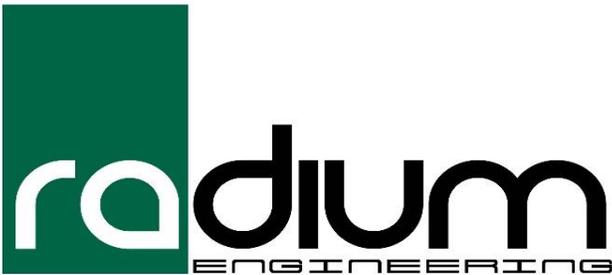


INSTALLATION INSTRUCTIONS

FUEL PUMP HANGER

08-17 GM



Document: 19-0318

Support: info@radiumauto.com

COLOR LEGEND FOR EACH STEP
20-1320 AND 20-1322 FUEL HANGER Follow YELLOW areas
20-1320 FUEL PUMP HANGER ONLY Follow ORANGE areas
20-1322 FUEL PUMP HANGER ONLY Follow GREEN areas

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.

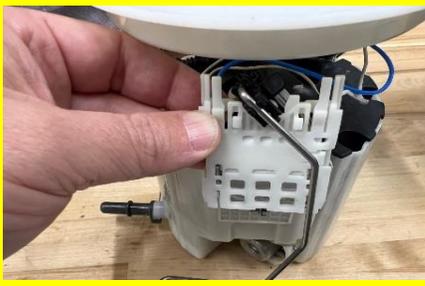
Only install in a well-ventilated location to minimize buildup of fuel vapors.

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.

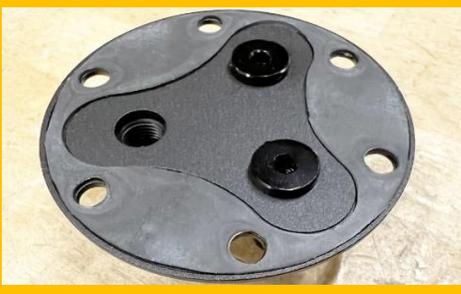
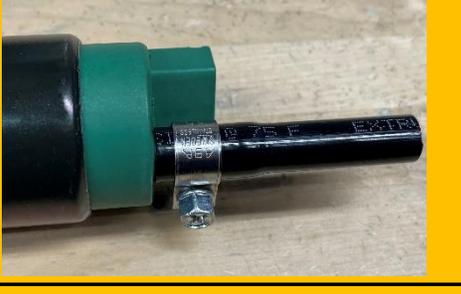
WARNING

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.

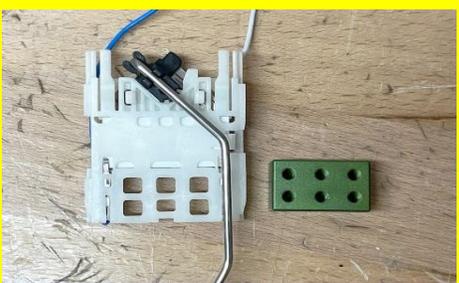
STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1	10mm Socket Wrench	Because this product is compatible with many different applications, the instructions may vary slightly from the exact vehicle used.	
		The terms "driver-side" and "passenger-side" will NOT be referenced. As depicted, these instructions will always reference "LH" and "RH" areas of the vehicle.	
		First, be sure all fuel is removed from the tank. Next, disconnect the negative battery terminal.	
2		The fuel pump is located underneath the RH rear seat. Unfortunately, GM did not incorporate a fuel pump access panel for these vehicles.	
		For removing the OEM fuel pump unit, there are 2 options: 1. Remove the rear subframe and drop the fuel tank. 2. Slowly and carefully cut the sheet metal just above the fuel pump unit. NOTE: Radium Engineering offers an access cover that can be retrofitted to the Cadillac CTS-V (P/N: 20-0835). But the cutting line dimensions are very specific. For more information, go to www.radiumauto.com .	
		NOTE: This instruction manual will only document pictures with the rear sheet metal altered for easy access.	
3		To unplug the fuel pump connector (shown), depress the thumb lock and pull.	
4	Rag	Push the SAE quick connect fuel feed line fitting further onto the unit, then simultaneously squeeze the 2 locks (shown blue) and pull away. Have a rag handy as fuel will likely spill from this connection.	

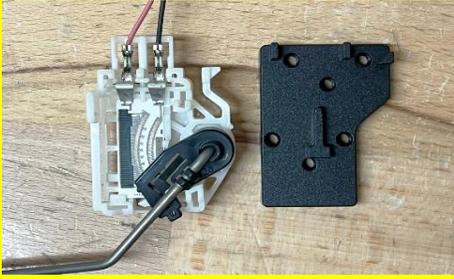
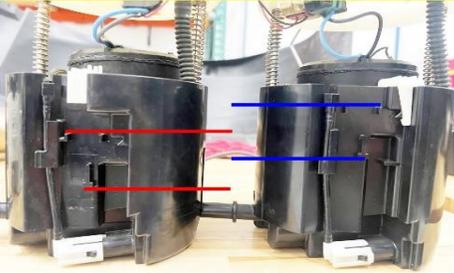
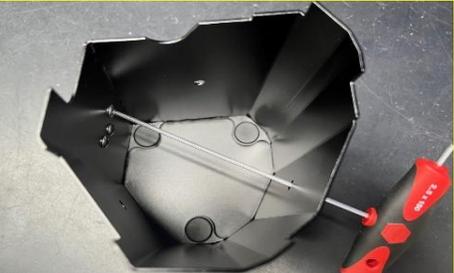
5		To release the OEM hold-down metal ring it is recommended to use a special fuel tank lock ring tool such as OEM Tools, P/N: 24398 (shown).	
6	1/2" Drive Breaker Bar	Put the lock ring tool in place and turn counterclockwise. Because the OEM pump unit is spring-loaded, it will pop up when released.	
		Remove the OEM fuel tank lock ring. This will be reused.	
7	Rag	Carefully pull the OEM pump unit upwards just enough to expose the crossover connection. Push the SAE quick connect crossover fitting further onto the unit, then simultaneously squeeze the 2 locks (shown green) and pull away.	
8	Rag	NOTE: Some vehicles (such as the CTS-V) have 2 OEM fuel pumps. As shown with the red arrow, these vehicles will have a fuel level sensor connector that needs to be unplugged.	
9	Bucket	Tilt and twist the assembly to clear the fuel float arm. Pull the pump unit out and drain into a bucket.	
		Inspect the large green fuel tank gasket. Replace if necessary (AC Delco P/N: 22682111). Cover the gas tank opening to prevent dirt and/or debris from accidentally falling in.	
		As shown, there are multiple variations of the OEM pump unit that are compatible with this product.	
10		Set the OEM pump unit onto a workbench.	
		There are a couple variations of fuel level sensors.	
		To remove the fuel level sensor style in the depiction, squeeze the outer locking tabs and pull the sensor up and out of the OEM collector.	

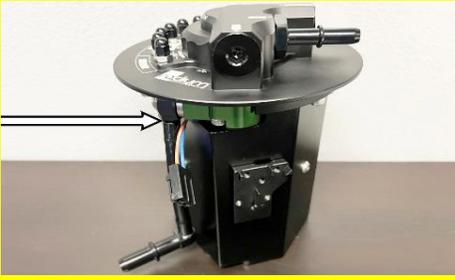
11		<p>To remove the fuel level sensor style in the depiction, squeeze the outer lock (shown yellow) and simultaneously push the sensor up (shown red) to release.</p>	
12		<p>To unplug the fuel level sensor connector (if applicable), depress the thumb lock and pull away.</p> <p>NOTE: The OEM parts that will be reused: fuel level sensor, fuel tank gasket, fuel tank lock ring, internal crossover line, and (optionally) the external fuel feed line.</p>	
13	3mm Allen Wrench	<p>Open the Radium Engineering product box and pull out the assembly.</p> <p>As shown, remove the collector box.</p>	
14	4mm Allen Wrench	<p>Remove the lower bracket assembly.</p>	
15	3/8" Nut Driver	<p>Each product is preassembled with wiring for 1 fuel pump.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 1. Add the appropriate amount of the (provided) wiring connectors to the bottom side of the fuel hat. Be sure to reference the terminal labeling on the top side of the fuel hat. 2. If installing Deatchwerks DW440 pump(s), the preassembled wiring must be removed. Wiring for these pumps will be performed in a later step. 	
16		<p><u>20-1320 FUEL PUMP HANGER ONLY</u></p> <p>There is a triple pump collector (shown) on the underside of the fuel hat. Each port is dedicated to a fuel pump.</p> <p>The preassembled product from Radium Engineering is ONLY ready for triple pump applications. For single and dual pump applications following the next few steps. For triple pump applications, nothing needs to be modified.</p>	

17	4mm Allen Wrench	20-1320 FUEL PUMP HANGER ONLY For single and dual pump applications, plugs will need to be installed into these ports. The provided 2AN ORB plugs must be installed on the opposing side of the collector. First remove the 6 screws.	 A black metal fuel pump hanger is shown being disassembled. A red-handled screwdriver is used to remove six screws from the top plate. The top plate and several screws are laid out on a wooden surface.
	1/8" Allen Wrench	20-1320 FUEL PUMP HANGER ONLY Install the included 2AN ORB plug(s).	 A top-down view of the black metal fuel pump hanger. Two black 2AN ORB plugs are shown inserted into the top ports. The hanger has several other ports and a central opening.
	Oil Lubrication	Single pump applications: Use 2 plugs Dual pump applications: Use 1 plug (shown) Triple pump applications: Use 0 plugs NOTE: When reinstalling, be sure the gasket (shown) is installed.	
18	4mm Allen Wrench	20-1320 FUEL PUMP HANGER ONLY Because of space constraints orient the collector so the port nearest the green venturi jet pump is plugged. This isn't absolutely necessary, but it is ideal for single and dual pump applications.	 A close-up view of the fuel pump hanger showing the ports and the screws. A red-handled screwdriver is visible, and a green venturi jet pump is partially visible in the background.
	Oil Lubrication	20-1320 FUEL PUMP HANGER ONLY If installing AEM 50-1220 compact fuel pump(s), use the plastic submersible tubing provided in the kit (not the rubber submersible hose). Lubricate the pump barb and the inner walls of the tube. Apply a small amount of heat and quickly insert. Secure the tubing to the pump(s) using the provided EFI clamp(s).	 A close-up view of the AEM 50-1220 compact fuel pump. It has a green plastic body and a black metal barbed end. A black plastic submersible tube is being inserted into the pump.
	Heat Gun		
	Phillips Screwdriver		
19	Oil Lubrication	20-1320 FUEL PUMP HANGER ONLY If installing Deatschwerks DW440 fuel pump(s), use the submersible rubber hose provided in the kit (not the plastic submersible tubing). Cut the hose to 52mm for each fuel pump. Secure the hose to the pump(s) using the provided EFI clamp(s).	 A close-up view of the Deatschwerks DW440 fuel pump. It is a cylindrical metal pump with a black rubber hose attached to the side. An EFI clamp is visible on the hose.
	Heat Gun		
	Phillips Screwdriver		
20	Screwdriver	20-1320 FUEL PUMP HANGER ONLY Insert the provided EFI clamp(s) over the hose then install the pump(s) to the collector, as shown. Secure the hose to the pump(s) using the EFI clamp(s).	 A close-up view of the fuel pump assembly installed on the collector. The pump is secured to the collector with screws, and the hose is secured to the pump with an EFI clamp. A green venturi jet pump is also visible.
21	Screwdriver		
22			

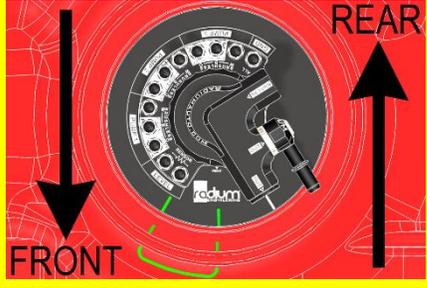
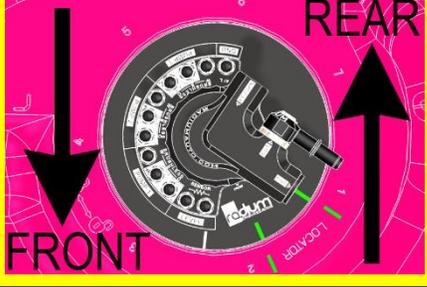
23		20-1320 FUEL PUMP HANGER ONLY Plug in the fuel pump connector(s).	
	Wire Cutter	20-1320 FUEL PUMP HANGER ONLY If wiring Deatschwerks DW440 pump(s), ring terminals must be installed. A pump harness (not included) is required. This is typically provided by the pump manufacturer. Cut the Deatschwerks wiring to the appropriate length based on the distance needed to travel. Reference the terminal labeling on top of the fuel hat.	
	Wire Stripper	20-1320 FUEL PUMP HANGER ONLY	
	Wire Crimper	For wiring Deatschwerks DW440 pump(s), install the included ring terminals and heat shrink as shown.	
	Heat Gun		
	3/8" Socket Wrench	White Wire = "BRUSHLESS-W"	
3/8" Wrench	Blue Wire = "BRUSHLESS-B" Orange Wire = "BRUSHLESS-O" Black Wire = "GND-ALL" (<-this is shared with pump 1,2,3)		
26	1/4" Allen Wrench	20-1322 FUEL PUMP HANGER ONLY	
	Oil Lubrication	There is a triple pump collector on the underside of the fuel hat. Each port is dedicated to a fuel pump. The provided 6AN ORB plugs must be installed for any unused ports. *Single pump applications: Use 2 plugs *Dual pump applications: Use 1 plug (shown) Triple pump applications: Use 0 plugs <i>*Because of space constraints it is ideal to plug the port nearest the green venturi jet pump for single and dual pump applications.</i>	
27		20-1322 FUEL PUMP HANGER ONLY To install the Walbro F900002XX E85 fuel pump(s), 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 barb. 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.	
28	Oil lubrication	20-1322 FUEL PUMP HANGER ONLY	
	Thread Locker	To permit the fitting to swivel when assembled, lubricate the O-ring.	
	2.5mm Allen Wrench	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, as shown.	

29	Oil Lubrication	20-1322 FUEL PUMP HANGER ONLY	
	15mm Wrench	Lubricate the O-ring on the green 6AN pump outlet fitting(s).	
		Tighten the pump outlet fitting(s) to each collector port.	
30		20-1322 FUEL PUMP HANGER ONLY	
		Plug in the fuel pump connector(s).	
31			
		Be sure all internal wiring is routed away from the perimeter of the fuel hat.	
32	Phillips Screwdriver		
	4mm Allen Wrench	For the green fuel filter to lineup and fit properly, the fuel pumps will need to be properly rotated individually.	
		Once appropriately oriented, secure the EFI hose clamps to the collector barbs (20-1320 fuel hanger only).	
		Secure the lower bracket assembly as shown.	
33	Cutter		
		As shown, bend and secure the venturi jet pump return tube to the lower bracket using the provided cable zip ties. This will point fuel flow to the bracket just above the fuel pump inlets and prevent aeration.	
34			
		There are 3 different fuel level mounting configurations required for all compatible vehicles. Provided are 2 different fuel level sensor mounts that can be configured in all 3 different ways.	
		If your fuel level sensor looks like the one pictured, you will need to install the green fuel level mount shown.	

35		<p>If your fuel level sensor looks like the one pictured, you will need to install the black fuel level mount shown.</p>	
36		<p>There are 2 different ways to install the black fuel level mount. This will depend on which fuel pump unit you have.</p> <p>Reference the picture and note if you need to install the black fuel level mount in a "high position" or a "low position".</p>	
37	2.5mm Allen Wrench	<p>When installing the fuel level mount, it is easiest to reach into the collector box and simply start the threads by hand for each of the 3 provided screws.</p> <p>After the screws have been started, insert the Allen wrench through the hole on the opposing side of the 3 collector box holes. Be careful not to cross thread.</p>	
38		<p>Shown is the green fuel level mount installed.</p>	
39		<p>Shown is the black fuel level mount installed in the "high position". To install the mount in the "low position", use the upper 3 threads to effectively drop it down.</p>	
40		<p>Depending on the OEM fuel system, there are 2 different size SAE quick connects for the internal crossover hose.</p> <p>The OEM unit on the left is small. The OEM unit on the right is large.</p>	

41		There are 2 SAE quick connect adapters included for the internal crossover hose. Use the adapter that matches your OEM unit.	
42	Oil Lubrication	Rotate the non convoluted tube away from the assembly. Lubricate the barb and the inside walls of the tube. Apply a small amount of heat and quickly insert. No clamp is necessary.	
	Heat Gun		
43	3mm Allen Wrench	If the OEM unit had 2 fuel pumps from the factory, the preinstalled blue/brown wire connector is not required. The fuel level is connected within the fuel tank. The 2 ring terminals can be removed from the underside of the fuel hat.	
		When reinstalling the collector box, route the 2-wire brown/blue fuel level connector (if applicable), as shown. Be sure it does not get pinched.	
44	Cutter	FOR FUEL LEVEL SENSORS THAT REQUIRE THE BLACK MOUNT	
		In order for these specific sensors to fit through the fuel tank opening, a minor modification is required. Carefully cut the plastic section off the fuel level sensor in the area depicted in blue.	
		NOTES: 1. This is NOT removing the mechanical stop for the fuel level float. The mechanical stop is still present. 2. This modification is NOT required for sensors that use the green mount.	
45	Cutter	NOTE: The fuel level sensor wires do NOT need to be cut for OEM units that have 2 pumps stock. The connector will be plugged back into the fuel tank connector in a later step. Because of this, the next few steps related to the assembly of the provided 2 pin connector, can be disregarded.	
		For all other vehicles, cut the 2 fuel level sensor wires.	
46		The next step requires a crimper. For an inexpensive non-ratcheting variation, Moxley 063811-1000 can be used.	

47		As shown, crimp the provided terminals to the OEM wires.	
48		Insert each wire terminal into the included connector until a click is felt.	
		NOTE: Because the sensor measures resistance, wire polarity does not matter.	
49	2.5mm Allen Wrench	Mount the fuel level sensor to the collector box.	
		Black Level Sensor Mount: To install, insert the sensor, then pull downwards until it locks into place, as shown.	
		Green Level Sensor Mount: To install, lineup the sensor holes to the 3 holes on the mount. Secure the sensor using the 3 small provided screws.	
50		Plug the fuel level sensor to the mating electrical connector coming out of the collector box.	
51		As shown, there are 3 different positions that the SAE quick connect fuel feed outlet port points coming out of the OEM pump unit.	
		If your OEM pump unit looks like the "red" port pictured, use the preinstalled straight fitting.	
52	7/8" Deep Socket	If your OEM unit looks like the "black" port pictured in the previous step, replace the preinstalled straight fitting with the 90 degree banjo fitting (shown).	
	Oil Lubrication		
	4mm Allen Wrench		

53		As shown, place the assembled Radium Engineering fuel pump hanger above the center of the fuel tank. Connect the SAE quick connect crossover. If applicable, plug in the OEM fuel level connector (shown) as well.	
		NOTE: When the fuel pump hanger is fully inside the tank, the crossover line and fuel level connector need to stay on opposing sides from the fuel level float to prevent interference. Meaning, the collector box must be positioned between them.	
54		When lowering the pump hanger into the fuel tank, the float goes in first followed by the crossover hose. But make sure the crossover line (and fuel level connector) stay away from the fuel level float.	
55		Because there are multiple fuel tanks compatible with this fuel pump hanger, the Radium Engineering top hat has 2 pairs of indexing locators.	
		If the fuel tank has an indicator that looks as pictured (shown green), rotate and lineup the specific pair of top hat indicators shown.	
56		If the fuel tank has 2 locators that look as pictured (shown green), rotate and lineup the specific pair of top hat indicators shown.	
		After properly positioned, reinstall the fuel tank lock ring.	
57	Cutter	Cut the OEM fuel feed hose in the location shown.	
58	Oil Lubrication	Slide on the included small EFI hose clamp.	
	Heat Gun	Lubricate the provided 90 degree SAE quick connector O-ring as well as the inner wall of the cut tube.	
	Screwdriver	As shown, install the SAE quick connect fitting and tighten the clamp.	

59	Oil Lubrication	Lubricate the internal O-ring in the SAE quick connect fitting and press onto the mating fitting until a "click" is felt.			
60	Wire Cutter	Unravel the electrical tape and cut off the OEM fuel pump connector. Shown is the OEM dual fuel pump connector (no fuel level sensor wires).			
61	Wire Stripper	<p>Wiring Assembly</p> <ol style="list-style-type: none"> Strip 1/4" (6mm) of insulation off the wires. Slide a short piece of large heat shrink over the large wires and slide a short piece of small heat shrink over the 2 small wires (if applicable). Crimp the appropriately sized ring terminals to the corresponding wires. Slide the heat shrink over the crimped area. Heat the tubing until they fully shrink. 			
	Wire Crimpers				
	Heat Gun				
62	8mm Nut Driver	Place each ring terminal on the appropriate stud. To secure, use the provided insulated acorn nuts.			
		OEM wiring: Grey = Fuel Pump Power Pink = Fuel Pump Ground			
		Aftermarket wiring (differs): DW440 brushless controller wiring shown			