



## INSTALLATION INSTRUCTIONS

## FUEL HANGER SURGE TANK & EXTENSION ADD-ON

AUDI R8 & LAMBORGHINI GALLARDO LP/HURACAN

## CAUTION

Only a qualified technician following applicable safety procedures should perform the installation of this product. One must have knowledge in repair and modification of fuel systems and general vehicle modifications to install this product.

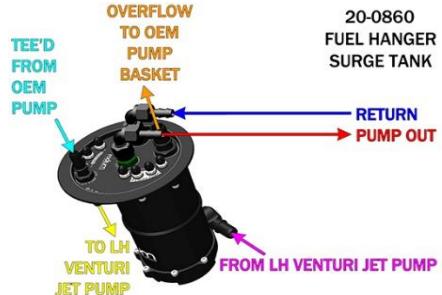
**Gasoline and other fuels are flammable and can be explosive.**

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No sparks, open flames, smoking or other ignition sources are to be present. Draining and removal of all fuel from the fuel system is recommended.  
Proper eye and personal protection is required at all times during installation.

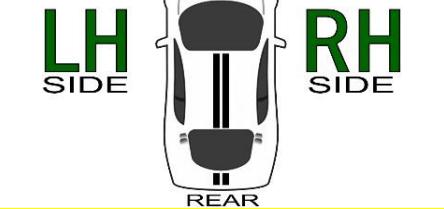
## WARNING

The fuel system is under pressure! Do not loosen any connections until relieving the fuel system pressure. Consult a service manual for instructions on relieving fuel pressure safely. This product is designed for off-highway and racing use only. Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.



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**Support:** [info@radiumauto.com](mailto:info@radiumauto.com)

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		<p><b>20-0860 FUEL HANGER SURGE TANK INSTALLATION</b></p> <p><i>NOTE: If the 20-0868 Extension Add-On was purchased, reference the instructions at the end of this manual first.</i></p> <p>The terms "driver-side" and "passenger-side" will NOT be referenced. As depicted, these instructions will always reference "LH" and "RH" areas of the vehicle.</p>	
2	10mm Socket Wrench	<p>Disconnect the negative battery terminal.</p> <p><b>CAUTION:</b> Disconnecting the battery may cancel fault memories of some control units. Consequently, before disconnecting the battery, always cross examine any fault memories.</p>	
3	T30 Torx 10mm Socket Wrench 17mm Socket Wrench Flat Head Screwdriver	<p>Position the seats all the way forward.</p> <p>To access the fuel tank, the rear shelf panel (shown) has to be removed. This procedure is complex and will depend on many factors that are not described in this instruction manual.</p> <p>Note that the removal procedure is increasingly difficult for those with convertibles and/or older cars with CD players.</p>	
4	T30 Torx	Remove the LH fuel tank access cover.	

5	<p>Slide the red lock back on the electrical connector. Squeeze the red lock and pull to release.</p> <p>Squeeze the locks and pull to release the large and small OEM SAE quick connectors.</p>	
6	<p>To unlock and remove the sealing ring for the fuel hat, an OEM style tool is recommended.</p> <p>Radium Engineering successfully uses UTMALL T10202 (shown).</p>	
7	<p>Simply spin the tool counterclockwise to remove the lock ring.</p> <p>Pull the fuel hat up just enough to disconnect the 2 internal SAE quick fittings.</p>	
8	<p>Disconnect the 2 internal fuel level electrical connectors (shown).</p> <p>Peel off the large gasket from the fuel hat and reinstall to the fuel tank opening.</p> <p>Cover the fuel tank opening to avoid debris from into the tank.</p>	
9	<p>Electrical Cutters</p> <p>As shown, desolder the 4 fuel level wires from the underside of the fuel hat.</p> <p>Alternatively, the wires can be cut. If so, be sure to leave as much slack as possible.</p>	
10	<p>Wire Strippers</p> <p>Wire Crimpers</p> <p>Strip 3/16" of insulation off all 4 wires.</p> <p>Open the Radium Engineering product box. Slide a short piece of small heat shrink over each green wire.</p> <p>Twist the black wires together and slide one piece of the small heat shrink over the 2 wires. This is a shared ground.</p> <p>Crimp 3 small ring terminals to the wires, as shown.</p>	

11	Heat Gun	<p>Slide the heat shrink over the crimped area.</p> <p>Heat the tubing until they fully shrink.</p>	
12	3mm Allen Wrench 3/4" Wrench 3/8" Wrench	<p>Remove the bolts that secure the fuel hat to the canister. As shown, separate the parts. Do not lose the O-ring gasket (shown).</p> <p>There are 2 different "FUEL PUMP OUTLET" bulkhead fittings provided with different barbs. Install the fitting which best matches the pump.</p> <p>When securing the included pump connector harness to the internal electrical studs, reference the fuel hat labeling. To prevent the studs from rotating, a second wrench is required. NOTE: If the pump does not match either provided connector, see the following step.</p>	
13	Wire Stripper Wire Crimper Heat Gun 3/8" Socket Wrench 3/8" Wrench	<p><b>Follow this step if installing: TI Automotive E5LM, Deatschwerks DW400 or DW440, Bosch BR540, Fuelab 49614.</b></p> <p>-A flying lead pump harness (not included) is required. This is typically provided by the pump manufacturer.</p> <p>-Install the included ring terminals and heat shrink as shown.</p> <p>-When securing to the electrical studs, reference the fuel hat labeling. For brushless pumps: W=White, R=Red, B=Black, G=Green.</p> <p>-To prevent the studs rotating, a second wrench is required.</p>	
14	Cutter	<p>Both large ID and small ID tubing are provided. These are required to match the specific pump's outlet OD. Cut to the lengths below.</p> <p><b>Small ID Tube:</b> 2.2" (56mm) AEM 50-1200</p> <p><b>Large ID Tube:</b> 1.9" (49mm) Bosch BR540</p> <p><b>Large ID Tube:</b> 1.9" (49mm) Deatschwerks DW400</p> <p><b>Large ID Tube:</b> 2.8" (70mm) Deatschwerks DW440</p> <p><b>Large ID Tube:</b> 2.9" (73mm) Protec 11928 / Fuelab 49614</p> <p><b>Large ID Tube:</b> 1.6" (40mm) Ti Automotive E5LM</p> <p><b>Small ID Tube:</b> 2.3" (59mm) Walbro GSS342</p> <p><b>Large ID Tube:</b> 2.4" (61mm) Walbro F90000267/274/285/295</p>	
15	Oil Lubrication Heat Gun	<p>Lubricate the fuel pump outlet barb and the inner end of the straight (non convoluted) tubing. Gently apply force until it is fully seated.</p> <p><b>NOTES:</b></p> <ol style="list-style-type: none"> <li>1. Fuel pump hose barbs can fracture if not treated with care.</li> <li>2. Extra tubing is provided in case of damage during assembly.</li> <li>3. Some pumps require low heat to temporarily soften the tubing. If this is the case, be careful not to over-heat and melt the tubing.</li> </ol>	
16	9/32" Nut Driver	<p>As shown, secure the tubing to the outlet barb using one of the EFI hose clamps.</p> <p>Loosely place another EFI hose clamp over the tubing as shown.</p>	

17	Oil Lubrication	<p>Lubricate the internal "FUEL PUMP OUTLET" barb and the other side of the tubing. Gently apply force until the tube is fully seated. NOTE: Heat is NOT required on this side of the tubing connection.</p> <p>Do not tighten this EFI hose clamp yet. The fuel pump will first need to be rotated into the proper orientation.</p>	
18	Screwdriver	<p>For all of these compatible pumps, the inlet and outlet are not centered with respect to the pump body. Rotate the fuel pump until the mounting bracket is flush with the pump body and the fuel pump outlet tube is straight.</p> <p>There are 2 sets of clamps in the kit. Use the smaller clamps for 39mm (OD) pumps and the larger clamps for all other pumps. As shown, wrap the clamps around the pump, through the bracket slots, then tighten.</p>	
19	9/32" Nut Driver	<p>Tighten the upper EFI hose clamp.</p>	
20		<p>Install the sock filter onto the fuel pump inlet.</p>	
21	Oil Lubrication	<p>If installing a Walbro 39/50 DCSS fuel pump, lubricate the orange seal (shown).</p>	
22		<p>Plug in the fuel pump electrical connector.</p>	

23		<p>As shown, place the O-ring gasket into the groove.</p> 
24	<p>3mm Allen Wrench</p> <p>NOTE: The bolt-hole flange pattern uses poka yoke, so it cannot be improperly orientated when installed.</p>	<p>Reinstall the FHST canister.</p> 
25	<p>3/8" Socket Wrench</p> <p>3/8" Wrench</p> <p>NOTES:</p> <ol style="list-style-type: none"> <li>1. As shown, connect the ring terminal from the OEM black wires to "GROUND".</li> <li>2. As shown, connect the smaller OEM male connector green wire (which routes to the upper internal float) to "LEVEL1".</li> <li>3. As shown, connect the larger OEM female connector green wire (which routes to the lower internal float) to "LEVEL2".</li> </ol>	<p>Install the pair of fuel level sensor wires, as shown.</p> 
26	<p>Be sure the OEM gasket is installed to the fuel tank opening.</p> <p>Set the FHST assembly next to the LH fuel tank opening.</p> <p>Reach into the fuel tank, find the 2 OEM fuel level connectors, and plug them in, as shown.</p>	
27	<p>Oil Lubrication</p> <p>Reach into the fuel tank and find the large SAE female connector. Push the SAE connectors together until a "click" is felt.</p>	
28	<p>Oil Lubrication</p> <p>Lubricate the male portion of the SAE quick connect fitting on the underside of the FHST fuel hat.</p> <p>Reach into the fuel tank and find the small SAE female connector. For proper fuel hat orientation, this connection will be made in the front of the surge tank canister. Push the SAE connectors together until a "click" is felt.</p>	

29		<p>When dropping in the FHST, the lower SAE connection should auto-rotate into position pointing towards the LH rear. If there is resistance getting the fuel hat to seat flush, this fitting may have rotated towards the front RH of the vehicle.</p> <p>Because the Gallardo LP/Gen1 R8 tanks are different then the Huracan/Gen2 R8, the final resting orientation will slightly differ. However, the RADIUM logo should be legible when viewing it from behind the seat looking towards the rear.</p>	
		30	
31	<p>Oil Lubrication</p> <p>Push the OEM SAE quick connectors onto the fuel hat fittings, as shown. Make sure a "click" is felt.</p>	<p>Lubricate the male portions of both SAE quick connect fittings on the top side of the FHST fuel hat.</p> <p>Push the OEM SAE quick connectors onto the fuel hat fittings, as shown. Make sure a "click" is felt.</p>	
32	<p>Electrical Cutters</p>	Cut off the OEM electrical connector.	
33	<p>Wire Strippers</p>	Strip 1/4" of insulation off the 3 wires.	
34	<p>Wire Crimpers</p> <p>Heat Gun</p>	<p>Slide a short piece of small heat shrink over each wire.</p> <p>Crimp 3 small ring terminals to the wires.</p> <p>Slide the heat shrink over the crimped area.</p> <p>Heat the tubing until they fully shrink.</p>	

35	<p>8mm Wrench</p> <p>Connect the ring terminals to the fuel hat as follows:</p> <table border="0" data-bbox="388 192 915 318"> <tr> <td><b>OEM Wire Colors</b></td><td><b>FHST Sensor Labels</b></td></tr> <tr> <td>White or Grey/Green</td><td>"Ground"</td></tr> <tr> <td>Brown/Black or Brown/Yellow</td><td>"Fuel Level 1"</td></tr> <tr> <td>White/Blue or Brown/Blue</td><td>"Fuel Level 2"</td></tr> </table> <p>Do not overtighten the acorn nuts and risk spinning the terminals.</p>	<b>OEM Wire Colors</b>	<b>FHST Sensor Labels</b>	White or Grey/Green	"Ground"	Brown/Black or Brown/Yellow	"Fuel Level 1"	White/Blue or Brown/Blue	"Fuel Level 2"	
<b>OEM Wire Colors</b>	<b>FHST Sensor Labels</b>									
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White/Blue or Brown/Blue	"Fuel Level 2"									
36	<p><b>NOTE: Electrical is NOT provided in this kit. Radium Engineering recommends P/N: 17-0031 DIY FUEL PUMP WIRING KIT (shown).</b></p> <p>A relay must be used to drive the new FHST fuel pump.</p> <p>NOTE: External brushless fuel pump wiring will not be covered in this manual. This procedure is very specific to the brushless controller used. Reference the manufacturer's manual for proper wiring.</p>									
37	<p>There are many ways to trigger the fuel pump relay.</p> <p>1a. If using the FHST for port injection, an adjustable pressure switch can be used to activate the relay at a specific manifold pressure. <b>Shown is Radium Engineering P/N: 20-0236.</b></p> <p>1b. For the Lamborghini Huracan/Gen2 Audi R8 (Type4S), the OEM fuel pump is brushless. The relay trigger is commonly sourced from an ECU output or from an adjustable pressure switch.</p> <p>1c. For the Lamborghini Gallardo LP/Gen1 Audi R8 (Type42), the relay trigger can be sourced from an ECU output, an adjustable pressure switch, or from the OEM fuel pump power wire.</p>									
38	<p>Wire Strippers</p> <p>Wire Crimpers</p> <p>Heat Gun</p> <p>Use the large diameter shrink tube and large AWG ring terminals to connect to the FHST.</p> <p>Cut each piece of shrink tube to length and insert onto each wire.</p> <p>NOTE: Wiring is not included in this kit. Crimp a ring terminal to each wire.</p> <p>As shown, heat shrink into place.</p>									
39	<p>Drill an 11/16" (17.5mm) hole in the fuel tank access cover.</p> <p>Slide the provided rubber grommet over the fuel pump wires.</p> <p>As shown, secure the rubber grommet to the fuel tank access cover.</p>									
40	<p>8mm Wrench</p> <p>Install the ring terminals to the corresponding fuel hat studs.</p> <p>NOTE: Only a brushless fuel pump will use all 4 pump studs.</p> <p>Tighten all acorn nuts. Do not over torque.</p> <p>NOTE: there will be extra parts in the kit that will NOT be used.</p>									

41	<p>NOTE: Towards the middle, just behind the FHST, a hole is slotted in the firewall. This permits fuel feed and fuel return hoses to get between the FHST and the engine bay.</p>	
42	<p><b>NOTE: hose plumbing is NOT provided in this kit. Radium Engineering recommends P/N: 20-0867-0X PIK PLUMBING.</b></p> <p>Shown is a fuel feed hose secured to the FUEL PUMP OUTLET port as well as a fuel pressure regulator return hose secured to the RETURN INLET port. Neither of these hoses are provided in this kit.</p>	
43	<p>10mm Socket Wrench</p> <p>After all other components are installed, reconnect the battery. Switch the ignition to the ON position to pressurize the fuel system. Check for leaks. If no leaks are found, start the vehicle.</p> <p>Reinstall all OEM components in reverse order.</p> <p><b>INSTALLATION COMPLETE</b></p>	
44	<p><b>20-0868 EXTENSION ADD-ON INSTALLATION</b></p> <p>First be sure to follow steps 1-13 above.</p> <p>NOTES:</p> <ol style="list-style-type: none"> <li>1. The extension add-on is compatible with deep tanks ONLY, ie: Lamborghini Huracan and Audi R8 Type-4S (Gen2)</li> <li>2. The extension add-on is NOT compatible with shallow tanks, ie: Lamborghini Gallardo LP and Audi R8 Type-42 (Gen1)</li> </ol>	
45	<p>All work will be performed on the LH fuel tank (not the tank where the factory fuel pump is located).</p> <p>First, some extra space is required. There is an OEM venturi jet pump mounted on the fuel tank floor directly under the fuel hat. It is pressed into 2 studs. Reach in and pull it from side to side to free it from the bottom of the tank. NOTE: This is difficult and will take some ingenuity.</p>	
46	<p>Do your best not to break the plastic.</p> <p>When the venturi jet pump is released, double check that no plastic pieces are left inside the tank.</p>	

47	3mm Allen Wrench	<p>Using the longer M4x0.7x16mm screws, attach the OEM jet pump to the stainless steel bracket in the orientation shown. Position the jet pump assembly around the "frontside" of the fuel level sensor mount. Secure the bracket to the fuel tank studs using the provided plastic flange nuts.</p> <p>NOTE: confirm there is no interference with the fuel level sensor by rotating the float throughout its full range.</p>	
48	10mm Socket	<p>Position the jet pump assembly around the "frontside" of the fuel level sensor mount. Secure the bracket to the fuel tank studs using the provided plastic flange nuts.</p> <p>NOTE: confirm there is no interference with the fuel level sensor by rotating the float throughout its full range.</p>	
49		<p>Confirm there is no interference with the fuel level sensor by rotating the float throughout its full range.</p>	
50		<p>Place the provided O-ring into the groove on top of the extension.</p>	
51	3mm Allen Wrench	<p>Using the shorter M4x0.7x10mm screws, secure the canister to the extension, as shown.</p>	
52		<p>Place the provided O-ring into the groove on top of the bottom cap.</p>	

53	3mm Allen Wrench	<p>Using the shorter M4x0.7x10mm screws, secure the extension to the bottom cap, as shown.</p> <p>NOTE: A couple of the screws will be slightly difficult to access. A ball end Allen wrench will make this step easier.</p>	
54		<p>Install the long stainless pump bracket to the fuel hat. Follow steps 15-22 for installing the pump. Cut the appropriate ID tubing to length.</p> <p>Small ID Tube: 3.7" (95mm) AEM 50-1200</p> <p>Large ID Tube: 3.4" (88mm) Bosch BR540</p> <p>Large ID Tube: 3.4" (88mm) Deatschwerks DW400</p> <p>Large ID Tube: 4.3" (110mm) Deatschwerks DW440</p> <p>Large ID Tube: 4.4" (113mm) Protec 11928 / Fuelab 49614</p> <p>Large ID Tube: 3.1" (80mm) Ti Automotive E5LM</p> <p>Small ID Tube: 3.8" (98mm) Walbro GSS342</p> <p>Large ID Tube: 3.9" (100mm) Walbro F90000267/274/285/295</p>	
55		<p>Follow steps 25-43 for installing the FHST into the fuel tank.</p> <p>Shown is how the assembly would look if it were visible.</p>	
56		<p>The only other difference when using the extension kit, is the final orientation of the fuel hat. Because of the position of the lower fill port (fuel from the LH venturi jet pump), the fuel hat will be rotated roughly ~50 degree clockwise from usual.</p> <p>Follow steps 30-43 for finalizing the installation.</p> <p><b>INSTALLATION COMPLETE</b></p>	