

Last Modified: 6-2-2008	5.1 C	From: 200601
Model Year: 2007	Model: Camry	Doc ID: RM000000PDV012X
Title: 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0016: Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A) (2007 Camry)		

DTC	P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)
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DTC	P0017	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor B)
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DTC	P0018	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor A)
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DTC	P0019	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor B)
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DESCRIPTION

In the VVT system, the appropriate intake and exhaust valve open and close timings are controlled by the ECM. The ECM performs intake and exhaust valve control by performing the following: 1) controlling the camshaft and camshaft oil control valve, and operating the camshaft timing gear; and 2) changing the relative positions of the gaps between the camshaft and crankshaft.

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0016	Deviation in crankshaft position sensor signal and VVT sensor 1 (for intake camshaft (bank 1)) signal (2 trip detection logic)	<ul style="list-style-type: none"> • Mechanical system (Timing chain has jumped teeth or chain stretched) • ECM
P0017	Deviation in crankshaft position sensor signal and VVT sensor 1 (for exhaust camshaft (bank 1)) signal (2 trip detection logic)	<ul style="list-style-type: none"> • Mechanical system (Timing chain has jumped teeth or chain stretched) • ECM

DTC NO.	DTC DETECTION CONDITION	TROUBLE AREA
P0018	Deviation in crankshaft position sensor signal and VVT sensor 2 (for intake camshaft (bank 2)) signal (2 trip detection logic)	<ul style="list-style-type: none"> • Mechanical system (Timing chain has jumped teeth or chain stretched) • ECM
P0019	Deviation in crankshaft position sensor signal and VVT sensor 2 (for exhaust camshaft (bank 2)) signal (2 trip detection logic)	<ul style="list-style-type: none"> • Mechanical system (Timing chain has jumped teeth or chain stretched) • ECM

MONITOR DESCRIPTION

To monitor the correlation of the intake camshaft position and crankshaft position, the ECM checks the VVT learning value while the engine is idling. The VVT learning value is calibrated based on the camshaft position and crankshaft position. The intake valve timing is set to the most retarded angle while the engine is idling. If the VVT learning value is out of the specified range in consecutive driving cycles, the ECM illuminates the MIL and sets the DTC P0016 (Bank 1) or P0018 (Bank 2).

To monitor the correlation of the exhaust camshaft position and crankshaft position, the ECM checks the VVT learning value while the engine is idling. The VVT learning value is calibrated based on the camshaft position and crankshaft position. The exhaust valve timing is set to the most advanced angle while the engine is idling. If the VVT learning value is out of the specified range in consecutive driving cycles, the ECM illuminates the MIL and sets the DTC P0017 (Bank 1) or P0019 (Bank 2).

MONITOR STRATEGY

Related DTCs	P0016: Camshaft timing misalignment at idle (intake camshaft bank 1) P0017: Camshaft timing misalignment at idle (exhaust camshaft bank 1) P0018: Camshaft timing misalignment at idle (intake camshaft bank 2) P0019: Camshaft timing misalignment at idle (exhaust camshaft bank 2)
Required sensors/components (Main)	VVT actuator
Required sensors/components (Sub)	Camshaft position sensor, Crankshaft position sensor
Frequency of operation	Once per drive cycle

Duration	Within 1 minute
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

All:

Monitor runs whenever following DTCs are not present	P0011 (VVT system 1 - advance) P0012 (VVT system 1 - retard) P0021 (VVT system 2 - advance) P0115 - P0118 (ECT sensor)
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Intake side:

Engine speed	500 to 1,000 rpm
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Exhaust side:

VVT feedback mode	Executing
VVT	Maximum advanced position
Engine speed	500 to 1,000 rpm

TYPICAL MALFUNCTION THRESHOLDS

Intake side:

One of the following conditions is met:	Condition 1 or 2
1. VVT leaning value at maximum retarded valve timing	Less than 18.5°CA
2. VVT leaning valve at maximum retarded valve timing	More than 43.5°CA


Exhaust side:

One of the following conditions is met:	Condition 1 or 2
1. VVT leaning value	Less than 77°CA
2. VVT leaning value	More than 102°CA

WIRING DIAGRAM

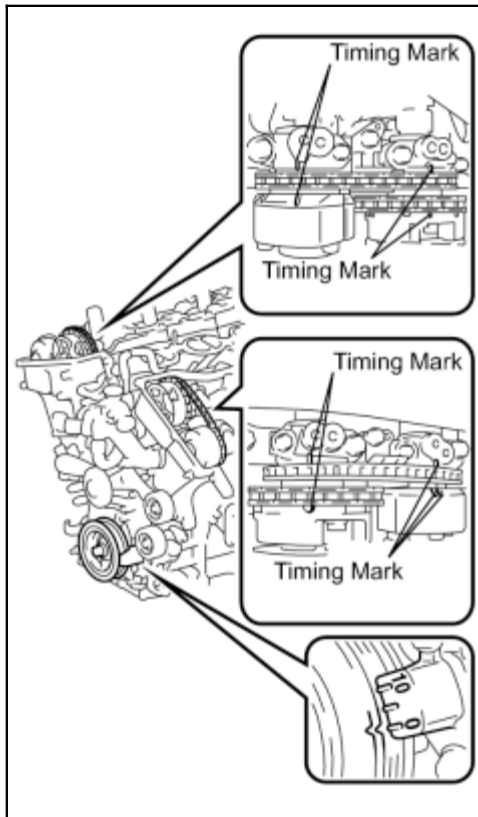
Refer to DTC P0335  .

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  .

PROCEDURE

1.	CHECK VALVE TIMING (CHECK FOR LOOSE AND A JUMPED TOOTH OF TIMING CHAIN)
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(a) Remove the cylinder head covers RH and LH.

(b) Turn the crankshaft pulley, and align its groove with the timing mark "0" of the timing chain cover.

(c) Check that the timing marks of the camshaft timing gears are aligned with the timing marks of the

bearing cap as shown in the illustration.

If not, turn the crankshaft 1 revolution (360°), then align the marks as above.

OK:

Timing marks on camshaft timing gears are aligned as shown in the illustration.

(d) Reinstall the cylinder head covers.

NG ► **ADJUST VALVE TIMING (REPAIR OR
REPLACE TIMING CHAIN)**

OK ► **REPLACE ECM**

