Diagnostic Trouble Codes (DTC) P20EE, P207F And P103C, Diagnostic Procedure - REPLACES GUIDED DIAGNOSTICS IN PREMIUM TECH TOOL (PTT) - US10+OBD2013 to US14+OBD2016 (Non-Common Rail) Emissions, Commonly Model Years 2014 To 2017

Internal Content

IMPORTANT
An eService case IS NOT required for ANY STEP of the process below. A case should ONLY BE OPENED if further assistance is required to complete diagnosis. **If test results determine an SCR replacement is required, A CASE IS NOT REQUIRED TO ORDER A REPLACEMENT.** **Cases submitted solely to request approval to replace an SCR WILL BE REFUSED.**

The following checklist should be used for diagnosis of P20EE, P207F or P103C on US10+OBD13 to US14+OBD16 chassis instead of Guided Diagnostics.

DO NOT REPLACE ANY PARTS UNTIL ALL ACTIVITIES LISTED IN THIS SOLUTION ARE COMPLETE.

NOTE: The Malfunction Indicator Lamp (MIL) may still be lit even if P20EE shows inactive on a DTC Readout.

I. Vehicle History

- The following information should be obtained and reviewed prior to beginning diagnosis.

- Is this the chassis's first visit to the dealer for either of these codes?

- Have there been any previous failures or problems that may have caused problems with the Exhaust Aftertreatment System (EATS)?

Live UI Examples:

- Turbocharger failure
- EGR Cooler failure
- Coolant passage through the exhaust
- Excessive fuel through the exhaust (Injector failure, AHI failure)
- DPF failure
- Contaminated DEF

NOTE: If this is the chassis's first visit for any of the three codes, a Crystal Sublimation should be performed and the chassis released after confirming the items below.

II. Check the DTC Readout

- A complete DTC Readout from the time of the vehicle's arrival should be attached to the eService case if one must be opened as outlined in Step V.

- Are there any other NOx sensor DTCs present?

• **P225E** and **P0422** are very similar to P20EE. The checks below should be followed for these codes as well.

• Any other NOx sensor codes may suggest intermittent NOx sensor failure.

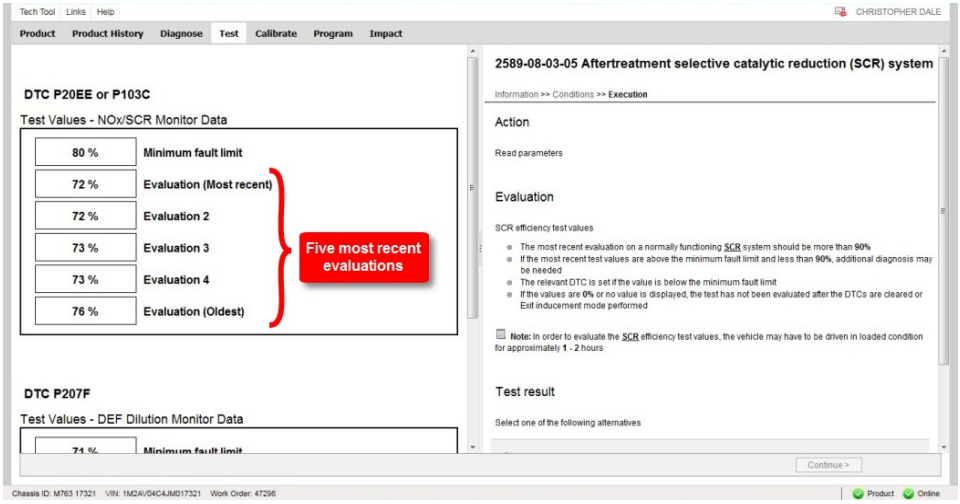
- Are there any codes present for other engine components that would indicate an issue contributing to or causing either P20EE, P207F or P103C?

• Examples:

○ **EGR System**
○ Fuel System (Includes AHI)
○ Turbocharger/Boost
○ DPF
○ Exhaust temperature

III. Check SCR Efficiency Evaluations

- SCR Efficiency values can be found in Premium Tech Tool (PTT)
Live UI **:ion 2589-08-03-05 Aftertreatment Selective Catalytic Reduction (SCR) System.**



• The last five efficiency evaluations are displayed as shown in the screenshot above.

○ **Note:** US10+OBD13 vehicles will only display one previous evaluation. A screenshot should still be provided if an eService case is opened.

○ If all five tests are below the fault limit, SCR conversion has been poor for an extended amount of time.

○ If only one or two are below the fault limit, conversion is only intermittently poor.

- Information on driving conditions when the poor conversion is occurring may provide insight into the cause of the codes.

IV. SCR System Checks

- Check DEF quality with a refractometer

- Physically check for any contamination in the DEF tank

• Examples

- Dirt or Debris
- Coolant
- Water
- Fuel
- Oil

Live UI

- Physically inspect the DEF Dosing Valve, Diffuser Pipe, and SCR Inlet for crystallized DEF

• Ensure there is no significant/excessive crystal buildup in any component.

○ **NOTE:** A small amount of crystal accumulation is normal.

• **If significant accumulation is noted clean it as first step and then** ensure that the DEF dosing valve is correctly installed with all gaskets and clamps positioned properly.

- Perform DEF Dosing Test 2 (confirms correct operation of the DEF dosing valve)

• Located in Operation 2589-08-03-05 Aftertreatment Selective Catalytic Reduction (SCR) System.

○ Test B from the first screen of the operation

• Test two is the **Small Dosing Test**

○ The test should be run twice and results noted to an accuracy of 2 milliliters
○ Nominal Volume is **55 mL**

○ Acceptable range is 55 mL ± 3 mL

- Run a NOx Conversion, Operation 2549-08-03-03.

• **Note:** This test checks the function of both NOx sensors. It does not evaluate SCR efficiency.

• While running the routine if you get new NOx sensor fault code (Egs: P220E-93 , P220F-93), then troubleshoot that fault code. Typically P220E-93 fault code suggests replacement of NOx1 sensor.

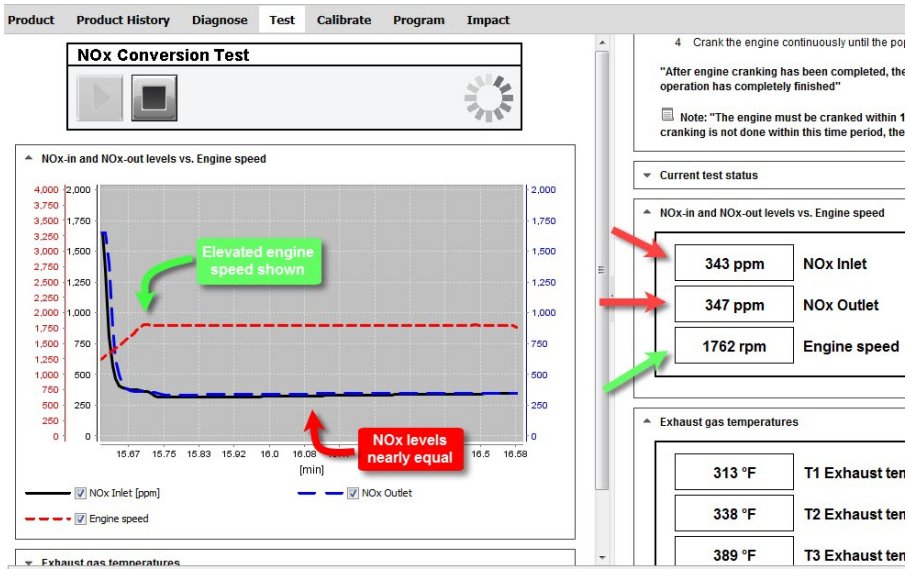
• Inlet and Outlet NOx Sensor values should be close to each other at high engine speed (last portion of the test) as shown below.

Live UI

If during the test difference between NOx sensors are greater than

10%, we recommend replacing sensor reading higher value and re-do the test.

The likelihood that both sensors require replacement at once is low. Replacement of both sensors at once should not be considered immediately unless affected by an upstream failure.



V. If no fault is found and an eService is required for further assistance, the following items MUST BE included when the case is opened:

- A thorough description of vehicle history

- Summary of previous visits to service locations
- Previous repairs and part replacements and findings that led to the repair or replacement

- A complete list of all diagnostic steps performed including actual numerical values observed in the steps above.

- "Performed GD", "Completed worksheet", "Completed solution" etc. do not provide any information on work that has already been done.
- "Good", "OK", "in spec", are not acceptable values. Numerical values are required.
- CBR solution numbers should be included.

- A complete DTC Readout from the time of the vehicle's arrival.

- A screenshot of SCR efficiency evaluations as shown in Section III.

Live UI **enshot of the NOx Conversion test as shown in Section**

Tags

k98892323 p0422-00 p103c-00 p207f-00

p20ee-00 p225e-00 p042200 p103c00

p207f00 p20ee00 p225e00 mack volvo

Related links and attachments

No links or attachments available

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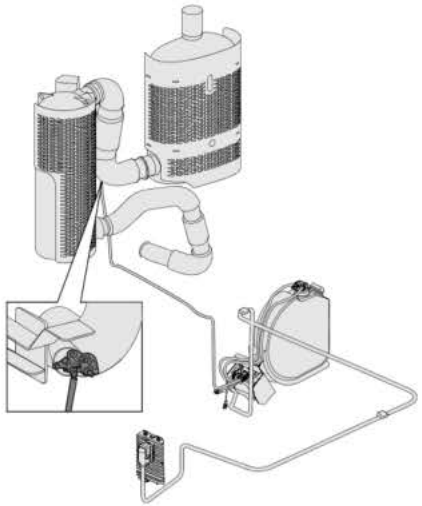
to help improve the content of this article

Live UI

Aftertreatment selective catalytic reduction (SCR) system



Illustrations are used for reference only, may differ slightly from the actual vehicle

2549-08-03-03 NOx Conversion

Simulation

Information >> Conditions >> Execution

Purpose

Check NOx sensor offset

Components to be tested are:

- NOx sensor

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

- Reference from diagnostic/service information or Technical support
- Relevant DTCs: **P207F, P20EE, P225E, P225C**

Description

The test can be used when:

- Verification - To compare system behaviour before and after repair

Note: Operation may take approximately 20 - 30 minute(s) to complete

Information

Continue > Cancel

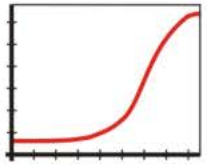
Tech Tool

Tech Tool | Links | Help

BRADLEY PICKENS

Product | **Product History** | **Diagnose** | **Test** | **Calibrate** | **Program** | **Impact**

A



B

C

Exit inducement mode

D

SCR efficiency test values

2589-08-03-05 Aftertreatment selective catalytic reduction (SCR) system

Simulation

Information >> Conditions >> Execution

Purpose

Check that a newly installed, repaired, overhauled or replaced SCR system works correctly

Selections

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

A - System pressure build up

Check function/leakage of pump and hoses

B - Dosing test

- Check function/leakage of dosing valve
- Perform the Dosing test after the dosing valve has been replaced in order to exit inducement and clear DTC **P208E** or **P103B**

C - Exit inducement mode

- This should only be performed to exit inducement mode in order to find the root cause of DTC **P207F** or **P103C**
- Reset SCR system inducement timers

D - SCR efficiency test values

The following diagnostic trouble codes (DTCs) are concerned: **P207F** or **P20EE**

Continue > | Cancel

Chassis ID: M763 19305 VIN: 1M2AV07C0JM019305 Work Order: 000000

Product | Online

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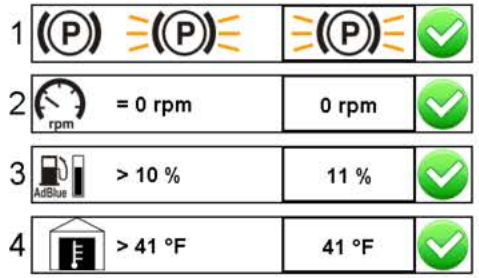
Product | **Product History** | **Diagnose** | **Test** | **Calibrate** | **Program** | **Impact**



2589-08-03-05 Aftertreatment selective catalytic reduction (SCR) system

Simulation

Information >> **Conditions** >> Execution

Automatically checked conditions

1 Parking brake applied
2 Engine not running
3 DEF tank level above 10 %
4 Ambient temperature above 41 °F

Continue > | Cancel

Chassis ID: M763 19305 VIN: 1M2AV07C0JM019305 Work Order: 000000

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Tech Tool

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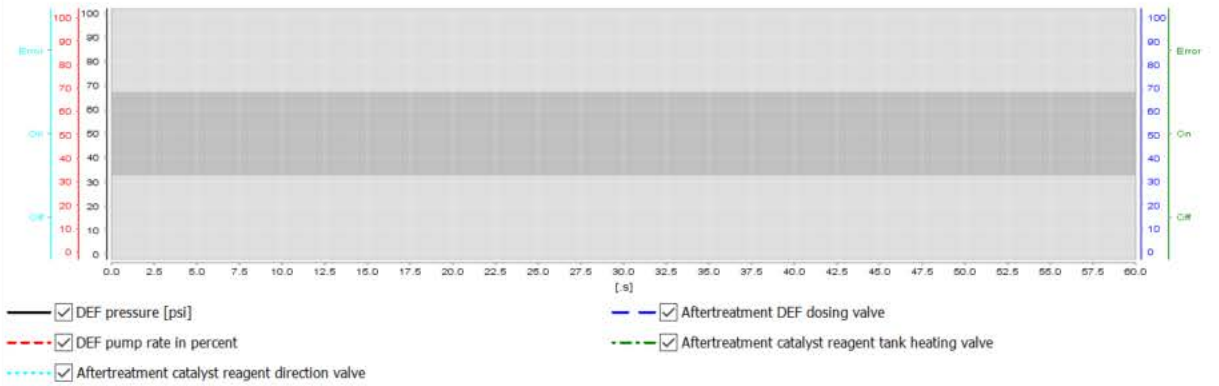
Product | **Product History** | **Diagnose** | **Test** | **Calibrate** | **Program** | **Impact**

SCR Start-up Test (Pressure build up)

DEF System Status:
Waiting for start

Graph



2589-08-03-05 Aftertreatment selective catalytic reduction (SCR) system

Simulation

Information >> Conditions >> **Execution**

Information

This test gives the possibility to start up / build up the pressure without starting the engine

The test can be used to check that the repaired, serviced or replaced dosing system is working correctly

Action

- Before starting the test, monitor the signals and make sure the DEF pressure is near **0 kPa (0 psi)** without a large deviation
- Start the test

Note: The SCR Start-up test should be run for several minutes to verify that the system can hold pressure over time

Parameter values

14.5038 psi	**DEF pressure**
0 %	**DEF pump rate in percent**
0	**Aftertreatment DEF dosing valve**
	DEF tank heating valve
	DEF direction valve
60 %	**DEF concentration**

Evaluation

The pressure should build up to approximately **900 kPa (130 psi)**

Test result

Select one of the following alternatives

- (•) OK
- ( ) Not OK

[ ] Restart the operation

Continue >

Chassis ID: M763 19305 VIN: 1M2AV07C0JM019305 Work Order: 000000

Product Online

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