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2019-23 Ford Ranger (truck) 2.3L EcoBoost High-Pressure Fuel Pump Kit Install Guide

PRODUCT PART SKU#: H086-1848

Warning! Please follow all warnings and instructions found in your vehicle service manual. The following instructions must be read and fully understood before beginning installation. Failure to follow these instructions may result in vehicle damage, personal injury, or death. If these instructions are not fully understood, do not attempt installation.

Please note that this product does require vehicle calibration. Please ensure provisions are made prior to installation. Nostrum Tuning Guides are available upon request. If you are already in touch with a tuner, please have them reach out to support@nostrumshop.com or access the Tuning Guide via the dealer portal on the Nostrum website. If you do not currently have a tuner, we will gladly connect you with someone within the Nostrum dealer network.

Required tools:

- 7 mm socket
- 8 mm socket, deep well
- 10 mm socket, deep well
- 5 mm Allen socket
- Ratchet wrench
- Socket extensions of various lengths
- 10 mm wrench
- 12 mm closed-end wrench
- 17 mm open-end wrench
- 17 mm crow's foot adapter
- Trim removal tool
- Pick tools
- T45 Torx socket
- 5/16" Quick-Connect fuel line disconnect tool, low profile
    - Recommend Ford Rotunda tool P/N: 310-250 (includes 3/8" & 5/16" on same tool)
- Torque wrench capable of 2 to 25 Nm (20-220 in-lb) **NOTE IMPERIAL UNITS ARE IN INCH-LB.**
- Torque-angle gauge or torque wrench with torque angle capability
- ECU programming interface or other calibration delivery method
- Safety glasses
- Fire extinguisher (Class B minimum recommended)

Consumables:

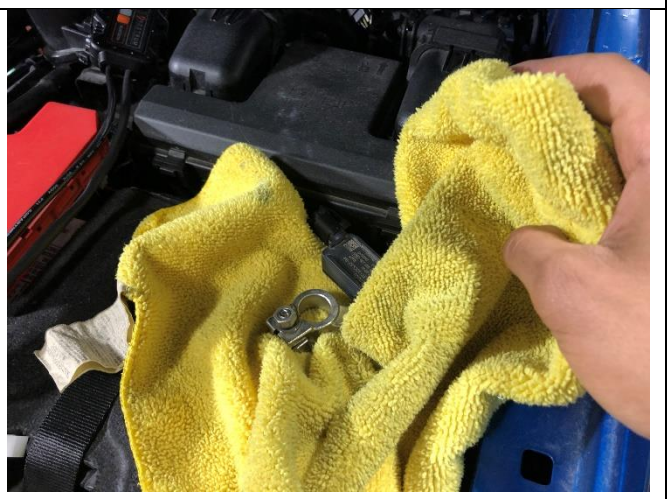
- Lint free absorbent towels
- Disposable rubber gloves

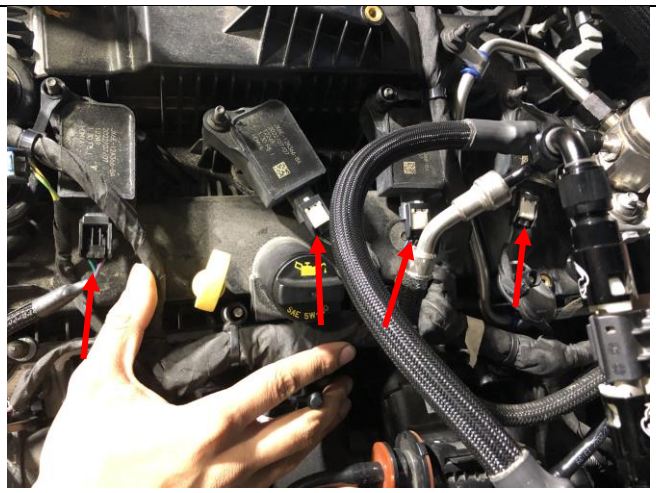
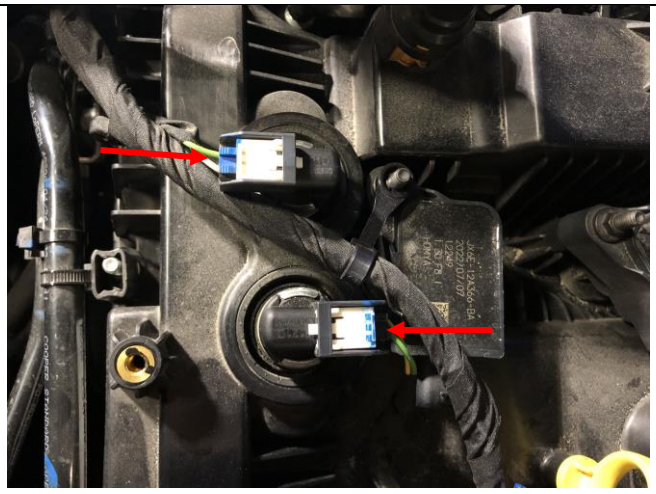
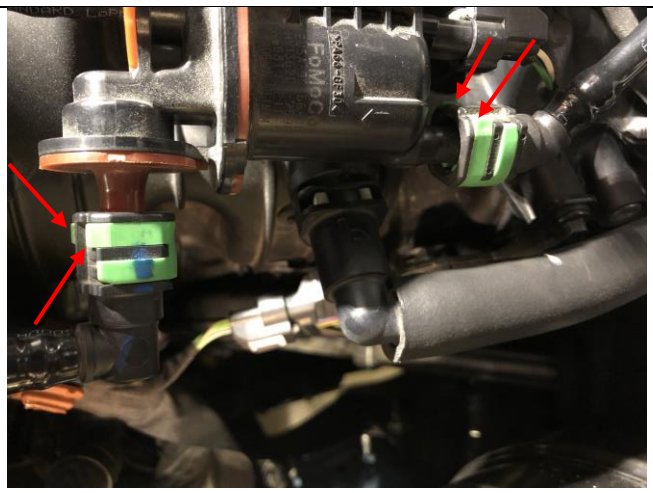
Additional recommended OEM Ford parts (not included but considered "one-time use" by Ford):

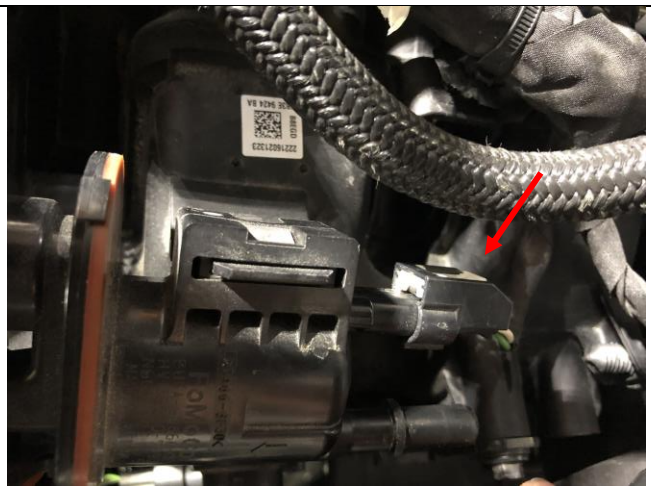
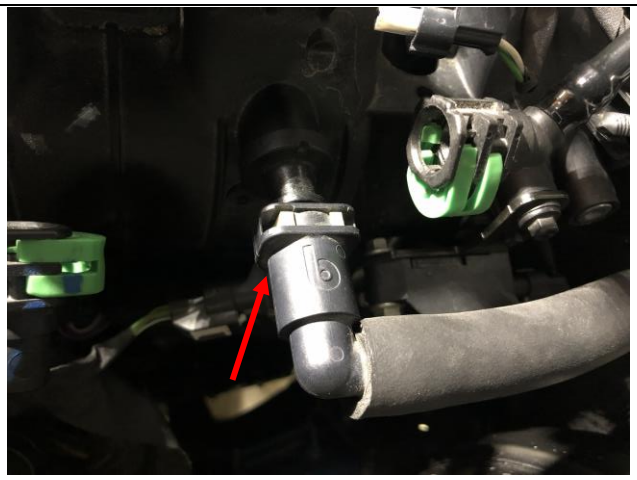
- High-pressure fuel line P/N: K2GZ-9J323-B (verify this is the correct part number for your vehicle)
- EGR tube gasket P/N: LB5Z-9E464-C (verify this is the correct part number for your vehicle)

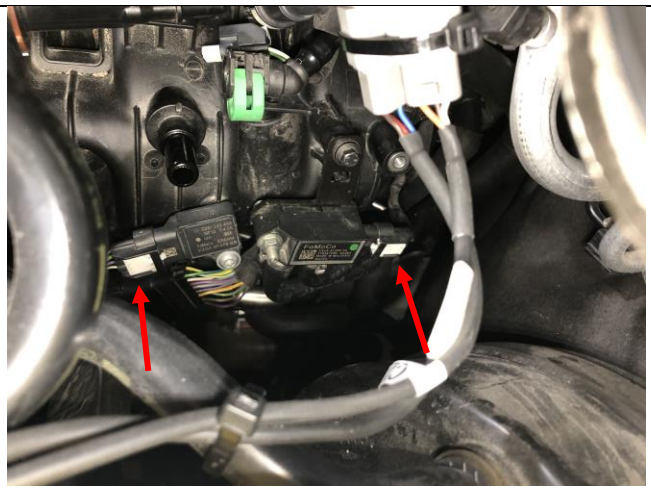
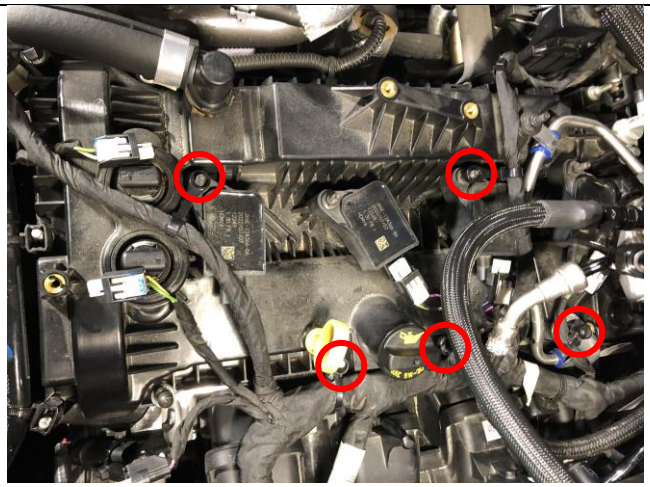
NHP 2019-23 Ford Ranger (truck) 2.3L EcoBoost High-Pressure Fuel Pump Kit Parts List:

Description	Quantity	Part #
Ford 2.3L EB Truck HPFP sub-assembly	1	H066-1481
Pump flange, Ford 2.3L EB truck, blue	1	H140-1200
O-ring, HPFP flange to cylinder head, 38x2	1	9262K201
5/16" Nylon fuel line assembly, 5/16" QC 180-deg male to 5/16" QC 90-deg female	1	L176-0590
Pump to flange bolt, SS SHCS, M6x1.0-45mm	2	91292A143
Electrical adapter, Molex, male	1	E066-0372
Flange Installation Alignment Tool	1	A140-0313
Flange to engine fastener, SS SHCS, M6X1.0-40mm	2	91292A142

NOTICE: Ford recommends replacing the high-pressure fuel line in the event of removal. Ford service documentation identifies this high-pressure fuel line as a "one time use" item and should be replaced per Ford Service Manual. As a standard Ford Motorcraft service part, this line is NOT supplied with your NHP kit and replacement is at consumer's discretion. **Ford Motorcraft P/N: K2GZ-9J323-B** **In addition, Ford recommends replacing the EGR gasket after removal of the tube. This Ford service part is NOT supplied with your NHP kit and replacement is at consumer's discretion.** **Ford Motorcraft P/N: LB5Z-9E464-C**	
1. Using a 10 mm socket disconnect the negative battery terminal.	
	Figure 1
2. Insulate the negative terminal with a rag or equivalent to prevent it from contacting the negative post on the battery and restoring power to the vehicle. **If you choose NOT to replace the Ford recommended high-pressure line P/N: K2GZ-9J323-B, you may skip to Step 26.**	
	Figure 2

3. Disconnect the four coil pack electrical connectors by pulling back the white locking tabs. Then push down the rear of the tabs and pull the connectors off the coil packs.	
	Figure 3
4. Disconnect the two connectors from the VCT oil control solenoids by pulling back the white locking tabs. Then push down the rear of the tabs and pull the connectors off the solenoids.	
	Figure 4
5. Remove the two vacuum hoses from the purge valve solenoid by pushing the protruding fingers on the green tab outward. While doing so, push down the tabs to release the hoses from its locks. **Red arrows indicate fingers.**	
	Figure 5

6. Disconnect the connector from the purge solenoid by pulling back the white locking tab. Then push down the rear of the tab and pull the connector off.	
	Figure 6
7. Lift the purge solenoid up from its mounting bracket, then remove the solenoid from the vehicle.	
	Figure 7
8. Remove the vacuum hose connected to the intake manifold by pushing in the white tab beneath the hose then pulling the hose off.	
	Figure 8

9. Remove the MAP sensor connector and EGR transducer connector by pulling back the white locking tabs. Then push down the rear of the tabs and pull out the connectors.	
	Figure 9
10. Using a 7 mm socket, loosen the worm gear clamp holding the silicone coupler to the throttle body. Then pull the coupler off the throttle body.	
	Figure 10
11. Release the five (5) wire harness retaining clips from the valve cover.	
	Figure 11

12. Disconnect the four (4) wire harness retaining clips on the front of the intake manifold.

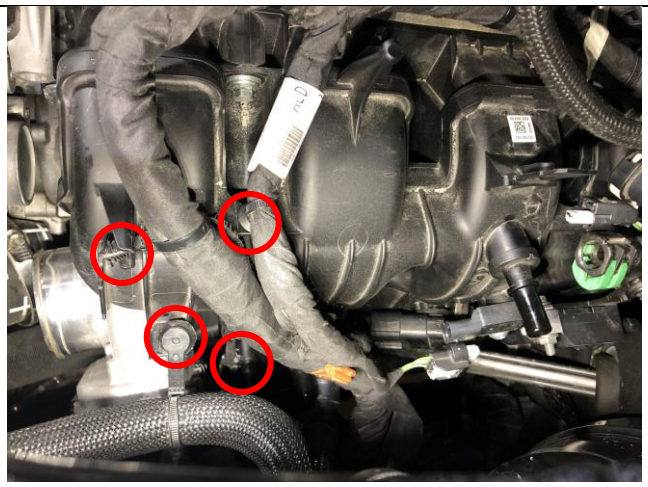


Figure 12

13. Disconnect the retaining clip from the rear of the intake manifold.

Figure 13

14. Disconnect the throttle body electrical connector by pulling back the red locking tab. Then push down the rear of the connector and pull the connector off.

    The red circle shows the location of the connector. See Step 15 for a close up view of the connector location.

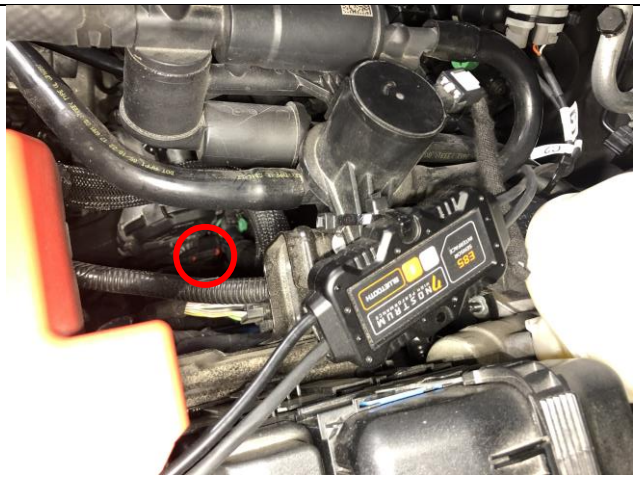


Figure 14

15. A close-up of the connector:

    The red arrow points toward the part of the connector that needs to be pressed down to pull off the connector after the locking tab has been released.

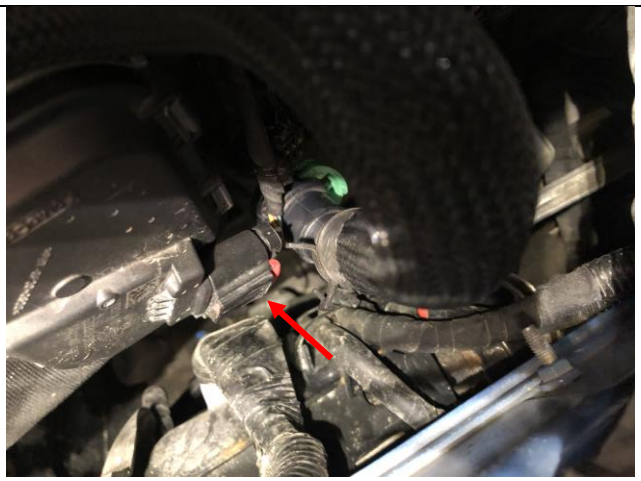


Figure 15

16. Disconnect the fuel injector harness connectors by pushing in the black tab in the middle of the connectors then pulling them away from each other.

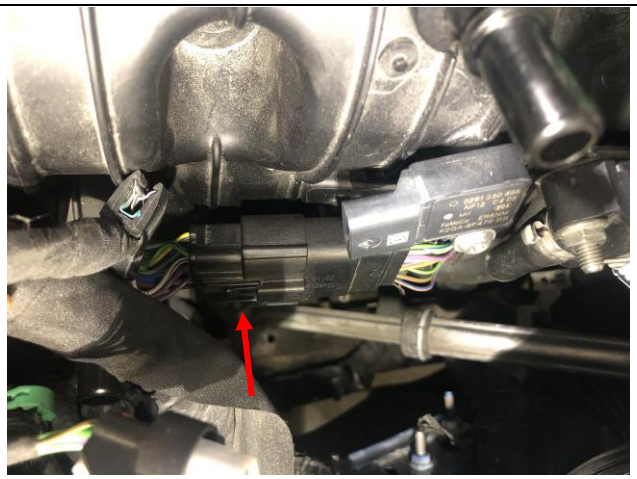


Figure 16

17. Disconnect the retaining clip holding the fuel injector harness connector to the intake manifold.

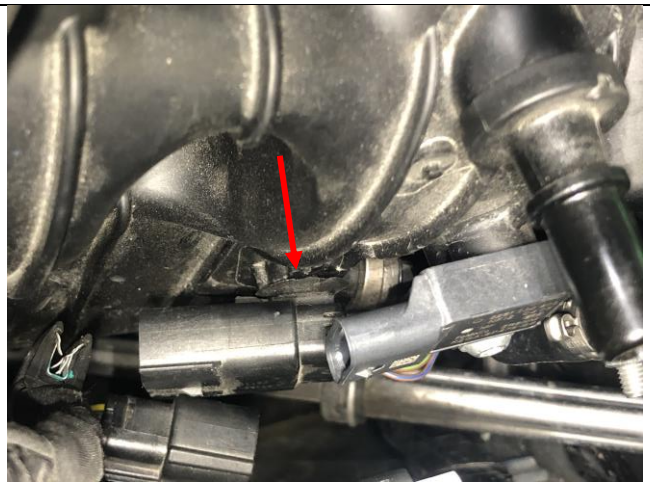


Figure 17

18. Using an 8 mm socket remove the bolt mounting the EGR transducer sensor bracket to the intake manifold.

Figure 18

19. Using a 10 mm socket and/or wrench, remove the two 10 mm nuts and one 10 mm bolt connecting the EGR tube to the intake manifold. The 10 mm bolt may be difficult to access. The studs are connected to the nuts, once they are removed, the studs will come out with them.

    Ford recommends replacing the EGR gasket after removal of the tube.
    Ford P/N: LB5Z-9E464-C

    Torque: **11 Nm (97 in-lb)**

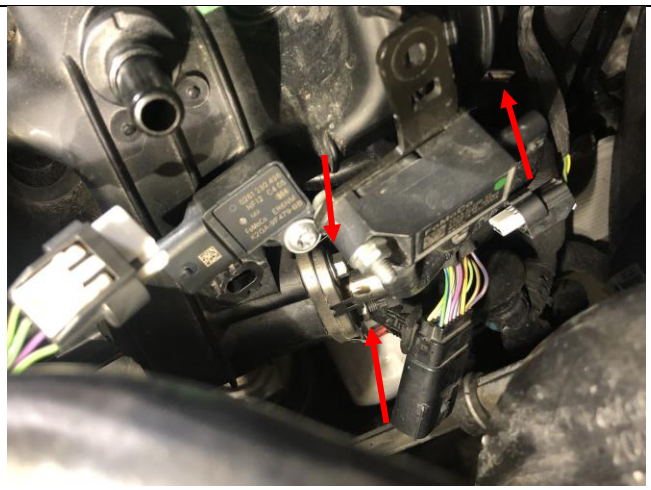


Figure 19

20. Using a 10 mm socket remove the five (5) intake manifold bolts, then position the manifold slightly toward the driver's side fender.

    Torque spec: 25 Nm (220 in-lb)

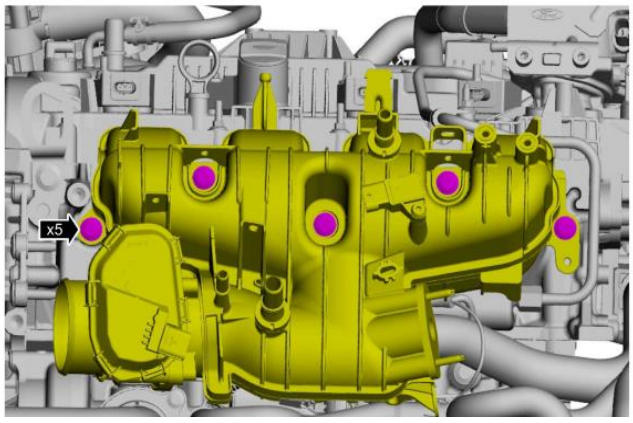
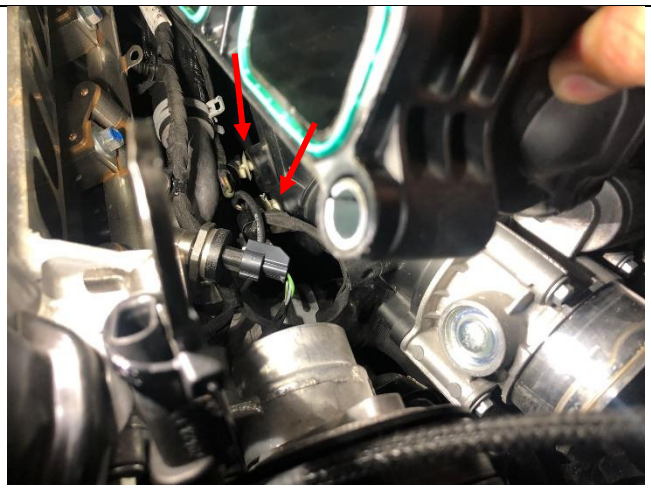
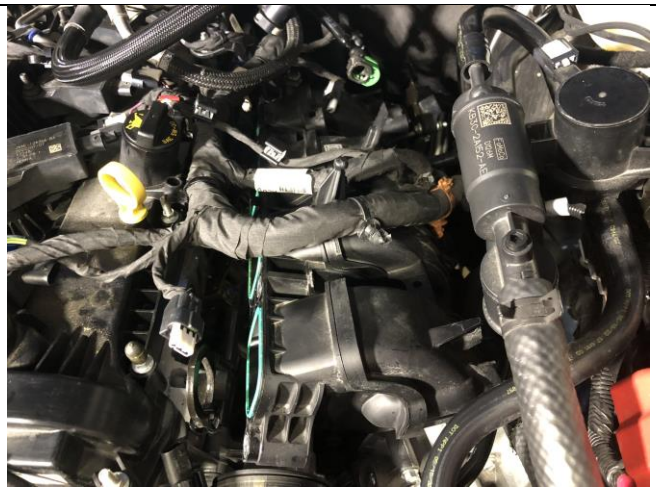
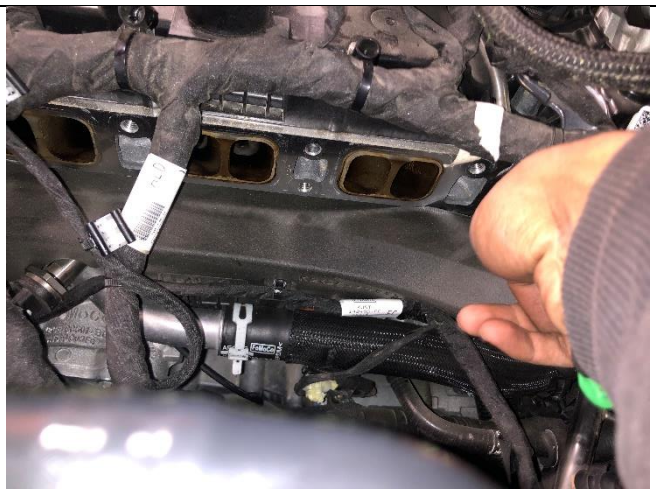


Figure 20

21. Release the two (2) retaining clips holding the knock sensor electrical connectors to the back of the intake manifold.	
	Figure 21
22. Remove the intake manifold by routing it beneath the engine wiring harness and pulling it out from the front of the engine bay.	
	Figure 22
23. Remove the fuel rail sound dampening foam.	
	Figure 23

24. Using a 17 mm wrench, loosen the high-pressure line compression nut from the fuel rail. Use an absorbent towel to capture any fuel that leaks from the line during and after removal.

    This high-pressure line is categorized as "one-time use" by Ford. Ford recommends replacing the line. Ford P/N: K2GZ-9J323-B

    Safety glasses are recommended for this step.

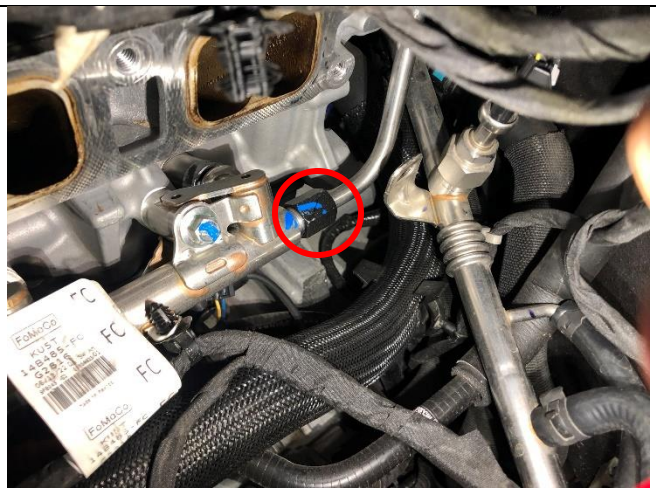


Figure 24

25. This image shows the disconnected high-pressure fuel line with an absorbent towel underneath.

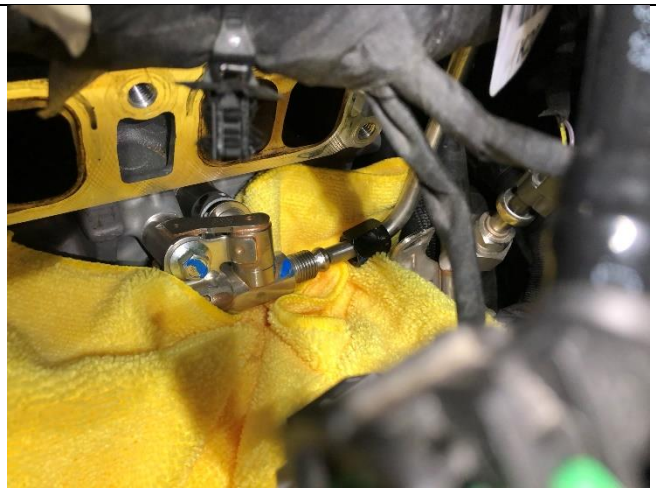


Figure 25

26. Using a T45 Torx socket, remove the four high-pressure fuel pump protective bracket bolts, then remove the protective bracket.

    Two of the bracket bolts are located behind the pump and are difficult to see. Figure 27 shows the location of these bolts.

Figure 26

27. The red arrows point toward the two bolts that are difficult to see. Set the bolts and bracket aside for storage (you will not use them with the NHP HPFP)

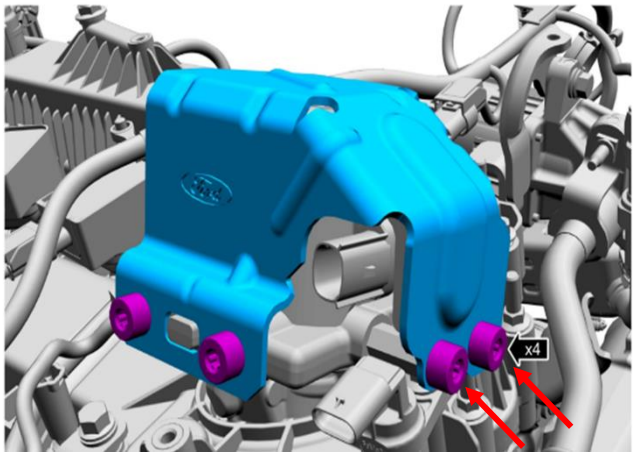


Figure 27

28. Remove the high-pressure pump sound dampening foam by pealing it up and off the pump. Set this aside for storage (you will not use it with the NHP HPFP.)

Figure 28

29. Using a low profile 5/16” fuel line disconnect tool, remove the low-pressure feed line from the high-pressure pump. Place the 5/16” end of the disconnect tool over the high-pressure pump inlet, then push the low-pressure line into the disconnect tool, this will release the low-pressure line from the pump. Use clean lint free towels to catch any fuel that escapes.

    We recommend Ford Rotunda tool P/N: 310-250

Figure 29

30. Using 8 mm and 10 mm deep well sockets, remove the 8 mm and 10 mm studs that secure the high-pressure fuel line to the valve cover.

    The 8 mm stud is circled in green.

    The 10 mm stud is circled in yellow.

Figure 30

31. Using a 17 mm wrench, disconnect the high-pressure line from the high-pressure fuel pump, then remove the high-pressure fuel line.

    Use clean, lint free towels to capture and soak up the spilled fuel once the line is removed.

    Safety glasses and rubber gloves are recommended.

Figure 31

32. Remove the electrical harness connector from the high-pressure pump by pulling back the red locking tab. Then push down on the middle of the connector and pull the connector off.

    See Figure 33 for details.

Figure 32

33. The arrow points toward the part of the connector that will need to be pressed down on once the red locking tab has been released.

Figure 33

34. Install the high-pressure line, then hand tighten the compression nut to the fuel rail.

Figure 34

35. Using a 17 mm crow's foot adapter or equivalent and a torque wrench, torque the high-pressure line compression nut on the fuel rail. The compression nut has a 3-step tightening procedure.

    Stage 1: 7 Nm (62 in-lb)
    Stage 2: 10 Nm (89 in-lb)
    Stage 3: Tighten an additional 38 degrees

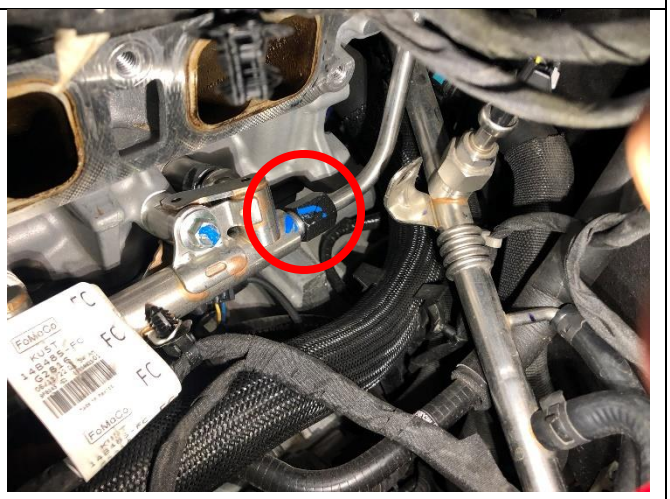


Figure 35

36. Use an 8 mm socket to remove the bolts securing the stock pump. Gradually loosen the bolts, alternating between two bolts as you loosen so that you don't side load the factory pump piston.

    Then remove the pump from the engine bay. Cap the inlet and outlet fittings to prevent contamination. Set the stock pump aside for storage with the other stock parts previously removed.

Figure 36

37. Be sure the flange mounting face on the cylinder head is clean and free of debris. Place the provided flange alignment tool into the center of the NHP provided flange, with the O-ring on the NHP flange facing down.

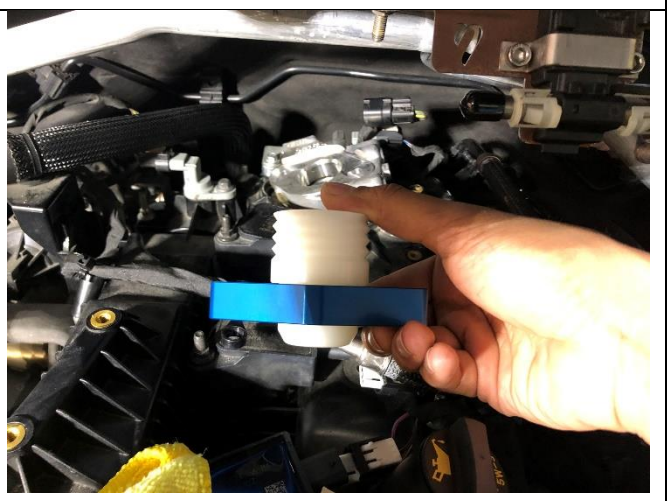


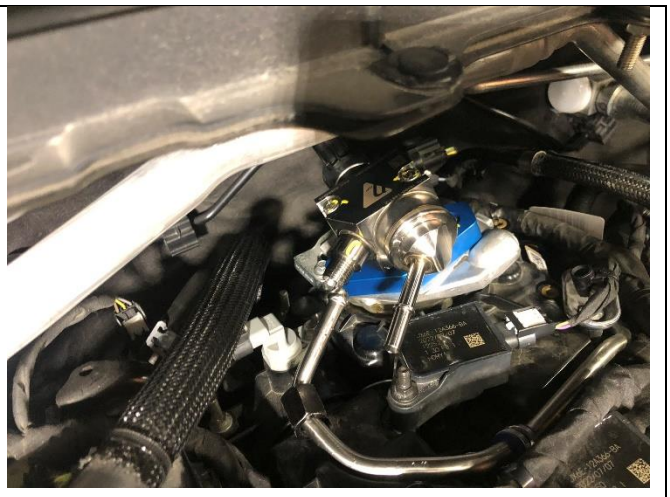
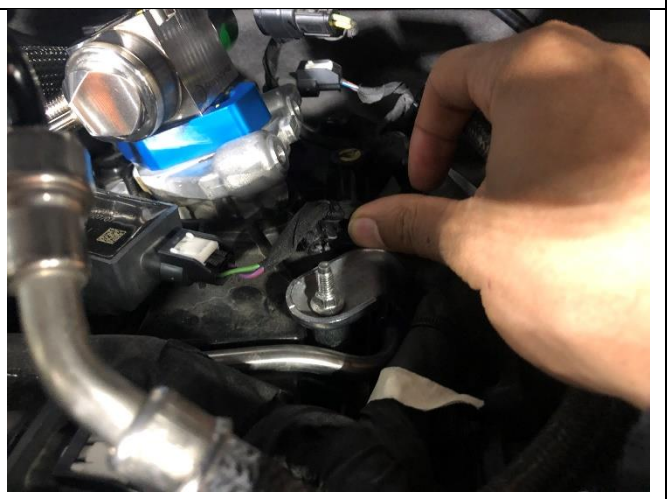
Figure 37

38. Place the tool and flange into the high-pressure pump bore. Align the flange bolt holes and hand start the two M6x1.0-40mm fasteners (shorter of the two fasteners provided). Seat the fasteners and then torque them using a torque wrench and 5mm Allen head socket.

    Torque spec: 14 Nm (124 in-lb)

    After the flange has been torqued remove the flange alignment tool.

Figure 38

39. Carefully maneuver the pump into place without contacting the high-pressure fuel line and without contacting the plunger and spring retainer on the pump. You may need to push down after you have inserted the pump into the flange to overcome the O-ring compression to the flange. Align the rotation of the pump as shown, then hand start the included M6x1.0-45 mm pump to flange bolts (longer of the two fasteners provided) using a 5 mm Allen socket. **Note: Depending on the cam position the pump may initially sit further from the flange.** It is important to alternate tightening of the pump bolts one turn at a time (to make sure even pressure is applied and ensure pump bore or spring damage does not occur. **Seat the pump to the flange but do not fully tighten. It is important that the pump is free to rotate slightly for the following steps.**	
	Figure 39
40. Re-Install the 8 mm high-pressure line mounting stud. **Torque spec: 11 Nm (97 in-lb)**	
	Figure 40

41. Maneuver the upper mounting bracket down the high-pressure line (away from the pump). The 10 mm high-pressure line mounting stud will **NOT** be reinstalled for the NHP HPFP.

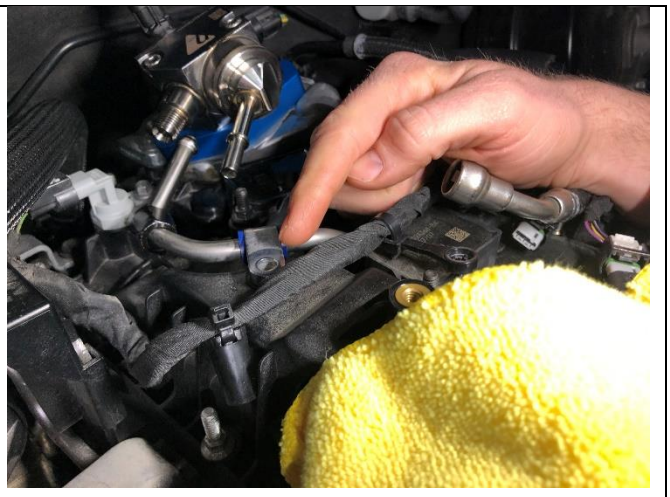


Figure 41

42. Connect the provided high-pressure pump electrical connector adapter to the OEM pump harness connector. Be sure to listen for the click and to push the red locking tab into the connector to secure the connection.

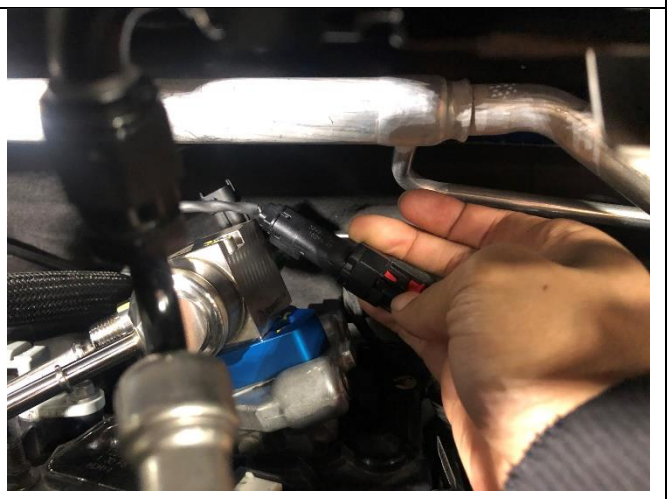


Figure 42

43. Connect the high-pressure pump electrical connector adapter to the high-pressure pump solenoid. Be sure to listen for the click.

Figure 43

44. **Manipulating The High-Pressure Tube To Align To The HPFP**: slide a 12 mm closed-end wrench onto the pump side of the high-pressure line and align the wrench as shown in Figure 44. Bend/Pull the line towards the front of the engine. Continue this maneuver until the high-pressure fuel fitting is a half inch away from the pump fitting.

    Rotation of the high-pressure pump may be necessary when bending the line.

Figure 44

45. Move the 12 mm wrench about 1-1/2" inches from the fitting as shown and then bend the line towards the pump until the spherical fitting is as close to parallel with the pump fitting as possible.

Figure 45

46. Once the high-pressure line has been aligned with the fitting on the pump; torque the two M6 fasteners that secure the high-pressure pump to the flange.

    Torque spec: 14 Nm (124 in-lb)

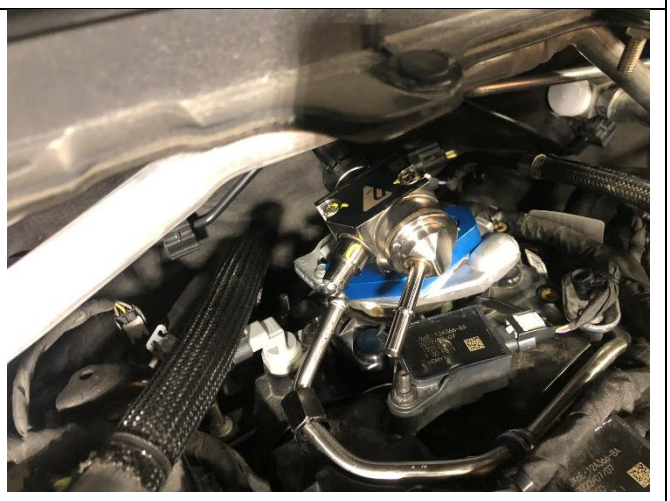


Figure 46

47. Seat the spherical fitting of the tube into the female cone of the pump. While holding the tube in position, start to thread the compression nut on the male pump fitting. Hand thread the compression nut to the fitting on the high-pressure pump until seated. When the tube is aligned well to the fitting, you should be able to lightly spin the compression nut onto the male fitting.
Note: Do not FORCE the compression nut as it may lead to cross threading of the threads. If threading is difficult, manipulate the tube further to improve alignment.

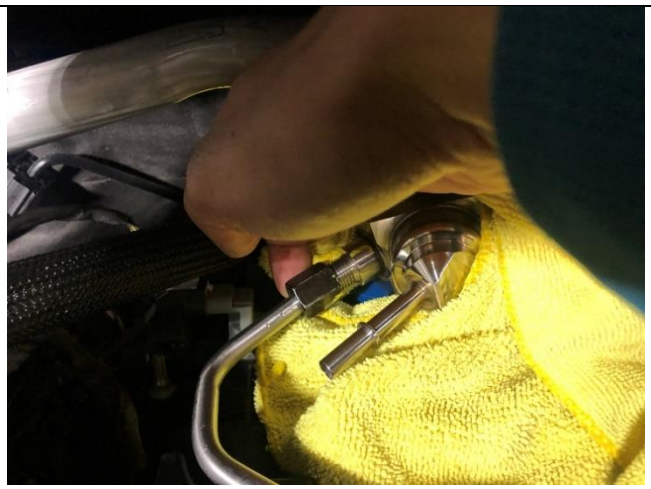


Figure 47

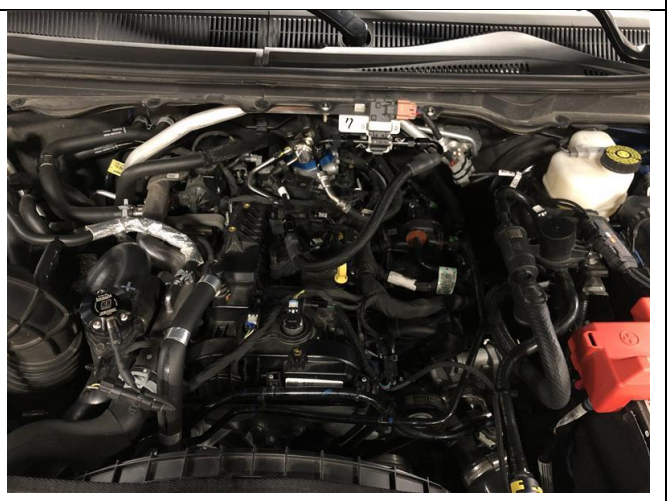
48. After seating the compression nut by hand, use a 17 mm crow's foot adapter and a torque wrench to torque the high-pressure line compression nut to the high-pressure fuel pump. The compression nut has a 3-step tightening procedure.

Stage 1: 7 Nm (62 in-lb)
Stage 2: 10 Nm (89 in-lb)
Stage 3: Tighten an additional 38 degrees

Figure 48

49. Connect the NHP provided Nylon low-pressure adapter line male 5/16" QC fitting to the factory low-pressure fuel line female 5/16" QC fitting. Make sure the fittings are properly seated.

Figure 49

50. Connect the NHP provided Nylon low-pressure adapter line female 5/16” 90 degree fitting to the low-pressure inlet on the high-pressure pump. Make sure the connection is secure.	
	Figure 50
51. Reverse the remainder of the steps to re-assemble the vehicle. Start at Step 23 and work your way back.	
	Figure 51

Hardware installation is complete.

Calibration

Do not start your vehicle, this product requires calibration. Please contact your tuner or refer to the Nostrum Tuning Guide to make the necessary changes prior to starting the vehicle. Once calibration is complete, please proceed to the next step.

First Start-Up

1. Be sure to remove all installation tools and loose items from the engine compartment. Follow good, safe practices when working on your vehicle. Be sure to reassemble all parts and components according to your OE service manual.

2. Key cycle the vehicle into the "Accessory On" position (do not go to the Start position). The low-pressure fuel pump will activate and the fuel system will pressurize. Check the high-pressure fuel pump and the low-pressure system for leaks. If no leaks are found, proceed to Step 3.

3. Cycle the key to the Start position and let the vehicle attempt several start cycles. Remember that the fuel lines, pump, and part of the fuel rail are filled with air, therefore this step is necessary to evacuate that air and get the system charged. If it starts, continue with the following steps. If it does not, key off the vehicle. Check the high-pressure lines to the fuel rail, to the pump and the pump itself for leaks. If no leaks are found, proceed to step 4.

4. Key cycle one more time to Start. Engine should start-up and idle. If so, continue with the following steps. If not, repeat Steps 2-4 again.

5. Let the car idle for a few minutes. Check for leaks in the low and high-pressure systems again.

6. Installation is complete!

NOTE: a fault code may appear at the first key cycle due to the extended cranking time or the low-pressure in the fuel rail, both due to the air in the fuel system.
This code should self-clear after the OEM defined quantity of key cycles.

NOTE: Please check for fuel leaks after driving the vehicle and letting it cool for an extended period of time. Fittings may loosen after the first heat cycle due to thermal expansion and contraction. Retighten fittings if needed.

For additional technical & software support please contact:

Email: support@nostrumshop.com
Phone: **734-548-8677 (during normal business hours)**

Revision	Notes	Date
2.0	Initial Release	4/05/2024
2.1	Updated tools and parts list	4/16/2024
2.2	Correct error in parts list table heading. Updated product image on page 1.	4/17/2024