INSTALLATION MANUAL

BULLET PROOF OIL COOLER KIT
2003-2007
F-SERIES

NEAL TECHNOLOGIES, INC.
U.S. PATENT 8,375,917; 8,505,512 and OTHER PATENTS PENDING
UPDATED 1/8/2018

© 2014 BULLET PROOF DIESEL
Important note on A/C Condensers:

Bullet Proof Diesel offers a Non-Traditional A/C Condenser Mounting Bracket:

This bracket is required for mounting the Bullet Proof Diesel Air-to-Oil Cooler if you have a non-traditional style 6.0L condenser.

Non-Traditional A/C Condenser Mounting Bracket
P/N: 90100059
BEFORE You Begin Installation

Important note on Power Steering Coolers:

In mid 2006 Ford made a mounting location change to the power steering cooler. The power steering cooler on 2003- early 2006 models is in the lower position, at/near the bottom of the radiator. In the late 2006-2007 models, the power steering cooler has been located up near the hood latch, near the top of the radiator.

Here you can see the power steering cooler in the lower position, near the bottom of the radiator.

If you have the high-mounted power steering cooler, the condenser mounted BPD Engine Oil Cooler will require you to relocate your power steering cooler to the lower position.

To do this you will need a power steering cooler relocation kit. These parts are listed on BulletProofDiesel.com and are shown here:

Power Steering Cooler Relocation Kit:
P/N: 90100024
Note on Turbo Oil Feed Lines:

On a few, very early 2003 6.0L diesel trucks, Ford used a thread-in style turbo oil feed tube. This threaded turbo feed tube is extremely rare and is only present on some 2003 models. The threaded style of oil feed tube applies to all Ford 6.0L’s with the production date of 3/18/2003 and earlier.

This threaded oil feed tube is not compatible with the oil transfer block from Bullet Proof Diesel. The Bullet Proof Diesel block requires the slip-fit O-ring style connection.

If you find that your turbo oil feed tube is the threaded style, you will need to purchase a new turbo oil feed tube from Bullet Proof Diesel or Ford.

Ford Part Number is: 3C3Z-9T516-BA
Bullet Proof Diesel Part number: 6000082
These are the parts included in your kit. Please locate and identify each part prior to starting the installation process. There are some drawings in the back of this manual that can aid you in identifying the proper pieces.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>90100077</td>
<td>EGR Cooler Gasket Set and Turbo Hardware</td>
<td>1</td>
</tr>
<tr>
<td>6502039</td>
<td>Bullet Proof Diesel Oil Filter Mount</td>
<td>1</td>
</tr>
<tr>
<td>6000015</td>
<td>High Capacity Engine Oil Cooler</td>
<td>1</td>
</tr>
<tr>
<td>6000013</td>
<td>Diesel Oil Filter, 85832</td>
<td>1</td>
</tr>
<tr>
<td>6200002</td>
<td>Constant Tension Spring Clamp</td>
<td>2</td>
</tr>
<tr>
<td>6200004</td>
<td>Allen Head, Black, Metric 35mm</td>
<td>2</td>
</tr>
<tr>
<td>6200005</td>
<td>Allen Head, Black, Metric 40mm</td>
<td>2</td>
</tr>
<tr>
<td>6200011</td>
<td>¾-20 Lock Nut</td>
<td>4</td>
</tr>
<tr>
<td>6200015</td>
<td>¼” Flat Washer</td>
<td>4</td>
</tr>
<tr>
<td>6200013</td>
<td>5/16-18 Lock Nut</td>
<td>1</td>
</tr>
<tr>
<td>6200014</td>
<td>5/16-18 x 1 ¼ Hex Head Bolt</td>
<td>1</td>
</tr>
<tr>
<td>6200076</td>
<td>5/16-18 x ¾” Hex Head Bolt</td>
<td>2</td>
</tr>
<tr>
<td>6200016</td>
<td>5/16” Flat Washer</td>
<td>4</td>
</tr>
<tr>
<td>6400004</td>
<td>Silicone Hose,(6 inches)</td>
<td>1</td>
</tr>
<tr>
<td>6400008</td>
<td>#12 90° Elbow Fitting</td>
<td>2</td>
</tr>
<tr>
<td>6400038</td>
<td>#12 O-Ring Hex Plug</td>
<td>2</td>
</tr>
<tr>
<td>6400007</td>
<td>#12 JIC Straight Fitting</td>
<td>2</td>
</tr>
<tr>
<td>6400002</td>
<td>¼” Counter Sunk Hex Plug</td>
<td>1</td>
</tr>
<tr>
<td>90201009</td>
<td>Hoses with Fittings Attached (per Hose Routing Diagram)</td>
<td>3</td>
</tr>
<tr>
<td>90201000</td>
<td>6.0L Adapter Manifold Block, Assembled</td>
<td>1</td>
</tr>
</tbody>
</table>

**Unique Parts for 2003-2004 Installation:**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6502032</td>
<td>03-04 Oil Filter Bracket, Driver’s Side</td>
<td>1</td>
</tr>
<tr>
<td>6502028</td>
<td>03-04 Rock Panel, Driver’s Side</td>
<td>1</td>
</tr>
</tbody>
</table>

**Unique Parts for 2005-2007 Installation:**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6502033</td>
<td>05-07 Oil Filter Bracket, Driver’s Side</td>
<td>1</td>
</tr>
<tr>
<td>6502034</td>
<td>05-07 Rock Panel, Driver’s Side</td>
<td>1</td>
</tr>
</tbody>
</table>

**With Condenser Bracket Mounting:**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>6502044</td>
<td>Condenser Mounting Bracket</td>
<td>1</td>
</tr>
<tr>
<td>6200083</td>
<td>Hex Head Sheet Metal Screw</td>
<td>6</td>
</tr>
<tr>
<td>6200084</td>
<td>Aluminum Spacer</td>
<td>6</td>
</tr>
<tr>
<td>6502049</td>
<td>Left hand transmission cooler lowering bracket</td>
<td>1</td>
</tr>
<tr>
<td>6502050</td>
<td>Right hand transmission cooler lowering bracket</td>
<td>1</td>
</tr>
<tr>
<td>6200043</td>
<td>Rivets</td>
<td>8</td>
</tr>
<tr>
<td>6200063</td>
<td>Washers</td>
<td>8</td>
</tr>
</tbody>
</table>
BEFORE You Begin Installation

Installation Overview

Installing the Bullet Proof Diesel Oil Cooler Kit is no more difficult than replacing the OEM oil cooler. That being said, it is important to remember that this is major surgery. Cleanliness and taking the time to do the job correctly are essential for a perfect installation.

There are two major stages to the installation:

1. Replacement of the OE EGR cooler and oil cooler with the Bullet Proof Diesel (BPD) Oil and EGR coolers. This is performed the same as OE repair procedures with only a few deviations and includes removal of the turbo and intake manifold.

2. Installation of the air cooled engine oil cooler and oil lines. This stage will also entail the removal of the air conditioning condenser. Please make sure that you have the equipment to do that according to the established EPA regulations.

Please Note: There are some slight differences between different model years you should check on and be aware of. Please see the pages 14-17 regarding transmission coolers, turbo oil supply lines and power steering coolers.

Extra Help: Step-By-Step Instructions for Removal of the Intake Manifold

Detailed installation and removal instructions for the EGR Cooler and Engine Oil Cooler can be purchased online. Please go to BulletProofDiesel.com. Click on “Questions? We have answers”. Click on “Do-It-Yourself” and find the link to purchase the information from eAutoRepair.net for your particular make and model. Once purchased, please proceed to the section:

Repair → Type “INTAKE MANIFOLD” → Search
Engine → Click on “MECHANICAL”
Click on “ENGINE – 6.0 DIESEL” —F250-F550 PICKUPS’
Click on “HEADINGS”

Search for the “IN-VEHICLE REPAIR” category, which includes removal and replacement instructions for the intake manifold.
Installation Stage 1: The Oil Transfer Block

1. Follow the OE oil cooler replacement procedures (which include removal of the intake manifold and turbo).

2. Install the OE oil cooler gasket into the Bullet Proof Diesel (BPD) Oil Transfer Block.

3. Remove the oil pressure sender and oil temperature sensor from the OE oil cooler housing.

4. Gently clean and install the oil temperature sensor and the oil pressure sender into the oil transfer block.

5. When the OE oil cooler is completely removed, remove all of the oil and debris from the HPOP reservoir.

6. Remove and discard the HPOP filter. The BPD Oil Transfer Block has an integral HPOP screen, made from stainless steel, which operates in place of the OE HPOP filter.

7. Use the OE bolts and torque specifications to install the BPD Oil Transfer Block.
8. Discard the OE silicone coolant hose. This is replaced by the silicone hose and spring clamps supplied in the kit. We recommend using the spring clamps over regular hose clamps due to the location and the difficulty involved with tightening regular hose clamps after the installation is complete. Spring clamps, by design, will tighten as the silicone rubber relaxes.

9. Continue following the OE installation procedure. Once the intake manifold is installed, but prior to the turbo being installed, the “in” oil hose (hose #3) should be installed.

10. Install the oil/fuel filter housing using the bolts supplied in the kit. There are two long and two short bolts. Install the bolts into the corresponding long and short holes on the oil filter housing. Use OE torque specifications to tighten the bolts.

11. Discard the OE oil filter element, but retain the element cover, as this will still be used to cover the void in the non-functional OE oil filter housing.

12. Complete the installation procedures except for installing the air filter assembly and intercooler air hoses.

NOTE: THERE ARE NUMEROUS UPGRADES AND UPDATES THAT CAN AND SHOULD BE INSTALLED DURING THIS PHASE. YOU CAN PURCHASE THE APPROPRIATE UPDATE KIT FROM BulletProofDiesel.com SEARCH KEYWORD: “PROFESSIONAL”
Installation Stage 2: The Oil Cooler, Oil Filter, and Condenser Mount

Remove the Condenser:

1. Mark hood latch position with a Sharpie marker or other.

2. Remove plastic condenser cover/upper radiator air deflector.

3. Remove hood latch mechanism.
4. Recover A/C refrigerant per EPA regulations.

**NOTE:** IF YOU ARE INSTALLING A COLD WEATHER PACKAGE PLEASE REFER TO PAGE 32 FOR FURTHER INSTRUCTION.

5. Remove “L” brackets that hold the condenser in place.

6. Disconnect the A/C lines from condenser AFTER the refrigerant is properly recovered.

**Mounting the Oil Cooler to the Bracket:**

**NOTE:** PLEASE SEE COLD WEATHER KIT SECTION ON PAGE 31 IF APPLICABLE PRIOR TO THIS STEP.

7. Use the mounting studs on the condenser bracket along with the supplied hardware to secure the air cooler in place.

**NOTE:** THE INLET INTO THE OIL COOLER SHOULD BE ON THE DRIVER’S SIDE OF THE BRACKET. THE INLET IS POSITIONED IN THE MIDDLE OF THE COOLER, WHILE THE OUTLET IS NEAR THE TOP OF THE COOLER. THIS IS IMPORTANT SO THAT AIR WILL NOT BECOME TRAPPED WITHIN THE COOLER.
On the BPD oil cooler, there are three ports. The two large ports are for oil in and oil out. The small port can be used for any of the following:

- Supply line for a by-pass oil filtration system.
- Port for engine oil temperature or engine oil pressure gauge.
- Other uses such as oil supply for a secondary turbo, etc.

This port should be blocked off if you do not intend to use it for any of the above.

**To block this port off properly, follow these steps PRIOR to installation of the air cooler:**

8. Identify the ¼ pipe-plug brass insert that fits this port (provided with kit).

9. Wrap the brass plug with Teflon pipe-sealing tape and install into the cooler. DO NOT OVER TIGHTEN.

10. After installation of the oil cooler system, check for oil leaks with the engine running.
**NOTE:** ORIENT THE OIL COOLER AS SHOWN, CAREFUL TO NOTE INLET AND OUTLET POSITIONS (OUTLET IS HIGHER THAN INLET TO AVOID TRAPPING AIR IN THE COOLER).

**Mounting the Bracket to the Condenser:**

11. Place condenser on working surface (see picture)
12. Identify the holes in the condenser.

**NOTE:** If your condenser is different than what is shown, you may have an aftermarket condenser or a newer OEM condenser. Please refer to page 2 for more details.

13. Position the oil cooler and bracket on the condenser.

Supplied mounting hardware.

14. Align the square slots/holes in the bracket with the holes in the condenser. Be sure to allow for the condenser bracket to align with the top of the condenser when finished.
15. IF NO HOLE IS AVAILABLE for the mounting hardware (this is a rare occurrence) you can drill a hole through the edge of the condenser.

**NOTE:** Use a 1/8” (.125) diameter drill bit and carefully align the hole position so that it and the installed screw will NOT damage the tubes at the end of the condenser.

**NOTE:** Make sure you use the 4 aluminum spacers as shown in the next picture. This creates an important air gap between the oil cooler and the A/C condenser.
16. Mount the bracket to the condenser using the hardware provided. Drill only if necessary.

17. Secure the bracket to the condenser with all four screws, making final adjustments such that the top level of the bracket aligns with the top level of the condenser.

18. Mount the oil hoses, (#2 and #3) provided on the condenser at this time – be sure to tighten the hoses now, as this is the easiest time to do so.

Be sure that the cooler bracket crowns are aligned with the condenser crowns.
Note on Transmission Coolers:

Most F-Series trucks are equipped with a transmission cooler. This cooler is located behind the condenser, underneath the hood latch. While most of these coolers are 14 inches tall, some heavy-duty transmission coolers are 17 inches tall. The 17 inch transmission coolers will need to be lowered to allow for enough room to clear the Bullet Proof Engine Oil Cooler.

If you have the 17 inch tall cooler, you will need the transmission cooler lowering brackets, included with the kit.

The picture above shows the transmission cooler before modifications.

**NOTE:** VERIFY THAT YOUR TRANSMISSION FLUID LINES ARE NOT KINKED OR PINCHED AFTER LOWERING THE TRANSMISSION COOLER.
This shows the necessary modification to the mounting stems at the bottom of the transmission cooler, it should lower it by 2.5 inches. Some drilling and cutting will be necessary.

**NOTE:** VERIFY THAT YOUR TRANSMISSION FLUID LINES ARE NOT KINKED OR PINCHED AFTER LOWERING THE TRANSMISSION COOLER.
Installing the Condenser with the Oil Cooler Attached:

19. Install the condenser loosely in the truck. Check to make sure that the orientation of the cooler is as shown and that nothing is going to hit, rub or interfere with it. Two people definitely make this part of the installation much easier.

20. Install the condenser “L” brackets on the newly installed cooler bracket crowns.

**NOTE:** **PRE-FILLING THE ENGINE OIL COOLER WITH OIL IS BOTH NECESSARY AND PARAMOUNT!**

21. Install the A/C hoses.

22. Recharge the A/C system as a last step just in case you have an oil leak.

23. Reinstall the hood latch (using the marks as a guide) and the condenser cover/upper radiator air deflector.
24. Bolt the oil filter adapter to the oil filter mounting bracket using the supplied 5/16” hardware

25. Install the hose fittings into the oil filter housing exactly as shown above.

**NOTE:** SEE APPROPRIATE HOSE ROUTING DIAGRAM FOR FITTING PLACEMENT AND ORIENTATION
NOTE: VERIFY THAT THE HOSE FITTINGS ARE IN THE PROPER PORTS. ONE OIL IN AND ONE OIL OUT MUST BE USED IN ORDER TO PREVENT ENGINE DAMAGE. MAKE SURE THAT HOSE #1 FROM THE ENGINE TO THE OIL FILTER IS ATTACHED TO AN “OIL IN” PORT, AND THAT HOSE #2 EXITING THE OIL FILTER TO THE COOLER IS “OIL OUT”

26. Mount the oil filter bracket to the backside of the bumper frame rail on the drivers’ side using the OE bumper mounting bolts and hardware to secure the oil filter bracket. It is generally easier to connect both hoses to the oil filter adapter before mounting the oil filter assembly to the vehicle frame.

NOTE: ON SOME MODELS, THE FRONT LEAF SPRING BOLT MAY NEED TO BE TRIMMED FOR CLEARANCE OF THE OIL FILTER.
Oil Hose Routing

1. Route oil hose #1 (Oil Out from Engine on Driver’s Side) from transfer block down and under the air cleaner. In this picture, the air cleaner has been removed.

2. This view shows the hose running from under the air cleaner element along the intercooler line and towards the front of the truck. Make sure to secure the oil hose away from the intercooler.
3. Hose #1 is routed out and down towards the engine oil filter assembly.

4. Route hose #1 down and under the engine oil assembly as shown. Secure the hose to prevent rubbing or chaffing.

**NOTE:** THE 56” HOSE MAY SEEM SHORT BUT HAS BEEN THOROUGHLY TESTED AND PROVES TO WORK BEST IN THIS PATH.
5. To make installation of the #2 hose easier, make sure the oil filter assembly is firmly mocked up in place. Once the hose #1 from the engine is connected to the oil filter assembly, install hose #2

6. Install hose #3 to the cooler if you haven’t already done so. Route the hose through the core support where the A/C hoses and intercooler come through.

NOTE: TAKE CARE TO INSURE THE OIL HOSE AND A/C HOSES DO NOT RUB. THIS COULD LEAD TO THE EVENTUAL FAILURE OF THE A/C HOSES.

Tech Tips for Weatherizing Your Oil Lines and Fittings

Some of our customers live in areas/climates where salt or chemicals are used for deicing the roads in the winter months. These substances can cause premature deterioration of the fittings and hoses.

Instead of replacing these parts as they wear from the attack of chemicals, a simple rubberized undercoating (pictured) can help ensure that your fittings are protected against the elements, so you can enjoy your Bullet Proof Diesel products for years to come.
Installation Wrap-Up

1. Adjust oil filter assembly placement to clearance the bumper support brackets and tighten hardware. Install the previously removed bumper support brackets and install the rock panel bracket. If there is interference with the oil filter assembly, re-adjust the oil filter bracket until the oil filter assembly has proper clearance.

2. Once the above steps are complete, prime the oil cooler and filter with oil. This can be accomplished by pumping oil from a bulk oil dispenser through the oil supply hose or by filling the oil cooler and filter with oil at the time of installation.

3. Finish the OE oil cooler installation procedure. Make sure all connections are tight.

On the 2005-2007 Installation: Install the rock panel as shown in place of the bumper bracket.

The 2003-2004 version has a rock panel, too. It serves a similar purpose but looks and fits a bit differently.
Hose Routing Diagrams
Hose Routing Diagram: 2003-2004 F-Series, Condenser Mounted

**NOTE:** Hose length is measured by the cut length of the hose not including fittings.
**Hose Routing Diagram: 2005-2007 F-Series, Condenser Mounted**

**NOTE:** Hose length is measured by the cut length of the hose not including fittings.
BulletProofDiesel.com
Bullet Proof Cold Weather Kit
Neal Technologies, Inc.
(Patent pending)
Updated 11/17/2011
The purpose of the cold weather kit is allow operation of 6.0L Powerstroke diesel engines in cold climates where ambient air temperatures are low enough to cause concern when using an air-to-liquid cooler.

The kit consists of an oil thermostat and the necessary hardware and hoses to install the thermostat. The thermostat kit is fully reverse compatible with all Bullet Proof Condenser mounted oil system kits.

**THE COLD WEATHER KIT FUNCTIONS AS FOLLOWS:**

Oil from the engine is pumped into the Bullet Proof oil cooler system by the OEM low pressure oil pump. After being filtered the oil then heads to the cooler. If the oil has not reached the desired operating temperature, it is allowed to bypass the engine oil cooler and return to the engine. Once the desired engine oil temperature has been reached, the thermostat closes and eliminates the path by which oil can circumvent the oil cooler. Oil will follow the path of least resistance. When cold, the oil cooler offers greater resistance to flow than the oil cooler thermostatic bypass circuit. At no time is the oil cooler blocked or made to be static. A path of less resistance is opened or blocked depending oil temperature.

A pressure bypass valve is also incorporated into the thermostat assembly. This will allow a portion of the oil to bypass the oil cooler in the event a pressure differential greater than 18PSI exists between the inlet and outlet of the engine oil cooler. This ensures a constant flow of oil to the engine under extreme operating conditions such as racing or subfreezing climates.
**To install the Cold Weather Kit:**

1. Make sure all components are CLEAN.
2. Remove the A/C condenser. Be sure to follow the Factory guidelines for this procedure.
3. *If you are retrofitting the Cold Weather Kit to an existing installation of the Bullet Proof oil cooler kit, you will need to remove the oil cooler from the condenser mount and remove the oil cooler mount from the condenser.*
4. Attach the thermostat assembly to the “oil out” side of the oil cooler. Make sure to seat the O-ring all the way into the oil cooler. Be careful not to seat the O-ring on the threads of the fitting. This could cause an oil leak.

5. Position the oil cooler and thermostat as shown
6. If you are retro fitting the thermostat to an existing installation, mark where the thermostat support bracket touches the oil cooler mount. Remove the oil cooler assembly from the oil cooler mounting bracket and drill a ¼” hole where the bracket was marked. Remember to remove the oil cooler bracket from the condenser prior to drilling the hole. Condensers are expensive.

![Image of drilling and installing components](image1.jpg)

**NOTE:** Condenser support bracket comes with the stud already attached in current kits.

7. Attach the oil cooler bracket to the condenser per the instructions in the Bullet Proof oil cooler installation manual. On retro installs, make sure to install the ¼”- 20x1” bolt through the drilled ¼” hole so that the hex head is between the oil cooler mount and the A/C condenser. Ensure you have a wrench that will fit between the oil cooler mount and the A/C condenser.
8. Install the oil cooler assembly as shown. Tighten the oil cooler to the condenser bracket with oil cooler mounting hardware.

9. Tighten the thermostat to cooler coupler as shown below.

10. Install the bypass manifold.

11. Install the oil filter to oil cooler hose #7 on the bypass manifold.

12. Lower the condenser back into place and mark the areas on the headlight support bracket where the thermostat will interfere.
13. Remove the condenser and cut out the marked area with a hack saw or other suitable tool.

14. Re-install the condenser and ensure adequate clearance of both the transmission cooler and the headlamp support bracket.

15. Refer back the Bullet Proof Diesel Engine Oil Cooler installation manual for additional instructions if you need to continue installing the Oil Cooler Kit.

**NOTE:** **Remember to prime to oil system before starting the engine. Failure to do so can result in severe engine damage.**
<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>DESCRIPTION</th>
<th>PART NO.</th>
<th>QTY.</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>9&quot; Oil Line Strt / Strt</td>
<td>90100014</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>56&quot; Oil Line 90° / Strt</td>
<td>90100002</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>90’ Fitting</td>
<td>64000008</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Straight Fitting</td>
<td>64000007</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>BPD Oil Filter Adapter</td>
<td>6502039</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>Oil Filter</td>
<td>6000013</td>
<td>1</td>
</tr>
<tr>
<td>15</td>
<td>BPD Oil Filter Bracket</td>
<td>6502033</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Hex Bolt 1 1/4&quot;</td>
<td>6200014</td>
<td>1</td>
</tr>
<tr>
<td>17</td>
<td>Hex Bolt 3/4&quot;</td>
<td>6200076</td>
<td>2</td>
</tr>
<tr>
<td>18</td>
<td>Washer</td>
<td>6200016</td>
<td>4</td>
</tr>
<tr>
<td>19</td>
<td>Hex Nut</td>
<td>6200013</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>Plug</td>
<td>6400038</td>
<td>2</td>
</tr>
</tbody>
</table>