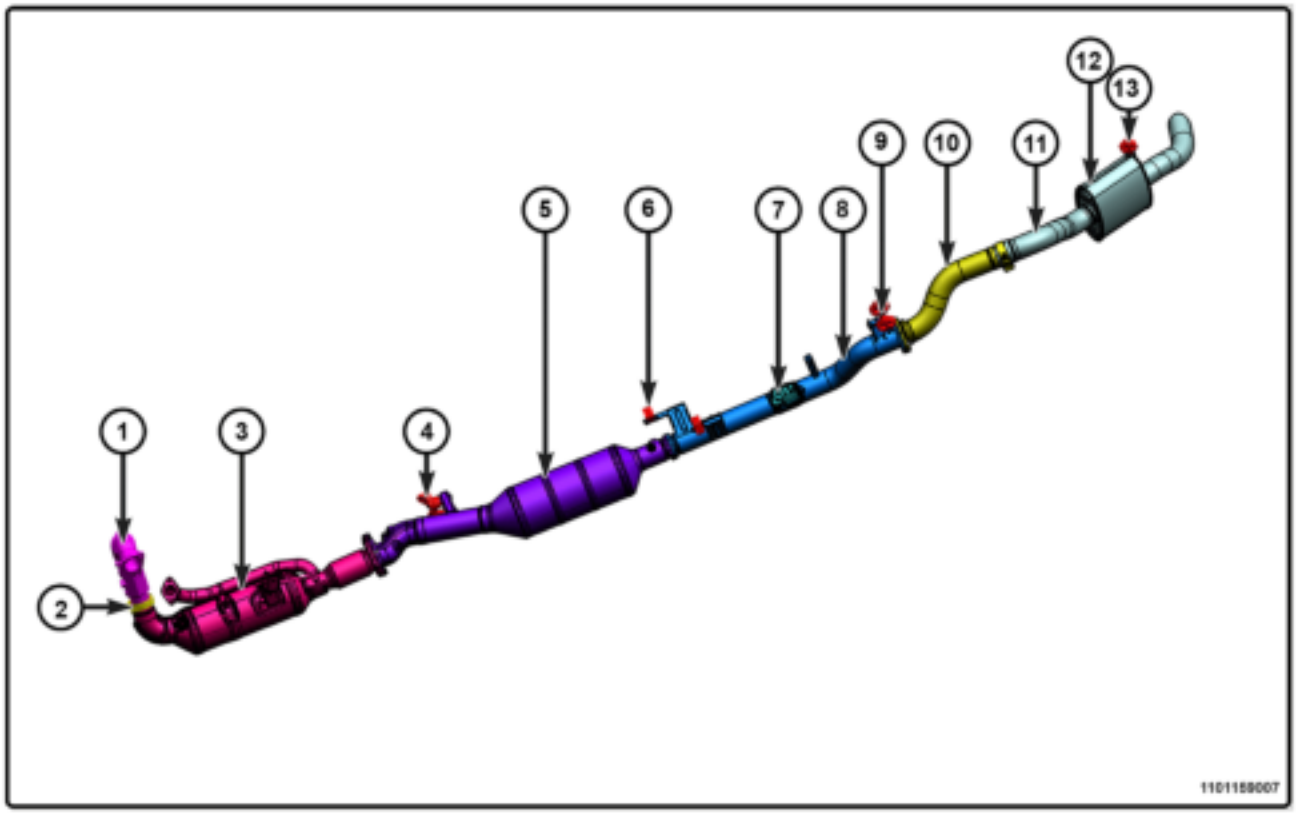
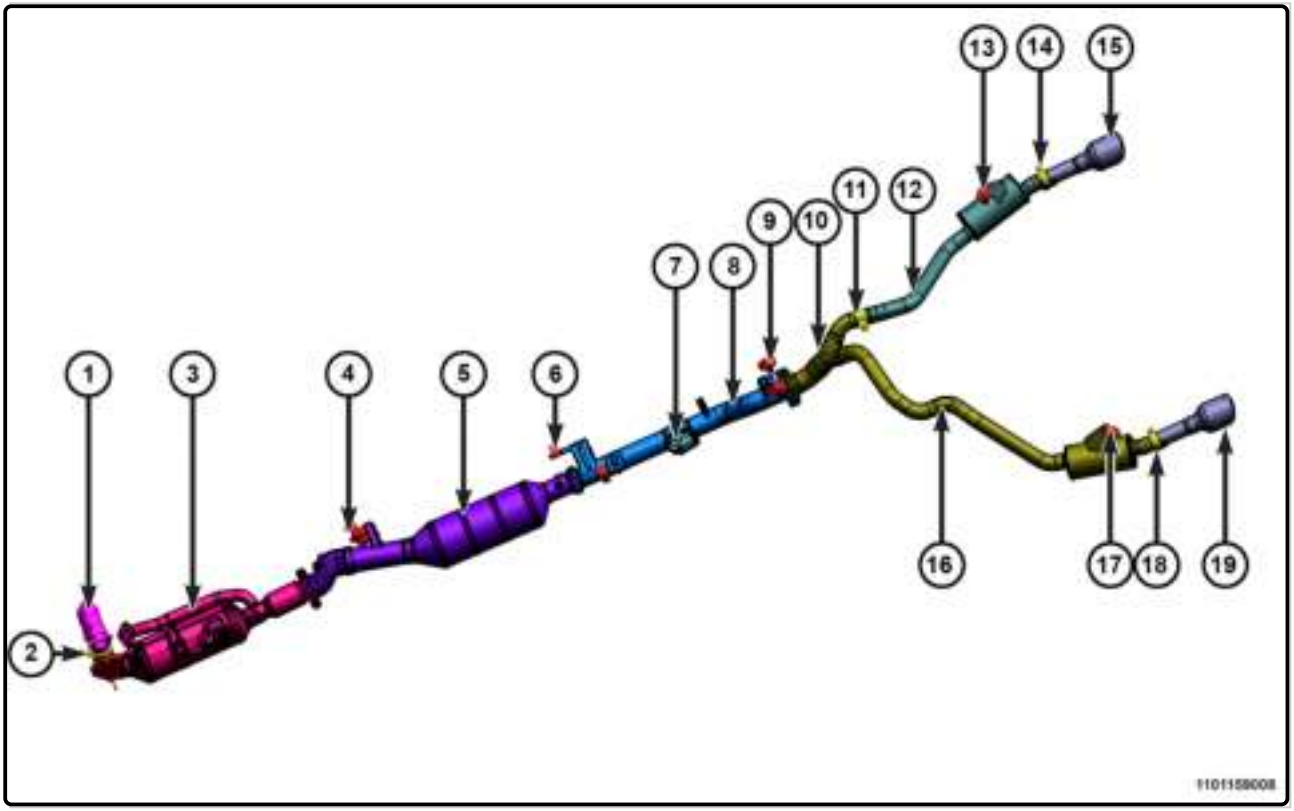
EXHAUST SYSTEM - DESCRIPTION (DSL)

DIESEL ENGINE



SINGLE EXHAUST SYSTEM

1 - FRONT EXHAUST PIPE (ELBOW)	8 - EXHAUST EXTENSION PIPE
2 - EXHAUST V-BAND CLAMP	9 - EXHAUST ISOLATOR
3 - DIESEL OXIDATION CATALYST (DOC)/DIESEL PARTICULATE FILTER (DEF)	10 - REAR EXHAUST EXTENSION PIPE
4 - EXHAUST ISOLATOR	11 - EXHAUST CLAMP
5 - SELECTIVE CATALYST REDUCTION (SCR)	12 - EXHAUST TAIL PIPE
6 - EXHAUST ISOLATOR	13 - EXHAUST ISOLATOR
7 - EXHAUST VALVE ACTUATOR	



DUAL EXHAUST SYSTEM

1 - FRONT EXHAUST PIPE (ELBOW)	10 - LEFT EXHAUST RESONATOR
2 - EXHAUST V-BAND CLAMP	11 - EXHAUST CLAMP
3 - DIESEL OXIDATION CATALYST (DOC)/DIESEL PARTICULATE FILTER (DEF)	12 - RIGHT EXHAUST RESONATOR
4 - EXHAUST ISOLATOR	13 - EXHAUST ISOLATOR
5 - SELECTIVE CATALYST REDUCTION (SCR)	14- EXHAUST CLAMP
6 - EXHAUST ISOLATOR	15 - RIGHT TAIL PIPE TIP
7 - EXHAUST VALVE ACTUATOR	16 - EXHAUST ISOLATOR
8 - EXHAUST EXTENSION PIPE	17 - EXHAUST CLAMP
9 - EXHAUST ISOLATOR	18 - LEFT TAIL PIPE TIP

- The exhaust system must be properly aligned to prevent stress, leakage and body contact. Minimum clearance between any exhaust component and the body or frame is 25.4 mm (1.0 in.). If the system contacts any body panel, it may amplify objectionable noises from the engine or body.

DESCRIPTION

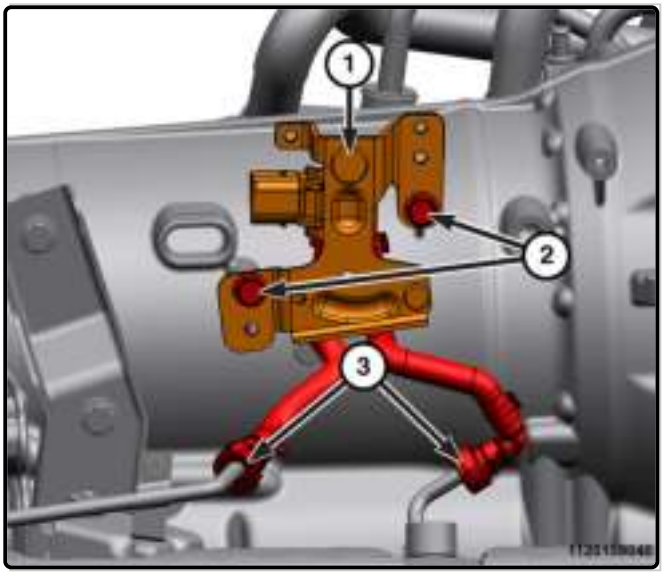
- The first component of the aftertreatment system consists of two catalyst elements, working together to drastically reduce tailpipe emissions. The Diesel Oxidation Catalyst (DOC) is in the front half and the Diesel

Particulate Filter (DPF) is in the back half. Also the Differential Pressure Sensor and a temperature sensor are used as monitor the DPF.

OPERATION

- The NO2 molecules in the exhaust temperature range of 300 - 400°C (572 - 753°F) regenerate the Diesel Particulate Filter (DPF), which is passive regeneration. If the passive regeneration cannot keep up with the build up of soot in the DPF, the Powertrain Control Module (PCM) will actively regenerate the DPF to burn off soot. Residue remains inside the DPF in the form of non-burnable ash. Ash comes from the oils and other materials that are present in the soot. Ash is not eliminated by the regeneration cycle. Excessive ash accumulation requires replacement of the DPF. The DPF uses a silicon carbide wall-flow monolith with a platinum coating to trap particulates. The monolith contains a large number of square parallel channels, which run in the axial direction and are separated by thin porous walls. The channels are alternatively open at one end, and plugged at the other. The exhaust gases flow through the walls and escape through the pores in the wall material. Particulates, however, are too large to escape and are trapped in the monolith walls. The PCM starts the regeneration of the DPF if the soot load exceeds a mapped value. The PCM determines the load condition of the DPF based upon the engine operating points and the exhaust gas pressure upstream and downstream of the DPF. A pressure differential sensor provides the pressure input to the PCM. During the regeneration process, the PCM raises the temperature in the DPF to burn off soot accumulated. Under normal operation, the engine does not produce enough heat to oxidize the soot in the DPF. This process requires temperatures above 550°C (1,022 °F). The PCM calculates the ash mass stored in the DPF by using the total fuel consumption, which has a strong correlation with oil consumption.

- The Exhaust Differential Pressure Sensor (1) is remotely mounted on the transmission housing. Two pressure tubes (3) measure pressure before and after the Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF). The sensor is critical for fail-safe of regeneration strategy, because it interprets high pressure drops as possible high soot loads.



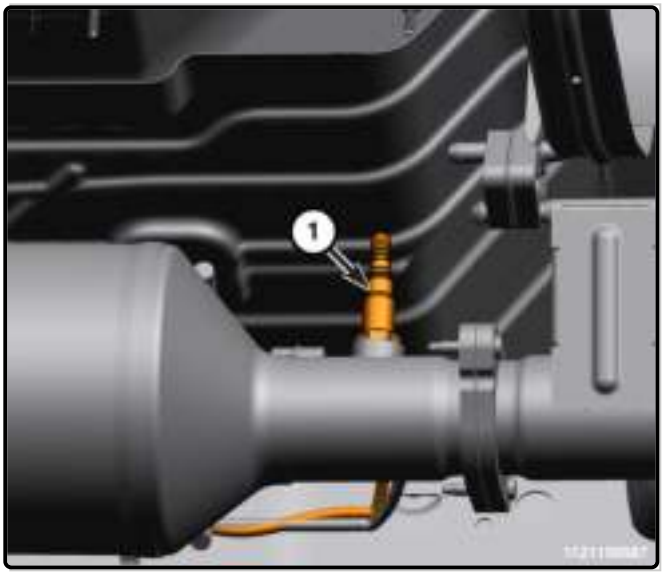
- The Exhaust Gas Temperature Sensor (EGT) operates as a typical two wire 5-Volt sensor. It sends a signal to the Powertrain Control Module (PCM) monitoring the temperature of the exhaust gases in the Diesel Particulate Filter.

The EGT Sensor are located:

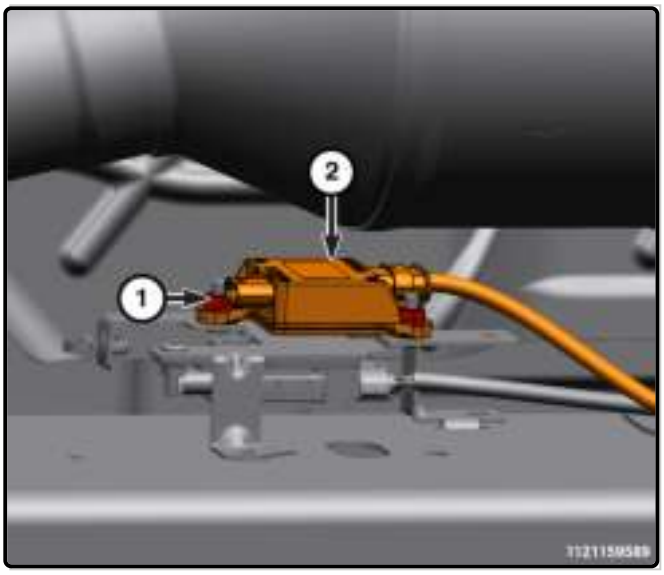
- 1/1 is located on the outlet of the exhaust manifold
- 1/2 is located on the inlet of the Diesel Oxidation Catalyst (DOC)/Diesel Particulate Filter (DPF)
- 1/3 is located between the Diesel Oxidation Catalyst (DOC) and the Diesel Particulate Filter (DPF)
- 1/4 is located on the inlet of Selective Catalytic Reduction (SCR).

There are two types of heat shields used. One is stamped steel the other is molded foil sheets. The shields attach to the vehicle around the exhaust system to prevent heat from the exhaust system from entering the passenger area and other areas where the heat can cause damage to other components.

- The Particulate Matter (PM) sensor (1) is located in the rear of the Selective Catalyst Reduction (SCR). The function of the PM sensor is to measure the tailpipe soot and to prove the Diesel Particulate Filter (DPF) is working according to On Board Diagnostic (ODB) requirements.



- The PM sensor module (1) is only serviceable with the PM sensor.



- The Selective Catalytic Reduction (SCR) is a catalyst element made of copper zeolite used in reducing nitrous oxide gases (NOx) to an element of nitrogen. By injecting a Diesel Exhaust Fluid (DEF) solution upstream of a catalyst, the DEF solution will vaporize and decompose to form ammonia and carbon dioxide. When the ammonia vapor reacts with the NOx gas, it converts it to a harmless nitrogen and water by-product.