



# INSTALLATION INSTRUCTIONS

## DUAL EXTERNAL PUMP FST

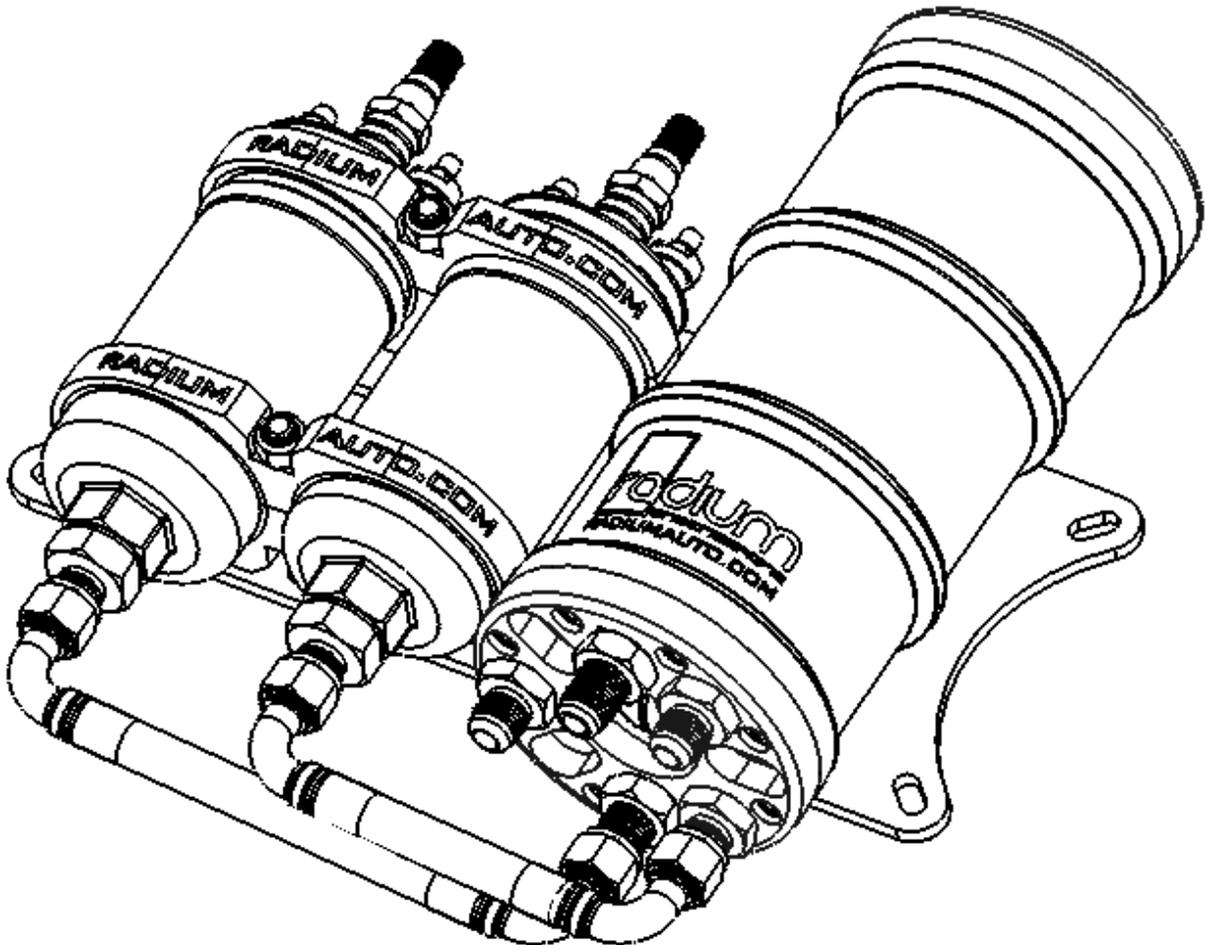
### Horizontal Mount

SUPPORT: [INFO@RADIUMAUTO.COM](mailto:INFO@RADIUMAUTO.COM)

Document: 19-0042

#### READ AND UNDERSTAND THESE INSTRUCTIONS COMPLETELY BEFORE BEGINNING INSTALLATION

Radium Engineering Fuel Surge Tanks (FST) are designed to enhance the fuel system by providing resistance to starvation (from fuel slosh) and by increasing the fueling capability of the system. They are designed for fuel injected engines only and should not be used in carbureted applications.



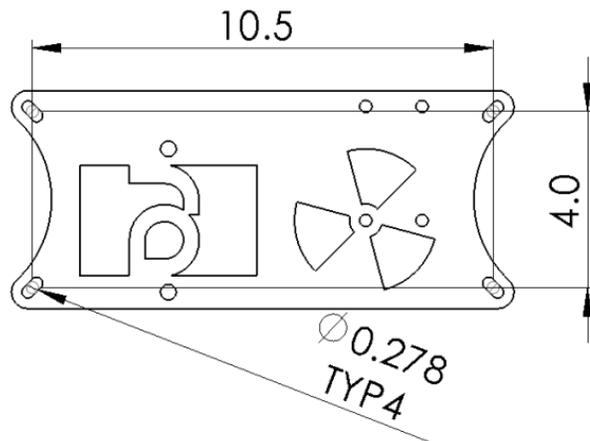
The primary fuel pump in the vehicle's main fuel tank or fuel cell will no longer directly feed the engine. This pump will now be used to fill and maintain the level of fuel in the surge tank. The two external FST pumps will be the high pressure source for the engine's fuel demand.

This fuel must be pressure regulated either with a fuel pressure regulator. Fuel pressure should be checked before and after installation to ensure there is no difference with the fuel surge tank kit operating. Any change in fuel pressure can affect engine performance.

The Radium Engineering fuel surge tank canister is fully assembled, sealed, and ready to be installed.

## MOUNTING

The FST should be firmly mounted to a stable, structural component of the vehicle away from moving parts and excessive heat. The FST should not shake or vibrate excessively during operation. Mounting holes are provided on the bottom plate for M6 or ¼" screws. Use blue Loctite on the fasteners that thread into the surge tank. Below are the mounting dimensions for the bottom plate. This surge tank must be mounted to a level floor for proper use.



## ASSEMBLY

NOTE: If not installing the optional Radium 4-port Fuel Manifold, skip the first 4 steps listed below.

1. Decide which of the included fittings (plug, -10AN, -8AN) you wish to use at each end of the manifold. Instead of clamping the manifold down and risking a marred surface, tighten these two opposing fittings simultaneously by rotating against each other with wrenches.
2. Use a small impact gun to remove the fittings from the fuel pump outlets. Install the included -6AN fittings. Bosch pumps use crush washers. AEM and DW pumps use O-rings. Torque to 20 ft-lb.
3. Install the included O-rings on the 37 degree flared side of the adapter fittings, as shown. **To prevent failure, lubricate the O-rings.**
4. Spin the pumps into the 4-port adapter as shown and hand tighten.



Use the picture below as a reference to build and construct the complete FST assembly. First, tighten the -6AN fittings to the fuel pump inlets. Bosch pumps use crush washers. AEM and DW pumps use O-rings. Next, line-up and secure the fuel pumps to the mounting plate using the billet clamps and 2 sets of M8 bolt/nuts. Install the surge tank to the mounting plate using the 4 included M6 screws. Do not tighten the hardware yet.



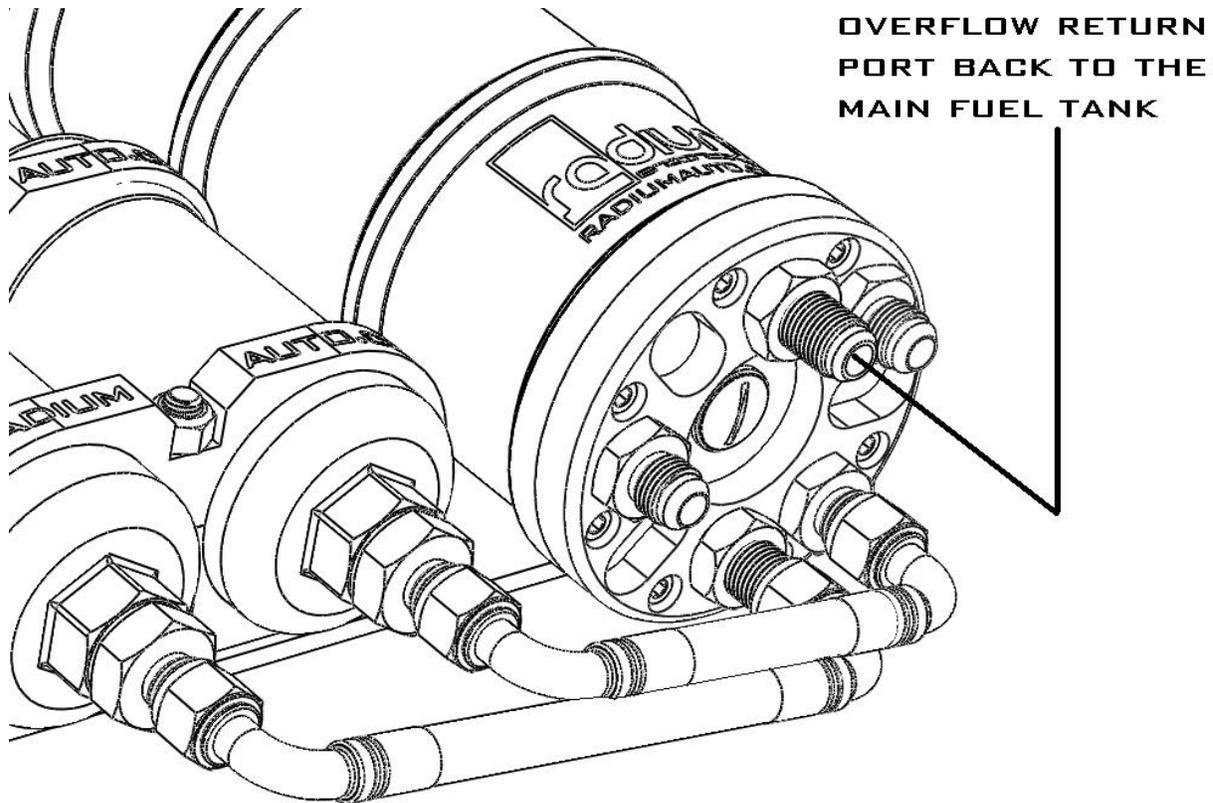
Using a non-marring aluminum wrench, connect the 2 included PTFE hoses from the surge tank's green port fittings to the fuel pumps (as shown) and tighten. NOTE: if mounting this kit to a ceiling, such as the bottom side of the vehicle, always connect the PTFE hoses to the 2 lowest mounted FST ports for optimal starvation protection.

Tighten the M8 bolts/locking nuts to 30 in-lbs to avoid warping the mounting plate. Fully tighten the rest of the hardware.

## PLUMBING

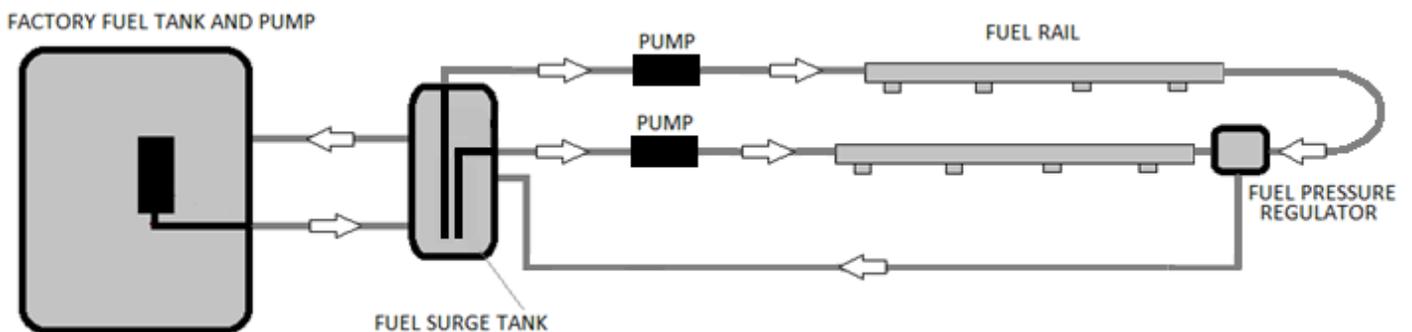
Fuel entering the surge tank from the primary fuel pump must be filtered. Also, these surge tanks use PTFE (Teflon) hoses. If the FST will be mounted in the cabin, it is recommended to use PTFE fuel hose as well.

There are three extra -6AN port fittings on the surge tank that directly access the internal fluid volume of the surge tank. The highest top port (shown in picture) should be connected to the main fuel tank's return port.



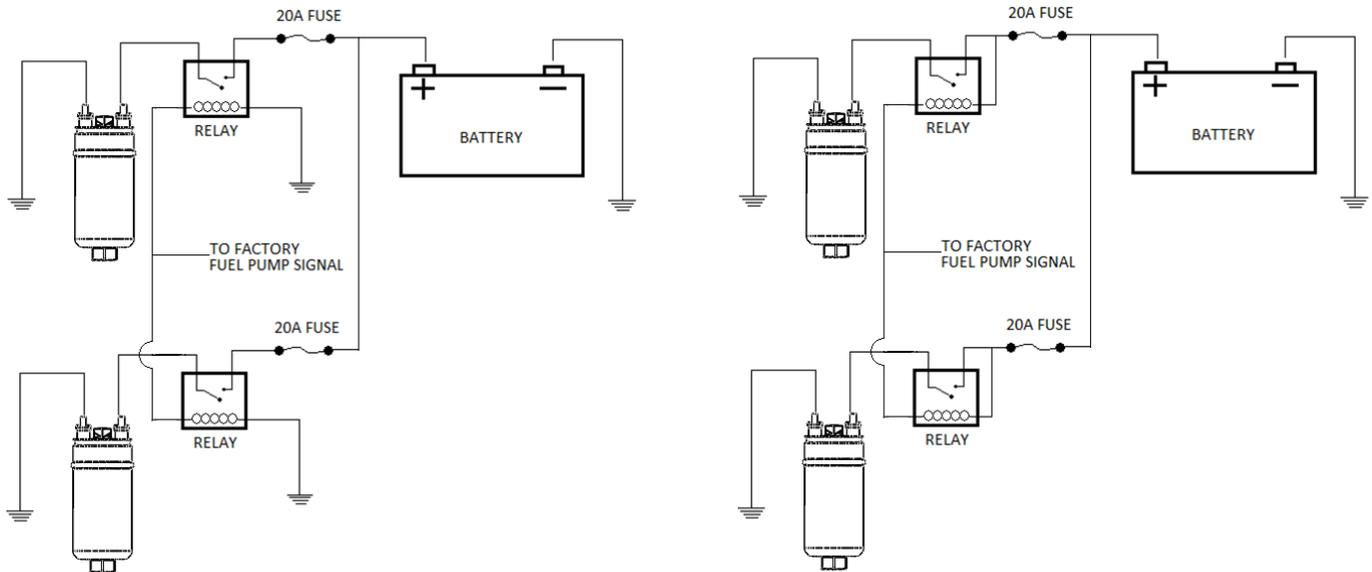
The other two ports are interchangeable. One of the port fittings connects to the factory fuel pump in the main fuel tank. The other port fitting connects to the fuel pressure regulator's discharge.

The diagram below shows a typical routing scheme that can be used when installing this fuel surge tank kit. However, there are many other options for plumbing depending on the vehicle.



## WIRING

The external FST pumps must be wired to a 12VDC power source and chassis ground using 12AWG (minimum) wires. The two M6 lock nuts are used for the 12V power terminals on the fuel pumps. The two M5 lock nuts are used for the ground terminals on the fuel pumps. It is highly recommended to activate both pumps with individual 20A fuses and relays that are triggered by the same signal as the primary fuel pump in the main tank. The diagram below to the left assumes that the primary fuel pump signal is positive 12V. If the factory fuel pump signal uses a ground trigger, the relay should be wired as shown in the diagram to the right.



## START UP

The surge tank must be fully primed with fuel before the engine will start. One method for priming the system is to remove both FST pump fuses and cycle the vehicle's ignition power several times. This will activate the primary fuel pump for a few seconds each time. After 3-4 cycles it should be ready to start. Replace both of the FST pump fuses.

## SERVICING

The Radium FST can be serviced by following the steps below:

1. Unscrew and disconnect both of the external FST pump wiring terminals.
2. Carefully loosen the hoses and dispose all remaining fuel in the hoses.
3. Remove the eight M5x0.8mm bolts on the perimeter of the fuel surge tank's top cap.
4. Carefully remove top cap with the fittings still attached.
5. Contact Radium Engineering for replacement parts.
6. Assemble in reverse order.
7. Carefully reassemble and ensure large O-rings are not disturbed when placing end caps on FST.
8. Torque all M5x0.8mm bolts to 30 in-lb in a cross-pattern order.
9. Test for leaks before putting surge tank back in use.