

## **MASTER CYLINDER INSPECTION AND MAINTENANCE**

### **INSPECTION**

The master cylinders should periodically be checked for:

1. **Cleanliness**—Visually inspect the master cylinder and surrounding area for evidence of hydraulic fluid and/or other contamination. Care should be taken to ensure that the piston rod is free of contamination which could cause damage to the O-ring.
2. **Leaks**—If there is evidence of leakage at the fittings, tightening or replacement of the fittings should remedy the problem. If the master cylinder has been overfilled, evidence of leakage will be present, but no correction is necessary other than cleaning the leaked fluid. If the cylinder is leaking around the piston rod, removal of the cylinder is required and inspection and maintenance should be performed as outlined in the following section.
3. **Failure to maintain or hold pressure**—If the master cylinder fails to maintain or hold pressure, the system should be bled in accordance with paragraph 5(c). If this fails to correct the problem, the master cylinder should be removed and inspected and repaired as outlined below.

### **MAINTENANCE AND REPAIR**

#### **1. Removal of the Master Cylinder**

- a. Drain the hydraulic fluid from the system by loosening the bleeder valve on the brake caliper. Collect the drained fluid and dispose of in an appropriate manner. Pumping the master cylinder will aid in this process.
- b. Disconnect the hydraulic lines from the master cylinder and plug or cap the hydraulic lines to prevent entry of contaminants.
- c. Disconnect the attach bolts from the top and bottom of the master cylinder and remove the master cylinder.

#### **2. Disassembly of the Master Cylinder**

Disassembly, inspection and repair of the master cylinder should be done in a clean environment on a smooth flat working surface.

- a. Remove the snap ring from the top of the master cylinder. Apply enough downward pressure on the piston rod to alleviate the pre-loaded spring compressive force on the snap ring and rod support. Using snap-ring pliers, remove the snap ring using caution to maintain, then slowly release the pressure on the piston rod.
- b. Slide the piston rod, attached parts and compression spring out of the master cylinder body.

- c. Using pliers, unscrew the spring guide from the lower end of the piston rod.
- d. Slide the piston and spring off the lower end of the piston rod.
- e. Remove the clevis and jam nut from the top of the piston rod.
- f. Slide the rod support off the upper end of the piston rod.
- e. Remove the O-rings from the piston, piston rod and rod support.

### **3. Inspection and Repair**

Repair is limited to cleaning and installation of new parts only.

- a. Inspect cylinder body for evidence of severe corrosion, cracks, nicks or scoring, any of which is cause for rejection of the part.
- b. Replace any component that has evidence of severe corrosion, or other damage that would render it unserviceable.
- c. Inspect O-rings for wear, brittleness, or other damage. It is recommended that all O-rings be replaced whenever the master cylinder is disassembled, however the O-rings may be reused if they are in like new condition.
- e. Clean all metal parts in solvent and dry with compressed air. O-rings should be cleaned with hydraulic fluid and wiped clean.

### **4. Reassembly of the Master Cylinder**

- a. Using hydraulic fluid as a lubricant, and care not to damage the O-rings, install new O-rings inside the rod support and on the outside in the upper groove (the one without the slots) of the rod support.
- b. Lubricate the piston rod O-ring and install on the lower end of the piston rod.
- c. Install an O-ring on the piston then slide the piston onto the lower end of the piston rod with the chamfer facing the piston rod O-ring.
- d. Clean the lower threads of the piston rod and spring guide with alcohol or acetone.
- e. Apply Lock-Tite 262 to the lower threads of the piston rod. Allow to dry for 24 hours before exposing to hydraulic fluid.
- f. Install the small spring on the bottom of the piston rod and the spring guide with the large end upward. Use pliers to tighten the spring guide.
- g. Lubricate the piston rod with hydraulic fluid, then slide the rod support onto the piston rod from the top with the O-ring groove toward the clevis end.

- h. Lubricate the interior of the cylinder body with hydraulic fluid and insert the compression spring and piston rod assembly.
- i. Install the snap ring. To facilitate this, pressure should be applied to the piston rod which will compress the compression spring. Insert the rod support further into the body until the snap ring groove is exposed.
- j. Reinstall the jam nut and clevis.

## **5. Reinstallation of the Master Cylinder**

- a. Reinstall the upper and lower attach bolts and tighten to the proper value, not so tight that it prevents freedom of travel of the master cylinder. Check that the clevis is adjusted to allow full travel of the master cylinder piston rod from the brake pedal and that the adjustment allows the piston rod to fully extend.
- b. Uncap and reattach the hydraulic lines to the master cylinder using the proper torque value.
- c. Bleed the brakes in the following manner using MIL-H-5606 hydraulic fluid.:
  - (1) Remove the vent plug from the brake system reservoir.
  - (2) Connect a clean hydraulic pressure source such as a hydraulic hand pump to the bleeder valve on the lower end of the wheel cylinder.
  - (3) Open the bleeder valve one-half turn.
  - (4) Pump hydraulic fluid into the system, observing the level in the brake system reservoir. When the reservoir is nearly full, tighten bleeder fitting and remove hydraulic pressure source.
  - (5) Replace and tighten brake system reservoir vent plug.
  - (6) Apply hard pressure to the brake pedal. Check to ensure that you have a "hard pedal" and that there are no leaks. You may have to pump the brake pedal several times
  
  - (7) If a "soft pedal" condition exists, repeat steps (1) through (6).