BRAKE SYSTEM

BR0PW–01

PRECAUTION

- **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 precaution in the IN section.**

TROUBLESHOOTING

PROBLEM SYMPTOMS TABLE

BR0PX–04

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	Suspected Area		See page
Lower pedal or spongy pedal	1. Brake system (Fluid leaks)		DI–199
	2. Brake system (Air in)		BR–4
	3. Piston seals (Worn or damaged)	Front	BR–22
		Rear	BR–32
	4. Master cylinder (Faulty)		BR–9
	5. Booster push rod (Out of adjustment)		BR–17
Brake drag	1. Brake pedal freeplay (Minimal)		BR–6
	2. Parking brake lever travel (Out of adjustment)		BR–8
	3. Parking brake wire (Sticking)		–
	4. Pad (Cracked or distorted)	Front	BR–19
		Rear	BR–28
	5. Piston (Stuck)	Front	BR–22
		Rear	BR–32
	6. Piston (Frozen)	Front	BR–22
		Rear	BR–32
	7. Booster push rod (Out of adjustment)		BR–17
	8. Booster system (Vacuum leaks)		BR–14
	9. Master cylinder (Faulty)		BR–9
Brake pull	1. Piston (Stuck)	Front	BR–22
		Rear	BR–32
	2. Pad (Oily)	Front	BR–19
		Rear	BR–28
	3. Piston (Frozen)	Front	BR–22
		Rear	BR–32
	4. Disc (Scored)	Front	BR–25
		Rear	BR–37
	5. Pad (Cracked or distorted)	Front	BR–19
		Rear	BR–28
Hard pedal but brake inefficient	1. Brake system (Fluid leaks)		DI–199
	2. Brake system (Air in)		BR–4
	3. Pad (Worn)	Front	BR–19
		Rear	BR–28
	4. Pad (Cracked or distorted)	Front	BR–19
		Rear	BR–28
	5. Pad (Oily)	Front	BR–19
		Rear	BR–28
	6. Pad (Glazed)	Front	BR–19
		Rear	BR–28
	7. Disc (Scored)	Front	BR–25
		Rear	BR–37
	8. Booster push rod (Out of adjustment)		BR–17
	9. Booster system (Vacuum leaks)		BR–14

Symptom	Suspected Area		See page
Noise from brake	1. Pad (Cracked or distorted)	Front	BR–19
		Rear	BR–28
	2. Installation bolt (Loose)	Front	BR–22
		Rear	BR–32
	3. Disc (Scored)	Front	BR–25
		Rear	BR–37
	4. Pad support plate (Loose)	Front	BR–22
		Rear	BR–32
	5. Sliding pin (Worn)	Front	BR–22
		Rear	BR–32
	6. Pad (Dirty)	Front	BR–19
		Rear	BR–28
	7. Pad (Glazed)	Front	BR–19
		Rear	BR–28
	8. Anti–squeal shim (Damaged)	Front	BR–19
		Rear	BR–28

BRAKE FLUID

BR0PY–03

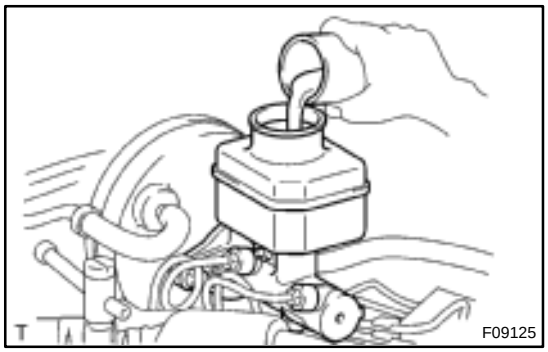
BLEEDING

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.

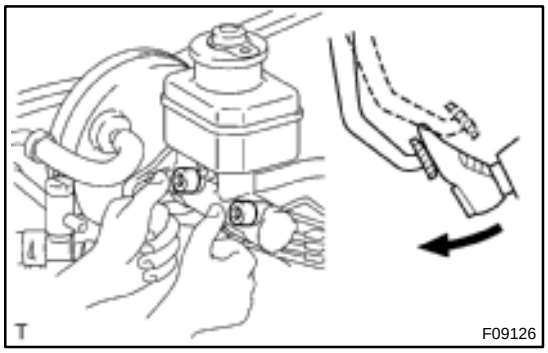
NOTICE:

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



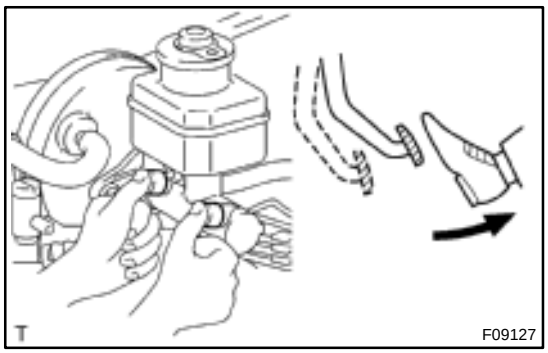
2. BLEED MASTER CYLINDER

HINT:

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

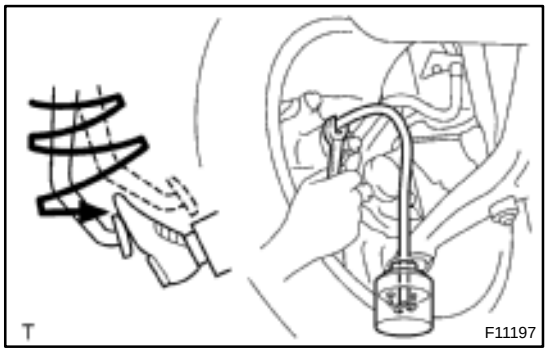
(a) Disconnect the brake lines from the master cylinder.
SST 09023–00100

(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.



3. BLEED BRAKE LINE

(a) Connect a vinyl tube to the 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.

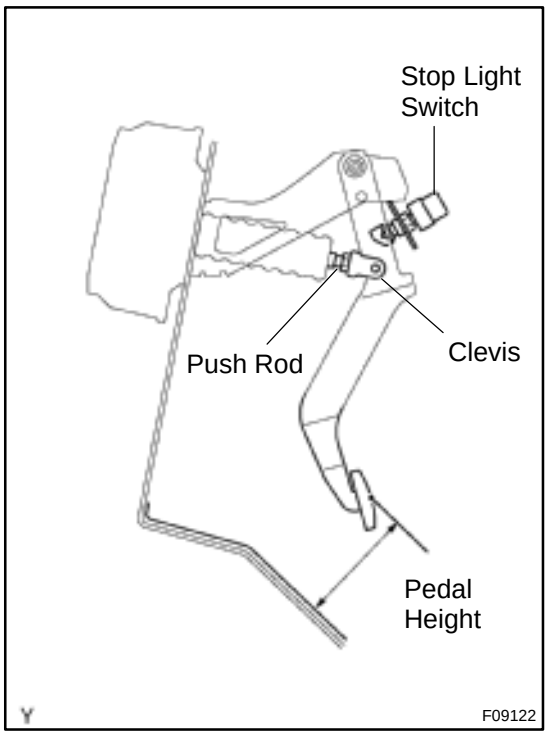
(d) Repeat (b) and (c) until all the air in the fluid has been bleeding out.

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

4. CHECK FLUID LEVEL IN RESERVOIR

Check the fluid level and add fluid if necessary.

Fluid: SAE J1703 or FMVSS No. 116 DOT3



BRAKE PEDAL

BR0PZ–03

ON–VEHICLE INSPECTION

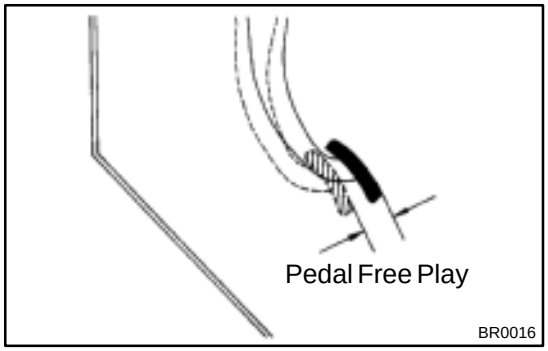
1. CHECK PEDAL HEIGHT

Pedal height from dash panel:
142.1 – 152.1 mm (5.594 – 5.988 in.)

If the pedal height is incorrect, adjust it.

2. IF NECESSARY, ADJUST PEDAL HEIGHT

(a) Disconnect the connector from the stop light switch.
(b) Loosen the stop light switch lock nut and remove the stop light switch.
(c) Loosen the clevis lock nut.
(d) Adjust the pedal height by turning the pedal push rod.
(e) Tighten the clevis lock nut.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)
(f) Install the stop light switch.
(g) Connect the connector to 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) Push the brake pedal in 5 – 15 mm (0.20 – 0.59 in.), and check that stop light lights up.
(j) After adjusting the pedal height, check the pedal free play.

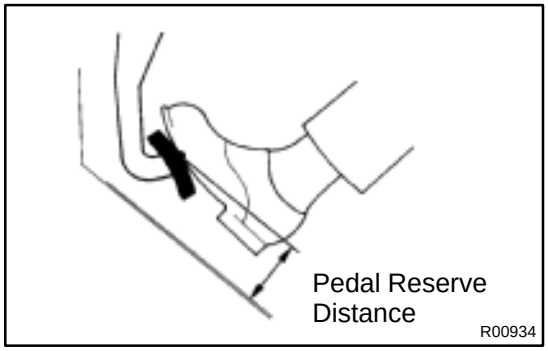


3. CHECK PEDAL FREE PLAY

(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 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.

Stop light switch clearance:
0.5 – 2.4 mm (0.020 – 0.094 in.)



4. CHECK PEDAL RESERVE DISTANCE

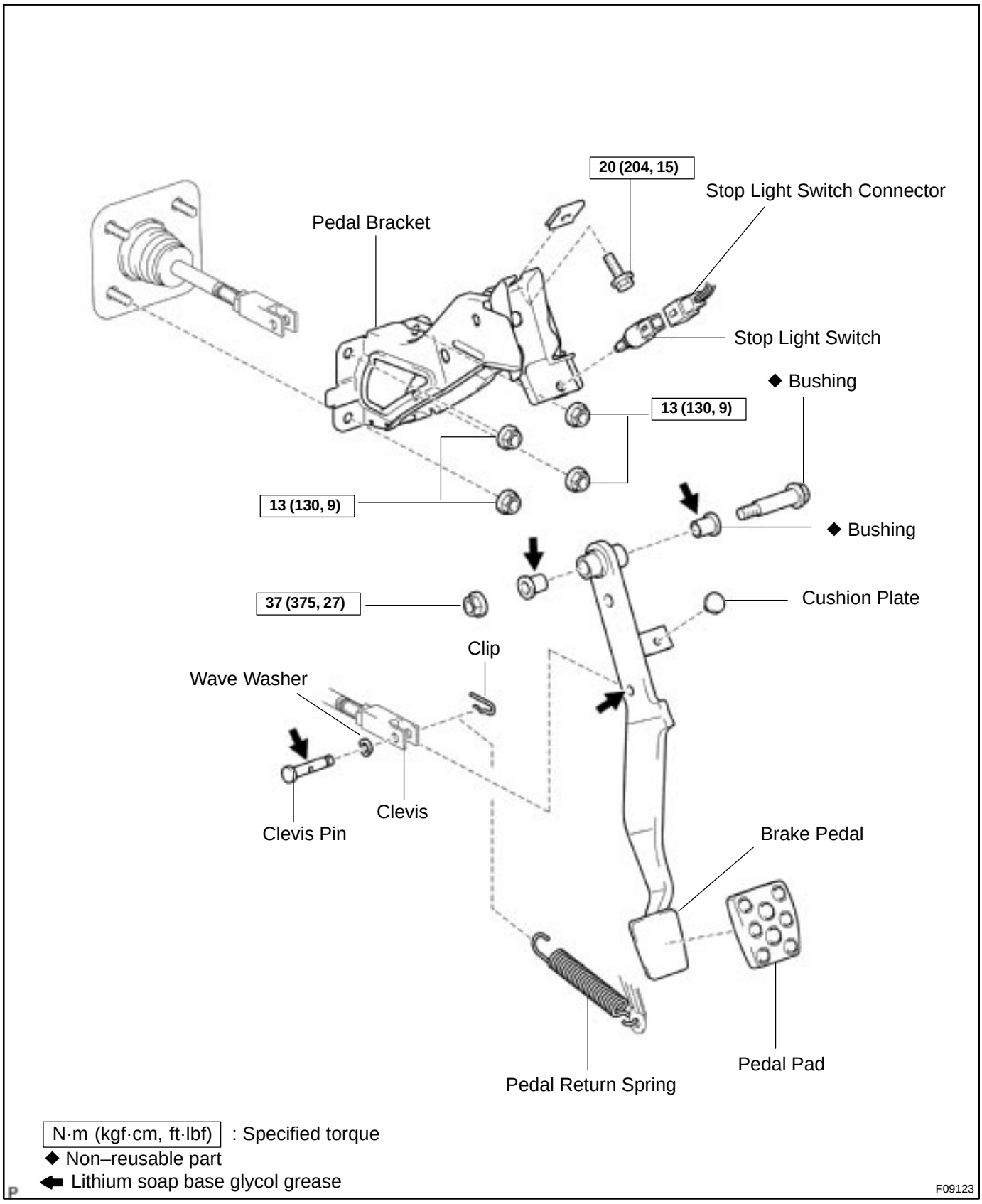
Release the parking brake lever.
With engine running, depress the pedal and measure the pedal reserve distance, as shown.

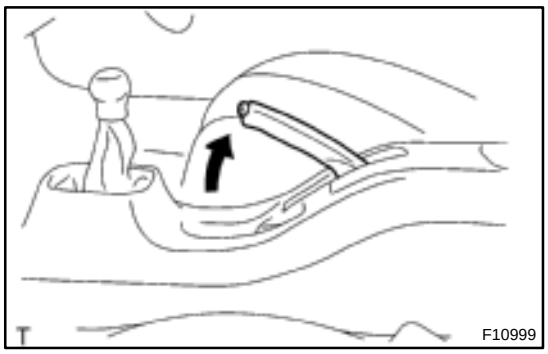
Pedal reserve distance from dash panel at 490 N (50 kgf, 110.2 lbf): More than 85 mm (3.35 in.)

If incorrect, troubleshoot the brake system.

BR145–02

COMPONENTS





PARKING BRAKE LEVER

BR0Q0–03

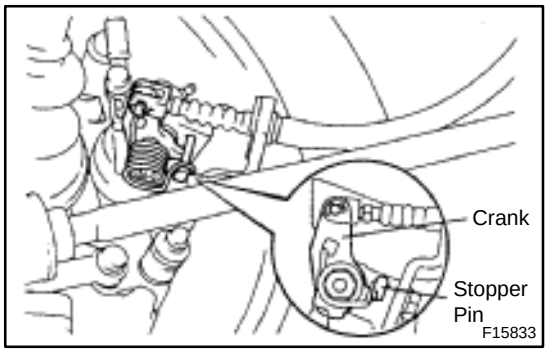
ON–VEHICLE INSPECTION

1. CHECK PARKING BRAKE LEVER TRAVEL

Pull the parking brake lever all the way up, and count the number of clicks.

Parking brake lever travel at 196 N (20 kgf, 44.1 lbf): 5 – 8 clicks

If incorrect, adjust the parking brake.



2. IF NECESSARY, ADJUST PARKING BRAKE

(a) Remove the console box.

(b) Loosen the lock nut and loosen the adjusting nut until the left and right parking brake cranks touch the stopper pin.

(c) Start the engine and depress the brake pedal with the thread force at about 490 N (50 kgf, 110 lbf) for 10 times.

(d) Tighten the adjusting nut until the cable has no looseness.

(e) Pull the parking brake lever up strongly once.

(f) Release the parking brake lever.

(g) Turn the adjusting nut until the lever travel is correct.

(h) Tighten the lock nut.

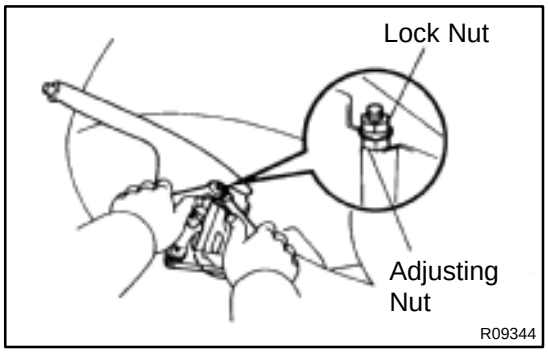
Torque: 5.4 N·m (55 kgf·cm, 48 in.·lbf)

(i) Release the parking brake lever and check the brake drag of the rear brake by turning the rear wheel.

(j) Check that the left and right brake cranks touch the stopper pin under the condition in which the parking brake lever is released.

(k) Check that the brake indicator light comes on when operating the parking brake lever.

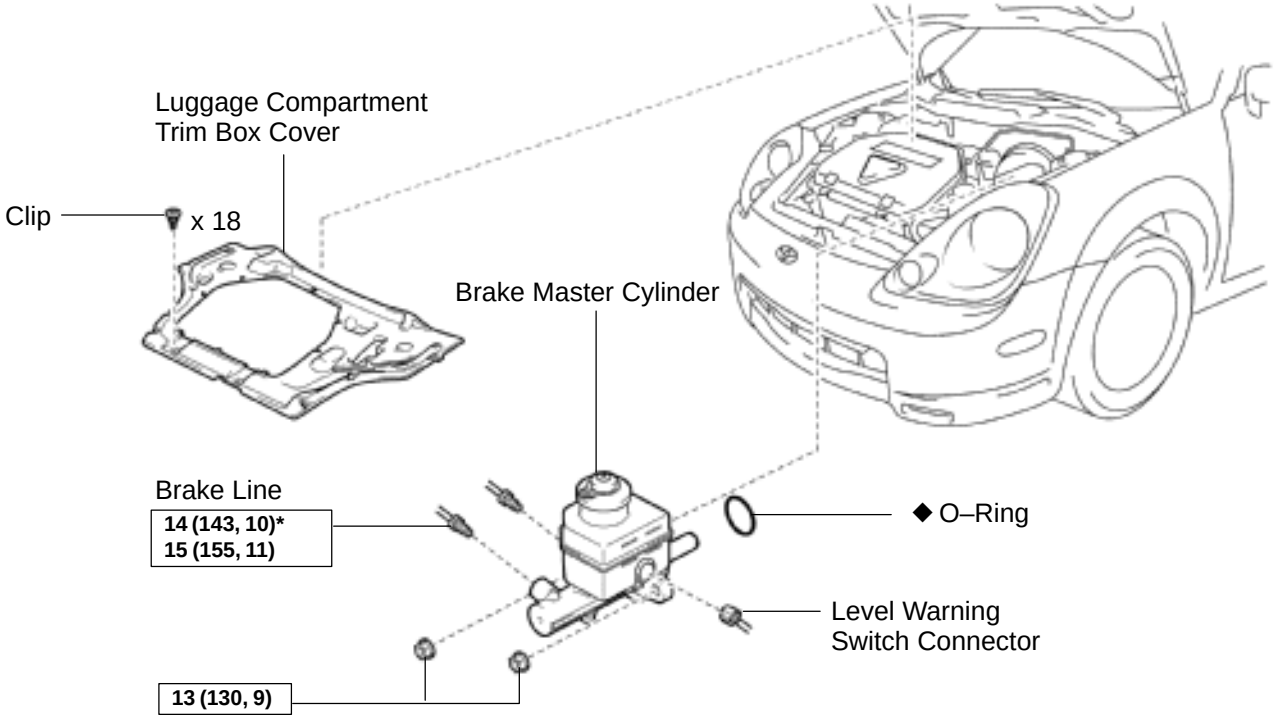
(l) Install the console box.



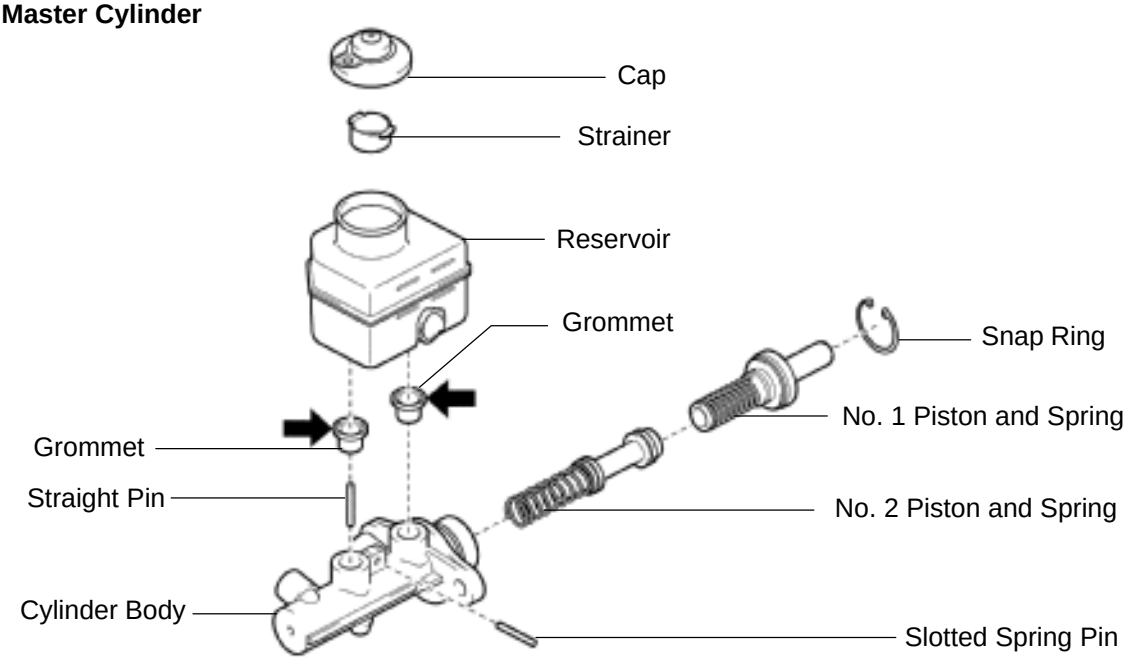
BRAKE MASTER CYLINDER

COMPONENTS

BR0Q1–03



Brake Master Cylinder



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

◆ Non–reusable part

*For use with SST

Lithium soap base glycol grease

F09124

BR1AO–03

REMOVAL

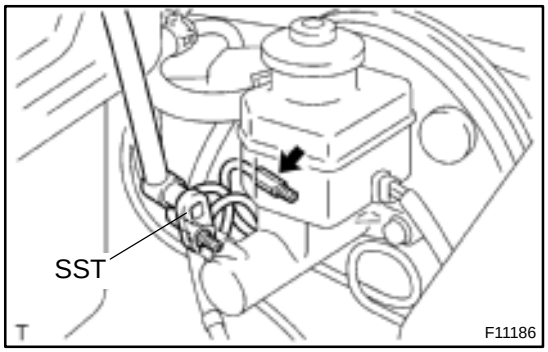
1. REMOVE LUGGAGE COMPARTMENT TRIM BOX COVER

2. DISCONNECT LEVEL WARNING SWITCH CONNECTOR

3. DRAW OUT FLUID WITH SYRINGE

NOTICE:

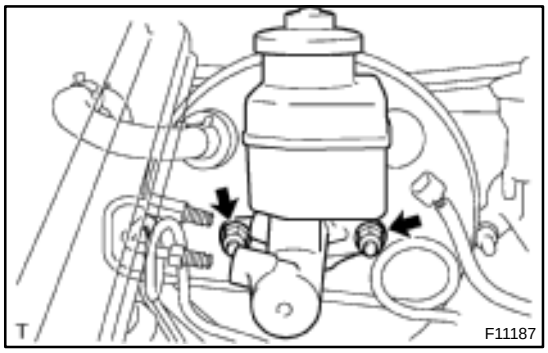
Do not let brake fluid remain on a painted surface. Wash it off immediately.



4. DISCONNECT BRAKE LINES FROM BRAKE MASTER CYLINDER

Using SST, disconnect the 2 brake lines.

SST 09023–00100



5. REMOVE BRAKE MASTER CYLINDER

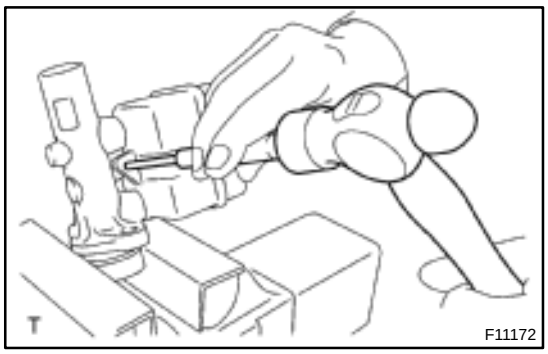
(a) Remove the 2 nuts.

(b) Pull out the master cylinder.

(c) Remove the O–ring from the master cylinder.

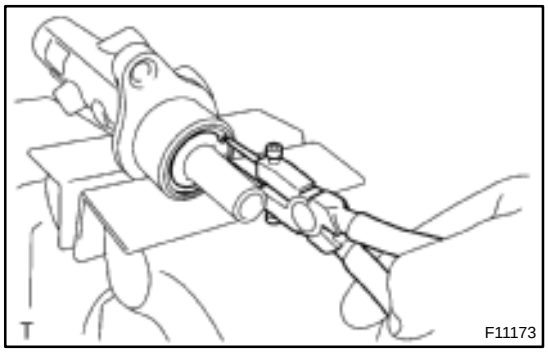
BR1AP–01

DISASSEMBLY



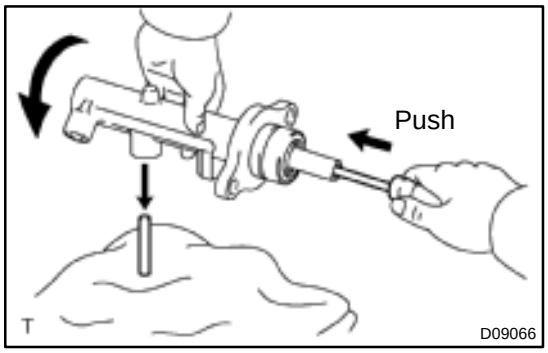
1. REMOVE RESERVOIR

(a) Using a pin punch and a hammer, tap out the slotted spring pin.
(b) Remove the reservoir.
(c) Remove the 2 grommets from the reservoir.
(d) Remove the cap and strainer from the reservoir.



2. REMOVE 2 PISTON AND SPRINGS

(a) Using snap ring pliers, remove the snap ring.



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

HINT:

Tape the screwdriver tip before use.

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

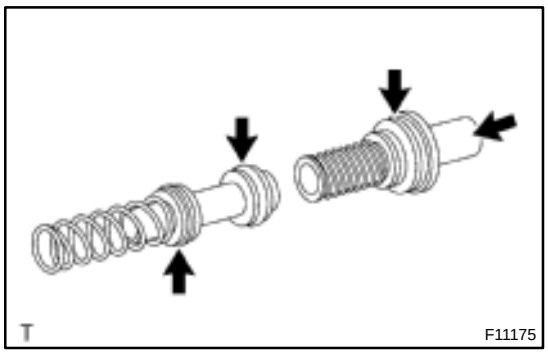
BR1AQ–01

REASSEMBLY

1. COAT PARTS WITH LITHIUM SOAP BASE GLYCOL GREASE, AS SHOWN

2. INSTALL NO. 2 PISTON AND SPRING

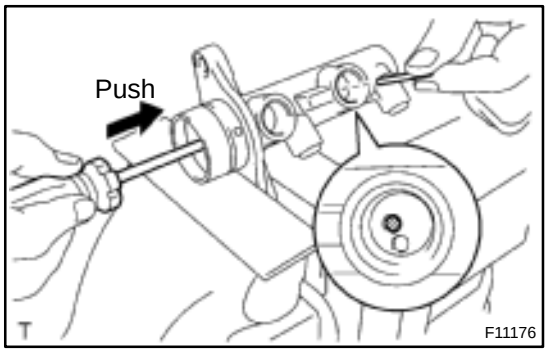
(a) Install the No. 2 piston and spring.



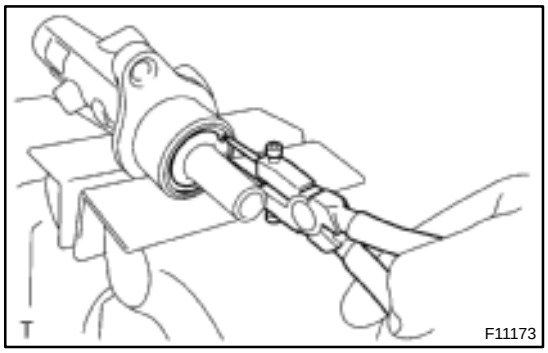
(b) Using a screwdriver, while pushing the No. 2 piston and spring, then install the straight pin.

3. INSTALL NO. 1 PISTON AND SPRING

(a) Install the No. 1 piston and spring.



(b) Using snap ring pliers, install the snap ring.

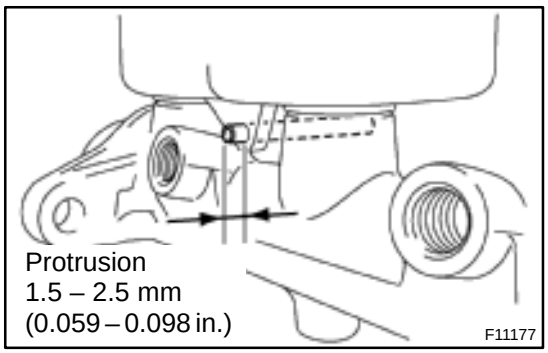


4. INSTALL RESERVOIR

(a) Install the strainer and cap to the reservoir.

(b) Install the 2 grommets and reservoir to the cylinder body.

(c) Using a pin punch and a hammer, tap in the slotted spring pin.

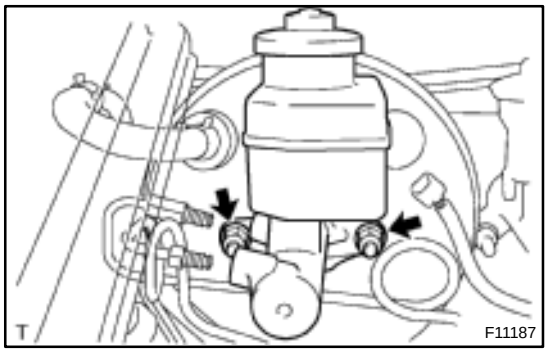


BR1AR–03

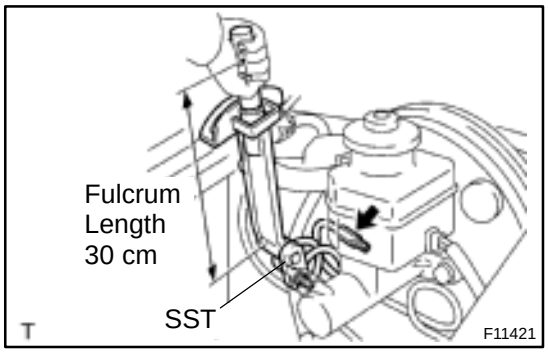
INSTALLATION

1. INSTALL BRAKE MASTER CYLINDER

(a) Install a new O–ring to the master cylinder.



(b) Install the master cylinder with the 2 nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)



2. CONNECT BRAKE LINES TO MASTER CYLINDER

Using SST, connect the 2 brake lines.

SST 09023–00100

Torque:
15 N·m (155 kgf·cm, 11 ft·lbf)
14 N·m (143 kgf·cm, 10 ft·lbf) for use with SST

HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81in.).

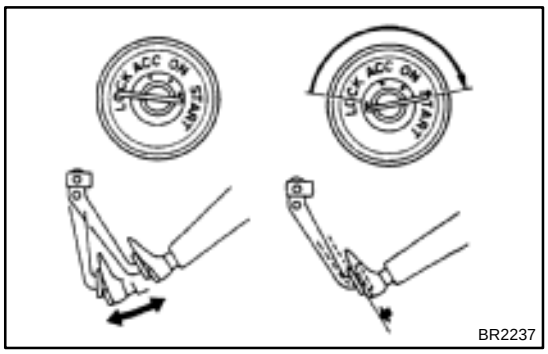
3. CONNECT LEVEL WARNING SWITCH CONNECTOR

4. FILL 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. INSTALL LUGGAGE COMPARTMENT TRIM BOX COVER



BRAKE BOOSTER ASSEMBLY

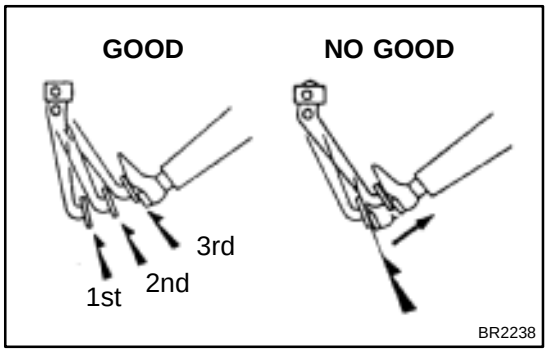
BR0Q7–02

ON–VEHICLE INSPECTION

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

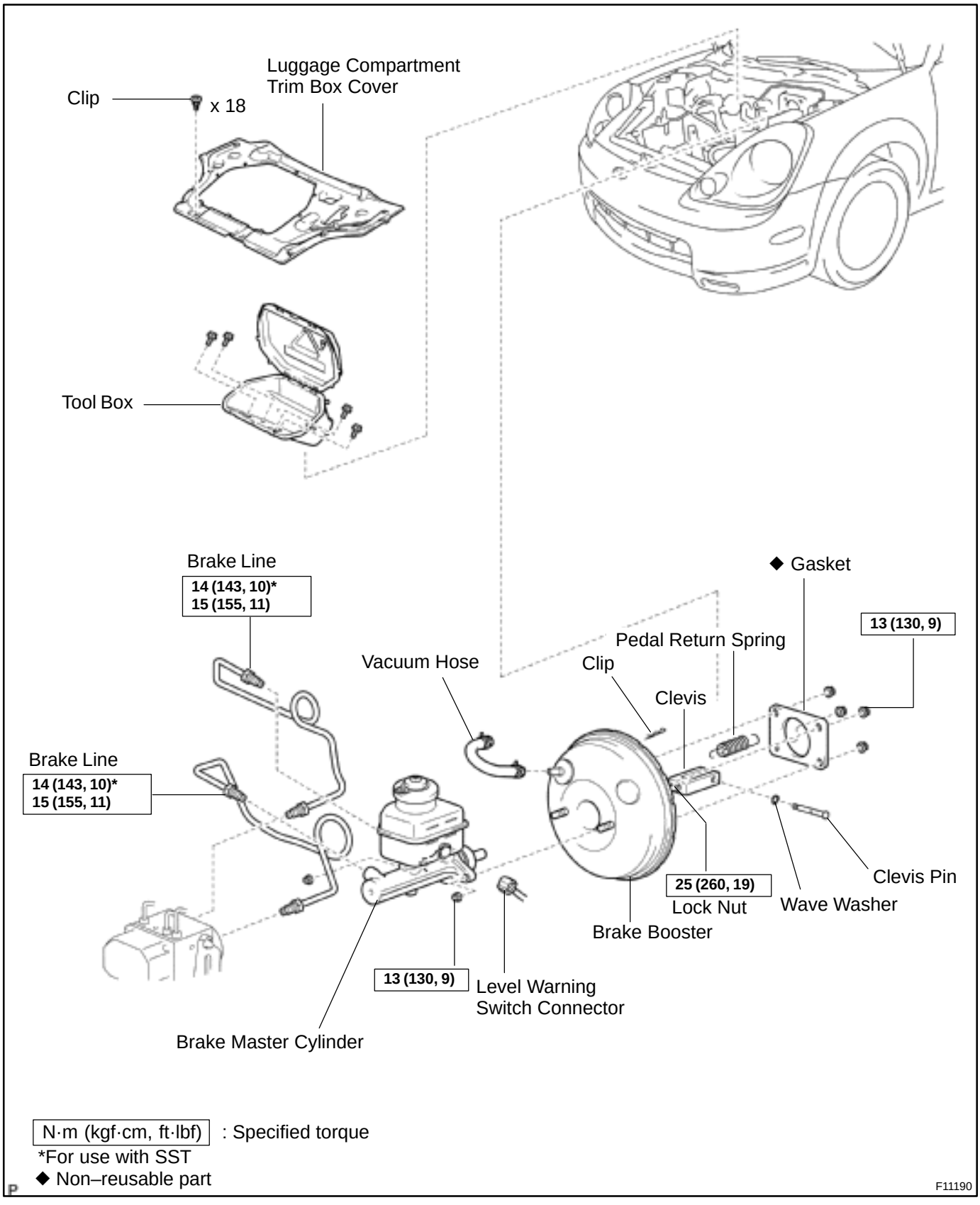
(a) Start the engine and stop it after 1 or 2 minutes. Depress the brake pedal several times slowly.

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.

BR0Q8–03

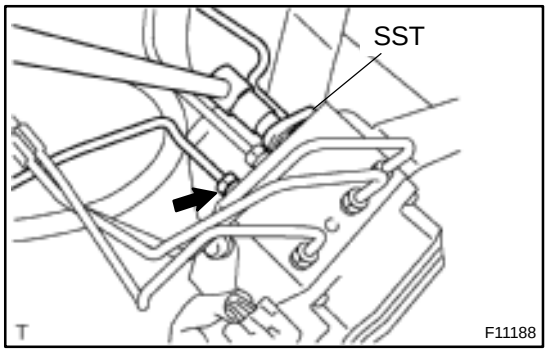
COMPONENTS



BR146–04

REMOVAL

1. **REMOVE MASTER CYLINDER (See page BR–10)**
2. **REMOVE TOOL BOX**
3. **DISCONNECT VACUUM HOSE FROM BRAKE BOOSTER**



4. **REMOVE 2 BRAKE LINES**

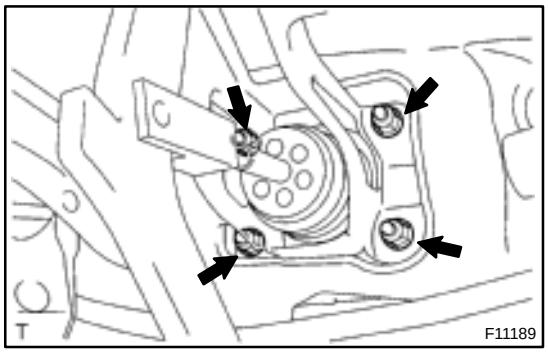
Using SST, remove the 2 brake lines from the ABS actuator.

SST 09023–00100

5. **REMOVE BRAKE BOOSTER**

(a) Using needle–nose pliers, remove the return spring and clip.

(b) Remove the clevis pin and wave washer.

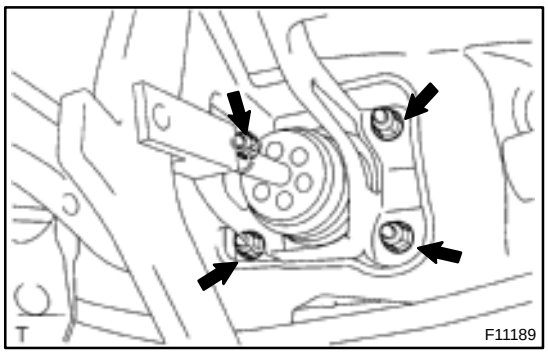


(c) Remove the 4 nuts and clevis.

(d) Pull out the brake booster and gasket.

BR1AD–01

INSTALLATION

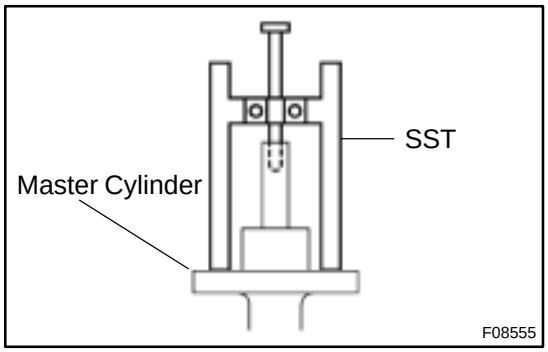


1. INSTALL BRAKE BOOSTER

(a) Install a new gasket and the brake booster with the 4 nuts.
Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

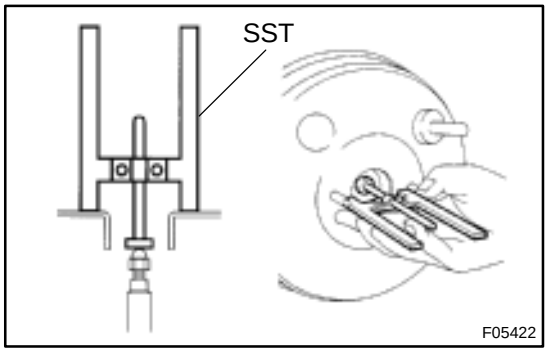
(b) Install the clevis to the brake pedal with the wave washer, clevis pin and clip.

(c) Using needle–nose pliers, install the pedal return spring.



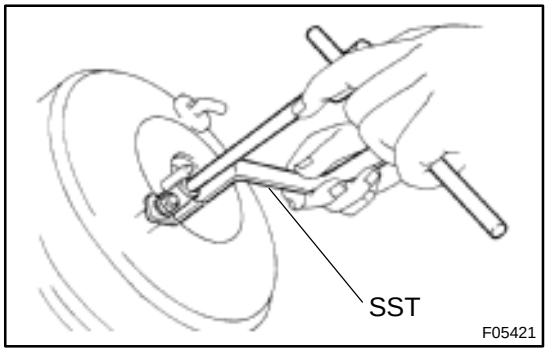
2. ADJUST LENGTH OF BOOSTER PUSH ROD

(a) Set the SST on the master cylinder, and lower the pin until its tip slightly touches the piston.
SST 09737–00011



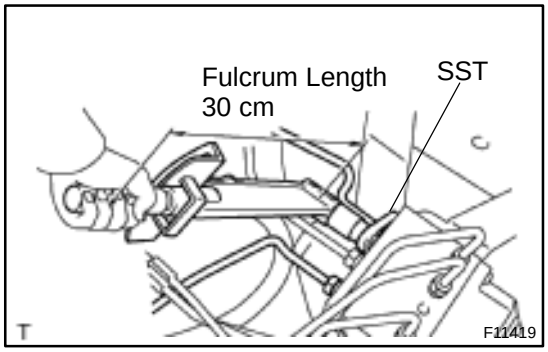
(b) Turn the SST upside down, and set it on the booster.
SST 09737–00011

(c) Measure the clearance between the booster push rod and pin head (SST).
Clearance: 0 mm (0 in.)



(d) Using SST, adjust the booster push rod length until the push rod lightly touches the pin head.
SST 09737–00020

3. CONNECT VACUUM HOSE TO BRAKE BOOSTER



4. INSTALL BRAKE LINES

Using SST, install the 2 brake lines to the ABS actuator.
Torque:
15 N·m (155 kgf·cm, 11 ft·lbf)
14 N·m (143 kgf·cm, 10 ft·lbf) for use with SST

HINT:
Use a torque wrench with a fulcrum length of 30 cm (11.81in.).

5. INSTALL MASTER CYLINDER (See page BR–13)

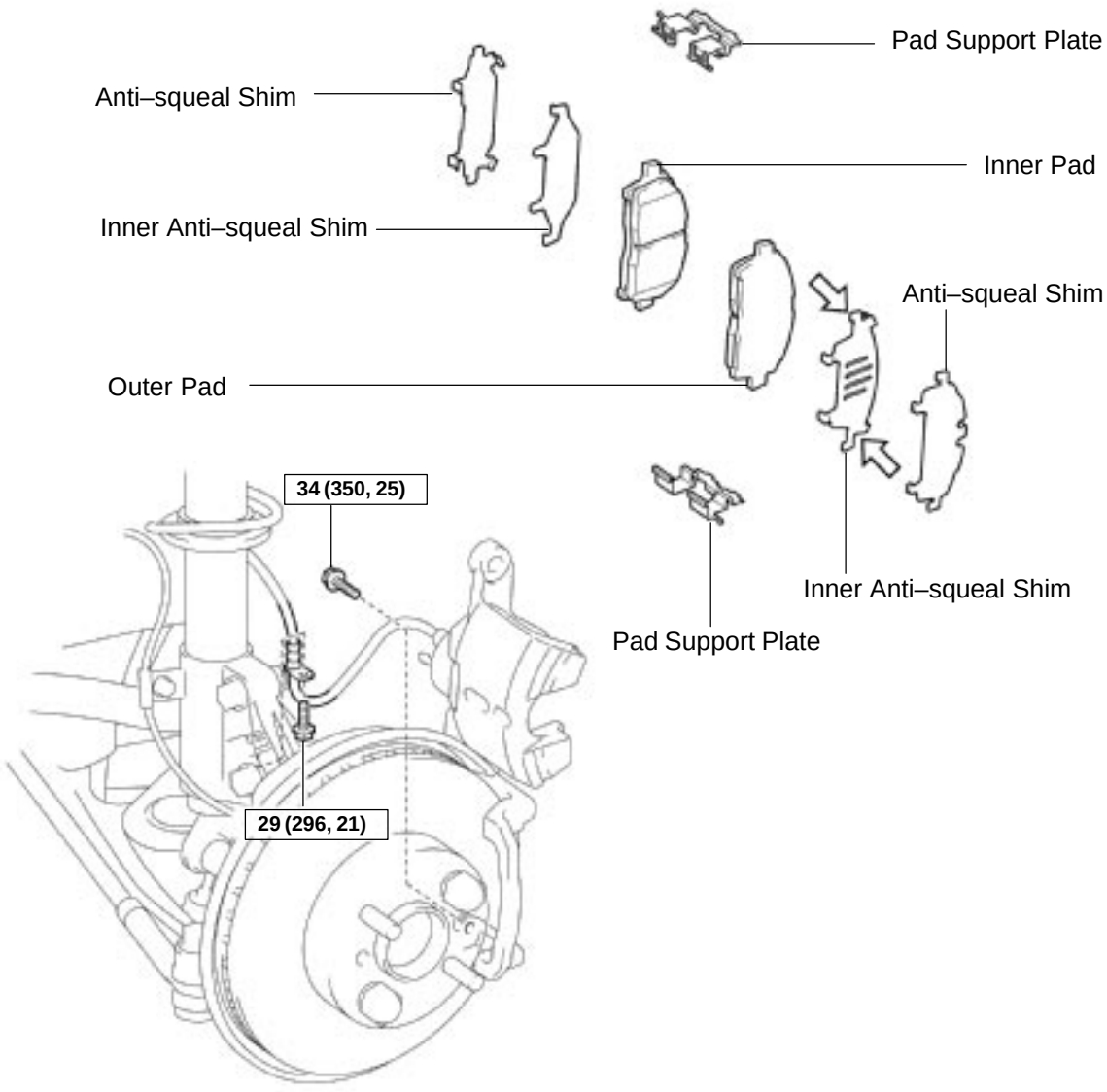
6. FILL RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)

7. **CHECK FOR FLUID LEAKAGE**
8. **CHECK AND ADJUST BRAKE PEDAL (See page BR–6)**
9. **DO OPERATIONAL CHECK (See page BR–14)**
10. **INSTALL TOOL BOX**
11. **INSTALL LUGGAGE COMPARTMENT TRIM BOX COVER**

FRONT BRAKE PAD

BR0QB–03

COMPONENTS



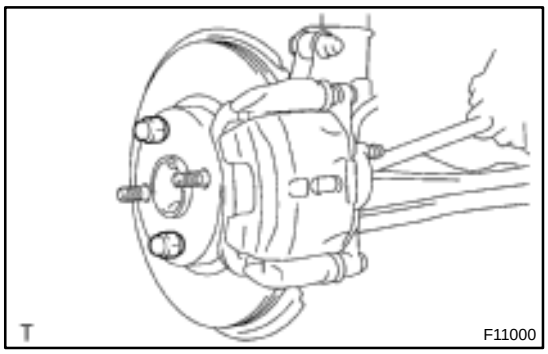
N·m (kgf·cm, ft·lbf) : Specified torque

⇦ Disc brake grease

F11009

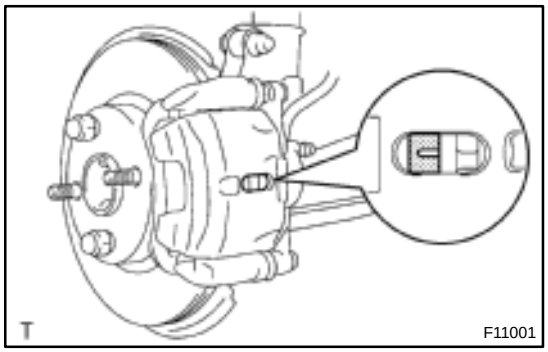
BR1AE–01

REPLACEMENT



1. REMOVE FRONT WHEEL

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



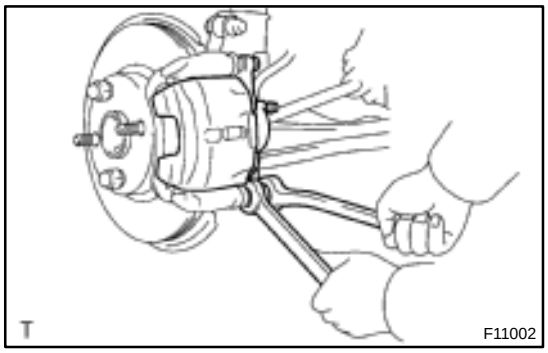
2. INSPECT PAD LINING THICKNESS

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. DISCONNECT FLEXIBLE HOSE FROM SHOCK ABSORBER

Remove the bolt and disconnect the flexible hose.

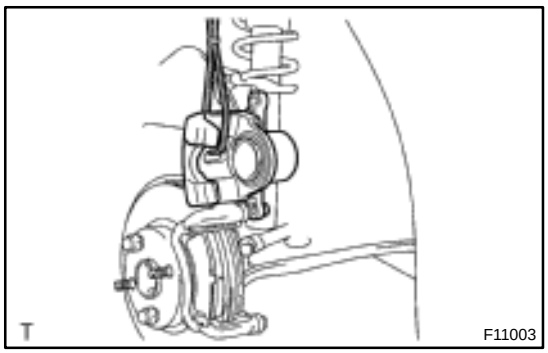


4. LIFT UP CALIPER

(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.

5. REMOVE 2 PADS WITH 4 ANTI–SQUEAL SHIMS

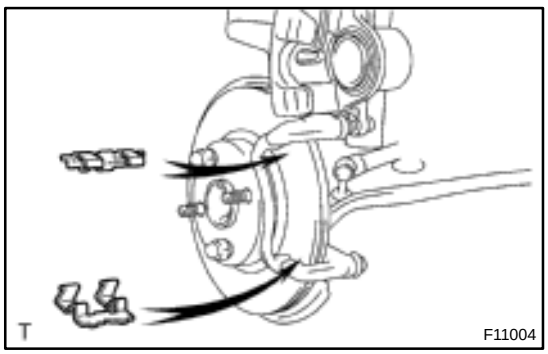
6. REMOVE 2 PAD SUPPORT PLATES

NOTICE:

The support plates can be used again provided that they have sufficient rebound, no deformation, cracks or wear, and remove all rust, dirt and foreign particles.

7. CHECK DISC THICKNESS AND RUNOUT

(See page BR–25)



8. INSTALL PAD SUPPORT PLATES

Install the 2 pad support plates.

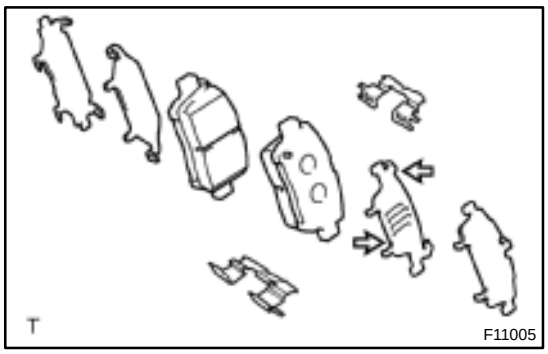
NOTICE:

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

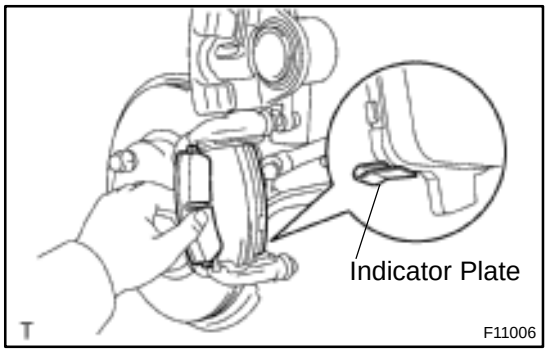
9. INSTALL NEW PADS

NOTICE:

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



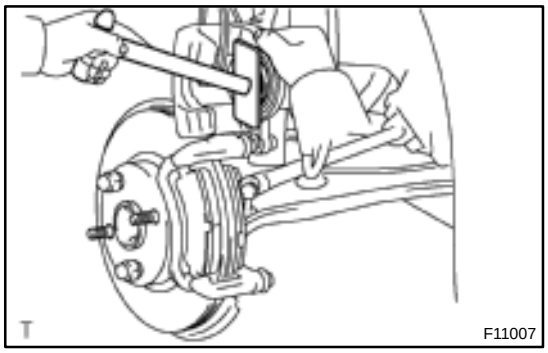
(a) Apply disc brake grease to both sides of the inner anti–squeal shims position outside (See page BR–19).
(b) Install the 2 anti–squeal shims on the outer pad.
(c) Install the 2 anti–squeal shims on the inter pad.



(d) Install the inside pads with the pad wear indicator plate facing downward.
(e) Install the outside pad.

NOTICE:

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

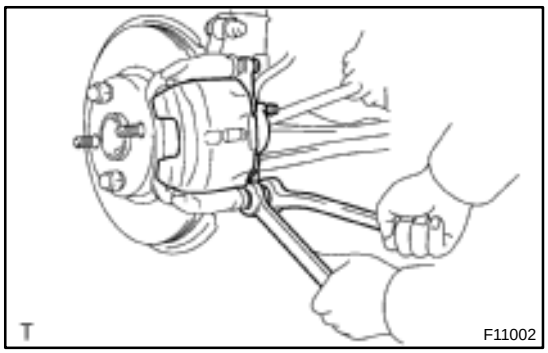


10. INSTALL CALIPER

(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 cylinder on the torque plate with bottom side installation bolt.
(d) Hold the sliding pin and torque the installation bolt.
Torque: 34 N·m (350 kgf·cm, 25 ft·lbf)

11. CONNECT FLEXIBLE HOSE FROM SHOCK ABSORBER

Connect the brake hose and install the bolt.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)

12. INSTALL FRONT WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

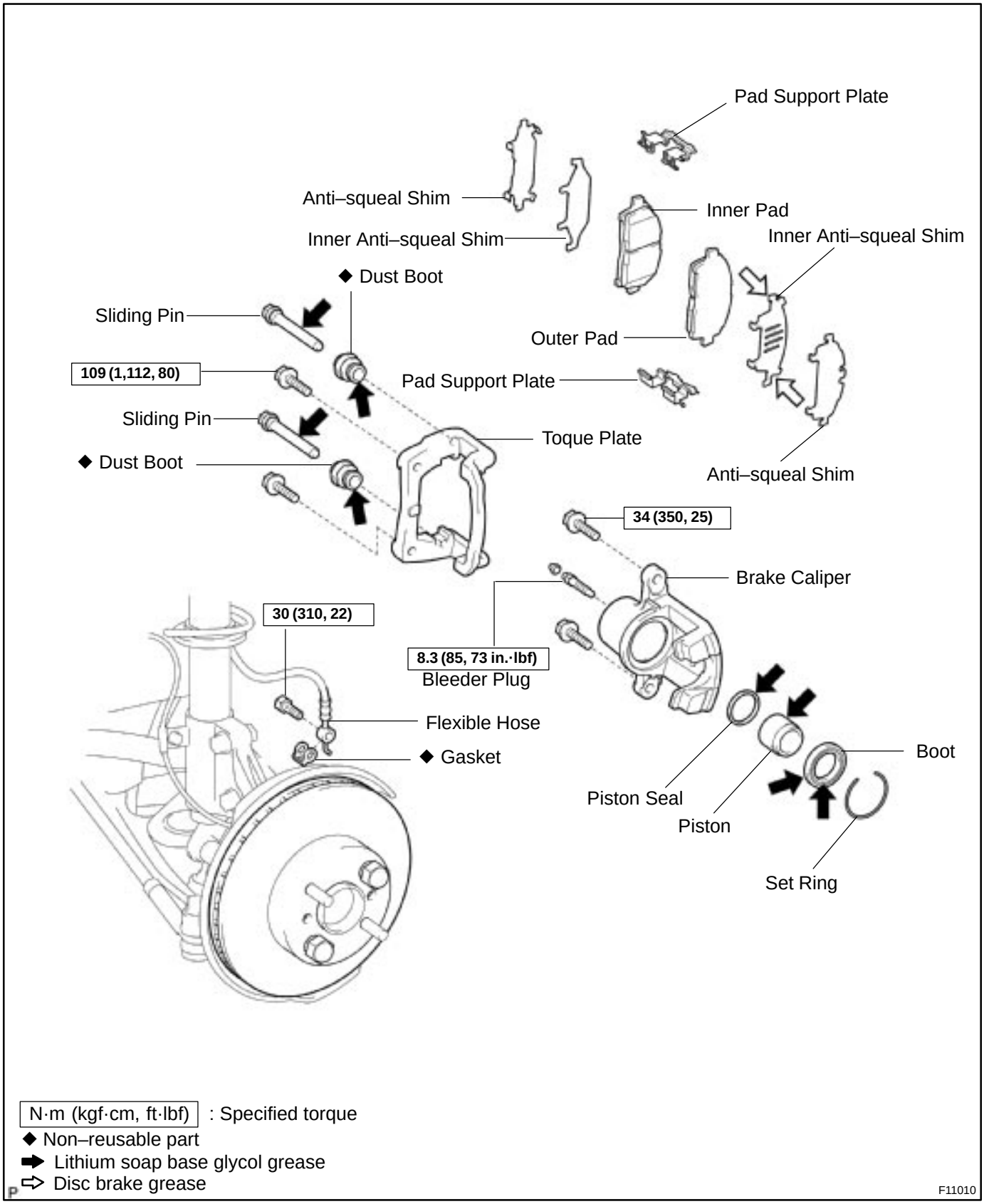
13. DEPRESS BRAKE PEDAL SEVERAL TIMES

14. CHECK THAT FLUID LEVEL IS AT MAX LINE

FRONT BRAKE CALIPER

COMPONENTS

BR1AF–01

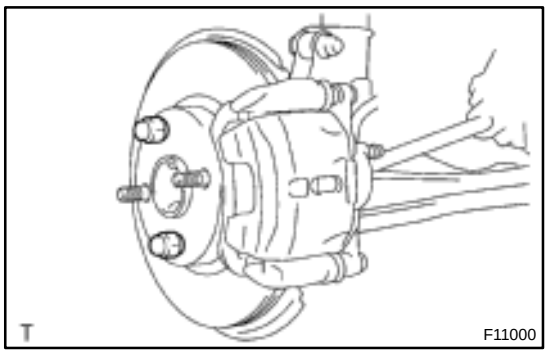


N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
➡ Lithium soap base glycol grease
⇨ Disc brake grease

F11010

BR1AG–01

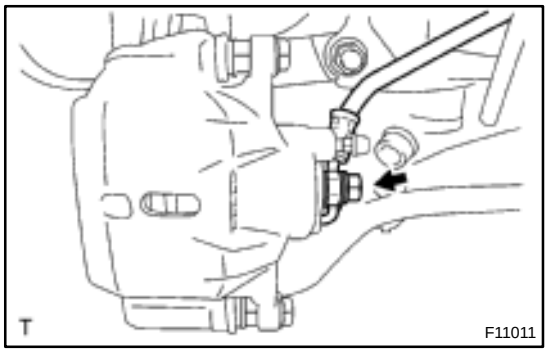
REMOVAL



1. REMOVE FRONT WHEEL

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

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



2. DISCONNECT FLEXIBLE HOSE

Remove the union bolt and gasket from the caliper, 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.
- Use a container to catch the brake fluid as it drains 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)

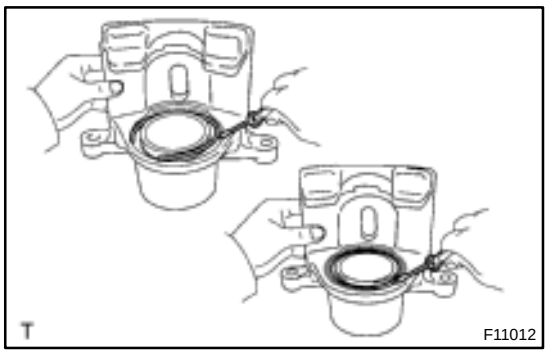
(b) Remove the caliper from the torque plate.

4. REMOVE 2 PADS WITH ANTI–SQUEAL SHIMS

5. REMOVE 2 PAD SUPPORT PLATES

BR0QF–03

DISASSEMBLY

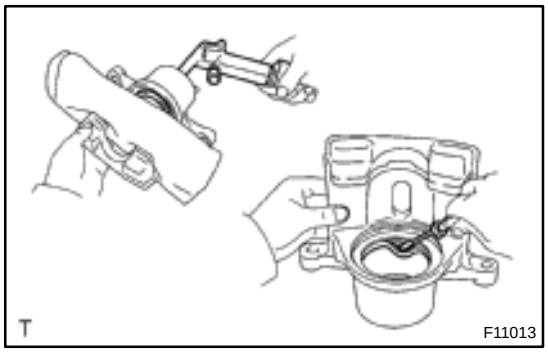


1. REMOVE SET RING AND CYLINDER BOOT

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

2. REMOVE PISTON

(a) Place a piece of cloth or similar between the piston and the caliper.



(b) Use compressed air to remove the piston from the cylinder.

CAUTION:

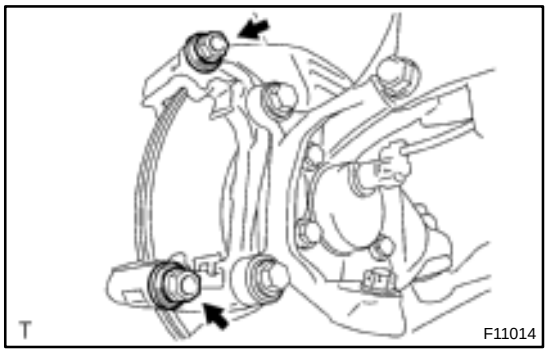
Do not place your fingers in front of the piston when using compressed air.

3. REMOVE PISTON SEAL

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

4. REMOVE BLEEDER PLUG

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



5. REMOVE SLIDING PINS AND DUST BOOTS

(a) Remove the 2 sliding pins from the torque plate.

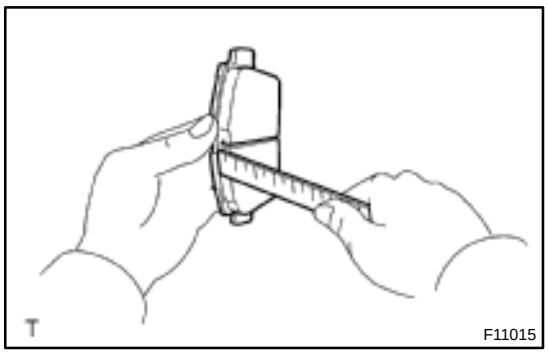
(b) Remove the 2 dust boots.

NOTICE:

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

BR0QG–03

INSPECTION



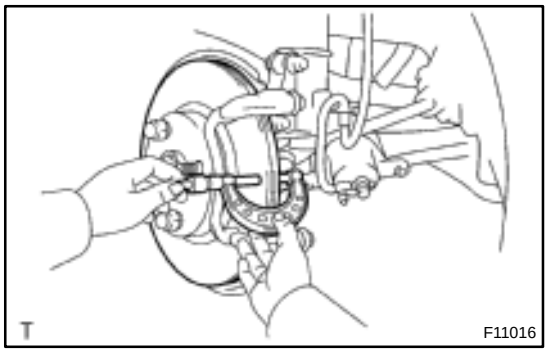
1. MEASURE PAD LINING THICKNESS

Using a ruler, measure the pad lining thickness.

Standard thickness: 11.0 mm (0.433 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, uneven wear.



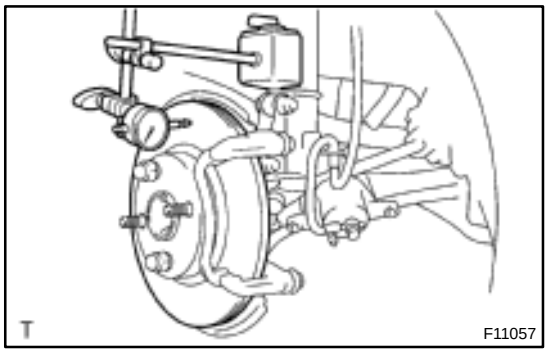
2. MEASURE DISC THICKNESS

Using a micrometer, measure the disc thickness.

Standard thickness: 20.0 mm (0.787 in.)

Minimum thickness: 18.0 mm (0.709 in.)

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

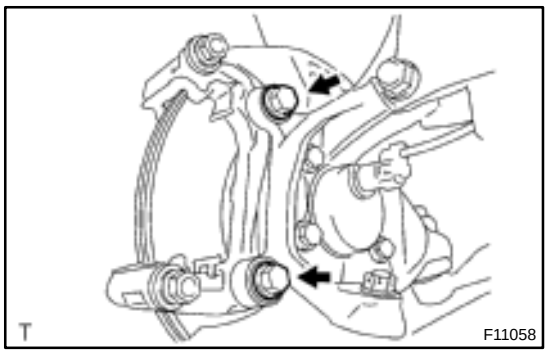


3. MEASURE DISC RUNOUT

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

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–9). 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

(a) Remove the 2 bolts and torque plate from the knuckle.

(b) Remove the hub nuts and the disc.

(1) Reinstall the disc in the position turned 1/4 from its original position on the hub.

(2) Install and torque the hub nuts.

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

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

(c) Repeat (b) until the disc has been installed on the 2 remaining hub positions.

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

(e) 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.

(f) Install the torque plate and torque the mounting bolts.

Torque: 109 N·m (1,112 kgf·cm, 80 ft·lbf)

BR0QH–01

REASSEMBLY

Reassembly is in the reverse order of disassembly (See page BR–24).

NOTICE:

Apply lithium soap base glycol grease to the parts indicated by arrows (See page BR–22).

BR0QI–02

INSTALLATION

Installation is in the reverse order of removal (See page BR–23).

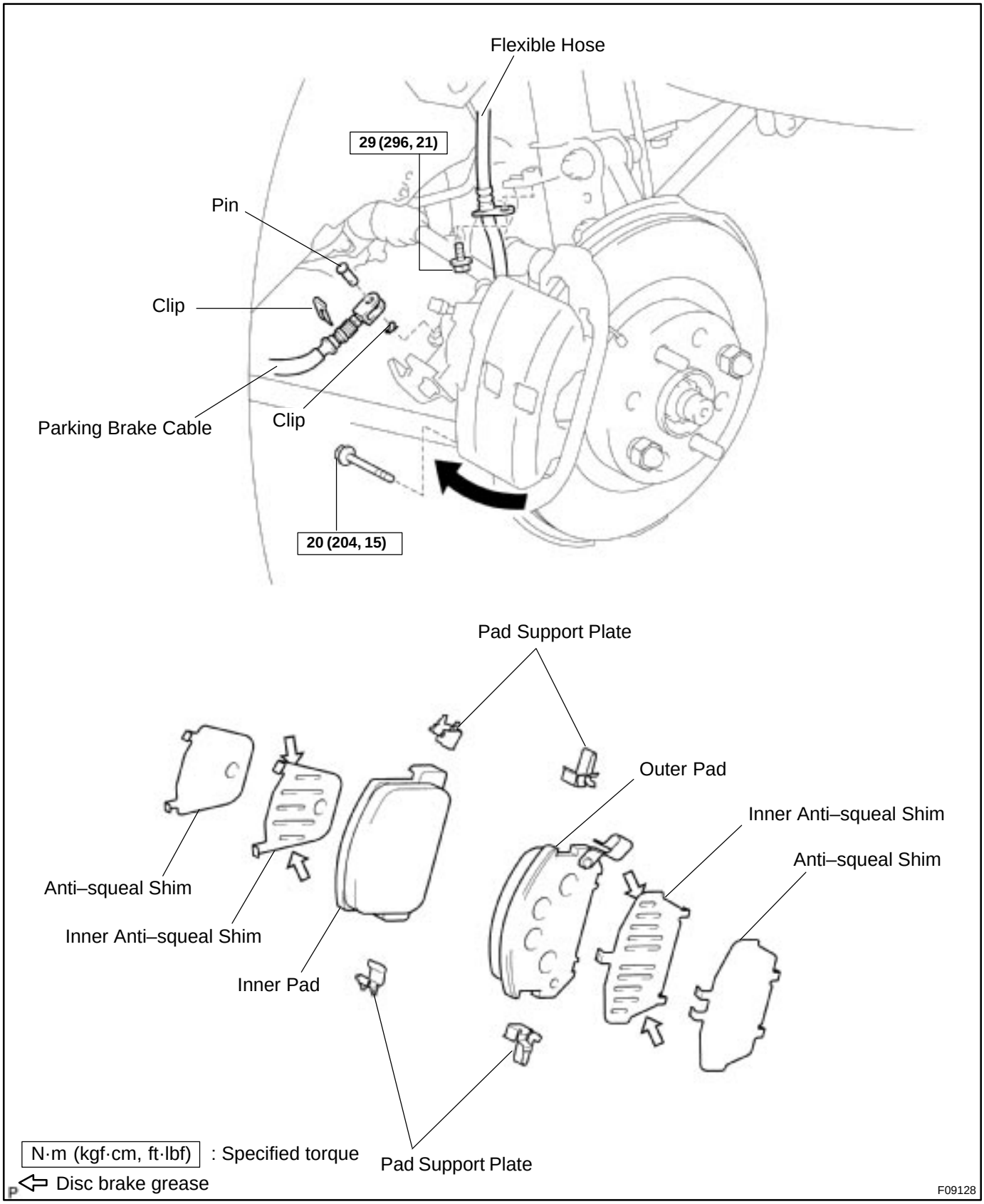
HINT:

- After installation, fill the brake reservoir with brake fluid and bleed brake system (See page BR–4).
- Check for leaks.

REAR BRAKE PAD

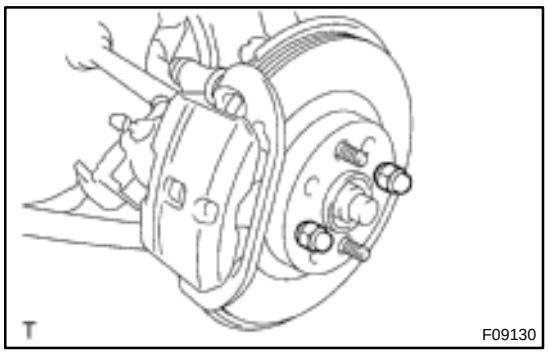
COMPONENTS

BR0QJ–04



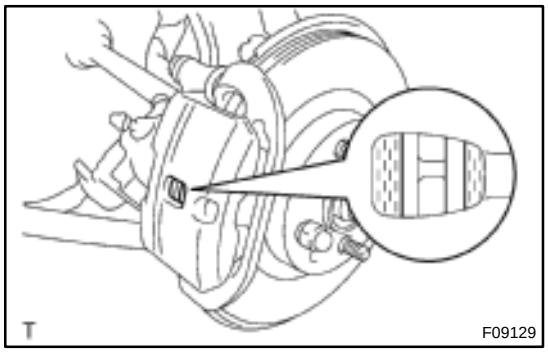
BR1AH–01

REPLACEMENT



1. REMOVE REAR WHEEL

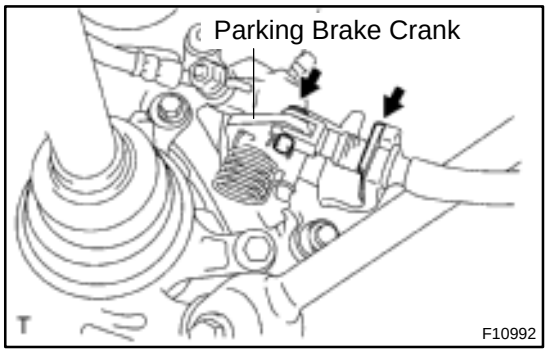
Remove the wheel and temporarily fasten the disc with the hub nuts.



2. INSPECT PAD LINING THICKNESS

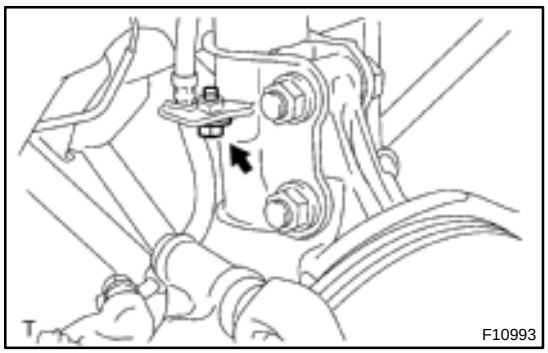
Check the pad thickness through the caliper inspection hole and replace the pads if they are not within the specification.

Minimum thickness: 1.0 mm (0.039 in.)



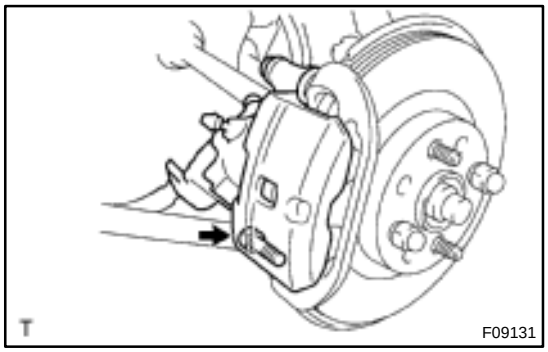
3. DISCONNECT PARKING BRAKE CABLE

(a) Remove the clip.
(b) Pull out the pin while pushing the parking brake crank.
(c) Remove the clip and disconnect the parking brake cable.



4. DISCONNECT FLEXIBLE HOSE FROM SHOCK ABSORBER

Remove the bolt and disconnect the flexible hose.

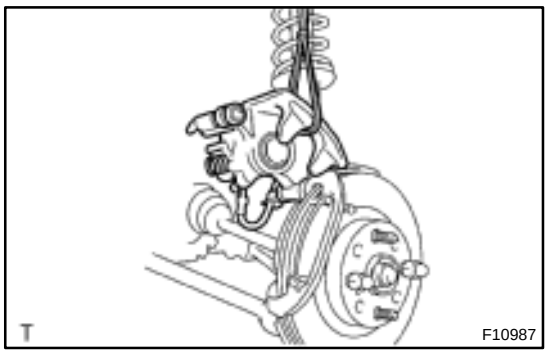


5. LIFT UP CALIPER

(a) 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.

6. REMOVE 2 PADS WITH 4 ANTI–SQUEAL SHIMS

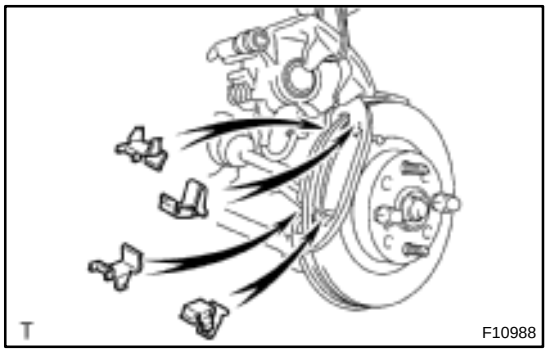
7. REMOVE 4 PAD SUPPORT PLATES

NOTICE:

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

8. CHECK DISC THICKNESS AND RUNOUT

(See page BR–37)

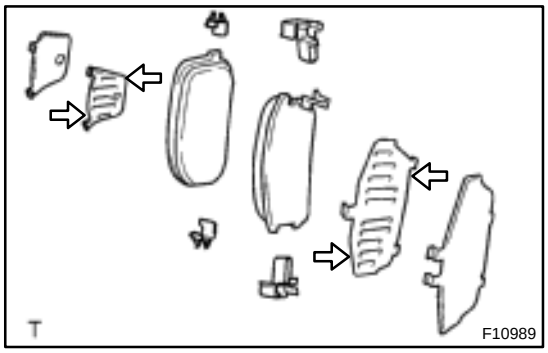


9. INSTALL 4 PAD SUPPORT PLATES

Install the 4 pad support plates.

NOTICE:

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



10. INSTALL NEW PADS

NOTICE:

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

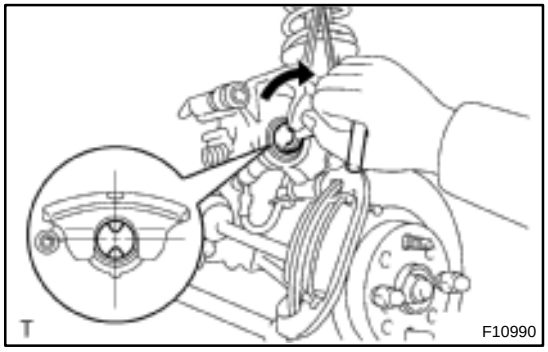
(a) Apply disc brake grease to both sides of the each inner anti–squeal shim (See page BR–28).

(b) Install the 2 anti–squeal shims on the outer pad.

(c) Install the 2 anti–squeal shims on the inter pad.

(d) Install the outside pad with the pad wear indicator plate facing upward.

(e) Install the inside pad.



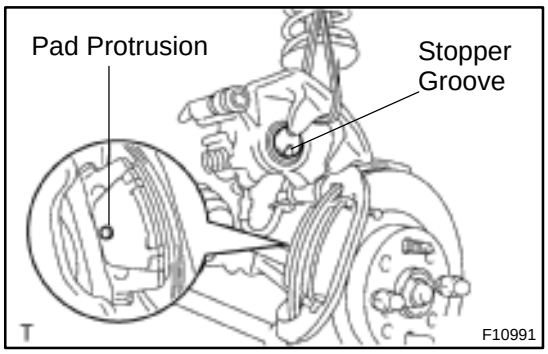
11. INSTALL CALIPER

(a) Using SST, slowly turn the piston clockwise until the piston turns freely, then align the cylinder protrusion and piston stopper groove.

SST 09719–14020 (09719–00020)

NOTICE:

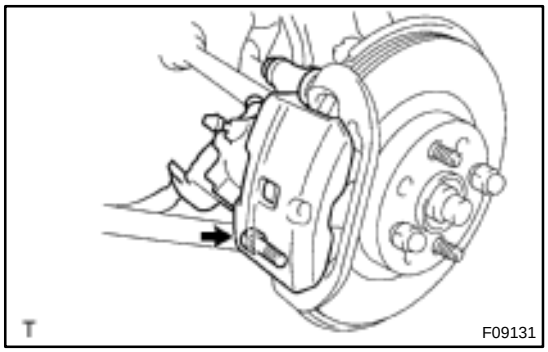
There is a case where the opposite piston fly out, so be sure to do the brake pad changing operation for one wheel at a time.



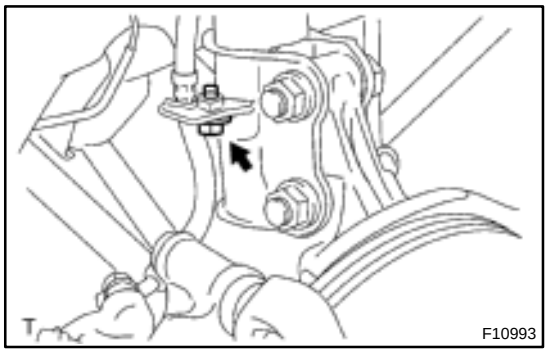
(b) Fit the pad protrusion into the piston stopper groove and install the caliper.

NOTICE:

- **Never make the dust boot be caught.**
- **Never twist the flexible hose.**

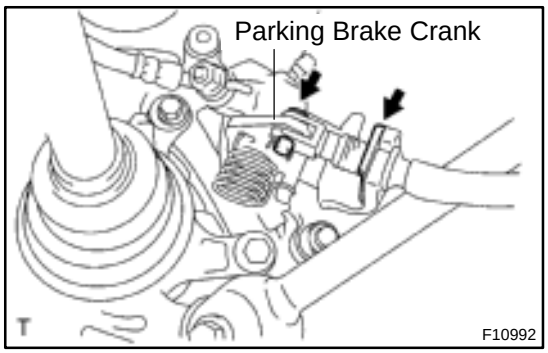


(c) Install the installation bolt.
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)



12. CONNECT FLEXIBLE HOSE TO SHOCK ABSORBER

Connect the flexible hose and install the bolt.
Torque: 29 N·m (296 kgf·cm, 21 ft·lbf)



13. CONNECT PARKING BRAKE CABLE

Connect the parking brake cable and install the clip.
Install the pin and pin clip while pushing the parking brake crank.

14. INSTALL REAR WHEEL
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)

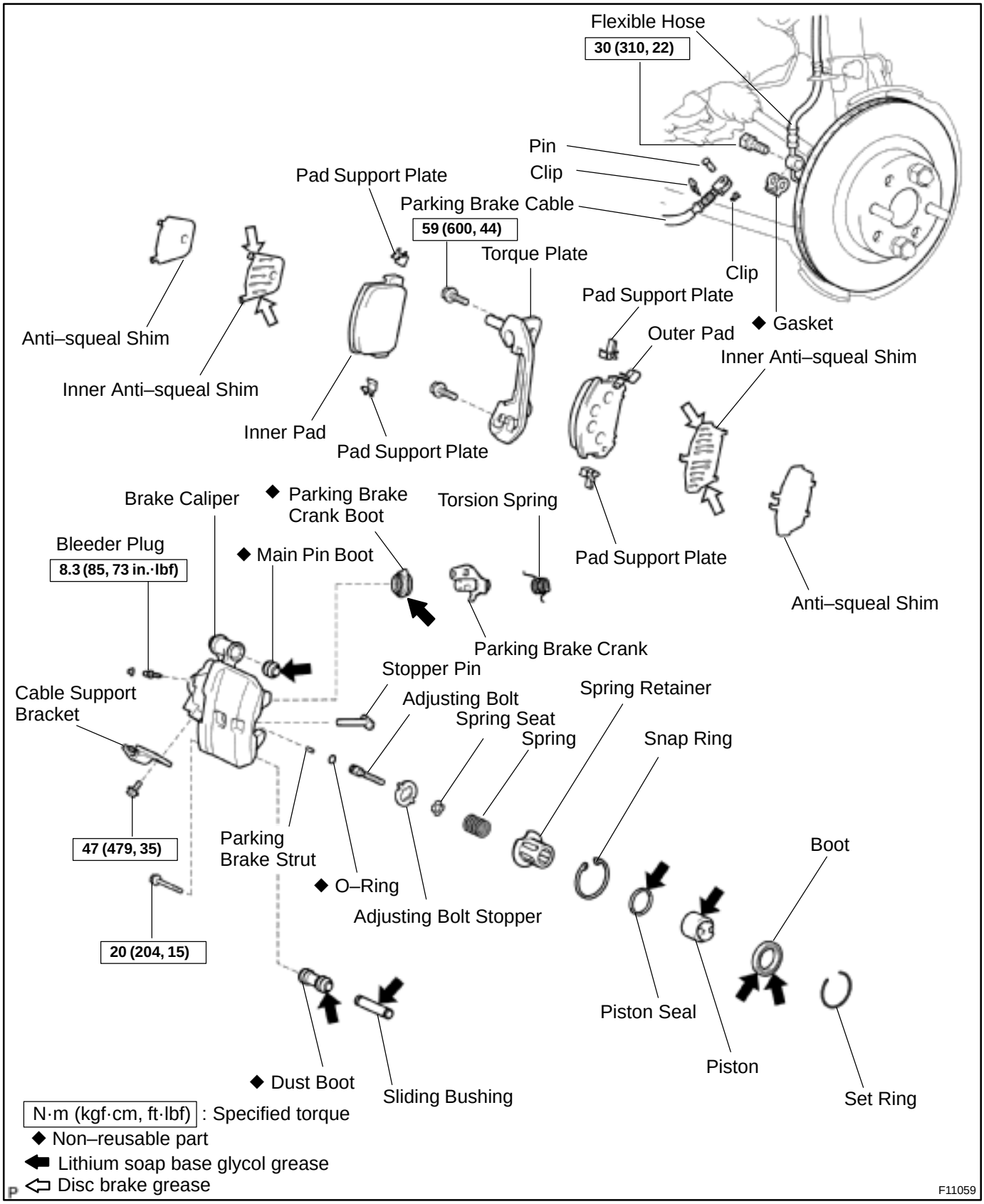
15. DEPRESS BRAKE PEDAL SEVERAL TIMES

16. CHECK THAT FLUID LEVEL IS AT MAX LINE

REAR BRAKE CALIPER

BR0QL–04

COMPONENTS



BR14D–02

REMOVAL

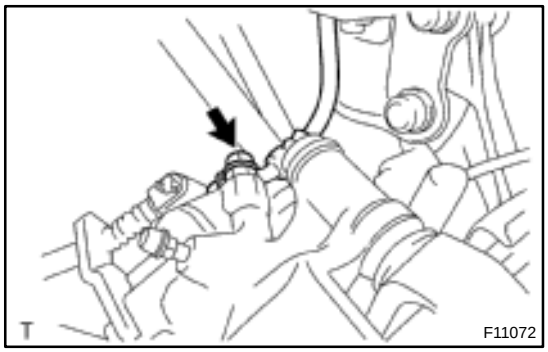
1. REMOVE REAR WHEEL

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

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

2. DISCONNECT PARKING BRAKE CABLE

(See page BR–29)



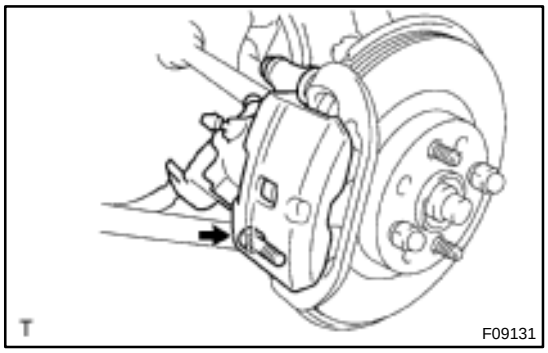
3. DISCONNECT FLEXIBLE HOSE FROM CALIPER

Remove the union bolt and gasket from the caliper, then disconnect the flexible hose.

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

HINT:

- At the time of installation, insert the flexible hose lock securely in the lock hole in the caliper.
- Use a container to catch the brake fluid as it drains out.



4. REMOVE CALIPER

Remove the installation bolt and caliper from the torque plate.

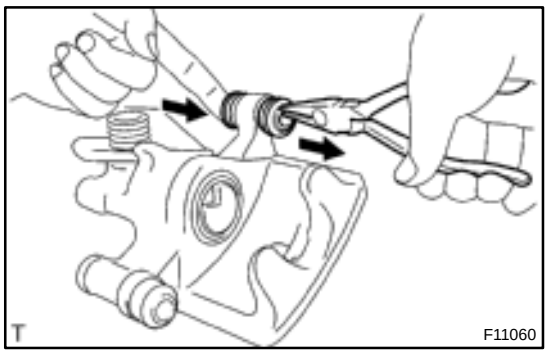
Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

5. REMOVE 2 PADS WITH 4 ANTI–SQUEAL SHIMS

6. REMOVE 4 PAD SUPPORT PLATES

BR1AI–01

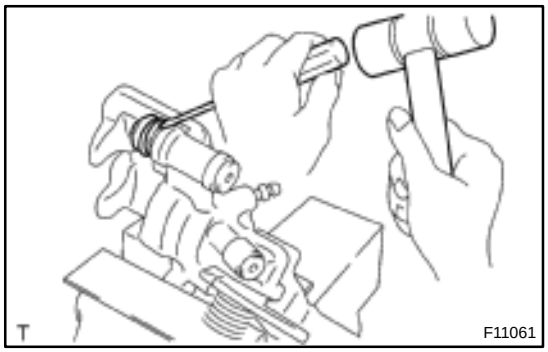
DISASSEMBLY



1. REMOVE DUST BOOT AND SLIDING BUSHING

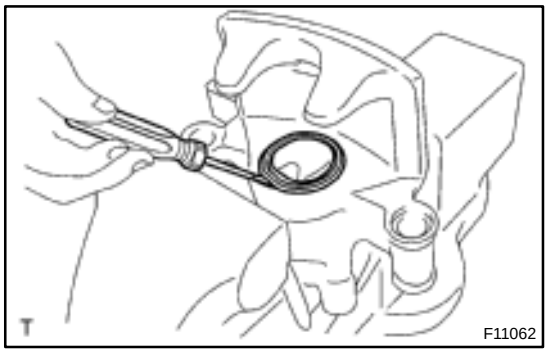
(a) Pull out the sliding bush with long–nose pliers by pushing it with a finger.

(b) Remove the dust boot.



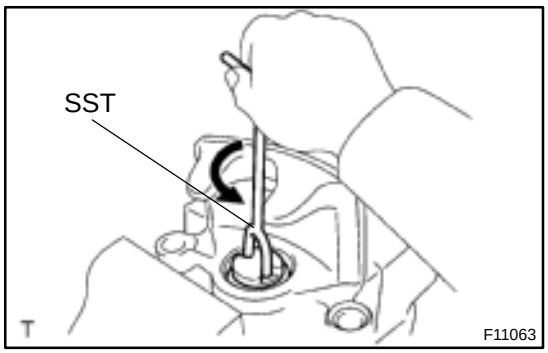
2. REMOVE MAIN PIN BOOT

Using a small screwdriver and a hammer, tap out the dust boot.



3. REMOVE CYLINDER BOOT SET RING AND CYLINDER BOOT

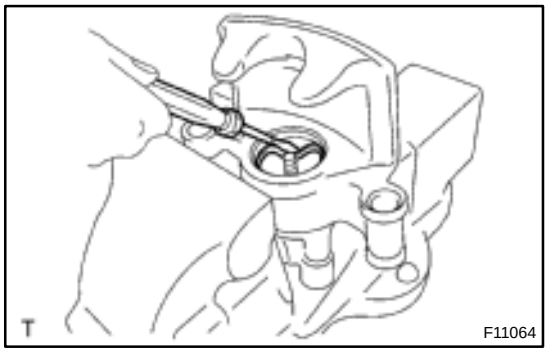
Using a small screwdriver, pry out the cylinder boot set ring and cylinder boot.



4. REMOVE PISTON FROM CYLINDER

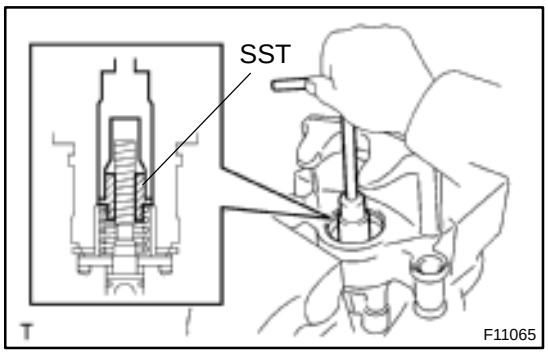
Using SST, turn the piston counterclockwise and remove it.

SST 09719–14020 (09719–00020)



5. REMOVE PISTON SEAL FROM CYLINDER

Using a small screwdriver, pry out the piston seal.

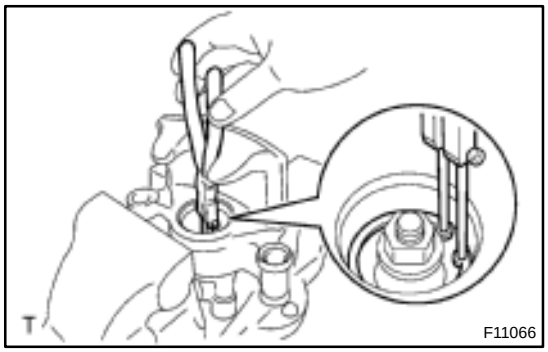


6. REMOVE ADJUSTING BOLT ASSEMBLY

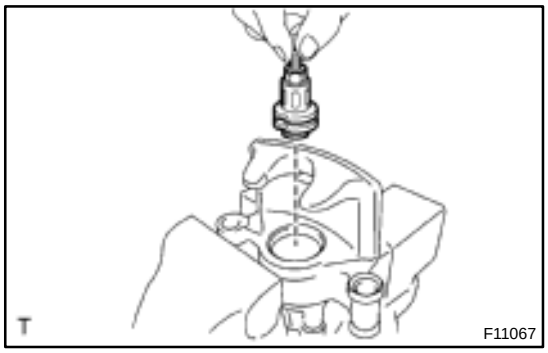
(a) Set SST onto the adjusting bolt, and lightly tighten it with a 14 mm deep socket.
SST 09756–00010

CAUTION:

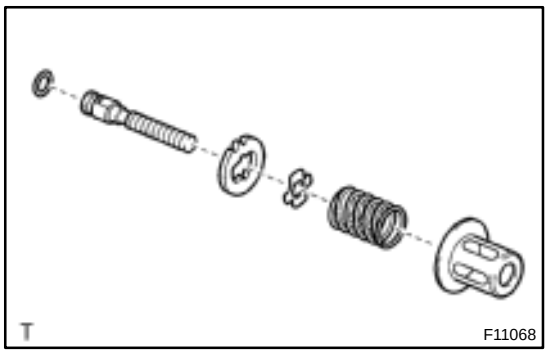
- **To insure safety, always use SST as there is a possibility of the spring flying out, causing injury or damaging to the interior surface of the cylinder.**
- **Be careful not to tighten the SST too tightly as this may damage the spring retainer.**



(b) Using snap ring pliers, remove the snap ring from the cylinder.



(c) Remove the parking brake strut, spring retainer, spring, spring plate and stopper together with the adjusting bolt from the cylinder.

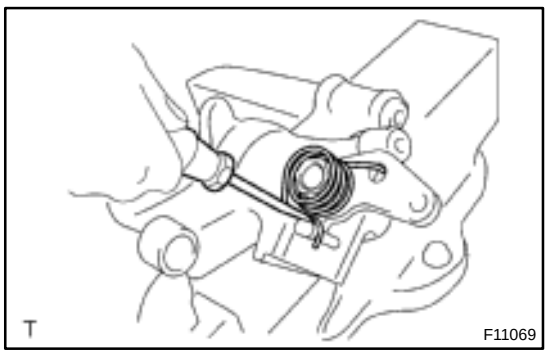


7. DISASSEMBLE ADJUSTING BOLT ASSEMBLY

(a) Remove the SST.
SST 09756–00010

(b) Remove the spring retainer, spring, spring seat and stopper from the adjusting bolt.

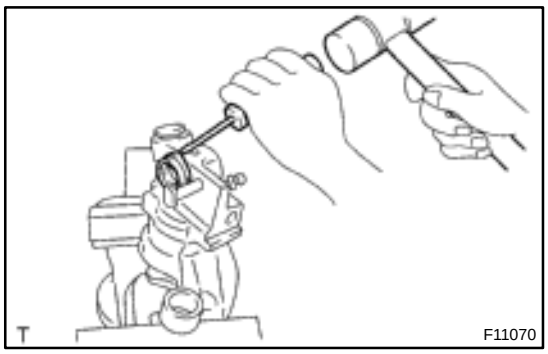
(c) Remove the O–ring from the adjusting bolt.



8. REMOVE TORSION SPRING FROM PARKING BRAKE CRANK

Using a small screwdriver, pry out the torsion spring.

9. REMOVE PARKING BRAKE CRANK FROM BRAKE CALIPER

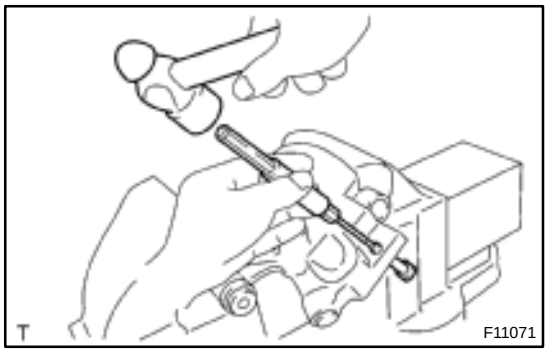


10. REMOVE PARKING BRAKE CRANK BOOT

Using a small screwdriver and a hammer, tap out the parking brake crank boot.

11. REMOVE BLEEDER PLUG

12. REMOVE BOLT AND CABLE SUPPORT BRACKET

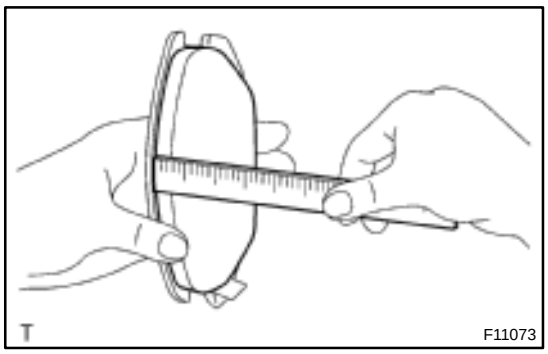


13. REMOVE STOPPER PIN

Using a pin punch and a hammer, tap out the stopper pin.

BR14F–02

INSPECTION



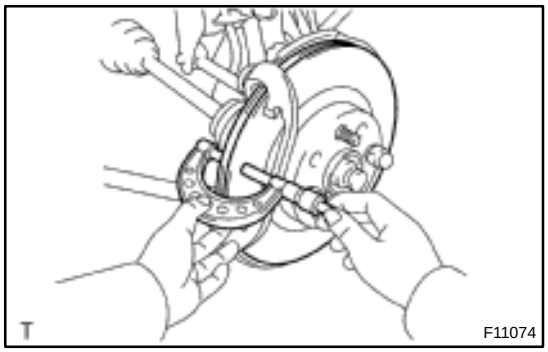
1. MEASURE PAD LINING THICKNESS

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 thickness or less, or if the pad has severe, uneven wear.



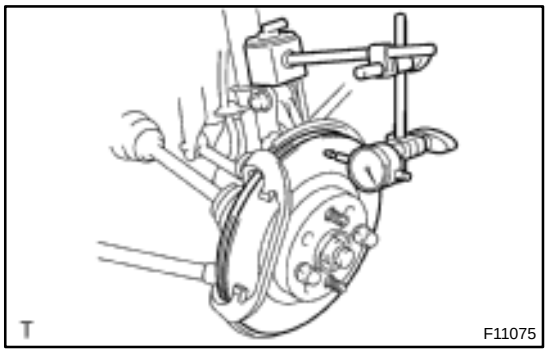
2. MEASURE DISC THICKNESS

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



3. MEASURE DISC RUNOUT

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

Maximum disc runout: 0.10 mm (0.0039 in.)

If the disc's runout is at the maximum value or greater, check the bearing play is in the axial direction and check the axle hub runout (See page SA–33). 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

(a) Remove the 2 mounting bolts and torque plate from the knuckle.

(b) Remove the hub nuts and the disc.

(1) Reinstall the disc in the position turned 1/4 from its original position on the hub.

(2) Install and torque the hub nuts.

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

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

(c) Repeat (b) until the disc has been installed on the 2 remaining hub positions.

(d) If the minimum runout recorded in (b) and (c) is less than 0.10 mm (0.0039 in.), install the disc in that position.

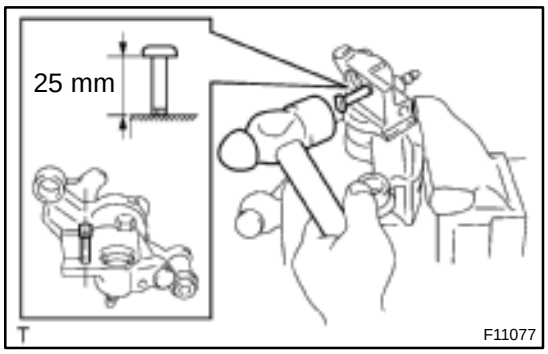
(e) If the minimum runout recorded in (b) and (c) is greater than 0.10 mm (0.0039 in.), replace the disc and repeat step 3.

(f) Install the torque plate and torque the 2 mounting bolts.

Torque: 59 N·m (600 kgf·cm, 44 ft·lbf)

BR1AJ–01

REASSEMBLY



1. INSTALL STOPPER PIN

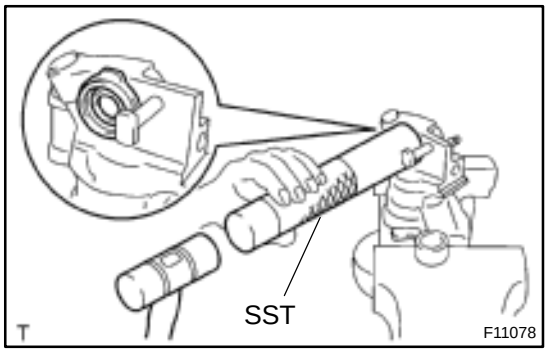
Tap in the pin to the brake cylinder until the stopper pin extends 25 mm (0.98 in.).

2. INSTALL CABLE SUPPORT BRACKET WITH BOLT

Torque: 47 N·m (479 kgf·cm, 35 ft·lbf)

3. INSTALL BLEEDER PLUG

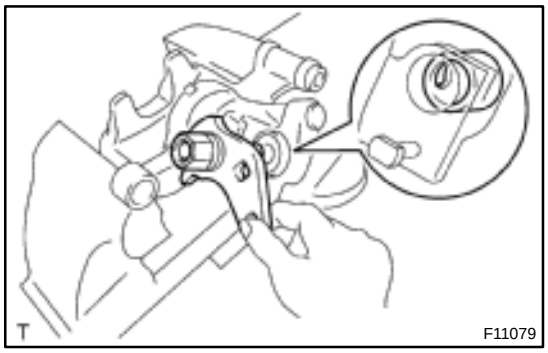
Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)



4. INSTALL PARKING BRAKE CRANK BOOT

(a) Using SST and a hammer, tap in new parking brake crank boot shown in the illustration.
SST 09612–22011

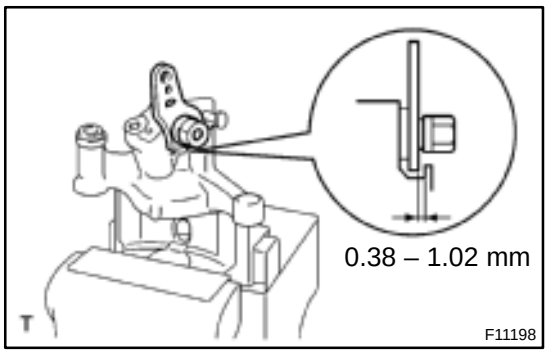
(b) Confirm that the metal plate portion of the parking brake crank boot fits snugly in the caliper.



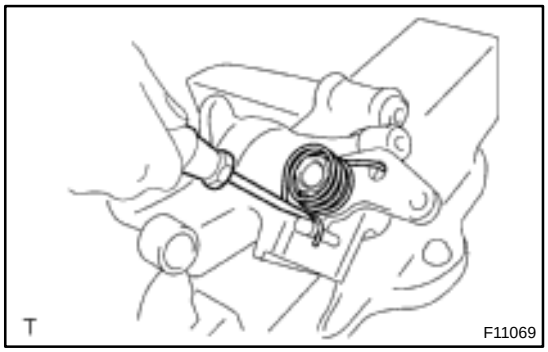
5. INSTALL PARKING BRAKE CRANK

(a) Check that the needle roller bearing is not covering the cylinder hole.

(b) Install the parking brake crank in the caliper.



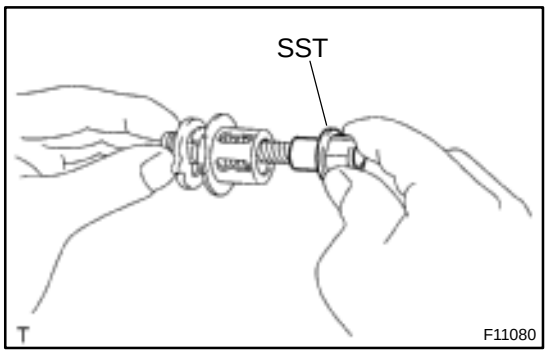
(c) Check that there is clearance between the parking brake crank and caliper.
Standard clearance:
0.38 – 1.02 mm (0.0150 – 0.0416 in.)



6. INSTALL TORSION SPRING

Using a small screwdriver, install the torsion spring.

7. INSTALL NEW O–RING TO ADJUSTING BOLT

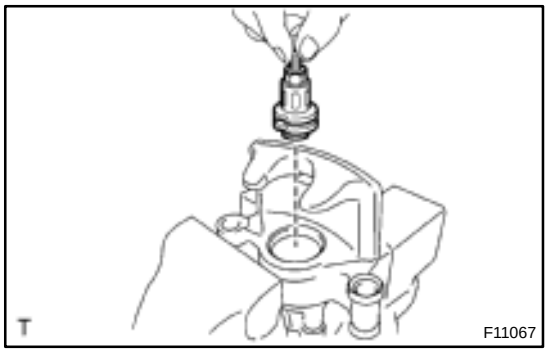


8. INSTALL ADJUSTING BOLT ASSEMBLY

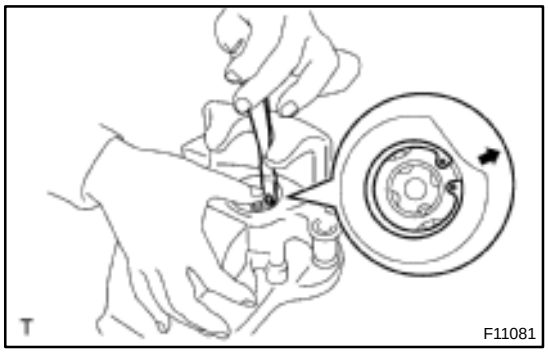
(a) Assemble the parking brake stopper, spring seat, spring, spring retainer and parking brake strut to the adjusting bolt, and using SST, fully tighten them down by hand.
SST 09756–00010

HINT:

- Position the inscribed surface of the stopper upward.
- Align the notches of the spring retainer and stopper.



(b) Install the adjusting bolt assembly into the cylinder.



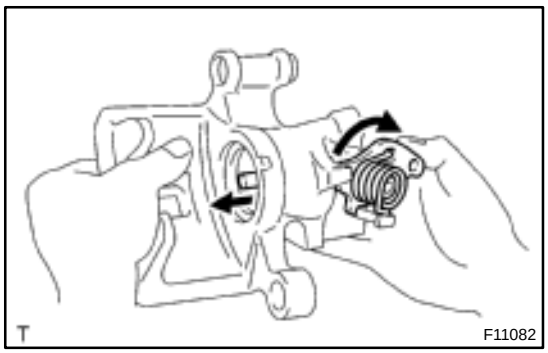
(c) Using snap ring pliers, install the snap ring.

HINT:

Face the snap ring opening toward the bleeder side.

(d) Remove the SST.
SST 09756–00010

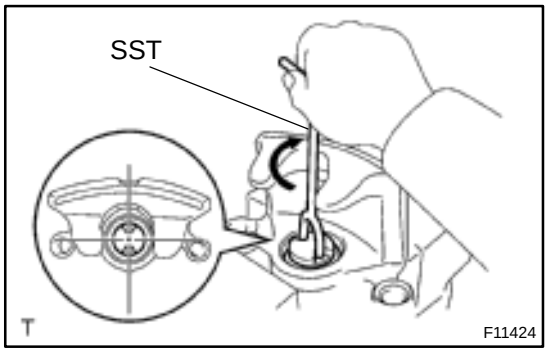
(e) Firmly pull up the adjusting bolt by hand and insure that it does not move.



9. CHECK PARKING BRAKE CRANK OPERATION

Move the parking brake crank by hand and insure that the adjusting bolt moves smoothly.

10. INSTALL PISTON SEAL IN CYLINDER

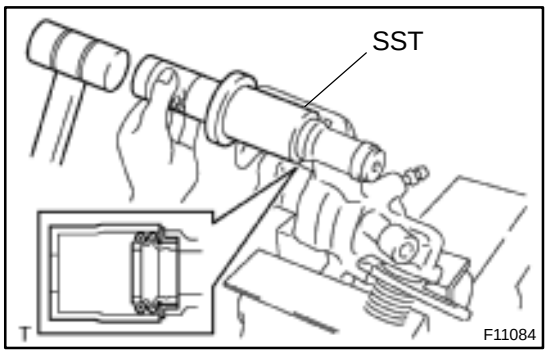


11. INSTALL PISTON IN CYLINDER

Using SST, slowly turn the piston clockwise until the piston turns freely, then align the cylinder protrusion and piston stopper groove.

SST 09719–14020 (09719–00020)

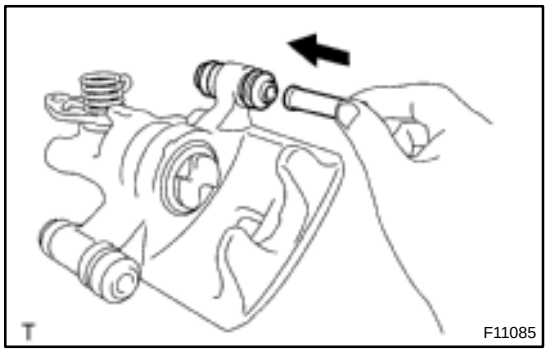
12. INSTALL CYLINDER BOOT AND SET RING IN CYLINDER



13. INSTALL MAIN PIN BOOT

(a) Using SST and a hammer, tap in a new main pin boot to the caliper.
SST 09325–12010

(b) Confirm that the metal plate portion of the main pin boot fits snugly in the caliper.



14. INSTALL DUST BOOT AND SLIDING BUSHING

(a) Install the dust boot.

(b) Install the bushing into the boot with the flange facing inside.

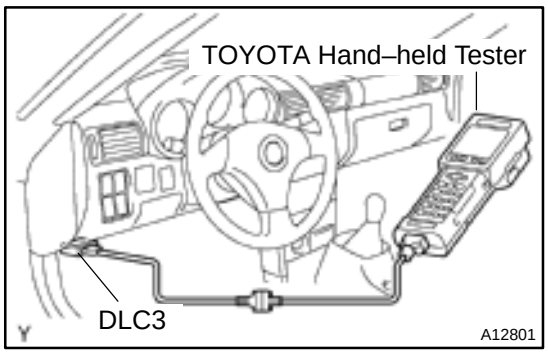
BR0B7–05

INSTALLATION

Installation is in the reverse order of removal (See page BR–33).

HINT:

- After installation, fill the brake reservoir with brake fluid and bleed the brake system (See page BR–4).
- Check for leaks.



ABS ACTUATOR

BR0QW–03

ON–VEHICLE INSPECTION

1. IN CASE OF USING TOYOTA HAND–HELD TESTER:

(a) Connect the TOYOTA hand–held tester to the DLC3.

(b) Start the engine and run it at idle.

(c) Select the ACTIVE TEST mode on the TOYOTA hand–held tester.

HINT:

Please refer to the TOYOTA 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 at 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 at 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 at 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

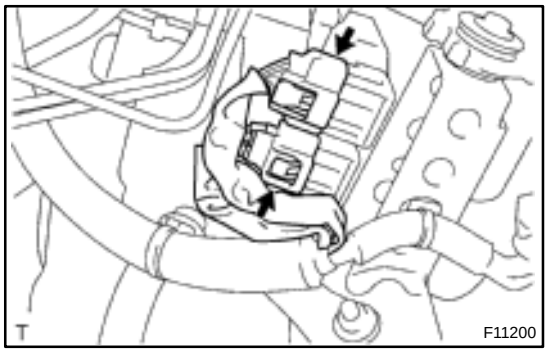
Left rear wheel: SRLH, SRLR

5. CLEAR DTC (See page DI–199)

6. IN CASE OF NOT USING TOYOTA HAND–HELD TESTER:

HINT:

Using the ABS actuator checker (SST), check the operation of the actuator. If the actuator does not operate, check the operation of sub–wire harness G according to the instructions on pages DI–178 and DI–173. If the solenoid and/or pump motor relay are abnormal, replace the relay and inspect the actuator operation again.



7. INSPECT BATTERY POSITIVE VOLTAGE

Battery positive voltage: 10 – 14 V

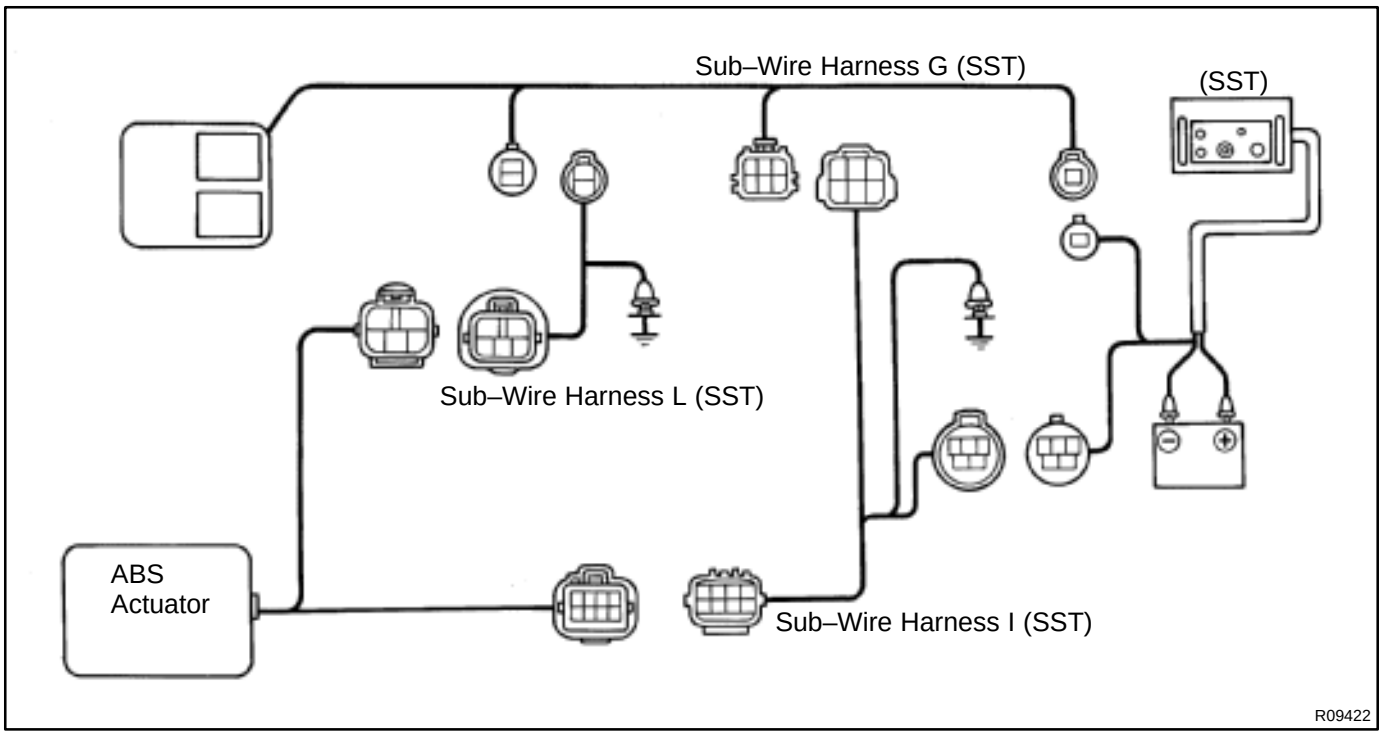
8. DISCONNECT CONNECTORS

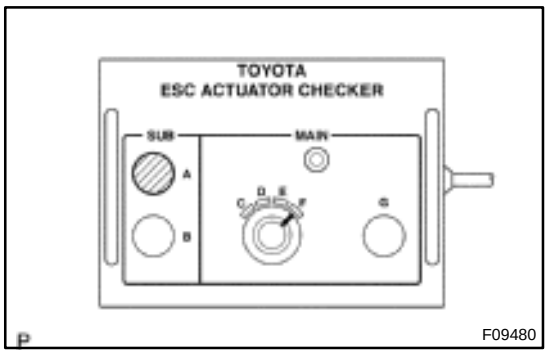
Disconnect the 2 connectors from the actuator.

9. CONNECT ACTUATOR CHECKER (SST)

(a) Connect the actuator checker (SST) to the actuator side wire harness via the sub–wire harness (SST), as shown.
SST 09990–00150, 09990–00250, 09990–00300, 09990–00360

(b) Connect the red cable of the checker to the battery positive (+) terminal and black cable to the negative (–) terminal. Connect the black cable of the sub–wire harness to the battery negative (–) terminal or body ground.





10. INSPECT ABS ACTUATOR OPERATION OF REAR LH WHEEL

HINT:

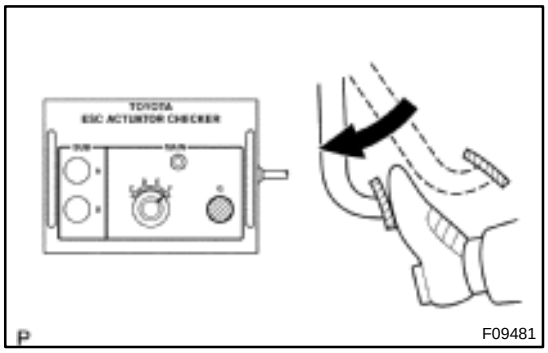
The functions of the ABS actuator checker switches are shown in the table below.

A	Motor ON/OFF
B	Front RH solenoid ON/OFF
C	–
D	Front LH solenoid
E	Rear RH solenoid
F	Rear LH solenoid
G	Solenoid ON/OFF

(a) Start the engine and run it at idle.

(b) Turn select switch of the actuator checker to the ”F” position.

(c) Push and hold in the ”A” switch for a few seconds. Make sure that you can hear the motor running.



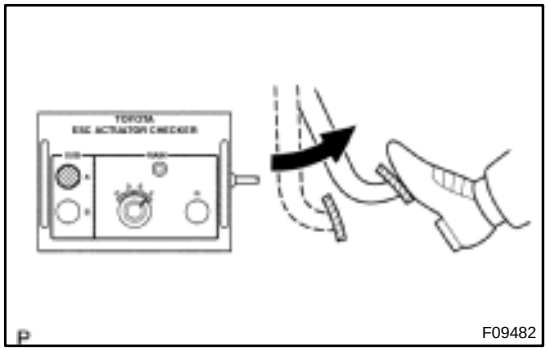
(d) Depress the brake pedal and hold it until step (g) is completed.

(e) Push and hold in the ”G” switch for a few seconds, and check that the brake pedal does not go down.

NOTICE:

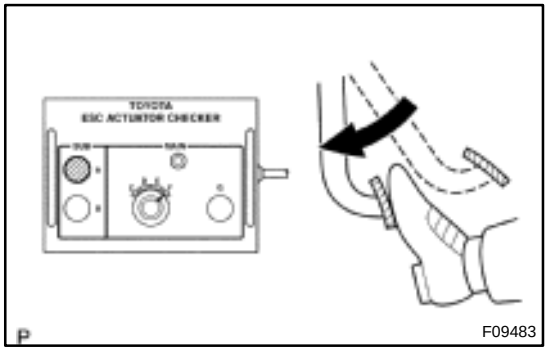
Do not keep the ”G” switch pushed down for more than 10 seconds.

(f) Release the ”G” switch and check that the pedal goes down.



(g) Push the ”A” switch and check that the pedal returns.

(h) Release the brake pedal.



(i) Push and hold in the ”A” switch for a few seconds.

(j) Depress the brake pedal and hold it for about 15 seconds. As you hold the pedal down, push the ”A” switch for a few seconds and check that the brake pedal does not pulsate.

(k) Release the brake pedal.

11. INSPECT FOR OTHER WHEELS

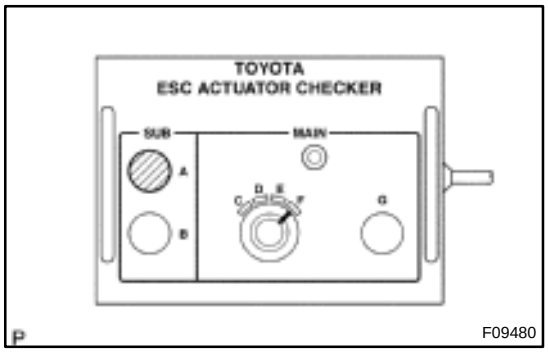
(a) Turn the selector switch to ”E” position (for rear RH wheel).

(b) Repeating (c) to (j) to the step 10, check the actuator operation similarly.

(c) Similarly, inspect ”front LH” and ”front RH” wheel.

HINT:

When inspecting the ”front RH” wheel, push the ”B” switch instead of the POWER SWITCH. This makes it possible to inspect wherever the selector switch position indicates.



12. PUSH MOTOR SWITCH

(a) Push and hold in the ”A” switch for a few seconds.

(b) Stop the engine.

13. DISCONNECT ACTUATOR CHECKER (SST) FROM ACTUATOR

(a) Disconnect the actuator checker (SST) and 3 sub–wire harness (SST) from the actuator.

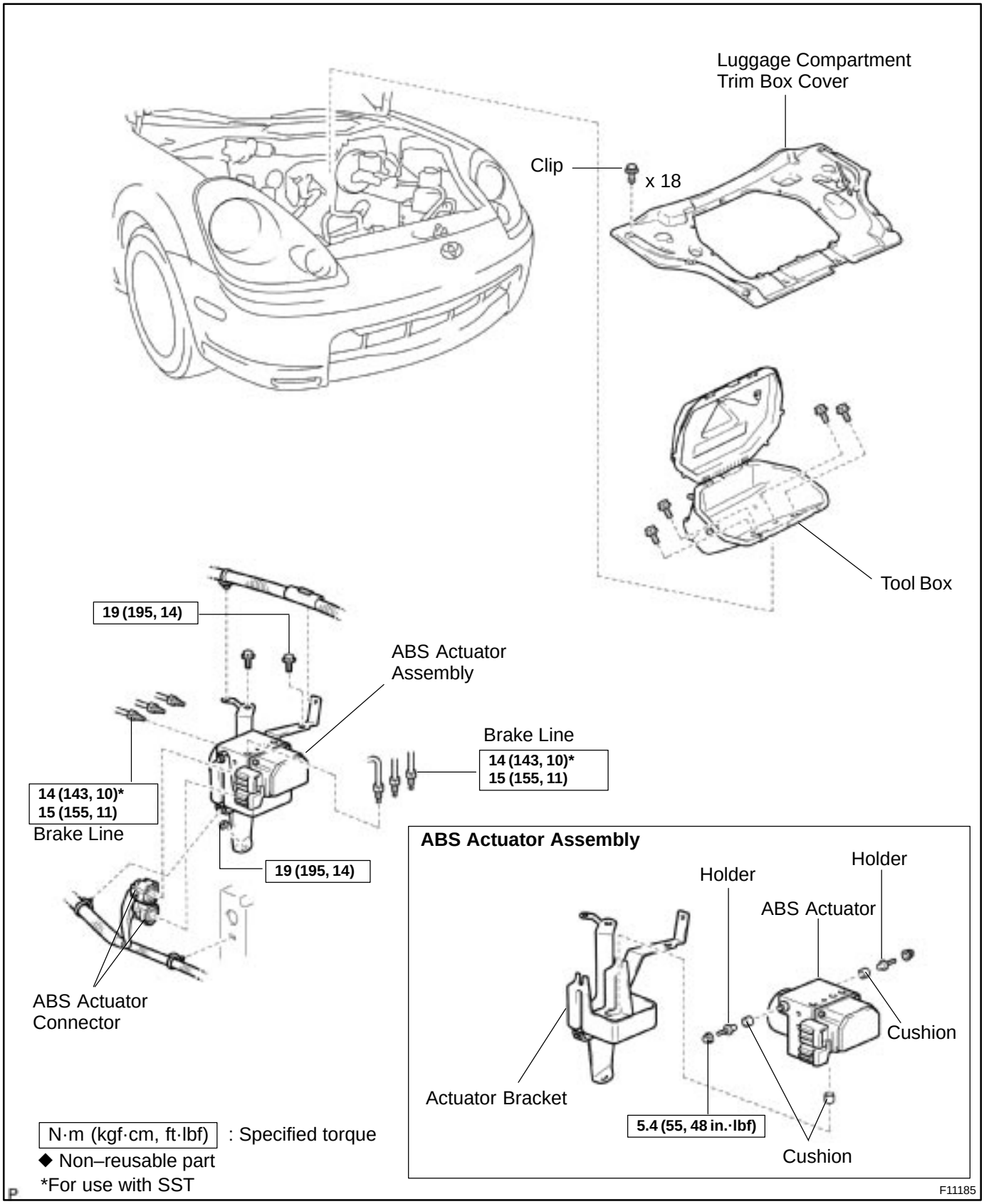
SST 09990–00150, 09990–00250, 09990–00300, 09990–00360

(b) Connect the actuator connectors.

(c) Clear the DTC (See page DI–154).

BR0QX–03

COMPONENTS

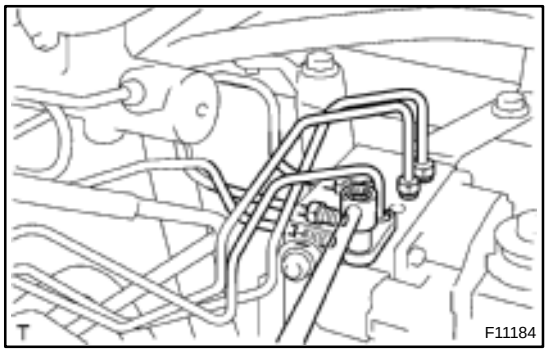


BR1AK–01

REMOVAL

1. REMOVE TOOL BOX

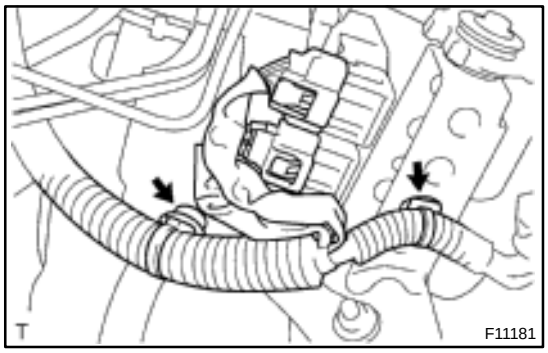
2. REMOVE LUGGAGE COMPARTMENT TRIM BOX COVER



3. DISCONNECT BRAKE LINES FROM ABS ACTUATOR

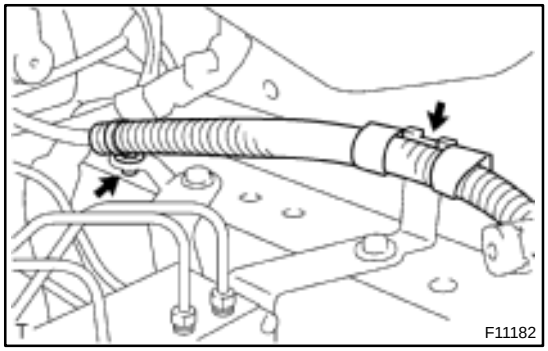
Using SST, disconnect the 6 brake lines.

SST 09023–00100

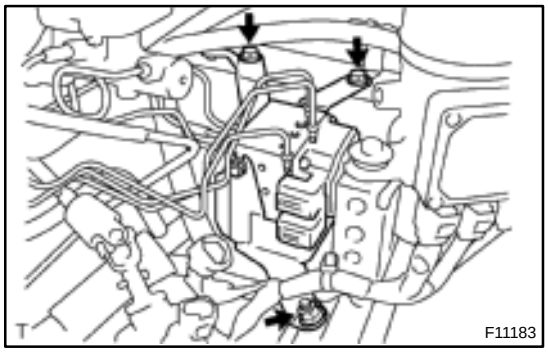


4. REMOVE ABS ACTUATOR

(a) Disconnect the 2 harness clamps and 2 actuator connectors.



(b) Disconnect the 2 harness clamps.



(c) Remove the 2 bolts, nut and the ABS actuator assembly.

(d) Remove the 2 nuts and ABS actuator from the actuator bracket.

(e) Remove the 2 holders and 3 cushions from the ABS actuator.

BR1AL–01

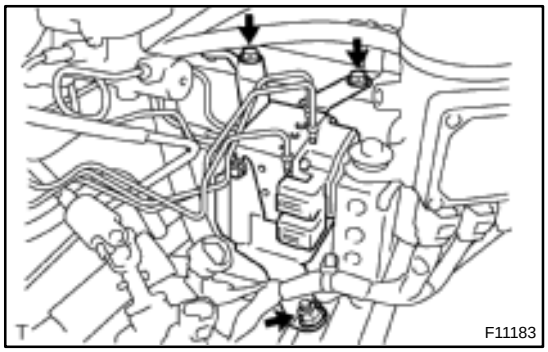
INSTALLATION

1. INSTALL ABS ACTUATOR

(a) Install the 2 holders and 3 cushions to the ABS actuator.

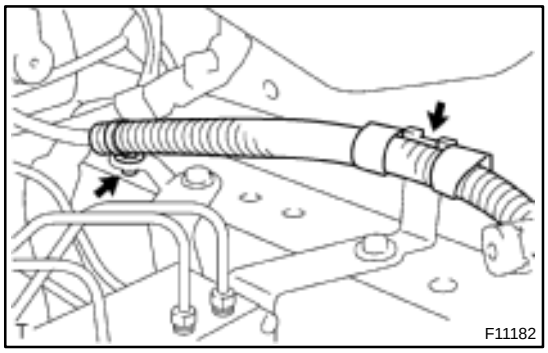
(b) Install the ABS actuator to the actuator bracket with the 2 nuts.

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

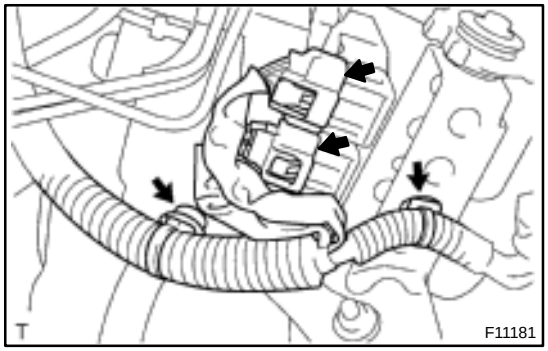


(c) Install the ABS actuator assembly with the 2 bolts and nut.

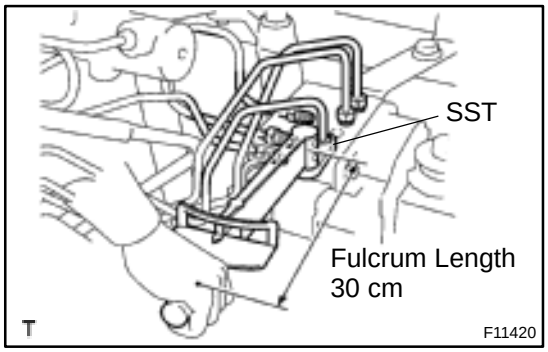
Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)



(d) Connect the 2 harness clamps.



(e) Connect the 2 harness clamps and 2 actuator connectors.



2. CONNECT BRAKE LINES TO ABS ACTUATOR

Using SST, connect the 6 brake lines.

SST 09023–00100

Torque:

15 N·m (155 kgf·cm, 11 ft·lbf)

14 N·m (143 kgf·cm, 10 ft·lbf) for use with SST

HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81in.).

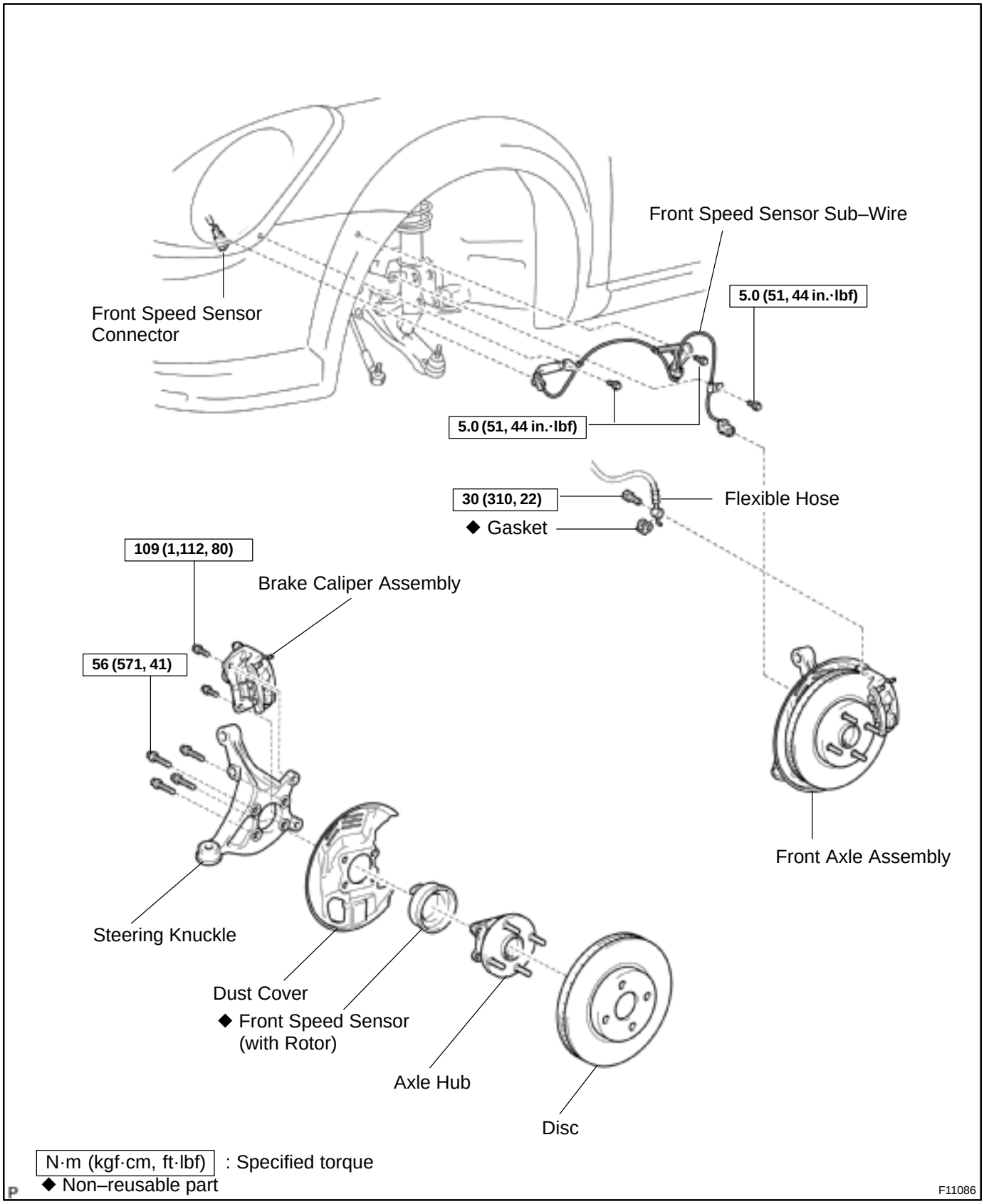
3. FILL RESERVOIR WITH BRAKE FLUID AND BLEED BRAKE SYSTEM (See page BR–4)

4. **CHECK FOR FLUID LEAKAGE**
5. **INSTALL LUGGAGE COMPARTMENT TRIM BOX COVER**
6. **INSTALL TOOL BOX**

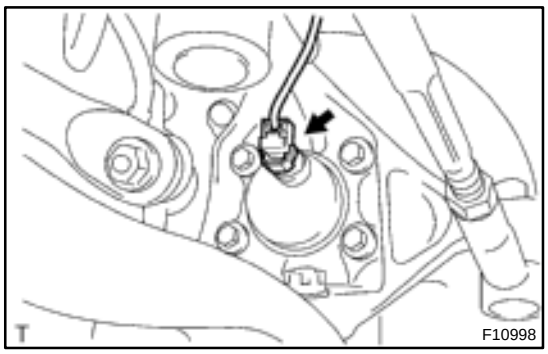
FRONT SPEED SENSOR

COMPONENTS

BR0R0–03



BR1AM–01



REPLACEMENT

1. REPLACE FRONT SPEED SENSOR

(a) Remove the front wheel.

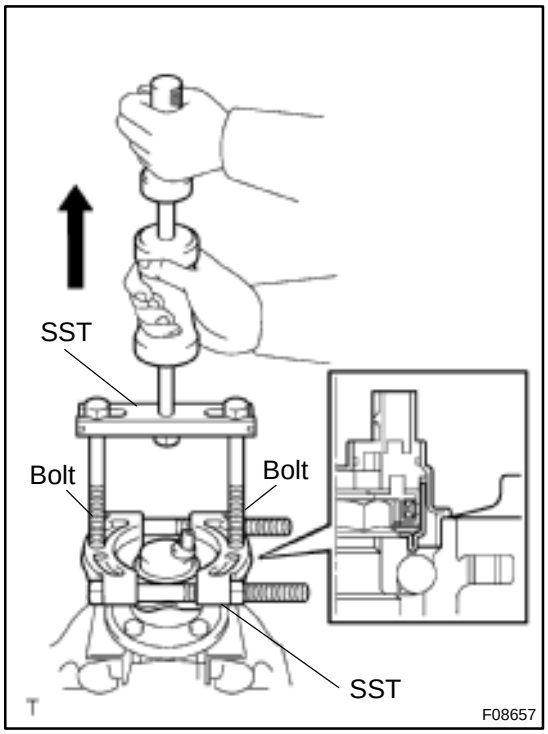
(b) Disconnect the front speed sensor connector.

(c) Remove the front speed sensor with the front axle hub (See page SA–9).

(d) Remove the front speed sensor.

(1) Using a pin punch and a hammer, tap out the 2 pins and remove the 2 attachments from SST.

SST 09520–00031



(2) Mount the rear axle hub in a soft jaw vise.

NOTICE:

Replace the axle hub assembly if it is dropped or a strong shock is given to it.

(3) Using SST and 2 bolts (Diameter: 12 mm, Pitch: 1.5 mm), remove the speed sensor.

SST 09520–00031 (09520–00040, 09521–00020), 09950–00020

NOTICE:

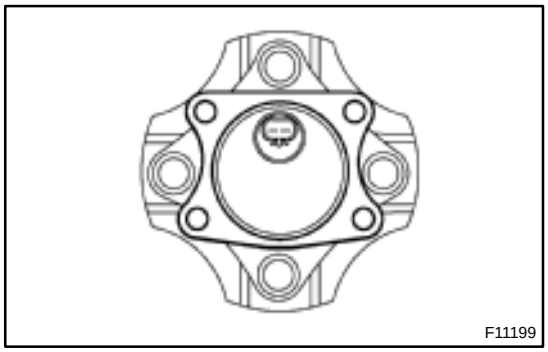
- **If the sensor rotor is damaged, replace the axle hub assembly.**
- **Do not scratch the contacting surface of axle hub and speed sensor.**

(e) Install a new front speed sensor.

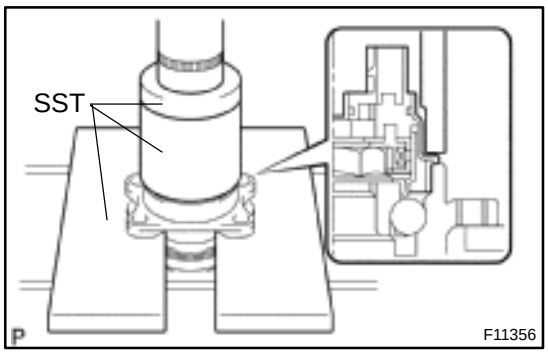
(1) Clean the contacting surface of the axle hub and a new speed sensor.

NOTICE:

Take care not to stick any foreign objects to the sensor rotor.



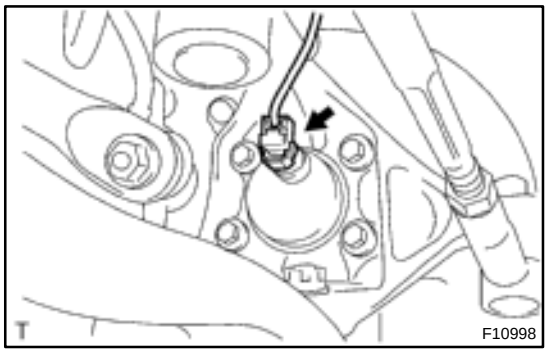
(2) Place the speed sensor on the axle hub so that the connector makes the most downward position under the on–vehicle condition.



(3) Using SST and a press, install the speed sensor to the axle hub.
SST 09527–10011, 09710–04101, 09950–60020 (09951–00680)

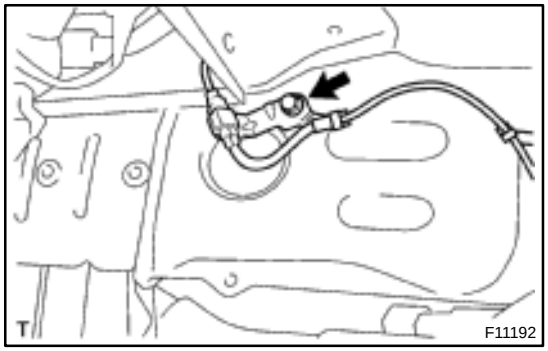
NOTICE:
- **Do not tap the speed sensor with a hammer directly.**
- **Check that the speed sensor detection portion is free from foreign objects.**
- **Press in the speed sensor straight and slowly.**

(f) Install the front speed sensor with the front axle hub (See page SA–13).
(g) Connect the front speed sensor connector.
(h) Install the front wheel.
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
(i) Check the speed sensor signal (See page DI–154).

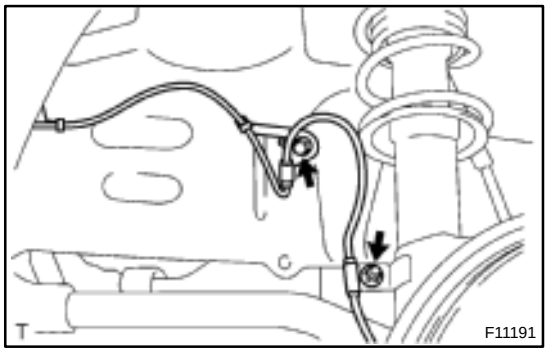


2. LH SIDE:
REPLACE FRONT SPEED SENSOR SUB–WIRE

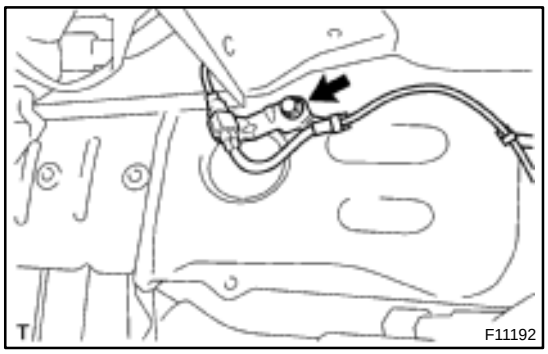
(a) Disconnect the sensor connector from the speed sensor.
(b) Remove the fender liner.



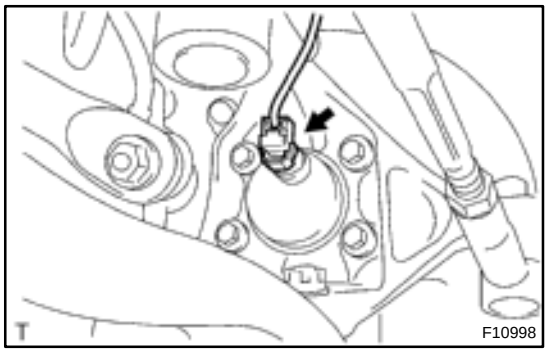
(c) Remove the clamp bolt.
(d) Disconnect the speed sensor sub–wire connector.



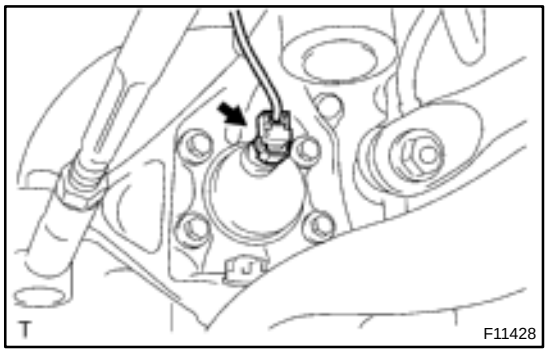
(e) Remove the 2 clamp bolts and speed sensor sub–wire.
(f) Install the 2 clamps of a new speed sensor wire with the 2 bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)



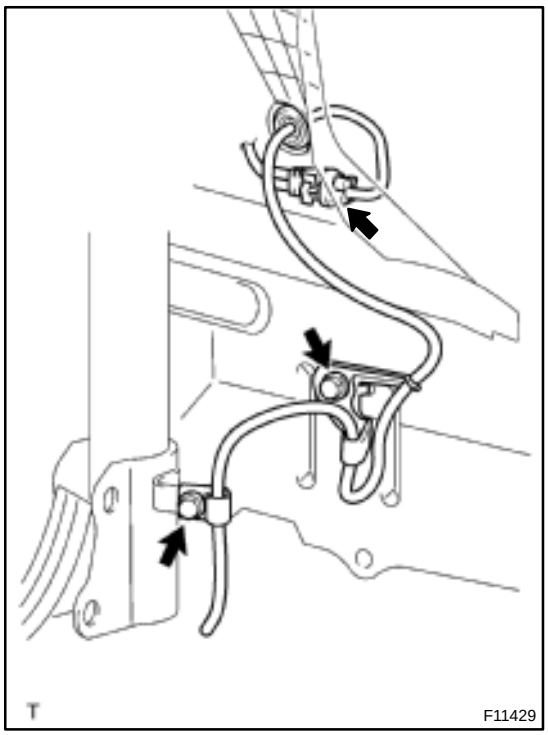
(g) Install the clamp with the bolt.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(h) Connect the front speed sensor connector.
(i) Install the fender liner.



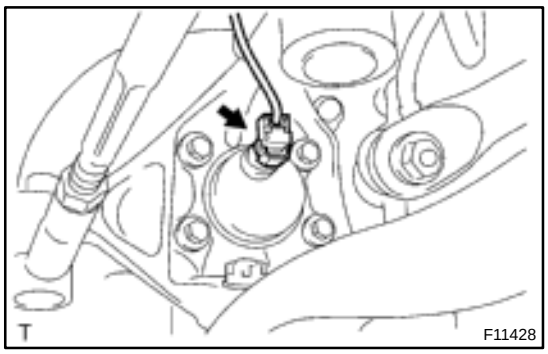
(j) Connect sensor connector to the speed sensor.
(k) Check the speed sensor signal (See page DI–154).



3. RH SIDE:
REPLACE FRONT SPEED SENSOR SUB–WIRE
(a) Disconnect the sensor connector from the speed sensor.
(b) Remove the fender liner.



(c) Disconnect the speed sensor sub–wire connector.
(d) Remove the 2 clamp bolts and speed sensor sub–wire.
(e) Install the 2 clamps of a new speed sensor wire with the 2 bolts.
Torque: 5.0 N·m (51 kgf·cm, 44 in.·lbf)
(f) Connect the front speed sensor connector to the sub–wire connector.
(g) Install the fender liner.

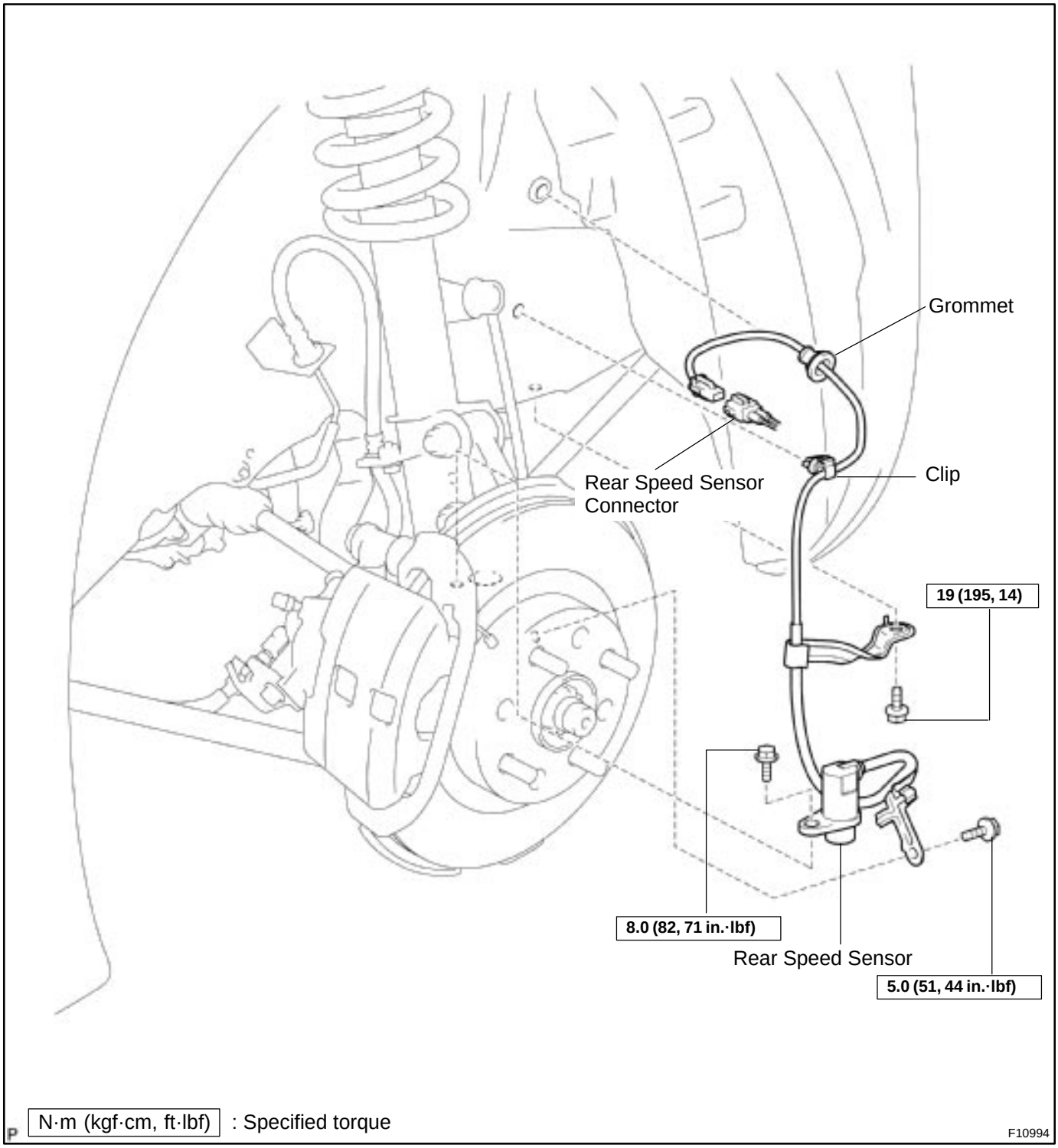


(h) Connect the sensor connector to the speed sensor.
(i) Check the speed sensor signal (See page DI–154).

REAR SPEED SENSOR

COMPONENTS

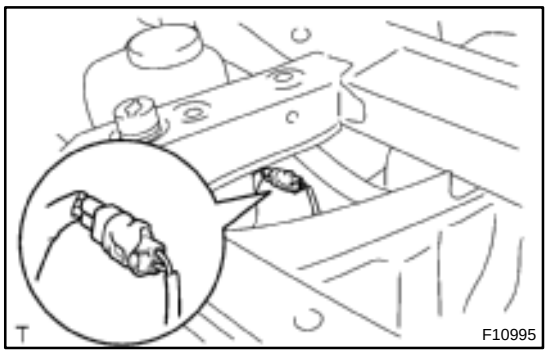
BR0R3–03



BR1AN–01

REPLACEMENT

REPLACE REAR SPEED SENSOR

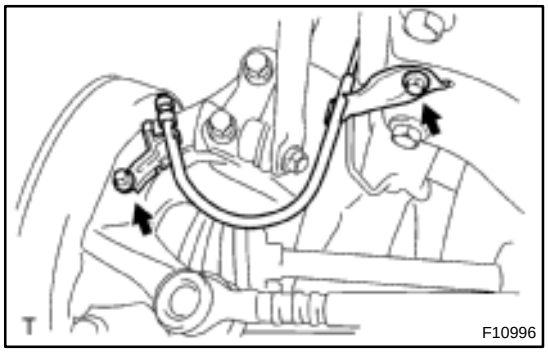


(a) Disconnect the rear speed sensor connector.

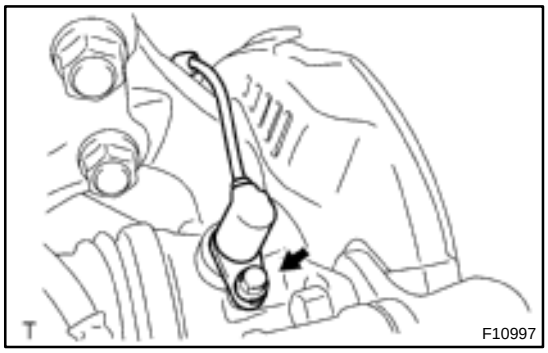
(b) Remove the rear speed sensor.

(1) Remove the rear wheel.

(2) Remove the grommet and clip.



(3) Remove the 2 clamp bolts.



(4) Remove the bolt and speed sensor.

NOTICE:

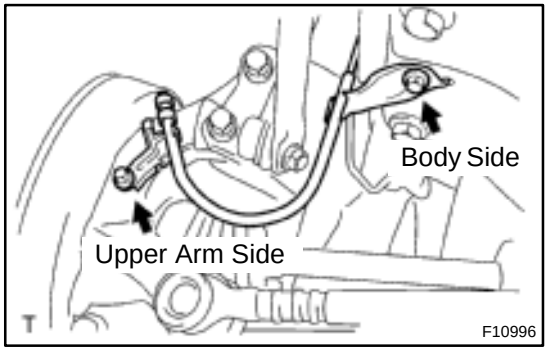
At the time of installation, please refer to the following items.

- **There are no foreign objects on the sensor or the part of the knuckle to which the sensor is to be installed.**
- **The sensor is installed flat against the knuckle when the bolt is tighten.**

(c) Install a new speed sensor.

(1) Install the speed sensor with the bolt.

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)



(2) Install the 2 clamp bolts.

Torque:

19 N·m (195 kgf·cm, 14 ft·lbf) for body side

5.0 N·m (51 kgf·cm, 44 in.·lbf) for upper arm side

(3) Install the grommet and clip.

(4) Install the rear wheel.

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

(d) Connect the speed sensor connector.

(e) Check the speed sensor signal (See page DI–154).