



## P1290 · Ford

# Cylinder Head Temperature Sensor Signal Less Than Self-Test Range

P1290 on a Ford means the powertrain control module (PCM) commanded a self-test of the cylinder head temperature (CHT) sensor circuit and the signal it read back was below the minimum value the test allows. The computer saw a voltage or temperature reading from the CHT sensor that was lower than any plausible reading for the engine at that moment, so it flagged the circuit as faulty.

| SYSTEM     | CODE TYPE     | SEVERITY | FIX DIFFICULTY | AREA                                      |
|------------|---------------|----------|----------------|-------------------------------------------|
| Powertrain | Ford specific | Medium   | Intermediate   | Fuel and air metering (injector circuits) |

## Symptoms you may notice

- Illuminated check engine light, often with no other noticeable symptoms
- Rough idle or stumbling when the engine is cold, because the PCM is not receiving an accurate head temperature
- Poor fuel economy or black smoke from the tailpipe if the PCM defaults to a rich fuel strategy
- Cooling fan running constantly or not at all, since fan operation is tied to CHT readings on many Ford models
- Hard starting or extended cranking when hot, if the PCM misjudges the engine temperature
- Temperature gauge or dashboard message behaving erratically on vehicles that display CHT-derived data

## Common causes, most likely first

- 1 Faulty cylinder head temperature sensor, typically an open or shorted thermistor element
- 2 Damaged or chafed wiring between the CHT sensor and the PCM, especially near hot exhaust components
- 3 Corroded or loose connector pins at the CHT sensor or PCM harness
- 4 High resistance in the sensor ground circuit, which pulls the signal below the self-test threshold
- 5 PCM internal fault on the CHT input circuit, though this is the least common cause
- 6 Coolant level low enough to expose the sensor tip, causing an artificially low reading during the self-test
- 7 Aftermarket sensor or pigtail with incorrect resistance characteristics installed during a previous repair



## How to diagnose and fix it

- 1 Scan all modules and record freeze-frame data for P1290, then clear the code and verify whether it returns on a cold start
- 2 Inspect the CHT sensor connector and the harness run for chafing, heat damage, or pushed-out pins, and repair as needed
- 3 Measure the CHT sensor resistance with a multimeter and compare it to the Ford specification for the current engine temperature
- 4 Back-probe the sensor signal and ground wires at the PCM and check for excessive voltage drop on the ground side
- 5 Check coolant level and confirm the sensor is fully immersed, then top up and retest if low
- 6 Replace the CHT sensor with a Ford-specified part and clear the code, then run a cold-start self-test to confirm the repair
- 7 If the circuit tests good but the code persists, perform a PCM pin-fit and continuity test on the CHT input before condemning the PCM

## Why a cold start matters for P1290

- The self-test that sets P1290 runs under specific conditions, often after a cold soak, so a warm engine may pass the test and hide the fault until the next morning.
- A low coolant level can expose the CHT sensor tip and produce a reading below the self-test range even when the sensor and wiring are perfectly good.
- Technicians sometimes replace the CHT sensor when the real problem is a corroded ground splice shared with other sensors, so always check ground integrity first.
- On some Ford engines the CHT sensor is a two-wire thermistor and on others it is integrated into a coolant temperature sensor assembly, so confirm the exact configuration before ordering parts.
- P1290 does not always mean the sensor has failed; a pinched harness behind the intake or near the thermostat housing can short the signal to ground intermittently.

## Can I keep driving with P1290?

You can usually drive the vehicle short distances to a repair shop, but avoid heavy loads, long trips, and towing until the fault is repaired because the PCM may be running a default fuel and fan strategy. If the engine overheats or the cooling fan stops working, pull over and stop driving.

## Tools that help

- OBD-II scan tool with Ford-specific live data and freeze-frame capability
- Digital multimeter with resistance and voltage-drop functions
- Back-probe kit or pin probes for PCM connector testing
- Ford service information for CHT sensor resistance specifications
- Coolant refractometer or hydrometer to verify coolant concentration and level



## Reading P1290

- P** Powertrain: engine, transmission and emissions.
- 1** Manufacturer-specific code (Ford): its meaning depends on the make.
- 2** Fuel and air metering (injector circuits).
- 90** The exact fault within that area.

## Often seen with

**P1289** Turbocharge Bypass Valve Short To Ground · **P1289** Manifold Tune Valve Solenoid Circuit Open Or Shorted · **P1291** No Temp Rise Seen From Fuel Heaters · **P1289** Cylinder Head Temperature Sensor Signal Greater Than Self-Te · **P1291** Injector High Side Short To GND Or VBATT Bank 1 · **P1289** Manifold Tune Valve Solenoid Circuit Open Or Shorted · **P1291** No Temp Rise Seen From Fuel Heaters · **P1289** Switching Solenoid for Air Assisted Injection Valves Bank 2 · **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 [How a Gyroscope Works: Gimbals and Precession](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/ford-p1290/>

