

# DETROIT DIESEL



## Installation Instructions

### 18SP631 – MBE 4000 Oil Gallery Threaded Plug Installation

#### KIT DESCRIPTION

A new service kit (P/N: 23536501) is now available to install two threaded plugs in place of cup plugs in the rear oil gallery on MBE 4000 engines.

#### **NOTICE:**

This kit should only be used on engine serial number range 0460817468 through 0460840294.

You **MUST** use tapping tool kit J-47485.

Under no circumstances should any other tapping tool or procedure be used or warranty coverage may be denied.

#### KIT CONTENTS

This kit contains the following parts listed in Table 1.

Part Number	Quantity	Description
23536499	2	Plug – M26 x 1.0
000000001073	2	Seal Ring
4570140222	1	Oil Pan Gasket
4570150180	1	Flywheel Housing Gasket
0259975047	1	Rear Crankshaft Seal
18SP631	1	Installation Instructions

**Table 1**      **Content for Service Kit (P/N: 23536501)**

#### INSTALLATION PROCEDURE

Remove the cup plugs as follows (see Figures 1-3):

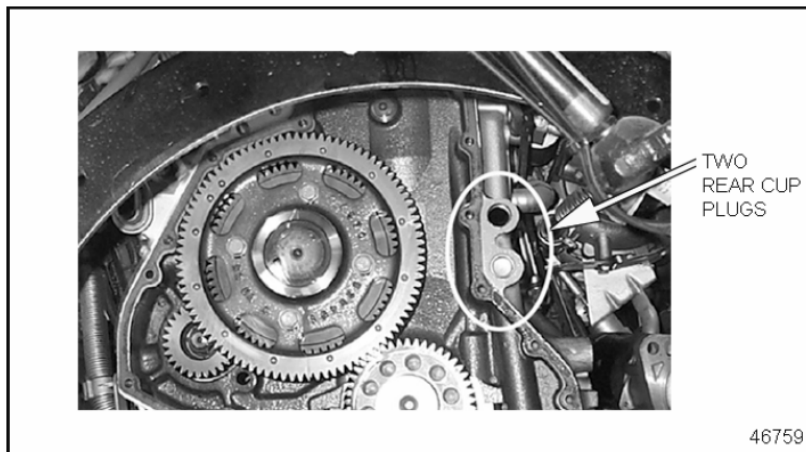
1. Apply the parking brake, chock the wheels, and perform any other applicable safety steps.
2. Disconnect vehicle battery power.
3. Remove the transmission and clutch. Refer to the applicable vehicle service manual.
4. Remove the flywheel. Refer to section 1.12 of the *MBE4000 Service Manual* (6SE412).
5. Remove the oil pan. Refer to section 3.1 of the *MBE4000 Service Manual* (6SE412).

**NOTE:** Do NOT remove the Oil Pressure Limiting Valve at this time.

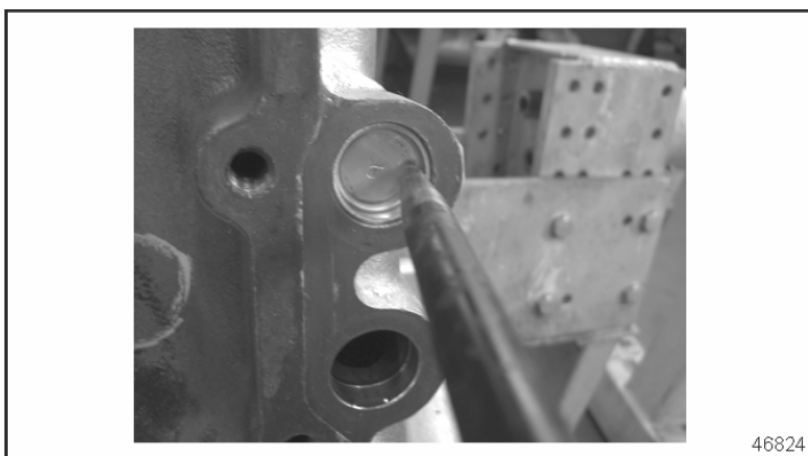
6. Support the engine by placing suitable jack stands under the cylinder block pan rails. Make sure to not damage the sealing surfaces of the pan rails.
7. Remove the rear engine mounts. Refer to the applicable vehicle service manual.
8. Remove the flywheel housing. Refer to section 1.16 of the *MBE 4000 Service Manual* (6SE412).
9. If the engine is equipped with a bracket and epoxy on the right rear of the cylinder block to retain the two rear cup plugs, remove the bracket and epoxy and discard.

<b>NOTICE:</b>
Do NOT drill through the cup plug to attach a slide hammer or similar device.

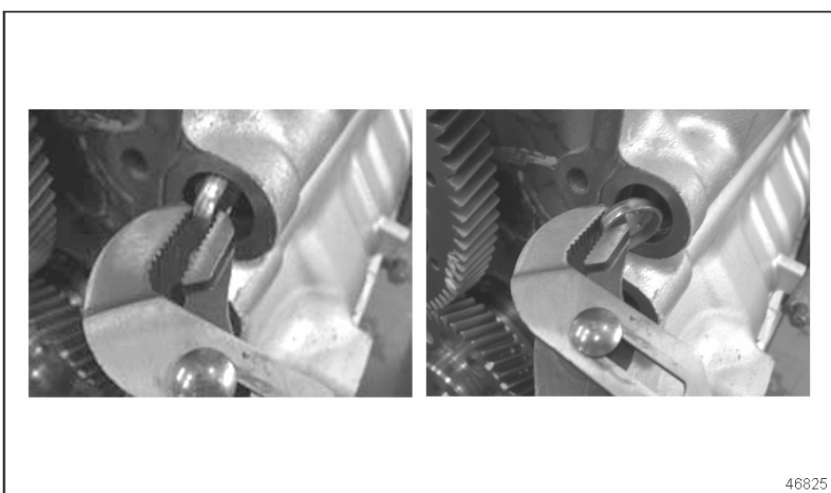
10. Remove the two rear cup plugs using the following procedure. Make sure to not damage the plug bores in the cylinder block. See Figure 1 for location of cup plugs.
  - a) Use a punch or chisel to hit the bottom of the cup plug near one side to turn it sideways. See Figure 2.
  - b) After turning the plug sideways, use pliers to grab the plug as shown in Figure 3.
  - c) Carefully pull the cup plug from the cylinder block as shown in Figure 3.



**Figure 1      Removal of Two Rear Cup Plugs**



**Figure 2**      **Proper Location of Punch to Turn Plug Sideways**

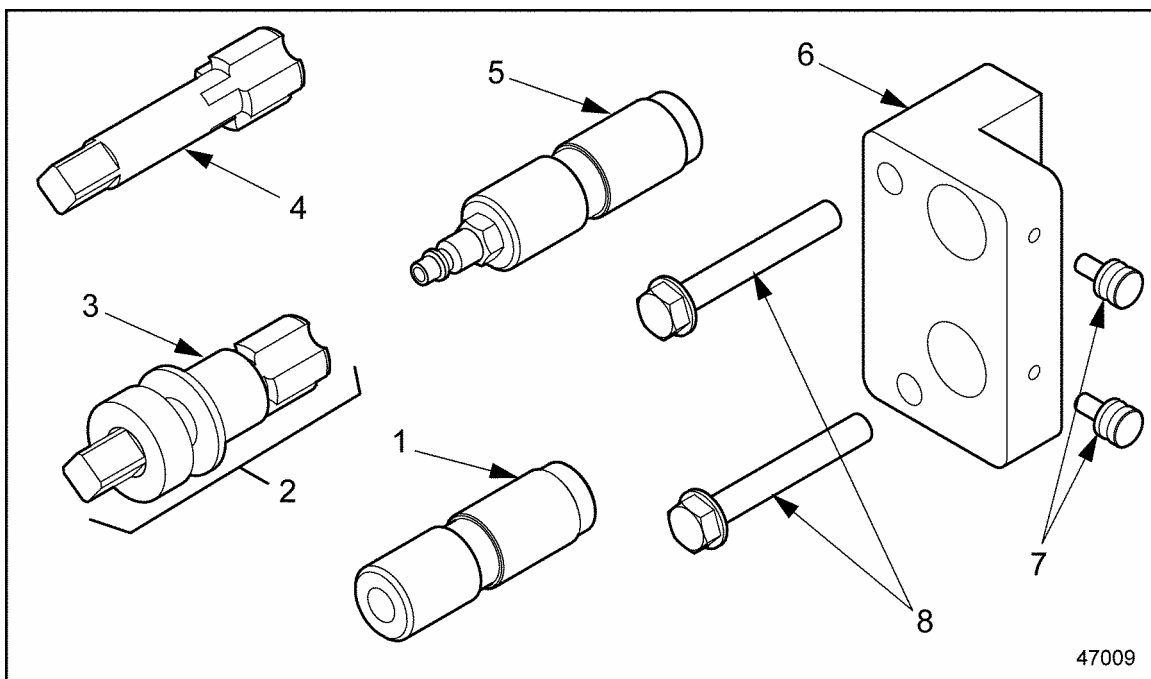


**Figure 3**      **Removing Plugs with Pliers**

11. Using a dry shop towel, clean both cylinder block plug bores so they are clean and dry.

**Installing adaptor block and tapping tool J-47485 (see Figures 4-6)**

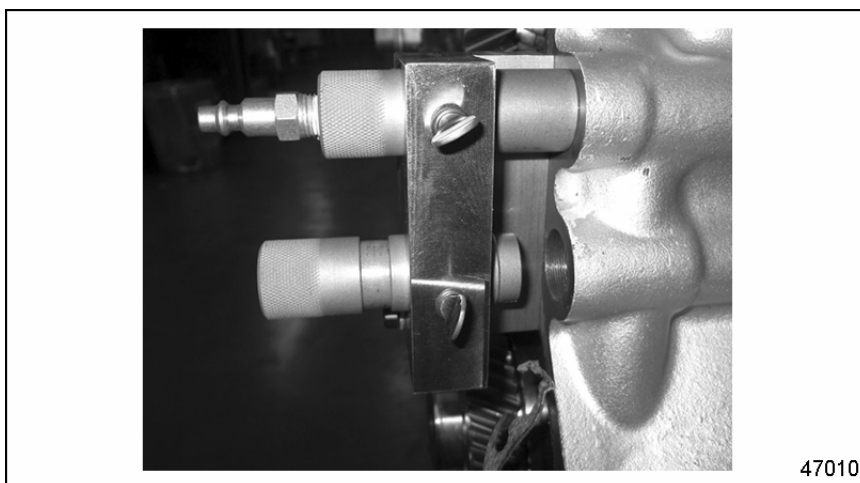
See Figure 4 for a view of the tools found in kit J-47485.



- |                                   |                                    |
|-----------------------------------|------------------------------------|
| 1. Centering Adaptor (J-47485-4)  | 5. Air Fitting Adaptor (J-47485-3) |
| 2. Tap Guide Assembly (J-47485-6) | 6. Adaptor Block (J-47485-1)       |
| 3. Tap Guide (J-47485-2)          | 7. Set Screws (2)                  |
| 4. Spare Tap (J-47485-5)          | 8. Attaching Bolts, M10 x 1.5 (2)  |

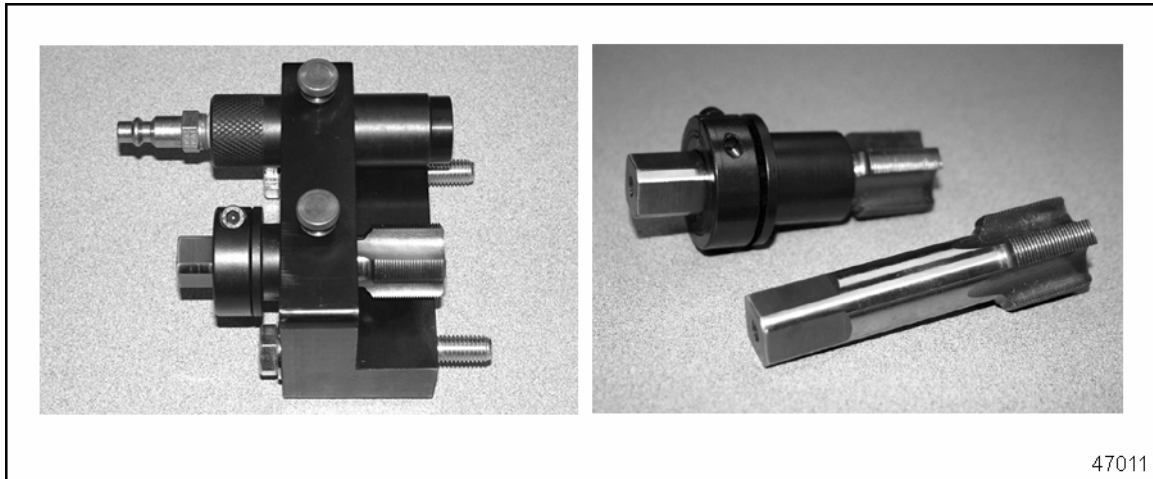
**Figure 4 Adapter Block and Tapping Tools Kit J-47485**

1. Ensure all gasket material is removed from the rear face of the cylinder block and the surface is clean and dry.
2. Install Adaptor Block (J-47485-1) to the rear face of the cylinder block using the two M10 x 1.5 attaching bolts. Only tighten the bolts finger tight at this time. See Figure 4.
3. Install the Air Fitting Adaptor (J-47485-3) in the top hole and the Centering Adaptor (J-47485-4) in the bottom hole of the Adaptor Block (J-47485-1). The Air Fitting and Centering Adaptors will help center the Adapter Block to the cup plug bores. See Figure 5.



**Figure 5 Adapter Block, Centering Adaptor, and Air Fitting Adaptor**

4. Finger tighten the two set screws. See Figure 5.
5. Tighten the two M10 x 1.5 attaching bolts to 33 N·m (24 lb·ft).
6. Loosen the Centering Adapter (J-47485-4) set screw and remove the adapter from the bottom hole, but leave the Air Fitting Adapter (J-47485-3) in place.
7. Clean and inspect the tap before using. Spare tap is included in kit. See Figure 4.
8. Apply a light coat of clean engine oil to the shaft of the Tap (J-47485-5) and install the Tap Guide Assembly (J-47485-6) into the bottom hole of the Adaptor Block (J-47485-1). See Figure 6.



**Figure 6 Tap Guide Assembly and Adaptor Block**

9. Fully seat the Tap Guide (J-47485-2) into the Adaptor Block (J-47485-1) and tighten the set screw.

**⚠ CAUTION:**

**EYE INJURY**

**To avoid injury from flying debris, wear a face shield or goggles.**

**NOTICE:**

Air Pressure is used to keep as many chips as possible out of the oil galley. The air pressure will blow the chips past the cutting flutes. Keep any sensitive areas covered.

### **Tapping Bottom Plug Bore**

1. Connect regulated and filtered air supply at 15 psi to the Air Fitting Adapter (J-47485-3).
2. Using light force, start the tapping process. Ensure the tap is well lubricated at all times.

3. Back the tap off every  $\frac{1}{4}$  turn. The tap will bottom out on the tap stop.
4. Turn off shop air and loosen tap guide assembly set screw. Remove the Tap Guide Assembly (J-47485-6) from the Adapter Block (J-47485-1).
5. Check and clean the newly tapped hole.
6. Check the front face of the tapped hole for burrs. If burrs are present, lightly stone the surface.
7. Disconnect shop air from the Air Fitting Adaptor (J-47485-3).

### **Tapping Top Plug Bore**

1. Loosen the Air Fitting Adapter (J-47485-3) set screw.
2. Move the Air Fitting Adapter (J-47485-3) to the bottom plug bore and tighten set screw.
3. Clean and inspect tap for damage before tapping top hole. Spare tap is included in kit.
4. Apply a light coat of clean engine oil to the shaft of the Tap (J-47485-5) and install the Tap Guide Assembly (J-47485-6) into the top hole of the Adaptor Block (J-47485-1).
5. Fully seat the Tap Guide (J-47485-2) into the Adaptor Block (J-47485-1) and tighten the set screw.



**CAUTION:**

**EYE INJURY**

**To avoid injury from flying debris, wear a face shield or goggles.**

6. Connect regulated and filtered air supply at 15 psi to the Air Fitting Adapter (J-47485-3).
7. Using light force, start the tapping process. Ensure the tap is well lubricated.
8. Back the tap off every  $\frac{1}{4}$  turn. The tap will bottom out on the tap stop.
9. Turn off shop air and loosen the tap guide assembly set screw. Remove Tap Guide Assembly (J-47485-6) from the Adapter Block (J-47485-1).
10. Check and clean the newly tapped hole.
11. Check the front face of the tapped hole for burrs. If burrs are present, lightly stone the surface.
12. Disconnect shop air from the Air Fitting Adaptor (J-47485-3).
13. Loosen the two M10 x 1.5 attaching bolts and remove the Air Fitting Adaptor (J-47485-3) and Adaptor Block (J-47485-1) from the cylinder block.

## Cylinder Block Cleaning Process

1. Remove the Oil Pressure Limiting Valve. Refer to section 3.4.1 of the *MBE 4000 Service Manual* (6SE412).

### NOTICE:

When removing the oil pressure limiting valve, take note of the direction in which the valve was installed.

2. Use an aerosol spray can of brake cleaner or similar to clean the Oil Pressure Limiting Valve.
3. Clean the newly tapped holes by spraying brake cleaner or similar cleaner down the main oil gallery towards the oil pan.
4. Clean and inspect the rear face of the cylinder block and gear train.

## Installation of Threaded Plugs

1. Test the condition of the tapped holes by installing a threaded plug by hand. If the plugs bind or stop prematurely, inspect and make any necessary repairs to the threads.
2. Install the seal rings onto the two threaded plugs. See Figure 7.



**Figure 7 Threaded Plugs and Seal Rings**

3. Apply Loctite® 640 or 680 on the plugs.
4. Install the threaded plugs into the cylinder block and torque to 150 N·m (110 lb·ft).

### NOTICE:

Note the direction of the oil pressure limiting valve.  
Incorrect installation can cause oil pressure problems.

5. Reinstall the Oil Pressure Limiting Valve. Refer to section 3.4.1 of the *MBE 4000 Service Manual* (6SE412).

6. Reinstall all other removed components in reverse order.
7. After all work has been completed, start and run the engine and verify there are no leaks.

**DETROIT DIESEL**

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