



P20F1

SCR NOx Pre-Catalyst Over Temperature (Bank 2)

P20F1 indicates that the powertrain control module has detected an excessively high temperature at the selective catalytic reduction (SCR) NOx pre-catalyst on bank 2, which is the catalyst element positioned ahead of the main SCR catalyst in the exhaust stream. The computer compares the pre-catalyst temperature sensor reading against a calibrated threshold and stores this code when the temperature remains above that limit for a set period, signaling a risk of thermal damage to the catalyst or surrounding components.

SYSTEM Powertrain	CODE TYPE Generic (all makes)	SEVERITY Medium	FIX DIFFICULTY Intermediate	AREA Fuel and air metering and auxiliary emission controls
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Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Reduced engine power or limp mode if the PCM derates the engine to protect the exhaust system
- A burning or hot metallic smell from the exhaust area after driving
- Poor fuel economy or increased diesel exhaust fluid (DEF) consumption
- In rare cases, visible heat discoloration or damage to nearby underbody components

Common causes, most likely first

- 1 Faulty or skewed pre-catalyst temperature sensor on bank 2
- 2 Excessive hydrocarbon (HC) or diesel fuel entering the exhaust stream from a leaking injector or rich combustion
- 3 Restricted or failed SCR catalyst causing heat to build upstream
- 4 Engine misfire or over-fueling that raises exhaust gas temperatures
- 5 Damaged wiring or connector at the bank 2 pre-catalyst temperature sensor
- 6 Cooling system or EGR fault that raises combustion and exhaust temperatures
- 7 PCM calibration issue or internal error in the temperature monitoring strategy



How to diagnose and fix it

- 1 Connect a scan tool and record freeze-frame data for P20F1, then compare the bank 2 pre-catalyst temperature reading with ambient and engine coolant temperature after a cold soak.
- 2 Inspect the bank 2 pre-catalyst temperature sensor, its connector, and wiring for chafing, corrosion, or loose pins, and repair as needed.
- 3 Check for exhaust leaks, restrictions, or damaged catalyst substrate upstream of the SCR system.
- 4 Perform a cylinder balance or injector contribution test to identify a leaking or over-fueling injector that could raise exhaust temperatures.
- 5 Verify the engine cooling system and EGR operation are within specification, since overheating or faulty EGR can elevate exhaust temperatures.
- 6 If the sensor and wiring test good, substitute a known-good temperature sensor or use a signal simulator to confirm whether the PCM is misinterpreting a valid signal.
- 7 After repairs, clear the code and run the manufacturer's SCR monitor to confirm the pre-catalyst temperature stays within the calibrated range.

What most technicians overlook on P20F1

- A skewed temperature sensor can read high without any wiring fault, so comparing its cold-soak value to ambient temperature is a quick and often decisive check.
- This code can be set by a rich-running engine or a leaking injector that sends unburned fuel into the exhaust, so always review fuel trims and misfire counters before condemning the catalyst.
- The pre-catalyst temperature sensor is sometimes shared with the main SCR catalyst strategy, meaning a single sensor fault can trigger multiple SCR-related codes and mislead diagnosis.
- A restricted SCR catalyst or a failed DEF dosing injector can cause heat to back up into the pre-catalyst, so exhaust backpressure and DEF dosing tests belong in the diagnostic plan.
- On some vehicles, a low coolant level or a sticking thermostat raises exhaust temperatures enough to set this code without any sensor fault at all.

Can I keep driving with P20F1?

You can usually drive the vehicle a short distance to a repair shop, but avoid heavy loads, sustained high-speed driving, or towing until the fault is repaired because continued overheating can destroy the SCR catalyst. If the engine enters limp mode or you smell burning, stop driving and arrange a tow.

Tools that help

- OBD-II scan tool with live data and freeze-frame capability
- Infrared thermometer
- Digital multimeter
- Wiring diagram for the bank 2 pre-catalyst temperature sensor circuit
- Basic hand tools for sensor and connector access



Reading P20F1

- P** Powertrain: engine, transmission and emissions.
- 2** Generic (SAE) code: it means the same thing on every OBD-II vehicle.
- 0** Fuel and air metering and auxiliary emission controls.
- F1** The exact fault within that area.

Often seen with

P207F Reductant Quality Performance · **P20E8** Reductant Pressure Too Low · **P20EE** NOx Catalyst Efficiency Below Threshold (Bank 1) · **P20F0** SCR NOx Catalyst Over Temperature (Bank 2) · **P20F2** SCR NOx Catalyst Efficiency Below Threshold (Bank 2)

See it working

Watch the animated explainer **V6 Engine Explained: 60° Bank and Firing Order** on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p20f1/>

