

BRAKE SYSTEM

BR0BW-01

GENERAL DESCRIPTION

Care must be taken to replace each part properly as it could affect the performance of the brake system and result in a driving hazard. Replace the parts with parts of the same part number or equivalent.

It is very important to keep parts and the area clean when repairing the brake system.

If the vehicle is equipped with a mobile communication system, refer to the precautions in the IN section.

TROUBLESHOOTING

BR0BX-03

PROBLEM SYMPTOMS TABLE

Use the table below to help you find the cause of the problem. The numbers indicate the priority of the likely cause of the problem. Check each part in order. If necessary, replace these parts.

Symptom	Suspect Area	See page
Low pedal or spongy pedal	<ol style="list-style-type: none"> 1. Fluid leaks for brake system 2. Air in brake system 3. Piston seals (Worn or damaged) 4. Master cylinder (Faulty) 5. Booster push rod (Out of adjustment) 	DI-407 BR-4 BR-25 BR-35 BR-12 BR-21
Brake drag	<ol style="list-style-type: none"> 1. Brake pedal freeplay (Minimum) 2. Parking brake lever travel (Out of adjustment) 3. Parking brake wire (Sticking) 4. Rear brake shoe clearance (Out of adjustment) 5. Pad (Cracked or distorted) 6. Piston (Stuck) 7. Piston (Frozen) 8. Tension or return spring (Faulty) 9. Booster push rod (Out adjustment) 10. Vacuum leaks for booster system 11. Master cylinder (Faulty) 	BR-6 BR-8 — BR-46 — BR-22 BR-32 BR-25 BR-35 BR-25 BR-35 BR-46 BR-21 BR-18 BR-12
Brake pull	<ol style="list-style-type: none"> 1. Piston (Stuck) 2. Pad (Cracked or distorted) 3. Piston (Frozen) 4. Disk (Scored) 5. Pad (Cracked or distorted) 	BR-25 BR-35 BR-22 BR-32 BR-25 BR-35 BR-25 BR-35 BR-22 BR-32

BRAKE – TROUBLESHOOTING

Hard pedal but brake inefficient	<ol style="list-style-type: none"> 1. Fluid leaks for brake system 2. Air in brake system 3. Pad (Worn) 4. Pad (Cracked or distorted) 5. Pad (Oily) 6. Pad (Glazed) 7. Disk (Scored) 8. Booster push rod (Out of adjustment) 9. Vacuum leaks for booster system 	<p>DI-407 BR-4 BR-22 BR-32 BR-22 BR-32 BR-22 BR-32 BR-22 BR-32 BR-25 BR-35 BR-21 BR-18</p>
Noise from brakes	<ol style="list-style-type: none"> 1. Pad (Cracked or distorted) 2. Installation bolt (Loose) 3. Disk (Scored) 4. Pad support plate (Loose) 5. Sliding pin (Worn) 6. Pad (Dirty) 7. Pad (Glazed) 8. Tension or return spring (Faulty) 9. Anti-squeal shim (Damaged) 10. Shoe hold-down spring (Damaged) 	<p>BR-22 BR-32 BR-25 BR-35 BR-25 BR-35 BR-35 BR-35 BR-35 BR-22 BR-32 BR-32 BR-32 BR-46 BR-22 BR-32 BR-46</p>

BRAKE FLUID BLEEDING

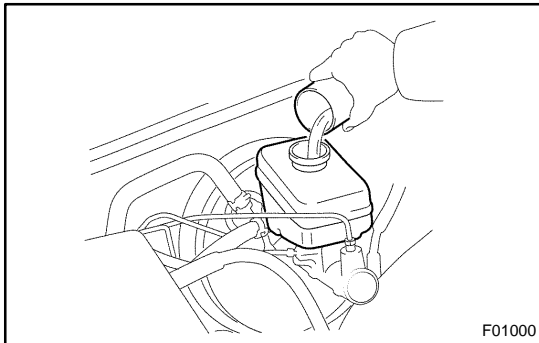
BROBY-02

HINT:

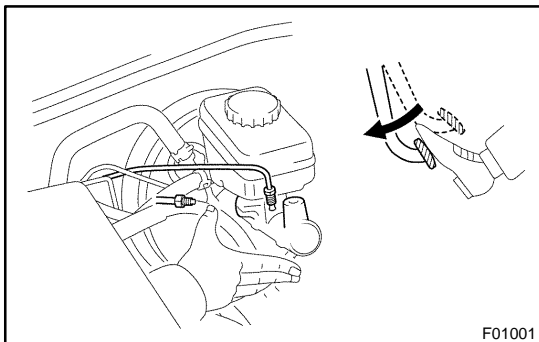
If any work is done on the brake system or if air in the brake lines is suspected, bleed the system of air.

NOTICE:

Do not let brake fluid remain on painted surfaces. Wash it off immediately.



1. **FILL RESERVOIR WITH BRAKE FLUID**
Fluid: SAE J1703 or FMVSS NO.116DOT3

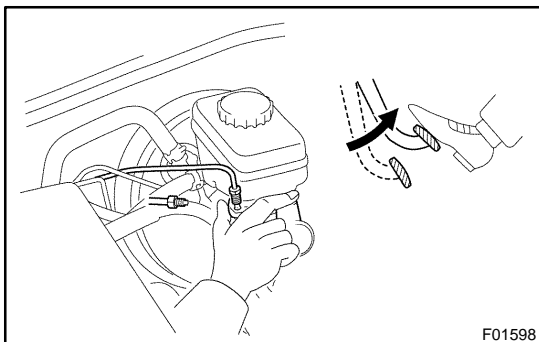


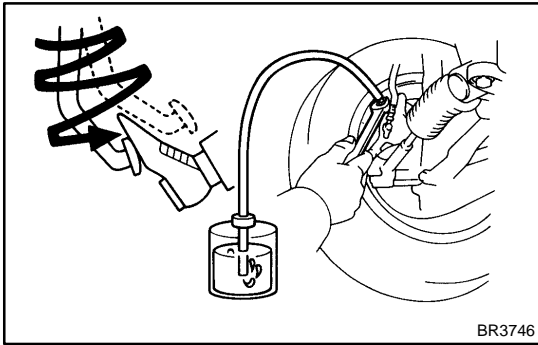
2. **BLEED MASTER CYLINDER**

HINT:

If the master cylinder has been disassembled or if the reservoir becomes empty, bleed the air from the master cylinder.

- (a) Disconnect the brake lines from the master cylinder.
- (b) Slowly depress the brake pedal and hold it.
- (c) Block off the outer holes with your fingers, and release the brake pedal.
- (d) Repeat (b) and (c) 3 or 4 times.

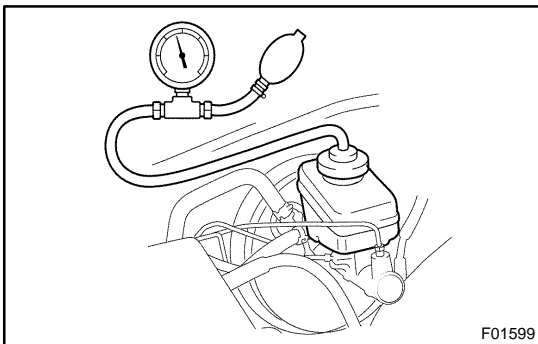




3. BLEED BRAKE LINE

- (a) Connect the vinyl tube to the brake caliper.
- (b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.
- (c) At the point when fluid stops coming out, tighten the bleeder plug, then release the brake pedal.
- (d) Repeat (b) and (c) until all the air in the fluid has been bled out.
- (e) Repeat the above procedure to bleed the air out of the brake line for each wheel.

Torque: 11 N·m (110 kgf·cm, 8 ft·lbf)



4. BLEED BRAKE ACTUATOR

- (a) Remove the reservoir cap.
- (b) Install the SST to the reservoir.
SST 09992-00242, 09992-00350
- (c) Connect the vinyl tube to the bleeder plug of the brake actuator.
- (d) Using SST, apply the pressure described below to the reservoir.

Pressure: 98.1 kpa (1.0 kgf/cm², 14.2 psi)

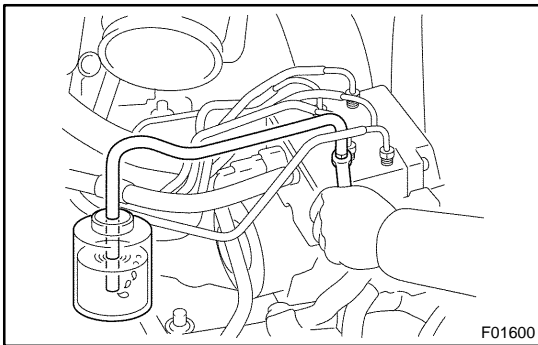
- (e) Loosen the bleeder plug.
- (f) Bleed the air out of the brake actuator, tighten the bleeder plug.

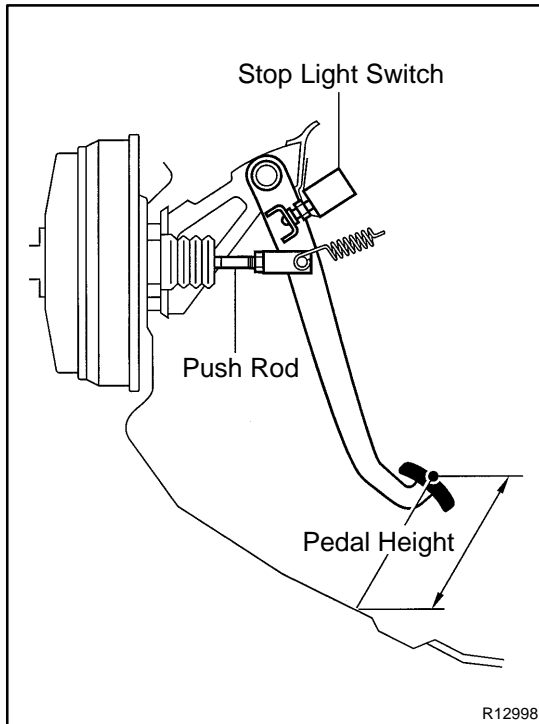
Torque: 8.3 N·m (85 kgf·cm, 74 in.-lbf)

5. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.

Fluid: SAE J1703 or FMVSS NO.116DOT3





BRAKE PEDAL ON-VEHICLE INSPECTION

BR0BZ-01

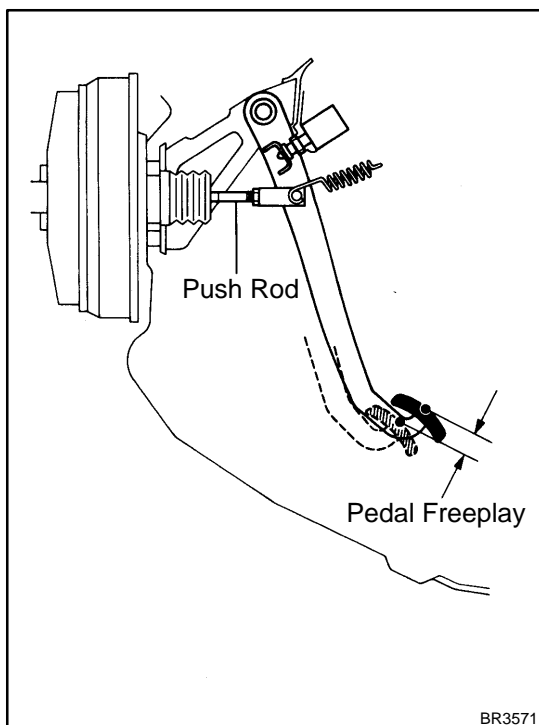
1. CHECK PEDAL HEIGHT

Pedal height from floor panel:
133.8–143.8 mm (5.268–5.661 in.)

If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

- (a) Remove the under cover, lower pad and air duct.
- (b) Disconnect the connector from the stop light switch.
- (c) Loosen the stop light switch lock nut and remove the stop light switch.
- (d) Loosen the push rod lock nut.
- (e) Adjust the pedal height by turning the pedal push rod.
- (f) Tighten the push rod lock nut.
Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)
- (g) Install the stop light switch.
- (h) Push the brake pedal in 5–15 mm (0.20–0.59 in.), turn the stop light switch to lock the nut in the position where the stop light goes off.
- (i) Connect the connector to the stop light switch.
- (j) After installation, push the brake pedal in 5–15 mm (0.20–0.59 in.), check that stop light lights up.
- (k) After adjusting the pedal height, check the pedal freeplay.



3. CHECK PEDAL FREEPLAY

- (a) Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
- (b) Push in the pedal by hand until the beginning of the second point of resistance is felt, then measure the distance, as shown.

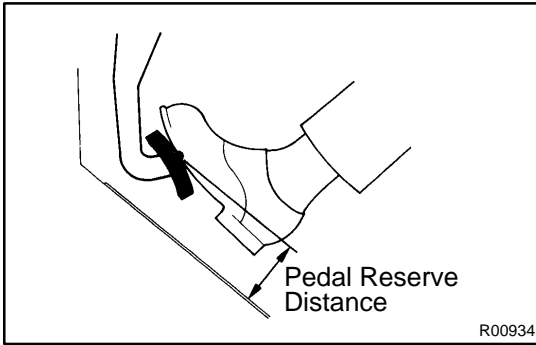
Pedal freeplay:
1–6 mm (0.04–0.24 in.)

If the clearance is incorrect, check the stop light switch clearance. If it is OK, then troubleshoot the brake system.

HINT:

The freeplay to the 1st point of resistance is due to the play between the clevis and pin. It is 1–3 mm (0.04–0.12 in.) on the pedal.

- (c) Install the air duct, lower pad and under cover.



4. CHECK PEDAL RESERVE DISTANCE

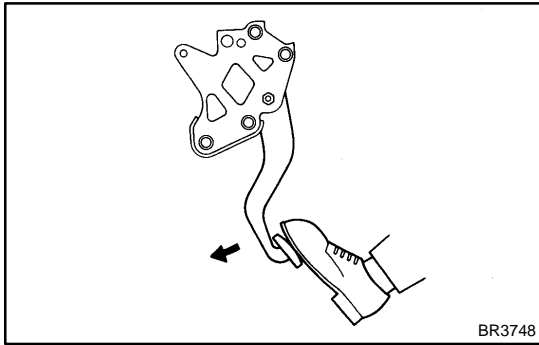
Release the parking brake.

With the engine running, depress the pedal and measure the pedal reserve distance, as shown.

Pedal reserve distance at 490 N (50 kgf, 110.2 lbf):

More than 70 mm (2.76 in.)

If the reserve distance is incorrect, troubleshoot the brake system.



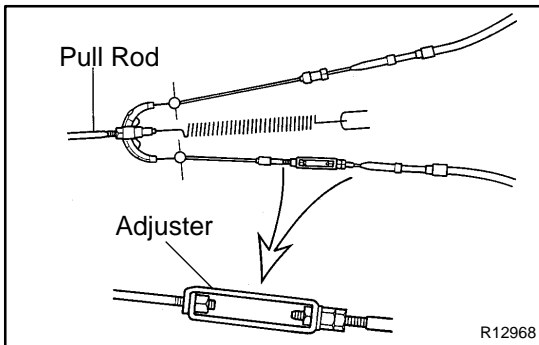
PARKING BRAKE PEDAL ON-VEHICLE INSPECTION

BROC0-01

1. CHECK PARKING BRAKE PEDAL TRAVEL

Depress the parking brake pedal all the way and count the number of clicks.

**Parking brake pedal travel at 294 N (30 kgf, 66.1 lbf):
5-7 clicks**



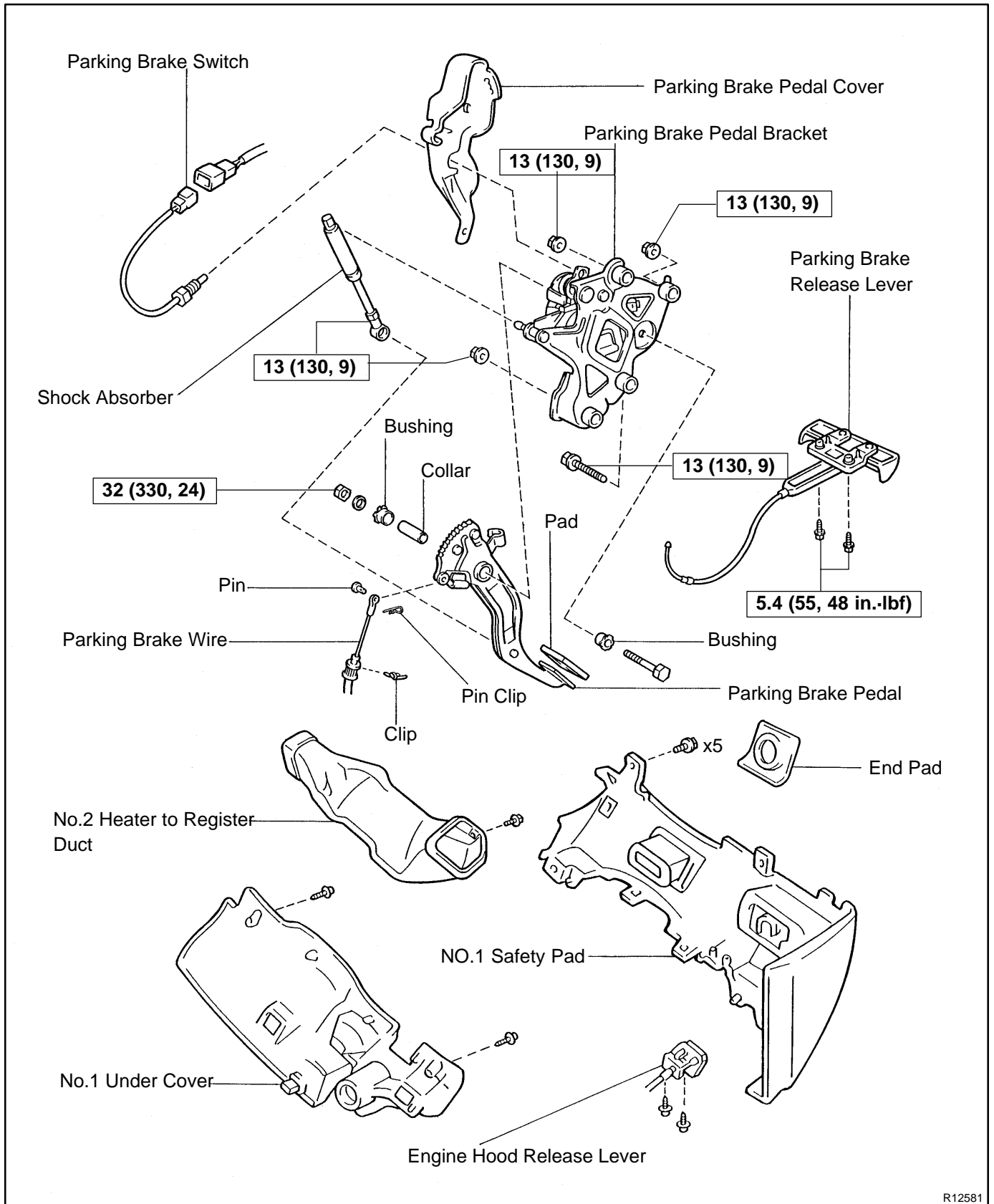
2. IF NECESSARY, ADJUST PARKING BRAKE

- (a) Adjust the parking brake shoe clearance.
- (b) Loosen the adjuster lock nut and adjuster until the parking brake pedal travel becomes correct.

HINT:

If the adjustment cannot be made within the range of travel of the adjuster, remove the propeller shaft and make an adjustment at the pull rod.

COMPONENTS



R12581

REMOVAL

1. REMOVE THESE PARTS:

(See page [BO-83](#))

- (a) No.1 under cover
- (b) End pad
- (c) No.1 safety pad
- (d) No.2 heater to register duct
- (e) Scuff plate

2. REMOVE PARKING BRAKE PEDAL ASSEMBLY

- (a) Disconnect the parking brake switch connector.
- (b) Remove the 2 bolts, and disconnect the parking brake release lever from the safety pad.

Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)

- (c) Remove the pin clip and pull out the pin from the parking brake wire.
- (d) Remove the clip, and disconnect the parking brake wire.
- (e) Remove the bolt, 3 nuts and parking brake pedal assembly.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

3. REMOVE PARKING BRAKE PEDAL COVER

4. REMOVE PARKING BRAKE SWITCH

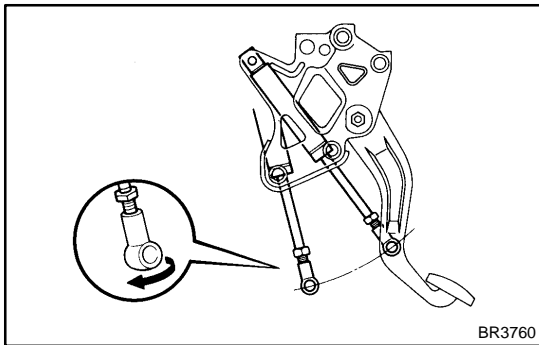
5. REMOVE PARKING BRAKE RELEASE WIRE

6. REMOVE SHOCK ABSORBER

7. REMOVE PARKING BRAKE PEDAL

Remove the bolt, nut, 2 bushings, collar and pedal.

Torque: 32 N·m (330 kgf-cm, 24 ft-lbf)



8. IF NECESSARY, ADJUST SHOCK ABSORBER

- (a) Loosen the union lock nut.
- (b) Install the shock absorber to the pin on the pedal bracket side, then extend the piston rod fully.
- (c) Return the pedal until it hits the cushion.
- (d) Make adjustments so that the shock absorber's union and the pin on the pedal side are aligned, then turn the union one turn counterclockwise.
- (e) Install the shock absorber to the pedal and torque the lock nut.

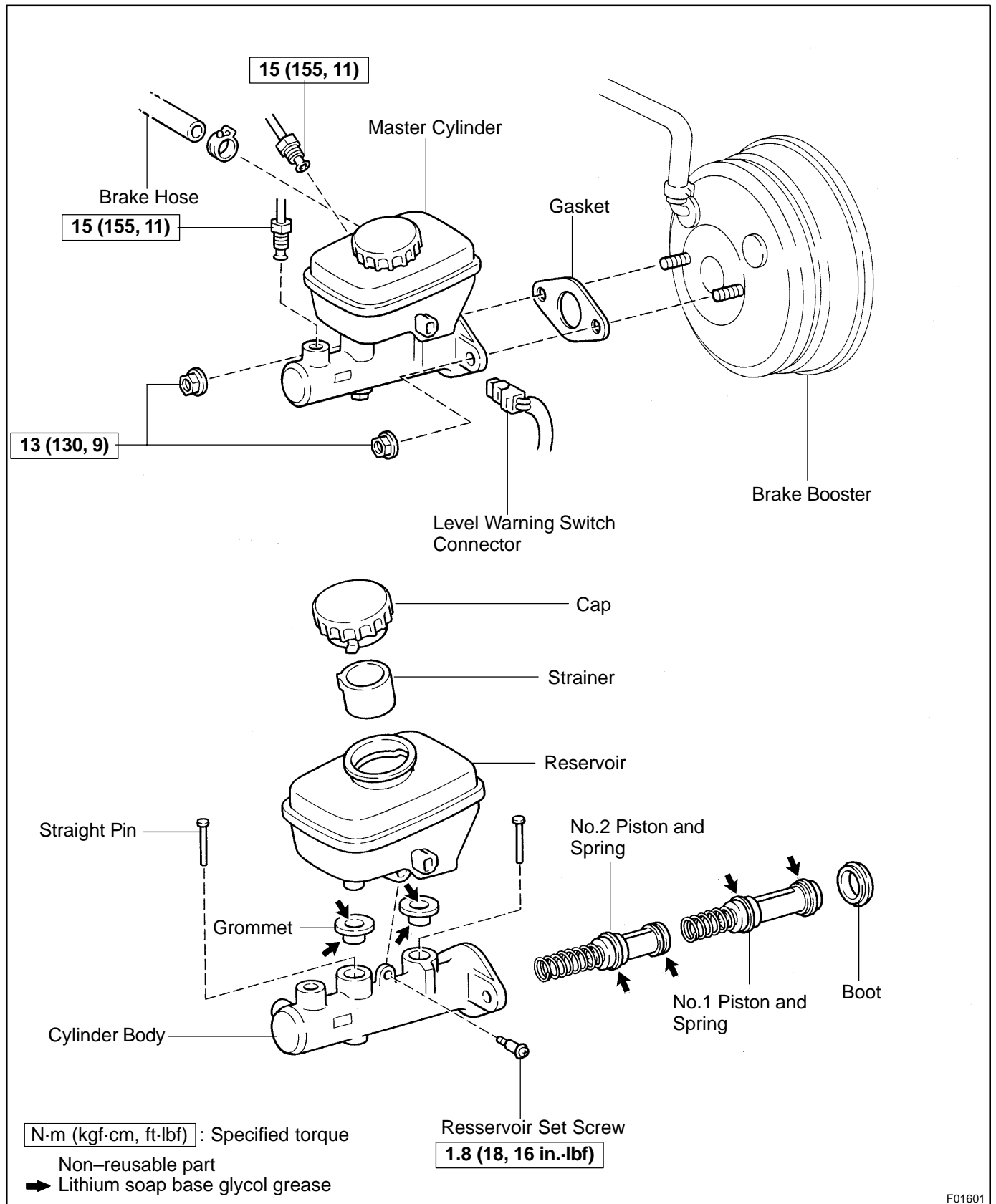
Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [BR-10](#)).

BRAKE MASTER CYLINDER COMPONENTS

BROC4-01



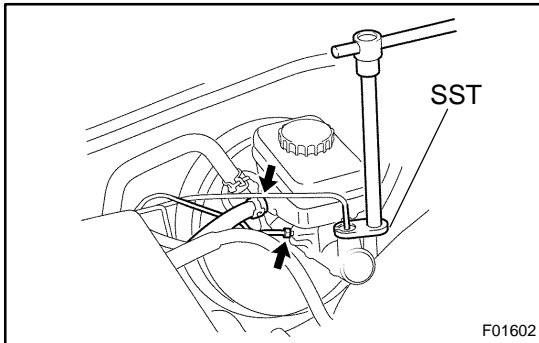
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REMOVAL

1. DISCONNECT LEVEL WARNING SWITCH CONNECTOR
2. DRAW OUT FLUID WITH SYRINGE

NOTICE:

Do not let brake fluid remain on a painted surface. Wash it off immediately.



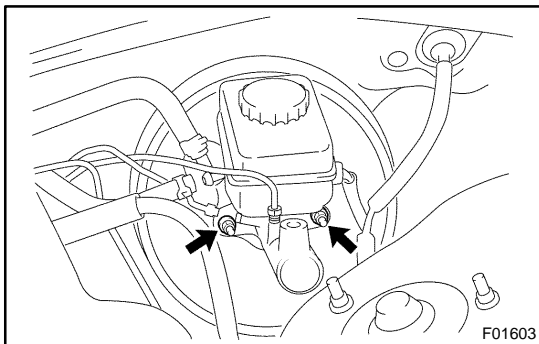
3. DISCONNECT BRAKE LINES

- (a) Using SST, disconnect the 2 brake lines from the master cylinder.

SST 09023-00100

Torque: 15 N·m (155 kgf-cm, 11 ft-lbf)

- (b) Disconnect the brake hose from the reservoir.

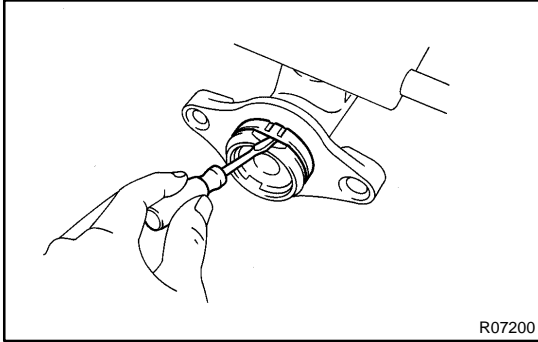


4. REMOVE MASTER CYLINDER

- (a) Remove the 2 nuts.

Torque: 13 N·m (130 kgf-cm, 9 ft-lbf)

- (b) Pull out the master cylinder and gasket from the brake booster.



DISASSEMBLY

1. REMOVE MASTER CYLINDER BOOT

Using a screwdriver, remove the master cylinder boot.

HINT:

At the time of installation, please refer to the following item.
With the UP mark on the master cylinder boot facing upwards, install the cylinder boot on the master cylinder.

2. REMOVE RESERVOIR CAP AND STRAINER

- (a) Turn the reservoir cap to the "open" side and remove it.
- (b) Remove the strainer.

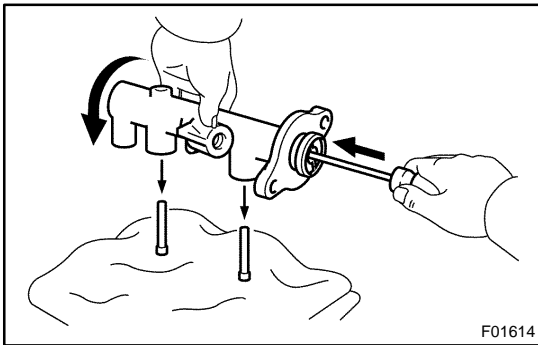
3. REMOVE RESERVOIR

Remove the set screw and pull out the reservoir.

Torque: 1.8 N·m (18 kgf·cm, 16 in.-lbf)

4. REMOVE 2 GROMMETS

5. PLACE CYLINDER IN VISE



6. REMOVE 2 PISTONS AND SPRINGS

- (a) Push in the piston with a screwdriver and remove the 2 straight pins by turning over the cylinder body.

HINT:

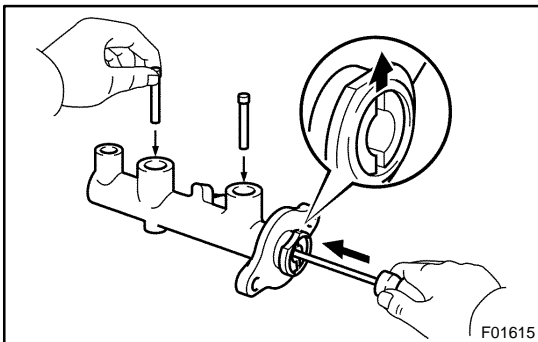
Tap the screwdriver tip before use.

- (b) Remove the 2 pistons and springs by hand, pulling straight out, not at an angle.

NOTICE:

If they are pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.

At the time of reassembly, be careful not to damage the rubber lips on the pistons.



HINT:

At the time of reassembly, please refer to the following item.
Insert the piston with elliptic hole facing vertically.

INSPECTION

HINT:

Clean the disassembled parts with compressed air.

1. **INSPECT CYLINDER BORE FOR RUST OR SCORING**
2. **INSPECT CYLINDER FOR WEAR OR DAMAGE**

If necessary, clean or replace the cylinder.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-14](#)).

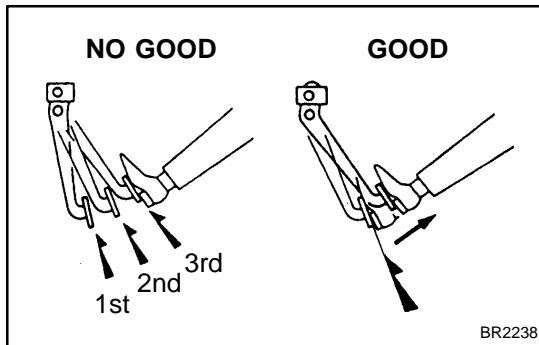
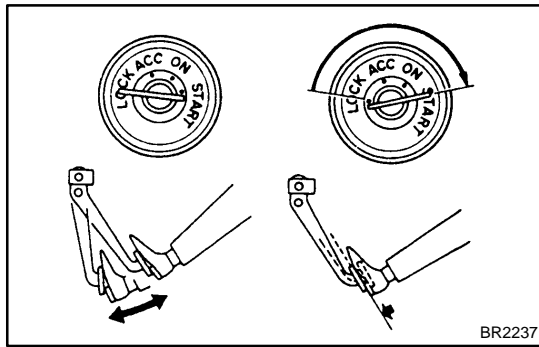
NOTICE:

Apply lithium soap base glycol grease to the rubber parts indicated by arrows (See page [BR-12](#)).

INSTALLATION

Installation is in the reverse order of removal (See page [BR-13](#)).

1. BEFORE INSTALLATION, ADJUST LENGTH OF BRAKE BOOSTER PUSH ROD (See page [BR-21](#))
2. AFTER INSTALLATION, FILL BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#)), CHECK FOR FLUID LEAKAGE
3. CHECK AND ADJUST BRAKE PEDAL (See page [BR-6](#))



BRAKE BOOSTER ASSEMBLY ON-VEHICLE INSPECTION

BROCA-01

1. OPERATING CHECK

- (a) Depress the brake pedal several times with the engine off and check that there is no change in the pedal reserve distance.
- (b) Depress the brake pedal and start the engine. If the pedal goes down slightly, operation is normal.

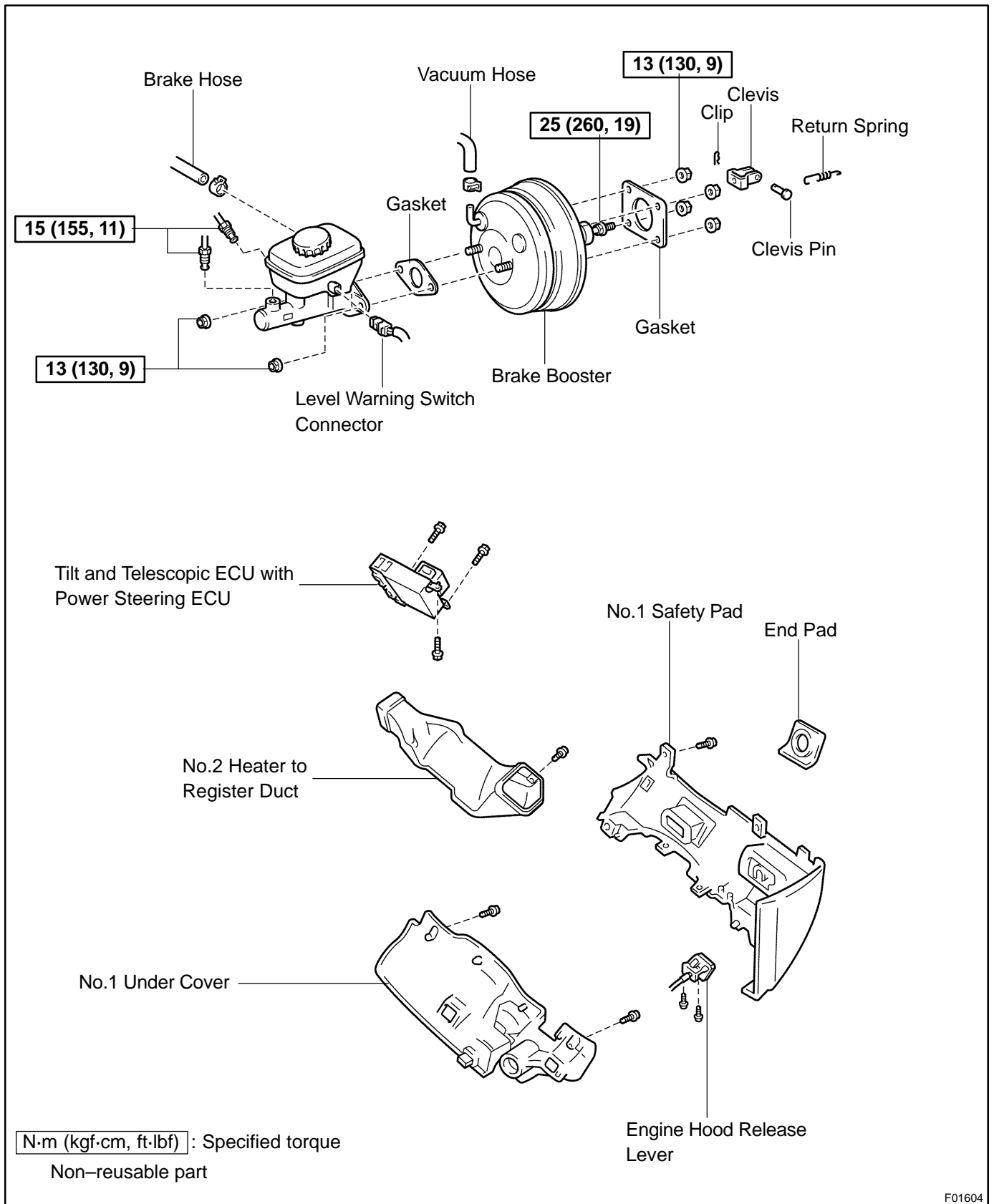
2. AIR TIGHTNESS CHECK

- (a) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

If the pedal goes down farthest the 1st time, but gradually rises after the 2nd or 3rd time, the booster is air tight.

- (b) Depress the brake pedal while the engine is running, and stop the engine with the pedal depressed. If there is no change in the pedal reserve travel after holding the pedal for 30 seconds, the booster is air tight.

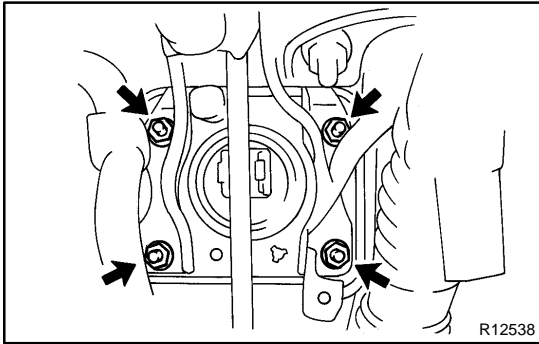
COMPONENTS



F01604

REMOVAL

1. REMOVE MASTER CYLINDER (See page BR-13)
2. REMOVE NO.1 UNDER COVER, NO.1 SAFETY PAD AND NO.2 HEATER TO REGISTER DUCT (See page BO-83)
3. REMOVE TILT AND TELESCOPIC ECU WITH POWER STEERING ECU
4. REMOVE CLIP AND RETURN SPRING
5. REMOVE CLEVIS PIN
6. REMOVE VACUUM HOSE
7. REMOVE BRAKE BOOSTER
 - (a) Remove the 4 booster installation nuts and clevis.
 - (b) Pull out the brake booster and gasket.



INSTALLATION

1. INSTALL BRAKE BOOSTER

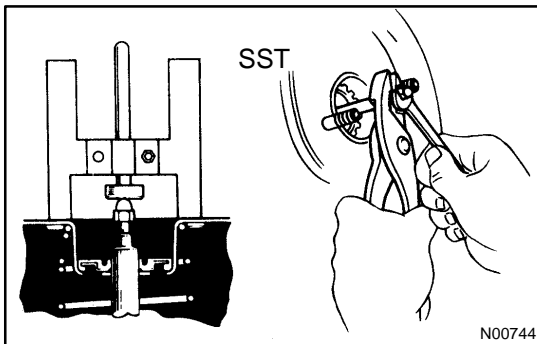
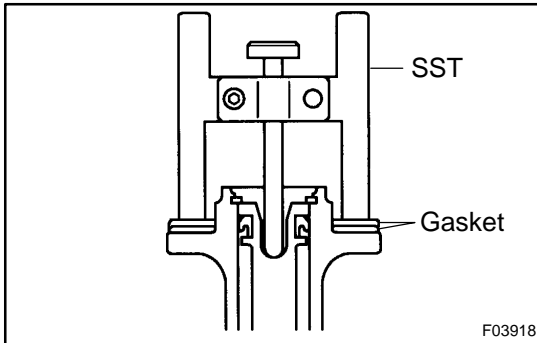
- Install the clevis to the operating rod.
- Install the booster and a new gasket.
- Install and torque the booster installation nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)
- Insert the clevis pin into the clevis and brake pedal, and install the clip to the clevis pin.
- Install the pedal return spring.

2. ADJUST LENGTH OF BOOSTER PUSH ROD

NOTICE:

When adjusting the length of the booster push rod, install 2 new gaskets to the master cylinder. When installing the master cylinder, remove one gasket before installing the master cylinder.

- Install 2 new gaskets on the master cylinder.
- Set SST on the gasket, and lower the pin until its tip slightly touches the piston.
SST 09737-00010



- Turn the SST upside down, and set it on the booster.
SST 09737-00010
- Measure the clearance between the booster push rod and pin head (SST).
Clearance: 0 mm (0 in.)
- Adjust the booster push rod length until the push rod lightly touches the pin head.
Torque: 7.4 N·m (75 kgf·cm, 65 in.-lbf)

3. INSTALL THESE PARTS:

- Tilt and telescopic ECU with power steering ECU
- No.1 under cover, No.1 safety pad and No.2 heater to register duct (See page [BO-90](#))
- Vacuum hose
- Master cylinder (See page [BR-17](#))

4. FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))

5. CHECK FOR FLUID LEAKAGE

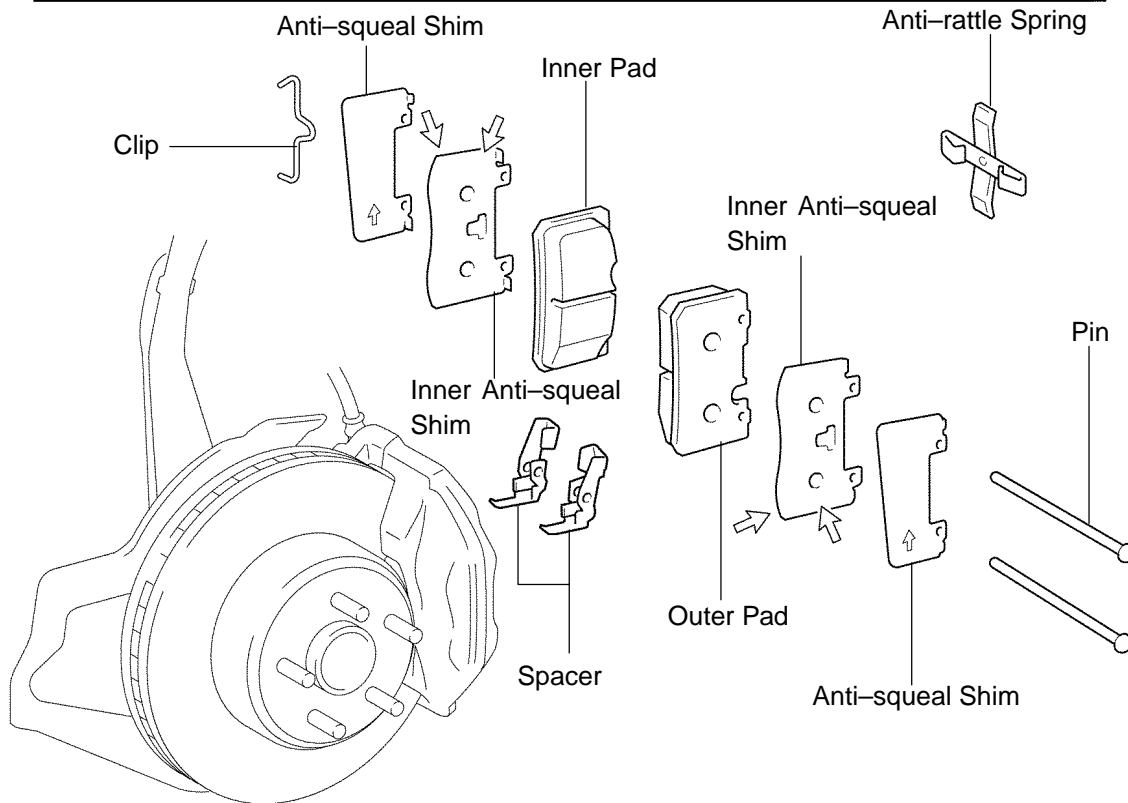
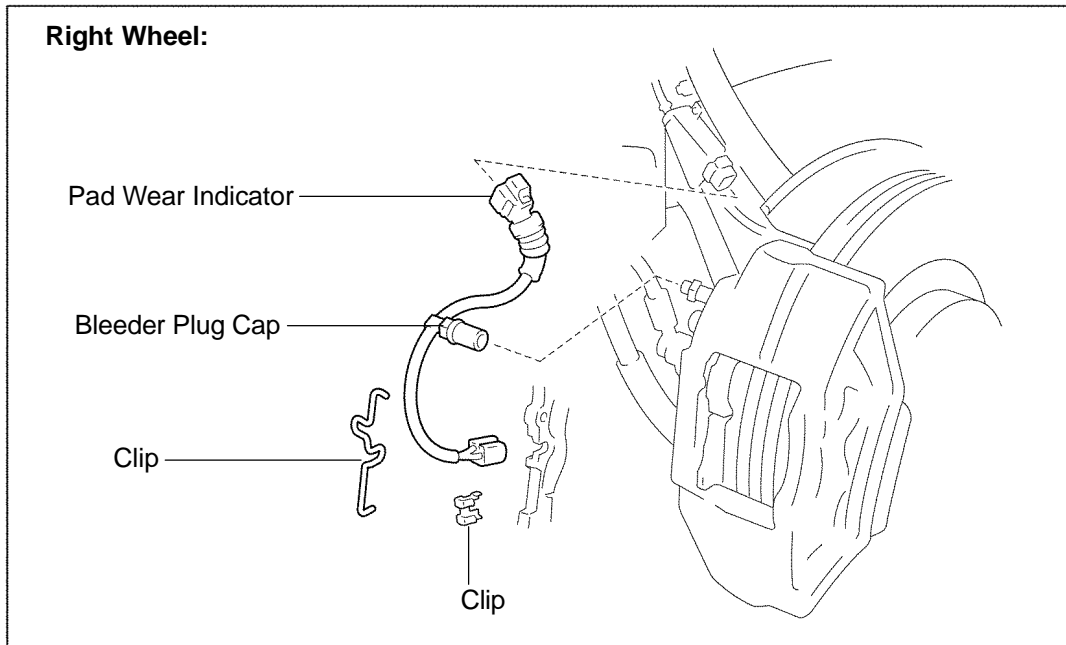
6. CHECK AND ADJUST BRAKE PEDAL

(See page [BR-6](#))

7. DO OPERATIONAL CHECK (See page [BR-18](#))

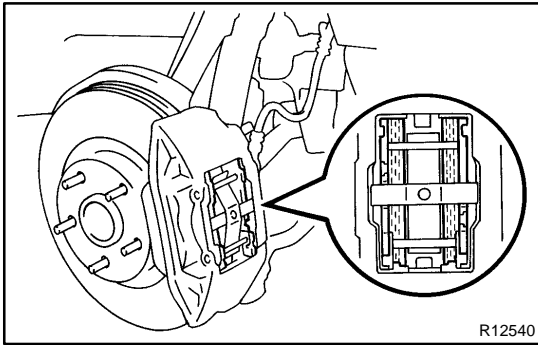
FRONT BRAKE PAD COMPONENTS

BR0CE-01



⇒ Disc brake grease

F01605

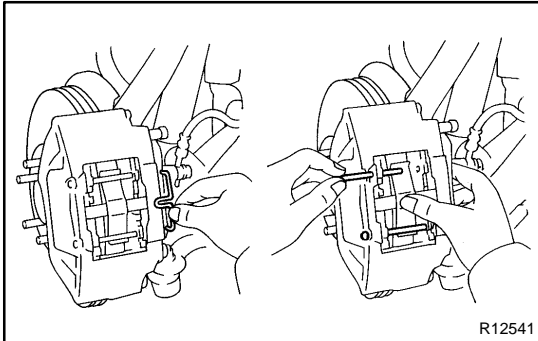


REPLACEMENT

1. REMOVE FRONT WHEEL
2. INSPECT PAD LINING THICKNESS

Check the pad thickness and replace pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



3. REMOVE THESE PARTS:

- (a) Clip and 2 pins
- (b) Anti-rattle spring

NOTICE:

The anti-rattle springs, spacers and clips can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

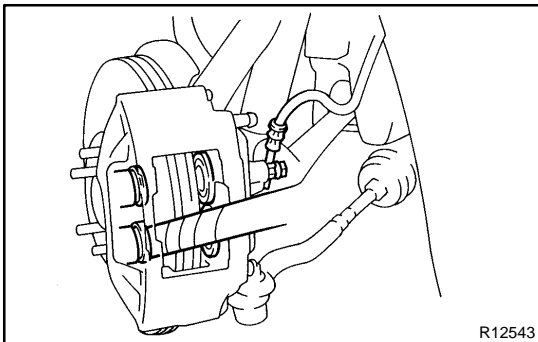
4. REMOVE PADS

- (a) Remove the 2 pads.
- (b) Right wheel:
Remove the clip and bleeder cap, disconnect the pad wear indicator from the inner pad.
- (c) Remove the spacer and 2 anti-squeal shims from each pad.

5. RIGHT WHEEL:

CHECK PAD WEAR INDICATOR (See page BR-28)

6. CHECK DISC THICKNESS AND RUNOUT
(See page BR-28)



7. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

- (a) Draw out a small amount of brake fluid from the reservoir.
- (b) Press in the pistons with a monkey wrench handle or equivalent.

HINT:

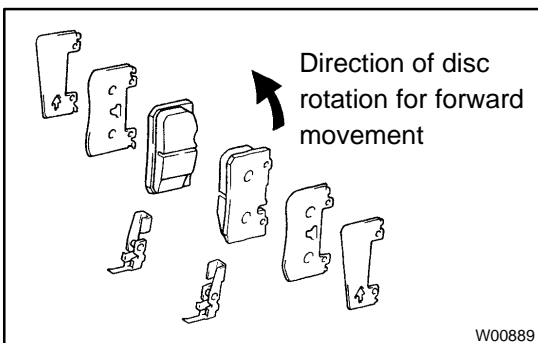
Tape the monkey wrench handle before use.

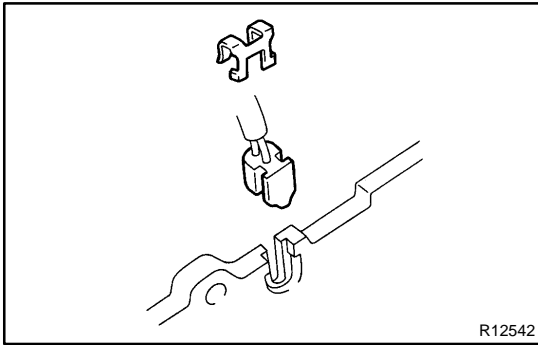
If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

- (c) Apply disc brake grease to both sides of the inner anti-squeal shims (See page BR-22).
- (d) Install the 2 anti-squeal shims and spacer on each pad.

HINT:

Make sure the shims and spacers are facing the front (rotation direction) as shown in the illustration.





- (e) Right wheel:
Connect the pad wear indicator to the inner pads, and install a new clip.

HINT:

Install the clip lock securely in the grooves of the pad.

- (f) Install the 2 pads with the spacer facing downward.

8. INSTALL ANTI-RATTLE SPRING AND 2 PINS

**9. RIGHT WHEEL:
INSTALL CLIP**

Install the pad wear indicator wire harness to the clip, then install the clip and bleeder cap to the caliper.

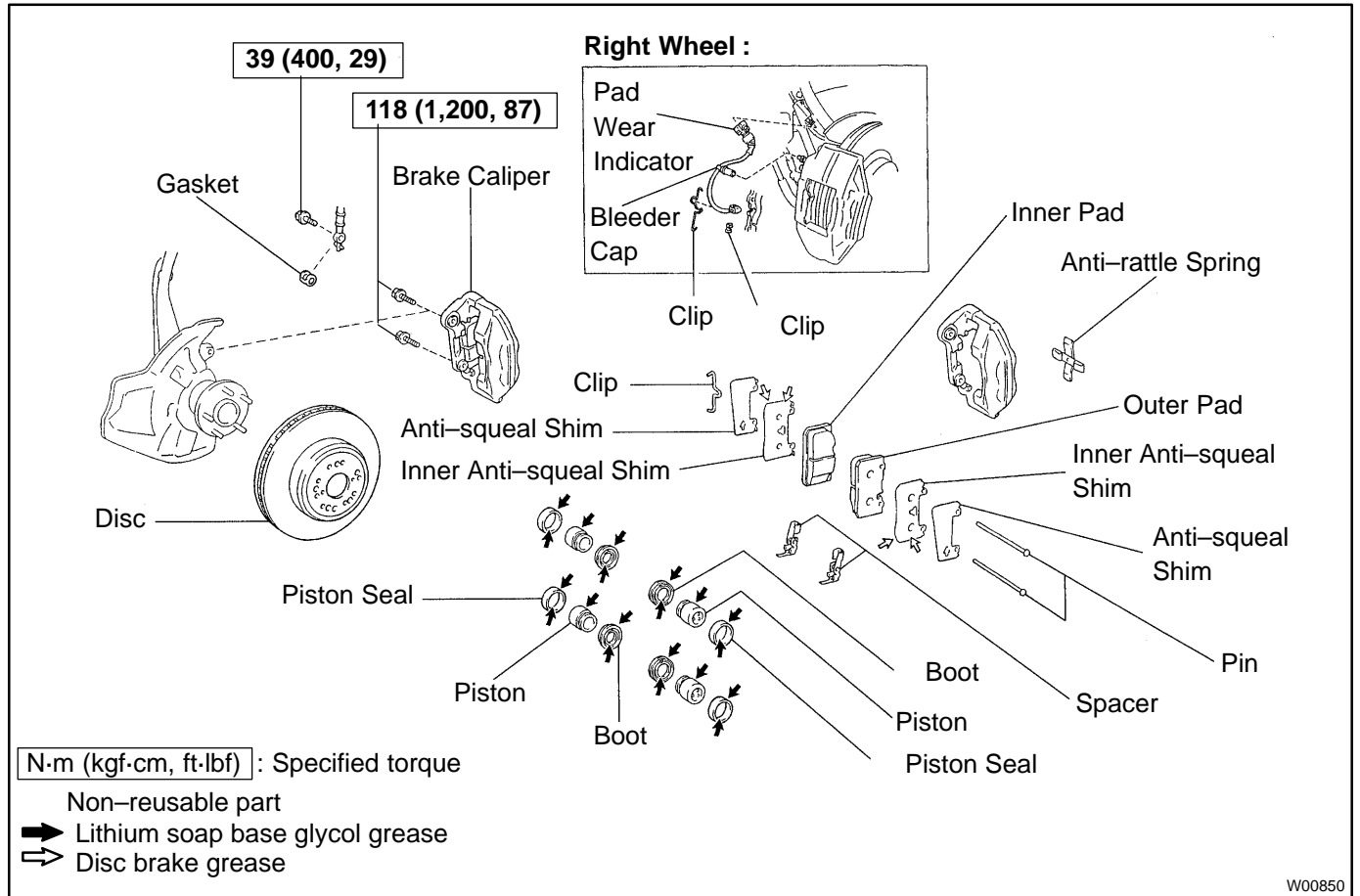
NOTICE:

Make sure the wire harness does not interfere with the caliper, etc.

10. INSTALL FRONT WHEEL

FRONT BRAKE CALIPER COMPONENTS

BR0CG-01

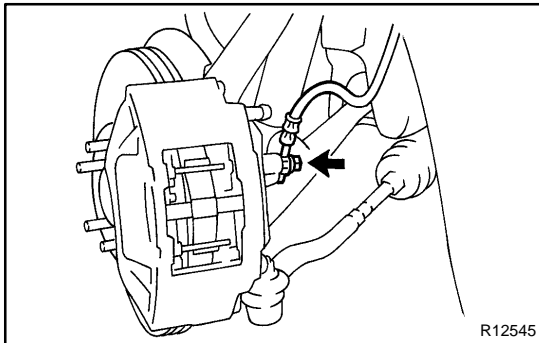


REMOVAL

1. REMOVE FRONT WHEEL
2. REMOVE THESE PARTS:
 - (a) Clip and 2 pins
 - (b) Anti-rattle spring
 - (c) 2 pads with anti-squeal shims and spacers

HINT:

Do not disconnect the pad wear indicator unless you are replacing the brake pads.



3. DISCONNECT BRAKE HOSE

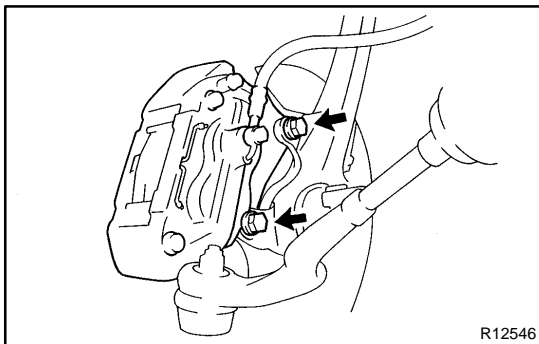
- (a) Remove the union bolt and gasket from the caliper, then disconnect the brake hose from the caliper.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

HINT:

At the time of installation, please refer to the following item. Install the flexible hose lock securely in the lock hole in the caliper.

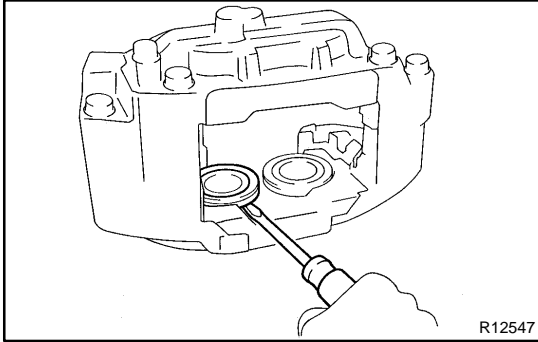
- (b) Use a container to catch the brake fluid as it drains out.



4. REMOVE CALIPER

Remove the 2 bolts and caliper from the knuckle.

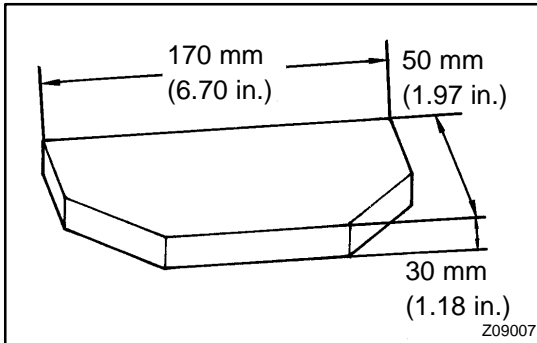
Torque: 118 N·m (1,200 kgf·cm, 87 ft·lbf)



DISASSEMBLY

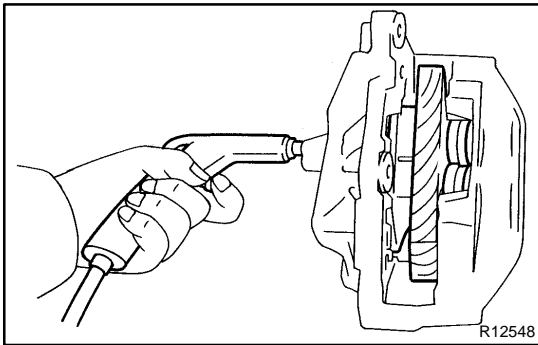
1. REMOVE CYLINDER BOOTS

Using a screwdriver, remove the cylinder boots from the cylinder.



2. REMOVE PISTONS

(a) Prepare a wooden plate to hold the pistons.

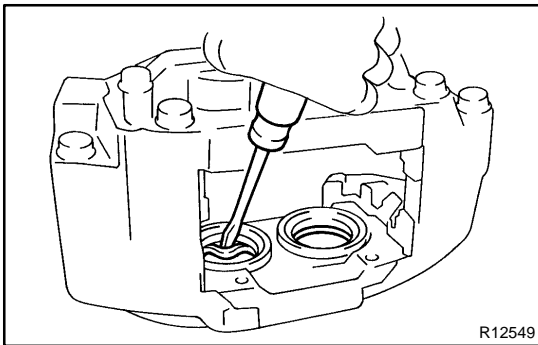


(b) Place the plate between the pistons and insert a pad on one side.

(c) Use compressed air to remove the pistons alternately from the cylinder.

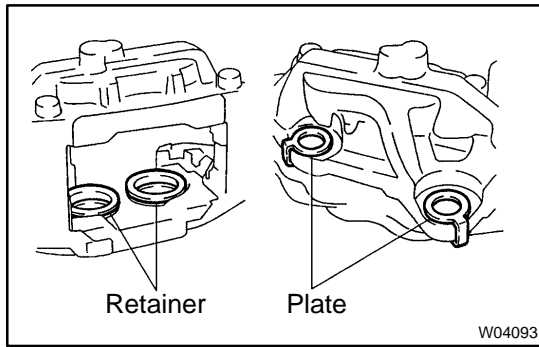
CAUTION:

Do not place your fingers in front of the pistons when using compressed air.



3. REMOVE PISTON SEALS

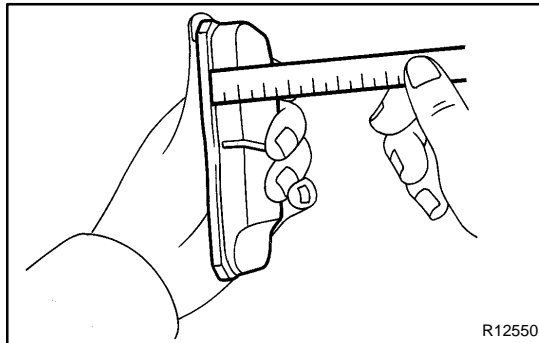
Using a screwdriver, remove the 4 piston seals from the cylinder.



INSPECTION

1. INSPECT 4 RETAINERS AND 2 PLATES

The retainers and plates are non-reusable part, replace the caliper if they are cracked or deformed, or if they come off.



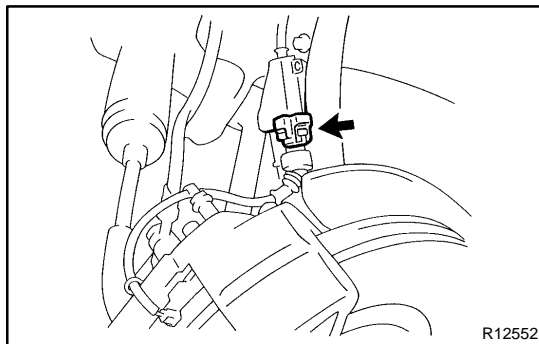
2. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 12.0 mm (0.472 in.)

Minimum thickness: 1.0 mm (0.039 in.)

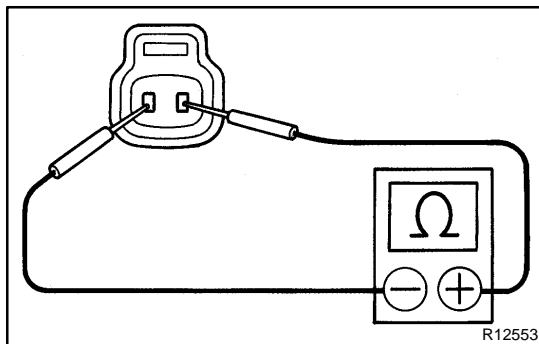
Replace the pad if the pad's thickness is at the minimum or less, or if the pad has severe, uneven wear.



3. RIGHT WHEEL:

INSPECT PAD WEAR INDICATOR

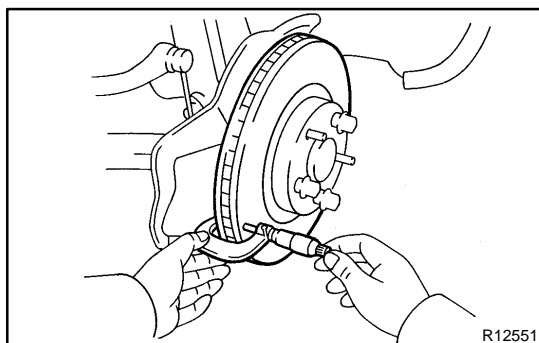
(a) Disconnect the pad wear indicator connector from the speed sensor wire harness.



(b) Check that continuity exists of pad wear indicator connector.

If no continuity exists, replace the pad wear indicator.

(c) Connect the connector to the speed sensor wire harness until the clicking sound can be heard.



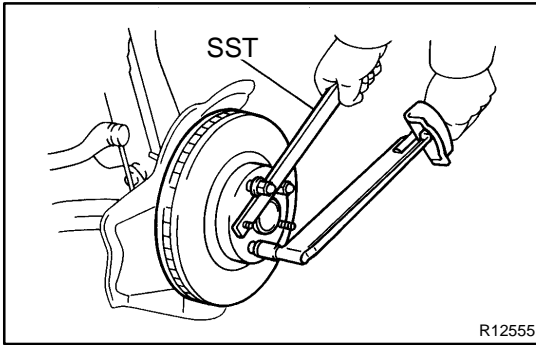
4. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 28.0 mm (1.102 in.)

Minimum thickness: 26.0 mm (1.024 in.)

Replace the disc if the thickness of the disc is at the minimum or less. Replace the disc or grind it on a lathe if it is scored or worn unevenly.



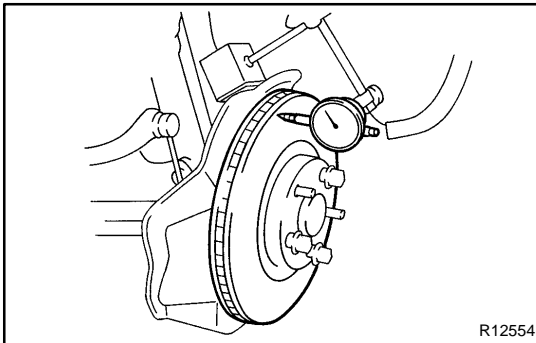
5. MEASURE DISC RUNOUT

- (a) Tighten the disc with the 3 hub nuts.

HINT:

Using SST 09330-00021 to hold the disc during measurement.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



- (b) Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the outside edge.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page SA-13). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On-Car" brake lathe.

6. IF NECESSARY, ADJUST DISC RUNOUT

- (a) Remove the 3 hub nuts, 2 screws and disc. Reinstall the disc 1/5 of a turn round from its original position on the hub. Install and torque the 3 hub nuts.

Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.

HINT:

Use SST 09330-00021 to hold the disc during loosening/torquing the hub nuts.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

- (b) Repeat (a) until the disc has been installed on the 3 remaining hub position.
- (c) If the minimum runout recorded in (a) and (b) is less than 0.05 mm (0.0020 in.), install the disc in that position.
- (d) If the minimum runout recorded in (a) and (b) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 5.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-27](#)).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by the arrows (See page [BR-25](#)).

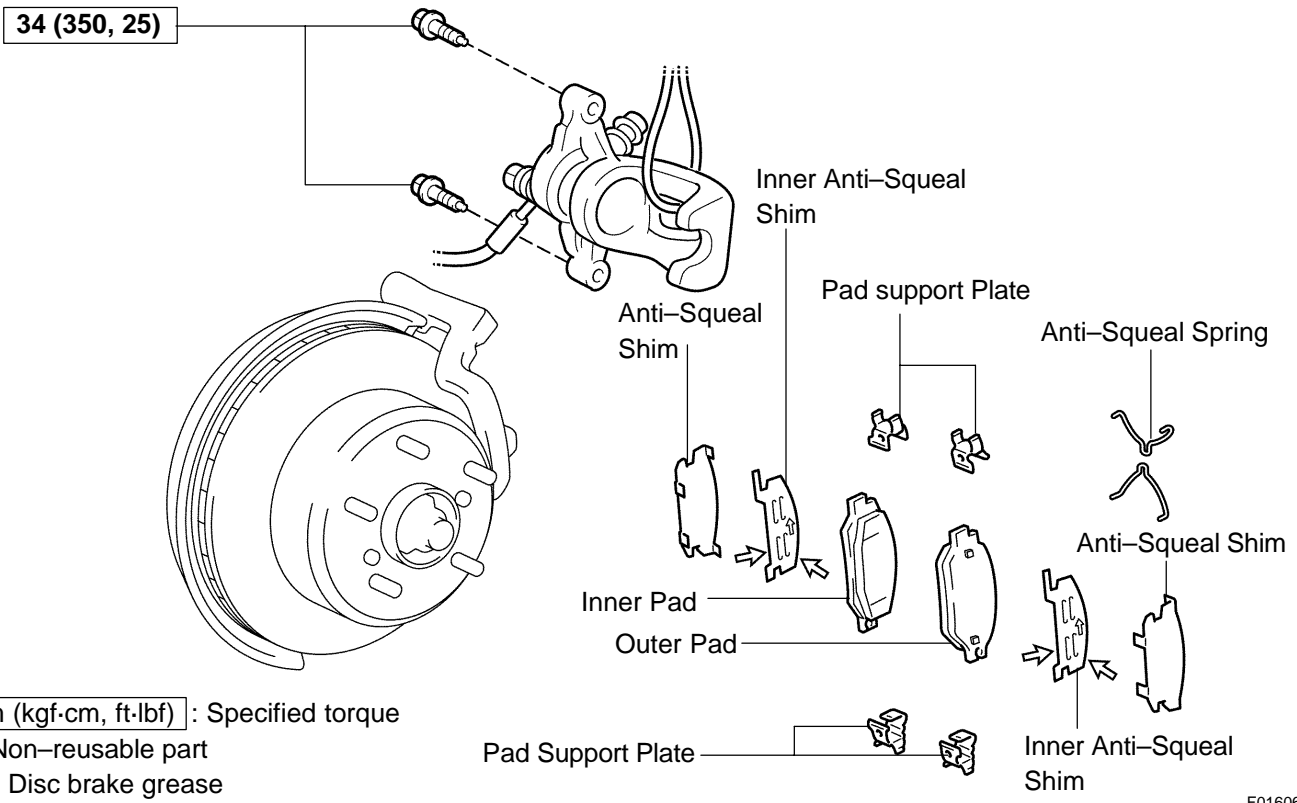
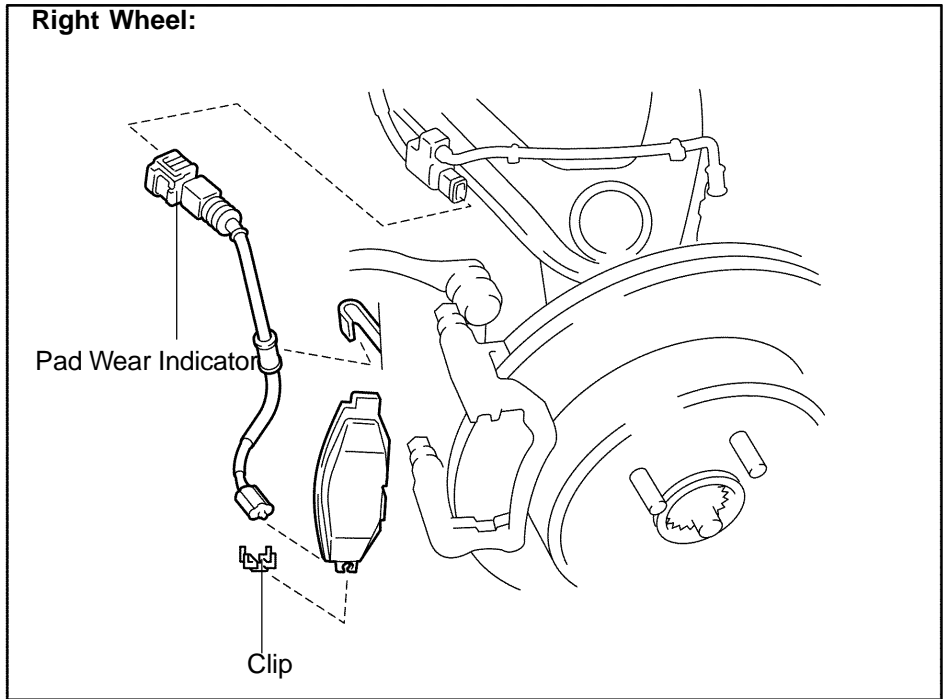
INSTALLATION

Installation is in the reverse order of removal (See page [BR-26](#)).

1. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))
2. CHECK FOR FLUID LEAKAGE

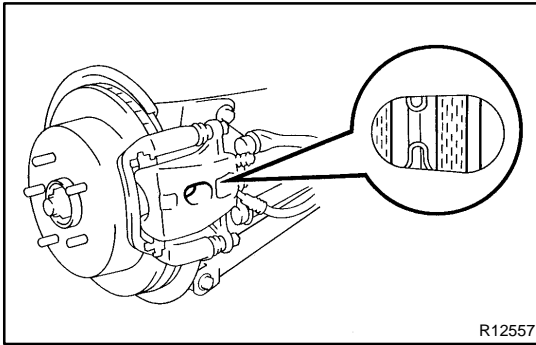
REAR BRAKE PAD COMPONENTS

BROC-01



N·m (kgf·cm, ft·lbf) : Specified torque
 Non-reusable part
 ⇒ Disc brake grease

F01606



REPLACEMENT

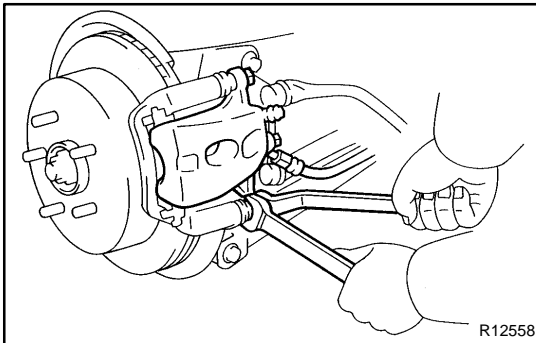
1. REMOVE REAR WHEEL
2. INSPECT PAD LINING THICKNESS

Check the pad thickness through the caliper inspection hole and replace pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)

3. REMOVE CALIPER

(a) Hold the sliding pin and loosen the installation bolt.



(b) Remove the 2 installation bolts.

(c) Remove the caliper and suspend it securely.

HINT:

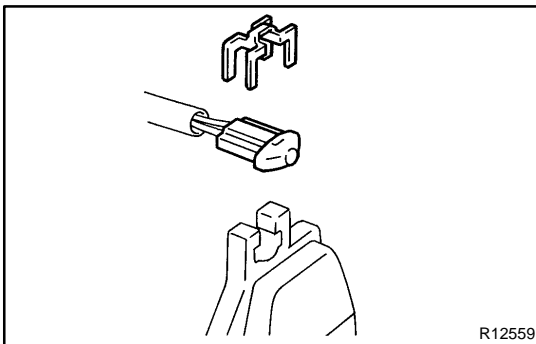
Do not disconnect the flexible hose from the caliper.

4. REMOVE PADS

(a) Remove the 2 anti-squeal springs.

(b) Remove the 2 pads.

(c) Remove the 4 anti-squeal shims.



(d) Right wheel:

Remove the clip, and disconnect the pad wear indicator from the inner pad.

(e) Remove the 4 pad support plates.

NOTICE:

The anti-squeal springs and support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and have had all rust, dirt and foreign particles cleaned off.

5. RIGHT WHEEL:

CHECK PAD WEAR INDICATOR (See page BR-38)

6. CHECK DISC THICKNESS AND RUNOUT

(See page BR-38)

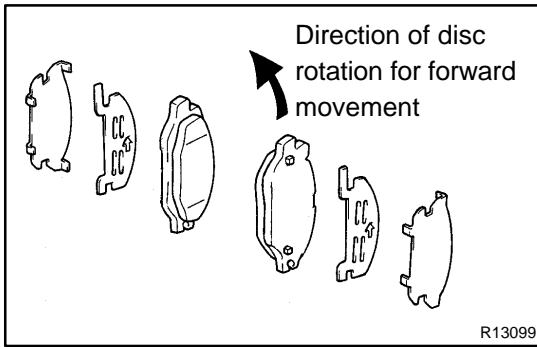
7. INSTALL 4 PAD SUPPORT PLATES

8. INSTALL NEW PADS

NOTICE:

When replacing worn pads, the anti-squeal shims must be replaced together with the pads.

(a) Apply disc brake grease to both sides of the inner anti-squeal shims (See page BR-32).



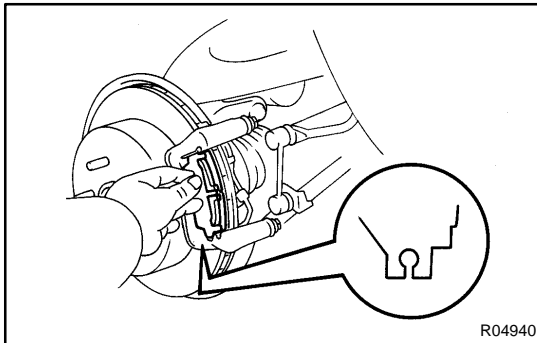
- (b) Install the 2 anti-squeal shims to each pad.

HINT:

Make sure the inner anti-squeal shims are facing the front (rotation direction) as shown in the illustration.

- (c) Right wheel:

Connect the pad wear indicator to the inner pad, and install a new clip. Then install the inner pad with the pad wear indicator facing downward.

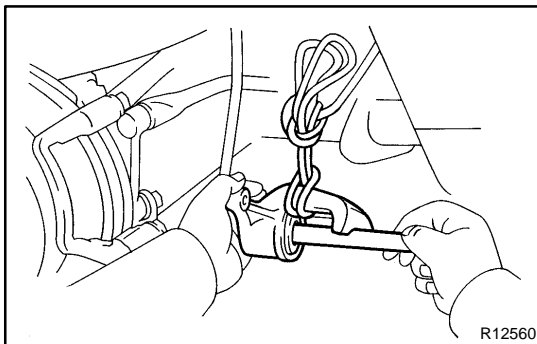


- (d) Install the other pads, as shown in the illustration.

NOTICE:

There should be no oil or grease adhering to the friction surfaces of the pads or disc.

- (e) Install the 2 anti-squeal springs.



9. INSTALL CALIPER

- (a) Draw out a small amount of brake fluid from the reservoir.
 (b) Press in the piston with a hammer handle or similar implement.

HINT:

If the piston is difficult to push in, loosen the bleeder plug and push in the piston while letting some brake fluid escape.

- (c) Temporarily install the caliper on the torque plate with the 2 installation bolts.
 (d) Hold the sliding pin and torque the 2 installation bolts.

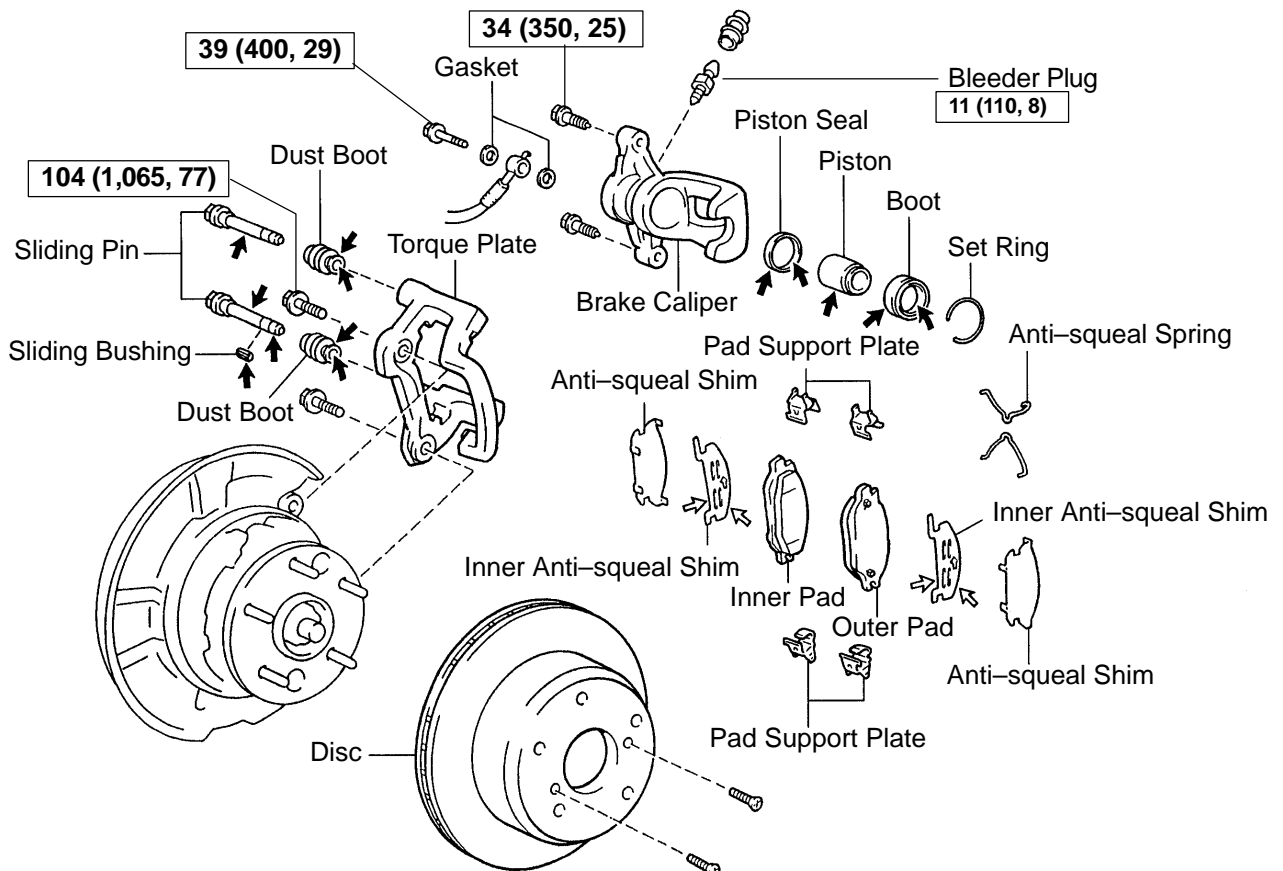
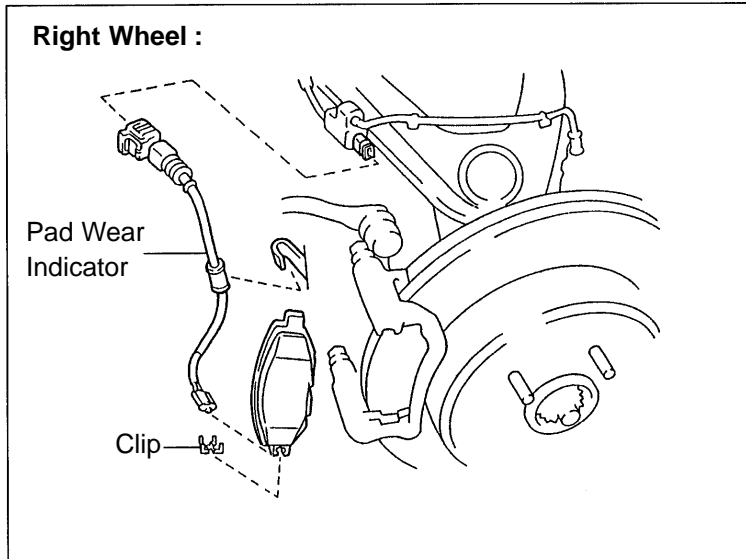
Torque: 34 N·m (350 kgf-cm, 25 ft-lbf)

10. INSTALL REAR WHEEL

11. CHECK THAT FLUID LEVEL IS AT MAX LINE

REAR BRAKE CALIPER COMPONENTS

BR00-01



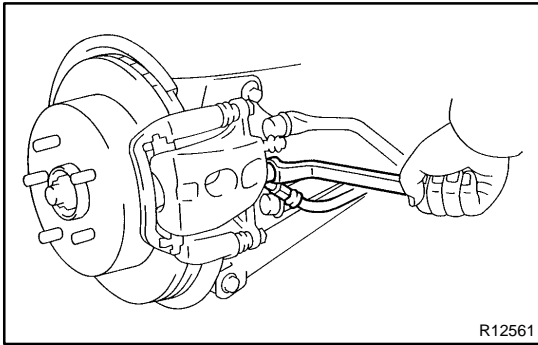
N·m (kgf·cm, ft·lbf) : Specified torque

Non-reusable part

➡ Lithium soap base glycol grease

➡ Disc brake grease

W04095



REMOVAL

1. DISCONNECT FLEXIBLE HOSE

- (a) Remove the union bolt and 2 gaskets from the caliper, then disconnect the flexible hose from the caliper.

Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

- (b) Use a container to catch the brake fluid as it drains out.

2. REMOVE CALIPER

- (a) Hold the sliding pin and loosen the 2 installation bolts.

- (b) Remove the 2 installation bolts.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

- (c) Remove the caliper from the torque plate.

3. REMOVE 2 PADS (See page BR-33)

- (a) Remove the 2 anti-squeal springs.

- (b) Remove the 2 pads with anti-squeal shims.

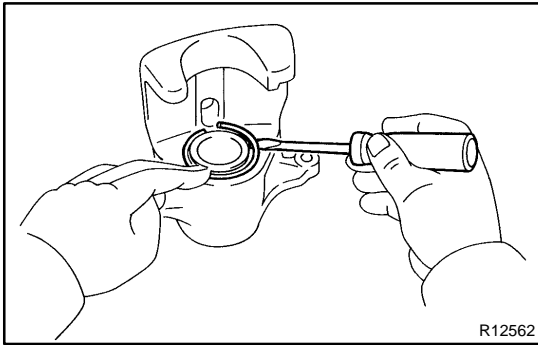
- (c) Right wheel:

Remove the clip, and disconnect the pad wear indicator from the inner pad.

- (d) Remove the 4 pad support plates.

HINT:

Do not disconnect the pad wear indicators unless you are replacing the brake pads.

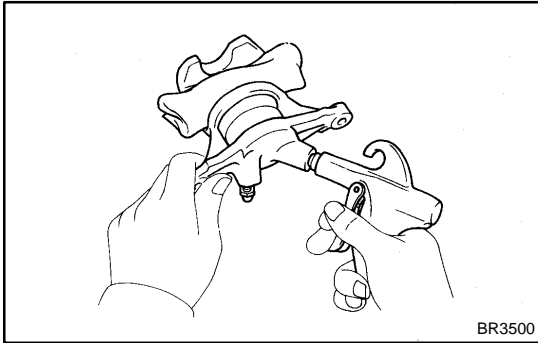


R12562

DISASSEMBLY

1. REMOVE CYLINDER BOOT SET RING AND BOOT

Using a screwdriver, remove the cylinder boot set ring and cylinder boot from the cylinder.



BR3500

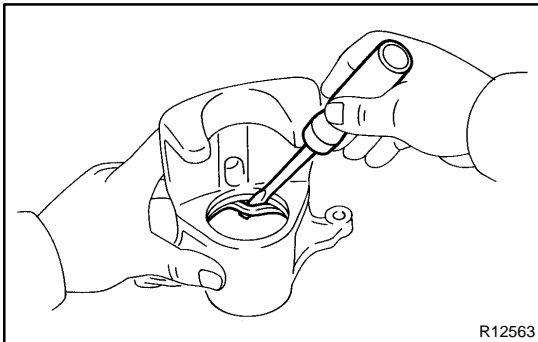
2. REMOVE PISTON

- Place a piece of cloth or similar article between the piston and caliper.
- Use compressed air to remove the piston from the cylinder.

CAUTION:

At the time of disassembly, please refer to the following item.

Do not place your fingers in front of the piston when using compressed air.



R12563

3. REMOVE PISTON SEAL

Using a screwdriver, remove the piston seal from the cylinder.

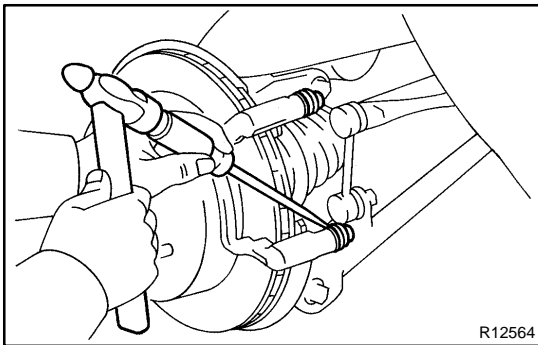
4. REMOVE SLIDING PINS AND DUST BOOTS

- Remove the 2 sliding pins from the torque plate.

NOTICE:

At the time of resassembly, please refer to the following item.

Insert the sliding pin with the sliding bushing into the bottom side.



R12564

- Using a screwdriver and hammer, tap out the 2 dust boots.

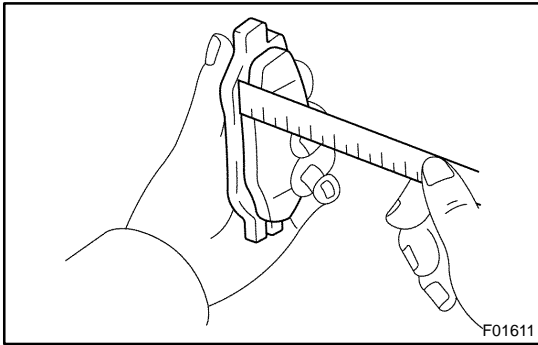
HINT:

At the time of installation, use a 21 mm socket and tap in 2 new dust boots into the torque plate.

NOTICE:

At the time of resassembly, please refer to the following item.

Confirm that the metal plate portion of the dust boot fits correctly in the torque plate.



INSPECTION

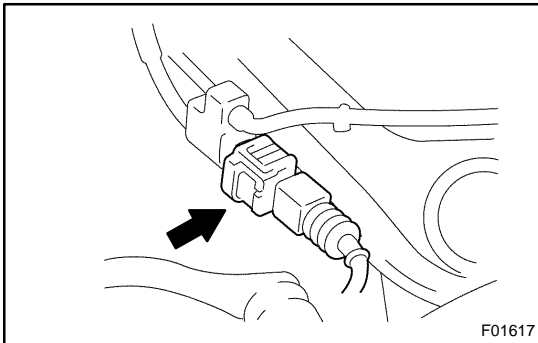
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 10.0 mm (0.394 in.)

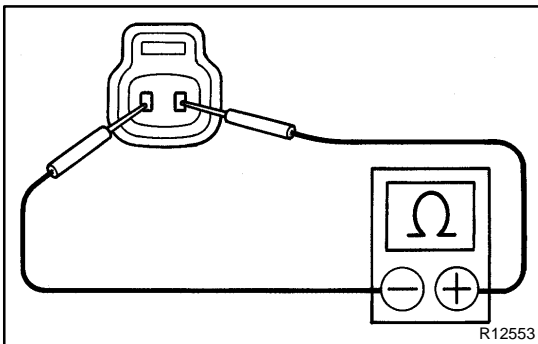
Minimum thickness: 1.0 mm (0.039 in.)

Replace the pad if the pad's thickness is at the minimum or less, or if the pad has severe, uneven wear.



2. RIGHT WHEEL: INSPECT BRAKE PAD WEAR INDICATOR

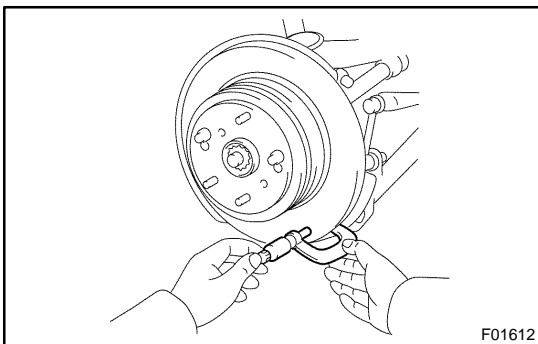
(a) Disconnect the pad wear indicator connector from the speed sensor wire harness.



(b) Check that continuity exists of pad wear indicator connector.

If no continuity exists, replace the pad wear indicator.

(c) Connect the connector to the speed sensor wire harness until the clicking sound can be heard.



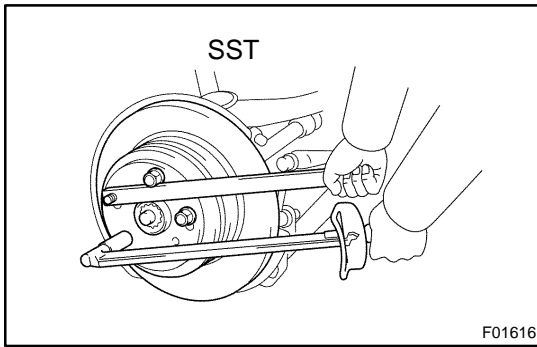
3. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 16.0 mm (0.630 in.)

Minimum thickness: 15.0 mm (0.591 in.)

Replace the disc if the thickness of the disc is at the minimum or less. Replace the disc or grind it on a lathe if it is scored or worn unevenly.



F01616

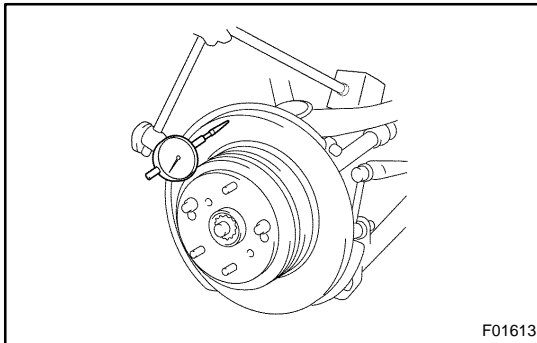
4. MEASURE DISC RUNOUT

- (a) Tighten the disc with the 3 hub nuts.

HINT:

Using SST 09330-00021 to hold the disc during measurement.

Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)



F01613

- (b) Using a dial indicator, measure the disc runout at a position 10 mm (0.39 in.) from the out side edge.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc's runout is at the maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See page SA-54). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grid it on a "On-Car" brake lathe.

5. IF NECESSARY, ADJUST DISC

- (a) Remove the 2 bolts and torque plate.

- (b) Remove the 3 hub nuts, 2 screws and disc. Reinstall the disc 1/5 of a turn round from its original position on the hub. Install and torque the 3 hub nuts and 2 screws.

HINT:

Use SST 09330-00021 to hold the disc during loosening/torquing the hub nuts.

Torque:

Hub nut 103 N·m (1,050 kgf·cm, 76 ft·lbf)

Screw 5.4 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Remeasure the disc runout. Make a note of the runout and the disc's position on the hub.
- (d) Repeat (b) until the disc has been installed on the 3 remaining hub positions.

If the minimum runout recorded in (b) and (c) is less than 0.05 mm (0.0020 in.), install the disc in that position.

If the minimum runout recorded in (b) and (c) is greater than 0.05 mm (0.0020 in.), replace the disc and repeat step 4.

- (e) Install the 2 bolts and torque plate.

Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-37](#)).

NOTICE:

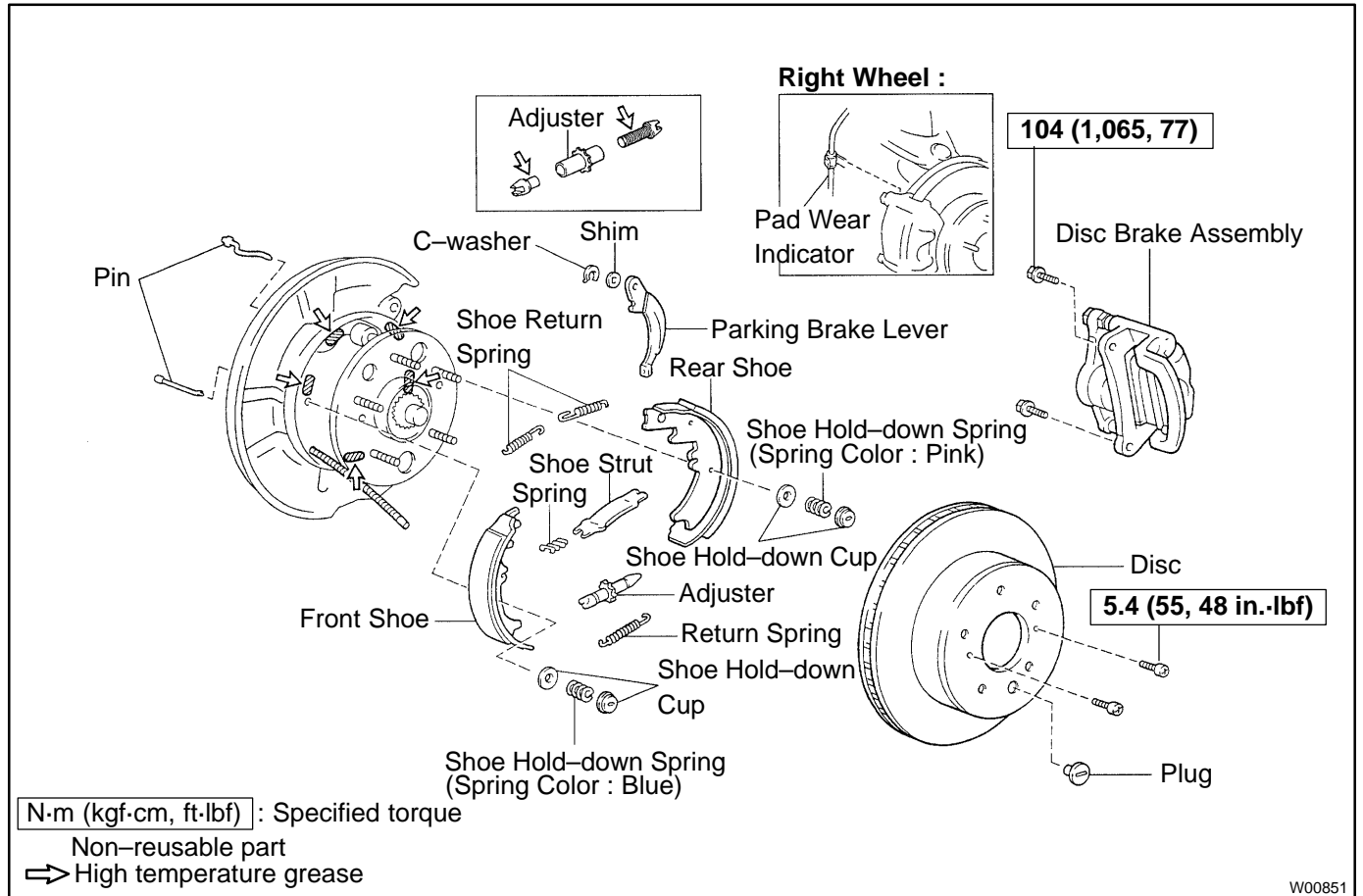
Apply lithium soap base glycol gerase to the parts indicated by the arrows (See page [BR-35](#)).

INSTALLATION

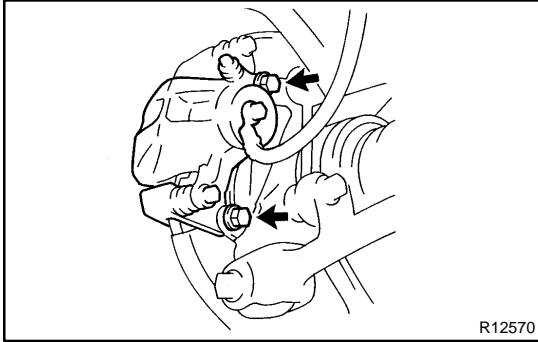
Installation is in the reverse order of removal (See page [BR-36](#)).

1. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))
2. CHECK FOR FLUID LEAKAGE

PARKING BRAKE COMPONENTS



W00851



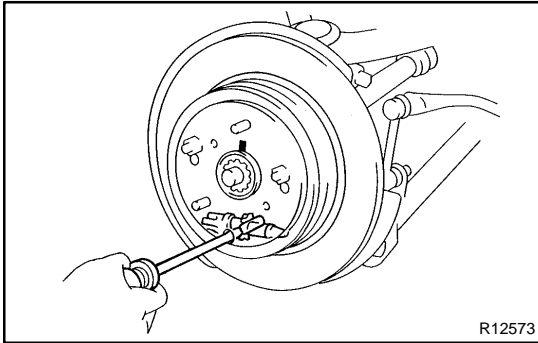
R12570

DISASSEMBLY

1. REMOVE REAR WHEEL

2. REMOVE REAR DISC BRAKE ASSEMBLY

- (a) Right wheel:
Disconnect the pad wear indicator wire harness from the clamp.
- (b) Remove the 2 mounting bolts and disc brake assembly.
Torque: 104 N·m (1,065 kgf·cm, 77 ft·lbf)
- (c) Suspend the disc brake securely. Make sure the hose is not stretched.



R12573

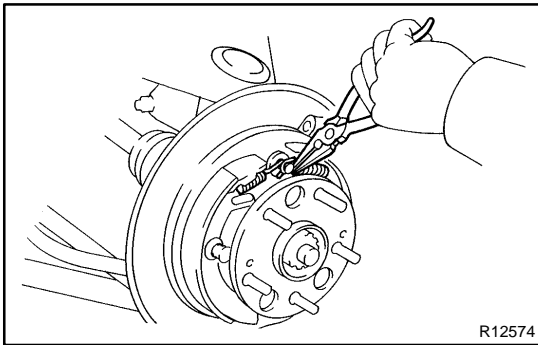
3. REMOVE DISC

- (a) Place matchmarks on the disc and rear axle hub.
- (b) Remove the 2 screws and disc.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

HINT:

If the disc cannot be removed easily, return the shoe adjuster until the wheel turns freely.

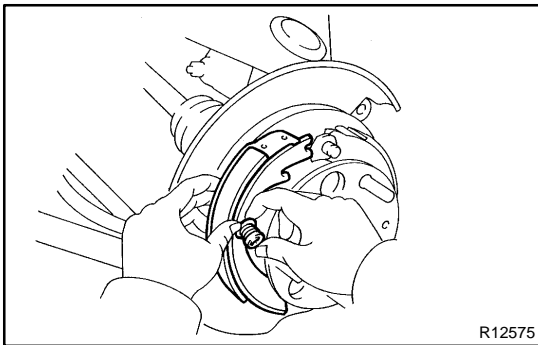


R12574

4. REMOVE SHOE RETURN SPRINGS

Using needle-nose pliers, remove the 2 shoe return springs.

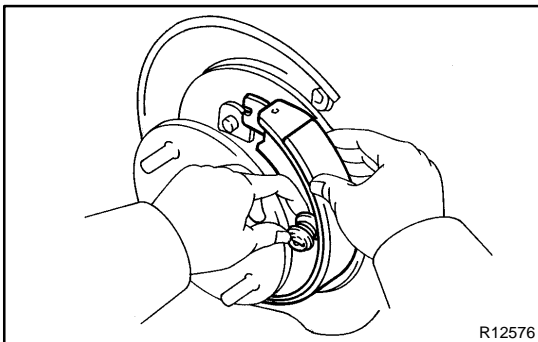
5. REMOVE SHOE STRUT WITH SPRING



R12575

6. REMOVE FRONT SHOE, ADJUSTER AND TENSION SPRING

- (a) Slide out the front shoe and remove the shoe adjuster.
- (b) Disconnect the tension spring and remove the front shoe.



R12576

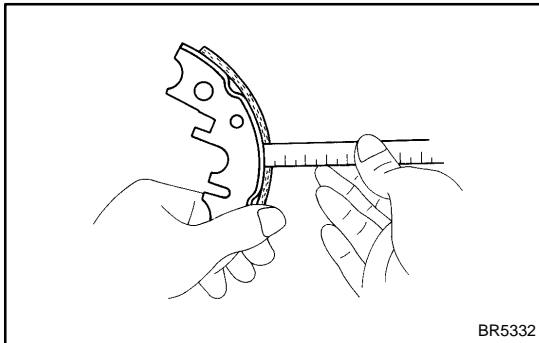
7. REMOVE REAR SHOE

- (a) Slide out the rear shoe.
- (b) Remove the tension spring from the rear shoe.
- (c) Disconnect the parking brake cable from the parking brake shoe lever.
- (d) Remove the shoe hold-down spring cups, springs and pins.

INSPECTION

1. INSPECT DISASSEMBLED PARTS

Inspect the disassembled parts for wear, rust or damage.



BR5332

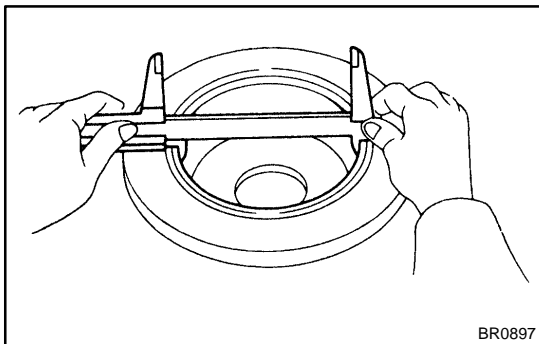
2. MEASURE BRAKE SHOE LINING THICKNESS

Using a ruler, measure the thickness of the shoe lining.

Standard thickness: 2.5 mm (0.098 in.)

Minimum thickness: 1.0 mm (0.039 in.)

If the lining thickness is at the minimum or less, or if there is severe, uneven wear, replace the brake shoe.



BR0897

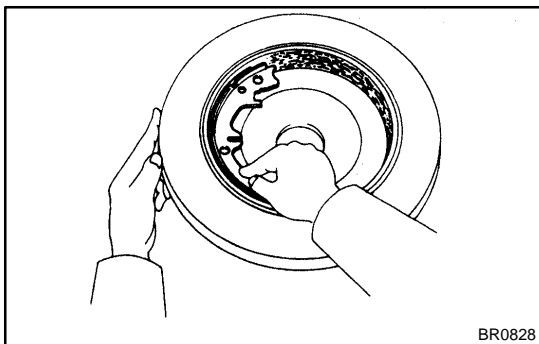
3. MEASURE DISC INSIDE DIAMETER

Using a vernier calipers, measure the inside diameter of the disc.

Standard inside diameter: 190 mm (7.48 in.)

Maximum inside diameter: 191 mm (7.52 in.)

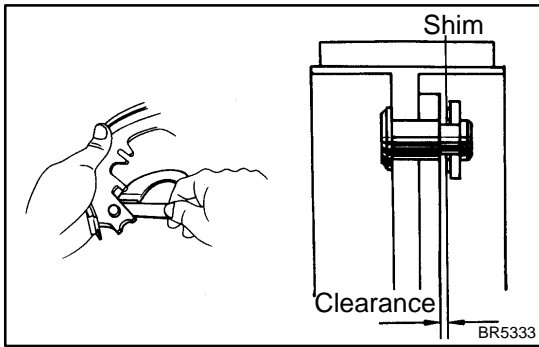
Replace the disc if the inside diameter is at the maximum value or more. Replace the disc or grind it with a lathe if the disc is scored or worn unevenly.



BR0828

4. INSPECT PARKING BRAKE LINING AND DISC FOR PROPER CONTACT

Apply chalk to the inside surface of the disc, then grind down the brake shoe lining to fit. If the contact between the disc and the brake shoe lining is improper, repair it using a brake shoe grinder or replace the brake shoe assembly.



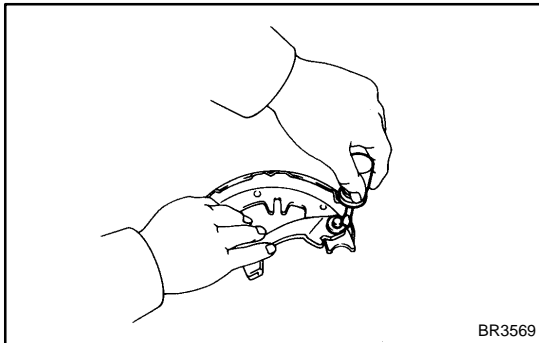
5. MEASURE CLEARANCE BETWEEN PARKING BRAKE SHOE AND LEVER

Using a feeler gauge, measure the clearance.

Standard clearance: Less than 0.35 mm (0.0138 in.)

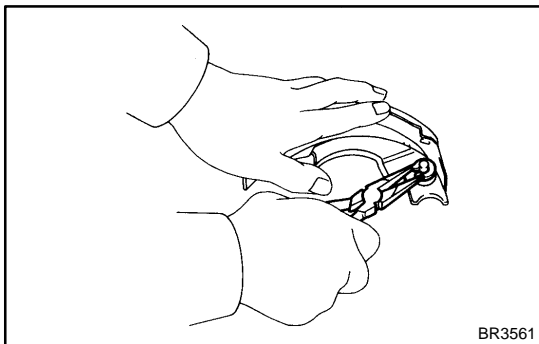
If the clearance is not within the specification, replace the shim with one of the correct size.

Thickness	mm (in.)	Thickness	mm (in.)
0.3	(0.012)	0.9	(0.035)
0.6	(0.024)	-	-



6. IF NECESSARY, REPLACE SHIM

- (a) Using a screwdriver, remove the C-washer.
- (b) Remove the parking brake shoe lever, and install the correct size shim.



- (c) Install the parking brake shoe lever with a new C-washer.
- (d) Remeasure the clearance.

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page [BR-43](#)).

NOTICE:

Apply high temperature grease to the parts indicated by the arrows (See page [BR-42](#)).

1. ADJUST PARKING BRAKE SHOE CLEARANCE

- (a) Temporarily install the hub nuts.
- (b) Install the 2 screws.

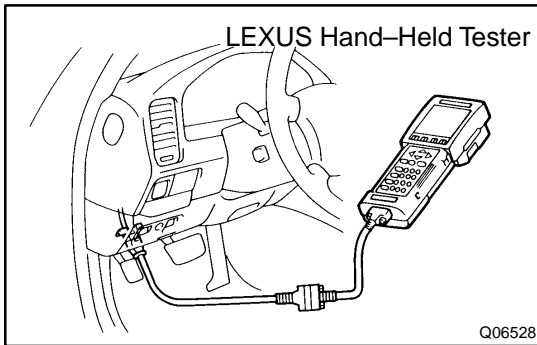
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

- (c) Remove the hole plug.
- (d) Turn the adjuster and expand the shoes until the disc locks.
- (e) Return the adjuster 8 notches.
- (f) Install the hole plug.

2. SETTLING PARKING BRAKE SHOES AND DISC

- (a) Drive the vehicle at about 50 km/h (31 mph) on a safe, level and dry road.
- (b) Depress the parking brake pedal with a force of 147 N (15 kgf, 33 lbf).
- (c) Drive the vehicle for about 400 meters (0.25 mile) in this condition.
- (d) Repeat this procedure 2 or 3 times.

3. CHECK AND ADJUST PARKING BRAKE PEDAL TRAVEL (See page [BR-8](#))



BRAKE ACTUATOR ON-VEHICLE INSPECTION

BR0EA-01

1. CONNECT THE LEXUS HAND-HELD TESTER

- (a) Connect the LEXUS hand-held tester to the DLC3.
- (b) Start the engine and run it at idle.
- (c) Select the ACTIVE TEST mode on the LEXUS hand-held tester.
- (d) Please refer to the LEXUS hand-held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- (a) With the motor relay ON, check the actuator motor operation noise.
- (b) Turn the motor relay OFF.
- (c) Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
- (d) With the motor relay ON, check that the pedal does not pulsate.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

- (e) Turn the motor relay OFF and release the brake pedal.

3. INSPECT RIGHT FRONT WHEEL OPERATION

NOTICE:

Never turn ON the solenoid which is not described below.

- (a) With the brake pedal depressed, perform the following operations.
- (b) Turn the SFRH and SFRR solenoid ON simultaneously, and check that the pedal cannot be depressed.

NOTICE:

Do not keep solenoid ON for more than 10 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

- (c) Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.
- (d) Turn the motor relay ON, and check that the pedal returns.

NOTICE:

Do not keep motor relay ON for more than 5 seconds continuously. When operating it continuously, set the interval of more than 20 seconds.

- (e) Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

As in the same procedure, check the solenoids of other wheels.

HINT:

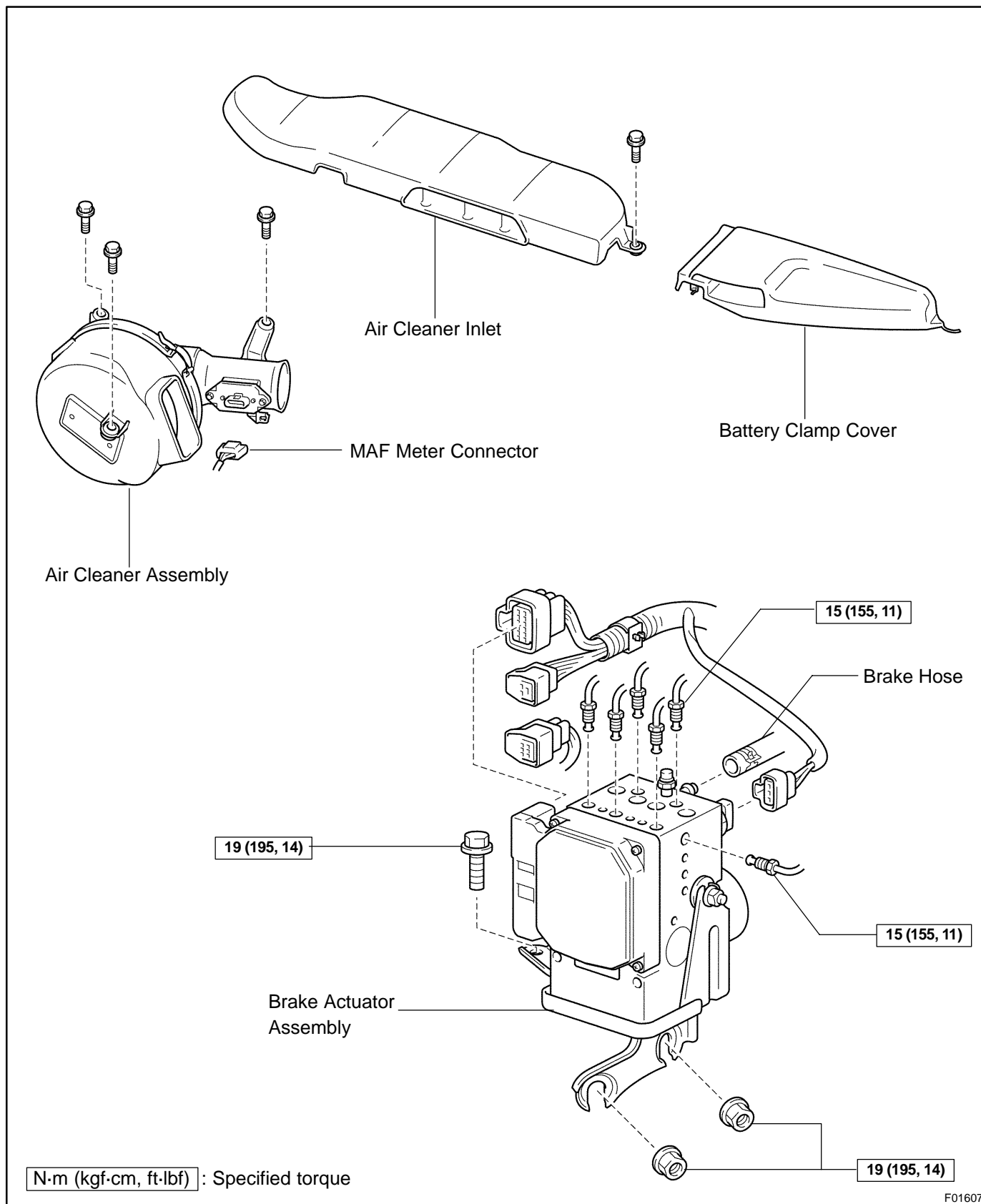
Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

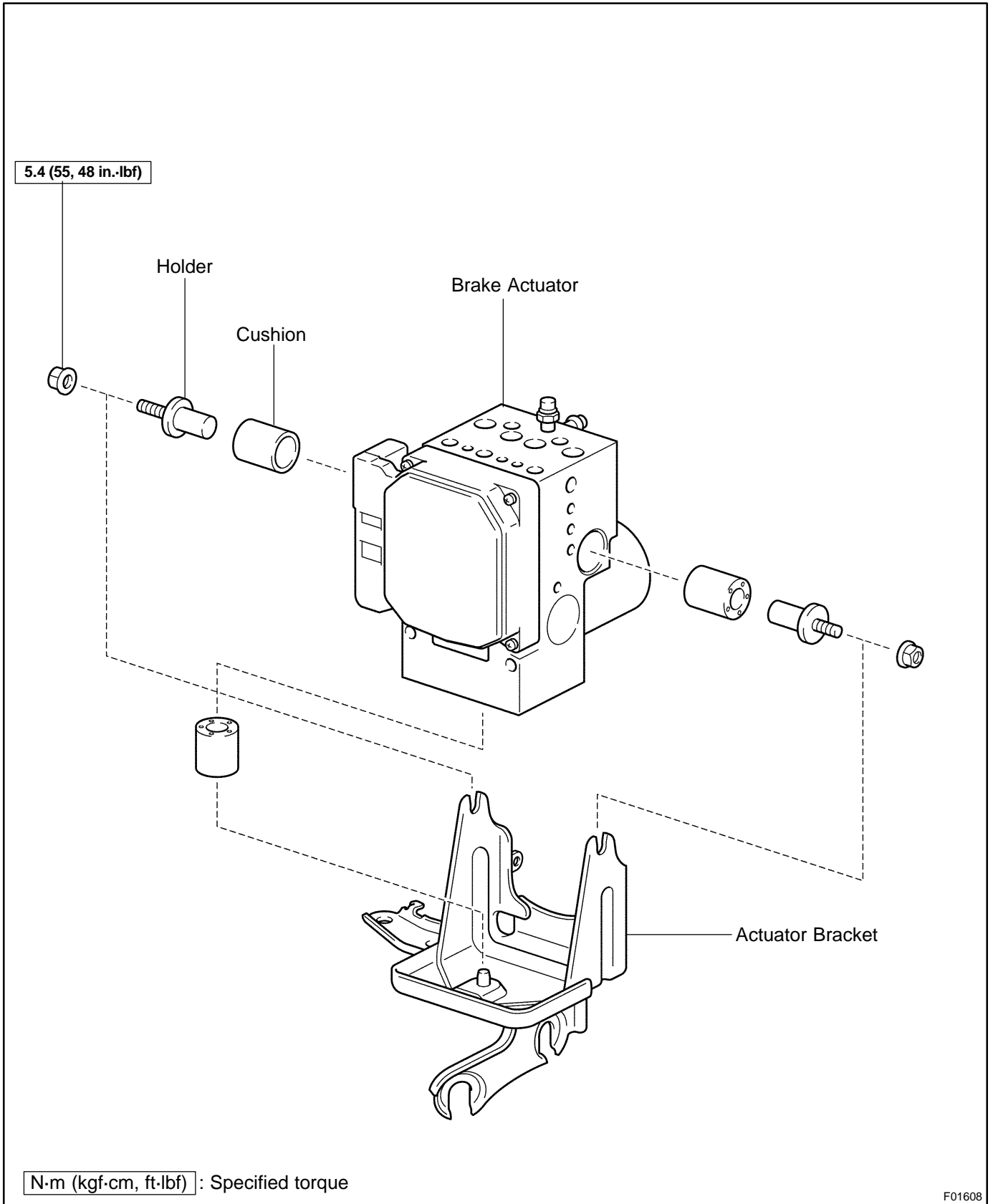
Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page [DI-307](#))

COMPONENTS



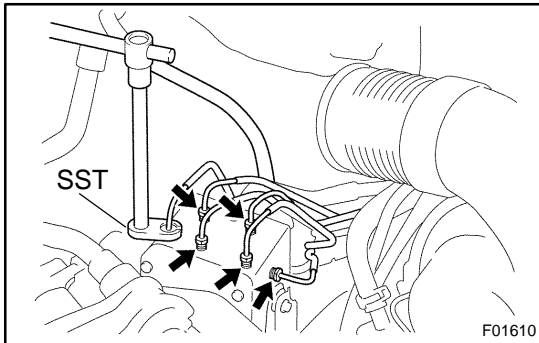
F01607



REMOVAL

1. REMOVE AIR CLEANER ASSEMBLY AND AIR CLEANER INLET

- (a) Remove the battery clamp cover, bolt and air cleaner inlet.
- (b) Disconnect the MAF meter connector.
- (c) Remove the 3 bolts and loosen the hose clamp, pull out the air cleaner assembly with the cleaner hose.

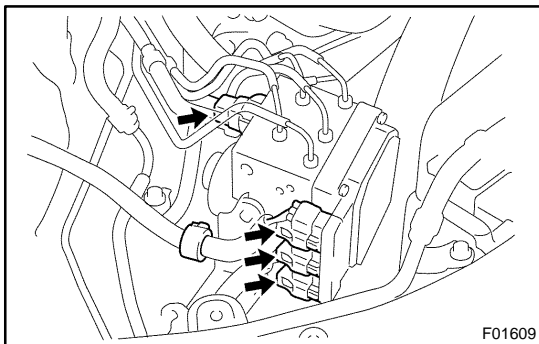


2. DISCONNECT BRAKE LINE

Using SST, disconnect the 6 brake lines from the brake actuator.

SST 09023-00100

Torque: 15 N·m (155 kgf-cm, 11 ft-lbf)



3. REMOVE BRAKE ACTUATOR ASSEMBLY

- (a) Disconnect the 2 connectors from the brake actuator.
- (b) Remove the bolt, 2 nuts and brake actuator assembly.
Torque: 19 N·m (195 kgf-cm, 14 ft-lbf)

4. REMOVE BRAKE ACTUATOR

- (a) Remove the 2 nuts and actuator from the actuator bracket.
Torque: 5.4 N·m (55 kgf-cm, 48 in.-lbf)
- (b) Remove the 2 cushion bolts and 3 cushions from the brake actuator.

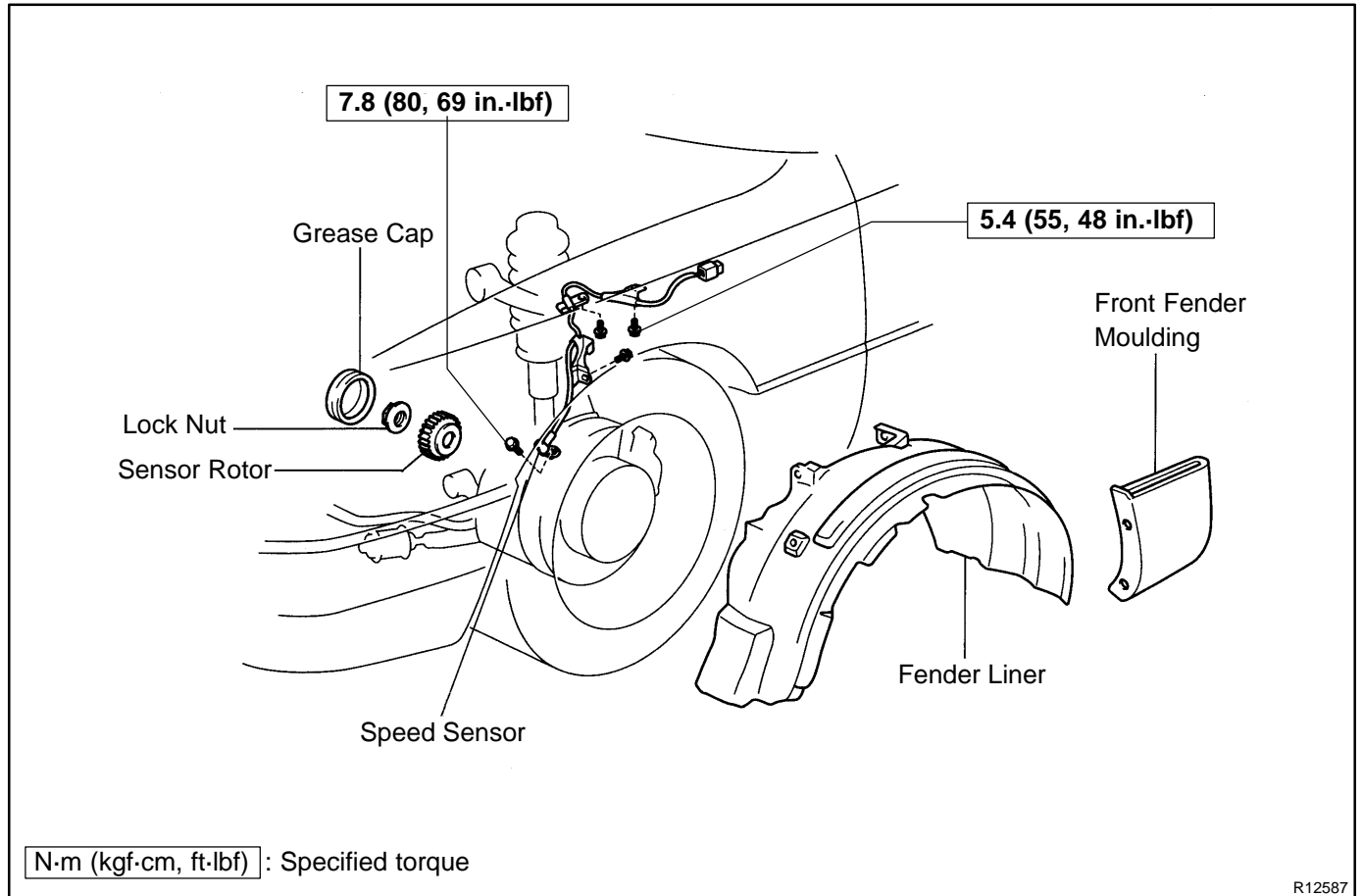
INSTALLATION

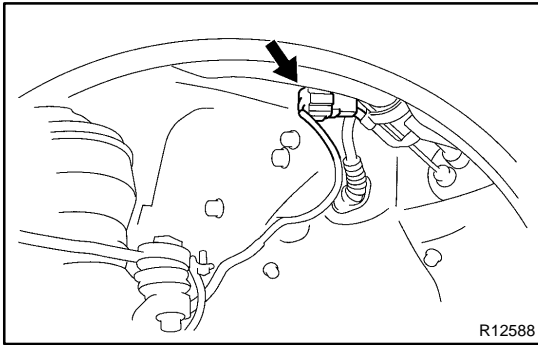
Installation is in the reverse order of removal (See page [BR-50](#)).

1. AFTER INSTALLATION, FILL BRAKE RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page [BR-4](#))
2. CHECK FOR FLUID LEAKAGE

FRONT SPEED SENSOR COMPONENTS

BR02-01

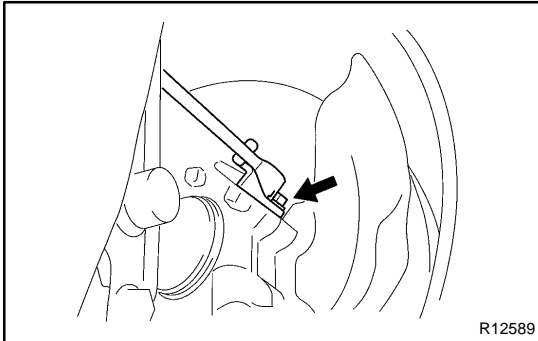




REMOVAL

1. DISCONNECT CONNECTOR

- (a) Remove the front fender moulding and fender liner.
- (b) Disconnect the speed sensor connector.



2. REMOVE SPEED SENSOR

- (a) Remove the 3 clamp bolts holding the sensor harness to the body and steering knuckle.

Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)

- (b) Right wheel:
Disconnect the pad wear indicator connector from the speed sensor wire harness.

- (c) Remove the speed sensor from the steering knuckle.

Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

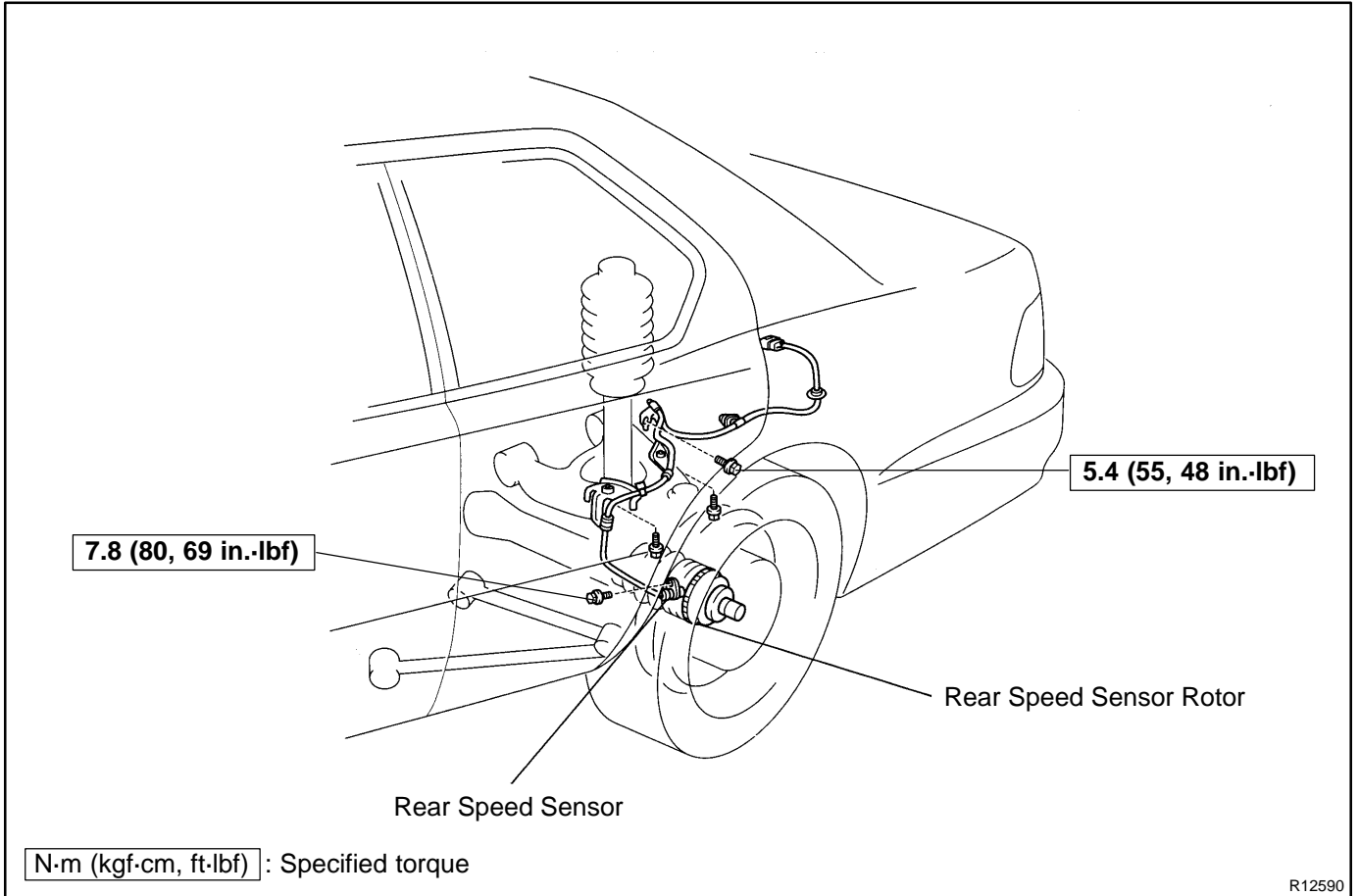
INSTALLATION

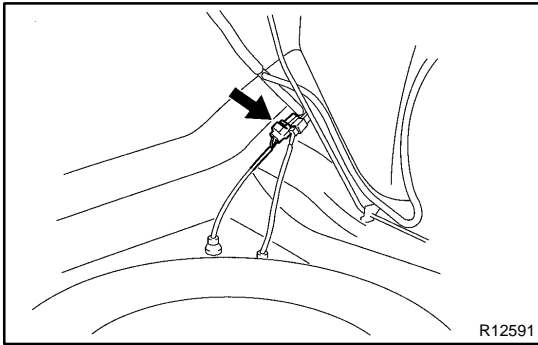
Installation is in the reverse order of removal (See page [BR-53](#)).

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page [DI-307](#))

REAR SPEED SENSOR COMPONENTS

BR05-01

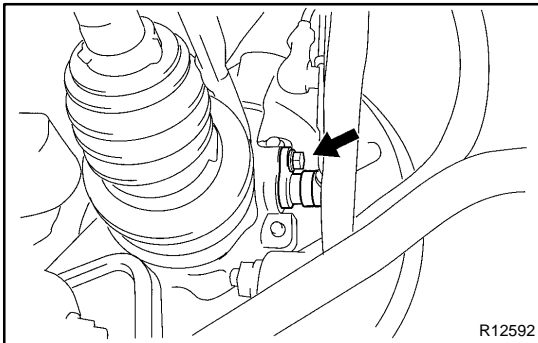




REMOVAL

1. DISCONNECT SPEED SENSOR CONNECTOR

- (a) Remove the trim front cover of the luggage compartment.
- (b) Disconnect the speed sensor connector, and pull out the sensor wire harness with the grommet.



2. REMOVE SPEED SENSOR

- (a) Remove the 3 clamp bolts.
Torque: 5.4 N·m (55 kgf·cm, 48 in.-lbf)
- (b) Remove the 4 clamps from the upper arm and body.
- (c) Right wheel:
Disconnect the pad wear indicator connector from the speed sensor.
- (d) Remove the speed sensor from the axle carrier.
Torque: 7.8 N·m (80 kgf·cm, 69 in.-lbf)

INSTALLATION

Installation is in the reverse order of removal (See page [BR-56](#)).

AFTER INSTALLATION, CHECK SPEED SENSOR SIGNAL (See page [DI-307](#))