

# MAGNUSON

## SUPERCHARGERS

### 2021-2025 Ford F150 Installation Manual

**Only for 5.0L 4-Valve Engine with Automatic Transmission and Single alternator.**



**\* PREMIUM GASOLINE FUEL REQUIRED \***



#### ATTENTION!

**Your MAGNUSON SUPERCHARGER kit  
is sensitive to corrosion!**

**Use only the vehicle manufacturer  
recommended coolant for your engine in  
the intercooler system as well.**

Magnuson Products LLC  
1990 Knoll Drive, Bldg A, Ventura, CA 93003  
(805) 642-8833 phone  
[magnusonsuperchargers.com](http://magnusonsuperchargers.com)

**Important Note:** Before installing this kit, please read through the installation procedure and verify that all items are present.

The Magnuson calibration included with this kit is intended to work on stock vehicle configurations. Magnuson will not support any wheel/tire or axle combination outside of the standard Ford options.

Premium fuel (91 octane or higher) is required to prevent “spark-knock” or detonation under certain operating conditions. Drain the vehicle fuel tank and fill the vehicle with premium fuel prior to supercharger installation.

**Spark Plugs required (Ford Performance M-12405-50VDE)**  
**\*IMPORTANT: Spark plugs must be changed every 25,000 miles**  
**5W50 FULL SYNTHETIC motor oil REQUIRED**

Motorcraft Yellow Coolant (PN VC-13DL-G)

#### **LIMIT OF LIABILITY STATEMENT**

The information contained in this publication was accurate and in effect at the time the publication was approved for printing and is subject to change without notice or liability. Magnuson Superchargers reserves the right to revise the information presented herein or to discontinue the production of parts described at any time.

#### **SAFETY PRECAUTIONS**

**STOP! CAREFULLY READ THE IMPORTANT SAFETY PRECAUTIONS and WARNINGS BEFORE PROCEEDING WITH THE INSTALLATION!**

Appropriate disassembly, assembly methods and procedures are essential to ensure the personal safety of the individual performing the kit installation. Improper installation due to the failure to correctly follow these instructions could cause personal injury or death. Read each step of the installation manual carefully before starting the installation.

- Always wear safety glasses for eye protection.
- Place ignition switch in the OFF position.
- Disconnect the battery, and insulate the connections to prevent an electrical spark.
- Always apply the parking brake when working on a vehicle.
- Block the front and rear tire surface to prevent unexpected vehicle movement.
- If working with a lift, always consult vehicle manual for correct lifting specifications.
- Operate the engine only in well-ventilated areas to avoid exposure to carbon monoxide.
- Do not smoke or use flammable items near or around the fuel system.
- Use chemicals and cleaners in well-ventilated areas.
- Batteries produce explosive gases, which can cause personal injury. Therefore, do not allow flames, sparks or flammable substances to come near the battery.
- Keep hands and any other objects away from the radiator fan blades.

### **SAFETY PRECAUTIONS CONTINUED**

- Keep yourself and your clothing away from moving parts when the engine is running.
- Do not wear loose clothing or jewelry that can get caught in rotating parts or scratch surface finishes.
- Allow the engine, cooling system, brakes and exhaust to cool before working on a vehicle. **WORK SAFELY!** Perform this installation on a good clean level surface for maximum safety and with the engine turned off.

### **TOOLS REQUIRED**

- **Safety glasses**
- **Metric socket set in short and deep variants**
- **10mm flex socket for RH front SC housing fastener**
- **5mm and 6mm Allen sockets**
- **1/4 and 3/8 drive ratchets + various length extensions**
- **Constant tension clamp pliers**
- **Die grinder and carbide bit for aluminum**
- **Fork tool for fir tree connections on wiring harness**
- **Coolant (consult your owner's manual for the correct type). The same coolant can be used for your intercooler system.**
- **Vacuum filling device for your coolant system**
- **1/4" and 3/8" drive Torque Wrenches (in-lb. and ft-lb.)**
- **Heat gun for shrinking Gates hose clamps**
- **Drain pan for coolant**
- **Blue Loctite (242 or 243)**
- **Brake Cleaner**

## PRE-INSTALLATION CHECKLIST

Before installing your Magnuson Supercharger Kit, complete the following checklist.

1. **Verify Condition of Vehicle:** Before the supercharger kit is installed, ensure the engine runs smoothly and that the factory check engine light (CEL) is OFF.  
This product is intended for use only on **STOCK, UNMODIFIED, WELL-MAINTAINED** engines. Installation on a worn-out or modified engine is not recommended and not supported. High mileage-based vehicles (100k+) should be well maintained and serviced, and Magnuson recommends changing the fuel pump on high mileage vehicles to ensure adequate fuel pressure can be maintained at all times. Poor performing fuel pumps cannot supply the required fuel will result in a lean condition that will damage your engine.
2. Make sure your work area and the under-hood area are free from debris. This supercharger must not be subjected to contamination by dirt or any type of foreign material. Tape off the intake ports on the cylinder heads as soon as you have removed the factory intake to avoid foreign material, tools or other debris from entering the engine.
3. Fuel in the system remains under high pressure even when the engine is not running. Before working on or disconnecting any of the fuel lines or fuel system components, the fuel system pressure must be relieved. Failure to do so can result in personal injury. Do not smoke or carry lighted tobacco or open flame of any type when working on or near any fuel-related components. Highly flammable mixtures are always present and can be ignited, resulting in personal injury.

### Contact Information:

**Magnuson Superchargers**  
1990 Knoll Drive, Bldg A  
Ventura, CA 93003

**Sales/Technical Support Line:** (805) 642-8833  
**Website:** [www.magnusonsuperchargers.com](http://www.magnusonsuperchargers.com)  
**Email:** [sales@magnusonsuperchargers.com](mailto:sales@magnusonsuperchargers.com)

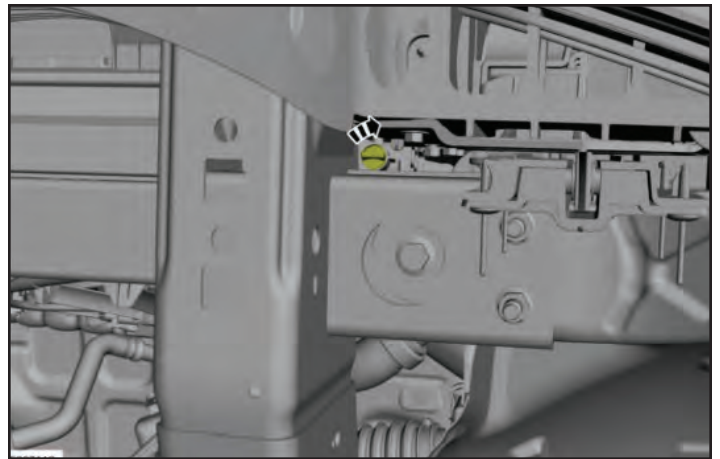
**Ensure that you have the ability to recalibrate the ECU for your vehicle prior to installing this supercharger.**

1. Disconnect the Fuel Pump Control Module electrical connector. This is located under the bed, near the spare tire.
2. Start the engine and allow it to idle until it stalls.
3. After the engine stalls, crank the engine for approximately 10 seconds to make sure the fuel injector supply manifold pressure has been relieved.
4. Turn the ignition switch to the OFF position.
5. Reconnect the fuel pump driver module.

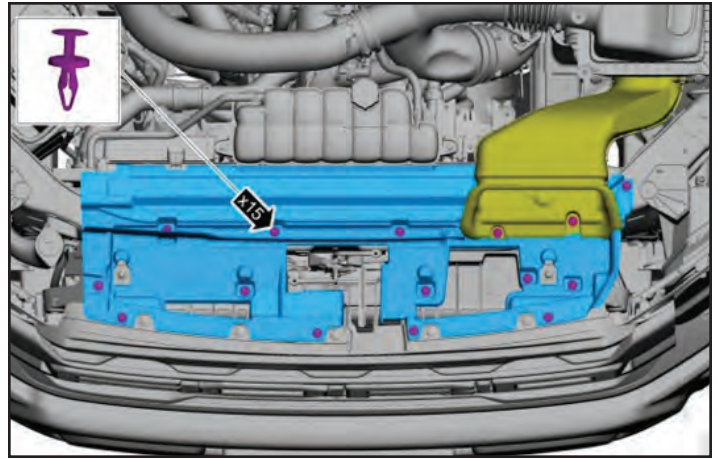


6. Locate the battery on the passenger side of vehicle. With an 10mm wrench disconnect the (-) negative battery cable. Secure the cable away from the battery so that it does not accidentally contact the terminal and make connection during the installation.

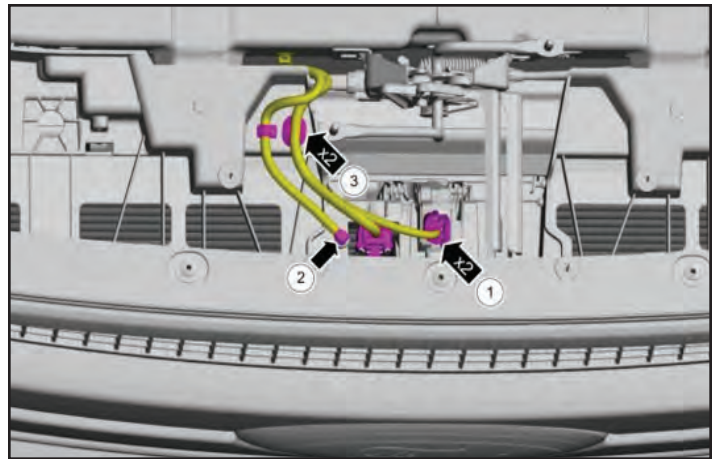
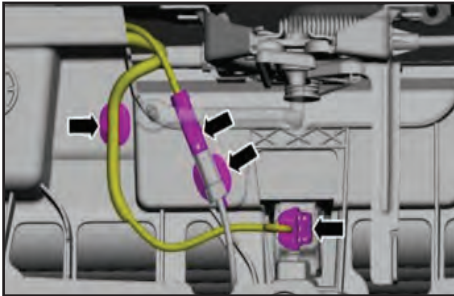
7. **IMPORTANT: Allow the engine to cool to room temperature before opening the radiator cap! Severe burns can occur from exposure to hot coolant. Open the cap slowly and proceed with caution.** Drain the coolant into a suitable container. Ensure the container is clean if you plan to re-use the coolant, otherwise dispose of used coolant as per your local regulations. Remove the radiator cap to vent the system. The drain petcock is located on the bottom, drivers' side of the radiator. Loosen the spigot and allow the coolant to drain into the container. Tip: A 3/8" ID hose can be slipped over the end of the petcock to minimize spillage during the draining process.



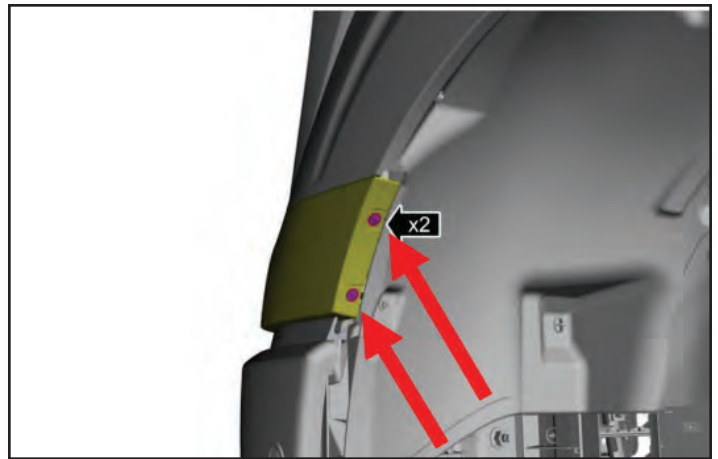
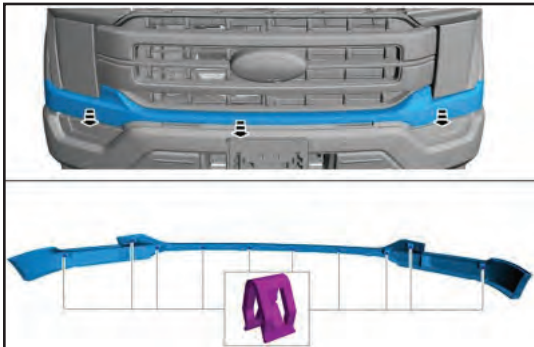
8. Prepare to remove the front grill assembly from the vehicle. Remove the factory plastic radiator shroud by pulling up on the center of the push pins to allow them to be removed. Use a flat head screwdriver to pry the center head up. These will all be reused. 2024MY vehicle shown. Other model years may vary slightly.



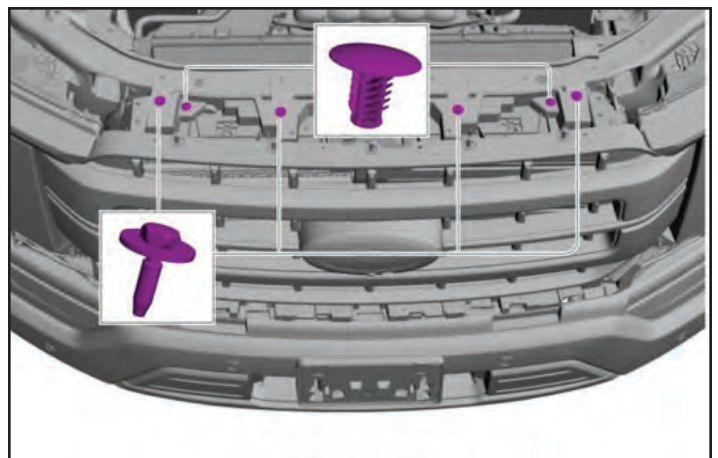
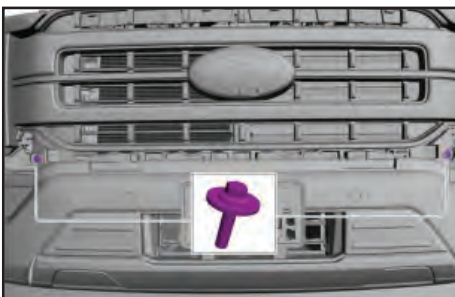
9. Disconnect the factory electrical connections from front grill area as applicable.



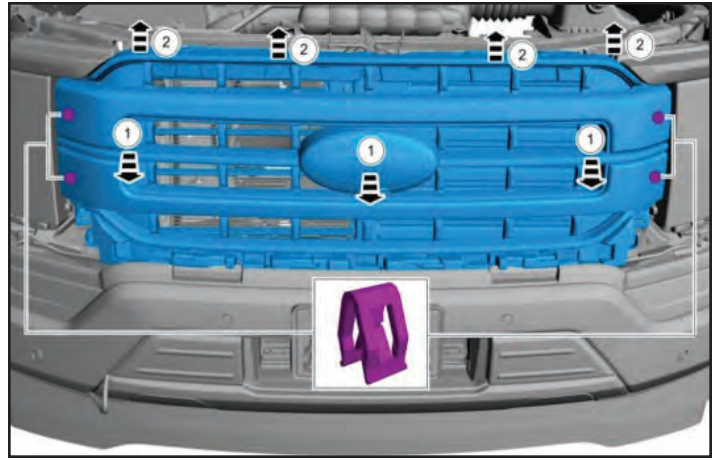
10. Remove the (2x per side) push pins from the lower grill shell in the inner fender area. Pull the lower grill shell section from the vehicle.



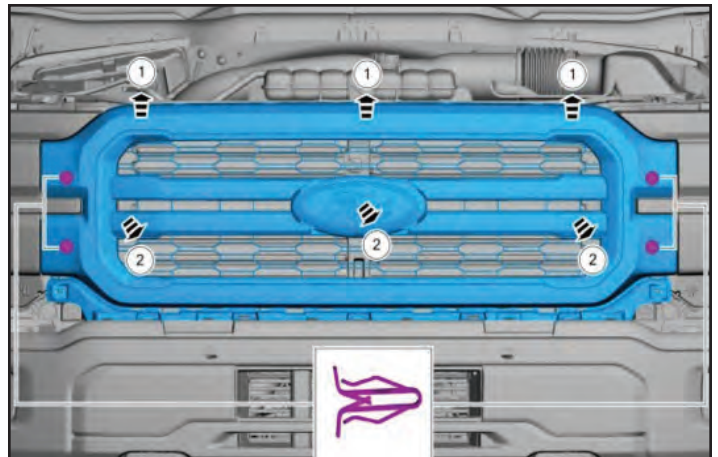
11. Remove the (4x) bolts using a 10mm socket and the (2) push pins from the upper side of the grill shell. Remove the (2x) lower bolts from the bottom side of the grill shell.



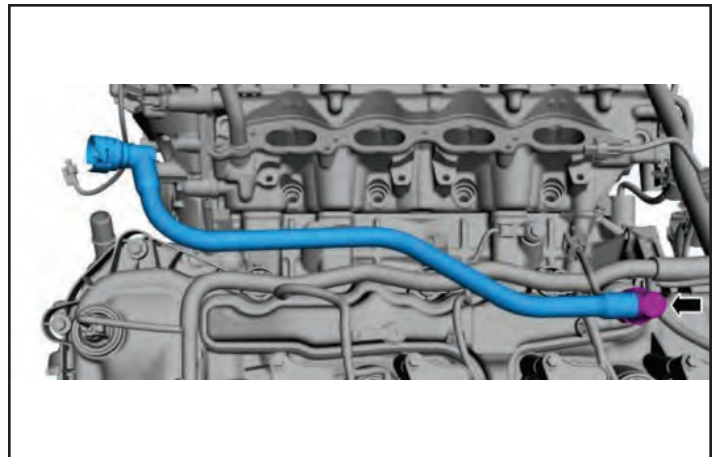
12. For pre-2024 vehicles, remove the (4x) pin-type retainer. Pull up and disengage the locating pins along the top of the grill. Pull forward on center of the grill to remove.



13. For 2024+ vehicles, pull up and disengage the locating pins along the top of the grill. Pull forward on center of the grill to remove. Set the grill assembly aside on a blanket for now.

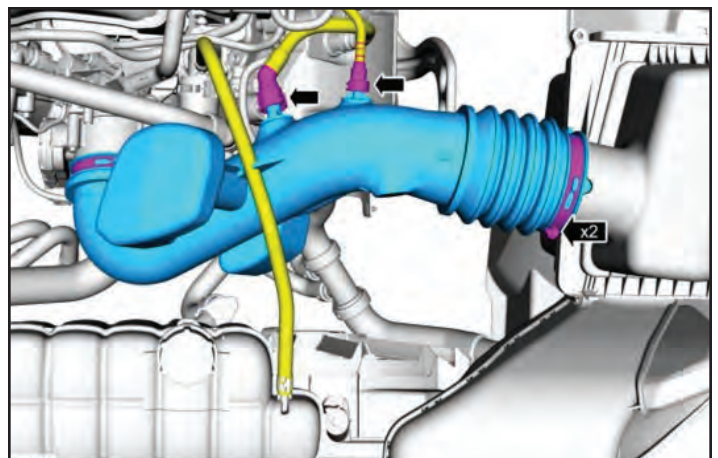


14. Remove the factory PCV fresh air quick-connect fitting from inlet tube. This tube will be used later.

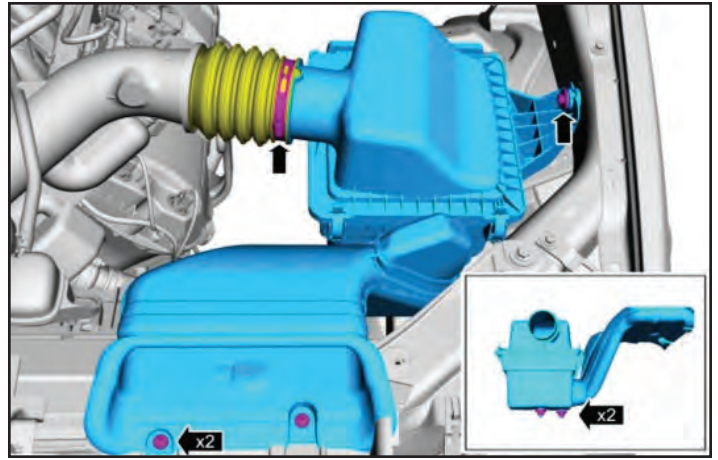


15. Disconnect the (2x) quick connect fittings from air inlet tube. Using a 9/32" nut driver, loosen the factory hose clamp securing the air inlet tube to the throttle body and airbox.

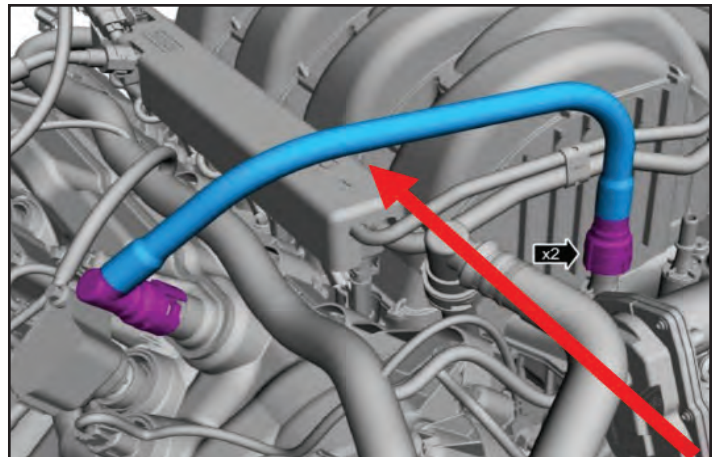
**If the ETC wires are taped to the throttle body, carefully cut the tape to free them.** Disconnect the electronic throttle electrical connector by pushing up on the safety lock and then squeezing the connector and pulling away.



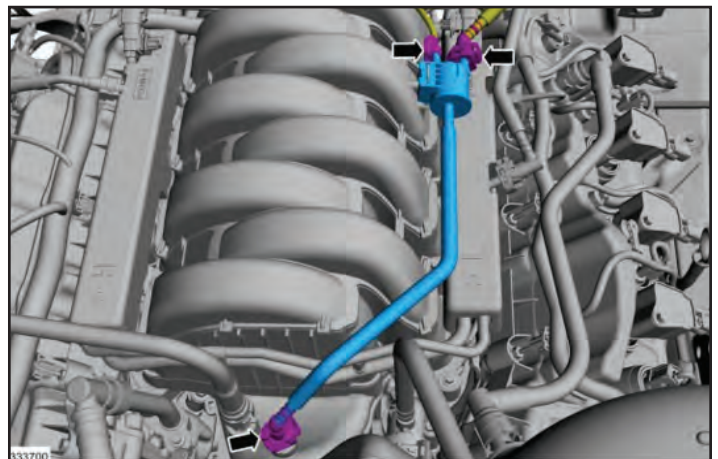
16. Using a 13mm socket, remove the (1x) factory fastener securing airbox to the fender. Using a panel puller or flat head screw driver, remove the (2x) push-pins from the factory air snorkel. Remove airbox from vehicle.



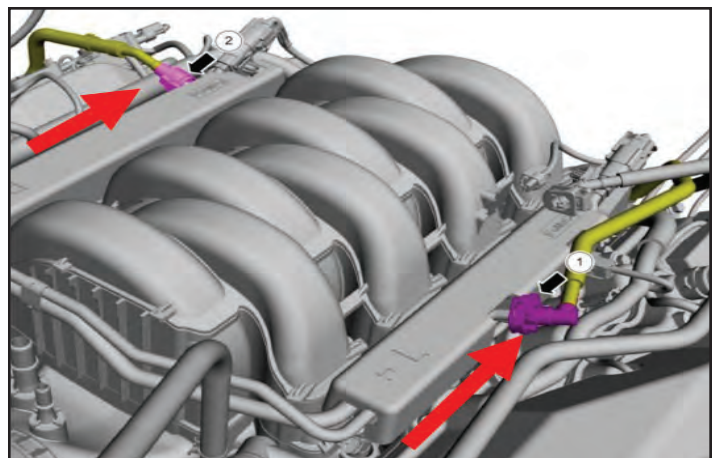
17. Remove the RH side valve cover PCV line from intake manifold and valve cover. This tube will be reused.



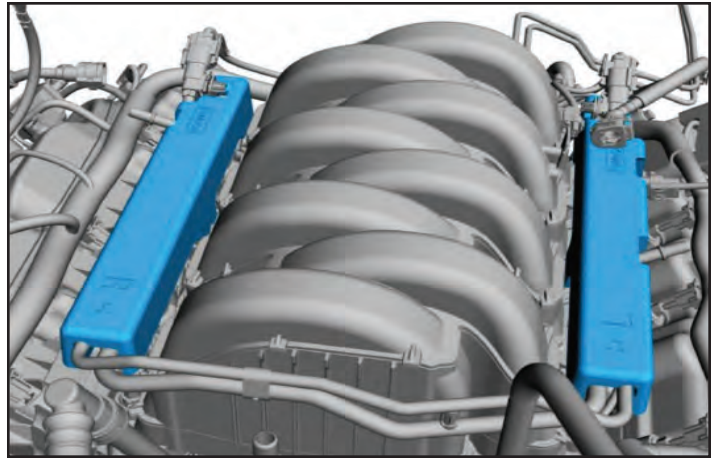
18. Disconnect the fuel EVAP solenoid electrical connector by squeezing locking tab and pulling away. Disconnect the EVAP solenoid quick connect fitting hose from the solenoid and from the intake manifold by releasing locking tab and pulling away.



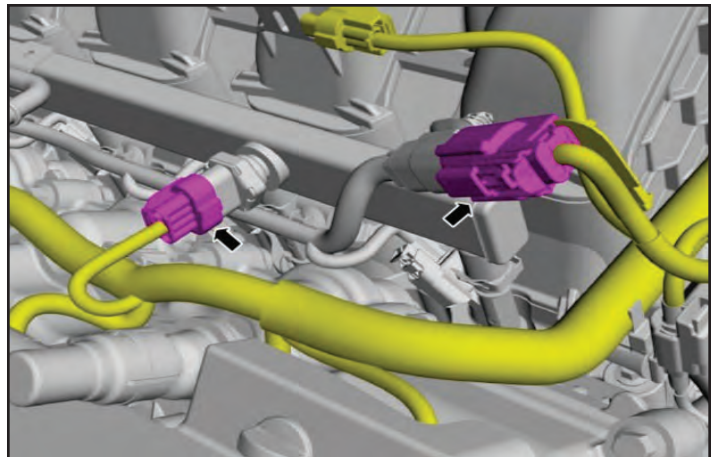
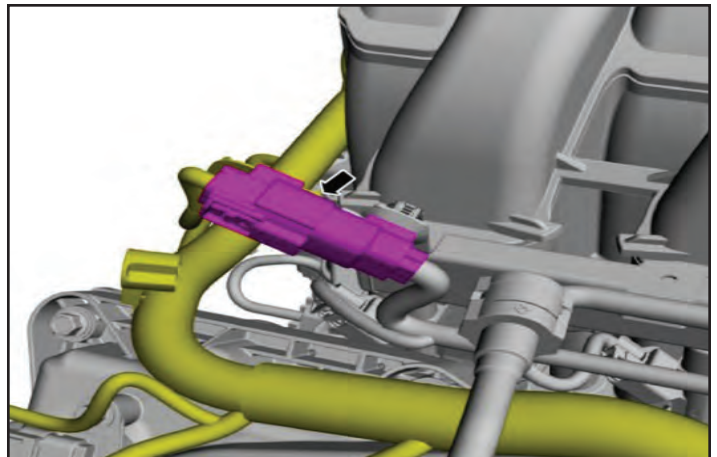
19. Carefully remove the factory fuel line by releasing the safety lock, then squeezing the connector and pulling back. The fuel system may still have pressure, use protective eyewear and multiple rags to catch any possible fuel leak. **NOTE: THIS FUEL LINE HAS A CHECK VALVE, DO NOT FLIP ORIENTATION. DO NOT REMOVE FROM DI PUMP TO ELIMINATE CONFUSION. 90- DEG. END ALWAYS CONNECTS TO FUEL FEED SUPPLY!**



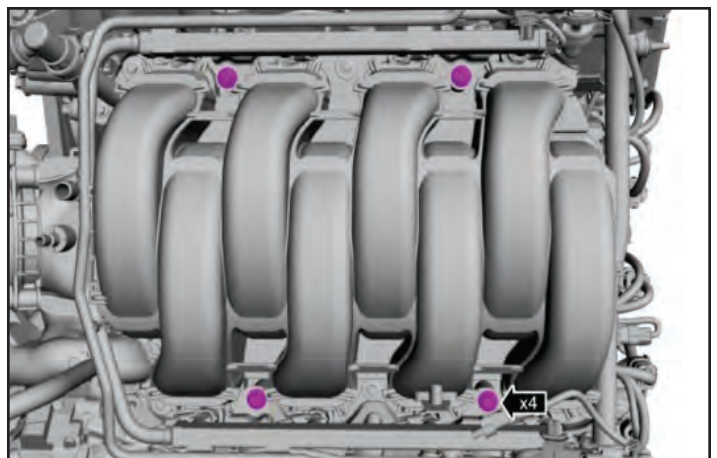
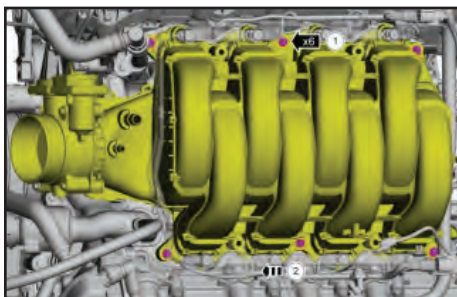
20. Remove the fuel rail foam insulation, these items will not be reused.



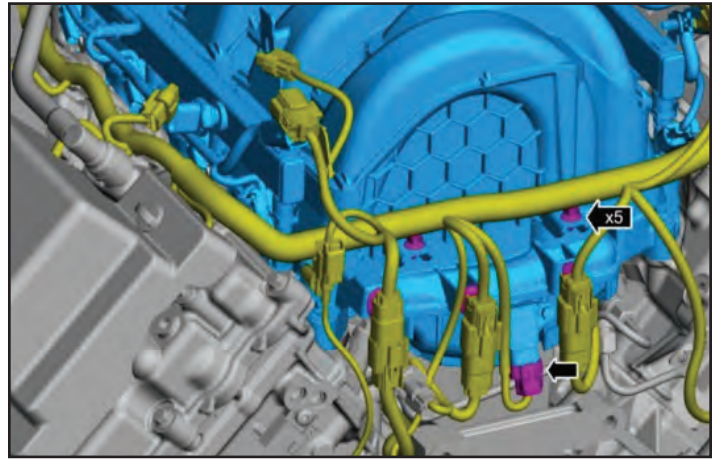
21. Disconnect the LH and RH port injector harness 6-way pigtails located at the back corners of the intake. Push the connectors out of the way. Remove the fuel pressure sensor electrical connector from the driver's side fuel rail by releasing the locking tab and squeezing the connector, then pulling away.



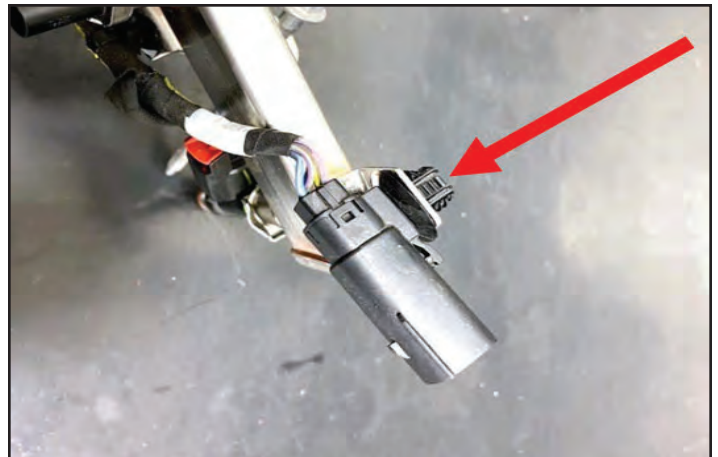
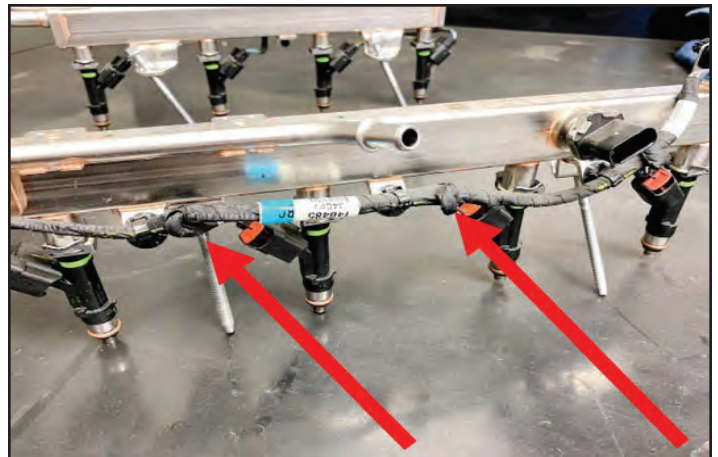
22. Loosen (4) fuel rail bolts using a 10mm socket then loosen (8) manifold to cylinder head bolts using an 8mm socket.



23. Use compressed air to remove any debris from the cylinder head, block and surrounding areas of the fuel rail and injectors. Lift up on the front of the intake and carefully slide it forward enough to gain access to the wiring harness retainers, and MAP sensor connector at the back of the intake. Use a forked tool to disconnect the retainers then cycle the lock and disconnect the MAP sensor connector. The intake can then be removed from the engine.



24. Disconnect (8) fuel injector harness connectors by cycling the locks then squeezing the connectors. Using side cutters, carefully remove the clips that secure the injector harness to the fuel rail. Use caution not to cut the wiring harness. These clips will not be reused. Disconnect the injector pigtails from the fuel rail at both corners. Mark the harnesses on the factory identification labels as LH and RH as they will be re-installed to the Magnuson supercharger in the same orientation and position in a later step.



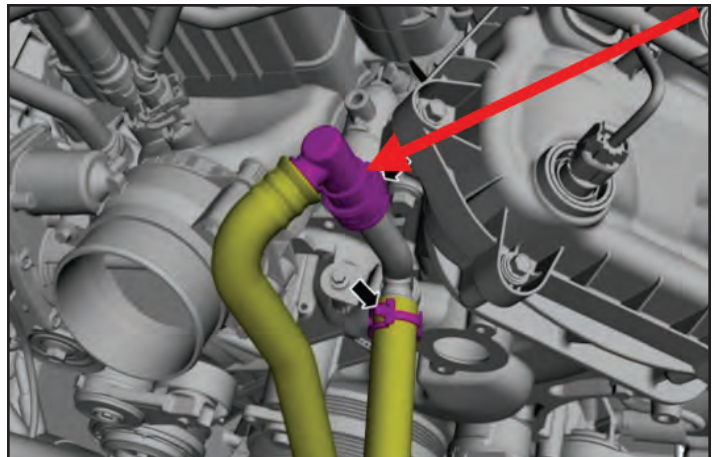
25. Clean the intake faces of both cylinder heads using a clean, lint-free rag and brake cleaner, ensuring nothing falls into the ports. Tape up the ports to keep foreign material from falling inside while you continue with installation of the kit.



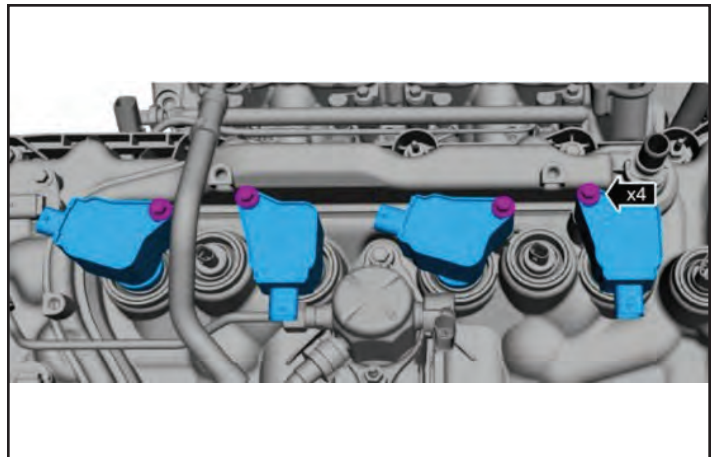
26. Disconnect the passenger side heater tube quick-connect fitting by squeezing and lifting up then remove the heater tube from the RH front corner of the engine to gain additional access for supercharger installation. Save the tube and fastener for re-installation later.



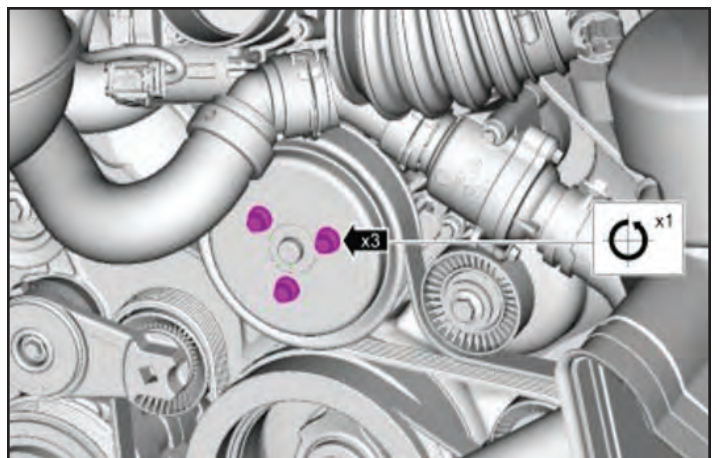
27. Disconnect the driver side heater tube quick-connect fitting by squeezing and lifting it upward.



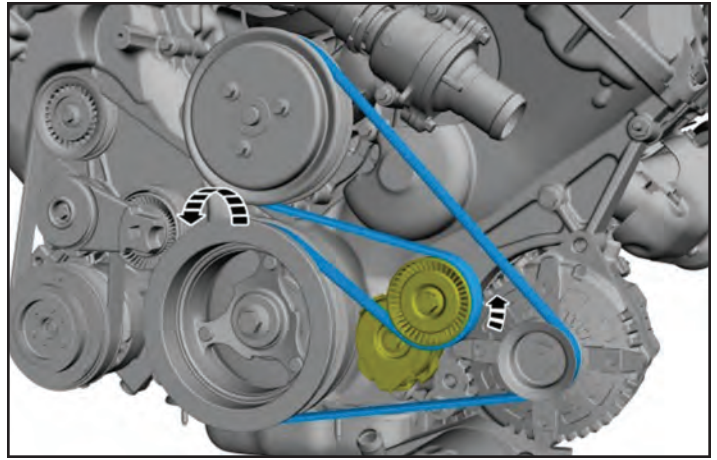
28. Disconnect the electrical connectors from all (8) ignition coils then remove all the coils from the engine. Select the revised Ford Performance M-12405-50VDE spark plugs from the kit. Verify the gap using a feeler gauge; the gap should be 0.032". If the gap needs to be adjusted, use the proper gapping tool to ensure you do not damage the fine electrode on the spark plug. Use the proper spark plug socket or a magnet to carefully lower the plugs into place so you do not damage them. Install the revised plugs and torque them to 11 ft-lbs. (or 128 in-lbs.). Reinstall the coils and torque the coil bolts to 97 in-lbs. Re-install the electrical connectors to all coils ensuring you cycle the locks. **\*\* IMPORTANT: Spark plugs MUST be changed every 25,000 miles \*\***



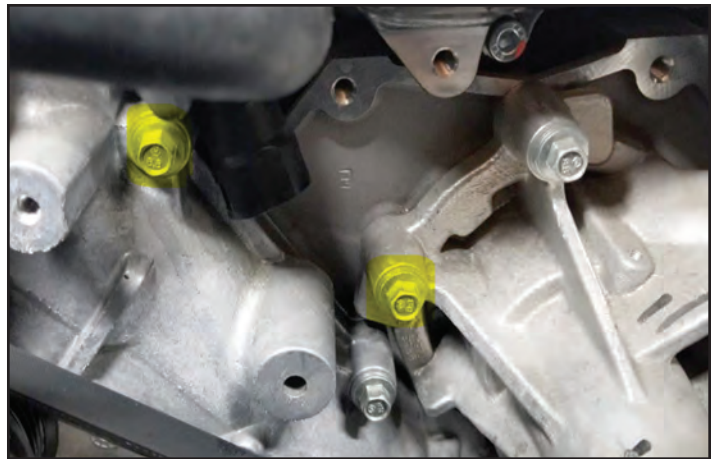
29. Loosen but do not remove the (3x) bolts securing the water pump pulley using a 10mm socket (while belt is on).



30. Remove the belt from the engine by using a 15mm socket on a ½" breaker bar and rotating the spring-loaded tensioner in a counter-clockwise direction. Remove the water pump pulley using a 10mm socket and set it aside as it will be reused.

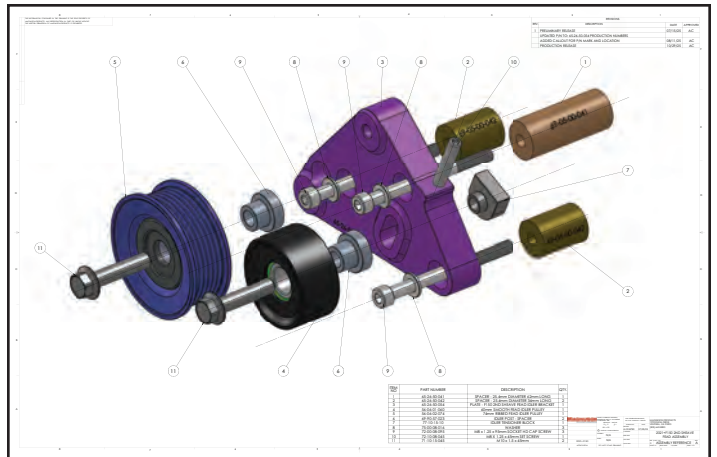


31. Using a 10mm socket, remove (2) factory fasteners from the highlighted locations. One secures the water pump, the other secures the front cover.

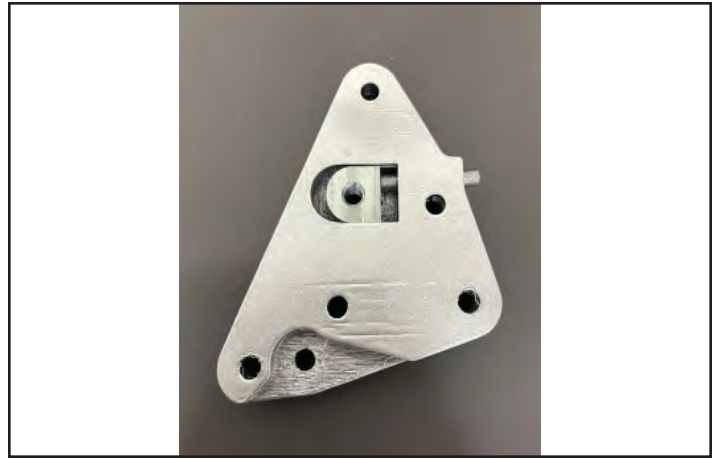


32. Select the following hardware from the kit as shown in the exploded view drawing below (Note: this slide is available full size in the Appendix at the back of this manual):

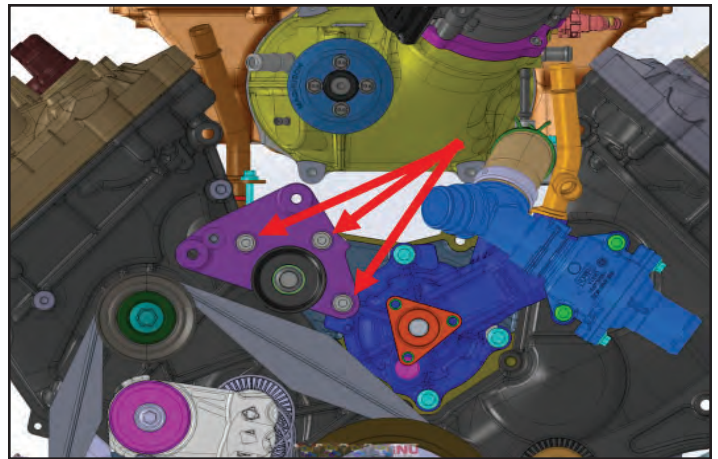
- (1) Idler Bracket Plate PN 65-26-50-054
- (2) 34mm long spacers PN 65-26-50-042
- (1) 62mm long spacer PN 65-26-50-041
- (1) Idler Pulley (60mm smooth) PN 56-06-01-060
- (1) Idler Post Spacer PN 69-90-57-023
- (1) Idler Tensioner Block 77-10-15-010
- (3) Washers PN 75-00-08-016
- (3) M8 X 95mm long socket head cap screw fasteners PN 72-00-08-095
- (1) M8 Set Screw PN 72-10-08-045
- (1) M10 X 45mm long fastener PN 71-10-15-045



33. Sub-assemble the smooth idler and its' related hardware to the billet bracket (Items 4, 6, 7 and 11). Apply blue Loctite to the bolt then thread it in all the way by hand until you are still able to slide the pulley sub-assembly back and forth in the slot. Apply blue Loctite to the set screw then thread it into the bracket. Looking from the back of the bracket, adjust the set screw depth so that it contacts the side of tensioner block and centers it in the middle of slot (see photo). Flip the sub-assembly around and tighten the idler bolt down with a ratchet and socket by hand to keep the pulley in this location. The bolt will be final torqued in a subsequent step after the bracket sub-assembly has been installed to the engine.



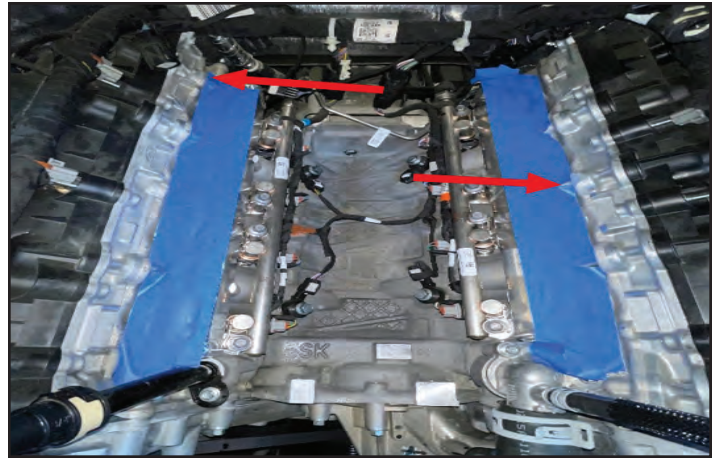
34. Sub-assemble three washers and the socket head cap screws (SHCS) through the bracket in the locations shown, then slip the spacers onto the fasteners facing the back of the bracket. Apply blue Loctite to all three cap screws then carefully install the bracket sub-assembly onto the engine as shown below. Run down then torque all three fasteners to 18 ft-lbs.



35. Select the ribbed idler pulley, M10 fastener and Idler Post Spacer (Items 5, 6 and 11 in the drawing) from the kit. Apply blue Loctite to the M10x45mm flange head bolt then install the ribbed pulley sub-assembly onto the billet bracket at the circled location shown. Torque BOTH the ribbed and the smooth pulley bolts to 40 ft-lb.



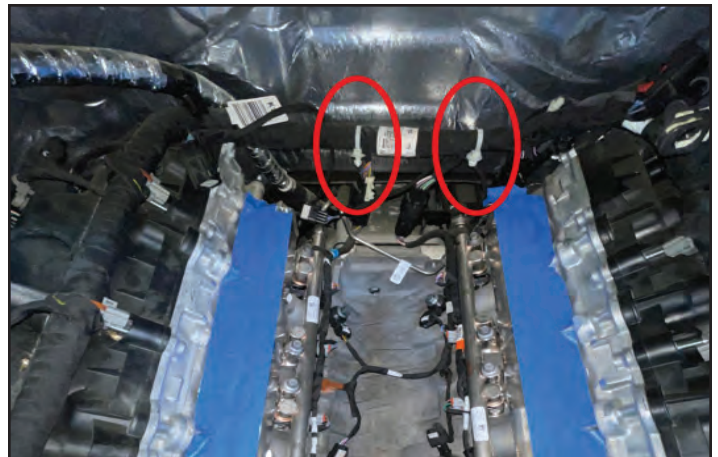
36. Using a die grinder, radius the casting bosses on the cylinder heads in the following 2 locations: LH (drivers side) middle and RH (passenger side) rear. A close up view of the modified casting boss is shown in the next step.



37. Here is a closeup of the casting bosses that need to be modified. This will provide additional clearance for the spacers and supercharger housing. Use a vacuum while grinding to minimize debris. Clean up any chips after you have finished the modification.



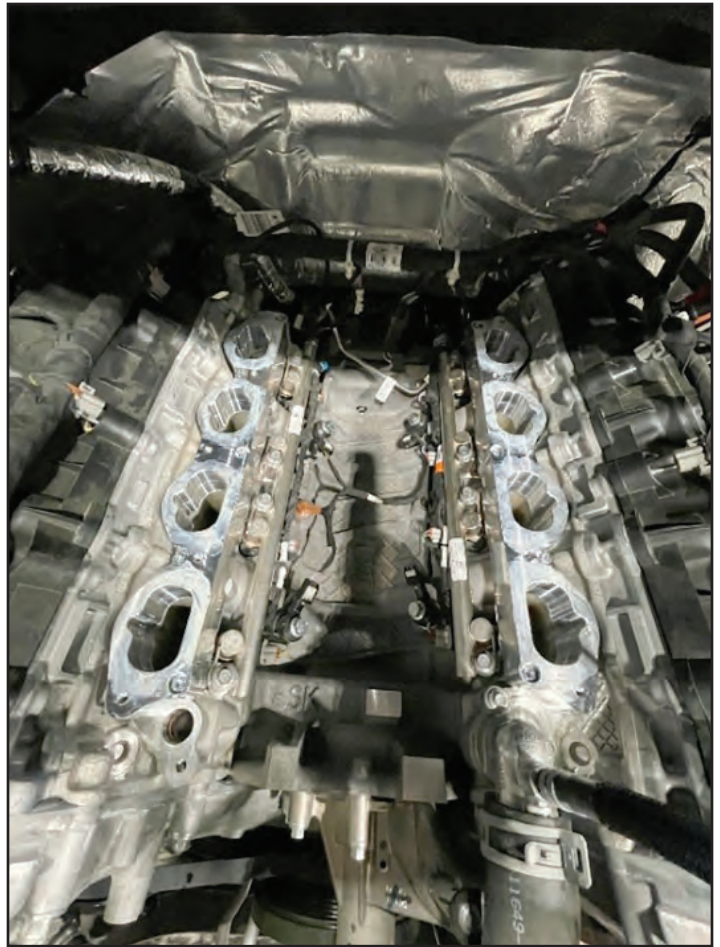
38. Trim two fir tree connectors off of the main wiring harness bundle at the back of the engine.



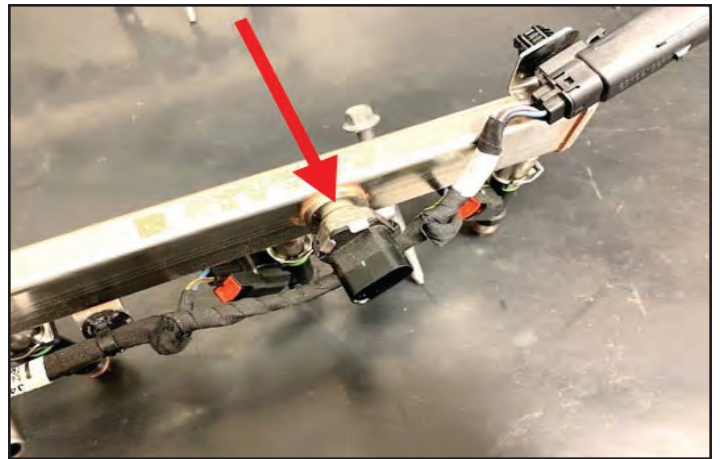
39. Select 4 billet intake spacers from the kit. Note that these parts are laser engraved on one end with their location (LH/RH Upper/Lower). Install the supplied intake gaskets into all 4 spacers, ensuring they are fully seated around each port.



40. Remove the tape from the intake ports on the engine and install the LH and RH LOWER spacers to the engine. (5) M6X20mm SHCS fasteners secure each spacer. Apply blue Loctite to all fasteners then hand-start them into the cylinder heads and run them down until they are just about to make contact with the spacer. Centering the spacer against the bolts will optimize the alignment of the spacers to the housing and make installation of the supercharger housing fasteners easier. When you are satisfied with the alignment, begin to tighten the SHCS starting from the center outward. Tighten the fasteners a turn at a time to compress the gaskets evenly and avoid bending the spacers. Once the spacers have made contact with the cylinder heads, then final torque the SHCS to 141 in-lbs. Repeat the process for the UPPER spacers. **Note: On some vehicles LH UPPER spacer contacts the middle cylinder head bolt boss and will prevent installation of the upper spacer bolts. Slight additional grinding of the bolt boss may be required. Mark the location on the head and grind as necessary. Re-apply tape to the LH and RH spacers to keep debris out of the engine whenever grinding.**



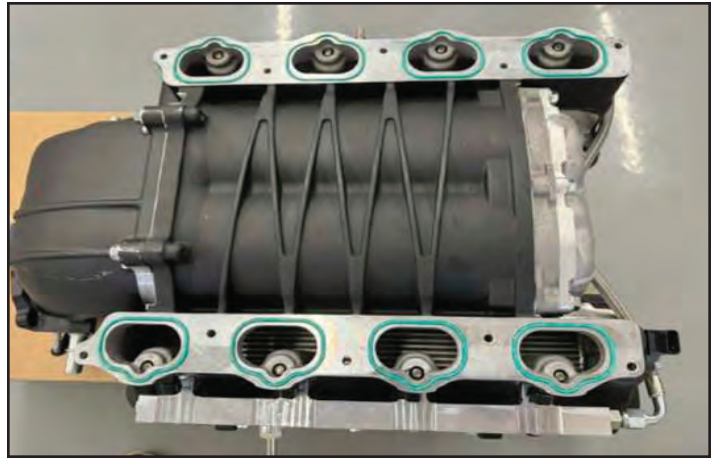
41. Harvest the following hardware from your factory intake assembly: throttle body and bolts, throttle body gasket, fuel pressure sensor (see photo) and (8) seals from the intake ports. A 24mm deep socket is used to remove the fuel pressure sensor.



42. We will now begin to prepare the supercharger assembly for installation into the vehicle. **If the bypass hose has come pre-installed, remove it from the lower fitting at the supercharger inlet. Leave it connected to the bypass.** Remove the lid from your supercharger using a 10mm socket to loosen and remove all the fasteners. Set the lid and all the fasteners aside in a safe place. Cut the hardware bag that is zip tied to the fuel rail and set it aside.



43. Flip the supercharger housing over and install the (8) gaskets that were harvested from the factory intake into place on the supercharger. Ensure the gaskets are fully seated.



44. Select the following hardware from the bag that was zip tied to the fuel rail:  
(2) Fuel rail fittings with o-ring



45. Lubricate the o-ring on each fuel fitting with a small amount of Lubriplate grease found in the kit. Thread one fitting into each side of the fuel rail then torque the fittings 22 ft-lbs. (LH side shown, RH side similar).



46. Apply Blue Loctite to the sensor threads as shown below. Apply a lite amount of Lubriplate to the o-ring on the sensor. Torque the sensor to 53 in-lbs. (6 Nm). Then angle tighten the nut 25 degrees.



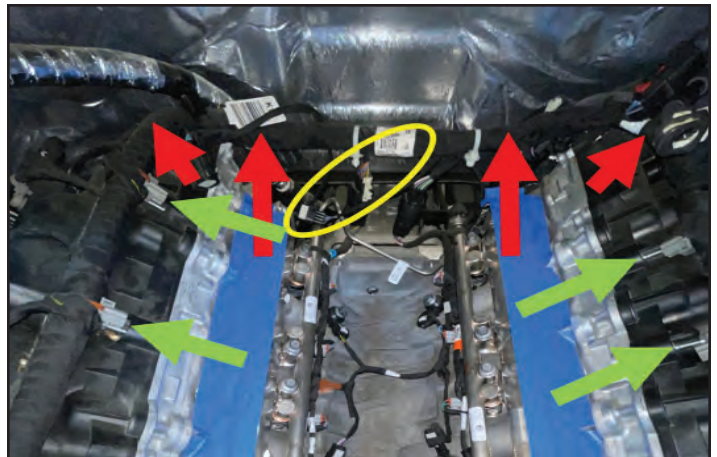
47. Select the factory LH and RH fuel injector harnesses that were previously removed and labelled. Orient them with the multi-pin connector facing toward the rear of the supercharger then connect them onto all (8) injectors ensuring they are fully seated. Cycle the locks on each injector.



48. Use a small pick or screwdriver to remove the fir tree connectors from the multi-pin connectors at the end of each fuel injector harness (RH side shown, LH side similar).



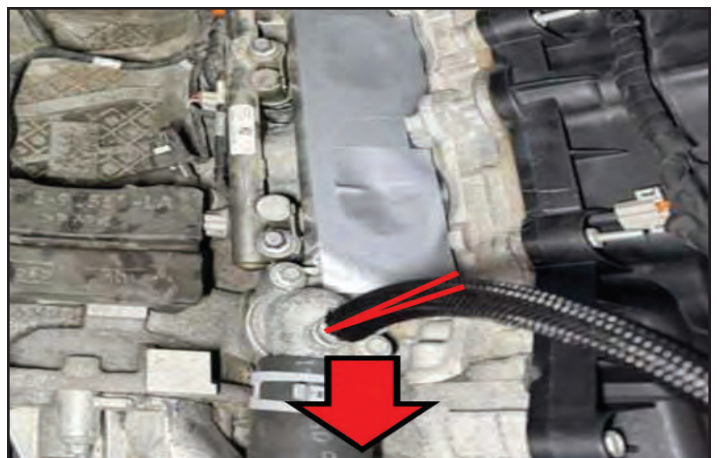
49. Ensure the main wiring harness bundle and any harness connectors are pushed rearward to allow sufficient space for the supercharger to be installed (red arrows). Note the location of the factory MAP sensor harness takeout as this will need to be installed to the sensor just prior to final placement of the supercharger. If the wiring harness pigtail is taped back to the MAP sensor hardshell connector, cut the tape to extend the length of this connection (yellow encircled area). In addition, lift up on the LH and RH main harness bundles to disconnect the grey plastic harness locators from the locating pins on the cam covers (green arrows).



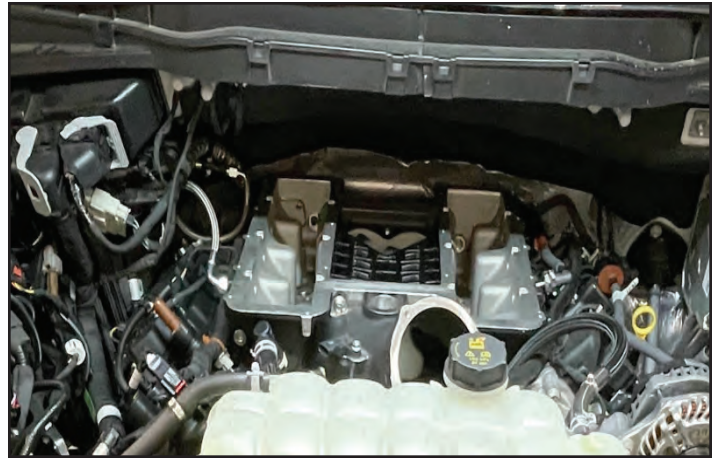
50. If your application has a small coolant bleed line as shown, remove the coolant hose from the bleed tube at the LH front of the engine.

Insert a deep socket with extension over the bleed hose and gently bend the tube a few degrees toward the front of the vehicle. This will provide additional clearance to the supercharger housing at this location.

Re-install the coolant hose onto the tube and secure it using the factory clamp.

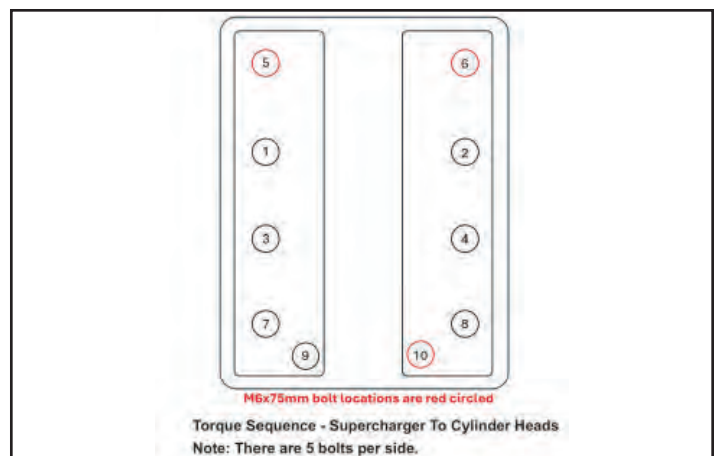


51. Prepare to install the supercharger housing onto the engine. It is recommended to place a heavy blanket or foam pad over the radiator cradle and coolant reservoir area so that you have a safe place to temporarily put the housing while preparing to lift the unit into place. Alternatively, an engine hoist can be used to slowly guide the housing into place. Remove any tape covering up the intake port spacers. A light coating of Lubriplate grease can be applied around all (8) ports on the billet spacers to minimize rolling the gaskets on the housing as you are positioning it into place. As the housing is nearing its' final location, reach back behind it and connect the MAP sensor harness to the sensor at the RH rear corner of the housing. Ensure the connector is fully seated then secure the lock on the connector. Lower the housing into place, aligning the ports to the billet adaptors. Ensure that the wiring harness or connectors are not being pinched by the housing assembly, as clearance is very tight on both sides. Ensure the housing sits flush against both banks and is not being held up by the harness or connectors.



52. Gather the following fasteners from the kit:  
 (3) M6x75mm fasteners  
 (7) M6x30mm fasteners

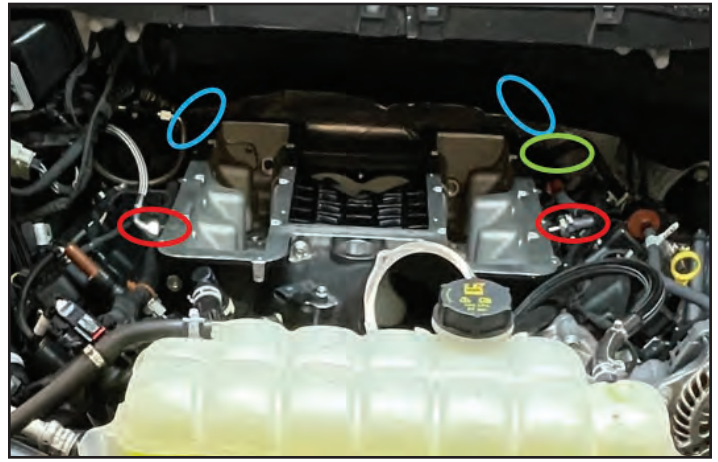
Apply blue Loctite to the fasteners, then carefully align the housing and hand-start all the fasteners only a few turns first before running any down. Tip: It is easiest to hand-start the fasteners at the back of the housing first (positions 5 and 6) since they are the hardest to reach. A 10mm flex socket is needed for the RH front fastener in position 9. Once all the fasteners have been hand-started, then proceed to run them down to zero torque in the sequence shown below. Pre-torque the fasteners to 44 in-lbs. then 88 in-lbs. then finally to 140 in-lbs, following the torque sequence shown here for each pass. There is a larger version of this diagram at the back of this manual.



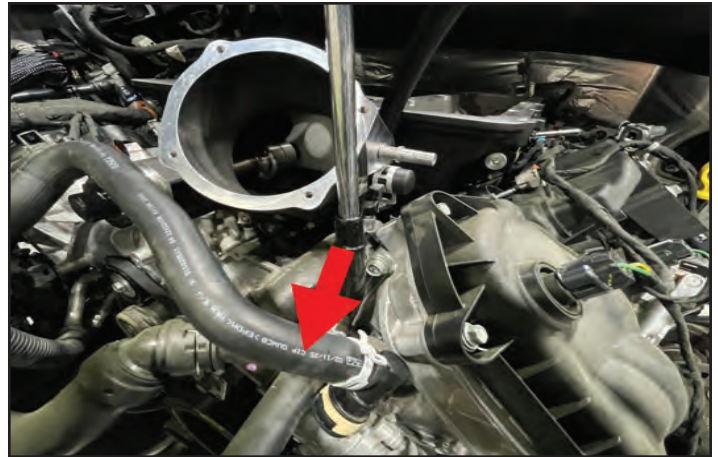
53. Apply a light amount of Lubriplate grease to the fuel fittings on each side of the fuel rail. Connect the fuel lines to the fittings on each side ensuring they are fully seated (red encircled areas). Cycle the lock on the LH side.

**IMPORTANT: Pull back on the fuel connections to confirm they are locked onto the fittings.**

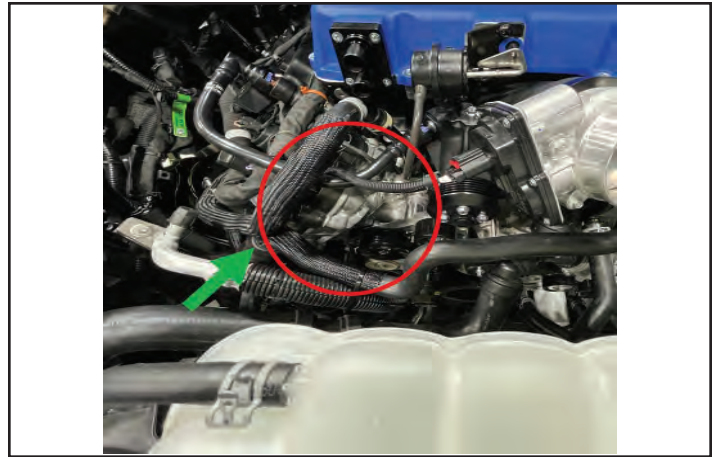
Connect the multi-pin fuel injector harnesses at the LH and RH rear corners of the housing (blue encircled areas). Connect the harness to the fuel pressure sensor (green encircled area). Ensure the locks are cycled on all harness connectors.



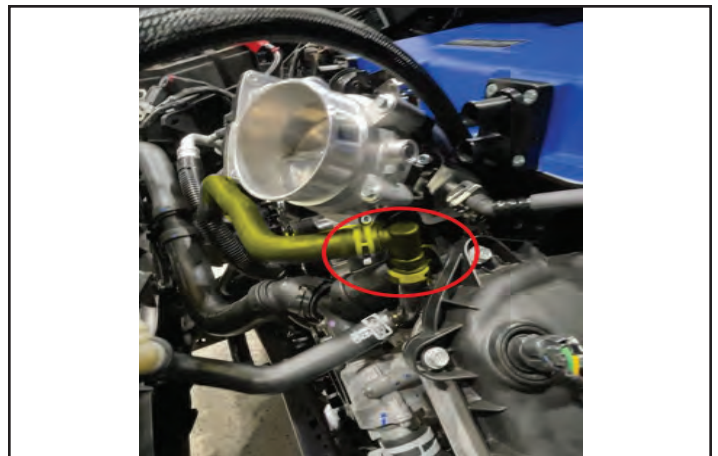
54. Insert a 3/8 drive extension into the LH heater tube and gently bend the tube forward toward the front of the vehicle a few degrees to allow for clearance to the throttle body, which will be installed in a later step.



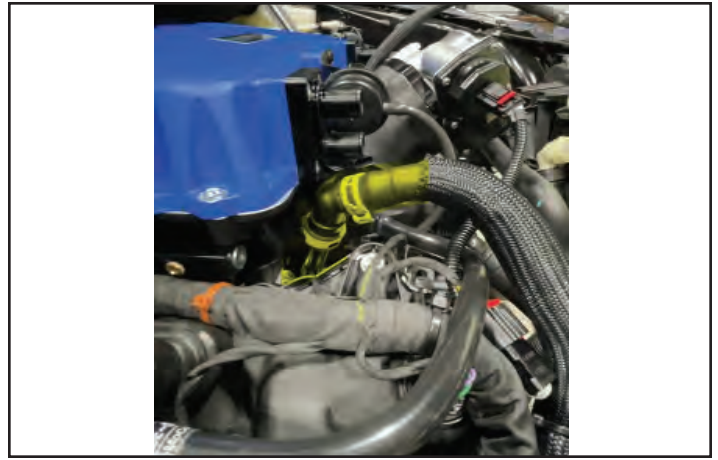
55. The two OE heater hoses are zip tied together at this location. Cut off two of the zip ties to allow the hoses to separate as shown in the photo. One zip tie should remain to secure the two hoses together in the location shown by the green arrow.



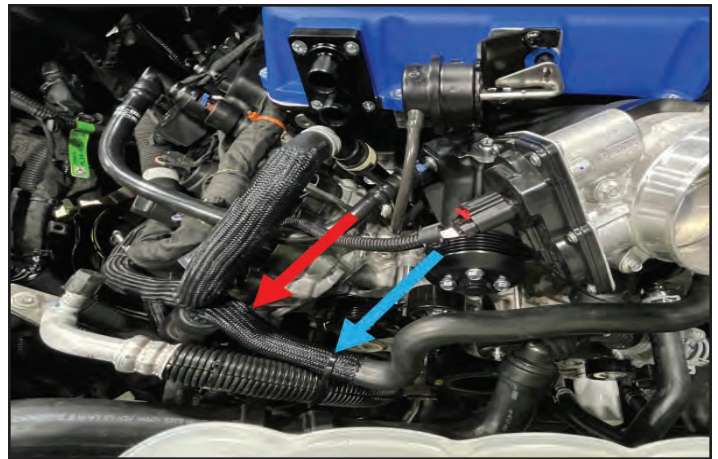
56. Swap the LH and RH heater tube connectors side for side. The 90-degree quick connect fitting should now be installed to the LH hose as shown. Install it to the heater tube, ensuring it is locked into place.



57. Re-install the RH heater tube and fastener into the front of the RH cylinder head. Torque the heater tube bolt to 106 in-lbs. then install the 45-degree fitting that was removed from the LH side over to the RH heater hose. Install the quick connect fitting onto the tube, ensuring it has locked into place.



58. Secure the LH heater tube to the AC line using a new zip tie from the kit at the location shown by the blue arrow to keep it from contacting the supercharger pulley. Ensure the hose is not kinked at the location shown by the red arrow.



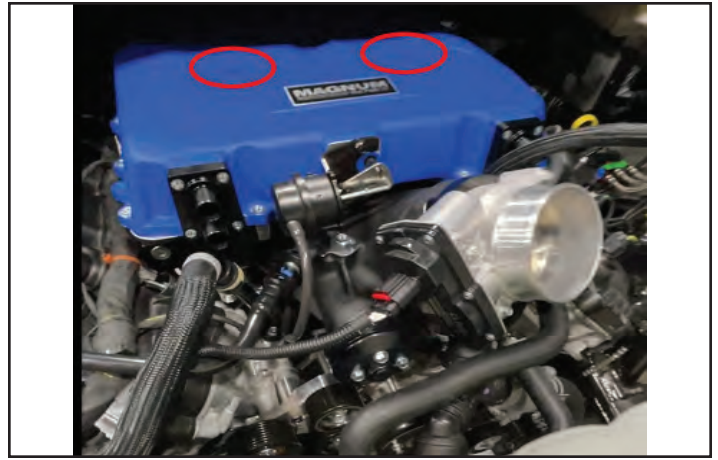
59. We will now prepare to install the lid onto the supercharger housing. Flip the lid over and inspect the gasket on the underside ensuring it is fully seated in the groove around the entire perimeter. Flip it back over being careful not to damage the charge air coolers or disturb the gasket. Pre-install (4) long fasteners back into the locations shown with yellow circles.



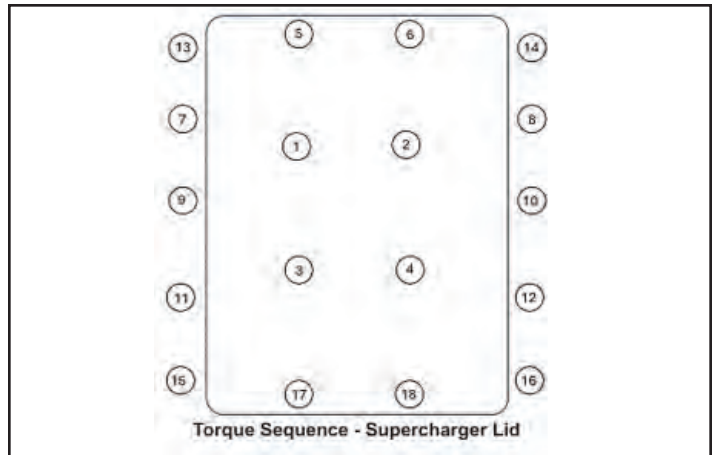
60. Carefully install the lid onto the housing being careful not to roll the gasket. Carefully rock the lid side to side if the pre-installed fasteners catch as you are sliding it into place.



61. Install the remaining short fasteners around the outer perimeter of the lid. The remaining (2) long fasteners go into the front center holes circled in red on the image.



62. Hand-start all the fasteners a few turns, starting in the center of the lid then working your way around the perimeter. 10mm sockets in short and deep variants and short socket extensions are needed to access the bolts. The two rear-most fasteners in the center of the lid (positions 5 and 6) are easiest to access using a 10mm deep socket by reaching around the back of the lid. Once the deep socket is installed into the pocket you can use your fingers to spin it down. Zero-torque all the fasteners in sequence as shown below. Final torque the fasteners to 124 in-lbs. in sequence. (There is a larger version of this diagram in the back of this manual).



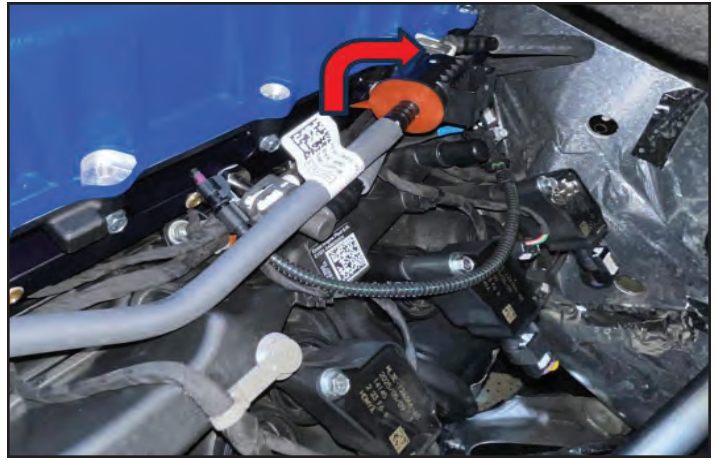
63. Connect the bypass hose between the port on the bypass and the tube on the RH side of the supercharger inlet.



64. Re-install the factory PCV purge hose between the RH cam cover and the RH side of the supercharger inlet. Rotate the quick-connect fittings as necessary so that they allow the factory hose to connect to both fittings. Ensure the hose is fully seated.



65. Find the original fuel vapor solenoid assembly that was removed earlier. While holding the hose in place, re-orient the solenoid body 90 degrees clockwise relative to the hose. See the photo as well as the next step for detail.



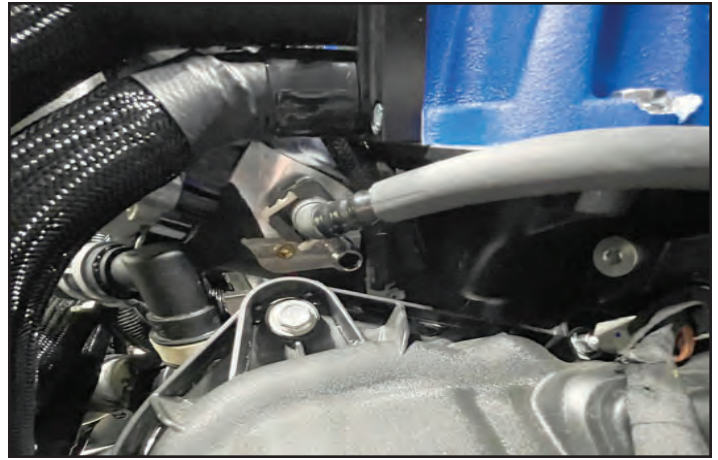
66. With the vapor solenoid hose assembly now re-oriented, the solenoid body should have its' bracket mount facing outward (toward the drivers side fender) and its' pre-formed hose pointing toward the center of the intake as shown below. See the following two photos.



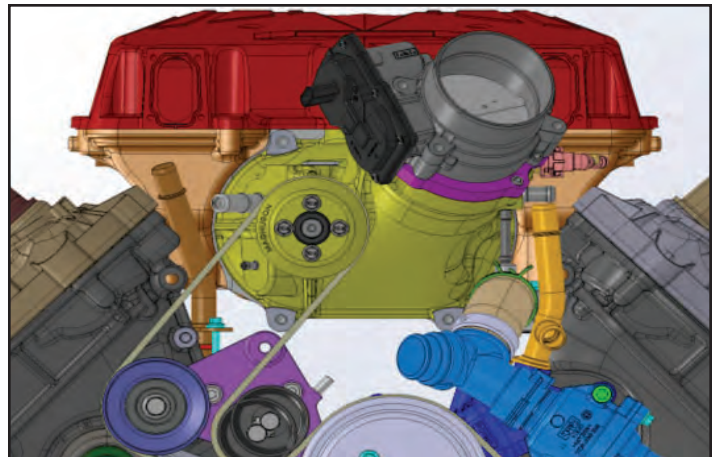
67. Locate the 2-pin vapor solenoid wiring harness extension in the kit. Connect the harness extension between the VMV solenoid and the factory harness. Connect the VMV solenoid to the factory hose connection located at the LH rear of the engine. Ensure you cycle the locking tab. Place the solenoid in the area above the coil.



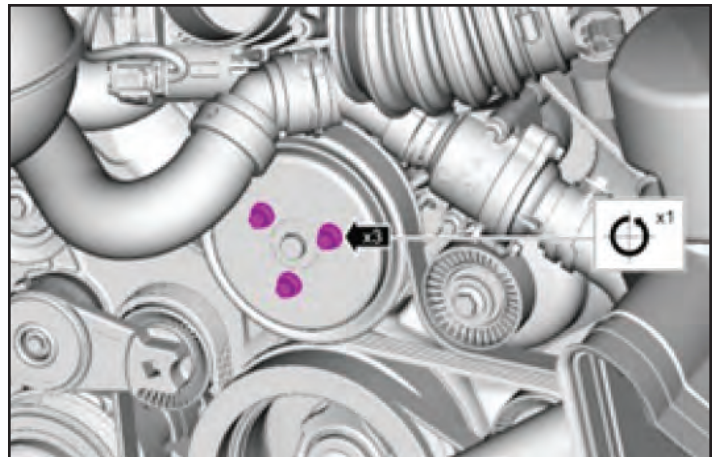
68. Route the VMV hose from the solenoid toward the male SAE connection on the LH front of the supercharger. Connect the hose to this fitting and cycle the lock.



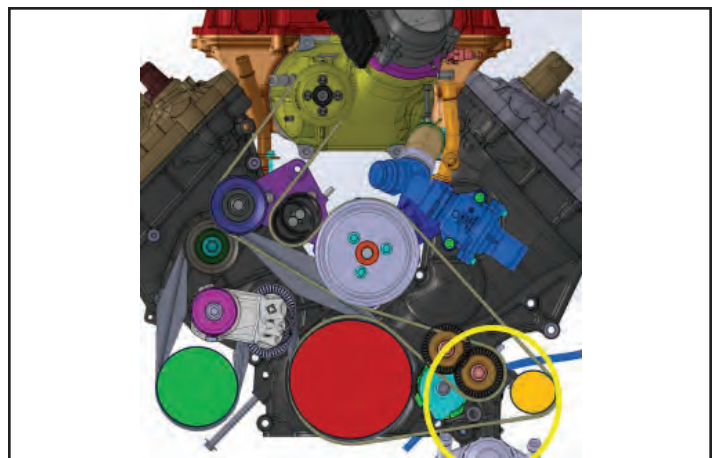
69. If your supercharger pulley did not come installed, select the supercharger pulley and (4) M6 X 16mm bolts from the kit. Apply blue Loctite to the pulley bolts then install the pulley to the front of the supercharger. Snug the pulley bolts down for now as we will final torque them after the belt has been installed.



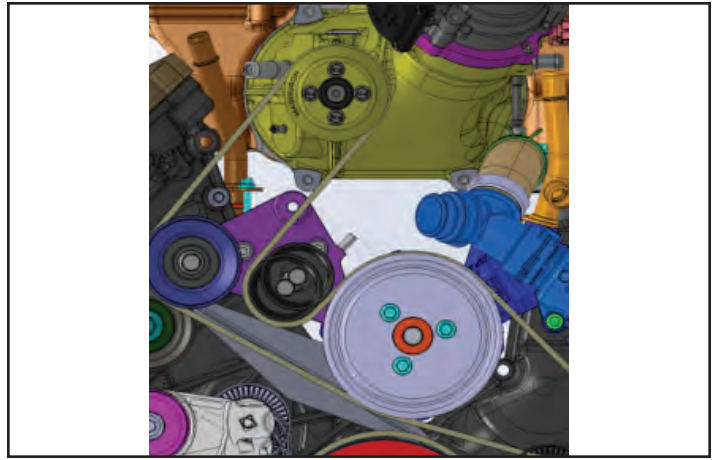
70. Re-install the water pump pulley using the factory fasteners. Snug the fasteners against the pulley for now. We will final torque these fasteners after the belt has been installed.



71. Install the FEAD belt per the belt routing diagram. A full-size image is available at the back of the manual. Cycle the tensioner (circled in yellow below) then slip the belt over the pulleys, ensuring it is properly seated over each. If the belt is too short, loosen the idler that has the slide adjustment and set screw. Loosen the set screw a couple turns then re-tighten the idler pulley and install the belt. It is important that the tensioner utilizes approximately 75%-80% of it's travel from its rest position after the belt has been installed and seated since the belt will stretch during high load conditions and may come off if the tensioner reaches its' end stop.



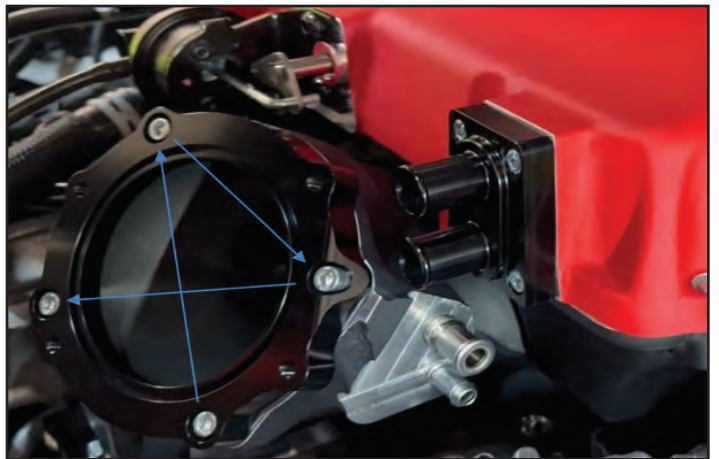
72. Final torque the supercharger pulley bolts to 106 in-lbs.  
Final torque the water pump pulley bolts to 18 ft-lbs.



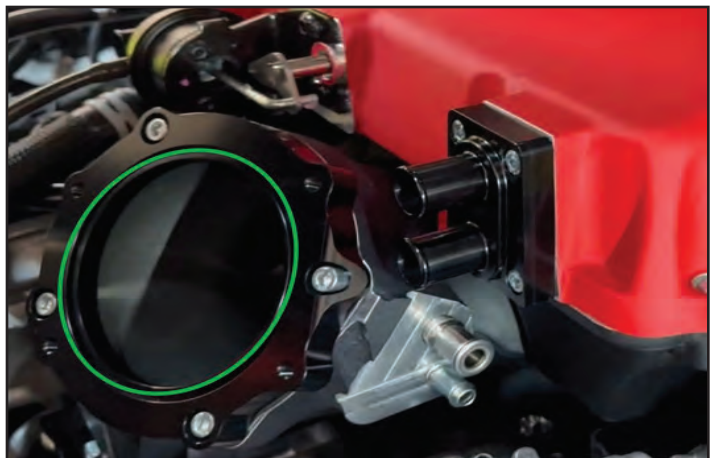
73. Select the foam gasket, billet throttle body adaptor and (4) M6 X 20mm SHCS from the kit. Harvest the factory press in place seal from the factory intake.



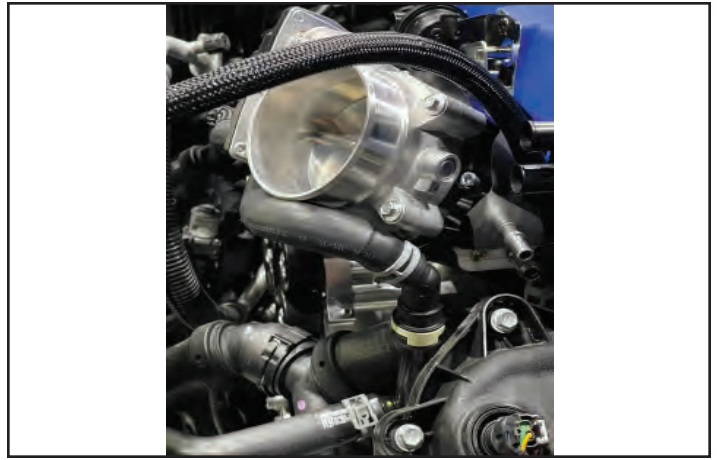
74. Orient and install the foam gasket between the supercharger inlet and the billet adaptor then secure the adaptor to the inlet using the socket head screws (SHCS). Torque the screws in a criss-cross pattern to 124 in-lbs.



75. Install the seal that was harvested from the factory intake.



76. Harvest the factory throttle body and fasteners from the original intake and install to the adaptor. Torque the fasteners in a crisscross pattern to 110 in-lbs.



77. Remove the two lid fasteners shown in the photo on the LH side of the lid. Select the reservoir bracket PN 65-26-50-056 and (2) M6 X 25mm long fasteners (fasteners are located in the bag that was zip tied to the fuel rail). Secure the reservoir bracket to the lid using the revised 25mm long fasteners. Torque the fasteners to 124 in-lbs. to secure the bracket.



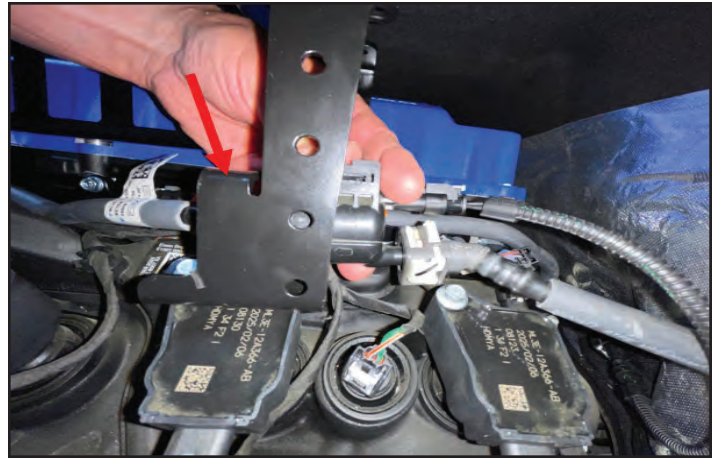
78. Re-install the LH PCV tube onto the LH cam cover ensuring it locks into place. The end shown in the photo will connect to the clean air tube in a subsequent step.



79. Remove the first and third coil bolts from the engine on the LH side (cylinder #5 and #7). These will be re-used.



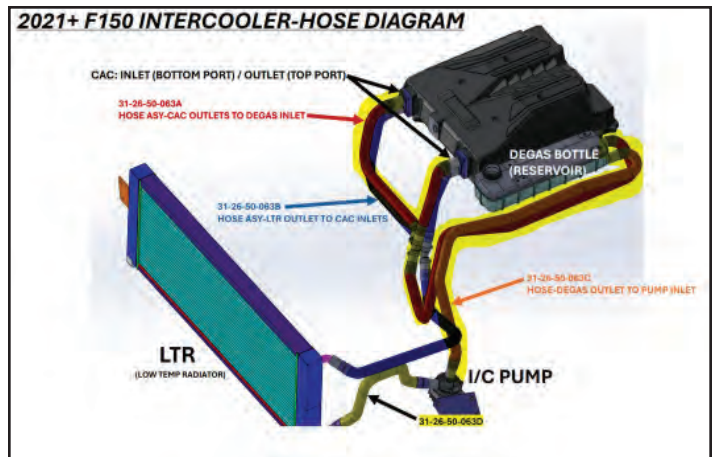
80. Select the LH rear reservoir bracket PN 65-26-50-058 shown in the photo. **Note: this bracket has an extra horizontal tab at the arrow location.** Install the original coil bolt through the bracket and into the 3rd coil counting from the front of the engine. Run the bolt down but do not tighten it. Position the VMV solenoid so that it rests below the horizontal tab on the bracket. The VMV solenoid can be zip tied to the side of the PCV tube to secure it as needed. Ensure it lays in place as low as possible. Optional: if additional VMV solenoid clearance is required, remove the solenoid assembly from the vehicle and carefully trim the plastic tab off the side of the solenoid.



81. Select the LH front reservoir bracket PN 65-26-50-056. Install the remaining coil bolt through this bracket and into the first coil at the LH front of the engine. Run the bolt down but do not tighten it yet. Note: this bracket is shown with the reservoir installed, however that will be completed in a subsequent step.



82. Select the reservoir, hoses PN 063A and 063C (highlighted) and (2) 3/4" constant tension clamps from the kit. Pre-install the constant tension clamps over the U-shaped hose ends then install the hoses to the back of the reservoir. The 063A hose has a wider U-shaped end and installs onto the inboard position of the reservoir as shown below. Secure the hoses using the clamps. Do not connect the opposite ends of the 063A hoses to the supercharger yet. These connections will be made in a later step. There is a larger version of this diagram in the back of this manual.



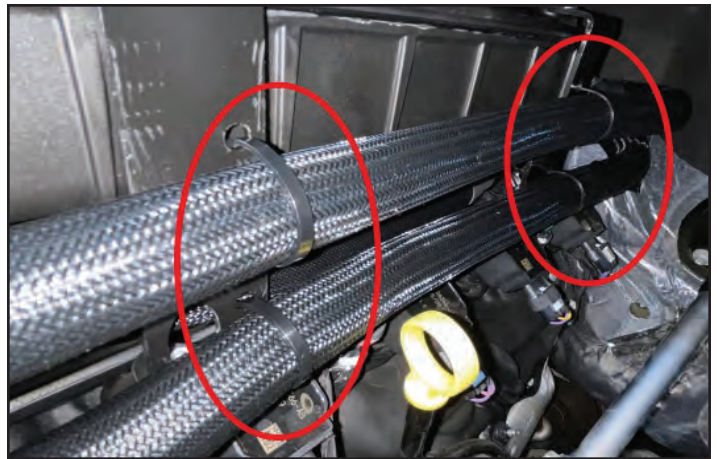
83. Slide the reservoir and hose assembly into position under the brackets along the LH side of the supercharger. Secure it using (6) M6 X 12mm bolts from the kit. Torque the bolts to 60 in-lbs.



84. Torque the (2) bracket bolts that install through the coils to 88 in-lbs.



85. Secure both hoses to the brackets using (4) zip ties from the kit as shown.



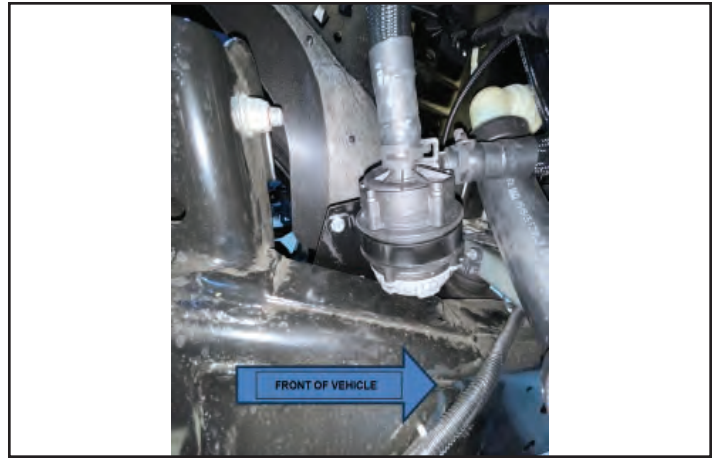
86. Install (2) M8 J-clips from the kit into the LH frame rail (just ahead of the shock mount) at the locations shown. **Note: Some vehicles may have a plastic splash shield affixed in this location. If your vehicle has a shield, remove it temporarily to gain access for mounting the pump bracket.**



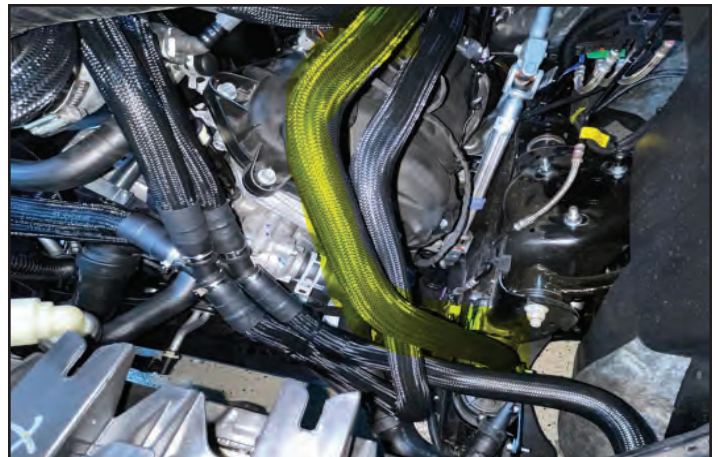
87. Select the flat mounting bracket PN 65-26-50-060 and (2) M8X25mm long fasteners from the kit. Secure the bracket to the frame using the fasteners. **Note: if your vehicle has a plastic splash shield as shown in the photo, re-install it and use the M8 bolts to secure it and the bracket as shown. Torque the bolts 18 ft-lbs.**



88. Select the intercooler pump, U-shaped bracket and (2) M6X12mm fasteners from the kit. Install and orient the pump to the bracket as shown then secure the pump sub-assembly to the mounting bracket using the fasteners. **Note: the pump inlet should face upward and the outlet should point toward the front of the vehicle as shown. Tighten the fasteners to 89 in-lbs.**



89. Route the 063C hose down toward the intercooler pump inlet. Secure the hose to the pump inlet using a 3/4" constant tension clamp. An additional photo of the 063C hose is shown in the next step.



90. 063C hose shown connected to the intercooler pump.



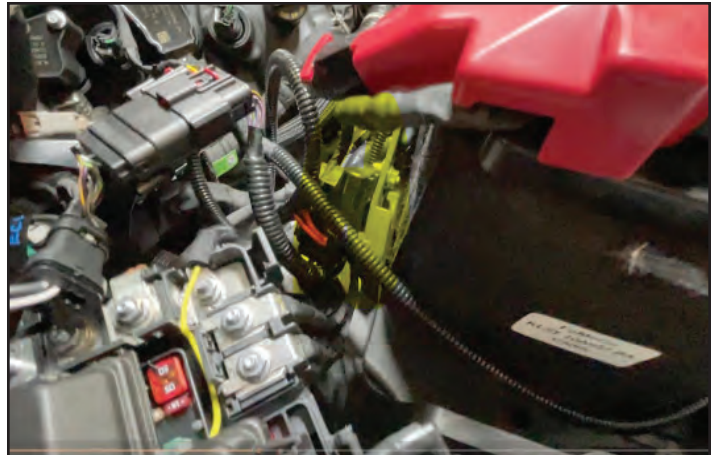
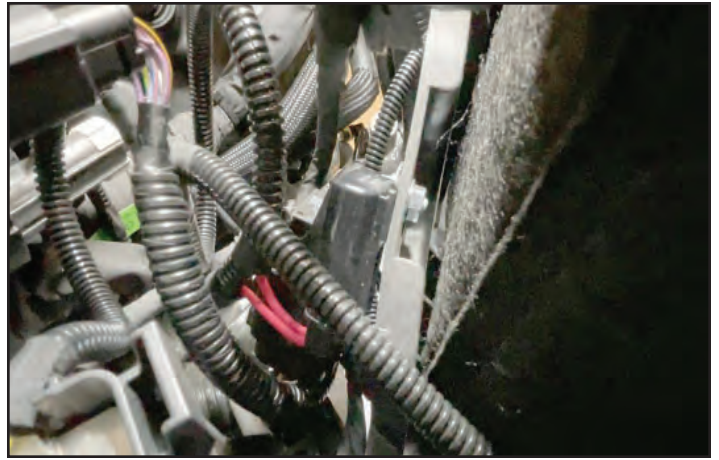
## INTERCOOLER PUMP HARNESS INSTALLATION

91. Obtain the intercooler pump electrical harness (82-55-80-078). Mount the relay to the side of the battery box as shown in the following step. Then route the harness with the connector on the end across the top of the radiator core, then down toward where the intercooler pump will be located on the driver side frame rail, as shown in the following photos.

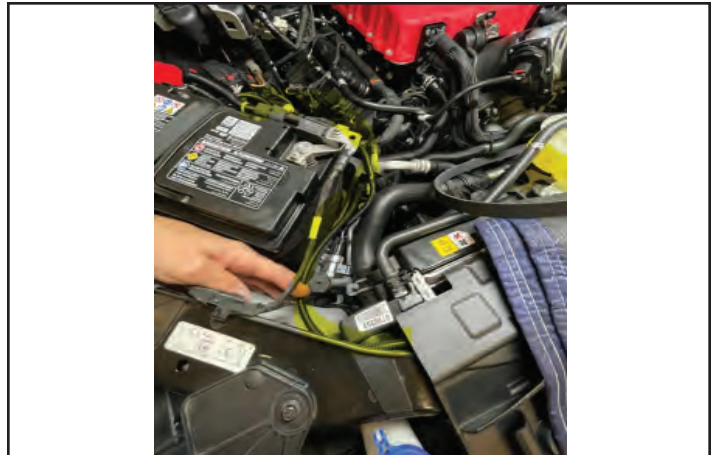


92. Mount the relay and fuse holder.

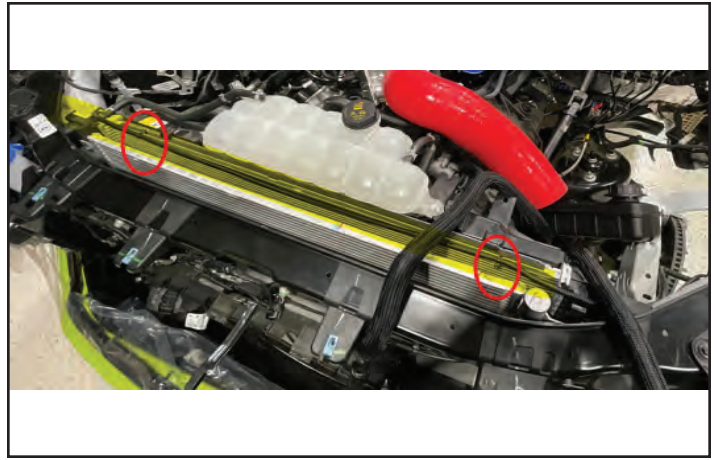
Drill a ¼ inch hole approximately ½ inch down from the top of the battery tray at the location shown. Install the provided fuse into the fuse holder then mount the fuse holder and relay together using a M6 X 16mm long bolt and nut from the kit.



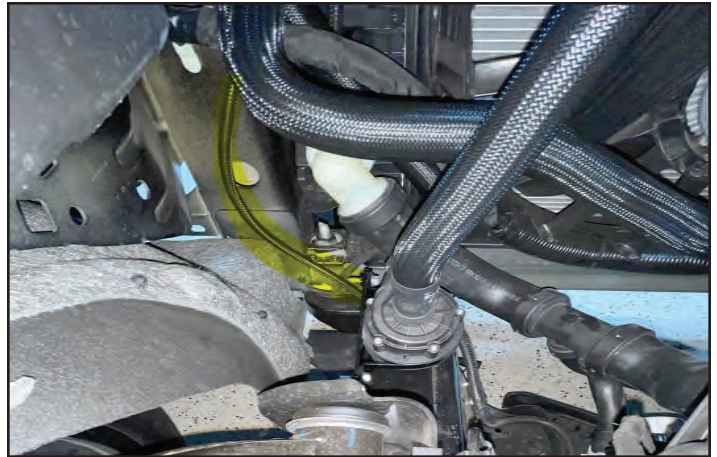
93. The I/C pump connector routes across the top of the radiator core toward the drivers' side front corner of engine bay, then down to where the intercooler pump will mount. See the following photos.



94. The intercooler pump connector routes across the top of the radiator core then down toward the drivers' side front corner of the engine bay, toward the intercooler pump. Secure the harness to the top of the radiator core in the two circled locations using zip ties through the slots in the core shown here.

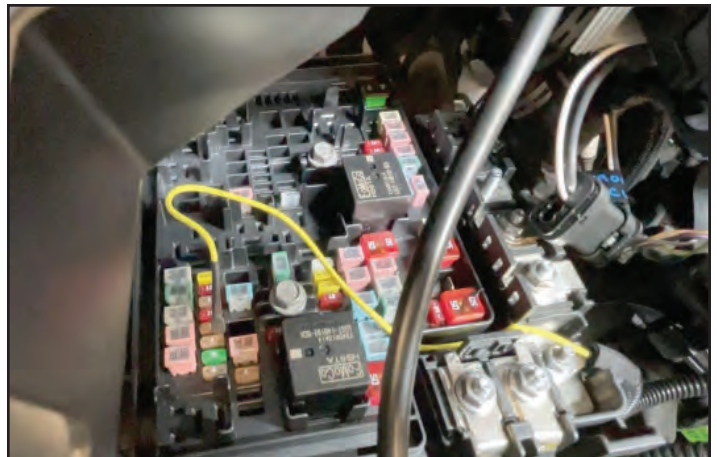


95. Connect the pump harness to the pump. Ensure the lock is cycled. Zip tie the pump harness to secure it as required.



96. Locate and route the yellow trigger wire at the opposite end of the relay harness into the fuse box at the RH rear corner of the engine compartment.

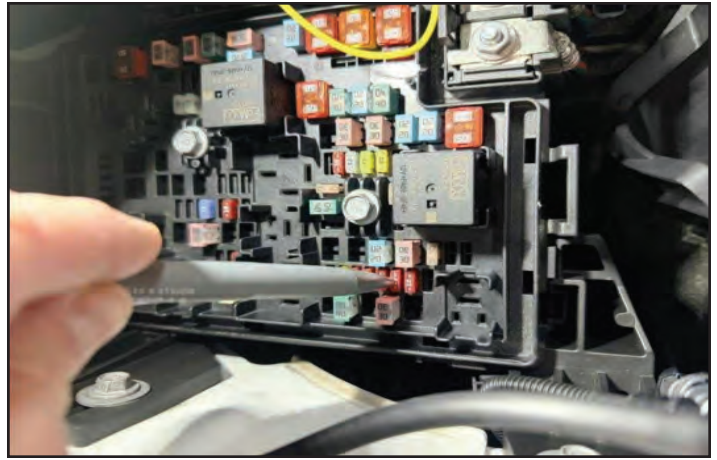
**2024+ vehicles:** Remove the third fuse from the front at the location shown (brown 5 amp). Install the fuse tap found at the end of the yellow trigger wire onto the fuse then re-install the fuse back into the same location, ensuring it is fully seated. The following photo highlights the fuse location.



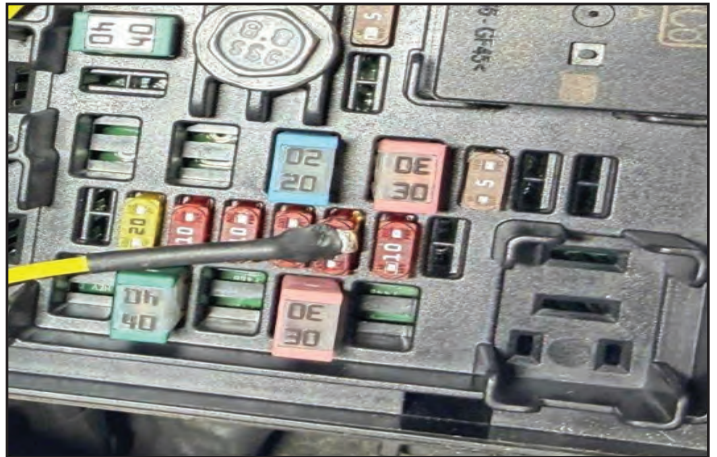
97. Here is a close-up view of the fuse location that the fuse tap is to be installed at for 2024+ vehicles.



98. **2021 – 2023 Vehicles:** Remove the fuse at location F23 (second from the front) as shown. Install the fuse tap to the fuse then re-insert it back into the fuse panel in the same location, ensuring it is fully seated .



99. **2021 – 2023 Vehicles:** Close up view of the fuse location that the fuse tap is to be installed at for 2021 - 2023 MY vehicles.



100. Route the black ground wire from the I/C pump harness to the passenger side of the engine compartment by the battery. Locate the factory ground at this location, remove the fastener, install the intercooler pump ground eyelet onto the fastener then re-install the fastener. Torque to 88 in-lbs.

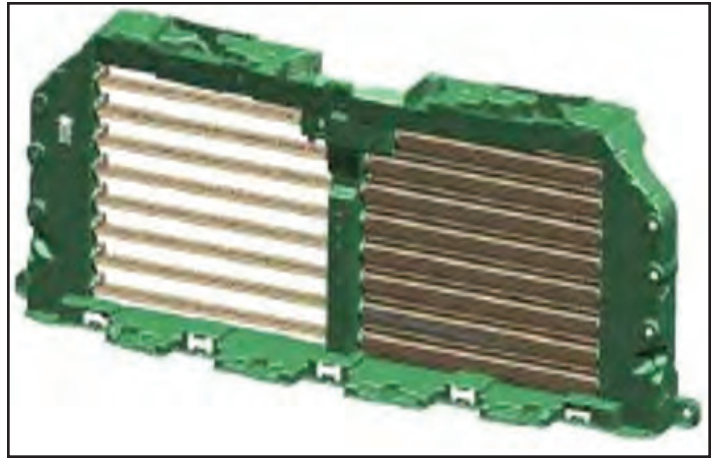


101. Route the red wire (part of the intercooler pump wiring harness installed above) to the positive terminal inside the fuse panel at the location shown. Remove the nut from the positive terminal and install the red wire eyelet. Reinstall the nut onto the terminal and torque to 88 in-lbs. Re-install the fuse box cover ensuring it is fully seated to prevent moisture from entering.



## ACTIVE GRILL SHUTTER MODIFICATION / LTR INSTALLATION

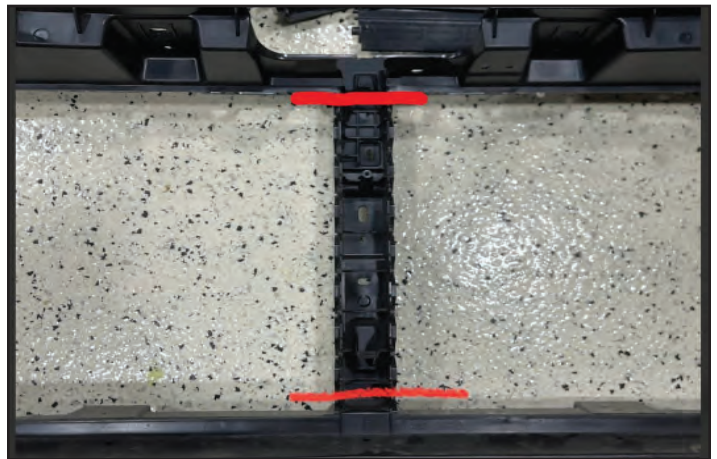
102. Remove the active grill shutter surround from the front fascia by removing all push pins from the lower close out panel, followed by (2) nuts on each side then releasing the spring clips at the bottom of the surround. Lift the surround out of the front fascia so it can be modified. Remove and discard all active grill shutter blades.



103. Remove and set aside the active grill shutter motor.



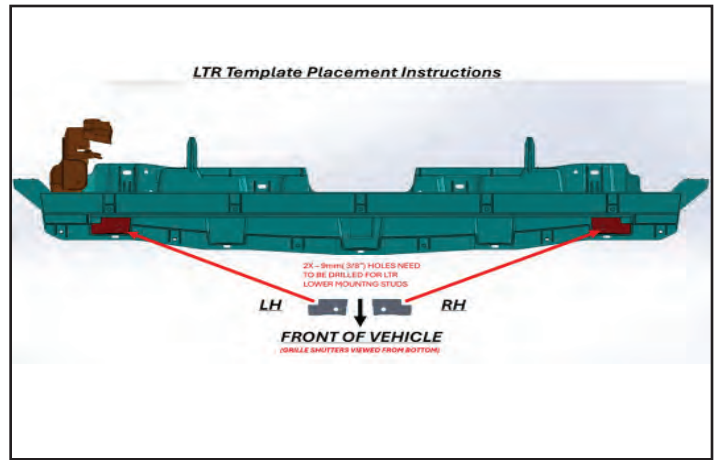
104. After the shutter blades have been removed, cut the center support from the shutter surround as pictured.



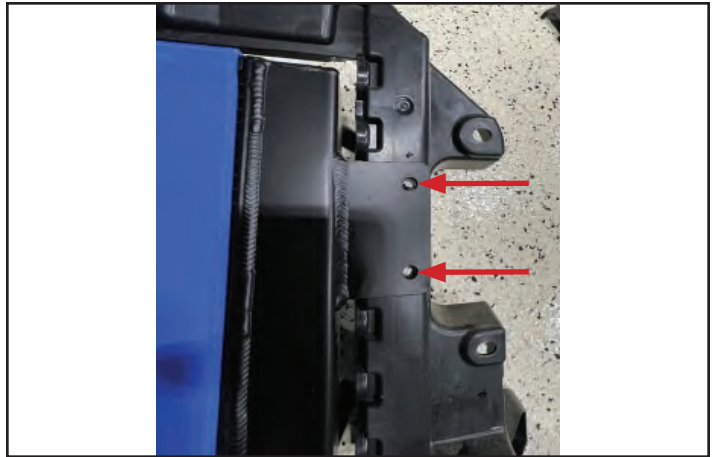
105. Locate the drill template in the Appendix at the back of the manual. Print out the drill template to locate and drill holes. Be sure to print 1:1 scale (100%). Cut out the templates and place them into the locations of the factory shutter surround as shown.



106. Here are the template placement locations.



107. Install the LTR with the coolant tubes facing toward the rear, into the factory shutter surround by first locating the studs through the holes that were just drilled in the bottom. Center the LTR brackets on each side of the surround then mark and drill four  $\frac{1}{4}$ " holes (2 per side shown with arrows) through the brackets as shown.



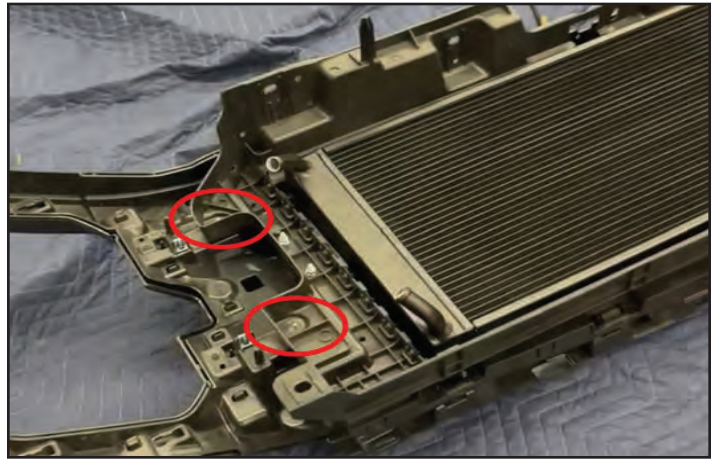
108. Secure the LTR to the surround using fasteners from the kit: (2) M8 serrated nuts on the bottom LTR studs, and (4) M6 X 20mm stainless button head fasteners and (4) flanged nuts on the side brackets. Note: ensure the button head bolts face the front of the surround during installation. (2 locations shown here with arrows)



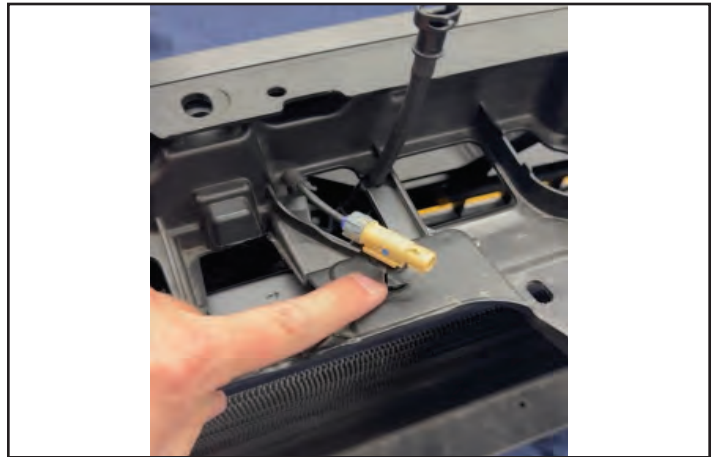
109. The lower grill has 3 spring steel clips which are used to fasten it to the LTR/shutter assembly. The 2 outer clips must be moved to the inboard positions as shown.



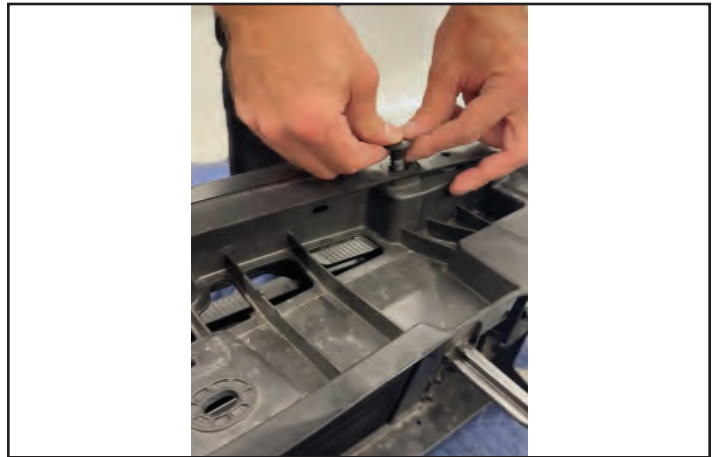
110. Install the LTR / shutter assembly back into the grill from the back. Push the two pieces together to engage the spring steel clips which were re-located in the previous step, then re-install the factory nuts that secure both assemblies (2 per side) at the locations shown (LH shown, RH similar).



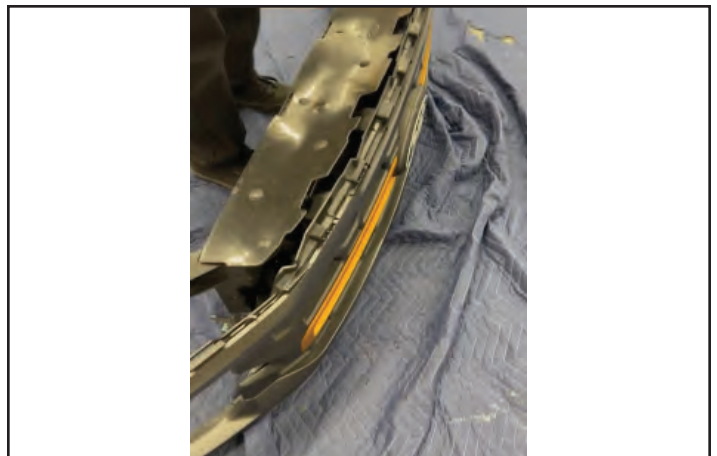
111. Route and re-install the harness connector (and washer hose if applicable).



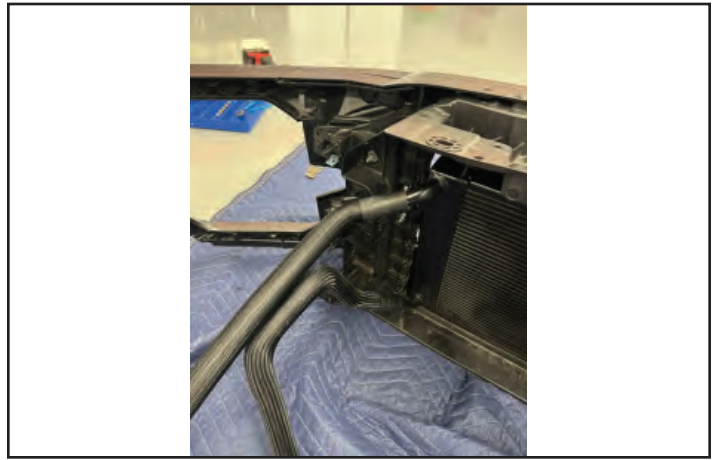
112. Re-install (5) fir tree connectors to secure the upper grill to the surround.



113. Flip the fascia assembly upside down and re-install the lower close-out panel using the factory push pins.



114. Install and orient the upper (063B) and lower (063D) LTR hoses as shown. See the hose routing diagram in the Appendix at the back of this manual. Secure the hoses using the constant-tension clamps provided in the kit.



115. Select the air deflector that was removed in a previous step. Reference the Appendix at the back of the manual to make a clearance cut in the location shown to allow the LTR hoses to pass through this area. Re-install the air deflector using the factory push pins.



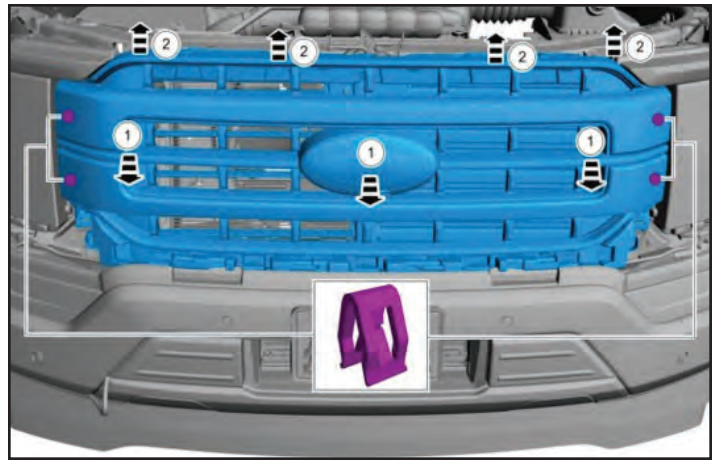
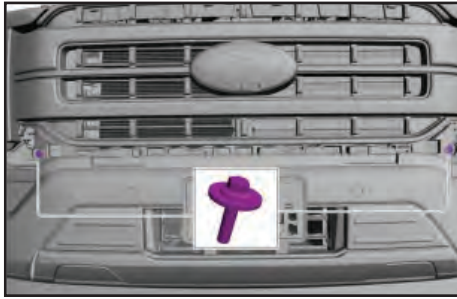
116. Have a second person assist as you prepare to re-install the front grill assembly to the vehicle. Route the LTR hoses through the opening that was made in the close-out panel earlier as you mate the grill to the vehicle. Carefully re-install it by locating the factory centering pins into the holes. Hold it in place as you begin to re-install the push pins and fasteners. See the following slides for detail.



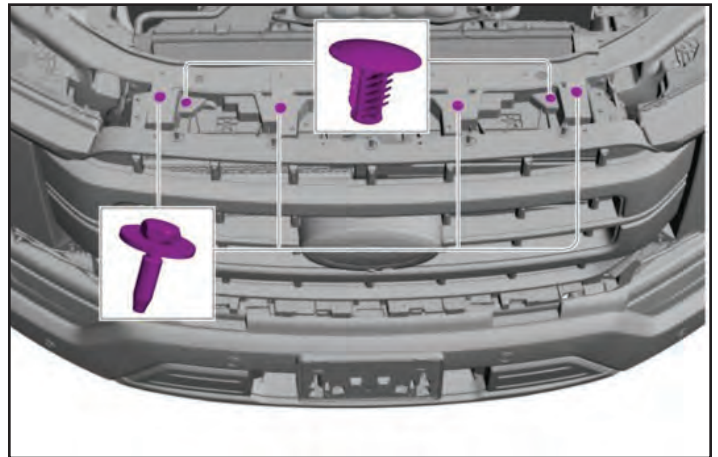
117. Ensure the wiring harnesses by the hood latch (and washer hose, if equipped) do not become pinched as you install the grill. These will be re-connected once we have secured the grill back to the vehicle in the next few steps



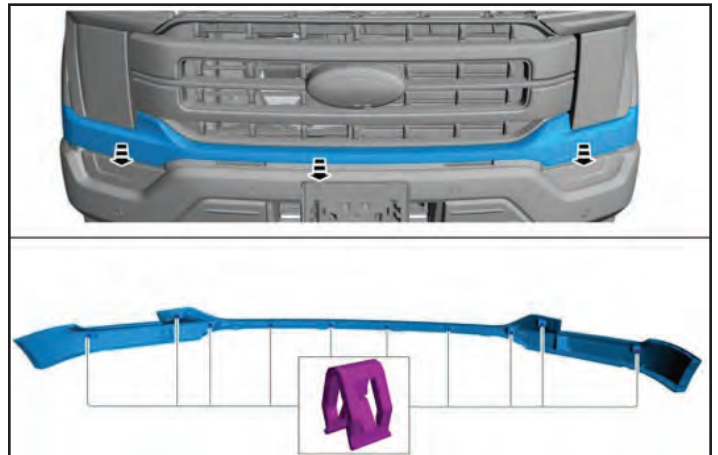
118. Ensure the grill clips are secure in the following pictured seven (7) locations.



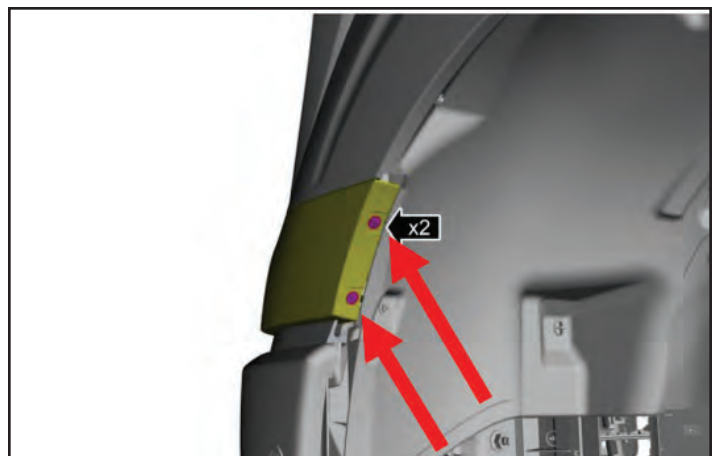
119. Torque the four (4) fasteners to 36 in-lbs. on the top of the active grill shutter. Install the pin-type retainers to secure the top of the active grill shutter.



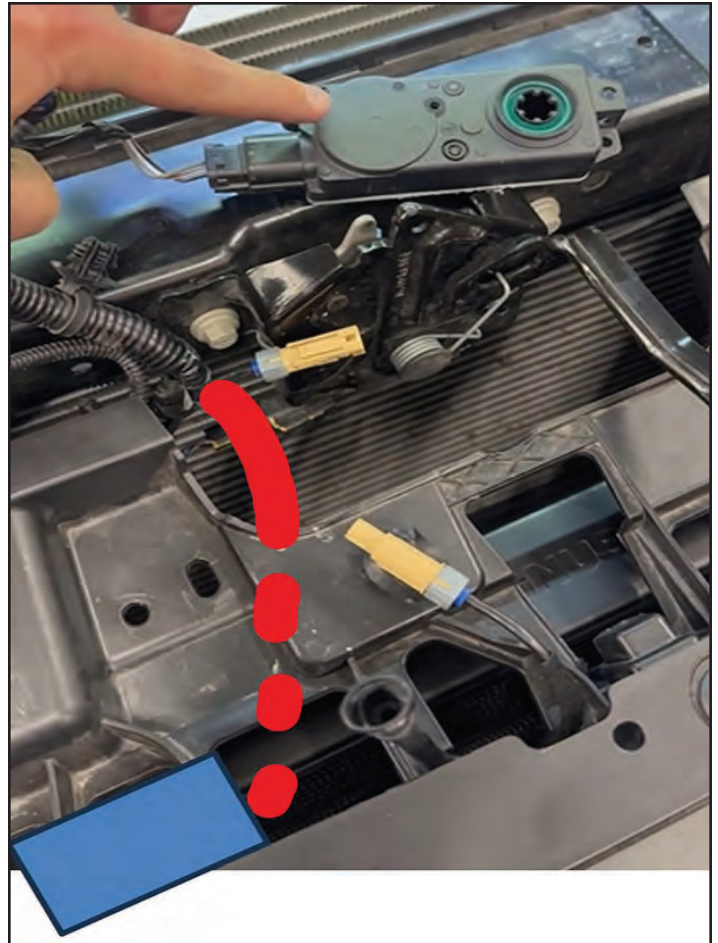
120. Install the front bumper upper cover trim panel.



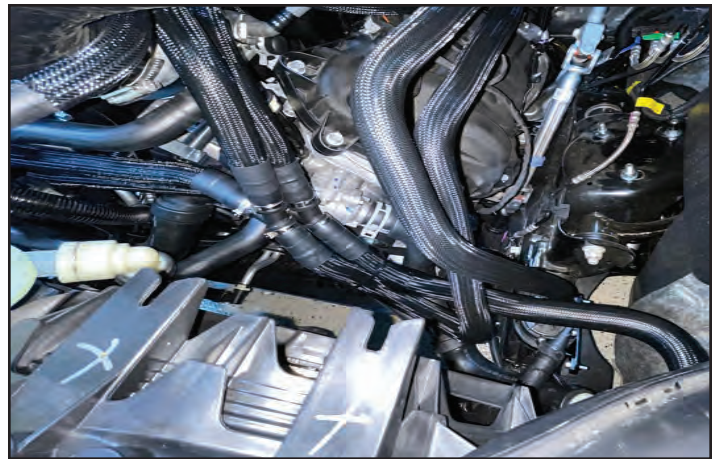
121. Install two (2) bolts in each wheel well that were previously removed. Torque to 15 in-lbs.



122. Re-connect the active grill shutter motor then route it under the plastic panel to the location shown in blue. Zip tie it in place underneath this location. Re-connect the wiring harnesses and washer hose at this location as well.



123. Route and install the remaining coolant lines to the front of the supercharger following the hose routing diagram at the back of this manual. Note that the 063B hose assembly (coming from the LTR) installs to the LOWER fittings on each side of the lid and the 063A hose assembly installs to the UPPER fittings (this hose comes from the reservoir). See the following step for additional details.



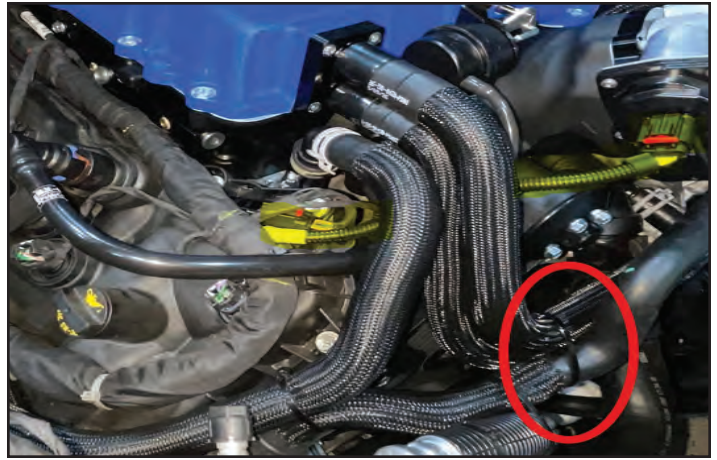
124. Constant tension clamps are provide in the kit for the 4 locations on the lid. Install the clamps over the lower hoses then cycle the clamps while pushing the hoses onto the tubes, ensuring they are fully seated. For the upper hoses, it is easiest to cycle the clamps and hold them in place over the tube, then install the upper hose onto the tube.



A small amount of Lubriplate grease can be used on the upper hoses to ease installation.

125. Connect the throttle body extension harness (highlighted in yellow) supplied in the kit, in between the factory harness and the throttle body. Cycle the locks on the connectors and route the harness away from the belt and pulleys.

Inspect all the hoses and zip tie them as needed to keep them from contacting the belt, pulleys or rubbing against any other components.



126. Route and install the 063D hose (highlighted in yellow) to the intercooler pump outlet. Secure it using a constant tension clamp from the kit.



## AIR INDUCTION SYSTEM

127. Gather the lower airbox section.



128. Mark the lower airbox as shown.



129. Cut the area out using a small cutoff wheel. Clean the edges and remove any burs or loose material.



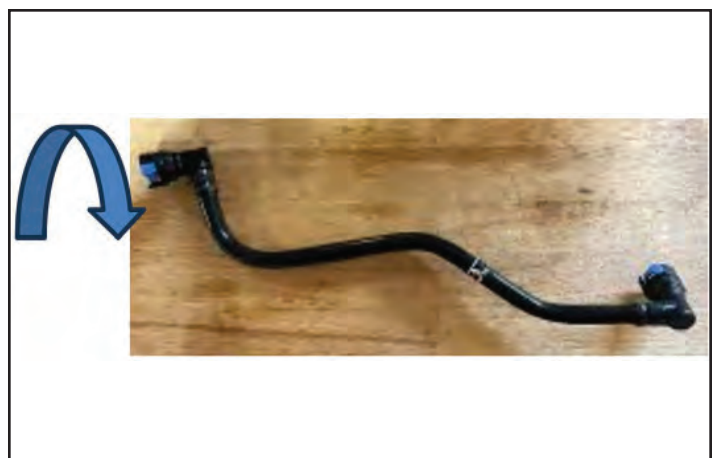
130. Re-install the factory airbox into the two lower isolator grommets then secure it using the fastener located at the inner LH fender. Tighten the bolt to 13 ft-lbs.



131. Harvest the gear clamps from both ends of the OE clean air tube and install them to the Magnuson replacement. Install the new clean air tube (highlighted in yellow) between the throttle body and the airbox ensuring it is fully seated. Tighten the clamps on each end to 27 in-lbs.



132. Connect the original PCV fresh air inlet line (previously installed to the LH cam cover) to the fitting on the clean air inlet tube. It may be necessary to rotate the connectors against the tube to make the connection.



## SECTION E – FINAL ASSEMBLY

133. Vacuum fill the engine cooling system using the correct coolant type as identified in the vehicle owner's manual. Most 2018-2024 Ford vehicles use Motorcraft Yellow as noted in the beginning of this manual. Verify you are using the correct type before mixing coolants. Fill the engine coolant to the marked level on the radiator degas bottle. Make sure the radiator petcock is closed tightly.

134. Using the same coolant, vacuum fill the intercooler system through the degas bottle. The coolant should be approximately one inch below the top of the cap. Install the degas bottle cap and tighten when full.

**IMPORTANT: Both coolant systems can trap a large amount of air. It is very important to verify that the air is purged and that coolant is flowing properly through both systems. IT IS HIGHLY RECOMMENDED TO USE A VACUUM FILLING DEVICE ON THIS ENGINE.**

135. Inspect all underhood wiring harnesses and hoses for potential interference issues. Use zip ties to safely secure these items away from any areas of concern.

136. If the vehicle is not flashed yet refer to the PCM Flashing section.

**DO NOT ATTEMPT TO START THE VEHICLE IF THE PCM IS NOT EQUIPPED WITH A REVISED CALIBRATION. OPERATING THE ENGINE WITHOUT THE RECALIBRATED PCM WILL RESULT IN ENGINE DAMAGE OR FAILURE AND WILL VOID THE WARRANTY.**

**AFTER THE REVISED CALIBRATION HAS BEEN FLASHED, CYCLE THE KEY A FEW TIMES TO PRIME THE FUEL SYSTEM. IMPORTANT: CHECK FOR ANY LEAKS BEFORE STARTING THE VEHICLE FOR THE FIRST TIME!!**

137. Re-install the battery terminal connections by connecting the positive (+) cable first then connecting the negative (-) cable.

138. Place the fuel door decal on the backside of the fuel door. With the supercharger system installed, the vehicle is no longer E85 compatible. If your vehicle has a Flex- Fuel badge, it is recommended that this also be removed at this time.



139. Change the oil and oil filter for the vehicle  
(Note: the revised oil type is **5W50 Full Synthetic**,  
Consult the owner's manual for the correct oil  
filter).



## Adaptive Learning Drive Cycle For Automatic Transmission

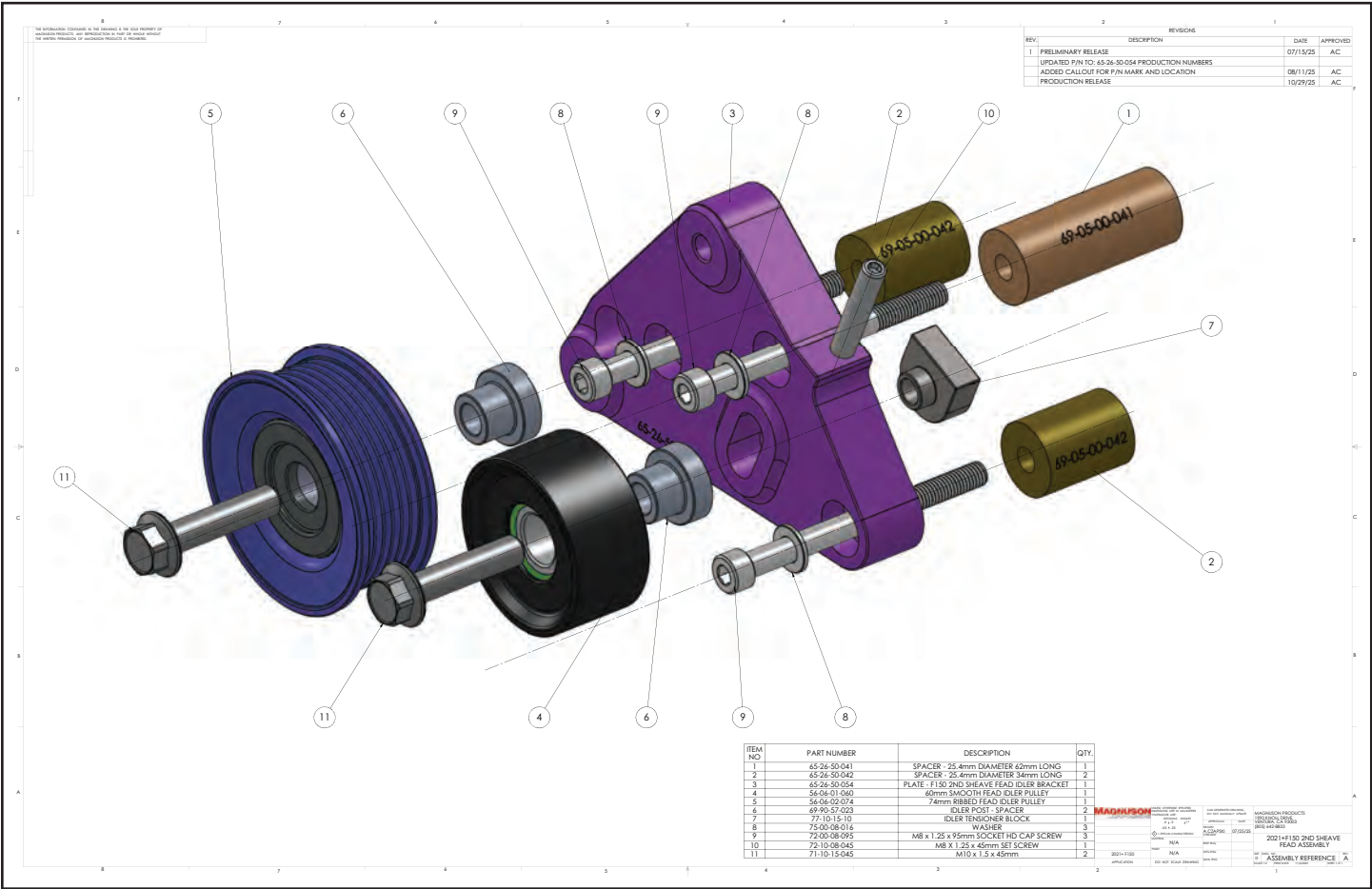
**IT IS NORMAL TO HAVE HARSH/ROUGH SHIFTS AFTER INSTALLATION IS COMPLETE. FOLLOW THE BELOW PROCEDURES TO RELEARN THE TRANSMISSION STRATEGY.**

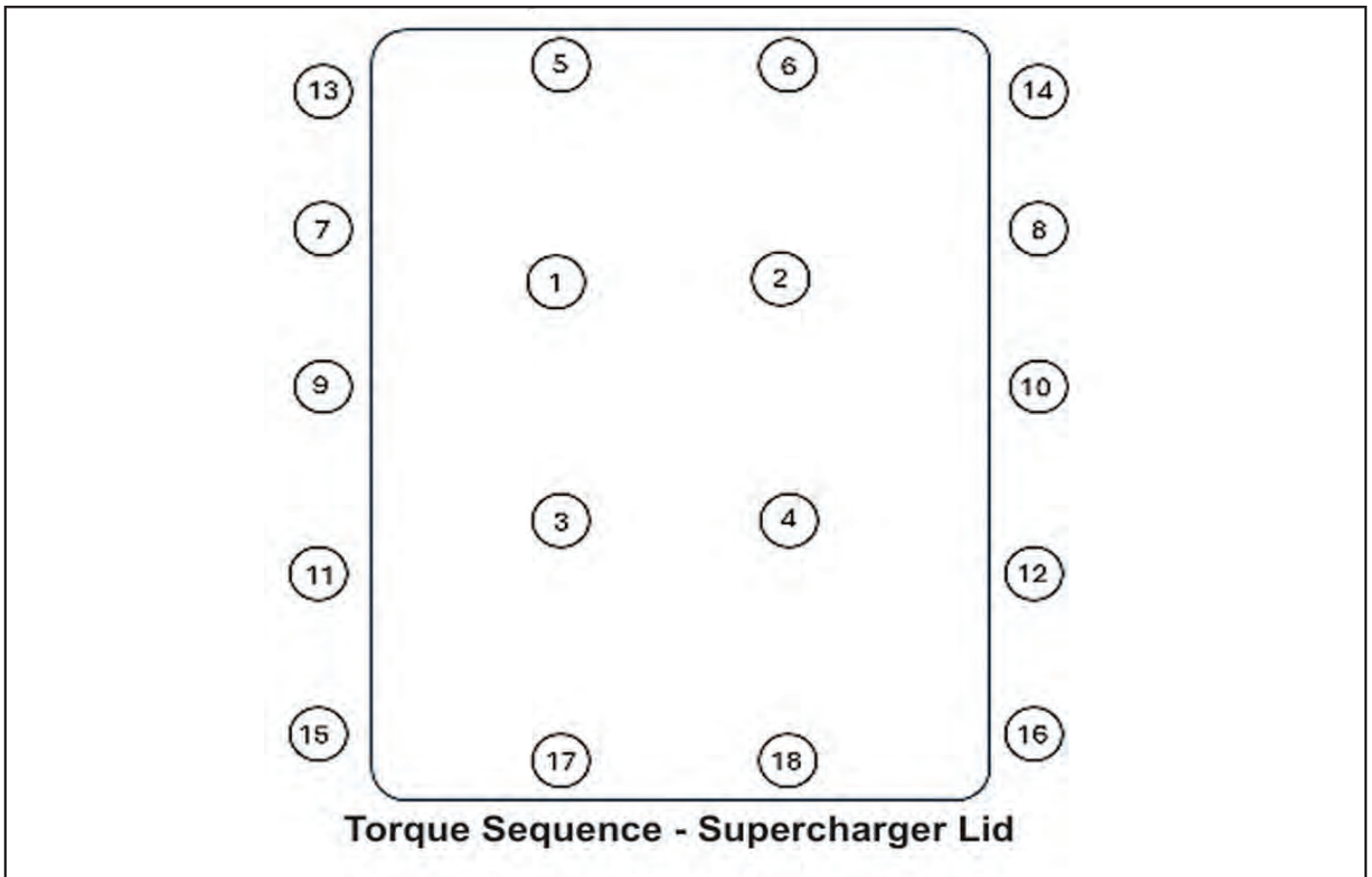
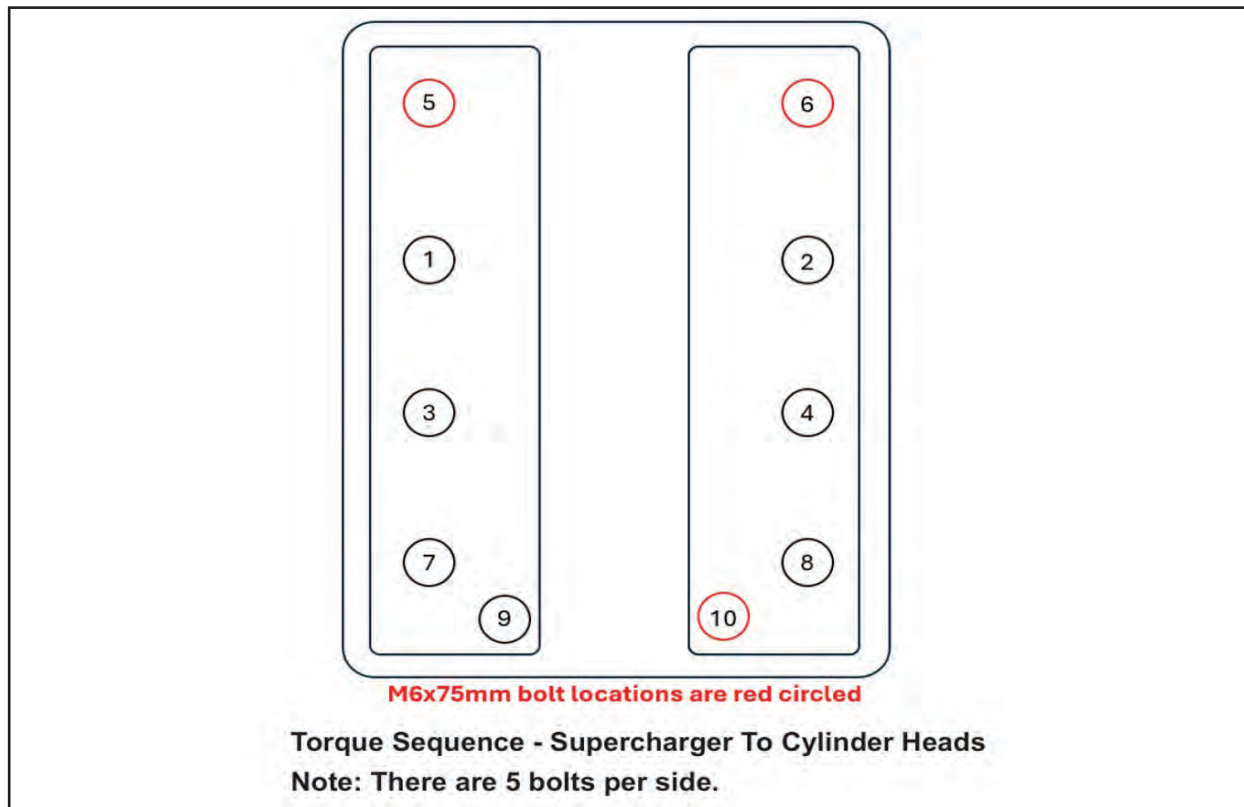
### Programming Procedures

**NOTE:** Perform the adaptive learning drive cycle on a level road surface.

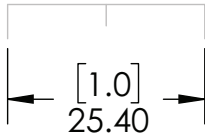
1. **NOTE:** Vehicles equipped with diesel engines use a TCM (transmission control module) that stores the transmission strategy information. Using the scan tool, clear the TCM KAM .
2. Using the scan tool, clear the DTCs (Diagnostic Trouble Codes) and Transmission Adaptive Tables.
3. Drive the vehicle until the engine and transmission reach normal operating temperature.
4. Accelerate from a stop with light throttle (15%) ensuring that upshifts 1st through 8th occur at engine speeds between 1300-1600 rpm.
5. Continue to accelerate (may apply slightly more throttle after 7-8 upshift at 32-38 mph (51-61 km/h) until you achieve 55 mph (88 km/h) and the 8-9 and 9-10 shifts complete.
6. Brake very gently to a complete stop and hold foot on brake for five (5) seconds.
7. Shift the transmission to Neutral. Wait 1 second.
8. Shift the transmission to Reverse. Wait 2 seconds.
9. Shift the transmission to Neutral. Wait 1 second.
10. Shift the transmission to Drive. Wait 2 seconds.
11. Repeat Steps 3 through 9 six additional times.

Appendix

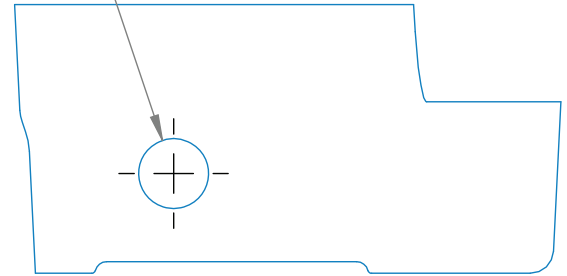
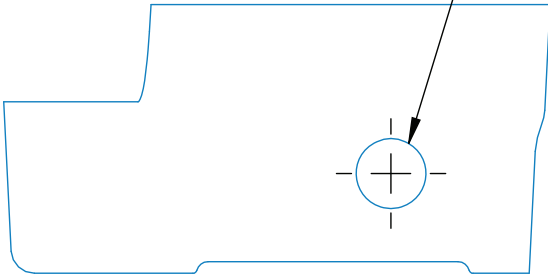




**SCALE 1:1**

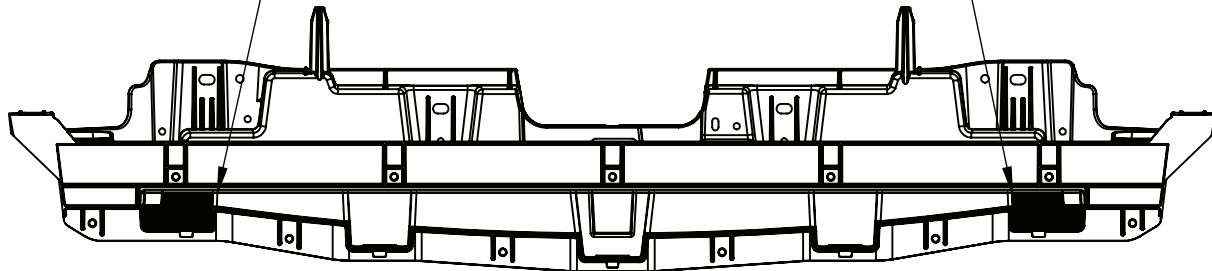


2X Ø 9.0mm OR 3/8" DRILL



**LH SIDE**

**RH SIDE**



**ALIGN WITH BOTTOM SURFACES ON GRILLE SHUTTER SURROUND AS SHOWN**

**FRONT OF VEHICLE**



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN MILLIMETERS  
TOLERANCES ARE:

DECIMALS ANGLES  
.X ± .5 ± 1°  
.XX ± .25

◇ = SPECIAL CHARACTERISTIC

MATERIAL:

FINISH: SEE NOTES

DO NOT SCALE DRAWING

**MAGNUSON**  
SUPERCHARGERS

APPROVALS

DATE

DRAWN A.CZAPSKI

DATE

CHECKED

ENGR.

ISSUED

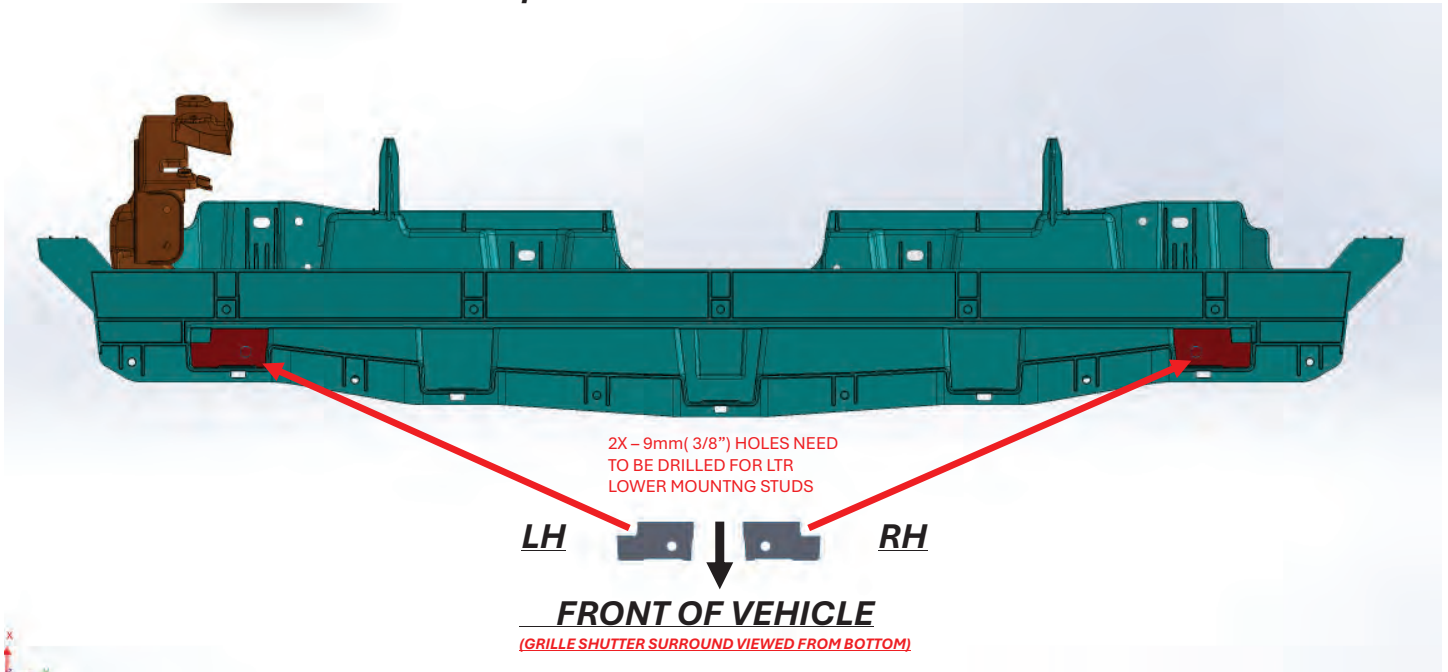
MAGNUSON PRODUCTS  
1990 KNOLL DRIVE  
VENTURA, CA 93003  
(805) 642-8833

LTR DRILL TEMPLATE  
2024+ GRILLE SHUTTER SURROUND

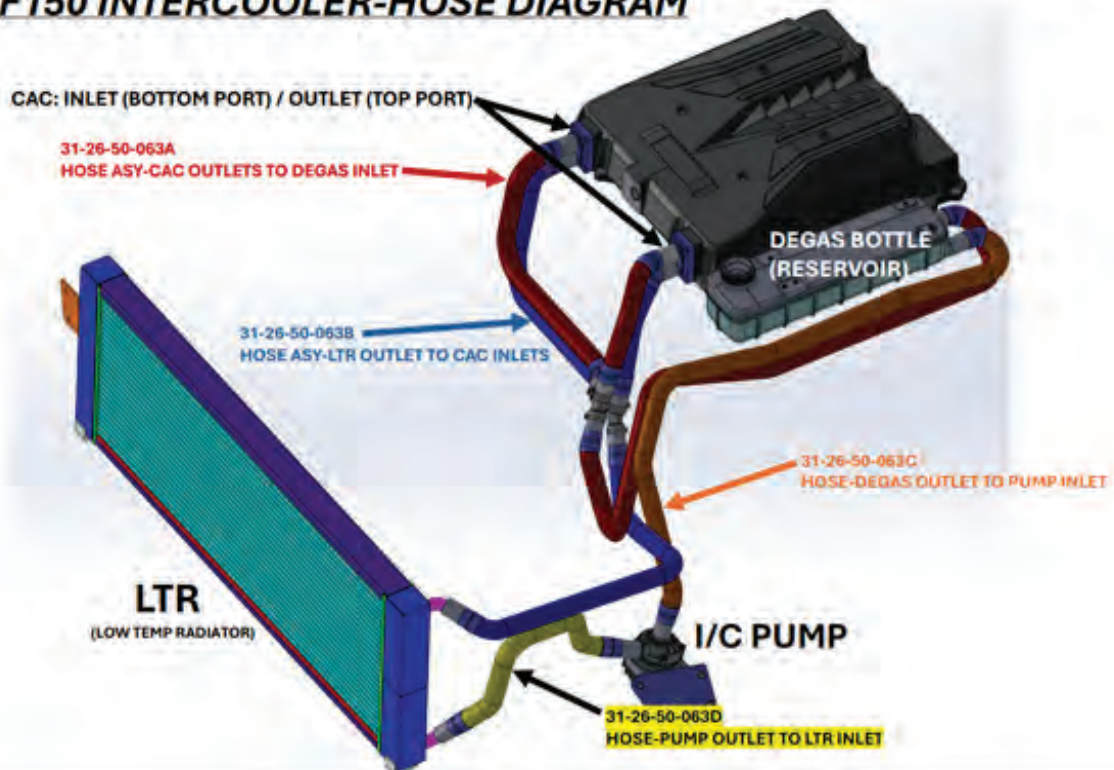
SIZE DWG. NO. N/A REV. 1

PRINT DATE: 10/14/2025 SHEET 1 OF 1

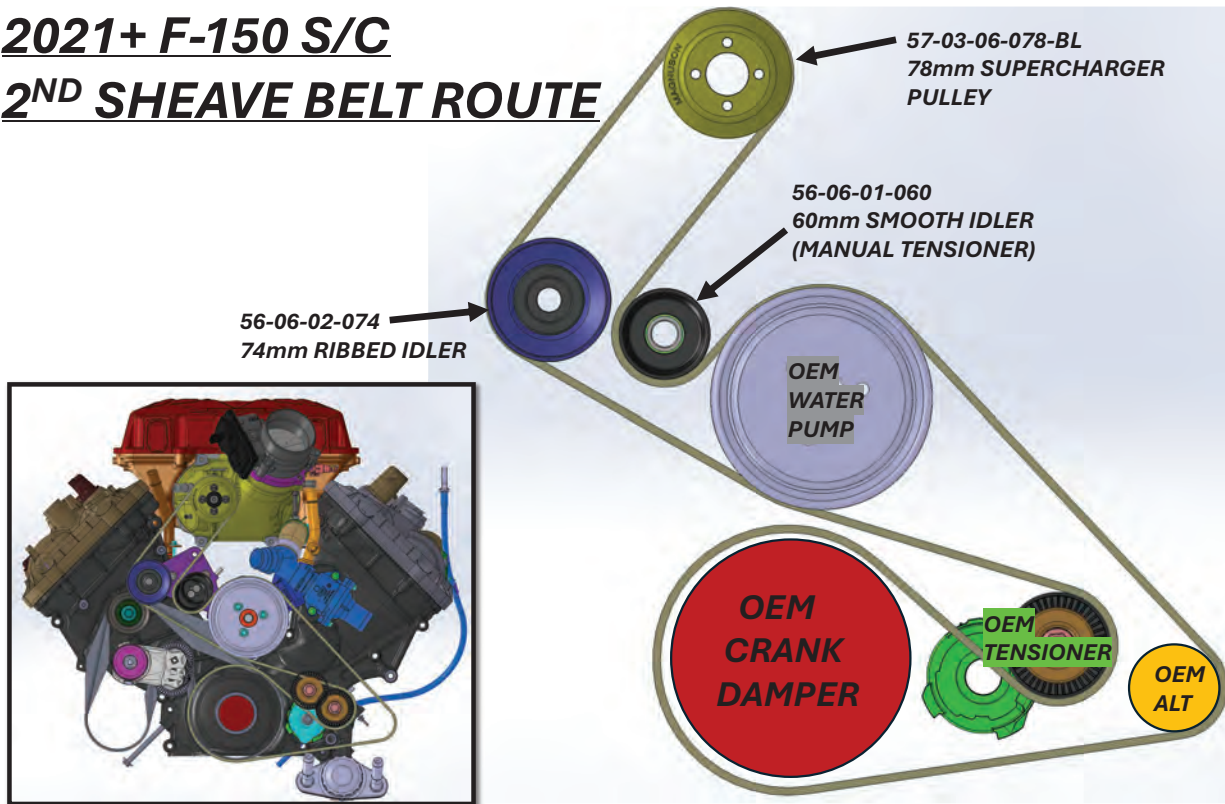
## LTR Template Placement Instructions



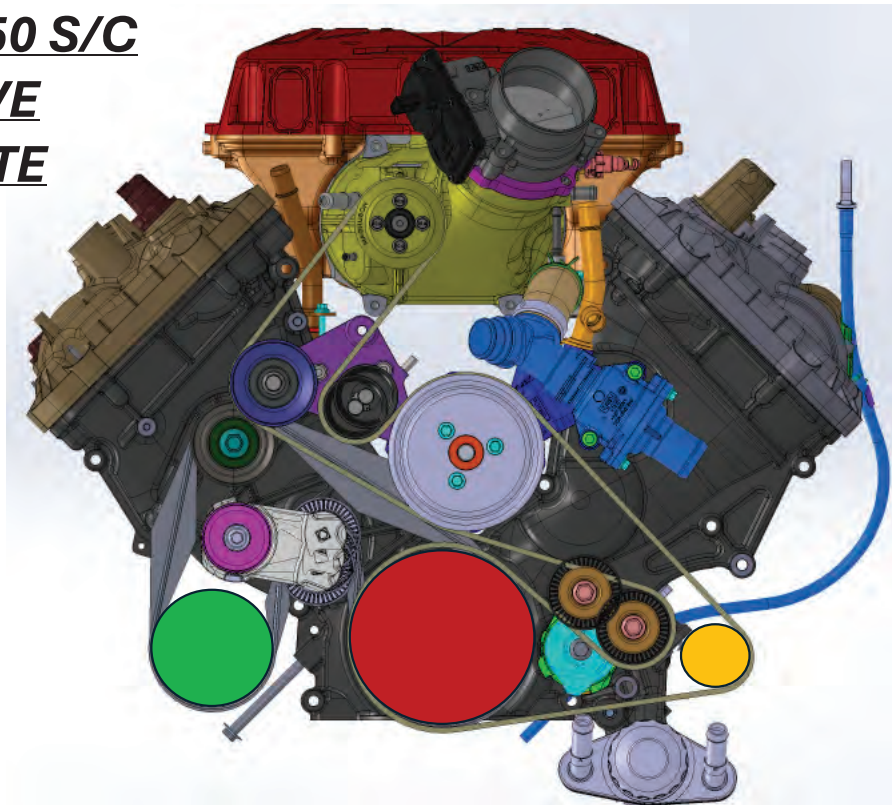
## 2021+ F150 INTERCOOLER-HOSE DIAGRAM



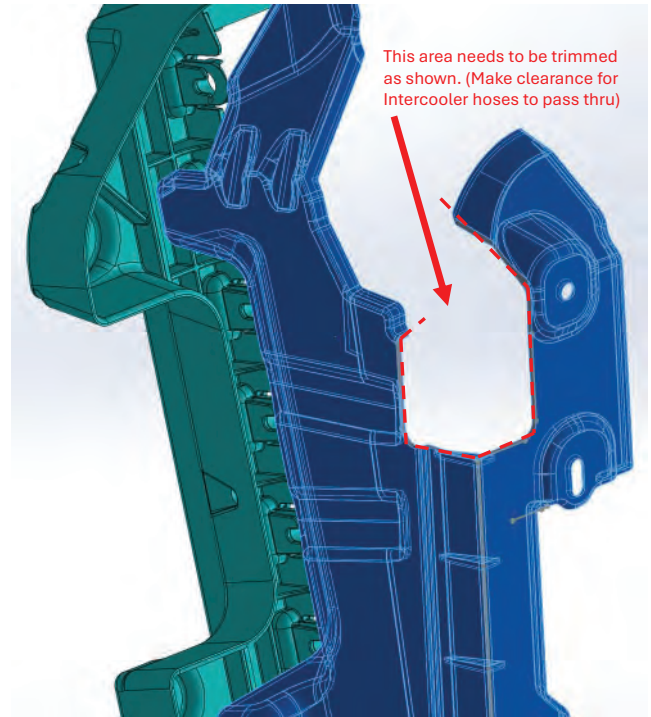
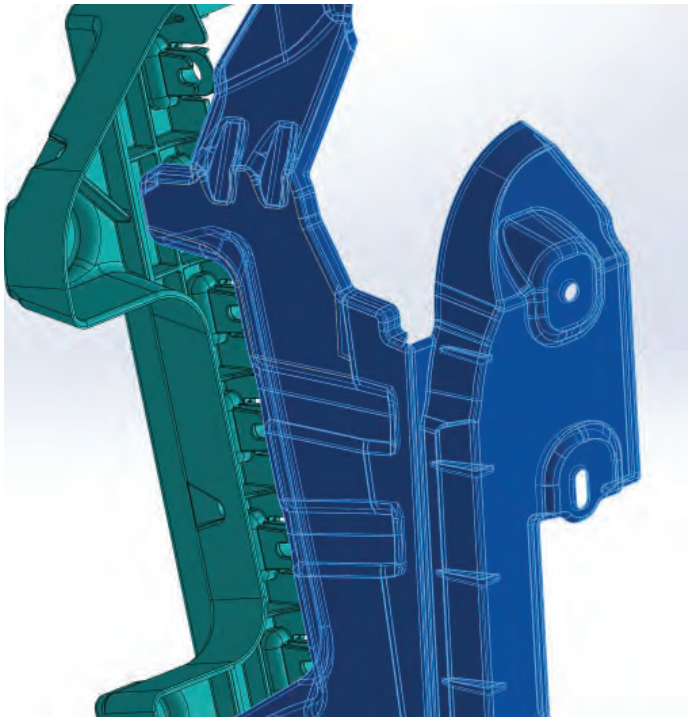
## **2021+ F-150 S/C** **2<sup>ND</sup> SHEAVE BELT ROUTE**



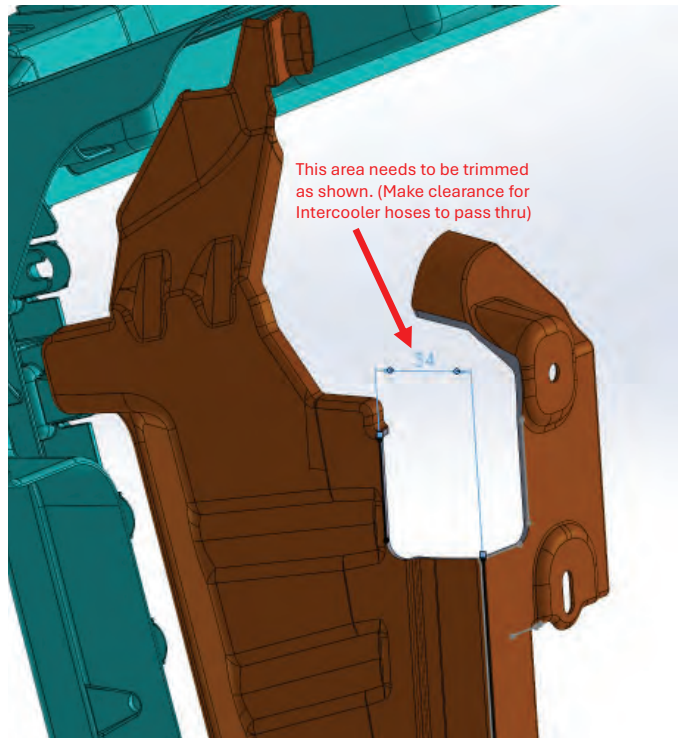
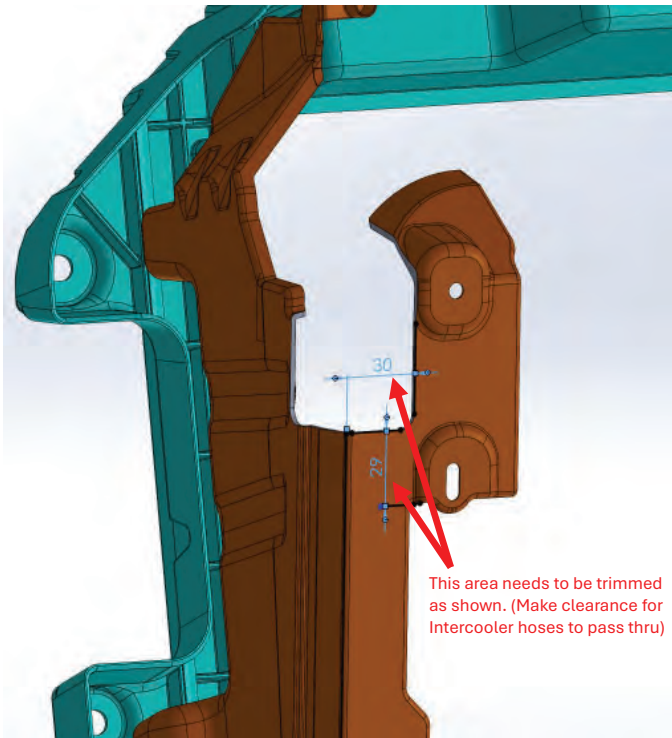
## **2021+ F-150 S/C** **2<sup>ND</sup> SHEAVE** **BELT ROUTE**



### ***LH OEM Deflector Trim Instructions***



### ***LH OEM Deflector Trim Instructions***



## NOTES

## NOTES

## NOTES



**MAGNUSON**  
*SUPERCHARGERS*