## SUBJECT

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<td>DD Platform – All Years</td>
<td>Removal of the Needle, Amplifier, and Pressure Limiting Valve Return Lines – Three-Filter System</td>
<td>Adding approved warnings and notices to procedures that have a step to remove and install the high pressure fuel rail feed lines. Updated the removal and installation of the high pressure fuel rail feed lines step to be consistent across all procedures.</td>
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2 Removal of the Needle, Amplifier, and Pressure Limiting Valve Return Lines - Three-Filter System

Remove as follows:

**WARNING: PERSONAL INJURY**

All hardware/components must be installed in the proper locations, and MUST be fastened to the specified torque. Failure to properly torque hardware/components will result in failure of a high pressure fuel feed line, resulting in possible fire and/or personal injury.

**NOTICE:** Engine size/model year specific service kits, containing all necessary parts to replace the high pressure fuel rail feed lines have been released. Refer to TS letter 12 TS-9 for the high pressure fuel line kit numbers to repair these engines.

1. Remove and discard the high pressure fuel rail feed lines. Refer to section "Removal of the High Pressure Fuel Rail Feed Lines - Three-Filter System".
2. Using J-48836 and J-48770, remove the needle return line from the rear of the cylinder head and discard the sealing washers.
3. Remove the needle return line from the fuel filter module and the high pressure flange.
4. Remove the Pressure Limiting Valve (PLV) return line from the fuel rail and discard sealing washers.
5. Remove the PLV return line from the fuel filter module.
6. Using J-48836 and J-48770, remove the amplifier return line from the rear of the cylinder head and discard the sealing washers.
7. Remove the amplifier return line from the fuel filter module.
3 Installation of the Needle, Amplifier, and Pressure Limiting Valve Return Lines - Three-Filter System

Install as follows:

1. Install the amplifier and needle return line fittings to the cylinder head. Using J-48770, torque M18 x 1.5 to 55 to 60 N·m (40 to 44 lb·ft) and M16 x 1.5 to 45 to 50 N·m (33 to 37 lb·ft).

2. Install the amplifier return line from the fitting on the rear of the cylinder head, using new sealing washers to the fuel filter module.
   a. Use J-48770 to torque the line fitting to the fitting in the cylinder head; torque to 23 to 25 N·m (17 to 19 lb·ft).
   b. Use an appropriate tool to hold the fitting on the fuel filter module; torque to 28 to 30 N·m (21 to 22 lb·ft).

3. Install the Pressure Limiting Valve (PLV) return line from the fuel rail to the fuel filter module with new banjo washers. Use an appropriate tool; torque to 28 to 30 N·m (21 to 22 lb·ft). Torque the banjo bolt to 30 to 32 N·m (22 to 24 lb·ft).

4. Install the needle return line to the cylinder head using new sealing washers, the fuel filter module and the high-pressure flange.
   a. Use J-48770 to torque the line fitting to the fitting in the cylinder head; torque to 23 to 25 N·m (17 to 19 lb·ft).
   b. Use an appropriate tool to hold the fitting on the fuel filter module and to the high-pressure flange; torque to 28 to 30 N·m (17 to 19 lb·ft).
   c. Torque the check valve to 50 to 55 N·m (37 to 41 lb·ft).

**WARNING: PERSONAL INJURY**

All hardware/components must be installed in the proper locations, and MUST be fastened to the specified torque. Failure to properly torque hardware/components will result in failure of a high pressure fuel feed line, resulting in possible fire and/or personal injury.

**NOTICE:** Engine size/model year specific service kits, containing all of the necessary parts to replace the high-pressure fuel rail feed lines have been released. Refer to TS letter 12 TS-9 (http://www.ddcsn.com/cps/rde/xbcr/ddcsn/11TL12.pdf) for the high-pressure fuel line kit numbers to repair these engines.

5. Install the high pressure fuel rail feed lines. Refer to section "Installation of the High Pressure Fuel Rail Feed Lines".
4 Removal of the Fuel Rail - Three-Filter System

Remove as follows:

1. Steam clean the engine.
2. Disconnect the batteries.
3. Disconnect the fuel rail pressure sensor electrical harness connector.

**WARNING: PERSONAL INJURY**

To prevent the escape of high pressure fuel that can penetrate skin, ensure the engine has been shut down for a minimum of 10 minutes before servicing any component within the high pressure circuit. Residual high fuel pressure may be present within the circuit.

**NOTICE:** When removing the fuel rail feed tubes, cover the ends to ensure debris does not enter the tubes.

4. Remove the high pressure fuel injector lines with tool J-48770. Refer to section "Removal of the High Pressure Fuel Injector Lines - Three-Filter System".

**WARNING: PERSONAL INJURY**

All hardware/components must be installed in the proper locations, and MUST be fastened to the specified torque. Failure to properly torque hardware/components will result in failure of a high pressure fuel feed line, resulting in possible fire and/or personal injury.

**NOTICE:** Engine size/model year specific service kits, containing all necessary parts to replace the high pressure fuel rail feed lines have been released. Refer to TS letter 12 TS-9 for the high pressure fuel line kit numbers to repair these engines.

5. Remove the high pressure fuel rail feed lines. Refer to section "Removal of the High Pressure Fuel Injector Lines - Three-Filter System".
6. Remove the pressure limiting valve (PLV) line from fuel rail. Refer to section "Removal of the Needle, Amplifier, and Pressure Limiting Valve Return Lines - Three-Filter System".
7. Remove bolts and clamps connecting the fuel rail to the camshaft housing and remove the fuel rail.
5 Installation of the Fuel Rail - Three-Filter System

Install as follows:

1. Install the fuel rail to the camshaft frame with three clamps and six bolts; hand-tighten bolts.
2. Using tool J-48770, install the fuel injector feed tubes to the fuel rail and injectors; hand-tighten the fuel injector feed tubes.
3. Install the high pressure fuel rail feed lines to the fuel rail and high pressure pump with tool J-48770; hand-tighten.
4. Install the Pressure Limiting Valve (PLV) fuel return line to the fuel filter module and fuel rail with tool J-48770; hand-tighten.
5. Torque the following in this sequence:
   a. Fuel rail clamp bolts to 14 N·m (120 lb·in.).
   b. High pressure fuel injector lines to 40 N·m (30 lb·ft).
   c. High-pressure fuel rail feed lines to 40 N·m (30 lb·ft).
   d. PLV banjo bolt to 35 N·m (26 lb·ft).
6. If removed, install the fuel rail pressure sensor; torque to 65 to 70 N·m (48 to 52 lb·ft) and then install connector.
7. If removed, install the PLV and torque to 100 N·m (74 lb·ft).

**WARNING: PERSONAL INJURY**

All hardware/components must be installed in the proper locations, and MUST be fastened to the specified torque. Failure to properly torque hardware/components will result in failure of a high pressure fuel feed line, resulting in possible fire and/or personal injury.

**NOTICE:** Engine size/model year specific service kits, containing all of the necessary parts to replace the high pressure fuel rail feed lines have been released. Refer to TS letter 12 TS-9 for the high pressure fuel line kit numbers to repair these engines.

8. Install the new vibration dampers, P-clips and mounting bracket. Refer to section "Installation of the High Pressure Fuel Rail Feed Lines".

**CAUTION: ELECTRICAL SHOCK**

To avoid injury from electrical shock, use care when connecting battery cables. The magnetic switch studs are at battery voltage.

9. Connect the batteries.
10. Prime the fuel system. Refer to section "Priming the Fuel System Using ESOC 350 Fuel Priming Pump - Three-Filter System".

**WARNING: PERSONAL INJURY**

To avoid injury before starting and running the engine, ensure the vehicle is parked on a level surface, parking brake is set, and the wheels are blocked.

**WARNING: ENGINE EXHAUST**

To avoid injury from inhaling engine exhaust, always operate the engine in a well-ventilated area. Engine exhaust is toxic.

11. Start the engine and check for leaks.