

P060F: INTERNAL CONTROL MODULE COOLANT TEMPERATURE PERFORMANCE

OVERVIEW

Severity	:	High
DIY Difficulty Level	:	Intermediate
Repair Cost	:	\$50-&200
Can I Still Drive?	:	Yes

What Does The P060F Code Mean?

When a code P060F is stored, it means that the powertrain control module (PCM) has detected an internal performance error with the engine coolant temperature (ECT) sensor circuit. Other controllers may also detect an internal PCM performance error (in the ECT sensor circuit) and contribute to a P060F being stored.

Internal control module monitoring processors are responsible for various controller self-test duties and overall internal control module accountability. ECT sensor input and output signals are subject to self-test and are monitored constantly by the PCM and other related controllers. The transmission control module (TCM), traction control module (TCSM), and other controllers are subject to interaction with the ECT sensor.

ECT sensors are composed of a thermal resistor that is dipped in a hard resin and sealed in a metal or plastic housing. Brass is the most common metal used as ECT sensor housing material. The ECT housing is designed so that it may be threaded into a coolant passage in the engine intake manifold, cylinder head, or block. As warm coolant passes through the passages and across the ECT sensor, the level of thermal resistance in the ECT sensor decreases.

When engine coolant decreases in temperature, resistance increases and ECT sensor circuit voltage is reduced as a result. These fluctuations in resistance (which result in circuit voltage variations) are interpreted by the PCM as changes in engine coolant temperature. ECT sensor input data is critical

in calculating fuel delivery and ignition timing strategy.

Whenever the ignition is on and the PCM is energized, internal ECT circuit self-tests are initiated. In addition to running internal controller self-tests, the controller area network (CAN) also compares signals from each individual module to ensure that all controllers are functioning properly. These tests are performed simultaneously.

If the PCM detects a discrepancy between any of the on-board controllers, which would indicate an internal ECT sensor error, a code P060F will be stored and a malfunction indicator lamp (MIL) may be illuminated. Multiple failure cycles may be necessary for MIL illumination, depending upon the perceived severity of the malfunction.

What Are The Symptoms Of The P060F Code?

Symptoms of a P060F trouble code may include:

- Drivability issues (especially at start-up)
- Harsh or erratic automatic transmission shifting
- Reduction in fuel efficiency
- Rough idle or stall (especially at idle)
- Hesitation upon acceleration

What Are The Potential Causes Of The P060F Code?

- Causes for this code may include:
- Defective controller or programming error
- Open or shorted circuit or connectors in the CAN harness
- Insufficient control module ground
- Defective ECT sensor
- Corroded electrical (ECT) connector
- Open or shorted circuits between the ECT sensor and the PCM

How Can You Fix The P060F Code?

Even to the most experienced and well-equipped professional technician, diagnosing a code P060F can prove to be quite a challenge. There is also the issue of reprogramming. Without the necessary reprogramming equipment, it will be impossible to replace a defective controller and complete a successful repair.

If there are ECM/PCM power supply codes present, they will obviously need to be rectified before attempting to diagnose a P060F. Also, if there are ECT sensor codes present, these must be diagnosed and repaired first.

There are several preliminary tests that can be performed prior to declaring an individual controller defective. A diagnostic scanner, a digital volt/ohmmeter (DVOM), and a source of reliable vehicle information will be required. An infrared thermometer with a laser pointer may be useful.

Connect the scanner to the vehicle diagnostic port and retrieve all stored codes and freeze frame data. You will want to write this information down, just in case the code proves to be an intermittent one. After recording all pertinent information, clear the codes and test drive the vehicle until the code is reset or the PCM enters readiness mode.

If the PCM enters readiness mode, the code is intermittent and will be more difficult to diagnose. The condition, which caused the P060F to be stored, may even need to worsen before a diagnosis can be made. If the code is reset, continue with this short list of preliminary tests.

When attempting to diagnose a P060F, information may be your greatest tool. Search your vehicle information source for technical service bulletins (TSB) that parallel the code stored, vehicle (year, make, model, and engine), and symptoms exhibited. If you find the right TSB, it may yield diagnostic information that will aid you in a major way.

Use your source of vehicle information to obtain connector face views, connector pin-out charts, component locators, wiring diagrams, and diagnostic flow charts related to the code and vehicle in question.

Use the DVOM to test controller power supply fuses and relays. Test and replace blown fuses as required. Fuses should be tested with the circuit loaded.

If all fuses and relays appear to be functioning as intended, a visual inspection of controller related wiring and harnesses is in order. You will also want to check chassis and engine ground junctions. Use your vehicle information source to obtain ground locations for related circuits. Use the DVOM to test ground integrity.

Visually inspect system controllers for signs of water, heat, or collision damage. Any controller that is damaged, especially by water, should be considered defective.

If controller power and ground circuits are intact, suspect a defective controller or a controller programming error. Controller replacement will require reprogramming. In some cases, you may purchase reprogrammed controllers through aftermarket sources. Other vehicles/controllers will require on-board reprogramming that may only be done through a dealership or other qualified source.

Testing The ECT Sensor And Circuits

Any stored ECT sensor related code warrants checking to make sure that the engine is not overheating. It should be full of coolant and operating within the acceptable temperature range.

Probe the reference circuit pin of the ECT sensor connector using the positive test lead of the DVOM. Use the negative test lead to probe the ground pin.

With the key on and the engine off (KOEO), test for reference voltage (typically 5-volts) and a ground at the ECT sensor connector.

If reference voltage and ground are present on the respective connector pins, plug-in the sensor connector. Probe the signal circuit of the ECT sensor with the positive test lead of the DVOM (negative probe connected to known good engine ground). Use the infrared thermometer to check actual coolant temperature. Check out the temperature to voltage chart (found within the vehicle information source). With it you may determine if the ECT sensor is functioning properly by comparing actual voltage with desired voltage.

If the ECT sensor fails to reflect the correct amount of voltage (according to actual coolant temperature) suspect that it is defective.

If the ECT sensor signal circuit reflects the correct degree of voltage, use the DVOM to test the signal circuit at the PCM connector. If there is not a sensor signal at the PCM connector but it is detected at the sensor connector, an open circuit exists between the two components.

- Unlike most other codes, the P060F is likely caused by a defective controller or a controller programming error
- Test system ground integrity by connecting the negative test lead of the DVOM to ground and the positive test lead to battery voltage

Severity Description

Internal control module processor codes should be categorized as severe. A stored code P060F could result in serious drivability and fuel efficiency issues, suddenly and without warning.

Reference Sources

[P060F ICM Coolant Temperature Performance](#), OBD-Codes.