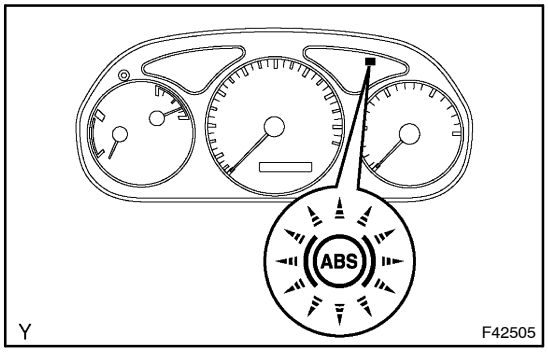
05BBX–01

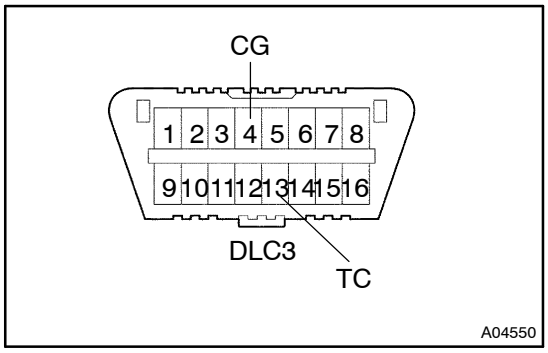
PRE–CHECK

1. DIAGNOSIS SYSTEM

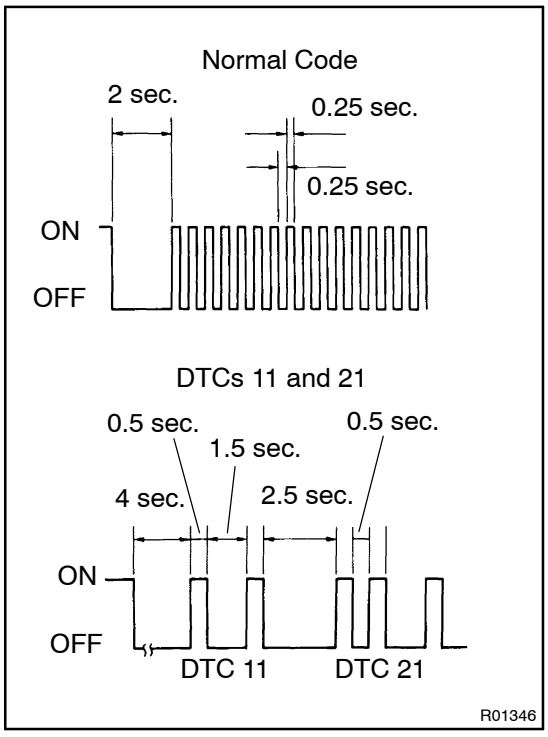
(a) Check the ABS warning light.
When the ignition switch is turned ON, check that the ABS warning light lights up for 3 seconds.

HINT:
If the indicator check result is abnormal, proceed to the trouble-shooting for the ABS warning light circuit (See page 05–254).





(b) When not using hand–held tester:
Check the DTC.
(1) Using SST, connect terminals TC and CG of the DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.



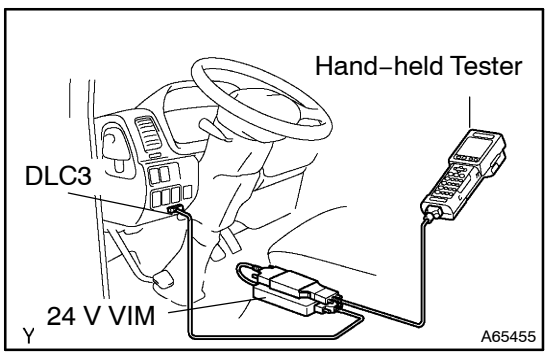
(3) Read the DTC from the ABS warning light on the combination meter.

HINT:
- If no code appears, inspect the diagnostic circuit or the ABS warning light circuit (See page 05–263 or 05–254).
- As an example, the blinking patterns for normal code, DTCs 11 and 21 are shown in the illustration.

(4) Check the details of the code using the code table on page 05–205.

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

(5) After completing the check, remove the SST from the DLC3.
SST 09843–18040

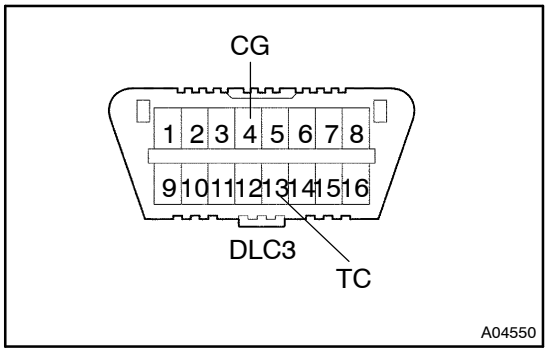


(c) When using hand–held tester:
Check the DTC.

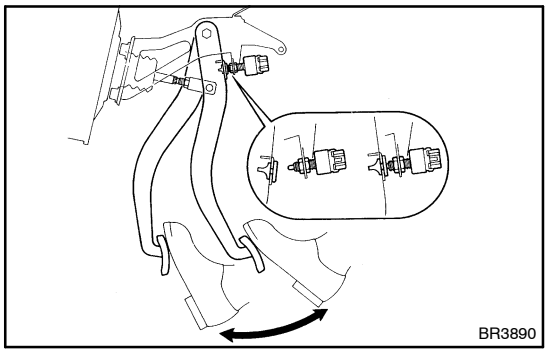
NOTICE:
Be sure to use the 24 V VIM, because the hand–held tester will be destroyed without using the 24 V VIM.

(1) Connect 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:
Refer to the hand–held tester operator's manual for further details.



(d) When not using the hand–held tester:
Clear the DTC.
(1) Using SST, connect terminals TC and CG of the DLC3.
SST 09843–18040
(2) Turn the ignition switch ON.

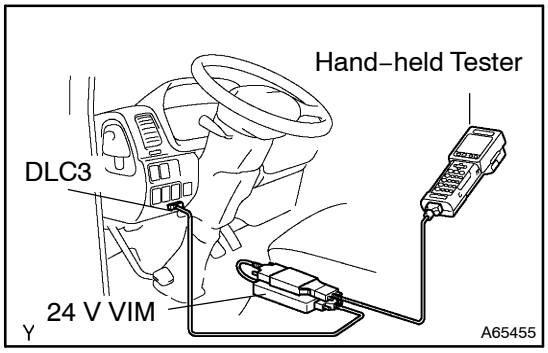


(3) Clear the DTC stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.
(4) Check that the ABS warning light indicates the normal code.
(5) Remove the SST from the DLC3.

HINT:
Disconnection of the battery cable during repairs will not erase the DTC in the ECU.

(e) When using the hand–held tester:
Clear the DTC.
(1) Connect the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Operate the hand–held tester to erase the codes.

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



2. CHECK SENSOR SIGNAL (TEST MODE):
When using the hand–held tester

NOTICE:
Be sure to use the 24 V VIM, because the hand–held tester will be destroyed without using the 24 V VIM.

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

(a) Check the sensor signal.
(1) Connect the hand–held tester to the DLC3.
(2) Turn the ignition switch ON.
(3) Perform the master cylinder pressure sensor check.
(4) Perform the vacuum sensor check.
(5) Perform the speed sensor check.

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

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

3. DATA LIST

HINT:
According to the DATA LIST displayed on the hand–held tester, you can read the value of the switch, sensor, and actuator without parts removal. Reading the DATA LIST as the first step of troubleshooting is one way to shorten the labor time.

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON.
(c) Read the "DATA LIST", according to the display on the tester.

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 lamp 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	BEFORE : No ABS operation (RR) OPERATE : During ABS operation (RR)	–
ABS OPERT RL	ABS operation (RL) / BEFORE or OPERATE	BEFORE : No ABS operation (RL) OPERATE : During ABS operation (RL)	–
WHEEL SPD FR	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD FL	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer
WHEEL SPD RR	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph)max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer

Item	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
WHEEL SPD RL	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph) max.: 255 km/h (158 mph)	Actual wheel speed	Speed indicated on speedometer
IG VOLTAGE	ECU power supply voltage / NORMAL or TOO LOW	NORMAL : 19 V or over TOO LOW : Below 19 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 – 0.7 V	Reading increases when brake pedal is depressed
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	–

4. ACTIVE TEST

HINT:

Performing the ACTIVE TEST using the hand–held tester allows the relay and actuator to operate without parts removal. Performing the ACTIVE TEST as the first step of troubleshooting is one way to shorten the labor time.

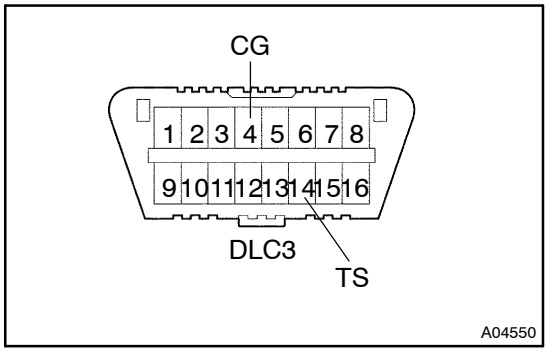
It is possible to display the DATA LIST during the ACTIVE TEST.

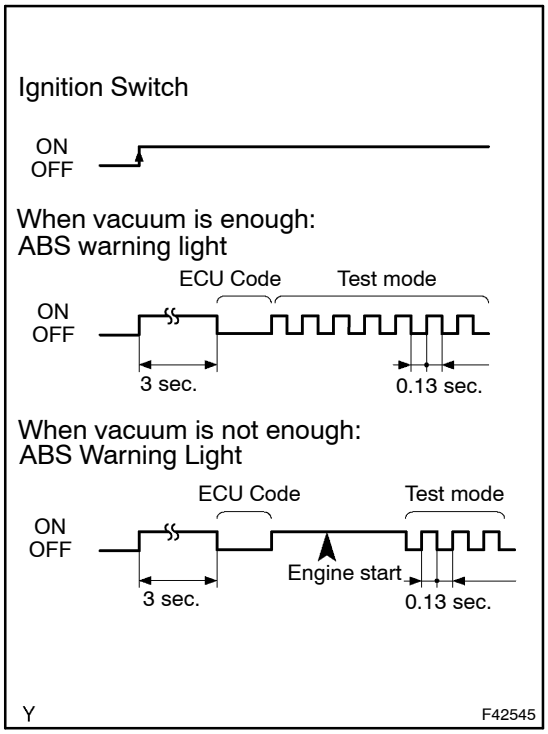
(a) Connect the hand–held tester to the DLC3.

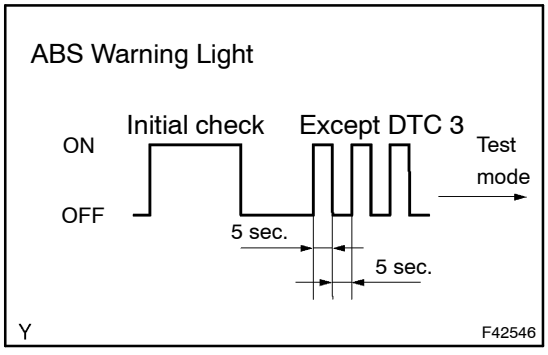
(b) Turn the ignition switch ON.

(c) Perform the ACTIVE TEST, according to the display on the tester.

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







5. When not using the hand–held tester: CHECK SENSOR SIGNAL (TEST MODE)

(a) Check the sensor signal.

(b) Procedures for the test mode:

(1) Turn the ignition switch OFF.

(2) Using SST, connect terminals TS and CG of the DLC3.

SST 09843–18040

(3) Turn the ignition switch ON.

(4) Check that it enters into the test mode after the ABS warning light is on for 3 seconds (initial value check) and the ECU code is output. Do not depress the brake pedal until the entry of the test mode is confirmed.

(5) If the ABS warning light remains on even after the ECU code output, start the engine. Then, check that it enters into the test mode in several seconds. Do not depress the brake pedal until the entry of the test mode is confirmed. The way of the light indication after the ECU code is output depends on vacuum of the vacuum booster.

When vacuum is enough, it enters into the test mode. When vacuum is not enough, the indication light remains on.

HINT:

- To prevent a installation of a wrong skid control ECU, output an ECU code when starting the test mode. The code varies with the vehicle type to which the ECU is installed, and therefore it is necessary to confirm whether it fits the vehicle type whenever starting the test mode.

ECU code table:

Vehicle type	Code
Front disc brake, short	1
Front disc brake, long	2
Front drum brake, short	3
Front drum brake, long	4

- If the ABS warning light does not blink, inspect the ABS warning light circuit (See page 05–254).

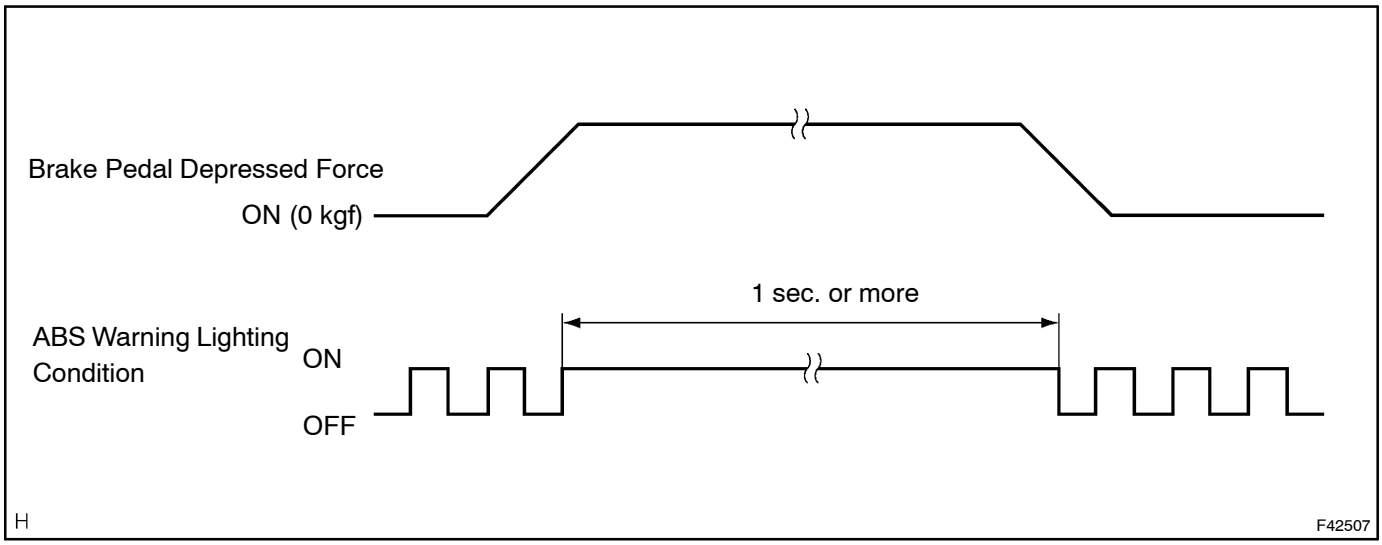
(c) Check master cylinder pressure sensor.

(1) When starting the engine, stop the engine once and then turn the ignition switch ON.

HINT:

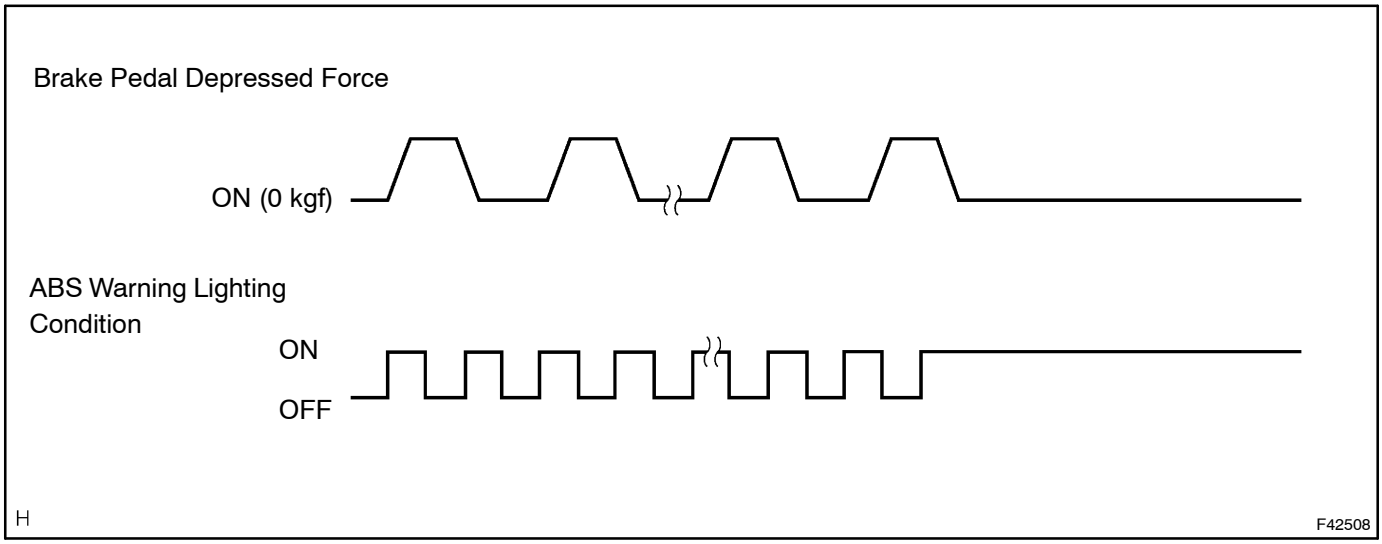
Do not start the engine.

(2) After releasing the brake pedal for 1 second or more, depress it again by a force of 186 N (19 kgf, 42 lbf) or more.
(3) Check that the ABS warning light lights up.
(4) Depress the brake pedal for 1 second with the ABS warning light lit and release it.
(5) Check that the blinking pattern of the ABS warning light returns to that in the test mode.



HINT:
- Do not depress the brake pedal several times.
- If the ABS warning light does not light up although the brake pedal is depressed, the master cylinder pressure sensor may be defective.

(d) Check vacuum sensor.
(1) Depress the brake pedal several times.
(2) Check that the ABS warning light lights up.



HINT:

- If the ABS warning light does not light up after depressing the brake pedal continuously, the vacuum sensor may be defective.
- When the parking brake is released, the vacuum warning buzzer may sound.
- Soon after the warning light changes from blinking to lighting, stop the pumping operation.

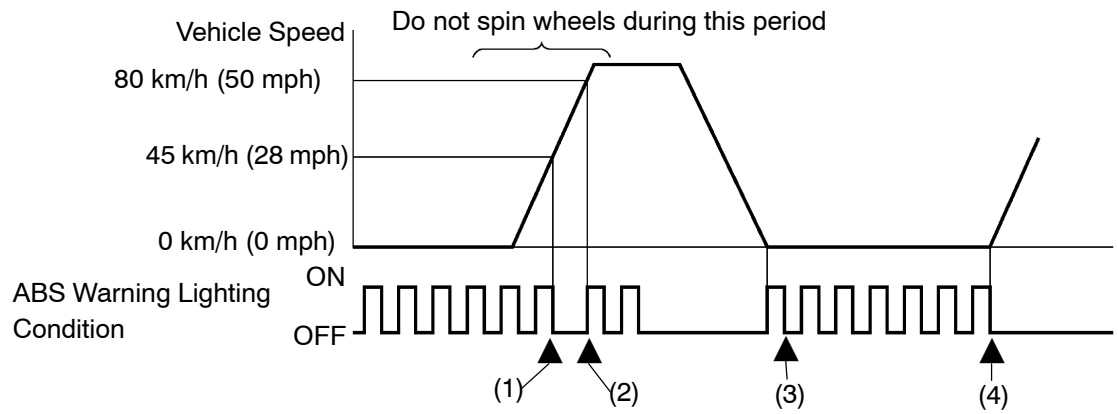
(e) Check speed sensor.

(1) Start the engine.

(2) Check that the ABS warning light blinks.

(3) Drive the vehicle straight forward.
When driving the vehicle with the speed faster than 90 km/h (56 mph) for several seconds, check that the ABS warning light goes off.

Lighting Condition during Speed Sensor Check (Normal)



(1): OFF after middle speed check over 45 km/h (28 mph)

(2): Blinking for approx.1 sec. in high speed check over 80 km/h (50 mph), and then OFF after the check

(3): Blinking during vehicle stopped (light condition when the speed sensor check is finished normally)

(4): OFF during vehicle running (light condition when the speed sensor check is finished normally)

F42509

(4) Stop the vehicle.

HINT:

- The sensor check may not be completed if the rear wheels are spinning.
- There is a case that the warning light will not turn off after check if starting the sensor check while steering the vehicle.
- When the sensor is abnormal, the light condition before the sensor check is finished is different from that when it is normal.

(f) Check the ABS warning light condition after the check is completed.
Lighting condition when the speed sensor check is finished normally:

Vehicle condition	Lighting condition of ABS warning light
Vehicle stopped	Blinking (ON) (It blinks even if the test mode is not finished normally)
Vehicle running	Not blinking (OFF)

HINT:

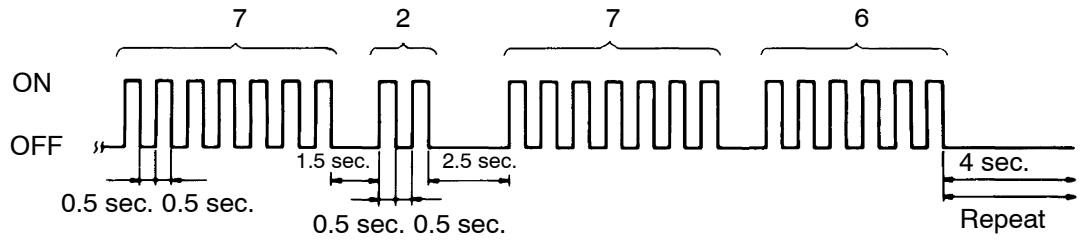
- When the sensor check is not finished and the sensor is abnormal, the warming light is flashes even while driving.
- When the sensor check is not finished and the sensor is abnormal, the ABS will not operate.

(g) Read the DTC:
(1) Using SST, connect terminals TC and CG of the DLC3.
SST 09483–18040
(2) Turn the ignition switch ON.
(3) Read the number of blinks of the ABS warning light.

HINT:

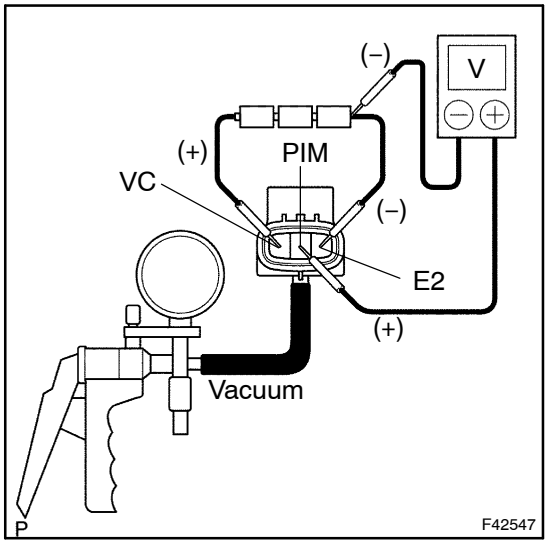
- See the list of the DTC shown on the 05–205.
- If all the sensors are normal, a normal code is output (A cycle of 0.25 seconds ON and 0.25 seconds OFF is repeated).
- If 2 or more malfunctions are indicated at the same time, the lowest numbered code will be displayed.

Malfunction Code (Example DTC 72, 76)



BR3893

(4) After performing the check, turn the ignition switch OFF, and disconnect the SST from the DLC3.



6. CHECK VACUUM SENSOR

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

(b) Connect the VC terminal to the battery's positive (+) terminal, and the E2 terminal to the battery's negative (–) terminal, and then apply about 4.5 V between the VC and E2 terminals.

NOTICE:

Do not apply voltage of 6 V or more to terminals VC and E2.

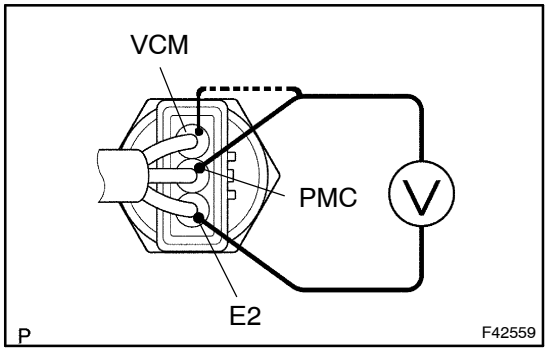
(c) Connect a voltmeter to terminals PIM and E2 of the ECU, and measure the output voltage under the ambient atmospheric pressure.

(d) Apply vacuum to the vacuum sensor in segments from 20 kPa (150 mmHg, 5.91 in.Hg) to 100 kPa (750 mmHg, 29.53 in.Hg).

(e) Measure the voltage drop from above step (c) for each segment.

Standard:

Front brake caliper fluid pressure	Voltage
20 kPa (150 mmHg, 5.91 in.Hg)	1.2 V
60 kPa (450 mmHg, 17.71 in.Hg)	2.4 V
100 kPa (750 mmHg, 29.53 in.Hg)	3.6 V



7. CHECK MASTER CYLINDER PRESSURE SENSOR

(a) Measure the voltage between terminals VCM and E2 of the master cylinder pressure sensor.

Standard: 4.85 – 5.15 V

(b) Install the LSPV gauge to the front caliper bleeder plug portion, and bleed the LSPV gauge.

(c) Remove the air cleaner inlet and battery clamp cover.

(d) Start the engine and depress the brake pedal, and then check the relation between the fluid pressure and voltage between the PMC and E2 terminals of the master cylinder pressure sensor with the connector still connected.

Standard:

Front Brake Caliper Fluid Pressure	Voltage
0 MPa (0 Kgf/cm^2, 0 psi)	0.5 V
9.8 MPa (100 kgf/cm^2, 1,422 psi)	2.5 V
19.6 MPa (200 kgf/cm^2, 2,844 psi)	4.5 V