P011D: CHARGE AIR TEMPERATURE/INTAKE AIR TEMPERATURE CORRELATION BANK 2

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	**$50-$200**
Can I Still Drive?	:	**Yes** (Short-term only)

What Does The P011D Code Mean?

A stored code P011D means that the powertrain control module (PCM) has detected a discrepancy in the correlating signals between the charge air temperature (CAT) sensor and the intake air temperature (IAT) sensor for engine bank number two.

Bank 2 refers to the engine bank that does not contain the number one cylinder. As you can probably tell by the code description, this code is used only in vehicles that are equipped with forced air induction devices and multiple intake air inlet sources. Intake air inlet sources are called throttle bodies. Forced air induction devices include turbochargers and superchargers.

CAT sensors are normally composed of a thermal resistor that protrudes from the housing on a wire pedestal. The resistor is positioned so that ambient air entering the engine intake, after leaving the intercooler (sometimes called the air charge cooler), may flow across it. The housing is normally designed to thread or bolt into a turbocharger/supercharger inlet pipe, near the intercooler). As charge air temperature increases, the level of resistance in the CAT resistor decreases; causing circuit voltage to move towards the reference maximum. The PCM sees these variations in CAT sensor voltage as changes in charge air temperature.

The CAT sensor/s provides 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 calculation.

The IAT sensor acts in much the same manner as the CAT sensor; in fact, some early (pre OBD-II) computerized vehicle service manuals described the intake air temperature sensor as an air charge temperature sensor. The IAT sensor is positioned so that ambient intake air is drawn across it as it is enters the engine intake. The IAT sensor is located near the air filter housing or air inlet pipe.

A code P011D will be stored and a malfunction indicator lamp (MIL) may be illuminated if the PCM detects voltage signals from the CAT sensor and the IAT sensor which differ by more than a preprogrammed degree. Multiple ignition cycles, with a failure, may be required for MIL illumination.

What Are The Symptoms Of The P011D Code?

Symptoms of a P011D trouble code may include:

- Decreased engine performance
- Excessive rich or lean exhaust
- Delayed engine start-up (especially when cold)
- Diminished fuel efficiency

What Are The Potential Causes Of The P011D Code?

Causes for this code may include:

- Defective CAT/IAT sensor
- Open or shorted CAT/IAT sensor wiring or connector
- Restricted intercooler
- PCM or PCM programming error

How Can You Fix The P011D Code?

I would gain access to diagnostic scanner, a digital volt/ohmmeter (DVOM), and a reliable vehicle information source before attempting to diagnose a code P011D.

Diagnosing any CAT sensor related code, should begin by making sure that there are no obstructions in air flow across the intercooler.

A visual inspection of all CAT/IAT system wiring and connectors is in order if there are no intercooler obstructions and the air filter is relatively clean. Make repairs as required.

Next, I would connect the scanner to the vehicle diagnostic port and retrieve all stored codes and freeze frame data. Freeze frame data could be best described as a snap shot of the exact circumstances which were occurring at the time of the malfunction which led to the stored code P011D. I like to write this information down as it may be helpful as the diagnosis proceeds.

Now, clear the codes and test-drive the vehicle to see if the code is reset.

If it is:

- Test the individual CAT/IAT sensors using the DVOM and your vehicle information source.
- Place the DVOM on the ohms setting and test the sensors while unplugged.
- Consult your vehicle information source for component testing specifications.
- CAT/IAT sensors that fail to comply with the manufacturer's specifications must be replaced.

If the sensors all comply with manufacturer's specifications:

- Test for reference voltage (typically 5-volts) and a ground at sensor connectors.
- Use the DVOM and connect the positive test lead to the reference voltage pin of the sensor connector with the negative test lead connected to the ground pin of the connector.

If you find reference voltage and a ground:

- Reconnect the sensor and test the sensor signal circuit with the engine running.
- Follow the temperature to voltage chart found within the vehicle information source to determine if the sensor is functioning properly.
- Sensors which fail to reflect the same degree of voltage (according to the temperature of intake air/charge air) as specified by the manufacturer must be replaced.

If the sensor signal circuit reflects the correct degree of voltage:

- Test the signal circuit (for the sensor in question) at the PCM connector. If there is a sensor signal at the sensor connector and none at the PCM connector, there is an open circuit between the two components.
- Test individual system circuits using the DVOM. Disconnect the PCM (and all related controllers) and follow the diagnostic flow chart or connector pin diagrams to test individual circuit resistance and/or continuity.

Suspect PCM failure or a PCM programing error if all CAT/IAT sensors and circuits are within specifications.

- Check technical service bulletins (TSB) for help with your diagnosis
- The IAT sensor is often left unplugged after air filter replacement or other related maintenance

Severity Description

Overall engine performance and fuel efficiency may be adversely affected by the conditions which contribute to a code P011D being stored, it should be categorized as severe.

Reference Sources

P011D: Charge / Intake Air Temp Correlation Bank 2, OBD-Codes.