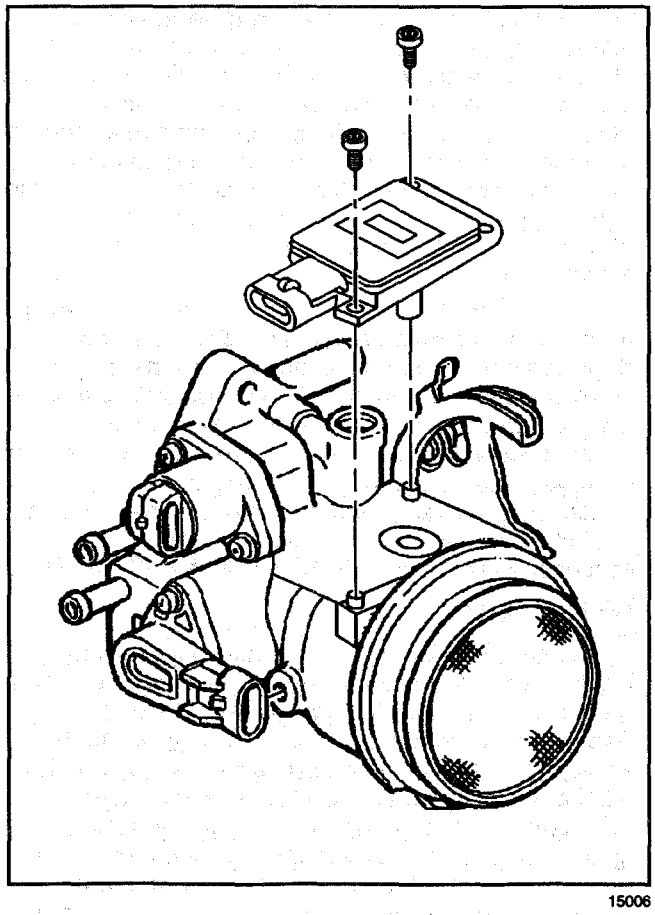
Knock Sensors

The knock sensors detect abnormal vibration (spark knocking) in the engine. The sensors are mounted in the engine block near the cylinders. The knock sensors produce an AC voltage signal under all engine operating conditions. The PCM adjusts the Ignition Control (IC) spark timing based on the amplitude and frequency of the KS signal being received.

The PCM contains integrated Knock Sensor (KS) diagnostic circuitry. The PCM uses the circuitry to diagnose the KS sensors and related wiring. The PCM calculates an average voltage of each knock sensor's signals and takes instantaneous signal voltage readings. The PCM uses the instantaneous signal voltage readings to determine the state of the knock sensor circuitry. If the knock sensor system is operating normally, the PCM should monitor instantaneous KS signal voltage readings varying outside a voltage range above and below the calculated average voltage. If the PCM malfunctions in a manner which will not allow proper diagnosis of the KS circuit DTC 325 will set. DTCs P0327 and P0332 are designed to diagnose the knock sensors, and related wiring, so problems encountered with the KS system should set a DTC.

For further information, refer to *Knock Sensor System Description*.

Mass Air Flow Sensor

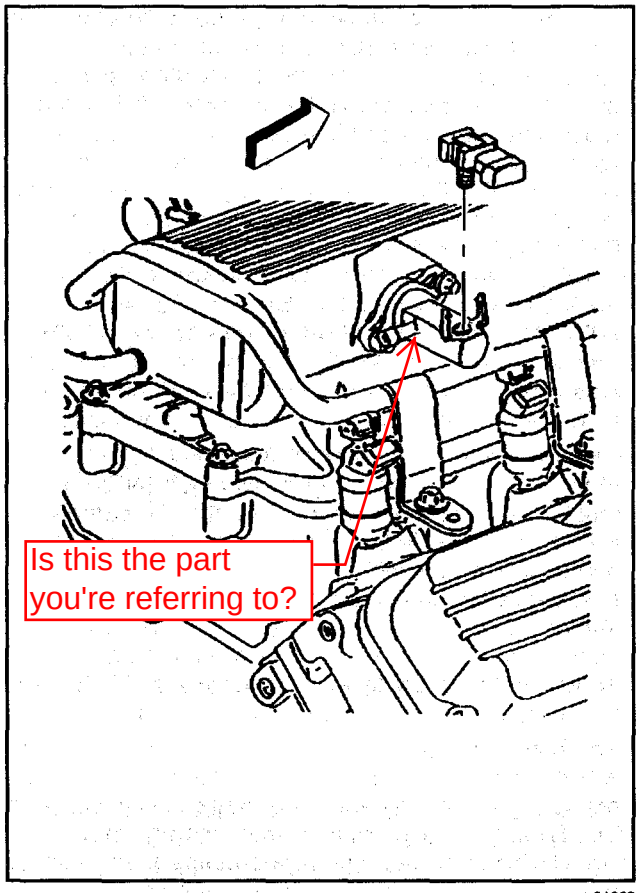


15006

The Mass Air Flow (MAF) sensor measures the amount of air which passes through the throttle body. The PCM uses this information to determine the operating condition of the engine, to control fuel delivery. A large quantity of air indicates acceleration, while a small quantity indicates deceleration or idle.

The scan tool displays the MAF value in grams per second (gm/s). At idle, MAF should read between 4 gm/s -7 gm/s on a fully warmed up engine. Values should change rather quickly on acceleration, but values should remain fairly stable at any given RPM. A MAF sensor malfuction or MAF signal circuit problem should set DTC P0101, DTC P0102, or DTC P0103.

Manifold Absolute Pressure Sensor



21663

The Manifold Absolute Pressure (MAP) sensor responds to changes in intake manifold pressure (vacuum). The MAP sensor signal voltage to the PCM varies from below 2 volts at idle (high vacuum) to above 4 volts with the key ON, engine not running or at wide-open throttle (low vacuum). The MAP sensor is used to determine manifold pressure changes while the linear EGR flow test diagnostic is being run (refer to DTC P0401), to determine engine vacuum level for other diagnostics and to determine barometric pressure (BARO).