BRAKE OPERATING SYSTEM

Adjustments

DRUM BRAKES

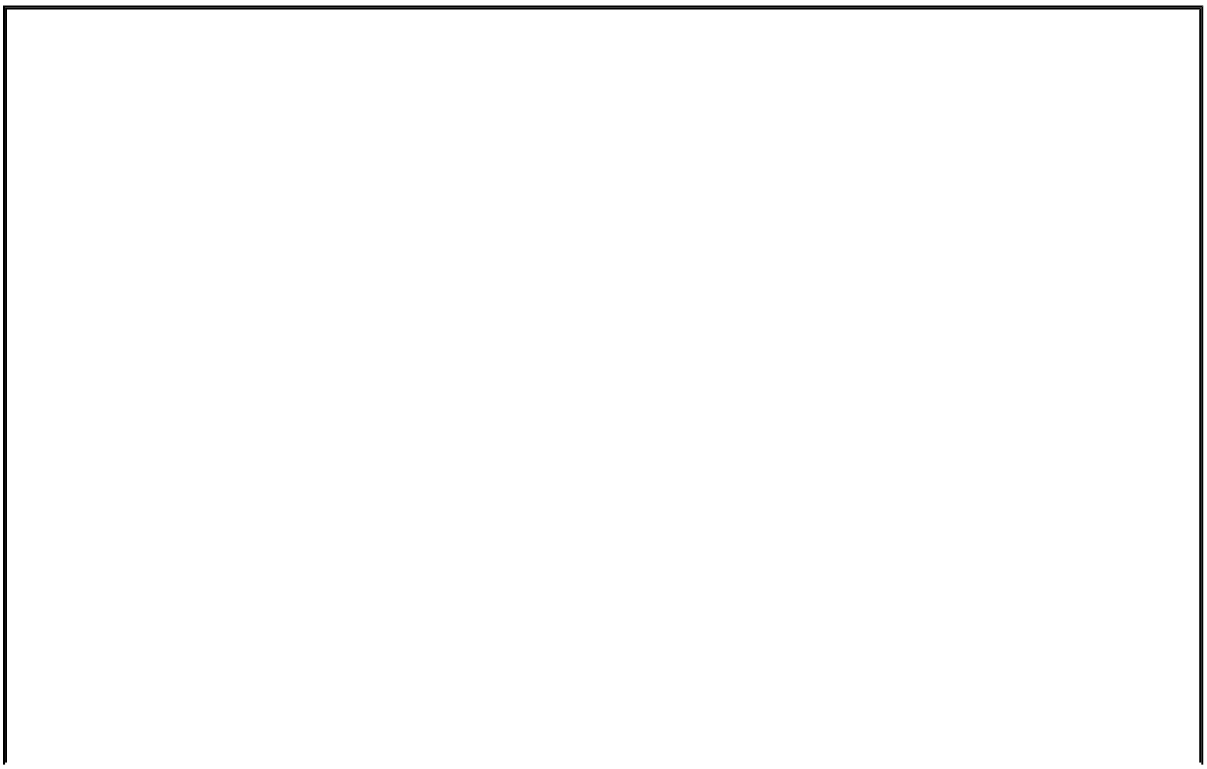
The rear drum brakes on your Taurus/Sable are self-adjusting. The only adjustment necessary should be an initial one after new brake shoes have been installed or some type of service work has been done on the rear brake system.

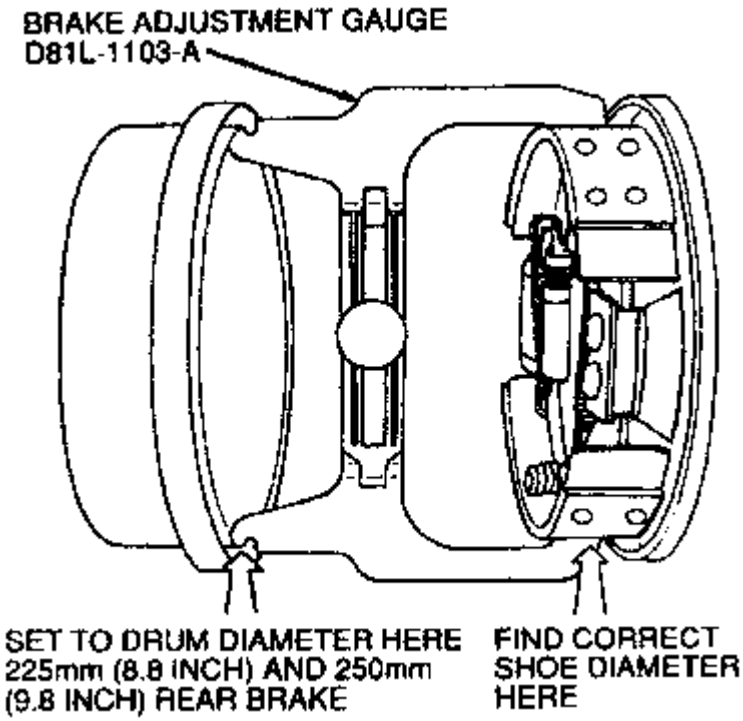
After any brake service, obtain a firm brake pedal before moving the car. Adjusted brakes must not drag. The wheel must turn freely. Be sure the parking brake cables are not too tightly adjusted.

A special brake shoe gauge is necessary for making an accurate adjustment after installing new brake shoes. The special gauge measures both the drum diameter and the brake shoe setting.

Since no adjustment is necessary except when service is performed on the rear brakes, this procedure begins with the car safely supported by jackstands and the rear drums removed.

1. **Apply a small amount of Disc Brake Caliper Slide Grease D7AZ-19590-A or equivalent, to the points where the shoes contact the rear brake backing plate. Do NOT get grease on the linings!**
2. **Determine the inside diameter of the drum braking surface using Brake Adjustment Gauge D81L-1103-A or equivalent.**





Using the correct tool to determine the inside diameter of the drum braking surface

Click to enlarge

3. **Adjust the brake shoes and linings diameter to fit the gauge. Align the brake shoes and linings vertically so that the flats on the bottom of the brake shoes and linings are about 0.05 in. (1.5mm) above the bottom of the brake shoe abutment plate BEFORE setting the gauge diameter. Hold the automatic brake shoe adjusting lever out of engagement while rotating the adjusting screw. Make sure the screw rotates freely. Lubricate if necessary.**
4. **Rotate the brake adjustment gauge around the brake shoes and linings to be sure of the proper setting.**
5. **Install the brake drum, as outlined later in this section.**
6. **Install the tire and wheel assembly. Install the wheel cover and nut covers, if applicable.**
7. **Finish the adjustment by pressing the brake pedal down several times with a minimum of 25 lbs. (111 N) of force.**
8. **After adjustment, check the brake operation by making several stops from various forward speeds.**

DISC BRAKES

Front disc brakes require no adjustment. Hydraulic pressure maintains the proper pad-to-disc contact at all times.

On vehicles equipped with rear disc brakes, the main difference is that the rear caliper houses the emergency brake actuator. The rear disc brakes are self-adjusting. Hydraulic pressure maintains the proper pad-to-disc contact at all times.

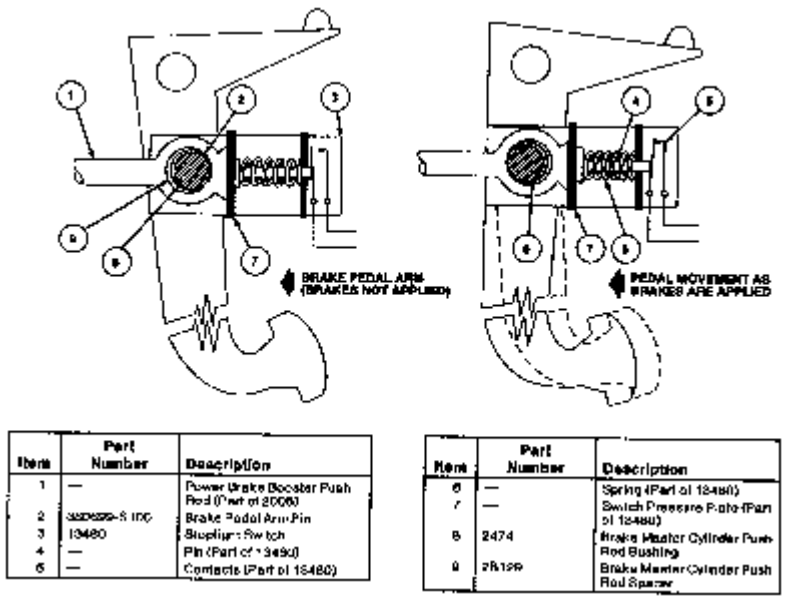
BRAKE PEDAL FREE HEIGHT

1. **Insert a slender sharp pointed rod through the carpet and sound deadener to dash panel metal.**
2. **Measure the distance to the center top of the brake pedal pad.**
3. **If the position of the pedal is not within specification, check the pedal for worn bushings, missing bushings and loose retaining bolts.**
4. **Repair defective components as required. Proper specification should be minimum 6.34 in. (161mm) pedal free height to maximum 7.09 in. (180mm) and maximum 2.34 in. (59.4mm) pedal travel.**
5. **If the measurement is still not within specification, check the brake pedal booster for proper adjustment.**

Brake Light Switch

REMOVAL & INSTALLATION

The mechanical stop light switch assembly is installed on the pin of the brake pedal arm, so it straddles the master cylinder pushrod.



Item	Part Number	Description
1	—	Power Brake Booster Push Rod (Part of 2056)
2	[illegible]	Brake Pedal Arm Pin
3	13480	Stoplight Switch
4	—	Pin (Part of 13480)
5	—	Contacts (Part of 13480)

Item	Part Number	Description
6	—	Spring (Part of 13480)
7	—	Switch Pressure Plate (Part of 13480)
8	2474	Brake Master Cylinder Push Rod Bushing
9	2A139	Brake Master Cylinder Push Rod Spacer

Depressing the brake pedal compresses a spring which activates the brake light

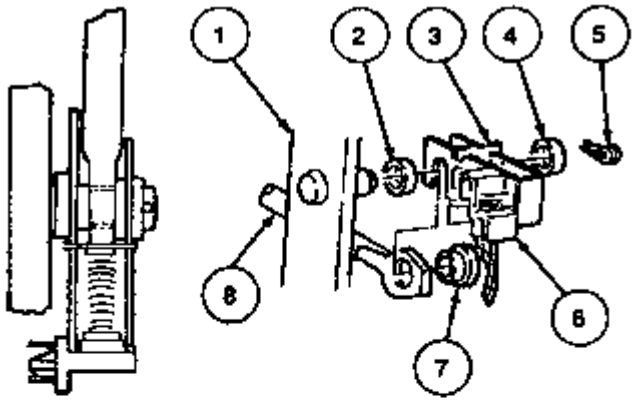
Click to enlarge

1. **Disconnect the negative battery cable.**
2. **Disengage the wire harness at the connector from the switch.**

The locking tab must be lifted before the connector can be removed.

3. **Remove the hairpin retainer and white nylon washer. Slide the stop light switch and the pushrod away from the pedal. Remove the switch by sliding the it up or down.**

Since the switch side plate nearest the brake pedal is slotted, it is NOT necessary to remove the brake master cylinder pushrod black bushing or the white spacer washer nearest the pedal arm from the brake pedal pin.



Item	Part Number	Description
1	2455	Brake Pedal
2	—	Inside Nylon Washer (White) (Part of 13480)
3	13480	Stoplight Switch
4	—	Outer Nylon Washer (White) (Part of 13480)
5	—	Hairpin Retainer (Part of 13480)
6	—	Wire Harness Connector
7	—	Nylon Bushing (Black) (Part of 13480)
8	—	Master Cylinder Push Rod (Part of 2140)

Exploded view of the brake light switch

Click to enlarge

To install:

4. **Position the switch so the U-shaped side is nearest the pedal and directly over/under the pin. The black bushing must be in position in the pushrod eyelet with the washer face on the side away from the brake pedal arm.**
5. **Slide the switch up/down, trapping the master cylinder pushrod and black bushing between the switch side plates. Push the switch and pushrod assembly firmly towards the brake pedal arm. Assemble the outside white plastic washer to the pin, then install the hairpin retainer to trap the whole assembly.**

Do not substitute another type of pin retainer. Replace only with a production hairpin retainer.

6. **Attach the wire harness connector to the switch.**
7. **Check the stop light switch for proper operation. Stop lights should illuminate with less than 6 lbs. (27 N) of force applied to the brake pedal at the pad.**

The stop light switch wire harness must have sufficient length to travel with the switch during full stroke at the pedal.

8. **Connect the negative battery cable.**

Brake Pedal

REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. Disengage the brake light/stop light switch electrical connector.
3. Remove the pushrod retainer and master cylinder pushrod spacer (nylon washer). Slide the stop light switch outboard along the brake pedal pin just far enough for the outer hole of the switch frame to clear the pin.
4. Remove the switch by sliding it upward. Remove the master cylinder (black) bushing from the pushrod.
5. Loosen the four power brake booster retaining nuts at the pedal support bracket. Slide the pushrod and inner master cylinder nylon washer off the pedal pin if the vehicle does not have speed control.
6. Remove the locknut, then remove the pivot bolt, brake pedal, and brake master cylinder pushrod bushing from the pedal support. Remove the speed control adapter, if equipped by unlatching the locking tab.

To install:

7. Apply a light coating of clean engine oil to the clean bushings.
8. Position the brake pedal in the pedal support bracket, then install the pivot bolt. Install the locknut and tighten to 10-20 ft. lbs. (14-27 Nm).

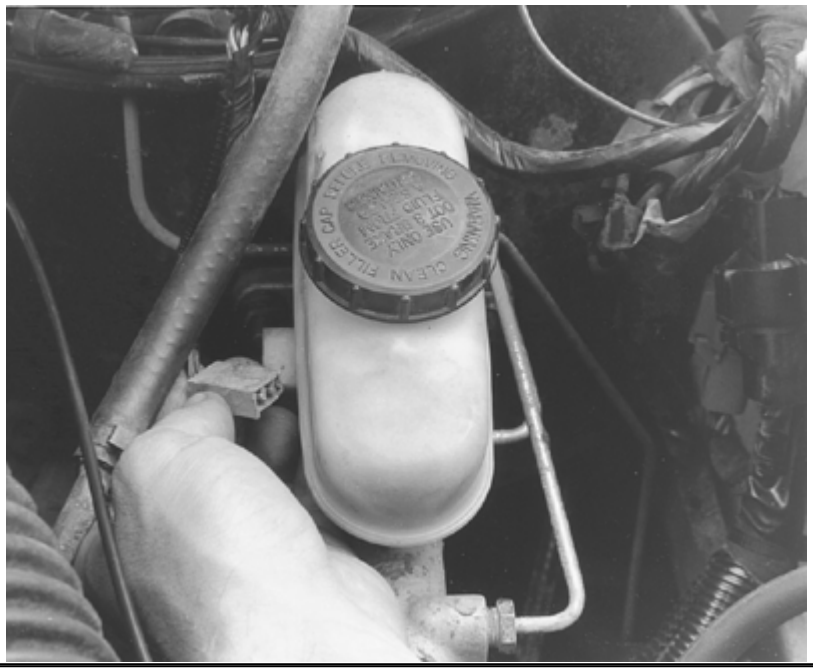
The head of the brake master cylinder pushrod bushing must be on the side of the booster pushrod away from the brake pedal.

9. Install the inner brake master cylinder pushrod spacer (or, if equipped, the speed control adapter), the master cylinder pushrod and the pushrod bushing on the brake pedal pin.
10. Do NOT oil the brake light switch. Position the brake light switch so that it straddles the pushrod with the slot on the pedal pin and the switch outer frame hole just clearing the pin. Slide the brake light switch down onto the pin and pushrod. Slide the assembly inboard toward the brake pedal arm. Install the outer brake master cylinder pushrod spacer and pushrod retainer. Lock the retainer securely.
11. Tighten the booster retaining nuts to 16-21 ft. lbs. (21-29 Nm).
12. Connect the brake light switch wiring to the brake light switch, then connect the negative battery cable.

Master Cylinder

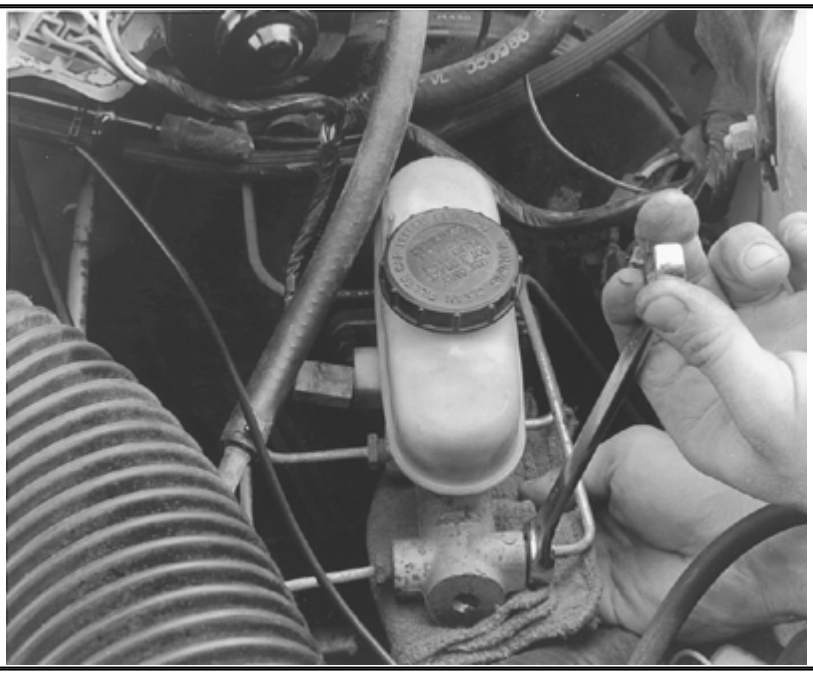
REMOVAL & INSTALLATION

1. Disconnect the negative battery cable.
2. For vehicles equipped with ABS, apply the brake pedal a few times to eliminate all of the vacuum in the system.
3. Disengage the brake warning indicator electrical connector.



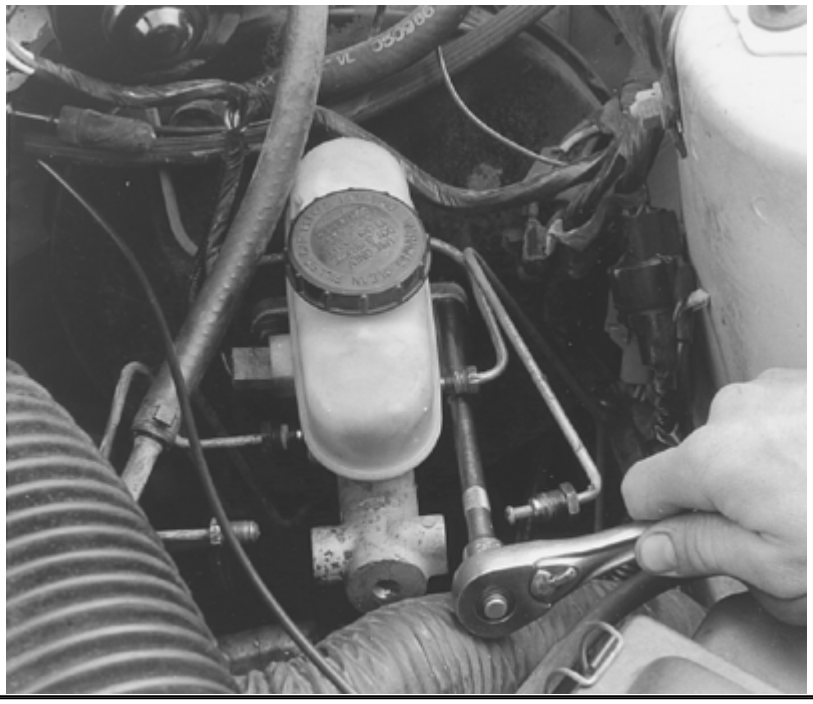
Disengage the electrical connector from the brake warning indicator

4. **Disconnect the brake lines from the primary and secondary outlet ports of the master cylinder and the brake pressure control valve.**



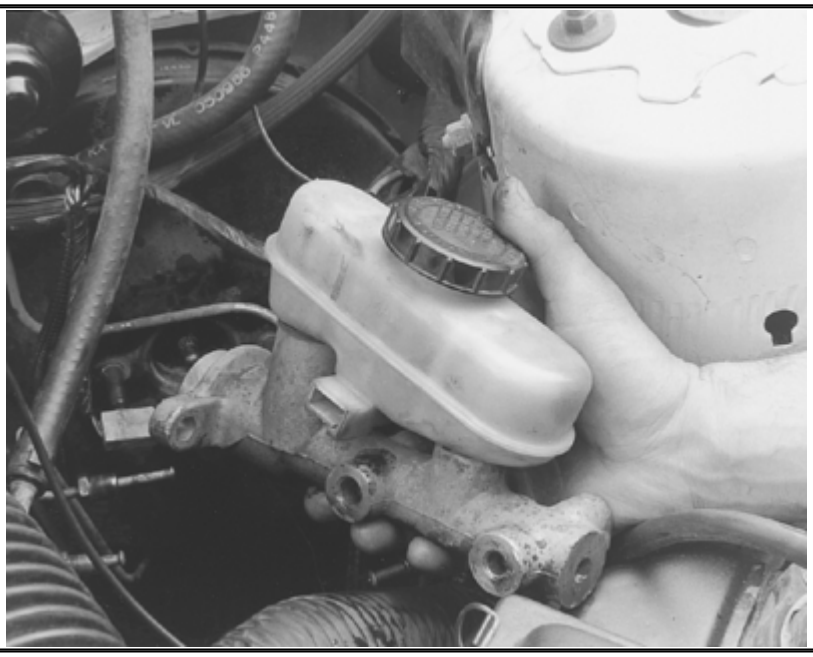
Disconnect the brake lines from the primary and secondary outlet ports of the master cylinder

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.**



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

7. **Slide the master cylinder forward and upward from the vehicle.**



... slide the master cylinder assembly forward and upward from the vehicle

To install:

8. **In order to ease installation, bench bleed the master cylinder before installation:**
    1. **Mount the master cylinder in a holding fixture, such as a soft jawed vise. Be careful not to damage the master cylinder housing.**
    2. **Fill the master cylinder with brake fluid.**
    3. **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.

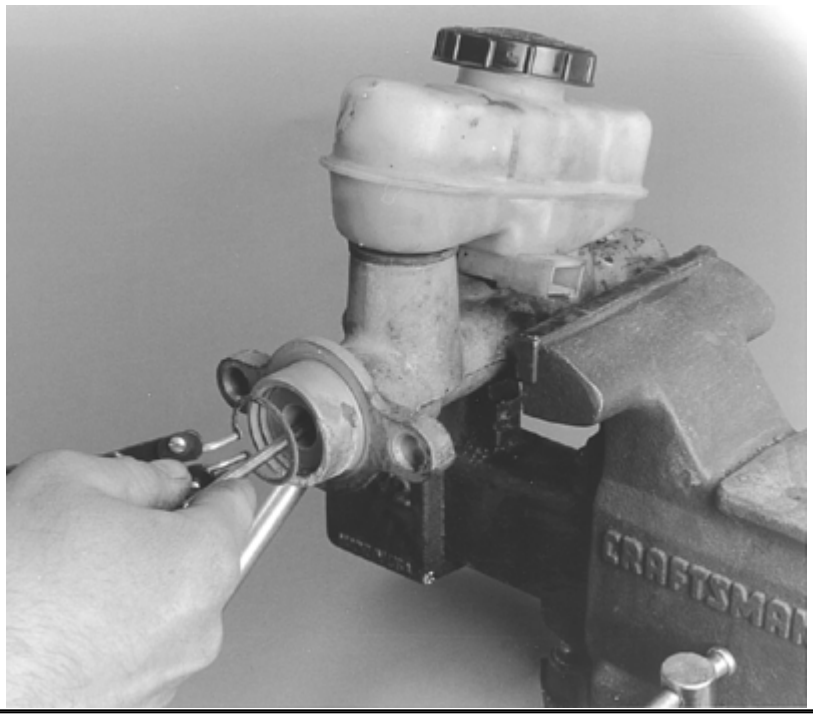
4. Place a finger tightly over each outlet port, then allow the master cylinder piston to return.
5. Repeat the procedure until only clear fluid is expelled from the master cylinder. Plug the outlet ports, then remove the master cylinder from the holding fixture.

9. For vehicles equipped with ABS, install a new seal in the groove in the master cylinder mounting face.
10. Mount the master cylinder over the booster pushrod and onto the two studs on the power brake booster assembly.
11. Install the retaining nuts, then tighten them to 16-21 ft. lbs. (21-29 Nm).
12. Attach the brake fluid lines to the master cylinder and the brake pressure control valve ports.
13. For vehicles equipped with ABS, install the HCU supply hose to the master cylinder fitting, then secure it with the hose clamp.
14. Connect the brake warning light wire.
15. Fill the brake master cylinder with DOT 3 brake fluid to 0.16 in. (4.0mm) below the MAX lines on the side of the reservoir.
16. Connect the negative battery cable, then bleed the brake system. For details, please refer to the procedure located later in this section.
17. Operate the brakes several times, then check for external hydraulic leaks.

OVERHAUL

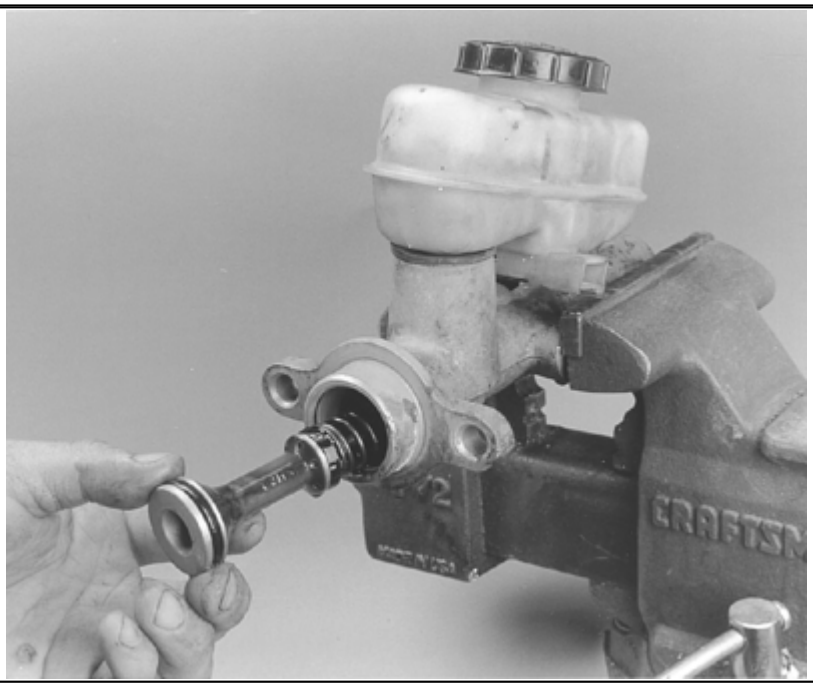
Brake master cylinders on vehicles equipped with ABS cannot be overhauled. If service is required, the master cylinder must be replaced as an assembly.

18. Remove the master cylinder from the vehicle. Position the assembly in a suitable holding fixture. If mounting in a vise, clamp it to the vise by the flange to avoid damage to the bore or reservoir areas.
19. Thoroughly clean the outside of the master cylinder assembly. Remove the cap, then drain and properly discard all old brake fluid.
20. Depress the primary piston, then remove the snapring from the retaining groove at the open end of the bore.

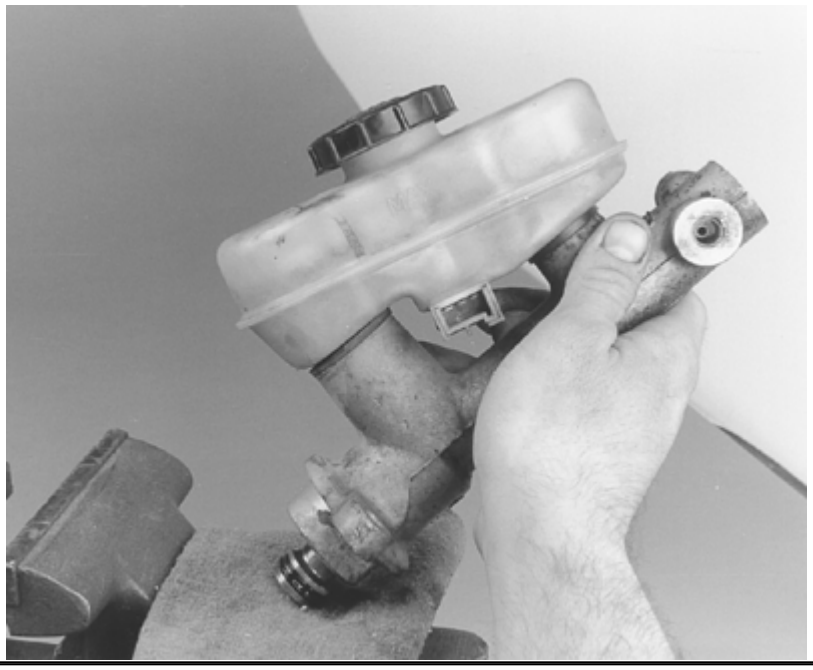


Depress the primary piston, then remove the snapring from the retaining groove at the open end of the bore

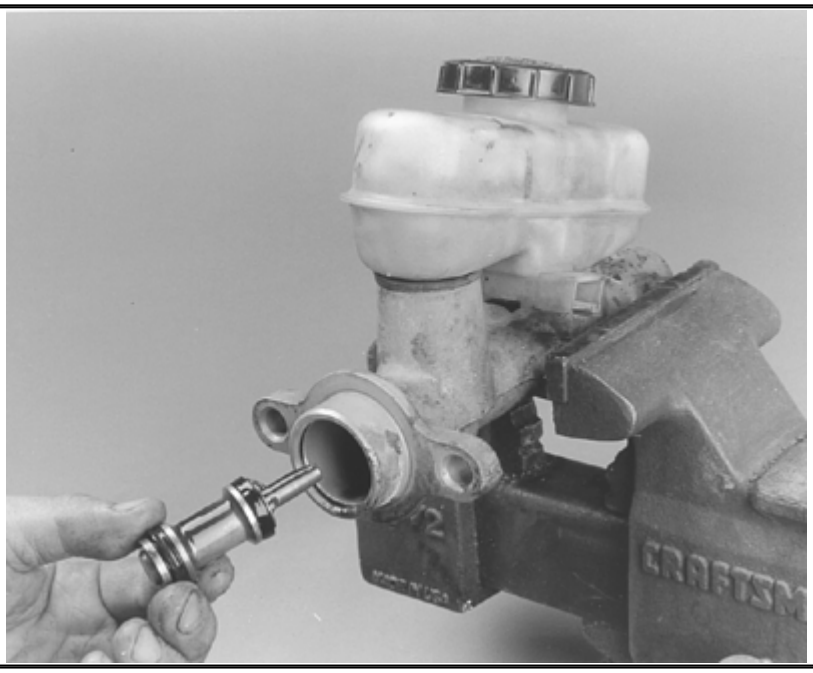
21. Remove the primary and secondary pistons from the master cylinder. Tap open the end of the master cylinder on the bench to remove the pistons. If the secondary piston does not come out readily, use low pressure compressed air to aid in removal.



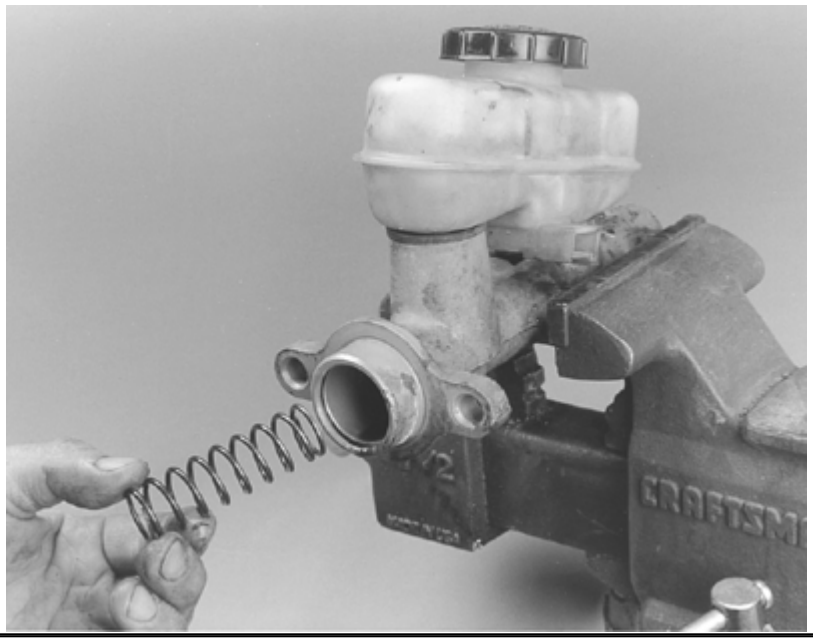
Removing the primary piston from the master cylinder



If the secondary piston does not come out readily, lightly tap the open end of the master cylinder on the bench, then the piston should slide out



Remove the secondary piston, then ...



... remove the secondary piston spring

22. **Remove the reservoir assembly.**

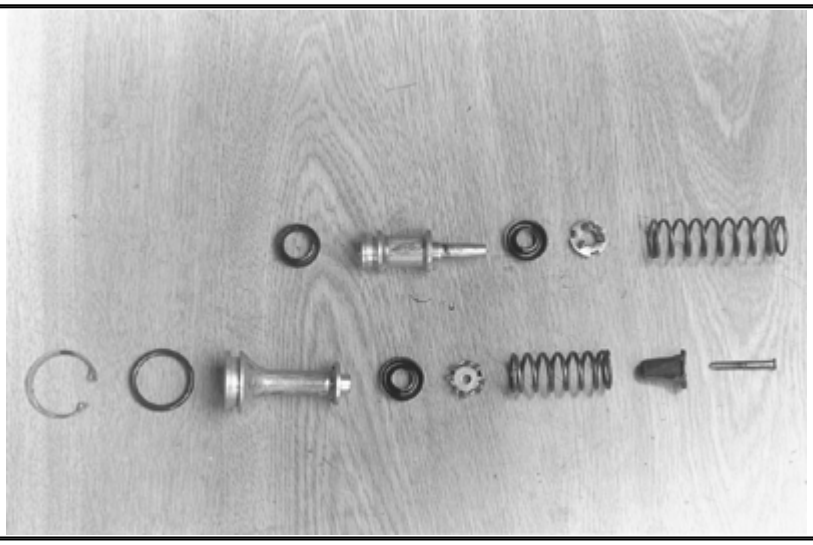
23. **On the station wagon, remove the pressure control valve.**

To assemble:

24. **Inspect all seals on the pistons for damage and replace as required. Inspect the master cylinder body, and replace if defective. Dip all parts in clean brake fluid before installation.**

Inspect all seals on the primary and secondary pistons, and replace if necessary

Replacing a seal on the secondary piston



Exploded view of the internal components of the master cylinder

25. **Install the secondary piston (smaller) assembly into the bore, spring end first.**
26. **Install the primary piston into the bore, spring end first.**
27. **Depress the primary piston, then install the snapring.**
28. **On the station wagon, install the brake pressure control valve.**
29. **Install the master cylinder reservoir assembly.**
30. **Fill and bleed the master cylinder, then put the securely cap the reservoir. Connect the negative battery cable.**

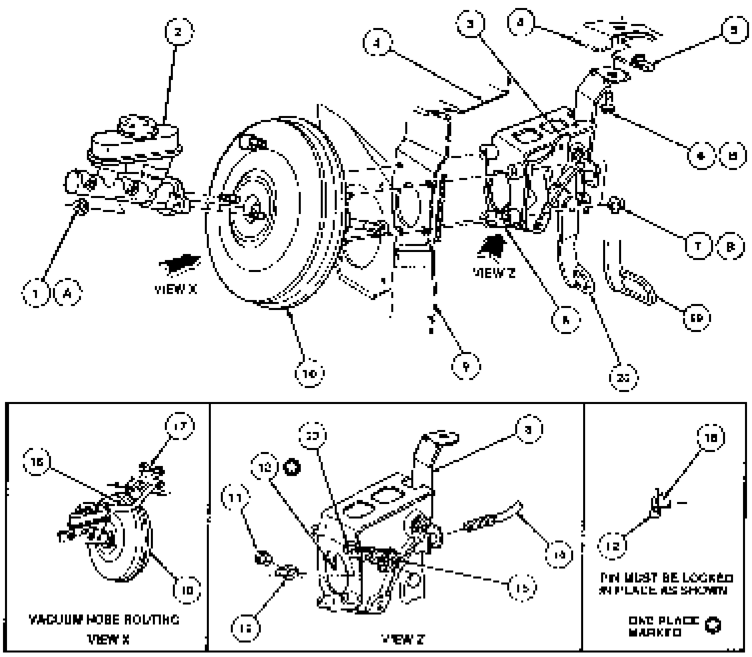
Power Brake Booster

REMOVAL & INSTALLATION

1. **Disconnect the negative battery cable, then remove the brake lines from the primary and secondary ports of the master cylinder.**
2. **Disconnect the manifold vacuum hose from the power brake booster check valve. For vehicles equipped with ABS, depress the brake pedal several times to**

eliminate all of the vacuum in the system.

3. Disengage the fluid level warning indicator electrical connector.
4. Unfasten the nuts securing the master cylinder to the power brake booster, then remove the master cylinder.
5. Working inside the vehicle, under the instrument panel, remove the brake light switch wiring connector from the switch. Remove the pushrod retainer and the master cylinder pushrod spacer (outer nylon washer) from the brake pin. Slide the brake light switch along the brake pedal pin, far enough for the outer hole to clear the pin.
6. Remove the switch by sliding it upward. Remove the booster-to-dash panel retaining nuts. Slide the booster pushrod and pushrod bushing off the brake pedal pin.
7. Working inside the engine compartment, remove the screws from the vacuum outlet manifold fitting at the dash panel, then position the vacuum fitting aside.
8. Position the wire harness aside. Remove the transaxle shift cable and bracket.
9. Move the power brake booster forward until the booster studs clear the dash panel, then remove the booster.



Item	Part Number	Description
1	[illegible]	Nut
2	2140	Brake Master Cylinder
3	[illegible]	Clutch Pedal and Bracket
4		[illegible]
5	[illegible]	U-Nut
6	[illegible]	Bolt

Item	Part Number	Description
7	[illegible]	Nut
8	[illegible]	Pedal Support Bracket
9	[illegible]	Dash Panel
10	-	[illegible]
11	[illegible]	Brake Master Cylinder Push Rod Bearing

Item	Part Number	Description
12	[illegible]	[illegible]
13	[illegible]	Washer
14	--	Vacuum Tube
15	[illegible]	[illegible]
16	[illegible]	[illegible]
17	[illegible]	Vacuum Outlet Manifold
18	—	[illegible]

Item	Part Number	Description
19	2455	Brake Pedal (Automatic Transaxle)
20	2455	Brake Pedal (Manual Transaxle)
A	—	[illegible]
B	—	[illegible]

Common power brake booster and related components

Click to enlarge

To install:

10. **Align the pedal support bracket inside the vehicle, then place the power brake booster in position on the dash panel and hand-start the retaining nuts.**
11. **Working inside the vehicle, install the master cylinder pushrod spacer or speed control dump valve, pushrod and master cylinder pushrod bushing onto the pedal pin and into the pushrod. The head of the bushing should be on the side of the pushrod away from the pedal arm. Tighten the booster-to-dash panel retaining nuts to 16-21 ft. lbs. (21-29 Nm).**
12. **Position the brake light switch so that is straddles the booster pushrod with the brake light switch slot toward the pedal blade and hole just clearing the pin. Slide the switch down onto the pin. Slide the assembly toward the pedal arm, being careful not to bend or deform the brake light switch. Install the master cylinder pushrod spacer on the pin, then secure all of the parts to the pin with the hairpin retainer. Make sure the retainer is fully installed and locked over the pedal pin. Attach the brake light switch wiring connector to the switch.**
13. **Position the speed control dump valve to the dash panel, then secure using the two retaining screws.**
14. **Move the wiring harness into position. Install the shift cable and bracket.**
15. **Connect the manifold vacuum hose to the power brake booster check valve.**
16. **Position the master cylinder assembly on the booster assembly studs.**
17. **Install the brake tube fittings into the master cylinder ports. Tighten to 10-17 ft. lbs. (14-24 Nm). Tighten the master cylinder nuts to 16-21 ft. lbs. (21-29 Nm).**
18. **Engage the fluid level warning indicator electrical connector.**
19. **Bleed the brake system. For details, please refer to the procedure later in this section.**
20. **Adjust the manual shift linkage.**
21. **Connect the negative battery cable, then start the engine and check the brake function.**

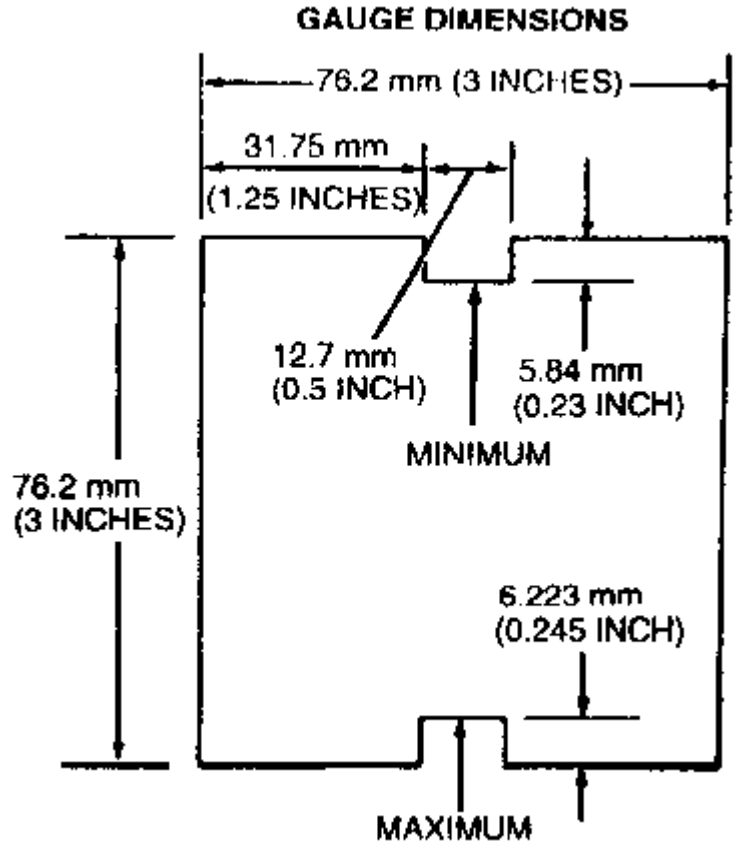
ADJUSTMENT

On vehicles without ABS, the power brake booster has an adjustable pushrod (output rod) which is used to compensate for dimensional variations in an assembled power brake booster. The pushrod length is adjusted after each booster unit has been assembled in production. A properly adjusted pushrod that remains assembled to the power brake booster with which it was matched during production should never require a service adjustment.

A power brake booster that is suspected of having an improper pushrod length will indicate either of the following:

- **A pushrod that is too long will prevent the master cylinder piston from completely releasing hydraulic pressure and eventually cause the brakes to drag.**
- **A pushrod that is too short will have excessive brake pedal travel and cause a groaning noise to come from the power brake booster.**

If necessary, pushrod length can be checked using a pushrod gauge and the following procedure.



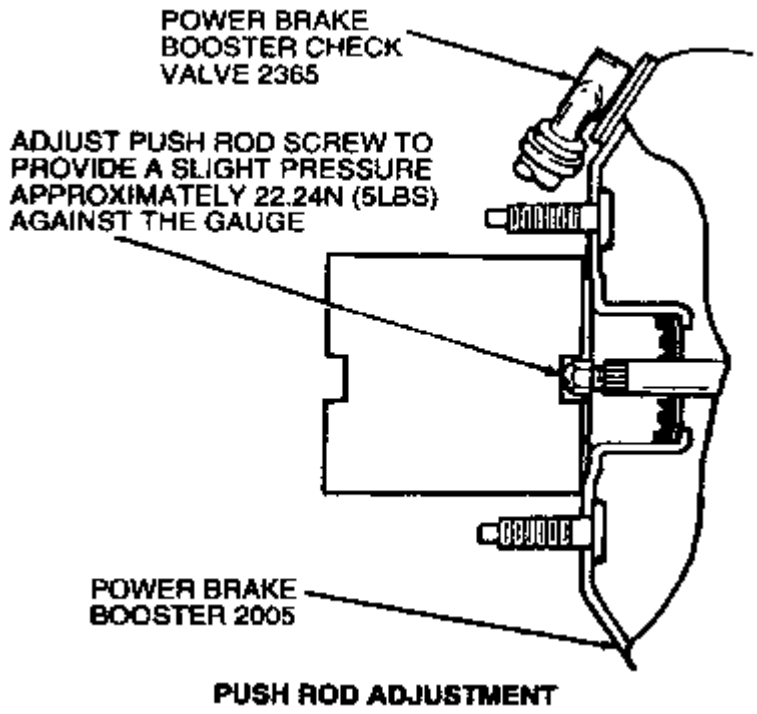
Power brake booster pushrod adjustment gauge dimensions

Click to enlarge

1. **Without disconnecting the brake lines, disconnect the master cylinder and set it away from the booster power unit.**

The master cylinder must be supported to avoid damaging the brake lines.

2. **With the engine running, check and adjust the pushrod length so that is it 0.230-0.245 in. (5.84-6.22mm), as indicated by the gauge shown. A force of approximately 5 lbs. (22 N) applied to the pushrod with the gauge will confirm that the pushrod is seated within the power booster. If adjustment is necessary, grip the rod only by the knurled area.**



Power brake booster pushrod adjustment

Click to enlarge

3. **Install the master cylinder on the power booster. Gradually and alternately tighten the retaining nuts to 16-21 ft. lbs. (21-29 Nm).**

Proportioning Valve

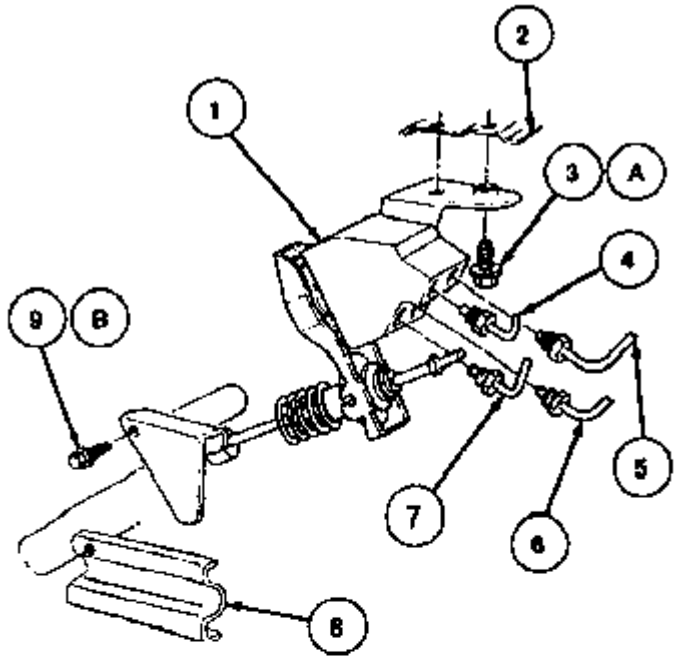
REMOVAL & INSTALLATION

The valve for the sedan is mounted to the floorpan near the left rear wheel. The valves for the station wagon are screwed into the master cylinder.

Sedan

1. **Raise and safely support the vehicle.**
2. **Note the position of the four brake tubes connected to the valve, then disconnect them from the valve assembly.**
3. **Remove the screw retaining the valve bracket to the lower suspension arm.**
4. **Remove the two screws retaining the valve bracket to the underbody, then remove the assembly.**

The service replacement valve will have a red plastic gauge clip on the valve, which must not be removed until the valve is installed on the vehicle.



Item	Part Number	Description
1	2B547	Brake Load Sensor Proportioning Valve
2	—	Body
3	N802191-S56	Bolt
4	2L568	Brake Tube Assy
5	2L569	Brake Tube Assy
6	2265	Brake Tube Assy
7	2B255	Brake Tube Assy
8	5500	Rear Suspension Arm and Bushing
9	N804846-S56	Bolt
10	—	Lower Adjusting Screw
11	—	Red Plastic Gauge (Not Shown)
A	—	Tighten to 11.4-15.6 N·m (8-12 Lb-Ft)
B	—	Tighten to 6-8 N·m (4-6 Lb-Ft)

View of a common proportioning valve-sedan only

Click to enlarge

To install:

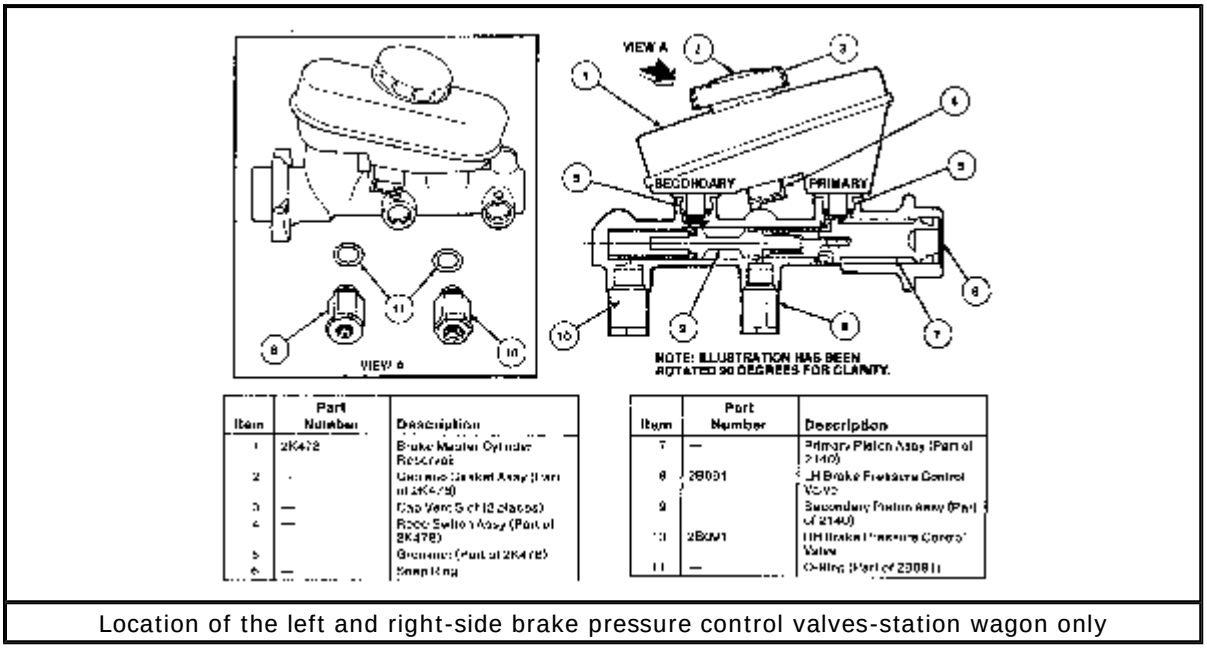
5. **Make sure the rear suspension is in the full rebound position.**
6. **Make sure the red plastic gauge clip is in position on the valve and that the operating rod lower adjustment screw is loose.**
7. **Position the valve assembly to the underbody, then install the two retaining screws.**
8. **Position the valve bracket to the lower suspension arm, then install one retaining screw. Tighten the screw to 4-6 ft. lbs. (6-8 Nm). Make sure the brake pressure**

differential valve adjuster sleeve is resting on the lower bracket, then tighten the setscrew.

9. **Connect the brake lines in the same position as removed.**
10. **Bleed the rear brakes. For details, please refer to the procedure located later in this section.**
11. **Remove the red plastic gauge clip, then carefully lower the vehicle.**

Station Wagon

1. **Disconnect the primary or secondary brake line from the master cylinder, as necessary.**
2. **Loosen and remove the brake pressure control valve(s) from the master cylinder housing.**



Location of the left and right-side brake pressure control valves-station wagon only

Click to enlarge

To install:

3. **Install the brake pressure control valve(s) in the brake master cylinder housing port, then tighten to 10-16 ft. lbs. (13-22 Nm).**
4. **Install the brake tube, then tighten to 12-15 ft. lbs. (16-20 Nm).**
5. **Fill and bleed the brake system. For details, please refer to *Brake System Bleeding*.**

Brake Hoses and Pipes

REMOVAL & INSTALLATION

Flexible Hoses

Flexible hoses are usually installed between the frame-to-front calipers and the frame-to-rear differential, although they may be used elsewhere on some applications. Commonly, flexible hoses are used at points on the vehicle where

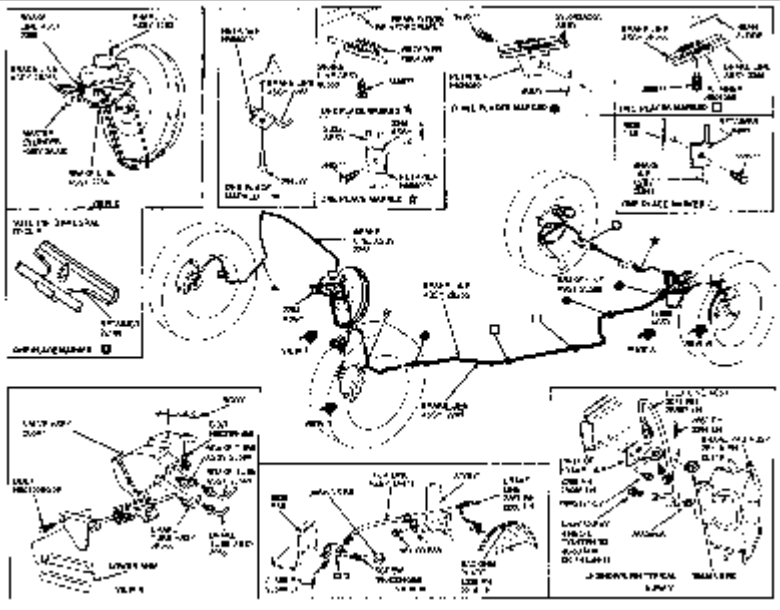
suspension travel would damage or break a solid pipe. Hoses should be replaced if they show signs of softening, cracking or other damage.

FRONT HOSE

1. **Raise and safely support the vehicle.**
2. **Remove the wheel and tire assembly from the rotor mounting face. Be careful not to damage or interfere with the wheel cylinder bleeder screw during removal.**
3. **Disconnect the front brake hose from the caliper. Remove the hollow retaining bolt that connects the hose fitting to the caliper. Remove the front brake hose assembly from the caliper, then plug the hose to avoid dirt or contamination from entering the hose.**
4. **Remove the front brake hose from the brake fluid distributor tube, then remove the brake hose clip and the brake hose.**

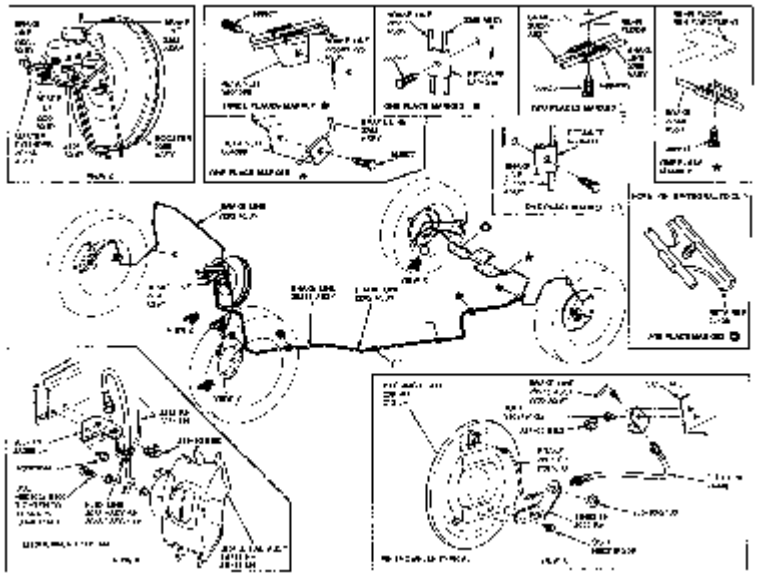
To install:

5. **Connect the front brake hose to the fluid distributor tube, then install the hose clip.**
6. **Remove the plugs, then install the brake hose on the caliper using a new copper washer on each side of the fitting outlet. Insert a retaining bolt through the washers and fittings, then tighten the bolts to 30-40 ft. lbs. (41-54 Nm).**
7. **Bleed the brake system. For details, please refer to the procedure later in this section. Make sure to replace the rubber bleed screw after bleeding the system.**
8. **Install the wheel and tire assembly, then carefully lower the vehicle. Tighten the lug nuts to 85-105 ft. lbs. (115-142 Nm).**



Schematic of brake lines and related components-sedan

Click to enlarge

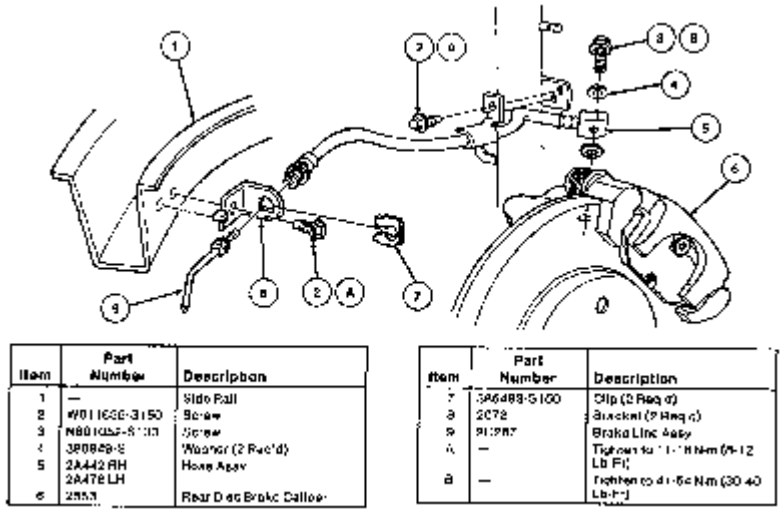


Schematic of brake lines and related components-station wagon

Click to enlarge

REAR HOSE

1. **Raise and safely support the vehicle.**
2. **Remove the wheel and tire assembly.**
3. **Remove the rear wheel brake hose from the rear disc brake caliper assembly.**
4. **Remove the rear wheel brake hose from the rear shock absorber.**
5. **Remove the brake hose clip from the bracket, then remove the rear hose from the brake fluid distribution tube.**



Item	Part Number	Description
1	—	Side Rail
2	W701636-S150	Screw
3	N801052-S100	Screw
4	380869-S	Washer (2 Req'd)
5	2A442 RH 2A478 LH	Hose Assy
6	2553	Rear Disc Brake Caliper

Item	Part Number	Description
7	3A6488-S100	Clip (2 Req'd)
8	2C72	Bracket (2 Req'd)
9	2B387	Brake Line Assy
A	—	Tighten to 11-16 Nm (8-12 Lb Ft)
B	—	Tighten to 41-54 Nm (30-40 Lb-Ft)

Common rear brake hose assembly

Click to enlarge

To install:

6. **Seat the brake hose into the bracket, then install the hose clip.**

7. **Connect the hose to the brake fluid distributor tube.**
8. **Using new washers, connect the rear wheel brake hose to the rear disc caliper. Tighten the retaining bolt to 30-40 ft. lbs. (41-54 Nm).**
9. **Bleed the brake system, as outlined later in this section.**
10. **Install the wheel and tire assembly, then carefully lower the vehicle and final tighten the lug nuts to 85-105 ft. lbs. (115-142 Nm).**

Steel Pipes

When replacing steel brake pipes, always use the double-walled steel piping which is designed to withstand high pressure and resist corrosion. Also, it is important to make sure that the pipe is of the same size to assure both a proper fit and proper brake operation.

CAUTION

Never use copper tubing. It is subject to fatigue, cracking, and/or corrosion, which will result in brake line failure.

Whenever possible, try to work with brake lines that are already cut to the length needed. These lines are available at most auto parts stores and have machine made flares, the quality of which is hard to duplicate with most of the available inexpensive flaring kits.

When the brakes are applied, there is a great deal of pressure developed in the hydraulic system. An improperly formed flare can leak with a resultant loss of stopping power. If you have never formed a double-flare, take time to familiarize yourself with the flaring kit; practice forming double-flares on scrap tubing until you are satisfied with the results.

1. **Obtain the recommended bulk $^{3}/_{16}$ in. double wall steel brake tubing and the correct standard tube nuts for $^{3}/_{16}$ in. tubing.**

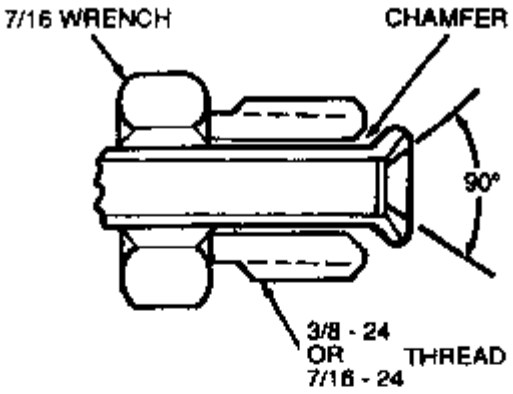
The outside diameter of the line is used to specify size.

2. **Using a tubing cutter, cut the tubing to the proper length. Clean burrs after cutting. The correct length may be determined by measuring the line to be replaced using a length of cord, then adding $^{1}/_{8}$ in. (1.2mm) for each flare.**

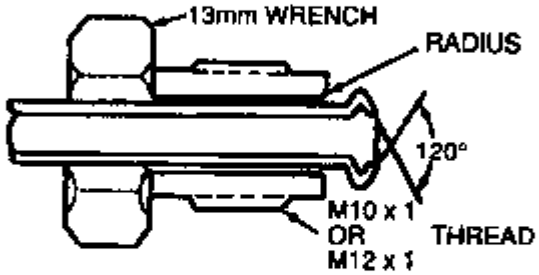
Make sure the fittings are installed and oriented correctly before flaring both ends of the line.

3. **Place a tube nut onto the tube in the correct direction, then flare the tube with an SAE inverted flare or a metric ISO flare using Brake Line Flaring Tool D81L-2269-A, or equivalent. Carefully follow the instructions included with the tool. Repeat on the opposite end of the tube.**

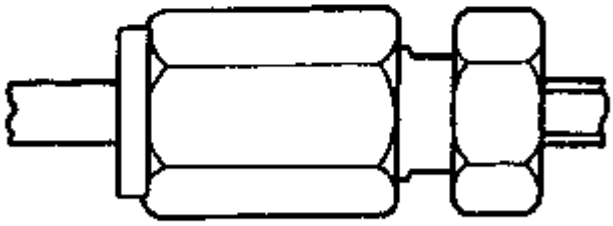
- SAE double 45-degree flare.



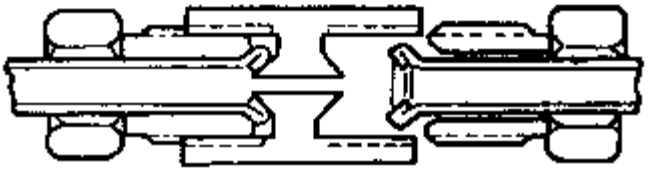
- ISO Metric flare.



- Tube to tube connection.



- SAE double 45 Union (repair).



Commonly used types of brake line flared connections

Click to enlarge

4. **Bend the replacement tube to match the removed tube using a tubing bender. When the replacement brake tube is installed, maintain adequate clearance to metal edges and moving or vibrating parts.**
5. **Clean the brake tube by flushing with clean brake fluid. Install the brake tube, then**

tighten the tube nuts to specification using an inch lb. torque wrench.

6. **Bleed the brake system.**

Bleeding

PROCEDURE

Manual Bleeding

1. **Clean all dirt from the master cylinder filler cap.**
2. **If the master cylinder is known or suspected to have air in the bore, it must be bled BEFORE any of the wheel cylinders or calipers. To bleed the master cylinder, loosen the upper secondary left front outlet fitting approximately $^3/_4$ of a turn.**
3. **Have an assistant depress the brake pedal slowly through its full travel. Close the outlet fitting and let the pedal return slowly to the fully released position. Wait 5 seconds and then repeat the operation until all air bubbles disappear.**
4. **Loosen the upper primary right-hand front outlet fitting about $^3/_4$ of a turn. Repeat Step 3 with the right-hand front outlet fitting.**
5. **To continue to bleed the brake system, remove the rubber dust cap from the wheel cylinder bleeder fitting or caliper fitting at the right rear side of the vehicle. Check to make sure the wheel cylinder bleeder screw is positioned at the upper half of the front caliper. If not, the caliper is located on the wrong side. Place a suitable box wrench on the bleeder fitting, then attach a rubber drain tube to the fitting. The end of the tube should fit snugly around the bleeder fitting.**
6. **Submerge the free end of the tube in a container partially filled with clean brake fluid, then loosen the fitting about $^3/_4$ of a turn.**

Submerge the free end of the brake tube in a container partly filled with clean brake fluid, then loosen the fitting about $^3/_4$ of a turn

7. **Have an assistant push the brake pedal down slowly through its full travel. Close the bleeder fitting and allow the pedal to slowly return to its full release position. Wait 5 seconds, then repeat the procedure until no bubbles appear at the submerged end of the bleeder tube.**

8. **When the fluid is completely free of air bubbles, close the bleeder fitting, then remove the bleeder tube. Install the rubber dust cap on the bleeder fitting.**
9. **Repeat this procedure in the following sequence: left front, left rear and right front. Refill the master cylinder reservoir after each wheel cylinder or caliper has been bled, then install the master cylinder cover and gasket. When brake bleeding is completed, the fluid level should be filled to the maximum level indicated on the reservoir using clean brake fluid from a sealed container.**
10. **Always make sure the disc brake pistons are returned to their normal positions by depressing the brake pedal several times until normal pedal travel is established. If the pedal feels spongy, repeat the bleeding procedure.**

Pressure Bleeding

For pressure bleeding, use Rotunda Brake Bleeder 104-00064 or equivalent. Always bleed the longest line first. The bleeder tank should contain enough new brake fluid to complete the braking operation. Use only DOT 3 brake fluid from a new, sealed container. Never reuse brake fluid that has been drained from the hydraulic system. The pressure bleeder tank should be charged with 10-30 psi (69-206 kPa) of air pressure.

1. **Clean all dirt from the reservoir filler cap and surrounding area.**

NEVER exceed 50 psi (344 kPa) of air pressure to prevent system damage.

2. **Remove the master cylinder filler cap, then fill the reservoir with fluid to the MAX fill line. Following the manufacturer's instructions, install the pressure bleeder adapter tool to the master cylinder reservoir, then attach the bleeder tank hose to the fitting on the adapter.**
3. **If all wheel cylinders are to be bled, start with the right-hand rear brake wheel cylinder. Remove the dust cap from the right rear caliper bleeder fitting. Attach a rubber drain tube to the fitting, making sure the tube fits snugly.**
4. **Open the valve on the bleeder tank to admit pressurized brake fluid to the master cylinder reservoir.**
5. **Submerge the free end of the tube in a container partly filled with clean brake fluid, then loosen the wheel cylinder bleeder screw.**
6. **When the air bubbles cease to appear in the fluid at the submerged end of the bleeder tube, close the wheel cylinder bleeder screw, then remove the tube. Tighten to 7.5-8.9 ft. lbs. (10-12 Nm). Replace the rubber dust cap on the wheel cylinder bleeder screw.**
7. **Repeat Steps 3-6 at the left front disc brake caliper.**
8. **Next, repeat Steps 4, 5 and 6 at the left rear wheel cylinder or caliper, and then the right front disc brake caliper.**
9. **When the bleeding procedure is finished, close the bleeder tank valve, then remove the hose from the adapter fitting.**
10. **After disc brake service, make sure the disc brake pistons are returned to their normal positions and that the brake shoe and lining assemblies are properly seated. This is accomplished by depressing the brake pedal a few times until normal pedal travel is established.**
11. **Remove the pressure bleeder adapter tool from the master cylinder. Fill the master cylinder reservoir to the proper level using clean brake fluid from a sealed container.**

Rear Brake Bleeding With a Fully Charged Accumulator

1. **Remove the dust cap from the right rear caliper bleeder fitting. Attach a rubber drain tube to the fitting, making sure the tube fits snugly.**
2. **Turn the ignition switch to the RUN position. This will turn on the electric pump to charge the accumulator, as required.**
3. **Have an assistant hold the brake pedal in the applied position. Open the bleeder fitting for 10 seconds at a time until an air-free stream of brake fluid flow is observed.**

CAUTION

To prevent possible injury, care must be used when opening the bleeder screws, due to the high pressures stored by a fully charged accumulator.

4. **Repeat the procedure at the left rear caliper.**
5. **Pump the brake pedal several times to complete the bleeding procedure.**
6. **Adjust the fluid level in the reservoir to the MAX mark with a fully charged accumulator.**

If the pump motor is allowed to run continuously for approximately 20 minutes, an internal thermal safety switch may shut the motor off to prevent it from overheating. If that happens, a 2-10 minute cool down period is typically required before normal operation can resume.