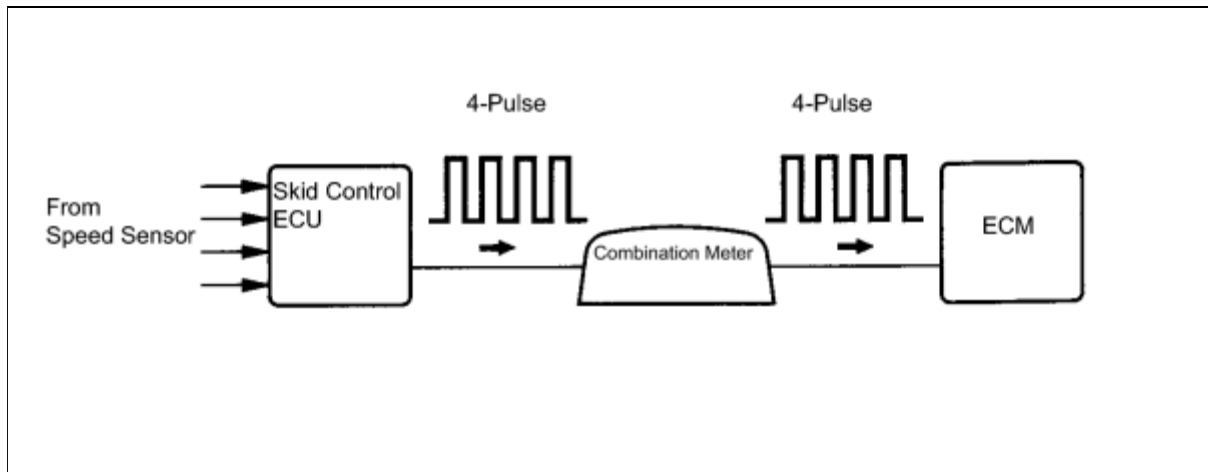


Last Modified: 7-13-2007		1.6 C
Service Category: Engine/Hybrid System		Section: Engine Control
Model Year: 2008	Model: ES350	Doc ID: RM000000W8E02GX
Title: 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0500: Vehicle Speed Sensor "A" (2008 ES350)		

DTC	P0500	Vehicle Speed Sensor "A"
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DESCRIPTION

The speed sensor detects the wheel speed and sends the appropriate signals to the skid control ECU. The skid control ECU converts these wheel speed signals into a 4-pulse signal and outputs it to the ECM via the combination meter. The ECM determines the vehicle speed based on the frequency of these pulse signals.



DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0500	Vehicle speed signal from vehicle speed sensor is cut for 0.14 sec. or more while cruise control is in operation	<ul style="list-style-type: none"> • Vehicle speed sensor • Vehicle speed sensor signal circuit • Combination meter • ECM • Skid control ECU

MONITOR DESCRIPTION

The ECM assumes that the vehicle is being driven when the transmission counter gear indicates more than 300 rpm and over 30 seconds have passed since the park/neutral position switch was turned OFF. If there is no signal from the vehicle speed sensor with these conditions satisfied, the ECM concludes that the vehicle speed sensor is malfunctioning. The ECM will turn on the MIL and a DTC will be set.

MONITOR STRATEGY

Related DTCs	P0500: Vehicle Speed Sensor Circuit
Required sensors/components (Main)	Vehicle speed sensor, Combination meter, ABS ECU
Required sensors/components (Sub)	Counter gear Speed (CS) sensor, ECT sensor

Frequency of operation	Continuous
Duration	2 seconds
MIL operation	Immediately
Sequence of operation	None

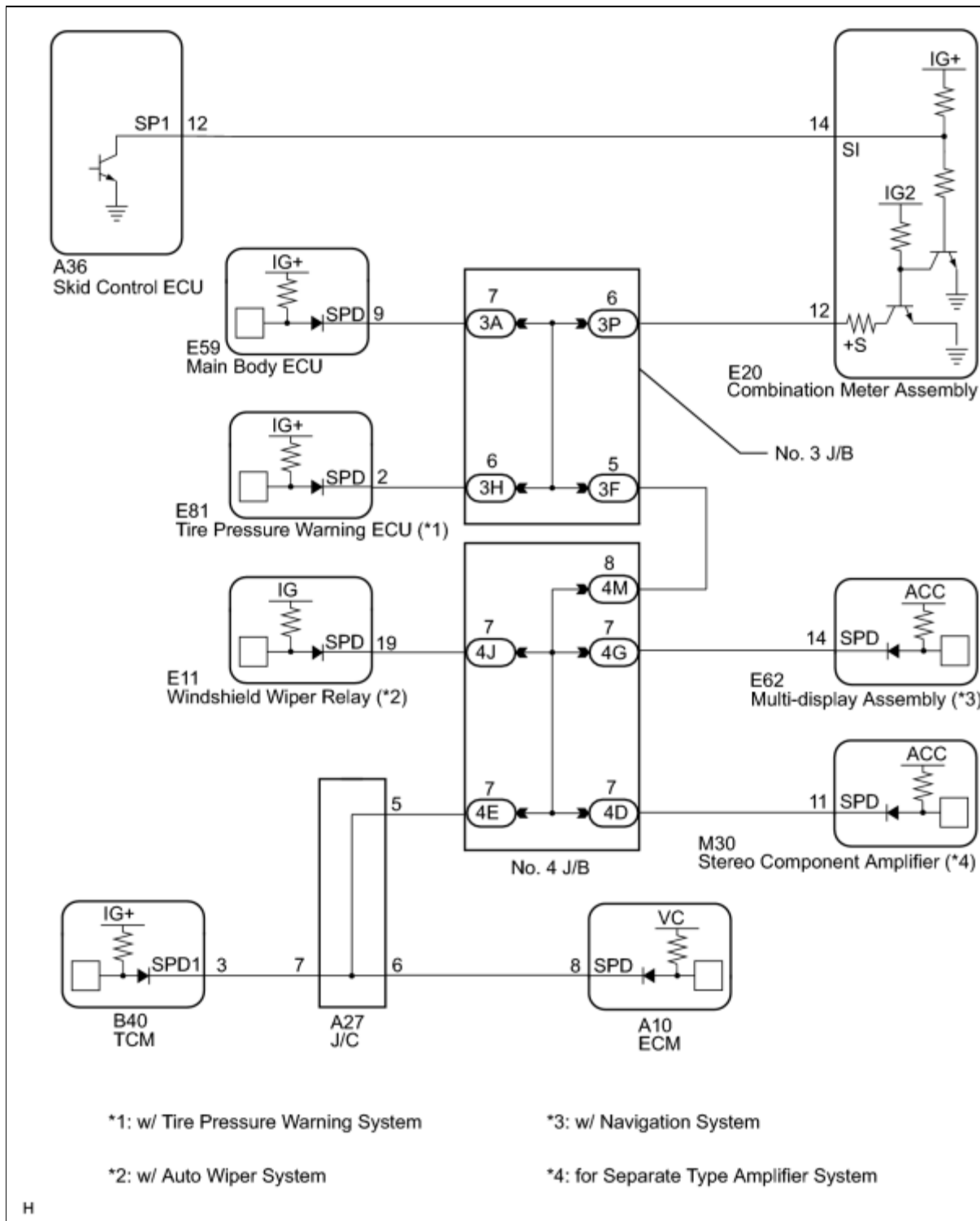
TYPICAL ENABLING CONDITIONS

The monitor will run whenever these DTCs are not present	P0101 - P0103 (MAF sensor) P0105 - P0108 (MAP sensor) P0115 - P0118 (ECT sensor) P0120 - P02238 (TP sensor) P0125 (VSS/ECT1 sensor, non-ECT)
Time after engine switch off to on	3 seconds or more
Engine	Running
Battery voltage	8 V or more
Engine switch	ON
Starter	OFF
Either of following conditions is met	Condition 1 or 2
1. All of following conditions are met	Condition (a) (b) or (c)
(a) ECT	20°C (68°F) or more
(b) ECT fail	Not detected
(c) Time after park/neutral position switch ON to OFF	30 seconds or more
2. All of following conditions are met	-
Either (a) or (b) is set	-
(a) ECT	Less than 20°C (68°F)
(b) ECT fail	Detected
(c) Time after park/neutral position switch ON to OFF	30 seconds or more

TYPICAL MALFUNCTION THRESHOLDS

Vehicle speed sensor signal	No pulse input
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WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air-fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction INFO.

PROCEDURE

1. CHECK SPEEDOMETER

(a) Drive the vehicle and check whether the operation of the speedometer in the combination meter is normal.

HINT:

- The vehicle speed sensor is operating normally if the speedometer reading is normal.
- If the speedometer does not operate, check it by following the procedure described in speedometer circuit.

NG ▶ GO TO SPEEDOMETER CIRCUIT

OK



2. READ VALUE OF TECHSTREAM (VEHICLE SPEED)

(a) Connect Techstream to the DLC3.

(b) Turn the engine switch on (IG).

(c) Turn the tester on.

(d) Select the following menu items: Powertrain / Engine / Data List / Vehicle Speed.

(e) Drive the vehicle.

(f) Read the value displayed on the tester.

OK:

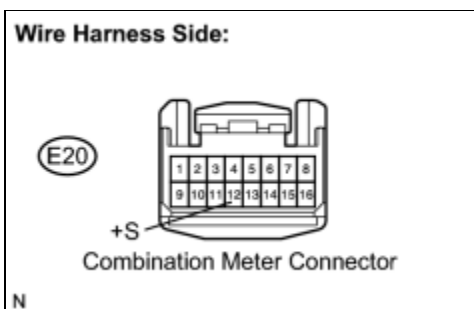
Vehicle speeds displayed on tester and speedometer display are equal.

NG ▶ CHECK INTERMITTENT PROBLEMS

OK



3. CHECK COMBINATION METER ASSEMBLY (+S VOLTAGE)



(a) Disconnect the E20 combination meter connector.

(b) Turn the engine switch on (IG).

(c) Measure the voltage between the specified terminal of the combination meter and body ground.

Standard voltage:

TESTER CONNECTION	SPECIFIED CONDITION
E20-12 (+S) - Body ground	4.5 to 5.5 V

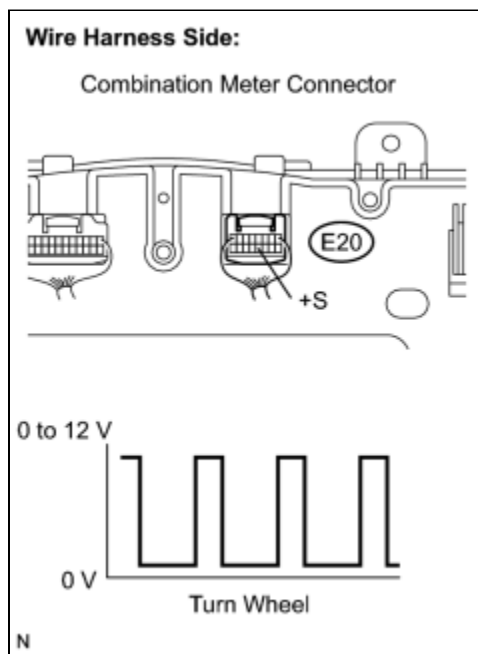
(d) Reconnect the combination meter connector.

NG ► **CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - ECM)**

OK



4. CHECK COMBINATION METER ASSEMBLY (SPD SIGNAL WAVEFORM)



(a) Shift the transmission gear selector lever to the neutral position.

(b) Jack up the vehicle.

(c) Turn the engine switch on (IG).

(d) Measure the voltage between the specified terminal of the combination meter and body ground while the wheel is turned slowly.

Standard voltage:

TESTER CONNECTION	SPECIFIED CONDITION
E20-12 (+S) - Body ground	Voltage generated intermittently

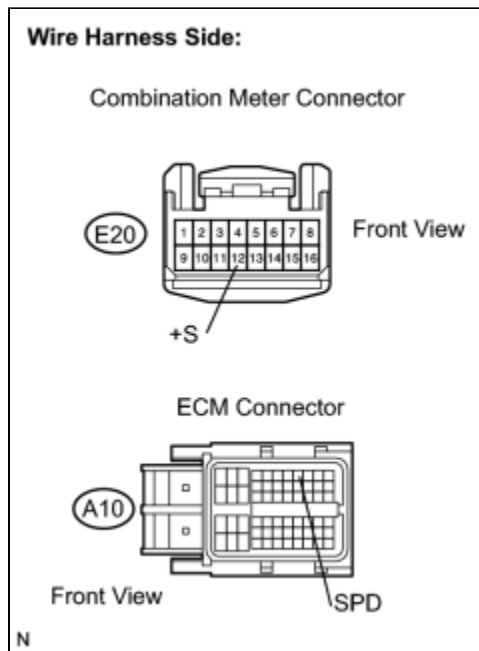
HINT:

The output voltage should fluctuate up and down, similarly to the diagram, when the wheel is turned slowly.

OK



5. CHECK HARNESS AND CONNECTOR (COMBINATION METER ASSEMBLY - ECM)



(a) Disconnect the E20 combination meter connector.

(b) Disconnect the A10 ECM connector.

(c) Measure the resistance.

Standard resistance (Check for open):

TESTER CONNECTION	SPECIFIED CONDITION
+S (E20-12) - SPD (A10-8)	Below 1 Ω

Standard resistance (Check for short):

TESTER CONNECTION	SPECIFIED CONDITION
+S (E20-12) or SPD (A10-8) - Body ground	10 k Ω or higher

(d) Reconnect the combination meter connector.

(e) Reconnect the ECM connector.

NG  REPAIR OR REPLACE HARNESS OR CONNECTOROK  REPLACE ECM