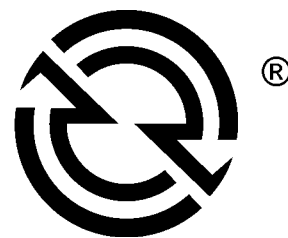


DETROIT DIESEL



MBE 4000 Service Information

NUMBER: 08 MBE 4000-3 **S.M. REF.:** 2.3 **ENGINE:** EPA04 MBE 4000 **DATE:** July 2008


SUBJECT: HIGH PRESSURE FUEL LINE AND TRANSFER TUBE


PUBLICATION:DDC-SVC-MAN-0023


High pressure fuel line and transfer tube removal and installation procedures have been updated.

REMOVAL OF HIGH PRESSURE FUEL LINE AND TRANSFER TUBE

Remove as follows:

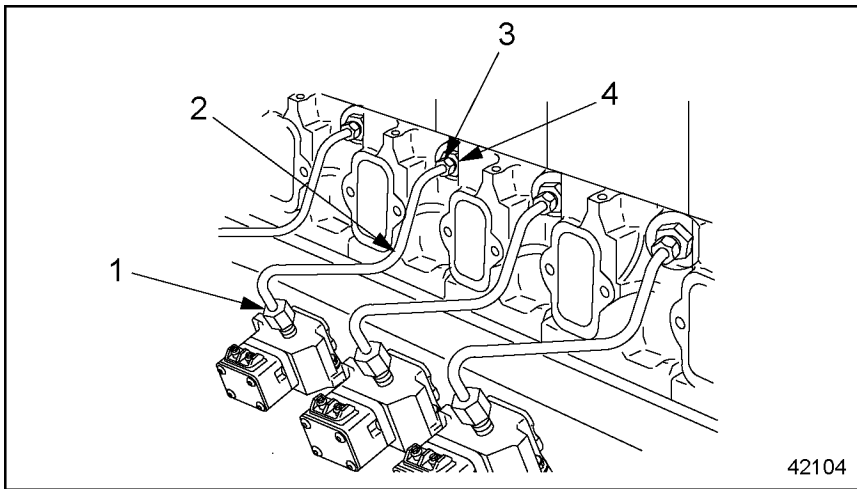
 WARNING: PERSONAL INJURY
To prevent the escape of high pressure fuel that can penetrate skin, ensure the engine has been shut down for a minimum of 10 minutes before servicing any component within the high pressure circuit. Residual high fuel pressure may be present within the circuit.

 WARNING: FIRE
To avoid injury from fire, keep all potential ignition sources away from diesel fuel, including open flames, sparks, and electrical resistance heating elements. Do not smoke when refueling.

 WARNING: FIRE
To avoid injury from fire caused by heated diesel-fuel vapors: <ul style="list-style-type: none"><input type="checkbox"/> Keep those people who are not directly involved in servicing away from the engine.<input type="checkbox"/> Stop the engine immediately if a fuel leak is detected.<input type="checkbox"/> Do not smoke or allow open flames when working on an operating engine.<input type="checkbox"/> Wear adequate protective clothing (face shield, insulated gloves and apron, etc.).<input type="checkbox"/> To prevent a buildup of potentially volatile vapors, keep the engine area well ventilated during operation.

1. Remove both engine trim covers.
2. Remove the cylinder head cover for each cylinder head.
3. Remove the intake manifold.

4. To prevent the transfer tube from rotating during the high pressure fuel line disassembly, secure the transfer tube thrust nut using a 24 mm fuel line wrench (J-47484 or J-45063) and loosen the high pressure fuel line nut at the transfer tube using a 17 mm fuel line wrench (J-47483) or a 17 mm open end wrench. See Figure 1.



- | | |
|--|---|
| 1. High Pressure Fuel Injector Line Nut (Injector Unit Pump) | 3. High Pressure Fuel Injector Line Nut (Transfer Tube) |
| 2. High Pressure Fuel Injector Line | 4. Transfer Tube Thrust Nut |

Figure 1 High Pressure Fuel Injector Line

**⚠ WARNING:
PERSONAL INJURY**

To avoid injury from the sudden release of a high pressure hose connection, wear a face shield or goggles.

NOTICE:

The high pressure fuel line and transfer tube are one-time use items. Failure to install a new high pressure fuel line and transfer tube will cause fuel leaks and high pressure fuel line failures.

5. Using a 17 mm fuel line wrench (J-47483) or a 17 mm open end wrench, loosen the high pressure fuel injector line nut at the injector unit pump. Discard the high pressure fuel injector line. See Figure 1.
6. Using a 24 mm fuel line wrench (J-45063 or J-47484), loosen the thrust nut on the transfer tube. Remove and discard the transfer tube and the O-ring. See Figure 1.

INSTALLATION OF HIGH PRESSURE FUEL INJECTOR LINES

Installation steps are as follows:

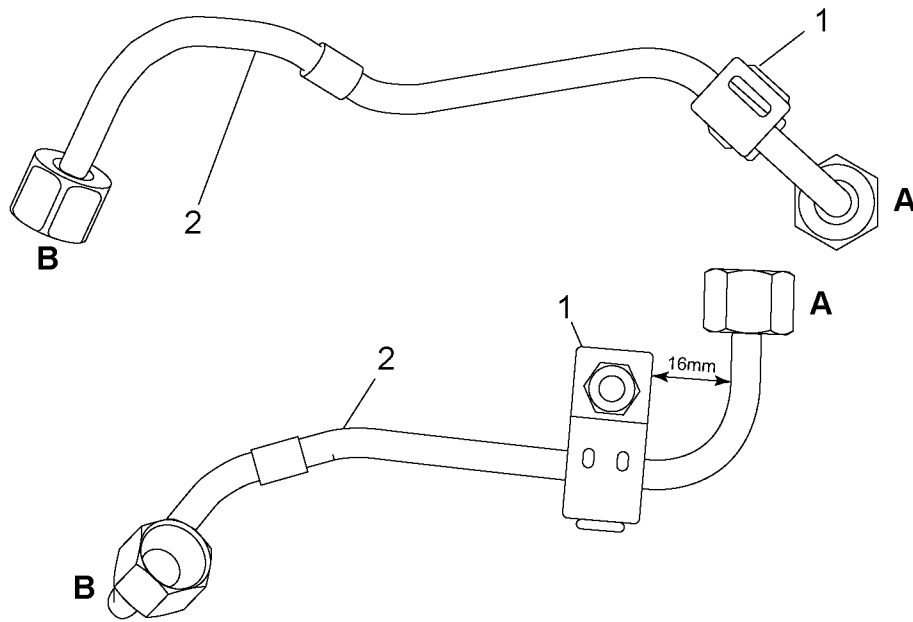
NOTICE:

New high pressure fuel injector lines are supplied ready for installation. Never use pliers or sharp-edged tools to bend injector lines. Doing so could damage them. High pressure fuel injector lines should fit without tension over the transfer tube and unit pump fittings.
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NOTICE:

Discard the old high pressure fuel line and transfer tube. Do not re-use them!
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1. The new high pressure fuel line comes assembled with the damper. Ensure that the damper is aligned correctly on the high pressure fuel line. The damper should be aligned vertically, parallel to the first element of fuel line, which exits the Electronic Unit Pump. The flat side of the damper, where the nut is located, should point towards the Electronic Unit Pump. The damper edge should be 16 mm from the edge of the first element of the fuel line, which exits the Electronic Unit Pump. See Figure 2.



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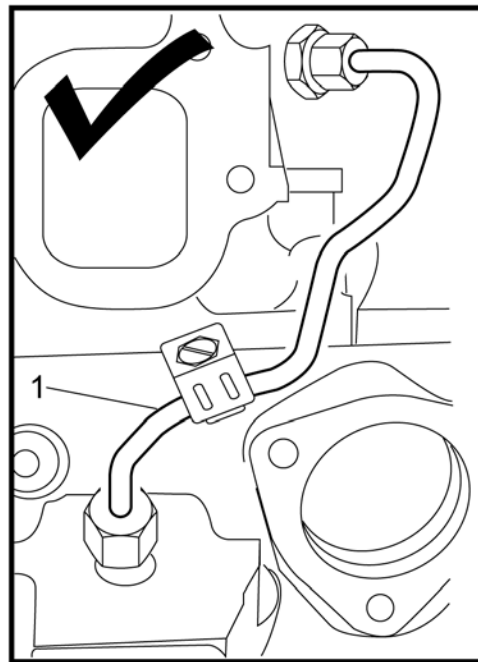
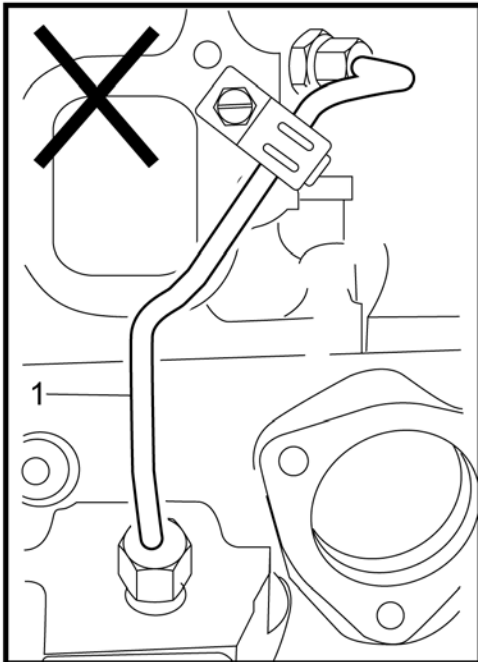
1. Damper
2. Fuel line

- A. Electronic Unit Pump end
- B. Cylinder Head end

Figure 2 Damper and Fuel Line

2. Apply a light coat of clean engine oil to the transfer tube O-ring and install the transfer tube into the cylinder head.
3. Using a 24 mm socket, torque the thrust nut to 45 N·m (33 lb·ft).
4. Align the new high pressure fuel injector line fittings to the transfer tube and unit pump. Ensure the fuel line is not installed backwards, and that the end of the high pressure fuel line is properly seated in the transfer tube and unit pump fitting.

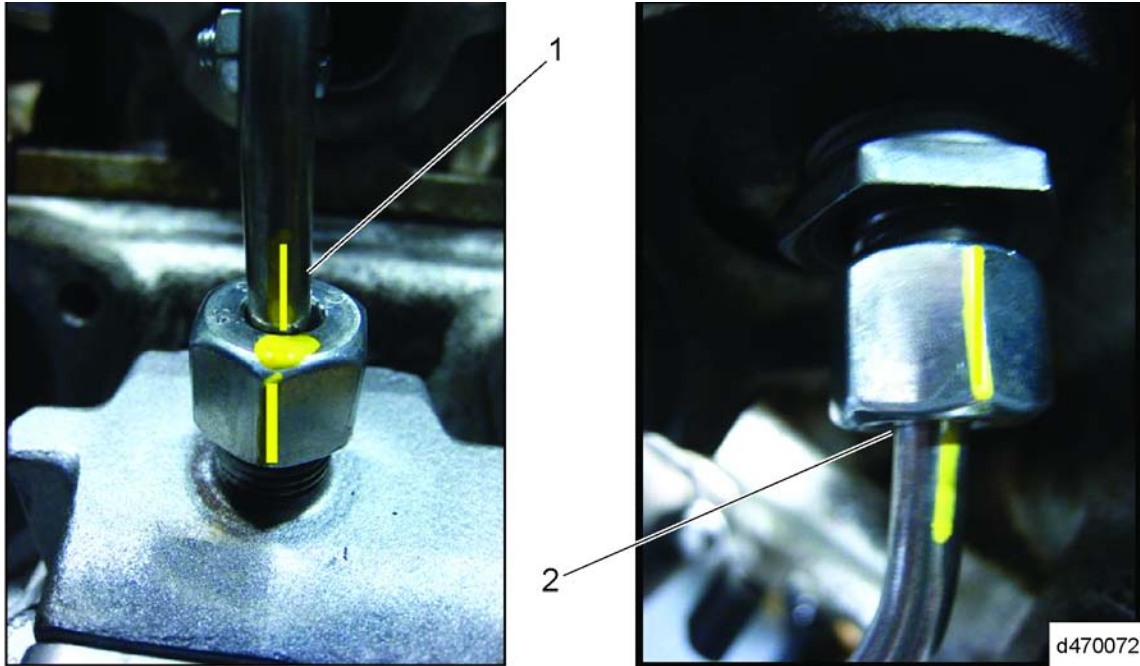
- Hand tighten the high pressure fuel injector line nut first at the unit pump, and then at the transfer tube. While hand tightening the nuts, gently move the high pressure fuel line back and forth to ensure the end of the line is properly seated in the transfer tube and unit pump fitting. See Figure 3 for the proper orientation of the fuel line. If the high pressure fuel injector line has been installed incorrectly and torqued, remove the high pressure fuel injector line and transfer tube and replace with new parts. Ensure that the damper is not touching any other fuel lines or other engine or vehicle components.



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Figure 3 Orientation of Fuel Line

- Once the high pressure fuel injector line nuts are hand tight, draw a vertical line with a highly visible marker along the front edge of both of the nuts and up the fuel line. The line drawn along the edge of the nuts and the fuel line should be aligned. See Figure 4.

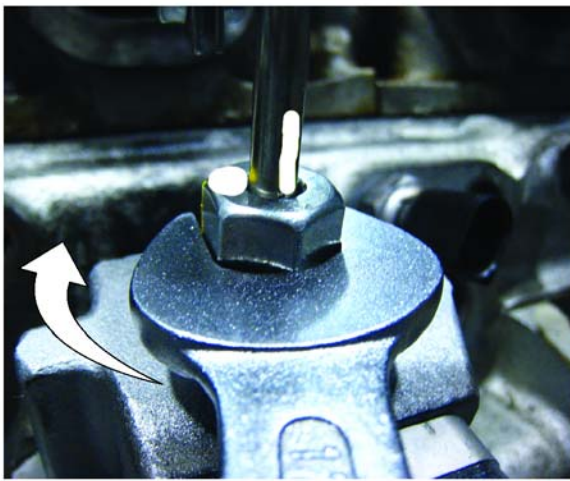


1. Electronic Unit Pump End

2. Transfer Tube End

Figure 4 Marking Of High Pressure Fuel Injector Line And Nuts

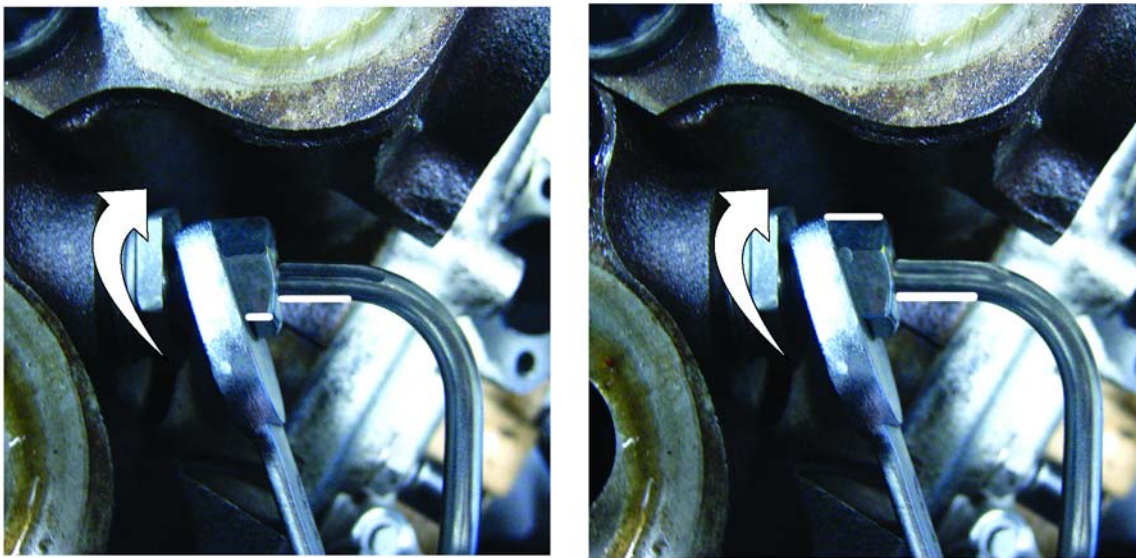
- Using a 17 mm fuel line wrench (J-47483) or a 17 mm open end wrench, tighten the high pressure fuel line nut at the unit pump end by turning the nut through 120 degrees. 120 degrees can be measured by turning the nut so that the nut edge which had been marked has been turned through 1/3 of a full turn, or through two nut flats. Lack of space in some engine configurations may mean that the 120 degree turn will have to be completed in two turns of 60 degrees, or one nut flat each. See Figure 5.



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Figure 5 Turning Fuel Line Nut 120 Degrees at Unit Pump End

- Use a 24 mm fuel line wrench (J-45063 or J-47484), hold the transfer tube thrust nut. Using a 17 mm fuel line wrench (J-47483) or a 17 mm open end wrench, tighten the high pressure fuel injector line nut at the transfer tube end by turning the nut through 120 degrees. 120 degrees can be measured by turning the nut so that the nut edge which had been marked has been turned through 1/3 of a full turn, or through two nut flats. Lack of space in some engine configurations may mean that the 120 degree turn will have to be completed in two turns of 60 degrees, or one nut flat each. See Figure 6.



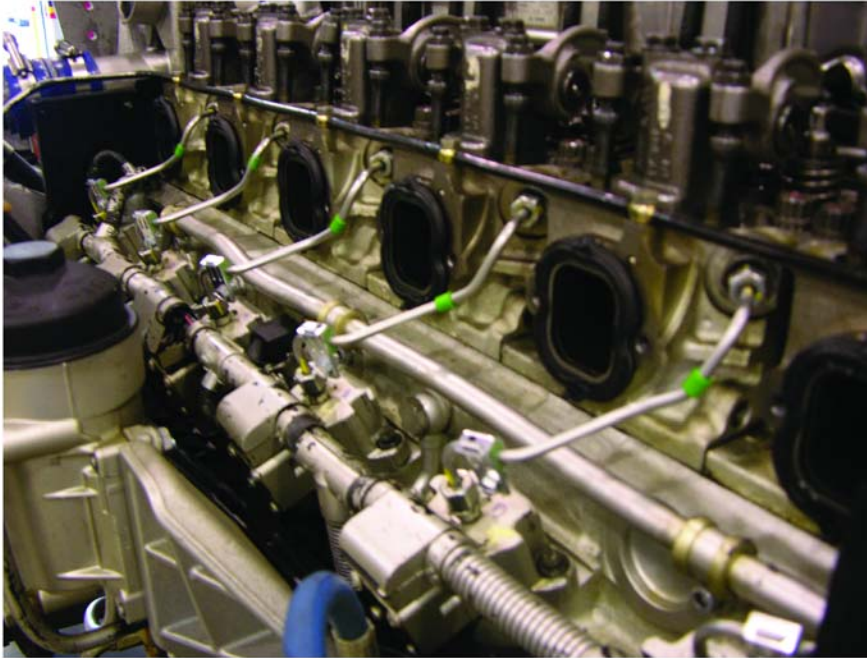
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Figure 6 Turning Fuel Line Nut 120 Degrees At Transfer Tube End

NOTICE:

To avoid damage to the high pressure fuel injector lines when applying torque, ensure that the transfer tube thrust nut is held in place with a 24 mm fuel line wrench such as (J-45063 or J-47484).

9. Ensure that all six dampers on the high pressure fuel injector lines are installed correctly. The damper should be aligned vertically, parallel to the first element of fuel line, which exits the Electronic Unit Pump. See Figure 7.



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Figure 7 Correct High Pressure Fuel Line Installations

10. Install the intake manifold.
11. Install the cylinder head covers.
12. Prime the fuel system. Refer to section "Priming the Fuel System".

**⚠ CAUTION:
EXHAUST FUMES**

To avoid injury or injury to bystanders from fumes, engine or vehicle fuel system service operations should be performed in a well ventilated area.

NOTICE:

Do NOT loosen any high pressure fuel injector line nuts or other fuel line connections for priming purposes. Use the priming port on the fuel filter housing for engine S/N 0460810824 (EGR) or S/N 0460805219 (non-EGR) and higher. Engines built prior to the change points will have the priming port installed through Campaigns 06C-2 (EGR) and 06C-1 (non-EGR). Never loosen fuel line connections to bleed air from the fuel system.

13. Run the engine and check for leaks.

NOTICE:

Do NOT re-torque high pressure fuel injector line nuts. If leaks are detected after installation, remove the necessary high pressure fuel injector line and transfer tube, discard them, and install new parts.

14. Shut down the engine.

ADDITIONAL SERVICE INFORMATION

Additional service information is available in the Detroit Diesel *EPA04 MBE 4000 Workshop Manual* (DDC-SVC-MAN-0023). The next revision to this manual will include the revised information.

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