

# INSTALLATION INSTRUCTIONS

## EVO 7-8-9 FUEL PUMP HANGER

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Document# 19-0460

**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. It is recommended to drain the tank to reduce fuel spills and make installation easier and safer. Remove the hex bolt on the bottom LH side of the tank using a 12mm socket wrench.

Remove the rear seat bench by pulling forward on the 2 levers underneath. NOTE: removing the front left seat will provide additional working space but is not absolutely necessary.

Find the fuel pump access panel (shown) on the LH side under the lower seat cushion. Unscrew the 4 Phillips head screws and remove the fuel pump access panel. Once removed, 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.



2. 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.

Pop the hood and disconnect the battery's negative terminal with a 10mm socket wrench. CAUTION: Disconnecting the battery may cancel fault memories of some control units.



3. To detach the OEM feed line (shown top) and crossover line (shown left), simply squeeze the two opposing locking tabs and pull the female fitting away from the male tube. Be careful not to side load the white plastic fittings. Use a rag to clean up any spilled fuel.

Loosen the spring clamp on the return hose (shown bottom) with a pair of pliers. Carefully twist the hose to dislodge it from the 6mm return barb.

Remove the six M5x.8mm nuts holding down the black metal retaining ring using an 8mm socket wrench. Set the nuts aside as they will be reused.

Spin the metal retaining ring around to remove. The metal retaining ring will NOT be reused.



4. 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 then tilt the fuel pump housing towards the RH side to clear the level sender float, as shown.

Pull the OEM fuel pump housing out and drain into the bucket. Clean the fuel pump housing and set it onto a workbench.

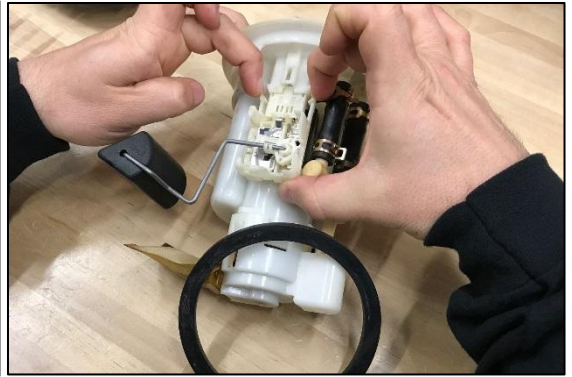


5. The only parts that will be reused from the OEM fuel pump housing is the fuel level sender and large black gasket shown.

Slide the gasket out and around the assembly.

To remove the fuel level sensor, pry the 2 tabs outwards (as shown) and simultaneously slide the module downwards to release.

NOTE: Be careful not to damage the circuit board or bend the float arm.



6. First, remove the 3 internal fuel hanger bracket screws using a 4mm Allen wrench. As shown, remove the fuel hanger bracket.

For dual fuel pump applications, extra wiring is included in the kit for Walbro fuel pumps ONLY. For all other pumps, use the wiring provided with the fuel pump purchase and the ring terminals and heat shrink provided in this kit.

Using the provided lock nuts, connect the ring terminals to the "PUMP 2 +" and "PUMP 2 -" studs.



#### 7. 20-1342 ONLY: WALBRO F90000267/274/285 PUMP INSTALLATION

First, inspect the pump outlet barb. If deformed, modified or damaged, the provided fuel pump adapter will not install correctly and the pump cannot be used.

Slide the black collar over the pump outlet with the flat surface upward.

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

Place the included O-ring on the pump outlet, as shown.



#### 8. 20-1342 ONLY: WALBRO F90000267/274/285 PUMP INSTALLATION

Apply a medium-strength thread locking compound to the 3 included bolt threads. Slide the black collar upward and line up the green fitting holes to the black fitting threads. Secure and tighten all bolts evenly using a 2.5mm Allen wrench, as shown.



#### 9. 20-1342 ONLY: WALBRO F90000267/274/285 PUMP INSTALLATION

Lubricate the O-ring (not shown) on the male 6AN green fitting and install the fuel pump into one of the ports on the underside of the top plate using a 15mm wrench. Either of the 2 ports can be used as they share the same external outlet. Plug in the fuel pump connector.

Dual fuel pump applications for 20-1342 ONLY:

1. Repeat the last few steps for adding a fuel pump outlet adapter.
2. Install the second fuel pump connector to the electrical studs underneath the fuel hat.
3. The large electrical connectors will need to be strategically placed in the unit.



#### 10. 20-1340 ONLY: BRUSHLESS FUEL PUMP INSTALLATION

A 6AN ORB to 8.5mm barb is preinstalled into one of the pump ports under the fuel hat. Replace this fitting with the included 10mm barb fitting. For dual pump applications, remove the plug from the second port and install the other 10mm barb fitting. Lubricate the O-rings.

##### NOTES:

1. The fuel pumps share the same external outlet so ports are interchangeable.
2. Each brushless pump requires the provided large ID submersible fuel tubing.
3. For Deatschwerks DW810 pumps ONLY:
  - a. Cut the provided large ID tubing to 1.2 inch (29mm) in length.
  - b. Find the (Deatschwerks provided) 10mm barb fitting and install to the pump outlet.
4. Secure the tubing with the provided EFI hose clamps.



#### 11. 20-1340 ONLY: AEM 50-1220 FUEL PUMP INSTALLATION

A 6AN ORB to 8.5mm barb should be preinstalled into one of the pump ports under the fuel hat. For dual pump applications, remove the plug from the second port and install the provided 6AN ORB to 8.5mm barb fitting. Be sure to lubricate the O-ring.

##### NOTES:

1. The fuel pumps share the same external outlet so ports are interchangeable.
2. Each pump requires the provided submersible fuel hose to be 1.5 inch (37mm) in length.
3. Secure the tubing with the provided EFI hose clamps.



#### 12. 20-1340 BRUSHLESS PUMPS ONLY

Flying lead harnesses are not included. These come from the pump manufacturer. Colors vary. Install the included ring terminals and heat shrink as shown. When securing, use a 3/8" socket wrench and reference the fuel hat labeling.

##### BRUSHLESS PUMPS

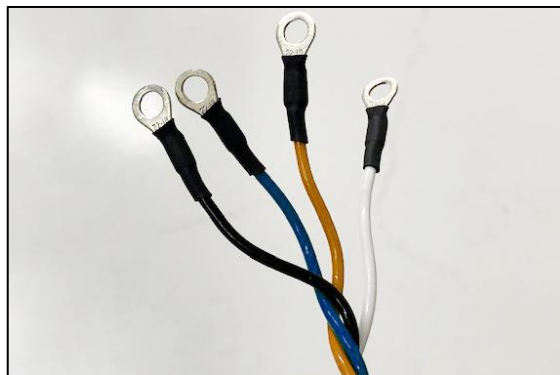
Blue or Green = "1A" (single pump) or "2A" (dual pump)

White Wire = "1B" (single pump) or "2B" (dual pump)

Orange or Red = "1C" (single pump) or "2C" (dual pump)

\*Black Wire = "G" (shared ground for pump 1 and pump 2)

*\*NOTE: This terminal is not used for 3-wire pumps as they don't require a ground.*



#### 13. 20-1340 BRUSHED PUMPS ONLY

Flying lead harnesses are not included. These come from the pump manufacturer. Install the included ring terminals and heat shrink. When securing, use a 3/8" socket wrench and reference the fuel hat labeling (shown).

##### AEM 50-1220

Install the ring terminals underneath the fuel hat to the "2-WIRE PUMP" studs.

RED = "PUMP1 +" (single pump) or "PUMP2 +" (dual pump)

BLACK = "PUMP1 -" (single pump) or "PUMP2 -" (dual pump)

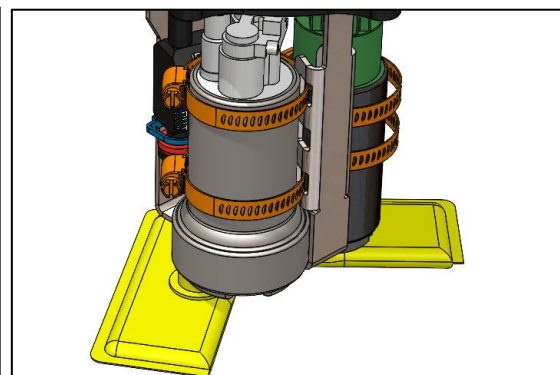


14. Rotate the pump(s) until the body is tangentially touching the internal pump bracket. Secure using the large clamps (shown orange) included in the kit. NOTE: Walbro F90000274 and AEM 50-1220 fuel pumps are shown.

Reinstall the 3 internal pump bracket bolts.

Install the filter socks (shown yellow) onto each fuel pump inlet.

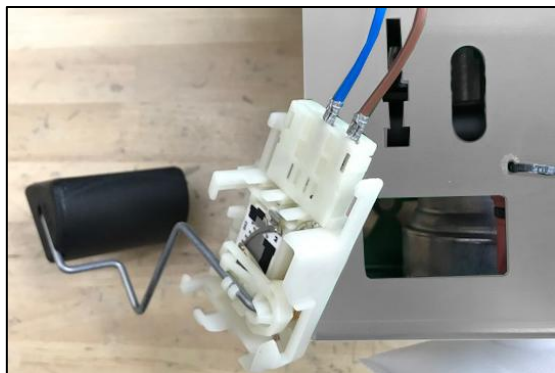
Find the other "loose" zip tie (shown blue) included in the kit. Secure the venturi jet pump outlet barb (near the duckbill valve) to the internal fuel hanger bracket.



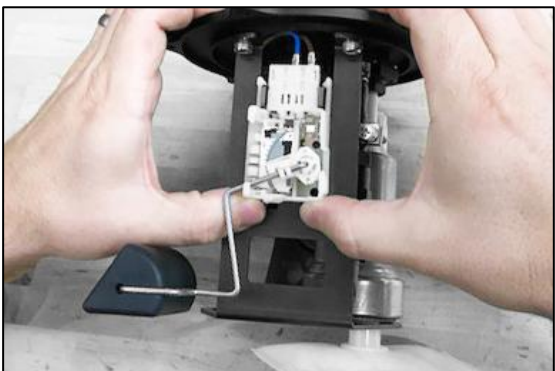


15. Insert the male flat blade terminals from the blue and brown wires into the 2 functioning fuel level sender electrical slots. Because this is a resistance sensor, it does not matter which wire goes into which slot. There is no polarity.

CAUTION: Do not mistakenly insert one of the terminals into the empty slot. 1 of the 3 slots is not used in the OEM level sensor connector.

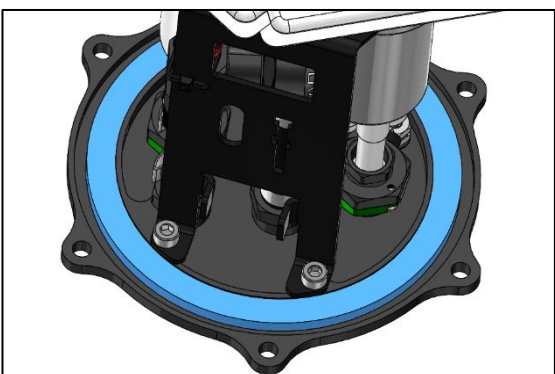


16. Next, insert the fuel level sensor unit through the fuel pump hanger bracket slots towards the bottom. Carefully slide the fuel level sensor upwards until the white plastic tabs lock onto the fuel hanger bracket.



17. Find the OEM rubber gasket that was previously removed from the OEM fuel pump unit. Inspect to make sure there are no rips, tears, cuts, imperfections, etc.

Fully seat the gasket on the underside of the fuel hanger top hat, as shown in blue.



18. If the OEM fuel lines will be reconnected or if the Radium EVO 7-8-9 Fuel Hanger Plumbing Kit will be installed, there is a short OEM fuel tube that will need to be removed.

NOTE: Installation is much simpler if the gas tank is lowered. This will provide additional room.

Look into the sheet metal hole and follow the OEM fuel pump feed hose downstream. Using a flashlight, find the SAE quick connection point towards the front LH side of the opening.



19. Squeeze the 2 blue locking tabs and simultaneously pull the tube off the hard line. Have a rag handy. NOTE: This procedure is much easier without a fuel pump module installed, as shown.

This short OEM fuel hose will NOT be reused.



20. Find the short 3/8" rubber hose, the EFI clamps, and the SAE quick connect fitting in the fuel pump hanger kit.

NOTE: Disregard this step if installing the fuel hanger plumbing kit.



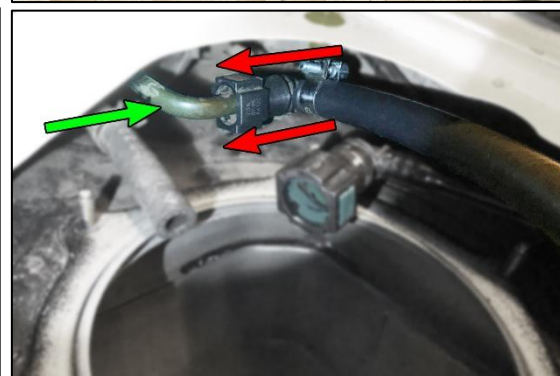
21. Insert the provided SAE quick connect barb into the short 3/8" 6AN rubber fuel hose. Secure with the provided EFI clamp. This will be used for the feed line.

NOTE: Disregard this step if installing the fuel hanger plumbing kit.



22. Take the new hose and reach back underneath the sheet metal to connect the fitting. Push on the SAE quick connect fitting until a "click" is felt. Gently pull back to verify the connection has been properly made. Temporarily tuck the hose underneath the sheet metal.

NOTE: Disregard this step if installing the fuel hanger plumbing kit.



23. Carefully tip the fuel hanger assembly to angle in the fuel level sender float first. Next, readjust vertically and drop the fuel pump hanger down into the tank moving the connectors out of the way one by one.

Make note of the orientation of the assembly. The OEM fuel tank studs are not exactly symmetrical so it cannot be misaligned.

The top plate and gasket should be flush with the fuel tank lid area. Reinstall the OEM flange nuts in a crisscross pattern. CAUTION: Do not over tighten.



24. The OEM crossover will be slightly too long to connect as-is. A trick is to remove the RH access cover on the passive side of the gas tank using a Phillips head screwdriver. Squeeze the 2 blue locking tabs on the crossover fitting and simultaneously pull off, as shown. Have a rag handy.

Gently pull the crossover tube towards the RH side of the vehicle to slide it through the 2 clips underneath the sheet metal (not shown). Back on the LH side, connect the OEM SAE quick connect fitting to the Radium "Siphon" port first. Now reconnect the OEM SAE quick connect fitting back on the RH side. The fittings will be fully engaged when a "click" is felt.



25. To reinstall the OEM fuel feed and return line, follow the steps below. For installing the Radium EVO 7-8-9 Fuel Hanger Plumbing Kit's feed and return lines, skip these instructions and reference the instructions at the end of this document.

First, measure and cut the new rubber fuel feed hose to length (if necessary). Secure to the new "Pump" barbed fitting using the provided EFI clamp.

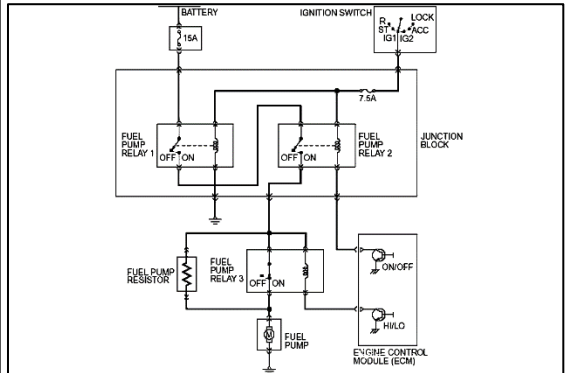
Finally, install the return hose to the new "Return" barb. Secure using the OEM clamp as shown.



26. As shown, the OEM Mitsubishi fuel pump uses a 15A fuse.

The OEM circuit uses a resistor to slow down the fuel pump when the engine is at low loads. At high loads, the ECM energizes "Fuel Pump Relay-3" to bypass the resistor and drive the fuel pump directly with high voltage.

If reusing the OEM wiring, use with caution! These aftermarket fuel pumps can potentially draw more current than the OEM electrical specified 15A. This is especially the case with high fuel pressures (high boost).



27. Using a pick, dislodge the 3 tabs on the OEM electrical connector and flip the lock upwards. Cut all 4 wires as close to the connector as possible, as shown.

Remove some of the electrical tape. Strip the insulation for all 4 wires about ¼" back.

#### Wire Identification:

BLACK - small gauge (AWG): **Fuel Sensor**

BLACK - small gauge (AWG): **Fuel Sensor**

WHITE - large gauge (AWG): **Fuel Pump +**

BLACK - large gauge (AWG): **Fuel Pump -**

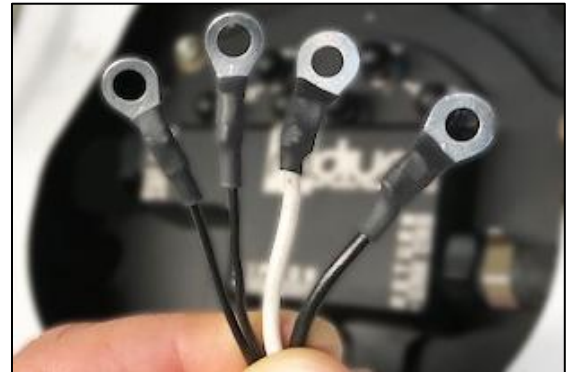


28. Cut two ½" pieces of the small diameter shrink tube. Insert onto each sensor wire (two small gauge wires). Next, crimp on a small gauge (AWG) ring terminal to each wire. Slide the shrink tube over the crimped section of the ring terminal and shrink into place with a heat gun.

To reuse the OEM fuel pump power wiring, use the large diameter shrink tube and large gauge (AWG) ring terminals to connect the fuel pump wires.

**WARNING:** The OEM fuel pump power wiring cannot supply power directly for 2 pumps!

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



29. Attach the ring terminal with the large gauge (AWG) black wire to the ground "GND" pump-1 terminal.

Attach the ring terminal with the large gauge (AWG) white wire to the power "PWR" pump-1 terminal.

Attach the ring terminals with the small gauge (AWG) black wires to the "LEVEL" terminals. NOTE: There is no polarity on the fuel level sensor so these wires cannot be installed backwards.

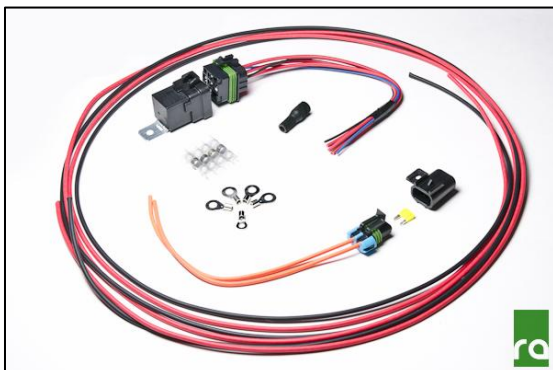
Secure all connections using the included acorn nuts.





30. Optional: Radium Engineering recommends upgrading to high current wiring.

Consider using Radium DIY wiring kit P/N: 17-0031 (shown) for each fuel pump. This includes a dedicated fuse, relay, 10AWG wire, etc. It is recommended to use the OEM fuel pump wiring to trigger this fused relay power source for each fuel pump.



31. A low micron aftermarket fuel filter is required. Consider purchasing the Radium EVO 7-8-9 Fuel Hanger Plumbing Kit (discussed at the end of this document).

Reconnect the battery. Pressurize the fuel system and confirm the new fuel pump(s) are properly operating. 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 metal cover plate and rear seat.

**INSTALLATION COMPLETE**



#### 1. Optional Radium 20-0376-0X Fuel Hanger Plumbing Kit

NOTE: For this kit, the OEM fuel feed line will be reassigned as the fuel return line.

Using light oil, lubricate the O-rings on the two included 10AN ORB to 8AN male adapter fittings. Secure the fittings to the fuel filter ports using a non-marring 1" wrench.



2. Using a 4mm Allen hex wrench and 8mm wrench, secure the lower portion of the filter clamp to the mounting bracket using the included nuts and bolts (x3).

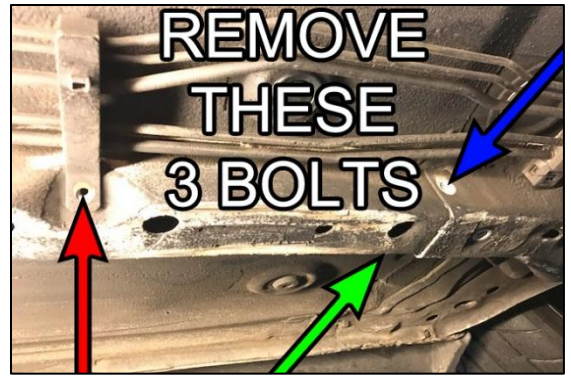


3. Place the fuel filter onto the lower clamp with the green "OUTLET" up against the bracket, as shown. Find the upper portion of the filter clamp and two M5x0.8mm bolts provided in the kit. Clamp the fuel filter down to the mounting bracket using a 4mm Allen hex wrench.



4. Safely raise the vehicle.

Remove the hard line bracket mounting bolt shown using a 10mm socket wrench. Remove the front two bolts shown using a 12mm wrench. These bolts will NOT be reused.



5. Simply pry the OEM rubber plug out of the floor, as shown.

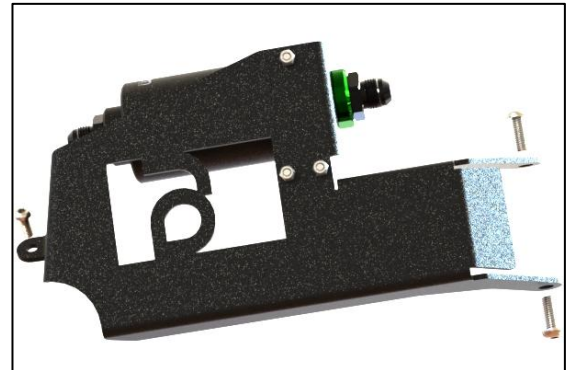


6. Flip the plug around and reinsert until it locks in place, as shown. This will provide additional room for the fuel filter assembly.



7. Lineup the filter bracket assembly to the open threaded holes. Install the 3 provided button head bolts to the chassis. If necessary, pull and spread the OEM hard lines to permit additional space.

Use a 4mm Allen hex wrench for the rear bolt (shown left) and a 5mm Allen hex wrench for the 2 front bolts (shown right).



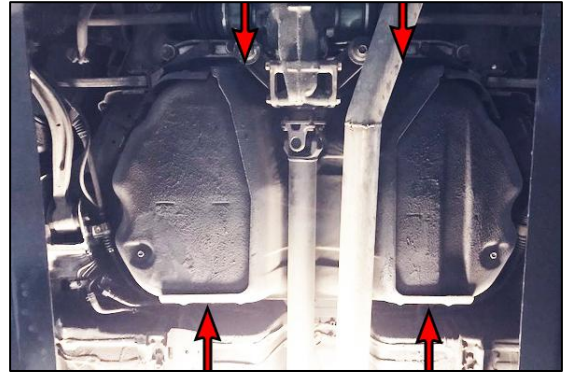
8. The Mitsubishi Evolution does not have sufficient space to fit a large -8AN fuel feed hose down from the top of the tank to below the tank. The modifications described below are required.

Using a 12mm wrench, temporarily remove the mounting bracket that secures the LH side emergency brake cable to the chassis, as shown.





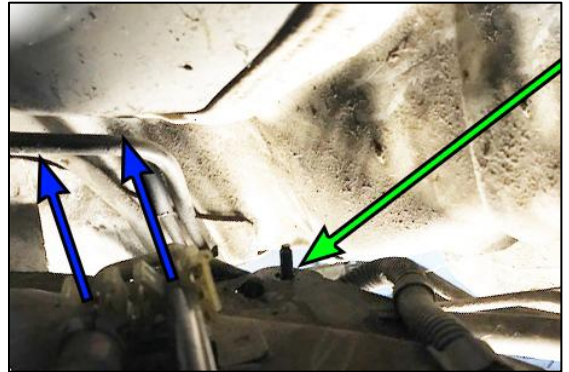
9. To drop the fuel tank down a few inches and allow extra working room, remove the 4 nuts shown using a 14mm socket wrench.



10. From inside the cabin, look into the fuel pump access hole towards the LH side of the tank.

Reach in and pull the OEM fuel and return hard lines upwards (shown blue) to release them from the clamps attached to the gas tank.

Using an 8mm socket wrench, remove the nut from the OEM stud (shown green) that secures the OEM fuel lines.



11. From underneath the car, find the two ABS electrical connector hold down clips. Dislodge the plastic clips so there are simply two holes, shown in purple.



12. Using a pair of pliers or channel locks, reach up and bend the gas tank tab downwards.

This will permit the needed space to allow the -8AN fuel feed hose to safely pass through.



13. The gas tank tab bend will look similar to what is shown.

NOTE: this picture was taken with the gas tank uninstalled and outside of the vehicle for reference only.



14. As shown, assemble the included SAE quick connect and EFI clamp to the rubber 5/16" 5AN hose provided in this kit.

Install this hose to the OEM feed tubing. Reference fuel hanger installation Steps 19 and 20 above for more details. This hose will now be a return line. NOTE: This procedure is much easier without a fuel pump module installed.



15. Remove any hoses and/or fittings from the "Pump" and "Return" ports. Have a rag handy. Install the larger barb fitting provided in this fuel hanger plumbing kit to the "Return" port. Install the 8AN ORB to 8AN male fitting (provided in the original fuel pump hanger kit) to the "Pump" port. Be sure to lubricate these O-rings first.

Find the -8AN PTFE hose in the kit that has a 120 degree and a straight hose end. Run this line through the area mentioned above. Loosely install the 120 degree hose end to the "Pump" port (do not tighten yet).

Run the rubber hose clockwise around the perimeter of the fuel hanger towards the "Return" barb. Measure and cut to length. Secure the hose with the included EFI hose clamp.



16. From underneath the vehicle, be sure the -8AN PTFE hose is free of obstruction, sharp edges, suspension components, hot exhaust, etc. Connect the -8AN straight hose end to the black fuel filter "INLET" fitting (do not tighten yet).

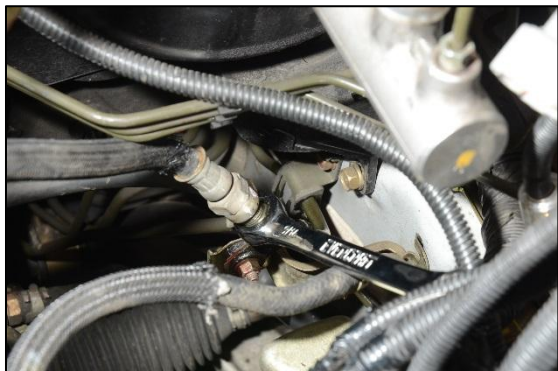
Remount the fuel tank and the emergency brake clamp to the chassis. Recheck that the -8AN feed hose is not pinched or against any sharp edges. Secure the ABS connector keeping it away from the suspension. Use the provided cable zip ties to secure the -8AN feed hose, as shown.

Tighten both ends of this -8AN hose using a 7/8" wrench. To prevent hose end marring, an aluminum wrench is recommended.



17. Find the junction that connects the OEM fuel feed hard line to the OEM fuel rail rubber hose underneath the brake master cylinder (LHD cars). To disconnect, use a 14mm flare nut wrench and a 17mm open-ended wrench. Significant force will be required. Be careful not to bend or distort the OEM hard line.

NOTE: The OEM rubber fuel feed hose will not be reused.



18. As shown, install the provided -6AN male to inverted flare fitting into the OEM "feed" hard line (now converted to a return line).

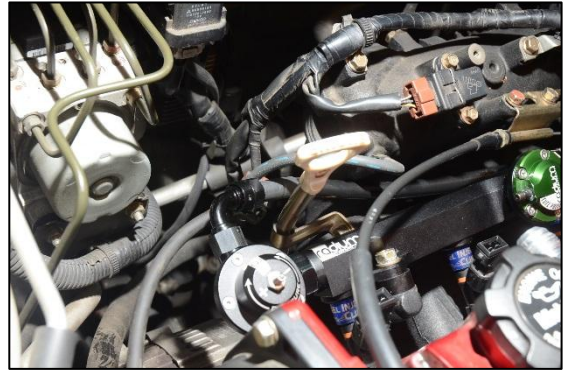


19. Find the -6AN PTFE hose in the kit. Install the 45 degree hose end to the -6AN to inverted flare fitting. Install the 90 degree hose end to a -6AN return fitting on the FPR (not included).

NOTE: If installing to a Radium Fuel Rail with a Radium DMR installed in the RH port, make sure the -6AN male return fitting is pointing towards the rear of the vehicle. This hose will route from right to left just above the intake manifold runners, as shown.

NOTE: Hose routing may differ if installing a different brand fuel pressure regulator.

Tighten the hose ends with a non-marring 9/16" wrench.



20. Find the last -8AN PTFE hose end in the kit. Install the 45 degree hose end to the fuel rail. Radium Fuel Pressure Gauge and 14-0148-08 Inline Adapter Fitting is shown. Route the hose down towards the hard lines staying clear of any hot or moving parts.

Install the straight hose end to the -8AN fuel filter outlet fitting. Tighten the hose ends with a non-marring 7/8" wrench.

Reconnect the battery. Pressurize the fuel system 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 metal cover plate and rear seat.

**INSTALLATION COMPLETE**

