P011A: ENGINE COOLANT TEMPERATURE SENSOR 1/2 CORRELATION

OVERVIEW

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

What Does The P011A Code Mean?

On the rare occasion that a code P011A is stored in an OBD-II vehicle, it means that the powertrain control module (PCM) has detected a problem with the correlating signals between two separate engine coolant temperature (ECT) sensors.

These sensors have been designated as A and B but could also be called primary and secondary. Obviously, this code is used only in vehicles with multiple ECT sensors.

Typically, ECT sensors are composed of a thermal resistor that is surrounded by a durable resin in a brass, aluminum, or plastic housing. The housing is designed to thread into the engine block, radiator, intake manifold (coolant passage), or cylinder head. The ECT sensor is shaped and positioned so that, once the thermostat has opened, engine coolant may flow across the tip. The exposed resistor is in the tip of the sensor.

As the flowing engine coolant temperature increases, the level of resistance in the ECT resistor decreases. This allows circuit voltage to increase. The PCM recognizes these variations in ECT voltage as changes in engine coolant temperature.

The ECT sensor/s provides data to the PCM, for drivability strategy and electronic cooling fan operation, but may also serve to provide a signal to the temperature gauge in the instrument cluster.

If the PCM detects independent voltage signals from the separate ECT sensors which differ by more than a preprogrammed degree, a code P011A will be stored and a malfunction indicator lamp (MIL) may be illuminated. Multiple failure cycles may be required for MIL illumination on certain models.

What Are The Symptoms Of The P011A Code?

Symptoms of a P011A engine code may include:

- Excessive rich or lean exhaust
- Rough engine idle (especially at cold start up)
- Diminished fuel efficiency
- Decreased engine performance

What Are The Potential Causes Of The P011A Code?

Causes for this code may include:

- Defective ECT sensor
- Open or shorted ECT sensor wiring or connector
- Low engine coolant condition
- Bad thermostat
- Faulty water pump
- Air pocket in engine cooling system
- PCM or PCM programming error

How Can You Fix The P011A Code?

I like to have access to a diagnostic scanner, a digital volt/ohmmeter (DVOM), and a reliable vehicle information source before attempting to diagnose a code P011A.

Before beginning my diagnosis for any ECT sensor related code, I would make sure that the engine cooling system is filled to the proper level with the correct coolant. Operate the engine to ensure that the thermostat, water pump, radiator, and cooling fans are all working as intended. Ensure that there are no air pockets in the cooling system. The engine cooling system must be working properly before this code can be diagnosed.

Once the cooling system is operating normally, visually inspect all system wiring and connectors and 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 is a snap shot of the exact circumstances which were occurring at the time of the failure that led to the stored code P011A. I usually write this information down in case I need it later in the diagnosis. Now, I clear the codes and test-drive the

vehicle to see if the code is reset.

Use the DVOM to test the individual ECT sensors if the code is set before the PCM enters readiness mode. Any ECT sensor that fails the manufacturer's recommended test must be replaced. Consult your vehicle information source for testing specifications.

If all ECT sensors comply with manufacturer's specifications; test individual system circuits using the DVOM and make any necessary repairs.

Suspect PCM failure or a PCM programing error if all sensors and circuits are in working order.

Additional diagnostic notes:

- Be sure to unplug all related controllers from the circuit before testing resistance with the DVOM
- Use caution when testing high pressure engine coolant
- Check technical service bulletins (TSB) for help with your diagnosis

Severity Description

Since engine drivability, electronic cooling fan operation, and/or temperature gauge accuracy may be effected by the conditions which contribute to a code P011A being stored, it should be considered severe.

Reference Sources

Technical Service Bulletin for P011A - Mazda