The torque based ETC system illuminates a powertrain malfunction indicator (wrench) on the instrument panel cluster (IPC) when a concern is present. Concerns are accompanied by diagnostic trouble codes (DTCs) and may also illuminate the malfunction indicator lamp (MIL).

(TORQUE BASED) ELECTRONIC THROTTLE CONTROL (ETC) > ELECTRONIC THROTTLE BODY THROTTLE ACTUATOR CONTROL (TAC)

For additional information on the electronic throttle body TAC, refer to ENGINE CONTROL COMPONENTS in this service information.

(TORQUE BASED) ELECTRONIC THROTTLE CONTROL (ETC) > ELECTRONIC THROTTLE BODY THROTTLE POSTION SENSOR

There is one reference voltage and one signal return circuit between the PCM and the electronic throttle body throttle position sensor. The reference voltage and the signal return circuits are shared with the reference voltage and signal return circuits used by the accelerator pedal position (APP) sensor. There are also 2 throttle position (TP) signal circuits for redundancy. The redundant TP signals are required for increased monitoring reasons. The first TP signal (TP1) has a negative slope (increasing angle, decreasing voltage) and the second TP signal (TP2) has a positive slope (increasing angle, increasing voltage). The TP2 signal reaches a limit of approximately 4.5 volts at approximately 45 degrees of throttle angle.

For additional information on the electronic throttle body throttle position sensor, refer to ENGINE CONTROL COMPONENTS in this service information.

(TORQUE BASED) ELECTRONIC THROTTLE CONTROL (ETC) > ACCELERATOR PEDAL POSITION (APP) SENSOR

For additional information on the APP sensor, refer to ENGINE CONTROL COMPONENTS in this service information.

(TORQUE BASED) ELECTRONIC THROTTLE CONTROL (ETC) > ELECTRONIC THROTTLE CONTROL (ETC) SYSTEM STRATEGY

The ETC strategy was developed to improve fuel economy and to accommodate variable camshaft timing. This is possible by not coupling the throttle angle to the driver pedal position. Uncoupling the throttle angle (produce engine torque) from the pedal position (driver demand) allows the powertrain control strategy to optimize fuel control and transmission shift schedules while delivering the requested wheel torque.

The ETC monitor system is distributed across 2 processors within the PCM: the main powertrain control processor unit (CPU) and a separate monitoring processor. The primary monitoring function is carried out by the independent plausibility checker software, which resides on the main processor. It is responsible for determining the driver demanded torque and comparing it to an estimate of the actual