

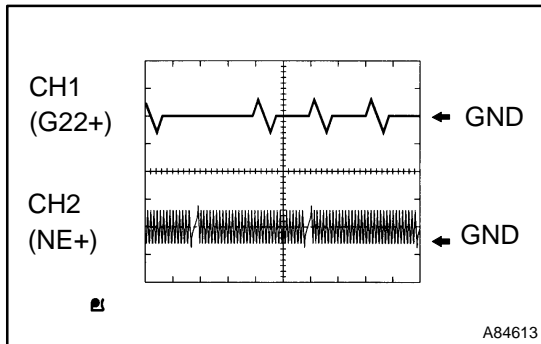
<b>DTC</b>	<b>P0340</b>	<b>CAMSHAFT POSITION SENSOR "A" CIRCUIT (BANK 1 OR SINGLE SENSOR)</b>
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<b>DTC</b>	<b>P0341</b>	<b>CAMSHAFT POSITION SENSOR "A" CIRCUIT RANGE/PERFORMANCE (BANK 1 OR SINGLE SENSOR)</b>
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**CIRCUIT DESCRIPTION**

The camshaft position sensor (G22+ signal) consists of a magnet, iron core and pickup coil. The G22+ signal plate has 3 teeth on its outer circumference and is installed on the camshaft timing pulley. When the camshafts rotate, the protrusion on the signal plate and the air gap on the pickup coil changes, causing fluctuations in the magnetic field and generating an electromotive force in the pickup coil. The NE+ signal plate (crankshaft timing pulley) has 34 teeth and is installed to the crankshaft. The NE+ signal sensor generates 34 signals at every engine revolution. The ECM detects the crankshaft angle and the engine revolution based on the NE+ signals, and the cylinder and the angle of the VVT based on the combination of the G22+ and NE+ signals.

DTC No.	DTC Detection Condition	Trouble Area
P0340	<ul style="list-style-type: none"> <li>No camshaft position sensor signal to ECM during cranking (2 trip detection logic)</li> <li>No camshaft position sensor signal to ECM with engine speed 600 rpm or more (1 trip detection logic)</li> </ul>	<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>Timing chain has jumped a tooth</li> <li>ECM</li> </ul>
P0341	While crankshaft rotates twice, camshaft position sensor signal is input to ECM 12 times or more (1 trip detection logic) • Hint: Under normal condition, the camshaft position sensor is input into the ECM 3 times per 2 engine revolutions	



Reference: Inspection using the oscilloscope.

HINT:

The correct waveform is as shown on the left.

Item	Contents
Terminal	CH1: G22+ - NE- CH2: NE+ - NE-
Equipment Set	5V/DIV, 20ms/DIV
Condition	During cranking or idling

## MONITOR DESCRIPTION

If there is no signal from the camshaft position sensor despite the engine revolving, or if the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction of the sensor.

## MONITOR STRATEGY

Related DTCs	P0340	Camshaft position sensor (bank 1) range check or rationality
	P0341	Camshaft position sensor (bank 1) range check or rationality
Required sensors/components	Main sensors	Camshaft position sensor
	Related sensors	Crankshaft position sensor, engine speed sensor
Frequency of operation	Continuous	
Duration	5 seconds	
MIL operation	P0340 case 2 (mis-aligned) and P0341: Immediately P0340 case 1 (no signal): 2 driving cycles	
Sequence of operation	None	

## TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See "List of Disable a Monitor" (On page 05-25)	
<b>P0340 Case 1 (No signal):</b>		
Starter	ON	
Minimum battery voltage while starter ON	–	11 V
<b>P0340 Case 2 (Mis-aligned):</b>		
Engine speed	600 rpm	–
Starter	OFF	
<b>P0341:</b>		
Engine speed	600 rpm	–
Time after restart	180° CA	–

## TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
<b>P0340 Case 1 (No signal):</b>	
Camshaft position sensor signal	No signal
<b>P0340 Case 2 (Mis-aligned):</b>	
Crankshaft/camshaft alignment is mis-aligned (judged by comparing the crankshaft position to the camshaft position)	
Camshaft position sensor signal: No input in appropriate timing.	
<b>P0341:</b>	
Crankshaft/Camshaft alignment	Mis-aligned
Camshaft position sensor count	12 or more / 720° CA (= Engine 2 revolutions)

## COMPONENT OPERATING RANGE

Parameter	Standard Value
Camshaft position sensor signal input during every 720° CA	3

## WIRING DIAGRAM

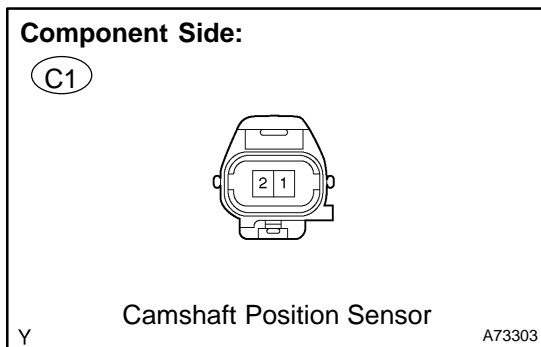
Refer to DTC P0335 on page 05-168.

## INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand-held tester or the OBD II scan tool. 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, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

### 1 INSPECT CAMSHAFT POSITION SENSOR(RESISTANCE)



- (a) Measure the resistance between the terminals of camshaft position sensor connector.

**Standard:**

Tester Connection	Specified Condition
1 - 2	1,630 to 2,740 Ω at cold
	2,065 to 3,225 Ω at hot

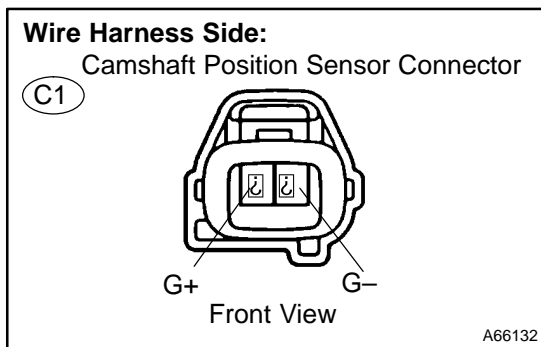
**NOTICE:**

"Cold" and "Hot" shown above mean the temperature of the coils themselves. "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).

**NG** → REPLACE CAMSHAFT POSITION SENSOR

**OK**

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



- (a) Disconnect the C1 camshaft position sensor connector.  
 (b) Disconnect the E3 ECM connector.  
 (c) Check the resistance between the wire harness side connectors.

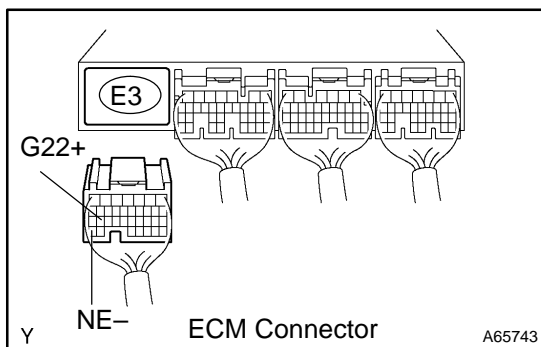
**Standard (Check for open):**

Tester Connection	Specified Condition
G+ (C1-1) - G22+ (E3-26)	Below 1 Ω
G- (C1-2) - NE- (E3-34)	

**Standard (Check for short):**

Tester Connection	Specified Condition
G+ (C1-1) or G22+ (E3-26) - Body ground	10 kΩ or higher
G- (C1-2) or NE- (E3-34) - Body ground	

- (d) Reconnect the ECM connector.  
 (e) Reconnect the camshaft position sensor connector.



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

**OK**

**3 CHECK SENSOR INSTALLATION(CAMSHAFT POSITION SENSOR)**

(a) Check the camshaft position sensor installation.

**NG** **TIGHTEN SENSOR**

**OK**

**4 CHECK CAMSHAFT TIMING GEAR ASSY(TEETH OF PLATE)**

(a) Check the teeth of the signal plate.

**NG** **REPLACE CAMSHAFT TIMING GEAR ASSY**

**OK**

**REPLACE ECM (See page 10-11)**