Service Instructions

HYDRAULIC BRAKE VALVE
Master Cylinder Section

Service Instructions

MASTER CYLINDER SECTION – AUTOMOTIVE BRAKE FLUID

POWER ASSIST SECTION – HYDRAULIC OIL

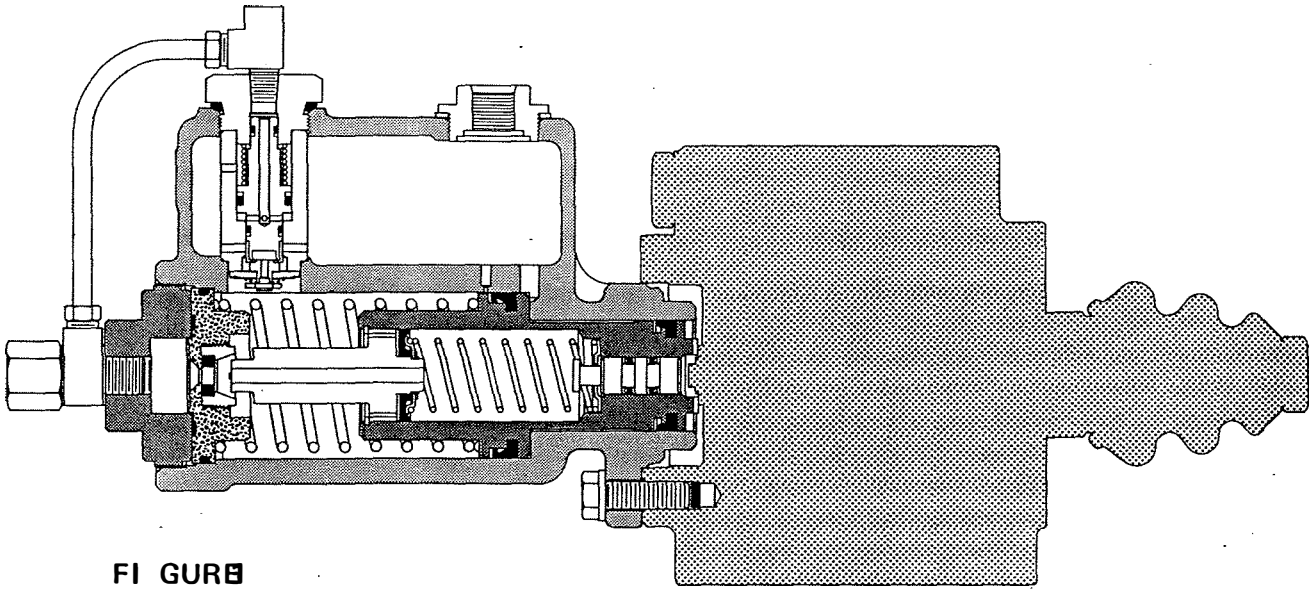

FIGURE 1

This instruction sheet services the Master Cylinder Sections for these model numbers:

02-460-372

TYPICAL SYSTEM SCHEMATIC

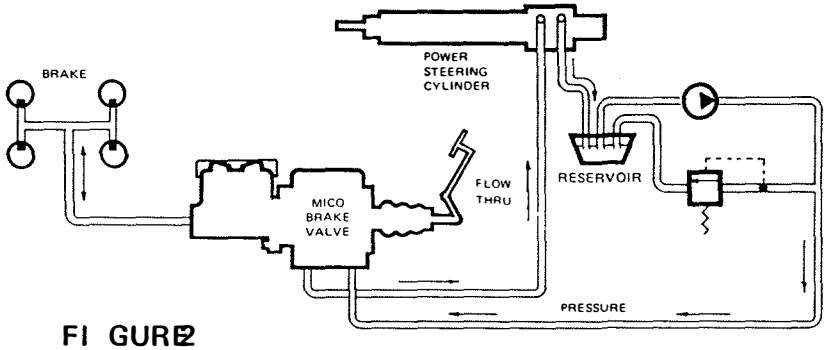

FIGURE 2

(This circuit may not apply to your installation)

REMOVING BRAKE VALVE FROM VEHICLE AND SEPARATING SECTIONS

(Refer to Figures 1 and 3)

1. Remove Brake Valve from vehicle by disconnecting necessary fluid lines, disconnecting push rod, and removing mounting bolts. Drain fluid from assembly.
2. Separate Master Cylinder Section from Power Assist Section by removing three cap screws and three washers.

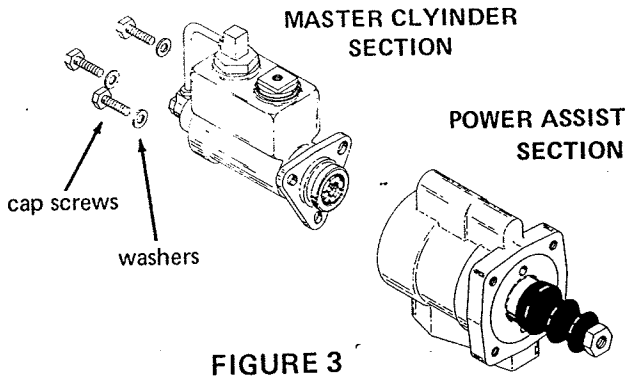

FIGURE 3

MASTER CYLINDER DISASSEMBLY

(Refer to Figures 1 and 4)

1. Remove filler plug (item 24) and gasket (item 23) from housing (item 22).
2. Drain fluid from unit before disassembling.
3. Loosen upper tube nut on tube assembly (item 28).
4. Remove line bolt (item 1) and gasket (item 2). Swing tube assembly (item 28) and fitting block (item 3) aside, then remove gasket (item 4).
5. Remove end plug (item 5) with an appropriate tool.

   CAUTION: End plug (item 5) is under tension of spring (item 10).

6. Retainer assembly (item 9) should follow end plug (item 5) as it is removed.
7. Remove tee (item 27), tube assembly (item 28) and fitting block (item 3) from relief valve (item 26).
8. Remove relief valve assembly (item 26) and o-ring (item 25) from housing. Refer to the relief valve section for disassembly procedure. NOTE: Tip of relief valve protrudes into cylinder bore when installed.
9. Remove spring (item 10) from housing.
10. Remove piston assembly (item 21) from housing by pushing on piston with a wooden dowel from the small diameter end of housing.
11. Remove cups (items 18 & 20) from piston (item 19).
12. Depress piston (item 12) and remove retaining ring (item 11).

    CAUTION: Piston (item 12) is under tension of spring (item 15)

13. Remove cup (item 13) and retainer (item 14) from piston (item 12).
14. Remove spring (item 15) from piston bore (item 19).
15. Remove piston assembly (item 17) from piston (item 19) by pressing in on piston (item 17) with a wooden dowel from the small diameter end of piston (item 19).
16. Remove slotted retainer (item 16) from piston assembly (item 17).

MASTER CYLINDER ASSEMBLY

(Refer to Figures 1 and 4) Use only brake fluid in Master Cylinder Section.

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

1. Clean all parts thoroughly before disassembling.
2. Install slotted retainer (item 16) on new piston assembly (item 17) and gently install into piston (item 19). Note direction of cups, back-up rings and retainer.
3. Install spring (item 15), large end first into piston (item 19).
4. Install new cup (item 13) and retainer (item 14) on piston (item 12).
5. Install piston (item 12) into piston (item 19), cup end first. Depress piston (item 12) and install new retaining ring (item 11) into piston (item 19).
6. Install new cups (items 18 & 20) on piston (item 19).
7. Install piston assembly (item 21) into housing (item 22). Note direction of assembly.
8. Install spring (item 10) into housing.
9. Install new relief valve assembly (item 26) and new o-ring (item 25) into housing. Refer to relief valve section for assembly procedure.
10. Install new seal (item 6) and new o-ring (item 8) on new retainer (item 7) and then install new retainer assembly (item 9) in housing. Note direction of retainer.
11. Install end plug (item 5) in housing. Tighten securely.
12. Install tee (item 27), tube assembly (item 28) and fitting block (item 3) on new relief valve (item 26). Swing tube assembly (item 28) into place. Assemble new gaskets (items 2 & 4) and line bolt (item 1). Tighten line bolt securely.
13. Tighten upper tube nut of tube assembly (item 28).
14. Install new gasket (item 23) and filler plug (item 24) on housing (item 22).

● Items included in Repair Kit 02-400-169

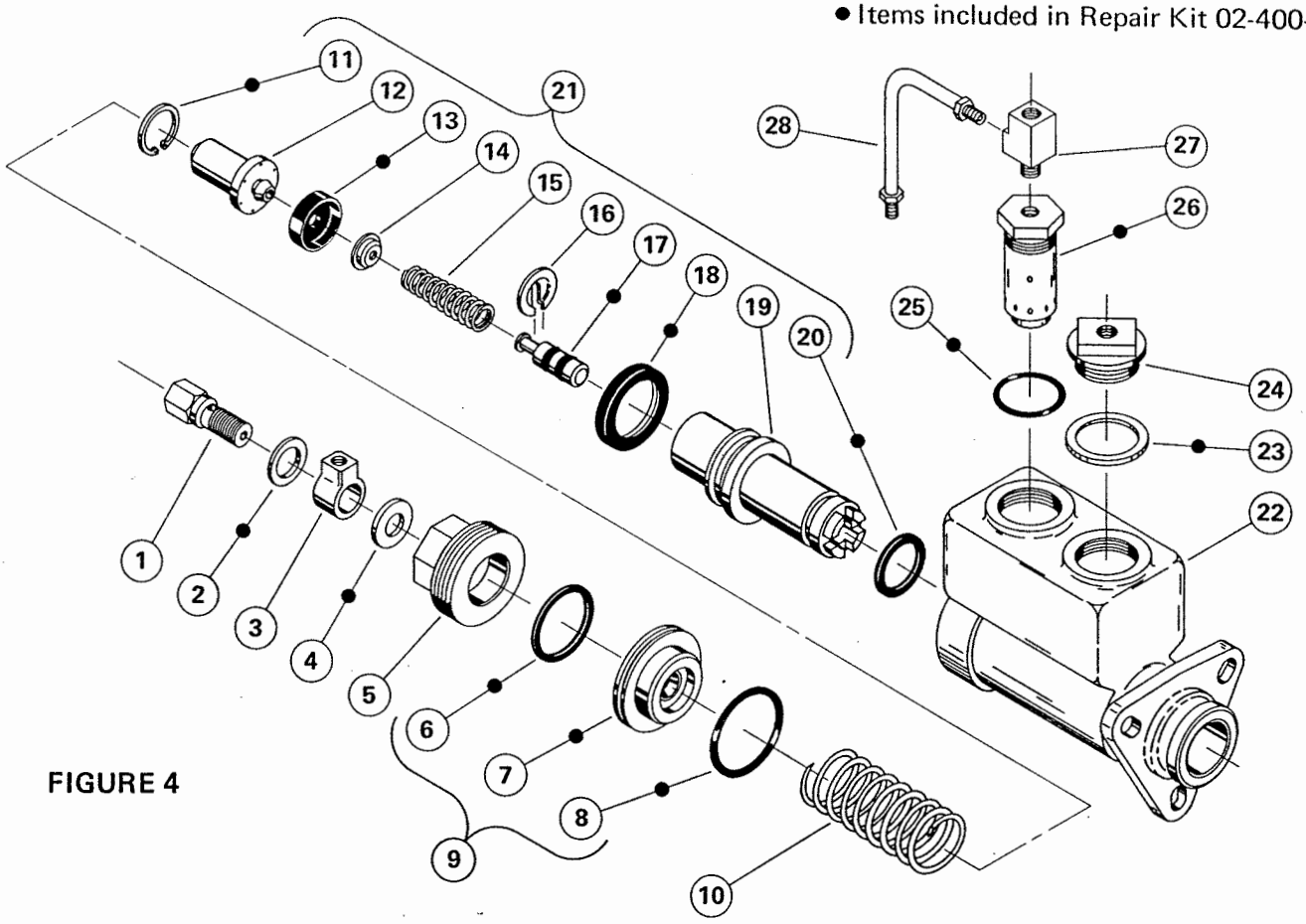

FIGURE 4

RELIEF VALVE DISASSEMBLY

(Refer to Figure 5)

1. Loosen tubing assembly.
2. Loosen relief valve cap assembly with box end wrench.
3. Tubing can be removed as relief valve cap is rotated.
4. Remove relief valve cap assembly carefully as it is pre-loaded by valve spring. Remove o-ring from relief valve cap.

RELIEF VALVE ASSEMBLY

(Refer to Figure 5)

1. Clean all parts thoroughly before assembling.
2. Insert relief valve assembly (piston assembly and body assembly) into cylinder casting.
3. Install relief valve spring.
4. Install new o-ring on relief valve cap.
5. Position tubing assembly flare nuts on fitting (elbow) before tightening relief valve cap with wrench. Tighten relief valve cap (torque 75 - 80 ft. lbs.), tube nuts and line bolts.

RELIEF VALVE CAP

O-RING ●

RELIEF VALVE SPRING ●

PISTON AND BODY ASSEMBLY ●

● Items included in Repair Kit 02-400-169

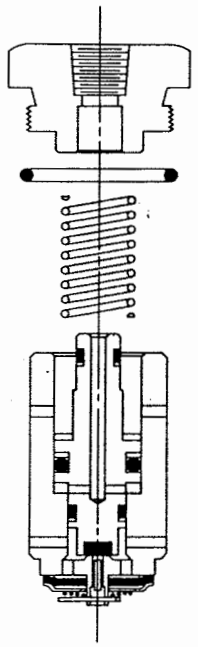

FIGURE 5

CONNECTING SECTIONS AND MOUNTING BRAKE VALVE ON VEHICLE

(Refer to Figures 1 and 3)

1. Attach Master Cylinder Section to Power Assist Section with three cap screws and three washers. Torque 35 - 40 ft. lbs.
2. Install unit on vehicle. Connect push rod. Connect fluid lines. Bleed system of air. Tighten fittings if leaks should occur. Make several applications to be sure Brake Valve is working properly.

BLEEDING PROCEDURES

NOTE: BE SURE THAT YOU MAINTAIN A HIGH LEVEL OF FLUID IN THE RESERVOIR DURING AND AFTER THE ENTIRE BLEEDING PROCESS.

CAUTION: USE ONLY HYDRAULIC BRAKE FLUID SAE J1703 OR DOT BRAKE FLUID OR BRAKE FLUID SPECIFIED BY VEHICLE MANUFACTURER.

NEVER REUSE FLUID THAT HAS BEEN DRAINED FROM THE SYSTEM.

PRESSURE BLEEDING INSTRUCTIONS

1. Master Cylinder must be securely mounted to power assist section.
2. Fill reservoir with proper fluid used.
3. Be certain all fittings are tight to avoid leaking.
4. DO NOT DEPRESS PEDAL.
5. Connect pressure bleeder into reservoir adapter. Recommended bleeding pressure is 30 P.S.I. maximum.
6. Open 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 bleeder screw.
8. Remove pressure bleeder.
9. Open bleeder screw at master cylinder. Actuate cylinder to remove any residual air. Tighten bleeder screw before permitting pedal to return.
10. Actuate pedal several times. If pedal is spongy, check for system leaks and repeat bleeding process.

BENCH BLEEDING INSTRUCTIONS

1. This process can be done in a bench vise or on the vehicle with master cylinder mounted to power assist section.
2. Remove master cylinder filler cap assembly.
3. Connect short lengths of tubing to outlet ports and immerse the other ends below the fluid level in the master cylinder reservoir. Keep reservoir fluid within 1/2" of inside reservoir top.
4. Actuate master cylinder piston with a smooth object large enough to hold the small internal piston from coming out. Slowly stroke and release master cylinder piston 1 3/8 - 1 1/2 inches. Repeat until air bubbles in reservoir have ceased.
5. Remove tubing. This should be done quickly so the loss of brake 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 vehicle. Finish all plumbing connections before continuing to step 7.
7. Bleed remaining air from system by depressing brake pedal and opening bleeder fitting closest to 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 1/2" of top and install filler cap assembly.
9. Be certain all fittings are tight to avoid any leaking.
10. Actuate pedal several times. If brake pedal feels spongy, check for system leaks and repeat bleeding process.

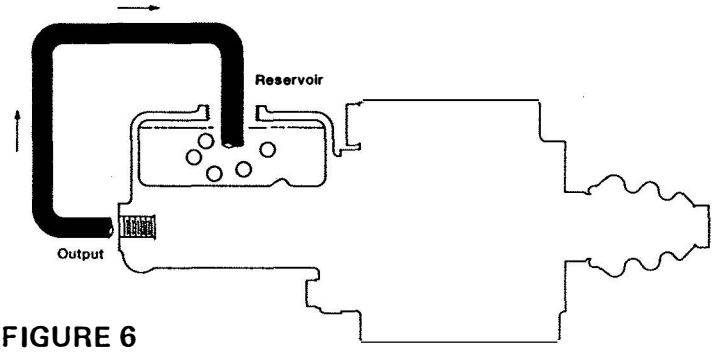

FIGURE 6

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