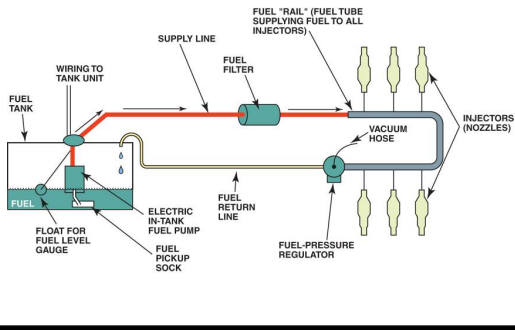


FIGURE 20-1 Typical port fuel-injection system, indicating the location of various components. Notice that the fuel-pressure regulator is located on the fuel return side of the system. The computer does not control fuel pressure. But does control the operation of the electric fuel pump (on most systems) and the pulsing on and off of the injectors.



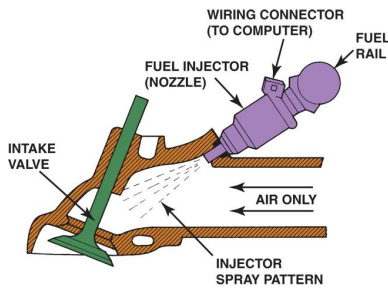
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FIGURE 20-2 A dual-nozzle TBI unit on a Chevrolet 4.3-L V-6 engine. The fuel is squirted above the throttle plate where the fuel mixes with air before entering the intake manifold.



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FIGURE 20-3 A typical port fuel-injection system squirts fuel into the low pressure (vacuum) of the intake manifold, about 3 in. (70 to 100 mm) from the intake valve.



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FIGURE 20-4 The tension of the spring in the fuel-pressure regulator determines the operating pressure on a throttle-body fuel-injection unit.

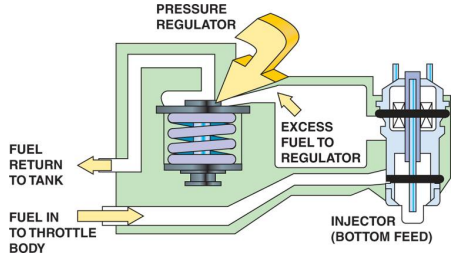


FIGURE 20-5 The injectors receive fuel and are supported by the fuel rail.

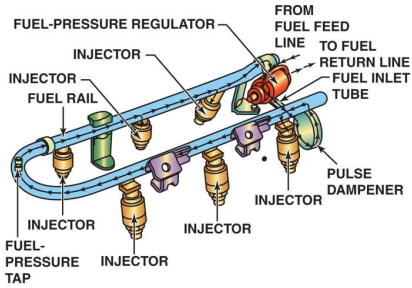


FIGURE 20-6 Cross-section of a typical port fuel-injection nozzle assembly. These injectors are serviced as an assembly only; no part replacement or service is possible except for replacement of external O-ring seals.

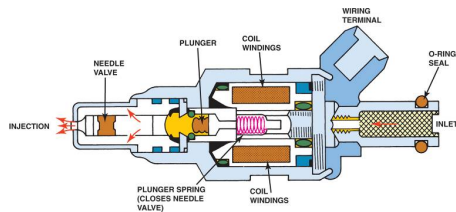
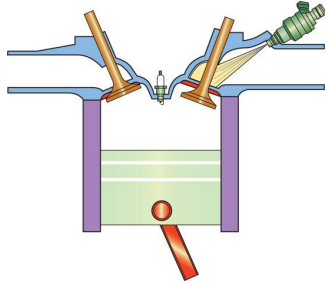


FIGURE 20-7 Port fuel injectors spray atomized fuel into the intake manifold about 3 inches (75 mm) from the intake valve.



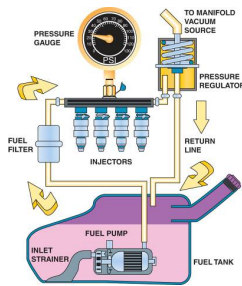
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FIGURE 20-8 A port fuel-injected engine that is equipped with long, tuned intake manifold runners.



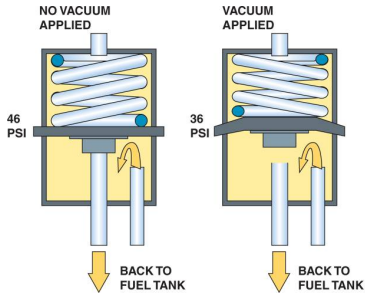
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FIGURE 20-9 A typical port fuel-injected system showing a vacuum-controlled fuel-pressure regulator.



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FIGURE 20-10 A typical fuel-pressure regulator that has a spring that exerts 46 pounds of force against the fuel. If 20 inches of vacuum are applied above the spring, the vacuum reduces the force exerted by the spring on the fuel, allowing the fuel to return to the tank at a lower pressure.

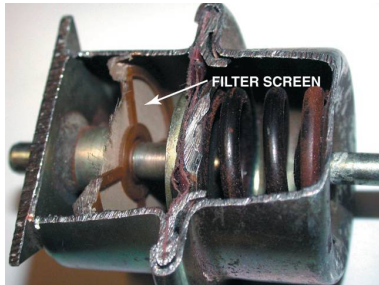


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FIGURE 20-11 A lack of fuel flow could be due to a restricted fuel-pressure regulator. Notice the fine screen filter. If this filter were to become clogged, higher than normal fuel pressure would occur.

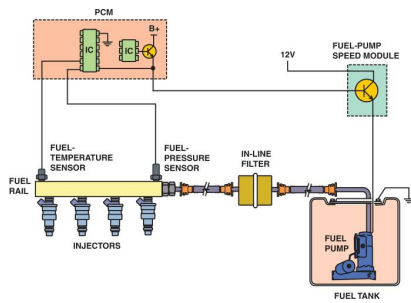


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FIGURE 20-12 The fuelpressure sensor and fueltemperature sensor are often constructed together in one assembly to help give the PCM the needed data to control the fuel-pump speed.



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FIGURE 20-13 A mechanical returnless fuel system. The bypass regulator in the fuel tank controls fuel line pressure.

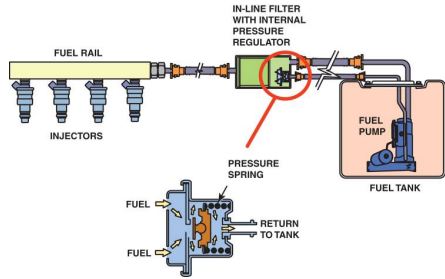


FIGURE 20-14 A demand delivery system uses an intake regulator.

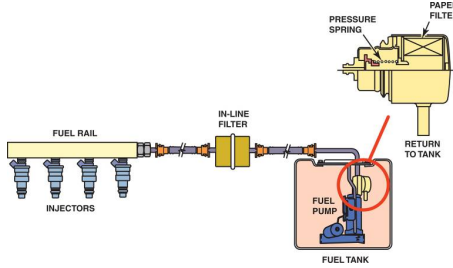
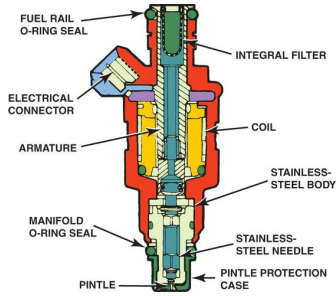


FIGURE 20-15 A rectangular-shaped fuel rail is used to help dampen fuel system pulsations and noise caused by the injectors opening and closing.



FIGURE 20-16 A multiport fuel injector. Notice that the fuel flows straight through and does not come in contact with the coil windings.



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FIGURE 20-17 Each of the eight injectors shown are producing a correct spray pattern for the applications. While all throttle-body injectors spray a conical pattern, most port fuel injections do not.

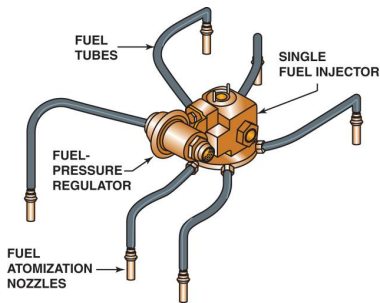


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FIGURE 20-18 A central port fuel-injection system.



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FIGURE 20-19 A factory replacement unit for a CSFI unit that has individual injectors at the ends that go into the intake manifold instead of poppet valves.

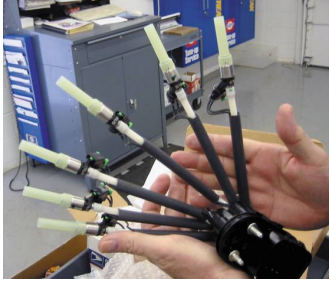


FIGURE 20-20 The small arrows indicate the air bypassing the throttle plate in the closed throttle position. This air is called minimum air. The air flowing through the IAC is the airflow that determines the idle speed.

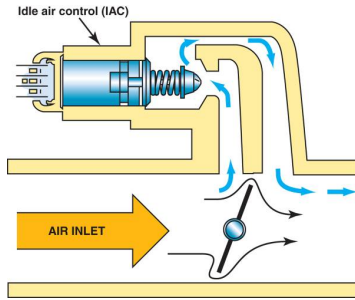


FIGURE 20-21 Most stepper motors use four wires, which are pulsed by the computer to rotate the armature in steps.

