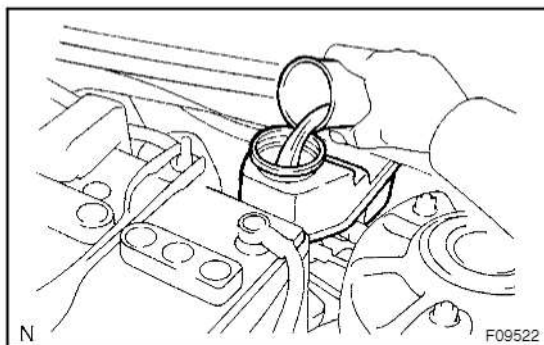




BRAKE FLUID BLEEDING

BR1US-01

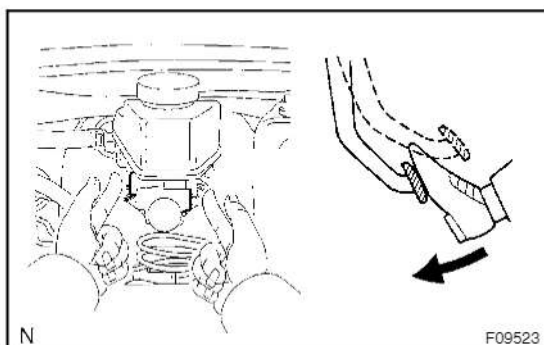
HINT:

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

NOTICE:

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

1. **FILL BRAKE RESERVOIR WITH BRAKE FLUID**
Fluid: SAE J1703 or FMVSS No. 116 DOT3
2. **REMOVE BATTERY**

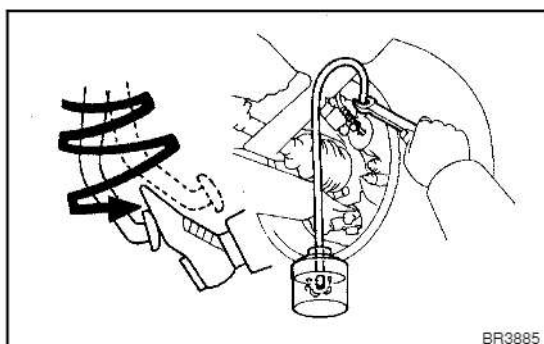
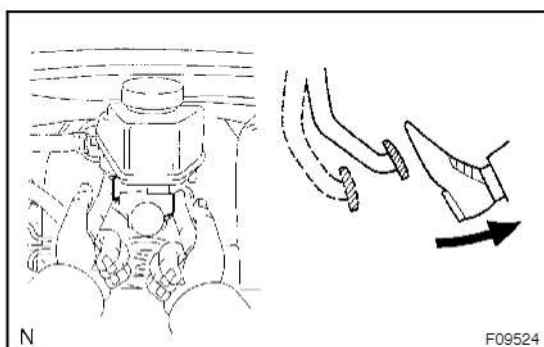


3. BLEED MASTER CYLINDER

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.
SST 09023-00100
- (b) Slowly depress the brake pedal and hold it.
- (c) Block off the outlet plug with your finger and release the brake pedal.
- (d) Repeat (b) and (c) 3 or 4 times.



4. BLEED BRAKE LINE

- (a) Connect the vinyl tube to the bleeder plug.
- (b) Depress the brake pedal several times, then loosen the bleeder plug with the pedal held down.
- (c) When fluid stops coming out, tighten the bleeder plug, then release the brake pedal.
Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)
- (d) Repeat (b) and (c) until all the air in the fluid is completely bled out.

- (e) Repeat the above procedure to bleed the air out of the brake line for each wheel.

5. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid, if necessary.

Fluid: SAE J1703 or FMVSS No. 116 DOT3

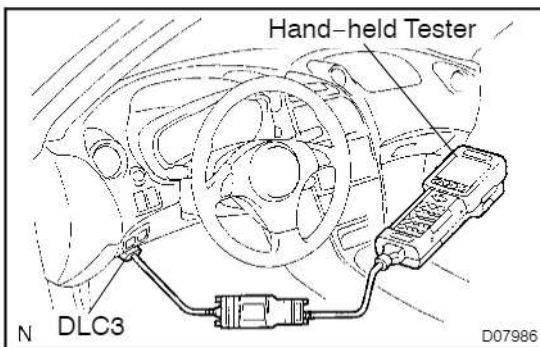
6. w/ VSC:

IF NECESSARY, BLEED VSC ACTUATOR

NOTICE:

After performing the usual air bleeding in the brake system, if the height or feel of the brake pedal cannot be obtained, perform air bleed in the VSC actuator using hand-held tester by the following procedures.

- (a) Depress the brake pedal more than 20 times with the engine off.



- (b) Connect the hand-held tester to the DLC3, then turn the ignition switch ON.

NOTICE:

Do not start the engine.

- (c) Select the "AIR BLEEDING" on the hand-held tester.

HINT:

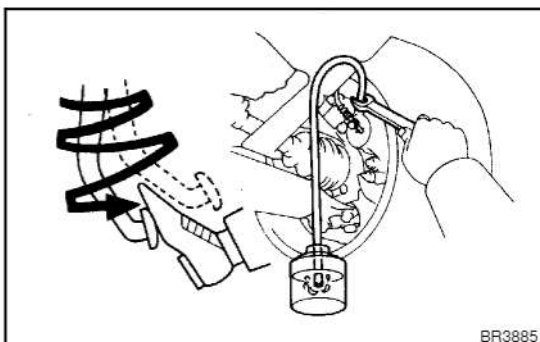
Please refer to the hand-held tester operator's manual for further details.

- (d) Bleed out the air from the usual brake line in "Step1: Increase" on the hand-held tester display.

NOTICE:

- **Perform the air bleed by following the display of hand-held tester.**
- **Be careful that the brake fluid in the master cylinder reservoir tank does not become empty.**

- (1) Connect the vinyl tube to either one of the bleeder plug.



- (2) Depress the brake pedal several times, then loosen the bleeder plug of one of the above wheels with the pedal held down.
- (3) When fluid stops coming out, tighten the bleeder plug, then release the brake pedal.

Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

- (4) Repeat (2) and (3) until all the air in the fluid is completely bled out.
- (5) Repeat the above procedure to bleed the air out of the brake line for each wheel.

- (e) Bleed out the air from the suction line in "Step2: Inhalation" on the hand-held tester display.

NOTICE:

- **Perform the air bleed by following the display of hand-held tester.**
- **Be careful that the brake fluid in the master cylinder reservoir tank does not become empty.**
 - (1) Connect the vinyl tube to the bleeder plug at the right front wheel or the right rear wheel and loosen the bleeder plug.
 - (2) Operate the VSC actuator using hand-held tester to bleed the air.

NOTICE:

- **The operation stops automatically in 4 seconds.**
- **At this time, be sure to release the brake pedal.**
 - (3) Check that the operation stops using the screen of hand-held tester.
 - (4) Repeat (2) and (3) until all the air in the fluid is completely bled out.

Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

- (5) For the rest of a wheel, bleed the air in the same way as stated in the above procedure.
- (f) Bleed out the air from the pressure reduction line in "Step3: Decrease" on the hand-held tester display.

NOTICE:

- **Perform the air bleed by following the display of hand-held tester.**
- **Be careful that the brake fluid in the master cylinder reservoir tank does not become empty.**
 - (1) Connect a vinyl tube to either one of the bleeder plug.
 - (2) Loosen the bleeder plug.
 - (3) Operate the VSC actuator using hand-held tester, completely depress the brake pedal and keep depressing.

NOTICE:

- **The operation stops automatically in 4 seconds. When performing this procedure continuously, at least 20 seconds interval is required.**
- **During this procedure, pedal feel seems heavy, but completely depress so that the brake fluid comes out from the bleeder plug.**
- **Be sure to keep depressing the brake pedal. Never depress and release the pedal repeatedly.**
 - (4) Tighten the bleeder plug, then release the brake pedal.

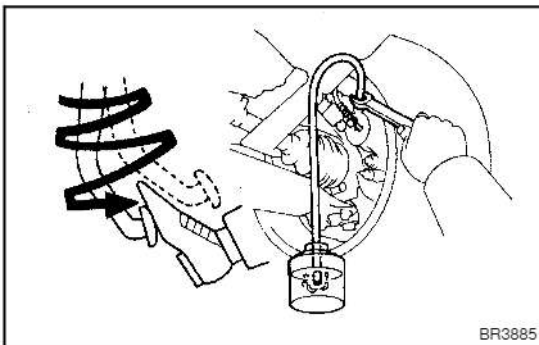
Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)

- (5) Repeat (2) to (4) until all the air in the fluid is completely bled out.

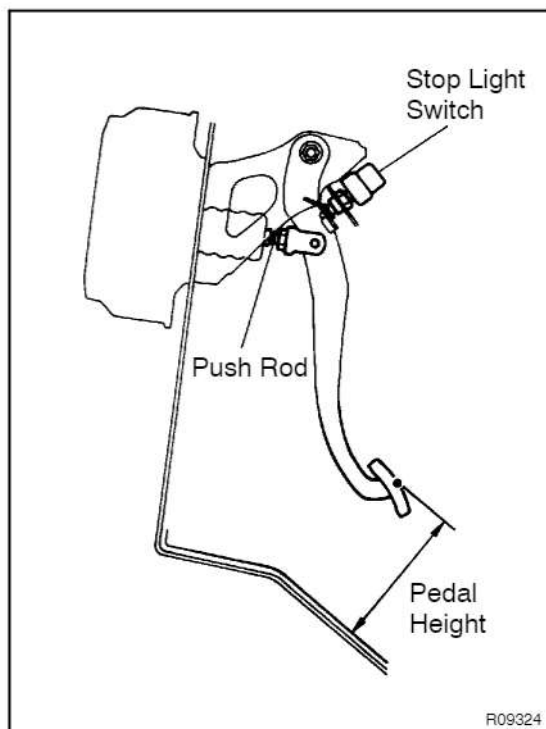
- (6) Repeat the above procedure to bleed the air out of the brake line for each wheel.
- (g) Bleed out the air from the usual brake line again in "Step4: Increase" on the hand-held tester display.

NOTICE:

- **Perform the air bleed by following the display of hand-held tester.**
 - **Be careful that the brake fluid in the master cylinder reservoir tank does not become empty.**
- (1) Connect the vinyl tube to either one of the bleeder plug.



- (2) Depress the brake pedal several times, then loosen the bleeder plug of one of the above wheels with the pedal held down.
- (3) When fluid stops coming out, tighten the bleeder plug, then release the brake pedal.
- Torque: 8.3 N·m (85 kgf·cm, 73 in·lbf)**
- (4) Repeat (2) and (3) until all the air in the fluid is completely bled out.
- (5) Repeat the above procedure to bleed the air out of the brake line for each wheel.
- (h) Check the fluid level and add fluid if necessary.
- Fluid: SAE J1703 or FMVSS No. 116 DOT3**



BRAKE PEDAL ON-VEHICLE INSPECTION

BR1U4-01

1. CHECK PEDAL HEIGHT

Pedal height from asphalt sheet:

Standard pedal:

139.8 – 149.8 mm (5.504 – 5.898 in.)

Sport Pedal:

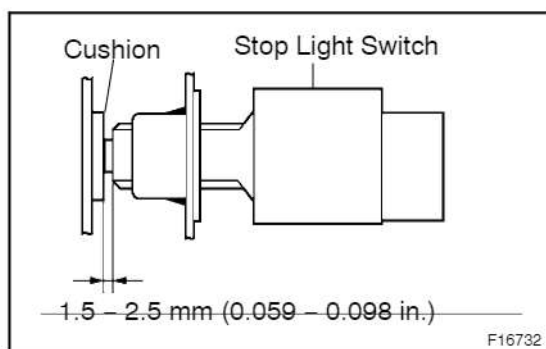
141.1 – 151.1 mm (5.555 – 5.949 in.)

If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

- Remove the lower No. 1 panel.
- Disconnect the connector from the stop light switch.
- Turn the stop light switch counterclockwise and remove the stop light switch.
- Loosen the clevis lock nut.
- Adjust the pedal height by turning the pedal push rod.
- Tighten the clevis lock nut.

Torque: 25 N·m (260 kgf·cm, 19 ft·lbf)



- Insert the stop light switch until the body hits the cushion.

NOTICE:

When inserting the stop light switch, support the pedal from behind so that the pedal is not pushed in.

- Make a quarter turn clockwise to install the stop light switch.

NOTICE:

The turning torque for installing the stop light switch should be 1.5 N·m (15 kgf·cm, 13 in.·lbf) or less.

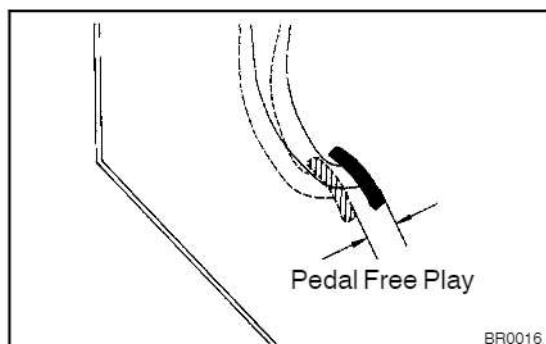
HINT:

Due to the inverse screw structure, if the stop light switch is turned clockwise, the stop light switch moves in the direction to be pulled out.

- Connect the connector to the stop light switch.
- Check the protrusion of the rod.

Protrusion of the rod: 1.5 – 2.5 mm (0.059 – 0.098 in.)

- After adjusting the pedal height, check the pedal free play.



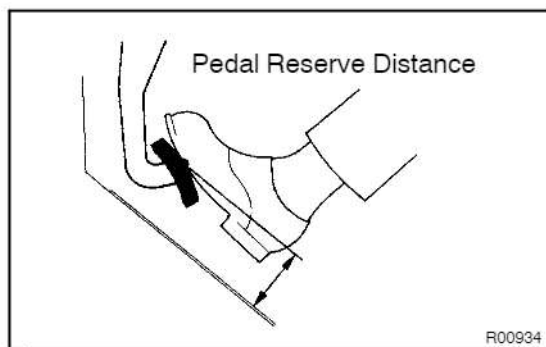
3. CHECK PEDAL FREE PLAY

- Stop the engine and depress the brake pedal several times until there is no more vacuum left in the booster.
- Push in the pedal until the beginning of the resistance is felt. Measure the distance, as shown.

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

If incorrect, check the stop light switch clearance.

If the clearance is OK, then troubleshoot the brake system.



4. CHECK PEDAL RESERVE DISTANCE

Release the parking brake lever.

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

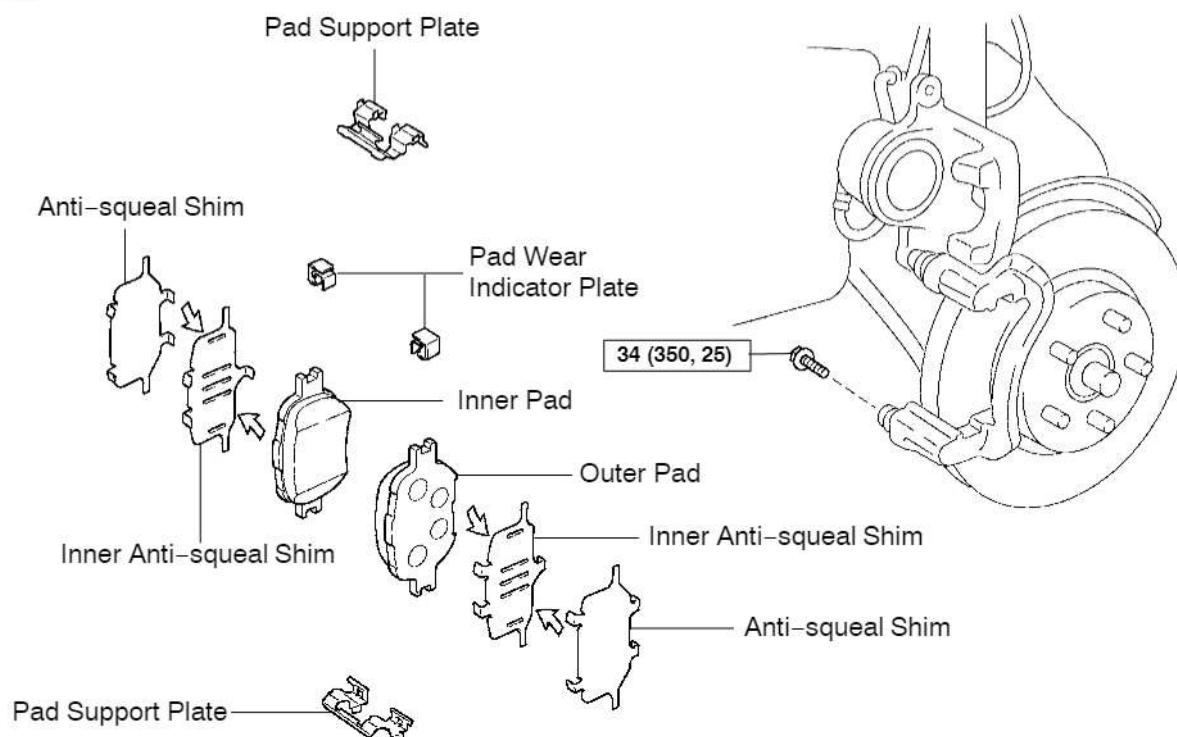
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf): More than 85 mm (3.35 in.)

If incorrect, troubleshoot the brake system.

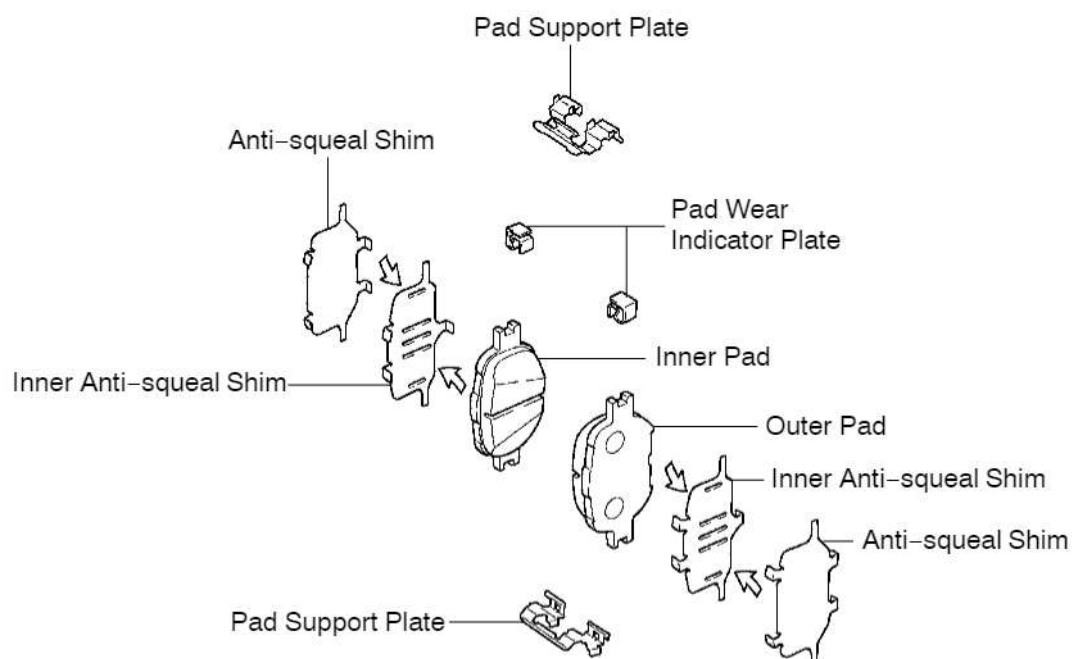
FRONT BRAKE PAD COMPONENTS

BR15T-03

Australia:



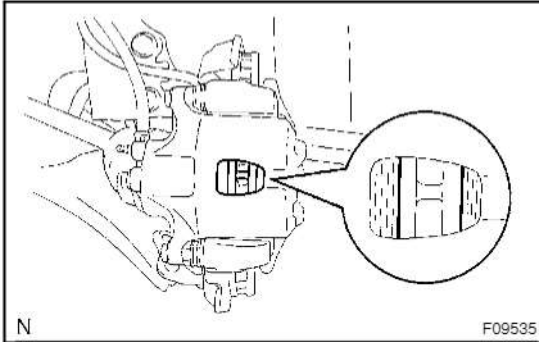
Europe:



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

N ➞ Disc brake grease

F16234

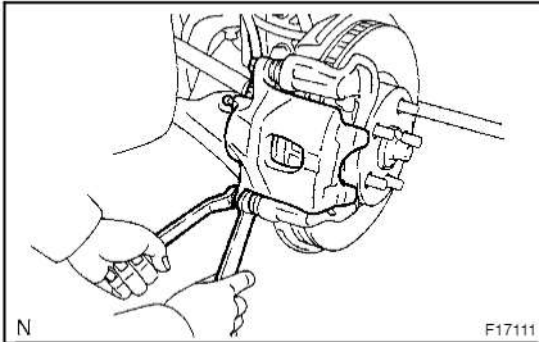


REPLACEMENT

1. REMOVE FRONT WHEEL
2. INSPECT PAD LINING THICKNESS

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

Minimum thickness: 1.0 mm (0.039 in.)



3. LIFT UP CALIPER

- (a) Hold the sliding pin and remove the bottom side installation bolt.

HINT:

Do not disconnect the flexible hose from the brake caliper.

- (b) Lift up the caliper and suspend it securely.
4. REMOVE 2 PADS WITH 4 ANTI-SQUEAL SHIMS AND 2 PAD WEAR INDICATOR PLATES
5. REMOVE 2 PAD SUPPORT PLATE

NOTICE:

The 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.

6. CHECK DISC THICKNESS AND RUNOUT

(See page BR-14)

7. INSTALL PAD SUPPORT PLATES

Install the 2 pad support plates.

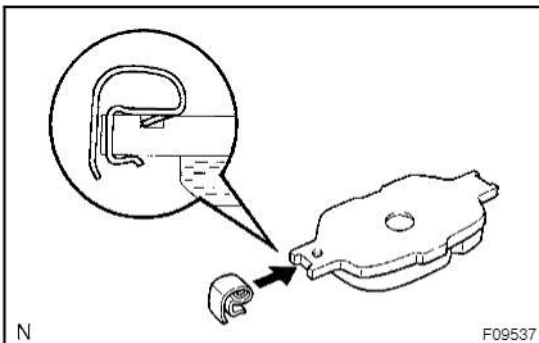
NOTICE:

Do not assemble the upper and lower pad support plates in reverse.

8. INSTALL NEW PADS

NOTICE:

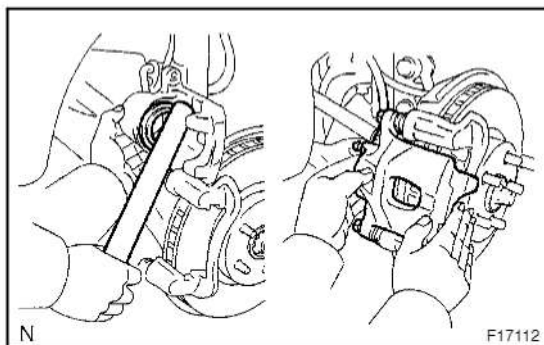
When replacing worn pads, the anti-squeal shims and wear indicator plates must be replaced together with the pads.



- (a) Install a pad wear indicator plate on each pad.
- (b) Apply disc brake grease to both sides of each inner anti-squeal shim (See page BR-7).
- (c) Install the 2 anti-squeal shims on each pad.
- (d) Install the pads with the pad wear indicator plate facing upward.

NOTICE:

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

**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 equivalent.

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) Install the caliper.
- (d) Hold the sliding pin and torque the installation bolts.

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

10. INSTALL FRONT WHEEL

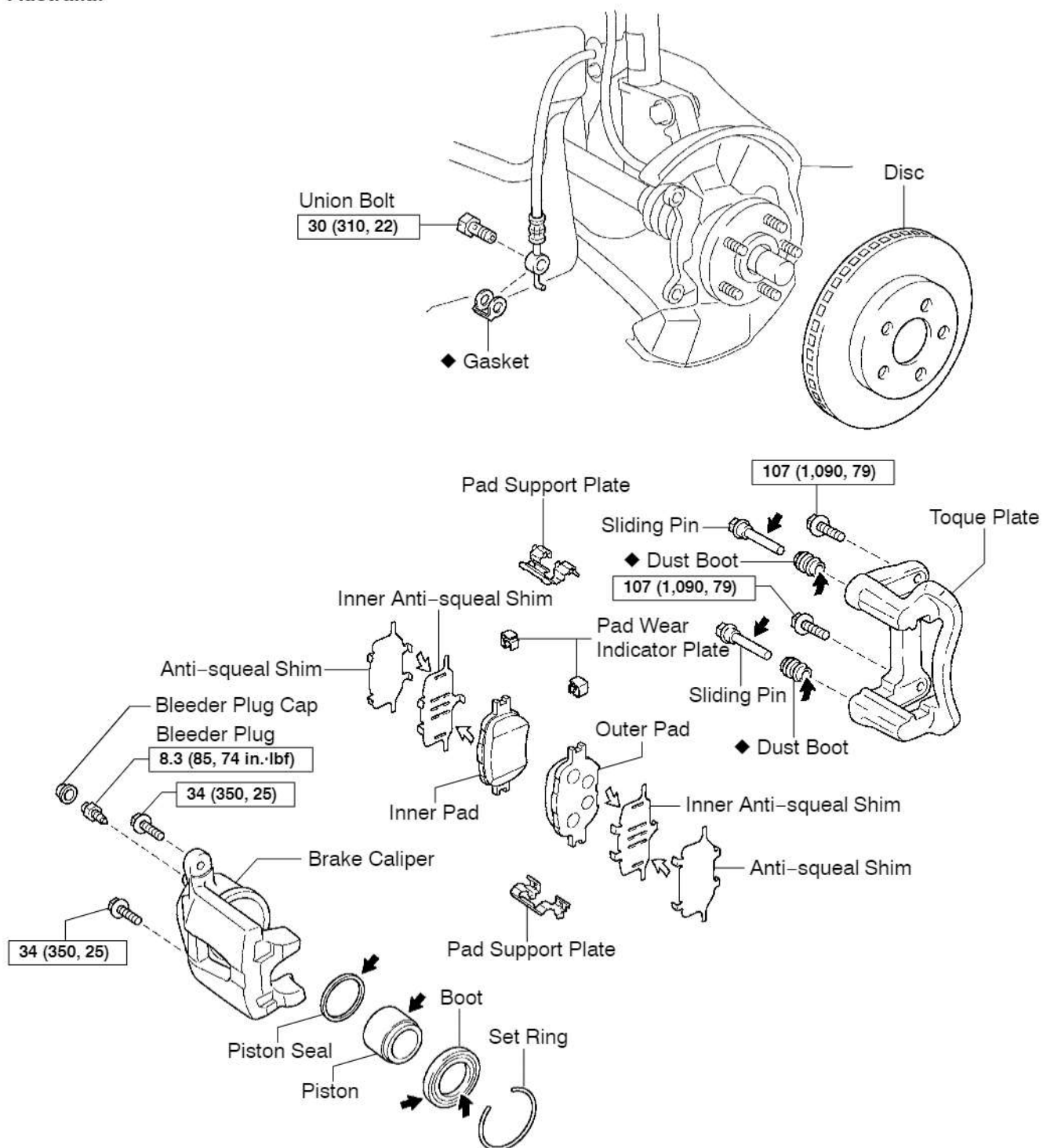
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

11. DEPRESS BRAKE PEDAL SEVERAL TIMES**12. CHECK THAT FLUID LEVEL IS AT MAX LINE**

FRONT BRAKE CALIPER COMPONENTS

BR15V-02

Australia:



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

◆ Non-reusable part

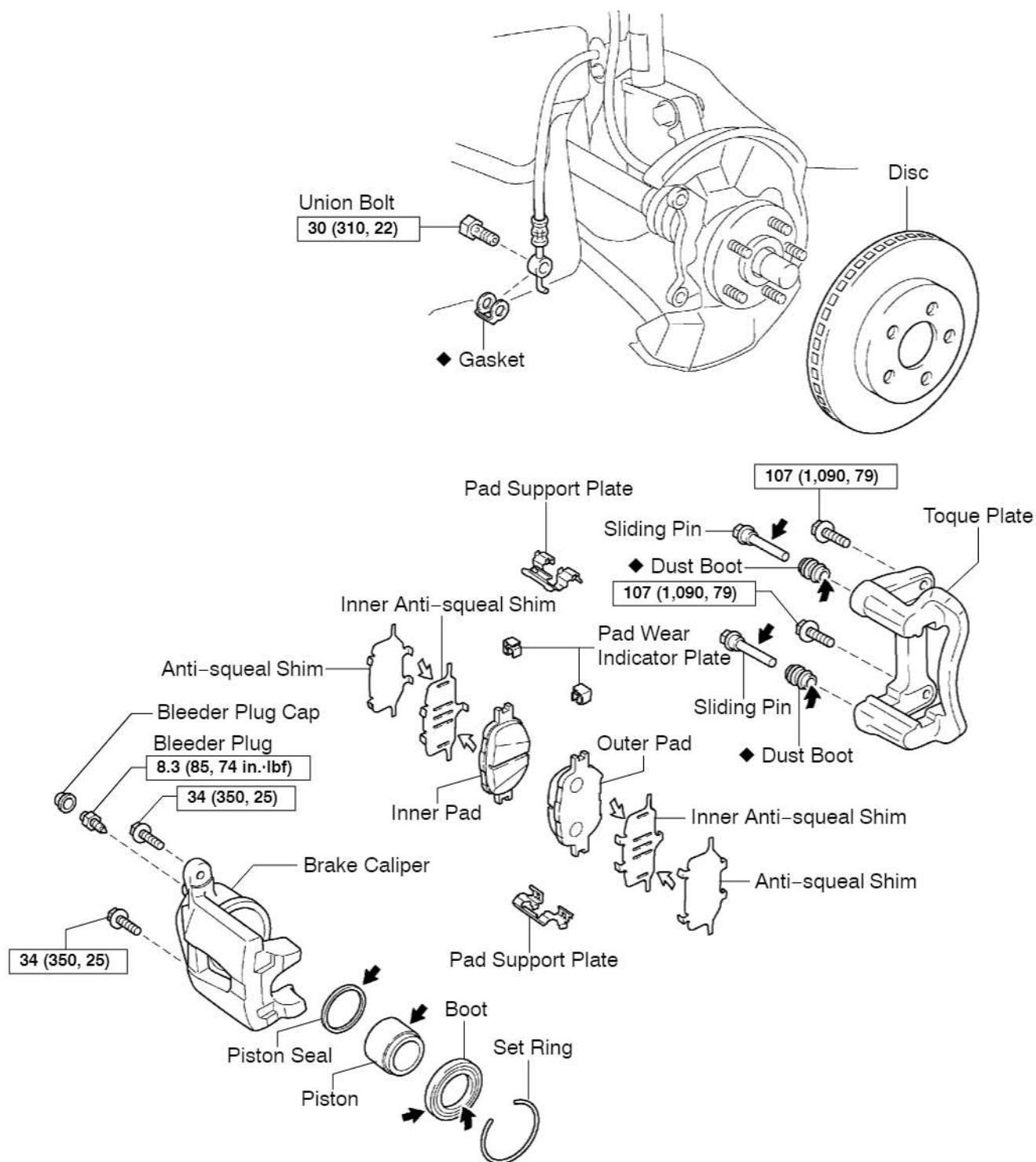
➡ Lithium soap base glycol grease

➡ Disc brake grease

N

F16230

Europe:



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

◆ Non-reusable part

➡ Lithium soap base glycol grease

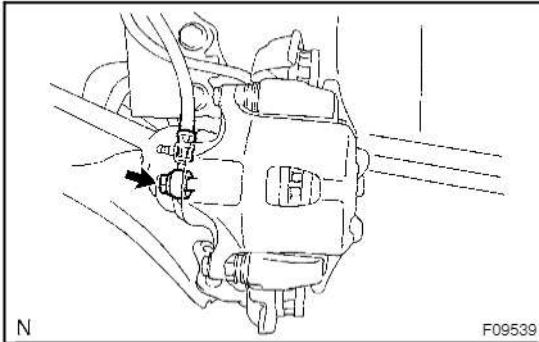
N ➡ Disc brake grease

REMOVAL

1. REMOVE FRONT WHEEL

Remove the wheel and temporarily fasten the disc with hub nuts.

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



2. DISCONNECT FLEXIBLE HOSE

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

Torque: 30 N·m (310 kgf·cm, 22 ft·lbf)

HINT:

At the time of installation, install the flexible hose lock securely in the lock hole in the caliper.

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

3. REMOVE CALIPER

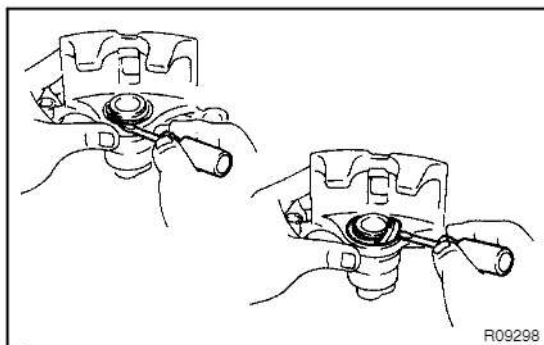
- (a) Hold the sliding pin and remove the 2 installation bolts.

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

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

4. REMOVE 2 PADS WITH ANTI-SQUEAL SHIMS

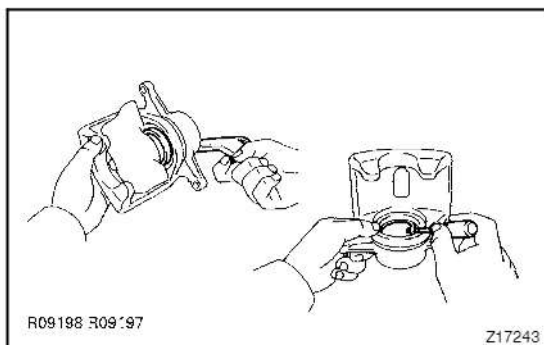
5. REMOVE 2 PAD SUPPORT PLATES



DISASSEMBLY

1. REMOVE SET RING AND CYLINDER BOOT

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



2. REMOVE PISTON

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

CAUTION:

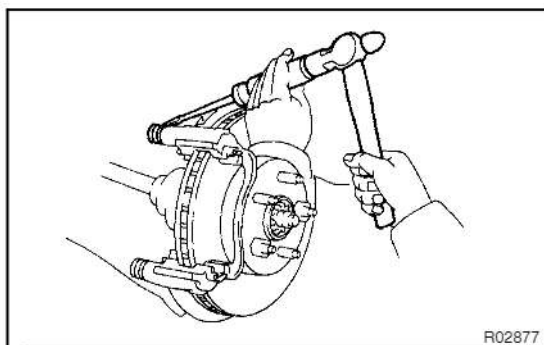
Do not place your fingers in front of the piston when using compressed air.

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.



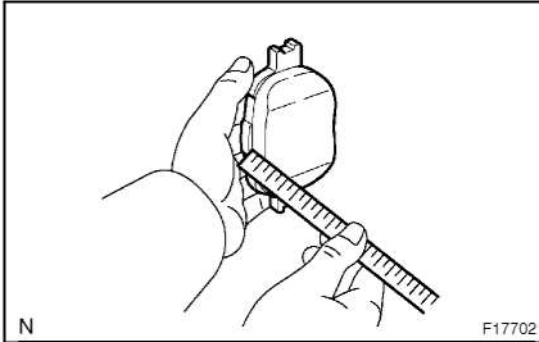
- Using a screwdriver and hammer, tap out the 2 dust boots.

HINT:

At the time of reassembly, use a 19 mm socket wrench and tap in 2 new dust boots into the torque plate.

NOTICE:

At the time of reassembly, check that the metal plate portion of the dust boot fits snugly in the torque plate.



INSPECTION

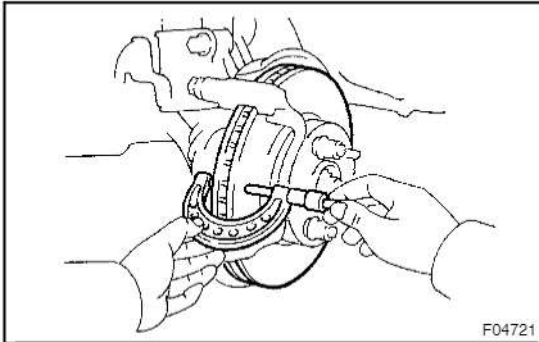
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 11.5 mm (0.453 in.)

Minimum thickness: 1.0 mm (0.039 in.)

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



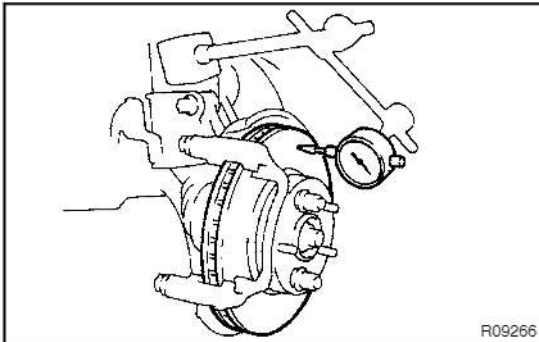
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 25.0 mm (0.984 in.)

Minimum thickness: 23.0 mm (0.906 in.)

Replace the disc if the disc's thickness is minimum thickness or less. Replace the disc or grind it on a lathe if it is badly scored or worn unevenly.

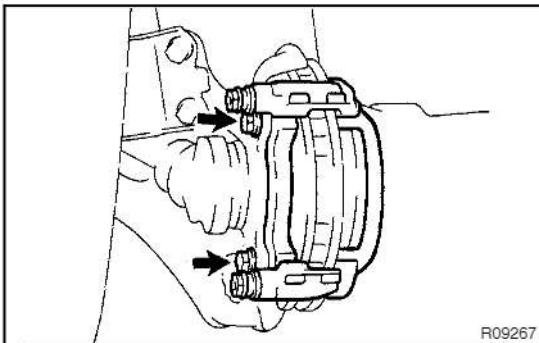


3. MEASURE DISC RUNOUT

Using a dial indicator, measure the disc runout 10 mm (0.39 in.) away from the outer edge of the disc.

Maximum disc runout: 0.05 mm (0.0020 in.)

If the disc runout is maximum value or greater, check the bearing play in the axial direction and check the axle hub runout (See Pub. No. RM734E, page SA-12). If the bearing play and axle hub runout are not abnormal, adjust the disc runout or grind it on a "On-car" brake lathe.



4. IF NECESSARY, ADJUST DISC RUNOUT

- Remove the 2 bolts and torque plate from the knuckle.
- Remove the hub nuts and the disc. Reinstall the disc in the position turned 1/5 from its original position on the hub. Install and torque the hub nuts.

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

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

- Repeat (b) until the disc is 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 3.
- Install the torque plate and torque the mounting bolts.

Torque: 107 N·m (1,090 kgf·cm, 79 ft·lbf)

REASSEMBLY

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

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by arrows ([See page BR-10](#)).

INSTALLATION

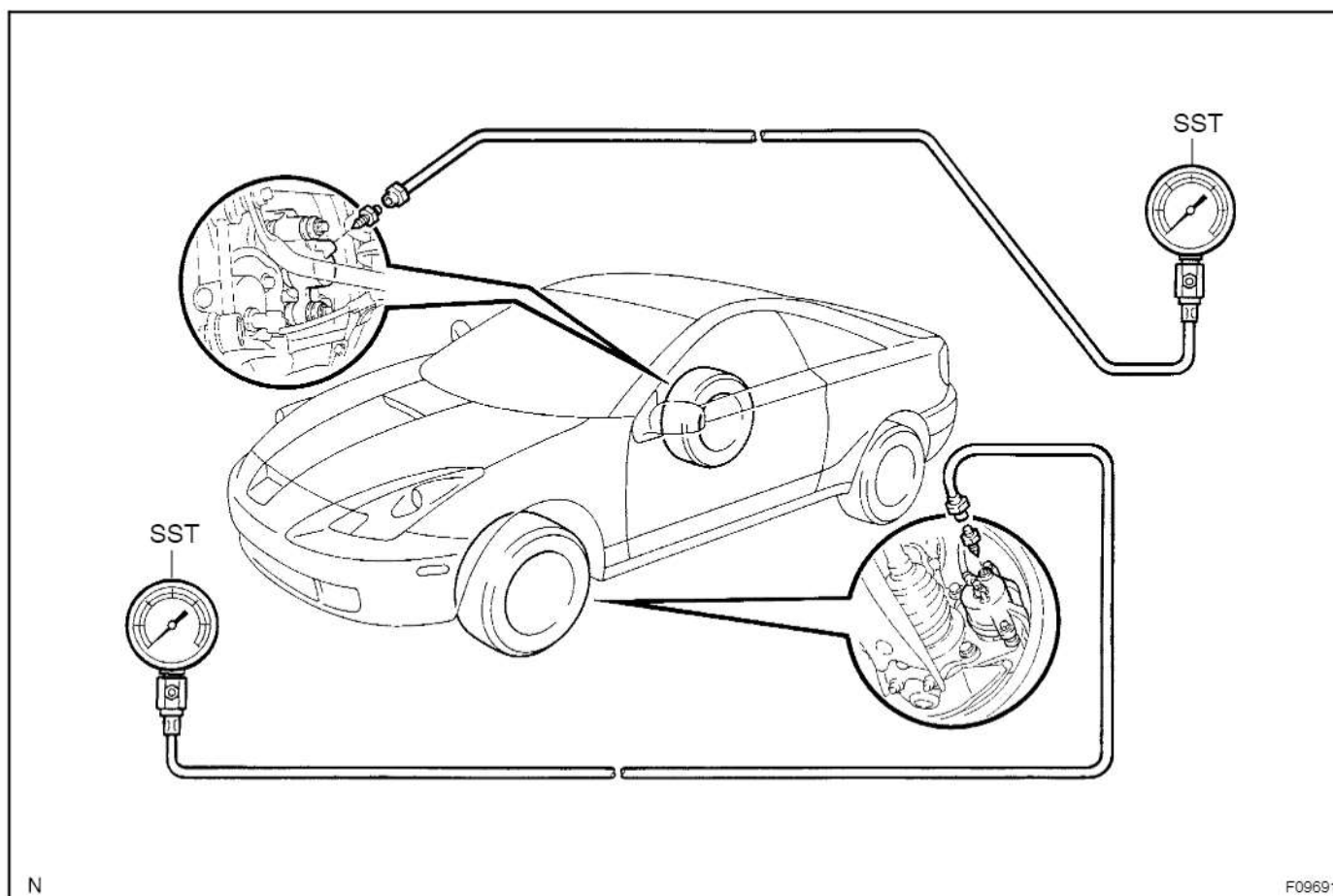
Installation is in the reverse order of removal ([See page BR-12](#)).

HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system ([See page BR-1](#)).
- Check for leaks.

PROPORTIONING VALVE (P VALVE) ON-VEHICLE INSPECTION

BR16C-02



N

F09691

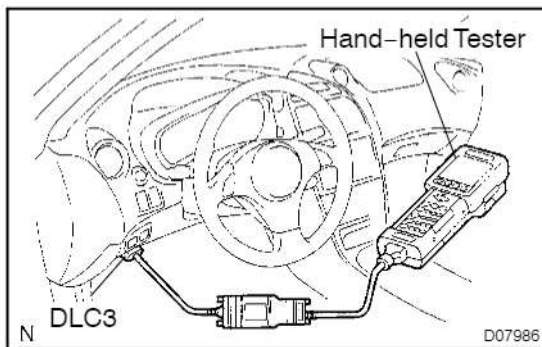
1. **INSTALL LSPV GAUGE (SST) AND BLEED AIR**
SST 09709-29018
2. **BLEED AIR FROM FLUID PRESSURE GAUGE**
3. **RAISE MASTER CYLINDER PRESSURE AND CHECK REAR BRAKE CALIPER PRESSURE**

Master cylinder fluid pressure	Rear brake caliper fluid pressure
2,450 kPa (25.0 kgf/cm ² , 344 psi)	2,450 kPa (25.0 kgf/cm ² , 344 psi)
7,850 kPa (80.0 kgf/cm ² , 1,103 psi)	4,450 kPa (45.4 kgf/cm ² , 625 psi)

When inspecting the fluid pressure, inspect the left front and right rear together, and the right front and left rear together.

If the rear fluid pressure is incorrect, replace the P valve assembly.

4. **BLEED BRAKE SYSTEM (See page BR-1)**
5. **CHECK FOR LEAKS**



BR1US-01

ABS ACTUATOR ON-VEHICLE INSPECTION

1. IN CASE OF USING HAND-HELD TESTER:

- Connect the hand-held tester to the DLC3.
- Start the engine and run it at idle.
- Select the ACTIVE TEST mode on the hand-held tester.

HINT:

Please refer to the hand-held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- With the motor relay ON, check the actuator motor operation noise.
- Turn the motor relay OFF.
- Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
- 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.

- 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.

- With the brake pedal depressed, perform the following operations.
- 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.

- Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.
- 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.

- Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

In the same procedure, check the solenoids of other wheels.

HINT:

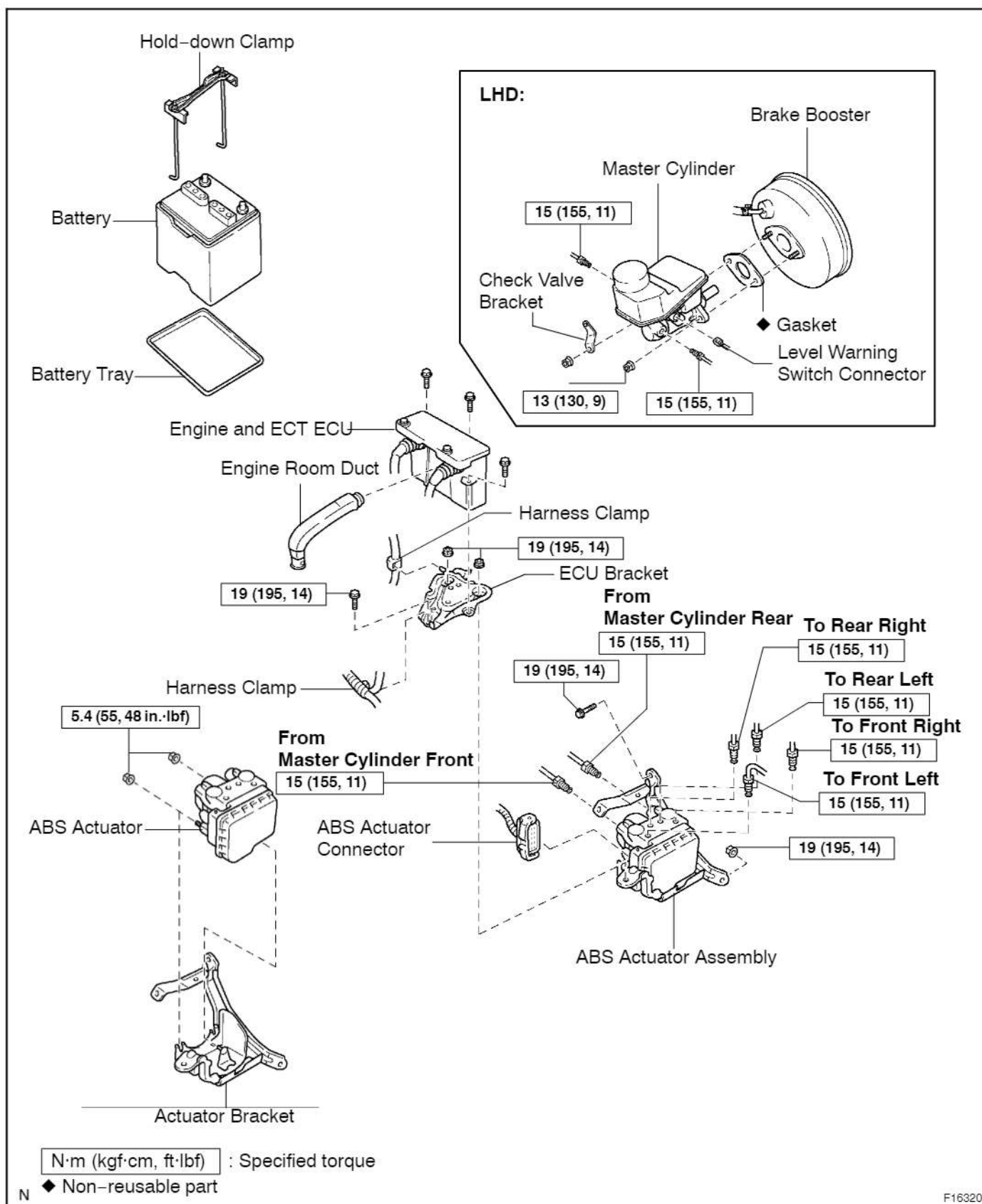
Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page DI-3)

COMPONENTS



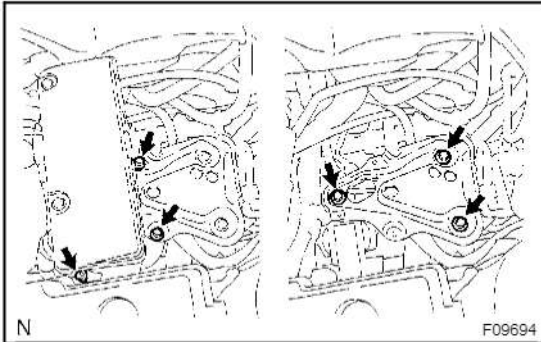
REMOVAL

1. REMOVE BATTERY

Remove the hold-down clamp, battery and battery tray.

2. LHD:

REMOVE MASTER CYLINDER (See Pub. No. RM734E, page BR-9)

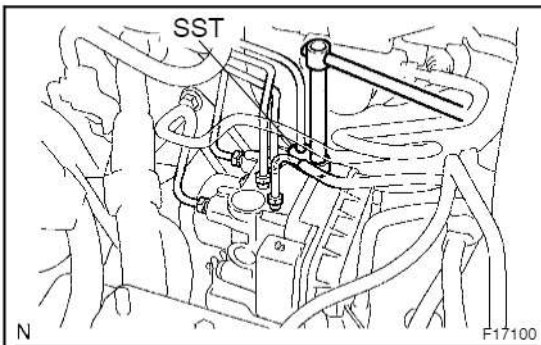


3. REMOVE ENGINE AND ECT ECU AND ECU BRACKET

- Remove the 3 bolts, and move the engine and ECT ECU aside.
- Disconnect the 2 harness clamps, remove the bolt and the 2 nuts and ECU bracket.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

4. DISCONNECT ACTUATOR CONNECTOR



5. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines.

SST 09023-00100

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

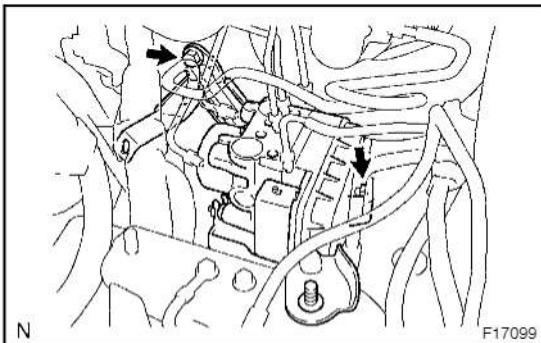
HINT:

- When disconnecting the brake lines, use tags or make a name to identify the place to reconnect (See Page BR-19).
- At the time of installation, connect each brake line to the correct position (See Page BR-19).

6. REMOVE ACTUATOR

- Disconnect the hose clamp from the actuator bracket.
- Remove the bolt, nut and actuator assembly.
- Remove the 2 nuts and actuator from the actuator bracket.

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

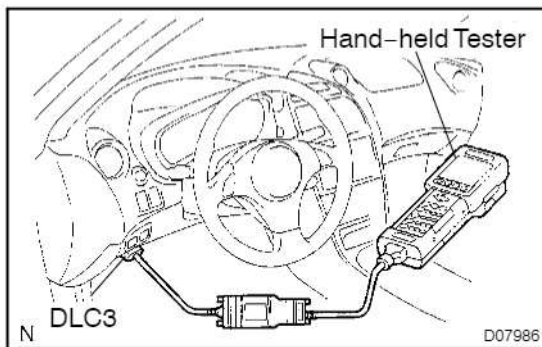


INSTALLATION

Installation is in the reverse order of removal ([See page BR-20](#)).

HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system ([See page BR-1](#)).
- Check for leaks.



BR1U8-01

ABS & VSC ACTUATOR ON-VEHICLE INSPECTION

1. IN CASE OF USING HAND-HELD TESTER:

- Connect the hand-held tester to the DLC3.
- Start the engine and run it at idle.
- Select the ACTIVE TEST mode on the hand-held tester.

HINT:

Please refer to the hand-held tester operator's manual for further details.

2. INSPECT ACTUATOR MOTOR OPERATION

- With the motor relay ON, check the actuator motor operation noise.
- Turn the motor relay OFF.
- Depress the brake pedal and hold it for about 15 seconds. Check that the brake pedal cannot be depressed.
- 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.

- 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.

- With the brake pedal depressed, perform the following operations.
- 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.

- Turn the SFRH and SFRR solenoid OFF simultaneously, and check that the pedal can be depressed.
- 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.

- Turn the motor relay OFF and release the brake pedal.

4. INSPECT OTHER WHEEL OPERATION

In the same procedure, check the solenoids of other wheels.

HINT:

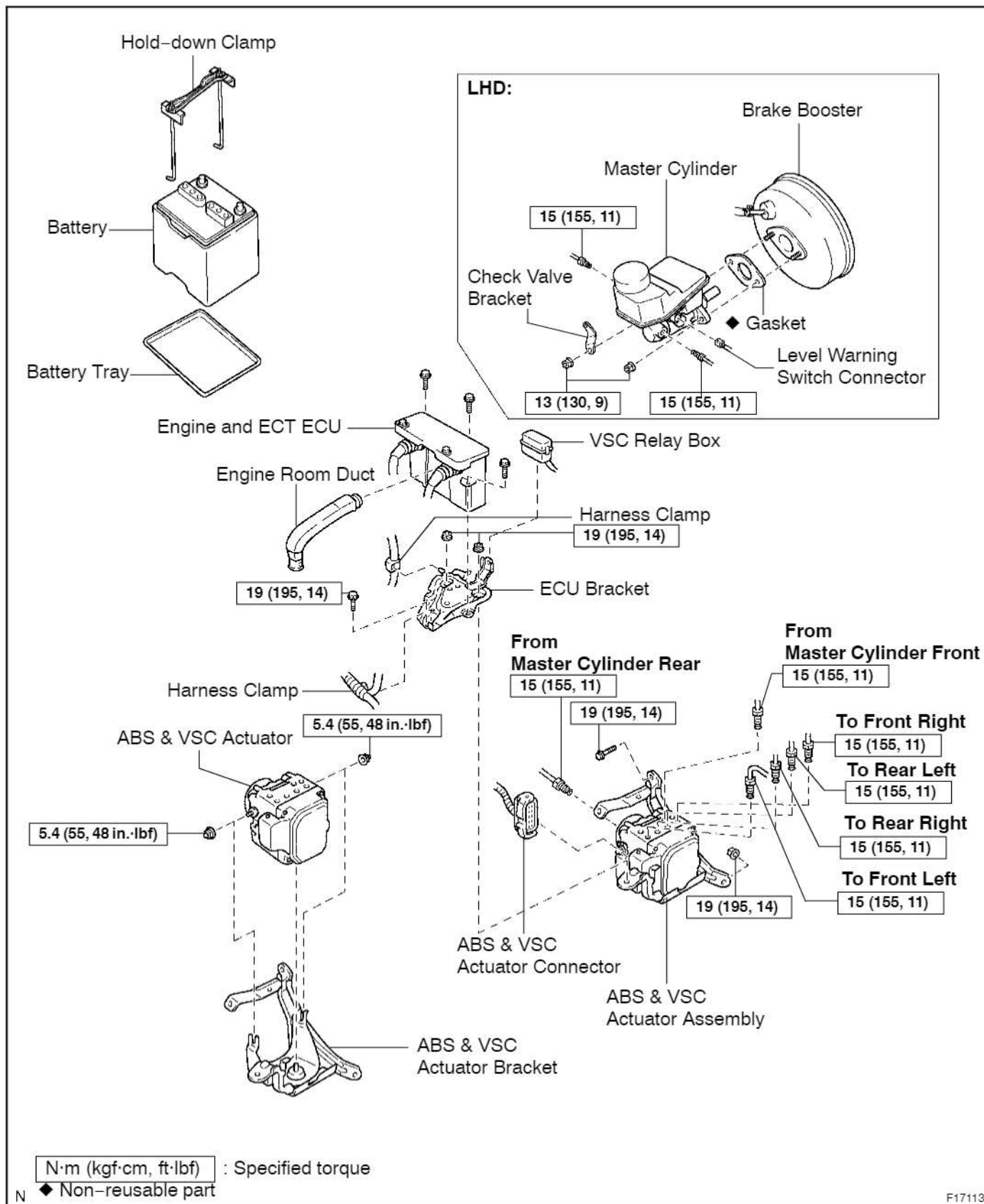
Left front wheel: SFLH, SFLR

Right rear wheel: SRRH, SRRR

Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page DI-53)

COMPONENTS



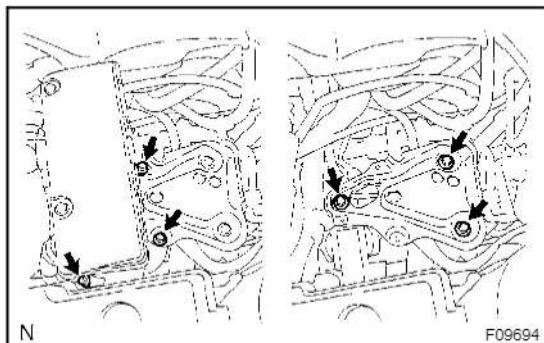
REMOVAL

1. REMOVE BATTERY

Remove the hold-down clamp, battery and battery tray.

2. LHD:

REMOVE MASTER CYLINDER (See Pub. No. RM734E, page BR-9)



3. REMOVE ENGINE AND ECT ECU AND ECU BRACKET

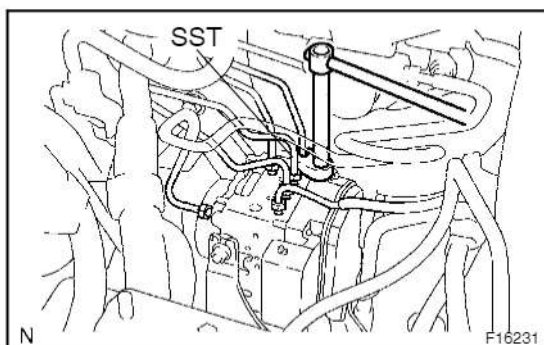
- (a) Remove the 3 bolts, and move the engine and ECT ECU aside.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

- (b) Disconnect the 2 harness clamps and VSC relay box, and then remove the bolt and 2 nuts, and ECU bracket.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

4. DISCONNECT ACTUATOR CONNECTOR



5. DISCONNECT BRAKE LINES

Using SST, disconnect the 6 brake lines.

SST 09023-00100

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

HINT:

- When disconnecting the brake lines, use tags or make a name to identify the place to reconnect (See Page BR-23).
- At the time of installation, connect each brake line to the correct position (See Page BR-23).

6. REMOVE ACTUATOR

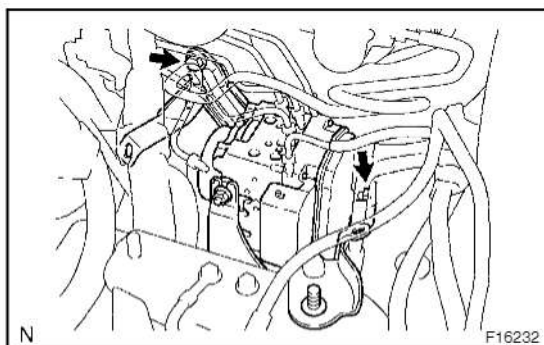
- (a) Disconnect the hose clamp from the actuator bracket.

- (b) Remove the bolt, nut and actuator assembly.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

- (c) Remove the 2 nuts and actuator from the actuator bracket.

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



INSTALLATION

Installation is in the reverse order of removal ([See page BR-24](#)).

HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system ([See page BR-1](#)).
- Check for leaks.