

DTC	P0365	Camshaft Position Sensor "B" Circuit (Bank 1)
DTC	P0367	Camshaft Position Sensor "B" Circuit Low Input (Bank 1)
DTC	P0368	Camshaft Position Sensor "B" Circuit High Input (Bank 1)
DTC	P0390	Camshaft Position Sensor "B" Circuit (Bank 2)
DTC	P0392	Camshaft Position Sensor "B" Circuit Low Input (Bank 2)
DTC	P0393	Camshaft Position Sensor "B" Circuit High Input (Bank 2)

DESCRIPTION

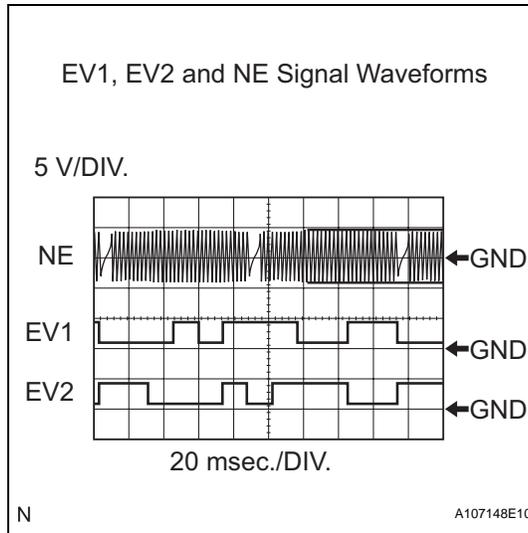
The exhaust camshaft's Variable Valve Timing (VVT) sensor (EV1, 2 signal) consists of a magnet and MRE (Magnetic Resistance Element).

The exhaust camshaft has a sensor plate with 3 teeth on its outer circumference.

When the exhaust camshaft rotates, changes occur in the air gaps between the 3 teeth and MRE, which affects the magnet. As a result, the resistance of the MRE material fluctuates. The VVT sensor converts the exhaust camshaft rotation data to pulse signals, uses the pulse signals to determine the camshaft angle, and sends it to the ECM.

DTC No.	DTC Detection Condition	Trouble Area
P0365 P0390	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 more than 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 for exhaust camshaft circuit VVT sensor for exhaust camshaft Exhaust camshaft Jumped tooth of timing chain ECM
P0367 P0392	Output voltage of VVT sensor less than 0.3 V 4 seconds (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in VVT sensor for exhaust camshaft circuit VVT sensor for exhaust camshaft Exhaust camshaft Jumped tooth of timing chain ECM
P0368 P0393	Output voltage of VVT sensor more than 4.7 V 4 seconds (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in VVT sensor for exhaust camshaft circuit VVT sensor for exhaust camshaft Exhaust camshaft Jumped tooth of timing chain ECM

Reference: Inspection using an oscilloscope



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HINT:

- The correct waveform is as shown.
- EV1+ and EV2+ stand for the VVT sensor signal, and NE+ stands for the CKP sensor signal.

Item	Content
Terminal	NE+ - NE- EV1+ - EV1- EV2+ - EV2-
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	P0365: VVT sensor (bank 1) open/short P0365: VVT position/Crankshaft position misalignment (bank 1) P0367: VVT position sensor (bank 1) range check (low voltage) P0368: VVT position sensor (bank 1) range check (high voltage) P0390: VVT sensor (bank 2) open/short P0390: VVT position/Crankshaft position misalignment (bank 2) P0392: VVT position sensor (bank 2) range check (low voltage) P0393: 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	4 seconds
MIL Operation	2 driving cycles: P0365, P0390 (cranking) Immediate: Others
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever following DTCs are not present	None
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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

P0365, P0390 (Engine running):

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

P0365, P0390 (Cranking):

Starter	ON
Minimum battery voltage	Less than 11 V

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TYPICAL MALFUNCTION THRESHOLDS**P0365, P0390 (Chattering):**

Exhaust camshaft position sensor voltage	Less than 0.3 V, or more than 4.7 V
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P0367, P0392 (Low voltage):

Exhaust camshaft position sensor voltage	Less than 0.3 V
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P0368, P0393 (High voltage):

Exhaust camshaft position sensor voltage	More than 4.7 V
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P0365, P0390 (Engine running, Cranking):

Exhaust camshaft position signal	No signal
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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](#)).

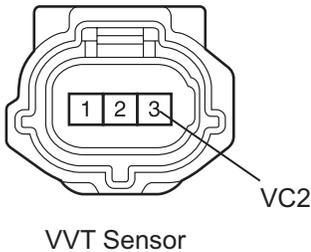
INSPECTION PROCEDURE

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](#)).

1 CHECK WIRE HARNESS (SENSOR POWER SOURCE)

Wire Harness Side:

(B54) Bank 1 (B40) Bank 2



N

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- (a) Disconnect the B54 or B40 VVT sensor connector.
- (b) Measure the voltage according to the value(s) in the table below.

Standard voltage

Tester Connection	Specified Condition
B54-3 (VC2) - Body ground	4.5 to 5.0 V
B40-3 (VC2) - Body ground	4.5 to 5.0 V

- (c) Reconnect the VVT sensor connector.

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REPAIR OR REPLACE HARNESS AND CONNECTOR

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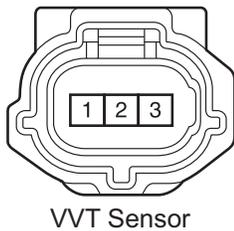
OK

2 CHECK WIRE HARNESS (VVT SENSOR - ECM)

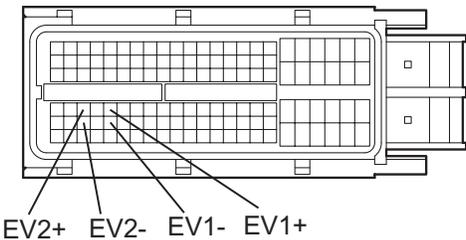
Wire Harness Side:

(B54) Bank 1

(B40) Bank 2



(B30) ECM



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- (a) Disconnect the B54 or B40 VVT sensor connector.
- (b) Disconnect the B30 ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard resistance (Check for open)

Tester Connection	Specified Condition
B54-1 (EX+) - B30-68 (EV1+)	Below 1 Ω
B54-2 (EX-) - B30-91 (EV1-)	Below 1 Ω
B40-1 (EX+) - B30-66 (EV2+)	Below 1 Ω
B40-2 (EX-) - B30-89 (EV2-)	Below 1 Ω
B54-1 (EX+) or B30-68 (EV1+) - Body ground	10 kΩ or higher
B54-2 (EX-) or B30-91 (EV1-) - Body ground	10 kΩ or higher
B40-1 (EX+) or B30-66 (EV2+) - Body ground	10 kΩ or higher
B40-2 (EX-) or B30-89 (EV2-) - Body ground	10 kΩ or higher

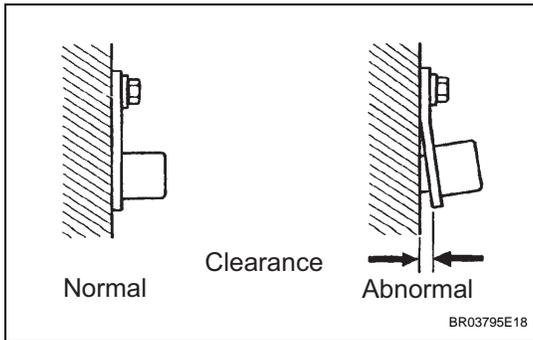
- (d) Reconnect the VVT sensor connector.
- (e) Reconnect the ECM connector.

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REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

3 CHECK SENSOR INSTALLATION (VVT SENSOR FOR EXHAUST CAMSHAFT)



(a) Check the VVT sensor installation.

OK:

Sensor is installed correctly.

NG → **SECURELY REINSTALL SENSOR**

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OK

4 CHECK EXHAUST CAMSHAFT

(a) Check the teeth of the camshaft.

NG → **REPLACE EXHAUST CAMSHAFT**

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 (see page [ES-39](#)).
- (e) Start the engine.
- (f) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / PENDING CODES.
- (g) Read DTCs.

Result

Display (DTC Output)	Proceed to
No output	A
P0365, P0352, P0353, P0354, P0355 or P0356	B

HINT:

If the engine does not start, replace the ECM.

B → **REPLACE ECM**

A

END