



P2CEF

Auxiliary Thermostat A Stuck Open

P2CEF indicates that the powertrain control module (PCM) has detected the auxiliary thermostat is stuck open, meaning the engine coolant is flowing through the auxiliary cooling circuit even when it should be closed to help the engine reach operating temperature quickly. The PCM typically compares measured coolant temperature rise against an expected model and flags the code when the warm-up rate is too slow or the temperature never reaches the target range within a calibrated time.

SYSTEM	CODE TYPE	SEVERITY	FIX DIFFICULTY	AREA
Powertrain	Generic (all makes)	Medium	Intermediate	Hybrid propulsion

Symptoms you may notice

- Often no symptoms besides the warning light, especially in mild weather or during long drives. The engine takes noticeably longer to reach normal operating temperature, and the temperature gauge may stay low for an extended period.
- The heater may blow lukewarm or cold air for longer than usual, particularly in cold weather or at idle.
- Fuel economy may drop slightly because the engine runs in open-loop fuel control for a longer time.
- In cold climates, the cabin may never get comfortably warm, and the defroster may struggle to clear the windshield.
- A secondary code for slow closed-loop fuel control or catalyst efficiency may appear if the engine stays cold too long.

Common causes, most likely first

- 1 A failed auxiliary thermostat that is mechanically stuck open, often due to a broken spring, worn seal, or debris lodged in the seat.
- 2 A faulty coolant temperature sensor (CTS) or its wiring, causing the PCM to misjudge the actual warm-up rate and set a false code.
- 3 Low coolant level or trapped air in the cooling system, which prevents the auxiliary circuit from pressurizing and warming correctly.
- 4 A stuck-open auxiliary thermostat caused by a missing or deteriorated thermostat seal, allowing coolant to bypass the closed thermostat.
- 5 A wiring fault, such as a chafed or corroded connector at the auxiliary thermostat heater circuit, if the thermostat is electrically assisted.
- 6 A PCM calibration issue or a software update that changes the warm-up model, though this is less common than mechanical failures.
- 7 A restriction or blockage in the auxiliary coolant hoses or heater core that alters flow and confuses the warm-up strategy.



How to diagnose and fix it

- 1 Check the coolant level and inspect for leaks or air pockets, then pressure-test the system and bleed it properly before condemning any part.
- 2 Use a scan tool to read live coolant temperature data and compare it with a infrared thermometer at the thermostat housing to verify the actual warm-up behavior.
- 3 Inspect the auxiliary thermostat and its housing for mechanical binding, debris, or a missing seal, and replace the thermostat if it is confirmed stuck open.
- 4 Test the coolant temperature sensor and its wiring for resistance and continuity against the manufacturer's specification, and replace it if out of range.
- 5 If the auxiliary thermostat is electrically controlled, check the heater circuit for power, ground, and continuity, and repair any wiring faults.
- 6 Clear the code and perform a road test with the scan tool recording coolant temperature and warm-up time to confirm the repair.
- 7 If the code returns after all mechanical and electrical checks pass, verify the PCM has the latest calibration and check for technical service bulletins before replacing the PCM.

Why a stuck-open thermostat may not be the real culprit

- A slow warm-up that sets P2CEF is frequently caused by a low coolant level or air trapped in the system rather than a failed thermostat, so always bleed the cooling system before replacing parts.
- The auxiliary thermostat is often part of a split cooling circuit, and a fault in the main thermostat or its housing can mimic an auxiliary thermostat failure, so verify which thermostat the code actually refers to.
- A coolant temperature sensor that reads a few degrees low can trigger P2CEF without any mechanical thermostat problem, and this is a common misdiagnosis trap.
- In some vehicles, the auxiliary thermostat is electrically heated to open earlier, and a blown fuse or relay for that heater circuit will set this code even though the thermostat itself is fine.
- P2CEF does not always mean the thermostat is fully stuck open; a thermostat that is slow to close or partially open can set the code intermittently, especially in cold weather.

Can I keep driving with P2CEF?

You can usually continue driving with P2CEF, but avoid long periods of idling in cold weather and do not ignore a persistent low temperature gauge, because prolonged cold running can damage the catalytic converter and increase engine wear. Have the cooling system checked promptly, especially if the heater performance has dropped or the code returns after clearing.



Tools that help

- OBD-II scan tool with live data capability
- Infrared thermometer
- Coolant pressure tester
- Digital multimeter
- Hose clamp pliers and basic hand tools
- Factory service information for cooling system bleeding procedure

Reading P2CEF

P	Powertrain: engine, transmission and emissions.
2	Generic (SAE) code: it means the same thing on every OBD-II vehicle.
C	Hybrid propulsion.
EF	The exact fault within that area.

Often seen with

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 · **P2181** Cooling System Performance

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/p2cef/>

