

# INSTALLATION INSTRUCTIONS

## FUEL SURGE TANK KIT

2015+ Ford F150 and Raptor

Document: 19-0201

Support: info@radiumauto.com

1. It is recommended to work with an empty fuel tank.
2. Working under the vehicle is required.
3. When installing any part which has an O-ring, lubricate with light oil.

### 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.

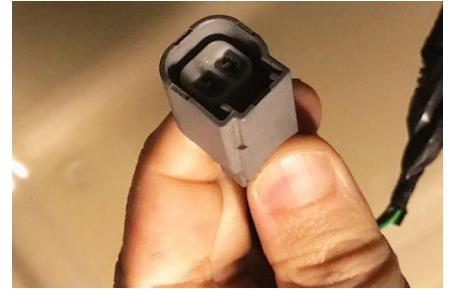
### WARNING

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.

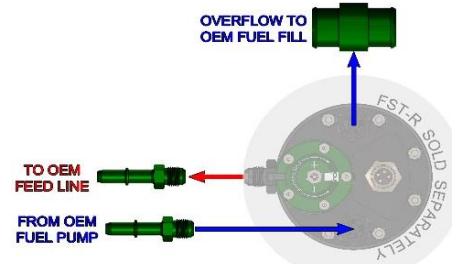
Fuel system components may not be legal for sale or use on emissions controlled motor vehicles. Consult local, state, and federal laws.

STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1	4mm Allen Wrench	The FST-R (sold separately) top cap may need to be properly orientated. First, remove the 6 perimeter bolts (shown cyan). Next, lift up the top cap and rotate according to the picture. As a reference, note where the M6 mounting threads (shown red) are located. Finally, tighten bolts making sure the gasket does not kink.	
	3/4" Wrench		
	7/16" Wrench		
	Pipe Thread Paste		
	11/16" Wrench	Replace the preassembled pump outlet fitting with the provided 90 degree fitting (shown blue) in the kit. To install the pressure gauge (yellow) to the inline fitting (shown purple), first apply pipe thread paste to the threads. Screw it finger tight, then add another 1.5 to 3 turns. Finally, install the <u>inline fitting to the 90 degree fitting on the FST-R</u> .	
2	Threadlocker	Secure the FST-R to the included bracket using the 4 provided bolts (shown red) and a medium strength threadlocker.	
	4mm Allen Wrench		
	8mm Wrench		
	3mm Allen Wrench	Using the thumb tabs, unlock and remove the provided flying lead wire connectors from both the relay and fuse holder. Overlap the fuse holder and relay mounting tabs placing the relay down first. Secure to the stainless steel mounting bracket using the provided M5 locking nut and M5 bolt (shown green)	
		For overflow purposes, the port (shown orange) should be at the top.	
3	10mm Wrench	<b>2015-2017 Trucks Only</b> Pop the hood. Unlatch the fuse cover panel and remove the fuel pump fuse. Depending on the model, this can be either at terminal 9 or 56.	
		To relieve fuel pressure, start the engine and allow it to stall. Switch the vehicle OFF and replace the fuse and panel.	
		Disconnect the negative battery terminal.	
4	10mm Wrench	<b>2018+ Trucks Only</b> Pop the hood. Unlatch the fuse cover panel and remove the fuel pump fuse at terminal 50.	
		To relieve fuel pressure, start the engine and allow it to stall. Switch the vehicle OFF and replace the fuse and panel.	
		Disconnect the negative battery terminal.	

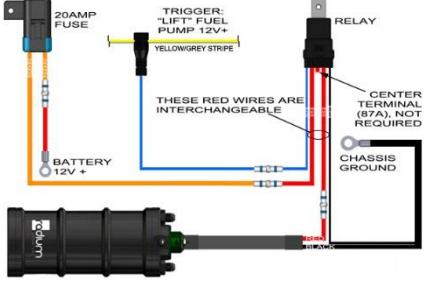
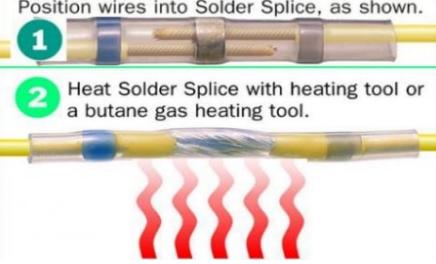
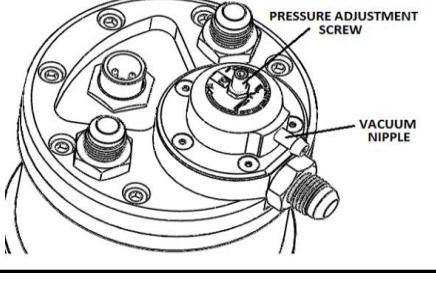
5	<p>13mm Socket</p> <p>16mm Socket</p> <p></p>	<p>For accessibility, the fuel tank will need to be dropped down.</p> <p>To remove the skid plate (shown), unfasten the four 13mm hex head nuts that secure to the 2 fuel tank straps.</p> <p>Next, support the fuel tank on both ends. Unscrew the fuel tank strap bolts using a 16mm socket wrench. Unlatch the fuel tank straps (shown) from the chassis to remove.</p>	
6	<p>10mm Socket</p> <p></p>	<p>Find the metal fuel filler tube that is on the opposing side of the fender gas door. Remove the single M6 bolt that secures the metal fuel filler tube to the body.</p>	
7	<p>7mm Wrench</p> <p>Flat Head Screwdriver</p> <p></p>	<p>Near the frame rail, loosen the worm drive hose clamp that fastens the rubber filler hose to the metal filler tube. Slowly drop the tank down until this fuel fill connection can be pulled apart, as shown.</p>	
8		<p>Find the electrical connector (shown) on the outer LH top side of the gas tank. Depress the thumb tab and pull away to disconnect.</p>	
9		<p>Find the electrical connector (shown) on the top rear of the gas tank. Depress the thumb tab and pull away to disconnect.</p>	
10		<p>Find the electrical fuel pump connector (shown) on the top of the gas tank. First, slide the red tab to the side to unlock. Next, depress the thumb tab and pull away to disconnect.</p>	

11	Flat Blade	Find where the vent line that runs parallel to the fuel filler hose connects to the tank. Gently pry the green lock up and pull away to disconnect.	
12	Flat Blade Rag	Find the fuel feed line and EVAP SAE connections. These will be side by side on top of the front of the gas tank.  For the fuel feed line, gently pry the blue lock up and pull away to disconnect. Be prepared with a rag as fuel will leak out of this connection.  For the EVAP line, gently squeeze the black side locks and simultaneously pull away to disconnect.	
13	Hose Cutter	The FST overflow port will return fuel into the gas tank via the fuel fill tube. The included barbed coupler will replace a small cut away section from the OEM rubber fuel fill hose.  Cut a 1/2" wide section out of the center of the OEM rubber fill hose. Remember to allow enough room to access the hose end fitting that will be installed later.	
14	Pipe Thread Paste 15mm Wrench 1/4" Socket Wrench	Apply pipe thread paste or tape to the 1/4" NPT threads on the included 90 degree 6AN adapter fitting. Install the fitting in the barbed coupler. Install finger tight, then add another 1.5 to 3 turns. Ideally the fitting should run in an upwards direction parallel with the fuel filler tube.  Install the barbed coupler into the center section of the OEM rubber fill hose and secure using the provided hose clamps.	
15		Find the fuel feed hose connection that was unplugged on the top of the fuel tank at the very front. This was the smaller of the two fittings that had the blue SAE quick connect lock. Follow this OEM hard line towards the front of the truck about 12 inches downstream until you find the next SAE quick connect with a blue lock. Unlatch this SAE quick connect fitting and pull. Have a rag handy as fuel will spill.  Remove this short section of OEM fuel hard line (shown) from the truck. This will NOT be reused.	
16	Light Oil	Find the two SAE quick connect male fittings provided in the kit. These will be installed into the fuel feed connection areas from the previous step, ie: the OEM fuel line from the fuel pump (shown) and the OEM fuel line to the engine (not shown).  Lubricate the male portion and insert into the OEM SAE female connectors until a "click" is felt. To secure, push down the blue locks.	

17	M8x1.25mm Die	<p>To mount the FST-R, first find the three OEM studs underneath the vehicle. These will be located on the LH side of the truck, underneath the front door.</p> <p>NOTE: These OEM M8x1.25mm studs have body paint on them. The thickness of the paint may require a rethreading die (shown) to be used for cleaning the threads.</p>	
	13mm Wrench	Lineup the three FST-R bracket holes to the OEM studs and secure the mount using the provided M8x1.25mm nuts.	
	13mm Socket Wrench		
	18		
	Wire Stripper	In order to activate the FST-R fuel pump, the included relay will be triggered from the OEM fuel pump's power wire. This yellow/grey stripe wire is found at the end of the connector and is large (AWG) gauge, as shown.	
19		First, find the included blue wire. Strip the blue insulation back to expose 3/8" of copper.	
	20		
21	Diagonal Cutter	Unscrew both ends off the included black Posi-Tap connector. Insert the OEM yellow/grey stripe power wire (near the fuel pump connector) into the slotted end of the Posi-Tap connector. Screw the center section back on making sure the wire gets pierced.	
22		Slide the Posi-Tap collar end piece over the blue wire provided in the kit. Insert the blue wire into the end of the Posi-tap connector. Finally, smash the blue wire by tightening the collar end into the Posi-Tap connector, as shown. See the online Posi-Tap tutorial videos for more detailed information.	



23	Light Oil      NOTE: Hose clamps are not necessary for Push Lok connections.	To properly install the 6AN Push Lok hose ends into the provided 3/8" EFI hose, the barbs will need to be lubricated first. The hose can then be pushed fully onto the barbs, as shown.  NOTE: Hose clamps are not necessary for Push Lok connections.	
24	11/16" Wrench Oil Lubrication	Install a straight hose end to the included EFI fuel hose. Tighten the hose end to the 90 degree 6AN elbow NPT fitting in the fuel filler hose coupler. Route the opposite end of this hose along the fuel fill tube and in a manner which it can be easily accessed after the gas tank is reinstalled. NOTE: this hose will be cut shorter in the following step.	
25	Diagonal Cutter Oil Lubrication	The gas tank can now be reinstalled. All connections will be reattached excluding the fuel feed line at the very front of the gas tank. The larger EVAP hose next to the fuel feed line can be installed. Reinstall all other components in reverse order.	
26	Diagonal Cutter Oil Lubrication	<b>Hose Recommendations:</b> Highest FST Port: 180 Degree Hose End Barbed Coupler: Straight Hose End Hose Cut Length: 94 inches	
27	Diagonal Cutter Oil Lubrication 11/16" Wrench	Route a hose from the inline 6AN gauge adapter over the top of the frame rail to the forward most Radium SAE male fitting. This is the connection that routes fuel directly to the engine.  <b>Hose Recommendations:</b> FST-R Pump Outlet Side Port: 45 Degree Hose End Radium SAE Female Fitting: 90 Degree Hose End Hose Cut Length: 18 inches	
28	Electrical Pick RTV Silicone	The fuel pump inside the OEM gas tank will supply fuel to the FST-R. Route a hose from the lowest FST-R port over the frame rail to the rearmost Radium SAE male fitting on the top of the gas tank.  <b>Hose Recommendations:</b> Lower FST-R Port: 90 Degree Hose End Radium SAE Male Fitting: Straight Hose End Hose Cut Length: 30 inches	

29	Wire Cutters	<b>FUEL SURGE TANK P/N: 20-0933</b>	
	Wire Strippers	Use the shrink tube and ring terminals provided with the FST-R. Cut each piece of shrink tube to length and insert onto each wire. Crimp a ring terminal to each wire. As shown, heat shrink into place.	
	Wire Crimpers		
	Heat Gun		
		<b>FUEL SURGE TANK P/Ns: 20-0129-00, 20-0129-01, 20-0130-00, 20-0130-01 20-0133-01, 20-0134-00, 20-0134-01, 20-0135-00, 20-0135-01, 20-0368-00</b> The circular flying lead connector has a keyway that must be properly oriented prior to inserting into the mating FST-R connector. Spin fully clockwise to lock into place.	
30	Wire Cutters	Assemble the components as shown in the wiring schematic (not to scale). Cut all wires to length.	
	Wire Strippers		
	Wire Crimpers		
	Heat Gun	<b>NOTE:</b> 1. For strain relief, always allow slack in the wire so it does not pull. 2. There are 2 slotted holes in the stainless steel mounting bracket specifically to keep the relay and fuse wires secured with a cable zip-tie.	
31	Heat Gun	Note the different locations of the included solder butt connectors in the wiring schematic diagram above. There are 4 solder butt connectors.	
		To properly use the solder butt connectors, strip each wire insulation back and insert both wires into the butt connector ends. Use a heat gun. Be careful with the surrounding area as the internal solder may take a couple minutes to melt. Verify the connection is solid by giving it a tug.	
32	13mm Socket	Secure the large chassis ground ring terminal to one of the OEM M8 studs that mounts the Radium Engineering bracket. It may be necessary to remove some paint to expose bare metal for a good electrical contact.	
	Diagonal Cutter		
	11mm Socket		
		Using the included split wire loom for protection, route the red power wire to the battery safely avoiding hot areas or any sharp edges that could cause unwanted chaffing. Connect the small power ring terminal to the M6 positive battery terminal, as shown.	
		Use the cable zip ties included to secure the wire loom in place.	
33		Temporarily remove the new fuel pump fuse and reconnect the negative battery terminal.	
		Switch the ignition to the ON position a few times without starting the engine. This will prime the OEM fuel pump and fill the FST-R. Check for leaks and fix any that may have occurred. Reinstall the fuse.	
		It may take longer than usual to start the engine as air pockets are being bled from the system. Start and idle the engine. Re-check for leaks.	
34	3/8" Open End Wrench	The FST-R is NOT set to a specific pressure. To increase pressure, tighten set screw. To reduce pressure, loosen set screw. Adjust the FST-R to the desired pressure. OEM 3.5L GTDi fuel pressure is 58-75psi (400-520 kPa). Consult with your tuner before setting the fuel pressure. Once adjusted, lock the set screw in place with the jam nut.	
	3/32" Allen Wrench		
		NOTES: 1. Do NOT connect a vacuum hose to the fuel pressure regulator nipple unless a 1:1 rising rate is required. 2. The extra orifice is not required unless minimum static fuel pressure cannot be achieved.	
<b>INSTALLATION COMPLETE</b>			