INSTALLATION INSTRUCTIONS

FUEL PUMP HANGER

MITSUBISHI LANCER EVOLUTION X

Support: info@radiumauto.com

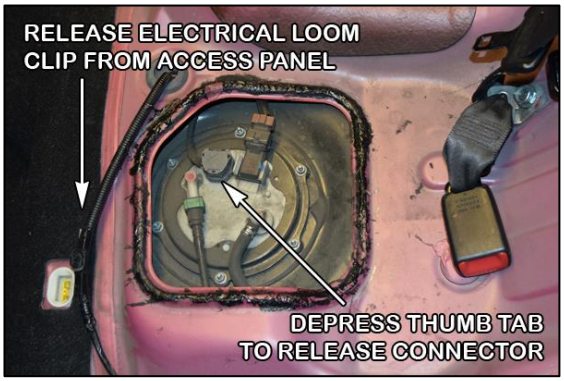
Document# 19-0236

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. **Note: To reduce fuel spills and make installation easier and safer, it is highly recommended to drain the gas tank.**

To remove the rear seat cushion, pull up on the 2 front anchor points. Find the LH fuel pump access panel under the seat cushion. To remove, first disconnect the electrical loom clip (shown) then carefully pull upwards around the perimeter of the panel. It is fastened down with an adhesive caulking, but can be re moved and reinstalled easily.

To depressurize the fuel system, first squeeze the tab and unplug the gray wiring connector on top of the pump housing (shown). 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.



2. Dislodge the battery panel in the trunk and disconnect the negative terminal of the battery with a 10mm socket wrench. CAUTION: Disconnecting the battery may cancel fault memories of some control units.

As shown, 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 pressure feed line, use a flat head screwdriver to dislodge the green plastic retaining clip upwards. Next, simply pull the connector away from the fitting. Use a rag to clean up any spilled fuel. Loosen the hose clamp on the return hose and remove it from the housing's barb fitting, as shown.

3. If equipped, spread the 2 retaining tabs outwards and simultaneously pull upwards to release the OEM fuel pressure sensor. Unplugging the electrical connector is not necessary.

To allow extra room, the nearby rubber grommet in the sheet metal can be removed and the OEM wiring harness can be pulled out for easier modification access later.

Using an 8mm wrench, loosen the six M5 nuts holding the retaining ring. Next, hold the fuel pump housing down with one hand and remove each nut one by one by hand as the housing is slightly spring-loaded.

Finally, remove the black steel retaining ring and set aside as it will NOT be reused.

4. Before removing the OEM fuel pump housing, place an empty bucket nearby as there will be residual fuel in the gas tank. Tilt the fuel pump housing towards the back and right side of the vehicle then pull up. Be careful not to damage the fuel level float arm. Using pliers, release the crossover hose, as shown. Pull the OEM fuel pump housing out and drain into the bucket.

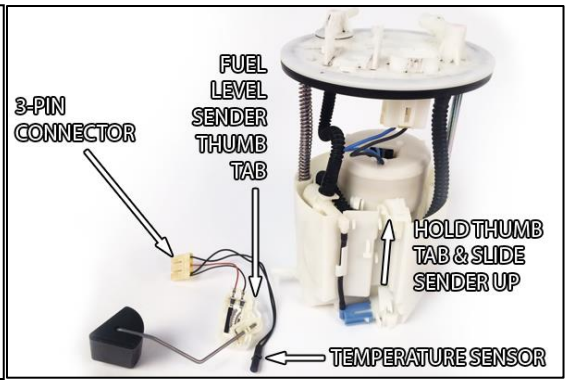
Remove the large rubber gasket from the OEM fuel pump housing. This will be reused.

Clean the fuel pump housing and set it onto a workbench. There will be fuel in the OEM bucket. The only two parts that will be reused are the fuel level sender and temperature sensor.

5. To remove the fuel level and fuel temperature sensors from the OEM fuel pump housing, first depress the thumb tab and unplug the larger 4-wire connector from underneath the top plate. Next, pry and pop the fuel temperature sensor probe out of the locking tabs.

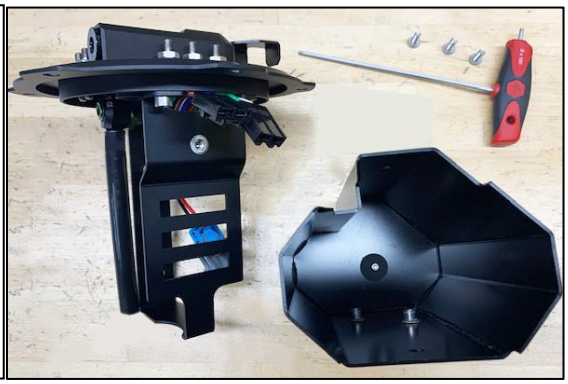
To remove the fuel level sender, press the upper right thumb tab inwards and simultaneously push the module up and out gently until it unlocks. Be careful not to damage the circuit board or bend the float arm. Finally, release the temperature probe wires from the fuel pump housing tabs to fully release the sensor assembly.

If the fuel pump hanger kit was purchased with fuel pump(s) included, skip Steps 6-18.



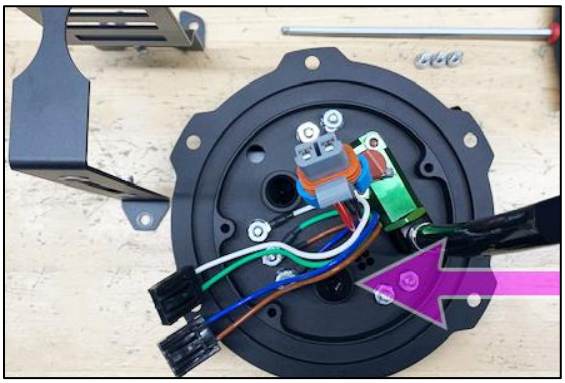
6. To install fuel pumps, the fuel hanger must be partially disassembled.

To remove the collector box, unscrew the 3 button head screws using a 3mm Allen Wrench.



7. To remove the fuel pump bracket, unscrew the 3 socket head screws using a 4mm Allen wrench. NOTE: the fuel pump bracket may be a different color depending on the kit purchased.

If installing 2 fuel pumps, remove the 6AN ORB plug (shown purple) from the port underneath the top plate using a ¼" Allen Wrench.



8. **Follow this step for RADIUM P/N: 20-0640-00 ONLY**

Lubricate and install the provided 8.5mm barb fittings to the bottom top hat port(s).

Apply oil lubrication to all associated barbs and to both inner ends of the tubing. Gently apply force to push it onto the fuel pump outlet barb. For many 300/320/340LPH pumps, low heat is required to temporarily soften the tubing. If this is the case, be careful not to over-heat and melt the tubing.

As shown, secure using one of the EFI hose clamps and a 9/32" nut driver. Slide a second hose clamp onto the tubing attached to the fuel pump. Use lubrication as previously mentioned and push the tube over the barb until it is fully seated. NOTE: Do NOT apply heat on this side of the tubing connection. It is NOT required.

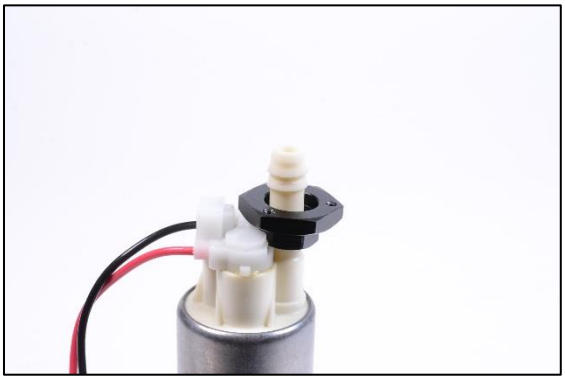
Do not tighten this hose clamp yet. The fuel pump will first need to be rotated into the proper position.

9. **Follow this step for RADIUM P/Ns: 20-0642-00 and 20-0644-00 ONLY**

Because of height constraints, the included low profile fuel pump outlet adapters are required for Walbro F90000267/274/285 (shown) and/or Deatschwerks DW400 fuel pumps.

Before proceeding, inspect the pump outlet hose barb. If the hose barb is deformed, modified or damaged, the Radium Engineering fuel pump outlet adapter will not install correctly and the pump cannot be used.

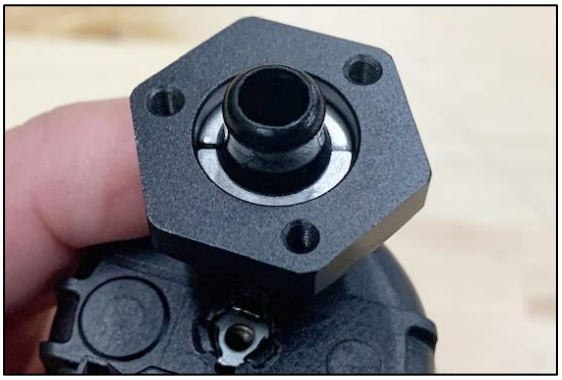
First, slide the black machined aluminum collar over the pump outlet with the flat surface upward as shown.



10. **Follow this step for RADIUM P/Ns: 20-0642-00 and 20-0644-00 ONLY**

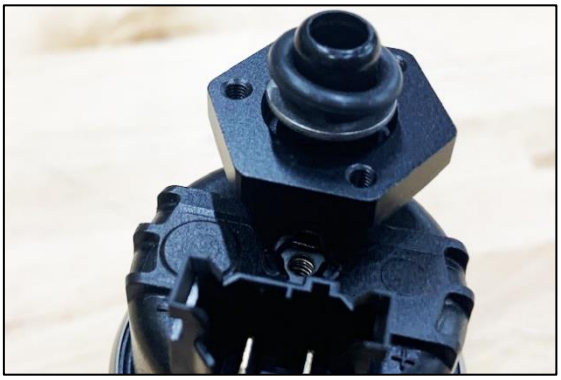
Slip the stainless-steel retainer between the 2 large hose barbs. When assembled, the retainer will lodge itself under the barb ridge closest to the end of the pump outlet.

NOTE: The Deatschwerks DW400 fuel pump (Bosch BR540) fuel pump is shown.



11. **Follow this step for RADIUM P/Ns: 20-0642-00 and 20-0644-00 ONLY**

Place the included O-ring on the fuel pump outlet, as shown. Apply a light coat of lubrication to the O-ring.



12. **Follow this step for RADIUM P/Ns: 20-0642-00 and 20-0644-00 ONLY**

As shown, slide the black collar upward.

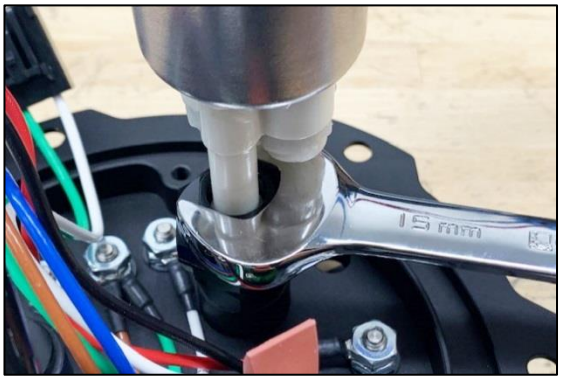
13. **Follow this step for RADIUM P/Ns: 20-0642-00 and 20-0644-00 ONLY**

Line up the upper 6AN fitting holes to the lower fitting threads. NOTE: Because of height discrepancies, the Walbro F90000267/274/285 pumps will use a BLACK upper fitting (shown). The Deatschwerks DW400 pump will use a GREEN upper fitting (not shown).

Apply a medium strength thread locking compound to the threads of the 3 included small screws. Secure and tighten all bolts evenly using a 2.5mm Allen wrench. Perform this same procedure for the second pump (if applicable).

14. **Follow this step for RADIUM P/Ns: 20-0642-00 and 20-0644-00 ONLY**

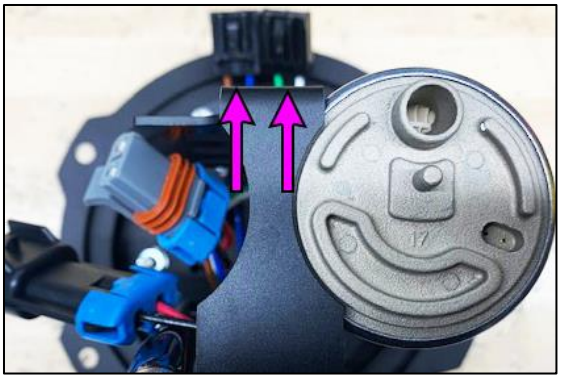
Lubricate the outlet adapter O-ring with oil. Tighten the adapter to the 6AN ORB port using a 15mm open-ended wrench, as shown.



15. Reinstall the fuel pump bracket. Allow the “fuel sensor” connectors to exit the pump bracket in the direction depicted (top of picture). This will setup for easier connections in a later step.

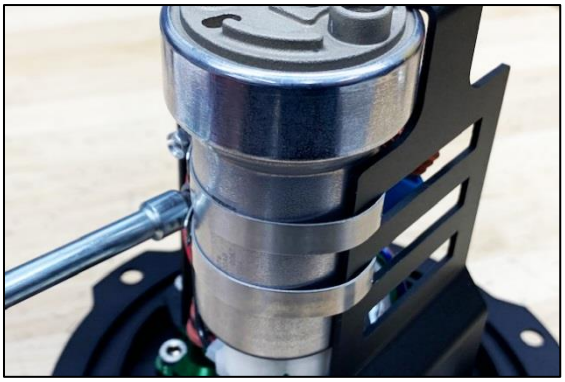
Rotate and align the fuel pump(s) concentrically with the cut-outs in the fuel pump bracket.

NOTE: For the fuel pumps (from 20-0640-00) that use submersible fuel hose, tighten the EFI hose clamps after the alignment is complete.



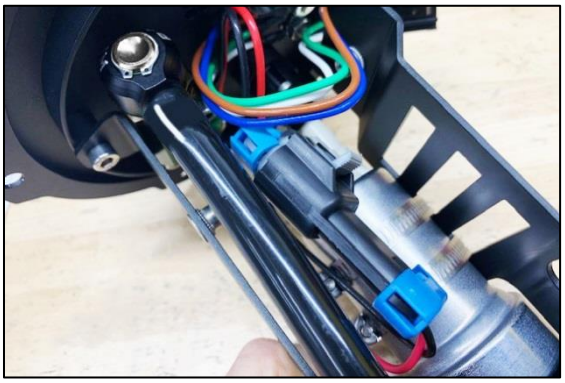
16. Using a ¼” nut driver, open up the provided worm drive clamps. NOTE: Two clamps will be used for each fuel pump.

Insert each clamp around an appropriate slot in the fuel pump bracket and tighten.



17. If using 2 pumps, install the provided connector harness ring terminals to the “PUMP2” wiring studs underneath the top plate. Tighten the lock nuts with a 3/8” wrench.

Plug in each fuel pump connector.



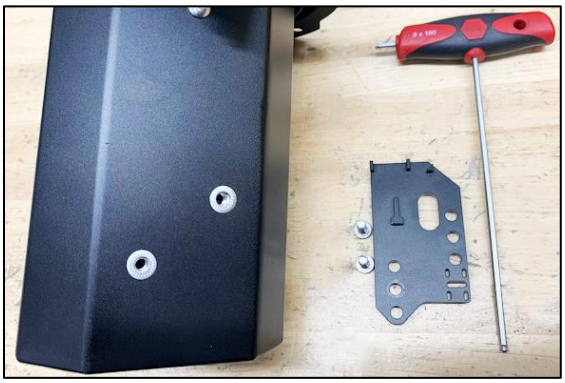
18. Next, press the filter sock(s) onto each pump inlet and secure with the star washer.

NOTE: The Radium fuel pump hanger was designed for a specific type of fuel pump sock filter. Large filter socks which have a rigid internal “skeleton” insert can be difficult since they cannot be formed inside the collector box.

Below are recommendations for all pumps (excluding DW400):
-RADIUM Engineering, P/N: 14-0143 Fuel Pump Inlet Filter Sock, 11mm ID
-AEM, P/N: 50-1220 (the filter sock that is provided in this fuel pump kit)

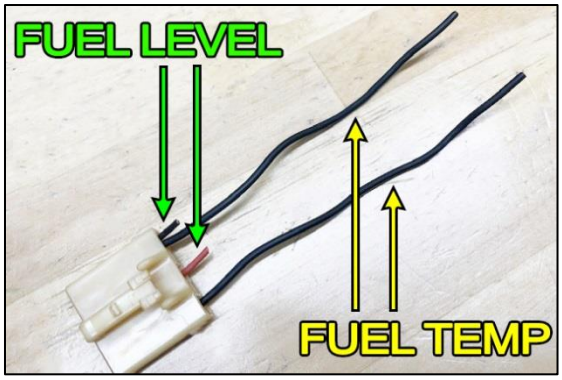
19. When dropping the assembled unit back into the collector box, the filter sock(s) might need to be folded for best clearance. Reinstall the collector box mounting screws.

Next, remove the Radium fuel sensor mount attached to the collector box using a 3mm Allen wrench, as shown.

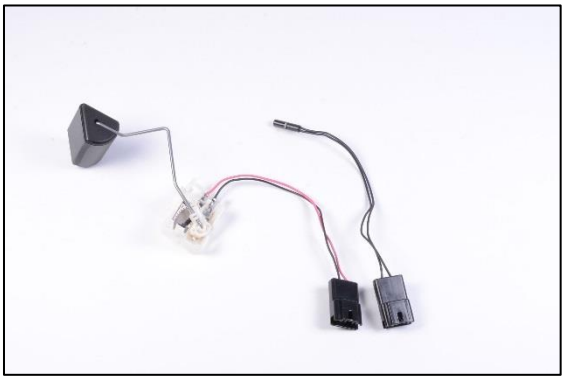


20. Find the internal OEM fuel sensor connector previously removed. Cut the 4 wires. This connector will NOT be reused.

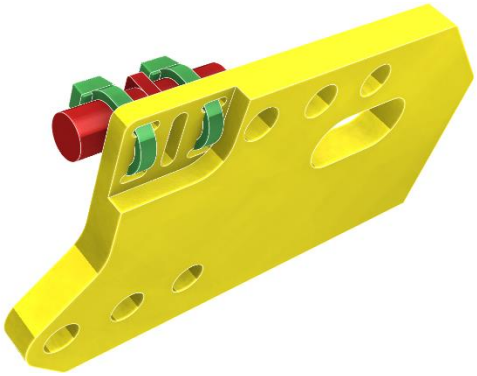
NOTE: the fuel level sender will need as much wire as possible. The fuel temperature sensor wires can be cut shorter.



21. Strip all 4 wires from the fuel level sender and fuel temperature sensor. Next, crimp the 4 included terminals to each wire using a tool such as Molex 63811-1000 hand crimper. Slide the terminals into the plastic plugs until a “click” is felt. Polarity is not critical.



22. Place the fuel temperature sensor (shown red) on the fuel sensor mount (shown yellow). Slide the 2 included zip ties (shown green) in and out of the 4 slotted holes. Secure the OEM fuel temperature sensor and cut the zip tie tails.



23. Reattach the Radium fuel sensor mount to the collector box. Next, carefully slide the OEM fuel level sensor downwards onto the mount until the tab locks into place.

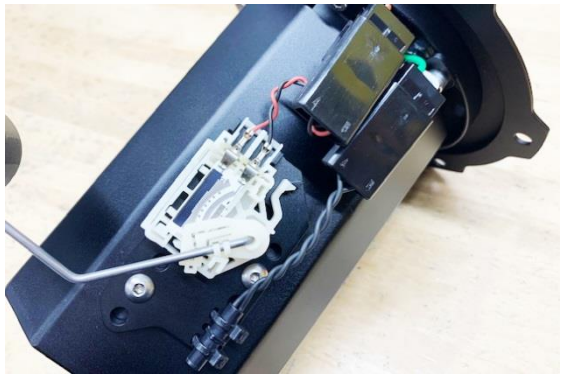
INTERNAL WIRING

Plug in the 2 mating connectors as follows:

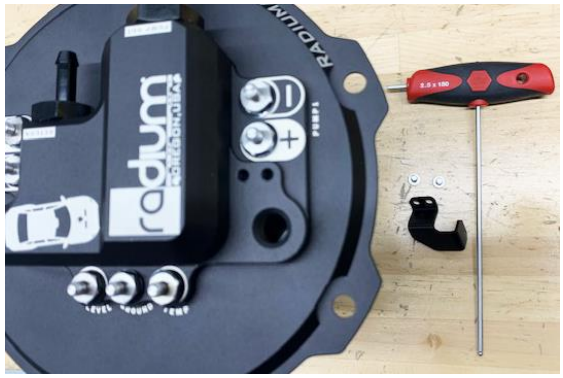
OEM Temperature Sensor ---------> **GREEN/WHITE connector**

OEM Fuel Level Sender ---------> **BLUE/BROWN connector**

Position the 2 aforementioned connectors tight against the collector box. All of the excess wire should be pushed into the collector box.



24. Using a 2.5mm Allen wrench, remove the pressure sensor hold-down bracket.



25. Inspect the condition of the OEM gasket and replace if necessary (Mitsubishi MN139931).

Install the fuel tank gasket around the underside of the Radium fuel pump hanger.

26. Place the assembled fuel pump hanger in the car near the gas tank opening.

Reach in the tank and find the short rubber crossover hose. Attach the OEM crossover hose to the lower barb on the outside of the collector box. Secure using pliers.

NOTE: for fuel pump hangers manufactured prior to March 2021, the connection pictured may slightly differ.

27. When dropping the fuel hanger down into the tank, be sure components such as the fuel level float, crossover hose (shown), sensor connectors, etc. do not get hung up.

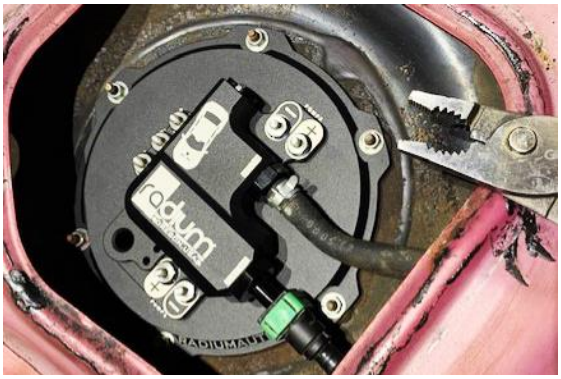
NOTE: For proper orientation, reference the pictured EVO X etched into the top plate.

28. Reinstall the OEM M5 flange nuts using an 8mm wrench. Tighten to factory specs in steps using an alternating crisscross pattern.

Lubricate the “PUMP OUT” SAE quick connect. Push-in the OEM feed line and push down on the OEM green lock to secure the connection. Gently tug to verify a positive lock has been made.

Connect the rubber OEM hose to the barbed “RETURN” fitting and secure the clamp using pliers.

NOTE: This step does not apply if installing a plumbing kit. See more information at the end of this manual.



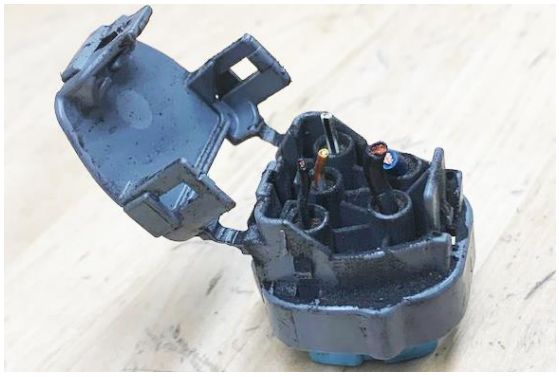
29. Send the OEM harnesses and pressure sensor from the interior back through the sheet metal hole and on top of the fuel tank. Reseat the rubber grommet.

If the vehicle is equipped with a tank pressure sensor, lubricate the O-ring and insert it into the top plate. Lineup the 2 hold-down bracket holes and secure using a 2.5mm Allen hex wrench. ***NOTE: If the vehicle came from outside North America and/or did not come with this sensor, purchase Radium Engineering P/N: 20-0421 to block off this port.***

30. **EXTERNAL WIRING**

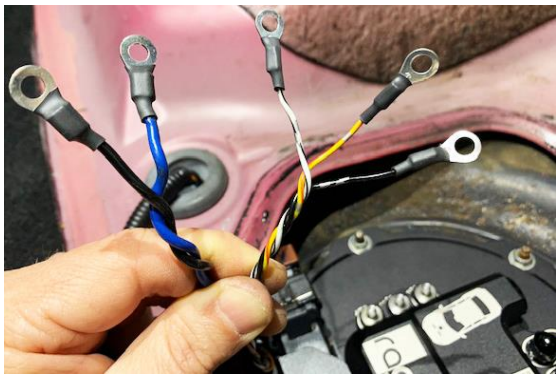
As shown, cut off the OEM 5-pin fuel pump control module connector.

Remove enough OEM tape and loom to permit each wire to reach their respective terminals.



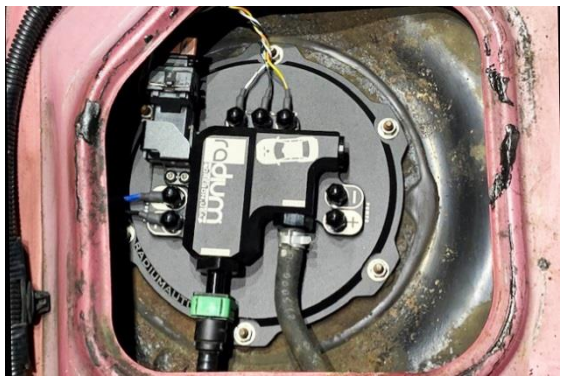
31. A wire stripper, crimper, and a heat gun are required in this step. As shown, all 5 wires will be terminated with ring terminals. Be sure the thick gauge wires use the large ring terminals and large heat shrink and the thin gauge wires use the small ring terminals and small heat shrink. Extra parts may be present in the kit and can be used as spares.

Fuel Level Sender, Thin AWG:	2008-2010 = Yellow/Red	2011-2016 = Red
Fuel Temp Sensor, Thin AWG:	2008-2010 = White/Black	2011-2016 = Purple
Sensor Ground, Thin AWG:	2008-2010 = Black	2011-2016 = White/Black
Pump Power, Thick AWG:	2008-2010 = Blue	2011-2016 = Blue
Pump Ground, Thick AWG:	2008-2010 = Black	2011-2016 = Black



32. After installing the ring terminals to the appropriate studs, tighten the insulating acorn nuts.

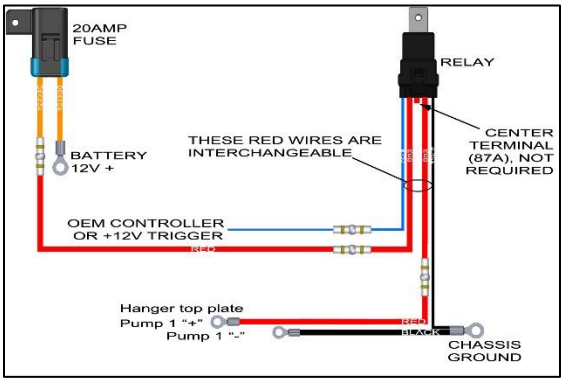
NOTE: OEM wiring should NOT be used with aftermarket pumps that draw more than 15A of current. It is recommended to use the OEM wiring to trigger a fused relay power source for the pump(s) for high current pumps. The PWM square wave will successfully trigger a relay.



33. **Optional high-current wiring**
For high flow aftermarket fuel pumps, consider using Radium DIY wiring kit 17-0031 (shown) for each pump. This includes a dedicated fuse, relay, 10AWG wire, etc.

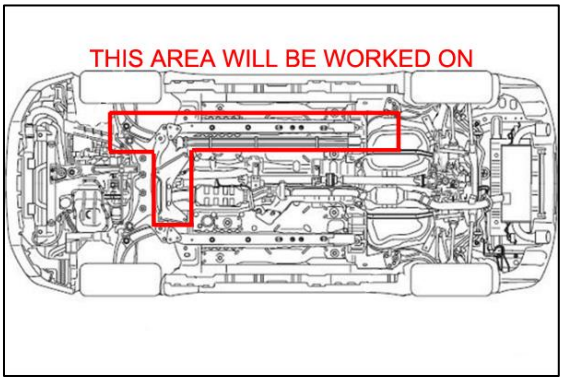
Extra electrical connection parts may be present in the kit and can be used as spares.

NOTE: The 20-064X-0X Fuel Hanger kit eliminates the OEM module's "post" fuel pump filter. A low micron aftermarket filter should be installed downstream to protect the injectors from debris. See the 20-0246-0X Fuel Hanger Feed Kit below for the best solution.

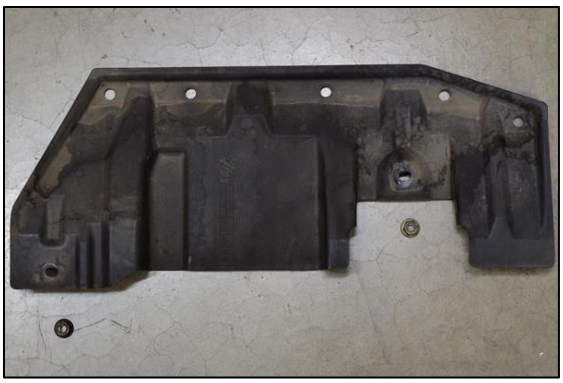


34. **SKIP TO STEP 45 IF THE OPTIONAL PLUMBING KITS WERE NOT PURCHASED.**

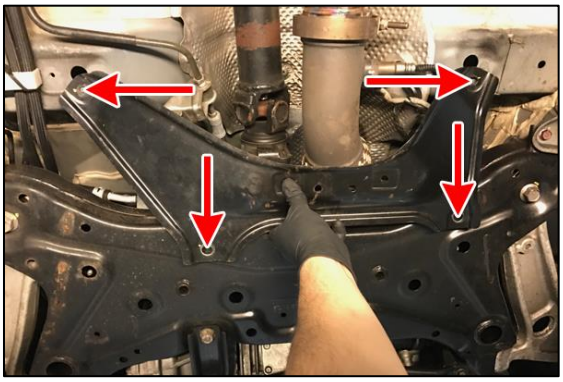
Optional 20-0246-0X Fuel Hanger Feed Kit. Steps 34-43
Safely raise the vehicle.



35. The plastic shield (pictured) near the left rear tire and the metal shield near the front left tire that covers the hard lines need to be removed temporarily. Using a 10mm socket wrench, remove the M6 screws and drop the shield down.



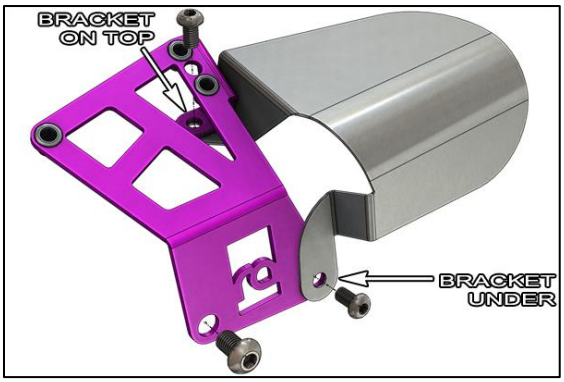
36. The center metal under tray brace (pictured) under the exhaust downpipe elbow and driveshaft needs to be removed temporarily. Remove the 4 bolts and drop the brace down.



37. When installing the included fuel filter bracket (shown in purple), note that the front OEM hard line shield will be reinstalled at the same time. The OEM shield will sit on top of the bracket on one side and underneath the bracket on the other side, as shown.

Use the included stainless steel hardware to secure the shield and bracket. The two M6 bolts require a 4mm Allen wrench.

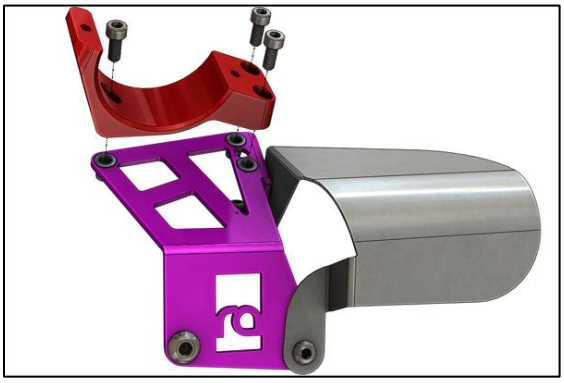
NOTE:
Only install the M8 bolt now if the under tray brace will not be reused.



38. Find the fuel filter clamp in the kit.

Using the included stainless steel hardware, install the lower portion of the clamp (shown in red) to the bracket's rivet nuts.

The three M5 bolts require a 4mm Allen wrench.

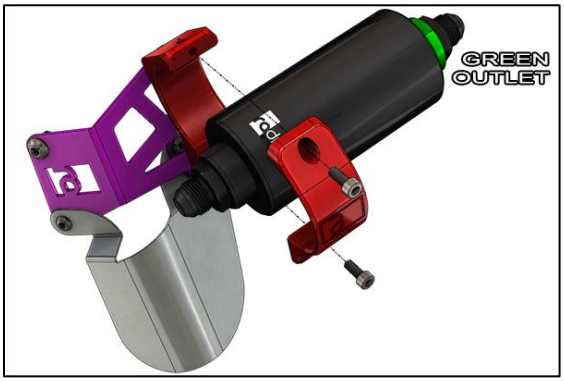


39. Lubricate the O-rings and install the two 8AN adapter fittings into the fuel filter ends.

Temporarily install the filter and upper clamp to the bracket using the three stainless steel hardware.

Make sure the filter is orientated so the outlet (denoted in green) is pointing towards the engine.

The two M5 bolts require a 4mm Allen wrench. Do not torque these bolts yet.



40. Find the shorter PTFE hose included in the kit. Route the hose in the engine bay between the fuel filter and the fuel rail keeping the 45 degree hose end at the fuel rail side.

From underneath the vehicle, pull and slide the fuel filter downwards out of the clamp. Torque the straight hose end to the green fuel filter outlet. Slide the fuel filter all the way back into place. Lineup the clamp to the filter, as shown. Have another person simultaneously torque the 45 degree hose end to the aftermarket fuel rail's 8AN male inlet fitting. For hose end clocking purposes, allow the filter to rotate inside the clamp until the 45 degree hose end is tight.

Next, torque the two fuel filter clamp bolts.

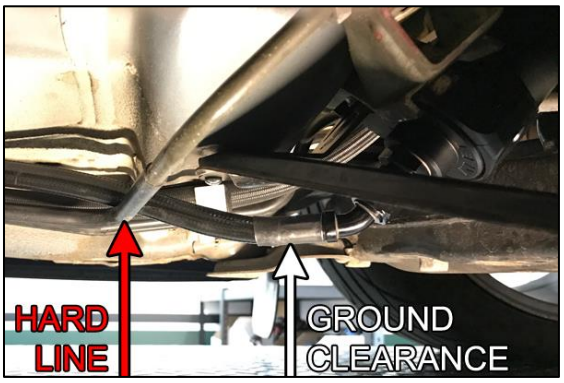
41. Loosely install the longer PTFE fuel hose included in this kit from the fuel pump hanger to the fuel filter.

The straight hose end connects to the "PUMP OUT" port.

The 45 degree hose end connects to the fuel filter inlet port. Be sure to route the PTFE hose above the hard brake line, as shown.

Make sure the fuel filter inlet hose end port has sufficient ground clearance, as shown.

Use the included zip ties to the secure the PTFE hose to the hard lines underneath the vehicle.



42. Using a 7/8" wrench, torque the 45 degree hose end on the fuel filter inlet first, than torque the straight hose end on the pump hanger. To avoid breaking anything, brace the part. To prevent hose end marring, an aluminum wrench is recommended.

Reinstall the rear plastic hard line shield.

43. When reinstalling the center under tray brace, first check for clearance near the 45 degree hose end. Grind if necessary.

The OEM under tray brace will sandwich the Radium fuel filter bracket. Three of the OEM under tray brace bolts will be reused. For the fuel filter area, use the longer stainless steel button head bolt (shown) included in the kit. Torque with a 5mm Allen hex wrench.

44. **<u>Optional 20-0249 Fuel Hanger Return Kit. Steps 44-45</u>**
This kit will use the OEM feed line as the new return line.

Remove the 6AN ORB fitting from the "RETURN" port on the Radium pump hanger. Transfer the O-ring from this fitting to the included 3/8" SAE Male Fitting. Lubricate the O-ring and install it into the "RETURN" port.

Fully insert the plastic OEM feed line on the green 3/8" SAE male fitting. NOTE: It is always a good idea to use light oil to lubricate the internal O-ring. Push the OEM green lock down to secure the connection. Gently tug the hose connection to verify a positive lock has been made.

NOTE: Flush out the fuel remaining in the OEM return as this line will no longer be used.

45. Torque the 5/16” SAE Male Fitting into either end of the PTFE hose included in the kit. If installing to a Radium fuel rail with a DMR installed onto the top port, make sure the 6AN male return fitting is pointing towards the left side of the vehicle. Loosely install the opposing hose end to the DMR’s 6AN male fitting. NOTE: Hose routing will differ if installing onto a different brand pressure regulator.

Install the 5/16” SAE Male Fitting into the OEM “feed” hose (now converted to a return hose). NOTE: It is always a good idea to use light oil to lubricate the internal O-ring. Push the OEM red lock down to secure the connection. Gently tug the hose connection to verify a positive lock has been made.

Wrap the included cushion clamp around the PTFE hose. Using one of the M6 bolts included in the fuel rail, secure the hose to the fuel rail, as shown. Torque the hose end with a 9/16” wrench.

46. Reconnect battery. Turn key to ON position. Confirm new fuel pump(s) prime. If no leaks are found, start vehicle. The engine may run rough for a few seconds until all the air is bled from the fuel system. Recheck for leaks. Reinstall OEM metal cover (shown) and rear seat.

Installation Complete

NOTES REGARDING THE VENTURI JET PUMP

1. The Radium Engineering fuel hanger kit features a venturi jet pump integrated to the high pressure line. This transfers fuel into the collector box without restricting the return line resulting in fuel pressure bleed-off when the fuel pump(s) is inactive. If pressure is to be maintained at the fuel rail with the engine OFF, a check valve (not included) can be installed on the feed line.

2. For the venturi jet pump to properly operate, 15-45 LPH of fuel will be diverted from the fuel pump outlet. Make sure adequate fuel pump flow capacity is available.