

PRE-CHECK

1. DIAGNOSIS SYSTEM

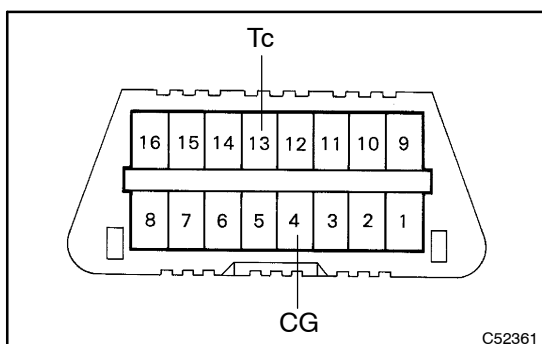
(a) Release the parking brake pedal.

(b) Check the warning light.

When the ignition switch is turned ON, check that the ABS warning light and brake warning light turns on for 3 sec.

HINT:

- When the parking brake is applied or the level of the brake fluid is low, the brake warning light is lit.
- If the indicator check result is not normal, proceed to troubleshooting for the ABS warning light circuit (See page 05-498 or 05-500) or brake warning light circuit (See page 05-501).



(c) In case of not using hand-held tester:

Check the DTC.

(1) Using SST, connect terminals Tc and CG of DLC3.
SST 09843-18040

(2) Turn the ignition switch to ON.

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

HINT:

- If not code appears, inspect the diagnostic circuit or ABS warning light circuit (See page 05-505 or 05-500).
- As an example, the blinking patterns for normal code and codes 11 and 21 are shown on the left.
- Codes are explained in the code table on page 05-458.

If 2 or more malfunctions are indicated at the same time DTC will be displayed in ascending order.

(5) After completing the check, remove the SST from the DLC3.

SST 09843-18040

(d) In case of using hand-held tester:

Check the DTC.

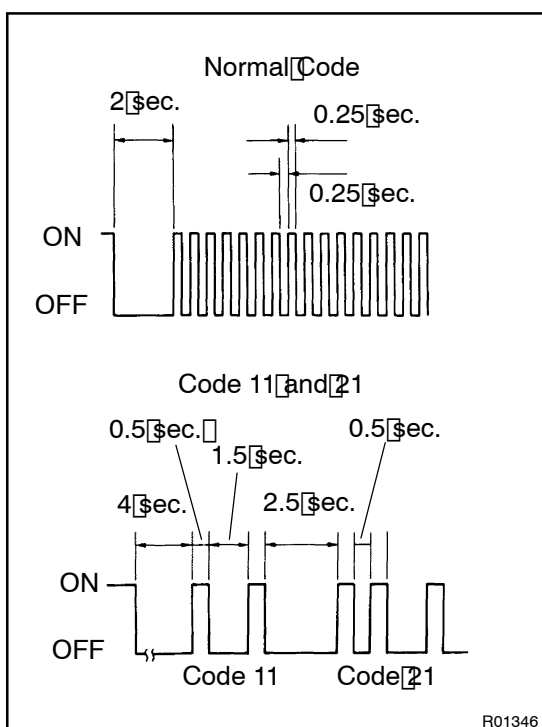
(1) Read the DTC by following the prompts on the tester screen.

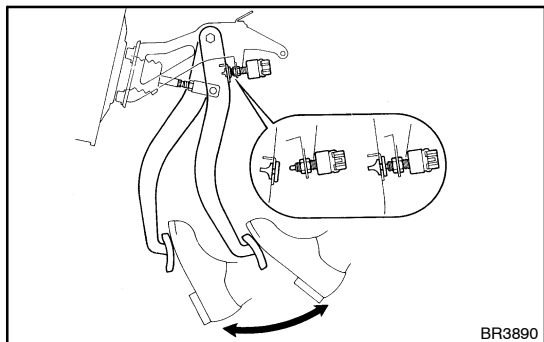
HINT:

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

(e) In case of not using hand-held tester:

Clear DTC.





- (1) Using SST, connect the terminals Tc and CG of the DLC3.

SST 09843-18040

- (2) Turn the ignition switch to ON.

- (3) Clear DTC stored in ECU by depressing the brake pedal 8 or more times within 5 sec.

- (4) Check that the ABS warning light shows the normal code.

- (5) Remove the SST from the DLC3.

SST 09843-18040

HINT:

Disconnecting the battery cable during repairs will not erase the DTC in the ECU.

- (f) In case of using hand-held tester:

Clear the DTC.

- (1) Turn the ignition switch to ON.

- (2) Operate the hand-held tester to erase the codes.

HINT:

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

2. DATA LIST

HINT:

According to the DATA LIST displayed by the Hand-held tester, you can read the value of the switch, sensor, actuator and so on without parts removal. Reading the DATA LIST as a first step of troubleshooting is one of the method to shorten the labor time.

- (a) Connect the Hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on tester, read the "DATA LIST".

| Item | Measurement Item / Range (Display) | Normal Condition | Diagnostic Note |
|---------------|--|---|-----------------|
| ABS MOT RELAY | ABS motor relay / ON or OFF | | |
| SOL RELAY | Solenoid relay / ON or OFF | | |
| STOP LIGHT SW | Stop light switch / ON or OFF | ON : Brake pedal depressed OFF : Brake pedal released | |
| PKB SW | Parking brake switch / ON or OFF | ON : Parking brake applied OFF : Parking brake released | |
| ABS OPERT FR | ABS operation (FR) / BEFORE or OPERATE | BEFORE : No ABS operation (FR) OPERATE : During ABS operation (FR) | |
| ABS OPERT FL | ABS operation (FL) / BEFORE or OPERATE | BEFORE : No ABS operation (FL) OPERATE : During ABS operation (FL) | |
| ABS OPERT RR | ABS operation (RR) / BEFORE or OPERATE | Actual wheel speed | |

| Item | Measurement Item / Range (Display) | Normal Condition | Diagnostic Note |
|-----------------|---|---|---|
| ABS OPERT RL | ABS operation (RL) / BEFORE or OPERATE | Actual wheel speed | |
| WHEEL SPD FR | Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH) | Actual wheel speed | Speed indicated on speedometer |
| WHEEL SPD FL | Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH) | Actual wheel speed | Speed indicated on speedometer |
| WHEEL SPD RR | Wheel speed sensor (RR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH) | Actual wheel speed | Speed indicated on speedometer |
| WHEEL SPD RL | Wheel speed sensor (RL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH) | Actual wheel speed | Speed indicated on speedometer |
| IG VOLTAGE | ECU power supply voltage / NORMAL or TOO LOW | NORMAL : 9.5 V or over TOO LOW : Below 9.5 V | |
| SFRR | ABS solenoid (SFRR) ON / OFF | | |
| SFRH | ABS solenoid (SFRH) ON / OFF | | |
| SFLR | ABS solenoid (SFLR) ON / OFF | | |
| SFLH | ABS solenoid (SFLH) ON / OFF | | |
| SRRR (SRR) | ABS solenoid (SRRR (SRR)) ON / OFF | | |
| SRRH (SRH) | ABS solenoid (SRRH (SRH)) ON / OFF | | |
| SRLR | ABS solenoid (SRLR) ON / OFF | | |
| SRLH | ABS solenoid (SRLH) ON / OFF | | |
| MAS CYL PRESS 1 | Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V | When brake pedal is released : 0.3 – 0.9 V | Reading increases when brake pedal is depressed |
| AIR BLD SUPPORT | Air bleed support / SUPPORT or NOT SUP | Supported | |
| TEST MODE | Test mode / NORMAL or TEST | NORMAL : Normal mode TEST : During test mode | |
| #CODES | Number of DTC recorded / min.: 0, max.: 255 | Min.: 0, max.: 21 | |

3. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the Hand-held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the method to shorten the labor time.

It is possible to display the DATA LIST during the ACTIVE TEST.

- (a) Connect the Hand-held tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) According to the display on tester, perform the "ACTIVE TEST".

| Item | Vehicle Condition / Test Details | Diagnostic Note |
|---------------|---|---|
| SFRR | Turns ABS solenoid (SFRR) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SFRH | Turns ABS solenoid (SFRH) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SFLR | Turns ABS solenoid (SFLR) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SFLH | Turns ABS solenoid (SFLH) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SRRR | Turns ABS solenoid (SRRR) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SRRH | Turns ABS solenoid (SRRH) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SRLR | Turns ABS solenoid (SRLR) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SRLH | Turns ABS solenoid (SRLH) ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SFRR & SFRH | Turns ABS solenoid SFRR & SFRH ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SFLR & SFLH | Turns ABS solenoid SFLR & SFLH ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SRH & SRR | Turns ABS solenoid SRH & SRR ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SRLR & SRLH | Turns ABS solenoid SRLR & SRLH ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SFRH & SFLH | Turns ABS solenoid SFRH & SFLH ON / OFF | Operation of solenoid (clicking sound) can be heard |
| SOL RELAY | Turns ABS solenoid relay ON / OFF | Operation of solenoid (clicking sound) can be heard |
| ABS MOT RELAY | Turns ABS motor relay ON / OFF | Operation of motor can be heard |

| Item | Vehicle Condition / Test Details | Diagnostic Note |
|-----------------|------------------------------------|---------------------------|
| ABS WARN LIGHT | Turns ABS warning light ON / OFF | Observe combination meter |
| BRAKE WRN LIGHT | Turns BRAKE warning light ON / OFF | Observe combination meter |

4. FREEZE FRAME DATA

- The vehicle (sensor) status at the occurrence of abnormality of the diagnosis code and during the ABS operation can be memorized and displayed by the hand-held tester.
- Only one record of freeze frame data is stored, however, freeze frame data during the ABS operating is always up-dated. After the storage of freeze frame data, up to 31 ignition "ON" operations are stored and displayed.

HINT:

If the ignition switch "ON" operation exceeds 31 times, "31" appears on the display.

- If the diagnosis code abnormality occurs, the freeze frame data at the occurrence of the abnormality is stored but the ABS actuation data is deleted.

| Hand-held Tester Display | Measurement Item | Reference Value* |
|--------------------------|---|--|
| VEHICLE SPD | Wheel speed reading | Speed indication of a meter |
| STOP LIGHT SW | Stop light switch signal | Stop light switch ON: ON, OFF: OFF |
| # IG ON | Number of operations of ignition switch ON after memorizing freeze frame data | 0 - 31 |
| MAS CYL PRESS | Master cylinder pressure sensor reading | Brake pedal release : 0.3 - 0.9 V Brake pedal depress: 0.8 - 4.5 V |
| MASS PRESS GRADE | Master cylinder pressure sensor change | -30 - 200 MPa/s |
| SYSTEM | System status | ABS activated: ABS BA activated: BA Fail safe mode activated: FAIL SF No system activated: NO SYS |

*: If no conditions are specifically stated for "Idling", it means the shift lever is at N or P position, the A/C switch is OFF and all accessory switches are OFF.

5. SPEED SENSOR SIGNAL CHECK

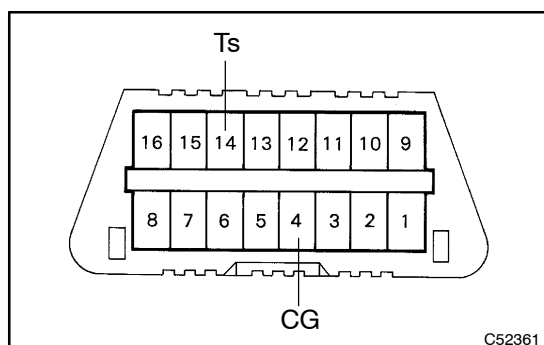
HINT:

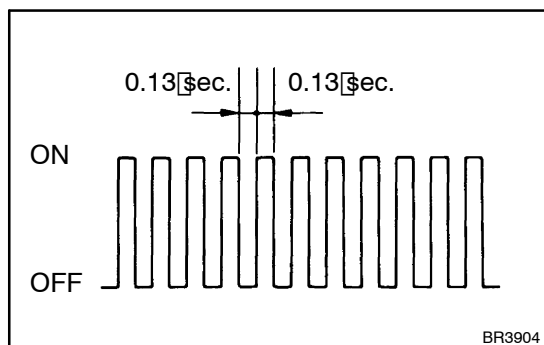
- If the ignition switch is turned from ON to ACC or LOCK during test mode, DTC of sensor check function will be erased.
 - During test mode, ECU records all DTC of sensor check function. By performing sensor signal check, the codes are erased if normality is confirmed. The codes left over are the codes where abnormality was found.
- In case of not using hand-held tester:
Check the speed sensor signal.
 - Turn the ignition switch to ON.

- Using SST, connect the terminals Ts and CG of DLC3.

SST 09843-18040

- 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 its circuit (See page 05-500 and 05-503).

(5) Drive the vehicle straight forward.

HINT:

Drive the vehicle higher than 45 km/h (28 mph) for several sec.

(6) Stop the vehicle.

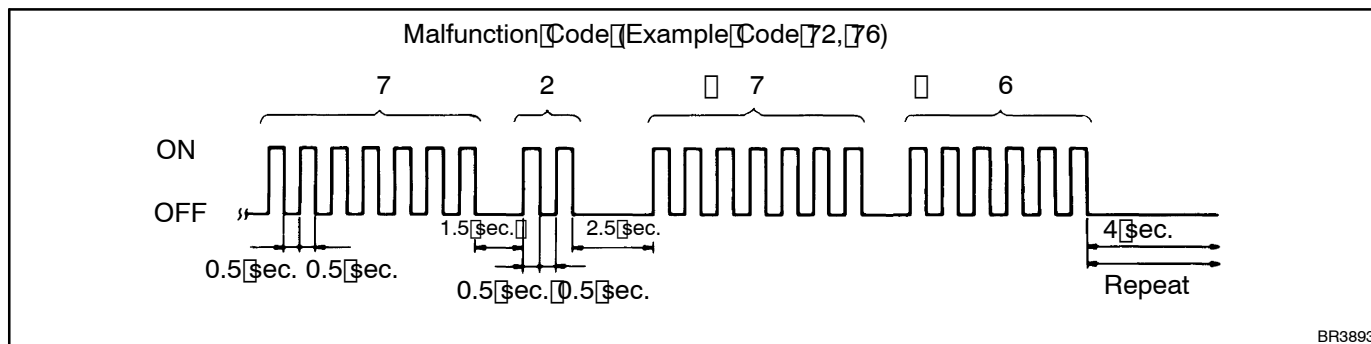
(7) Using SST, connect the terminals Tc and CG of the DLC3.

SST 09843-18040

(8) Read the number of blinks of the ABS warning light.

HINT:

- See the list of DTC shown on the 05-458.
- If every sensor is normal, there is a normal code 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 DTC will be displayed in ascending order.



(9) After performing the check, turn the ignition switch to OFF, and remove the SST from the DLC3.

SST 09843-18040

(b) In case of using hand-held tester:

Check the speed sensor signal.

(1) Perform step (3) to (6) on the this page.

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

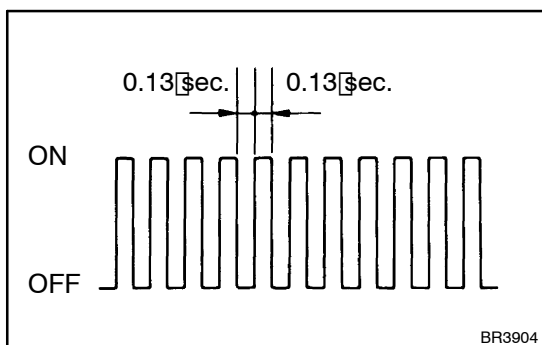
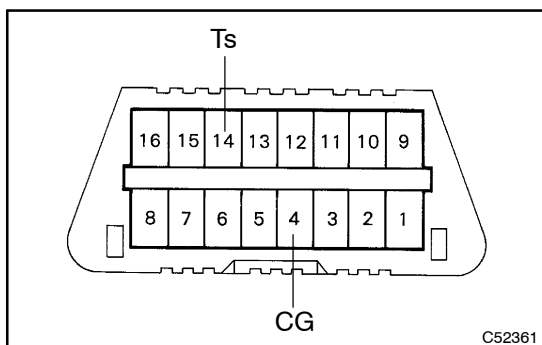
HINT:

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

6. BRAKE ASSIST OPERATE CHECK

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 brake assist operate.

- (1) Using SST, connect terminals Ts and CG of DLC3.
SST 09843-18040
- (2) Start the engine.

- (3) 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 page 05-500 and 05-503).

- (4) While the vehicle is stationary, release the brake pedal for 1 sec. Then depress the brake pedal with a force of at least 98 N (10 kgf) for more than 1 sec.
- (5) While the vehicle is stationary, quickly depress the brake pedal. At this time, confirm that the ABS warning light remains lit for approximately 3 sec.

(b) In case of using hand-held tester:

Check the brake assist operate.

Perform step (2) to (5) on the this page.

HINT:

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