P2427: EXHAUST GAS RECIRCULATION COOLING VALVE CONTROL CIRCUIT HIGH

OVERVIEW

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

What Does The P2427 Code Mean?

A stored code P2427, means that the powertrain control module (PCM) has detected an excessive degree of voltage on the exhaust gas recirculation (EGR) cooling valve control circuit. EGR cooling systems are only used in diesel engine applications.

The EGR system is designed to deliver a portion of inert exhaust gases back to the engine induction system where it is substituted for oxygen rich clean air. Substituting the spent exhaust gases for oxygen rich air causes a reduction in nitrogen oxide (NOx) particles. Regulated by federal mandate, NOx is a contributing part of ozone depleting exhaust emissions.

EGR cooling systems are used to reduce the temperature of EGR gases before they enter the engine air induction system. The EGR cooling system functions like a radiator or heater core. Engine coolant is sealed inside of a finned area which is positioned so that EGR gases may flow across it. A cooling fan is sometimes used as well. The electronically controlled EGR cooling valve regulates the flow of engine coolant to the EGR cooler under certain conditions.

The PCM uses input signals from the engine coolant temperature (ECT) sensor and the EGR cooler temperature sensor/s to determine when and to what degree the EGR cooling valve is opened or closed at any given time. The PCM monitors EGR cooling valve control system voltage whenever the key is turned on.

ECT and EGR cooler temperature sensors provide the PCM with variations in EGR cooler and engine coolant temperature. The PCM compares these input signals to calculate whether or not the EGR cooling system is functioning as intended. EGR temperature sensors are typically located near the EGR valve and ECT sensors are usually positioned in a cylinder head water jacket or intake manifold water jacket.

If the EGR cooling valve control system voltage is too high above the normal expected value range of programmed parameters, or if the input signals from the EGR temperature sensor/s are not similar to that of the ECT sensor, a P2427 will be stored and a malfunction indicator lamp may be illuminated.

What Are The Symptoms Of The P2427 Code?

Symptoms of a P2427 trouble code may include:

- No symptoms (except code storage)
- Increased cylinder temperature
- Diminished fuel efficiency
- Exhaust temperature sensor codes
- Engine temperature sensor codes

What Are The Potential Causes Of The P2427 Code?

Causes for this code may include:

- Open or shorted EGR cooling valve control wiring or connectors
- Low engine coolant
- Defective EGR temperature sensor/s
- Clogged EGR cooler
- Engine overheating
- Faulty EGR cooling fan

How Can You Fix The P2427 Code?

The engine cooling system should be filled to the proper level with the appropriate coolant before proceeding. If there are engine coolant leaks or the engine is overheating, it must be repaired before proceeding with a diagnosis of the stored P2427.

A diagnostic scanner, a digital volt/ohmmeter, a source of vehicle information, and an infrared thermometer (with a laser pointer) are some of the tools that I would use to diagnose a P2427.

Step 1

I might start with a visual inspection of the wiring harnesses and connectors associated with the EGR temperature sensor and the ECT sensor. Harnesses that are in close proximity to hot exhaust pipes and manifolds should be carefully examined.

Step 2

Connect the scanner to the vehicle diagnostic port and retrieve all stored codes and pertinent freeze frame data. Before I clear the codes and test drive the vehicle, I like to write this information down in case this proves to be an intermittent code.

At this time, one of two things will occur: either the PCM will enter readiness mode (with no codes stored) or the P2427 will be reset.

If the PCM enters readiness more, the P2427 is intermittent and will be more difficult to diagnose. In many cases, the condition will have to worsen before an accurate diagnosis may be made.

If the P2427 is reset, use the scanner data stream to observe EGR temperature sensor data and ECT sensor data. Narrowing the scanner data stream to include only pertinent information, will yield faster data response.

If the scanner indicates EGR temperature and ECT are within acceptable parameters, suspect a defective PCM or a PCM programming error. This is your least likely scenario.

Step 2

If EGR temperature sensor data or ECT sensor data is erratic or not within desired parameters, test the sensor/s in question by following testing procedures and specifications located in your source of vehicle information. Sensors which fail to coincide with manufacturer’s specifications should be considered defective.

Step 3

Use the DVOM to test the EGR cooling valve control circuit if the sensors are working properly. Remember to disconnect all related controllers before testing. Repair or replace open or shorted circuits as required.

Step 4

If all EGR cooling valve control sensor circuits are intact, use the infrared thermometer to check exhaust gas temperature at the EGR cooler (valve) inlet and the EGR cooler outlet (with the engine running and at normal operating temperature).

Compare your findings with manufacturer's specifications and replace faulty EGR cooling system components as necessary.

Note: The installation of aftermarket and high performance EGR components may cause a P2427 to be stored

Severity Description

A stored code P2427 is related to the exhaust gas recirculation system. It should not be classified as severe.

Reference Sources

P2427 Exhaust Gas Recirculation Cooling Valve Control Circuit High, OBD-Codes.