Component Procedures: Brake Rotor/Disc

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Component Procedures: Brake Rotor/Disc

Parts and Labor (itype_189)

Parts

Qualifier	Part #	Name	Price	Note
Front Brakes	23118055	Rotor	137.01	
Rear Brakes	23132528	Rotor	150.05	

Labor

Operation	Qualifier Path	Skill	Std Hrs	Wty Hrs
Remove & Replace	Brake Components > Brakes, R&R > Front Pads	B	1.3	0.0
Remove & Replace	Brake Components > Brakes, R&R > Front Pads >?		0.3	0.2
Remove & Replace	Brake Components > Brakes, R&R > Front Pads >?		0.2	0.2
Remove & Replace	Brake Components > Brakes, R&R > Front Pads >?		0.1	0.2
Remove & Replace	Brake Components > Brakes, R&R > Front Pads >?		0.2	0.2
Remove & Replace	Brake Components > Brakes, R&R > Front Pads >?		0.2	0.2
Remove & Replace	Brake Components > Brakes, R&R > Front Pads >?		0.4	0.2
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads	B	1.3	0.0
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads > ?		0.3	0.2
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads > ?		0.2	0.2
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads > ?		0.1	0.2
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads > ?		0.2	0.2
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads > ?		0.2	0.2
Remove & Replace	Brake Components > Brakes, R&R > Rear Pads > ?		0.4	0.2

Specifications Quick Reference (itype_439)

Quick Specifications
- item

Brake Pad and Rotor Burnishing (Article 10599)

Burnishing the brake pad s and brake rotor s is necessary in order to ensure that the braking surfaces 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 disc brake pad s have been replaced.
- Select a smooth road with little or no traffic.
- Accelerate the vehicle to 48 km/h (30 mph).
- Using moderate to firm pressure, apply the brakes to bring the vehicle to a stop. Do not allow the brakes to lock.
- Repeat steps 2 and 3 until approximately 20 stops have been completed. Allow sufficient cooling periods between stops in order to properly burnish the brake pads and rotors.

Brake Rotor Assembled Lateral Runout Correction (Article 10600)

- 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 4 800–11 300 km (3,000–7,000 mi). Refer to Brake Rotor Assembled Lateral Runout Measurement .
Review the following acceptable methods for bringing the brake rotor assembled LRO to within specifications. Determine which method to use for the specific vehicle being repaired.
- The correction plate method of correcting assembled LRO involves the addition of a tapered plate between the brake rotor and the hub/axle flange. The correction plate method can be used to correct LRO that exceeds the specification by up to 0.23 mm (0.009 in). Refer to Brake Rotor Assembled Lateral Runout Correction - Correction Plates .
- 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.

Brake Rotor Assembled Lateral Runout Correction - Correction Plates (Article 10601)

Special Tools
CH-45101-100 - Conical Brake Rotor Washers
Equivalent regional tools: Special Tools
- 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. 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 4,800–11,300 km (3,000–7,000 mi). Brake Rotor Assembled Lateral Runout Measurement
- Rotate the brake rotor to position the high spot, identified and marked during the brake rotor assembled LRO measurement procedure, to face upward. Click for full-size image
- 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.
- Inspect the mounting surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
- Select the correction plate, following the manufacturer's instructions, which has a specification closest to the assembled LRO measurement. For example: If the assembled LRO measurement was 0.076 mm (0.003 in), the 0.076 mm (0.003 in) correction plate would be used. If the measurement was 0.127 mm (0.005 in), the 0.152 mm (0.006 in) correction plate would be used.
- Determine the positioning for the correction plate (1) using the high spot mark (3) made during the brake rotor assembled LRO measurement procedure.
- Do NOT install used correction plates in an attempt to correct brake rotor assembled LRO.
- Do NOT stack up, or install more than one correction plate onto one hub/axle flange location, in an attempt to correct brake rotor assembled LRO.
- Install the correction plate (1) onto the hub/axle flange, with the V-shaped notch (2) orientated to align with the high spot mark (3), that was positioned to face upward.
- Install the brake rotor to the hub/axle flange. Use the matchmark made prior to removal for proper orientation to the flange. Click for full-size image
- 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.
- Continue to hold the rotor secure and tighten the lug nut firmly by hand.
- Install the remaining CH-45101-100 - Conical Brake Rotor Washers and lug nuts onto the wheel studs and tighten the nuts firmly by hand in a star-pattern. Click for full-size image
- Tighten the lug nuts in a star-pattern to specification, in order to properly secure the rotor. Tire and Wheel Removal and Installation
- Measure the assembled LRO of the brake rotor. Brake Rotor Assembled Lateral Runout Measurement
- If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to Brake Rotor Assembled Lateral Runout Correction .
- If the brake rotor assembled LRO measurement 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.

Brake Rotor Assembled Lateral Runout Correction - On Vehicle Lathe (Article 10602)

Special Tools
CH-45101-100 - Conical Brake Rotor Washers
For equivalent regional tools, refer to Special Tools .
- 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. 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 4 800–11 300 km (3,000–7,000 mi). Brake Rotor Assembled Lateral Runout Measurement
- This procedure cannot be used on vehicles with ETRS (Electronic Transmission Range Select).
- Ensure that the caliper and caliper bracket that are already being supported, are clear from contacting any rotating components, such as the brake rotor.

- 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.
- Inspect the mounting surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles or debris remaining.
- Set up the lathe, following the manufacturer's instructions.
- Refinish the brake rotor, following the brake lathe manufacturer's instructions.
- After each successive cut, inspect the brake rotor thickness. Brake Rotor Thickness Measurement
- If at any time the brake rotor exceeds the minimum allowable thickness after refinish specification, the brake rotor must be replaced. After replacing the rotor, proceed to step 10.
- After refinishing the brake rotor, use the following procedure in order to obtain the desired non-directional finish:
- Follow the brake lathe manufacturer's recommended speed setting for applying a non-directional finish.
- Using moderate pressure, apply the non-directional finish:
- 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.
- After applying a non-directional finish, clean each friction surface of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Remove the lathe from the vehicle.
- Measure the assembled LRO of the brake rotor. Brake Rotor Assembled Lateral Runout Measurement
- If the brake rotor assembled LRO measurement still exceeds the maximum allowable specification, refer to Brake Rotor Assembled Lateral Runout Correction .
- 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.

Brake Rotor Refinishing (Article 10603)

Special Tools
- CH-41013 - Rotor Resurfacing Kit
- CH-42450-A - Wheel Hub Resurfacing Kit
Equivalent regional tools: Special Tools
The disc brake rotors do not require refinishing as part of routine brake system service. New disc brake rotor s 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 disc 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 rotor MUST first be checked for adequate thickness to allow the rotor to be refinished and remain above the minimum allowable thickness after refinish specification. Brake Rotor Thickness Measurement
Disc brake rotors should only be refinished if they have adequate thickness to be refinished. A rotor can be refinished if one or more of the following conditions exists (DO NOT refinish for cosmetic reasons):
- Thickness variation and/or lateral runout are in excess of the maximum allowable specification
- Excessive corrosion/rust and/or pitting on the braking surface
- Excessive blueing discoloration and/or heat spots on the braking surface
- 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.
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.
- Using the CH-42450-A - Wheel Hub Resurfacing Kit , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
- Using the CH-41013 - Rotor Resurfacing Kit , thoroughly clean any rust or corrosion from the mating surface and mounting surface of the brake rotor.
- Inspect the mating surfaces of the hub/axle flange and the rotor to ensure that there are no foreign particles or debris remaining.
- 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.
- Ensure that any vibration dampening attachments are securely in place.
- With the brake lathe running, slowly bring in the cutting tools until they just contact the brake rotor friction surfaces.
- 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 properly mounted to the lathe.
- If the witness mark does not extend three-quarters or more of the way around the brake rotor, re-mount the rotor to the lathe.
- Following the brake lathe manufacturer's instructions, refinish the brake rotor.
- After each successive cut, inspect the brake rotor thickness. Brake Rotor Thickness Measurement
- If at any time the brake rotor exceeds the minimum allowable thickness after refinish specification, the brake rotor must be replaced.
- After refinishing the brake rotor, use the following procedure in order to obtain the desired non-directional finish:
- Follow the brake lathe manufacturer's recommended speed setting for applying a non-directional finish.
- Using moderate pressure, apply the non-directional finish:
- 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.
- After applying a non-directional finish, clean each friction surface of the brake rotor with a solution of mild dish washing detergent and water, or a GM approved brake cleaner and a clean shop towel to remove metal particles remaining from machining. Repeat the cleaning process if necessary to remove all metal particles.
- Remove the brake rotor from the brake lathe.
- Measure the assembled LRO of the brake rotor to ensure optimum performance of the disc brakes. Brake Rotor Assembled Lateral Runout Measurement
- If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Brake Rotor Assembled Lateral Runout Correction

Front Brake Rotor Replacement (LFX) (Article 10615)

Special Tools
- J-41013 - Rotor Resurfacing Kit
- J-42450-A - Wheel Hub Resurfacing Kit
For equivalent regional tools, refer to Special Tools .

Removal Procedure
- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
- Remove and discard the disc brake caliper bracket bolts (1). Click for full-size image
- Remove the disc brake caliper and bracket assembly and support with heavy mechanics wire or equivalent.
- Remove the disc brake rotor bolt (1). Click for full-size image
- Remove the disc brake rotor (1). Click for full-size image

Installation Procedure
- Using the J-42450-A - Wheel Hub Resurfacing Kit , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
- Using the J-41013 - Rotor Resurfacing Kit , thoroughly clean any rust or corrosion from the mating surface and mounting surface of the brake rotor.
- Inspect the mating surfaces of the hub/axle flange and the rotor to ensure there are no foreign particles or debris remaining.
- Install the disc brake rotor (1). Click for full-size image
- Install the disc brake rotor bolt (1) and tighten to 10 Nm (89 lb in) . Click for full-size image
- Install the disc brake caliper and bracket assembly.
- Install 2 new disc brake caliper bracket bolts (1) and tighten to 40 Nm (30 lb ft) + 90 degrees . Click for full-size image
- Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
- If the brake rotor was refinished or replaced, or if new brake pad s were installed, burnish the pads and rotors. Refer to Brake Pad and Rotor Burnishing .

Rear Brake Rotor Replacement (LFX) (Article 10632)

Special Tools
- J-41013 - Rotor Resurfacing Kit
- J-42450-A - Wheel Hub Resurfacing Kit
For equivalent regional tools, refer to Special Tools .

Removal Procedure
- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
- Remove and discard the disc brake caliper bracket bolts (1). Click for full-size image
- Remove the disc brake caliper and bracket assembly (1) and support with heavy mechanics wire or equivalent. Click for full-size image
- Remove the disc brake rotor bolt (1). Click for full-size image
- Remove the disc brake rotor (1). Click for full-size image

Installation Procedure
- Using the J-42450-A - Wheel Hub Resurfacing Kit , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
- Using the J-41013 - Rotor Resurfacing Kit , thoroughly clean any rust or corrosion from the mating surface and mounting surface of the brake rotor.
- Inspect the mating surfaces of the hub/axle flange and the rotor to ensure there are no foreign particles or debris remaining.
- Install the disc brake rotor (1). Click for full-size image
- Install the disc brake rotor bolt (1) and tighten to 10 Nm (89 lb in) . Click for full-size image
- Install the disc brake caliper and bracket assembly (1). Click for full-size image
- Install 2 new disc brake caliper bracket bolts (1) and tighten to 40 Nm (30 lb ft) +90 degrees . Click for full-size image
- Inspect the parking brake adjustment. Refer to Parking Brake Adjustment .
- Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
- If the brake rotor was refinished or replaced, or if new brake pad s were installed, burnish the pads and rotors. Refer to Brake Pad and Rotor Burnishing .

Brake Rotor Thickness Measurement (w/ ZL1 (Front)) (Article 10592)

- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Using a micrometer (1) calibrated in thousanths-of-a-millimeter, or ten-thousanths-of-an-inch, measure and record the thickness of the brake rotor at four or more points, evenly spaced around the rotor. Ensure 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 rotor, about 13 mm (½ in), for each measurement. Click for full-size image
- Compare the lowest thickness measurement recorded specifications. Refer to Disc Brake Component Specifications .
- If the lowest thickness measurement of the brake rotor is above the brake rotor discard thickness specification, the rotor may be able to be reused, depending upon surface and wear conditions which may be present.
- If the lowest thickness measurement of the brake rotor is at or below the brake rotor discard thickness specification, the rotor requires replacement.
- Instgall the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .

Brake Rotor Thickness Measurement (w/o ZL1 (Front)) (Article 10593)

- If the inboard friction surface of the brake rotor is not accessible, reposition and support the brake caliper bracket and/or brake caliper with the brake pad s. Refer to Front Brake Rotor Replacement and/or Rear Brake Rotor Replacement .
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Using a micrometer 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 rotor. Ensure 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 rotor, about 13 mm (½ in), for each measurement. Click for full-size image
- Compare the lowest thickness measurement recorded specifications. Refer to Disc Brake Component

Specifications .
- If the lowest thickness measurement of the brake rotor is above the minimum allowable thickness after refinishing specification, the rotor may be able to be refinished, depending upon surface and wear conditions which may be present.
- If the lowest thickness measurement of the brake rotor is at or below the minimum allowable thickness after refinishing specification, the rotor may not be refinished.
- If the lowest thickness measurement of the brake rotor is at or below the discard thickness specification, the rotor requires replacement.

Brake Rotor Thickness Variation Measurement (w/ ZL1 (Front)) (Article 10594)

- Raise and support the vehicle. Refer to Lifting and Jacking the Vehicle .
- Remove the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- 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 rotor. Ensure 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 rotor, about 13 mm (½ in), for each measurement. Click for full-size image
- Calculate the difference between the highest and lowest thickness measurements recorded to obtain the amount of thickness variation.
- Compare the thickness variation measurement to the following specification: Specification Brake rotor maximum allowable thickness variation: 0.025 mm (0.001 in)
Brake rotor maximum allowable thickness variation: 0.025 mm (0.001 in)
- If the brake rotor thickness variation measurement exceeds the specification, the rotor requires replacement.
- Install the tire and wheel assembly. Refer to Tire and Wheel Removal and Installation .

Brake Rotor Thickness Variation Measurement (w/o ZL1 (Front)) (Article 10595)

- If the inboard friction surface of the brake rotor is not accessible, reposition and support the brake caliper bracket and/or brake caliper with the brake pad s. Refer to Front Brake Rotor Replacement and/or Rear Brake Rotor Replacement .
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Using a micrometer 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 rotor. Ensure 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 rotor, about 13 mm (½ in), for each measurement. Click for full-size image
- Calculate the difference between the highest and lowest thickness measurements recorded to obtain the amount of thickness variation.
- Compare the thickness variation measurement to the following specification: Specification Brake rotor maximum allowable thickness variation: 0.025 mm (0.001 in)
Brake rotor maximum allowable thickness variation: 0.025 mm (0.001 in)
- If the brake rotor thickness variation measurement exceeds the specification, the rotor requires refinishing or replacement.

Brake Rotor Surface and Wear Inspection (w/ ZL1 (Front)) (Article 10590)

- Raise and support the vehicle. Lifting and Jacking the Vehicle
- Remove the tire and wheel assembly. Tire and Wheel Removal and Installation
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Inspect the friction surfaces of the brake rotor for the following Braking Surface Conditions:
- Heavy rust and/or pitting Light surface rust can be removed with an abrasive disc.
- Cracks and/or heat spots
- Excessive blueing discoloration
- If the friction surfaces of the brake rotor exhibit one or more of the Braking Surface Conditions, the rotor requires replacement.
- 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 rotor friction surfaces. Click for full-size image
- Compare the groove scoring depth recorded to the following specification: Specification Brake rotor maximum

allowable scoring: 1.50 mm (0.059 in)
Brake rotor maximum allowable scoring: 1.50 mm (0.059 in)
- If the brake rotor scoring depth exceeds the specification, or if an excessive amount of scoring is present, the rotor requires replacement.
- Install the tire and wheel assembly. Tire and Wheel Removal and Installation

Brake Rotor Surface and Wear Inspection (w/o ZL1 (Front)) (Article 10591)

- If the inboard friction surface of the brake rotor is not accessible, reposition and support the brake caliper bracket and/or brake caliper with the brake pad s. Refer to Front Brake Rotor Replacement and/or Rear Brake Rotor Replacement .
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Inspect the friction surfaces of the brake rotor for the following Braking Surface Conditions:
- 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 rotor.
- Cracks and/or heat spots
- Excessive blueing discoloration
- If the friction surfaces of the brake rotor exhibit one or more of the Braking Surface Conditions, the rotor requires refinishing or replacement.
- Using a micrometer calibrated in thousandths-of-a-millimeter, or ten-thousandths-of-an-inch, measure and record the scoring depth of any grooves present on the rotor friction surfaces. Click for full-size image
- Compare the groove scoring depth recorded to the following specification: Specification Brake rotor maximum allowable scoring: 1.50 mm (0.059 in)
Brake rotor maximum allowable scoring: 1.50 mm (0.059 in)
- If the brake rotor scoring depth exceeds the specification, or if an excessive amount of scoring is present, the rotor requires refinishing or replacement.

Brake Rotor Assembled Lateral Runout Measurement (w/ ZL1 (Front)) (Article 10588)

Special Tools
- CH-41013 - Rotor Resurfacing 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 .
- 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 4,800–11,300 km (3,000–7,000 mi).
- 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 .
- Matchmark the position of the brake rotor to the wheel studs if this has not been done already.
- Inspect the mating surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles, corrosion, rust, or debris remaining. If the wheel hub/axle flange and/or if the brake rotor mating surfaces exhibit these conditions, perform the following steps:
- Remove the front brake rotor from the vehicle. Refer to Front Brake Rotor Replacement .
- Using the CH-42450-A - wheel hub resurfacing kit , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
- Using the CH-41013 - rotor resurfacing kit , thoroughly clean any rust or corrosion from the mating surface of the brake rotor.
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Install the rotor to the hub/axle flange using the matchmark made prior to removal.
- Hold the rotor firmly in place against the hub/axle flange and install one of th CH-45101-100 - conical brake rotor washers (1), and one lug nut (2) onto the upper-most wheel stud. Click for full-size image
- Continue to hold the rotor secure and tighten the lug nut firmly by hand.
- Install the remaining CH-45101-100 - conical brake rotor washers and lug nuts onto the wheel studs and tighten the nuts firmly by hand in a star-pattern. Click for full-size image
- Tighten the lug nuts in a star-pattern to specification. Refer to Tire and Wheel Removal and Installation .
- If the brake rotor has been REPLACED with a new rotor, proceed to step 14.
- If the brake rotor meets the following criteria, proceed to step 10.

- The rotor is within specifications and is being REUSED.
- The rotor does NOT exhibit thickness variation exceeding the maximum allowable level.
- 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 degree angle, approximately 13 mm (0.5 in) from the outer edge of the rotor. Click for full-size image
- Measure and record the assembled LRO of the brake rotor.
- Rotate the rotor until the lowest reading is displayed on the indicator dial, then set the dial to zero.
- Rotate the rotor until the highest reading is displayed on the dial.
- Mark the location of the high spot relative to the nearest wheel stud, or studs.
- Measure and record the amount of LRO.
- Compare the brake rotor assembled LRO to the following specification: Specification Front brake rotor maximum allowable assembled lateral runout: 0.09 mm (0.003 in)
Front brake rotor maximum allowable assembled lateral runout: 0.09 mm (0.003 in)
- If the brake rotor assembled LRO is within specifications, proceed to step 18. If the brake rotor assembled LRO exceeds the specification proceed to step 14.
- 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 degree angle, approximately 13 mm (0.5 in) from the outer edge of the rotor.
- If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to Brake Rotor Assembled Lateral Runout Correction .
- If the brake rotor assembled LRO measurement 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.

Brake Rotor Assembled Lateral Runout Measurement (w/o ZL1 (Front)) (Article 10589)

Special Tools
- CH-41013 - Rotor Resurfacing 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 .
- 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 4,800–11,300 km (3,000–7,000 mi).
- 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 .
- Matchmark the position of the brake rotor to the wheel studs if this has not been done already.
- Inspect the mating surface of the hub/axle flange and the brake rotor to ensure that there are no foreign particles, corrosion, rust, or debris remaining. If the wheel hub/axle flange and/or if the brake rotor mating surfaces exhibit these conditions, perform the following steps:
- Remove the brake rotor from the vehicle. Refer to Front Brake Rotor Replacement and/or Rear Brake Rotor Replacement .
- Using the CH-42450-A - wheel hub resurfacing kit , thoroughly clean any rust or corrosion from the mating surface of the hub/axle flange.
- Using the CH-41013 - rotor resurfacing kit , thoroughly clean any rust or corrosion from the mating surface of the brake rotor.
- Clean the friction surfaces of the brake rotor with denatured alcohol, or an equivalent approved brake cleaner.
- Install the rotor to the hub/axle flange using the matchmark made prior to removal.
- Hold the rotor firmly in place against the hub/axle flange and install one of th CH-45101-100 - conical brake rotor washers (1), and one lug nut (2) onto the upper-most wheel stud. Click for full-size image
- Continue to hold the rotor secure and tighten the lug nut firmly by hand.
- Install the remaining CH-45101-100 - conical brake rotor washers and lug nuts onto the wheel studs and tighten the nuts firmly by hand in a star-pattern. Click for full-size image
- Tighten the lug nuts in a star-pattern to specification. Refer to Tire and Wheel Removal and Installation .
- If the brake rotor has been REFINISHED or REPLACED with a new rotor, proceed to step 14.
- If the brake rotor meets the following criteria, proceed to step 10.
- 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.

- 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 degree angle, approximately 13 mm (0.5 in) from the outer edge of the rotor. Click for full-size image
- Measure and record the assembled LRO of the brake rotor.
- Rotate the rotor until the lowest reading is displayed on the indicator dial, then set the dial to zero.
- Rotate the rotor until the highest reading is displayed on the dial.
- Mark the location of the high spot relative to the nearest wheel stud, or studs.
- Measure and record the amount of LRO.
- Compare the brake rotor assembled LRO to the following specification: Specification Front brake rotor maximum allowable assembled lateral runout: 0.06 mm (0.002 in)
Front brake rotor maximum allowable assembled lateral runout: 0.06 mm (0.002 in)
- If the brake rotor assembled LRO is within specifications, proceed to step 18. 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.
- 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 degree angle, approximately 13 mm (0.5 in) from the outer edge of the rotor.
- If the brake rotor assembled LRO measurement exceeds the specification, bring the LRO to within specifications. Refer to Brake Rotor Assembled Lateral Runout Correction .
- If the brake rotor assembled LRO measurement 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.

Vibration Diagnosis and Correction (Article 12596)

Non Standards
- Brake Rotor/Drum Balance Inspection (12597)