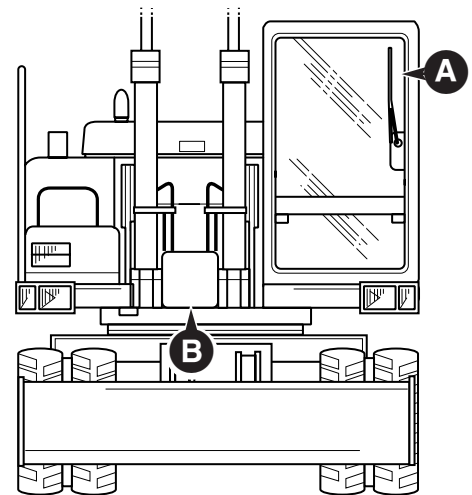


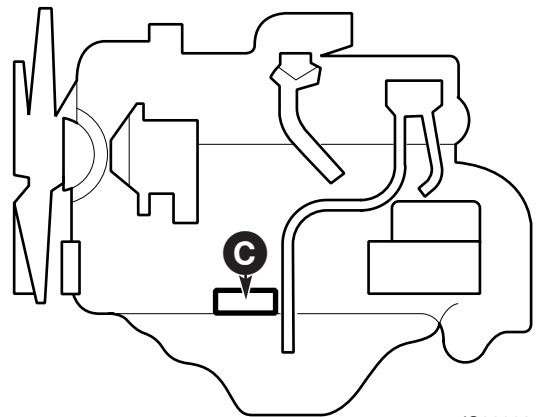
Machine Serial Plates

Each machine has a Data Plate, located to the rear left, inside the cab as shown at **A**. The machine serial number is inscribed at **B** and the engine number at **C**.

If the engine is replaced by a new one, the data plate serial number will be wrong. Either stamp the new number on the plate or stamp out the old one. This will prevent the wrong number being quoted when ordering replacement parts.



JS06050

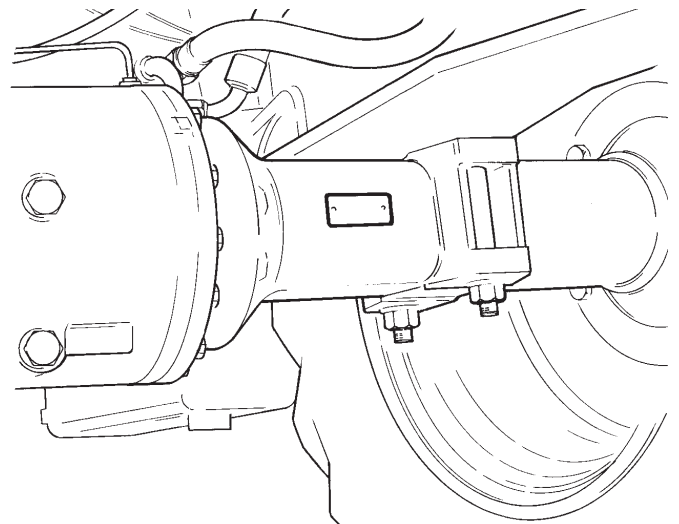


JS06060

Axle Serial Plate

The axle serial number is stamped on a plate mounted to the rear face of the axle, as shown.

- 1 When replacement parts are required, always ensure that the correct parts are obtained, e.g. in the case of gear replacements, always check the part number stamped on the gear, and the number of teeth.
- 2 When ordering replacement parts, quote the details on the serial plate as shown.



S156570

Torque Settings

Note 1: The figures quoted are for non-plated fasteners and are to be used only when there is no torque setting specified in the relevant procedure in this service manual.

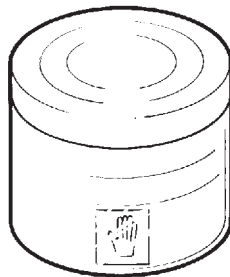
Note 2: The 4T grade settings DO NOT APPLY to fasteners used on the engine. If any 4T specification fasteners are found on the engine, these must be tightened to the figure quoted in the relevant engine manual.

Bolt Size	Strength Grade of Bolt or Stud											
	4T			8.8			10.9			12.9		
	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft	Nm	kgf m	lbf ft
M3	0.39	0.04	0.28	-	-	-	-	-	-	-	-	-
M4	0.78	0.08	0.57	-	-	-	-	-	-	-	-	-
M5	1.67	0.17	1.2	-	-	-	-	-	-	-	-	-
M6	2.84	0.29	2.1	8.04	0.82	5.9	11.3	1.15	8.3	-	-	-
M8	7.06	0.72	5.2	19.6	2.00	14.5	27.7	2.82	20.4	48.0	4.9	35
M10	14.0	1.43	10.3	39.1	3.99	28.8	55.0	5.61	40.6	94.0	9.6	69
M12	24.6	2.51	18.1	68.5	6.98	50.5	96.2	9.81	71	166	16.9	122
M16	61.9	6.31	45.7	173	17.6	127.6	242	24.7	178.5	400	40.8	295
M20	122	12.4	90	337	34.4	249	475	48.4	350	-	-	-
M22	167	17.0	123	464	47.3	342	652	66.5	481	-	-	-
M24	210	21.4	155	584	59.5	431	821	83.7	606	-	-	-
M27	311	31.7	229	864	88.1	637	1220	124	900	-	-	-
M30	420	42.8	310	1170	119	863	1650	168	1217	-	-	-
M33	576	58.7	425	1600	163	1180	2260	230	1667	-	-	-
M36	736	75.1	543	2050	209	1512	2880	294	2124	-	-	-
M39	961	98.0	709	2680	273	1977	3760	383	2773	-	-	-
M42	1190	121	878	3300	336	2434	4640	473	3422	-	-	-
M45	1490	152	1099	4140	422	3054	5820	593	4293	-	-	-
M48	1780	182	1312	4960	506	3659	6970	711	5141	-	-	-

* **Note:** All bolts are high tensile and must not be replaced by bolts of a lesser tensile specification.

Service Tools

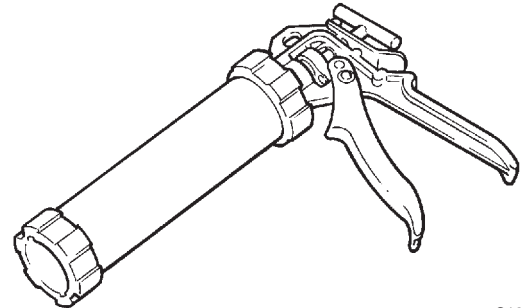
Body and Framework (Section B)



S186240

Hand Cleaner - special blend for the removal of polyurethane adhesives.

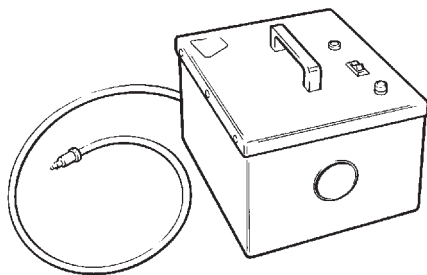
4104/1310 (454g; 1lb tub)



S186270

Cartridge Gun - hand operated - essential for the application of sealants, polyurethane materials etc.

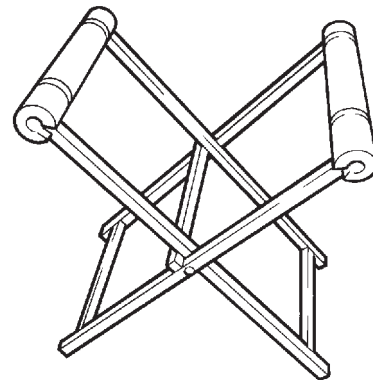
892/00845



S186250

12V Mobile Oven - 1 cartridge capacity - required to pre-heat adhesive prior to use. It is fitted with a male plug (703/23201) which fits into a female socket (715/04300).

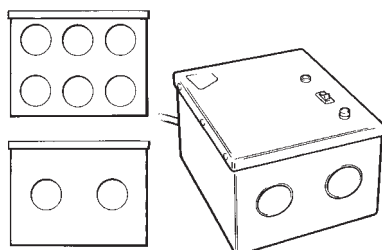
992/12300



S186280

Folding Stand for Holding Glass - essential for preparing new glass prior to installation.

892/00843

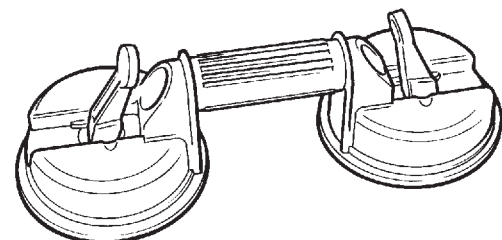


S186260

240V Static Oven - available with 2 or 6 cartridge capacity - required to pre-heat adhesive prior to use. No plug supplied. Note: 110V models available upon request - contact JCB Technical Service

992/12400 - 2 cartridge x 240V

992/12600 - 6 cartridge x 240V



S186300

Glass Lifter - minimum 2 off - essential for glass installation, 2 required to handle large panes of glass. Ensure suction cups are protected from damage during storage.

892/00842

Every 500 Operating Hours or 3-Monthly Whichever occurs first

- 1 Do a 250 hour service plus:
- 2 Clean
 - a Radiator, grille and oil cooler fins.
- 3 Grease
 - a Slew ring teeth and slew pinion.
 - * b Axle pivot and steering joints.
(JCB HP Grease should be used on all axle grease points. If an alternative grease is used the service interval must be reduced to 50 hours or weekly.)
- 4 Change
 - a Engine oil.
 - b Engine oil full flow filter elements.
 - c Fuel filter element.
 - d Engine oil filter by-pass element.
 - e Front axle hub oil.
 - f Rear axle hub/differential oil.
- 5 Check (Engine Stopped)
 - a Exhaust system security.
 - * b Propshaft +.
 - * c Servo accumulator operation +.
 - * d Brake accumulator operation +.
 - e Hydraulic oil (check the degradation and cleanliness by sampling).
 - f Seat belt condition and security.
 - g Teeth and sidecutters.
- 6 Check (Engine Running)
 - a Operation of throttle system.
 - b Operation of overload warning.
 - c Operation of stop control.

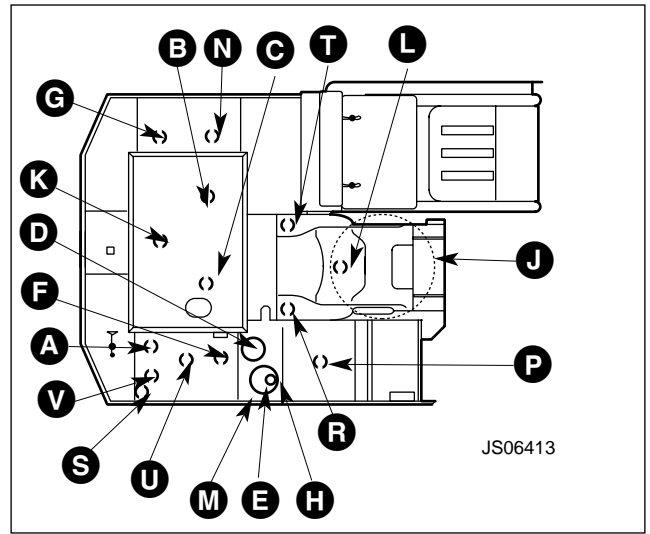
Every 1000 Operating Hours or 6-Monthly Whichever occurs first

- 1 Do a 500 hour service plus:
- 2 Clean
 - a Fuel lift pump strainer.
 - b Hydraulic fluid suction strainer.
- 3 Grease
 - a Replenish slew gearbox grease.
- 4 Change (Engine Stopped)
 - a Engine air filter element (outer).
 - b Hydraulic tank air breather element.
 - c Slew gearbox oil.
 - d Return filter element †††.
 - e Nephron filter †††.
 - f Servo oil filter element †††.
 - g Drain filter †††.
 - h Front axle differential oil.
 - * j Steering line filter element †††.
- 5 Check (Engine Stopped)
 - * a Hub brake friction plates for wear.
Renew as necessary +.

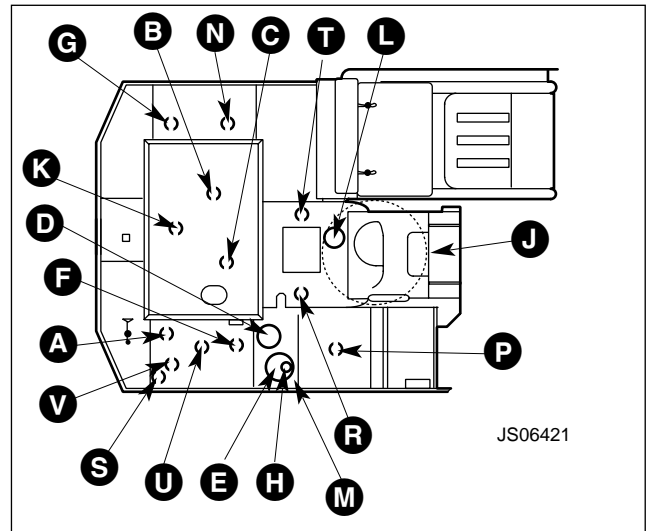
Every 2000 Operating Hours or Yearly Whichever occurs first

- 1 Do a 1000 hour service plus:
 - 2 Clean
 - * a Injectors (and test) +.
 - 3 Check (Engine Stopped)
 - a. Valve clearance and lubrication.
 - b Sample hydraulic oil and replace if necessary.
 - 4 Change
 - a Hydraulic fluid suction strainer.
 - b Engine air filter element (inner).
 - c Drive gearbox oil.
- ††† If using a breaker or crusher, see **Revised Service Schedules - Rockbreaker or Crusher Usage** in this section.
- * + Indicates jobs which should be done by a specialist.

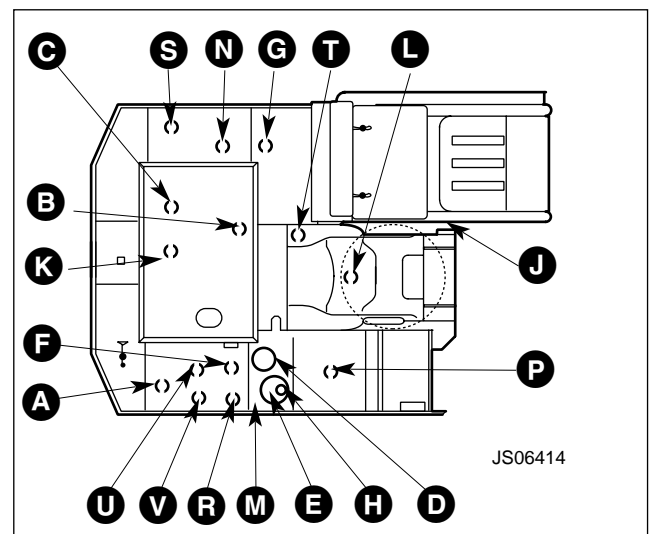
- A - Steering Filter
- B - Fuel Filter
- C - Engine Oil Filter
- D - Hydraulic Return Filter
- E - Hydraulic Suction Filter
- F - Hydraulic Drain Line Filter
- G - Air Filter
- H - Hydraulic Oil Tank Filler Cap/Air Breather
- J - Slew Ring Gear
- K - Engine Oil Sump Drain Plug
- L - Slew Motor/Gearbox
- M - Hydraulic Oil Tank
- N - Engine Cooling Radiator
- P - Fuel Tank Filler Cap
- R - Water Separator
- * S - Plexus Filter
- T - Breaker In-line Filter (if fitted)
- U - Hydraulic Pump
- V - Hydraulic Servo Oil Filter



JS130W/145W



JS160W



175W

System Diagnosis (cont'd)

Air in System

Gauge Readings:

Low Side Gauge - High.
High Side Gauge - High.

Other symptoms:

Sight Glass - Bubbles visible during system operation.

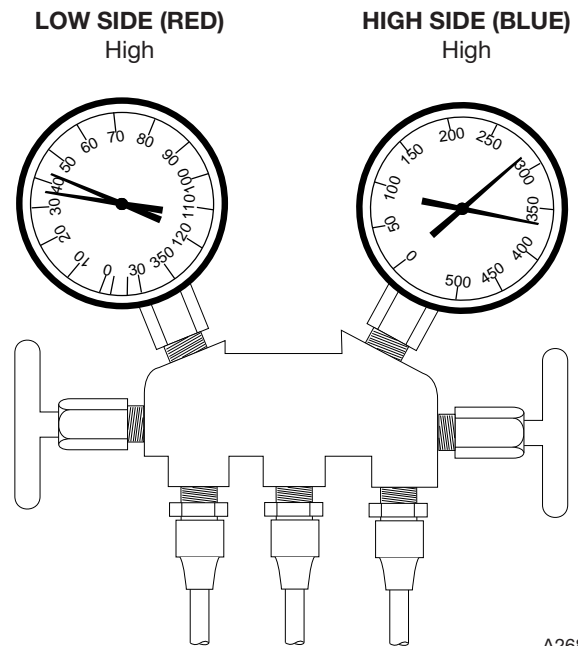
Pipes - Low pressure pipes are hot to the touch.

Diagnosis:

Air is present in the system, possibly from inadequate evacuation procedure.

Correction:

1. Evacuate A/C system.
2. Check compressor oil for contamination. Check compressor for proper oil amount. Correct if necessary.
3. Charge system with R-134a.
4. Operate system and check performance.



A268070

LOW SIDE - 2.8 bar (2.8 kgf/cm²)(40 lbf/in²)
 HIGH SIDE - 22.1 bar (22.5 kgf/cm²)(320 lbf/in²)

Expansion Valve Improperly Mounted or Heat Sensing Tube Defective (Opening Too Wide)

Gauge Readings:

Low Side Gauge - High.
High Side Gauge - High.

Other symptoms:

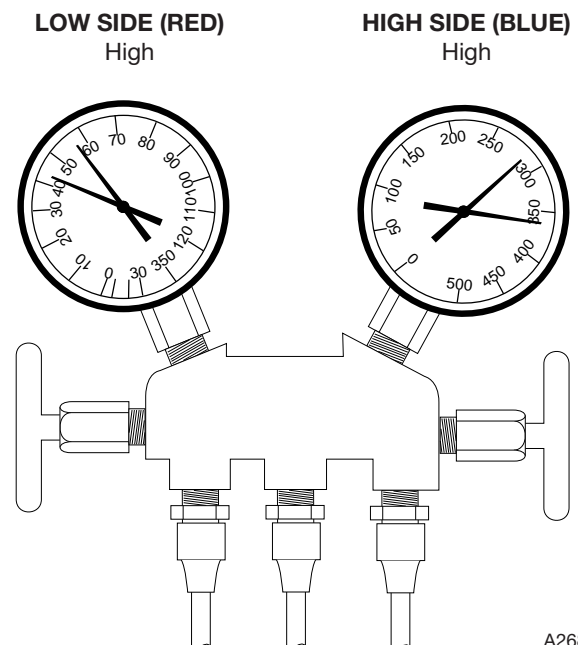
Pipes - Large amount of frost or moisture on low side pipes.

Diagnosis:

Excessive refrigerant in low side pipes possibly from expansion valve being opened too wide.

Correction:

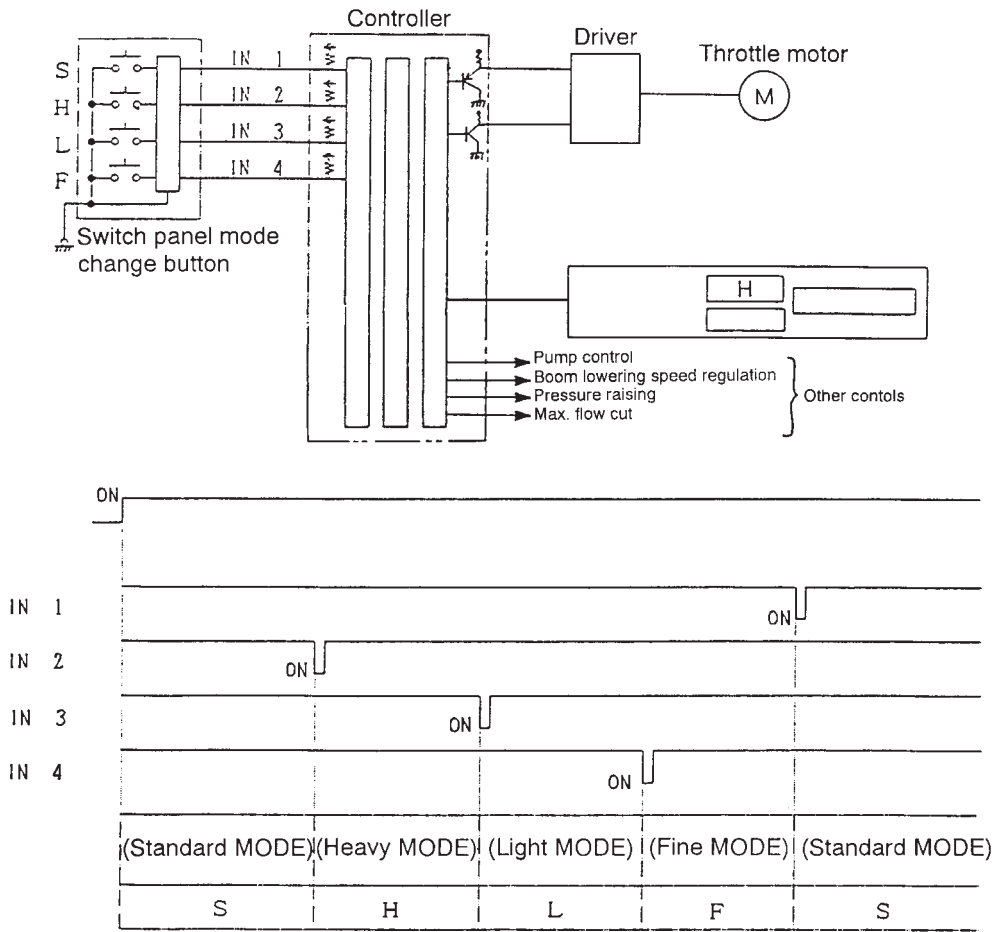
1. Leak test system.
2. Evacuate A/C system.
3. Repair system leaks.
4. Charge system with R-134a.
5. Operate system and check performance.



A268080

LOW SIDE - 3.5 bar (3.5 kgf/cm²)(50 lbf/in²)
 HIGH SIDE - 22.1 bar (22.5 kgf/cm²)(320 lbf/in²)

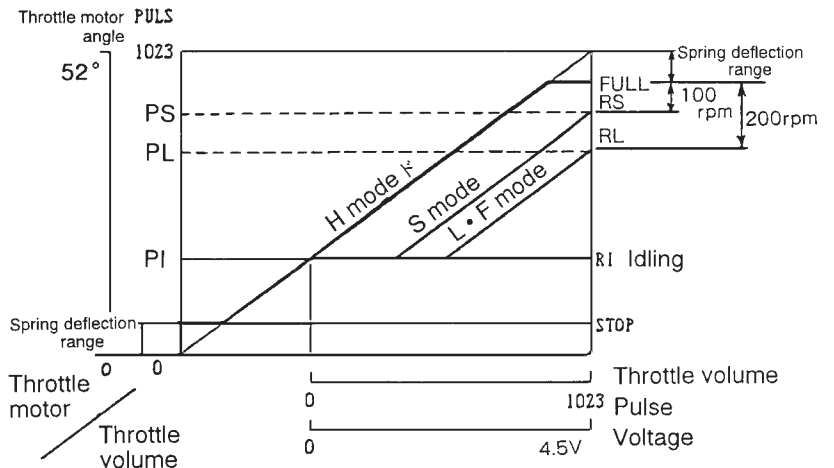
Revolution Control for Each Mode



The machine is in the standard mode when the key switch is **ON**. This position is 100 rpm less than the **FULL** rotational position (H mode). Also note the position where it has decreased by 200 rpm from **FULL** rotation in **L** and **F** modes.

Relation of throttle volume and pulse are shown in diagram below. Even though the position of throttle volume is the same, engine RPM varies with each mode.

However, when pressing a mode switch button, the above four modes can be selected together with their corresponding engine RPM.



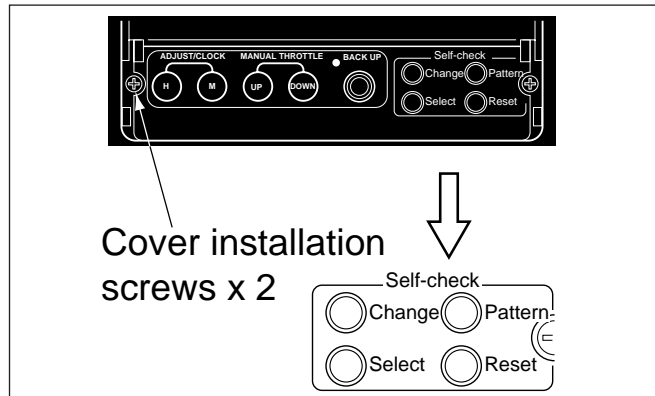
Self Test Function (continued)

Each item is changed with the Self Check Switches located on the right hand side of the back-up switch.

There are four Self Check Switches

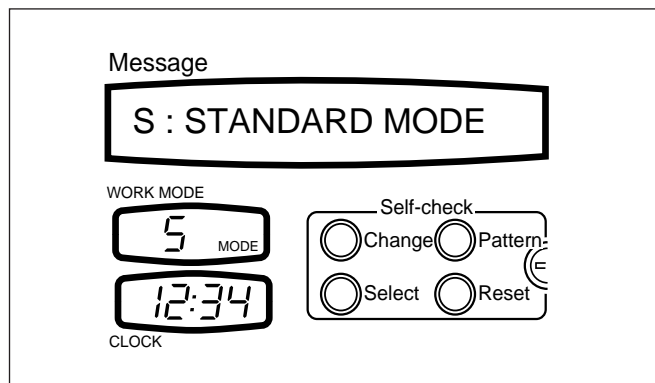
- 1 The **CHANGE** switch which is used to change to the self-check mode.
- 2 **PATTERN** switch which changes from the service check function to the setting function.
- 3 **SELECT** switch which moves from item to item.
- 4 **RESET** which locks the set values into the controller.

This set of four switches is usually covered so that the operator cannot accidentally operate them.



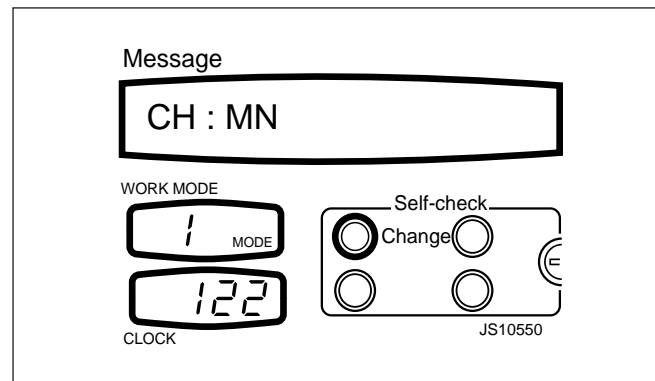
Checking Methods

When the engine key is inserted and turned to the **ON** position, the "**STANDARD MODE**" is displayed in the Message display section, and **S** is displayed in the **WORK** mode section and the **TIME** is displayed in the **CLOCK** display.



When the **CHANGE** switch is pressed the Model designation is displayed:

- 122 = JS130W
- 152 = JS160W



Fault Diagnosis (continued)

Engine Trouble, Problem No 11 (continued)

Troubleshoot	Cause	Remedy
<p>Key switch ON</p> <p>Is fuel cut lever on stop side</p> <p>YES</p> <p>NO</p> <p>Remove the stop motor connector and connect female side (cab side) to service connector (6 pin). Measure voltage between LR and ground, connecting LR to + and ground to -. Is it within the range of 20~30V.</p> <p>NO</p> <p>Remove the stop motor connector and attach service connector to female side. Confirm continuity between L and LW. Is the following true? Key switch ON: Continuity Key switch OFF: ∞∞</p> <p>YES</p> <p>NO</p> <p>Measure voltage between shut down relay 1 connector L and ground, connecting L to + and ground to -. Is the following true? Emergency stop button ON: 0V Emergency stop button OFF: 20~30V</p> <p>NO</p> <p>YES</p> <p>To judge if relay is defective or not, interchanging the relay with one in the centralized relay is another method.</p>	<p>Engine system Abnormality</p> <p>Breakage of LR wiring between stop motor connector and CND or between CND and fuse</p> <p>Stop motor defect</p> <p>Shut down relay defect</p> <p>Shut down relay 2 Defect or breakage of L wiring between shut down 1 and 2</p>	<p>Inspect engine system.</p> <p>Repair LR wiring.</p> <p>Replace stop motor.</p> <p>Replace shut down relay 1.</p> <p>Replace shut down relay 2 or repair L wiring.</p>

Stabilisers/Blade Auxiliary Relief Pressure

1 Prepare the Machine

a Put the operator levers into neutral and lower the gate lock lever. Start the engine and park the machine on level ground. Operate the dipper out and lower the boom to set the bucket on the ground. Lower the blade onto the ground. Stop the engine. Release the hydraulic oil tank pressure. (See **Releasing Tank Pressure**).

b Connect a 0 - 400 bar (0 - 6000 lb/in²) pressure gauge and adaptor to port G4 on the hydraulic pump (see view **A** on page 4 - 1).

2 Start the engine, lower the gate lock lever and run the engine at maximum no-load speed in the **S** mode.

3 Pressure Adjustment

Note: For accurate setting, the pressure should be adjusted **up** to the required level. Release lock nut **X**. Adjust setting screw **Y** to indicate a pressure below the required level and then bring the pressure back up for final setting. Tighten lock nut **X**.

a Press the dozer blade switch **C** to the right to select dozer operation.

b Raise the blade, and then continue to operate the control **D** lever at **A**.

c The pressure gauge reading should be compared to the technical data at the start of the section. If it is outside the limits, adjust ARV **J**.

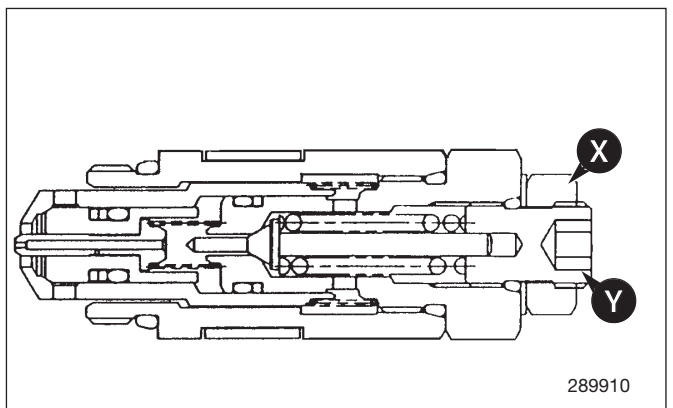
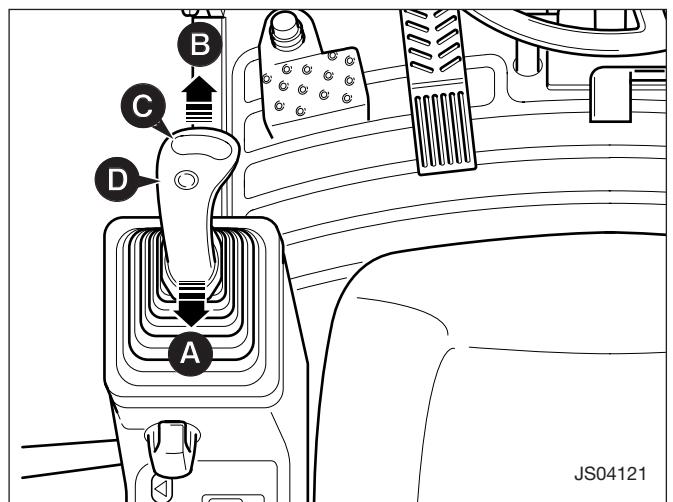
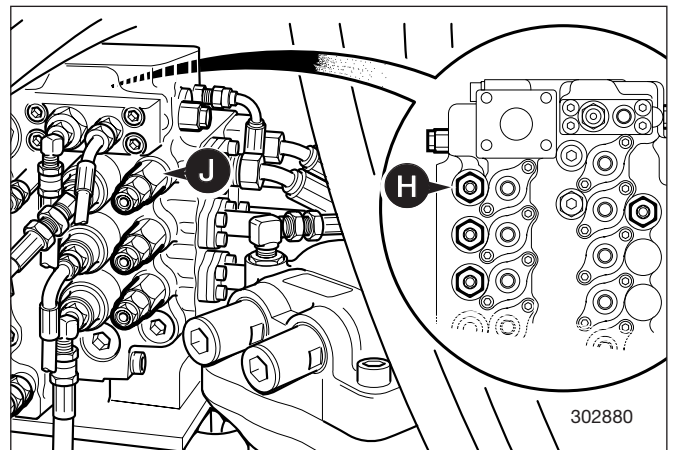
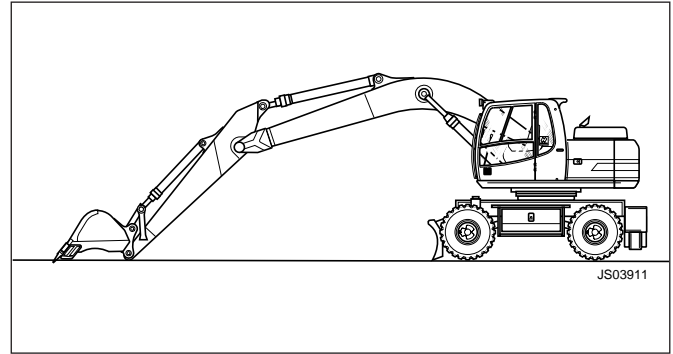
d Lower the blade fully and then continue to operate the control lever, as at **B**.

e Repeat step 4c and, if necessary, adjust ARV **H**.

4 If further ARV tests are necessary, carry out the relevant procedures detailed in this section. If no further ARV tests are required, restore the MRV pressure setting to its original value (see **Auxiliary Relief Valve, General**, step 3).

5 Press the dozer blade switch to the left to return the control to the excavator. Check that the dozer lamp goes out.

6 Stop the engine and release the hydraulic pressure (see **Releasing Tank Pressure**). Remove the pressure gauge and adaptor.



Assembly

Clean each part in a suitable solvent and dry using compressed air.

Inspect all parts and renew as required.

Care must be taken not to let dust or dirt adhere to parts after cleaning and that parts do not become dented, scratched or damaged.

Fit new 'O'-rings, plugs, packing, oil seals and fastener seals.

Apply Lithium grease to all new oil seals (particularly the lip areas) and 'O'-rings, and clean hydraulic fluid to all sliding parts before installation.

All tapped holes and gasket faces should be thoroughly degreased by washing, as liquid packing and adhesive is used on all gasket surfaces and threads.

Apply adhesive to the final few threads of a bolt or screw. Do not apply excessive amounts of adhesive. Wipe off any surplus.

Leave the pump for at least twelve hours after assembly to allow the adhesive to dry fully.

Ensure that all components are re-fitted to the positions from which they were removed, paying particular attention not to intermix components from identical sets front and rear.

- 1 Install regulator piston **23** and bridging piece **29** into the front of pump housing **1**.

Note: Make sure the bridging piece is orientated as shown on page 17 - 9.

- 2 Fit 'O'-ring **82** and back-up ring **94** to stopper **24**. Insert the stopper into pump housing **1**.

Fit 'O'-ring **85** and back-up ring **95** to stopper **25**. Insert the stopper into pump housing **1**.

Note 1: Install stoppers **24** and **25** with the tapped centre holes facing outwards.

Note 2: The back-up ring is fitted to the end of the stopper nearest the tapped hole, with the 'O'-ring innermost.

Note 3: The stoppers must be fitted flush with the housing to prevent damage to the 'O'-rings.

- 3 Assemble the front piston/cylinder block assembly as follows:

- a Mount spring seat **20** on cylinder block assembly **4** followed by conical spring assembly **19** and retainer holder **12**.

- b Install piston assembly **6** into retainer plate **11** and insert the pistons in cylinder block assembly **4**.

- 4 Pass shaft **5** through cylinder block assembly **4** from the rear, double splined end first.

- 5 Insert pin **63** into the front side of the pump housing. Install valve plate **9**, stepped face outermost, so that the slot on its rear face locates the pin.

- 6 Install cylinder block **4**/shaft **5** assembly into pump housing **1** with the piston shoes outermost.

- 7 Using suitable blocks to allow the shaft to clear the work surface, position the pump housing on the bench, front end uppermost.

- 8 a Fit the two guide assemblies **21** and slide metal **22** to swash plate **7**.

Note: The hole in slide metal **22** is not central. Install with the hole furthest from the pistons.

- b Assemble swash plate **7** into the pump housing.

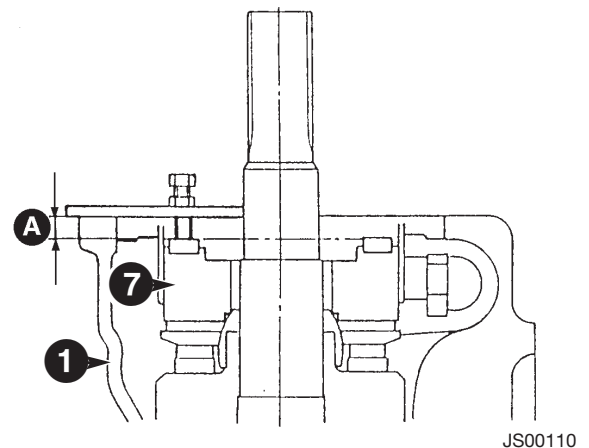
Note: Position regulator piston **23** with the groove for slide metal **22** in the centre and locate the two during assembly.

- 9 Using a suitable tool (see **Service Tools**, Section 1) and a press, fit bearing **3** onto shaft **5**.

Note: This job can be carried out by drifting the bearing into place, taking care not to scratch or damage the bearing, the shaft or any other parts.

- 10 Fit bearing cage/rollers **14** on swash plate **7**. Set guide assembly **21** in the cut-out of the bearing cage, standing upright.

- 11 Using a swash plate levelling jig (see **Service Tools**, Section 1), adjust swash plate **7** so that it is parallel with the outer face of pump housing **1**, by ensuring the same height **A** on the left and the right



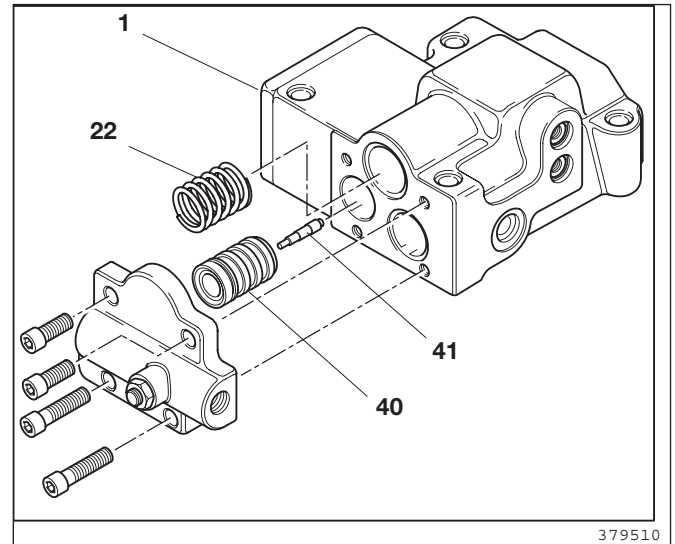
- 12 Install two guide rods (see **Special Tools**, Section 1) into opposite threaded holes in the pump housing flange.

Regulator (cont'd)**Dismantling and Assembly (cont'd)****Assembly (cont'd)**

- 10** Insert set spring **22** into hole **A** of regulator body.

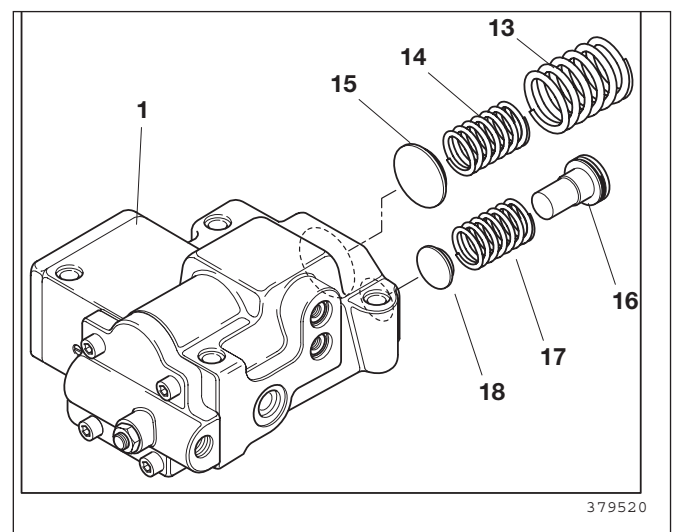
Insert compensating piston **41** and piston case **40** into hole **B** of regulator body **1**.

Fit pilot cover **21** and secure with socket head screws **19** and **20** tightened to a torque of 11.8 Nm (10.3 lbf ft).



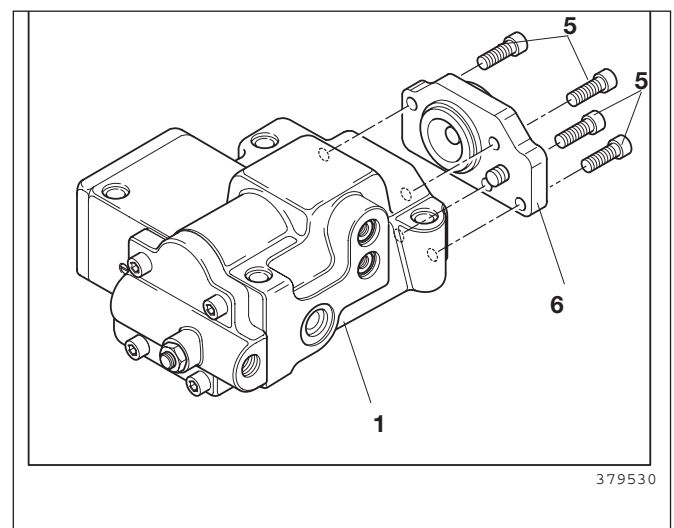
- 11** Insert spring seat **18** (flat face first), pilot spring **17** and adjusting ring **16** into hole **E** of regulator body **1**.

Insert spring seat **15** (flat face first) inner spring **14** and outer spring **13** into hole **D** of regulator body **1**.



- 12** Install the cover **6** assembly comprising adjusting screws **7/8**, adjusting ring **12**, mounting nut **11**, two locking nuts **10** and adjusting screw **9**.

Secure the cover using socket head screws **5** tightened to a torque of 11.8 Nm (10.3 lbf/ft).



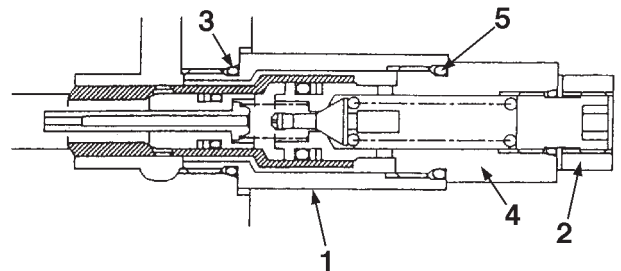
Overload Relief Valve

Dismantling

- 1 Slacken the valve housing **1** and remove complete from the control valve body.

Note: Because pressure adjustment is difficult, do not dismantle the adjusting screw **2** and poppet assembly.

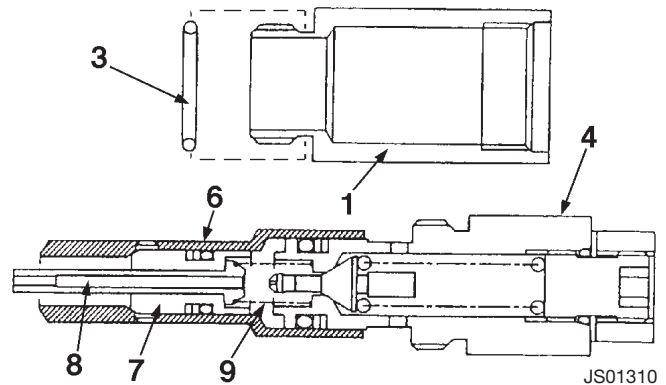
- 2 Remove 'O'-ring **3** and discard.
- 3 Slacken relief valve seat **4** and remove as a sub assembly.
- 4 Remove 'O'-ring **5** and discard.
- 5 Remove poppet housing sleeve **6**, piston **7**, poppet **8** and spring **9**.
- 6 Remove 'O'-rings and seals **10** and **11** and discard.



JS01300

Cleaning, Inspection

- 1 Clean all parts in clean oil and dry with compressed air. Inspect all parts.
- 2 Ensure piston **7** and poppet sleeve **6** move smoothly.
- 3 Check spring **9** has no defects, deformation or wear.
- 4 Remove slight defects by lapping.
- 5 Renew damaged or badly worn parts.



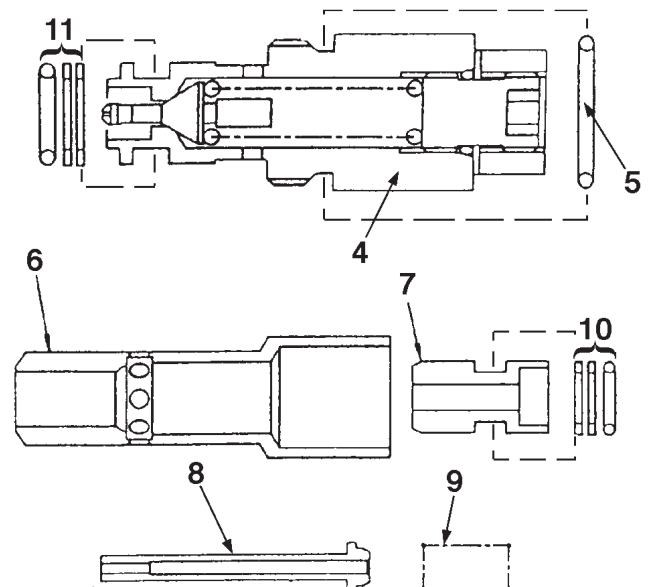
JS01310

Assembly

Assembly is the reverse of the dismantling procedure.

Torque Settings

- 1 39 Nm (29 lbf ft)
- 4 58 Nm (43 lbf ft)



JS01320

General (cont'd)

Dismantling and Assembly

Note: It is not usually necessary to remove an entire valve from the circuit piping. The cartridges themselves are basic service items and are usually easy to remove from their mounting for cleaning or replacement. However, seals and 'O' rings must always be discarded and replaced with new ones.

The valves shown in the illustrations opposite are typical of the types of valve fitted in the hydraulic system. The procedures for fitting, removing and servicing the cartridges are similar in each case. The torque figures for replacing the cartridges are detailed in the table below right.

Key

- A** Two cartridge valve, e.g. flow regulators and direct acting relief valves with check valves.
- B** Single cartridge valve, e.g. pressure reducing valves and sequence valves.
- C** Cross port relief valve.
- D** Multi cartridge valve, e.g. dual sequence valve with relief and check valves.

WARNING

Hydraulic Pressure

Hydraulic fluid at system pressure can injure you. Before disconnecting or connecting hydraulic hoses, stop the engine and operate the controls to release pressure trapped in the hoses. Make sure the engine cannot be started while the hoses are open.

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- 1 Stop the engine and operate the service controls to relieve system pressure.

WARNING

Gear Change Circuit Accumulators

The gear change circuit accumulators remain charged even when the main servo circuit has been vented. Do NOT remove the gear change/pilot circuit sequence valve or its components until these accumulators have been discharged as described under Gear Change Valve.

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- 2 Remove the cartridge from the body, catching any excess fluid in a suitable container. Plug the port and/or hoses as necessary.
- 3 Inspect the cartridge for visible signs of contaminants, carefully removing any obvious particles.
- 4 With the cartridge submerged in a suitable cleaning agent, operate the inner working parts with a piece of stiff plastic tubing. **Do not use sharp objects.**
- 5 After cleaning, blow dry with clean filtered air.

- 6 Replace all seals and 'O' rings. Dip the cartridge in clean hydraulic oil.
- 7 Re-install the cartridge and torque tighten to the figure given in the table.
- 8 When all cartridges are cleaned and re-installed, pressure test the system.

WARNING

Hydraulic Fluid

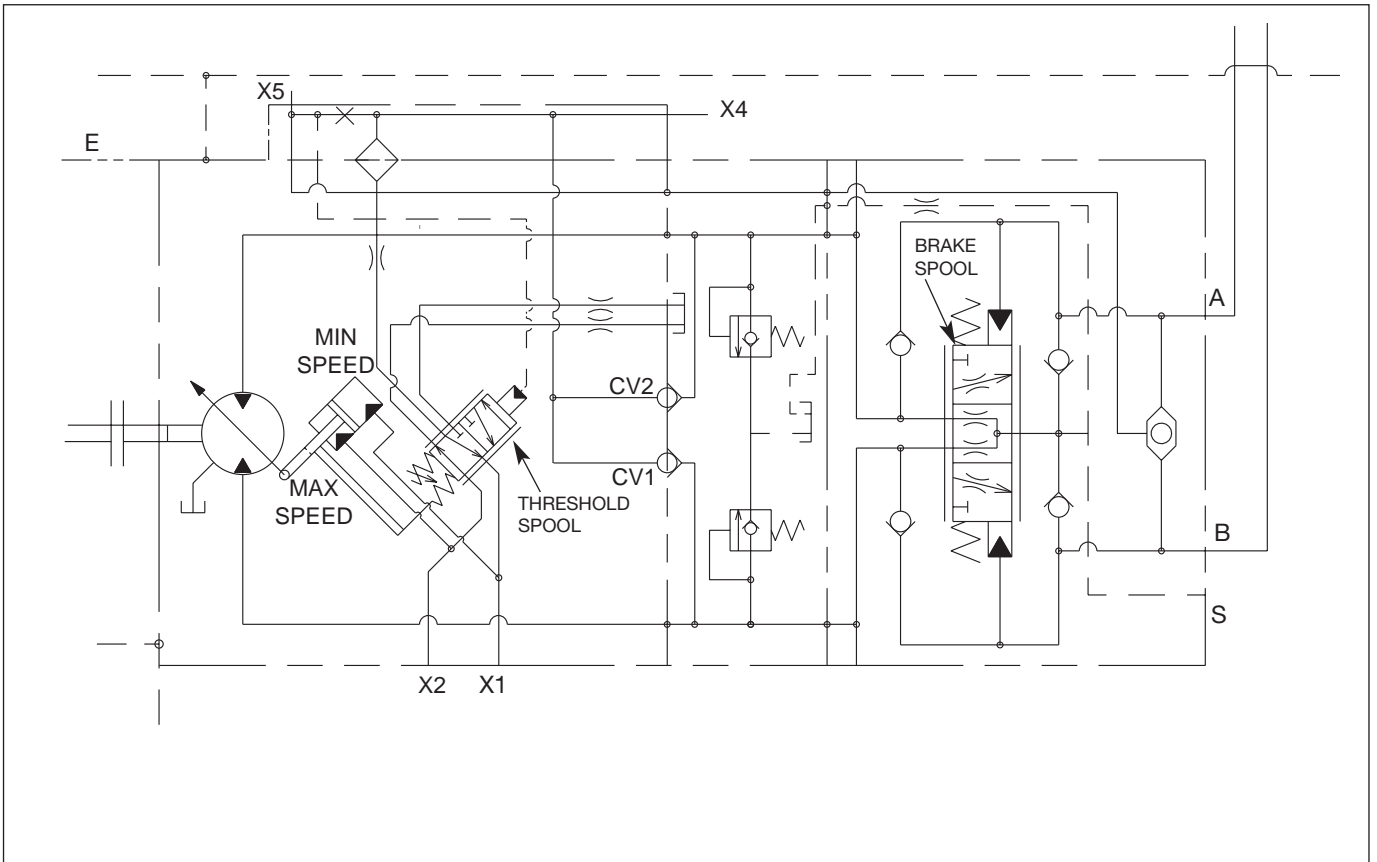
Fine jets of hydraulic fluid at high pressure can penetrate the skin. Do not use your fingers to check for hydraulic fluid leaks. Do not put your face close to suspected leaks and then inspect the cardboard for signs of hydraulic fluid. If hydraulic fluid penetrates your skin, get medical help immediately.

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- 9 If a cartridge does not function correctly, replace it with a new factory tested unit.

Service	Torque into Body	
	Nm	lbf ft
Cross Port Relief	40 - 50	30 - 37
Dual Sequence with relief	60 - 65	44 - 48
Dual Sequence with relief and Check	45 - 50	33 - 37
Direct Acting Relief with Check	40 - 50	30 - 37
Flow Regulator	45 - 50	33 - 37
Flow Regulator with Bypass Orifice	200 - 215	148 - 150
Pressure Reducer	45 - 50	33 - 37
Sequence Valve	45 - 50	33 - 37

Drive Motor Circuit schematic (JS 145W/JS175W)



Operation

Under normal non-inclined road conditions, oil enters at ports A and B (depending on the drive direction). At port A, oil pressure moves the shuttle and oil flows at system pressure to act on the threshold piston. The oil is allowed to pass through the motor and back to tank

Oil is available to the brake spool section. The flow is dead-ended at a check valve, but is available at the spool end, where it selects a spool. Oil passes through the other check valve, where it is dead-ended by the selected spool.

When the machine encounters an incline however, the operation changes. Oil still flows through the motor but, as the pressure starts to build up from the effect of the incline, this pressure starts to be felt at CV1 which allows oil to pass, at CV2, which closes off, the supply to the filter, through the orifice, across the spool to the Max speed /Min Flow side of the piston. The piston holds Max speed.

The pressure is felt at the spool end, but the spool does not select as the spring pressure holds it stationary. Oil from the other side of the piston is open to tank. As the pressure rises to match and overcome the spring pressure (threshold pressure), the spool will start to select.

The oil flow across the spool changes direction to feed the Min speed/Max flow side of the piston, this moving the piston in the opposite direction altering the swash angle to give maximum torque. The max side of the piston is then open to tank. The spool shuttles to match torque with road conditions.

When the machine travels down hill, the motor operation acts as a pump, the oil supply is insufficient to prevent cavitation within the motor. Negative pressure can lift the check valve and allow oil from tank to make up and prevent cavitation. The restrictions within the brake spool give the motor its braking effect by slowing the oil as it returns to tank.

Ports on Motor Body.

- X1** Gauge Port. Servo Piston Pressure (Max displacement side)
- X2** Gauge Port. Servo piston Pressure (Min displacement side)
- X4** Gauge Port. Servo supply Pressure (Before Orifice)
- X5** Gauge Port. System Pressure.

Ports A and B Main drive pressure hoses from valve block.

The threshold pressure can be adjusted to alter the point at which maximum and minimum displacement takes place. The adjustment screw gives a 57 Bar increase/reduction per one complete turn. Altering the threshold pressure will give varying amounts of torque and speed that will effect the machines road speed and also the machines ability to climb hills.

There is no external adjustment on the displacement limiter screw as on 130/160W machines. Although adjustment is still possible, it is done by the addition/removal of shims, internally.