

HYDRAULIC BRAKE BOOSTER ON-VEHICLE INSPECTION

BR123-03

1. CHECK HYDRAULIC BRAKE BOOSTER FLUID PRESSURE CHANGE

- (a) Inspect the battery positive voltage.

Battery positive voltage: 10 - 14 V

- (b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

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

- (c) Install LSPV gauge (SST) and brake pedal effort gauge, bleed air.

SST 09709-29018

- (d) When booster does not operate:

Depress the brake pedal and check fluid pressure.

At 245 N (25 kgf, 55 lbf):

Front brake pressure	Rear brake pressure
2,100 kPa (21 kgf/cm ² , 305 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

At 343 N (35 kgf, 77 lbf):

Front brake pressure	Rear brake pressure
3,100 kPa (32 kgf/cm ² , 450 psi) or more	0 kPa (0 kgf/cm ² , 0 psi)

- (e) When booster operate:

- (1) Turn the ignition switch ON and wait until the pump motor has stopped.

- (2) Depress the brake pedal and check fluid pressure.

At 49 N (5 kgf, 11 lbf):

Front brake pressure	Rear brake pressure
1,000 - 2,200 kPa (10.2 - 22.4 kgf/cm ² , 145 - 319 psi)	1,200 - 2,400 kPa (12.2 - 24.4 kgf/cm ² , 174 - 348 psi)

At 98 N (10 kgf, 22 lbf):

Front brake pressure	Rear brake pressure
3,400 - 4,600 kPa (34.7 - 46.9 kgf/cm ² , 493 - 667 psi)	3,800 - 5,000 kPa (38.7 - 51.0 kgf/cm ² , 551 - 725 psi)

At 147 N (15 kgf, 33 lbf):

Front brake pressure	Rear brake pressure
5,600 - 6,800 kPa (57.1 - 69.3 kgf/cm ² , 812 - 986 psi)	6,000 - 7,200 kPa (61.2 - 73.4 kgf/cm ² , 870 - 1,044 psi)

At 196 N (20 kgf, 44 lbf):

Front brake pressure	Rear brake pressure
7,800 - 9,000 kPa (79.5 - 91.8 kgf/cm ² , 1,131 - 1,305 psi)	8,200 - 9,400 kPa (83.6 - 95.9 kgf/cm ² , 1,189 - 1,363 psi)

2. In case of using TOYOTA hand-held tester: INSPECT HYDRAULIC BRAKE BOOSTER OPERATION

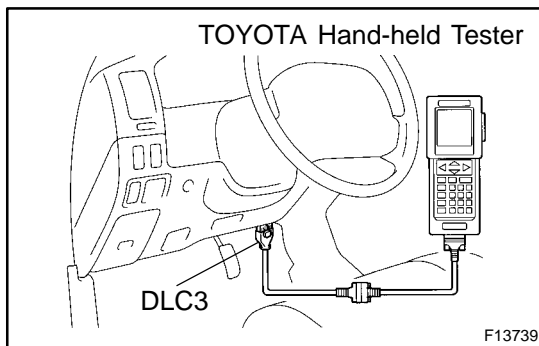
- (a) Inspect the battery positive voltage.
Battery positive voltage: 10 - 14 V
- (b) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

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

- (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 (See page [BR-42](#)).



- (e) Connect the TOYOTA hand-held tester.
 - (1) Connect the TOYOTA hand-held tester to the DLC3.
 - (2) Turn the ignition switch ON.
 - (3) 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.
 - To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.
- (f) Inspect the front TRAC & VSC solenoid operation.
 - (1) Select "SA1" and "SA2" on the TOYOTA hand-held tester.
 - (2) With "SA1" and "SA2" turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the pedal cannot be depressed.

HINT:

To protect the solenoids, TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid 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 sec.

- (3) Once, release the brake pedal.

- (4) When the solenoids are OFF, after depressing the brake pedal again and check that the brake 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 TOYOTA hand-held tester.
 - (2) With "SFRH" and "SFLH" turned ON simultaneously with the TOYOTA hand-held tester, depress the brake pedal with stable force and check that the brake pedal cannot be depressed.

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

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

- (3) Once, release the brake pedal when the solenoids are OFF, check that the brake 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 brake pedal with stable force, turn the SFRH and SFRR solenoids ON simultaneously.

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

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

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

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

HINT:

To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (7) When the solenoids are OFF, check that the brake 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 lever.
- (j) Shift the transfer shift lever to "N" position and check that the rear wheels by rotating them by hand.
- (k) Inspect the rear TRAC & VSC solenoid operation.

- (1) Select the "SA3" and "STR" on the TOYOTA hand-held tester.
- (2) Turn the "SA3" and "STR" ON simultaneously with the TOYOTA hand-held tester, and check that the rear wheels does not rotate 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, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid 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 sec.

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

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

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid 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 right rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid 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 right rear wheel stop, 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 it by hand.
- (m) Inspect the left rear ABS solenoid operation.
 - (1) Select the "SA3", "STR" and "SRLH" on the TOYOTA hand-held tester.
 - (2) Turn the "SA3", "STR" and "SRLH" ON with the TOYOTA hand-held tester, and check that the left rear wheel by rotating it 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 left rear wheel by rotating it by hand.

HINT:

- To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid 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 left rear wheel stop, replace the hydraulic brake booster.

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

HINT:

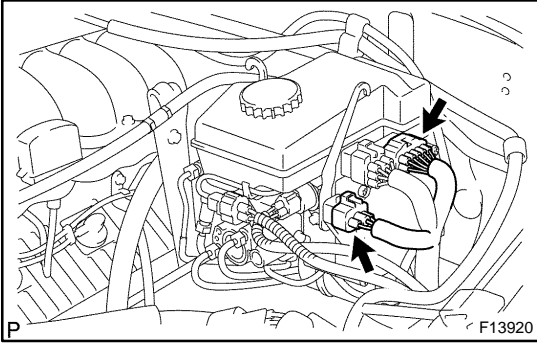
To protect the solenoids, the TOYOTA hand-held tester turns OFF automatically 2 sec. after every solenoid has been turned ON.

- (5) When the solenoids are ON, check that the left rear wheel by rotating it 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.

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



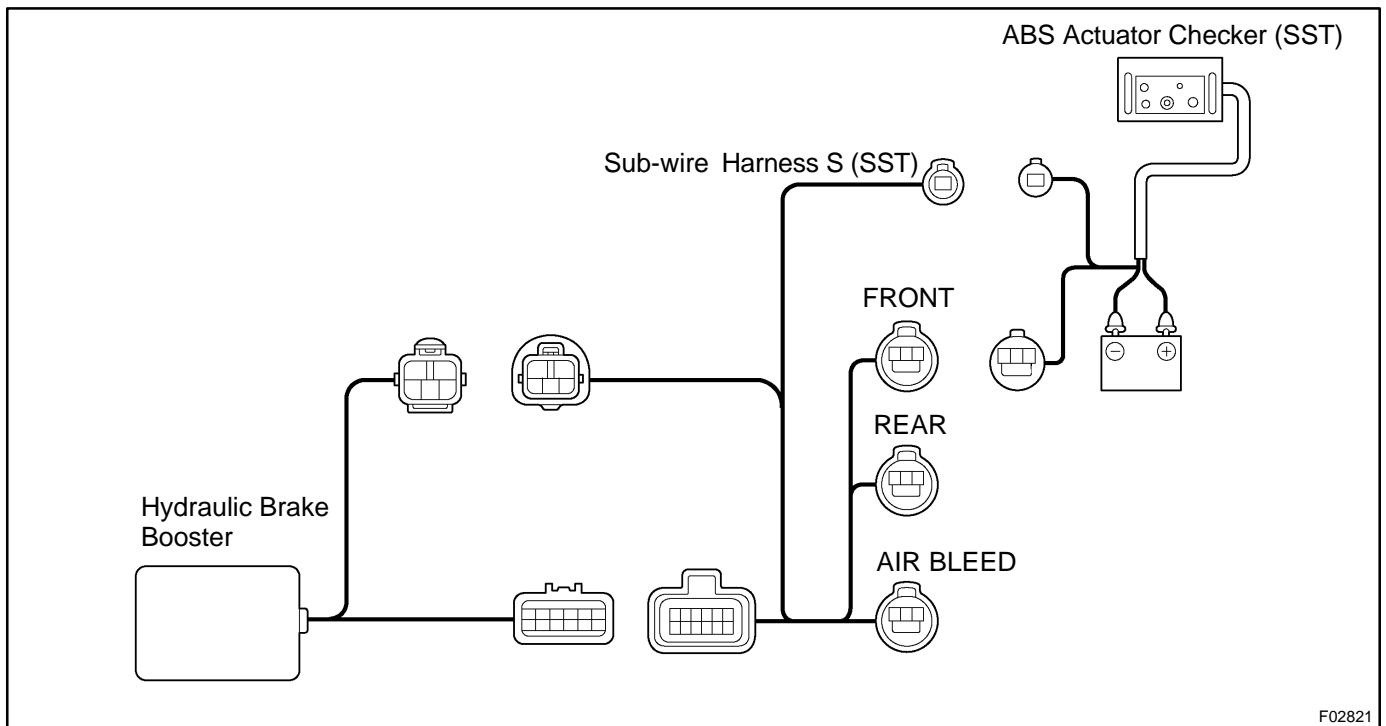
**3. In case of using ABS actuator checker (SST):
INSPECT HYDRAULIC BRAKE BOOSTER OPERATION**

- (a) Inspect the battery positive voltage.
Battery positive voltage: 10 - 14 V
- (b) Disconnect the 2 connectors from hydraulic brake booster.
- (c) Connect the ABS actuator checker (SST) to the hydraulic brake booster side wire harness via the sub-wire harness S (SST), as shown in the following chart.
SST 09990-00150, 09990-00480

HINT:

Connect the connector with the label of "FRONT" attached to the connector of ABS 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 ABS actuator checker.
SST 09990-00240
- (f) Turn the ignition switch OFF, depress the brake pedal more than 40 times.

HINT:

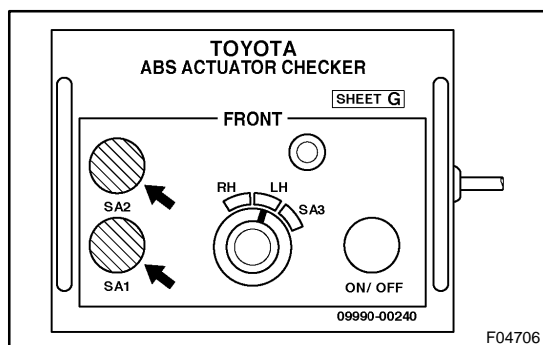
When a pressure in power supply system is released, reaction force becomes heavy and stroke becomes shorter.

- (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 (See page [BR-42](#)).



- (i) Inspect the front TRAC & 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 sec. When operating it continuously, set the interval of more than 20 sec.

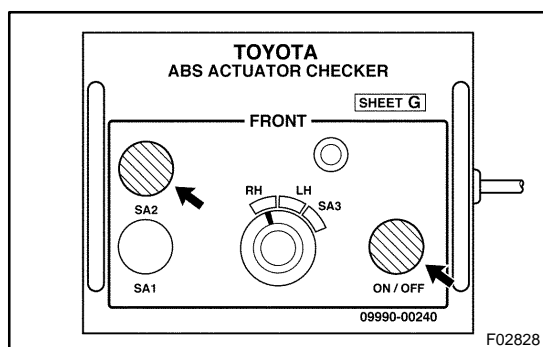
- (2) Check that the brake pedal cannot be depressed. If the pedal can be depressed, replace the hydraulic brake booster.

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

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

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

If the pedal cannot 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:

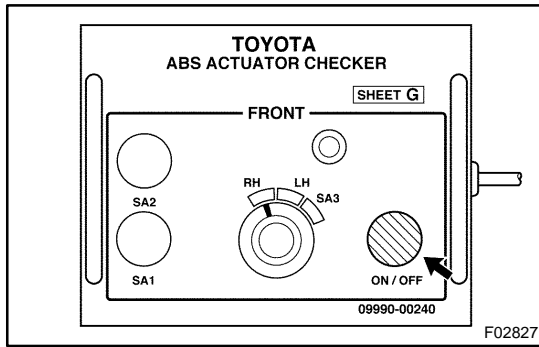
Do not keep the MAIN push switch and "SA2" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

- (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 brake 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:

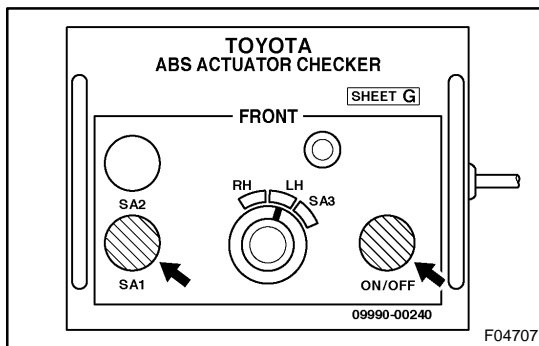
Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

- (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 brake 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:

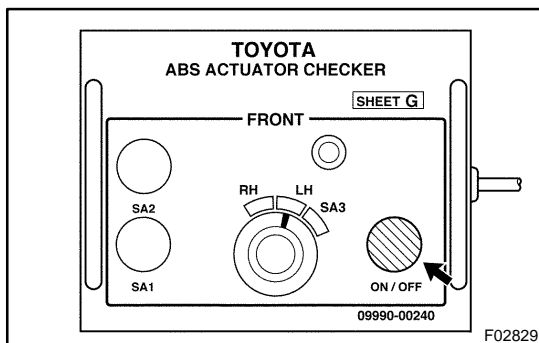
Do not keep the MAIN push switch and "SA1" switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

- (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 brake 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:

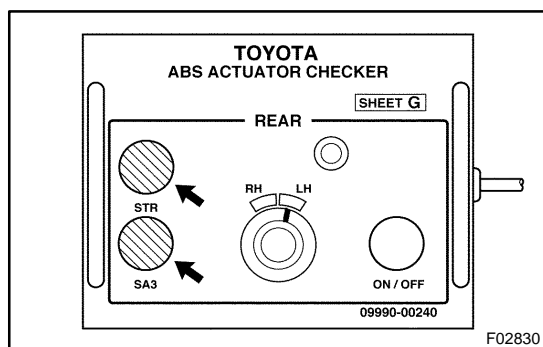
Do not keep the MAIN push switch pushed down for more than 10 sec. When operating it continuously, set the interval of more than 20 sec.

- (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 brake 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 TRAC & VSC solenoid.
- (1) Release the parking brake lever 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 sec.
- Do not keep the "SA3" switch pushed down for more than 5 sec.
- When operating it continuously, set the interval of more than 20 sec.

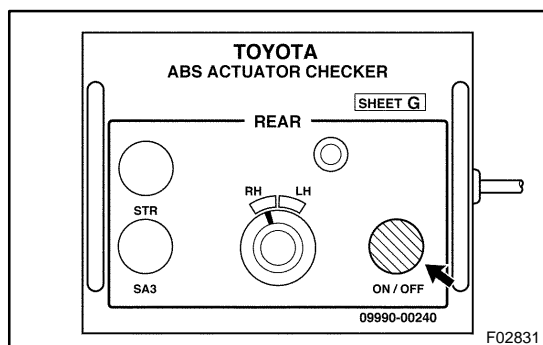
- (3) Check that the rear wheels stop.

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 and release the brake pedal when the pump begins rotating. Wait until the pump stops.
- (3) Turn the ignition switch OFF.
- (4) Depress the brake pedal with a force of 490 N (50 kgf, 110 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.

- (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

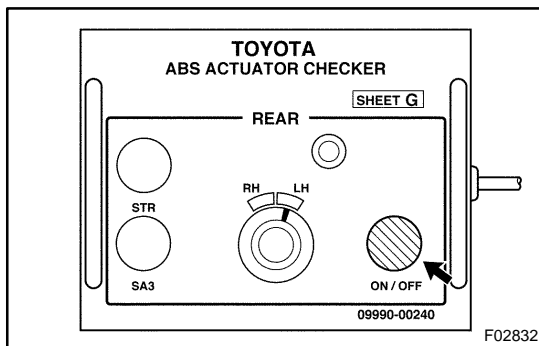
If the fluid surface level rises up, replace the hydraulic brake booster.

NOTICE:

Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake lever 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 rotates.

If the right rear wheel stops, 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 and release the brake pedal when the pump begins rotating. Wait until the pump stops.
 - (3) Turn the ignition switch OFF.
 - (4) Depress the brake pedal with a force of 490 N (50 kgf, 110 lbf), record the fluid surface in the reservoir tank of the hydraulic brake booster.
 - (5) Press the MAIN push switch for 10 sec., and check that the fluid surface in the reservoir tank of the hydraulic brake booster does not rise up at this time.

If the fluid surface level rises up, replace the hydraulic brake booster.

NOTICE:

Do not press MAIN push switch for more than 10 sec. When operating the switch continuously, do it an interval of more than 20 sec.

- (6) Start the engine and run it at idle.
- (7) Depress the brake pedal.
- (8) Release the parking brake lever 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 rotates.

If the left rear wheel stops, 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 S (SST) from the hydraulic brake booster.
- (u) Connect the 2 connectors to the actuator.
- (v) Clear the DTC (See page [DI-224](#)).