VEHICLE STABILITY CONTROL SYSTEM

DTC C0226: SFR SOLENOID CIRCUIT; DTC C0236: SFL SOLENOID CIRCUIT; DTC C0246: SRR SOLENOID CIRCUIT; DTC C0256: SRL SOLENOID CIRCUIT; DTC C1225: SM SOLENOID CIRCUIT

DESCRIPTION

These solenoids turn on when signals are received from the skid control ECU and they control the pressure acting on the wheel cylinders to control the braking force.

DTC Code	DTC Detection Condition	Trouble Area
C0226 C0236 C0246 C0256	Open or short in the solenoid circuit continues for 0.05 seconds or more.	Brake actuator assembly
C1225	Any of the following is detected: 1. While switching solenoid (SM1 or SM2) is ON, overcurrent continues for 0.15 seconds or more. 2. While switching solenoid (SM1 or SM2) is OFF, an open circuit continues for 0.05 seconds or more. 3. While switching solenoid (SM1 or SM2) is ON, an open circuit continues for 0.05 seconds or more. 4. While switching solenoid (SM1 or SM2) is OFF, current continues to be applied for 0.1 seconds or more. 5. Short to GND in the switching solenoid (SM1 or SM2) continues for 0.1 seconds or more. 6. Switching solenoids SM1 and SM2 are shorted for 0.1 seconds or more.	Brake actuator assembly

WIRING DIAGRAM

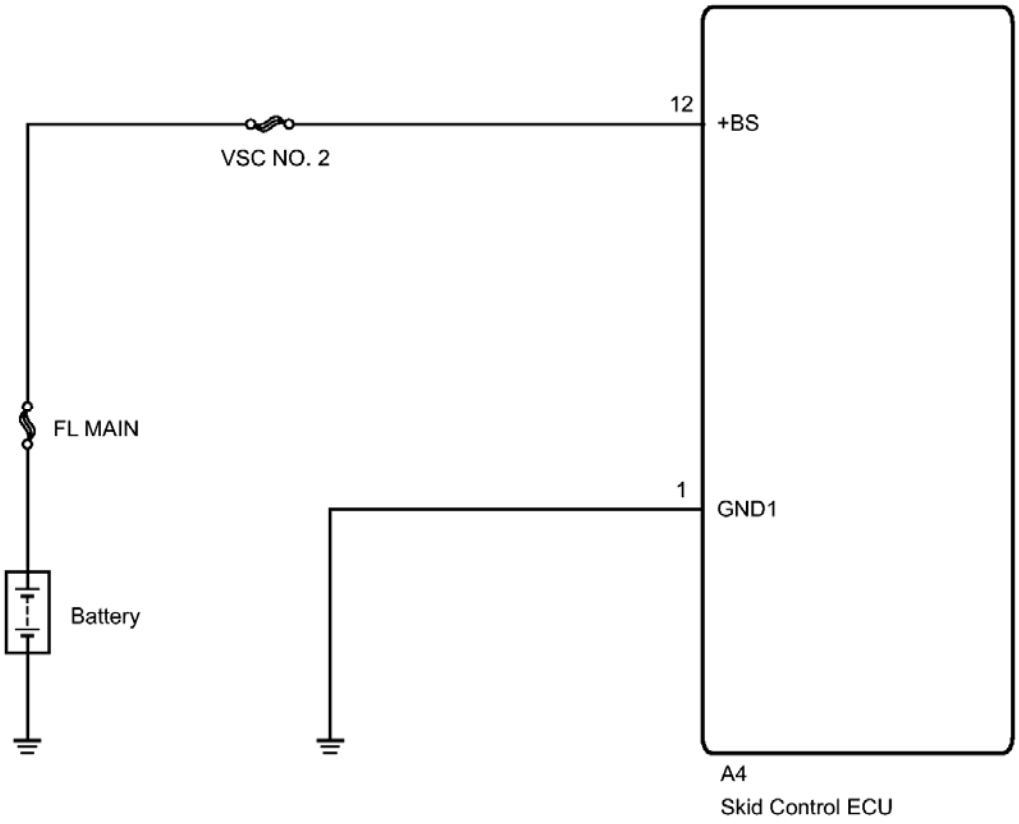


Fig. 1: Skid Control ECU - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **RECONFIRM DTC**

   HINT:

   These codes are detected when a problem is determined in the brake actuator assembly.

   The solenoid circuits are in the brake actuator assembly.

   Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check

if any DTCs are output before replacing the brake actuator assembly.

a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
b. Start the engine.
c. Drive the vehicle at a speed of 20 km/h (12 mph) or more for 30 seconds or more.
d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C0226, C0236, C0246, C0256 and C1225) are not output	A
DTCs (C0226, C0236, C0246, C0256 and/or C1225) are output	B

HINT:

- If a speed signal of 6 km/h (4 mph) or more is input to the skid control ECU with the ignition switch to ON and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.
- If the normal system code is output (no trouble codes are output), slightly jiggle the connectors, wire harness, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator assembly (skid control ECU), inspect and repair the connector or wire harness.
- The DTCs were possibly output due to a bad connection of the connector terminal.

B --> See step 3

A --> See step 2

2. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH**

TROUBLESHOOTING

3. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C0273: OPEN IN ABS MOTOR RELAY CIRCUIT; DTC C0274: SHORT IN ABS MOTOR RELAY CIRCUIT; DTC C1361: SHORT IN ABS MOTOR FAIL SAFE RELAY CIRCUIT

DESCRIPTION

The ABS motor relay supplies power to the ABS pump motor. While the ABS is activated, the ECU turns the motor relay on and operates the ABS pump motor.

If the voltage supplied to the motor relay (BM) is below the DTCs detection threshold due to low voltage from the battery or alternator, these DTCs may be stored.

DTC Code	DTC Detection Condition	Trouble Area
C0273	Either of the following is detected: 1. All of the following conditions continue for 0.1 seconds or more. • The IG1 terminal voltage is between 9.5 and 17.2 V. • While initial check, or ABS, BA, TRAC or VSC is operating. • Relay contact remains open when the relay is ON. 2. Both of the following conditions continue for 0.1 seconds or more. • The IG1 terminal voltage is less than 9.5 V. • Relay contact remains open when the relay is ON.	• Fusible link block (VSC NO. 1 fuse) • ABS motor relay circuit • Brake actuator assembly (ABS motor relay)
C0274	When the motor relay is OFF, the motor relay remains closed for 4 seconds or more.	• ABS motor relay circuit • Brake actuator assembly (ABS motor relay)
C1361	Immediately after the ignition switch is turned to ON, the relay contact is closed for 4 seconds when the motor fail safe relay is OFF.	• Fusible link block (VSC NO. 1 fuse) • ABS motor fail safe relay circuit • Brake actuator assembly (ABS motor fail safe relay)

WIRING DIAGRAM

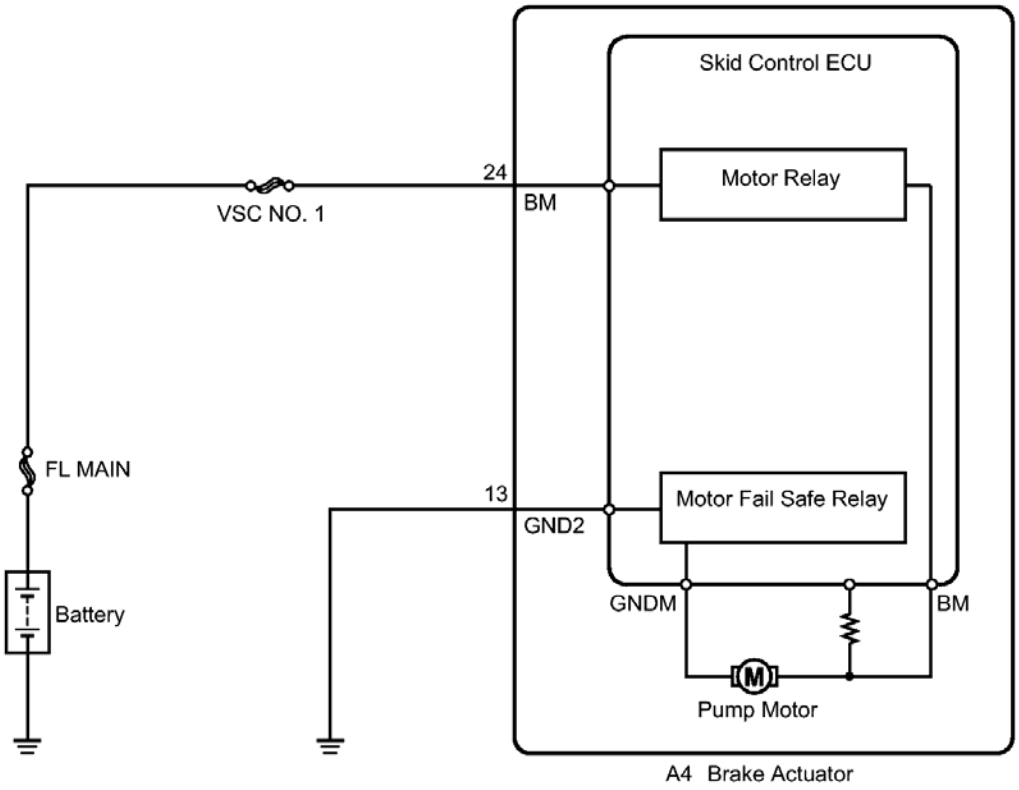


Fig. 2: ABS Motor Relay Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

HINT:

When DTC C1241 and/or C1417 is output together with DTC C0273, C0274 and/or C1361, inspect and repair the trouble areas indicated by DTC C1241 and/or C1417 first. Refer to **DTC C1241: Low Power Supply Voltage Malfunction**, or refer to **DTC C1417: High Power Supply Voltage Malfunction**).

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM (ABS MOTOR RELAY)**
   a. Connect the Techstream to the DLC3.
   b. Start the engine.

c. Turn the Techstream on.

d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Active Test.

e. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Motor Relay	ABS motor relay	Relay ON/OFF	Operating sound of motor can be heard

f. Check for operating sound of the ABS motor relay when operating it using the Techstream.

RESULT

Result	Proceed to
Operating sound is not heard	A
Operating sound is heard	B

B --> See step 4

A: Go to next step

2. **INSPECT SKID CONTROL ECU (BM TERMINAL)**

a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

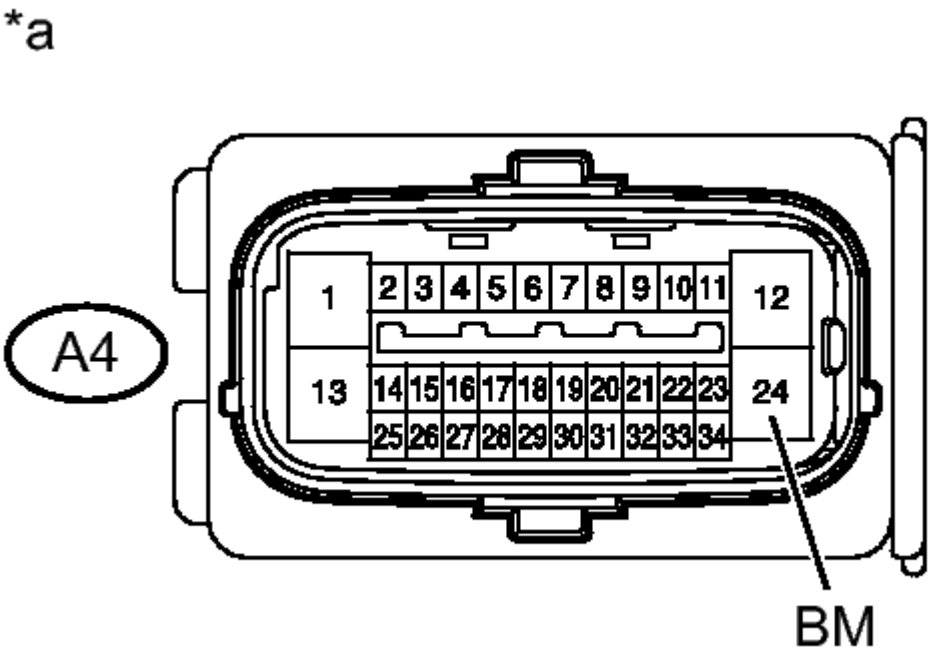


Fig. 3: Inspecting Skid Control ECU (+BM Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector.
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
A4-24 (BM) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (BM CIRCUIT)

OK: Go to next step

3. **INSPECT SKID CONTROL ECU (GND2 TERMINAL)**
   a. Measure the resistance according to the value(s) in the table below.

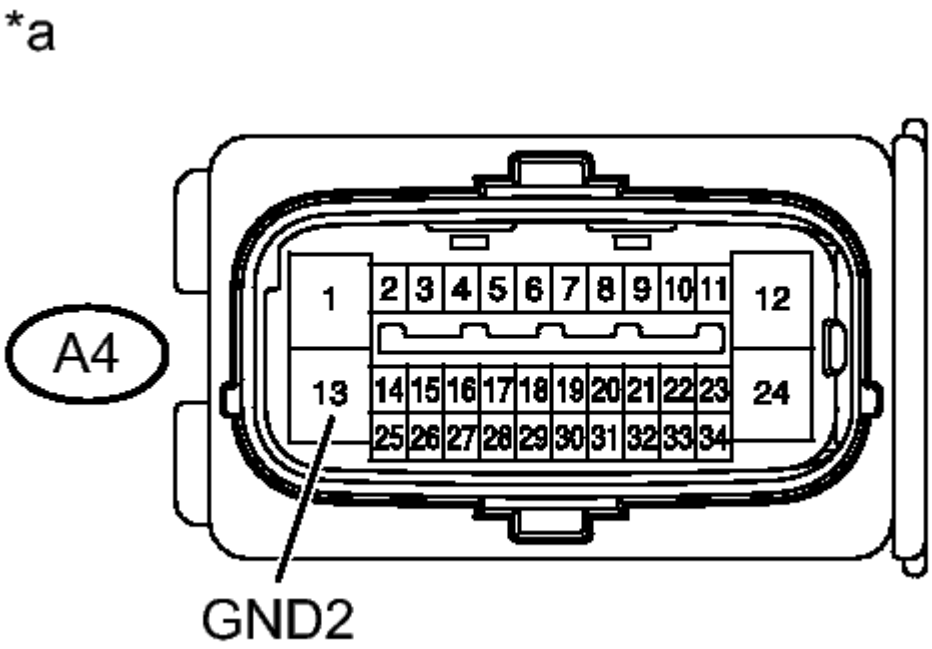


Fig. 4: Inspecting Skid Control ECU (GND2 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-13 (GND2) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND2 CIRCUIT)

OK: Go to next step

4. **RECONFIRM DTC**

HINT:

This code is detected when a problem is identified in the brake actuator assembly.

The ABS motor relay is in the brake actuator assembly.

Therefore, ABS motor relay inspection and motor relay unit inspection cannot be performed. Be sure to check if the DTC is output before replacing the brake actuator assembly.

a. Turn the ignition switch off.
b. Reconnect the skid control ECU connector.
c. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
d. Start the engine.
e. Drive the vehicle at a speed of 20 km/h (12 mph) or more for 30 seconds or more.
f. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C0273, C0274 and C1361) are not output	A
DTCs (C0273, C0274 and/or C1361) are output	B

HINT:

- If a speed signal of 6 km/h (4 mph) or more is input to the skid control ECU with the ignition switch to ON and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.

- If the normal system code is output (no trouble codes are output), slightly jiggle the connectors, wire harness, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator assembly (skid control ECU), inspect and repair the connector or wire harness.
- The DTCs were possibly output due to a bad connection of the connector terminal.

B --> See step 6

A --> See step 5

5. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C0278: OPEN IN ABS SOLENOID RELAY CIRCUIT; DTC C0279: SHORT IN ABS SOLENOID RELAY CIRCUIT

DESCRIPTION

The ABS solenoid relay supplies power to the ABS solenoid and TRAC solenoid.

The solenoid relay is turned on 1.5 seconds after the ignition switch is turned to ON, and is turned off if an open or short in the solenoid is detected by self diagnosis performed when the vehicle starts running.

The ABS solenoid relay is housed in the skid control ECU in the actuator assembly.

DTC Code	DTC Detection Condition	Trouble Area
C0278	Either of the following is detected: 1. Both of the following conditions continue for 0.2 seconds or more. • The IG1 terminal voltage is 9.5 V or more. • The solenoid relay contact is open when the relay is ON. 2. Both of the following conditions continue for 0.2 seconds or more. • The IG1 terminal voltage becomes lower than 9.5 V when the relay is turned on. • The relay contact remains open.	• Fusible link block (VSC NO. 2 fuse) • ABS solenoid relay circuit • Brake actuator assembly (ABS solenoid relay)
C0279	Immediately after the ignition switch is turned to ON, the solenoid relay contact is closed for 4	• ABS solenoid relay circuit • Brake actuator assembly (ABS

	seconds when the relay is turned off.	solenoid relay)

WIRING DIAGRAM

Refer to DTCs C0226, C0236, C0246, C0256 and C1225. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

HINT:

When DTC C1241 and/or C1417 is output together with DTC C0278 and/or C0279, inspect and repair the trouble areas indicated by DTC C1241 and/or C1417 first. Refer to **DTC C1241: Low Power Supply Voltage Malfunction**, or refer to **DTC C1417: High Power Supply Voltage Malfunction**).

PROCEDURE

1. **INSPECT SKID CONTROL ECU (+BS TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

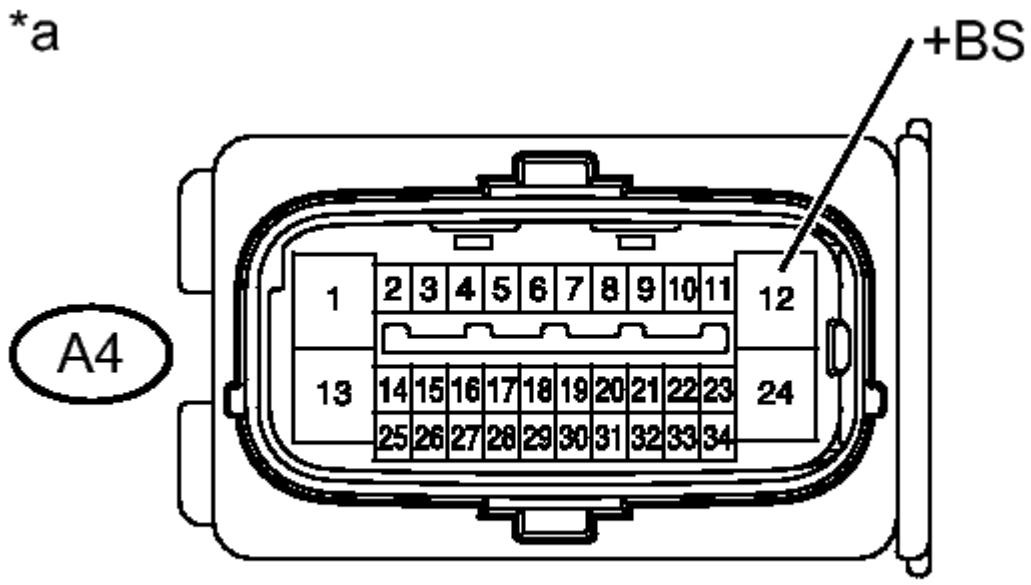


Fig. 5: Inspecting Skid Control ECU (+BS Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector.

c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Condition	Specified Condition
A4-12 (+BS) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (+BS CIRCUIT)

OK: Go to next step

2. **INSPECT SKID CONTROL ECU (GND1 TERMINAL)**

   a. Measure the resistance according to the value(s) in the table below.

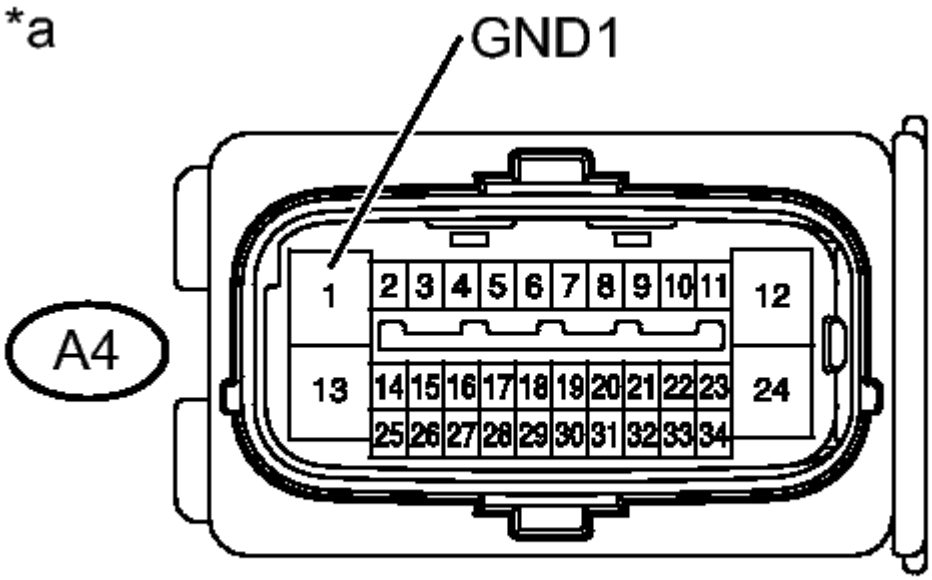


Fig. 6: Inspecting Skid Control ECU (GND1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-1 (GND1) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)

OK: Go to next step

3. **RECONFIRM DTC**

HINT:

This code is detected when a problem is identified in the brake actuator assembly.

The solenoid circuit is in the brake actuator assembly.

Therefore, solenoid circuit inspection and solenoid unit inspection cannot be performed. Be sure to check if the DTC is output before replacing the brake actuator assembly.

a. Reconnect the skid control ECU connector.
b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
c. Start the engine.
d. Drive the vehicle at a speed of 20 km/h (12 mph) or more for 30 seconds or more.
e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C0278 and C0279) are not output	A
DTCs (C0278 and/or C0279) are output	B

HINT:

- If a speed signal of 6 km/h (4 mph) or more is input to the skid control ECU with the ignition switch to ON and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.
- If the normal system code is output (no trouble codes are output), slightly jiggle the connectors, wire harnesses, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator assembly (skid control ECU), inspect and repair the connector or wire harness.
- The DTCs were possibly output due to a bad connection of the connector terminal.

B --> See step 5

A --> See step 4

4. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1203: ECM COMMUNICATION CIRCUIT MALFUNCTION

DESCRIPTION

The circuit is used to send TRAC and VSC control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU.

If the skid control ECU is replaced or if the memory is cleared, system information such as the destination or vehicle type will be unconfirmed. After switching to Test Mode, the skid control ECU performs initialization when starting communication with the vehicle, and stores the system information in 2 or 3 seconds.

DTC Code	DTC Detection Condition	Trouble Area
C1203	Engine, drive source and destination variations that are sent from the ECM do not match the ones of the skid control ECU or there is no information in the memory.	• ECM • Brake actuator assembly (Skid control ECU)

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK PART NUMBER (ECM)**
   a. Check that the part number of the installed ECM is correct.

   OK

   ECM installed in the vehicle has the correct part number.

   RESULT

Result	Proceed to
OK	A
NG (for 2GR-	

FE)	B
NG (for 1AR-FE)	C

B --> See step 5

C --> See step 7

A: Go to next step

2. **CLEAR AND STORE SYSTEM INFORMATION**
   a. Clear the system information. Refer to **CALIBRATION** .
   b. Store the system information. Refer to **CALIBRATION** .

NEXT: Go to next step

3. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1203) is not output	A
DTC (C1203) is output	B

B --> See step 6

A --> See step 4

4. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPLACE ECM. Refer to REMOVAL**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
7. **REPLACE ECM. Refer to REMOVAL**

DTC C1210: ZERO POINT CALIBRATION OF YAW RATE SENSOR UNDONE; DTC C1336: ZERO

POINT CALIBRATION OF ACCELERATION SENSOR UNDONE

DESCRIPTION

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system (w/ VDIM).
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU) (w/o VDIM).

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123 (Lost Communication with Yaw Rate Sensor Module) and U0124 (Lost Communication with Lateral Acceleration Sensor Module) are output (w/ VDIM).

The DTCs are also output when the calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1210	Zero point calibration of yaw rate sensor undone.	• Sensor installation (w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) installation (w/o VDIM) • Brake actuator assembly (Skid control ECU)
		• Sensor installation

C1336	Zero point calibration of acceleration sensor undone.	(w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) installation (w/o VDIM) • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC U0123, U0124 and/or U0126 is output together with DTC C1210 and/or C1336, inspect and repair the trouble areas indicated by DTC U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.

PROCEDURE

1. **PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR**
   a. Perform zero point calibration of the yaw rate and acceleration sensor. Refer to **CALIBRATION** .

   NEXT: Go to next step

2. **PERFORM TEST MODE (SIGNAL CHECK)**
   a. Turn the ignition switch off.
   b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

      OK

      All Test Mode DTCs are cleared.

      HINT:

      - If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .
      - For vehicles without VDIM, the Yaw Rate Sensor is inside the ECU.

      RESULT

Result	Proceed to
All Test Mode DTCs are cleared.	A
All Test Mode DTCs are not cleared (w/ VDIM).	B
All Test Mode DTCs are not cleared (w/o VDIM).	C

B --> See step 3

C --> See step 6

A --> END

3. **CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION**
   a. Turn the ignition switch off.
   b. Check that the yaw rate and acceleration sensor has been installed properly. Refer to

INSTALLATION .

OK

The sensor is tightened to the specified torque.

The sensor is not installed in a tilted position.

NG --> See step 8

OK: Go to next step

4. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is output	A
DTC is not output	B

B --> See step 9

A: Go to next step

5. **READ VALUE USING TECHSTREAM (YAW RATE AND ACCELERATION SENSOR)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Deceleration Sensor	Acceleration sensor / min.: -18.52 m/s^2 , max.: 18.39	-	During deceleration/acceleration: Changes continuously

	m/s^2		
Deceleration Sensor2	Acceleration sensor 2 / min.: -18.52 m/s^2 , max.: 18.39 m/s^2	-	During deceleration/acceleration: Changes continuously
Yaw Rate Sensor	Yaw rate sensor / min.: -128 degrees/s, max.: 127 degrees/s	Vehicle stationary: 0 degrees/s Right turn: -128 to 0 degrees/s Left turn: 0 to 127 degrees/s	-
Yaw Rate Sensor2	Yaw rate sensor 2 / min.: -128 degrees/s, max.: 127 degrees/s	Vehicle stationary: 0 degrees/s Right turn: -128 to 0 degrees/s Left turn: 0 to 127 degrees/s	-

f. Check that the yaw rate and acceleration sensor output value displayed on the Techstream.

OK

The yaw rate and acceleration sensor output value is normal.

NOTE: Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 11

OK --> See step 10

6. **CHECK BRAKE ACTUATOR ASSEMBLY INSTALLATION**
   a. Check that the brake actuator assembly has been installed properly. Refer to **INSTALLATION** .

      OK

      The brake actuator assembly is tightened to the specified torque.

      The brake actuator assembly is not installed in a tilted position.

   NG --> See step 12

   OK: Go to next step

7. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

      RESULT

Result	Proceed to
DTC is output	A
DTC is not output	B

   B --> See step 14

   A --> See step 13

8. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**
9. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
10. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
11. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
12. **INSTALL BRAKE ACTUATOR ASSEMBLY CORRECTLY. Refer to INSTALLATION**
13. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
14. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1232: ACCELERATION SENSOR STUCK MALFUNCTION; DTC C1243: ACCELERATION SENSOR STUCK MALFUNCTION; DTC C1245: ACCELERATION SENSOR OUTPUT

MALFUNCTION

DESCRIPTION

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system (w/ VDIM).
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU) (w/o VDIM).

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123 (Lost Communication with Yaw Rate Sensor Module) and U0124 (Lost Communication with Lateral Acceleration Sensor Module) are set (w/ VDIM).

These DTCs are also output when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1232	At a vehicle speed of 10 km/h (6 mph) or more, acceleration sensor output value does not change for 30 seconds or more.	• Sensor installation (w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) installation (w/o VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)
C1243	While the vehicle speed changes from 30 km/h (19 mph) to 0 km/h (0 mph), the condition that the value of acceleration sensor does not change by 0.0294 G or more occurs 16 times or more.	• Sensor installation (w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) installation (w/o VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)
C1245	At a vehicle speed of 30 km/h (19 mph) or more, the difference between the forward and backward G calculated from the acceleration sensor value and that calculated from the vehicle speed sensor exceeds 0.35 G for 60 seconds or more.	• Sensor installation (w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) installation (w/o VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)

WIRING DIAGRAM

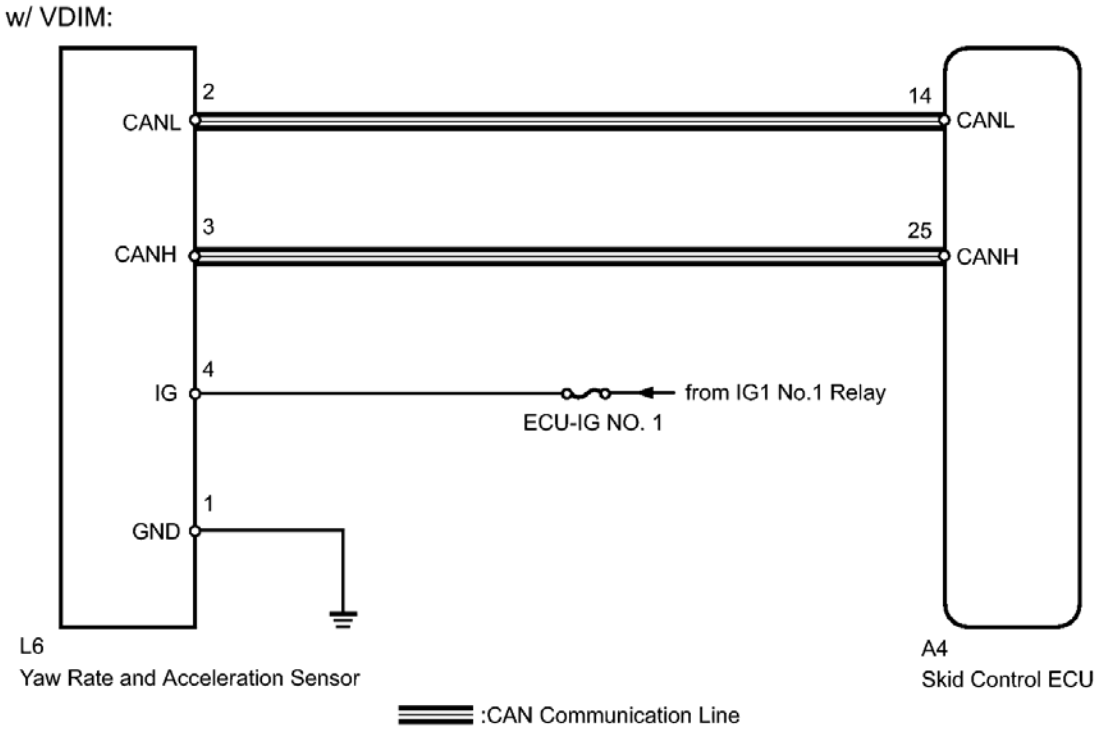


Fig. 7: Yaw Rate And Acceleration Sensor - Wiring Diagram (w/ VDIM)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

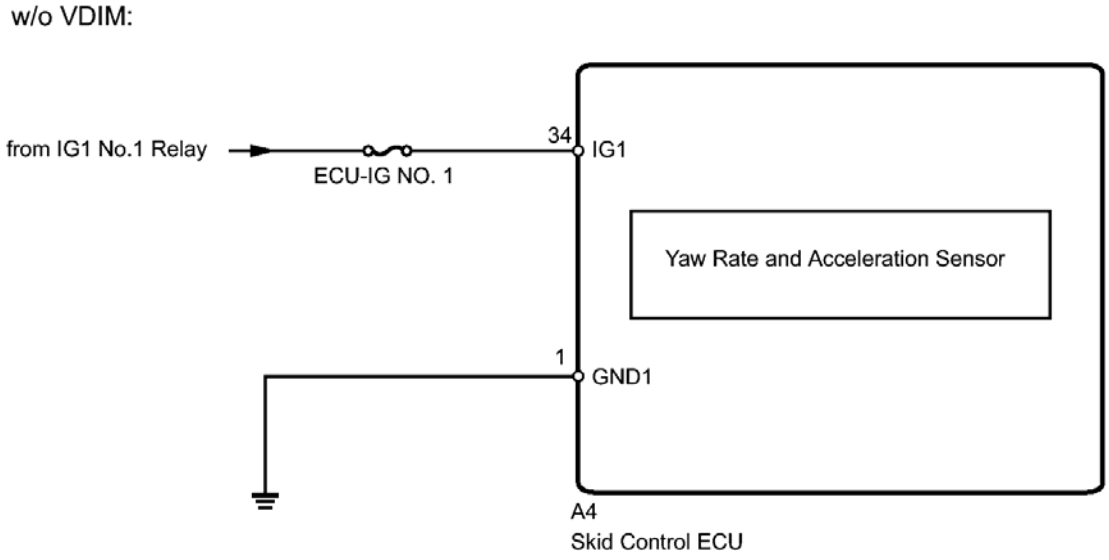


Fig. 8: Yaw Rate And Acceleration Sensor - Wiring Diagram (w/o VDIM)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly or yaw rate and acceleration**

sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

HINT:

When DTC U0123, U0124 and/or U0126 is output together with DTC C1232, C1243, and/or C1245, inspect and repair the trouble areas indicated by DTC U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.

PROCEDURE

1. **CHECK VEHICLE EQUIPMENT**
   a. Confirm whether the vehicle is w/ VDIM or w/o VDIM.

   RESULT

Result	Proceed to
w/ VDIM	A
w/o VDIM	B

   B --> See step 3

   A: Go to next step

2. **CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION**
   a. Check that the yaw rate and acceleration sensor has been installed properly. Refer to **INSTALLATION** .

      OK

      The sensor is tightened to the specified torque.

      The sensor is not installed in a tilted position.

      NOTE: Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .

      HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 5

OK --> See step 4

3. **CHECK BRAKE ACTUATOR ASSEMBLY**
   a. Check that the brake actuator assembly has been installed properly. Refer to **INSTALLATION** .

      OK

      The brake actuator assembly is tightened to the specified torque.

      The brake actuator assembly is not installed in a tilted position.

      HINT:

      If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 7

OK --> See step 6

4. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
5. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
7. **INSTALL BRAKE ACTUATOR ASSEMBLY CORRECTLY. Refer to INSTALLATION**

DTC C1240: YAW RATE SENSOR DISCRIMINATION

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1240	The yaw rate and acceleration sensor identification information stored in the skid control ECU is not consistent with the yaw rate and acceleration sensor identification information sent via CAN communication continuously for 1 second or more.	• Yaw rate and acceleration sensor • Brake actuator assembly (Skid control ECU)

HINT:

This DTC is frequently recorded when a standalone yaw rate and acceleration sensor is connected to a vehicle that is w/o VDIM.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **If the vehicle is w/o VDIM, confirm that a standalone yaw rate and acceleration sensor is not installed. If a standalone yaw rate and acceleration sensor is installed, remove it.**

PROCEDURE

1. **CHECK VEHICLE EQUIPMENT**
   a. Confirm whether the vehicle is w/ VDIM or w/o VDIM.

   RESULT

Result	Proceed to
w/ VDIM	A
w/o VDIM	B

   B --> See step 3

   A: Go to next step

2. **CHECK PART NUMBER (YAW RATE AND ACCELERATION SENSOR)**
   a. Check that the part number of the installed yaw rate and acceleration sensor is correct.

      OK

      Yaw rate and acceleration sensor installed in the vehicle has the correct part number.

   NG --> See step 5

   OK: Go to next step

3. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   RESULT

Result	Proceed to
DTC (C1240) is not output	A
DTC (C1240) is output	B

B --> See step 6

A --> See step 4

4. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1241: LOW POWER SUPPLY VOLTAGE MALFUNCTION

DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU (housed in the actuator assembly) stores this DTC and the fail safe function prohibits ABS operation.

This DTC is stored when the IG1 terminal voltage deviates from the DTC detection condition due to a malfunction in the power supply or charging circuit such as the battery or alternator circuit, etc.

The DTC is cleared when the IG1 terminal voltage returns to normal.

DTC Code	DTC Detection Condition	Trouble Area
	Any of the following is detected: 1. At a vehicle speed of 3 km/h (2 mph) or more, the IG1	

C1241	terminal voltage is less than 9.5 V for 10 seconds or more. 2. When the solenoid relay remains ON and the IG1 terminal voltage is less than 9.5 V, the relay contact is open for 0.22 seconds or more. 3. With the IG1 terminal voltage 9.5 V or less, the vehicle speed sensor power supply decreases for 60 seconds or more. 4. When the motor fail safe relay is ON after the	• ECU-IG NO. 1 fuse • Battery • Charging system • Power source circuit • Internal power supply circuit of the skid control ECU

		motor relay turns ON, the IG1 terminal voltage is 9.5 V or less and the actuator pump drive motor is OFF for 0.22 seconds or more.	

WIRING DIAGRAM

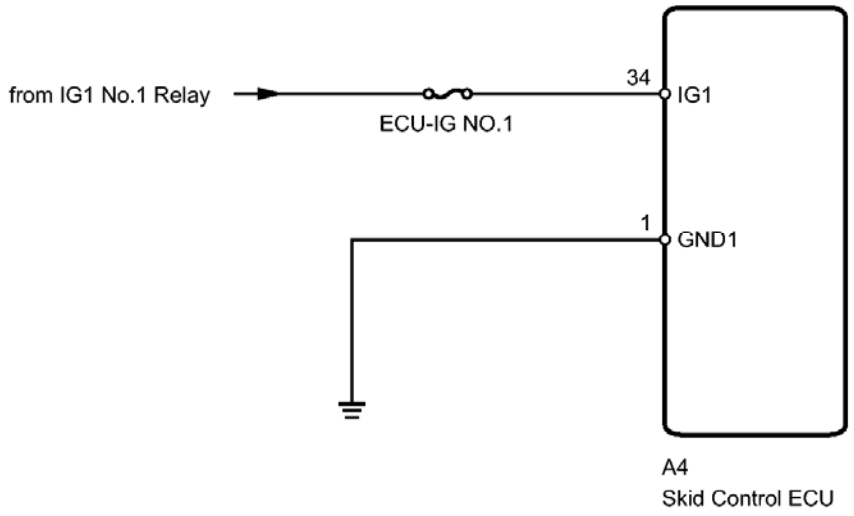


Fig. 9: Internal Power Supply Circuit Of Skid Control ECU - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      RESULT

Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

   B --> See step 6

   C --> See step 7

   A: Go to next step

2. **INSPECT SKID CONTROL ECU (IG1 TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

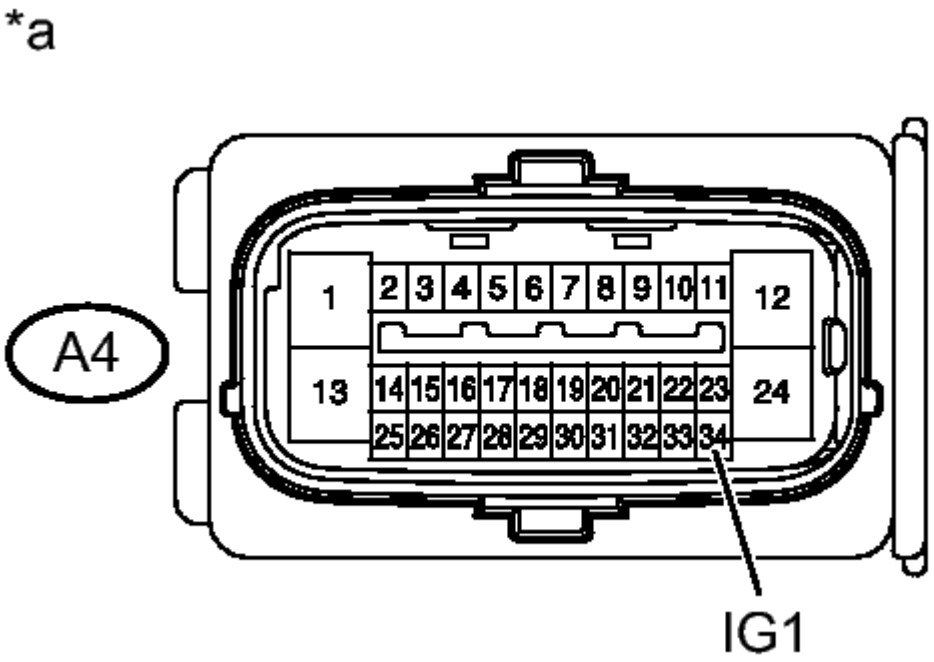


Fig. 10: Inspecting Skid Control ECU (IG1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector.
c. Turn the ignition switch to ON.
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A4-34 (IG1) - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK: Go to next step

3. **INSPECT SKID CONTROL ECU (GND1 TERMINAL)**
   a. Turn the ignition switch off.

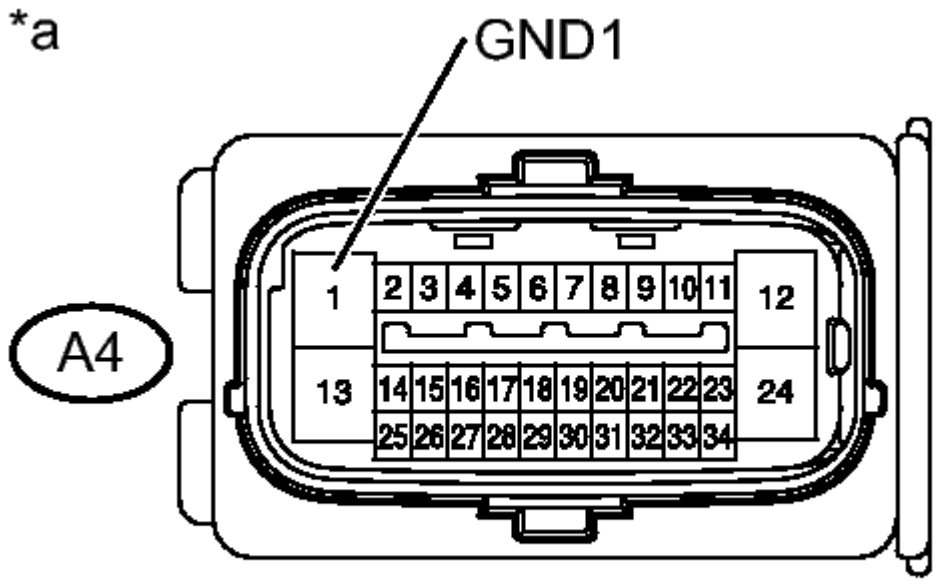


Fig. 11: Inspecting Skid Control ECU (GND1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-1 (GND1) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness

	connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)

OK: Go to next step

4. **RECONFIRM DTC**
   a. Reconnect the skid control ECU connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 20 km/h (12 mph) or more for 30 seconds or more.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1241) is not output	A
DTC (C1241) is output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 8

A --> See step 5

5. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
7. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
8. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1271: LOW OUTPUT SIGNAL OF FRONT SPEED SENSOR RH (TEST MODE DTC); DTC C1272: LOW OUTPUT SIGNAL OF FRONT SPEED SENSOR LH (TEST MODE DTC); DTC C1275: ABNORMAL CHANGE IN OUTPUT SIGNAL OF FRONT SPEED SENSOR RH (TEST MODE DTC); DTC C1276: ABNORMAL CHANGE IN OUTPUT SIGNAL OF FRONT SPEED SENSOR LH (TEST MODE DTC)

DESCRIPTION

DTCs C1271 to C1276 will be cleared when the speed sensor sends a vehicle speed signal or when Test Mode ends. DTCs from C1271 to C1276 are output only in Test Mode.

DTC Code	DTC Detection Condition	Trouble Area
C1271 C1272	Detected only during Test Mode.	• Front speed sensor RH/LH • Sensor installation • Speed sensor rotor
C1275 C1276	Detected only during Test Mode.	Speed sensor rotor

HINT:

- DTCs C1271 and C1275 are for the front speed sensor RH.
- DTCs C1272 and C1276 are for the front speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1401 and C1402. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	FR speed sensor open detection / Error or	Error: Momentary interruption Normal:	-

	Normal	Normal	
FL Speed Open	FL speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

RESULT

Result	Proceed to
There are momentary interruptions	A
There are no momentary interruptions	B
There is a constant open circuit	C

HINT:

Perform the above inspection before removing the sensor and connector.

B --> See step 4

C --> See step 6

A: Go to next step

2. **REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - FRONT SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Repair or replace the harness or connector.
   c. Check for any momentary interruption between the skid control ECU and the front speed sensor. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .
   d. Check that there are no momentary interruptions.

NEXT: Go to next step

3. **PERFORM TEST MODE (SIGNAL CHECK)**
   a. Turn the ignition switch off.
   b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

   OK

All Test Mode DTCs are cleared.

NG --> See step 4

OK --> END

4. **READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

   g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 6

OK: Go to next step

5. **PERFORM TEST MODE (SIGNAL CHECK)**
   a. Turn the ignition switch off.
   b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

      OK

      All Test Mode DTCs are cleared.

   NG --> See step 6

   OK --> See step 16

6. **CHECK FRONT SPEED SENSOR INSTALLATION**
   a. Turn the ignition switch off.

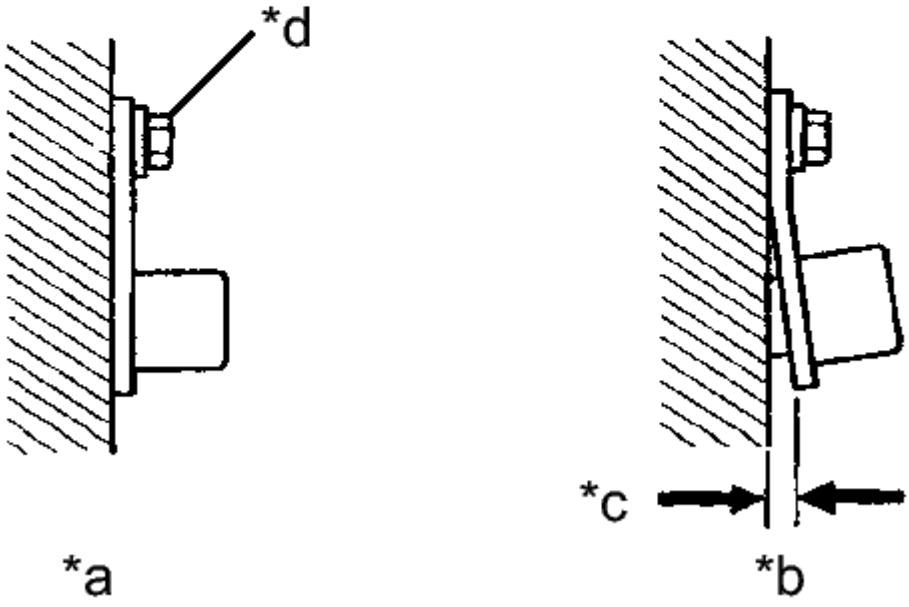


Fig. 12: Checking Front Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Check the speed sensor installation.

OK

There is no clearance between the sensor and the front steering knuckle.

The installation bolt is tightened properly.

Torque

8.0 N*m (82 kgf*cm, 71 in.*lbf)

TEXT IN ILLUSTRATION

*a	OK
*b	NG
*c	Clearance
*d	8.0 N*m (82 kgf*cm, 71 in.*lbf)

NG --> See step 17

OK: Go to next step

7. **CHECK FRONT SPEED SENSOR TIP**
   a. Remove the front speed sensor. Refer to **REMOVAL** .
   b. Check the speed sensor tip.

      OK

      No scratches, oil, or foreign matter on the sensor tip.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR

OK: Go to next step

8. **CHECK FRONT SPEED SENSOR ROTOR**
   a. Remove the front speed sensor rotor. Refer to **REMOVAL** .
   b. Check the speed sensor rotor.

      OK

      No scratches, oil, or foreign matter on the rotor.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

      HINT:

      If the front speed sensor rotor needs to be replaced, replace it together with the front drive outboard joint shaft assembly.

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK: Go to next step

9. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - FRONT SPEED SENSOR)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   b. Disconnect the skid control ECU connector.
   c. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

   FOR RH

Tester Connection	Condition	Specified Condition
A4-7 (FR+) - A20-2 (FR+)	Always	Below 1 ohms
A4-7 (FR+) - Body ground	Always	10 kohms or higher
A4-6 (FR-) - A20-1 (FR-)	Always	Below 1 ohms
A4-6 (FR-) - Body ground	Always	10 kohms or higher

   FOR LH

Tester Connection	Condition	Specified Condition
A4-19 (FL+) - A6-2 (FL+)	Always	Below 1 ohms
A4-19 (FL+) - Body ground	Always	10 kohms or higher
A4-18 (FL-) - A6-1 (FL-)	Always	Below 1 ohms
A4-18 (FL-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

10. **INSPECT SKID CONTROL ECU (SENSOR INPUT)**
    a. Reconnect the skid control ECU connector.

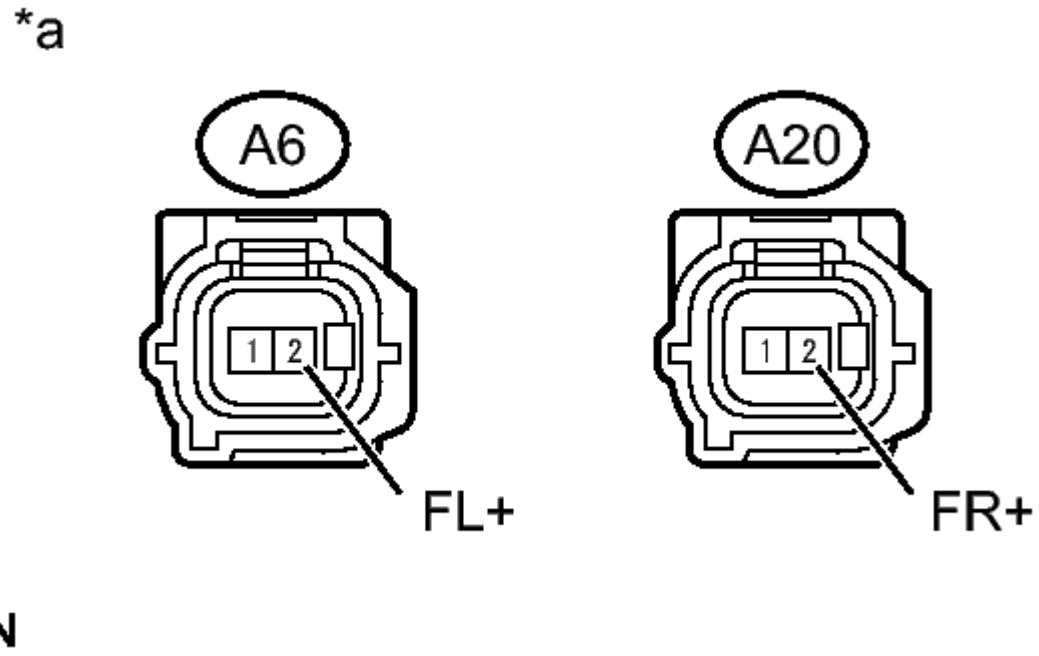


Fig. 13: Inspecting Skid Control ECU (Sensor Input)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

    b. Turn the ignition switch to ON.
    c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
A20-2 (FR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition
A6-2 (FL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Front Speed Sensor)

NG --> See step 18

OK: Go to next step

11. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Turn the ignition switch off.
    b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

    OK

    All Test Mode DTCs are cleared.

NG --> See step 12

OK --> See step 16

12. **REPLACE FRONT SPEED SENSOR**
    a. Turn the ignition switch off.
    b. Replace the front speed sensor. Refer to **REMOVAL** .

    NOTE: Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .

NEXT: Go to next step

13. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

    OK

    All Test Mode DTCs are cleared.

NG --> See step 14

OK --> END

14. **REPLACE FRONT SPEED SENSOR ROTOR**
    a. Turn the ignition switch off.
    b. Remove the front drive shaft assembly. Refer to **REMOVAL** .
    c. Replace the front drive outboard joint shaft assembly (front speed sensor rotor). Refer to **DISASSEMBLY** .

    HINT:

    If the front speed sensor rotor needs to be replaced, replace it together with the front drive outboard joint shaft assembly.

    NOTE: Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .

    NEXT: Go to next step

15. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

    OK

    All Test Mode DTCs are cleared.

    NG --> See step 18

    OK --> END

16. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
17. **INSTALL FRONT SPEED SENSOR CORRECTLY. Refer to INSTALLATION**
18. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1273: LOW OUTPUT SIGNAL OF REAR SPEED SENSOR RH (TEST MODE DTC); DTC C1274: LOW OUTPUT SIGNAL OF REAR SPEED SENSOR LH (TEST MODE DTC); DTC C1277: ABNORMAL CHANGE IN OUTPUT SIGNAL OF REAR SPEED SENSOR RH (TEST MODE DTC); DTC C1278: ABNORMAL CHANGE IN OUTPUT SIGNAL OF REAR SPEED SENSOR LH (TEST MODE DTC)

DESCRIPTION

DTCs C1273 to C1278 will be cleared when the speed sensor sends a vehicle speed signal or when Test Mode ends. DTCs from C1273 to C1278 are output only in Test Mode.

DTC Code	DTC Detection Condition	Trouble Area
		• Rear speed sensor RH/LH

C1273 C1274	Detected only during Test Mode.	• Sensor installation • Speed sensor rotor
C1277 C1278	Detected only during Test Mode.	Speed sensor rotor

HINT:

- DTCs C1273 and C1277 are for the rear speed sensor RH.
- DTCs C1274 and C1278 are for the rear speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1403 and C1404. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	RR speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	RL speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

RESULT

Result	Proceed to
There are momentary interruptions	A

There are no momentary interruptions	B
There is a constant open circuit	C

HINT:

Perform the above inspection before removing the sensor and connector.

B --> See step 4

C --> See step 6

A: Go to next step

2. **REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Repair or replace the harness or connector.
   c. Check for any momentary interruption between the skid control ECU and the rear speed sensor. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .
   d. Check that there are no momentary interruptions.

NEXT: Go to next step

3. **PERFORM TEST MODE (SIGNAL CHECK)**
   a. Turn the ignition switch off.
   b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

      OK

      All Test Mode DTCs are cleared.

NG --> See step 4

OK --> END

4. **READ VALUE USING TECHSTREAM (REAR SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.

e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.

f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 6

OK: Go to next step

5. **PERFORM TEST MODE (SIGNAL CHECK)**

a. Turn the ignition switch off.

b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

OK

All Test Mode DTCs are cleared.

NG --> See step 6

OK --> See step 18

6. **CHECK REAR SPEED SENSOR INSTALLATION**
   a. Turn the ignition switch off.

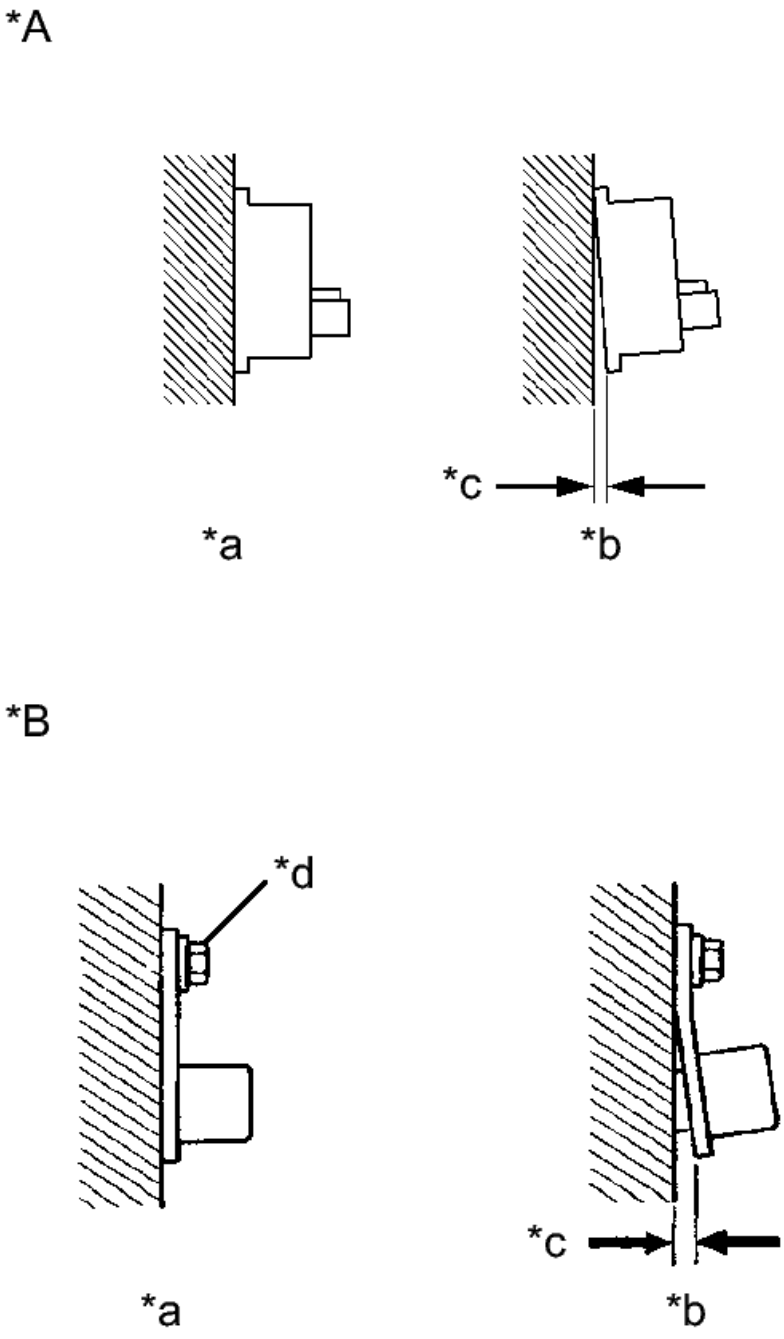


Fig. 14: Checking Rear Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Check the speed sensor installation (for 2WD).

OK

There is no clearance between the sensor and the rear axle carrier.

c. Check the speed sensor installation (for AWD).

OK

There is no clearance between the sensor and the rear axle carrier.

The installation bolt is tightened properly.

Torque

8.0 N*m (82 kgf*cm, 71 in.*lbf)

TEXT IN ILLUSTRATION

*A	for 2WD
*B	for AWD
*a	OK
*b	NG
*c	Clearance
*d	8.0 N*m (82 kgf*cm, 71 in.*lbf)

RESULT

Result	Proceed to
OK (for AWD)	A
OK (for 2WD)	B
NG (for 2WD)	C
NG (for AWD)	D

B --> See step 9

C --> See step 19

D --> See step 20

A: Go to next step

7. **CHECK REAR SPEED SENSOR TIP**
   a. Remove the rear speed sensor. Refer to **REMOVAL** .
   b. Check the speed sensor tip.

      OK

      No scratches, oil, or foreign matter on the sensor tip.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

NG --> CLEAN OR REPLACE REAR SPEED SENSOR

OK: Go to next step

8. **CHECK REAR SPEED SENSOR ROTOR**
   a. Remove the rear speed sensor rotor. Refer to **REMOVAL** .
   b. Check the speed sensor rotor.

      OK

      No scratches, oil, or foreign matter on the rotor.

      RESULT

Result	Proceed to
NG	A
OK	B

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

      HINT:

      If the rear speed sensor rotor needs to be replaced, replace it together with the drive outboard joint shaft.

B --> See step 9

A --> CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

9. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)**
   a. for 2WD
      1. Make sure that there is no looseness at the locking part and the connecting part of the connector.
      2. Disconnect the skid control ECU connector.
      3. Measure the resistance according to the value(s) in the table below.

         Standard Resistance

         FOR RH

Tester Connection	Condition	Specified Condition
A4-17 (RR+) - k1-2 (RR+)	Always	Below 1 ohms
A4-17 (RR+) - Body ground	Always	10 kohms or higher
A4-16 (RR-) - k1-1 (RR-)	Always	Below 1 ohms
A4-16 (RR-) - Body ground	Always	10 kohms or higher

         FOR LH

Tester Connection	Condition	Specified Condition
A4-5 (RL+) - n1-2 (RL+)	Always	Below 1 ohms
A4-5 (RL+) - Body ground	Always	10 kohms or higher
A4-4 (RL-) - n1-1 (RL-)	Always	Below 1 ohms
A4-4 (RL-) - Body ground	Always	10 kohms or higher

   b. for AWD

1. Make sure that there is no looseness at the locking part and the connecting part of the connector.
2. Disconnect the skid control ECU connector.
3. Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR RH

Tester Connection	Condition	Specified Condition
A4-17 (RR+) - L41-1 (RR+)	Always	Below 1 ohms
A4-17 (RR+) - Body ground	Always	10 kohms or higher
A4-16 (RR-) - L41-2 (RR-)	Always	Below 1 ohms
A4-16 (RR-) - Body ground	Always	10 kohms or higher

FOR LH

Tester Connection	Condition	Specified Condition
A4-5 (RL+) - K30-1 (RL+)	Always	Below 1 ohms
A4-5 (RL+) - Body ground	Always	10 kohms or higher
A4-4 (RL-) - K30-2 (RL-)	Always	Below 1 ohms
A4-4 (RL-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

10. **INSPECT SKID CONTROL ECU (SENSOR INPUT)**
    a. for 2WD
        1. Reconnect the skid control ECU connector.

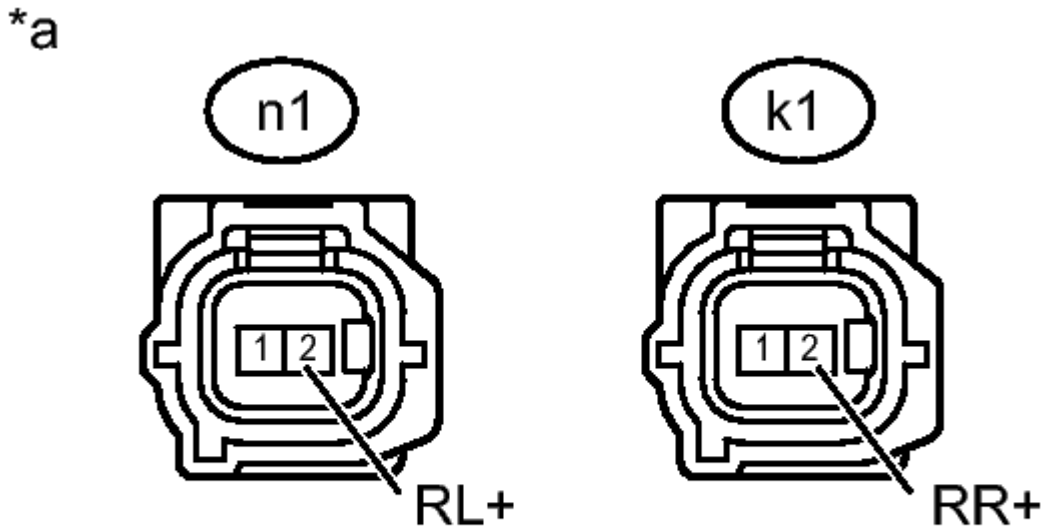


Fig. 15: Inspecting Skid Control ECU (Sensor Input)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

        2. Turn the ignition switch to ON.
        3. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
k1-2 (RR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition
n1-2 (RL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Speed Sensor)

b. for AWD

1. Reconnect the skid control ECU connector.

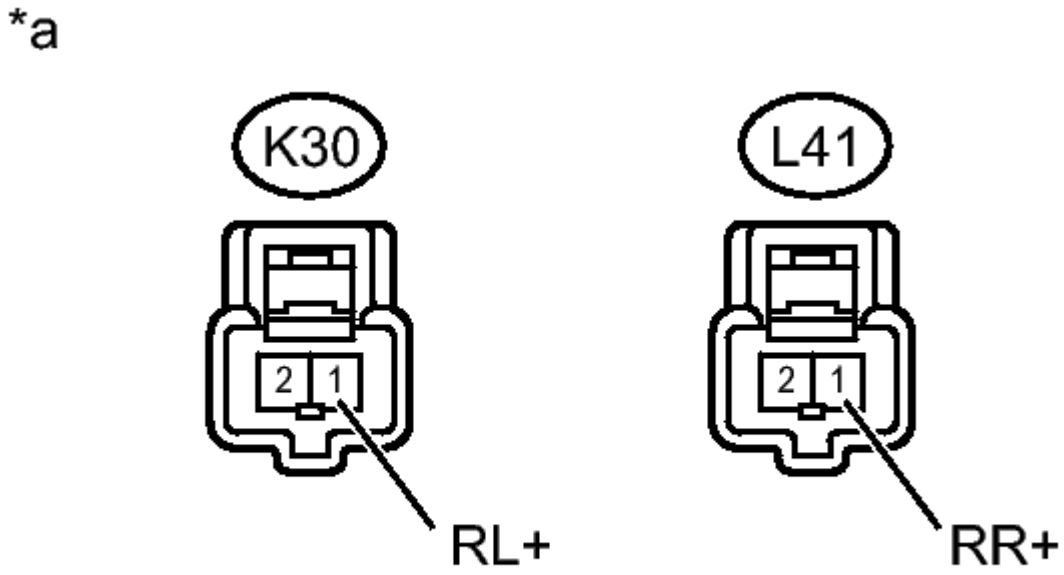


Fig. 16: Rear Speed Sensor Harness Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the ignition switch to ON.
3. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
L41-1 (RR+) -	Ignition switch	8 to 14 V

Body ground	ON	

FOR LH

Tester Connection	Switch Condition	Specified Condition
K30-1 (RL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Speed Sensor)

NG --> See step 21

OK: Go to next step

11. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Turn the ignition switch off.
    b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

    OK

    All Test Mode DTCs are cleared.

    RESULT

Result	Proceed to
OK	A
NG (for 2WD)	B
NG (for AWD)	C

B --> See step 12

C --> See step 14

A --> See step 18

12. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY**
    a. Turn the ignition switch off.
    b. Replace the rear speed sensor and the rear axle hub and bearing assembly (rear speed sensor rotor). Refer to **REMOVAL** .

       HINT:

       The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

       If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly with rear speed sensor.

       NOTE: Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .

NEXT: Go to next step

13. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

       OK

       All Test Mode DTCs are cleared.

NG --> See step 21

OK --> END

14. **REPLACE REAR SPEED SENSOR**
    a. Turn the ignition switch off.
    b. Replace the rear speed sensor. Refer to **REMOVAL** .

       NOTE: Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .

NEXT: Go to next step

15. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

       OK

All Test Mode DTCs are cleared.

NG --> See step 16

OK --> END

16. **REPLACE REAR SPEED SENSOR ROTOR**
    a. Turn the ignition switch off.
    b. Remove the rear drive shaft assembly. Refer to **REMOVAL** .
    c. Replace the rear drive outboard joint shaft assembly (rear speed sensor rotor). Refer to **DISASSEMBLY** .

    HINT:

    If the rear speed sensor rotor needs to be replaced, replace it together with the rear drive outboard joint shaft assembly.

    NOTE: Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .

    NEXT: Go to next step

17. **PERFORM TEST MODE (SIGNAL CHECK)**
    a. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

    OK

    All Test Mode DTCs are cleared.

    NG --> See step 21

    OK --> END

18. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
19. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY. Refer to REMOVAL**
20. **INSTALL REAR SPEED SENSOR CORRECTLY. Refer to INSTALLATION**
21. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1279: ACCELERATION SENSOR OUTPUT VOLTAGE MALFUNCTION (TEST MODE DTC)

DESCRIPTION

DTC C1279 can be cleared when the yaw rate and acceleration sensor sends a yaw rate and/or acceleration signal or when Test Mode ends. DTC C1279 is output only in Test Mode.

DTC Code	DTC Detection Condition	Trouble Area
C1279	Detected only during Test Mode.	• Sensor installation (w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Skid control ECU (Brake actuator assembly) installation (w/o VDIM) • Skid control ECU (Brake actuator assembly) (w/o VDIM)

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK VEHICLE EQUIPMENT**
   a. Confirm whether the vehicle is w/ VDIM or w/o VDIM.

   RESULT

Result	Proceed to
w/ VDIM	A
w/o VDIM	B

   B --> See step 7

   A: Go to next step

2. **CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION**
   a. Check that the yaw rate and acceleration sensor has been installed properly. Refer to **INSTALLATION** .

      OK

      The sensor is tightened to the specified torque.

      The sensor is not installed in a tilted position.

NG --> See step 6

OK: Go to next step

3. **INSPECT YAW RATE AND ACCELERATION SENSOR (IG TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

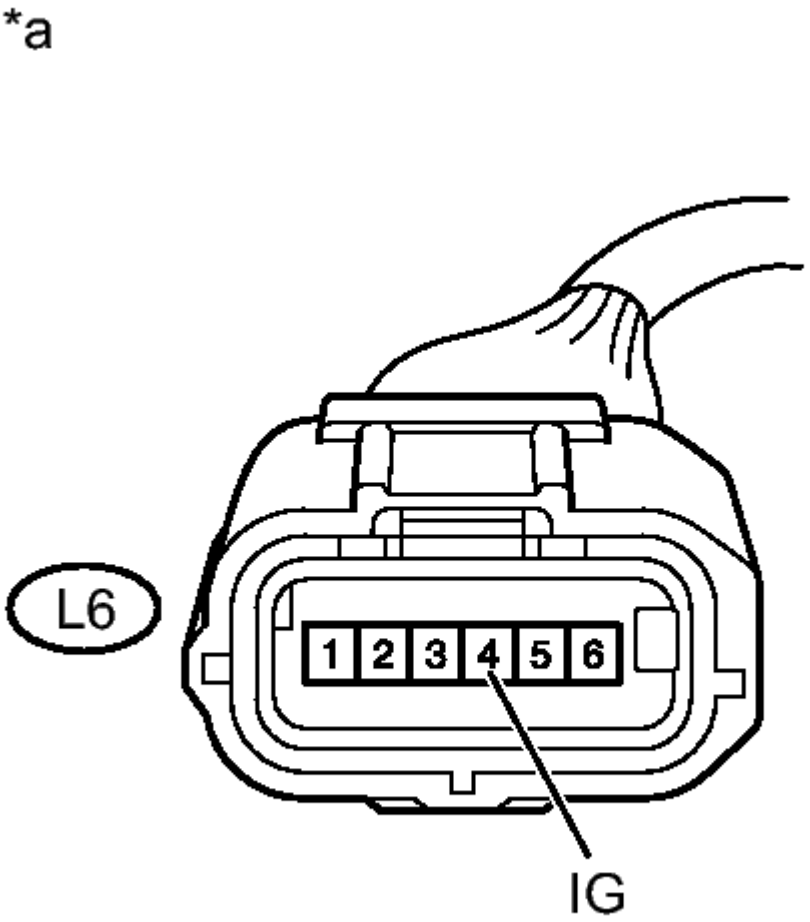


Fig. 17: Measuring Voltage Of Yaw Rate And Acceleration Sensor (IG Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Disconnect the yaw rate and acceleration sensor connector.
   c. Turn the ignition switch to ON.
   d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
L6-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Yaw Rate and Acceleration Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG CIRCUIT)

OK: Go to next step

4. **INSPECT YAW RATE AND ACCELERATION SENSOR (GND TERMINAL)**
   a. Turn the ignition switch off.

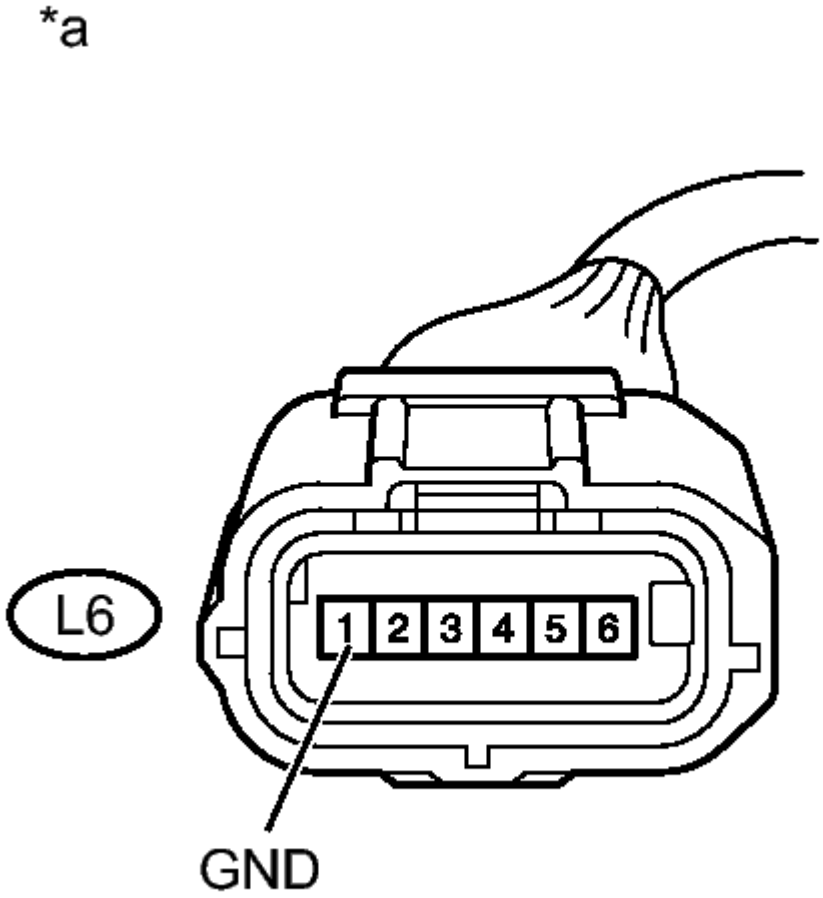


Fig. 18: Inspecting Yaw Rate And Acceleration Sensor (GND Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L6-1 (GND) - Body ground	Always	Below 1 ohms

NOTE: Check the yaw rate and acceleration sensor signal after replacement.

Refer to TEST MODE PROCEDURE .

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Yaw Rate and Acceleration Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK --> See step 5

5. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
6. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**
7. **CHECK BRAKE ACTUATOR ASSEMBLY INSTALLATION**
   a. Check that the Brake actuator assembly has been installed properly. Refer to **INSTALLATION** .

      OK

      The Brake actuator assembly is tightened to the specified torque.

      The Brake actuator assembly is not installed in a tilted position.

NG --> See step 9

OK --> See step 8

8. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
9. **INSTALL BRAKE ACTUATOR ASSEMBLY CORRECTLY. Refer to INSTALLATION**

DTC C1281: MASTER CYLINDER PRESSURE SENSOR OUTPUT MALFUNCTION (TEST MODE DTC)

DESCRIPTION

DTC C1281 will be cleared when the master cylinder pressure sensor sends a master cylinder pressure signal or when Test Mode ends. DTC C1281 is output only in Test Mode.

DTC Code	DTC Detection Condition	Trouble Area
		• Stop light switch

C1281	Detected only during Test Mode.	• Brake pedal load sensing switch • Master cylinder pressure sensor

WIRING DIAGRAM

Refer to DTCs C1425 and C1429. Refer to **WIRING DIAGRAM**, or refer to **WIRING DIAGRAM**).

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK STOP LIGHT OPERATION**
   a. Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

   OK

Condition	Illumination Condition
Brake pedal depressed	ON
Brake pedal released	OFF

   NG --> See step 8

   OK: Go to next step

2. **READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH AND BRAKE PEDAL LOAD SENSING SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

   ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
		ON:	

Stop Light SW	Stop light switch / ON or OFF	Brake pedal depressed OFF: Brake pedal released	-
Brake Pedal Load Sensing SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond the specified point	-

f. Check that the stop light switch display and brake pedal load sensing switch display observed on the Techstream change according to brake pedal operation.

OK

The Techstream displays ON or OFF according to brake pedal operation.

g. Slowly depress the brake pedal, and check when the stop light switch and brake pedal load sensing switch turn ON.

OK

First the stop light switch should turn ON, and then the brake pedal load sensing switch should turn ON.

RESULT

Result	Proceed to
OK	A
Turning on of the stop light switch is	B

not confirmed	
Turning on of the brake pedal load sensing switch is not confirmed	C
The brake pedal load sensing switch turns on first	D

B --> See step 5

C --> See step 6

D --> See step 7

A: Go to next step

3. **READ VALUE USING TECHSTREAM (MASTER CYLINDER PRESSURE SENSOR)**
   a. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   b. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Master Cylinder Sensor	Master cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed

   c. Check that the brake fluid pressure value of the master cylinder pressure sensor observed on the Techstream changes when the brake pedal is depressed.

OK

When the pedal is depressed, voltage displayed on the Techstream increases.

NG --> See step 9

OK: Go to next step

4. **PERFORM TEST MODE (SIGNAL CHECK)**
   a. Turn the ignition switch off.
   b. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

      OK

      All Test Mode DTCs are cleared.

NG --> See step 9

OK --> See step 10

5. **INSPECT SKID CONTROL ECU (STP1 TERMINAL)**
   a. Turn the ignition switch off.

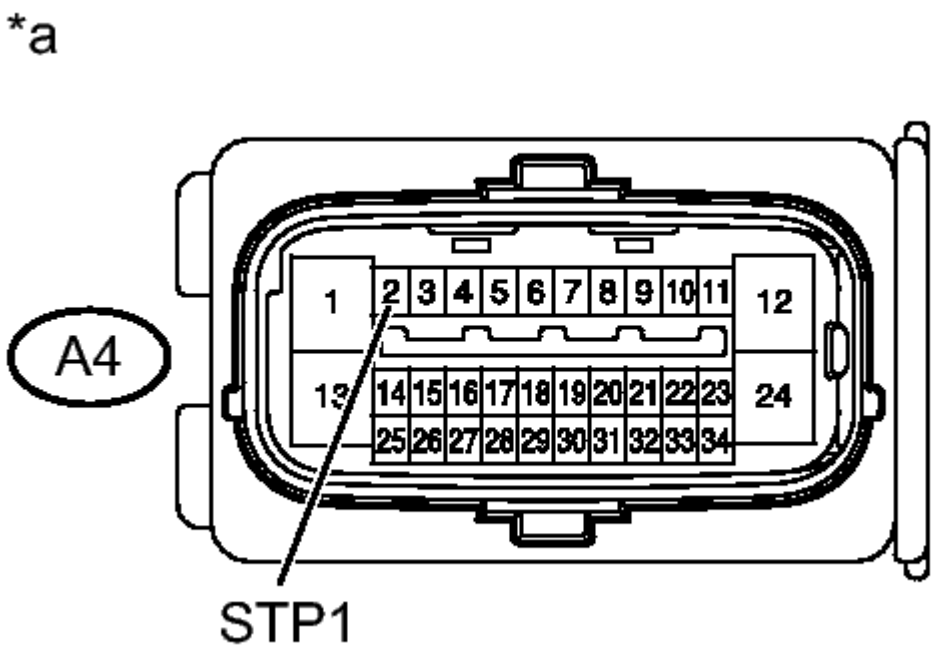


Fig. 19: Inspecting Skid Control ECU (STP1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   c. Disconnect the skid control ECU connector.

d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A4-2 (STP1) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
A4-2 (STP1) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (STP1 CIRCUIT)

OK --> See step 9

6. **INSPECT SKID CONTROL ECU (FSW+ TERMINAL)**
   a. Turn the ignition switch off.

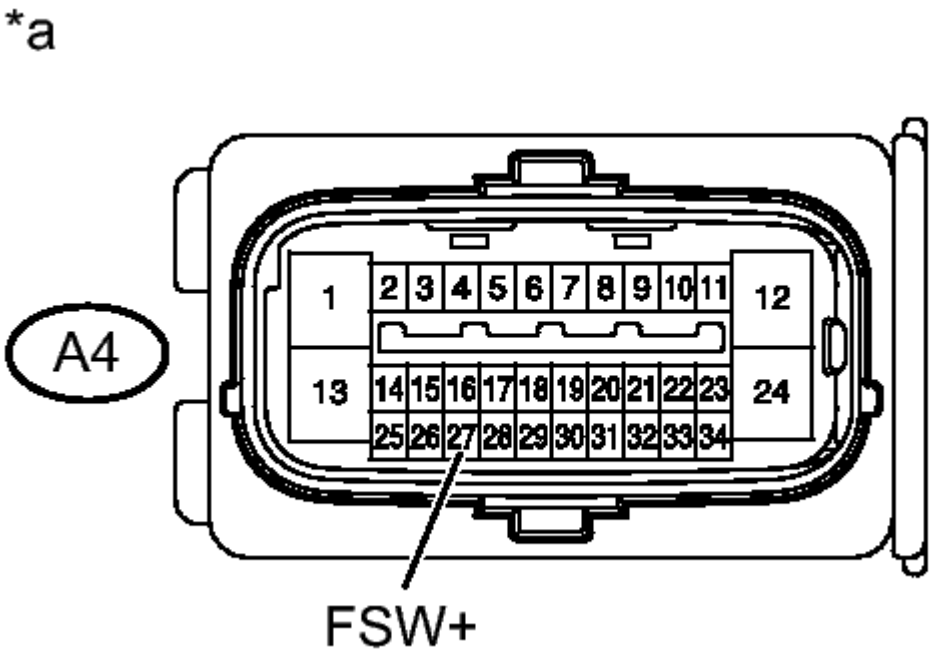


Fig. 20: Inspecting Skid Control ECU (FSW+ Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Make sure that there is no looseness at the locking part and the connecting part of the connector.
c. Disconnect the skid control ECU connector.
d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
A4-27 (FSW+) - Body ground	Brake pedal load sensing switch OFF (Brake pedal depressed)	0.9 to 1.1 kohms
A4-27 (FSW+) - Body ground	Brake pedal load sensing switch ON (Brake pedal	192 to 234 ohms

	released)	

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (FSW+ CIRCUIT)

OK --> See step 9

7. **CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION**
   a. Turn the ignition switch off.
   b. Check the brake pedal height and stop light switch installation. Refer to **INSTALLATION** .

      OK

      The brake pedal height and stop light switch installation are normal.

NG --> See step 12

OK --> See step 11

8. **INSPECT STOP LIGHT CIRCUIT. Refer to PROBLEM SYMPTOMS TABLE**
9. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
10. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
11. **REPLACE BRAKE PEDAL SUB-ASSEMBLY (BRAKE PEDAL LOAD SENSING SWITCH). Refer to REMOVAL**
12. **ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH. Refer to ADJUSTMENT**

DTC C1290: STEERING ANGLE SENSOR ZERO POINT MALFUNCTION

DESCRIPTION

The skid control ECU acquires steering angle sensor zero point every time the ignition switch is turned to ON and the vehicle is driven at 35 km/h (22 mph) or more for approximately 5 seconds. The ECU also stores the previous zero point.

If front wheel alignment or the steering wheel position is adjusted without disconnecting the cable from the

negative (-) battery terminal, or if the yaw rate and acceleration sensor zero point is not acquired after the adjustments have been completed, the skid control ECU detects the difference between the previous zero point and newly acquired zero point and outputs this DTC to indicate a poor adjustment.

Warning operation for the steering angle sensor zero point malfunction will be cleared by turning the ignition switch off.

DTC Code	DTC Detection Condition	Trouble Area
C1290	The newly acquired steering angle sensor zero point vastly differs from the previous one.	• Yaw rate and acceleration sensor zero point calibration incomplete • Poor adjustment of the center position of the steering wheel • Poor adjustment of front wheel alignment • Brake actuator assembly (Skid control ECU)

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **PERFORM ZERO POINT CALIBRATION OF YAW RATE AND ACCELERATION SENSOR**
   a. Perform zero point calibration of the yaw rate and acceleration sensor. Refer to **CALIBRATION** .

      HINT:

      - When the stored zero point of the yaw rate and acceleration sensor is cleared, steering angle sensor zero point will also be cleared.
      - If the zero point and output value of the yaw rate and acceleration sensor and the output value of the speed sensors are not normal, steering angle sensor zero point cannot be acquired normally even if the vehicle is driven straight ahead at 35 km/h (22 mph) or more.

   NEXT: Go to next step

2. **CHECK STEERING ANGLE SENSOR ZERO POINT CALIBRATION**
   a. Turn the ignition switch off.
   b. Start the engine.
   c. Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.
   d. Check that the center position of the steering wheel is correctly set while driving straight ahead.

      HINT:

      If the front wheel alignment and steering position are adjusted as a result of an abnormal center

position of the steering wheel, acquire yaw rate and acceleration sensor zero point again after adjusting the front wheel alignment and steering position again.

OK

The steering wheel is centered correctly.

NG --> See step 4

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle and turn the steering wheel to the right and left at a speed of 35 km/h (22 mph) or more.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1290) is not output	A
DTC (C1290) is output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 5

A --> END

4. **ADJUST FRONT WHEEL ALIGNMENT OR STEERING POSITION. Refer to ADJUSTMENT**
5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1380: STOP LIGHT CONTROL RELAY MALFUNCTION

DESCRIPTION

Upon receiving the hill-start assist control or the dynamic radar cruise control operating signal from the skid control ECU, the relay contact turns on and the stop light comes on.

DTC Code	DTC Detection Condition	Trouble Area
C1380	Either of the following is detected: 1. When the voltage at the IG1 terminal is 9.5 V or more and the stop light control relay drive output (STPO) is ON, a signal has not been input to the STP2 terminal for 2 seconds or more. 2. When the voltage at the IG1 terminal is 9.5 V or more and the stop light control relay drive output (STPO) is OFF, the signal at the STP1 is different from the input signal at the STP2 for 5 seconds or more.	• STOP LP relay • Stop light switch • Stop light switch circuit • Stop light control relay • Stop light control relay circuit • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM

w/ VDIM:

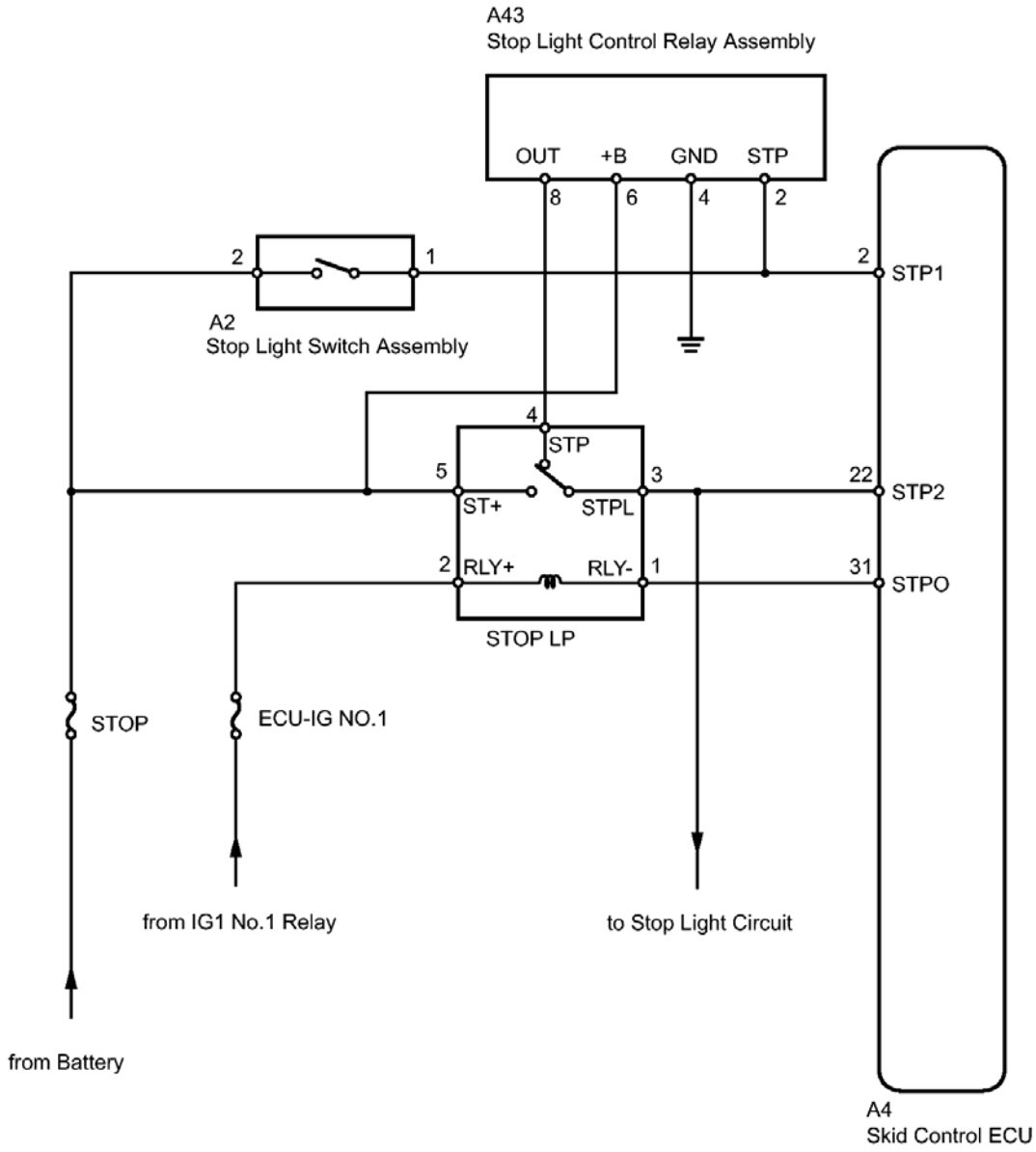


Fig. 21: Stop Light Control Relay Circuit (w/ VDIM) - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**

HINT:

When DTC C1425 and/or C1426 is output together with DTC C1380, inspect and repair the trouble areas indicated by DTC C1425 and/or C1426 first. Refer to **DTC C1425: Open in Stop Light Switch Circuit**, or refer to **DTC C1426: Stop Light Switch OFF Stuck Malfunction**).

PROCEDURE

1. **INSPECT STOP LP RELAY**
   a. Remove the STOP LP relay from engine room relay block.
   b. Measure the resistance according to the value(s) in the table below.

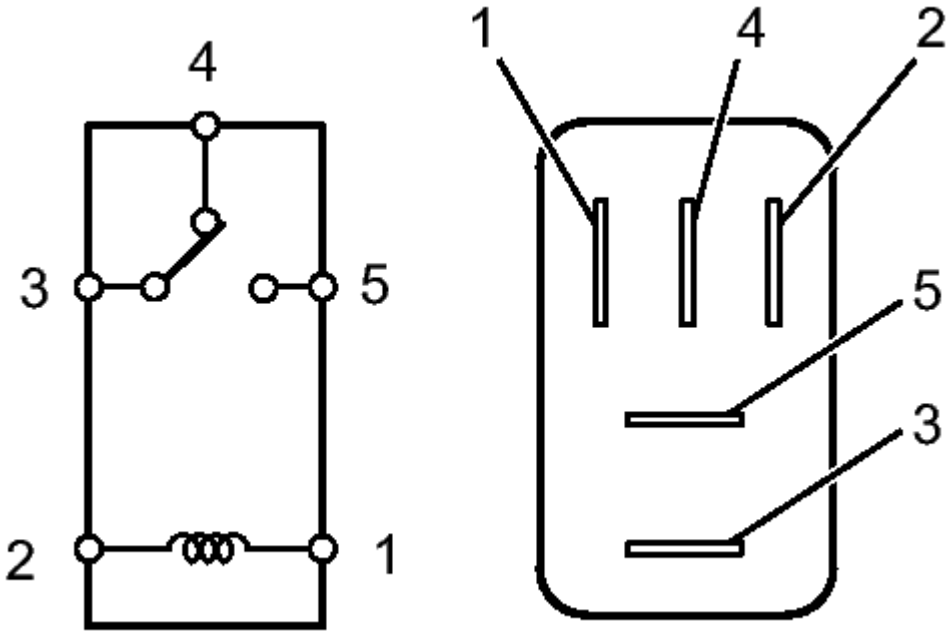


Fig. 22: Identifying STOP LP Relay Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage not applied	Below 1 ohms
	Battery voltage applied to	10 kohms or higher

	terminal 1 and 2	
3 - 5	Battery voltage not applied	10 kohms or higher
	Battery voltage applied to terminal 1 and 2	Below 1 ohms

NG --> REPLACE STOP LP RELAY

OK: Go to next step

2. **INSPECT STOP LP RELAY (ST+ TERMINAL)**
   a. Measure the voltage according to the value(s) in the table below.

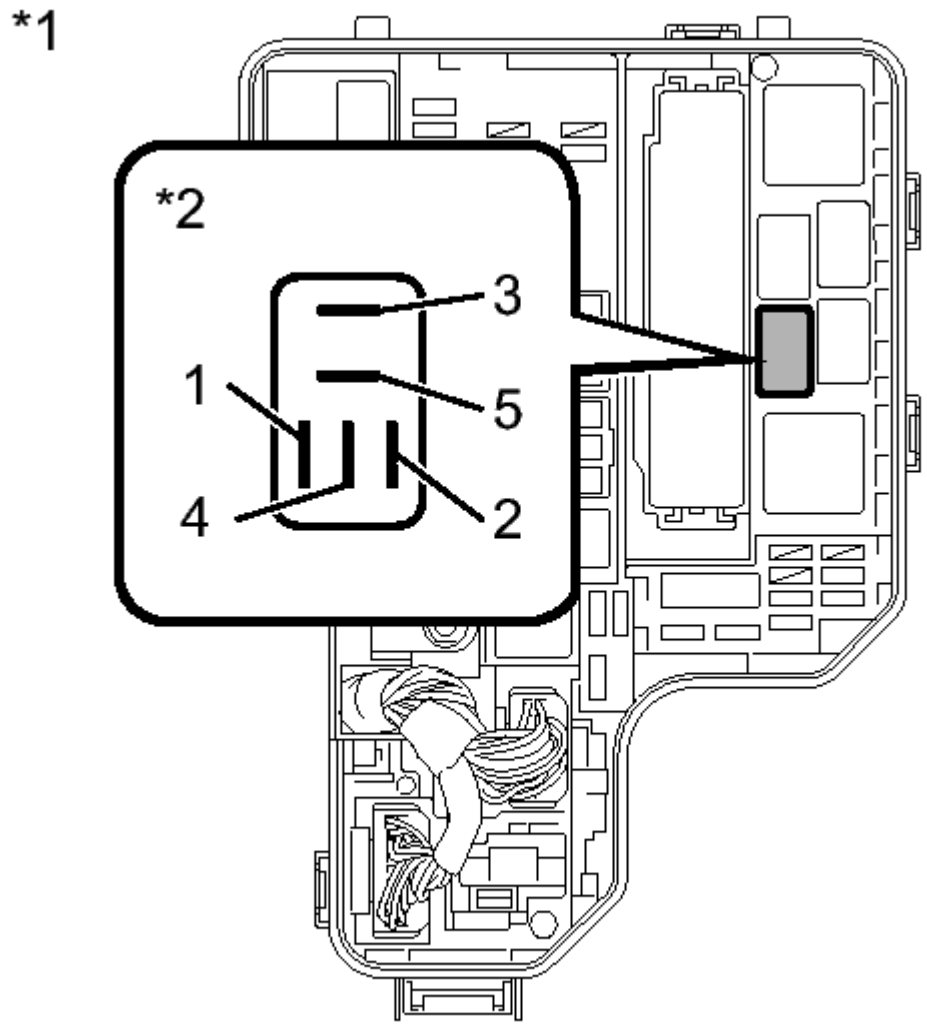


Fig. 23: Measuring Voltage Of STOP LP Relay (ST+ Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
STOP LP relay-5 (ST+) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

	Engine Room

*1	Relay Block
*2	STOP LP Relay Holder

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. **INSPECT STOP LP RELAY (STP TERMINAL)**
   a. Measure the voltage according to the value(s) in the table below.

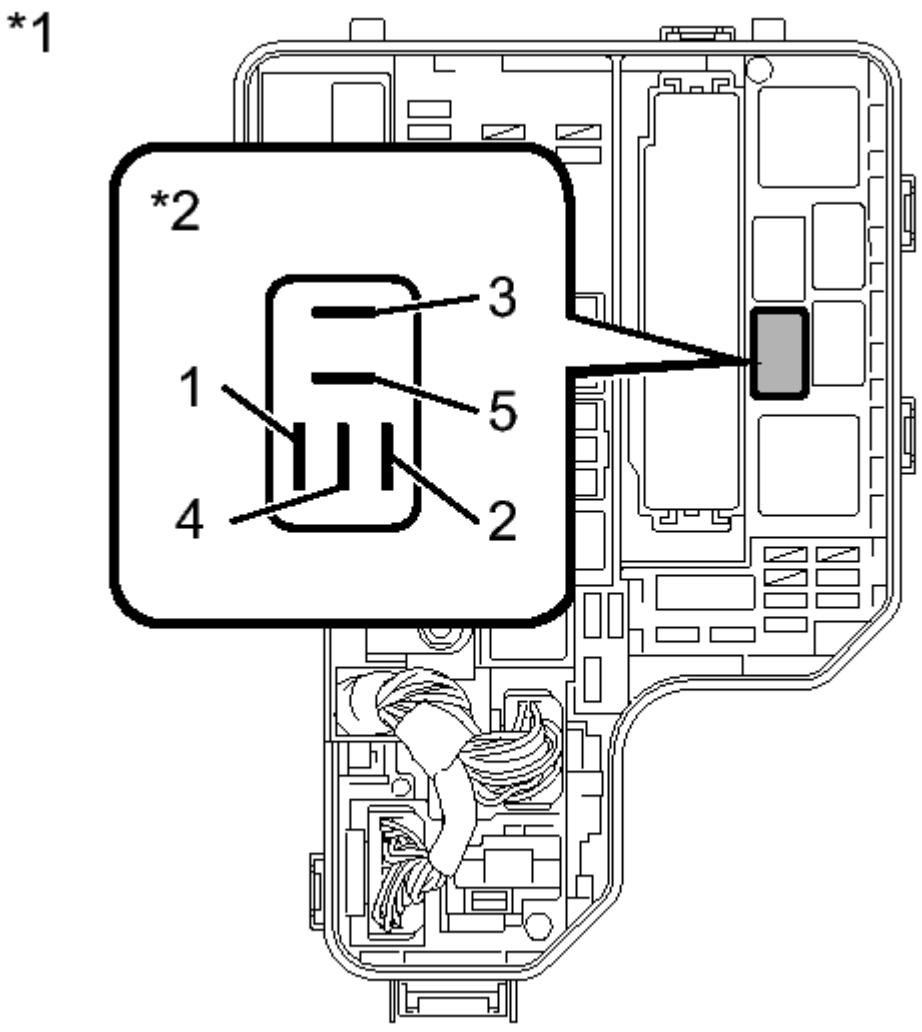


Fig. 24: Measuring Voltage Of STOP LP Relay (ST+ Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
STOP LP relay-4 (STP) - Body ground	Brake pedal depressed	11 to 14 V
STOP LP relay-4 (STP) - Body ground	Brake pedal released	Below 1.5 V

TEXT IN ILLUSTRATION

*1	Engine Room Relay Block
*2	STOP LP Relay Holder

NG --> See step 7

OK: Go to next step

4. **INSPECT SKID CONTROL ECU (STP2 TERMINAL)**
   a. Install the STOP LP relay.
   b. Disconnect the A4 skid control ECU connector.
   c. Measure the voltage according to the value(s) in the table below.

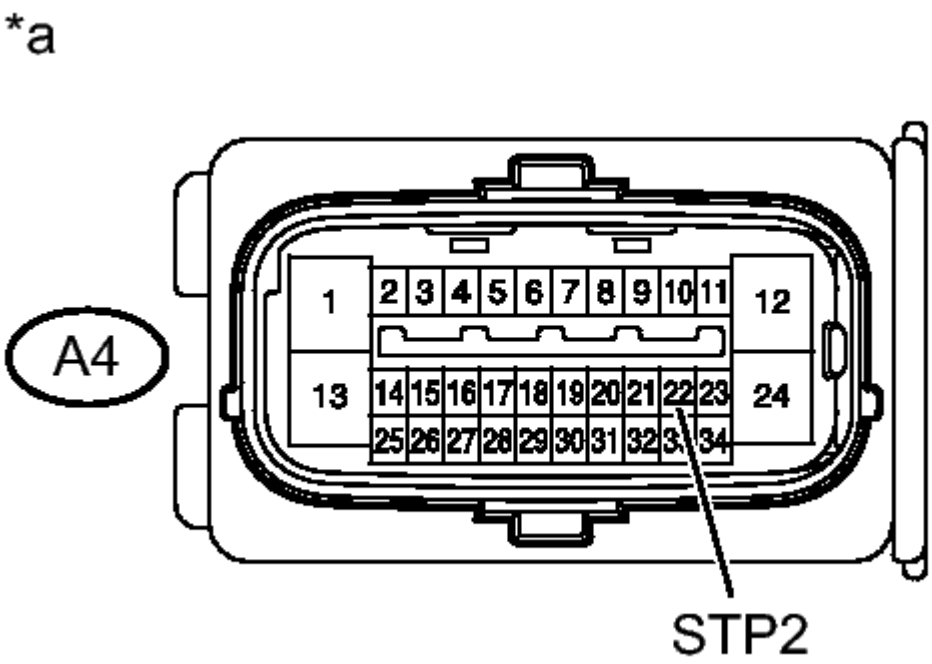


Fig. 25: Inspecting Skid Control ECU (STP2 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A4-22 (STP2) - Body ground	Brake pedal depressed	11 to 14 V
A4-22 (STP2) - Body ground	Brake pedal released	Below 1.5 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (STP1 TERMINAL)**
   a. Measure the voltage according to the value(s) in the table below.

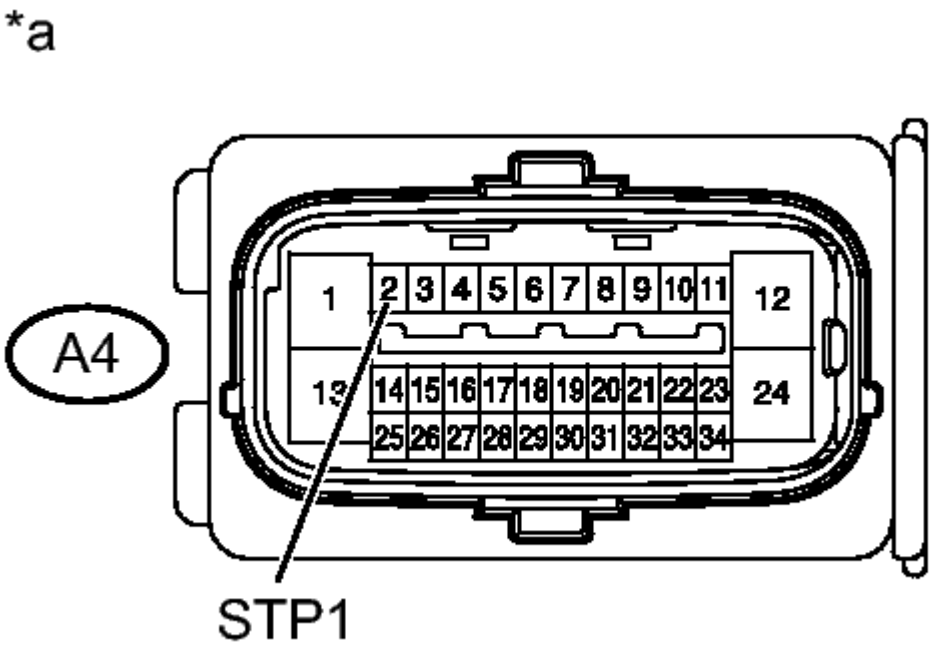


Fig. 26: Inspecting Skid Control ECU (STP1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A4-2 (STP1) - Body ground	Brake pedal depressed	11 to 14 V
A4-2 (STP1) - Body ground	Brake pedal released	Below 1.5 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness

	connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

6. **INSPECT SKID CONTROL ECU (STPO TERMINAL)**
   a. Measure the voltage according to the value(s) in the table below.

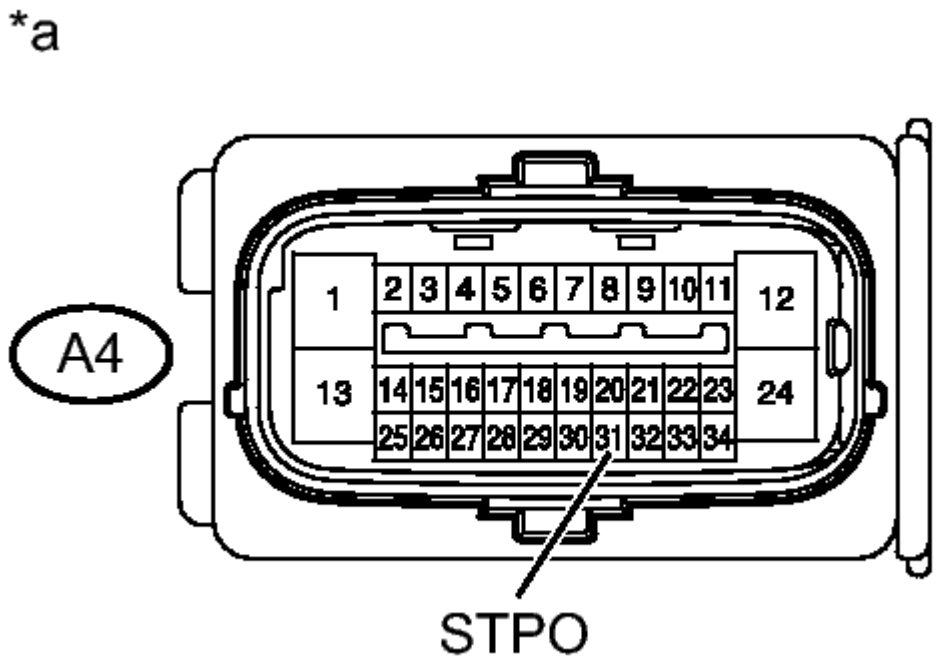


Fig. 27: Inspecting Skid Control ECU (STPO Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A4-31 (STPO) - Body ground	Ignition Switch ON	11 to 14 V

TEXT IN ILLUSTRATION

	Front

*a	view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 11

7. **CHECK HARNESS AND CONNECTOR (STOP LIGHT CONTROL RELAY ASSEMBLY - STOP LP RELAY)**
   a. Disconnect the A43 stop light control relay Assembly
   b. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Switch Condition	Specified Condition
STOP LP relay-4 (STP) - A43-8 (OUT)	Always	Below 1 ohms
STOP LP relay-4 (STP) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

8. **INSPECT STOP LIGHT CONTROL RELAY ASSEMBLY (+B TERMINAL)**
   a. Measure the voltage according to the value(s) in the table below.

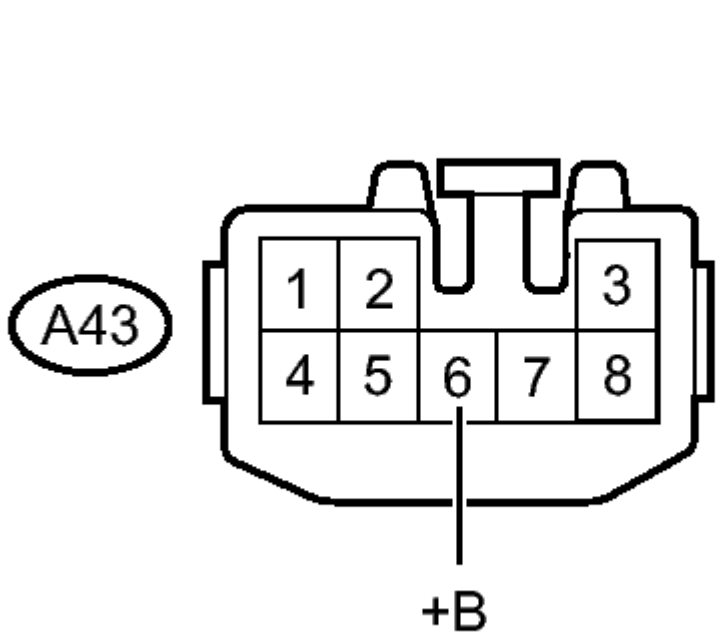


Fig. 28: Inspecting Stop Light Control Relay Assembly (+B Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A43-6(+B) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Stop Light Control Relay)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

9. **INSPECT STOP LIGHT CONTROL RELAY ASSEMBLY (GND TERMINAL)**

a. Measure the resistance according to the value(s) in the table below.

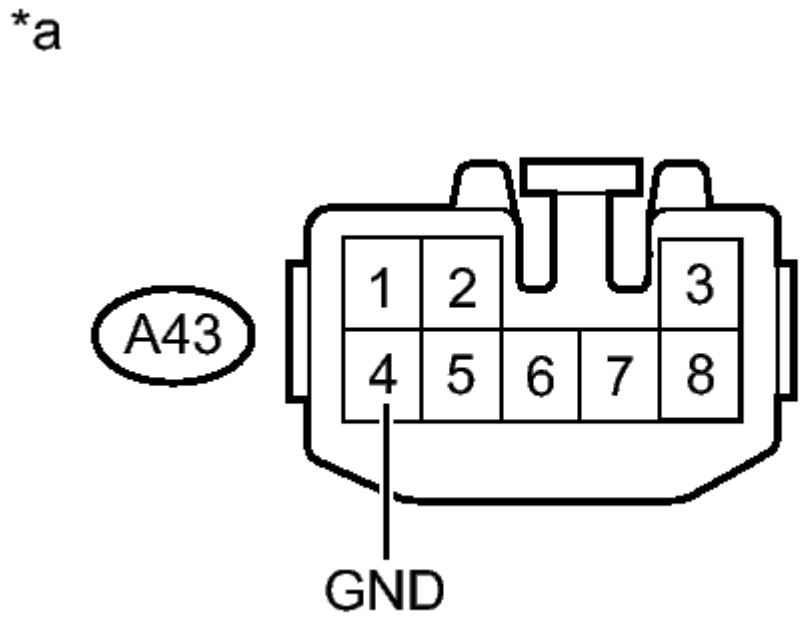


Fig. 29: Inspecting Stop Light Control Relay Assembly (GND Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
A43-4 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Stop Light Control Relay)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

10. **INSPECT STOP LIGHT CONTROL RELAY ASSEMBLY (STP TERMINAL)**
    a. Measure the voltage according to the value(s) in the table below.

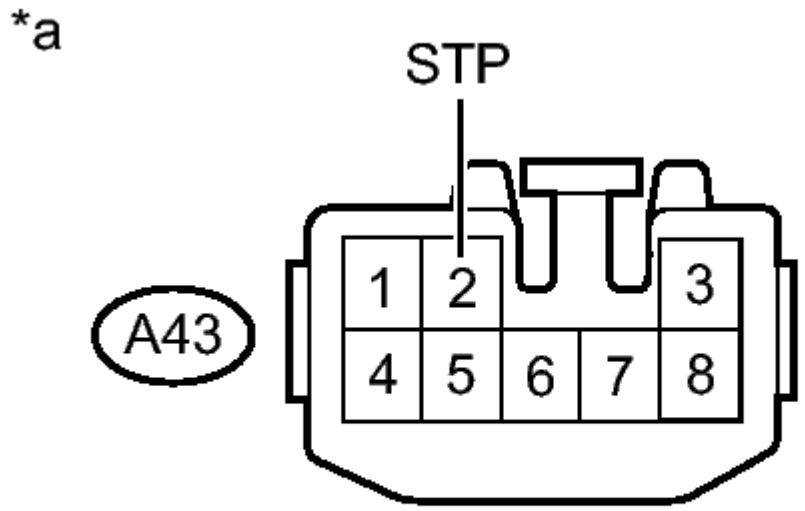


Fig. 30: Inspecting Stop Light Control Relay Assembly (STP Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A43-2 (STP) - Body ground	Brake pedal depressed	11 to 14 V
A43-2 (STP) - Body ground	Brake pedal released	Below 1.5 V

TEXT IN ILLUSTRATION

	Front view of wire harness

*a	connector (to Stop Light Control Relay)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> REPLACE STOP LIGHT CONTROL RELAY ASSEMBLY

11. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1381: ACCELERATION SENSOR POWER SUPPLY VOLTAGE MALFUNCTION

DESCRIPTION

The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system.

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123 (Lost Communication with Yaw Rate Sensor Module) and U0124 (Lost Communication with Lateral Acceleration Sensor Module) are set.

These DTCs are also output when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1381	At a vehicle speed of more than 3 km/h (2 mph), an acceleration sensor power source malfunction signal is received for 10 seconds or more.	• Yaw rate and acceleration sensor power source circuit • Yaw rate and acceleration sensor

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the yaw rate and acceleration sensor, perform zero point calibration. Refer to CALIBRATION .

HINT:

When DTC U0123, U0124 and/or U0126 is output together with DTC C1381, inspect and repair the trouble

areas indicated by DTC U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.

PROCEDURE

1. **INSPECT YAW RATE AND ACCELERATION SENSOR (IG TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.

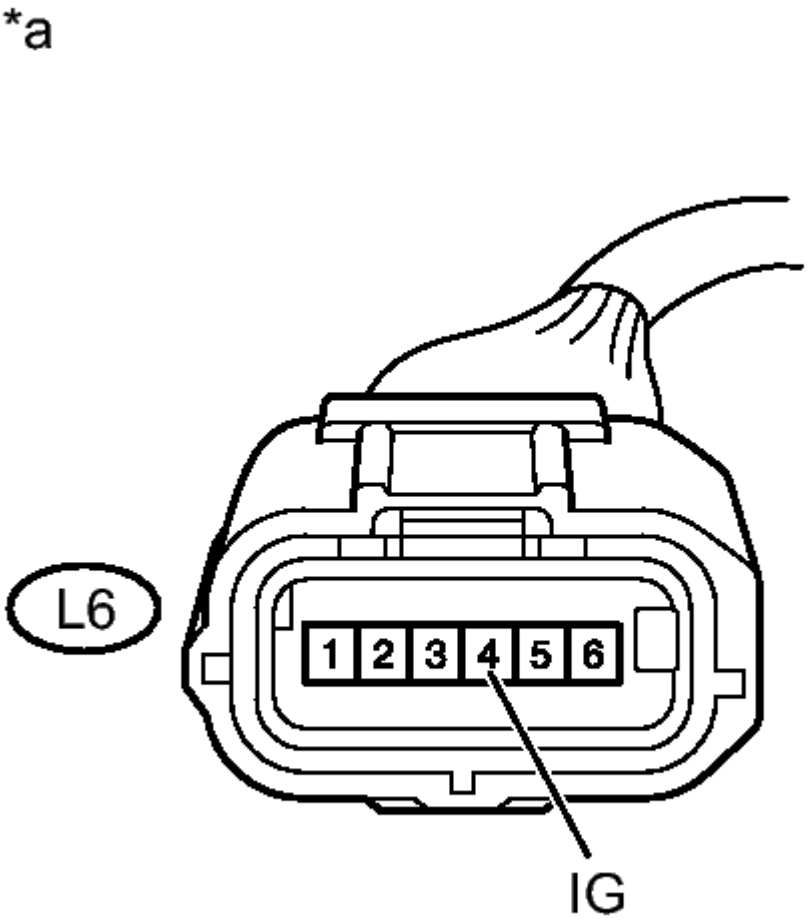


Fig. 31: Measuring Voltage Of Yaw Rate And Acceleration Sensor (IG Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Disconnect the yaw rate and acceleration sensor connector.
   c. Turn the ignition switch to ON.
   d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
L6-4 (IG) - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Yaw Rate and Acceleration Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG CIRCUIT)

OK: Go to next step

2. **INSPECT YAW RATE AND ACCELERATION SENSOR (GND TERMINAL)**
   a. Turn the ignition switch off.

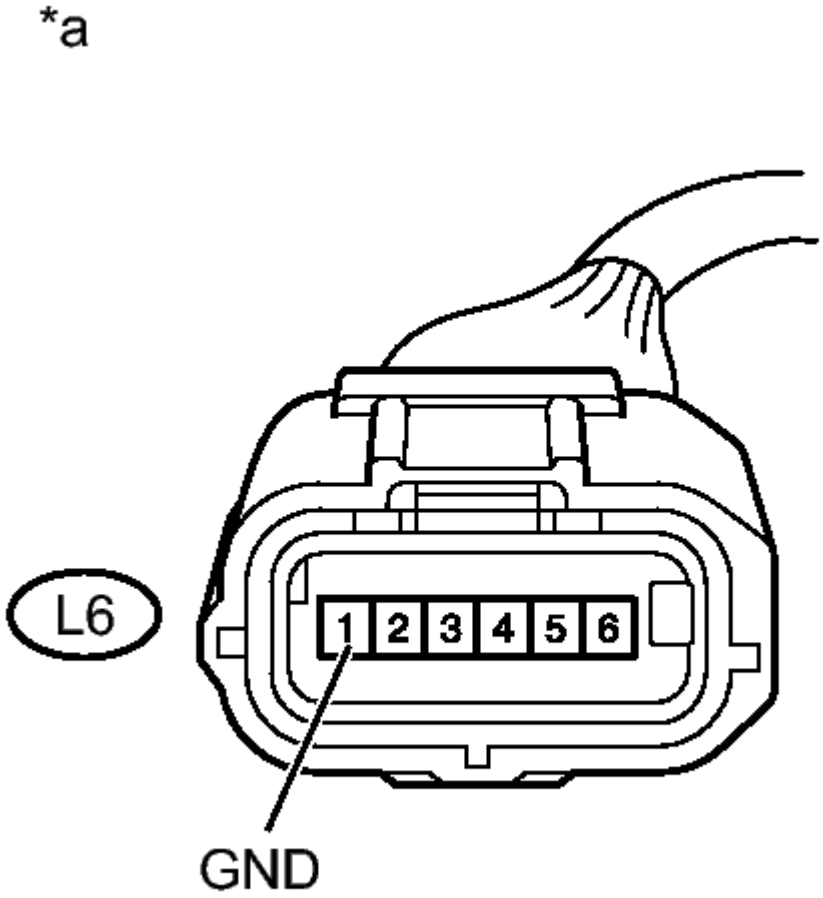


Fig. 32: Inspecting Yaw Rate And Acceleration Sensor (GND Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
L6-1 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Yaw Rate and Acceleration Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND CIRCUIT)

OK: Go to next step

3. **RECONFIRM DTC**
   a. Reconnect the yaw rate and acceleration sensor connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 3 km/h (2 mph) or more for at least 10 seconds.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1381) is not output	A
DTC (C1381) is output	B

NOTE: **Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 5

A --> See step 4

4. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH**

TROUBLESHOOTING

5. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**

DTC C1401: FRONT SPEED SENSOR RH MALFUNCTION; DTC C1402: FRONT SPEED SENSOR LH MALFUNCTION

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU. These signals are used for ABS control.

Speed sensor rotors have 48 serrations and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU.

The hall IC type speed sensor uses the frequency of output pulses to detect the vehicle speed. Because the sensor outputs digital pulses, it can detect vehicle speeds even when the vehicle is nearly stationary.

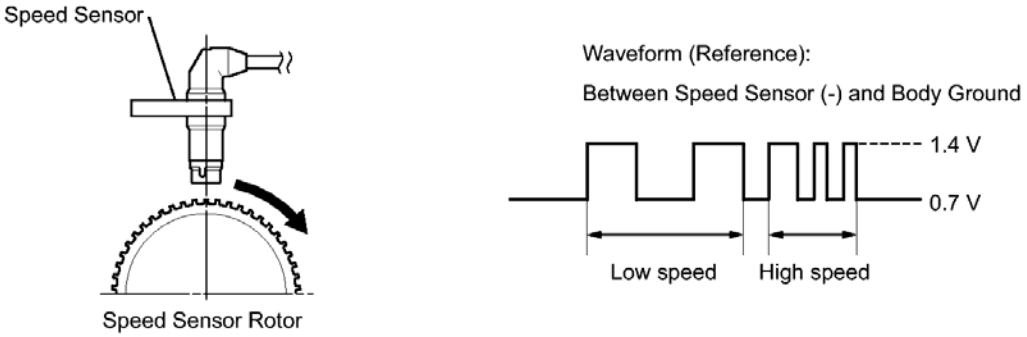


Fig. 33: Identifying Front Speed Sensor Operation With Waveform (Reference)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Measure the connection status between the sensor connector and the vehicle wire harness.

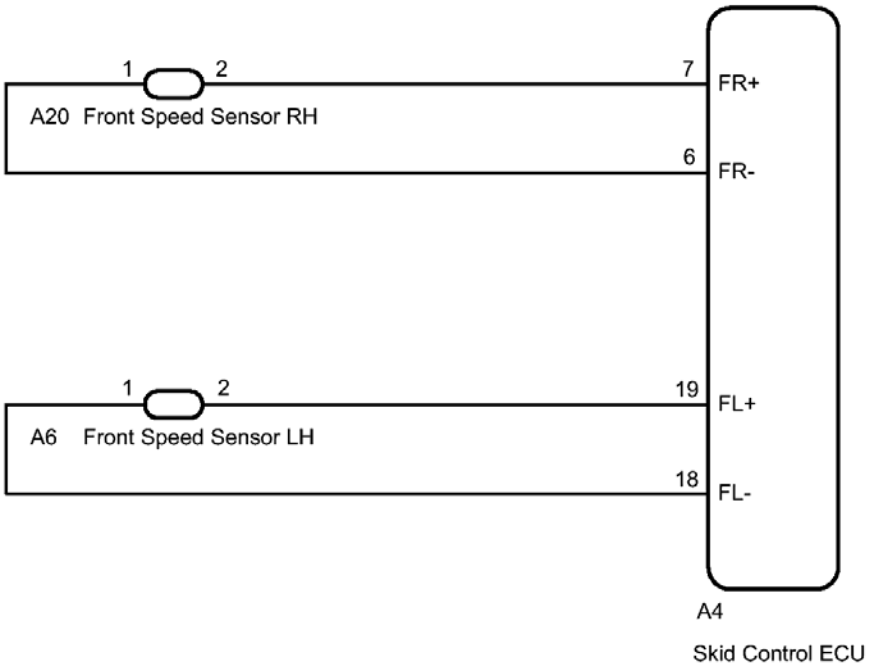
DTC Code	DTC Detection Condition	Trouble Area
C1401	Any of the following is detected: 1. At a vehicle speed 10 km/h (6 mph) or more, output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more (for 2WD) or for 30 seconds or more (for AWD). 2. At a vehicle speed less than 10	• Front speed sensor RH/LH

C1402	km/h (6 mph), output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed 10 km/h (6 mph) or more, outputs from both front speed sensors are 0 km/h (0 mph) for 15 seconds or more (for 2WD) or for 30 seconds or more (for AWD).	• Speed sensor rotor

HINT:

- DTC C1401 is for the front speed sensor RH.
- DTC C1402 is for the front speed sensor LH.

WIRING DIAGRAM



N

Fig. 34: Front Speed Sensors Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK FRONT SPEED SENSOR INSTALLATION**

a. Check the speed sensor installation.

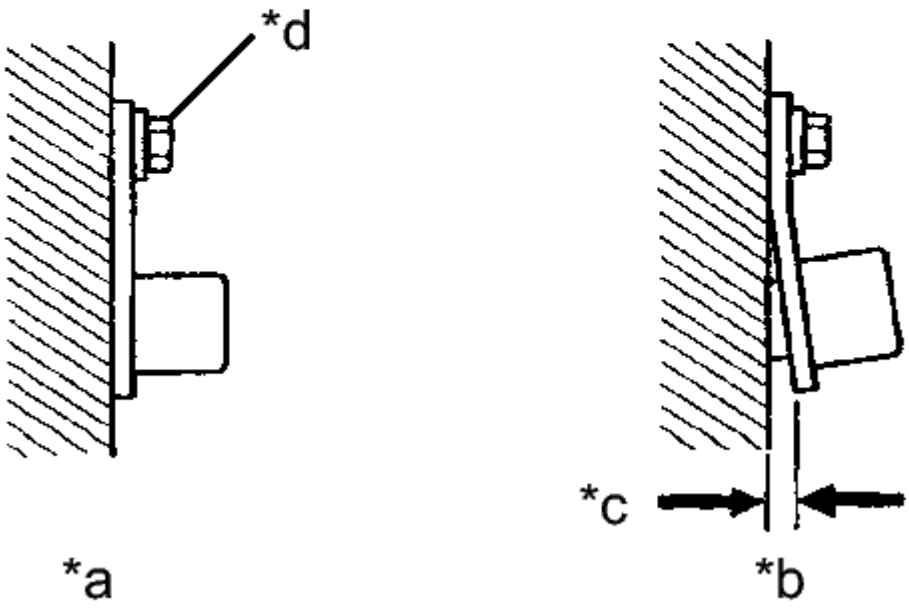


Fig. 35: Checking Front Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK

There is no clearance between the sensor and the front steering knuckle.

The installation bolt is tightened properly.

Torque

8.0 N*m (82 kgf*cm, 71 in.*lbf)

TEXT IN ILLUSTRATION

*a	OK
*b	NG
*c	Clearance
*d	8.0 N*m (82 kgf*cm, 71 in.*lbf)

NG --> See step 8

OK: Go to next step

2. **CHECK FRONT SPEED SENSOR TIP**
   a. Remove the front speed sensor. Refer to **REMOVAL** .
   b. Check the speed sensor tip.

      OK

      No scratches, oil, or foreign matter on the sensor tip.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR

OK: Go to next step

3. **CHECK FRONT SPEED SENSOR ROTOR**
   a. Remove the front speed sensor rotor. Refer to **REMOVAL** .
   b. Check the speed sensor rotor.

      OK

      No scratches, oil, or foreign matter on the rotor.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

      HINT:

      If the front speed sensor rotor needs to be replaced, replace it together with the front drive outboard joint shaft assembly.

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK: Go to next step

4. **READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)**
   a. Install the front speed sensor and the front speed sensor rotor.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

   g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 5

OK --> See step 7

5. **REPLACE FRONT SPEED SENSOR**
   a. Turn the ignition switch off.
   b. Replace the front speed sensor. Refer to **REMOVAL** .

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

NEXT: Go to next step

6. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Start the engine.
   c. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1401 and C1402) are not output	A
DTCs (C1401 and/or C1402) are output	B

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

- If the front speed sensor rotor needs to be replaced, replace it together with the front drive outboard joint shaft assembly.
- If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 9

A --> END

7. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
8. **INSTALL FRONT SPEED SENSOR CORRECTLY. Refer to INSTALLATION**
9. **REPLACE FRONT SPEED SENSOR ROTOR. Refer to DISASSEMBLY**

DTC C1403: REAR SPEED SENSOR RH MALFUNCTION; DTC C1404: REAR SPEED SENSOR LH MALFUNCTION

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU. These signals are used for ABS control.

- Speed sensor rotors have rows of alternating N and S magnetic poles and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU (for 2WD).
- Speed sensor rotors have 48 serrations and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU (for AWD).

The hall IC type speed sensor uses the frequency of output pulses to detect the vehicle speed. Because the sensor outputs digital pulses, it can detect vehicle speeds even when the vehicle is nearly stationary.

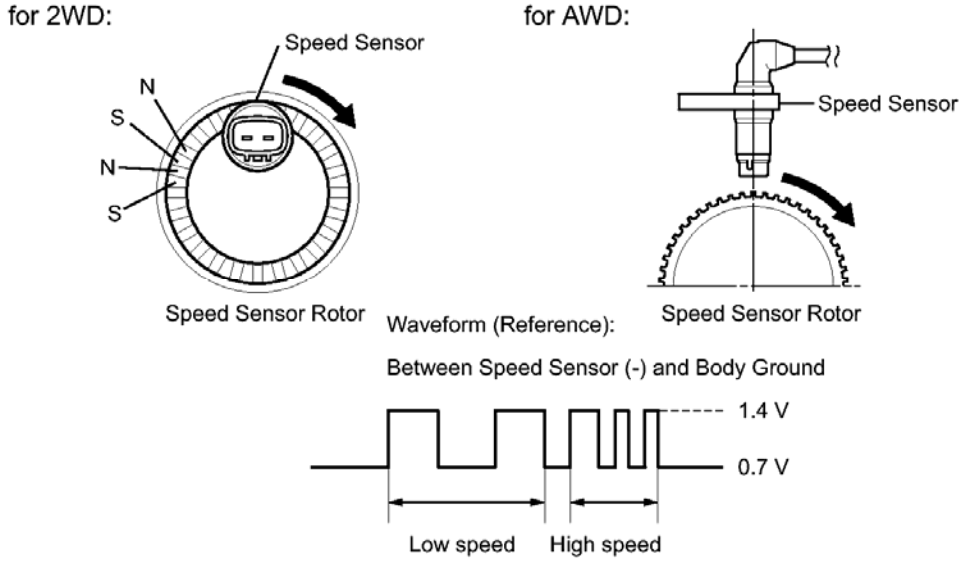


Fig. 36: Identifying Rear Speed Sensor Operation With Waveform (Reference)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Measure the connection status between the sensor connector and the vehicle wire harness.

DTC Code	DTC Detection Condition	Trouble Area
C1403 C1404	Any of the following is detected: 1. At a vehicle speed 10 km/h (6 mph) or more, output voltage from one of the speed sensors is less than that from the other sensors for 15 seconds or more (for 2WD) or for 30 seconds or more (for AWD). 2. At a vehicle speed less than 10 km/h (6 mph), output from one of the speed sensors is 0 km/h (0 mph) for 1 second or more. 3. At a vehicle speed less than 10 km/h (6 mph), outputs from both rear speed sensors are 0 km/h (0 mph) for a cumulative time of 200 seconds.	• Rear speed sensor RH/LH • Speed sensor rotor

HINT:

- DTC C1403 is for the rear speed sensor RH.
- DTC C1404 is for the rear speed sensor LH.

WIRING DIAGRAM

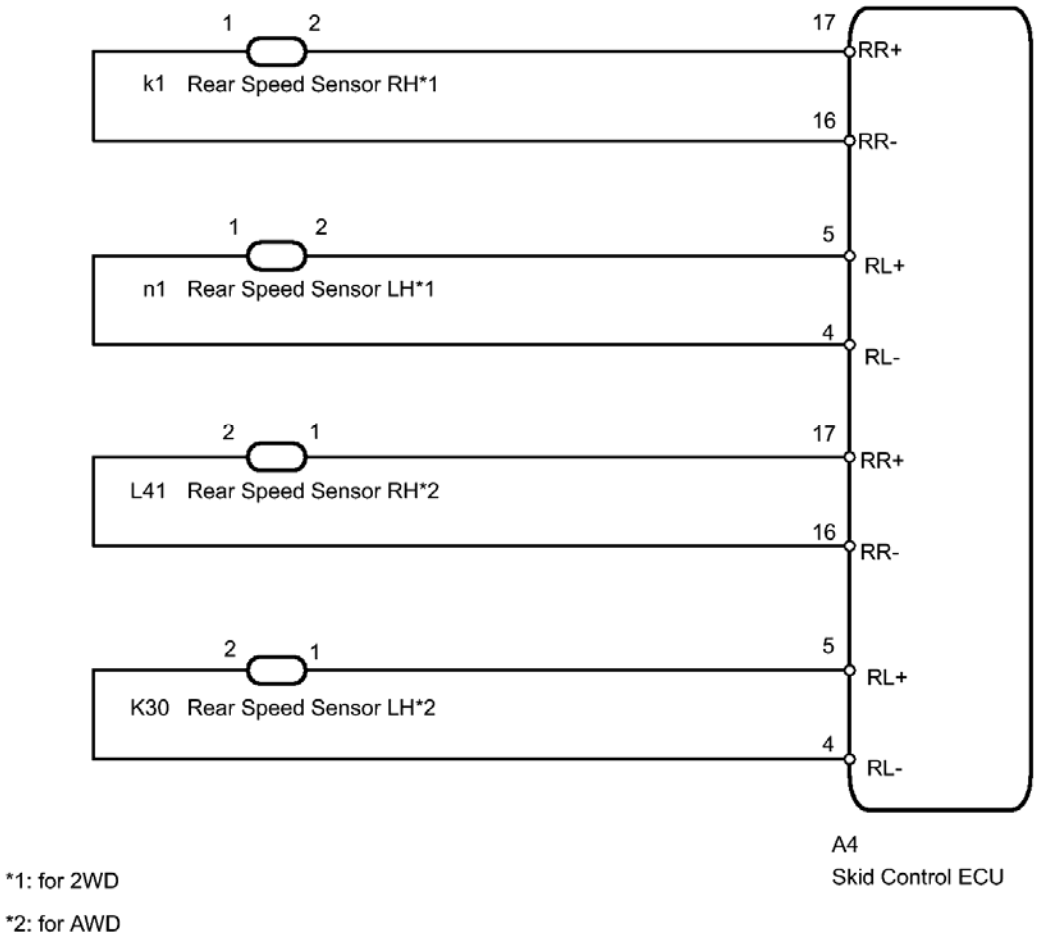


Fig. 37: Rear Speed Sensors Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK REAR SPEED SENSOR INSTALLATION**
    a. Check the speed sensor installation (for 2WD).

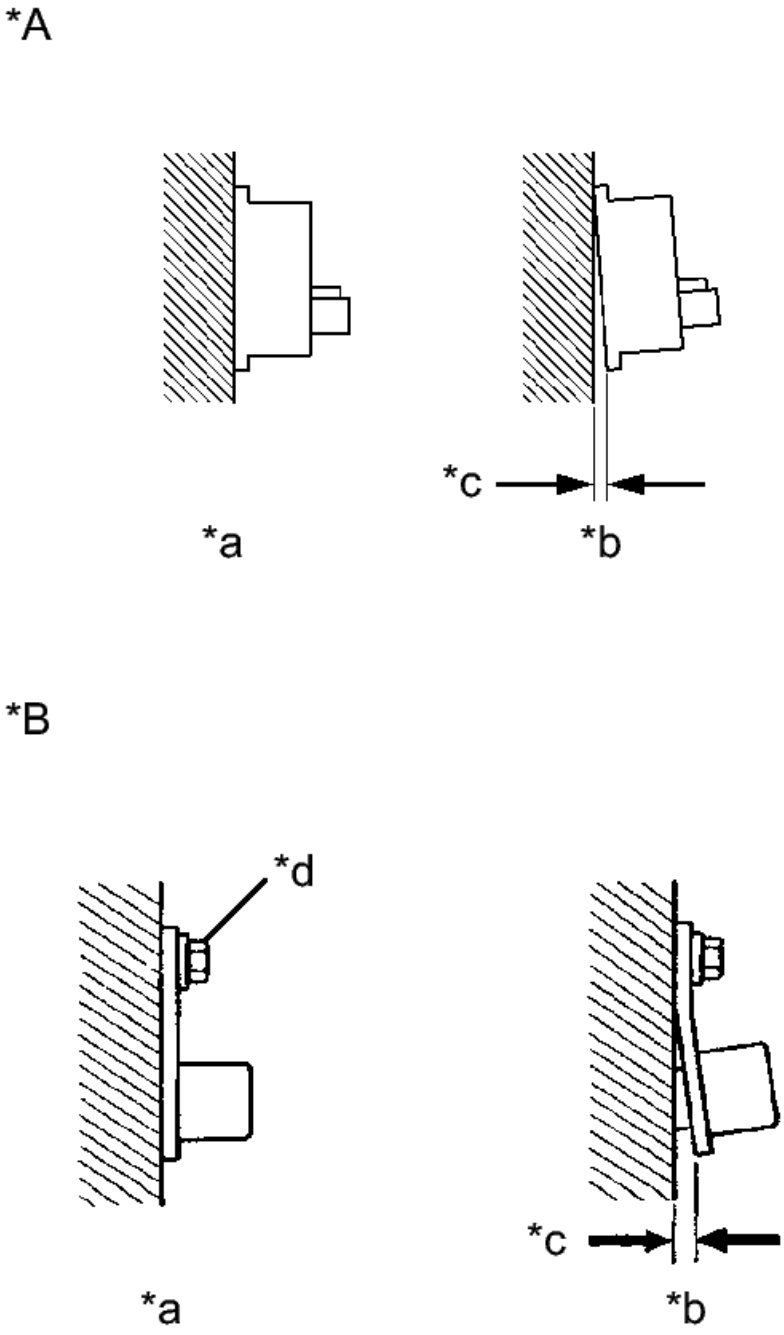


Fig. 38: Checking Rear Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

OK

There is no clearance between the sensor and the rear axle carrier.

b. Check the speed sensor installation (for AWD).

OK

There is no clearance between the sensor and the rear axle carrier.

The installation bolt is tightened properly.

Torque

8.0 N*m (82 kgf*cm, 71 in.*lbf)

TEXT IN ILLUSTRATION

*A	for 2WD
*B	for AWD
*a	OK
*b	NG
*c	Clearance
*d	8.0 N*m (82 kgf*cm, 71 in.*lbf)

RESULT

Result	Proceed to
OK (for AWD)	A
OK (for 2WD)	B
NG (for 2WD)	C
NG (for AWD)	D

B --> See step 4

C --> See step 7

D --> See step 8

A: Go to next step

2. **CHECK REAR SPEED SENSOR TIP**
   a. Remove the rear speed sensor. Refer to **REMOVAL** .
   b. Check the speed sensor tip.

      OK

      No scratches, oil, or foreign matter on the sensor tip.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

   NG --> CLEAN OR REPLACE REAR SPEED SENSOR

   OK: Go to next step

3. **CHECK REAR SPEED SENSOR ROTOR**
   a. Remove the rear speed sensor rotor. Refer to **REMOVAL** .
   b. Check the speed sensor rotor.

      OK

      No scratches, oil, or foreign matter on the rotor.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

      HINT:

      If the rear speed sensor rotor needs to be replaced, replace it together with the rear drive outboard joint shaft assembly.

   NG --> CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

   OK: Go to next step

4. **READ VALUE USING TECHSTREAM (REAR SPEED SENSOR)**
   a. Connect the Techstream to the DLC3.
   b. Start the engine.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.

e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

f. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

RESULT

Result	Proceed to
NG (for AWD)	A
NG (for 2WD)	B
OK	C

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

- The rear speed sensor rotor is incorporated into the rear axle hub and bearing assembly.

  If the rear speed sensor rotor needs to be replaced, replace it together with the rear axle hub and bearing assembly with rear speed sensor (for 2WD).

- If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 9

C --> See step 10

A: Go to next step

5. **REPLACE REAR SPEED SENSOR**
   a. Turn the ignition switch off.
   b. Replace the rear speed sensor. Refer to **REMOVAL** .

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

NEXT: Go to next step

6. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Start the engine.
   c. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1403 and C1404) are not output	A
DTCs (C1403	

and/or C1404) are output	B

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

- If the rear speed sensor rotor needs to be replaced, replace it together with the rear drive outboard joint shaft assembly.
- If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 11

A --> END

7. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY. Refer to REMOVAL**
8. **INSTALL REAR SPEED SENSOR CORRECTLY. Refer to INSTALLATION**
9. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY. Refer to REMOVAL**
10. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
11. **REPLACE REAR SPEED SENSOR ROTOR. Refer to DISASSEMBLY**

DTC C1405: OPEN OR SHORT IN FRONT SPEED SENSOR RH CIRCUIT; DTC C1406: OPEN OR SHORT IN FRONT SPEED SENSOR LH CIRCUIT

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU. These signals are used for ABS control.

Speed sensor rotors have 48 serrations and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU.

The hall IC type speed sensor uses the frequency of output pulses to detect the vehicle speed. Because the sensor outputs digital pulses, it can detect vehicle speeds even when the vehicle is nearly stationary.

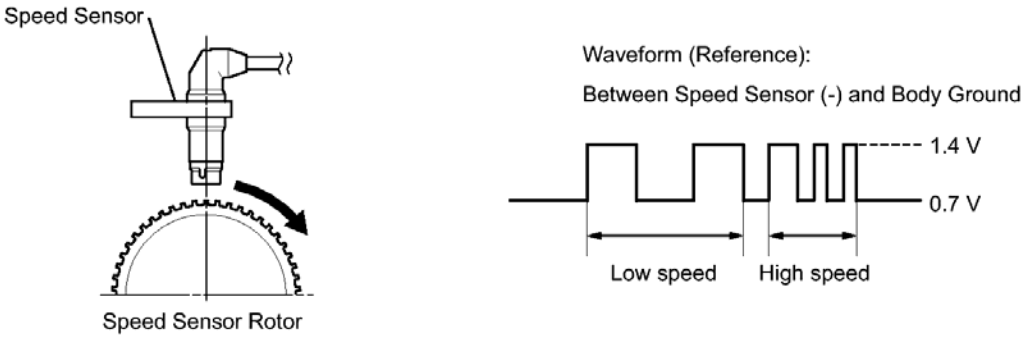


Fig. 39: Identifying Front Speed Sensor Operation With Waveform (Reference)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Measure the connection status between the sensor connector and the vehicle wire harness.

DTC Code	DTC Detection Condition	Trouble Area
C1405 C1406	Either of the following is detected: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more. 2. With the IG1 terminal voltage 9.5 V or more, the sensor power supply voltage decreases for 0.5 seconds or more.	• Front speed sensor RH/LH • Speed sensor circuit • Brake actuator assembly (Skid control ECU)

HINT:

- DTC C1405 is for the front speed sensor RH.
- DTC C1406 is for the front speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1401 and C1402. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	FR speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	FL speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

OK

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG --> See step 4

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR	Front wheel speed sensor RH reading /	Vehicle	When driving at

Wheel Speed	Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	stopped: 0 km/h (0 mph)	constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 4

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1405 and	A

C1406) are not output	
DTCs (C1405 and/or C1406) are output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 8

A --> See step 6

4. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - FRONT SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
   c. Disconnect the skid control ECU connector and the front speed sensor connector.
   d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR RH

Tester Connection	Condition	Specified Condition
A4-7 (FR+) - A20-2 (FR+)	Always	Below 1 ohms
A4-7 (FR+) - Body ground	Always	10 kohms or higher
A4-6 (FR-) - A20-1 (FR-)	Always	Below 1 ohms
A4-6 (FR-) - Body ground	Always	10 kohms or higher

FOR LH

Tester		Specified

Connection	Condition	Condition
A4-19 (FL+) - A6-2 (FL+)	Always	Below 1 ohms
A4-19 (FL+) - Body ground	Always	10 kohms or higher
A4-18 (FL-) - A6-1 (FL-)	Always	Below 1 ohms
A4-18 (FL-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (SENSOR INPUT)**
   a. Reconnect the skid control ECU connector.

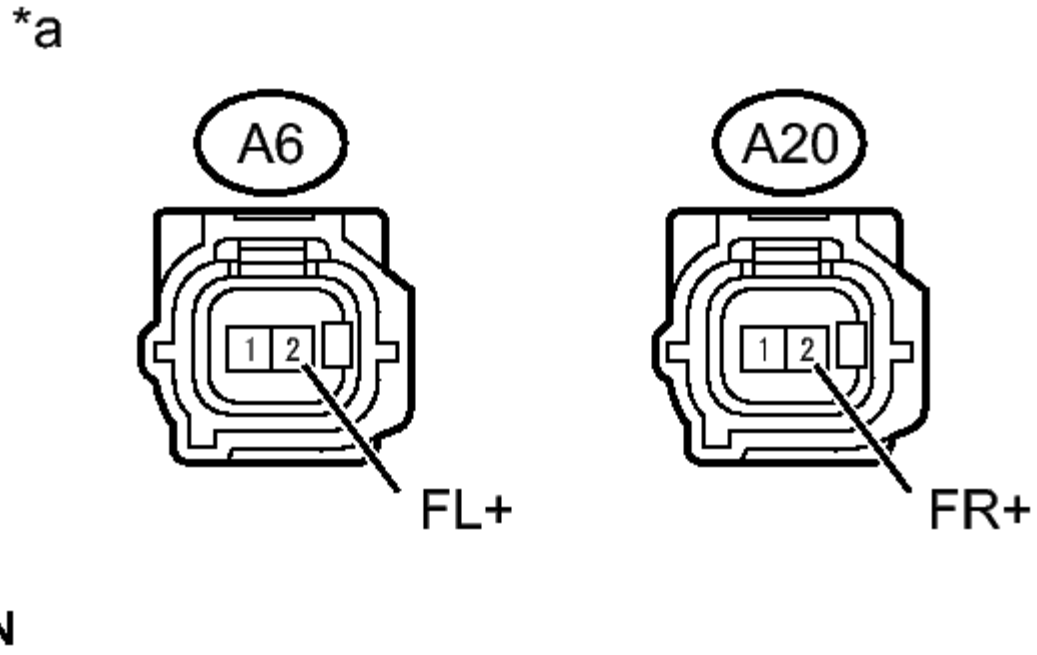


Fig. 40: Inspecting Skid Control ECU (Sensor Input)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Turn the ignition switch to ON.

c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
A20-2 (FR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition
A6-2 (FL+) - Body ground	Ignition switch ON	8 to 14 V

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Front Speed Sensor)

NG --> See step 8

OK --> See step 7

6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **REPLACE FRONT SPEED SENSOR. Refer to REMOVAL**
8. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1407: OPEN OR SHORT IN REAR SPEED SENSOR RH CIRCUIT; DTC C1408: OPEN OR SHORT IN REAR SPEED SENSOR LH CIRCUIT

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU. These signals are used for ABS control.

- Speed sensor rotors have rows of alternating N and S magnetic poles and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU (for 2WD).
- Speed sensor rotors have 48 serrations and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU (for AWD).

The hall IC type speed sensor uses the frequency of output pulses to detect the vehicle speed. Because the sensor outputs digital pulses, it can detect vehicle speeds even when the vehicle is nearly stationary.

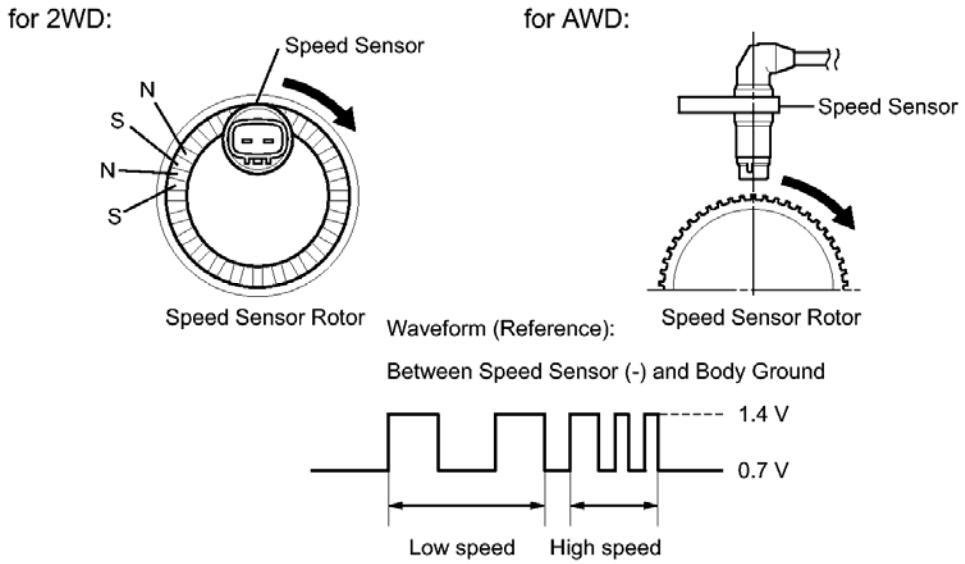


Fig. 41: Identifying Rear Speed Sensor Operation With Waveform (Reference)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Measure the connection status between the sensor connector and the vehicle wire harness.

DTC Code	DTC Detection Condition	Trouble Area
C1407	Either of the following is detected: 1. An open in the speed sensor signal circuit continues for 0.5 seconds or more.	• Rear speed sensor RH/LH • Speed sensor circuit

C1408	2. With the IG1 terminal voltage 9.5 V or more, the sensor power supply voltage decreases for 0.5 seconds or more.	• Brake actuator assembly (Skid control ECU)

HINT:

- DTC C1407 is for the rear speed sensor RH.
- DTC C1408 is for the rear speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1403 and C1404. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	RR speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	RL speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

RESULT

Result	Proceed to
There are no momentary interruptions	A

There are momentary interruptions	B

HINT:

Perform the above inspection before removing the sensor and connector.

B --> See step 4

A: Go to next step

2. **READ VALUE USING TECHSTREAM (REAR SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

   g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The

speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 4

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1407 and C1408) are not output	A
DTCs (C1407 and/or C1408) are output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 8

A --> See step 6

4. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)**

a. for 2WD

1. Make sure that there is no looseness at the locking part and the connecting part of the connector.
2. Disconnect the skid control ECU connector.
3. Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR RH

Tester Connection	Condition	Specified Condition
A4-17 (RR+) - k1-2 (RR+)	Always	Below 1 ohms
A4-17 (RR+) - Body ground	Always	10 kohms or higher
A4-16 (RR-) - k1-1 (RR-)	Always	Below 1 ohms
A4-16 (RR-) - Body ground	Always	10 kohms or higher

FOR LH

Tester Connection	Condition	Specified Condition
A4-5 (RL+) - n1-2 (RL+)	Always	Below 1 ohms
A4-5 (RL+) - Body ground	Always	10 kohms or higher
A4-4 (RL-) - n1-1 (RL-)	Always	Below 1 ohms
A4-4 (RL-) - Body ground	Always	10 kohms or higher

b. for AWD

1. Make sure that there is no looseness at the locking part and the connecting part of the connector.

2. Disconnect the skid control ECU connector.
3. Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR RH

Tester Connection	Condition	Specified Condition
A4-17 (RR+) - L41-1 (RR+)	Always	Below 1 ohms
A4-17 (RR+) - Body ground	Always	10 kohms or higher
A4-16 (RR-) - L41-2 (RR-)	Always	Below 1 ohms
A4-16 (RR-) - Body ground	Always	10 kohms or higher

FOR LH

Tester Connection	Condition	Specified Condition
A4-5 (RL+) - K30-1 (RL+)	Always	Below 1 ohms
A4-5 (RL+) - Body ground	Always	10 kohms or higher
A4-4 (RL-) - K30-2 (RL-)	Always	Below 1 ohms
A4-4 (RL-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (SENSOR INPUT)**
   a. for 2WD

1. Reconnect the skid control ECU connector.

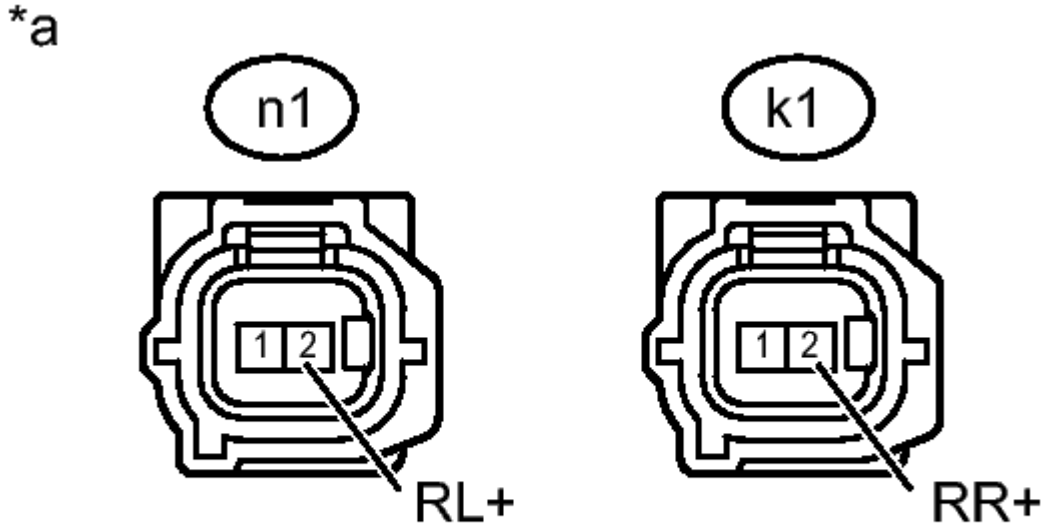


Fig. 42: Inspecting Skid Control ECU (Sensor Input)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the ignition switch to ON.
3. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
k1-2 (RR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition
n1-2 (RL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

	Front

*a	view of wire harness connector (to Rear Speed Sensor)

b. for AWD

1. Reconnect the skid control ECU connector.

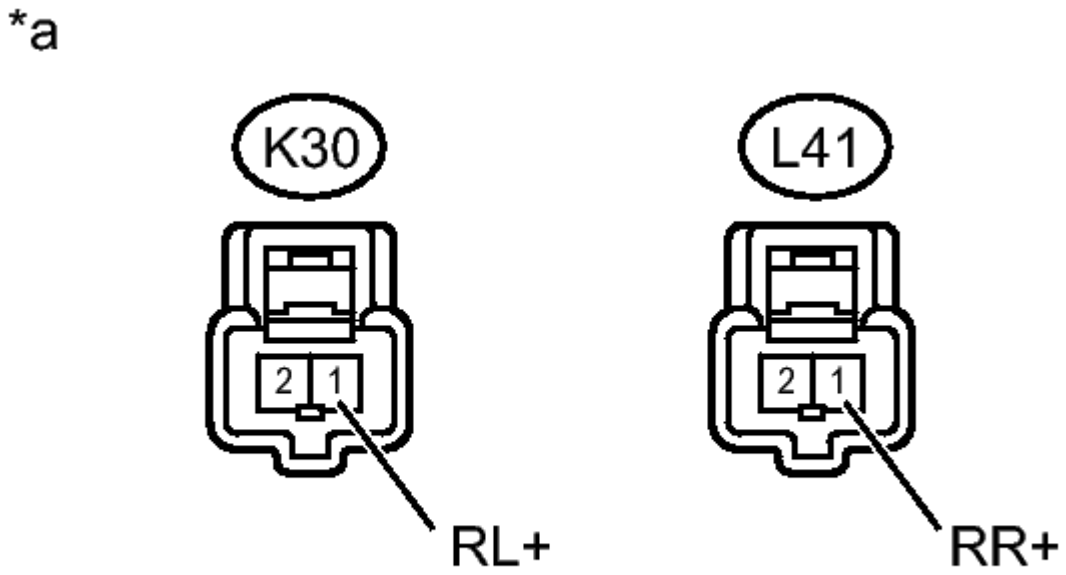


Fig. 43: Rear Speed Sensor Harness Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the ignition switch to ON.
3. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
L41-1 (RR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition
K30-1 (RL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Speed Sensor)

RESULT

Result	Proceed to
OK (for 2WD)	A
OK (for AWD)	B
NG	C

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 9

C --> See step 8

A --> See step 7

6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

7. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY. Refer to REMOVAL**
8. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
9. **REPLACE REAR SPEED SENSOR. Refer to REMOVAL**

DTC C1413: FRONT SPEED SENSOR RH OUTPUT MALFUNCTION; DTC C1414: FRONT SPEED SENSOR LH OUTPUT MALFUNCTION

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU. These signals are used for ABS control.

Speed sensor rotors have 48 serrations and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU.

The hall IC type speed sensor uses the frequency of output pulses to detect the vehicle speed. Because the sensor outputs digital pulses, it can detect vehicle speeds even when the vehicle is nearly stationary.

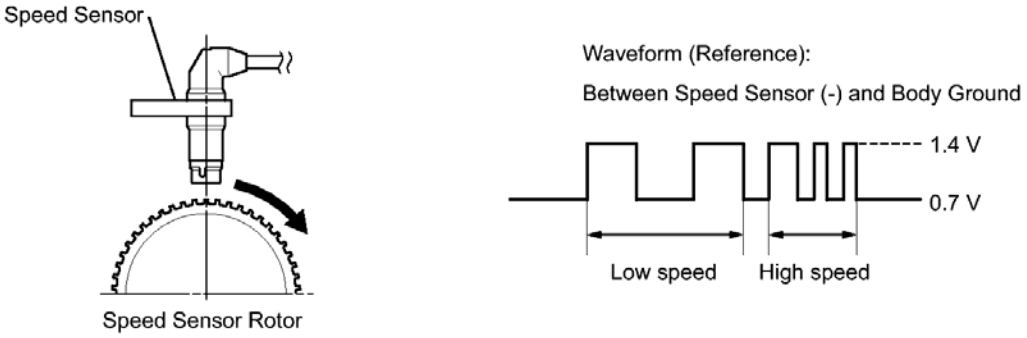


Fig. 44: Identifying Front Speed Sensor Operation With Waveform (Reference)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Measure the connection status between the sensor connector and the vehicle wire harness.

DTC Code	DTC Detection Condition	Trouble Area
C1413 C1414	Any of the following is detected: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more	• Front speed sensor RH/LH • Speed sensor circuit • Speed sensor rotor

	within 5 seconds. 3. At a vehicle speed 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Brake actuator assembly (Skid control ECU)

HINT:

- DTC C1413 is for the front speed sensor RH.
- DTC C1414 is for the front speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1401 and C1402. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	FR speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	FL speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

OK

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG --> See step 4

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

   g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 4

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1413 and C1414) are not output	A
DTCs (C1413 and/or C1414) are output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 11

A --> See step 9

4. **CHECK FRONT SPEED SENSOR INSTALLATION**
   a. Turn the ignition switch off.

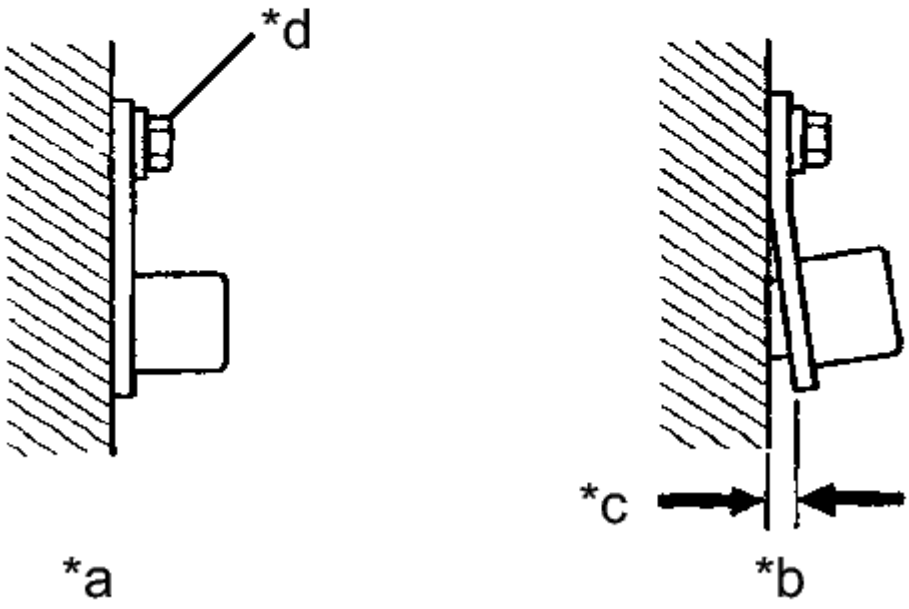


Fig. 45: Checking Front Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Check the speed sensor installation.

OK

There is no clearance between the sensor and the front steering knuckle.

The installation bolt is tightened properly.

Torque

8.0 N*m (82 kgf*cm, 71 in.*lbf)

TEXT IN ILLUSTRATION

*a	OK
*b	NG
*c	Clearance
*d	8.0 N*m (82 kgf*cm, 71 in.*lbf)

NG --> See step 12

OK: Go to next step

5. **CHECK FRONT SPEED SENSOR TIP**
   a. Remove the front speed sensor. Refer to **REMOVAL** .
   b. Check the speed sensor tip.

      OK

      No scratches, oil, or foreign matter on the sensor tip.

      HINT:

      - If the sensor is contaminated with oil or other foreign material, clean the sensor.
      - If there is iron powder sticking to the rotor, this will result in a malfunction, so confirm that the rotor is not contaminated with foreign material before replacing the sensor.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR

OK: Go to next step

6. **CHECK FRONT SPEED SENSOR ROTOR**
   a. Remove the front speed sensor rotor. Refer to **REMOVAL** .
   b. Check the speed sensor rotor.

      OK

      No scratches, oil, or foreign matter on the rotor.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

HINT:

If the front speed sensor rotor needs to be replaced, replace it together with the front drive outboard joint shaft assembly.

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR ROTOR

OK: Go to next step

7. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - FRONT SPEED SENSOR)**
   a. Install the front speed sensor and the front speed sensor rotor.
   b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
   c. Disconnect the skid control ECU connector and the front speed sensor connector.
   d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR RH

Tester Connection	Condition	Specified Condition
A4-7 (FR+) - A20-2 (FR+)	Always	Below 1 ohms
A4-7 (FR+) - Body ground	Always	10 kohms or higher
A4-6 (FR-) - A20-1 (FR-)	Always	Below 1 ohms
A4-6 (FR-) - Body ground	Always	10 kohms or higher

FOR LH

Tester Connection	Condition	Specified Condition
A4-19 (FL+) - A6-2 (FL+)	Always	Below 1 ohms
A4-19 (FL+) - Body ground	Always	10 kohms or higher
A4-18 (FL-) - A6-1	Always	Below 1

(FL-)		ohms
A4-18 (FL-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

8. **INSPECT SKID CONTROL ECU (SENSOR INPUT)**
   a. Reconnect the skid control ECU connector.

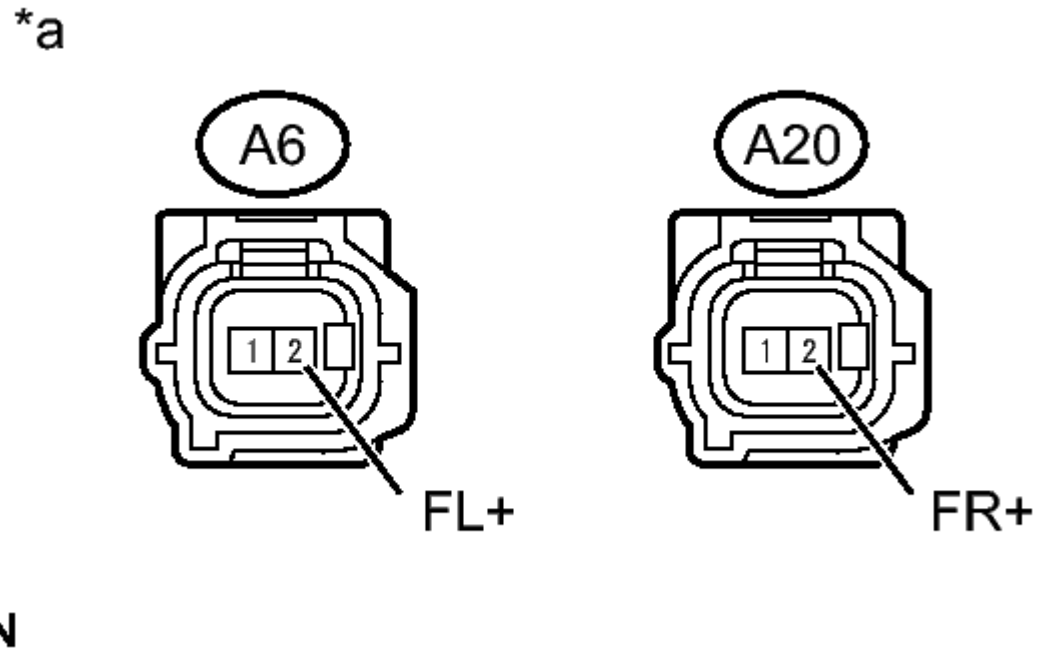


Fig. 46: Inspecting Skid Control ECU (Sensor Input)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Turn the ignition switch to ON.
   c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
A20-2 (FR+) - Body	Ignition switch	8 to 14 V

ground	ON	

FOR LH

Tester Connection	Switch Condition	Specified Condition
A6-2 (FL+) - Body ground	Ignition switch ON	8 to 14 V

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Front Speed Sensor)

NG --> See step 11

OK --> See step 10

9. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
10. **REPLACE FRONT SPEED SENSOR. Refer to REMOVAL**
11. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
12. **INSTALL FRONT SPEED SENSOR CORRECTLY. Refer to INSTALLATION**

DTC C1415: REAR SPEED SENSOR RH OUTPUT MALFUNCTION; DTC C1416: REAR SPEED SENSOR LH OUTPUT MALFUNCTION

DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the skid control ECU. These signals are used for ABS control.

- Speed sensor rotors have rows of alternating N and S magnetic poles and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU (for 2WD).
- Speed sensor rotors have 48 serrations and their magnetic fields change when the rotors turn. Each speed sensor detects that magnetic change and sends a pulse signal to the skid control ECU (for AWD).

The hall IC type speed sensor uses the frequency of output pulses to detect the vehicle speed. Because the sensor outputs digital pulses, it can detect vehicle speeds even when the vehicle is nearly stationary.

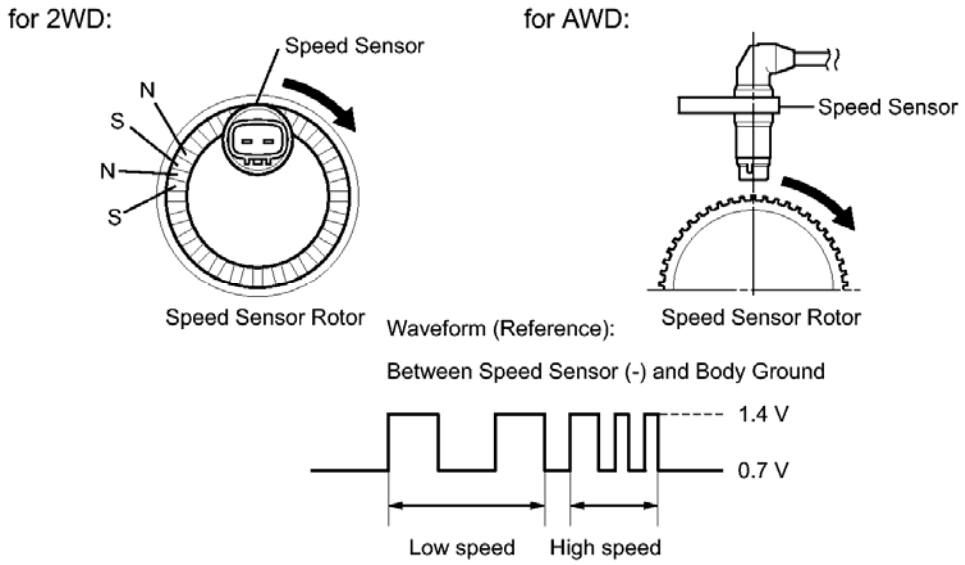


Fig. 47: Identifying Rear Speed Sensor Operation With Waveform (Reference)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Measure the connection status between the sensor connector and the vehicle wire harness.

DTC Code	DTC Detection Condition	Trouble Area
C1415 C1416	Any of the following is detected: 1. An open in the sensor signal circuit of a malfunctioning area occurs 255 times or more. 2. At a vehicle speed 20 km/h (12 mph) or more, noise occurs in the sensor signals of a malfunctioning wheel 75 times or more within 5 seconds. 3. At a vehicle speed 10 km/h (6 mph) or more, noise occurs once per rotor rotation for 15 seconds or more.	• Rear speed sensor RH/LH • Speed sensor circuit • Speed sensor rotor • Brake actuator assembly (Skid control ECU)

HINT:

- DTC C1415 is for the rear speed sensor RH.
- DTC C1416 is for the rear speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C1403 and C1404. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Speed Open	RR speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	RL speed sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

OK

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG --> See step 4

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (REAR SPEED SENSOR)**
   a. Turn the ignition switch off.
   b. Connect the Techstream to the DLC3.
   c. Start the engine.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

   g. Check that the speed value output from the speed sensor displayed on the Techstream.

HINT:

Factors that affect the indicated vehicle speed include tire size, tire inflation, and tire wear. The speed indicated on the speedometer has an allowable margin of error. This can be tested using a speedometer tester (calibrated chassis dynamometer). For details about testing and the margin of error, see the reference chart. Refer to **ON-VEHICLE INSPECTION** .

OK

The speed value output from the speed sensor displayed on the Techstream is the similar speed as indicated on the speedometer.

NG --> See step 4

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 40 km/h (25 mph) or more for at least 60 seconds.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1415 and C1416) are not output	A
DTCs (C1415 and/or C1416) are output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 11

A --> See step 9

4. **CHECK REAR SPEED SENSOR INSTALLATION**
   a. Turn the ignition switch off.

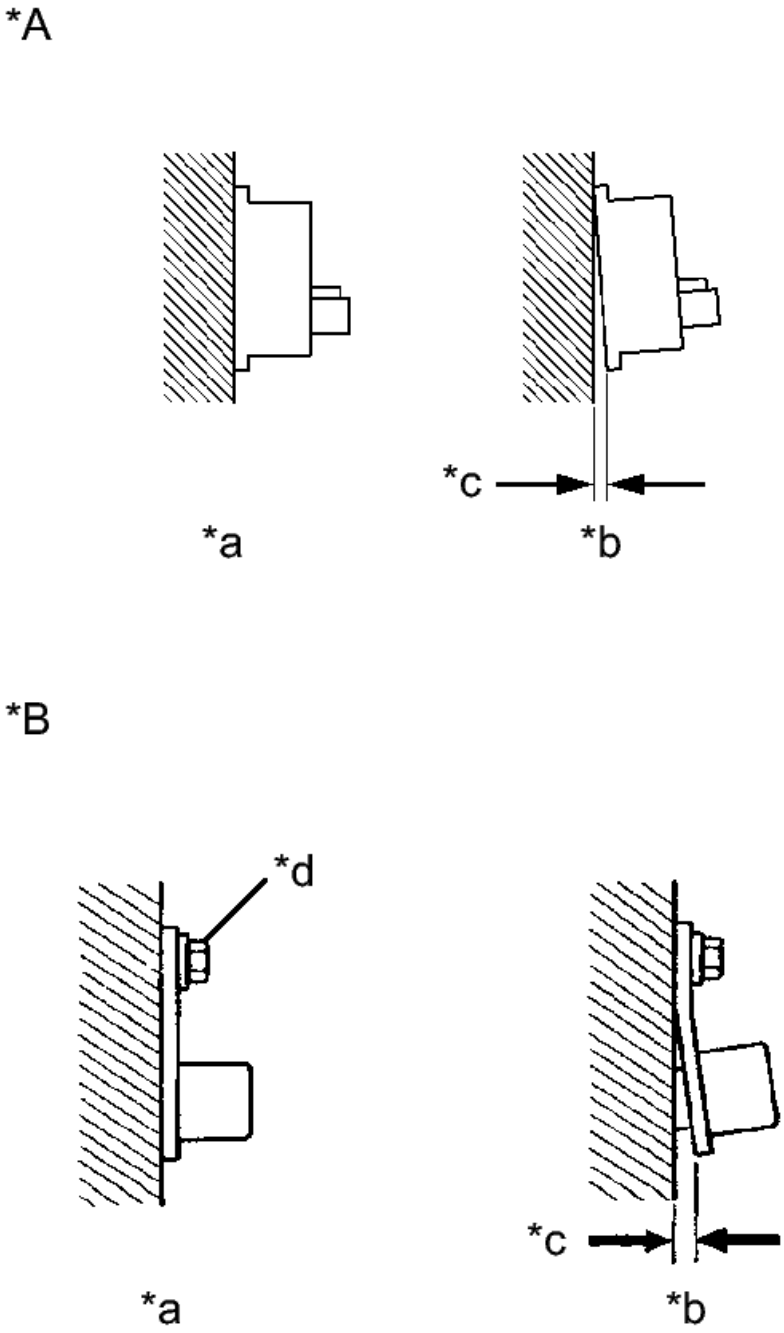


Fig. 48: Checking Rear Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Check the speed sensor installation (for 2WD).

OK

There is no clearance between the sensor and the rear axle carrier.

c. Check the speed sensor installation (for AWD).

OK

There is no clearance between the sensor and the rear axle carrier.

The installation bolt is tightened properly.

Torque

8.0 N*m (82 kgf*cm, 71 in.*lbf)

TEXT IN ILLUSTRATION

*A	for 2WD
*B	for AWD
*a	OK
*b	NG
*c	Clearance
*d	8.0 N*m (82 kgf*cm, 71 in.*lbf)

RESULT

Result	Proceed to
OK (for AWD)	A
OK (for 2WD)	B
NG (for AWD)	C
NG (for 2WD)	D

B --> See step 7

C --> See step 12

D --> See step 13

A: Go to next step

5. **CHECK REAR SPEED SENSOR TIP**
   a. Remove the rear speed sensor. Refer to **REMOVAL** .
   b. Check the speed sensor tip.

      OK

      No scratches, oil, or foreign matter on the sensor tip.

      HINT:

      - If the sensor is contaminated with oil or other foreign material, clean the sensor.
      - If there is iron powder sticking to the rotor, this will result in a malfunction, so confirm that the rotor is not contaminated with foreign material before replacing the sensor.

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

NG --> CLEAN OR REPLACE REAR SPEED SENSOR

OK: Go to next step

6. **CHECK REAR SPEED SENSOR ROTOR**
   a. Remove the rear speed sensor rotor. Refer to **REMOVAL** .
   b. Check the speed sensor rotor.

      OK

      No scratches, oil, or foreign matter on the rotor.

      RESULT

Result	Proceed to
NG	A
OK	B

      NOTE: Check the speed sensor signal after cleaning or replacement. Refer to TEST MODE PROCEDURE .

      HINT:

If the front speed sensor rotor needs to be replaced, replace it together with the rear drive outboard joint shaft assembly.

B --> See step 7

A --> CLEAN OR REPLACE REAR SPEED SENSOR ROTOR

7. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)**
   a. for 2WD
      1. Make sure that there is no looseness at the locking part and the connecting part of the connector.
      2. Disconnect the skid control ECU connector.
      3. Measure the resistance according to the value(s) in the table below.

         Standard Resistance

         FOR RH

Tester Connection	Condition	Specified Condition
A4-17 (RR+) - k1-2 (RR+)	Always	Below 1 ohms
A4-17 (RR+) - Body ground	Always	10 kohms or higher
A4-16 (RR-) - k1-1 (RR-)	Always	Below 1 ohms
A4-16 (RR-) - Body ground	Always	10 kohms or higher

         FOR LH

Tester Connection	Condition	Specified Condition
A4-5 (RL+) - n1-2 (RL+)	Always	Below 1 ohms
A4-5 (RL+) - Body ground	Always	10 kohms or higher
A4-4 (RL-) - n1-1 (RL-)	Always	Below 1 ohms

A4-4 (RL-) - Body ground	Always	10 kohms or higher

b. for AWD

1. Make sure that there is no looseness at the locking part and the connecting part of the connector.
2. Disconnect the skid control ECU connector.
3. Measure the resistance according to the value(s) in the table below.

Standard Resistance

FOR RH

Tester Connection	Condition	Specified Condition
A4-17 (RR+) - L41-1 (RR+)	Always	Below 1 ohms
A4-17 (RR+) - Body ground	Always	10 kohms or higher
A4-16 (RR-) - L41-2 (RR-)	Always	Below 1 ohms
A4-16 (RR-) - Body ground	Always	10 kohms or higher

FOR LH

Tester Connection	Condition	Specified Condition
A4-5 (RL+) - K30-1 (RL+)	Always	Below 1 ohms
A4-5 (RL+) - Body ground	Always	10 kohms or higher
A4-4 (RL-) - K30-2 (RL-)	Always	Below 1 ohms
A4-4 (RL-) - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

8. **INSPECT SKID CONTROL ECU (SENSOR INPUT)**
   a. for 2WD
      1. Reconnect the skid control ECU connector.

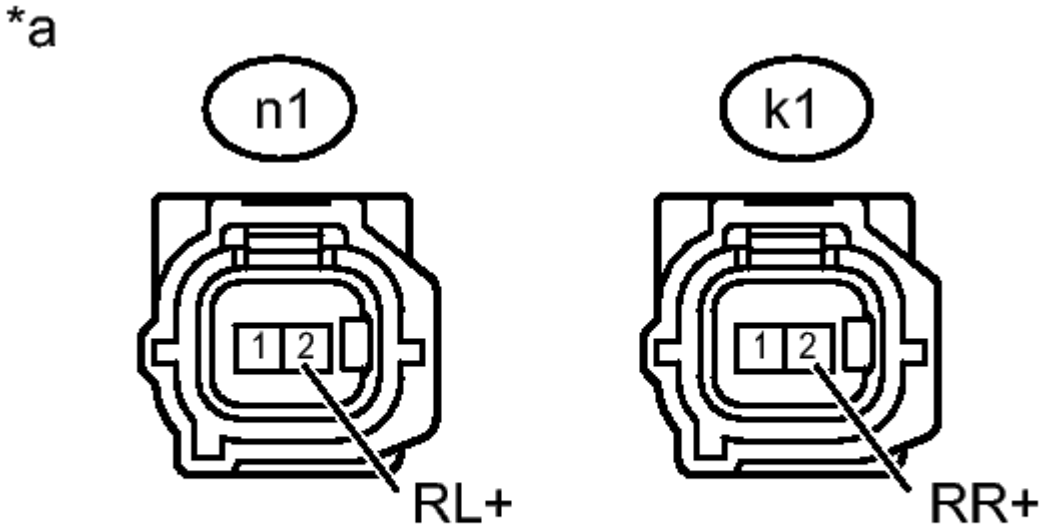


Fig. 49: Inspecting Skid Control ECU (Sensor Input)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

      2. Turn the ignition switch to ON.
      3. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
k1-2 (RR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition

n1-2 (RL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Speed Sensor)

b. for AWD

1. Reconnect the skid control ECU connector.

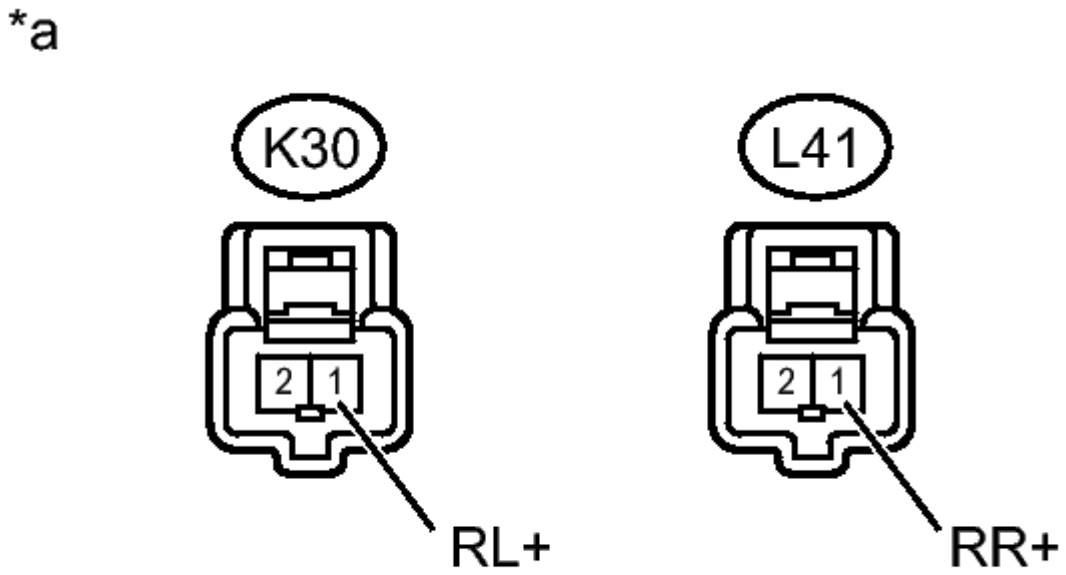


Fig. 50: Rear Speed Sensor Harness Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

2. Turn the ignition switch to ON.
3. Measure the voltage according to the value(s) in the table below.

Standard Voltage

FOR RH

Tester Connection	Switch Condition	Specified Condition
L41-1 (RR+) - Body ground	Ignition switch ON	8 to 14 V

FOR LH

Tester Connection	Switch Condition	Specified Condition
K30-1 (RL+) - Body ground	Ignition switch ON	8 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Rear Speed Sensor)

RESULT

Result	Proceed to
OK (for 2WD)	A
OK (for AWD)	B
NG	C

NOTE: **Check the speed sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 14

C --> See step 11

A --> See step 10

9. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
10. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY. Refer to REMOVAL**
11. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
12. **INSTALL REAR SPEED SENSOR CORRECTLY. Refer to INSTALLATION**
13. **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY. Refer to REMOVAL**
14. **REPLACE REAR SPEED SENSOR. Refer to REMOVAL**

DTC C1417: HIGH POWER SUPPLY VOLTAGE MALFUNCTION

DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU (housed in the actuator assembly) stores this DTC and the fail safe function prohibits ABS operation.

This DTC is stored when the IG1 terminal voltage deviates from the DTC detection condition due to a malfunction in the power supply or charging circuit such as the battery or alternator circuit, etc.

The DTC is cleared when the IG1 terminal voltage returns to normal.

DTC Code	DTC Detection Condition	Trouble Area
C1417	The IG1 terminal voltage is 17.4 V or more for 1 second or more.	• ECU-IG1 NO. 1 fuse • Battery • Charging system • Power source circuit • Internal power supply circuit of the skid control ECU

WIRING DIAGRAM

Refer to DTC C1241. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      RESULT

Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

   B --> See step 4

   C --> See step 5

   A: Go to next step

2. **INSPECT SKID CONTROL ECU (IG1 TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

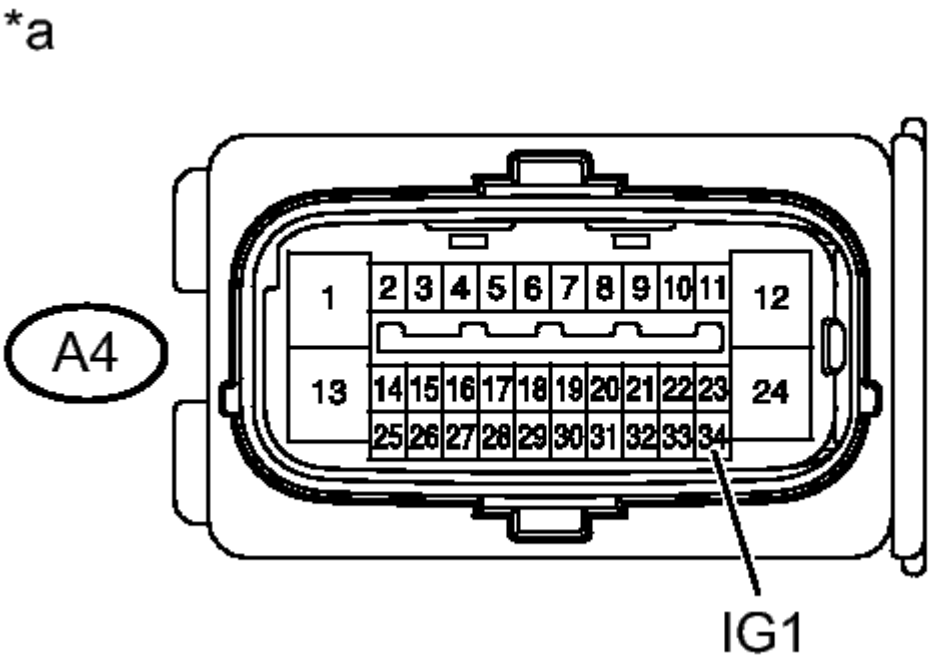


Fig. 51: Inspecting Skid Control ECU (IG1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector.
c. Turn the ignition switch to ON.
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A4-34 (IG1) - Body ground	Ignition switch ON	11 to 14 V

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

TEXT IN ILLUSTRATION

*a	Front view of wire harness

	connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK --> See step 3

3. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
4. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
5. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**

DTC C1419: ACCELERATION SENSOR INTERNAL CIRCUIT; DTC C1435: YAW RATE SENSOR INTERNAL CIRCUIT

DESCRIPTION

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system (w/ VDIM).
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU) (w/o VDIM).

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123 (Lost Communication with Yaw Rate Sensor Module) and U0124 (Lost Communication with Lateral Acceleration Sensor Module) are set (w/ VDIM).

These DTCs are also output when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1419	A data malfunction signal is received from the acceleration sensor.	• Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)
C1435	A data malfunction signal is received from the yaw rate sensor.	• Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC U0123, U0124 and/or U0126 is output together with DTC C1419 and/or C1435, inspect and repair the trouble areas indicated by DTC U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.

PROCEDURE

1. **CHECK VEHICLE EQUIPMENT**
   a. Confirm whether the vehicle is w/ VDIM or w/o VDIM.

   RESULT

Result	Proceed to
w/ VDIM	A
w/o VDIM	B

   B --> See step 3

   A: Go to next step

2. **REPLACE YAW RATE AND ACCELERATION SENSOR**
   a. Replace the yaw rate and acceleration sensor. Refer to **REMOVAL** .

      NOTE: Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .

      HINT:

      If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

   NEXT --> END

3. **REPLACE BRAKE ACTUATOR ASSEMBLY**
   a. Replace the brake actuator assembly. Refer to **REMOVAL** .

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NEXT --> END

DTC C1420: ACCELERATION SENSOR MALFUNCTION

DESCRIPTION

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system (w/ VDIM).
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU) (w/o VDIM).

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2).

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123 (Lost Communication with Yaw Rate Sensor Module) and U0124 (Lost Communication with Lateral Acceleration Sensor Module) are set (w/ VDIM).

These DTCs are also output when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1420	After the difference between GL1 and GL2 becomes 0.6 G or more with the vehicle stationary, the difference remains 0.4 G or more for 60 seconds or more.	• Sensor installation (w/ VDIM) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) installation (w/o VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC U0123, U0124 and/or U0126 is output together with DTC C1420, inspect and repair the trouble

areas indicated by DTC U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.

PROCEDURE

1. **CHECK VEHICLE EQUIPMENT**
   a. Confirm whether the vehicle is w/ VDIM or w/o VDIM.

   RESULT

Result	Proceed to
w/ VDIM	A
w/o VDIM	B

   B --> See step 3

   A: Go to next step

2. **CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION**
   a. Check that the yaw rate and acceleration sensor has been installed properly. Refer to **INSTALLATION** .

   OK

   The sensor is tightened to the specified torque.

   The sensor is not installed in a tilted position.

   NOTE: Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .

   HINT:

   If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

   NG --> See step 5

   OK --> See step 4

3. **CHECK BRAKE ACTUATOR ASSEMBLY**
   a. Check that the brake actuator assembly has been installed properly. Refer to **INSTALLATION** .

OK

The brake actuator assembly is tightened to the specified torque.

The brake actuator assembly is not installed in a tilted position.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 7

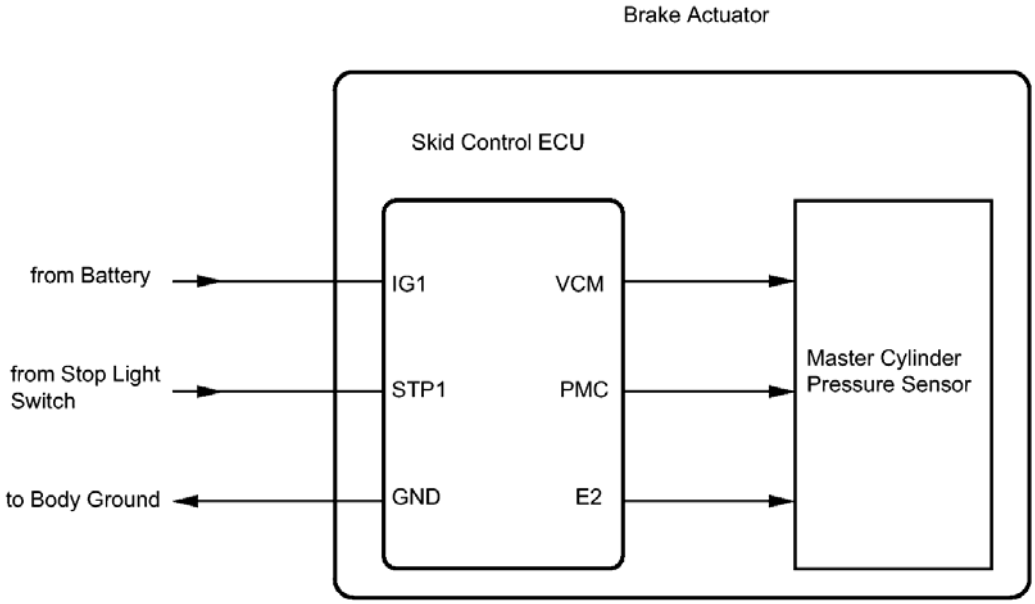
OK --> See step 6

4. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
5. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
7. **INSTALL BRAKE ACTUATOR ASSEMBLY CORRECTLY. Refer to INSTALLATION**

DTC C1421: OPEN OR SHORT IN MASTER CYLINDER PRESSURE SENSOR; DTC C1423: MASTER CYLINDER PRESSURE SENSOR ZERO POINT LOW MALFUNCTION; DTC C1424: MASTER CYLINDER PRESSURE SENSOR OUTPUT MALFUNCTION

DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU in the brake actuator assembly.



VCM: Power Supply for Master Cylinder Pressure Sensor

PMC: Master Cylinder Pressure Sensor Input

E2: Master Cylinder Pressure Sensor Ground

N

Fig. 52: Master Cylinder Pressure Sensor System Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DTC Code	DTC Detection Condition	Trouble Area
C1421	Either of the following is detected: 1. With the IG1 terminal voltage between 9.5 and 17.4 V, the VCM terminal voltage is not between 4.64 and 5.37 V for 0.1 seconds or more. 2. When the VCM terminal voltage is between 4.64 and 5.37 V, the PMC terminal voltage is not between 0.26 and 4.56 V for 0.1 seconds or more.	Brake actuator assembly (Master cylinder pressure sensor)
C1423	The PMC terminal voltage is less than 0.27 V for 5 seconds or more.	Brake actuator assembly (Master cylinder pressure sensor)
	Any of the following is detected: 1. Noise occurs in the PMC terminal 7 times or more within 5 seconds.	

C1424	2. When the vehicle speed drops from 40 km/h (25 mph) to 10 km/h (6 mph), the master cylinder pressure does not change by at least 0.048 MPa. 3. At a vehicle speed 7 km/h (4.3 mph) or more, the PMC terminal voltage is between 0.86 and 1.0 V and does not change by at least 0.048 MPa for 60 seconds or more. 4. At a vehicle speed 7 km/h (4.3 mph) or more, the PMC terminal voltage is 1.0 V or more and does not change by at least 0.048 MPa for 30 seconds or more.	Brake actuator assembly (Master cylinder pressure sensor)

WIRING DIAGRAM

Refer to DTC C1425. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

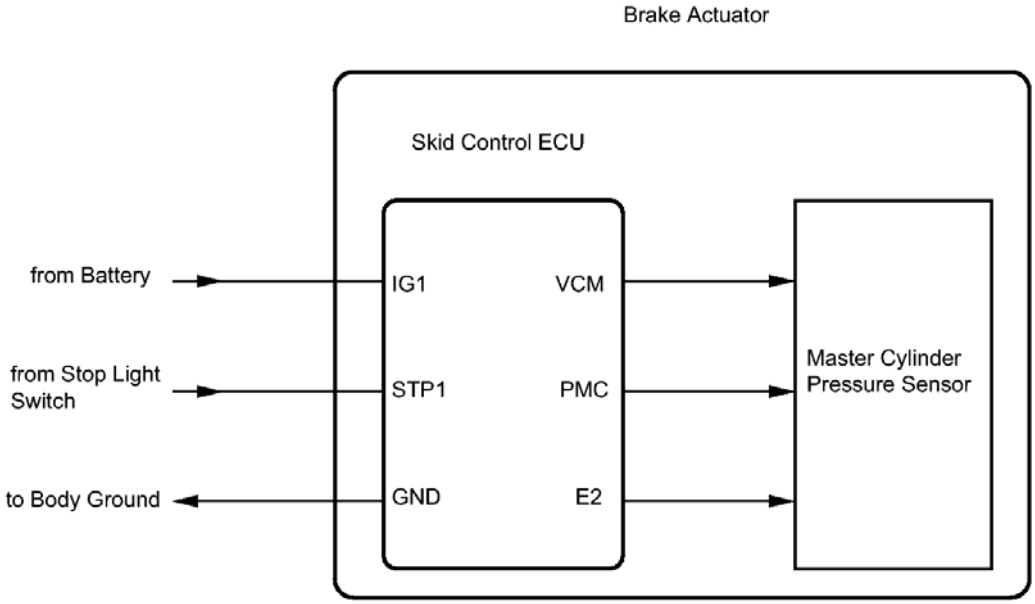
1. **REPLACE BRAKE ACTUATOR ASSEMBLY**
   a. Replace the brake actuator assembly (master cylinder pressure sensor). Refer to **REMOVAL** .

NEXT --> END

DTC C1422: MASTER CYLINDER PRESSURE SENSOR ZERO POINT HIGH MALFUNCTION

DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU in the brake actuator assembly.



N

Fig. 53: Master Cylinder Pressure Sensor System Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DTC Code	DTC Detection Condition	Trouble Area
C1422	When the stop light switch is OFF, the PMC terminal voltage is more than 0.86 V for 5 seconds or more.	• Stop light switch • Stop light switch circuit • Master cylinder pressure sensor circuit • Brake actuator assembly (Master cylinder pressure sensor)

WIRING DIAGRAM

Refer to DTC C1425. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC C1425 and/or C1426 is output together with DTC C1422, inspect and repair the trouble areas indicated by DTC C1425 and/or C1426 first. Refer to **DTC C1425: Open in Stop Light Switch Circuit**, or refer to **DTC C1426: Stop Light Switch OFF Stuck Malfunction**).

PROCEDURE

1. **CHECK STOP LIGHT OPERATION**
   a. Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

   OK

Condition	Illumination Condition
Brake pedal depressed	ON
Brake pedal released	OFF

   NG --> See step 8

   OK: Go to next step

2. **READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

   ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

   f. Check that the stop light condition observed on the Techstream changes according to brake pedal operation.

OK

The Techstream displays ON or OFF according to brake pedal operation.

NG --> See step 5

OK: Go to next step

3. **CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION**
   a. Turn the ignition switch off.
   b. Check the brake pedal height and stop light switch installation. Refer to **INSTALLATION** .

   OK

   The brake pedal height and stop light switch installation are normal.

NG --> See step 9

OK: Go to next step

4. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Start the engine.
   c. Drive the vehicle at a speed of 40 km/h (25 mph) or more and perform braking test (decelerate the vehicle by depressing the brake pedal).
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1422) is not output	A
DTC (C1422) is output	B

B --> See step 7

A --> See step 6

5. **INSPECT SKID CONTROL ECU (STP1 TERMINAL)**
   a. Turn the ignition switch off.

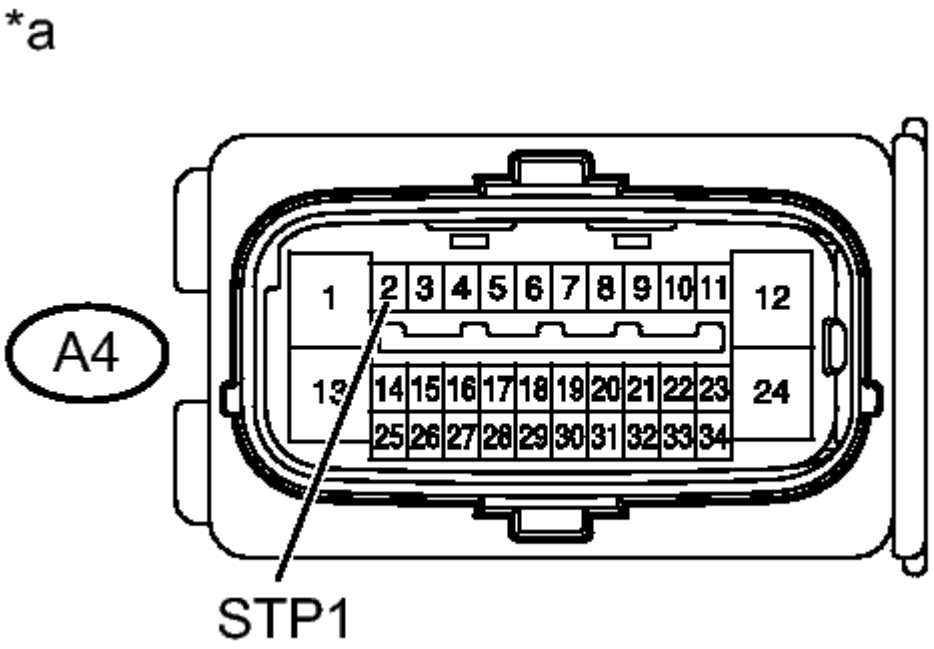


Fig. 54: Inspecting Skid Control ECU (STP1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
c. Disconnect the skid control ECU connector.
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A4-2 (STP1) - Body ground	Stop light switch ON (Brake pedal depressed)	8 to 14 V
A4-2 (STP1) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

TEXT IN ILLUSTRATION

	Front

*a	view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (STP1 CIRCUIT)

OK --> See step 7

6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
8. **INSPECT STOP LIGHT CIRCUIT. Refer to PROBLEM SYMPTOMS TABLE**
9. **ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH. Refer to ADJUSTMENT**

DTC C1425: OPEN IN STOP LIGHT SWITCH CIRCUIT

DESCRIPTION

The skid control ECU (housed in the actuator assembly) inputs stop light switch signals and the condition of brake operation.

The skid control ECU has an open detection circuit, which outputs this DTC when detecting an open in the stop light input line or the ground line of the stop light circuit with the stop light switch off (brake pedal not depressed).

DTC Code	DTC Detection Condition	Trouble Area
C1425	When IG1 terminal voltage is between 9.5 and 17.4 V, an open stop light switch circuit continues for 3 seconds or more.	• STOP fuse • Stop light switch • Stop light switch circuit • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM

w/ VDIM:

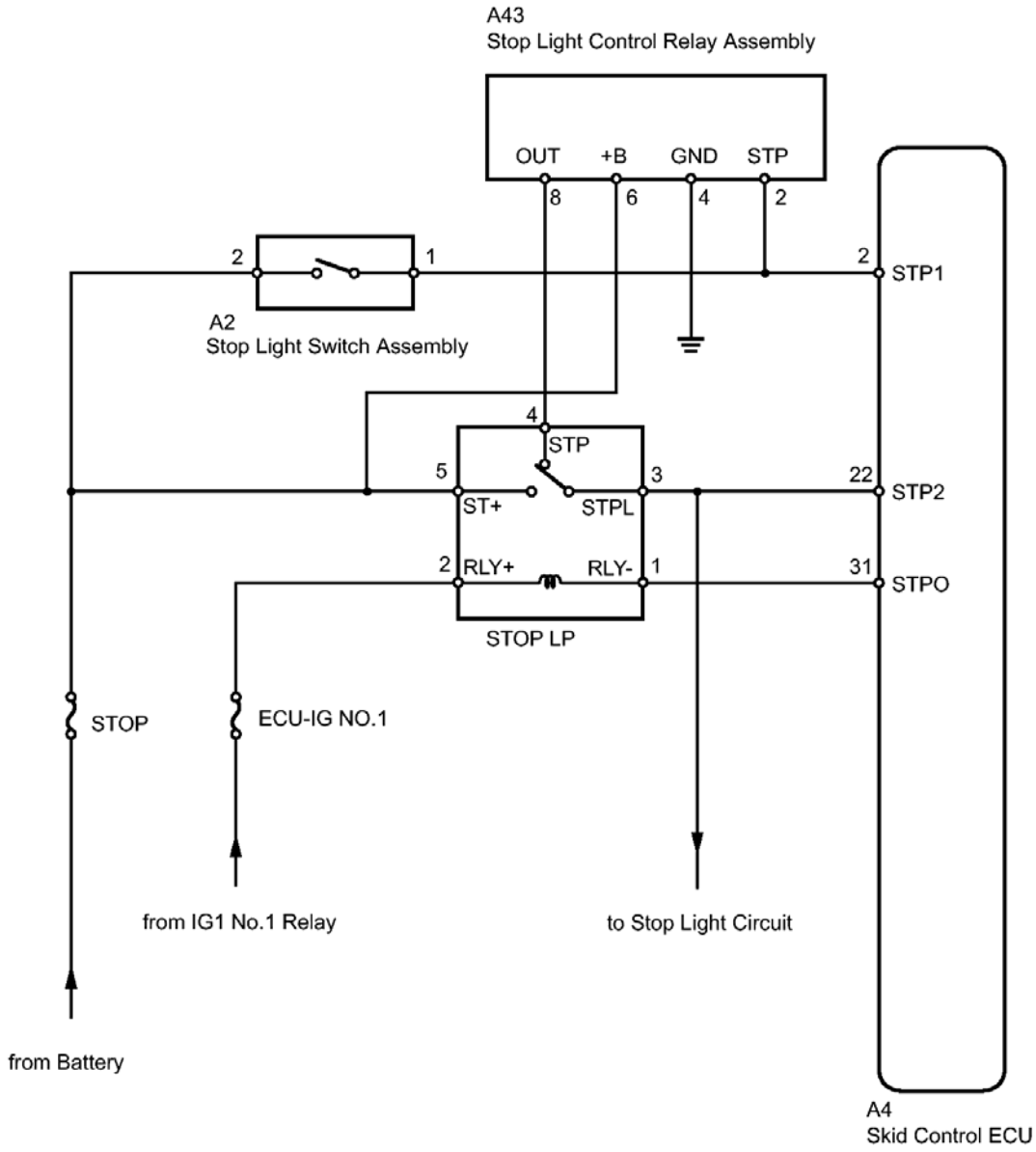


Fig. 55: Stop Light Control Relay Circuit (w/ VDIM) - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

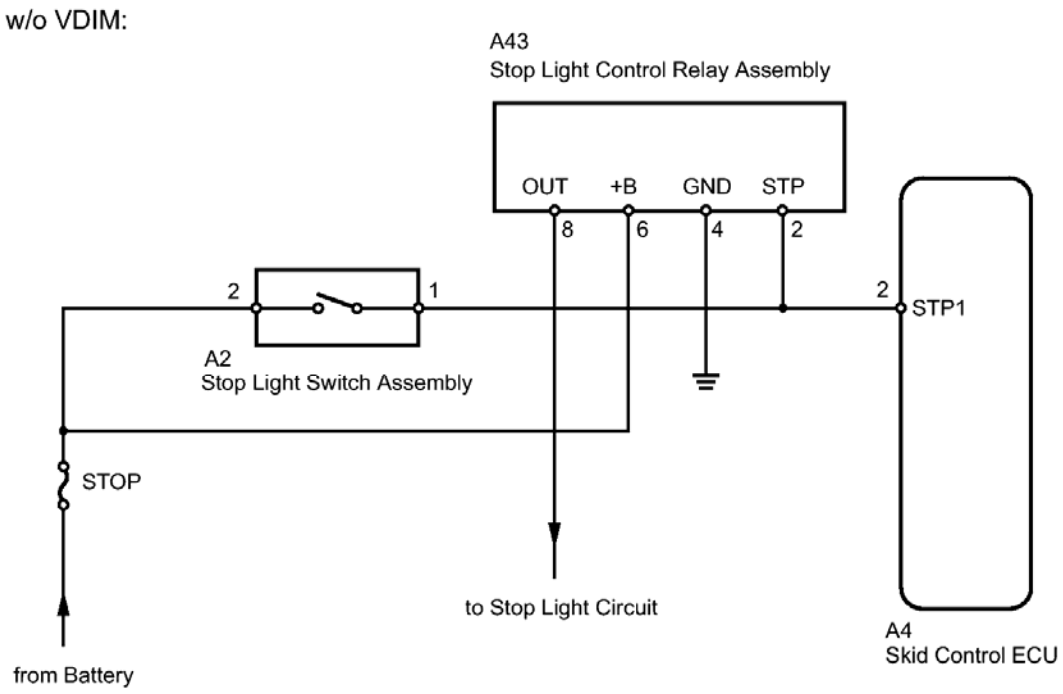


Fig. 56: Stop Light Control Relay Circuit (w/o VDIM) - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **CHECK STOP LIGHT OPERATION**
   a. Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK

Condition	Illumination Condition
Brake pedal depressed	ON
Brake pedal released	OFF

NG --> See step 4

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

   f. Check that the stop light switch display observed on the Techstream changes according to brake pedal operation.

OK

The Techstream displays ON or OFF according to brake pedal operation.

NG --> See step 8

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Depress the brake pedal several times to test the stop light circuit.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to

DTC (C1425) is not output	A
DTC (C1425) is output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 9

A --> See step 10

4. **INSPECT STOP LIGHT SWITCH (POWER SOURCE TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
   b. Disconnect the stop light switch connector.
   c. Measure the voltage according to the value(s) in the table below.

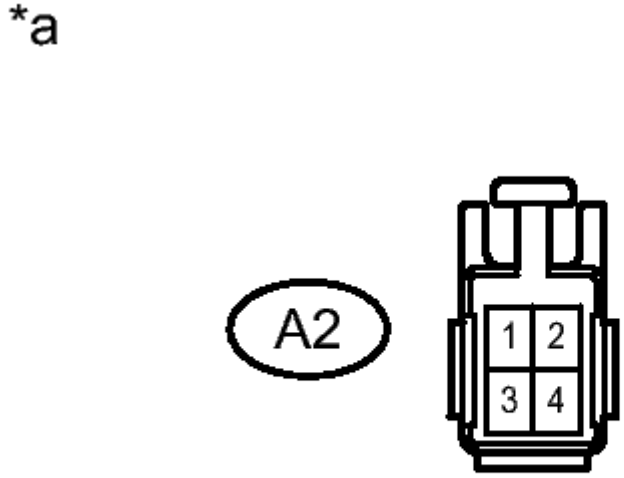


Fig. 57: Measuring Voltage Of Stop Light Switch (Power Source Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A2-2 - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Stop Light Switch)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK: Go to next step

5. **INSPECT STOP LIGHT SWITCH**
   a. Measure the resistance according to the value(s) in the table below.

*a

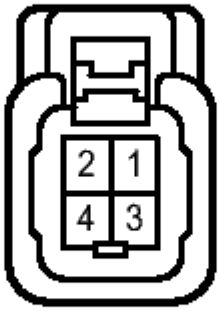


Fig. 58: Stop Light Switch Connector End View

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Switch pin free	Below 1 ohms
1 - 2	Switch pin pushed in	10 kohms or higher

TEXT IN ILLUSTRATION

*a	Component without harness connected (Stop Light Switch)

NG --> See step 11

OK: Go to next step

6. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT SWITCH)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   b. Disconnect the skid control ECU connector and the stop light switch connector.
   c. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
A2-1 - A4-2 (STP1)	Always	Below 1 ohms

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

7. **RECONFIRM DTC**
   a. Reconnect the skid control ECU connector and the stop light switch connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.

d. Depress the brake pedal several times to test the stop light circuit.

e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1425) is not output	A
DTC (C1425) is output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 9

A --> See step 12

8. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT SWITCH)**

a. Turn the ignition switch off.

b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

c. Disconnect the skid control ECU connector and the stop light switch connector.

d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-2 (STP1) - A2-1	Always	Below 1 ohms

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 9

9. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
10. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
11. **REPLACE STOP LIGHT SWITCH. Refer to REMOVAL**
12. **INSPECT LIGHTING SYSTEM (STOP LIGHT CIRCUIT). Refer to PROBLEM SYMPTOMS TABLE**

DTC C1426: STOP LIGHT SWITCH OFF STUCK MALFUNCTION

DESCRIPTION

The skid control ECU (housed in the actuator assembly) inputs stop light switch signals and the condition of brake operation.

The skid control ECU has an open detection circuit, which outputs this DTC when detecting an open in the stop light input line or the ground line of the stop light circuit with the stop light switch off (brake pedal not depressed).

DTC Code	DTC Detection Condition	Trouble Area
C1426	When the brake pedal load sensing switch is ON, the master cylinder pressure is 2 MPa or more and the deceleration calculated from the vehicle speed is 0.2 G or more, the stop light switch is OFF for 2 seconds or more.	• STOP fuse • Stop light switch • Stop light switch circuit • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM

Refer to DTC C1425. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **CHECK STOP LIGHT OPERATION**
   a. Check that the stop lights come on when the brake pedal is depressed, and go off when the brake pedal is released.

OK

Condition	Illumination Condition
Brake pedal depressed	ON
Brake pedal released	OFF

NG --> See step 4

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Brake Pedal Load Sensing SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond	-

		the specified point	

f. Check that the stop light switch display and brake pedal load sensing switch display observed on the Techstream change according to brake pedal operation.

OK

The Techstream displays ON or OFF according to brake pedal operation.

g. Slowly depress the brake pedal, and check that the stop light switch and brake pedal load sensing switch turn ON.

OK

First the stop light switch should turn ON, and then the brake pedal load sensing switch should turn ON.

RESULT

Result	Proceed to
OK	A
NG (Turning on of the stop light switch is not confirmed)	B
NG (The brake pedal load sensing switch turns on first)	C

B --> See step 8

C --> See step 9

A: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.

b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .

c. Start the engine.

d. Depress the brake pedal several times to test the stop light circuit.

e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1426) is not output	A
DTC (C1426) is output	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 10

A --> See step 11

4. **INSPECT STOP LIGHT SWITCH (POWER SOURCE TERMINAL)**

a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

b. Disconnect the stop light switch connector.

c. Measure the voltage according to the value(s) in the table below.

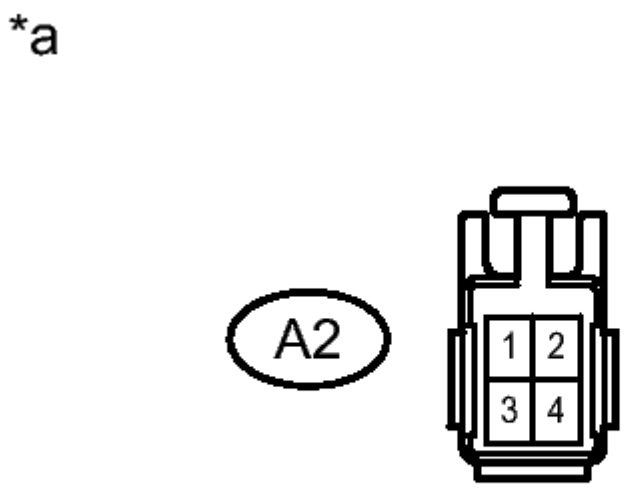


Fig. 59: Measuring Voltage Of Stop Light Switch (Power Source Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A2-2 - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Stop Light Switch)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK: Go to next step

5. **INSPECT STOP LIGHT SWITCH**

a. Measure the resistance according to the value(s) in the table below.

*a

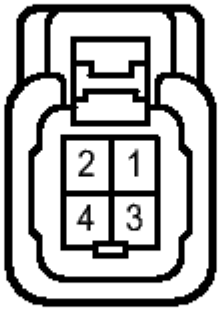


Fig. 60: Stop Light Switch Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
1 - 2	Switch pin free	Below 1 ohms
1 - 2	Switch pin pushed in	10 kohms or higher

TEXT IN ILLUSTRATION

*a	Component without harness connected (Stop Light Switch)

NG --> See step 12

OK: Go to next step

6. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT SWITCH)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   b. Disconnect the skid control ECU connector and the stop light switch connector.
   c. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
A2-1 - A4-2 (STP1)	Always	Below 1 ohms

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

7. **RECONFIRM DTC**
   a. Reconnect the skid control ECU connector and the stop light switch connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Depress the brake pedal several times to test the stop light circuit.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   RESULT

Result	Proceed to
DTC (C1426) is not output	A
DTC (C1426) is output	B

   HINT:

   If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 10

A --> See step 13

8. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT SWITCH)**
   a. Turn the ignition switch off.
   b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
   c. Disconnect the skid control ECU connector and the stop light switch connector.
   d. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
A4-2 (STP1) - A2-1	Always	Below 1 ohms

   HINT:

   If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 10

9. **CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION**
   a. Turn the ignition switch off.
   b. Check the brake pedal height and stop light switch installation. Refer to **INSTALLATION** .

   OK

   The brake pedal height and stop light switch installation are normal.

   HINT:

   If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 14

OK --> See step 15

10. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
11. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
12. **REPLACE STOP LIGHT SWITCH. Refer to REMOVAL**

13. **INSPECT LIGHTING SYSTEM (STOP LIGHT CIRCUIT). Refer to PROBLEM SYMPTOMS TABLE**
14. **ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH. Refer to ADJUSTMENT**
15. **REPLACE BRAKE PEDAL SUB-ASSEMBLY (BRAKE PEDAL LOAD SENSING SWITCH). Refer to REMOVAL**

DTC C1427: MOTOR MALFUNCTION

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1427	Actuator pump motor does not operate properly.	• Brake actuator assembly (Ground circuit) • Brake actuator assembly (Motor circuit)

WIRING DIAGRAM

Refer to DTCs C0273, C0274 and C1361. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM (ABS MOTOR RELAY)**
   a. Connect the Techstream to the DLC3.
   b. Start the engine.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Active Test.
   e. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Motor Relay	ABS motor relay	Relay ON/OFF	Operating sound of motor can be heard

   f. Check for operating sound of the ABS motor relay when operating it using the Techstream.

RESULT

Result	Proceed to
Operating sound is not heard	A
Operating sound is heard	B

B --> See step 3

A: Go to next step

2. **INSPECT SKID CONTROL ECU (GND2 TERMINAL)**
   a. Turn the ignition switch off.

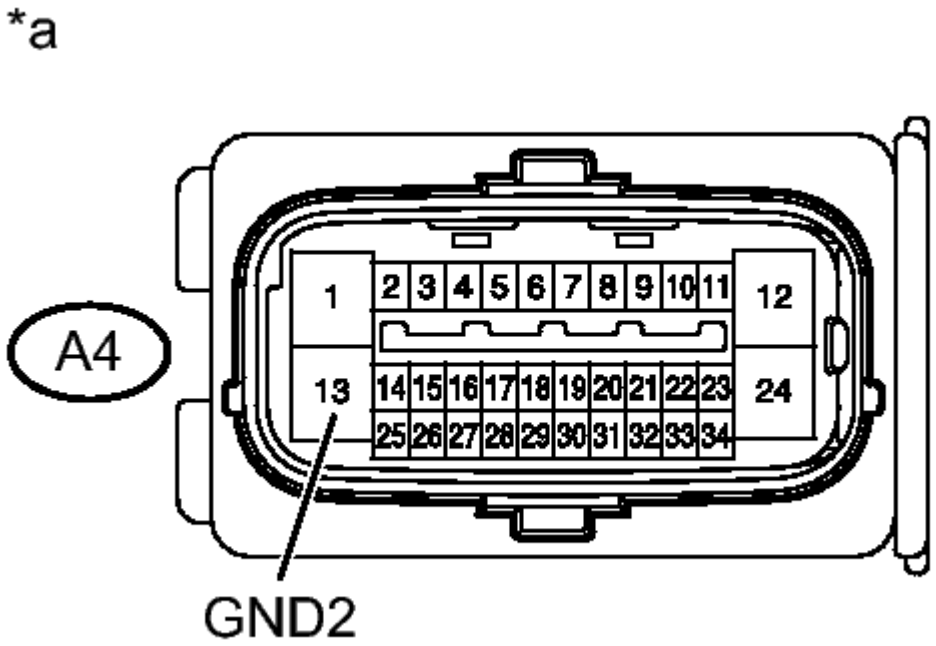


Fig. 61: Inspecting Skid Control ECU (GND2 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
   c. Disconnect the skid control ECU connector.
   d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-13 (GND2) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND2 CIRCUIT)

OK: Go to next step

3. **RECONFIRM DTC**

HINT:

This code is detected when a problem is identified in the brake actuator assembly.

The ABS motor relay is in the brake actuator assembly.

Therefore, ABS motor relay unit inspection cannot be performed. Be sure to check if the DTC is output before replacing the brake actuator assembly.

a. Turn the ignition switch off.
b. Reconnect the skid control ECU connector.
c. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
d. Start the engine.
e. Drive the vehicle at a speed of 20 km/h (12 mph) or more for 30 seconds or more.
f. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1427) is not	A

output	
DTC (C1427) is output	B

HINT:

- If a speed signal of 6 km/h (4 mph) or more is input to the skid control ECU with the ignition switch to ON and the stop light switch off, the ECU performs self diagnosis of the motor and solenoid circuits.
- If the normal system code is output (no trouble codes are output), slightly jiggle the connectors, wire harness, and fuses of the brake actuator assembly. Make sure that no DTCs are output.
- If any DTCs are output while jiggling a connector or wire harness of the brake actuator assembly (skid control ECU), inspect and repair the connector or wire harness.
- The DTCs were possibly output due to a bad connection of the connector terminal.

B --> See step 5

A --> See step 4

4. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

DTC C1428: MOTOR CIRCUIT MALFUNCTION

DESCRIPTION

DTC Code	DTC Detection Condition	Trouble Area
C1428	With the ABS motor relay OFF and the ABS motor fail safe relay ON, an open in the motor circuit continues for 2 seconds or more.	Brake actuator assembly (Motor circuit)

WIRING DIAGRAM

Refer to DTCs C0273, C0274 and C1361. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the**

following inspection procedure.

PROCEDURE

1. **REPLACE BRAKE ACTUATOR ASSEMBLY**
   a. Replace the brake actuator assembly. Refer to **REMOVAL** .

NEXT --> END

DTC C1429: OPEN OR SHORT IN BRAKE PEDAL LOAD SENSING SWITCH

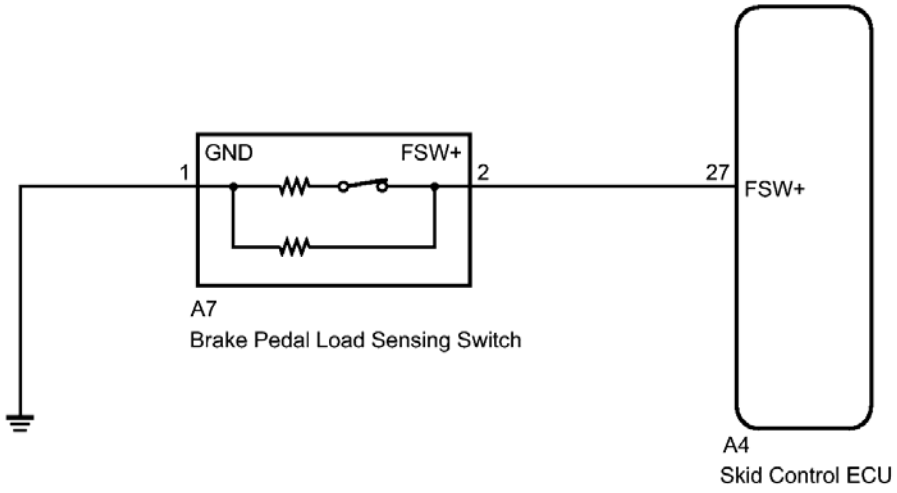
DESCRIPTION

The brake pedal load sensing switch is turned on when the brake pedal is depressed with force exceeding a predetermined level.

The skid control ECU detects if the brake pedal is depressed or not via this circuit.

DTC Code	DTC Detection Condition	Trouble Area
C1429	An open or short in the brake pedal load sensing switch continues for 0.3 seconds or more.	• Brake pedal load sensing switch • Brake pedal load sensing switch circuit • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM



N

Fig. 62: Brake Pedal Load Sensing Switch Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC C1425 and/or C1426 is output together with DTC C1429, inspect and repair the trouble areas indicated by DTC C1425 and/or C1426 first. Refer to **DTC C1425: Open in Stop Light Switch Circuit**, or refer to **DTC C1426: Stop Light Switch OFF Stuck Malfunction**).

PROCEDURE

1. **READ VALUE USING TECHSTREAM (BRAKE PEDAL LOAD SENSING SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Brake Pedal Load Sensing SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond the specified point	-

   f. Check that the brake pedal load sensing switch display observed on the Techstream changes according to brake pedal operation.

OK

The Techstream displays ON or OFF according to brake pedal operation.

NG --> See step 3

OK: Go to next step

2. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Perform the road test.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1429) is not output	A
DTC (C1429) is output	B

B --> See step 6

A --> See step 5

3. **INSPECT BRAKE PEDAL LOAD SENSING SWITCH**

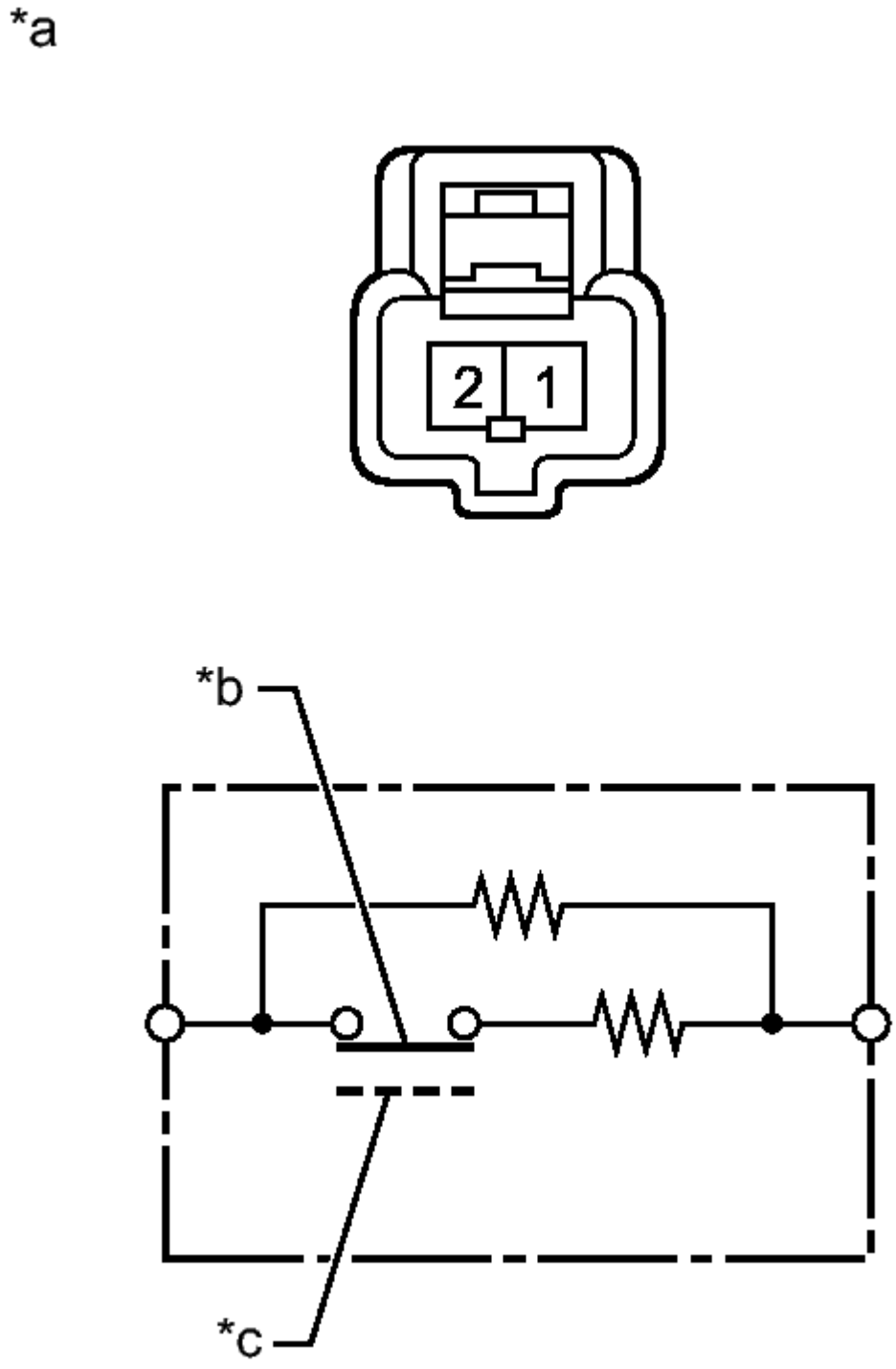


Fig. 63: Inspecting Brake Pedal Load Sensing Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

	Component

*a	without harness connected (Brake Pedal Load Sensing Switch)
*b	Brake Pedal Released (ON)
*c	Brake Pedal Depressed (OFF)

NOTE:

- **Do not remove the brake pedal load sensing switch from the brake pedal sub-assembly.**
- **When there is a malfunction in the brake pedal load sensing switch, replace the brake pedal sub-assembly.**

a. Turn the ignition switch off.
b. Make sure that there is no looseness at the locking part and the connecting part of the connector.
c. Disconnect the brake pedal load sensing switch connector.
d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
2 (FSW+) - 1 (GND)	Brake pedal load sensing switch OFF (Brake pedal depressed)	950 to 1050 ohms
2 (FSW+) - 1 (GND)	Brake pedal load sensing switch ON (Brake pedal	203 to 223 ohms

	released)	

NG --> See step 7

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE PEDAL LOAD SENSING SWITCH)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   b. Disconnect the skid control ECU connector.
   c. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
A4-27 (FSW+) - A7-2 (FSW+)	Always	Below 1 ohms
A4-27 (FSW+) - Body ground	Always	10 kohms or higher
A7-1 (GND) - Body ground	Always	Below 1 ohms

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 6

5. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
7. **REPLACE BRAKE PEDAL SUB-ASSEMBLY (BRAKE PEDAL LOAD SENSING SWITCH). Refer to REMOVAL**

DTC C1430: BRAKE PEDAL LOAD SENSING SWITCH OFF STUCK MALFUNCTION; DTC C1431: BRAKE PEDAL LOAD SENSING SWITCH ON STUCK MALFUNCTION

DESCRIPTION

The brake pedal load sensing switch is turned on when the brake pedal is depressed with force exceeding a

predetermined level.

The skid control ECU detects if the brake pedal is depressed or not via this circuit.

DTC Code	DTC Detection Condition	Trouble Area
C1430	Either of the following is detected: 1. With the stop light switch ON, the brake pedal load sensing switch OFF, and the master cylinder pressure 6 MPa or more, the deceleration is 0.4 G or more for 1 second or more. 2. With the stop light switch ON, the brake pedal load sensing switch OFF, and the master cylinder pressure 6 MPa or more, the vehicle speed is 0 km/h (0 mph) for 5 seconds or more.	• Brake pedal load sensing switch • Brake pedal load sensing switch circuit • Brake actuator assembly (Skid control ECU)
C1431	Either of the following is detected: 1. Immediately after the ignition switch is turned to ON, the brake pedal load sensing switch is ON and the stop light switch is OFF for 10 seconds or more. 2. The condition that the brake pedal load sensing switch remains ON while the vehicle speed increases from 0 km/h (0 mph) to 30 km/h (18 mph) occurs 5 times in succession.	• Brake pedal load sensing switch • Brake pedal load sensing switch circuit • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM

Refer to DTC C1429. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC C1425 and/or C1426 is output together with DTC C1430 and/or C1431, inspect and repair the trouble areas indicated by DTC C1425 and/or C1426 first. Refer to **DTC C1425: Open in Stop Light Switch Circuit**, or refer to **DTC C1426: Stop Light Switch OFF Stuck Malfunction**).

PROCEDURE

1. **READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH AND BRAKE PEDAL LOAD SENSING SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
Brake Pedal Load Sensing SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond the specified point	-

   f. Check that the stop light switch display and brake pedal load sensing switch display observed on the Techstream change according to brake pedal operation.

      OK

      The Techstream displays ON or OFF according to brake pedal operation.

   g. Slowly depress the brake pedal, and check when the stop light switch and brake pedal load sensing switch turn ON.

OK

First the stop light switch should turn ON, and then the brake pedal load sensing switch should turn ON.

RESULT

Result	Proceed to
OK	A
NG (Turning on of the brake pedal load sensing switch is not confirmed)	B
NG (The brake pedal load sensing switch turns on first)	C

B --> See step 3

C --> See step 5

A: Go to next step

2. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Perform the road test.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1430 and	A

C1431) are not output	
DTCs (C1430 and/or C1431) are output	B

B --> See step 8

A --> See step 6

3. **INSPECT BRAKE PEDAL LOAD SENSING SWITCH**

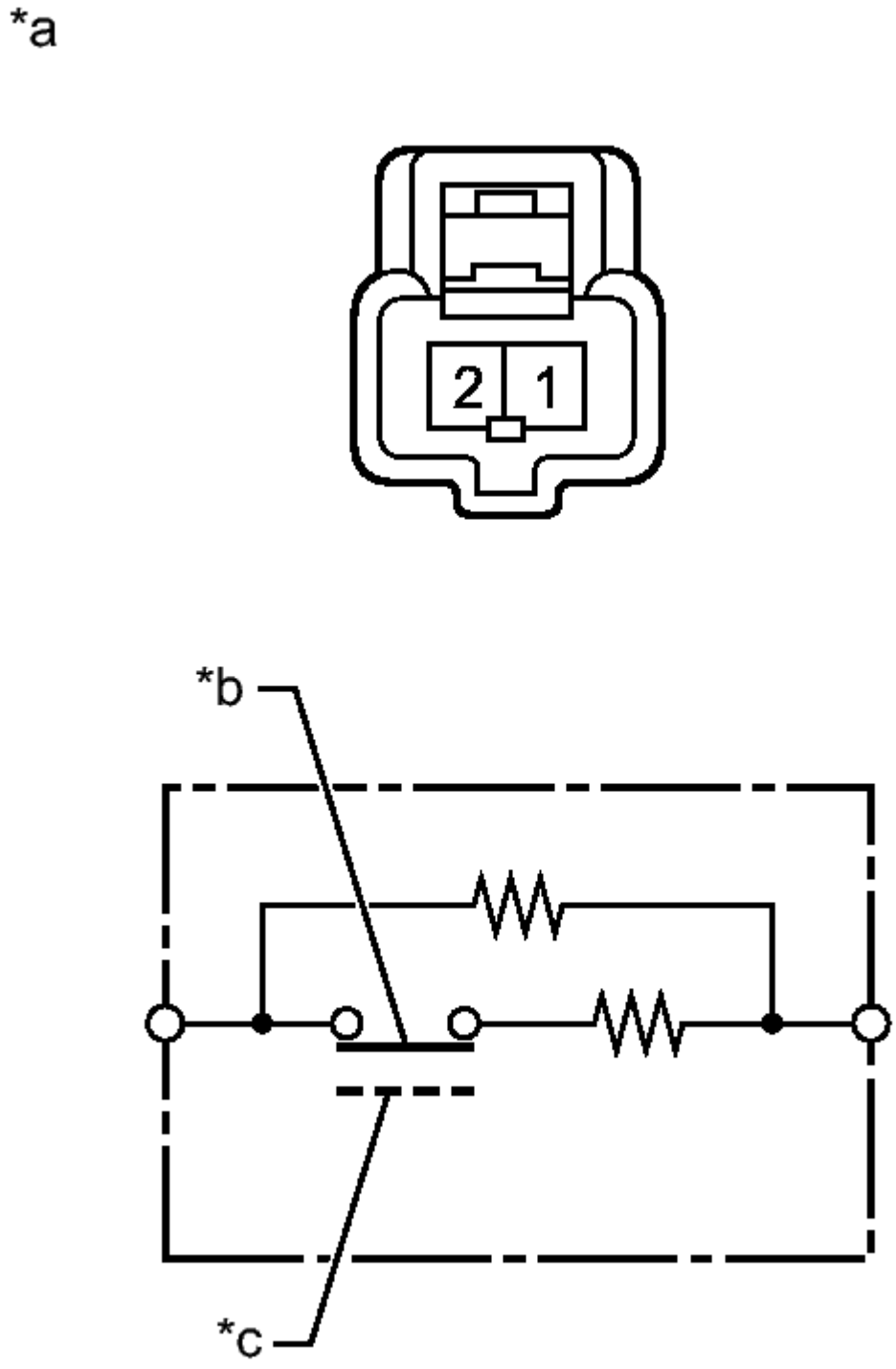


Fig. 64: Inspecting Brake Pedal Load Sensing Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

	Component

*a	without harness connected (Brake Pedal Load Sensing Switch)
*b	Brake Pedal Released (ON)
*c	Brake Pedal Depressed (OFF)

NOTE:

- **Do not remove the brake pedal load sensing switch from the brake pedal sub-assembly.**
- **When there is a malfunction in the brake pedal load sensing switch, replace the brake pedal sub-assembly.**

a. Turn the ignition switch off.
b. Make sure that there is no looseness at the locking part and the connecting part of the connector.
c. Disconnect the brake pedal load sensing switch connector.
d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
2 (FSW+) - 1 (GND)	Brake pedal load sensing switch OFF (Brake pedal depressed)	950 to 1050 ohms
2 (FSW+) - 1 (GND)	Brake pedal load sensing switch ON (Brake pedal	203 to 223 ohms

	released)	

NG --> See step 7

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE PEDAL LOAD SENSING SWITCH)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   b. Disconnect the skid control ECU connector.
   c. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
A4-27 (FSW+) - A7-2 (FSW+)	Always	Below 1 ohms
A4-27 (FSW+) - Body ground	Always	10 kohms or higher
A7-1 (GND) - Body ground	Always	Below 1 ohms

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 8

5. **CHECK BRAKE PEDAL AND STOP LIGHT SWITCH INSTALLATION**
   a. Turn the ignition switch off.
   b. Check the brake pedal height and stop light switch installation. Refer to **INSTALLATION** .

   OK

   The brake pedal height and stop light switch installation are normal.

NG --> See step 9

OK --> See step 7

6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **REPLACE BRAKE PEDAL SUB-ASSEMBLY (BRAKE PEDAL LOAD SENSING SWITCH). Refer to REMOVAL**
8. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
9. **ADJUST BRAKE PEDAL OR STOP LIGHT SWITCH. Refer to ADJUSTMENT**

DTC C1432: STEERING ANGLE SENSOR POWER SOURCE VOLTAGE MALFUNCTION

DESCRIPTION

Steering angle sensor signals are sent to the skid control ECU via the CAN communication system. When there is a malfunction in the CAN communication system, it will be detected by the steering angle sensor zero point malfunction diagnostic function.

DTC Code	DTC Detection Condition	Trouble Area
C1432	Steering angle sensor power supply malfunction signal is received from steering angle sensor.	• Steering angle sensor power supply • Spiral cable (Steering angle sensor)

WIRING DIAGRAM

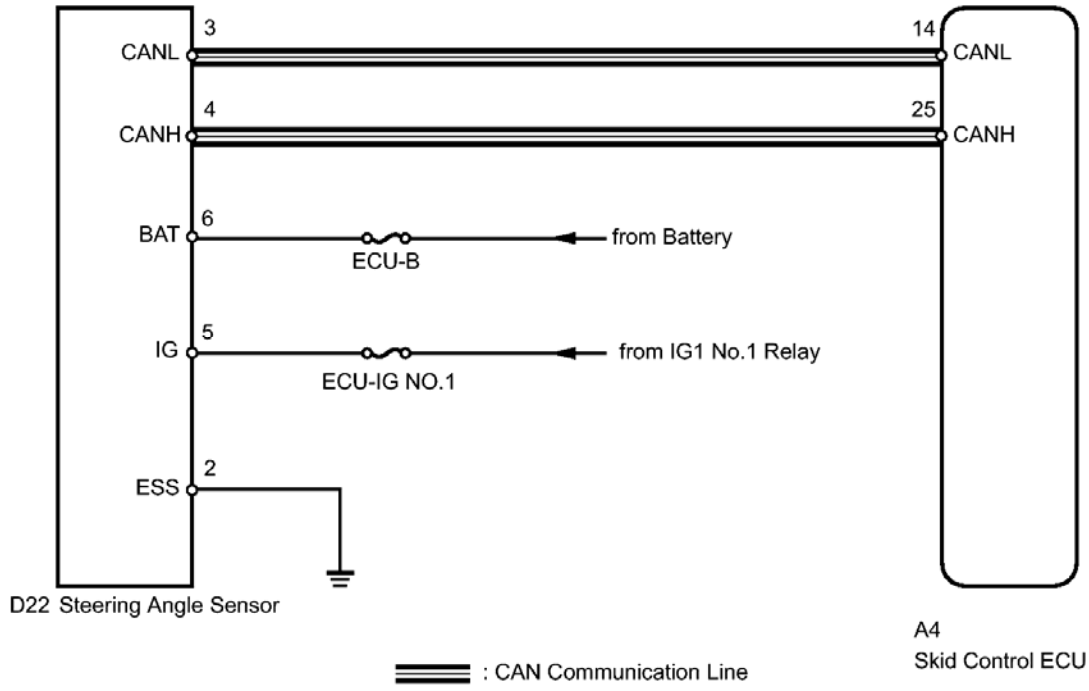


Fig. 65: Steering Angle Sensor Power Supply - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- When DTC U0073, U0123, U0124 and/or U0126 is output together with DTC C1432, inspect and repair the trouble areas indicated by DTC U0073, U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.
- When the speed sensor or the yaw rate and acceleration sensor has trouble, DTCs for the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs for the speed sensor or yaw rate and acceleration sensor are output together with DTCs for the steering angle sensor, inspect and repair the speed sensor and yaw rate and acceleration sensor first, and then inspect and repair the steering angle sensor.

PROCEDURE

1. **INSPECT STEERING ANGLE SENSOR (POWER SOURCE TERMINAL)**
   a. Remove the steering wheel and the column cover lower.

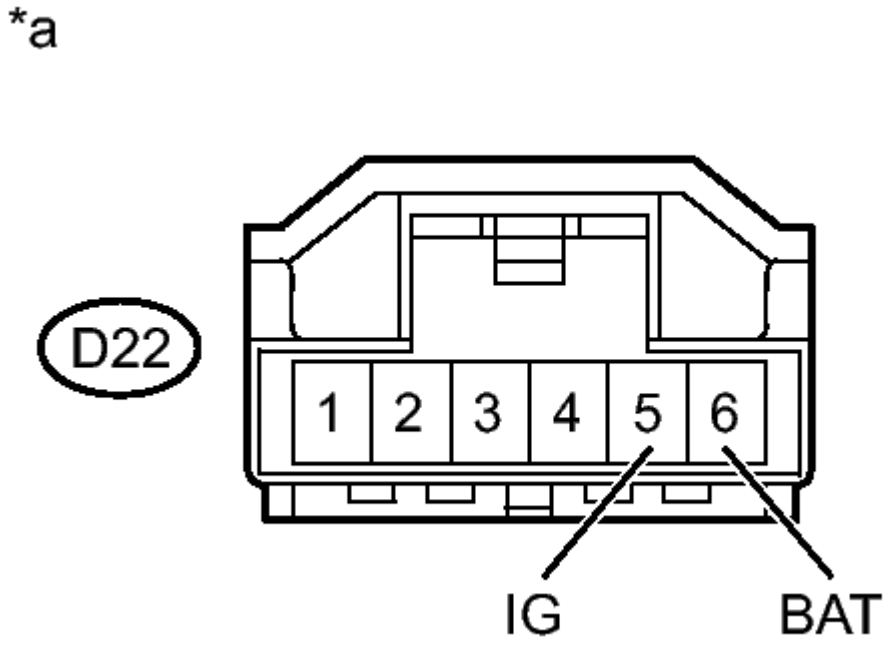


Fig. 66: Inspecting Steering Angle Sensor (Power Source Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
c. Disconnect the steering angle sensor connector.
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D22-5 (IG) - Body ground	Ignition switch ON	11 to 14 V
D22-6 (BAT) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Steering Angle Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK: Go to next step

2. **INSPECT STEERING ANGLE SENSOR (GROUND TERMINAL)**
   a. Turn the ignition switch off.

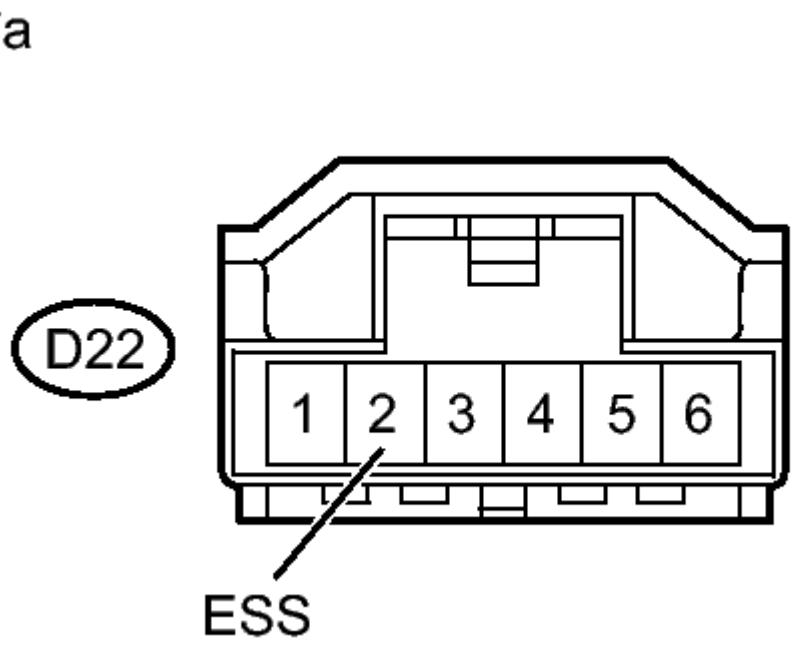


Fig. 67: Inspecting Steering Angle Sensor (Ground Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D22-2 (ESS) - Body ground	Always	Below 1 ohms

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Steering

Angle Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GROUND CIRCUIT)

OK --> See step 3

3. **REPLACE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY (STEERING ANGLE SENSOR). Refer to REMOVAL**

DTC C1433: STEERING ANGLE SENSOR INTERNAL CIRCUIT

DESCRIPTION

Steering angle sensor signals are sent to the skid control ECU via the CAN communication system. When there is a malfunction in the CAN communication system, it will be detected by the steering angle sensor zero point malfunction diagnostic function.

DTC Code	DTC Detection Condition	Trouble Area
C1433	Either of the following is detected: 1. With the IG1 terminal voltage 9.5 to 17.4 V, the skid control ECU receives an error signal from the steering angle sensor for 0.012 seconds. 2. An open in the sensor power supply circuit for 1 second or more.	Spiral cable (Steering angle sensor)

WIRING DIAGRAM

Refer to DTC C1432. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- When DTC U0073, U0123, U0124 and/or U0126 is output together with DTC C1433, inspect and repair the trouble areas indicated by DTC U0073, U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.
- When any of the speed sensors or the yaw rate and acceleration sensor has trouble, DTCs for the steering

angle sensor may be output even when the steering angle sensor is normal. When DTCs for the speed sensors or yaw rate and acceleration sensor are output together with DTCs for the steering angle sensor, inspect and repair the speed sensor and yaw rate and acceleration sensor first, and then inspect and repair the steering angle sensor.

PROCEDURE

1. **REPLACE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY (STEERING ANGLE SENSOR)**
   a. Replace the spiral cable (steering angle sensor). Refer to **REMOVAL** .

      HINT:

      If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

   NEXT --> END

DTC C1434: STEERING ANGLE SENSOR OUTPUT MALFUNCTION

DESCRIPTION

Steering angle sensor signals are sent to the skid control ECU via the CAN communication system. When there is a malfunction in the CAN communication system, it will be detected by the steering angle sensor zero point malfunction diagnostic function.

DTC Code	DTC Detection Condition	Trouble Area
C1434	Error in communication between the skid control ECU and the steering angle sensor, or abnormal steering angle sensor zero point.	• Steering angle sensor power supply • Spiral cable (Steering angle sensor)

WIRING DIAGRAM

Refer to DTC C1432. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: Inspect the fuses for circuits related to this system before performing the following inspection procedure.

HINT:

- When DTC U0073, U0123, U0124 and/or U0126 is output together with DTC C1434, inspect and repair the trouble areas indicated by DTC U0073, U0123, U01245 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with**

Steering Angle Sensor Module.

- When any of the speed sensors or the yaw rate and acceleration sensor has trouble, DTCs for the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs for the speed sensors or yaw rate and acceleration sensor are output together with DTCs for the steering angle sensor, inspect and repair the speed sensor and yaw rate and acceleration sensor first, and then inspect and repair the steering angle sensor.

PROCEDURE

1. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the ignition switch off.
   c. Turn the ignition switch to ON again and check that no CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .
   d. Start the engine.
   e. Drive the vehicle and turn the steering wheel to the right and left at a speed of 35 km/h (22 mph) and check that no speed sensor or yaw rate and acceleration sensor DTCs are output. Refer to **DTC CHECK / CLEAR** .

   RESULT

Result	Proceed to
No CAN communication system, speed sensor, or yaw rate and acceleration sensor DTCs are output	A
CAN communication system DTC is output	B
Speed sensor or yaw rate and acceleration sensor DTC is output	C

   HINT:

   - If there is a malfunction in any of the speed sensors or the yaw rate and acceleration sensor, an abnormal value may be output although the steering angle sensor is normal.
   - If speed sensor and yaw rate and acceleration sensor DTCs are output simultaneously, repair

these two sensors first and inspect the steering angle sensor.

B --> See step 5

C --> See step 6

A: Go to next step

2. **INSPECT STEERING ANGLE SENSOR (POWER SOURCE TERMINAL)**
   a. Turn the ignition switch off.

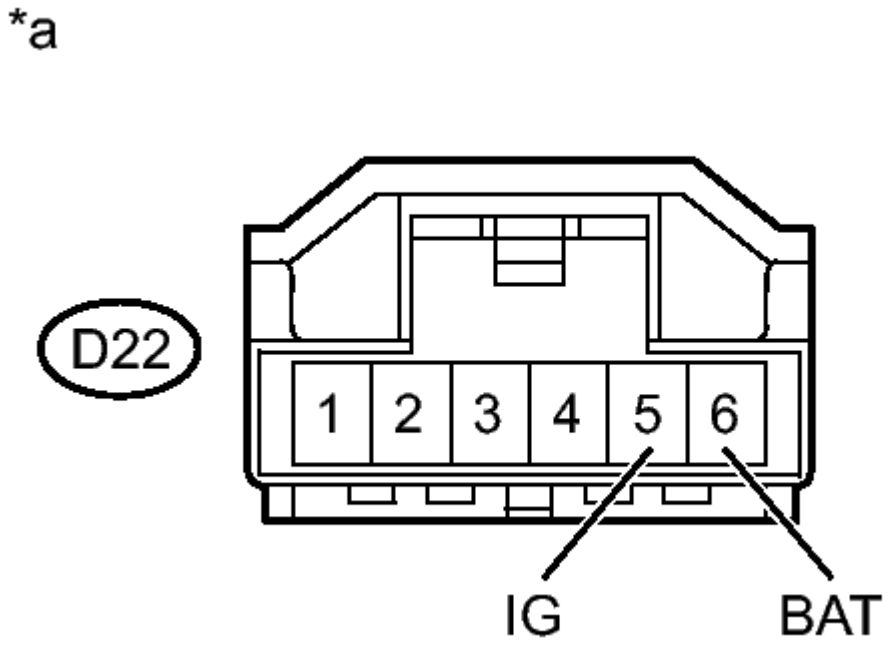


Fig. 68: Inspecting Steering Angle Sensor (Power Source Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Remove the steering wheel and the column cover lower.
   c. Make sure that there is no looseness at the locking part and the connecting part of the connector.
   d. Disconnect the steering angle sensor connector.
   e. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D22-5 (IG) - Body ground	Ignition switch ON	11 to 14 V

D22-6 (BAT) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Steering Angle Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK: Go to next step

3. **INSPECT STEERING ANGLE SENSOR (GROUND TERMINAL)**
   a. Turn the ignition switch off.

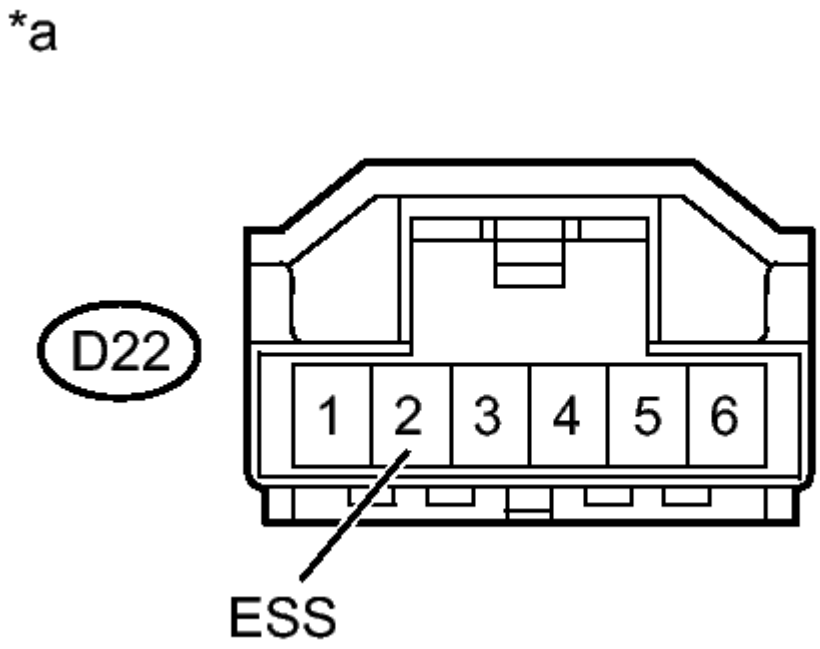


Fig. 69: Inspecting Steering Angle Sensor (Ground Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
D22-2 (ESS) - Body ground	Always	Below 1 ohms

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Steering Angle Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GROUND CIRCUIT)

OK --> See step 4

4. **REPLACE SPIRAL WITH SENSOR CABLE SUB-ASSEMBLY (STEERING ANGLE SENSOR). Refer to REMOVAL**
5. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPAIR CIRCUIT INDICATED BY OUTPUT DTC. Refer to DIAGNOSTIC TROUBLE CODE CHART**

DTC C1436: YAW RATE SENSOR MALFUNCTION

DESCRIPTION

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system (w/ VDIM).
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU) (w/o VDIM).

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle's condition using 2 circuits (GL1,

GL2).

If there is a malfunction in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123 (Lost Communication with Yaw Rate Sensor Module) and U0124 (Lost Communication with Lateral Acceleration Sensor Module) are set (w/ VDIM).

These DTCs are also output when calibration has not been completed.

DTC Code	DTC Detection Condition	Trouble Area
C1436	Either of the following is detected: 1. With the vehicle stationary, the yaw rate and acceleration sensor output value is not 0°. 2. Abnormal comparison value.	• Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)

WIRING DIAGRAM

Refer to DTCs C1232, C1243 and C1245. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

HINT:

When DTC U0123, U0124 and/or U0126 is output together with DTC C1436, inspect and repair the trouble areas indicated by DTC U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.

PROCEDURE

1. **READ VALUE USING TECHSTREAM (YAW RATE AND ACCELERATION SENSOR)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester	Measurement	Normal	Diagnostic

Display	Item/Range	Condition	Note
Yaw Rate Sensor	Yaw rate sensor / min.: -128 degrees/s, max.: 127 degrees/s	Vehicle stationary: 0 degrees/s Right turn: -128 to 0 degrees/s Left turn: 0 to 127 degrees/s	-
Yaw Rate Sensor2	Yaw rate sensor 2 / min.: -128 degrees/s, max.: 127 degrees/s	Vehicle stationary: 0 degrees/s Right turn: -128 to 0 degrees/s Left turn: 0 to 127 degrees/s	-

f. Check that the yaw rate and acceleration sensor output value displayed on the Techstream.

RESULT

Result	Proceed to
The yaw rate and acceleration sensor output value is within +/- 6 degrees/s when the vehicle is stationary, but the value fluctuates when turning (w/ VDIM)	A
The yaw	

rate and acceleration sensor output value is within +/- 6 degrees/s when the vehicle is stationary, but the value fluctuates when turning (w/o VDIM)	B
The yaw rate and acceleration sensor output value is not within +/- 6 degrees/s when the vehicle is stationary (w/ VDIM)	C
The yaw rate and acceleration sensor output value is not within +/- 6 degrees/s when the vehicle is stationary (w/o VDIM)	D
OK	E

NOTE: **Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .**

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 3

C --> See step 4

D --> See step 5

E --> See step 6

A: Go to next step

2. **CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION**
   a. Turn the ignition switch off.
   b. Check that the yaw rate and acceleration sensor has been installed properly. Refer to **INSTALLATION** .

OK

The sensor should be tightened to the specified torque.

The sensor should not be installed in a tilted position.

NOTE: Check the yaw rate and acceleration sensor signal after replacement. Refer to TEST MODE PROCEDURE .

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 7

OK --> See step 4

3. **CHECK BRAKE ACTUATOR ASSEMBLY INSTALLATION**
   a. Check that the brake actuator assembly has been installed properly. Refer to **INSTALLATION** .

OK

The brake actuator assembly is tightened to the specified torque.

The brake actuator assembly is not installed in a tilted position.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 8

OK --> See step 5

4. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**
8. **INSTALL BRAKE ACTUATOR ASSEMBLY CORRECTLY. Refer to INSTALLATION**

DTC C1437: LOST COMMUNICATION WITH ECM

DESCRIPTION

The skid control ECU receives signals from the ECM via the CAN communication system.

DTC Code	DTC Detection Condition	Trouble Area
C1437	When the IG1 terminal voltage is 10 V or more and the vehicle speed is 15 km/h (9 mph) or more, data cannot be sent to the ECM for 2 seconds or more.	• CAN communication system (Skid control ECU to ECM) • Brake actuator assembly (Skid control ECU)

WIRING DIAGRAM

Refer to DTCs U0073, U0100, U0123, U0124 and U0126. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
EFI Communication Open	EFI communication open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

OK

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG --> See step 3

OK: Go to next step

2. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 15 km/h (9 mph) or more for 10 seconds or more.
   e. Check that no CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .
   f. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC (C1437) is not output	A
DTC (C1437) is output	B
DTC (CAN communication system DTC) is output	C

B --> See step 6

C --> See step 7

A --> See step 5

3. **REPAIR OR REPLACE HARNESS OR CONNECTOR (SKID CONTROL ECU - ECM)**
   a. Turn the ignition switch off.
   b. Repair or replace the harness or connector.
   c. Check for any momentary interruption between the skid control ECU and the ECM. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .
   d. Check that there is no momentary interruption.

   NEXT: Go to next step

4. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle at a speed of 15 km/h (9 mph) or more for 10 seconds or more.
   e. Check that no CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .
   f. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   RESULT

Result	Proceed to
DTC (C1437) is not output	A
DTC (C1437) is output	B
DTC (CAN communication system DTC) is output	C

   B --> See step 6

   C --> See step 7

   A --> END

5. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
7. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1439: STEERING ANGLE SENSOR INITIALIZATION INCOMPLETE; DTC C1445:

VEHICLE DRIVEN WITH STEERING ANGLE SENSOR NOT INITIALIZED

DESCRIPTION

The skid control ECU acquires the steering angle sensor zero point every time the ignition switch is turned to ON and the vehicle is driven at 35 km/h (22 mph) or more for approximately 5 seconds. The ECU also stores previous zero points.

DTCs C1439 and C1445 will be cleared when the ignition switch is turned off.

DTC Code	DTC Detection Condition	Trouble Area
C1439	After the steering angle sensor zero point calibration is cleared due to, for example, fluctuations in the power source, the steering angle sensor zero point calibration cannot be obtained for 60 seconds of continuous driving.	• Spiral cable (Steering angle sensor) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU)
C1445	Steering angle sensor zero point calibration cannot be obtained when the vehicle is driven without a record of steering angle sensor zero point calibration at a speed of 35 km/h (22 mph) or more for 30 seconds or more without the brake pedal being depressed.	• Spiral cable (Steering angle sensor) • Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU)

INSPECTION PROCEDURE

NOTE: **Before proceeding with the inspection, explain to the customer that the output DTC is related to temporary loss of the steering angle zero point calibration, such as when the power source voltage drops when the battery is removed, and confirm that this condition occurred.**

HINT:

- When DTC U0073, U0123, U0124 and/or U0126 is output together with DTC C1439 and/or C1445, inspect and repair the trouble areas indicated by DTC U0073, U0123, U0124 and/or U0126 first. Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**.
- When the speed sensor or the yaw rate and acceleration sensor has trouble, DTCs for the steering angle sensor may be output even when the steering angle sensor is normal. When DTCs for the speed sensor or yaw rate and acceleration sensor are output together with other DTCs for the steering angle sensor,

inspect and repair the speed sensor and yaw rate and acceleration sensor first, and then inspect and repair the steering angle sensor.

PROCEDURE

1. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the ignition switch off.
   c. Turn the ignition switch to ON again and check that no CAN communication system DTCs are output. Refer to **DIAGNOSIS SYSTEM** .
   d. Drive the vehicle and turn the steering wheel to the right and left at a speed of 35 km/h (22 mph) and check that no speed sensor, yaw rate and acceleration sensor and steering angle sensor DTCs are output. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1439 and/or C1445) are output	A
CAN communication system DTC is output	B
Speed sensor, yaw rate and acceleration sensor and/or steering angle sensor DTC is output	C
DTCs (C1439 and C1445) are not output	D

HINT:

- If there is a malfunction in the speed sensor or the yaw rate and acceleration sensor, an abnormal value may be output although the steering angle sensor is normal.
- If the speed sensor and the yaw rate and acceleration sensor DTCs are output simultaneously, repair the sensors and inspect the steering angle sensor.
- If the same DTC C1439 and/or C1445 is not output again, the DTC may have been stored due to a temporary loss of the steering angle zero point calibration, such as when the power source voltage drops.

B --> See step 4

C --> See step 5

D --> See step 6

A: Go to next step

2. **CHECK STEERING ANGLE SENSOR ZERO POINT CALIBRATION**
   a. Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.
   b. Check that the centered position of the steering wheel is correctly set while driving straight ahead.

      HINT:

      If the front wheel alignment and steering position are adjusted as a result of an off-centered position of the steering wheel, acquire yaw rate and acceleration sensor zero point again after the adjustments are completed.

      OK

      The steering wheel is centered correctly.

NG --> See step 7

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle and turn the steering wheel to the right and left at the speed of 35 km/h (22 mph) or more.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

      RESULT

Result	Proceed to
DTCs (C1439 and C1445) are not output	A
Yaw rate and acceleration sensor	

and/or steering angle sensor DTC is output	B

HINT:

- If the same DTC C1439 and/or C1445 is not output again, the DTC may have been stored due to a temporary loss of the steering angle zero point calibration, such as when the power source voltage drops.
- If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 5

A --> END

4. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPAIR CIRCUIT INDICATED BY OUTPUT DTC. Refer to DIAGNOSTIC TROUBLE CODE CHART**
6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **ADJUST FRONT WHEEL ALIGNMENT OR STEERING POSITION. Refer to ADJUSTMENT**

DTC C1440: UNUSUAL BANK ANGLE DETECTED

DESCRIPTION

If the skid control ECU determines that the vehicle is being driven at a steep bank angle, the skid control ECU stores DTC C1440 while VSC operation is temporarily disabled.

It is not a malfunction if the system and sensor circuits are normal and if the normal VSC operation resumes, which automatically clears DTC C1440, after the vehicle is returned to a normal position.

HINT:

DTC C1440 and the yaw rate and acceleration sensor DTC are stored when the skid control ECU determines that the vehicle is being driven at a steep bank angle and either of the following conditions is present:

- The yaw rate and acceleration sensor is installed at a tilted angle.
- The yaw rate and acceleration sensor signal output is stuck.

DTC Code	DTC Detection Condition	Trouble Area

C1440	Driving at a steep bank angle.	• Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Perform a road test.
   c. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   RESULT

Result	Proceed to
DTC (C1440) is output	A
DTC (C1440) is not output	B
Yaw rate and acceleration sensor DTC is output	C

   B --> END

   C --> See step 3

   A: Go to next step

2. **CLEAR DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .

   HINT:

   - If the skid control ECU determines that the vehicle is being driven at a steep bank angle, the skid control ECU stores DTC C1440 while VSC operation is temporarily disabled.
   - It is not a malfunction if the system and sensor circuits are normal and if the normal VSC operation resumes, which automatically clears DTC C1440, after the vehicle is returned to a normal position.

NEXT --> END

3. **REPAIR CIRCUIT INDICATED BY OUTPUT DTC. Refer to DIAGNOSTIC TROUBLE CODE CHART**

DTC C1441: BRAKE BOOSTER MALFUNCTION

DESCRIPTION

If the brake booster is damaged and does not provide braking support when depressing the brake pedal, the skid control ECU determines that the brake booster has a malfunction and stores DTC C1441.

DTC Code	DTC Detection Condition	Trouble Area
C1441	When the brake pedal load sensing switch and master cylinder pressure sensor are functioning normally and the brake pedal load sensing switch is judged as ON, the pressure signal from the master cylinder pressure sensor does not indicate an increase.	Brake booster assembly

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK VACUUM SYSTEM**
   a. Check the brake booster assembly. Refer to **INSPECTION** .

   NEXT --> END

DTC C1442: INVALID DATA RECEIVED FROM ACCELERATION SENSOR; DTC C1443: INVALID DATA RECEIVED FROM YAW RATE SENSOR

DESCRIPTION

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system (w/ VDIM).
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU) (w/o VDIM).

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle condition.

DTC Code	DTC Detection Condition	Trouble Area
C1442	With terminal IG1 voltage between 9.5 and 17.4 V, an invalid data signal is received	• Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU)

	from the acceleration sensor for 10 seconds or more.	(w/o VDIM)
C1443	With terminal IG1 voltage between 9.5 and 17.4 V, an invalid data signal is received from the yaw rate sensor for 10 seconds or more.	• Yaw rate and acceleration sensor (w/ VDIM) • Brake actuator assembly (Skid control ECU) (w/o VDIM)

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly or yaw rate and acceleration sensor, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Start and idle the engine for 60 seconds, and then stop the engine.
   c. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTCs (C1442 and/or C1443) are output (w/ VDIM)	A
DTCs (C1442 and/or C1443) are output (w/o VDIM)	B
DTCs (C1442 and C1443) are not output	C

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> See step 3

C --> See step 4

A --> See step 2

2. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
3. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
4. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC U0073: CONTROL MODULE COMMUNICATION BUS OFF; DTC U0100: LOST COMMUNICATION WITH ECM / PCM; DTC U0123: LOST COMMUNICATION WITH YAW RATE SENSOR MODULE; DTC U0124: LOST COMMUNICATION WITH LATERAL ACCELERATION SENSOR MODULE; DTC U0126: LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE

DESCRIPTION

The skid control ECU receives signals from the ECM and steering angle sensor via the CAN communication system.

- The skid control ECU receives signals from the yaw rate and acceleration sensor via the CAN communication system. (w/ VDIM)
- The skid control ECU receives signals from the yaw rate and acceleration sensor (built into skid control ECU). (w/o VDIM)

DTC Code	DTC Detection Condition	Trouble Area
U0073	Any of the following is detected: 1. When the IG1 terminal voltage is between 10 and 17.4 V, after the output of data from the skid control ECU is completed, the signals cannot be sent for 5 seconds or more. 2. The condition that bus OFF state occurs once or more within 0.1 seconds occurs 10 times in succession. (Sent signals cannot be received.) 3. When the IG1 terminal voltage is between 10 and 17.4 V, a delay in receiving data from the yaw rate and acceleration sensor and steering angle sensor continues for 1 second or more.	CAN communication system

	4. When the IG1 terminal voltage is between 10 and 17.4 V, the following occurs 10 times in succession. • The condition that a delay in receiving data from the yaw rate and acceleration sensor and steering angle sensor occurs more than once within 5 seconds.	
U0100	When the IG1 terminal voltage is between 10 and 17.4 V and the vehicle speed is 15 km/h (9 mph) or more, data cannot be received from the ECM for 2 seconds or more.	CAN communication system (Skid control ECU to ECM)
U0123	Either of the following is detected: 1. When the IG1 terminal voltage is between 10 and 17.4 V, data from the yaw rate sensor cannot be received for 1 second or more. 2. When the IG1 terminal voltage is between 10 and 17.4 V, the following occurs 10 times in succession. • The condition that data from the yaw rate sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)
U0124	Either of the following is detected: 1. When the IG1 terminal voltage is between 10 and 17.4 V, data from the acceleration sensor cannot be received for 1 second or more. 2. When the IG1 terminal voltage is between 10 and 17.4 V, the following occurs 10 times in succession. • The condition that data from the acceleration sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)
U0126	Either of the following is detected: 1. When the IG1 terminal voltage is between 10 and 17.4 V, data from the steering angle sensor cannot be received for 1 second or more. 2. When the IG1 terminal voltage is between 10 and 17.4 V, the following occurs 10 times in succession. • The condition that data from the steering angle sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to steering angle sensor)

WIRING DIAGRAM

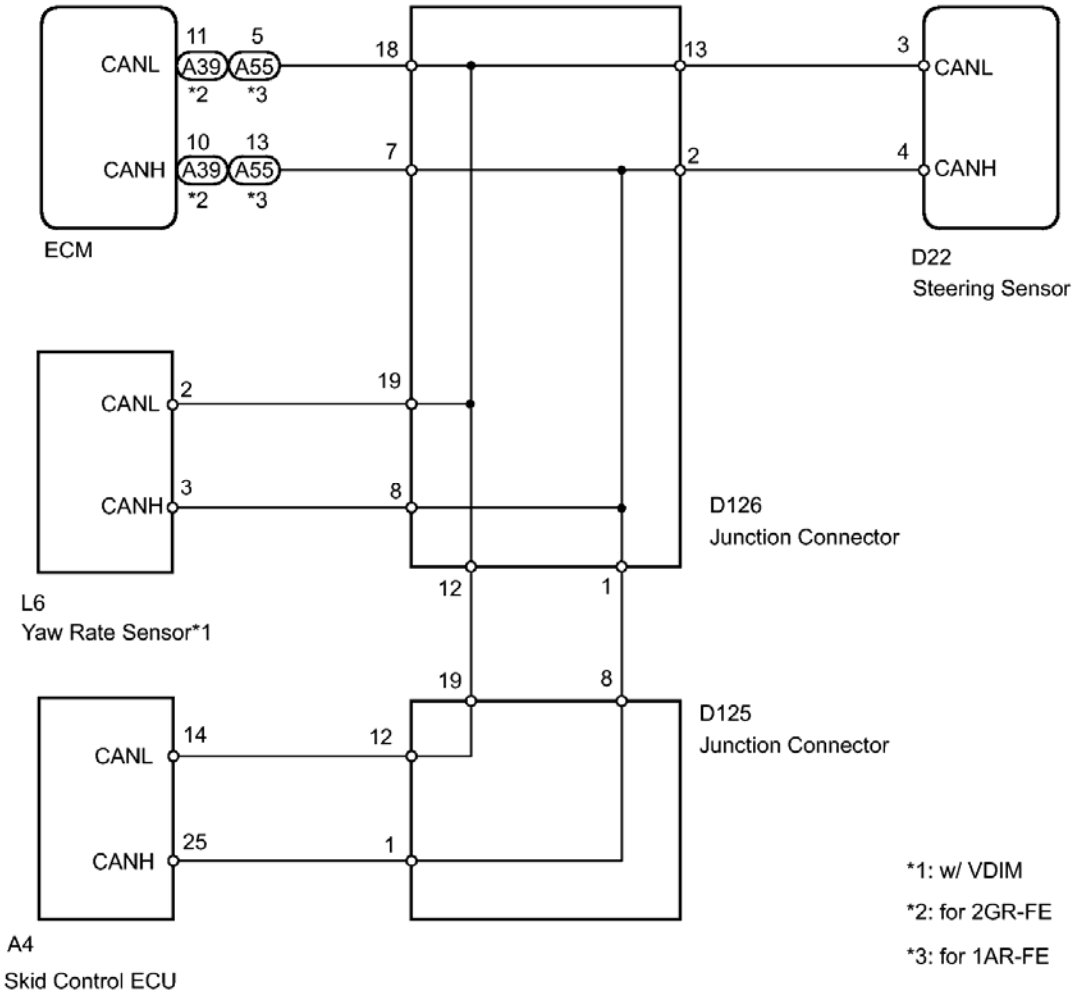


Fig. 70: Skid Control ECU to Steering Angle Sensor - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**
   a. Using the Techstream, check for any momentary interruption in the wire harness and connector corresponding to the DTC. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
	EFI		

EFI Communication Open	communication open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Yaw Rate Open	Yaw rate sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Steering Open	Steering angle sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-

RESULT

Result	Proceed to
There is a constant open circuit	A
There are no momentary interruptions	B
There are momentary interruptions	C

HINT:

Perform the above inspection before removing the sensor and connector.

B --> See step 3

C --> See step 4

A: Go to next step

2. **CHECK IF EACH SENSOR AND ECM CONNECTOR IS SECURELY CONNECTED**
   a. Turn the ignition switch off.
   b. Check if each sensor or ECM connector is securely connected.

   OK

   Each connector is securely connected.

NG --> CONNECT CONNECTOR TO EACH SENSOR OR ECM CORRECTLY

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Record the output DTCs (for ABS, VSC system and/or CAN communication system). Refer to **DTC CHECK / CLEAR** for ABS and VSC system, or refer to **DIAGNOSIS SYSTEM** for CAN communication system).

      HINT:

      If CAN communication system DTCs and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS and/or VSC system) after the CAN communication system returns to normal.

      RESULT

Result	Proceed to
DTC is not output	A
DTC (ABS and/or VSC system DTC) is output	B
DTC (CAN communication system DTC) is output	C

B --> See step 7

C --> See step 8

A --> See step 6

4. **REPAIR OR REPLACE HARNESS OR CONNECTOR**
   a. Turn the ignition switch off.
   b. Repair or replace the harness or connector.
   c. Check for any momentary interruption between the skid control ECU and each sensor or ECM. Refer to **CHECK FOR INTERMITTENT PROBLEMS** .
   d. Check that there are no momentary interruptions.

NEXT: Go to next step

5. **RECONFIRM DTC**
   a. Turn the ignition switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Start the engine.
   d. Drive the vehicle and turn the steering wheel to the right and left at a speed of 15 km/h (9 mph) or more.
   e. Check that no CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .
   f. If ABS and/or VSC system DTCs are output, record them.

RESULT

Result	Proceed to
DTC is not output	A
DTC (ABS and/or VSC system DTC) is output	B
DTC (CAN communication system DTC) is output	C

HINT:

The CAN communication system must be normal when performing troubleshooting for each sensor DTC (for ABS and/or VSC system).

B --> See step 7

C --> See step 8

A --> END

6. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **REPAIR CIRCUIT INDICATED BY OUTPUT DTC. Refer to DIAGNOSTIC TROUBLE CODE CHART**
8. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

SYMPTOM TESTS

ABS Warning Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

If any of the following is detected, the ABS warning light remains on:

- The skid control ECU connector is disconnected from the skid control ECU.
- There is a malfunction in the skid control ECU internal circuit.
- There is an open in the harness between the combination meter and the skid control ECU.
- The ABS control system is defective.

HINT:

In some cases, the Techstream cannot be used when the skid control ECU is abnormal.

WIRING DIAGRAM

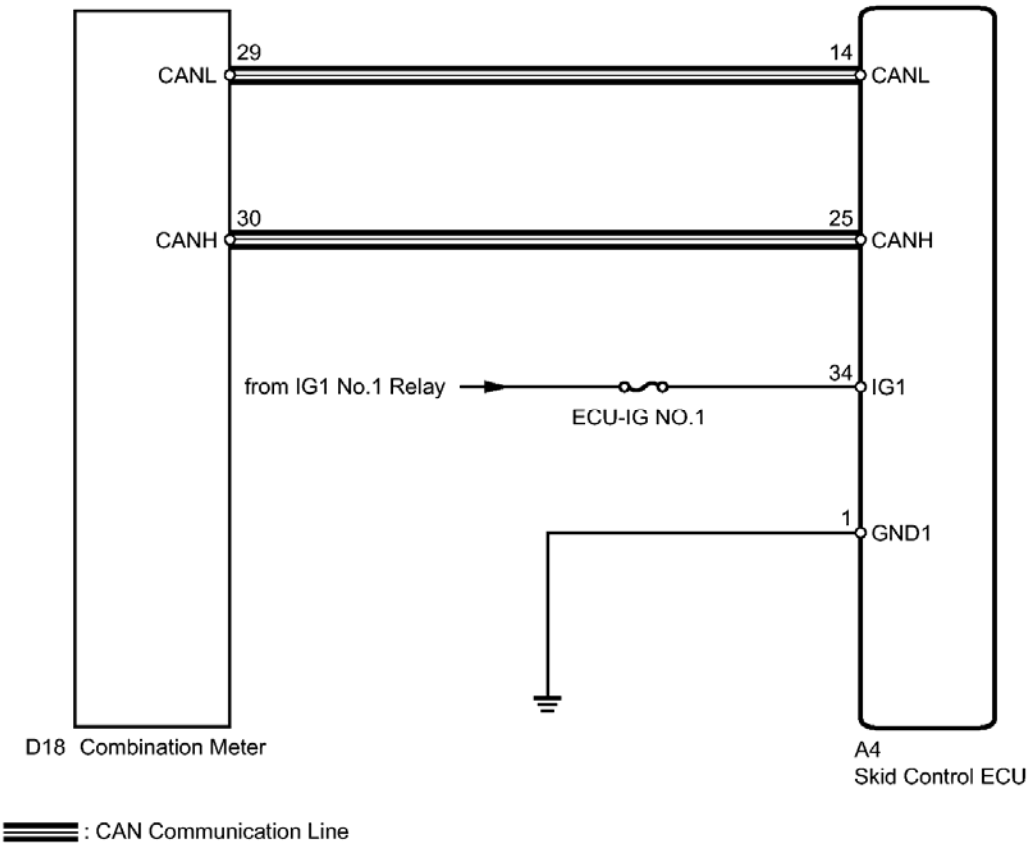


Fig. 71: ABS Warning Light - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

   RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

   B --> See step 8

   A: Go to next step

2. **CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**
   a. Check if the skid control ECU connector is securely connected.

      OK

      The connector is securely connected.

   NG --> CONNECT CONNECTOR TO ECU CORRECTLY

   OK: Go to next step

3. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

   RESULT

Result	Proceed to
OK	A
NG	

(for 2GR-FE)	B
NG (for 1AR-FE)	C

B --> See step 9

C --> See step 10

A: Go to next step

4. **INSPECT SKID CONTROL ECU (IG1 TERMINAL)**
   a. Disconnect the skid control ECU connector.

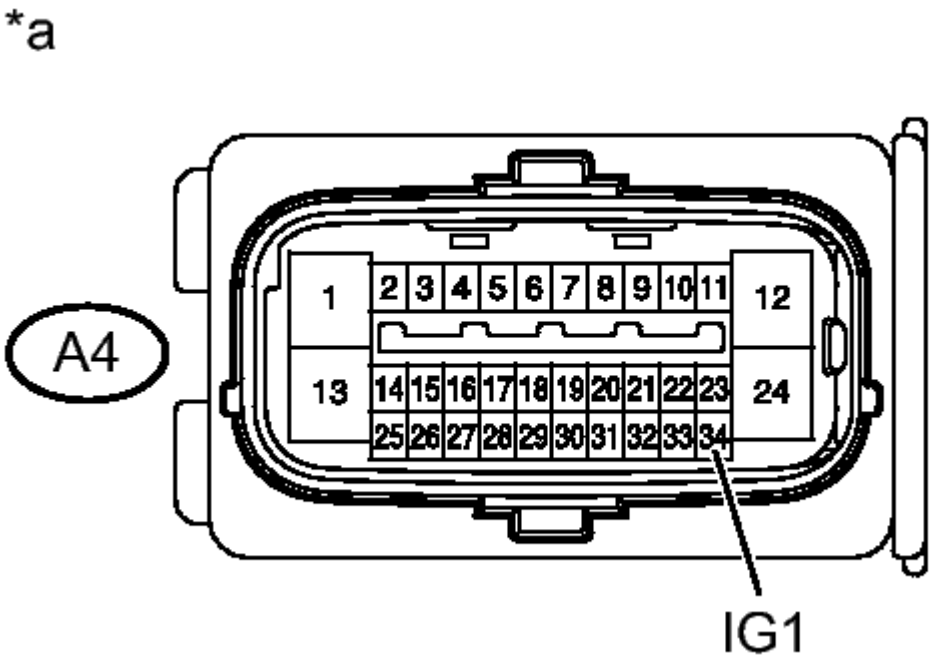


Fig. 72: Inspecting Skid Control ECU (IG1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Turn the ignition switch to ON.
   c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester	Switch	Specified

Connection	Condition	Condition
A4-34 (IG1) - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (GND1 TERMINAL)**
   a. Turn the ignition switch off.

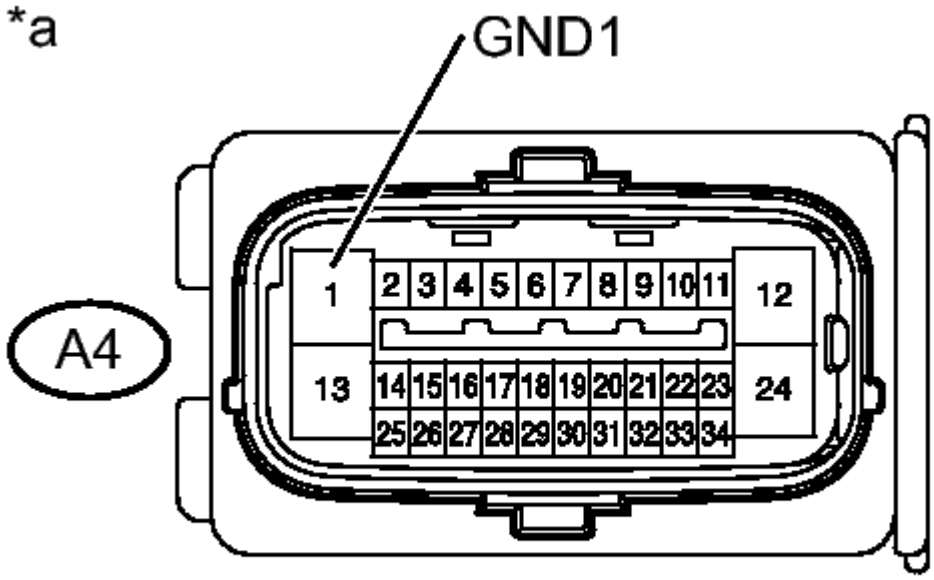


Fig. 73: Inspecting Skid Control ECU (GND1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-1 (GND1) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)

OK: Go to next step

6. **PERFORM ACTIVE TEST USING TECHSTREAM (ABS WARNING LIGHT)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp ABS	ABS warning light	OFF or ON	Operate with IG ON and the vehicle stopped

   g. Check that the ABS warning light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The ABS Warning Light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 11

OK --> See step 7

7. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
8. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
9. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
10. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
11. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

ABS Warning Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to ABS Warning Light Remains ON. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 4

A: Go to next step

2. **CHECK ABS WARNING LIGHT**
   a. Disconnect the skid control ECU connector.
   b. Turn the ignition switch to ON.
   c. Check that the ABS warning light comes on.

      OK

      The ABS warning light comes on.

      HINT:

      If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 3

OK --> See step 5

3. **PERFORM ACTIVE TEST USING TECHSTREAM (ABS WARNING LIGHT)**
   a. Turn the ignition switch off.
   b. Reconnect the skid control ECU connector.
   c. Connect the Techstream to the DLC3.
   d. Turn the ignition switch to ON.
   e. Turn the Techstream on.
   f. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   g. Select the Active Test on the Techstream.

      COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note

Indicat. Lamp ABS	ABS warning light	OFF or ON	Operate with IG ON and the vehicle stopped

h. Check that the ABS warning light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The ABS warning light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 6

OK --> See step 5

4. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
6. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

Brake Warning Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

If any of the following is detected, the brake warning light remains on:

- The skid control ECU connector is disconnected from the skid control ECU.
- The brake fluid level is insufficient.
- The parking brake is applied.
- EBD operation has been disabled.

WIRING DIAGRAM

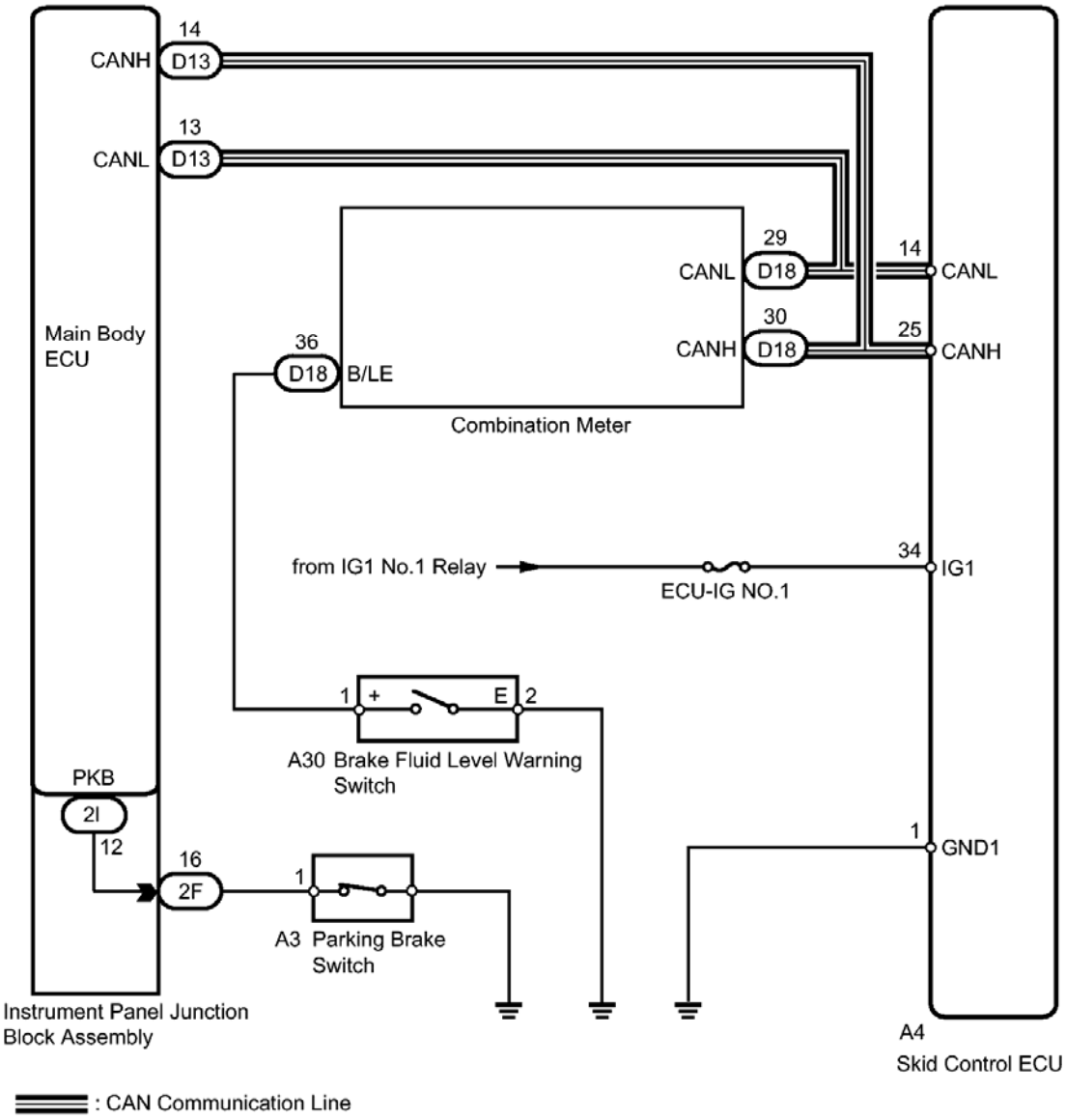


Fig. 74: Brake Warning Light - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 14

A: Go to next step

2. **CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**
   a. Check if the skid control ECU connector is securely connected.

      OK

      The connector is securely connected.

   NG --> CONNECT CONNECTOR TO ECU CORRECTLY

   OK: Go to next step

3. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      RESULT

Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

   B --> See step 15

C --> See step 16

A: Go to next step

4. **INSPECT SKID CONTROL ECU (IG1 TERMINAL)**
   a. Disconnect the skid control ECU connector.

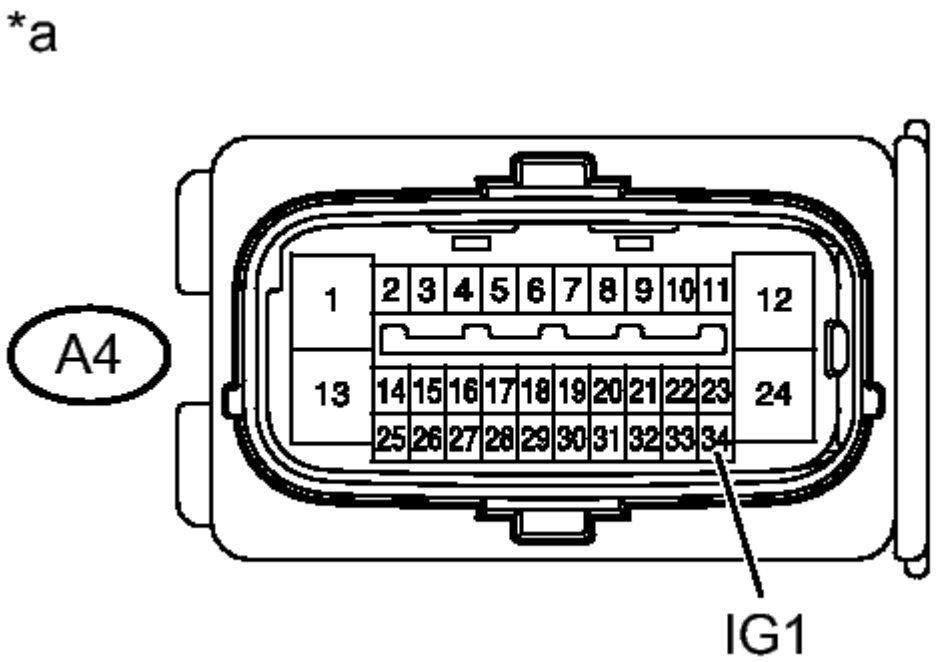


Fig. 75: Inspecting Skid Control ECU (IG1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Turn the ignition switch to ON.
   c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A4-34 (IG1) - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

	Front view of wire

*a	harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 CIRCUIT)

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (GND1 TERMINAL)**
   a. Turn the ignition switch off.

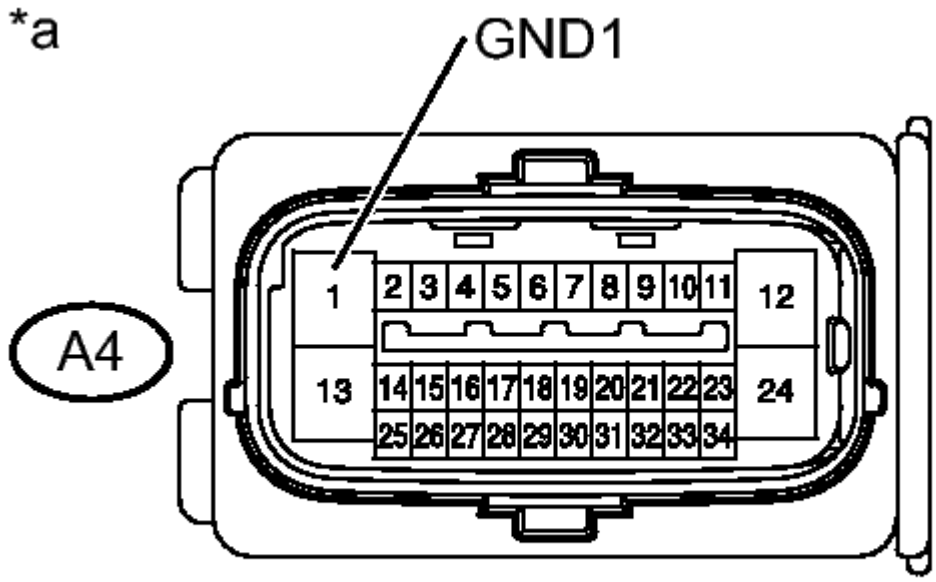


Fig. 76: Inspecting Skid Control ECU (GND1 Terminal)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-1 (GND1) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (GND1 CIRCUIT)

OK: Go to next step

6. **READ VALUE USING TECHSTREAM (PARKING BRAKE SWITCH)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   f. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-

   g. Using the Techstream, check the switch condition on the Techstream changes according to parking brake pedal operation.

      OK

      The Techstream displays ON or OFF according to parking brake pedal operation.

NG --> See step 10

OK: Go to next step

7. **INSPECT BRAKE FLUID LEVEL WARNING SWITCH**
   a. Turn the ignition switch off.

*a

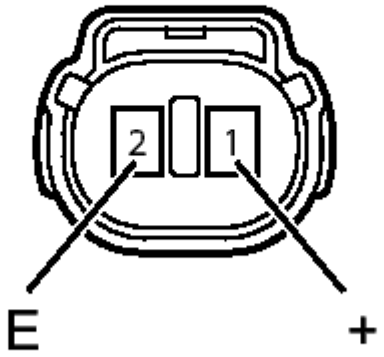


Fig. 77: Brake Fluid Level Warning Switch Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Remove the reservoir filler cap and strainer.
   c. Disconnect the brake fluid level warning switch connector.
   d. Measure the resistance according to the value(s) in the table below.

HINT:

A float is located inside the reservoir. Its position can be changed by increasing or decreasing the level of brake fluid.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
1 (+) - 2 (E)	Brake fluid level warning switch OFF (Float up)	1.9 to 2.1 kohms
	Brake	

1 (+) - 2 (E)	fluid level warning switch ON (Float down)	Below 1 ohms

HINT:

If there is no problem after finishing the above check, adjust the brake fluid level to the MAX level.

TEXT IN ILLUSTRATION

*a	Component without harness connected (Brake Fluid Level Warning Switch)

NG --> See step 17

OK: Go to next step

8. **CHECK HARNESS AND CONNECTOR (COMBINATION METER - BRAKE FLUID LEVEL WARNING SWITCH)**
   a. Disconnect the combination meter connector.
   b. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
D18-36 (B/LE) - A30-1 (+)	Always	Below 1 ohms
D18-36 (B/LE) - Body ground	Always	10 kohms or higher
A30-2 (E) - Body ground	Always	Below 1 ohms

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

9. **PERFORM ACTIVE TEST USING TECHSTREAM (BRAKE WARNING LIGHT)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Brake	Brake warning light	OFF or ON	Operate with IG ON and the vehicle stopped

   g. Check that the brake warning light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The brake warning light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 18

OK --> See step 20

10. **INSPECT PARKING BRAKE SWITCH**
    a. Turn the ignition switch off.

*a



Fig. 78: Parking Brake Switch Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the parking brake switch connector.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
1 - Body ground	Parking brake switch ON (Switch pin free)	Below 1 ohms
1 - Body ground	Parking brake switch OFF (Switch pin pushed in)	10 kohms or higher

TEXT IN ILLUSTRATION

	Component

*a	without harness connected (Parking Brake Switch)

NG --> See step 19

OK: Go to next step

11. **CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK - PARKING BRAKE SWITCH)**
    a. Disconnect the instrument panel junction block assembly connector.
    b. Measure the resistance according to the value(s) in the table below.

    Standard Resistance

Tester Connection	Condition	Specified Condition
2F-16 - A3-1	Always	Below 1 ohms
2F-16 - Body ground	Always	10 kohms or higher

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

12. **CHECK HARNESS AND CONNECTOR (INSTRUMENT PANEL JUNCTION BLOCK - MAIN BODY ECU)**
    a. Remove the main body ECU from the instrument panel junction block assembly.
    b. Measure the resistance according to the value(s) in the table below.

    Standard Resistance

Tester Connection	Condition	Specified Condition
2I-12 - 2F-16	Always	Below 1 ohms
2I-12 - Body ground	Always	10 kohms or higher

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> REPLACE INSTRUMENT PANEL JUNCTION BLOCK ASSEMBLY

OK --> See step 13

13. **REPLACE MAIN BODY ECU. Refer to REMOVAL**
14. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
15. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
16. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
17. **REPLACE BRAKE MASTER CYLINDER RESERVOIR ASSEMBLY (BRAKE FLUID LEVEL WARNING SWITCH). Refer to DISASSEMBLY**
18. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**
19. **REPLACE PARKING BRAKE SWITCH. Refer to REMOVAL**
20. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

Brake Warning Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to Brake Warning Light Remains ON. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 4

A: Go to next step

2. **CHECK BRAKE WARNING LIGHT**
   a. Disconnect the skid control ECU connector.
   b. Turn the ignition switch to ON.
   c. Check that the brake warning light comes on.

   OK

   The brake warning light comes on.

   HINT:

   If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 3

OK --> See step 5

3. **PERFORM ACTIVE TEST USING TECHSTREAM (BRAKE WARNING LIGHT)**
   a. Turn the ignition switch off.
   b. Reconnect the skid control ECU connector.
   c. Connect the Techstream to the DLC3.
   d. Turn the ignition switch to ON.
   e. Turn the Techstream on.
   f. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   g. Select the Active Test on the Techstream.

COMBINATION METER

Tester	Test	Control	Diagnostic

Display	Part	Range	Note
Indicat. Lamp Brake	Brake warning light	OFF or ON	Operate with IG ON and the vehicle stopped

h. Check that the Brake warning light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The brake warning light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 6

OK --> See step 5

4. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
6. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

TRAC OFF Indicator Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

Pressing the VSC OFF switch turns off traction control and pressing and holding this switch turns off traction and VSC controls. If TRAC control is turned off, the TRAC OFF indicator light will come on.

If there is a malfunction in the SFI system, the TRAC system will turn off and the TRAC OFF indicator will turn on.

WIRING DIAGRAM

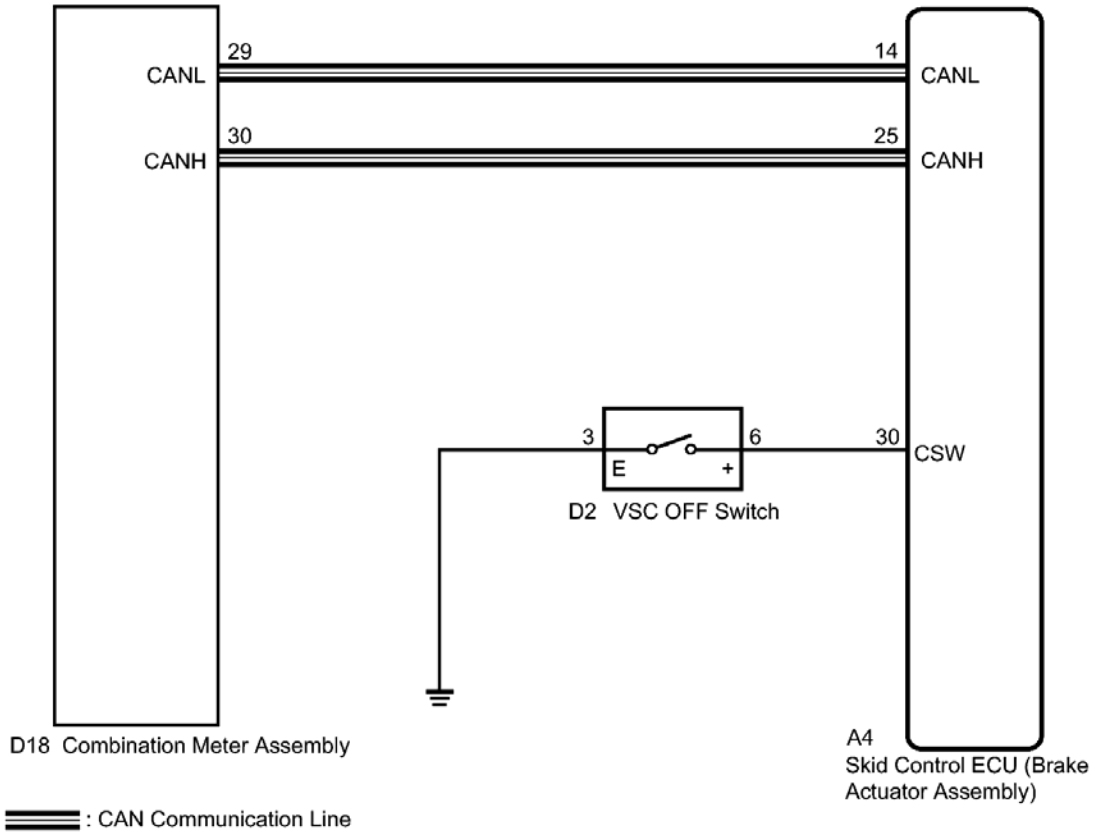


Fig. 79: Skid Control ECU Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK SFI SYSTEM**
   a. Check if SFI system DTCs are output.
      For 2GR-FE. Refer to **DIAGNOSIS SYSTEM**
      For 1AR-FE. Refer to **DIAGNOSIS SYSTEM**

RESULT

Result	Proceed to
DTCs are not	A

output	
DTCs are output (for 2GR-FE)	B
DTCs are output (for 1AR-FE)	C

B --> See step 16

C --> See step 15

A: Go to next step

2. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 10

A: Go to next step

3. **CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**
   a. Check if the skid control ECU (brake actuator assembly) connector is securely connected.

OK

The connector is securely connected.

NG --> CONNECT CONNECTOR TO ECU CORRECTLY

OK: Go to next step

4. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      RESULT

Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

B --> See step 11

C --> See step 12

A: Go to next step

5. **READ VALUE USING TECHSTREAM (VSC OFF SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
   e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

      ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TRAC/VSC Off Mode	VSC OFF switch / Normal, TRC OFF or VSC	Normal: Normal TRC OFF: TRAC off mode VSC	-

	OFF	OFF: VSC off mode	

f. Using the Techstream, check the switch condition on the Techstream changes according to VSC OFF switch operation.

OK

The Techstream display changes according to VSC OFF switch operation.

NG --> See step 7

OK: Go to next step

6. **PERFORM ACTIVE TEST USING TECHSTREAM (TRAC OFF INDICATOR LIGHT)**
   a. Reconnect the skid control ECU (brake actuator assembly) connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
VSC TRC Indicator	VSC TRC indicator light	OFF or ON	Operate with IG ON and the vehicle stopped

g. Check that the TRAC OFF indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The TRAC OFF indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 13

OK --> See step 9

7. **INSPECT VSC OFF SWITCH**
   a. Turn the ignition switch off.

*a

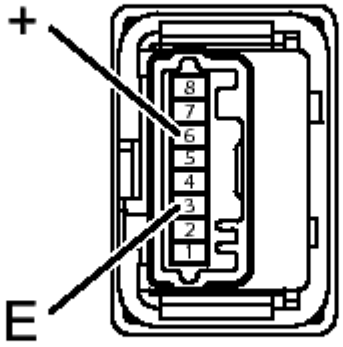


Fig. 80: Measuring Resistance Of VSC OFF Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Disconnect the VSC OFF switch connector.
   c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
6 (+) - 3 (E)	Switch is pushed in	Below 1 ohms
6 (+) - 3 (E)	Switch is not pushed in	10 kohms or higher

TEXT IN ILLUSTRATION

	Component without

*a	harness connected (VSC OFF Switch)

NG --> See step 14

OK: Go to next step

8. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - VSC OFF SWITCH)**
   a. Disconnect the skid control ECU (brake actuator assembly) connector.
   b. Measure the resistance according to the value(s) in the table below.

   Standard Resistance

Tester Connection	Condition	Specified Condition
A4-30 (CSW) - D2-6 (+)	Always	Below 1 ohms
A4-30 (CSW) - Body ground	Always	10 kohms or higher
D2-3 (E) - Body ground	Always	Below 1 ohms

   HINT:

   If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

   NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

   OK --> See step 9

9. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
10. **CHECK CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
11. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
12. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
13. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

14. **REPLACE VSC OFF SWITCH. Refer to REMOVAL**
15. **CHECK SFI SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
16. **CHECK SFI SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

TRAC OFF Indicator Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to TRAC OFF Indicator Light Remains ON. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

   RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

   B --> See step 5

   A: Go to next step

2. **PERFORM ACTIVE TEST USING TECHSTREAM (TRAC OFF INDICATOR)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.
   e. Select the Active Test on the Techstream.

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
TRC OFF Indicator Light	TRAC OFF indicator	Display ON / OFF	Observe combination meter

f. Check that the TRAC OFF indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The TRAC OFF indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 3

OK --> See step 4

3. **PERFORM ACTIVE TEST USING TECHSTREAM (TRAC OFF INDICATOR LIGHT)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
VSC TRC Indicator	VSC TRC indicator light	OFF or ON	Operate with IG ON and the vehicle stopped

g. Check that the TRAC OFF Indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The TRAC OFF indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 6

OK --> See step 4

4. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
5. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

VSC OFF Indicator Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

Pressing the VSC OFF switch turns off traction control and pressing and holding this switch turns off traction and VSC controls. If VSC control is turned off, the VSC OFF indicator light will come on.

WIRING DIAGRAM

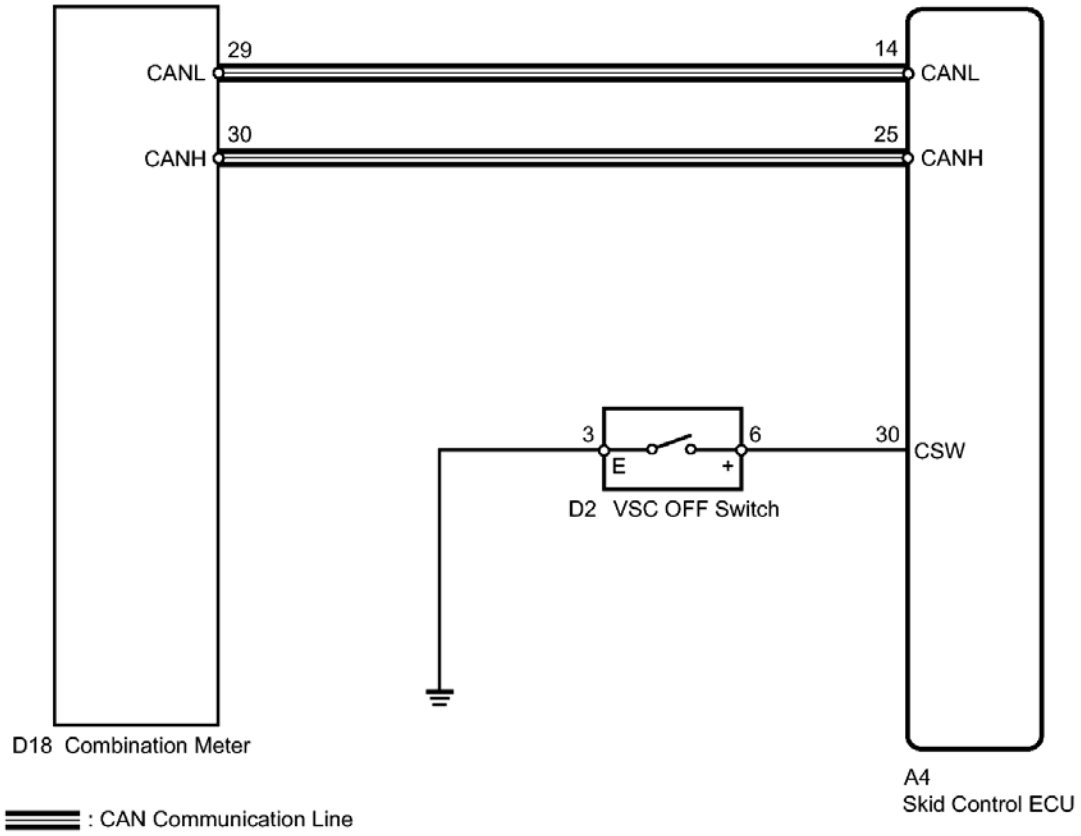


Fig. 81: Skid Control ECU Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is	B

output	

B --> See step 9

A: Go to next step

2. **CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**
   a. Check if the skid control ECU connector is securely connected.

      OK

      The connector is securely connected.

   NG --> CONNECT CONNECTOR TO ECU CORRECTLY

   OK: Go to next step

3. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      RESULT

Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

   B --> See step 10

   C --> See step 11

   A: Go to next step

4. **READ VALUE USING TECHSTREAM (VSC OFF SWITCH)**
   a. Connect the Techstream to the DLC3.

b. Turn the ignition switch to ON.
c. Turn the Techstream on.
d. Enter the following menus: Chassis / ABS/VSC/ TRAC / Data List.
e. Select the Data List on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
TRAC/VSC Off Mode	VSC OFF switch / Normal, TRC OFF or VSC OFF	Normal: Normal TRC OFF: TRAC off mode VSC OFF: VSC off mode	-

f. Using the Techstream, check the switch condition on the Techstream changes according to VSC OFF switch operation.

OK

The Techstream display changes according to VSC OFF switch operation.

NG --> See step 6

OK: Go to next step

5. **PERFORM ACTIVE TEST USING TECHSTREAM (VSC OFF INDICATOR LIGHT)**
a. Reconnect the skid control ECU connector.
b. Connect the Techstream to the DLC3.
c. Turn the ignition switch to ON.
d. Turn the Techstream on.
e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. VSC	VSC OFF indicator	OFF or ON	Operate with IG ON and

OFF	light		the vehicle stopped

g. Check that the VSC OFF indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The VSC OFF indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 12

OK --> See step 8

6. **INSPECT VSC OFF SWITCH**

a. Turn the ignition switch off.

*a

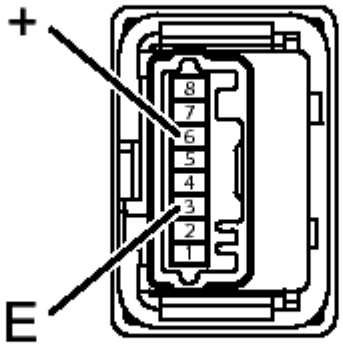


Fig. 82: Measuring Resistance Of VSC OFF Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the VSC OFF switch connector.

c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Switch Condition	Specified Condition
6 (+) - 3 (E)	Switch pushed in	Below 1 ohms
6 (+) - 3 (E)	Switch not pushed in	10 kohms or higher

TEXT IN ILLUSTRATION

*a	Component without harness connected (VSC OFF Switch)

NG --> See step 13

OK: Go to next step

7. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - VSC OFF SWITCH)**
   a. Disconnect the skid control ECU connector.
   b. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A4-30 (CSW) - D2-6 (+)	Always	Below 1 ohms
A4-30 (CSW) - Body ground	Always	10 kohms or higher
D2-3 (E) - Body ground	Always	Below 1 ohms

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 8

8. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
9. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
10. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
11. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
12. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**
13. **REPLACE VSC OFF SWITCH. Refer to REMOVAL**

VSC OFF Indicator Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to VSC OFF Indicator Light Remains ON. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 5

A: Go to next step

2. **PERFORM ACTIVE TEST USING TECHSTREAM (VSC OFF INDICATOR LIGHT)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.
   e. Select the Active Test on the Techstream.

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
VSC OFF Indicator Light	VSC OFF indicator light	Indicator light ON / OFF	Observe combination meter

   f. Check that the VSC OFF indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The VSC OFF indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 3

OK --> See step 4

3. **PERFORM ACTIVE TEST USING TECHSTREAM (VSC OFF INDICATOR LIGHT)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. VSC OFF	VSC OFF indicator light	OFF or ON	Operate with IG ON and the vehicle stopped

g. Check that the VSC OFF indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The VSC OFF indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 6

OK --> See step 4

4. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
5. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

Slip Indicator Light Remains ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

If the skid control ECU stores a DTC, the SLIP indicator light will come on in the combination meter.

The SLIP indicator light blinks during VSC and/or TRAC operation.

When the system fails, the SLIP indicator light comes on to warn the driver. Refer to **DIAGNOSIS SYSTEM** .

WIRING DIAGRAM

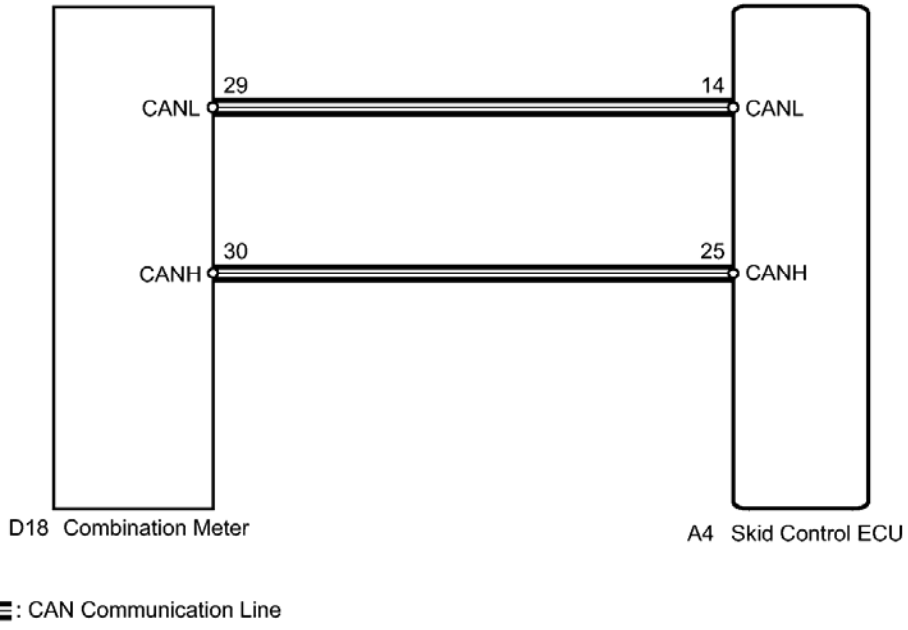


Fig. 83: Slip Indicator Light Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 6

A: Go to next step

2. **CHECK IF SKID CONTROL ECU CONNECTOR IS SECURELY CONNECTED**
   a. Check if the skid control ECU connector is securely connected.

      OK

      The connector is securely connected.

   NG --> CONNECT CONNECTOR TO ECU CORRECTLY

   OK: Go to next step

3. **INSPECT BATTERY**
   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      RESULT

Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

   B --> See step 7

   C --> See step 8

   A: Go to next step

4. **PERFORM ACTIVE TEST USING TECHSTREAM (SLIP INDICATOR LIGHT)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.

f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Slip	SLIP indicator light	OFF or ON	Operate with IG ON and the vehicle stopped

g. Check that the SLIP indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The SLIP indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 9

OK --> See step 5

5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
6. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
8. **CHECK OR REPLACE CHARGING SYSTEM OR BATTERY. Refer to ON-VEHICLE INSPECTION**
9. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

Slip Indicator Light does not Come ON

DESCRIPTION

The skid control ECU is connected to the combination meter via CAN communication.

WIRING DIAGRAM

Refer to SLIP Indicator Light Remains ON. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

RESULT

Result	Proceed to
DTC is not output	A
DTC is output	B

B --> See step 4

A: Go to next step

2. **PERFORM ACTIVE TEST USING TECHSTREAM (SLIP INDICATOR LIGHT)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.
   e. Select the Active Test on the Techstream.

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Slip Indicator Light	SLIP indicator light	Indicator light ON / OFF	Observe combination meter

   f. Check that the SLIP indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The SLIP indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 3

OK --> See step 5

3. **PERFORM ACTIVE TEST USING TECHSTREAM (SLIP INDICATOR LIGHT)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the ignition switch to ON.
   d. Turn the Techstream on.
   e. Enter the following menus: Body Electrical / Combination Meter / Active Test.
   f. Select the Active Test on the Techstream.

COMBINATION METER

Tester Display	Test Part	Control Range	Diagnostic Note
Indicat. Lamp Slip	SLIP indicator light	OFF or ON	Operate with IG ON and the vehicle stopped

   g. Check that the SLIP indicator light on the combination meter turns on or off in accordance with the Techstream operation.

OK

The SLIP indicator light turns on or off in accordance with the Techstream operation.

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

NG --> See step 6

OK --> See step 5

4. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
6. **REPLACE COMBINATION METER ASSEMBLY. Refer to REMOVAL**

CIRCUIT TESTS

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer emits a warning sound to inform the driver when Hill-start Assist Control operation is started or finished.

WIRING DIAGRAM

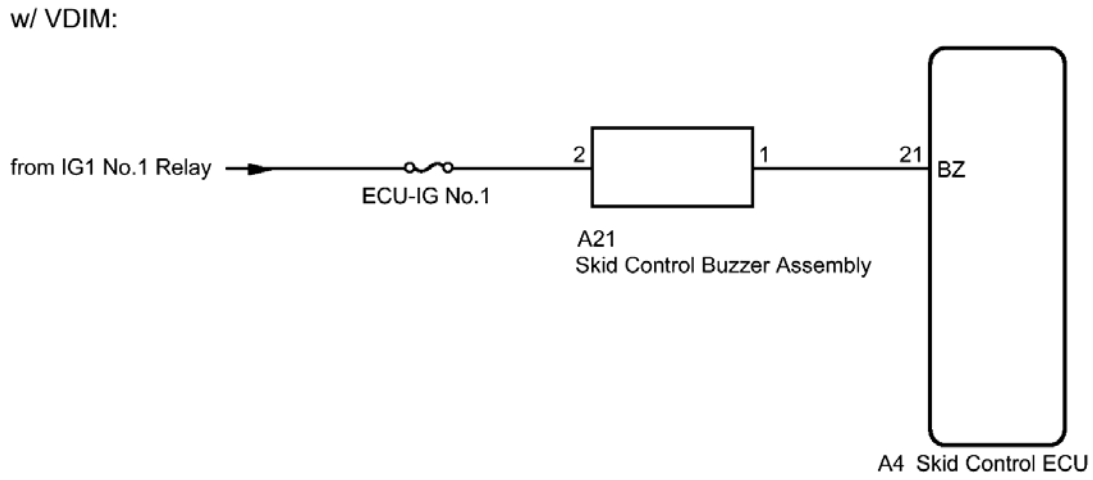


Fig. 84: Skid Control Buzzer Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .**
- **Inspect the fuses for circuits related to this system before performing the following inspection procedure.**

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM (SKID CONTROL BUZZER ASSEMBLY)**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.

c. Turn the Techstream on.

d. Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.

e. Select the Active Test on the Techstream.

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Skid control buzzer	Buzzer ON/OFF	Buzzer can be heard

f. Check that the buzzer sounds/stops when turning the skid control buzzer on/off by using the Techstream.

RESULT

Result	Proceed to
Buzzer does not sound or sounds constantly	A
Buzzer sounds/stops	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> END

A: Go to next step

2. **INSPECT SKID CONTROL BUZZER ASSEMBLY (POWER SOURCE TERMINAL)**

a. Turn the ignition switch off.

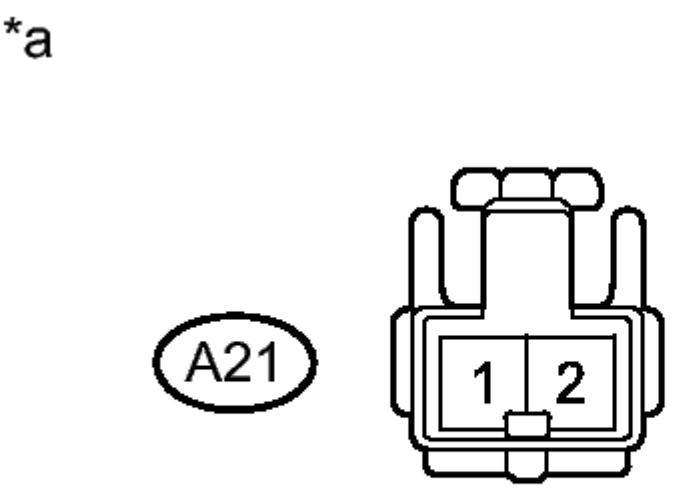


Fig. 85: Skid Control Buzzer Assembly Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control buzzer connector.
c. Turn the ignition switch to ON.
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A21-2 - Body ground	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control Buzzer)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (POWER SOURCE CIRCUIT)

OK: Go to next step

3. **INSPECT SKID CONTROL BUZZER ASSEMBLY**
   a. Turn the ignition switch off.

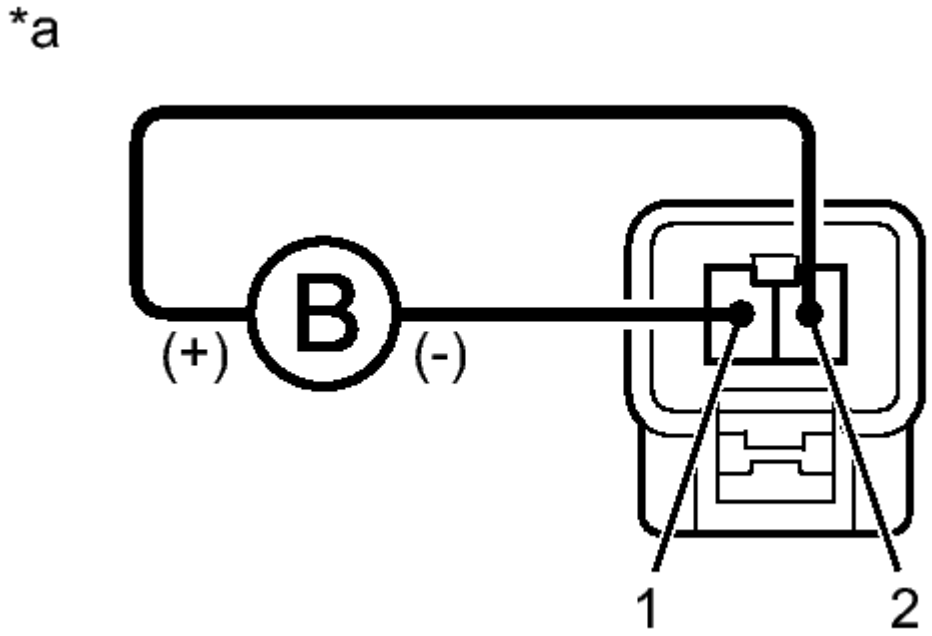


Fig. 86: Inspecting Skid Control Buzzer Assembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Apply battery negative voltage to terminal 1, and battery positive voltage to terminal 2 of the skid control buzzer, and then check that the buzzer sounds.

      OK

      The skid control buzzer sounds.

TEXT IN ILLUSTRATION

*a	Component without harness connected (Skid Control Buzzer)

NG --> See step 6

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - SKID CONTROL BUZZER ASSEMBLY)**
   a. Disconnect the skid control ECU connector.
   b. Measure the resistance according to the value(s) in the table below.

      Standard Resistance

Tester Connection	Condition	Specified Condition
A4-21 (BZ) - A51-1	Always	Below 1 ohms
A4-21 (BZ) - Body ground	Always	10 kohms or higher

      HINT:

      If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

   NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

   OK --> See step 5

5. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
6. **REPLACE SKID CONTROL BUZZER ASSEMBLY. Refer to REMOVAL**

TC and CG Terminal Circuit

DESCRIPTION

Connecting terminals TC and CG of the DLC3 causes the ECU to display the DTC by blinking the ABS warning light and SLIP indicator light.

WIRING DIAGRAM

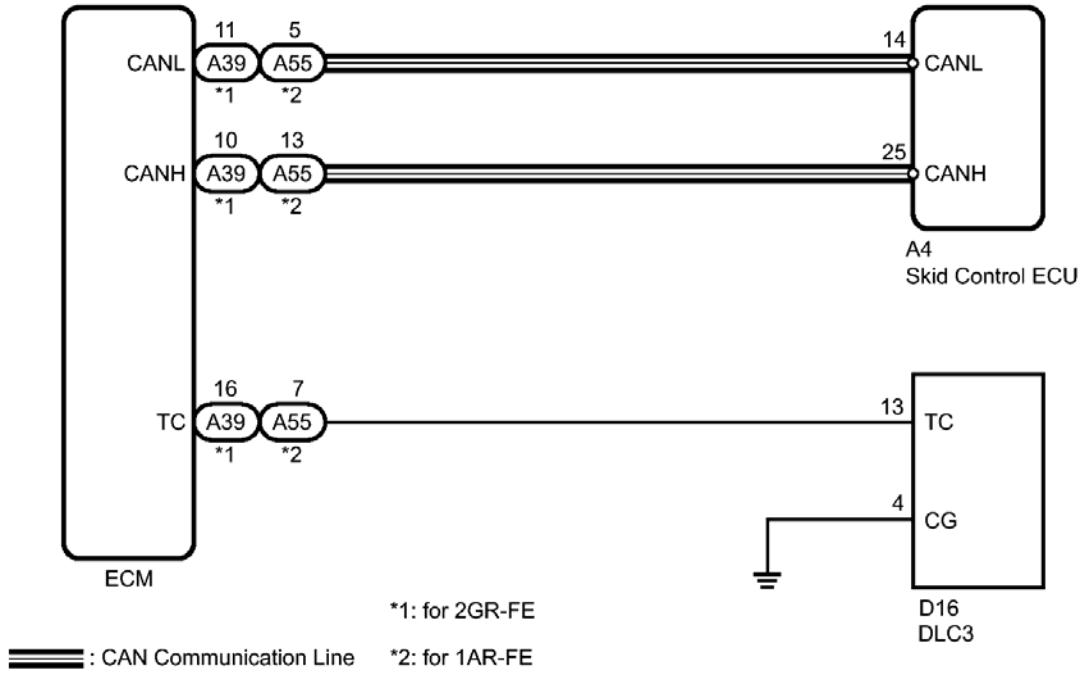


Fig. 87: TC And CG Terminal Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

When the warning lights continue to blink, a ground short in the wiring of terminal TC of the DLC3 or an internal ground short in one or more ECUs is suspected.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DTC CHECK / CLEAR** .

RESULT

Result	Proceed to
DTC is not output	A
DTC	

is output	B

B --> See step 7

A: Go to next step

2. **INSPECT DLC3**
   a. Turn the ignition switch to ON.

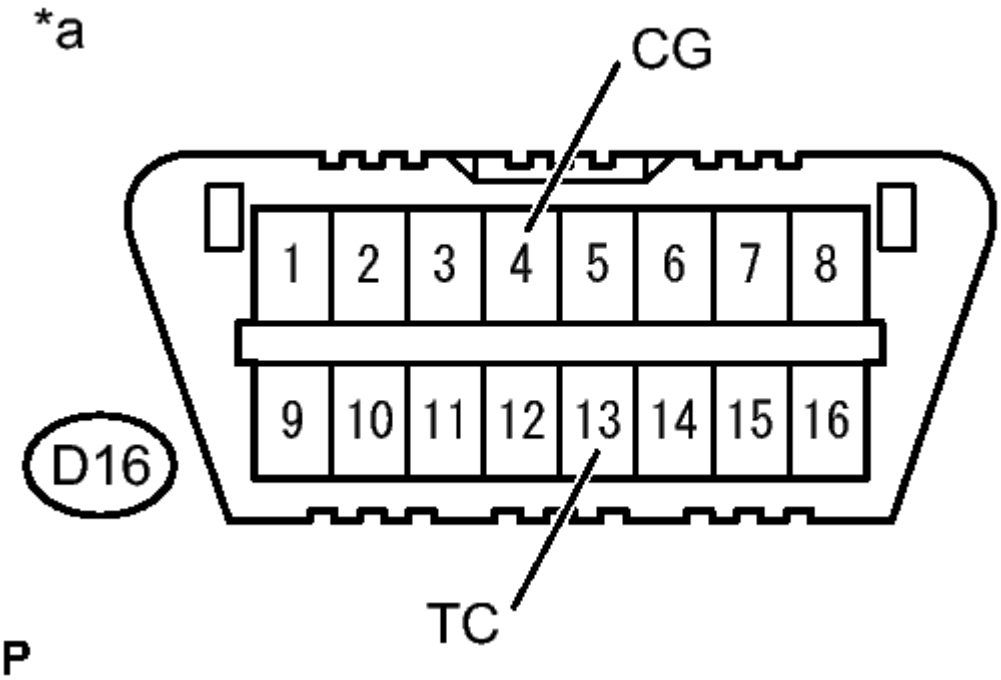


Fig. 88: DLC3 Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
D16-13 (TC) - D16-4 (CG)	Ignition switch ON	11 to 14 V

TEXT IN ILLUSTRATION

	Front view

*a	of DLC3

RESULT

Result	Proceed to
NG	A
OK	B

B --> See step 5

A: Go to next step

3. **CHECK HARNESS AND CONNECTOR (TC of DLC3 - ECM)**
   a. for 2GR-FE
      1. Turn the ignition switch off.
      2. Disconnect the ECM connector.
      3. Measure the resistance according to the value(s) in the table below.

         Standard Resistance

Tester Connection	Condition	Specified Condition
D16-13 (TC) - A39-16 (TC)	Always	Below 1 ohms
D16-13 (TC) - Body ground	Always	10 kohms or higher

   b. for 1AR-FE
      1. Turn the ignition switch off.
      2. Disconnect the ECM connector.
      3. Measure the resistance according to the value(s) in the table below.

         Standard Resistance

Tester Connection	Condition	Specified Condition
D16-13 (TC) - A55-7 (TC)	Always	Below 1 ohms

D16-13 (TC) - Body ground	Always	10 kohms or higher

RESULT

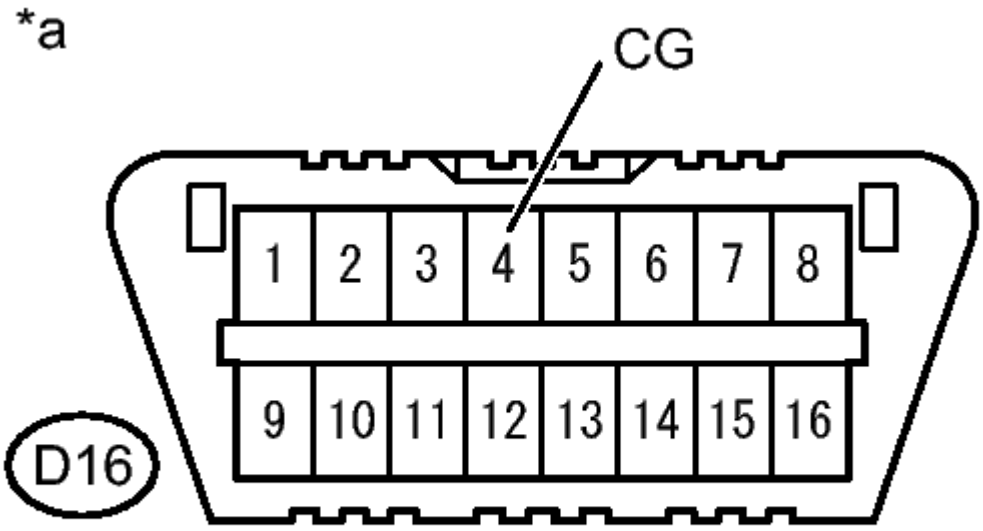
Result	Proceed to
OK	A
NG (for 2GR-FE)	B
NG (for 1AR-FE)	C

B --> REPAIR OR REPLACE HARNESS OR CONNECTOR

C --> REPAIR OR REPLACE HARNESS OR CONNECTOR

A: Go to next step

4. **CHECK HARNESS AND CONNECTOR (CG of DLC3 - BODY GROUND)**
   a. Measure the resistance according to the value(s) in the table below.



P

Fig. 89: Measuring Resistance Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
D16-4 (CG) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*a	Front view of DLC3

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. **CHECK ECM (TC of DLC3 INPUT)**
   a. Turn the ignition switch off.

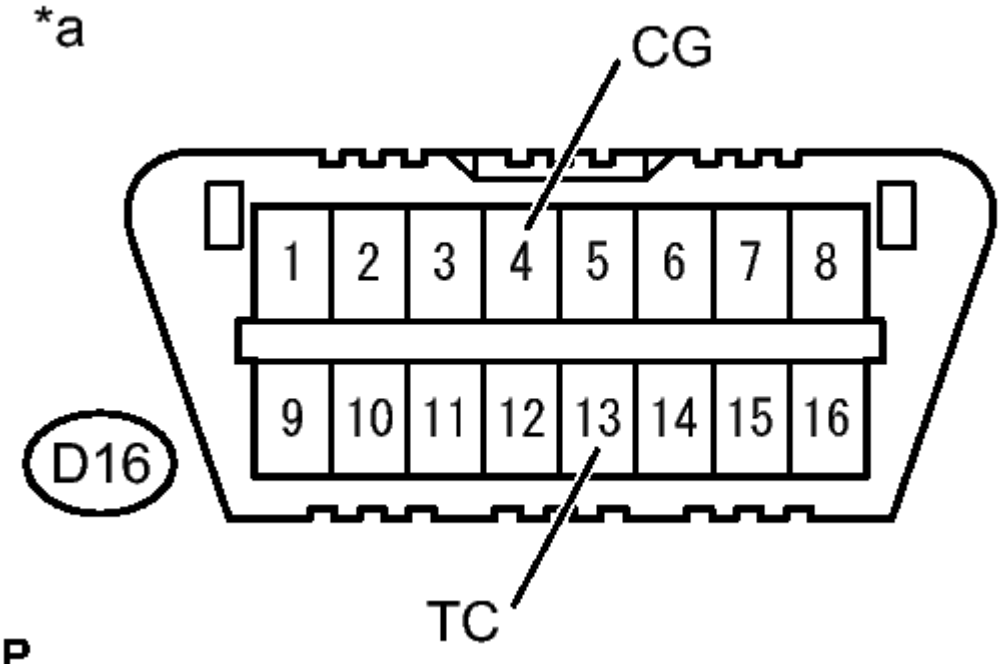


Fig. 90: DLC3 Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Reconnect the ECM connector.
c. Using SST, connect terminals TC and CG of the DLC3.
   - **SST: 09843-18040**
d. Turn the ignition switch to ON.
e. Check that the check engine warning light is blinking.

TEXT IN ILLUSTRATION

*a	Front view of DLC3

RESULT

Result	Proceed to
Check engine warning light is blinking	A
Check engine warning	

light is not blinking	B

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

B --> REPAIR OR REPLACE WIRE HARNESS OR ECM (TC of ECM CIRCUIT)

A --> See step 6

6. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**
7. **INSPECT CAN COMMUNICATION SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART**

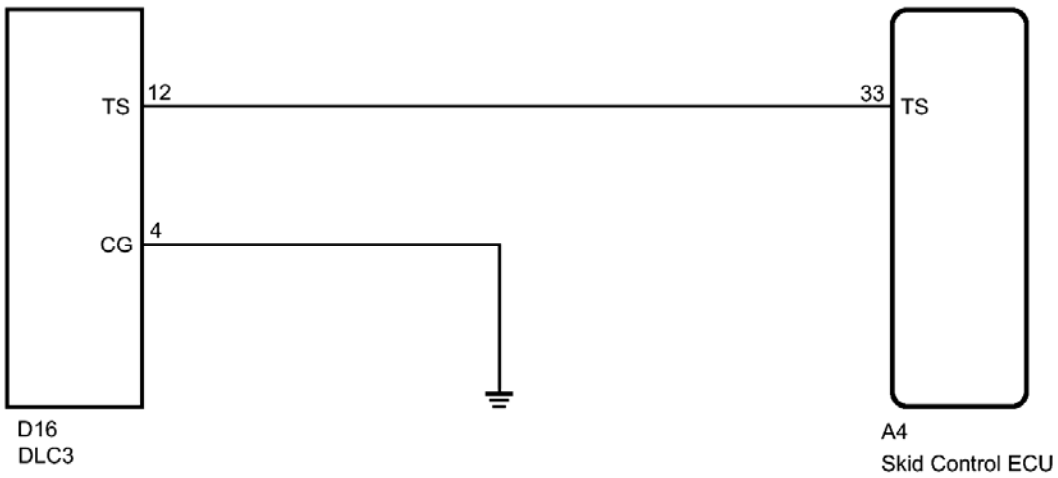
TS and CG Terminal Circuit

DESCRIPTION

In Test Mode (signal check), a malfunction in a speed sensor that cannot be detected when the vehicle is stopped can be detected while driving.

Sensor check mode can be entered by connecting terminals TS and CG of the DLC3 and turning the ignition switch from off to ON.

WIRING DIAGRAM



N

Fig. 91: TS and CG Terminal Circuit - Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake actuator assembly, perform zero point calibration and store system information. Refer to CALIBRATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - TS of DLC3)**
   a. Disconnect the skid control ECU connector.
   b. Measure the resistance according to the value(s) in the table below.

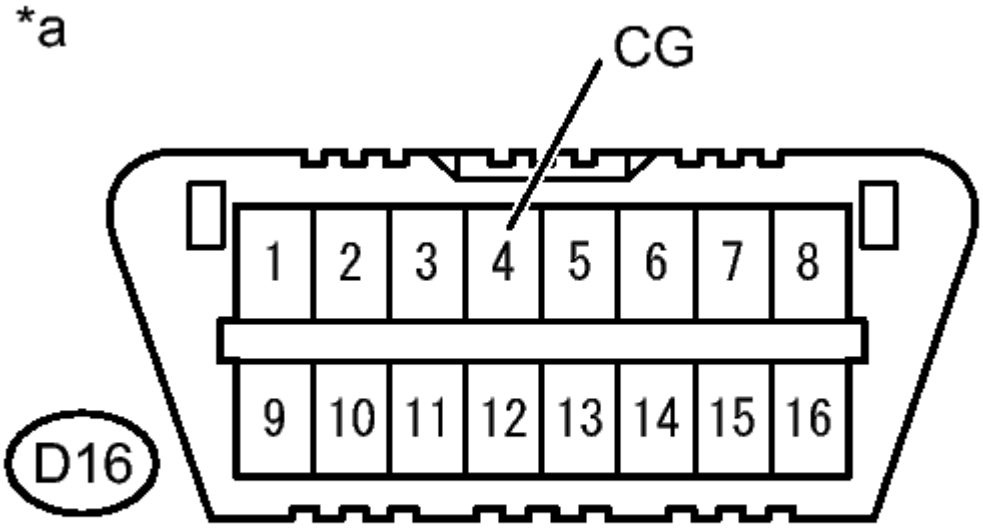
   Standard Resistance

Tester Connection	Condition	Specified Condition
A4-33 (TS) - D16-12 (TS)	Always	Below 1 ohms
A4-33 (TS) - Body ground	Always	10 kohms or higher

   NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

   OK: Go to next step

2. **CHECK HARNESS AND CONNECTOR (CG of DLC3 - BODY GROUND)**
   a. Measure the resistance according to the value(s) in the table below.



P

Fig. 92: Measuring Resistance Of DLC3
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
D16-4 (CG) - Body ground	Always	Below 1 ohms

HINT:

If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step before replacing the part. Refer to **PROBLEM SYMPTOMS TABLE** .

TEXT IN ILLUSTRATION

*a	Front view of DLC3

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 3

3. **REPLACE BRAKE ACTUATOR ASSEMBLY. Refer to REMOVAL**

VEHICLE STABILITY CONTROL SYSTEM

PRECAUTION

PRECAUTION

1. **IGNITION SWITCH EXPRESSIONS**
   a. The type of ignition switch used on this model differs according to the specifications of the vehicle. The expressions listed in the table below are used in this information.

Expression	Switch (Position)	Engine Switch (Condition)
Ignition switch off	LOCK	Off
Ignition switch ACC	ACC	On (ACC)
Ignition switch ON	ON	On (IG)
Engine start	START	Start

2. **TROUBLESHOOTING PRECAUTIONS**
   a. When there is a malfunction with terminal contact points or part installation problems, removal and installation of the suspected parts may return the system to the normal condition either completely or temporarily.
   b. In order to determine the malfunctioning area, be sure to check the conditions at the time the malfunction occurred, such as DTC output and the Freeze Frame Data, and record them before disconnecting each connector or removing and installing parts.
   c. Since the system may be influenced by malfunctions in systems other than the VSC system, be sure to check for DTCs in other systems.
3. **HANDLING PRECAUTIONS**
   a. Do not remove or install VSC parts such as the steering angle sensor or yaw rate and acceleration sensor except when necessary, as they must be calibrated after removal or installation.
   b. Be sure to perform preparation before work and confirmation after work is completed by following the directions in the repair information when working on the VSC system.
   c. Be sure to remove and install the ECU, brake actuator and each sensor, etc. with the ignition switch off unless it is specified in the inspection procedure.
   d. If the ECU, brake actuator or a sensor has been removed and installed, it is necessary to check the

system for problems after the parts have been reassembled. Check for DTCs using the Techstream, and also check that system functions and signals received by the ECU are normal using Test Mode.

4. **DTC PRECAUTION**

   a. Warnings for some DTCs will not be cleared by just replacing the defective parts. If a warning is still displayed after completing a repair, turn the ignition switch off before beginning the procedure for clearing DTCs.

   NOTE: **If a part is still malfunctioning even after the DTC is cleared, the DTC will be stored again.**

5. **CHASSIS DYNAMOMETER PRECAUTION**

When testing with a 2-wheel drum tester such as a speedometer tester, a combination tester for the speedometer and brake, a chassis dynamometer, or when jacking up the front wheels and turning the wheels, perform the following procedure to enter the Inspection Mode and stop the TRAC and VSC systems.

Enter Inspection Mode to disable TRAC and VSC control when using a chassis dynamometer.

HINT:

The vehicle may move unexpectedly out of the dynamometer because of TRAC and VSC operations.

NOTE:

- **Secure the vehicle with the lock chain for safety.**
- **When performing procedures related to VSC OFF switch operation, make sure that the mode is VSC OFF mode.**

a. Activating Inspection Mode (When Using the Techstream)

1. Ensure that the ignition switch is off and the engine is stopped.
2. Make sure that the shift lever is in P.
3. Connect the Techstream to the DLC3.
4. Start the engine.
5. Turn the Techstream on.
6. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Inspection Mode.
7. Check if combination meter's VSC OFF indicator and TRAC OFF indicator lights come on.

HINT:

- If the combination meter's VSC OFF indicator and TRAC OFF indicator lights do not come on, repeat the steps.
- Turning the ignition switch off ends Inspection Mode.

b. Activating Inspection Mode (When not Using the Techstream)

HINT:

- Perform steps "D" to "H" within 30 seconds.

1. Ensure that the ignition switch is off and the engine is stopped (Step "A").
2. Make sure that the shift lever is in P (Step "B").
3. Start the engine (Step "C").
4. Apply the parking brake by depressing the parking brake pedal (Step "D").
5. Depress and release the brake pedal twice (Step "E").
6. Depress and hold the brake pedal down, then release and apply the parking brake twice (Step "F").
7. With the parking brake applied, depress and release the brake pedal twice (Step "G").
8. Check if combination meter's VSC OFF indicator and TRAC OFF indicator lights come on (Step "H").

   HINT:

   - If the combination meter's VSC OFF indicator and TRAC OFF indicator lights do not come on in step "H", repeat the steps from "A" to "H".
   - Turning the ignition switch off ends Inspection Mode.

6. **CAN COMMUNICATION SYSTEM PRECAUTIONS**

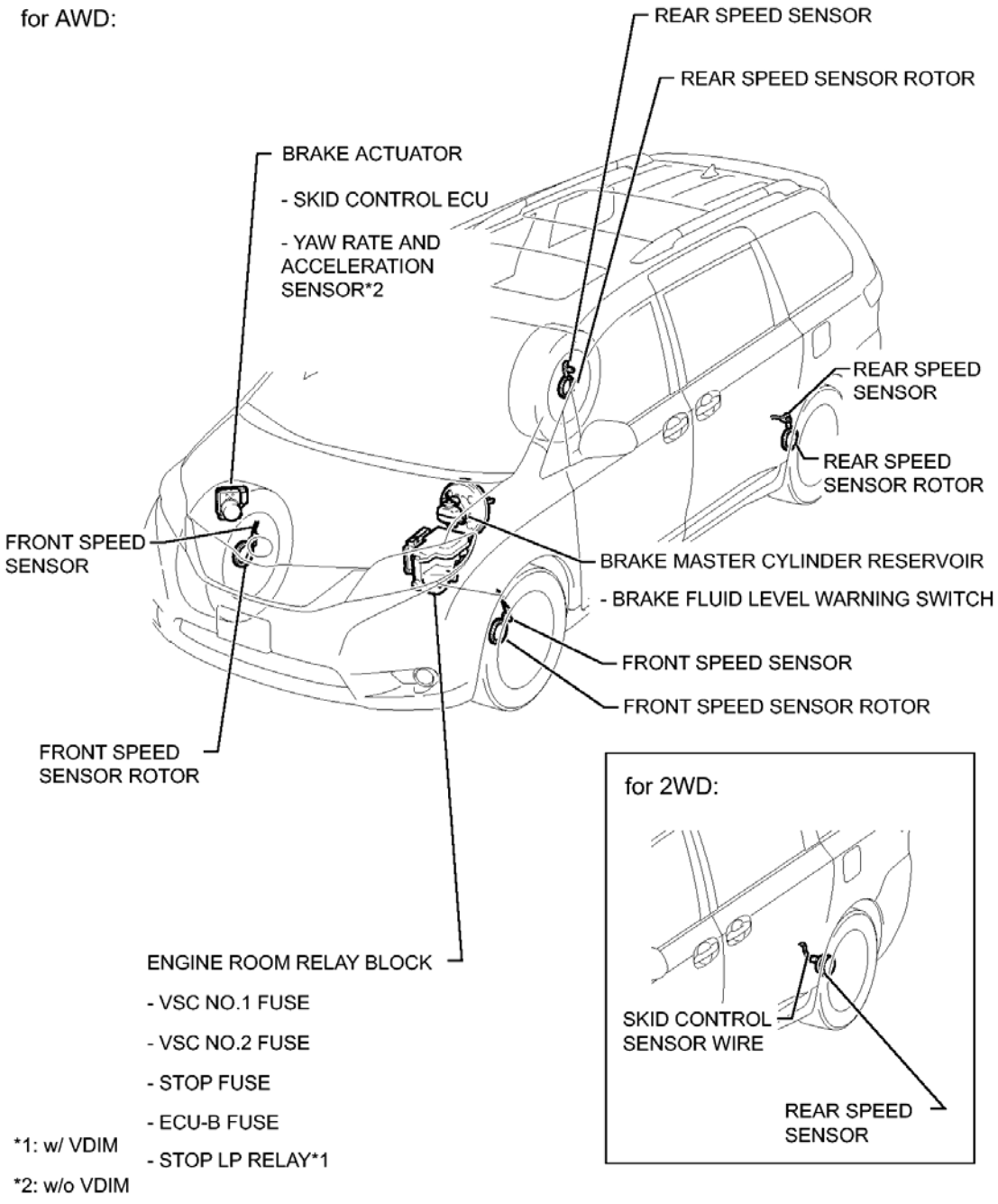
   a. The CAN communication system is used for data communication between the skid control ECU, the steering angle sensor, the yaw rate and acceleration sensor and other ECUs. If there are any problems in the CAN communication lines, corresponding DTCs for the communication lines are output.

   b. If any CAN communication line DTCs are output, repair the malfunction in the communication lines and troubleshoot the VSC system after data communication becomes normal.

   c. In order to enable CAN communication, a specific type of wiring is used for the CAN communication lines. The wiring used for each communication line is a twisted pair of wires that have an equal length. A bypass wire should not be used because the data being transmitted will be corrupted.

PARTS LOCATION

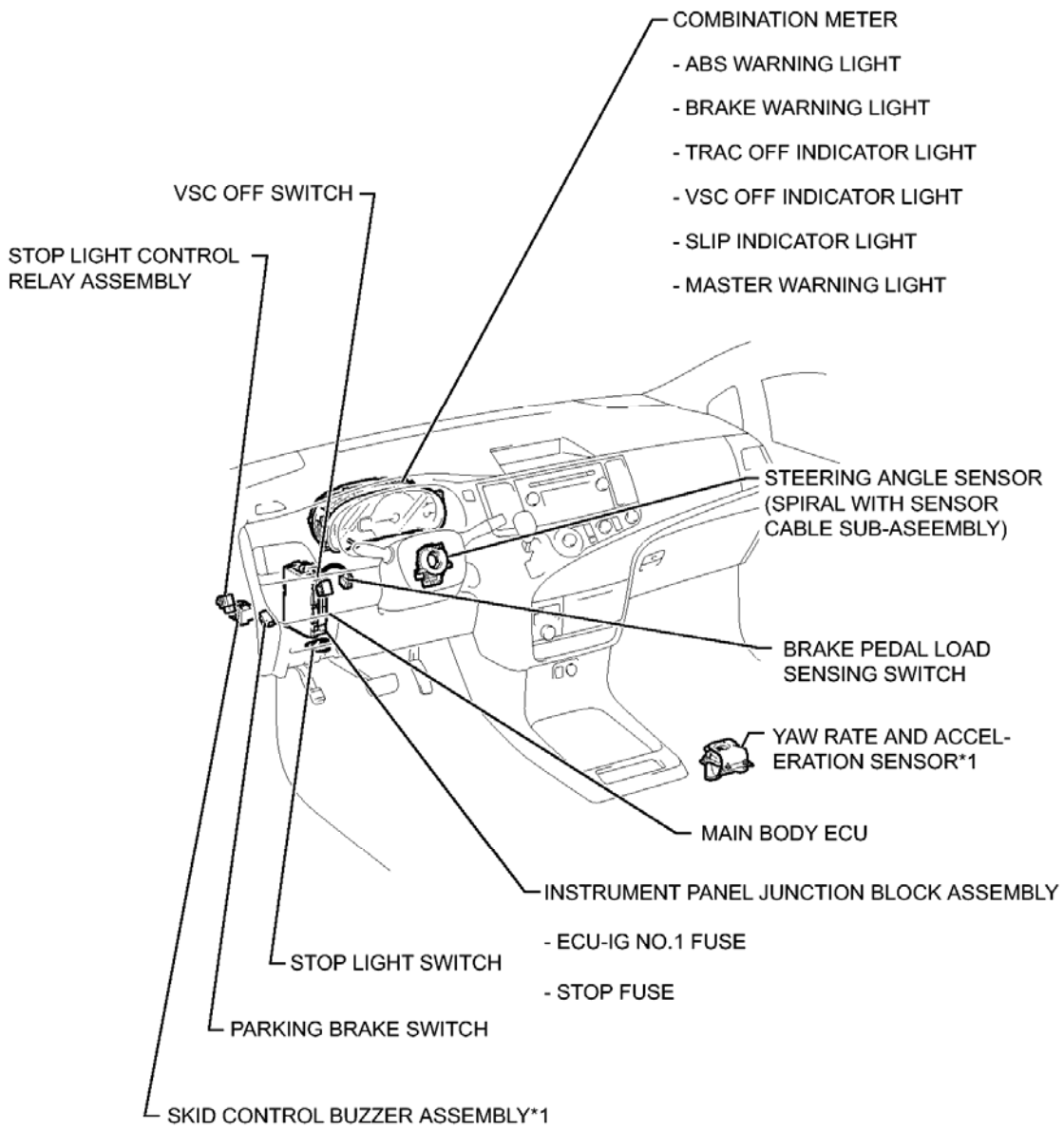
ILLUSTRATION



P

Fig. 1: Vehicle Stability Control System Components Location (1 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

ILLUSTRATION



*1: w/VDIM

P

Fig. 2: Vehicle Stability Control System Components Location (2 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

SYSTEM DIAGRAM

SYSTEM DIAGRAM

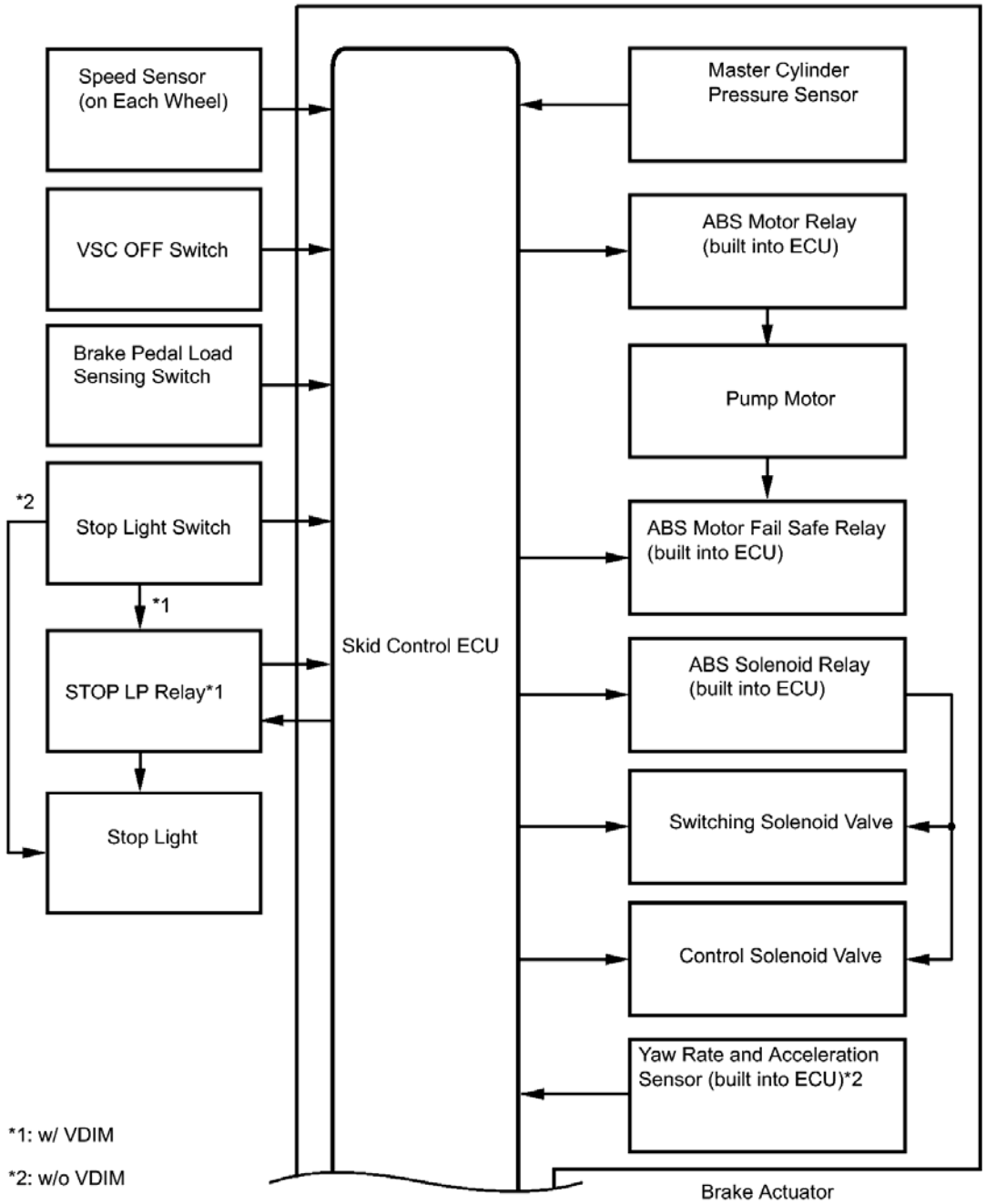


Fig. 3: Vehicle Stability Control System Diagram (1 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

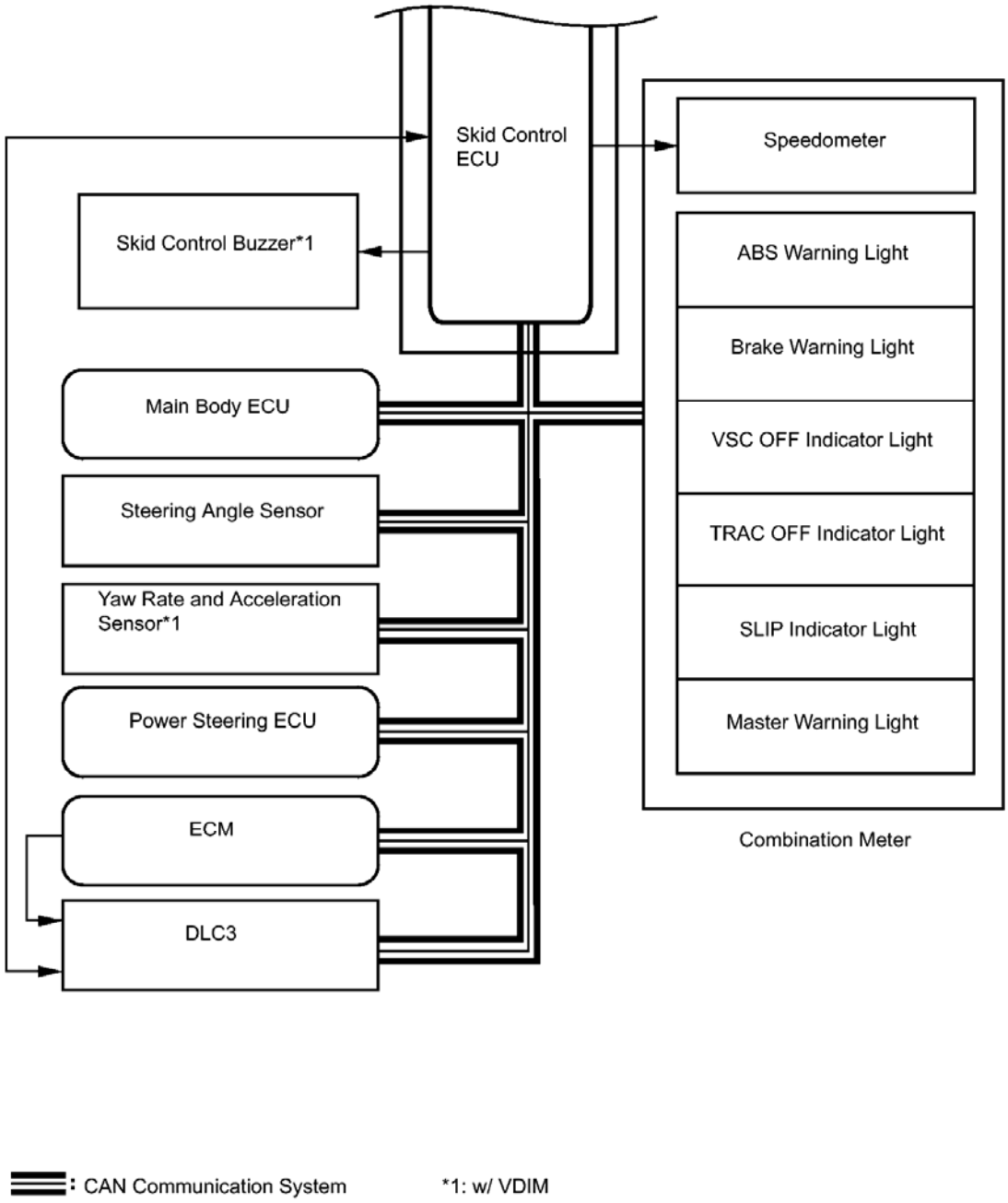


Fig. 4: Vehicle Stability Control System Diagram (2 Of 2)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Transmitting ECU (Transmitter)	Receiving ECU	Signal	Communication Method
Skid control ECU	Steering angle sensor	Steering angle sensor request signal	CAN communication system
			CAN communication

Steering angle sensor	Skid control ECU	Steering angle sensor signal	system
Skid control ECU*1	Yaw rate and acceleration sensor	Yaw rate and acceleration request signal	CAN communication system
Yaw rate and acceleration sensor*1	Skid control ECU	Yaw rate and acceleration signal	CAN communication system
Skid control ECU	ECM	• Wheel speed signal • VSC data signal	CAN communication system
ECM	Skid control ECU	• Shift position signal • Throttle position signal • Engine speed signal • Intake air temperature signal • Engine torque request signal • Accelerator pedal position signal	CAN communication system
Main body ECU	Skid control ECU	Parking brake switch signal	CAN communication system
Skid control ECU	Combination meter	• ABS warning light signal • Brake warning light signal • VSC OFF indicator light signal • TRAC OFF indicator light signal • SLIP indicator light signal • Master warning light signal • Wheel speed signal	CAN communication system
Skid control ECU	Power steering ECU	• Target steering angle signal • Target relative angle signal	CAN communication system
Power steering ECU	Skid control ECU	Electronic power steering cooperative control enabling signal	CAN communication system

*1: w/ VDIM

*2: w/o VDIM

SYSTEM DESCRIPTION

SYSTEM DESCRIPTION

1. **FUNCTION DESCRIPTION**
    a. Vehicle Dynamics Integrated Management (VDIM)
        1. VDIM integrally controls engine output and braking in coordination with steering control to ensure vehicle running, cornering and stopping performance for active safety.
    b. Steering Cooperation Control
        1. Performs cooperative control with the power steering ECU in order to provide steering torque assist in accordance with present vehicle dynamics.
    c. Anti-lock Brake System (ABS)
        1. ABS helps prevent the wheels from locking when the brakes are applied firmly or when braking on a slippery surface.
    d. Electronic Brake force Distribution (EBD)
        1. EBD control utilizes ABS, realizing proper brake force distribution between the front and rear wheels in accordance with the driving conditions. In addition, when braking while cornering, it also controls the brake forces applied to the right and left wheels, helping to stabilize vehicle behavior.
    e. Brake Assist (BA)
        1. The primary purpose of Brake Assist is to provide supplementary brake force to assist a driver who cannot generate a large brake force during emergency braking, thus helping ensure the vehicle's braking performance.
    f. Traction Control (TRAC)
        1. Helps restrain the slippage of the drive wheels if the driver depresses the accelerator pedal excessively when starting off or accelerating on a slippery surface.
    g. Vehicle Stability Control (VSC)
        1. Helps restrain sideways slippage of the vehicle during a strong understeer tendency or strong oversteer tendency while cornering.
    h. Hill-start Assist Control*1
        1. When the vehicle starts off on a steep or a slippery hill, Hill-start Assist Control performs 4-wheel hydraulic pressure control to prevent the vehicle from moving backward.
2. **FUNCTION OF COMPONENTS**

Component		Function
	• Solenoid valve • Master cylinder cut	Change the fluid path based on the signals from the skid control ECU during the operation of the brake control system functions

Brake actuator assembly	solenoid valve	in order to control the fluid pressure applied to each wheel cylinder.
	Master cylinder pressure sensor	Assembled in the brake actuator, detects the master cylinder pressure.
	Skid control ECU	Judges the vehicle driving condition based on the signals from each sensor, and sends the brake control signals to the brake actuator.
	Yaw rate and acceleration sensor*2	• Detects the vehicle's longitudinal and lateral acceleration and deceleration. • Detects the vehicle's yaw rate.
	Motor relay	Supplies power to the pump motor.
	Solenoid relay	Supplies power to the solenoid valves.
		• Illuminates together with the ABS warning light to alert the driver when the skid control ECU detects a malfunction in the EBD control. • Illuminates

Combination meter	Brake warning light	to alert the driver when the skid control ECU detects a malfunction in the brake booster. • Illuminates to alert the driver when the brake fluid level is low. • Illuminates to inform the driver when the parking brake is applied.
	ABS warning light	Illuminates to alert the driver when the skid control ECU detects a malfunction in the ABS.
	SLIP indicator light	• Blinks to inform the driver when TRAC or VSC is operating. • Illuminates to alert the driver when the skid control ECU detects a malfunction in the TRAC or VSC systems.
	VSC OFF	Illuminates to inform the driver

	indicator light	when VSC OFF mode is selected.
	TRAC OFF indicator light	Illuminates to inform the driver when TRAC OFF mode is selected
	Master warning light	Illuminates to alert the driver when the skid control ECU detects a malfunction in the brake control system.
Skid control buzzer*1		Emits a warning sound to inform the driver when Hill-start Assist Control operation is started or finished.
STOP LP relay*1		Illuminates the stop lights while Hill-start Assist Control is operating.
Steering angle sensor		Detects the direction and angle of the steering wheel.
Yaw rate and acceleration sensor*1		• Detects the vehicle's longitudinal and lateral acceleration and deceleration. • Detects the vehicle's yaw rate.
Speed sensor		Detect the wheel speed of each of the 4 wheels.
Stop light switch		Detects brake pedal operation.
Brake pedal load sensing		Detects the brake pedal depressing

switch	force.
Parking brake switch	Detects the parking brake pedal status.
VSC OFF switch	Enables the driver to select Normal mode, TRAC OFF mode, or VSC OFF mode.
ECM	• Sends the throttle position signal, accelerator pedal position signal, engine speed signal etc., to the skid control ECU. • Based on the signals received from the skid control ECU, controls the engine output.
Main body ECU	Detects the parking brake signal and outputs it to the skid control ECU via CAN communication.

*1: w/ VDIM

*2: w/o VDIM

HOW TO PROCEED WITH TROUBLESHOOTING

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

*: Use the Techstream.

1. **VEHICLE BROUGHT TO WORKSHOP**

   NEXT: Go to next step

2. **CUSTOMER PROBLEM ANALYSIS**
   a. Interview the customer and confirm the problem. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .

      NEXT: Go to next step

3. **CHECK DTC AND FREEZE FRAME DATA***
   a. Check and record DTCs and Freeze Frame Data.
   b. Clear the DTCs and Freeze Frame Data. Refer to **DTC CHECK / CLEAR** for DTC Check/Clear, or. Refer to **FREEZE FRAME DATA** for Freeze Frame Data).
   c. Reconfirm the DTCs.
      1. Reconfirm the DTCs based on the recorded DTCs and Freeze Frame Data. Refer to **DTC CHECK / CLEAR** for DTC Check/Clear, or. Refer to **FREEZE FRAME DATA** for Freeze Frame Data).

         HINT:

         - When DTCs indicating CAN communication system malfunctions are output, repair the CAN communication system before repairing each corresponding sensor. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .
         - If any of DTCs U0100, U0123, U0124, and U0126 is output together with a CAN communication DTC, first check the appropriate sensor for a momentary open circuit. Refer to **CHECK FOR INTERMITTENT PROBLEMS**.

         RESULT

Result	Proceed to
DTC is output	A
DTC is not output (Problem symptom does not occur)	B
DTC is not	

output (Problem symptom occurs)	C

B --> GO TO STEP 5

C --> GO TO STEP 6

A: Go to next step

4. **DIAGNOSTIC TROUBLE CODE CHART**
   a. Proceed to Diagnostic Trouble Code Chart. Refer to **DIAGNOSTIC TROUBLE CODE CHART**.

   NEXT --> GO TO STEP 7

5. **SYMPTOM SIMULATION**
   a. Proceed to How to Proceed with Troubleshooting. Refer to **HOW TO PROCEED WITH TROUBLESHOOTING** .

   NEXT: Go to next step

6. **PROBLEM SYMPTOMS TABLE**
   a. Proceed to Problem Symptoms Table. Refer to **PROBLEM SYMPTOMS TABLE**.

   NEXT: Go to next step

7. **CIRCUIT INSPECTION***

   NEXT: Go to next step

8. **IDENTIFICATION OF PROBLEM**

   NEXT: Go to next step

9. **REPAIR OR REPLACEMENT**

   NEXT: Go to next step

10. **CONFIRMATION TEST***

    NEXT --> END

CHECK FOR INTERMITTENT PROBLEMS

CHECK FOR INTERMITTENT PROBLEMS

1. **CHECK FOR INTERMITTENT PROBLEMS**

HINT:

A momentary interruption (open circuit) in the connectors and/or wire harnesses between the sensors and ECUs can be detected using the ECU Data List function of the Techstream.

a. Turn the ignition switch off.
b. Connect the Techstream to the DLC3.
c. Turn the ignition switch to ON.
d. Turn the Techstream on.
e. Follow the directions on the Techstream to display the Data List and select areas where momentary interruptions should be monitored.

HINT:

- A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned to ON (initial check).
- If the Error display remains displayed, check for continuity between the ECUs and the sensors, or between ECUs.
- The Error display on the Techstream will remain displayed for 1 second after the harness signal changes from momentary interruption (open circuit) to normal condition.

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR Speed Open	Front speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
	Rear speed		

RL Speed Open	sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Open	EFI communication open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Yaw Rate Open	Yaw rate sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Deceleration Open	Acceleration sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Steering Open	Steering angle sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Master Cylinder Open	Master cylinder pressure sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
IG Voltage Value Decreased	IG voltage value decrease detection / Error or Normal	Error: Decrease Normal: Normal	-
IG Voltage Value Increased	IG voltage value increase detection / Error or Normal	Error: Increase Normal: Normal	-
FR Speed Sensor Voltage	Front speed sensor RH voltage open detection /	Error: Momentary interruption	-

Open	Error or Normal	Normal: Normal	
FL Speed Sensor Voltage Open	Front speed sensor LH voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Sensor Voltage Open	Rear speed sensor RH voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Sensor Voltage Open	Rear speed sensor LH voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
M/C Pressure Sensor Noise	Master cylinder pressure sensor noise detection / Error or Normal	Error: Malfunction Normal: Normal	-
Brake Pedal Switch Open	Brake pedal load sensing switch open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Yaw Rate Sensor Voltage Open	Yaw rate sensor voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Invalid	EFI communication invalid detection / Error or Normal	Error: Invalid Normal: Normal	-

f. While observing the screen, gently jiggle the connectors or wire harnesses between the ECUs and

sensors, or between ECUs.

OK

Normal display appears.

HINT:

The connector and/or wire harness has a momentary interruption (open circuit) if the display changes. Repair or replace the connectors and/or wire harnesses as one of them is faulty.

CALIBRATION

CALIBRATION

1. **DESCRIPTION**
   - After replacing any VSC related components or performing a front wheel alignment adjustment, clear and read the sensor calibration data and system information.
   - Follow the chart below to perform calibration.

Parts to be Replaced / Operation	Necessary Operation
Brake actuator assembly (Skid control ECU)	Yaw rate and acceleration sensor zero point calibration and store system information
Yaw rate and acceleration sensor	a. Clearing zero point calibration data and system information b. Yaw rate and acceleration sensor zero point calibration and store system information
	a. Clearing zero point

		calibration data and system information
Front wheel alignment adjustment	b.	Yaw rate and acceleration sensor zero point calibration and store system information

2. **PERFORM YAW RATE AND ACCELERATION SENSOR ZERO POINT CALIBRATION AND STORE SYSTEM INFORMATION (When Using the Techstream)**

NOTE:

- **Stored system information cannot be overwritten unless it is cleared. Clear the stored information and then store new system information.**
- **While obtaining the zero points, keep the vehicle stationary and do not vibrate, tilt, move or shake it. (Do not start the engine.)**
- **Be sure to perform this procedure on a level surface with an inclination of less than 1 degree.**

a. Clear the zero point calibration data and system information.

NOTE: **Performing the following procedure will clear the zero points of the yaw rate and acceleration sensor and system information simultaneously.**

1. Turn the ignition switch off.
2. Check that the steering wheel is centered.
3. Check that the shift lever is in P.
4. Connect the Techstream to the DLC3.
5. Turn the ignition switch to ON.
6. Turn the Techstream on.
7. Select the skid control ECU to clear the zero point calibration data using the Techstream. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Reset Memory.
8. Turn the ignition switch off.

NOTE:

- **If the vehicle is driven after the zero point of the yaw rate and acceleration sensor and system information are cleared, DTCs will be stored.**

- **If the ignition switch is turned to ON for more than 15 seconds with the shift lever in P after the zero points of the yaw rate and acceleration sensor have been cleared, only the zero point of the yaw rate sensor will be stored. If the vehicle is driven under these conditions, the skid control ECU will store the zero point calibration for the acceleration sensor as not being completed. The skid control ECU will then also indicate this as a malfunction of the VSC system using the indicator lights.**

b. Perform the yaw rate and acceleration sensor zero point calibration and store system information.

NOTE: **Performing the following procedure will perform the yaw rate and acceleration sensor zero point calibration and store system information simultaneously.**

1. Turn the ignition switch off.
2. Check that the steering wheel is centered.
3. Check that the shift lever is in P.

NOTE:

- **DTCs C1210 (Zero Point Calibration of Yaw Rate Sensor Undone) and C1336 (Zero Point Calibration of Acceleration Sensor Undone) will be recorded if the shift lever is not in P.**
- **If a DTC is stored that indicates zero point calibration is incomplete, repeat the procedure starting at the step for clearing the zero point calibration data and system information.**

4. Connect the Techstream to the DLC3.
5. Turn the ignition switch to ON.
6. Turn the Techstream on.
7. Switch the skid control ECU to Test Mode using the Techstream. Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Signal Check.
8. After Test Mode has been entered, keep the vehicle stationary on a level surface for 5 seconds or more.
9. Check that the ABS warning and SLIP indicator lights come on for several seconds and then blink in Test Mode.

HINT:

- If the ABS warning and SLIP indicator lights do not blink, perform zero point calibration again.
- The zero point calibration is performed only once after the system enters Test Mode.

- Calibration cannot be performed again until the stored data is cleared.

10. Turn the ignition switch off and disconnect the Techstream.

3. **PERFORM YAW RATE AND ACCELERATION SENSOR ZERO POINT CALIBRATION AND STORE SYSTEM INFORMATION (When not Using the Techstream)**

NOTE:

- **Stored system information cannot be overwritten unless it is cleared. Clear the stored information and then store new system information.**
- **While obtaining the zero points, keep the vehicle stationary and do not vibrate, tilt, move or shake it. (Do not start the engine.)**
- **Be sure to perform this procedure on a level surface with an inclination of less than 1 degree.**

a. Clear the zero point calibration data and system information.

NOTE: **Performing the following procedure will clear the zero points of the yaw rate and acceleration sensor and system information simultaneously.**

1. Turn the ignition switch off.
2. Check that the steering wheel is centered.
3. Check that the shift lever is in P.
4. Turn the ignition switch to ON.
5. The warning light and indicator light come on for 3 seconds to indicate that the initial check is completed.
6. Using SST, connect and disconnect terminals TS and CG of the DLC3 4 times or more within 8 seconds.

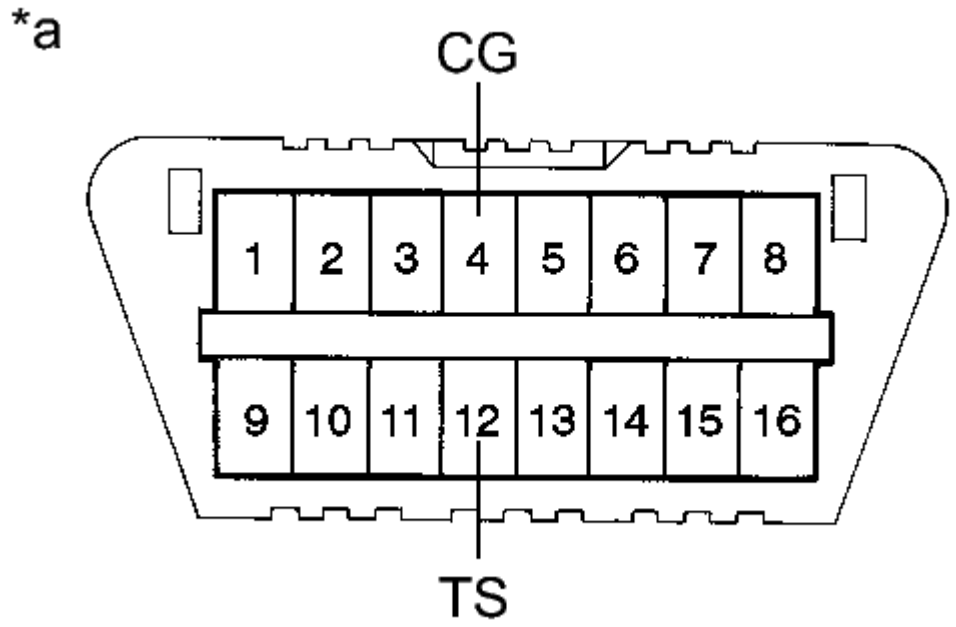


Fig. 5: DLC3 Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- **SST: 09843-18040**

TEXT IN ILLUSTRATION

*a	Front view of DLC3

7. Check that the ABS warning and SLIP indicator lights come on.

NOTE:

- **If the vehicle is driven after the zero point of the yaw rate and acceleration sensor and system information are cleared, DTCs will be stored.**
- **If the ignition switch is turned to ON for more than 15 seconds with the shift lever in P after the zero points of the yaw rate and acceleration sensor have been cleared, only the zero point of the yaw rate sensor will be stored. If the vehicle is driven under these conditions, the skid control ECU will store the zero point calibration for the acceleration sensor as not being completed. The skid control ECU will then also indicate this as a malfunction of the VSC system using the indicator lights.**

b. Perform the yaw rate and acceleration sensor zero point calibration and store system information.

NOTE: **Performing the following procedure will perform the yaw rate and acceleration sensor zero point calibration, and also store system information simultaneously.**

1. Turn the ignition switch off.
2. Check that the steering wheel is centered.
3. Check that the shift lever is in P.

NOTE:

- **DTCs 36 (Zero Point Calibration of Yaw Rate Sensor Undone) and 98 (Zero Point Calibration of Acceleration Sensor Undone) will be recorded if the shift lever is not in P.**
- **If a DTC is stored that indicates zero point calibration is incomplete, repeat the procedure starting at the step for clearing the zero point calibration data and system information.**

4. Using SST, connect terminals TS and CG of the DLC3.

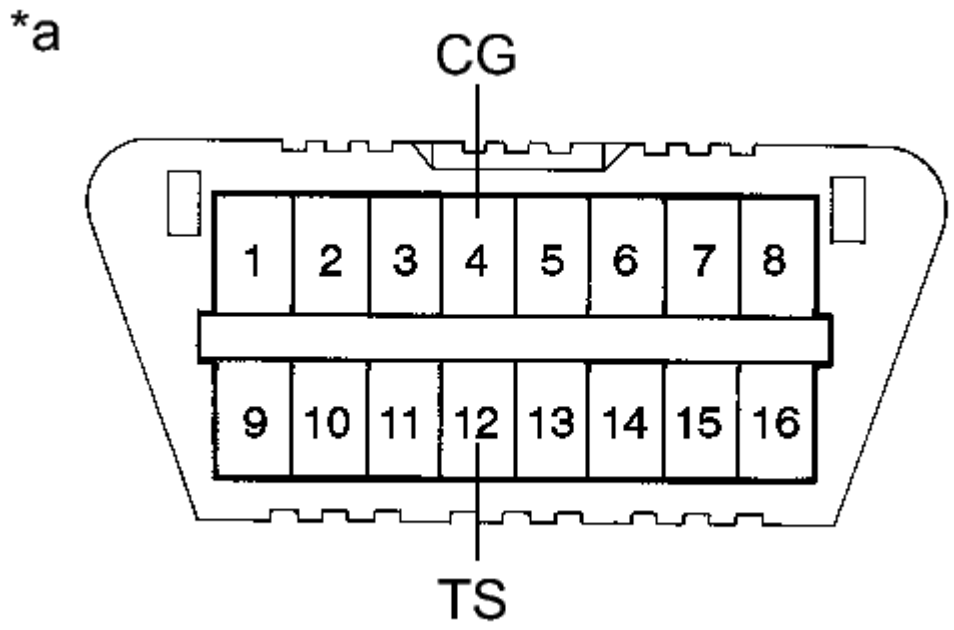


Fig. 6: DLC3 Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- **SST: 09843-18040**

TEXT IN ILLUSTRATION

	Front

*a	view of DLC3

5. Turn the ignition switch to ON.
6. After Test Mode has been entered, keep the vehicle stationary on a level surface for 2 seconds or more.
7. Check that the ABS warning and SLIP indicator lights come on for several seconds and then blink in Test Mode.

   HINT:

   - If the ABS warning and SLIP indicator lights do not blink, perform zero point calibration again.
   - The zero point calibration is performed only once after the system enters Test Mode.
   - Calibration cannot be performed again until the stored data is cleared.
8. Turn the ignition switch off and disconnect SST from the DLC3.

TEST MODE PROCEDURE

TEST MODE PROCEDURE

1. **SENSOR CHECK USING TEST MODE (SIGNAL CHECK) (When Using the Techstream)**

   NOTE: 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 ignition switch is turned from ON to ACC or off during Test Mode (signal check), DTCs recorded during the sensor check will be cleared.
   - During Test Mode (signal check), the skid control ECU (brake actuator assembly) records all DTCs detected in the sensor check. By performing Test Mode (signal check), the codes are cleared if a normal condition is confirmed. The remaining codes are the codes where a malfunction was found.

   a. Procedure to enter Test Mode
      1. Turn the ignition switch off.
      2. Check that the steering wheel is centered.
      3. Check that the shift lever is in P.
      4. Connect the Techstream to the DLC3.
      5. Turn the ignition switch to ON.
      6. Turn the Techstream on.
      7. Switch the skid control ECU (brake actuator assembly) to Test Mode using the Techstream.

Enter the following menus: Chassis / ABS/VSC/TRAC / Utility / Signal Check.

8. Check that the ABS warning and SLIP indicator lights come on for several seconds and then blink in Test Mode.

   HINT:

   If the ABS warning and SLIP indicator lights do not blink, inspect the TS and CG terminal circuit and ABS warning and SLIP indicator light circuits.

Trouble Area	See Procedure
TS and CG terminal circuit	Refer to **TS and CG Terminal Circuit**
ABS warning light circuit (Remains on)	Refer to **ABS Warning Light Remains ON**
ABS warning light circuit (Does not come on)	Refer to **ABS Warning Light does not Come ON**
SLIP indicator light circuit (Remains on)	Refer to **Slip Indicator Light Remains ON**
SLIP indicator light circuit (Does not come on)	Refer to **Slip Indicator Light does not Come ON**

9. Check the ABS sensors.

   HINT:

Check that the ABS warning light is blinking in the Test Mode blinking pattern before performing the ABS sensor check.

b. Acceleration Sensor Check

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

HINT:

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

c. Lost Booster Pressure Judgement Check and Master Cylinder Pressure Sensor Zero Point Calibration

NOTE: Perform a check in the lost booster pressure state (vacuum in the booster is depressurized).

1. Turn the ignition switch to ON.
2. Check that the brake warning light comes on when depressing the brake pedal with a force greater than 59 N (6 kgf, 13.2 lbf) for 1 second or more. (The lost booster pressure state is judged as normal.)
3. Start the engine while depressing the brake pedal with a force greater than 59 N (6 kgf, 13.2 lbf) for 1 second or more.
4. Check that the brake warning light goes off when quickly releasing the brake pedal. (The lost booster pressure state is judged as normal.)
5. Leave the vehicle for 1 second or more. (Master cylinder pressure sensor zero point calibration)

NOTE:

- **If depressing the brake pedal slowly or repeatedly, the master cylinder pressure sensor zero point calibration is not performed normally.**
- **If the lost booster pressure judgement check results are not normal, then the master cylinder pressure sensor check cannot be performed.**
- **If rechecking after the engine has started, end Test Mode, enter Test Mode again, and release vacuum in the booster by pumping the brake pedal prior to rechecking.**

d. Master Cylinder Pressure Sensor Check

1. Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, then quickly and continuously depress the brake pedal with a force greater than 98 N (10 kgf, 22.0 lbf) for 1 second.
2. Check that the ABS warning light stays on for 3 seconds.

HINT:

- Confirm that the ABS warning light comes on.
- While the ABS warning light is illuminated, continue to depress the brake pedal with a force of 98 N (10 kgf, 22.0 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.

e. Speed Sensor Check

1. Drive the vehicle straight-ahead.

   Accelerate the vehicle to a speed of 45 km/h (28 mph) or more for several seconds.

2. Check that the ABS warning light goes off.

   HINT:

   - The sensor check may not be completed if wheelspin occurs.
   - The ABS warning light blinks when the sensor check has been completed and the brake pedal is depressed.
   - The ABS warning light comes on immediately if a malfunction is detected during the speed sensor check.

3. Stop the vehicle.

   NOTE:

   - **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 the vehicle speed exceeds 80 km/h (50 mph), a sensor check code will be stored again. Decelerate or stop the vehicle before the speed reaches 80 km/h (50 mph).**
   - **If the sensor check has not been completed, the ABS warning light will blink while driving and the ABS will not operate.**

   HINT:

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

f. VSC OFF Switch Check

1. Briefly press the VSC OFF switch.

2. Check that the TRAC OFF indicator light goes off.
3. Briefly press the VSC OFF switch again to turn the TRAC OFF indicator light on.

g. End of Sensor Check

1. If the sensor check is completed, the ABS warning light blinks (Test Mode) when the vehicle is stopped and goes off while the vehicle is being driven.

NOTE:

- **When the speed sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.**
- **If the sensor check has not been completed, the ABS warning light will blink while driving and the ABS will not operate.**

h. Read Sensor Check DTCs

1. Read the DTC(s) by following the Techstream screen.

NOTE:

- **If only DTCs other than Test Mode sensor check DTCs are displayed, repair the malfunctions and clear the DTCs.**
- **If Test Mode sensor check DTCs and other DTCs are displayed or if only Test Mode sensor check DTCs are displayed, repair the malfunctions, clear the DTCs, and perform Test Mode inspection again.**

HINT:

See "Sensor Check DTCs".

2. Turn the ignition switch off and disconnect the Techstream.

i. Sensor Check DTCs

DTC Code	Detection Item	Trouble Area
C1271	Low Output Signal of Front Speed Sensor RH	• Front speed sensor RH • Sensor installation • Speed sensor rotor
C1272	Low Output Signal of Front Speed	• Front speed sensor LH • Sensor installation

	Sensor LH	• Speed sensor rotor
C1273	Low Output Signal of Rear Speed Sensor RH	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
C1274	Low Output Signal of Rear Speed Sensor LH	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
C1275	Abnormal Change in Output Signal of Front Speed Sensor RH	Speed sensor rotor
C1276	Abnormal Change in Output Signal of Front Speed Sensor LH	Speed sensor rotor
C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH	Speed sensor rotor
C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH	Speed sensor rotor
		• Sensor installation (w/ VDIM) • Yaw rate and acceleration

		sensor (w/ VDIM) • Skid control ECU (Brake actuator assembly) installation (w/o VDIM) • Skid control ECU (Brake actuator assembly) (w/o VDIM)
C1279	Acceleration Sensor Output Voltage Malfunction	
C1281	Master Cylinder Pressure Sensor Output Malfunction	• Stop light switch • Brake pedal load sensing switch • Master cylinder pressure sensor

HINT:

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

2. **SENSOR CHECK USING TEST MODE (SIGNAL CHECK) (When not Using the Techstream)**

NOTE: After replacement of the skid control ECU (brake actuator assembly) and/or yaw rate and acceleration sensor, perform zero point calibration of the yaw rate and acceleration sensor.

HINT:

- If the ignition switch is turned from ON to ACC or off during Test Mode (signal check), DTCs recorded during the sensor check will be cleared.
- During Test Mode (signal check), the skid control ECU (brake actuator assembly) records all DTCs

detected in the sensor check. By performing Test Mode (signal check), the codes are cleared if a normal condition is confirmed. The remaining codes are the codes where a malfunction was found.

a. Procedure to enter Test Mode

1. Turn the ignition switch off.
2. Check that the steering wheel is centered.
3. Check that the shift lever is in P.
4. Using SST, connect terminals TS and CG of the DLC3.

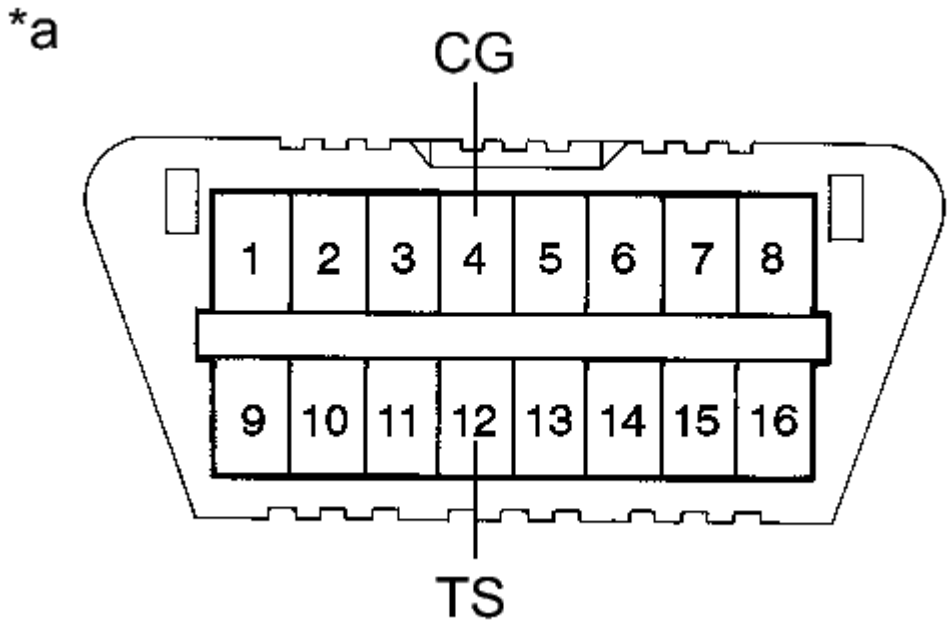


Fig. 7: DLC3 Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- **SST: 09843-18040**

TEXT IN ILLUSTRATION

*a	Front view of DLC3

5. Turn the ignition switch to ON.
6. Check that the ABS warning and SLIP indicator lights come on for several seconds and then blink in Test Mode.

HINT:

If the ABS warning and SLIP indicator lights do not blink, inspect the TS and CG terminal

circuit and ABS warning and SLIP indicator light circuits.

Trouble Area	See Procedure
TS and CG terminal circuit	Refer to **TS and CG Terminal Circuit**
ABS warning light circuit (Remains on)	Refer to **ABS Warning Light Remains ON**
ABS warning light circuit (Does not come on)	Refer to **ABS Warning Light does not Come ON**
SLIP indicator light circuit (Remains on)	Refer to **Slip Indicator Light Remains ON**
SLIP indicator light circuit (Does not come on)	Refer to **Slip Indicator Light does not Come ON**

7. Check the ABS sensors.

   HINT:

   Check that the ABS warning light is blinking in the Test Mode blinking pattern before performing the ABS sensor check.

b. Acceleration Sensor Check

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

HINT:

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

c. Lost Booster Pressure Judgement Check and Master Cylinder Pressure Sensor Zero Point Calibration

NOTE: Perform a check in the lost booster pressure state (vacuum in the booster is depressurized).

1. Turn the ignition switch to ON.
2. Check that the brake warning light comes on when depressing the brake pedal with a force greater than 59 N (6 kgf, 13.2 lbf) for 1 second or more. (The lost booster pressure state is judged as normal.)
3. Start the engine while depressing the brake pedal with a force greater than 59 N (6 kgf, 13.2 lbf) for 1 second or more.
4. Check that the brake warning light goes off when quickly releasing the brake pedal. (The lost booster pressure state is judged as normal.)
5. Leave the vehicle for 1 second or more. (Master cylinder pressure sensor zero point calibration)

NOTE:

- **If depressing the brake pedal slowly or repeatedly, the master cylinder pressure sensor zero point calibration is not performed normally.**
- **If the lost booster pressure judgement check results are not normal, then the master cylinder pressure sensor check cannot be performed.**
- **If rechecking after the engine has started, end Test Mode, enter Test Mode again, and release vacuum in the booster by pumping the brake pedal prior to rechecking.**

d. Master Cylinder Pressure Sensor Check

1. Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, then quickly and continuously depress the brake pedal with a force greater than 98 N (10 kgf, 22.0 lbf) for 1 second.
2. Check that the ABS warning light stays on for 3 seconds.

HINT:

- Confirm that the ABS warning light comes on.
- While the ABS warning light is illuminated, continue to depress the brake pedal with a force of 98 N (10 kgf, 22.0 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation

above is performed.

e. Speed Sensor Check

1. Drive the vehicle straight-ahead.

   Accelerate the vehicle to a speed of 45 km/h (28 mph) or more for several seconds.

2. Check that the ABS warning light goes off.

   HINT:

   - The sensor check may not be completed if wheelspin occurs.
   - The ABS warning light blinks when the sensor check has been completed and the brake pedal is depressed.
   - The ABS warning light comes on immediately if a malfunction is detected during the speed sensor check.

3. Stop the vehicle.

   NOTE:

   - **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 the vehicle speed exceeds 80 km/h (50 mph), a sensor check code will be stored again. Decelerate or stop the vehicle before the speed reaches 80 km/h (50 mph).**
   - **If the sensor check has not been completed, the ABS warning light will blink while driving and the ABS will not operate.**

   HINT:

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

f. VSC OFF Switch Check

1. Briefly press the VSC OFF switch.
2. Check that the TRAC OFF indicator light goes off.
3. Briefly press the VSC OFF switch again to turn the TRAC OFF indicator light on.

g. End of Sensor Check

1. If the sensor check is completed, the ABS warning light blinks (Test Mode) when the vehicle is stopped and goes off while the vehicle is being driven.

NOTE:

- **When the speed sensor, and master cylinder pressure sensor checks are completed, the sensor check is completed.**
- **If the sensor check has not been completed, the ABS warning light will blink while driving and the ABS will not operate.**

h. Read Sensor Check DTCs

1. Using SST, connect terminals TC and CG of the DLC3.

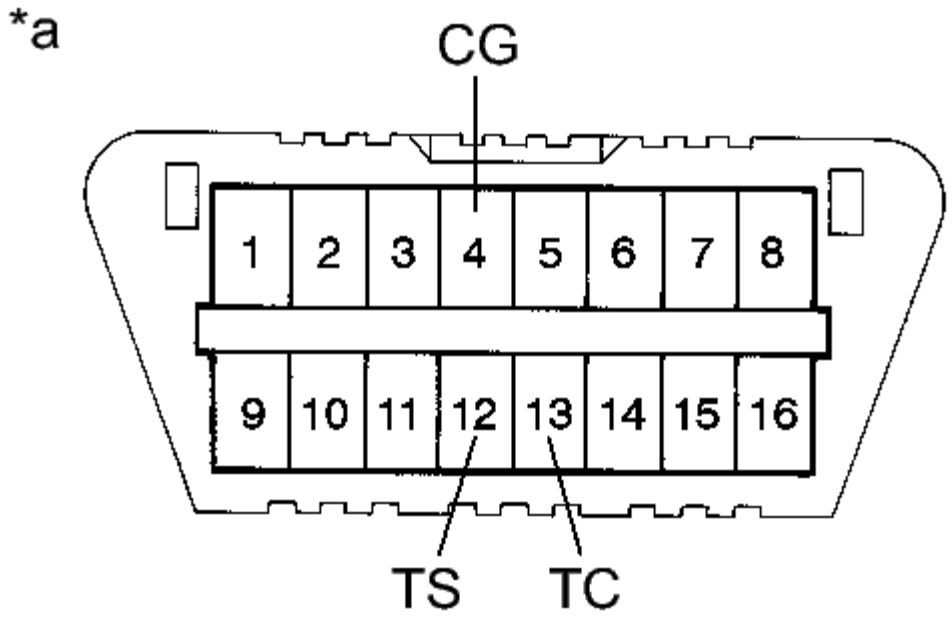


Fig. 8: DLC3 Connector End View
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- **SST: 09843-18040**

TEXT IN ILLUSTRATION

*a	Front view of DLC3

2. Count the number of blinks of the ABS warning light and SLIP indicator lights.

HINT:

- When the system is operating correctly, each light will blink continuously in a pattern

of 0.25 seconds on, then 0.25 seconds off.

- When one DTC is output, each lamp will output the same code at 4 second intervals. (For example, Code 21 would be output as 2 flashes, a 1.5 second pause, and then 1 flash).
- When 2 or more DTCs are output, each lamp will output a different code at 2.5 second intervals, and when all codes have been output, there will be a 4 second pause and the sequence will repeat.
- When multiple codes are set, they are output in order starting with the lowest DTC number.
- See the list of DTCs (See procedure "A").

NOTE:

- **If only DTCs other than Test Mode sensor check DTCs are displayed, repair the malfunctions and clear the DTCs.**
- **If Test Mode sensor check DTCs and other DTCs are displayed or if only Test Mode sensor check DTCs are displayed, repair the malfunctions, clear the DTCs, and perform Test Mode inspection again.**

3. After performing the check, disconnect SST from terminals TS and CG, and TC and CG of the DLC3 and turn the ignition switch off.
4. Turn the ignition switch to ON.

HINT:

- If the ignition switch is not turned to ON after SST is removed from the DLC3, the previous Test Mode will continue.
- If the ignition switch is turned to ON with terminals TS and CG connected, the previous Test Mode will continue.

i. Sensor Check DTCs

ABS SENSOR

DTC Code	Detection Item	Trouble Area
71	Low Output Signal of Front Speed Sensor RH	• Front speed sensor RH • Sensor installation • Speed sensor rotor
72	Low Output Signal of Front Speed	• Front speed sensor LH • Sensor installation

	Sensor LH	• Speed sensor rotor
73	Low Output Signal of Rear Speed Sensor RH	• Rear speed sensor RH • Sensor installation • Speed sensor rotor
74	Low Output Signal of Rear Speed Sensor LH	• Rear speed sensor LH • Sensor installation • Speed sensor rotor
75	Abnormal Change in Output Signal of Front Speed Sensor RH	Speed sensor rotor
76	Abnormal Change in Output Signal of Front Speed Sensor LH	Speed sensor rotor
77	Abnormal Change in Output Signal of Rear Speed Sensor RH	Speed sensor rotor
78	Abnormal Change in Output Signal of Rear Speed Sensor LH	Speed sensor rotor
		• Sensor installation (w/ VDIM) • Yaw rate and acceleration

79	Acceleration Sensor Output Voltage Malfunction	sensor (w/ VDIM) • Skid control ECU (Brake actuator assembly) installation (w/o VDIM) • Skid control ECU (Brake actuator assembly) (w/o VDIM)
81	Master Cylinder Pressure Sensor Output Malfunction	• Stop light switch • Brake pedal load sensing switch • Master cylinder pressure sensor

HINT:

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

PROBLEM SYMPTOMS TABLE

PROBLEM SYMPTOMS TABLE

If there are no DTCs output and the problem still occurs, check the circuits for each problem symptom in the order given in the following table and proceed to the relevant troubleshooting information.

NOTE: When replacing the brake actuator assembly, sensors, etc., turn the ignition switch off.

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

VEHICLE STABILITY CONTROL SYSTEM

Symptom	Suspected Area	See
ABS, BA and/or EBD does not operate	Check for DTCs again and make sure that the normal system code is output.	Refer to **DTC CHECK / CLEAR**
	IG power source circuit (Low power supply voltage malfunction)	Refer to **DTC C1241: Low Power Supply Voltage Malfunction**
	IG power source circuit (High power supply voltage malfunction)	Refer to **DTC C1417: High Power Supply Voltage Malfunction**
	Front speed sensor circuit (Output malfunction)	Refer to **DTC C1413: Front Speed Sensor RH Output Malfunction; DTC C1414: Front Speed Sensor LH Output Malfunction**
	Rear speed sensor circuit (Output malfunction)	Refer to **DTC C1415: Rear Speed Sensor RH Output Malfunction; DTC C1416: Rear Speed Sensor LH Output Malfunction**
	Front speed sensor circuit (Open or short malfunction)	Refer to **DTC C1405: Open or Short in Front Speed Sensor RH Circuit; DTC C1406: Open or Short in Front Speed Sensor LH Circuit**
	Rear speed sensor circuit (Open or short malfunction)	Refer to **DTC C1407: Open or Short in Rear Speed Sensor RH Circuit; DTC C1408: Open or Short in Rear Speed Sensor LH Circuit**
	Front speed sensor circuit (Comparison malfunction)	Refer to **DTC C1401: Front Speed Sensor RH Malfunction; DTC C1402: Front Speed Sensor LH Malfunction**
	Rear speed sensor circuit (Comparison malfunction)	Refer to **DTC C1403: Rear Speed Sensor RH Malfunction; DTC C1404: Rear Speed Sensor LH Malfunction**
	Check the brake actuator assembly using the Techstream. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leaks.	Refer to **ON-VEHICLE INSPECTION**
	If the symptom still occurs even after the circuits listed above have	

	been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU).	Refer to **REMOVAL**
ABS, BA and/or EBD does not operate efficiently	Check for DTCs again and make sure that the normal system code is output.	Refer to **DTC CHECK / CLEAR**
	Front speed sensor circuit (Output malfunction)	Refer to **DTC C1413: Front Speed Sensor RH Output Malfunction; DTC C1414: Front Speed Sensor LH Output Malfunction**
	Rear speed sensor circuit (Output malfunction)	Refer to **DTC C1415: Rear Speed Sensor RH Output Malfunction; DTC C1416: Rear Speed Sensor LH Output Malfunction**
	Front speed sensor circuit (Open or short malfunction)	Refer to **DTC C1405: Open or Short in Front Speed Sensor RH Circuit; DTC C1406: Open or Short in Front Speed Sensor LH Circuit**
	Rear speed sensor circuit (Open or short malfunction)	Refer to **DTC C1407: Open or Short in Rear Speed Sensor RH Circuit; DTC C1408: Open or Short in Rear Speed Sensor LH Circuit**
	Front speed sensor circuit (Comparison malfunction)	Refer to **DTC C1401: Front Speed Sensor RH Malfunction; DTC C1402: Front Speed Sensor LH Malfunction**
	Rear speed sensor circuit (Comparison malfunction)	Refer to **DTC C1403: Rear Speed Sensor RH Malfunction; DTC C1404: Rear Speed Sensor LH Malfunction**
	Stop light switch circuit (Open or short malfunction)	Refer to **DTC C1425: Open in Stop Light Switch Circuit**
	Stop light switch circuit (Stuck off malfunction)	Refer to **DTC C1426: Stop Light Switch OFF Stuck Malfunction**
	Check the brake actuator assembly using the Techstream. (Check brake actuator assembly operation using the Active Test function.) If abnormal, check the hydraulic circuit for leaks.	Refer to **ON-VEHICLE INSPECTION**
	If the symptom still occurs even after the circuits listed above have been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU).	Refer to **REMOVAL**
	Check for DTCs again and make sure that the normal system code is output.	Refer to **DTC CHECK / CLEAR**

ABS sensor DTC check cannot be done	TC and CG terminal circuit	Refer to **TC and CG Terminal Circuit**
	If the symptom still occurs even after the circuits listed above have been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU).	Refer to **REMOVAL**
ABS warning light abnormal (Remains on)	ABS warning light circuit	Refer to **ABS Warning Light Remains ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
ABS warning light abnormal (Does not come on)	ABS warning light circuit	Refer to **ABS Warning Light does not Come ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
Brake warning light abnormal (Remains on)	Brake warning light circuit	Refer to **Brake Warning Light Remains ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
Brake warning light abnormal (Does not come on)	Brake warning light circuit	Refer to **Brake Warning Light does not Come ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
	Check for DTCs again and make sure that the normal system code is output.	Refer to **DTC CHECK / CLEAR**
	IG power source circuit (Low power supply voltage malfunction)	Refer to **DTC C1241: Low Power Supply Voltage Malfunction**
	IG power source circuit (High power supply voltage malfunction)	Refer to **DTC C1417: High Power Supply Voltage Malfunction**
	Check the hydraulic circuit for leaks.	-
	Front speed sensor circuit (Output malfunction)	Refer to **DTC C1413: Front Speed Sensor RH Output Malfunction; DTC C1414: Front Speed Sensor LH Output Malfunction**
	Rear speed sensor circuit (Output malfunction)	Refer to **DTC C1415: Rear Speed Sensor RH Output Malfunction; DTC C1416: Rear Speed Sensor LH Output Malfunction**
	Front speed sensor circuit (Open or short malfunction)	Refer to **DTC C1405: Open or Short in Front Speed Sensor RH Circuit; DTC C1406: Open or Short in Front Speed Sensor LH Circuit**
	Rear speed sensor circuit (Open or	Refer to **DTC C1407: Open or Short in Rear Speed Sensor RH Circuit; DTC**

VSC and/or TRAC does not operate	short malfunction)	**C1408: Open or Short in Rear Speed Sensor LH Circuit**
	Front speed sensor circuit (Comparison malfunction)	Refer to **DTC C1401: Front Speed Sensor RH Malfunction; DTC C1402: Front Speed Sensor LH Malfunction**
	Rear speed sensor circuit (Comparison malfunction)	Refer to **DTC C1403: Rear Speed Sensor RH Malfunction; DTC C1404: Rear Speed Sensor LH Malfunction**
	Yaw rate and acceleration sensor circuit (Zero point malfunction)	Refer to **DTC C1210: Zero Point Calibration of Yaw Rate Sensor Undone; DTC C1336: Zero Point Calibration of Acceleration Sensor Undone**
	Yaw rate and acceleration sensor circuit (Power supply malfunction)	Refer to **DTC C1381: Acceleration Sensor Power Supply Voltage Malfunction**
	Acceleration sensor circuit (Comparison malfunction)	Refer to **DTC C1420: Acceleration Sensor Malfunction**
	Yaw rate sensor circuit (Comparison malfunction)	Refer to **DTC C1436: Yaw Rate Sensor Malfunction**
	Yaw rate and acceleration sensor circuit (Stuck or output malfunction)	Refer to **DTC C1232: Acceleration Sensor Stuck Malfunction; DTC C1243: Acceleration Sensor Stuck Malfunction; DTC C1245: Acceleration Sensor Output Malfunction**
	Yaw rate and acceleration sensor circuit (Continuous invalidation malfunction)	Refer to **DTC C1442: Invalid Data Received from Acceleration Sensor; DTC C1443: Invalid Data Received from Yaw Rate Sensor**
	Yaw rate and acceleration sensor circuit (Internal malfunction)	Refer to **DTC C1419: Acceleration Sensor Internal Circuit; DTC C1435: Yaw Rate Sensor Internal Circuit**
	Steering angle sensor circuit (Zero point malfunction)	Refer to **DTC C1290: Steering Angle Sensor Zero Point Malfunction**
	Steering angle sensor circuit (Zero point initialization or calibration malfunction)	Refer to **DTC C1439: Steering Angle Sensor Initialization Incomplete; DTC C1445: Vehicle Driven with Steering Angle Sensor not Initialized**
	Steering angle sensor circuit (Power supply malfunction)	Refer to **DTC C1432: Steering Angle Sensor Power Source Voltage Malfunction**
	Steering angle sensor circuit (Output malfunction)	Refer to **DTC C1434: Steering Angle Sensor Output Malfunction**
	Steering angle sensor circuit (Internal malfunction)	Refer to **DTC C1433: Steering Angle Sensor Internal Circuit**

	If the symptom still occurs even after the circuits listed above have been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU).	Refer to **REMOVAL**
VSC sensor DTC check cannot be done	Check for DTCs again and make sure that the normal system code is output.	Refer to **DTC CHECK / CLEAR**
	TC and CG terminal circuit	Refer to **TC and CG Terminal Circuit**
	If the symptom still occurs even after the circuits listed above have been inspected and proved to be normal, replace the brake actuator assembly (skid control ECU).	Refer to **REMOVAL**
VSC OFF indicator light abnormal (Remains on)	VSC OFF indicator light circuit	Refer to **VSC OFF Indicator Light Remains ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
VSC OFF indicator light abnormal (Does not come on)	VSC OFF indicator light circuit	Refer to **VSC OFF Indicator Light does not Come ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
TRAC OFF indicator light abnormal (Remains on)	TRAC OFF indicator light circuit	Refer to **TRAC OFF Indicator Light Remains ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
TRAC OFF indicator light abnormal (Does not come on)	TRAC OFF indicator light circuit	Refer to **TRAC OFF Indicator Light does not Come ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
SLIP indicator light abnormal (Remains on)	SLIP indicator light circuit	Refer to **Slip Indicator Light Remains ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
SLIP indicator light abnormal (Does not come on)	SLIP indicator light circuit	Refer to **Slip Indicator Light does not Come ON**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
Sensor check cannot be done	TS and CG terminal circuit	Refer to **TS and CG Terminal Circuit**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**
Skid control buzzer abnormal	Skid control buzzer circuit	Refer to **Skid Control Buzzer Circuit**
	Brake actuator assembly (Skid control ECU)	Refer to **REMOVAL**

TERMINALS OF ECU

TERMINALS OF ECU

1. **TERMINALS OF ECU**

*a

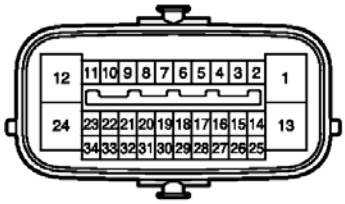


Fig. 9: ECU Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Component without harness connected (Skid Control ECU)	-	-

Terminal No. (Symbol)	Terminal Description
1 (GND1)	Skid control ECU ground
2 (STP1)	Stop light switch input
4 (RL-)	Rear wheel speed LH (-) signal input
5 (RL+)	Rear wheel speed LH (+) power supply output
6 (FR-)	Front wheel speed RH (-)

	signal input
7 (FR+)	Front wheel speed RH (+) power supply output
11 (SP1)	Speed signal output for speedometer
12 (+BS)	Solenoid relay power supply
13 (GND2)	Pump motor ground
14 (CANL)	CAN communication line L
16 (RR-)	Rear wheel speed RH (-) signal input
17 (RR+)	Rear wheel speed RH (+) power supply output
18 (FL-)	Front wheel speed LH (-) signal input
19 (FL+)	Front wheel speed LH (+) power supply output
21 (BZ)	Skid control buzzer output
22 (STP2)	Stop light control relay input
24 (BM)	Motor relay power supply
25 (CANH)	CAN communication line H
27 (FSW+)	Brake pedal load sensing switch input
30 (CSW)	VSC OFF switch input
31	Stop light

(STPO)	control relay output
33 (TS)	Sensor check input
34 (IG1)	ECU power supply

2. **TERMINAL INSPECTION**
   a. Disconnect the connectors and measure the voltage or resistance on the wire harness side.

*a

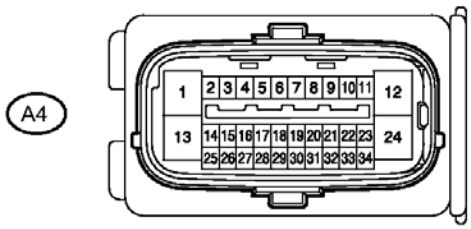


Fig. 10: Skid Control ECU Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

TEXT IN ILLUSTRATION

*a	Front view of wire harness connector (to Skid Control ECU)	-	-

HINT:

Voltage cannot be measured with the connectors connected to the skid control ECU as the connectors are watertight.

STANDARD

Terminal No. (Symbol)	Wiring Color	Terminal Description	Condition	Specified Condition
A4-1	W-B -	Skid control		

(GND1) - Body ground	Body ground	ECU ground	Always	Below 1 ohms
A4-2 (STP1) - Body ground	L - Body ground	Stop light switch input	Stop light switch on --> off (Brake pedal depressed --> released)	8 to 14 V --> Below 1.5 V
A4-12 (+BS) - Body ground	W - Body ground	Solenoid relay power supply	Always	11 to 14 V
A4-13 (GND2) - Body ground	W-B - Body ground	Pump motor ground	Always	Below 1 ohms
A4-21 (BZ) - Body ground	G-O - Body ground	Skid control buzzer output	Ignition switch ON, buzzer not sounding	6 to 10 V
A4-22 (STP2) - Body ground	G - Body ground	Stop light control relay input	Stop light switch on --> off (Brake pedal depressed --> released)	8 to 14 V --> Below 1.5 V
A4-24 (BM) - Body ground	B-R - Body ground	Motor relay power supply	Always	11 to 14 V
A4-27 (FSW+) - Body ground	Y - Body ground	Brake pedal load sensing switch input	Brake pedal load sensing switch off --> on (Brake pedal depressed --> released)	950 to 1050 ohms --> 203 to 223 ohms
			VSC OFF	

A4-30 (CSW) - Body ground	P - Body ground	VSC OFF switch input	switch held on --> off (Released)	Below 1 ohms --> 10 kohms or higher
A4-31 (STPO) - Body ground	G-B - Body ground	Stop light control relay output	Ignition switch to ON	11 to 14 V
A4-34 (IG1) - Body ground	L - Body ground	ECU power supply	Ignition switch to ON	11 to 14 V

DIAGNOSIS SYSTEM

DIAGNOSIS SYSTEM

1. **DESCRIPTION**

   When troubleshooting a vehicle with the diagnosis system, the only difference from the usual troubleshooting procedure is connecting the Techstream to the vehicle and reading various data output from the vehicle's skid control ECU.

   The skid control ECU records DTCs when it detects a malfunction in itself or in its circuits.

   To check the DTCs, connect the Techstream to the DLC3 on the vehicle. The Techstream enables you to clear the DTCs, activate the various actuators, and check the Freeze Frame Data and Data List.

   a. Check the battery voltage.

      Standard voltage

      11 to 14 V

      If the voltage is below 11 V, recharge the battery before proceeding to the next step.

   b. Check the DLC3. Refer to **GENERAL INFORMATION** .

2. **DIAGNOSIS**

   a. If the skid control ECU detects a malfunction, the ABS warning, brake warning and SLIP indicator lights will come on in order to warn the driver.

   b. The DTCs are simultaneously stored in the memory.

      The DTCs can be read by connecting SST between terminals TC and CG of the DLC3 and observing the blinking pattern of the ABS warning and SLIP indicator lights, or by connecting the Techstream. Refer to **DTC CHECK / CLEAR**.

c. This system has a Test Mode (signal check) function.

The DTCs can be read by connecting SST between terminals TS and CG of the DLC3 and observing the blinking pattern of the ABS warning and SLIP indicator lights, or by connecting the Techstream. Refer to **TEST MODE PROCEDURE**.

3. **WARNING LIGHT AND INDICATOR LIGHT INITIAL CHECK**

a. Release the parking brake.

NOTE: When releasing the parking brake, move the shift lever to P 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 ignition switch is turned to ON, check that the ABS warning, brake warning, VSC OFF indicator, SLIP indicator light and TRAC OFF indicator lights on the combination meter's for approximately 3 seconds.

HINT:

If the warning light and indicator light check result is not normal, proceed to Troubleshooting for the ABS warning, brake warning, TRAC OFF indicator, VSC OFF indicator and SLIP indicator light circuits.

If the indicator remains on or does not come on, proceed to troubleshooting for the light circuits listed below.

Trouble Area	See Procedure
ABS warning light circuit (Remains on)	Refer to **ABS Warning Light Remains ON**
ABS warning light circuit (Does not come on)	Refer to **ABS Warning Light does not Come ON**
Brake	Refer to

warning light circuit (Remains on)	**Brake Warning Light Remains ON**
Brake warning light circuit (Does not come on)	Refer to **Brake Warning Light does not Come ON**
TRAC OFF indicator light circuit (Remains on)	Refer to **TRAC OFF Indicator Light Remains ON**
TRAC OFF indicator light circuit (Does not come on)	Refer to **TRAC OFF Indicator Light does not Come ON**
VSC OFF indicator light circuit (Remains on)	Refer to **VSC OFF Indicator Light Remains ON**
VSC OFF indicator light circuit (Does not come on)	Refer to **VSC OFF Indicator Light does not Come ON**
SLIP indicator light circuit (Remains	Refer to **Slip Indicator Light Remains**

on)	**ON**
SLIP indicator light circuit (Does not come on)	Refer to **Slip Indicator Light does not Come ON**

DTC CHECK / CLEAR

DTC CHECK / CLEAR

1. **DTC CHECK/CLEAR (When Using the Techstream)**
   a. Check for DTCs.
      1. Connect the Techstream to the DLC3.
      2. Turn the ignition switch to ON.
      3. Turn the Techstream on.
      4. Read the DTCs following the prompts on the Techstream. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
      5. Check the details of the DTCs. Refer to **DIAGNOSTIC TROUBLE CODE CHART**.
   b. Clear the DTCs.
      1. Connect the Techstream to the DLC3.
      2. Turn the ignition switch to ON.
      3. Turn the Techstream on.
      4. Operate the Techstream to clear the codes. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
      5. According to the display on the Techstream, select the trouble code data display with the clear button.
2. **DTC CHECK/CLEAR (When not Using the Techstream)**
   a. Check for DTCs.
      1. Using SST, connect terminals TC and CG of the DLC3.

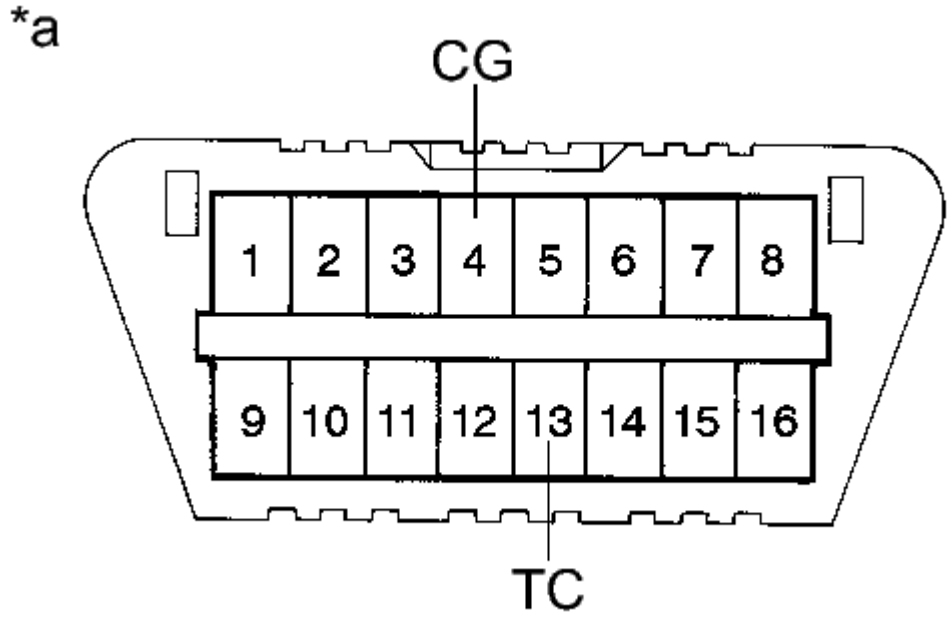


Fig. 11: DLC3 Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- **SST: 09843-18040**

TEXT IN ILLUSTRATION

*a	Front view of DLC3

2. Turn the ignition switch to ON.
3. Observe the blinking pattern of the ABS warning and SLIP indicator lights in order to identify the DTC.

HINT:

If no code appears, inspect the TC and CG terminal circuit, and ABS warning and SLIP indicator light circuits.

Trouble Area	See Procedure
TC and CG terminal circuit	Refer to **TC and CG Terminal Circuit**

ABS warning light circuit (Remains on)	Refer to **ABS Warning Light Remains ON**
ABS warning light circuit (Does not come on)	Refer to **ABS Warning Light does not Come ON**
SLIP indicator light circuit (Remains on)	Refer to **Slip Indicator Light Remains ON**
SLIP indicator light circuit (Does not come on)	Refer to **Slip Indicator Light does not Come ON**

4. Count the number of blinks of the ABS warning and SLIP indicator lights.

   HINT:

   - When the system is operating correctly, each light will blink continuously in a pattern of 0.25 seconds on, then 0.25 seconds off.
   - When one DTC is output, each lamp will output the same code at 4 second intervals. (For example, Code 21 would be output as 2 flashes, a 1.5-second pause, and then 1 flash).
   - When 2 or more DTCs are output, each lamp will output a different code at 2.5-second intervals, and when all codes have been output, there will be a 4-second pause and the sequence will repeat.
   - When multiple codes are set, they are output in order starting with the lowest DTC number.

5. The codes are explained in the code table.

   ABS DTC

Warning Light	Techstream

Display	Display
11	C0278
12	C0279
13	C0273
14	C0274
21	C0226
22	C0236
23	C0246
24	C0256
25	C1225
31	C1401
	C1405
32	C1402
	C1406
33	C1403
	C1407
34	C1404
	C1408
35	C1413
36	C1414
38	C1415
39	C1416
41	C1241
	C1417
43	C1232
	C1243
44	C1419
	C1420
	C1442
45	C1245
46	C1421
	C1422
	C1423
	C1424
49	C1425
	C1426
51	C1427
	C1428
59	C1203
67	C1429
	C1430

	C1431
91	C1361
94	U0073
95	C1240
	U0124
97	C1381
98	C1336

VSC DTC

Indicator Light Display	Techstream Display
31	C1432
	C1433
	C1434
32	C1232
34	C1435
	C1436
	C1443
36	C1210
43*1	-
51	C1201
53	C1203
62	U0123
63	U0126
64	C1380
65	C1437
	U0100
66	C1290
	C1439
	C1445
98	C1440
	C1441

*1: This DTC is output when the VSC system detects a malfunction in the ABS.

6. After completing the check, disconnect terminals TC and CG of the DLC3 to turn off the display.

   If 2 or more DTCs are detected at the same time, the DTCs will be displayed in ascending order.

b. Clear the DTCs.

1. Using SST, connect terminals TC and CG of the DLC3.

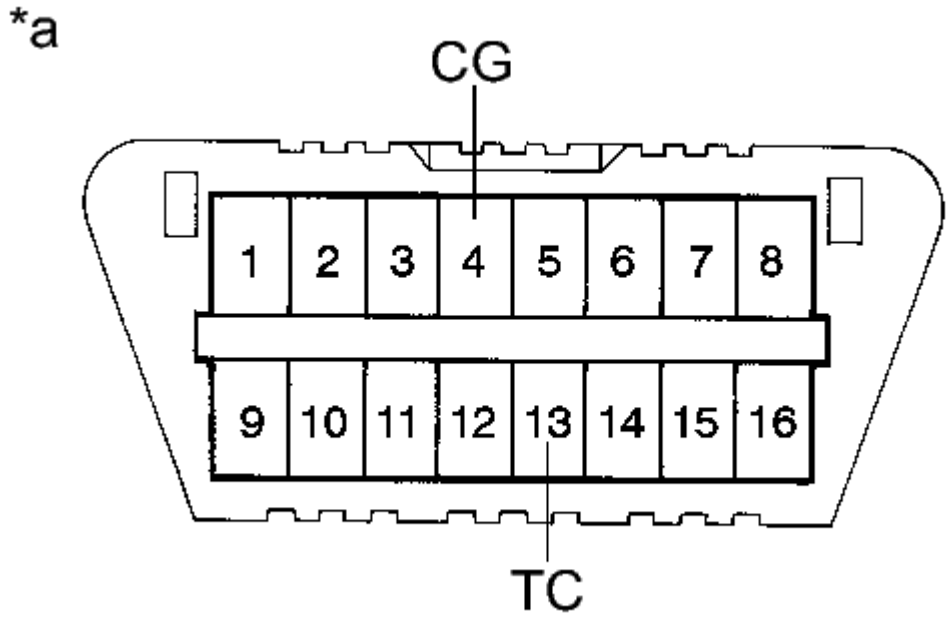


Fig. 12: DLC3 Connector Terminal Identification
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

- **SST: 09843-18040**

TEXT IN ILLUSTRATION

*a	Front view of DLC3

2. Turn the ignition switch to ON.
3. Clear the DTCs stored in the ECU by depressing the brake pedal 8 times or more within 5 seconds.

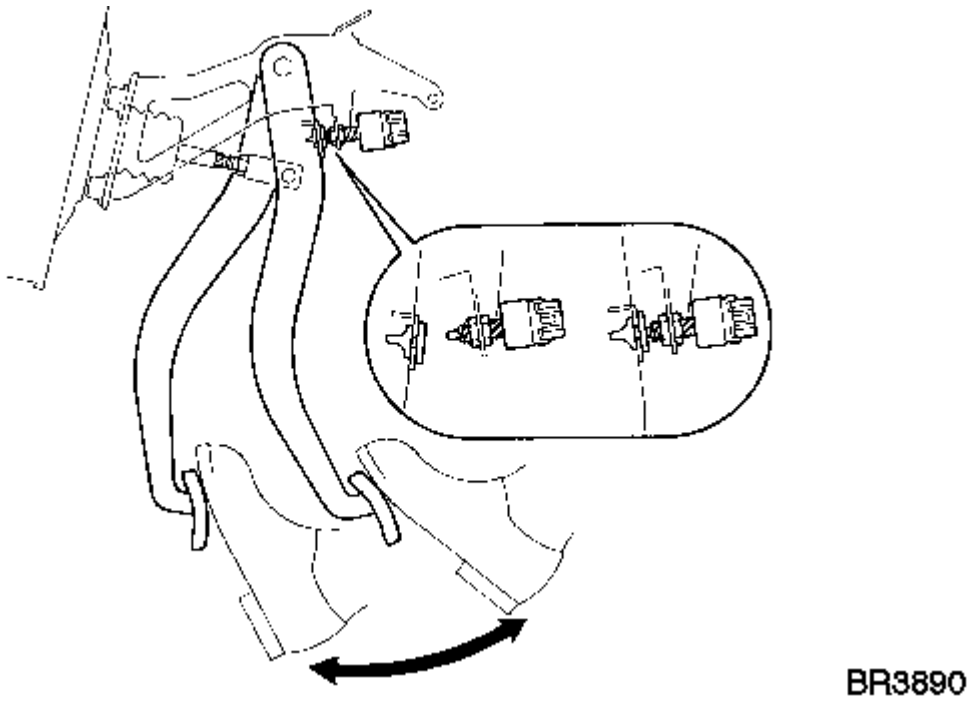


Fig. 13: Depressing Brake Pedal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

4. Check that the warning light indicates a normal system code.
5. Remove SST from the terminals of the DLC3.

HINT:

Clearing the DTCs cannot be performed by disconnecting the battery terminal or the ECU-IG NO. 1 fuse.

3. **END OF DTC CHECK/CLEAR**
   a. Turn the ignition switch to ON.
   b. Check that the ABS warning and SLIP indicator lights go off within approximately 3 seconds after turning the ignition switch to ON.

FREEZE FRAME DATA

FREEZE FRAME DATA

1. **FREEZE FRAME DATA**
   a. Whenever an ABS DTC is detected, the skid control ECU stores the current vehicle (sensor) state as Freeze Frame Data.
   b. The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from off to ON since the last time the ABS was activated.

HINT:

- If the vehicle is stopped or at a low speed (7 km/h (4.3 mph) or less), or if a DTC is detected, the skid control ECU will stop counting the number.
- Freeze Frame Data at the time the ABS operates:

  The skid control ECU stores and updates data whenever the ABS system operates.

  When the ECU stores data at the time a DTC is detected, the data stored during ABS operation is cleared.

- Freeze Frame Data at the time a DTC is detected:

  When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

2. **CHECK FREEZE FRAME DATA**
   a. Connect the Techstream to the DLC3.
   b. Turn the ignition switch to ON.
   c. Turn the Techstream on.
   d. Enter the following menus: Chassis / ABS/VSC/TRAC / Trouble Codes.
   e. According to the display on the Techstream, select the trouble code data display with Freeze Frame Data.

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
Elapsed Time after Freeze Trigger	Elapsed time after freeze trigger / Min.: 0 ms, Max.: 510 msec	-	-
Number of IG ON	Number of operations of ignition switch being turned to ON after storing Freeze Frame Data / 0 to 31	-	-
Buzzer	Skid control buzzer / ON or OFF	ON: Buzzer on OFF: Buzzer off	-
	Stop light	ON: Brake pedal depressed	

Stop Light SW	switch / ON or OFF	OFF: Brake pedal released	-
Parking Brake SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
Gear Position	Gear position information / P/N, R, 1st-6th, FAIL or NOT R	Actual gear position	-
Shift Lever Position	Shift lever position information / P/N, R, D/M, 1st-6th/B or FAIL	Actual shift lever position	-
Operated System	Operated system status / ABS, VSC, TRC, BA, HAB, PBA, PB, HA-CTRL, FAIL, SYS or Non	-	ABS: ABS activated VSC: VSC activated TRC: TRAC activated BA: BA activated HAB: HAB activated PBA: PBA activated PB: PB activated HA-CTRL: Hill-start assist control activated FAIL: Fail safe mode activated SYS: System prohibit activated Non: No operation activated
Master Cylinder Sensor	Master cylinder pressure sensor reading / Min.: 0 V, Max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed
	Master cylinder	When brake	

M/C Sensor Grade	pressure sensor change / Min.: -30 MPa/s, Max.: 225 MPa/s	pedal is released or pedal held at constant position: 0 MPa/s	When brake pedal is being operated: Changes in proportion with pedal movement speed
Yaw Rate Sensor	Yaw rate sensor / Min.: -128 deg/s, Max.: 127 deg/s	Vehicle stopped: 0 deg/s Turning right: -128 to 0 deg/s Turning left: 0 to 127 deg/s	-
Lateral G	Lateral G / Min.: -25.10 m/s^2 , Max.: 24.90 m/s^2	-	During turning: Changes in proportion with acceleration
Forward and Rearward G	Forward and backward G / Min.: - 25.10 m/s^2 , Max.: 24.90 m/s^2	-	During acceleration/deceleration: Changes in proportion with acceleration
FR Wheel Speed	Front wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RR Wheel Speed	Rear wheel speed sensor RH reading / Min.: 0 km/h (0 mph), Max.: 326	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

	km/h (202 mph)		
RL Wheel Speed	Rear wheel speed sensor LH reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed	Maximum wheel speed sensor reading / Min.: 0 km/h (0 mph), Max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed Grade	Vehicle speed grade / Min.: -25.10 m/s^2 , Max.: 24.90 m/s^2	Vehicle stopped: 0 m/s^2	During driving: Changes in proportion with vehicle acceleration/deceleration
Real Engine Torque	Real engine torque / Min.: -1024 N*m, Max.: 1023 N*m	-	-
Accelerator Opening Angle %	The difference of a present accelerator / Min.: 0%, Max.: 128%	When the accelerator pedal is released: 0%	During accelerator pedal operation: Changes in proportion with the pedal movement
Brake Pedal Load Sensing SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond	-

		the specified point	
Inspection Mode	Inspection mode / Other or Inspect	Other: Normal mode Inspect: Inspection mode	-
Steering Angle Sensor	Steering angle sensor / Min.: - 3276.8 deg, Max.: 3276.7 deg	Left turn: Increase Right turn: Decrease	-
TRAC/VSC Off Mode	TRAC/VSC off mode / Normal, TRAC OFF or VSC OFF	Normal: Normal mode TRAC OFF: TRAC off mode VSC OFF: VSC off mode	-

3. **CLEAR FREEZE FRAME DATA**

NOTE: Clearing the DTCs will also clear the Freeze Frame Data.

a. Connect the Techstream to the DLC3.
b. Turn the ignition switch to ON.
c. Clear the DTCs and Freeze Frame Data. Refer to **DTC CHECK / CLEAR**.

FAIL-SAFE CHART

FAIL-SAFE CHART

1. **FAIL SAFE OPERATION**

- If there is a problem with sensor signals or brake actuator systems, the skid control ECU prohibits power supply to the brake actuator and informs the ECM of VSC system failure.

  The brake actuator turns off the solenoids and the ECM stops its VSC according to signals from the skid control ECU. The vehicle will operate in a manner similar to a vehicle that is not equipped with ABS, TRAC and VSC systems.

  ABS control will be prohibited, but EBD control will continue to the extent that EBD control is

possible. If EBD control is impossible, the brake warning light will come on to warn the driver. Refer to **DIAGNOSIS SYSTEM**.

- If a VSC system component malfunctions before VSC begins, VSC will be prohibited. If a system component malfunctions while VSC is operating, the system will gradually stop operating so as not to trigger a sudden change in vehicle stability.

  If it is impossible to control the systems, the warning light will come on to inform the driver of system control termination. Refer to **DIAGNOSIS SYSTEM**.

  HINT:

  For vehicles with the combination meter, the master warning light will come on and a warning message will be displayed on the combination meter if any of the EBD system, BA system, or TRAC system is malfunctioning or if the ABS control or VSC cannot be performed.

ABS, EBD AND BA SYSTEM

Malfunctioning Area	Control Method
ABS system	ABS, BA, TRAC, VSC control prohibited
BA system	ABS, BA, TRAC, VSC control prohibited
EBD system	ABS, EBD, BA, TRAC, VSC control prohibited

HINT:

A malfunction in either the ABS or BA system will result in identical operation, with ABS, BA, TRAC, VSC system control being prohibited.

TRAC AND VSC SYSTEM

Malfunctioning Area	Control Method
	Before

Engine control system (TRAC system)	control: Disables control During control: Uses only the brakes to perform control
Brake control system (VSC system)	Before control: Disables control During control: Uses only the engine to perform control
Brake control system (TRAC system)	Before control: Disables control During control: Disables control (by gradually stopping control)

HINT:

The TRAC and VSC systems use different systems to prohibit different controls depending on the malfunctioning parts.

DATA LIST / ACTIVE TEST

DATA LIST / ACTIVE TEST

1. **DATA LIST**

   HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTE: In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

a. Warm up the engine.
b. Turn the ignition switch off.
c. Connect the Techstream to the DLC3.
d. Turn the ignition switch to ON.
e. Turn the Techstream on.
f. Enter the following menus: Chassis / ABS/VSC/TRAC / Data List.
g. According to the display on the Techstream, read the Data List.

ABS/VSC/TRAC

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ABS Warning Light	ABS warning light / ON or OFF	ON: Warning light ON OFF: Warning light OFF	-
Brake Warning Light	Brake warning light / ON or OFF	ON: Warning light ON OFF: Warning light OFF	-
Buzzer	Skid control buzzer / ON or OFF	ON: Buzzer ON OFF: Buzzer OFF	-
Stop Light SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
		ON: Parking brake	

Parking Brake SW	Parking brake switch / ON or OFF	applied OFF: Parking brake released	-
Main Idle SW	Main idle switch / ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
Brake Pedal Load Sensing SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond the specified point	-
Gear Position	Gear position information / P, N, R, 1st-6th, FAIL, NOT R	Actual gear position	-
Shift Lever Position	Shift lever position information / P, N, R, D/M, 1st-6th/B, FAIL	Actual shift lever position	-
Shift Information	Shift information / ON or OFF	ON: During gear change	-
Inspection Mode	Inspection mode / Other or Inspect	Other: Normal mode Inspect: Inspection mode	-
	Number of ignition switch		

Number of IG ON (Inspection)	being turned to ON after entering inspection mode / min.: 0, max.: 255	-	-
Master Cylinder Sensor	Master cylinder pressure sensor / min.: 0 V, max.: 5 V	When brake pedal is released: 0.3 to 0.9 V	Reading increases when brake pedal is depressed
Zero Point of M/C	Memorized zero value / min.: -12.5 MPa, max.: 12.4 MPa	-	-
Deceleration Sensor	Acceleration sensor / min.: -18.327 m/s^2 , max.: 18.183 m/s^2	-	During deceleration/acceleration: Changes continuously
Zero Point of Decele	Memorized zero value / min.: -25.10 m/s^2 , max.: 24.90 m/s^2	-	-
Deceleration Sensor2	Acceleration sensor 2 / min.: -18.327 m/s^2 , max.: 18.183 m/s^2	-	During deceleration/acceleration: Changes continuously
Zero Point of Decele2	Memorized zero value / min.: -25.10 m/s^2 , max.: 24.90 m/s^2	-	-
Yaw Rate Sensor	Yaw rate sensor / min.: -128 degrees/s, max.: 127 degrees/s	Vehicle stationary: 0 degrees/s Right turn: -128 to 0 degrees/s Left turn: 0 to 127 degrees/s	-

Zero Point of Yaw Rate	Memorized zero value / min.: -128 degrees/sec, max.: 127 degrees/sec	-	-
Yaw Rate Sensor2	Yaw rate sensor 2 / min.: -128 degrees/s, max.: 127 degrees/s	Vehicle stationary: 0 degrees/s Right turn: -128 to 0 degrees/s Left turn: 0 to 127 degrees/s	-
Zero Point of Yaw Rate2	Memorized zero value / min.: -128 degrees/s, max.: 127 degrees/s	-	-
Steering Angle Sensor	Steering angle sensor / min.: -3276.8 degrees, max.: 3276.7 degrees	Left turn: Increase Right turn: Decrease	-
Zero Point of Steering Angle	Memorized zero value / min.: -3276.8 degrees, max.: 3276.7 degrees	After steering angle sensor zero point calibration: 0 degrees	-
Lateral G	Lateral G / min.: -25.10 m/s^2 , max.: 24.90 m/s^2	-	During turning: Changes in proportion with acceleration
Forward and Rearward G	Forward and backward G / min.: -25.10 m/s^2 , max.: 24.90 m/s^2	-	During acceleration/deceleration: Changes in proportion with acceleration
Yaw Rate Value	Yaw rate value / min.: -128 degrees/s, max.: 127	-	During turning: Changes in proportion with yaw

	degrees/s		
Steering Angle Value	Steering angle value / min.: -3276.8 degrees, max.: 3276.7 degrees	-	During steering operation: Changes in proportion with steering wheel rotation
Slip Indicator Light	Slip indicator light / ON or OFF	ON: Indicator light ON OFF: Indicator light OFF	-
FR Wheel Speed	Front wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RR Wheel Speed	Rear wheel speed sensor RH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear wheel speed sensor LH reading / min.: 0 km/h (0 mph), max.: 326 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
Vehicle Speed	Maximum wheel speed sensor reading / min.: 0 km/h (0 mph), max.: 326 km/h (202	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

	mph)		
FR Wheel Acceleration	Front wheel RH acceleration / min.: -200.84 m/s^2 , max.: 199.27 m/s^2	-	During deceleration/acceleration: Changes continuously
FL Wheel Acceleration	Front wheel LH acceleration / min.: -200.84 m/s^2 , max.: 199.27 m/s^2	-	During deceleration/acceleration: Changes continuously
RR Wheel Acceleration	Rear wheel RH acceleration / min.: -200.84 m/s^2 , max.: 199.27 m/s^2	-	During deceleration/acceleration: Changes continuously
RL Wheel Acceleration	Rear wheel LH acceleration / min.: -200.84 m/s^2 , max.: 199.27 m/s^2	-	During deceleration/acceleration: Changes continuously
FR Wheel ABS Ctrl Status	Front wheel RH ABS control status / ON or OFF	ON: During control	-
FL Wheel ABS Ctrl Status	Front wheel LH ABS control status / ON or OFF	ON: During control	-
RR Wheel ABS Ctrl Status	Rear wheel RH ABS control status / ON or OFF	ON: During control	-
RL Wheel ABS Ctrl Status	Rear wheel LH ABS control status / ON or OFF	ON: During control	-
RR Wheel EBD Ctrl Status	RR wheel EBD control status/ON or OFF	ON: During control	-
RL Wheel EBD	RL wheel EBD control	ON: During	

Ctrl Status	status/ON or OFF	control	-
BA Ctrl Status	BA control status / ON or OFF	ON: During control	-
TRC (TRAC) Ctrl Status	TRAC control status / ON or OFF	ON: During control	-
TRC (TRAC) Engine Ctrl Status	TRAC engine control status / ON or OFF	ON: During control	-
TRC (TRAC) Brake Ctrl Status	TRAC brake control status / ON or OFF	ON: During control	-
FR Wheel VSC Ctrl Status	Front wheel RH VSC control status / ON or OFF	ON: During control	-
FL Wheel VSC Ctrl Status	Front wheel LH VSC control status / ON or OFF	ON: During control	-
RR Wheel VSC Ctrl Status	Rear wheel RH VSC control status / ON or OFF	ON: During control	-
RL Wheel VSC Ctrl Status	Rear wheel LH VSC control status / ON or OFF	ON: During control	-
Engine Revolutions	Engine speed / min.: 0 RPM, max.: 65535 RPM	Engine stopped: 0 RPM	When engine speed is constant: No large fluctuations
Real Engine Torque	Real engine torque / min.: -1024 Nm, max.: 1023 Nm	-	-
Accelerator Opening Angle %	The difference of a present accelerator / min.: 0%, max.: 128%	When the accelerator pedal is released: 0%	During accelerator pedal operation: Changes in proportion with the pedal movement
		ON: Solenoid	

Solenoid Relay	ABS solenoid relay / ON or OFF	relay ON OFF: Solenoid relay OFF	-
ECB (Electronically Controlled Brake system) Motor Relay	ABS motor relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
Fail Safe Motor Relay	ABS motor fail safe relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
TR(A)C/VSC Solenoid (SM2)	Master cut solenoid (SM2) / ON or OFF	ON: Operating	-
TR(A)C/VSC Solenoid (SM1)	Master cut solenoid (SM1) / ON or OFF	ON: Operating	-
ABS Solenoid (SFRH)	ABS solenoid (SFRH) / ON or OFF	ON: Operating	-
ABS Solenoid (SFRR)	ABS solenoid (SFRR) / ON or OFF	ON: Operating	-
ABS Solenoid (SFLH)	ABS solenoid (SFLH) / ON or OFF	ON: Operating	-
ABS Solenoid (SFLR)	ABS solenoid (SFLR) / ON or OFF	ON: Operating	-
ABS Solenoid (SRRH)	ABS solenoid (SRRH) / ON or OFF	ON: Operating	-
ABS Solenoid (SRRR)	ABS solenoid (SRRR) / ON or OFF	ON: Operating	-
ABS Solenoid (SRLH)	ABS solenoid (SRLH) / ON or OFF	ON: Operating	-
ABS Solenoid (SRLR)	ABS solenoid (SRLR) / ON or OFF	ON: Operating	-
	Front speed		

FR Speed Open	sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Open	Front speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RR Speed Open	Rear speed sensor RH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
RL Speed Open	Rear speed sensor LH open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Open	EFI communication open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Yaw Rate Open	Yaw rate sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Deceleration Open	Acceleration sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
Steering Open	Steering angle sensor open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
	Master cylinder pressure sensor	Error: Momentary	

Master Cylinder Open	open detection / Error or Normal	interruption Normal: Normal	-
MT Voltage Value	Motor driving monitor voltage / min.: 0 V, max.: 20 V	-	-
TRAC/VSC Off Mode	VSC OFF switch / Normal, TRC OFF or VSC OFF	Normal: Normal mode TRC OFF: TRAC off mode VSC OFF: VSC off mode	-
Number of DTC	Number of DTC recorded / min.: 0, max.: 255	-	-
IG Voltage Value Decreased	IG voltage value decrease detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
IG Voltage Value Increased	IG voltage value increase detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FR Speed Sensor Voltage Open	Front speed sensor RH voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
FL Speed Sensor Voltage Open	Front speed sensor LH voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
	Rear speed sensor RH	Error:	

RR Speed Sensor Voltage Open	voltage open detection / Error or Normal	Momentary interruption Normal: Normal	-
RL Speed Sensor Voltage Open	Rear speed sensor LH voltage open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
M/C Pressure Sensor Noise	Master cylinder pressure sensor noise detection / Error or Normal	Error: Malfunction Normal: Normal	-
Brake Pedal Switch Open	Brake pedal load sensing switch open detection / Error or Normal	Error: Momentary interruption Normal: Normal	-
EFI Communication Invalid	EFI communication invalid detection / Error or Normal	Error: Invalid Normal: Normal	-

2. **ACTIVE TEST**

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts to operate without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

a. Warm up the engine.
b. Turn the ignition switch off.
c. Connect the Techstream to the DLC3.
d. Turn the ignition switch to ON.
e. Turn the Techstream on.
f. Enter the following menus: Chassis / ABS/VSC/TRAC / Active Test.

g. According to the display on the Techstream, perform the Active Test.

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ABS Warning Light	ABS warning light	Warning light ON/OFF	Observe combination meter
Brake Warning Light	Brake warning light	Warning light ON/OFF	Observe combination meter
Buzzer	Skid control buzzer	Buzzer ON/OFF	Buzzer can be heard (w/ VDIM)
Solenoid Relay	ABS solenoid relay	Relay ON/OFF	-
Motor Relay	ABS motor relay	Relay ON/OFF	Operating sound of motor can be heard
ABS Solenoid (SRLR)	ABS solenoid (SRLR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SRLH)	ABS solenoid (SRLH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SRRR)	ABS solenoid (SRRR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SRRH)	ABS solenoid (SRRH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
			Operating

ABS Solenoid (SFLR)	ABS solenoid (SFLR)	Solenoid ON/OFF	sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFLH)	ABS solenoid (SFLH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFRR)	ABS solenoid (SFRR)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
ABS Solenoid (SFRH)	ABS solenoid (SFRH)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
VSC/TRAC Solenoid (SMR)	Master cut solenoid (SM2)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
VSC/TRAC Solenoid (SMF)	Master cut solenoid (SM1)	Solenoid ON/OFF	Operating sound of solenoid (clicking sound) can be heard
TRC OFF Indicator Light	TRAC OFF indicator Light	Indicator Light ON/OFF	Observe combination meter
VSC OFF Indicator Light	VSC OFF Indicator Light	Indicator Light ON/OFF	Observe combination meter
Slip Indicator Light	SLIP Indicator Light	Indicator Light ON/OFF	Observe combination meter

DIAGNOSTIC TROUBLE CODE CHART

DIAGNOSTIC TROUBLE CODE CHART

NOTE: Turn the ignition switch off before removing any parts.

HINT:

- If no abnormality is found when inspecting parts, inspect the skid control ECU (brake actuator assembly) and ground points for poor connections.
- If a trouble code is displayed during the DTC check, check the circuit indicated by the DTC. For details of each code, refer to the appropriate information for the respective "DTC Code" in the DTC chart.
- When 2 or more DTCs are detected, perform circuit inspection one by one until the problem is identified.
- For DTCs indicated by the warning light or indicator light, refer to the DTC charts in DTC Check/Clear.
- Inspect the fuses and relays before inspecting the trouble areas shown in the table below.

DTC

DTC Code	Detection Item	See
C0226	SFR Solenoid Circuit	Refer to **DTC C0226: SFR Solenoid Circuit; DTC C0236: SFL Solenoid Circuit; DTC C0246: SRR Solenoid Circuit; DTC C0256: SRL Solenoid Circuit; DTC C1225: SM Solenoid Circuit**
C0236	SFL Solenoid Circuit	Refer to **DTC C0226: SFR Solenoid Circuit; DTC C0236: SFL Solenoid Circuit; DTC C0246: SRR Solenoid Circuit; DTC C0256: SRL Solenoid Circuit; DTC C1225: SM Solenoid Circuit**
C0246	SRR Solenoid Circuit	Refer to **DTC C0226: SFR Solenoid Circuit; DTC C0236: SFL Solenoid Circuit; DTC C0246: SRR Solenoid Circuit; DTC C0256: SRL Solenoid Circuit; DTC C1225: SM Solenoid Circuit**
C0256	SRL Solenoid Circuit	Refer to **DTC C0226: SFR Solenoid Circuit; DTC C0236: SFL Solenoid Circuit; DTC C0246: SRR Solenoid Circuit; DTC C0256: SRL Solenoid Circuit; DTC C1225: SM Solenoid Circuit**
C0273*1	Open in ABS Motor Relay Circuit	Refer to **DTC C0273: Open in ABS Motor Relay Circuit; DTC C0274: Short in ABS Motor Relay Circuit;**

		DTC C1361: Short in ABS Motor Fail Safe Relay Circuit
C0274	Short in ABS Motor Relay Circuit	Refer to **DTC C0273: Open in ABS Motor Relay Circuit; DTC C0274: Short in ABS Motor Relay Circuit; DTC C1361: Short in ABS Motor Fail Safe Relay Circuit**
C0278	Open in ABS Solenoid Relay Circuit	Refer to **DTC C0278: Open in ABS Solenoid Relay Circuit; DTC C0279: Short in ABS Solenoid Relay Circuit**
C0279	Short in ABS Solenoid Relay Circuit	Refer to **DTC C0278: Open in ABS Solenoid Relay Circuit; DTC C0279: Short in ABS Solenoid Relay Circuit**
C1203	ECM Communication Circuit Malfunction	Refer to **DTC C1203: ECM Communication Circuit Malfunction**
C1210	Zero Point Calibration of Yaw Rate Sensor Undone	Refer to **DTC C1210: Zero Point Calibration of Yaw Rate Sensor Undone; DTC C1336: Zero Point Calibration of Acceleration Sensor Undone**
C1225	SM Solenoid Circuit	Refer to **DTC C0226: SFR Solenoid Circuit; DTC C0236: SFL Solenoid Circuit; DTC C0246: SRR Solenoid Circuit; DTC C0256: SRL Solenoid Circuit; DTC C1225: SM Solenoid Circuit**
C1232	Acceleration Sensor Stuck Malfunction	Refer to **DTC C1232: Acceleration Sensor Stuck Malfunction; DTC C1243: Acceleration Sensor Stuck Malfunction; DTC C1245: Acceleration Sensor Output Malfunction**
C1240	Yaw Rate Sensor Discrimination	Refer to **DTC C1240: Yaw Rate Sensor Discrimination**
C1241	Low Power Supply Voltage Malfunction	Refer to **DTC C1241: Low Power Supply Voltage Malfunction**
C1243*1	Acceleration Sensor Stuck Malfunction	Refer to **DTC C1232: Acceleration Sensor Stuck Malfunction; DTC C1243: Acceleration Sensor Stuck Malfunction; DTC C1245: Acceleration Sensor Output Malfunction**
C1245*1	Acceleration Sensor Output Malfunction	Refer to **DTC C1232: Acceleration Sensor Stuck Malfunction; DTC C1243: Acceleration Sensor Stuck Malfunction; DTC C1245: Acceleration Sensor Output Malfunction**
	Steering Angle Sensor Zero Point	Refer to **DTC C1290: Steering Angle**

C1290	Malfunction	**Sensor Zero Point Malfunction**
C1336	Zero Point Calibration of Acceleration Sensor Undone	Refer to **DTC C1210: Zero Point Calibration of Yaw Rate Sensor Undone; DTC C1336: Zero Point Calibration of Acceleration Sensor Undone**
C1361	Short in ABS Motor Fail Safe Relay Circuit	Refer to **DTC C0273: Open in ABS Motor Relay Circuit; DTC C0274: Short in ABS Motor Relay Circuit; DTC C1361: Short in ABS Motor Fail Safe Relay Circuit**
C1380	Stop Light Control Relay Malfunction	Refer to **DTC C1380: Stop Light Control Relay Malfunction**
C1381	Acceleration Sensor Power Supply Voltage Malfunction	Refer to **DTC C1381: Acceleration Sensor Power Supply Voltage Malfunction**
C1401*1	Front Speed Sensor RH Malfunction	Refer to **DTC C1401: Front Speed Sensor RH Malfunction; DTC C1402: Front Speed Sensor LH Malfunction**
C1402*1	Front Speed Sensor LH Malfunction	Refer to **DTC C1401: Front Speed Sensor RH Malfunction; DTC C1402: Front Speed Sensor LH Malfunction**
C1403*1	Rear Speed Sensor RH Malfunction	Refer to **DTC C1403: Rear Speed Sensor RH Malfunction; DTC C1404: Rear Speed Sensor LH Malfunction**
C1404*1	Rear Speed Sensor LH Malfunction	Refer to **DTC C1403: Rear Speed Sensor RH Malfunction; DTC C1404: Rear Speed Sensor LH Malfunction**
C1405*1	Open or Short in Front Speed Sensor RH Circuit	Refer to **DTC C1405: Open or Short in Front Speed Sensor RH Circuit; DTC C1406: Open or Short in Front Speed Sensor LH Circuit**
C1406*1	Open or Short in Front Speed Sensor LH Circuit	Refer to **DTC C1405: Open or Short in Front Speed Sensor RH Circuit; DTC C1406: Open or Short in Front Speed Sensor LH Circuit**
C1407*1	Open or Short in Rear Speed Sensor RH Circuit	Refer to **DTC C1407: Open or Short in Rear Speed Sensor RH Circuit; DTC C1408: Open or Short in Rear Speed Sensor LH Circuit**
C1408*1	Open or Short in Rear Speed Sensor LH Circuit	Refer to **DTC C1407: Open or Short in Rear Speed Sensor RH Circuit; DTC C1408: Open or Short in Rear Speed Sensor LH Circuit**
	Front Speed Sensor RH Output	Refer to **DTC C1413: Front Speed Sensor RH Output Malfunction; DTC**

C1413*1	Malfunction	**C1414: Front Speed Sensor LH Output Malfunction**
C1414*1	Front Speed Sensor LH Output Malfunction	Refer to **DTC C1413: Front Speed Sensor RH Output Malfunction; DTC C1414: Front Speed Sensor LH Output Malfunction**
C1415*1	Rear Speed Sensor RH Output Malfunction	Refer to **DTC C1415: Rear Speed Sensor RH Output Malfunction; DTC C1416: Rear Speed Sensor LH Output Malfunction**
C1416*1	Rear Speed Sensor LH Output Malfunction	Refer to **DTC C1415: Rear Speed Sensor RH Output Malfunction; DTC C1416: Rear Speed Sensor LH Output Malfunction**
C1417	High Power Supply Voltage Malfunction	Refer to **DTC C1417: High Power Supply Voltage Malfunction**
C1419	Acceleration Sensor Internal Circuit	Refer to **DTC C1419: Acceleration Sensor Internal Circuit; DTC C1435: Yaw Rate Sensor Internal Circuit**
C1420	Acceleration Sensor Malfunction	Refer to **DTC C1420: Acceleration Sensor Malfunction**
C1421*2	Open or Short in Master Cylinder Pressure Sensor	Refer to **DTC C1421: Open or Short in Master Cylinder Pressure Sensor; DTC C1423: Master Cylinder Pressure Sensor Zero Point Low Malfunction; DTC C1424: Master Cylinder Pressure Sensor Output Malfunction**
C1422*2	Master Cylinder Pressure Sensor Zero Point High Malfunction	Refer to **DTC C1422: Master Cylinder Pressure Sensor Zero Point High Malfunction**
C1423*2	Master Cylinder Pressure Sensor Zero Point Low Malfunction	Refer to **DTC C1421: Open or Short in Master Cylinder Pressure Sensor; DTC C1423: Master Cylinder Pressure Sensor Zero Point Low Malfunction; DTC C1424: Master Cylinder Pressure Sensor Output Malfunction**
C1424*2	Master Cylinder Pressure Sensor Output Malfunction	Refer to **DTC C1421: Open or Short in Master Cylinder Pressure Sensor; DTC C1423: Master Cylinder Pressure Sensor Zero Point Low Malfunction; DTC C1424: Master Cylinder Pressure Sensor Output Malfunction**
C1425*3	Open in Stop Light Switch Circuit	Refer to **DTC C1425: Open in Stop Light Switch Circuit**
C1426	Stop Light Switch OFF Stuck Malfunction	Refer to **DTC C1426: Stop Light Switch OFF Stuck Malfunction**

C1427*1	Motor Malfunction	Refer to **DTC C1427: Motor Malfunction**
C1428*1	Motor Circuit Malfunction	Refer to **DTC C1428: Motor Circuit Malfunction**
C1429	Open or Short in Brake Pedal Load Sensing Switch	Refer to **DTC C1429: Open or Short in Brake Pedal Load Sensing Switch**
C1430	Brake Pedal Load Sensing Switch OFF Stuck Malfunction	Refer to **DTC C1430: Brake Pedal Load Sensing Switch OFF Stuck Malfunction; DTC C1431: Brake Pedal Load Sensing Switch ON Stuck Malfunction**
C1431	Brake Pedal Load Sensing Switch ON Stuck Malfunction	Refer to **DTC C1430: Brake Pedal Load Sensing Switch OFF Stuck Malfunction; DTC C1431: Brake Pedal Load Sensing Switch ON Stuck Malfunction**
C1432	Steering Angle Sensor Power Source Voltage Malfunction	Refer to **DTC C1432: Steering Angle Sensor Power Source Voltage Malfunction**
C1433	Steering Angle Sensor Internal Circuit	Refer to **DTC C1433: Steering Angle Sensor Internal Circuit**
C1434	Steering Angle Sensor Output Malfunction	Refer to **DTC C1434: Steering Angle Sensor Output Malfunction**
C1435	Yaw Rate Sensor Internal Circuit	Refer to **DTC C1419: Acceleration Sensor Internal Circuit; DTC C1435: Yaw Rate Sensor Internal Circuit**
C1436	Yaw Rate Sensor Malfunction	Refer to **DTC C1436: Yaw Rate Sensor Malfunction**
C1437	Lost Communication with ECM	Refer to **DTC C1437: Lost Communication with ECM**
C1439	Steering Angle Sensor Initialization Incomplete	Refer to **DTC C1439: Steering Angle Sensor Initialization Incomplete; DTC C1445: Vehicle Driven with Steering Angle Sensor not Initialized**
C1440	Unusual Bank Angle Detected	Refer to **DTC C1440: Unusual Bank Angle Detected**
C1441	Brake Booster Malfunction	Refer to **DTC C1441: Brake Booster Malfunction**
C1442	Invalid Data Received from Acceleration Sensor	Refer to **DTC C1442: Invalid Data Received from Acceleration Sensor; DTC C1443: Invalid Data Received from Yaw Rate Sensor**
C1443	Invalid Data Received from Yaw Rate Sensor	Refer to **DTC C1442: Invalid Data Received from Acceleration Sensor; DTC C1443: Invalid Data Received**

		from Yaw Rate Sensor
C1445	Vehicle Driven with Steering Angle Sensor not Initialized	Refer to **DTC C1439: Steering Angle Sensor Initialization Incomplete; DTC C1445: Vehicle Driven with Steering Angle Sensor not Initialized**
U0073	Control Module Communication Bus OFF	Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**
U0100	Lost Communication with ECM / PCM	Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**
U0123	Lost Communication with Yaw Rate Sensor Module	Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**
U0124	Lost Communication with Lateral Acceleration Sensor Module	Refer to **DTC U0073: Control Module Communication Bus OFF; DTC U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**
		Refer to **DTC U0073: Control Module Communication Bus OFF; DTC**

U0126	Lost Communication with Steering Angle Sensor Module	**U0100: Lost Communication with ECM / PCM; DTC U0123: Lost Communication with Yaw Rate Sensor Module; DTC U0124: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126: Lost Communication with Steering Angle Sensor Module**

*1 to *3:

Even after the trouble areas are repaired, the ABS warning light will not go off unless the following operations are performed:

- *1:
  a. Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
  b. Clear the DTCs.

- *2:
  a. Turn the ignition switch to ON.
  b. Keep the vehicle stationary for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
  c. Drive the vehicle at a speed of 50 km/h (31 mph) and depress and hold the brake pedal firmly for approximately 3 seconds.
  d. Repeat the above operation 3 times or more and check that the ABS warning light goes off.
  e. Clear the DTCs.

- *3:
  a. Turn the ignition switch to ON.
  b. Depress the brake pedal.
  c. Clear the DTCs.

TEST MODE DTC

DTC Code	Detection Item	See
C1271	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	Refer to **DTC C1271: Low Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1272: Low Output Signal of Front Speed Sensor LH (Test Mode DTC); DTC C1275: Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1276: Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)**

C1272	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	Refer to **DTC C1271: Low Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1272: Low Output Signal of Front Speed Sensor LH (Test Mode DTC); DTC C1275: Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1276: Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)**
C1273	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Refer to **DTC C1273: Low Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1274: Low Output Signal of Rear Speed Sensor LH (Test Mode DTC); DTC C1277: Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1278: Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)**
C1274	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Refer to **DTC C1273: Low Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1274: Low Output Signal of Rear Speed Sensor LH (Test Mode DTC); DTC C1277: Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1278: Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)**
C1275	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	Refer to **DTC C1271: Low Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1272: Low Output Signal of Front Speed Sensor LH (Test Mode DTC); DTC C1275: Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1276: Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)**
C1276	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	Refer to **DTC C1271: Low Output Signal of Front Speed Sensor RH (Test Mode DTC); DTC C1272: Low Output Signal of Front Speed Sensor LH (Test Mode DTC); DTC C1275: Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC);**

		DTC C1276: Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)
C1277	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	Refer to **DTC C1273: Low Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1274: Low Output Signal of Rear Speed Sensor LH (Test Mode DTC); DTC C1277: Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1278: Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)**
C1278	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	Refer to **DTC C1273: Low Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1274: Low Output Signal of Rear Speed Sensor LH (Test Mode DTC); DTC C1277: Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC); DTC C1278: Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)**
C1279	Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)	Refer to **DTC C1279: Acceleration Sensor Output Voltage Malfunction (Test Mode DTC)**
C1281	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	Refer to **DTC C1281: Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)**