Last Modified: 5-3-2010	6.4 C	**From:** 200904
Model Year: 2010	**Model:** Prius	**Doc ID:** RM000000XI9077X
Title: BRAKE CONTROL / DYNAMIC CONTROL SYSTEMS: ELECTRONICALLY CONTROLLED BRAKE SYSTEM: C0200/31,C0205/32,C1271/71,C1272/72: Front Speed Sensor RH Circuit (2010 Prius)		

DTC	**C0200/31**	**Front Speed Sensor RH Circuit**

DTC	**C0205/32**	**Front Speed Sensor LH Circuit**

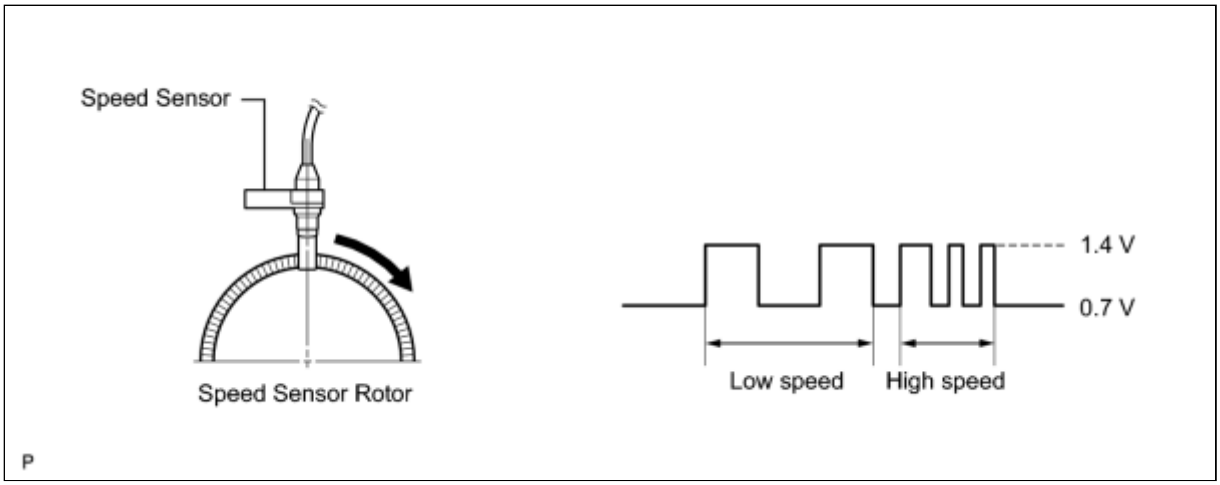
DTC	**C1271/71**	**Low Output Signal of Front Speed Sensor RH (Test Mode DTC)**

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.



DTC CODE	INF CODE	DTC DETECTION CONDITION	TROUBLE AREA

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)

DTC CODE	INF CODE	DTC DETECTION CONDITION	TROUBLE AREA
↑	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)
↑	512	A malfunction occurs in 2 or more wheels.	↑

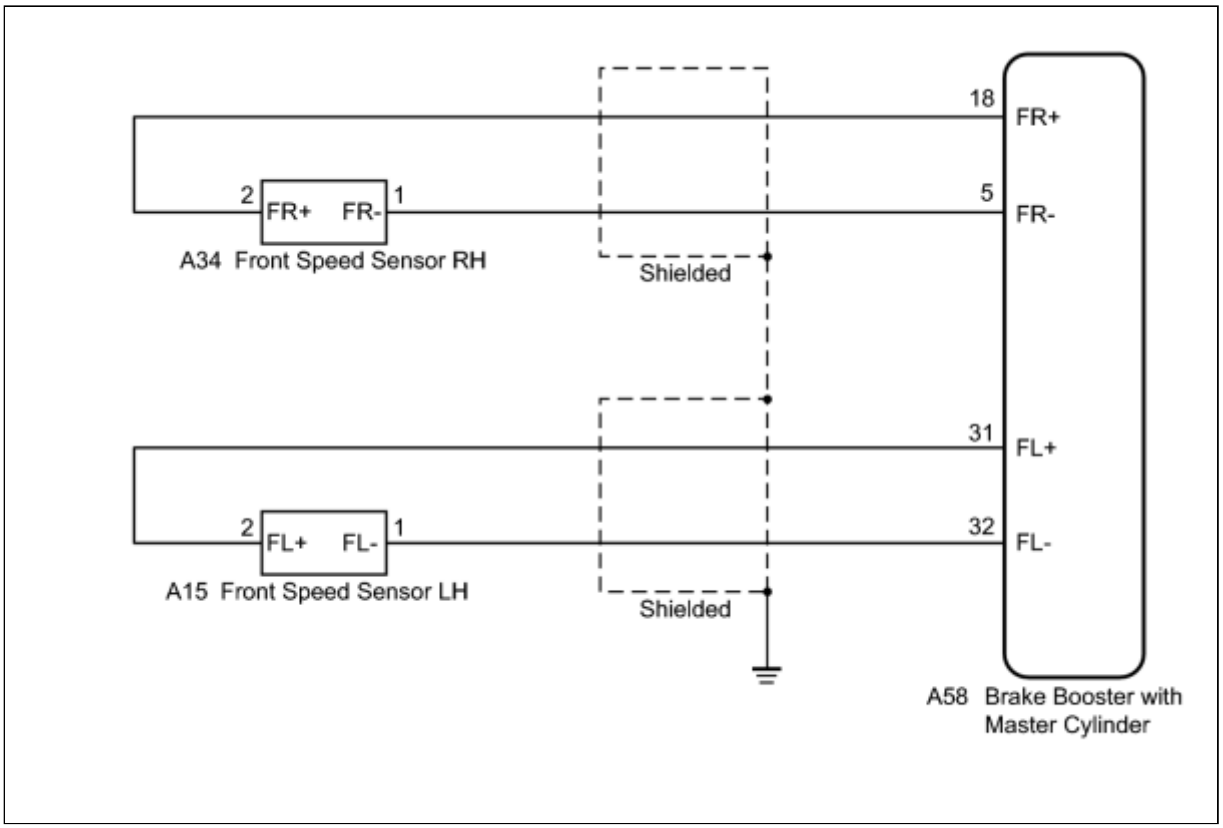
DTC CODE	INF CODE	DTC DETECTION CONDITION	TROUBLE AREA
↑	513	An open is detected in the speed sensor signal circuit for 0.05 seconds or more.	• Open or short in speed sensor • Open or short in wire harness • Improperly connected connector, deformation or corrosion of terminals • Front speed sensor LH • 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)

DTC CODE	INF CODE	DTC DETECTION CONDITION	TROUBLE AREA
↑	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



INSPECTION PROCEDURE

NOTICE:

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

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 INFO .

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 ▼

2.	**READ VALUE USING TECHSTREAM (FRONT SPEED SENSOR)**

(a) Select the Data List on the Techstream INFO .

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 INFO .

OK:

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

NG ▶ **CHECK FRONT SPEED SENSOR INSTALLATION**

OK ▼

3.	**PERFORM TEST MODE INSPECTION (SIGNAL CHECK)**

(a) Turn the power switch off.

(b) Perform the sensor check in the Test Mode procedure INFO .

OK:

All Test Mode DTCs are cleared.

NG ▶ **CHECK FRONT SPEED SENSOR INSTALLATION**

OK ▼

4.	**RECONFIRM DTC**

(a) Turn the power switch off.

(b) Clear the DTCs INFO .

(c) Turn the power switch on (READY).

(d) Perform a road test.

(e) Check if the same DTC is recorded INFO .

Result:

RESULT	PROCEED TO
DTCs (C0200/31 and C0205/32) are not output	A
DTCs (C0200/31 and/or C0205/32) are output	B

HINT:

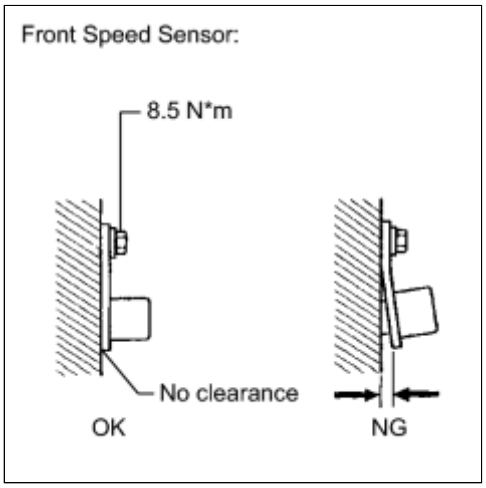
If troubleshooting has been carried out according to Problem Symptoms Table, refer back to the table and proceed to the next step INFO .

B ▶ **REPLACE FRONT SPEED SENSOR**

A

CHECK FOR INTERMITTENT PROBLEMS

5.	**CHECK FRONT SPEED SENSOR INSTALLATION**



(a) Turn the power switch off.

(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 **INSTALL FRONT SPEED SENSOR CORRECTLY**

OK

6.	**CHECK FRONT SPEED SENSOR TIP**

(a) Remove the front speed sensor INFO .

(b) Check the speed sensor tip.

OK:

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

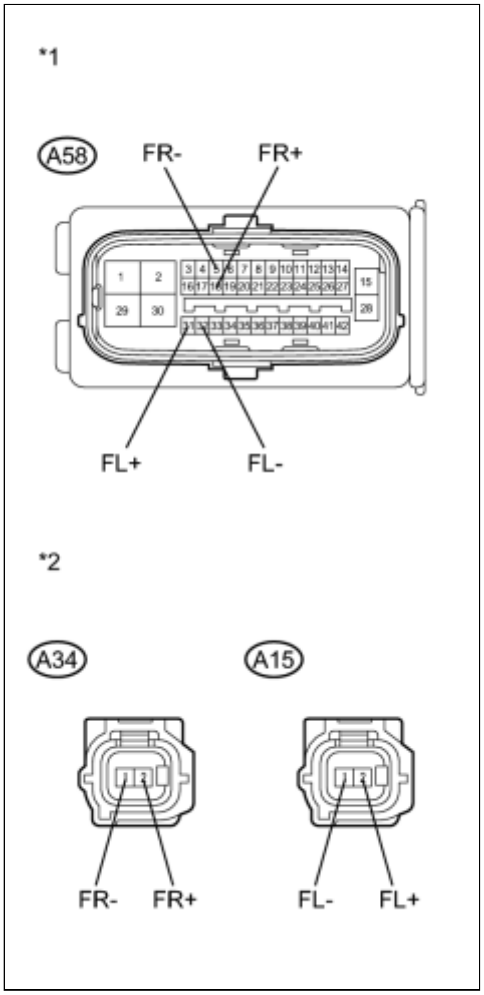
NOTICE:

Check the speed sensor signal after cleaning or replacement INFO **.**

NG **CLEAN OR REPLACE FRONT SPEED SENSOR**

OK

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.

(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 Ω
A58-18 (FR+) - Body ground	Always	10 kΩ or higher
A58-5 (FR-) - A34-1 (FR-)	Always	Below 1 Ω
A58-5 (FR-) - Body ground	Always	10 kΩ or higher

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
A58-31 (FL+) - A15-2 (FL+)	Always	Below 1 Ω
A58-31 (FL+) - Body ground	Always	10 kΩ or higher
A58-32 (FL-) - A15-1 (FL-)	Always	Below 1 Ω
A58-32 (FL-) - Body ground	Always	10 kΩ or higher

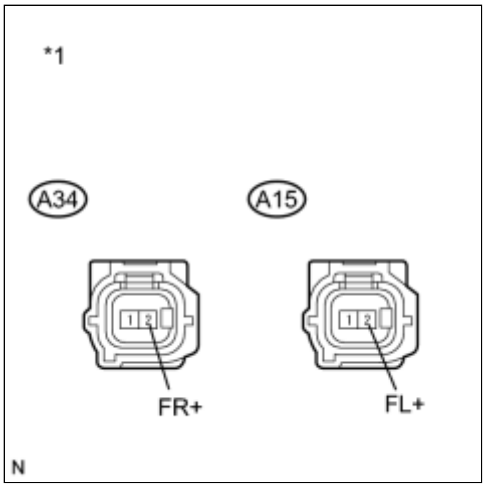
Text in Illustration

*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 ▼

8.	**INSPECT SKID CONTROL ECU (SENSOR OUTPUT)**



(a) Reconnect the skid control ECU connector.

(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 (FR+) - Body ground	Power 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 ▶ **REPLACE BRAKE BOOSTER WITH MASTER CYLINDER**

OK ▼

9.	RECONFIRM DTC

(a) Turn the power switch off.

(b) Reconnect the front speed sensor connector.

(c) Clear the DTCs INFO .

(d) Turn the power switch on (READY).

(e) Perform a road test.

(f) Check if the same DTC is recorded INFO .

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 INFO **.**

B ▶ **CHECK FOR INTERMITTENT PROBLEMS**

A ▼

10.	REPLACE FRONT SPEED SENSOR

(a) Turn the power switch off.

(b) Replace the front speed sensor INFO .

NOTICE:

Check the speed sensor signal after replacement INFO .

NEXT

11.	RECONFIRM DTC

(a) Clear the DTCs INFO .

(b) Turn the power switch on (READY).

(c) Perform a road test.

(d) Check if the same DTC is recorded INFO .

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 INFO .

B END

A

12.	REPLACE FRONT SPEED SENSOR ROTOR

(a) Turn the power switch off.

(b) Replace the front axle hub sub-assembly (front speed sensor rotor) INFO .

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.

NOTICE:

Check the speed sensor signal after replacement INFO .

NEXT

13.	**RECONFIRM DTC**

(a) Clear the DTCs INFO .

(b) Turn the power switch on (READY).

(c) Perform a road test.

(d) Check if the same DTC is recorded INFO .

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 INFO .

B ▶ END

A ▶ REPLACE BRAKE BOOSTER WITH MASTER CYLINDER