

SECTION B

SINGLE PISTON DISC BRAKE ALL SERIES

CONTENTS

Division	Subject	Paragraph
I	TROUBLE DIAGNOSIS: Single Piston Disc Brake Trouble Diagnosis.	50-16
II	DESCRIPTION AND OPERATION: Description Operation	50-17 50-18
III	ADJUSTMENTS AND MINOR SERVICE: Shoe and Lining Replacement Hold-Off Valve Replacement Bleeding Disc Brakes	50-19 50-20 50-21
IV	REMOVAL AND INSTALLATION: (Not Applicable)	-
V	OVERHAUL AND MAJOR SERVICE: Caliper Overhaul Rotor Servicing	50-22 50-23
VI	SPECIFICATIONS: Single Piston Disc Brake Specifications	50-24
		50B-1

<p>50-16 SINGLE PISTON DISC BRAKE TROUBLE DIAGNOSIS</p> <p>PULLS</p> <p>CAUSES</p> <p>Incorrect Tire Pressures.</p> <p>Front End Out of Line.</p> <p>Unmatched Tires on Same Axle.</p> <p>Restricted Brake Tubes or Hoses.</p> <p><i>Malfunctioning Caliper Assembly.</i></p> <p>Defective or Damaged Shoe and Lining (Grease or Brake Fluid on Lining or Bent Shoe).</p> <p>Malfunctioning Rear Brakes.</p> <p>Loose Suspension Parts.</p> <p>Loose Calipers.</p>	<p>CORRECTIONS</p> <p>Inflate evenly on both sides to the recommended pressures. (See owner's manual.)</p> <p>Check and align to manufacturer's specifications.</p> <p>Tires with approximately the same amount of tread should be used on the same axle.</p> <p>Check for soft hoses and damaged lines. Replace with new hoses and new double-walled steel brake tubing.</p> <p>Check for stuck or sluggish pistons, proper lubrication.</p> <p>Install new shoe and lining in complete axle sets.</p> <p>Check for inoperative auto adjusting mechanism, defective lining (grease or brake fluid on lining) or defective wheel cylinders. Repair as necessary.</p> <p>Check all suspension mountings.</p> <p>Check and torque bolts to specifications.</p>
<p>BRAKE ROUGHNESS OR CHATTER (PEDAL PULSATES)</p> <p>CAUSES</p> <p>Excessive Lateral Runout.</p> <p>Parallelism not within Specifications.</p> <p><i>Wheel Bearings not Adjusted.</i></p> <p>Rear Drums Out of Round.</p> <p>Shoe Reversed (Steel against iron).</p>	<p>CORRECTIONS</p> <p>Check per instructions and replace or machine the rotor, if not within specifications.</p> <p>Check per instructions and replace or machine the rotor, if not within specifications.</p> <p><i>Adjust wheel bearings to correct specifications.</i></p> <p>Check runout and if not within specifications, turn the drums. (Not over maximum of 0.060 on the diameter.)</p> <p>Replace shoe and lining and machine rotor within specifications.</p>
<p>EXCESSIVE PEDAL EFFORT</p> <p>CAUSES</p> <p>Malfunctioning Power Brake.</p> <p>Partial System Failure.</p> <p>Excessively Worn Shoe and Lining.</p> <p>Piston in Caliper Stuck or Sluggish.</p>	<p>CORRECTIONS</p> <p>Check power brake and repair if necessary.</p> <p>Check front and rear brake system and repair if necessary. Also check brake warning light, if a failed system is found and light did not function.</p> <p>Check and replace in axle sets.</p> <p>Remove caliper and rebuild.</p> <p style="text-align: right;">50-171A</p>

Figure 50-38 Single Piston Disc Brake Trouble Diagnosis

<p>EXCESSIVE PEDAL EFFORT (Continued)</p> <p>CAUSES</p> <p>Fading Brakes due to Incorrect Lining.</p>	<p>CORRECTIONS</p> <p>Remove and replace with original equipment lining.</p>
<p>EXCESSIVE PEDAL TRAVEL</p> <p>CAUSES</p> <p>Partial Brake System Failure.</p> <p>Insufficient Fluid in Master Cylinder.</p> <p>Air Trapped in System.</p> <p>Rear Brake not Adjusting.</p> <p>Bent Shoe and Lining.</p>	<p>CORRECTIONS</p> <p>Check both front and rear system for a failure and repair. Also check warning light. It should have indicated a failure.</p> <p>Fill reservoirs with approved brake fluid. Check for leaks.</p> <p>Bleed system.</p> <p>Adjust rear brakes and repair auto adjusters.</p> <p>Replace axle set of shoe and lining.</p>
<p>DRAGGING BRAKES (A very light drag is present in all disc brakes immediately after pedal is released.)</p> <p>CAUSES</p> <p>Master Cylinder Pistons not Returning Correctly.</p> <p>Restricted Brake Tubes or Hoses.</p> <p>Incorrect Parking Brake Adjustment on Rear Brakes.</p> <p>Check Valve Installed in Outlet to Front Disc Brakes.</p>	<p>CORRECTIONS</p> <p>With reservoir cover off, check for fluid spurt at bypass holes as pedal is depressed. Adjust push rod, if necessary or rebuild master cylinder.</p> <p>Check for soft hoses or damaged tubes and replace with new hoses and new double-walled steel brake tubing.</p> <p>Check and readjust to correct specifications.</p> <p>Check master cylinder outlet and remove check valve if present.</p>
<p>GRABBING OR UNEVEN BRAKING ACTION</p> <p>CAUSES</p> <p>All conditions listed under "Pulls".</p> <p>Malfunction of Combination Valve.</p> <p>Malfunction of Power Brake Unit.</p> <p>Binding Brake Pedal Mechanism.</p>	<p>CORRECTIONS</p> <p>Replace and bleed system.</p> <p>Check operation and repair, if necessary.</p> <p>Check and lubricate, if necessary.</p> <p style="text-align: right;">50-171B</p>

Figure 50-39 Single Piston Disc Brake Trouble Diagnosis

DIVISION I

TROUBLE DIAGNOSIS

50-16 SINGLE PISTON DISC BRAKE TROUBLE DIAGNOSIS

a. Testing Electrical Circuit of Combination Valve

1. Disconnect wire from switch terminal and use a jumper to connect wire to a good ground.
2. Turn ignition key to "On" - warning lamp should light. If lamp does not light, bulb is burned out or electrical circuit is defective. Replace bulb or repair electrical circuit as necessary.
3. When warning lamp lights, turn ignition switch off. Disconnect jumper and reconnect wire to switch terminal.

b. Testing Warning Light Switch Portion of Combination Valve

1. Attach a bleeder hose to a rear brake bleed screw and immerse the other end of the hose in a container partially filled with clean brake fluid. Be sure master cylinder reservoirs are full.

2. Turn ignition switch to "On" - open bleeder screw while a helper applies moderate pressure to the brake pedal. Warning lamp should light. Close bleeder screw before helper releases brake pedal. Reapply brake pedal with moderate-to-heavy pressure. Light should go out.

3. Attach the bleeder hose to a front brake bleeder screw and repeat above test. Warning lamp action should be the same as in Step No. 2. Turn ignition switch off.

4. If warning lamp does not light during Steps 2 and 3 but does light when a jumper is connected to ground, the warning light switch portion of the combination valve is defective. Do not attempt to disassemble the combination valve. If any portion of the combination valve is defective, *it must be replaced with a new combination valve.*

DIVISION II

DESCRIPTION AND OPERATION

50-17 DESCRIPTION

The single piston disc brake is constructed from a single casting which contains one large piston bore in the inboard section of the casting. The fluid inlet hole and bleeder valve hole are machined into the inboard section of the caliper and connect directly to the piston bore. See Figure 50-40.

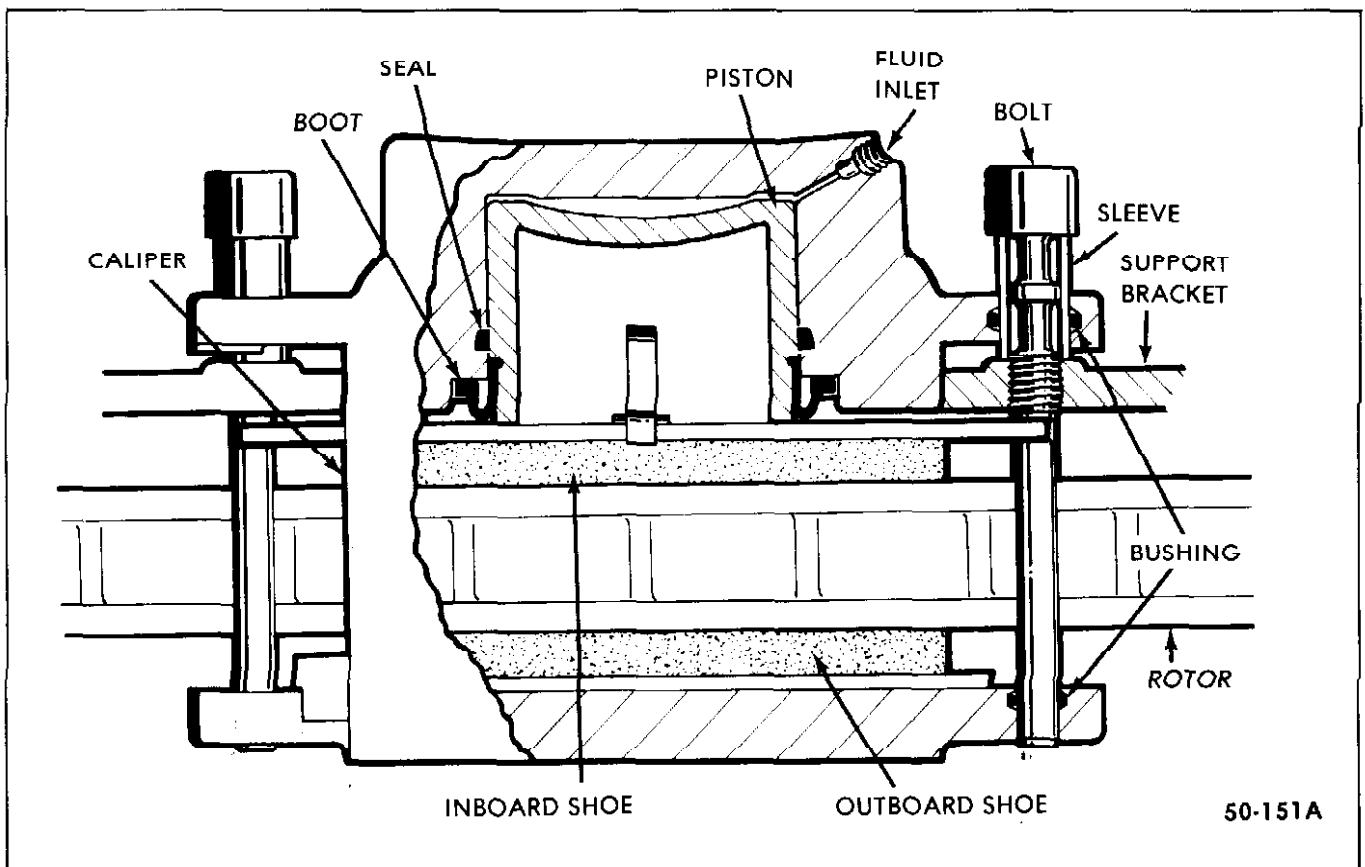


Figure 50-40 - Single Piston Disc Brake

A piston seal groove is provided in the side wall of the piston bore. The groove is machined so that it is shallower toward the bottom of the piston bore. The purpose of this is to put more compression on the edge of the square cut seal which faces the brake fluid pressure.

The top of the piston bore is machined to accept a sealing dust boot. The dust boot contains a metal retainer as a part of the boot. The retainer part of the boot is pressed into the recess in the top of the piston bore. The inside diameter of the boot fits into a groove which is machined in the piston.

The piston is formed from steel, precision ground and nickle-chrome plated, giving it a very hard and durable surface. The use of abrasives or any attempt to re-machine the piston will destroy the plating.

Note that there is no piston spring in the bottom of the caliper bore. Shoe wear is automatically compensated for by the sliding caliper feature.

The machined caliper casting has two mounting ears at each end of the caliper. Holes are machined in each of the mounting ears. The holes in the inboard ears are larger in diameter than the holes in the outboard ears. Grooves are machined in the inside diameter of the holes in the four ears to accommodate rubber bushings. Sleeves are assembled through the two large holes in the inboard ears.

A support bracket is mounted on the suspension. The caliper assembly is attached to the support bracket using two special bolts which are plated to resist corrosion. These bolts are inserted through the sleeves, support bracket, under the ears on the inboard shoe and through the outboard ears on the caliper. The bolt threads engage tapped holes in the support bracket and the bolt heads are tightened against the ends of the sleeves. The caliper is free

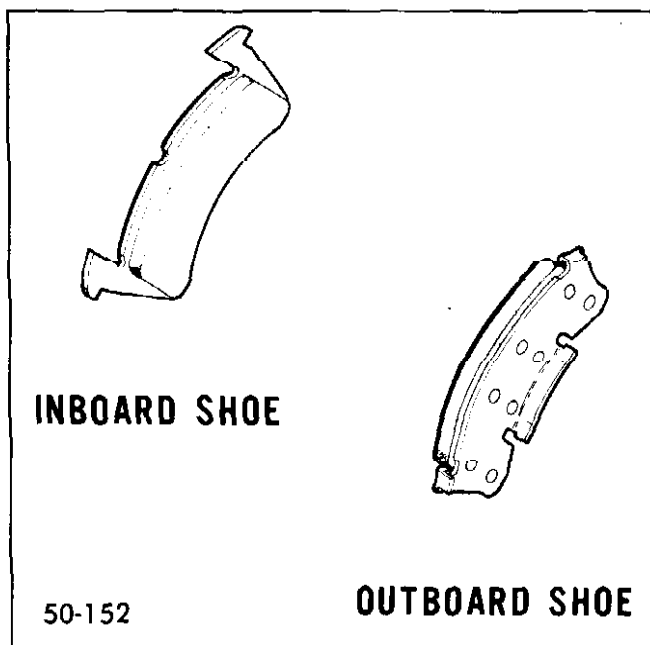


Figure 50-41--Brake Shoe and Lining Assemblies

to slide on the sleeves at the inboard ears and on the bolt at the outboard ears.

The shoe and lining assemblies are constructed of a stamped metal shoe with the lining riveted to the shoe. The outboard shoe and lining differs from the inboard shoe and lining as shown in Figure 50-41.

1. The outboard shoe and lining assembly has a thinner metal shoe with slightly thinner lining.

2. The outboard shoes have ears on the top ends which are bent over at right angles to the shoe, and another large tab at the bottom of the shoe which is also bent at a right angle to the shoe. The ears at the top fit over the outboard mounting ears on the caliper. The large tab at the bottom of the shoe fits in the cut-out in the outboard section of the caliper. The inboard shoe and lining has ears on the top ends which fit over the caliper retaining bolts. A special spring inside the hollow piston supports the bottom edge of the inboard shoe.

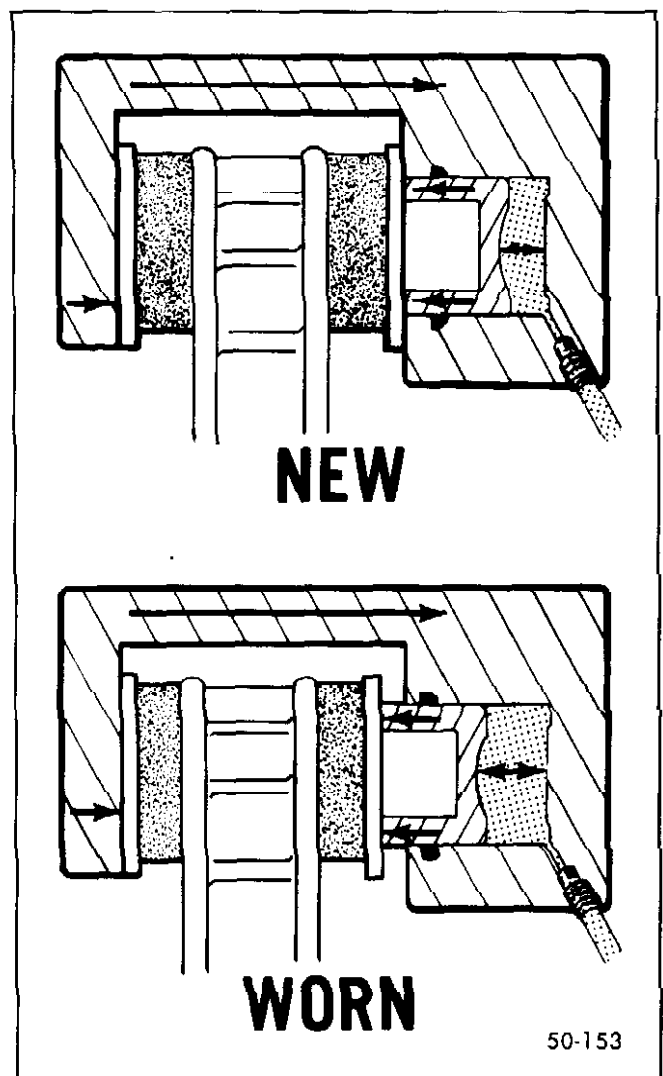


Figure 50-42 - Simplified Cross Section

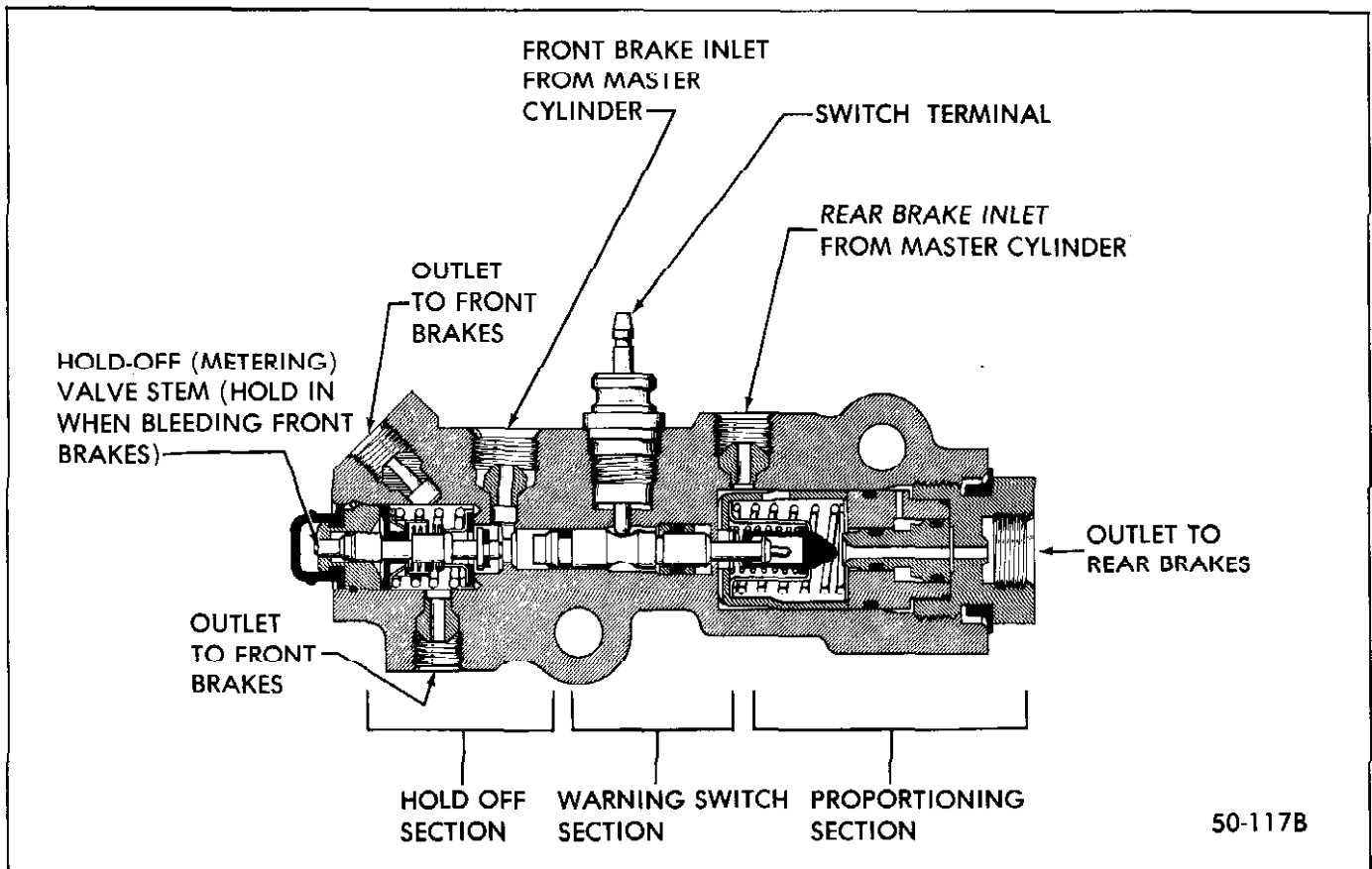


Figure 50-42A - Combination Valve

A cast iron, ventilated rotor is used in conjunction with these disc brakes. It contains two machined braking surfaces separated by ventilating fins. A groove is added to the center of the rotor braking surfaces to aid in dampening out brake noise.

a. Combination Valve - Description

A combination valve is used on all cars equipped with disc brakes. The valve combines the functions of a front brake hold-off (metering) valve, a rear brake pressure proportioning valve, and a hydraulic differential pressure switch; hence, the name "combination" valve. The valve is mounted on the left front side rail of the frame and is connected to the master cylinder and wheel cylinders through hydraulic lines (see Figure 50-42A). A wiring harness connects the electrical terminal of the differential pressure switch to the brake warning light on the instrument panel.

50-18 OPERATION

The significant feature of the single piston caliper operation is that it is free to slide on the two mounting bolts which thread into the support bracket. Figure 50-47 shows a simplified cross section of the caliper, with both new and worn linings, and the forces at work when the brakes are applied.

Upon application of the brakes, the fluid pressure behind the piston increases. Pressure is exerted equally against the bottom of the piston and also against the bottom of the piston bore. The pressure applied to the piston is transmitted to the inboard shoe and lining, forcing the lining against the inboard rotor surface. The pressure applied to the bottom of the piston bore forces the caliper to slide or move on the mounting bolts toward the inboard side, or toward the car. Since the caliper is one piece, this movement toward the car causes the outboard section of the caliper to apply pressure against the back of the outboard shoe and lining assembly, forcing the lining against the outboard rotor surface. As the line pressure builds up, the shoe and lining assemblies are pressed against the rotor surfaces with increased force, bringing the car to a stop.

In actual practice, the application and release of the brake pressure causes a very slight movement of the piston and caliper. Upon release of the braking effort, the piston and caliper merely relax into a released position. In the released position the shoes do not retract any appreciable distance from the rotor surfaces.

The bottom section of Figure 50-42 shows that, as the brake lining wears, the piston moves out of the caliper bore and the caliper repositions itself on the mounting bolts and equal distance toward the car. In this manner the caliper assembly maintains the inboard and outboard

shoe and lining in the same relationship with the rotor surface throughout the full life of the lining.

b. Combination Valve - Operation

The hold-off section of the valve limits pressure to the front disc brakes until a pre-determined front input pressure is reached. There is no restriction at inlet pressures below 3 psi. The purpose of the hold-off valve is to limit pressure to the front disc brakes until the rear drum brakes are activated (rear line pressure must overcome the rear brake shoe return spring tension before the rear brakes actuate).

The proportioning section of the valve proportions outlet pressure to the rear brakes after a pre determined rear input pressure has been reached. This is done to prevent rear wheel lock-up on vehicles with light rear wheel loads. Certain models having high rear wheel loads do not have the proportioning feature. The valve is designed to have a "by-pass" feature which assures full system pressure to the rear brakes in the event of a front brake system failure.

The differential pressure warning switch is designed to constantly compare front and rear brake pressure from the master cylinder and energize the warning light on the dash in the event of a front or rear system failure. The valve and switch are so designed that the switch will latch in the "warning" position once a failure has occurred. The only way the light can be turned off is to repair the failure and apply a pedal force as required to develop up to 450 psi line pressure.

DIVISION III

ADJUSTMENTS AND MINOR SERVICE

50-19 SHOE AND LINING REPLACEMENT

a. Lining Inspection

Inspect the brake linings any time that the wheels are removed (tire rotation, etc.). Check both ends of the outboard shoe by looking in at each end of the caliper. See Figure 50-43. These are the points at which the highest rate of wear normally occurs. However, at the same time, check the lining thickness on the inboard shoe to make sure that it has not worn prematurely. Look down through the inspection hole in the top of the caliper to view the inboard shoe. Whenever the thickness of any lining is worn to within .020 of rivet at either end of the shoe, all disc brake shoe and lining assemblies should be replaced at the same time. See Figure 50-44.

b. Caliper Removal

1. Remove two thirds of the total fluid capacity from the front master cylinder reservoir. This may be done by breaking the front line connection at the master cylinder and bleeding down the fluid level. Do not remove the

brake line or completely empty the reservoir or it will be necessary to bleed the hydraulic system. Discard -- do not attempt to reuse -- the brake fluid removed.

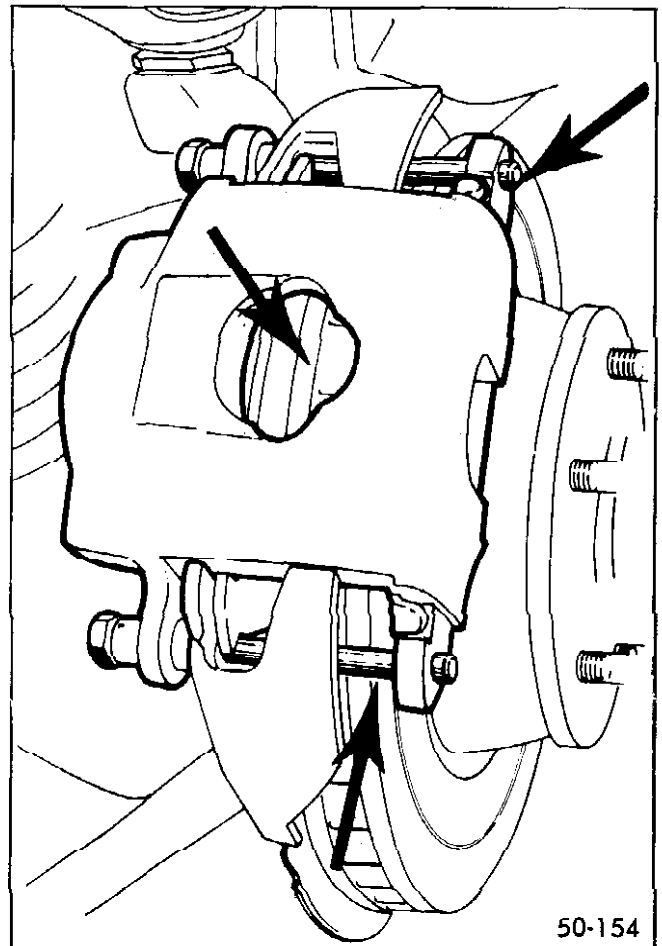


Figure 50-43--Lining Inspection

NOTE: Removal of the fluid is necessary to prevent reservoir overflow when the caliper piston is pushed back in its bore to remove the caliper.

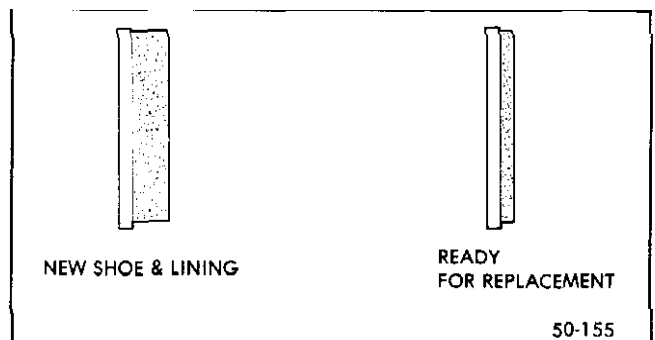


Figure 50-44--New and Worn Linings

2. Raise the car and remove the wheel covers and wheel assemblies. Position a 7 inch "C" clamp on the caliper so that the solid side of the clamp rests against the inside of the caliper and the screw end rests against the metal part of the outboard shoe. See Figure 50-45. Tighten the "C"

clamp until the caliper moves away from the car far enough to push the piston to the bottom of the piston bore. This will allow the shoes to back off from the rotor surfaces. Remove the "C" clamp.

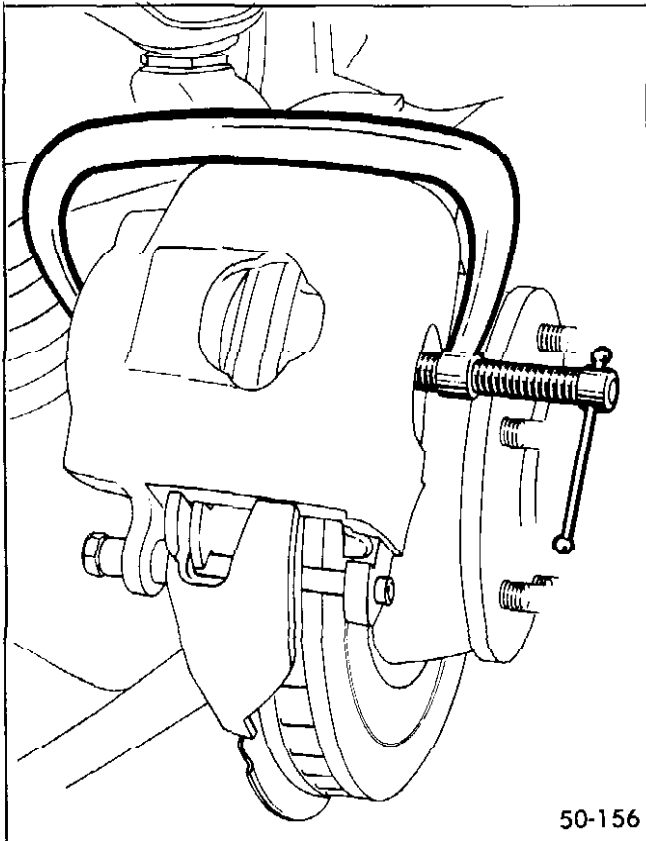


Figure 50-45 Use of C Clamp

3. It is not necessary to disconnect the brake hose for shoe and lining replacement. Remove the two mounting bolts which attach the caliper to the support bracket. See Figure 50-46. Lift the caliper off the rotor and remove the inboard shoe. Dislodge the outboard shoe and position the caliper on the front suspension arm so that the brake hose will not support the weight of the caliper. Remove the shoe support spring from the cavity in the piston.

4. Using tool, No. J-22835, remove the sleeves from the inboard ears of the caliper. See Figure 50-47. Next, remove the rubber bushings from the grooves in each of the four caliper ears.

c. Cleaning and Inspection

1. Thoroughly clean the holes and the bushing grooves in the caliper ears. Wipe all dirt from the mounting bolts. Do not use abrasives on the bolts since this will damage the plating. If the bolts are corroded, or damaged, they should be replaced.

2. Examine the inside of the caliper for evidence of fluid leakage. If leakage is noted, the caliper should be overhauled. Wipe the inside of the caliper clean, including the exterior of the dust boot. Check the boot for cuts, cracks

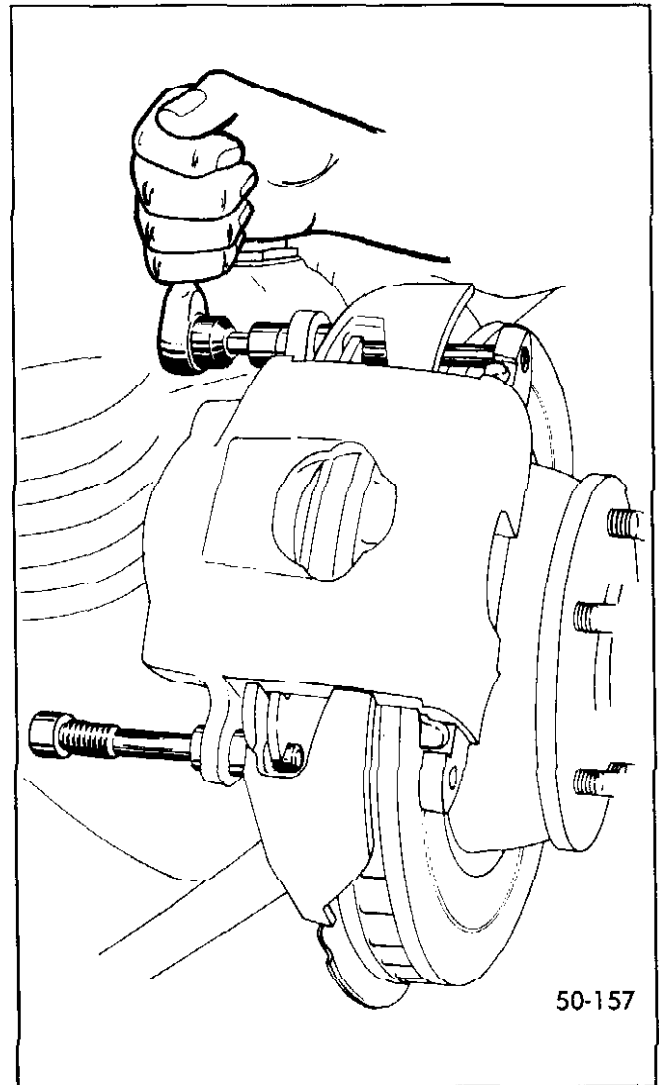


Figure 50-46--Removing Mounting Bolts

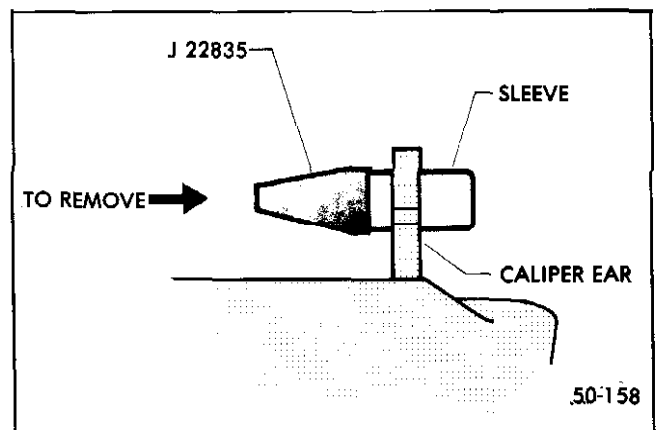


Figure 50-47 - Remove Sleeves

or other damage. Make sure that the boot is properly engaged in the groove in the piston and also in the caliper counter-bore. See Figure 50-48.

CAUTION: Do not use compressed air to clean the inside

of the caliper since this may cause the dust boot to become unseated.

3. If the vehicle has a brake problem and diagnosis points to the rotor, it should be inspected and checked for runout at this time. (Refer to paragraph 50-21.)

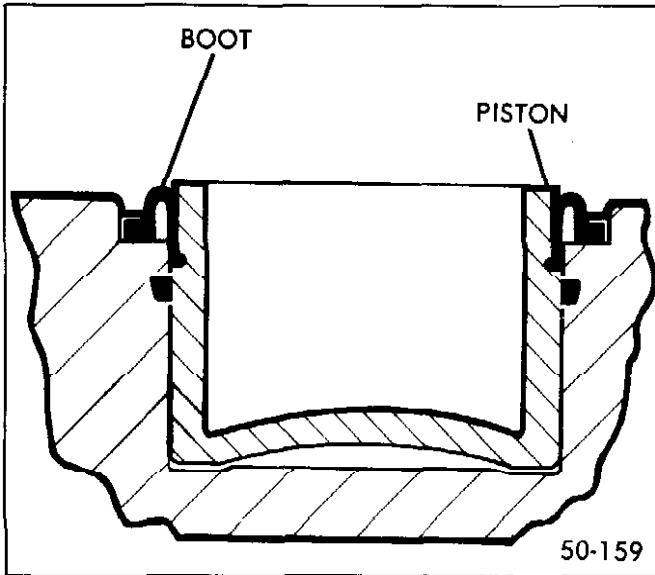


Figure 50-48--Boot Installation

d. Caliper Installation

1. Using Buick Silicone Lube, No. 1050243, lubricate new sleeves, on all surfaces. Lubricate new rubber bushings, bushing grooves and the small ends of bushings in all four caliper ears. See Figure 50-49. Install rubber bushings in all four caliper ears.

CAUTION: It is essential that the new sleeves and rubber

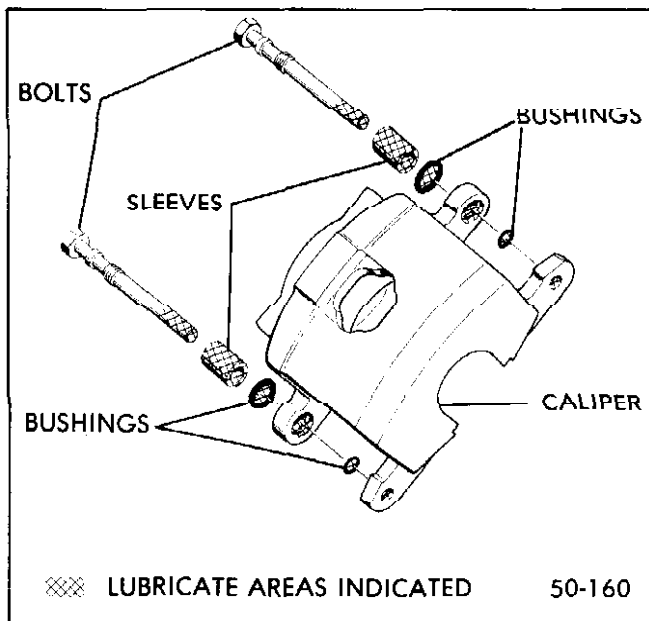


Figure 50-49--Lubrication

bushings be used and that lubrication instructions be followed in order to insure the proper functioning of the sliding caliper design.

2. Use Tool, J-22835, to install the sleeves. See Figure 50-50. Position the sleeves so that the end toward the shoe and lining assemblies is flush with the machined surface of the ear.

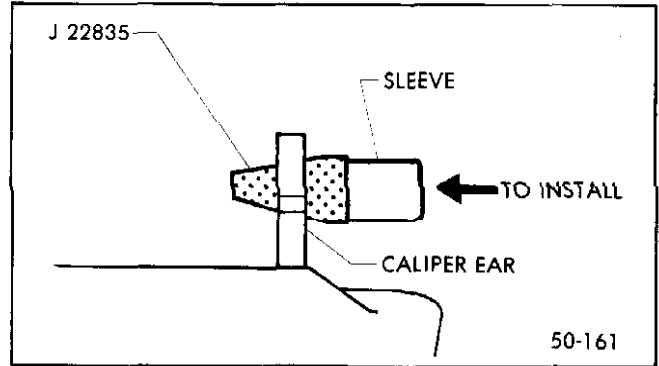


Figure 50-50--Sleeve Installation

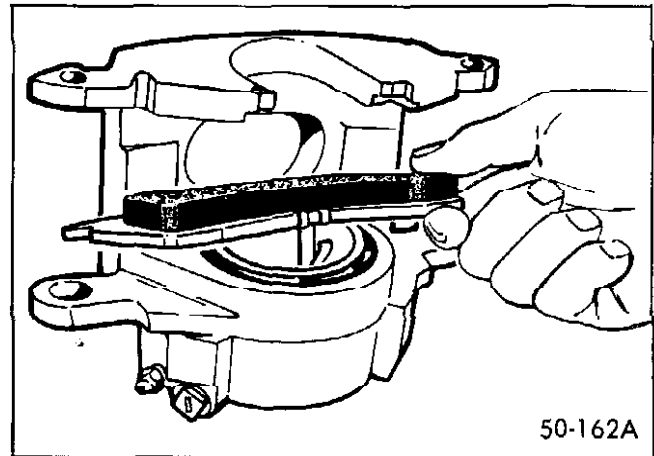


Figure 50-51--Inserting Shoe Support Spring

3. Install the shoe support spring by replacing the single tang end of the spring over the notch in the center of the edge of the shoe. Then press the two tangs at the spring end of the inboard shoe spring over the bottom edge of the shoe so that they engage the shoe securely, as shown in Figure 50-51.

4. Position the inboard shoe and lining assembly (with spring attached) in the caliper so that the ear end of the shoe and lining is down and the bottom end up at an angle with the spring resting on the piston I.D. See Figure 50-52. Press down on both ends of the shoe until the shoe is in a flat position, resting on the piston. The spring end of the inboard shoe support spring should be resting on the I.D. of the piston.

5. Position the outboard shoe in the caliper, with the ears at the top of the shoe over the caliper ears and the tab at the bottom of the shoe engaged in the caliper cut-out. See Figure 50-53.

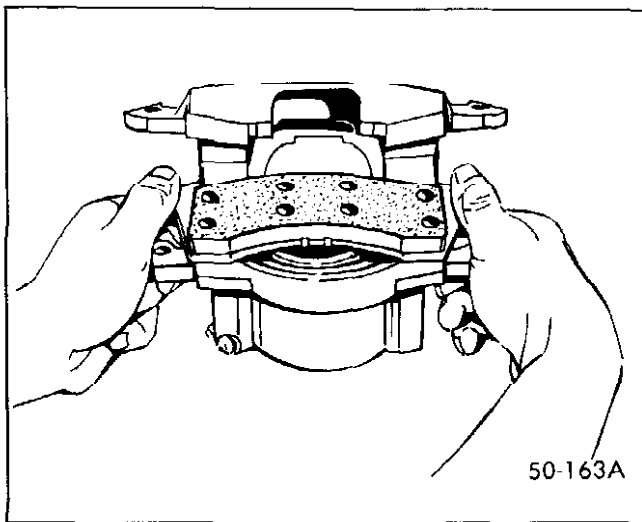


Figure 50-52--Installing Inboard Shoe

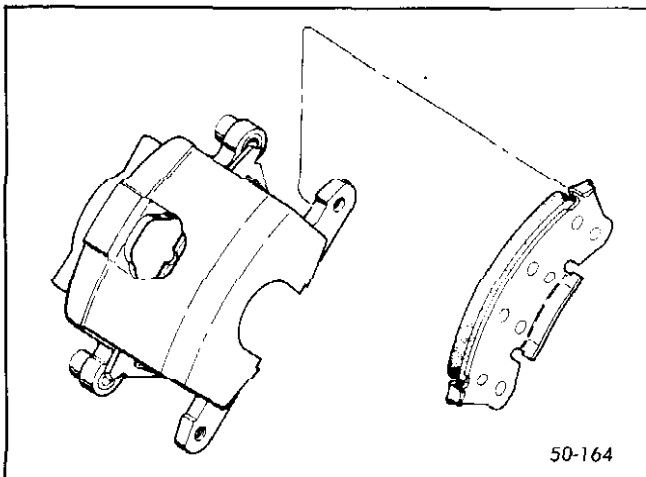


Figure 50-53--Installing Outboard Shoe

6. With both shoes installed, lift up the caliper and rest the bottom edge of the outboard lining on the outer edge of the rotor to make sure that there is no clearance between the tab at the bottom of the outboard shoe and the caliper abutment. Using a 1/4x1x2-1/2 inch metal bar to bridge the caliper cut-out, clamp the outboard shoe to the caliper with moderate pressure. Use a clean C clamp to avoid contamination of the brake lining and do not use excessive force which may deform the lining face.

7. Using vise-grip pliers, clinch both upper ears of the outboard shoe to prevent shoe rattle. Locate the pliers 1/8 to 1/4 inch from the outer edge of the shoe ear. See Figure 50-54. After clinching, measure the tangential and radial clearance between the caliper and the shoe ears. If the clearance exceeds 0.005 inch in either direction, re-adjust the pliers and repeat the clinching procedure.

8. After clinching, remove the C clamp and position the caliper over the rotor, lining up the holes in the caliper ears with the holes in the mounting bracket. Make sure that the brake hose is not twisted or kinked. Start the bolts

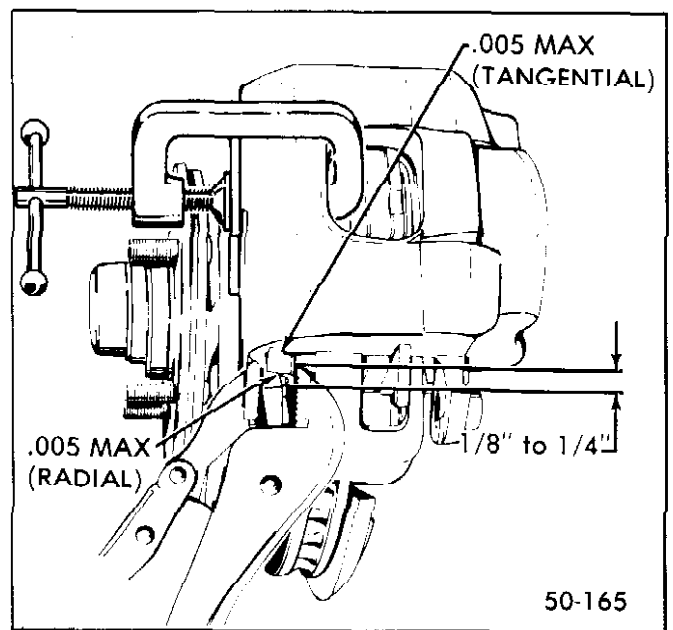


Figure 50-54--Clinching Outboard Shoe

through the sleeves in the inboard caliper ears and through the mounting bracket, making sure that the ends of the bolts pass under the retaining ears on the inboard shoe. See Figure 50-55. Push the bolts on through to engage the holes in the outboard caliper ears, at the same time threading the bolts into the mounting bracket. Torque the bolts to 35 lb. ft.

NOTE: THIS DISC BRAKE CALIPER ATTACHMENTS FASTENER IS AN IMPORTANT ATTACHING PART IN THAT IT COULD AFFECT THE PERFORMANCE OF VITAL COMPONENTS AND SYSTEMS, AND/OR COULD RESULT IN MAJOR REPAIR EXPENSE. IT MUST BE REPLACED WITH ONE OF THE SAME PART NUMBER OR WITH AN EQUIVALENT PART IF REPLACEMENT BECOMES NECESSARY. DO NOT USE A REPLACEMENT PART OF LESSER QUALITY OR SUBSTITUTE DESIGN. TORQUE VALUES MUST BE USED AS SPECIFIED DURING REASSEMBLY TO ASSURE PROPER RETENTION OF THIS PART.

e. Completion

1. Replace the shoe and linings on the other front wheel disc brake in exactly the same manner as just described. Relining is to be done in full axle sets only. When completed, reinstall the wheel and tire assemblies. Torque wheel nuts to 70 lb. ft. Install wheel covers and lower the car to the floor. Add fresh approved brake fluid to the master cylinder reservoirs to bring the level up to within 1/8 inch of the top. Before moving the vehicle, pump the brake pedal several times to make sure that it is firm- that the car can be safely stopped.

NOTE: THIS WHEEL TO BRAKE DRUM AND/OR AXLE SHAFT FASTENER IS AN IMPORTANT ATTACHING PART IN THAT IT COULD AFFECT

THE PERFORMANCE OF VITAL COMPONENTS AND SYSTEMS, AND/OR COULD RESULT IN MAJOR REPAIR EXPENSE. IT MUST BE REPLACED WITH ONE OF THE SAME PART NUMBER OR WITH AN EQUIVALENT PART IF REPLACEMENT BECOMES NECESSARY. DO NOT USE A REPLACEMENT PART OF LESSER QUALITY OR SUBSTITUTE DESIGN. TORQUE VALUES MUST BE USED AS SPECIFIED DURING REASSEMBLY TO ASSURE PROPER RETENTION OF THIS PART.

2. Whenever the front wheel disc brakes are relined, the rear drum brakes should be checked also.

50-20 COMBINATION VALVE REPLACEMENT

The combination valve is not repairable and must be serviced as a complete assembly. See Figure 50- 56.

1. Disconnect hydraulic lines at combination valve. Plug lines to prevent loss of fluid and entrance of dirt. Disconnect warning switch wiring harness from valve switch terminal.

2. Remove combination valve.

3. Install combination valve by reversing removal steps.

4. Bleed entire brake system.

CAUTION: Do not move car until a firm brake pedal is obtained.

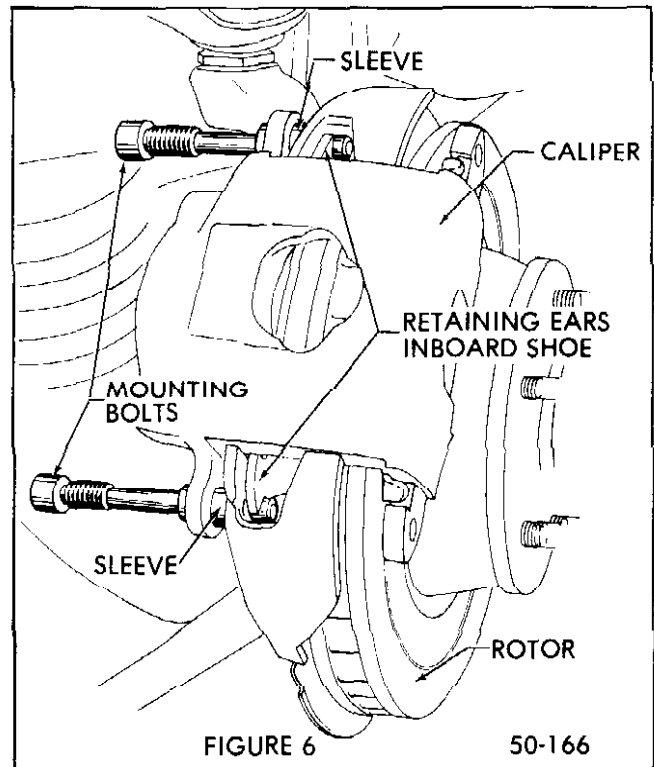


Figure 50-55--Installing Mounting Bolts

50-21 BLEEDING DISC BRAKES

The bleeding operation for disc brakes is the same as for drum brakes. The only exception is that the metering pin

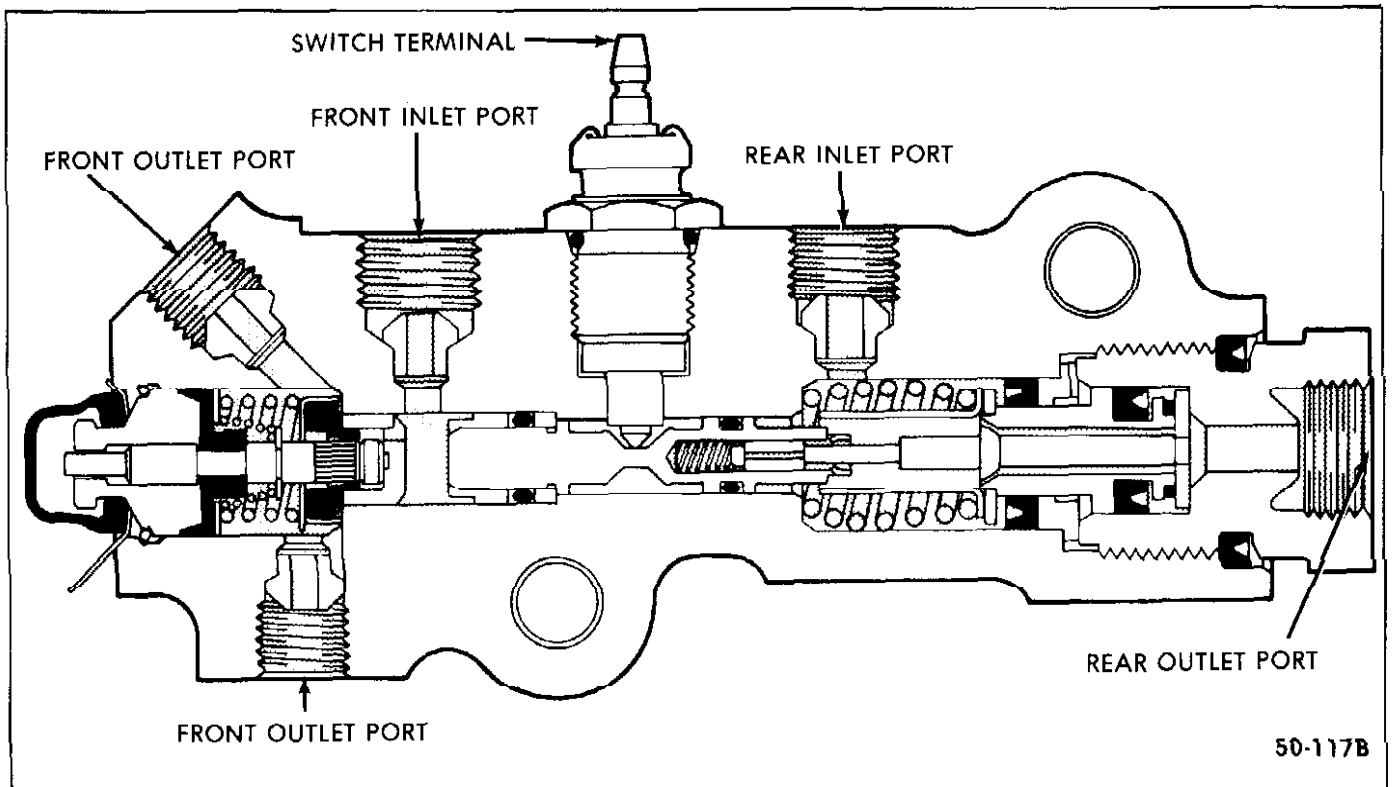


Figure 50-56--Disc Brake Combination Valve

in the hold-off section of the combination valve must be held in while bleeding. This is done by depressing the pin, under the rubber boot on the front end of the combination valve, either by hand or by using special Tool J-23770. See Figure 50-56. It is not necessary to remove rubber boot covering the metering pin during the bleeding process.

The metering pin must be depressed for all bleed pressures. When bleeding the system after replacing the combination valve, it will be necessary to bleed the front brakes first, followed by the rears. It is suggested that the left front be bled first, followed by the right front and then the rears.

After bleeding the system, a maximum line pressure of 450 psi is required to turn off (reset) the warning light. This pressure can be developed by depressing the brake pedal with a force of up to 100 lbs.

DIVISION V

OVERHAUL AND MAJOR SERVICE

50-22 CALIPER OVERHAUL

a. Removal

1. Removal of the caliper for overhaul is the same as for shoe and lining replacement (refer to paragraph 50-19) except that it will be necessary to disconnect the brake hose.

2. First, disconnect the hose from the steel brake line and cap the fittings to prevent dirt from entering the line or the hose. Then, remove the U-shaped retainer from the hose fitting. Withdraw the hose from the frame support bracket and remove the caliper -- with hose attached -- to a work bench for overhaul.

b. Disassembly

1. Before beginning disassembly, thoroughly clean the exterior of the caliper using clean denatured alcohol. Place the caliper on a clean work surface.

2. Remove the brake hose from the caliper, discarding the copper gasket. Check the hose for worn spots, cracks or other signs of deterioration. Discard the hose, if damaged, to be replaced with a new hose at reassembly. Drain brake fluid from the caliper.

3. Use clean shop towels to pad the interior of the caliper and remove the piston by directing compressed air into the caliper inlet hole. See Figure 50-57.

CAUTION: Use just enough air pressure to ease the piston out of the bore. If the piston is blown out--even with padding provided--it may become damaged.

WARNING: Do not place the fingers in front of the piston

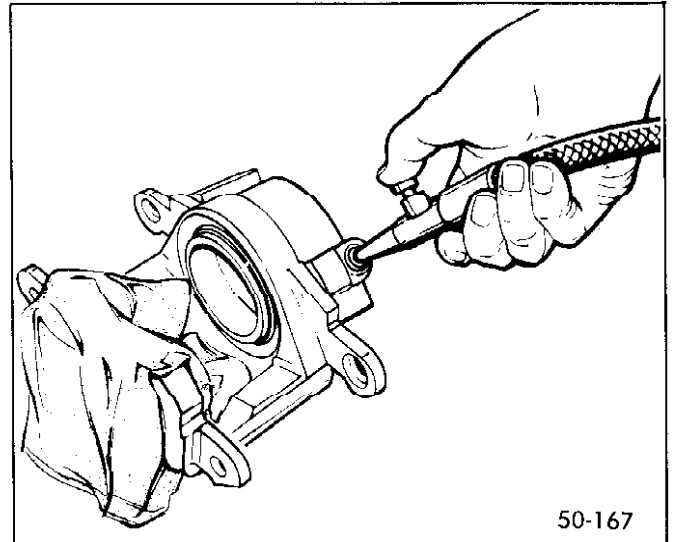


Figure 50-57--Removing Piston

in an attempt to catch or protect it when applying compressed air. This could result in serious injury.

4. Use a screwdriver to pry the boot out of the caliper. Extend the screwdriver across the caliper bore, under the boot, and pry up. Be careful not to scratch the caliper bore.

5. Use a piece of wood or plastic -- a plastic toothpick is ideal -- to remove the piston seal from its groove in the caliper bore. **DO NOT USE A METAL TOOL OF ANY TYPE FOR THIS OPERATION.**

6. Remove the bleeder valve from the caliper.

c. Cleaning and Inspection

1. The boot, piston seal, rubber bushings and sleeves are to be replaced each time the caliper is overhauled. Discard, do not bother to clean and inspect, these parts.

2. Clean all other parts in clean denatured alcohol. Use dry, filtered compressed air to dry parts and blow out all passages in the caliper and bleeder valves.

CAUTION: The use of lubricated shop air will leave a film of mineral oil on the metal parts. This may damage rubber parts when they come in contact after reassembly.

3. Check the mounting bolts for corrosion, breaks in the plating or other damage. Do not use abrasives in an attempt to clean the bolts -- replace them.

4. Carefully examine the piston OD for scoring, nicks, corrosion and worn or damaged chrome plating. If any surface defects are detected, replace the piston.

CAUTION: The piston OD is the primary sealing surface in the caliper assembly. It is manufactured and plated to close tolerances. Refinishing by any means or the use of any abrasive in the field is not acceptable.

5. Check the bore in the caliper for the same defects as the piston with the exception of plating damage. The piston bore is not plated and stains or minor corrosion can be polished with crocus cloth. Do not use emery cloth. Thoroughly clean the caliper after the use of crocus cloth. If the bore cannot be cleaned up in this manner, replace the caliper.

d. Reassembly

1. Lubricate the bore in the caliper and the new piston seal with clean brake fluid. Position the seal in the caliper bore groove. Lubricate the piston with clean brake fluid and assemble a new boot into the groove in the piston so that the fold faces the open end of the piston. Insert the piston into the caliper bore, using care not to unseat the seal and force down to the bottom in the bore. This will require a force of 50 to 100 pounds. Position the OD of the boot in the caliper counterbore and seat with tool No. J-22904. See Figure 50-58.

2. Check the boot installation to make sure that the retaining ring molded into the boot is not bent and that the boot is installed fully, below the caliper face, and evenly all around. See Figure 50-58. Otherwise dirt or moisture may enter the bore and cause damage or corrosion.

3. Install the brake hose in the caliper inlet using a new copper gasket.

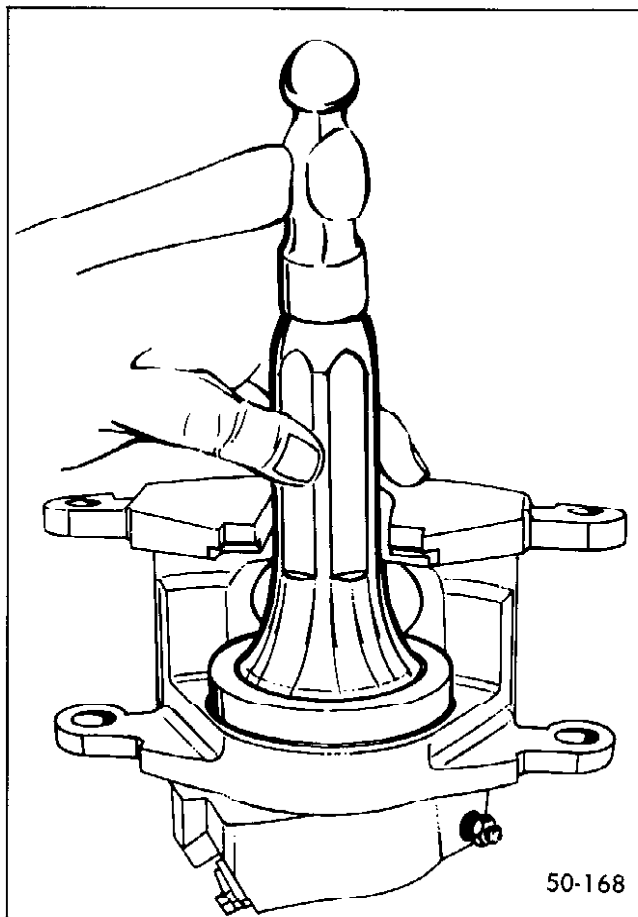


Figure 50-58--Seating Boot

e. Installation

1. Installation of the caliper and mounting parts (rubber bushings, sleeves, shoe and lining assemblies, and bolts) is the same as for lining replacement (refer to paragraph 50-19) except for the following:

(a) The brake hose must be connected to the brake line at the frame bracket.

(b) After overhaul -- or any time that the brake hose or line is disconnected -- the calipers must be bled. Use either the manual or pressure tank method.

50-23 ROTOR SERVICING

a. Checking Lateral Runout

1. Lateral runout is the movement of the rotor from side to side as it rotates on the steering knuckle spindle. This could be described as "rotor wobble."

2. The movement of the rotor from side to side in the lateral plane causes the brake shoe and lining and pistons to be knocked back into their bores. This results in additional pedal travel required and a vibration during the braking action.

3. To check lateral runout, first tighten the wheel bearings until all of the play is out of the bearings. Fasten a dial indicator to some portion of the suspension so that the point of the stylus contacts the rotor face approximately one inch from the rotor edge. See Figure 50-59. Set the dial at zero. Move the rotor one complete rotation, checking the indicator as the rotor moves.

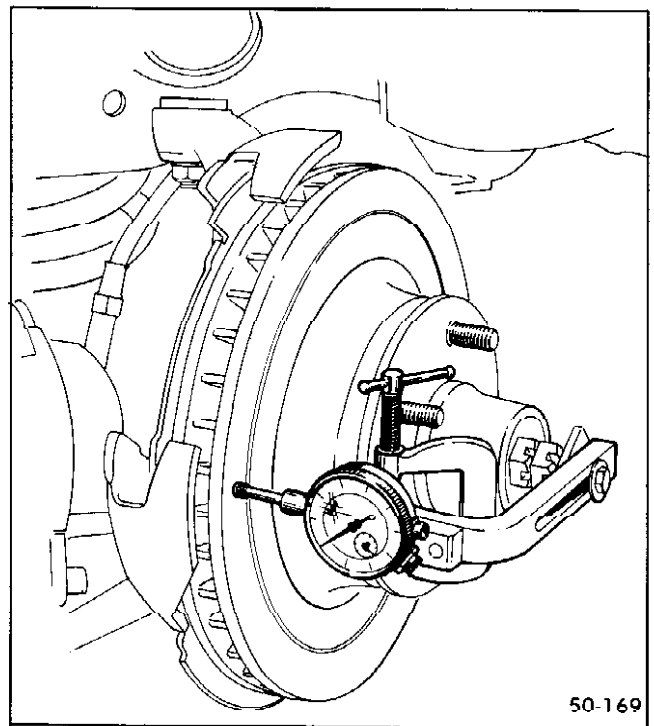


Figure 50-59--Checking Rotor For Lateral Runout

4. Lateral runout should not be over .004 total indicator reading.

b. Parallelism Check

1. Parallelism is the measurement of the thickness of the rotor at four or more points around the circumference of the rotor. All measurements must be made at the same distance in from the edge of the rotor.

2. A rotor that varies over .0005 causes pedal vibration, as well as front end vibration during brake applications. A rotor that does not meet these specifications may be refinished to specifications if precision equipment is available.

c. Rotor Tolerance and Surface Finish

In manufacturing the brake rotor, tolerances of the rubbing surfaces for flatness, for parallelism and for lateral runout are held very close. The maintenance of these close controls on the shape of the rubbing surfaces is necessary to prevent brake roughness.

In addition to these tolerance the surface finish must be held to a specified range. The control of the rubbing surface finish is necessary to avoid pulls and erratic performance and to extend lining life.

d. Acceptable Defects

Light scoring of the rotor surfaces not exceeding .015 in

depth, which may result from normal use, is not detrimental to brake operation.

e. Machining

Since accurate control of the rotor tolerances is necessary for proper performance of the disc brakes, machining of the rotor should be done only with precision equipment.

NOTE: *All brake disc have a minimum thickness dimension cast into them. This dimension is the minimum wear dimension and not a refinish dimension. Do not refinish a brake disc that will not meet the specifications, as shown below, after refinishing.*

ROTOR THICKNESS

A-Series 1.040

B-C-E-Series 1.290

MINIMUM THICKNESS AFTER REFINISH

A-Series .980

B-C-E-Series 1.230

DISCARD THICKNESS

A-Series .965

B-C-E-Series 1.215

DIVISION VI

SPECIFICATIONS

DIVISION VI SPECIFICATIONS

50-24 SINGLE PISTON DISC BRAKE SPECIFICATIONS

a. Tightening Specifications

Use a reliable torque wrench to tighten the parts listed, to insure proper tightness without straining or distorting parts. These specifications are for clean and lightly lubricated threads only, dry or dirty threads produce increased friction which prevents accurate measurement of tightness.

Part	Location	Thread Size	Torque
Bolt	Brake Hose to Caliper	7/16-20	22 lb. ft.
Bolt	Splash Shield and Mounting Bracket to Knuckle (Upper)	5/8-18	125 lb. ft.
Bolt	Caliper to Mounting Bracket	Special	35 lb. ft.
Screw	Combination Valve Mounting	5/16-18	150 lb. ft.
Nut	Wheel Attaching 43-44000	Special	70 lb. ft.
	45-46-48-49000	Special	75 lb. ft.

b. General Specifications

Disc Brake Type	Sliding Caliper—Disc
Location	Front Wheels Only
Disc Type	Ventilated—Cast Iron
Disc Diameter 43-44000	11.00"
45-46-48-49000	11.86"
Disc Runout (Maximum) 43-44000004"
45-46-48-49000005"
Disc Surface Finish	30-80 Micro-Inch
Disc Thickness Maximum 43-44000	1.040"
45-46-48-49000	1.290"
Disc Thickness Minimum 43-44000965"
45-46-48-49000	1.215"
Disc Parallelism (Thickness Variation)0005"
Brake Shoe and Lining Type	Riveted

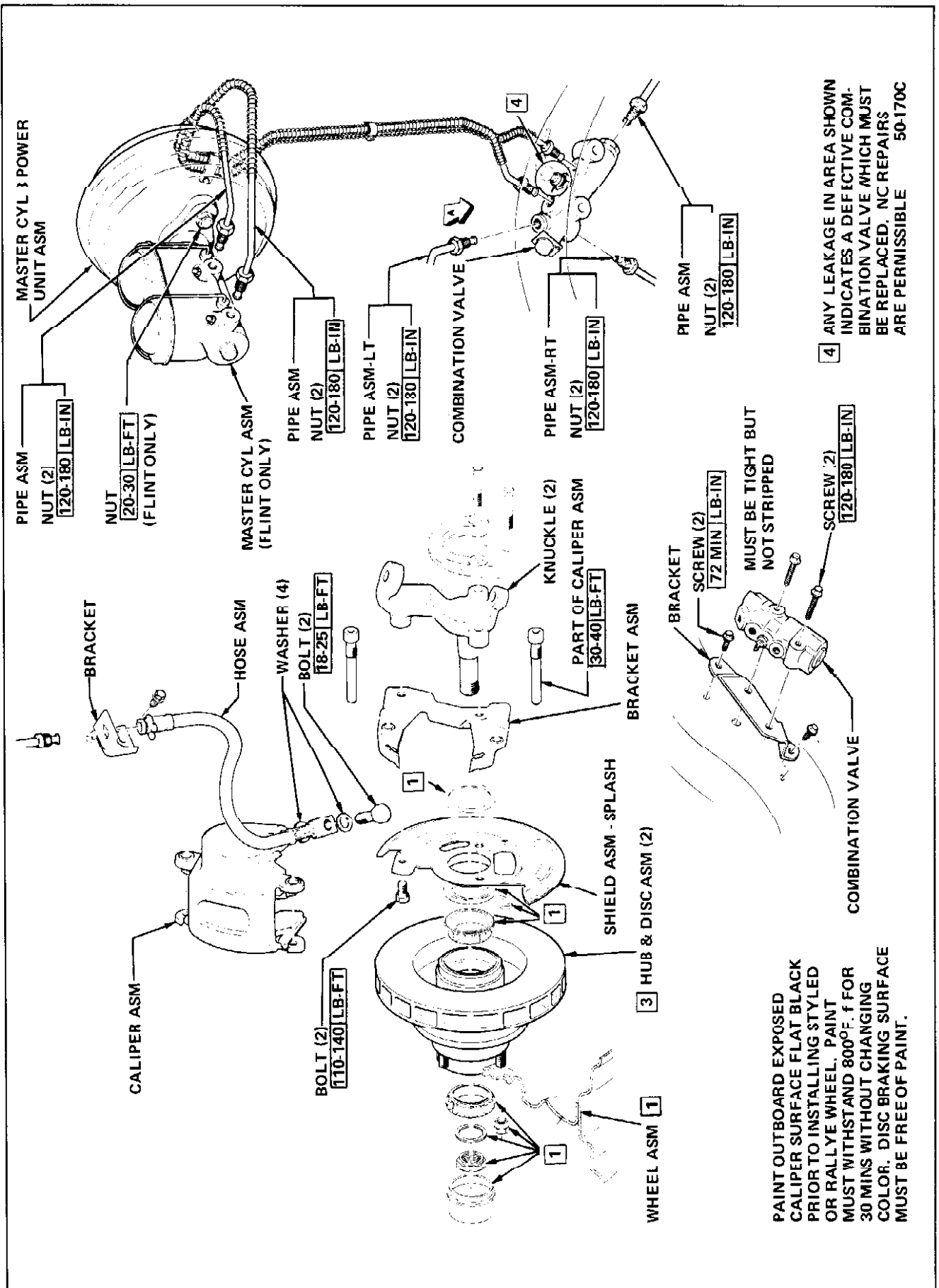


Figure 50-60 Disc Brake System - 43-44000