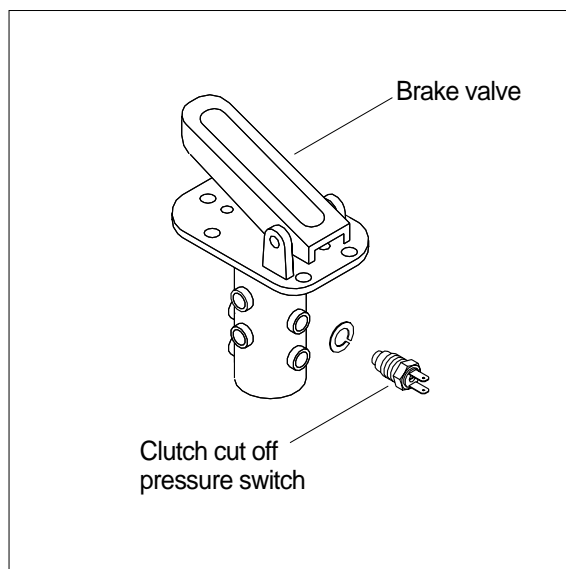


GROUP 3 TESTS AND ADJUSTMENTS

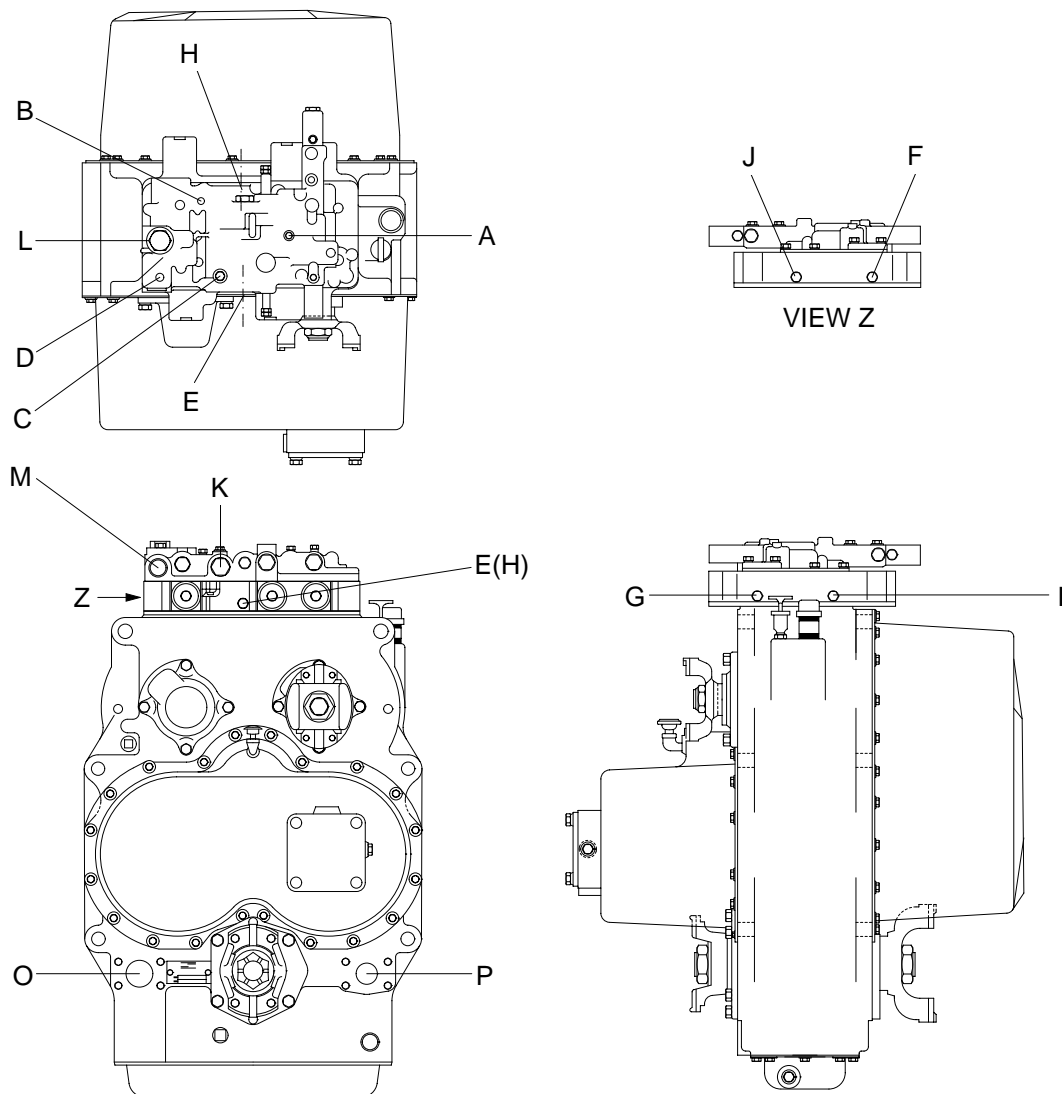
1. CLUTCH CUT OFF PRESSURE SWITCH TEST

The setting pressure of the clutch cut off pressure switch should be suited with the specification. The rated pressure is 25kgf/cm². For the detailed method for pressure adjusting, refer to page 4-25.



2. PRESSURE AND OIL FLOW CHECKS

1) TRANSMISSION CLUTCH PRESSURE CHECK AND CONNECTION PORTS



Port	Description	Port	Description
A	Forward clutch port 1/8 NPTF	I	3rd clutch pressure check point on modulator valve
B	Reverse clutch port 1/8 NPTF	J	4th clutch pressure check point on modulator valve
C	Lubr oil pressure check port 1/4 NPTF	K	Lube oil port from cooler
D	Clutch pressure check port 1/4 NPTF	L	Port for outlet to converter
E	Forward clutch pressure check point on modulator valve	M	Port for oil supply from filter
F	Reverse clutch pressure check point on modulator valve	O	Port for charging pump suction line
G	1st clutch pressure check point on modulator valve	P	Port for drain connection from converter
H	2nd clutch pressure check point on modulator valve		

2) TESTING

Before testing is carried out, ensure that the oil is at the correct level and at normal operating temperature 82.2~93.3°C(180~200°F).

3) TORQUE CONVERTER STALL TEST

Mark the engine crankshaft pulley with chalk or reflective tape and check the maximum no-load speed of the engine using a stroboscopic tachometer.

Raise the loader arms and set the machine against fixed obstruction. Apply firmly the footbrake. Select forward 3th and, with the throttle fully open, check engine speed which should be as shown in technical data. Torque converter stall speed is 2140 ± 70 rpm.

- ※ **Do not apply the clutch cut off switch during this test as the clutch disconnect will be activated and a false reading will result.**

Repeat the above test whilst simultaneously operating the loader arm raise service to blow off the main relief valve.

Engine speed should be as shown in technical data.

If engine speeds are appreciably below the stated figures, the engine is losing power and should be serviced or overhauled. Where the engine speed does not change significantly from the governed speed, check the transmission for clutch slippage or internal leakage. Above phenomenon is also indicated an incorrect torque converter.

4) CLUTCH PRESSURE TEST

Connect a pressure gauge to the clutch pressure points. Run the engine at idling speed, engage clutches in sequence(As in previous test) and note the gauge readings which should be as shown in technical data. Clutch pressure should be in 12.7~15.4kgf/cm²(180~220psi).

Clutch pressure should not vary by more than 0.34bar(5psi) from one another. Any clutch showing a greater variation should be disassembled for servicing.

- ※ **Never use service brake while making clutch pressure checks.**

Units having brake actuated declutching in forward and/or reverse will not give a true reading.

Always use parking brake when making clutch pressure checks.

5) CONVERTER LUBE FLOW TEST

Disconnect converter drain back line at transmission with engine running at 2000rpm and measure oil into a gallon container. Measure oil leakage for 15 seconds and multiply the volume of oil by four to get gallons per minute(GPM) leakage.

- ※ **Leakage not to exceed 5 gallon(18.9liter) max.**

6) OIL PRESSURE TEST AT CONVERTER REGULATING VALVE PORT

Install hydraulic pressure gauge at pressure connection on converter regulating valve. Check and record oil pressure at 2000rpm and at maximum speed(Engine at full throttle).

- **Converter out pressure : 3.9~4.9kgf/cm²(55~70psi)**

If a flow meter is available, install in line between converter charging pump and oil filters. Flow meter must be able to withstand 21.0kgf/cm²(300psi).

Disconnect hose between pump and filter at filter end and using suitable fittings connect to pressure port of tester. Install hose between filter and tester, connecting same to reservoir port of tester.

Do not use tester load valve at any time during test. When taking flow reading, all readings should be taken on the first(Left) half of flow gauge. Whenever the needle shows on the right half of gauge, correct by switching to higher scale.

If a flow meter is not available for checking converter pump output, proceed with manual transmission and converter checks. If the converter shows leakage within specifications and clutch pressures 12.7~15.4kgf/cm²(180~220psi) are all equal within 0.4kgf/cm²(5psi) refer to Group 2 on low converter charging pump output.

- **Charging pump rating : 40GPM(Pumps are rated at 2000rpm)**

Pump output listed applies to a new pump in each case. A 20% tolerance below this figure is permissible ; However, if pump output is more than 20% below specification the pump must be replaced and not rebuilt.

7) CLUTCH LEAKAGE TEST

Check clutch pressures at low engine idle with oil at operating temperatures 82~93°C(180~200°F). Engine speed must remain constant during entire leakage check. Shift lever into forward 4 speeds. Record pressures. Shift lever in reverse and 1st. Record pressure. All pressure must be equal within 0.4kgf/cm²(5psi). If clutch pressure varies in any one clutch more than 0.4kgf/cm²(5psi), repair clutch.

If a flow meter is available install in line coming out of converter pump. See flow diagram for location of pressure on flow checks. Check pump volume at 2000rpm and at low engine idle. Record readings. See pump volume specifications at 2000rpm.

Install flow meter in the line coming from transmission to converter. Check oil volume at 2000rpm and at low idle in the following speed selections. Record readings.

- Forward - Low speed through high
- Reverse - Low speed

Subtract readings in each speed from pump volume reading to get transmission clutch leakage.

- Example :

Pump volume at idle	8gallon	Pump volume	8gal
Forward-Low speed through high	6gallon	Forward-Low speed	6gal
Reverse-Low speed	6gallon	Clutch leakage	2gal

If clutch leakage varies more than 1gallon from one clutch to another, repair clutch.

※ **Leakage must not exceed max 4 gallon(15.1liter).**

3. CONVERTER CHARGE PUMP REPLACEMENT AND PRIMING PROCEDURE

- 1) The cause for pump failure must be found and corrected before a replacement pump is installed.
Check all of the hoses, tubes, O-rings, adaptors and split flanges.
- 2) Replace any collapsed or damaged hoses, damaged split flange O-rings, tube O-rings and adaptors.
- 3) After all checks have been made and corrections completed install the pump.
- 4) See below **filling instruction**.
- 5) Start the engine. Run the engine at low idle for two minutes, watch the clutch pressure gage and listen for cavitation of the pump.
- 6) If the pressure does not come up, check the oil level and bleed off air from system as follows.
- 7) To bleed off the air from the system, loosen the pressure gage line at the pressure regulating valve or loosen the pressure hose at the oil filter or pressure regulating valve. Crank the engine over until the air is displaced with oil. **Do not start the engine.**
- 8) If bleeding the lines does not correct the problem it may become necessary to prime the pump.
Disconnect the suction hose or pressure hose, whichever is higher, and fill the port with transmission oil, reconnect the hose and tighten.
- 9) Start the engine and check pressure.
- 10) Recheck oil level with hot oil 82~93° C(180~200° F) with engine at idle. Add oil as necessary to bring oil level to full mark.

※ **Filling instruction**

Use only type oil recommended. Fill transmission through filler opening until fluid comes up to **low** mark on transmission dipstick.

If the dipstick is not accessible oil level check plugs are provided.

Remove **lower** check plug, fill until oil runs from **lower** oil hole. Replace filler and level plug.

Run engine two minutes at 500~600rpm to prime torque converter and hydraulic lines. Recheck level of fluid in transmission with engine running at idle(500~600rpm).

Add quantity necessary to bring fluid level to **low** mark on dipstick or runs freely from **lower** oil level check plug hole. Install oil level plug or dipstick. Recheck with hot oil 82~93° C(180~200° F).

Bring oil level to **high** mark on dipstick or runs freely from **upper** oil level plug.

4. TORQUE CONVERTER TO ENGINE INSTALLATION PROCEDURE

- 1) Remove all burrs from flywheel mounting face and nose pilot bore. Clean drive plate surface with solvent.
- 2) Check engine flywheel and housing for conformance to standard SAE#3-SAE J-927 tolerance specifications for pilot bore size, pilot bore runout and mounting face flatness. Measure and record engine crankshaft end play.
- 3) Install two 63.50mm(2.50") long transmission to flywheel housing guide studs in the engine flywheel housing as shown. Rotate the engine flywheel to align a drive plate mounting screw hole with the flywheel housing access hole.
- 4) Install a 101.60mm(4.00") long drive plate locating stud .3750-24 fine thread in a drive plate nut. Align the locating stud in the drive plate with the flywheel drive plate mounting screw hole positioned in step No.3.
- 5) Locate torque converter on flywheel housing aligning drive plate to flywheel and torque converter to flywheel housing.
- ※ **Install torque converter to flywheel housing screws. Tighten screws to specified torque. Remove torque converter to engine guide studs. Install remaining screws and tighten to specified torque.**
- 6) Remove drive plate locating stud.
- 7) Install drive plate attaching screw and washer. Snug screw but **do not tighten**.
- 8) Measure engine crankshaft end play after transmission has been completely installed on engine flywheel. This value must be within 0.025mm of the end play recorded in step No.2.

