INSTALLATION INSTRUCTIONS

FUEL SURGE TANK, FSTR-RA

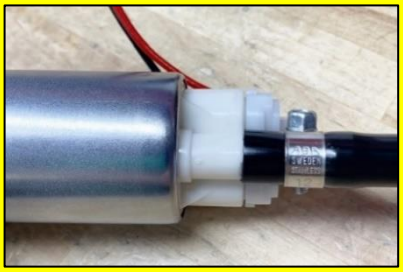
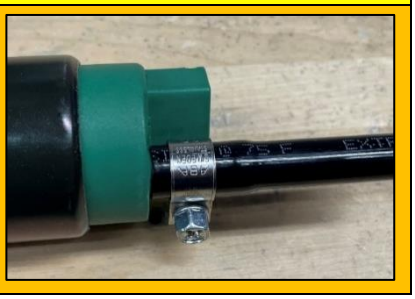
DOCUMENT #19-0361
SUPPORT: info@radiumauto.com

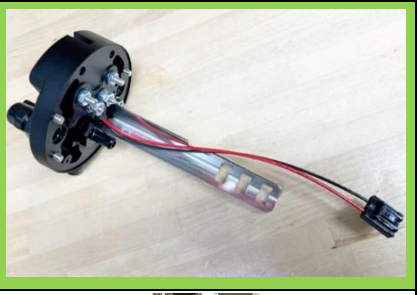
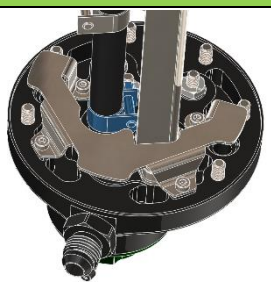
<u>WARNING</u>: DO NOT SMOKE WHILE WORKING ON FUEL SYSTEM. KEEP SPARKS AND OPEN FLAMES AWAY FROM FUEL SYSTEM. DISCONNECT BATTERY BEFORE BEGINNING WORK.

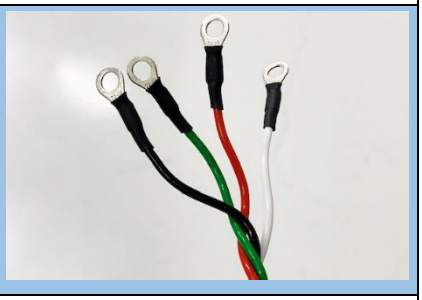
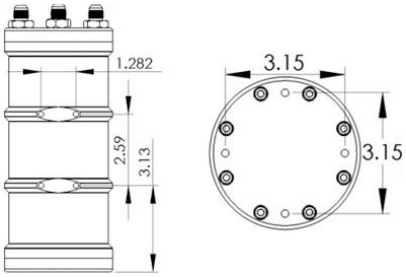
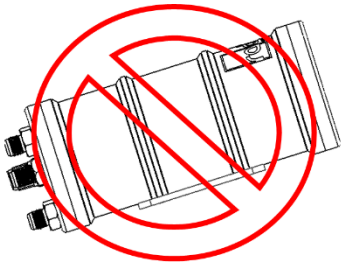
The RADIUM FSTR-RA (Fuel Surge Tank, Regulated-Rotating Assembly) is designed to enhance the vehicle with resistance to fuel starvation and by increasing the fueling capability of the system. The FSTR-RA features an integrated high-flow 1:1 vacuum referenced adjustable fuel pressure regulator, eliminating the need for an external FPR and drastically simplifying hose plumbing.

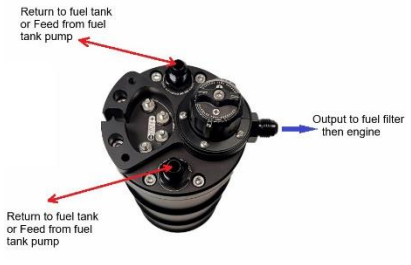
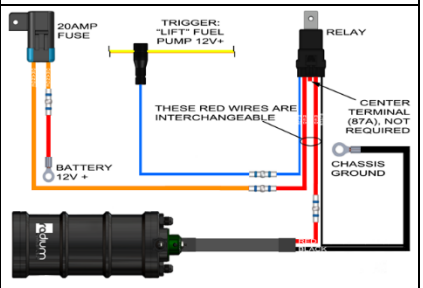
NOTE: When using a surge tank, the primary fuel pump in the vehicle's main fuel tank will no longer directly feed the engine. This fuel pump will now be used to fill and maintain the level of fuel in the surge tank. The FSTR-RA pump will now be the high pressure source for the engine's fuel demand. Fuel pressure should be checked before and after installation to ensure there is no difference with the FSTR-RA operating. Any change in fuel pressure can affect engine performance.

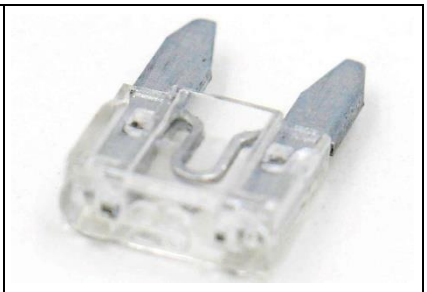
ASSEMBLY AND INSTALLATION

1	3mm Allen Wrench	As shown, unscrew the 2 flat head bolts to remove the wire harness cover.	
2	4mm Allen Wrench	As shown, unscrew the 6 perimeter bolts and remove the top hat assembly from the canister. NOTES: 1. Do not lose the 6 socket head bolts. 2. Do not lose the 6 O-rings under the bolts. 3. Do not lose the large canister O-ring.	
3	Oil Lubrication 9/32" Nut Driver Hose Cutter	**Large Barbed Fuel Pumps ONLY** Use the large ID tubing and the large EFI clamps for the following pumps. Cut the tube to the listed length, based on the fuel pump. **TUBE SIZE — FUEL PUMP — CUT LENGTH** -Large ID — Walbro F90000267-274-285-295 — 3.2" (82mm) -Large ID — Ti Automotive E5LM — 2.2" (57mm) -Large ID — Bosch BR540 / Deatschwerks DW440 — 2.8" (72mm) -Large ID — Deatschwerks DW440 — 4.2" (106mm) -Large ID — Deatschwerks DW810 — 3.5" (88mm) -Large ID — Protec 11928 / Fuelab 49614 — 4.3" (108mm)	
4	Oil Lubrication 9/32" Nut Driver Hose Cutter	**Small Barbed Fuel Pumps ONLY** Use the small ID tubing and the small EFI clamps for the following pumps. Cut the tube to the listed length, based on the fuel pump. **TUBE SIZE — FUEL PUMP — CUT LENGTH** -Small ID — Walbro GSS341 / Walbro GSS342 — 3.5" (88mm) -Small ID — AEM 50-1000 / AEM 50-1200 — 3.3" (85mm) -Small ID — AEM 50-1220 — 3.8" (95mm)	

5	2.5mm Allen Wrench	**Small Barbed Fuel Pumps ONLY** As shown, unscrew the 4 socket head bolts to remove the deflector.	
6	¾" or 19mm Socket	**Small Barbed Fuel Pumps ONLY** As shown, remove the barbed adapter fitting.	
7	¾" or 19mm Socket	**Small Barbed Fuel Pumps ONLY** As shown, install the smaller barbed adapter fitting.	
8	3/8" Socket	**Walbro GSS341/2 & AEM 50-1000/1200/1220 ONLY** Replace the preinstalled harness with the included wire harness (shown). **For all other pumps** Simply remove the preassembled Walbro F90000267-274-285-295 wire harness, for now.	
9	9/32" Nut Driver Oil Lubrication	Slide a second EFI hose clamp onto the fuel pump tubing. Push the tube over the barb underneath the top hat. Rotate the pump until it seats against the pump mounting bracket and the tubing is straight. Tighten the upper EFI hose clamp (shown blue).	
10		Secure the appropriate filter sock onto the pump inlet.	

11	Screwdriver	Wrap the 2 large clamps (shown in blue) around the pump and the stainless steel mounting post. Orient the clamps for best fitment and tighten. Connect the hanging electrical lead to the fuel pump. See below for wiring the pumps.	
12	3/8" Socket Heat Gun Wire Crimper Wire Stripper	Crimp the ring terminals to each wire included with the pump. Slide the heat shrink over the crimped area and apply heat. Using the provided lock nuts, connect each ring terminal to the corresponding terminal. BRUSHLESS PUMPS ONLY: The engraved "Red-Green-White-Black" nomenclature on the fuel hat is specific to Ti Automotive E5LM wire connectors. Take note as other brushless fuel pumps may use different wire colors.	
13		As shown, place the large O-ring on the outside groove of the canister.	
14	4mm Allen Wrench Torque Wrench	Next, carefully place the top pump assembly onto the canister. Tighten the 6 bolts in an alternating cross-pattern **making sure not to pinch the large O-ring.** Torque the bolts to 30in-lbs (3.4Nm). The FSTR-RA is now ready to be installed into the vehicle.	
15		The FSTR-RA should be firmly mounted to a stable, structural component of the vehicle away from moving parts and excessive heat. The M6x1mm threaded boss dimensional units shown are "inches". Universal mounting brackets for the FSTR-RA are available at www.radiumauto.com	
16		It is possible to mount the FSTR-RA anywhere between a vertical and horizontal position. However, an upright "vertical" position is preferred for optimal protection. NOTE: Do NOT orient the FSTR-RA with the top pointing downward. This will trap air and lead to premature fuel starvation.	

17		The FSTR-RA is designed for “dead-head” plumbing. NOTES: 1. No other FPR (fuel pressure regulator) should be installed in the fuel system. 2. If the main fuel tank does not have a return, one will have to be fabricated. Depicted is using 14-0058 (or 14-0062) with 14-0270 on the OEM filler hose.	
18		Three 6AN (3/8”) hoses will need to be constructed. The two 6AN ports on top of the FSTR-RA are interchangeable. One port will receive fuel from the main tank’s “lift” pump. The other port will return the overflow fuel back to the main tank. The side port is the pump outlet and is routed to the fuel rail(s). A low-micron fuel filter should be used on this feed line.	
19		To achieve a 1:1 vacuum/boost reference, a vacuum hose needs to be routed from the intake manifold to the FSTR-RA. The FSTR-RA comes with several different vacuum port adapter fittings. Choose the one that best suits the application. If no vacuum reference is required, use the small screw to plug the vacuum port.	
20		The fuel pressure is not pre-set to any particular pressure. Adjustment is required for all installations. Fuel pressure is adjusted by turning the knob on top of the regulator. Tighten to increase pressure. Once target pressure is achieved, the regulator adjustment will not change. Do not attempt to tighten the Allen screw on the adjustment knob.	
21		The FSTR-RA pump must be wired to a 12V source capable of providing more current than the maximum current draw of the pump. It is highly recommended to activate the surge tank pump with a relay that is triggered by the same signal as the primary fuel pump. Depicted is a Radium Engineering fuel pump wiring kit (17-0031).	
22	8mm Socket 3mm Allen Wrench	Install the ring terminals to the appropriate electrical wiring studs using the provided insulating acorn nuts. NOTE: The FSTR-RA example shown is using a 4-wire Ti Automotive E5LM brushless fuel pump. As depicted, insert the wires through the strain relief slot. Reinstall the wire harness cover (not shown).	

23		The FSTR-RA must be fully primed with fuel before output pressure can be adjusted. Simply remove the FSTR-RA pump fuse and cycle the vehicle's ignition power several times. This will activate the primary lift fuel pump for a few seconds each time. Check for leaks. After 3-4 cycles, the surge tank should be ready.	
24		A fuel pressure gauge (or sensor) is needed to monitor pressure. Install the gauge/sensor anywhere along the high pressure line starting from the FSTR-RA side port. Radium Engineering 20-0152 is shown.	
25		Reinstall the FSTR-RA fuel pump fuse. Turn the vehicle's ignition power ON. The lift pump and FSTR-RA pump should prime at the same time. Check for leaks. Watch the pressure gauge/sensor during this time. Turn the pressure adjustment screw until proper fuel pressure is obtained. Several priming cycles may be necessary to allow the desired pressure.	
26		Disconnect the vacuum line from the FSTR-RA and temporarily plug the hose, as shown. Start the engine. With the engine idling, check static fuel pressure. Reinstall the vacuum line. **INSTALLATION COMPLETE**