Troubleshooting Lift Cylinder Drift and Tilt Cylinder Drift

Compact Track Loader:
All
Multi Terrain Loader:
All
Skid Steer Loader:
All


Reference Testing and Adjusting, RENR2860, "216 and 226 Skid Steer Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"

Reference Testing and Adjusting, RENR2889, "228 and 248 Skid Steer Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"


Reference Testing and Adjusting, RENR2875, "236, 246, and 248 Skid Steer Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"
Reference Testing and Adjusting, RENR2889, "228 and 248 Skid Steer Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"

Reference Testing and Adjusting, RENR4811, "236, 246, 252, and 262 Skid Steer Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"


Reference Testing and Adjusting, RENR8747, "248B and 268B Skid Steer Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"

Reference Testing and Adjusting, RENR4819, "247 and 257 Multi Terrain Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"

Reference Testing and Adjusting, RENR4877, "247B and 257B Multi Terrain Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"


Reference Testing and Adjusting, RENR4819, "267, 277, and 287 Multi Terrain Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"

Reference Testing and Adjusting, RENR4887, "267B, 277B, and 287B Multi Terrain Loaders Machine Systems", "Operational Checks - Drift Check (Lift and Tilt Cylinder)"


The recognized standard for cylinder drift is 3 mm (0.12 inch) per minute. The amount of cylinder drift will depend on the integrity of the cylinder as well as the integrity of all components within the hydraulic circuit. If the measured cylinder drift is excessive, the following checks may be utilized in order to identify the possible cause.

Note: A measurement of cylinder drift that is above the standard may not indicate an issue that can be resolved by component replacement.

Note: Replacement of the work tool control valve should be considered lastly in order to resolve an issue of cylinder drift. Single replacement of the work tool control valve may not be the best solution when you weigh the alternatives against machine usage and machine application.
Designations for cylinder connections

(A) Cylinder rod end
(B) Cylinder head end

Checking Components that Affect Lift Cylinder Drift

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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.
Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

Checking the Dead Engine Lower Valve

Before you perform this check, ensure that the dead engine lower valve is fully functional.

1. Lower the lift arms fully. Plug the hose and cap the dead engine lower valve. See Illustration 2.

2. Perform the drift test.
   - If cylinder drift is acceptable, inspect the dead engine lower valve and inspect the lines. Replace the components, if necessary. Repeat the drift test.
   - If cylinder drift is unacceptable, continue to the next check.

Checking the Ride Control Valve (if Equipped)
If the machine is equipped with ride control, the ride control valve may be the cause of drift.

Illustration 3  g01619304

1. In order to isolate the ride control valve, cap the line that is connected to the head end of the lift cylinder.

   **Note:** The line for the head end of the lift cylinder connects to Port (H) on the valve. See Illustration 3.

2. Perform the drift check.

   ◦ If cylinder drift is acceptable, troubleshoot the ride control valve. If you do not find any issues with the harness or with the harness connections, replace the ride control valve.

   ◦ If cylinder drift is unacceptable, reconnect the ride control valve and continue to the next check.

**Checking the Lift Cylinders**

This check is used to determine if there is any internal damage to the seals of the lift cylinders.

1. Remove the work tool.

2. Lower the lift arms fully and purge all pressure.
3. Disconnect the hose from the lift cylinder head end port. See Illustration 4.

**Note:** Only isolate one cylinder at a time for this test.

If the hose is inaccessible, you can disconnect the hose at a connection that is downstream.

4. Install a cap on the hose and install a temporary hose between the cylinder port and an external tank.

5. Start the machine and power the lift arms into the stops.

6. Check for leakage from the cylinder port.
   - If there is a constant flow of oil after the initial surge, replace the seals or replace the cylinder.
   - If there is not a constant flow of oil, continue to the next check.

**Checking the Line Relief Valve**

The line relief valves in the work tool control valve may be stuck or the line relief valves may be contaminated. These situations may be the cause of cylinder drift.
1. Change the relief valve (1B) with another relief valve in the work tool valve or with one that is known to be good. See Illustration 5.

As an alternative, remove relief valve (1B) and plug the port with a 266-8799 Plug As.

2. Perform the drift check.
   - If cylinder drift is acceptable, replace the relief valve with a new relief valve.
   - If cylinder drift remains unacceptable, inspect the work tool control valve for possible causes.

**Note:** Ensure that the relief valves are correct for each circuit.

**Note:** For instruction on replacing the work tool control valve, see Disassembly and Assembly, "Control Valve (Work Tool) - Remove" and to Disassembly and Assembly, "Control Valve (Work Tool) - Install".

**Note:** If cylinder drift is still an issue, contact your dealer service representative for further information.

**Checking Components that Affect Tilt**

**Cylinder Drift**
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, "Dealer Service Tool Catalog" for tools and supplies suitable to collect and contain fluids on Cat products.

Dispose of all fluids according to local regulations and mandates.

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**WARNING**

Personal injury can result from hydraulic oil pressure and hot oil.

Hydraulic oil pressure can remain in the hydraulic system after the engine has been stopped. Serious injury can be caused if this pressure is not released before any service is done on the hydraulic system.

Make sure all of the attachments have been lowered, oil is cool before removing any components or lines. Remove the oil filler cap only when the engine is stopped, and the filler cap is cool enough to touch with your bare hand.

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**WARNING**

Escaping fluid under pressure, even a pinhole 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.

Always use a board or cardboard when checking for a leak.

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**Checking the Self-Level Valve (if Equipped)**

If the machine is equipped with a self-level valve, bypass the valve. This action will determine if the valve is the cause of the tilt cylinder drift.
1. To bypass the self-level valve, connect lines (A) and (B) with a jumper hose. Block the tilt circuit lines to Port + (C) and Port (D) at the valve. Install caps on port (C) and to port (D). See Illustration 6.

2. Connect lines (A) and (B) with a jumper hose to take the self-level valve out of the system.

3. Perform the drift check.
   - If cylinder drift is acceptable, replace the self-level valve.
   - If cylinder drift is unacceptable, continue to the next check.

**Checking the Tilt Cylinders**

This check is used to determine if there is any internal damage to the seals of the tilt cylinders.

1. Remove the work tool.

2. Lower the lift arms fully. Rack back the coupler and purge all pressure in the hydraulic system. Then, tie the coupler to the lift arms.

3. Disconnect the hose from the tilt cylinder head end port.

   **Note:** Only isolate one cylinder at a time for this test.

4. Install a cap on the cylinder hose. Then, connect an additional hose between the cylinder port and an external tank.

5. Start the machine. Rack back the coupler onto the stops. Check for leakage from the hose.
Note: If the coupler is not initially rested against the stops, there may be a sudden leak in the beginning of the test.

Look for any leakage after the initial surge.

6. Repeat this test for each tilt cylinder.
   ◦ If there is a constant flow of oil after the initial surge, replace the seals or replace the cylinder.
   ◦ If there is not a constant flow of oil, continue to the next check.

Checking the Line Relief Valves

The line relief valves in the valve may be stuck or the line relief valves may be contaminated. These situations may be the cause of cylinder drift.

1. Change relief valve (2A) with another relief valve in the work tool valve or with a relief valve that is known to be good. See Illustration 7.

   As an alternative, remove relief valve (2A) and plug the port with a 266-8799 Plug As.

2. Perform the drift check.
   ◦ If cylinder drift is acceptable, replace the relief valve with a new relief valve.
   ◦ If cylinder drift remains unacceptable, inspect the work tool control valve for possible causes.
**Note:** Ensure that the relief valves are correct for each circuit.

**Note:** For instruction on replacing the work tool control valve, see Disassembly and Assembly, "Control Valve (Work Tool) - Remove" and to Disassembly and Assembly, "Control Valve (Work Tool) - Install".

**Note:** If cylinder drift is still an issue, contact your dealer service representative for further information.