

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 Bleeder Valve	6	-	53
Caliper to Steering Knuckle Mounting Bolts	95	70	-
Retaining Frame to Caliper Housing Bolts	27	19	-
Rotor to Front Wheel Hub Detent Screw	4	-	35
Splash Shield to 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 linings for minimum thickness and wear.
4. Measure the thickness.

Important: The minimum thickness of the inner or the outer pad is 7 mm (0.28 inch).

5. Install the brake pads in axle sets only.
6. Install the front wheels. Refer to *Section 2E, Tires and Wheels*.
7. 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 0.10 mm (0.004 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.

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.

Light scoring of the rotor surfaces not exceeding 0.40 mm (0.016 inch) in depth, which may result from normal use, is not detrimental to brake operation.

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

Notice: Permissible lateral runout is a maximum 0.10 mm (0.004 inch). If lateral runout exceeds the specification, ensure that there is no dirt between the

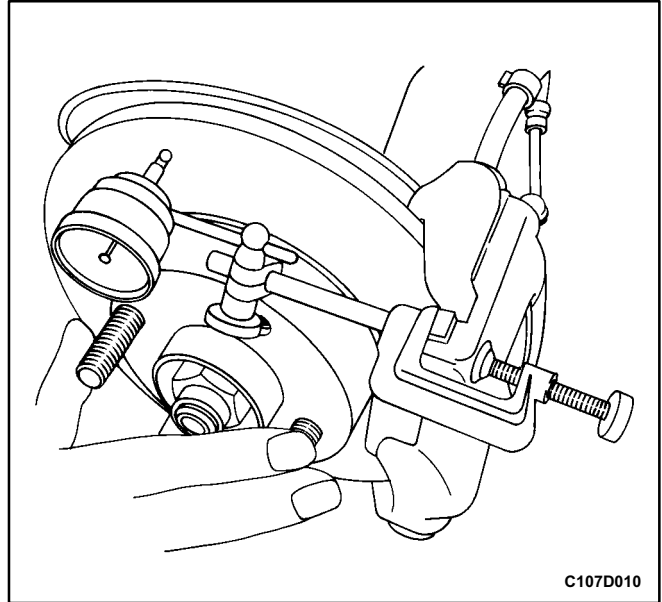
4D - 2 FRONT DISC BRAKES

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 nuts. Refer to *Section 2E, Tires and Wheels*.
4. Fasten a dial indicator to the brake caliper.
5. Set the gauge probe tip to approximately 10mm (0.39inch) from the outer edge of the brake rotor, perpendicular to the disc and under slight preload.
6. Remove the dial indicator and the wheel nuts that connect 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. Refinish the rotor, if required, with precision equipment. Discard the rotor if it fails to meet the above specifications after refinishing.
8. Install the rotor. Refer to „Rotor” in this section.



MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

SHOE AND LINING (BRAKE PADS)

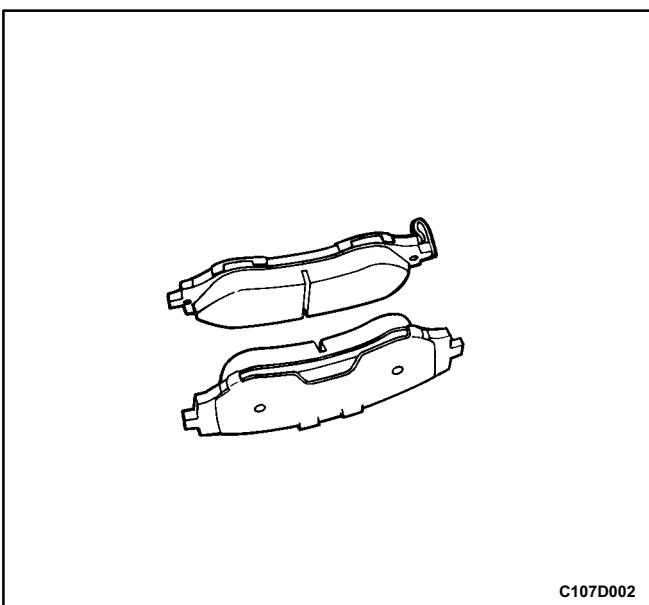
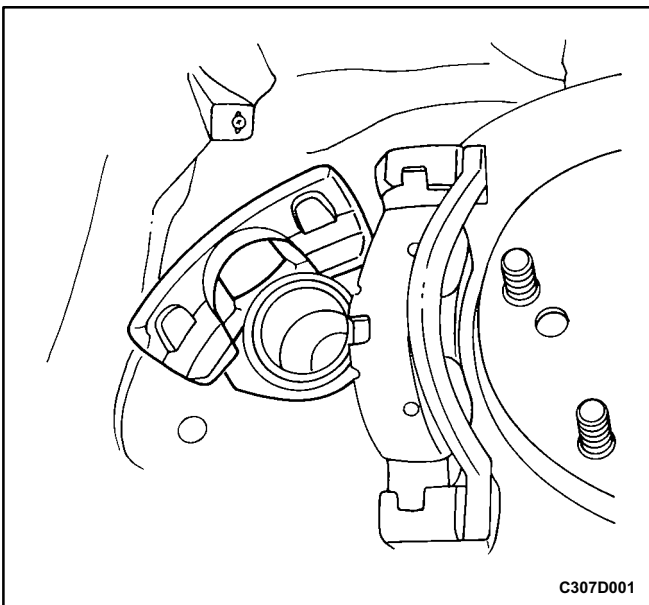
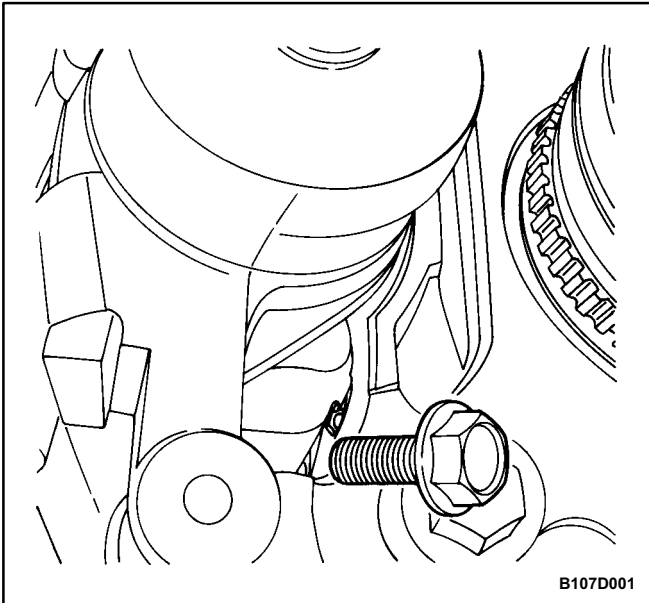
Removal Procedure

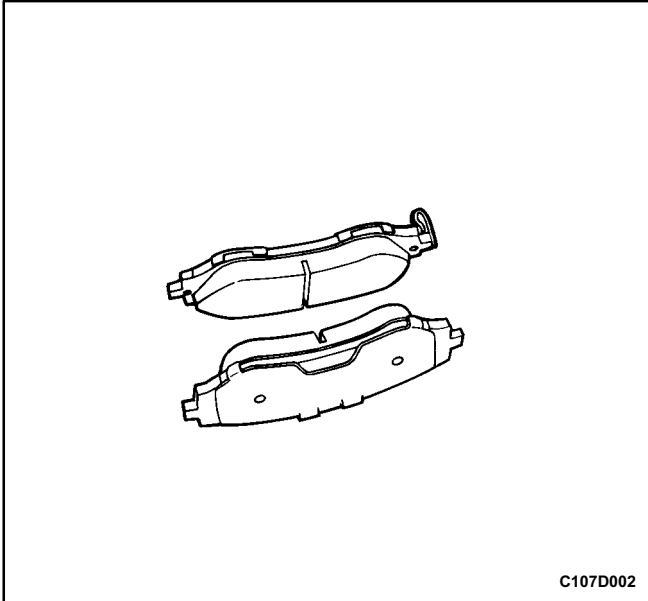
1. Raise and suitably support the vehicle.
2. Remove the front wheels. Refer to *Section 2E, Tires and Wheels*.
3. Remove the lower bolt of the caliper assembly retaining frame.

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

4. Pull the caliper piston housing up.

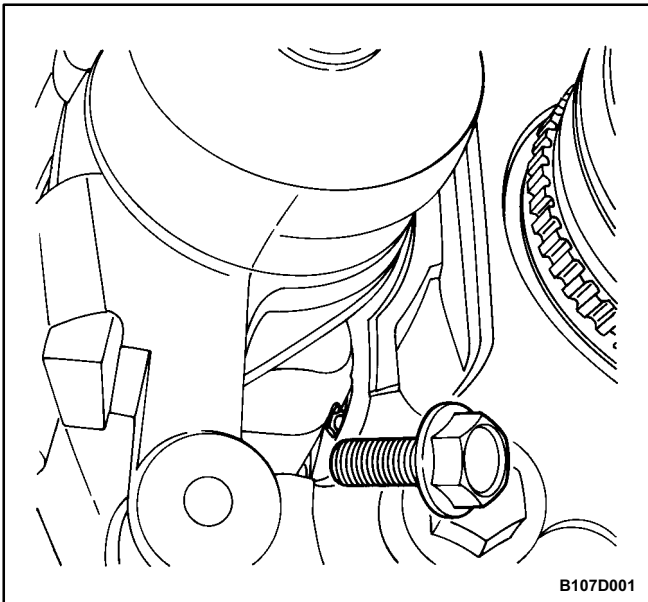
5. Remove the brake pads.





Installation Procedure

1. Measure the minimum brake pad thickness. Refer to „Lining Inspection” in this section.
2. Install the brake pads into the caliper.
3. Push the piston inward, if needed.



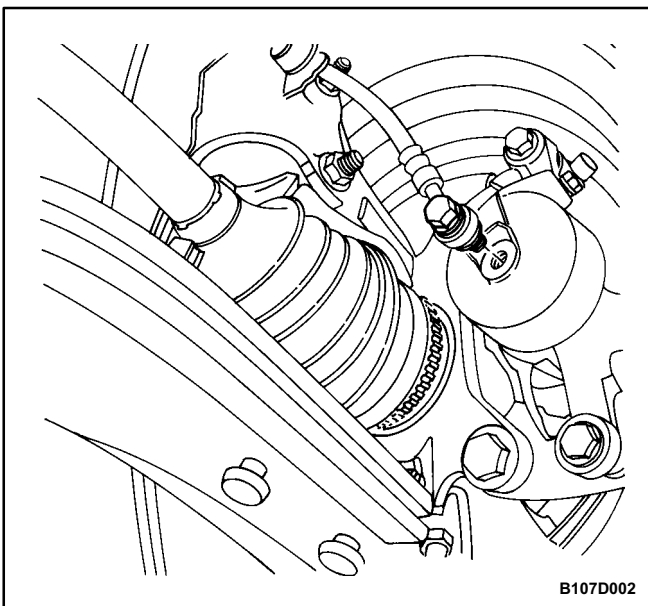
Notice: Take care not to damage the piston seal when the retaining frame is pulled down.

4. Pull down the caliper retaining frame and secure it with the lower bolt.

Tighten

Tighten the upper and lower retaining frame to caliper housing bolts to 27 N•m (19 lb•ft).

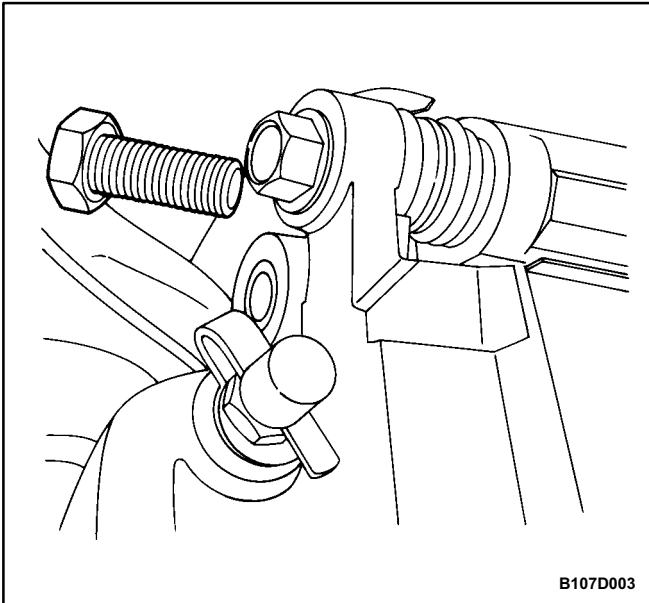
5. Install the front wheels. Refer to *Section 2E, Tires and Wheels*.
6. Lower the vehicle.



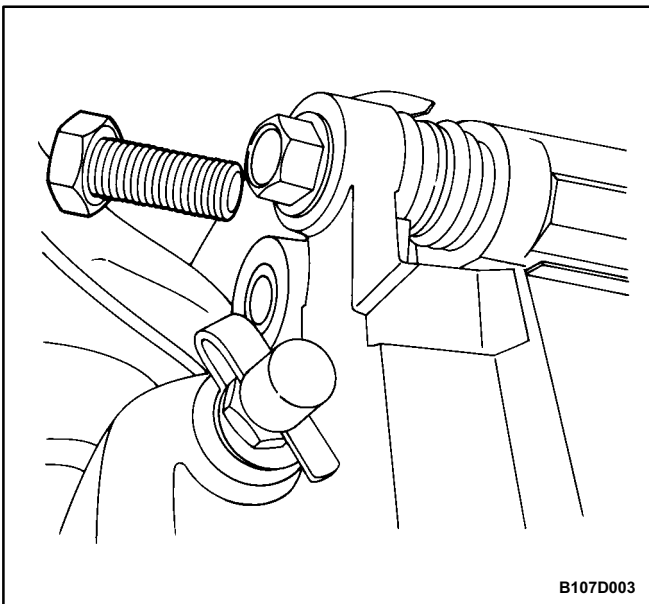
CALIPER ASSEMBLY

Removal Procedure

1. Raise and suitably support the vehicle.
2. Mark the position of the front wheels relative to the wheel hubs and remove the wheels. Refer to *Section 2E, Tires and Wheels*.
3. Remove the bolt and the washers attaching the brake hose to the caliper.



4. Disconnect the brake hose, and plug the openings in the caliper and the brake hose to prevent fluid loss and contamination.
5. Remove the caliper mounting bolts from the steering knuckle, and remove the caliper assembly.

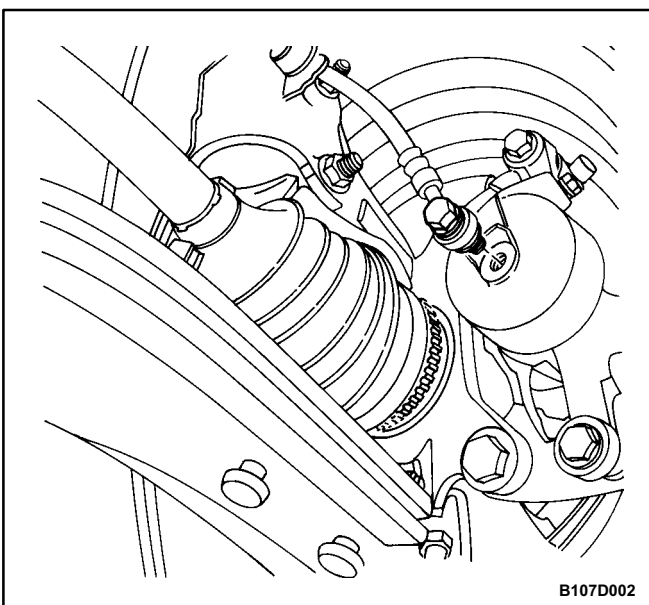


Installation Procedure

1. Install the caliper assembly with the mounting bolts.

Tighten

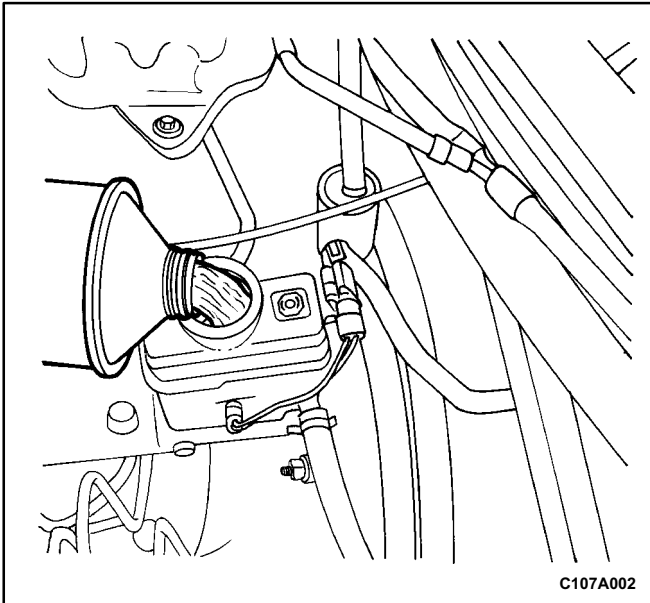
Tighten the caliper to steering knuckle mounting bolts to 95 N•m (70 lb•ft).



2. Connect the brake hose.

Tighten

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



3. Install the front wheels. Refer to *Section 2E, Tires and Wheels*.
4. Lower the vehicle.
5. Fill the master cylinder to the proper level with clean brake fluid.
6. Bleed the caliper. Refer to *Section 4A, Hydraulic Brakes*.
7. Recheck the fluid level.

Notice: Do not move the vehicle until a firm pedal is obtained, or improper braking action will result.

8. Repeatedly press the brake pedal to bring the pads in contact with the rotor.

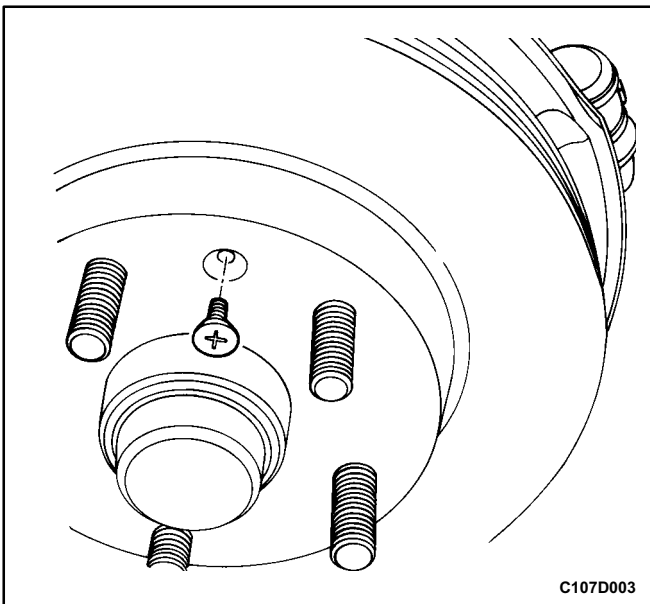
ROTOR

Removal Procedure

Notice: Do not hang the caliper assembly from the brake hose. Any resulting internal hose restriction will impede uniform braking action.

Important: To guarantee uniform braking on both sides, both rotors must have identical surfaces regarding smoothness and scoring depth. For this reason, always replace both rotors.

1. Remove the caliper assembly without disconnecting the brake hoses. Refer to „Caliper Assembly” in this section.
2. Remove the rotor to front wheel hub detent screws.
3. Pull off the rotor.



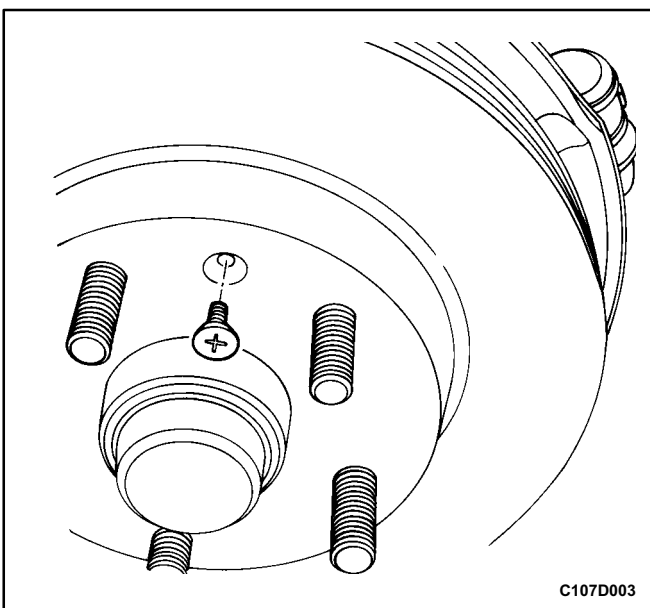
Installation Procedure

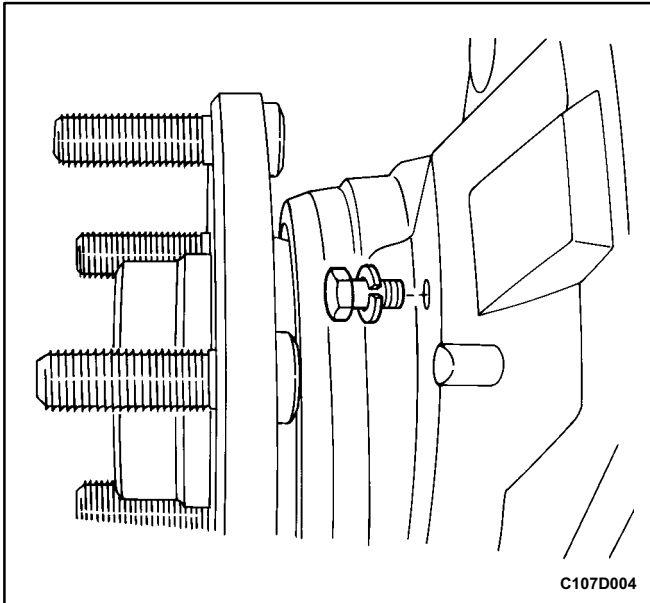
1. Inspect the rotor. Refer to „Rotor Inspection” in this section.
2. Install the rotor to the front wheel hub by tightening the detent screw.

Tighten

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

3. Install the caliper assembly. Refer to „Caliper Assembly” in this section.

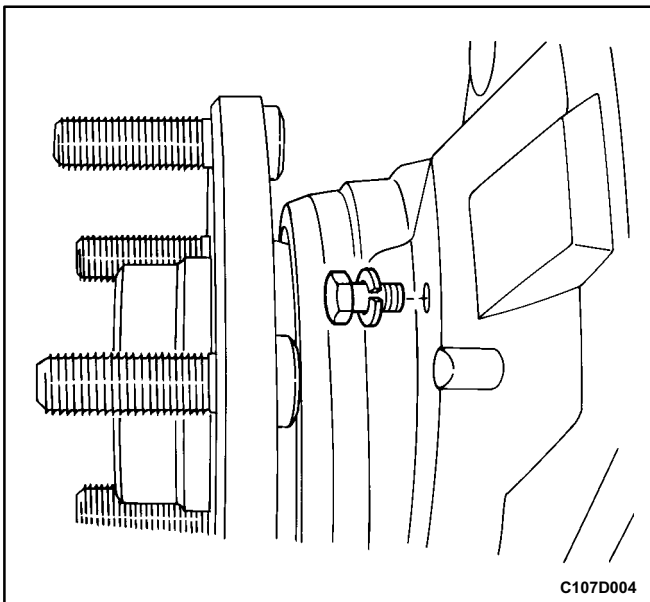




SPLASH SHIELD

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).

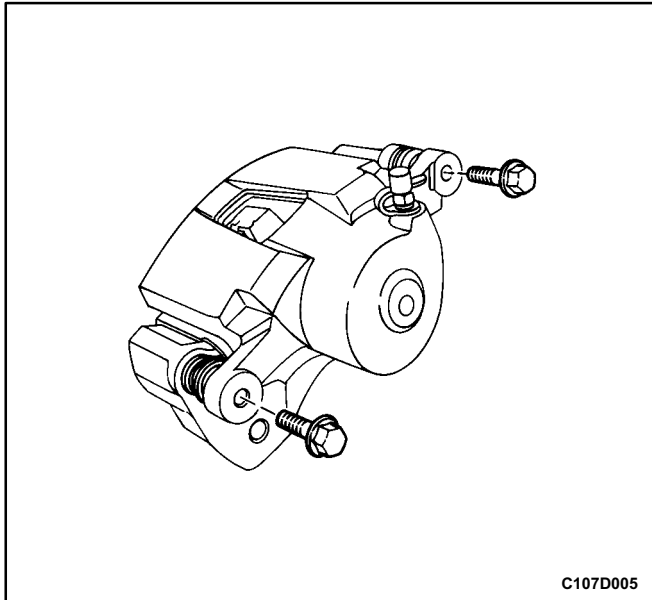
3. Install the rotor. Refer to „Rotor” in this section.

UNIT REPAIR

CALIPER OVERHAUL

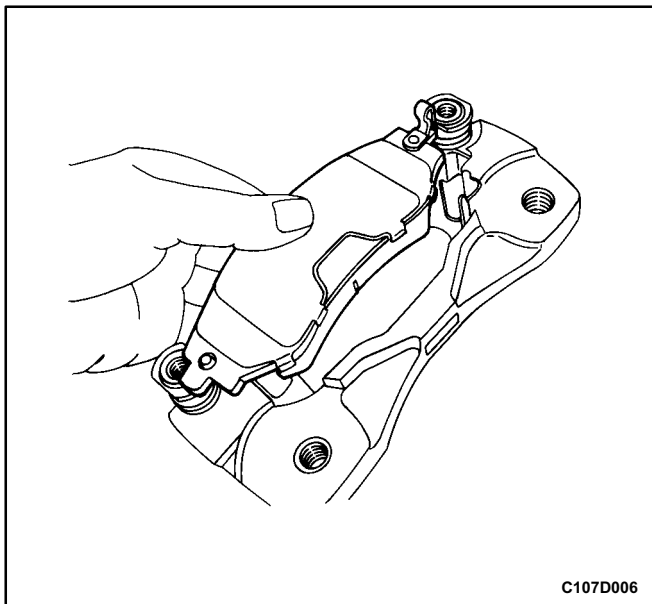
Disassembly Procedure

1. Remove the caliper assembly. Refer to „Caliper Assembly” in this section.
2. Remove the bolts connecting the caliper piston housing to the retaining frame.



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3. Remove the front pad brake set, including the pad springs, from the caliper. Refer to „Shoe and Lining (Brake Pads)” in this section.

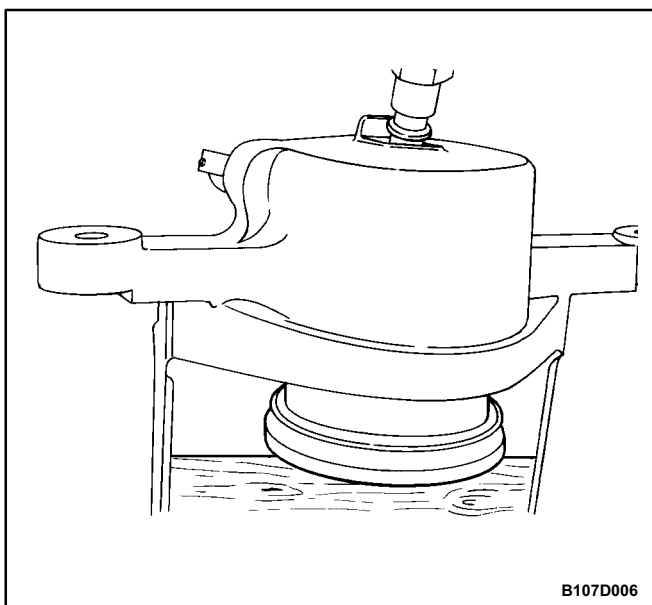


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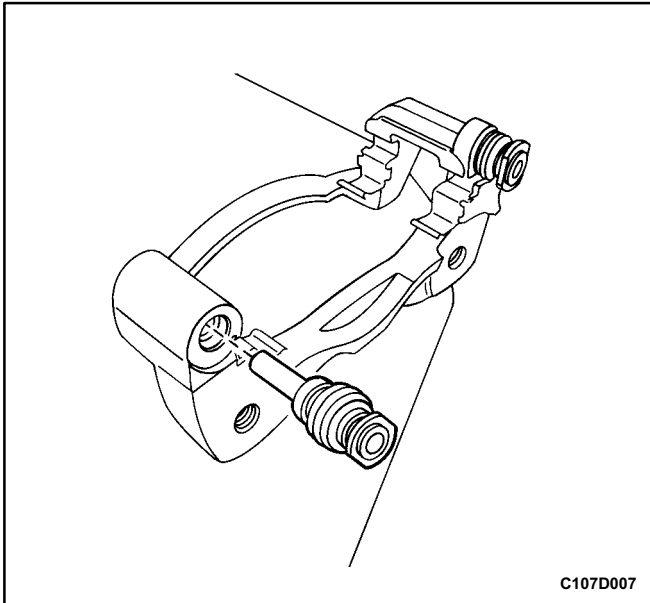
Caution: Do not place fingers in front of the piston in an attempt to catch or protect it when applying compressed air. This could result in serious injury.

Important: Insert a piece of hardwood into the caliper housing interior when removing the piston.

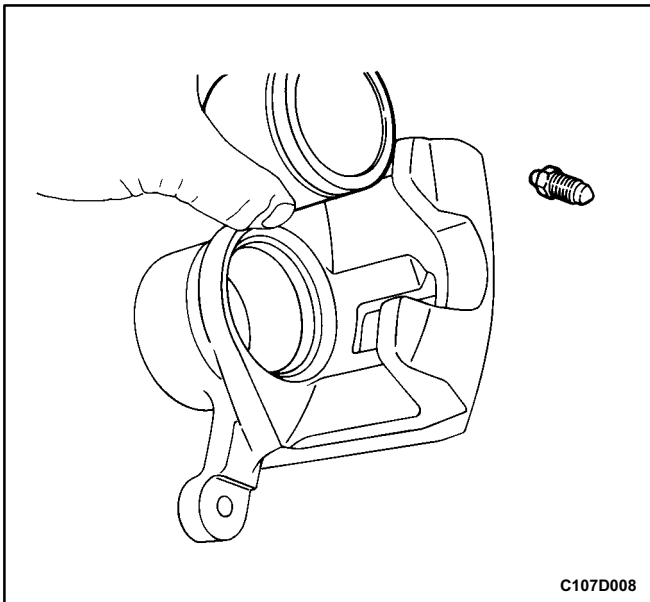
4. Using compressed air, blow out the piston from housing.
5. Remove the outer seal.
6. Remove the inner seal from the caliper piston bore.



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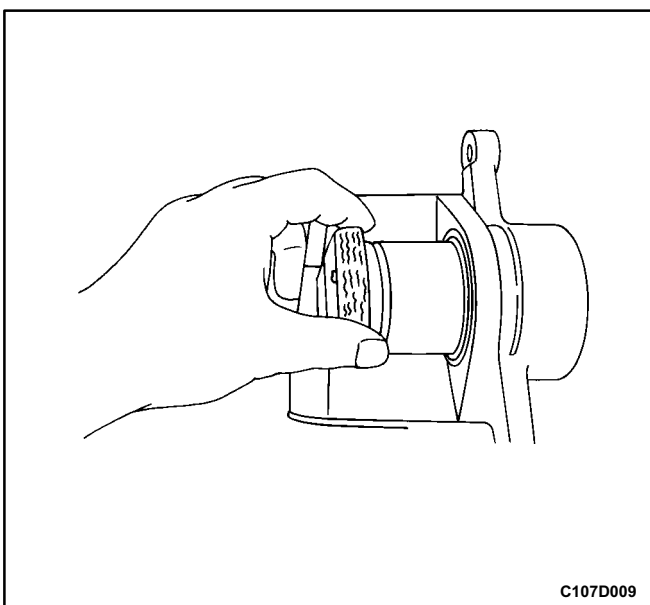
7. Remove the bleeder valve protector and the bleeder valve.
8. Pull out the pins and the rubber boots.



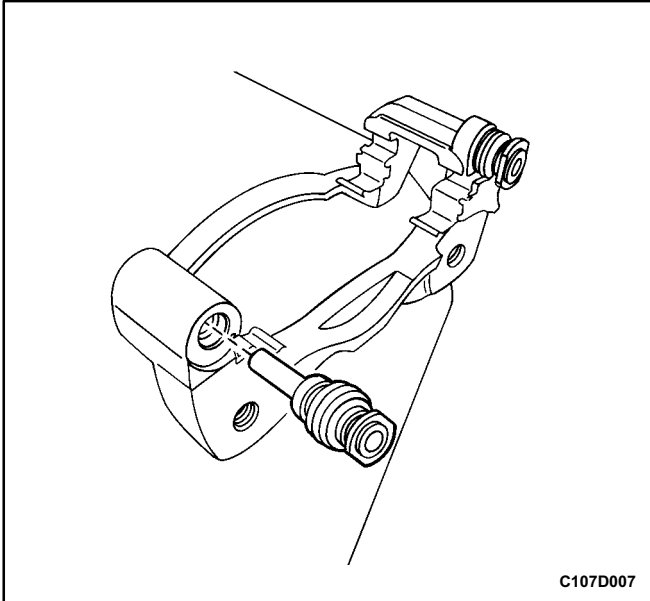
Assembly Procedure

1. Clean all the parts in denatured alcohol or brake fluid. Dry the parts with unlubricated compressed air and blow out all the passages in the housing and the bleeder valve.
2. Inspect the piston and the caliper for scoring, nicks, and corrosion. Replace the components if these elements are found.
3. Inspect the caliper bleeder valve.

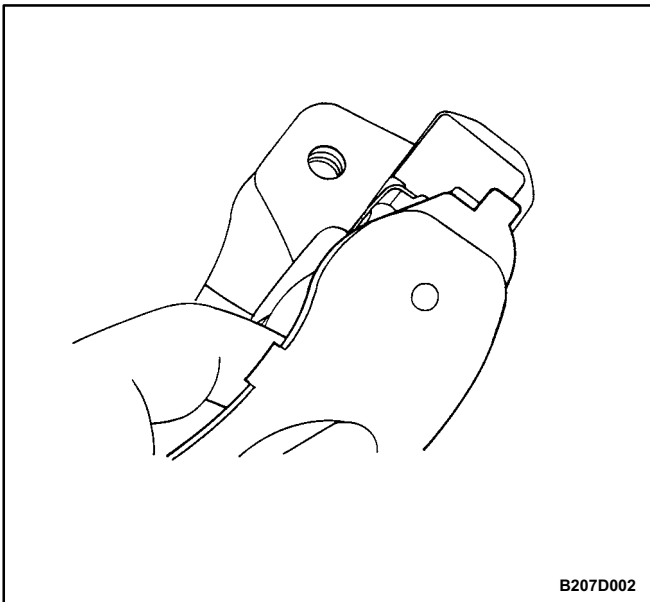
Important: Do not remove material from the piston or the caliper bore.



4. Lubricate a new piston inner seal.
5. Install the piston inner seal into the caliper housing groove. Make sure the seal is not twisted.
6. Install the outer piston dust seal in the groove.
7. Lubricate the piston with brake fluid.
8. Push the piston inward until it is properly seated.



9. Coat the pins with rubber grease and install the boots.



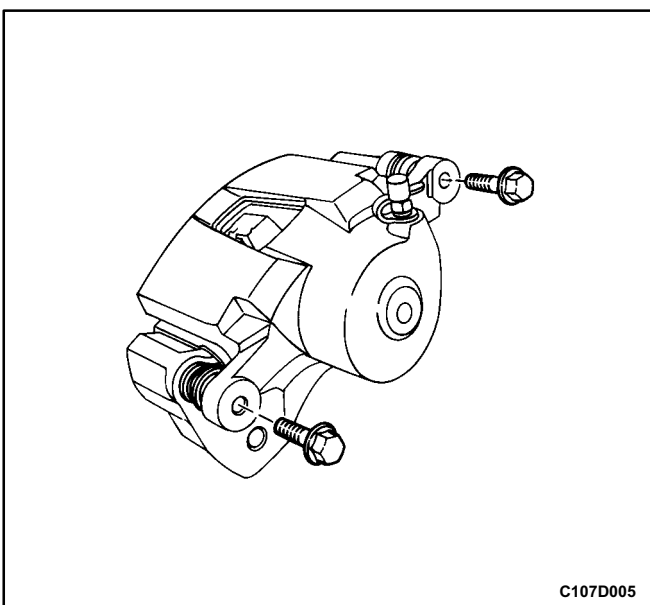
10. Install the caliper bleeder valve and the protector.

Tighten

Tighten the caliper bleeder valve to 6 N•m (53 lb•in).

11. Connect the brake pads and the pad springs.

Important: Make sure the pad springs are properly installed.



12. Connect the retaining frame to the caliper housing with the bolts.

Tighten

Tighten the retaining frame to caliper housing bolts to 27 N•m (19 lb•ft).

13. Install the caliper assembly. Refer to „Caliper Assembly” in this section.

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 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.

Important:

- Replace all components included in the repair kits used to service this 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.