

INSTALLATION INSTRUCTIONS

FUEL PUMP HANGER

2011+ MUSTANG/SHELBY (S197/S550/S650)

Support: info@radiumauto.com

Document# 19-0161

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

1. This fuel pump hanger covers many years and a large range of Ford models and engines. These instructions may vary from the specific application getting worked on. **Fuel pressure should be checked prior to installation and mimicked after installation.** To reduce spills and make installation easier and safer, the gas tank should be drained.

The fuel pump is underneath the LH rear seat. Slide the front LH seat all the way forward. Squeeze the connection underneath the lower front bench (shown) on both sides. Pull forward and lift the seat up and out of the vehicle.

Clean the area underneath the bench seat.



2. Unseat the rubber gasket by pulling up around the perimeter of the large sheet metal hole.



3. On top of the fuel pump housing, slide the electrical connector's red locking tab to the side. NOTE: Because the Shelby GT500 uses 2 fuel pumps, the 2-row connector (shown) is slightly different than other Ford models. All related steps still apply.

Squeeze the tab and unplug the white connector. To depressurize the fuel system, start the engine and allow it to stall. Remove the key from the ignition. Unscrew the gas tank filler cap temporarily to relieve any residual pressure.

Disconnect the negative terminal of the battery with an 8mm socket wrench.



4. To gain maximum access to the fuel pump area, dislodge the wiring strain relief connection shown. Move the connector and rubber cover out of the way.



5. It is recommended to clean the top of the fuel pump housing and the surrounding area. This will prevent loose dirt from falling into the gas tank.

To detach the SAE quick connect line, first pull the red lock out of the connector, as shown.



6. Press the thumb button and pull the female fitting away from the male connection. Use a rag to clean up any spilled fuel.



7. To release the OEM hold-down metal ring it is recommended to use a special fuel tank lock ring tool such as OEM Tools, P/N: 24398 (shown).

Put the lock ring tool in place. Attach a ½" drive breaker bar with an extension. Turn the lock ring counterclockwise. A popping noise is normal to hear when it is released.



8. NOTE: Some vehicles require a slight modification to the chassis for OEM fuel pump removal. Only perform the following step if necessary.

Using a pair of pliers, bend one side of the access hole in the sheet metal just enough for the OEM fuel tank lock ring to be removed.



9. Remove the OEM fuel tank lock ring. Note that the OEM Ford pump module is spring-loaded and will pop up as soon as the lock ring is disengaged.

NOTE: The sheet metal can be bent back into place after reinstalling the lock ring.



10. Before removing the OEM fuel pump housing, place an empty bucket nearby. There will be residual fuel in the gas tank. Slowly lift the canister straight up.



11. Tilt and twist the assembly to clear the float arm. Once the float clears, the crossover hose will be visible. Squeeze the thumb tab and pull away to release the crossover hose, as shown.

NOTE: If your car has a second (smaller) crossover tube, unplug that as well and leave it disconnected in the tank. Follow the instructions towards the end of the document (in grey) for the other required steps regarding these rare vehicles.

Pull the OEM fuel pump housing out and drain into the bucket. Inspect the large green gasket. Motorcraft P/N: CG-816. Immediately cover the gas tank opening to prevent dirt and/or debris from falling in. Next, set the OEM unit onto a workbench.



12. For S197 Ford Shelby GT500 (pump unit shown at left), a post-pump filter is already externally mounted underneath the car so a low micron aftermarket fuel filter is NOT necessary.

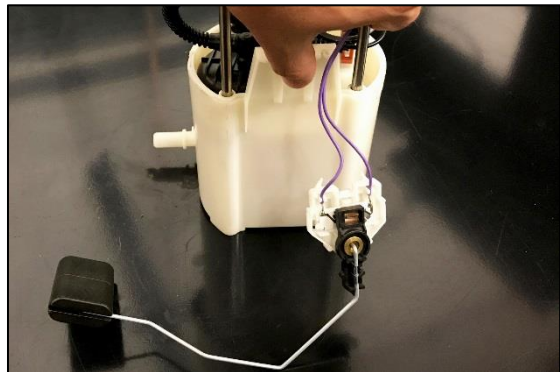
For Ford Mustang GT (pump unit shown at right), a post-pump filter is integrated into the unit. The Radium fuel pump hanger does NOT include an internal post-pump fuel filter. **A low micron filter should be installed** somewhere downstream of the pump(s) prior to the injectors and/or fuel pressure regulator. This will protect the fuel system from small debris. Radium carries these filters in various elements (P/N: 20-0220-05, P/N: 20-0220-03).



13. Remove the fuel level sensor from the OEM fuel hanger by gently pulling the thumb tab outwards. Do NOT use excessive force! Simultaneously press downwards to release the sender. Depress the 2-pin wiring thumb tab from underneath the top plate and unplug the connector.

The only parts that will be reused are the fuel level sender and the large gasket.

Using a pair of cutters, cut the electrical connector off. Keep as much wire slack as possible.



14. Strip the ends of the wires. Crimp the included flat male wire terminals to each wire using a tool such as Molex 63811-1000 hand crimper.

Slide the terminals into the plastic connector until a "click" is felt. It does not matter what wire goes into which slot. Wire polarity is not specific. An extra connector may be included in the kit and can be used as a spare.

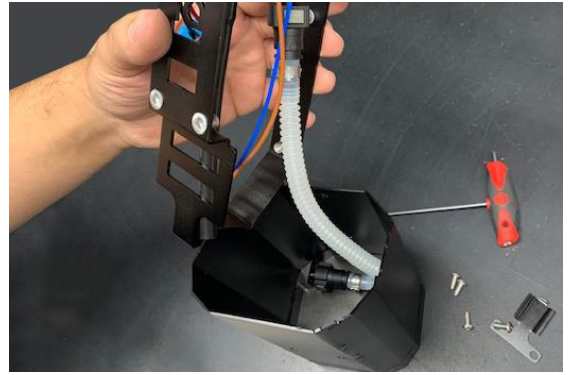
Find the small Radium fuel level sensor mount in the kit. Slide it onto the OEM fuel level sender until it snaps in place, as shown.

If the fuel pump hanger was purchased with pump(s) included, skip Steps 15-41.



15. PUMPS NOT INCLUDED KITS ONLY

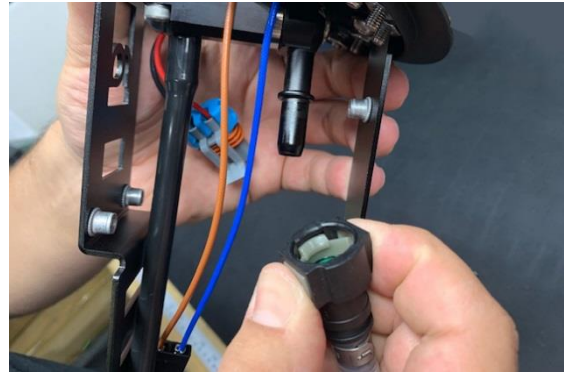
Using a 3mm Allen hex wrench, remove the four M5 bolts around the collector box (2 on each side). To separate, pull the fuel hat away from the collector box.



16. Squeeze the crossover tubing's SAE quick connect locking tabs and pull to release.

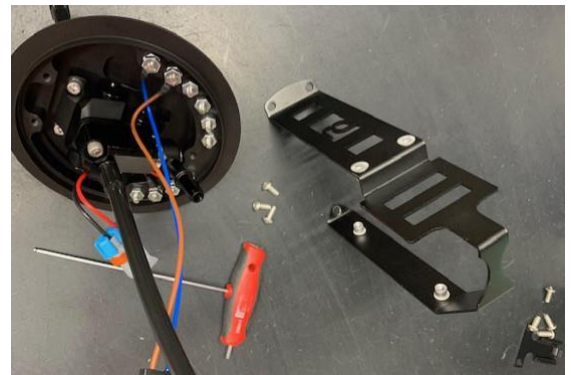
NOTE: For single fuel pump applications, be sure the unused port on the underside has a 6AN ORB plug fitting installed.

If installing a single fuel pump, skips step 17-23.



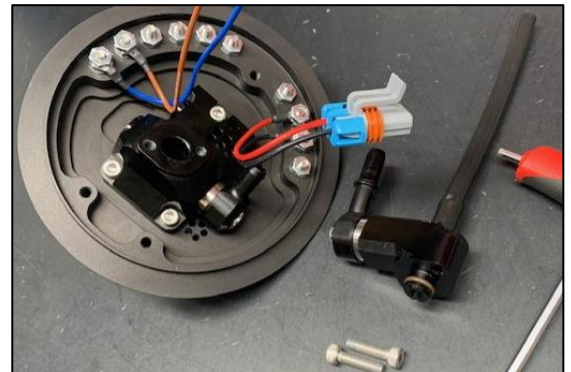
17. DUAL PUMP ASSEMBLY ONLY

To uninstall the pump bracket from the fuel hat, remove the three M5 bolts using a 3mm Allen hex wrench. The parts should now look as shown.



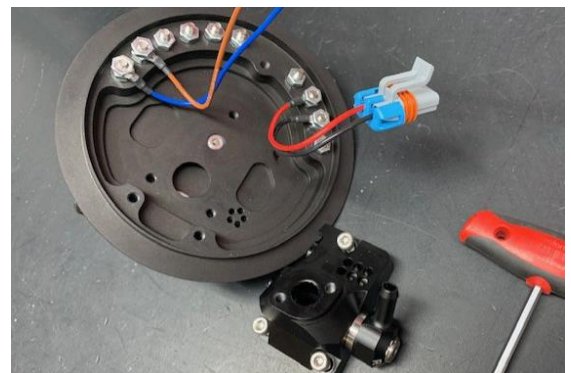
18. DUAL PUMP ASSEMBLY ONLY

To uninstall the venturi jet pump from the fuel pump collector, remove the two M5 bolts using a 4mm Allen hex wrench. The parts should now look as shown.



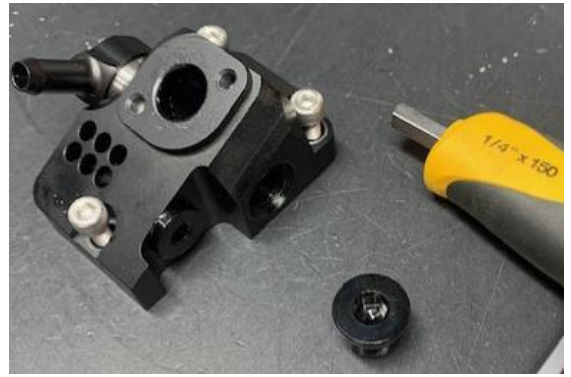
19. DUAL PUMP ASSEMBLY ONLY

To uninstall the fuel pump collector from the top hat, remove the three M5 bolts using a 4mm Allen hex wrench. The parts should now look as shown.



20. DUAL PUMP ASSEMBLY ONLY

To uninstall the 6AN ORB plug from the fuel pump collector, use a 1/4" Allen hex wrench. The parts should now look as shown.



21. DUAL PUMP ASSEMBLY ONLY

To install the adapter to the fuel pump collector for the second (dual) pump, first lubricate the fitting's O-ring. To secure, use a 4mm Allen hex wrench.

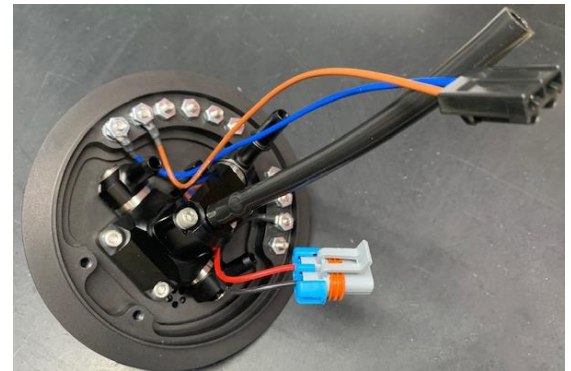
NOTE: The standard "brushed" fuel pump kit is depicted. The Ti Automotive E5LM "brushless" fuel pump kit (not shown) uses female 6AN fittings instead of the hose barb fittings shown.



22. DUAL PUMP ASSEMBLY ONLY

When reinstalling the fuel pump collector to the fuel hat, be sure the O-ring is in place.

Reinstall everything in reverse order until the assembly looks as shown.

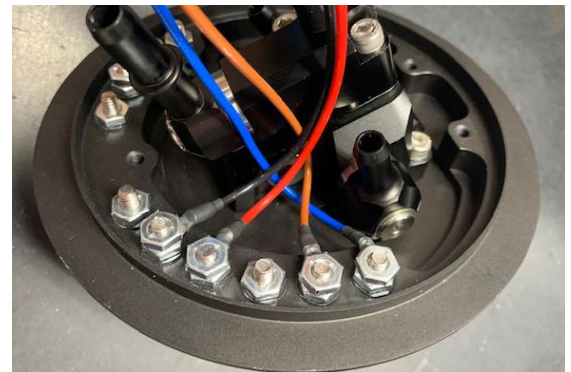


23. DUAL PUMP ASSEMBLY ONLY

Attach the provided electrical fuel pump connector to the wiring studs underneath the top hat using the included lock nuts. The red wire is positive (R) and the black wire is negative (B).

NOTES:

1. This step does not apply to the Ti Automotive E5LM "brushless" fuel pump kit. The wires will be installed in a later step.
1. Extra hardware may be included which can be used as spares.



24. Cut the appropriate ID tubing to length.

Small ID Tube: 3.1" (80mm) AEM 50-1200

Large ID Tube: 3.4" (88mm) Bosch BR540 (Deatschwerks DW400)

Large ID Tube: 4.1" (104mm) Deatschwerks DW440

Large ID Tube: 3.3" (84mm) Deatschwerks DW810 (1. Use large DW barb 2. Dual pumps cannot be staged)

Large ID Tube: 4.1" (105mm) Protec 11928 / Fuelab 49614

Small ID Tube: 3.3" (83mm) Walbro G5S342

Large ID Tube: 3.0" (77mm) Walbro F90000267/274/285

To install the fuel tubing, apply oil lubrication to all associated barbs and to both inner ends of the tubing. Low heat is required to temporarily soften the tubing. Be careful not to over-heat and melt the tubing.

NOTE: The brushless Ti Automotive E5LM pump does not require tubing.



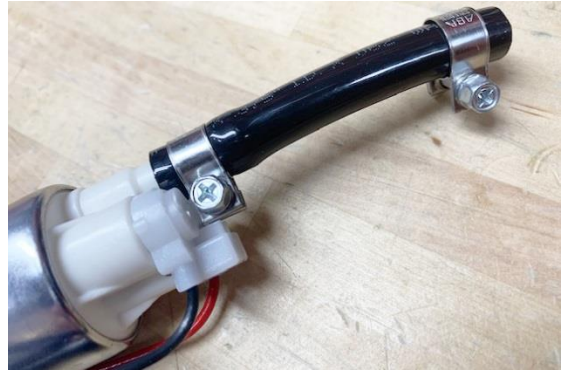
25. Gently apply force to push it onto the fuel pump outlet barb.

Care must be taken not to kink the tubing:

1. Fuel pump hose barbs can fracture if not treated with extra care.
2. Extra tubing is provided in case of damage during assembly.

Secure using one of the EFI hose clamps. As shown, slide a second hose clamp onto the tubing. Use lubrication as previously mentioned and push the tube over the fuel hat barb until it is fully seated. Do not tighten this hose clamp yet. The fuel pump will first need to be rotated into the proper position. If applicable, repeat this process for the second pump.

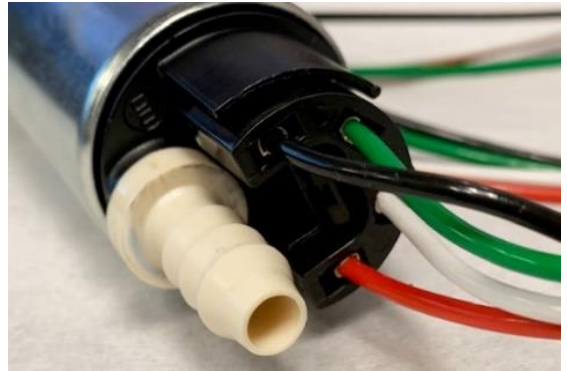
NOTE: This step does not apply for the brushless Ti Automotive E5LM pump.



26. BRUSHLESS TI AUTOMOTIVE E5LM FUEL PUMP ONLY

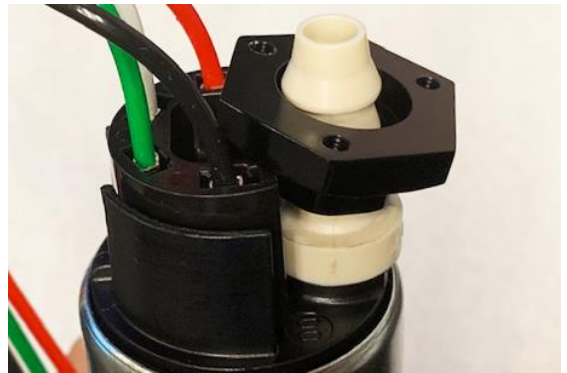
Inspect the pump outlet hose barb. If deformed or damaged, the Radium check valve pump adapter will NOT attach properly.

The Ti Automotive E5LM 4-pin wiring connector MUST first be installed to the electrical terminals, as shown.



27. BRUSHLESS TI AUTOMOTIVE E5LM FUEL PUMP ONLY

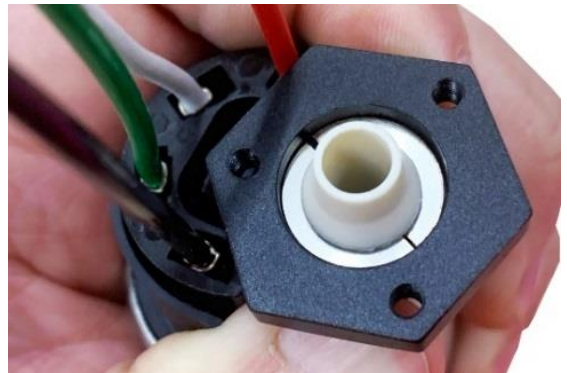
To install the check valve, first slide the black collar over the pump outlet with the flat surface upward, as shown.



28. BRUSHLESS TI AUTOMOTIVE E5LM FUEL PUMP ONLY

Next, slip the stainless steel retainers under the hose barb ridge closest to the end of the pump outlet opening. Be patient, this may take a little bit of work.

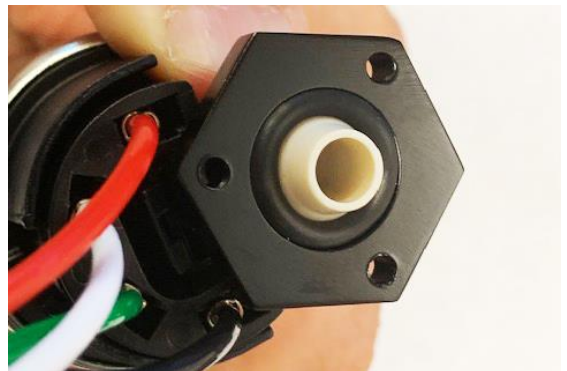
Pull the collar up to confirm the retainers lock into place as depicted.



29. TI AUTOMOTIVE E5LM FUEL PUMP ASSEMBLY ONLY

Place the included O-ring on the pump outlet. Apply a petroleum-based lubricant to the O-ring.

Slide the black collar upward and tuck the O-ring into the groove, as shown.



30. TI AUTOMOTIVE E5LM FUEL PUMP ASSEMBLY ONLY

Place the O-ring onto the check valve plunger groove, as shown.



31. TI AUTOMOTIVE E5LM FUEL PUMP ASSEMBLY ONLY

Place the O-ring onto the check valve plunger groove, as shown.



32. TI AUTOMOTIVE E5LM FUEL PUMP ASSEMBLY ONLY

Insert the plunger rod through the internal center hole of the green adapter fitting, as shown.



33. TI AUTOMOTIVE E5LM FUEL PUMP ASSEMBLY ONLY

Apply a high strength thread locking compound to the threads on the 3 included screws. Line up the green fitting holes to the black fitting threads. To secure, use a 2.5mm Allen hex wrench.

Inspect the internal side of the green fitting. When installed properly, the plunger should be slightly sticking out of the center hole at rest, as shown.



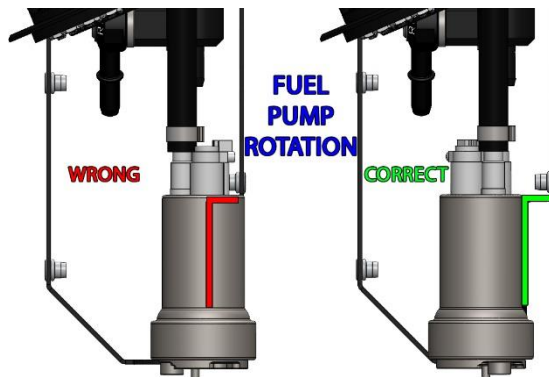
34. TI AUTOMOTIVE E5LM FUEL PUMP ASSEMBLY ONLY

Install the 6AN male check valve to the 6AN female banjo fitting, as shown. Tighten using a 13/16" wrench and an 11/16" wrench.



35. Reinstall the fuel pump bracket.

As shown, rotate until the fuel pump (39mm OD) body is tangent to the pump bracket. This will permit the fuel pump outlet(s) to be as straight as possible.

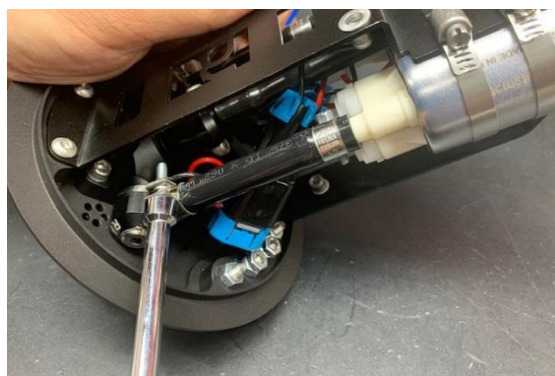


36. Once the proper orientation is achieved, secure the fuel pump(s) to the pump bracket using the stainless steel worm-drive clamps and a flat head screwdriver.



37. Tighten the upper EFI clamp(s) shown.

NOTE: This step does not apply for the Ti Automotive E5LM brushless pump.



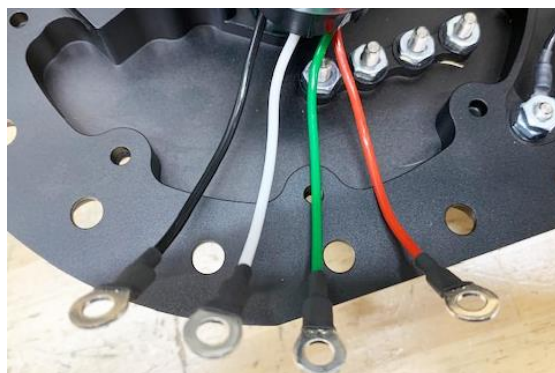
38. Install the fuel pump inlet filter(s).

NOTE: the fuel hanger requires a pliable filter sock. Radium P/N: 14-0143 is shown. Radium P/N: 14-0543 is used for the brushless Ti Automotive E5LM pumps.



39. For Walbro pumps (or equivalent) plug in the provided fuel pump electrical connector(s).

For all other pumps, cut the fuel pump wires to length and strip the ends. Slide the provided heat shrink to each wire. Crimp the provided ring terminals to the end of each wire. Slide the heat shrink over the crimped area. Apply heat to shrink the insulation, as shown. Connect each ring terminal to the corresponding wire color terminal.



40. Prepare to reinstall the collector box. Push the crossover fitting back onto the venturi jet pump SAE quick connect fitting until a "click" is felt.



41. Slide the 2 fuel level wires into the collector box slot as shown.

Insert the assembly into the collector box.



42. Secure the fuel level sensor using the collector box screws and a 3mm Allen wrench. Plug in the electrical fuel level sensor connectors.

Install the green O-ring gasket into recessed area and pull the OEM crossover hose out of the gas tank, as shown.



43. Push the OEM crossover line over the Radium SAE quick connector until it "clicks" in place.

Tilt the assembly so the fuel level float and crossover line fit into the tank. NOTE: To prevent fuel level float arm interference, make sure the crossover hose is rotated toward the rear of the vehicle.



44. It is normal to have a slight interference with the fuel level sensor. When sliding the fuel level sensor past the tank opening, gently push the sensor inward, as shown.

Carefully lower the fuel pump assembly until the top hat fully seats onto the gas tank opening.

For proper orientation, reference the vehicle etched on top of the fuel hat.



45. Using the tool and socket wrench from earlier, reinstall the lock ring, as shown.



46. VEHICLES WITH AN EXTRA CROSSOVER TUBE ONLY

NOTE: At the time of writing this, the only vehicles that are required to perform these steps are the 2020-2022 Shelby GT500. Ford may have used this only other rare cars.

Notice in the picture there is an additional convoluted crossover tube.

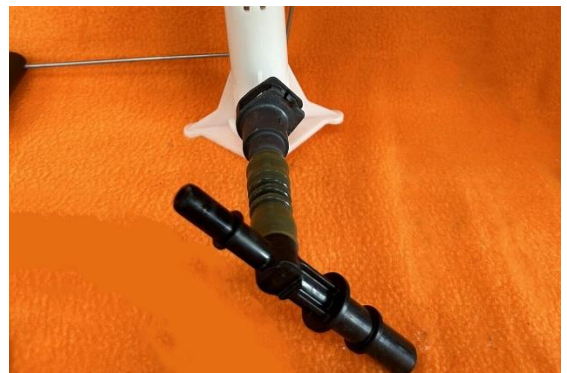


47. VEHICLES WITH AN EXTRA CROSSOVER TUBE ONLY

Remove the fuel hat from the opposing (passive) side of the tank. The TEE (shown) must be removed. Simply squeeze the SAE quick connector and pull to release.

Now reinstall the fuel hat and connect the large convoluted crossover tubing (inside the tank) directly to the fuel hat assembly.

NOTE: The small crossover hose can remain in the fuel tank (disconnected) if need be.



48. EXTERNAL WIRING

NOTE: External brushless fuel pump wiring will not be covered in this manual. This is very specific to the pump controller used.

Cut off the OEM fuel pump control module connector keeping as much wire as possible. Remove some of the wire loom then strip the wire insulation 3/16" back.

Cut two 1/2" pieces of the small diameter shrink tube and insert a piece onto each sensor wire (2 small gauge wires). Next, crimp on a small AWG ring terminal to each wire. Slide the shrink tube over the crimped section of the ring terminal and shrink into place with a heat gun.



49. EXTERNAL WIRING Use the large diameter shrink tube and large AWG ring terminals to connect the pump wires. Crimp the ring terminals onto each wire using a standard wire crimper, using the included shrink tube to insulate the crimped area of the ring terminal.

Single Fuel Pump Applications ONLY: In some cases, the OEM Ford wiring (designed for less than 15A) will be sufficient unless fuel pressure is excessive. The Ford wiring should also not be used if the fuel pump ever draws more than 15A of current. In these cases, it is recommended to use the OEM wiring to trigger a fused relay power source for the pump(s).

NOTES:

1. To connect the fuel pump(s) with upgraded wiring, see below.
2. To connect the fuel pump reusing OEM wiring, use the following step.
3. Extra electrical parts may be included in the kit and can be used as spares.



50. EXTERNAL WIRING

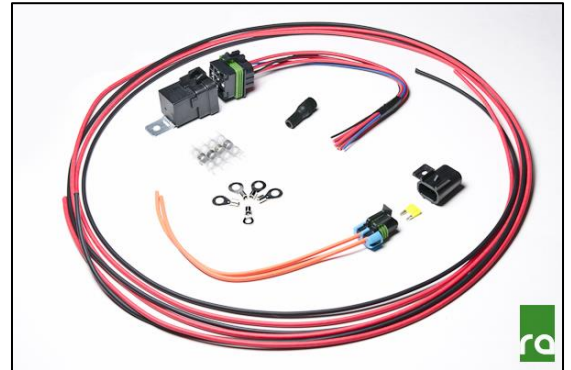
Referencing the pinout chart, install the terminated wires onto the corresponding studs.

Tighten the included acorn nuts.

FUEL PUMP1	+ 14AWG	Green/Blue
	- 14AWG	Gray/Pink
FUEL PUMP2 Ford Shelby GT500 Only	+ 14AWG	Yellow/Gray
	- 14AWG	White/Pink
FUEL LEVEL	+ 22AWG	Green/Blue
	- 22AWG	Yellow/Pink

51. EXTERNAL WIRING

For high current fuel pumps and/or all dual pump applications, consider using Radium DIY wiring kit 17-0031 (shown) for each pump. This includes a dedicated fuse, relay, 10AWG wire, etc.



52. The integrated fuel pressure regulator is NOT preassembled to a specific pressure.

NOTE: The included gold orifice is ONLY required if minimum base pressure cannot be achieved. The preassembled silver orifice (shown) should be used in all other situations for optimal dynamic performance.



53. A sensor, gauge, etc. (not included) is required to calibrate fuel pressure. For legacy fuel hangers (shown), a 3/8" wrench and a 3/32" Allen wrench is required to make fuel pressure adjustments. For current fuel hangers, simply turn the adjustment knob. Rotating clockwise increases pressure. Rotating counterclockwise decreases fuel pressure.

NOTES:

1. If attempting to mimic the flat fuel pressure curve found on most late model Fords, leave the regulator nipple open to atmosphere.
2. If a 1:1 rising rate is required, connect an intake manifold vacuum/boost hose (not supplied) to the regulator nipple. This is common with forced induction tuning.



54. Reconnect the battery and turn the ignition key to the ON position. Confirm the new fuel pump(s) prime for a few seconds and check for leaks. If no leaks are found, start the vehicle. The engine may run rough for a few seconds until all the air is bled from the fuel system. Recheck for leaks. Reinstall the OEM cover plate and rear seat. **INSTALLATION COMPLETE**

NOTE: Excluding the 13-14 Ford Shelby GT500, the OEM Ford fuel pump module uses an integrated post fuel pump filter. Because this is now eliminated, an aftermarket low micron fuel filter must be installed downstream in the fuel system. GO TO WWW.RADIUMAUTO.COM TO FIND ALL OF THESE NECESSARY FUEL COMPONENTS.



55. **20-0806 FUEL HANGER FPR BLOCK-OFF**

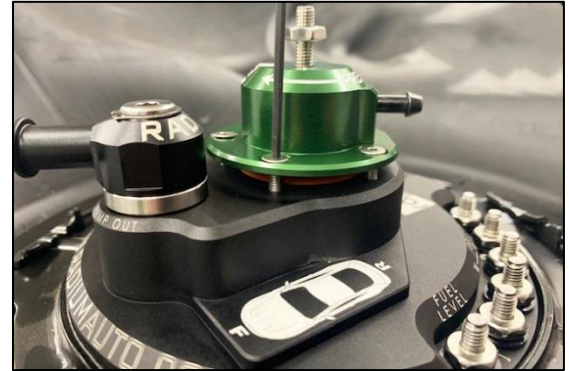
For legacy fuel hangers (shown), loosen the jam nut using a 3/8" wrench. Next, loosen the set screw to release the preload on the integrated fuel pressure regulator spring.

For current fuel hangers, loosen the adjustment knob to release the preload on the integrated fuel pressure regulator spring.



56. **20-0806 FUEL HANGER FPR BLOCK-OFF**

Using a 5/64" Allen hex wrench, loosen the 5 perimeter screws slowly in a crisscross fashion. Remove the cap.



57. **20-0806 FUEL HANGER FPR BLOCK-OFF**

Remove the diaphragm, spring, and spring hat (shown).



58. **20-0806 FUEL HANGER FPR BLOCK-OFF**

Unscrew the internal orifice (shown) using a 7/16" socket wrench.



59. **20-0806 FUEL HANGER FPR BLOCK-OFF**

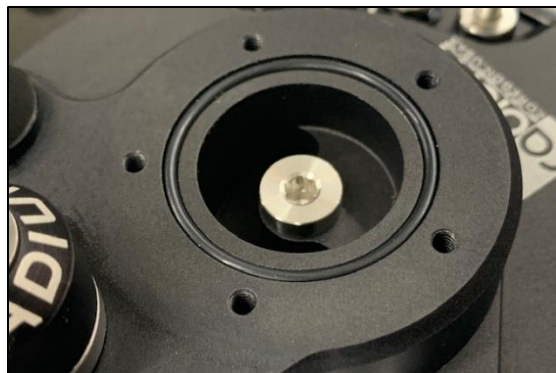
Lubricate the O-ring found on the included plug.



60. **20-0806 FUEL HANGER FPR BLOCK-OFF**

Using a 4mm Allen hex wrench, install the plug.

Install the included O-ring into the groove, as shown.



61. **20-0806 FUEL HANGER FPR BLOCK-OFF**

Using a 5/64" Allen hex wrench, install the cap using the #5-40 screws included in the Fuel Hanger Block-Off kit



62. **20-0806 FUEL HANGER FPR BLOCK-OFF**

Remove the FUEL RETURN plug using a 1/4" Allen hex wrench. A 6AN ORB adapter fitting (not provided) is required for the return fitting. Radium Engineering P/N: 20-1000-0606 is shown.

INSTALLATION COMPLETE

NOTE: An external fuel pressure regulator will need to be installed in the system. GO TO WWW.RADIUMAUTO.COM TO FIND ALL OF THESE NECESSARY FUEL COMPONENTS.

