2010 BRAKES

Electronically Controlled Brake System (Diagnostic Codes & Circuit Tests) - Prius (Except PHV)

ELECTRONICALLY CONTROLLED BRAKE SYSTEM

DTC 36: ABS CONTROL SYSTEM MALFUNCTION; DTC 43: ABS CONTROL SYSTEM MALFUNCTION

DESCRIPTION

These DTCs are stored if the VSC and/or electronically controlled brake system detects a malfunction in the ABS control system.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
36	-	Malfunction in the ABS control system.	ABS control system
43	-	Malfunction in the ABS control system.	ABS control system

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK ABS CONTROL SYSTEM**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch on (READY).
   c. Drive the vehicle at a speed of approximately 40 km/h (25 mph) or more for 60 seconds or more.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTC (ABS control system DTC) is not	A

output	
DTC (ABS control system DTC) is output	B

B --> See step 4

A: Go to next step

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

   Result

Result	Proceed to
DTCs (36 and 43) are not output	A
DTCs (36 and/or 43) are output	B

B --> See step 5

A --> See step 3

3. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
4. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE**

CODE CHART

5. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC 42: ELECTRONICALLY CONTROLLED BRAKE SYSTEM MALFUNCTION; DTC 45: ELECTRONICALLY CONTROLLED BRAKE SYSTEM MALFUNCTION

DESCRIPTION

These DTCs are stored if the ABS and/or VSC system detects a malfunction in the electronically controlled brake system.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
42	-	Malfunction in the electronically controlled brake system.	Electronically controlled brake system
45	-	Malfunction in the electronically controlled brake system.	Electronically controlled brake system

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK ELECTRONICALLY CONTROLLED BRAKE SYSTEM**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch on (READY).
   c. Drive the vehicle at a speed of approximately 40 km/h (25 mph) or more for 60 seconds or more.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTC (Electronically controlled brake system DTC) is not output	A
DTC (Electronically controlled brake system	B

DTC) is output	

B --> See step 4

A: Go to next step

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

   Result

Result	Proceed to
DTCs (42 and 45) are not output	A
DTCs (42 and/or 45) are output	B

B --> See step 5

A --> See step 3

3. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
4. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
5. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C0200/31: FRONT SPEED SENSOR RH CIRCUIT; DTC C0205/32: FRONT SPEED SENSOR LH CIRCUIT; DTC C1271/71: LOW OUTPUT SIGNAL OF FRONT SPEED SENSOR RH (TEST MODE DTC); DTC C1272/72: LOW OUTPUT SIGNAL OF FRONT SPEED SENSOR LH (TEST MODE DTC)

DESCRIPTION

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

DTCs C1271/71 and C1272/72 can be cleared when the speed sensor sends a wheel speed signal or when Test Mode ends. DTCs C1271/71 and C1272/72 are output only in Test Mode.

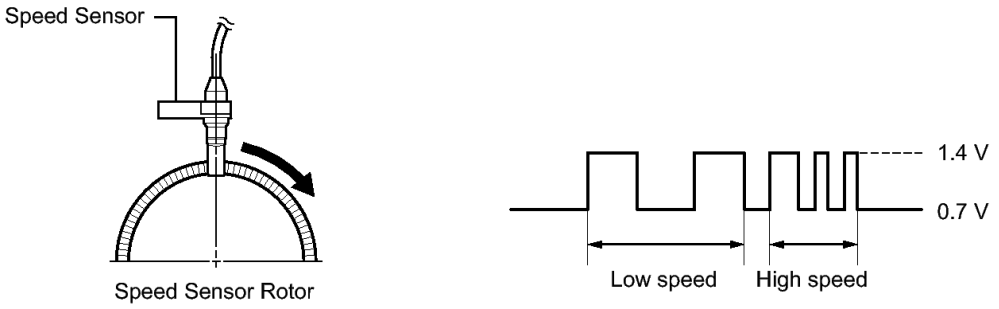

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Fig. 1: Identifying Front Wheel Speed Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C0200/31	501	While driving at 10 km/h (6 mph) or more, speed sensor output from one or two wheels is lower than that from other wheels for 15 seconds or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	502	A malfunction occurs in 2 or more wheels.	?
?	503	An open is detected in the speed sensor signal circuit for 0.05 seconds or more.	• Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor RH • Brake booster with master

			cylinder (Skid control ECU)
?	504	Instantaneous interruption of sensor signal from the malfunctioning wheel occurs 255 times or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	506	When VM1 voltage is 8.6 V or more, sensor supply voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
?	507	While driving at 10 km/h (6 mph) or more, speed sensor output from one wheel is 0 km/h (0 mph) for 1 second or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	508	When IG1 terminal voltage is 9.5 V or more, sensor voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
C0205/32	511	While driving at 10 km/h (6 mph) or more, speed sensor output from one or two wheels is lower than that from other wheels for 15 seconds or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor LH • Brake booster with master cylinder (Skid control ECU)
		A malfunction occurs in 2 or	

?	512	more wheels.	?
?	513	An open is detected in the speed sensor signal circuit for 0.05 seconds or more.	• Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor LH • Brake booster with master cylinder (Skid control ECU)
?	514	Instantaneous interruption of sensor signal from the malfunctioning wheel occurs 255 times or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor LH • Brake booster with master cylinder (Skid control ECU)
?	516	When VM1 voltage is 8.6 V or more, sensor supply voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
?	517	While driving at 10 km/h (6 mph) or more, speed sensor output from one wheel is 0 km/h (0 mph) for 1 second or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	518	When IG1 terminal voltage is 9.5 V or more, sensor voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
C1271/71 C1272/72	-	Detected only during Test Mode.	• Front speed sensor RH/LH • Sensor installation • Speed sensor rotor

HINT:

- DTCs C0200/31 and C1271/71 are for the front speed sensor RH.
- DTCs C0205/32 and C1272/72 are for the front speed sensor LH.

WIRING DIAGRAM

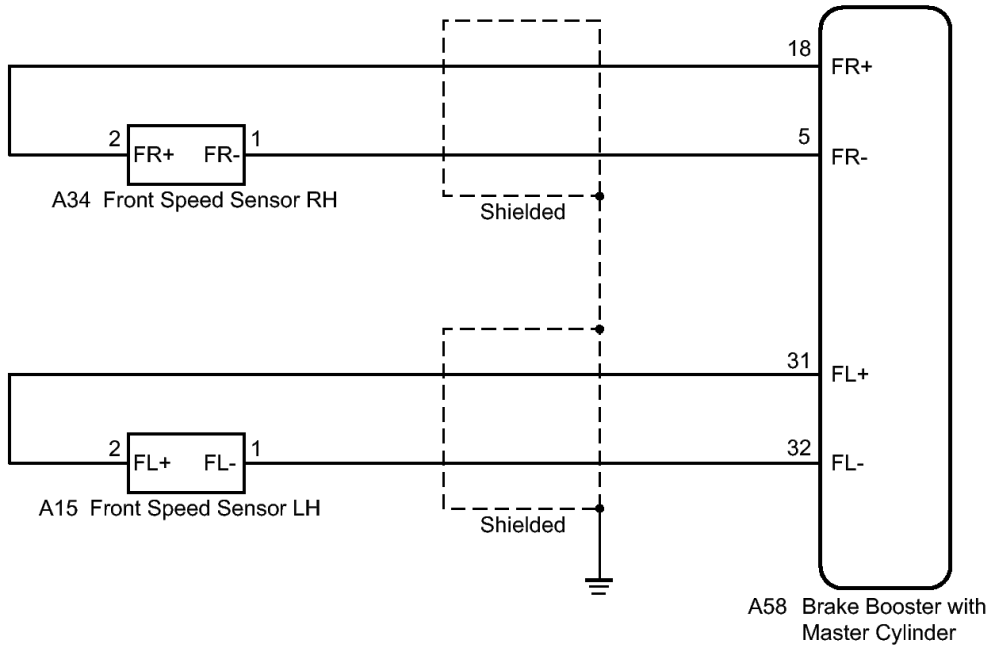


Fig. 2: Identifying Front Speed Sensor Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

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

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	-

OK

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)**
   a. 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 speed sensor RH / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
FL Wheel Speed	Front speed sensor LH / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

b. 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: Go to next step

3. **PERFORM TEST MODE INSPECTION (SIGNAL CHECK)**
   a. Turn the power 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 5

   OK: Go to next step

4. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   d. Perform a road test.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C0200/31 and C0205/32)	A

are not output	
DTCs (C0200/31 and/or C0205/32) 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 10

A --> See step 14

5. **CHECK FRONT SPEED SENSOR INSTALLATION**
   a. Turn the power switch off.

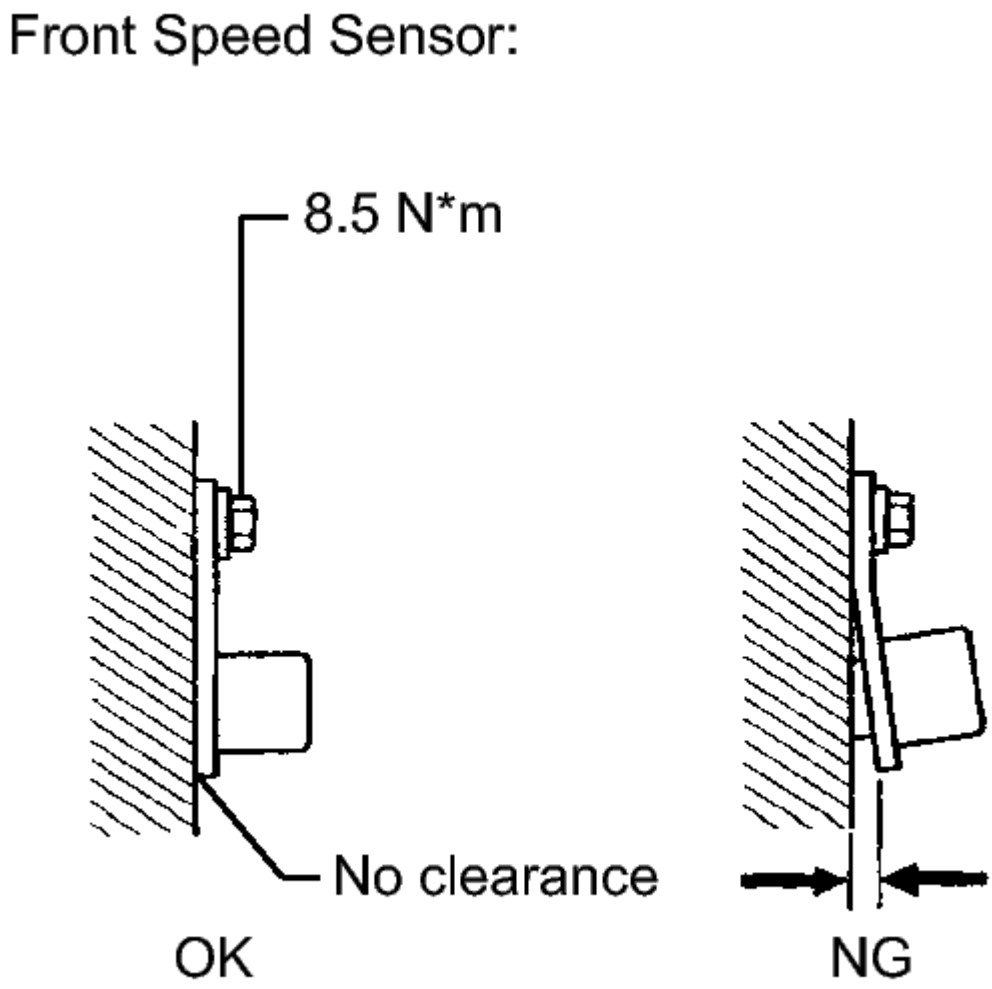


Fig. 3: Identifying Proper Front Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

8.5 N*m (87 kgf*cm, 75 in.*lbf)

NG --> See step 16

OK: Go to next step

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

      OK

      The sensor tip is free of scratches, oil, and foreign matter.

      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

7. **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 connectors.

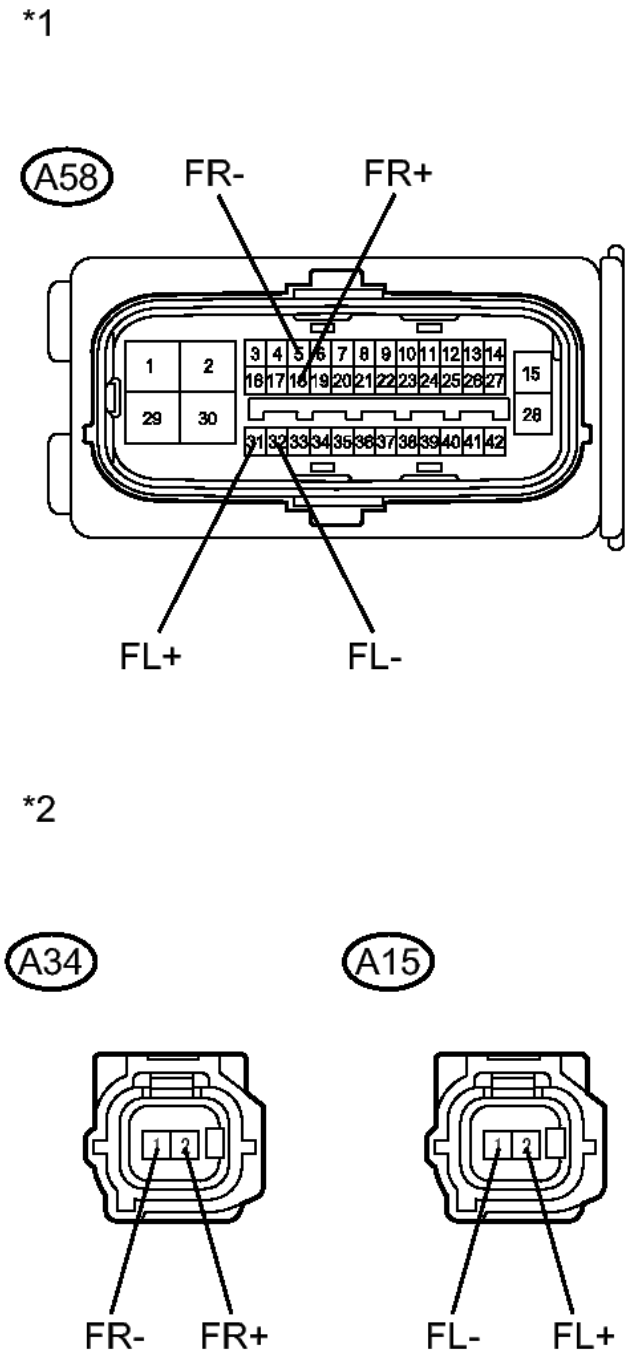


Fig. 4: Identifying Skid Control ECU Connector And Front Speed Sensor Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector and the front speed sensor connector.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

for RH

for LH

Tester Connection	Condition	Specified Condition
A58-18 (FR+) - A34-2 (FR+)	Always	Below 1 ohms
A58-18 (FR+) - Body ground	Always	10 kohms or higher
A58-5 (FR-) - A34-1 (FR-)	Always	Below 1 ohms
A58-5 (FR-) - Body ground	Always	10 kohms or higher

Tester Connection	Condition	Specified Condition
A58-31 (FL+) - A15-2 (FL+)	Always	Below 1 ohms
A58-31 (FL+) - Body ground	Always	10 kohms or higher
A58-32 (FL-) - A15-1 (FL-)	Always	Below 1 ohms
A58-32 (FL-) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

	Front view of wire

*1	harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Front Speed Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

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

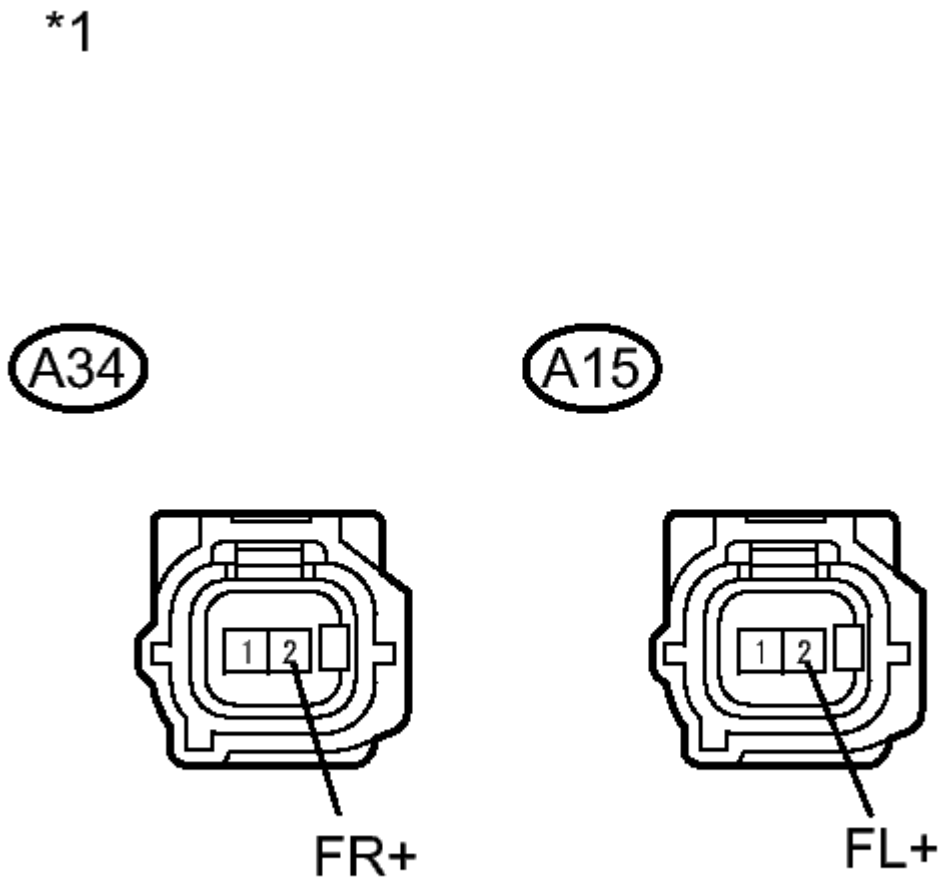


Fig. 5: Identifying Front Speed Control Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

for RH

for LH

Tester Connection	Switch Condition	Specified Condition
A34-2	Power	

(FR+) - Body ground	switch on (IG)	5.7 to 14 V

Tester Connection	Switch Condition	Specified Condition
A15-2 (FL+) - Body ground	Power switch on (IG)	5.7 to 14 V

TEXT IN ILLUSTRATION

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

NG --> See step 15

OK: Go to next step

9. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Reconnect the front speed sensor connector.
   c. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   d. Turn the power switch on (READY).
   e. Perform a road test.
   f. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C0200/31 and/or C0205/32) are output	A
DTCs (C0200/31	

and C0205/32) are not 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 14

A: Go to next step

10. **REPLACE FRONT SPEED SENSOR**
    a. Turn the power 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

11. **RECONFIRM DTC**
    a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
    b. Turn the power switch on (READY).
    c. Perform a road test.
    d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C0200/31 and/or C0205/32) are output	A
DTCs (C0200/31 and C0205/32) are not 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 --> END

A: Go to next step

12. **REPLACE FRONT SPEED SENSOR ROTOR**
    a. Turn the power switch off.
    b. Replace the front axle hub sub-assembly (front speed sensor rotor). Refer to **REMOVAL** .

HINT:

The front speed sensor rotor is incorporated into the front axle hub sub-assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle hub sub-assembly.

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

NEXT: Go to next step

13. **RECONFIRM DTC**
    a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
    b. Turn the power switch on (READY).
    c. Perform a road test.
    d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C0200/31 and/or C0205/32) are output	A
DTCs (C0200/31 and C0205/32) are not	B

output	

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 --> See step 15

14. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
15. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
16. **INSTALL FRONT SPEED SENSOR CORRECTLY. Refer to INSTALLATION**

DTC C0210/33: REAR SPEED SENSOR RH CIRCUIT; DTC C0215/34: REAR SPEED SENSOR LH CIRCUIT; DTC C1273/73: LOW OUTPUT SIGNAL OF REAR SPEED SENSOR RH (TEST MODE DTC); DTC C1274/74: LOW OUTPUT SIGNAL OF REAR SPEED SENSOR LH (TEST MODE DTC)

DESCRIPTION

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

DTCs C1273/73 and C1274/74 can be cleared when the speed sensor sends a wheel speed signal or when Test Mode ends. DTCs C1273/73 and C1274/74 are output only in Test Mode.

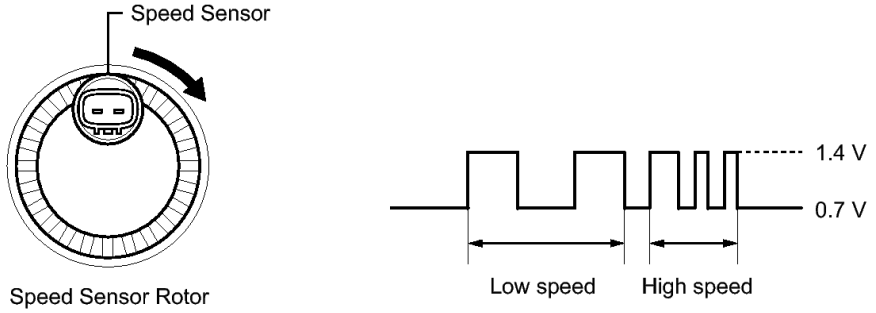


Fig. 6: Identifying Rear Wheel Speed Sensor
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
			• Open or short in speed sensor

C0210/33	521	While driving at 10 km/h (6 mph) or more, speed sensor output from one or two wheels is lower than that from other wheels for 15 seconds or more.	• Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	522	A malfunction occurs in 2 or more wheels.	?
?	523	An open is detected in the speed sensor signal circuit for 0.05 seconds or more.	• Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	524	Instantaneous interruption of sensor signal from the malfunctioning wheel occurs 255 times or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	526	When VM1 voltage is 8.6 V or more, sensor supply voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
?	527	While driving at 10 km/h (6 mph) or more, speed sensor output from one wheel is 0 km/h (0 mph) for 1 second or	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or

		more.	corrosion of terminals • Rear speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	528	When IG1 terminal voltage is 9.5 V or more, sensor voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
C0215/34	531	While driving at 10 km/h (6 mph) or more, speed sensor output from one or two wheels is lower than that from other wheels for 15 seconds or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor LH • Brake booster with master cylinder (Skid control ECU)
?	532	A malfunction occurs in 2 or more wheels.	?
?	533	An open is detected in the speed sensor signal circuit for 0.05 seconds or more.	• Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor LH • Brake booster with master cylinder (Skid control ECU)
?	534	Instantaneous interruption of sensor signal from the malfunctioning wheel occurs 255 times or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor LH • Brake booster with master cylinder (Skid control ECU)
?	536	When VM1 voltage is 8.6 V or more, sensor supply voltage	• Open or short in wire harness

		drops for 0.5 seconds or more.	• Brake booster with master cylinder (Skid control ECU)
?	537	While driving at 10 km/h (6 mph) or more, speed sensor output from one wheel is 0 km/h (0 mph) for 1 second or more.	• Open or short in speed sensor • Improperly installed speed sensor, or abnormal clearance between sensor and rotor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Rear speed sensor RH • Brake booster with master cylinder (Skid control ECU)
?	538	When IG1 terminal voltage is 9.5 V or more, sensor voltage drops for 0.5 seconds or more.	• Open or short in wire harness • Brake booster with master cylinder (Skid control ECU)
C1273/73 C1274/74	-	Detected only during Test Mode.	• Rear speed sensor RH/LH • Sensor installation • Speed sensor rotor

HINT:

- DTCs C0210/33 and C1273/73 are for the rear speed sensor RH.
- DTCs C0215/34 and C1274/74 are for the rear speed sensor LH.

WIRING DIAGRAM

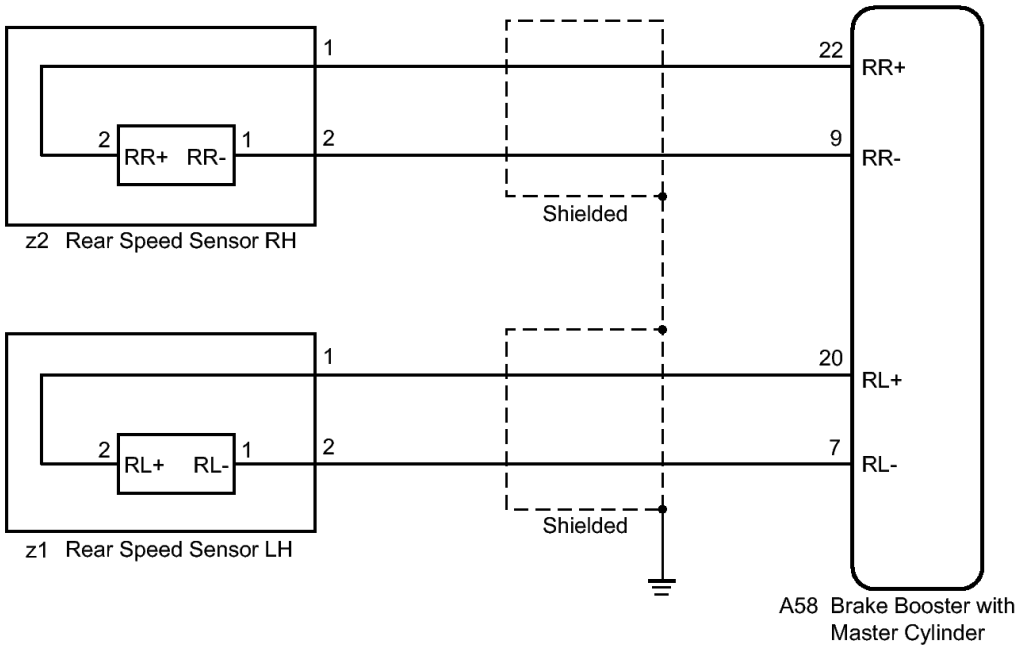


Fig. 7: Identifying Rear Speed Sensor Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

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

ABS/VSC/TRAC

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

RL Speed Open	sensor LH open detection / Error or Normal	Momentary interruption Normal: Normal	-

OK

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (REAR SPEED SENSOR)**
   a. 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 speed sensor RH / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations
RL Wheel Speed	Rear speed sensor LH / Min.: 0 km/h (0 mph), Max.: 326.4 km/h (202 mph)	Vehicle stopped: 0 km/h (0 mph)	When driving at constant speed: No large fluctuations

   b. 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: Go to next step

3. **PERFORM TEST MODE INSPECTION (SIGNAL CHECK)**
   a. Turn the power 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 5

   OK: Go to next step

4. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   d. Perform a road test.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C0210/33 and C0215/34) are not output	A
DTCs (C0210/33 and/or C0215/34) 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 10

A --> See step 12

5. **CHECK REAR SPEED SENSOR INSTALLATION**
   a. Turn the power switch off.

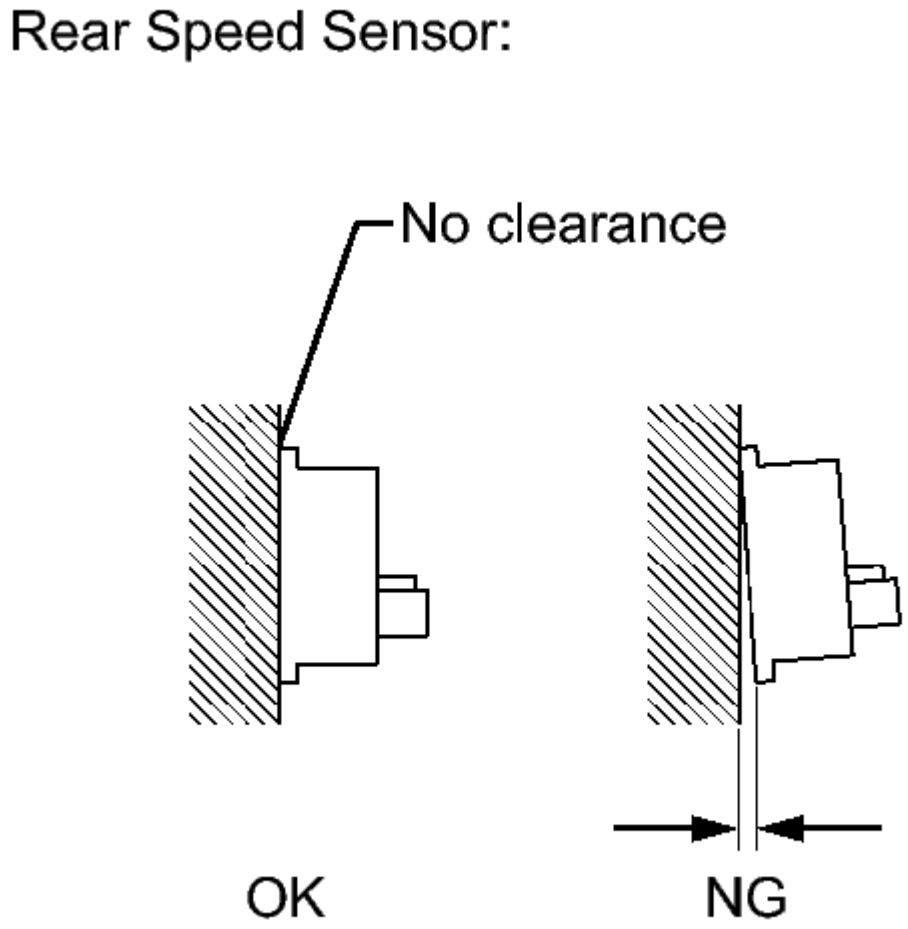


Fig. 8: Identifying Proper Rear Speed Sensor Installation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Check the speed sensor installation.

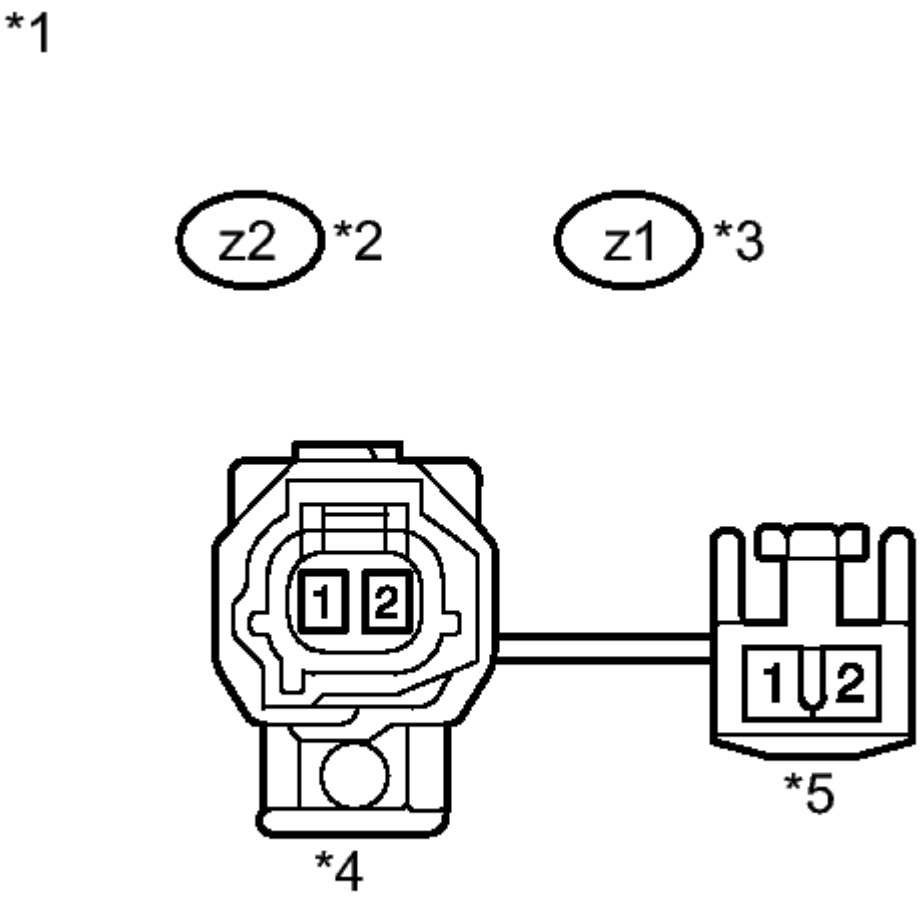
OK

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

NG --> See step 14

OK: Go to next step

6. **CHECK HARNESS AND CONNECTOR (SKID CONTROL SENSOR WIRE)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.



N

Fig. 9: Identifying Rear Speed Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Disconnect the rear speed sensor connector and the skid control sensor wire.
   c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

for RH

for LH

Tester Connection	Condition	Specified Condition
z2 ("A"-2) - z2 ("B"-1)	Always	Below 1 ohms
z2 ("A"-2) - z2 ("B"-2)	Always	10 kohms or higher
z2 ("A"-2) - Body ground	Always	10 kohms or higher
z2 ("A"-1) - z2 ("B"-2)	Always	Below 1 ohms
z2 ("A"-1) - z2 ("B"-1)	Always	10 kohms or higher
z2("A"-1) - Body ground	Always	10 kohms or higher

Tester Connection	Condition	Specified Condition
z1 ("A"-2) - z1 ("B"-1)	Always	Below 1 ohms
z1 ("A"-2) - z1 ("B"-2)	Always	10 kohms or higher
z1 ("A"-2) - Body ground	Always	10 kohms or higher
z1 ("A"-1) - z1 ("B"-2)	Always	Below 1 ohms
z1 ("A"-1) - z1 ("B"-1)	Always	10 kohms or higher
z1 ("A"-1) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of skid control

	sensor wire
*2	for RH
*3	for LH
*4	Front view of wire harness connector (to Sensor Side Connector "A")
*5	Front view of wire harness connector (to Vehicle Side Connector "B")

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

NG --> See step 15

OK: Go to next step

7. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)**
   a. Reconnect the skid control sensor wire (for vehicle side connector).

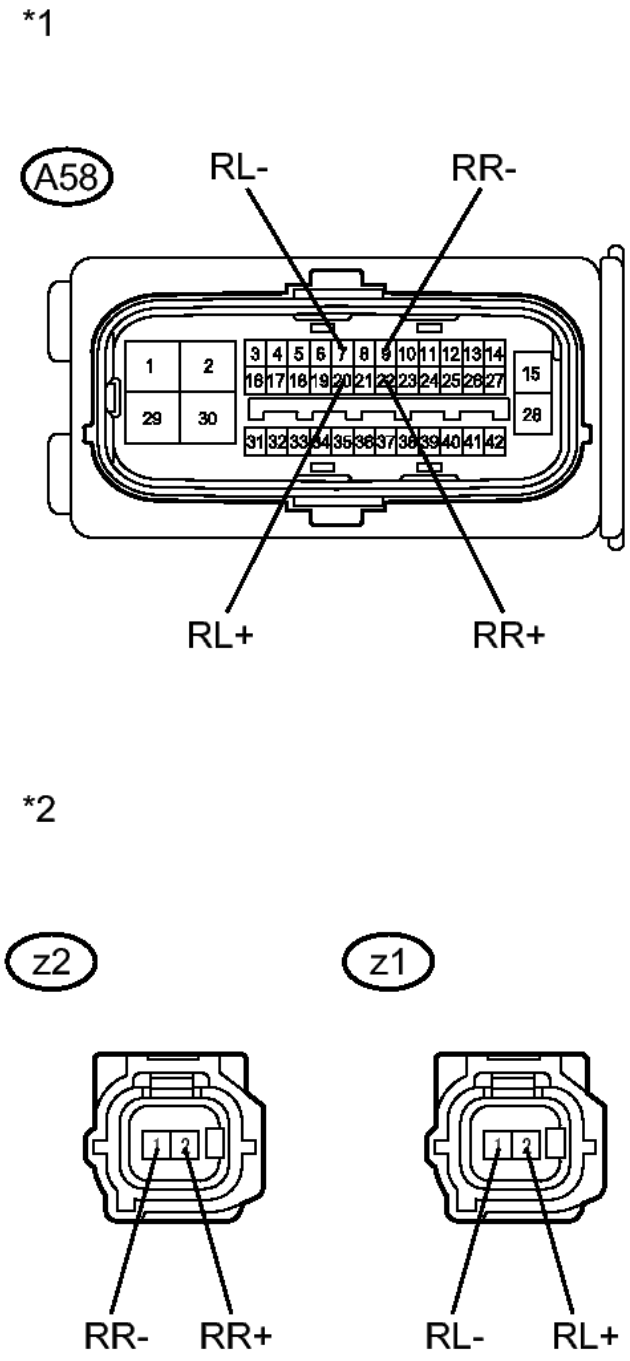


Fig. 10: Identifying Skid Control ECU Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

for RH

for LH

Tester Connection	Condition	Specified Condition
A58-22 (RR+) - z2-2 (RR+)	Always	Below 1 ohms
A58-22 (RR+) - Body ground	Always	10 kohms or higher
A58-9 (RR-) - z2-1 (RR-)	Always	Below 1 ohms
A58-9 (RR-) - Body ground	Always	10 kohms or higher

Tester Connection	Condition	Specified Condition
A58-20 (RL+) - z1-2 (RL+)	Always	Below 1 ohms
A58-20 (RL+) - Body ground	Always	10 kohms or higher
A58-7 (RL-) - z1-1 (RL-)	Always	Below 1 ohms
A58-7 (RL-) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness

	connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Rear Speed Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

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

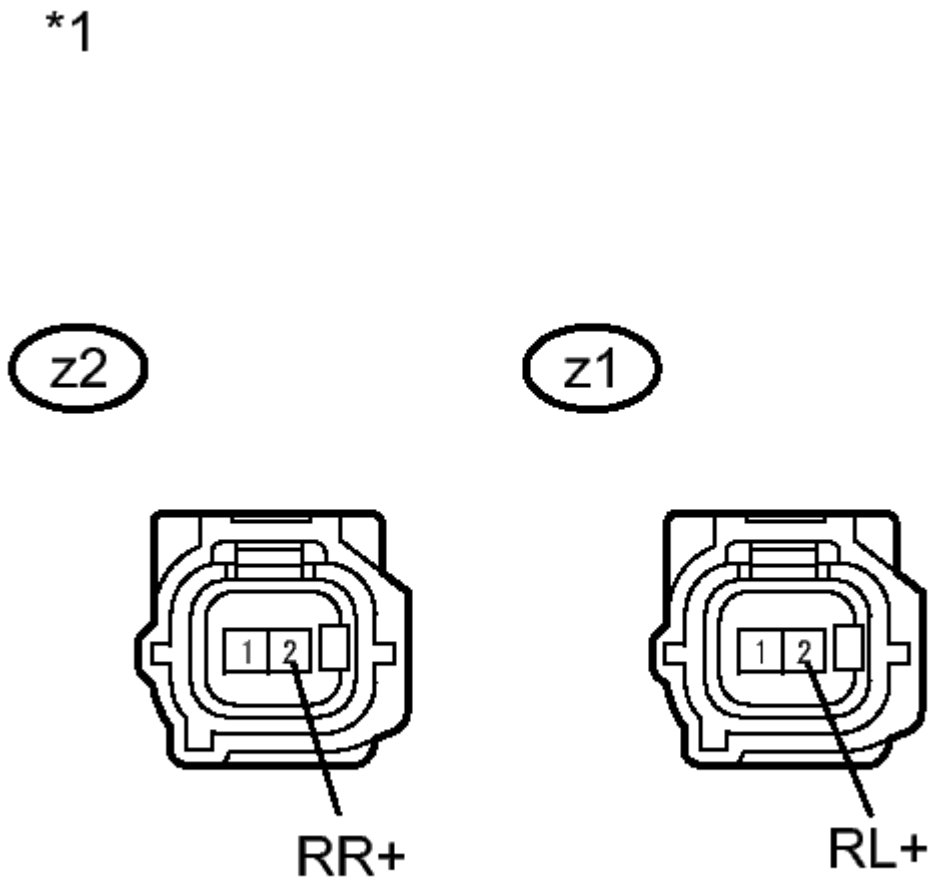


Fig. 11: Identifying Skid Control ECU Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

for RH

for LH

Tester Connection	Switch Condition	Specified Condition
z2-2 (RR+)	Power	5.7 to 14

- Body ground	switch on (IG)	V

Tester Connection	Switch Condition	Specified Condition
z1-2 (RL+) - Body ground	Power switch on (IG)	5.7 to 14 V

TEXT IN ILLUSTRATION

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

NG --> See step 13

OK: Go to next step

9. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Reconnect the rear speed sensor connector.
   c. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   d. Turn the power switch on (READY).
   e. Perform a road test.
   f. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C0210/33 and/or C0215/34) are output	A
DTCs (C0210/33 and C0215/34)	B

are not output	

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 12

A: Go to next step

10. **REPLACE REAR SPEED SENSOR AND REAR SPEED SENSOR ROTOR**
    a. Turn the power 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

11. **RECONFIRM DTC**
    a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
    b. Turn the power switch on (READY).
    c. Perform a road test.
    d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

    Result

Result	Proceed to
DTCs (C0210/33 and/or C0215/34) are output	A
DTCs	

(C0210/33 and C0215/34) are not 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 --> END

A --> See step 13

12. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
13. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
14. **INSTALL REAR SPEED SENSOR CORRECTLY. Refer to INSTALLATION**
15. **REPLACE SKID CONTROL SENSOR WIRE. Refer to REMOVAL**

DTC C0371/71: YAW RATE SENSOR (TEST MODE DTC); DTC C1234/34: YAW RATE SENSOR MALFUNCTION; DTC C1243/43: ACCELERATION SENSOR STUCK MALFUNCTION; DTC C1244/44: OPEN OR SHORT IN ACCELERATION SENSOR CIRCUIT; DTC C1245/45: ACCELERATION SENSOR OUTPUT MALFUNCTION; DTC C1279/79: ACCELERATION SENSOR OUTPUT VOLTAGE MALFUNCTION (TEST MODE DTC); DTC C1381/97: 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 are any problems in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123/62 (Lost Communication with Yaw Rate Sensor Module) and U0124/95 (Lost Communication with Lateral Acceleration Sensor Module) are output.

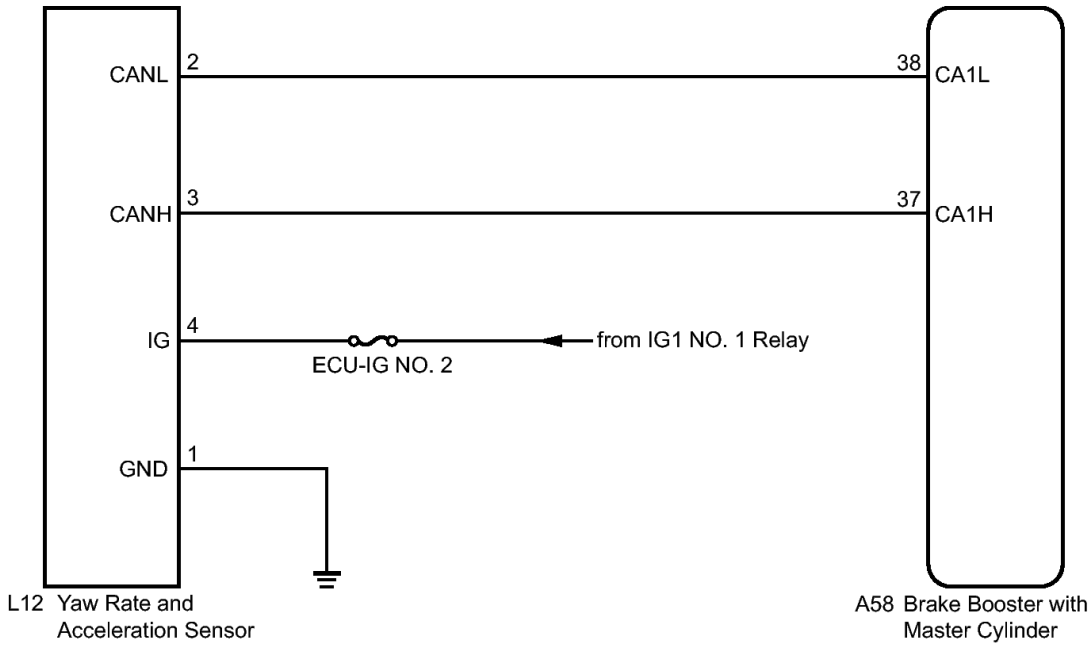
These DTCs are also output when calibration has not been completed.

DTCs C0371/71 and C1279/79 will be cleared when the yaw rate and acceleration sensor sends a yaw rate and/or acceleration signal or when Test Mode ends. DTCs C0371/71 and C1279/79 are output only in Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1234/34	711	While yaw rate sensor communication is enabled, a malfunction signal output is received during the sensor self-check (Sensor 1 (GL1) malfunction).	Yaw rate and acceleration sensor internal malfunction
?	712	While yaw rate sensor communication is enabled, a malfunction signal output is received during the sensor self-check (Sensor 2 (GL2) malfunction).	?
?	713	While yaw rate sensor communication is enabled, a malfunction signal output is received during the sensor self-check (Zero point calibration malfunction).	?
?	714	While yaw rate sensor communication is enabled, a malfunction signal output is received during the sensor self-check (Two-value comparison malfunction).	?
C1243/43	561	An acceleration sensor malfunction occurs 16 times or more when the vehicle speed drops from above 30 km/h (19 mph) to 0 km/h (0 mph).	Yaw rate and acceleration sensor internal stuck malfunction
?	562 563 564	A fixed acceleration sensor value is determined.	?
C1244/44	571	Either of the following is detected: 1. Difference between GL1 and GL2 does not become less than 0.4 G for 60 seconds or more after reaching 0.6 G when the vehicle is stopped. 2. A malfunction signal from the acceleration sensor is received.	• Yaw rate and acceleration sensor installed improperly • Yaw rate and acceleration sensor
C1245/45	581	Difference between longitudinal G calculated from the acceleration sensor value and that calculated from the vehicle speed exceeds 0.35	• Yaw rate and acceleration sensor installed improperly • Yaw rate and acceleration

		G for 60 seconds or more.	sensor
C1381/97	601	While yaw rate and acceleration sensor communication is enabled, a supply voltage malfunction signal is received from the sensor for 10 seconds.	• Yaw rate and acceleration sensor supply voltage shut down • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU)
C0371/71	-	Detected only during Test Mode.	• Sensor installation • Yaw rate and acceleration sensor
C1279/79	-	Detected only during Test Mode.	• Sensor installation • Yaw rate and acceleration sensor

WIRING DIAGRAM



N

Fig. 12: Yaw Rate And Acceleration Sensor To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the yaw rate and acceleration sensor, perform zero point

calibration. Refer to CALIBRATION .

HINT:

When U0123/62 and/or U0124/95 is output together with C1234/34, C1243/43, C1244/44, C1245/45, and/or C1381/97, inspect and repair the trouble areas indicated by U0123/62 and/or U0124/95 first. Refer to **DTC U0073/94: Control Module Communication Bus OFF; DTC U0123/62: Lost Communication with Yaw Rate Sensor Module; DTC U0124/95: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126/63: Lost Communication with Steering Angle Sensor Module; DTC U0293/59: Communication Error from HV ECU**.

PROCEDURE

1. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch off.
   c. Turn the power switch on (READY).
   d. Drive the vehicle at a speed of 30 km/h (19 mph) or more, turn the steering wheel, and decelerate (depress the brake pedal) the vehicle.
   e. Turn the power switch on (IG) again and check that no CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .
   f. Check if DTC C1210/36 (Zero Point Calibration of Yaw Rate Sensor Undone) or C1336/98 (Zero Point Calibration of Acceleration Sensor Undone) is output. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C1210/36, C1336/98 and CAN communication system DTC) are not output	A
CAN communication system DTC is output	B
DTCs (C1210/36 and/or C1336/98) are output	C

C --> See step 7

B --> See step 6

A: Go to next step

2. **CHECK YAW RATE AND ACCELERATION SENSOR INSTALLATION**
   a. Turn the power 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 tilted.

NG --> See step 8

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 connector.

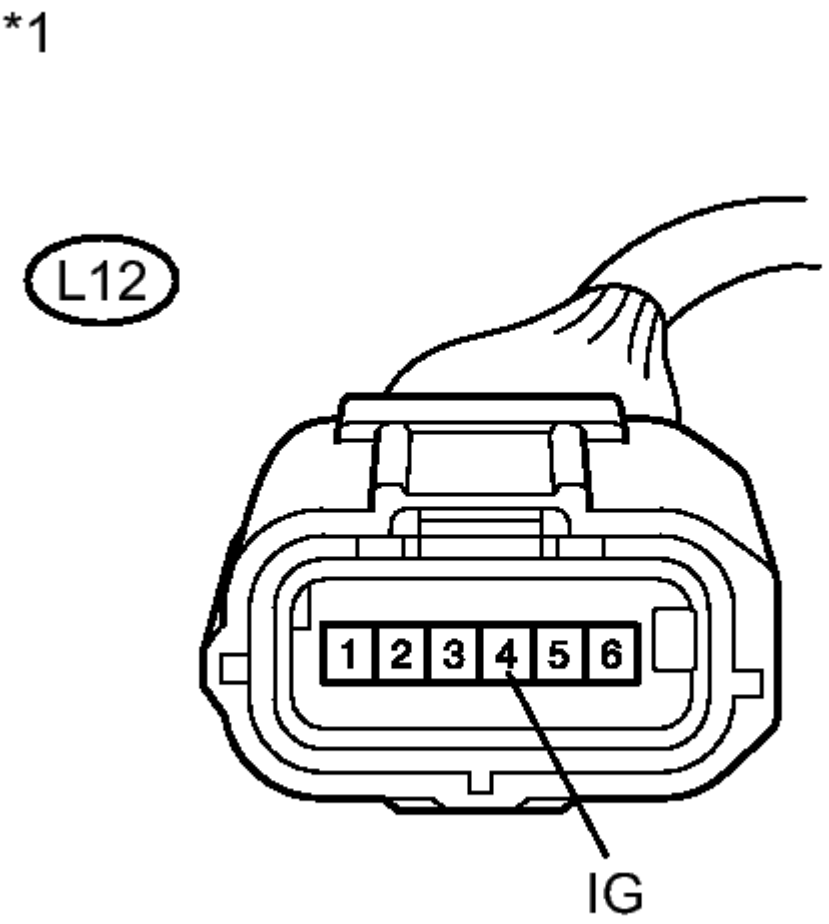


Fig. 13: Identifying Yaw Rate And Acceleration Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
L12-4 (IG) - Body ground	Power switch on (IG)	11 to 14 V

TEXT IN ILLUSTRATION

*1	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 power switch off.

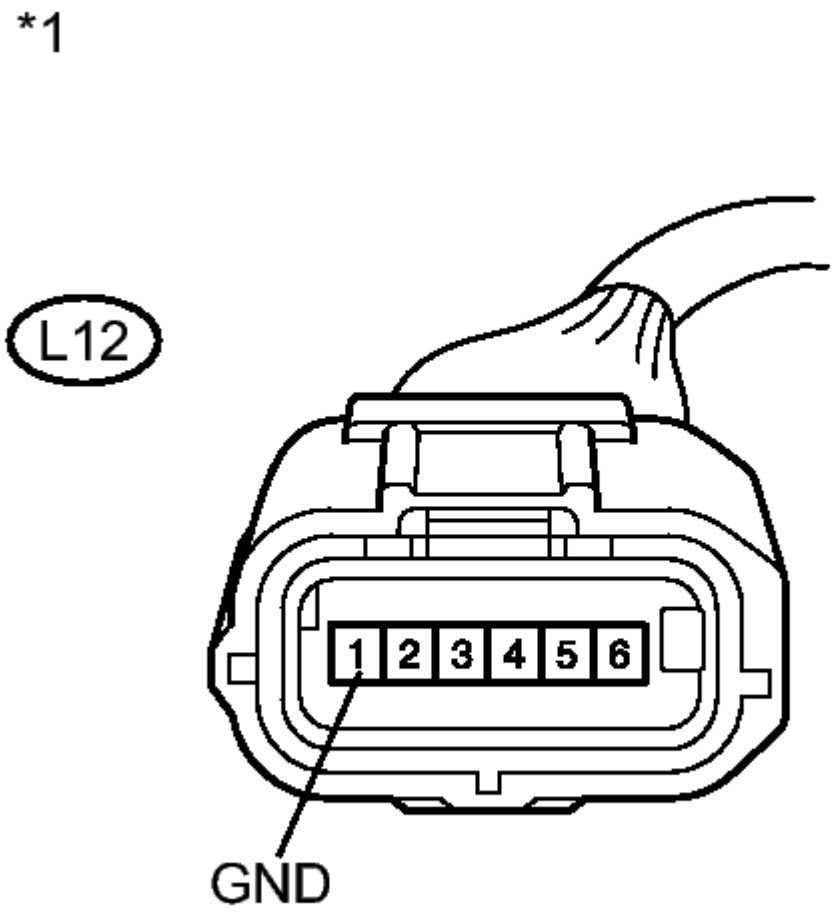


Fig. 14: Identifying Yaw Rate And Acceleration Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
L12-1 (GND) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

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

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

OK --> See step 5

5. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
6. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
8. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**

DTC C1202/68: MASTER RESERVOIR LEVEL MALFUNCTION

DESCRIPTION

When a fluid level drop in the master cylinder reservoir is detected, the signal is input to the skid control ECU.

If the DTC for the fluid level drop is memorized, the warning will be canceled and the DTC will not be stored when the fluid level returns to normal.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1202/68	371	An open is detected in the switch signal circuit for 2 seconds or more.	• Brake master cylinder reservoir (Brake fluid level warning switch) internal open circuit • Open in wire harness • Brake booster with master

			cylinder (Skid control ECU)
?	-	The reservoir level remains low.	• Low brake fluid level • Brake fluid leaks • Brake master cylinder reservoir (Brake fluid level warning switch) internal short circuit • Short in wire harness • Brake disc rotor excessive wear • Brake booster with master cylinder (Skid control ECU)

WIRING DIAGRAM

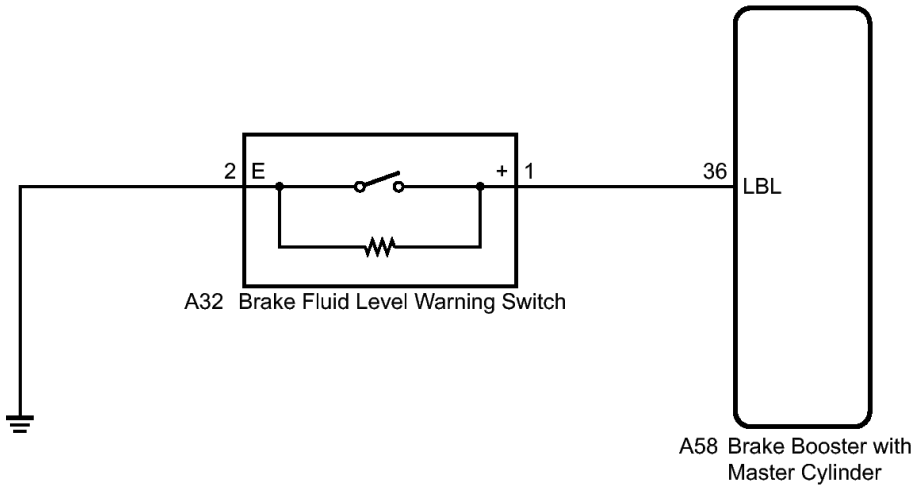


Fig. 15: Brake Fluid Level Warning Switch To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

When releasing the parking brake, chock the wheels for safety.

PROCEDURE

1. **CHECK BRAKE FLUID LEVEL**
   a. Check that the brake fluid level is sufficient.

      OK

      Brake fluid level is sufficient.

      HINT:

      If the fluid level is low, check for fluid leaks, and repair as necessary.

      1. Check for brake fluid leaks (Connection between the brake booster pump, brake master cylinder reservoir and brake booster with master cylinder, and the brake booster with master cylinder and wheel cylinders).

         HINT:

         If no leaks exist, add and adjust fluid using the Techstream. Refer to **ON-VEHICLE INSPECTION** .

      2. Check that the trouble code is not output again. Refer to **DTC CHECK / CLEAR** .

   b. Check that there are no leaks from the connections between the brake booster pump and brake booster with master cylinder.

      HINT:

      As a visual check is very difficult, perform the check with the following procedure.

      1. Bleed the air from the brake systems. Refer to **BLEEDING** .
      2. Connect the Techstream to the DLC3.
      3. Turn the power switch on (IG).
      4. 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
Accumulator Sensor	Accumulator pressure sensor / Min.: 0 V, Max.: 5 V	Specified value: 2.9 to 4.2 V	When brake fluid is stored in the accumulator: Accumulator pressure changes in accordance with volume

			of fluid stored in the accumulator

5. Wait for 30 seconds without depressing the brake pedal.
6. Check that the accumulator pressure sensor output values change is within the specified range.

   OK

   Accumulator pressure sensor output values change is within 0.55 V.

NG --> CHECK AND REPAIR BRAKE FLUID LEAKS OR ADD FLUID

OK: Go to next step

2. **INSPECT BRAKE FLUID LEVEL WARNING SWITCH**
   a. Turn the power switch off.

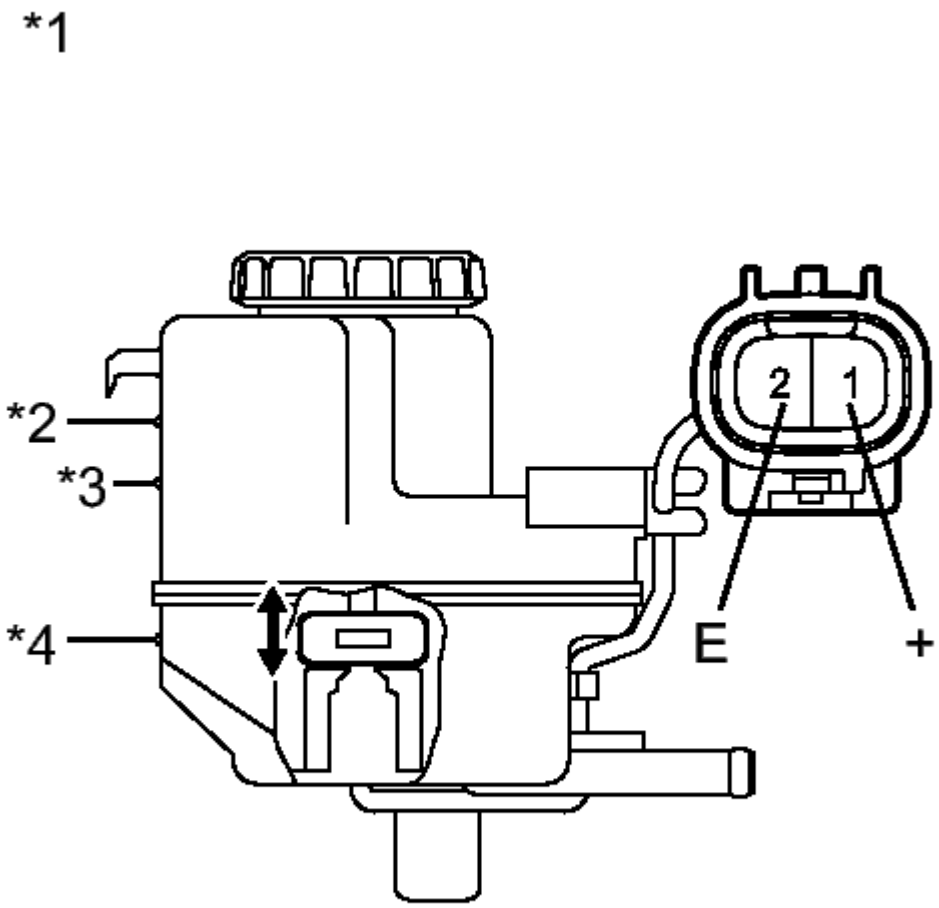


Fig. 16: Identifying Brake Reservoir And Brake Fluid Level Warning Switch
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Remove the reservoir filler cap and strainer.
c. Make sure that there is no looseness at the locking part and the connecting part of the connector.
d. Disconnect the brake fluid level warning switch connector.
e. Measure the resistance according to the value(s) in the table below.

HINT:

A float is located inside the reservoir. Its position changes according to the level of brake fluid.

Standard Resistance

Tester	Switch	Specified

Connection	Condition	Condition
1 (+) - 2 (E)	Brake fluid level warning switch OFF (Float up)	1.84 to 2.16 kohms
1 (+) - 2 (E)	Brake fluid level warning switch ON (Float down)	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Component without harness connected (Brake Fluid Level Warning Switch)
*2	MAX Line
*3	Fluid Level Support Line
*4	MIN Line

NG --> See step 8

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE FLUID LEVEL WARNING SWITCH)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.

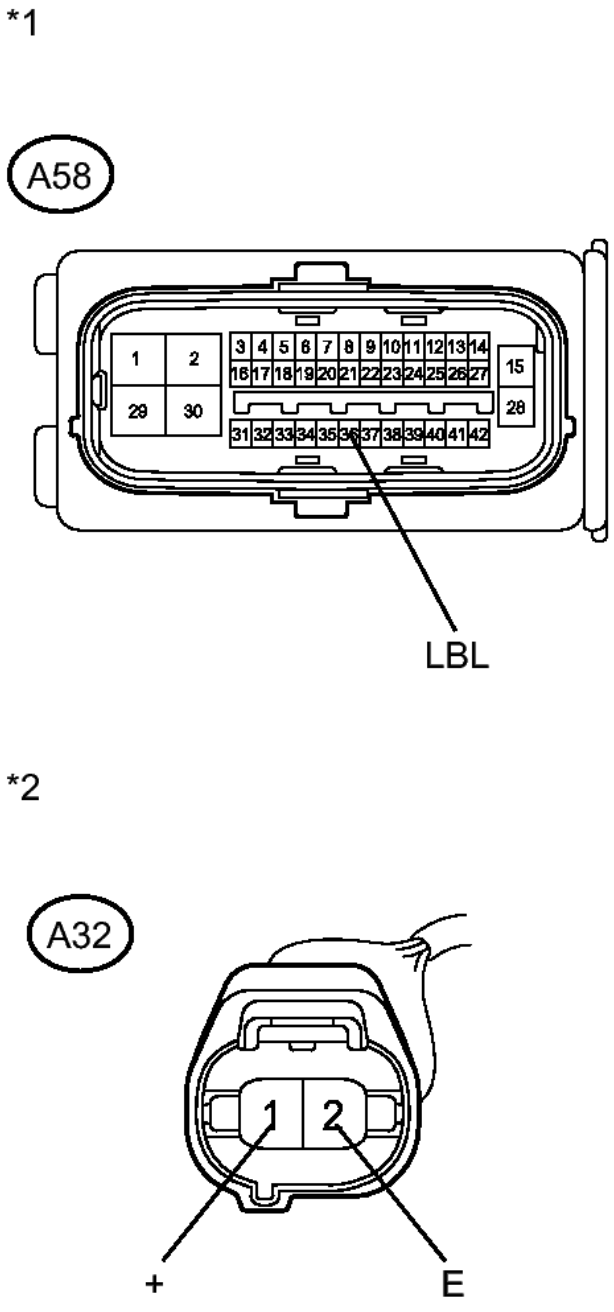


Fig. 17: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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
A58-36 (LBL) - A32-1 (+)	Always	Below 1 ohms
A58-36 (LBL) - Body ground	Always	10 kohms or higher
A32-2 (E) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Brake Fluid Level Warning Switch)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. **INSPECT SKID CONTROL ECU (SWITCH INPUT)**
   a. Reconnect the skid control ECU connector.

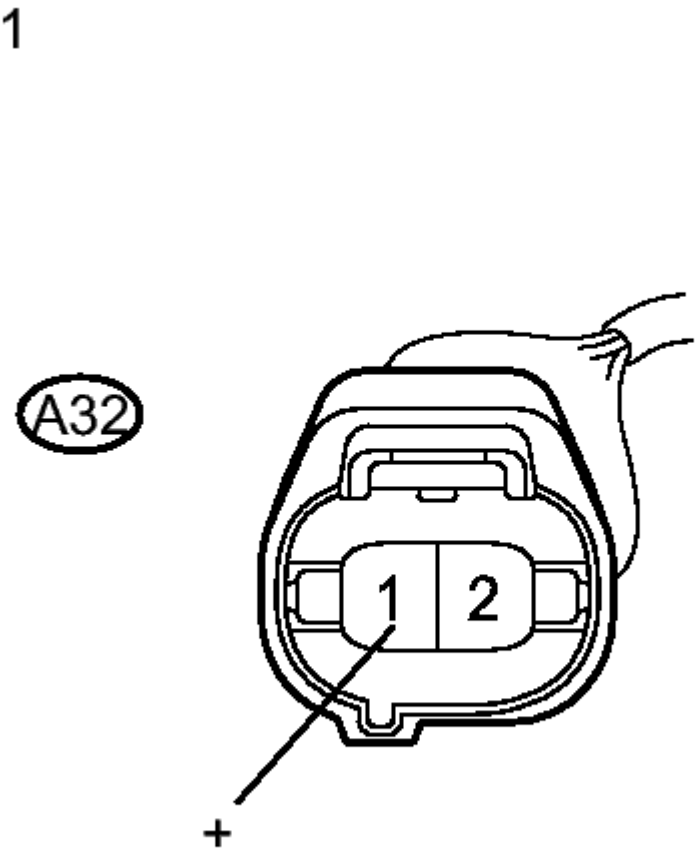


Fig. 18: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A32-1 (+) - Body ground	Power switch on (IG)	4 to 7 V

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Brake Fluid Level Warning Switch)

NG --> See step 9

OK: Go to next step

5. **CHECK BRAKE DISC**
   a. Turn the power switch off.
   b. Reconnect the brake fluid level warning switch connector.
   c. Disconnect the brake pedal stroke sensor connector.
   d. Perform a road test according to Freeze Frame Data or customer problem analysis. Check the brake line pressure vibration caused due to uneven wear of the disc according to brake pedal vibration.

      OK

      Brake pedal does not vibrate during braking.

      HINT:

      - An unevenly worn disc may vibrate the caliper piston and cause fluctuations in brake line pressure, triggering a malfunction detection condition.
      - The brake pedal does not kick back due to wheel cylinder piston vibration during electronically controlled brake system control.
      - If the brake pedal stroke sensor connector is disconnected, the fail-safe function will prohibit electronically controlled brake system control.
      - The Active Test does not prohibit electronically controlled brake system control when the vehicle is running, so disconnect the stroke sensor connector before continuing with inspection.
      - Disc uneven wear can be checked by measuring the disc thickness variation. Refer to **INSPECTION** for front, or refer to **INSPECTION** for rear).

   NG --> REPLACE BRAKE DISC

   OK: Go to next step

6. **RECONFIRM DTC**

a. Reconnect the brake pedal stroke sensor connector.
b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
c. Turn the power switch on (READY).
d. Perform a road test.
e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTC (C1202/68) is not output	A
DTC (C1202/68) 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 7

7. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
8. **REPLACE BRAKE MASTER CYLINDER RESERVOIR ASSEMBLY (BRAKE FLUID LEVEL WARNING SWITCH). Refer to REMOVAL**
9. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1203/95: ECM COMMUNICATION CIRCUIT MALFUNCTION

DESCRIPTION

The circuit is used to send TRAC and VSC information from the skid control ECU to the power management control ECU, and hybrid control system information from the power management control ECU to the skid control ECU via the CAN communication system.

Identification information sent from other ECUs is stored when shipped from the factory and used as default values.

NOTE: DTC C1203/95 is output when an incorrect ECU is installed. If initialization is

performed and learning occurs with an incorrect ECU installed, operations and functions will differ from that stored when the vehicle was shipped from the factory. Therefore, make sure that learning occurs properly.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1203/95	-	Either of the following is detected: 1. Identification information sent from other ECUs does not match with the value stored when shipped from the factory. 2. No stored information for destination.	• The wrong ECU and sensor was installed • Brake booster with master cylinder (Skid control ECU)

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK PART NUMBER**
   a. Check that a proper power management control ECU, main body ECU and yaw rate and acceleration sensor are installed.

      OK

      Proper ECUs and sensor are installed.

   b. Check if the power management control ECU, main body ECU and yaw rate and acceleration sensor had been replaced before the DTC was recorded.

      OK

      ECU and sensor had not been replaced.

      Result

Result	Proceed to
OK	A
NG (A proper power	

management control ECU is not installed and/or the power management control ECU had been replaced)	B
NG (A proper main body ECU is not installed and/or the main body ECU had been replaced)	C
NG (A proper yaw rate and acceleration sensor is not installed and/or the yaw rate and acceleration sensor had been replaced)	D

D --> See step 7

C --> See step 6

B --> See step 5

A: Go to next step

2. **PERFORM INITIALIZATION AND CALIBRATION OF LINEAR SOLENOID VALVE**
   a. Perform initialization and calibration of the linear solenoid valve. Refer to **INITIALIZATION** .

      HINT:

      Before carrying out Perform Initialization and Calibration of Linear Solenoid Valve, C1203/95 will

be output.

NEXT: Go to next step

3. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (IG).
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTC (C1203/95) is output	A
DTC (C1203/95) is not output	B

B --> END

A --> See step 4

4. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
5. **REPLACE POWER MANAGEMENT CONTROL ECU. Refer to REMOVAL**
6. **REPLACE MAIN BODY ECU (INSTRUMENT PANEL JUNCTION BLOCK). Refer to REMOVAL**
7. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**

DTC C1210/36: ZERO POINT CALIBRATION OF YAW RATE SENSOR UNDONE; DTC C1336/98: 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.

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

If there are any problems in the bus lines between the yaw rate and acceleration sensor and the CAN communication system, DTCs U0123/62 (Lost Communication with Yaw Rate Sensor Module) and U0124/95

(Lost Communication with Lateral Acceleration Sensor Module) will be output.

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

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1210/36	-	Yaw rate sensor zero point calibration is incomplete.	• Zero point calibration undone • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU) (Perform zero point calibration and check for DTCs. If no DTCs are output again, the sensor is normal.)
C1336/98	-	Either of the following is detected: 1. The vehicle is driven normally without zero point calibration completed. 2. After completing zero point calibration, zero point voltage of	• Zero point calibration undone • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU) (Perform zero point calibration

		the sensor is not within the range of 2.38 to 2.62 V.	and check for DTCs. If no DTCs are output again, the sensor is normal.)

INSPECTION PROCEDURE

NOTE:

- **When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .**
- **When replacing the yaw rate and acceleration sensor, perform zero point calibration. Refer to CALIBRATION .**

HINT:

When U0123/62 and/or U0124/95 is output together with C1210/36 and/or C1336/98, inspect and repair trouble areas indicated by U0123/62 and/or U0124/95 first. Refer to **DTC U0073/94: Control Module Communication Bus OFF; DTC U0123/62: Lost Communication with Yaw Rate Sensor Module; DTC U0124/95: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126/63: Lost Communication with Steering Angle Sensor Module; DTC U0293/59: Communication Error from HV ECU**.

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. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   d. Drive the vehicle at a speed of 30 km/h (18 mph) or more, turn the steering wheel, and decelerate (depress the brake pedal) the vehicle.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C1210/36	

and/or C1336/98) are output	A
DTCs (C1210/36 and C1336/98) are not output	B

HINT:

- The DTCs are recorded because zero point calibration has not been completed.
- End the procedure because the same DTCs are not recorded after completion of zero point calibration.

B --> END

A: Go to next step

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

   OK

   The sensor bolt should be tightened to the specified torque.

   The sensor should not be tilted.

NG --> See step 7

OK: Go to next step

4. **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 .

NEXT: Go to next step

5. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .

b. Turn the power switch on (READY).
c. Drive the vehicle at a speed of 30 km/h (18 mph) or more, turn the steering wheel, and decelerate (depress the brake pedal) the vehicle.
d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C1210/36 and/or C1336/98) are output	A
DTCs (C1210/36 and C1336/98) are not output	B

B --> END

A --> See step 6

6. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
7. **INSTALL YAW RATE AND ACCELERATION SENSOR CORRECTLY. Refer to INSTALLATION**

DTC C1211/25: SLA LINEAR SOLENOID; DTC C1212/26: SLR LINEAR SOLENOID; DTC C1225/31: SA1 SOLENOID CIRCUIT; DTC C1226/32: SA2 SOLENOID CIRCUIT; DTC C1227/33: SA3 SOLENOID CIRCUIT; DTC C1228/34: STR SOLENOID CIRCUIT; DTC C1352/21: FRONT INCREASING PRESSURE SOLENOID RH MALFUNCTION; DTC C1353/23: FRONT INCREASING PRESSURE SOLENOID LH MALFUNCTION; DTC C1356/22: FRONT DECREASING PRESSURE SOLENOID RH MALFUNCTION; DTC C1357/24: FRONT DECREASING PRESSURE SOLENOID LH MALFUNCTION

DESCRIPTION

Each solenoid adjusts pressure which affects each wheel cylinder according to signals from the skid control ECU and controls the vehicle.

The master cut solenoid is closed and blocks the regulator pressure from the electronically controlled brake system control pressure when the system is normal. The master cut solenoid is open and sends the master cylinder and regulator hydraulic pressure to the non-assisted brake wheel cylinders during the fail-safe due to a system malfunction.

HINT:

If the supply voltage decreases, a drop in current may cause a DTC to be stored.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1211/25	21	Excess current is applied for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	22	An open is detected for 0.05 seconds or more while the solenoid is OFF.	?
?	23	An open is detected for 0.05 seconds or more while the solenoid is ON.	• Supply voltage reduced • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	24	A short to +B or voltage leaks is detected for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1212/26	31	Excess current is applied for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	32	An open is detected for 0.05 seconds or more while the solenoid is OFF.	?
?	33	An open is detected for 0.05 seconds or more while the solenoid is ON.	• Supply voltage reduced • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	34	A short to +B or voltage leaks is detected for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1225/31	41	Excess current is applied for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	42	An open is detected for 0.05 seconds or more while the solenoid is OFF.	?
?	43	An open is detected for 0.05 seconds or more while the solenoid is ON.	• Supply voltage reduced • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	44	A short to +B or voltage leaks are detected for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1226/32	51	Excess current is applied for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)

?	52	An open is detected for 0.05 seconds or more while the solenoid is OFF.	?
?	53	An open is detected for 0.05 seconds or more while the solenoid is ON.	• Supply voltage reduced • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	54	A short to +B or voltage leaks are detected for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1227/33	61	Excess current is applied for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	62	An open is detected for 0.05 seconds or more while the solenoid is OFF.	?
?	63	An open is detected for 0.05 seconds or more while the solenoid is ON.	• Supply voltage reduced • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	64	A short to +B or voltage leaks are detected for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1228/34	71	Excess current is applied for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	72	An open is detected for 0.05 seconds or more while the solenoid is OFF.	?
?	73	An open is detected for 0.05 seconds or more while the solenoid is ON.	• Supply voltage reduced • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	74	A short to +B or voltage leaks are detected for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1352/21	11 12	When the solenoid relay contact on, open or short in solenoid circuit continues for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1353/23	15 16	When the solenoid relay contact on, open or short in solenoid circuit continues for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)

C1356/22	13 14	When the solenoid relay contact on, open or short in solenoid circuit continues for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1357/24	17 18	When the solenoid relay contact on, open or short in solenoid circuit continues for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU or brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

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

   HINT:

   If a DTC for undervoltage is output, first troubleshoot the power source system.

   Result

Result	Proceed to
DTCs (C1211/25, C1212/26, C1225/31, C1226/32, C1227/33, C1228/34, C1352/21, C1353/23, C1356/22 and C1357/24) are not output	A
A DTC	

(C1241/41) for undervoltage is output	B
DTCs (C1211/25, C1212/26, C1225/31, C1226/32, C1227/33, C1228/34, C1352/21, C1353/23, C1356/22 and/or C1357/24) are output	C

C --> See step 4

B --> See step 3

A --> See step 2

2. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
3. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
4. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1214/62: HYDRAULIC CONTROL SYSTEM MALFUNCTION

DESCRIPTION

The skid control ECU controls braking force according to the hybrid control system regenerative braking force and inputs the hydraulic pressure necessary for operating each wheel cylinder according to the wheel cylinder pressure sensor.

DTCs may be stored if one of the following occurs:

- Brake fluid leaks.
- Wheel cylinder vibrates due to uneven wear of a brake rotor.
- Foreign matter enters solenoid valve.
- Line pressure drops during air bleeding.
- Brake pad is replaced.

- Rotor is replaced.

HINT:

When replacing the brake pad, retracting the brake calipers piston and attaching a new brake pad will greatly increase the clearance between the brake pad and brake disc, which will likely cause these DTCs to be set the next time the brake pedal is depressed. As there is not malfunction, clear the DTCs.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1214/62	431	Decrease in hydraulic pressure control performance. (Pressure increase malfunction)	• Brake fluid leaks • Brake disc rotor excessive wear • Brake booster with master cylinder (Brake actuator)
?	432	Decrease in hydraulic pressure control performance. (Pressure decrease malfunction)	?
?	433	Malfunctions such as leaks occur in the SLA valve.	?
?	434 435	Malfunctions such as leaks occur in the SLR valve.	?
?	436 437	Decrease in hydraulic pressure control performance.	?
?	438	Malfunctions such as leaks occur in a hydraulic circuit valve.	Brake booster with master cylinder (Brake actuator)

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

When C1364/61 is output together with C1214/62, inspect and repair the trouble areas indicated by C1364/61 first. Refer to **DTC C1246/46: Master Cylinder Pressure Sensor Malfunction; DTC C1281/81: Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC); DTC C1364/61: Wheel Cylinder Pressure Sensor Malfunction**.

PROCEDURE

1. **CHECK FOR FLUID LEAK**
   a. Check that there is no fluid leaks in the brake line between the brake actuator and the wheel

cylinder.

b. Check that the brake is not dragging.

OK

There is no fluid leaks or dragging.

NG --> REPAIR OR REPLACE APPLICABLE PART

OK: Go to next step

2. **PERFORM AIR BLEEDING**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Perform the air bleeding procedure in Bleed Brake System. Refer to **BLEEDING - Step 2** .

NEXT: Go to next step

3. **CHECK BRAKE BOOSTER WITH MASTER CYLINDER (ACTUATOR SIDE)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
   b. Disconnect the skid control ECU connector 2 minutes after the power switch is turned off.
   c. Check both the connector case and the terminal for deformation and corrosion.

OK

No deformation or corrosion.

NG --> See step 8

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (VEHICLE SIDE)**
   a. Measure the voltage and resistance on the wire harness side. Refer to **TERMINALS OF ECU** .

OK

Voltage and resistance readings are all normal.

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

5. **READ VALUE USING TECHSTREAM (WHEEL CYLINDER PRESSURE SENSOR)**
   a. Reconnect the skid control ECU connector.
   b. Connect a pedal effort gauge. Refer to **ON-VEHICLE INSPECTION** .
   c. Connect the Techstream to the DLC3.

d. Turn the power switch on (IG).

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
Wheel Cylinder Pressure Sensor	Wheel cylinder pressure sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

f. Check the output value of the wheel cylinder pressure sensor at each hydraulic pressure level during the electronically controlled brake system control.

Standard Voltage

for Front Wheel Cylinder Pressure Sensor LH

for Front Wheel Cylinder Pressure Sensor RH

Hydraulic Pressure (MPa (kgf/cm^2, psi))	Wheel Cylinder Pressure Sensor (V)
2.0 (20.4, 290)	0.53 to 1.33
5.0 (51.0, 725)	1.12 to 1.92
7.0 (71.4, 1015)	1.52 to 2.32
10.0 (102.0, 1451)	2.14 to 2.94

Hydraulic Pressure (MPa (kgf/cm^2, psi))	Wheel Cylinder Pressure Sensor (V)
2.0 (20.4, 290)	0.53 to 1.33
5.0 (51.0,	1.12 to

725)	1.92
7.0 (71.4, 1015)	1.52 to 2.32
10.0 (102.0, 1451)	2.14 to 2.94

NG --> See step 8

OK: Go to next step

6. **CHECK BRAKE DISC**
   a. Turn the power switch off.
   b. Disconnect the brake pedal stroke sensor connector.
   c. Perform a road test according to Freeze Frame Data or customer problem analysis. Check the brake line pressure vibration caused due to uneven wear of the disc according to brake pedal vibration.

      OK

      Brake pedal does not vibrate during braking.

      HINT:

      - An unevenly worn disc may vibrate the caliper piston and cause fluctuations in brake line pressure, triggering a malfunction detection condition.
      - The brake pedal does not kick back due to wheel cylinder piston vibration during electronically controlled brake system control.
      - If the brake pedal stroke sensor connector is disconnected, the fail-safe function will prohibit electronically controlled brake system control.
      - The Active Test does not prohibit electronically controlled brake system control when the vehicle is running, so disconnect the stroke sensor connector before continuing with inspection.
      - Disc uneven wear can be checked by measuring the disc thickness variation. Refer to **INSPECTION** for front, or refer to **INSPECTION** for rear).

NG --> REPLACE BRAKE DISC

OK: Go to next step

7. **RECONFIRM DTC**
   a. Reconnect the brake pedal stroke sensor connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Perform a road test under the same malfunction conditions recreated based on the Freeze Frame Data or customer problem analysis.

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

Result

Result	Proceed to
DTC (C1214/62) is not output	A
DTC (C1214/62) is output	B

HINT:

If the DTC is no longer output, it can be suspected that it was output due to an improperly connected connector.

B --> See step 8

A --> See step 9

8. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
9. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1231/31: STEERING ANGLE SENSOR CIRCUIT MALFUNCTION

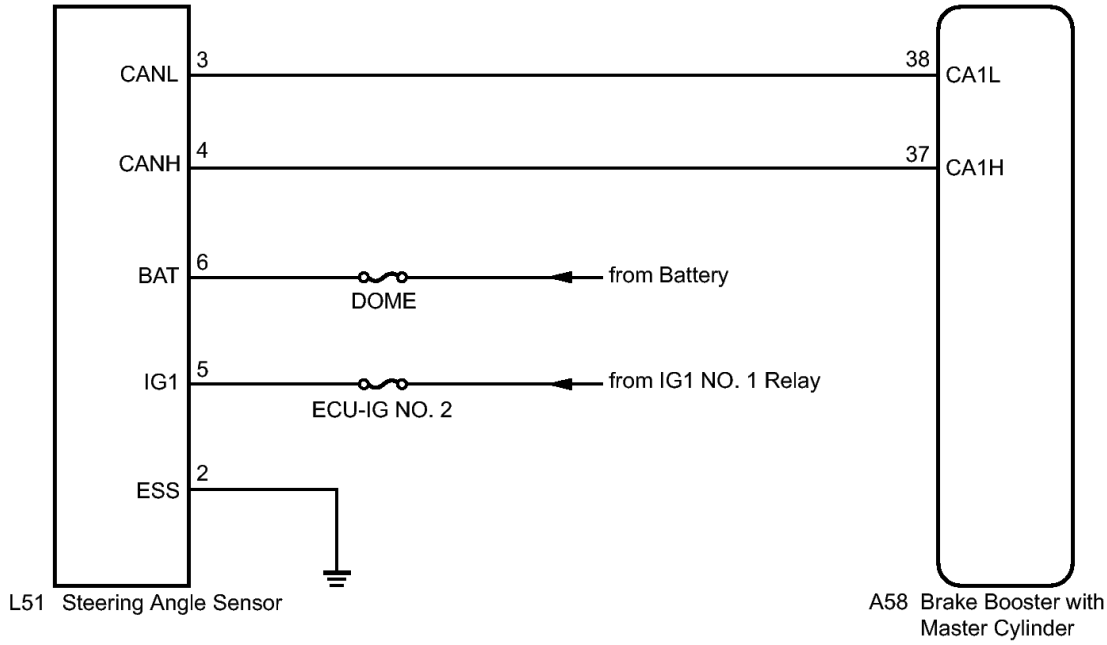
DESCRIPTION

The skid control ECU inputs steering angle sensor signals via the CAN communication. When a malfunction occurs in the communication line with the steering angle sensor, DTC U0126/63 (Lost Communication with Steering Angle Sensor Module) is output.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1231/31	701	While steering angle sensor communication is enabled, a malfunction signal output is received during the sensor self-check (sensor malfunction).	Steering angle sensor internal malfunction
?	702	While steering angle sensor communication is enabled, a malfunction signal output is received during the sensor self-check (internal malfunction).	?

?	703	While steering angle sensor communication is enabled, a malfunction signal output is received during the sensor self-check (+B malfunction).	?

WIRING DIAGRAM



N

Fig. 19: Steering Angle Sensor To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

HINT:

- When U0126/63 is output together with C1231/31, inspect and repair the trouble areas indicated by U0126/63 first. Refer to **DTC U0073/94: Control Module Communication Bus OFF; DTC U0123/62: Lost Communication with Yaw Rate Sensor Module; DTC U0124/95: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126/63: Lost Communication with Steering Angle Sensor Module; DTC U0293/59: Communication Error from HV ECU**.
- When the speed sensor or the yaw rate and acceleration sensor are malfunctioning, 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. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch off.
   c. Turn the power switch on (IG) again and check that no CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .
   d. Drive the vehicle and turn the steering wheel to the right and left at the speed of 35 km/h (22 mph) and check that no speed sensor and/or yaw rate and acceleration sensor DTCs are output. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTC (C1231/31) is output	A
CAN communication system DTC is output	B
Speed sensor and/or yaw rate and acceleration sensor DTC is output	C
DTC (C1231/31) is not output	D

   HINT:

   - When DTCs indicating CAN communication system malfunctions are output, repair the CAN communication system before repairing each corresponding sensor.
   - 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 speed sensor and yaw rate and acceleration sensor DTCs are output simultaneously, repair these two sensors and inspect the steering angle sensor.

D --> See step 7

C --> See step 6

B --> See step 5

A: Go to next step

2. **INSPECT STEERING ANGLE SENSOR (POWER SOURCE TERMINAL)**
   a. Turn the power switch off.

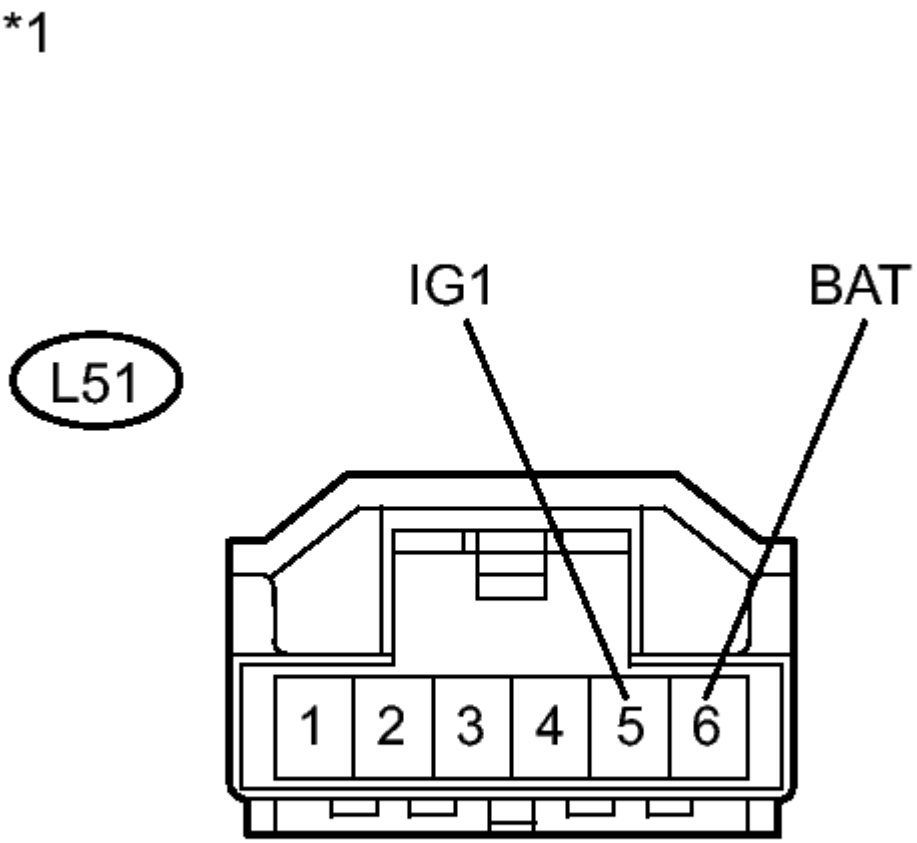


Fig. 20: Identifying Steering Angle Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   b. Remove the steering wheel and the column cover.
   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	Condition	Specified Condition
L51-5 (IG1) - Body ground	Power switch on (IG)	11 to 14 V
L51-6 (BAT) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

*1	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 power switch off.

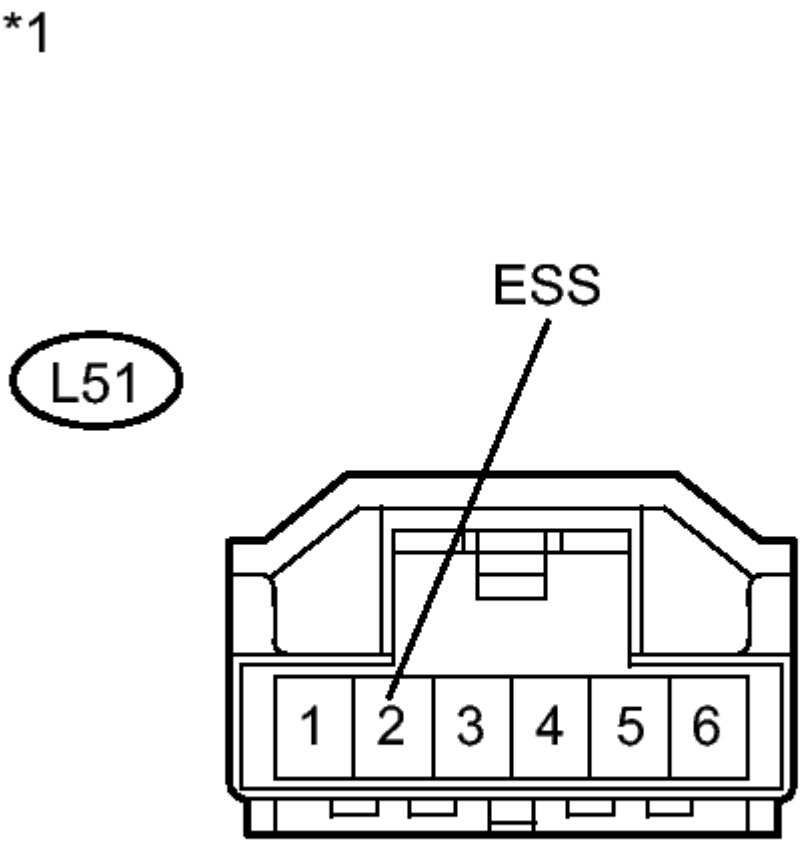


Fig. 21: Identifying Steering Angle Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
L51-2 (ESS) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Steering Angle Sensor)

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 (GROUND CIRCUIT)

OK --> See step 4

4. **REPLACE SPIRAL CABLE SUB-ASSEMBLY (STEERING ANGLE SENSOR). Refer to REMOVAL**
5. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
7. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1235/35: FOREIGN OBJECT IS ATTACHED ON TIP OF FRONT SPEED SENSOR RH; DTC C1236/36: FOREIGN OBJECT IS ATTACHED ON TIP OF FRONT SPEED SENSOR LH; DTC C1238/38: FOREIGN OBJECT IS ATTACHED ON TIP OF REAR SPEED SENSOR RH; DTC C1239/39: FOREIGN OBJECT IS ATTACHED ON TIP OF REAR SPEED SENSOR LH; DTC C1275/75: ABNORMAL CHANGE IN OUTPUT SIGNAL OF FRONT SPEED SENSOR RH (TEST MODE DTC); DTC C1276/76: ABNORMAL CHANGE IN OUTPUT SIGNAL OF FRONT SPEED SENSOR LH (TEST MODE DTC); DTC C1277/77: ABNORMAL CHANGE IN OUTPUT SIGNAL OF REAR SPEED SENSOR RH (TEST MODE DTC); DTC C1278/78: ABNORMAL CHANGE IN OUTPUT SIGNAL OF REAR SPEED SENSOR LH (TEST MODE DTC)

DESCRIPTION

When foreign matter adheres to the speed sensor tip or speed sensor rotor, these DTCs are output. An abnormal waveform input from the sensor determines these conditions.

These DTCs may be detected when a malfunction occurs in the connector terminals or wire harness of the speed sensor circuit.

DTCs C1275/75 to C1278/78 will be cleared when the speed sensor sends a wheel speed signal or when Test

Mode ends. DTCs from C1275/75 to C1278/78 are output only in Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1235/35	541	Either of the following is detected: 1. When driving at 20 km/h (12 mph) or more, noise occurs on the speed sensor signal waveform for 5 seconds or more. 2. When driving at 10 km/h (6 mph) or more, noise occurs once per wheel revolution for 15 seconds or more.	• Speed sensor rotor malfunction (foreign object attached) • Foreign object attached to speed sensor • Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Resistance in speed sensor circuit • Brake booster with master cylinder (Skid control ECU)
C1236/36	542	Either of the following is detected: 1. When driving at 20 km/h (12 mph) or more, noise occurs on the speed sensor signal waveform for 5 seconds or more. 2. When driving at 10 km/h (6 mph) or more, noise occurs once per wheel revolution for 15 seconds or more.	• Speed sensor rotor malfunction (foreign object attached) • Foreign object attached to speed sensor • Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Resistance in speed sensor circuit • Brake booster with master cylinder (Skid control ECU)
C1238/38	543	Either of the following is detected: 1. When driving at 20 km/h (12 mph) or more, noise occurs on the speed sensor signal waveform for 5 seconds or more. 2. When driving at 10 km/h (6 mph) or more, noise occurs once per wheel revolution for 15 seconds or more.	• Speed sensor rotor malfunction (foreign object attached) • Foreign object attached to speed sensor • Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Resistance in speed sensor circuit • Brake booster with master

			cylinder (Skid control ECU)
C1239/39	544	Either of the following is detected: 1. When driving at 20 km/h (12 mph) or more, noise occurs on the speed sensor signal waveform for 5 seconds or more. 2. When driving at 10 km/h (6 mph) or more, noise occurs once per wheel revolution for 15 seconds or more.	• Speed sensor rotor malfunction (foreign object attached) • Foreign object attached to speed sensor • Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Resistance in speed sensor circuit • Brake booster with master cylinder (Skid control ECU)
C1275/75 C1276/76 C1277/77 C1278/78	-	Detected only during Test Mode.	• Speed sensor • Speed sensor rotor

HINT:

- DTCs C1235/35 and C1275/75 are for the front speed sensor RH.
- DTCs C1236/36 and C1276/76 are for the front speed sensor LH.
- DTCs C1238/38 and C1277/77 are for the rear speed sensor RH.
- DTCs C1239/39 and C1278/78 are for the rear speed sensor LH.

WIRING DIAGRAM

Refer to DTCs C0200/31, C0205/32, C0210/33 and C0215/34. Refer to **WIRING DIAGRAM** for front, and. Refer to **WIRING DIAGRAM** for rear).

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK DTC**
   a. Check that no speed sensor malfunction DTC is output. Refer to **DTC CHECK / CLEAR** .

      HINT:

When C0200/31, C0205/32, C0210/33, and/or C0215/34 are output together with C1235/35, C1236/36, C1238/38, and/or C1239/39, inspect and repair the trouble areas indicated by C0200/31, C0205/32, C0210/33, and/or C0215/34 first.

Result

Result	Proceed to
DTCs (C1235/35 and/or C1236/36) are output	A
DTCs (C1238/38 and C1239/39) are output	B
Speed sensor malfunction DTCs (C0200/31, C0205/32, C0210/33 and/or C0215/34) are output	C

C --> See step 17

B --> See step 10

A: Go to next step

2. **CHECK FRONT SPEED SENSOR AND FRONT SPEED SENSOR ROTOR**
   a. Remove the front speed sensor and front speed sensor rotor. Refer to **REMOVAL** and. Refer to **REMOVAL**).
   b. Check the speed sensor tip and speed sensor rotor.

      OK

      The sensor tip and rotor is free of scratches, oil, and foreign matter.

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

NG --> CLEAN OR REPLACE FRONT SPEED SENSOR AND FRONT SPEED SENSOR ROTOR

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - FRONT SPEED SENSOR)**
   a. Install the front speed sensor and front speed sensor rotor.

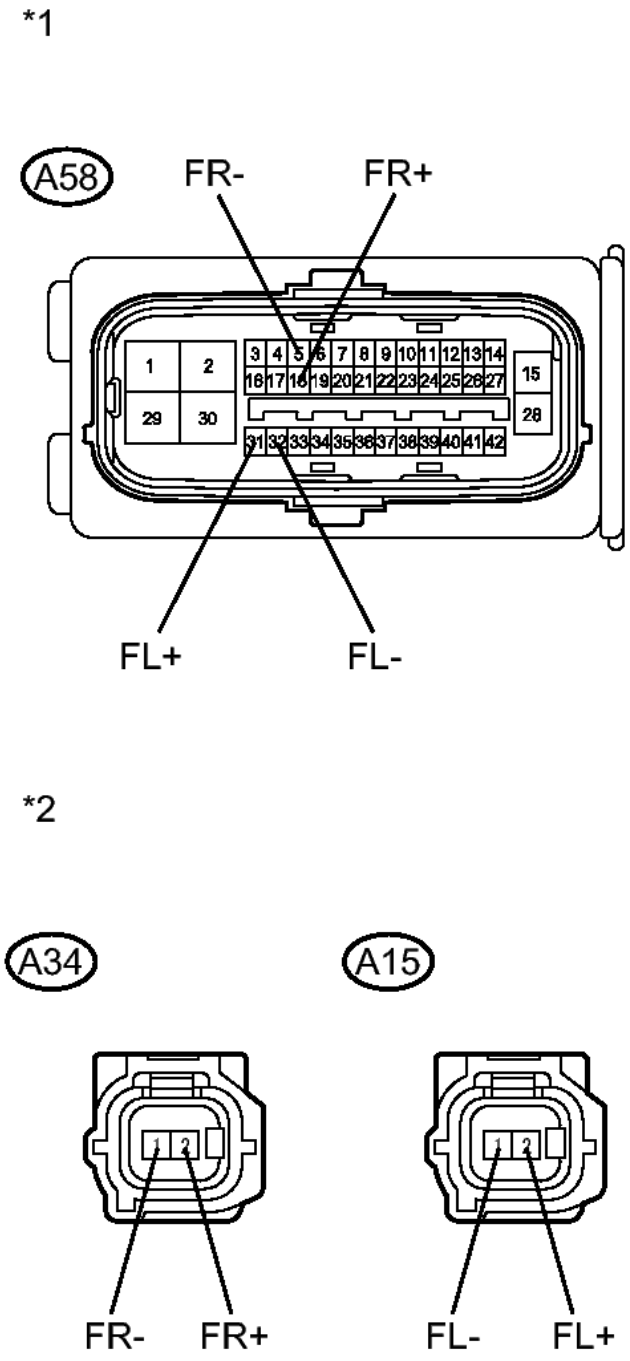


Fig. 22: Identifying Skid Control ECU Connector And Front Speed Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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 and the front speed sensor connector.

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

Standard Resistance

for RH

for LH

Tester Connection	Condition	Specified Condition
A58-18 (FR+) - A34-2 (FR+)	Always	Below 1 ohms
A58-18 (FR+) - Body ground	Always	10 kohms or higher
A58-5 (FR-) - A34-1 (FR-)	Always	Below 1 ohms
A58-5 (FR-) - Body ground	Always	10 kohms or higher

Tester Connection	Condition	Specified Condition
A58-31 (FL+) - A15-2 (FL+)	Always	Below 1 ohms
A58-31 (FL+) - Body ground	Always	10 kohms or higher
A58-32 (FL-) - A15-1 (FL-)	Always	Below 1 ohms
A58-32 (FL-) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Front Speed Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. **INSPECT SKID CONTROL ECU (SENSOR OUTPUT)**
   a. Reconnect the skid control ECU connector.

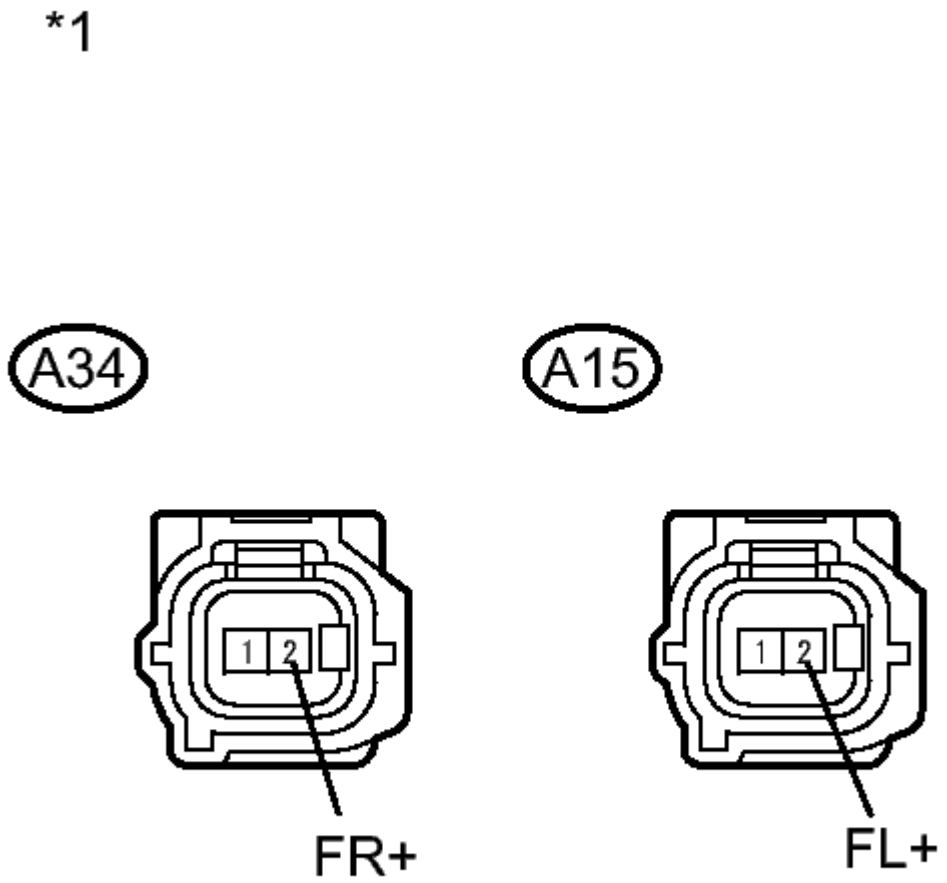


Fig. 23: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

for RH

for LH

Tester Connection	Switch Condition	Specified Condition
A34-2	Power	

(FR+) - Body ground	switch on (IG)	5.7 to 14 V

Tester Connection	Switch Condition	Specified Condition
A15-2 (FL+) - Body ground	Power switch on (IG)	5.7 to 14 V

TEXT IN ILLUSTRATION

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

NG --> See step 16

OK: Go to next step

5. **RECONFIRM DTC**
   a. Reconnect the front speed sensor connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   d. Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 15 seconds.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C1235/35 and/or C1236/36) are output	A
DTCs (C1235/35 and C1236/36)	B

are not output	

B --> See step 18

A: Go to next step

6. **REPLACE FRONT SPEED SENSOR**
   a. Turn the power 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

7. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch on (READY).
   c. Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 15 seconds.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C1235/35 and/or C1236/36) are output	A
DTCs (C1235/35 and C1236/36) are not output	B

B --> END

A: Go to next step

8. **REPLACE FRONT SPEED SENSOR ROTOR**
   a. Turn the power switch off.

b. Replace the front axle hub sub-assembly (front speed sensor rotor). Refer to **REMOVAL** .

HINT:

The front speed sensor rotor is incorporated into the front axle hub sub-assembly.

If the front speed sensor rotor needs to be replaced, replace it together with the front axle hub sub-assembly.

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

NEXT: Go to next step

9. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch on (READY).
   c. Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 15 seconds.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C1235/35 and/or C1236/36) are output	A
DTCs (C1235/35 and C1236/36) are not output	B

B --> END

A --> See step 16

10. **CHECK HARNESS AND CONNECTOR (SKID CONTROL SENSOR WIRE)**
    a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

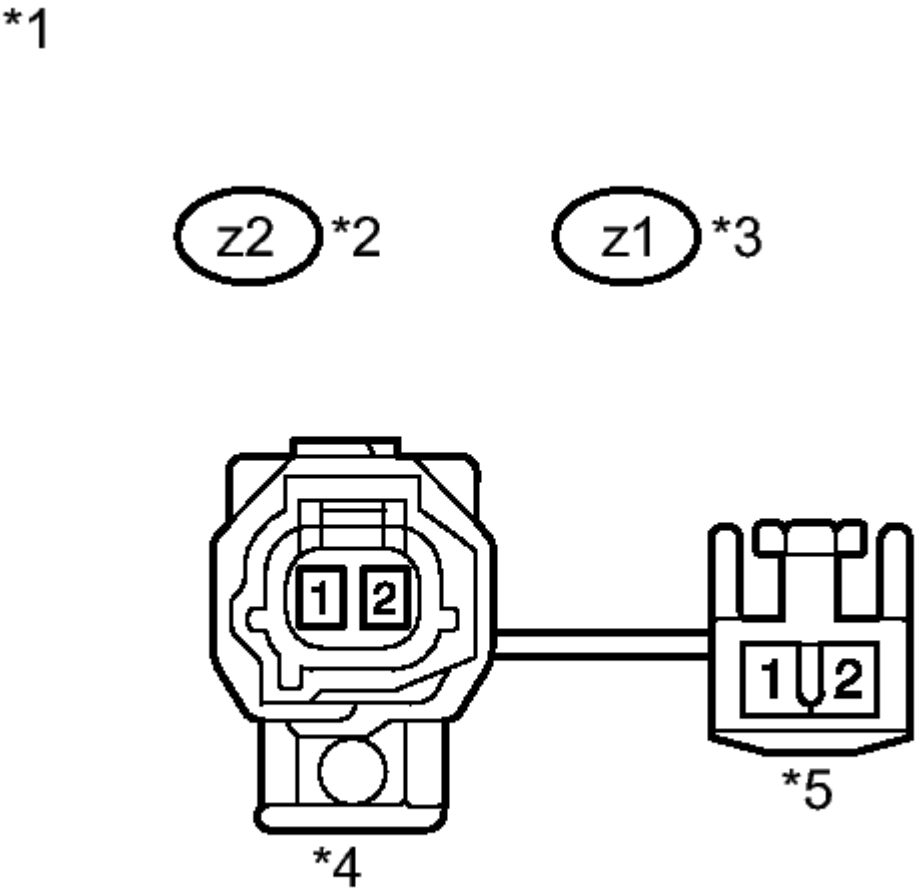


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Fig. 24: Identifying Rear Speed Sensor Connector And Skid Control Sensor Wire
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the rear speed sensor connector and the skid control sensor wire.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

for RH

for LH

Tester Connection	Condition	Specified Condition
z2 ("A"-2) -	Always	Below 1

z2 ("B"-1)		ohms
z2 ("A"-2) - z2 ("B"-2)	Always	10 kohms or higher
z2 ("A"-2) - Body ground	Always	10 kohms or higher
z2 ("A"-1) - z2 ("B"-2)	Always	Below 1 ohms
z2 ("A"-1) - z2 ("B"-1)	Always	10 kohms or higher
z2("A"-1) - Body ground	Always	10 kohms or higher

Tester Connection	Condition	Specified Condition
z1 ("A"-2) - z1 ("B"-1)	Always	Below 1 ohms
z1 ("A"-2) - z1 ("B"-2)	Always	10 kohms or higher
z1 ("A"-2) - Body ground	Always	10 kohms or higher
z1 ("A"-1) - z1 ("B"-2)	Always	Below 1 ohms
z1 ("A"-1) - z1 ("B"-1)	Always	10 kohms or higher
z1 ("A"-1) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of skid control sensor wire
*2	for RH
*3	for LH
*4	Front view of wire harness connector

	(to Sensor Side Connector "A")
*5	Front view of wire harness connector (to Vehicle Side Connector "B")

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

NG --> See step 19

OK: Go to next step

11. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - REAR SPEED SENSOR)**
    a. Reconnect the skid control sensor wire (for vehicle side connector).

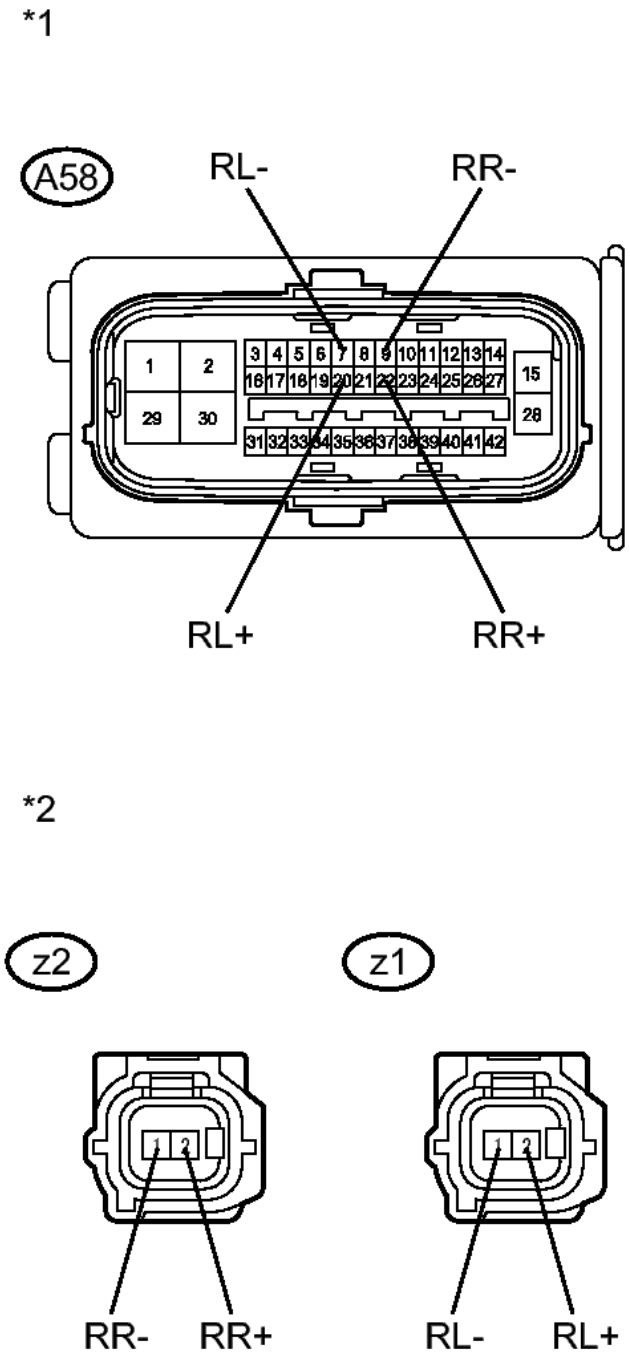

Fig. 25: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

for RH

for LH

Tester Connection	Condition	Specified Condition
A58-22 (RR+) - z2-2 (RR+)	Always	Below 1 ohms
A58-22 (RR+) - Body ground	Always	10 kohms or higher
A58-9 (RR-) - z2-1 (RR-)	Always	Below 1 ohms
A58-9 (RR-) - Body ground	Always	10 kohms or higher

Tester Connection	Condition	Specified Condition
A58-20 (RL+) - z1-2 (RL+)	Always	Below 1 ohms
A58-20 (RL+) - Body ground	Always	10 kohms or higher
A58-7 (RL-) - z1-1 (RL-)	Always	Below 1 ohms
A58-7 (RL-) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness

	connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Rear Speed Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

12. **INSPECT SKID CONTROL ECU (SENSOR OUTPUT)**
    a. Reconnect the skid control ECU connector.

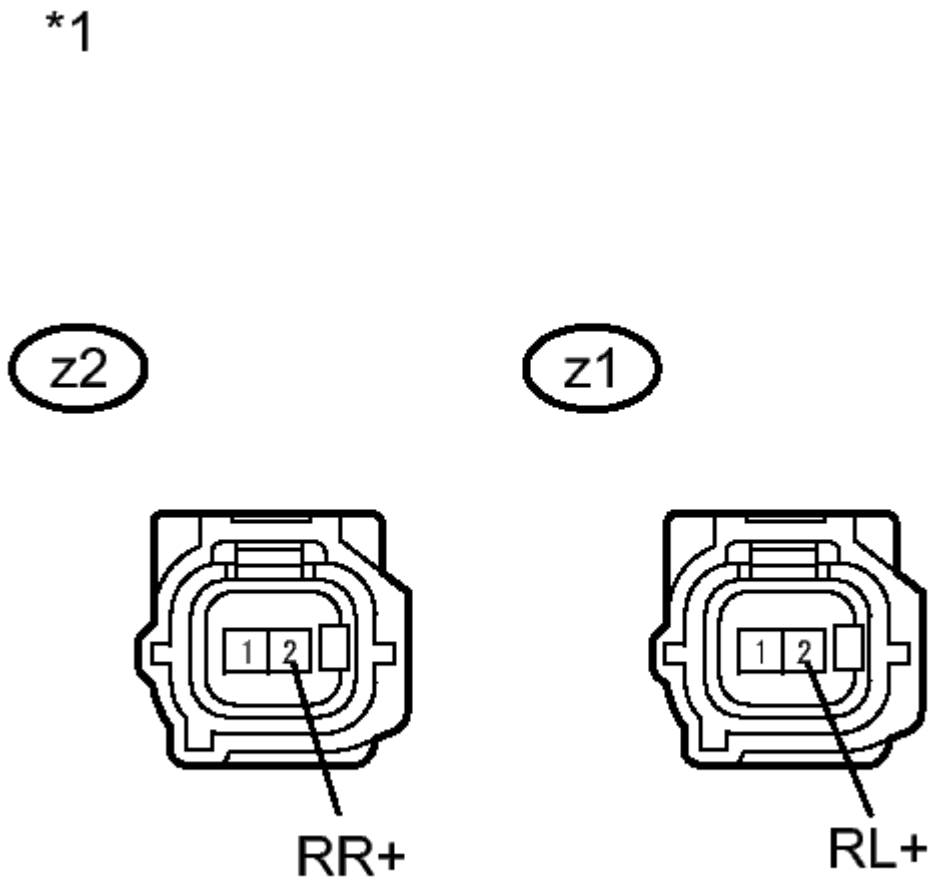

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Fig. 26: Identifying Rear Speed Sensor Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

for RH

for LH

Tester Connection	Switch Condition	Specified Condition
z2-2 (RR+)	Power	5.7 to 14

- Body ground	switch on (IG)	V

Tester Connection	Switch Condition	Specified Condition
z1-2 (RL+) - Body ground	Power switch on (IG)	5.7 to 14 V

TEXT IN ILLUSTRATION

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

NG --> See step 16

OK: Go to next step

13. **RECONFIRM DTC**
    a. Reconnect the rear speed sensor connector.
    b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
    c. Turn the power switch on (READY).
    d. Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 15 seconds.
    e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

    Result

Result	Proceed to
DTCs (C1238/38 and/or C1239/39) are output	A
DTCs (C1238/38 and C1239/39) are not output	B

B --> See step 18

A: Go to next step

14. **REPLACE REAR SPEED SENSOR AND REAR SPEED SENSOR ROTOR**
    a. Turn the power 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

15. **RECONFIRM DTC**
    a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
    b. Turn the power switch on (READY).
    c. Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 15 seconds.
    d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

       Result

Result	Proceed to
DTCs (C1238/38 and/or C1239/39) are output	A
DTCs (C1238/38 and C1239/39) are not output	B

B --> END

A --> See step 16

16. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
17. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
18. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
19. **REPLACE SKID CONTROL SENSOR WIRE. Refer to REMOVAL**

DTC C1241/41: LOW BATTERY POSITIVE VOLTAGE; DTC C1242/42: OPEN IN IG1 / IG2 POWER SOURCE CIRCUIT

DESCRIPTION

If a malfunction is detected in the power supply circuit, the skid control ECU power source voltage drops, or there is insufficient voltage to operate ABS main relay, the skid control ECU will store these codes.

These codes may be also be stored if the auxiliary battery voltage drops below 9.5 V.

HINT:

DTC C1256/56 (Accumulator Low Pressure) may also be memorized if there is a drop in power source voltage.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1241/41	101	Any of the following conditions when the BS terminal voltage is 9.3 V or less: 1. Vehicle not decelerated (brake pedal is not depressed) for 3 seconds or more. 2. While depressing the brake pedal, linear solenoid current does not satisfy 1.34A. 3. Vehicle decelerated (brake pedal is depressed) for 0.06 seconds.	• Improperly connected connector, deformation or corrosion of terminals • Auxiliary battery • Hybrid control system (Charging circuit) • Brake booster with master cylinder (Skid control ECU)
?	102	Either of the following conditions when the ECU internal voltage is 6.3 V or less: 1. When main relay ON is requested, voltage of the relay connection does not exceed 3.5 V for 0.22 seconds or more.	?

		2. Sensor supply voltage is 4.75 V or less, or 5.25 V or more for 0.06 seconds. 3. Accumulator pressure sensor output voltage is 4.54 V or less, or 5.46 V or more for 0.06 seconds.	
?	551	When driving at 3 km/h (1.9 mph) or more, IG1 terminal voltage is 9.5 V or less, or VM1 voltage is 8.6 V or less for 10 seconds or more.	?
?	552	When VM1 voltage is 8.6 V or less, sensor supply voltage is low for 60 seconds or more.	?
?	553	VM1 voltage is 16.6 V or more for 0.8 seconds.	?
C1242/42	111	Voltage is not applied to the IG1 terminal (less than 3.5 V), and applied to the IG2 terminal (9.5 V or more) for 4 seconds or more.	• Open or short in IG1 circuit • Improperly connected connector, deformation or corrosion of terminals • Smart key system (IG start circuit) • Auxiliary battery • Hybrid control system (Charging circuit) • Brake booster with master cylinder (Skid control ECU)
?	112	Voltage is not applied to the IG2 terminal (less than 3.5 V), and applied to the IG1 terminal (9.5 V or more) for 4 seconds or more.	• Open or short in IG2 circuit • Improperly connected connector, deformation or corrosion of terminals • Smart key system (IG start circuit) • Auxiliary battery • Hybrid control system (Charging circuit) • Brake booster with master cylinder (Skid control ECU)

WIRING DIAGRAM

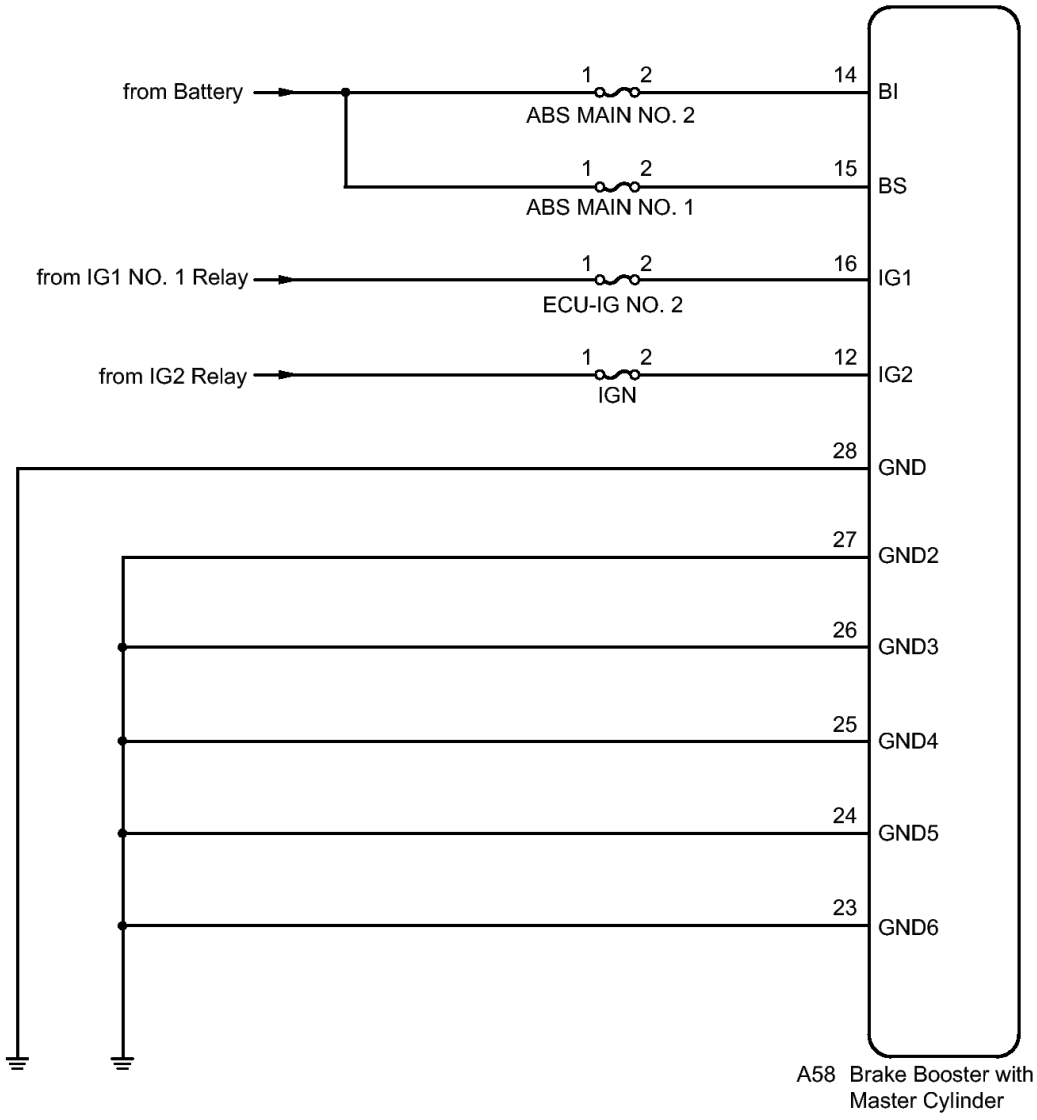


Fig. 27: Brake Booster With Master Cylinder Power Source Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK SMART KEY SYSTEM (for Start Function)**
   a. Check if the smart key system (for start function) DTC is output. Refer to **DTC CHECK /**

CLEAR .

Result

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

B --> See step 9

A: Go to next step

2. **CHECK HYBRID CONTROL SYSTEM**
   a. Check if the hybrid control 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 10

A: Go to next step

3. **CHECK DTC**
   a. Check that no main relay DTC is output. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
Main relay malfunction DTC is not	A

output	
Main relay malfunction DTC is output	B

B --> See step 11

A: Go to next step

4. **CHECK AUXILIARY BATTERY**
   a. Check the auxiliary battery voltage.

      Standard Voltage

      11 to 14 V

   NG --> CHARGE OR REPLACE AUXILIARY BATTERY

   OK: Go to next step

5. **INSPECT SKID CONTROL ECU (POWER SOURCE TERMINAL)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connector.

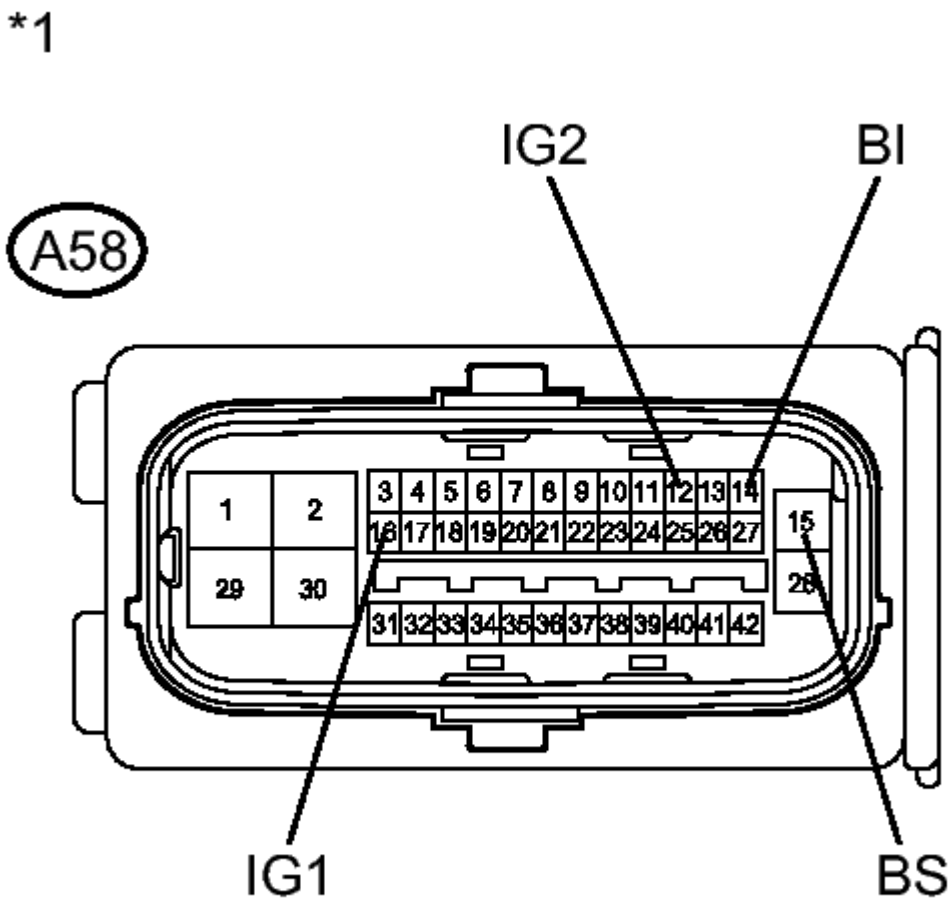


Fig. 28: Identifying Skid Control ECU Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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
A58-14 (BI) - Body ground	Always	11 to 14 V
A58-15 (BS) - Body	Always	11 to 14 V

ground		
A58-16 (IG1) - Body ground	Power switch on (IG)	11 to 14 V
A58-12 (IG2) - Body ground	Power switch on (IG)	11 to 14 V

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

6. **INSPECT SKID CONTROL ECU (GND TERMINAL)**
   a. Turn the power switch off.

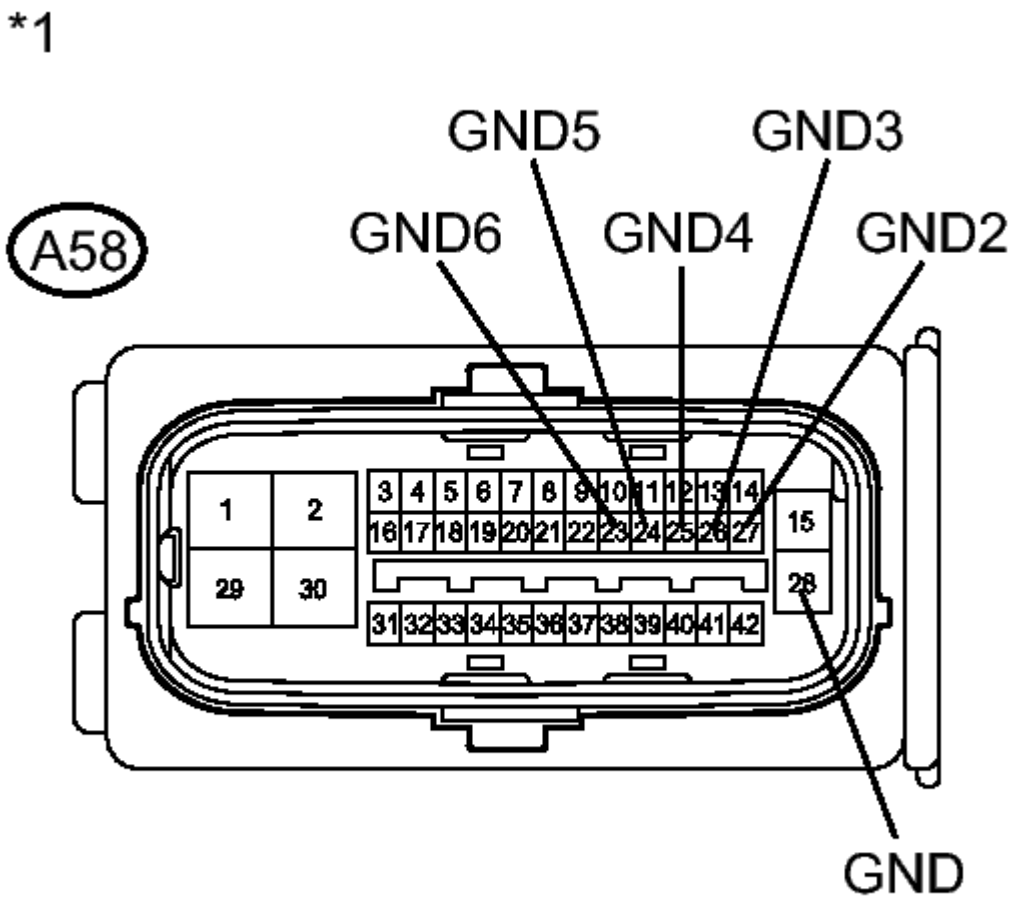


Fig. 29: Identifying Skid Control ECU Connector Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-28 (GND) - Body ground	Always	Below 1 ohms
A58-27 (GND2) - Body	Always	Below 1 ohms

ground		
A58-26 (GND3) - Body ground	Always	Below 1 ohms
A58-25 (GND4) - Body ground	Always	Below 1 ohms
A58-24 (GND5) - Body ground	Always	Below 1 ohms
A58-23 (GND6) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

7. **RECONFIRM DTC**
   a. Reconnect the skid control ECU connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   d. Perform a road test.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C1241/41	

and C1242/42) are not output	A
DTCs (C1241/41 and/or C1242/42) 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 12

A --> See step 8

8. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
9. **INSPECT SMART KEY SYSTEM (for Start Function). Refer to DIAGNOSTIC TROUBLE CODE CHART**
10. **INSPECT HYBRID CONTROL SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART**
11. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
12. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1246/46: MASTER CYLINDER PRESSURE SENSOR MALFUNCTION; DTC C1281/81: MASTER CYLINDER PRESSURE SENSOR OUTPUT MALFUNCTION (TEST MODE DTC); DTC C1364/61: WHEEL CYLINDER PRESSURE SENSOR MALFUNCTION

DESCRIPTION

The regulator pressure sensor and the wheel cylinder pressure sensor are built into the brake actuator, and measure the regulator pressure and the wheel cylinder pressure sent to the skid control ECU.

DTC C1281/81 will be cleared when the regulator pressure sensor sends a regulator pressure signal or when Test Mode ends. DTC C1281/81 is output only in Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1246/46	201	Sensor supply voltage (VCM1) is 4.75 V or less, or 5.25 V or more for 0.05 seconds.	Brake booster with master cylinder (Skid control ECU or brake actuator)
		Regulator pressure sensor output voltage (Preg) is less than 8%, or 90.3% or more	

?	202	(less than 0.4 V, or 4.52 V or more) of sensor supply voltage (VCM1) for 0.05 seconds or more.	?
?	203	When not under braking, the regulator pressure sensor output voltage is 0.2 V or less or 0.88 V or more for 3 seconds or more.	?
?	204	Either of the following is detected: 1. The regulator pressure sensor output voltage does not correspond with stroke sensor and the readings remain out of specification for 0.5 to 5 seconds or more continuously. (The stroke sensor may be malfunctioning.) 2. The regulator pressure sensor output voltage does not correspond with wheel cylinder pressure sensor and the outputs remain out of specification for 0.5 to 5 seconds or more continuously. (May be output with INF code 424.)	• Brake pedal stroke sensor • Brake booster with master cylinder (Skid control ECU or brake actuator)
?	207	Fluctuation of regulator pressure sensor output is out of specification (the difference between the present value and last value is 15 MPa or more) for 0.1 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
C1364/61	421	Sensor supply voltage 1 (VCM1) is 4.75 V or less, or 5.25 V or more for 0.05 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	422	Wheel cylinder pressure sensor output voltage (Pfront) is less than 8%, or 90.3% or more (less than 0.4 V, or 4.52 V or more) of sensor supply voltage (VCM1) for 0.05 seconds or more.	?
?	423	When not under braking, the wheel cylinder pressure sensor output voltage is 0.2 V or less or 0.88 V or more for 0.1 to 3 seconds or more.	?
?	424	The wheel cylinder pressure sensor output voltage does not correspond with regulator pressure sensor and the outputs remain out of specification for 0.5 to 5 seconds or	?

		more continuously. (May be output with INF code 204.)	
?	426	Fluctuation of wheel cylinder pressure sensor output is out of specification (the difference between the present value and last value is 15 MPa or more) for 0.1 seconds or more.	?
C1281/81	-	Detected only during Test Mode.	• Stop light switch • Regulator pressure sensor

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU or brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **READ VALUE USING TECHSTREAM (REGULATOR PRESSURE SENSOR)**
   a. Set a pedal effort gauge and LSPV gauge to rear wheel. Refer to **ON-VEHICLE INSPECTION** .
   b. Connect the Techstream to the DLC3.
   c. Turn the power switch on (IG).
   d. 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
Regulator Pressure Sensor Output	Regulator pressure sensor output / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

   e. Check the output value of the regulator pressure sensor as the brake pedal is depressed.

Standard Voltage

Brake Effort (N (kgf,	Regulator Pressure Sensor Output	Rear Right Wheel Hydraulic Pressure (MPa	Rear Left Wheel Hydraulic Pressure (MPa

lbf))	(V)	(kgf/cm^2, psi))	(kgf/cm^2, psi))
100 (10.2, 22.5)	1.35 to 2.15	4.10 to 8.10 (41.8 to 82.5, 595 to 1174)	4.10 to 8.10 (41.8 to 82.5, 595 to 1174)
200 (20.4, 45.0)	3.00 to 3.80	12.20 to 16.20 (124.4 to 165.1, 1770 to 2349)	12.20 to 16.20 (124.4 to 165.1, 1770 to 2349)

NG --> See step 6

OK: Go to next step

2. **READ VALUE USING TECHSTREAM (WHEEL CYLINDER PRESSURE SENSOR)**
   a. Set a LSPV gauge to front wheel. Refer to **ON-VEHICLE INSPECTION** .
   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
Wheel Cylinder Pressure Sensor	Wheel cylinder pressure sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

   c. Check the output value of the wheel cylinder pressure sensor at each hydraulic pressure during electronically controlled brake system control.

Standard Voltage

for Front Wheel Cylinder Pressure Sensor LH

for Front Wheel Cylinder Pressure Sensor RH

Hydraulic Pressure (MPa (kgf/cm^2,	Wheel Cylinder Pressure Sensor

psi))	(V)
2.0 (20.4, 290)	0.53 to 1.33
5.0 (51.0, 725)	1.12 to 1.92
7.0 (71.4, 1015)	1.52 to 2.32
10.0 (102.0, 1451)	2.14 to 2.94

Hydraulic Pressure (MPa (kgf/cm^2, psi))	Wheel Cylinder Pressure Sensor (V)
2.0 (20.4, 290)	0.53 to 1.33
5.0 (51.0, 725)	1.12 to 1.92
7.0 (71.4, 1015)	1.52 to 2.32
10.0 (102.0, 1451)	2.14 to 2.94

NG --> See step 6

OK: Go to next step

3. **READ VALUE USING TECHSTREAM (BRAKE PEDAL STROKE SENSOR AND PRESSURE SENSOR COMPARISON)**
   a. Set a pedal effort gauge and LSPV gauge to front and rear wheel. Refer to **ON-VEHICLE INSPECTION** .
   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
Stroke Sensor	Brake pedal stroke sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.65 to 1.35 V	Reading increases when brake pedal is depressed

Stroke Sensor2	Brake pedal stroke sensor 2 / Min.: 0 V, Max.: 5 V	When brake pedal released: 3.65 to 4.35 V	Reading decreases when brake pedal is depressed
Regulator Pressure Sensor Output	Regulator pressure sensor output / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed
Wheel Cylinder Pressure Sensor	Wheel cylinder pressure sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

c. Check the output value of the brake pedal stroke sensor as the brake pedal is depressed.

Standard Voltage

Brake Effort (N (kgf, lbf))	Stroke Sensor (V)	Stroke Sensor2 (V)	Regulator Pressure Sensor Output (V)	Wheel Cylinder Pressure Sensor (V)
100 (10.2, 22.5)	1.10 to 1.80	3.20 to 3.90	1.35 to 2.15	1.17 to 1.97
200 (20.4, 45.0)	1.45 to 2.15	2.85 to 3.55	3.00 to 3.80	2.58 to 3.38

NG --> See step 7

OK: Go to next step

4. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Perform a road test.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C1246/46 and C1364/61) are not output	A
DTCs (C1246/46 and/or C1364/61) are output	B

B --> See step 6

A --> See step 5

5. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
7. **REPLACE BRAKE PEDAL STROKE SENSOR. Refer to REMOVAL**

DTC C1247/47: STROKE SENSOR MALFUNCTION; DTC C1346/71: STROKE SENSOR ZERO POINT LEARNING MALFUNCTION (TEST MODE DTC); DTC C1392/48: STROKE SENSOR ZERO POINT CALIBRATION UNDONE

DESCRIPTION

The stroke sensor inputs the pedal stroke into the skid control ECU.

DTC C1346/71 will be cleared when the brake pedal stroke sensor sends a stroke sensor signal or when Test Mode ends. DTC C1346/71 is output only in Test Mode.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1247/47	211	Sensor supply voltage (VCM1) is 4.75 V or less, or 5.25 V or more for 0.2 seconds or more.	• Open or short in brake pedal stroke sensor power supply circuit • Improperly connected connector, deformation or corrosion of terminals • Brake booster with master cylinder (Skid control ECU)

?	212	Sensor output voltage 1 (SKS1) is less than 3%, or 97% or more (less than 0.15 V, or 4.85 V or more) of sensor supply voltage (VCM1) for 0.2 seconds or more.	• Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Brake pedal stroke sensor
?	213	Sensor output voltage 2 (SKS2) is less than 3%, or 97% or more (less than 0.15 V, or 4.85 V or more) of sensor supply voltage (VCSK) for 0.2 seconds or more.	?
?	214	Either of the following is detected: 1. Fluctuation of sensor output 1 (SKS1) is out of specification. 2. The difference between the present value and last value of sensor output voltage 1 (SKS1) is 8.5% or more (0.43 V or more) of sensor supply voltage (VCM1) for 0.2 seconds or more.	?
?	215	Either of the following is detected: 1. Fluctuation of sensor output 2 (SKS2) is out of specification. 2. The difference between the present value and last value of the sensor output voltage 2 (SKS2) is 8.5% or more (0.43 V or more) of the sensor supply voltage (VCM1) for 0.2 seconds or more.	?
?	216	Either of the following is detected: 1. Brake pedal OFF position (zero point learned value) is out of specification. 2. The zero point learned value of sensor output 1 (SKS1) is -17% to 25.9% (0.15 to 2.3V) or more than the theoretical value.	?
		Either of the following is detected: 1. Brake pedal OFF position	

?	217	(zero point learned value) is out of specification. 2. The zero point learned value of sensor output 2 (SKS2) is -31.7% to 17% (2.42 to 4.85V) or more than the theoretical value.	?
?	218	An excessive difference between the change in sensor output 1 (SKS1) and sensor output 2 (SKS2) is detected for 0.2 seconds or more.	?
?	219	Sensor data is invalid for 0.2 seconds or more. (Skid control ECU internal monitor circuit malfunction.)	?
?	220	The output from sensor 1 (SKS1) and sensor 2 (SKS2) differ by 15% or more from the theoretical value 5 V.	?
?	221	The output variation between sensor 1 (SKS1) and sensor 2 (SKS2) differ by an excessive amount.	?
?	222	Sensor data is invalid for 0.2 seconds or more with sensor supply voltage (VCM1) 4.75 V or less, or 5.25 V or more.	?
?	223	Sensor data is invalid for 0.2 seconds or more. (Open, short, or noise.)	?
C1392/48	-	Zero point calibration of stroke sensor is unfinished.	• Brake pedal stroke sensor zero point calibration incomplete (Initialization and calibration of linear solenoid valve incomplete) • Brake booster with master cylinder (Skid control ECU)
C1346/71	-	Detected only during Test Mode.	• Brake pedal stroke sensor • Brake pedal stroke sensor circuit

WIRING DIAGRAM

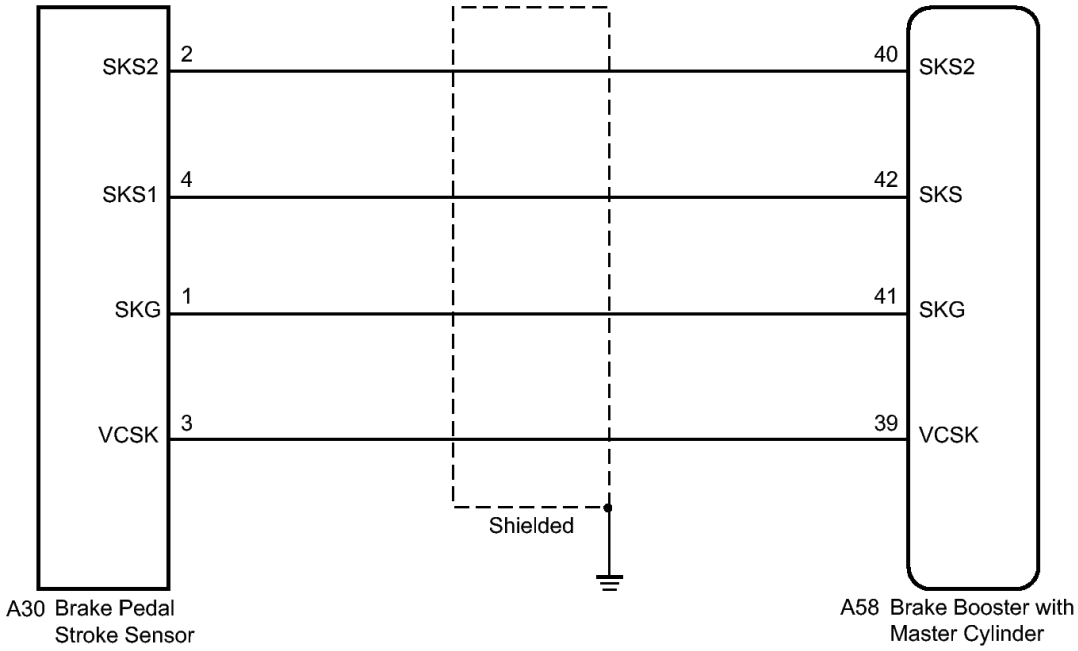


Fig. 30: Brake Pedal Stroke Sensor Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU) or brake pedal stroke sensor, perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

Check the condition of each related circuit connector before troubleshooting. Refer to **ELECTRONIC CIRCUIT INSPECTION PROCEDURE** .

PROCEDURE

1. **CHECK BRAKE PEDAL**
   a. Check that the brake pedal and the brake pedal stroke sensor are properly installed and that the pedal can be operated normally.
   b. Check and adjust the brake pedal height. Refer to **ADJUSTMENT** .
   c. Adjust the brake pedal stroke sensor. Refer to **ADJUSTMENT** .

   NEXT: Go to next step

2. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE PEDAL STROKE**

SENSOR)

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

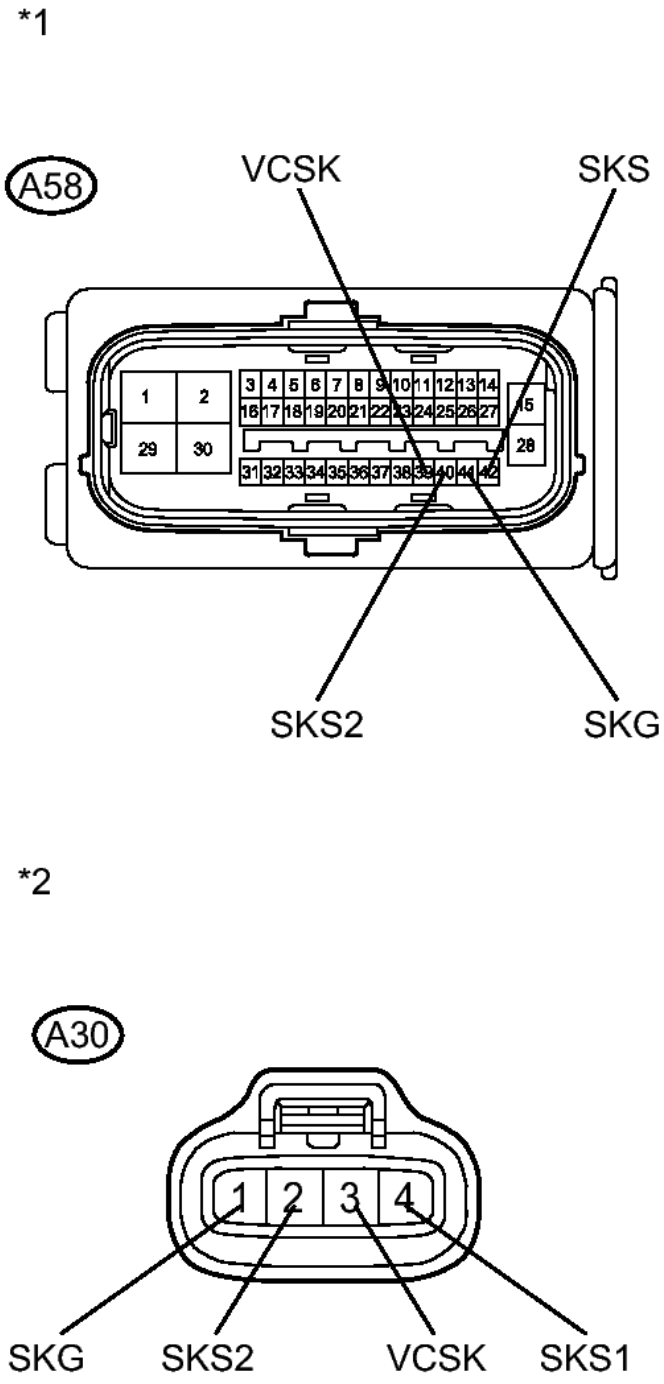


Fig. 31: Identifying Skid Control ECU Connector And Brake Pedal Stroke Sensor Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector and the brake pedal stroke sensor connector.
c. Check both the connector case and the terminal for deformation and corrosion.

OK

No deformation or corrosion.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-39 (VCSK) - A30-3 (VCSK)	Always	Below 1 ohms
A58-39 (VCSK) - Body ground	Always	10 kohms or higher
A58-41 (SKG) - A30-1 (SKG)	Always	Below 1 ohms
A58-41 (SKG) - Body ground	Always	10 kohms or higher
A58-42 (SKS) - A30-4 (SKS1)	Always	Below 1 ohms
A58-42 (SKS) - Body ground	Always	10 kohms or higher
A58-40 (SKS2) - A30-2 (SKS2)	Always	Below 1 ohms
A58-40 (SKS2) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Brake Pedal Stroke Sensor)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. **INSPECT SKID CONTROL ECU (SENSOR OUTPUT)**
   a. Reconnect the skid control ECU connector.

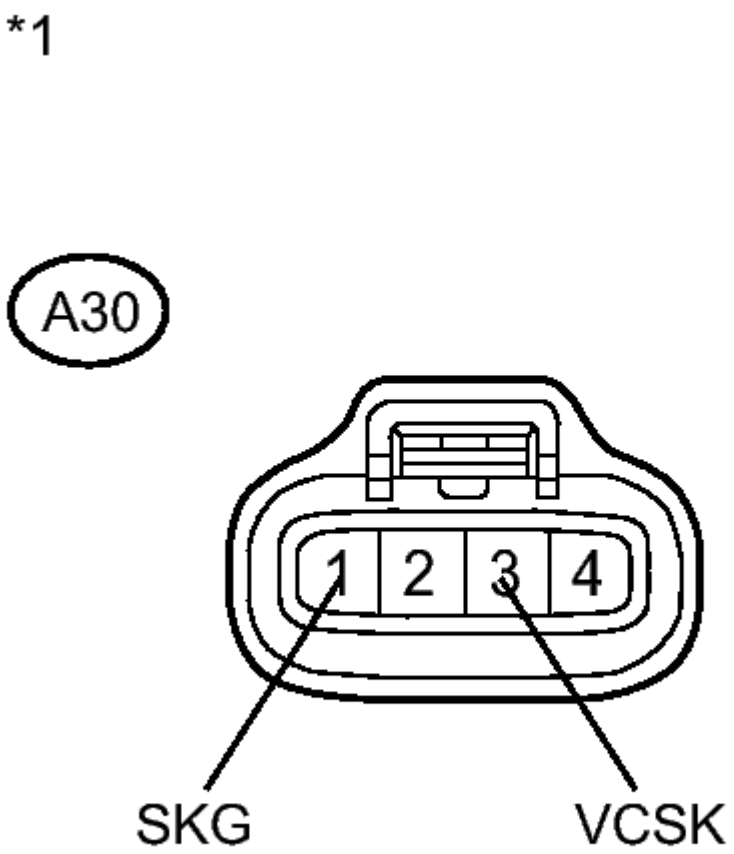


Fig. 32: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A30-3 (VCSK) - A30-1 (SKG)	Power switch on (IG)	4.84 to 5.16 V

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Brake Pedal Stroke Sensor)

NG --> See step 5

OK --> See step 4

4. **REPLACE BRAKE PEDAL STROKE SENSOR. Refer to REMOVAL**
5. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1249/49: OPEN IN STOP LIGHT SWITCH CIRCUIT

DESCRIPTION

The skid control ECU inputs the stop light switch signal and detects the brake pedal operation status.

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

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1249/49	231	When IG1 terminal voltage is 9.5 V or more, an open stop light switch circuit continues for 10 seconds or more.	• STOP fuse • Stop light switch • Stop light switch circuit • Brake booster with master cylinder (Skid control ECU)

WIRING DIAGRAM

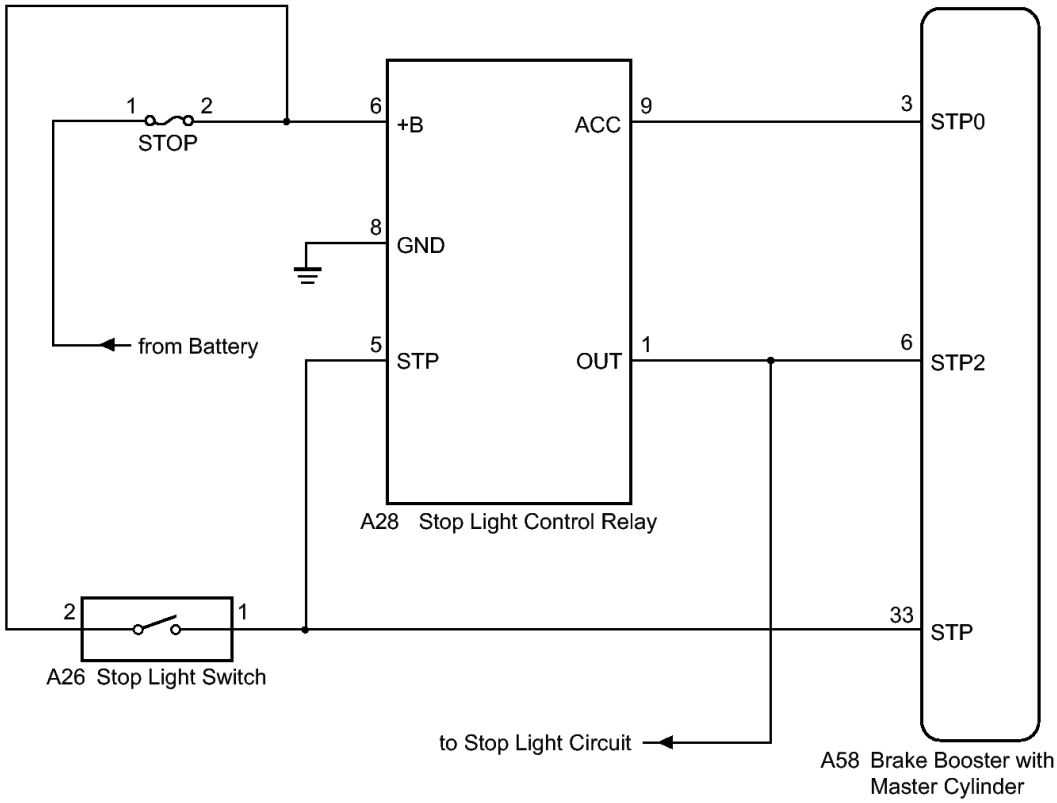


Fig. 33: Identifying Open in Stop Light Switch Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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	ON

depressed	
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 power switch on (IG).
   c. 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	-

   d. 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 9

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   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 (C1249/49) is not output	A
DTC (C1249/49) 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 12

A --> See step 10

4. **INSPECT STOP FUSE**
   a. Remove the STOP fuse from the main body ECU (instrument panel junction block).

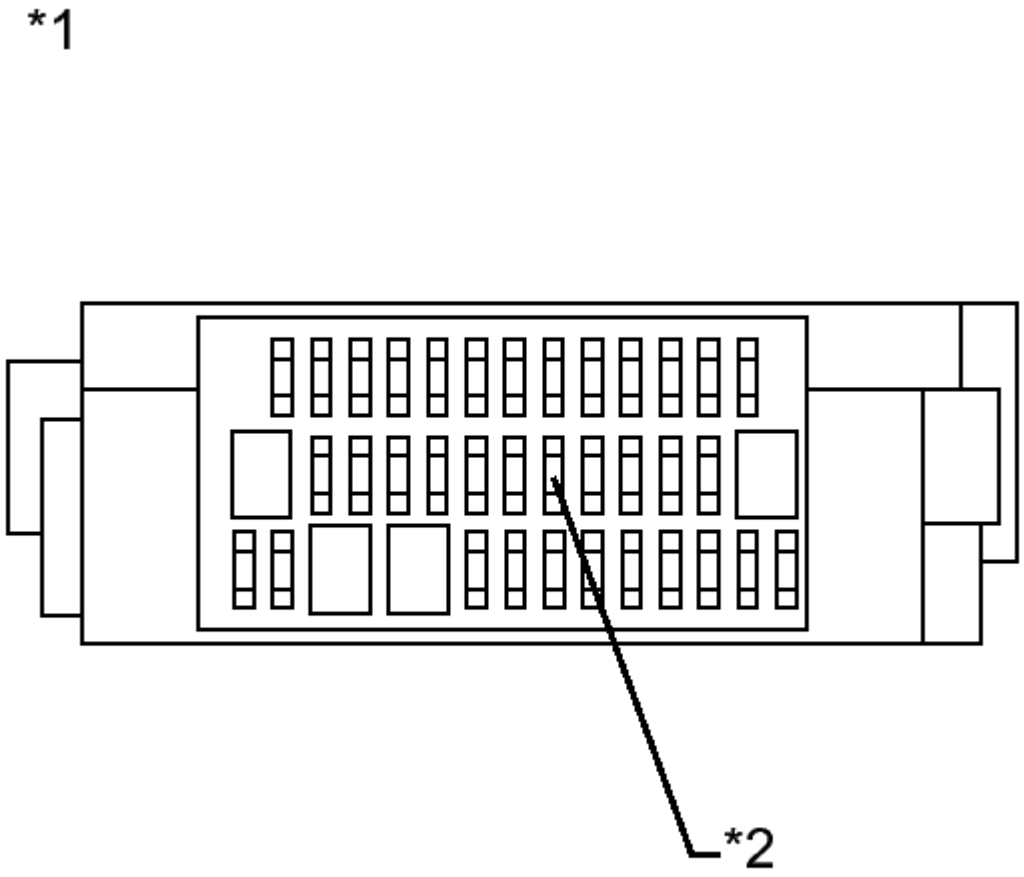


Fig. 34: Identifying STOP Fuse Location
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
STOP (10 A) fuse	Always	Below 1 ohms

TEXT IN ILLUSTRATION

	Main Body ECU

*1	(Instrument Panel Junction Block)
*2	STOP Fuse

NG --> REPLACE STOP FUSE

OK: Go to next step

5. **INSPECT STOP LIGHT SWITCH (POWER SOURCE TERMINAL)**
   a. Install the STOP fuse.

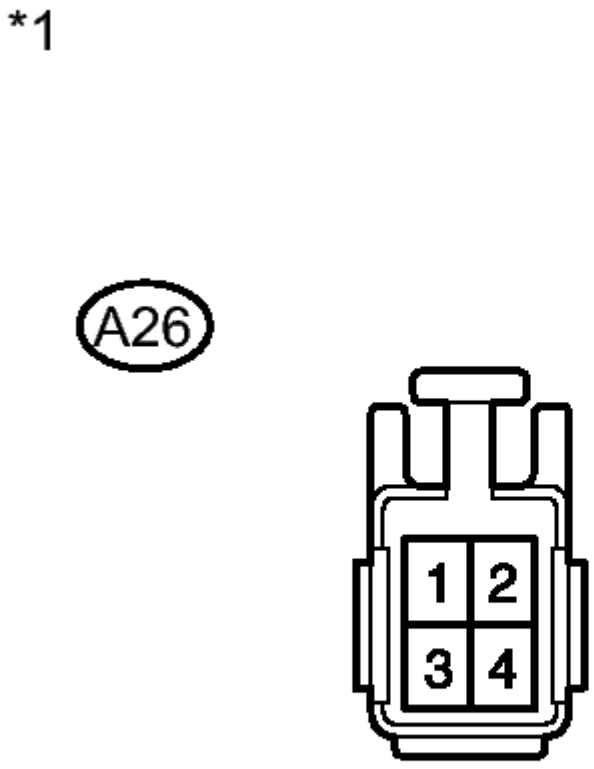


Fig. 35: Identifying Stop Light Switch Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Voltage

Tester Connection	Condition	Specified Condition
A26-2 - Body ground	Always	11 to 14 V

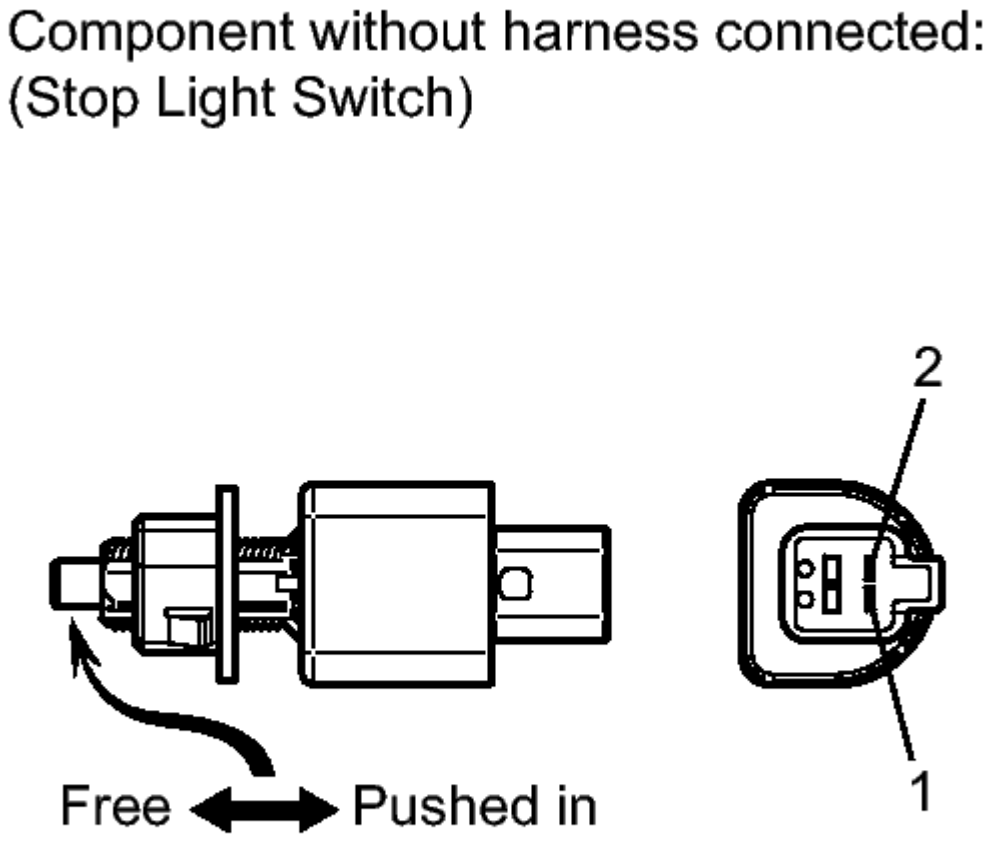
TEXT IN ILLUSTRATION

*1	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

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



N

Fig. 36: Identifying Stop Light Switch
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

NG --> See step 13

OK: Go to next step

7. **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.

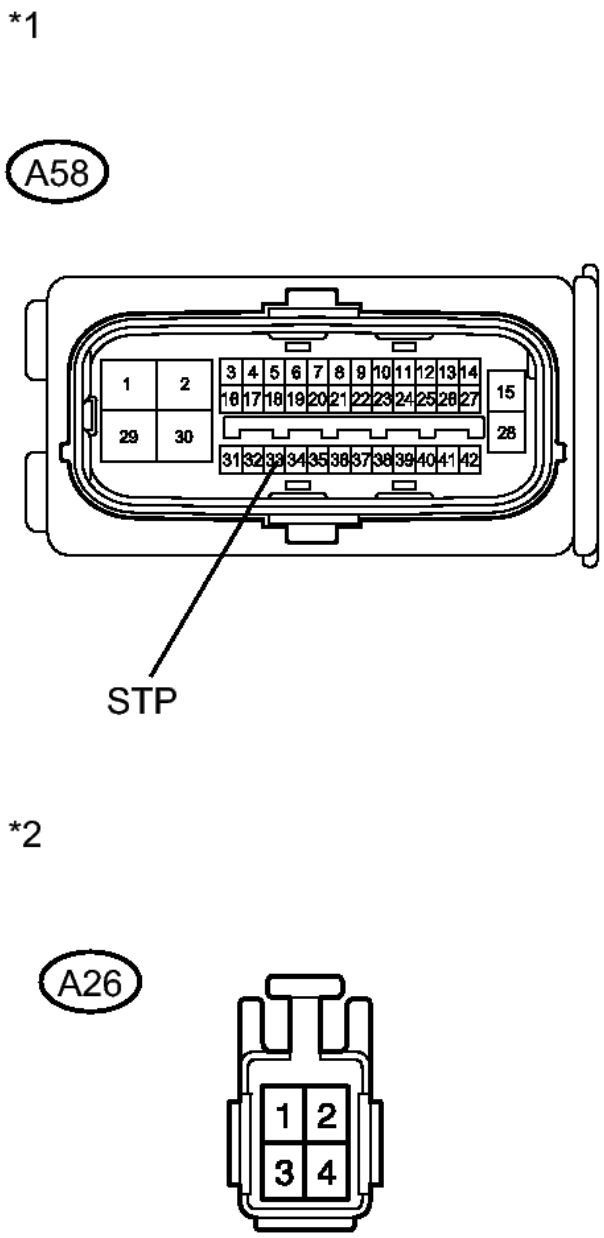


Fig. 37: Identifying ECU Connector

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

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
A58-33 (STP) - A26-1	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Stop Light Switch)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

8. **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. Turn the power switch on (READY).
   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

	Proceed

Result	to
DTC (C249/49) is not output	A
DTC (C1249/49) 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 12

A --> See step 11

9. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT SWITCH)**
   a. Turn the power switch off.

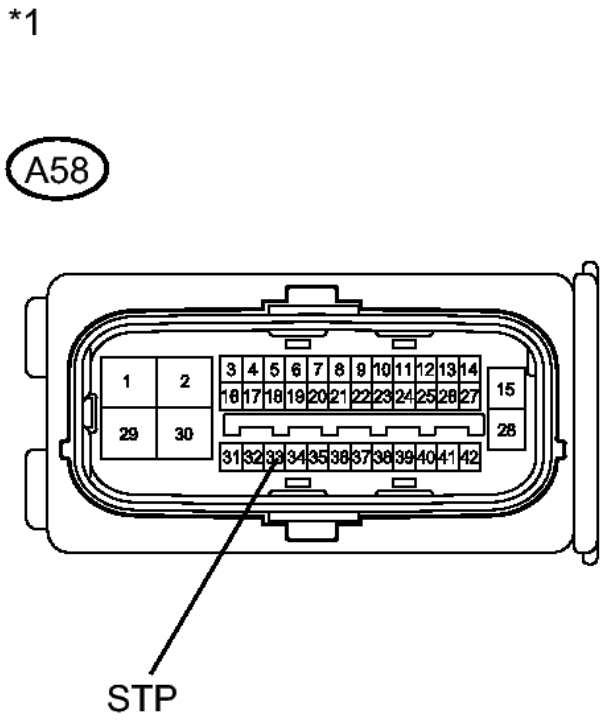


Fig. 38: Identifying Kid Control ECU Connector And Stop Light Switch Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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 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
A58-33 (STP) - A26-1	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Stop Light Switch)

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 12

10. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
11. **INSPECT LIGHTING SYSTEM (STOP LIGHT CIRCUIT). Refer to PROBLEM SYMPTOMS TABLE**
12. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
13. **REPLACE STOP LIGHT SWITCH. Refer to REMOVAL**

DTC C1252/52: BRAKE BOOSTER PUMP MOTOR ON TIME ABNORMALLY LONG; DTC C1253/53: PUMP MOTOR RELAY MALFUNCTION

DESCRIPTION

The skid control ECU detects decreases in the accumulator pressure according to the data from the accumulator pressure sensor, and then starts and stops the pump motor by operating the motor relay.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1252/52	311	The pump motor is operating continuously for 178 seconds or more. (When relay malfunction is 98 seconds or more.)	• Short in motor circuit or motor monitor circuit • Motor relay stuck • Accumulator pressure sensor malfunction in brake actuator • Brake booster with master cylinder (Skid control ECU)
C1253/53	321	With the IG1 terminal voltage 9.5 V or more, the motor drive monitor remains off for 0.2 seconds or more after a motor drive on request.	• Open in motor circuit or motor monitor circuit • Brake booster with master cylinder (Skid control ECU)
?	322	The motor drive monitor remains on for 2 seconds or more after a motor drive off request.	• Short in motor circuit or motor monitor circuit • Brake booster with master cylinder (Skid control ECU)
?	323	The skid control ECU internal motor drive logical inconsistency continues for 2 seconds or more.	Brake booster with master cylinder (Skid control ECU)
?	324	An open circuit in both skid control ECU internal motor relays 1 and 2.	• Open in motor circuit or motor monitor circuit • Brake booster with master cylinder (Skid control ECU)
?	325	An open circuit in both skid control ECU internal motor relays 1 and 3.	?
?	326	An open circuit in both skid control ECU internal motor relays 2 and 3.	?
?	327	An open circuit in skid control ECU internal motor relay 1.	?
?	328	An open circuit in skid control ECU internal motor relay 2.	?
		An open circuit in skid	

?	329	control ECU internal motor relay 3.	?

WIRING DIAGRAM

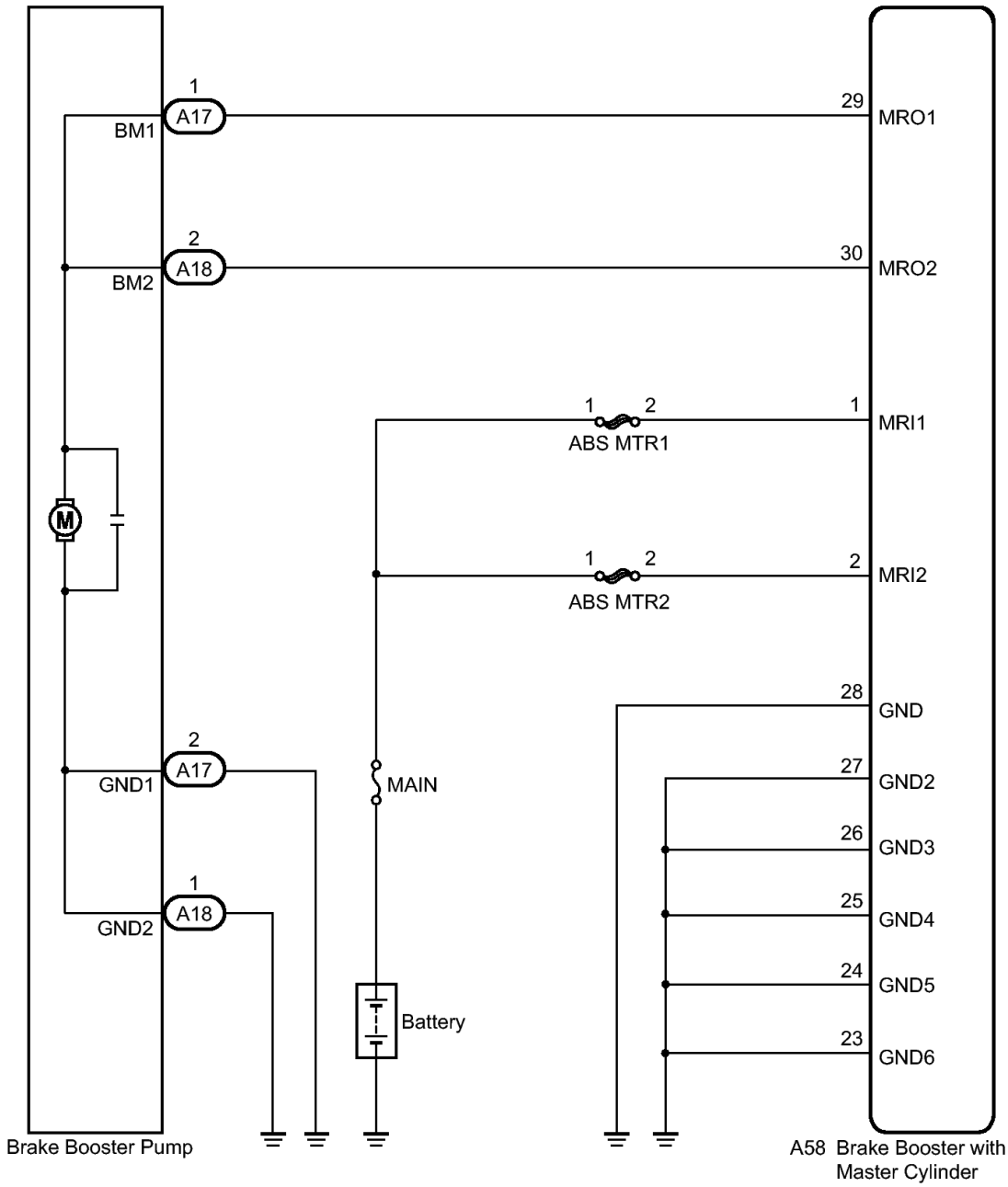


Fig. 39: Brake Booster Pump To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU or brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM (ABS MOTOR RELAY)**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* Motor Relay	ABS motor relay	Relay ON/OFF	-

*: Electronically Controlled Brake System

   d. 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
ECB* Motor Relay	ABS motor relay / ON or OFF	ON: Relay on OFF: Relay off	-

*: Electronically Controlled Brake System

   e. Check the operating condition of the ABS motor relay when operating it with the Techstream.

Result

Result	Proceed to
ABS motor relay in the Data List	

turns ON/OFF using the Active Test	A
ABS motor relay in the Data List does not change using the Active Test	B

B --> See step 6

A: Go to next step

2. **INSPECT BRAKE BOOSTER PUMP**
   a. Turn the power switch off.

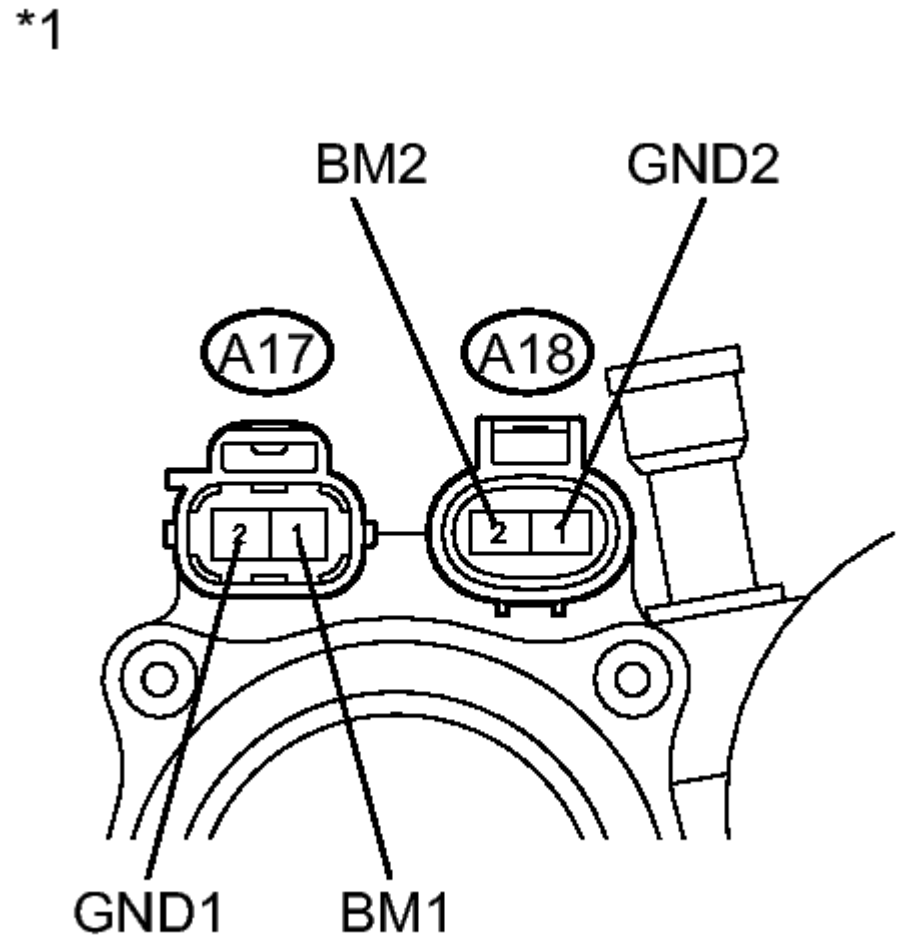


Fig. 40: Identifying Brake Booster Pump Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Make sure that there is no looseness at the locking part and the connecting part of the connectors.
c. Disconnect the brake booster pump connectors.
d. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A17-1 (BM1) - A17-2 (GND1)	Always	Below 10 ohms

A18-2 (BM2) - A18-1 (GND2)	Always	Below 10 ohms
A17-1 (BM1) - A18-2 (BM2)	Always	Below 1 ohms
A17-2 (GND1) - A18-1 (GND2)	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Component without harness connected (Brake Booster Pump)

NG --> See step 12

OK: Go to next step

3. **INSPECT BRAKE BOOSTER PUMP (GND TERMINAL)**
   a. Measure the resistance according to the value(s) in the table below.

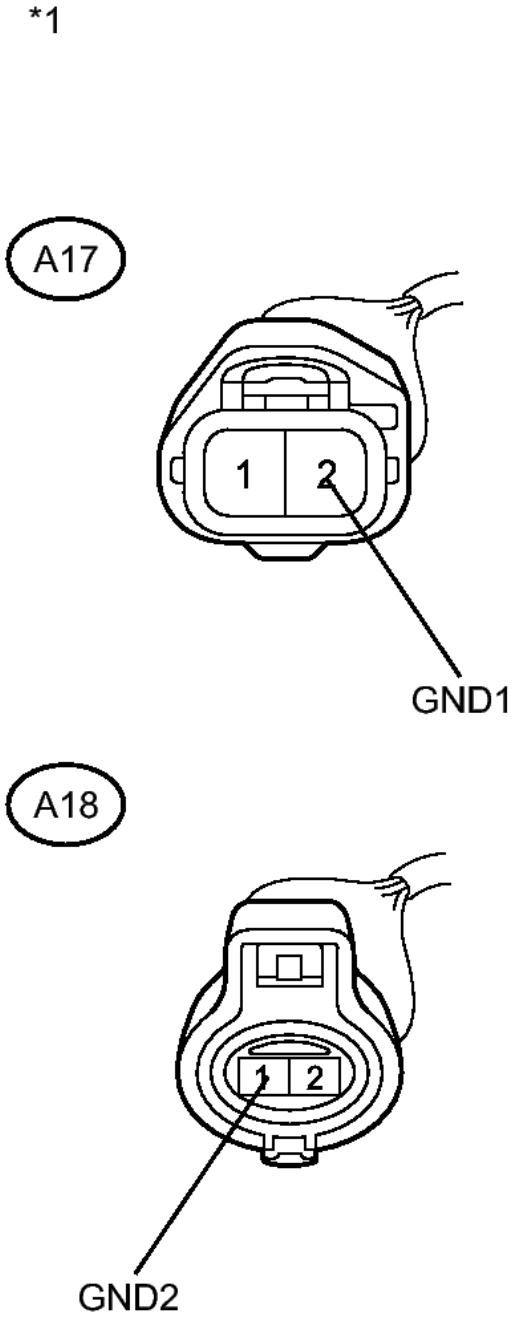


Fig. 41: Identifying Brake Booster Pump Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
A17-2 (GND1) - Body ground	Always	Below 1 ohms
A18-1 (GND2) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Brake Booster Pump)

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

OK: Go to next step

4. **READ VALUE USING TECHSTREAM (ACCUMULATOR PRESSURE SENSOR)**
   a. Reconnect the brake booster pump connectors.
   b. Connect the Techstream to the DLC3.
   c. Turn the power switch on (IG).
   d. 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
Accumulator Sensor	Accumulator pressure sensor / Min.: 0 V, Max.: 5 V	Specified value: 2.9 to 4.2 V	When brake fluid is stored in the accumulator: Accumulator pressure changes in accordance with volume of fluid stored in the

			accumulator

e. Wait for 30 seconds without depressing the brake pedal.
f. Check that the accumulator pressure sensor output values change is within the specified range.

OK

Accumulator pressure sensor output values change is within 0.55 V.

NG --> See step 9

OK: Go to next step

5. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (IG).
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTCs (C1252/52 and C1253/53) are not output	A
DTCs (C1252/52 and/or C1253/53) are output	B

B --> See step 11

A --> See step 10

6. **INSPECT ABS MTR FUSES**
   a. Turn the power switch off.

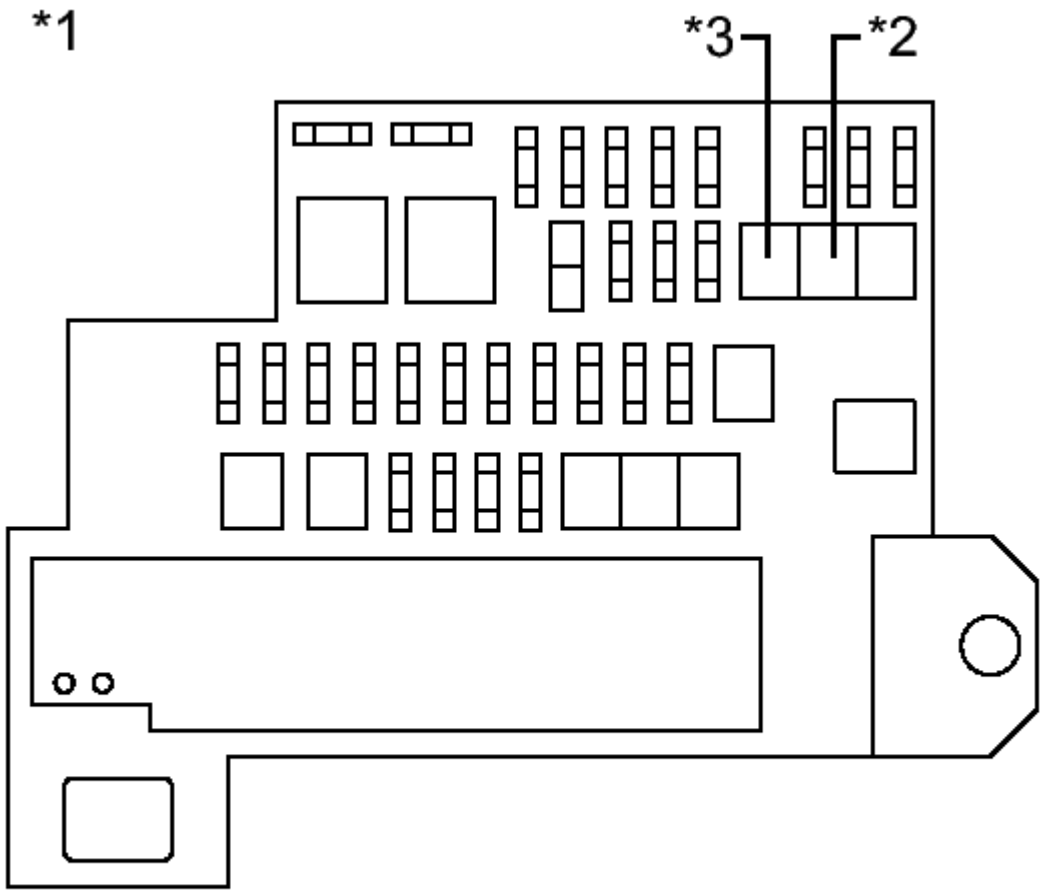


Fig. 42: Identifying ABS MTR Fuses
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Remove the ABS MTR fuses.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
ABS MTR1 (30 A) fuse	Always	Below 1 ohms
ABS MTR2 (30 A) fuse	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Engine Room Relay Block
*2	ABS MTR1 Fuse
*3	ABS MTR2 Fuse

NG --> REPLACE ABS MTR FUSES

OK: Go to next step

7. **INSPECT SKID CONTROL ECU (MRI TERMINAL)**
   a. Install the ABS MTR fuses.

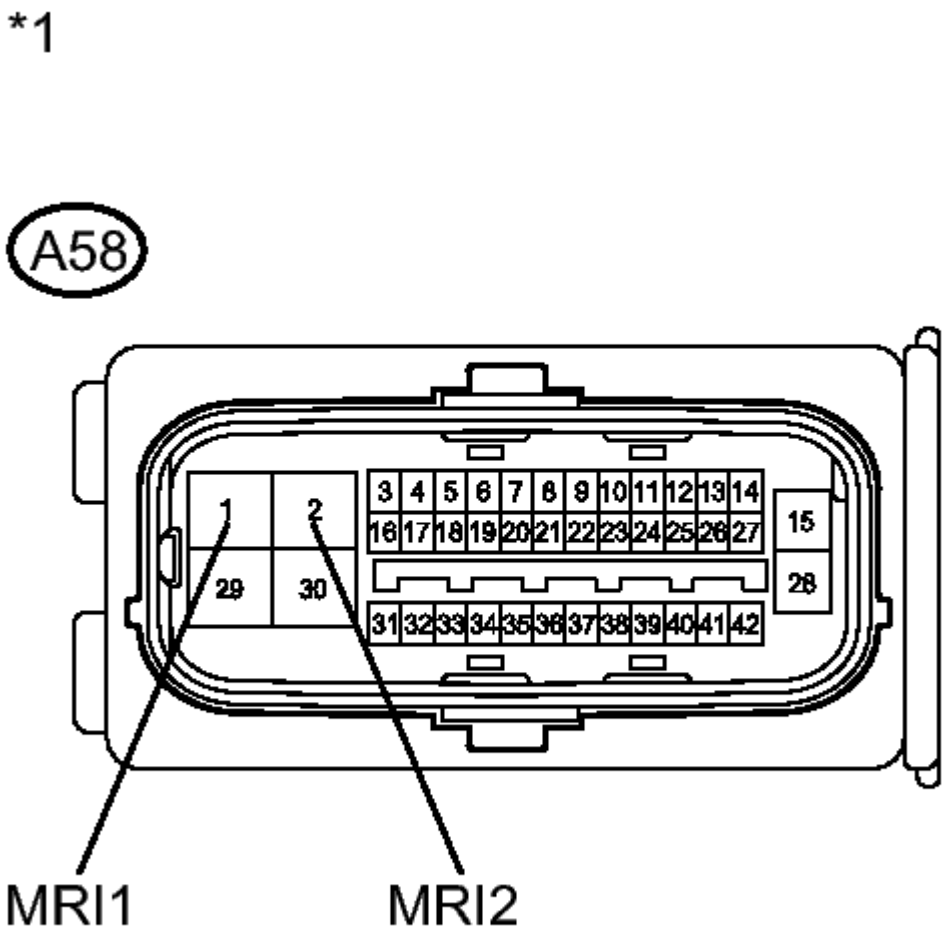


Fig. 43: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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	Condition	Specified Condition
A58-1 (MRI1) - Body ground	Always	11 to 14 V

A58-2 (MRI2) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

8. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - BRAKE BOOSTER PUMP)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

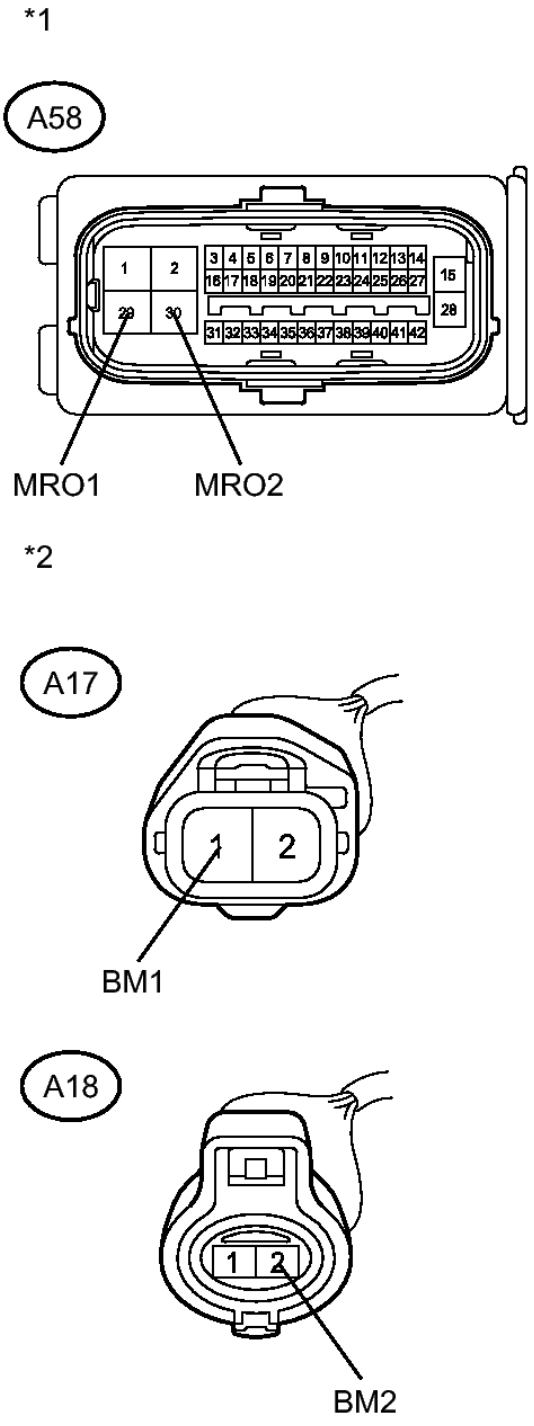


Fig. 44: Identifying Brake Booster Pump Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the brake booster pump connectors.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-29 (MRO1) - A17-1 (BM1)	Always	Below 1 ohms
A58-29 (MRO1) - Body ground	Always	10 kohms or higher
A58-30 (MRO2) - A18-2 (BM2)	Always	Below 1 ohms
A58-30 (MRO2) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Brake Booster Pump)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 11

9. **PERFORM ACTIVE TEST USING TECHSTREAM (SOLENOID VALVE)**

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

HINT:

The Active Test can be performed when the following conditions are met.

- ABS main relay is on.
- Park (P) selected.
- Parking brake is applied.
- Vehicle speed is 0 km/h (0 mph).

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* Solenoid (SMC/SRC/SCC)	Switching solenoid valve (SMC/SRC/SCC)	Solenoid ON/OFF	Operation sound of solenoid (clicking sound) can be heard

*: Electronically Controlled Brake System

b. Perform the Active Test of the solenoid using the Techstream.
c. 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
Wheel Cylinder Pressure Sensor	Wheel cylinder pressure sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

d. Check that the output value of wheel cylinder does not increase.

OK

The output value of wheel cylinder does not increase.

HINT:

If any output value increases, there may be brake fluid leaks in the brake actuator.

NG --> See step 11

OK --> See step 12

10. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
11. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
12. **REPLACE BRAKE BOOSTER PUMP. Refer to REMOVAL**

DTC C1256/56: ACCUMULATOR LOW PRESSURE

DESCRIPTION

The accumulator pressure sensor is built into the actuator and detects the accumulator pressure.

The skid control ECU turns on the brake warning light / red (malfunction) and brake warning light / yellow (minor malfunction), and sounds the skid control buzzer if it senses a decrease in the accumulator pressure.

DTC C1256/56 may be output if the accumulator pressure drops due to frequent braking (this is not a malfunction).

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1256/56	341	Significant drop in accumulator pressure continues. (DTCs will be stored and the buzzer will operate when either condition is met.)	• Accumulator pressure dropped due to frequent brake pedal operation (not a malfunction) • Pump motor malfunction • Accumulator deterioration • Accumulator pressure sensor • Supply voltage reduced

WIRING DIAGRAM

Refer to DTCs C1252/52 and C1253/53. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

When C1202/68, C1241/41, C1252/52, C1253/53 and/or C1391/69 are output together with C1256/56, inspect and repair the trouble areas indicated by C1202/68, C1241/41, C1252/52, C1253/53 and/or C1391/69 first. Refer to **DTC C1202/68: Master Reservoir Level Malfunction**. Refer to **DTC C1241/41: Low Battery**

Positive Voltage; DTC C1242/42: Open in IG1 / IG2 Power Source Circuit. Refer to **DTC C1252/52: Brake Booster Pump Motor on Time Abnormally Long; DTC C1253/53: Pump Motor Relay Malfunction**, or refer to **DTC C1391/69: Accumulator Leak Malfunction**).

PROCEDURE

1. **BRAKE PROBLEM CHECK**
   a. Ask the customer if frequent braking was performed while the brake warning light / yellow (minor malfunction) was on.

      OK

Result	Proceed to
Frequent braking was not performed	A
Frequent braking was performed	B

      HINT:

      This DTC is output even if the accumulator pressure drops only temporarily due to frequent braking.

   B --> END

   A: Go to next step

2. **INSPECT BRAKE BOOSTER PUMP**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

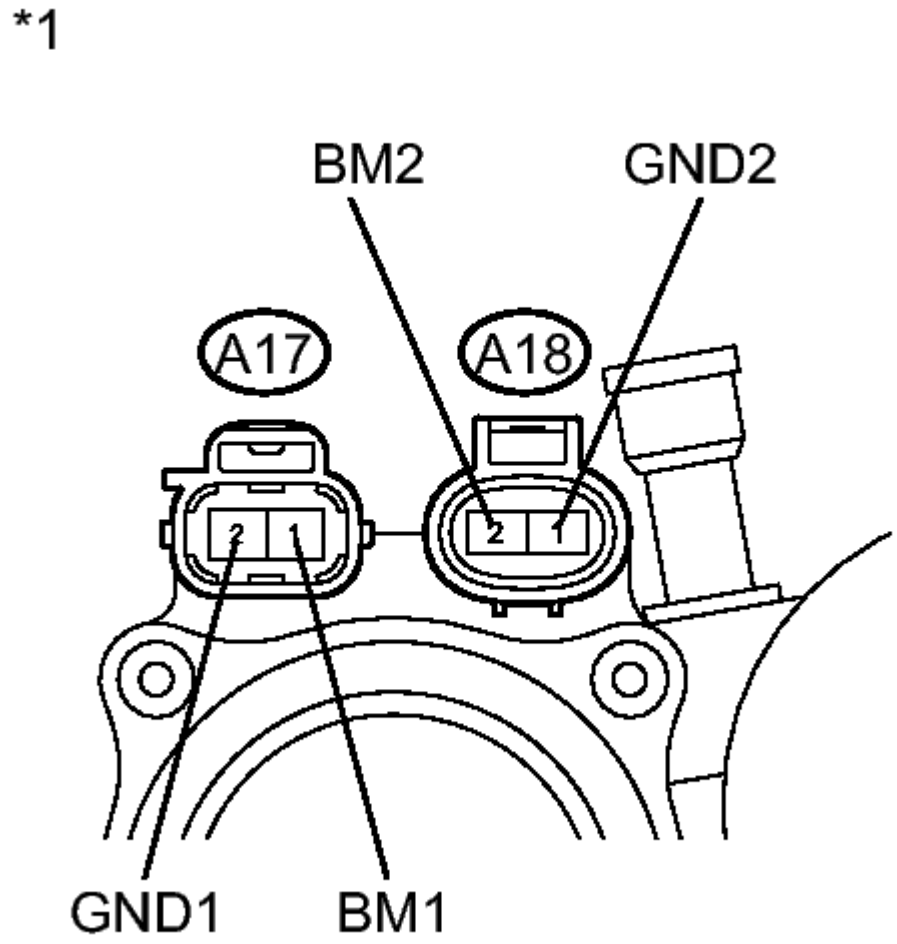


Fig. 45: Identifying Brake Booster Pump Connectors
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the brake booster pump connectors.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A17-1 (BM1) - A17-2 (GND1)	Always	Below 10 ohms
A18-2		

(BM2) - A18-1 (GND2)	Always	Below 10 ohms
A17-1 (BM1) - A18-2 (BM2)	Always	Below 1 ohms
A17-2 (GND1) - A18-1 (GND2)	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Component without harness connected (Brake Booster Pump)

NG --> See step 6

OK: Go to next step

3. **READ VALUE USING TECHSTREAM (ACCUMULATOR PRESSURE SENSOR)**
   a. Reconnect the brake booster pump connectors.
   b. Connect the Techstream to the DLC3.
   c. Turn the power switch on (IG).
   d. 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
Accumulator Sensor	Accumulator pressure sensor / Min.: 0 V, Max.: 5 V	Specified value: 2.9 to 4.2 V	When brake fluid is stored in the accumulator: Accumulator pressure changes in accordance with volume of fluid stored in the

			accumulator

e. Wait for 30 seconds without depressing the brake pedal.
f. Check that the accumulator pressure sensor output values change is within the specified range.

OK

Accumulator pressure sensor output values change is within 0.55 V.

NG --> See step 4

OK --> See step 5

4. **PERFORM ACTIVE TEST USING TECHSTREAM (SOLENOID VALVE)**
   a. Turn the power switch off.
   b. Connect the Techstream to the DLC3.
   c. Turn the power switch on (IG).
   d. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

HINT:

The Active Test can be performed when the following conditions are met.

- ABS main relay is on.
- Park (P) selected.
- Parking brake is applied.
- Vehicle speed is 0 km/h (0 mph).

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* Solenoid (SMC/SRC/SCC)	Switching solenoid valve (SMC/SRC/SCC)	Solenoid ON/OFF	Operation sound of solenoid (clicking sound) can be heard

*: Electronically Controlled Brake System

e. Perform the Active Test of the solenoid using the Techstream.
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
Wheel Cylinder Pressure Sensor	Wheel cylinder pressure sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

g. Check that the output value of wheel cylinder does not increase.

OK

The output value of wheel cylinder does not increase.

HINT:

If any output value increases, there may be brake fluid leaks in the brake actuator.

NG --> See step 7

OK --> See step 6

5. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE BRAKE BOOSTER PUMP. Refer to REMOVAL**
7. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1257/57: POWER SUPPLY DRIVE CIRCUIT

DESCRIPTION

The skid control ECU detects a drop in accumulator pressure according to the signals from the accumulator pressure sensor, then operates and stops the motor relay as well as the pump motor.

The skid control ECU troubleshoots the built-in motor relay drive circuit, and outputs this DTC when a malfunction is detected.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1257/57	361	While accumulator pressure falls below hard pump ON pressure, the hard drive circuit does not operate for 1 second or more.	Brake booster with master cylinder (Skid control ECU)
?	362	When hard driving, one of the 3 built-in motor relays does not operate for 0.2 seconds or more.	?

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

When C1241/41, C1242/42 and/or C1253/53 are output together with C1257/57, inspect and repair the trouble areas indicated by C1241/41, C1242/42 and/or C1253/53 first. Refer to **DTC C1241/41: Low Battery Positive Voltage; DTC C1242/42: Open in IG1 / IG2 Power Source Circuit** or. Refer to **DTC C1252/52: Brake Booster Pump Motor on Time Abnormally Long; DTC C1253/53: Pump Motor Relay Malfunction**).

PROCEDURE

1. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER**
   a. Replace the brake booster with master cylinder (skid control ECU). Refer to **REMOVAL** .

   NEXT --> END

DTC C1259/58: HV SYSTEM REGENERATIVE MALFUNCTION; DTC C1310/51: MALFUNCTION IN HV SYSTEM

DESCRIPTION

The skid control ECU communicates with the power management control ECU and controls braking force according to the motor's regenerative force.

The skid control ECU sends Enhanced-VSC signals to the power management control ECU and inputs operating signals from the power management control ECU.

The skid control ECU uses CAN communication for communication with the power management control ECU. If a communication malfunction is memorized, the skid control ECU prohibits Enhanced-VSC operation and a part of electronically controlled brake system control by fail-safe function.

If the signals from the power management control ECU returned to normal, the warning light will go off and the DTCs C1259/58 and C1310/51 will be cleared.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1259/58	-	The regeneration malfunction signal is input for at least 0.036 seconds when IG2 terminal voltage is 9.5 V or more for at least 2 seconds and communication with power management control ECU is valid.	Power management control ECU (Hybrid vehicle control ECU)
		The internal malfunction signal is input for at least 0.072 seconds	

C1310/51	-	when IG2 terminal voltage is 10.5 V or more for at least 2 seconds and communication with power management control ECU is valid.	Power management control ECU (Hybrid vehicle control ECU)

HINT:

This DTC will be output from the skid control ECU when the power management control ECU sends a malfunction signal to the skid control ECU.

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK HYBRID CONTROL SYSTEM**
   a. Check if the hybrid control 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 3

   A --> See step 2

2. **REPLACE POWER MANAGEMENT CONTROL ECU. Refer to REMOVAL**
3. **INSPECT HYBRID CONTROL SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART**

DTC C1290/66: STEERING ANGLE SENSOR ZERO POINT MALFUNCTION

DESCRIPTION

The skid control ECU acquires the steering angle sensor zero point every time the power switch is turned on (READY) 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 the front wheel alignment or the steering wheel position is adjusted without disconnecting the cable from the negative (-) battery terminal, or if 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.

The warning of the steering angle sensor zero point malfunction will be cancelled by turning the power switch off.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1290/66	751	The steering angle sensor zero point is judged as an abnormal value.	• 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

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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 power switch off.
   b. Turn the power switch on (READY).
   c. Drive the vehicle straight ahead at 35 km/h (22 mph) or more for at least 5 seconds.
   d. Check that the steering wheel is centered correctly while driving straight ahead.

      HINT:

      If front wheel alignment and steering position are adjusted as a result of an off-center 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 4

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   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 (C1290/66) is not output	A
DTC (C1290/66) is output	B

B --> See step 5

A --> END

4. **ADJUST FRONT WHEEL ALIGNMENT OR STEERING POSITION. Refer to ADJUSTMENT**
5. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1300: SKID CONTROL ECU MALFUNCTION

DESCRIPTION

The skid control ECU outputs this DTC if malfunctions are found in the circuit inside the ECU by self diagnosis.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1300	-	Skid control ECU internal malfunction.	Brake booster with master cylinder (Skid control ECU)

INSPECTION PROCEDURE

PROCEDURE

1. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER**
   a. Replace the brake booster with master cylinder (skid control ECU). Refer to **REMOVAL** .
   b. Perform initialization and calibration of the linear solenoid valve. Refer to **INITIALIZATION** .
   c. Perform the zero point calibration of the yaw rate and acceleration sensor. Refer to **CALIBRATION** .
   d. Perform the sensor check in the Test Mode procedure. Refer to **TEST MODE PROCEDURE** .

NEXT --> END

DTC C1311/11: OPEN IN MAIN RELAY 1 CIRCUIT; DTC C1312/12: SHORT IN MAIN RELAY 1 CIRCUIT

DESCRIPTION

The ABS main relay supplies power to the changeover solenoid and the linear solenoid.

The ABS main relay remains on for approximately 2 minutes after the power switch is turned off and the input of brake pedal operation signals stops, and supplies power to the system to keep it ready to operate.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
		Either of the following is detected: 1. When the power switch is on (READY):	

C1311/11	1	The ABS main relay contact is not turned ON (BS terminal voltage 3.5 V or more) for 0.2 seconds or more when ABS main relay ON is requested while IG1 terminal voltage is 9.5 V or more. 2. When the power switch is off: The ABS main relay contact is not turned ON (BS terminal voltage 3.5 V or more) for 0.2 seconds or more when ABS main relay ON is requested.	• Open or short in ABS main relay circuit • Brake booster with master cylinder (Skid control ECU)
C1312/12	2	The ABS main relay contact is turned ON (BS terminal voltage 3.5 V or more) for 4.5 seconds or more when ABS main relay OFF is requested from the ECU.	• Short in ABS main relay circuit • ABS main relay internal stuck • Brake booster with master cylinder (Skid control ECU)

WIRING DIAGRAM

Refer to DTCs C1241/41 and C1242/42. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **PERFORM ACTIVE TEST USING TECHSTREAM (ABS MAIN RELAY)**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* Main	ABS main	Relay ON/OFF	-

Relay	relay		

*: Electronically Controlled Brake System

d. 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
ECB* Main Relay	ABS main relay / ON or OFF	ON: Relay on OFF: Relay off	-

*: Electronically Controlled Brake System

e. Check the operating condition of the ABS main relay when operating it with the Techstream.

Result

Result	Proceed to
ABS main relay in the Data List turns ON/OFF using the Active Test	A
ABS main relay in the Data List does not change using the Active Test	B

B --> See step 4

A: Go to next step

2. **INSPECT SKID CONTROL ECU (BS TERMINAL)**
   a. Turn the power switch off.

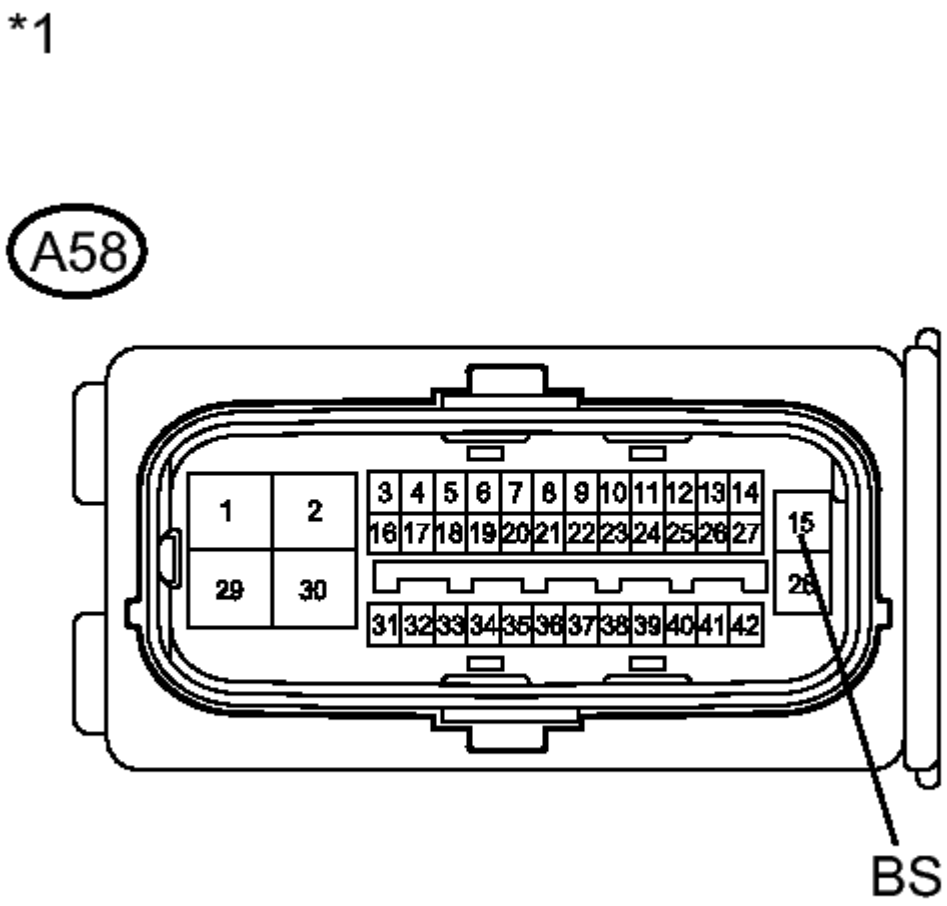


Fig. 46: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   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	Condition	Specified

Connection		Condition
A58-15 (BS) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

3. **RECONFIRM DTC**
   a. Reconnect the skid control ECU connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (IG).
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C1311/11and C1312/12) are not output	A
DTCs (C1311/11 and/or C1312/12) are output	B

B --> See step 8

A --> See step 7

4. **INSPECT ABS MAIN FUSES**
   a. Turn the power switch off.

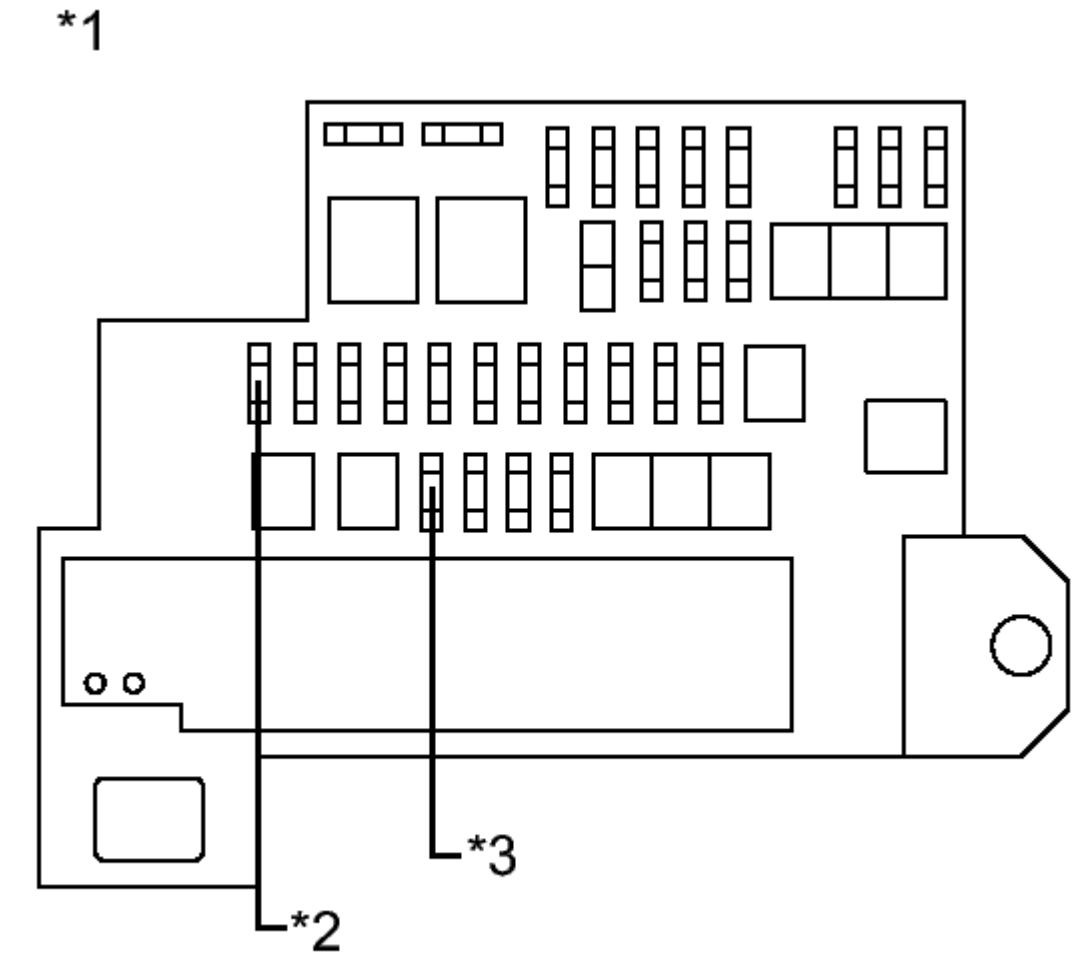


Fig. 47: Identifying ABS MAIN Fuses
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Remove the ABS MAIN fuses from the engine room relay block.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
ABS MAIN NO. 1 (20 A) fuse	Always	Below 1 ohms
ABS MAIN NO. 2 (7.5	Always	Below 1 ohms

A) fuse		

TEXT IN ILLUSTRATION

*1	Engine Room Relay Block
*2	ABS MAIN NO. 1 Fuse
*3	ABS MAIN NO. 2 Fuse

NG --> REPLACE ABS MAIN FUSES

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (BI TERMINAL)**
   a. Install the ABS MAIN fuses.

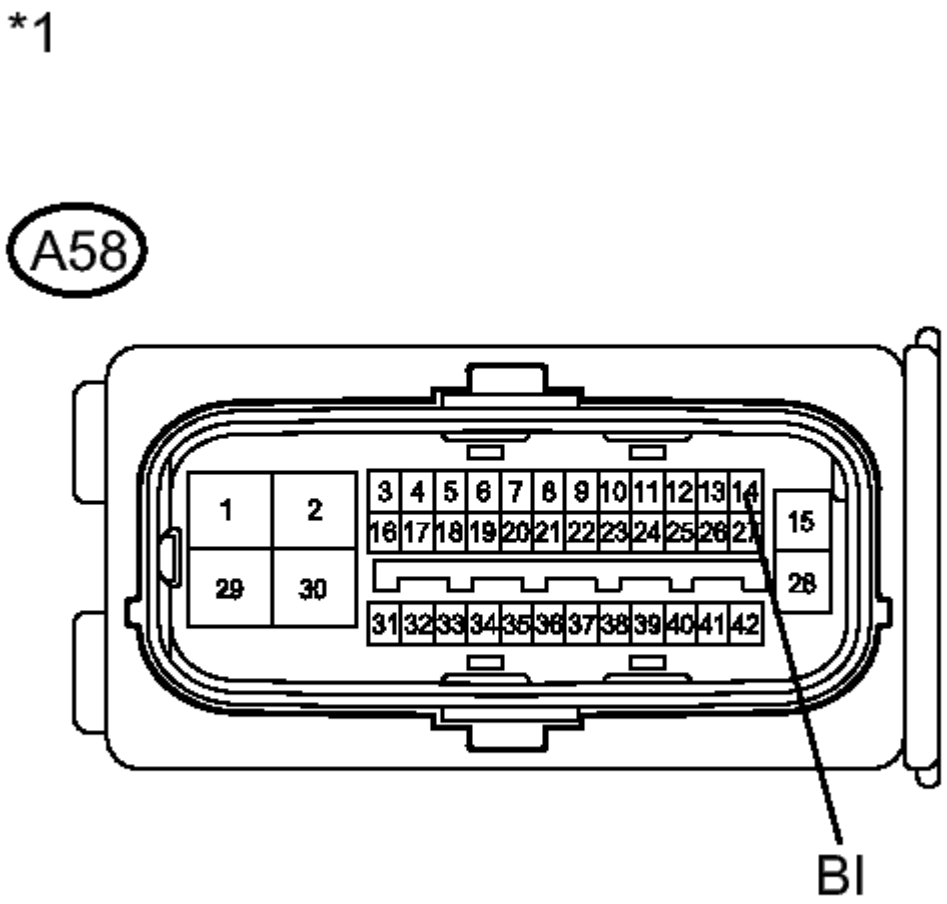


Fig. 48: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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	Condition	Specified Condition
A58-14 (BI) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

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

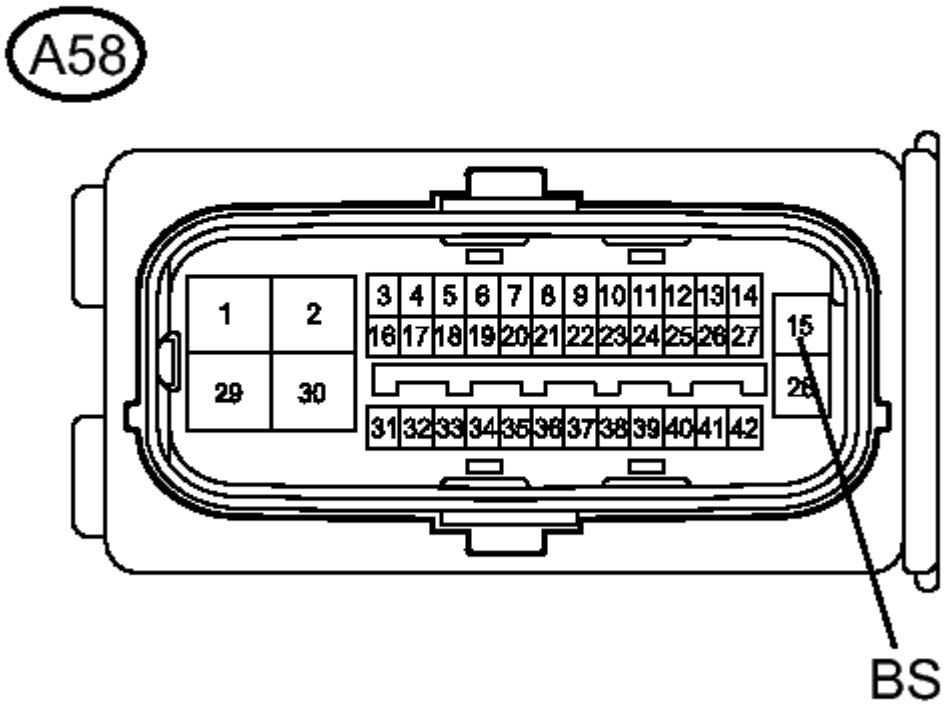


Fig. 49: Identifying Skid Control ECU BS Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Voltage

Tester Connection	Condition	Specified Condition
A58-15 (BS) - Body ground	Always	11 to 14 V

TEXT IN ILLUSTRATION

	Front view of wire harness

*1	connector (to Skid Control ECU)

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

OK --> See step 8

7. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
8. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1345/66: LINEAR SOLENOID VALVE OFFSET LEARNING UNDONE; DTC C1368/67: LINEAR SOLENOID VALVE OFFSET MALFUNCTION

DESCRIPTION

The skid control ECU stores and corrects the individual differences in the stroke sensor, actuator solenoids, and stroke simulator solenoid. Perform initialization of the linear solenoid valve and calibration if any of these parts is replaced.

The skid control ECU receives park (P) signal from the power management control ECU through the CAN communication system.

The DTCs are cleared when the linear valve offset learning results are normal.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1345/66	-	Linear valve offset learning undone.	Perform linear valve offset learning and check for DTCs. If no DTCs are output again, the valve is normal.
C1368/67	-	Offset learned value out of specification.	• Perform linear valve offset learning and check for DTCs. If no DTCs are output again, the valve is normal. • Brake booster with master cylinder (Brake actuator)

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

When C1451/72 is output together with C1345/66 and/or C1368/67, inspect and repair the trouble areas indicated by C1451/72 first. Refer to **DTC C1451/72: Motor Drive Permission Malfunction**.

PROCEDURE

1. **CHECK DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch off.
   c. Turn the power switch on (IG).
   d. Check that the DTCs (electronically controlled brake system and hybrid control system) are recorded. Refer to **DTC CHECK / CLEAR** for electronically controlled brake system, or refer to **DTC CHECK / CLEAR** for hybrid control system).

      Result

Result	Proceed to
DTCs (except C1345/66, C1368/67 and hybrid control system DTC) are not output	A
Hybrid control system DTC is output	B
DTCs (except C1345/66 and/or C1368/67) are output	C

      HINT:

      Before carrying out Perform Initialization and Calibration of the Linear Solenoid Valve, C1203/95 will output.

C --> See step 5

B --> See step 4

A: Go to next step

2. **PERFORM INITIALIZATION AND CALIBRATION OF LINEAR SOLENOID VALVE**
   a. Turn the power switch off.
   b. Perform initialization and calibration of the linear solenoid valve. Refer to **INITIALIZATION** .

NEXT: Go to next step

3. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (IG).
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTCs (C1345/66 and C1368/67) are not output	A
DTCs (C1345/66 and/or C1368/67) are output	B

B --> See step 6

A --> END

4. **INSPECT HYBRID CONTROL SYSTEM. Refer to DIAGNOSTIC TROUBLE CODE CHART**
5. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
6. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1365/54: ACCUMULATOR PRESSURE SENSOR MALFUNCTION

DESCRIPTION

The accumulator pressure sensor is built into the brake actuator.

The skid control ECU detects the accumulator pressure from the data sent from the accumulator pressure sensor, and then runs and stops the pump motor by operating the motor relay.

DTCs may be output if the accumulator pressure drops due to frequent braking (this is not a malfunction).

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1365/54	331	Sensor supply voltage (VACC) is 4.54 V or less, or 5.46 V or more for 0.8 seconds or more.	Brake booster with master cylinder (Skid control ECU or brake actuator)
?	332	Accumulator pressure sensor output voltage (PACC) is less than 8%, or 88% or more of sensor supply voltage for 0.8 seconds or more (less than 0.4 V, or 4.4 V or more for 0.8 seconds or more).	?
?	333	Fluctuation of sensor output is out of specification (the difference between the present value and last value is 7.5 MPa) for 0.8 seconds or more.	?
?	334	With the vehicle driven at 6 km/h (4 mph) or more and output value of the accumulator pressure sensor 19.7 MPa or less, the pump motor does not operate for 12 seconds or more.	?

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU or brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **READ VALUE USING TECHSTREAM (ACCUMULATOR PRESSURE SENSOR)**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. 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

Accumulator Sensor	Accumulator pressure sensor / Min.: 0 V, Max.: 5 V	Specified value: 2.9 to 4.2 V	When brake fluid is stored in the accumulator: Accumulator pressure changes in accordance with volume of fluid stored in the accumulator

d. Wait for 30 seconds without depressing the brake pedal.
e. Check that the accumulator pressure sensor output values change is within the specified range.

OK

Accumulator pressure sensor output values change is within 0.55 V.

NG --> See step 4

OK: Go to next step

2. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Perform a road test.
   d. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTC (C1365/54) is not output	A
DTC (C1365/54) is output	B

B --> See step 4

A --> See step 3

3. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
4. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1380/64: STOP LIGHT CONTROL RELAY MALFUNCTION

DESCRIPTION

Upon receiving the dynamic radar cruise control system operating signal from the skid control ECU, the relay contact turns on and the stop light comes on.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1380/64	761	When the voltage at the BI terminal is 8.9 V or more and the stop light control relay drive output (STP0) is ON, a signal is not input to the STP2 terminal for 2 seconds or more.	• Stop light switch • Stop light switch circuit • Stop light control relay • Stop light control relay circuit • Brake booster with master cylinder (Skid control ECU)
?	762	When the voltage at the BI terminal is 8.9 V or more and the stop light control relay drive output (STP0) is OFF, the signal at the STP terminal is different from the input signal at the STP2 for 5 seconds or more.	• Stop light switch • Stop light switch circuit • Stop light control relay • Stop light control relay circuit • Brake booster with master cylinder (Skid control ECU)

WIRING DIAGRAM

Refer to DTC C1249/49. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

HINT:

When C1249/49 is output together with C1380/64, inspect and repair the trouble areas indicated by C1249/49 first. Refer to **DTC C1249/49: Open in Stop Light Switch Circuit**.

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 11

   OK: Go to next step

2. **READ VALUE USING TECHSTREAM (STOP LIGHT SWITCH)**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. 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	-

   d. Check that the stop light switch 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 8

OK: Go to next step

3. **PERFORM ACTIVE TEST USING TECHSTREAM (STOP LIGHT CONTROL RELAY)**
   a. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Stop Light Relay	Stop light control relay	Relay ON/OFF	Stop lights come on

   b. Perform the Active Test of the stop light control relay using the Techstream.
   c. 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 Relay Output	Stop light control relay output / ON or OFF	ON: Relay output on OFF: Relay output off	-

   d. Check for stop light control relay operation using Data List and stop light operation by performing an Active Test.

Result

Result	Proceed to
Data List content and stop light operation are normal	A
Data List content is normal but stop lights do not turn	B

on or off	

B --> See step 6

A: Go to next step

4. **INSPECT SKID CONTROL ECU (STP2 TERMINAL)**
   a. Turn the power switch off.

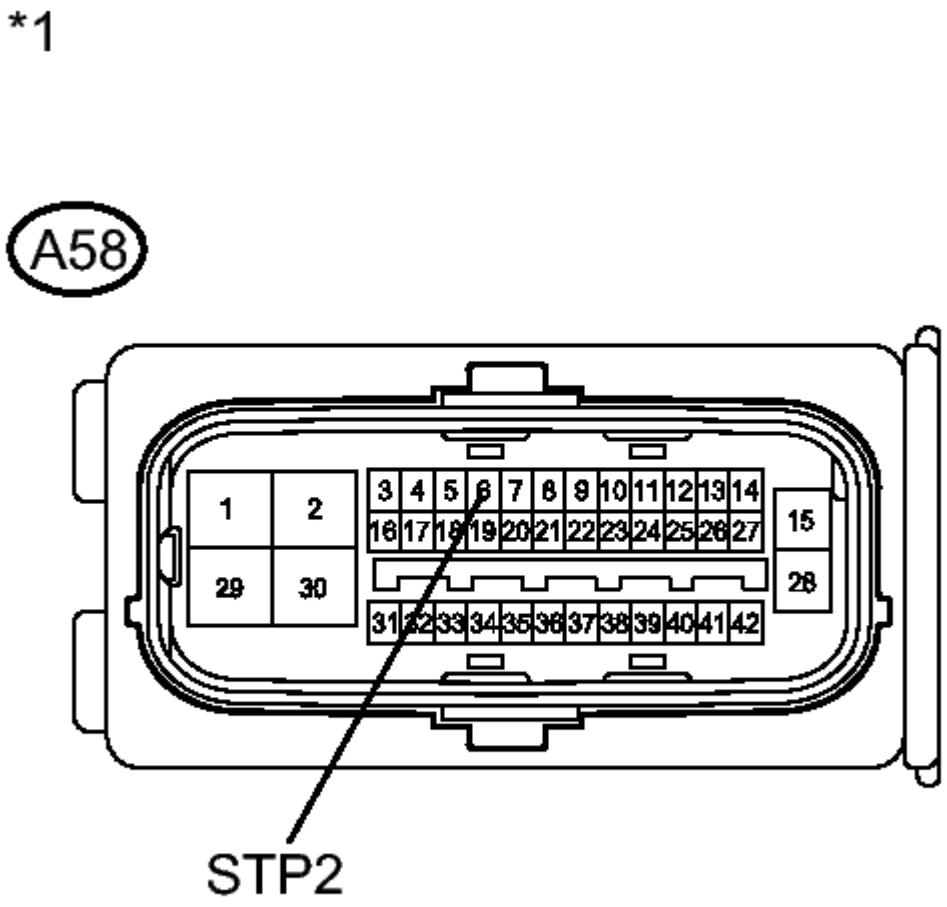


Fig. 50: Identifying Skid Control ECU STP2 Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   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
A58-6 (STP2) - Body ground	Stop light switch ON (Brake pedal depressed)	11 to 14 V
A58-6 (STP2) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

TEXT IN ILLUSTRATION

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

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR (STP2 CIRCUIT)

OK: Go to next step

5. **RECONFIRM DTC**
   a. Reconnect the skid control ECU connector.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   d. Perform a road test.
   e. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTC (C1380/64) is not	A

output	
DTC (C1380/64) is output	B

B --> See step 10

A --> See step 9

6. **INSPECT STOP LIGHT CONTROL RELAY**
   a. Inspect the stop light control relay. Refer to **INSPECTION** .

      OK

      The stop light control relay is normal.

   NG --> See step 12

   OK: Go to next step

7. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - STOP LIGHT CONTROL RELAY)**
   a. Make sure that there is no looseness at the locking part and the connecting part of the connectors.

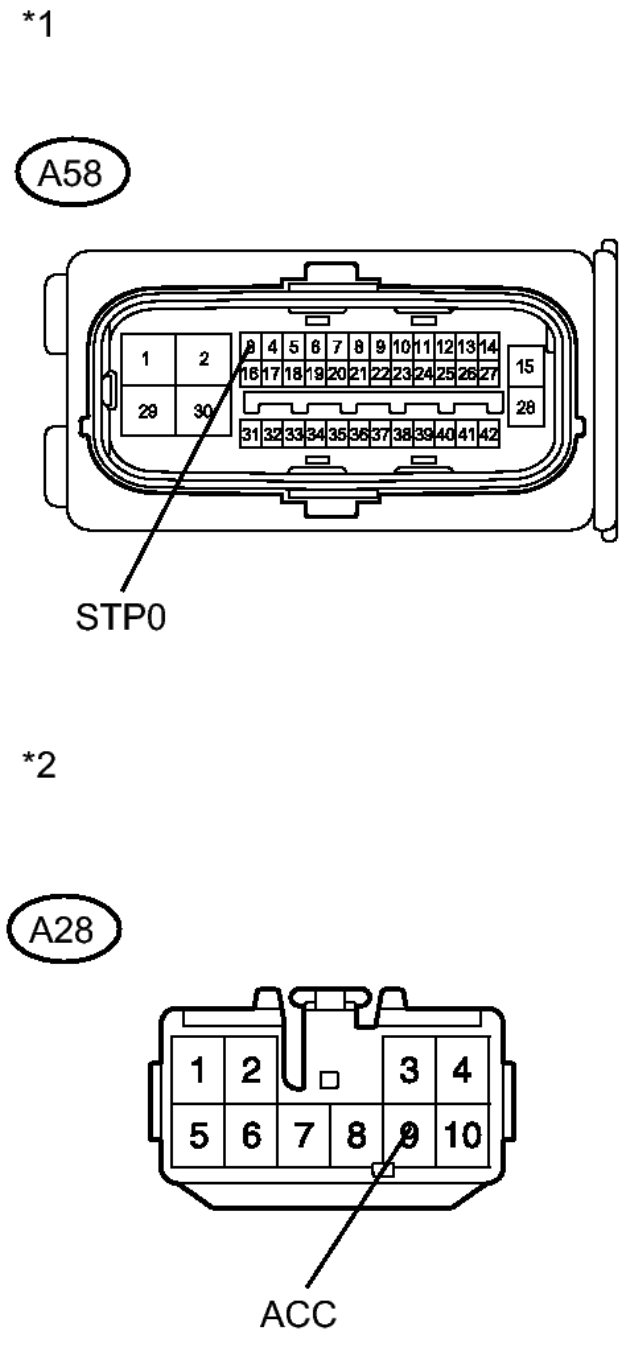


Fig. 51: Identifying Skid Control ECU Connector And Stop Light Control Relay Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control ECU connector and the stop light control relay connector.
c. Measure the resistance according to the value(s) in the table below.

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-3 (STP0) - A28-9 (ACC)	Always	Below 1 ohms
A58-3 (STP0) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Stop Light Control Relay)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK --> See step 10

8. **INSPECT SKID CONTROL ECU (STP TERMINAL)**
   a. Turn the power switch off.

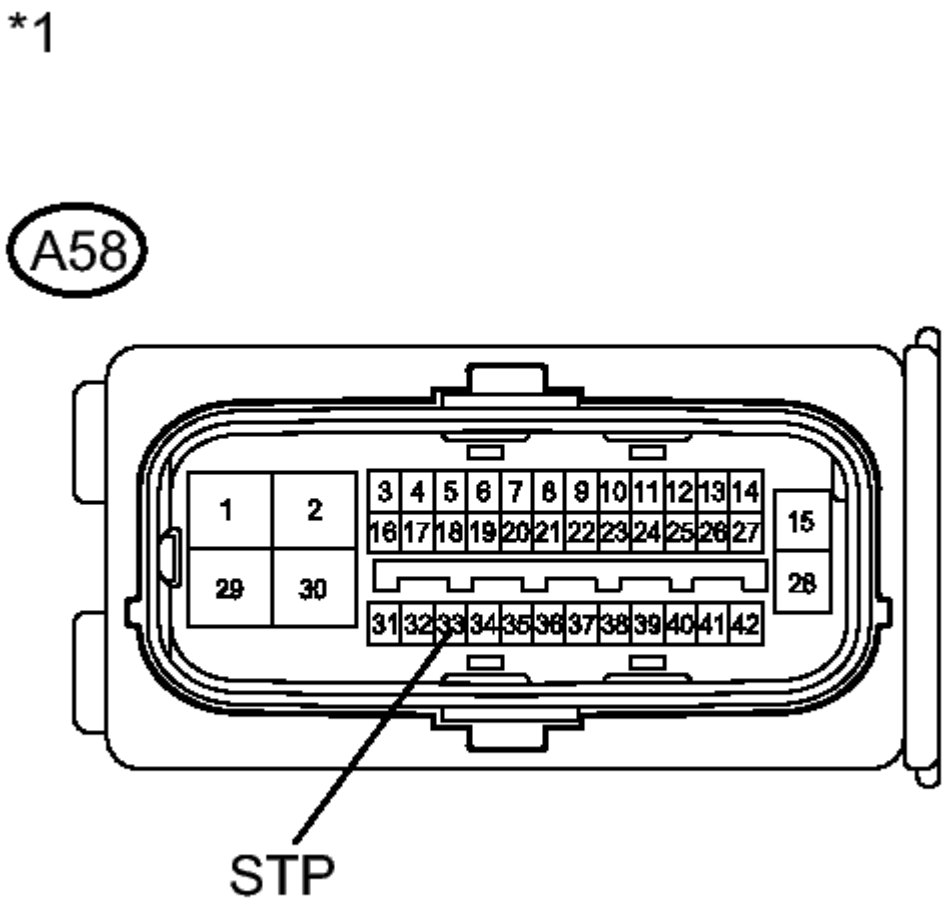


Fig. 52: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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
A58-33 (STP) - Body	Stop light switch ON (Brake	11 to 14 V

ground	pedal depressed)	
A58-33 (STP) - Body ground	Stop light switch OFF (Brake pedal released)	Below 1.5 V

TEXT IN ILLUSTRATION

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

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

OK --> See step 10

9. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
10. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
11. **INSPECT STOP LIGHT CIRCUIT. Refer to PROBLEM SYMPTOMS TABLE**
12. **REPLACE STOP LIGHT CONTROL RELAY. Refer to REMOVAL**

DTC C1391/69: ACCUMULATOR LEAK MALFUNCTION

DESCRIPTION

The DTC is stored if internal or external brake fluid leaks are detected due to improper sealing in the brake actuator or brake booster pump. Internal leaks are suspected if the pump motor operates frequently without braking.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1391/69	351	Either of the following is detected: 1. Accumulator pressure sensor input does not increase before braking or while the pump motor is operating.	• Brake fluid leaks • Brake booster with master cylinder (Brake actuator)

		2. Accumulator pressure sensor input reduction rate exceeds the specification before braking and while the pump motor is not operating.	(Malfunctioning internal seal, low gas pressure in accumulator, etc.)

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (brake actuator), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK FOR FLUID LEAK**
   a. Check that there is no fluid leaks in the brake line between the brake actuator and the wheel cylinder which is indicated by DTCs.
   b. Check that the brake is not dragging.

   OK

   There is no fluid leaks or dragging.

   NG --> REPAIR OR REPLACE APPLICABLE PART

   OK: Go to next step

2. **RECONFIRM DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   b. Turn the power switch on (READY).
   c. Check if the same DTC is recorded. Refer to **DTC CHECK / CLEAR** .

   Result

Result	Proceed to
DTC (C1391/69) is output	A
DTC (C1391/69) is not output	B

B --> See step 6

A: Go to next step

3. **PERFORM ACTIVE TEST USING TECHSTREAM (SOLENOID VALVE)**
   a. Turn the power switch off.
   b. Connect the Techstream to the DLC3.
   c. Turn the power switch on (IG).
   d. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

      HINT:

      The Active Test can be performed when the following conditions are met.

      - ABS main relay is on.
      - Park (P) selected.
      - Parking brake is applied.
      - Vehicle speed is 0 km/h (0 mph).

      ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* Solenoid (SMC/SRC/SCC)	Switching solenoid valve (SMC/SRC/SCC)	Solenoid ON/OFF	Operation sound of solenoid (clicking sound) can be heard

      *: Electronically Controlled Brake System

   e. Perform the Active Test of the solenoid using the Techstream.
   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
Wheel Cylinder Pressure Sensor	Wheel cylinder pressure sensor / Min.: 0 V, Max.: 5 V	When brake pedal released: 0.1 to 0.9 V	Reading increases when brake pedal is depressed

g. Check that the output value of wheel cylinder does not increase.

OK

The output value of wheel cylinder does not increase.

HINT:

If any output value increases, there may be brake fluid leaks in the brake actuator.

Result

Result	Proceed to
The output value of wheel cylinder increases	A
The output values of wheel cylinders do not increase	B

B --> See step 5

A: Go to next step

4. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER**
   a. Replace the brake booster with master cylinder (brake actuator). Refer to **REMOVAL** .

NEXT --> See step 5

5. **REPLACE BRAKE BOOSTER PUMP. Refer to REMOVAL**
6. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

DTC C1439/66: STEERING ANGLE SENSOR INITIALIZATION INCOMPLETE; DTC C1445/66: VEHICLE DRIVEN WITH STEERING ANGLE SENSOR NOT INITIALIZED

DESCRIPTION

The skid control ECU acquires the steering angle sensor zero point every time the power switch is turned on

(IG) 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 C1439/66 and C1445/66 will be cleared when the power switch is turned off.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1439/66	752	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.	• Steering angle sensor • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU)
C1445/66	753	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.	• Steering angle sensor • Yaw rate and acceleration sensor • Brake booster with master cylinder (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 calibration, such as when the power source voltage drops when the battery is removed, and confirm that this condition occurred.

HINT:

- When DTC U0073/94, U0123/62, U0124/95 and/or U0126/63 is output together with DTC C1439/66 and/or C1445/66, inspect and repair the trouble areas indicated by DTC U0073/94, U0123/62, U0124/95 and/or U0126/63 first. Refer to **DTC U0073/94: Control Module Communication Bus OFF; DTC U0123/62: Lost Communication with Yaw Rate Sensor Module; DTC U0124/95: Lost Communication with Lateral Acceleration Sensor Module; DTC U0126/63: Lost Communication with Steering Angle Sensor Module; DTC U0293/59: Communication Error from HV ECU**.
- 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 power switch off.
   c. Turn the power switch on (IG) 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 (C1439/66 and/or C1445/66) 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 (C1439/66 and C1445/66) are not output	D

   HINT:

   - When DTCs indicating CAN communication system malfunctions are output, repair the CAN communication system before repairing each corresponding sensor.
   - 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 C1439/66 and/or C1445/66 is not output again, the DTC may have been stored due to a temporary loss of the steering angle zero calibration, such as when the power source voltage drops.

D --> See step 6

C --> See step 5

B --> See step 4

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 steering wheel is centered correctly 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 power switch off.
   b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .
   c. Turn the power switch on (READY).
   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 (C1439/66 and C1445/66) are not output	A
Yaw rate and acceleration sensor and/or steering angle sensor DTC is output	B

HINT:

If the same DTC C1439/66 and/or C1445/66 is not output again, the DTC may have been stored due to a temporary loss of the steering angle zero calibration, such as when the power source voltage drops.

B --> See step 5

A --> END

4. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
5. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. 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 C1440/98: 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 C1440/98 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.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1440/98	-	Driving at a steep bank angle.	Yaw rate and acceleration sensor

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 (C1440/98) is output	A
DTC (C1440/98) is not output	B
Yaw rate and acceleration sensor DTC is output	C

   C --> See step 3

   B --> END

   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 C1440/98 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.

   NEXT --> END

3. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**

DTC C1442/44: INVALID DATA RECEIVED FROM ACCELERATION SENSOR; DTC C1443/34: 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.

The yaw rate sensor has a built-in acceleration sensor and detects the vehicle condition.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1442/44	572	With terminal IG1 voltage between 9.5 and 17.4 V, an invalid data signal is received from the acceleration sensor for 10 seconds or more.	Yaw rate and acceleration sensor
C1443/34	715	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

INSPECTION PROCEDURE

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

PROCEDURE

1. **CHECK 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
DTCs (C1442/44 and/or C1443/34) are output	A
DTCs (C1442/44 and C1443/34)	B

are not output	

B --> See step 3

A --> See step 2

2. **REPLACE YAW RATE AND ACCELERATION SENSOR. Refer to REMOVAL**
3. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

DTC C1451/72: MOTOR DRIVE PERMISSION MALFUNCTION

DESCRIPTION

If air bleeding has not been performed, the skid control ECU stores DTC C1451/72 to prevent the entry of air due to the pump motor operation.

DTC C1451/72 is stored when Invalid Mode is selected, the system will not return to normal until air bleeding procedure is performed.

DTC Code	INF Code	DTC Detection Condition	Trouble Area
C1451/72	-	Air bleeding has not been performed.	• Brake fluid leaks • Air bleeding not performed

INSPECTION PROCEDURE

PROCEDURE

1. **CHECK BRAKE FLUID LEVEL**
   a. Check that the brake fluid level is sufficient.

      OK

      Brake fluid level is sufficient.

      HINT:

      - If the fluid level drops, check for fluid leaks, and repair as necessary.
      - If no fluid leaks exist, add and adjust fluid. Refer to **ON-VEHICLE INSPECTION** .

   NG --> CHECK AND REPAIR BRAKE FLUID LEAKS OR ADD FLUID

   OK: Go to next step

2. **PERFORM AIR BLEEDING**
   a. Bleed the air from the brake systems. Refer to **BLEEDING** .

      HINT:

      If air bleeding has been performed, this DTC will be cleared.

   NEXT: Go to next step

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

      Result

Result	Proceed to
DTC (C1451/72) is output	A
DTC (C1451/72) is not output	B

   B --> END

   A: Go to next step

4. **CLEAR DTC**
   a. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .

   NEXT --> END

DTC U0073/94: CONTROL MODULE COMMUNICATION BUS OFF; DTC U0123/62: LOST COMMUNICATION WITH YAW RATE SENSOR MODULE; DTC U0124/95: LOST COMMUNICATION WITH LATERAL ACCELERATION SENSOR MODULE; DTC U0126/63: LOST COMMUNICATION WITH STEERING ANGLE SENSOR MODULE; DTC U0293/59: COMMUNICATION ERROR FROM HV ECU

DESCRIPTION

The skid control ECU receives the signals from the power management control ECU, steering angle sensor, and yaw rate and acceleration sensor via the CAN communication system.

DTC Code	INF Code	DTC Detection Condition	Trouble Area

U0073/94	461	Either of the following is detected: 1. Yaw rate and acceleration sensor communication is disabled for 1 second or more. 2. Yaw rate and acceleration sensor communication is disabled once or more per 5 seconds 10 times or more within 60 seconds.	• CAN communication line (CAN No. 1 bus) • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU)
?	462	Either of the following is detected: 1. Steering angle sensor communication is disabled for 1 second or more. 2. Steering angle sensor communication is disabled once or more per 5 seconds 10 times or more within 60 seconds.	• CAN communication line (CAN No. 1 bus) • Steering angle sensor • Brake booster with master cylinder (Skid control ECU)
?	463 464	Bus off occurs once or more per 0.1 seconds 10 times repeatedly.	• CAN communication line • Brake booster with master cylinder (Skid control ECU)
?	465 466	Sending does not complete within 5 seconds after data is output from the skid control ECU.	?
U0123/62	731	Yaw rate sensor communication is disabled for 1 second or more.	• CAN communication line (CAN No. 1 bus) • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU)
?	732	Yaw rate sensor communication is disabled once or more per 5 seconds 10 times or more within 60 seconds.	?
U0124/95	591	Acceleration sensor communication is disabled for 1 second or more.	• CAN communication line (CAN No. 1 bus) • Yaw rate and acceleration sensor • Brake booster with master cylinder (Skid control ECU)
?	592	Acceleration sensor communication is disabled once per 5 seconds 10 times or more within 60 seconds.	?

U0126/63	741	Steering angle sensor communication is disabled for 1 second or more.	• CAN communication line (CAN No. 1 bus) • Steering angle sensor • Brake booster with master cylinder (Skid control ECU)
?	742	Steering angle sensor communication is disabled once or more per 5 seconds 10 times or more within 60 seconds.	?
U0293/59	411 412 413	Either of the following is detected: 1. With the IG2 terminal voltage 9.5 V or more, data from the power management control ECU cannot be received for 2 seconds or more. 2. With the IG2 terminal voltage 9.5 V or more, data from the power management control ECU cannot be received once or more within 5 seconds occur 10 times in succession.	• CAN communication line (Power management bus) • Power management control ECU (Hybrid vehicle control ECU) • Brake booster with master cylinder (Skid control ECU)

WIRING DIAGRAM

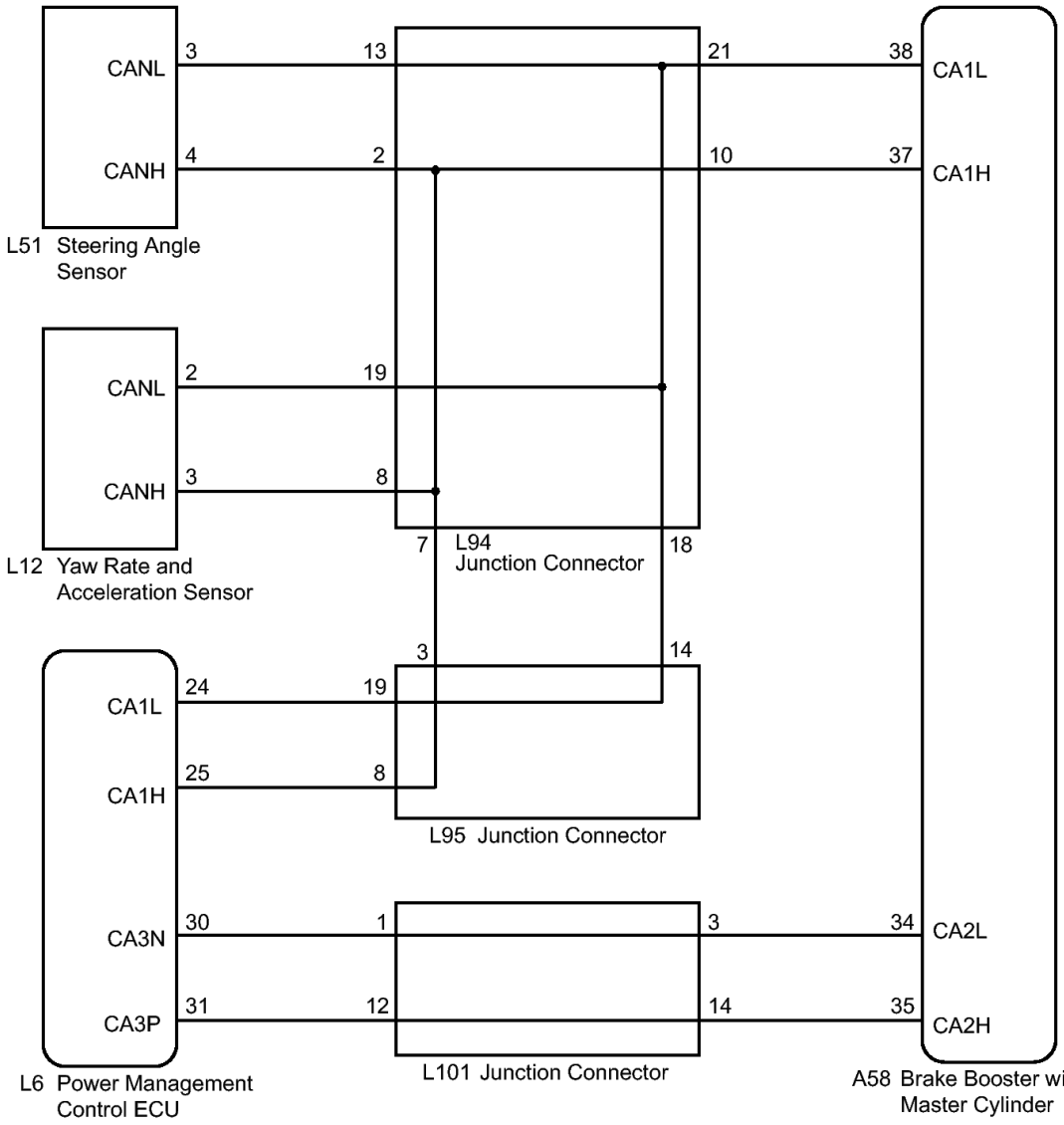


Fig. 53: Electronically Controlled Brake System Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

PROCEDURE

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

ABS/VSC/TRAC

	Measurement	Normal	Diagnostic

Tester Display	Item/Range	Condition	Note
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	-
HV Communication Open	Hybrid vehicle communication 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 any sensor or connector.

C --> See step 4

B --> See step 3

A: Go to next step

2. **CHECK IF EACH SENSOR AND ECU CONNECTOR ARE SECURELY CONNECTED**
   a. Turn the power switch off.
   b. Check if each sensor and ECU connector are securely connected.

OK

Each sensor and ECU connector are securely connected.

NG --> CONNECT CONNECTOR TO EACH SENSOR OR ECU CORRECTLY

OK: Go to next step

3. **RECONFIRM DTC**
   a. Turn the power switch off.
   b. Record the output DTCs (for ABS, VSC, electronically controlled brake system, and/or CAN communication system). Refer to **DTC CHECK / CLEAR** for ABS, VSC and/or electronically controlled brake system, or refer to **DIAGNOSIS SYSTEM** for CAN communication system).

      HINT:

      If the CAN communication system DTC and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS, VSC and/or electronically controlled brake system) after the CAN communication system returns to normal.

      Result

Result	Proceed to
DTC is not output	A
DTC (ABS, VSC and/or electronically controlled brake system DTC) is output	B
DTC (CAN communication system DTC) is output	C

C --> See step 8

B --> See step 7

A --> See step 6

4. **REPAIR OR REPLACE HARNESS OR CONNECTOR**
   a. Turn the power 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 ECU. 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 power switch off.

b. Clear the DTCs. Refer to **DTC CHECK / CLEAR** .

c. Turn the power switch on (READY).

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, VSC and/or electronically controlled brake system DTCs are output, record them. Refer to **DTC CHECK / CLEAR** .

Result

Result	Proceed to
DTC is not output	A
DTC (ABS, VSC and/or electronically controlled brake system DTC) is output	B
DTC (CAN communication system DTC) is output	C

HINT:

The CAN communication system must be normal when repairing each sensor DTC (for ABS, VSC and/or electronically controlled brake system).

C --> See step 8

B --> See step 7

A --> END

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

TROUBLESHOOTING

7. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**
8. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

CIRCUIT TEST

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 malfunctioning.

WIRING DIAGRAM

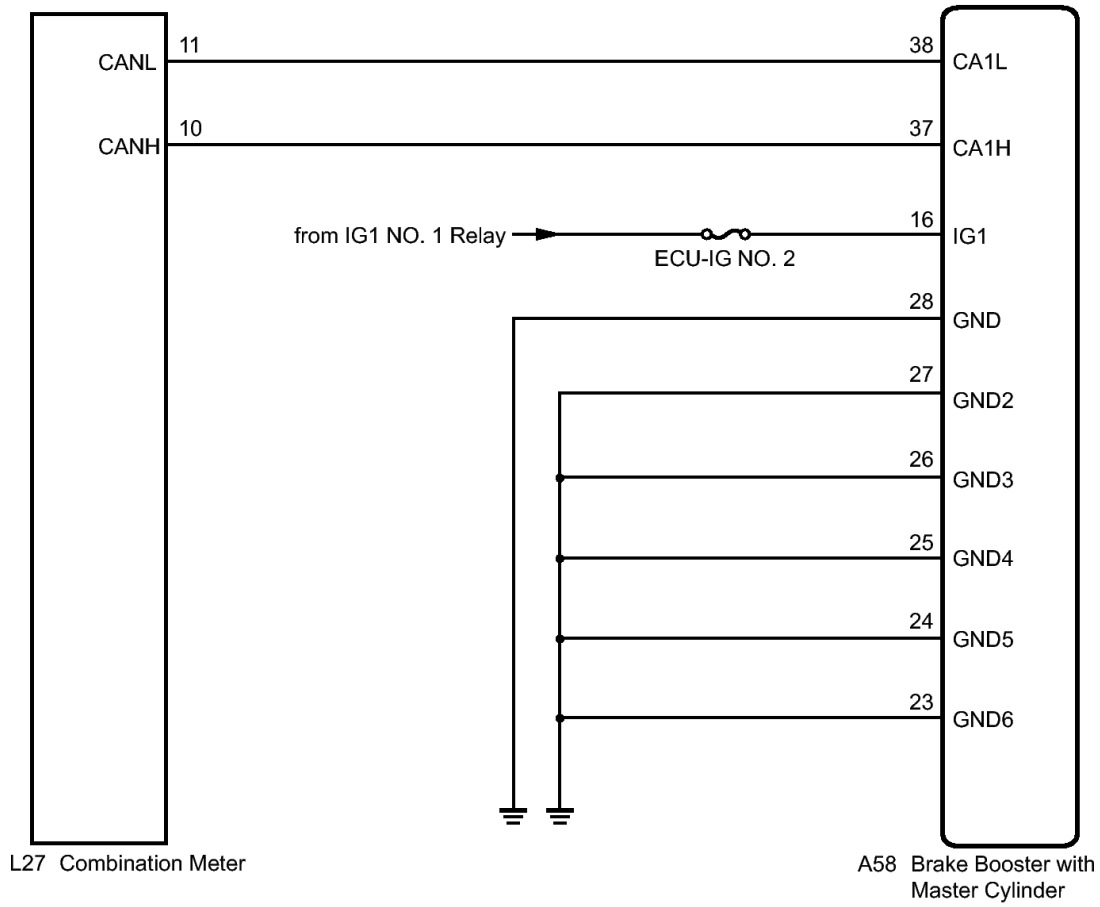


Fig. 54: Combination Meter To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

   Result

	Proceed

Result	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. **CHECK AUXILIARY BATTERY**
   a. Check the auxiliary battery voltage.

      Standard Voltage

      11 to 14 V

   NG --> CHARGE OR REPLACE AUXILIARY BATTERY

   OK: Go to next step

4. **INSPECT SKID CONTROL ECU (IG1 TERMINAL)**
   a. Disconnect the skid control ECU connector.

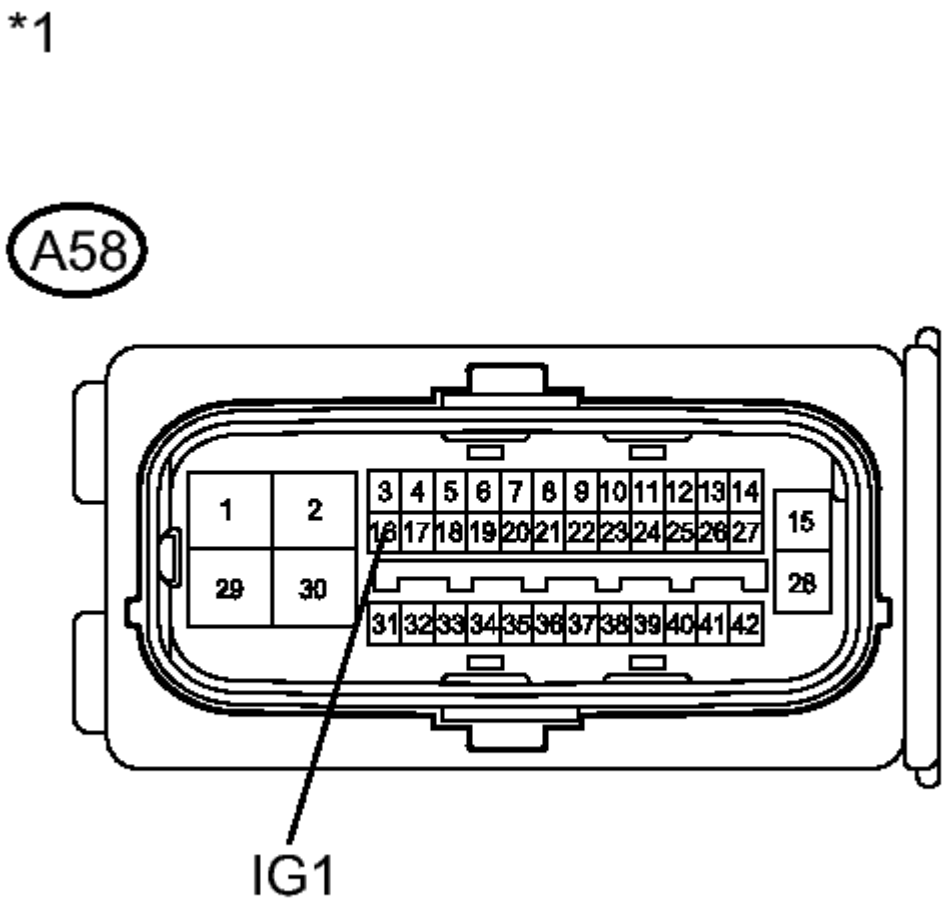


Fig. 55: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A58-16 (IG1) - Body ground	Power switch on (IG)	11 to 14 V

TEXT IN ILLUSTRATION

*1	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 (GND TERMINAL)**
   a. Turn the power switch off.

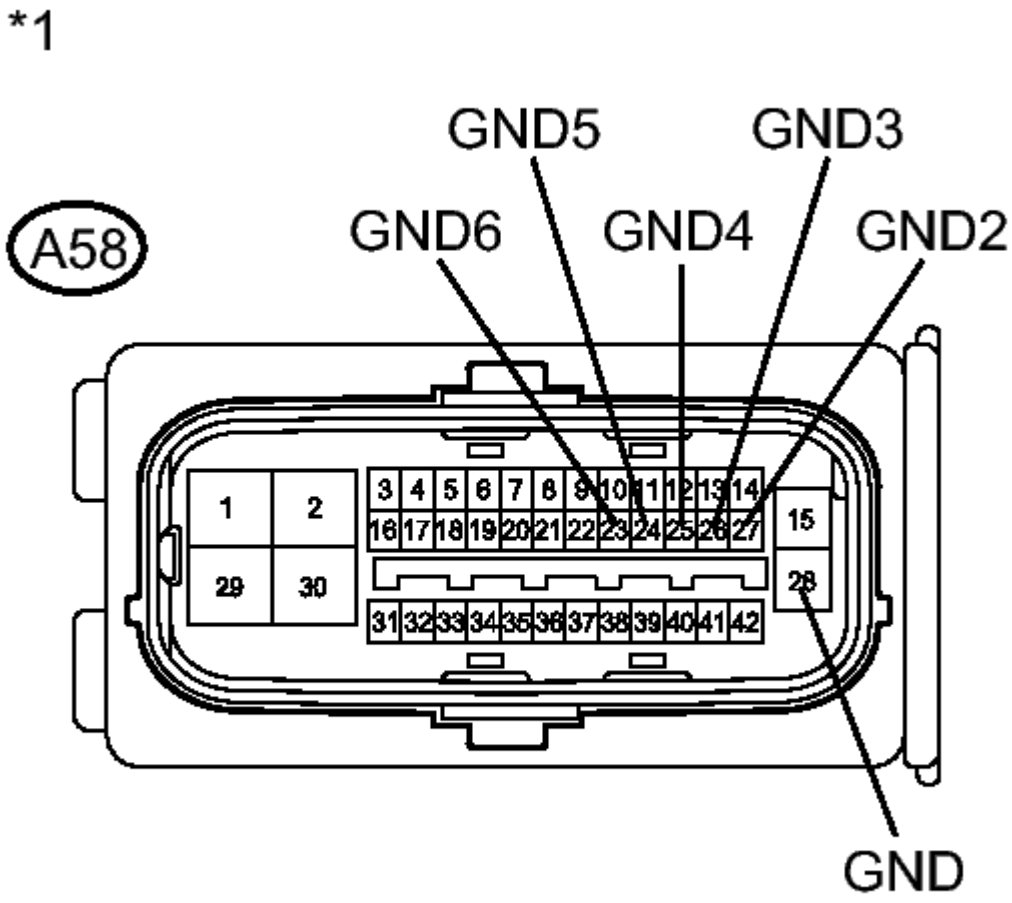


Fig. 56: Identifying Skid Control ECU Ground Terminals
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-28 (GND) - Body ground	Always	Below 1 ohms
A58-27 (GND2) - Body ground	Always	Below 1 ohms
A58-26 (GND3) - Body ground	Always	Below 1 ohms
A58-25 (GND4) - Body ground	Always	Below 1 ohms
A58-24 (GND5) - Body ground	Always	Below 1 ohms
A58-23 (GND6) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

6. **INSPECT COMBINATION METER**
   a. Reconnect the skid control ECU connector.
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   c. Check the combination meter.

      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 9

OK --> See step 7

7. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
8. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
9. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

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 booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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 power switch on (IG).
   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. **INSPECT COMBINATION METER**
   a. Turn the power switch off.
   b. Reconnect the skid control ECU connector.
   c. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   d. Check the combination meter.

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 BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
6. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

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 / red (malfunction) 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

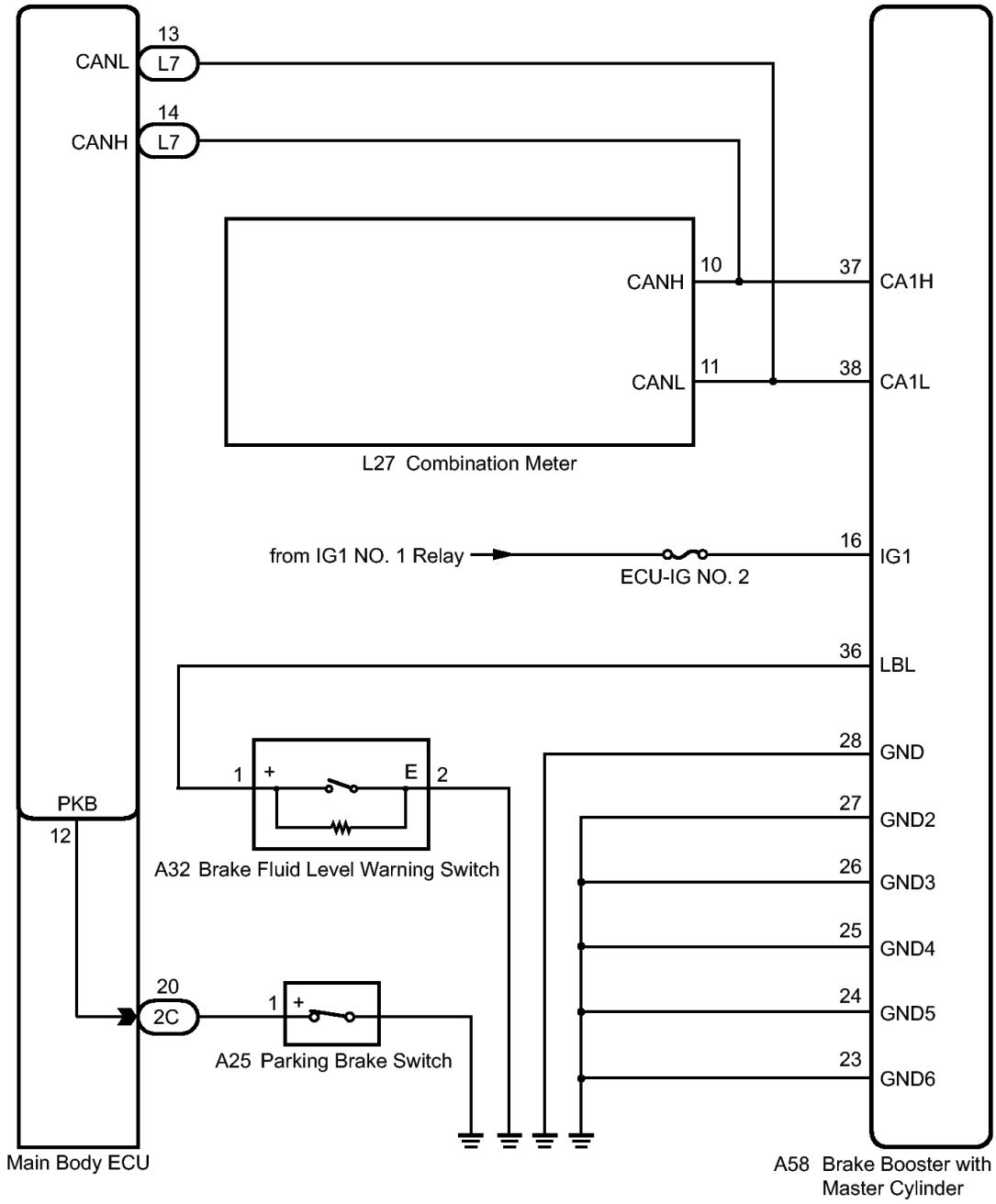


Fig. 57: Main Body ECU to Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK DTC**
   a. Check if a ABS, VSC and/or electronically controlled brake 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 13

   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 14

   A: Go to next step

3. **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

4. **CHECK AUXILIARY BATTERY**
   a. Check the auxiliary battery voltage.

      Standard Voltage

      11 to 14 V

NG --> CHARGE OR REPLACE AUXILIARY BATTERY

OK: Go to next step

5. **INSPECT SKID CONTROL ECU (IG1 TERMINAL)**
   a. Disconnect the skid control ECU connector.

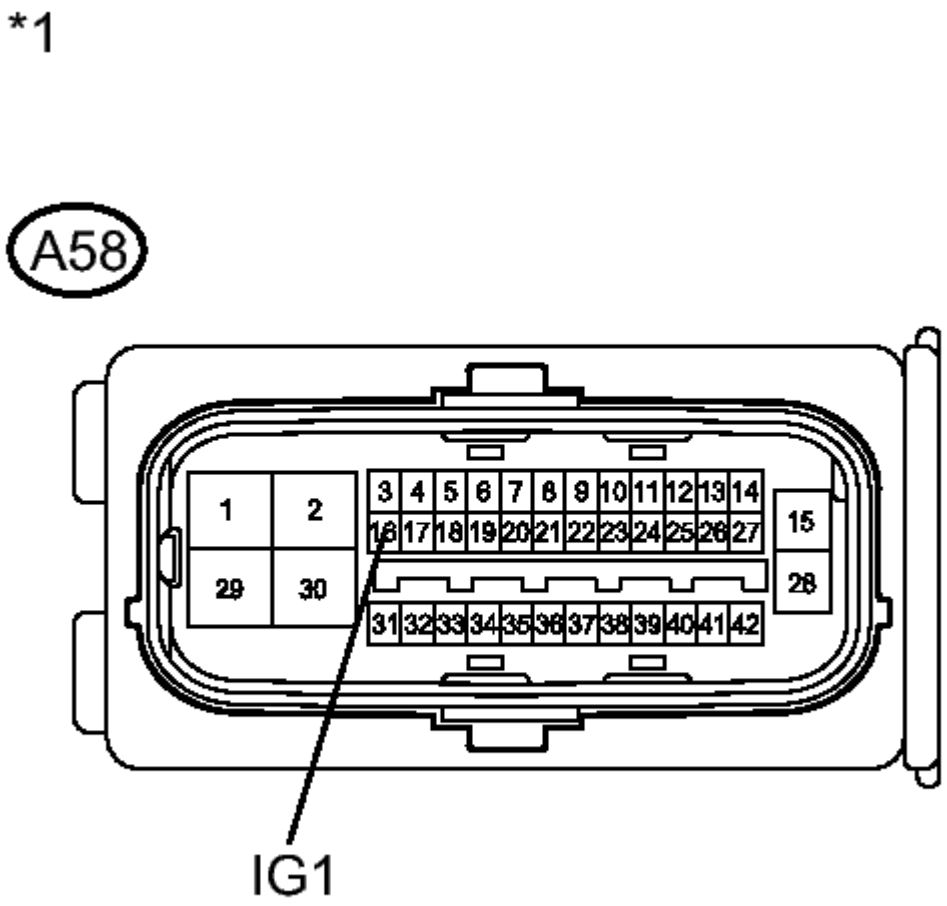


Fig. 58: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Turn the power switch on (IG).
c. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
A58-16 (IG1) - Body ground	Power switch on (IG)	11 to 14 V

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

6. **INSPECT SKID CONTROL ECU (GND TERMINAL)**
   a. Turn the power switch off.

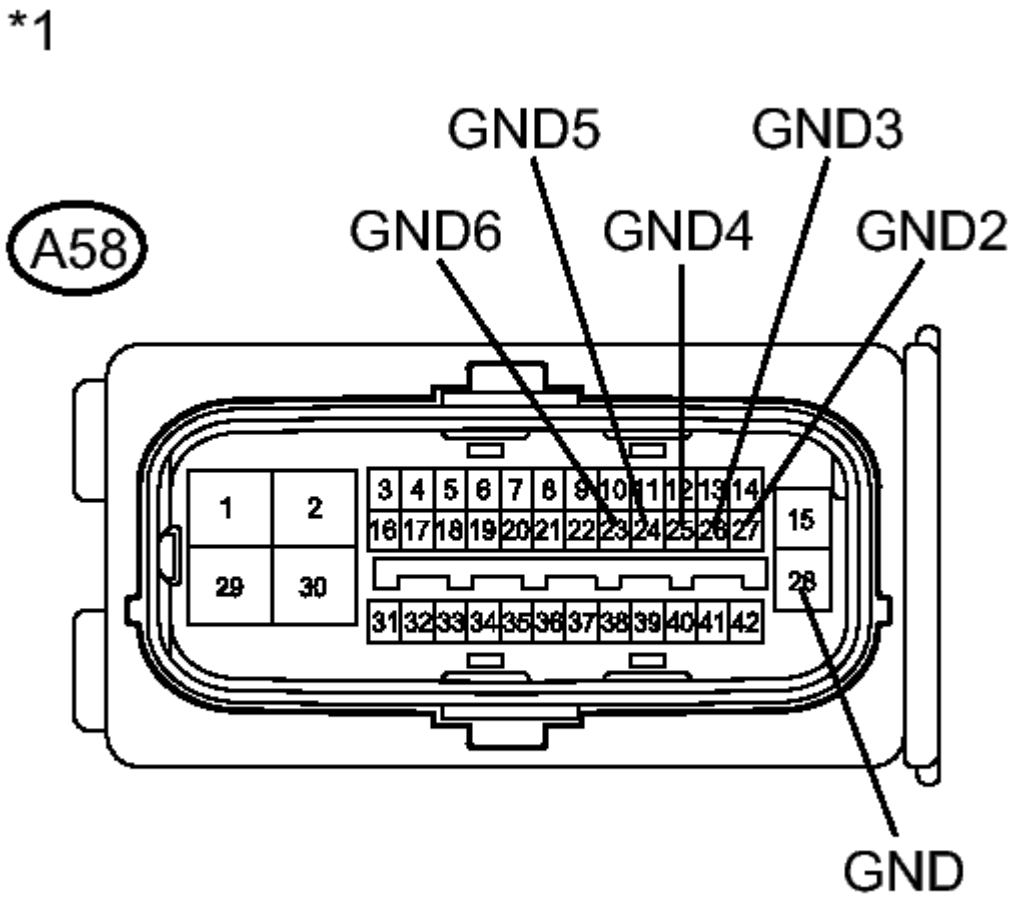


Fig. 59: Identifying Skid Control ECU Ground Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-28 (GND) - Body ground	Always	Below 1 ohms
A58-27 (GND2) - Body ground	Always	Below 1 ohms
A58-26 (GND3) - Body ground	Always	Below 1 ohms
A58-25 (GND4) - Body ground	Always	Below 1 ohms
A58-24 (GND5) - Body ground	Always	Below 1 ohms
A58-23 (GND6) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

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

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

OK: Go to next step

7. **READ VALUE USING TECHSTREAM (PARKING BRAKE SWITCH)**
   a. Reconnect the skid control ECU connector.
   b. Connect the Techstream to the DLC3.
   c. Turn the power switch on (IG).
   d. 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	-

   e. Using the Techstream, check the switch condition on the Techstream changes according to parking brake operation.

OK

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

NG --> See step 9

OK: Go to next step

8. **INSPECT COMBINATION METER**
   a. Turn the power switch off.
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   c. Check the combination meter.

OK

The brake warning light / red (malfunction) 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 15

OK --> See step 11

9. **INSPECT PARKING BRAKE SWITCH**
   a. Turn the power switch off.

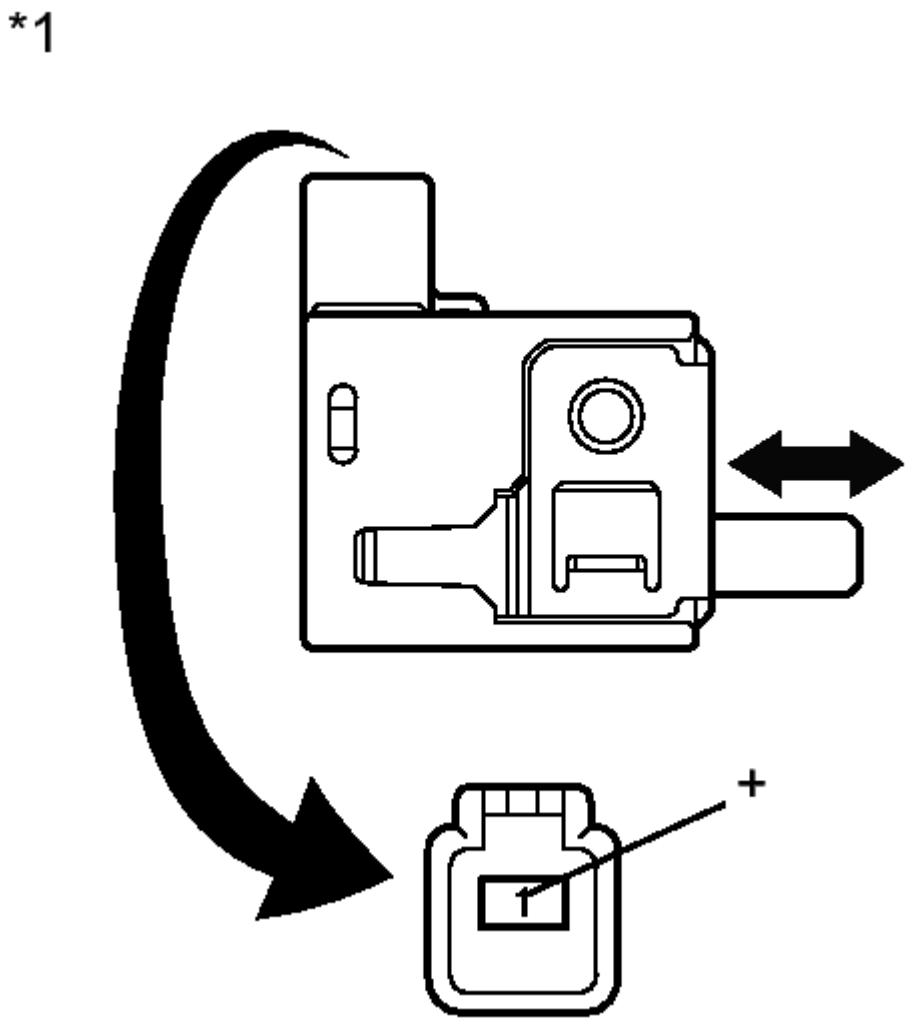


Fig. 60: Identifying Parking Brake Switch Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

   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

*1	Component without harness connected (Parking Brake Switch)

NG --> See step 16

OK: Go to next step

10. **CHECK HARNESS AND CONNECTOR (MAIN BODY ECU - PARKING BRAKE SWITCH)**
    a. Disconnect the main body ECU connector.

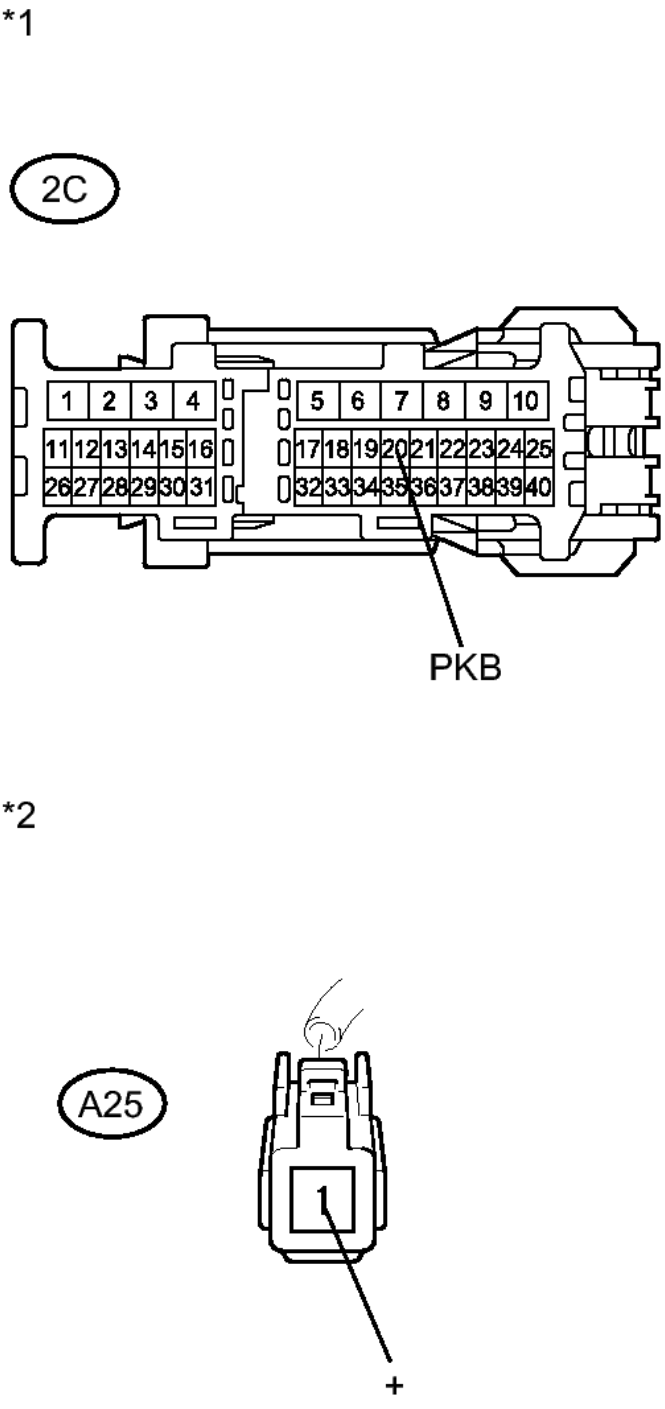


Fig. 61: Identifying Main Body ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
2C-20 (PKB) - A25-1 (+)	Always	Below 1 ohms
2C-20 (PKB) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Main Body ECU)
*2	Front view of wire harness connector (to Parking Brake Switch)

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 12

11. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
12. **REPLACE MAIN BODY ECU (INSTRUMENT PANEL JUNCTION BLOCK). Refer to REMOVAL**
13. **REPAIR CIRCUITS INDICATED BY OUTPUT DTCS. Refer to DIAGNOSTIC TROUBLE CODE CHART**

14. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
15. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**
16. **REPLACE PARKING BRAKE SWITCH. 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 booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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 / RED (MALFUNCTION)**
   a. Disconnect the skid control ECU connector.
   b. Turn the power switch on (IG).
   c. Check that the brake warning light / red (malfunction) comes on.

OK

The brake warning light / red (malfunction) 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. **INSPECT COMBINATION METER**
   a. Turn the power switch off.
   b. Reconnect the skid control ECU connector.
   c. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   d. Check the combination meter.

   OK

   The brake warning light / red (malfunction) 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 BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
6. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

Brake Control Warning 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 brake warning light / yellow (minor malfunction) comes on in the combination meter.

WIRING DIAGRAM

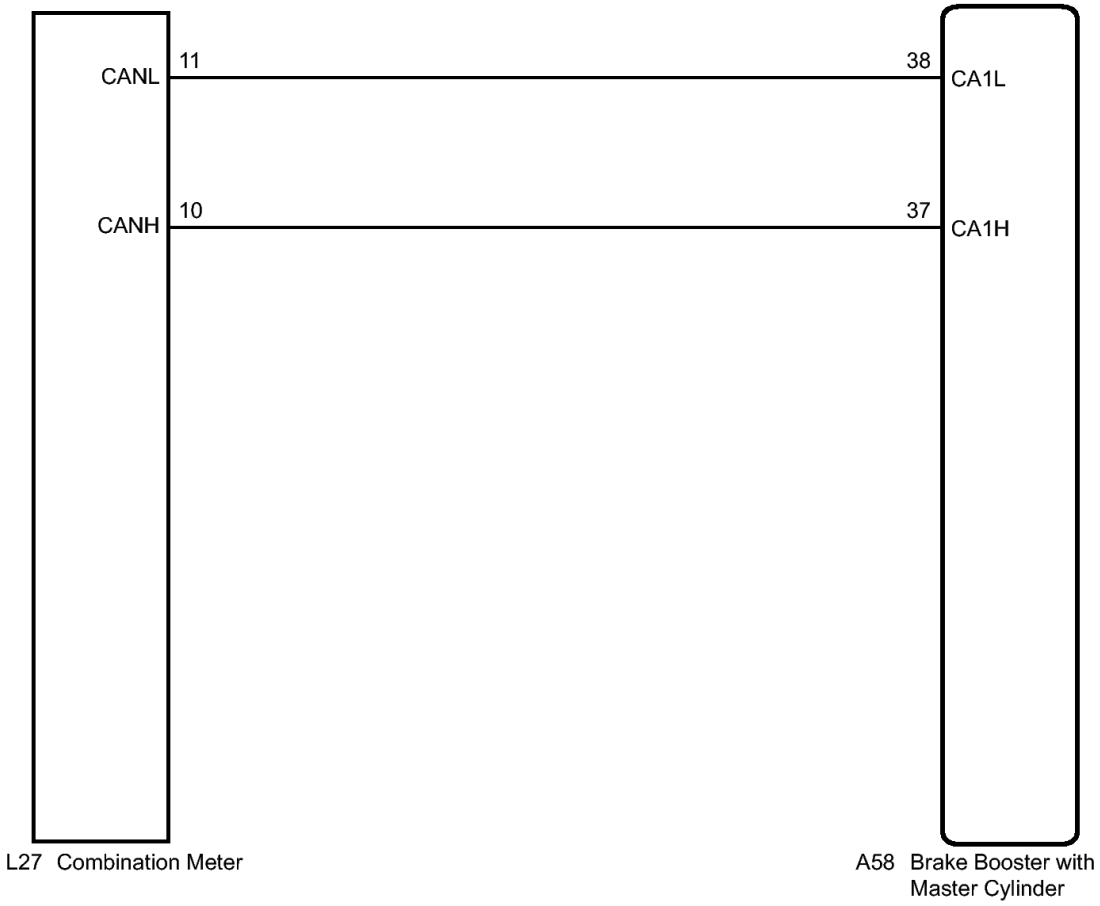


Fig. 62: Brake Control Warning Light Remains ON Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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. **CHECK AUXILIARY BATTERY**
   a. Check the auxiliary battery voltage.

   Standard Voltage

   11 to 14 V

   NG --> CHARGE OR REPLACE AUXILIARY BATTERY

   OK: Go to next step

4. **INSPECT COMBINATION METER**
   a. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   b. Check the combination meter.

   OK

The brake warning light / yellow (minor malfunction) 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 7

OK --> See step 5

5. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
6. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
7. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

Brake Control 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 Control Warning Light Remains ON. Refer to **WIRING DIAGRAM**.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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 (BRAKE WARNING LIGHT / YELLOW (MINOR MALFUNCTION))**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
ECB* Warning Light	Brake warning light / yellow (minor malfunction)	Warning light ON/OFF	Observe combination meter

*: Electronically Controlled Brake System

   d. Check that the brake warning light / yellow (minor malfunction) on the combination meter turns on or off in accordance with the Techstream operation.

OK

The brake warning light / yellow (minor malfunction) 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. **INSPECT COMBINATION METER**
   a. Turn the power switch off.

b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

c. Check the combination meter.

OK

The brake warning light / yellow (minor malfunction) 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 6

OK --> See step 4

4. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
5. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
6. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

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 comes 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

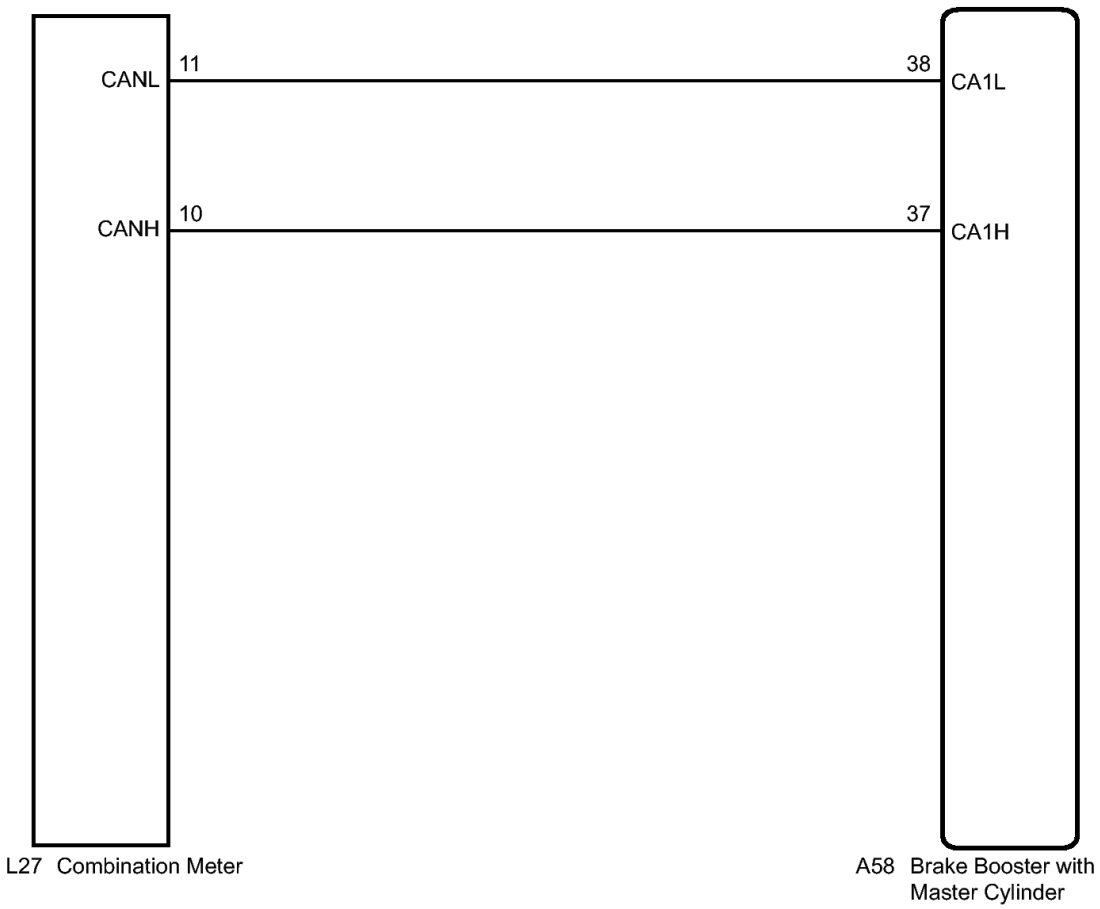


Fig. 63: Combination Meter To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK CAN COMMUNICATION SYSTEM**
   a. Check if a CAN communication system DTC is output. Refer to **DIAGNOSIS SYSTEM** .

   Result

	Proceed

Result	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. **CHECK AUXILIARY BATTERY**
   a. Check the auxiliary battery voltage.

      Standard Voltage

      11 to 14 V

   NG --> CHARGE OR REPLACE AUXILIARY BATTERY

   OK: Go to next step

4. **INSPECT COMBINATION METER**
   a. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   b. Check the combination meter.

      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 5

OK --> See step 7

5. **REPLACE NO. 5 METER CIRCUIT PLATE**
   a. Replace the No. 5 meter circuit plate. Refer to **DISASSEMBLY** .
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   c. Check the combination meter.

      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 6

OK --> END

6. **REPLACE NO. 2 METER CIRCUIT PLATE**
   a. Replace the No. 2 meter circuit plate. Refer to **DISASSEMBLY** .
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   c. Check the combination meter.

      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 --> END

7. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
8. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
9. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

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 booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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 7

   A: Go to next step

2. **PERFORM ACTIVE TEST USING TECHSTREAM (SLIP INDICATOR LIGHT)**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Slip Indicator Light	Slip indicator light	Indicator light ON/OFF	Observe combination meter

d. 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 6

3. **INSPECT COMBINATION METER**
   a. Turn the power switch off.
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   c. Check the combination meter.

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 4

OK --> See step 6

4. **REPLACE NO. 5 METER CIRCUIT PLATE**
   a. Replace the No. 5 meter circuit plate. Refer to **DISASSEMBLY** .
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to

DATA LIST / ACTIVE TEST .

c. Check the combination meter.

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 5

OK --> END

5. **REPLACE NO. 2 METER CIRCUIT PLATE**
   a. Replace the No. 2 meter circuit plate. Refer to **DISASSEMBLY** .
   b. Perform the Active Test of the combination meter (meter CPU) using the Techstream. Refer to **DATA LIST / ACTIVE TEST** .
   c. Check the combination meter.

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 8

OK --> END

6. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
7. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
8. **REPLACE NO. 3 METER CIRCUIT PLATE. Refer to DISASSEMBLY**

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer sounds intermittently to warn the driver when the accumulator pressure is abnormally low. This buzzer also sounds intermittently when VSC is operating.

HINT:

The skid control buzzer may sound when the accumulator pressure drops due to frequent braking. Refer to **DTC C1256/56: Accumulator Low Pressure**.

WIRING DIAGRAM

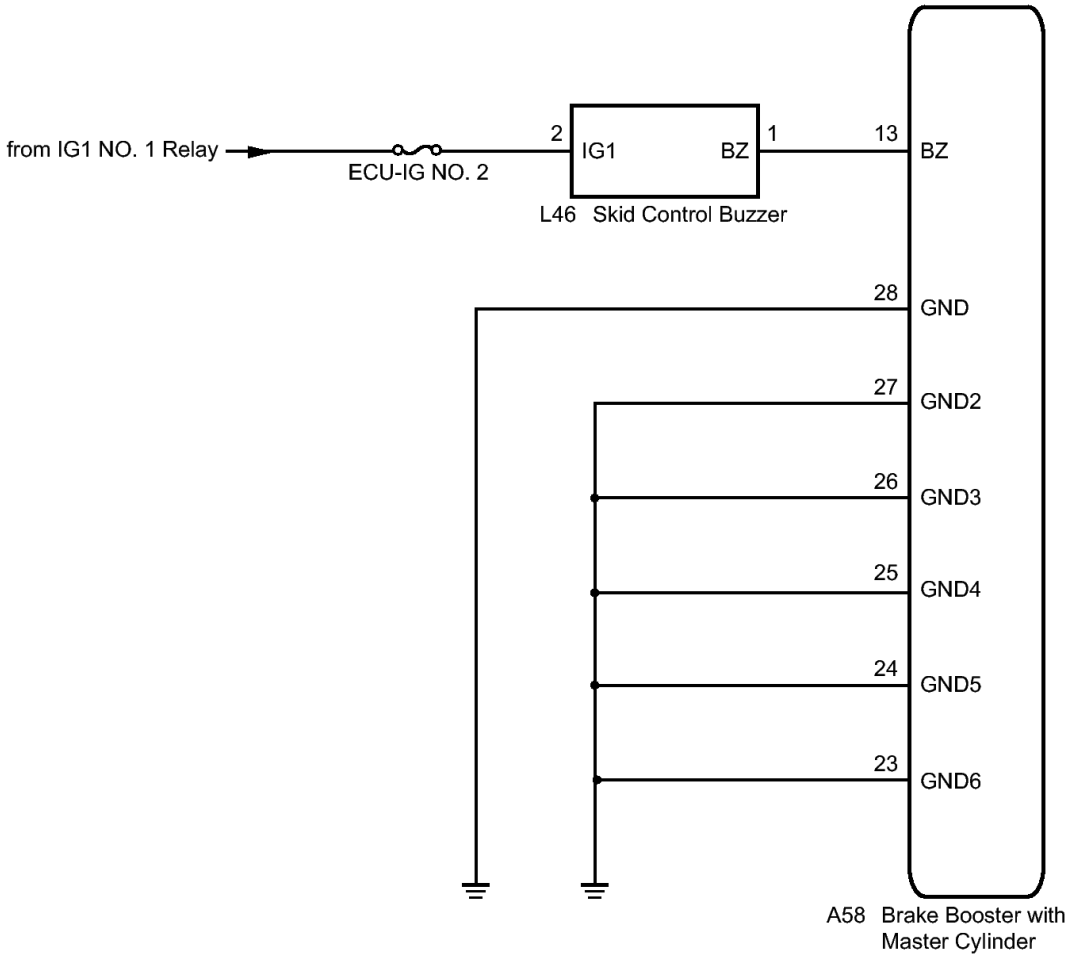


Fig. 64: Skid Control Buzzer To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to

INITIALIZATION .

PROCEDURE

1. **CHECK BUZZER OPERATION**
   a. Confirm problem symptoms of the skid control buzzer according to the customer problem analysis.

      HINT:

      If the buzzer stops after sounding continuously, a temporary drop in accumulator pressure is the suspected cause.

      Result

Result	Proceed to
Buzzer does not sound	A
Buzzer sounds constantly	B

B --> See step 7

A: Go to next step

2. **PERFORM ACTIVE TEST USING TECHSTREAM (SKID CONTROL BUZZER)**
   a. Connect the Techstream to the DLC3.
   b. Turn the power switch on (IG).
   c. Select the Active Test on the Techstream. Refer to **DATA LIST / ACTIVE TEST** .

      ABS/VSC/TRAC

Tester Display	Test Part	Control Range	Diagnostic Note
Buzzer	Skid control buzzer	Buzzer ON/OFF	Buzzer can be heard

   d. Check that the buzzer sounds/stops when turning the skid control buzzer on/off using the Techstream.

      Result

	Proceed

Result	to
Buzzer does not sound	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 --> See step 11

A: Go to next step

3. **INSPECT SKID CONTROL BUZZER (POWER SOURCE TERMINAL)**
   a. Turn the power switch off.

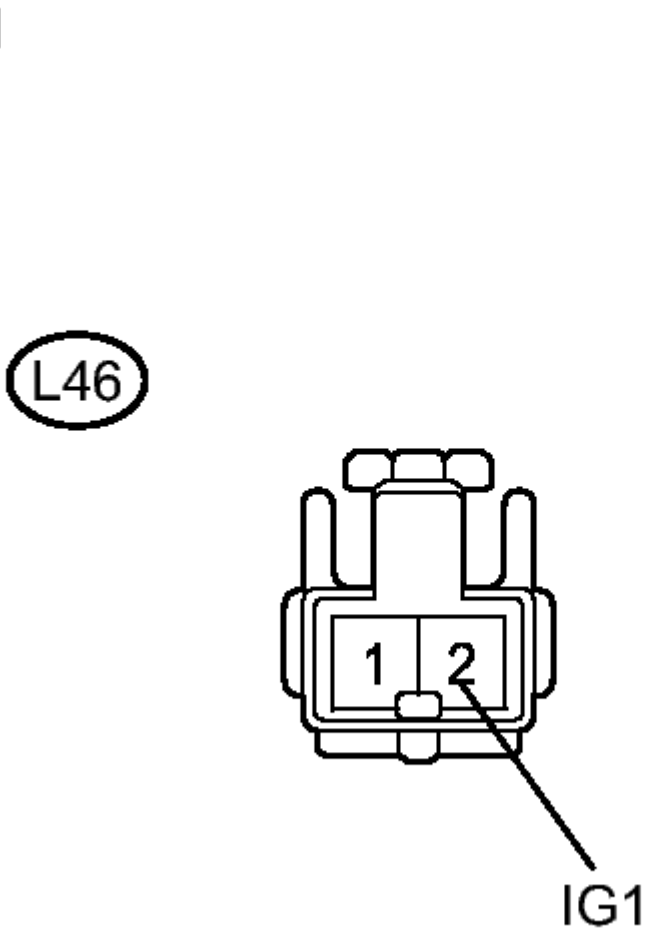


Fig. 65: Identifying Skid Control Buzzer Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Disconnect the skid control buzzer connector.
c. Turn the power switch on (IG).
d. Measure the voltage according to the value(s) in the table below.

Standard Voltage

Tester Connection	Switch Condition	Specified Condition
L46-2 (IG1) - Body ground	Power switch on (IG)	11 to 14 V

TEXT IN ILLUSTRATION

*1	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

4. **INSPECT SKID CONTROL BUZZER**
   a. Turn the power switch off.

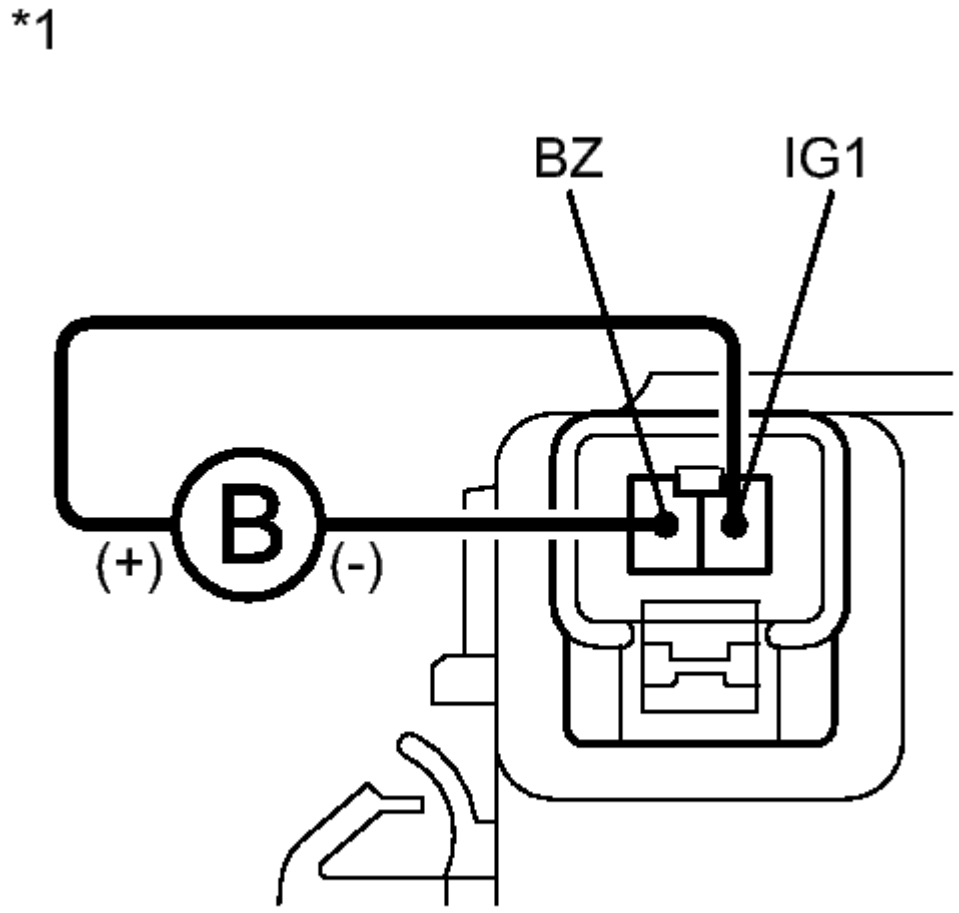


Fig. 66: Identifying Negative (-) Lead From The Battery To Terminal 1, And A Positive (+) Lead To Terminal 2 Of The Skid Control Buzzer
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

b. Connect a negative (-) lead from the battery to terminal 1, and a positive (+) lead to terminal 2 of the skid control buzzer, and then check that the buzzer sounds.

OK

The skid control buzzer sounds.

TEXT IN ILLUSTRATION

*1	Component without harness connected

	(Skid Control Buzzer)

NG --> See step 12

OK: Go to next step

5. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - SKID CONTROL BUZZER)**
   a. Disconnect the skid control ECU connector 2 minutes after the power switch is turned off.

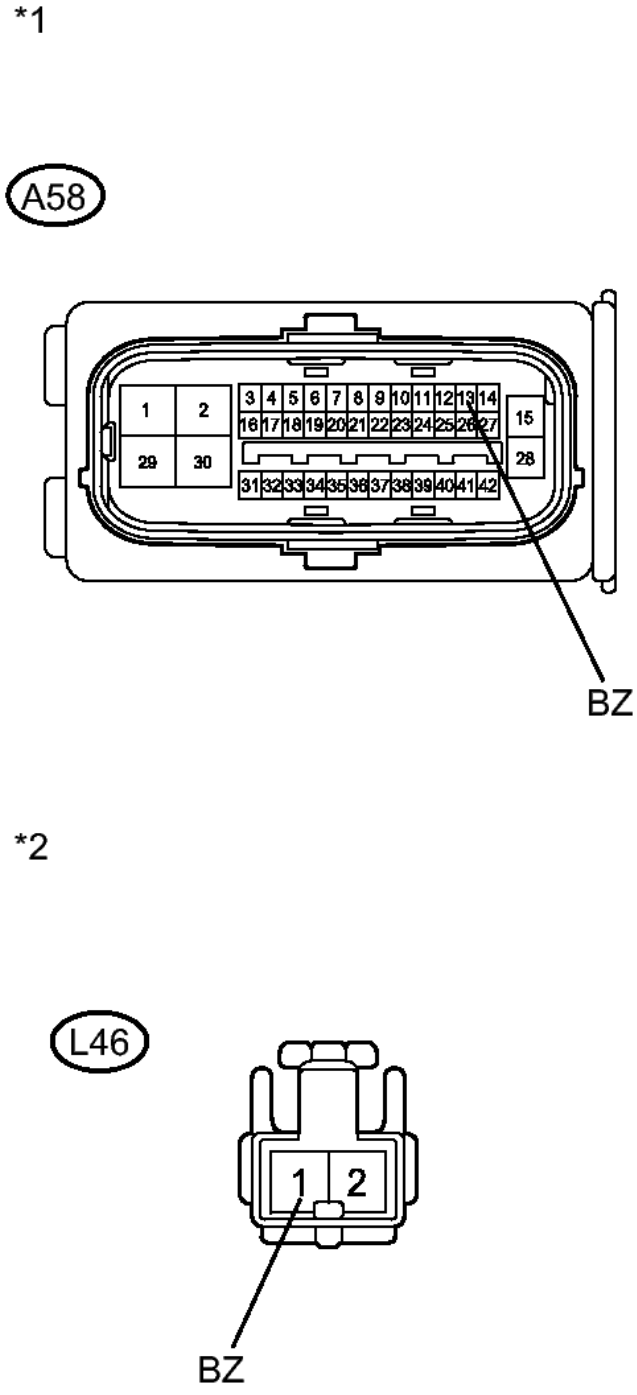


Fig. 67: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

HINT:

Do not open/close the driver door within 2 minutes after the power switch is turned off.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-13 (BZ) - L46-1 (BZ)	Always	Below 1 ohms
A58-13 (BZ) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of wire harness connector (to Skid Control Buzzer)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

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

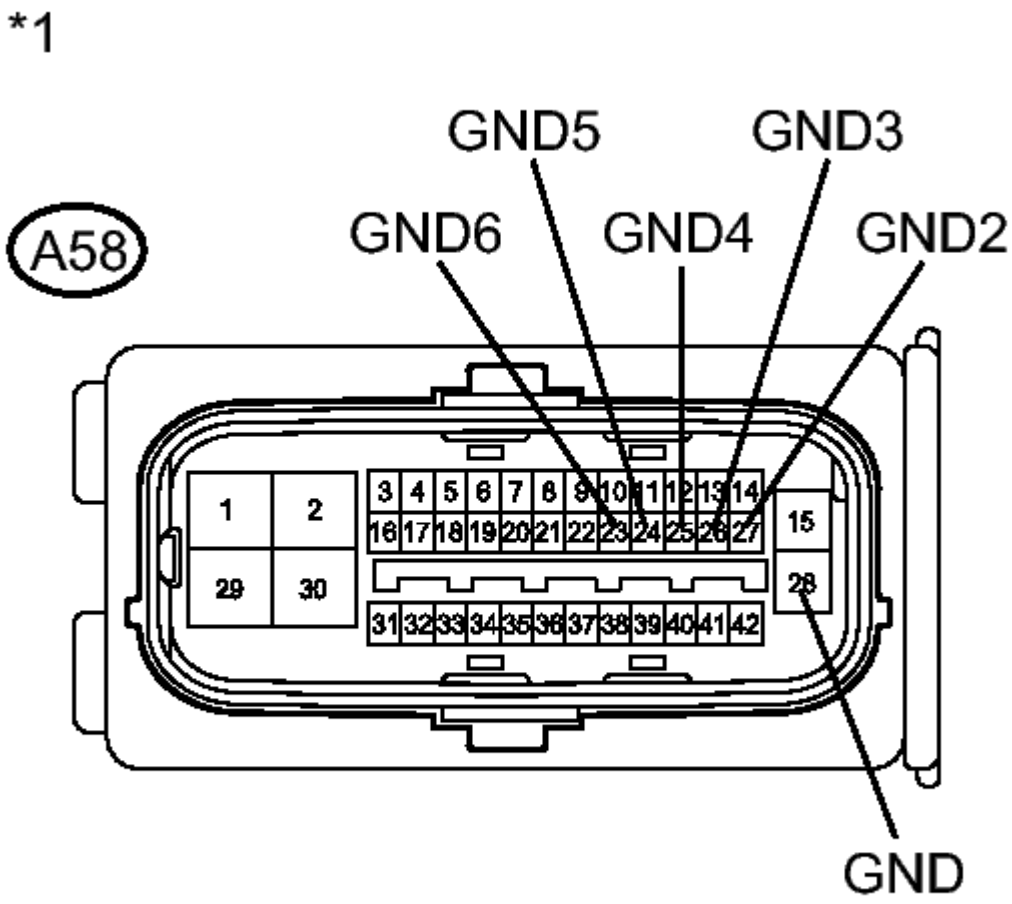


Fig. 68: Identifying Skid Control ECU Gnd Terminal
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-28 (GND) - Body ground	Always	Below 1 ohms
A58-27 (GND2) - Body ground	Always	Below 1 ohms
A58-26		

(GND3) - Body ground	Always	Below 1 ohms
A58-25 (GND4) - Body ground	Always	Below 1 ohms
A58-24 (GND5) - Body ground	Always	Below 1 ohms
A58-23 (GND6) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

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

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 (GND CIRCUIT)

OK --> See step 10

7. **INSPECT SKID CONTROL ECU**
   a. Disconnect the skid control ECU connector.
   b. Check that the skid control buzzer operation.

Result

Result	Proceed to
Buzzer stops	A

Buzzer sounds constantly	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 --> See step 8

A --> See step 10

8. **REPLACE SKID CONTROL BUZZER**
   a. Reconnect the skid control ECU connector.
   b. Replace the skid control buzzer. Refer to **REMOVAL** .
   c. Check that the skid control buzzer operation.

Result

Result	Proceed to
Buzzer stops	A
Buzzer sounds constantly	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 --> See step 9

A --> END

9. **CHECK IF CONNECTOR IS SECURELY CONNECTED**
   a. Gently jiggle the connectors and wire harnesses and check the skid control buzzer operation.

Result

Result	Proceed

	to
Buzzer stops	A
Buzzer sounds constantly	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 HARNESS OR CONNECTOR

A --> END

10. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
11. **CHECK FOR INTERMITTENT PROBLEMS. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**
12. **REPLACE SKID CONTROL BUZZER. 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.

WIRING DIAGRAM

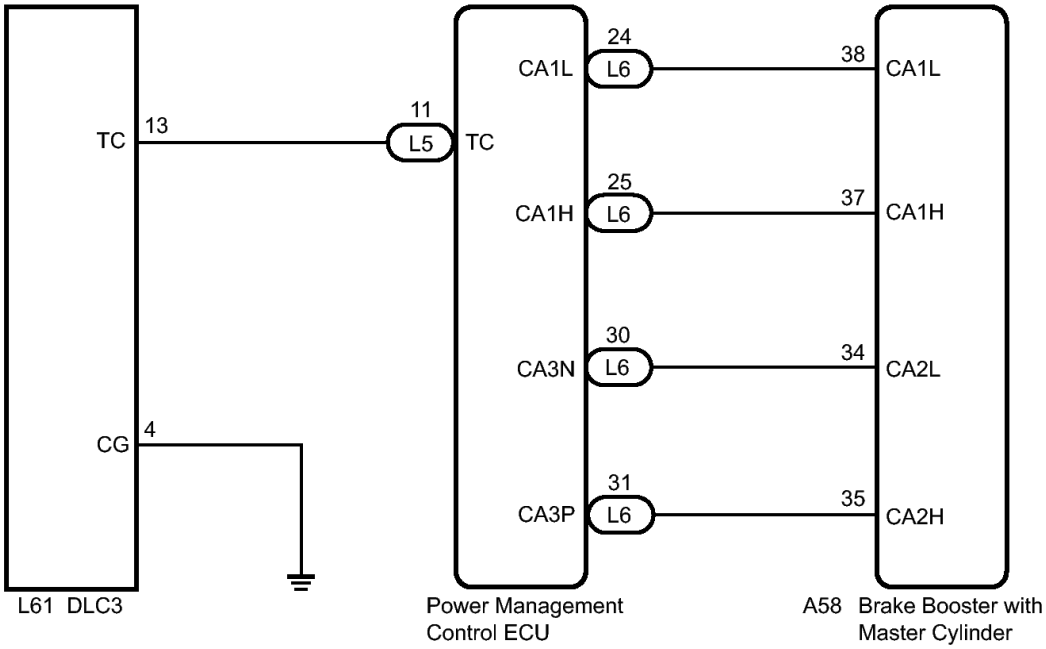


Fig. 69: TC And CG Terminal Circuit Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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 booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

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	A

output	
DTC is output	B

B --> See step 6

A: Go to next step

2. **CHECK HARNESS AND CONNECTOR (TC of DLC3 - POWER MANAGEMENT CONTROL ECU)**
   a. Disconnect the power management control ECU connector.

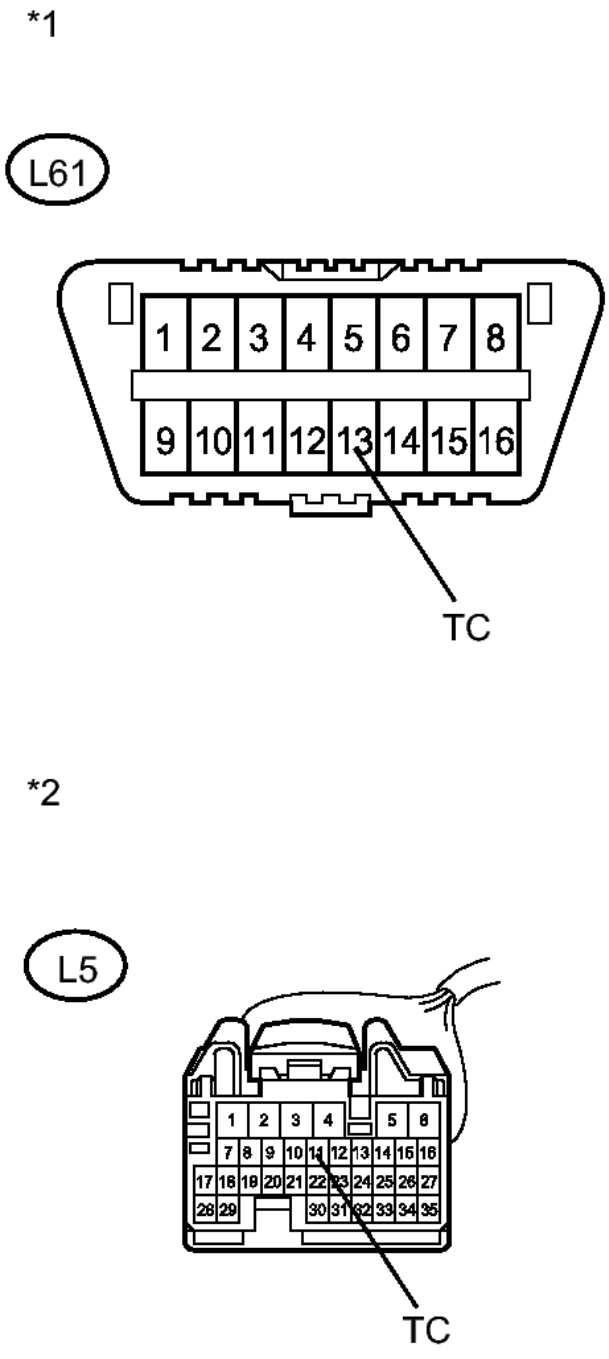


Fig. 70: Identifying Power Management Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
L61-13 (TC) - L5-11 (TC)	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of DLC3
*2	Front view of wire harness connector (to Power Management Control ECU)

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

3. **CHECK HARNESS AND CONNECTOR (CG of DLC3 - BODY GROUND)**
   a. Measure the resistance according to the value(s) in the table below.

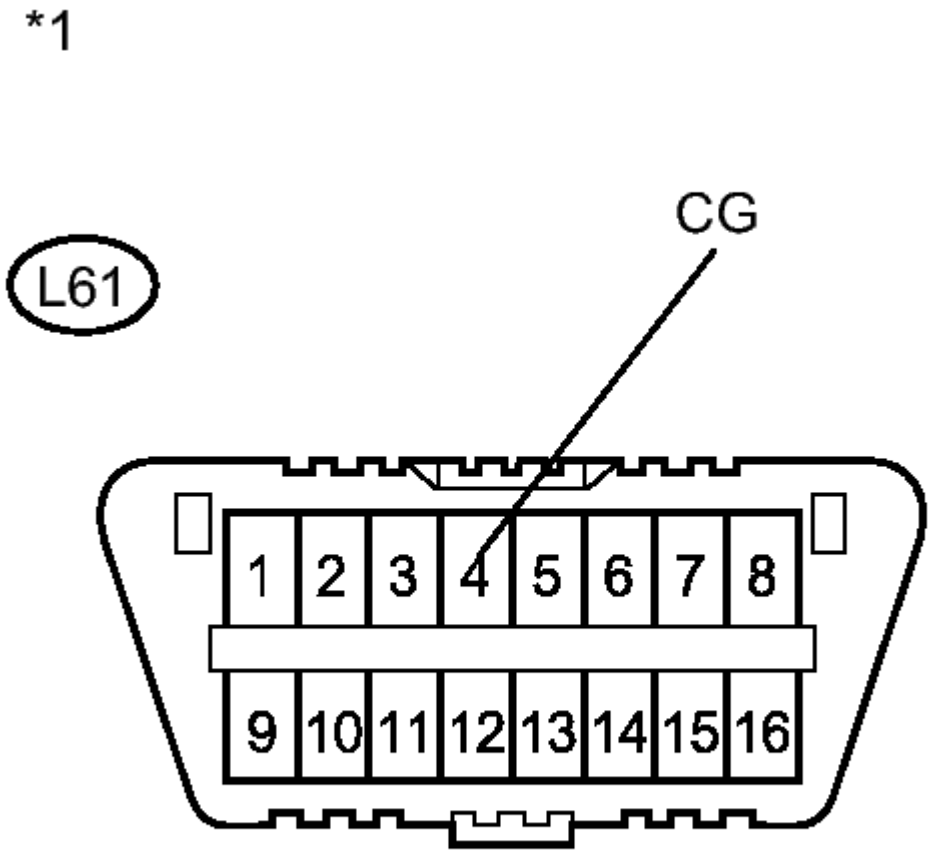


Fig. 71: Identifying L61 Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
L61-4 (CG) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of DLC3

NG --> REPAIR OR REPLACE HARNESS OR CONNECTOR

OK: Go to next step

4. **CHECK HARNESS AND CONNECTOR (TC of DLC3 - BODY GROUND)**
   a. Measure the resistance according to the value(s) in the table below.

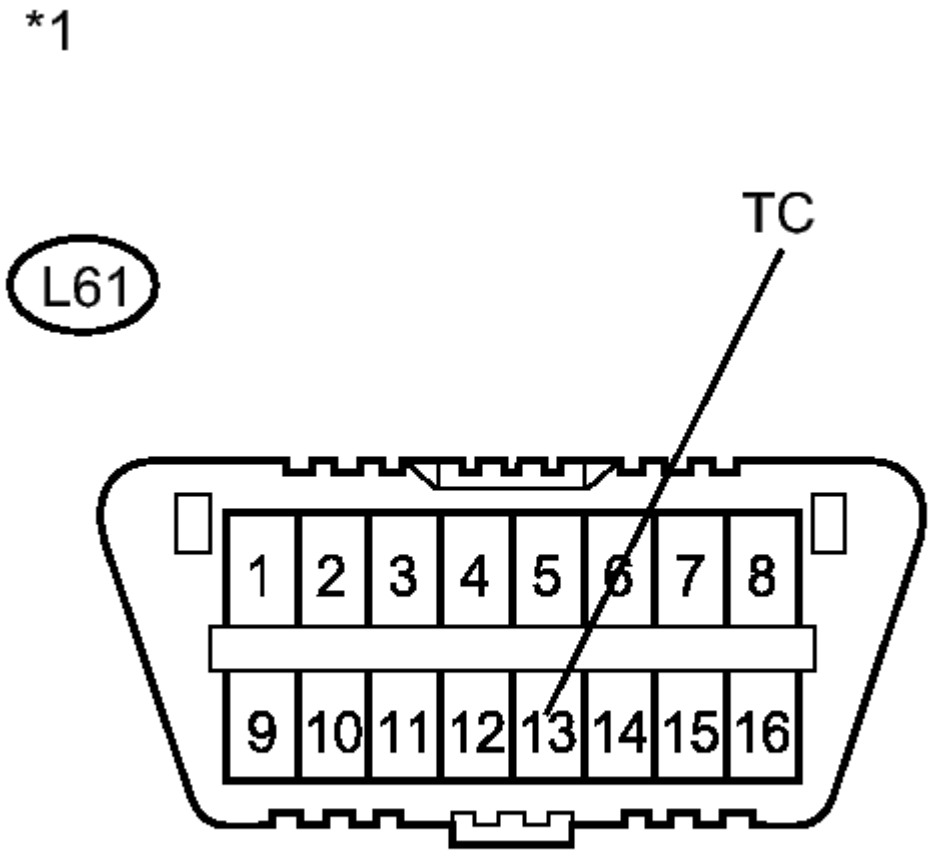


Fig. 72: Identifying L61 Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
L61-13		

(TC) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of DLC3

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 WIRE HARNESS OR EACH ECU

OK --> See step 5

5. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**
6. **INSPECT CAN COMMUNICATION SYSTEM. Refer to HOW TO PROCEED WITH TROUBLESHOOTING**

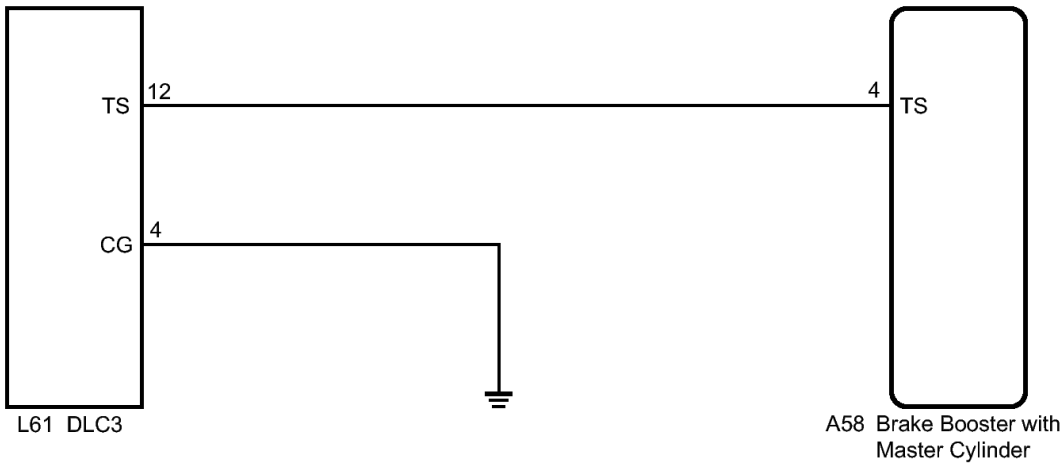
TS and CG Terminal Circuit

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 power switch from off to on (IG).

WIRING DIAGRAM



N

Fig. 73: L61 DLC3 To Brake Booster With Master Cylinder Wiring Diagram
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

INSPECTION PROCEDURE

NOTE: When replacing the brake booster with master cylinder (skid control ECU), perform initialization and calibration of the linear solenoid valve. Refer to INITIALIZATION .

PROCEDURE

1. **CHECK HARNESS AND CONNECTOR (SKID CONTROL ECU - TS of DLC3)**
   a. Disconnect the skid control ECU connector.

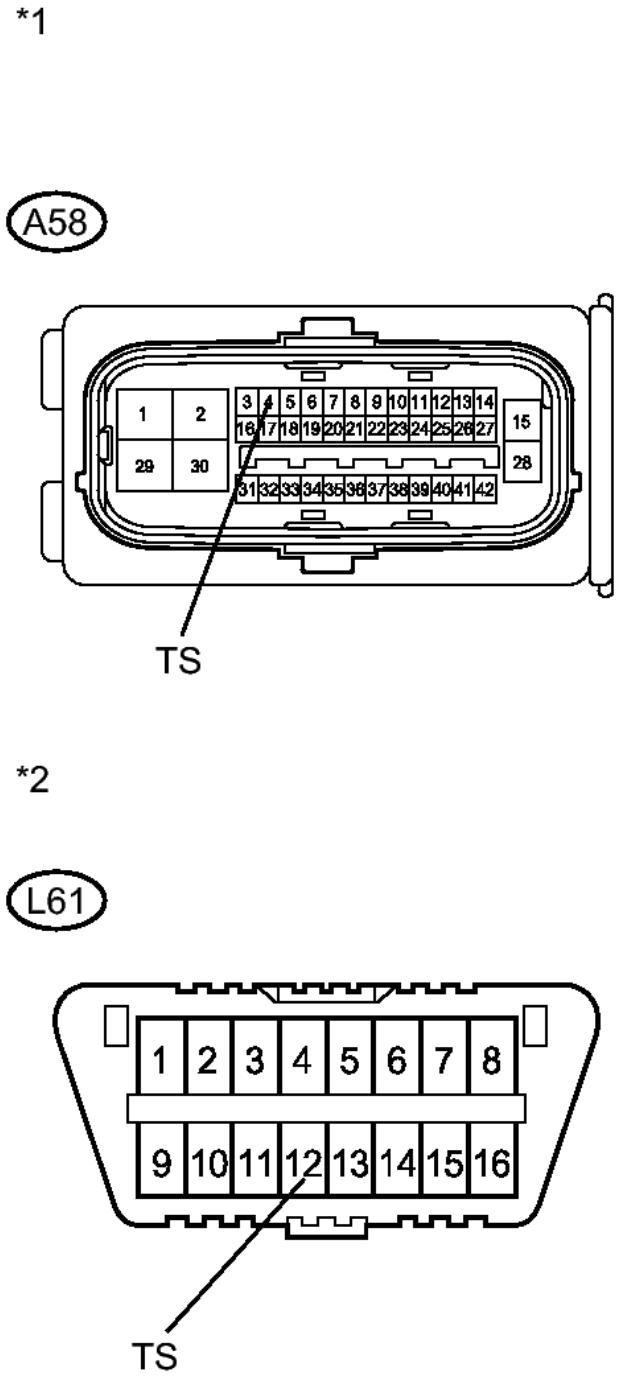


Fig. 74: Identifying Skid Control ECU Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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

Standard Resistance

Tester Connection	Condition	Specified Condition
A58-4 (TS) - L61-12 (TS)	Always	Below 1 ohms
A58-4 (TS) - Body ground	Always	10 kohms or higher

TEXT IN ILLUSTRATION

*1	Front view of wire harness connector (to Skid Control ECU)
*2	Front view of DLC3

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.

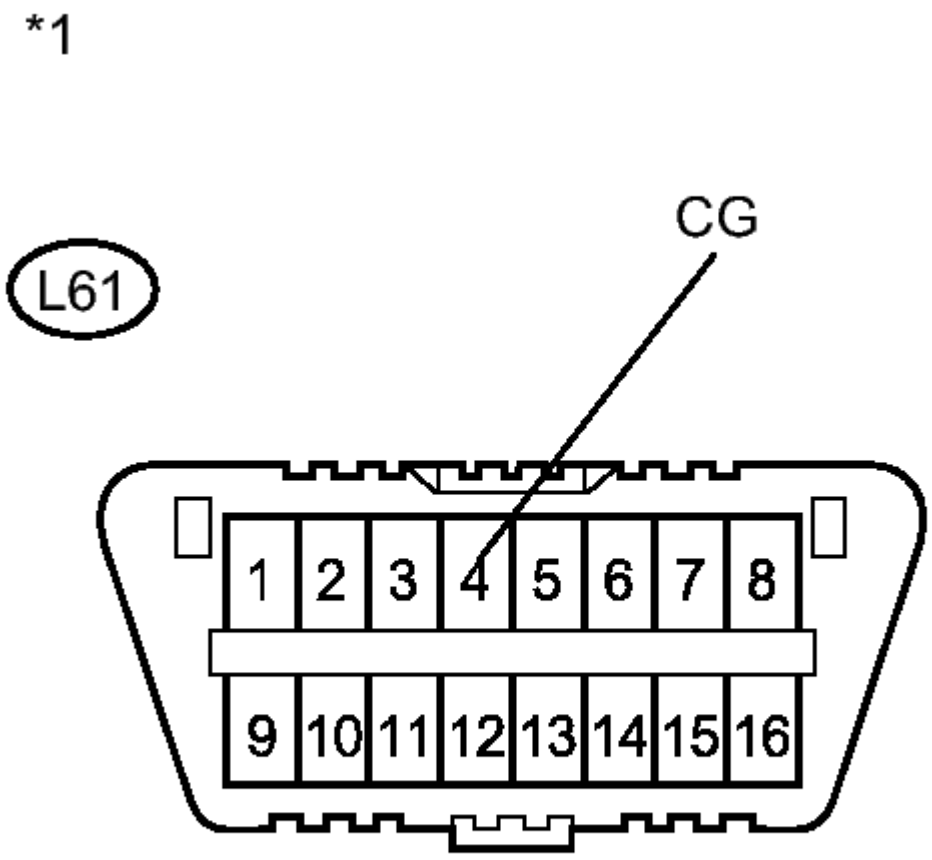


Fig. 75: Identifying L61 Connector
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Standard Resistance

Tester Connection	Condition	Specified Condition
L61-4 (CG) - Body ground	Always	Below 1 ohms

TEXT IN ILLUSTRATION

*1	Front view of DLC3

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 3

3. **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER. Refer to REMOVAL**

