

INSTALLATION INSTRUCTIONS

FUEL SURGE TANK INSTALLATION KITS

2004+ LOTUS ELISE/EXIGE/CUP (2ZZ-GE)

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Document 19-0237

THESE INSTRUCTIONS ARE DIVIDED INTO 2 SECTIONS FOR EACH INSTALLATION KIT: **20-0013 FRAME RAIL MOUNT** AND **20-0006 TRUNK MOUNT**

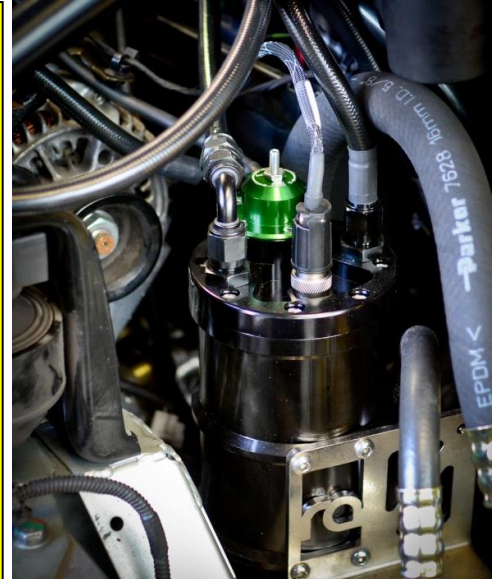
20-0013 FUEL SURGE TANK KIT, FRAME RAIL MOUNT

NOTE: The following charcoal canister relocation modification does not apply to the Lotus Elise, Cup, and 2-Eleven. Below is only in regards to factory supercharged Exige-S models.

CHARCOAL CANISTER RELOCATION IS NECESSARY IN ORDER TO MOUNT THE SURGE TANK ON THE FRAME RAIL (SHOWN). RELOCATION IS UP TO THE DISCRETION OF THE INSTALLER. RADIUM DOES NOT PROVIDE INSTRUCTIONS ON THIS PROCESS.

IF THE CHARCOAL CANISTER IS REMOVED, A CHECK ENGINE LIGHT WILL BE PRESENT AND THE VEHICLE WILL NOT BE EMISSIONS LEGAL.

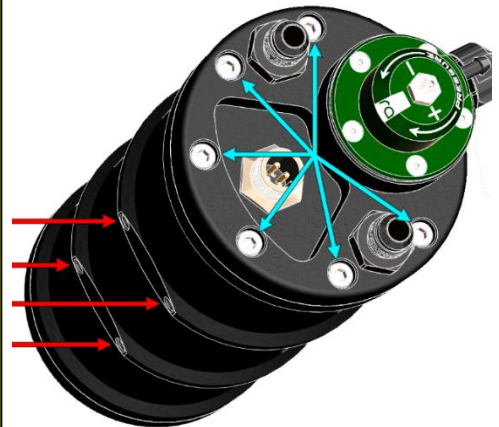
THE CHARCOAL CANISTER IS LOCATED ON THE RIGHT SIDE FRAME RAIL NEAR THE FUEL FILLER TUBE AND CAN BE ACCESSED THROUGH THE RIGHT HAND REAR WHEEL WELL.



1. The top cap of the FST-R (sold separately) needs to be properly orientated.

First, remove the 6 perimeter bolts (shown cyan). Next, lift up the top cap assembly 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.

Using a medium strength threadlocker, fasten the provided mounting bracket to the FST's vertical mount holes using the 4 provided M6x10mm screws. Attach the relay, fuse holder and small ring terminal wire from the wiring harness to the bracket's spare hole. Use the M5 bolt and nut to secure the fuse and relay.

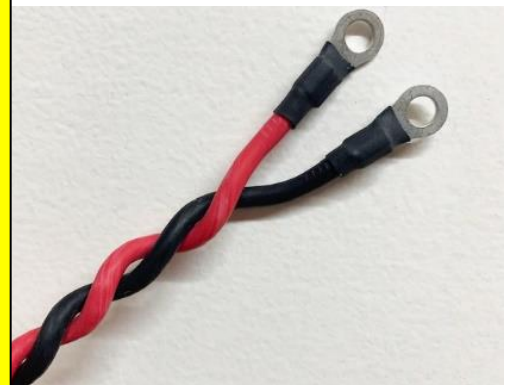


2. FUEL SURGE TANK P/N: 20-0933

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.

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

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.



3. To relieve fuel pressure, pull out fuel pump fuse No. R1 20A (06+ model shown). The 4-position fuse holders are located at the front left of the engine compartment.

Start the engine and allow it to stall. Reinsert the fuel pump fuse. Disconnect the negative terminal of the battery.

Jack up and safely support the rear of the vehicle. Remove the RH rear wheel and fender liner. Remove underside panels to access the rear firewall.



4. Remove the stock fuel line from the fuel rail fuel pipe. This is accomplished using the included 5/16" Fuel Line Disconnect Tool. If misplaced, use NAPA part number BK7001932.

Insert tool into end of hose and apply pressure while simultaneously tugging on hose. The tool will release the barbed locking mechanism and the hose should slide off.



5. Find the rubber fuel filler hose on the lower RH side of the firewall from the engine bay. Loosen both OEM clamps and remove the hose from the vehicle, as shown.

Cut a 1" section of hose out of the middle of the straight section of the tube. This should be roughly 4.5 inches from the end that attaches to the fuel tank. This measurement may vary depending on model of Lotus. Please double check before cutting.



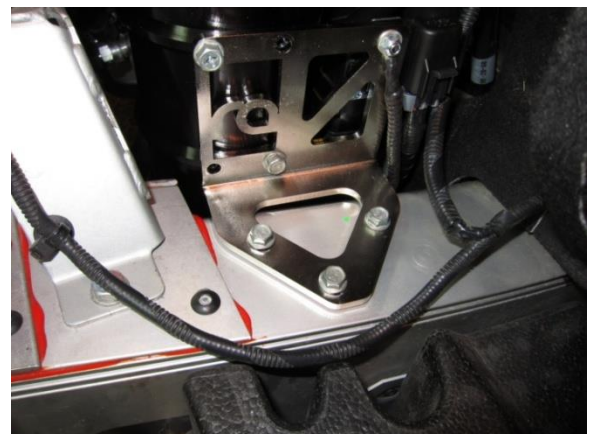
6. Find the included NPT to 6AN elbow and barbed fuel filler adapter. Apply PTFE paste to the fitting's tapered threads and screw it into the barbed adapter. Rotate so the 6AN fitting is in line with the barbed adapter. Secure the cut sections to the filler adapter using the provided clamps.

Reinstall the fuel filler adapter with the 6AN fitting pointing upwards. Position such that there are no kinks or unnecessary bends in the hose.



7. From inside the RH rear wheel well, locate the three fasteners on the frame rail holding the A/C line bracket in place. If the vehicle is not equipped with A/C, there will be 3 threaded holes in this location. NOTE: The Lotus 211 typically does not have these aforementioned threaded holes. Drilling and pulling three M6x1mm rivet nuts is required.

Remove the A/C line bracket fasteners and install the FST over the top of the A/C line bracket. Use the three M6X1.0X25mm screws included in the kit to fasten the bracket to the frame rail.



8. Route the electrical leads from the FST harness across the bulkhead wall, below the intake manifold.

Secure the wiring away from moving or high temperature components.

Locate the ring terminal on the FST wiring harness. This is the main power connection.



9. Locate the power distribution block on the vehicle bulkhead wall below the ECU. This is best accessed from underneath the vehicle.

Pop open the plastic cover on the distribution block and remove either one of the nuts.

Install the ring terminal wire from the FST harness and replace the nut.

Tighten the nut and snap the cover closed.



10. From the LH rear wheel well, locate the inertia safety switch in the engine compartment.

It is attached to the inside of the frame rail and has an electrical connector plugged into the bottom of it.

Unplug the connector from the inertia switch by squeezing the latch and pulling downward.



11a. For newer kits manufactured after August 2023, locate the single Weather Pak connector from the FST harness. Cut off the connector and strip the wire to expose the copper. The switched fuel pump wire terminal 3 on the inertia switch connector. Locate the Posi-tap connector in the kit and unscrew both ends. Put the slotted end around the terminal 3 wire. Push the trigger wire into the Posi-Tap connector. Tighten both ends together, as shown.

Secure all wires away from moving engine components and pinch points.



11b. For older FST install kits manufactured prior to August 2023, locate the jumper harness (shown) included in the installation kit.

Next, locate the single-wire connector from the FST harness and plug it into the connector from the previous step.

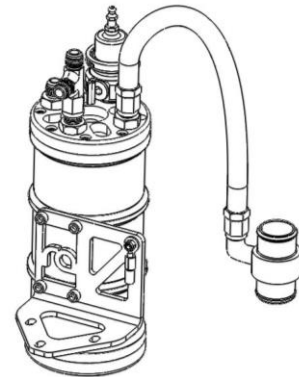
Secure all wires away from moving engine components and pinch points.



12. Install the short hose with straight hose end fittings from the FST to the fuel return adapter fitting, as shown. Use the port on the FST that is nearest the fuel filler adapter.

Adjust the orientation of the fuel filler adapter to suit the hose installation.

Tighten the hose clamps on the return adapter and the hose end fittings.



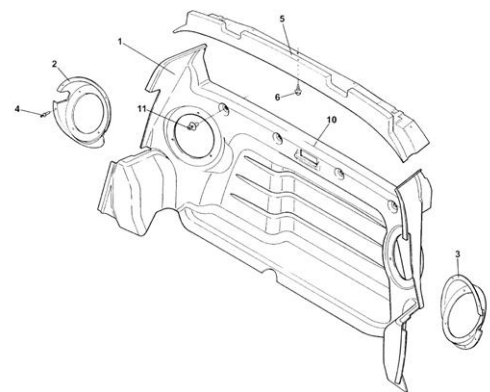
13. **Aftermarket Fuel Rail Applications Only:** The hose with 90deg and 45deg hose ends will be used. The hose with 180deg and 45deg hose ends will not be used. Install the 45deg hose end to the FST-R outlet side port. Run the hose to the left side of the engine and secure to the LH fuel rail port.

OEM Fuel Rail Applications Only: The hose with 180deg and 45deg hose ends will be used. The hose with 90deg and 45deg hose ends will not be used. Install the included SAE quick connect adapter (shown) to the 180deg hose end. Remove the green SAE lock and lubricate the internal O-rings. Insert the fitting onto the OEM fuel rail's SAE male connection. After engaged, reinstall the green retaining clip onto the fitting and secure with the small screw.



14. Before installing the last hose, the interior will need to be removed.

First, remove all seat bolts and unplug the LH seat belt terminals. Unscrew the belts from the seats and remove both seats from the vehicle. Pop open the plastic seat belt cover and unscrew the upper seat belt hanger from the roll bar. Remove all associated retaining clips of the rear plastic panel. Unplug the speaker terminals and the interior light. Remove the panel as well as the foam insulation.

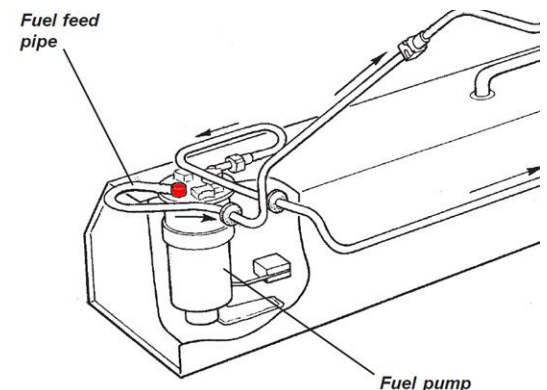


15. There should now be access to the fuel pump plate located behind the LH seat on the shelf.

Remove the 6 Allen head screws on the fuel pump access panel.

Carefully set the fuel pump access cover aside.

Shown in red is the plastic fitting that will be replaced.



16. Be extremely careful when removing the yellow clip. This is very easy to drop and lose underneath the fuel tank. If lost, these yellow clips can be purchased from a local dealership.

Toyota P/N: 77241-32060 or Lotus P/N: A120L6012S

After the clip is removed, pull up on the fuel line fitting until it unseats from the fuel pump housing. Remove the complete fuel line from the vehicle.

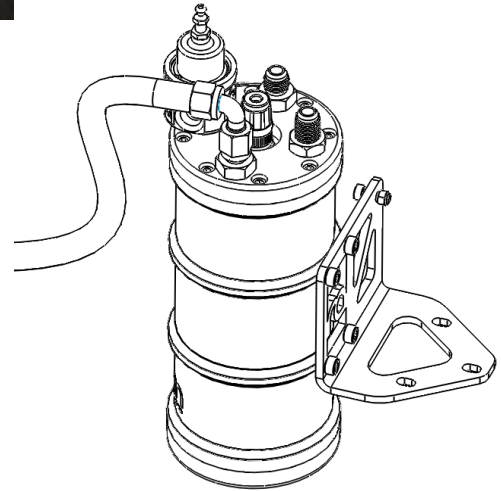


17. The final FST hose is the longest and has 90 degree hose ends.

First, install the fuel pump adapter fitting to one end.

Install the other side to the last port on the surge tank (shown). NOTE: The FST-R will look slightly different than diagram, but the port is in same location.

Route this hose along the bulkhead wall under the intake manifold to the area where the factory fuel line exited the bulkhead into the engine bay.



18. Route the hose through the hole in the firewall where the factory fuel line originally passed through. Cautiously, keep the hose away from moving parts such as the Lotus gear selector lever assembly. Also, keep the hose away from sharp edges and all high temperature engine components.

Lubricate the fuel pump adapter's internal O-ring. Next, push the fitting/hose assembly into the OEM fuel pump port until it is fully seated. Reinsert the yellow clip completely until it locks in place.

Finally, secure the included rubber grommet onto the firewall surface.



19. Adjusting Fuel Pressure:

The FST-R features an integrated and adjustable fuel pressure regulator. The pressure is adjusted by turning the threaded screw on the regulator top. Tightening the screw will increase pressure. Loosening the screw will decrease pressure. Use a pressure gauge on the output line of the FST-R to monitor pressure. Have an assistant prime the fuel pump by cycling ignition power. When the pump is running take note of the fuel pressure. Make adjustments to the FST-R as needed. The OEM Lotus fuel pressure is 3.25bar (47-48 psi). When pressure is adjusted, start the engine. It may take several seconds of cranking for the air to be bled out of the system. Once it starts and is idling, check the pressure one last time. **CHECK FOR LEAKS.** When pressure is confirmed, lock the adjustment screw in place with the lock nut. NOTE: The extra gold orifice is ONLY required if fuel pressure cannot be dialed down to the desired target.

A vacuum hose connection to the regulator should NOT be used if attempting to mimic OEM Lotus fuel pressure.

INSTALLATION COMPLETE: 20-0013 FST KIT, FRAME RAIL MOUNT

20-0006 FUEL SURGE TANK KIT, TRUNK MOUNT

1. To relieve fuel pressure, pull out fuel pump fuse No. R1 20A (06 Elise shown). The 4-position fuse holders are located at the front left of the engine compartment on the cabin bulkhead.

Start the engine and allow it to stall.

Reinsert the fuel pump fuse and disconnect both battery terminals.



2. Jack up and safely support the rear of the vehicle.

Remove the RH rear wheel and fender liner. Remove the underside panels to access the rear firewall where the fuel filler tube resides.

Loosen the hose clamps on the rubber fuel filler hose. Remove the rubber fuel filler tube from the vehicle.



3. Cut a 1" section from the middle of the straight section of the filler hose, roughly 4.5 inches from the end that attaches to the fuel tank. This measurement may vary depending on Lotus model. Please double check before cutting.

Install the fuel return adapter as shown with the included hose clamps. Leave the hose clamps semi-loose. This will help with adjusting fitment later.

Use a small amount of Teflon paste on the 90 degree adapter fitting and screw it into the aluminum fuel return adapter.



4. Rotate the fitting so that it is inline with the aluminum adapter pointing toward the inlet of the filler hose. Reinstall the fuel filler hose assembly into the vehicle.



5. Remove the LH rear wheel and fender liner. From the LH rear wheel well, locate the inertia safety switch in the engine compartment. As shown, it is attached to the inside of the frame rail and has an electrical connector plugged into the bottom.



6. Unplug the connector from the inertia switch by squeezing the latch and pulling downward.



7. Locate the jumper harness included in the installation kit.

Connect this jumper harness in between the inertia switch and the factory inertia switch harness.

This connection allows the new fuel surge tank pump to be deactivated if the vehicle were to be involved in a collision.



8. Disconnect and remove the battery and all carpet from the trunk.

There are existing electrical conduits located in the far left hand front corner of the trunk that lead into the engine bay.

Drill two 1" holes just on the right side of these existing electrical conduits through the trunk wall into the engine bay. NOTE: The picture shown is taken from the engine bay side (not the trunk side).



9. Locate the 2 longest preassembled hoses and two of the rubber grommets included in the kit. Slide the grommets over each hose as shown.

From inside the trunk, push the 2 hoses through the holes and into the engine bay. Seat both grommets into the drilled holes. The proper length will be adjusted later.



10. Using the included 5/16" SAE disconnect tool, remove the OEM fuel line from the fuel rail pipe. Insert the tool into the end of hose and apply pressure while simultaneously tugging on hose. The tool will release the SAE quick connect locking mechanism and the hose should slide off.

On the other end of the factory fuel line, simply squeeze the fuel coupler and pull off. This OEM Lotus hose will not be reused.



11. From the engine bay, install one of the SAE quick disconnect adapter fittings (shown) onto the shorter hose.

Unless an aftermarket fuel rail is used, install the other SAE quick disconnect adapter fitting (shown) onto the longer hose. For users with aftermarket fuel rails, the long hose can install directly to the rail.

NOTE: the green lock and screw will be installed in the following step.

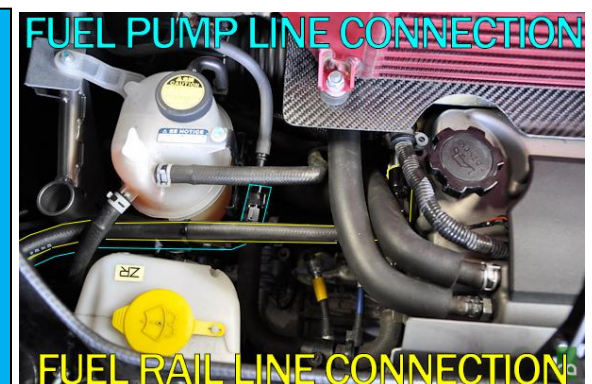


12. Lubricate the internal O-rings inside the SAE quick connect fittings. As shown, route the PTFE hoses between the coolant and washer fluid reservoirs.

Push the SAE adapter fitting from the longest PTFE hose onto the SAE male connection on the fuel rail. For aftermarket rails, install directly to the fuel rail.

Push the SAE adapter fitting from the shorter PTFE hose onto the SAE male connection from the OEM fuel pump line.

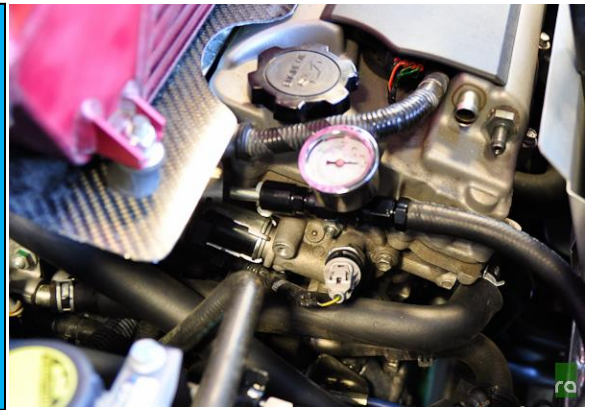
Install a green lock to each SAE adapter fitting using a 5/64" Allen wrench.



Optional Pressure Sensor/Gauge

Screw a 1/8" NPT fuel pressure sensor or gauge into the Radium Engineering 14-0148-06 fitting sold separately. Use Teflon paste on the threads being cautious to not get excess into the flow area of the fitting.

Install the gauge and fitting onto the fitting shown in the previous step. Attach the hose from the previous step to the other end of the gauge fitting.



13. Drill a 1" hole through the trunk wall into the engine bay on the right side of the trunk forward wall as shown.

This area can be accessed from inside the RH rear wheel well (as shown) or from inside the trunk on the right side.



14. Locate the shortest hose in the kit and the remaining rubber grommet. Slide the grommet around the 90 degree hose end and push the straight hose end through the drilled hole from the trunk side.

Route the hose through the engine bay and connect the straight hose end to the fuel return adapter fitting and tighten. Secure the hose away from chafe points and moving engine components.

Note: The 90 degree hose end will remain in the trunk.



15. Locate the two M6x1.0mm floor mounted bolts on the right side of the trunk. Using a 10mm socket, remove these bolts and washers.

Locate the fuel surge tank mounting bracket. Line up the floor holes and temporarily secure it to the trunk floor using the previous bolts/washers.

NOTE: This step is easiest to perform if the FST-R is NOT mounted to the bracket.



16. Eye up the bracket and scribe the inner wall through the hole on the upper left portion of the bracket and remove it from the trunk. Drill a ¼" hole through the wall into the rear right fender well. Note: Pending the accuracy of the hole drilled, it may need to be enlarged to be concentric with the FST bracket's mounting hole.

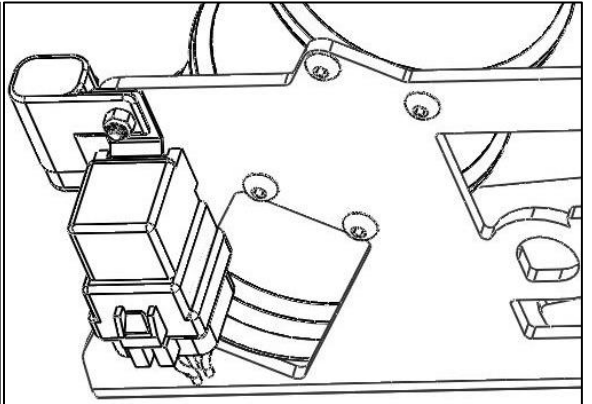
No more drilling is required. Now is a good time to vacuum out the fiberglass chips in the trunk area.



17. Using the four M6x1.0mm button head screws and some medium strength threadlocker, fasten the mounting bracket to the FST-R canister. Tighten using a 4mm Allen wrench.



18. Locate the main wiring harness and confirm there is a fuse in the fuse holder. Use the M5x0.8x16mm bolt and nut to secure the fuse and relay in place.



19. FUEL SURGE TANK P/N: 20-0933

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.

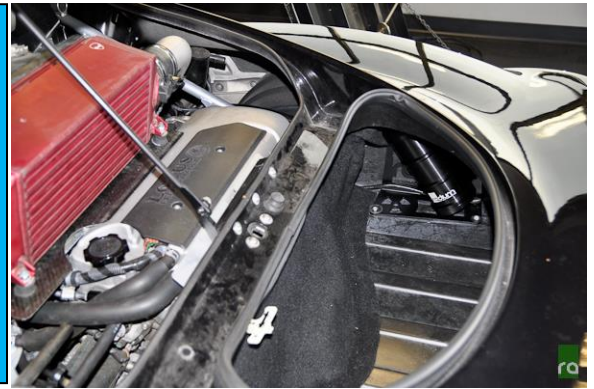
FUEL SURGE TANK P/Ns: 20-0129-00, 20-0129-01, 20-0130-00, 20-0130-01 20-0133-01, 20-0134-00, 20-0134-01, 20-0135-00, 20-0135-01, 20-0368-00

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.



20. Test fit the FST-R with the bracket in the trunk to ensure there are no fitment issues. The surge tank is now ready to be permanently installed in the vehicle. Use the factory trunk floor bolts and washers to fasten the surge tank and bracket in place.

Use the included M6x25mm screw, washer, and nut to secure the bracket to the vertical wall using the drilled hole from earlier steps.



21. Route the included main harness around the backside wall of the trunk near the taillights. Leave the 2 power and ground ring terminals on the floor near the battery location until it is ready to be reinstalled.

On the left side of the trunk wall, gently push the 1-pin connector through the factory rubber grommet, as shown. In the engine bay, plug the connector into the inertia switch jumper harness.

Secure all wires away from moving engine components and pinch points.

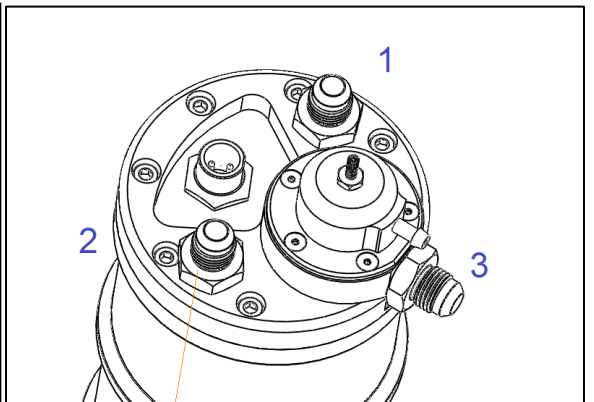


22. Using the diagram at right, connect the fuel hoses to the Radium FST-R.

Port 1: Output fuel overflow returning back to OEM tank via filler neck adapter.

Port 2: Input fuel supply from OEM fuel tank pump.

Port 3: Outlet high pressure fuel feed line to engine fuel rail.



23. Unscrew the bolt located in the front center of the trunk. Locate the included rubber cushioned clamp and zip ties. Route the two hoses through the rubber cushioned clamp. Screw the bolt back in being careful not to pinch the hoses.

Use the included zip ties to keep the hoses together on both sides of the rubber cushioned clamp.

Confirm that all plumbing connections are tight in the entire system.



24. Reinstall the battery and the 2 ring terminals from the main harness.

The FST-R must be filled before starting the engine. Cycle the ignition several times. Listen for the pump inside the FST-R to confirm the electrical. After 3-4 cycles, the fuel system should be fully primed.

When the vehicle is running, INSPECT ALL CONNECTIONS FOR LEAKS! Check that all hoses are clear of moving engine parts. Test-drive the vehicle and inspect again for fluid leaks. Care must be taken to avoid spilling fuel in the trunk area.



25. Use a gauge to adjust fuel pressure. Tighten the FST-R set screw on the top to increase pressure. Loosen the set screw to reduce pressure. OEM Lotus 2ZZ-GE fuel pressure is 3.25 Bar. Once fuel pressure is adjusted, lock set screw in place with the jam nut. NOTE: The extra gold orifice is ONLY required if fuel pressure cannot be dialed down to the desired target.

A vacuum hose connection to the regulator should NOT be used if attempting to mimic OEM Lotus fuel pressure.

INSTALLATION COMPLETE: 20-0006 FST KIT, TRUNK MOUNT

