Computers and Control Systems: Description and Operation
Camshaft Actuator System Description

Camshaft Actuator System Description

Camshaft Position (CMP) Actuator System

The camshaft position (CMP) actuator system is used for a variety of engine performance enhancements. These enhancements include lower emission output through exhaust gas recirculation (EGR) control, a wider engine torque range, improved gas millage, and improved engine idle stability. The CMP actuator system accomplishes this by controlling the amount of intake and exhaust valve overlap.

CMP Actuator System Operation

The camshaft position (CMP) actuator system is controlled by the control module. The control module sends a pulse width modulated **12-volt** signal to a CMP actuator solenoid in order to control the amount of engine oil flow to a Cam Phaser passage. There are 2 different passages for oil to flow through, a passage for cam advance and a passage for cam retard. The Cam Phaser is attached to a camshaft and is hydraulically operated in order to change the angle of the camshaft relative to crankshaft position (CKP). Engine oil pressure (EOP), viscosity, temperature and engine oil level can have an adverse affect on Cam Phaser performance. The control module calculates the optimum cam position through the following inputs:

* Engine speed
* Manifold absolute pressure (MAP)
* Throttle position indicated angle
* CKP
* CMP
* Engine load
* Barometric (BARO) pressure

The Cam Phaser default position is **0 degrees**. The control module uses the following inputs before assuming control of the Cam Phaser:

* Engine coolant temperature (ECT)
* Closed loop fuel control
* Engine oil temperature (EOT)
* EOP
* Engine oil level
* CMP actuator solenoid circuit state
* Ignition 1 signal voltage
* BARO pressure

CMP Actuator Solenoid Circuit Diagnostics

The control module monitors the control circuits of the camshaft position (CMP) actuator solenoid for electrical faults. The control module has the ability to determine if a control circuit is open, shorted high, and shorted low. If the control module detects a fault with a CMP actuator solenoid circuit, a DTC will set.

CMP Actuator System Performance Diagnostics

The control module monitors the performance of the camshaft position (CMP) actuator system by monitoring the actual and desired position of the CMP Sensor. If the difference between the actual and desired position is more than a calibrated angle for more than a calibrated amount of time, a DTC will set.