

POWER BOOSTERS

Virtually all modern vehicles use a vacuum assisted power brake system to multiply the braking force and reduce pedal effort. Since vacuum is always available when the engine is operating, the system is simple and efficient. A vacuum diaphragm is located on the front of the master cylinder and assists the driver in applying the brakes, reducing both the effort and travel he must put into moving the brake pedal. The vacuum diaphragm housing is normally connected to the intake manifold by a vacuum hose. A check valve is placed at the point where the hose enters the diaphragm housing, so that during periods of low manifold vacuum brakes assist will not be lost. Depressing the brake pedal closes off the vacuum source and allows atmospheric pressure to enter on one side of the diaphragm. This causes the master cylinder pistons to move and apply the brakes. When the brake pedal is released, vacuum is applied to both sides of the diaphragm and springs return the diaphragm and master cylinder pistons to the released position. If the vacuum supply fails, the brake pedal rod will contact the end of the master cylinder actuator rod and the system will apply the brakes without any power assistance. The driver will notice that much higher pedal effort is needed to stop the car and that the pedal feels harder than usual.

Vacuum Leak Test

1. Operate the engine at idle without touching the brake pedal for at least one minute.
2. Turn off the engine and wait one minute.
3. Test for the presence of assist vacuum by depressing the brake pedal and releasing it several times. If vacuum is present in the system, light application will produce less and less pedal travel. If there is no vacuum, air is leaking into the system.

System Operation Test

1. With the engine **OFF**, pump the brake pedal until the supply vacuum is entirely gone.
2. Put light, steady pressure on the brake pedal.
3. Start the engine and let it idle. If the system is operating correctly, the brake pedal should fall toward the floor if the constant pressure is maintained.

Power brake systems may be tested for hydraulic leaks just as ordinary systems are tested.

*** WARNING

Clean, high quality brake fluid is essential to the safe and proper operation of the brake system. You should always buy the highest quality brake fluid that is available. If the brake fluid becomes contaminated, drain and flush the system, then refill the master cylinder with new fluid. Never reuse any brake fluid. Any brake fluid that is removed from the system should be discarded.

Brake Light Switch

REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. Disconnect the electrical connector at the switch. The locking tab on the connector must be lifted before the connector can be removed.
3. Remove the hairpin retainer, slide the brake light switch, the pushrod and the nylon washers and bushings away from the pedal and remove the switch.

➡ **Since the switch side plate nearest the brake pedal is slotted, it is not necessary to remove the brake master cylinder pushrod and 1 washer from the brake pedal pin.**

To install:

4. Position the switch so the U-shaped side is nearest the pedal and directly over/under the pin. Then slide the switch down/up trapping the master cylinder pushrod and black bushing between the switch side plates. Push the switch and pushrod assembly firmly toward the brake pedal arm. Assemble the outside white plastic washer to the pin and install the hairpin retainer to trap the whole assembly.
5. Assemble the wire harness connector to the switch. Check the switch for proper operation.

➡ **The brake light switch wire harness must be long enough to travel with the switch during full pedal stroke. If wire length is insufficient, reroute the harness or service, as required.**

Master Cylinder

REMOVAL & INSTALLATION

1988-94 Vehicles

➡ See Figures 1, 2, 3 and 4

1. Disconnect the negative battery cable.
2. For vehicles equipped with ABS, apply the brake pedal a few times to exhaust all the vacuum in the system.
3. Disengage the brake warning indicator electrical connector.
4. Disconnect the brake lines from the primary and secondary outlet ports of the master cylinder and the brake pressure control valve.

➡ **The master cylinder on the 1988-89 Lincoln Continental is part of the anti-lock brake hydraulic actuation unit and cannot be removed separately.**

5. For vehicles equipped with ABS; disconnect the Hydraulic Control Unit (HCU) supply hose at the master cylinder, then secure in a position to prevent the loss of brake fluid.
6. Remove the nuts attaching the master cylinder to the brake booster assembly.
7. Slide the master cylinder forward and upward from the vehicle.

To install:

8. In order to ease installation, bench bleed the master cylinder before installation:
 - a. Mount the master cylinder in a holding fixture, such as a soft jawed vise. Be careful not to damage the master cylinder housing.
 - b. Fill the master cylinder with brake fluid.
 - c. Place a suitable container under the master cylinder to catch the fluid being expelled from the outlet ports. Using a suitable tool inserted into the booster pushrod cavity, push the master cylinder piston in slowly.
 - d. Place a finger tightly over each outlet port, then allow the master cylinder piston to return.
 - e. Repeat the procedure until only clear fluid is expelled from the master cylinder. Plug the outlet ports, then remove the master cylinder from the holding fixture.
9. For vehicles equipped with ABS, install a new seal in the groove in the master cylinder mounting face.

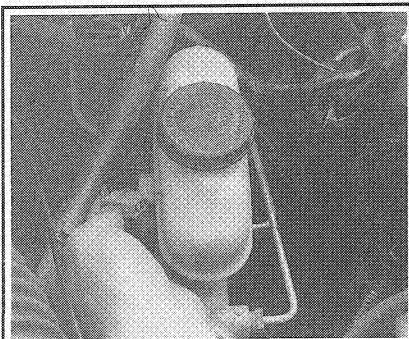


Fig. 1 Disengage the electrical connector from the brake warning indicator

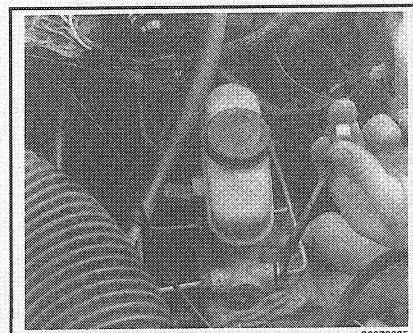


Fig. 2 Disconnect the brake lines from the primary and secondary outlet ports of the master cylinder

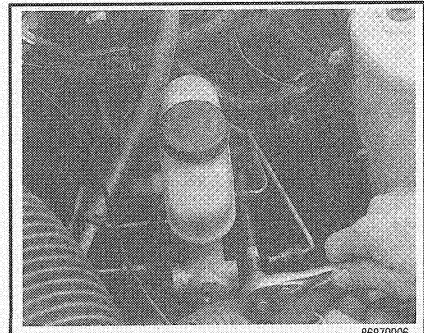


Fig. 3 Remove the retaining nuts attaching the master cylinder to the brake booster assembly, then . . .