

P0424: HEATED CATALYST TEMPERATURE BELOW THRESHOLD (BANK 1)

OVERVIEW

Severity	:	<div><div></div></div> High
DIY Difficulty Level	:	<div><div>Intermediate</div></div>
Repair Cost	:	\$250-\$350
Can I Still Drive?	:	Yes

What Does The P0424 Code Mean?

When I have diagnosed a code P0424, I have found that the powertrain control module (PCM) has detected a problem with the temperature of the heated catalytic converter for engine bank one. Bank 1 designates that the problem has occurred in the bank of the engine that contains the number one cylinder.

Although I cannot state with absolute certainty that a code P0424 is only applicable to diesel powered vehicles; I have never seen it exhibited in anything other than diesel powered vehicles.

Heated catalytic converters are used to reduce exhaust emissions produced by diesel fueled engines. A filtration block, composed of ceramic fibers interwoven with platinum and other precious metals, enclosed in an inline steel housing and placed in the exhaust system, is the key component of the heated catalytic converter.

Beyond the heat created as a side effect of engine exhaust, diesel engine exhaust must frequently be heated further in order to sufficiently reduce nitrogen oxide (N₂O) particles, carbon monoxide, and unburned hydrocarbons into harmless ions of nitrogen, oxygen, carbon dioxide, and water.

Temperatures inside the heated catalytic converter are often designed to reach a minimum of 1,200-degrees Fahrenheit. In order to produce the extreme temperatures needed to reduce diesel engine emissions, diesel exhaust fluid is injected into the heated catalytic converter in intervals

controlled by the PCM.

Upstream and downstream exhaust temperature sensors are used by the PCM to monitor the heated catalytic converter threshold. This is necessary to ensure that the filtration element (catalyst) is being heated sufficiently.

Exhaust gases are pushed through the manifold, into the exhaust pipe, over the upstream exhaust temperature sensor, and through the heated catalytic converter. After they pass through the heated catalytic converter, they flow across the downstream exhaust temperature sensor.

The PCM is programmed with specific minimum requirements regarding the temperature differential between exhaust gases entering the catalytic converter and exhaust gases exiting the catalytic converter. These programmed requirements are referred to here as the heated catalyst temperature threshold.

If heated catalyst temperature variation (between the upstream and downstream exhaust temperature sensors) is less than the minimum allowable threshold, a code P0424 will be stored and a malfunction indicator lamp (MIL) may be illuminated.

Other bank 1 catalyst trouble codes include [P0420](#), [P0421](#), [P0422](#), [P0423](#), [P0425](#), [P0426](#), [P0427](#), [P0428](#), and [P0429](#).

What Are The Symptoms Of The P0424 Code?

Symptoms of this code may include:

- Decreased fuel efficiency
- A lack of general engine performance
- Excessive black smoke from exhaust
- Other related diagnostic trouble codes
- MIL (malfunction indicator lamp) illumination

What Are The Potential Causes Of The P0424 Code?

Potential causes for this code to set are:

- Malfunctioning diesel exhaust fluid injection system
- Inadequate diesel exhaust fluid
- Defective exhaust temperature sensor/s
- Burnt, broken, or disconnected wiring and/or connectors

How Can You Fix The P0424 Code?

In order to diagnose a code P0424, I would need a diagnostic scanner, digital volt/ohmmeter

(DVOM), an infrared thermometer (preferably with a laser pointer), and a reliable vehicle information source (such as All Data DIY).

Prior to attempting to diagnose a stored code P0424, any diesel exhaust fluid injection system related codes should be dispatched and the engine should be running efficiently.

I normally start with a visual inspection of system wiring harnesses and connectors, focusing on harnesses that are routed near hot exhaust pipes and manifolds, as well as those that are routed near sharp edged objects like exhaust shields.

Next, I would connect the scanner to the vehicle diagnostic port and retrieve all trouble codes and freeze frame data. I have discovered that writing this information down may prove helpful later in my diagnosis. Now I would clear the codes and test-drive the vehicle to see if the P0424 is immediately reset.

I would start the engine and allow it to reach normal operating temperature if the P0424 is reset. I would test-drive the vehicle while carefully using the scanner data stream to observe exhaust temperature sensor input data. Narrowing the data stream to include only pertinent data will yield a more accurate data sample.

Once the PCM enters closed loop operation, and driving conditions are met for the diesel exhaust fluid injection system to be activated, exhaust gas temperature sensor signals should reach an acceptable threshold and remain relatively steady.

If they do not, gain access to the catalytic converter by placing the vehicle on a lift or hoist and use the infrared thermometer to take a manual temperature reading of the exhaust pipe in close proximity to the exhaust temperature sensor/s. Compare the temperature displayed on the infrared thermometer with the data presented on the scanner to determine if there is a problem with one of the exhaust temperature sensors.

Consult your vehicle information source for recommended vehicle specifications and use the DVOM to check resistance of the exhaust temperature sensor in question.

Additional diagnostic notes:

- The presence of a stored P0424 does not often condemn the catalytic converter
- Exhaust temperature sensor failure is more common than catalytic converter failure
- Diesel exhaust fluid must be present and of the correct variety before diagnosing a P0424
- Disconnect all related controllers before attempting to test system circuit resistance with the DVOM

Severity Description

If a code P0424 has been stored in your vehicle, it may be an indication that the diesel exhaust fluid injection system is not functioning. This code should be categorized as severe.

Reference Sources

[P0424 Heated Catalyst Temperature Below Threshold \(Bank 1\)](#), OBD-Codes.