2003-2007 Ford 6.0 liter Diesel EGR Cooler removal and Oil Cooler replacement procedure.

VS 1.2

This is a guide to perform the removal of the intake to access the EGR Cooler as well as the replacement of the Oil Cooler. Consult professionals about what is being done here. A 6.0 is a very expensive engine and a lot can't be taken to chance or for granted. Each year of these trucks is different and adjustments will be necessary to investigate and take into consideration.

The steps here are primarily combined from the oil cooler and EGR replacement YouTube videos from **DieselTechRon** https://www.youtube.com/watch?v=y8Ba7A08VNo
and from **srmastertech** YouTube 3 part video on the process
https://www.youtube.com/watch?v=fHyEo3wZ9uA

Both videos explaining the process and recommend to be watched prior to performing this work.

Torque specs for each model year will need to be researched prior to re-assembly.

Here's some tools and equipment that can help make the job go smoothly.

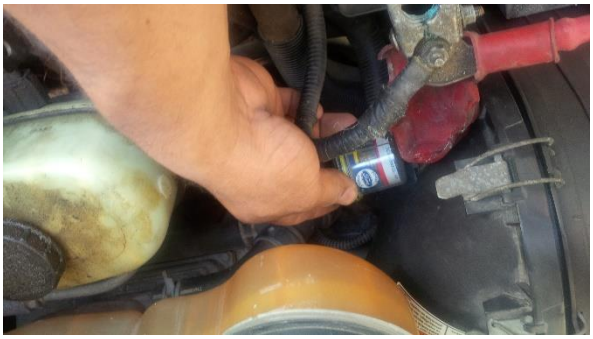
- General mechanic lube
- TORX sockets, including #30 #35 #40 and #45
- Door panel removal tool
- Rags
- PRY bar (this is used quite a bit)
- Air compressor. You don't need to use air tools, but you need lots of air to blow out dirt and such.
- Shop Vac
- 10mm 11mm 13mm 15mm sockets of various depths are used the most.
- 2" 6" and 18" socket extensions are very helpful
- TORQUE WRENCH that can go up to at least 25ft/lbs and be able to do inch pounds.
- Various other hand tools, like box wrenches, pliers etc.
- Envelopes to hold bolts and nuts and various little pieces for reassembly tracking

FORD PARTS

- OIL COOLER, GASKETS and SCREEN – Ford Part# **3C3Z-6A642-CA**
- Ford Intake Manifold Gasket Ford Part# **3c3z-9439-aa**
- EGR Cooler to Intake O-ring Ford Part# **3C3Z-9J469-AA**
- EGR Cooler Rear gasket Ford Part# **3c3z-9e933-aa**
- EGR cooler front/top gasket Ford Part# **3c3z-9e933-ba**
- Turbo Bolts / O-ring Kit Ford Part# **3c3z-9t514-ag**
- GREEN BREATHER O-RING Ford Part# **W302725**
- coolant cap Ford Part# **9c3z-8101-b**

Time to complete for first time doing it can be 12 hours

1. Let vehicle cool down, you need to drain coolant.
2. Carefully open up the degauss bottle pressure cap to release the pressure.
3. Drain Coolant from petcock at bottom of radiator. Approximately 18 liters will come out.
4. Spray threads and clamps with wd40 or penetrating oil to loosen them up.
5. Disconnect and remove both batteries to give you room and remove risk of shorting the terminals when you set a tool down.
6. Disconnect degas bottle top left hose that goes to the engine. Leave the clamp on the hose. No need to remove it from the engine side.
7. Disconnect the top right side degas hose from the radiator. The nipple on the radiator is made of plastic…be gentle you can break it.
8. Disconnect air filter minder. It pulls out.



9. Disconnect MAF (if applicable)
10. Remove dip stick (gives you some extra room and wont snag on wires)
11. Remove air cleaner as a whole

12. Unclamp the coolant hose on bottom of degauss bottle. There are two screws on top to hold it in place which need to be removed. Once done, bottle should come out.

13. Remove cold air charge hose that comes up on driver's side of the engine. Loosen clamps but leave them on hose. Usually comes right off with some wiggling.

14. Disconnect the bottom of the cold charge air hose.

15. Remove the Air Cleaner Turbo Inlet Tube. (11mm)

16. Pull the hose off the breather tube from the engine that goes to the inlet. There is a small O-ring that you should replace. Ford part# W302725

17. Take oil filter cap off and remove filter to let oil drain out. Save the oil filter until work is completed.
    Put the oil cap back in without the filter if you are concerned you might break the oil filter tube.
    MOTORCRAFT FL-2016 OIL FILTER

18. Disconnect hot air charge hose from turbo. Loosen the clamp at the end of the rubber CAC charge hose that clamps onto the turbo and onto the input of the intercooler. Don't remove the clamp that holds these rubber adapters onto the metal pipe. It is very easy to over tighten and permanently deform the pipe requiring replacement.

19. Remove upper engine wire loom plastic hold down connectors and bungee cord it out of the way.

20. Pull on serpentine belt and set tensioner lock to allow belt to be loose for alternator removal.

21. Take off the nut that holds down the power cable on the alternator, remove the cable, then put the nut back on the alternator so that you don't lose it. Unplug wire harness.
Remove alternator 3 bolts.

22. Removing alternator reveals glow plug on passenger side. Disconnect and move cable out of the way.

23. Remove TURBO oil supply line 10mm

24. Other end of line is 8mm on 04 and up. Quick disconnect on 03/early 04.

25. Disconnect TURBO actuator connector

26. Gentle on the oil supply line bracket when removing oil supply line.
Push in on the connector to release the cable loom

27. Disconnect exhaust downpipe band clamp and remove. 11MM deep

Note its orientation. The top part of the clamp sits on a small tab that is on the end of the downpipe to hold it in place.
Note this so that when you reassemble the clamp sits properly and you don't bend it.

28. Loosen then exhaust input pipe to turbo. Don't take the nut off. Note the orientation of this clamp for reinstall alignment.

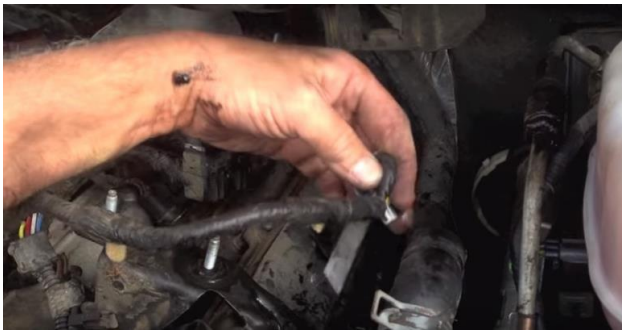
29. Sometimes the clamp will get stuck. Gentle taps with something to loosen it enough to get it off. Spray some penetrating oil on it to get it to loosen its grip. Sometimes you need to wiggle the turbo around a bunch to get it to come loose.

30. Once clamp loosened, take it off the pipe, but leave it on the turbo.

31. Take the 4 bolts off the FICM. Note the ones that have studs or not, and their location. Leave any nuts on the studs for easier retrieval come time to put it back.

32. Disconnect the connectors on the bottom of the FICM. Squeeze and pull them down. If they don't come, push up on them first, then down. Start front and move your way back. (3 connectors)

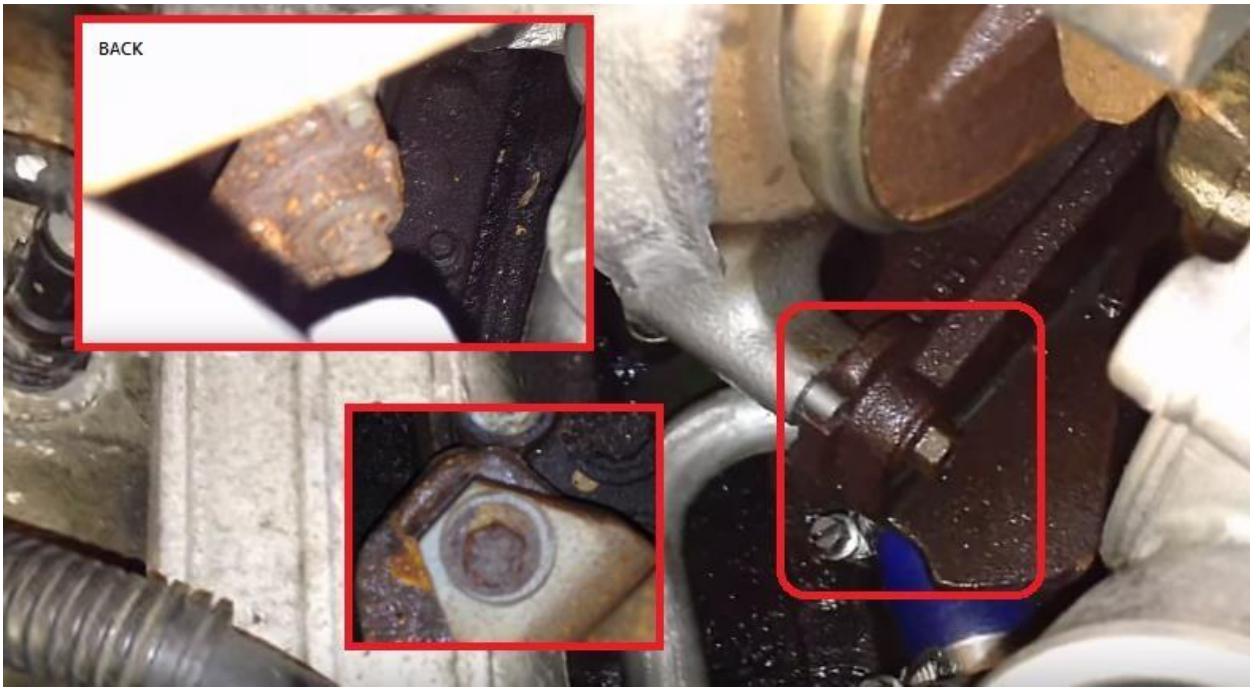
33. Remove Exhaust Back Pressure EBP sensor



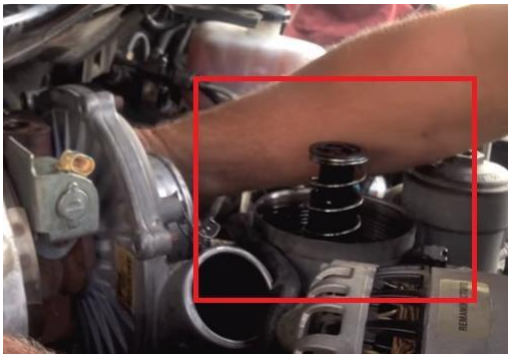
34. Disconnect GLOWPLUG harness. Right side. Push on the red connector and then squeeze and pull it apart. Move that wire back out of the way.

TURBO REMOVAL

35. There are three bolts. Two front facing, one on the back



36. Careful of your oil filter tube. Done break this. Trouble. Maybe put cover on it if you haven't already.

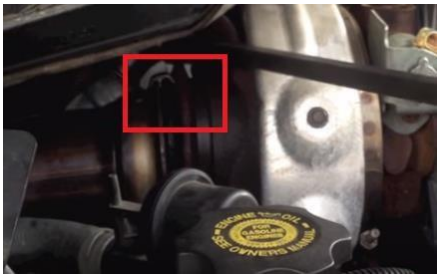


37. 10MM swivel on a long extension to start

38. O3/04 have a shield on the top of the turbo. If you can the bolts holding this shield off, it might help with clearance for removal, but you can get it in and out without doing it.

39. There's a 10MM way in the back. A box wrench on it pointing straight up allows a pry bar to push on wrench to break loose.

40. Once bolts are off, use a pry bar to disconnect the exhaust pipe. There's a little clip on the pipe that holds it in place.



41. Once disconnected, use a pry bar and pull up on the turbo. You will fight the down pipe, up pipe on the right and the oil down drain on the bottom. Patience.

42. Once loose, rotate it and remove

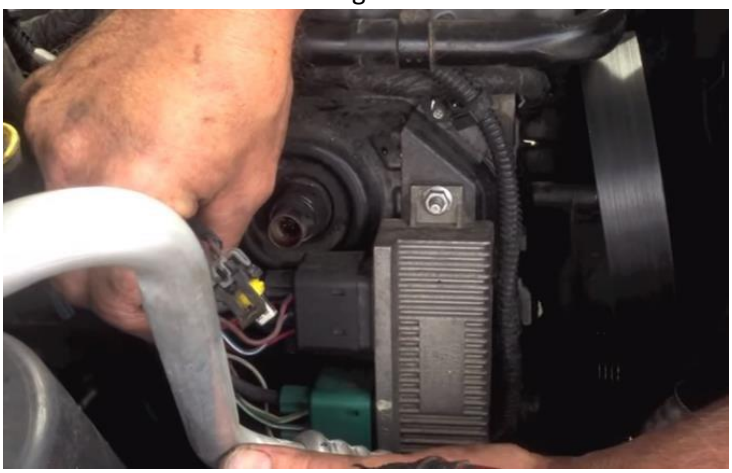
43. Disconnect and remove the MAP sensor bracket. Disconnect the wire harness from the sensor, disconnect the pipe from the intake manifold. Little clamp on the engine holds the pipe in place.

44. Disconnect vacuum line from Heater Control Valve. Just pulls out.

45. Disconnect the heater hose at front and push it out of the way.

46. Disconnect ICP connector (location is truck year/model dependent)

47. Disconnect GLOW plug connectors from Glow plug module. On the o3/04 they sit horizontal and I had to remove them to get the loom out.



FAN shroud removal

Removing this will give you more room.

48. Disconnect Upper RAD hose. Slide clamp back.

49. Disconnect upper radiator brackets

50. Loosen driver's side positive battery cable hold-downs that runs along the front of the radiator.

51. Move it to the back temporarily

52. Remove upper rad bolts

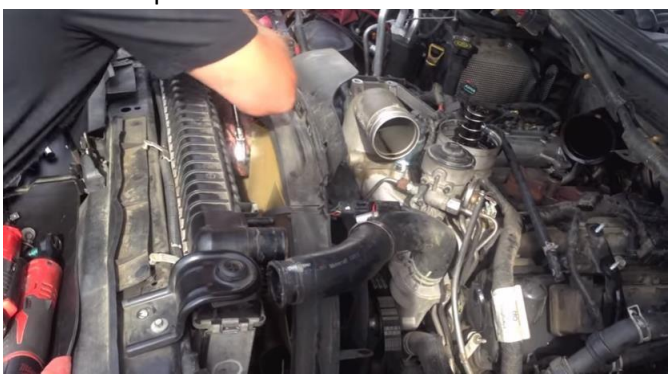
53. Use a bar and push the inner fan shroud and push out and up.

54. Gently pull it out, watch for fan wires.

55. Once the shroud is out, put the upper rad brackets back in, just need on each side to hold it for this job.

56. Disconnect the electric fan connector.

57. Use a 15mm socket on an extension and undo the 4 bolts (5 on a 03/04) on the inner fan shroud. Just push the fan around to reveal the bolts and take them out.



58. Bolts at the bottom of the shroud. Use a wrench on the back so that you don't break the plastic shroud if you think it looks weak.

59. The shroud is loose; you can just pull it towards the front of the truck. Gives more room to work on things.

60. Clean out the area around the pedestal before you move the oil down tube. Use a shop vac and an air gun to get things out. Don't let anything go down this tube!

61. First spray the bottom of the turbo oil drain tube to make the o ring loose.

62. Pull on it, wiggle it, pry it gently, should pop right out.

63. Once the pipe is out, unbolt the turbo pedestal mount and remove it.

64. Put the oil down pipe back in to prevent contamination in the hole.

INJECTOR HARNESS REMOVAL

65. Careful of the clips. Push down on the clip, and pull gently on the connector. You can pull up on the clip and remove it. Just don't lose it. Just be careful. There are TINY pins inside the engine that these connect to.

Done loose the clip if they come off.

66. Remove the injector harness connectors on both sides.
67. There is a ground wire on the driver's side on the back of the intake. Remove that.
68. Take a picture of the weave before you start remove things
69. Note the types of studs on our intake where the loom is connected.

70. Proceed to remove the injector wire loom on the driver side

71. There are some clips that hold it into place as it goes from driver to passenger side. Remove those.

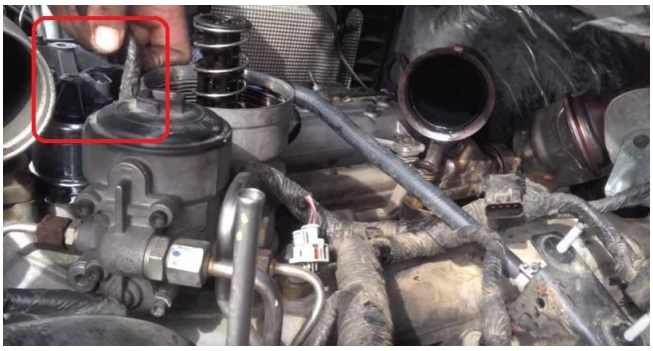
72. Make sure your clips are there!

73. Disconnect IPR

74. Once unclipped the loop will reveal itself.

75. Take off intake temp sensor

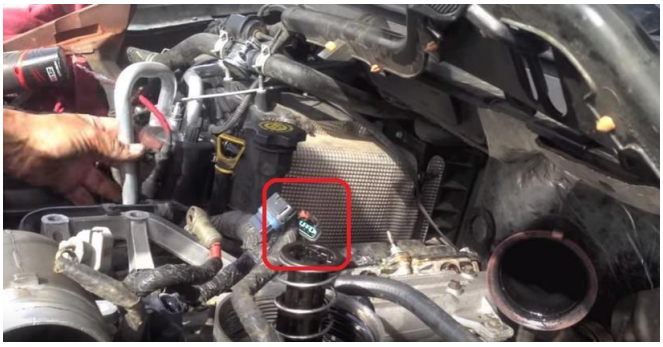
76. Disconnect EGR sensor.



77. Disconnect water temperature

78. Disconnect oil pressure switch (single wire) oil temp sensor (dual wire). Sits down by the base of the oil filter housing.

79. Note the position of the Glow Plug connector and the way it looms through.

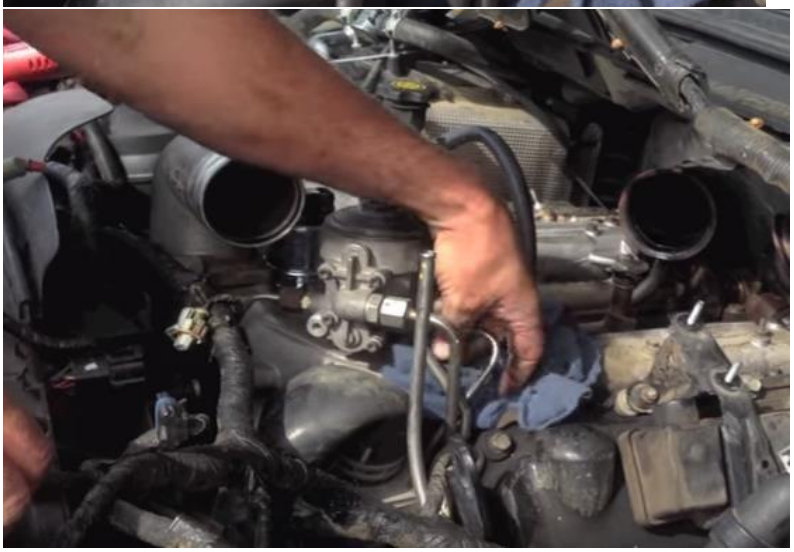


80. Majority of the wire loom should be loose. Pull it out and over the fan shroud out of the way.

81. CAUTION! Make sure there is nothing on either side of this intake. When you pull this, you don't want anything falling into the holes!!

82. Put some rags around the fuel filter to catch any diesel that comes out when you loosen these lines.

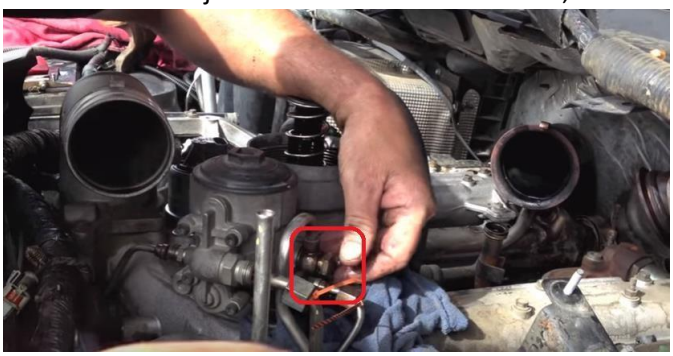
83. Put ZIP ties on the actual lines to ensure the bolts don't slide down.



84. Remove fuel lines

85. If not sure about the lines, use a backup wrench to keep things from possibly breaking.

86. Remove fuel banjo bolt. Careful of the washers, don't lose.



87. TORX 45. Take them out of the fuel/oil filter assembly.

88. Remove the oil/fuel filter assembly.

89. Spray the EGR cooler clamp to loosen it.

90. If truck has turbo heatshield, remove.

91. Remove the back clamp for the egr cooler.

92. Undo the heater hose clamp. Bend it back a bit. Just be gentle.

93. Remove the bracket on the passenger side fuel line. Note this bolt as is different than others used in this build by a small degree in size.

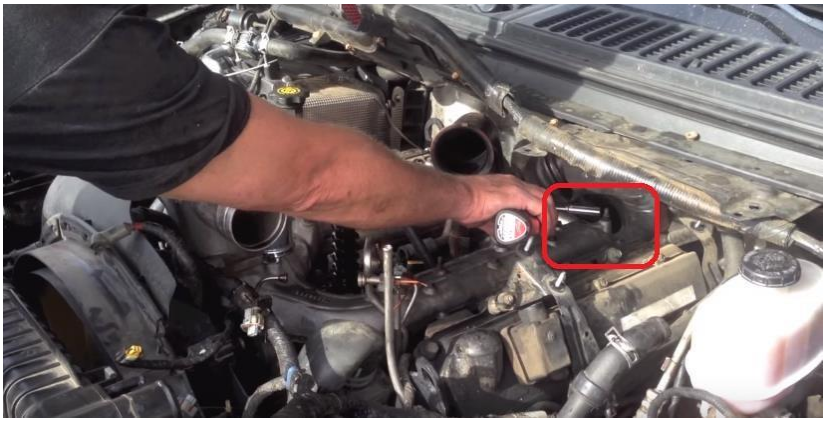
EGR COOLER COUPLER HOSE removal

94. Spray it first. It's the blue pipe shown here.
There's a notch on it…it should be at 12:00 position, and then it will slide out (towards passenger compartment)

95. If you can't push it, you can pry it back gently

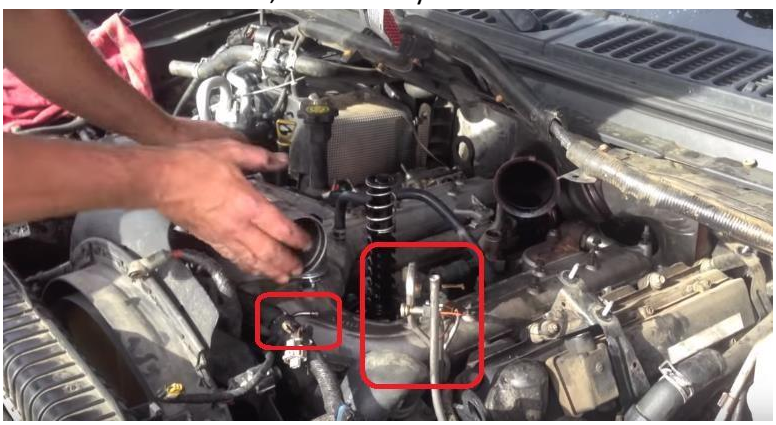
Intake Bolt Removal

96. Note which ones have studs!! Each year is different. Take notes/pictures/mark them to allow proper reassembly. Leave the bolts in it as you loosen them, and this will help.



97. Remove the ground wire on the back driver side stud on intake

98. Once the bolts are out, make sure your fuel lines are out of the way

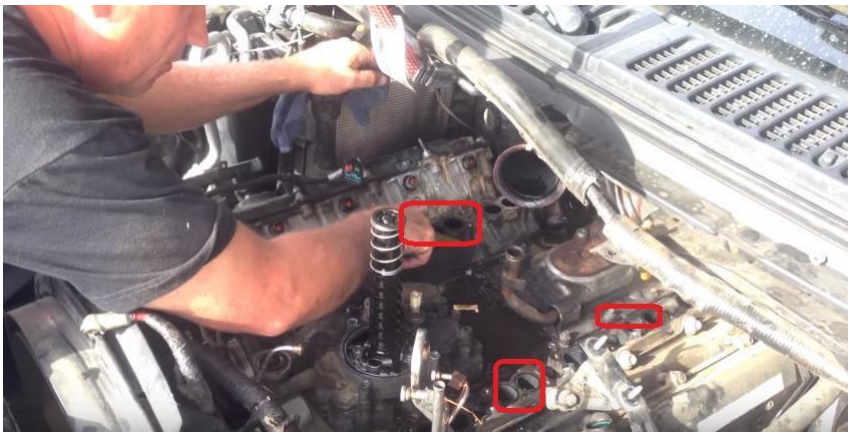


99. Tugging on the inlet pipe, you should be able to loosen the intake. It takes some elbow work sometimes.

100. Depending on your model year, the air intake will look similar to the following. The one on the left is an 03/04 (round EGR cooler), the one on the right (rectangle cooler) 05-07.

If you are planning to weld or delete your EGR cooler, you can remove this item with the 3 bolts holding it in place.

101. Once it's out, clean the intake surface on the engine block. DO NOT let anything fall down any of the intake holes!!



102. Use some carb or break cleaner on a cloth and clean the surface.

103. Use some masking tape to cover the ports

104. Make sure this area is clean of debris. This needs to be a clean area to prevent any contamination falling into the oil reservoir under the oil cooler

105. Once you have it as clean as you can, start removing your oil cooler.

106. Take out the five 45 TORX first. Take out the five #30 Torx

107. When they are out, put some rags down in the valley to catch as much oil that will come out as possible.

108. Remove cooler cover off.

109. Take off the bolts that hold the oil cooler base.

110. Once you have all the bolts, pull up on the cooler a bit, but don't pull it out yet…let it sit a little and drain.

111. Pull out the cooler and set it aside in a pan to let it continue to drain.

112. Now start to clean this area. Surgical clean.

113. Don't let ANY debris fall in that puddle of oil. Wipe it off on the rags.

114. Empty out as much oil as you can from the reservoir

115. Blow out the bolt holes of any oil. This will prevent false torques.

116. Once you have as much oil removed as you can, remove the screen in the bottom of the reservoir and replace with your new one.

REPLACING OIL COOLER

117. Gently pry the coolant outlet cover off.

118. When this pops off, then you need to pry it in half…replace the gasket.

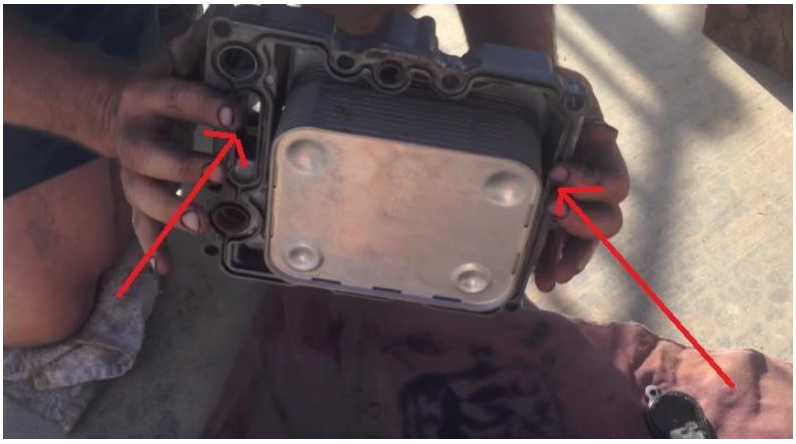
119. Dump remaining oil/coolant out of the cooler

120. To get the cooler out, remove these two nuts (13 MM) on the cooler housing by the coolant and oil inlet/outlet ports

121. And the two bolts under the housing.

122. Keep track of these bolts, the wrong one in here, one that is too long will break the case.

123. Once the bolts and nuts are out, find something to support the housing.



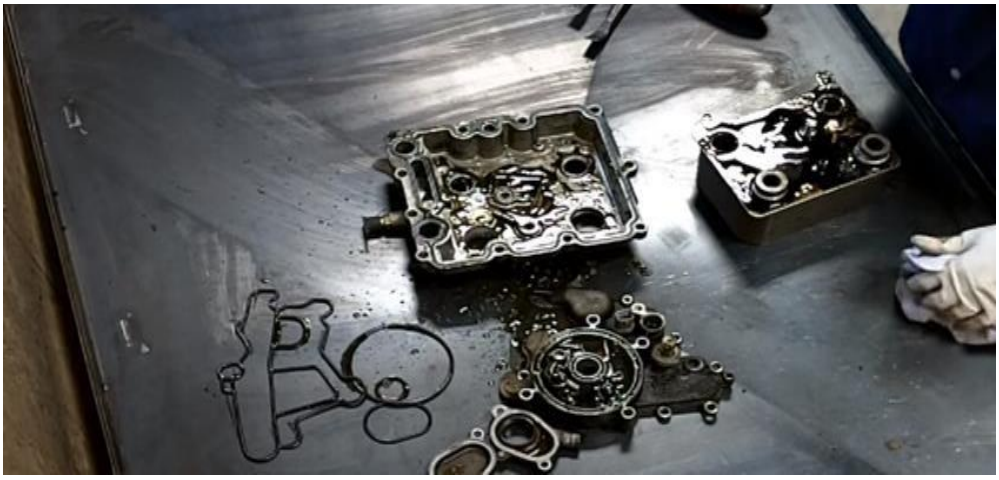
124. This example uses blocks of wood to keep the housing at a height that will let the cooler fall out when the coolant ports are tapped with a hammer.

125. Put something into the coolant port that will let you tap down on the cooler inlet/outlet without impacting and damaging the case around it.

126. Use a hammer to tap on these ports to loosen it from the case.

127. Tap on both sides evenly until it starts to push out….cooler will fall out

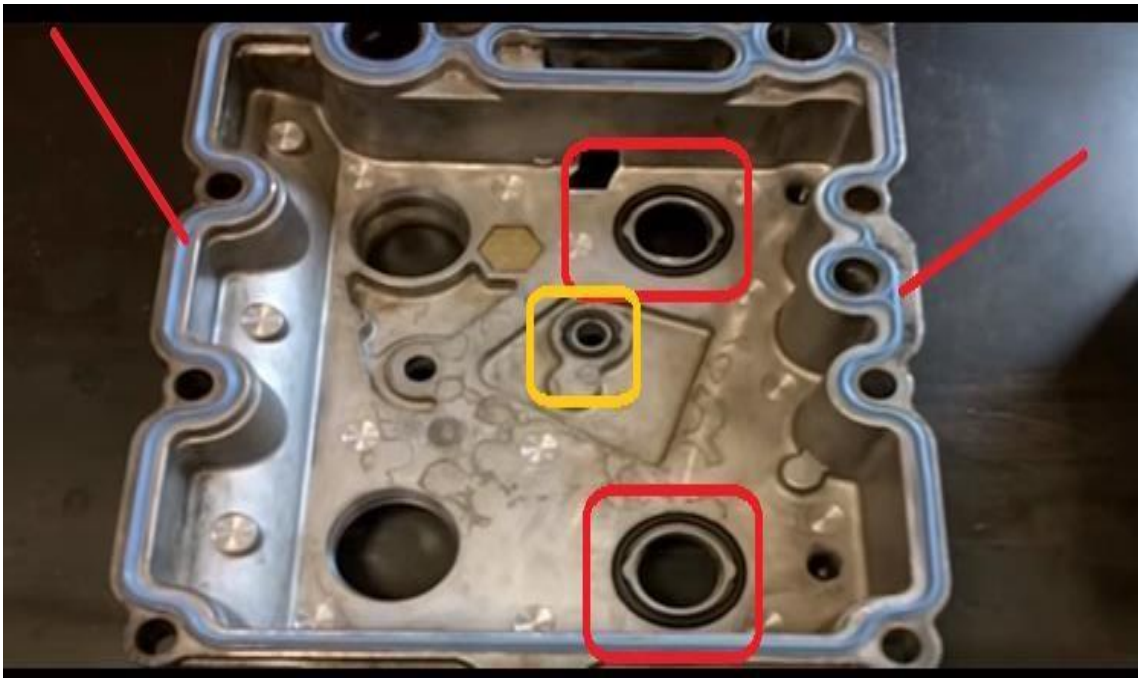
128. Take out Gaskets and O-rings and clean the case.



129. Clean out the vent hold with a paper clip or something. Just make sure it's cleared to allow atmospheric pressure into high pressure oil reservoir.

130. Install O Rings on oil cooler. Big ones on bottom. Little bit of lube to keep them seated. Useful for all rings.

131. Oil cooler cover. Two large, one small in the middle (this is on 04+ model years) Large blue gasket around the outside. Don't roll the gasket. Push in the corners first, then push in the straight sections. Later models have a fitting in the middle that you unscrew and use your remaining tiny o ring. 03/04 its part of the molded case.

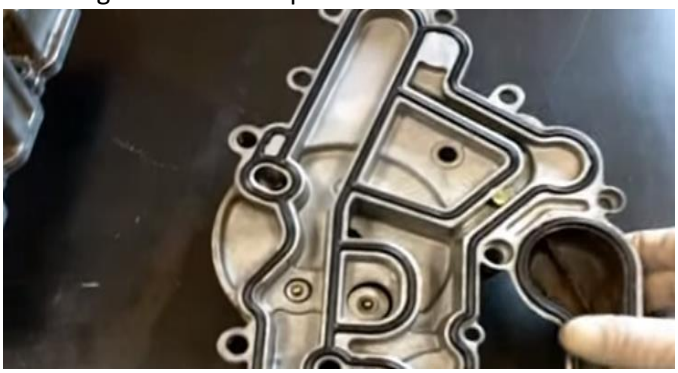


132. Once you have all gaskets and seals replaced (yellow circled in previous picture is model year dependent) put the oil cooler cover onto the oil cooler.

133. Push it together.

134. Put the 4 bolt that hold the oil cooler into the oil cooler cover. Torque bolts

135. Put the gasket on the top cover.



136. Place the top cover (pictured above) onto the oil cooler cover.

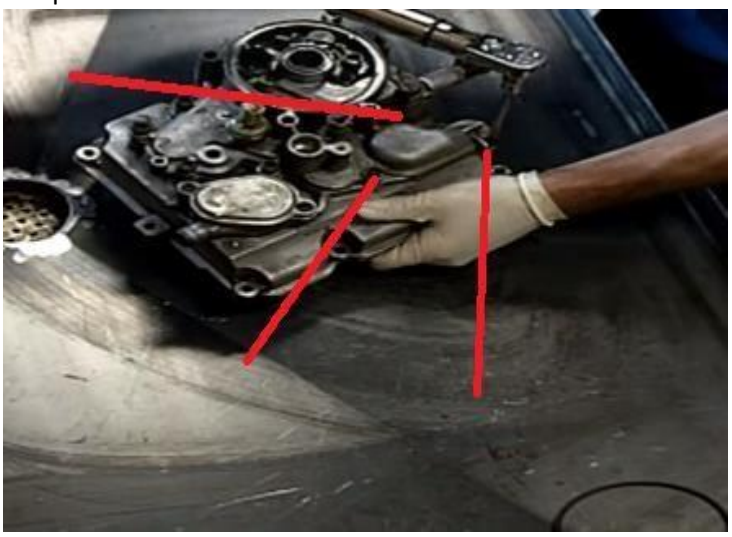
137. Put on the Coolant outlet to EGR cooler adapter onto the oil cooler cover. It's held in place by the rubber seal.

138. Make sure you've put in the rubber gasket.

139. Place on top of the EGR coolant adapter. Note the notch direction

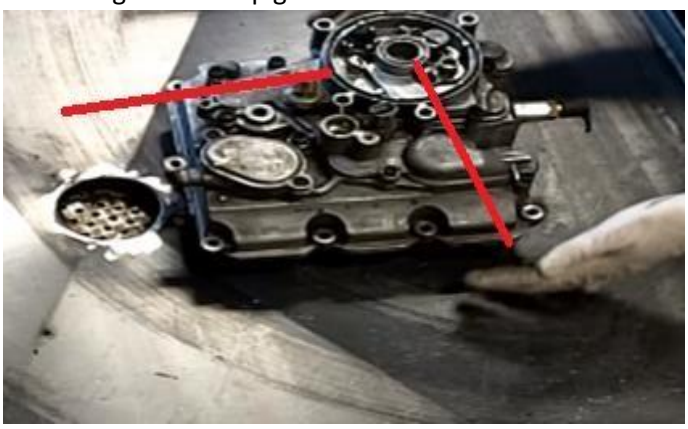
140. Screw the cover back on

141. Torque the 3 small bolts.



142. The remaining T45 bolts should be torqued

143. Install large round top gasket and the smaller oil filter tube seal and this is done.



144. Install the oil cooler assembly and put in the bolts. Torque

145. Now ready to put the intake back on

EGR DELETE / BYPASS

If you are doing an EGR delete/bypass, those steps would be performed here.
If welding exhaust inlet/outlet on EGR cooler, recommend using new gaskets and seals to prevent up pipe exhaust leak and possible backpressure leak from the EGR valve opening.

The procedure outline here assumes that an EGR DELETE has not been done. You will need to update the steps accordingly to suit your installation if you are deleting the EGR.

REASSEMBLY PROCESS

146. Check the intake gaskets. You can reuse them. **Replace with ford part# 3c3z-9439-aa**

147. The raised lip on the gasket indicates the side of the gasket that goes INTO the intake, not down to the block.

148. Reinstall the INTAKE

149. Get the exhaust intake to meet up. Make sure you put in the new EGR cooler exhaust gasket 3c3z-9e933-aa. If exhaust doesn't meet up, a floor jack supporting the pipe may help to move it up a little.

150. Once it is seated, thumb tighten the screws for the intake.

151. Reconnect the blue EGR coolant hose. It slides on with the notch pointing upwards (12:00 position) then turn it so that the notch is pointing away from that position for it to be locked in.

152. Draw down the intake evenly, make sure you don't have anything under or pinching the intake. Torque it.

153. Tight up the EGR cooler exhaust clamp at the back. The bolt should be straight up and down.

154. Remove turbo drain back tube. Replace o rings using Part# **3c3z-9t514-ag**

155. Reinstall TURBO pedestal and torque

156. Replace drain back tube

157. Replace the oil and fuel filter case. Draw the bolts down evenly. It will break an ear very easily.

158. Put the banjo plug back in. Make sure it s clean

159. Hand tighten the fuel line bolts. Then tighten with wrench.

160. Replace the **shorter** bolt that we set aside earlier. bracket on the passenger side fuel line

161. Start to bring your wire loom over. Make sure the glowplug connector is on the bottom.

162. Start connecting items. Make sure they actually connect! Power wire goes behind the A/C line

163. Reconnect glow plug module

164. Oil Temp and pressure sensors

165. Careful of the valve cover bolt that it doesn't cut the cable. Make sure it's a bolt, not a stud

166. Once you have as much threaded and connected as you can, get the injector wire loom

167. Injector loom under main loom

168. Push the injector connectors back on. BE GENTLE. They should just slide on easy. If not. Check

169. These are connecting to very very tiny unforgiving pins in the head. You want to be GENTLE

170. Connect IPR. That wire should go between FICM wires.

171. Connect back ground wire (with bracket) or on the back stud of intake and connect EBP connector.

172. Reinstall back bracket if applicable

173. Fix tab that we bent back earlier and screw it back in.

174. Reinstall the TURBO

175. The challenge is to align the oil drain back tube along with the exhaust output on the left and the exhaust input on the back. It will fight you.

176. The turbo will drop into place on the tube, make sure exhaust clip is in place.

177. On the back side of the exhaust input, make sure the little dowel is lined up. That ensures the turbo is seated.
Use new turbo bolts from Part# **3c3z-9t514-ag and torque.**

178. Might need a pry bar to align the exhaust. It should be really well seated before you clamp it.

179. Clamp the up pipes to the turbo.

180. Install the oil feed line to the turbo and housing and connect the turbo VGT actuator.

181. Install the FICM. Connect the 3 cables to the bottom, make sure they click in and then bolt it down.

182. Reinstall Turbo heatshield between turbo and FICM

183. Install the cold charge air cooler bottom hose first.

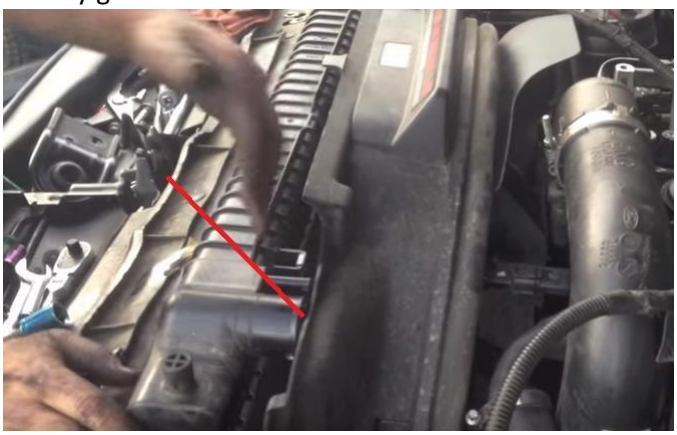
184. On the bottom make sure the bolt is at a slight angle away from the radiator, not straight up and down. It affects the installation of the air inlet snorkel

185. Take off the radiator top supports and move the battery positive cable out of the way over the motor.

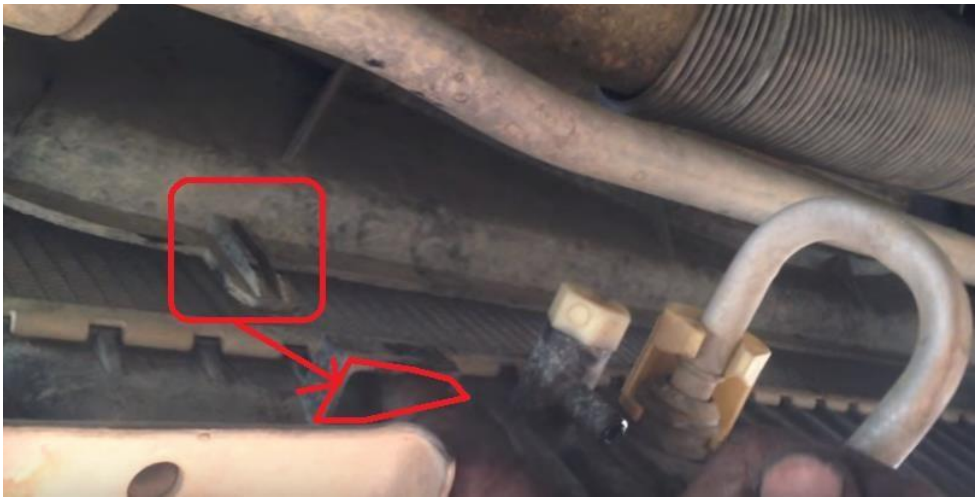
186. Bolt the fan shroud back

187. CAREFULLY feed the larger shroud back down.

188. Usually gets to about here



189. On the bottom side of the shroud, you want to feed the tabs into the slot. Try and get the tabs on both sides as close as you can to the hole



190. If you can’t pull it down from the bottom, give it a push from the top.

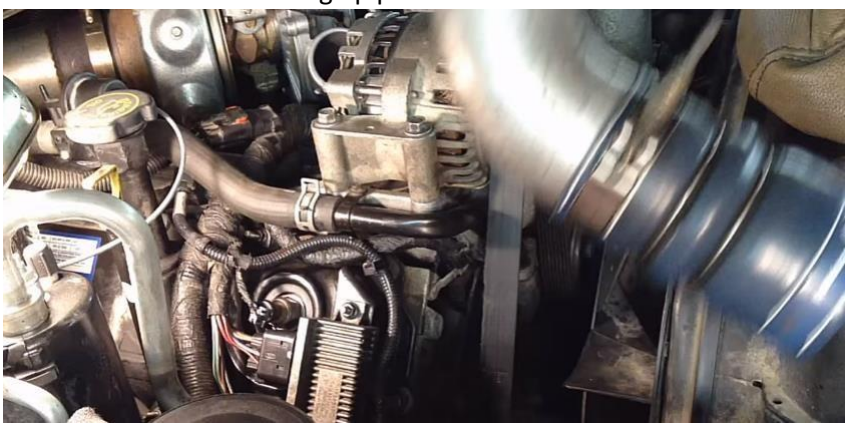
191. Put the battery cable back and clip it in

192. Connect the upper radiator brackets and the inlet coolant pipe.

193. Reconnect fan power connector

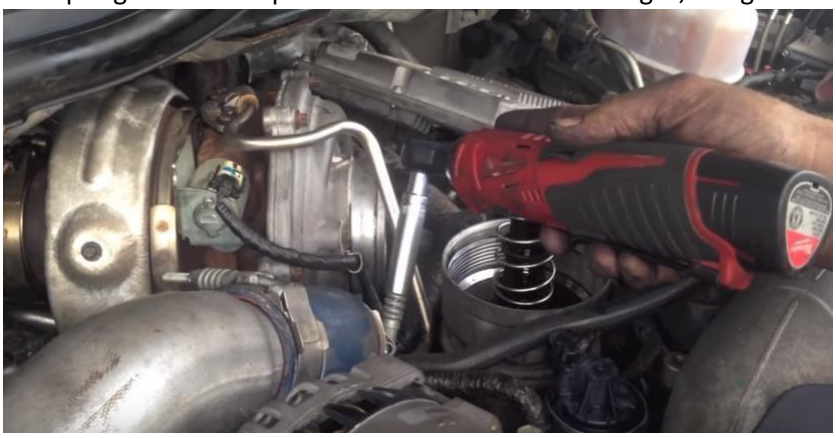
194. Reconnect the alternator and put the belt on. Makes sure the nut holding positive power cable is tight.

195. Reconnect the hot air charge pipe to turbo and to intercooler



196. Make sure the marks line up.

197. The spring should compress. Don't need to be TOO tight, but good resistance. Torque



198. Connect the bottom end

199. Reconnect the upper air snorkel to the turbo, and the little downpipe. Put in the new o ring. Ford Part# W302725

200. Snug it up. Note the line on the turbo for alignment

201. Connect the upper shroud

202. Install the coolant bottle (3 hoses) and the air snorkel/filter and reconnect MAF sensor

203. Reconnect vacuum lines to heater hose

204. Put filter minder gauge back in

205. Reinstall batteries and connect.

206. Put the oil filter you removed back in and oil filter cap back on.

207. Review your steps. Carefully look over the engine for any items that might not be reconnected due to engine model differences to this document. Ensure that your engine has everything back to normal with now wires chaffing.

208. If coolant is clean and being reused, put it back in. Recommend new coolant cap be installed Ford part #**9c3z-8101-b**

    If a coolant flush is going to be performed, at this time you will need to at least fill the engine with tap water or distilled water. This will depend on the coolant flush procedure you are following. The coolant flush procedure would be performed after engine is running.

START PROCEEDURE

209. Look over the engine and make sure you haven't left any tools in the engine compartment.

210. Disconnect starter wire (yellow)

211. Unplug and touch to the positive of battery. Make sure your key is OUT of the ignition.

212. This will start cranking the engine. Let it crank for 20 seconds, then let the starter rest for 1 minute to cooldown. Do this at least 3 times. This will prime oil and fuel system. Also lets you visually check to see if any problems are showing before truck starts.

213. Reconnect the starter cable

214. Turn the key to ON and let it prime for 30 seconds. You might need to do this 2 or 3 times.

215. Start the truck. It can be hard starting the first time.

216. Once started and all checks out, no leaks etc.,

217. **Change the oil if applicable.** ALWAYS use an OEM Ford oil filter kit.

218. Perform a proper 6.0 coolant flush if applicable

Oil Cooler / EGR DELETE COMPLETED