Superduty 6.0L Powerstroke Engine

Removal/Installation Service Tips

May 2004
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  The procedure steps must be followed in a specific order.

• **Turbo Marmon Clamp**
  • Saves time during assembly to reposition the clamp for better accessibility.

• **Turbo Adapter Tube**
  Saves time by using a half moon wrench to better access the fasteners from the adapter tube to the exhaust.

• **Factory Lifting Eye**
  Must be removed because it does not have the correct angle to work with the engine lift bracket.

• **Torque Converter Nuts**
  Saves time by not having to raise and lower the vehicle to remove or install the torque converter nuts.

• **Engine Removal/Installation from Vehicle Chassis**
  Calls out the desired tools that will save time by not having to remove the vehicle’s hood.

• **Engine Mounted to Stand**
  It is not necessary to remove the starter motor, which will save time.

• **Bell Housing Bolts**
  How to torque the 9 bell housing bolts.
SECTION 303-01D: Engine — 6.0L Diesel
REMOVAL

Engine

**Special Tool(s)**

- Diesel Engine Lifting Bracket (D83T-6000-B) 303-D043
- Fuel Line Tool (T90T-9550-S) 310-5039
- Heavy Duty Floor Crane 014-00071
- Adapter For 303-D043 303-D043-02
- Adapter For 303-D043 303-D043-01
- Wrench, Fan Clutch Nut 303-591

**Removal**

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Disconnect the LH and RH battery ground cables. For additional information, refer to Section 414-01.

Vehicles with manual transmission

3. **NOTE:** On vehicles equipped with manual transmissions, the transmission must be removed before the engine can be removed. Remove the transmission. For additional information, refer to Section 308-03.

Follow the Shop Manual for the correct order to REMOVE the engine sub-assemblies.

**Note:**

Not following the workshop manual procedure may result in removing the engine sub-assemblies out of the correct order. This can result in extra time to complete the procedure.
SECTION 303-01D: Engine — 6.0L Diesel 
REMOVAL

REMOVAL

Procedure revision date: 10/02/2002

Engine

Special Tool(s)

- Diesel Engine Lifting Bracket (D83T-6000-B) 303-D043
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Material

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Super Duty SAE 15W-40 Motor Oil</td>
<td>WSS-M2C171-C</td>
</tr>
<tr>
<td>Premium Engine Coolant</td>
<td>ESE-M97B44-A</td>
</tr>
<tr>
<td>R-134a Refrigerant</td>
<td>WSH-M17B19-A</td>
</tr>
</tbody>
</table>

Installation

All vehicles

1. With the vehicle in NEUTRAL, position it on a hoist. For additional information, refer to Section 100-02.
2. Raise the engine high enough to clear the No. 1 crossmember, then position the engine into the vehicle.

Follow the Shop Manual for the correct order to INSTALL the engine sub-assemblies.

Note:

Not following the workshop manual procedure may result in installing engine sub-assemblies out of the correct order. This can result in extra time to complete the procedure.
Turbo Marmon Clamp *Service Tip* (Page 1 of 2)

Factory installed position of the marmon clamp.

To ease reassembly, reverse clamp and position as shown.

• Turbo shown removed from vehicle for clarity
Recommended position of the turbo marmon clamp.

• This is the “in-vehicle” view as the Technician will see it.

• Not having the turbo marmon clamp positioned as shown makes it very difficult to see, access or torque the nut on the clamp during re-assembly.
View shown from underneath the vehicle raised on a hoist.

• A 13mm half-moon wrench is the best way to access and hold the left outer bolt while removing and installing the nut shown. It saves time because of the curved shape of the tool.

Note: This wrench was not used to determine the labor operation time.

• The curve wrench aids in gaining access to the turbo adapter tube bolt. Access is possible with a regular straight wrench, but more difficult.
Recommended tool to torque the outer left nut and bolt to the turbo adapter tube.

• The half moon wrench is used to prevent the bolt from turning while using the torque wrench to torque the nut.
• The half moon wrench saves time because the curve of the tool makes access to the bolt easier.
Turbo Adapter Tube Service Tip (Page 3 of 3)

Recommended tool to remove/install the nut and bolt to the turbo adapter tube.

Available thru:

• Snap-On
• Matco
• MAC
• Craftsman
Recommended tool for removing the two bolts for the factory lifting eye.

- Factory lifting eye is located on the back side of the right cylinder head. Using a straight ratchet helps keep the ratchet and allen socket lined up properly to break the bolts loose. A flex ratchet may not keep a straight-on angle, and can possibly cause damage to the bolt heads or allen socket.

- The factory lifting eye does not have the correct angle to work with the engine lift bracket, therefore, it must be removed.

*Note: The installation procedure recommends reinstalling the factory lifting eye.*
Recommended tool for removing loose the two bolts for the factory lifting eye.

• Tool is a long 1/4 or 3/8 inch ratchet without a flexhead.
Recommended tool to remove or install the torque converter attaching nuts.

- Using this tool combination allows you to remove the torque converter nuts from the front of the vehicle without raising it on a hoist.
- This step helps save time by not having to raise and lower the vehicle to remove the torque converter attaching nuts.
Torque Converter Nuts Service Tip (Page 2 of 2)

Recommended tool to remove/install torque converter nuts:

1  1/2 inch drive ratchet

2  1/2 inch drive extension (Approx. 3 feet in length)
Desired tools for removing the engine from the chassis:

1) Diesel Engine Lifting Bracket (D83T-6000-B)
2) Adapter for 303-D043 (303-D043-02)
3) Adapter for 303-D043 (303-D043-01)

• Using the desired tools allows the Technician to lift the engine straight up and out with no side-to-side movement. A conventional spreader bar and chain requires hood removal and allows more uncontrolled movement that the Technician can struggle to control.

• Using the desired tools will save time when performing the engine removal and install steps.
Engine Hoist

Diesel Engine Lift Bracket

Shows how engine lift bracket attaches to the engine hoist.
Removal procedure calls for removal of the battery cable from the starter motor. Removal of the starter motor is not necessary to remove the engine from the chassis.

• The removal of the starter motor is only necessary if additional repairs need to be performed. (Example: If coolant is found in the combustion chambers, new injector sleeves may need to be installed. If engine disassembly is necessary, drain the engine block. The starter needs to be removed to remove RH block drain).
The question has been raised, “How do you torque the transmission bell housing bolts?” The following pages show how to torque each transmission bell housing bolt and the tools that are used.
Bell Housing Bolts 1-3 Service Tip (Page 2 of 5)

Torquing left side lowest bell housing bolt.

Torquing left side 2nd lowest bell housing bolt.

Torquing left side middle bell housing bolt.
**Bell Housing Bolts 4-6 Service Tip** (Page 3 of 5)

Torquing left side upper bell housing bolt.

Torquing left side top bell housing bolt.

Torquing right side lowest bell housing bolt.
Bell Housing Bolts 7-9 Service Tip (Page 4 of 5)

Torquing right side 2nd lowest bell housing bolt.

Torquing right side upper bell housing bolt.

Torquing right side top bell housing bolt.
Bell Housing Bolts *Service Tip* (Page 5 of 5)

Recommended tools to torque the Bell Housing bolts:

1) 1/2 inch Drive Extension, Approx. 3 Feet in Length
2) 1/2 Drive Extension, 10 in. in Length Equipped with Socket Locking Collar
3) 13mm Swivel Socket

Note: An Impact Swivel Socket may be used to torque fasteners but CANNOT exceed a 15 degree working angle.