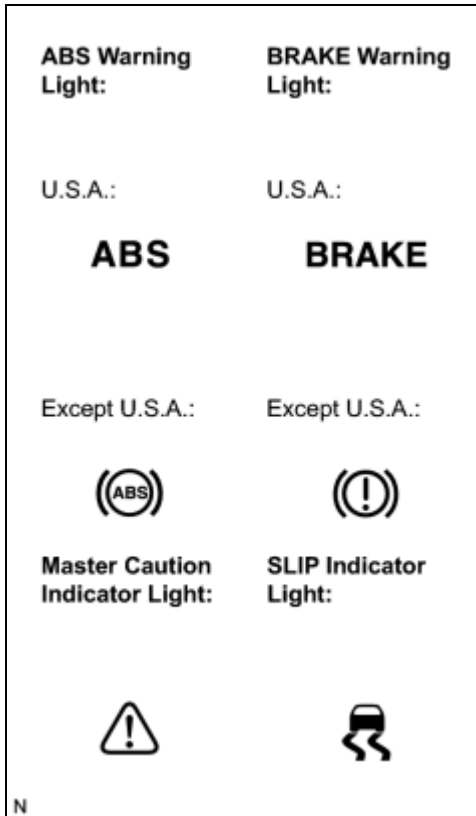


Last Modified: 7-13-2007		1.6 D
Service Category: Brake	Section: Brake Control/Dynamic Control System	
Model Year: 2008	Model: ES350	Doc ID: RM000000XHT01CX
Title: BRAKE CONTROL: VEHICLE STABILITY CONTROL SYSTEM: TEST MODE PROCEDURE (2008 ES350)		

## TEST MODE PROCEDURE

### 1. WARNING LIGHT AND INDICATOR LIGHT INITIAL CHECK



(a) Release the parking brake.

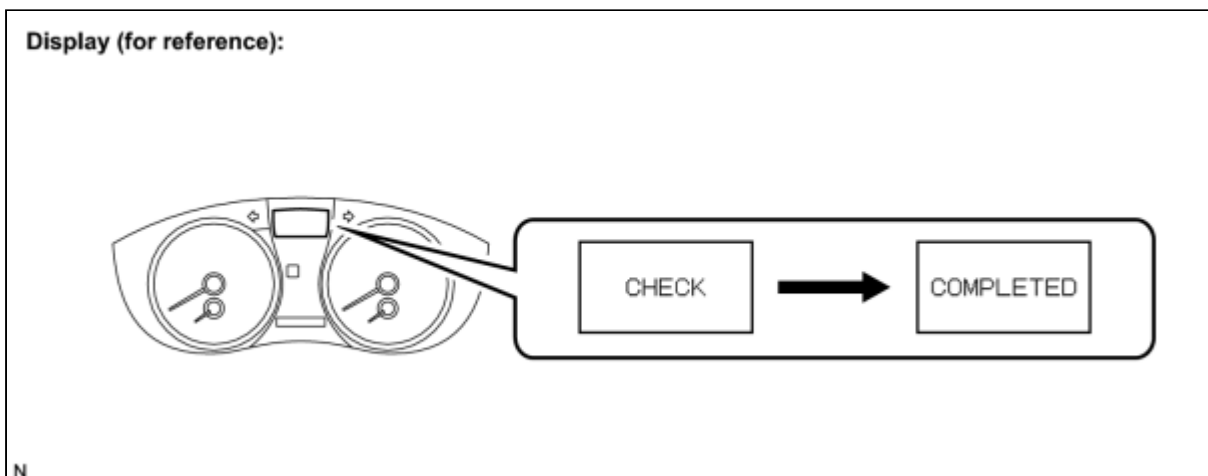
**NOTICE:**

Before releasing the parking brake, move the shift lever to the P position for safety.

**HINT:**









When the parking brake is applied or the level of the brake fluid is low, the BRAKE warning light comes on.

- (b) When the engine switch is turned on (IG), check that the ABS warning, BRAKE warning, SLIP indicator, and master caution indicator lights come on for approximately 3 seconds.
- (c) Make sure that the message on the multi information display changes from the check message to the completed message for 2 seconds.



**HINT:**

- If the ECU stores a DTC, the ABS warning, BRAKE warning and SLIP indicator lights will come on.
- If the vehicle is equipped with a multi information display, and the vehicle stores a DTC, the master caution indicator light will illuminate, and the multi information display will indicate a malfunction. In this case, the ABS warning, BRAKE warning, and SLIP indicator lights will also come on.
- If the indicator remains on or does not come on, proceed to troubleshooting for the light circuits listed below.
- Illustrations may differ from the actual screen displayed depending on the specifications of the vehicle and customized settings.

TROUBLE AREA	SEE PROCEDURE
ABS warning light circuit	 or 
BRAKE warning light circuit	 or 
VSC warning light circuit	 or 
SLIP indicator light circuit	 or 

## 2. SENSOR CHECK USING TEST MODE (SIGNAL CHECK) (TECHSTREAM)

### NOTICE:

After replacement of the brake actuator assembly and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

### HINT:

- If the engine switch is turned from on (IG) to on (ACC) or off during Test Mode (signal check), DTCs of the signal check function will be erased.
- During Test Mode (signal check), the skid control ECU records all DTCs of the signal check function. By performing the Test Mode (signal check), the codes are erased if a normal condition is confirmed. The remaining codes are the codes where an abnormality was found.

(a) Procedure to enter Test Mode.

- (1) Turn the engine switch off.
- (2) Connect Techstream to the DLC3.
- (3) Check that the steering wheel is centered and move the shift lever to the P position.
- (4) Turn the engine switch on (IG).
- (5) Set Techstream to Test Mode (select "Signal Check").

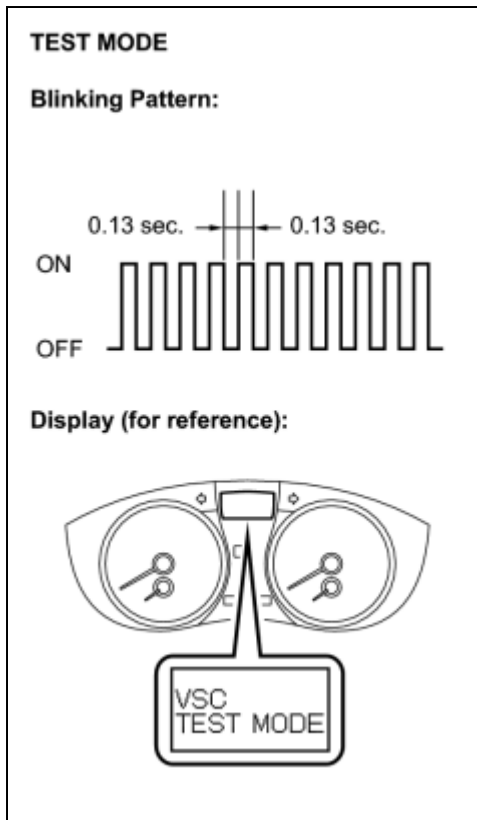
### HINT:

Refer to Techstream operator's manual for further details.

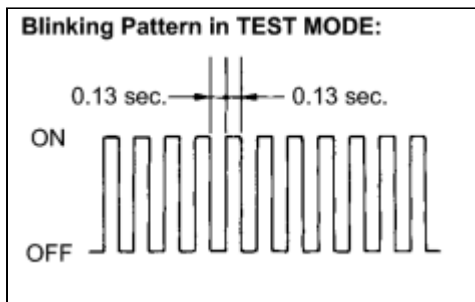
- (6) Check that the ABS warning light blinks and the VSC test mode message is displayed on the multi information display (Test Mode).

### HINT:

- The SLIP indicator light remains on during Test Mode because TRAC is prohibited.
- If the ABS and VSC warning (multi information display) lights do not blink, inspect the TS and CG terminal circuit, and ABS and VSC warning light circuits.
- Illustrations may differ from the actual screen displayed depending on the specifications of the vehicle and customized settings.



TROUBLE AREA	SEE PROCEDURE
TS and CG terminal circuit	<a href="#">INFO</a>
ABS warning light circuit	<a href="#">INFO</a>
VSC warning light circuit	<a href="#">INFO</a>



(7) Check the ABS sensor.

**HINT:**

Check that the ABS warning light is blinking in Test Mode and perform the check.

### 3. ACCELERATION SENSOR CHECK (TECHSTREAM)

(a) Keep the vehicle stationary on a level surface for 1 second or more.

**HINT:**

Acceleration sensor check can be performed with the master cylinder pressure sensor check below.

### 4. MASTER CYLINDER PRESSURE SENSOR CHECK (TECHSTREAM)

(a) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly and continuously depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second.

(b) Check that the ABS warning light stays on for 3 seconds.

**HINT:**

- Ensure that the ABS warning light comes on.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time brake pedal operation above is performed.
- If the check of the master cylinder pressure sensor is not completed, depressing the brake pedal causes further decrease in the negative pressure, making the sensor check difficult to be completed.

- If the negative pressure is insufficient, the master cylinder pressure sensor check may not be completed. In this case, run the engine at idle to obtain sufficient negative pressure.
- If the brake pedal is strongly depressed when the negative pressure is insufficient, the BRAKE warning light may come on in accordance with the booster pressure control. In this case, run the engine at idle to obtain sufficient negative pressure.

## 5. SPEED SENSOR CHECK (TECHSTREAM)

(a) Check the speed sensor signal.

(1) Drive the vehicle straight ahead.

Accelerate the vehicle to a speed of 45 km/h (28 mph) or more for several seconds and check that the ABS warning light goes off.

### **HINT:**

**The sensor check may not be completed if wheelspin occurs.**

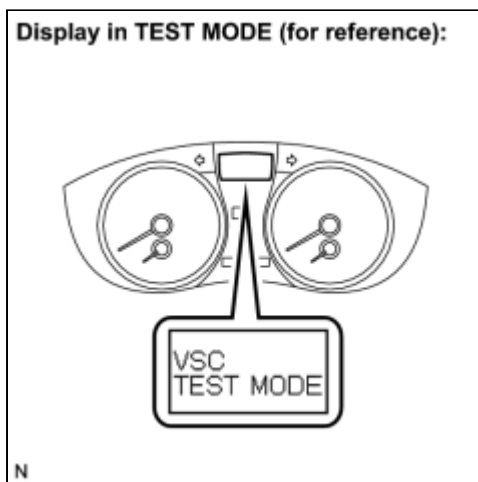
(b) Stop the vehicle.

### **NOTICE:**

- Before performing the speed sensor check, complete the acceleration sensor and master cylinder pressure sensor checks.
- The speed sensor check may not be completed if the speed sensor check is started while turning the steering wheel or spinning the wheels.
- After the ABS warning light goes off and if the vehicle speed exceeds 80 km/h (50 mph), a signal check code will be stored again. Accelerate or stop the vehicle before the speed reaches 80 km/h (50 mph).
- If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.

### **HINT:**

**When the sensor check has been completed, the ABS warning light goes off while driving and blinks in the Test Mode pattern while stationary.**



(c) Check the VSC sensor.

(1) Check that the VSC test mode message is displayed on the multi information display, and perform the check.

### **HINT:**

**Illustrations may differ from the actual screen displayed depending on the specifications of the vehicle and customized settings.**

## 6. YAW RATE SENSOR CHECK (TECHSTREAM)

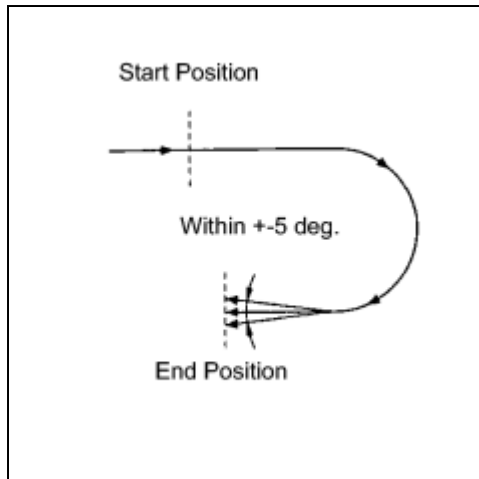
(a) Check the output of the yaw rate sensor.

(1) Keep the vehicle in a stationary condition on a level surface for 1 second or more.

(2) Move the shift lever from P to the D position and drive the vehicle

at a speed of approximately 5 km/h (3 mph), and turn the steering wheel either to the left or right 90° or more until the vehicle makes a 180° turn.

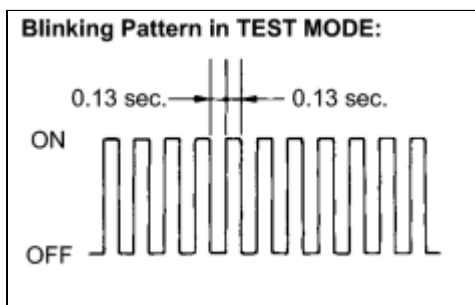
(3) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.



**HINT:**

- If the skid control buzzer sounds, the sensor check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit INFO, then perform the sensor check again.
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. 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.
- Do not turn the engine switch off while turning.
- Do not move the shift lever to the P position while turning, but changing in the vehicle speed, stopping, or driving in reverse is possible.
- Complete the turn within 20 seconds.

## 7. END OF SENSOR CHECK (TECHSTREAM)



(a) If the sensor check is completed, the ABS warning light blinks (Test Mode) when the vehicle stops and the ABS warning light is off while the vehicle is driving.

**NOTICE:**

- When the yaw rate sensor, acceleration sensor, speed sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.
- If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.

## 8. READ DTC OF SIGNAL CHECK FUNCTION (TECHSTREAM)

(a) Read the DTC(s) by following the tester screen.

**NOTICE:**

- If only the DTCs are displayed, repair the malfunction area and clear the DTCs.
- If the DTCs or Test Mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the Test Mode inspection.

**HINT:**

See the list of DTC (See procedure "A").

## 9. SENSOR CHECK USING TEST MODE (SIGNAL CHECK) (SST CHECK WIRE)

**NOTICE:**

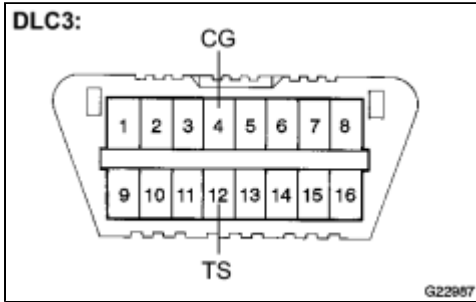
After replacement of the brake actuator assembly and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

**HINT:**

- If the engine switch is turned from on (IG) to on (ACC) or off during Test Mode (signal check), DTCs of the signal check function will be erased.
- During Test Mode (signal check), the skid control ECU records all DTCs of the signal check function. By performing the Test Mode (signal check), the codes are erased if a normal condition is confirmed. The remaining codes are the codes where an abnormality was found.

(a) Procedure to enter Test Mode.

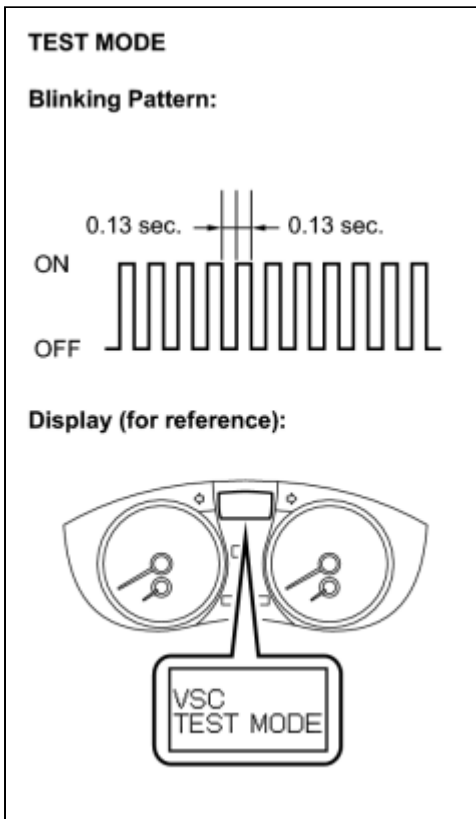
- (1) Turn the engine switch off.
- (2) Check that the steering wheel is centered and move the shift lever to the P position.



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

**SST: 09843-18040**

(4) Turn the engine switch on (IG).

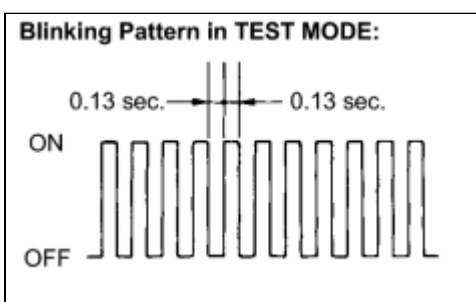


(5) Check that the ABS warning light blinks and the VSC test mode message is displayed on the multi information display (Test Mode).

**HINT:**

- The SLIP indicator light remains on during Test Mode because TRAC is prohibited.
- If the ABS and VSC warning (multi information display) lights do not blink, inspect the TS and CG terminal circuit, and ABS and VSC warning light circuits.
- Illustrations may differ from the actual screen displayed depending on the specifications of the vehicle and customized settings.

TROUBLE AREA	SEE PROCEDURE
TS and CG terminal circuit	<a href="#">INFO</a>
ABS warning light circuit	<a href="#">INFO</a>
VSC warning light circuit	<a href="#">INFO</a>



(6) Check the ABS sensor.

**HINT:**

Check that the ABS warning light is blinking in Test Mode and perform the check.

## 10. ACCELERATION SENSOR CHECK (SST CHECK WIRE)

- (a) Keep the vehicle stationary on a level surface for 1 second or more.

### **HINT:**

Acceleration sensor check can be performed with the master cylinder pressure sensor check below.

## 11. MASTER CYLINDER PRESSURE SENSOR CHECK (SST CHECK WIRE)

- (a) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly and continuously depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second.
- (b) Check that the ABS warning light stays on for 3 seconds.

### **HINT:**

- Ensure that the ABS warning light comes on.
- While the ABS warning light stays on, continue to depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.
- If the check of the master cylinder pressure sensor is not completed, depressing the brake pedal causes further decrease in the negative pressure, making the sensor check difficult to be completed.
- If the negative pressure is insufficient, the master cylinder pressure sensor check may not be completed. In this case, run the engine at idle to obtain sufficient negative pressure.
- If the brake pedal is strongly depressed when the negative pressure is insufficient, the BRAKE warning light may come on in accordance with the booster pressure control. In this case, run the engine at idle to obtain sufficient negative pressure.

## 12. SPEED SENSOR CHECK (SST CHECK WIRE)

- (a) Check the speed sensor signal.

- (1) Drive the vehicle straight ahead.

Accelerate the vehicle to a speed of 45 km/h (28 mph) or more for several seconds and check that the ABS warning light goes off.

### **HINT:**

The sensor check may not be completed if wheelspin occurs.

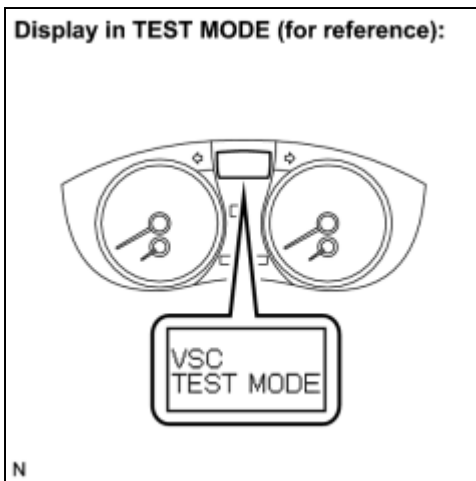
- (b) Stop the vehicle.

### **NOTICE:**

- Before performing the speed sensor check, complete the acceleration sensor and master cylinder pressure sensor checks.
- The speed sensor check may not be completed if the speed sensor check is started while turning the steering wheel or spinning the wheels.
- After the ABS warning light goes off, if vehicle speed exceeds 80 km/h (50 mph), a signal check code will be stored again. Accelerate or stop the vehicle before the speed reaches 80 km/h (50 mph).
- If the signal check has not been completed, the ABS warning light blinks while driving and the ABS system does not operate.

### **HINT:**

When the sensor check has been completed, the ABS warning light goes off while driving and blinks in the Test Mode pattern while stationary.



(c) Check the VSC sensor.

- (1) Check that the VSC test mode message is displayed on the multi information display, and perform the check.

**HINT:**

**Illustrations may differ from the actual screen displayed depending on the specifications of the vehicle and customized settings.**

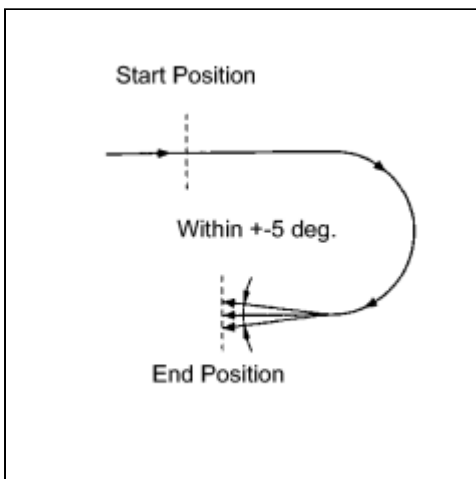
### 13. YAW RATE SENSOR CHECK (SST CHECK WIRE)

(a) Check the output of the yaw rate sensor.

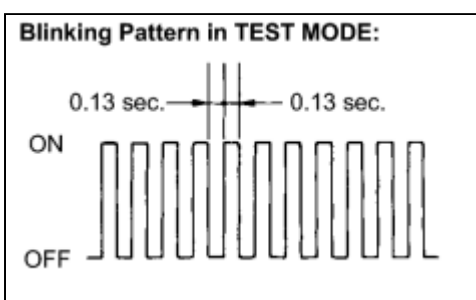
- (1) Keep the vehicle stationary on a level surface for 1 second or more.
- (2) Move the shift lever from P to the D position and drive the vehicle at a vehicle speed of approximately 5 km/h (3 mph) and turn the steering wheel either to the left or right 90° or more and until the vehicle makes a 180° turn.
- (3) Stop the vehicle and move the shift lever to the P position. Check that the skid control buzzer sounds for 3 seconds.

**HINT:**

- If the skid control buzzer sounds, the sensor check is completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit INFO, then perform the sensor check again.
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check the DTC.
- Make a 180° turn. At the end of the turn, the direction of the vehicle should be within 180°  $\pm$  5° of its start position.
- Do not spin the wheels.
- Do not turn the engine switch off while turning.
- Do not move the shift lever to the P position while turning, but changing in the vehicle speed, stopping, or driving in reverse is possible.
- Complete the turn within 20 seconds.



### 14. END OF SENSOR CHECK (SST CHECK WIRE)



- (a) If the sensor check is completed, the ABS warning light blinks (Test Mode) when the vehicle stops and the ABS warning light is off while the vehicle is driving.

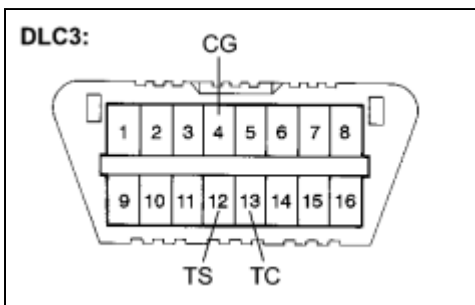
**NOTICE:**

- When the yaw rate sensor, acceleration sensor, speed sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.
- If the sensor check is not completed, the ABS warning light blinks even



while the vehicle is driving and the ABS does not operate.

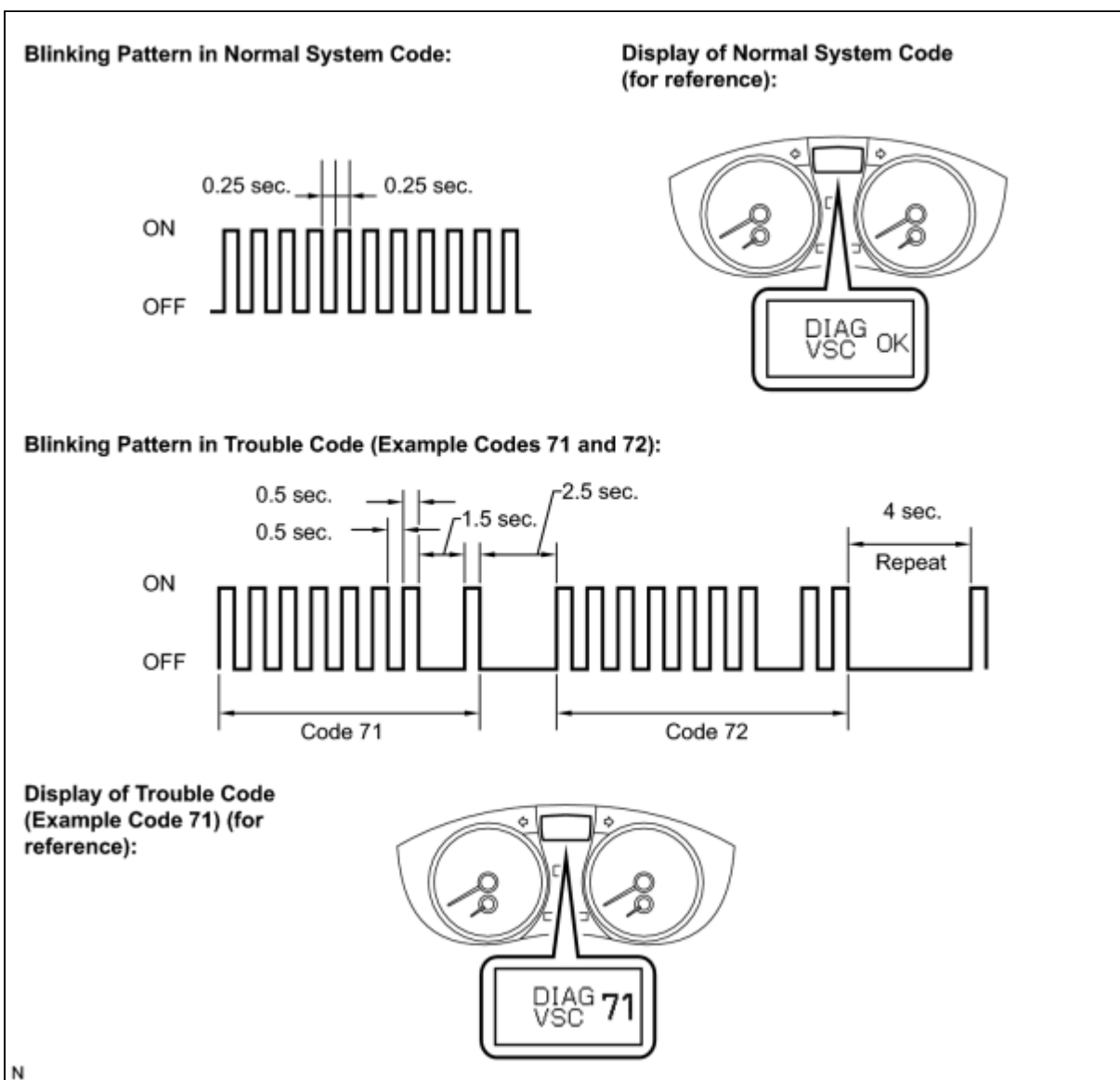
### 15. READ DTC OF SIGNAL CHECK FUNCTION (SST CHECK WIRE)



(a) Using SST, connect terminals TC and CG of the DLC3.

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(b) Count the number of blinks of the ABS warning light and read a diagnosis VSC message on the multi information display.



#### NOTICE:

- If only the DTCs are displayed, repair the malfunction area and clear the DTCs.
- If the DTCs or Test Mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the Test Mode inspection.

**HINT:**

- If more than 1 malfunction is detected at the same time, the lowest numbered code will be displayed first.
- Illustrations may differ from the actual screen displayed depending on the specifications of the vehicle and customized settings.
- See the list of DTC (See procedure "A").

(c) After performing the check, disconnect the SST from terminals TS and CG, and TC and CG of the DLC3 and turn the engine switch off.

(d) Turn the engine switch on (IG).

**HINT:**

- If the engine switch is not turned on (IG) after the SST is removed from the DLC3, the previous Test Mode will continue.
- If the engine switch is turned on (IG) with terminals TS and CG shorted, the previous Test Mode will continue.

**16. DTC OF TEST MODE (SIGNAL CHECK) FUNCTION (Procedure "A")****ABS sensor:**

DTC CODE	DETECTION ITEM	TROUBLE AREA
C1271/71	Low output signal of front speed sensor RH	<ul style="list-style-type: none"> <li>• Front speed sensor RH</li> <li>• Sensor installation</li> <li>• Speed sensor rotor</li> </ul>
C1272/72	Low output signal of front speed sensor LH	<ul style="list-style-type: none"> <li>• Front speed sensor LH</li> <li>• Sensor installation</li> <li>• Speed sensor rotor</li> </ul>
C1273/73	Low output signal of rear speed sensor RH	<ul style="list-style-type: none"> <li>• Rear speed sensor RH</li> <li>• Sensor installation</li> <li>• Speed sensor rotor</li> </ul>
C1274/74	Low output signal of rear speed sensor LH	<ul style="list-style-type: none"> <li>• Rear speed sensor LH</li> <li>• Sensor installation</li> <li>• Speed sensor rotor</li> </ul>
C1275/75	Abnormal change in output signal of front speed sensor RH	Speed sensor rotor
C1276/76	Abnormal change in output signal of front speed sensor LH	Speed sensor rotor
C1277/77	Abnormal change in output signal of rear speed sensor RH	Speed sensor rotor
C1278/78	Abnormal change in output signal of rear speed sensor LH	Speed sensor rotor
C1279/79	Acceleration sensor output voltage malfunction	<ul style="list-style-type: none"> <li>• Yaw rate and acceleration sensor</li> <li>• Sensor installation</li> </ul>
C1281/81	Master cylinder pressure sensor output malfunction	<ul style="list-style-type: none"> <li>• Stop light switch</li> <li>• Master cylinder pressure sensor</li> </ul>

**VSC sensor:**

DTC CODE	DETECTION ITEM	TROUBLE AREA
C0371/71	Yaw rate sensor	Yaw rate and acceleration sensor

**HINT:**

The codes in this table are output only in Test Mode (signal check).

