



### When You Step On the Gas

The gas pedal in your car is connected to the throttle valve. This is the valve that regulates how much **AIR** enters the engine. So the gas pedal is really the air pedal. When you step on the gas pedal, the throttle valve opens up more, letting in more air. The computer (ECU) "sees" the throttle valve open and increases the fuel rate in anticipation of more air entering the engine.

Sensors monitor the mass of air entering the engine, as well as the amount of oxygen in the exhaust. The computer (ECU) used this information to fine-tune the fuel delivery so that the air-to-fuel ratio is just right.

**Mass Airflow Sensor (MAF):** Tells the Computer (ECU) the mass of air entering the engine.

**Oxygen Sensor(s):** Monitors the amount of oxygen in the exhaust, so the ECU can determine how rich or lean the fuel mixture is, to make adjustments accordingly.

**Throttle Position Sensor (TPS):** Monitors the throttle position (which determines how much air goes into the engine) so the ECU can respond quickly to changes, increasing or decreasing the fuel rate.

**Coolant Temperature Sensor:** Allows the ECU to determine when the engine has reached its proper operating temperature.

**Manifold Absolute Pressure Sensor (MAP):** Monitors the pressure of the air in the intake manifold. The amount of air being drawn into the engine is a good indication of how much power it is producing; and, the more air that goes into the engine, the lower the manifold pressure. So, this reading is used to gauge how much power is being produced.

**Crank Sensor and Cam Sensor:** Monitors engine speed. These sensors tell the ECU when the injectors should be fired.

Information from these sensors is processed by the computer, which then determines the proper air-to-fuel mixture. This signal is sent to the fuel injectors, which open and inject fuel into the intake valve from the fuel rail. When the injector is energized, an electromagnet moves a plunger that opens the valve, allowing the pressurized fuel to squirt out through a tiny nozzle. The nozzle is designed to make as fine a mist as possible and is capable of opening and closing many times per second. The longer the injector is held open, the richer the fuel mixture. The ignition system on your vehicle has to work in perfect harmony with the rest of the engine. The goal is to ignite the fuel at exactly the right time so that the expanding gases can produce maximum power. If the ignition system fires at the wrong time, power will fall and gas consumption will rise.

You can help minimize build-up on your fuel injectors with regular additions of a good quality fuel injector cleaner. Just add a bottle of cleaner into a full tank of gasoline every 5,000 kilometres to help keep your injectors clean. Then be sure to have them professionally cleaned once a year to remove any stubborn deposits. Your fuel injectors will operate at peak efficiency and your vehicle will operate at maximum performance. Make fuel injector cleaning a part of your regular vehicle maintenance program.