

GENERIC · POWERTRAIN

P050C

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P050C

Cold Start Engine Coolant Temperature Performance

P050C indicates that the engine control module (ECM) has detected a cold-start engine coolant temperature (ECT) performance problem, meaning the coolant temperature did not rise as expected during the warm-up phase after a cold start. The ECM compares the ECT sensor signal against a modeled temperature profile and flags the code when the actual reading deviates from the expected value by more than a calibrated threshold.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Vehicle speed, idle control and auxiliary inputs

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Extended fast idle or rough idle during the first few minutes after a cold start
- Poor fuel economy or increased fuel consumption during warm-up
- Hesitation or stumble when accelerating from a cold start
- In cold weather, the heater may blow lukewarm air for an unusually long time
- In rare cases, the engine may be hard to start when cold

Common causes, most likely first

- 1 Faulty engine coolant temperature (ECT) sensor reading incorrectly
- 2 Sticking or failed thermostat that opens too early or remains open
- 3 Low coolant level or trapped air in the cooling system
- 4 Damaged or corroded wiring or connector at the ECT sensor
- 5 Engine control module (ECM) software calibration issue or internal fault
- 6 Coolant temperature sensor circuit high resistance due to poor splice or ground



How to diagnose and fix it

- 1 Check coolant level and inspect for leaks or air pockets in the cooling system
- 2 Perform a visual inspection of the ECT sensor and its wiring harness for damage or corrosion
- 3 Use a scan tool to compare the ECT sensor reading with actual coolant temperature when cold and during warm-up
- 4 Test the ECT sensor resistance against the manufacturer's temperature-resistance chart
- 5 Verify thermostat operation by monitoring coolant temperature rise during warm-up
- 6 Check for technical service bulletins (TSBs) or ECM software updates related to cold-start temperature performance
- 7 If all else checks out, diagnose the ECM and its connections for faults

Cold-start ECT code misdiagnosis traps

- A thermostat that sticks open is a frequent cause that many technicians overlook because the engine may still reach normal operating temperature eventually, but the warm-up rate is too slow.
Air pockets in the cooling system after a coolant service can cause the ECT sensor to read erratically during warm-up, triggering P050C without any faulty component.
- The ECT sensor may pass a simple resistance test at room temperature but still be inaccurate at cold temperatures, so a full temperature-resistance curve check is essential.
- P050C can be set by a low coolant level that leaves the sensor partially exposed, so always verify the cooling system is properly filled and bled before condemning parts.
On some vehicles, a weak or failing battery can cause voltage drops that affect sensor readings during cold starts, leading to false P050C codes.

Can I keep driving with P050C?

You can generally continue driving with P050C, but avoid extended idling and heavy acceleration until the engine is fully warmed up. If you notice overheating, coolant loss, or the heater not working, stop driving and have the cooling system inspected promptly.

Tools that help

- OBD-II scan tool with live data capability
- Digital multimeter
- Infrared thermometer
- Coolant refractometer or hydrometer
- Socket set and wrenches



Reading P050C

- P** Powertrain: engine, transmission and emissions.
- 0** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 5** Vehicle speed, idle control and auxiliary inputs.
- 0C** The exact fault within that area.

Often seen with

P0115 Engine Coolant Temperature Circuit Malfunction · **P0116** Engine Coolant Temperature Circuit Range/Performance · **P0117** Engine Coolant Temperature Circuit Low Input · **P0118** Engine Coolant Temperature Circuit High Input · **P0128** Coolant Thermostat (Coolant Temperature Below Thermostat Reg

See it working

Watch the animated explainer [Engine Cooling System Trainer: How Engines Stay Cool](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p050c/>

