P0381: GLOW PLUG/HEATER INDICATOR CIRCUIT MALFUNCTION

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$400**
Can I Still Drive?	:	No

What Does The P0381 Code Mean?

This diagnostic trouble code (DTC) is a generic powertrain code, which means that it applies to all 1996-newer vehicles (Volkswagen, Audi, Isuzu, Dodge, Ford, etc.). Although generic, the specific repair steps may vary depending on make/model.

When I encounter a stored code P0381, I know that the powertrain control module (PCM) has detected a malfunction in the glow plug heater indicator circuit. This code is used exclusively in diesel powered vehicles. Diesel engine glow plugs are used to increase cylinder temperatures in diesel engines, specifically during cold start conditions.

High compression is used to cause fuel to combust in diesel engines. Since compression ratios are so extreme, diesel engine blocks are typically more dense and heavy than engine blocks of gasoline fueled engines. This can lead to reduced cylinder temperatures which make the diesel engine more difficult to start, especially during cold weather conditions. Since diesel engines generate combustion without spark, cylinder temperature is crucial to cold start efficiency.

Cylinder temperature is increased when voltage is applied to the glow plugs and they literally begin to glow red hot. Most OBD-II equipped vehicles use one glow plug per cylinder, but some applications use fewer plugs, placed strategically within the intake manifold or cylinder head.

Glow plug heater voltage is normally controlled by the PCM but some vehicles are also equipped

with a stand-alone glow plug heater controller. Others have a glow plug heater controller integrated within the PCM. The glow plug controller uses input signals from the engine coolant temperature sensor and the ambient air temperature sensor to calculate glow plug activation strategy. When the controller recognizes that conditions warrant glow plug activation, an output signal is sent to a glow plug timer relay which allows battery voltage to reach the glow plugs.

Since the glow plugs are grounded by the engine block (or cylinder head) they become very hot and begin to glow when battery voltage is applied. Glow plug operation only takes place when the engine temperature is below a programmed temperature.

Included in the glow plug heater control circuit is the glow plug indicator. The glow plug indicator is an instrument panel integrated warning lamp that is illuminated when the glow plugs/heater are in operation. During cold start conditions, the glow plug indicator is typically illuminated after the ignition switch is turned to the ON position, and it goes off prior to starting the engine. This short period of time allows the energized glow plugs to heat the cylinders before attempting to start the engine. The glow plug indicator is designed to alert the driver that the glow plugs are in operation.

If the PCM detects a problem in the circuit that controls the glow plug/heater indicator, a P0381 will be stored and a malfunction indicator lamp may be illuminated.

What Are The Symptoms Of The P0381 Code?

Symptoms of a P0381 code may include:

- Delayed engine start up, especially during periods of extremely cold weather
- Excessive smoke from the exhaust
- No glow plug indicator illumination
- Constant glow plug indicator illumination

What Are The Potential Causes Of The P0381 Code?

Possible causes for this engine code include:

- Defective glow plug indicator lamp bulb
- Faulty glow plug/heater relay
- Glow plug/heater controller malfunction
- Open or shorted glow plug/heater indicator circuit
- Bad instrument panel circuit board

How Can You Fix The P0381 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.

You will need a scanner, a digital volt/ohmmeter (DVOM), and a reputable vehicle information source (such as All Data DIY) to diagnose a code P0381.

I usually begin my diagnosis with a visual inspection of all system related wiring and connectors. In this case, I would also test all fuses and fusible links that are related to the glow plugs/heater, gauges, and indicators.

I would continue by connecting the scanner to the vehicle diagnostic connector to retrieve the stored codes and freeze frame data. I would write this information down. If this code proves to be intermittent, it may prove helpful. Next, I'd clear the codes and operate the glow plug/heater to see if it is immediately reset. If the P0381 is reset, consult your vehicle information source for system relay design specifications. Use the DVOM to test system circuits and relays. Make repairs as needed and retest the system.

If the glow plug heater indicator fails to illuminate, suspect an open circuit, a faulty relay, or a bad glow plug timer controller.

If the glow plug heater indicator remains illuminated, suspect a shorted (to power) circuit or a faulty instrument panel circuit board.

If the glow plug indicator seems to operate normally and the P0381 continues to reset, suspect a defective glow plug or an open glow plug/heater circuit.

Additional diagnostic note: An easy method of testing glow plugs is to remove them from the engine, ground them, and apply 12-volts. If the glow plug begins to glow, it is functioning properly. If it does not, replace the glow plug

Severity Description

Glow plug operation will likely be disabled if a code P0381 is stored, therefore it should be considered a severe condition.

Reference Sources

P0381: Glow Plug/Heater Indicator Circuit Malfunction, OBD-Codes.