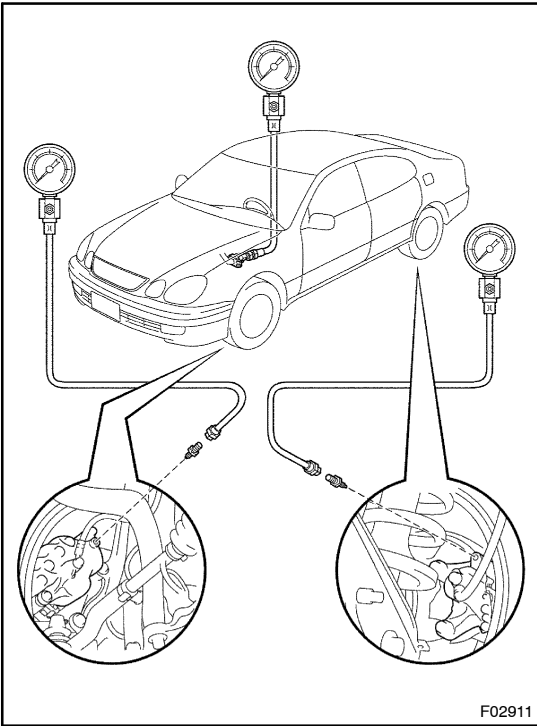




HYDRAULIC BRAKE BOOSTER ON-VEHICLE INSPECTION

BR0K7-05

1. HYDRAULIC BRAKE BOOSTER OPERATION INSPECTION

- Inspect the battery voltage.
Battery voltage: 10 – 14 V
- Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- Install LSPV gauge (SST) and brake pedal effort gauge, bleed air.
SST 09709-29018
- When booster does not operate.
Depress the brake pedal and check fluid pressure.

At 250 N (26 kgf, 56 lbf):

Front brake pressure	Rear brake pressure
2,220 kPa (22.6 kgf/cm ² , 321 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

At 350 N (36 kgf, 78 lbf):

Front brake pressure	Rear brake pressure
3,220 kPa (32.8 kgf/cm ² , 467 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

- When booster operate.
 - Turn the ignition switch ON and wait until the pump motor has stopped.
 - Depress the brake pedal and check fluid pressure.

At 50 N (5 kgf, 11 lbf):

Front brake pressure	Rear brake pressure
1,170 – 2,190 kPa (11.9 – 22.3 kgf/cm ² , 169 – 317 psi)	1,335 – 2,525 kPa (13.6 – 25.8 kgf/cm ² , 193 – 367 psi)

At 100 N (10 kgf, 22 lbf):

Front brake pressure	Rear brake pressure
3,905 – 5,475 kPa (39.8 – 55.8 kgf/cm ² , 566 – 794 psi)	4,230 – 6,010 kPa (43.1 – 61.3 kgf/cm ² , 613 – 872 psi)

At 150 N (15 kgf, 33 lbf):

Front brake pressure	Rear brake pressure
6,300 – 8,520 kPa (64.3 – 86.9 kgf/cm ² , 915 – 1,236 psi)	6,660 – 9,060 kPa (67.9 – 92.4 kgf/cm ² , 966 – 1,314 psi)

At 200 N (20 kgf, 44 lbf):

Front brake pressure	Rear brake pressure
8,820 – 11,420 kPa (89 – 116 kgf/cm ² , 1,266 – 1,650 psi)	9,210 – 11,990 kPa (93.9 – 122 kgf/cm ² , 1,336 – 1,735 psi)

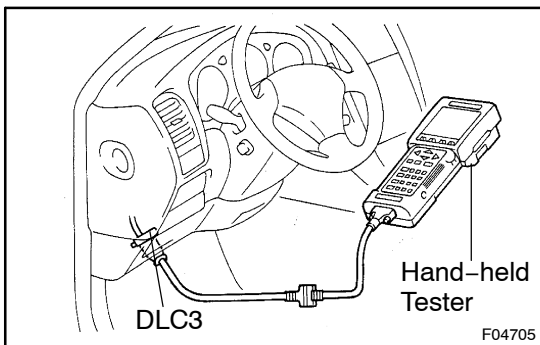
2. IN CASE OF USING HAND-HELD TESTER

- (a) Inspect the battery voltage.

Battery voltage: 10 – 14 V

- (b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- (c) Check that the brake pedal becomes heavy to depress. If the pedal does not become to be heavy to depress, check and replace the brake line and hydraulic brake booster.
- (d) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor.



- (e) Connect the hand-held tester.
- (1) Connect the hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON.
 - (3) Select the "ACTIVE TEST" mode on the hand-held tester.

HINT:

- Please refer to the hand-held tester operator's manual for further details.
- To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after every solenoid has been turned ON.

- (f) Inspect the front TRC & VSC solenoid operation.
- (1) Select "SA1" and "SA2" on the hand-held tester.
 - (2) With "SA1" and "SA2" turned ON simultaneously with the hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.

If the pedal can be depressed, replace the hydraulic brake booster.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

- (3) Once, release the brake pedal.

- (4) When the solenoids are OFF, after depressing the pedal again and check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (g) Inspect the front ABS solenoid operation.
 - (1) Select "SFRH" and "SFLH" on the hand-held tester.
 - (2) With "SFRH" and "SFLH" turned ON simultaneously with the hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.

If the pedal can be depressed, replace the hydraulic brake booster.

- (3) When the solenoids are OFF, check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (4) Once, release the brake pedal. After depressing and holding the pedal with stable force, turn the SFRH and SFRR solenoids ON simultaneously.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.

- (5) When the solenoids are OFF, check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (6) Once, release the brake pedal. After depressing the pedal with stable force, turn the SFLH and SFLR solenoids ON simultaneously.

HINT:

To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.

- (7) When the solenoids are OFF, check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (h) Jack up and support the vehicle.
- (i) Release the parking brake pedal.
- (j) Inspect the rear TRC & VSC solenoid operation.
 - (1) Select the "SA3" and "STR" on the hand-held tester.

- (2) Turn the "SA3" and "STR" ON simultaneously with the hand-held tester, and check that the rear wheels by stopping them by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels rotate, replace the hydraulic brake booster.

- (3) Turn the "SA3" and "STR" OFF simultaneously, and check that the rear wheels by rotating them by hand.

HINT:

- To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

NOTICE:

When operating it continuously, set the interval of more than 20 secs.

If the rear wheels stop, replace the hydraulic brake booster.

- (k) Inspect the right rear ABS solenoid.

- (1) Select the "SA3", "STR" and "SRRH", on the hand-held tester.
- (2) Turn the "SA3", "STR" and "SRRH" ON simultaneously with the hand-held tester, and check that the right rear wheel by rotating them by hand.

HINT:

- To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the rear wheels stop, replace the hydraulic brake booster.

- (3) Turn the "SA3", "STR" and "SRRH" OFF, and check that the rear wheel by stopping them by hand.

HINT:

- To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels rotate, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRRH" and "SRRR" ON simultaneously.
- (5) When the solenoids are ON, check that the right rear wheel by rotating them by hand.

- (l) Inspect the left rear ABS solenoid operation.
 - (1) Select the "SA3", "STR" and "SRLH" on the hand-held tester.
 - (2) Turn the "SA3", "STR" and "SRLH" ON with hand-held tester, and check that the left rear wheel by rotating them by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

If the rear wheels stop, replace the hydraulic brake booster.

- (3) Turn the "SA3", "STR" and "SRLH" OFF and check that the rear wheels by rotating them by hand.

HINT:

- To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.
- When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.
- When solenoid is OFF, the wheel might stop temporarily. However if the wheel rotates again, the function works normally.

If the rear wheels rotate, replace the hydraulic brake booster.

- (4) Depress the pedal with stable force, then turn the "SRLH" and "SRLR" ON simultaneously.

HINT:

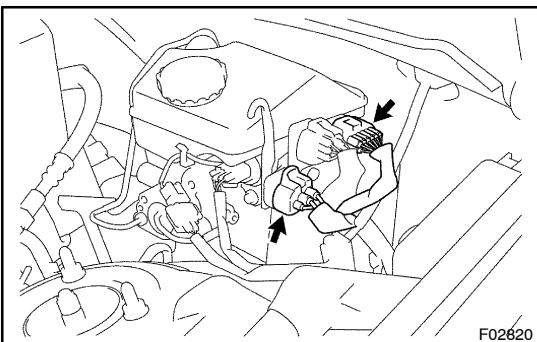
To protect the solenoids, hand-held tester turns OFF automatically 2 secs. after has been turned ON.

- (5) When the solenoids are ON, check that the right rear wheel by rotating them by hand.

HINT:

When rotating the wheel fast, the fail-safe function is activated and judgement cannot be made properly. So rotate the wheel as slowly as possible.

- (m) Lower the vehicle.
- (n) Disconnect the hand-held tester.

**3. IN CASE OF USING ABS ACTUATOR CHECKER**

- (a) Inspect the battery voltage.
Battery voltage: 10 – 14 V
- (b) Disconnect the 2 connectors from hydraulic brake booster.

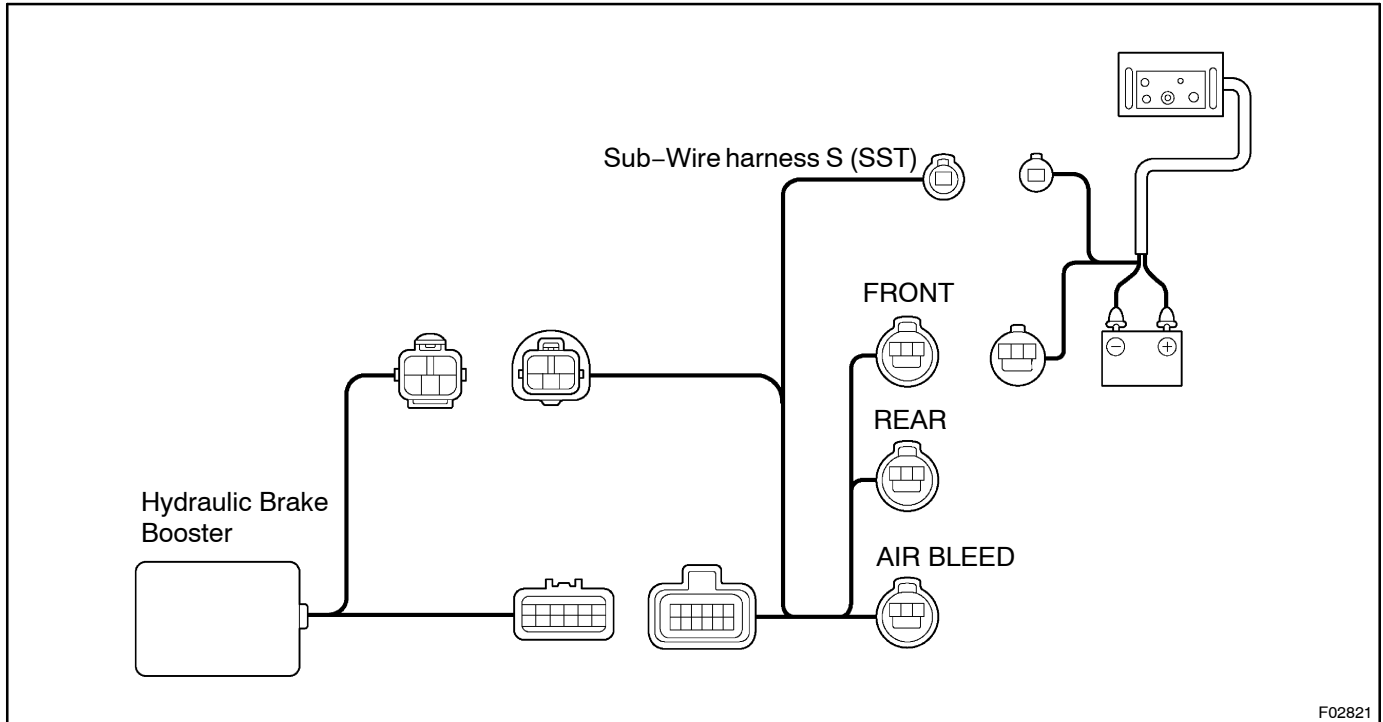
- (c) Connect the actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness (SST), as shown in the chart below.

SST 09990-00150, 09990-00480

HINT:

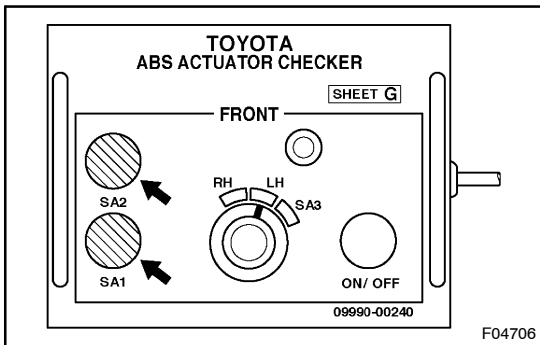
Connect the connector with the label of "FRONT" attached to the connector of actuator checker.

- (d) Connect the red cable of the checker to the battery positive (+) terminal and the black cable to the negative (-) terminal.



- (e) Place "SHEET G" (SST) of "FRONT" on actuator checker.
SST 09990-00240
- (f) Turn the ignition switch OFF, depress the brake pedal more than 40 times.
- (g) Check that the brake pedal becomes heavy to depress. If the pedal does not become to be heavy to depress, check and replace the brake line and hydraulic brake booster.
- (h) Turn the ignition switch ON, check the pump motor operation noise.

If the pump motor does not operate, check and replace the wire harness and pump motor.



- (i) Inspect the front TRC & VSC solenoid operation.
- (1) Push in and hold the "SA1" and "SA2" switches simultaneously, depress strongly and hold the brake pedal with stable force.

NOTICE:

Do not keep the "SA1" and "SA2" pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

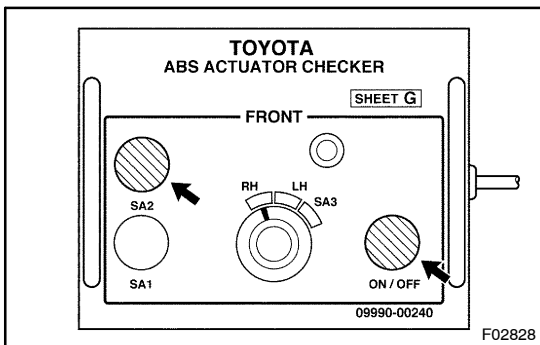
- (2) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (3) Release the "SA1" switch and check that the pedal can be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the "SA2" switch and check that the pedal can be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.



- (j) Inspect the right front ABS solenoid operation.
- (1) Turn the selector switch to "RH" position.
 - (2) Push and hold in the MAIN push switch and "SA2" switch simultaneously depress and hold the brake pedal with stable force.

NOTICE:

Do not keep the MAIN push switch and "SA2" switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (3) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA2" switch simultaneously and check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

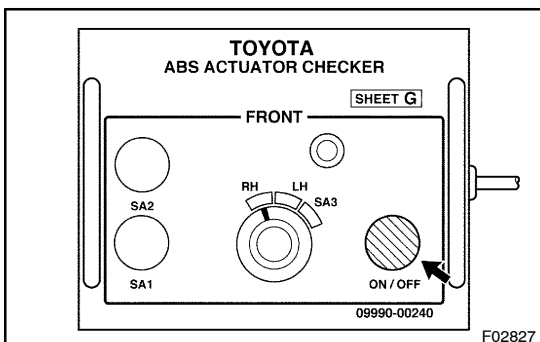
- (5) Release the brake pedal.

- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

NOTICE:

Do not keep the MAIN push switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

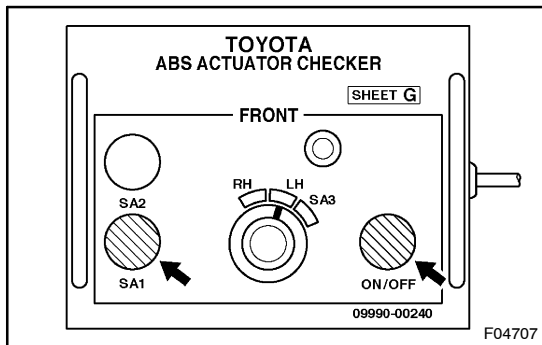
- (7) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.



- (8) Release the MAIN push switch and check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (9) Release the brake pedal.



- (k) Inspect the left front ABS solenoid operation.

- (1) Turn the selector switch to "LH" position.
- (2) Push and hold in the MAIN push switch and "SA1" switch simultaneously, depress and hold the brake pedal with stable force.

NOTICE:

Do not keep the MAIN push switch and "SA1" switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

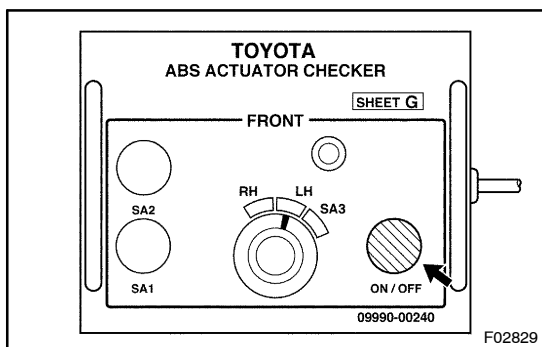
- (3) Check that the brake pedal cannot be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

- (4) Release the MAIN push switch and "SA1" switch simultaneously, and check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

- (5) Release the brake pedal.



- (6) Depress and hold the brake pedal with stable force, push and hold in MAIN push switch.

NOTICE:

Do not keep the MAIN push switch pushed down for more than 10 seconds. When operating it continuously, set the interval of more than 20 seconds.

- (7) Check that the brake pedal cannot be depressed.

If the pedal can be depressed, replace the hydraulic brake booster.

- (8) Release the MAIN push switch and check that the pedal can be depressed.

If the pedal cannot be depressed, replace the hydraulic brake booster.

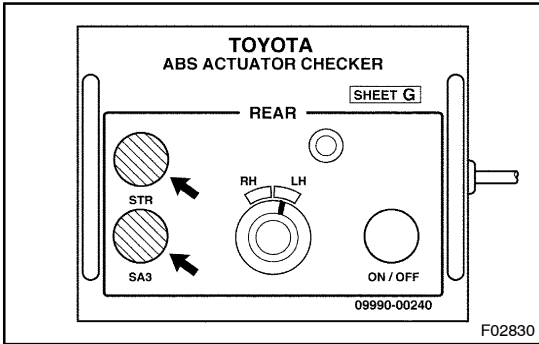
- (9) Release the brake pedal.

- (l) Turn the ignition switch OFF, then reconnect the connector of sub-wire harness from the one with label of "FRONT" to "REAR".

- (m) Place "SHEET G" of "REAR" on the actuator checker.

- (n) Jack up and support the vehicle.

- (o) Start the engine and run it at idle.



- (p) Inspect the rear TRC & VSC solenoid.
- (1) Release the parking brake pedal and shift the shift lever to "L" position.
 - (2) Push and hold the "SA3" switch and "STR" switch simultaneously.

NOTICE:

- **Do not keep the "STR" switch pushed down for more than 10 seconds.**
- **Do not keep the "SA3" switch pushed down for more than 5 seconds.**
- **When operating it continuously, set the interval of more than 20 seconds.**

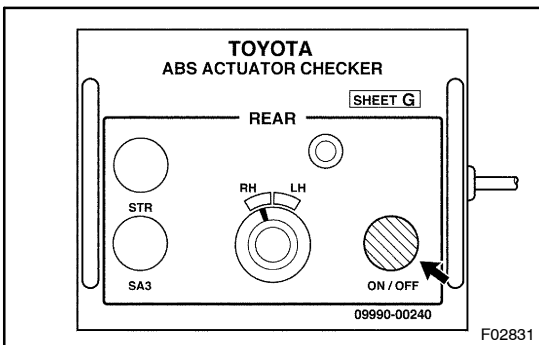
- (3) Check that the rear wheels stop.

If the rear wheels rotate, replace the hydraulic brake booster.

- (4) Release the "SA3" switch and "STR" switch simultaneously.

- (5) Check that the rear wheels rotate.

If the rear wheels stop, replace the hydraulic brake booster.



- (q) Inspect the right rear ABS solenoid.
- (1) Turn the selector switch to "RH" position.
 - (2) Depress the brake pedal several times the release the pedal after the pump has begun to operate, and wait until the pump stops.
 - (3) Turn the ignition switch OFF.
 - (4) With push and hold in the MAIN push switch, depress the pedal with force of 196 N (20 kgf, 44 lbf) and hold it 6 times for 10 secs.

NOTICE:

When operating it continuously, set the interval of more than 20 seconds.

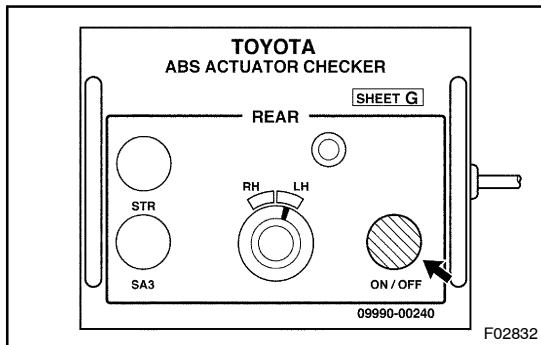
- (5) Check that pedal is not hard to depress.

If pedal is hard to depress, replace the hydraulic brake booster.

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake pedal and shift the shift lever to "L" position.
- (9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.

- (10) Check that the right rear wheel rotate.

If the right rear wheels stop, replace the hydraulic brake booster.



- (r) Inspect the left rear ABS solenoid.
 - (1) Turn the selector switch to "LH" position.
 - (2) Depress the brake pedal several times the release the pedal after the pump has begun to operate, and wait until the pump stops.
 - (3) Turn the ignition switch OFF.
 - (4) With push and hold in the MAIN push switch, depress the pedal with force of 196 N (20 kgf, 44 lbf) and hold it 6 times for 10 secs.

NOTICE:

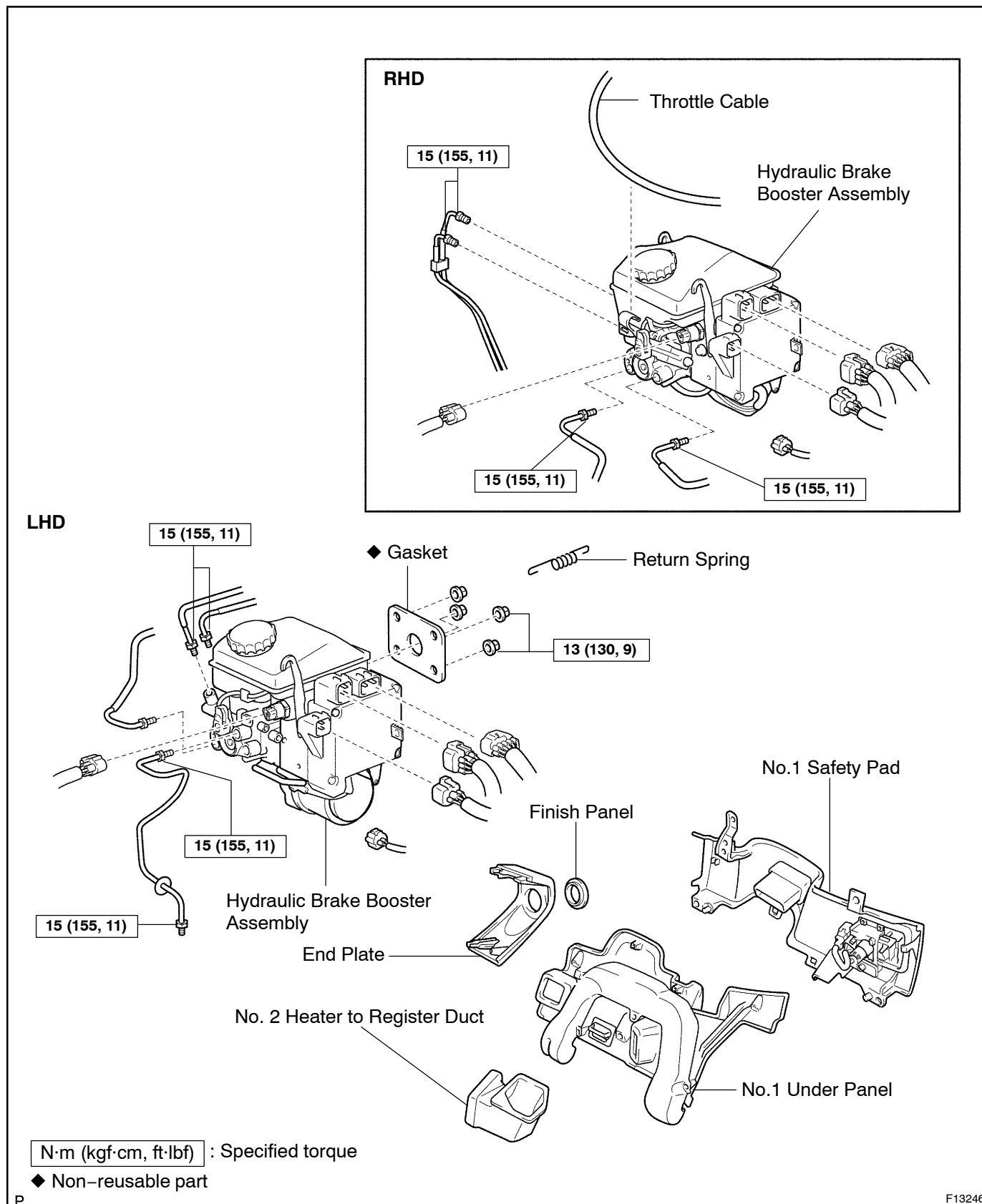
When operating it continuously, set the interval of more than 20 seconds.

- (5) Check that pedal is not hard to depress.
If pedal is hard to depress, replace the hydraulic brake booster.
- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake pedal and shift the shift lever to "L" position.
- (9) Once, release the brake pedal. After depressing the brake pedal with stable force, then push and hold MAIN push switch.
- (10) Check that the left rear wheel rotate.

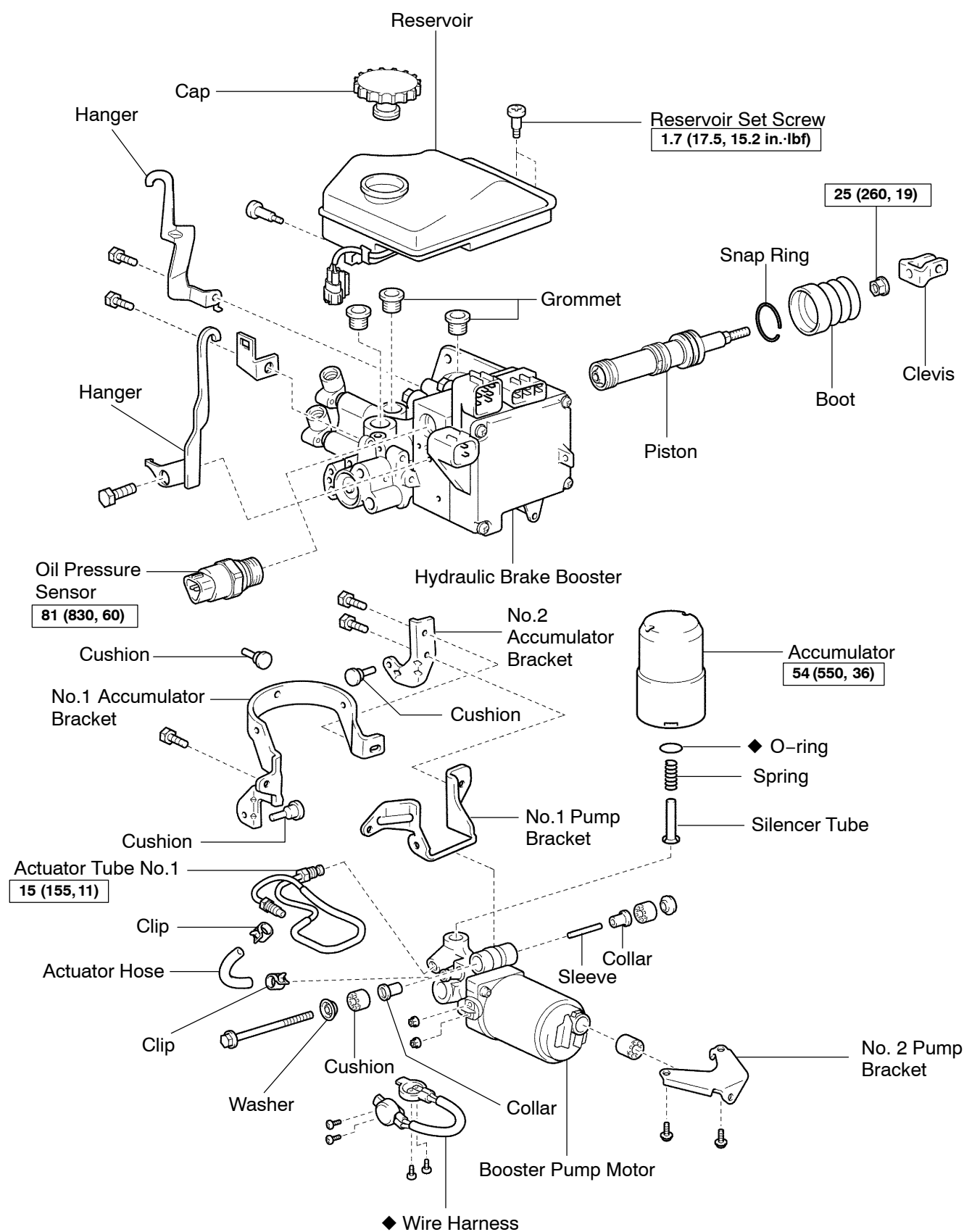
If the left rear wheels stop, replace the hydraulic brake booster.

- (s) Stop the engine and lower the vehicle.
- (t) Remove the "SHEET G" (SST) and disconnect the actuator checker (SST) and sub-wire harness (SST) from the hydraulic brake booster.
SST 09990-00150, 09990-00240, 09990-00480
- (u) Connect the 2 connectors to the actuator.
- (v) Clear the DTC (See Pub. No. RM588E on page DI-210).

COMPONENTS



Reference: LHD



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

◆ Non-reusable part

F13247

REMOVAL

NOTICE:

Before starting the work, make sure that the ignition switch is OFF and depress the brake pedal more than 40 times.

HINT:

When a pressure in power supply system is released, reaction force becomes heavy.

NOTICE:

- As high pressure is applied to the brake actuator tube No.1, never deform it.
- Until the work is over, do not turn the ignition switch ON.

1. DRAW OUT FLUID WITH SYRINGE

NOTICE:

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

2. REMOVE THESE PARTS (See Pub. No. RM588E on page BO-91):

- End panel and finish panel
- No.1 under panel
- No.2 heater to register duct
- No.1 safety pad

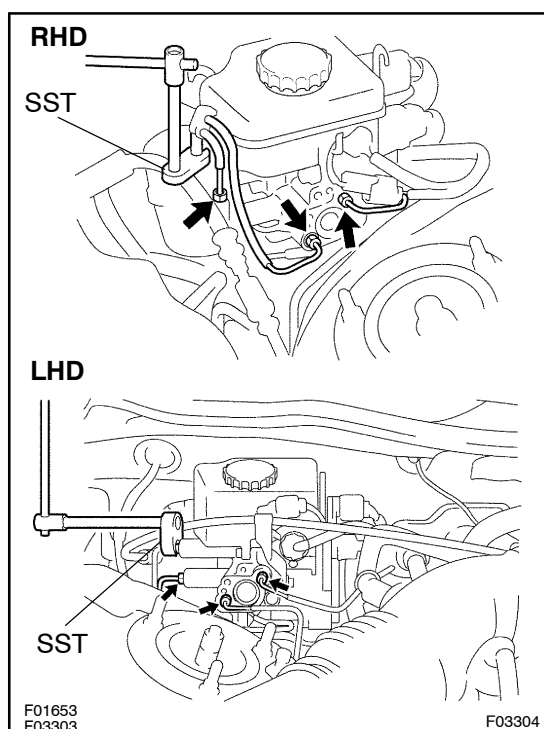
3. DISCONNECT LEVEL WARNING SWITCH CONNECTOR

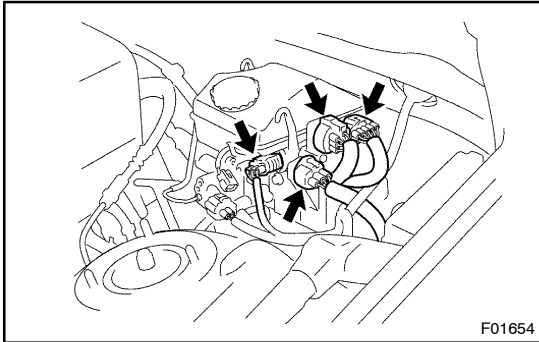
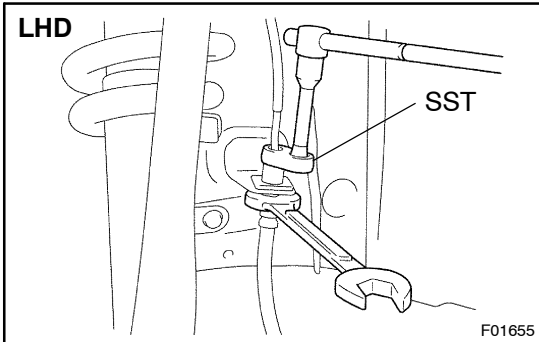
4. DISCONNECT BRAKE LINES

Using SST, disconnect the 4 brake lines.

SST 09023-00100

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



**5. LHD:****DISCONNECT LEFT FRONT WHEEL BRAKE LINE**

Using SST, disconnect the left front wheel brake line from the flexible hose.

SST 09023-00100

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

6. LHD:**REMOVE 2 BRAKE LINE CLAMPS****7. RHD:****DISCONNECT THROTTLE CABLE FROM CLAMP****8. DISCONNECT 4 CONNECTORS****9. REMOVE PEDAL RETURN SPRING, CLIP AND CLEVIS PIN****10. REMOVE HYDRAULIC BRAKE BOOSTER ASSEMBLY**

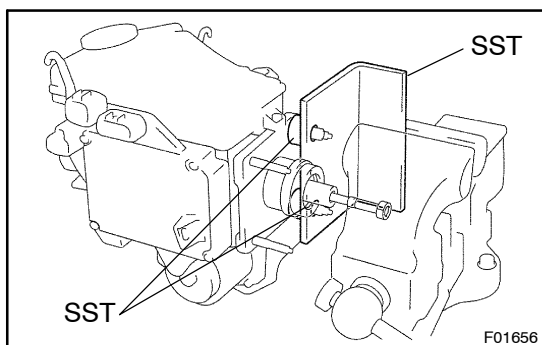
(a) Remove the clevis from push rod.

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

(b) Remove the 4 booster installation nuts.

Torque: 13 N·m (130 kgf·cm, 9 ft·lbf)

(c) Remove the booster assembly and gasket.



DISASSEMBLY

1. PLACE HYDRAULIC BRAKE BOOSTER IN VISE

Using SST, set the hydraulic brake booster in vise.

SST 09630-00014 (09631-00142),
09950-60010 (09951-00180, 09951-00190)

2. REMOVE RESERVOIR AND GROMMETS

- Remove reservoir cap.
- Remove the 3 set screws and pull out the reservoir.

Torque: 1.7 N·m (17.5 kgf·cm, 15.2 in·lbf)

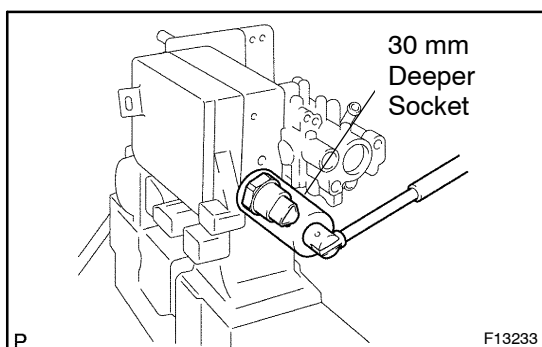
- Remove the 3 grommets.

3. REMOVE CLEVIS AND CYLINDER BOOT

- Loosen the lock nut, then remove the clevis and lock nut.

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

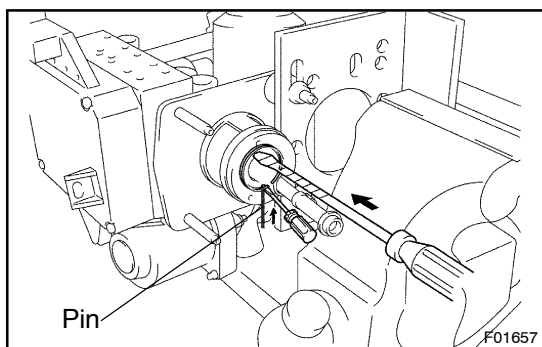
- Remove the cylinder boot.



4. REMOVE OIL PRESSURE SENSOR

Using 30 mm deeper socket wrench and remove the oil pressure sensor.

Torque: 81 N·m (830 kgf·cm, 60 ft·lbf)



5. REMOVE PISTONS

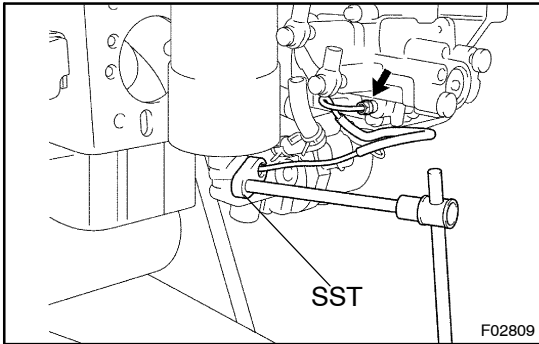
- Pressing the piston in with a screwdriver, use a pin or an equivalent to push the snap ring from the hole in the body then remove it with another screwdriver.
- Remove the piston, pulling straight out, not at an angle.

NOTICE:

- If pulled out and installed at an angle, there is a possibility that the cylinder bore could be damaged.
- At the time of reassembly, be careful not to damage the rubber lips on the pistons.

6. REMOVE ACTUATOR HOSE

7. REMOVE 2 BOLTS AND HANGERS

**8. REMOVE BRAKE ACTUATOR TUBE NO.1**

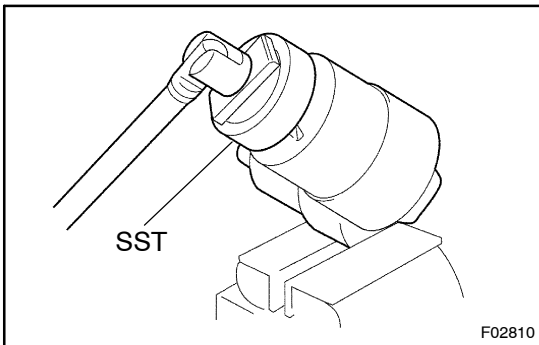
Using SST, remove the brake actuator tube No.1.

SST 09023-00100

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

9. REMOVE BOOSTER PUMP AND ACCUMULATOR

- (a) Remove the 2 screws and disconnect the wire harness connector from the booster assembly.
- (b) Remove the 3 bolts, No.1 accumulator bracket, No.2 accumulator bracket and booster pump and accumulator with the No.1 pump bracket.
- (c) Remove the bolt and No.1 pump bracket, and remove the 2 washers, 3 cushions, 2 collars and sleeve.
- (d) Remove the 2 bolts and No.2 pump bracket.

**10. REMOVE ACCUMULATOR FROM BOOSTER PUMP**

- (a) Using SST, remove the accumulator.

SST 09318-12010

Torque: 54 N·m (550 kgf·cm, 36 ft·lbf)

- (b) Remove the silencer tube, spring and O-ring.

DISPOSAL

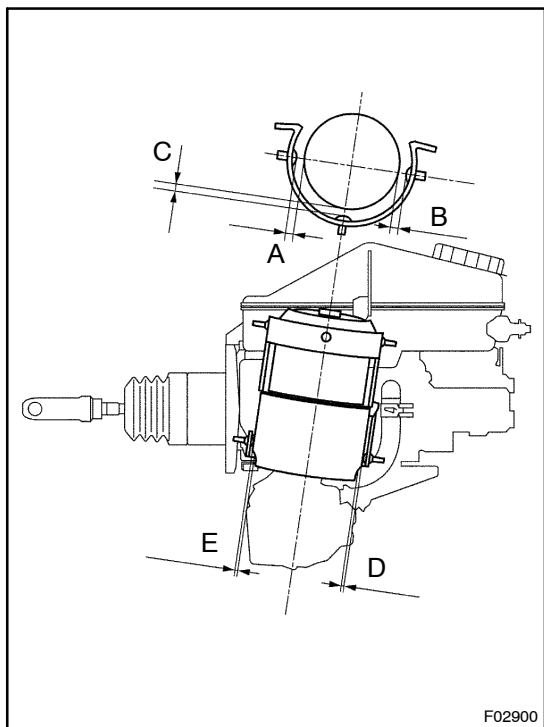
DISPOSAL METHOD OF ACCUMULATOR

- (a) Follow the procedures described below and drain the high pressure fluid from the accumulator.
- (b) Place the accumulator in a vise, cover it with a cloth over a saw then cut the accumulator body slowly.

CAUTION:

Never cut at a stretch.

- (c) When the outer body of the accumulator is cut, gas discharges.



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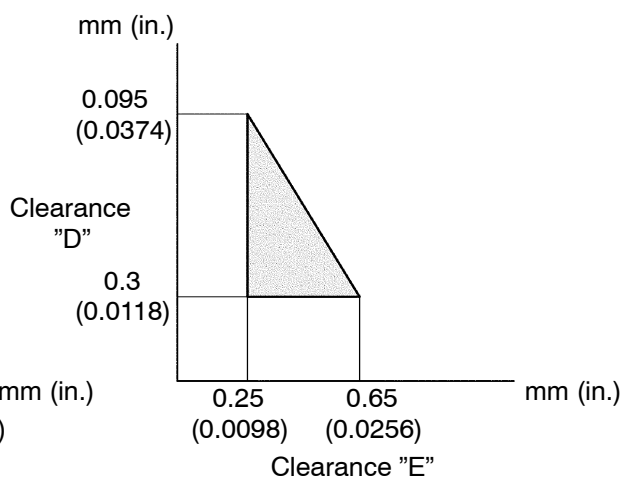
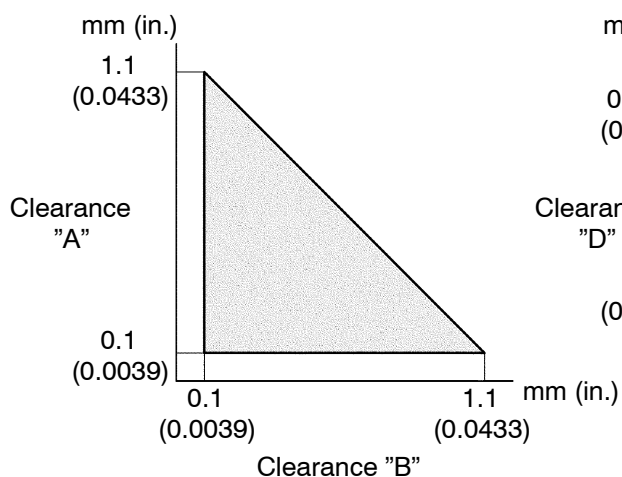
REASSEMBLY

Reassembly is in the reverse order of disassembly (See [page BR-15](#)).

INSTALL ACCUMULATOR BRACKET

When installing the accumulator bracket, adjust to ensure that clearance (A, B, D and E) shown in the illustration on the left corresponds to each value in the graphs below and are within the C range, using a thickness gauge.

C Range: 0.1 – 0.4 mm (0.004 – 0.016 in.)



F02901

INSTALLATION

Installation is in the reverse order of removal. (See page BR-19).