



Temperature Sensor Troubleshooting Guide - US10+OBD13 And Newer



Component Overview

The Exhaust Gas Temperature Sensors are utilized in the Exhaust Aftertreatment System for temperature readings at specific locations in different stages of the system. These are two-wire sensors which correlate resistance to temperature. The sensors are commonly referred to as T1, T2, T3 & T4 respective to their place in the exhaust stream. T4 was added for OBD19 and newer emissions. These sensors report to the Aftertreatment Control Module (ACM) and play an important part in the EATS strategy and diagnostics.

The primary failure mode Temperature Sensors is internal failure.

Diagnosis and Repair

Perform a DTC Readout. Review the tables below to determine which category the DTC currently being diagnosed falls under. Proceed according to the directions for the appropriate section.


NOTE: Active Temperature Sensor DTCs will cause Regens to abort.

High Exhaust Temperature DTCs

DTC	Description
P1151-00	Aftertreatment System Over Temperature
P2428-00	Exhaust Gas Temperature Too High

Directions: The above DTCs commonly fault in correlation to an upstream component failure that causes high temperature readings in the EATS. If other system DTCs are present prioritize the system DTCs first. If no other DTCs or upstream faults observed, proceed with the directions below.

Exhaust Temp Plausibility DTCs

 Live UI these codes should only be diagnosed if they are Active or have a DTC Confirmed status of True.

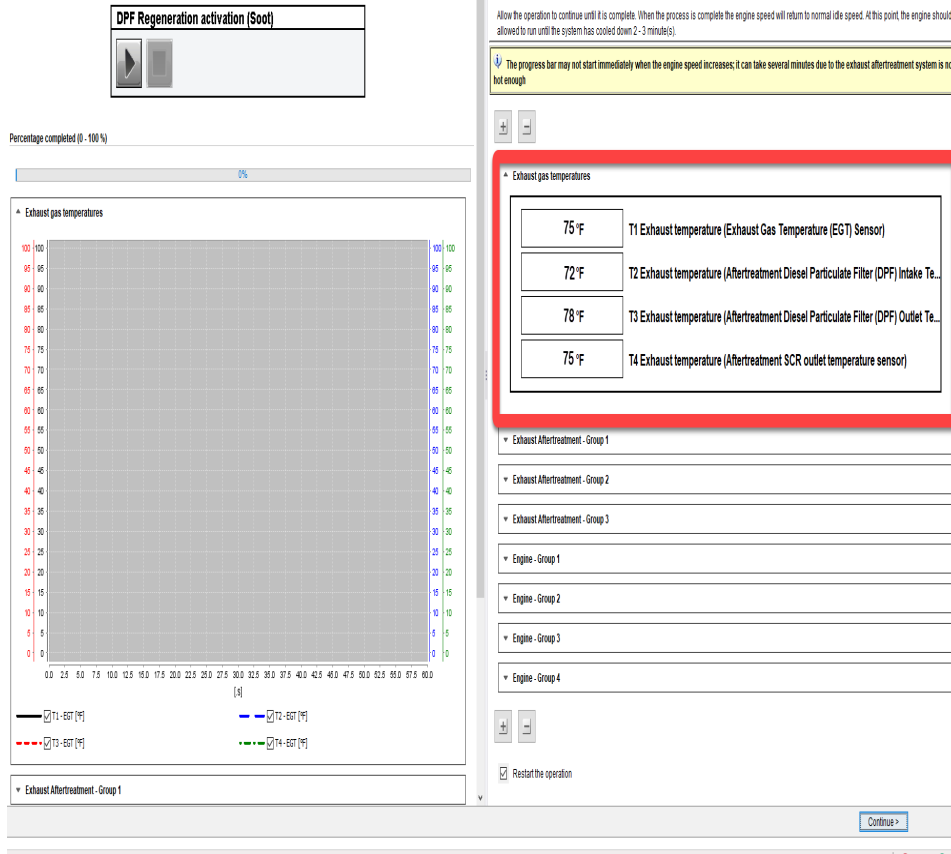
DTC	Description
P246F-64	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 4 NOTE: OBD19 & 20 Vehicle only, 1-Box SCR Follow TSB <i>DEF Crystallization, dosing valve, clean.</i>
P2084-64	Exhaust Gas Temperature Sensor Circuit Range/Performance (Bank 1 Sensor 2)
P2080-64	Exhaust Gas Temperature Sensor Circuit Range/Performance Bank 1 Sensor 1
P242B-64	Exhaust Gas Temperature Sensor Circuit Range/Performance (Bank 1 Sensor 3)

Directions: Confirm the Temperature Sensor Values at Ambient and/or during a Heating Cycle (Regen). Any sensors that are out of expected range should be replaced using the Impact operations below:

Operation	Title
2581-03-02-05	Exhaust Temperature Sensor, Replacement. T1
2581-03-02-06	Exhaust Temperature Sensor, Replacement. T2
2581-03-02-07	Exhaust Temperature Sensor, Replacement. T3

If no fault is found, ensure software is up to date on the Engine ECU (EMS), as some diagnostics improvements have been released.

Ambient Temperature Evaluation - Using PTT 2589-08-03-02 Subtest A, Select Soot Regeneration, **DO NOT START THE ENGINE** (this is a manual condition that can be bypassed); rather use key on, engine off. Before starting the regen using the drop down menu view temperature sensors readings. When engine/exhaust is at ambient temperature, all Temperature Sensors should read close (approx. within 10 Degree F) to the same value.

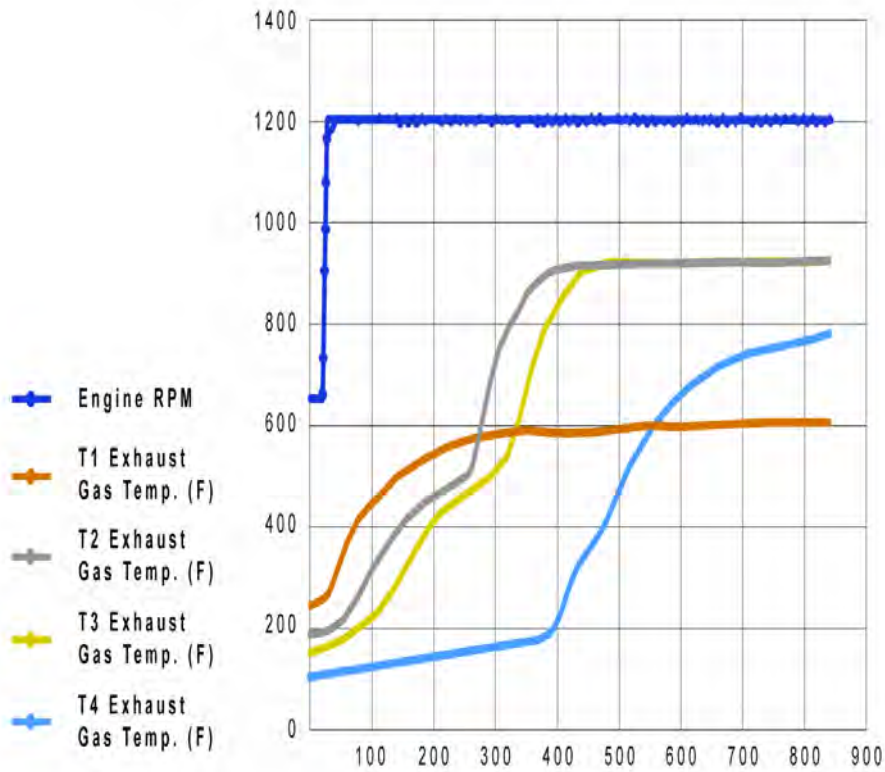


Heating Cycle Evaluation - Using PTT 2589-08-03-02 Subtest A, perform a Soot Regen. View/graph the temperature sensors. Make sure the values rise in the respective order shown in the graph below.

Note: PTT will abort regen for active Temp Sensor DTCs, it may be necessary to clear DTC in order to perform the follow evaluation.

Note: PTT will provide expected value under the information tab during the regeneration.

Exhaust Temperatures profile during Regeneration from a cold engine



Electrical DTCs - Only diagnose active and/or confirmed DTCs.

DTC	DESCRIPTION
P242A-15	Exhaust Gas Temperature Sensor Bank 1 Sensor 3
P2031-15	Exhaust Gas Temperature Sensor Bank 1 Sensor 2
P0544-15	Exhaust Gas Temperature Sensor Bank 1 Sensor 1
P2032-00	Engine Exhaust Gas Temperature Circuit Low (Bank 1 Sensor 2)
P242C-00	Exhaust Gas Temperature Sensor Circuit Low (Bank 1 Sensor 3)
P0545-00	Exhaust Gas Temperature Short Circuit Low
P2471-00	Exhaust Gas Temperature Sensor Circuit High Bank 1 Sensor 4
P2470-00	Exhaust Gas Temperature Sensor Circuit Low Bank 1 Sensor 4

Live UI ons:

1 Visual inspection wiring harness for damage

1. visual inspection wiring harness for damage.
2. Follow PTT Diagnostic to perform harness and sensor checks.

Rules For Replacement

- Warranty will only cover replacement of a temperature sensor if one of the DTCs in Yellow sections above is present.
- Standard Diagnostic Time for a Temperature Sensor 1.4 hrs.

Review the applicable video link below

MACK	EXHAUST GAS TEMP SENSOR
VOLVO	EXHAUST GAS TEMP SENSOR

Tags

- [p1151-00](#)
- [p2428-00](#)
- [p246f-64](#)
- [p2084-64](#)
- [p2080-64](#)
- [p242b-64](#)
- [p0545-00](#)
- [p2471-00](#)
- [p2470-00](#)
- [mack](#)
- [volvo](#)
- [p242a-15](#)
- [p2031-15](#)
- [p0544-15](#)
- [p2032-00](#)
- [p242c-00](#)
- [unlocking uptime](#)

Related links and attachments

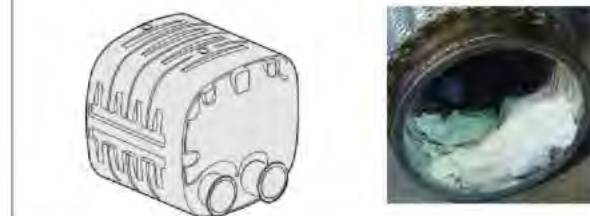

- [KC-2171 2581-03-02-06 REDUCED](#)
- [KC-2171 2581-03-02-05 REDUCED](#)
- [KC-2171 2581-03-02-07 REDUCED](#)

Feedback

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to help improve the content of this article



A DPF 20 - 60 minute(s)**B** SCR 30 - 90 minute(s)**2589-08-03-02 Exhaust Aftertreatment System, Service Regeneration** Simulation

Information >> Conditions >> Execution

Purpose

- Perform a service regeneration (DPF)
- Perform DEF crystal sublimation
- Check that the regeneration functions properly
- Prepare particulate filter for ash cleaning

Selections

Select the illustration corresponding to the method or test to be performed

A - 2545-08-03-03 Diesel Particulate Filter Service Regeneration

- This operation is used to perform a "service regeneration" of the diesel particulate filter (DPF)
- During engine operation, the DPF becomes loaded with soot. Regeneration of the DPF takes place during engine operation in order to remove the soot.
- If the soot level becomes greater than what can be removed by the normally-occurring regeneration process, service regeneration may be needed. Service regeneration may also be needed to prepare the filter for ash cleaning.


B - 2585-11-03-03 SCR, Diesel Exhaust Fluid, Crystal Sublimation


- Under certain circumstances, the SCR catalyst may become loaded with DEF crystals. These deposits develop when the DEF is injected in cold duty cycles in which the SCR catalyst does not reach the proper temperature needed for chemical reaction. If the crystallization level becomes greater than that which can be removed by normal engine operation, manual regeneration may be needed.
- In this process the solid crystals are converted to a gaseous state. This conversion is performed by heating the SCR unit to a temperature that causes the conversion of the crystals to occur, thereby removing them from the system.
- Heating of the **SCR** catalyst is accomplished by heating of the diesel particulate filter (DPF), similar to the DPF regeneration except that the temperatures are higher and it can take longer time.


Continue >



Cancel




1 

2  = Released

3  > 600rpm

4  

2589-08-03-02 Exhaust Aftertreatment System, Service Regeneration

 Simulation

Information >> Conditions >> Execution

Manual conditions

- 1 Parking brake applied
- 2 Accelerator pedal (AP) released
- 3 Engine running
- 4 Vehicle outdoors in a suitable area

Confirmed

Continue > Cancel

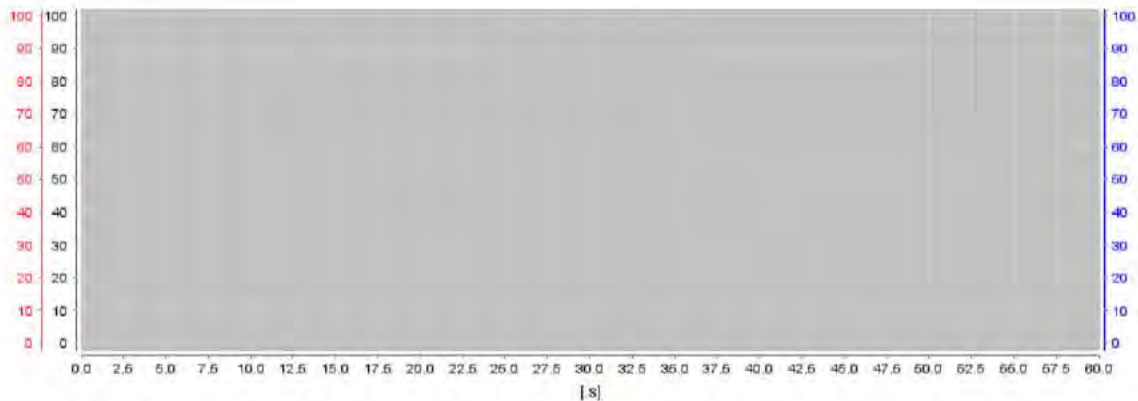
DPF Regeneration activation (Soot)



Percentage completed (0 - 100 %)

0%

Exhaust gas temperatures



T1 - EGT [°F]

T2 - EGT [°F]

T3 - EGT [°F]

Exhaust Aftertreatment - Group 1

Exhaust Aftertreatment - Group 2

Exhaust Aftertreatment - Group 3

Engine - Group 1

Engine - Group 2

2589-08-03-02 Exhaust Aftertreatment System, Service Regeneration

Simulation

Information >> Conditions >> Execution

Information

Action

Note: The process can be stopped at any point by selecting the stop button

Start the regeneration by pressing the play button

Allow the operation to continue until it is complete. When the process is complete the engine speed will return to normal idle speed. At this point, the engine should be allowed to run until the system has cooled down 2 - 3 minute(s).

The progress bar may not start immediately when the engine speed increases; it can take several minutes due to the exhaust aftertreatment system is not hot enough



Exhaust gas temperatures

Exhaust Aftertreatment - Group 1

Exhaust Aftertreatment - Group 2

Exhaust Aftertreatment - Group 3

Engine - Group 1

Engine - Group 2

Engine - Group 3

Engine - Group 4



Restart the operation

Continue >