011-041 Aftertreatment Diesel Particulate Filter

General Information

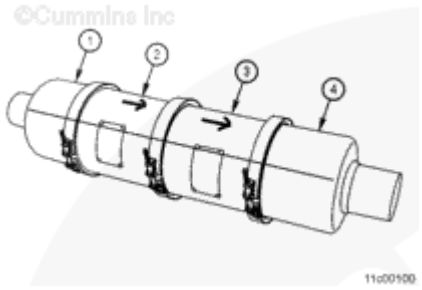
WARNING

During regeneration, exhaust gas temperature could reach 800°C [1500°F], and exhaust system surface temperature could exceed 700°C [1300°F], which is hot enough to ignite or melt common materials, and to burn the skin. The exhaust and exhaust components can remain hot after the vehicle has stopped moving. To avoid the risk of fire, property damage, burns or personal injury, allow the exhaust system to cool before beginning this procedure or repair and make sure that no combustible materials are located where they are likely to come in contact with hot exhaust or exhaust components.

CAUTION

The aftertreatment diesel oxidation catalyst elements contained in the aftertreatment system are made of brittle material. Do not drop or strike the side of the aftertreatment system as damage to the aftertreatment diesel oxidation catalyst element can result.

Due to the number of various exhaust aftertreatment applications, this procedure contains generic information. **Not** all



illustrations within this procedure will represent the applications being serviced.

The aftertreatment system is composed of four sections. These sections are:

1. Inlet
2. Aftertreatment Diesel Oxidation Catalyst
3. Aftertreatment Diesel Particulate Filter
4. Outlet.

NOTE: In some applications, the aftertreatment diesel oxidation catalyst can be integrated into the inlet of the exhaust aftertreatment system.

Preparatory Steps

WARNING

Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To reduce the possibility of arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

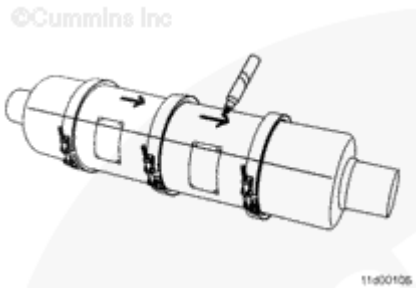
- Disconnect the vehicle batteries. Refer to the OEM service manual.
- Disconnect the exhaust gas pressure sensor tubes, if necessary.
  - For ISX engines, use this procedure in the Signature™, ISX and QSX Service Manual, Bulletin 3666239.Refer to Procedure 011-027 in Section

11.
- For ISM engines, use this procedure in the ISM, ISMe, and QSM11 Service Manual, Bulletin 3666322. Refer to Procedure 011-027 in Section 11.

- Disconnect the aftertreatment particulate filter differential pressure sensor tubes, if necessary. Refer to Procedure 011-047 in Section 11.
- Disconnect the exhaust gas temperature sensor electrical connector(s) from wiring harness.
  - Use this procedure in the Troubleshooting and Repair Manual, CM871 and CM876 Electronic Control System, ISX and ISM Engines, Bulletin 4021560. Refer to Procedure 019-376 in Section 19.

Remove

Mark the direction of the exhaust flow on the outside of the aftertreatment system to aid in assembly.



WARNING

This component or assembly weighs greater than 23 kg [50 lb]. To prevent serious personal injury, be sure to have assistance or use appropriate lifting equipment to lift this component or assembly.

CAUTION

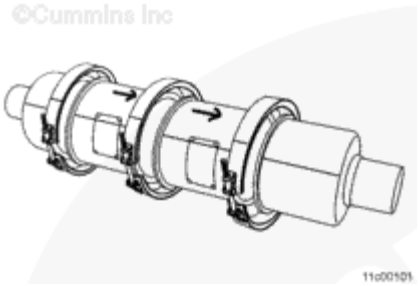
The aftertreatment diesel oxidation catalyst elements contained in the aftertreatment system are made of brittle material. Do not drop or strike the side of the aftertreatment system as damage to the aftertreatment diesel oxidation catalyst element can result.

NOTE: If necessary, remove any additional mounting hardware to remove the aftertreatment diesel particulate filter from the vehicle.

Remove the v-band clamps from the inlet and outlet flanges of the aftertreatment diesel particulate filter.

Separate the flanges by approximately 25 mm [1 in] to allow removal over the gasket retainer rings.

Remove and discard the gaskets.



Inspect for Reuse

CAUTION

Do not use a grinder or abrasive air tool to remove residual gasket material, as this can damage the flange and cause the connection to leak. Do not use an open flame to burn off soot accumulation from the face of the aftertreatment diesel particulate filter. Do not scrape off soot accumulation from the face of the aftertreatment diesel particulate filter.

CAUTION

Do not use an open flame to burn off soot accumulation from the face of the aftertreatment diesel particulate filter.

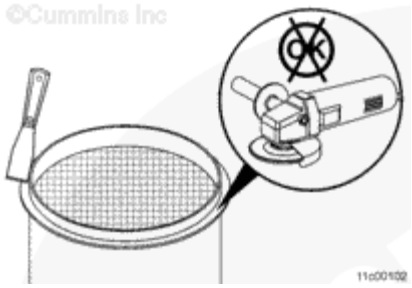
CAUTION

Do not scrape off soot accumulation from the face of the aftertreatment diesel particulate filter.

NOTE: The aftertreatment diesel particulate filter relies on gas flow through the walls to collect soot. To accomplish gas flow through the walls of the filter, every other cell on the face of the filter is plugged with a ceramic material. Therefore it is not possible to see light straight through the holes in the aftertreatment diesel particulate filter.

Remove any residual gasket material from the flanges on the aftertreatment diesel particulate filter with a scraping tool.

Avoid dropping fragments of gasket material into the aftertreatment diesel



particulate filter.

NOTE: It is not possible to inspect the outlet of the aftertreatment diesel oxidation catalyst and inlet of the aftertreatment diesel particulate filter on aftertreatment systems with a joined aftertreatment diesel oxidation catalyst - aftertreatment diesel particulate filter.

Refer to the Catalyst and Aftertreatment Particulate Filter Reuse Guidelines, Bulletin 4021600, to inspect the inlet and outlet faces of the aftertreatment diesel particulate filter for signs of damage. Replace the aftertreatment diesel particulate filter if damage is found.

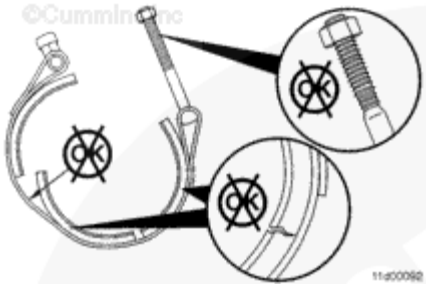
If the aftertreatment diesel particulate filter has been removed for cleaning and is considered reusable according to the Catalyst and Aftertreatment Particulate Filter Reuse Guidelines, Bulletin 4021600, the filter can be cleaned using diesel particulate filter cleaner, Part Number 4918840, with adapter kit, Part Number 4918893, or diesel particulate filter cleaner, Part Number 4919052, with adapter kit, Part Number 4919172, or other Cummins Inc. approved cleaning machine if cleaning an aftermarket or retro-fit filter, either the Part Number 4918840 or 4919052 diesel particulate filter cleaner can be used with adapter kit, Part Number 4919182. Refer to the manufacturer's service manual for appropriate cleaning procedures.

NOTE: If the aftertreatment diesel particulate filter was removed due to an active Fault Code 1981 or Fault Code 1922 and is contaminated with coolant, it must be replaced with a new aftertreatment diesel particulate filter.

Inspect the V-band clamps and mounting straps for signs of over extension. The band **must not** be bent or damaged.

Inspect the V-band clamps and mounting strap threads for damage.

Replace the V-band clamp or strap if damage is found.

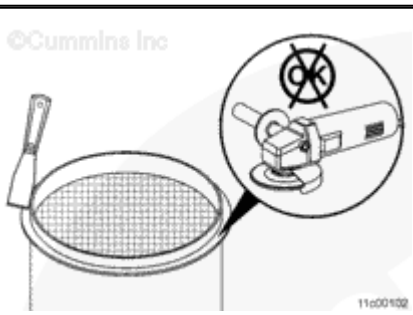


Maintenance Check

If the aftertreatment diesel particulate filter is being removed for an ash cleaning or soot cleaning maintenance interval, the aftertreatment diesel particulate filter will need to be removed and cleaned using a cleaning tool approved by Cummins Inc. Consult the Service Tool Instruction, Bulletins 3400284 and 3400253, for information regarding parts and operation of Cummins Inc. approved cleaning tools. Conventional cleaning can **not** be used to clean aftertreatment diesel particulate filters.

Because it can be difficult to determine if an aftertreatment diesel particulate filter is plugged with ash or soot, it will be necessary to clean the aftertreatment diesel particulate filter before performing a stationary regeneration to prevent any system damage from occurring. For information on how to perform a stationary regeneration use the following procedre. Refer to Procedure 014-013 in Section 14.

Performing the ash and/or soot cleaning



procedure will:

- Remove excess soot to allow a stationary regeneration without damaging the aftertreatment diesel particulate filter
- Allow the aftertreatment diesel particulate filter to be reused after a 1981 and/or 1922 fault code occurs
- Remove excess ash and improve regeneration frequency.

Performing a stationary regeneration after cleaning the aftertreatment diesel particulate filter for ash and/or soot will:

- Remove any residual soot from the system that was **not** removed during the cleaning procedure
- Test the diesel oxidation catalyst efficiency
- Test the aftertreatment system functionality.

NOTE: Soot will plug the cleaning machine filter quicker than ash. Cleaning soot from a DPF using Cummins Inc. approved machines can result in the need for increased maintenance intervals of the cleaning machine filter.

Install

WARNING

This component or assembly weighs greater than 23 kg [50 lb]. To prevent

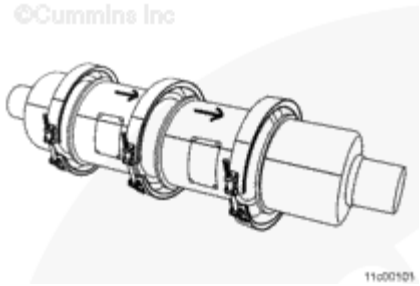
serious personal injury, be sure to have assistance or use appropriate lifting equipment to lift this component or assembly.

Install new gaskets on the inlet and outlet of the aftertreatment diesel particulate filter canister.

NOTE: In some applications, a locating tab was integrated into the gasket retaining ring. The locating tab will prevent the jointed aftertreatment diesel oxidation catalyst - aftertreatment diesel particulate filter from being installed backwards, and will restrict the rotational orientation that the filter can be installed.

NOTE: On vertical aftertreatment orientations, an aftertreatment diesel particulate filter differential pressure sensor tube support can be present. Be sure that the support is aligned with the tube prior to installing the filter.

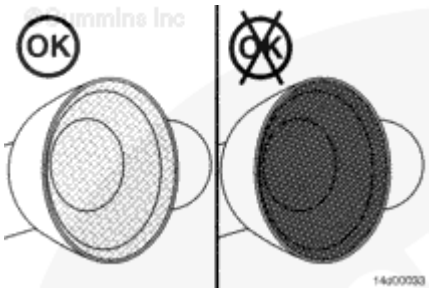
Loosely tighten the v-band clamps to allow rotation for final alignment of the differential pressure sensor tubes.



NOTE: Some accumulation of exhaust residue/soot is normal and does not indicate a malfunctioning aftertreatment diesel particulate filter.

A heavy buildup of exhaust residue/soot can indicate a malfunction of the aftertreatment diesel particulate filter.

If the aftertreatment diesel particulate filter is being replaced due to black smoke, and the exhaust stack is found to have heavy black soot accumulation, clean the last 152 to 254 mm [6 to 10 in] of the exhaust system outlet.

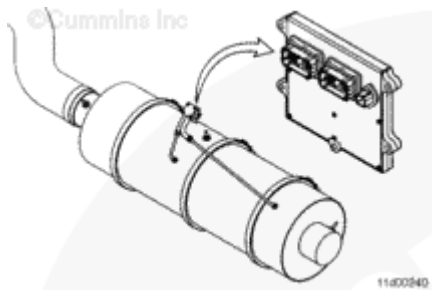


Adjust

If the aftertreatment diesel particulate filter was replaced or cleaned due to Fault Code 1922, it will be necessary to reset the stored soot load in the engine's ECM.

Advanced ECM Data

- Use INSITE™ electronic service tool to perform the Aftertreatment Maintenance Reset Procedure.
- Use INSITE™ electronic service tool or the in cab switch, if equipped, to perform a stationary regeneration. Refer to Procedure 014-013 in Section 14
- In situations where Fault Code 1981 is active and Fault Codes 2639, 1921, and 1922 are **not** active, it is **not** necessary to perform a stationary regeneration after replacing the aftertreatment diesel particulate filter
- In situations where Fault Code 1981 and/or 1922 are active and the aftertreatment diesel particulate filter was cleaned,a stationary regeneration **must** be performed after installing the filter on the vehicle.



Finishing Steps

WARNING

Batteries can emit explosive gases. To reduce the possibility of personal injury, always ventilate the compartment before servicing the batteries. To reduce the possibility of arcing, remove the negative (-) battery cable first and attach the negative (-) battery cable last.

- Connect the exhaust gas temperature sensor electrical connector(s) to the wiring harness, if necessary.
  - Use this procedure in the Troubleshooting and Repair Manual, CM871 and CM876 Electronic Control System, ISX and ISM Engines, Bulletin 4021560. Refer to Procedure 019-376 in Section 19.
- Connect the aftertreatment particulate filter differential pressure sensor tubes, if necessary.
- Refer to Procedure 011-047 in Section 11.
- Connect the exhaust gas pressure sensor tubes, if necessary.
  - For ISX engines, use this procedure in the Signature™, ISX and QSX Service Manual, Bulletin 3666239.Refer to Procedure 011-027 in Section 11.
  - For ISM engines, use this procedure in the ISM, ISMe, and QSM11 Service Manual, Bulletin 3666322. Refer to Procedure 011-027 in Section 11.
- Tighten the V-band clamps.

Torque Value: 20 n.m [177 in-lb]

- Connect the vehicle batteries. Refer

to the OEM service manual. • Operate the vehicle on an engine dynamometer or perform a road test with the engine at rated load for a minimum of 5 minutes to make sure the aftertreatment system is performing properly. Refer to Procedure 014-005 in Section 14. • Check for exhaust leaks. • Check for fault codes.		

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