

NOx Sensor Replacement Guide - US10+OBD13 And Newer Emissions



Review the tables below to determine which category the DTC currently being diagnosed falls under. Provide instructions for the appropriate section.

I. Diagnostic Trouble Codes With NOx Sensor in the Description

Fault Code	Fault Description	Comments
P220A-1C	NOx Sensor Supply Voltage Circuit (Bank 1 Sensor 1), Circuit voltage out of range	Power supply - not s
P220B-1C	NOx Sensor Gas Outlet High Voltage, Circuit voltage out of range	Power supply - not s
P225D-00	NOx Sensor Performance - Signal Stuck Low Bank 1 Sensor 1	Sensor reading fresh issue)
P225F-00	NOx Sensor Performance - Signal Stuck Low Bank 1 Sensor 2	Sensor reading fresh issue)
U029D-00	Lost Communication With NOx Sensor "A"	Most likely Harness
U029E-00	Lost Communication with NOx Sensor B	Most likely Harness
P229F-64	NOx Sensor Gas Outlet Removed, Signal plausibility failure	Nuisance code, mos

Although the codes above have the term "NOx sensor" in their descriptions, it is highly unlikely that the senso these codes. The table above specifies the likely cause of each code.

Direction/Repair: DO NOT REPLACE the NOx sensor(s) for these codes. Diagnostics should be performed in a above.

II. Inlet NOx Sensor (NOx1) Diagnostic Trouble Codes - Sensor Failure Likely

Fault Code	Fault Description
P22FB-92	NOx Sensor Performance - Sensing Element Bank 1 Sensor 1, Performance or Incorrect Operatio
P220E-93	NOx Sensor Heater Control Circuit Range/Performance (Bank 1 Sensor 1), No operation
P2200-13	NOx Sensor Bank 1 Sensor 1, Circuit Open
P2203-00	NOx Sensor Circuit High Bank 1 Sensor 1
P2205-13	NOx Sensor Gas Outlet Open Circuit, Circuit open

P2206-00	NOx sensor heater control circuit low, bank 1 sensor 1
P2208-00	NOx sensor heater sense circuit, bank 1 sensor 1

These codes indicate that the inlet NOx sensor is likely damaged and needs to be replaced.

Direction: In Premium Tech Tool, verify that either the code is Active, or if Inactive that the Confirmed DT detailed status information as shown in the example below.

DTC List (2 Items)

Control Unit ▲	DTC	Status
Brake ECU (MID 136)	SID 69: Axel load sensor, FMI 2: Data erratic, intermittent, or incorrect	Active
Engine Control Module (EMS)	P229F64: NOx Sensor Gas Outlet Removed, Signal Plausibility Failure	Active 0

NOx Sensor Gas Outlet Removed

⊟ Detailed status information

Title ▲	Value
Confirmed DTC	True
Pending DTC	False
Test failed	True
Test failed since last clear	True
Test failed this operation cycle	True
Test not completed since last clear	False
Test not completed this operation cycle	False
Warning indicator requested	False

Repair: If the DTC meets either of the above criteria, replace the Inlet NOx Sensor ONLY. No other diagn

III. Inlet NOx Sensor (NOx1) Diagnostic Trouble Codes - Potential Sensor Fail

Fault Code	Fault Description
P026C-00	Fuel Injection Quantity Lower Than Expected
P026D-00	Fuel Injection Quantity Higher Than Expected
P2201-64	NOx Sensor Bank 1 Sensor 1, Signal plausibility failure
Live UI -00	NOx Sensor Performance - Signal Stuck High Bank 1 Sensor 1

These codes indicate that the inlet NOx sensor is potentially damaged, but further investigation is required to

Direction:

- For US17+OBD2016, US17+OBD2017, and US17+OBD2018 emissions vehicles: PTT test [2589-08-03-18 Exhal Test, NOx Sensor Test](#) should be performed.
- For all other emissions levels: PTT test [2549-08-03-03 NOx Conversion Test](#) should be performed.

Repair:

- If the NOx1 sensor fails the evaluation, replace the Inlet NOx Sensor ONLY.
- If the NOx2 sensor (Outlet NOx Sensor) fails the test, disregard the results.

IV. Outlet NOx Sensor (NOx2) Diagnostic Trouble Codes - Sensor Failure Likel

Fault Code	Fault Description
P220F-93	NOx Sensor Incorrect Value at Startup, No operation
P229E-13	NOx Sensor Bank 1 Sensor 2, Circuit open
P22A6-00	NOx sensor heater sense circuit, bank 1 sensor 2
P22A1-00	NOx Sensor Circuit High Bank 1 Sensor 2
P22A3-13	NOx Sensor Heater Control Bank 1 Sensor 2, Circuit open
P22A4-00	NOx sensor heater control circuit low, bank 1 sensor 2
P22FE-00	NOx Sensor Performance - Sensing Element Bank 1 Sensor 2

These codes indicate that the outlet NOx sensor is likely damaged and needs to be replaced.

Direction: In Premium Tech Tool, verify that either the code is Active, or if Inactive that the Confirmed DT detailed status information as shown in the example below.

DTC List (2 Items)

Control Unit ▲	DTC	Status
Brake ECU (MID 136)	SID 69: Axel load sensor, FMI 2: Data erratic, intermittent, or incorrect	Active
Engine Control Module (EMS)	P229F64: NOx Sensor Gas Outlet Removed, Signal Plausibility Failure	Active  0

NOx Sensor Gas Outlet Removed

Detailed status information

Title ▲	Value
Confirmed DTC 	True 
Pending DTC	False
Test failed	True
Test failed since last clear	True
Test failed this operation cycle	True
Test not completed since last clear	False
Test not completed this operation cycle	False
Warning indicator requested	False

Repair: If the DTC meets either of the above criteria, replace the Outlet NOx Sensor ONLY. No other diag required.

V. Diagnostic Trouble Codes For Emissions System - Either Sensor Possible

Fault Code	Fault Description
P225E-00	NOx Sensor Performance - Signal Stuck High Bank 1 Sensor 2
P20EE-00	SCR NOx Catalyst Efficiency Below Threshold (Bank 1)
P103C-00	NOx Catalyst Efficiency Inducement, Selective Catalytic Reduction (SCR) Unit
P207F-00	Reductant Quality

These codes indicate an issue with the emissions system, which could be caused by a failed NOx sensor.

Direction:

- For US17+OBD2016, US17+OBD2017, and US17+OBD2018 emissions vehicles: PTT test [2589-08-03-18 Exhal Test, NOx Sensor Test](#) should be performed.
- For all other emissions levels: PTT test [2549-08-03-03 NOx Conversion Test](#) should be performed.

 Live UI : Follow guidance from test results.



Tags

- [p2200-13](#)
- [p2203-00](#)
- [p2205-13](#)
- [p2206-00](#)
- [p2208-00](#)
- [p026c-00](#)
- [p026d-00](#)
- [p2201-64](#)
- [p225c-00](#)
- [p220f-93](#)
- [p229e-13](#)
- [p220a-1c](#)
- [p220b-1c](#)
- [p225d-00](#)
- [p225f-00](#)
- [u029d-00](#)
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- [p229f-64](#)
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- [p22a1-00](#)
- [p22a3-13](#)
- [p22a4-00](#)
- [p22fe-00](#)
- [p225e-00](#)
- [p20ee-00](#)
- [p103c-00](#)
- [p207f-00](#)

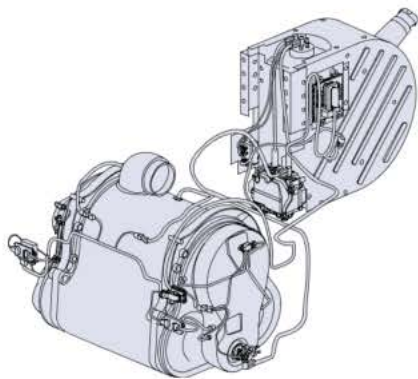
Related links and attachments

No links or attachments available



Feedback

[Give feedback](#) to help improve the cont



2589-08-03-18 Exhaust Aftertreatment System Analysis

Simulation

Information >> Conditions >> Execution >> Result

Purpose

Comprehensive check of Exhaust Aftertreatment System (EATS)

Note: This operation should only be used in the following circumstances

- Reference from diagnostic/service information or Technical support
- Relevant DTCs: P103C, P20EE, P225E, P225C, P229F, P2201, P0422

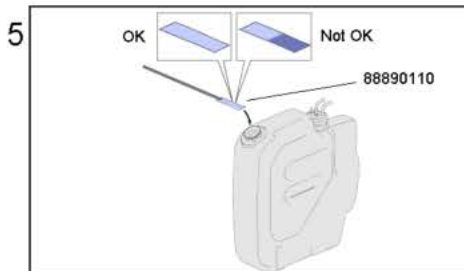
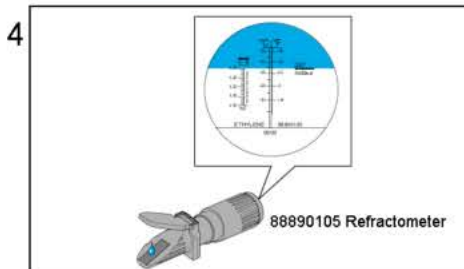
Description

- The ECM routine will perform a self-evaluating system test on the Exhaust Aftertreatment System (EATS)
- All tests can be performed in sequential order, or specific sub-tests can be individually selected

Available sub-tests that can be performed individually

- 1 NOx sensors
- 2 DEF dosing system
- 3 SCR efficiency

Operation may take approximately 15 - 45 minute(s) to complete



2589-08-03-18 Exhaust Aftertreatment System Analysis

☐ Simulation

Information >> Conditions >> Execution >> Result

Manual conditions

- 1 Reference from diagnostic/service information or Technical support (DTCs: P103C, P20EE, P225E, P225C, P229F, P2201, P0422)
- 2 Parking brake applied
- 3 Vehicle outdoors in a suitable area
- 4 DEF concentration within specifications
- 5 DEF free from contamination

☐ Confirmed

Continue Cancel



Start



DEF System Status:

Waiting for start

Percentage completed (0 - 100%)

0%

▼ Primary Parameters

▼ Secondary Parameters

2589-08-03-18 Exhaust Aftertreatment System Analysis

Simulation

Information >> Conditions >> Execution >> Result

▼ Information

▲ Action

It is highly recommended to run all the subtests at the same time in order to achieve an optimal system evaluation. However, each subtest can be selected individually on recommendation from diagnostic/service information or Technical Support.

Note: All subtests are enabled by default

Deselect which subtests not to run

- ☒ NOx sensors
- ☒ DEF dosing system
- ☒ SCR efficiency

Ignition Key ON and Engine OFF

- 1 Read out the status of the operating conditions
- 2 Check that all signals and values are stable and without abnormal deviations
- 3 Check that all signals are displaying realistic values according to the actual conditions

Start the engine and let it idle

- 1 Start the test
- 2 Wait until test has completed
- 3 Continue to the Result step



▼ Primary Parameters

▼ Secondary Parameters

▼ Static parameters, initial readout



Continue >

