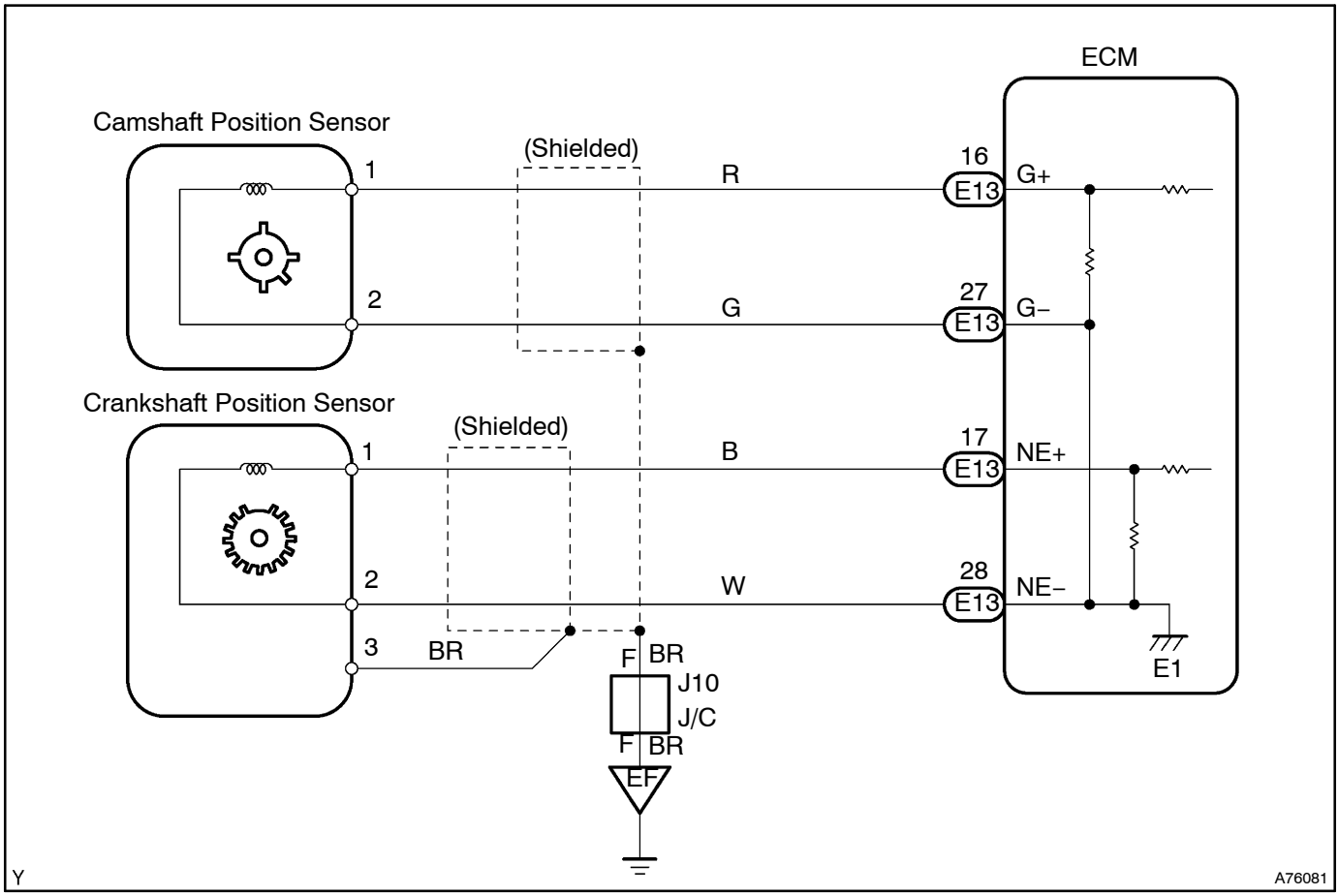
DTC	12	ENGINE SPEED SENSOR CIRCUIT MALFUNCTION1 (TDC OR G1 CIRCUIT)

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 pump drive shaft pulley. When the pump drive shaft pulley 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 crank angle sensor plate. 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	• Open or short in crank position sensor circuit • Camshaft position sensor • Pump drive shaft pulley • ECM
	No camshaft position sensor signal to ECM with engine speed 650 rpm or more	

WIRING DIAGRAM

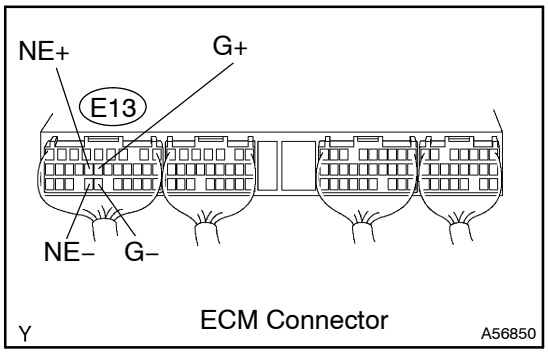


INSPECTION PROCEDURE

HINT:

- Perform troubleshooting of DTC 12 first. If no trouble is found, troubleshoot the following mechanical system.
- Read freeze frame data using the 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 CAMSHAFT POSITION SENSOR



(a) Check the camshaft position sensor for resistance (See page 10–26).

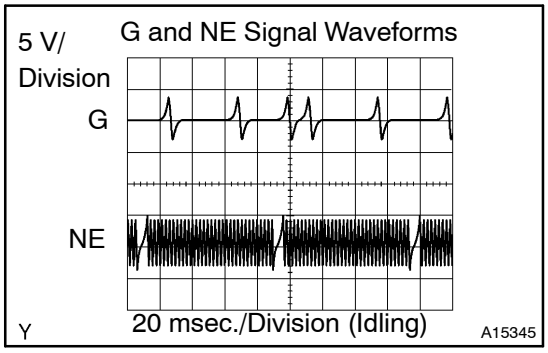
(b) Reference

(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.

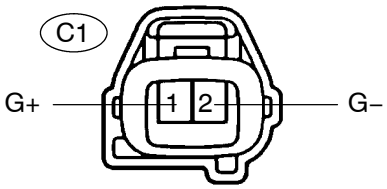


NG → REPLACE CAMSHAFT POSITION SENSOR

OK

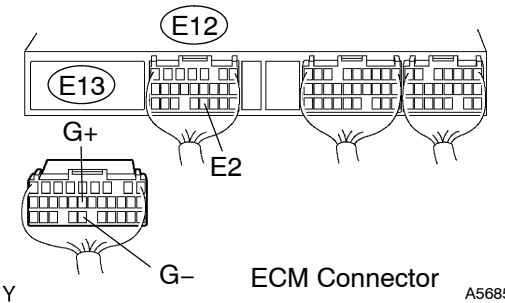
2 CHECK HARNESS AND CONNECTOR(ECM – CAMSHAFT POSITION SENSOR)

Wire Harness Side



Camshaft Position Sensor Connector

A52113



A56851

(a) Disconnect the camshaft position sensor connector.
(b) Disconnect the ECM E13 connector.
(c) Check the continuity between the wire harness side connector.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
G+ (C1 – 1) ⇔ G+ (E13 – 16)	Continuity
G– (C1 – 2) ⇔ G+ (E13 – 27)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
G+ (E13 – 16) ⇔ G+ (E13 – 27)	No continuity
G+ (E13 – 16) ⇔ E2 (E12 – 20)	
G– (E13 – 27) ⇔ E2 (E12 – 20)	

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

OK

3 CHECK SENSOR INSTALLATION

(a) Check the camshaft position sensor installation.

NG → **TIGHTEN SENSOR**

OK

4 INSPECT PUMP DRIVE SHAFT PULLEY(SIGNAL PLATE TEETH)

(a) Remove the timing gear cover (See Page 14–214).
(b) Check the pump drive shaft pulley teeth.

NG → **REPLACE PUMP DRIVE SHAFT PULLEY**

OK

CHECK AND REPLACE ECM