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

CIRCUIT DESCRIPTION

Refer to DTC P0335 on page 05–177.

DTC No.	DTC Detection Condition	Trouble Area
P0016	Deviation in crankshaft position sensor signal and VVT sensor signal (2 trip detection logic)	• Mechanical system (Timing chain has jumped a tooth, 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 sets a DTC.

(a)   VVT learning value is less than 30°CA (CA: Crankshaft Angle), or more than 46°CA.

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

MONITOR STRATEGY

Related DTCs	P0016: Deviation in crankshaft position sensor signal and VVT sensor signal
Required sensors/components	Crankshaft position sensor, camshaft position sensor
Frequency of operation	Once per driving cycle
Duration	60 seconds
MIL operation	2 driving cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

The monitor will run whenever the following DTCs are not present	See page 05–20
VVT feedback mode	ON
Engine speed	900 rpm or more, and 5,000 rpm or less

TYPICAL MALFUNCTION THRESHOLDS

Either of the following conditions is met:	(a) or (b)
(a) VVT learned value	Less than 30°CA
(b) VVT learned value	More than 46°CA

WIRING DIAGRAM

Refer to DTC P0335 on page 05–177.

INSPECTION PROCEDURE

HINT:

Read freeze frame data using the hand–held tester or the OBD II scan tool. Freeze frame data records the engine condition when 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(CHECK FOR LOOSE AND A JUMPED TOOTH OF TIMING CHAIN) (See page 14–6)

OK: The match marks of crankshaft pulley and camshaft pulley are aligning.

NG ⟩	ADJUST VALVE TIMING (See page 14–6) (REPAIR OR REPLACE TIMING CHAIN)

OK ⟩

REPLACE ECM (See page 10–24)