

## P007F: CHARGE AIR COOLER TEMPERATURE SENSOR BANK1/BANK2 CORRELATION

### OVERVIEW

Severity	:	<div><div>Medium</div></div>
DIY Difficulty Level	:	<div><div>Intermediate</div></div>
Repair Cost	:	<b>\$100-\$400</b>
Can I Still Drive?	:	<b>Yes</b> (Short-term only)

### What Does The P007F Code Mean?

A stored code P007F means that the powertrain control module (PCM) has detected a discrepancy in the correlating signals between the charge air temperature (CAT) sensors for the separate banks of the engine. Bank 1 refers to the engine bank that contains the number one cylinder.

As you have probably gathered by the code description, a P007F is applicable only to vehicles that are equipped with forced air induction systems and multiple intake air inlet sources. Intake air inlet sources include throttle bodies and forced air induction systems are configured around turbochargers and superchargers.

CAT sensors are typically composed of a thermal resistor in a plastic housing. The CAT sensor is inserted through the air inlet tube (from outside to inside) with the resistor suspended on a two-wire pedestal. It is positioned so that ambient air entering the turbocharger inlet pipe (after leaving the air charge cooler/intercooler), may flow across it. The CAT sensor is normally designed to thread or bolt into the turbocharger/supercharger inlet pipe, near the intercooler.

The level of resistance in the CAT sensor resistor decreases as actual charge air temperature increases. This causes circuit voltage to move towards the reference maximum. The PCM recognizes these variations in CAT sensor voltage as changes in charge air temperature and reacts accordingly.

The CAT sensors provide data to the PCM for boost pressure solenoid operation and boost pressure release valve operation, as well as certain facets of fuel delivery and ignition timing calibration.

If the PCM detects voltage signals from the CAT sensors (for engine banks one and two) which reflect a difference that exceeds the maximum allowable parameters, a code P007F will be stored and a malfunction indicator lamp (MIL) may be illuminated. Multiple drive cycles with a detected failure may be required for MIL illumination.

## What Are The Symptoms Of The P007F Code?

Symptoms of a P007F engine code may include:

- Diminished engine performance
- Louder than normal sucking or hissing noise on acceleration
- Hesitation upon acceleration
- Rich or lean exhaust condition
- Diminished fuel efficiency

## What Are The Potential Causes Of The P007F Code?

Causes for this engine code may include:

- Defective CAT sensor
- Disconnected or burst air inlet hose
- Open or shorted CAT sensor wiring or connector
- Restricted air filter element
- Introduction of aftermarket methanol injection systems
- PCM or PCM programming error

## How Can You Fix The P007F Code?

When diagnosing CAT sensor related codes, I would likely begin by ensuring that there are no obstructions in air flow across the intercooler.

If there are no intercooler obstructions and the air filter is relatively clean; a visual inspection of all CAT sensor system wiring and connectors is in order.

If the vehicle has been equipped with an aftermarket methanol injection system, PCM reprogramming may be required for optimum performance gains. The PCM will typically continue to store a code until reprogramming occurs.

I would need a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a source of reliable vehicle information when attempting to diagnose a code P007F.

I would continue by connecting the scanner to the vehicle diagnostic port and retrieving all stored codes and freeze frame data. Freeze frame data provides a snap shot of the exact circumstances which were occurring at the time of the malfunction which led to the stored code P007F. I would write this information down as it may be helpful as I go deeper into the diagnostic process. Now, I would clear the codes and test-drive the vehicle to see if the code is reset.

If the P007F is immediately reset:

- Use the positive test lead of the DVOM to probe the reference circuit pin of the sensor connector and the negative test lead to probe the ground pin
- Turn the key on with the engine off (KOEO) and test for reference voltage (typically 5-volts) and a ground at the individual CAT sensor connectors

If the appropriate reference voltage and ground are discovered:

- Reconnect the sensor and probe the signal circuit of the CAT sensor with the positive test lead of the DVOM (ground probe grounded to known good engine ground)
- Turn the key on with the engine running (KOER) and test the sensor signal circuit with the engine running. It may be necessary to rev the engine or even drive the vehicle to perform an effective test of the CAT sensor signal circuit
- A temperature to voltage chart can likely be found within the vehicle information source. Use it to determine if the sensor is functioning properly
- If either of the CAT sensors fail to reflect the appropriate degree of voltage (according to the actual CAT) suspect that it is defective. You may use an infrared thermometer with a laser pointer to establish actual CAT.

If the correct degree of voltage is exhibited by the sensor signal circuit:

- Use the DVOM to test the signal circuit (for the sensor in question) at the PCM connector. If there is a sensor signal at the sensor connector but not at the PCM connector, an open circuit between the two components must be repaired

You may test individual system circuits using the DVOM only after the PCM (and all related controllers) have been disconnected. Follow connector pin-out charts and wiring diagrams to effectively test individual circuit resistance and/or continuity.

If all system circuits appear to be functioning as intended, you can use the DVOM (and your source of reliable vehicle information) to test the individual CAT sensors. Consult your vehicle information source for component testing specifications and place the DVOM on the ohms setting. Test the sensors while they are unplugged. CAT sensors which fail to comply with manufacturer's specifications should be considered defective.

Suspect PCM failure or a PCM programming error only if all CAT sensors and circuits are within

specifications.

- By matching the vehicle, symptoms, and codes stored to technical service bulletins (TSB), you may find help with your diagnosis

## Severity Description

Engine performance and fuel efficiency will undoubtedly be adversely affected by the conditions which contribute to a code P007F being stored. It should be categorized as severe.

## Reference Sources

[P007F: Charge Air Cooler Temperature Sensor Bank1/Bank2 Correlation](#), OBD-Codes.