NOSTRUM
HIGH PERFORMANCE

Ford Ranger Raptor 3.0L EcoBoost Big Bore High-Pressure Fuel Pump

PRODUCT PART SKU#: H086-1953

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:

- Socket wrench
- 10 mm deep well socket
- 8 mm socket
- 7 mm socket
- Torque-angle wrench capable of (0-41+ in-lbs) (0-40 Nm) (0-20 ft-lbs)
- 11/16” crow’s foot adapter
- Flat blade screwdriver
- 17 mm open end wrench
- 5 mm Allen socket adapter
- Trim removal tools
- ECU programming interface or other calibration delivery method
- Safety glasses
- Fire extinguisher (Class B minimum recommended)

Consumables:

- Lint free absorbent towels
- Clean engine oil
- Disposable rubber gloves

H086-1953 Parts List:

Description	Quantity	Part #
Ranger Raptor 3.0 R-Code High-Pressure Tube Assembly with Bracket	1	H926-1952
Ranger Raptor 3.0 R-Code HPFP Mounting Flange	1	H140-1950
O-ring, HPFP flange to cylinder head, 38x2 (installed in flange)	1	9262K201
Flange to Cylinder Head Mounting bolts, SS, M8-1.25 x 25mm length	2	91292A148
3.0L EcoBoost 1150-250 Big Bore High-Pressure Fuel Pump	1	H066-1192
HPFP to Flange Mounting Bolts, SS, M6-1 x 50mm length	2	91292A144
Electrical Harness Adapter Bosch Compact Female 2 Pin to Molex Male 2 Pin	1	E066-0372
Pump Flange Alignment Installation Tool	1	A140-0313
High Temp Rubber Tubing	1	5119K46
Snap-Grip clamps	2	9579K68

1. Using a 10 mm socket disconnect the negative battery terminal. Cover the terminal with a rag or electrical tape to prevent it from contacting the negative post on the battery and restoring power to the vehicle.

Figure 1

2. Disconnect the 3 vacuum hoses from the air inlet tube.

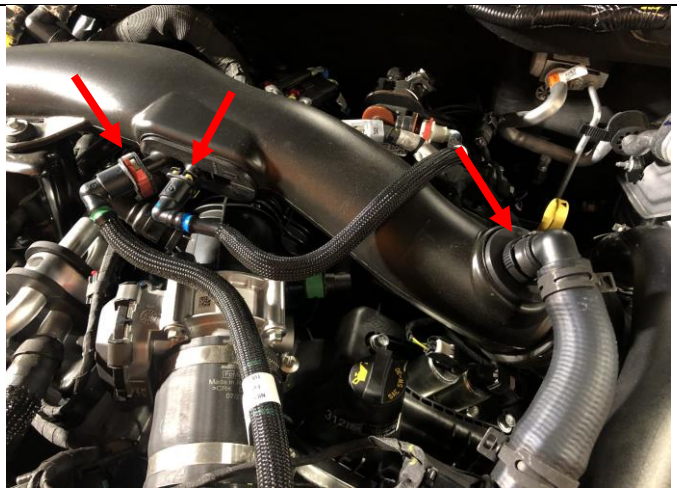


Figure 2

3. Disconnect the electrical connectors from the throttle inlet pressure sensor highlighted in blue and from the turbocharger bypass valve highlighted in yellow.

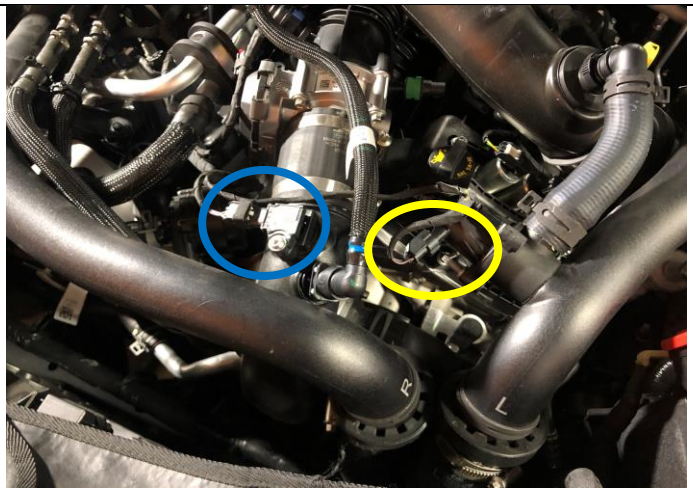


Figure 3

4. Using a 7 mm socket or flat-blade screwdriver loosen the hose clamp connecting the air inlet tube to the air box and slide the flexible tubing off the airbox.

   Reassembly Torque: 5 Nm (41 in-lbs)

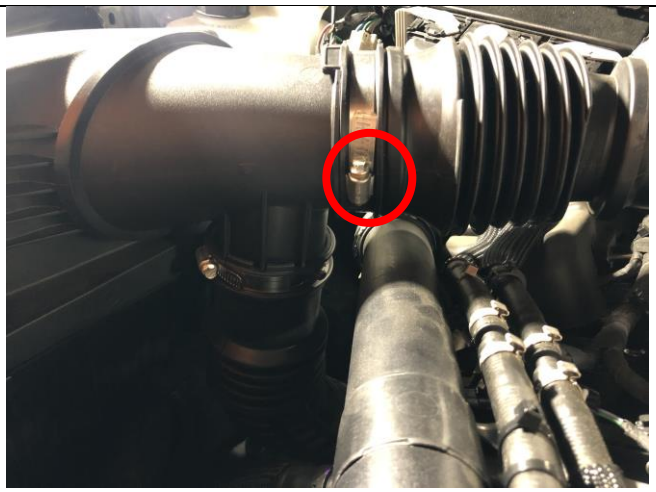


Figure 4

5. Using a 7 mm socket or flat-blade screwdriver loosen the hose clamp connecting the flexible rubber portion of the air inlet tube to the hard plastic portion of the air inlet tube. This clamp is located to the right of the rubber vacuum hose specified in *Figure 2*. Then slide the flexible hose section off the hard tube.

   Reassembly Torque: 5 Nm (41 in-lbs)

Figure 5

6. Using an 8 mm socket remove the fastener mounting the air inlet tube to the metal bracket, then remove the inlet tube.

   Reassembly Torque: 11 Nm (100 in-lbs)

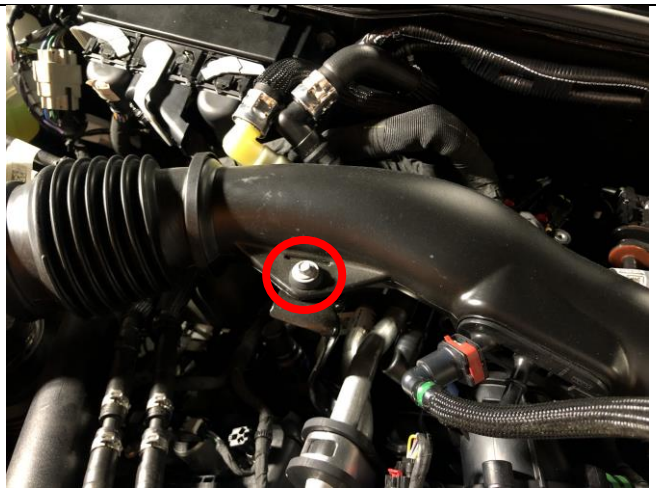


Figure 6

7. Disconnect both ends of the vacuum hose that is routed over the coolant hardline. This vacuum hose is located on the passenger side of the vehicle and connects to the top of the intake manifold and the valve cover. Pull the spring loaded retainer clips outward to remove the hose.

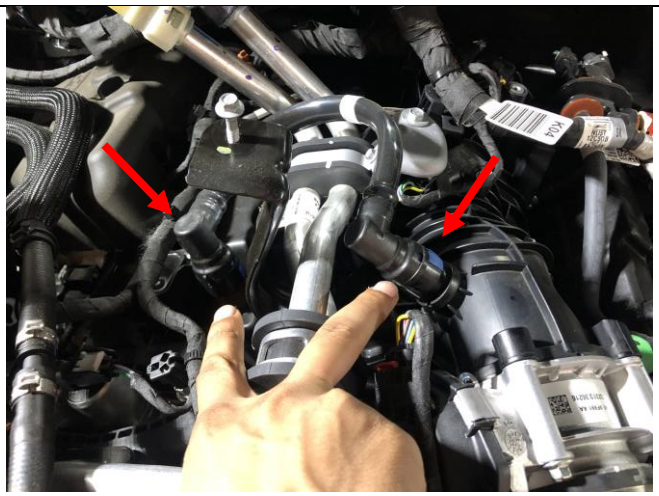


Figure 7

8. Using a 10 mm socket remove the nut highlighted in blue and the 8 mm bolt highlighted in yellow to disconnect the coolant hardline from the valve cover and intake manifold.

   Bolt Reassembly Torque: 8 Nm (70 in-lbs)
   Nut Reassembly Torque: 10 Nm (89 in-lbs)

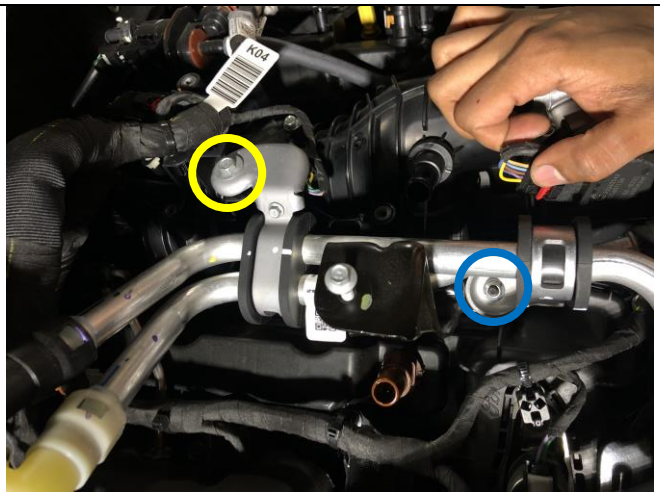


Figure 8

9. Using a 10 mm socket remove the nut mounting the metal bracket to the valve cover.

   Reassembly Torque: 10 Nm (89 in-lbs)

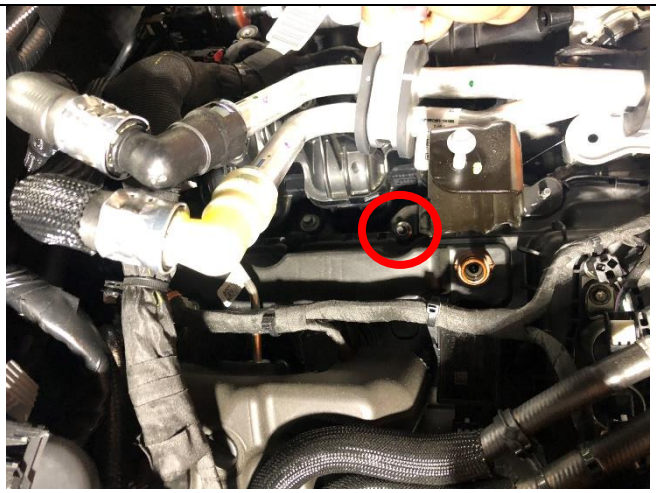


Figure 9

10. Disconnect the MAP (Manifold Absolute Pressure) sensor connector and the throttle body electrical connector. Slide the connector locks reward of the connector and squeeze the connector release tab to remove.

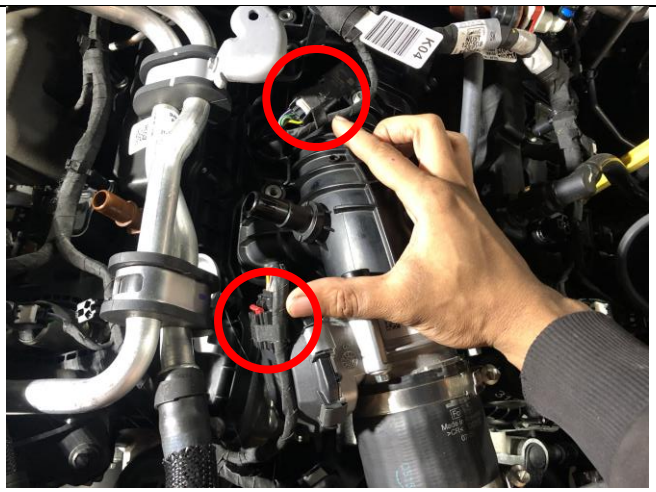


Figure 10

11. Disconnect the specified vacuum hose from the intake manifold. Slide the green lock out of its seated location, then remove connection from manifold.

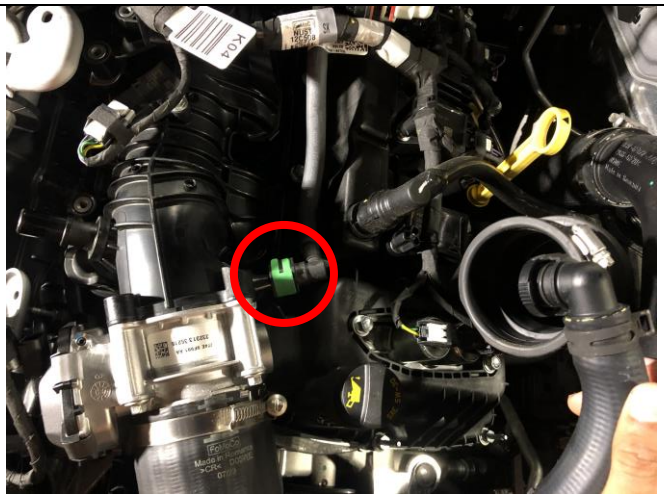


Figure 11

12. Use a trim removal tool to pry up on the 2 retaining clips mounting the engine wire harness to the intake manifold.

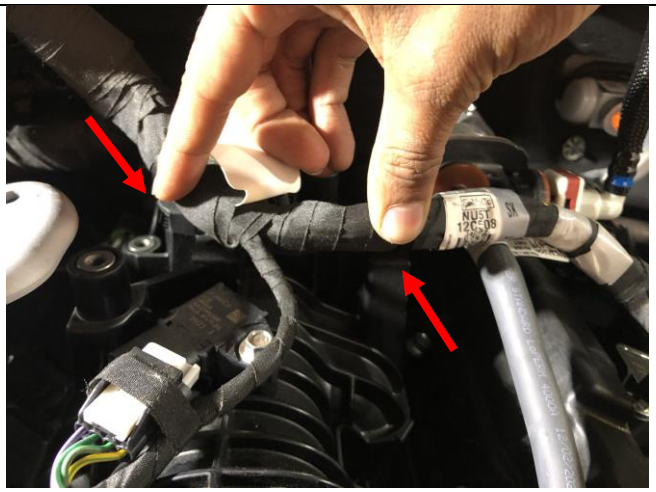


Figure 12

13. Using a trim removal tool pry up on the 2 white retaining clips mounting the fuel injector harness connectors to the intake manifold.

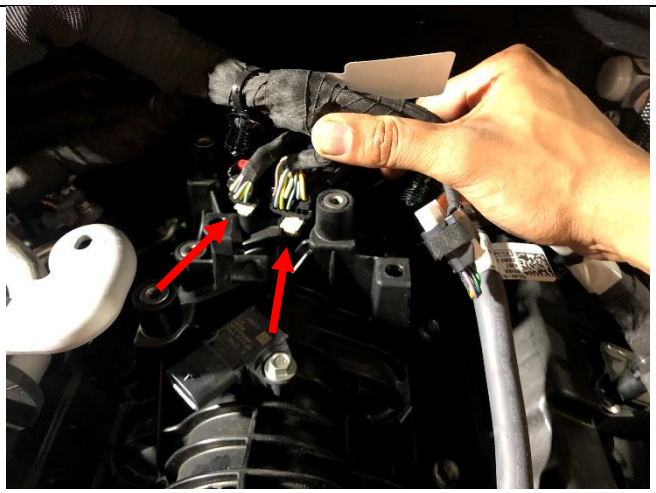


Figure 13

14. Remove the connector from the charge air pressure sensor by sliding the white locking tab outward and squeezing the connector retainer to remove.

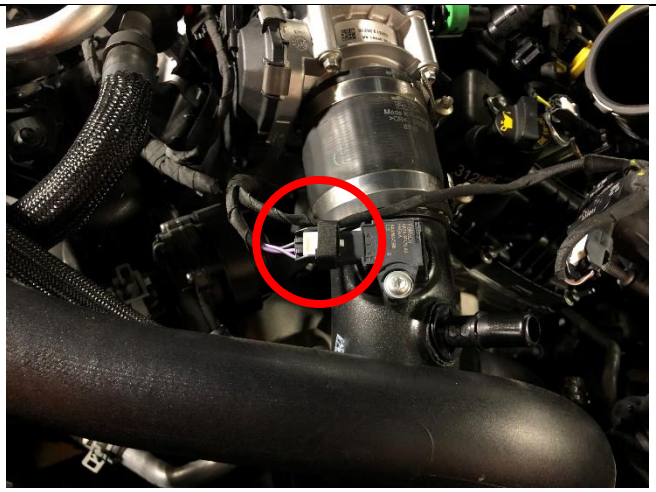


Figure 14

15. Using a 7 mm socket loosen the hose clamp connecting the charge pipe to the throttle body.
Reassembly Torque: 5 Nm (41 in-lbs)

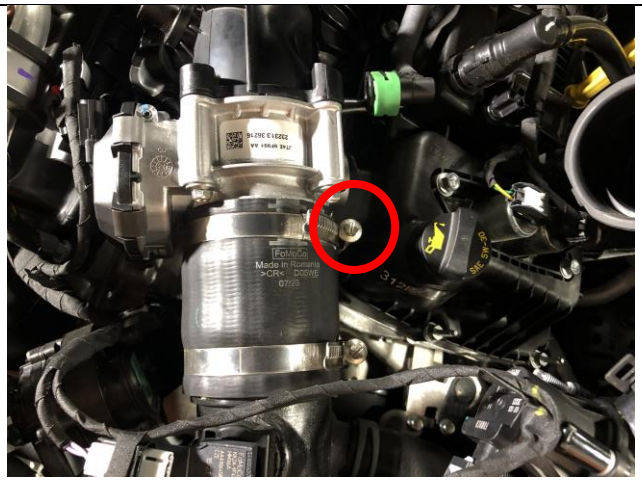


Figure 15

16. Using a trim removal tool pry up on the retaining clip mounting the engine wire harness to the valve cover.

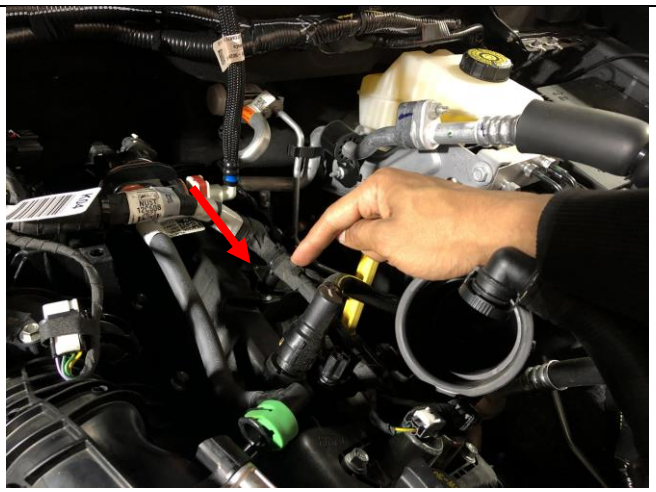


Figure 16

17. Using an 8 mm socket remove the charge pipe bracket bolt. This bolt is located in-between two coolant hoses in front of the idler pulley. It may be difficult to see.

    Reassembly Torque: 8 Nm (71 in-lbs)

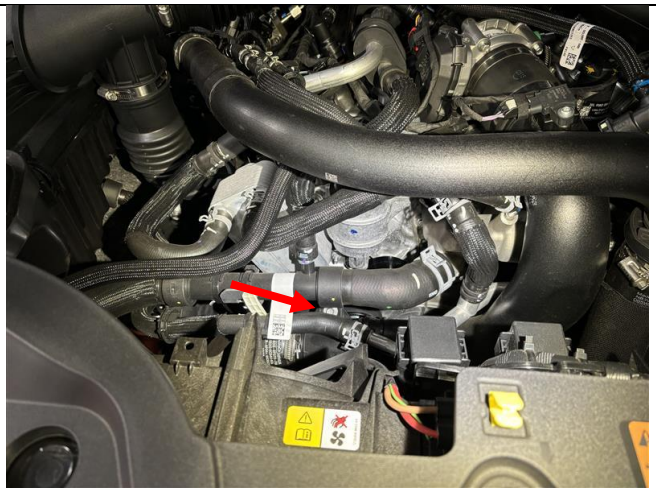


Figure 17

18. *Figure 18* shows a close-up of the bolt.

Figure 18

19. Pull the charge pipe off the throttle body.

Figure 19

20. Use a trim removal tool to pry up on the two retaining clips mounting the fuel injector harness to the back of the intake manifold.

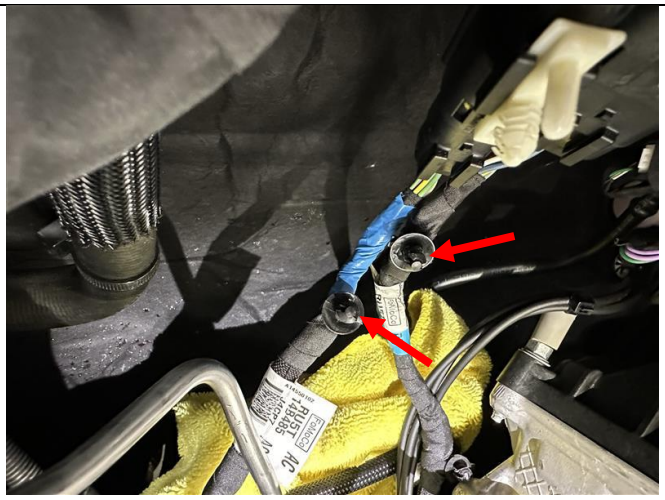


Figure 20

21. Using an 8 mm socket remove the 8 bolts mounting the intake manifold to the cylinder heads. *Figure 21* shows the location of the front 4 bolts, while *Figure 22* shows the rear 4 bolts.

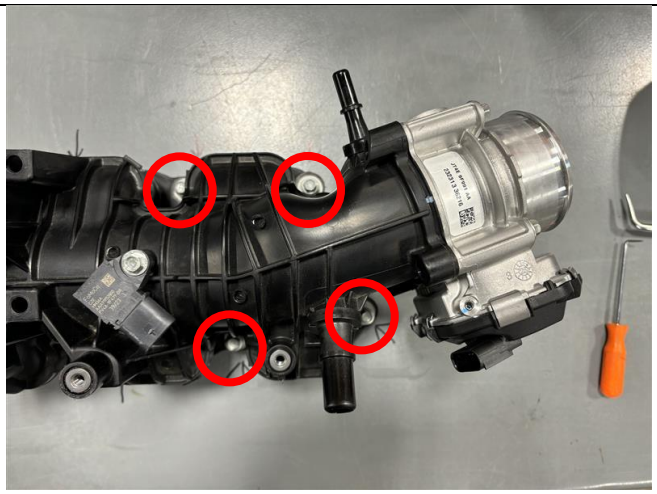


Figure 21

22. *Figure 22* shows the location of the 4 rear intake manifold bolts.

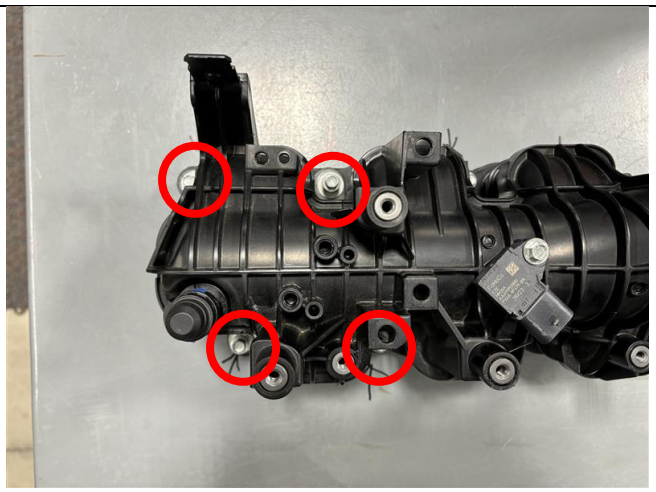


Figure 22

23. When reinstalling the intake manifold tighten the bolts in 2 stages.

    Stage 1: Bolts 1 through 8 in sequence:
    5 Nm (44 in-lbs)

    Stage 2: Bolts 8 through 1 in reverse sequence:
    10 Nm (88 in-lbs)

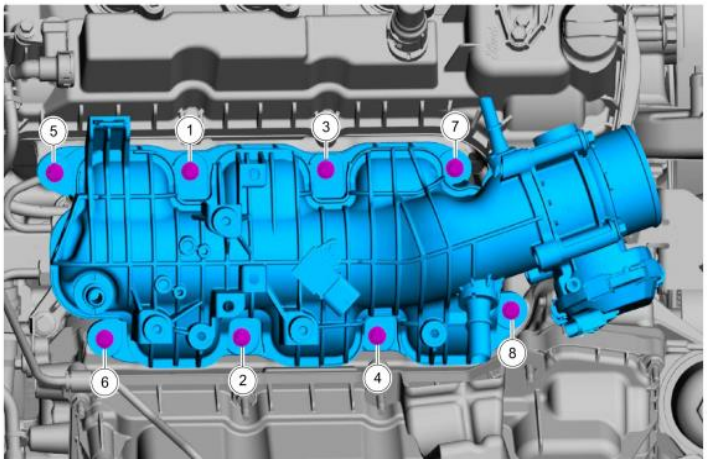


Figure 23

24. Use a trim removal tool to remove the wire harness retainer clip shown in *Figure 24* from the sound damping foam on top of the high-pressure fuel pump.

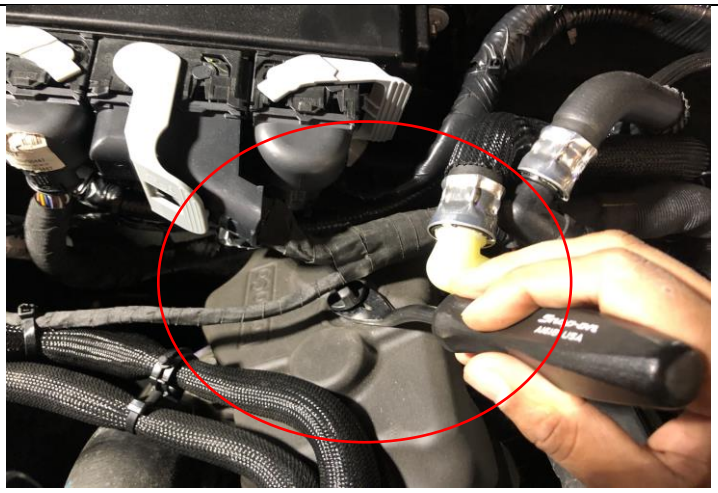


Figure 24

25. Remove the sound damping foam by pulling up and out.

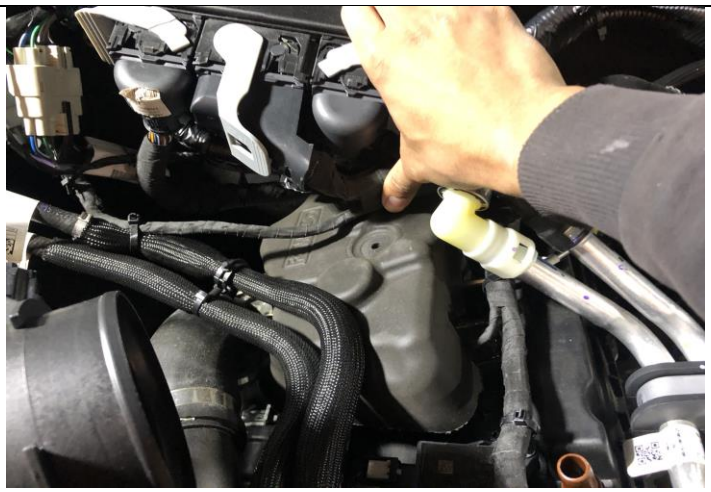


Figure 25

26. Using a 10 mm socket remove the fasteners highlighted in *Figure 26* that secure the top of the bracket to the pump studs. These will not be reused.

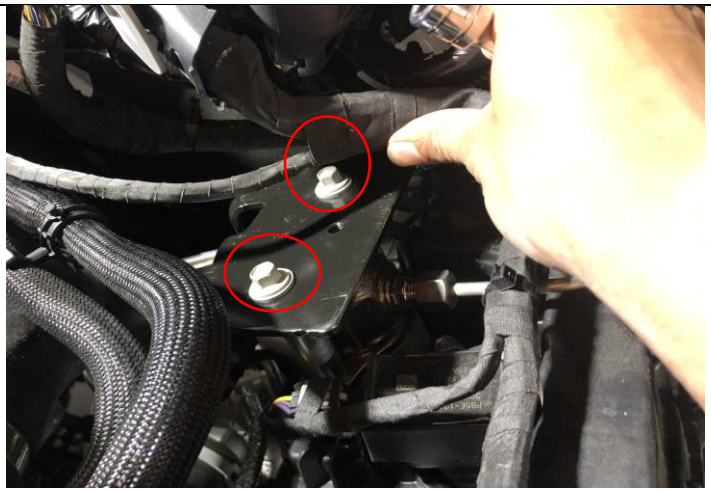


Figure 26

27. Using a 10 mm socket remove the bolt going into the side of the high-pressure fuel pump highlighted in *Figure 27* to gain access to the high-pressure fuel pump.

Figure 27

28. Lift off the high-pressure fuel pump cover to expose the high-pressure fuel pump.

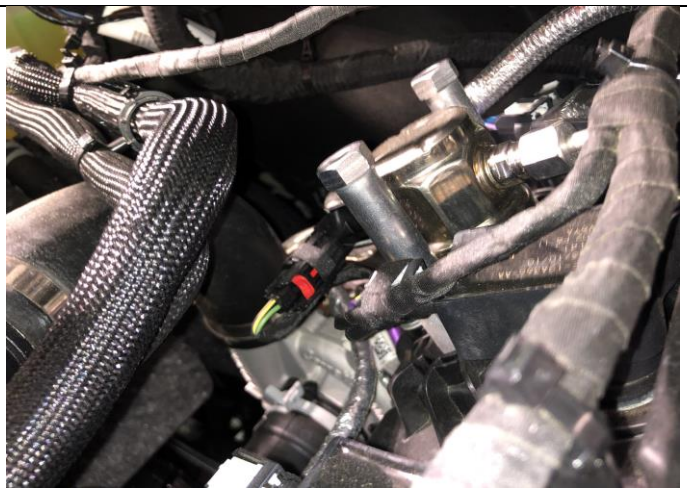


Figure 28

29. Disconnect the fuel pump electrical connector by sliding the red locking tab out and squeezing the retainer to pull the connector off the pump.

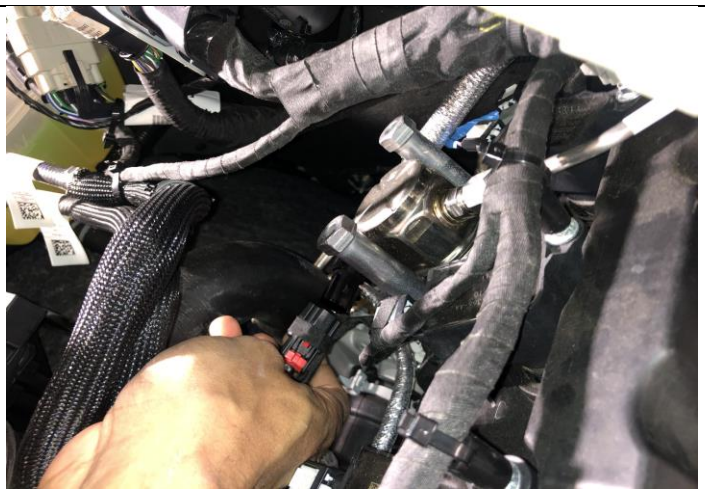


Figure 29

30. Remove the low-pressure supply line by pulling the blue retainer clip out of its seated location and sliding the fuel line off the pump inlet. Make sure to have absorbent towels wrapped around the fitting to reduce fuel spray.

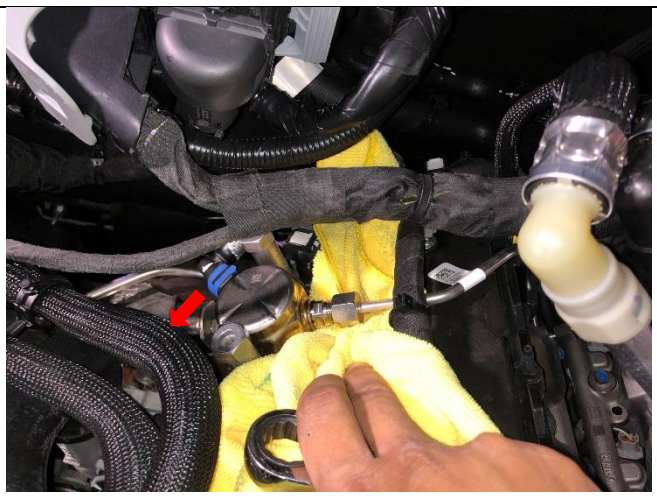


Figure 30

31. *Figure 31* displays the quick connect low-pressure fuel line once removed.

Figure 31

32. Use a 17 mm open-end wrench to remove the high-pressure fuel line connection at high-pressure fuel pump.

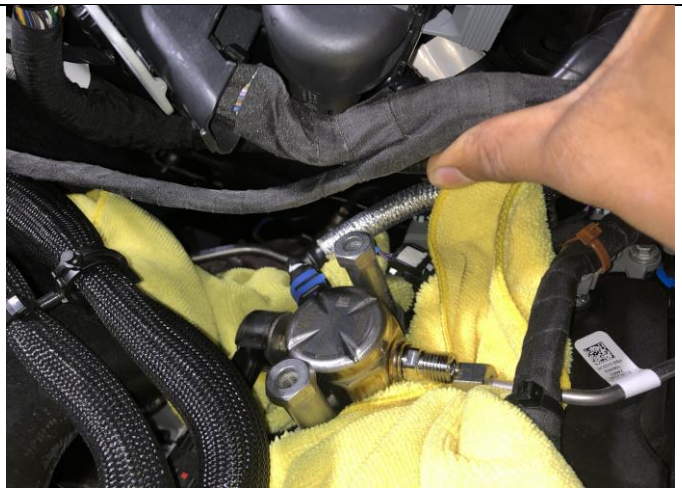


Figure 32

33. Use a 17 mm open-end wrench to remove the high-pressure fuel line at the fuel rail. Make sure to use absorbent towels to absorb any spilled fuel.

Figure 33

34. Use a 10 mm deep socket to remove the highlighted nut securing the high-pressure to the valve cover. The high-pressure fuel line will not be reused.

Figure 34

35. Use an 18 mm socket to remove the bolts that secure the high-pressure fuel pump to the cylinder head, alternating between each bolt 1-2 revolutions at a time to avoid damage to the high-pressure fuel pump or pump bore due to side loading.

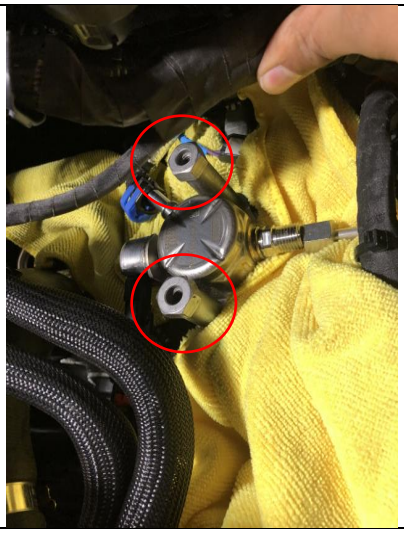


Figure 35

36. Cap the inlet and outlet of the high-pressure fuel pump once it is removed to prevent debris from entering the pump during storage.

On high mileage vehicles remove and inspect the pump follower from the bore and check the roller on the follower for signs of extreme wear and or needle bearing failure. Check the follower bore, paying extra attention to the portion highlighted in *Figure 36*, for signs of excessive wear grooves or burn marks while the follower is removed. If excessive wear is found replace the high-pressure fuel pump follower.

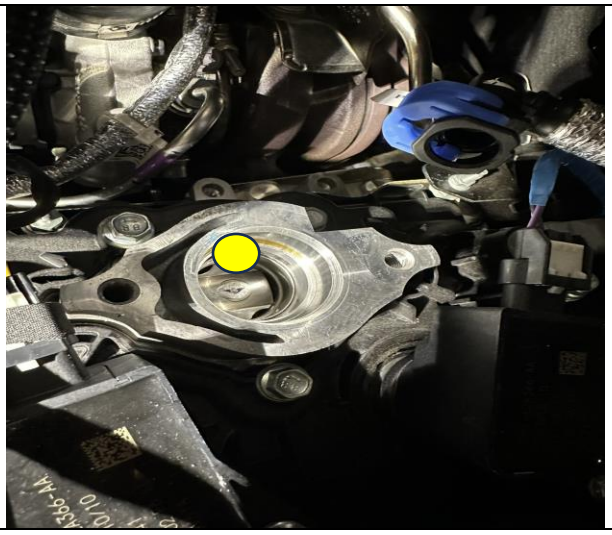


Figure 36

37. Install the Nostrum flange, O-ring side down and seated against the cylinder head, using the bore centering tool provided to correctly position the new flange against the head. Use a 5 mm Allen socket adapter to thread the provided M8 bolts into the cylinder head. Torque the bolts to **20 Nm +45 degrees** and remove the bore centering tool.

Figure 37

38. Ensure the preinstalled O-ring on the high-pressure fuel pump is properly seated. Lubricate the O-ring with clean engine oil and place the pump into the flange.

Figure 38

39. Using a 5 mm Allen socket adapter begin hand threading the provided M6 bolts, alternating from side to side 1-2 revolutions at a time to avoid side loading the pump until it is fully seated on the flange.

Figure 39

40. Once the high-pressure fuel pump is fully seated to the flange and both bolts are hand tight use a 5 mm Allen socket adapter to torque both bolts to **14 Nm (10 ft-lbs)**.

Figure 40

41. Install the provided high-pressure fuel line, paying attention to the orientation so that it aligns with both the high-pressure fuel pump and the fuel rail, making sure the bracket is properly aligned with the valve cover. Secure the bracket utilizing the provided nut. Use a 10 mm deep well socket to torque the nut to **10 Nm (7 ft-lbs).**

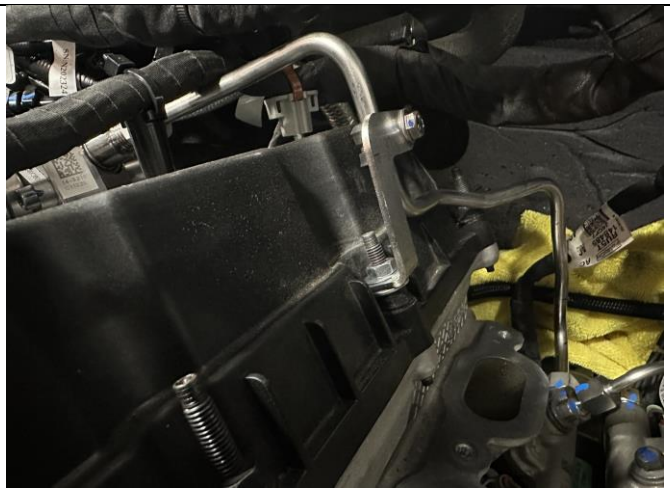


Figure 41

42. Align the upper side of the high-pressure line to the high-pressure fuel pump outlet making sure the line is as concentric and straight to the pump fitting as possible. Begin hand threading the nut onto the fitting until hand tight, the nut should thread on smoothly and easily if everything is properly aligned.

Figure 42

43. Align and make sure the lower portion of the high-pressure line is seated and straight into the fuel rail, then begin hand threading the nut onto the fuel rail, the nut should thread on smoothly and easily if everything is properly aligned.

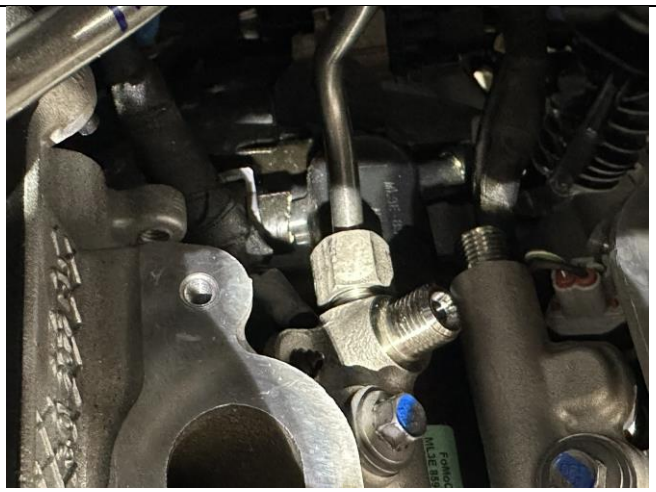


Figure 43

44. Once the nut is hand tight at the rail use an 11/16th crow's foot to torque the nut at the high-pressure fuel pump to **33 Nm (24 ft-lbs)**.

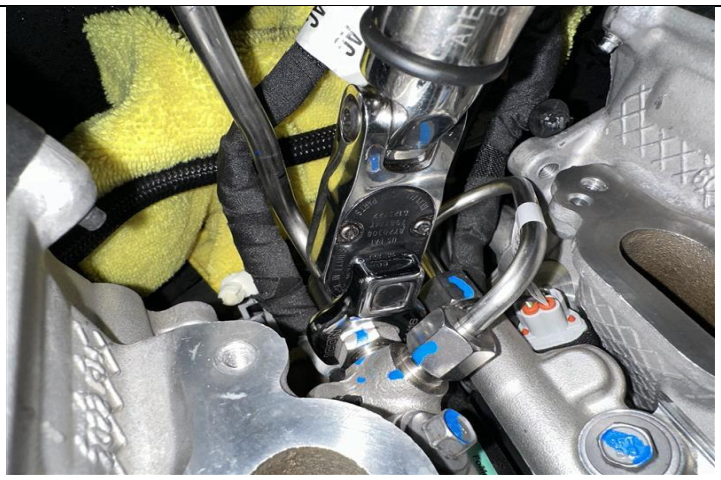


Figure 44

45. Once the nut at the high-pressure fuel pump is hand tight, use an 11/16th crow's foot to torque the nut at the fuel rail to **33 Nm (24 ft-lbs)**.

Figure 45

Figure 46

46. Connect the pump side of the adapter to the pump solenoid first. A click will be felt and heard when the connector is fully seated.

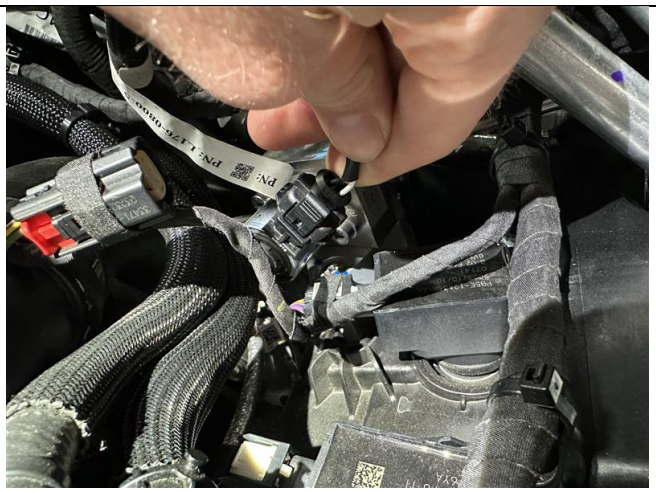


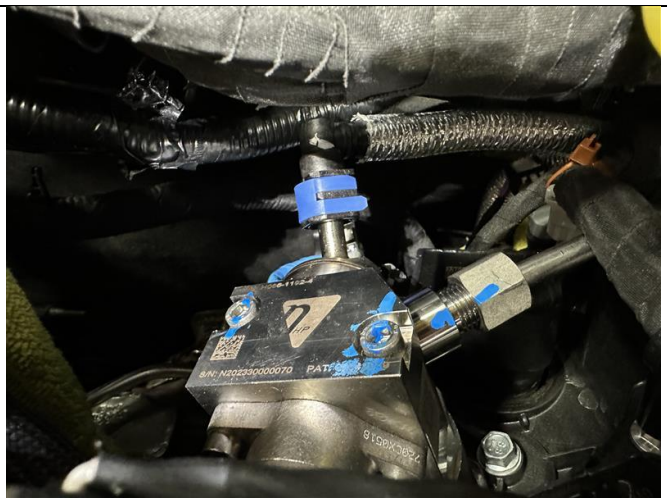
Figure 47

47. Connect the engine harness to the other side of the pump adapter. A firm click will be felt and heard when the connector is fully seated. Make sure to press the red locking tab back into its locked position.

Figure 48

48. Slide the factory low-pressure supply line onto the low-pressure inlet of the high-pressure fuel pump until it won't slide down any further.

Figure 49

49. Lock the blue tab back into place to secure the line to the high-pressure fuel pump inlet. Give the fitting a gentle tug to make sure it is fully seated and locked.	
	Figure 50
50. Once the Nostrum pump and fuel line are installed, reinstallation of all remaining components can begin. Follow the steps of disassembly listed above in reverse to re-install components. Follow all torque specs that are included in each step where applicable. If a torque spec is not included in a step where it seems applicable assume snug fit with a wrench or socket wrench.	
	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
1.0	Initial Release	8/14/2024