Service Manual

WLS 432ZX

Service Manual - WLS 432ZX

Publication No.
550/43477/1

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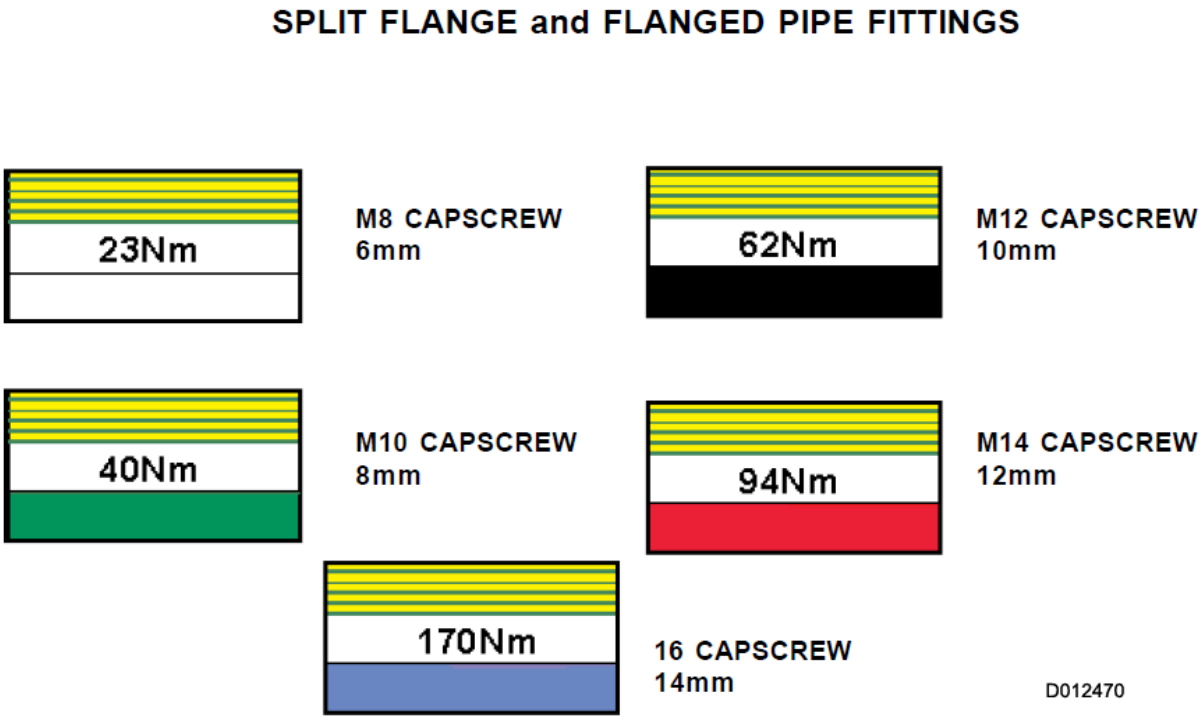
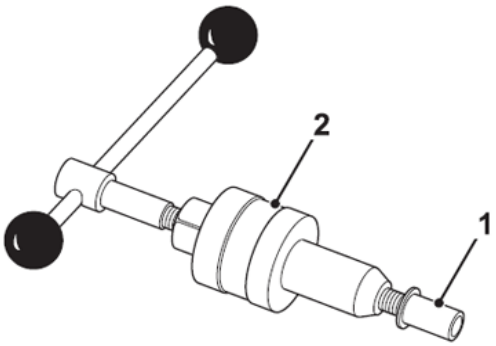


Fig 4.

Service Tools

Section B - Body and Framework



826/01179 M6 x 16mm Rivet Nut
826/01106 M6 x 19mm Rivet Nut
826/01177 M8 x 18mm Rivet Nut
826/01176 M10 x 23mm Rivet Nut
826/01333 M10 x 26mm Rivet Nut
Installation Tool Available from : Bollhoff Fastenings Ltd.
Midacre
The Willenhall Estate
Rose Hill
The Willenhall
Willenhall
West Midlands, WV13 2JW

Folding Stand for Holding Glass

Essential for preparing new glass prior to installation. JCB part number - 892/00843 ⇨ *Fig 5. (1-8)*

Notes:

⚠ CAUTION

'O' rings, Seals and Gaskets

Badly fitted, damaged or rotted 'O' rings, seals and gaskets can cause leakages and possible accidents. Renew whenever disturbed unless otherwise instructed. Do not use Triochloroethane or paint thinners near 'O' rings and seals.

INT-3-2-12

⚠ WARNING

Hydraulic Hoses

Damaged hoses can cause fatal accidents. Inspect the hoses regularly for:

- **Damaged hose ends**
- **Chafed outer covers**
- **Ballooned outer covers**
- **Kinked or crushed hoses**
- **Embedded armouring in outer covers**
- **Displaced end fittings.**

INT-3-3-2

⚠ CAUTION

Waxoyl contains turpentine substitute which is flammable. Keep flames away when applying Waxoyl. Waxoyl can take a few weeks to dry completely. Keep flames away during the drying period.

Do not weld near the affected area during the drying period. Take the same precautions as for oil to keep Waxoyl off your skin. Do not breathe the fumes. Apply in a well-ventilated area.

5-3-1-9

⚠ WARNING

Working Under the Machine

Make the machine safe before getting beneath it. Ensure that any fitments on the machine are secure; engage the park brake, remove the starter key, disconnect the battery.

INT-3-3-8_2

⚠ WARNING

Certain seals and gaskets (e.g. crankshaft oil seal) on JCB machines contain fluoroelastomeric materials such as Viton, Fluorel and Technoflon. Fluoroelastomeric materials subjected to high temperatures can produce highly corrosive hydrofluoric acid. THIS ACID CAN SEVERELY BURN.

New fluoroelastomeric components at ambient temperature require no special safety precautions.

Used fluoroelastomeric components whose temperatures have not exceeded 300°C (572°F) require no special safety precautions. If evidence of decomposition (e.g. charring) is found, refer to the next paragraph for safety instructions DO NOT TOUCH COMPONENT OR SURROUNDING AREA.

Used fluoroelastomeric components subjected to temperatures greater than 300°C (572°F) (e.g. engine fire) must be treated using the following safety procedure. Make sure that heavy duty gloves and special safety glasses are worn:

1 **Thoroughly wash contaminated area with 10% calcium hydroxide or other suitable alkali solution, if necessary use wire wool to remove burnt remains.**

2 **Thoroughly wash contaminated area with detergent and water.**

3 **Contain all removed material, gloves etc. used in this operation in sealed plastic bags and dispose of in accordance with Local Authority Regulations.**

DO NOT BURN FLUOROELASTOMERIC MATERIALS.

INT-3-3-5_3

⚠ WARNING

Protect your eyes when grinding metal. Wear safety glasses or goggles. Remove or protect any combustible materials from the area which could be ignited by sparks.

GEN-1-12

TRANSMISSION AND AXLES	- Check	●				☐		
Clutch Pack Pressures	- Check	●				☐		
Clutch Disconnect/Dump Button	- Check					☐		
Clutch Pack Calibration	- Check	●				☐		
Speed Change and Selection	- Check	●						
Forward/Reverse Selection/Operation	- Check	●						
Neutral Start Operation	- Check	●				●		
Reverse Alarm (if fitted)	- Check	●						
Oil Cooler and Pipework	- Check	●						

Table 7.

Functional Test	**Operation**	**10 Hr**	**100 Hr**	**250 Hr**	**As and When**	**500 Hr**	**1000 Hr**	**2000 Hr**
HYDRAULICS								
MRV Pressure	- Check and Adjust	●				☐		
Steer Circuit MRV Pressure	- Check and Adjust	●				☐		
ARV Pressure	- Check and Adjust	☐						
Operation of All Services	- Check	●	☐					
Hoses for Damage and Leaks	- Check		☐					
Pipework for Damage and Leaks	- Check		☐					
Piston Rods and Gland Seals	- Check		☐					

Table 8.

Functional Test	**Operation**	**10 Hr**	**100 Hr**	**250 Hr**	**As and When**	**500 Hr**	**1000 Hr**	**2000 Hr**
ELECTRICS								
Starter Motor	- Check	●						☐
Alternator	- Check	●						☐
Gauges and Warning Lights	- Check	●				☐		
Proximity Sensor Function	- Check	●				☐		
Cab Switches	- Check	●				☐		
Wiper Motors	- Check	●						
Heater	- Check	☐						
Other (give details)	- Check	☐						
CAB								
Glazing for Correct Fit	- Check		●					

Engine Oil and Filter

Checking the Oil Level

⚠ CAUTION

Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

2-3-3-2

1 Park the machine on level ground and lower the attachments to the ground.

2 Stop the engine. Put the transmission in neutral and remove the starter key.

3 Open the right side engine cover.

4 Check that the oil level is between the two marks on the dipstick A ⇨ *Fig 12. (🗋 3-14)*.

5 If necessary, add the recommended oil through the filler point B.

6 Make sure the filler cap and the dipstick are secure. Close and lock the engine cover.

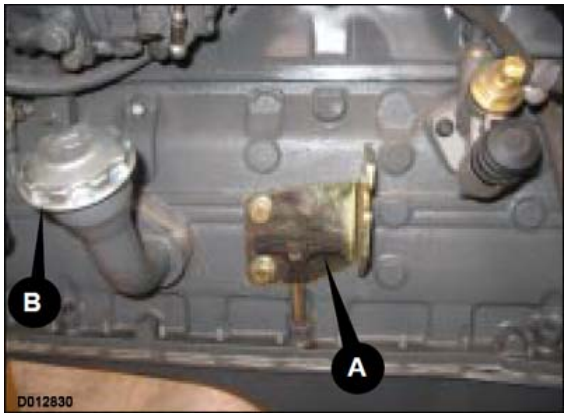


Fig 12.

Changing the Oil and Filter

⚠ WARNING

Make the machine safe before getting beneath it. Lower the tipper body to the fully lowered position; engage the park brake; remove the starter key, disconnect the battery.

0197

⚠ CAUTION

Hot oil and engine components can burn you. Make sure the engine is cool before doing this job.

2-3-3-2

1 Park the machine on level ground and lower the attachments to the ground.

2 Stop the engine. Put the transmission in neutral and remove the starter key.

3 Open the left side engine cover.

4 Place a suitable container beneath the drain plug (to catch the oil).⇨ *Fig 13. (🗋 3-15)*

5 Unscrew the drain plug **A .**

6 Drain the sump oil.

Section B

Body and Framework

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Cooling Pack

Introduction

This cooling pack is a combination pack. It provides all the necessary cooling activities for the machine's components with the exception of the Air Conditioning. (It should be noted that whilst most machines are fitted with air conditioning, it is an optional fitment. Its fitment or not makes no difference to the main cooling pack's function.)

When viewed from the the engine side **A,** the individual sections of the cooling pack are: **1** Hydraulic oil cooling **2** Engine Coolant Radiator **3.** ⇨ *Fig 6. (B-8)*Transmission Oil Cooling.

The cooling pack sections are held together by top and bottom holding plates. By removing the section securing bolts, it is possible to remove and replace a single section.

It is intended that to replace a single section the complete pack will need to be removed from the machine.

Key	
7	Coolant drain plug.
8	The cooling packs lower mounting points.

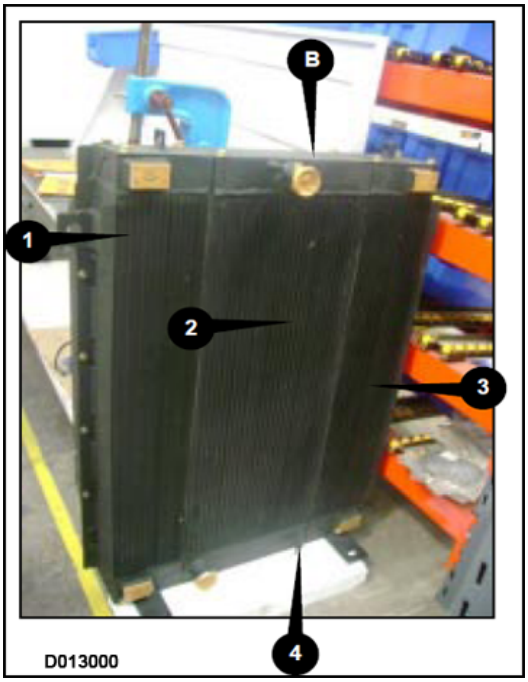


Fig 6.

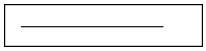
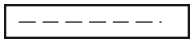
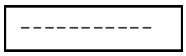
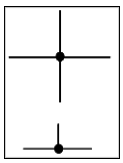
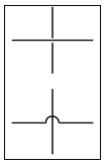
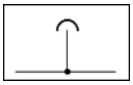
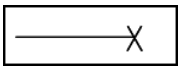
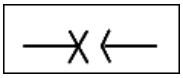
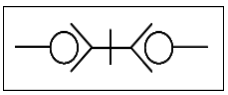
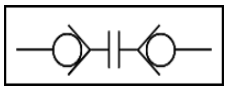
Removal and Replacement

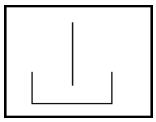
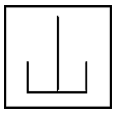
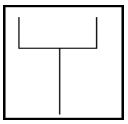
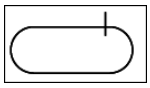
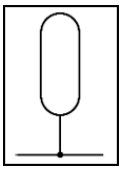
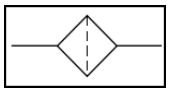
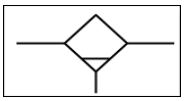
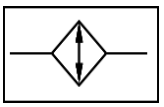
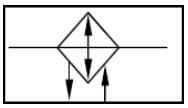
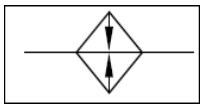
Removal

The cooling pack is a combination unit that cools water, air, transmission and hydraulic oils. Before attempting to work onthe cooling pack unit, all appropriate safety measures must be taken.

1 Park the machine on firm level ground and lower the loader arms. Engage the parking brake. Put the transmission in neutral and chock both sides of all four wheels. Stop the engine and let it cool down. Operate the hydraulic control levers to release pressure trapped in the hoses then remove the hydraulic tank filler cap. Refit the cap once any residual pressure has been released.

Table 5. Energy Transmissions and Conditioning

	Working line, return or feed
	Pilot control
	Drain lines
	Flexible pipe
	Line junction
	Crossing lines
	Air bleed
	Line plugged, also pressure test point
	Line plugged with take off line
	Quick release couplings - connected
	Quick release couplings - disconnected

	Reservoir - return line above fluid level
	Reservoir - return line below fluid level
	Header tank
	Pressure sealed tank
	Accumulator
	Filter or strainer
	Water trap
	Cooler - with no indication of coolant flow
	Cooler - indicating direction of coolant flow
	Heater

Assembly

1 Stone all machined surfaces with a medium grit carborundum stone ⇨ *Fig 20. (E-13)*.

Fig 20.

2 If the bushings have been removed, deburr the bushing bores with an emery cloth. Rinse parts in a solvent. Air blast all the parts and wipe with a clean, lintless cloth before starting assembly ⇨ *Fig 21. (E-13)*.

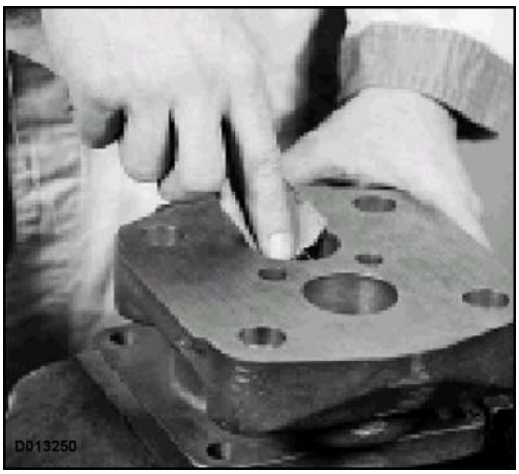


Fig 21.

3 Grip shaft end cover in vise with mounting face down Examine plug or plugs* to be sure they're tightly in place. Replacement is necessary only if parts are damaged. Remove with screwdriver. * PGP/PGM315 and 330 have two plugs in both the shaft end and port end covers. PGP/PGM350 and 365 have one plug on the outlet side of their shaft end and por/t end covers

4 New plugs should be screwed in tightly. Stake the plug with a prick punch at both ends of the screwdrive slot and around edges. Peen the edge of the hole 1/32" to 1/16" with a 1-1/2" diameter steel ball. ⇨ *Fig 22. (E-13)* Note : If new plug or plugs are being installed, coat threads with Loctite thread sealant.

Fig 22.

Note: Assembly steps 5, 6, 7, & 8, apply to shaft end cover, bearing carrier and portend cover. Any bushings removed from the shaft end cover, portend cover or bearing carrier should be assembled in the drive bores with the groove to the top of unit (12 o'clock). Assemble the bushings in the driven bores with the groove to the bottom of the unit (6o'clock). The PGP/PGM315 does not have grooved bushings, therefore the bushing seeams shold be placed at the 12 and 6 o'clock positions.

5 Bushings should be pressed into the bores, one at a time, using the special installation tool and and arbor press. Be sure the that the grooves (or seams) are positioned as stated in Step #5. The bushings must be pressed into the bores flush with the casting face. Be sure to support the castings so that they are square and level ⇨ *Fig 23. (E-14)*.

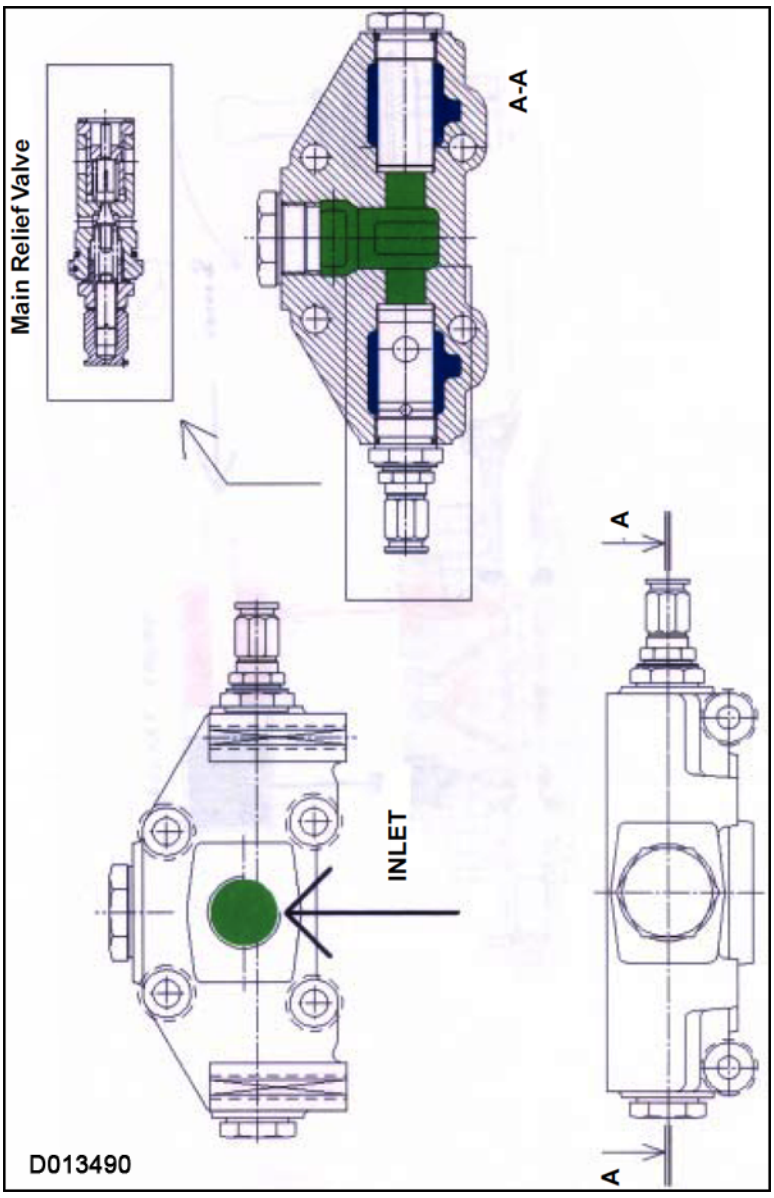


Fig 44.

INLET SECTION

The inlet port is at the side of the section shown with a green color⇨ *Fig 44. (E-23)*.

The cross-section of the main relief is also shown for reference.

Venting the Hydraulic Pressure

⚠ WARNING

Hydraulic Pressure (Servo Machines)

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine. When the engine has stopped, turn the starter switch to on. Operate the controls to release pressure trapped in the hoses. Turn the starter switch to off. Make sure the engine cannot be started while the hoses are open.

5-1-7-1

Machines from the serial number given above are fitted with a new generation loader control valve. A feature of this new valve is that when the ignition is turned off, the servo control is disconnected from its pressure accumulator. This can falsely give the impression should the control lever be operated, that there is no residual pressure in the system. To prevent the hydraulic system being opened whilst there is still residual pressure present, the following venting procedure MUST be carried out

1 Park the machine on firm level ground. Lower the attachments to the ground, apply the park brake and set the transmission to neutral ⇨ *Fig 56. (E-33)*.

2 Switch the engine OFF.

3 Turn the ignition ON, but DO NOT start the engine.

4 Ensured the loader isolation switch in the right hand side cab switch bank is turned ON. (The switch will be illuminated when ON.)

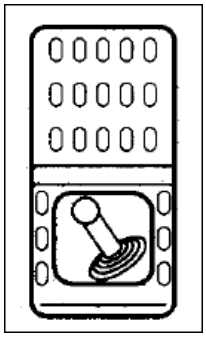


Fig 56.

5 Operate the loader control lever repeatedly to vent any residual pressure.

6 Turn OFF the ignition and disconnect the batteries to ensure the machine cannot be started while the hydraulic system is open.

Automatic Carry Control System Venting

Before attempting any maintenance work on the load suspension hydraulic system, the isolating ball valve must be OPEN.

The isolating ball valve is normally CLOSED for ACCS to be operative ⇨ *Fig 57. (E-33)*.

⚠ WARNING

The loader arms will fall to the ground if they are not on the ground or securely supported before the isolating ball valve is opened. Ensure isolating ball valve is open before attempting any maintenance work on the load suspension hydraulic circuit. The isolating ball valve is closed for normal system operation.

0106

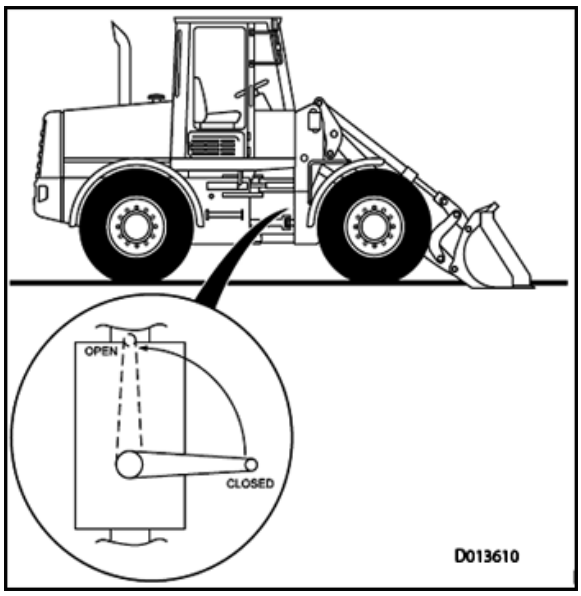


Fig 57.

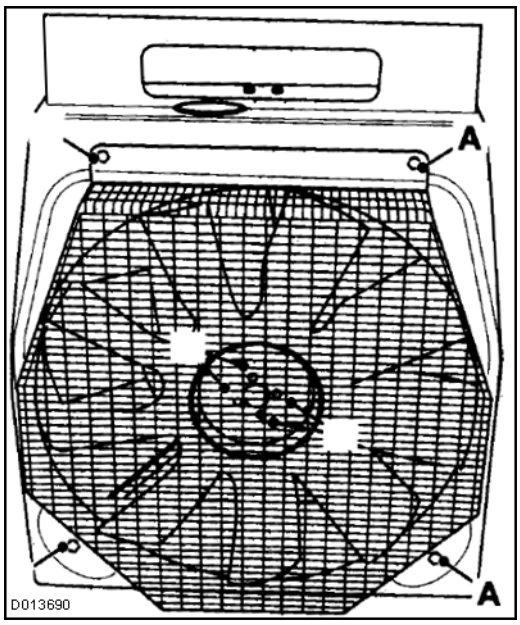


Fig 65.

9 Remove the four bolts B securing the fan blades to the motor hub and remove the fan. Store the fan carefully so as not to damage the blades. (Do not refit a fan with damaged blades.)

10 Lower the fan housing to the closed position and remove the two Allen bolts **A** securing the fan motor to the spider and remove the motor ⇨ *Fig 66. (E-43)*.

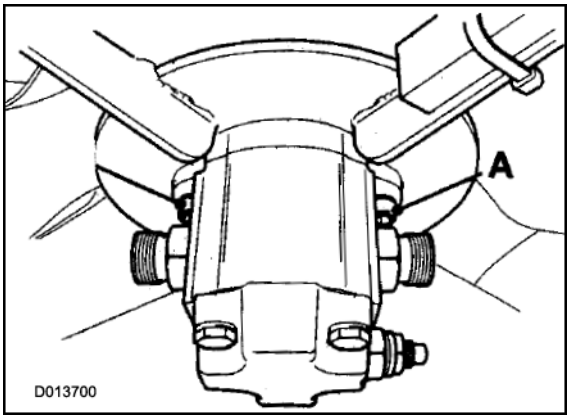


Fig 66.

Replacement

Replacement is the reverse of the removal procedure, however note the following.

⚠ WARNING

Fluid Under Pressure

Fine jets of fluid at high pressure can penetrate the skin. Keep face and hands well clear of fluid under pressure and wear protective glasses. Hold a piece of cardboard close to suspected leaks and then inspect the cardboard for signs of fluid. If fluid penetrates your skin, get medical help immediately.

INT-3-1-10_2

1 Take care to secure the hydraulic hoses inside the fan housing to prevent possible contact with the fan.

2 Top up the hydraulic fluid as necessary with the correct grade of fluid. Refer to **Section 3 - Routine Maintenance.**

Uni-Directional Motor

General

Note: Before removing or dismantling the motor, check that its performance is as specified in **Technical Data**. If the performance is below that specified, the motor should be renewed. Renewal of components such as gears, bearings and housing will not effect a permanent cure. if a motor's output is satisfactory but there is evidence of external leakage, it should be dismantled for re-sealing only. Before dismantling make sure the motor's external body and the work area are thoroughly cleaned and are

Dismantling, Inspection and Assembly

For motor components,.

Dismantling

Note: *It is very important to work in a clean environment* when repairing hydraulic motors. Plug all ports and wash the exterior of the motor with a proper cleaning solvent before stripping the motors.

1 Remove the port plugs and ensure all oil is drained from the motor.

Steering Cylinder

Dismantling of Steering Cylinder

1 Place cylinder on V-block and lock Cap end cover mounting .

2 Open the Head End Cover Locking and unscrew the head end cover using tool recommended in Assembly drawing.

3 Take out the piston rod sub assembly.

4 Lock Rod eye mounting with a bar.

5 Unscrew the Piston nyloc nut with help of right size spanner.

6 Slide out the piston.

7 Take out the Head end cover by sliding on piston rod.

8 Inspect all components and seals for any damages and replace damaged parts.

Tools Recommended			
Part No	Tools	Size	Torque
3	Hook Spanner	Standard	Manual
5	Spanner	50	50-55 kgf-km

Note: Apply loctite 242/ Anabond 118 on piston rod threads.

Assembly of Steering Cylinder

1 Clean all components of cylinder thoroughly

2 Assemble seals on Piston and Head end cover as shown in drawing.

3 Slide head end cover on piston rod.

4 Slide Piston on Piston rod end step.

5 Screw in Nyloc Nut on piston rod to recommended torque.

6 Assemble Piston Rod sub assembly into tube sub assembly with out damaging the piston seal.

7 Tighten the Head end cover.

8 Apply thread locker wherever required as recommended in drawings.

9 Mount cylinder and test cylinder in low idle for air bleeding.

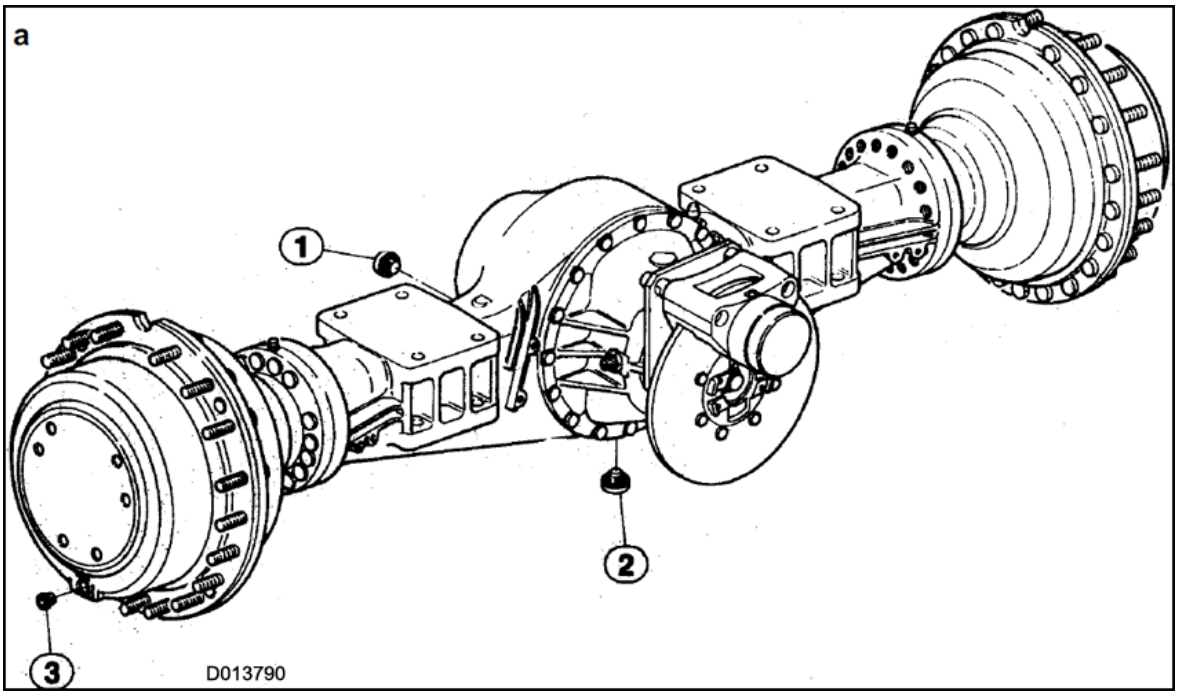


Fig 3.

Place the oil level plug (3) by rotating drive unit of 90° so to position “OIL LEVEL” writing horizontal and fill up to have oil overflowing, refit plug ⇨ *Fig 4. (F-4)*

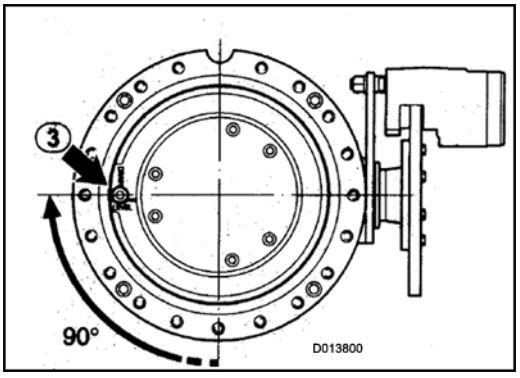


Fig 4.

Important: *Dispose of used oil in accordance with specific local regulation.*

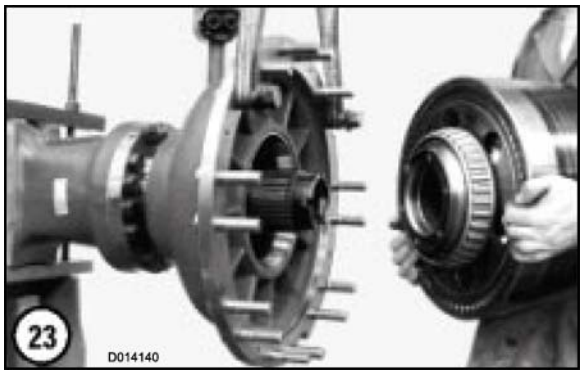


Fig 41.

Pry off lock ring from ring gear by a screw-driver ⇨ *Fig 42. (F-14)*.

Fig 42.

Remove ring gear support ⇨ *Fig 43. (F-14)*.

Fig 43.

Should inner race (of wheel outer bearing) be replaced, it has to be removed by a puller or remover.

Re-assemble by an heating equipment or proper tool ⇨ *Fig 44. (F-14)*.

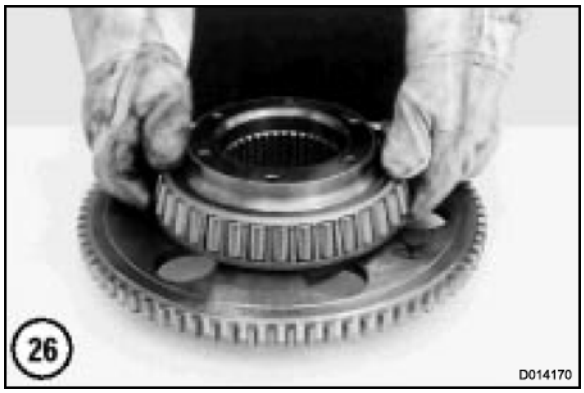


Fig 44.

Remove piston; it's easier by blowing com-pressed air in brake oil delivery ducting ⇨ *Fig 45. (F-15)*.

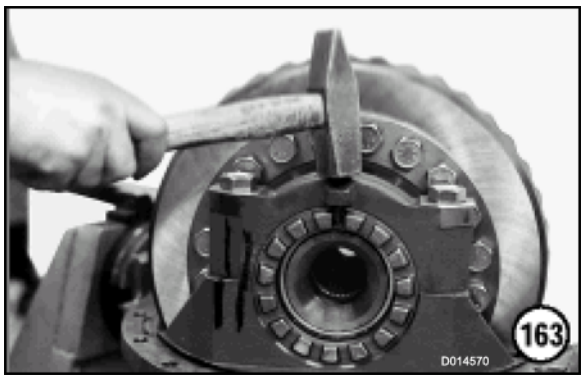


Fig 82.

Lock fixing screws to bevel gear with a tor-que of 31.5 ÷ 34.5 kgm ⇨ *Fig 83. (F-24)*.

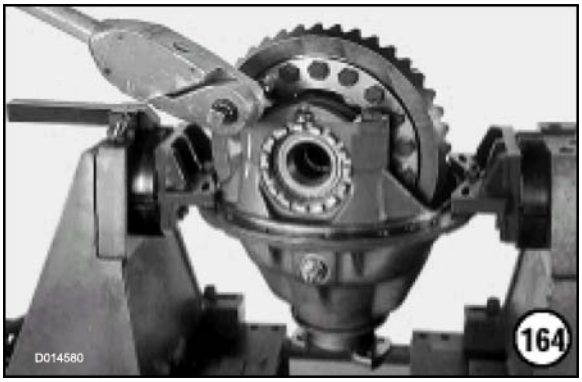


Fig 83.

Apply sealing compound on deflection pin of bevel gear, screw in till bevel crown contact; unscrew with ~ 60° to create the play reque-sted and fix the lock nut with screw in position ⇨ *Fig 84. (F-24)*.

Fig 84.

Perform the two securing notches on pinionnut. Clean throughly contact surfaces, apply hard locking compound and then install differen-tial unit on axle case. Lock the connecting screws with a torque of21 ÷ 23 daNm ⇨ *Fig 85. (F-24)*.

Fig 85.

Rear Axle Final Drive overhauling and re- assembling

Refit wheel hub, fit wheel bearing outer races, make sure of their proper seating; then position wheel bearing inner race with roller cage prior press fitting lip seal.

Note: *Smear Loctite 573 or equivalent sea-lant on outer diameter surface.*

Remove and replace O-Ring seals on piston ⇨ *Fig 86. (F-25)*.

MAX-TRAC

MAX-TRAC SECTION

1 Half case

2 Thrust washer of planetary gear

3 Planetary gear

4 Bevel thrust washer of side gear

5 Side gear

6 Half case

7 Spider

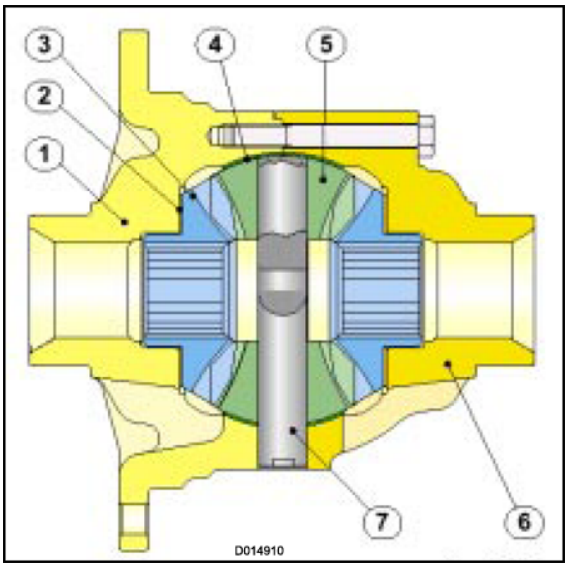


Fig 114.

Release the bolts of the two half cases ⇒ *Fig 115. (F-34)*.

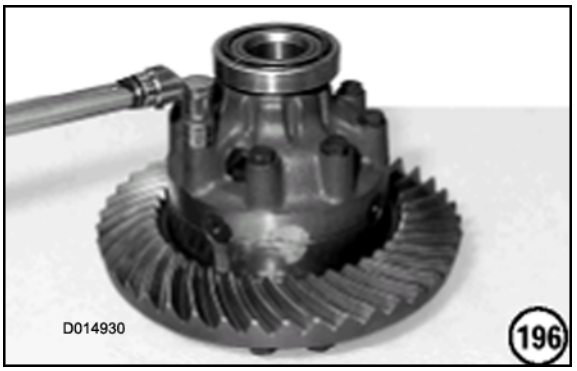


Fig 115.

Mark the two half-cases, the spider and open it ⇒ *Fig 116. (F-34)*.

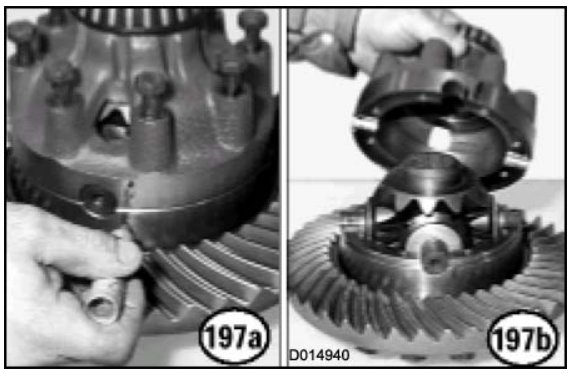


Fig 116.

Remove spider with the four side gears and relevant thrust washers ⇒ *Fig 117. (F-35)*

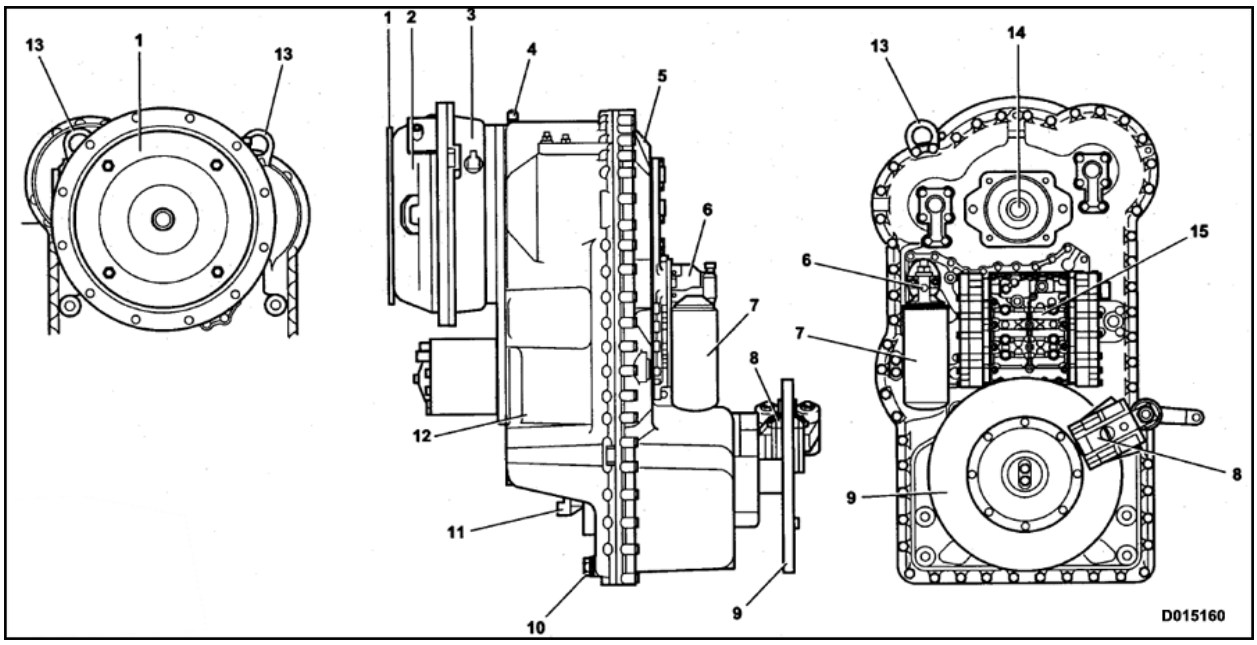


Fig 135.

Table 3.

Key	
1	Input drive plate
2	Torque converter
3	Converter bell housing
4	Breather
5	Cover - transmission case
6	Filter head
7	Filter
8	Parking brake caliper
9	Output drive flange/ brake disc to front axle
10	Magnetic oil drain plug
11	Output drive flange to rear axle
12	Transmission case
13	Lifting lugs
14	Hydraulic pump mounting
15	Electro- hydraulic control unit

E3	Short circuit to battery voltage at display output.	Cable or connectors are defective and are contacted to battery voltage.	Check cables from TCU to the display.
			Check the connectors at the display.
			Change display.
E4	Short circuit to earth at display output.	Cable or connectors are defective and are contacted to vehicle earth.	Check cables from TCU to the display.
		Display has an internal defect.	Check the connectors at the display.
			Change display.
F1	General EEPROM fault.	TCU is defective.	Replace TCU
F2	Configuration lost.	Interference during saving data on non volatile memory.	Reprogramme the correct configuration for the vehicle (eg. with cluster controller).
F3	Application error.	Something in the application is wrong.	Replace TCU.
F5	Clutch failure.	One of the AEB values is out of limit.	Check clutch.
F6	Clutch adjustment data lost.	Interference during saving data on non volatile memory.	Execute AEB.
		TCU is brand new or from another vehicle.	

Brake

Brake Circuits, Valves and Pedals

Removal and Replacement

Note: The articulation lock must be fitted before any maintenance is done on the machine. This will prevent anyone getting crushed between the two parts of the chassis.

Removal

1 Park the machine on firm, level ground. Apply the parking brake and stop the engine. Securely chock all four wheels. Repeatedly apply and release the service brakes and parking brake until all the pressure in the accumulators is exhausted.

⚠ WARNING

Before disconnecting any part of the brake hydraulic system, make sure that engine is switched off and hydraulic pressure is fully discharged.

BRAK-3-1

⚠ WARNING

A minimum of 10 applications of the service brake is possible from the stored accumulator pressure. Disconnect service brake accumulator hoses with extreme caution.

BRAK-3-2

2 Disconnect and blank all hydraulic hoses having first identified them to ensure correct replacement.

3 Identify then unplug the electrical connections from the three pressure switches.

4 Remove the clip **1** from the foot brake push rod assembly.

5 Remove cap screws **2** and remove the valve from the bracket ⇒ *Fig 1. (G-1)*.

Replacement

1 Refit the valve by reversing the removal sequence.

2 When connecting the foot pedal linkage, adjust clevis **3** to take up any slack in the valve push rod.

Note: *If there are two holes in the brake pedal lever, connect the valve push rod to the upper hole.*

3 After refitting the valve, start the engine and wait for a few minutes until the accumulators are charged. Bleed the service brakes as described in Bleeding the Brakes.

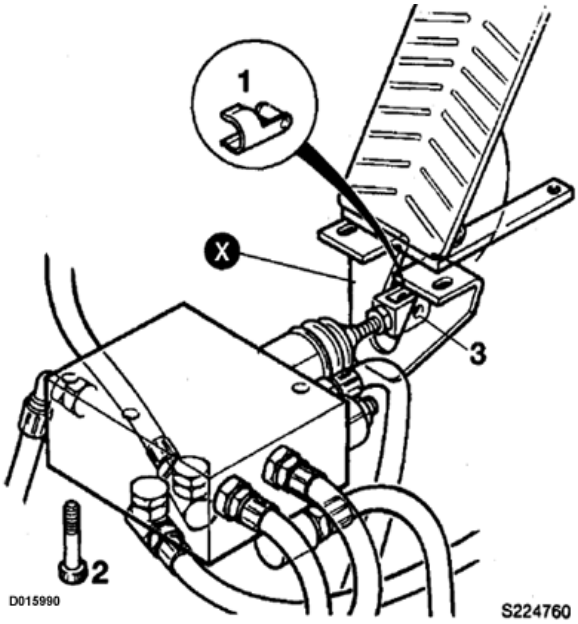


Fig 1.

Charging the Accumulators

⇨ *Fig 11. (G-11)*

System Testing

⚠ WARNING

Before working on the brake system make sure the machine is on level ground and chock all four wheels.

BRAK-1-4

Note: *The articulation lock must be fitted before any maintenance is done on the machine. This will prevent anyone getting crushed between the two parts of the chassis.*

⚠ WARNING

Before disconnecting any part of the brake hydraulic system, make sure that engine is switched off and hydraulic pressure is fully discharged.

BRAK-3-1

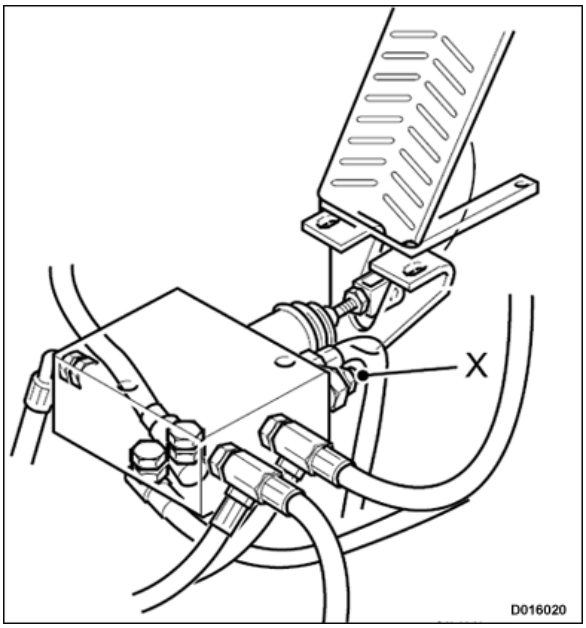


Fig 11.

1 Switch off the engine and operate the brake pedal repeatedly to make sure that all hydraulic pressure stored in the accumulators is discharged.

2 Disconnect one of the service brake accumulator hoses from the brake valve. Make up an adaptor to connect Pressure Test Gauge Kit 892/00253 between the valve and the accumulator hose.

3 Switch on the engine and check the gauge reading which should rise to the Pressure Regulator Cut-out Pressure. (See Technical Data.) Operate the service brake pedal repeatedly with the engine running and check that the gauge reading does not fall below the Pressure Regulator Cut-in Pressure. (See Technical Data.)

4 Switch on the engine and check the gauge reading which should rise to the Pressure Regulator Cut-out Pressure. (See Technical Data.) Operate the service brake pedal repeatedly with the engine running and check that the gauge reading does not fall below the Pressure Regulator Cut-in Pressure. (See Technical Data.)

Stop the engine and operate the service brake pedal a few times. The accumulator pressure should fall only slightly with each brake application. If the pressure falls drastically, it is likely that the accumulators need recharging with nitrogen gas. Repeat this test for the other brake circuit.

Note: *The pressure differential cannot be adjusted*

Testing the System Pressure (Remote Test Point)

1 Switch off the engine and operate the brake pedal repeatedly to make sure that all hydraulic pressure stored in the accumulators is discharged.

2 Connect Pressure Test Gauge Kit 892/00253 to the remote test point beneath the engine cover.

3 Switch on the engine and check the gauge reading which should rise to the Pressure Regulator Cut-Out pressure. (See Technical Data) As soon as this pressure is reached, the gauge reading will fall to zero. Record the maximum pressure obtained.

Note: *Provided there are no leaks on the system and the brake* pedal is not applied the gauge reading will remain at zero. Once the system's maximum pressure has been

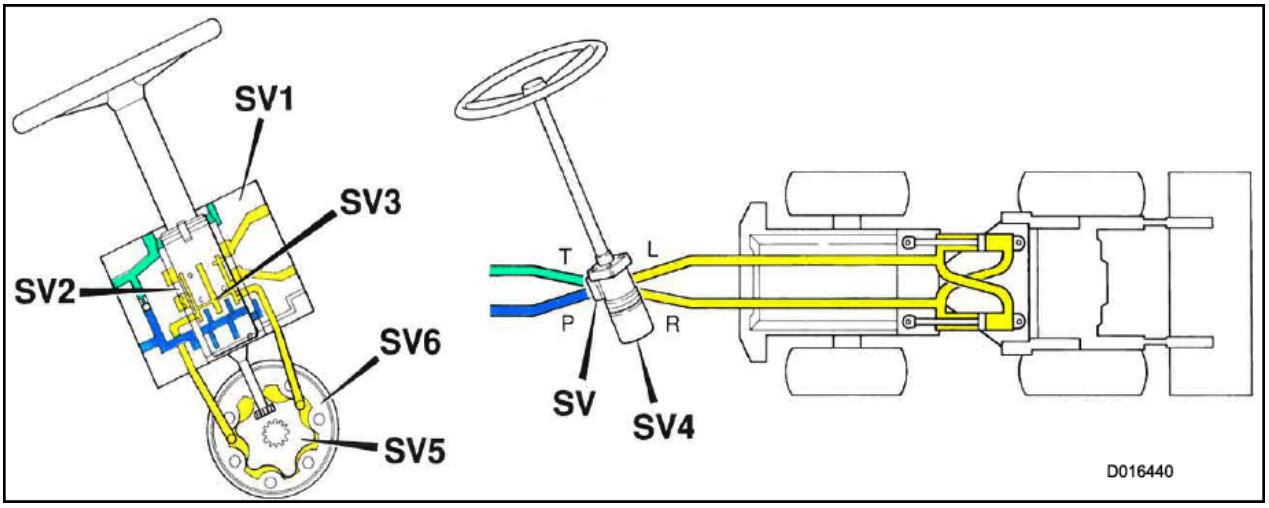


Fig 1.

Description

⇒ *Fig 2. (H-2)*

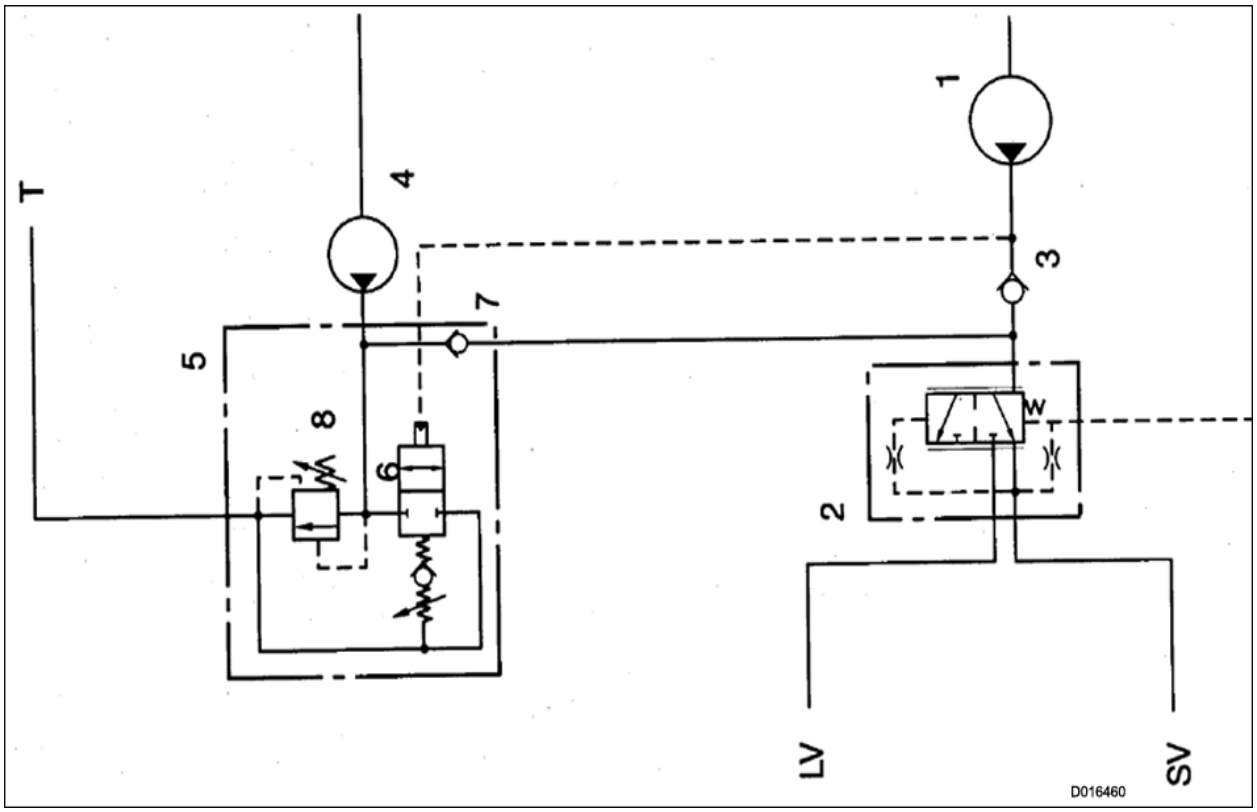
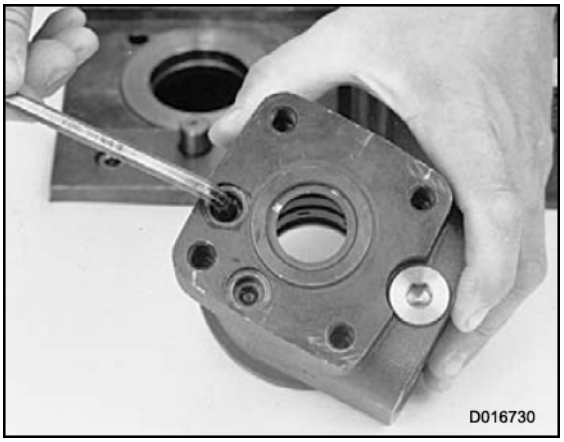


Fig 2.



Shake out the two springs and two valve balls into your hand. The valve seats are bonded into the housing and cannot be removed. ⇒ *Fig 29. (H-12)*

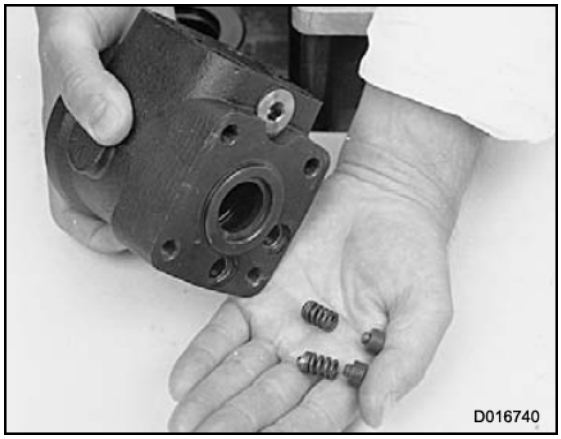


Fig 29.

The shock valves are now dismantled. ⇒ *Fig 30. (H-12)*

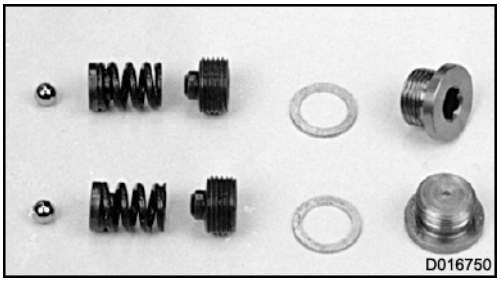


Fig 30.

Screw out the plug using and 8 mm hexagon socket spanner. Remove seal washers. ⇒ *Fig 31. (H-12)*

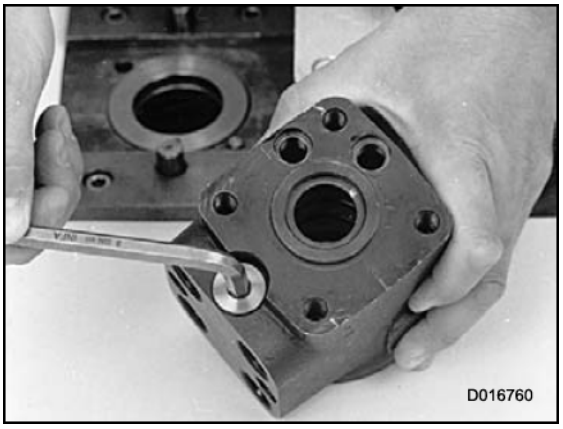


Fig 31.

Unscrew the setting screw using an 8 mm hexagon socket spanner.⇒ *Fig 32. (H-12)*

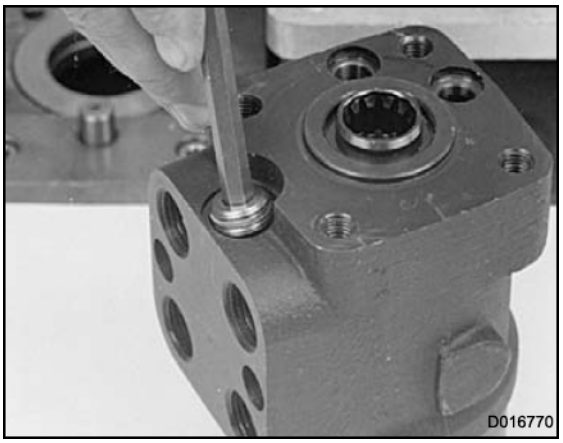


Fig 32.

Shake out spring and piston. The valve seat is bonded into the housing and cannot be removed. ⇒ *Fig 33. (H-13)*