DTC	P0016	CRANKSHAFT POSITION − CAMSHAFT POSITION CORRELATION (BANK 1 SENSOR A)

CIRCUIT DESCRIPTION

Refer to DTC P0335 and P0339 on page 05−171.

DTC No.	DTC Detection Condition	Trouble Area
P0016	Deviation in crankshaft position sensor signal and VVT sensor (bank 1) signal (2 trip detection logic)	• Mechanical system (jumped tooth of timing chain, chain stretched) • ECM

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the Variable Valve Timing (VVT) system to control the intake valve camshaft. The VVT system includes the ECM, the Oil Control Valve (OCV) and the VVT controller. The ECM sends a target duty−cycle control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake valve camshaft. The ECM calibrates the valve timing of the VVT system by setting the camshaft to the maximum retard angle when the engine speed is idling. The ECM closes the OCV to retard the cam. The ECM stores this valve as VVT learned value. When the difference between the target valve timing and the actual valve timing is 5 degrees or less, the ECM stores this in its memory.

If the learned value meets both of the following conditions (”a” and ”b”), the ECM interprets this as a defect in the VVT system and set a DTC.

(a) VVT learning value is less than 27°CA or more than 49°CA.

(b) Above condition continues for more than 18 seconds.

MONITOR STRATEGY

Related DTCs	P0016: Camshaft Timing Misalignment
Required sensors/ components (Main)	VVT actuator
Required sensors/ components (Related)	Camshaft position sensor, Crankshaft position sensor
Frequency of operation	Once per driving cycles
Duration	Within 60 seconds
Mil operation	2 driving cycles
Sequence operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever this DTC is not present	See page 05−16
Engine RPM	550 to 1,000 rpm

TYPICAL MALFUNCTION THRESHOLDS

One of the following coditions is met	Condition (a) or (b)
(a) VVT learning valve at maximum retarded valve timing	Less than 27.8°CA
(b) VVT learning valve at maximum retarded valve timing	More than 48°CA

WIRING DIAGRAM

Refer to DTC P0335 and P0339 on page 05−171.

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, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air−fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	**CHECK VALVE TIMING (See page 14−75)**

(a) Check for loose or jumped tooth of timing chain.

OK: The matchmarks of crankshaft pulley and camshaft pulley are aligning.

NG → **ADJUST VALVE TIMING (See page 14−75)**

OK

REPLACE ECM (See page 10−9)