



# 18SP653\* – EPA04 and EPA98 MBE 4000<sup>®</sup> High Pressure Fuel Line and Transfer Tube Installation

\* - Rev. 9/24/08

## KIT DESCRIPTION

A service kit (P/N: A4600700135) is now available to install EPA07 high pressure fuel injector lines and transfer tubes on EPA98 and EPA04 MBE 4000 engines.

## KIT CONTENTS


The kit contains the parts listed in Table 1.

Part Number	Qty.	Description
A4600700233	6	High Pressure Fuel Injector Line and Damper Assembly
A9060170524	6	Transfer Tube
A4570980180	6	Gasket – Intake Manifold
A4600160021	6	Gasket – Cylinder Head Cover
A4600980080	2	Gasket – Elbow-to-Intake Manifold
A9062030480	2	Gasket – Pipe-to-Mixer Housing
A4605841347	1	Label – Torque Instructions
18SP653	1	Installation Instructions

Table 1 Kit P/N: A4600700135 MBE 4000 High Pressure Fuel Line and Transfer Tube

## INSTALLATION PROCEDURE

Remove the fuel lines and transfer tubes as follows (see Figure 1):

 <b>WARNING:</b>
<b>PERSONAL INJURY</b>
<p><b>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 pressure fuel may be present within the circuit.</b></p>

<b>NOTICE:</b>
<p>When replacing high pressure fuel line(s), always replace the associated transfer tube. High pressure fuel lines and transfer tubes are one-time use components. Always discard the old high pressure fuel line and transfer tube.</p>

 **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.**

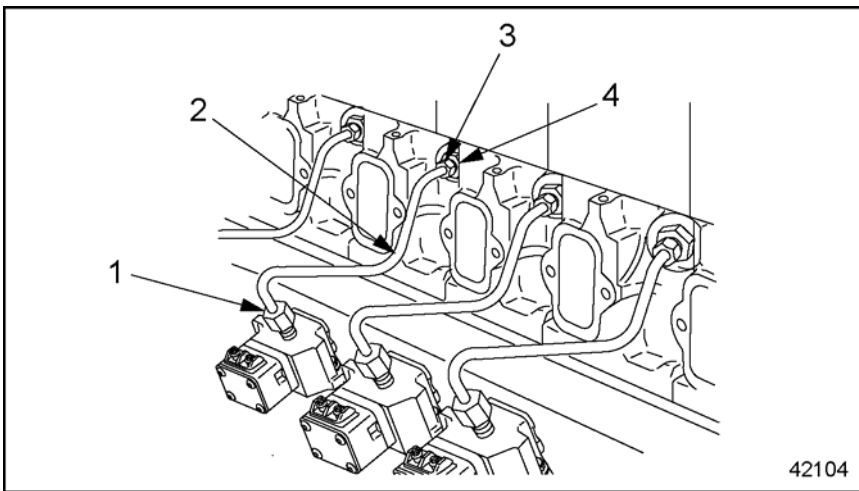
 **WARNING:**

**FIRE**

**To avoid injury from fire caused by heated diesel-fuel vapors:**

- **Keep those people who are not directly involved in servicing away from the engine.**
- **Stop the engine immediately if a fuel leak is detected.**
- **Do not smoke or allow open flames when working on an operating engine.**
- **Wear adequate protective clothing (face shield, insulated gloves and apron, etc.).**
- **To prevent a buildup of potentially volatile vapors, keep the engine area well ventilated during operation.**

1. Shut off engine and apply the parking brake, chock the wheels, disconnect vehicle battery power, and perform any other applicable safety steps.
2. Remove both engine trim covers. Refer to the *MBE 4000 Workshop Manual* [DDC-SVC-MAN-0023 (6SE412)].
3. Remove the cylinder head cover for all six cylinder heads. Refer to section 1.1.1 of the *MBE 4000 Workshop Manual* [DDC-SVC-MAN-0023 (6SE412)].
4. Remove the intake manifold. Refer to section 6.1.1 of the *MBE 4000 Workshop Manual* [DDC-SVC-MAN-0023 (6SE412)].
5. To prevent the transfer tube from rotating during the high pressure fuel line disassembly, secure the transfer tube thrust nut using 24mm fuel line wrench (J-47484 or J-45063) and loosen the high pressure fuel line nut at the transfer tube using a 17mm wrench.



1. Injector Line Nut, Unit Pump Fitting  
2. Injector Line

3. Injector Line Nut, Transfer Tube Fitting  
4. Thrust Bolt

**Figure 1 Loosening the Injector Line Nuts**

**NOTICE:**

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

6. Using a 17mm wrench, loosen the high pressure fuel injector line nut at the injector unit pump. See Figure 1. Discard the high pressure fuel injector line.

**WARNING:**

**EYE INJURY**

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

7. Using 24mm 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.

**NOTICE:**

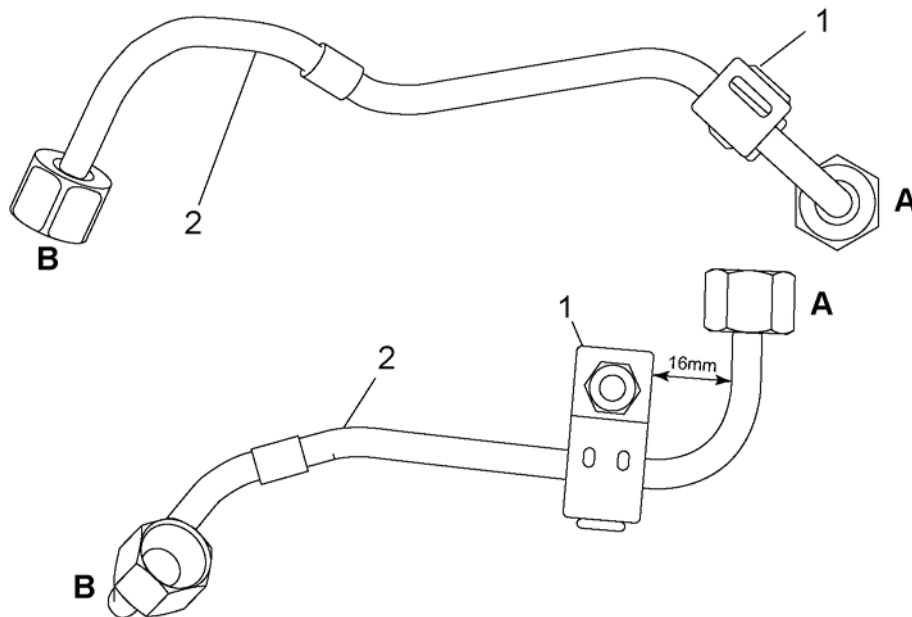
Discard the high-pressure fuel line and transfer tube. Do not re-use them!

**Install the new high pressure fuel injector lines and transfer tubes 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.

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 16mm from the edge of the first element of fuel line, which exits the Electronic Unit Pump. See Figure 2.



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1. Damper

2. High Pressure Fuel Injector Line

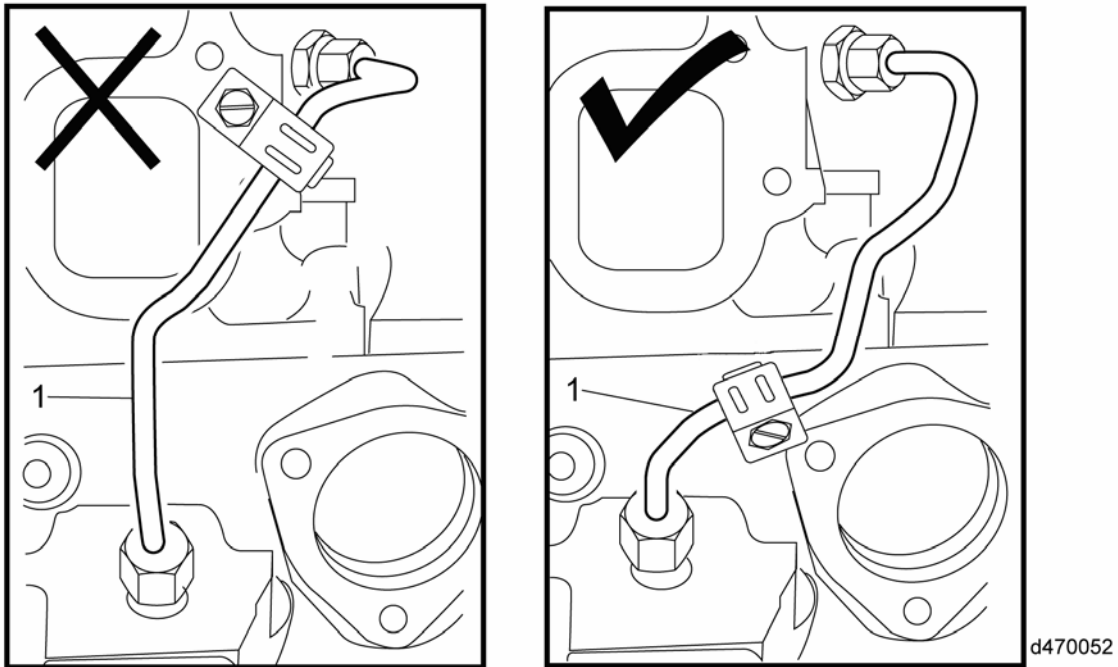
A. EUP End

B. Cylinder Head End

**Figure 2 Damper Installation**

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 24mm 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.

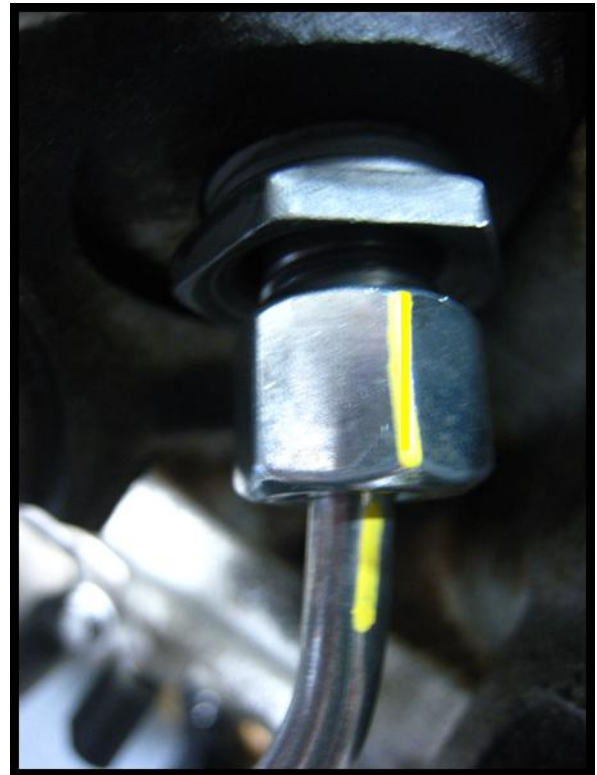


**Figure 3** New High Pressure Fuel Injector Line Installation

5. 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.



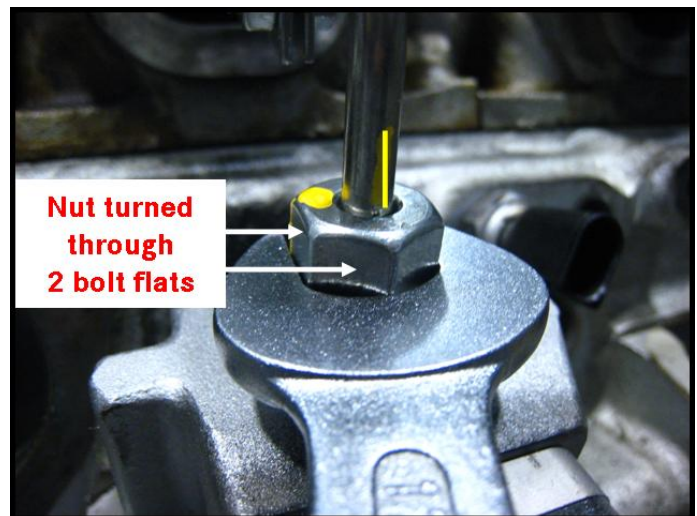
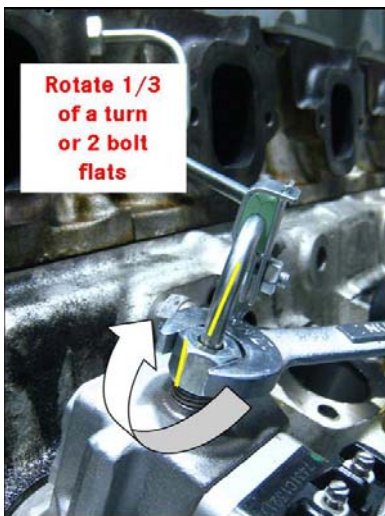
Electronic Unit Pump End



Transfer Tube End

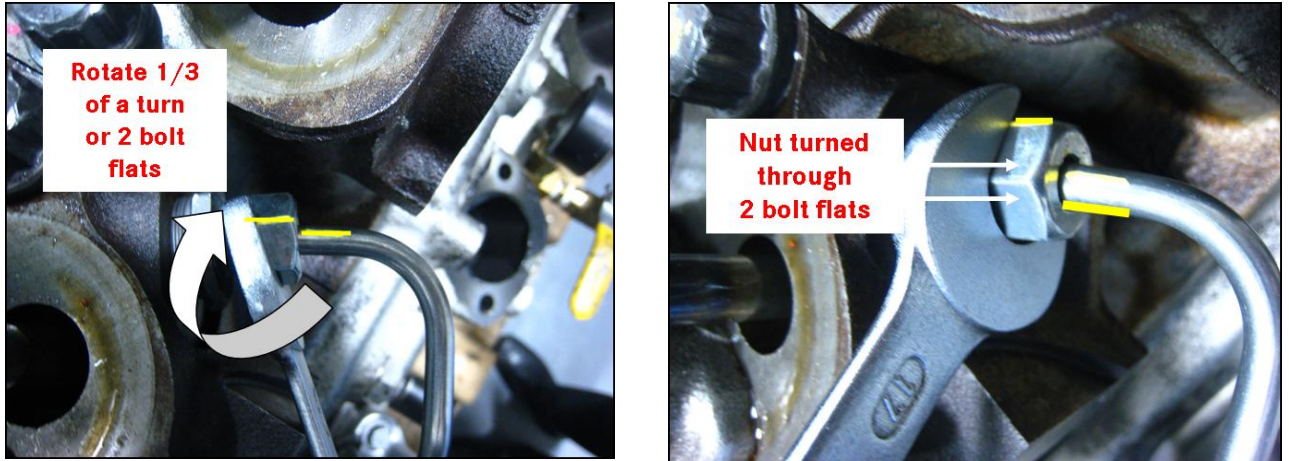
**Figure 4 Marking Of High Pressure Fuel Injector Line And Nuts**

- Using a 17mm 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 bolt 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 bolt flat each. See Figure 5.



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

- Using 24mm fuel line wrench (J-45063 or J-47484), hold the transfer tube thrust nut. Using a 17mm 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 bolt 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 bolt flat each. See Figure 6.

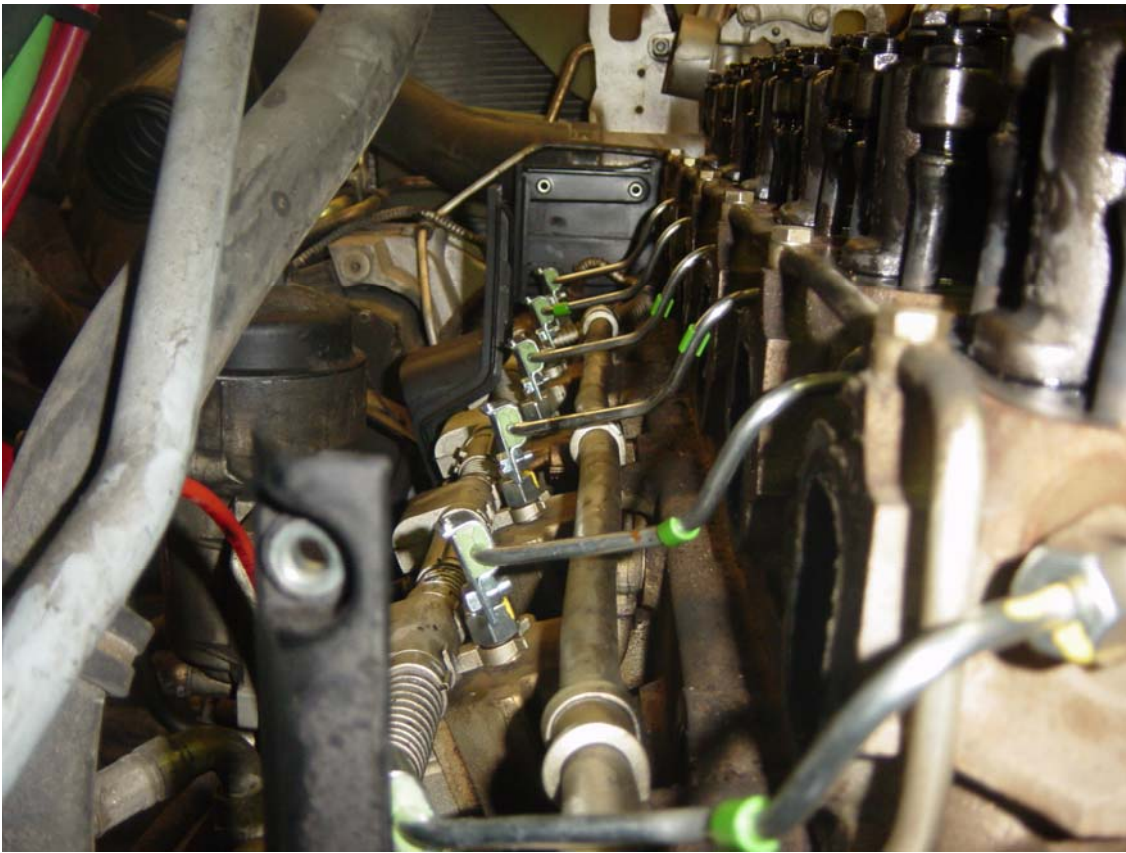


**Figure 6** Turning Fuel Line Nut 120 Degrees At Transfer Tube End

**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 24mm wrench such as (J-45063 or J-47484).

- 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.



**Figure 7 Correct High Pressure Fuel Line Installation**

9. Install the intake manifold. Refer to section 6.1.2 of the *MBE 4000 Workshop Manual* [DDC-SVC-MAN-0023 (6SE412)].
10. Remove the red label on the intake manifold that shows the torque specification for the high pressure fuel line. See Figure 8 for examples of the old label.



**Figure 8 Removal of Red Torque Specification Label on Intake Manifold**



11. Install the new label that comes in the kit. See Figure 9.




**Figure 9** Installation of New Torque Specification Label on Intake Manifold

12. Install the cylinder head covers. Refer to section 1.1.2 of the *MBE 4000 Workshop Manual* [DDC-SVC-MAN-0023 (6SE412)].

13. Prime the fuel system. Refer to section 11.1.5 of the *MBE 4000 Workshop Manual* [DDC-SVC-MAN-0023 (6SE412)].

<b>NOTICE:</b>
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.

 <b>WARNING:</b>
<b>PERSONAL INJURY</b>
<b>To avoid injury or injury to bystanders from fumes, engine or vehicle fuel system, service operations should be performed in a well ventilated area.</b>

14. Run the engine and check for leaks.

<b>NOTICE:</b>
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.

15. Shut down the engine.



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