

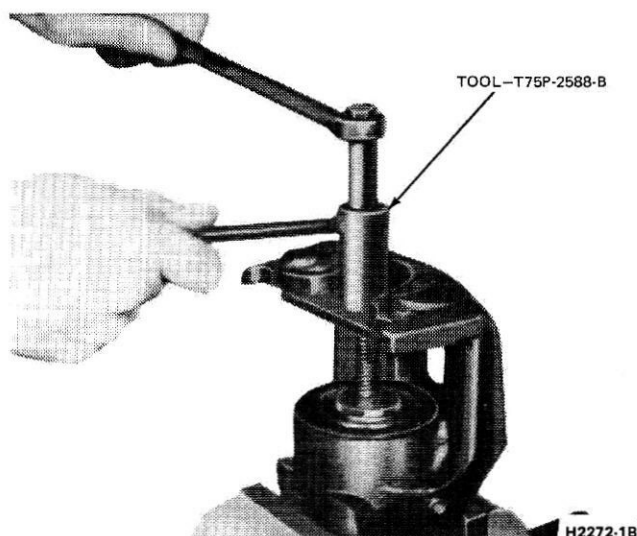


FIG. 23 Bottoming Piston

ROTOR REFINISHING

All Models Equipped With Disc Brakes

Refer to Brake Diagnostic Procedures in Part 12-01 for conditions necessitating rotor refinishing.

Disc Brake Lathe 54-0020 or equivalent should be used to refinish disc brake rotors.

Front Rotor

Rotor minimum thickness must not be less than shown in Fig. 24, nor less than the number cast on the inside of the rotor after refinishing. Lateral runout of the braking surfaces must not exceed 0.003 inch and the surface finish is to be in the 80/15 micro-inch range.

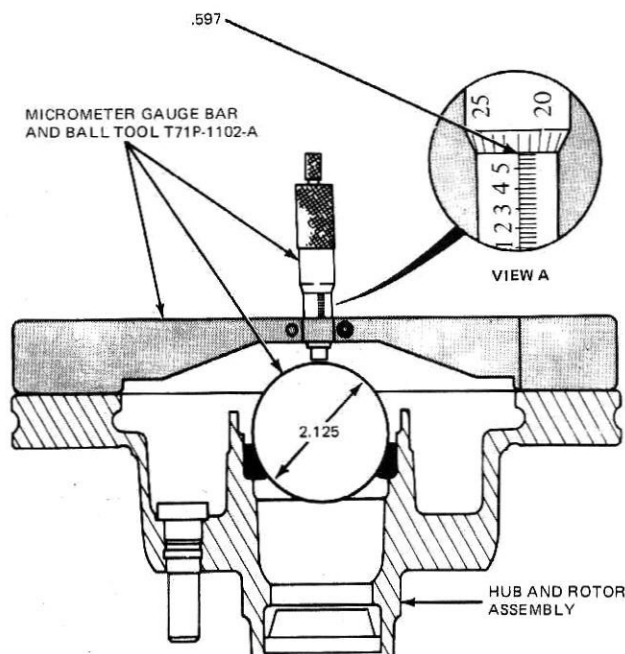
Maximum allowable stock removal of the inner rotor braking surface is determined by the use of a micrometer gauge bar and ball tool (Tool T71P-1102-A) (Fig. 25) as follows:

Car Model	Base Line Setting		Rotor Minimum Thickness ①
	2.25 Ball	2.125 Ball	
LTD II, Cougar, Thunderbird	.035	—	1.12
Continental Mark V	.035	—	1.12
Ford, Mercury, Lincoln Continental	.035	—	1.12
Mustang II, Pinto, Bobcat	—	.597	0.81
Granada, Monarch, Versailles	—	.350	0.81
Fairmont, Zephyr	—	.244	0.81

① Rotors having a thickness less than shown here must be replaced regardless of the micrometer gauge bar and ball measurement.

CH1963-1E

FIG. 24 Front Rotor Micrometer Gauge Bar Base-Line Setting—Front Rotor Minimum Thickness



H1961-1C

FIG. 25 Gauging Front Rotor Inner Braking Surface (Mustang II, Pinto, Bobcat, Fairmont and Zephyr Shown)

1. Remove the inner grease retainer and bearing assembly from the hub and rotor assembly. Wipe the inner and outer bearing cups clean.
2. Carefully place the gauge ball in the inner bearing cup (**do not drop**).
3. Set the micrometer to the base line setting dimension shown in Fig. 24.
4. Position the micrometer gauge bar on the rotor inner braking surface with the micrometer centered over the ball (Fig. 25). To measure the distance between the micrometer base-line setting and the ball, turn the micrometer down to touch the top of the ball, and calculate the difference between that reading and the base line setting. This distance is equal to the maximum allowable stock removal from the inside braking surface only. If the micrometer end, at the base-line setting, touches the ball, no additional stock removal is allowed.

If the micrometer must be retracted from the base-line setting to allow the legs to set on the rotor surface, the rotor has had more than allowable stock removed and the rotor assembly must be replaced.

5. Check the rotor for the maximum amount of stock that can be removed from the rotor thickness. Measure actual rotor thickness with micrometer and subtract minimum allowable thickness (cast in individual rotor and shown in shop manual). Total material removal (combination of both sides) must not exceed this amount. **If the rotor thickness is less than the minimum (Fig. 24), the rotor must be replaced regardless of the gauge bar and**

ball measurement. Rotor minimum thickness is also shown on each rotor.

6. Position the rotor in the lathe arbor. Never use a lathe that cuts only one face of the rotor at a time; it must be a simultaneous straddle cut. Install a dial indicator to read rotor lateral run-out near the center of the rotor face. If run-out is 0.002 or below, proceed to machine rotor. If run-out is over 0.002, loosen rotor on the arbor and rotate the rotor 90 degrees. Re-read the run-out and if it is below 0.002, proceed to machine the rotor. If run-out is still over 0.002, again loosen the rotor and rotate it an additional 90 degrees. Re-check the run-out. If run-out is 0.002 or less, proceed to machine the rotor. If the run-out still exceeds 0.002, return the rotor to the best run-out position obtained. If the rotor run-out can be brought below 0.005, proceed to machine the rotor. If the rotor cannot be brought below 0.005 run-out, it must be replaced.
7. Set the cutting tool to just contact the high spots on the rotor, then adjust the cutting tool to the minimum depth required to clean up the rotor face.

Do not exceed the allowable stock removal for the inner braking surface or total rotor thickness. Before installing the rotor on the spindle, clean all chips from the rotor and flush new grease through the bearing with a bearing packing tool.

REAR ROTOR

Refinishing of the rear disc brake rotor is basically the same procedure as that used with the front disc brake rotor. The primary difference is in the gauge used to determine the maximum allowable stock removal on the inner braking surface. Because of the difference in shape between the two rotor hat-sections (there is no bearing cup in the rear hat-section) a special tool (Fig. 26) is required to gauge the rear rotor inner braking surface.

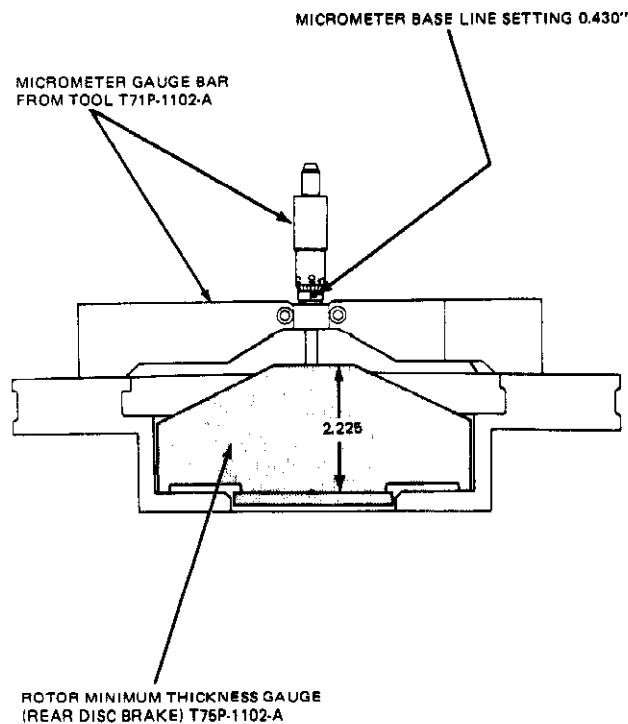
The critical factor in refinishing a rotor is whether or not the thickness of the braking surface will be within specifications when the resurfacing operation is completed. The minimum allowable thickness dimension is cast into each rotor and must be followed when refinishing.

Lateral runout of the braking surfaces must not exceed 0.004 inch and the surface finish is to be in the 80/15 micro-inch range.

Maximum allowable stock removal of the inner rotor braking surface is determined by the use of the micrometer gauge bar (Tool T71P-1102-A) used on the front disc brake rotor, plus a rear disc rotor minimum thickness gauge (Tool T75P-1102-A or T75P-1102-B).

To check the rotor:

1. Carefully place the thickness gauge in the inner hat section of the rotor (do not drop). Make sure that the area of gauge contact is clean and free of rust or contamination.
2. Set the micrometer to the baseline setting dimension shown in Fig. 27.
3. Position the micrometer gauge bar on the rotor inner braking surface with the micrometer centered over the thickness gauge (Fig. 27). To measure the distance between the micrometer base line setting



H2273-1B

FIG. 26 Gauging Rear Rotor Inner Braking Surface—Ford, Mercury, Thunderbird, Continental Mark V and Lincoln Continental Shown

Car Model	Base Line Setting		Rotor Minimum Thickness ①
	T75P-1102-A (2.225 Gauge)	T75P-1102-B (2.475 Gauge)	
Mark V, Lincoln, Ford, Mercury	.430	—	.895
Monarch, Granada, Versailles	—	.351	.895
① Rotors having a thickness less than shown here must be replaced regardless of the micrometer gauge and bar measurement.			

CH2292-1D

FIG. 27 Rear Rotor Micrometer Gauge Bar Base Line Setting—Rotor Minimum Thickness

and the thickness gauge, turn the micrometer down to touch the top of the thickness gauge and calculate the difference between that reading and the original setting. This distance is equal to the maximum allowable stock removal from the inside braking face only. If the micrometer end, at the base line setting, touches the thickness gauge, no additional stock removal is allowed.

If the micrometer must be retracted from the baseline setting to allow the legs to set on the rotor surface, the rotor has had more than allowable stock removed and must be replaced.

4. Check the rotor for the maximum amount of stock that can be removed from the rotor thickness. Measure actual rotor thickness with the micrometer

and subtract the minimum allowable thickness (cast into the rotor). Total material removal (combination of both sides) must not exceed this amount. If the rotor thickness is less than the minimum the rotor must be replaced, regardless of the gauge bar and thickness gauge measurement.

5. Position the rotor in the lathe arbor. Determine the rotor runout by following the procedure given in Step 6 under Front Rotor Refinishing.

6. Set the cutting tool to just contact the high spots on the rotor, then adjust the cutting tool to the minimum depth required to clean up the rotor face. If runout exceeds 0.004 inch after resurfacing, replace the rotor.

Do not exceed either the allowable stock removal from the inner braking surface or the total rotor thickness. Clean all cuttings and chips from the rotor before installing it on the axle.

SPECIFICATIONS

FRONT DISC BRAKE DIMENSIONS AND SPECIAL SERVICE TOOLS

Component	Ford, Mercury	Lincoln Continental, Continental Mark V	LTD II, Cougar, Thunderbird	Pinto, Bobcat, Mustang II	Fairmont, Zephyr	Granada, Monarch, Versailles
Lining Material	Riveted	Riveted	Riveted	Riveted	Riveted	Riveted
Lining Size	6.40 x 1.80 outer 5.16 x 1.90 inner	6.40 x 1.80 outer 5.16 x 1.90 inner	6.40 x 1.80 outer 5.16 x 1.90 inner	5.0 x 1.4 outer 5.0 x 1.4 inner	5.92 x 1.97 outer 4.74 x 2.32 inner	6.0 x 1.9 outer 5.24 x 1.9 inner
Lining Wear Limit (From Shoe Surface)	1/8	1/8	1/8	1/8	1/8	1/8
Lining to Rotor Clearance (Brakes Released)	0.000-0.010	0.000-0.010	0.000-0.010	0.000-0.010	0.000-0.010	0.000-0.010
Caliper Cylinder Bore Dia.	3.100	3.100	3.100	2.6	2.36	2.6
Master Cylinder Bore Dia.	1.000	1.000 ④	1.000	0.938	0.9750	0.938 ⑤
Front Rotor Nominal Thickness	1.180	1.180	1.180	0.870	0.870	0.870
Front Rotor Minimum Thickness ①	1.120	1.120	1.120	0.810	0.810	0.810
Front Rotor Diameter	11.80 outside 7.785 inside	11.80 outside 7.785 inside	10.720 outside ② 6.785 inside ②	9.3 outside 6.24 inside	10.08 outside 6.24 inside	11.03 outside 7.03 inside
Front Rotor Allowable Runout	0.003	0.003	0.003	0.003	0.003	0.003
Front Rotor Finish (Micro-inches)	15-80	15-80	15-80	15-80	15-80	15-80
Front Rotor Thickness Variation	0.0005 ③	0.00025	0.0005	0.0005	0.0005	0.0005
Gauge Bar Micro-meter Base-Line Setting	See Overhaul Section					
① Minimum Safe Thickness is shown on each Rotor. ④ 1.125" Dia. Std. on Mark V. Also used with Disc Brake option for Lincoln. ② "Same As Ford" on Police Vehicles. ⑤ 1.00" Dia. used with Rear Disc Brake option. ③ 0.0004 on Mercury.						

REAR DISC BRAKE DIMENSIONS AND SPECIAL SERVICE TOOLS

Component	Mercury and Ford	Lincoln and Mark V	Granada, Monarch and Versailles
Lining Material	Riveted	Riveted	Riveted
Lining Size	6.02 x 1.90 Inner & Outer	6.02 x 1.90 Inner & Outer	6.02 x 1.90 Inner & Outer
Lining Wear Limit (From Shoe Surface)	1/8	1/8	1/8
Caliper Cylinder Bore Diameter	2.6	2.6	2.1
Rear Rotor Nominal Thickness	.945	.945	.945
Rear Rotor ① Minimum Thickness	.895	.895	.895
Rear Rotor Diameter	11.50 Outside 7.26 Inside	11.50 Outside 7.26 Inside	10.66 Outside 6.33 Inside
Rear Rotor Allowable Runout	.004	.004	.004
Rear Rotor Finish (Micro-Inches)	15-80	15-80	15-80
Rear Rotor Thickness Variation	0.0005	0.0004	0.0005

① Minimum safe thickness is shown on each rotor.

SPECIAL SERVICE TOOLS

Tool No.	Description	Tool No.	Description
Tool 7000 DE	Rubber Tipped Air Nozzle	2162	Adapter Cap
T71P-1102-A	Ball and Gage Bar Kit	J22742	Bleeder Valve Spring Clip
T75P-1102-A	Rotor Micrometer Gage Bar		
T75P-1102-B	Rotor Micrometer Gage Bar		
T75P-2588-B	Piston Turning Tool		
T75P-2588-A	Piston Removing Tool		
54-0020	Disc Brake Rotor Lathe	Milbar 1112-144	Inch Pound Torque Wrench

CH2293-20

Vacuum Brake Booster— Dash Mounted

**PART
12-50**

Applies to All Car Lines

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS		DIAGNOSIS AND TESTING	
Brake Booster to Master Cylinder		Vacuum Power Brake Function Test	50-2
Push Rod	50-1	REMOVAL AND INSTALLATION	
DESCRIPTION	50-1	Brake Booster - Vacuum	50-2

CH2485-28

DESCRIPTION

The diaphragm-type brake booster is a self-contained vacuum-hydraulic braking unit mounted on the engine side of the dash panel.

The brake booster is of the vacuum suspended-type, which utilizes engine intake manifold vacuum and atmospheric pressure for its power. **Adjustment of the push rod is the only service permitted on the brake booster. Excepting for Fairmont/Zephyr vehicles,**

which can only be checked using the MAX-MIN push rod gauge (Fig. 1). If the push rod is not within the prescribed limits, a new booster must be installed.

If any brake booster is damaged or inoperative, replace it with a new booster. The brake booster (including the check valve) is serviced only as an assembly.

ADJUSTMENTS

BRAKE BOOSTER-TO-MASTER CYLINDER PUSH ROD

Adjustment

Except for Fairmont/Zephyr vehicles, the vacuum booster has an adjustable push rod (output rod) which is used to compensate for dimensional variations in an assembled booster. The push rod length is adjusted after each booster power unit has been assembled in production. **A properly adjusted push rod that remains assembled to the booster with which it was matched in production should never require a service adjustment.**

A booster that is suspected of having an improper push rod length will indicate either of the following:

1. A push rod which is too long will prevent the master cylinder piston from completely releasing hydraulic pressure and eventually cause the brakes to drag.
2. A push rod which is too short will increase brake pedal travel and cause a clunk noise from the booster and master cylinder assembly.

If necessary, a booster push rod length can be verified with a push rod gauge (See Fig. 1) using the following procedure:

1. Without disconnecting the brake tubes, disconnect the master cylinder and set it away from the

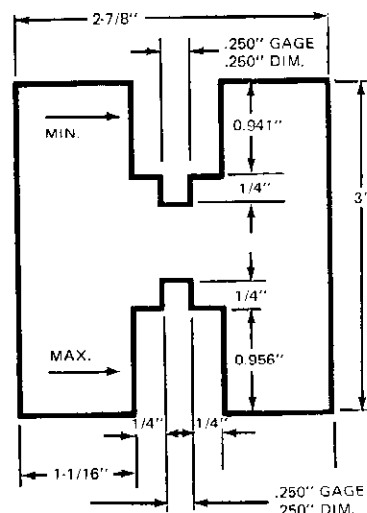


FIG. 1 Push Rod Gauge Dimensions

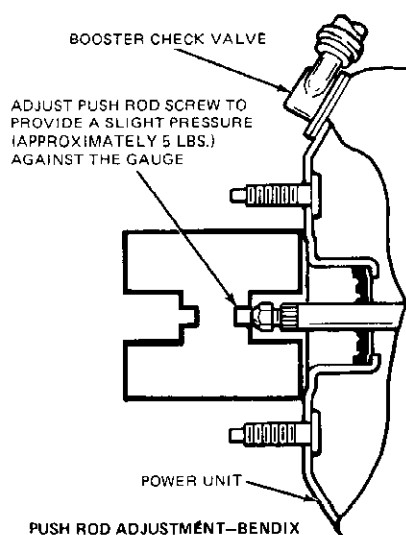
booster power unit. The master cylinder must be supported to prevent damaging the brake tubes.

2. With the engine running, gauge and adjust the push rod length as shown in Figure 2. (A force of approximately 5 pounds applied to the push rod with the gauge will assure that the push rod is seated within the power unit.)

3. Install the master cylinder on the power unit and alternate tightening the retaining nuts gradually to the torque specified in Part 12-01.
4. With the engine running and the master cylinder reservoir cover removed, observe the fluid surface in the reservoirs when the brake pedal is applied rapidly. **Some fluid movement should occur in the forward reservoir. If fluid surface movement did not occur, the push rod is adjusted too long and the procedure must be repeated to prevent eventual brake drag.**

Fairmont/Zephyr Vehicles

Fairmont/Zephyr vehicles have the vacuum booster to master cylinder push rod manufactured to a specific length. The screw adjuster found on other vehicles has been eliminated and adjustments are not necessary. However, the push rod gauge length can be checked to determine if the length is within limits.



H1871-1C

FIG. 2 Brake Booster Push Rod Measurement

DIAGNOSIS AND TESTING

VACUUM POWER BRAKE FUNCTION TEST

The vacuum booster may be tested for proper operation by following the procedure in Part 12-01 under Power Brake Function Test.

REMOVAL AND INSTALLATION

BRAKE BOOSTER—VACUUM

Pinto, Bobcat, Mustang II, Granada and Monarch, (Refer to Fig. 3.)

Removal (Same for all above vehicles except as noted)

1. Working inside the vehicle below the instrument panel, remove the stoplight switch wiring connector from the switch. Remove the hair pin retainer and outer nylon washer from the pedal pin. Slide the stoplight switch off the brake pedal pin just far enough for the outer arm to clear the pin. Remove the switch. Be careful not to damage the switch during removal. Slide the booster push rod, bushing and the inner nylon washer off the brake pedal pin.

a. Pinto and Bobcat

Working in engine compartment, remove air cleaner from carburetor on all engines. Then perform the following steps on 4-cylinder engines only: Disconnect accelerator cable from carburetor. Remove screw that secures accelerator cable to accelerator shaft bracket and remove cable from bracket. Remove two (2) screws that secure accelerator shaft bracket to manifold and rotate bracket toward engine. Remove screw that secures heater outlet tube clip to rocker arm cover and remove clip. Remove hose from inlet port of automatic choke water cover and move tube up and toward engine away from work area. Remove vacuum hose or hoses from solenoid on fender

apron. Remove screw that secures solenoid to fender apron and move away from area.

b. Mustang II (4-cylinder and 6-cylinder engines only)

Remove air cleaner from carburetor. Perform the following steps on 4-cylinder engine only: Remove accelerator cable from carburetor. Remove two (2) screws that secure accelerator cable bracket to engine and move bracket toward engine. Disconnect choke thermostat water inlet hose from the thermostat cover, and secure hose up out of booster area. Remove vacuum hose from EGR vacuum reservoir.

2. Disconnect manifold vacuum hose from booster.
3. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder and cap lines. Also, plug ports in master cylinder.
4. Remove two (2) nuts attaching master cylinder to brake booster assembly and remove master cylinder.
5. Working inside car, remove the booster-to-dash panel attaching nuts. From the engine compartment, move booster forward until push rod clears dash panel, rotate front of booster up 90 degrees and remove booster by raising up until clear.

Installation (Same for all above vehicles except as noted)

1. Place booster in position on dash panel with check valve in upper right side.
2. Working inside vehicle, install inner nylon washer, booster push rod, and bushings on brake pedal pin. Secure booster to dash panel with self-locking nuts and torque to 13-25 ft.-lbs. Position stoplight switch so that it straddles booster push rod with switch slot toward pedal blade and hole just clearing pin. Slide switch completely onto pin. **Be careful not to bend or deform switch.** Install nylon washer on pin and secure all parts to pin with hair pin retainer. Make sure retainer is fully installed and locked over pedal pin. Install stoplight switch wiring connector on stoplight switch.
3. Connect the manifold vacuum hose to the booster using hose clamp.
4. Position master cylinder assembly over booster push rod and onto two (2) studs on booster assembly. Install attaching nuts and torque to 13-25 ft.-lbs.
5. Remove caps from brake tubes and plugs from master cylinder outlet ports and install brake tube fittings into ports and torque to specification.

a. Pinto and Bobcat (4-cylinder engines only)

Place heater outlet tube in position on engine and install tube end hose on automatic choke water cover. Secure hose to cover with hose clamp. Secure tube to rocker arm cover with clip and screw. Place accelerator shaft bracket in position on engine and secure with two (2) screws. Route accelerator cable to shaft bracket and secure cable bracket to shaft bracket with a screw. Connect

accelerator cable to carburetor. Position vacuum solenoid on fender apron and install screw. Install vacuum hose on solenoid. Install air cleaner on 4-cylinder and 6-cylinder engines.

b. Mustang II (4-cylinder engines only)

Place heater outlet tube in position on engine and install tube end hose on automatic choke water cover. Secure hose to cover with a hose clamp. Secure tube to rocker arm cover with clip and screw. Place accelerator shaft bracket in position on engine and secure with two (2) screws. Connect accelerator cable to carburetor. Install vacuum hose on EGR vacuum reservoir. Install air cleaner on 4-cylinder and 6-cylinder engines.

6. Bleed the brake system. Refer to Hydraulic System Bleeding, Part 12-01.
7. Start engine and check power brake function.

FAIRMONT/ZEPHYR

Removal

1. Working in engine compartment, remove air cleaner from carburetor on all engines. Then perform the following steps on 2.3 Litre engines only: Disconnect accelerator cable from carburetor. Remove the screw that secures the accelerator cable to accelerator shaft bracket and remove cable from bracket. Remove two (2) screws that secure accelerator shaft bracket to manifold and rotate bracket toward engine.
2. Disconnect manifold vacuum hose from booster.
3. Remove the brake tubes from the primary and secondary outlet ports of the master cylinder and cap lines.

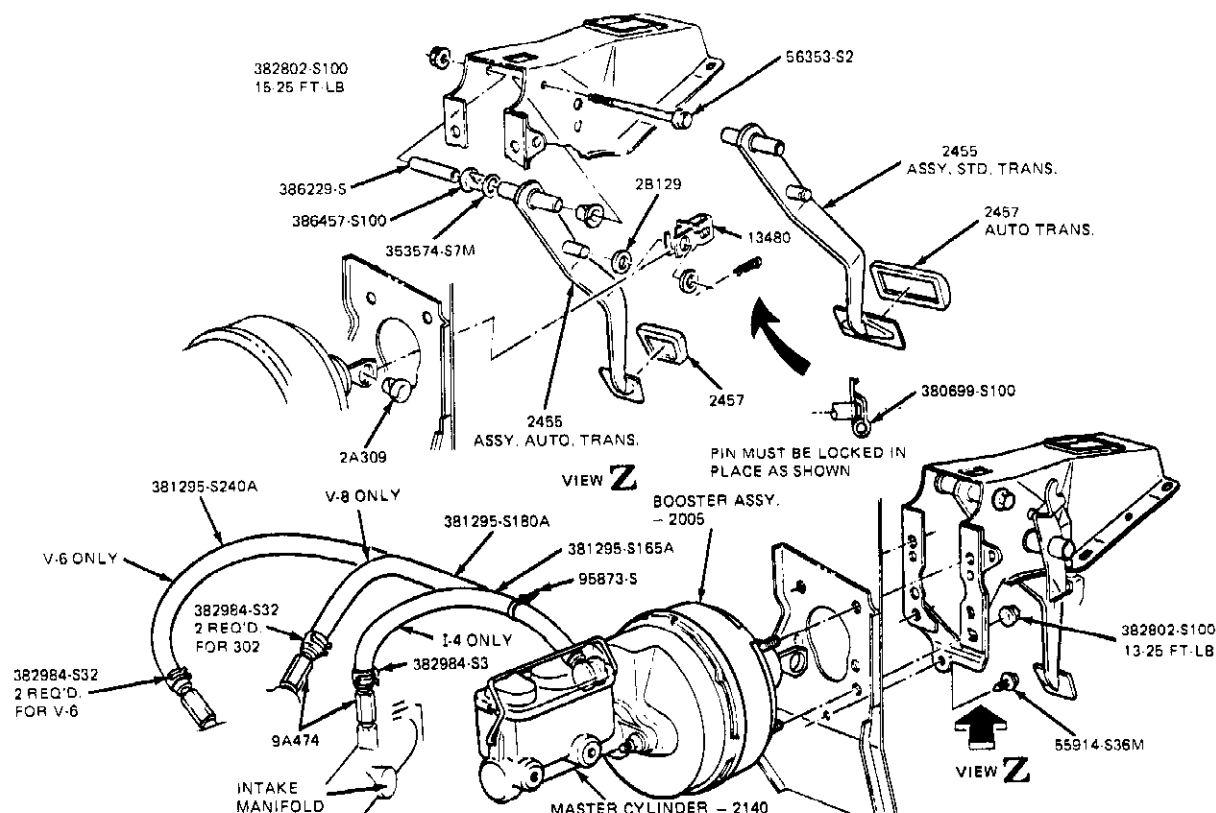


FIG. 3 Typical Vacuum Booster Installation—Mustang II Shown

4. Remove two (2) nuts attaching master cylinder to brake booster assembly and remove master cylinder.
5. Working inside the vehicle below the instrument panel, remove the stoplight switch wiring connector from the switch. Remove the hairpin retainer and outer nylon washer from the pedal pin. Slide the stoplight switch off the brake pedal pin just far enough for the outer arm to clear the pin. Remove the switch. Be careful not to damage the switch during removal. Remove the booster to dash panel attaching nuts. Slide the booster push rod, bushing and the inner nylon washer off the brake pedal pin.
6. Inside the engine compartment, move booster forward until the booster studs clear the dash panel, then rotate front of booster inboard (toward engine) and remove booster by raising up until clear.

Installation

1. Place booster in position on dash panel with check valve in upper right side. Do not install the booster to dash panel attaching nuts.
2. Working inside vehicle, install inner nylon washer, booster push rod and bushings on brake pedal pin. Secure the booster to dash panel attaching nuts and torque to 13-25 ft-lbs. Position stoplight switch so that it straddles booster push rod with switch slot toward pedal blade and hole just clearing pin. Slide switch completely onto pin. Be careful not to bend or deform switch. Install nylon washer on pin and secure all parts to pin with hairpin retainer. Make sure retainer is fully installed and locked over pedal

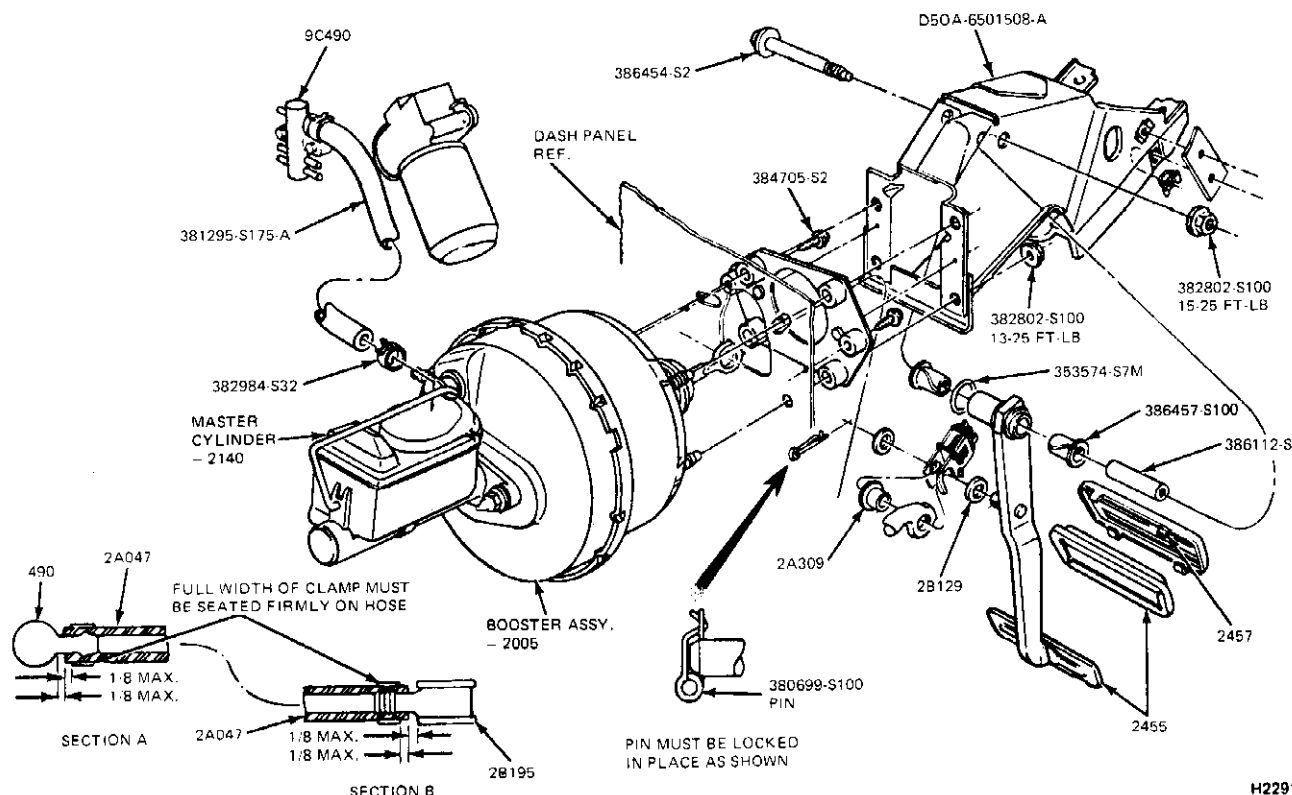
pin. Install stoplight switch wiring connector on stoplight switch.

3. Connect the manifold vacuum hose to the booster using hose clamp.
4. Position master cylinder assembly over booster push rod and onto two (2) studs on booster assembly. Install attaching nuts and torque to 13-25 ft-lbs.
5. Remove caps from brake tube and plugs from master cylinder outlet ports and install brake tube fittings into ports and torque to specifications.
6. On 2.3 Litre engines, place accelerator shaft bracket in position on engine and secure with two (2) screws. Route accelerator cable bracket to shaft bracket with a screw. Connect accelerator cable to carburetor. Install the air cleaner on all engines.
7. Bleed the brake system using existing shop manual procedures.
8. Start engine and check power brake function.

LTD II, COUGAR, FORD, MERCURY AND THUNDERBIRD (REFER TO FIG. 4)

Removal (Same for all above vehicles except as noted)

1. Working inside the vehicle below the instrument panel, remove the stoplight switch wires at the connector. Remove the switch retaining pin. Slide the stoplight switch off from the brake pedal pin just far enough for the outer plate of the stoplight switch to clear the pin and then remove the switch from the pin. Be careful not to damage the switch during removal. Slide the booster push rod, nylon washers and bushing off the brake pedal pin.



H2291-2B

FIG. 4 Typical Vacuum Booster Installation—Thunderbird Shown

- a. **LTD II and Cougar (Cars equipped with speed control only).**
Working in engine compartment, remove left cowl screen. Remove three (3) nuts that retain speed control servo mounting bracket to dash panel and move servo away from working area.
2. Working in engine compartment remove the master cylinder from the booster. Set it aside without disturbing the hydraulic lines. It is not necessary to disconnect the brake lines but care should be taken that the brake lines are not deformed. Deformation of brake lines can lead to tube damage.
 3. Disconnect the manifold vacuum hose from the booster unit.
 4. Remove the booster-to-dash panel attaching nuts. Remove the booster assembly from the dash panel, sliding the push rod out from the engine side of the dash panel.

Installation (Same for all above vehicles except as noted)

1. Place booster in position on dash panel with check valve in upper right side.
 2. Working inside vehicle, install inner nylon washer, booster push rod, and bushing on brake pedal pin. Secure booster to dash panel with self-locking nuts and torque to 13-25 ft-lbs. Position stoplight switch so that it straddles booster push rod with switch slot toward pedal blade and hole just clearing pin. Slide switch completely onto pin. **Be careful not to bend or deform switch.** Install nylon washer on pin and secure all parts to pin with hair pin retainer. Make sure retainer is fully installed and locked over pedal pin. Install stoplight switch wiring connector on stoplight switch.
 3. Connect the manifold vacuum hose to the booster using hose clamp.
 4. Install the master cylinder to the booster studs and torque the attaching nuts to 13-25 ft-lbs.
- a. **LTD II and Cougar (Cars equipped with speed control only).**
Place speed control servo bracket in position on dash panel and secure with three (3) nuts.
5. Start engine and check power brake function.

Hydro-Boost Brake Booster

**PART
12-51**

Applies to Ford, Mercury, Lincoln Continental, Continental Mark V, Granada, Monarch and Versailles

SUBJECT	PAGE	SUBJECT	PAGE
DIAGNOSIS AND TESTING - Refer to Part 12-01		OPERATION (Cont'd.)	
GENERAL INFORMATION	51-1	Braking Position	51-3
OPERATION		Reserve System	51-3
Released Position - No Braking	51-3	REMOVAL AND INSTALLATION	51-5

CH2556-2B

GENERAL INFORMATION

The power steering pump provides the fluid pressure to operate both the hydraulically-powered brake booster (hydro-boost) and the power steering gear (Fig. 1).

The hydro-boost assembly contains an open center spool valve which controls pump pressure magnitude during braking, a lever mechanism to control the position of the valve, and a boost piston to provide the force necessary to operate a conventional master

cylinder which is attached to the front end of the booster. The hydro-boost also has a reserve system (compressed gas accumulator) which is designed to store *sufficient fluid under pressure to provide at least two (2) brake applications* in the event that the fluid flow from the power steering pump is not available. The brakes can also be applied manually if the reserve system is depleted. Fig. 2 shows a typical hydro-boost power section.

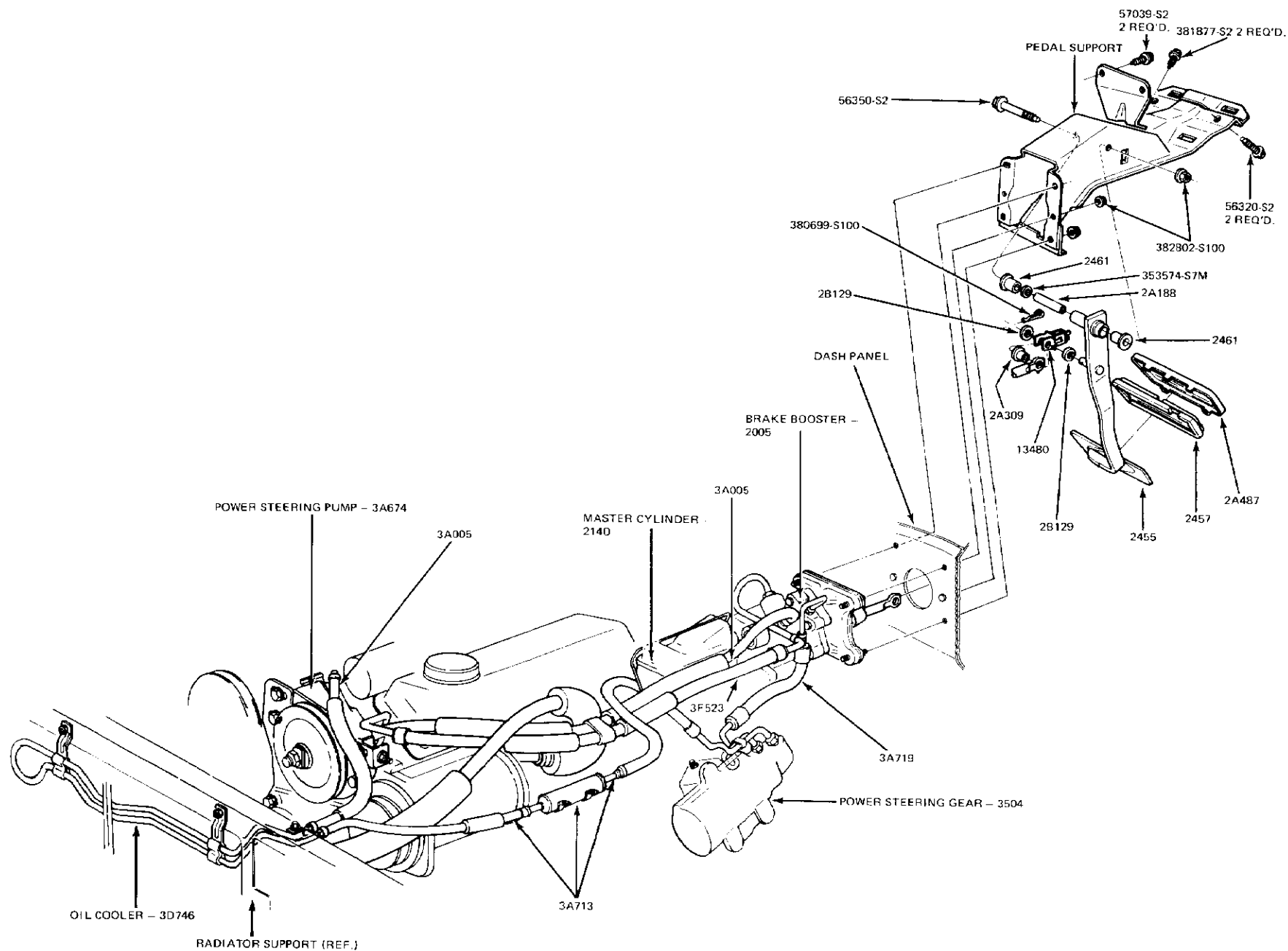


FIG. 1 Hydro-Boost Installation—Typical

OPERATION

RELEASED POSITION—NO BRAKING (REFER TO FIG. 2)

When the brake pedal is in released position (no braking), the spool valve return spring holds the spool valve open. In the open position, the spool valve provides an unrestricted fluid flow between the power steering pump and the power steering gear. Fluid pressure is blocked from entering the boost pressure chamber by lands on the spool valve. Therefore, as fluid pressure increases with steering demand, it has no effect on the boost pressure chamber. The boost pressure chamber is vented through the spool valve, to the pump return port and, back to the power steering pump.

BRAKING POSITION

As the brake pedal is depressed, it moves the pedal rod and initiates movement of the spool valve. This preliminary movement of the valve closes the fluid return port to the pump from the boost chamber and admits fluid into the boost chamber from the pressure port. Additional valve movement restricts fluid flow between the pump and steering gear, causing the power steering pump to increase fluid pressure to maintain essentially the same flow rate to the power steering gear. As the fluid pressure increases in the boost chamber, it forces the piston forward, actuating the master cylinder piston and resulting in brake application.

If, while braking, fluid pressure is required for steering, pump pressure will rise and the spool valve will shift in an open direction allowing more fluid to flow

to the steering gear. Even under extremes of braking, the fluid flow to the steering gear is fully sufficient for steering the car.

RESERVE SYSTEM

The reserve braking system consists of a charging valve, an accumulator valve and a compressed gas accumulator. The system is open to the pressure port of the hydro-boost.

The charging valve has an orifice and a check valve. Fluid from the pump passes around the check valve into the accumulator if the pump pressure exceeds the pressure in the accumulator. The charging rate is controlled by the orifice to minimize its effect on fluid flow to the steering gear. The check valve prevents reverse flow when the accumulator pressure is greater than pump pressure.

The accumulator valve is a small poppet type valve held closed by the pressure stored in the accumulator. An actuator on the spool valve sleeve opens the accumulator valve when a stop with no pump pressure is made that requires use of the reserve system pressure.

Fluid pressure can also enter the accumulator from the boost chamber through the accumulator valve. This condition occurs whenever boost chamber pressure momentarily exceeds accumulator pressure.

A pressure relief valve vents the accumulator to the pump pressure port whenever pressure in the accumulator exceeds approximately 1,400 psi.

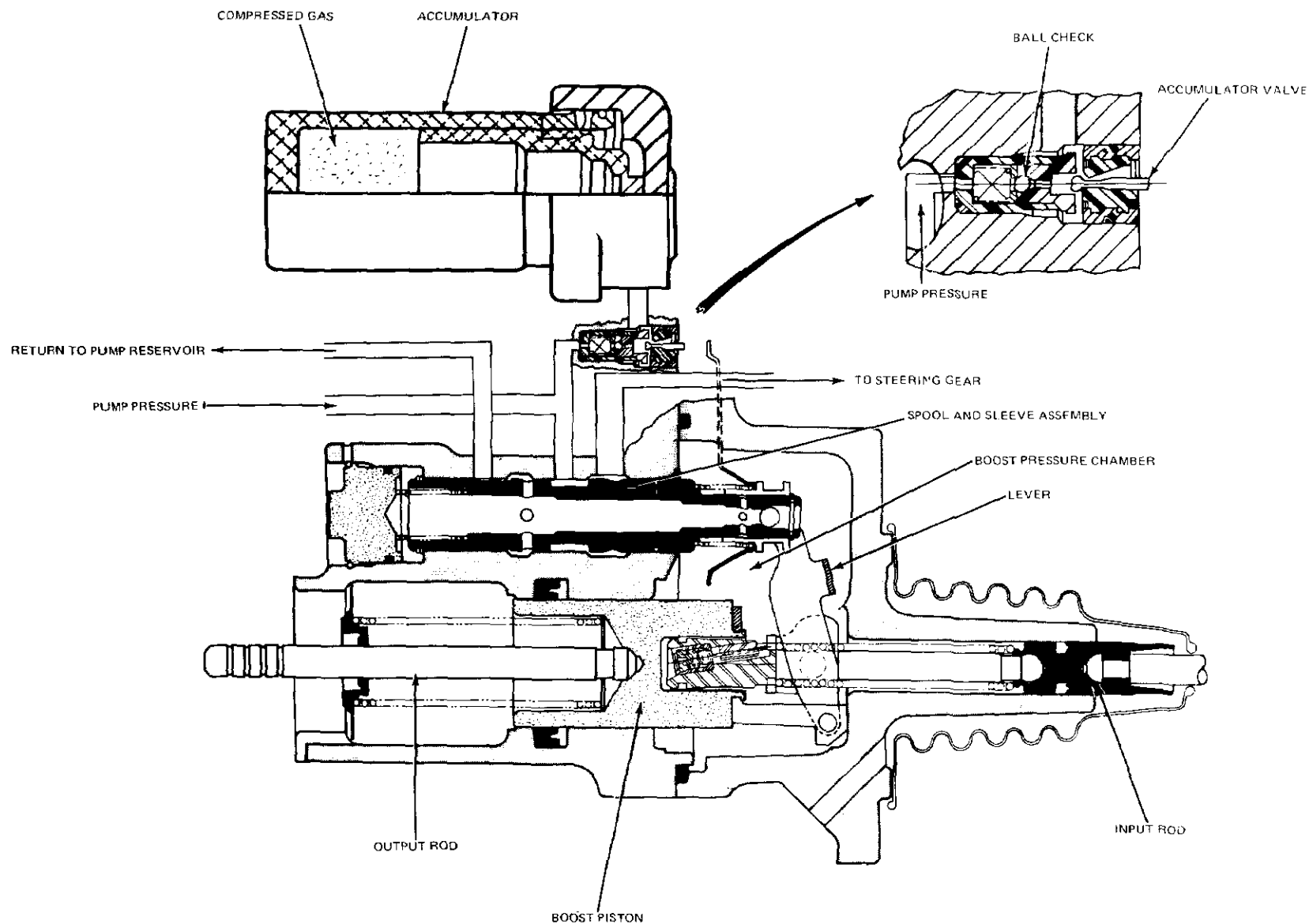


FIG. 2 Hydro-Boost—Sectional View

H2258-2C

DIAGNOSIS AND TESTING

Diagnosis and testing procedures for the Hydro-Boost system are covered in General Hydraulic Brake Service, Part 12-01.

REMOVAL AND INSTALLATION

REFER TO FIG. 3 OR 4

The hydro-boost is serviced as an assembly only. If the cause of the complaint is determined to exist in the booster, the unit should be replaced. Before removing the hydro-boost, discharge the accumulator by making several brake applications until a hard pedal is obtained. **NOTE: Do not disassemble the hydro-boost.** Following is the procedure for replacement.

Removal

1. Open the hood and remove the two nuts or bolts attaching the master cylinder to the brake booster. Remove the master cylinder from the hydro-boost. Secure it to one side without disturbing the hydraulic lines. It is not necessary to disconnect the brake lines, but care should be taken that the brake lines are not deformed. Permanent deformation of brake lines can lead to tube damage.
2. Disconnect the pressure, steering gear and return lines from the booster. Plug the lines and the ports in the hydro-boost to prevent entry of dirt.
3. Working from inside the vehicle below the instrument panel, disconnect the hydro-boost push rod from the brake pedal assembly. To do this, proceed as follows:

Disconnect the stoplamp switch wires at the connector. Remove the hairpin retainer. Slide the stoplamp switch off from the brake pedal pin just far enough for the switch outer hole to clear the pin, and then remove the switch from the pin. Be careful not to damage the switch during removal. Loosen the hydro-boost to dash panel attaching locknuts (Fig. 1). Slide the hydro-boost push rod and the nylon washers and bushing off the brake pedal pin (Fig. 1).

4. Remove the hydro-boost-to-dash panel attaching nuts (Fig. 1). Remove the hydro-boost assembly from the dash panel, sliding the push rod link out from the engine side of the dash panel.

Installation

1. Mount the hydro-boost assembly to the dash panel by inserting the push rod and boot through the hole

in the dash panel. **Loosely install the hydro-boost to dash panel attaching lock nuts** (Fig. 1).

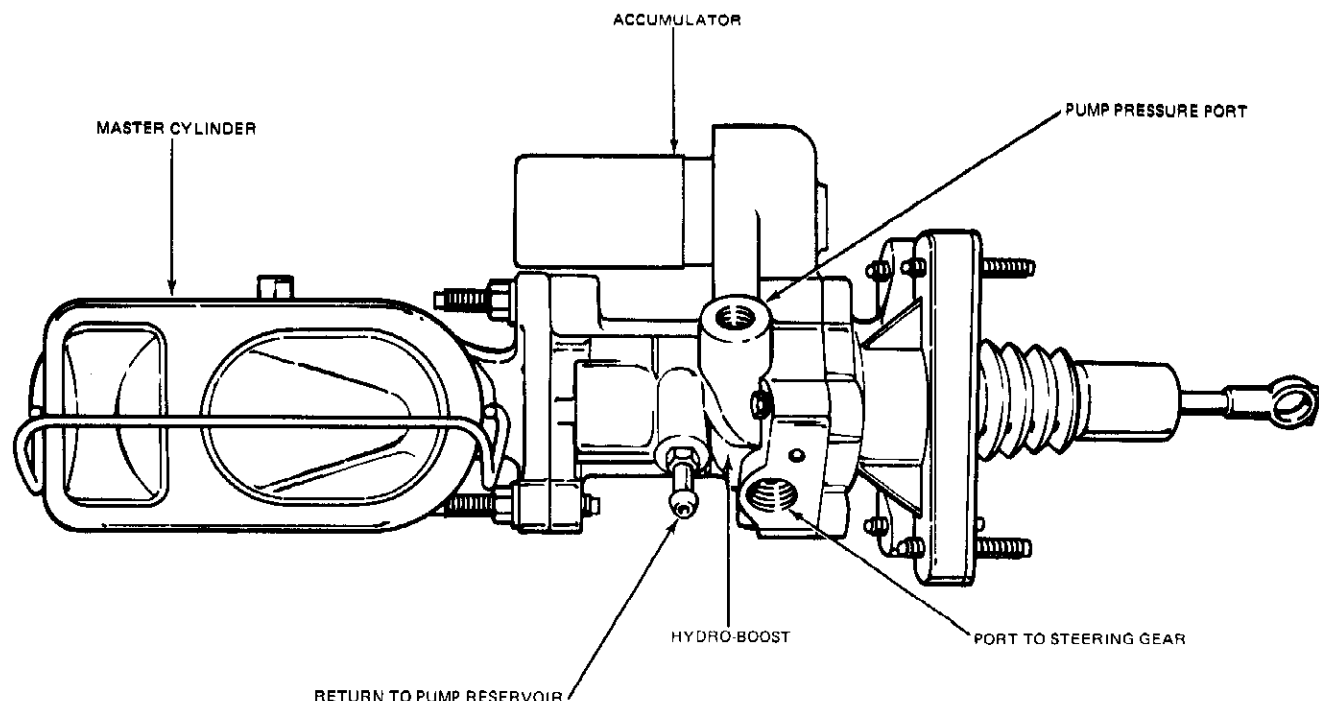
2. Working from inside the vehicle below the instrument panel, connect the hydro-boost push rod to the brake pedal assembly. To do this, proceed as follows:

Install the inner nylon washer, the hydro-boost push rod, and the bushing on the brake pedal pin. Position the switch so that it straddles the push rod with the switch slot on the pedal pin and the switch outer hole just clearing the pin. Slide the switch completely onto the pin and install the nylon washer as shown in Fig. 1. Be careful not to bend or deform the switch. Secure these parts to the pin with the hair-pin retainer. Connect the stoplamp switch wires to the connector, and install the wires in the retaining clip. Tighten the hydro-boost to dash panel attaching locknuts.

3. Install the master cylinder on the booster and secure with nuts or bolts. Torque attaching nuts or bolts to specification.
4. Remove the plugs and connect the fluid pressure, steering gear and return line fittings to the hydro-boost (Fig. 1). Torque fittings to specifications.
5. Remove the coil wire so the engine will not start. Fill the power steering pump reservoir and, while engaging the starter, apply the brakes with a pumping action. Do not cycle the steering wheel until all residual air has been purged from the hydro-boost.

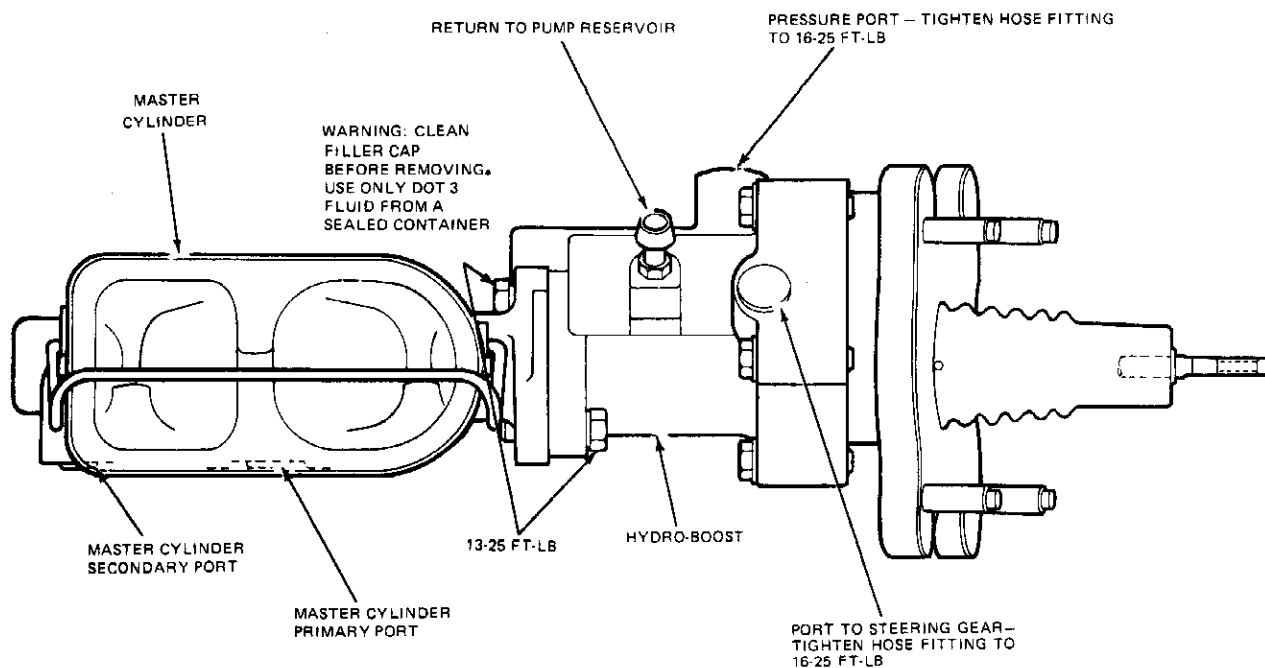
Check the fluid level and add as required. Install the coil wire, start the engine and apply the brakes with a pumping action. Cycle the steering wheel. Check for fluid leaks.

If a whine type noise should result following the installation of a hydro-boost, fluid aeration may be suspected. To correct this condition, refer to Purging (Devac) Power Steering System instructions detailed in Part 13-01, General Steering Service.



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FIG. 3 Hydro-Boost Assembly—Ford, Mercury, Lincoln Continental, Continental Mark V



H2565-2B

FIG. 4 Hydro-Boost Assembly—Granada, Monarch, Versailles

Parking Brake—Cable Actuated— Rear Wheels

**PART
12-70**
Applies To All Cars

SUBJECT	PAGE	SUBJECT	PAGE
ADJUSTMENTS		REMOVAL AND INSTALLATION	
Parking Brake Linkage Adjustment	70-4	Parking Brake Control Assembly	70-4
DESCRIPTION		Parking Brake Equalizer to Control Cable	70-17
Control Assemblies	70-1	Parking Brake Equalizer to Rear Wheel Cables	70-17
DIAGNOSIS AND TESTING		Parking Brake Intermediate Cable	70-17
Parking Brake Operation Test	70-3	Parking Brake Front Cable	70-16
Vacuum Tests — Vacuum Release		SPECIFICATIONS	70-20
Parking Brakes	70-3		

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DESCRIPTION

The various parking brake systems for 1978 cars are shown in Figs. 7 through 17. The various parking brake control assemblies are shown in Figs. 1 through 6.

CONTROL ASSEMBLIES

On Pinto/Bobcat/Mustang II vehicles, an independent hand-operated parking brake control, mounted on the tunnel between the front seats (Fig. 1) actuates the rear wheel brake shoes through cables. When the handle is pulled upward, the primary and secondary brake shoes are forced against the rear brake drums. The handle is held in the applied position by engagement of a spring-loaded pawl and ratchet. The brakes are released by pulling upward on the control and depressing the plunger in the end of the control assembly handle (Fig. 1).

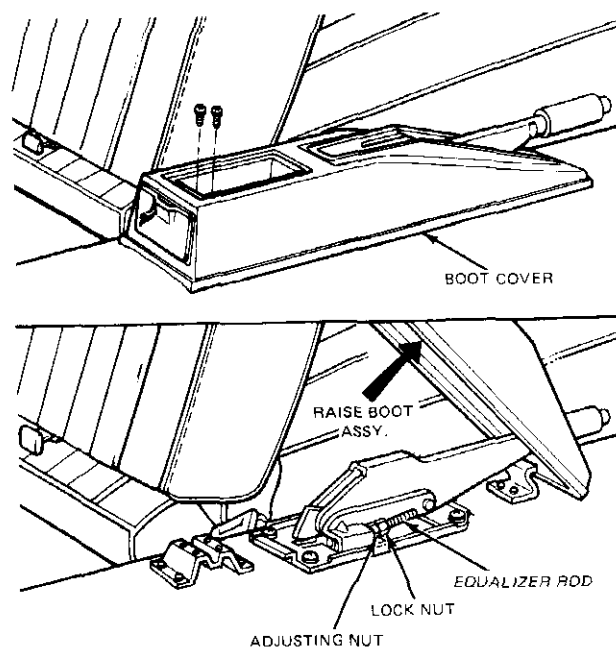
On all vehicles except Pinto, Bobcat and Mustang II, an independent foot-operated parking brake control actuates the rear wheel brake shoes through a cable system (Figs. 2, 3, 4, 5, 6 and 7).

A parking brake warning light is part of the system, indicating to the driver whether the parking brake is applied or released.

The automatic (vacuum) release type is either standard or optional equipment on all foot-operated parking brake systems except Fairmont and Zephyr, on which only the manual release system is available.

On the automatic-type, the vacuum power unit with mounting bracket is bolted to the control assembly. The vacuum-actuated piston within the unit is connected by a rod to the upper end of the release lever.

The vacuum motor is actuated to release the parking brake whenever the engine is running and the



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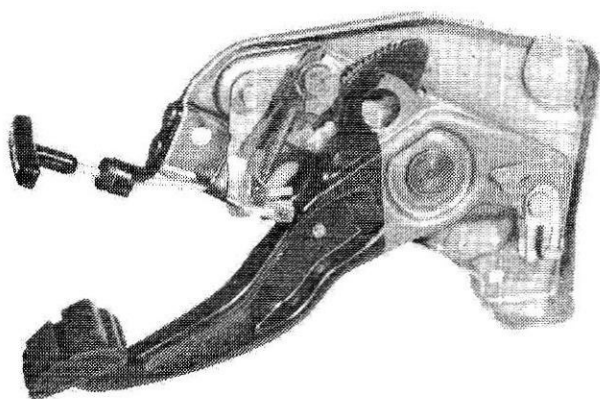
FIG. 1 Parking Brake Control Assembly—Pinto and Mustang II

transmission is in either a reverse or forward driving gear.

The lower end of the release lever extends out for alternate manual release, in the event of vacuum power failure or for optional manual release at any time.

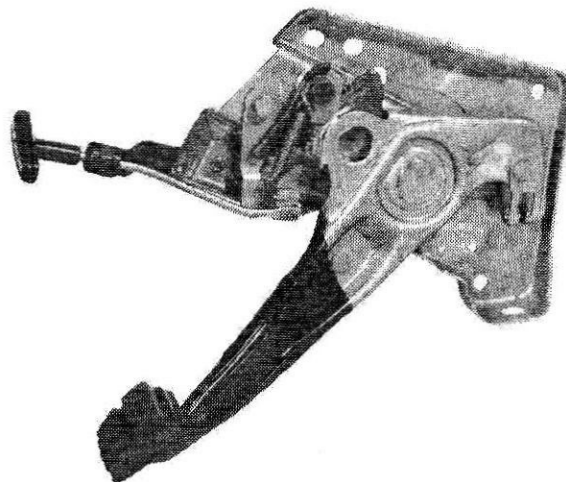
Hoses connect the power unit and the engine manifold to a vacuum release valve on the back-up light switch.

On the manually-released type, a T-handle extends from under the left side of the instrument panel. Pulling this handle releases the foot applied parking brake.



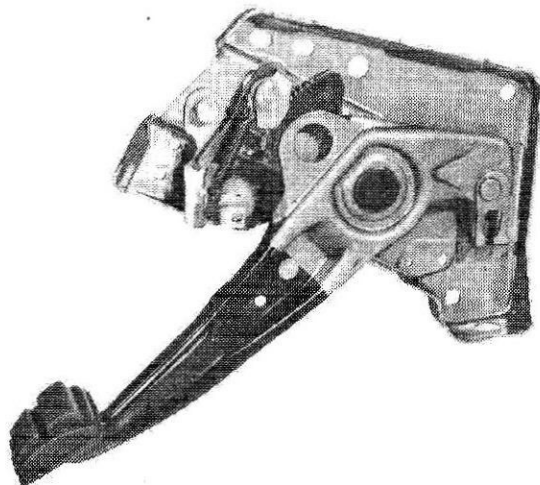
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FIG. 2 Parking Brake Control Assembly—
Manual Release—Fairmont/Zephyr



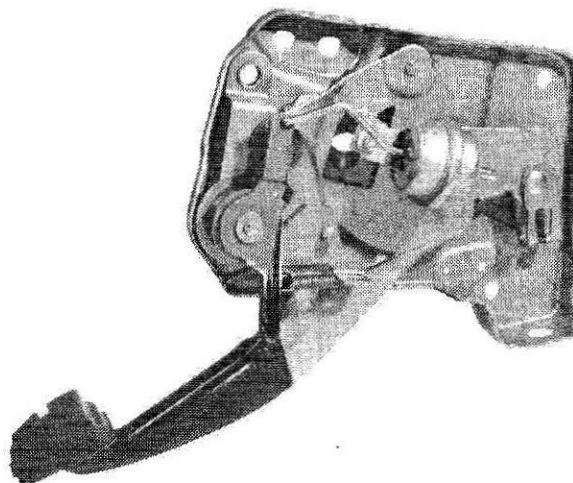
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FIG. 4 Parking Brake Control Assembly—
Manual Release—Granada, Monarch and
Versailles



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FIG. 3 Parking Brake Control Assembly—
Manual Release—Ford, LTD II, Cougar
and Thunderbird



H2576-1A

FIG. 5 Parking Brake Control Assembly—
Vacuum Release—Ford/Mercury