Filling and Flushing the Hydraulic System - Test

![Warning]

WARNING

Personal injury or death can result from improperly checking for a leak.

Always use a board or cardboard when checking for a leak. Escaping air or fluid under pressure, even a pin-hole size leak, can penetrate body tissue causing serious injury, and possible death.

If fluid is injected into your skin, it must be treated immediately by a doctor familiar with this type of injury.

NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.
Note: Clean all lines and all components with 4C-6796 Mineral Spirits, and install new filters. After the system has been flushed, dispose of the fluid according to local regulations.

Note: During the filling and the flushing procedure, the hydrostatic system must be at maximum output. The hydrostatic system is normally neutralized when the parking brake is applied. Disengage the parking brake for the following procedure.

### Filling the Hydrostatic System

#### Table 1

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>4C-9710</td>
<td>Hand Pump</td>
<td>1</td>
</tr>
<tr>
<td>8T-0855</td>
<td>Gauge 0 to 4000 kPa</td>
<td>1</td>
</tr>
<tr>
<td>1U-5755</td>
<td>Hose</td>
<td>1</td>
</tr>
<tr>
<td>6V-4143</td>
<td>Coupler Assemblies</td>
<td>2</td>
</tr>
<tr>
<td>6V-3989</td>
<td>Unvalved Nipple</td>
<td>1</td>
</tr>
</tbody>
</table>

**Recommended Procedure**

1. Release the hydraulic system pressure. Refer to Testing and Adjusting, "Hydraulic System Pressure - Release" for the correct procedure.

2. Replace the hydraulic oil filter that is on the machine with a **102-2828 Oil Filter (Cleanup)**.
3. Attach the 4C-9710 Hand Pump to fill port (1) on the oil filter.

4. Raise the cab. Refer to the Operation and Maintenance Manual, "Cab Support Operation".

Illustration 2  
g00807519

(2) Charge pressure tap

5. Install the 8T-0855 Pressure Gauge to the charge pressure tap (2) with a 1U-5755 Hose.

Illustration 3  
g00821162

6. Remove the plug (3) for the pump case drain. Add hydraulic oil to the piston pump until the port is full. Install the plug, but leave the plug loose. This will allow any air that is in the pump to escape when the engine is cranked.

7. Pump hydraulic oil into port (1) until one of the following events occurs.

- three to four minutes elapse.
the hydraulic oil level is at the middle of the sight gauge.

This will pump hydraulic oil into the piston pump.

**Note:** Do not exceed 4000 kPa (580 psi) in order to fill the charge circuit. Seal failure could result.

8. Add hydraulic oil to the hydraulic oil tank if the oil level has not reached the middle of the sight gauge.

9. Lower the cab.

10. Sit in the operator's seat. Fasten the seat belt. Lower the armrest.

11. Crank the engine until oil begins to appear at the case drain. This indicates that the piston pump is filled.

12. Tighten the plug for the pump case drain.

13. Start the engine and run the engine at low idle.

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**Note:** If the fan does not turn within 15 seconds after starting the engine, shut off the engine. Loosen two hose clamps (4) and disconnect hose (5). Fill the hose with hydraulic oil and reconnect the hose. Tighten the two hose clamps.

14. Look at the pressure gauge. The pressure should be $3100 \pm 200$ kPa ($450 \pm 30$ psi) within 15 seconds after start-up. If the pressure is low, stop the engine immediately. Check the hydraulic oil level in the tank. Determine the cause for low charge oil pressure before restarting the engine.

**Note:** If the charge pressure is not reached within 15 seconds, damage to the hydrostatic system will occur. Do not allow the hydrostatic system to operate with incorrect charge system pressures.
Alternate Procedure

This procedure should be followed if a 4C-9710 Hand Pump is not available.

1. Release the hydraulic system pressure. Refer to Testing and Adjusting, "Hydraulic System Pressure - Release" for the correct procedure.


3. Remove the plug (3) for the pump case drain. Add hydraulic oil to the piston pump until the port is full. Install the plug, but leave the plug loose. This will allow any air that is in the pump to escape when the engine is cranked.

4. Add oil to the hydraulic tank if the level is not in the middle of the sight gauge.
5. Loosen two hose clamps (4) and disconnect hose (5). Fill the hose with hydraulic fluid and reconnect the hose. Tighten the two hose clamps.

6. Install the **8T-0855** Pressure Gauge to the charge pressure tap (2) with a **1U-5755** Hose.

7. Lower the cab.

8. Sit in the operator's seat. Fasten the seat belt. Lower the armrest.

9. Crank the engine until oil begins to appear at the case drain. This indicates that the piston pump is filled.

10. Tighten the plug for the pump case drain.

11. Start the engine and run the engine at low idle.

12. Look at the pressure gauge. The pressure should be 3100 ± 200 kPa (450 ± 30 psi) within 15 seconds after start-up. If the pressure is low, stop the engine immediately. Check the hydraulic oil level in the tank. Determine the cause for low charge oil pressure before you restart the engine.

   **Note:** If charge pressure is not reached within 15 seconds, damage to the hydrostatic system will occur. Do not allow the hydrostatic system to operate with incorrect charge system pressures.

### Flushing The Hydrostatic System

**WARNING**

Hot oil and hot components can cause personal injury. Do not allow hot oil or hot components to contact skin.
NOTICE

Care must be taken to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the product. Be prepared to collect the fluid with suitable containers before opening any compartment or disassembling any component containing fluids.

Refer to Special Publication, NENG2500, "Caterpillar Tools and Shop Products Guide" for tools and supplies suitable to collect and contain fluids on Caterpillar products.

Dispose of all fluids according to local regulations and mandates.

Flushing of the entire hydrostatic system should be performed after a failure of a component. Contact your Caterpillar dealer for the correct procedure.

Note: If the oil becomes contaminated, premature component failure could result. Contaminated oil can also contribute to overheating.

Use the following procedure to flush the oil in the hydrostatic system.

**Flush the Drive Lines and the Lines for the Work Tool**

1. Follow the filling procedure and ensure that the system is properly filled with oil. Refer to "Filling the Hydrostatic System". Also ensure that the hydraulic tank is filled properly.

3. Disconnect electrical connection (6) for the brake solenoid (7).

4. Install the **8T-0855** Pressure Gauge to the charge pressure tap (2) with a **1U-5755** Hose.

5. Lower the cab.

6. Sit in the operator's seat. Fasten the seat belt. Lower the armrest.

7. Start the engine. The charge pressure should be \(3100 \pm 200\) kPa (\(450 \pm 30\) psi) within 15 seconds after you start the engine. Refer to Testing and Adjusting, "Hydrostatic System - Test" if the charge pressure is not within specifications.

8. Allow the machine to run for five minutes at low idle before you begin the flushing procedure.

9. Depress the parking brake switch in order to activate the hydrostatic system and the hydraulic system.

10. Raise and lower the lift arms for ten cycles. **Do not allow the cylinders to contact the stops.** This will prevent oil from flowing through the main relief valve for the work tool.

11. Extend and retract the tilt cylinders for ten cycles. **Do not allow the cylinders to contact the stops.**

12. Move the pilot operated hydraulic control slowly in the FORWARD direction until the engine just begins to lug. Do not allow the machine to drive through the parking brakes. Hold the hydraulic control in this position for two minutes.

13. Move the hydraulic control to the NEUTRAL position.
14. Move the pilot operated hydraulic control in the REVERSE direction until the engine just begins to lug. Do not allow the machine to drive through the parking brake. Hold the hydraulic control in this position for two minutes.

15. Reconnect the parking brake solenoid.

16. Drive the machine forward for two minutes in low idle. Drive the machine in reverse for two minutes in low idle.

17. Check the hydraulic oil contamination level. Refer to Testing and Adjusting, "Hydraulic Oil Contamination - Test" for the proper procedure.

18. If the levels are not low enough, replace the 102-2828 Oil Filter (Cleanup). Flush the system up to four times. If the levels are not low enough after the fourth time, drain the hydraulic oil and change the hydraulic oil filter. Refer to Operation and Maintenance Manual, "Hydraulic System Oil - Change" and the Operation and Maintenance Manual, "Hydraulic System Oil Filter - Replace" for the correct procedures.

19. Lower the cab and bolt down the cab. Refer to Operation and Maintenance Manual, "Cab Support Operation" for the correct procedure.

20. Replace the 102-2828 Oil Filter (Cleanup) with another 102-2828 Oil Filter (Cleanup). Change the filter after 50 hours to a standard filter.