P20C6: REDUCTANT HEATER D CONTROL CIRCUIT PERFORMANCE

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$450-$600**
Can I Still Drive?	:	**Yes**

What Does The P20C6 Code Mean?

A stored code P20C6 means that the powertrain control module (PCM) has detected improper voltage that is outside the normal expected value range within the control circuit for the on-board reductant heater designated with the letter D. This designation is used where multiple reductant heaters are in use, consult a vehicle specific repair manual to determine which is the D circuit for your application.

The catalyst system is responsible for reduction of (basically) all the other exhaust emissions although certain applications are also equipped with a NOx trap.

Exhaust gas recirculation (EGR) systems go another step further in the reduction of NOx. Nevertheless, today's larger and more powerful diesel engines cannot meet strict federal (U.S.) emission standards with the EGR, diesel particulate filter/catalytic converter, and NOx trap alone. It was for this reason that selective catalytic reduction (SCR) systems were invented.

SCR systems inject a reductant compound or a diesel exhaust fluid (DEF) into the exhaust in front of the diesel particulate filter and/or the catalytic converter. The precisely timed DEF injection elevates the temperature of the filtration element and allows it to perform more efficiently. It makes the filtration element last longer and allows fewer harmful exhaust emissions to be released into the atmosphere.

The entire SCS system is monitored and controlled by either the PCM or a stand-alone controller (which interacts with the PCM). Either way, the controller monitors the O2, NOx, and exhaust temperature sensors (as well as other inputs) to determine the appropriate time for DEF (reductant) injection. Precise DEF injection is necessary to maintain exhaust temperature within acceptable parameters and optimize pollutant filtration.

Reductant heaters are used to prevent diesel exhaust fluid from freezing during extreme temperatures. These heaters are typically located in the DEF reservoir and/or the reductant injector supply hose/s.

If the PCM detects improper voltage that is outside the normal expected value range within the control circuit for reductant heater D, a code P20C6 will be stored and a malfunction indicator lamp may be illuminated.

Reductant heaters may be inside a DEF tank (example shown here):

What Are The Symptoms Of The P20C6 Code?

Symptoms of a P20C6 trouble code may include:

- Diminished engine performance
- Excessive black smoke from vehicle exhaust
- Reduction in fuel efficiency
- Other SCR related codes

What Are The Potential Causes Of The P20C6 Code?

Causes for this code may include:

- Bad reductant heater
- Open or shorted circuits in the reductant heater control
- Defective reductant temperature sensor
- Bad SCR controller/PCM or programming error

How Can You Fix The P20C6 Code?

You will need access to a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a source of vehicle specific diagnostic information to diagnose a code P20C6.

Find a technical service bulletin (TSB)

If you can find a technical service bulletin (TSB) that matches the vehicle year, make, and model; as well as the engine size, code/s stored, and symptoms exhibited, it could yield helpful diagnostic information.

Visually inspect the reductant heater system harnesses and connectors

You will want to begin your diagnosis with a visual inspection of the reductant heater system harnesses and connectors. Burnt or damaged wiring and or connectors should be repaired or replaced before proceeding.

Retrieve all stored codes

Proceed by hooking the scanner to the vehicle diagnostic connector and retrieving all stored codes and pertinent freeze frame data. Write this information down before clearing the codes and test driving the vehicle until the PCM either enters readiness mode or the code is reset.

The code is intermittent and may be much more difficult to diagnose (at this time), if the PCM enters readiness mode. If this is the case, the conditions which contributed to the code being stored may need to worsen before an accurate diagnosis can be made.

Should the code be reset, search your source of vehicle information to obtain diagnostic flow charts, connector pin out charts, connector face views, as well as component testing procedures and specifications. This information will be required to complete the next step of your diagnosis.

Use the DVOM to test the power supply

Use the DVOM to test the power supply to the SCR control system/. Test fuses with the circuit loaded to avoid misdiagnosis. If the appropriate power (battery voltage) and ground circuits are discovered, use the scanner to activate the reductant heater/s and test output control circuit voltage. If voltage is insufficient, suspect that the controller is bad or has experienced a programming error.

If the voltage output circuit is within parameters, use the DVOM to test the reductant heater element in question. If the heater fails to meet manufacturer’s specifications, suspect that it has failed.

- If this code is exhibited in warm weather, suspect that a programming error has occurred

Severity Description

A stored code P20C6 should be considered severe and addressed as quickly as possible. The SCR system could be disabled because of it. Catalyst damage could result if the conditions which contributed to the code being stored are not rectified in a timely manner.

Reference Sources

P20C6 Reductant Heater D Control Circuit Performance, OBD-Codes.