

SECTION : 4D

FRONT DISC BRAKES

TABLE OF CONTENTS

SPECIFICATIONS	4D-1	CALIPER	4D-4
FASTENER TIGHTENING SPECIFICATIONS .	4D-1	ROTOR	4D-6
DIAGNOSIS	4D-1	SPLASH SHIELD	4D-7
LINING INSPECTION	4D-1	UNIT REPAIR	4D-8
ROTOR INSPECTION	4D-1	CALIPER OVERHAUL	4D-8
MAINTENANCE AND REPAIR	4D-3	GENERAL DESCRIPTION AND SYSTEM	
ON-VEHICLE SERVICE	4D-3	OPERATION	4D-10
SHOE AND LINING	4D-3	DISC BRAKE CALIPER	4D-10

SPECIFICATIONS

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Caliper Brake Hose Inlet Bolt	40	30	–
Caliper Bracket Mounting Bolts	95	70	–
Caliper Mounting Bolts	27	19	–
Rotor Detent Screw	4	–	35
Splash Shield Steering Knuckle Bolts	25	18	–

DIAGNOSIS

LINING INSPECTION

1. Raise and suitably support the vehicle.
2. Remove the front wheels. Refer to *Section 2E, Tires and Wheels*.
3. Visually check the brake shoe linings for minimum thickness and wear.
4. Measure the thickness.

Important : The minimum thickness of the inner or the outer brake shoe is 9 mm (0.35 inch).

5. Install the brake shoes in axle sets only.
6. Install the front wheels. Refer to *Section 2E, Tires and Wheels*.
7. Lower the vehicle.

ROTOR INSPECTION

Brake rotors are manufactured with close tolerances for thickness variation, flatness, and lateral runout, but pits and grooves are created in rotors during usage. Lack of uniformity of the braking surfaces of the rotor can cause inadequate braking and a pulsating pedal during braking. The surface finish of the rotor is also important because an unsuitable surface finish can cause pulling and rapid wear of the brake shoe lining. If a rotor does not meet the specification, it should be refinished to specification or replaced. Refinishing of the rotor should only be done with precision equipment.

Thickness variation can be checked by measuring 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 from the edge of the rotor. A rotor that varies by more than .10 mm (0.004 inch) can cause pedal

4D – 2 FRONT DISC BRAKES

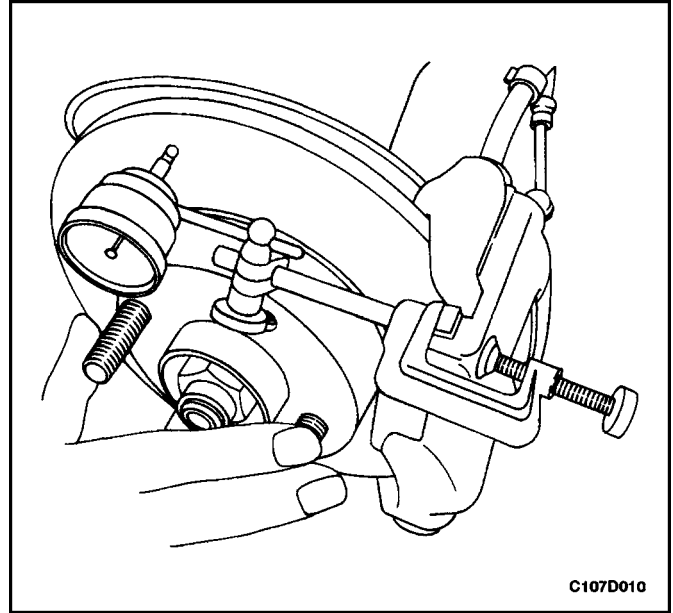
pulsation and/or front end vibration during braking. Thickness can be measured with a commercially available micrometer.

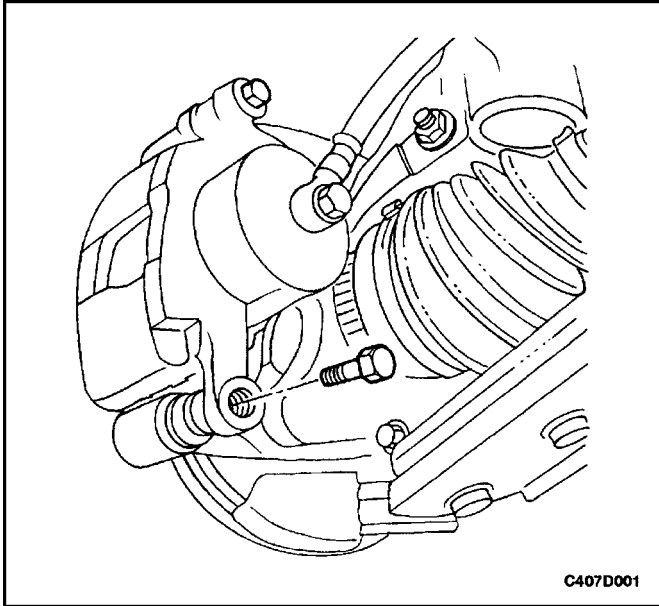
Light scoring of the rotor surfaces is acceptable if it does not exceed 0.40 mm (0.016 inch) in depth. Scoring measurements can be made with a commercially available brake micrometer.

Lateral runout cannot exceed 0.10 mm (0.004 inch). If lateral runout exceeds the specification, make sure that there is no dirt between the rotor and the hub and that hub-to-rotor contact surfaces are smooth and free from burrs. Use a commercially available dial indicator to check the lateral runout according to the following procedure:

1. Position the transaxle in NEUTRAL and raise the vehicle.
2. To preserve wheel balance, mark the relative positions of the wheel and hub, and remove the front wheel.
3. Fasten the brake rotor to the wheel hub with two wheel nuts.
4. Mount a dial indicator on the brake caliper.
5. Place the indicator tip approximately 10 mm (0.39 inch) from the outer edge of the brake rotor, perpendicular to the disc and under slight preload. Observe the indicator gauge while rotating the rotor.
6. After measuring is completed, remove the dial indicator and wheel nuts.

7. If necessary, refinish the rotor with precision equipment. Measure the runout again after refinishing. If the runout exceeds 0.10 mm (0.004 inch) after refinishing, the rotor should be replaced.
8. Align the marks that were made before wheel removal, and install the front wheel.
9. Lower the vehicle.





MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

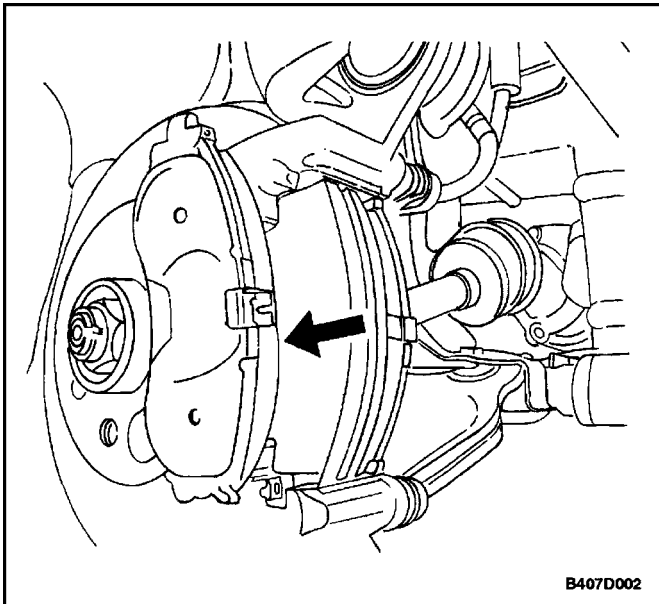
SHOE AND LINING

Removal Procedure

1. Raise and suitably support the vehicle. Refer to *Section 0B, General Information*.
2. To preserve wheel balance, mark the position of the front wheel relative to the wheel hub.
3. Remove the front wheel. Refer to *Section 2E, Tires and Wheels*.
4. Remove the lower caliper mounting bolt.

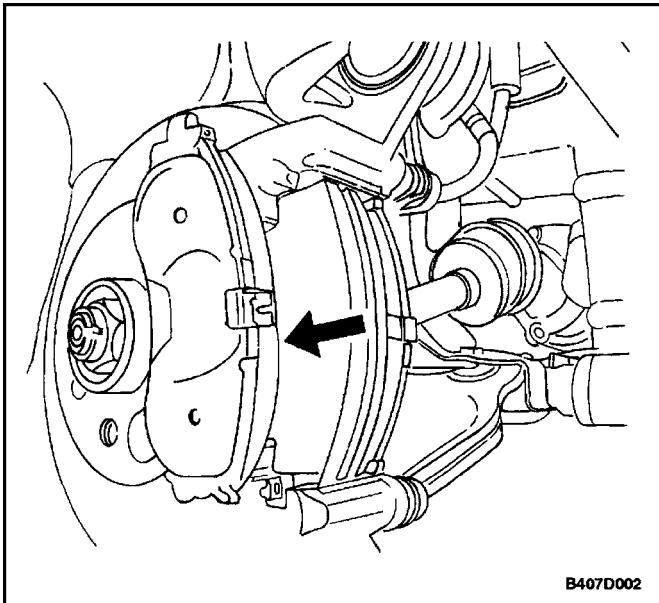
Important : Caliper removal is not necessary to service the brake shoes.

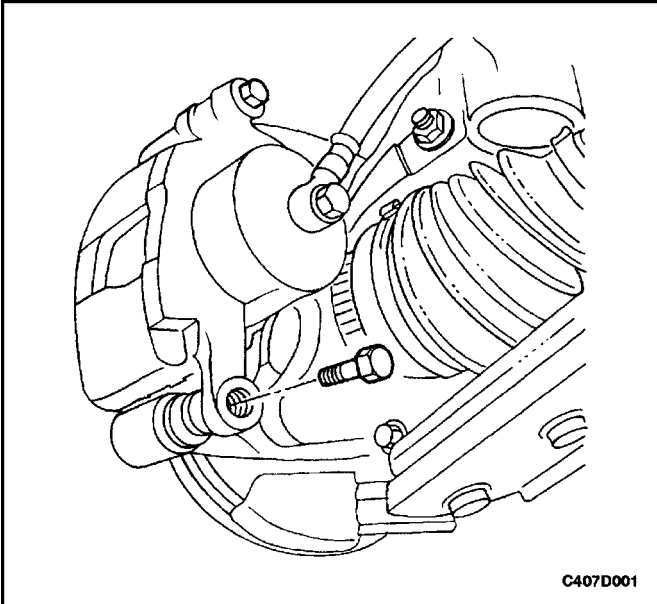
5. Pivot the caliper upward.
6. Remove the brake shoes.



Installation Procedure

1. Install the brake shoes.





2. If new brake shoes are being installed, they will be thicker than the worn shoes that were removed. Push the caliper piston inward, if necessary.
3. Pull the caliper downward and install the lower mounting bolt.

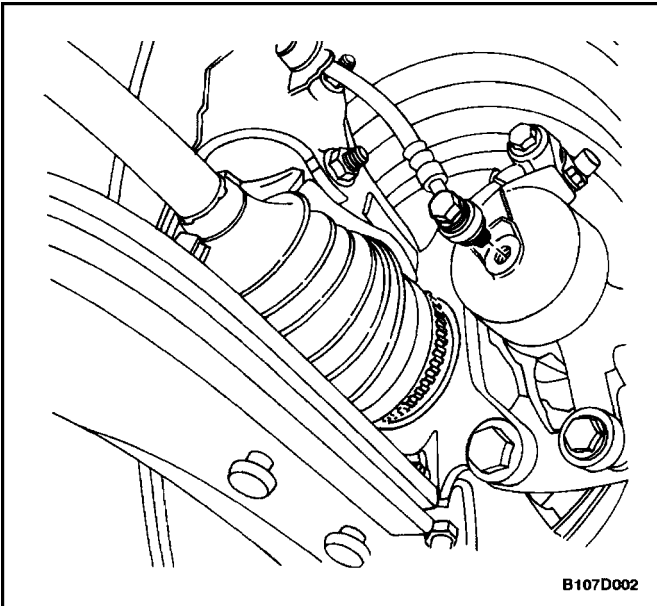
Important : Do not damage the piston dust seal when the caliper is pulled downward to reinstall the lower mounting bolt.

Tighten

Tighten the caliper mounting bolt to 27 N•m (19 lb–ft).

Tighten the pushrod clevis to 18 N•m (13 lb–ft).

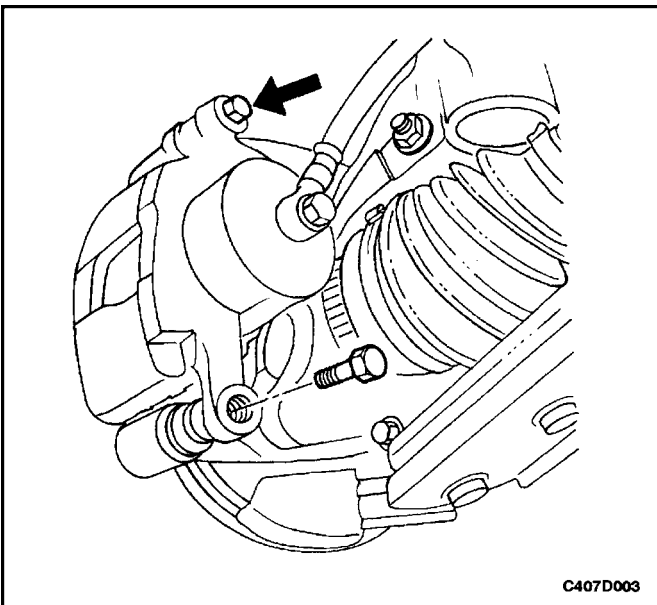
4. Align the marks that were made when removing the front wheel, and install the wheel. Refer to *Section 2E, Tires and Wheels*.
5. Pull the caliper downward and install the lower mounting bolt.



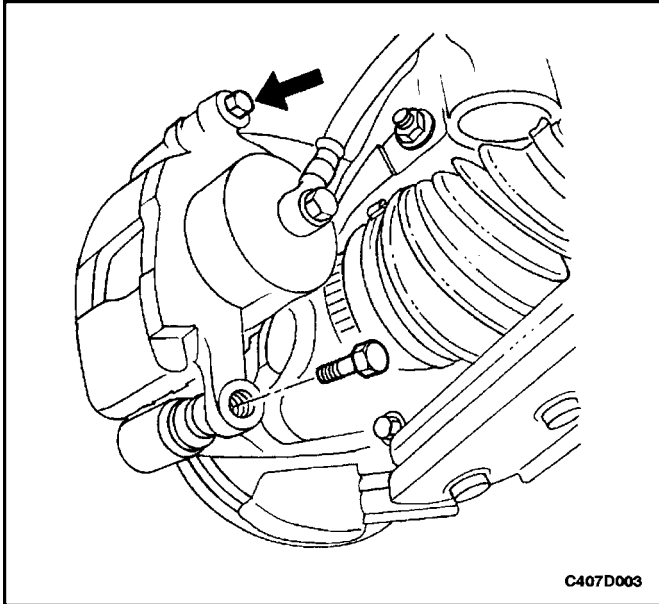
CALIPER

Removal Procedure

1. Raise and suitably support the vehicle. Refer to *Section 0B, General Information*.
2. To retain wheel balance, mark the position of the front wheel relative to the wheel hub. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the caliper brake hose inlet bolt. Remove the ring seals.



4. To prevent fluid loss or contamination, plug openings at the caliper inlet and the brake hose.
5. Remove the caliper mounting bolts.
6. Remove the caliper.

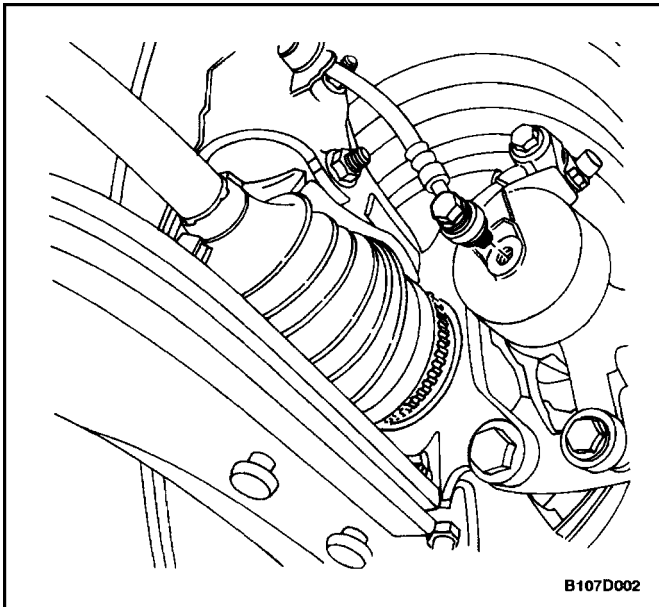


Installation Procedure

1. Install the caliper
2. Install the caliper mounting bolts.

Tighten

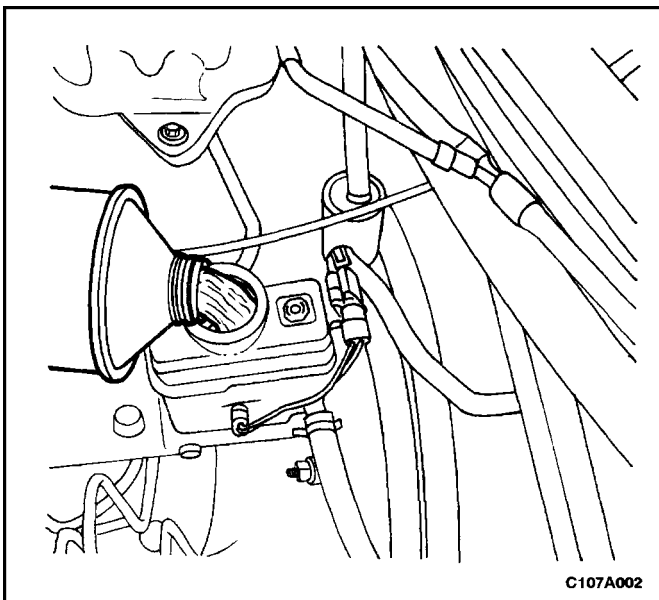
Tighten the caliper mounting bolts to 27 N•m (19 lb–ft).



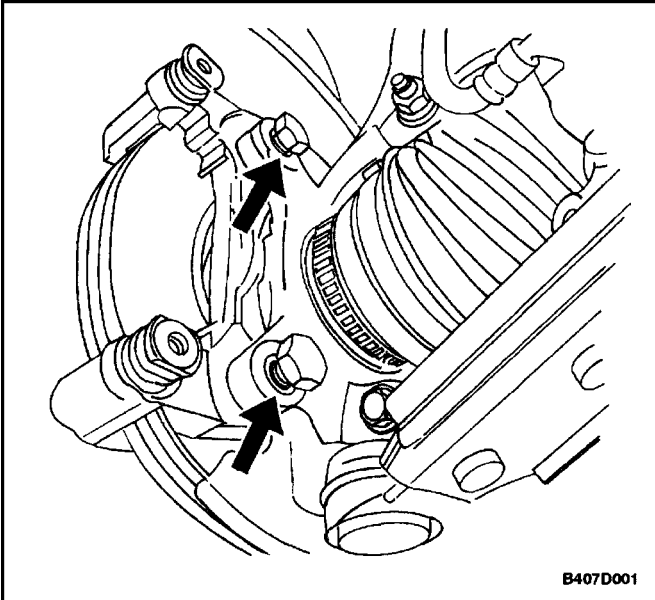
3. Install the brake hose to the caliper with the bolt and the ring seals.

Tighten

Tighten the caliper brake hose inlet bolt to 40 N•m (30 lb–ft).



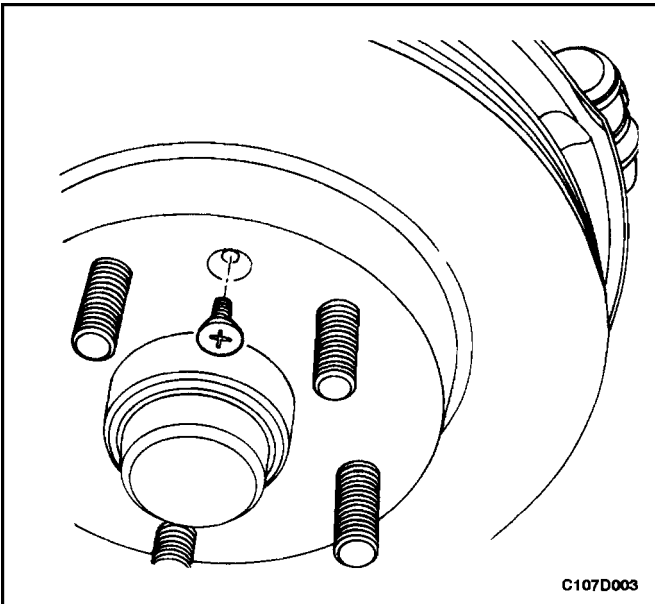
4. Align the marks that were made when removing the front wheel, and install the wheel. Refer to *Section 2E, Tires and Wheels*.
5. Lower the vehicle.
6. Fill the master cylinder reservoir to the proper level with clean brake fluid.
7. Bleed the air out of the brake system. Refer to *Section 4F, Antilock Brake System*.



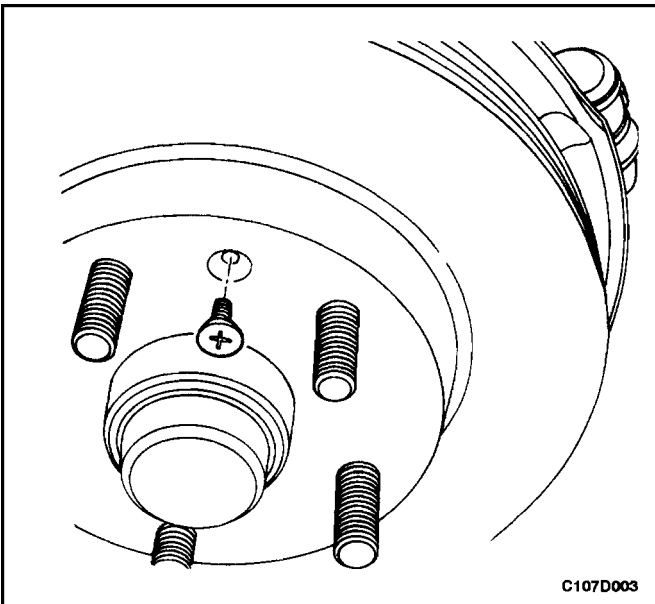
ROTOR

Removal Procedure

1. Remove the caliper. Refer to "Caliper" in this section.
2. Remove the brake shoes.
3. Remove the caliper mounting bracket.



4. Remove the rotor detent screw.
5. Remove the rotor.



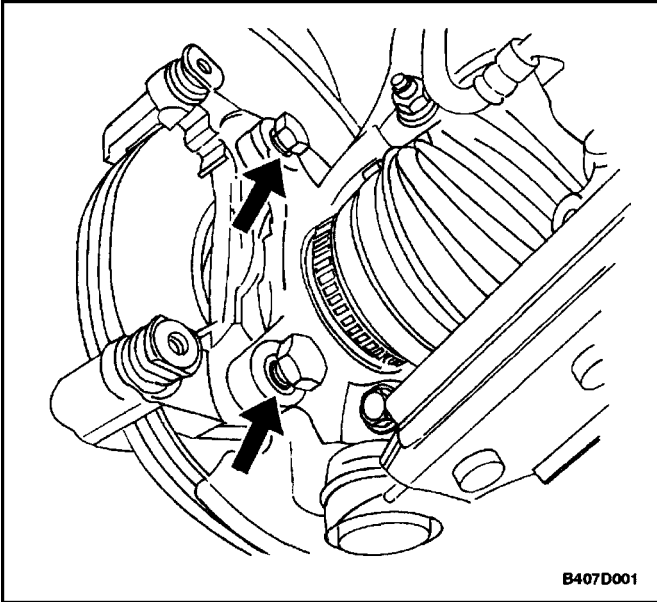
Installation Procedure

Important : To guarantee uniform braking, always refinish both rotors even if only one rotor is defective.

1. Install the rotor on the front wheel hub and install the detent screw.

Tighten

Tighten the rotor detent screw to 4 N•m (35 lb-in).

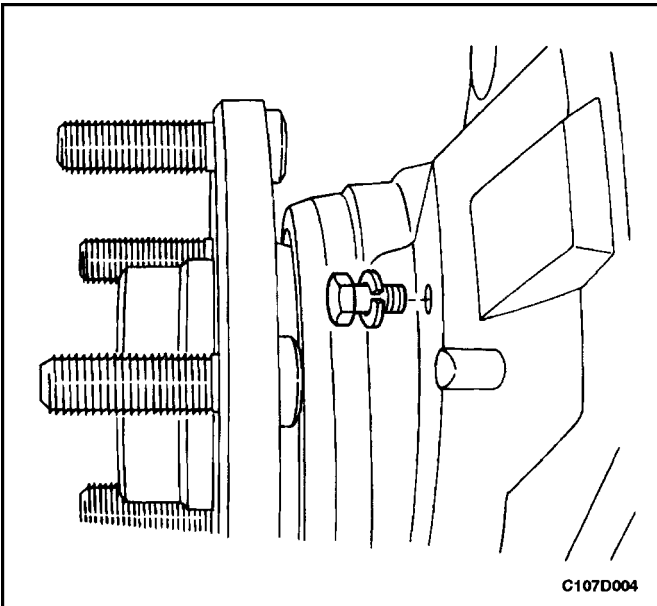


2. Apply a few drops of thread-locking compound to the caliper bracket mounting bolts and install the caliper bracket.

Tighten

Tighten the caliper bracket mounting bolts to 95 N•m (70 lb–ft).

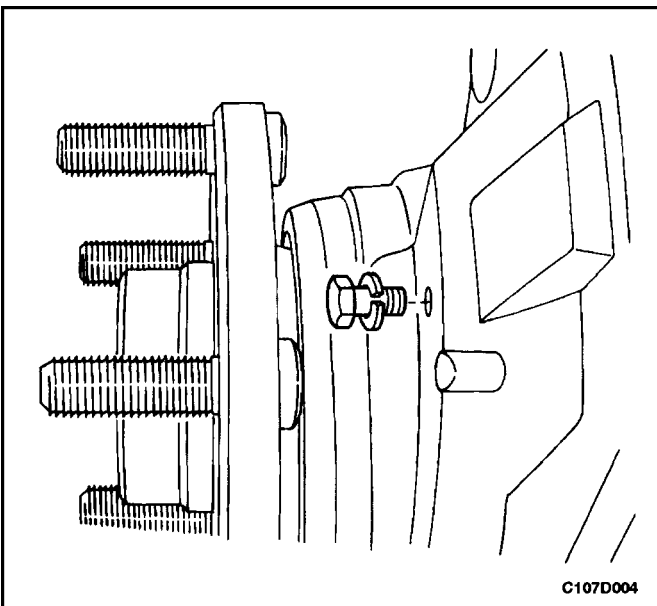
3. Install the brake shoes and the caliper. See "Caliper" in this section.



SPLASH SHIELD

Removal Procedure

1. Remove the rotor. Refer to "Rotor" in this section.
2. Remove the bolts and the lockwashers for the splash shield from the steering knuckle.
3. Remove the splash shield.



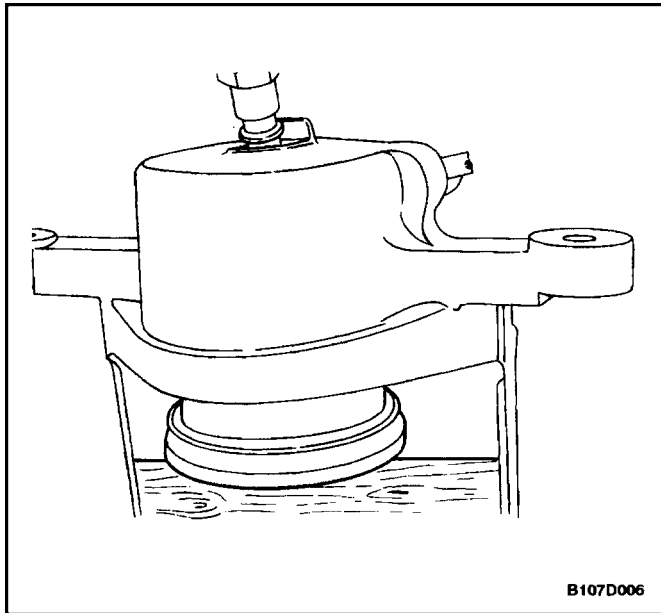
Installation Procedure

1. Install the splash shield.
2. Secure the splash shield to the steering knuckle with the bolts and the lockwashers.

Tighten

Tighten the splash shield-to-steering knuckle bolts to 25 N•m (18 lb–ft).

3. Install the rotor. Refer to "Rotor" in this section.



UNIT REPAIR

CALIPER OVERHAUL

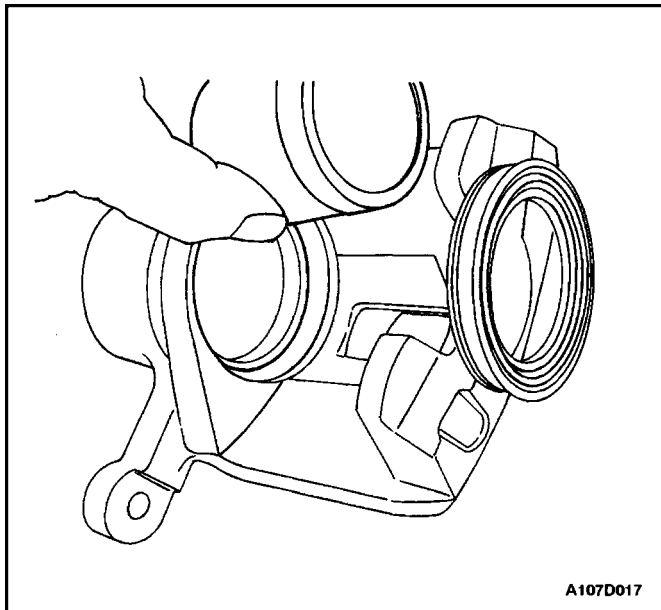
Disassembly Procedure

1. Remove the caliper. Refer to "Caliper" in this section.

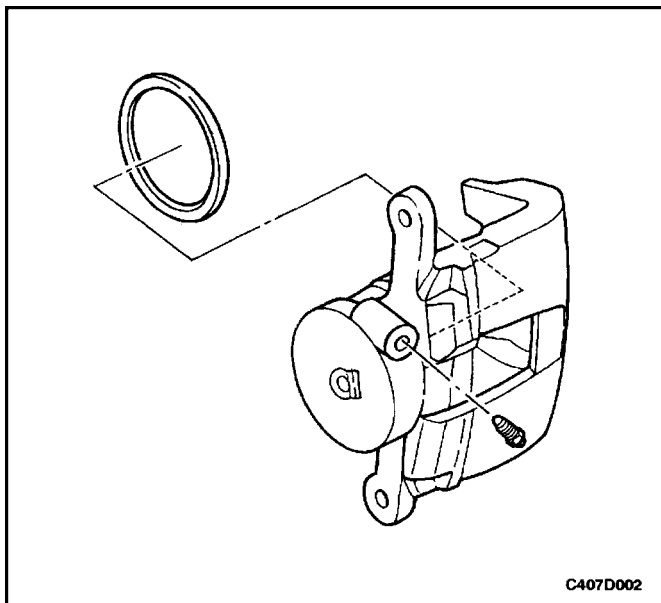
CAUTION : *Do not attempt to catch the piston when attempting to remove the piston with compressed air. The piston will pop out of its bore with enough force to damage a hand or fingers.*

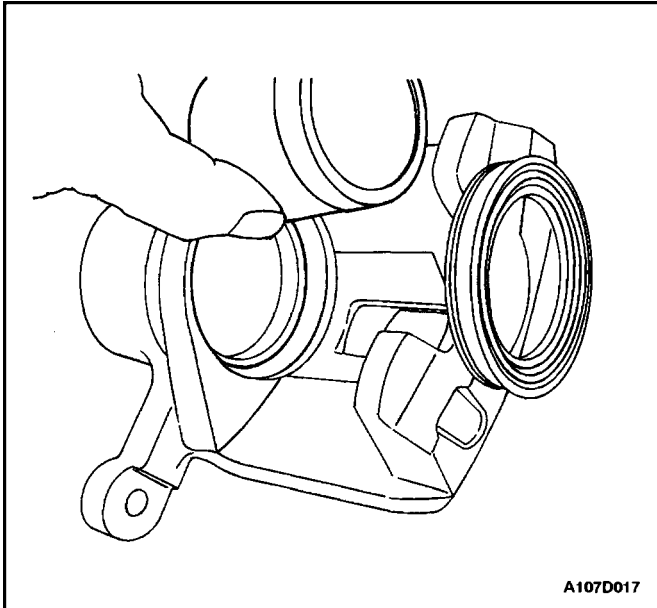
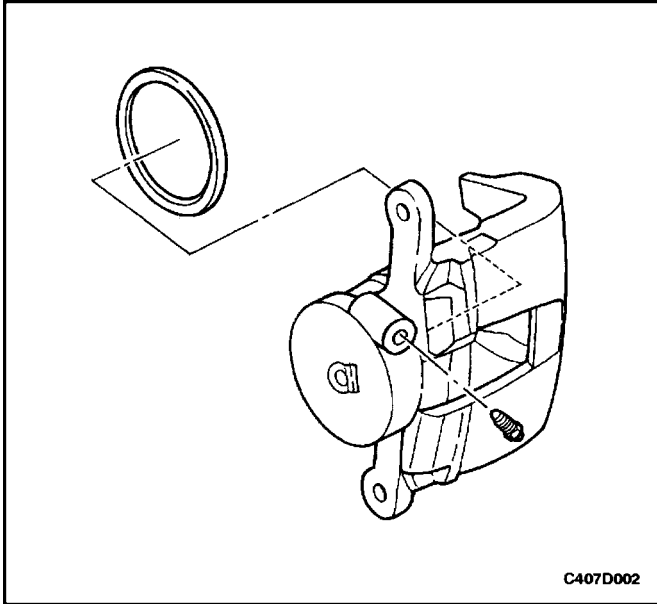
Notice : When removing the caliper piston with compressed air, insert a piece of hardwood into the caliper to prevent damage to the piston.

2. Apply unlubricated, compressed air at the hose inlet of the caliper.
3. Remove the piston from its bore and remove the piston dust seal.



4. Remove the inner seal from the bore. Avoid scratching the bore.
5. Remove the bleeder valve dust cap and the bleeder valve.





Assembly Procedure

Important : Do not use a hone or any other procedure to remove material from the caliper bore or the piston.

1. Clean all parts in denatured alcohol or brake fluid. Dry the parts with unlubricated, compressed air and blow out all passages in the housing and the bleeder valve.
2. Inspect the piston and caliper for scoring, nicks, or corrosion. Replace any components which show these conditions.
3. Install the bleeder valve.
4. Lubricate a new piston inner seal with brake fluid.
5. Install the piston inner seal into the groove in the caliper bore.
6. Install the piston dust seal in its groove.
7. Lubricate the piston with brake fluid.
8. Push the piston inward until it is properly seated. Make sure that the dust seal is in the correct groove in the piston and the caliper.
9. Reinstall the caliper. Refer to "Caliper" in this section.
10. Bleed the brake system. Refer to *Section 4F, Anti-lock Brake System*.

GENERAL DESCRIPTION AND SYSTEM OPERATION

DISC BRAKE CALIPER

The caliper has a single bore and is mounted to the steering knuckle with two mounting bolts. Hydraulic pressure, created by applying the brake pedal, is converted by the caliper to a stopping force. This force acts equally against the piston and the bottom of the caliper bore to move the piston outward and to slide the caliper inward, resulting in a clamping action on the rotor. This clamping action forces the linings against the rotor, creating friction to stop the vehicle.

- Replace all components included in the repair kits used to service the caliper.
- Lubricate the rubber parts with clean brake fluid to ease assembly.
- Do not use lubricated shop air on brake parts, as damage to the rubber components may result.
- If any hydraulic component is removed or disconnected, it may be necessary to bleed all or part of the brake system. Refer to *Section 4F, Antilock Brake System*.
- Replace the shoes in axle sets only.
- The torque values specified are for dry, unlubricated fasteners.
- Perform the service operations on a clean bench, free from all oily material.