

BRAKE

GENERAL INFORMATION	26-3	Inspection	26-19
Overview	26-3	Installation	26-19
Description	26-3	Brake Pedal Assembly	26-20
Specifications	26-4	Removal	26-20
Tools	26-5	Inspection	26-21
		Installation	26-21
DIAGNOSIS & TESTING	26-7	Front Disc Brake Assembly	26-23
Diagnosis Content	26-7	Description	26-23
Problem Symptoms Table	26-7	On-vehicle Inspection	26-23
On-vehicle Inspection	26-8	Removal	26-24
Operation Step	26-8	Disassembly	26-25
		Inspection	26-26
ON-VEHICLE SERVICE	26-9	Assembly	26-27
Brake Bleeding	26-9	Installation	26-29
Operation Step	26-9	Front Brake Hose Assembly	26-30
Brake Fluid Replacement	26-12	Removal	26-30
Operation Step	26-12	Installation	26-31
Brake Fluid Reservoir Assembly	26-13	Rear Disc Brake Assembly	26-32
On-vehicle Inspection	26-13	Description	26-32
Removal	26-13	On-vehicle Inspection	26-33
Installation	26-14	Removal	26-33
Brake Master Cylinder Assembly	26-15	Disassembly	26-34
Removal	26-15	Inspection	26-36
Installation	26-16	Assembly	26-37
Vacuum Booster with Brake		Installation	26-39
Master Cylinder Assembly	26-17	Rear Brake Hose Assembly	26-40
On-vehicle Inspection	26-17	Removal	26-40
Removal	26-18	Installation	26-40



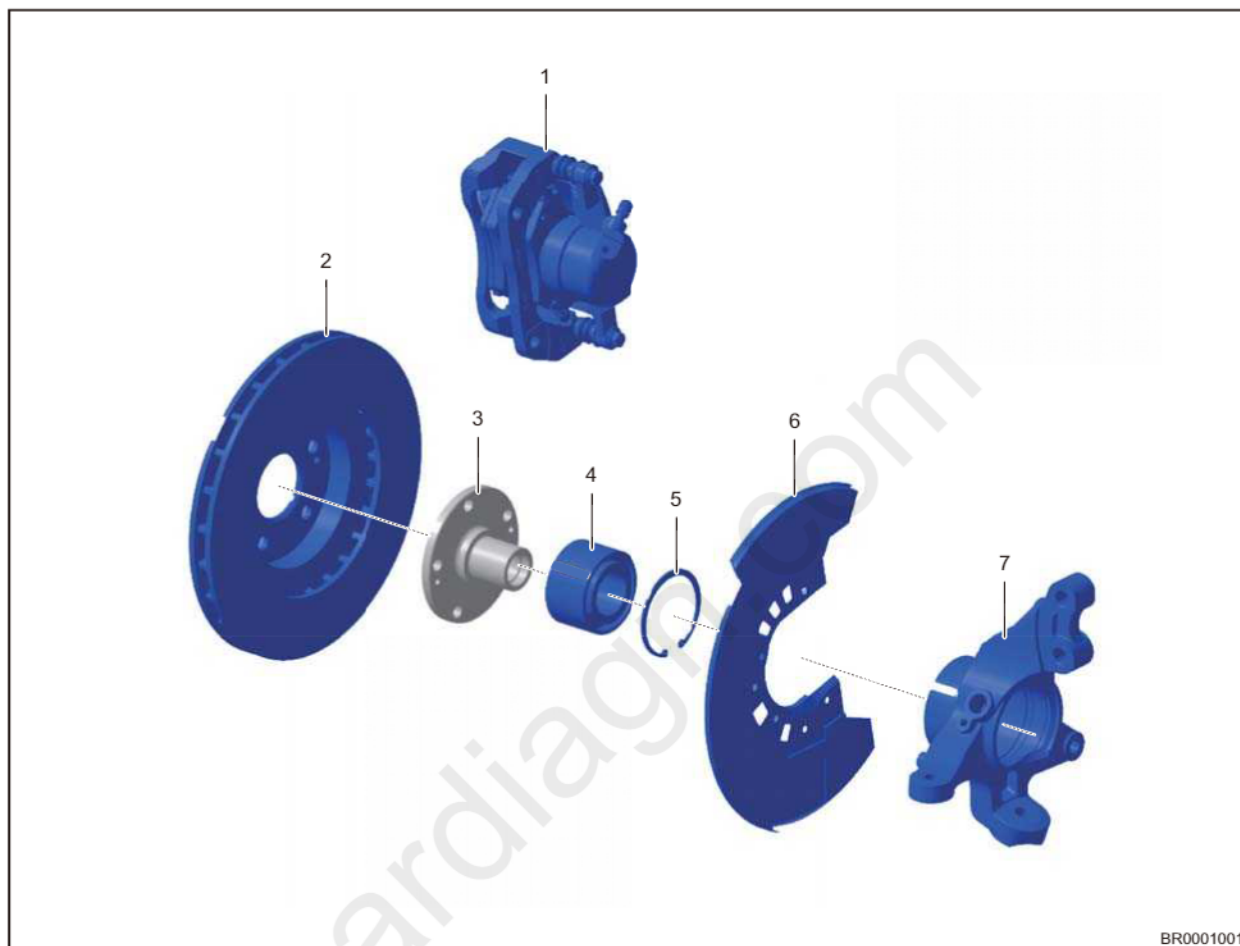
cardiagn.com

GENERAL INFORMATION

Overview

Description

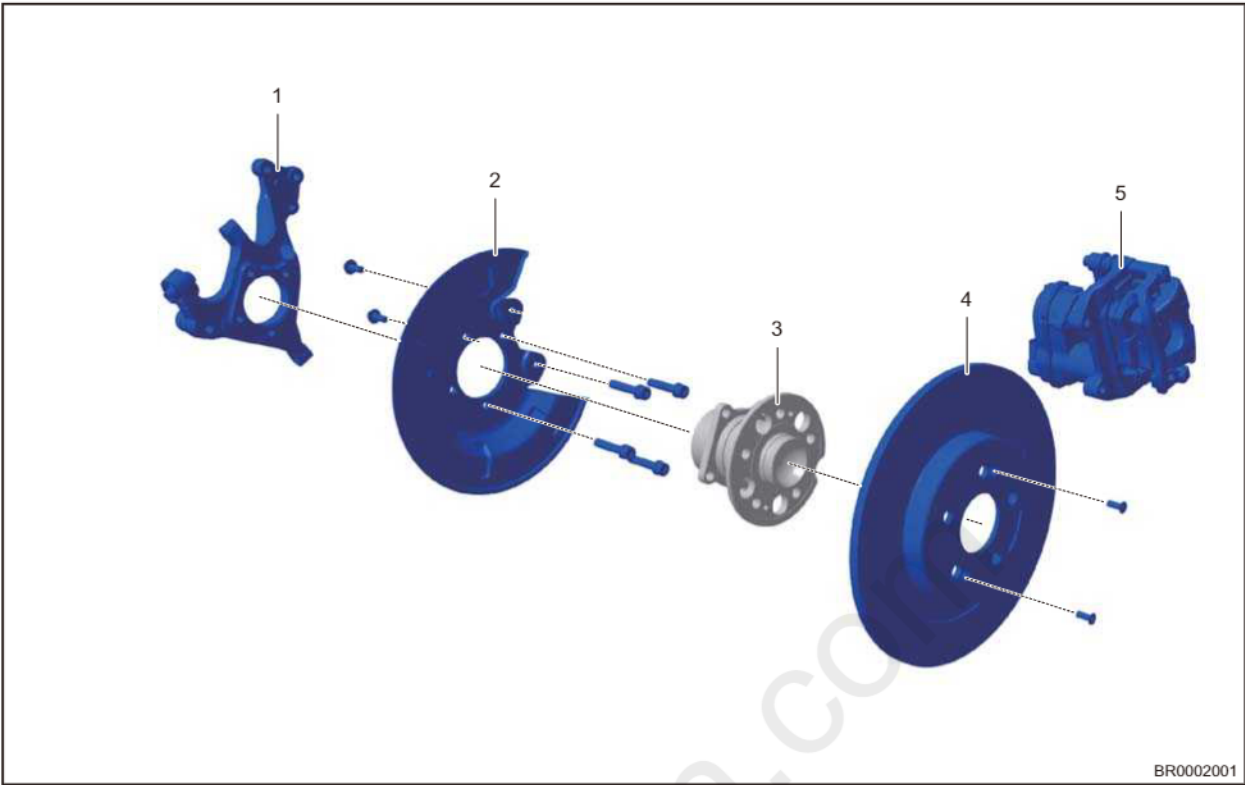
Front Ventilated Disc Brake Assembly



BR0001001

1 - Front Brake Caliper Assembly	2 - Front Brake Disc
3 - Front Hub	4 - Front Hub Bearing
5 - Bearing Retainer	6 - Front Dust Guard
7 - Front Steering Knuckle	

Rear Solid Disc Brake Assembly



1 - Rear Steering Knuckle	2 - Rear Dust Guard
3 - Rear Hub Bearing Assembly	4 - Rear Brake Disc
5 - Rear Brake Caliper Assembly	

Brake system uses the following configuration: a ventilated disc brake is used for each front wheel, and solid disc brake is used for each rear wheel (disc brake is used for service brake, and electric parking is used for parking brake).

Using lever principle, brake pedal pushes the pushrod into vacuum booster, which boosts the force of pushrod by using vacuum and then transmits the force to brake master cylinder assembly. Hydraulic pressure, produced in the brake master cylinder assembly, is transmitted to ABS Hydraulic Control Unit (HCU) through the brake line, and then distributed to individual brake calipers. Brake calipers apply force to brake linings using hydraulic pressure. Brake linings will cause wheel speed to decrease or stop depending on the amount of brake pressure applied.

Specifications

Torque Specifications

Description	Torque (N·m)
Wheel Mounting Bolt	110 ± 10
Master Cylinder Mounting Nut	13.7 ~ 21.6
Fixing Plug Between Brake Master Cylinder Assembly and Brake Pipe	18 ± 2
Fixing Nut Between Vacuum Booster Assembly and Brake Pedal Assembly	23 ± 2
Fixing Nut Between Brake Pedal Assembly and Body	23 ± 2
Coupling Plug Between Front Brake Caliper Assembly and Front Brake Hose Assembly	20 ± 2
Coupling Bolt Between Front Brake Caliper Assembly and Front Steering Knuckle Assembly	90 ~ 110
Front Brake Disc Locating Screw	4.5 ± 0.5

Description	Torque (N·m)
Front Brake Caliper Bleeder Screw	9 ~ 11
Guide Bolt Between Front Brake Caliper Fixing Bracket and Front Brake Cylinder Assembly	22 ~ 32
Coupling Plug Between Front Brake Hose Assembly and Front Brake Pipe	18 ± 2
Coupling Bolt Between Rear Brake Caliper Assembly and Rear Brake Hose Assembly	27 ± 2
Coupling Bolt Between Rear Brake Caliper Assembly and Brake Caliper Mounting Board Assembly	90 ~ 110
Rear Brake Disc Locating Screw	4.5 ± 0.5
Rear Brake Caliper Bleeder Screw	9 ~ 11
Guide Bolt Between Rear Brake Caliper Fixing Bracket and Rear Brake Cylinder Assembly	22 ~ 32
Coupling Plug Between Rear Brake Hose Assembly and Brake Pipe	18 ± 2
Parking Actuator Mechanism Fixing Screw	9 ~ 11

Front Disc Brake

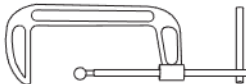
Description	Standard Thickness (mm)	Minimum Thickness (mm)	Brake Disc Runout (mm)
Front Brake Disc	25	23	Less than 0.06
Front Brake Lining	11	2	-

Rear Disc Brake

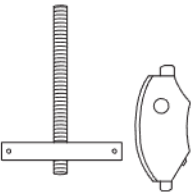
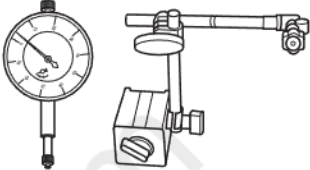
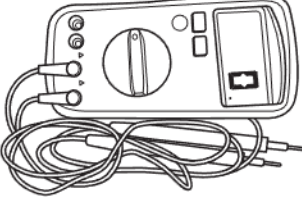
Description	Standard Thickness (mm)	Minimum Thickness (mm)	Brake Disc Runout (mm)
Rear Brake Disc	10	8	Less than 0.06
Rear Brake Lining	10.2	2	-

Tools

Special Tool

G Type Pliers	 093
---------------	--

General Tools

Rear Brake Cylinder Release Tool	 116
Dial Indicator and Magnetic Holder	 023
Vernier Caliper	 019
Digital Multimeter	 002

DIAGNOSIS & TESTING

Diagnosis Content

Problem Symptoms Table

Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Symptom	Possible Cause	Corresponding Measures
Brake shakes	Brake disc thickness is out of limit thickness	Check brake disc thickness difference
	Real brake disc runout is out of limit amount	Check real brake disc runout
	Hub bearing is damaged or worn	Check bearing damage
	Brake assembly bolt becomes loose	Check looseness of brake assembly bolt
	Steering/suspension part is loose or worn	Check in accordance with Repair Manual
	Tire dynamic balance	Check in accordance with Repair Manual
	Four-wheel alignment	Check in accordance with Repair Manual
	ABS operates	Check in accordance with Repair Manual
Abnormal noise occurs on bumpy road	Spring plate is worn or deformed	Check spring plate
	Brake assembly bolt becomes loose	Check looseness of brake assembly bolt
	Abnormal noise is caused by slight axial movement of brake caliper on bumpy road	Check guide pin and spring plate
	Steering/suspension part becomes loose or shock absorber is worn	Check in accordance with Repair Manual
Wheel dragging	Residual pressure in brake system	Loosen bleeder screw and discharge residual pressure
	Bearing is damaged	Check bearing
	Large sliding resistance of brake caliper	Check sliding of brake caliper
	Guide pin is deformed	Check deformation of guide pin
	Guide pin is not installed in place	Check if guide pin is installed in place
	Guide pin dust boot is damaged	Check if guide pin dust boot is damaged
	Linings are not installed correctly	Check if tab of linings are installed in place
	Drive shaft	Check in accordance with Repair Manual
	Chassis interference part	Check in accordance with Repair Manual
Brake noise	Metal scratching occurs during braking	Check for interferences and alarms
	Continuous "squeak" sound occurs for a longer time during braking	Check inside and outside linings for metal particles
	A clear "click" sound occurs at the beginning of braking	Check linings for looseness
	Relevant bolts are loose	Check in accordance with Repair Manual
	Relevant parts are damaged	Check in accordance with Repair Manual



On-vehicle Inspection

Operation Step

Warning/Caution/Hint

Caution:

- Use well-sealed brake fluid DOT4 or equivalent. DO NOT use oily solution, otherwise brake system seal may be damaged.
 - Brake fluid may damage paint surface. If brake fluid spills on paint surface, wash it off immediately with water.
 - DO NOT use gasoline, kerosene, alcohol, engine oil, transmission oil or any other fluid that contains mineral oil to clean the system components. These kinds of fluid will damage the rubber cover and seal.
 - During servicing, be sure to clean the grease or other foreign matter on the outer surface of brake caliper assembly, brake lining, brake disc and wheel hub.
 - When operating brake disc and brake caliper, be careful not to damage brake disc and brake caliper and scratch or cut brake shoe linings.
1. Check conditions of tires and wheels. Damaged or worn wheels and tires can cause a pull, shudder, vibration and a condition similar to sudden braking.
 2. If noise occurs while braking, check suspension components. Bounce the vehicle up and down several times and check suspension or steering components for any looseness, wear or damage.
 3. Check brake fluid level and condition.
 - (a) If brake fluid level is low, check ABS control unit assembly, brake caliper, brake line, brake master cylinder assembly and brake fluid reservoir, etc. for leakage.
 - (b) If brake fluid is contaminated, drain a certain amount of fluid for inspection. Replace with new fluid as necessary.

ON-VEHICLE SERVICE

Brake Bleeding

Operation Step

Be sure to perform brake bleeding and clutch bleeding after replacing hydraulic parts related to brake and clutch.

For details about clutch bleeding (See page 19-20)

There are 2 methods for brake bleeding, and specific operation procedures are as follows:

Method 1: Manual bleeding brake

Caution:

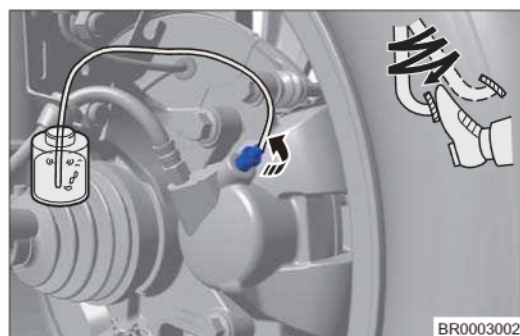
- When bleeding brake system, wear safety glasses.
- Be careful when bleeding air, as brake fluid at high pressure may spray out from bleeder screw.

Warning:

- Before removing brake fluid reservoir, wipe off any dust and other foreign matters on brake fluid reservoir to prevent them from entering.
- Use fresh, clear and well-sealed brake fluid with specified type or equivalent.
- DO NOT allow the brake fluid to adhere to any paint surface, such as vehicle body. If brake fluid leaks onto any paint surface, immediately wash it off.
- During bleeding, do not depress brake pedal repeatedly at any time with bleeder screw opened. Otherwise, air amount in the system will increase to make an extra bleeding.
- DO NOT drain the brake fluid in brake fluid reservoir while bleeding brake system.

Hint:

- An assistant will be required to assist when bleeding brake system.
1. Fill brake fluid reservoir with brake fluid to a proper level.
 2. Loosen bleeder screw cap and connect a clear plastic hose to bleeder screw. Submerge the end of hose into container.
 3. Have an assistant depress brake pedal 3 to 4 times repeatedly; and depress and hold it at a lower position, then loosen the bleeder screw.
 4. Tighten bleeder screw every time brake pedal goes down quickly, then release the brake pedal.



5. Repeat above steps, and use the same procedures to bleed brake line of each wheel in order of rear left wheel, front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

Empty sign: A stream of fresh brake fluid flows into clear container without bubbles.

Hint:

- During bleeding of brake system, make sure brake fluid level in brake fluid reservoir is always near "MAX" mark. Check brake fluid level at all times during bleeding. Add brake fluid as necessary.



BR0005002

6. Check and adjust the brake fluid level to "MAX" mark.
7. Check the brake pedal braking effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding procedures for brake system again as necessary.
8. Test vehicle to confirm that brakes operate properly with good depressing feel.

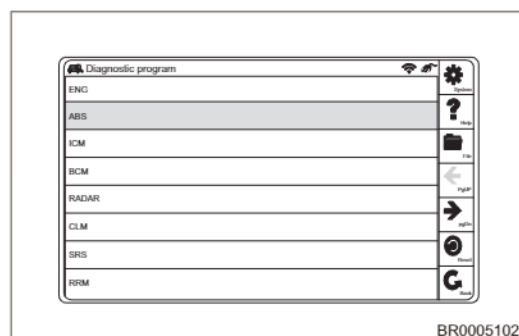
Method 2: Bleeding brake using diagnostic tester

Warning:

- Check that battery voltage should not be lower than 12 V.
- Bleeding order must be rear left/front left/front right/rear right.
- If it is necessary to repeat part or whole bleeding procedure, be sure to wait for 5 minutes to cool solenoid valve down, otherwise solenoid valve may be damaged due to overheat.
- Depress brake pedal repeatedly with a frequency of 0.5 times per second in the whole bleeding process.

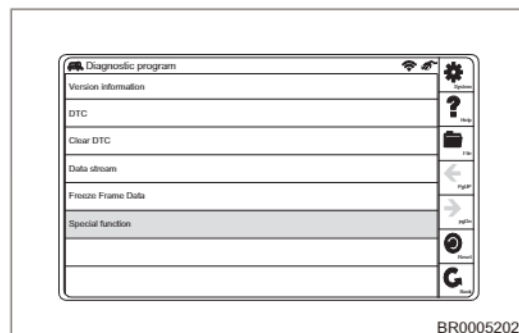
To reach sufficient pressure in hydraulic regulator, brake pedal needs to be depressed repeatedly during whole process.

9. Fill brake fluid reservoir with brake fluid to a proper level.
10. Depress brake pedal more than 20 times with engine stopped.
11. Turn ENGINE START STOP switch to ON, and enter T18 "Anti-lock Brake System/Electronic Stability Program" system using diagnostic tester.
 - (a) Please select [ABS] on Diagnostic program screen.



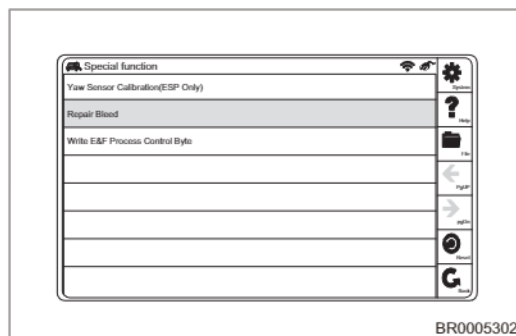
BR0005102

- (b) Please select [Special function] on Diagnostic program screen.

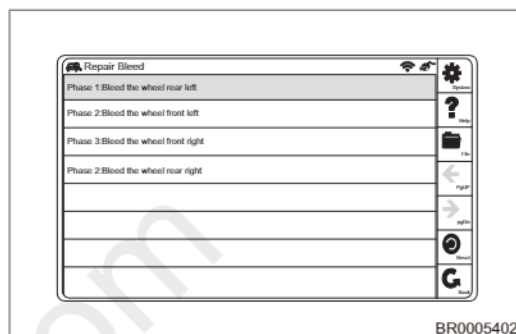


BR0005202

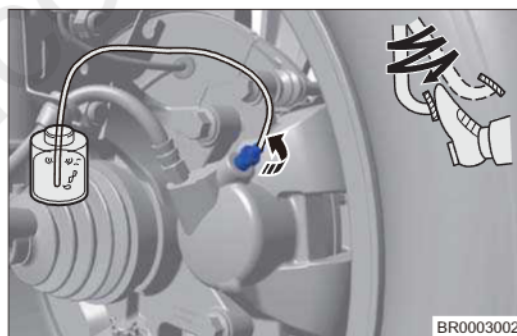
- (c) Please select [Repair Bleed] on Special function screen.



- (d) Please select [Phase 1: Bleed the wheel rear left] on Repair Bleed screen, then perform bleeding operation for rear left wheel.



12. Loosen bleeder screw cap of rear left wheel and connect a clear plastic hose to bleeder screw. Submerge the end of hose into container.



13. Use same bleeding procedures as rear left wheel to bleed air for brake lines of rear left wheel, front left wheel, front right wheel and rear right wheel, until no air exists in brake system.

Empty sign: A stream of fresh brake fluid flows into clear container without bubbles.

Hint:

- During bleeding of brake system, make sure brake fluid level in brake fluid reservoir is always near "MAX" mark. Check brake fluid level at all times during bleeding. Add brake fluid as necessary.

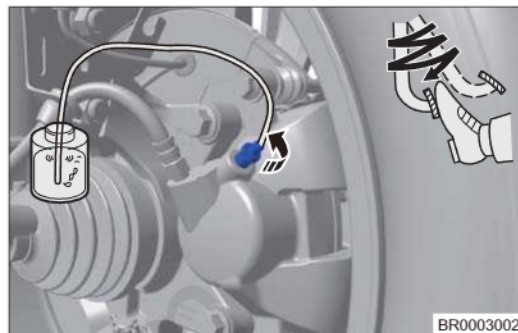


14. Check and adjust the brake fluid level to "MAX" mark.
15. Check the brake pedal effect. If braking effect is poor or pedal is spongy, air may still exist in system. Perform bleeding procedures for brake system again as necessary.
16. Test vehicle to confirm that brakes operate properly with good depressing feel.

Brake Fluid Replacement

Operation Step

1. Drain the brake fluid.
 - (a) Start engine and run it at idle.
 - (b) Screw off filler cap of brake fluid reservoir assembly. Loosen bleeder screw cap and connect a clear plastic hose to bleeder screw. Submerge the end of hose into container.
 - (c) Loosen bleeder screw, and depress brake pedal continuously until no brake fluid comes out.
2. Add brake fluid.
 - (a) Tighten bleeder screw after confirming that brake fluid has been drained. Fill brake fluid reservoir with new brake fluid to a proper level.
3. Perform bleeding procedures.
 - (a) After replacing with new brake fluid, be sure to bleed the brake system for normal operation. For details of brake system bleeding ([See page 26-9](#)).



Brake Fluid Reservoir Assembly

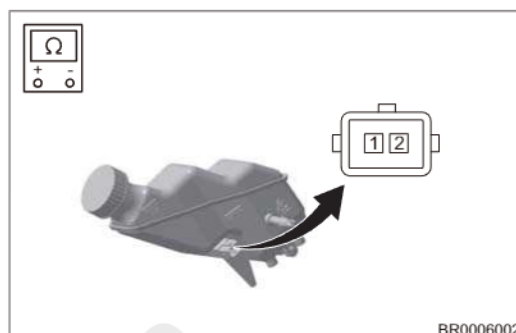
On-vehicle Inspection

1. Check the brake fluid level warning switch.
 - (a) Remove the brake fluid reservoir filler cap.
 - (b) Disconnect the brake fluid level warning switch wire harness connector.
 - (c) Using ohm band of digital multimeter, check for continuity between brake fluid level warning switch terminals according to conditions shown in table below.

Multimeter Connection	Condition	Specified Condition
Terminal 1 - Terminal 2	Float upward (switch ON)	∞
Terminal 1 - Terminal 2	Float downward (switch OFF)	$\leq 1 \Omega$

Hint:

- There is a float in fluid reservoir. Position of float changes as brake fluid level rises or drops.
 - If result is not as specified, replace brake fluid reservoir assembly.
- (d) Unplug fluid level sensor connector when warning light comes on. If warning light remains on, check wire harness and instrument cluster. If instrument cluster warning indicator goes off immediately, the fluid level sensor is malfunctioning. (Precondition: Brake fluid is within scale range)
 - (e) Add brake fluid to MAX mark.



Removal

1. Drain the brake fluid (See page 26-9).

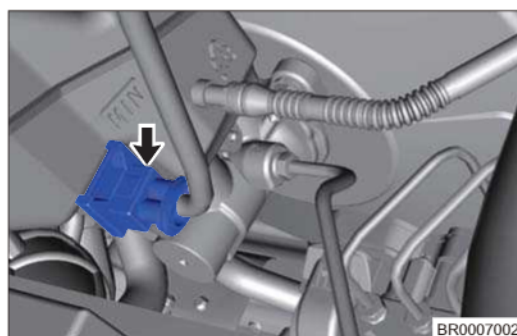
Hint:

- Drained brake fluid should be well kept in a container. Never discard it at will.

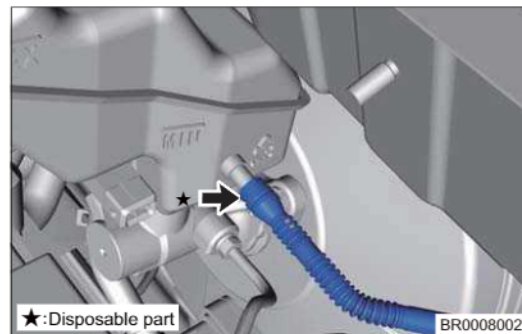
Caution:

- Wash off brake fluid immediately if it comes in contact with any paint surface.

2. Remove the brake fluid reservoir assembly.
 - (a) Disconnect the brake fluid level warning switch connector (arrow).

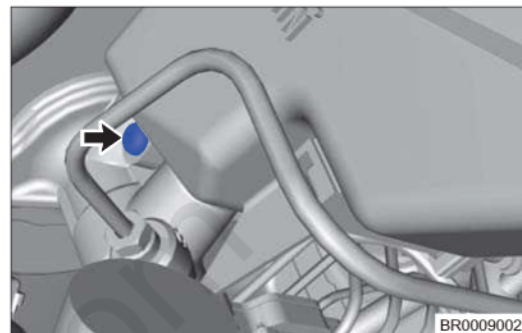


- (b) Disconnect clutch hose from brake fluid reservoir assembly (for MT models).



- (c) Remove fixing screw (arrow) between brake fluid reservoir assembly and brake master cylinder assembly.

Tightening torque
 $5 \pm 1 \text{ N}\cdot\text{m}$



- (d) Remove brake fluid reservoir assembly from brake master cylinder assembly.

Installation

1. Installation is in the reverse order of removal.

Hint:

Perform bleeding procedures for brake system and add brake fluid to a proper level after completing installation.

Caution:

- Clutch hose only can be used once, and cannot be used repeatedly after removal and installation.
- After hose is bent, it is normal that some material between two corrugations is "whitish".

Brake Master Cylinder Assembly

Removal

Warning/Caution/Hint

Warning:

- To prevent brake master cylinder assembly damage and other dirt from being attracted by booster, remove vacuum from vacuum booster before removing brake master cylinder assembly.
- Remove vacuum by depressing brake pedal repeatedly without engine running, until brake pedal is depressed firmly.
- After removing brake line, sealing measure should be taken to prevent foreign matter from entering.

1. Drain the brake fluid (See page 26-9).

Hint:

- Drained brake fluid should be well kept in a container. Never discard it at will.

Caution:

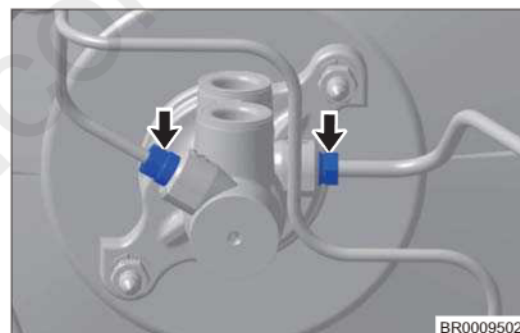
- Wash off brake fluid immediately if it comes in contact with any paint surface.

2. Remove the air filter with intake hose.
3. Remove the brake fluid reservoir assembly (See page 10-8).
4. Remove the brake master cylinder assembly (See page 26-9).

- (a) Loosen 2 fixing plugs (arrow) between brake master cylinder assembly and brake pipe.

Tightening torque

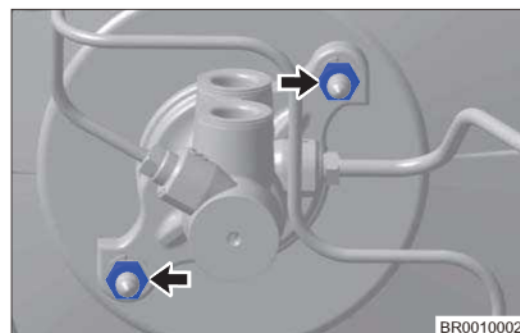
$18 \pm 2 \text{ N}\cdot\text{m}$



- (b) Loosen 2 fixing nuts and washers (arrow) between brake master cylinder assembly and vacuum booster.

Tightening torque

$13.7 - 21.6 \text{ N}\cdot\text{m}$



- (c) Carefully slide brake master cylinder assembly vertically out of vacuum booster.

Caution:

- The design of brake master cylinder assembly and piston makes piston fall out easily. To prevent the occurrence of this case, make sure the master cylinder is level or end surface faces downward (piston surface facing upward) when operating brake master cylinder assembly, to prevent master cylinder piston from dropping.
- Make sure that no foreign matter adheres to brake master cylinder assembly piston. If foreign matter adheres, clean it off with a piece of clean cloth. Then, apply grease to entire outer edge contact surface of the master cylinder piston.
- Master cylinder should be handled carefully. Avoid any impact to master cylinder, such as dropping. It cannot be reused if dropped.
- DO NOT tap or pinch the master cylinder piston, and avoid damaging the master cylinder piston in any other ways.

Installation

1. Installation is in the reverse order of removal.

Caution:

- Be sure to tighten fixing bolt and nut to specified torque during installation.
- Perform bleeding procedures for brake system and add brake fluid to a proper level after completing installation.
- Check if distance between brake master cylinder and brake pedal is within normal range after installation.

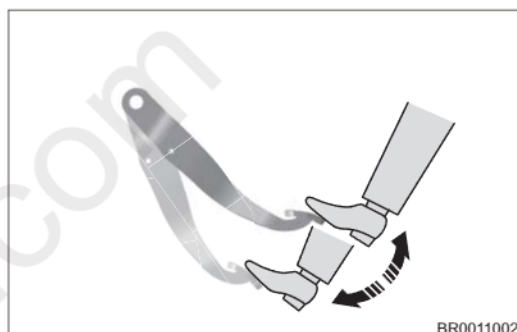
Specified distance: 125 mm

cardiagn.com

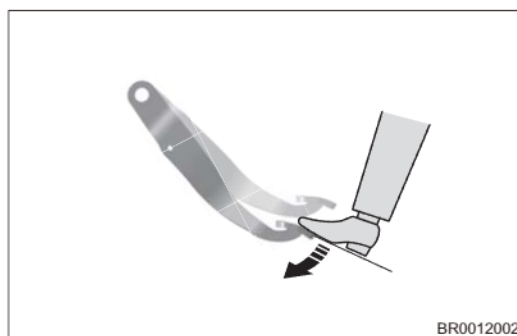
Vacuum Booster with Brake Master Cylinder Assembly

On-vehicle Inspection

1. Check the vacuum booster assembly.
 - (a) Check air tightness:
 - Start engine and stop it after 1 or 2 minutes, then disconnect negative battery cable. Slowly depress the brake pedal several times.
 - Make sure that booster is airtight. Check that every pedal depression amount becomes less than the previous one. If pedal operation is not as specified, check the check valve. If check valve is normal, replace the vacuum booster assembly.
 - Start the engine. Depress and hold pedal, and then stop engine.
 - Make sure that booster is airtight. Depress and hold pedal for 30 seconds, and check that pedal reserve distance does not change.
 - (b) Check operation.
 - Stop engine and disconnect negative battery cable.
 - Depress the pedal several times and check that pedal reserve distance does not change.



- Depress and hold the pedal, and then start engine. Check that the pedal can only be depressed slightly.



- If pedal operation is not as specified, check the check valve. If check valve is normal, replace the vacuum booster assembly.

Removal

1. Drain the brake fluid ([See page 26-9](#)).

Hint:

- Drained brake fluid should be well kept in a container. Never discard it at will.

Caution:

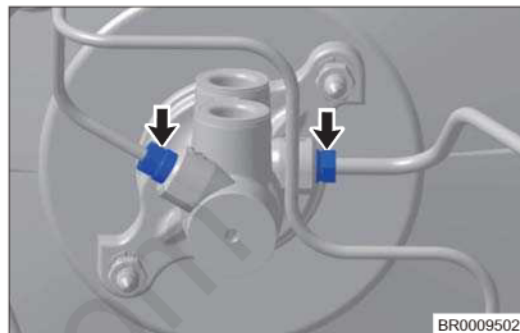
- Wash off brake fluid immediately if it comes in contact with any paint surface.

2. Disconnect the negative battery cable.
3. Remove the brake fluid reservoir assembly ([See page 26-9](#)).
4. Remove the vacuum booster with brake master cylinder assembly.

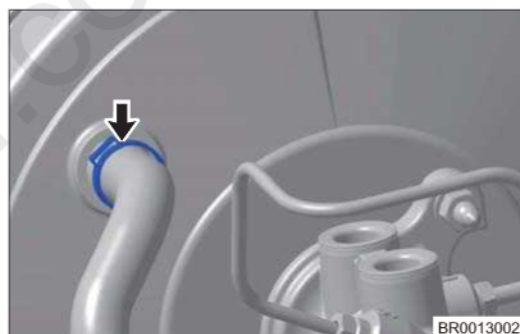
- (a) Loosen 2 fixing plugs (arrow) between brake master cylinder assembly and brake pipe.

Tightening torque

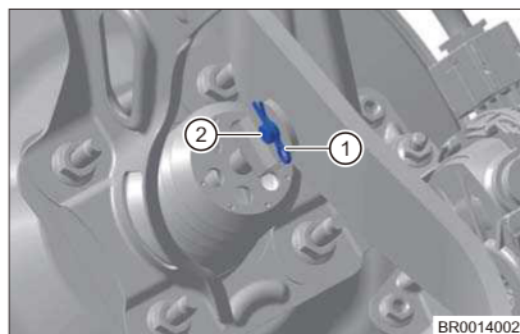
$18 \pm 2 \text{ N}\cdot\text{m}$



- (b) Detach vacuum tube assembly with check valve (arrow) from vacuum booster assembly.



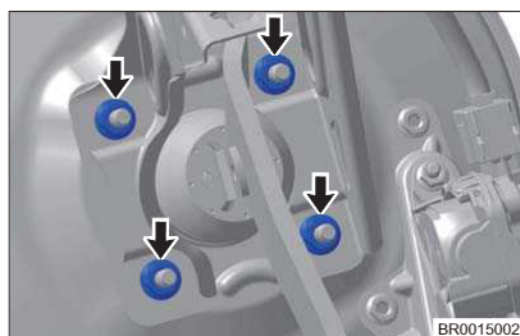
- (c) Remove locking pin (2) and push rod pin (1) from vacuum booster push rod and disengage brake pedal assembly.



- (d) Remove 4 fixing nuts (arrow) between vacuum booster assembly and brake pedal assembly.

Tightening torque

$23 \pm 2 \text{ N}\cdot\text{m}$

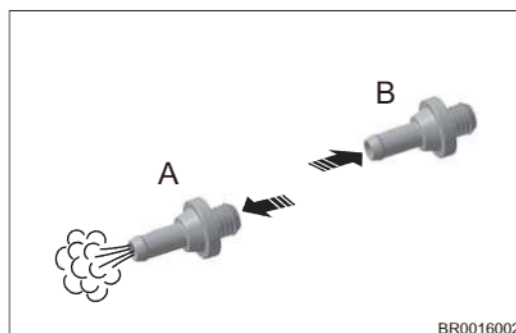


- (e) Move away the brake pedal.

- (f) Remove vacuum booster with brake master cylinder assembly from engine compartment.

Inspection

1. Check the check valve.
 - (a) Remove check valve from vacuum tube assembly.
 - (b) Check that there is airflow (A) from vacuum booster to engine, and no airflow (B) from engine to vacuum booster.
If result is not as specified, replace vacuum tube assembly.



Installation

1. Installation is in the reverse order of removal.

Caution:

- Be sure to tighten fixing bolt and nut to specified torque during installation.
- Perform bleeding procedures for brake system and add brake fluid to a proper level after completing installation.
- It is necessary to check or adjust brake switch assembly after removing vacuum booster with brake master cylinder assembly (Refer to installation of brake switch assembly).

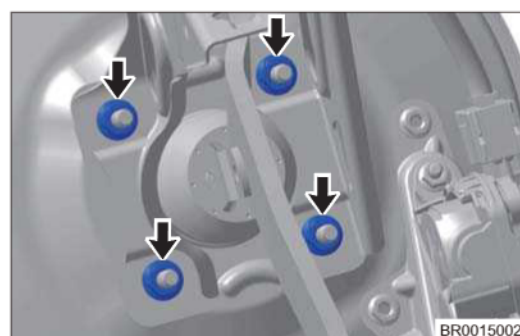
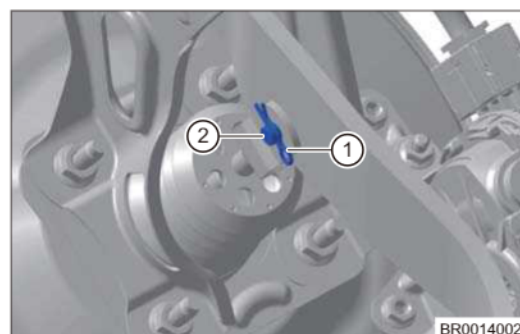
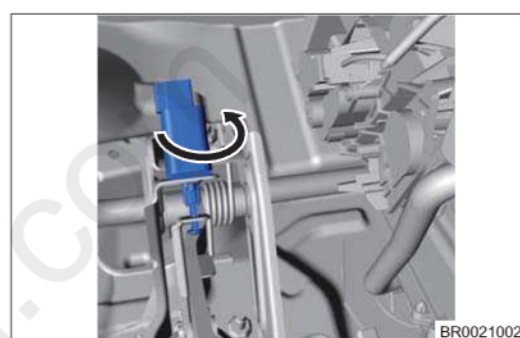
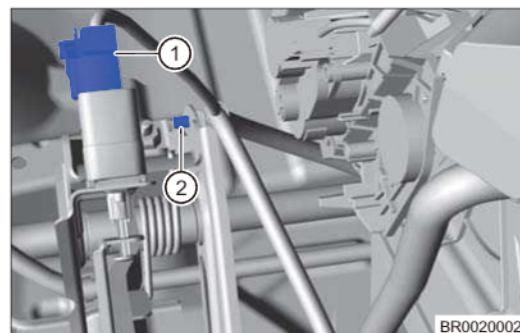
Brake Pedal Assembly

Removal

1. Remove the brake light switch assembly.
 - (a) Disconnect brake light switch assembly wire harness connector (1) and brake pedal fixing clip (2).
 - (b) Press switch by hand and turn it counterclockwise, align the switch body with lengthwise direction of pedal installation hole, and pull out brake switch assembly along opening of pedal, then remove brake switch assembly.
2. Remove the brake pedal assembly.
 - (a) Remove locking pin (2) and push rod pin (1) from vacuum booster push rod and disengage brake pedal assembly.
 - (b) Remove 4 fixing nuts (arrow) between vacuum booster assembly and brake pedal assembly.

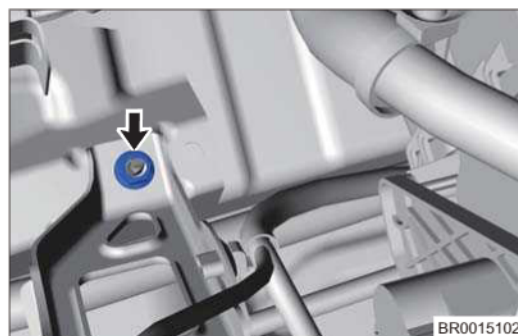
Tightening torque

$23 \pm 2 \text{ N}\cdot\text{m}$



- (c) Remove fixing nut (arrow) between brake pedal assembly and body.

Tightening torque
 $23 \pm 2 \text{ N}\cdot\text{m}$

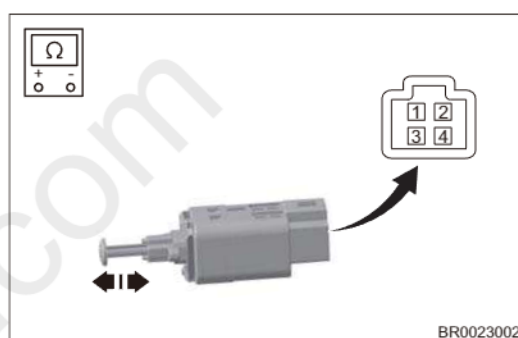


- (d) Remove brake pedal assembly from cabin.

Inspection

1. Check the brake light switch assembly.
 - (a) Using ohm band of digital multimeter, check for continuity between brake light switch assembly terminals according to table below.

Multimeter Connection	Switch Condition	Specified Condition
Terminal 1 - Terminal 3	Brake pedal depressed (switch pin released)	$\leq 1 \Omega$
Terminal 2 - Terminal 4	Brake pedal depressed (switch pin released)	∞
Terminal 1 - Terminal 3	Brake pedal released (switch pin pushed)	∞
Terminal 2 - Terminal 4	Brake pedal released (switch pin pushed)	$\leq 1 \Omega$

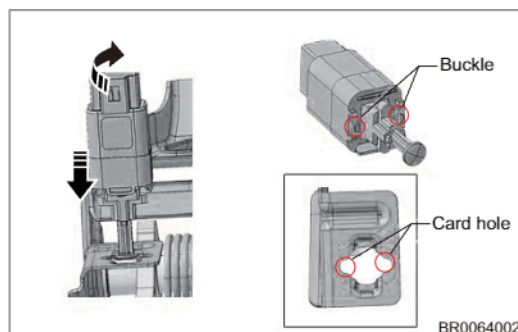


Hint:

- If result is not as specified, replace brake light switch assembly.

Installation

1. Install the brake pedal assembly. (Installation is in the reverse order of removal)
2. Install the brake switch assembly.
 - (a) Before assembling brake switch to vehicle, the lever must be pulled out completely. If the switch lever cannot be pulled out in the direction of axis, the lever has been pulled to the longest.
 - (b) Depress brake pedal fully, align brake switch body with mounting hole of pedal and insert it into mounting hole, press switch and turn it clockwise to clamp switch clip into clip hole of pedal (before assembly, brake pedal has been installed to brake master cylinder).
 - (c) Release brake pedal slowly to return brake pedal to initial position automatically under the action of return spring, and automatically adjust brake switch lever to appropriate gear position simultaneously.



- (d) Connect the back light switch assembly wire harness connector (arrow).



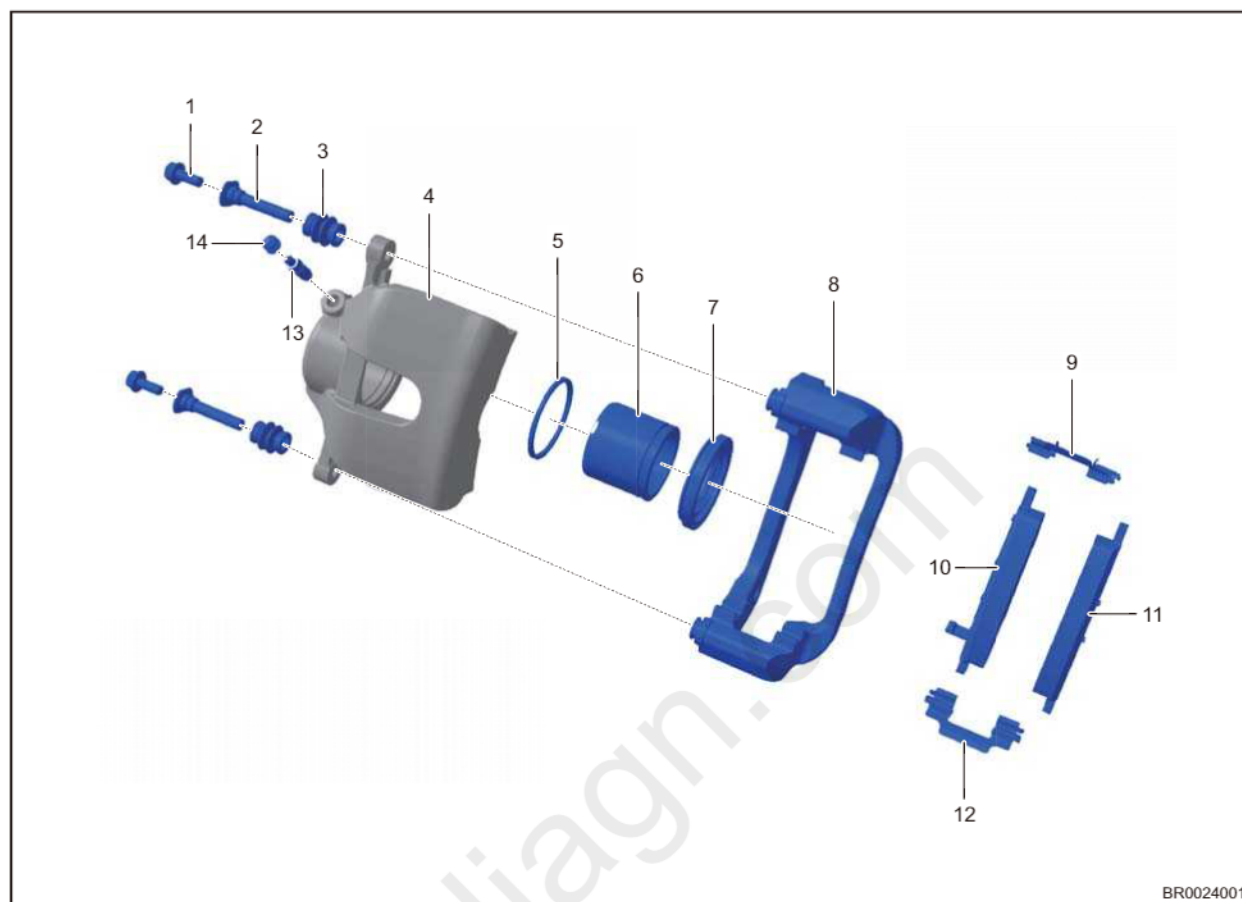
- (e) Installation is finished.

Caution:

- After completing installation, brake pedal should fully contact with brake switch lever (lever is compressed).
- After brake pedal is fully depressed, the hand should not release pedal during auto return of pedal and make pedal return to original position slowly. Avoid releasing pedal suddenly, large impact may lead brake switch to jump.
- Be sure to tighten fixing nuts to specified torques during installation.
- Check that brake light operates normally after installation.
- Check if brake pedal travel is within normal range after installing brake pedal.
Normal range: ≥ 120 mm

Front Disc Brake Assembly

Description



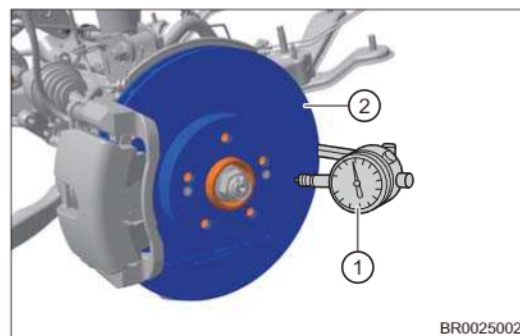
BR0024001

1 - Brake Caliper Guide Bolt	2 - Brake Caliper Guide Bolt Guide Pin
3 - Brake Caliper Guide Pin Rubber Dust Boot	4 - Front Disc Brake Cylinder
5 - Front Disc Brake Piston Seal Ring	6 - Front Disc Brake Piston
7 - Front Disc Brake Piston Dust Boot	8 - Front Disc Brake Caliper Fixing Bracket
9 - Upper Support Shim	10 - Inner Brake Lining
11 - Outer Brake Lining	12 - Lower Support Shim
13 - Bleeder Screw	14 - Bleeder Screw Cap

On-vehicle Inspection

1. Check the brake disc runout.
 - (a) Remove the front wheel (See page 24-8).
 - (b) Fix dial indicator (1) to a proper position, then set its pointer to a position about 10 mm from out edge of brake disc.

- (c) Turn brake disc (2) slowly and check its runout, mark the lowest and highest points and record these measured value.



- (d) Check the runout on the other side of brake disc in the same manner, mark the lowest and highest points and record these measured value.
- (e) Compare recorded runout value with limit value.
Front brake disc runout: Less than 0.06 mm
- (f) If runout exceeds the maximum value, replace brake disc.

Removal

Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the front left wheel (See page 24-8).
 2. Remove the front left brake caliper assembly.
 - (a) Remove 2 coupling bolts (1) between front left brake caliper assembly and front left steering knuckle.

Tightening torque

90 ~ 110 N·m

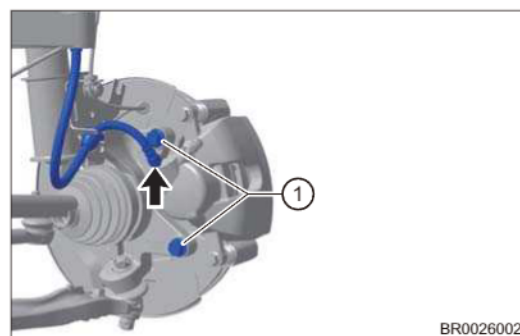
- (b) Remove coupling plug (arrow) between front left brake caliper assembly and front left brake hose assembly.

Tightening torque

20 ± 2 N·m

Caution:

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.

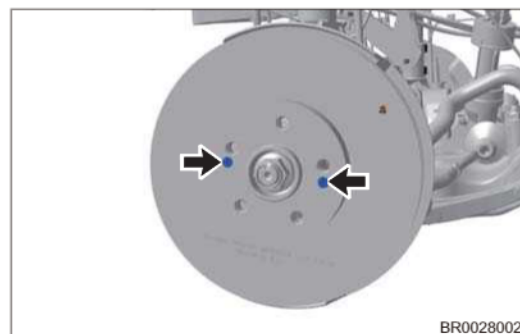


- (c) Remove the front left brake caliper assembly.
3. Remove the front left brake disc.

- (a) Remove 2 locating screws (arrow) and front left brake disc.

Tightening torque

4.5 ± 0.5 N·m



Disassembly

Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the bleeder screw (with bleeder screw cap).

- (a) Remove bleeder screw (with bleeder screw cap) (arrow) from brake caliper assembly.

Tightening torque

9 ~ 11 N·m



2. Remove the brake cylinder assembly.

- (a) Remove 2 guide bolts (arrow) between brake caliper fixing bracket and brake cylinder assembly.

Tightening torque

22 ~ 32 N·m



- (b) Separate brake cylinder assembly from brake caliper fixing bracket.

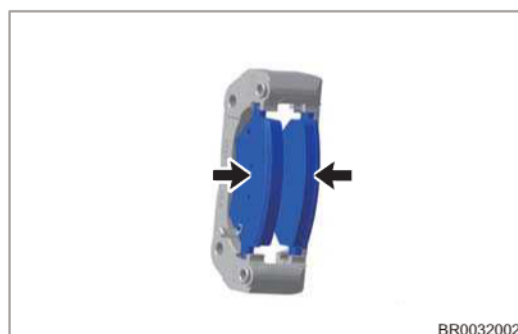
3. Remove the front brake caliper guide bolt guide pin (with dust boot).

- (a) Remove 2 brake caliper guide bolt guide pins (with dust boot) (arrow) from brake caliper fixing bracket.



4. Remove the front brake lining.

- (a) Remove inner brake lining and outer brake lining (arrow) from brake caliper fixing bracket.

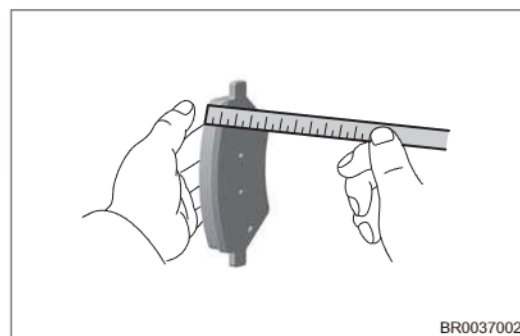


5. Remove the brake lining support shim.
 - (a) Remove 2 brake lining support shims (arrow) from brake caliper fixing bracket.



Inspection

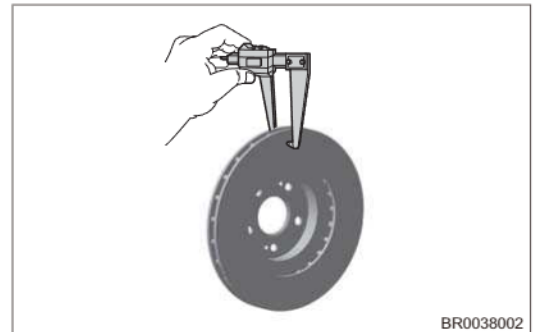
1. Check brake caliper fixing bracket and brake caliper guide pin set.
 - (a) Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - (b) Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
 - (c) Install the brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it with hand; otherwise replace it.
 - (d) After installing the brake lining, check if it is easy to drop (due to insufficient elasticity of support shim). Replace as necessary.
2. Check the brake lining.
 - (a) Visually check the brake lining for flatness, and also check for excessive wear. If the condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
 - (b) Measure the minimum brake lining thickness. When the minimum thickness of brake lining is 2 mm or less, replace the brake linings.



- (c) When replacing the excessively worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance. If it is unnecessary to replace brake linings, be sure to reinstall brake linings to original positions.
3. Check the brake disc.
 - (a) Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, the brake disc must be replaced.
 - (b) Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on the disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
 - (c) It is normal that the surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, the brake disc must be replaced.

4. Check the brake disc thickness.

- (a) Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.
 Standard thickness: 25 mm
 Minimum thickness: 23 mm



BR0038002

- (b) If it is less than the minimum thickness due to wear, replace brake disc.

Caution:

- DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum thickness.

Assembly**Warning/Caution/Hint**

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

Hint:

- When assembling brake caliper assembly, always keep your hands clean.
- When assembling brake caliper assembly, always use new clean brake fluid.
- Never use old front disc brake piston seal ring.

1. Install the brake lining support shim.

- (a) Securely install upper and lower support shims (arrow) onto brake caliper fixing bracket.



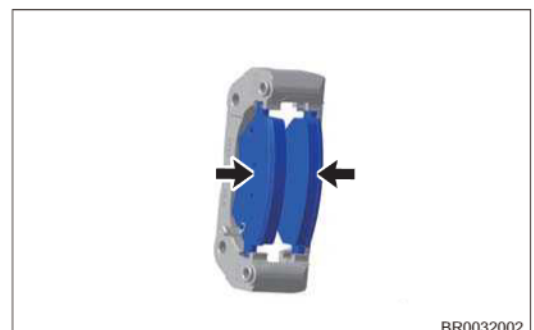
BR0033002

2. Install the front brake lining.

- (a) Securely install inner brake lining and outer brake lining (arrow) onto brake caliper fixing bracket. Make sure they are clamped in place.

Caution:

- Make sure contact surface of lining and brake disc is free of oil and grease.



BR0032002

3. Install the front brake caliper guide bolt guide pin (with dust boot).

- (a) Apply a small amount of grease to the contact surface between guide bolt guide pin and guide pin rubber dust boot (arrow), and securely install them to brake caliper fixing bracket.



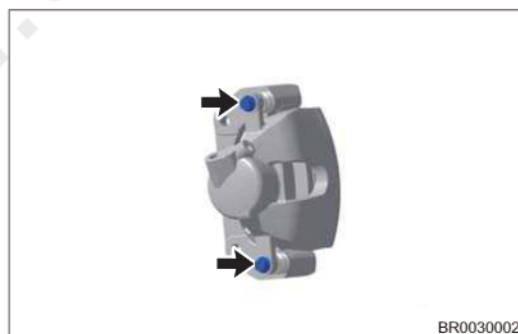
4. Install the brake cylinder assembly.

- (a) Using G type pliers, slightly retract brake cylinder piston.



- (b) Align brake caliper guide bolts (arrow) with guide pin holes and securely install brake cylinder assembly.

Tightening torque
22 ~ 32 N·m



5. Install the bleeder screw (with bleeder screw cap).

- (a) Securely install bleeder screw (with bleeder screw cap) (arrow) to front brake caliper assembly.

Tightening torque
9 ~ 11 N·m



Installation

1. Installation is in the reverse order of removal.

Caution:

- Make sure contact surface of lining and brake disc is free of oil and grease.
- Before installing brake linings, completely retract brake caliper piston back into bore of brake caliper.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner brake lining and outer brake lining reversely.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.

cardiagn.com



Front Brake Hose Assembly

Removal

Warning/Caution/Hint

Warning:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the front left wheel (See page 24-8).
2. Drain the brake fluid (See page 26-9).

Hint:

- Drained brake fluid should be well kept in a container. Never discard it at will.

Caution:

- Wash off brake fluid immediately if it comes in contact with any paint surface.

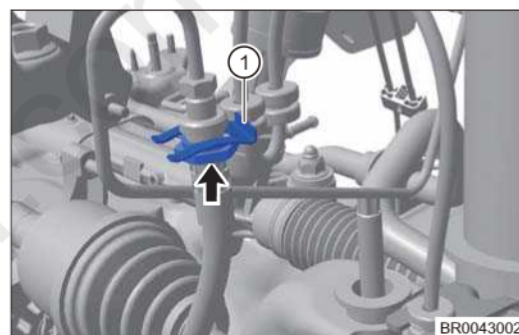
3. Remove the front left brake hose assembly.
 - (a) Loosen coupling bolt (arrow) between front left brake hose assembly and front left brake pipe, and disengage fixing clip (1).

Tightening torque

$18 \pm 2 \text{ N}\cdot\text{m}$

Caution:

- DO NOT bend or damage brake tube.
- DO NOT allow any foreign matter such as dirt and dust to enter brake pipe from joint parts.
- After removing brake line, perform sealing treatment to prevent foreign matter from entering.



- (b) Disengage fixing part (arrow) of front left brake hose assembly from front left shock absorber assembly.



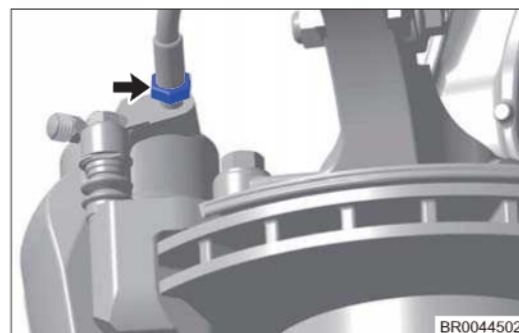
- (c) Remove coupling plug (arrow) between front left brake caliper assembly and front left brake hose assembly.

Tightening torque

$20 \pm 2 \text{ N}\cdot\text{m}$

Caution:

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.



- (d) Remove the front left brake hose assembly.

Installation

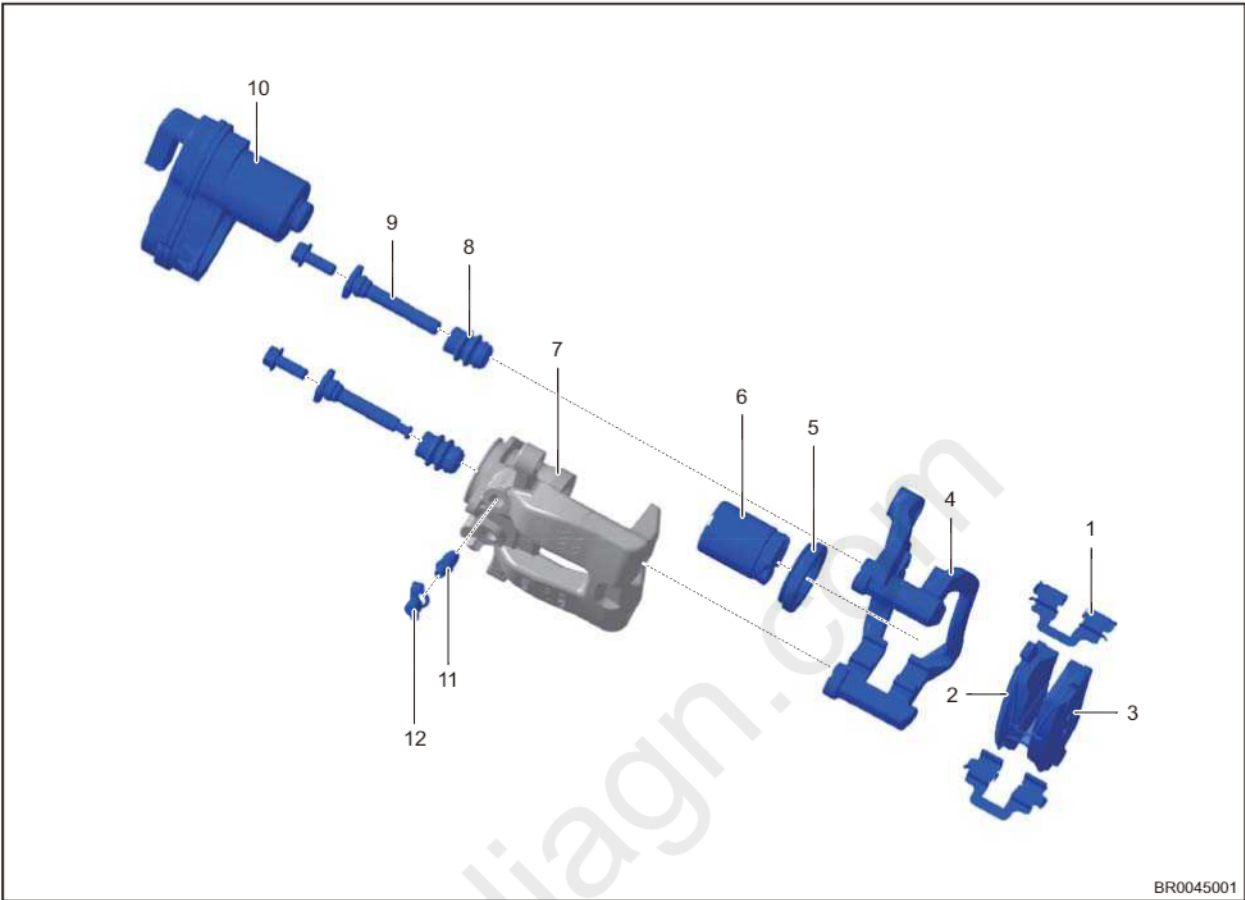
1. Installation is in the reverse order of removal.
 - Be sure to tighten fixing plugs to specified torques during installation.
 - Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
 - Be sure to perform bleeding procedures for brake system after installation.
 - Be sure to add brake fluid to a proper level after installation.

cardiagn.com



Rear Disc Brake Assembly

Description

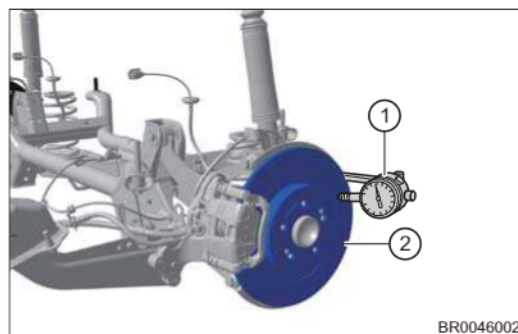


BR0045001

1 - Upper Support Shim	2 - Inner Brake Lining
3 - Outer Brake Lining	4 - Rear Disc Brake Caliper Fixing Bracket
5 - Rear Disc Brake Piston Dust Boot	6 - Rear Disc Brake Piston
7 - Rear Disc Brake Cylinder	8 - Brake Caliper Guide Bolt Guide Pin
9 - Brake Caliper Guide Bolt	10 - Parking Actuator
11 - Bleeder Screw	12 - Bleeder Screw Cap

On-vehicle Inspection

1. Check the brake disc runout.
 - (a) Remove the rear wheel (See page 24-8).
 - (b) Fix dial indicator (1) to a proper position, then set its pointer to a position about 10 mm from out edge of rear brake disc.
 - (c) Turn brake disc (2) slowly and check its runout, mark the lowest and highest points and record these measured value.



- (d) Check the runout on the other side of brake disc in the same manner, mark the lowest and highest points and record these measured value.
 - (e) Compare recorded runout value with limit value.
Rear brake disc runout: Less than 0.06 mm
 - (f) If runout exceeds the maximum value, replace brake disc.

Removal

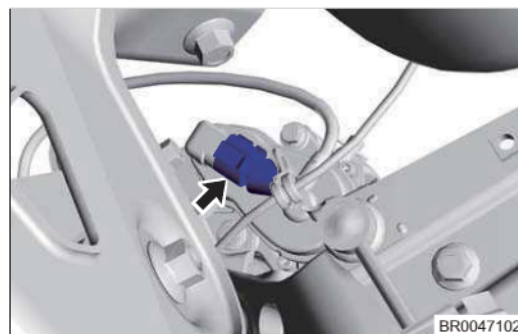
Warning/Caution/Hint

Hint:

- Use same procedures for right and left sides.
 - Procedures listed below are for left side.
1. Remove the rear left wheel (See page 24-8).
 2. Remove the rear left brake caliper assembly.

Caution:

- Be sure to perform "Enter Parking Brake Maintenance Mode" using diagnostic equipment before removal.
- (a) Unplug parking actuator connector (arrow) from EPB caliper.



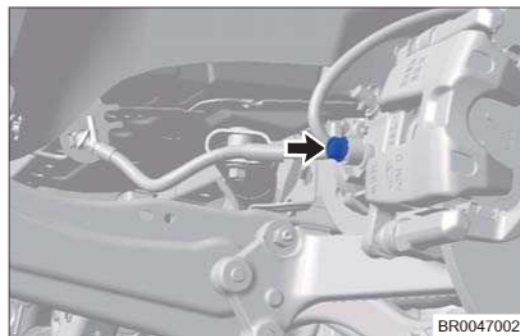
- (b) Remove coupling bolt and washer (arrow) between rear left brake caliper assembly and rear left brake hose assembly.

Tightening torque

$27 \pm 2 \text{ N}\cdot\text{m}$

Caution:

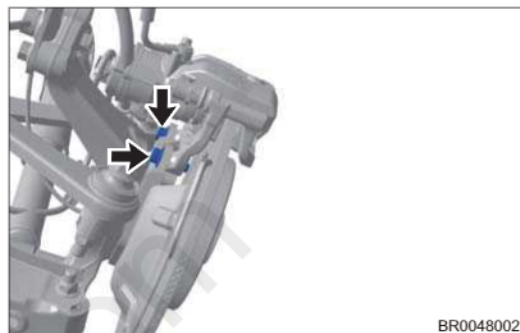
- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.



- (c) Remove coupling bolts (arrow) between rear left brake caliper assembly and left brake caliper mounting board assembly.

Tightening torque

$90 \sim 110 \text{ N}\cdot\text{m}$



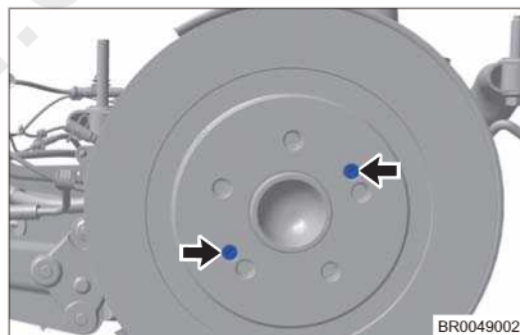
- (d) Remove the rear left brake caliper assembly.

3. Remove the rear left brake disc.

- (a) Remove locating screws (arrow) from rear left brake disc, and remove rear left brake disc.

Tightening torque

$4.5 \pm 0.5 \text{ N}\cdot\text{m}$



Disassembly

Warning/Caution/Hint

Hint:

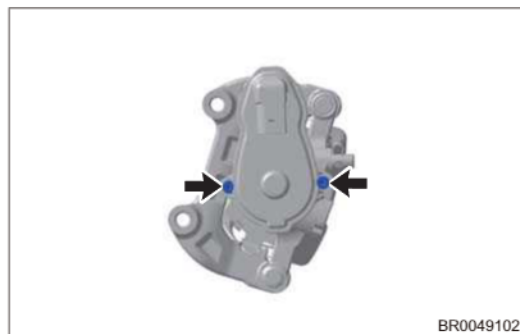
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Remove the parking actuator.

- (a) Remove 2 parking actuator fixing screws (arrow).

Tightening torque

$9 \sim 11 \text{ N}\cdot\text{m}$



2. Remove the bleeder screw (with bleeder screw cap).

- (a) Remove bleeder screw (with bleeder screw cap) (arrow) from brake caliper assembly.

Tightening torque

9 ~ 11 N·m

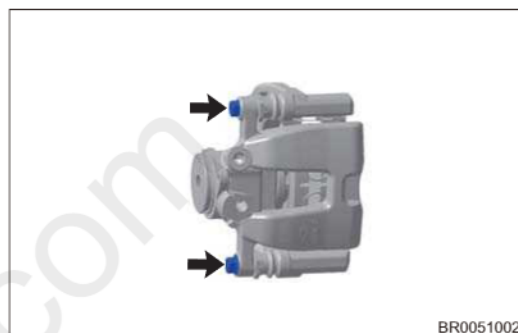


3. Remove the brake cylinder assembly.

- (a) Remove 2 guide bolts (arrow) between brake caliper fixing bracket and brake cylinder assembly.

Tightening torque

22 ~ 32 N·m



- (b) Separate brake cylinder assembly from brake caliper fixing bracket.

Warning:

- Slowly operate when performing this procedure using caliper with slanted spring, or brake plate may be popped out by spring, be careful not to injuring your feet.

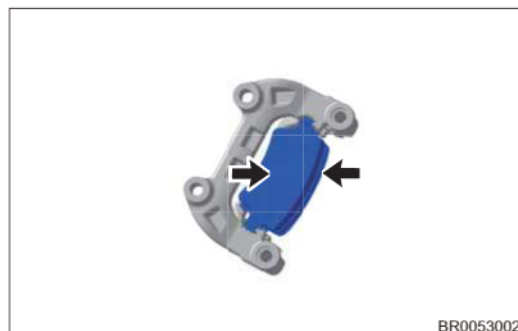
4. Remove the rear brake caliper guide bolt guide pin (with dust boot).

- (a) Remove 2 brake caliper guide bolt guide pins (with dust boot) (arrow) from brake caliper fixing bracket.

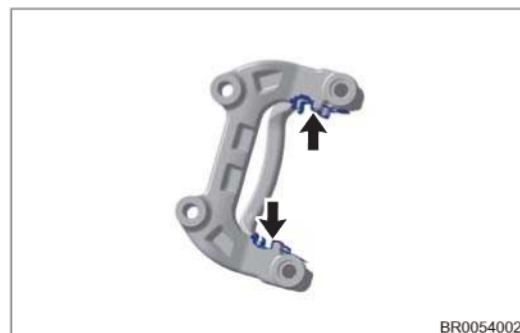


5. Remove the rear brake lining.

- (a) Remove inner brake lining and outer brake lining (arrow) from brake caliper fixing bracket.

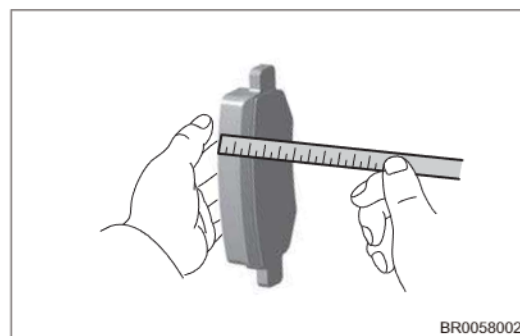


6. Remove the brake lining support shim.
 - (a) Remove 2 brake lining support shims (arrow) from brake caliper fixing bracket.



Inspection

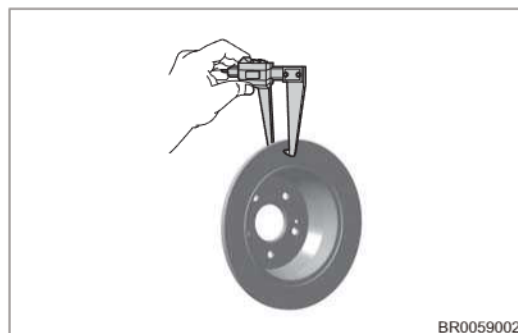
1. Check brake caliper fixing bracket and brake caliper guide pin set.
 - (a) Clean the contact surfaces of brake caliper fixing bracket and brake lining support shims with brake cleaner. Check for deformation, cracks, rust and foreign matter which is difficult to remove.
 - (b) Check brake caliper guide pin rubber dust boot for deformation, cracks, wear and foreign matter which is difficult to remove.
 - (c) Install the brake caliper guide pin and its rubber dust boot to brake caliper fixing bracket. Brake caliper guide pin set should move smoothly without sticking when pushing it with hand; otherwise replace it.
 - (d) After installing the brake lining, check if it is easy to drop (due to insufficient elasticity of support shim). Replace as necessary.
2. Check the brake lining.
 - (a) Visually check the brake lining for flatness, and also check for excessive wear. If the condition of lining cannot be confirmed accurately only by visual inspection, perform physical inspection as necessary.
 - (b) Measure the minimum brake lining thickness. When the minimum thickness of brake lining is 2 mm or less, replace the brake linings.



- (c) When replacing the excessively worn brake linings (inner and outer), it is also necessary to replace the linings on opposite side of vehicle as well as unchecked linings to maintain proper braking performance. If it is unnecessary to replace brake linings, be sure to reinstall brake linings to original positions.
3. Check the brake disc.
 - (a) Minor scratch or wear on brake disc surface is acceptable. If severe scratch or deformation exists, the brake disc must be replaced.
 - (b) Excessive wear of brake disc may cause poor contact between brake lining and surface of brake disc. If protrusion on the disc is not removed before installing new brake lining, it will cause abnormal wear of brake disc.
 - (c) It is normal that the surface of brake disc is worn when replacing brake lining. If cracks or burned spots exist, the brake disc must be replaced.

4. Check the brake disc thickness.

- (a) Using a vernier caliper, measure brake disc thickness at center of brake lining contact surface as shown in illustration.
 Standard thickness: 10 mm
 Minimum thickness: 8 mm



BR0059002

- (b) If it is less than the minimum thickness due to the wear of brake disc, replace brake disc.

Caution:

- DO NOT machine the brake disc, because it may make brake disc thickness less than the minimum.

Assembly**Warning/Caution/Hint****Hint:**

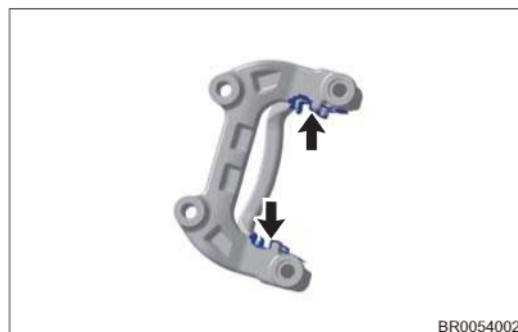
- Use same procedures for right and left sides.
- Procedures listed below are for left side.

Hint:

- When assembling brake caliper assembly, always keep your hands clean.
- When assembling brake caliper assembly, always use new clean brake fluid.
- Never use old rear disc brake piston seal ring.

1. Install the brake lining support shim.

- (a) Securely install upper and lower support shims (arrow) onto brake caliper fixing bracket.



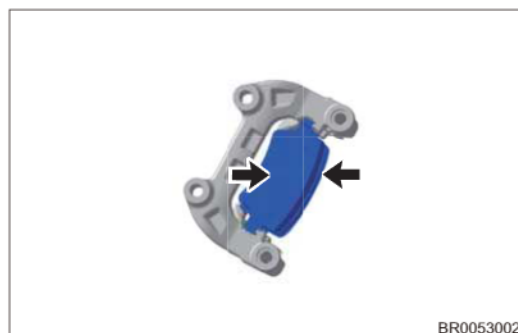
BR0054002

2. Install the rear brake lining.

- (a) Securely install inner brake lining and outer brake lining (arrow) onto brake caliper fixing bracket. Make sure they are clamped in place.

Caution:

- Make sure contact surface of lining and brake disc is free of oil and grease.



BR0053002

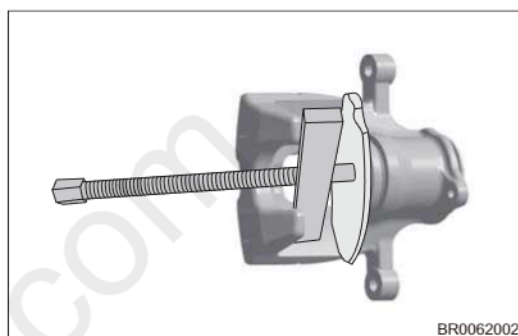
3. Install the rear brake caliper guide bolt guide pin (with dust boot).

- (a) Apply a small amount of grease to the contact surface between guide bolt guide pin and guide pin rubber dust boot (arrow), and securely install them to brake caliper fixing bracket.



4. Firmly press the brake piston.

- (a) Using brake cylinder piston pressing tool, slightly retract brake cylinder piston.



5. Install the slanted spring.

- (a) Pinch the well installed brake plate with hand, so that it closes to brake disc.
- (b) Install 2 legs of slanted spring into small holes on support lugs at the same side of inner and outer brake plates separately, and install slanted spring on the other side while keeping brake plates clamped.

Warning:

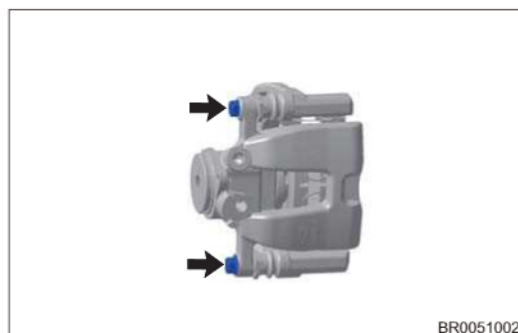
- Slowly operate when performing this procedure using caliper with slanted spring, or brake plate may be popped out by spring, be careful not to injuring your feet.

6. Install the brake cylinder assembly.

- (a) Align brake caliper guide bolts (arrow) with guide pin holes and securely install brake cylinder assembly.

Tightening torque

22 ~ 32 N·m



7. Install the bleeder screw (with bleeder screw cap).
- (a) Securely install bleeder screw (with bleeder screw cap) (arrow) to rear brake caliper assembly.

Tightening torque
9 ~ 11 N·m



8. Install the parking actuator.
- (a) Install 2 parking actuator fixing screws (arrow).

Tightening torque
9 ~ 11 N·m



Installation

1. Installation is in the reverse order of removal.

Caution:

- Make sure to tighten fixing bolt and nut to specified torque during installation.
- Before installing brake linings, completely retract brake caliper piston back into bore of brake caliper.
- Depress brake pedal several times to secure brake linings to brake disc in order to ensure safety after installing brake linings and before moving vehicle.
- Replace the brake linings in pairs. DO NOT replace one alone.
- DO NOT install inner brake lining and outer brake lining reversely.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.
- Be sure to perform "Exit Parking Brake Maintenance Mode" using diagnostic equipment after installation.

Rear Brake Hose Assembly

Removal

Warning/Caution/Hint

Caution:

- Be sure to wear necessary safety equipment to prevent accidents when repairing.
- Try to prevent body paint surface from being scratched during removal and installation.

Hint:

- Use same procedures for right and left sides.
- Procedures listed below are for left side.

1. Drain the brake fluid ([See page 26-12](#)).

Hint:

- Drained brake fluid should be well kept in a container. Never discard it at will.

Caution:

- Wash off brake fluid immediately if it comes in contact with any paint surface.

2. Remove the rear left brake hose assembly.

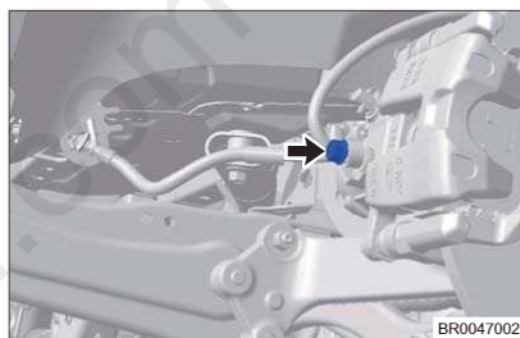
- (a) Remove coupling bolt and washer (arrow) between rear left brake caliper assembly and rear left brake hose assembly.

Tightening torque

$27 \pm 2 \text{ N}\cdot\text{m}$

Caution:

- DO NOT allow brake fluid to be sprayed on your clothes or skin when removing brake hose, as brake fluid is corrosive.



BR0047002

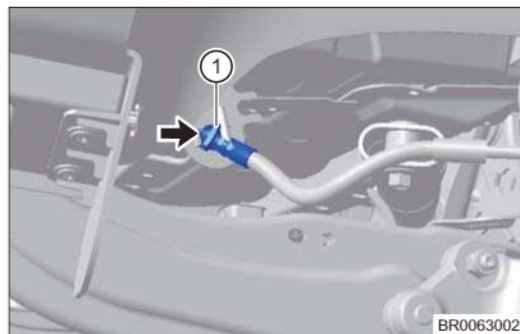
- (b) Loosen coupling plug (arrow) between rear left brake hose assembly and rear brake pipe, and move away clip (1).

Tightening torque

$18 \pm 2 \text{ N}\cdot\text{m}$

Caution:

- DO NOT bend or damage brake tube.
- DO NOT allow any foreign matter such as dirt and dust to enter brake pipe from joint parts.
- After removing brake line, perform sealing treatment to prevent foreign matter from entering.



BR0063002

- (c) Remove the rear left brake hose assembly.

Installation

1. Installation is in the reverse order of removal.

Caution:

- Be sure to tighten bolts and plugs in place during installation.
- Be sure to check brake system for leakage after installation. Repair or replace malfunctioning parts as necessary.
- Be sure to perform bleeding procedures for brake system after installation.
- Be sure to add brake fluid to a proper level after installation.