

# SECTION : 4D

## FRONT DISC BRAKES

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## SPECIFICATIONS

### FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Brake Hose Inlet Fitting-to-Caliper Bolt	40	30	–
Caliper-to-Steering Knuckle Mounting Bolts	95	70	–
Retaining Frame-to-Caliper Housing Bolts	22-32	16-24	–
Rotor-to-Front Wheel Hub Detent Screw	4	–	35
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## 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 linings for minimum thickness and wear.
4. Measure the thickness.

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

1. Install the brake pads in axle sets only.
2. Install the front wheels. Refer to *Section 2E, Tires and Wheels*.

3. Lower the vehicle.

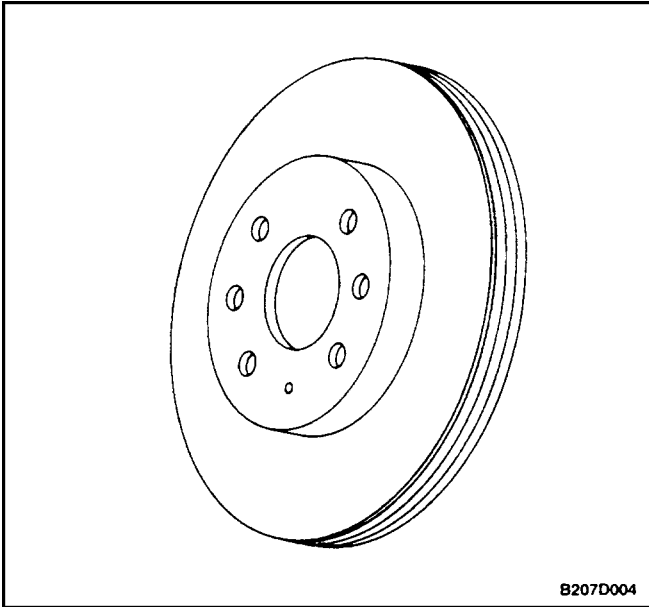
### ROTOR INSPECTION

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 in from the edge of the rotor.

A rotor that varies by more than 0.005 mm (0.0005 inch) can cause pedal pulsations and/or front end vibration during brake applications. A rotor that does not meet these specifications should be refinished to specifications or replaced.

## 4D – 2 FRONT DISC BRAKES

During manufacturing, the brake rotor and the tolerances of the braking surface regarding flatness, thickness variation, and lateral runout are held very close. The maintenance of close tolerances on the shape of the braking surfaces is necessary to prevent brake roughness.



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

Using a commercially available dial indicator, check lateral runout as follows:

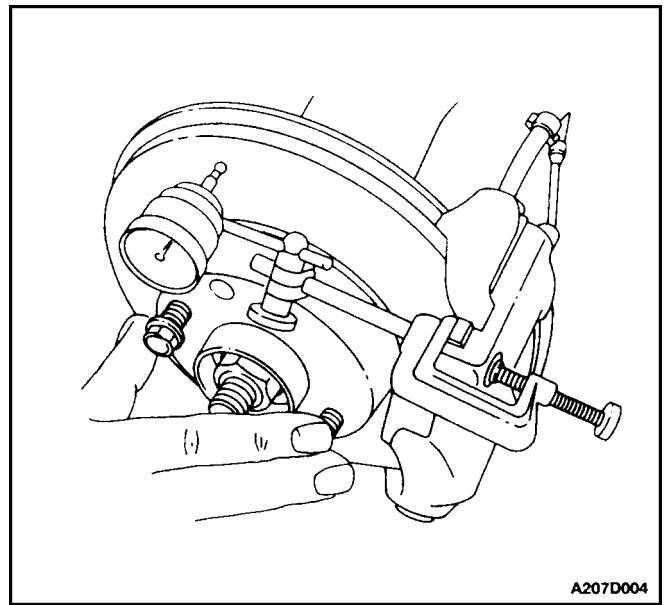
**Notice :** Permissible lateral runout is a maximum 0.03 mm (0.0012 inch). If lateral runout exceeds the specification, ensure that there is no dirt between the rotor and the hub and that contact surfaces are smooth and free from burrs.

1. Position the transaxle in NEUTRAL.
2. Remove the rotor. Refer to "Rotor" in this section.

3. Fasten the brake rotor to the wheel hub with two wheel bolts.
4. Fasten a dial indicator to the brake caliper.
5. Set the gauge probe tip to approximately 10 mm (0.39 inch) from the outer edge of the brake rotor, perpendicular to the disc and under slight preload.
6. Remove the dial indicator and the wheel bolts connecting the rotor to the hub.

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

7. If required, refinish the rotor with precision equipment. Discard the rotor if it fails to meet the above specifications after refinishing. Install the rotor. Refer to  $i^{\circ}$  Rotor  $\pm$  in this section.



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

## MAINTENANCE AND REPAIR

### ON-VEHICLE SERVICE

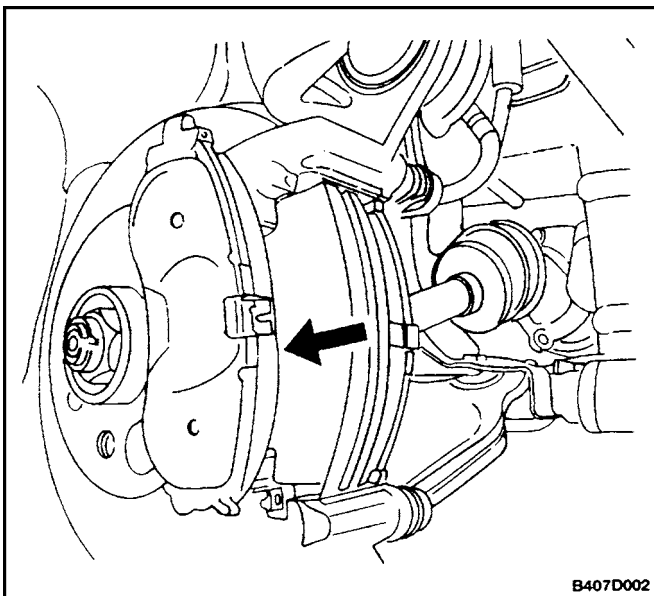
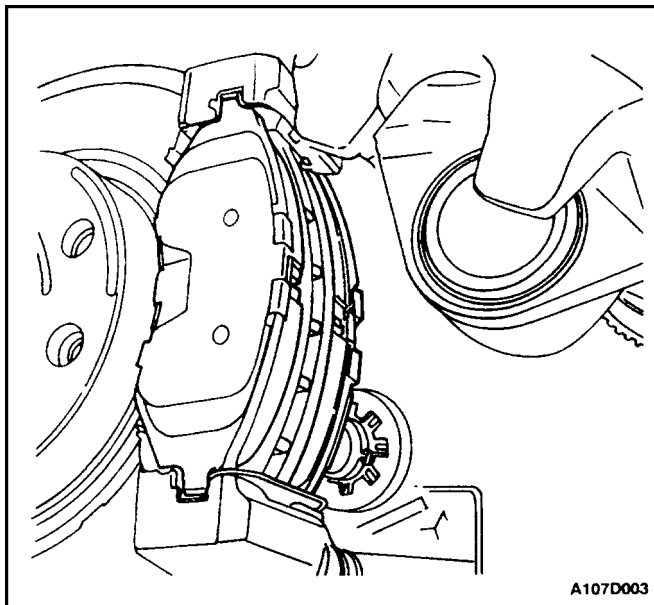
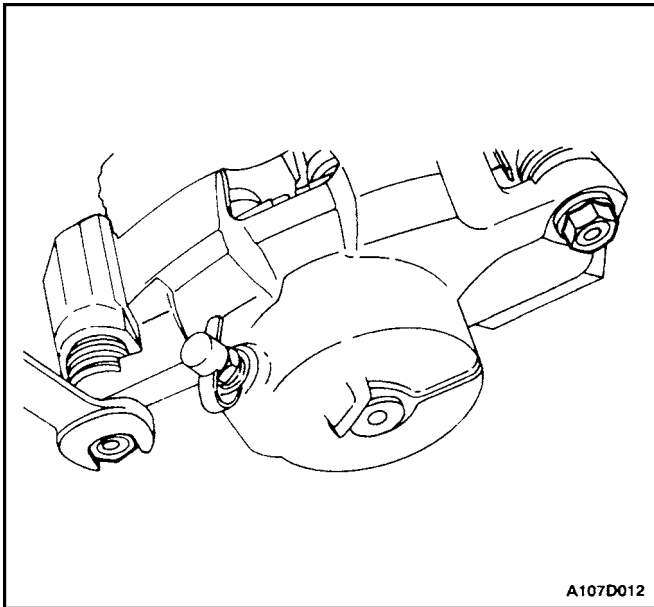
#### SHOE AND LINING

##### Removal Procedure

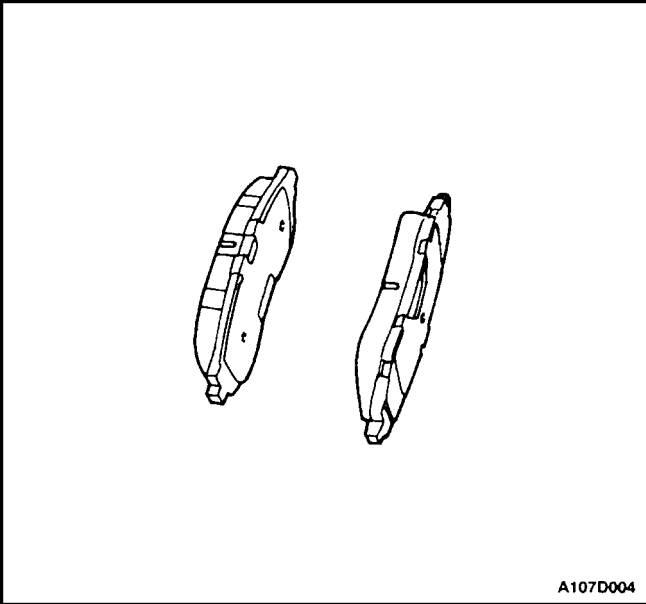
1. Raise and suitably support the vehicle.
2. To preserve wheel balance, mark the position of the front wheel relative to the wheel hub. Remove the front wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the lower caliper mounting bolt.

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

4. Pivot the caliper upward.

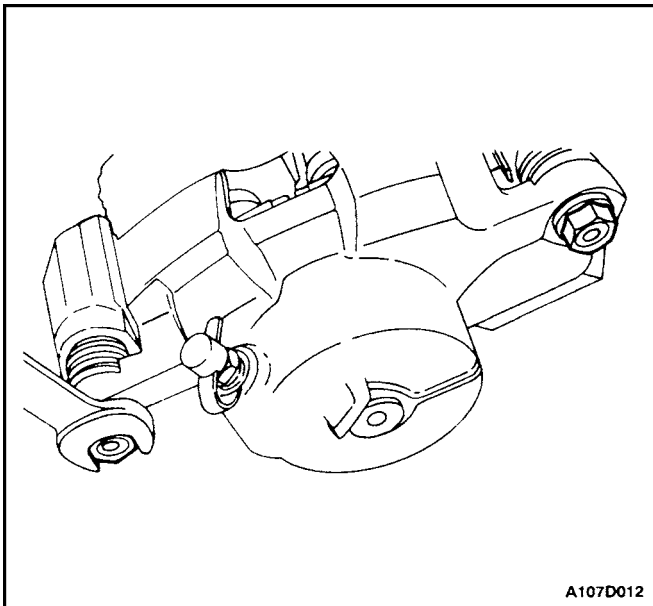


5. Remove the brake shoes.



## Installation Procedure

1. Install the brake shoes.
2. If new brake shoes are being installed, they will be thicker than the worn pads that were removed. Push the caliper piston inward, if necessary.



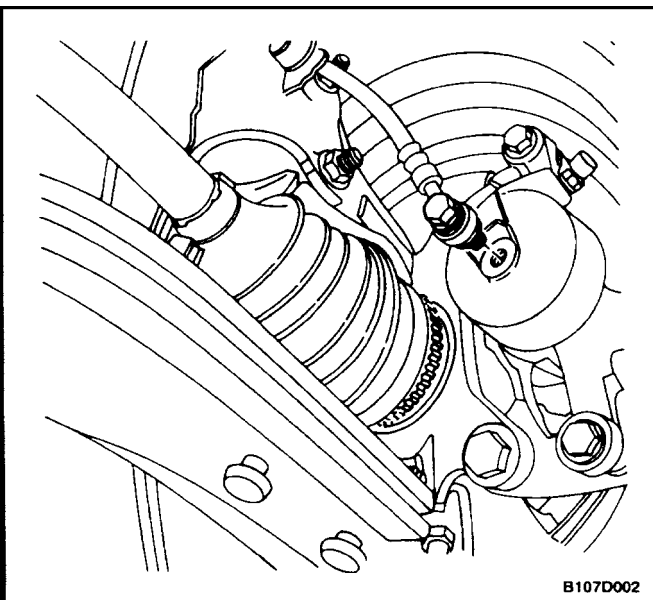
3. Pull the caliper downward and install the lower mounting bolt.

**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 22–32 N•m (16–24 lb–ft).

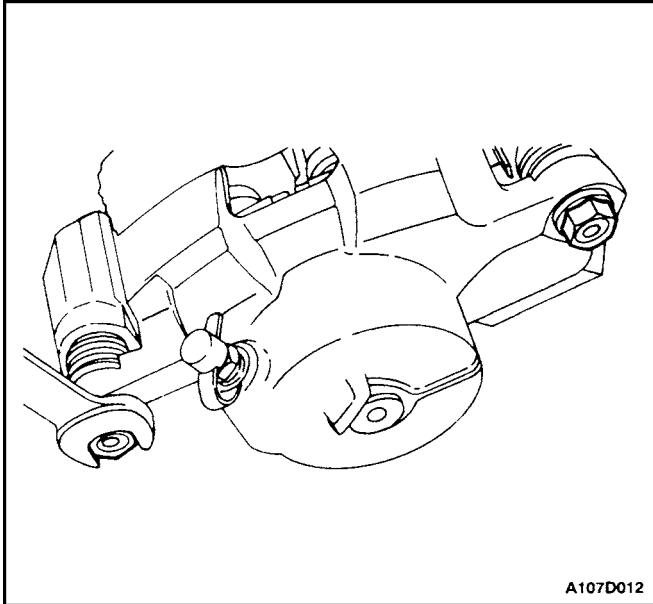
4. Align the marks that were made when removing the front wheel, and install the wheel. Refer to *Section 2E, Tires and Wheels*.
5. Lower the vehicle.



## CALIPER

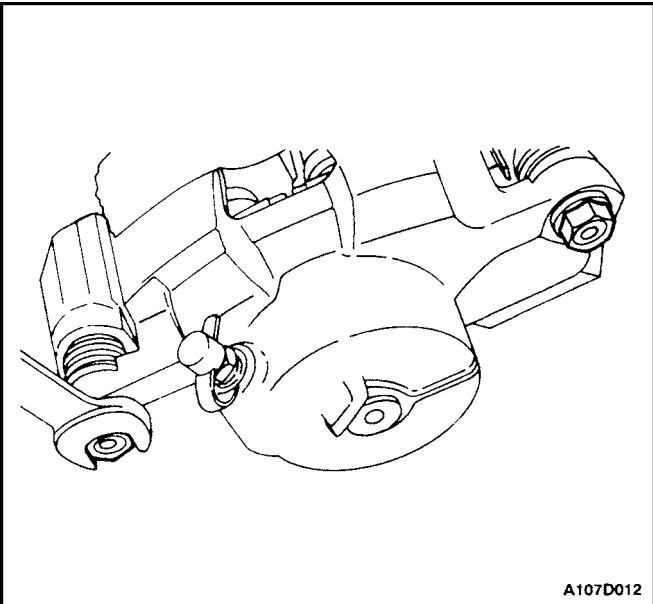
### Removal Procedure

1. Raise and suitably support the vehicle.
2. To preserve wheel balance, mark the position of the front wheel relative to the wheel hubs. Remove the wheel. Refer to *Section 2E, Tires and Wheels*.
3. Remove the bolt which attaches the brake hose to the caliper. Remove the washers.



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



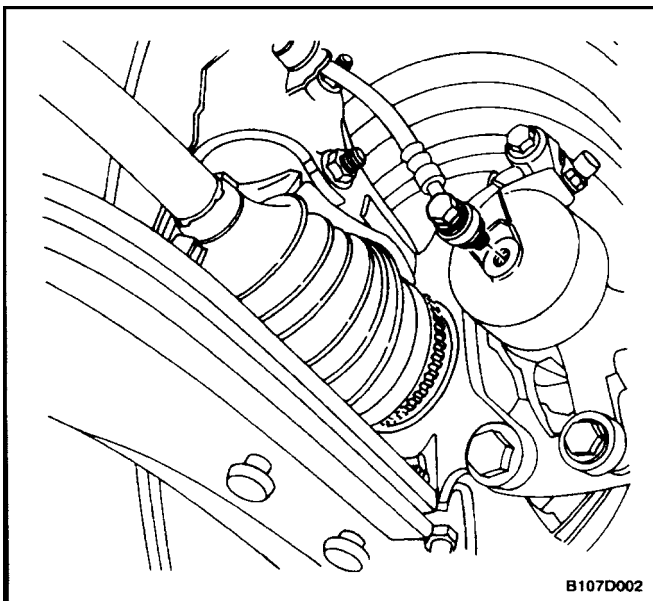
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### Installation Procedure

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

#### **Tighten**

Tighten the caliper mounting bolts to 22–32 N•m (16–24 lb–ft).

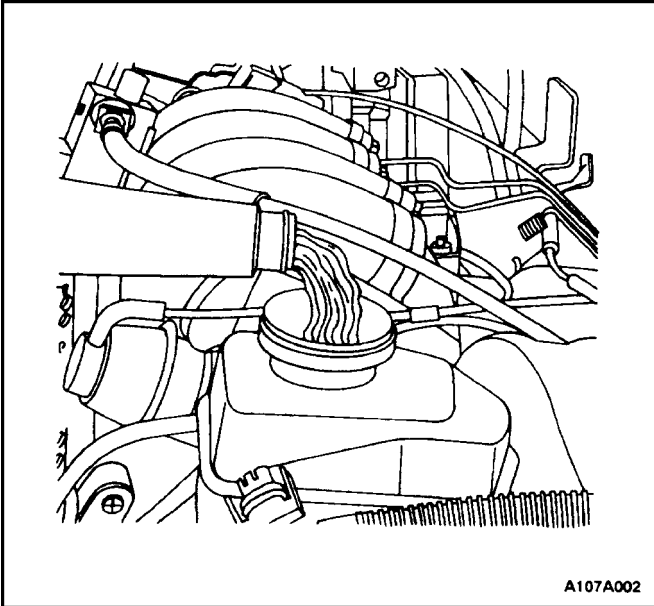


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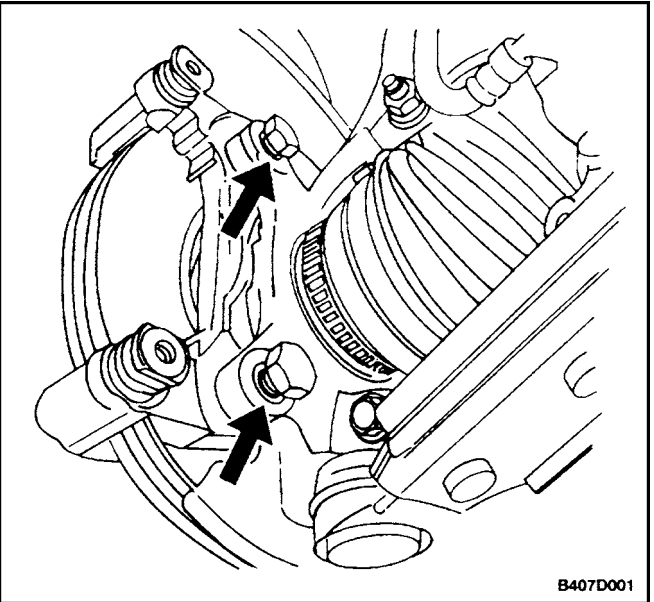
3. Connect the caliper inlet hose with the bolt and the washers.

#### **Tighten**

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



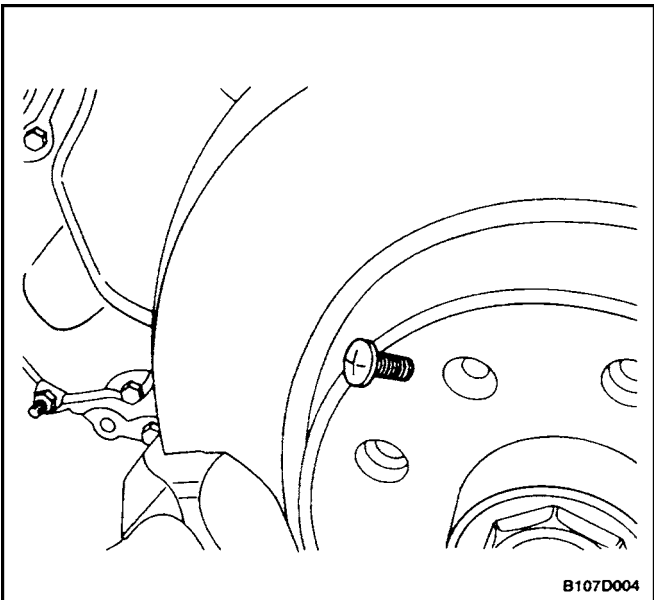
4. Align the marks that were made when removing the front wheel, and install the wheel. Refer to *Section 2E, Tires and Wheels*.
5. Lower the vehicle.
6. Fill the master cylinder reservoir to the proper level with clean brake fluid.
7. Bleed the air out of the brake system. Refer to *Section 4A, Hydraulic Brakes* or *Section 4F, Antilock Brake System*.
8. Recheck the fluid level in the master cylinder.
9. Repeatedly press the brake pedal to bring the pads into contact with the rotor. Do not move the vehicle until a firm pedal is obtained.



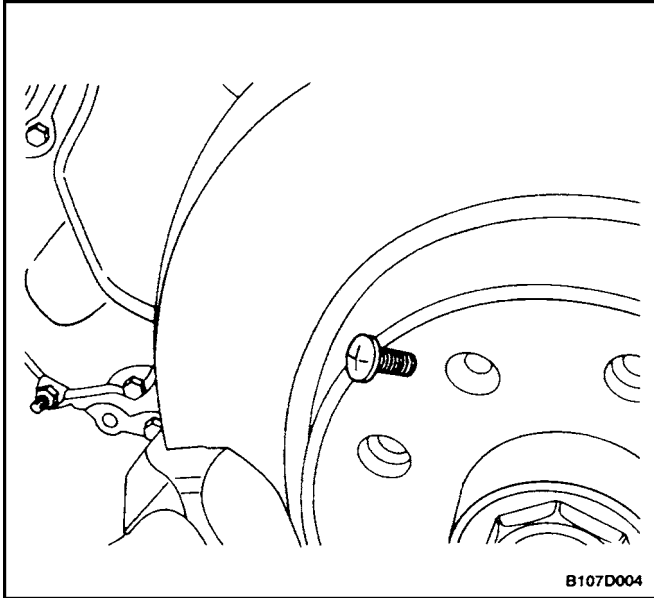
## ROTOR

### Removal Procedure

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



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



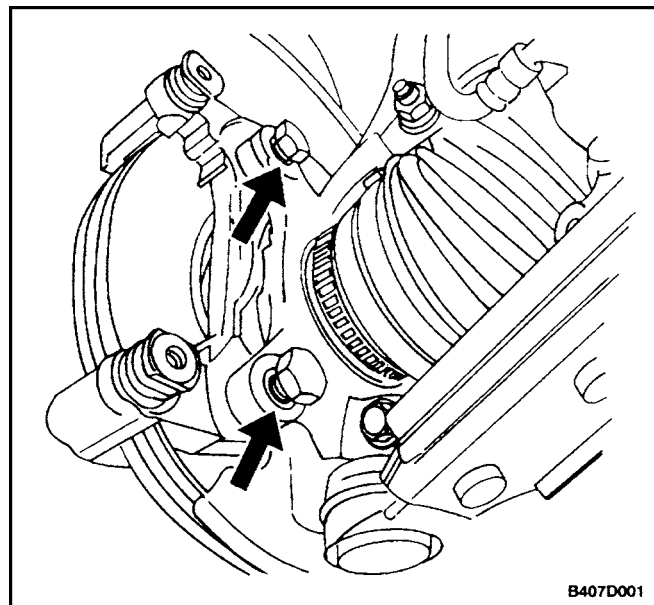
## Installation Procedure

**Important :** To guarantee uniform braking, always refinish both rotors even if only one rotor is defective. If a rotor is being replaced, use a new rotor on both sides of the vehicle.

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).

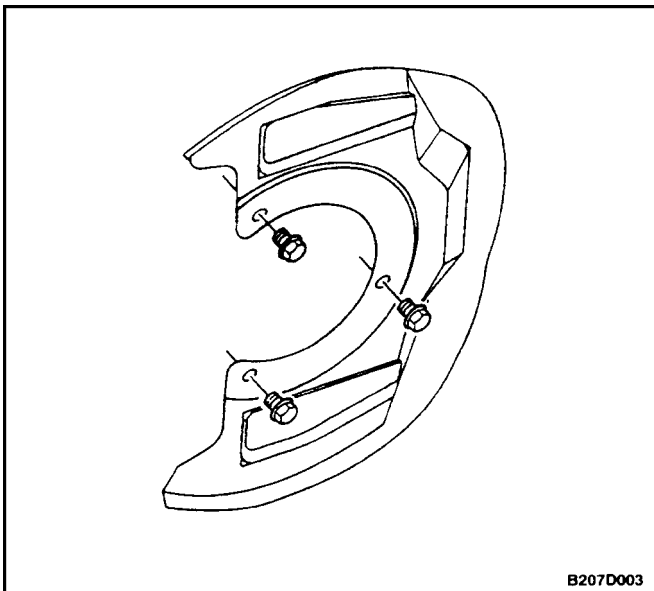


2. Apply a few drops of thread–locking compound to the bolts and install the caliper bracket.

### Tighten

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

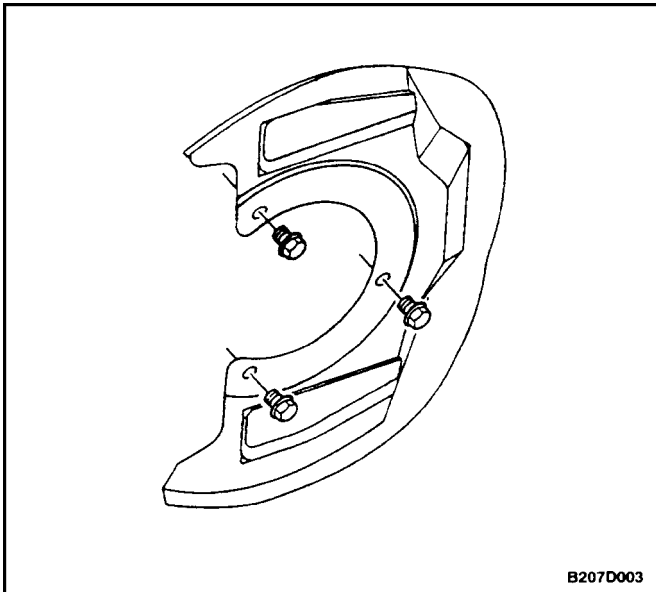
3. Install the brake pads and the caliper. See “Caliper” in this section.



## SPLASH SHIELD

### Removal Procedure

1. Remove the rotor. Refer to “Rotor” in this section.
2. Remove the screws 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 screws.

#### Tighten

Tighten the splash shield screws to 5 N•m (44 lb-in).

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

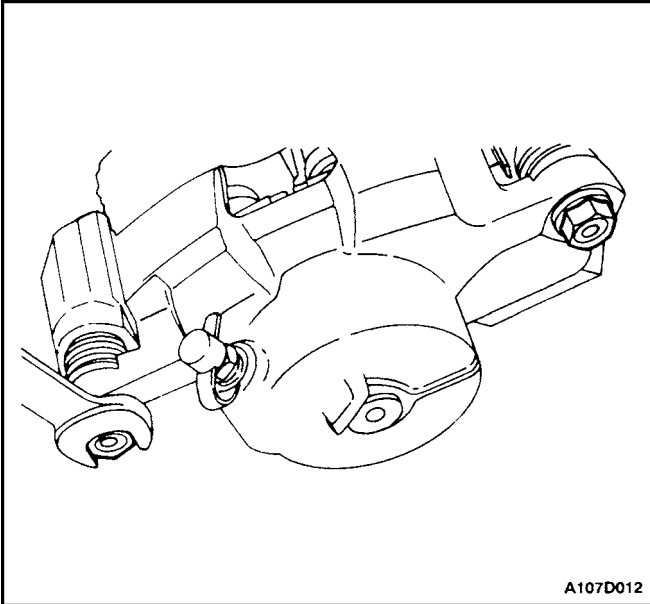


## UNIT REPAIR

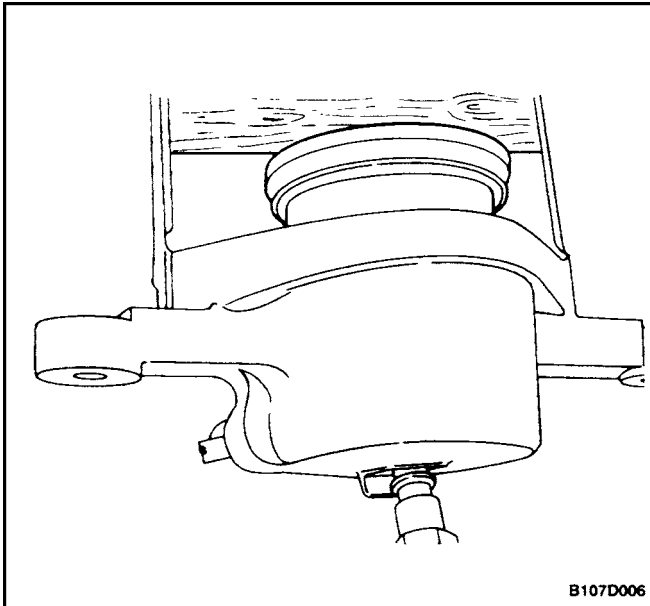
### CALIPER OVERHAUL

#### Disassembly Procedure

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



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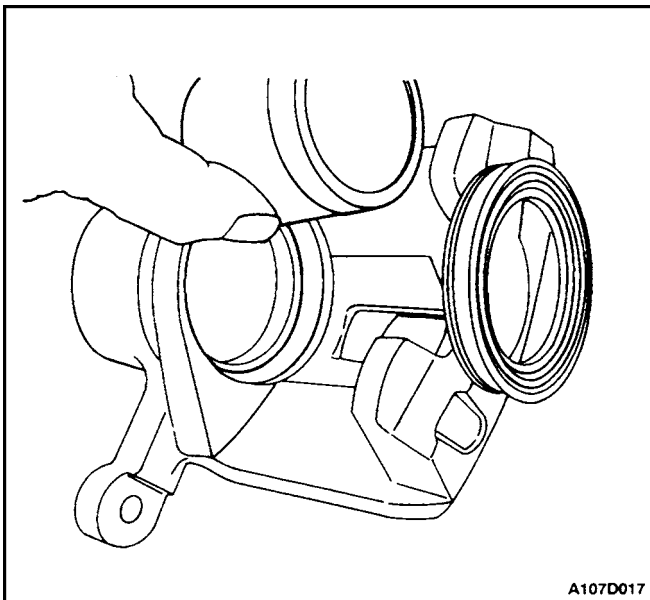


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**CAUTION :** Do not attempt to catch the piston when attempting to remove the piston with compressed air. The piston will pop out of its bore with enough force to damage a hand or fingers.

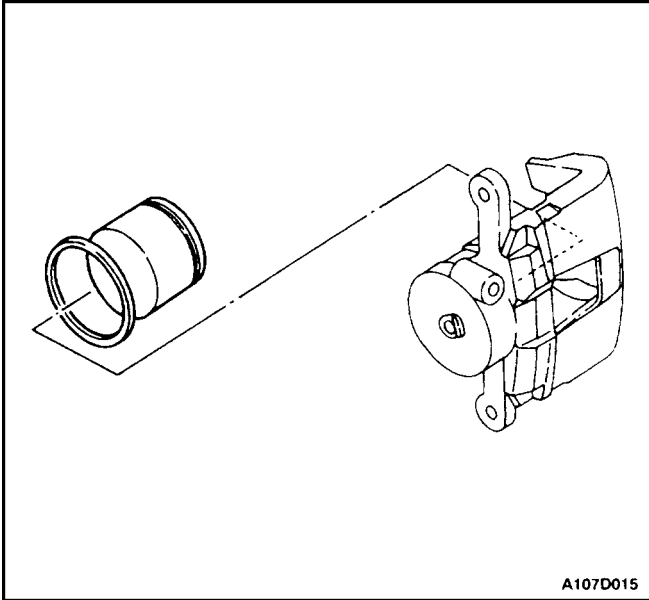
**Important :** When removing the caliper piston with compressed air, insert a piece of hardwood into the caliper to prevent damage to the piston.

2. Apply unlubricated compressed air at the hose inlet of the caliper.

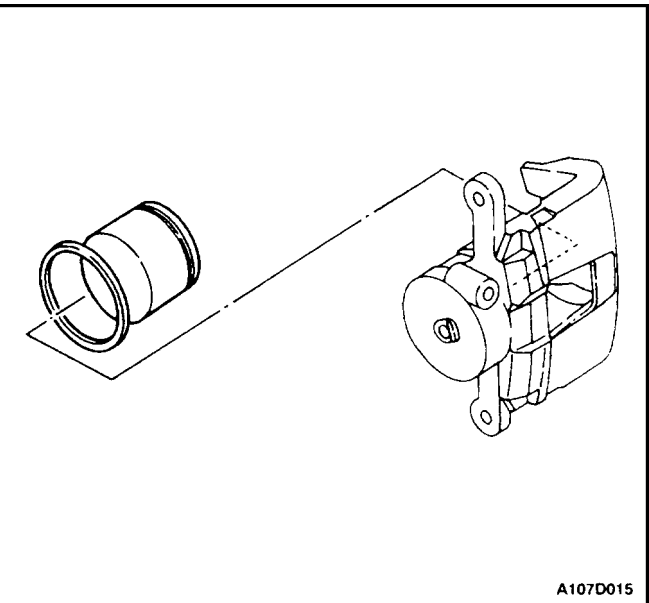


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3. Remove the piston from its bore, and remove the piston dust seal.



4. Remove the inner seal from the bore.
5. Remove the bleeder valve protector and the bleeder valve.

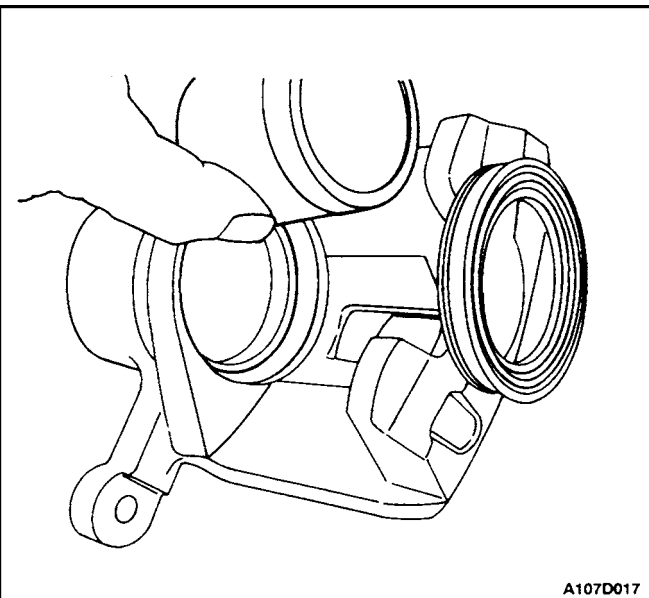


### Assembly Procedure

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 bleeder valve.
2. Inspect the piston and caliper for scoring, nicks, or corrosion. Replace any components which show these conditions.
3. Install the caliper bleeder valve.

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

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 caliper.
9. Reinstall the caliper. Refer to "Caliper" in this section.
10. Bleed the brake system. Refer to *Section 4A, Hydraulic brakes* or *Section 4F, Antilock Brakes*, if applicable.



## GENERAL DESCRIPTION AND SYSTEM OPERATION

### DISC BRAKE CALIPER ASSEMBLY

This caliper has a single bore and is mounted to the steering knuckle with two mounting bolts. Hydraulic pressure, created by pressing 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. It moves the piston outward and slides 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.
- Replace the pads in axle sets only.
- The torque values specified are for dry, unlubricated fasteners.
- Perform the service operations on a clean bench, free from all mineral oil materials.