

INSTALLATION INSTRUCTIONS

FUEL SURGE TANK, FST-R

DOCUMENT #19-0361

SUPPORT: info@radiumauto.com

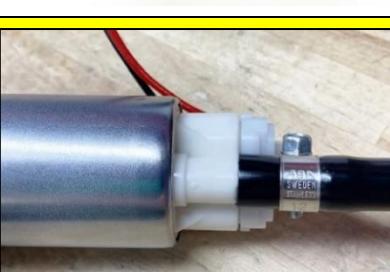
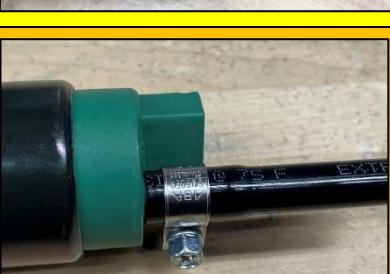
WARNING: DO NOT SMOKE WHILE WORKING ON FUEL SYSTEM. KEEP SPARKS AND OPEN FLAMES AWAY FROM FUEL SYSTEM. DISCONNECT BATTERY BEFORE BEGINNING WORK.

The RADIUM ENGINEERING FST-R (Fuel Surge Tank, Regulated) is designed to enhance the vehicle with resistance to fuel starvation and by increasing the fueling capability of the system. The FST-R 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.

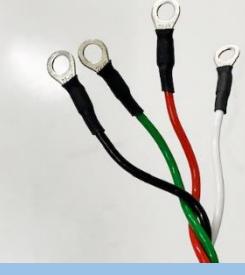
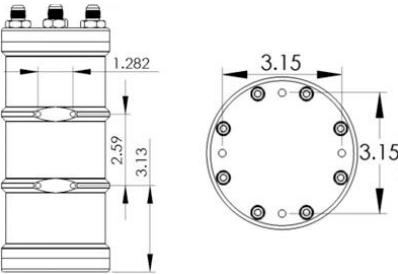
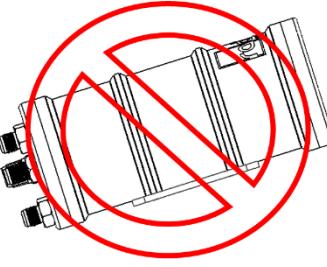
NOTE: When using a surge tank, the primary fuel pump in the vehicle's main fuel tank will no longer directly feed the engine. This fuel pump will now be used to fill and maintain the level of fuel in the surge tank. The FST-R pump will now be the high pressure source for the engine's fuel demand. Fuel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

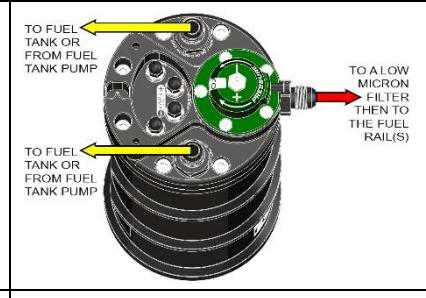
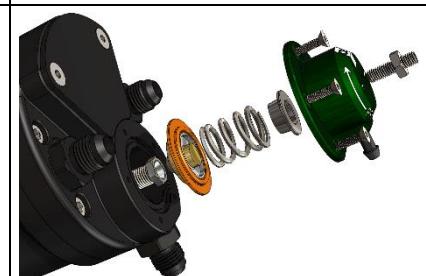
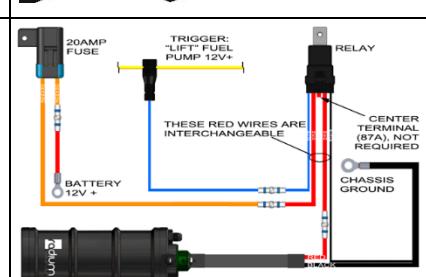
ASSEMBLY AND INSTALLATION

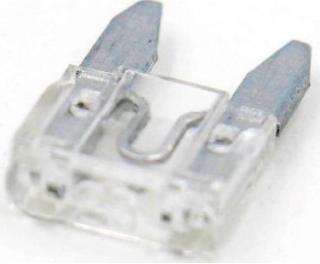
Compatible with Walbro F90000267/274/285, Walbro GSS342, AEM 50-1200, Ti Automotive E5LM, etc.

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| 1 | 3mm Allen Wrench | As shown, unscrew the 2 flat head bolts to remove the wire harness cover. |  |
| | 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 | Walbro F900002XX / Ti Automotive E5LM ONLY For these pumps, use the large ID tubing and the large EFI clamp provided. For the tall brushless Ti Automotive E5LM fuel pump, cut the 70mm tubing to 60mm length. |  |
| | 9/32" Nut Driver | | |
| | Hose Cutter | | |
| | | Lubricate the pump barb and both inner ends of the tubing. Note that fuel pump hose barbs can fracture if not treated with extra care. Secure the EFI hose clamp. | |
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| 4 | Oil Lubrication | Walbro GSS342 / AEM 50-1200 ONLY For these pumps, use the small ID tubing and the small EFI clamp provided. Lubricate the pump barb and both inner ends of the tubing. Note that fuel pump hose barbs can fracture if not treated with extra care. Secure using the EFI hose clamp. |  |
| | 9/32" Nut Driver | | |
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| 5 | 2.5mm Allen Wrench | Walbro GSS342 / AEM 50-1200 ONLY As shown, unscrew the 4 socket head bolts to remove the deflector. | |
| | $\frac{3}{4}$ " or 19mm Socket | Walbro GSS342 / AEM 50-1200 ONLY As shown, remove the barbed adapter fitting. | |
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| 6 | $\frac{3}{4}$ " or 19mm Socket | Walbro GSS342 / AEM 50-1200 ONLY As shown, install the smaller barbed adapter fitting. | |
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| 7 | $\frac{3}{8}$ " Socket | Walbro GSS342 / AEM 50-1200 ONLY Replace the harness with the included harness (shown). | |
| | | Ti Automotive E5LM ONLY For now, simply remove the preassembled harness. | |
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| | | <i>NOTE: The hex on the opposing side will need to be held in place to prevent the studs from spinning.</i> | |
| 8 | 9/32" Nut Driver | Slide a second EFI hose clamp onto the fuel pump tubing. Push the tube over the barb underneath the top hat. | |
| | Oil Lubrication | | |
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| | | Rotate the pump until it seats against the pump mounting bracket and the tubing is straight. Tighten the upper EFI hose clamp (shown blue). | |
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| 10 | | Secure the provided filter sock onto the pump inlet. | |
| | | <i>NOTE: Large rigid filter socks may not fit properly in the canister. The filter socks listed below are compatible:</i> | |
| | | -Radium 14-0143 (excluding Ti Automotive E5LM) | |
| | | -Radium 14-0543 (Ti Automotive E5LM Only) | |
| | | -Radium 14-0743 (Ti Automotive E5LM Only) | |
| | | -Radium 14-0843 (Ti Automotive E5LM Only) | |

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| 11 | Screwdriver | <p>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.</p> <p>Connect the hanging electrical lead to the fuel pump. See below for wiring the Ti Automotive E5LM pump.</p> |  |
| 12 | 3/8" Socket Heat Gun Wire Crimper Wire Stripper | <p>Ti Automotive E5LM ONLY</p> <p>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 (Red, Green, White, Black).</p> <p><i>NOTE: The hexes on the opposing side will need to be held in place to prevent the studs from spinning.</i></p> |  |
| 13 | | As shown, place the large O-ring on the outside groove of the canister. |  |
| 14 | 4mm Allen Wrench Torque Wrench | <p>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).</p> <p>The FST-R is now ready to be installed into the vehicle.</p> |  |
| 15 | | <p>The FST-R 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".</p> <p>Universal mounting brackets for the FST-R are available at www.radiumauto.com</p> |  |
| 16 | | <p>It is possible to mount the FST-R anywhere between a vertical and horizontal position. However, an upright "vertical" position is preferred for optimal protection.</p> <p>NOTE: Do NOT orient the FST-R with the top pointing downward. This will trap air and lead to premature fuel starvation.</p> |  |

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| 17 | <p>The FST-R is designed for “dead-head” plumbing.</p> <p>NOTES:</p> <ol style="list-style-type: none"> 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. |  <p>INSERT CUT HERE</p> |
| 18 | <p>Three 6AN (3/8") hoses will need to be constructed. The two 6AN ports on top (shown in yellow) 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 (shown in red) is the pump outlet and is routed to the fuel rail(s). A low-micron fuel filter should be used on this feed line.</p> |  |
| 19 | <p>To achieve a 1:1 vacuum/boost reference, a vacuum hose needs to be routed from the intake manifold to the FST-R barb, as shown. Use a 3/16" (5mm) ID hose. NOTE: 5/32" and 7/32" is compatible as well. Because the vacuum reference uses a 1:1 ratio, every 1lb of boost pressure, will yield a 1psi rise in fuel pressure. The range of adjustability is from 20psi to the maximum the pump can deliver.</p> |  |
| 20 | <p>3/8" Wrench 3/32" Allen Wrench 5/64" Allen Wrench 7/16" Socket</p> <p>An extra (gold) orifice is provided. This is not required for most applications. However, for vehicles using the high flowing Ti Automotive E5LM brushless pump, the gold orifice can be tested if base fuel pressure cannot be adjusted low enough.</p> |  |
| 21 | <p>The FST-R pump must be wired to a 12V source capable of providing more current than the maximum current draw of the pump.</p> <p>It is highly recommended to activate the FST 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).</p> |  |
| 22 | <p>8mm Socket 3mm Allen Wrench</p> <p>Install the ring terminals to the appropriate electrical wiring studs using the provided insulating acorn nuts.</p> <p>NOTE: The FST-R example shown is using a 4-wire Ti Automotive E5LM brushless fuel pump.</p> <p>As depicted, insert the wires through the strain relief slot. Reinstall the wire harness cover (not shown).</p> |  |

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| 23 | <p>The FST-R must be fully primed with fuel before output pressure can be adjusted.</p> <p>Simply remove the FST-R pump fuse and cycle the vehicle's ignition power several times. This will activate the primary fuel pump for a few seconds each time. Check for leaks. After 3-4 cycles, the surge tank should be ready.</p> |  |
| 24 | <p>WARNING: The FST-R fuel pressure is not set. Adjustment is required before starting the engine.</p> <p>A fuel pressure gauge (or sensor) is needed to monitor pressure. Install the gauge/sensor anywhere along the high pressure line starting from the FST-R side port.</p> <p>Radium Engineering 20-0152 is shown.</p> |  |
| 25 | <p>3/32" Allen Wrench</p> <p>Reinstall the FST-R fuel pump fuse. Turn the vehicle's ignition power ON. The lift pump and FST-R pump should prime at the same time.</p> <p>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.</p> |  |
| 26 | <p>3/8" Wrench</p> <p>3/32" Allen Wrench</p> <p>Disconnect the vacuum line from the FST-R and temporarily plug the hose, as shown. Start the engine. With the engine idling, check static fuel pressure.</p> <p>After making the final adjustments, tighten the jam nut on the adjustment screw. Reinstall the vacuum line.</p> <p>INSTALLATION COMPLETE</p> |  |