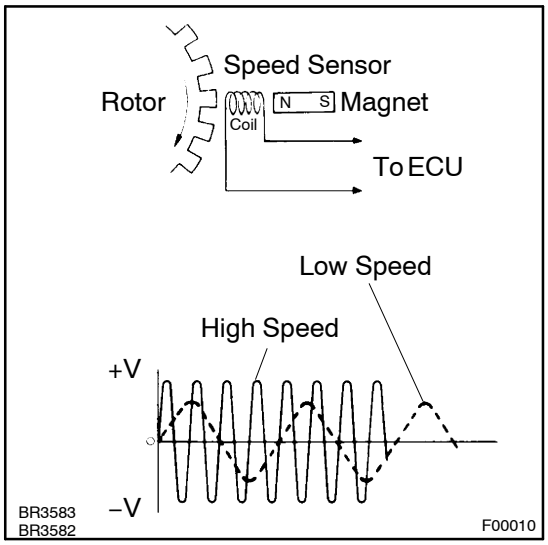
DIC3X–01

CIRCUIT INSPECTION

DTC	C0200/3 1 to C02 15 / 3 4	Speed Sensor Circuit

CIRCUIT DESCRIPTION



The speed sensor detects wheel speed and sends the appropriate signals to the ECU. These signals are used for control of the ABS control system. The front and rear rotors each have 48 serrations.

When the rotors rotate, the magnetic field emitted by the permanent magnet in the speed sensor generates 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
C0200/3 1 C0205 / 32 C0210 / 33 C0215 / 34	Detection of any of the conditions 1. through 4.: 1. At a vehicle speed of 10 km/h (6 mph) or more, pulses are not input for 15 sec. 2. Momentary interruption of the speed sensor signal occurs at least 7 times in the time between switching the ignition switch ON and switching it OFF. 3. Continuous noise occurs into the speed sensor signals with a vehicle speed at 20 km/h (12 mph) or more. 4. The condition that the speed sensor signal circuit is open continues for 0. 12 sec. or more. • ABS does not function • Brake pedal is not depressed • Parking brake is not set • Rear differential does not lock Under the above conditions, when the difference in velocity between the highest rotating and the second highest rotating wheels is within 2 km/h (1.2 mph), the slowest wheel rotates at 0 km/h (0 mph), and the second slowest wheel rotates at 12 km/h (7.5 mph) for 1 second or more.	• Right front, left front, right rear and left rear speed sensor • Each speed sensor circuit • Sensor rotor

HINT:

DTC No. C0200/3 1 are for the right front speed sensor.

DTC No. C0205 / 32 are for the left front speed sensor.

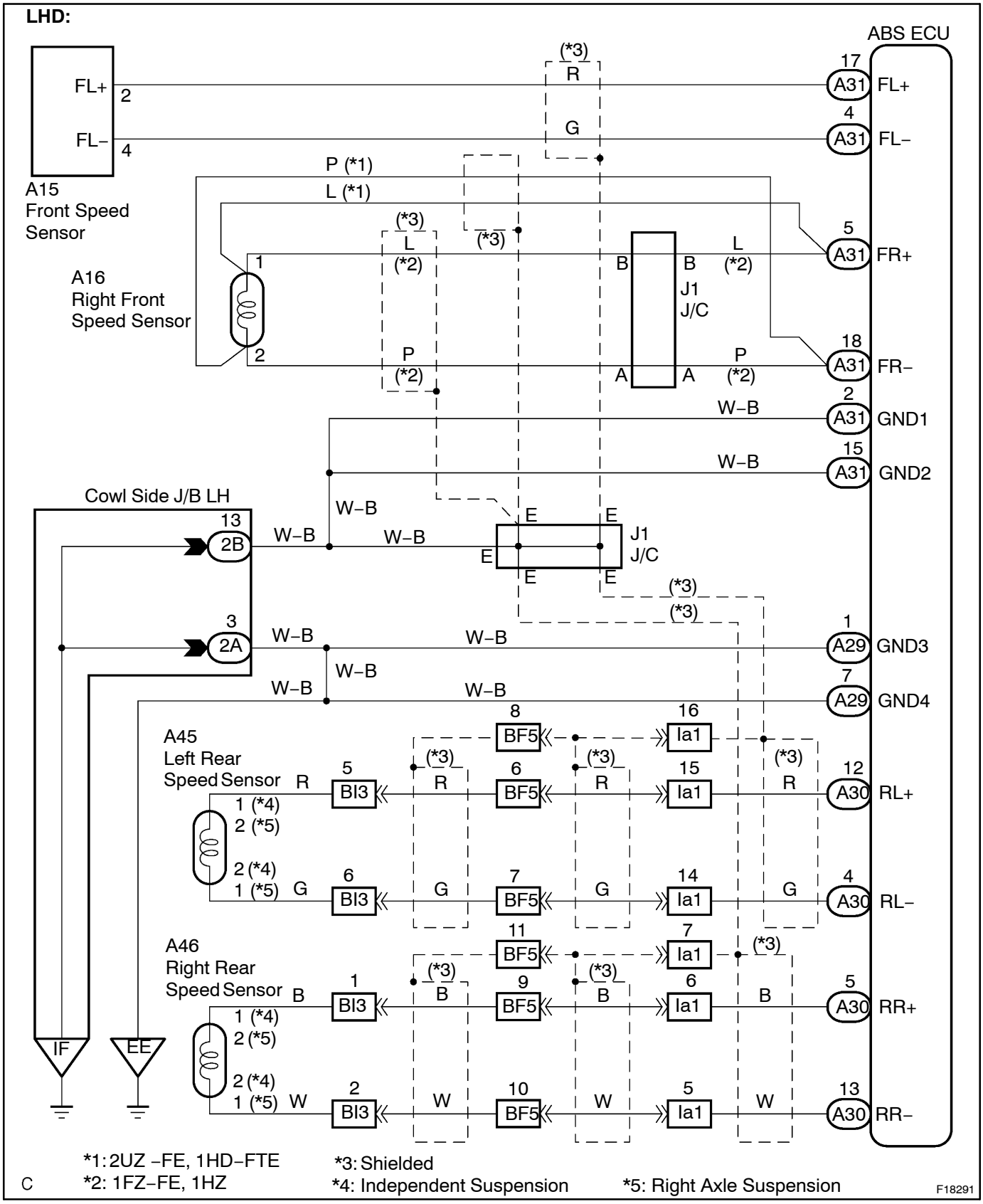
DTC No. C02 10/33 are for the right rear speed sensor.

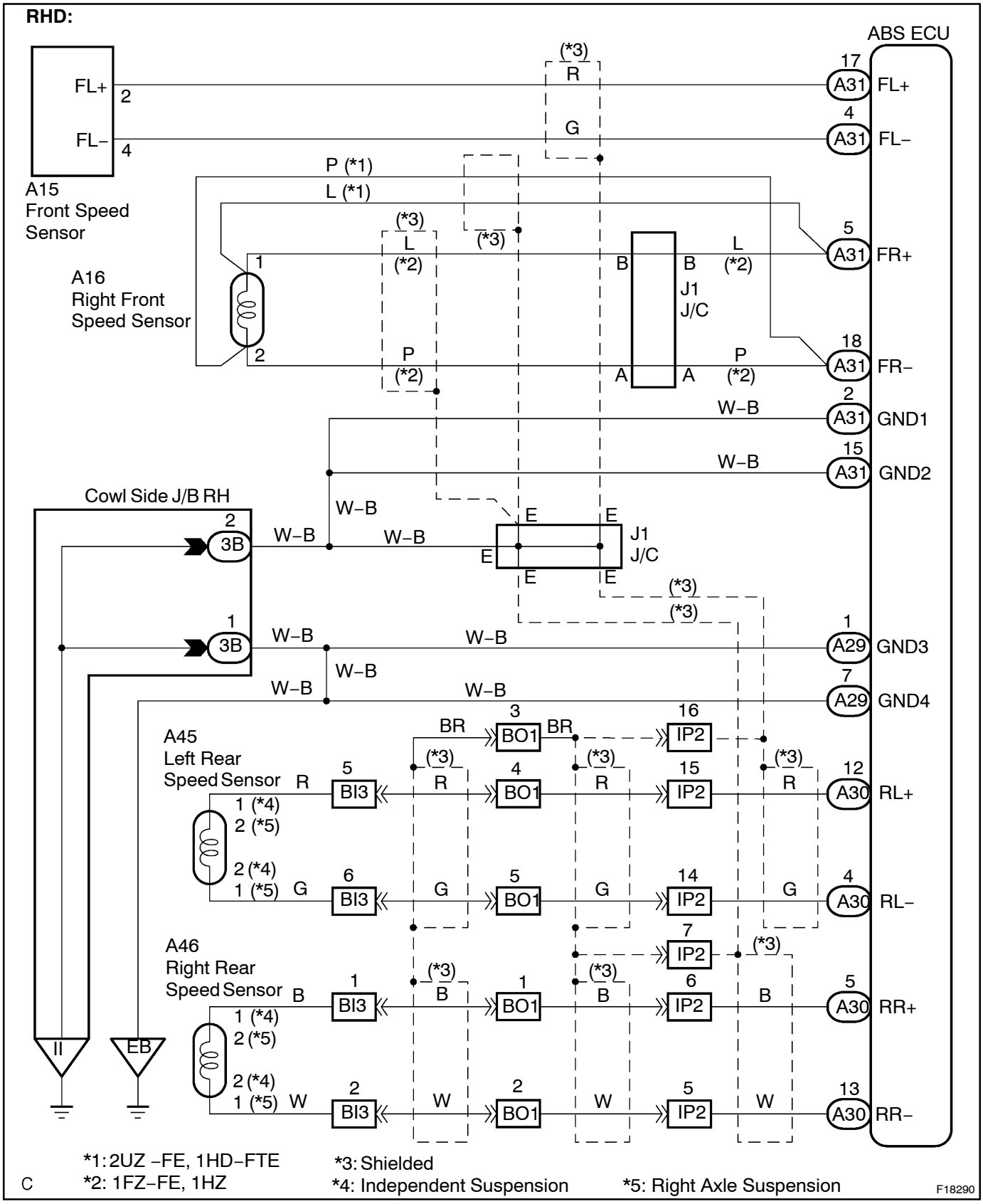
DTC No. C02 15/34 are for the left rear speed sensor.

Fail safe function:

If trouble occurs in the speed sensor circuit, the ECU cuts off current to the ABS solenoid relay and prohibits ABS control and the brake system becomes normal.

WIRING DIAGRAM




RHD:
ABS ECU
A15
Front Speed Sensor
FL+
FL–
A16
Right Front Speed Sensor
P (*1)
L (*1)
(*3)
R
G
L
(*2)
P
(*2)
J1
J/C
FR+
FR–
GND1
GND2
GND3
GND4
Cowl Side J/B RH
3B
W–B
E
A45
Left Rear Speed Sensor
A46
Right Rear Speed Sensor
BR
B
W
BI3
BO1
IP2
RL+
RL–
RR+
RR–
(*4)
(*5)
II
EB
*1: 2UZ –FE, 1HD–FTE
*2: 1FZ–FE, 1HZ
*3: Shielded
*4: Independent Suspension
*5: Right Axle Suspension
C
F18290

INSPECTION PROCEDURE

Start the inspection from step 1 when using the hand –held tester and start from step 2 when not using the hand–held tester.

1	**Check output value of speed sensor.**

PREPARATION:

(a) Connect the hand held tester to the DLC3.

(b) Turn the ignition switch to the ON position and push the hand –held tester main switch ON.

(c) Select the DATA LIST mode on the hand –held tester.

CHECK:

Check that there is no difference between the speed value output from the speed sensor displayed on the hand–held tester and the speed value displayed on the speedometer when driving the vehicle.

OK:

There is almost no difference between displayed speed value.

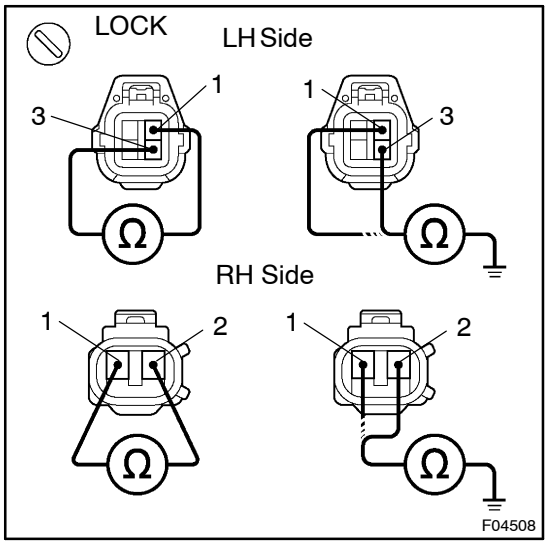
HINT:

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

OK → **Check and replace ABS ECU.**

NG

2	**Check speed sensor.**



FRONT:

PREPARATION:

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

(b) Disconnect the speed sensor connector.

CHECK:

LH Side:

Measure resistance between terminals 1 and 3 of the speed sensor connector.

RH side:

Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:

Resistance: 0.92 to 1.22 k Ω

CHECK:

LH Side:

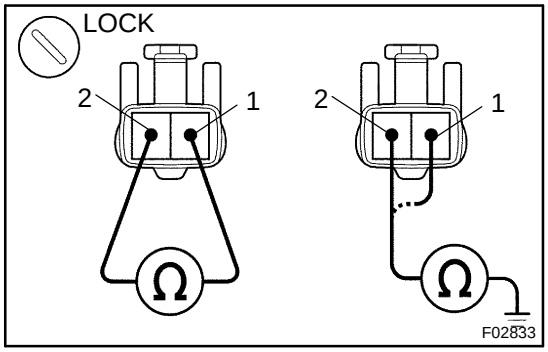
Measure resistance between terminal 1 or 3 of the speed sensor connector and body ground.

RH Side:

Measure resistance between terminal 1 or 2 of the speed sensor connector and body ground.

OK:

Resistance: 10 kΩ or higher



REAR:

PREPARATION:

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

(b) Disconnect speed sensor connector.

CHECK:

Measure resistance between terminals 1 and 2 of the speed sensor connector.

OK:

Resistance: 1.0 to 1.4 kΩ

CHECK:

Measure resistance between terminal 1 or 2 of the speed sensor connector and body ground.

OK:

Resistance: 10 kΩ or higher

NG	**Replace speed sensor.**

NOTICE:

Check the speed sensor signal after replacement (See page DI–54).

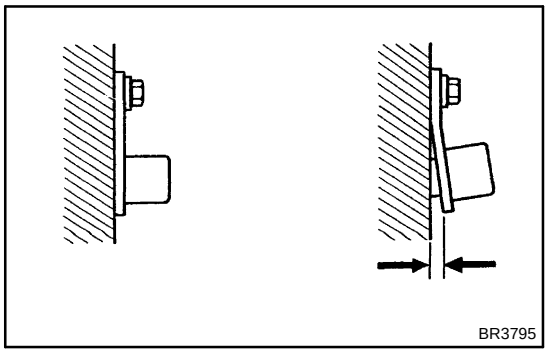
OK

3	**Check for open and short circuit in harness and connector between each speed sensor and ECU (See page IN–38).**

NG	**Repair or replace harness or connector.**

OK

4	Check sensor installation.



CHECK:

Check the speed sensor installation.

OK:

The installation bolt is tightened properly and there is no clearance between the sensor and front steering knuckle or rear axle carrier.
Torque: (Front speed sensor)
8.0 N·m (82 kgf·cm, 71 in.·lbf)

NG	Replace speed sensor.

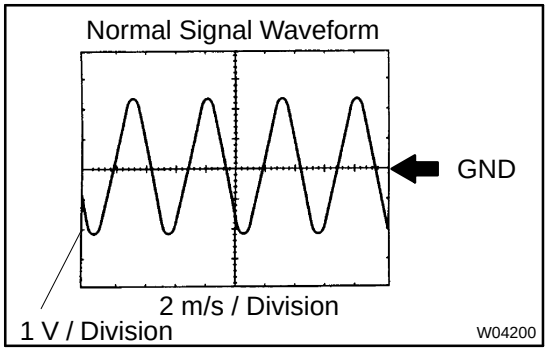
NOTICE:

Check the speed sensor signal after replacement (See page DI−54).

OK

5	Check speed sensor and sensor rotor serrations.

(REFERENCE) INSPECTION USING OSCILLOSCOPE



PREPARATION:

(a) Remove the ABS ECU.
(b) Connect the oscilloscope to each of terminals FR+, FL+, RR+ or RL+ and GND of the ABS ECU.

CHECK:

Drive the vehicle at about 20 km/h (12 mph), and check the signal waveform.

OK:

A waveform as shown in a figure should be output.

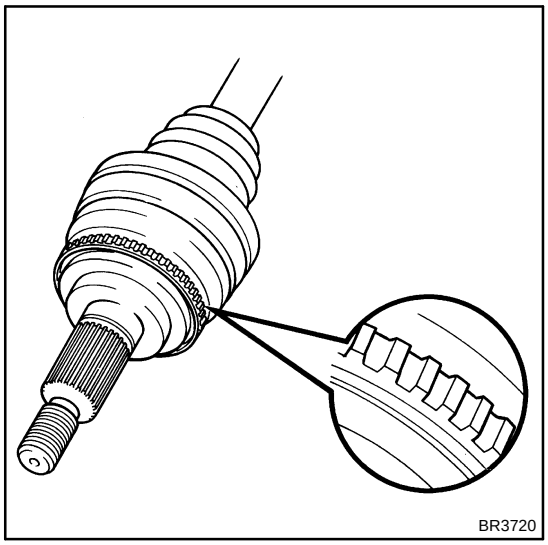
HINT:

- As vehicle speed (wheel revolution speed) increases, a cycle of 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 rotors scratches, looseness or foreign matter on it.

OK	Check and replace ABS ECU.

NG

6	Check sensor rotor and sensor tip.



FRONT:

PREPARATION:

(a) RFS:
Remove the steering axle shaft.

(b) IFS:
Remove the front drive shaft.

CHECK:

Check the sensor rotor serrations.

OK:

No foreign matter or missing teeth.

PREPARATION:

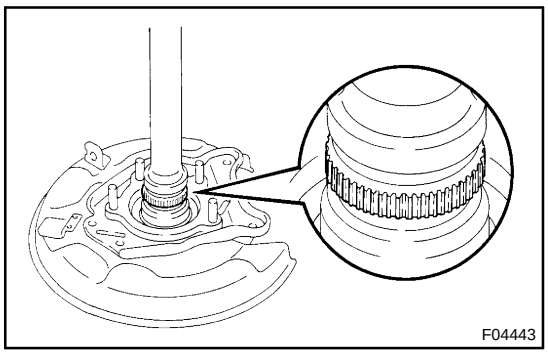
Remove the front speed sensor.

CHECK:

Check the sensor tip.

OK:

No foreign matter on the sensor tip.



REAR:

PREPARATION:

(a) RFS:
Remove the rear axle hub.

(b) IFS:
Remove the rear axle shaft.

CHECK:

Check the sensor rotor serrations.

OK:

No foreign matter or missing teeth.

PREPARATION:

Remove the rear speed sensor.

CHECK:

Check the sensor tip.

OK:

No foreign matter on the sensor tip.

NG → **Replace speed sensor or rotor.**

NOTICE:

Check the speed sensor signal after replacement (See page DI–54).

OK

Check and replace ABS ECU.