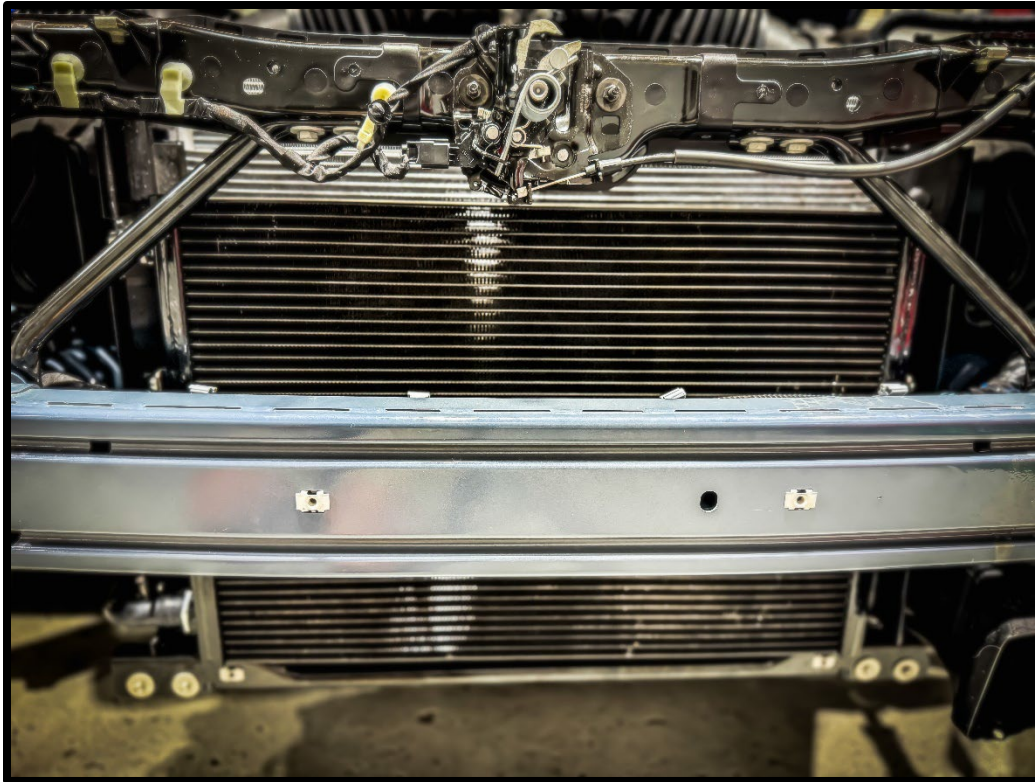




***HD LTR UPGRADE INSTALLATION MANUAL***

***2024 AND UP S650 FORD MUSTANG***



***WHIPPLE SUPERCHARGERS***

*3292 NORTH WEBER AVE*

*FRESNO, CA 93722*

*TEL 559.442.1261*

*FAX 559.442.4153*

[WWW.WHIPPLESUPERCHARGERS.COM](http://WWW.WHIPPLESUPERCHARGERS.COM)

*A COLOR PDF OF THIS MANUAL IS AVAILABLE, EMAIL  
[TECH@WHIPPLESUPERCHARGERS.COM](mailto:TECH@WHIPPLESUPERCHARGERS.COM) FOR A COPY*

## **INTRODUCTION**

Please read the installation manual and verify that all items are present. If you are missing hardware or have any questions, please contact your dealer or Whipple Superchargers.

## **RECOMMENDED TOOLS AND SUPPLIES**

The following items are not included in this supercharger kit and it is strongly recommended that they're used for ease of installation or maximum performance:

### **Tools**

1/4" and 3/8" torque wrenches. Safety glasses, metric wrench set, 1/4", 3/8", flat head and drain pan (for coolant). Trim pad tool (for pushpin removal). Clean shop towels.

### **Tie Straps**

These will be useful for securing the wiring harness away from the installation area as directed in the instruction manual. They are inexpensive and will be very handy during installation. You will need an assortment of 8" and 12".

### **Sealants, Chemicals and Lubricants**

Assembly lubricant (white lithium grease or petroleum jelly).

You'll be required to fill your intercooler system with approx. 2.5 gallons of **DISTILLED** water and Ford Factory specification engine coolant. This is not supplied in the kit, you can find engine coolant at any local auto parts store. **NEVER USE TAP WATER**, as it can corrode and create poor performance.

## **SAFETY PRECAUTIONS**



### **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 personally injury or death. Read each step of the installation manual carefully before starting the installation.

- Always wear safety glasses for eye protection.
- Place the ignition switch in the off position.
- Always apply the parking brake when working on vehicle.
- Block the front and rear tire surfaces to prevent unexpected vehicle movement.
- Operate the engine only in well-ventilated areas to avoid exposure to carbon monoxide.
- Do not smoke or use flammable items near or around fuel system.
- Use chemicals and cleaners only in well-ventilated areas.
- Batteries can produce explosive hydrogen gas which can cause personal injury. Do not allow flames, sparks or flammable sources to come near the battery.
- Keep hands and any other objects away from the radiator fan blades.
- Keep yourself and your clothing away from moving parts when the engine is running.
- Do not wear loose clothing or jewelry that can be caught in rotating or moving parts.

## GLOSSARY OF TERMS

ABBREVIATION	DESCRIPTION
ACT	Air Charger Temperature
DTC	Diagnostic Trouble Code
ECT	Engine Coolant Temperature
EGR	Exhaust Gas Recirculation
ETC	Electronic Throttle Control
EVAP	Evaporative emissions system
FHSCS	Flat Head Socket Cap Screw
IAT	Inlet Air Temperature
IC	Intercooler
ID	Internal Diameter
LB-IN	Pound-force inch
LB-FT	Pound-force foot
LTR	Low temp radiator
MAF	Mass Air Flow
MAP	Manifold Absolute Pressure
MY	Model Year
OBD	On Board Diagnostics
OD	Outside Diameter
PCV	Positive Crankcase Ventilation
PSI	Pound per Square Inch
SC	Supercharger
SHCS	Socket Head Cap Screw
TPS	Throttle Pressure Sensor
TRQ	Torque



**\*\*NOTICE:** Installation of Whipple Supercharger products signifies that you have read this document and have agreed to the terms stated within.

*It's the purchaser's responsibility to follow all installation instruction guidelines and safety procedures supplied with the product as it's received by the purchaser to determine the compatibility of the product with the vehicle or the device the purchaser intends to install the product on.*

*Whipple Superchargers assumes no responsibility for damages occurring from accident, misuse, abuse, improper installation, improper operation, lack of reasonable care or all previously stated reasons resulting from incompatibility with other manufacturer's products.*

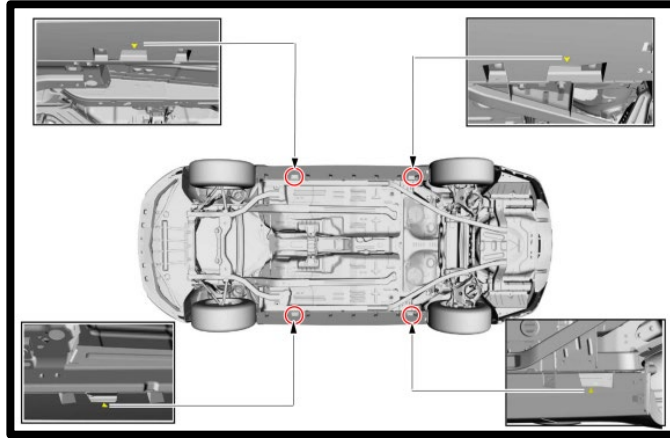
*There are no warranties expressed or implied for engine failure or damage to the vehicle in any way, loss of use or inconvenience or labor reimbursement. This includes merchantability and fitness.*

*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. Whipple Superchargers reserves the right to revise the information presented herein or to discontinue the production of parts described at any time.*

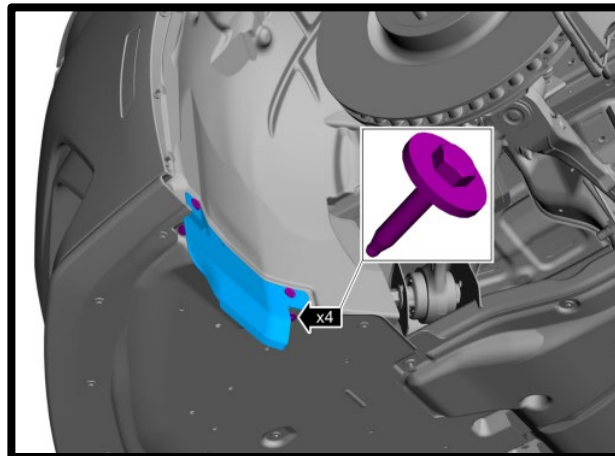
## INSTALLATION INSTRUCTIONS

It is strongly recommended that you read through this guide **before** you begin installing your performance parts.

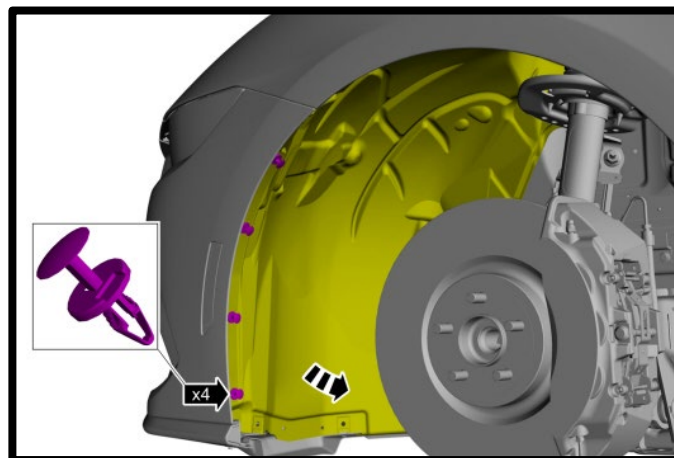
1. Lift the front of the vehicle using the Ford recommended lifting points and place on safety stands. It's recommended to remove the front wheels for easier access to front fascia.



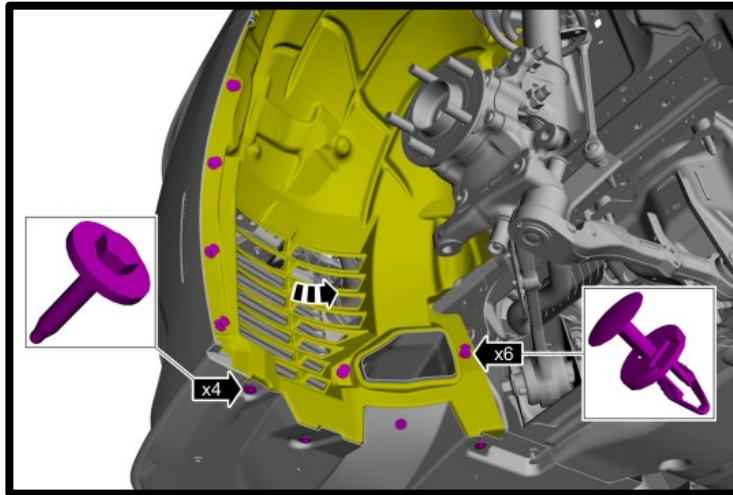
2. On both sides, remove the (4x) fasteners from body side front shield.



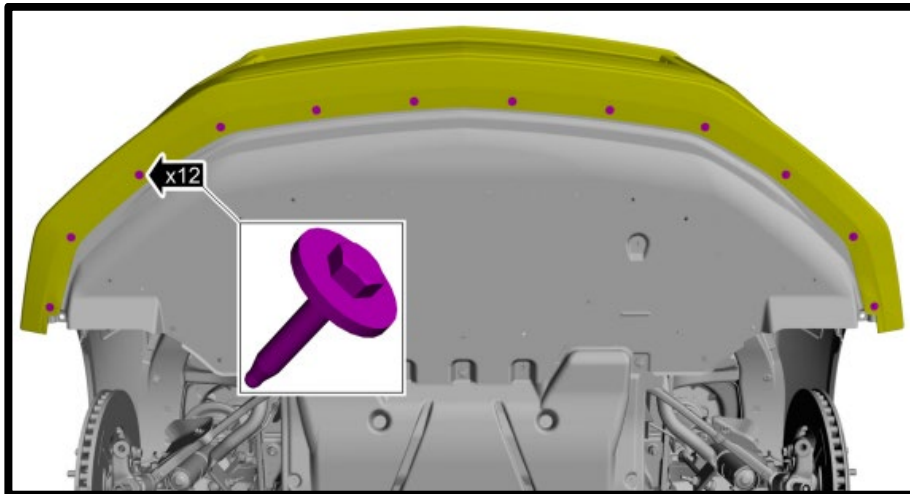
3. **(GT ONLY)** On both sides, remove the (4x) push pins and position aside the front fender splash shield.



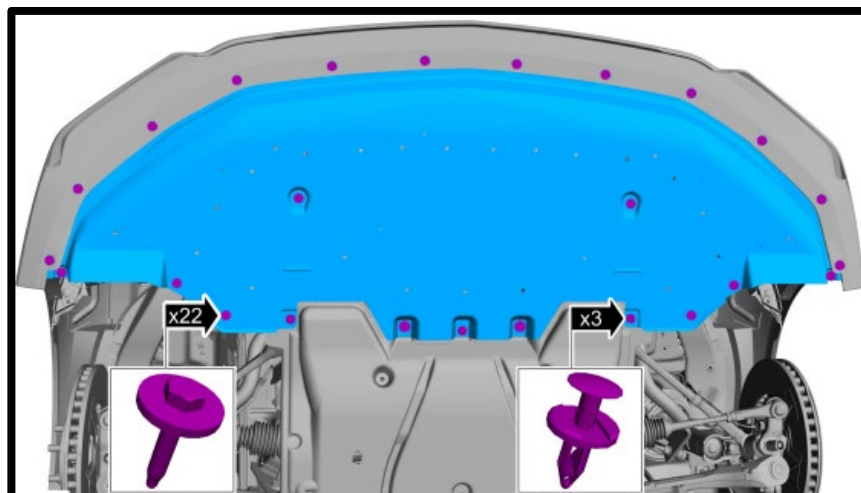
4. **(DARK HORSE)** On both sides, remove the (4x) fasteners and (6x) push pins from front fender splash shield.



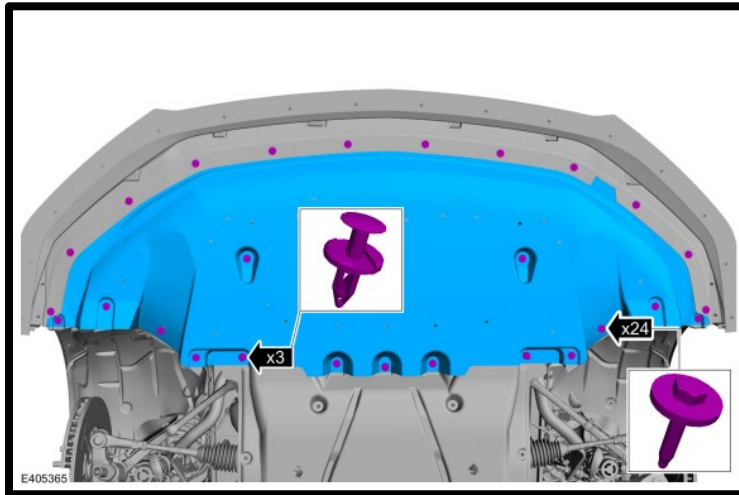
5. **(GT ONLY)** Remove the (12x) fasteners from the front chin splitter.



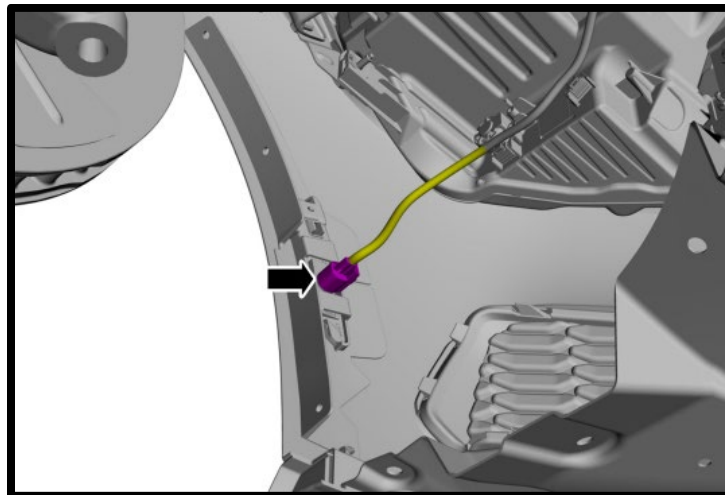
6. **(GT ONLY)** Remove the (22x) fasteners and (3x) push pin from the underbody shield. Remove shield from vehicle.



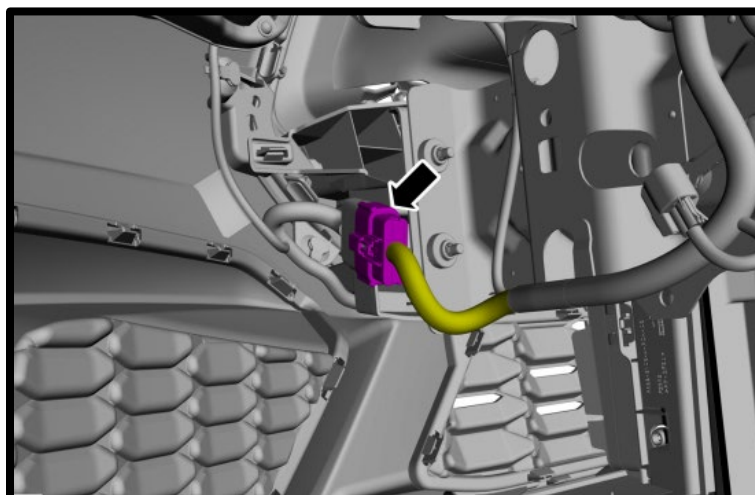
7. **(DARK HORSE)** Remove the (24x) fasteners and (3x) push pins from underbody shield.



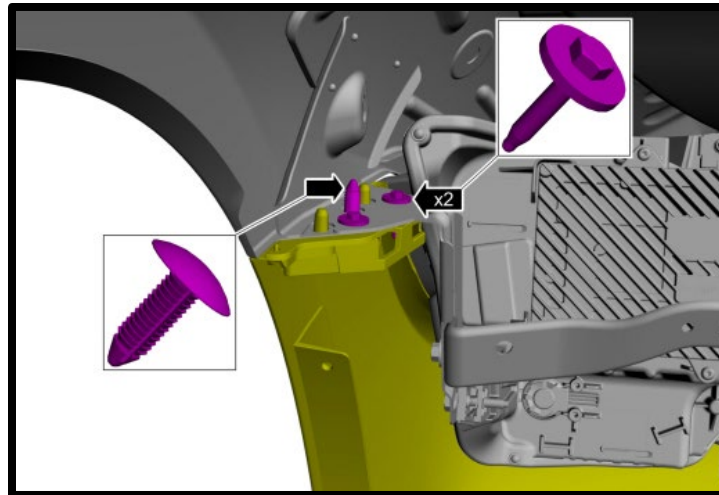
8. On both sides, disconnect electrical connector from front marker light.



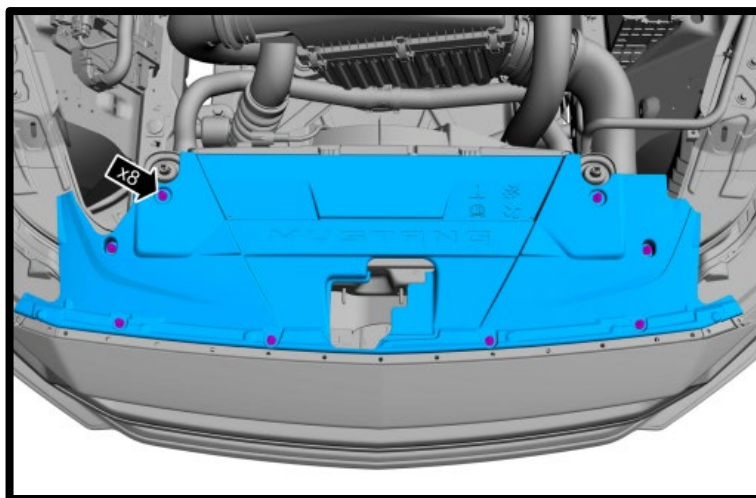
9. Disconnect the front bumper cover electrical connector.



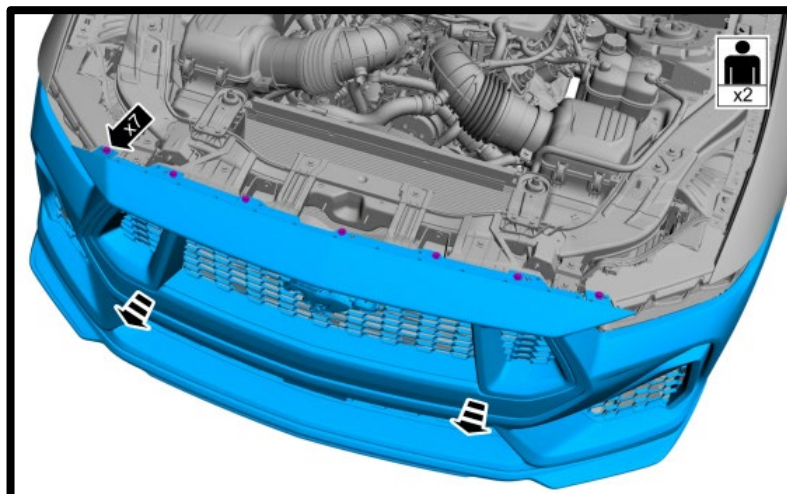
10. On both sides, remove the front bumper cover to fender push-pin and the bolts.



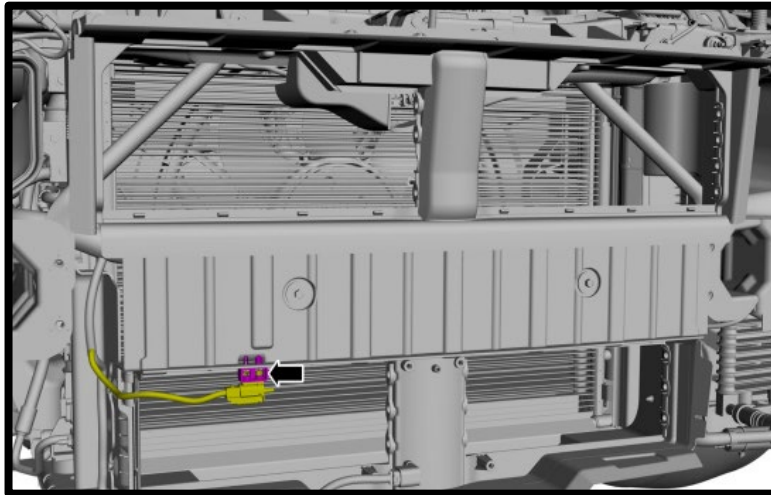
11. Remove the radiator sight shield by removing the (8x) push pins. Use a flat head screwdriver to pry the center head up. These will all be reused.



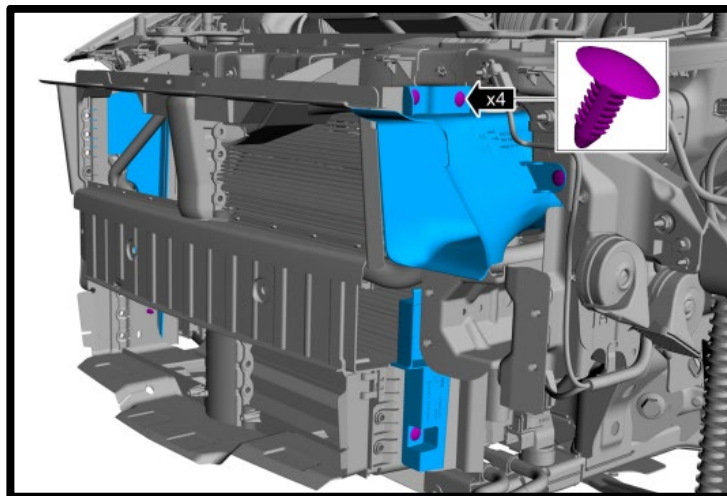
12. Remove the (7x) fasteners from fascia. Carefully pull the fascia forward.



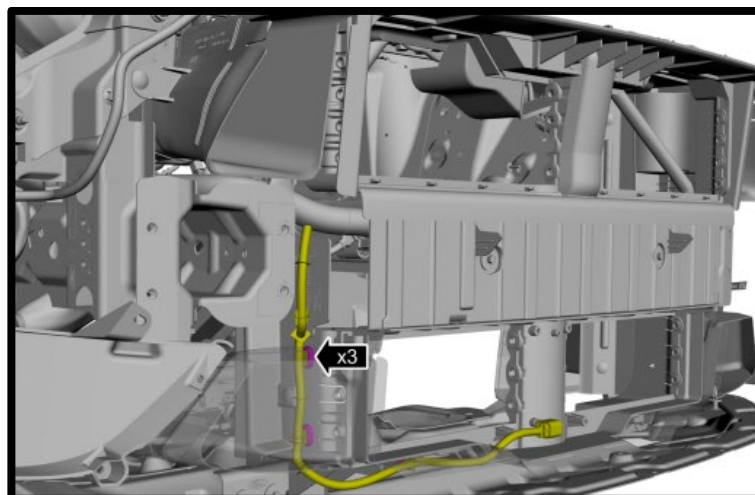
13. If equipped, disconnect the ambient air temperature sensor.



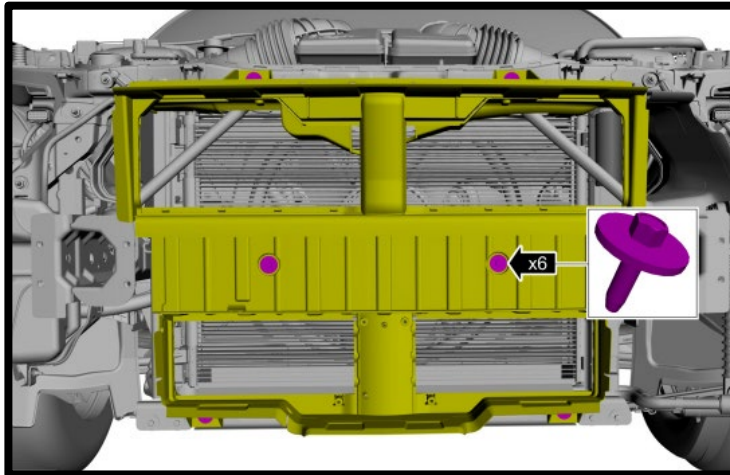
14. Remove the retainers (4x per side) from air ducts and remove ducts.



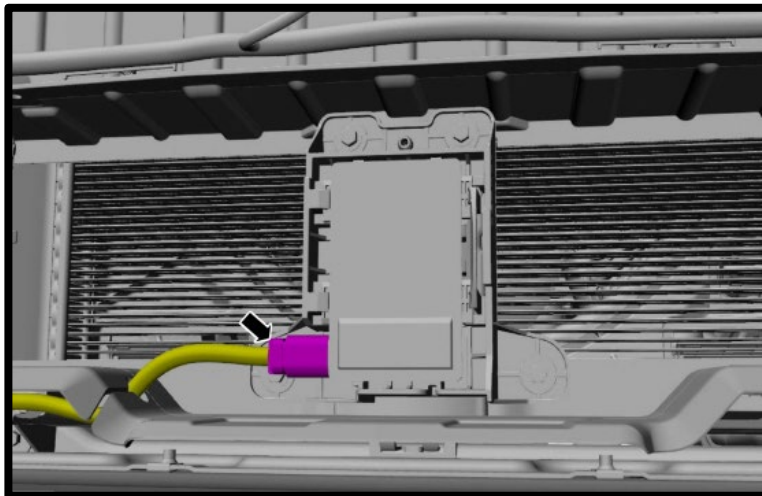
15. Detach wiring harness retainers (3x) and position aside.



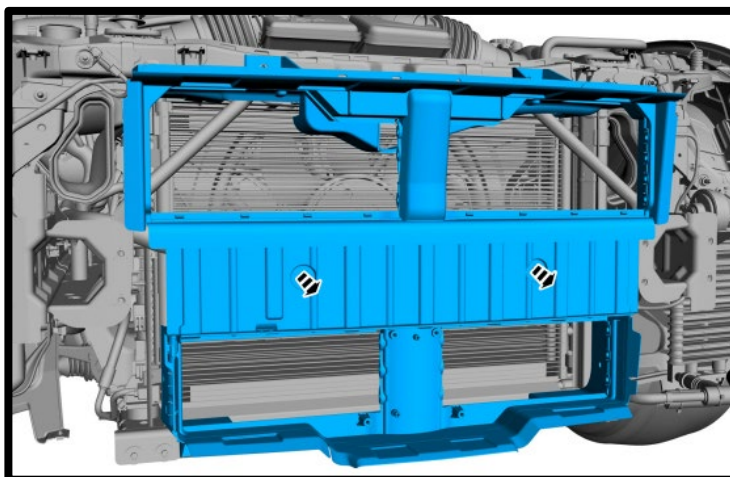
16. Remove the (6x) bolts and position active grille shutter forward.



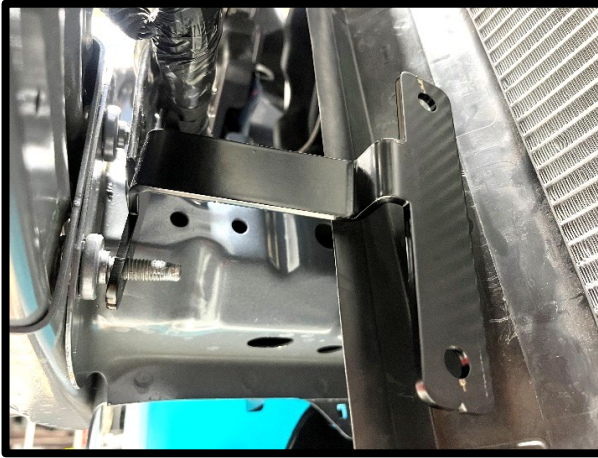
17. If equipped, disconnect the CCM wiring connector.



18. Remove the active grill shutter from vehicle. **NOTE:** Shell is reused.



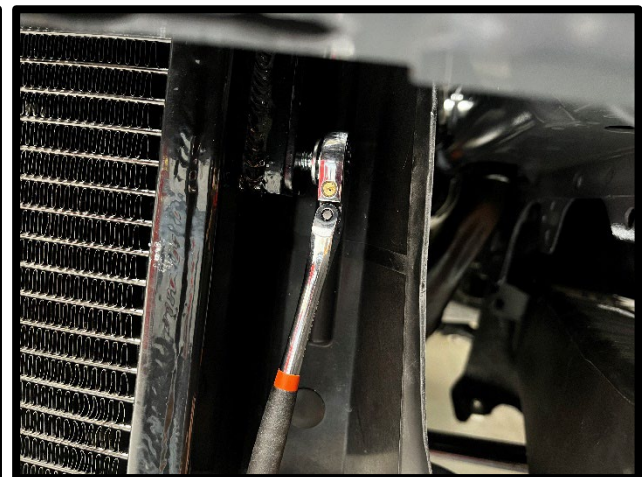
19. Install the supplied LTR mounting brackets to the factory bolt threads, behind bumper support. Use #3103457-01 on LH side, #3103457-02 on RH side. Secure using the (4x) 8mm flanged nuts. Leave slightly loose for LTR installation.



20. Using light amount of assembly grease or silicone, install the (2x) 3-916 orings to the (2x) 16AN to 3/4" barb fittings. Install fittings to LTR.



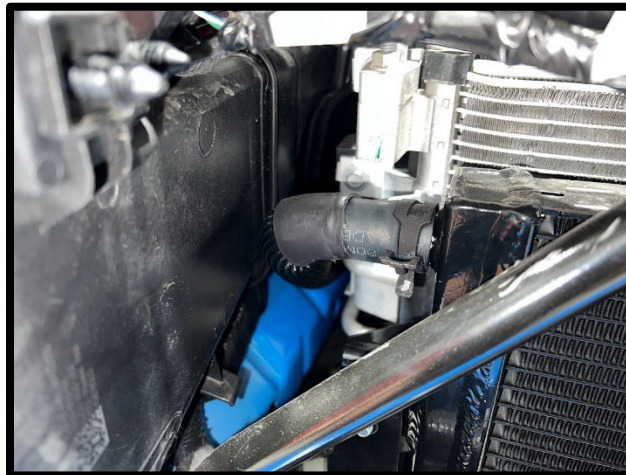
21. Install the LTR from the bottom, up to the brackets temporarily to notch the plastic closeout on RH side. Temporarily secure using supplied (4x) 8mm x 16mm HHFCS bolts. Notch for hose and fitting clearance. Once notched, center LTR and secure fasteners. **NOTE:** Use a ratchet wrench to secure LTR to bracket.



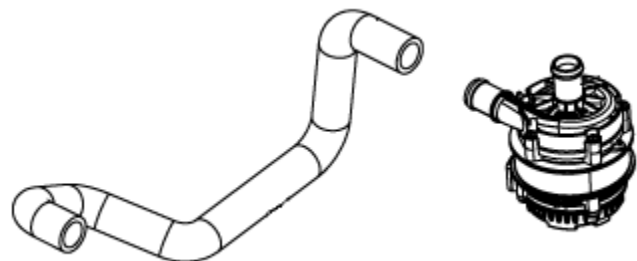
22. In some cases, you may need to adjust the radiator support bracket due to manufacturing variances. Ensure you have .25" clearance between support and bottom of LTR.



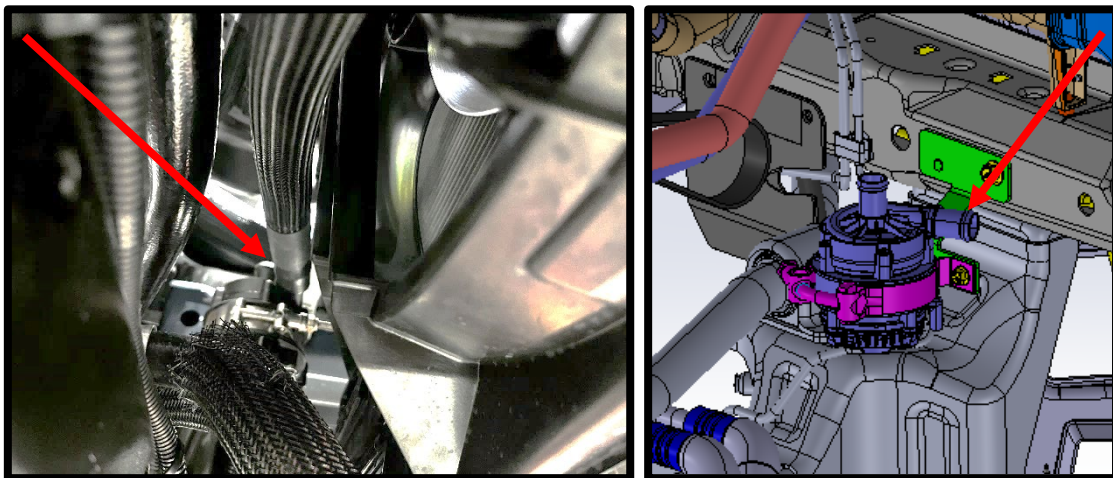
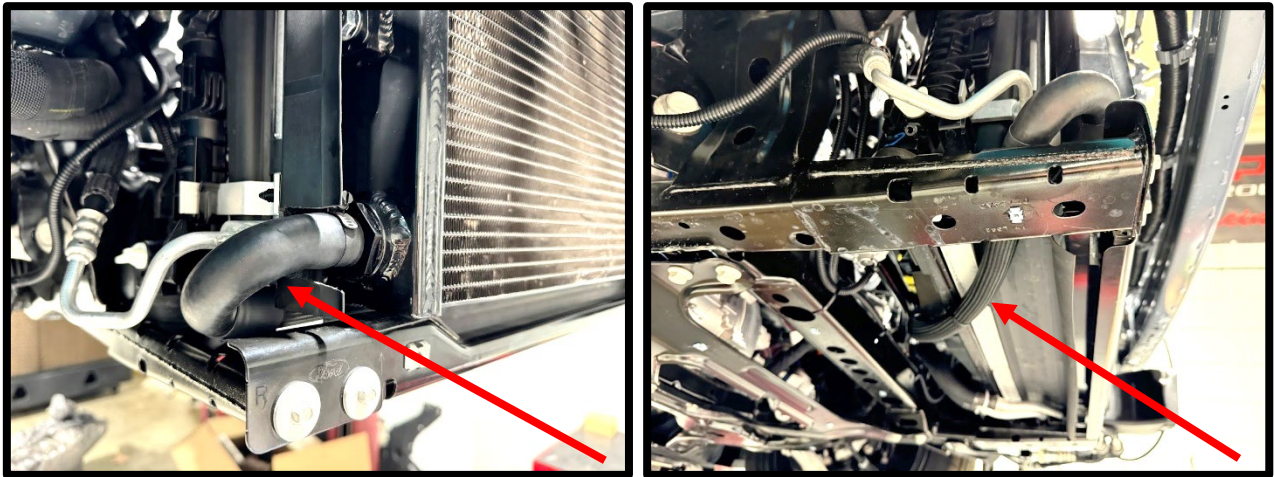
23. Install the original outlet hose to new LTR using original clamp.



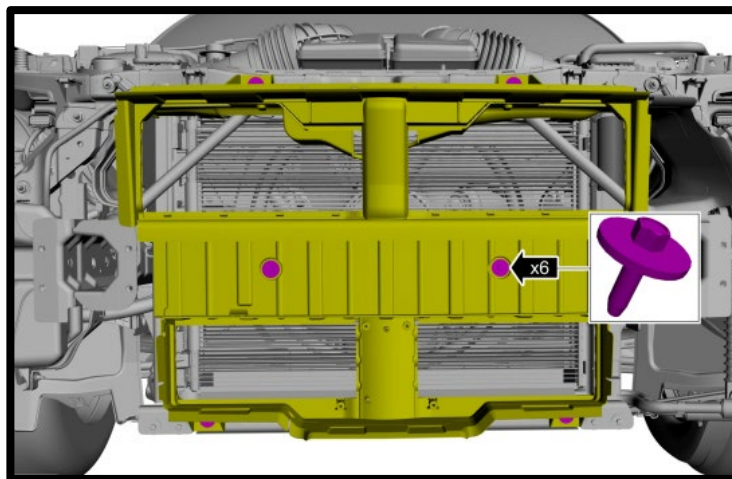
24. **(DUAL PUMP)** Install supplied hose from LTR bottom **OUTLET** fitting to new IC pump outlet and secure with clamps.



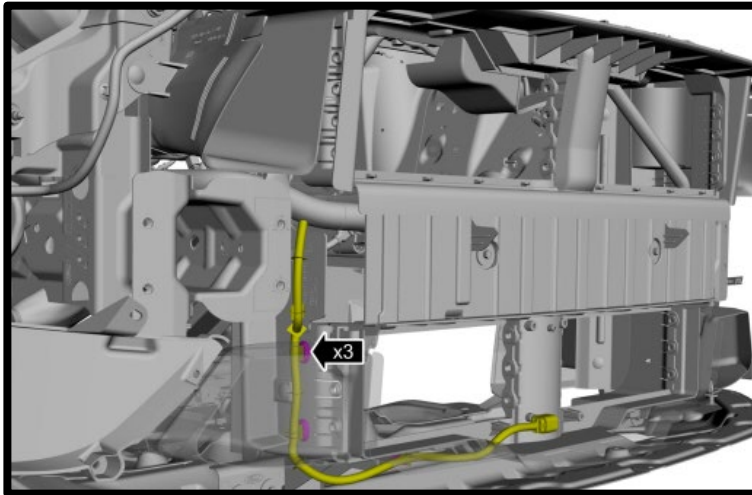
25. (**SINGLE PUMP**) Secure 180deg end to bottom LTR port using original hose clamp. Route the supplied hose from LTR bottom fitting to IC pump **OUTLET** fitting.



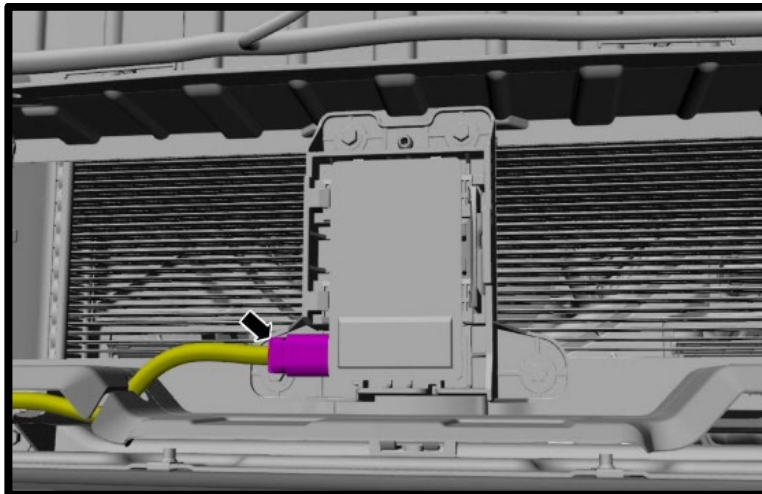
26. Install the (6x) bolts and position active grille shutter **SHELL ONLY (shutter grilles are NOT reused)**. Torque to 71 lb-in.



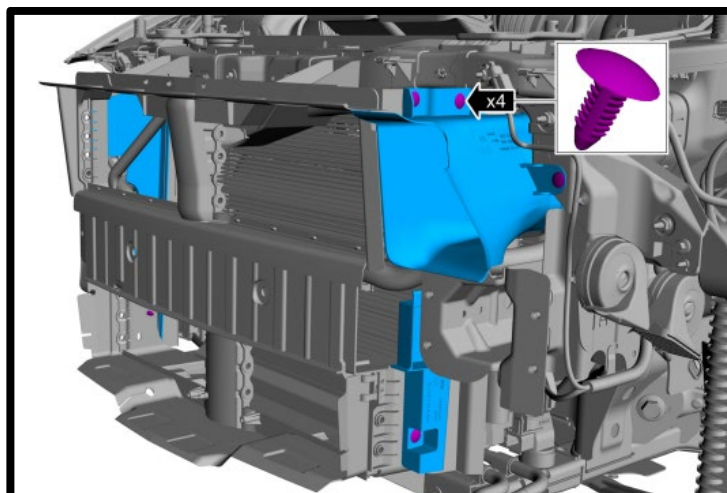
27. Attach wiring harness retainers (3x) if equipped.



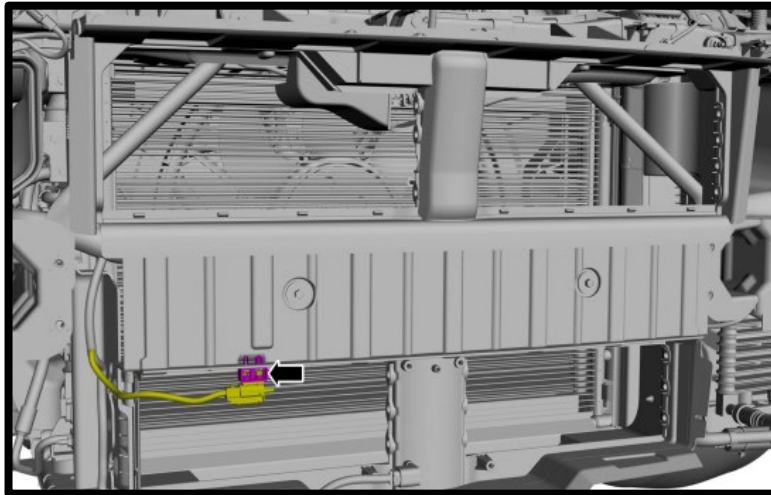
28. If equipped, reconnect the CCM wiring connector.



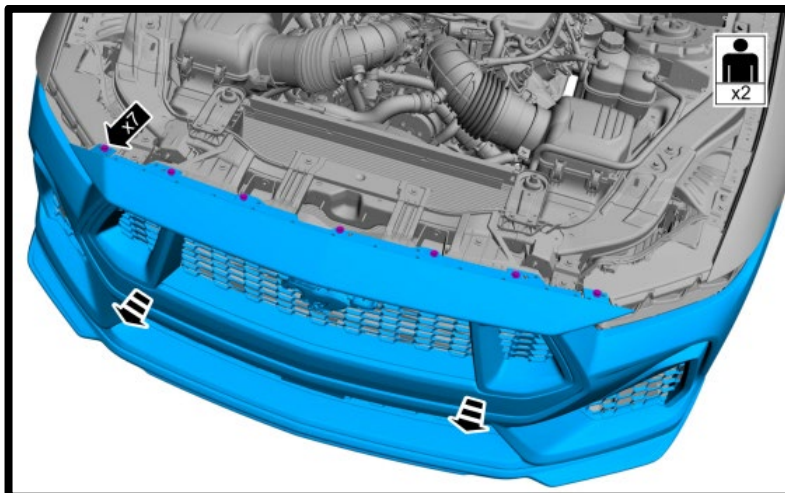
29. Reinstall airbox air ducts with stock retainers (4x per side).



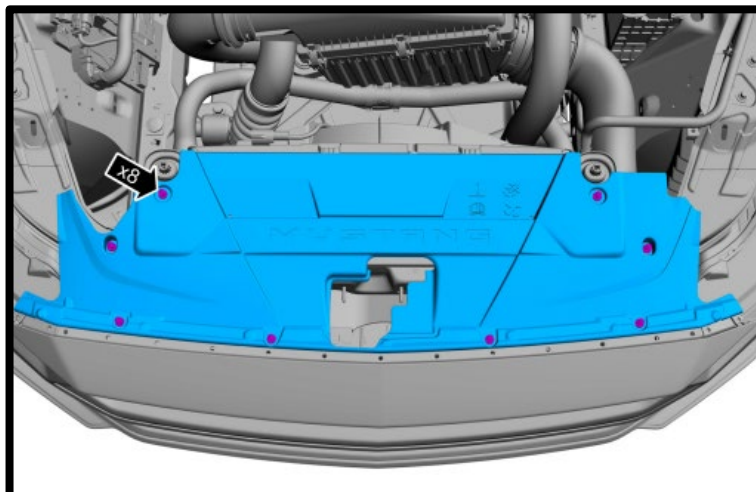
30. If equipped, connect the ambient air temperature sensor.



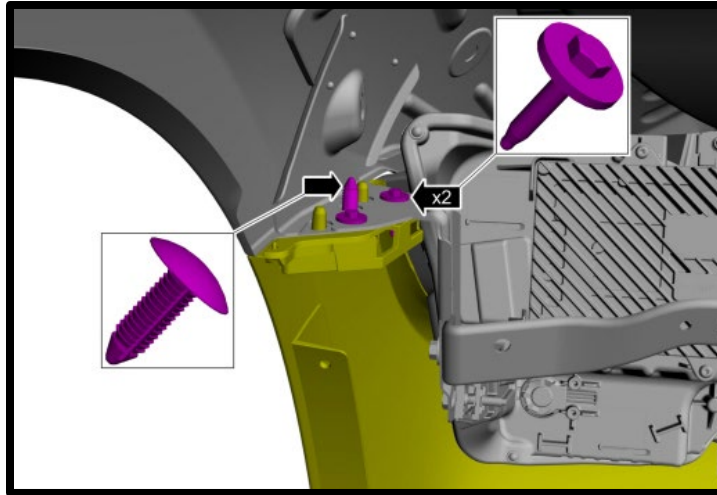
31. Install the (7x) fasteners from fascia.



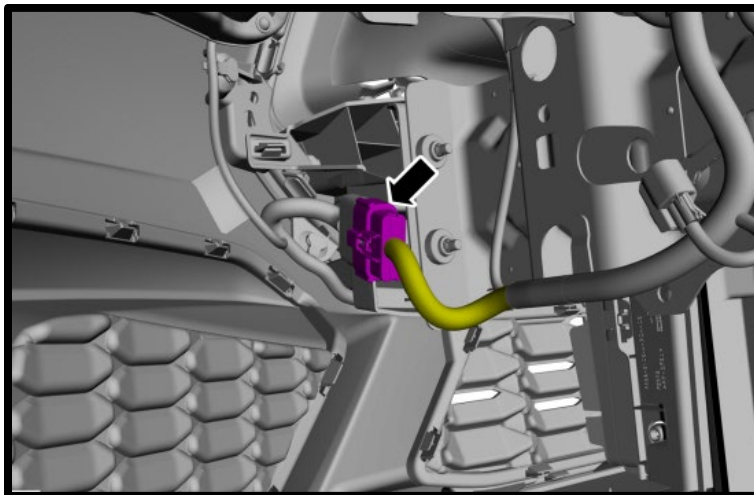
32. Install the radiator sight shield, secure using the (8x) push pins.



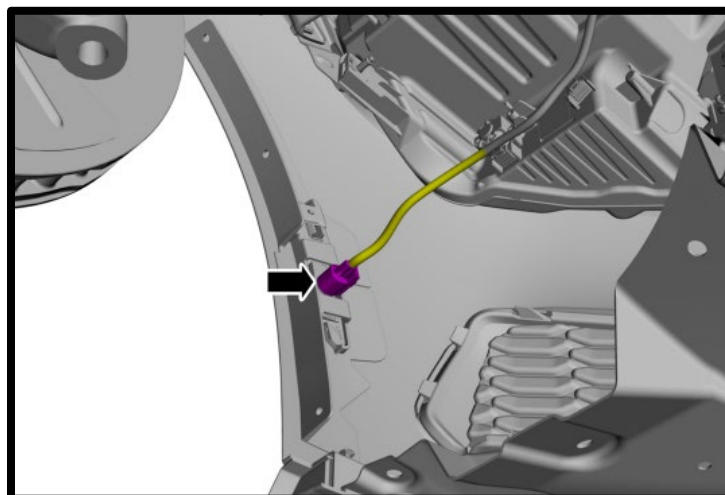
33. On both sides, install front bumper cover to fender with original push-pin and the bolts. Torque to 44 lb-in.



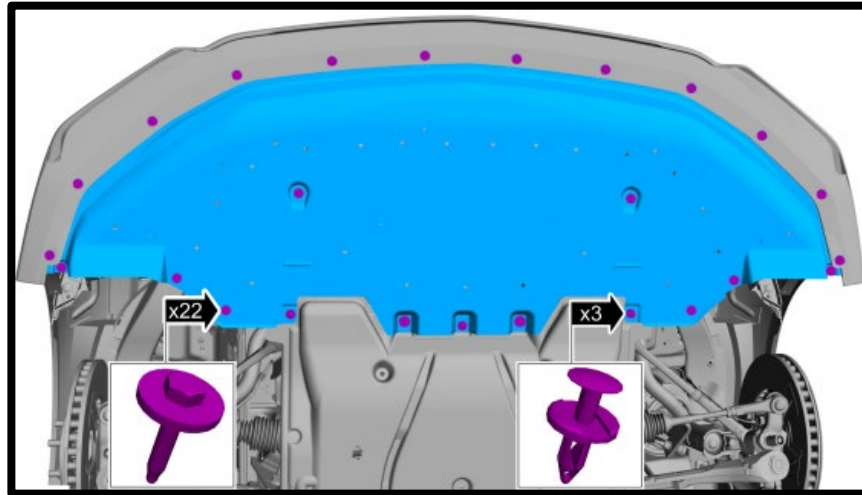
34. Connect the front bumper cover electrical connector.



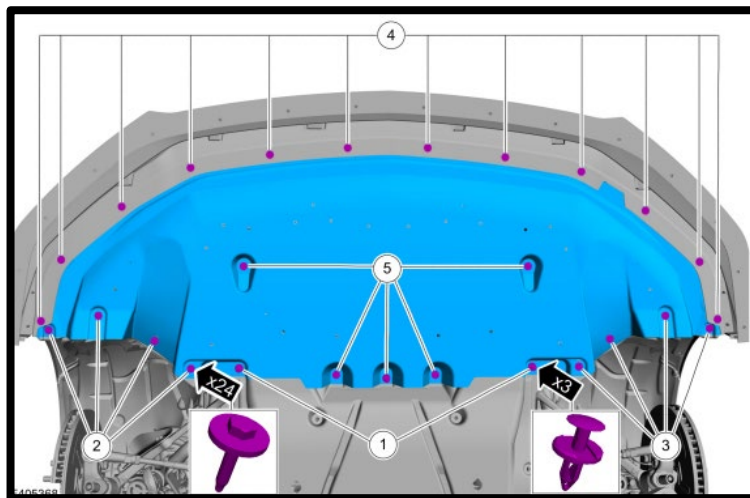
35. On both sides, connect front marker lights.



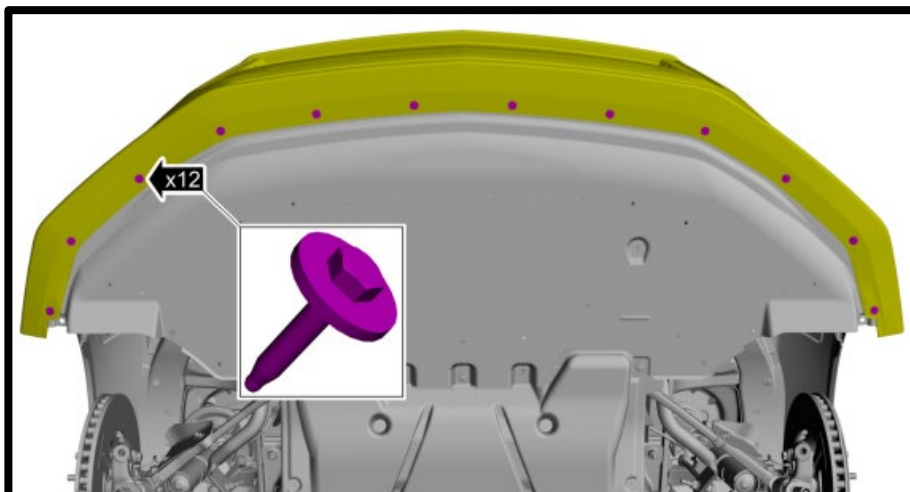
36. **(GT ONLY)** Install the (22x) fasteners and (3x) push pins, torque to 18 lb-in.



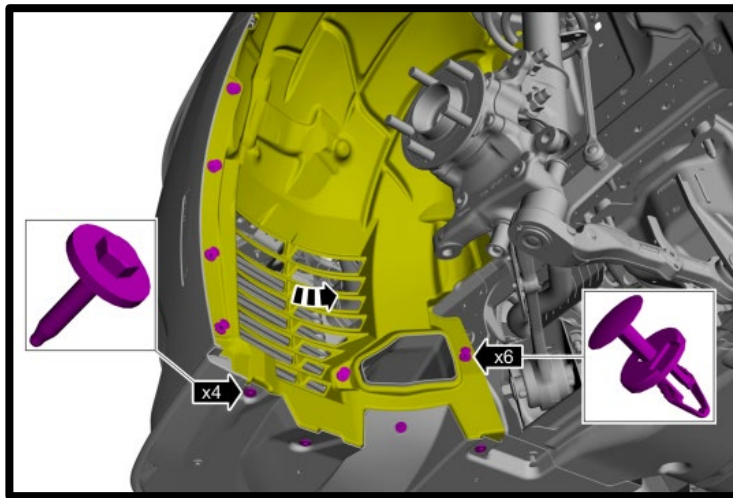
37. **(DARK HORSE)** Install under shield and chin spoiler in the following order, torque to 18 lb-in.



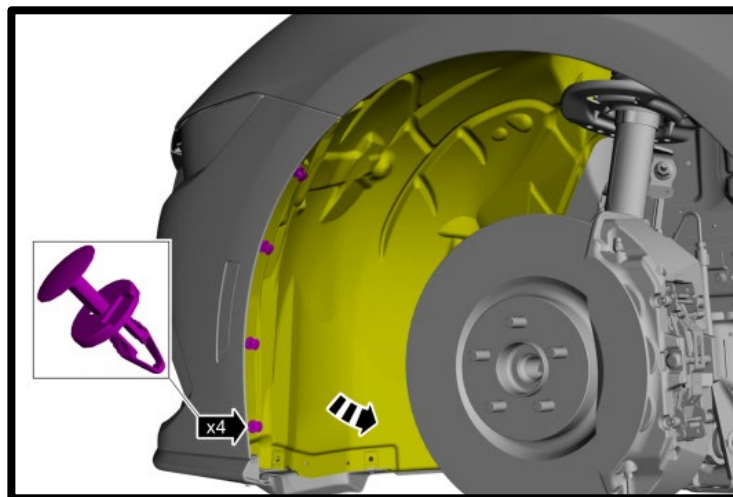
38. **(GT ONLY)** Install the (12x) fasteners to front chin splitter, torque to 18 lb-in.



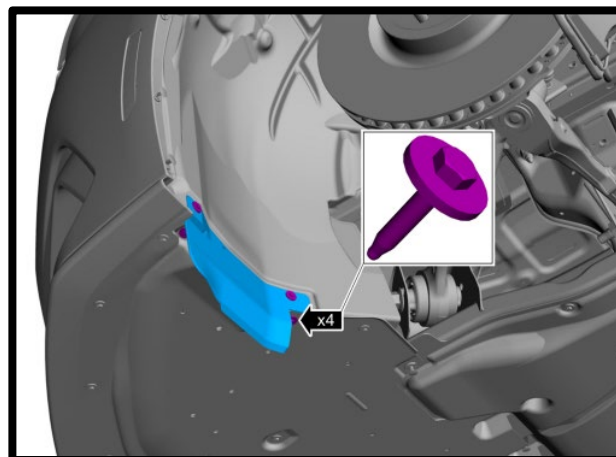
39. **(DARK HORSE)** On both sides, install the (4x) fasteners and (6x) push pins to front fender splash shield, torque to 18 lb-in.



40. **(GT ONLY)** On both sides, install the (4x) push pins to front fender splash shield.



41. On both sides, install the (4x) fasteners to body side front shield, torque to 18 lb-in.





The electric water pump used on the Whipple SC system has a built-in micro-processor that will vary pump cycle speed when air bubbles are present in the system. If air is trapped in the system, the pump may cycle at a lower speed while it cavitates, resulting in poor cooling performance, lower power and potentially dangerous conditions.

**For the best result, it is highly recommended to use a Radiator Cooling System Vacuum Purge and Refill Kit to properly evacuate the air from the intercooler system before filling the 50/50 mixture of coolant and distilled water. If one is not available, the following procedure will be adequate.**

42. Using a Lisle 24680 Spill-Free Funnel, or equivalent, secure the appropriate filler neck adapter to the filler neck.
43. Attach the funnel and fill with a 50/50 mixture of coolant and distilled water until the funnel is half full. Whipple recommends Ford Motorcraft Orange or Zerex G-05 to match the stock color. Whipple also recommends 1 bottle of Red Line Water Wetter or equivalent. Note: The Whipple IC system is compatible with all common types of antifreeze. Never use tap water, this will cause corrosion and destroy the system.
44. Turn the ignition to the **ON** position, after a brief delay, the electric pump motor will cycle. Air bubbles will begin to rise to the filler tee as the coolant level drops, continue to fill while pump is running. Once it's done filling, turn the ignition key **OFF**, the level will drop, top off with fluid. Reinstall filler cap and turn the ignition **ON** and let run for 15 seconds. Turn key **OFF**, remove cap to release air. Repeat until the filler tee holds at the cold fill level with key **OFF**. To build more pressure in the intercooler system, try squeezing the intercooler hoses while the pump is cycling. Building pressure in the system will help push the trapped air from the intercooler system to the filler tee. It also helps to lift the filler neck 4"-8" higher than its mount to help purge the air. **NOTE:** Do not let the coolant level in the funnel run empty as this may introduce more air into the system.
45. Cycle the ignition to the ON position again and repeat until the sound of the electric pump is continuous without pulsation and the fluid level is between  $\frac{1}{2}$  to  $\frac{3}{4}$  full. **NOTE: During water pump start-up, it is normal for a slight pulsation to occur. Once the pump has reached its maximum cycle speed, no pulsations should be present. If any pulsations occur, there is air in the system. NEVER GO WOT UNTIL AIR IS BLEDED OUT!**
46. Several drive cycles may be required to completely purge the air from the intercooler system. During a drive cycle, the intercooler system will build up pressure as the supercharger temperature increases. Any residual air trapped in the system will have to be bled out when the cap is removed. Use a rag when removing in case there is excess pressure. **TIP: Never go WOT until air has been bled from IC system, engine failure could occur if not bled properly.**

**WARNING: Always avoid removing the filler neck cap when the system is hot. The hot coolant is under pressure and may spray out causing burns.**

**WARNING: Triple check that the intercooler system is properly bled. Failure to do so can result in engine damage. Turn ignition on, let the pump run for 60 seconds, there should be zero cavitation during this test.**

47. Test drive vehicle for the first few miles under normal driving conditions. Listen for any noises, vibrations, engine misfire or anything that does not seem normal. Use the Tomahawk tool for logging and checking performance. Using the Whipple List, monitor the MCT (manifold charge temp), this should stay between 0-40deg above ambient, if it exceeds this, you will need to continue to bleed the air out of the intercooler water system.