

# Power Brake Units

## DELCO-MORAINE TANDEM DIAPHRAGM

**Buick**  
**Cadillac (Exc. Seville)**  
**Chevrolet**  
**Oldsmobile (Exc. Starfire & Omega)**  
**Pontiac**

### DESCRIPTION

Unit is mounted on firewall and connected directly to brake pedal. A combination of vacuum and atmospheric pressure is used to provide power assist. Power cylinder houses power piston assembly which contains primary and secondary diaphragms, pistons, floating control valve, reaction piston, and disc.

### REMOVAL & INSTALLATION

On Oldsmobile and Cadillac, disconnect and plug hydraulic lines at master cylinder. On Buick, Chevrolet, and Pontiac, disconnect master cylinder from power unit and place out of way (with hydraulic lines still attached). On all models, disconnect vacuum line from check valve. On Pontiac, remove check valve from power unit. Detach push rod from brake pedal. **NOTE** — On Cadillac, lower steering column cover must first be removed. On Chevelle and Monte Carlo, unbolt power unit and depress brake pedal to move unit from firewall and gain access to push rod pin. Unbolt and remove power unit. To install, reverse removal procedure and bleed system.

### OVERHAUL

**Disassembly (Power Cylinder)** — 1) Scribe a line across front and rear housings to aid in reassembly. Remove master cylinder if not done during removal. Remove front housing seal and master cylinder piston push rod. Attach unit to a suitable holding and separating fixture (J-22805 or J-23456). Separate housings using a suitable spanner wrench (J-9504).

**NOTE** — On tilt bracket mounting, use spanner wrench with suitable adapter (J-22893). Press down and turn counterclockwise. **CAUTION** — Separate slowly, as unit is under internal spring pressure. Ensure no pressure is put on plastic power piston.

2) Remove power piston return spring (retainer plate may come out with spring). If defective, remove check valve and grommet. Remove front housing seal. If equipped, remove push rod clevis and lock nut, from rear housing. Remove boot, felt silencer, power piston group, and seal from center of rear housing.

**Disassembly (Power Piston)** — 1) Remove diaphragm support ring from under secondary diaphragm. Remove piston rod. Place suitable power piston tool (J-23101) in vise. Position secondary power piston on tool, grip edge of support plate (not diaphragm) and rotate counterclockwise, to separate power pistons. **NOTE** — Primary support plate may unlock before primary power piston releases; however, continue turning until separation is complete.

2) Remove housing divider from secondary power piston, and bearing from divider. With secondary power piston still on tool, grip support plate (not diaphragm) and rotate clockwise, to unlock secondary support plate from secondary power piston. Remove secondary diaphragm. Push reaction piston and disc out of secondary power piston. Remove the air valve spring, if necessary.

3) Turn power piston tool over (small diameter end up). Remove primary power piston and diaphragm in same manner as secondary power piston. Remove air filter and silencer from power piston tube. Remove rubber reaction bumper from air valve. Using suitable rod (not exceeding  $\frac{1}{2}$ " in diameter), press air valve-push rod assembly from primary power piston. Remove "O" ring from air valve.

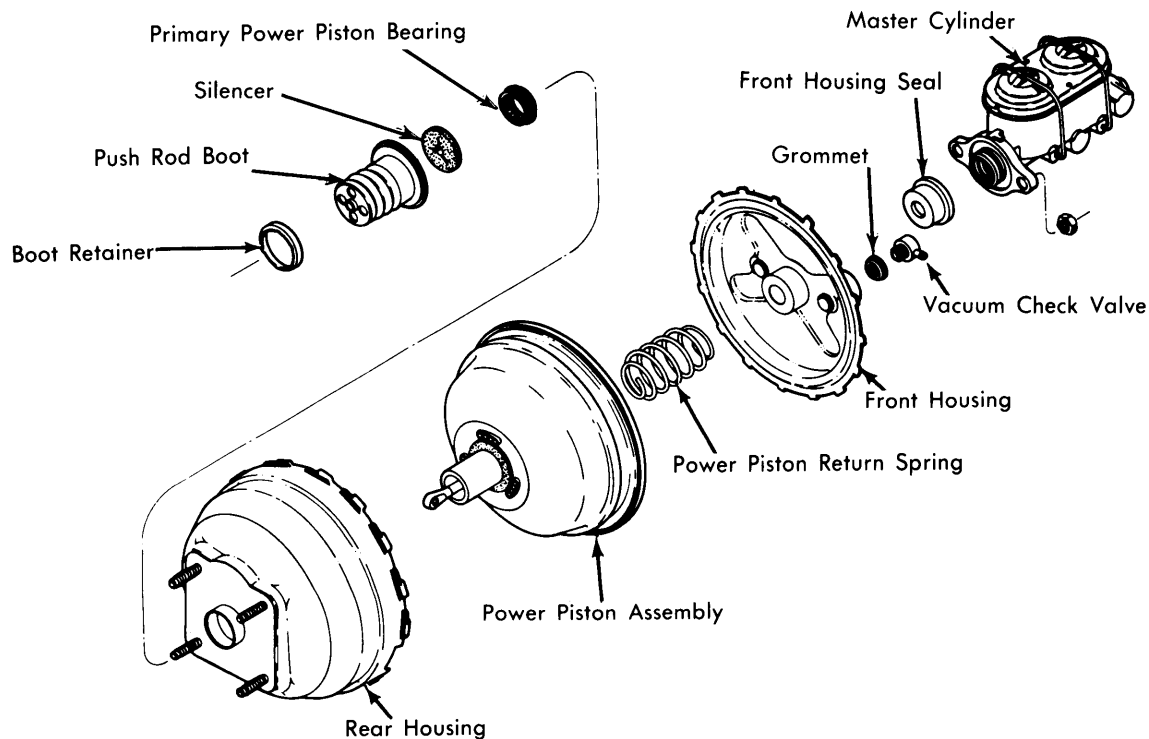


Fig. 1 Exploded View of Typical Delco-Moraine Tandem Power Cylinder

## DELCO-MORAINE TANDEM DIAPHRAGM (Cont.)

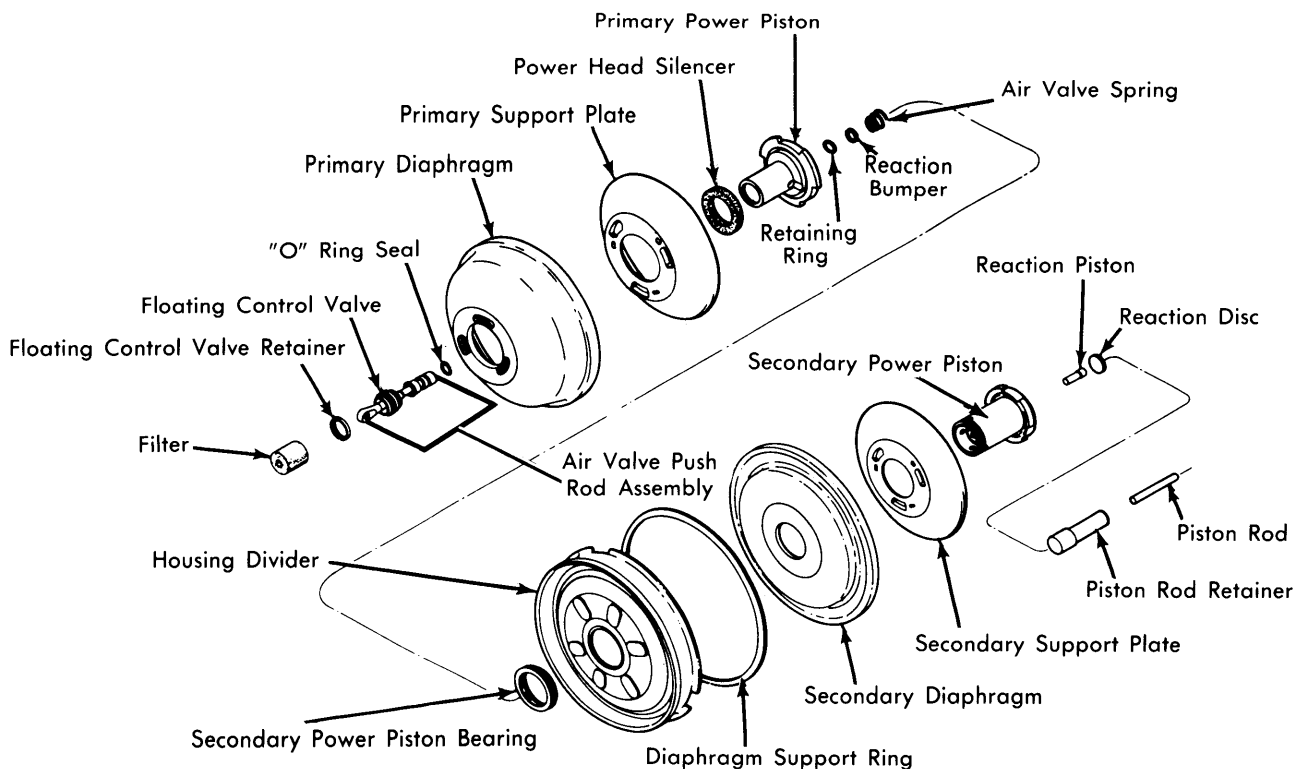


Fig. 2 Exploded View of Typical Delco-Moraine Tandem Power Piston

**Cleaning & Inspection** – Clean all plastic, metal, and rubber parts in denatured alcohol. Blow out all passages, orifices, and valve holes. Air dry all parts. Slight rust on housing may be cleaned with crocus or emery cloth (then reclean). Do not replace any rubber parts with cuts, nicks, or distortion. If in doubt, replace the part.

**NOTE** – Prior to installation of rubber, plastic, and metal friction parts, lubricate with suitable silicone lube (5459912).

**Reassembly** – 1) Replace vacuum check valve, with new grommet. Install front housing seal. Place new "O" ring on air valve. Insert air valve end of air valve-push rod assembly into primary power piston tube. **NOTE** – If floating control valve requires replacement, complete air valve-push rod assembly must be replaced. Seat floating control valve retainer on valve assembly. Manually press assembly so that floating control valve bottoms on tube. Suitable installer tool (J-23175) may be used. Install air filter and retaining ring in primary power piston tube. Position rubber reaction bumper on end of air valve.

2) If replacing either power piston with new parts, the following procedure should be used: Hand tighten power pistons to each other, without air valve spring (air valve-push rod assembly should be already assembled, as previously described). Insert and seat reaction piston into secondary power piston. Place suitable gauge (J-23337) in secondary power piston, with outer edge of gauge resting on bottom of large cavity (center section on gauge in smaller cavity). Move gauge to right or left of end of reaction piston. Piston is correct length if end of piston hits, but does not unseat, gauge. Replace with proper service piston if length is incorrect (too short or too long).

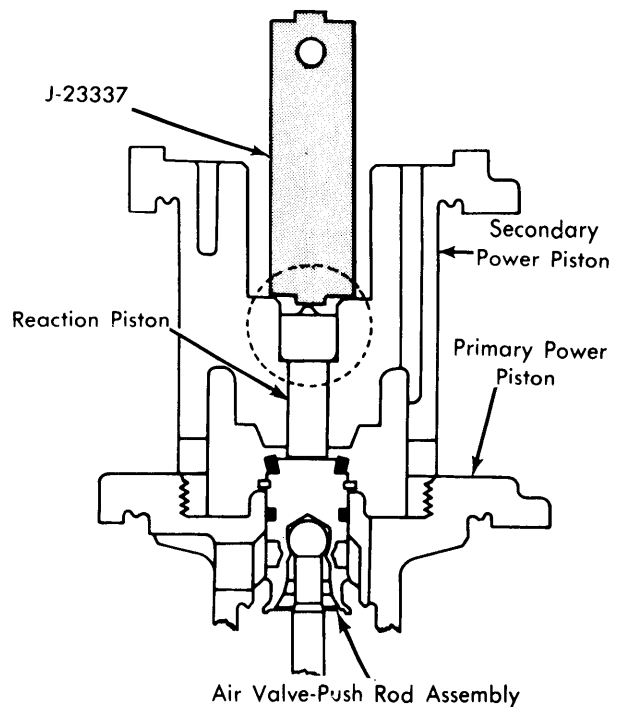


Fig. 3 Gauging of Power Piston

3) Place rubber reaction disc in large cavity of secondary power piston and seat disc on reaction piston. Unlock power pistons. Assemble primary diaphragm to primary support plate. Press raised flange of diaphragm I.D. through center hole of support plate (ensure plate fits in flange groove).

## DELCO-MORAIN TANDEM DIAPHRAGM (Cont.)

4) Mount power piston tool (J-23101) in vise, with small diameter end up. Position primary power piston on tangs of tool. Holding edge of primary support plate, place on power piston, press down, and rotate clockwise until assembly locks. Place power head silencer on tube of primary power piston, covering holes at base of tube.

5) Assemble secondary power piston, diaphragm, and support plate in same manner as primary power piston assembly (turn tool over, with large diameter end up).

6) Apply talcum powder to bead on O.D. of secondary diaphragm. Hold housing divider with primary diaphragm holding flange facing down. Install secondary bearing in I.D. of divider, with extended lip of bearing upward. Install suitable bearing protector tool (J-23188) on threaded end of secondary power piston. Hold housing divider with six oblong protrusions upward. Press divider down over tool and onto secondary piston tube (against diaphragm support ring). Remove bearing protector tool, but do not remove power piston tool.

7) Fold diaphragm away from O.D. of primary support plate. Position small end of air valve return spring on air valve. Set primary power piston on tubular portion of secondary power piston (ensure air valve return spring seats properly). Press down and screw power pistons tightly together. Pull diaphragm O.D. over flange of housing divider. Insert master cylinder piston rod into secondary power piston until flat end bottoms against rubber reaction disc.

8) Install new rear housing seal. Mount front housing on suitable holding fixture (J-22805). Assemble power piston group to rear housing. Press down until housing divider seats in rear housing and primary power piston bottoms against housing. Place piston rod retainer plate on end of power piston return spring in front housing.

9) Place housings in position to be locked (note location of scribe marks). Check to be sure piston rod retainer goes through center of retainer plate. Lock housings in reverse manner of separation, using appropriate tools.

10) Place silencer in closed end of power head boot. Stretch boot over push rod and over flange in center of rear housing. Install boot retainer. Install push rod clevis and lock nut, if equipped.

## PUSH ROD ADJUSTMENT

1) Place power unit in padded vise, with front housing up.

**NOTE** — Do not clamp tight. Insert master cylinder piston rod, flat end first, into piston rod retainer. Ensure rod is properly seated. Remove front housing seal, to assure no vacuum is in unit.

2) Place suitable gauge (J-22647) over piston rod, in a position which will allow gauge to be moved right or left without contacting studs. Piston rod should contact longer section of gauge. Rod is non-adjustable, and if out of limits, must be replaced with adjustable service rod. With service rod, adjust self-locking screw to meet gauging specifications.

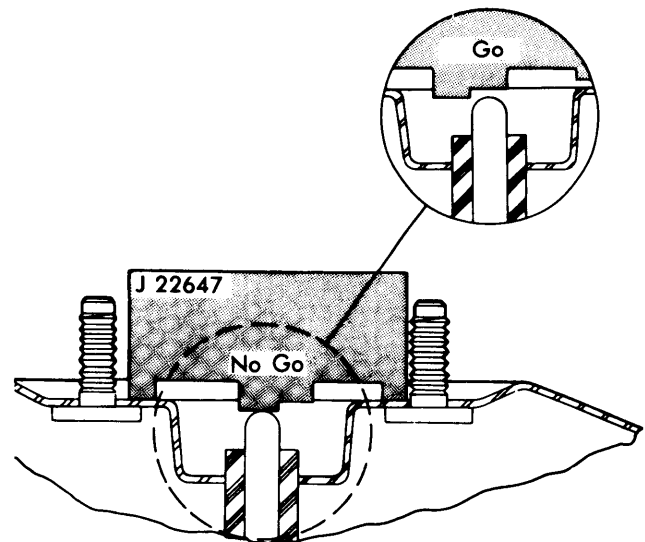


Fig. 4 Gauging Push Rod with Special Gauge