

Disc Brakes

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Description and Operation

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Disc Brake System Description and Operation

System Component Description

The disc brake system consists of the following components:

Disc Brake Pads

Applies mechanical output force from the hydraulic brake calipers to friction surfaces of brake rotors.

Disc Brake Rotors

Uses mechanical output force applied to friction surfaces from the disc brake pads to slow speed of tire and wheel assembly rotation.

Disc Brake Pad Hardware

Secures disc brake pads firmly in proper relationship to the hydraulic brake calipers. Enables a sliding motion of brake pads when mechanical output force is applied.

Disc Brake Caliper Hardware

Provides mounting for hydraulic brake caliper and secures the caliper firmly in proper relationship to caliper bracket. Enables a sliding motion of the brake caliper to the brake pads when mechanical output force is applied.

System Operation

Mechanical output force is applied from the hydraulic brake caliper pistons to the inner brake pads. As the pistons press the inner brake pads outward, the caliper housings draw the outer brake pads inward. This allows the output force to be equally distributed. The brake pads apply the output force to the friction surfaces on both sides of the brake rotors, which slows the rotation of the tire and wheel assemblies. The correct function of both the brake pad and brake caliper hardware is essential for even distribution of braking force.

Diagnostic Information and Procedures

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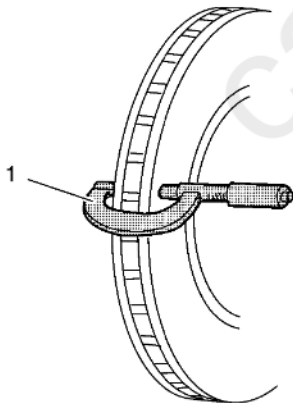
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Brake Rotor Thickness Measurement

Warning:

Refer to [Brake Dust Warning](#).

1. If the inboard friction surface of the brake rotor is not accessible, reposition and support the caliper with the brake pads. Refer to [Front Disc Brake Pads Replacement](#).



2. [Click here for full size](#)
3. Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
4. Using a micrometer (1) calibrated in thousandths-of-a-millimeter, or ten-thousandths-of-an-inch, measure and record the thickness of the brake rotor at four or more points, evenly spaced around the brake rotor.
5. Make sure that the measurements are only taken within the friction surfaces and that the micrometer is positioned the same distance from the outer edge of the brake rotor, about 13mm (1/2in), for each measurement.
6. Compare the lowest thickness measurement recorded to the following specifications:
7. Specification "Front"
 - Brake rotor minimum allowable thickness after refinishing: 18.20mm (0.717in)
 - Brake rotor discard thickness: 18.00mm (0.709in)
8. If the lowest thickness measurement of the brake rotor is above the minimum allowable thickness after refinishing specification, the brake rotor may be able to be refinished, depending upon surface and wear conditions which may be present.
9. If the lowest thickness measurement of the brake rotor is at or below the minimum allowable thickness after refinishing specification, the brake rotor may not be refinished.
10. If the lowest thickness measurement of the brake rotor is at or below the discard thickness specification, the brake rotor requires replacement.

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Brake Rotor Thickness Variation Measurement

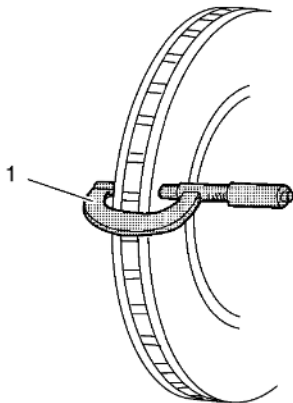
Warning:

Refer to [Brake Dust Warning](#).

Note:

Any disc brake rotor that exhibits thickness variation exceeding the maximum acceptable level must be refinished or replaced. Thickness variation exceeding the maximum acceptable level can cause brake pulsation.

1. If the inboard friction surface of the brake rotor is not accessible, reposition and support the caliper with the brake pads. Refer to [Front Disc Brake Pads Replacement](#).
2. Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.



3.

[Click here for full size](#)

4. Using a micrometer (1) calibrated in thousandths-of-a-millimeter, or ten-thousandths-of-an-inch, measure and record the thickness of the brake rotor at 4 or more points, evenly spaced around the brake rotor.
5. Make sure that the measurements are only taken within the friction surfaces and that the micrometer is positioned the same distance from the outer edge of the brake rotor, about 13 mm (1/2 in), for each measurement.
6. Calculate the difference between the highest and lowest thickness measurements recorded to obtain the amount of thickness variation.
7. Note:

Whenever a brake rotor is refinished or replaced, the assembled lateral runout (LRO) of the brake rotor must be measured to make sure optimum performance of the disc brakes.

8. Compare the thickness variation measurement to the following specification:
9. Specification

Brake rotor maximum allowable thickness variation: 0.001 mm (0.0004 in).

10. If the brake rotor thickness variation measurement exceeds the specification, the brake rotor requires refinishing or replacement.

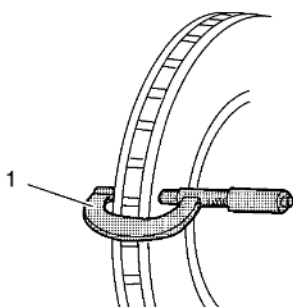
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Brake Rotor Surface and Wear Inspection

Warning:

Refer to [Brake Dust Warning](#).

1. If the inboard friction surface of the brake rotor is not accessible, reposition and support the caliper with the brake pads. Refer to [Front Disc Brake Pads Replacement](#).
2. Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
3. Inspect the friction surfaces of the brake rotor for the following braking surface conditions:
 4.
 - Heavy rust and/or pitting
 - Light surface rust can be removed with an abrasive disc. Heavy surface rust and/or pitting must be removed by refinishing the brake rotor.
 - Cracks and/or heat spots
 - Too much blueing discoloration
5. If the friction surfaces of the brake rotor exhibit one or more of the braking surface conditions, the brake rotor requires refinishing or replacement.





6. [Click here for full size](#)
7. Using a micrometer (1) calibrated in thousandths-of-a-millimeter, or ten-thousandths-of-an-inch, measure and record the scoring depth of any grooves present on the brake rotor friction surfaces.
8. Compare the groove scoring depth recorded to the following specification:
9. Specification
Brake rotor maximum allowable scoring: 1.50mm (0.059in) .
10. If the brake disc rotor scoring depth exceeds the specification, or if an excessive amount of scoring is present, the brake rotor requires refinishing or replacement.

Related Part Information

Part Name	Catalog Name	Part Code
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Brake Rotor	ROTOR PKG,BRK	SJ072
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Brake Rotor Assembled Lateral Runout Measurement

Special Tools

- CH-41013 Rotor Surfacing Kit
- CH-42450-A Wheel Hub Resurfacing Kit
- CH-45101 Hub and Wheel Runout Gauge
- CH-45101-100 Conical Brake Rotor Washers

For equivalent regional tools, refer to [Special Tools](#).

1. Warning:

Refer to [Brake Dust Warning](#).

2. Note:

- Brake rotor assembled lateral runout (LRO) exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4,800â€“11,300â€“km (3,000â€“7,000â€“mi).
- Brake rotor thickness variation MUST be inspected BEFORE inspecting for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to [Brake Rotor Thickness Variation Measurement](#).

3. Matchmark the position of the brake rotor to the wheel studs if this has not been done already.

4. Note:

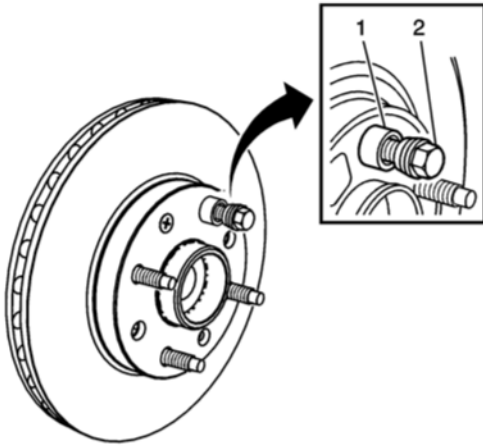
Whenever the brake rotor has been separated from the hub/axle flange, any rust or contaminants should be cleaned from the hub/axle flange and the brake rotor mating surfaces. Failure to do this may result in excessive assembled lateral runout (LRO) of the brake rotor, which could lead to brake pulsation.

5. Inspect the mating surface of the hub/axle flange and the brake rotor to make sure that there are no foreign particles, corrosion, rust, or debris remaining. If the wheel hub/axle flange and/or brake rotor mating surfaces exhibit these conditions, perform the following steps:

6.

1. Remove the brake rotor from the vehicle. Refer to [Front Brake Rotor Replacement](#).
2. Using the CH-42450-A wheel hub resurfacing kit, thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
3. Using the CH-41013 rotor resurfacing kit, thoroughly clean any rust or corrosion from the mating surface of the brake rotor.
4. Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.

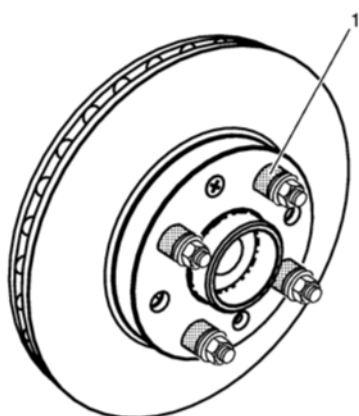
7. Install the rotor to the hub/axle flange using the matchmark made prior to removal.



8.

[Click here for full size](#)

9. Hold the brake rotor firmly in place against the hub/axle flange and install one of the *CH-45101-100* conical brake rotor washers (1), and one lug nut (2) onto the upper-most wheel stud.
10. Continue to hold the brake rotor secure and tighten the lug nut firmly by hand.

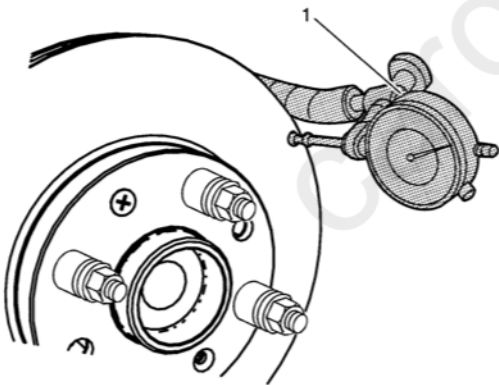


11. [Click here for full size](#)
12. Install the remaining *CH-45101-100* conical brake rotor washers (1) and lug nuts onto the wheel studs and tighten the nuts firmly by hand in the tightening sequence.
13. Tighten the lug nuts in sequence, in order to properly secure the rotor. Refer to [Tire and Wheel Removal and Installation](#).
14. If the brake rotor has been REFINISHED or REPLACED with a new rotor, proceed to step 14.

15. If the brake rotor meets the following criteria, proceed to step 10.

16.

- The rotor is within specifications and is being REUSED.
- The rotor has NOT been refinished.
- The rotor does not exhibit thickness variation exceeding the maximum allowable level.



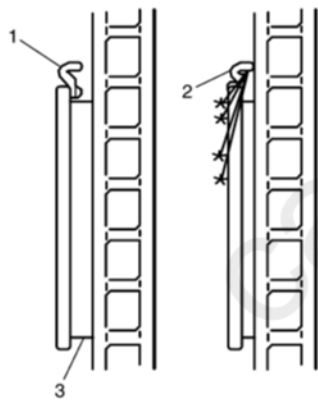
17. [Click here for full size](#)
18. Mount a dial indicator, *CH-45101* hub and wheel runout gauge (1), or equivalent, to the steering knuckle and position the indicator button so it contacts the brake rotor friction surface at a 90° angle, approximately 13mm (0.5in) from the outer edge of the rotor.
19. Measure and record the assembled LRO of the brake rotor:
20.
 1. Rotate the rotor until the lowest reading is displayed on the indicator dial, then set the dial to zero.
 2. Rotate the rotor until the highest reading is displayed on the dial.
 3. Mark the location of the high spot relative to the nearest wheel stud, or studs.
 4. Measure and record the amount of assembled LRO.
21. Compare the brake rotor assembled LRO to the following specification:
22. Specification

Front brake rotor maximum allowable assembled lateral runout: 0.06mm (0.002in)
23. If the brake rotor assembled LRO is within specifications, proceed to step 18.
24. If the brake rotor assembled LRO exceeds the specification, refinish the rotor to ensure true parallelism. Refer to [Brake Rotor Refinishing](#). After refinishing the rotor, proceed to step 14.
25. Mount a dial indicator, *CH-45101* hub and wheel runout gauge, or equivalent, to the steering knuckle and position the indicator button so it contacts the brake rotor friction surface at a 90° angle, approximately 13mm (0.5in) from the outer edge of the rotor.
26. Measure and record the assembled LRO of the brake rotor.
27.
 1. Rotate the rotor until the lowest reading is displayed on the indicator dial, then set the dial to zero.
 2. Rotate the rotor until the highest reading is displayed on the dial.
 3. Mark the location of the high spot relative to the nearest wheel stud, or studs.
 4. Measure and record the amount of assembled LRO.
28. Compare the brake rotor assembled LRO to the following specification:
29. Specification

Front brake rotor maximum allowable assembled lateral runout: 0.06mm (0.002in) .
30. If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to [Brake Rotor Assembled Lateral Runout Correction](#).
31. If the brake rotor assembled LRO measurement is within specification, install the brake caliper and depress the brake pedal several times to secure the brake rotor in place before removing the *CH-45101-100* conical brake rotor washers and the lug nuts.

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Brake Pad Inspection



1. [Click here for full size](#)

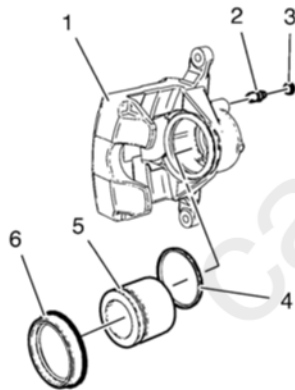
2. Warning:

Refer to [Brake Dust Warning](#).

3. Inspect the disc brake pads at regular intervals, or whenever the tire and wheel assemblies are removed from the vehicle.
4. If replacement is necessary, always replace disc brake pads in axle sets.
5. Inspect both edges of the disc brake pad friction surfaces (3). The highest rate of wear normally occurs at the trailing edge of the disc brake pads.
6. Inspect the thickness of the disc brake pads (3) in order to ensure that they have not worn prematurely. The disc brake pad wear should be approximately even per axle set.
7. Front brake pads have integral, audible wear sensors (1). When the disc brake pad wear reaches the minimum allowable thickness, the wear sensor contacts the disc brake rotor (2). The wear indicator will then produce an audible, high-pitched warning noise during wheel rotation.
8. Replace the disc brake pads when the friction surface (3) is worn to within 2.00 mm (0.079 in) of the mounting plates.
9. Verify that any disc brake pad shims that may be required are in place and not damaged or excessively corroded. Replace any missing or damaged shims in order to preserve proper disc brake performance.
10. Replace the disc brake pads if any have separated from the mounting plates.
11. Inspect the disc brake pads friction surfaces for cracks, fractures, or damage which may cause noise or otherwise impair disc brake performance.

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Brake Caliper Inspection

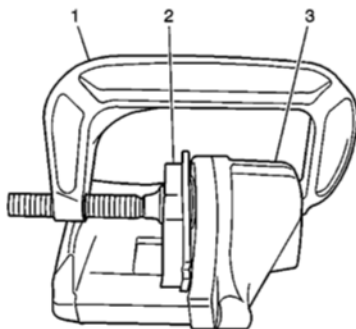


1. [Click here for full size](#)

2. Warning:

Refer to [Brake Dust Warning](#).

3. Inspect the brake caliper housing (1) for cracks, excess wear, and/or damage. If any of these conditions are present, the brake caliper requires replacement.
4. Inspect the caliper piston dust boot seal (2) for cracks, tears, cuts, deterioration and/or improper seating in the caliper body. If any of these conditions are present, the brake caliper requires overhaul or replacement.
5. Inspect for brake fluid leakage around the caliper piston dust boot seal (6) and on the disc brake pads. If there is any evidence of brake fluid leakage, the brake caliper requires overhaul or replacement.



6. [Click here for full size](#)
7. Inspect for smooth and complete travel of the caliper pistons into the caliper bores:
- 8.
- The movement of the caliper pistons into the caliper bores should be smooth and even. If the caliper piston is frozen or difficult to bottom, the caliper requires overhaul or replacement.
 - Insert a discarded inner brake pad(2) or block of wood in front of the piston. Using a large C-clamp(1) installed over the body of the caliper(3) and against the brake pad or block of wood, slowly bottom the piston in the bore.

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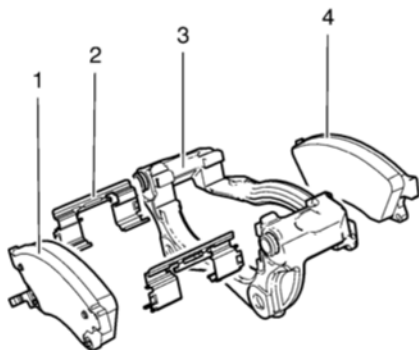
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Front Disc Brake Mounting and Hardware Inspection

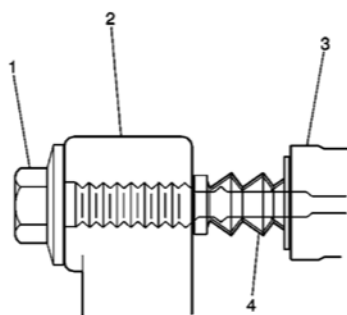
Warning:

Refer to [Brake Dust Warning](#).

1. Inspect the fluid level in the brake master cylinder reservoir.
2. If the brake fluid level is midway between the maximum-full point and the minimum allowable level then no brake fluid needs to be removed from the reservoir before proceeding.
3. If the brake fluid level is higher than midway between the maximum-full point and the minimum allowable level then remove brake fluid to the midway point before proceeding.



4.
[Click here for full size](#)
5. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
6. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
7. Grasp the brake caliper housing and try to move the brake caliper housing up/down and forward/reverse in relation to the brake caliper mounting bracket(3). If excessive looseness is observed the brake caliper bracket bushings and/or the brake caliper mounting bolts may need to be replaced.
8. Compress the front caliper pistons.
9.
 - Install a large C-clamp over the top of the caliper housing and against the back of the outboard pad(1).
 - Slowly tighten the C-clamp until the pistons are pushed completely into the caliper bores.
 - Remove the C-clamp from the caliper.
10. With the pistons compressed into the caliper bores, grasp the brake caliper housing and slide it back and forth on the brake caliper mounting bolts. Check for smooth operation. If the brake caliper housing slide force is high or the brake caliper housing does not slide smoothly, inspect the brake caliper mounting bolts and/or the brake caliper mounting bracket bushings for wear or damage. If wear or damage conditions are found, replacement of the brake caliper mounting bolts and/or the brake caliper mounting bracket bushings is necessary.
11. Remove the brake caliper mounting bolts from the brake caliper mounting bracket and support the brake caliper using heavy mechanics wire. Do not remove the hydraulic brake hose from the caliper. Refer to [Front Brake Caliper Replacement](#).
12. Remove the disc brake pads(1,4) from the brake caliper mounting bracket(3).
13. Inspect the disc brake pad mounting hardware for the following:
14.
 - Missing mounting hardware
 - Excessive corrosion
 - Bent mounting tabs(2)
 - Looseness at the brake caliper mounting bracket(3)
 - Looseness at the disc brake pads(1,4)
 - Excessive contaminants in the brake caliper mounting bracket surface and threads
15. If any of the conditions listed are found, the disc brake pad mounting hardware requires replacement.
16. Ensure the disc brake pads are held firmly in place on the brake caliper mounting bracket, yet slide easily on the mounting hardware without binding.



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18. Inspect the caliper bolts(1) for the following:

19.

- Binding
- Seizing
- Looseness in the brake caliper mounting bracket(3)
- Bent or damaged brake caliper mounting bolts
- Cracked or torn boots(4)
- Missing boots
- Bent or damaged brake caliper mounting bracket(3)

20. If any of the conditions listed are found then the brake caliper mounting hardware requires replacement.

21. Install the disc brake pads to the brake caliper mounting bracket.

22. Install the disc brake caliper to the brake caliper mounting bracket. Refer to [Front Brake Caliper Replacement](#).

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Repair Instructions

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Front Disc Brake Pads Replacement

Removal Procedure

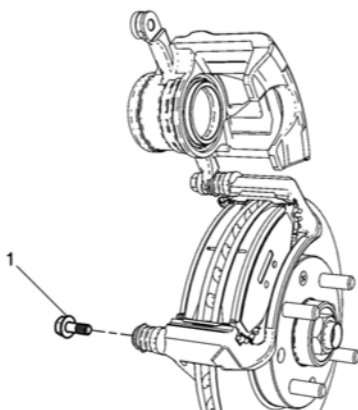
Warning:

Refer to [Brake Dust Warning](#).

Note:

Always replace disc brake pads in axle sets.

1. Inspect the fluid level in the master cylinder reservoir.
2. If the brake fluid level is midway between the maximum-full point and the minimum allowable level, no brake fluids needs to be removed from the reservoir before proceeding.
3. If the brake fluid level is higher than midway between the maximum-full point and the minimum allowable level, remove brake fluid to the midway point before proceeding.
4. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#)
5. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).





6.

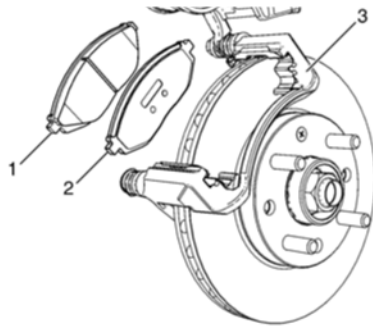
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7. Caution:

Support the brake caliper with heavy mechanic wire, or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

8. Remove the brake caliper lower guide pin bolt (1).

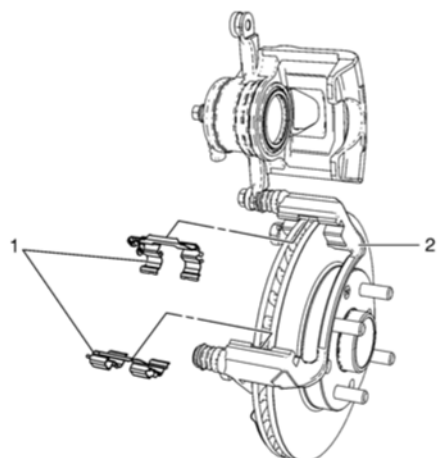




9.

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10. Without disconnecting the hydraulic brake flexible hose, pivot the caliper upward and secure the caliper with heavy mechanics wire, or equivalent.
11. Remove the inboard brake pad (1) from the caliper mounting bracket (3).
12. Note the location of the brake pad audible wear sensor.
13. Remove the outboard brake pad (2) from the caliper mounting bracket (3).



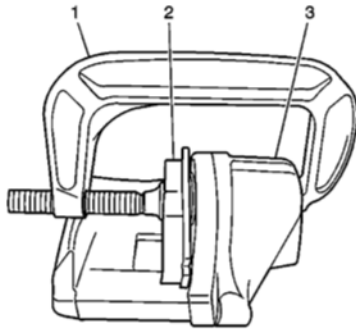
14.

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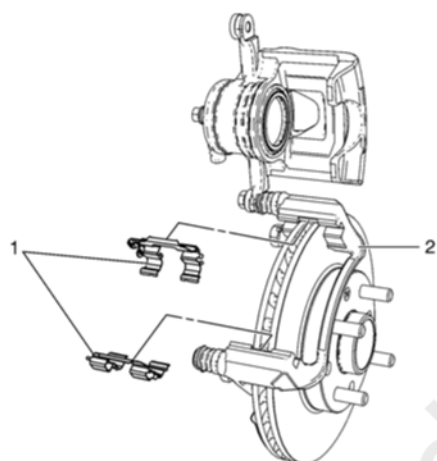
15. Remove the brake pad retainers (1) from the caliper bracket (2).

16. Inspect the disc brake mounting and hardware. Refer to [Front Disc Brake Mounting and Hardware Inspection](#).

Installation Procedure



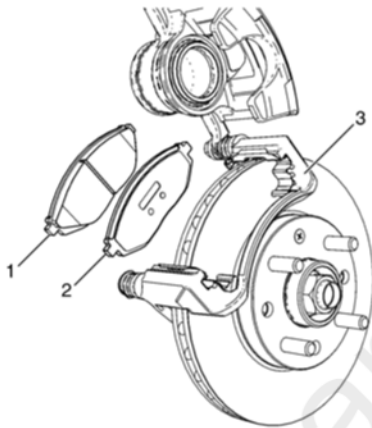
1. [Click here for full size](#)
2. Install a large C-clamp (1) over the body of the brake caliper (3), with the C-clamp ends against the rear of the caliper body and against an old inboard brake pad (2) or a wood block installed against the caliper pistons.
3. Tighten the C-clamp evenly until the caliper piston is compressed completely into the caliper bore.
4. Remove the C-clamp and the old brake pad or wood block from the caliper.



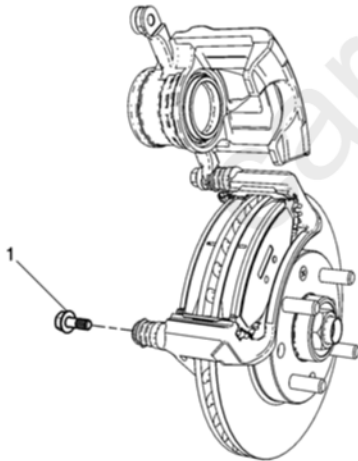
5.

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6. Install the brake pad retainers (1) to the caliper bracket (2).



7. [Click here for full size](#)
8. Note:
- The wear sensor equipped disc brake pad must be mounted inboard of the rotor with the leading edge of the sensor facing the brake rotor during forward wheel rotation, or at the top of the pad when installed in vehicle position.
9. Install the brake pads (1, 2) to the caliper bracket (3).
10. Remove the support, and rotate the brake caliper into position over the disc brake pads and to the caliper mounting bracket.



11. [Click here for full size](#)
12. Caution:

Refer to [Fastener Caution](#).
13. Install the lower brake caliper guide pin bolt (1) and tighten to 28â€%N-m (21â€%lbâ€%ft).
14. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
15. Lower the vehicle.
16. With the engine OFF, gradually apply the brake pedal approximatelyâ€%2/3 of its travel distance.
17. Slowly release the brake pedal.
18. Wait 15â€%seconds, then gradually apply the brake pedal approximatelyâ€%2/3 of its travel distance again until a firm brake pedal apply is obtained. This will properly seat the brake caliper pistons and brake pads.
19. Fill the master cylinder reservoir to the proper level. Refer to [Brake Master Cylinder Reservoir Filling](#).
20. Burnish the pads and rotors. Refer to [Brake Pad and Rotor Burnishing](#).

Related Part Information

Part Name	Catalog Name	Part Code
Front Disc Brake Pad PAD KIT,FRT DISC BRK		0739A
Front Disc Brake Pad PAD,FRT DISC BRK		0740A
Front Disc Brake Pad PAD KIT,FRT DISC BRK		0740B
Front Disc Brake Pad PAD,FRT DISC BRK		0951A
Front Disc Brake Pad PAD SET,FRT DISC BRK		SS154
Front Disc Brake Pad PAD KIT,FRT DISC BRK		SJ565
Front Disc Brake Pad PAD KIT,FRT DISC BRK		SS283

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Brake Pad and Rotor Burnishing

Warning:

Road test a vehicle under safe conditions and while obeying all traffic laws. Do not attempt any maneuvers that could jeopardize vehicle control. Failure to adhere to these precautions could lead to serious personal injury and vehicle damage.

Burnishing the brake pads and brake rotors is necessary in order to ensure that the braking surface are properly prepared after service has been performed on the disc brake system.

This procedure should be performed whenever the disc brake rotors have been refinished or replaced, and/or whenever the brake pads have been replaced.

1. Select a smooth road with little or no traffic.
2. Accelerate the vehicle to 48â€‰km/h (30â€‰mph).
3. Note:

Use care to avoid overheating the brakes while performing this step as it may adversely affect the heating characteristics of the NEW brake pad material.
4. Using moderate pressure, apply the brakes to bring the vehicle to a stop. Do not allow the brakes to lock.
5. Repeat stepsâ€‰2 andâ€‰3 until approximately 20â€‰stops have been completed. Allow sufficient cooling periods between stops in order to properly burnish the brake pads and rotors.

Related Part Information

Part Name	Catalog Name	Part Code
Front Brake Rotor	ROTOR,FRT BRK (W/HUB)	0220A
Front Brake Rotor	ROTOR,FRT BRK(W/HUB)	0220D
Front Brake Rotor	ROTOR,FRT BRK (W/WHL)	0330A
Front Brake Rotor	ROTOR,FRT BRK(W/WHL)	0330D
Front Brake Rotor	ROTOR KIT,FRT BRK	0349A
Front Brake Rotor	ROTOR SET,FRT BRK	0349B
Front Brake Rotor	ROTOR,FRT BRK	0350A
Front Brake Rotor	ROTOR,FRT BRK	0350B
Front Brake Rotor	ROTOR,FRT BRK(CSTG)	0350C
Front Brake Rotor	ROTOR,FRT BRK(MCHG)	0350D
Front Brake Rotor	ROTOR,FRT BRK (PERFORMANCE)	0351A
Front Brake Rotor	ROTOR,FRT BRK (COATED)	0352B
Front Disc Brake Pad	PAD KIT,FRT DISC BRK	0739A
Front Disc Brake Pad	PAD,FRT DISC BRK	0740A
Front Disc Brake Pad	PAD KIT,FRT DISC BRK	0740B
Front Disc Brake Pad	PAD,FRT DISC BRK	0951A
Rear Disc Brake Pad	PAD KIT,RR DISC BRK	0310A
Rear Disc Brake Pad	PAD,RR DISC BRK	0311A
Rear Disc Brake Pad	PAD KIT,RR DISC BRK	0315A
Front and Rear Disc Brake Pad	PAD KIT,FRT & RR DISC BRK	0318A
Rear Brake Rotor	ROTOR SET,RR BRK	0364A
Rear Brake Rotor	ROTOR,RR BRK(W/HUB)	0365A
Rear Brake Rotor	ROTOR,RR BRK (W/HUB)	0365C
Rear Brake Rotor	ROTOR,RR BRK(W/WHL)	0370A
Rear Brake Rotor	ROTOR,RR BRK(W/WHL)	0370C
Rear Brake Rotor	ROTOR KIT,RR BRK	0374Z

Part Name	Catalog Name	Part Code
Rear Brake Rotor	ROTOR,RR BRK	0375A
Rear Brake Rotor	ROTOR,RR BRK	0376A
Rear Brake Rotor	ROTOR,RR BRK (PERFORMANCE)	0377A
Rear Brake Rotor	ROTOR,RR BRK (COATED)	0378B
Rear Brake Rotor	ROTOR,RR BRK	0400A
Rear Brake Rotor	ROTOR,RR BRK (MACHINED)	0400B
Rear Brake Rotor	ROTOR,RR BRK	0400C
Rear Disc Brake Pad	PAD,RR DISC BRK	SB071
Front Brake Rotor	ROTOR KIT,FRT BRK	SJ032
Rear Brake Rotor	ROTOR KIT,RR BRK	SJ091
Front Brake Rotor	ROTOR,FRT BRK	SJ092
Rear Brake Rotor	ROTOR,RR BRK	SJ093
Front Disc Brake Pad	PAD SET,FRT DISC BRK	SS154
Front Brake Rotor	ROTOR KIT,FRT BRK	SJ498
Rear Brake Rotor	ROTOR KIT,RR BRK	SJ499
Front Brake Rotor	ROTOR,FRT BRK	SJ500
Rear Brake Rotor	ROTOR,RR BRK	SJ501
Front Disc Brake Pad	PAD KIT,FRT DISC BRK	SJ565
Front Brake Rotor	ROTOR KIT,FRT BRK	SS282
Front Disc Brake Pad	PAD KIT,FRT DISC BRK	SS283
Rear Disc Brake Pad	PAD KIT,RR DISC BRK	SS284
Brake Rotor	ROTOR PKG,BRK	SJ072

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Front Brake Caliper Replacement

Warning:

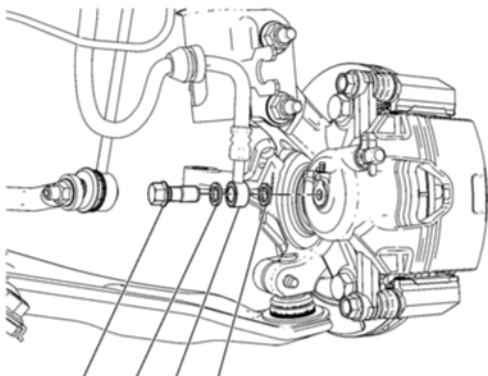
Refer to [Brake Dust Warning](#).

Warning:

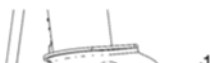
Refer to [Brake Fluid Irritant Warning](#).

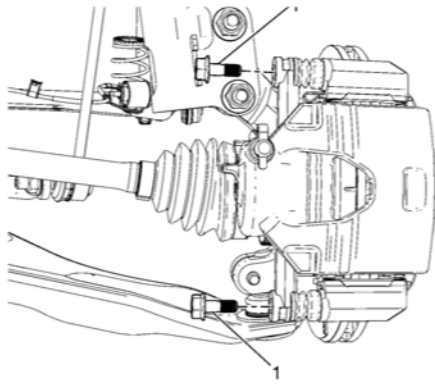
Removal Procedure

1. Inspect the fluid level in the master cylinder reservoir.
2. If the brake fluid level is midway between the maximum-full point and the minimum allowable level, no brake fluid needs to be removed from the reservoir before proceeding.
3. If the brake fluid level is higher than midway between the maximum-full point and the minimum allowable level, remove the brake fluid to the midway point before proceeding.
4. Raise and support the vehicle. Refer to [Lifting and Jacking the Vehicle](#).
5. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).



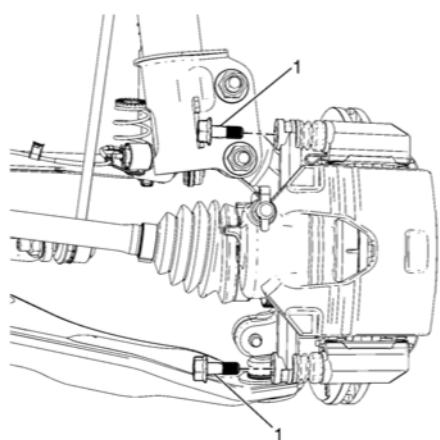
6. [Click here for full size](#)
7. Remove the brake hose-to-caliper bolt(1) from the brake caliper.
8. Remove the brake hose(3) from the brake caliper.
9. Remove and discard the 2copper brake hose washers(2). These washers may be stuck to the brake caliper and/or the brake hose end(3).
10. Cap or plug the opening in the brake caliper and the brake hose to prevent fluid loss and contamination.





11. [Click here for full size](#)
12. Remove the brake caliper guide pin bolts (1).
13. Remove the brake caliper from the caliper brackets.
14. Inspect the brake caliper guide pins for freedom of movement, and inspect the condition of the guide pin boots. Move the guide pins inboard and outboard within the bracket bores, without disengaging the slides from the boots, and observe for the following:
15.
 - Restricted caliper guide pin movement
 - Looseness in the brake caliper mounting bracket
 - Seized and binding caliper guide pins
 - Split or torn boots
16. If any of the conditions listed are found, the brake caliper guide pins and/or boots require replacement.

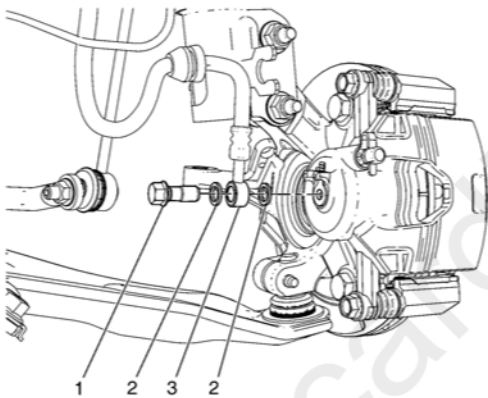
Installation Procedure



1. [Click here for full size](#)
2. Install the brake caliper to the brake caliper bracket.
3. Caution:

Refer to [Fastener Caution](#).

4. Install the brake caliper guide pin bolts(1) and tighten to 28N-m (21lb-ft).



5. [Click here for full size](#)
6. Remove the caps or plugs from the brake caliper opening and the brake hose(3).
7. Note:
Do not reuse the copper brake hose washers.
8. Install NEW copper brake hose washers(2) to the brake hose-to-caliper bolt(1) and to the brake hose(3).
9. Install the brake hose(3) and the brake hose-to-caliper bolt(1) to the brake caliper and tighten to 40N-m (30lb-ft).
10. Bleed the hydraulic brake system. Refer to [Hydraulic Brake System Bleeding](#).
11. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
12. Lower the vehicle.
13. With the engine OFF, gradually apply the brake pedal to approximately 2/3 of its travel distance.
14. Slowly release the brake pedal.
15. Wait 15 seconds, then gradually apply the brake pedal approximately 2/3 of its travel distance again until a firm brake pedal apply is obtained. This will properly seat the brake caliper pistons and brake pads.

Related Part Information

Part Name	Catalog Name	Part Code
Front Brake Caliper	CALIPER,FRT BRK	0050A
Front Brake Caliper	CALIPER KIT,FRT BRK	0050B
Front Brake Caliper	CALIPER,FRT BRK	0050C
Front Brake Caliper	CALIPER,FRT BRK (W/O BRK PADS)	0050D
Front Brake Caliper	CALIPER,FRT BRK (W/BRK PADS)	0050E
Front Brake Caliper	CALIPER,FRT BRK (W/O BRK PADS & BRKT)	0052A
Front Brake Caliper	CALIPER,FRT BRK (RPR)	X0151
Front Brake Caliper	CALIPER PKG,FRT BRK	SJ732
Front Brake Caliper	CALIPER KIT,FRT BRK	SJ131

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Front Brake Caliper Overhaul

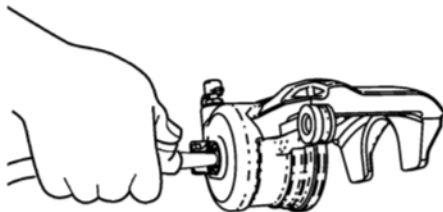
Warning:

Refer to [Brake Dust Warning](#).

Warning:

Refer to [Brake Fluid Irritant Warning](#).

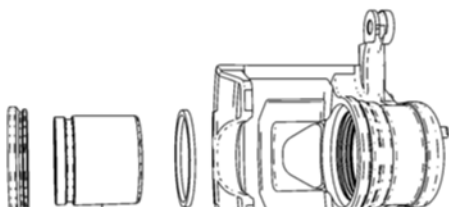
Removal Procedure

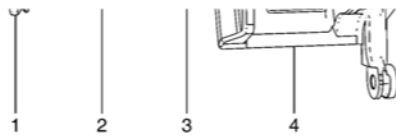


1. [Click here for full size](#)
2. **Warning:**

Do not place fingers in front of the caliper piston(s) in an attempt to catch or protect it when applying compressed air. The piston(s) can fly out with force and could result in serious bodily injury.
3. **Caution:**

Use clean cloths to pad interior of caliper housing during piston removal. Use just enough air to ease the pistons out of the bores. If the pistons are blown out, even with the padding provided, it may be damaged.
4. Remove the brake caliper from the vehicle. Refer to [Front Brake Caliper Replacement](#).
5. Remove the brake caliper piston from the caliper bore by directing low pressure compressed air into the caliper bore through the fluid inlet hole.



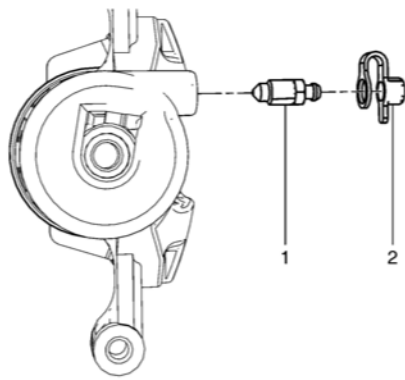


6.

[Click here for full size](#)

7. Remove the piston dust boot seal(1) from the seal counter-bore in the caliper(4). Discard the boot seal.
8. Using a small wooden or plastic tool, remove the piston seal(4) from the caliper bore. Discard the piston seal.





9.

[Click here for full size](#)

10. Remove the brake bleeder valve cap (2).

11. Remove the brake bleeder valve (1).

12. Note:

Do not use abrasives to clean the brake caliper piston.

13. Inspect the caliper bore for cracks, scoring, pitting, excessive rust, and/or excessive corrosion.

14. Clean the brake caliper piston bore and seal counterbore, and the caliper piston with denatured alcohol, or equivalent.

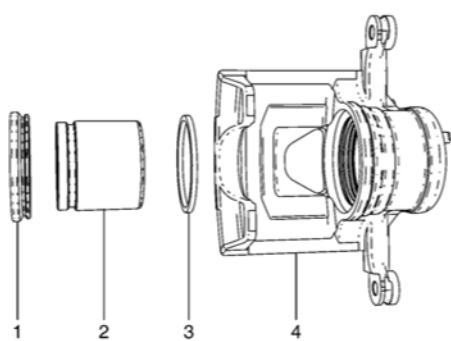
15. Dry the caliper piston bore and counterbore, and the piston with non-lubricated, filtered, compressed air.

16. If light rust or light corrosion are present in the caliper bore, attempt to remove the imperfection with a fine emery paper. If the imperfection cannot be removed, replace the caliper assembly.

17. If cracks, scoring, pitting, excessive rust, and/or excessive corrosion are present in the caliper bore, replace the caliper assembly.

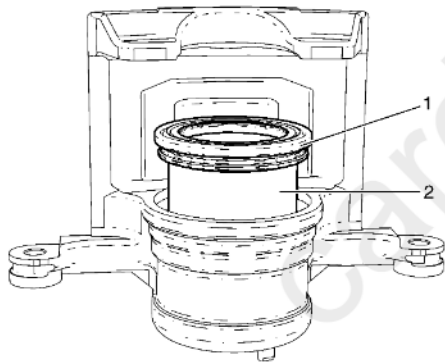
18. Inspect the caliper piston for cracks, scoring, and/or damage to the plating. Replace the caliper piston if any of these conditions exist.

Installation Procedure

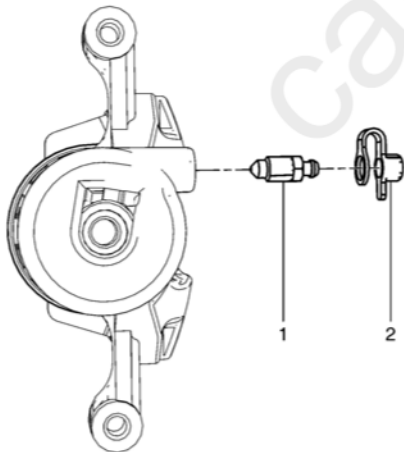


1. [Click here for full size](#)
2. Lubricate the new piston seal (3) with the brake fluid from a clean, sealed brake fluid container. Refer to [Brake System Specifications](#) for the recommended brake fluid.

3. Install the lubricated, new piston seal(3) into the caliper bore.
4. Apply a thin coat of brake fluid from a clean, sealed brake fluid container onto the outer surface area of the caliper piston(2). Refer to [Brake System Specifications](#) for the recommended brake fluid
5. Install the bottom half of the caliper piston(2) into the caliper bore.



6. [Click here for full size](#)
7. Install the new piston dust boot seal(1) over the caliper piston(2).
8. Compress the caliper piston(2) to the bottom of the caliper bore.
9. Fully seat the piston dust boot seal(1) into caliper counter-bore.



10.

[Click here for full size](#)

11. Caution:

Refer to [Fastener Caution](#).

12. Install the brake bleeder valve (1) to the caliper and tighten to 8.5 N-m (75 lb-in).

13. Install the brake bleeder valve cap (1).

14. Install the brake caliper to the vehicle. Refer to [Front Brake Caliper Replacement](#).

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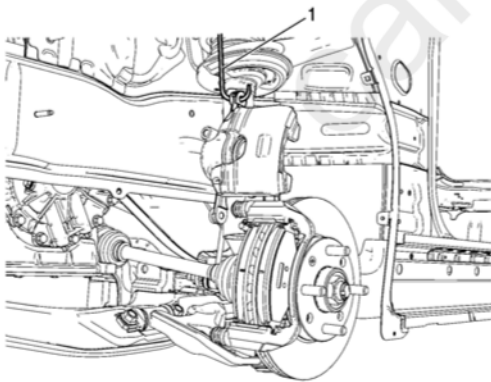
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Front Brake Caliper Bracket Replacement

Removal Procedure

Warning:

Refer to [Brake Dust Warning](#).

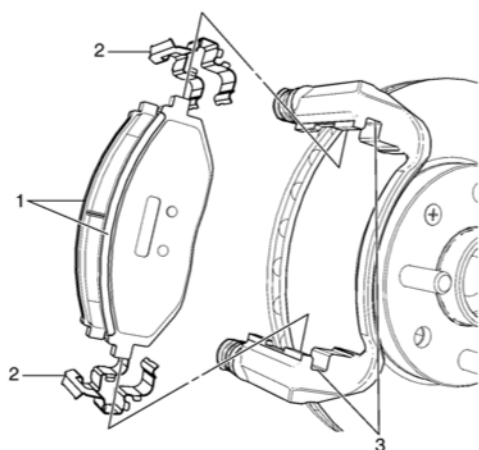


1. [Click here for full size](#)

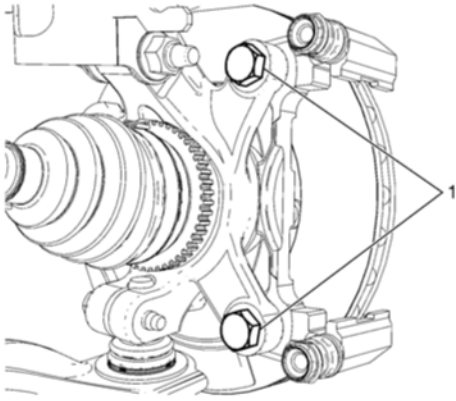
2. Caution:

Support the brake caliper with heavy mechanic wire, or equivalent, whenever it is separated from its mount and the hydraulic flexible brake hose is still connected. Failure to support the caliper in this manner will cause the flexible brake hose to bear the weight of the caliper, which may cause damage to the brake hose and in turn may cause a brake fluid leak.

3. Remove the brake caliper from the brake caliper mounting bracket and support the brake caliper with heavy mechanic's wire(1), or equivalent. Do NOT disconnect the hydraulic brake flexible hose from the caliper. Refer to [Front Brake Caliper Replacement](#).

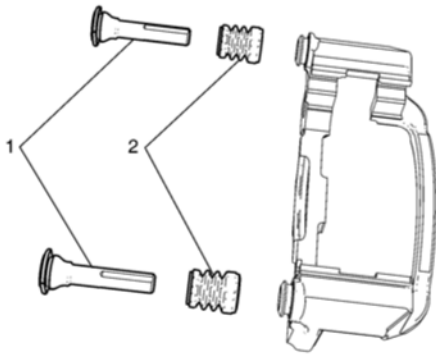


4. [Click here for full size](#)
5. Remove the brake pads (1) from the brake caliper bracket.
6. Remove the brake pad retainers (2) from the brake caliper bracket.
7. If reusing the bracket, thoroughly clean the pad hardware mating surfaces of the caliper bracket (3), of any debris and corrosion.
8. Inspect the disc brake pad retainers (2) for the following:
9.
 - Bent mounting tabs
 - Excessive corrosion
 - Looseness at the brake caliper mounting bracket
 - Looseness at the disc brake pads
10. If any of the conditions listed are found, the disc brake pad retainers require replacement.



11. [Click here for full size](#)
12. Note:

The brake caliper mounting bracket bolts must not be used. Replace the bolts with new bolts whenever the bolts are removed or become loose.
13. Remove the brake caliper mounting bracket bolts (1).
14. Remove the brake caliper bracket from the steering knuckle.

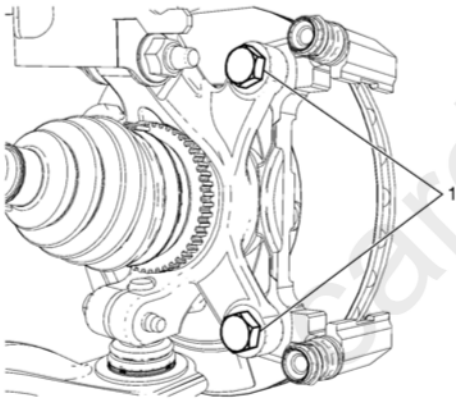


15. [Click here for full size](#)
16. Inspect the caliper bracket. If the brake caliper bracket is bent, cracked, or damaged, it requires replacement.
17. Inspect the brake caliper guide pins (1) for freedom of movement, and inspect the condition of the guide pin boots (2). Move the guide pins inboard and outboard within the bracket bores, without disengaging the slides from the boots, and observe for the following:
- 18.
- Restricted caliper guide pin movement
 - Looseness in the brake caliper mounting bracket
 - Seized or binding caliper guide pins

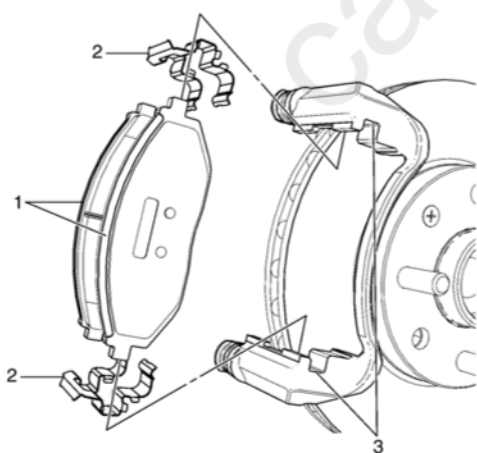
- Split or torn boots

19. If any of the conditions listed are found, the brake caliper guide pins and/or boots require replacement.

Installation Procedure



1. [Click here for full size](#)
2. Install the brake caliper mounting bracket to the steering knuckle.
3. Caution:
Refer to [Fastener Caution](#).
4. Install the 2 NEW brake caliper mounting bracket bolts (1) and tighten to 95 N-m (70 lb-ft).



5. [Click here for full size](#)
6. Apply a very thin coating of high temperature silicone brake lubricant to the pad hardware mating surfaces of the caliper bracket(3) only.
7. Clean the brake pad mating surfaces of the brake pad retainers(2).
8. Install the brake pad retainers(2) to the brake caliper bracket.
9. Note:

The wear sensor equipped disc brake pad must be mounted inboard of the rotor with the leading edge of the sensor facing the brake rotor during forward wheel rotation, or at the top of the pad when installed in vehicle position.
10. Install the brake pads(1) to the brake caliper bracket.
11. Remove the support and reposition the brake caliper over the brake pads and to the mounting bracket. Refer to [Front Brake Caliper Replacement](#).

Related Part Information

Part Name	Catalog Name	Part Code
Front Brake Caliper Bracket	BRACKET,FRT BRK CLPR	X0006
Front Brake Caliper Bracket	BRACKET,FRT BRK CLPR	X0161
Front Brake Caliper Bracket	BRACKET KIT,FRT BRK CLPR	X0164

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Front Brake Rotor Replacement

Special Tools

- CH-41013 Rotor Surfacing Kit
- CH-42450-A Wheel Hub Resurfacing Kit

For equivalent regional tools, refer to [Special Tools](#).

Warning:

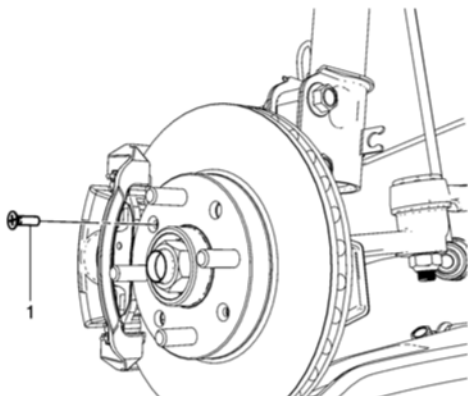
Refer to [Brake Dust Warning](#).

Removal Procedure

1. Caution:

Refer to [Vehicle Lifting and Jacking Caution](#).

2. Raise and support the vehicle.
3. Remove the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).

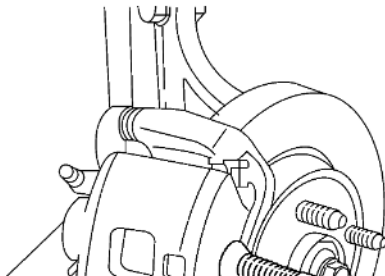


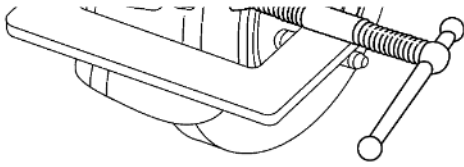


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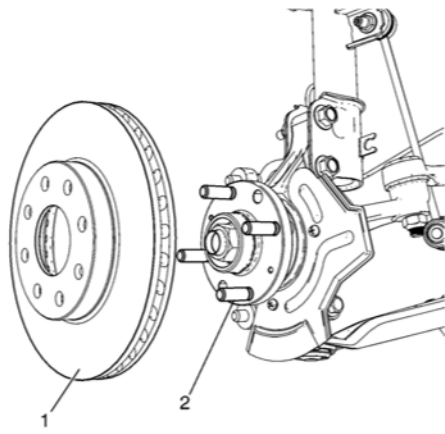
[Click here for full size](#)

5. Remove the brake rotor screwâ€“(1).



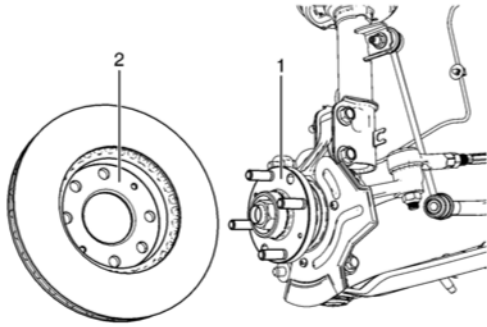


6. [Click here for full size](#)
7. Install a C-clamp over the body of the brake caliper, with the C-clamp ends against the rear of the caliper body and the outboard disc brake pad.
8. Tighten the C-clamp until the caliper piston is compressed into the caliper bore enough to allow the caliper to slide past the brake rotor.
9. Remove the C-clamp.



10. [Click here for full size](#)
11. Remove the brake caliper and the caliper mounting bracket as an assembly from the steering knuckle and support the assembly with heavy mechanics wire or equivalent. Ensure that there is no tension on the hydraulic brake flexible hose. Refer to [Front Brake Caliper Bracket Replacement](#).
12. Remove the brake rotor (1) from the hub flange (2).

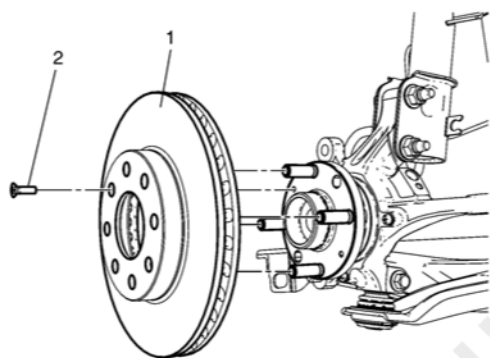
Installation Procedure



1. [Click here for full size](#)
2. Note:

Whenever the brake rotor has been separated from the hub/axle flange, any rust or contaminants should be cleaned from the hub/axle flange and the brake rotor mating surfaces. Failure to do this may result in excessive assembled lateral runout (LRO) of the brake rotor, which could lead to brake pulsation.

3. Using the *CH-42450-A* wheel hub resurfacing kit , thoroughly clean any rust or corrosion from the mating surface of the hub flange(1).
4. Using the *CH-41013* rotor resurfacing kit , thoroughly clean any rust or corrosion from the mating surface and mounting surface of the brake rotor(2).
5. Inspect the mating surfaces of the hub/axle flange and the rotor to ensure that there are no foreign particles or debris remaining.



6.

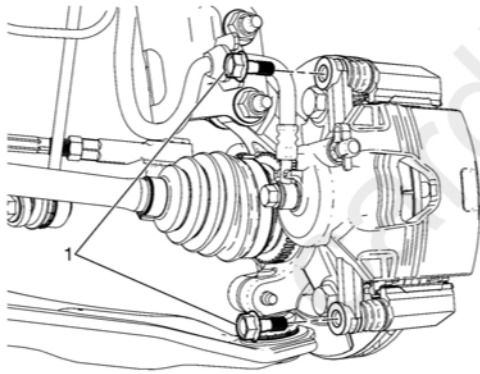
[Click here for full size](#)

7. Install the brake rotor(1) to the hub/axle flange.

8. Caution:

Refer to [Fastener Caution](#).

9. Install the brake rotor screw(2) and tighten to 4N-m (35lb-in).

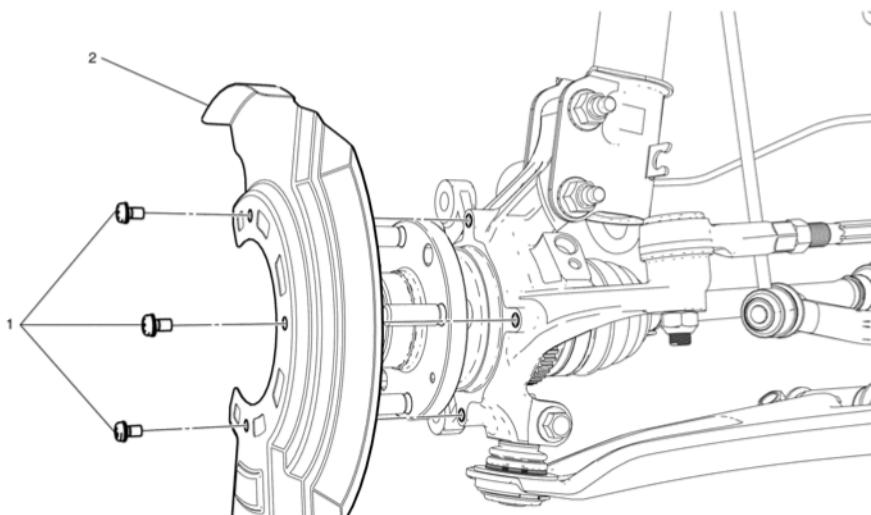


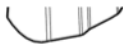
10. [Click here for full size](#)
11. Remove the support, and install the brake caliper and the brake caliper bracket as an assembly to the steering knuckle and install the brake caliper bracket bolts (1). Refer to [Front Brake Caliper Bracket Replacement](#).
12. Install the tire and wheel assembly. Refer to [Tire and Wheel Removal and Installation](#).
13. Lower the vehicle.
14. If the brake rotor was refinished or replaced, or if new brake pads were installed, burnish the pads and rotors. Refer to [Brake Pad and Rotor Burnishing](#).

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Front Brake Shield Replacement (Three Points Mounting)





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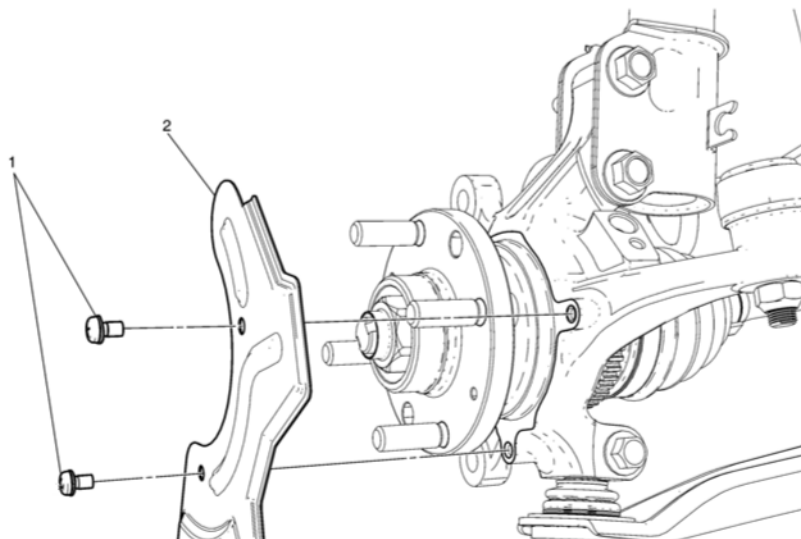
Callout	Component Name
Warning: Refer to Brake Dust Warning. Preliminary Procedures 1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle 2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation. 3. Without disconnecting the brake caliper hose, remove the brake caliper and bracket as an assembly and support with heavy mechanics wire or equivalent. Refer to Front Brake Caliper Bracket Replacement. 4. Remove the front brake rotor. Refer to Front Brake Rotor Replacement.	

Callout	Component Name
1	Disc Brake Splash Shield Bolt (Qty: 3) Caution: Refer to Fastener Caution. Tighten 4 N-m (35 lb-in)
2	Disc Brake Splash Shield

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Front Brake Shield Replacement (Two Points Mounting)





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Callout	Component Name
Warning: Refer to Brake Dust Warning. Preliminary Procedures 1. Raise the vehicle. Refer to Lifting and Jacking the Vehicle 2. Remove the tire and wheel. Refer to Tire and Wheel Removal and Installation. 3. Without disconnecting the brake caliper hose, remove the brake caliper and bracket as an assembly and support with heavy mechanics wire or equivalent. Refer to Front Brake Caliper Bracket Replacement. 4. Remove the front brake rotor. Refer to Front Brake Rotor Replacement.	

Callout	Component Name
1	Disc Brake Splash Shield Bolt (Qty:â€™%2) Caution: Refer to Fastener Caution . Tighten 4â€™%N-m (35â€™%lbâ€™%in)
2	Disc Brake Splash Shield

Related Part Information

Part Name	Catalog Name	Part Code
Front Brake Shield SHIELD,FRT BRK		0449A
Front Brake Shield SHIELD KIT,FRT BRK		0449B
Front Brake Shield SHIELD,FRT BRK		0450A

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Brake Rotor Assembled Lateral Runout Correction

Note:

- Brake rotor thickness variation MUST be checked BEFORE checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to [Brake Rotor Thickness Variation Measurement](#).
- Brake rotor assembled lateral runout (LRO) exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4,800â€”11,300â€”km (3,000â€”7,000â€”mi). Refer to [Brake Rotor Assembled Lateral Runout Measurement](#).

Review the following acceptable methods for bringing the brake disc assembled LRO to within specifications. Determine which method to use for the vehicle being repaired.

- The indexing method of correcting assembled LRO is most effective when the LRO specification is only exceeded by a relatively small amount: 0.025â€”0.127â€”mm (0.001â€”0.005â€”in). Indexing is used to achieve the best possible match of high spots to low spots between related components. Refer to [Brake Rotor Assembled Lateral Runout Correction - Indexing](#).
- The on-vehicle brake lathe method is used to bring the LRO to within specifications through compensating for LRO while refinishing the brake rotor. Refer to [Brake Rotor Assembled Lateral Runout Correction - On Vehicle Lathe](#).

If the assembled LRO cannot be corrected using these methods, then other components must be suspected as causing and/or contributing to the LRO concern.

Related Part Information

Part Name	Catalog Name	Part Code
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Brake Rotor	ROTOR PKG,BRK	SJ072
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Brake Rotor Assembled Lateral Runout Correction - Indexing

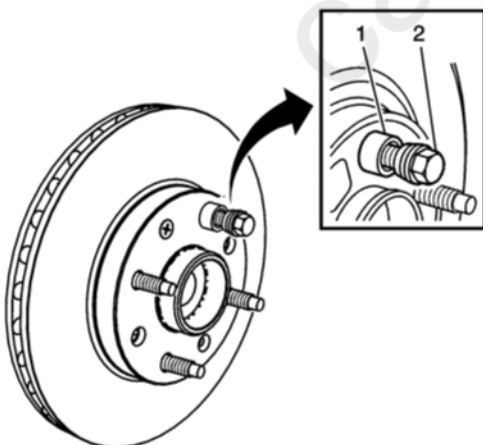
Special Tools

CH-45101-100 Conical Brake Rotor Washers

For equivalent regional tools, refer to [Special Tools](#).

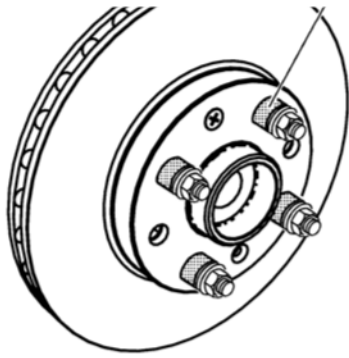
1. Warning:

Refer to [Brake Dust Warning](#).



2. [Click here for full size](#)
3. Note:
- Brake rotor thickness variation MUST be checked BEFORE checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to [Brake Rotor Thickness Variation Measurement](#).
 - Brake rotor assembled LRO exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4,800â€“11,300 km (3,000â€“7,000 mi). Refer to [Brake Rotor Assembled Lateral Runout Measurement](#).
4. Remove the *CH-45101-100* conical brake rotor washers and the lug nuts that were installed during the assembled LRO measurement procedure.
5. Inspect the mating surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
6. Index the brake rotor in a different orientation to the hub/axle flange.
7. Hold the rotor firmly in place against the hub/axle flange and install one of the *CH-45101-100* conical brake rotor washers (1) and one lug nut (2) onto the upper-most wheel stud.
8. Continue to hold the rotor secure and tighten the lug nut firmly by hand.





9. [Click here for full size](#)
10. Install the remaining *CH-45101-100* conical brake rotor washers and lug nuts onto the wheel studs (1) and tighten the nuts firmly by hand in the tightening sequence.
11. Tighten the lug nuts in sequence, in order to properly secure the rotor. Refer to [Tire and Wheel Removal and Installation](#).
12. Measure the assembled LRO of the brake rotor. Refer to [Brake Rotor Assembled Lateral Runout Measurement](#).
13. Compare the amount of change between this measurement and the original measurement.
14. If this measurement is within specifications, proceed to step 14.
15. If this measurement still exceeds specifications, repeat steps 1 through 9 until the best assembled LRO measurement is obtained.
16. Matchmark the final location of the rotor to the wheel studs if the orientation is different than it was originally.
17. If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to [Brake Rotor Assembled Lateral Runout Correction](#).
18. If the brake rotor assembled LRO is within specification, install the brake caliper and depress the brake pedal several times to secure the rotor in place before removing the *CH-45101-100* conical brake rotor washers and the lug nuts.

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Brake Rotor Assembled Lateral Runout Correction - On Vehicle Lathe

Special Tools

CH-45101-100 Conical Brake Rotor Washers

For equivalent regional tools, refer to [Special Tools](#).

1. Warning:

Refer to [Brake Dust Warning](#).

2. Note:

- Brake rotor thickness variation MUST be checked before checking for assembled lateral runout (LRO). Thickness variation exceeding the maximum acceptable level can cause brake pulsation. Refer to [Brake Rotor Thickness Variation Measurement](#).
 - Brake rotor assembled LRO exceeding the maximum allowable specification can cause thickness variation to develop in the brake rotor over time, usually between 4,800â€”11,300â€”km (3,000â€”7,000â€”mi). Refer to [Brake Rotor Assembled Lateral Runout Measurement](#).
3. Ensure that the brake caliper and brake caliper bracket that are already being supported, are clear from contacting any rotating components, such as the brake rotor.
 4. Remove the *CH-45101-100* conical brake rotor washers and the lug nuts that were installed during the assembled LRO measurement procedure and/or the indexing correction procedure.
 5. Inspect the mounting surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
 6. Set up the lathe, following the manufacturer instructions.
 7. Refinish the brake rotor, following the brake lathe manufacturers instructions.
 8. After each successive cut, inspect the brake rotor thickness. Refer to [Brake Rotor Thickness Measurement](#).
 9. If at any time the brake rotor exceeds the minimum allowable thickness after refinish specification, the brake rotor must be replaced. After replacing the brake rotor, proceed to stepâ€”10.
 10. After refinishing the brake rotor, use the following procedure in order to obtain the desired non-directional finish:
 11.
 1. Follow the brake lathe manufacturer recommended speed setting for applying a non-directional finish.
 2. Using moderate pressure, apply the non-directional finish:
 3.
 - If the lathe is equipped with a non-directional finishing tool, apply the finish withâ€”120-grit aluminum oxide sandpaper.
 - If the lathe is not equipped with a non-directional finishing tool, apply the finish with a sanding block andâ€”150-grit aluminum oxide sandpaper.
 4. After applying a non-directional finish, clean each friction surface of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
 12. Remove the lathe from the vehicle.
 13. Measure the assembled LRO of the brake rotor. Refer to [Brake Rotor Assembled Lateral Runout Measurement](#).
 14. If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to [Brake Rotor Assembled Lateral Runout Correction](#).
 15. If the brake rotor assembled LRO is within specification, install the brake caliper and depress the brake pedal several times to secure the brake rotor in place before removing the *CH-45101-100* conical brake rotor washers and the lug nuts.

Related Part Information

Part Name	Catalog Name	Part Code
Brake Rotor	ROTOR PKG,BRK	SJ072

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Brake Rotor Refinishing

Special Tools

- CH-41013 Rotor Resurfacing Kit
- CH-42450-A Wheel Hub Resurfacing Kit

For equivalent regional tools, refer to [Special Tools](#).

1. Note:

- The disc brake rotors do not require refinishing as part of routine brake system service. New disc brake rotors do not require refinishing.
- Do not refinish disc brake rotors in an attempt to correct the following conditions:
 - - Brake system noise – squeal, growl, groan
 - Uneven and/or premature brake pad wear
 - Superficial or cosmetic corrosion/rust of the disc brake rotor friction surface
 - Scoring of the disc brake rotor friction surface less than the maximum allowable specification
- Before refinishing a brake rotor, the brake rotor must first be checked for adequate thickness to allow the brake rotor to be refinished and remain above the minimum allowable thickness after refinish specification. Refer to [Brake Rotor Thickness Measurement](#).
- Disc brake rotors should only be refinished if they have adequate thickness to be refinished and if one or more of the following conditions exist:
 - - Thickness variation in excess of the maximum allowable specification
 - Excessive corrosion/rust and/or pitting
 - Cracks and/or heat spots
 - Excessive blueing, discoloration
 - Scoring of the disc brake rotor surface in excess of the maximum allowable specification
- Disc brake rotors may need to be refinished as part of the process for correcting brake rotor assembled lateral runout (LRO) that exceeds the maximum allowable specification.

2. Note:

If the vehicle is equipped with cross-drilled rotors, use a lathe with positive rake tooling. This setup requires less cutting pressure, which will result in less vibration, and a better surface finish. Also, use a vibration dampener when cutting. Otherwise, refinish according to the following instructions.

3. Note:

Whenever the brake rotor has been separated from the hub/axle flange, clean any rust or contaminants from the hub/axle flange and the brake rotor mating surfaces. Failure to do this may result in increased assembled lateral runout (LRO) of the brake rotor, which could lead to brake pulsation.

4. Using the CH-42450-A wheel hub resurfacing kit, thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
5. Using the CH-41013 rotor resurfacing kit, thoroughly clean any rust or corrosion from the mating surface and mounting surface of the brake rotor.

6. Inspect the mating surfaces of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
7. Mount the brake rotor to the brake lathe according to the lathe manufacturer's instructions, ensuring that all mounting attachments and adapters are clean and free of debris.
8. Ensure that any vibration dampening attachments are securely in place.
9. With the brake lathe running, slowly bring in the cutting tools until they just contact the brake rotor friction surfaces.
10. Observe the witness mark on the brake rotor. If the witness mark extends approximately three-quarters or more of the way around the brake rotor friction surface on each side, the brake rotor is correctly mounted to the lathe.
11. If the witness mark does not extend three-quarters or more of the way around the brake rotor, re-mount the brake rotor to the lathe.
12. Following the brake lathe manufacturer's instructions, refinish the brake rotor.
13. After each successive cut, inspect the brake rotor thickness. Refer to [Brake Rotor Thickness Measurement](#).
14. If at any time the brake rotor exceeds the minimum allowable thickness after refinish specification, the brake rotor must be replaced.
15. After refinishing the brake rotor, use the following procedure in order to obtain the desired non-directional finish:
16.
 1. Follow the brake lathe manufacturer's recommended speed setting for applying a non-directional finish.
 2. Using moderate pressure, apply the non-directional finish:
 3.
 - If the lathe is equipped with a non-directional finishing tool, apply the finish with 120-grit aluminum oxide sandpaper.
 - If the lathe is not equipped with a non-directional finishing tool, apply the finish with a sanding block and 150-grit aluminum oxide sandpaper.
 4. After applying a non-directional finish, clean each friction surface of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner and wipe each friction surface using a clean shop towel to remove metal particles remaining from machining. Repeat the cleaning process if necessary to remove all metal particles.
17. Remove the brake rotor from the brake lathe.
18. Measure the assembled LRO of the brake rotor to ensure optimum performance of the disc brakes. Refer to [Brake Rotor Assembled Lateral Runout Measurement](#).
19. If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to [Brake Rotor Assembled Lateral Runout Correction](#).

Related Part Information

Part Name	Catalog Name	Part Code
Front Brake Rotor	ROTOR,FRT BRK (W/HUB)	0220A
Front Brake Rotor	ROTOR,FRT BRK(W/HUB)	0220D
Front Brake Rotor	ROTOR,FRT BRK (W/WHL)	0330A
Front Brake Rotor	ROTOR,FRT BRK(W/WHL)	0330D
Front Brake Rotor	ROTOR KIT,FRT BRK	0349A
Front Brake Rotor	ROTOR SET,FRT BRK	0349B
Front Brake Rotor	ROTOR,FRT BRK	0350A
Front Brake Rotor	ROTOR,FRT BRK	0350B
Front Brake Rotor	ROTOR,FRT BRK(CSTG)	0350C
Front Brake Rotor	ROTOR,FRT BRK(MCHG)	0350D
Front Brake Rotor	ROTOR,FRT BRK (PERFORMANCE)	0351A
Front Brake Rotor	ROTOR,FRT BRK (COATED)	0352B
Rear Brake Rotor	ROTOR SET,RR BRK	0364A
Rear Brake Rotor	ROTOR,RR BRK(W/HUB)	0365A
Rear Brake Rotor	ROTOR,RR BRK (W/HUB)	0365C

Part Name	Catalog Name	Part Code
Rear Brake Rotor	ROTOR,RR BRK(W/WHL)	0370A
Rear Brake Rotor	ROTOR,RR BRK(W/WHL)	0370C
Rear Brake Rotor	ROTOR KIT,RR BRK	0374Z
Rear Brake Rotor	ROTOR,RR BRK	0375A
Rear Brake Rotor	ROTOR,RR BRK	0376A
Rear Brake Rotor	ROTOR,RR BRK (PERFORMANCE)	0377A
Rear Brake Rotor	ROTOR,RR BRK (COATED)	0378B
Rear Brake Rotor	ROTOR,RR BRK	0400A
Rear Brake Rotor	ROTOR,RR BRK (MACHINED)	0400B
Rear Brake Rotor	ROTOR,RR BRK	0400C
Front Brake Rotor	ROTOR KIT,FRT BRK	SJ032
Rear Brake Rotor	ROTOR KIT,RR BRK	SJ091
Front Brake Rotor	ROTOR,FRT BRK	SJ092
Rear Brake Rotor	ROTOR,RR BRK	SJ093
Front Brake Rotor	ROTOR KIT,FRT BRK	SJ498
Rear Brake Rotor	ROTOR KIT,RR BRK	SJ499
Front Brake Rotor	ROTOR,FRT BRK	SJ500
Rear Brake Rotor	ROTOR,RR BRK	SJ501
Front Brake Rotor	ROTOR KIT,FRT BRK	SS282
Brake Rotor	ROTOR PKG,BRK	SJ072

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Specifications

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Fastener Specifications

Single Use Non-Threaded Fasteners/Components

Application
Note:
All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.
Front Brake Caliper Piston Boot
Front Brake Caliper Piston Seal
Front Brake Hose Washer

Single Use Threaded Fastener/Component Tightening Specifications

Application	Specification
	Metric (English)
Note:	
All fasteners/components listed in this table MUST BE DISCARDED and replaced with NEW after removal.	
Brake Caliper Mounting Bracket Bolts	95â€‰N-mâ€‰(70â€‰lb-ft)

Reusable Threaded Fastener Tightening Specifications

Application	Specification
	Metric (English)
Note:	
All fasteners listed in this table can be reused after removal.	
Brake Caliper Bleeder Valve	8.5â€‰N-mâ€‰(75â€‰lb-in)
Brake Caliper Guide Pin Bolts	28â€‰N-mâ€‰(21â€‰lb-ft)
Brake Hose to Brake Caliper Banjo Bolt	40â€‰N-mâ€‰(30â€‰lb-ft)
Brake Rotor Screw	4â€‰N-mâ€‰(35â€‰lb-in)
Disc Brake Splash Shield Bolts	4â€‰N-mâ€‰(35â€‰lb-in)

1. BRAKES
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Disc Brake Component Specifications

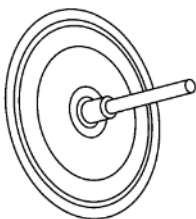
Application	Specification	
	Metric	English
Front Brake Pad		
Brake Pad Discard Thickness	2.00mm	0.079in
Brake Pad Lining Minimum Thickness	2.00mm	0.079in
Brake Pad Lining Thickness** New	11.00mm	0.433in
Brake Pad Thickness** New	11.00mm	0.433in
Front Brake Rotor - 13in Disc Brake		
Brake Rotor Diameter	236.00mm	9.291in
Brake Rotor Discard Thickness*	18.00mm	0.709in
Brake Rotor Maximum Allowable Assembled Lateral Runout	0.06mm	0.002in
Brake Rotor Maximum Allowable Scoring	1.50mm	0.059in
Brake Rotor Maximum Allowable Thickness Variation	0.01mm	0.0004in
Brake Rotor Minimum Thickness after Refinishing	19mm	0.748in
Brake Rotor Thickness** New	20mm	0.787in
Front Brake Rotor - 14in Disc Brake		
Brake Rotor Diameter	256.00mm	10.079in
Brake Rotor Discard Thickness*	22.00mm	0.866in
Brake Rotor Maximum Allowable Assembled Lateral Runout	0.06mm	0.002in
Brake Rotor Maximum Allowable Scoring	1.50mm	0.059in
Brake Rotor Maximum Allowable Thickness Variation	0.01mm	0.0004in
Brake Rotor Minimum Thickness after Refinishing	23mm	0.906in
Brake Rotor Thickness** New	24mm	0.945in
* All brake rotors have a minimum thickness dimension cast into them. Replace any rotor that is worn or machined below this specification.		

Special Tools and Equipment

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Special Tools

Illustration	Tool Number/Description
	CH-41013 Jâ€™41013 Rotor Resurfacing Kit

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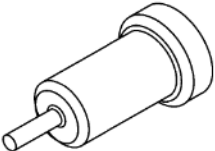
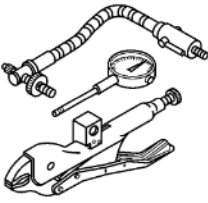
Illustration	Tool Number/Description
	CH-42450-A Jâ€™42450-A Wheel Hub Resurfacing Kit Click here for full size

Illustration	Tool Number/Description
	CH-45101 Jâ€™45101 Hub and Wheel Runout Gauge
Click here for full size	

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Illustration	Tool Number/Description
	CH-45101-100 Jâ€™45101-100 Conical Brake Rotor Washers Click here for full size