P0683: GLOW PLUG CONTROL MODULE TO PCM COMMUNICATION CIRCUIT

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$100-$300**
Can I Still Drive?	:	**Yes** (Short-term only)

What Does The P0683 Code Mean?

Code P0683 indicates that the Glow Plug Control Module to PCM Communication Circuit has lost communication. A fault has occurred that prohibits the powertrain control module (PCM) from communicating commands to the glow plug control module. The command is essentially an 'on and off ' signal.

The codes do not indicate a specific part within the system, just the area of failure. The glow plug circuit is relatively simple and can be diagnosed and repaired with little automotive background, other than a basic knowledge of the use of a volt/ohmmeter.

What is the purpose of the glow plugs?

Comprehending their function requires a basic understanding of the operating principles of a diesel.

Unlike a gasoline engine that needs a spark to ignite the fuel, a diesel engine relies on extremely high compression. Highly compressed, air creates extreme heat. The diesel compresses the air within its cylinders to the point that the air reaches temperatures high enough for spontaneous ignition of the fuel.

When a diesel engine block is cold, it is difficult to create enough heat through compression to

ignite the fuel. The reason is that the cold engine block cools the air causing a slower increase in temperature sufficient for starting.

When the vehicle powertrain control module (PCM) senses the engine is cold through signals from the oil and transmission temperature sensors, it turns on the glow plugs. The glow plugs get red hot and transfer heat to the combustion chamber to aid in starting the engine. They are on a timer and only operate for a few seconds. Any longer and they would quickly burn out.

How do they operate?

When the PCM senses the engine is cold is grounds a glow plug control module (GPCM). Once grounded, the GPCM grounds a glow plug solenoid (same as a starter solenoid) on the valve cover.

The solenoid in turn sends power to a glow plug bus bar. The bus bar has a separate wire to each glow plug. Power travels to the glow plugs where they heat the cylinder to aid startup.

The GPCM is a timer and only remains activated for a matter of seconds. This is sufficient to start the engine, but at the same time, it protects the glow plugs from overheating from prolonged activation.

What Are The Symptoms Of The P0683 Code?

Symptoms of a P0683 code may include:

- The check engine light will be illuminated and the above codes will be set.
- Little if any indication will be present if only one or two glow plugs have failed. If the engine is very cold it may be a little harder to start.
- The engine may exhibit a miss until it has sufficiently warmed up.
- If more than two glow plugs are malfunctioning, the engine will be very difficult to start.

What Are The Potential Causes Of The P0683 Code?

The causes for this DTC may include:

- Open or short in the wiring from the PCM to the GPCM, to the bus bar, or from the bus bar to the glow plug.
- Failed glow plug
- Loose or corroded connections
- Failed GPCM
- Loose or corroded connections on the glow plug solenoid
- Glow plug solenoid failure
- Insufficient battery power to solenoid
- Code P0670may accompany this code. This code points to the wiring harness from the GPCM

to the solenoid as a problem.

How Can You Fix The P0683 Code?

Over the years I have found this to be a common problem with diesels regardless of manufacturer. Due to the high amperage required to operate the glow plugs and their inclination to burn out, I suggest starting with the most common problems.

The GPCM uses low amperage, and although possible, is least likely to fail. The solenoid is also seldom replaced. When you're dealing with high amperage, even the least amount of looseness in a connection will create and arc and burn out the connector.

- Inspect the wiring visually from the PCM to the GPCM. Continue down to the solenoid on the valve cover, and from the solenoid to the bus bar and down to the glow plugs. Look for any loose or corroded connectors.
- Disconnect the black and green electrical connector at the GPCM. Inspect the connector for pushed out pins and corrosion.
- With the ohmmeter, check each of the terminals for a short to ground. Repair the short as necessary.
- Apply dielectric grease to the pins and reconnect the harness to the GPCM.
- Inspect the battery positive and GPCM connection on the glow plug solenoid. Make sure all wires are clean and tight.
- Inspect the glow plug bus bar. Check each wire's connection on the bus bar and make sure they are also clean and tight.
- Remove the wire from the glow plug and check it for a short to ground.
- Using the ohmmeter, probe the glow plug terminal with one lead and place the other on a ground. The glow plug has failed if the resistance is not between 0.5 to 2.0 ohms.
- Check the resistance in the wiring from the glow plug to the bus bar. The resistance should also be in the 0.5 to 2.0 range. If not, replace the wire.

If the above fails to turn up the problem, get a service manual and turn to the page depicting the glow plug circuit. Look at the color and pin number for power to the GPCM and the power from this to the solenoid. Probe these terminals as directed using the voltmeter.

If there is no power to the GPCM, the PCM has failed. If there is voltage to the GPCM, check the voltage from the GPCM to the solenoid. If there is no voltage to the solenoid, replace the GPCM.

Reference Sources

P0683 Glow Plug Control Module to PCM Communication Circuit Code, OBD-Codes.