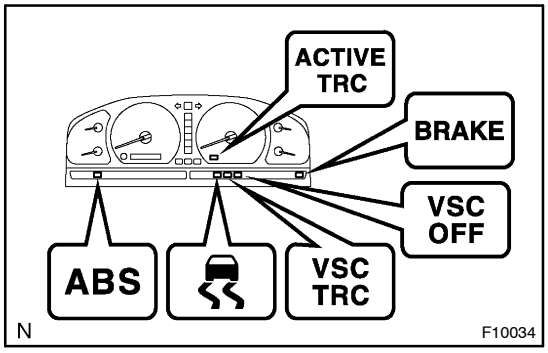
DI8FZ–01

# PRE–CHECK

## 1. DIAGNOSIS SYSTEM




(a) Check the warning lights and buzzer.

(1) Release parking brake lever.

(2) When the ignition switch is turned ON, check that the ABS, VSC TRC and BRAKE warning lights, VSC OFF, SLIP and ACTIVE TRC indicator lights goes on for 3 sec.

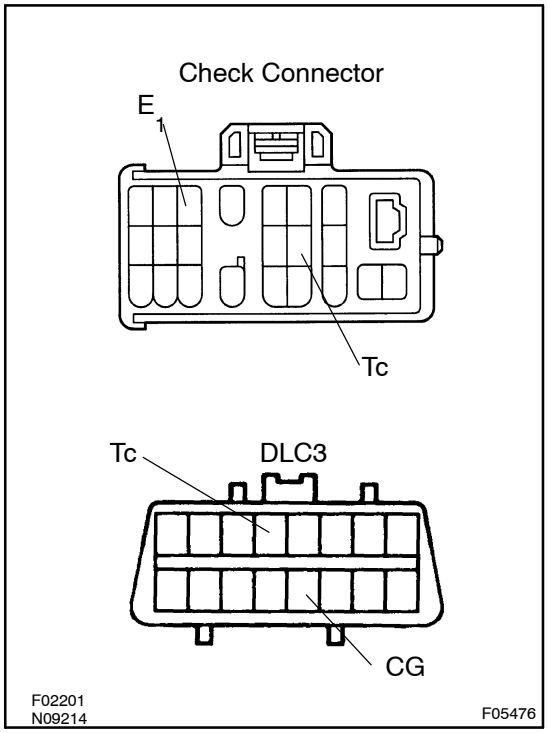
(3) When depressing the brake pedal repeatedly it may turn on the warning lights and buzzer.

HINT:

- If the ECU stores DTC, VSC TRC warning light and VSC OFF indicator light is ON.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit, VSC TRC warning light circuit, BRAKE warning light circuit, VSC OFF indicator light circuit, SLIP indicator light circuit and ACTIVE TRC indicator light circuit.

| Trouble Area | See Page |
|---|---|
| ABS warning light circuit | □ |
| VSC TRC warning light circuit | □ |
| BRAKE warning light circuit | □ |
| VSC OFF indicator light circuit | □ |
| SLIP indicator light circuit | □ |
| ACTIVE TRC indicator light circuit | □ |

□: Refer LAND CRUISER Chassis and Body Repair Manual (Pub. No. RM731E).




(b) In case of not using hand–held tester:
Check the DTC.

(1) Using SST, connect terminals Tc and $E_1$ of check connector or Tc and CG of DLC3.

SST 09843–18020 or 09843–18040

(2) Turn the ignition switch ON.

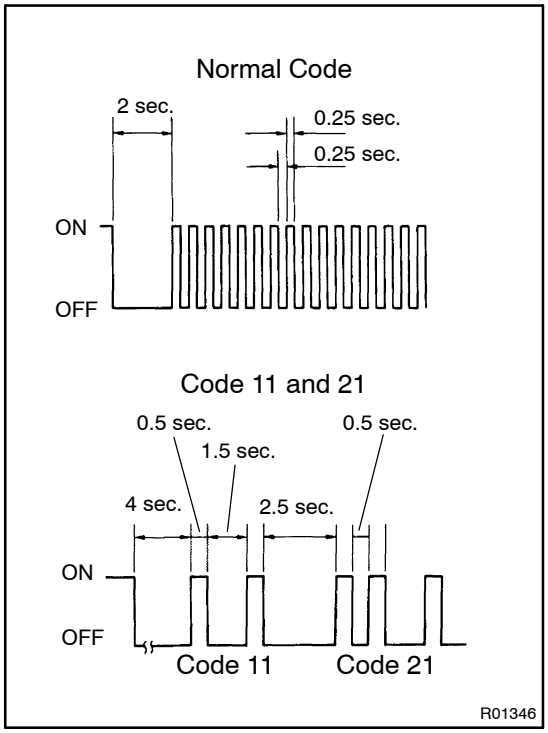
(3) Read the DTC from the ABS or VSC TRC warning light on the combination meter.

HINT:

- If no code appears, inspect the Tc circuit, ABS or VSC TRC warning light circuit.

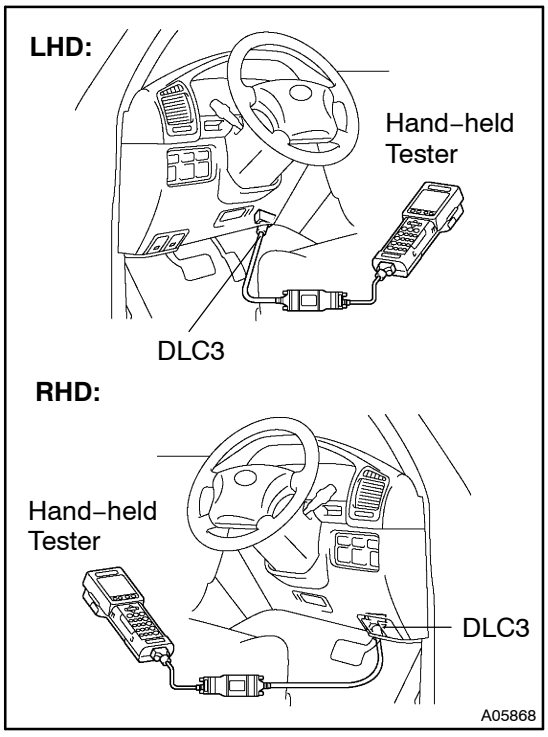
| Trouble Area | See page |
|---|---|
| Tc circuit | DI–53 |
| ABS warning light circuit | □ |
| VSC TRC warning light circuit | □ |

□: Refer LAND CRUISER Chassis and Body Repair Manual (Pub. No. RM731E).



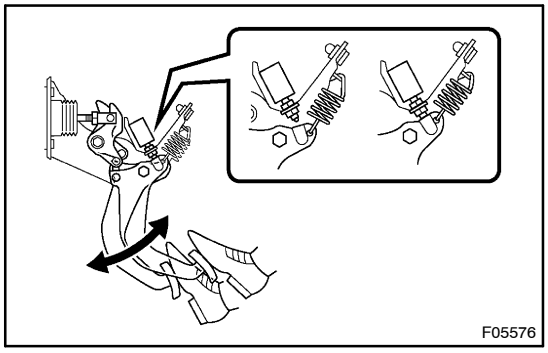

- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.
  (4) Codes are explained in the code table on page DI–42.
  (5) After completing the check, disconnect terminals Tc and $E_1$ of check connector and turn off the display.

If 2 or more malfunctions are indicated at the same time the lowest numbered DTC will be displayed 1st.

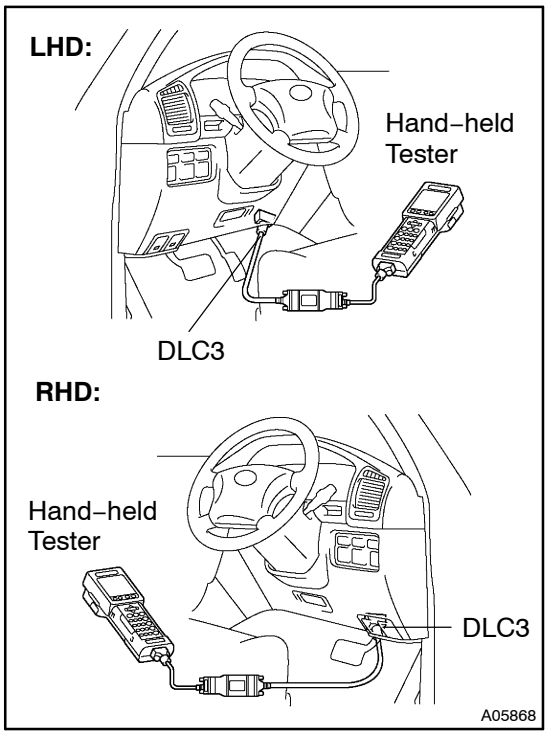



(c) In case of using hand –held tester:
Check the DTC.
(1) Hook up the hand –held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Read the DTC by following the prompts on the tester screen.

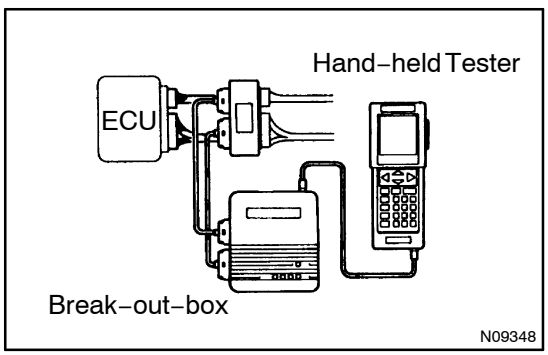
HINT:
Please refer to the hand –held tester operator's manual for further details.




(d) In case of not using hand –held tester:
Clear the DTC.
(1) Using SST, connect terminals Tc and E1 of check connector or Tc and CG of DLC3.
SST 09843 –18020 or 09843 –18040
(2) Turn the ignition switch ON.
(3) Clear the DTC stored in ECU by depressing the brake pedal 8 or more times within 5 sec.
(4) Check that the warning light shows the normal code.
(5) Remove the SST from the terminals of check connector or DLC3.
SST 09843 –18020 or 09843 –18040



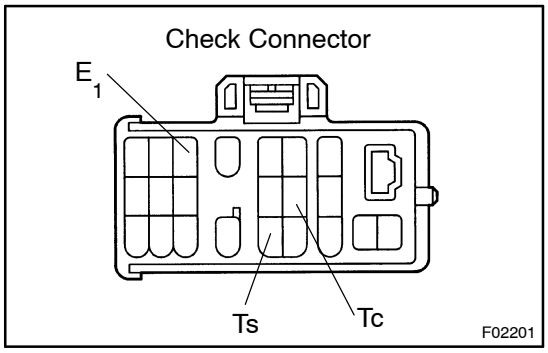

(e) In case of using hand –held tester:
Clear the DTC.
(1) Hook up the hand –held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand –held tester to erase the codes (See hand –held tester operator's manual.).




(f) Reference:
Using break –out–box and hand –held tester, measure the ECU terminal values.
(1) Turn the ignition switch OFF.
(2) Hook up the break –out–box and hand –held tester to the vehicle.
(3) Turn the ignition switch ON.
(4) Read the ECU input/output values by following the prompts on the tester screen.

HINT:

- Hand–held tester has a "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.
- Please refer to the hand –held tester/break –out–box operator's manual for further details.




**2. SPEED SENSOR SIGNAL CHECK (TEST MODE)**

HINT:

If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.

(a) In case of not using hand –held tester:

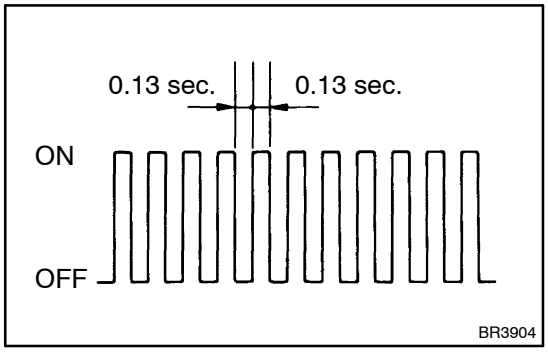
Check the speed sensor signal.

(1) Turn the ignition switch OFF.

(2) Using SST, connect terminals Ts and $E_1$ of check connector.

SST 09843 –18020

(3) Start the engine.




(4) Check that the ABS warning light blinks.

HINT:

If the ABS warning light does not blink, inspect the ABS warning light circuit and Ts circuit (See Pub. No. RM731E on page DI–133 and DI –165).

(5) Keep the vehicle in the stationary condition on the flat place for 6 sec. or more.

(6) Shift the transfer lever in L4 position and turn the center diff. lock switch ON.

(7) Shift the transfer lever back.

(8) Leaving the vehicle in the stationary condition and the brake pedal in free condition for 1 sec. or more, continue to depress the brake pedal with 98 N (10 kgf, 22 lbf) of force or more for 1 sec. or more.

(9) Leaving the vehicle in the stationary condition, depress the brake pedal with 980 N (100 kgf, 221 lbf) of force or more quickly.

HINT:

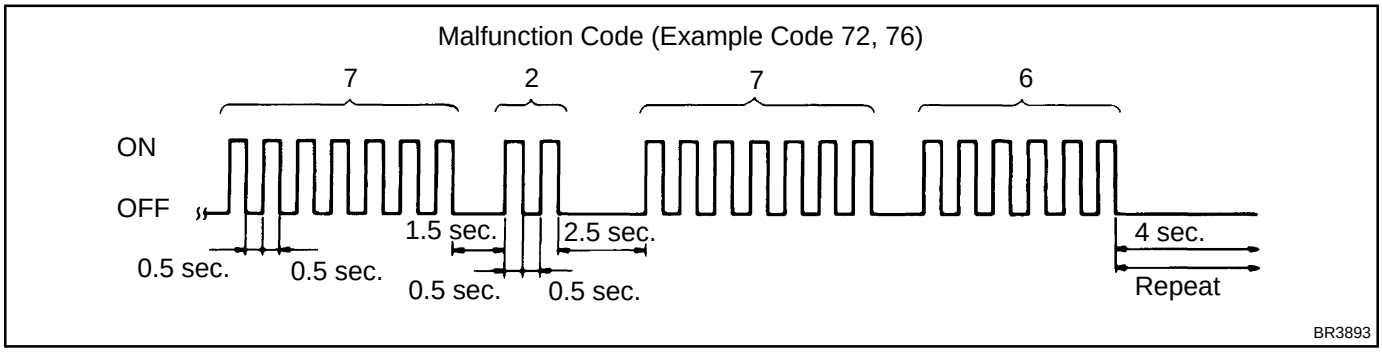
At this time, the ABS warning light comes on for 3 sec.

(10) Drive vehicle straight forward.
When driving the vehicle with the speed faster than 45 km/h (28 mph) for several seconds, check that the ABS warning light comes off.

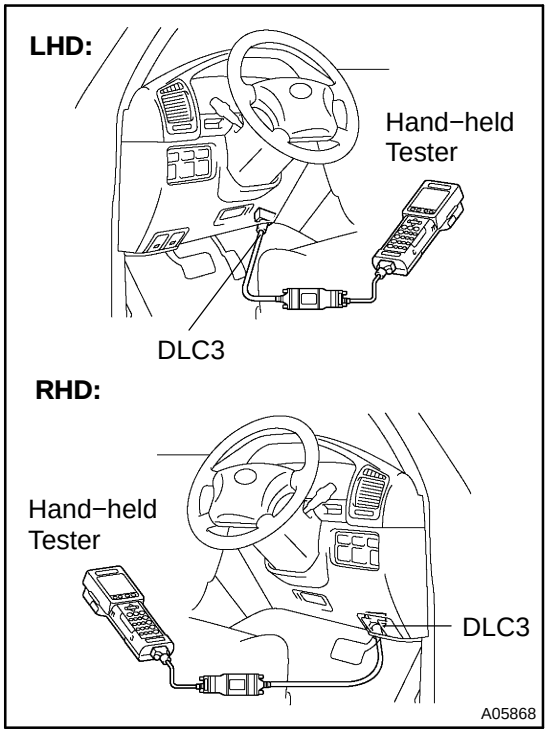
HINT:
There is a case that the sensor check is not completed if the vehicle has its rear wheels spun or its steering wheel steered during this check.

(11) Stop the vehicle.
(12) Using SST, connect terminals Tc and $E_1$ of check connector or Tc and CG of DLC3.
SST 09843−18020 or 09843−18040
(13) Read the number of blinks of the ABS warning light.

HINT:
- See the list of DTC shown on the next page.
- If every sensor is normal, a normal code is output (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.




(14) After doing the check, disconnect the SST from terminals of check connector or terminals of check connector and DLC3 and turn ignition switch OFF.
SST 09843−18020 or 09843−18040




(b) In case of using hand−held tester:
Check the sensor signal.
(1) Hook up the hand−held tester to the DLC3.
(2) Do step (3) and (5) to (10) on the previous page.
(3) Read the DTC by following the prompts on the tester screen.

HINT:
Please refer to the hand−held tester operator's manual for further details.

**DTC of speed sensor check function:**

| Code No. | Diagnosis | Trouble Area |
|---|---|---|
| C1271 / 71 | Low output voltage of right front speed sensor | S Right front speed sensor<br>S Sensor installation<br>S Sensor rotor |
| C1272 / 72 | Low output voltage of left front speed sensor | S Left front speed sensor<br>S Sensor installation<br>S Sensor rotor |
| C1273 / 73 | Low output voltage of right rear speed sensor | S Right rear speed sensor<br>S Sensor installation<br>S Sensor rotor |
| C1274 / 74 | Low output voltage of left rear speed sensor | S Left rear speed sensor<br>S Sensor installation<br>S Sensor rotor |
| C1275 / 75 | Abnormal change in output voltage of right front speed sensor | Right front speed sensor rotor |
| C1276 / 76 | Abnormal change in output voltage of left front speed sensor | Left front speed sensor rotor |
| C1277 / 77 | Abnormal change in output voltage of right rear speed sensor | Right rear speed sensor rotor |
| C1278 / 78 | Abnormal change in output voltage of left rear speed sensor | Left rear speed sensor rotor |
| C1279 / 79 | Deceleration sensor is faulty | S Deceleration sensor<br>S Sensor installation |
| C1281 / 81 | Master cylinder pressure sensor output signal is faulty | Master cylinder pressure sensor |
| C1282 / 82 | Transfer indicator (center diff. lock) switch malfunction | Transfer indicator (center diff. lock) switch |
| C1283 / 83 | Transfer L4 position switch malfunction | Transfer L4 position switch |

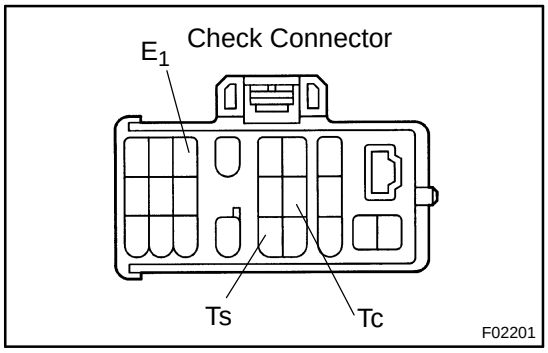
**3. In case of not using hand−held tester: VSC SENSOR CHECK (TEST MODE)**

**NOTICE:**

**When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.).**

HINT:

If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC will be erased.




(a) Procedures for test mode:

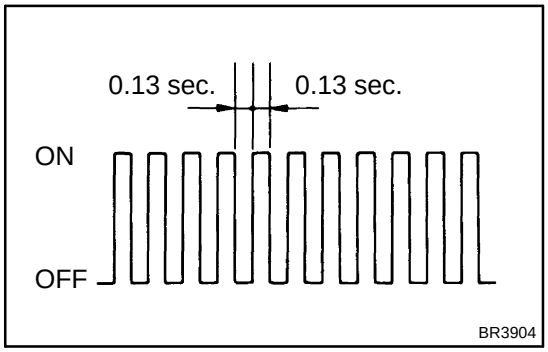
(1) Turn the ignition switch OFF.

(2) Check that the shift lever position is at P position, turn the steering wheel to the neutral position.

(3) Using SST, connect terminals Ts and $E_1$ of check connector.

SST 09843−18020

(4) Start the engine.



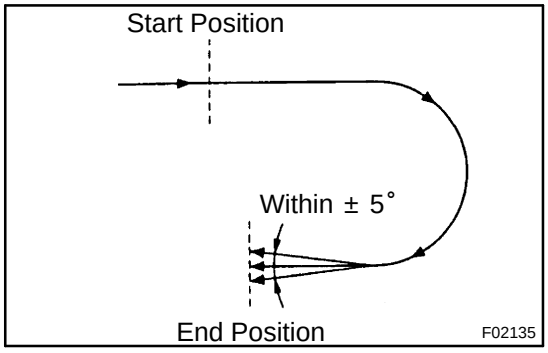

(5) Check that the VSC TRC warning light blinks.

HINT:

If the VSC TRC warning light does not blink, inspect the VSC TRC warning light circuit and Ts terminal circuit (See Pub. No. RM731E on page DI−138 and DI−165).

(b) Check the steering angle sensor.

Turn the steering wheel either to left or right for 450° or more from the vehicle stationary condition, and turn back the steering wheel to the straight ahead position.




(c) Check the yaw rate sensor.

Shift the shift lever to the D position and drive the vehicle at the vehicle speed of approx. 5 km/h (3 mph), turn the steering wheel either to left or right for 90° or more, and maintain 180° circular drive for the vehicle.

Stop the vehicle and shift the shift lever to the P position, check that the VSC buzzer sounds for 3 sec.

If the VSC buzzer sounded, the sensor check is in normal completion.

If the VSC buzzer does not sound, do the sensor check again.

If the VSC buzzer still won't sound, there is malfunction in the VSC sensor, so check the DTC.

HINT:

- Drive the vehicle circularly by 180°. At the end of the turn, the direction of the vehicle should be within 180° ± 5° of its start position.
- Do not spin the wheels.

(d) Read the DTC.

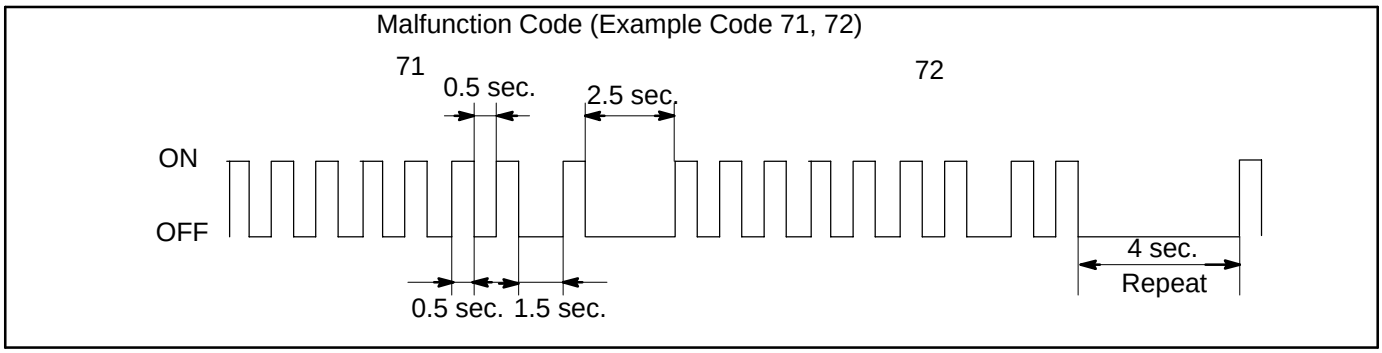
(1) Using SST, connect terminals Tc and $E_1$ of check connector or Tc and CG of DLC3.

SST 09843−18020 or 09843−18040

(2) Read the number of blinks of the VSC TRC warning light.

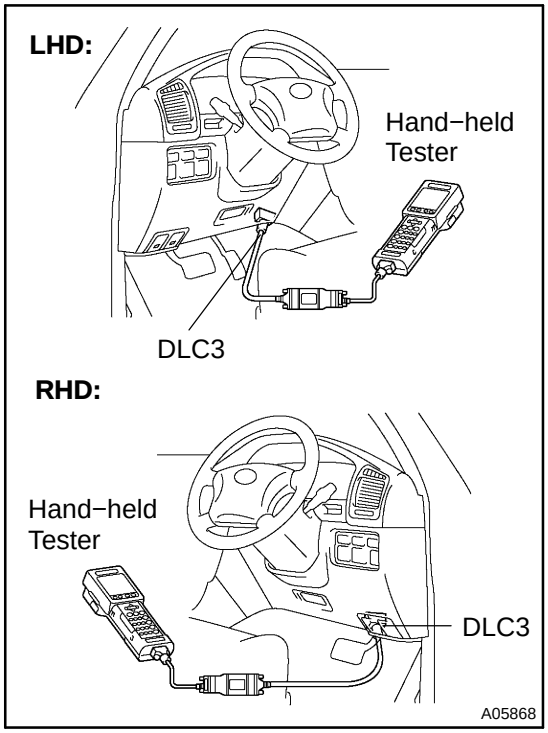
HINT:

- See the list of DTC shown on the next page.
- If every sensor is normal, a normal code is output. (A cycle of 0.25 sec. ON and 0.25 sec. OFF is repeated.)
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed 1st.




(3) After doing the check, disconnect the SST from terminals of check connector or terminals of check connector and DLC3 and turn ignition switch OFF.

SST 09843−18020 or 09843−18040




**4. In case of using hand−held tester: CHECK VSC SENSOR SIGNAL**

**NOTICE:**

**When having replaced the yaw rate sensor, deceleration sensor and/or ECU, perform zero point calibration of the yaw rate and deceleration sensors (See step 7.). Make sure that this operation should be done before starting the following.**

(a) Hook up the hand−held tester to the DLC3.

(b) Do steps (a)−(2), (4) and (b) to (c) on the previous page.

(c) Read the DTC by following the prompts on the tester screen.

HINT:

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

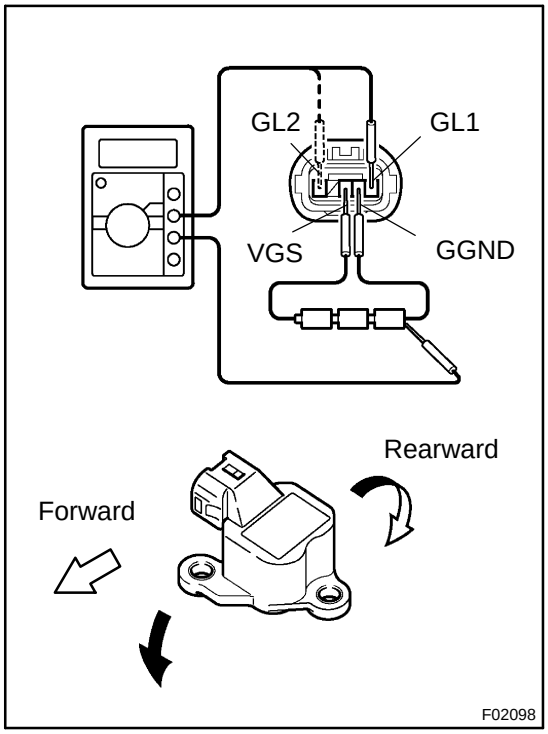
**DTC of the VSC sensor check function:**

| Code No. | Diagnosis | Trouble Area |
|---|---|---|
| C0371 / 71 | Yaw rate sensor output signal malfunction | S Yaw rate sensor<br>S Yaw rate sensor circuit |
| C1208 / 72 | Steering position sensor output signal malfunction | S Steering position sensor<br>S Steering position sensor circuit |

**5. DECELERATION SENSOR OPERATION DIAGNOSIS SYSTEM**

**CAUTION:**

**While checking the deceleration sensor operating diagnosis system, ABS does not work and brake system works as a conventional brake system.**




**6. DECELERATION SENSOR CHECK**

(a) Connect 3 dry batteries of 1.5 V in series.

(b) Connect VGS terminal to the batteries' positive (+) terminal, and GGND terminal to the batteries' negative (−) terminal, apply about 4.5 V between VGS and GGND terminals.

**NOTICE:**

**Do not apply voltage of 6 V or more to terminals VGS and GGND.**

(c) Check the output voltage of GL1 and GL2 terminals.

| Symbols | Condition | Standard Value |
|---|---|---|
| GL1 | Horizontal | About 2.3 V |
| GL1 | Lean forward | 0.4 V − about 2.3 V |
| GL1 | Lean rearward | About 2.3 V − 4.1 V |
| GL2 | Horizontal | About 2.3 V |
| GL2 | Lean forward | About 2.3 V − 4.1 V |
| GL2 | Lean rearward | 0.4 V − about 2.3 V |

HINT:

- S If the sensor is tilted too much it may show the wrong value.
- S If dropped, the sensor should be replaced with a new one.
- S The sensor removed from the vehicle should not be placed upside down.

(d) When replacing the deceleration sensor:
Perform the deceleration sensor zero point calibration.

**7. IF NECESSARY, PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSORS**

HINT:

- When having replaced the yaw rate sensor, deceleration sensor or/and the ECU, make sure to perform yaw rate and deceleration sensors zero point calibration.
- This operation is also required when the deceleration sensor or yaw rate sensor has been replaced since the calibrated zero point of both sensors will be erased.

**NOTICE:**

- **While obtaining the zero point, do not give any vibration to the vehicle by tilting, moving or shaking it and keep it in a stationary condition. (Do not start the engine.)**
- **Be sure to do this on a level surface (within an inclination of 1 %).**

(a) Clear the zero point of the yaw rate and deceleration sensors.

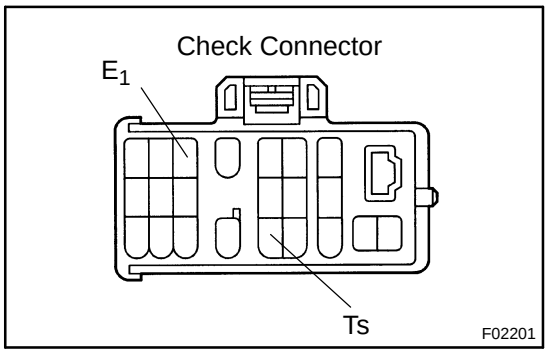
(1) Shift the shift lever to P range.

(2) Turn the ignition switch ON in a stationary condition.

(3) With the ignition switch ON, using SST, repeat a cycle of short and open between terminals Ts and $E_1$ of check connector 4 times or more within 8 sec. Check that the VSC warning light is lit indicating the recorded zero point is erased.

SST 09843−18020

(4) Turn the ignition switch OFF.




(b) Obtain zero point of the yaw rate sensor.

(1) Make the terminals Ts and $E_1$ of check connector disconnected.

(2) Turn the ignition switch ON.

HINT:

The vehicle should be in a stationary condition with the shift lever in P range.

(3) Check that the lighted VSC warning light goes off about 15 sec. after the ignition switch is turned ON.

HINT:

Even if the ignition is not turned OFF in step (a)−(4) and remains ON, the yaw rate sensor zero point calibration can be completed. In this case, the VSC warning light is lit about 15 sec. and starts blinking. (Normal code)

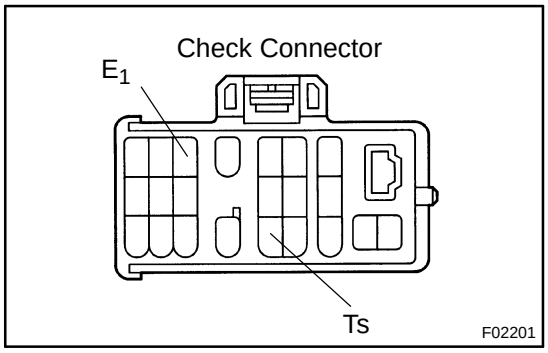
(4) After ensuring that the VSC warning light remains OFF for 2 sec., turn the ignition switch OFF.

HINT:

If the ignition switch is not turned OFF in step (a)−(4), ensure the blinking light for 2 sec. and turn the ignition switch OFF.

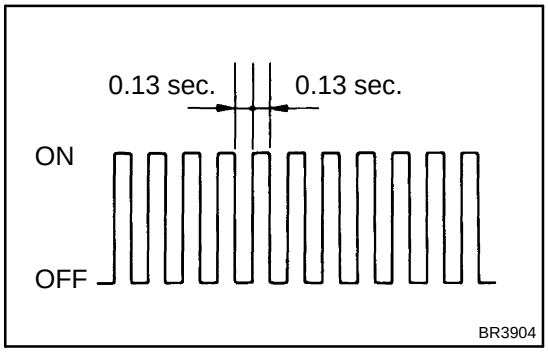
(c) Perform deceleration sensor zero point calibration.

**NOTICE:**
**After step (b) (the yaw rate sensor zero point calibration), the VSC warning light goes off. At this time, if the vehicle is driven without performing step (c) (deceleration sensor zero point calibration), deceleration sensor zero point calibration malfunction will be detected and the VSC warning light will light up. Therefore, perform step (c) right after step (b).**




(1) Using SST, connect the terminals Ts and $E_1$ of check connector.
SST 09843−18020
(2) Turn the ignition switch ON.

HINT:
Make the vehicle in a stationary condition with the shift lever in P range.




(3) After turning the ignition switch ON, check that the VSC warning light is lit for about 4 sec. and then starts quick blinking at 0.13 sec. intervals.
(4) After ensuring the blinking of the VSC warning light for 2 sec., turn the ignition switch OFF.
(5) Remove the SST and make the terminals Ts and $E_1$ of check connector disconnected.
SST 09843−18020