DELCO-MORAINE SINGLE DIAPHRAGM

Buick
Chevrolet
Oldsmobile
Pontiac

DESCRIPTION

A combined vacuum-hydraulic unit which uses a combination of intake manifold vacuum and atmospheric pressure to provide power assist. Reserve vacuum supply and vacuum check valve allow several brake applications, with vacuum assist, after engine has stopped. Unit is composed of two main sections: vacuum power cylinder and dual master cylinder. Vacuum power cylinder contains power piston assembly, which houses control valve, reaction mechanism, and power piston return spring.

REMOVAL & INSTALLATION

POWER BRAKE UNIT

Remove vacuum line from power unit and hydraulic lines from master cylinder (plug lines). Disconnect stop light switch wires, if necessary. Detach power unit push rod from brake pedal assembly. Unbolt power unit from firewall and remove from vehicle (with master cylinder). To install, reverse removal procedure and bleed system.

OVERHAUL

POWER BRAKE UNIT

Disassembly – 1) Scribe mark on housings for reassembly, and remove master cylinder.

2) Attach a separator tool and wrench (J-22893, J-23456, or J-9504 and J-22805), press down and turn counterclockwise to separate housings. If necessary, tap lightly with a plastic hammer.

NOTE – *Do not put pressure on plastic power piston extension.*

3) Remove rear housing, clevis, lock nut, retainer and silencer from push rod. Separate power piston and seal from rear housing.

4) Remove filter and pry lock ring off power piston. Then remove the following.

- Reaction retainer, piston rod, reaction plate, and three reaction levers.
- Air valve springs, small reaction bumper, and air valve spring retainer.

5) Position suitable support plate tool (J-21524) in vise and in notches of support plate. Grip support plate under diaphragm, press down and turn counterclockwise to separate power piston from plate.

6) Remove air valve snap ring. Press air valve from power piston using ½" diameter or smaller rod.

NOTE – *Air valve (floating control valve) push rod assembly is serviced as a complete unit. New assembly should always be installed if original is removed from power piston.*

7) Remove the following in order given:

- Power piston return spring, front housing seal.
- If defective, check valve and grommet.
- Push master cylinder push rod from center of reaction retainer.
- Push rod master cylinder "O" ring.

Cleaning & Inspection – Clean all metal, plastic, and rubber parts in denatured alcohol. Blow out all passages, orifices, and valve holes with clean, dry air. Air dry all parts. Slight rust on inside of housings can be polished with crocus or emery cloth. There should be no nicks, cuts, or abnormalities of any rubber part. If in doubt about its condition, replace the part.

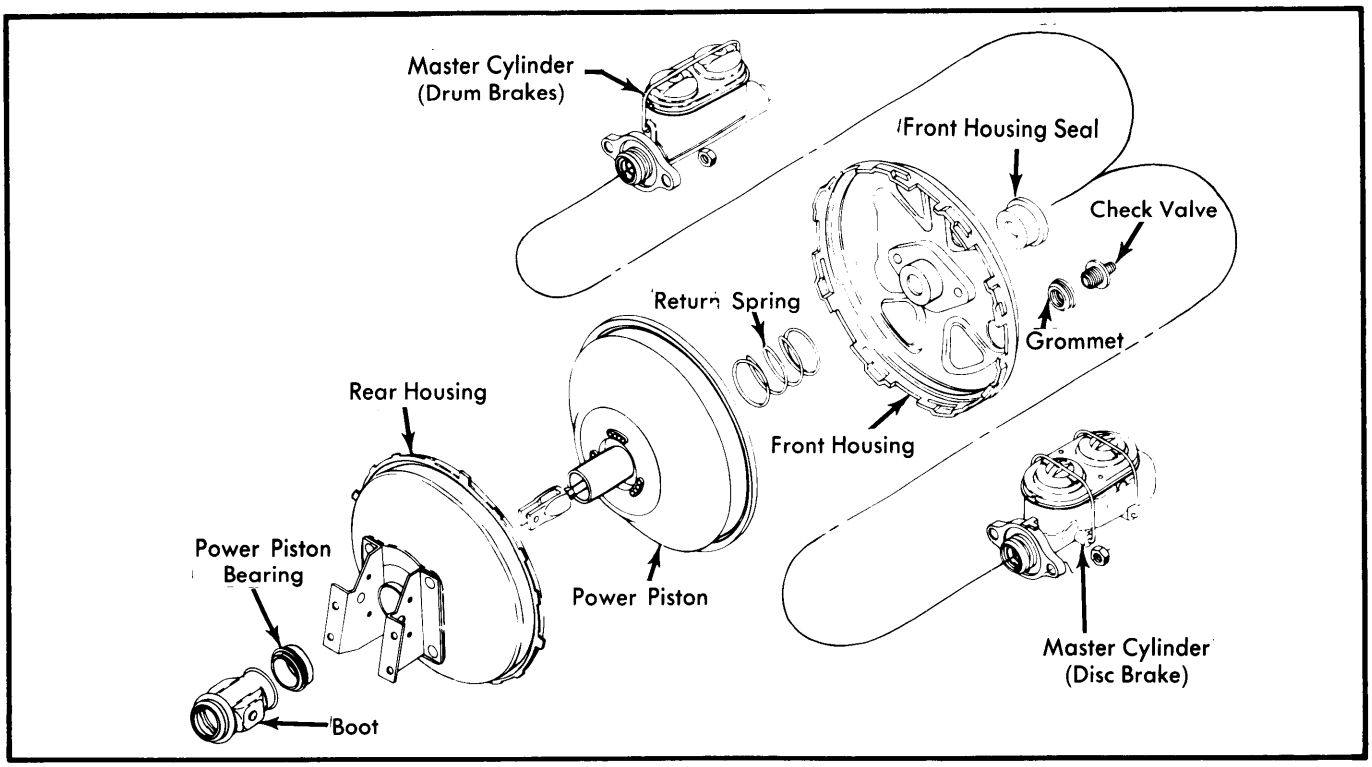

Fig. 1 Exploded View of a Typical Delco-Moraine Single Diaphragm Power Brake Unit

DELCO-MORAINE SINGLE DIAPHRAGM (Cont.)

Reassembly – 1) Replace check valve (with new grommet) if removed during disassembly. Install new front seal. Install new "O" ring in groove on master cylinder piston rod. Insert rod through reaction retainer with round end at tube end of retainer.

NOTE – *Lubricate all rubber parts and plastic and metal friction points with suitable lubricant (Delco Silicone Lube 5459912) prior to installation.*

2) Place suitable support plate tool (J-21524) in vise and position power piston on tool. Install new "O" ring on NEW (if removed) air valve assembly in second groove from push rod forward end. Press air valve assembly into seat in power piston tube. Install new valve retainer and press into place with suitable tool (J-21601).

3) Install push rod limiter washer over push rod. Install air filter. Press raised flange of power piston diaphragm through hole in center of support plate. Hold steel support plate (not diaphragm) and place over power piston tube, seating diaphragm flange in groove of tube.

4) Place assembly in padded vise (tube down). DO NOT clamp. Install snap ring in air valve groove. Seat the air valve spring on snap ring and reaction bumper in groove in end of air valve. Position air valve return springs and reaction levers in place. Set reaction plate (numbered side up) on levers and press down until levers pop into place. Assemble master cylinder rod and reaction retainer to power piston. Secure assembly with lock ring on power piston. Install air filter on push rod.

5) Install new seal in center of rear housing. Assemble power piston to rear housing. Place felt silencer and retainer clip on push rod. Install push rod boot to power piston tube. Assemble lock nut and clevis (if equipped) to push rod. Place front housing assembly on suitable holding fixture (J-22805). Place power piston return spring in front housing. Position rear housing assembly on suitable holding fixture (J-22805). Place power piston return spring in front housing. Position rear housing to front housing and lock together.

NOTE – *If housings do not lock together easily, apply vacuum to check valve.*

PUSH ROD ADJUSTMENT

1) Place suitable push rod gauge (J-22647) over push rod in position which will allow gauge to be moved from side to side without touching studs. Push rod must touch longer section of gauge. Rod should never touch shorter section.

2) If any variation from this check exists, obtain service adjustable push rod (with adjustable screw on end). Regulate push rod to match proper adjustment. Variation beyond these limits can cause primary cup to overlap the compensation port of master cylinder, trapping fluid and causing brake drag.

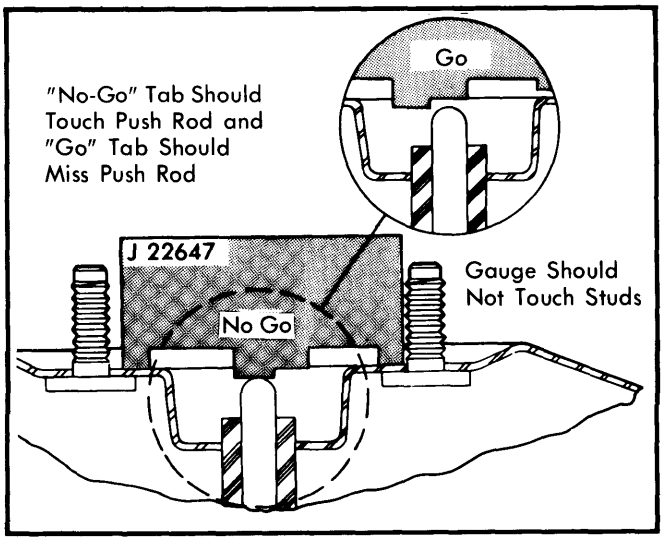

Fig. 2 Using "Go/No-Go" Push Rod Gauge to Measure Height of Push Rod

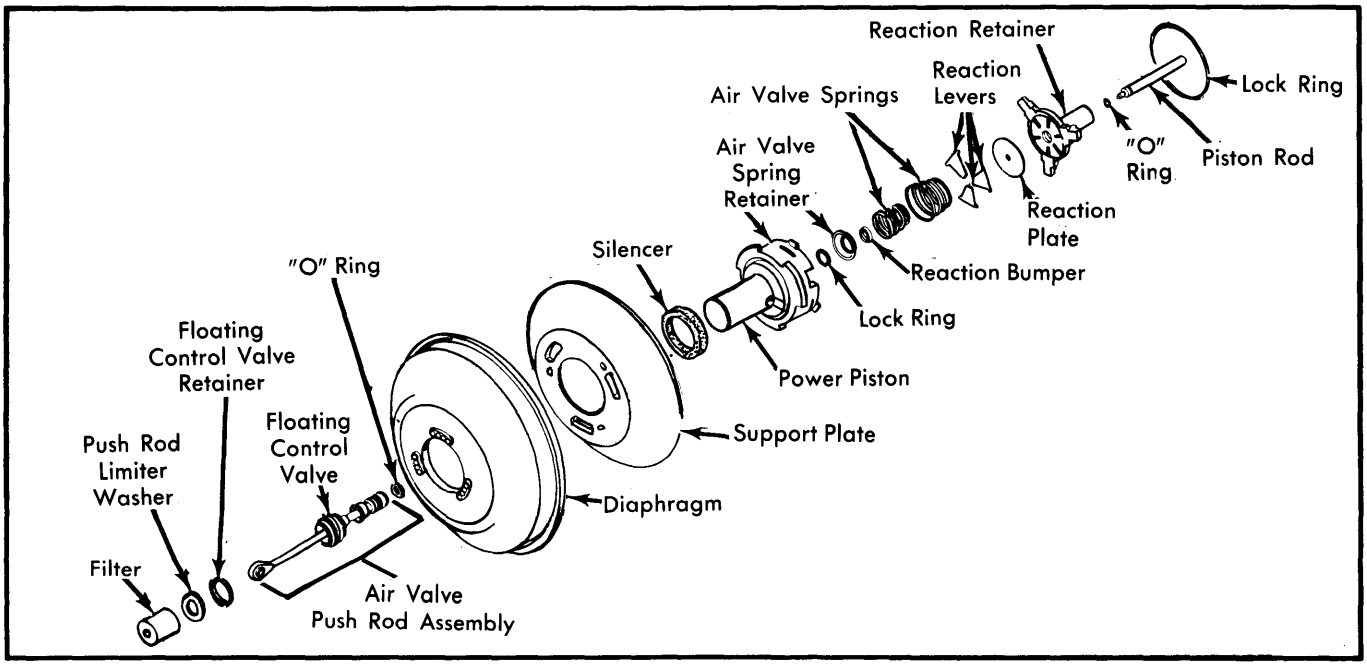

Fig. 3 Exploded View of a Typical Delco-Moraine Single Diaphragm Power Piston Assembly