

DTC	12	ENGINE SPEED SENSOR CIRCUIT MALFUNCTION(TDC OR G1 CIRCUIT)
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## CIRCUIT DESCRIPTION

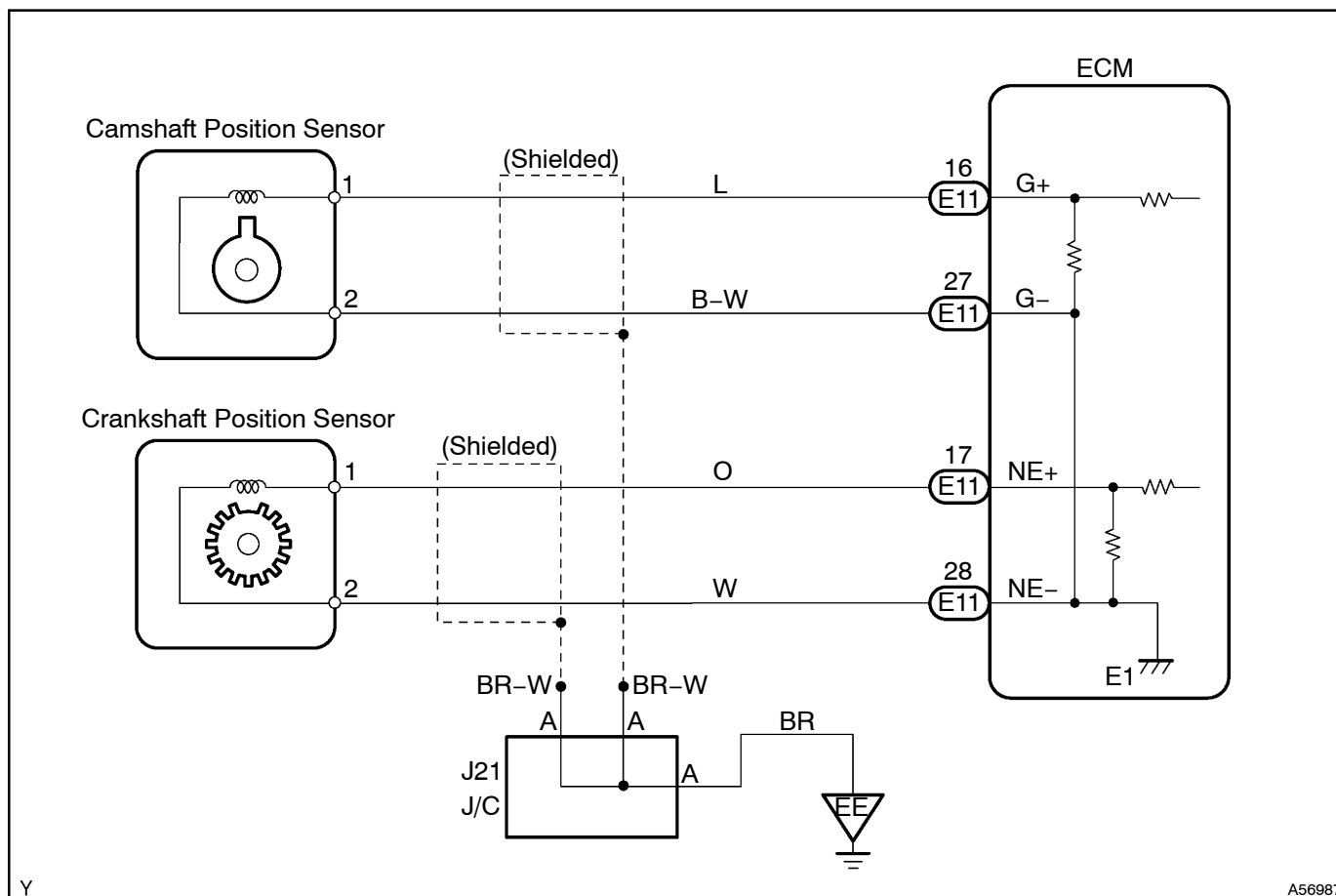
Camshaft position sensor (G signal) consists of a magnet, iron core and pickup coil.

The G signal plate has one tooth on its outer circumference and is installed the camshaft timing pulley. When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil change, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil.

The NE signal plate has 34 teeth and is mounted on the crankshaft timing pulley. The NE signal sensor generates 34 signals at every engine revolution. The ECM detects the standard crankshaft angle based on the G signal and the actual crankshaft angle and the engine speed by the NE signal.

DTC No.	DTC Detection Condition	Trouble Area
12	No camshaft position sensor signal to ECM during cranking	<ul style="list-style-type: none"> <li>• Open or short in camshaft position sensor circuit</li> <li>• Camshaft position sensor</li> <li>• Camshaft timing pulley</li> <li>• ECM</li> </ul>
	No camshaft position sensor signal to ECM with engine speed 650 rpm or more	

## WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC 12 first. If no trouble is found, troubleshoot the following mechanical system.
- Read freeze frame data using hand-held tester, as freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, etc. at the time of the malfunction.

1 INSPECT CRANK POSITION SENSOR

(a) Check the camshaft position sensor for resistance. (See page 10-9)

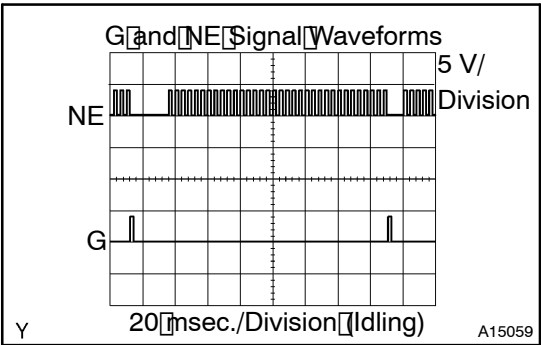
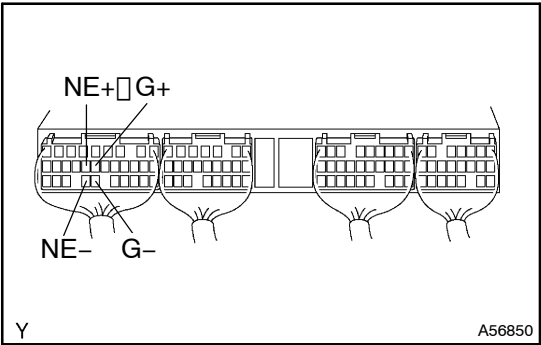
Resistance:  
1630 – 2740 Ω (COLD)  
2065 – 3225 Ω (HOT)

HINT:  
"Cold" and "Hot" above express the temperature of the part itself. "Cold" is from -10°C (14°F) to 50°C (122°F) and "Hot" is from 50°C (122°F) to 100°C (212°F)

- (b) Reference  
(1) Check the output wave form.

Item	Contents
Terminal	G+ ↔ G- NE+ ↔ NE-
Equipment set	5 V/DIV, 20 ms/DIV
Condition	During idling

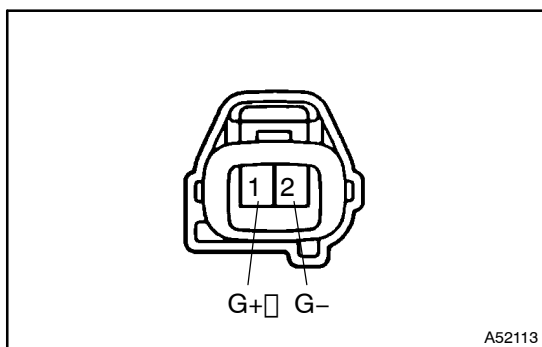
HINT:  
The correct waveforms are as shown.



NG REPLACE CRANK POSITION SENSOR

OK

## 2 CHECK HARNESS AND CONNECTOR (ECM-CAMSHAFT POSITION SENSOR)



- (a) Disconnect the camshaft position sensor connector.
- (b) Disconnect the ECM E11 connector.
- (c) Check for open between the terminals G+ of the camshaft position sensor harness side connector and G+ of the ECM E11 connector.

**Resistance: 1  $\Omega$  or less**

- (d) Check for short between the terminals G+ and G- of the ECM E11 connector.

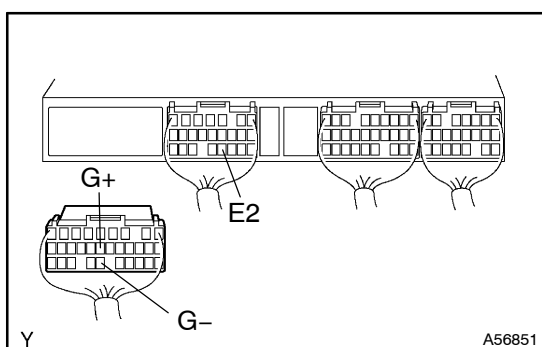
**Resistance: 1 M $\Omega$  or more**

- (e) Check for open between the terminals G- of the camshaft position sensor harness side connector and G- of the ECM E11 connector.

**Resistance: 1  $\Omega$  or less**

- (f) Check for short between the terminals G+, G- of the ECM E11 connector and E2 of the ECM E10 connector.

**Resistance: 1 M $\Omega$  or more**



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**REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

## 3 INSPECT SENSOR INSTALLATION

- (a) Check the camshaft position sensor installation.

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**TIGHTEN SENSOR**

OK

## 4 INSPECT CAMSHAFT TIMING PULLEY (SIGNAL PLATE TEETH)

- (a) Remove the timing belt No. 2 cover. (See Page 4-114)
- (b) Check the camshaft timing pulley teeth.

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**REPLACE CAMSHAFT TIMING PULLEY**

OK

## CHECK AND REPLACE ECM