beam / Bucket & 7 in 1 Bucket (If fitted). On machines fitted with standard Loader Buckets the ports of the Center Spool are blanked off.

If all the Spools are in the neutral position the oil flows through the open centre of the Loader Valve to the Backhoe Control Valve.

Oil from the outer Pump flows through to the new Unloader Valve mounted on the Chassis where it joins the flow from the outer pump to the Loader Control Valve.

The 7 Spool Backhoe Monobloc Control Valve is of the closed centre type. If all Spools are in the neutral position oil passes through a parallel Gallery Via a return line 6 Bar rated check valve through the Return Line Filter & Cooler back to Tank.



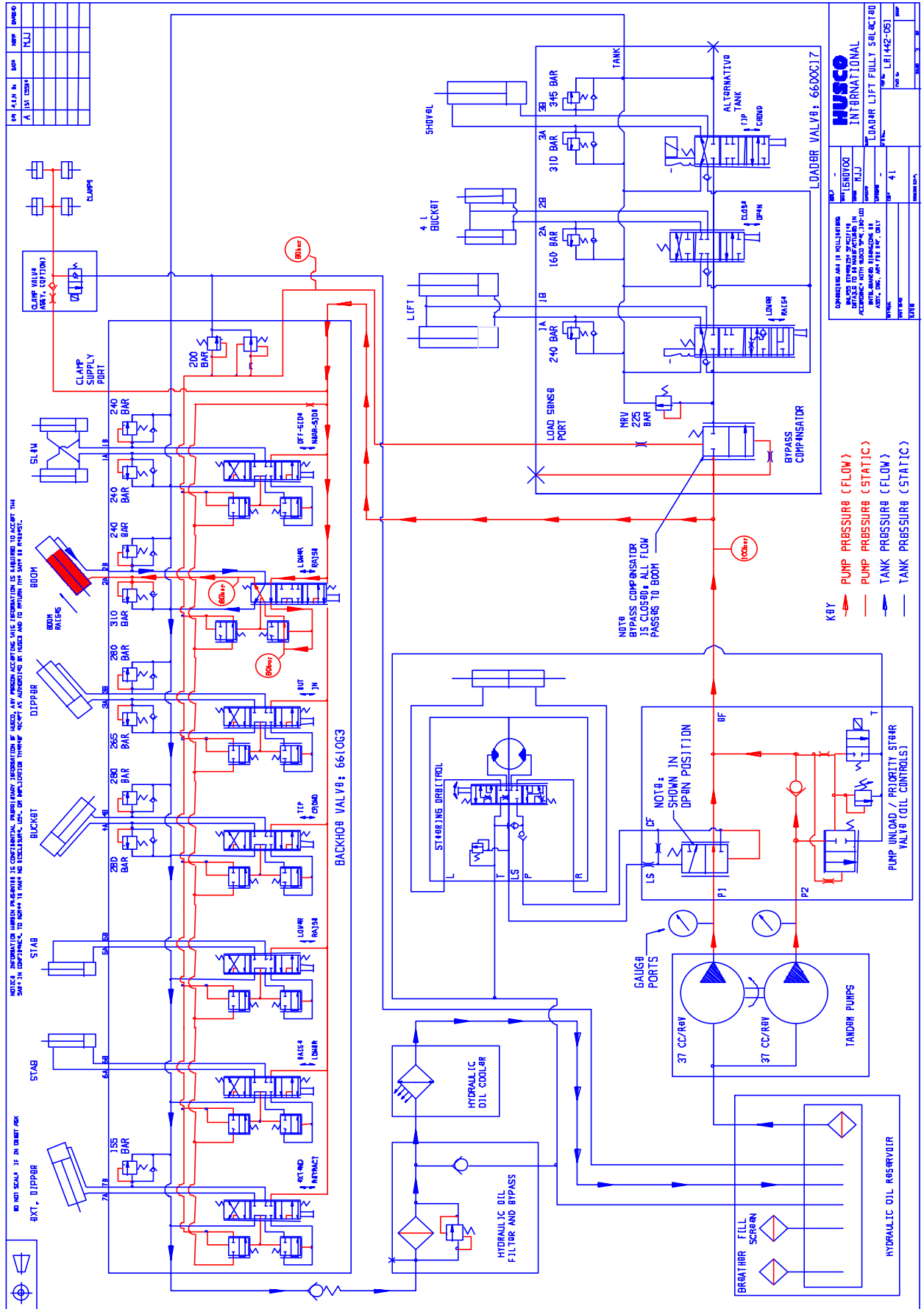
HYDRAULIC CIRCUIT (BACKHOE BOOM SPOOL SELECTED).

The Husco Isocomp Backhoe Control is a Closed Center, Load Sensing, Flow Sharing 7 Spool Valve. The Monobloc Valve features Pressure Compensation on each Spool, compared to the Danfoss Valve with Pressure Compensation on the Slew Section only. By locating the Pressure Compensators after the Spool it allows flow to all Backhoe Services during multi – function operation to keep the cylinders working together.

In this example a Spool has been selected to raise the Backhoe Boom, on selection of the Spool Load Sense Pressure is relayed via a small-bore hose to the spring side of the Bypass Compensator in the Loader Control Valve. The Load Sense Pressure plus Spring Pressure closes off the Bypass Compensator diverting the flow from both pumps directly to the Backhoe Control Valve. The flow then opens the Pressure Compensator allowing the oil to flow between the Lands of the Boom Spool to the Rod side of the Boom Cylinder.

Oil from the head side of the Cylinder flows through the return gallery of the Valve via the 6 Bar Check Valve through the Return Line Filter & Cooler back to Tank.

Machine Circuit Diagram: Backhoe Boom Selected to Raise



DO NOT SCALE
IF IN DOUBT ASK

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IS CONFIDENTIAL PROPRIETARY INFORMATION
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TRADE OF HUSCO. ANY PERSON ACCEPTING
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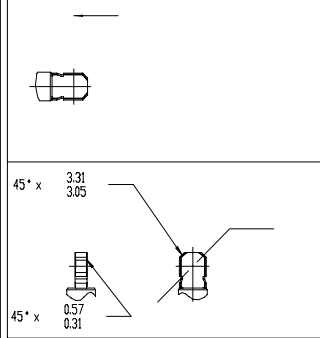
THIS INFORMATION IS REQUIRED TO ACC
CREDIT AND TO RETURN THE SAME ON REQUEST

EXCEPT THE
FOLLOWING

FERREX SPECIFICATION

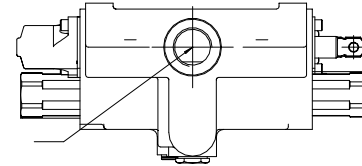
- A** 54130-1 RELIEF VALVE /ANTI VOID
SET TO 240 BAR (3500 PSI) AT 10 L/min (2.5 US/GPM)
TORQUE PER HUSCO SPEC 804-102 (3 PLACES)
- B** 54130-2 RELIEF VALVE /ANTI VOID
SET TO 310 BAR (4500 PSI) AT 10 L/min (2.5 US/GPM)
TORQUE PER HUSCO SPEC 804-102 (1 PLACE)
- C** 54130-1 RELIEF VALVE /ANTI VOID
SET TO 265 BAR (3845 PSI) AT 10 L/min (2.5 US/GPM)
TORQUE PER HUSCO SPEC 804-102 (1 PLACE)
- D** 54130-2 RELIEF VALVE /ANTI VOID
SET TO 280 BAR (4060 PSI) AT 10 L/min (2.5 US/GPM)
TORQUE PER HUSCO SPEC 804-102 (3 PLACES)
- E** 54130-13 RELIEF VALVE /ANTI VOID
SET TO 155 BAR (2250 PSI) AT 10 L/min (2.5 US/GPM)
TORQUE PER HUSCO SPEC 804-102 (1 PLACE)
- F** 56903 DRAIN REGULATOR ASSY.
SET TO 200 BAR (2900 PSI) AT 10 L/min (2.5 US/GPM)
TORQUE PER HUSCO SPEC 807-107 (1 PLACE)

TANG DETAILS



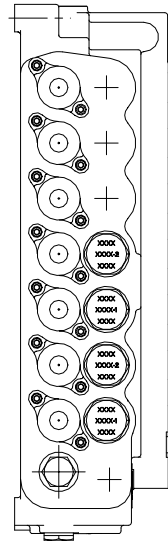
TANK OUTLET (1)
1 5/16"-12 UN-2B

O-RING PORT



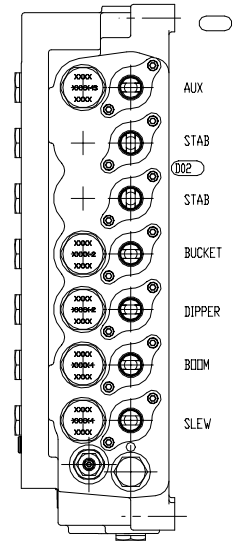
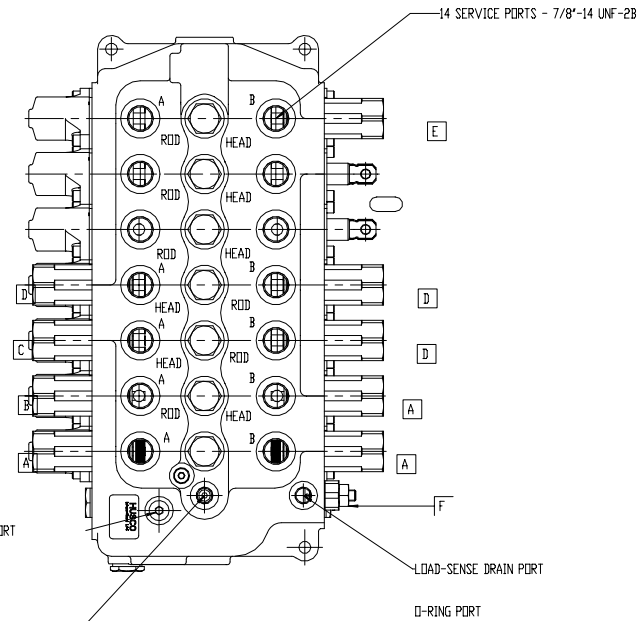
FERREX SPECIFICATION

PART NO. SEE TABLE
PUMP OUTPUTS: P1 60 L/MIN
P2 80 L/MIN
LOAD-SENSE RELIEF VALVE SETTING ADJUSTABLE
THROUGH RANGE 170-250 BAR
OPERATING TEMPERATURE: -20 TO +100°C
OIL TYPE: ISO 46
CENTRING SPRINGS ARE ADEQUATE TO RETURN
SPOOLS TO NEUTRAL AT 225 BAR AND 160 L/MIN

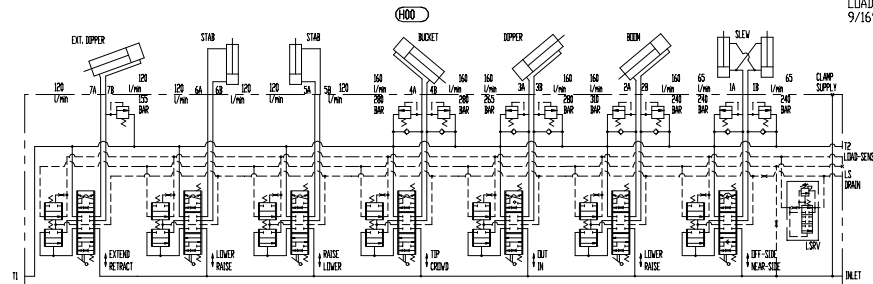


F03
CLAMP SUPPLY PORT

LOAD SENSE PORT
9/16"-18 UNF-2A



AUX
STAB
STAB
BUCKET
DIPPER
BOOM
SLEW



DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED DETAILS TO BE MANUFACTURED IN ACCORDANCE WITH HUSCO SPEC 100-01 UNLESS OTHERWISE SPECIFIED ON ASSY. DWG. ARE FOR REF. ONLY				SCALE 1:4 DATE 3/10/10 DRAWN BY JPS CHECKED BY N.J.J. APPROVED BY N.J.J. MATERIAL - HEAT TREAT - PLATING -				HUSCO <i>International Ltd.</i> CONTROL VALVE ASSY PART NO. AR1442-018 REVISED BY MGS 6610G3					
DATE	3/10/10	DATE	3/10/10	DATE	3/10/10	DATE	3/10/10	DATE	3/10/10	DATE	3/10/10	DATE	3/10/10
BY	JPS	BY	JPS	BY	JPS	BY	JPS	BY	JPS	BY	JPS	BY	JPS
CHECKED	N.J.J.	CHECKED	N.J.J.	CHECKED	N.J.J.	CHECKED	N.J.J.	CHECKED	N.J.J.	CHECKED	N.J.J.	CHECKED	N.J.J.
APPROVED	N.J.J.	APPROVED	N.J.J.	APPROVED	N.J.J.	APPROVED	N.J.J.	APPROVED	N.J.J.	APPROVED	N.J.J.	APPROVED	N.J.J.
MATERIAL	-	MATERIAL	-	MATERIAL	-	MATERIAL	-	MATERIAL	-	MATERIAL	-	MATERIAL	-
HEAT TREAT	-	HEAT TREAT	-	HEAT TREAT	-	HEAT TREAT	-	HEAT TREAT	-	HEAT TREAT	-	HEAT TREAT	-
PLATING	-	PLATING	-	PLATING	-	PLATING	-	PLATING	-	PLATING	-	PLATING	-

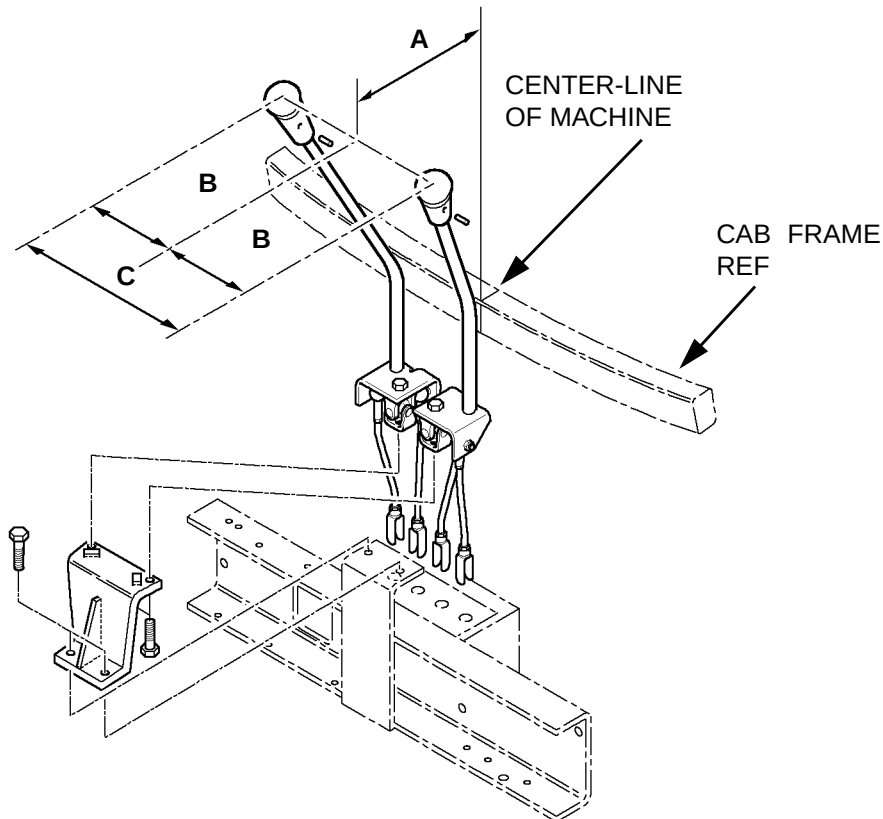
BACKHOE CONTROL LEVER ADJUSTMENT

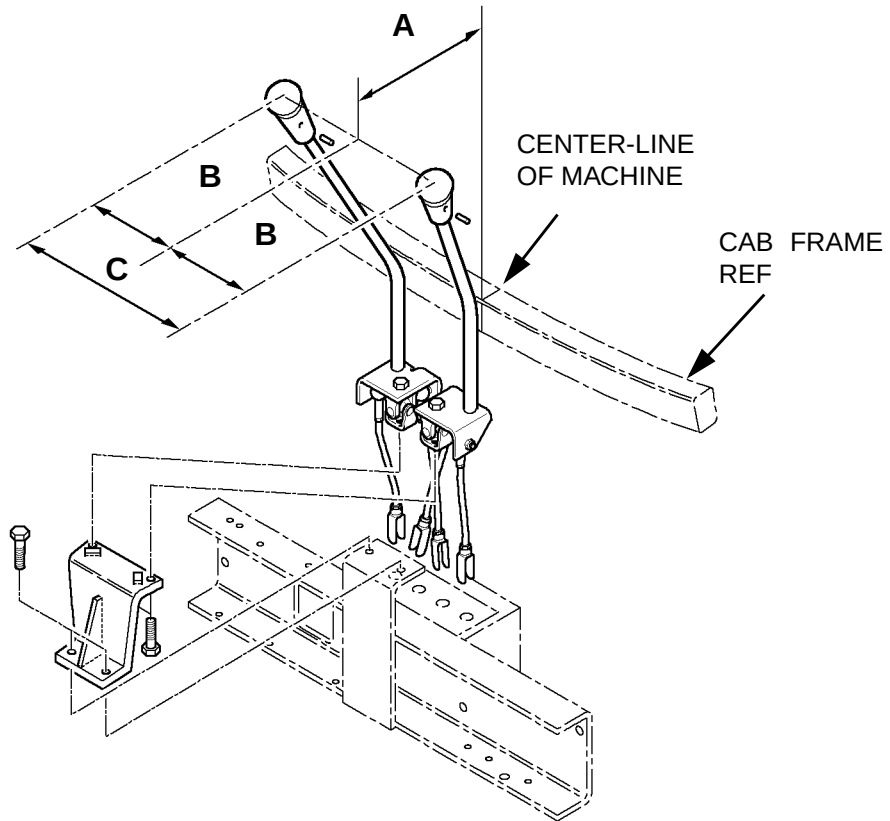
Adjustment procedure

1. Park the machine on a level surface.
2. Switch off the engine.
3. Check that the distance from the cab frame to the top of the backhoe control levers corresponds to A.
4. Check that the distance between the top of each backhoe control lever and the centre line of the machine corresponds to B.
5. Adjust the control rods at the backhoe valve assembly until the distances are correct.

Version	A	B	C
Standard mm (in)	10 in (254mm)	5.65 in (143.5mm)	11.3 in (287mm)
I.S.O. mm (in)	10 in (254mm)	5.65 in (143.5mm)	11.3 in (287mm)
X Pattern mm (in)	9.88 in (251mm)	6.04 in (153.5mm)	12.08 in (307mm)

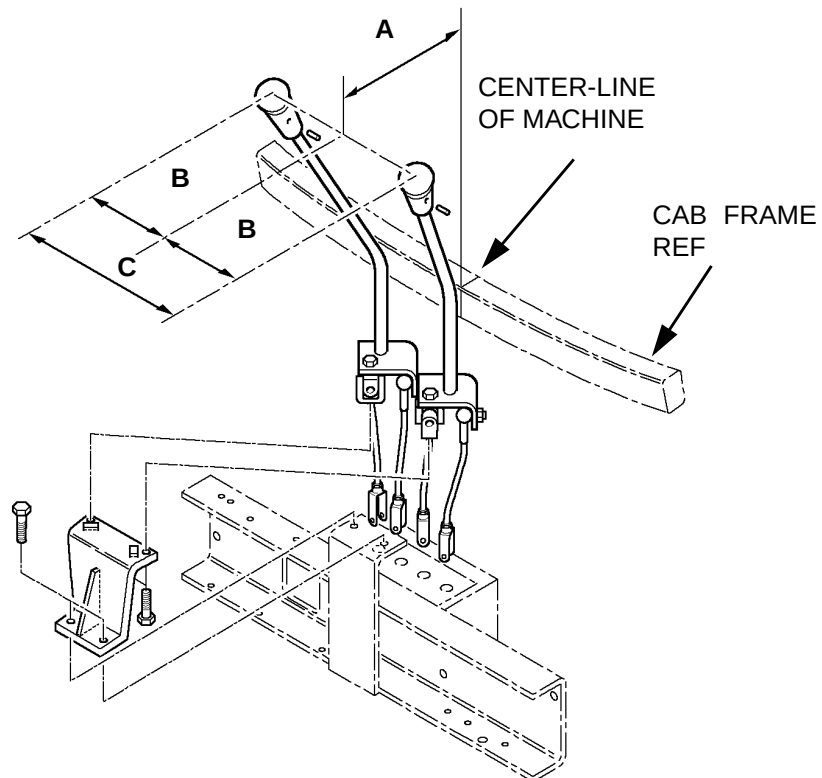
Standard SAE version





CI98G530

X Pattern Version

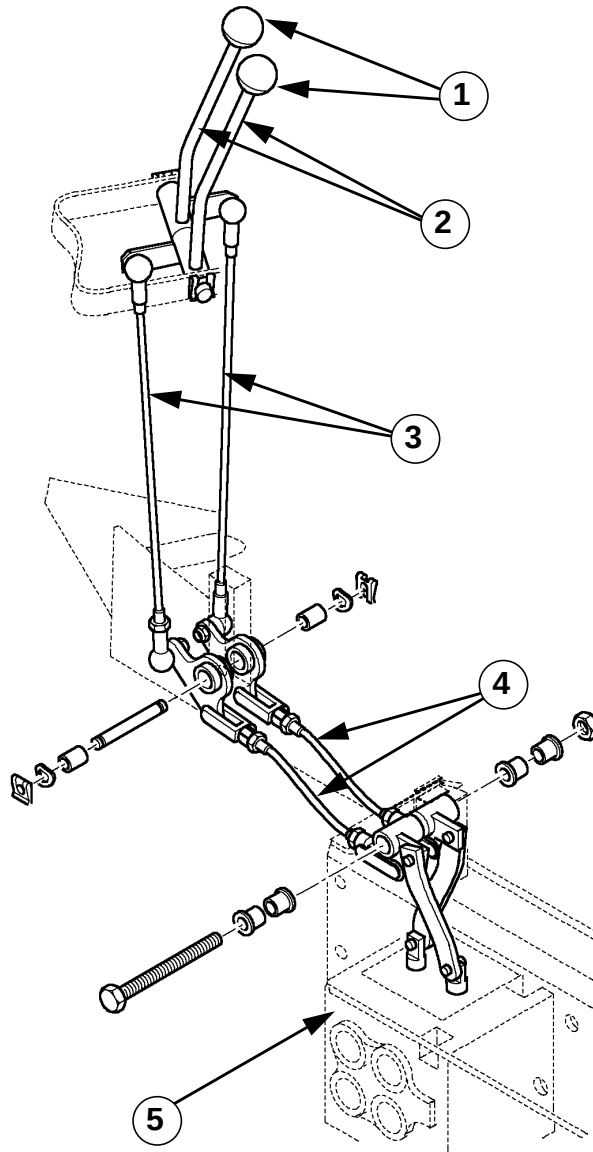


CI98F511

STABILIZER CONTROL LEVER ADJUSTMENT

Adjustment procedure

1. Park the machine on a level surface.
2. Switch off the engine.
3. Make sure that both stabilizer control levers are vertical and that the knobs are in line.
4. Adjust the connecting rods located behind the left side trim panel to make the control levers vertical or to align the knobs.
5. Operate each stabilizer control lever over its full range of movement. Make sure that the relevant spool on the backhoe valve operates over its full stroke.
6. If the stroke of the spool is not correct, adjust the length of the appropriate rod assembly at the backhoe valve.

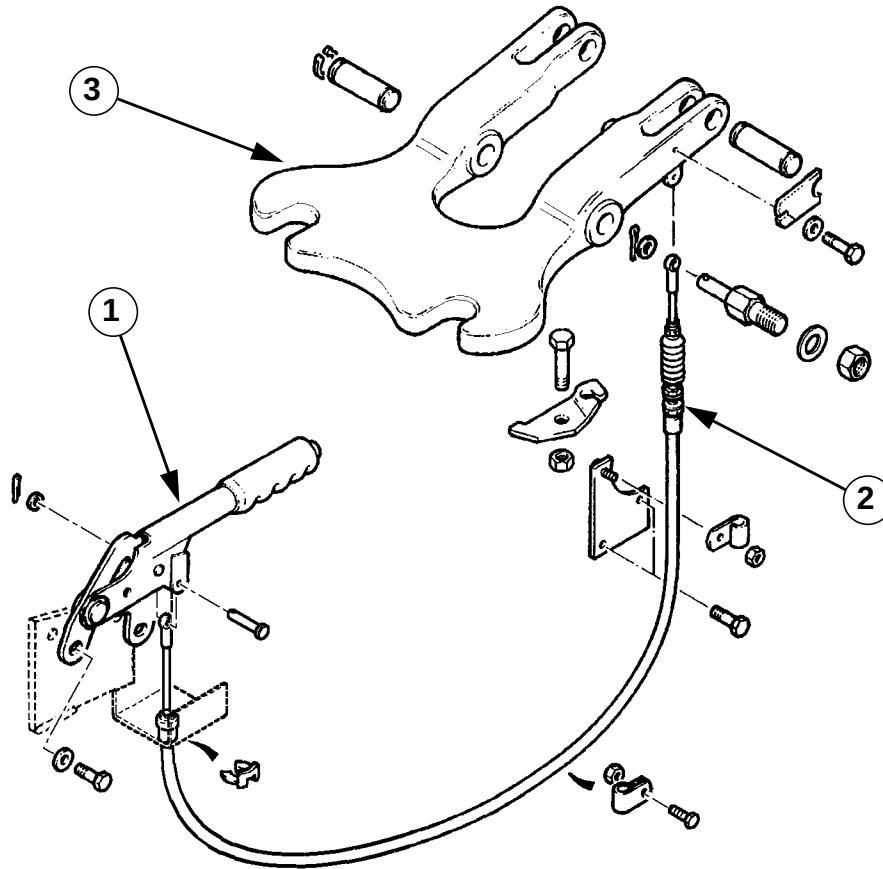


- | | |
|-----------------------------|------------------|
| 1. Knob | 4. Rod assembly |
| 2. Stabilizer control lever | 5. Backhoe valve |
| 3. Connecting rod | |

CI98F512

BOOM LATCH CABLE ADJUSTMENT

1. Make sure the cable is correctly fixed to the boom latch control lever (1).
2. Adjust the cable sheath stop (2) on the latch side of the boom, so the cable is slightly slack.
3. Try the boom latch a few times. If the catch (3) does not engage in its housing, slacken the cable by moving the cable sheath stop (2) towards the boom.



1. Boom latch control lever
2. Sheath stop

3. Catch

CI98F514

CHECKING AND ADJUSTING THE EXTERNAL WEAR PADS

Check and adjust the top and bottom bearing pads

1. Position the dipperstick so that the inner section is extended approximately 12 inches (300 mm) and is resting on the bottom bearing pad (11).
2. Remove the eight bolts (1), the spacers (13) and the top plate (2).
3. Slide out the old bearing pad (12) and replace it with a new one.
4. Install the plate (2), the spacers (13) and the bolts (1). Torque the bolts (1) to 100 ft lbs (140 Nm).
5. Lower the dipperstick until the bucket contacts the ground so that the inner telescopic section is pressed against the top bearing pad.
6. Remove the three bolts (9) and the retainer plate (8).
7. Remove the bottom bearing pad (11) and shims (10).
8. Install a new bearing pad (11) and adjust the shim thickness to give a maximum gap of less than 1 mm.

NOTE : Shims (10) = .020 in (0,5 mm), .040 in (1mm), .080 in (2 mm) and .160 in (4 mm) thickness.

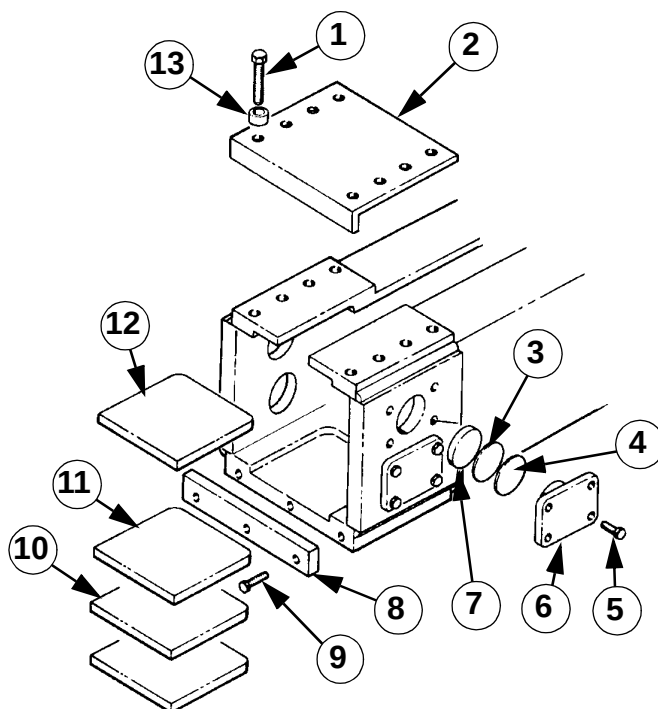
9. Install the retainer plate (8) and torque tighten the bolts (9) to 100 ft lbs (140 Nm).

Check and adjust the side wear pads

1. Remove the bolts (5), the housings (6), the shims (3) and (4) and the bearing pads (7).
2. Assemble a 1 mm shim (4), a 2 mm shim (3) and a new bearing pad (7) in the two housings (6).
3. Assemble the housings (6) on one side of the dipperstick housing with the bolts (5).
4. Push the inner section hard against the bearing pads just fitted.
5. Install two new bearing pads into the remaining housings (6).
6. Install the housings (6) to the opposite side of the outer section. Install and partially tighten the bolts (5).
7. Measure the clearance between the inner section and the bearing pads.
8. Remove the housings assembled in step 14 and add shims (3) and (4) behind the bearing pads (7) to achieve a total clearance between the bearing pads and the inner section of less than 1 mm.

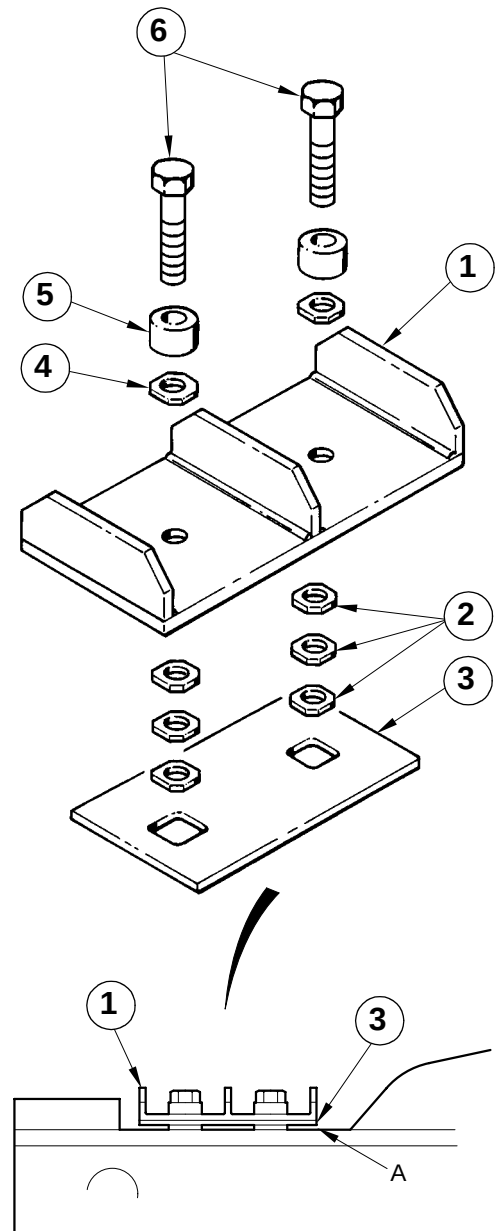
NOTE : Use the thickest shims available and put the thin shim in the housing (6). Shims are .040 in (1mm), or .080 in (2 mm) thickness.

9. Install and torque bolts (5) to 45 ft lbs (60 Nm).



CHECKING AND ADJUSTING THE UPPER WEAR PAD

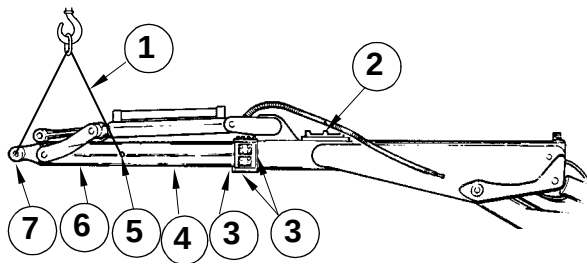
1. Position the digger to full reach and 3/4 extension of the extending dipperstick, but with the bucket 2 inches (50mm) off ground. Any wear will show as a gap between the outer wear pad (3) and the dipperstick. A maximum gap of .040 inch (1 mm) is permitted at A.
2. If adjustment is necessary, release both bolts (6) and remove the spacers (5) and the spare shims (4).
3. Remove the cover plate (1) and the second set of shims (2) which must be equally reduced in thickness to compensate for the measured wear. Use the spare shims removed at step 2 to obtain the correct shim thickness.
4. Install the cover plate (1) the spare shims (4), the spacers (5) and the bolts (6). Torque tighten the bolts (6) to 500 ft lbs (670 Nm).



789M395A

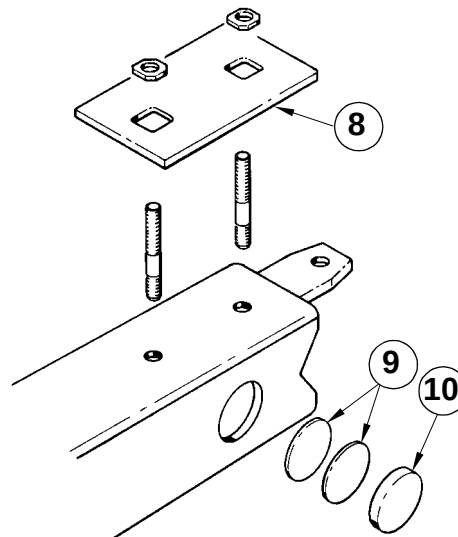
CHECKING AND ADJUSTING THE INTERNAL WEAR PADS

1. Remove the bucket, the bucket linkage and the bucket cylinder from the external dipperstick.
2. Lower the boom and the dipperstick until they are horizontal and extend the dipperstick 3/4 out.
3. Remove the external wear pads from the front end of the dipperstick (top pad, bottom pad and four side panels).
4. Extend the inner section (6) fully and remove the circlips from the extension cylinder (5). Drive out the pin with the soft metal bar.
5. Remove the bolts on the upper bearing (2), and remove the spacers, the spare shims and the retaining plate.
6. Support the inner section (6) by means of a chain sling (1) and bars inserted through the bucket ramm mounting hole (5) and the bucket pivot pin hole (7). Slide the inner section out of the dipperstick.



789M396A

7. Remove the wear pads (8) and (10) and the shims (9) from the sides and the top, at the rear of the dipperstick inner section.
8. With no shims, fit two new wear pads (10) into each side of the inner section and measure the width over the wear pad faces. This is dimension A.



789M397A

9. Measure the internal width of dipperstick outer section. This Dimension B. The thickness of the shims (9) required = (Dim. B minus Dim. A) minus .020 to .040 inch (0.5 to 1 mm.) Shims (9) must be divided equally and placed under the side wear pads (10). (.040 in (1mm) gap allowed) A smear of heavy grease in them during will help retain assembly.
10. Install a new, top rear, wear pad (8) over the two studs and the spacers.
11. Install the inner section (4) in the dipperstick.
12. Align the cylinder rod eye and fit the pin and circlip (5).
13. Assemble the top, bottom and side view pads. (See page 18).
14. Install the bucket cylinder, the bucket linkage and the bucket.



REMOVAL AND INSTALLATION OF THE STABILIZER HYDRAULIC CYLINDER (Centermount machines)

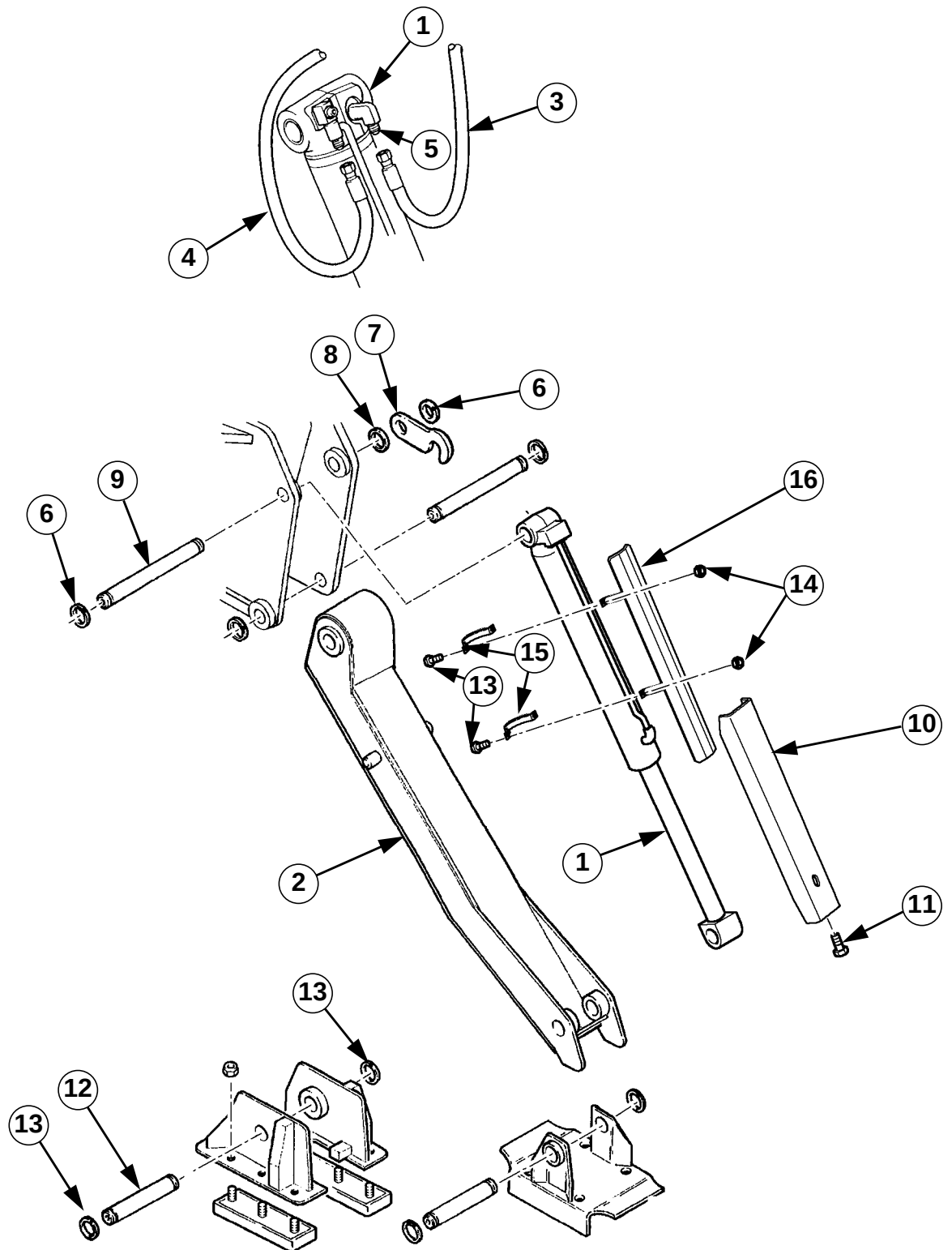
This information is applicable to a left-hand stabilizer hydraulic cylinder. The procedure for a right-hand stabilizer hydraulic cylinder is identical.

1. Park the machine on firm, level ground and lower the stabilizer legs (2). Make sure the machine is not raised from the ground.
2. Release the pressure from the hydraulic system
3. Place a suitable container below the hydraulic lines and connections.
4. Disconnect the flexible hoses (3) and (4) from the adaptors (5). Put caps on the flexible hoses (3) and (4) and the adaptors (5).
5. Remove the circlips (6), the hook (7) and the washer (8) from the upper pin (9).
6. Support the stabilizer hydraulic cylinder (1) at its upper eye with suitable lifting equipment.
7. Use a soft metal drift to remove the upper pin (9).
8. If fitted, remove the bolts (11) and the rock guard (10).
9. Remove the circlips (13) from the lower pin (12).
10. Use a soft metal drift to remove the lower pin (12).
11. Remove the stabilizer hydraulic cylinder (1) from the stabilizer leg (2).
12. Only carry out Step 13 if you install a replacement stabilizer hydraulic cylinder (1) on machine.
13. If fitted, remove the bolts (13), the nuts (14), the clamp bracket (15) and the guide (16) from the stabilizer hydraulic cylinder (1).

NOTE : *The installation of the stabilizer hydraulic cylinder is in the reverse order from that of removal.*

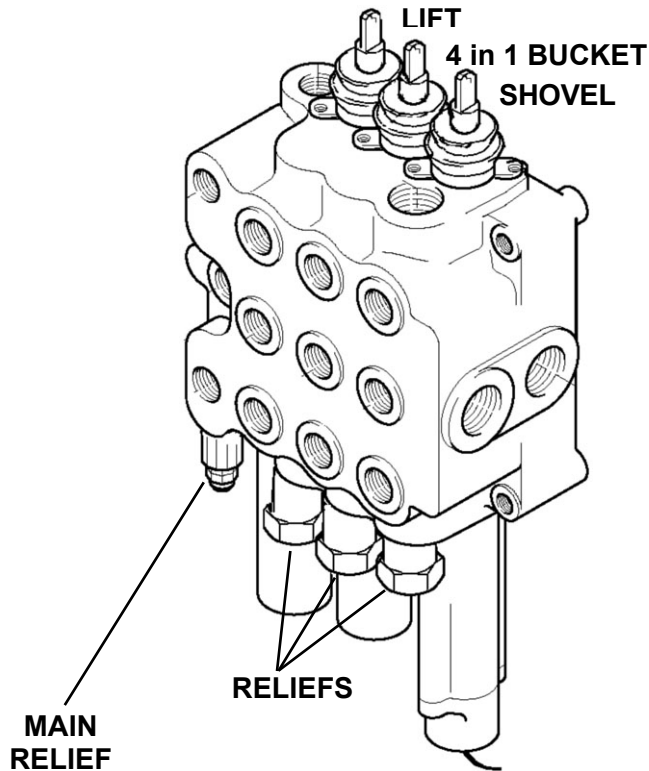
NOTE : *After installation, replenish the hydraulic system.*

NOTE : *After installation, carry out an operational test of the stabilizer hydraulic cylinder (1). Make sure that there are no leaks from the hydraulic lines and connections that have been disturbed.*



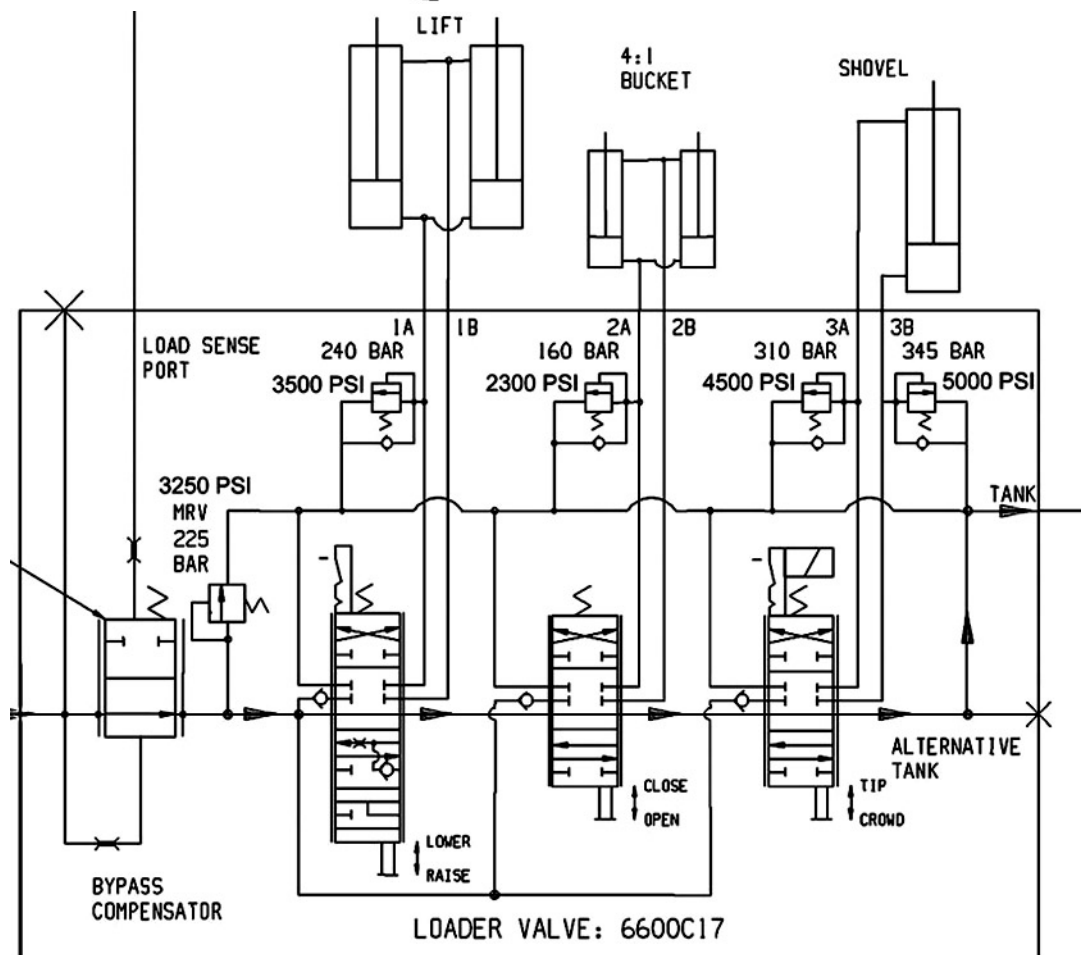
SECTION 9 LOADER FUNCTIONS





The open center Loader Control Valve is a three spool Monoblock which supplies oil to the Loader Beam / Shovel & 4 in 1 Bucket (If fitted). On machines fitted with standard Loader Buckets the ports of the Center Spool are blanked off.

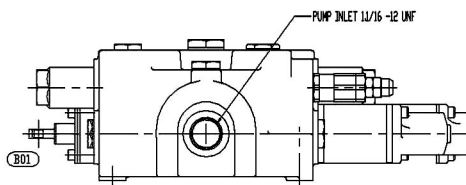
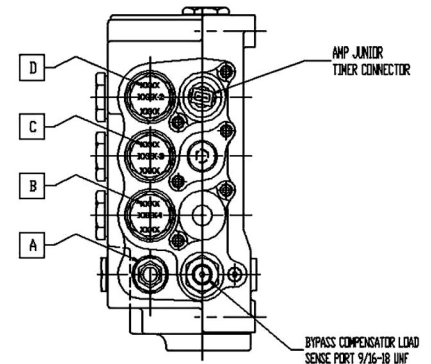
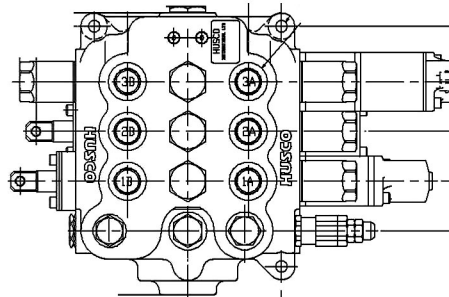
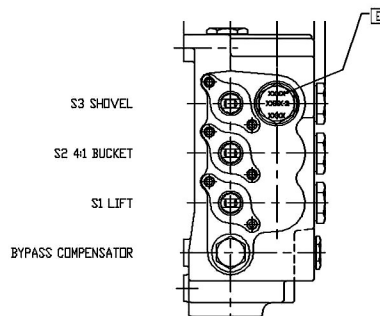
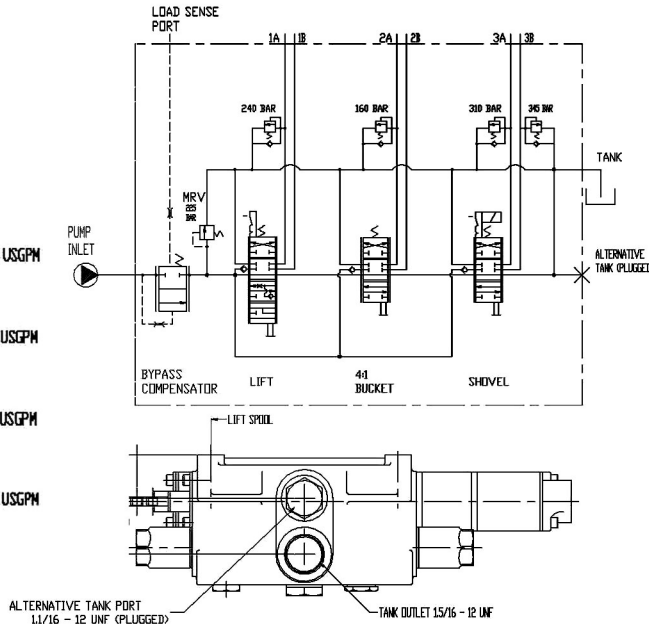
If all the Spools are in the neutral position the oil flows through the open center of the Loader Valve to the Backhoe Control Valve.



Husco Loader Valve

FERMEC SPECIFICATION

- A** MAIN RELIEF VALVE SET
TO 225-0+8 BAR (3260-0+116 PSD)
AT 80 L/MIN (21 USGPM)
TORQUE PER HUSCO SPEC 804-202
- B** RELIEF VALVE / ANTI VOID
SET TO 240 BAR (3480 PSD) AT (10 L/MIN) 2.5 USGPM
TORQUE PER HUSCO SPEC 804-102
- C** RELIEF VALVE / ANTI VOID
SET TO 160 BAR (2320 PSD) AT (10 L/MIN) 2.5 USGPM
TORQUE PER HUSCO SPEC 804-102
- D** RELIEF VALVE / ANTI VOID
SET TO 310 BAR (4500 PSD) AT (10 L/MIN) 2.5 USGPM
TORQUE PER HUSCO SPEC 804-102
- E** RELIEF VALVE / ANTI VOID
SET TO 345 BAR (5000 PSD) AT (10 L/MIN) 2.5 USGPM
TORQUE PER HUSCO SPEC 804-102



FERMEC SPECIFICATION

PART No: 6105963 M93
PUMP OUTPUT: P1 160 L/MIN (MAX)

MAIN RELIEF VALVE SETTING ADJUSTABLE
THROUGH THE RANGE 172 BAR TO 240 BAR
WITH -0/+6 BAR TOL. AT MAX PUMP FLOW

OPERATING TEMPERATURE: -20 °C TO 100 °C
OIL TYPE: ISO 46

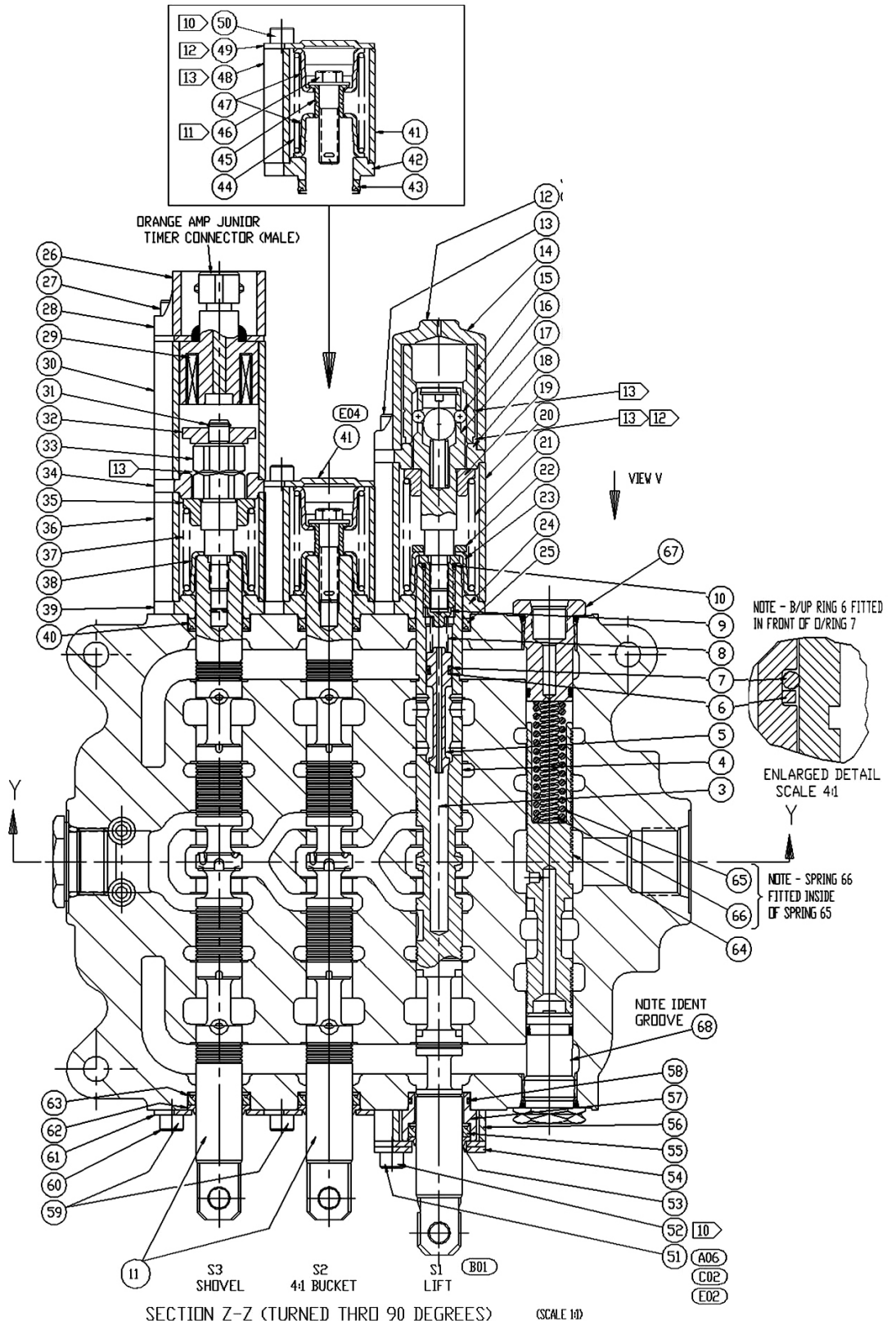
CENTERING SPRINGS ARE ADEQUATE TO RETURN
SPOOLS TO NEUTRAL AT 160 L/MIN & 207 BAR

SPOOL NUMBER	S3	S2	S1
SPOOL SERVICE	SHOVEL	41 BUCKET	LIFT
SPOOL TYPE	B (DOUBLE) (OIL DETENT)	B (DOUBLE) (OIL SPRINGS)	F (FLOAT) (OIL DETENT)
SPOOL POSITIONING SERVICE PORTS	2B HEAD	2A HEAD	1B HEAD
TYPE	DIRECT	DIRECT	DIRECT
SETTING FLOW	25 USGPM	25 USGPM	25 USGPM
SETTING PRESS	5000 PSI	4495 PSI	3480 PSI
MAKE UP CHECKS	YES	YES	YES
SPOOL MOVEMENT	8.74 (.344") IN & OUT	8.74 (.344") IN & OUT	NEUTRAL-FLOAT 16.15 (.636") NEUTRAL-RAISE 7.92 (.312") NEUTRAL-LOWER 6.35 (.250")
SPOOL SPRING FORCE	INSTALLED 95N (21.4lbf) CROWDED 110N (24.7lbf) DUMPED 110N (24.7lbf)	INSTALLED 95N (21.4lbf) OPEN 110N (24.7lbf) CLOSED 110N (24.7lbf)	INSTALLED 101N (22.8lbf) FLOAT 142N (31.9lbf) RAISE 117N (26.4lbf) LOWER 122N (27.5lbf)

DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED DETAILS TO BE MANUFACTURED IN ACCORDANCE WITH HUSCO SPECIFIC- IN UNITS (DIMENSIONS DIMENSIONS ON ASSY. TAG ARE FOR REF. ONLY)		DATE 3/4/1 25/10/00 PJS MJJ MJJ 41 D	HUSCO INTERNATIONAL CONTROL VALVE ASSY AR1442-032-1 6600C17 E08
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LOADER VALVE SEAL SERVICE AND REPAIR KIT
FERREC PT. NO. 6193757M91

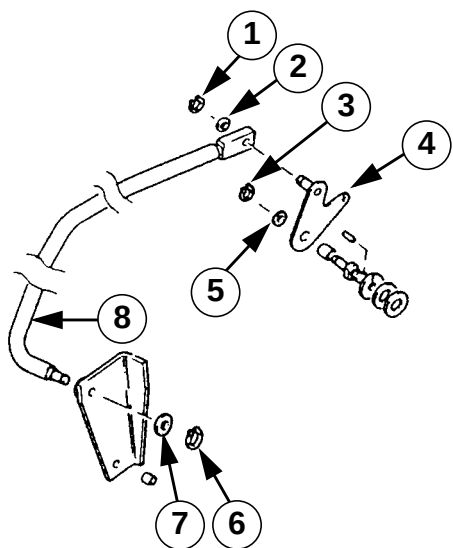
ITEM	QTY	DESCRIPTION	FERREC PART NUMBER
E	1	RELIEF VALVE ASSY	619311M91
D	1	RELIEF VALVE ASSY	619312M91
C	1	RELIEF VALVE ASSY	619313M91
B	1	RELIEF VALVE ASSY	619314M91
A	1	RELIEF VALVE ASSY	619315M91
76	1	PLATE-WAVE	NOT SERVICEABLE
75	1	PLUG ASSY - SAE	619321M91
74	1	PLUG ASSY - SAE	619322M91
73	1	SHUT-OFF PLUG ASSY	619323M91
72	1	PLUG ASSY - SAE	619324M91
71	3	PLUG ASSY	619325M91
70	3	SPRING	619326M91
69	3	POPPET-CV	619327M91
68	1	PLUG ASSY	619328M91
67	1	PLUG ASSY	619329M91
66	1	SPRING	619330M91
65	1	SPRING	619331M91
64	1	SPOOL	619332M91
63	1	SEAL-SPOOL	PART OF 619333M91
62	1	WIPER	PART OF 619334M91
61	1	PLATE-SEAL	PART OF 619335M91
60	2	CAP SCREW-SOC. HD.	PART OF 619336M91
59	2	STANDARD GLAND ASSY	619337M91
58	1	D-RING	PART OF 619338M91
57	1	SPACER-CAP-SPOOL	PART OF 619339M91
56	1	SPACER	PART OF 619340M91
55	1	SEAL-SPOOL	PART OF 619341M91
54	2	PLATE-SEAL	PART OF 619342M91
53	1	WIPER	PART OF 619343M91
52	2	CAP SCREW SOCKET HEAD	PART OF 619344M91
51	1	FLAT GLAND ASSY	619345M91
50	2	CAP SCREW SOCKET HEAD	PART OF 619346M91
49	1	PLATE SEAL	PART OF 619347M91
48	1	SPACER (WITH ID GROOVE)	PART OF 619348M91
47	2	SPRING SEAT	PART OF 619349M91
46	1	BOLT-HEX HD	PART OF 619350M91
45	1	SPACER	PART OF 619351M91
44	1	SPRING	PART OF 619352M91
43	1	SEAL-SPOOL	PART OF 619353M91
42	1	PLATE SEAL	PART OF 619354M91
41	1	SPOOL CAP ASSY	619355M91
40	1	SEAL SPOOL	PART OF 619356M91
39	1	PLATE-SEAL	PART OF 619357M91
38	1	SPRING SEAT	PART OF 619358M91
37	1	SPRING	PART OF 619359M91
36	1	SPACER	PART OF 619360M91
35	1	SPRING SEAT	PART OF 619361M91
34	1	PLATE SEAL	PART OF 619362M91
33	1	SPOOL END	PART OF 619363M91
32	1	CLAPPER	PART OF 619364M91
31	1	RETAINING RING-EXT	PART OF 619365M91
30	1	SPACER	PART OF 619366M91
29	1	MAGNET ASSY	PART OF 619367M91
28	1	CAP-FLANGE-SPECIAL	PART OF 619368M91
27	2	SOC. HD. CAP SCREW	PART OF 619369M91
26	1	MAGNETIC DETENT	619370M91
25	1	SEAL SPOOL	PART OF 619371M91
24	1	PLATE-SEAL	PART OF 619372M91
23	1	SPRING SEAT	PART OF 619373M91
22	1	SPACER	PART OF 619374M91
21	1	SPRING	PART OF 619375M91
20	1	SPACER	PART OF 619376M91
19	1	SPRING SEAT	PART OF 619377M91
18	1	PLATE-SEAL	PART OF 619378M91
17	1	SPOOL END ASSY-DETENT	PART OF 619379M91
16	4	BALL	PART OF 619380M91
15	1	SLEEVE-DETENT	PART OF 619381M91
14	1	CAP SPOOL	PART OF 619382M91
13	2	CAP SCREW SOC. HD.	PART OF 619383M91
12	1	SPOOL END ASSY-DETENT	619375M91
11	2	SPOOL	NOT SERVICEABLE
10	1	D-RING	NOT SERVICEABLE
9	1	SPOOL-END	NOT SERVICEABLE
8	1	SPRING	NOT SERVICEABLE
7	1	D-RING	NOT SERVICEABLE
6	1	BACKUP RING	NOT SERVICEABLE
5	1	POPPET	NOT SERVICEABLE
4	1	SPOOL	NOT SERVICEABLE
3	1	SPOOL ASSY.	NOT SERVICEABLE
2	4	AVDEL PLUG	NOT SERVICEABLE
1	1	HOUSING	NOT SERVICEABLE



LOADER BEAM

Removal

1. Park the machine on a level surface.
2. Remove the loader bucket (see page 11).
3. Remove the bucket cylinder and links (see page 21).
4. If fitted, remove the quick attach unit (see page 24).
5. Remove the loader beam cylinders (see page 26).
6. Only carry out steps 7 through 10 on machines with mechanical loader controls.
- 7.

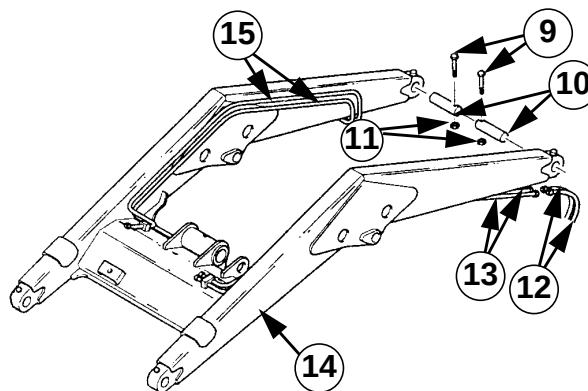


CS98M600

Remove the circlip (1) and the washer (2) from the top pivot pin of the feedback link (8).

8. Remove the circlip (6) and the washer (7) from the bottom pivot pin of the feedback link (8).
9. Remove the feedback link (8).
10. Remove the nut (3) and the washer (5) and slide the bellcrank (4) from the pivot pin.
11. Only carry out step 12 on machines with electronic loader controls.
12. Disconnect the bucket linkage and remove the loader bucket potentiometer (see page 33).
13. Remove the hood.

14.



CS98M601

Fit identifying tags to the hydraulic pipes (13) and (15) as an aid to installation.

15. Place suitable drainage container beneath the pipe connections.
16. Disconnect the hydraulic pipes (13) and (15) from the hydraulic hoses (12).
17. Fit blanks to the pipe connections and to hose connections.
18. Attach a suitable lifting equipment to the loader beam (14). Make sure the two front slings are approximately 800 mm (31 in) longer than the rear pair.
19. Remove the locknuts (11) and the bolts (9) which secure the pins (10) to the chassis. Discard the locknuts (11).

NOTE : When installing, install new locknuts (11) and tighten the bolts (9) to a torque of 60 Nm.

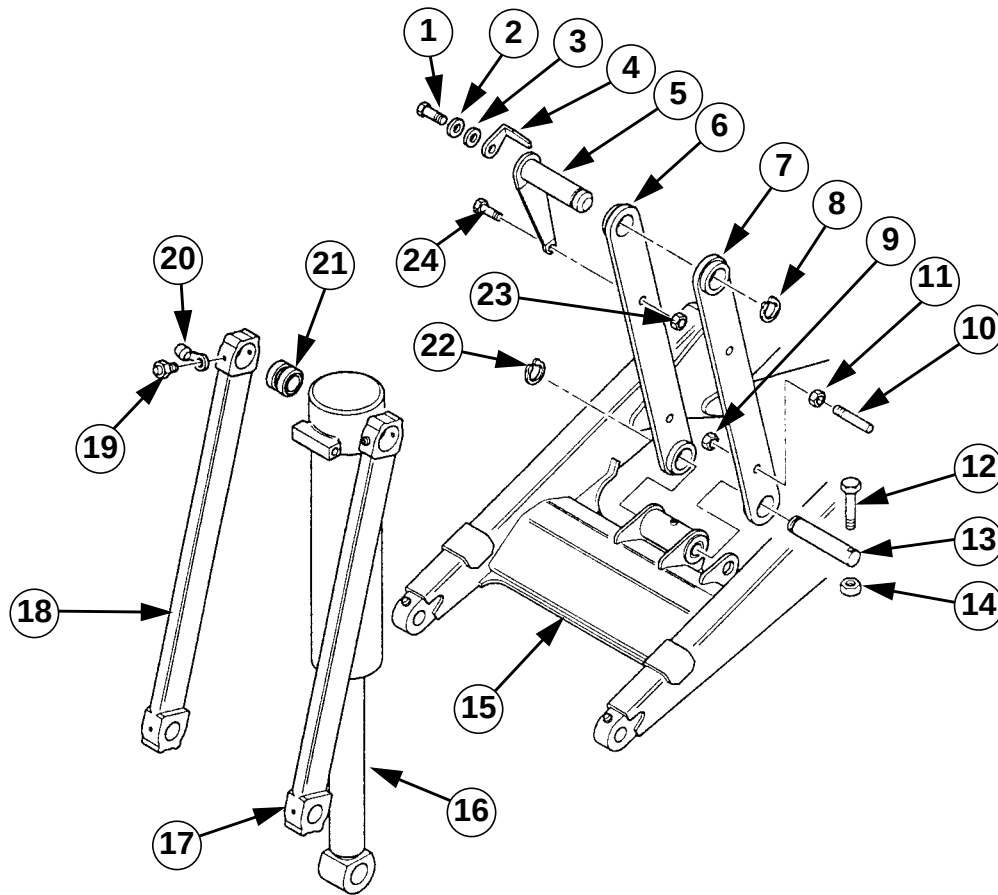
20. Carefully remove the pins (10) that attach the loader beam (14) to the chassis.
21. Lift the loader beams (14) clear of the machine. If the loader beams (14) grip the tower and make removal difficult, use the loader beam expander to jack the loader beams apart to aid their removal.

NOTE : Install the loader beam in the reverse order from that of removal but note the following :

1. Shims are only fitted adjacent to the outer face of the beam pivot. The self locking nut and bolt which retain the inner end of each beam pivot pin should be tightened to 67 Nm (50 lbf ft).
2. The bolts on the outer ends of the loader beam pivots must be tightened to 230 Nm (170 lbf ft).
3. The self-locking nut and bolt, which retain the pivot pin for the rod end of each beam lift cylinder, should be tightened to 48 Nm (35 lbf ft).
4. Calibrate the loader

BUCKET CYLINDER AND LINKS

Removal



CS98M596

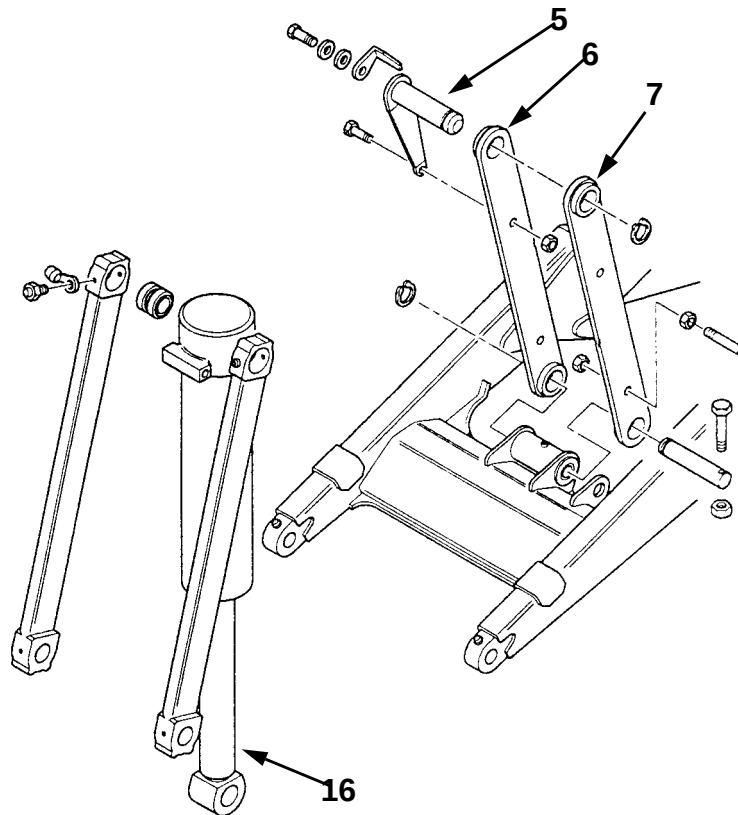
1. Park the machine on a level surface.
 2. Lower the loader beam and position the bucket flat on the ground.
 3. Depressurize the hydraulic system
 4. Remove the loader bucket
 5. Fit identifying tags to the hydraulic hoses as an aid to installation.
 6. Place a suitable drainage container beneath the hose connections.
 7. Disconnect the hydraulic hoses from the bucket cylinder (16).
 8. Fit blanks to the hose connections and to the bucket cylinder connections.
 9. Remove the nuts (9) and (11) and the potentiometer operating stud (10) from the link (7).
 10. Attach suitable lifting equipment to the bucket cylinder (16).
 11. Remove the circlip (8) from the pin (5).
 12. Support the link (7).
 13. Remove the locknut (23) and the bolt (24) attaching the pin (5) to the link (6). Discard the locknut (23).
- NOTE :** When installing, install a new locknut (23) and tighten the bolt (24) to a torque of 60 Nm.
14. Using a hammer and a soft metal drift, remove the pin (5).

15. When the pin (5) is sufficiently removed, remove the soft metal drift and lower the link (7) onto the loader crossbeam.
16. Support the link (6) and fully remove the pin (5).
17. Lower the link (6) onto the loader beam.
18. Remove the bucket cylinder (16) and lower it to the ground.
19. Service the bucket cylinder (16).

Installation

NOTE : *Install the bucket cylinder and links in the reverse order from that of removal but note the following.*

1. After installation, apply the specified grease to the grease nipples (19).
2. After installation of the loader bucket, make sure that the bucket cylinder (16) operates correctly.
3. Check the level of the hydraulic oil, replenish if necessary



LOADER BUCKET RETURN-TO-DIG ADJUSTMENT

960/965 only

Loader bucket return to dig is calibrated by the manufacturer prior to the machine being sold. Consult your local dealer if this needs re-setting.

750/760/860 only

Tools required

One 13 mm (1/2 inch) wrench for hexagonal head bolts

STEP 1

Place the machine on flat, level ground and engage the parking brake.

STEP 2

Lower the loader bucket to the ground and make sure that the bottom of the bucket is at the required digging angle.

STEP 3

Stop the engine and remove the starter switch key.

STEP 4



Unscrew the return-to-dig switch lock nut and slide the switch in the groove until the switch contact roller is resting on the loader beam cam, then tighten the nut.

STEP 5

Start the engine, raise the loader attachment completely and dump the bucket.

STEP 6

Place the control lever in return-to-dig position, the loader attachment will lower.

STEP 7

Check the position of the bucket. If the position is not correct, carry out the following step.

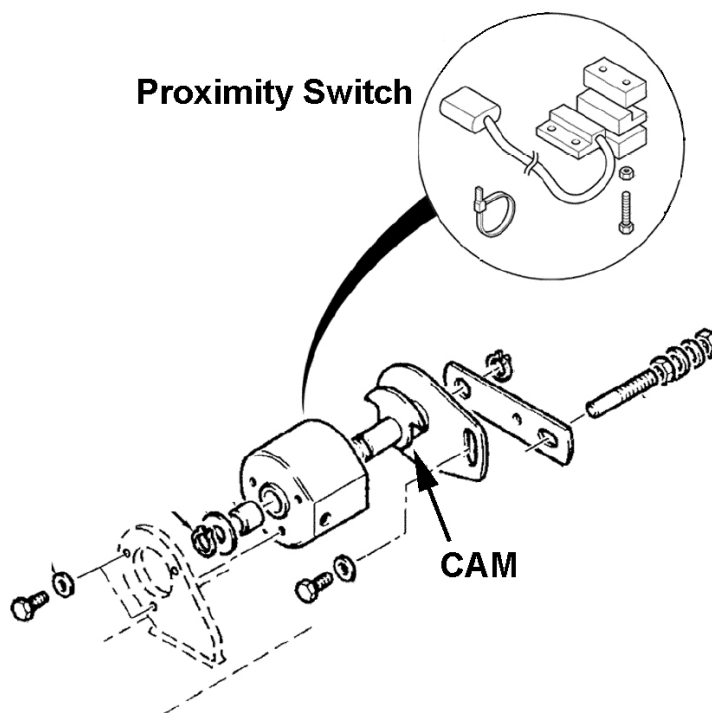
STEP 8

If the bucket does not tilt sufficiently towards the rear, slide the return-to-dig switch slightly towards the rear.

If the bucket tilts too far towards the rear, slide the return-to-dig switch slightly forwards.

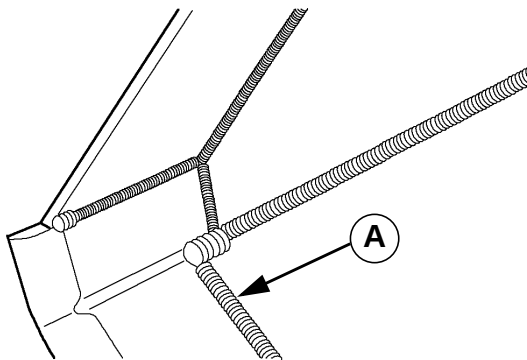
NOTE : When adjusting the switch, hold the switch in place while tightening the nuts.

Proximity Switch



REPLACEMENT OF WELD-ON CUTTING EDGE FOR STANDARD BUCKETS

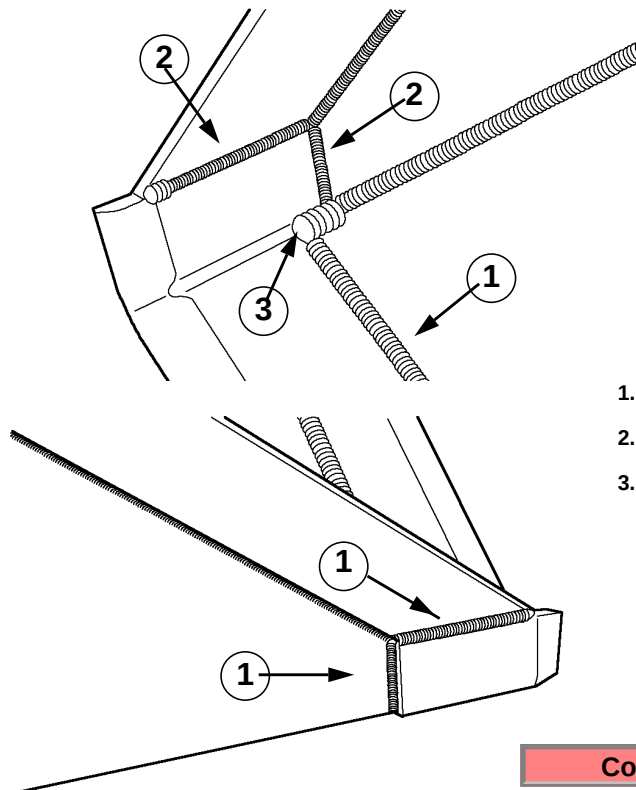
1. If the bucket is not removed from the machine, raise the bucket to a suitable height and use suitable supports to hold the loader frame and bucket in place.
2. If the bucket is equipped with bucket teeth, use carbon arc rod to remove the bucket teeth.
3. Use carbon arc rod or an acetylene cutting torch to remove the welds that hold the cutting edge. Keep distortion to a minimum when removing the cutting edge.
4. When removing the bottom rear weld for the cutting edge DO NOT cut through the floor of the bucket.



CS98M585

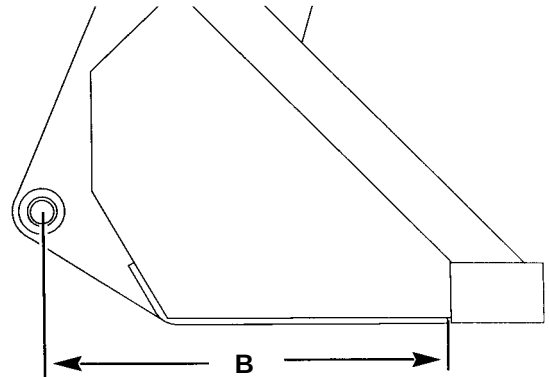
A LONG LIPPED BUCKET WELD

5. Use a grinder to remove any welds or extra metal on the bucket that will prevent the new cutting edge from fitting correctly.



1. (6 mm) Fillet
2. Fill Groove
3. Fill Corner

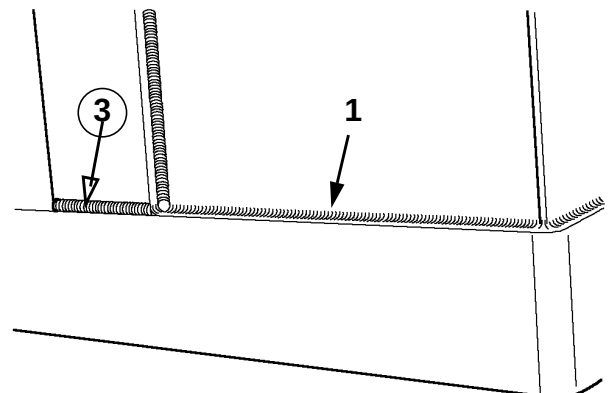
6. Put the cutting edge in place and use C-clamps to hold the cutting edge in place. See the illustration for the correct position of the cutting edge.



CS98M586

B LONG LIP BUCKET

7. Use E-7018 welding rod and weld the cutting edge to the bucket.
8. When welding the floor of the bucket to the top of the cutting edge :
 - A. Start at one end of the bucket and weld toward the centre until one welding rod is used.
 - B. Start at the centre of the bucket and weld in both directions from centre until one welding rod is used.
 - C. Start at the other end of the bucket and weld toward the centre until one welding rod is used.
 - D. Continue to weld the cutting edge to the bucket using this method until welding is complete.
9. If bucket teeth were removed from the old cutting edge, install the bucket teeth according to instructions in this section.



SECTION 10 SCHEDULED MAINTENANCE



Lubricants and Service Intervals

ELEMENTS/CAPACITIES/SERVICE INTERVALS/OIL SPECIFICATIONS TX760 / TX860 / TX860SB

	GEARBOX		REAR AXLE OIL	ENGINE			HYDRAULICS			FRONT AXLE		AIR FILTER PRIM. SEC	FUEL FILTER	FUEL TANK	COOLANT
	OIL & STRAINER	PR. FILTER		OIL	10W-30 (to 30°C)	20W-50 (from 30°C)	2654403M1	OIL	3515254M1	3515328M92	RL FILTER	2 WD OIL	4 WD OIL		
750-B	6190147M1	6190164M1	SEE NOTE	SAE 10W-30 (750-860)	10W-30 (to 30°C)	20W-50 (from 30°C)	2654403M1	ISO VG 46	3515254M1	3515328M92	13 MICRON	SAE EP 85W-140	SAE EP 85W-140	26561117	
760-B	15	-	22.5	22.5	10.7	10.7	-	46	-	-	-	4+1.1+1.1	4+1.1+1.1	-	120
860-B	15	-	22.5	22.5	10.7	10.7	-	46	-	-	-	4+1.1+1.1	4+1.1+1.1	-	120
960-B	15	-	See Manual	10.7	10.7	10.7	-	46	-	-	-	8+4.5+4.5	8+4.5+4.5	-	120
FIRST 50 HOURS	STRAINER Y	X	X	X	X	X	X	C	-	X	X	C	X	C	N.A.
EVERY 250 HOURS	C	-	C	X	X	X	X	C	-	-	-	C	C	-	N.A.
EVERY 500 HOURS	C	X	C	X	X	X	X	C	-	-	-	C	C	X	N.A.
EVERY 1000 HOURS	X	X	X	X	X	X	X	X	Y	X	X	X	X	-	N.A.
KEY	Y = CLEAN	X = REPLACE	C = CHECK	AR = AS REQUIRED	AD = ADJUST	BR = BRAKE FLUID (MINERAL OIL)	LHM P/No. 3621170M1								

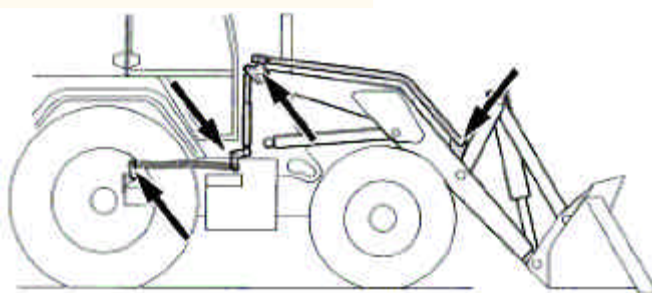
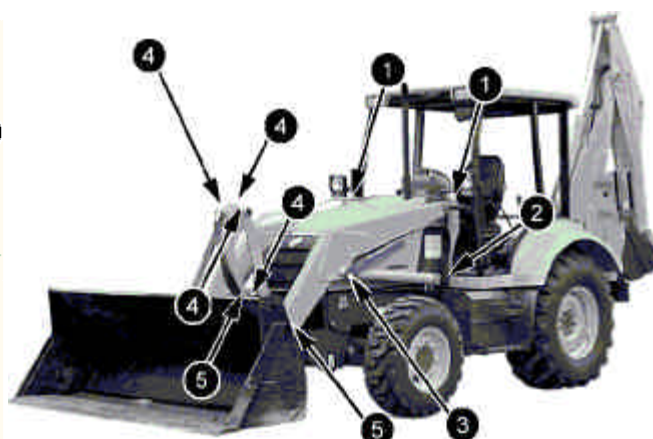
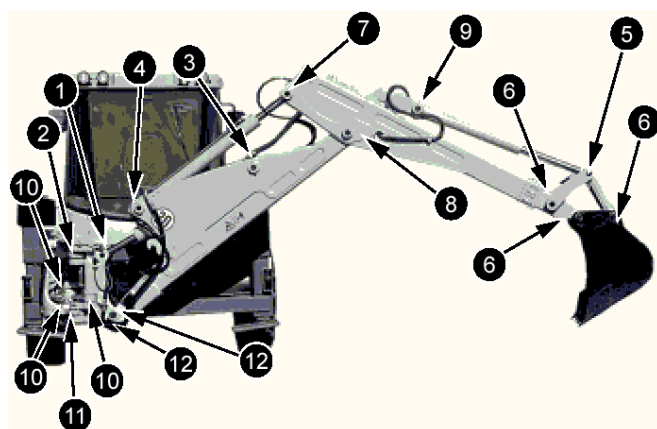
N.B. CAPACITIES IN LITRES. FOR US GALS ÷ 3.8
FRONT AXLES OILS = CENTRE HSG + 2 x HUBS

(NOTE: REAR AXLE OIL HAS AN ANTI-SQUAWK ADDITIVE.
P/No. 1889891M2 ADDED INFACORY)

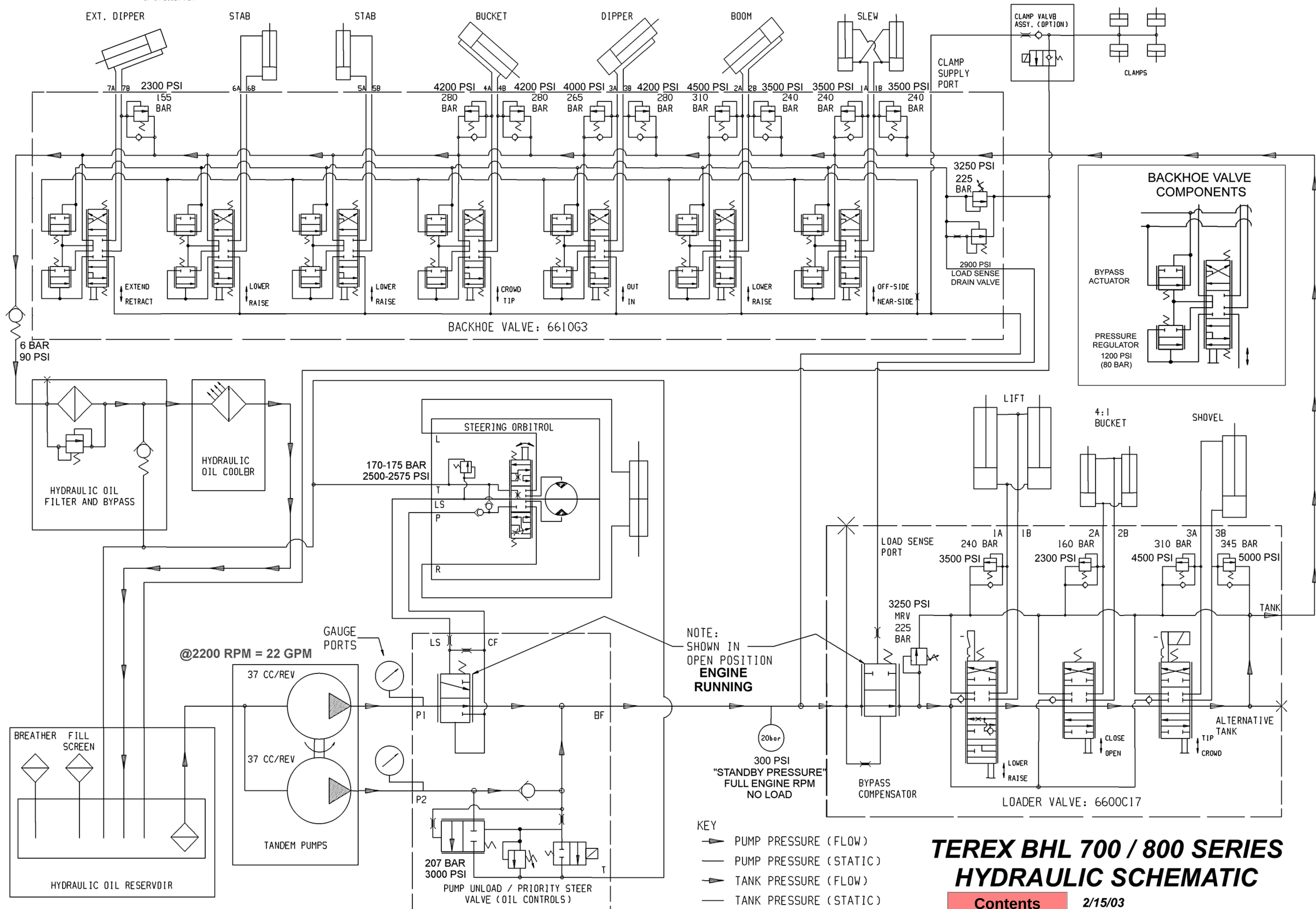
LOADER	BACKHOE	FRONT AXLE PIVOT	FRONT AXLE U.J.'S	PROP D SHAFTS	VALVE CLEARANCE COLD
DAILY GREASING	DAILY GREASING	DAILY GREASING	250 HOURS GREASING	WEEKLY GREASING	INLET 0.008" EXH 0.018"

GREASING POINTS

FRONT LOADER	14	10 HOURS
FRONT BUCKET (7 IN 1)	4	10 HOURS
FRONT AXLES AND PIVOT	8	10 HOURS
FRONT STEERING RAM	2	10 HOURS
REAR CARDAN SHAFT	3	50 HOURS
REAR BACKHOE	14	10 HOURS
MAST + PIVOT	6	10 HOURS
BRAKE PEDAL PIVOTS	4	250 HOURS.



IF IN DOUBT ASK



TEREX BHL 700 / 800 SERIES HYDRAULIC SCHEMATIC

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2/15/03

TEREX TX760 ELECTRICAL DIAGRAM

SHEET 1 of 2 2/17/03

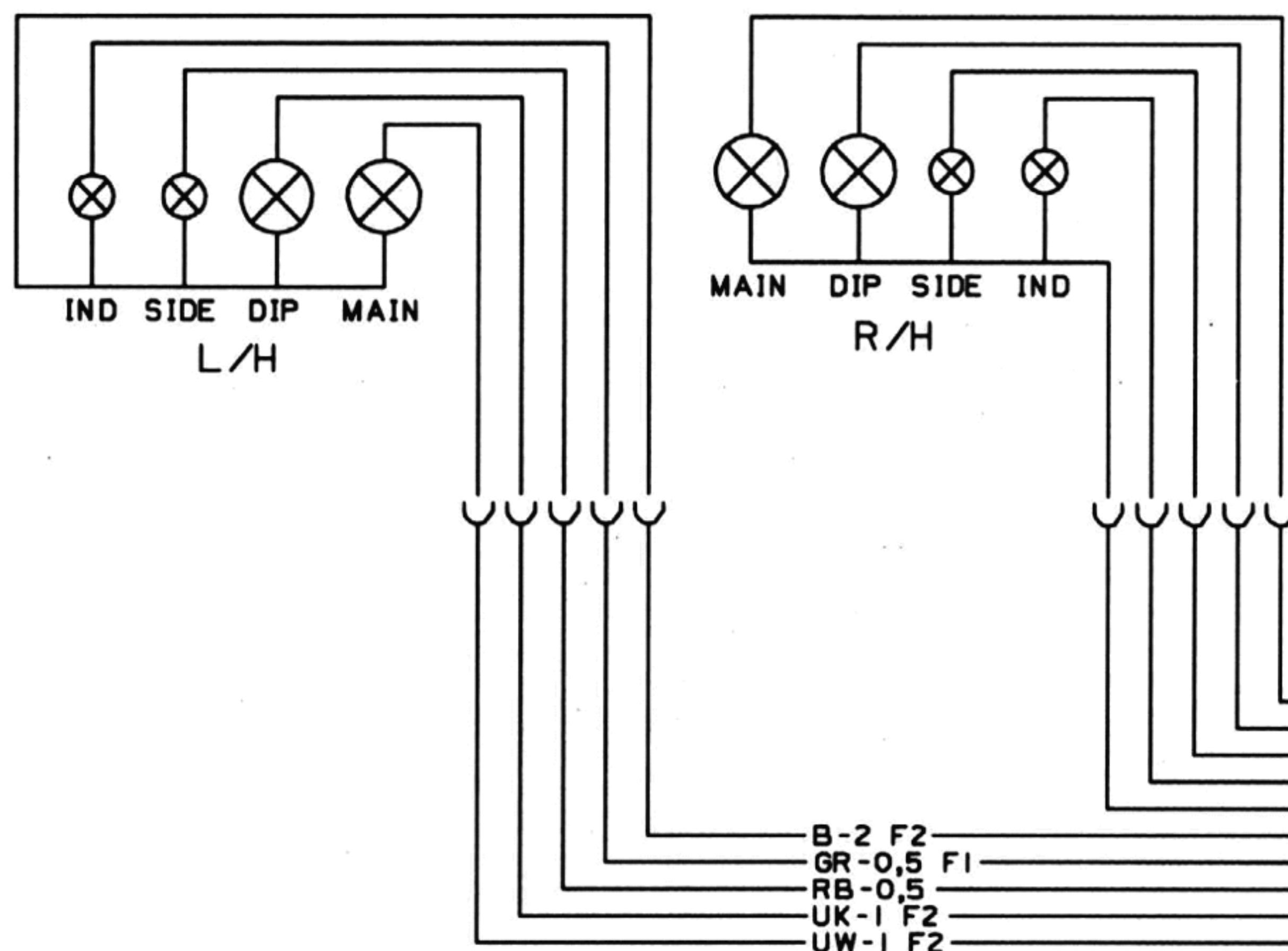
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WIRE COLOR CODE

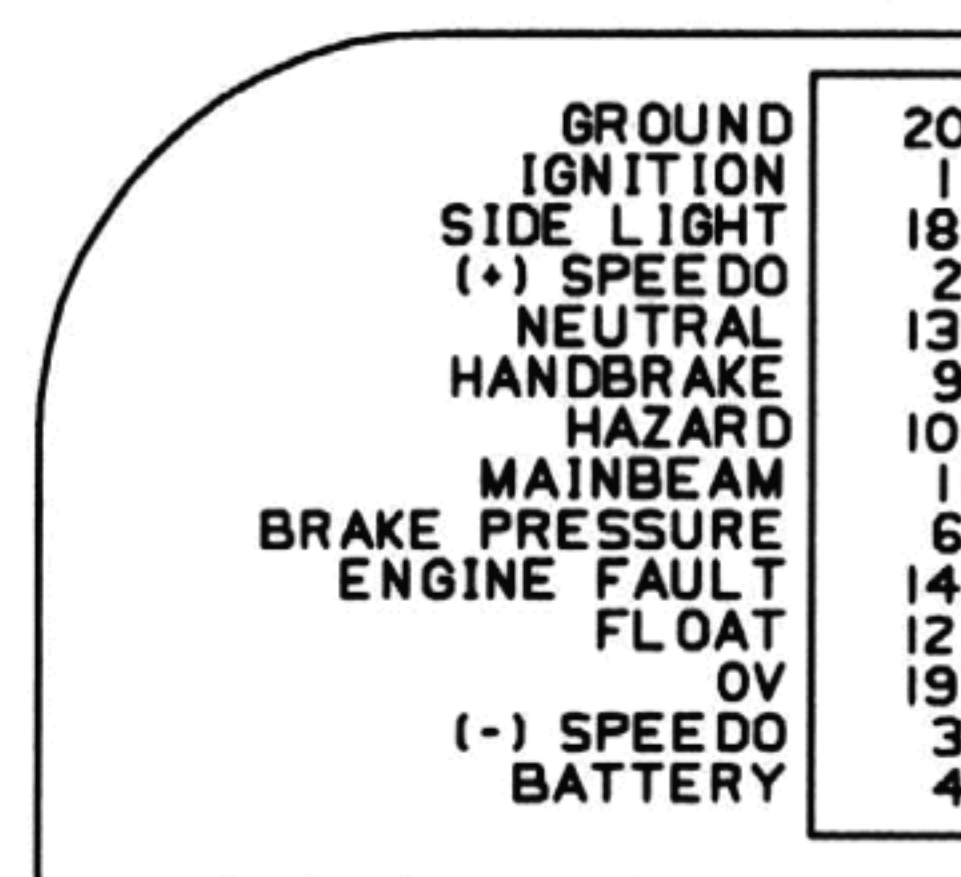
B= BLACK
G= GREEN
K= PINK
LG= LIGHT GREEN
N= BROWN
O= ORANGE
P= PURPLE
R= RED
S= SLATE
U= BLUE
W= WHITE
Y= YELLOW

CIRCUIT LOCATION CODE

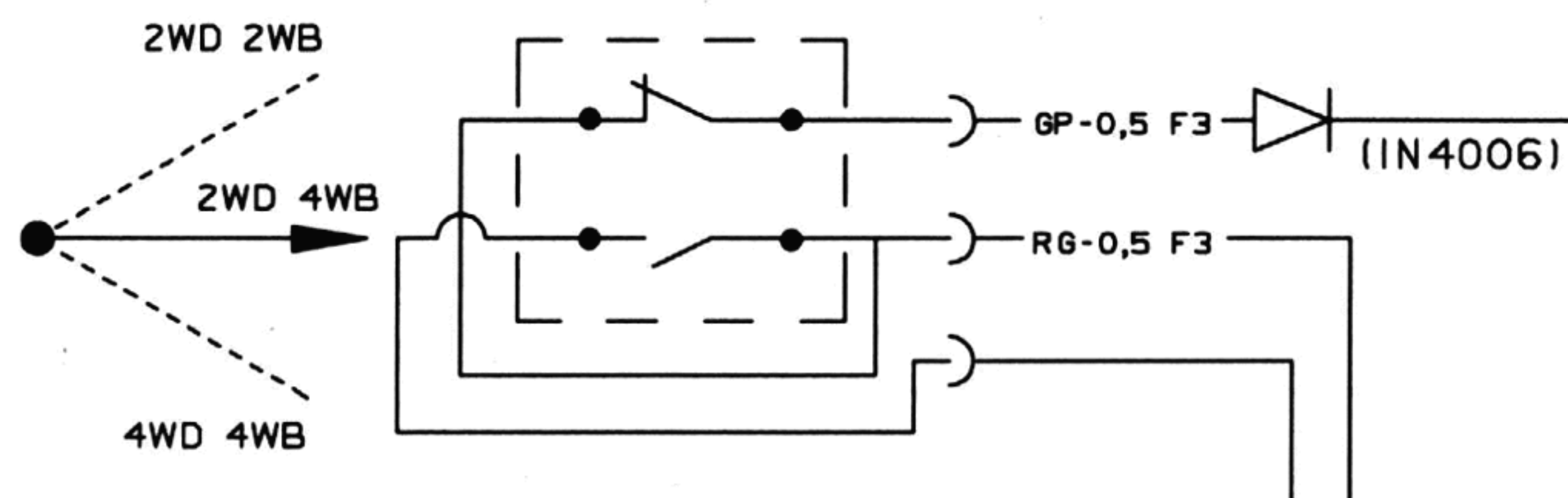
C= CHASSIS
F= FRONT CONSOLE
R= ROOF
S= SIDE CONSOLE



FRONT
INSTRUMENT PACK



(SELECTABLE 4WB)
MECHANICAL ONLY



FWD/REV
SWITCH

COMMON
FWD.
REV.
NEUTRAL

MULTI-FUNCTION
SWITCH

MAIN
DIP
SIDE
LEFT
RIGHT
HORN
INDICATOR COMMON
GROUND
GROUND

FRONT
SWITCH PACK

5
7
1
2
4
6
8
9
GROUND
ILLUM
IGNITION
WASH
WIPE
RIDE
Q/A

J1
(040-20WAY) (GREEN)

J2
(070-12WAY)

J3
(040-16WAY)

RELAY FUSEBOARD

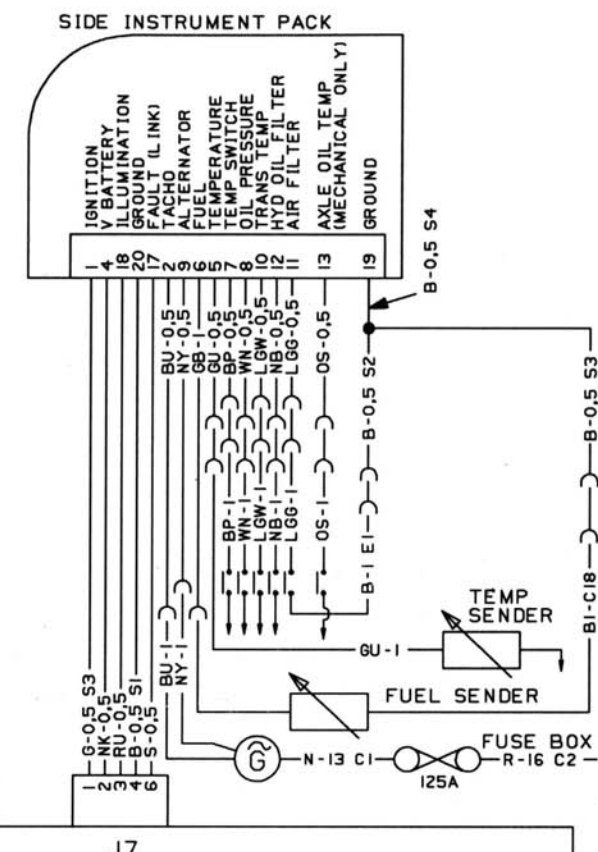
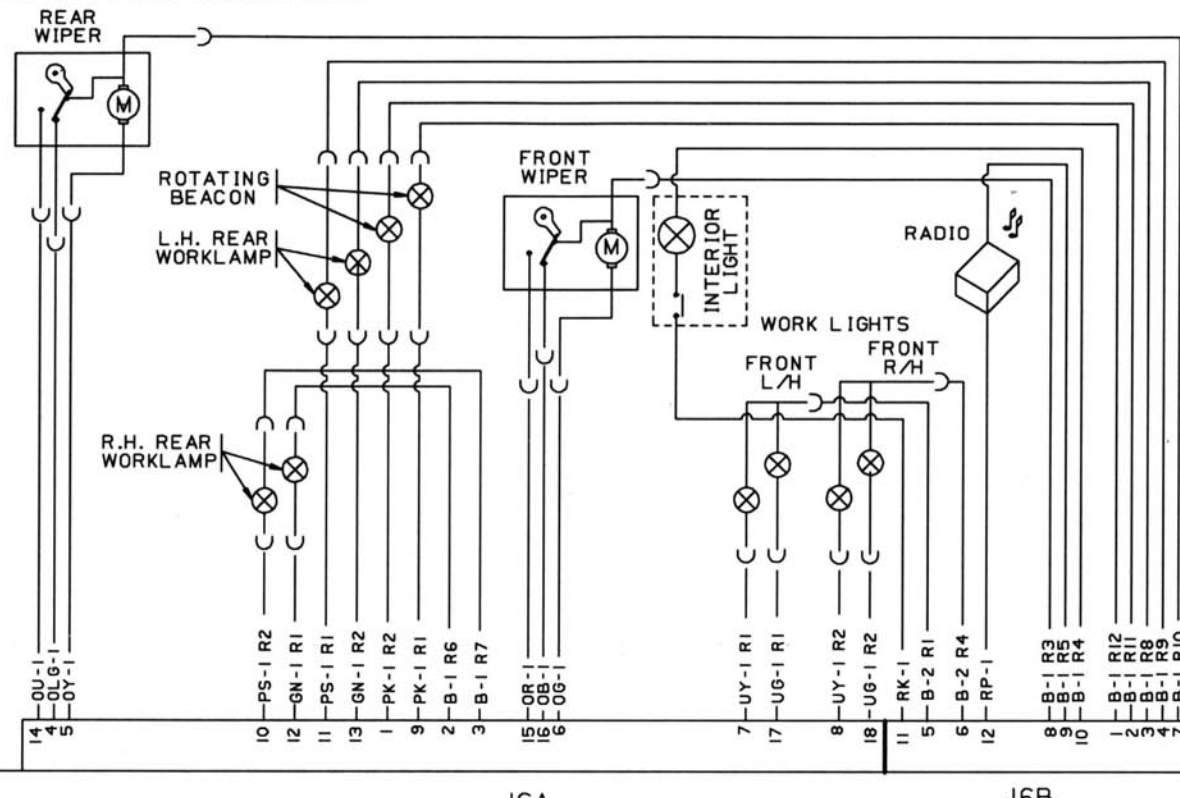
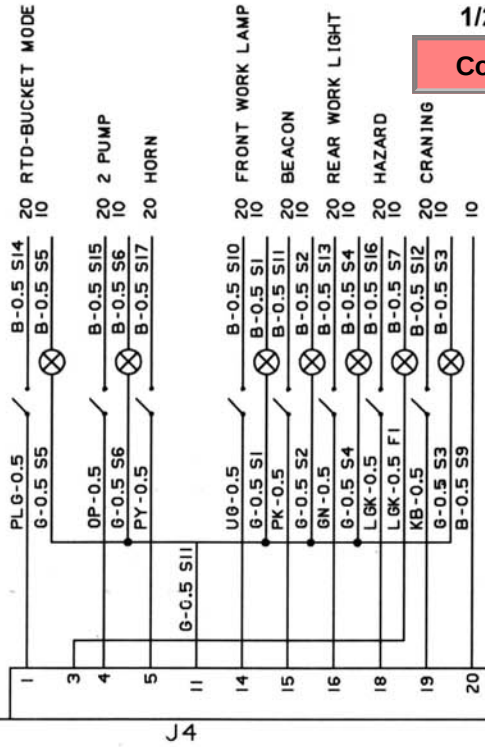
TEREX TX760 ELECTRICAL DIAGRAM

SIDE SWITCH BANK

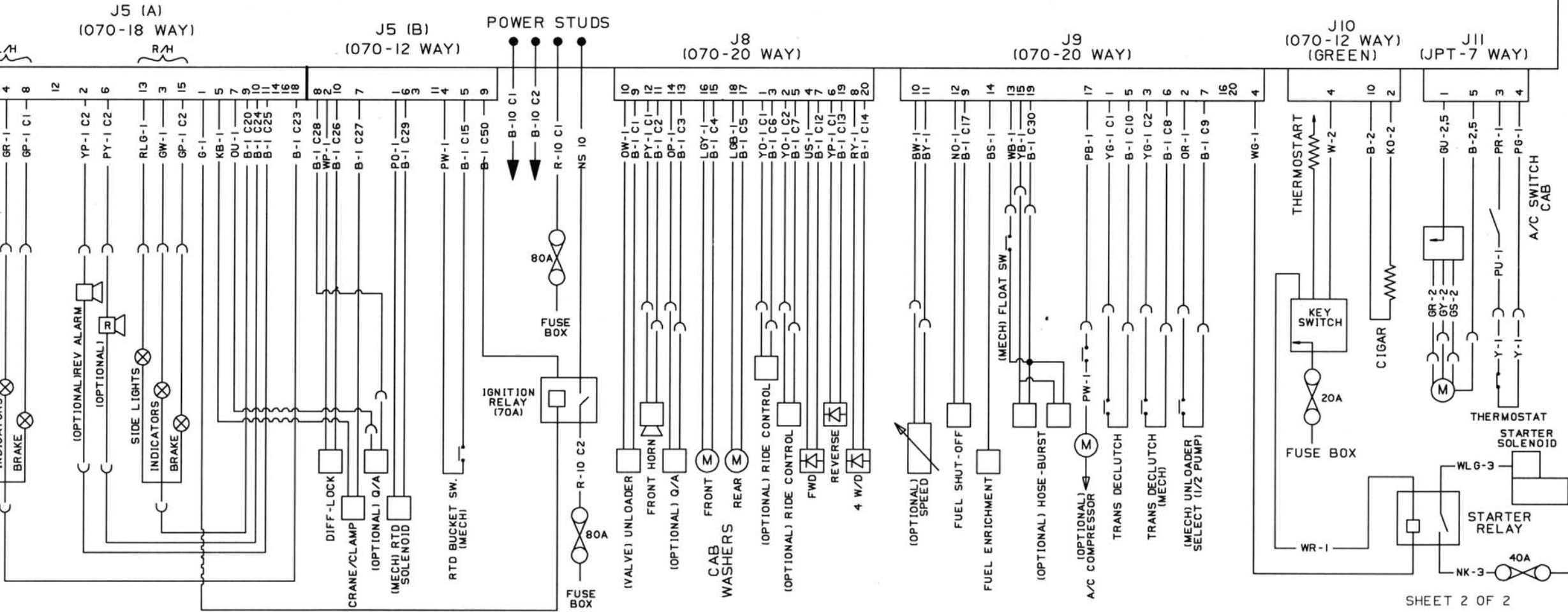
SHEET 2 of 2

1/21/03

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RELAY FUSEBOARD



TX750/60 & 860 Backhoe Key Part & Kit Numbers

- Service Manual # 6198135M2 & Supplement # 6198267M1
- Brake Booster Kit # 1958
- Air Conditioning Kit # TX760 SNA11
- LHM Brake Fluid # 3621216M1
- Agco Axles Anti-Squawk # 1889891M2
- Hydraulic Gauge Kit # 6108395M91
- Grease Gun Fitting for Axle # 6109585M91
- New Rear Window With Rigid Frame # 6109039M91
- Louvered Grill Kit # 2068
- Ride Control System # 662393
- Additional Counter Weight # 1937
- Iso Controls For B Series (Danfoss Hydraulics) # ACC1405
- Iso Controls For TX Machines (Husco Hydraulics) # ACC1944
- Air Conditioning Filter # 6101510M2
- Husco Backhoe Valve - Special Valve Tool To Install O'rings on spools # 6193762M92
- Air Ride Seat # ACC1954