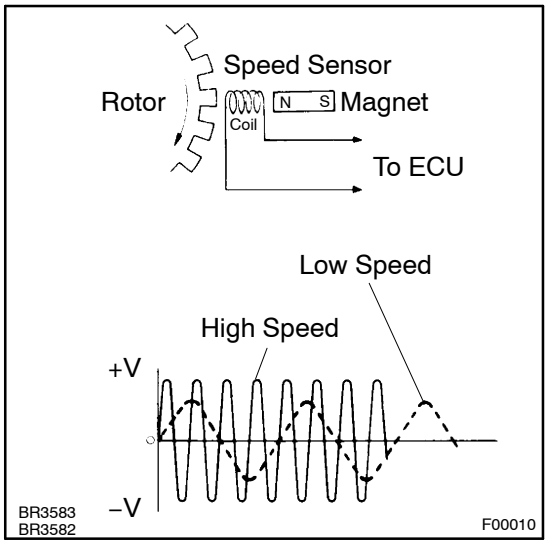
DTC	C0200/31	RIGHT FRONT SPEED SENSOR CIRCUIT

DTC	C0205/32	LEFT FRONT SPEED SENSOR CIRCUIT

CIRCUIT DESCRIPTION



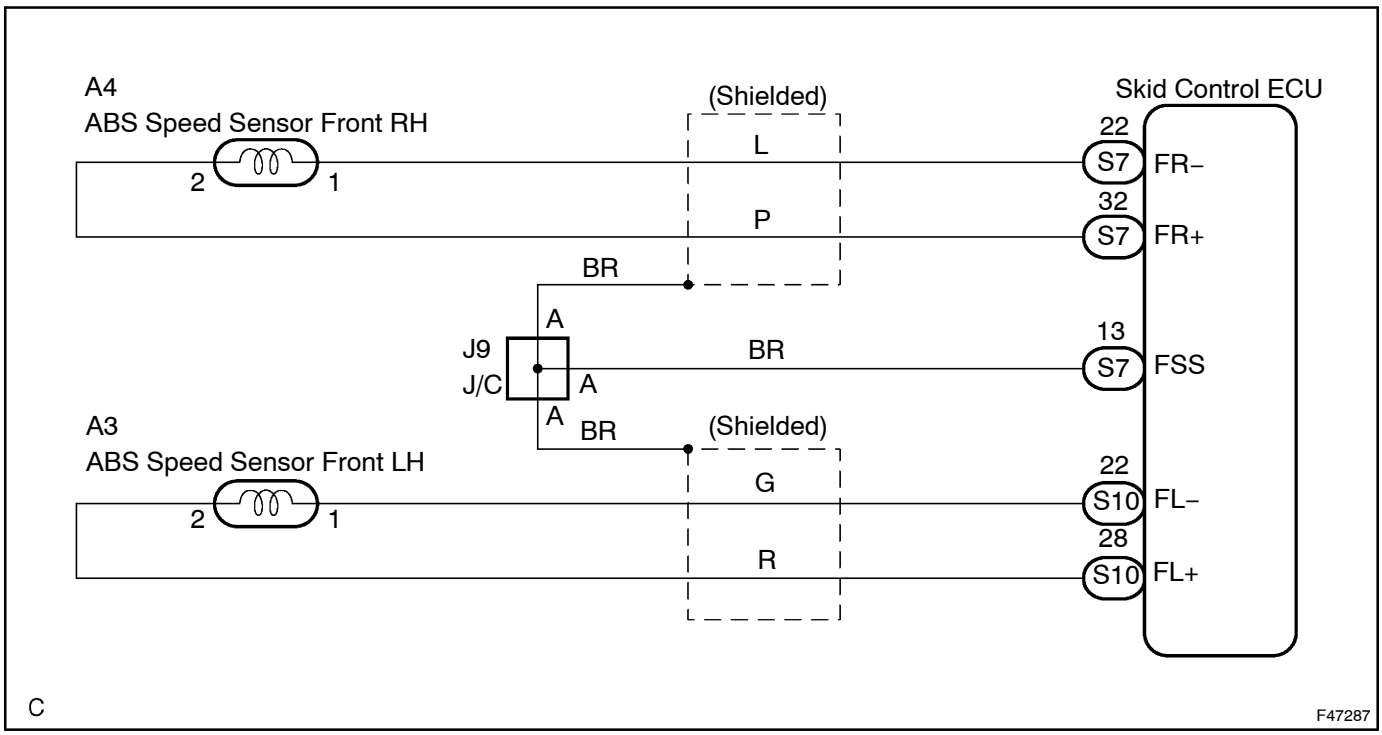
The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used to control the ABS control system. The front and rear rotors have 48 serrations, respectively.
When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates an AC voltage. Since the frequency of this AC voltage changes in direct proportion to the speed of the rotor, the frequency is used by the ECU to detect the speed of each wheel.

DTC No.	DTC Detecting Condition	Trouble Area
C0200/31 C0205/32	• Speed of a malfunctioning wheel is 0 km/h (0 mph) for at lease 15 sec. when vehicle speed is 10 km/h (6 mph) or more. • Speed of the slowest wheel is less than 1/7th of the 2nd slowest wheel for at least 15 sec. when vehicle speed is 10 km/h (6 mph) or more. • Abnormal high wheel speed pulse is input for at least 15 sec. • Abnormal high wheel speed pulse is input at least 7 times when ECU is on. • Speed sensor pulse signal is instantly cut 7 times or more. • Speed sensor signal line is open for at least 0.5 sec.	• Right front and left front speed sensor • Each speed sensor circuit • Sensor rotor • Sensor installation

HINT:

- DTC C0200/31 is for the right front speed sensor.
- DTC C0205/32 is for the left front speed sensor.
- The BRAKE warning light comes on when speed sensor malfunctions are detected in two or more wheels.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK HARNESS AND CONNECTOR(MOMENTARY INTERRUPTION)

(a) Using the intelligent tester II, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page 05–719).

Item	Measurement Item / Range (Display)	Normal Condition
FR Speed Open	FR speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition
FL Speed Open	FL speed sensor open detection / OPEN or NORMAL	NORMAL : Normal condition

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG → **Go to step 5**

OK

2	READ VALUE OF INTELLIGENT TESTER II(FRONT SPEED SENSOR)

(a) Connect the intelligent tester II to the DLC3.

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

(c) Select the DATA LIST mode on the intelligent tester II.

Item	Measurement Item / Range (Display)	Normal Condition
FR Wheel Speed	Wheel speed sensor (FR) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed
FL Wheel Speed	Wheel speed sensor (FL) reading / min.: 0 km/h (0 MPH, max.: 326 km/h (202 MPH)	Actual wheel speed

(d) Check that there is no difference between the speed value output from the speed sensor displayed on the intelligent tester II and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is almost no difference from the displayed speed value.

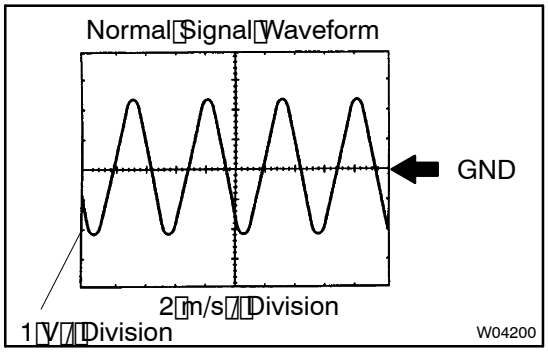
HINT:

There is tolerance of ± 10 % in the speedometer indication.

NG → **Go to step 4**

OK

3	INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

(a) Connect the oscilloscope to terminal FR+ – FR– or FL+ – FL– of the skid control ECU.

(b) Drive the vehicle at approximately 30 km/h (19 mph), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter attached to it.

NG	Go to step 6

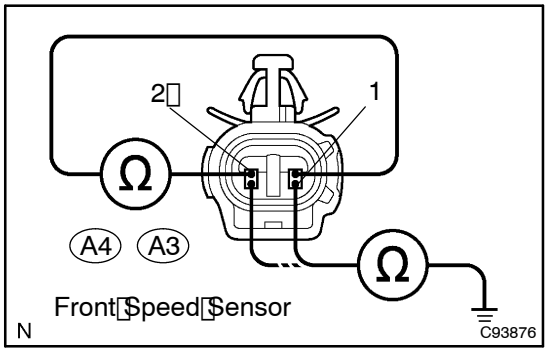
OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32–81 or 32–82)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05–721).

4 INSPECT FRONT SPEED SENSOR



(a) Make sure that there is no looseness at the connector's locking part and connecting part of the connector (A3 or A4.

(b) Disconnect the speed sensor connector.

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

Standard:

LH:

Tester Connection	Specified Condition
A3–2 (FL+) – A3–1 (FL–)	1.4 to 1.8 kΩ

RH:

Tester Connection	Specified Condition
A4–2 (FR+) – A4–1 (FR–)	1.4 to 1.8 kΩ

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

Standard:

LH:

Tester Connection	Specified Condition
A3–1 (FL–) – Body ground	10 kΩ or higher
A3–2 (FL+) – Body ground	10 kΩ or higher

RH:

Tester Connection	Specified Condition
A4–1 (FL–) – Body ground	10 kΩ or higher
A4–2 (FL+) – Body ground	10 kΩ or higher

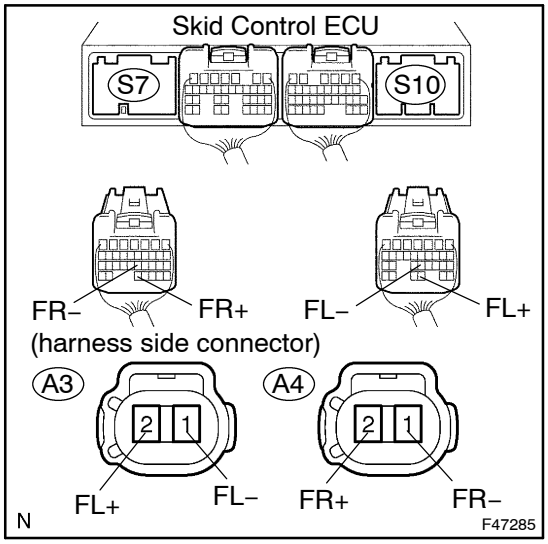
NOTICE:

Check the speed sensor signal after replacement (see page 05–724).

NG → **REPLACE FRONT SPEED SENSOR (SEE PAGE 32–75)**

OK

5	**CHECK HARNESS AND CONNECTOR(FRONT SPEED SENSOR – SKID CONTORL ECU)**



(a) Disconnect the skid control ECU connector and the front speed sensor connector.

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

Standard:

LH:

Tester Connection	Specified Condition
A3–1 (FL–) – S10–22 (FL–)	Below 1 Ω
A3–2 (FL+) – S10–28 (FL+)	Below 1 Ω

RH:

Tester Connection	Specified Condition
A4–1 (FR–) – S7–22 (FR–)	Below 1 Ω
A4–2 (FR+) – S7–32 (FR+)	Below 1 Ω

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

Standard:

LH:

Tester Connection	Specified Condition
A3–2 (FL+) – Body ground	10 kΩ or higher
A3–1 (FL–) – Body ground	10 kΩ or higher

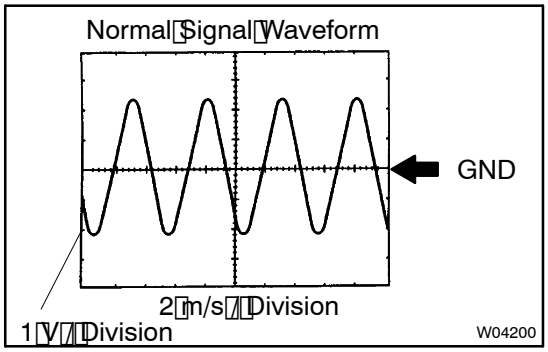
RH:

Tester Connection	Specified Condition
A4–2 (FR+) – Body ground	10 kΩ or higher
A4–1 (FR–) – Body ground	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

6	INSPECT SPEED SENSOR AND SENSOR ROTOR SERRATIONS



INSPECTION USING OSCILLOSCOPE

(a) Connect the oscilloscope to terminals FR+ – FR– or FL+ – FL– of the skid control ECU.

(b) Drive the vehicle at approximatery 30 km/h (19mph), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

HINT:

- As the vehicle speed (wheel revolution speed) increases, a cycle of the waveform narrows and the fluctuation in the output voltage becomes greater.
- When noise is identified in the waveform on the oscilloscope, error signals are generated due to the speed sensor rotor's scratches, looseness or foreign matter attached to it.

NG	Go to step 7

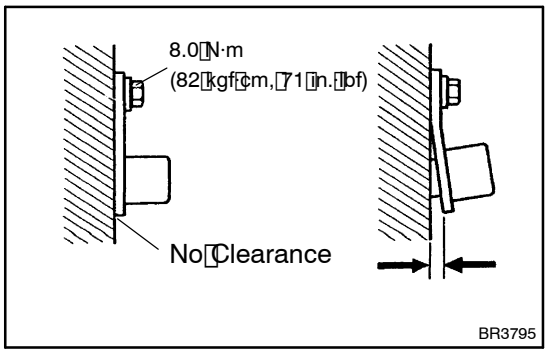
OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32–81 or 32–82)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05–721).

7	INSPECT FRONT SPEED SENSOR INSTALLATION



(a) Check the speed sensor installation.

OK:

- **There is no clearance between the sensor and front steering knuckle.**
- **The installation bolt is tightened properly.**

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

NOTICE:

Check the speed sensor signal after the replacement (see page 05–724).

NG	REPLACE FRONT SPEED SENSOR (SEE PAGE 32–75)

OK

REPLACE SKID CONTROL ECU ASSY (SEE PAGE 32–81 or 32–82)

NOTICE:

When replacing the skid control ECU assy, perform initialization of linear solenoid valve and calibration (see page 05–721).