DTC	P0016	Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor A)

DTC	P0018	Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor A)

DESCRIPTION

Refer to DTCs P0335 and P0339 (See page ES-170).

DTC No.	DTC Detection Condition	Trouble Area
P0016	Deviation in crankshaft position sensor signal and VVT sensor 1 signal (2 trip detection logic)	• Mechanical system (timing belt has jumped tooth, belt is stretched) • ECM
P0018	Deviation in crankshaft position sensor signal and VVT sensor 2 signal (2 trip detection logic)	• Mechanical system (timing belt has jumped tooth, belt is stretched) • ECM

ES

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, sent to the OCV, regulates the oil pressure applied 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 is idling. The ECM closes the OCV to retard the cam. The ECM stores this value as a VVT learning 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 learning value meets both of the following conditions, the ECM interprets this as a defect in the VVT system and sets a DTC.

1. The VVT learning value is less than 26°CA (bank 1)/23.2°CA (bank 2) or more than 45 °CA (bank 1)/39.1°CA (bank 2).
   The above condition continues for more than 18 seconds.

MONITOR STRATEGY

Related DTCs	P0016: Camshaft timing misalignment at idle (bank 1) P0018: Camshaft timing misalignment at idle (bank 2)
Required sensors/components	VVT actuator
Required sensors/components	Camshaft position sensor, Crankshaft position sensor
Frequency of operation	Once per drive cycle
Duration	Within 1 minute
MIL operation	2 drive cycles
Sequence of operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	P0011, P0012, P0021, P0022 (VVT system-Advance, Retard), P0115, P0116, P0117, P0118 (ECT sensor)
Engine RPM	500 to 1,000 rpm

TYPICAL MALFUNCTION THRESHOLDS

One of the following conditions is met:	-

1. VVT angle when camshaft is retarded maximum	Less than 26°CA (Bank 1) Less than 23.2°CA (Bank 2)
2. VVT angle when camshaft is retarded maximum	More than 45°CA (Bank 1) More than 39.1°CA (Bank 2)

WIRING DIAGRAM

Refer to DTC P0335 (See page ES-172).

HINT:
Read freeze frame data using the intelligent tester or the OBD II scan tool. The ECM records vehicle and driving condition information as freeze data the moment a DTC is stored. 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.

ES

1	CHECK VALVE TIMING (CHECK FOR LOOSE AND A JUMPING TEETH OF TIMING BELT)

OK:
The matchmarks of the crankshaft pulley and camshaft pulley are aligned.

NG → **ADJUST VALVE TIMING**

OK ↓

REPLACE ECM