

## P0116: ENGINE COOLANT TEMPERATURE (ECT) SENSOR CIRCUIT RANGE/PERFORMANCE

### OVERVIEW

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

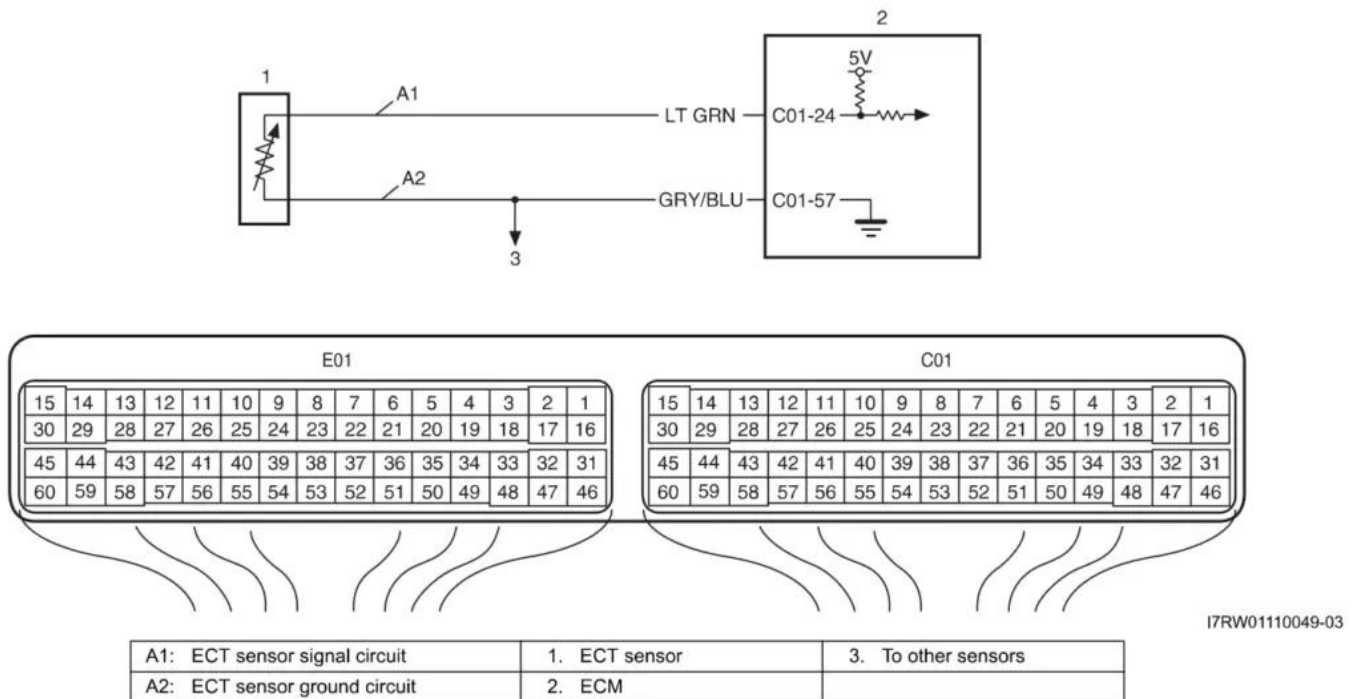
### What Does The P0116 Code Mean?

The ECT (Engine coolant temperature) sensor is a thermistor which changes resistance based on temperature of the coolant in contact with it. The ECT sensor will be located in the block or coolant passage. Usually it is a two wire sensor. One wire is a 5 Volt supply from the PCM (Powertrain Control Module) to the ECT. The other is a ground to the ECT.

As the temperature of the coolant changes the resistance on the signal wire changes accordingly. The PCM monitors the reading and determines coolant temperature in order to perform essential engine fuel management.

When engine coolant is low, sensor resistance is high. The PCM will see a high signal voltage (low temperature). When coolant is warm, the sensor's resistance is low and the PCM will see a high temperature.

The PCM expects to see slow resistance changes on the ECT signal circuit. If it sees a quick change in voltage that isn't consistent with an engine warming up, this P0116 code will set. Or if it sees a lack of change in ECT signal, this code may set.



P0116 wiring diagram

## What Are The Symptoms Of The P0116 Code?

There may be no noticeable symptoms if the problem is very intermittent, however the following may occur:

- MIL (Malfunction Indicator Lamp) illumination
- Poor drivability
- Black smoke at tailpipe
- Poor fuel economy
- May not idle
- May exhibit stalling or misfires

## What Are The Potential Causes Of The P0116 Code?

Potential causes of the P0116 code include:

- Missing or stuck-open thermostat
- Bad ECT sensor
- Short or open on signal wire
- Short or open on ground wire
- Poor connections in wiring

## How Can You Fix The P0116 Code?

If there are any other ECT sensor codes, diagnose them first.

Using a scan tool, check the ECT reading. On a cold engine, it should match the IAT reading or should be equal to ambient (outside) temperature reading. If it does match the IAT or ambient temp, check the freeze frame data on your scan tool (if equipped). The saved data should tell you what the ECT reading was when the fault occurred.

a) If the saved info indicates that the engine coolant reading was at the coldest extreme (around -30 deg. F) then that's a good indication the ECT resistance was intermittently high (unless you live in Anchorage!) Check for an open in the ECT sensor ground and signal circuits and repair as necessary. If they appear okay, warm the engine up while monitoring the ECT for any intermittent jumps high or low. If there are replace the ECT.

b) If the saved info indicates that the engine coolant reading was at the warmest extreme (around 250+ deg.F) then that's a good indication the ECT resistance was intermittently low. Check for a short to ground on the signal circuit and repair as necessary. If it appears okay, warm the engine up while monitoring the ECT for any intermittent jumps high or low. If there are replace the ECT.

Other ECT sensor and circuit related DTCs: [P0115](#), [P0117](#), [P0118](#), [P0119](#), [P0125](#), [P0128](#).

## Reference Sources

- [Diagnostic Trouble Code \(DTC\) Charts and Descriptions for P0116](#) - Page 24.
- [Technical Service Bulletin for P0116](#) - Mazda