

# INSTALLATION INSTRUCTIONS

## FORD COYOTE/VOODOO FUEL RAILS

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Document# 19-0491

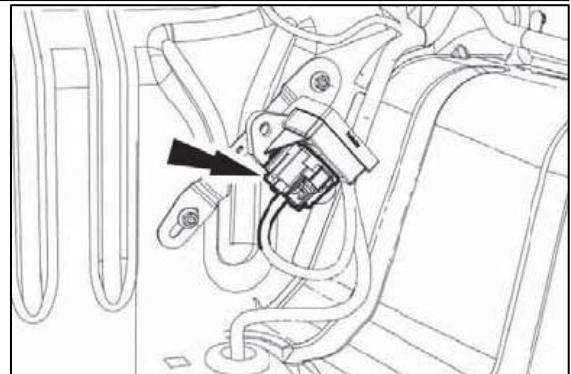
**WARNING: DO NOT EXPOSE WORK AREA TO ANY SPARKS OR FIRE. DO NOT SMOKE WHILE OPERATING ON THE FUEL SYSTEM. CLEAN UP ALL FUEL SPILLS IMMEDIATELY. WORK IN A WELL VENTILATED AREA.**

1. If accessible, refer to the factory Ford Service Manual for disassembly questions.

To relieve fuel pressure, disconnect the Fuel Pump Control Module electrical connector (as shown). Start and idle the vehicle and allow the engine to stall. Turn the ignition OFF and remove the key.

Disconnect the battery's (-) negative terminal.

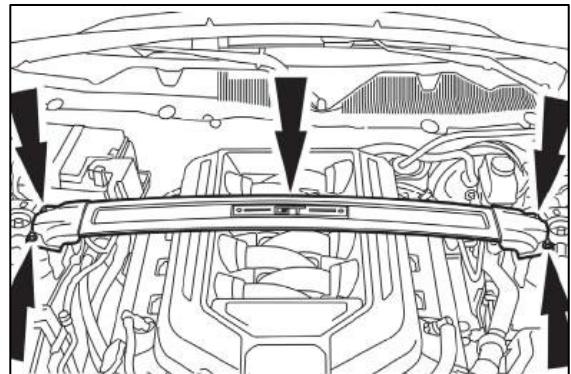
Install fender covers to protect the paint and body.



2. If equipped, remove the 4 nuts and the strut tower cross brace (shown). Reinstall the 4 nuts and torque to 35Nm. Remove the cosmetic engine cover.

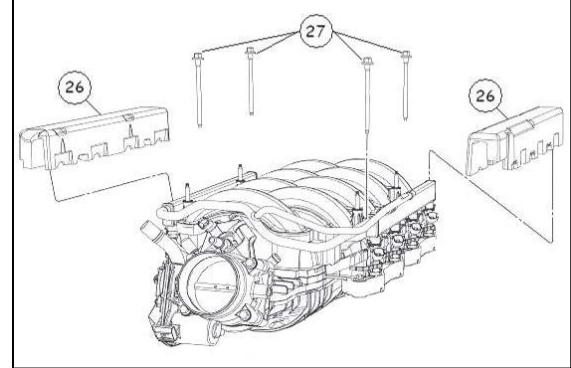
Remove the air intake ducting from the throttle body and any vacuum lines connected to the upper intake manifold and position them out of the way. Check for any dirt or debris around the fuel injectors and wash it off with solvent parts cleaner and a clean shop towel.

After the engine has cooled, place shop towels down and unplug the 3/8" SAE quick connect fuel supply hose from the LH fuel rail (and RH fuel rail for 2018+ only) by unlatching the lock. Catch any fuel that spills.



3. Remove the fuel rail insulation (shown 26). Disconnect the 8 injector connectors and fuel sensor (if applicable). Using a 10mm socket wrench, remove the 4 fuel rail screws (shown 27). To prevent fuel from draining, keep all injectors installed to the fuel rails and carefully remove the entire assembly from the vehicle. Clean out any dirt or debris found in the intake manifold injector seat bores.

On a workbench, carefully remove the OEM injector retaining clips. Pull each injector out. Inspect the O-rings and replace, if necessary. If applicable, unscrew the OEM fuel sensor from the rail. Drain excess fuel into a safe container for disposal.



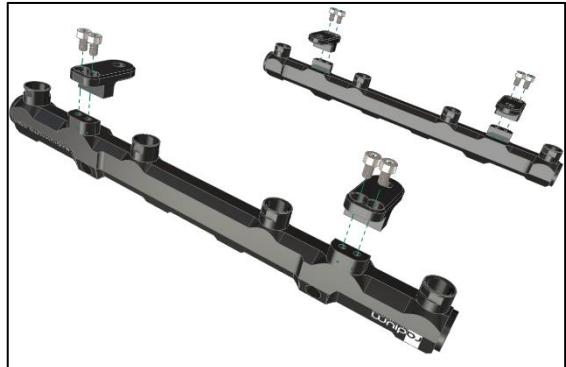
4. As shown, there are 2 sets of four billet mounting feet and eight M5x0.8mm socket head screws provided with the fuel rails.

The 4 mounting feet shown at the top are for Coyote intake manifolds specifically found in 2021+ F150 trucks.

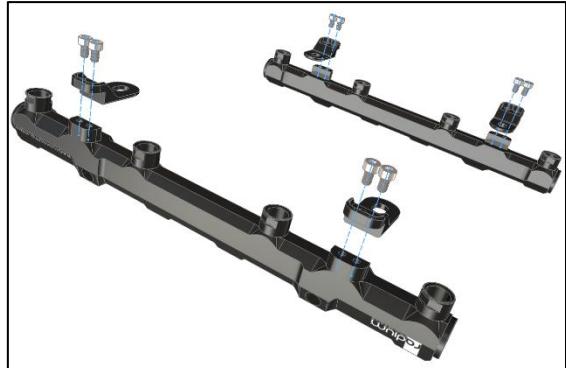
The 4 mounting feet shown at the bottom are for all other Coyote intake manifolds.



5. For the 2021+ Ford F150 V8 (only), install these specific mounting feet in the orientation shown. Apply a medium-strength thread locker to the 8 screws and secure using a 4mm Allen wrench.

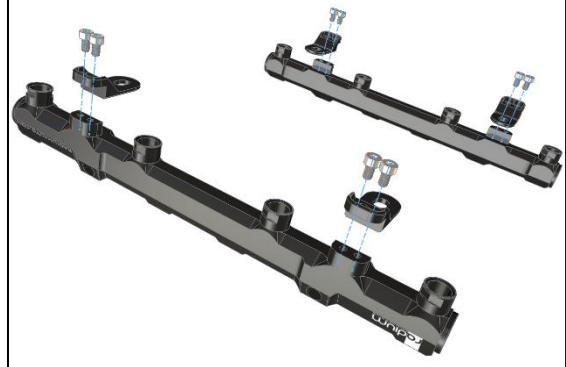


6. For all other Coyote intake manifolds, install these specific mounting feet in the orientation shown. Apply a medium-strength thread locker to the 8 screws and secure using a 4mm Allen wrench.



7. The 20-1433 fuel rails do NOT come with adapter fittings. Unless the 20-1433-PK plumbing kit was purchased, fittings will need to be purchased separately.

It is recommended to install the fittings to the fuel rails prior to installing the fuel rails to the intake manifold. The fuel rail plumbing kit instructions start in the following step. NOTE: The intake manifolds are only shown as a reference for the proper fitting port location.

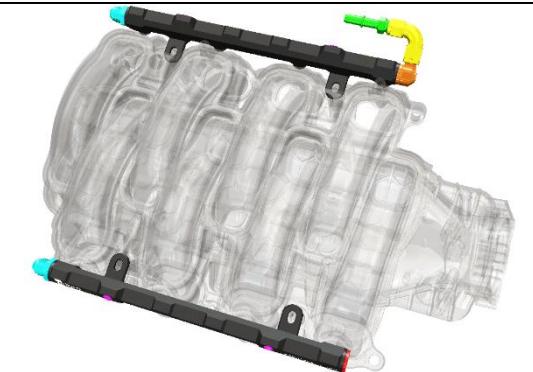


8. Follow below if installing the 20-1433-PK into a 11-17 Ford Mustang.

Install all four 1/8" NPT plugs (purple) into the side ports. First, apply PTFE paste to the threads. Next, hand tighten each fitting. Now add 1.5 to 3 turns using a 3/16" Allen wrench. NOTE: Threads will show even when tight.

Install one 8AN ORB plug (red) to the front RH port, the banjo fitting (orange) to the front LH port, and the 8AN fittings (blue) to the rear ports. Lubricate the O-rings and secure using a 5/16" Allen wrench, a 4mm Allen wrench and a 7/8" wrench, respectively.

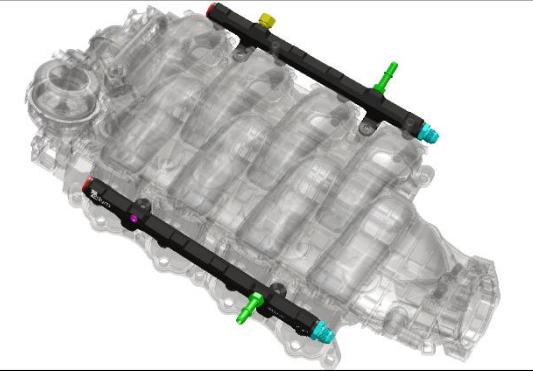
Install the quick connect (green) to the 90deg coupler (yellow), and the 90deg coupler to the banjo fitting. Secure using a 3/4" wrench, a 11/16" wrench, and a 13/16" wrench, respectively.



9. Follow below if installing the 20-1433-PK into a 2018+ Ford Mustang.

Install an 1/8" NPT plug (purple) into the rear RH side port, the 1/8" NPT sensor adapter to the rear LH side port, and the 1/8" NPT quick connect fittings (green) into the front side ports. First, apply PTFE paste to the threads. Next, hand tighten each fitting. Now add 1.5 to 3 turns using a 3/16" Allen wrench, 3/4" wrench, and 5/8" wrench, respectively. NOTE: Threads will show even when tight.

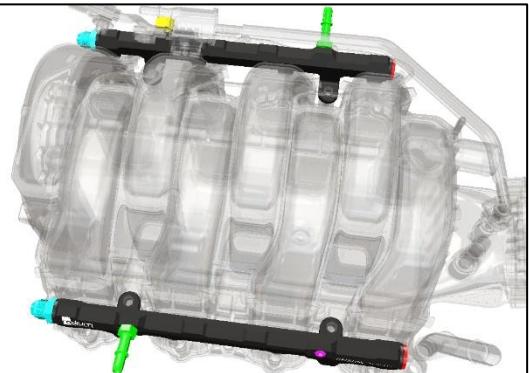
Install the 8AN ORB plugs (red) to the rear ports and the 8AN fittings (blue) to the front ports. Lubricate the O-rings and secure using a 5/16" Allen wrench and 7/8" wrench, respectively.



10. Follow below if installing the 20-1433-PK into a 2021+ Ford F150.

Install an 1/8" NPT plug (purple) into the front RH side port, the 1/8" NPT sensor adapter to the rear LH side port, and the 1/8" NPT quick connect fittings (green) into the front LH and rear RH side ports. First, apply PTFE paste to the threads. Next, hand tighten each fitting. Now add 1.5 to 3 turns using a 3/16" Allen wrench, 3/4" wrench, and 5/8" wrench, respectively. NOTE: Threads will show even when tight.

Install the 8AN ORB plugs (red) to the front ports and the 8AN fittings (blue) to the rear ports. Lubricate the O-rings and secure using a 5/16" Allen wrench and 7/8" wrench, respectively.

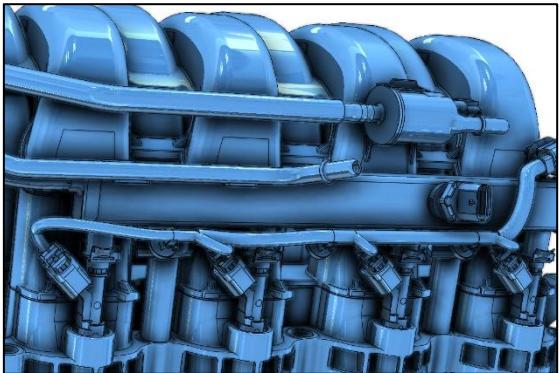


11. The Radium Engineering fuel rails are compatible with OEM Ford fuel injectors and equivalent aftermarket replacements that use 14mm upper O-rings.

Lubricate the top and bottom O-rings of each fuel injector and the injector bores with light oil. Fully insert the injectors into the fuel rail bores.



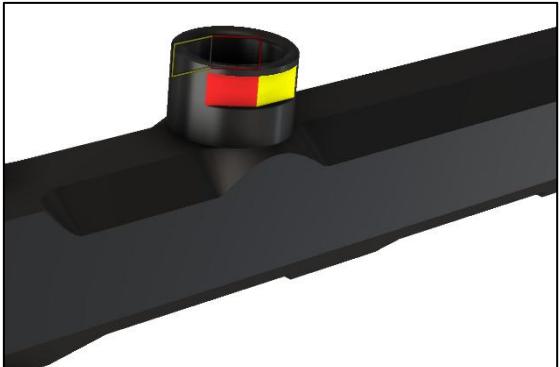
12. Prior to reinstalling the 8 OEM fuel injector retaining clips, it is important to position the fuel injectors exactly how they came from the factory. This is important for the injector wiring length to properly reach, but also for performance. For instance, the fuel injector from the 2021+ Ford F150 (shown) has a specific spray pattern that will not atomize as effectively if not clocked accordingly.



13. There are 2 possible injector directions (shown yellow and red). Properly orient the fuel injectors and reinstall the OEM retaining clips.

Position and line up each fuel rail over the intake manifold. Press firmly down and verify that the lower injector O-ring seal is fully inserted and seated. Once everything is positioned correctly, reuse the 4 OEM screws and torque to 7.1ftlbs (85inlbs, 9.6Nm) using a 10mm socket.

Plug in each of the fuel injector connectors (and fuel sensor if applicable).



14. Using a 7/8" wrench install the 8AN crossover hose.

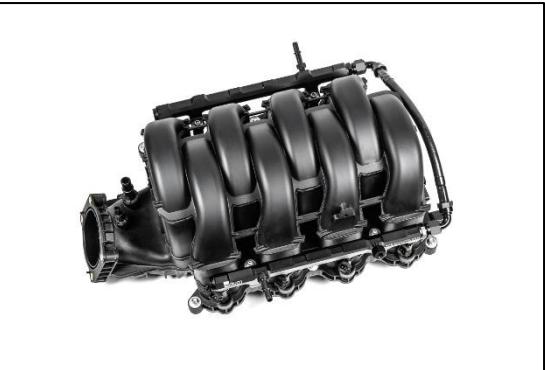
NOTE: For this application, the crossover hose routes along the backside of the intake manifold.



15. Because of the IMRC assembly on this application, the crossover hose routes along the frontside of the intake manifold.



16. For the truck intake manifolds, the crossover hose can be routed along the backside, as shown.



17. After everything is reinstalled, cycle the ignition a few times (without starting engine). This allows the fuel pump to prime the system.

**CHECK FOR LEAKS!** If no leaks are found, start the engine and check for leaks again while the engine is running. **NOTE:** If reusing the OEM fuel rail insulation, modification will be required.

**INSTALLATION COMPLETE**

