Volvo Selective Catalytic Reduction (SCR) Muffler Troubleshooting Guide - US10+OBD13 And Newer Emissions

Component Overview

The SCR contains a coated substrate that, with the input of heat and DEF, changes NOx into nitrogen and water vapor. The SCR's job in the Emissions After-Treatment System (EATS) is to lower the NOx level emitted into the atmosphere.

The performance of the SCR is evaluated by the NOx sensors. There are NOx sensors that are located on upstream (inlet) and downstream (outlet) ends of the SCR.

Important: the SCR is the last component in the EATS which makes it susceptible to any upstream failures.

Primary failure mode of the Muffler (SCR) is:

- Coating of the substrate being compromised
- Indigestions of foreign objects such as oil, coolant, fuel, etc.

Diagnosis and Repair

Prior to proceeding with any of the information below, any codes, symptoms or failures of upstream components must be diagnosed and corrected first.

Upstream components include:

- Base Engine (Starting or operation issues)
- EGR System
- Fuel System (Engine supply and aftertreatment hydrocarbon injector supply)
- Turbocharger/Boost
- Diesel Oxidation Catalyst (DOC)
- Diesel Particulate Filter (DPF)
- Aftertreatment sensors (Exhaust temperature)

The three DTCs below indicate problems with SCR function. These DTCs should only be diagnosed if they are active or if the DTC Confirmed status is True in the Detailed status information section.

Fault Code	Descriptions
P20EE	**SCR NOx Catalyst Efficiency Below Threshold (Bank 1)**
P103C	**NOx Catalyst Efficiency Inducement, Selective Catalytic Reduction (SCR) Unit**
P207F	**SCR NOx Catalyst Efficiency Below Threshold (Bank 1)**

Evaluations for SCR Muffler Replacement

The following systems need to be evaluated in progressive order to determine the state of the SCR.

1. **DEF System -** Test the Urea/DEF Systems functionality for proper:

- Quality
    - Check DEF Quality using Refractometer (88890105)
    - Litmus Test paper (88890110)

- Quantity
    - SCR Dosing Test in PTT, Operation 2589-08-03-05 subsection 1-3.
    - With the dosing nozzle removed, inspect for crystal build up.

If any of the above tests fail: Correct the issue, clear fault codes, and release the truck.

2. NOx Sensor Condition - Evaluate the condition of both NOx Sensors.

- Look for the following:
    - Non-OEM (3rd party) sensors, use CBR-2114 for guidance.
    - Any/All NOx sensor fault codes. See CBR-2116 for a list of these faults and recommendations.

If Non-OEM or faulty Nox Sensor(s) is found: Replace the sensor(s), clear faults and release the truck.

3. NOx Sensor Function and SCR Assessment- Evaluate NOx sensor function using the appropriate test for the vehicle's emission level, indicated below. Follow the directions in the Action column for Nox or SCR Replacements.

Emission Level	**PTT Operation**	**Action**
OBD 13-16	2549-08-03-03 Nox Conversion Test	Follow test recommendation, if no fault found replace the SCR in accordance with Impact procedures.
OBD 17 to current	2589-08-03-18 Exhaust Aftertreatment System Analysts or 2549-08-03-03 NOx conversion test below EATS annalysis	Follow test recommendation and release truck.
OBD 17-18 **TC Only**	No test…	Replace Both Nox Sensors if not replaced within past 3 months and release truck. If truck has received both Nox sensors within

		past 3 months replace the SCR in accordance to impact procedures.

Rules for Replacement

Standard Diagnostic time is 3 hours.

Note that Warranty will only cover replacement of the SCR if one of the three codes in the section above is present. If the SCR is suspected to have failed due to upstream contamination with no codes present, an eService case is required for further evaluation.

Tags

p103c00 p207f00 volvo scr p20ee00

unlocking uptime

Categories *

Make and Model > Volvo > VNL

Make and Model > Volvo > VNR

Make and Model > Volvo > VNM

Make and Model > Volvo > VNX

Make and Model > Volvo > VAH

Make and Model > Volvo > VHD

Vehicle System > Emissions

Related links and attachments

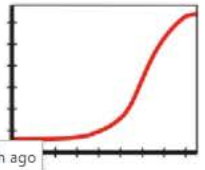
No links or attachments available

Feedback

Give feedback

to help improve the content of this article

A



Workbook last saved: 1h ago

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**

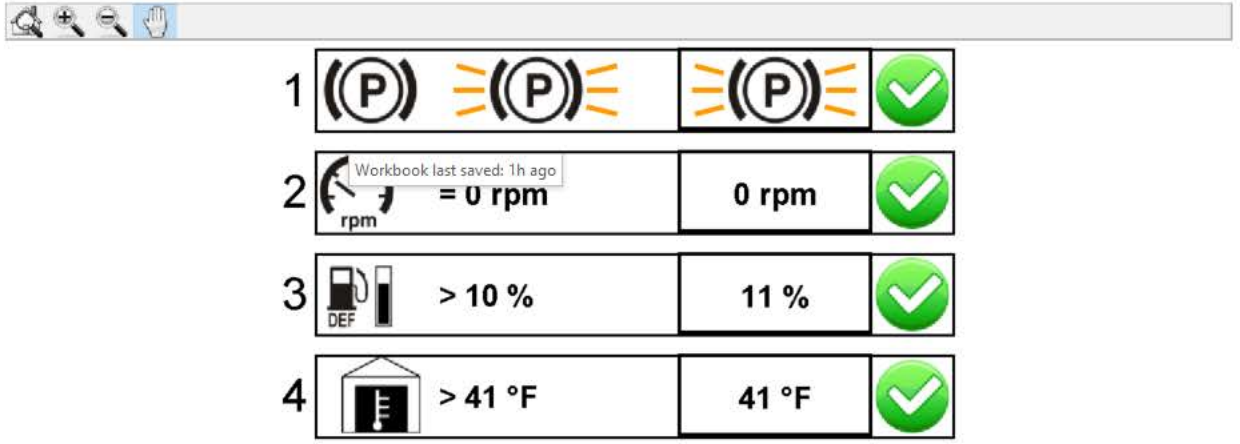
Continue > Cancel

Tech Tool

Tech Tool | Links | Help

BRADLEY PICKENS

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: M744 41340 VIN: 1M1AW07Y9EM041340 Work Order: 9999

Product | Online

12:15 PM
6/30/2022

Tech Tool

Tech Tool | Links | Help

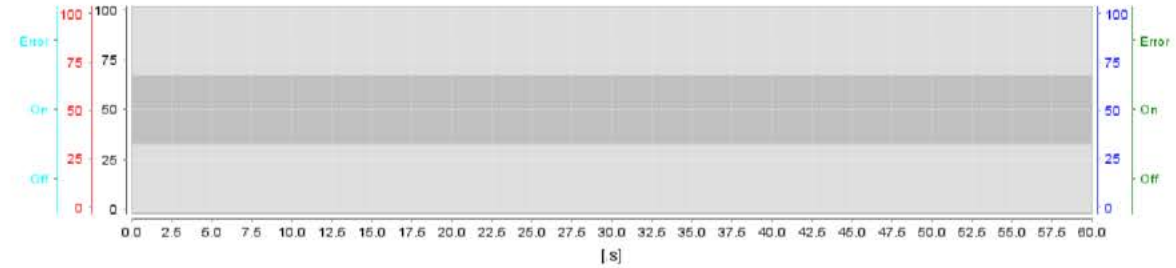
BRADLEY PICKENS

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

Continue >

Chassis ID: M744 41340 VIN: 1M1AW07Y9EM041340 Work Order: 9999

Product Online

12:16 PM
6/30/2022