

INSTALLATION INSTRUCTIONS

FUEL PUMP HANGER

FR-S, BRZ, GT86, GR86

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Document# 19-0368

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.

NOTE: It is recommended to drain the tank to reduce fuel spills and make installation easier and safer. Also, it is recommended to remove the front left seat for additional space. **MEASURE AND RECORD THE FUEL PRESSURE BEFORE BEGINNING INSTALLATION.**

1. Using a 10mm socket, remove the left side rear bench seat bolt. Lift the front while pushing down on the rear of the seat to dislodge it from the hook underneath. The fuel pump access cover is held down with black adhesive caulk. To remove, use a plastic panel tool to pry it upwards. Be careful not to dent or scratch the paint. Also, be careful to not get the messy caulk on anything in the surrounding area.

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 removed, lower left). 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.

To detach the OEM feed line, simply squeeze the white locks and pull the female fitting away from the male tube. Use a rag to clean up any spilled fuel. If necessary, use a flat blade to dislodge the white fuel clip from the male tube fitting. Insert the clip back into the OEM feed connector.



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

To remove the white fuel tank lock ring, many techs will use a hammer and flat chisel. However, it is recommended to purchase a spanner tool to avoid breaking the plastic. These are relatively inexpensive and can be found from companies like Lisle, OEMTools, Ryco (shown), etc. For these vehicles, Radium successfully uses Lisle P/N: 63000.

Spin the lock counterclockwise. Note: the pump housing is slightly spring-loaded. Remove the white plastic retaining ring and large flat sealing washer. Set them aside as they will be reused.



4. Before removing the OEM fuel pump housing, place an empty bucket nearby. There will be residual fuel in the gas tank and in the OEM fuel pump bucket. Slowly lift the canister straight up then tilt the fuel pump housing towards the right side to clear the level sender, as shown.

To detach the OEM crossover line, simply squeeze the yellow locks and pull the female fitting away from the male tube. Use a flat blade to dislodge the fuel clip from the male tube fitting. Insert the clip back into the OEM crossover connector.

Pull the OEM fuel pump housing out and drain into the bucket. Clean the fuel pump housing and set it onto a workbench. **NOTE:** there will be fuel in the OEM bucket.

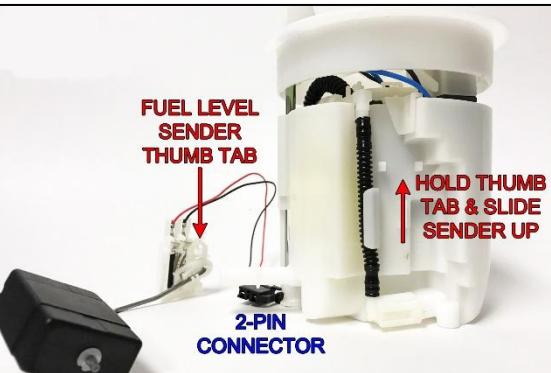


5. For 2012-2021 vehicles, pry and pull the black OEM gasket (not shown) down off the OEM module. For 2022+ vehicles, inspect the O-ring gasket on the fuel tank.

The only part that will be reused from the housing is the fuel level sender and large gaskets.

Depress the 2-pin wiring thumb tab from underneath the top plate and unplug the connector.

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.



6. Using a 3mm Allen wrench, remove the 2-bolt bracket that secures the crossover hose and the single upper bolt on the opposing side of the collector box.

As shown, separate the top fuel hat from the collector box.

Using a 4mm Allen wrench, remove the 3 bolts that secure in the internal pump bracket to the top fuel hat.



7. WALBRO F90000267/274/285 FUEL PUMP INSTALLATION ONLY

For dual pump applications, an extra connector is included for Walbro F900002XX pumps. Referencing the "FUEL PUMPS (2)" engraving on the fuel hat (shown), attach the wire leads to the underside stud terminals using the included metal lock nuts.



8. BRUSHLESS FUEL PUMP INSTALLATION ONLY

1. Find the wiring connector provided by the pump manufacturer. Strip the wires, slide over the included heat shrink, crimp the provided ring terminals, and cover the crimps using a heat gun. This same procedure is required if running 2 pumps.

2. The engraving labeled "A" "B" "C" is generic. Note what wire color equates to the letter.

3. For brushless pumps that use 4 wires (shown), use the "BRUSHLESS PUMP-GROUND" terminal for both pumps.



9. If installing 1 pump, be sure there is a 6AN ORB plug installed in (either) one of the bottom ports of the fuel hat. If installing 2 pumps, be sure there is no 6AN ORB plugs installed in either of the bottom ports of the fuel hat.

If installing brushless pump(s), install the provided barbed fitting(s) depicted using a 3/4" (19mm) socket. Be sure to lubricate the O-ring first.

If installing a Walbro F900002XX pump(s), see the following steps.



10. WALBRO F90000267/274/285 FUEL PUMP INSTALLATION ONLY

First inspect the pump outlet hose barb. If the hose barb is deformed, modified or damaged, the Radium 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 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.



11. WALBRO F90000267/274/285 FUEL PUMP INSTALLATION ONLY

Apply a high 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.



12. WALBRO F90000267/274/285 FUEL PUMP INSTALLATION ONLY

Lubricate the O-ring 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.

For single pump applications, either of the 2 ports can be used as they share the same external outlet.

Lubricate the connector seal(s) and plug in the fuel pump connector(s).



13. BRUSHLESS FUEL PUMP INSTALLATION ONLY

For brushless Deatschwerks pumps, the provided tubing will need to be cut. DW440=45mm (shown). DW810=29mm and requires the large barbed outlet fitting to be installed.

Lubricate the pump barb(s) and the inner walls of the provided tubing. Apply a small amount of heat and quickly insert. Use a screwdriver and the provided EFI hose clamp(s) to secure the tubing to the pump(s), as shown.

Insert the provided EFI clamp(s) over the tubing and install to the barb fitting(s) underneath the fuel hat.



14. Secure the 3 internal pump bracket bolts.

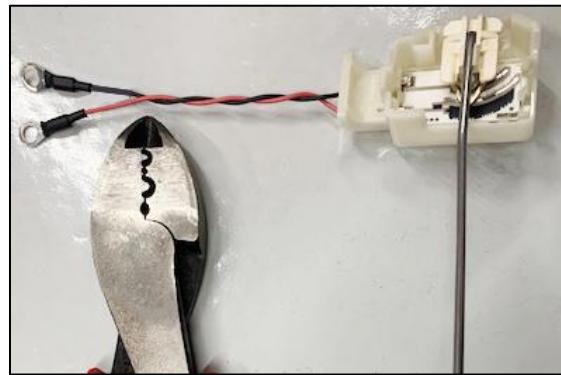
This kit was designed to be used with a pliable fuel pump filter sock. If applicable, use the provided RADIUM P/N: 14-0143 filter sock. Press the filter sock(s) onto each pump inlet and secure with the star washer. NOTE: Large fuel pump filter socks which have a rigid internal "skeleton" insert may NOT form to fit inside the collector box.



15. Locate the OEM fuel level sender and cut the black OEM 2-pin connector off allowing as much wire slack as possible. For flexibility, twist the 2 wires together, as shown.

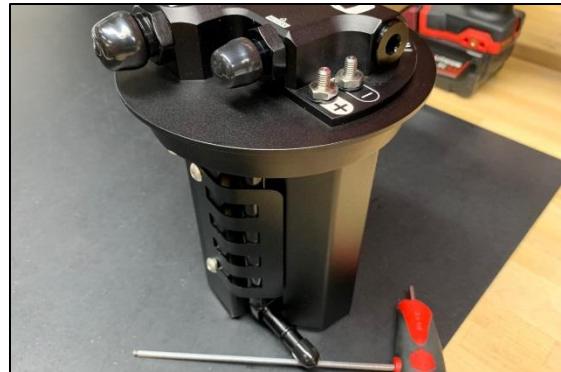
Strip off the wire insulation. Slide the provided heat shrink over the wires. Crimp 2 of the included ring terminals to each wire. Cover the crimp and apply heat.

Using a 3/8" socket, secure the ring terminals to the underside of the fuel hat. Because this is simply a resistance sensor, wire polarity is not important (not possible to wire it backwards).



16. Reinstall the assembly in reverse order.

Be sure the black mount for the fuel level sender is already installed to the collector box.



17. Next, carefully slide the OEM fuel level sender downwards onto the black fuel level sender mount until the tab locks into place.

NOTE: It is necessary to remove any adapter fitting installed in the fuel pump hanger "out" port. This allows extra room for the plastic lock-ring to be installed.



18. Find the OEM gasket that was previously removed from the tank and replace if needed.

12-20 Subaru P/N: 42025CA001

2022+ Subaru P/N: 42025CC010

12-21 Toyota P/N: SU003-07284

2022+ Toyota P/N: SU003-09610

Seat the gasket onto the fuel tank. For 12-21 vehicles, lubricate the inner wall of the gasket and the outer diameter of the fuel hat where they will slide together.



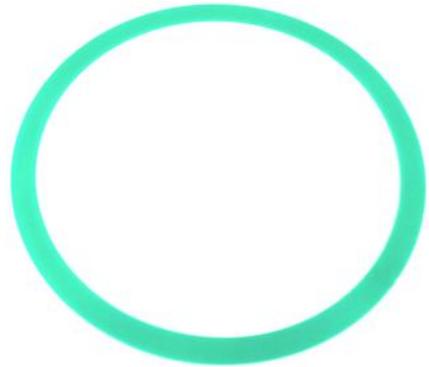
19. Reach into the fuel tank and pull the OEM crossover tubing connector out. Slide the OEM female SAE fitting over the 90 degree jet pump SAE male fitting until a "click" is felt.



20. When installing, lean the assembly side to side to prevent the crossover hose and fuel level float from contacting the opening of the fuel tank.

Before lowering the assembly all the way down, make note of the orientation graphic on top of the pump hanger assembly and make sure it is aligned correctly with the vehicle.

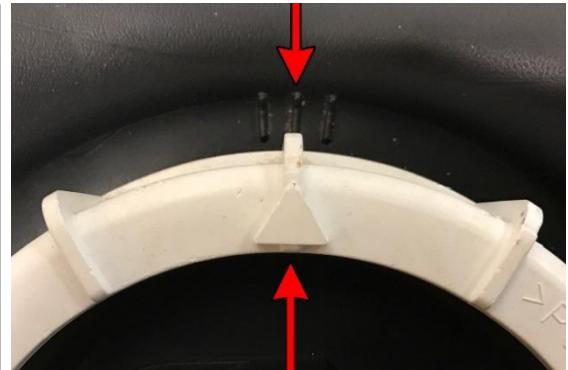
Reinstall the OEM sealing washer. These are commonly yellow or green (shown).



21. Next, reinstall the white OEM fuel tank lock ring.

PRO TIP: To properly find the lock ring starting thread point, line up these 2 markers shown. When the lock ring is rotated clockwise, it will immediately engage the threads.

Fully tighten the lock ring.



22. Reinstall the "OUT" adapter fitting.



23. External Wiring: The wire colors differ depending on the model year of the vehicle.

To identify the function of each of the 4 wires, first find the pair of thin gauge (AWG) wires. These are for the fuel level sensor. Because this is simply a resistance sensor, wire polarity is not important (not possible to wire it backwards). Next, find the pair of thick gauge (AWG) wires. These are for the fuel pump. To determine which is negative, use a multimeter to check continuity with a ground point on the vehicle. Cut off the OEM 4-pin fuel pump control module connector, as shown. Remove some of the tape, and wire loom than strip the insulation for all 4 wires about $\frac{1}{4}$ " back.

For Gen 1 vehicles (2012-202, FA20 engine) wire colors are as follows:

Red and violet small wires are for the fuel level sender.

Green: Pump +, Gray: Pump -



24. Cut two $\frac{1}{4}$ " 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. Extra parts may be present in the kit and can be used as spares.

NOTE: The OEM fuel pump wiring is designed for <15A. It should not be reused with aftermarket pumps at high fuel pressures. Also, it cannot be used in dual pump applications. To reuse the OEM fuel pump wiring, use the large diameter shrink tube and large gauge (AWG) ring terminals to connect the pump wires. The pump connection points on the hanger are labeled "+" for positive and "-" for negative. Single pump applications only use the "PUMP 1" terminals. Do not connect the ring terminals to the fuel pump hanger until the entire installation is complete.



22. Optional high-current wiring: For high flow, high pressure fuel pumps, consider using Radium DIY wiring kit P/N: 17-0031 (shown) for each 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 pump.

If using large-gauge wire for pump power, use the included larger ring terminals and associated heat shrink tubing.

NOTE: Do not connect the ring terminals to the fuel pump hanger until the entire installation is complete.



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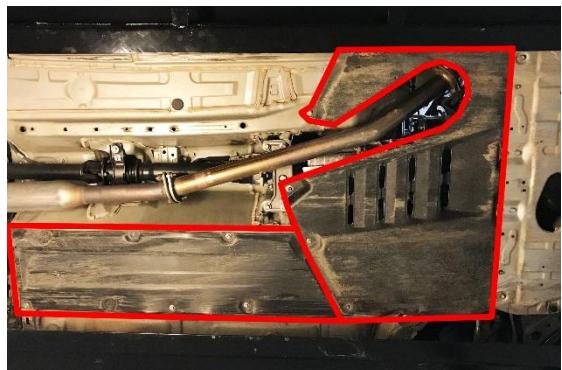
23. The fuel pump outlet uses a -8AN male adapter fitting and the return inlet uses a -6AN male adapter fitting. NOTE: The basic fuel pump hanger kit does not include fuel plumbing. A fuel pressure regulator and a low micron aftermarket fuel filter are required. These components are included in the 20-0306-03 and 20-0306-05 plumbing kit (see installation instructions below).

To finalize the external wiring, insert the fuel pump and fuel level sender ring terminals onto the appropriate studs. Tighten the included acorn nuts. 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. Start the vehicle. The engine may run rough for a few seconds until all the air is bled from the system. Fuel pressure will need to be properly set. While the engine is running check for leaks. Turn the engine OFF and reinstall the OEM metal cover plate (shown) and rear seat. **FUEL HANGER INSTALLATION COMPLETE**



24. Installation for (optional) 20-0306-03 and 20-0306-05 Plumbing Kits

First, safely raise the vehicle. Remove the 2 large underbody panels shown.



25. Find the mounting bracket and three M8 button head screws in the kit. Using a 5mm Allen hex wrench, secure the bracket to LH tunnel over the hard lines near the transmission.



26. Find the single O-ring and the inline 1/8" NPT adapter fitting included in the kit.

Install the O-ring to the -10AN male portion of the inline 1/8" NPT adapter fitting, as shown.



27. Apply Teflon (PTFE) paste to the fuel pressure gauge threads and screw it into the inline 1/8" NPT adapter fitting. Tighten finger tight, then add another 1.5 to 3 turns with a wrench.

Lubricate the inline 1/8" NPT adapter fitting O-ring with light oil and install to the fuel filter "OUTLET" port using a 1" non-marring wrench.

Lubricate the included 10AN ORB to 8AN male fitting's O-ring with light oil and install to the fuel filter "INLET" port using a 1" non-marring wrench.



28. Slide the fuel filter into the heat exchanger. Using a 4mm Allen hex wrench, secure the heat exchanger to the filter by tightening the M5 flat head screws.

For the fuel pressure regulator (FPR) fittings, install the 10AN male adapter fitting to the FPR 8AN ORB port. Install the 6AN ORB plug to the low-pressure port on the opposite side of the FPR. Install the three 6AN ORB to 6AN male adapter fittings into the three remaining FPR ports. Lubricate all O-rings.

Adjoin the 2 assemblies above by securing the 10AN male and 10AN female fittings, as shown.

NOTE: The regulator in your kit may look slightly different than what is shown in these instructions. However, the install steps are the same.



29. Find the 2 short (identical) 6AN PTFE hoses in the kit that have a 45-degree hose end on one side and a 90-degree hose end on the other side. Install the 45-degree hose end sides to the high pressure FPR ports.

From underneath the car, position the assembly in place and push the 2 PTFE hoses upwards towards the LH side strut of the engine bay.

Make sure the 45-degree hose ends are rotated in such a way that they run towards the sheet metal along the hard lines, as shown. This will keep them clear of the steering rod.



30. Secure the fuel filter heat exchanger section of the assembly to the mounting bracket using the four included M6 socket head bolts. Tighten using a 5mm Allen hex wrench.

If necessary, rotate the entire assembly so it is adjusted as shown. This may involve loosening and retightening of some fittings and bolts.



31. To make room near the fuel pump hanger, the rear most OEM fuel lines should be removed.

From underneath the vehicle in front of the gas tank (LH side), find the two OEM SAE fuel connections. Simply squeeze the tabs and simultaneously pull away from the hard lines. Next, pull the entire fuel Tee assembly (shown) down and out. This will NOT be reused.



32. Find the provided 3/8" fuel hose and two -6AN PushLok hose ends. Lubricate the straight hose end barbs and fully insert it into one side of the 3/8" fuel hose. Loosely route the hose between the outer front side of the gas tank and the foot well sheet metal. This may require access from the cabin and underneath the car. Route the -8AN PTFE hose in the same fashion.

From inside the cabin, install the straight -8AN hose end to the fuel pump hanger outlet port first giving it the largest bend radius possible. Next, install the straight -6AN hose end to the fuel hanger return port.

From underneath, install the 45 degree -8AN hose end to the fuel filter inlet port. Next, line up the 45 degree -6AN hose end to the low pressure FPR return port and cut the 3/8" hose to length. Using the included zip-ties, safely secure the long hoses to the existing hard lines, as shown.



33. From the engine bay, the two OEM fuel hoses attached to the high-pressure fuel pump (HPFP) hard line and the port injection fuel line need to be removed. For most engines they are both SAE quick connect fittings. If not, see the following step.

Slide the supplied SAE release tool over the metal pipe. While inserting the small diameter side of the tool into the yellow plastic release connection, simultaneously push the fuel hose further onto the metal pipe. While squeezing together, gently pull the fuel hose off the metal pipe. Have a rag handy as fuel will drain out.



34. Some vehicles will use a barbed feed line on the HPFP pump, as shown.

NOTE: Both OEM hard lines will not be reused so they can be plugged (or removed if necessary).



35. The two -6AN fuel lines from the Radium FPR are identical and cannot be crisscrossed. They can be connected to either the HPFP line or the port injection fuel line.

If connecting to OEM fuel rails, remove the green locks from the included Radium SAE fittings using a 5/64" Allen wrench. Secure the Radium SAE fittings to the 90-degree hose ends.

Lightly lubricate the OEM hard lines with oil and then fully insert the included Radium SAE fittings. Line up the threaded hole and place the Radium green lock onto the Radium SAE fitting.

Secure the small screw using the 5/64" Allen hex wrench.



36. The procedure for connecting to aftermarket fuel rails will vary. For Radium Engineering 20-0111 fuel rails, one hose can be connected directly to the front port of the LH Radium Engineering fuel rail, as shown. NOTE: The rest of the parts from the fuel rail plumbing kit (including the crossover hose) will be reused.



37. This step is only for the rare engines that use a barbed feed line for the HPFP.

Using a screwdriver, assemble the short hose to the adapter fitting using EFI clamps, as shown.

Secure the adapter fitting to the PTFE fuel hose using a 11/16" wrench.

Press the hose over the OEM feed line barb and secure the EFI clamp using a screwdriver.



38. 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 system. Also, fuel pressure will need to be properly set (see next step). While the engine is running check for leaks. Turn the engine OFF and reinstall the OEM metal cover plate (shown) and rear seat.



39(a). The Radium FPR does NOT come preset to a specific pressure.

To adjust pressure on regulators with set-screw adjustment (20-0306-xx), loosen the jam nut with a 3/8" wrench. Using a 3/32" Allen hex wrench, spin the set screw clockwise to increase pressure and counterclockwise to decrease fuel pressure. Use the pressure gauge as a reference. NOTE: If necessary, the Radium fuel pressure regulator 5-bolt top cap can be clocked to point the vacuum barb fitting in 5 different directions. Use a 5/64" Allen hex wrench.

OEM fuel pressure is set at a constant 4 Bar (58 psi). To mimic OEM fuel pressure, leave the FPR barb disconnected (vent to atmosphere). To convert the fuel pressure to dynamically change with manifold pressure at a 1:1 ratio, a vacuum line (not included) must be plumbed from the Radium FPR barb to an intake manifold vacuum source.



39(b). For newer kits (20-0966-0X) no tools are required to set fuel pressure. Simply turn the pressure adjustment knob until desired fuel pressure is achieved. The fuel pump(s) must be running to adjust pressure.

Once pressure is achieved, no locking is necessary. Do not attempt to tighten the Allen screw in the top of the regulator.

This regulator comes with several options for vacuum attachment. If no vacuum reference is needed, use the small screw to plug the vacuum port. Otherwise, select the vacuum fitting adapter that best suits the type of vacuum hose being used for the installation. More details on this are found in the instruction document for the Radium Multi-Port Regulator (MPR).



41. 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 system. While the engine is running check for leaks. Turn the engine OFF and reinstall the OEM metal cover plate (shown) and rear seat. **PLUMBING KIT INSTALLATION COMPLETE**

