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Model Year Start: 2023	Model: Prius Prime	Prod Date Range: [12/2022 -]
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: ELECTRONICALLY CONTROLLED BRAKE SYSTEM: C050C12; Left Rear Wheel Speed Sensor Circuit Short to Battery; 2023 - 2024 MY Prius Prius Prime [12/2022 -]		

DTC	C050C12	Left Rear Wheel Speed Sensor Circuit Short to Battery
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DESCRIPTION

The speed sensor detects wheel speed and sends the appropriate signals to the No. 2 skid control ECU (brake actuator assembly). These signals are used for brake control.

Speed sensor rotors have rows of alternating N and S magnetic poles, and their magnetic fields change when the rotors turn.

Each speed sensor detects that magnetic change and sends a pulse signal to the No. 2 skid control ECU (brake actuator assembly).

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
C050C12	Left Rear Wheel Speed Sensor Circuit Short to Battery	The speed sensor short signal is ON continuously for 0.5 seconds or more.	<ul style="list-style-type: none"> Rear speed sensor LH*1 Rear speed sensor LH (rear axle hub and bearing assembly LH)*2 Skid control sensor wire LH (No. 2 parking brake wire assembly) Wire harness and connector No. 2 skid control ECU (brake actuator assembly) 	Comes on	Brake/EPB	A	<ul style="list-style-type: none"> SAE Code: C050F Output ECU: No. 2 skid control ECU (brake actuator assembly)

*1: for AWD

*2: for 2WD

MONITOR DESCRIPTION

The No. 2 skid control ECU (brake actuator assembly) monitors the current or power supply voltage of the speed sensor. If the power supply voltage or output current is excessively high, the MIL is illuminated and a DTC is stored.

MONITOR STRATEGY

Related DTCs	C050F: Wheel speed sensor (RL) voltage circuit high
Required Sensors/Components(Main)	Speed sensor No. 2 skid control ECU (brake actuator assembly)
Required Sensors/Components(Related)	No. 2 skid control ECU (brake actuator assembly)
Frequency of Operation	Continuous
Duration	0.054 seconds: C050F (Case 2) 0.528 seconds: C050F (Case 1)
MIL Operation	Immediately
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Case 1

Monitor runs whenever the following DTCs are not stored	<p>C0501 (Case 1): Wheel speed sensor (FL) range/performance (correlation A)</p> <p>C0501 (Case 2): Wheel speed sensor (FL) range/performance (2 wheels)</p> <p>C0501 (Case 3): Wheel speed sensor (FL) range/performance (correlation B)</p> <p>C0501 (Case 4): Wheel speed sensor (FL) range/performance (pulse output high)</p> <p>C0502: Wheel speed sensor (FL) voltage circuit open</p> <p>C0508: Wheel speed sensor (FR) voltage circuit open</p> <p>C0507 (Case 1): Wheel speed sensor (FR) range/performance (correlation A)</p> <p>C0507 (Case 2): Wheel speed sensor (FR) range/performance (2 wheels)</p> <p>C0507 (Case 3): Wheel speed sensor (FR) range/performance (correlation B)</p> <p>C0507 (Case 4): Wheel speed sensor (FR) range/performance (pulse output high)</p> <p>C050E: Wheel speed sensor (RL) voltage circuit open</p> <p>C050D (Case 1): Wheel speed sensor (RL) range/performance (correlation A)</p> <p>C050D (Case 2): Wheel speed sensor (RL) range/performance (2 wheels)</p> <p>C050D (Case 3): Wheel speed sensor (RL) range/performance (correlation B)</p>
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	<p>C050D (Case 4): Wheel speed sensor (RL) range/performance (pulse output high)</p> <p>C0513 (Case 1): Wheel speed sensor (RR) range/performance (correlation A)</p> <p>C0513 (Case 2): Wheel speed sensor (RR) range/performance (2 wheels)</p> <p>C0513 (Case 3): Wheel speed sensor (RR) range/performance (correlation B)</p> <p>C0513 (Case 4): Wheel speed sensor (RR) range/performance (pulse output high)</p> <p>C0514: Wheel speed sensor (RR) voltage circuit open</p> <p>C137D: Brake system voltage circuit high</p> <p>C14E1 (Case 1): Wheel speed sensor (FL) voltage circuit low</p> <p>C14E1 (Case 2): Wheel speed sensor (FL) voltage circuit low (continuation)</p> <p>C14E4 (Case 1): Wheel speed sensor (FR) voltage circuit low</p> <p>C14E4 (Case 2): Wheel speed sensor (FR) voltage circuit low (continuation)</p> <p>C14E7 (Case 1): Wheel speed sensor (RL) voltage circuit low</p> <p>C14E7 (Case 2): Wheel speed sensor (RL) voltage circuit low (continuation)</p> <p>C14EA (Case 1): Wheel speed sensor (RR) voltage circuit low</p> <p>C14EA (Case 2): Wheel speed sensor (RR) voltage circuit low (continuation)</p>
Both of the following conditions are met	A and B
A. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
B. Command to wheel speed sensor power supply	On

Case 2

Both of the following conditions are met	-
ECU status	Remain
Command to wheel speed sensor power supply	Off

TYPICAL MALFUNCTION THRESHOLDS**Case 1**

Wheel speed sensor overcurrent signal (IC Data)	On
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Case 2

Wheel speed sensor power supply voltage low signal (IC Data)	Off
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COMPONENT OPERATING RANGE**Case 1**

Wheel speed sensor overcurrent signal (IC Data)	Off
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Case 2

All of the following conditions are met	-
ECU status	Remain
Command to wheel speed sensor power supply	Off
Remain	Finished
BM voltage	6 V or higher
Brake system voltage fail (C143B, C143C)	Not detected
ABS pump motor fail (C052D, C052E)	Not detected
ABS pump motor performance (gate voltage) fail (C052B)	Not detected
BSCM fail (C0597)	Not detected
Wheel speed sensor power supply voltage low signal (IC Data)	On

CONFIRMATION DRIVING PATTERN**NOTICE:**

When performing the normal judgment procedure, make sure that the driver door is closed and is not opened at any time during the procedure.

HINT:

- After repair has been completed, clear the DTC and then check that the vehicle has returned to normal by performing the following All Readiness check procedure.
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.

1. Connect the GTS to the DLC3.
2. Turn the ignition switch to ON and turn the GTS on.
3. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
4. Turn the ignition switch off.
5. Turn the ignition switch to ON (READY) and turn the GTS on.
6. Wait for 2 seconds or more. [*]

HINT:

[*]: Normal judgment procedure.

The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

7. Enter the following menus: Chassis / Brake/EPB* / Utility / All Readiness.

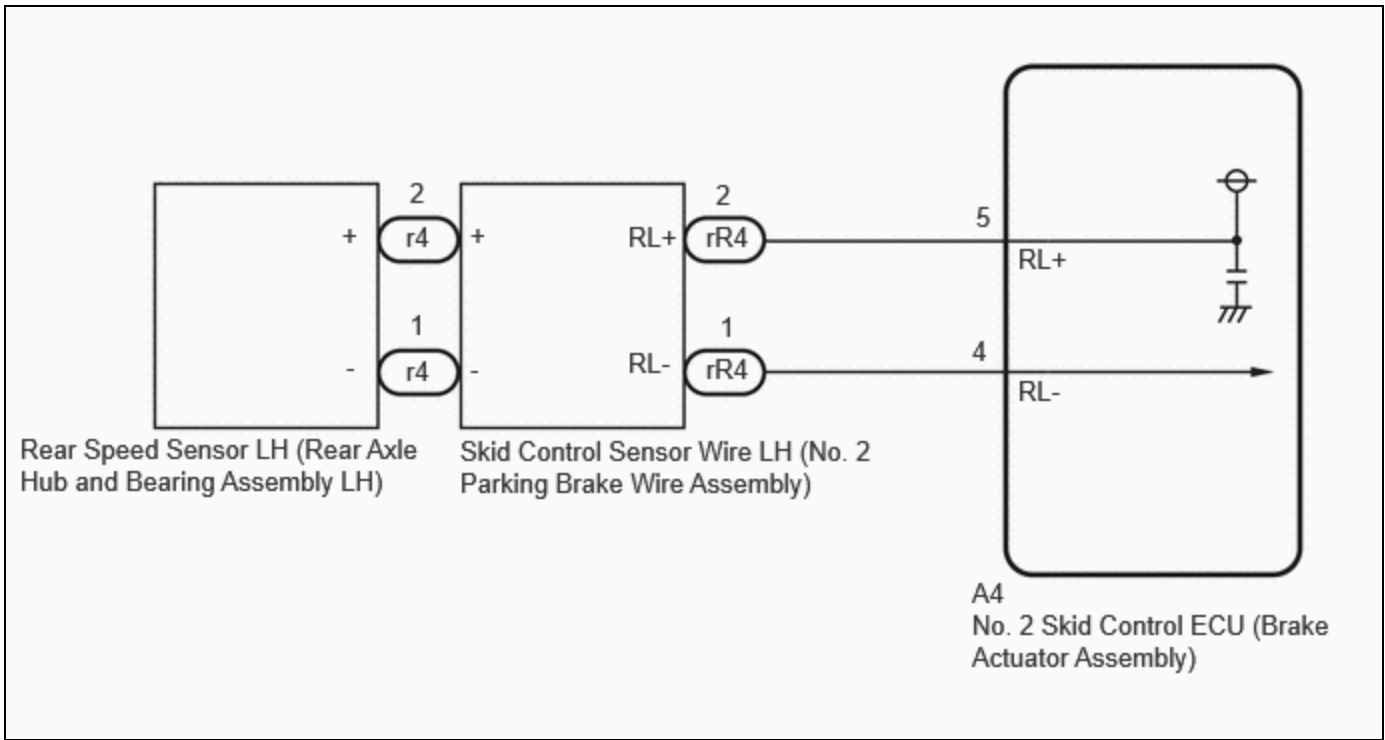
*: Electric Parking Brake System

8. Check the DTC judgment result.

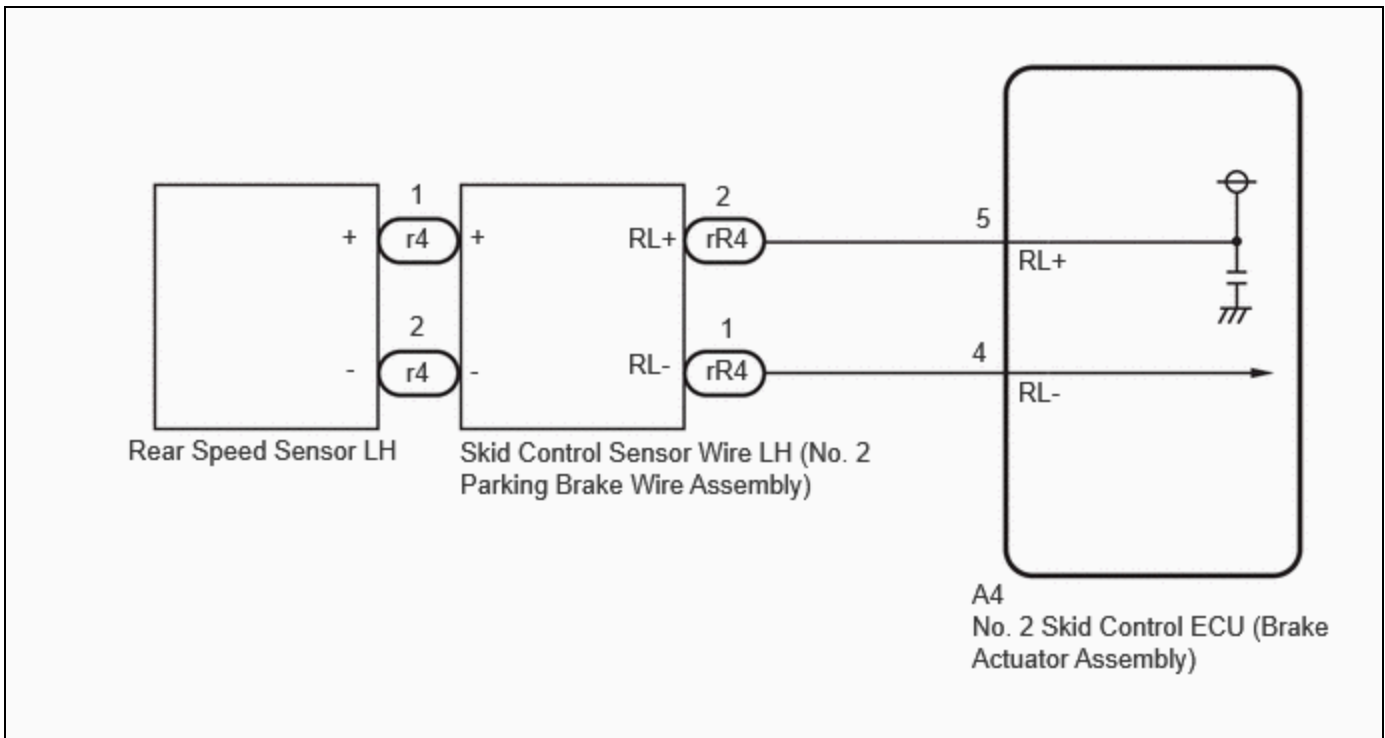
HINT:

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows INCOMPLETE, perform driving pattern again.

WIRING DIAGRAM**for 2WD**



for AWD



PROCEDURE

1.	CHECK VEHICLE
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RESULT	PROCEED TO
for 2WD	A
for AWD	B

B ► GO TO STEP 6

A



2. CHECK HARNESS AND CONNECTOR (SENSOR GROUND CIRCUIT)

Procedure1

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

OK:

The connector is securely connected.

Pre-procedure1

(b) Disconnect the r4 rear speed sensor LH (rear axle hub and bearing assembly LH) connector.

Procedure2

(c) Check both the connector case and the terminals for deformation and corrosion.

OK:

No deformation or corrosion.

Pre-procedure2

(d) Turn the ignition switch to ON.

Procedure3

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

Standard Voltage:



[Click Location & Routing\(r4\)](#)

[Click Connector\(r4\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
r4-2 (+) - r4-1 (-)	Ignition switch ON	11 to 14 V	V

HINT:

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

If the rear speed sensor LH and rear speed sensor rotor LH need to be replaced, replace the rear axle hub and bearing assembly LH.

Post-procedure1

(f) None

OK  **REPLACE REAR AXLE HUB AND BEARING ASSEMBLY**
LH 

NG



3.	CHECK HARNESS AND CONNECTOR (SENSOR GROUND CIRCUIT)
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Pre-procedure1

(a) Turn the ignition switch off.

Procedure1

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

OK:

The connector is securely connected.

Pre-procedure2

(c) Disconnect the rR4 skid control sensor wire LH (No. 2 parking brake wire assembly) connector.

Procedure2

(d) Check both the connector case and the terminals for deformation and corrosion.

OK:

No deformation or corrosion.

Pre-procedure3

(e) Turn the ignition switch to ON.

Procedure3

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

Standard Voltage:



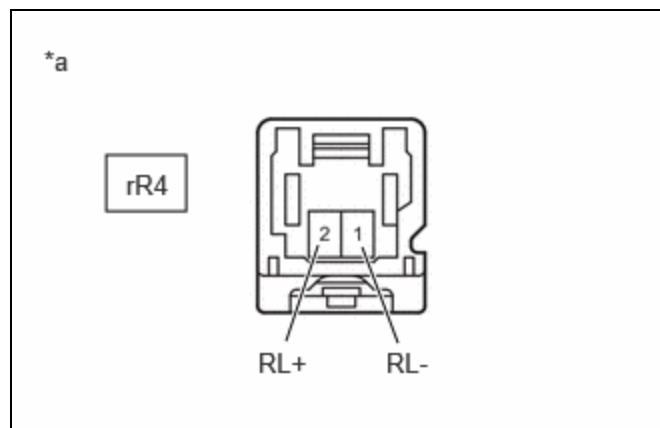
[Click Location & Routing\(rR4\)](#)

[Click Connector\(rR4\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
rR4-2 (RL+) - rR4-1 (RL-)	Ignition switch ON	11 to 14 V	V

Result:

PROCEED TO
OK
NG



*a	Front view of wire harness connector (to Skid Control Sensor Wire LH (No. 2 Parking Brake Wire Assembly))
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Post-procedure1

(g) None

OK ► REPLACE NO. 2 PARKING BRAKE WIRE ASSEMBLY

NG



4.	CHECK HARNESS AND CONNECTOR (SENSOR GROUND CIRCUIT)
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Pre-procedure1

(a) Turn the ignition switch off.

Procedure1

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

OK:

The connector is securely connected.

Pre-procedure2

(c) Disconnect the A4 No. 2 skid control ECU (brake actuator assembly) connector.

Procedure2

(d) Check both the connector case and the terminals for deformation and corrosion.

OK:

No deformation or corrosion.

Procedure3

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

Standard Voltage:



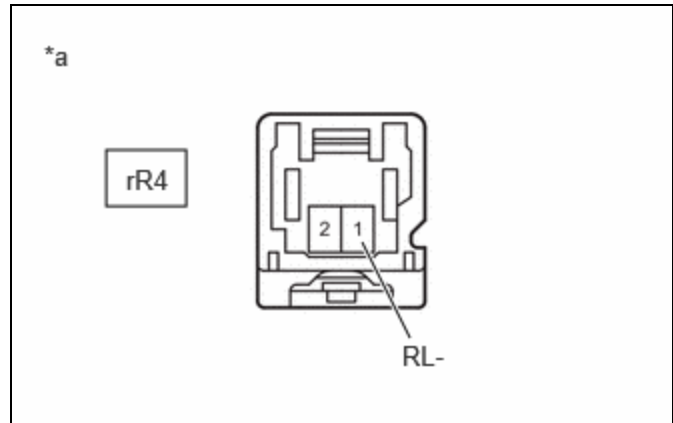
[Click Location & Routing\(rR4\).](#)

[Click Connector\(rR4\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
rR4-1 (RL-) - Body ground	Always	Below 1.5 V	V

Result:

PROCEED TO
OK
NG



*a Front view of wire harness connector (to Skid Control Sensor Wire LH (No. 2 Parking Brake Wire Assembly))

Post-procedure1

(f) None

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

5.	CHECK HARNESS AND CONNECTOR (NO. 2 PARKING BRAKE WIRE ASSEMBLY - BRAKE ACTUATOR ASSEMBLY)
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(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



[Click Location & Routing\(rR4,A4\).](#)

[Click Connector\(rR4\).](#)

[Click Connector\(A4\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
rR4-2 (RL+) or A4-5 (RL+) - rR4-1 (RL-) or A4-4 (RL-)	Always	10 kΩ or higher	kΩ

OK  **REPLACE BRAKE ACTUATOR ASSEMBLY** **NG**  **REPAIR OR REPLACE HARNESS OR CONNECTOR****6. CHECK HARNESS AND CONNECTOR (SENSOR GROUND CIRCUIT)**

Procedure1

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

OK:

The connector is securely connected.

Pre-procedure1

(b) Disconnect the r4 rear speed sensor LH connector.

Procedure2

(c) Check both the connector case and the terminals for deformation and corrosion.

OK:

No deformation or corrosion.

Pre-procedure2

(d) Turn the ignition switch to ON.

Procedure3

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

Standard Voltage:

[Click Location & Routing\(r4\).](#)[Click Connector\(r4\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
r4-1 (+) - r4-2 (-)	Ignition switch ON	11 to 14 V	V

Post-procedure1

(f) None

OK  **REPLACE REAR SPEED SENSOR LH****NG**

7. CHECK HARNESS AND CONNECTOR (SENSOR GROUND CIRCUIT)

Pre-procedure1

(a) Turn the ignition switch off.

Procedure1

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

OK:

The connector is securely connected.

Pre-procedure2

(c) Disconnect the rR4 skid control sensor wire LH (No. 2 parking brake wire assembly) connector.

Procedure2

(d) Check both the connector case and the terminals for deformation and corrosion.

OK:

No deformation or corrosion.

Pre-procedure3

(e) Turn the ignition switch to ON.

Procedure3

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

Standard Voltage:



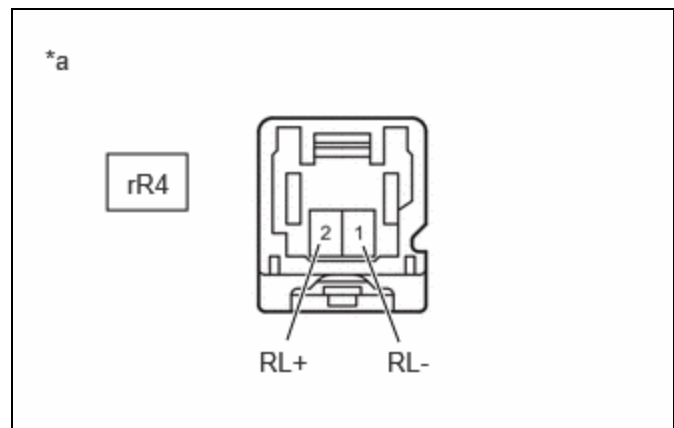
[Click Location & Routing\(rR4\).](#)

[Click Connector\(rR4\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
rR4-2 (RL+) - rR4-1 (RL-)	Ignition switch ON	11 to 14 V	V

Result:

PROCEED TO
OK
NG



*a	Front view of wire harness connector (to Skid Control Sensor Wire LH (No. 2 Parking Brake Wire Assembly))
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Post-procedure1

(g) None

OK ▶ **REPLACE NO. 2 PARKING BRAKE WIRE ASSEMBLY**

NG



8. CHECK HARNESS AND CONNECTOR (SENSOR GROUND CIRCUIT)

Pre-procedure1

(a) Turn the ignition switch off.

Procedure1

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

OK:

The connector is securely connected.

Pre-procedure2

(c) Disconnect the A4 No. 2 skid control ECU (brake actuator assembly) connector.

Procedure2

(d) Check both the connector case and the terminals for deformation and corrosion.

OK:

No deformation or corrosion.

Procedure3

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

Standard Voltage:

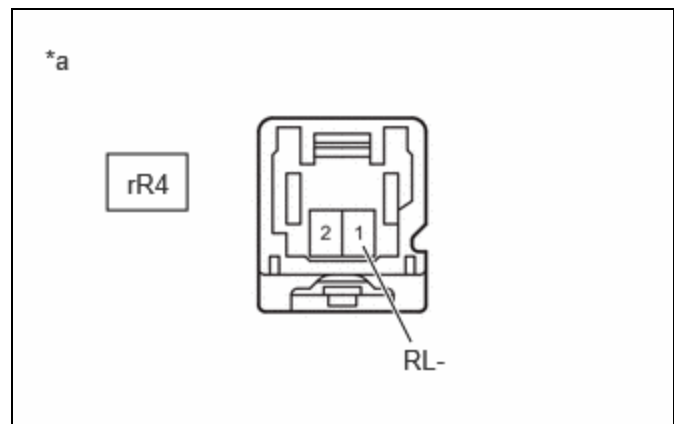


[Click Location & Routing\(rR4\).](#)

[Click Connector\(rR4\).](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
rR4-1 (RL-) - Body ground	Always	Below 1.5 V	V

Result:



*a Front view of wire harness connector (to Skid Control Sensor Wire LH (No. 2 Parking Brake Wire Assembly))

PROCEED TO
OK
NG

Post-procedure1

(f) None

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

OK
▼

9.	CHECK HARNESS AND CONNECTOR (NO. 2 PARKING BRAKE WIRE ASSEMBLY - BRAKE ACTUATOR ASSEMBLY)
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(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



[Click Location & Routing\(rR4,A4\)](#)

[Click Connector\(rR4\)](#)

[Click Connector\(A4\)](#)

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION	RESULT
rR4-2 (RL+) or A4-5 (RL+) - rR4-1 (RL-) or A4-4 (RL-)	Always	10 kΩ or higher	kΩ

OK ▶ REPLACE BRAKE ACTUATOR ASSEMBLY INFO

NG ▶ REPAIR OR REPLACE HARNESS OR CONNECTOR

