

GENERIC · POWERTRAIN

P20C1

OBD-II DIAGNOSTIC TROUBLE CODE (DTC)

P20C1

Reductant Heater C Control Circuit/Open

P20C1 indicates that the powertrain control module has detected an open circuit or excessive resistance in the control circuit for reductant heater C, which is one of the heating elements used to keep diesel exhaust fluid from freezing. The computer monitors the heater's electrical path and sets this code when the expected current flow is absent or out of range during the heater's commanded-on phase.

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

Symptoms you may notice

- Illumination of the check engine light, often with no other noticeable symptoms
- Extended crank times or a no-start condition in freezing temperatures because the DEF tank heater cannot thaw the fluid
- A driver information message warning that the exhaust fluid system requires service or that the vehicle will be speed-limited after a countdown
- Rough running or reduced engine power if the DEF system enters a derate strategy due to the heater fault
- A persistent diesel exhaust fluid warning lamp even after refilling the tank

Common causes, most likely first

- 1 A broken, corroded, or disconnected wire in the reductant heater C control circuit, especially at the heater connector or along the frame rail
- 2 A failed reductant heater C element itself, typically an open internal heating coil
- 3 A faulty powertrain control module driver for the heater control circuit, though this is less common
- 4 Water intrusion or corrosion in the heater connector causing high resistance or an intermittent open
- 5 A blown fuse or damaged relay that supplies power to the reductant heater circuit
- 6 Rodent damage or chafing of the heater wiring harness against the vehicle underbody



How to diagnose and fix it

- 1 Verify the code with a scan tool and check for any related powertrain codes that might indicate a broader electrical issue
- 2 Inspect the reductant heater C connector and wiring for corrosion, loose pins, or physical damage, and repair as needed
- 3 Measure the resistance of the heater element at the connector and compare it to the manufacturer's specification to confirm an open circuit
- 4 Check the fuse and relay that supply power to the reductant heater circuit, replacing any failed components
- 5 Perform a voltage drop test on the control circuit while commanding the heater on with a scan tool to isolate high resistance in the wiring
- 6 If the wiring and power supply are good but the heater does not actuate, replace the reductant heater assembly
- 7 Clear the code and perform a road test or a heater activation test to confirm the repair and ensure the code does not return

Reductant heater faults that fool technicians

- A common misdiagnosis is replacing the DEF heater when the actual fault is a corroded connector pin that creates an open circuit only when the harness is flexed by engine movement.
- Some vehicles will not command the reductant heater on unless the ambient temperature is below a certain threshold, so a static resistance check at room temperature may not reveal an intermittent open.
- The control circuit for reductant heater C may share a ground point with other sensors or heaters, and a poor ground can set this code even though the heater itself is fine.
- After repairing the circuit, many vehicles require a scan tool to reset the DEF system's adaptive learning or to clear a permanent derate countdown that persists even after the code is cleared.
- A reductant heater C open circuit can be caused by a failed heater relay that has welded closed and then overheated the wiring, so always inspect the relay and its socket for heat damage.

Can I keep driving with P20C1?

You can usually continue driving with P20C1, but avoid long trips in freezing weather because the DEF may not thaw and the vehicle could enter a speed-limiting derate. Have the fault diagnosed soon to prevent the system from escalating to a no-start condition.

Tools that help

- OBD-II scan tool with bidirectional control and live data capability
- Digital multimeter with resistance and voltage drop functions
- Wiring diagram for the reductant heater circuit
- Test light or fused jumper wire for circuit testing
- Socket set and trim removal tools for accessing the heater and harness



Reading P20C1

- 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.
- C1** The exact fault within that area.

Often seen with

P20BE Reductant Heater B Control Circuit Performance · **P20BF** Reductant Heater B Control Circuit Low ·
P20C0 Reductant Heater B Control Circuit High · **P20C2** Reductant Heater C Control Circuit Performance ·
P20C3 Reductant Heater C Control Circuit Low

See it working

Watch the animated explainer [How a Boxer Engine Works: Flat Engine Cutaway](#) on Auto Veteran to see the parts involved moving.

Full guide, related articles and animations: <https://www.autoveteran.tech/dtc-codes/p20c1/>

