P0088: FUEL RAIL/SYSTEM PRESSURE - TOO HIGH

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$50 - 600**
Can I Still Drive?	:	**Yes** (Short-term only)

What Does The P0088 Code Mean?

Some vehicles are equipped with a returnless fuel supply, this means that the fuel pump is pulse width modulated and can vary in pump speed to deliver fuel to the rail at a varible rate instead of constantly running the fuel pump and regulating the pressure with a pressure regulator, returning fuel back to the tank.

When a code P0088 is presented, it means that the powertrain control module (PCM) has detected a fuel rail pressure or fuel pressure sensor voltage input that exceeds maximum specifications.

The fuel rail pressure sensor is typically of the three-wire, piezoelectric variety. Usually a 5-volt reference voltage signal and a ground signal are supplied to the sensor. As fuel pressure (at the sensor) increases, sensor resistance decreases. If five is maximum voltage to the sensor, and fuel pressure is at its lowest, sensor output should be approximately .5-volts, because sensor resistance is at its highest.

As fuel pressure increases and sensor resistance decreases, the sensor signal voltage to the PCM should increase accordingly up to a maximum of 4.5-volts. These voltage figures are generic and you should consult the manufacturer's service manual for your vehicle prior to testing.

There is another fuel rail pressure sensor design that incorporates intake vacuum. Instead of monitoring fuel rail pressure directly, the sensor monitors the degree of intake manifold vacuum and sensor resistance is varied accordingly. The PCM receives the input voltage signal in much the

same way as the straight fuel pressure sensor.

In yet another type of fuel rail pressure sensor, the fuel pressure regulator is integrated. The pressure sensor has no bearing on the regulation of fuel pressure to the fuel rail but the regulator may (or may not) be electronically regulated.

Even if the fuel pressure regulator and sensor are integrated, the regulator may also be vacuum actuated.

Fuel rail pressure sensor voltage is received by the PCM, which adjusts fuel pump voltage to accomplish the desired amount of fuel rail pressure. This promotes more efficient fuel consumption.

If fuel rail pressure is higher than the amount programmed into the PCM, a P0088 will be stored and a service engine soon lamp may be illuminated.

What Are The Symptoms Of The P0088 Code?

Symptoms of a this engine code may include:

- Delayed startup, especially when the engine is cool
- Black smoke from the exhaust system
- Diminished fuel efficiency
- Spark plug fouling is possible in extreme circumstances
- Engine misfire codes and idle control codes may accompany a P0088

What Are The Potential Causes Of The P0088 Code?

Potential causes of a P0088 trouble code may include:

- Defective fuel pressure regulator
- Faulty fuel rail pressure sensor
- Shorted or open wiring and/or connectors in the fuel rail pressure sensor circuit
- A bad PCM or a PCM programming error

How Can You Fix The P0088 Code?

A good starting point is always to check for technical service bulletins (TSB) for your particular vehicle. Your issue may be a known issue with a known fix put out by the manufacturer and can save you time and money during diagnosis.

A diagnostic scanner, a digital volt/ohmmeter (DVOM), a suitable fuel pressure gauge, and a manufacturer's service manual (or the equivalent) will prove instrumental in diagnosing a code P0088.

NOTE: Please use caution when using a fuel pressure gauge under the hood of your vehicle. Fuel is under high pressure and fuel that comes into contact with hot surfaces or open spark could ignite and cause serious bodily injury.

I like to begin with a visual inspection of system wiring and connectors. Pay particular attention to harnesses and components on top of the engine. The warmth and ease of access associated with this area makes it popular with pests, which tend to damage system wiring and connectors. Repair or replace defective or damaged wiring and/or connectors as required. I would also test battery voltage, battery cable connections, and alternator output at this time.

If intake manifold vacuum is utilized to control or monitor fuel rail pressure, intake manifold vacuum must be sufficient to accomplish the task. Consult a manufacturer's service manual for acceptable vacuum specifications for your vehicle and make sure that your engine complies.

Test fuel system pressure using the fuel pressure gauge. Check the service manual for the exact fuel pressure specs that apply to your vehicle. Follow the manufacturer's recommendations for using the fuel pressure gauge.

If the actual fuel pressure is greater than what is recommended by the manufacturer, suspect a fuel pressure regulator malfunction. If the fuel pressure is within specs, suspect a faulty fuel rail pressure sensor or fuel rail pressure sensor circuit.

Follow the manufacturer's guidelines for testing the fuel rail pressure sensor and circuits with the DVOM. Disconnect controllers from the circuit before testing with the DVOM.

Additional diagnostic tips & notes:

- Fuel rail and related components are under high pressure. Use caution when removing the fuel pressure sensor or fuel pressure regulator
- Fuel pressure testing should be done with the ignition switch in the key on engine off (KOEO) position
- Turn the ignition switch off to connect/disconnect the fuel pressure gauge

Severity Description

Since excessive fuel pressure can lead to a wide variety of drivability issues and cause internal engine damage, a code P0088 should be investigated with some degree of urgency.

Reference Sources

Diagnostic Trouble Code (DTC) Charts and Descriptions for P0088 - Page 17.