



INSTALLATION INSTRUCTIONS

FST, FOR EXTERNAL PUMPS

P/N: 20-1195

Document: 19-0560

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

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.

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.

READ AND UNDERSTAND THESE INSTRUCTIONS COMPLETELY BEFORE BEGINNING

The Radium Engineering FST, For External Pumps is designed to enhance the fuel system by providing resistance to starvation (from fuel slosh). It is designed for fuel injected engines only and should not be used in carbureted applications.

The primary fuel pump in the vehicle's main gas 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. When selecting this fuel pump, keep in mind that it will operate at a very low pressure since it simply cycles fuel right back into the main gas tank. Standard EFI fuel pumps will typically suffice.

The new external fuel pump(s) will now be the high-pressure source for the engine's fuel demand. A fuel pressure regulator must be used. Fuel pressure should be checked before and after installation to ensure there is no difference with the FST operating. Any change in fuel pressure will affect engine performance.

ASSEMBLY: FST, FOR EXTERNAL PUMPS

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1		<p>NOTES:</p> <ol style="list-style-type: none"> 1. Can be used with a combination of 1 or 2 pickup tubes. 2. As depicted, a single 10AN pickup (with filter sock) is preinstalled. 3. Another 10AN pickup tube and corresponding fitting is included. 4. A 16AN pickup tube and corresponding fitting is also included. 5. If using the 16AN pickup tube, an external (high micron) filter will need to be purchased separately. See Radium P/N: 20-0220-04. <p>If using the preinstalled pickup (shown), skip the following steps.</p>	
	3mm Allen Wrench	Remove the 9 perimeter bolts holding the fuel hat to the surge tank.	

3		<p>Lift off the top hat and set the assembly on a work bench.</p> 
4	<p>3/8" Allen Wrench</p> <p>Oil Lubrication</p> <p>Adjustable Wrench</p>	<p>To install a second 10AN pickup, remove the 10AN ORB plug installed in the "10AN ORB FUEL PICKUP" port.</p> <p>Next, install the provided green 10AN ORB bulkhead fitting, as shown.</p> 
5	<p>Oil Lubrication</p> <p>Pinch Clamp Pliers</p>	<p>From underneath, slide the provided black tubing over the green barb.</p> <p>Cinch the included pinch clamp. NOTE: diagonal cutters (shown) can be used if pinch clamp pliers are not available.</p> 
6		<p>As shown, press the included filter sock onto the end of the new black pickup tube.</p> 
7		<p>To install a 16AN pickup, loosen the black 16AN ORB bushing and remove the pickup assembly from the top hat, as shown.</p> 
8	<p>Oil Lubrication</p> <p>Adjustable Wrench</p>	<p>As shown, install the large black bulkhead fitting to the top hat.</p> 

9	Oil Lubrication Pinch Clamp Pliers	From underneath, slide the provided large black tubing over the black barb. Cinch the included pinch clamp. NOTE: diagonal cutters can be used if pinch clamp pliers are not available.	
	1/8" Allen Wrench	20-0461 Fuel Level Switch and Indicator Installation	
	PTFE Sealing Paste	The float can be flipped for Normally Open (NO) or Normally Closed (NC) configuration by removing the E-clip. To be closed during low fuel, the float arrow should be pointing downward.	
	1/4" Wrench	Remove the 2AN ORB plug from the top plate. Apply PTFE paste to the threads of the float switch. Route switch wires through the top plate's threaded hole from underneath.	
	10	To screw in the switch, first hand tighten. Then add another 1.5 to 3 turns with a wrench until tight and sealed.	
	1/4" Wrench	The 2 wires can be routed for the installer's specific purposes. The switch will trigger when fuel level drops by 20% or more.	
	1/4" Wrench		
11	Diagonal Cutter	20-0508 Diagnostic Indicator Kit	
	Oil	Route the 2 pink wires (from the 20-0461 fuel level switch) through the included black aluminum tube.	
	1/2" Wrench	Lubricate the O-ring and thread the tube into the top plate and tighten.	
	Wire Stripper	Route 1 of the switch wires back down into the tube and out 1 of the side holes of the aluminum tube. Pull slack out.	
	Solder Station	Cut the other switch wire and red LED wire to length and solder together. Cover this connection with the included shrink tube.	
	Heat Gun		
	1/4" Wrench		
12	1/4" Wrench	20-0508 Diagnostic Indicator Kit	
	1/4" Wrench	Route the LED black wire down into the tube and out the same hole as the other level switch wire.	
	1/4" Wrench	Push the LED down into the tube until it is fully seated, as shown.	
	1/4" Wrench	Cover both loose wires with the protective sleeving and route to the power source. For simplicity, this can be the pump power terminals.	
	1/4" Wrench		
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	1/4" Wrench		
13	Wire Stripper	20-0508 Diagnostic Indicator Kit	
	Crimper	Crimp the ring terminals to the power and ground wires. Connect the red to the positive terminal and black to the negative terminal. Use heat shrink on the ring terminal crimps.	
	Heat Gun		
	1/4" Wrench	NOTE: The wiring described above puts the switch on the positive side of the LED. However, the switch can also be put on the negative side of the LED, as shown in the wiring diagram.	
14		Make sure the O-ring is properly seated in the FST canister groove, as shown.	

15	3mm Allen Wrench	Install the fuel hat pickup assembly into the surge tank. The orientation should be considered for optimal hose plumbing.	
	in-lb Torque Wrench	Install the 9 perimeter bolts and tighten in an alternating cross pattern to 30 in-lb.	
		Assembly Complete	

MOUNTING

The FST should be firmly mounted to a stable, structural component of the vehicle away from moving parts, excessive heat, and collision prone areas. The FST should not shake or vibrate excessively during operation. It is designed to be mounted in a standing vertical orientation only. Surge protection effectiveness will suffer if excessively tilted from the vertical position.

A threaded plate or M6x1.0mm nuts are required to secure the FST using the provided M6 x 1.0mm mounting bolts (shown). If necessary, rubber isolating sandwich mounts (not included) can be used to reduce noise/vibration transmission to the chassis.



PLUMBING

The PICKUP port(s) route to the inlet(s) of the external high pressure fuel pump(s).

The other 3 ports are female threaded for 8AN ORB (3/4"-16). The SUPPLY port receives fuel from the lift pump to fill the FST. The RETURN port accepts fuel from the FPR to fill the FST. The OVERFLOW port allows excess fuel to drain back to the main tank. If installing in a vehicle without a return port, the OVERFLOW port needs to enter the tank through some other means. This may require installing a fitting on the filler hose, pump module, and/or modifying the fuel tank. For proper function, DO NOT swap these ports around.



START UP

The FST must be primed with fuel before the engine can start. Remove the high pressure fuel pump fuse(s) and leave the lift pump fuse installed. Cycle the vehicle's ignition power several times. This will activate the lift pump for a few seconds each time. After 3-4 cycles the engine should be ready. Reinstall the fuel pump fuse(s) and start the engine. Fix any potential leaks and adjust fuel pressure.

