

# BOOSTED MASTER CYLINDER (Master Cylinder Section) Service Instructions

MASTER CYLINDER SECTION - Mineral Base Hydraulic Oil

POWER ASSIST SECTION - Mineral Base Hydraulic Oil

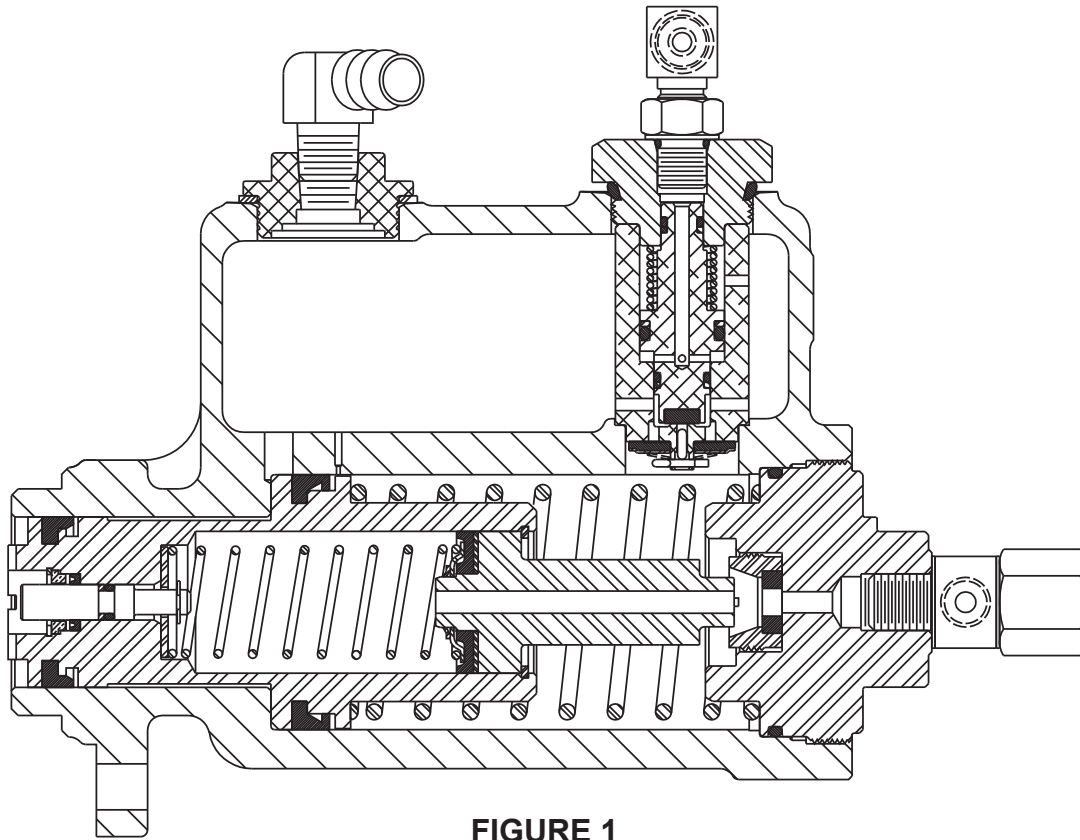


FIGURE 1

## TYPICAL SYSTEM SCHEMATIC

(This circuit may not apply to your installation)

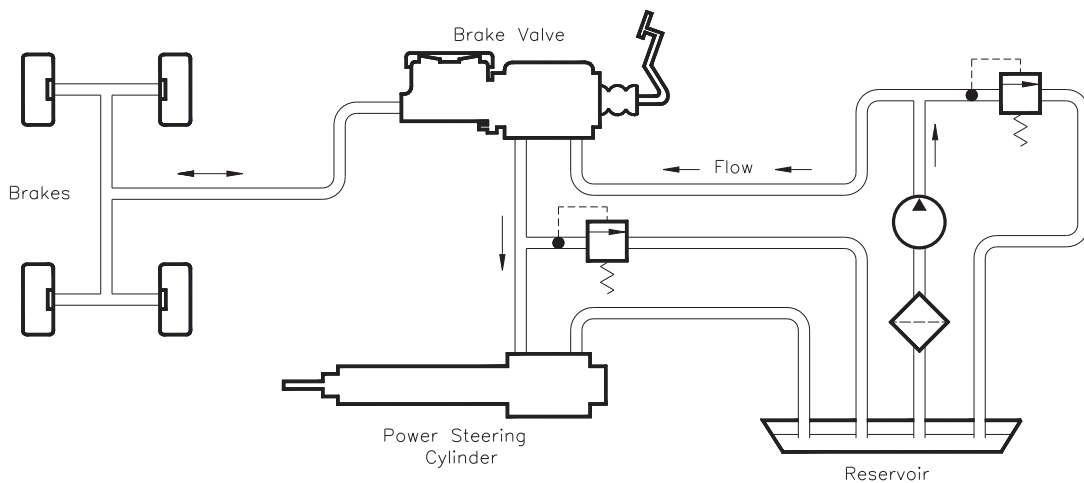


FIGURE 2

## REMOVING MASTER CYLINDER FROM THE MACHINE AND SEPARATING SECTIONS

(Refer to Figures 1 and 3)

1. Remove the master cylinder assembly from the machine by disconnecting the necessary fluid lines, disconnecting the push rod, and removing mounting bolts. Drain fluid from the assembly.
2. Separate the master cylinder section from the power assist section by removing three cap screws and three lock washers.

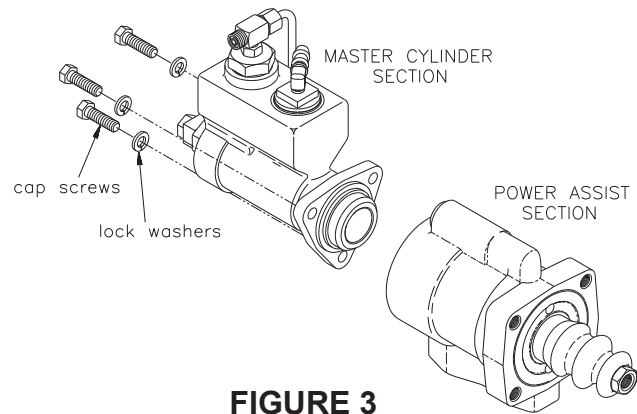


FIGURE 3

## CONNECTING SECTIONS AND MOUNTING MASTER CYLINDER ON THE MACHINE

(Refer to Figures 1 and 3)

1. Install the spacer between the two sections (only if used on original model).
2. Attach the master cylinder section to the power assist section with three cap screws and three lock washers. Torque cap screws 29.83-36.61 N·m (22-27 lb·ft).

3. Install the unit on the machine. Connect the push rod. Connect the fluid lines. Bleed the system of air. Tighten fittings if leaks occur. Make several applications to be sure the master cylinder is working properly. **NOTE: All fittings must be inspected for leaks and tightened if leaks occur.**

## DISASSEMBLY

(Refer to Figures 1 and 4)

1. Drain fluid from the unit before disassembling.
2. Remove upper tube nut on tubing assembly (34) from fitting (33). **NOTE: Fitting (33) need not be removed from relief valve end plug (32).**
3. Remove line bolt (1), gaskets (2 & 4), and fitting block (3). Tubing assembly (34) need not be removed from fitting block (3).
4. Remove end plug (5) using a large box end wrench.

### ⚠ CAUTION

End plug is under tension of spring (9).

5. Remove spring (9) from housing (25).
6. Remove o-ring (6), retainer (8), and seat (7) from end plug (5).
7. Remove piston assembly (10) from housing (25) by pushing on piston assembly with a wooden dowel from the small diameter side of housing.
8. Remove cups (19 & 21) from piston (20). Note the direction of cups (19 & 21).
9. Depress piston (12) and remove retaining ring (11). Hold firmly, spring (17) will force piston (12) out of piston (20) bore.
10. Remove retaining ring (16), retainer (15), cup (14), and washer (13) from piston (12).
11. Remove spring (17) and piston assembly (18) from piston (20) by pushing on piston assembly (18) with a wooden dowel from the small diameter side of piston (20).
12. Carefully remove retaining ring (24), spacer (23), and cup (22) from piston (20). Note direction of cup (22) and spacer (23).
13. Remove relief valve assembly (28) from housing (25). Remove end cap (32). Remove o-ring (31) from end cap (32). **NOTE: End cap (32) is under tension of spring (30).**
14. Remove filler cap (27) and gasket (26) from housing (25).

## ASSEMBLY

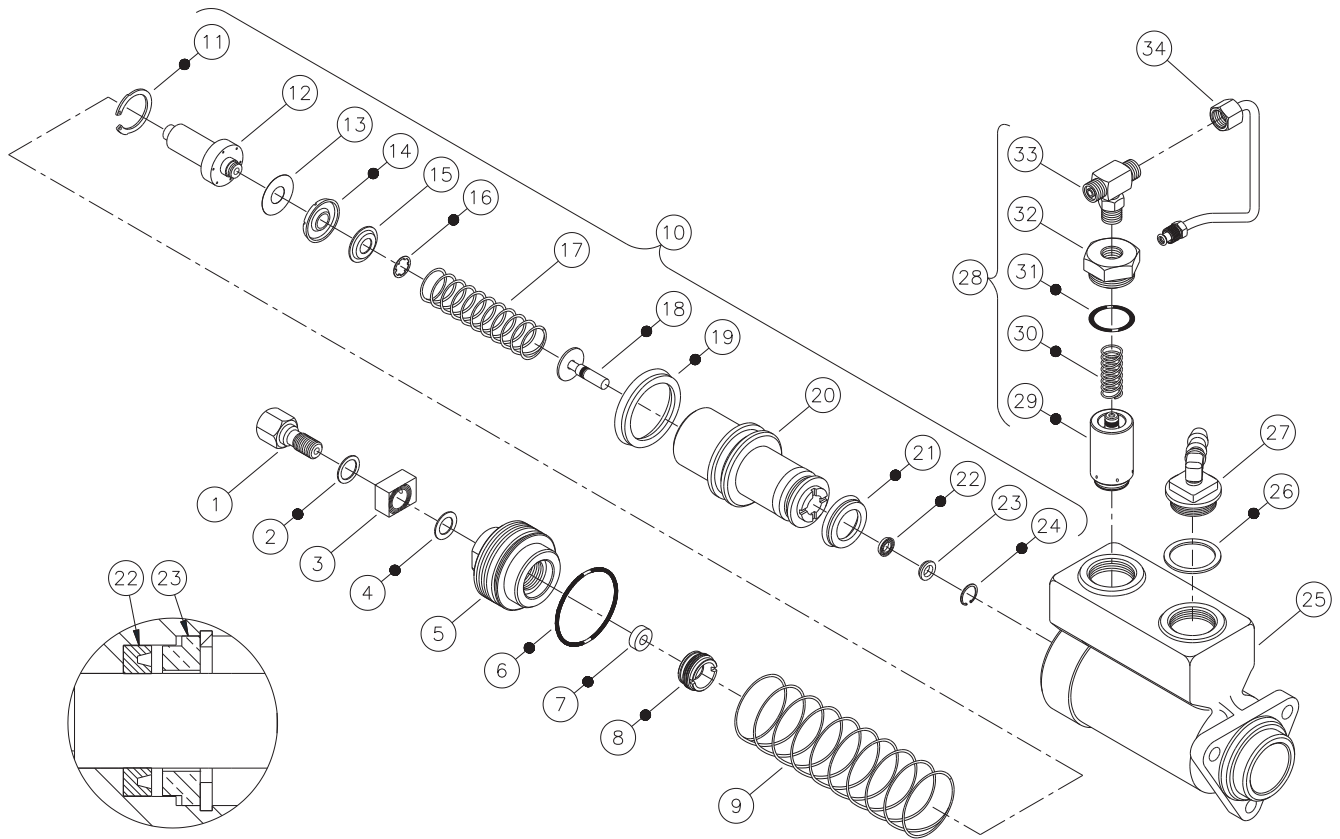
(Refer to Figures 1 and 4)

**Use only mineral base hydraulic oil in the master cylinder section.**

LUBRICATE ALL RUBBER COMPONENTS FROM THE REPAIR KIT WITH CLEAN TYPE FLUID USED IN THE SYSTEM.

1. Clean all parts thoroughly before assembling.
2. Install new cup (22), spacer (23), and new retaining ring (24). Note direction of cup (22) and spacer (23). See Figure 4a.
3. Carefully install new piston assembly (18) and spring (17) in piston (20) bore.
4. Install washer (13), new cup (14), retainer (15), and new retaining ring (16) on piston (12). Note direction of cup (14) and retainer (15).
5. Insert piston (12) into piston (20). Depress piston (12) and install new retaining ring (11).
6. Install new cup (19) and new cup (21) on piston (20). Note direction of cups (19 & 21).
7. Install piston assembly (10) into housing (25). Note the direction of piston assembly (10).
8. Install spring (9) over piston assembly (10).
9. Install new seat (7) and new retainer (8) in end plug (5). Apply two drops of Loctite 242 to threads of new retainer (8) and torque 16.3-19.0 N·m (12-14 lb·ft).
10. Install new o-ring (6) on end plug (5) and install end plug (5) into housing (25). Torque end plug (5) 67.8-108.5 N·m (50-80 lb·ft).
11. Install new piston and body assembly (29) in housing (25). Install new spring (30).
12. Install new o-ring (31) on end plug (32). Install end plug (32) in housing (25) and torque 88.5-101.7 N·m (65-75 lb·ft) so fitting (33) will align with tubing assembly (34).
13. Assemble new gaskets (2 & 4), fitting block (3), and line bolt (1) into end plug (5). Torque line bolt (1) 46.1-54.2 N·m (34-40 lb·ft). **NOTE: Position tubing assembly (34) to align with fitting (33) and hold fitting block (3) in a fixed position while tightening line bolt (1).**

● Items included in Repair Kit



**Figure 4a**

**FIGURE 4**

14. Install upper tube nut on tubing assembly (34) onto fitting (33) and torque 12.2-20.3 N·m (9-15 lb·ft).  
Tighten lower tube nut if necessary.
15. Install new gasket (26) and filler plug (27) on housing (25).
16. To continue assembly refer to CONNECTING SECTIONS AND MOUNTING MASTER CYLINER ON THE MACHINE on page 2.

# BLEEDING PROCEDURES

## NOTE

Use only proper fluid specified by machine manufacture. Never reuse fluid that has been drained from the system. Be sure to maintain a high level of fluid in the reservoir during and after the entire bleeding process.

## PRESSURE BLEEDING INSTRUCTIONS

1. Master cylinder must be mounted to the power assist section.
2. Fill the reservoir with proper fluid.
3. Be sure all fittings are tight to avoid leaking.
4. DO NOT DEPRESS THE PEDAL.
5. Connect the pressure bleeder to the reservoir adapter. Recommended bleeding pressure is 2.07 bar (30 PSI) maximum. **NOTE: Make sure to use correct pressure bleeder for the type fluid used in the system.**
6. Open the bleeder screw closest to master cylinder outlet. Most of the air contained in the system will escape by this route. Close bleeder screw.
7. Continue to the next bleeder screw and so on. At each point when air bubbles disappear close the bleeder screw.
8. Remove the pressure bleeder.
9. Open bleeder screw at the master cylinder. Actuate cylinder to remove any residual air. Tighten the bleeder screw before allowing the pedal to return.
10. Depress the pedal several times. If the pedal is spongy, check for system leaks and repeat bleeding process.
11. Fill reservoir to within 12.7 mm (0.50 in) of top. Install filler plug and torque 33.9-40.7 N·m (25-30 lb·ft).

## BENCH BLEEDING INSTRUCTIONS

(Refer to Figure 5)

1. This process can be done in a bench vise or on the machine with master cylinder mounted to the power assist section.
2. Remove master cylinder filler cap.
3. Connect a length of tubing to an outlet port and immerse the other end below the fluid level in the master cylinder reservoir. Keep reservoir fluid within 12.7 mm (0.50 in) of inside reservoir top.
4. Actuate master cylinder piston using a smooth object large enough to hold the small internal piston from coming out. Slowly stroke and release master cylinder piston 34.9-38.1 mm (1.38-1.50 in). Repeat until air bubbles in the reservoir have ceased.
5. Remove tubing. This should be done quickly so the loss of fluid will be minimized.
6. If cylinder was bench bled in a vise, it must now be attached securely to the power assist section and mounted on machine. Complete all plumbing connections before continuing to step 7.
7. Bleed remaining air from system by depressing brake pedal and opening bleeder fitting closest to the master cylinder. Close bleeder fitting before brake pedal is released. Continue to next bleeder port. In all cases the bleeder fittings must be closed before the brake pedal is released or air will be pulled in through the bleeder and ingest unwanted air in the system.
8. Fill reservoir to within 12.7 mm (0.50 in) of top. Install filler plug and torque 33.9-40.7 N·m (25-30 lb·ft).
9. Be sure all fittings are tight to avoid any leaking.
10. Depress the pedal several times. If brake pedal feels spongy, check for system leaks and repeat bleeding process.

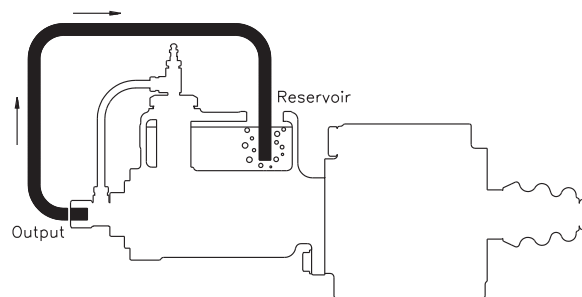


FIGURE 5