P228F: FUEL PRESSURE REGULATOR 1 EXCEEDED CONTROL LIMITS - TOO HIGH

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$200-$300**
Can I Still Drive?	:	**Yes** (Short-term only)

What Does The P228F Code Mean?

In my personal experience diagnosing a P228F, it has applied exclusively to diesel powered vehicles. It has also meant that the powertrain control module (PCM) had detected an excessive degree of fuel pressure sensor voltage in the electronic fuel pressure sensor/regulator during periods when the PCM attempted to carryout adaptive learning (or relearning) strategy.

The regulator in question had been designated with a 1. Systems which utilize multiple electronic fuel pressure regulators often use a numerical designation. The 1 may also refer to a certain bank of the engine. Check manufacturer's specifications for the vehicle in question. High pressure diesel fuel injection systems should be serviced by qualified personnel ONLY.

The PCM (or some type of integrated diesel controller) monitors/controls the electronic fuel pressure regulator. Using input data from the fuel pressure sensor (located in the fuel injector rail), the PCM adjusts pressure regulator voltage constantly when the engine is running. Battery voltage and ground signals are used to control a servo motor (in the fuel pressure regulator) which actuates a valve used to ensure that the desired level of fuel pressure may be achieved for any given situation.

When voltage is increased at the electronic fuel pressure regulator servo motor, a valve is opened, and fuel pressure is increased. Decreased voltage at the servo causes the valve to close and fuel pressure is decreased. The fuel pressure regulator and fuel pressure sensor are most frequently

integrated into a single housing (with one electrical connector) but may also be separate components.

If actual fuel pressure regulator 1 control circuit voltage (pressure) which is not within a certain parameter during a learning session, a P228F will be stored and a malfunction indicator lamp (MIL) may be illuminated.

What Are The Symptoms Of The P228F Code?

Symptoms of a P228F trouble code may include:

- No start condition
- Engine misfire codes and idle control codes may also accompany a P228F
- Diminished fuel efficiency
- Delayed startup when the engine is cool
- Black smoke from the exhaust system

What Are The Potential Causes Of The P228F Code?

Causes for this code may include:

- Engine not timed correctly
- Low engine oil pressure/level
- Faulty fuel pressure sensor
- Defective fuel pressure regulator
- Shorted or open wiring and/or connectors in the fuel pressure regulator control circuit
- Bad PCM or a PCM programming error

How Can You Fix The P228F Code?

You will need a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a source of reliable vehicle information in order to accurately diagnose a code P228F.

You may save yourself time by searching for technical service bulletins (TSB) that replicate the code stored, vehicle (year, make, model, and engine), and symptoms exhibited. This information may be found in your vehicle information source. If you find the right TSB, it could yield a speedy solution to your diagnosis.

Step 1

After you connect the scanner to the vehicle diagnostic port and retrieve all stored codes and pertinent freeze frame data, write the information down (in case the code proves to be an intermittent one).

After that, clear the codes and test drive the vehicle until one of two things happens; the code is restored or the PCM enters readiness mode.

The code may be more difficult to diagnose if the PCM enters readiness mode at this point, because the code is intermittent. The condition which caused the P228F to be stored may need to worsen before an accurate diagnosis can be made. If the code is restored, continue with the diagnosis.

Step 2

You may obtain connector face views, connector pinout charts, component locator charts, wiring diagrams, and diagnostic flow charts (pertaining to the code and vehicle in question) using your source of vehicle information.

Perform a visual inspection of related wiring and connectors. Repair or replace wiring that has been cut, burned, or damaged.

Step 3

Use the DVOM to test voltage and ground circuits at the electronic fuel regulator (1) and fuel pressure sensor/s. If no voltage is detected, check system fuses. Replace blown or otherwise defective fuses as required and retest.

Step 4

If voltage is detected, test the corresponding circuit at the PCM connector. If no voltage is detected there, suspect an open circuit between the sensor in question and the PCM. If voltage is discovered there, suspect a defective PCM or PCM programming error.

Step 5

Test the fuel pressure regulator and the fuel pressure sensor with the DVOM. If either of them do not comply with manufacturer's specifications, consider it defective.

If the fuel regulator (1) and sensor/s appear to be functioning properly, use a manual fuel pressure gauge to test actual fuel pressure at the rail in an effort to duplicate the failure condition.

Notes:

- Fuel rail and related components may be under (extremely) 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

Severity Description

Since insufficient/excessive fuel pressure may cause internal engine and catalytic converter damage and lead to various drivability issues, a code P228F should be categorized as severe.

Reference Sources

P228F Fuel Pressure Regulator 1 Exceeded Control Limits - Too High, OBD-Codes.