

## Electronic Engine Controls

The electronic engine controls consist of the following:

- PCM
- TP sensor — serviceable on 5.8L (4V) only
- CMP sensor
- CKP sensor
- MAF sensor
- HO2S
- CMS
- KS
- Fuel rail pressure and temperature sensor — 5.8L (4V) only
- ECT sensor — 5.8L (4V) only
- CHT sensor
- VCT oil control solenoid — 3.7L
- VCT variable force solenoid — 5.0L (4V)
- IAT2 sensor — 5.8L (4V) only
- SC bypass vacuum actuator — 5.8L (4V) only

The PCM:

- accepts input from various engine sensors and generates output signals to control fuel injection, ignition and emissions.

The TP sensor:

- sends the PCM a signal indicating the throttle plate angle.

The CMP sensor:

- sends the PCM a signal indicating camshaft position used for fuel synchronization.

The CKP sensor:

- sends the PCM a signal indicating crankshaft position.

The MAF sensor:

- uses a hot wire sensing element to measure the amount of air entering the engine.

The HO2S :

- creates a voltage signal dependent on exhaust oxygen content.
- provides feedback information to the PCM used to calculate fuel delivery.

The CMS :

- monitors oxygen content after it flows through the catalytic converter.
- provides a voltage to the PCM used to calculate catalytic converter integrity.

The KS :

- is used to detect engine detonation.
- sends a voltage signal to the PCM.

The fuel rail pressure and temperature sensor:

- measures the pressure and temperature of the fuel rail and sends these signals to the PCM.
- uses intake manifold vacuum as a pressure reference.

The ECT sensor:

- sends the PCM a signal indicating engine coolant temperature.
- voltage decreases as coolant temperature increases.

The CHT sensor:

- is mounted into the wall of the cylinder head and measures the temperature of the metal.

The VCT oil control solenoid — 3.7L:

- is an electronic solenoid that actuates the flow of oil to the variable camshaft. When the PCM transmits a signal based on the engine speed and load, the solenoid moves a valve spool, directing oil into the camshaft phaser cavity. This action changes valve timing by either inducing an advance, retard or hold condition. The camshaft is, thereby repositioned in relation to crankshaft timing and allows for optimum engine performance and lower emissions and reduced fuel consumption.

The VCT variable force solenoid — 5.0L (4V):

- is an electronic solenoid that supplies force to actuate the VCT oil control valve. When the PCM transmits a signal based on the engine speed and load, the solenoid moves the VCT oil control valve activating either the advance circuit, retard circuit or hold position. The camshaft is then repositioned in relation to crankshaft timing to allow for optimum engine performance with lower emissions and reduced fuel consumption.

The IAT2 sensor mounted in the intake manifold:

- sends the PCM a signal indicating the temperature of the air entering the cylinders after passing over the charge air cooler.

The SC bypass vacuum actuator mounted on the SC :

- controls the bypass valve inside the supercharger. The bypass valve allows the high pressure air at the outlet of the supercharger to vent back into the inlet of the supercharger, equalizing the pressure.