

**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: This fuel pump hanger kit covers many years and a large range of Subaru models. These instructions may vary from the specific application you are working with.**

First, remove all loose carpet and foam pieces in the trunk. The fuel pump is behind the rear seats. For wagons, the seats can be simply lowered. For sedans, first pull the 2 plastic caps off the lower seat cushion retaining bracket. Next, remove the bolts and lift the seat up and out of the vehicle. Next, remove the lower bolts that secure the seat back. Move the seats belts out of the way and lift up and pull it out. To remove the vertical bars, there are upper and lower bolts that need to be unscrewed. To release the panel from the clips, pull forward.

Remove the 4 Phillips head screws (shown) and lift off the fuel pump access cover.



2. 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.

To depressurize the fuel system, first squeeze the tab and unplug the white wiring connector on top of the pump housing. 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 a 10mm socket wrench. **CAUTION:** Disconnecting the battery may cancel fault memories of some control units. Consequently, before disconnecting the car's battery, always interrogate the fault memories.



3. To reduce spills and make installation easier and safer, the gas tank should be drained.

Remove the plug found underneath the RH side of the gas tank.

Older Model Subaru: 14mm Hex Bolt

Newer Model Subaru: 15mm Hex Bolt

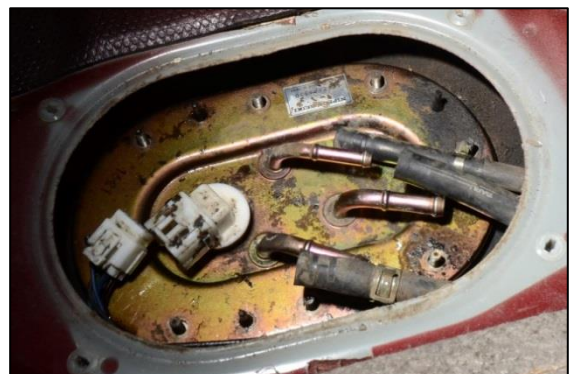
Catch all fuel in a clean fuel-safe container as shown.



4. Because of the many variations associated with this Subaru part, the fuel lines will differ. The one constant in all variations is the crossover line. This can be easily identified as it is the smallest diameter hose. The barb OD is 1/8" (6.4mm). Also, it is ALWAYS secured with a spring clamp.

Older Subarus will use a barb with a clamp on the feed and return lines. Newer model Subarus will use an SAE quick disconnect on the feed and return lines. The middle model years will use a SAE quick disconnect on the feed but a barb with a spring clamp on the return line.

The last variation is the position of the fuel feed outlet port. Newer model Subarus will be pointing forward, towards the front of the vehicle. The barbed feed line on older model Subarus will be in between the crossover and return lines and run essentially parallel with the other bars, exactly as shown.



5. To detach the SAE quick disconnect lines, simply squeeze the locks and pull the fitting away from the metal tube. Reinstall the plastic lock to the fitting. To detach all other hoses, use pliers to release the spring clamps and pull the hoses off. Use a rag to clean up any spilled fuel.

Before removing the OEM fuel pump housing, place an empty bucket nearby. There will be residual fuel in the gas tank. Carefully remove all eight M5 nuts using an 8mm socket wrench. Do not drop them as they will be reused. Tuck all hoses outwardly under the sheet metal. On some newer model Subarus, there is a 2-bolt silver support bracket that holds a vent valve line under the sheet metal. If equipped, push this bracket rearward out of the way.

Slowly lift the hanger straight up then twist for fuel filter clearance (if equipped). Tilt and twist the pump assembly 90 degrees and back to clear the level sender.



6a. Pull the OEM fuel pump housing out and drain into the bucket, as shown.

Inspect the large oval gasket. If it has not been recently lubricated in gasoline and/or is dried out, a replacement is necessary for proper sealing. Subaru P/N: 42060AA040

Immediately cover the gas tank opening to prevent dirt and/or debris from falling in.

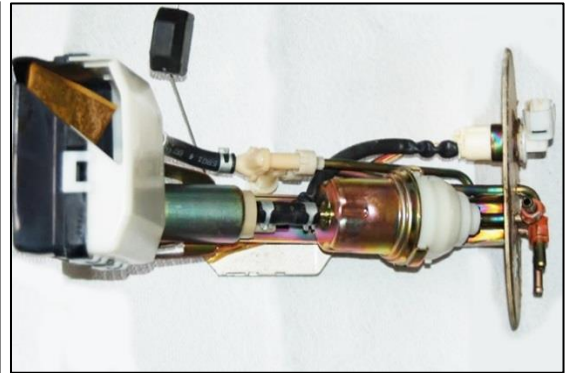
NOTE: Older Subaru vehicles use an external post-pump fuel filter commonly found in the engine bay mounted to the LH strut. As pictured, these vehicles do NOT use a post-pump filter that is integrated into the OEM hanger.

Next, set the OEM unit onto a workbench.



6b. NOTE: Subaru changed from external post-pump filters to internal post-pump filters around 2005 (depending on the model). This filter is easily identified as it is mounted directly to the fuel pump outlet, as shown.

**This Radium Engineering fuel pump hanger does NOT include an internal post-pump fuel filter.** For newer Subarus which have the internal post-pump filter (pictured), a low micron filter should be installed somewhere downstream of the pump 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: 20-0220-01, P/N: 20-0220-02, P/N: 20-0220-03).

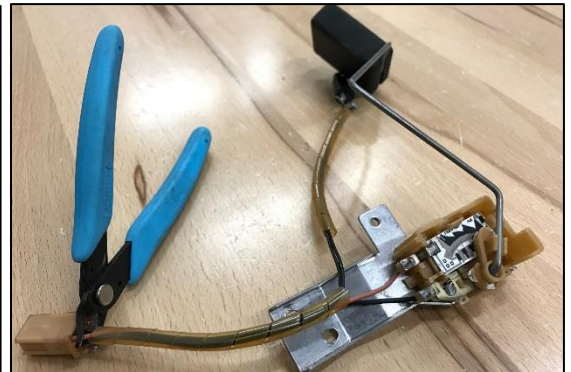


7. The only components that will be reused from the OEM assembly is the fuel temperature sensor and the fuel level sender.

Pop out the fuel temperature sensor probe.

Remove the fuel level sender bracket using a Phillips head screwdriver. This small screw will NOT be reused.

Using a pair of electrical cutters, cut the connector off. Keep as much wire slack as possible, as shown. Slide the clear plastic looming off the wires and discard.



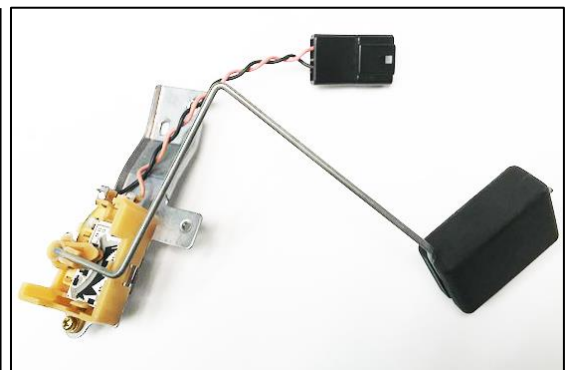
8. For the fuel level sender, first twist the wires together for flexibility.

Strip off the insulation and crimp the 2 included flat male terminals to each wire using a tool such as Molex 63811-1000 hand crimper.

Slide the terminals into the plastic connector (as shown) until a "click" is felt.

It does not matter what wire goes into which slot.

NOTE: the level sender will not be attached to the pump bracket until the fuel hanger is almost fully inserted into the gas tank.





9. For the fuel temperature sensor, find the small diameter heat shrink and 2 of the small gauge ring terminals in the kit.

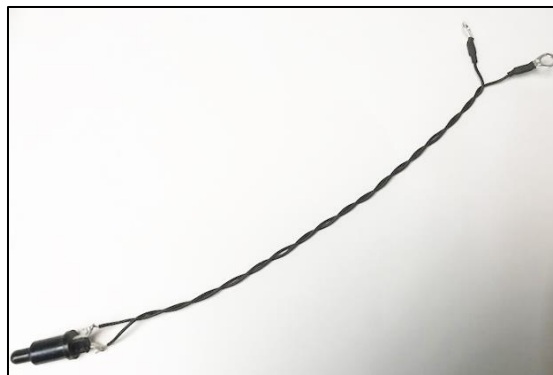
For flexibility, twist the fuel temperature sensor wires together.

Cut two ½" long sections of heat shrink.

Strip the insulation off the wires and slide on the heat shrink.

Crimp the ring terminals onto each wire with 15-20 lbs of pull force using a standard wire crimper.

Use a heat gun to compress the shrink tubing over the crimped areas, as shown.



10. The 3 port fittings are preinstalled for the most common Subaru fuel tank configuration. Extra fittings are included to suit your specific application.

**Crossover Fitting:** This is the same on all variations and will likely never need to be changed.

**Return Fitting:** For newer models, install the included 6AN ORB SAE quick disconnect fitting.

**Pump Out Fitting:** For older models, first install the included 8AN ORB to 6AN male low profile banjo fitting. This will permit the fitting to be at the correct angle. Next, install the included 6AN female to female union. This is required to extend the connection to the OEM fuel hose. Lastly, install the included 6AN male to barb fitting, as shown.



11. Be sure to use light oil lubrication for the O-rings prior to installing the fittings. Show is the correct fittings for the newer model Subarus.

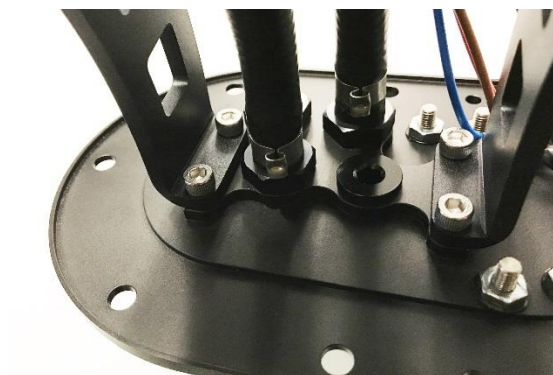
If uncertain about which fittings to use, check the OEM fuel lines installed in your specific application.



12. **If the fuel pump hanger was purchased with pump(s) included, skip Steps 12-19.**

For single fuel pump applications, be sure the unused port on the underside of the top plate has a 6AN ORB plug fitting installed, as shown.

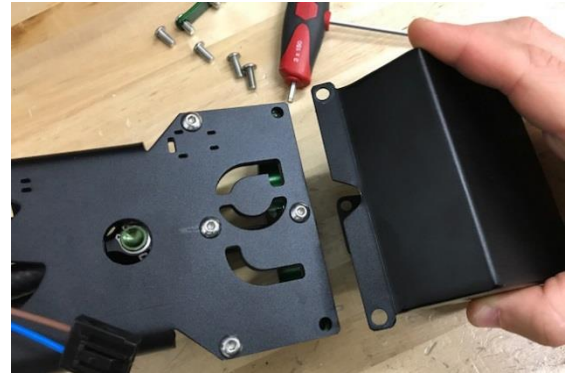
For dual fuel pump applications, install the included 6AN ORB barbed fitting in place of the 6AN ORB plug. Apply light oil to the O-ring. Extra wiring is included in the kit for the second pump. From underneath the top plate, attach the orange wire ring terminal to the "PWR-PUMP2" stud and the gray wire ring terminal to the "GND-PUMP2" stud using the included metal lock nuts.



13. To install the fuel pumps, first remove the four M5 bolts in the areas shown using a 3mm Allen hex wrench.



14. From the backside of the assembly, remove the two outer M5 bolts using a 3mm Allen hex wrench. Detach the collector box from the assembly, as shown.

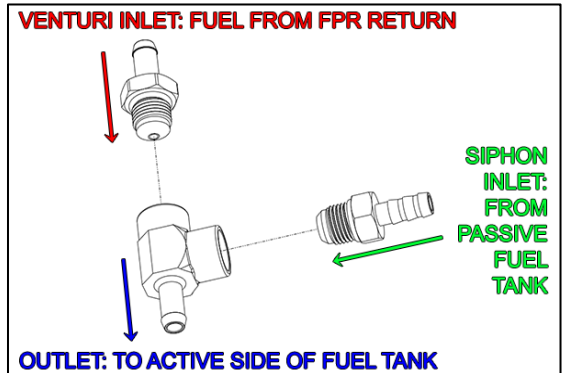


15. Remove the last four M5 bolts on the backside using a 3mm Allen hex wrench. This will detach the 2 fuel pump clamps from the assembly, as shown.



16. The Radium fuel pump hanger kit comes with 2 different venturi jet pump orifice fittings. The preinstalled **green** orifice is typically best for most applications. The **gold** orifice can be used in situations where back pressure in the return line needs to be reduced to a minimum. The proper orifice will be determined by the backpressure in the return line. This is dictated by many factors including the flow rate of the pump(s), if the pumps are staged, engine fuel consumption, the diameter and length of the return hose, etc.

**To prevent failure, the venturi jet pump O-rings MUST be lubricated prior to assembly.** Also, if installing fuel pumps, the jet pump and jet pump hose assembly can stay intact unless the orifice needs to be swapped.



17. Install the submersible rubber fuel hose to the fuel pump outlet barb. Strategically rotate the included EFI hose clamp and secure.

For dual fuel pump applications, install the extra submersible rubber fuel hose to the second fuel pump outlet barb. Next, install the rubber fuel hose to the 6AN ORB barb fitting from the earlier step. Secure both ends using the included appropriate EFI hose clamps.

Position the fuel pump(s) so the barbed outlet is closest to the bracket and the electrical connections are furthest from the bracket. Some rotating may be necessary.



18. Reinstall the clamps using the 4 screws. The pump(s) will hang from the bottom, as shown.

This kit was designed to be used with a specific filter sock (**RADIUM P/N: 14-0143**). However, the filter sock shown that come with AEM 50-1000 and 50-1200 pumps can also be used. Large fuel pump filter socks which have a rigid internal "skeleton" insert can NOT be formed to fit inside the Radium collector box.

Press the filter sock onto the pump inlet and secure with the star washer.

For proper collector box fitment, the fuel pump filter sock(s) must be folded, as shown.

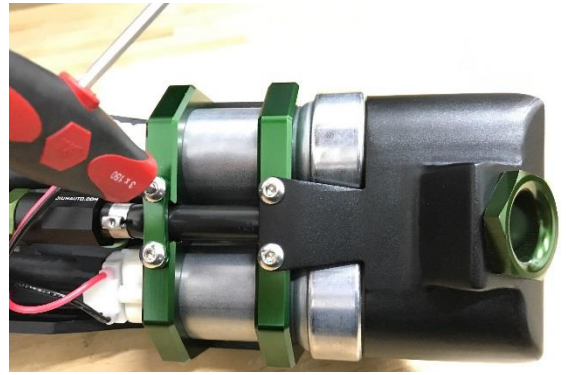




19. To reattach to the collector box assembly, secure the four M5 collector box bolts (2 on each side). Be sure the trap door check ball is free to move in and out.

Insert the venturi jet pump outlet tube into the collector box and fasten the 2 bolt bracket back into place, as shown.

Connect the fuel pump(s) electrical leads. This procedure will vary depending on the brand. As a reference, see the manufacturer's manual. For the Walbro F90000274 (or F90000267) fuel pump, first lubricate the orange connector seal.



20. Secure the fuel temperature sensor ring terminals to the "TEMP" studs on the underside of the top plate using the lock nuts. There is no polarity so they cannot be criss-crossed.

Using the included zip ties, secure the temperature probe and wires to the bracket, as shown.



21. When installing the OEM gasket, note that it must be orientated properly.

Wrap the OEM gasket around the collector box and work it all the way up until all 3 rubber nubs protrude through the top plate, as shown.



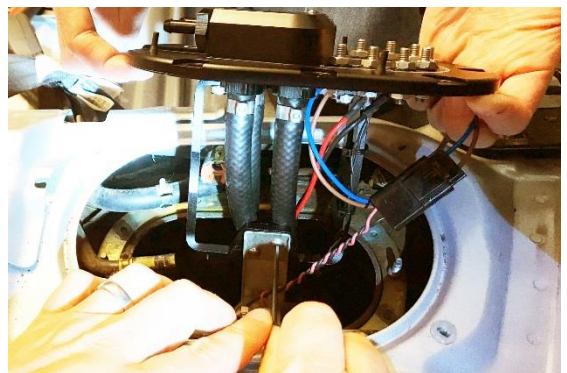
22. From the underside of the top plate, be sure that the OEM gasket is seated in the machined lip, as shown.

Confirm the OEM oval gasket is still pliable enough to seat properly. If it has dried out, purchase a new gasket. Subaru P/N: 42060AA040



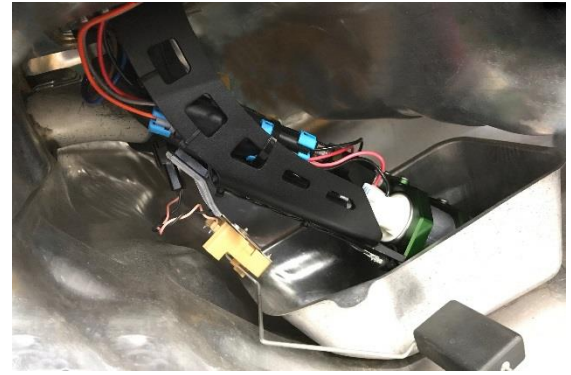
23. NOTE: The level sender cannot be attached until the hanger assembly is halfway installed into the gas tank. This step MUST be performed with 2 people (Installer#1 and Installer#2). First, remove the 2 small M4x0.7mm screws from the hanger bracket using a 2.5mm Allen hex wrench. Then, while outside the gas tank, plug in the connector with blue and brown wires to the level sender connector that was assembled in earlier steps.

From inside the trunk, Installer#1 needs to insert and hold the level sender in the tank allowing it to hang. From the rear seats, Installer#2 then slowly lowers the pump assembly into the tank. Installer#2 needs to firmly hold the assembly just high enough up for the level sender to be secured. Installer#1 should line up the 2 sender holes with the M4x0.7mm threads in the bracket. Using the 2.5mm Allen wrench, cautiously install the 2 bolts to secure the fuel level sender in place. Be careful not to strip the bolts or lose them in the tank.



24. Continue to lower and rotate the assembly until the Radium collector box sits properly into the OEM gas tank baffle. Not visible, but shown is what the inside of the gas tank would look like.

Secure the fuel pump hanger assembly in place using the 8 OEM flange nuts. Tighten in a cross pattern. Do NOT over torque these nuts as the M5 gas tank studs will break.

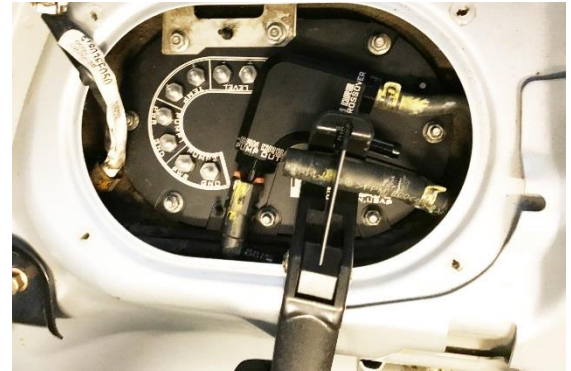


25. Connect all 3 fuel lines (fuel feed, return, crossover). Light oil is recommended to be used on all of these connections.

For older models, the OEM feed and return lines will need to be crossed to make the connections.

For model years that use an SAE quick disconnect fuel feed, gently pull the OEM line to free up the necessary slack to make the connection. Be sure the SAE lock fully engages, as shown.

NOTE: Depending on the specific Subaru model year, some modifications may be required. For example, this 2005 Impreza STi OEM return hose is being shortened by 1-inch, as shown.



26. **External Wiring:**

Cut off the OEM 6-pin fuel pump control module connector keeping as much wire as possible. Remove some of the wire loom then strip the insulation for all wires about 3/16" back.

Cut four 1/2" pieces of the small diameter shrink tube and insert a piece onto each sensor wire (4 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.



27. Use the large diameter shrink tube and large AWG ring terminals to connect the pump power wires. The connection points on the hanger are labeled "PWR" for positive and "GND" for negative.

**Single Fuel Pump Applications ONLY:** In some cases, the Subaru fuel pump controller (designed for less than 15A) will be sufficient unless fuel pressure is excessive. The OEM Subaru 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).

- To connect the fuel pump(s) with upgraded wiring, see "Optional High Current Wiring" below.
- To connect the fuel pump reusing OEM wiring, use the following step.



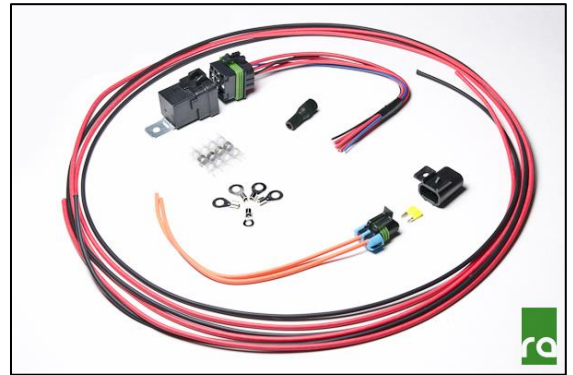
28. As shown, there are many wire color variations for all of the model years. Referencing the pinout chart, insert the ring terminals onto the corresponding studs.

Tighten the included plastic nuts with a 3/8" driver. Do not over-torque!

FUEL PUMP	+	Black/Red or Black/Yellow or Blue/Yellow
	-	Black
FUEL TEMP	+	Black/Yellow or Red/White or Green/Blue
	-	Blue/Black or Blue/Black or ---
	-	---
FUEL LEVEL	+	Red/Yellow or Black/White or Black/Yellow
	-	Blue

### 29. Optional High-Current 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.



30. Reconnect the battery and turn the 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 metal cover plate (shown) and rear seat.

**Installation Complete**



### Venturi Jet Pump Troubleshooting:

- A. If the vehicle is prematurely running out of fuel, the venturi jet pump is not siphoning fuel quick enough. In this case, the smaller black orifice should be installed into the venturi jet pump body.
- B. If the minimum static fuel pressure is higher than usual, there is likely too much backpressure in the FPR return line. In this case, the larger green orifice should be installed into the venturi jet pump body.

To better grasp this idea, see the general illustration of how a venturi jet pump works pictured at the right.

