

DTC	P0340	Camshaft Position Sensor Circuit Malfunction
DTC	P0342	Camshaft Position Sensor "A" Circuit Low Input (Bank 1 or Single Sensor)
DTC	P0343	Camshaft Position Sensor "A" Circuit High Input (Bank 1 or Single Sensor)
DTC	P0345	Camshaft Position Sensor "A" Circuit (Bank 2)
DTC	P0347	Camshaft Position Sensor "A" Circuit Low Input (Bank 2)
DTC	P0348	Camshaft Position Sensor "A" Circuit High Input (Bank 2)

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DESCRIPTION

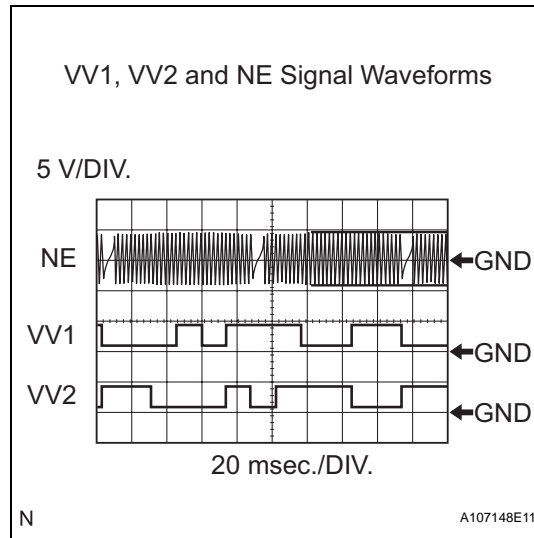
The intake camshaft's Variable Valve Timing (VVT) sensor (VV1, 2 signal) consists of a magnet and MRE (Magnetic Resistance Element).

The VVT camshaft drive gear has a sensor plate with 3 teeth on its outer circumference. When the gear rotates, changes occur in the air gaps between the sensor plate and MRE, which affects the magnetic field. As a result, the resistance of the MRE material fluctuates. The VVT sensor converts the gear rotation data to pulse signals, uses the pulse signals to determine the camshaft angle, and sends it to the ECM.

The crankshaft angle sensor plate has 34 teeth. The pickup coil generates 34 signals for each engine revolution. Based on a combination of the VVT signal and NE signal, the ECM detects the crankshaft angle. Then the ECM uses this data to control fuel injection time and injection timing. Also, based on the NE signal, the ECM detects the engine speed.

DTC No.	DTC Detection Condition	Trouble Area
P0340 P0345	When either condition below is met: <ul style="list-style-type: none"> Input voltage to ECM remains less than 0.3 V, or more than 4.7 V for 4 seconds, when 2 or more seconds have elapsed after turning ignition switch ON (1 trip detection logic) No VVT sensor signal to ECM during cranking (1 trip detection logic) 	<ul style="list-style-type: none"> Open or short in VVT sensor circuit for intake camshaft VVT sensor for intake camshaft Camshaft timing gear for intake camshaft Jumped tooth of timing chain for intake camshaft ECM
P0342 P0347	Output voltage of VVT sensor less than 0.3 V for 4 seconds (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in VVT sensor circuit for intake camshaft VVT sensor for intake camshaft Camshaft timing gear for intake camshaft Jumped tooth of timing chain for intake camshaft ECM
P0343 P0348	Output voltage of VVT sensor more than 4.7 V for 4 seconds (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in VVT sensor for intake camshaft circuit VVT sensor for intake camshaft Camshaft timing gear for intake camshaft Jumped tooth of timing chain for intake camshaft ECM

Reference: Inspection using an oscilloscope



HINT:

- The correct waveform is as shown.
- VV1+ and VV2+ stand for the VVT sensor signal, and NE+ stands for the CKP sensor signal.

Item	Content
Terminal	NE+ - NE- VV1+ - VV1- VV2+ - VV2-
Equipment Setting	5 V/DIV. 20 msec./DIV.
Condition	Cranking or idling

MONITOR DESCRIPTION

If no signal is transmitted by the VVT sensor despite the engine revolving, or the rotations of the camshaft and the crankshaft are not synchronized, the ECM interprets this as a malfunction of the sensor.

MONITOR STRATEGY

Related DTCs	P0340: VVT sensor (bank 1) open/short P0340: VVT position/Crankshaft position misalignment (bank 1) P0342: VVT position sensor (bank 1) range check (low voltage) P0343: VVT position sensor (bank 1) range check (high voltage) P0345: VVT sensor (bank 2) open/short P0345: VVT position/Crankshaft position misalignment (bank 2) P0347: VVT position sensor (bank 2) range check (low voltage) P0348: VVT position sensor (bank 2) range check (high voltage)
Required Sensors/Components (Main)	VVT position sensor (bank 1 and 2)
Required Sensors/Components (Sub)	Crankshaft position sensor
Frequency of Operation	Continuous
Duration	5 seconds
MIL Operation	2 driving cycles: P0340 (cranking), P0345 (cranking) Immediate: Others
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever following DTCs are not present	None
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P0340 (Engine running):

Engine speed	600 rpm or more
Starter	OFF

P0345 (Engine running):

Engine speed	600 rpm or more
Battery voltage	8 V or more
Starter	OFF
Ignition switch	ON

P0340, P0345 (Cranking):

Starter	ON
Minimum battery voltage	Less than 11 V

P0340, P0342, P0343 (Chattering, Low voltage, High voltage):

Starter	OFF
Ignition switch	ON
Time after ignition switch OFF to ON	2 seconds or more

P0345, P0347, P0348 (Chattering, Low voltage, High voltage):

Starter	OFF
Ignition switch	ON
Time after ignition switch OFF to ON	2 seconds or more
Battery Voltage	8 V or more

TYPICAL MALFUNCTION THRESHOLDS**P0340 (Engine running):**

Camshaft position and crankshaft position phase	Misaligned
Camshaft position signal	No signal

P0340 (Cranking):

Camshaft position signal	No signal
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P0340 (Chattering):

Camshaft position sensor voltage	Less than 0.3 V, or more than 4.7 V
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P0342 (Low voltage):

Camshaft position sensor voltage	Less than 0.3 V
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P0343 (High voltage):

Camshaft position sensor voltage	More than 4.7 V
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P0345 (Engine running, cranking):

VVT sensor signal	No signal
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P0345 (Chattering):

VVT sensor voltage	Less than 0.3 V, or more than 4.7 V
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P0347 (Low voltage):

VVT sensor voltage	Less than 0.3 V
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P0348 (High voltage):

VVT sensor voltage	More than 4.7 V
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COMPONENT OPERATING RANGE

VVT sensor voltage	0.3 to 4.7 V
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WIRING DIAGRAM

Refer to DTC P0335 (See page [ES-209](#)).

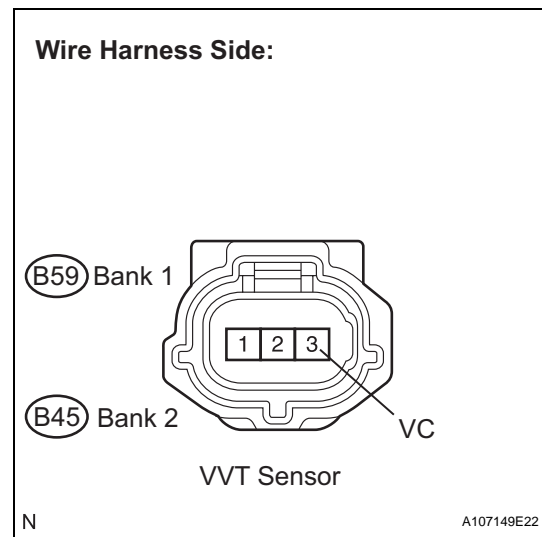
INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. 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 (See page [ES-40](#)).

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1 CHECK WIRE HARNESS (SENSOR POWER SOURCE)



- (a) Disconnect the B59 or B45 VVT sensor connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage

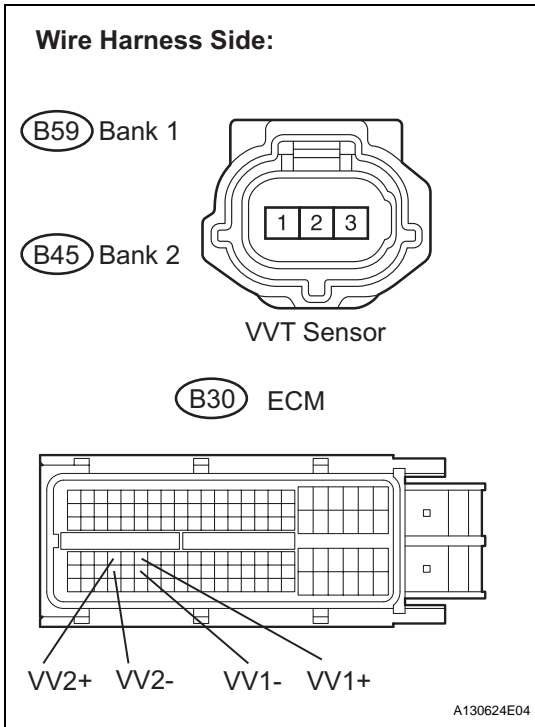
Tester Connection	Specified Condition
B59-3 (VC) - Body ground	4.5 to 5.0 V
B45-3 (VC) - Body ground	4.5 to 5.0 V

- (c) Reconnect the VVT sensor connector.

NG **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

2 CHECK WIRE HARNESS (VVT SENSOR FOR INTAKE CAMSHAFT - ECM)



- (a) Disconnect the B59 or B45 VVT sensor connector.
- (b) Disconnect the B30 ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance

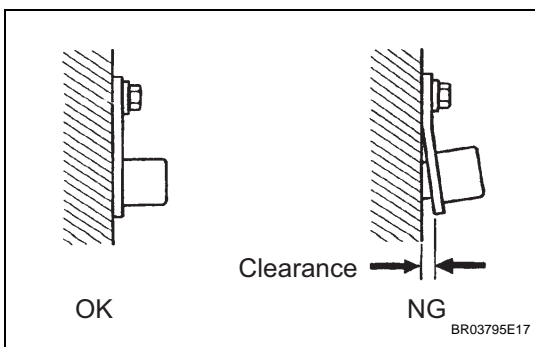
Tester Connection	Specified Condition
B59-1 (VVR+) - B30-69 (VV1+)	Below 1 Ω
B59-2 (VVR-) - B30-92 (VV1-)	Below 1 Ω
B45-1 (VVL+) - B30-67 (VV2+)	Below 1 Ω
B45-2 (VVL-) - B30-90 (VV2-)	Below 1 Ω
B59-1 (VVR+) or B30-69 (VV1+) - Body ground	10 kΩ or higher
B59-2 (VVR-) or B30-92 (VV1-) - Body ground	10 kΩ or higher
B45-1 (VVL+) or B30-67 (VV2+) - Body ground	10 kΩ or higher
B45-2 (VVL-) or B30-90 (VV2-) - Body ground	10 kΩ or higher

- (d) Reconnect the VVT sensor connector.
- (e) Reconnect the ECM connector.

NG REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK SENSOR INSTALLATION (VVT SENSOR FOR INTAKE CAMSHAFT)



- (a) Check the CKP sensor installation.

OK:
Sensor is installed correctly.

NG SECURELY REINSTALL SENSOR

OK

4 CHECK CAMSHAFT TIMING GEAR ASSEMBLY (TEETH OF PLATE)

- (a) Check the teeth of the signal plate.

OK:
Sensor plate teeth do not have any cracks or deformation.

NG REPLACE CAMSHAFT TIMING GEAR ASSEMBLY

OK

5 REPLACE VVT SENSOR

NEXT

6 CHECK WHETHER DTC OUTPUT RECURS

- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Turn the tester ON.
- (d) Clear DTCs.
- (e) Start the engine.
- (f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (g) Read DTCs.

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Result

Display (DTC Output)	Proceed to
No output	A
P0340, P0342, P0343, P0345, P0347 or P0348	B

HINT:
If the engine does not start, replace the ECM.

B → REPLACE ECM

A

END