



***BULLET PROOF DIESEL***®  
***.COM***

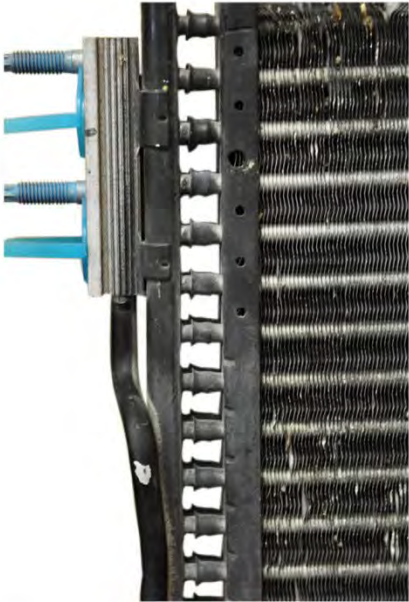
## **INSTALLATION MANUAL**

**BULLETPROOF OIL COOLER KIT  
OEM FILTER  
2003-2007  
F-SERIES**

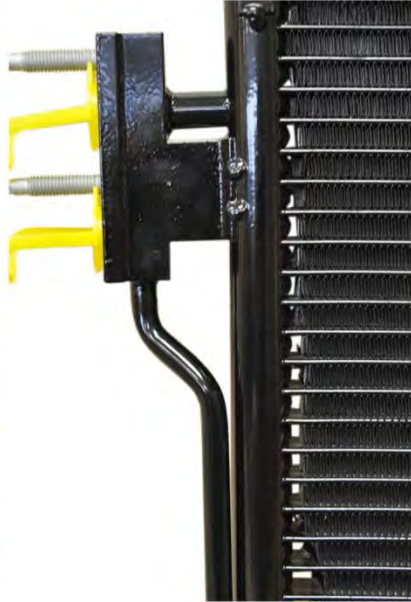
NEAL TECHNOLOGIES, INC.  
U.S. PATENT 8,375,917. OTHER PATENTS PENDING  
UPDATED 07/28/2022

# BEFORE You Begin Installation

*Important note on A/C Condensers:*



**Original OEM**



**New OEM**

## **Please Note:**

The Ford OEM A/C condenser has been changed.

If you have the new version (on right) please call us before you purchase.  
888-967-6653  
480-247-2331

Bullet Proof Diesel offers [a Non-Traditional A/C Condenser Mounting Bracket](#) as a solution:



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](http://BulletProofDiesel.com) and are shown here:



Power Steering Cooler Kit:  
P/N: 90100024

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.

<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
90201020	BPD Oil Transfer Block Assembly	1
6000117 or 6000118	High-Capacity Engine Air to Oil Cooler	1
6400004	3/4" Blue Silicone Heater Hose	1
6200002	3/4" Constant Tension Spring Clamp	2
6400007	#12 JIC Straight Fitting	1
6400008	#12 JIC 90° Elbow Fitting	1
6400002	1/4" Countersunk Hex Plug	1
6200015	1/4" Flat Washer	6
6200011	1/4"-20 Hex Locknut	5
6200130	M6 x 12mm Socket Head Cap Screw	3
6000121	Oil Filter Base Seal, OEM	1
6000070	Oil Filter Adapter O-Ring, OEM	1
90101048	Oil Cooler Input Hardline	1
6200003	Oil Cooler Gasket, OEM	1
6200012	1/4"-20 X 3/4" Bolt	1
6000092	VR Intake Gasket Set	1
6000036	Turbo Hardware Kit	1
90100045	31.75" Hose with 0° and 45° Fitting	1
<b>With Condenser Bracket Mounting</b>		
6502044	Condenser Mounting Bracket	1
6200083	Hex Head Sheet Metal Screw	6
6200084	Aluminum Spacer	6
6502049	Left hand transmission cooler lowering bracket	1
6502050	Right hand transmission cooler lowering bracket	1
6200043	Rivets	8
6200063	Washers	8
<b>Standard Installation</b>		
90100011	56" Hose with two 0° Fittings	1
90100049	7.5" Hose with 0° and 90° Fitting	1
6400086	#12 JIC Straight Union Male x Male	1
<b>Cold Weather Installation</b>		
90201008	Cold Weather Thermostat Assembly	1
90100044	5.5" Hose with 0° and 90° Fitting	1
90100046	12.25" Hose with two 0° Fittings	1
90100047	28.25" Hose with two 0° Fittings	1

# Read BEFORE You Begin Installation

## Installation Overview

Installing the Bullet Proof Diesel Oil Cooler Kit is no more difficult than replacing the OEM oil cooler. 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/or oil cooler with the Bullet Proof Diesel (BPD) Oil and/or 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 15-17 regarding transmission coolers 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](http://BulletProofDiesel.com). Click on “Questions? We have answers”. Click on “Do-It-Yourself” and find the link to purchase the information from [eAutoRepair.net](http://eAutoRepair.net) for your 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’**

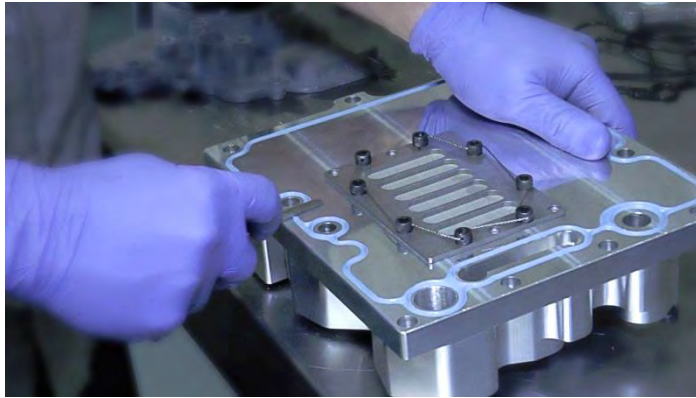
**Click on “HEADINGS”**

Search for the “**IN-VEHICLE REPAIR**” category, which includes removal and replacement instructions for the intake manifold.

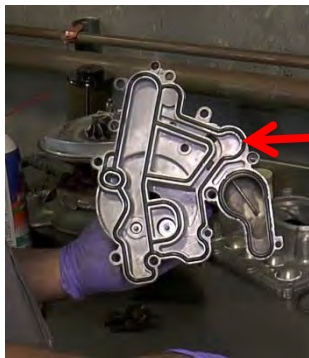


## Installation Stage 1: The Oil Transfer Block

1. Follow the OE oil cooler replacement procedures (which include removal of the intake manifold and turbo).
2. Install the provided OE oil cooler gasket into the Bullet Proof Diesel (BPD) Oil Transfer Block.



3. Remove the OE Oil Filter Base from the OE Oil Cooler block and remove the used seals from the base.

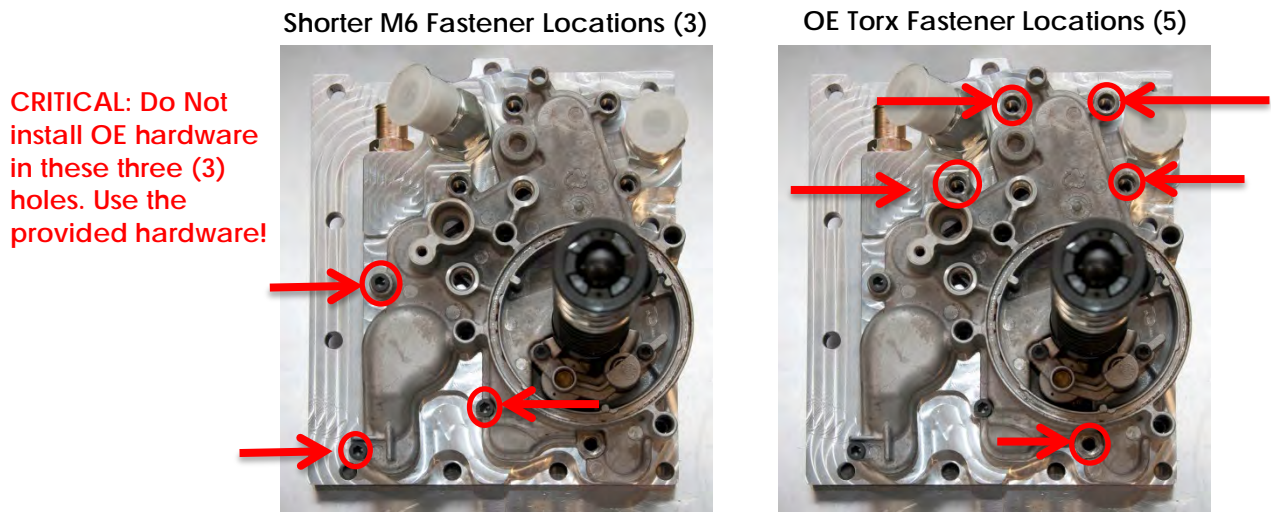


**OE Filter Base Seal**

4. Clean the seal gland of the OE Oil Filter Base and install the provided replacement seal.



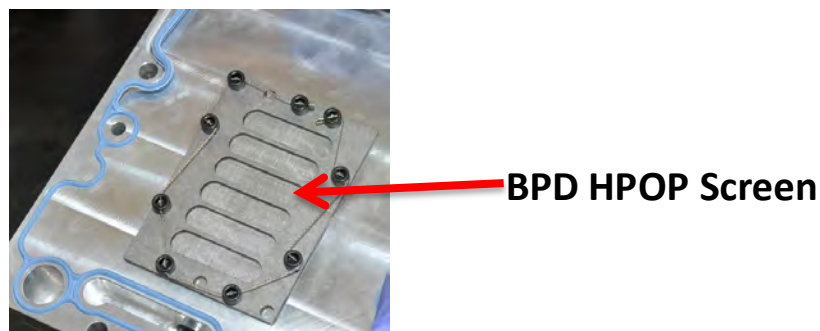
- Using the (3) provided M6 x 12mm socket head cap screws and the remaining OE Torx hardware (5), re-install the OE Oil Filter Base to the BPD Oil Transfer Block.



- Be sure to remove all the oil and debris from the HPOP reservoir.



- Remove and discard the OE 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.



8. Use the OE bolts and torque specifications to install the BPD Oil Transfer Block.



9. 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.

### Silicone Coolant Hose and Spring Clamps



**OE Filter  
Housing Seal**

10. Replace the OE Filter Housing Seal on the filter base. Do not reinstall the OE Filter housing and oil filter at this time, as it will be completed after the oil transfer hoses and intake manifold are installed.
11. Continue following the OE installation procedure for reinstalling the intake manifold. Stop before reinstalling the turbo to install the OIL IN return hose.

**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](http://BULLETPROOFDIESEL.COM) SEARCH KEYWORD: "PROFESSIONAL"**



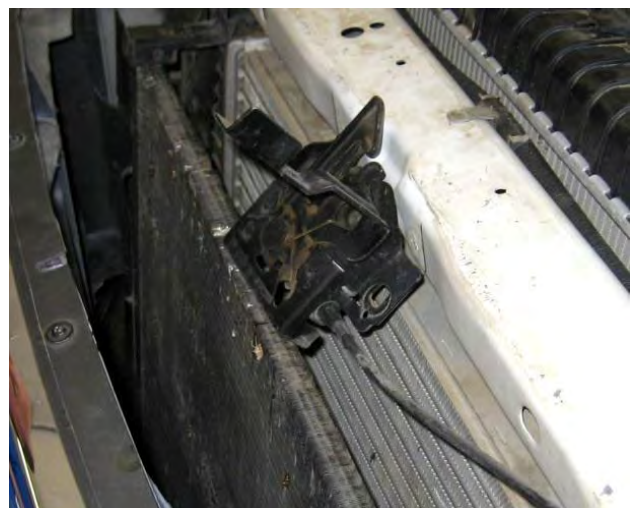
## Installation Stage 2: The Oil Cooler, Oil Filter, and Condenser Mount

### 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.
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:



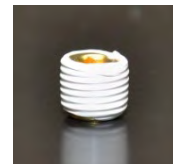
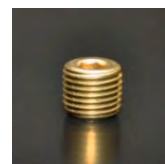
On the BPD oil cooler, there are three ports. The two large ports are for oil in and oil out. The small port can be used for any of the following:

- 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:**

7. Identify the  $\frac{1}{4}$  pipe-plug brass insert that fits this port (provided with kit).



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



9. After installation of the oil cooler system, check for oil leaks with the engine running.

10. Locate the oil cooler in the condenser mount with the hardline over the top of the oil cooler as shown. The mounting tab on the hardline should be positioned flat against the condenser mount bracket.



**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).**

11. Mark the location of the hardline mounting tab on the condenser mount and drill a 5/16" diameter hole for the mounting fastener.







**NOTE: ONCE THE HOLE LOCATION IS MARKED, REMOVE THE OIL COOLER AND HARDLINE FROM THE CONDENSER MOUNT BEFORE DRILLING.**

12. Once the hole for the hardline has been drilled, install the oil cooler using the mounting studs on the condenser bracket along with the supplied hardware to secure the air cooler in place. Do not install the hardline at this point, as it will need to be removed to install the bracket onto the condenser.



**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.**

## Mounting the Bracket to the Condenser:

13. Place condenser on working surface (see picture). The engine side of the condenser should be facing up, allowing the oil cooler to be installed on the side closest to the engine.
14. Position the oil cooler and bracket on the condenser.



Supplied mounting hardware.

15. 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.

**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.**





16. 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.

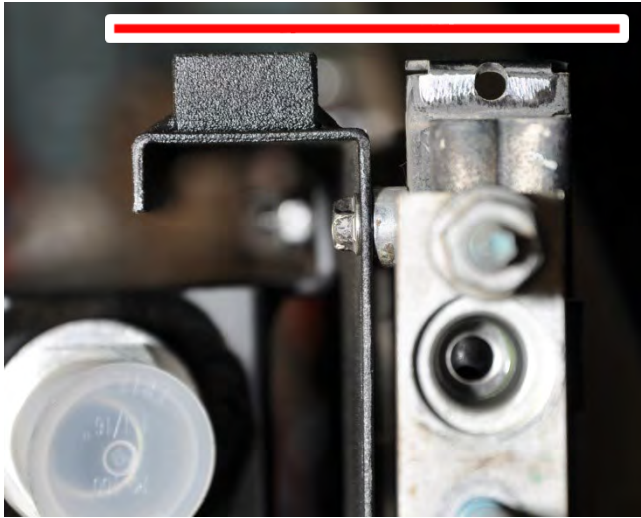
NOTE: USE A 1/8" (.125) DIAMETER DRILL BIT AND CAREFULLY ALIGN THE HOLE POSITION SO THAT IT AND THE INSTALLED SCREW WILL NOT DAMAGE THE TUBES AT THE END OF THE CONDENSER.

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.



17. Mount the bracket to the condenser using the hardware provided. Drill only if necessary.

18. 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.

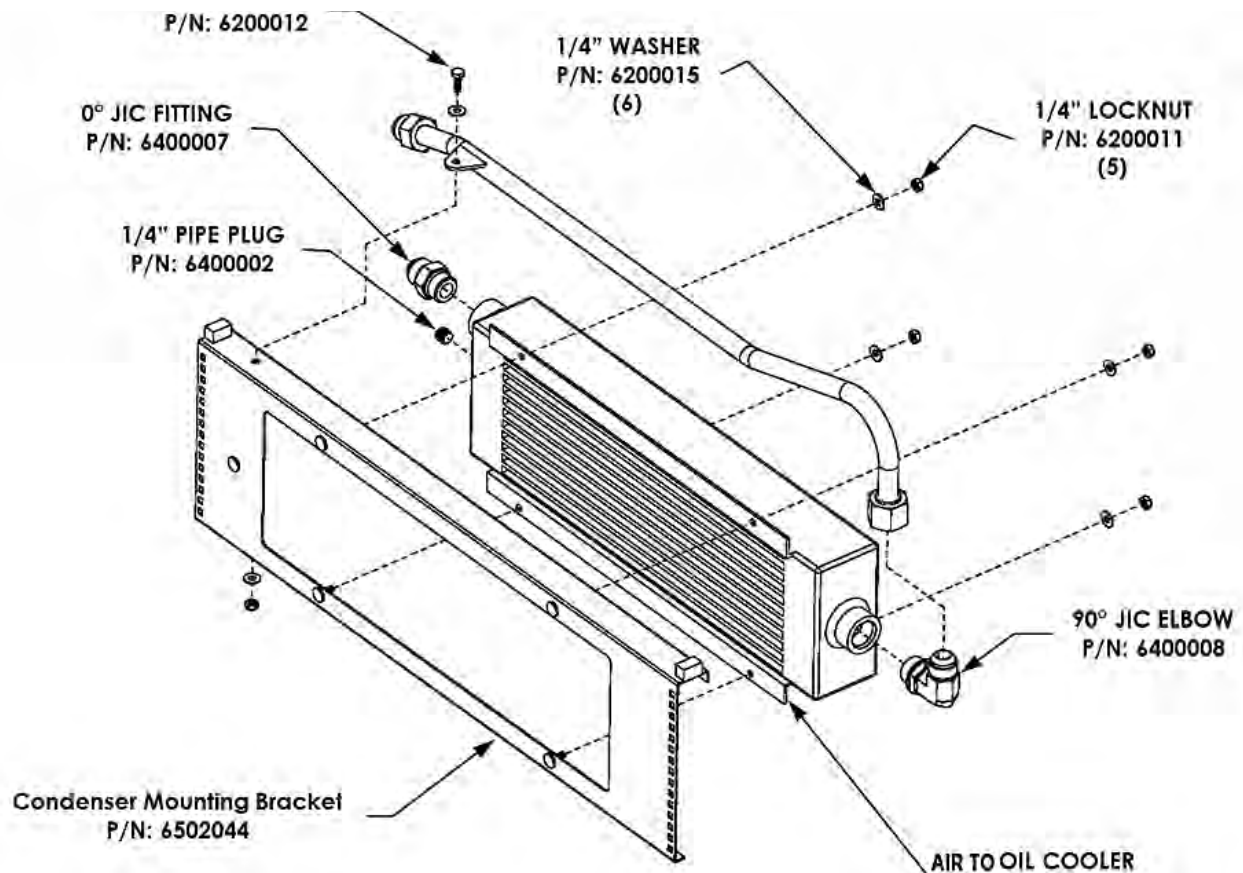


Be sure that the cooler bracket crowns are aligned with the condenser crowns.

19. After the condenser mount and oil cooler are installed, secure the hardline to the condenser mounting bracket using the supplied hardware as shown.



20. Install the Oil Return Hose onto oil cooler return port (with straight fitting) and tighten all the oil cooler fittings now, as this is the easiest time to do so. Refer to the hose routing diagrams on pages 27 and 29 for reference.





### ***Important 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 that are 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. TRIM THE HOSES AS NEEDED TO PREVENT KINKS OR RUBBING.**



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:

21. 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 will make this part of the installation much easier.
22. 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!**

23. Install the A/C hoses.
24. 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.

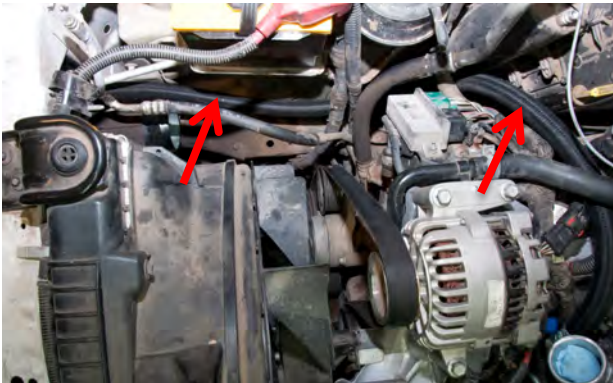
## Oil Hose Routing (Non Cold Weather Kit)

1. Route Oil Hose #3 (56" Oil Return from Cooler to Manifold Passenger Side) from transfer block OIL IN port out towards the passenger side near the battery tray. Make sure to Route UNDER the heater hose.

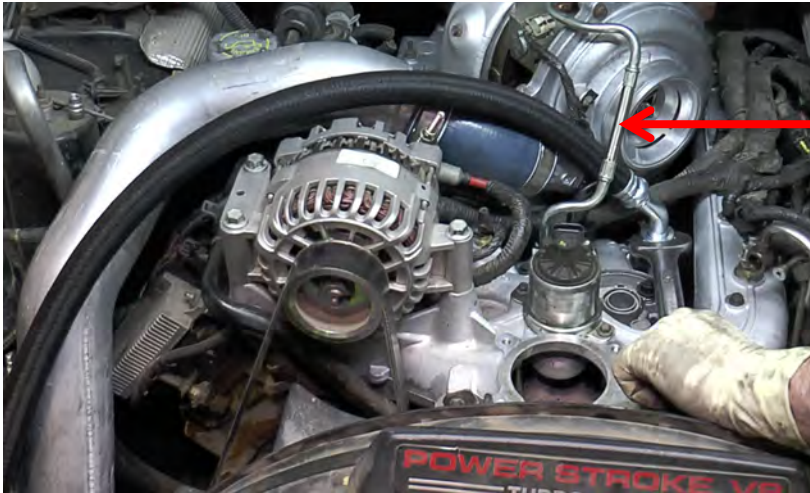
Route Under the  
Heater Hose



2. Continue routing Hose #3 from the battery tray area along the A/C condenser lines and through the radiator support, making a 90 degree bend. From here the line feeds directly into the oil cooler return port.



3. Continue the OE install procedure of the turbo, and charge air hose. Do not install the OE Oil/Fuel Filter Housing or Oil Tower. Once the turbo is installed, begin routing Hose #1 (32" Oil Out from Engine on Driver's Side) from transfer block OIL OUT port towards the passenger side near the battery tray. Make sure to route this hose behind the turbo oil feed line.



**Route Under the Turbo Feed Line**

**NOTE: The 45° hose connection mates to the oil transfer block.**

4. Connect Hose #2 (7.5" Oil from Union to Oil Cooler Hardline) is pushed through the radiator support access, into the Oil Cooler Hardline. The 90 degree fitting mates to the Oil Cooler Hardline as shown.



**Tip: Use 2 wrenches when tightening fittings to the oil cooler to reduce the stress on the hard line.**

**NOTE: Take caution when routing hoses and make sure they are not pinched or against any sharp edges. Pay special attention to hose routing around the alternator.**



5. Using the straight union fitting, connect Hose #1 and Hose #2 and tighten the fittings. This will complete the hose routing portion of the installation.



6. Once the hose fittings are installed and tightened, install the OE Filter Tower and OE Filter Housing.



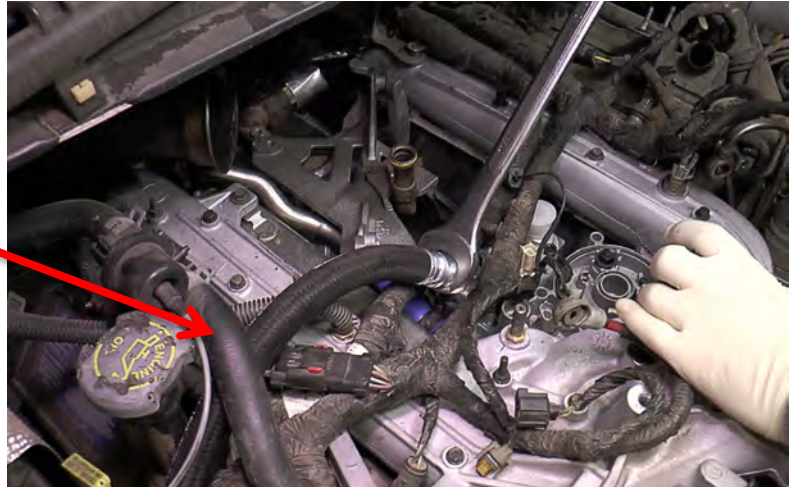
7. Reinstall the oil filter and cover. Continue the OE assembly instructions to complete the installation. Be sure to prime the oil system!



## Oil Hose Routing For Cold Weather Kit

1. Route Oil Hose #3 (28" Oil Return from Cold Weather Thermostat to Manifold Passenger Side) from transfer block OIL IN port out towards the passenger side near the battery tray. Make sure to Route UNDER the heater hose.

Route Under The  
Heater Hose



2. Hose #3 is routed to the passenger side battery tray where it will connect to the Cold Weather Thermostat. Hose #3 connects to the return side connection (to engine). Notice the orientation of the Cold Weather Thermostat with the cover facing the battery tray.

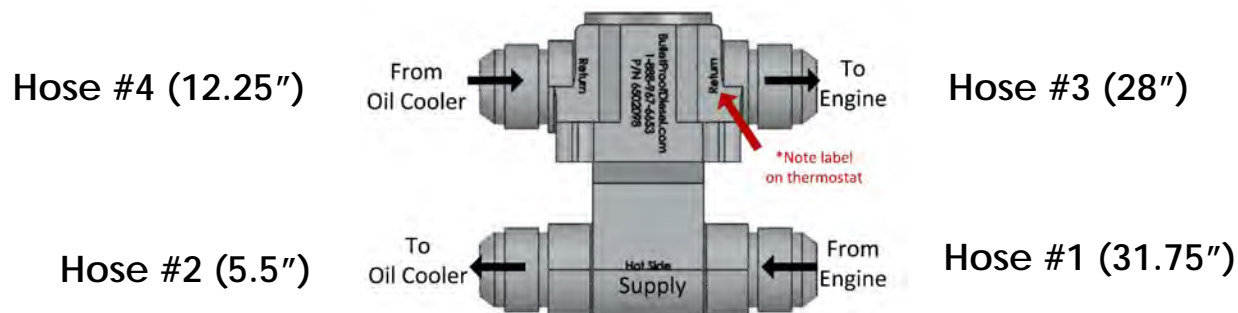
Hose #3  
Into Thermostat



NOTE: PLEASE USE CARE AND PATIENCE WHEN CONNECTING THE OIL HOSES TO THE COLD WEATHER THERMOSTAT. THE THERMOSTAT HOUSING IS ALUMINUM AND CAN BE CROSS THREADED EASILY. CROSS THREADED HOUSINGS WILL NOT BE COVERED UNDER WARRANTY.

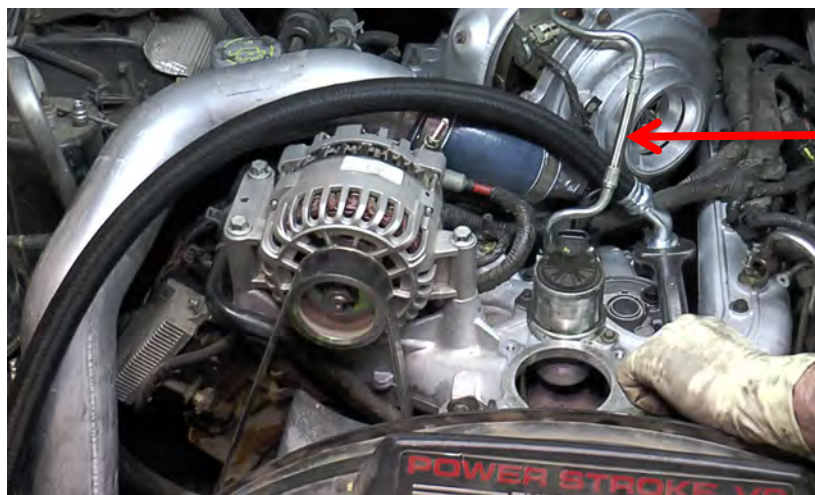


**NOTE: ORIENTATION OF THE COLD WEATHER THERMOSTAT IS CRITICAL! THE THERMOSTAT COVER SHOULD BE ORIENTED TOWARDS THE BATTERY TRAY. USE THE FOLLOWING IMAGE AND ROUTING DIAGRAMS ON PAGE 29 FOR INSTALLATION REFERENCE.**



**CAUTION: THERMOSTAT HOUSING WILL BE HOT DURING USE! ALLOW AN APPROPRIATE AMOUNT OF COOL DOWN TIME BEFORE SERVICING THE THERMOSTAT HOUSING.**

- Continue the OE install procedure of the turbo, and charge air hose. Do not install the OE Oil/Fuel Filter Housing or Oil Tower. Once the turbo is installed, begin routing Hose #1 (31.75" Oil Out from Engine on Driver's Side) from transfer block OIL OUT port towards the passenger side near the battery tray. Make sure to route this hose behind the turbo oil feed line.



**Route Under the Turbo Feed Line**

**NOTE: The 45° hose connection mates to the oil transfer block**

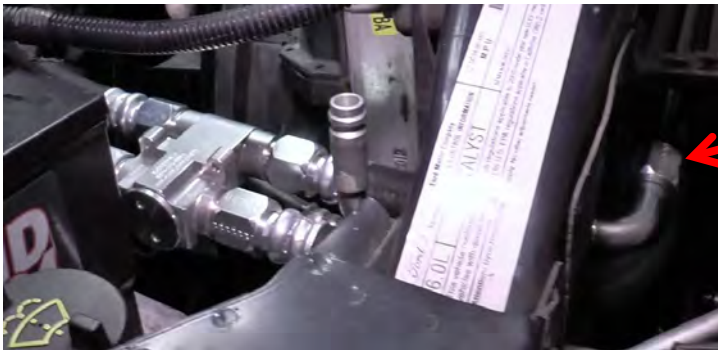
**\*Take caution when routing hoses and make sure they are not pinched or against any sharp edges. Pay special attention to hose routing around the alternator.**

- Hose #1 is routed to the passenger side battery tray where it will connect to the Cold Weather Thermostat. Hose #1 connects to the hot side connection (from engine). Notice the orientation of the Cold Weather Thermostat with the cover facing the battery tray.

Hose #1  
Into Thermostat



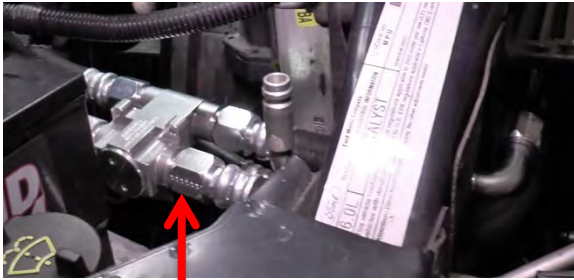
- Hose #2 (6" Oil from Thermostat to Oil Cooler Hardline) is routed from the Cold Weather Thermostat hot side port through the radiator support access, into the Oil Cooler Hardline. The 90 degree fitting mates to the Oil Cooler Hardline as shown.



Hose #2  
Into Hardline

**NOTE:** The 90° hose connection mates to the oil transfer hardline

6. Hose #4 (12" Return Oil from Oil Cooler Hardline to Thermostat) is routed Oil Cooler output, through the radiator support access, and into the return port on the Cold Weather Thermostat.



**Hose #4  
Into Thermostat**



**Hose #4  
Into Oil Cooler**

7. Once the hose fittings are installed and tightened, install the OE Filter Tower and OE Filter Housing.



8. Reinstall the oil filter and cover. Continue the OE assembly instructions to complete the installation. Be sure to prime the oil system!





## ***Note on Turbo-Charge Air Connections with the Cold Weather Kit:***

A flexible joint is required between the turbo and the charge air tube connecting to the intercooler. This joint is a blue tube section just behind the alternator. In 2005-2007 models, Ford increased the length of this tube by 1.5 inches from the previous model years.

Here you can see the location of the flexible tube, and the differences between the 03 - 04 and 05 – 07 models.



If you have the longer flexible tube, the Cold Weather Kit installation may require you to replace the flexible tube with the shorter (2003 – 2004) version.

Short Part Number: 6C3Z-6C640-C

Long Part Number: 6C3Z-6C640-A

## **Priming Oil System**

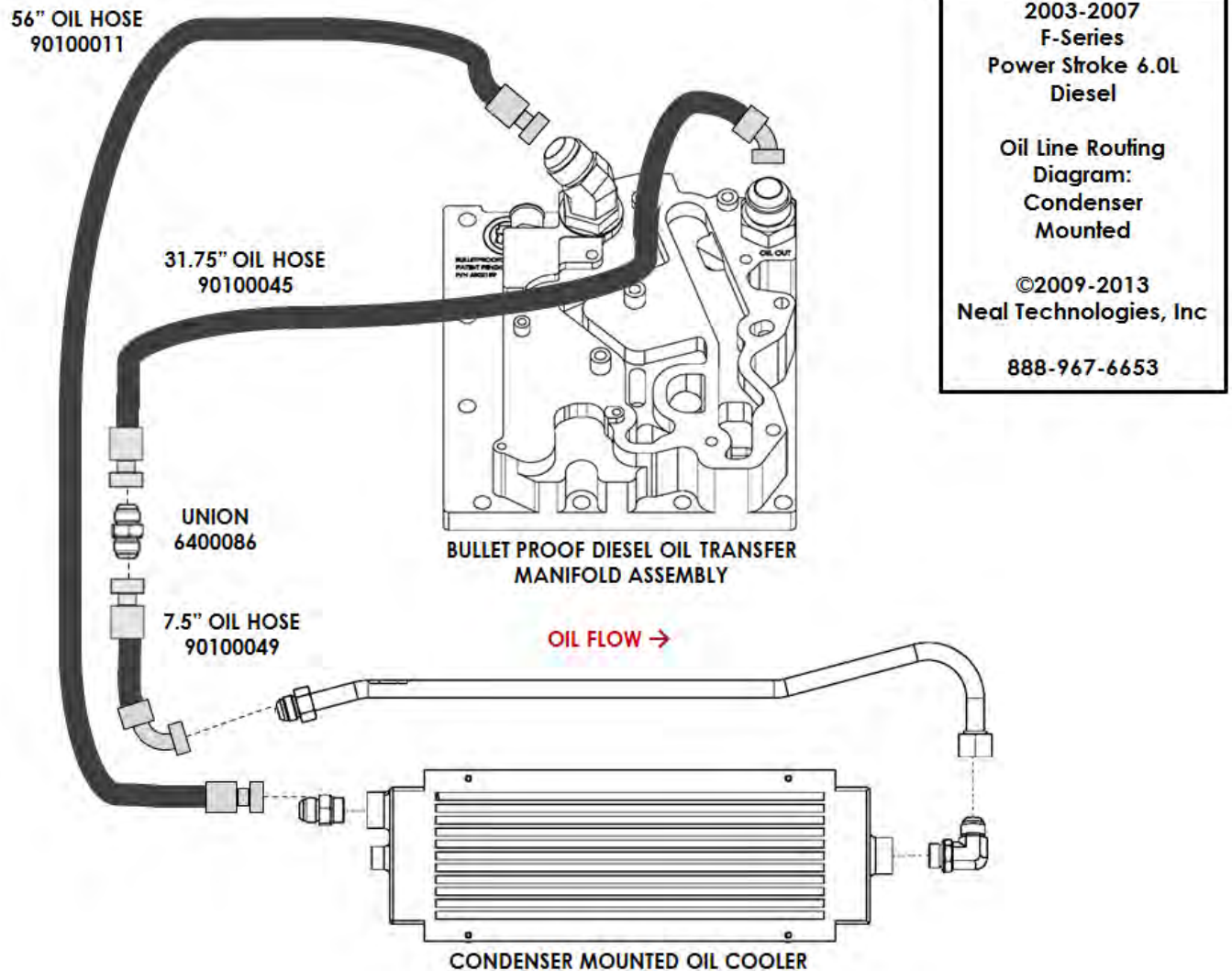
Once the above steps are complete, prime the oil cooler and/or filter with oil. This can be accomplished by pumping oil from a bulk oil dispenser through the oil supply hose or by filling the oil cooler with oil at the time of installation.

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

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

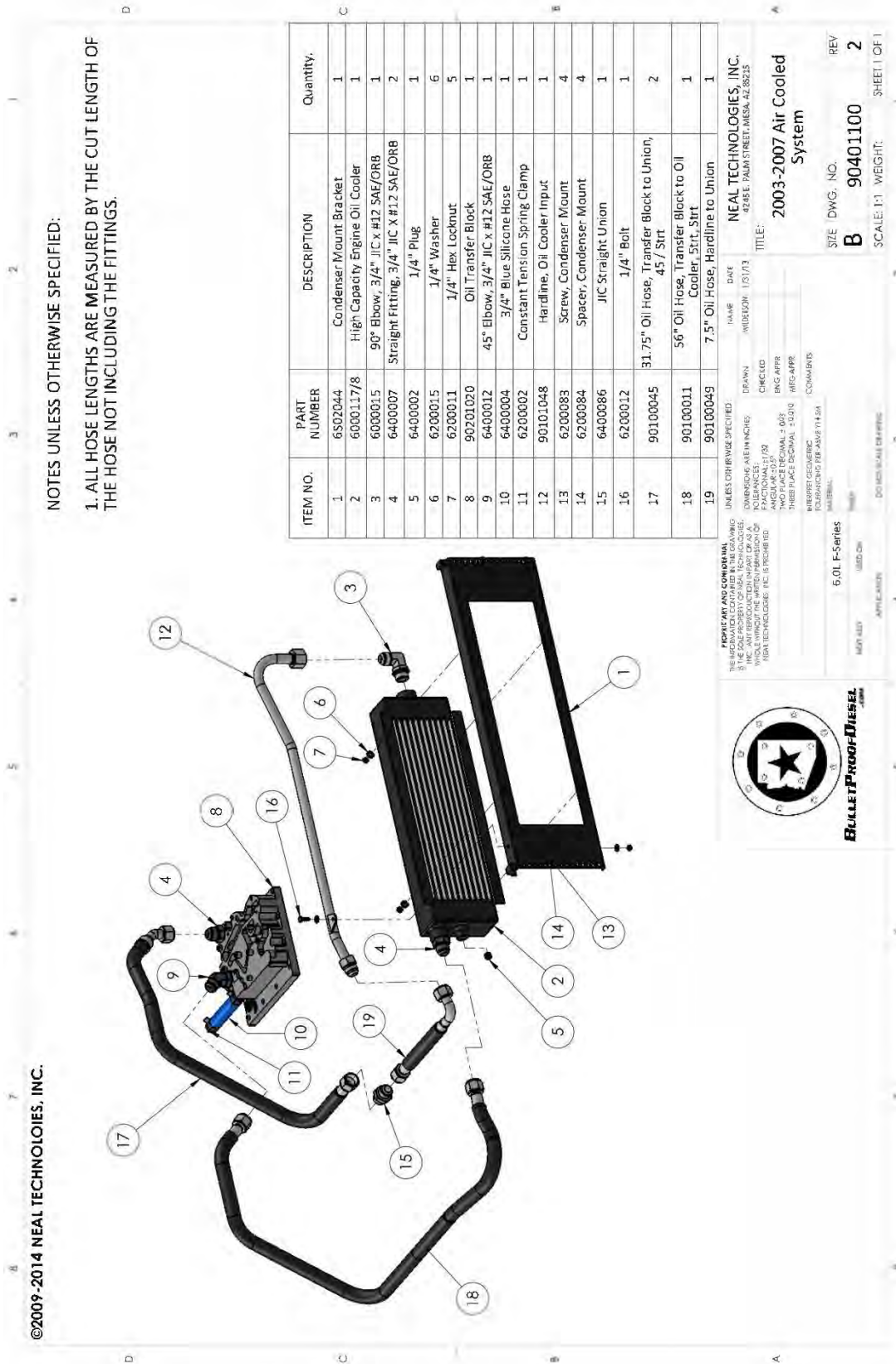
## Hose Routing Diagrams

### *Hose Routing Diagram: 2003-2007 F-Series, Condenser Mounted*

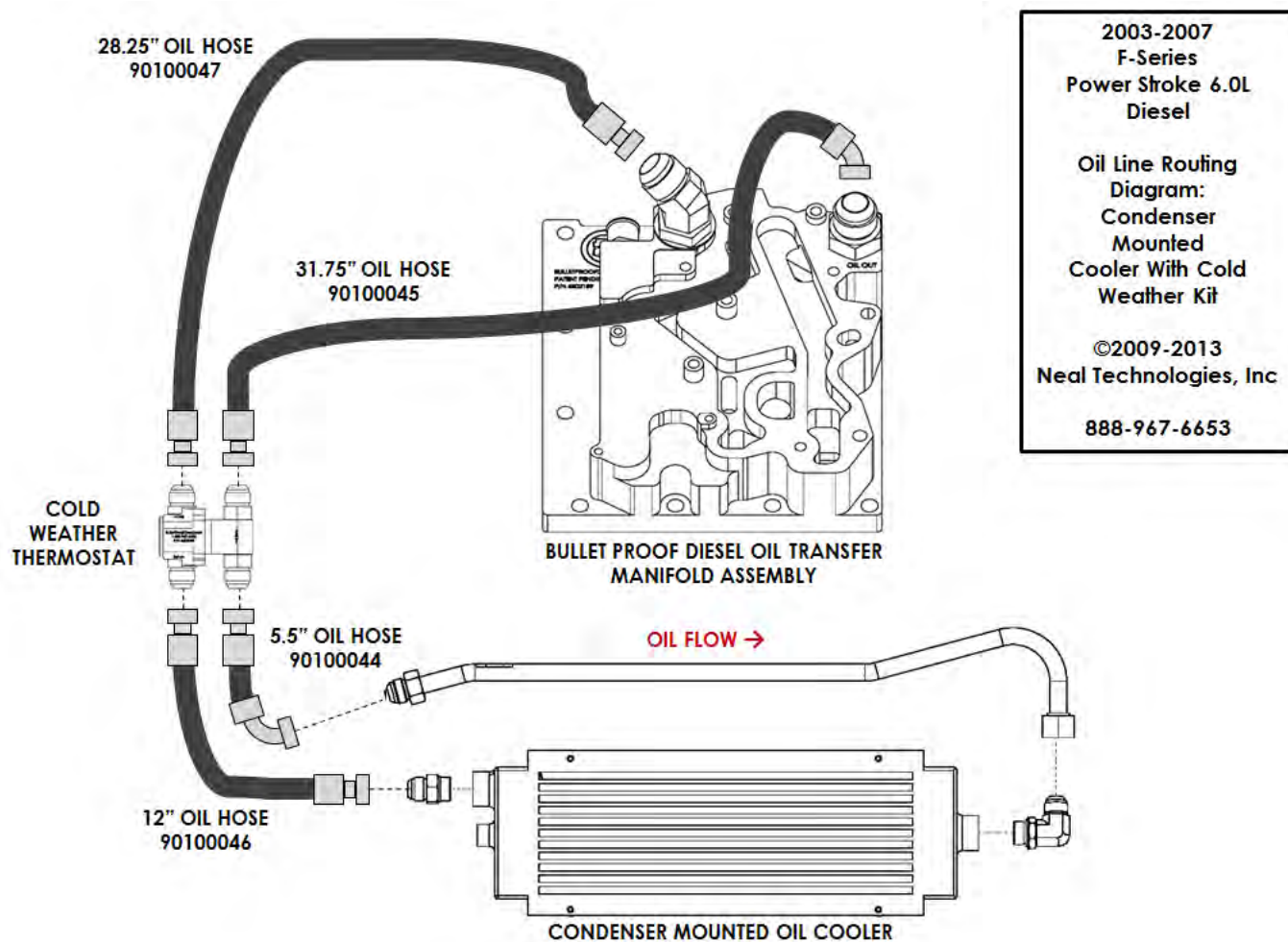


NOTE: HOSE LENGTH IS MEASURED BY THE CUT LENGTH OF THE HOSE NOT INCLUDING FITTINGS.





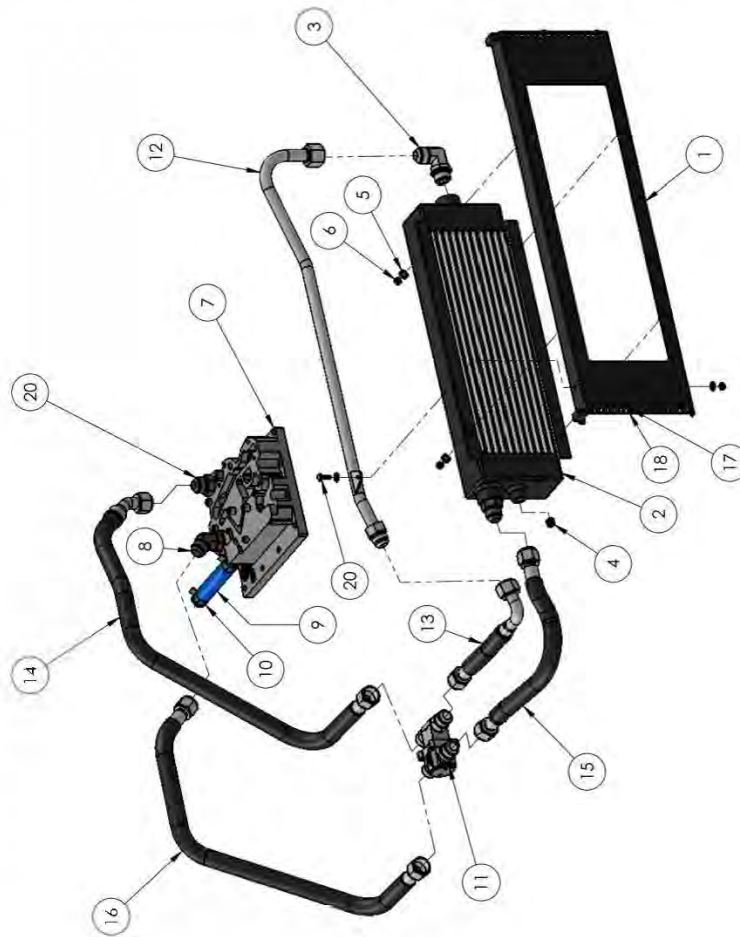
## Hose Routing Diagram: 2003-2007 F-Series, Condenser Mounted With Cold Weather Kit



NOTE: HOSE LENGTH IS MEASURED BY THE CUT LENGTH OF THE HOSE NOT INCLUDING FITTINGS.

NOTES UNLESS OTHERWISE SPECIFIED:

**1. ALL HOSE LENGTHS ARE MEASURED BY THE CUT LENGTH OF THE HOSE NOT INCLUDING THE FITTINGS.**



Item	Part Number	Description	Quantity
1	6502044	Condenser Mount Bracket	1
2	6000117/8	High Capacity Engine Oil Cooler	1
3	6400008	90° Elbow, 3/4" JIC x #12 SAE/ORB	1
4	6400002	1/4" Hex Plug	1
5	6200015	1/4" Washer	6
6	6200011	1/4" Locknut	5
7	90201020	BPD Manifold Block Assembly	1
8	6400012	45° Elbow, 3/4" JIC x #12 SAE/ORB	1
9	6400004	3/4" Blue Silicone Hose	1
10	6200002	Constant Tension Spring Clamp	2
11	90201008	Cold Weather Thermostat Assembly	1
12	90101048	Hardline, Oil Cooler Input	1
13	90100044	5.5" Oil Hose, Thermostat to Hardline, Strt / 90°	4
14	90100045	31.75" Oil Hose, Transfer Block to Thermostat, 45° / Strt	4
15	90100046	12.25" Oil Hose, Oil Cooler to Thermostat, Strt / Strt	1
16	90100047	28" Oil Hose, Transfer Block to Thermostat, Strt / Strt	2
17	6200083	Screw, Condenser Mount	4
18	6200084	Spacer, Condenser Mount	4
19	6200012	1/4" Bolt	1
20	6400007	Straight Fitting, 3/4" JIC x #12 SAE/ORB	2

[illegible]



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