



## 370z Road Race Fuel Pump

Standard Configuration: Surge Can Style with Single Walbro 255lph

### Installation Guide

Revision 5/19/2016

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## Section 1: Notice

Gasoline is extremely flammable and dangerous. Professional care needs to be taken to prevent fires and explosions while servicing the fuel tank. It is important to have as little fuel in the tank as possible before beginning the procedure.

Proper ventilation needs to be provided inside the vehicle while the fuel tank is open. Perform installation with both doors all the way open and the hatch open. Ideally, use a fan to ventilate the vehicle to reduce vapor inhalation.

A couple less obvious things that are highly recommended you have ready for the installation:

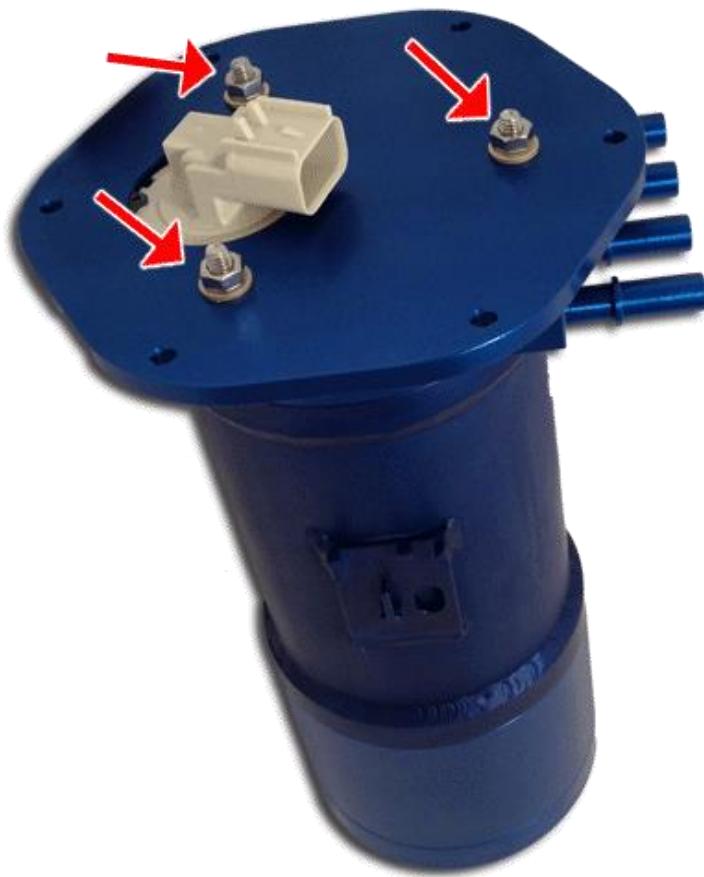
- Volt/Ohm Meter
- 1 Gallon of your preferred gasoline
- Sharpie, multiple colors
- Many rags and paper towels
- Plastic bags for nuts and bolts
- Flashlight
- Soldering Iron
- Ruler
- Thread Sealant (tape or paste)
- Basic Wiring Supplies

A small digital camera is very helpful because you can take photos inside the tank and then look at them to see if you achieved what you were trying to do inside there. It can be done with “feel” alone, but visual confirmation can help ensure that you will not have to go back into the tank. Of course, much care must be taken to not drop the camera or camera phone into the gasoline.

This installation guide will use images of pre-production components. Your final product will look different (better) and your hoses will not be blue in color. Overall form is the same, and installation technique is identical.

## Section 2: Product Preparation

The product ships mostly assembled. Take notice that there are 3 fasteners on the top side of the unit, and 4 on the bottom. It is not required to remove the bottom 4 bolts, and it is recommended that you do not. The product is constructed out of symmetrically fastened components, and it would be easy to put it back together without proper alignment or clocking. An exception would be to replace the internal pump, or to add a secondary fuel pump for higher power applications.



Take note of the orientation of the 4 hose barbs of the RRP manifold in relation to the level sensor mount and the electrical plug. Reference this photo later if you lose track of which way to put it back together.

Remove the 3 (10mm) nuts on the top of the unit. Remove the aluminum sealing washers and set them aside for later. You can now lift the tank flange off the assembly. Tolerances are machined tight and welded components can slightly warp, so it may occasionally be snug to get it to slide off the 3 studs. With the tank flange off, you can also remove the RRP manifold plate. This section is complete.

## Section 3: Vehicle Preparation

If you have not run the tank almost empty, it is important that you do this now. Drive the car until the tank is very close to empty.

Park the car somewhere with adequate ventilation and space for the doors to be fully open. If you can work on it outdoors, that is ideal.

Set the parking brake firmly.

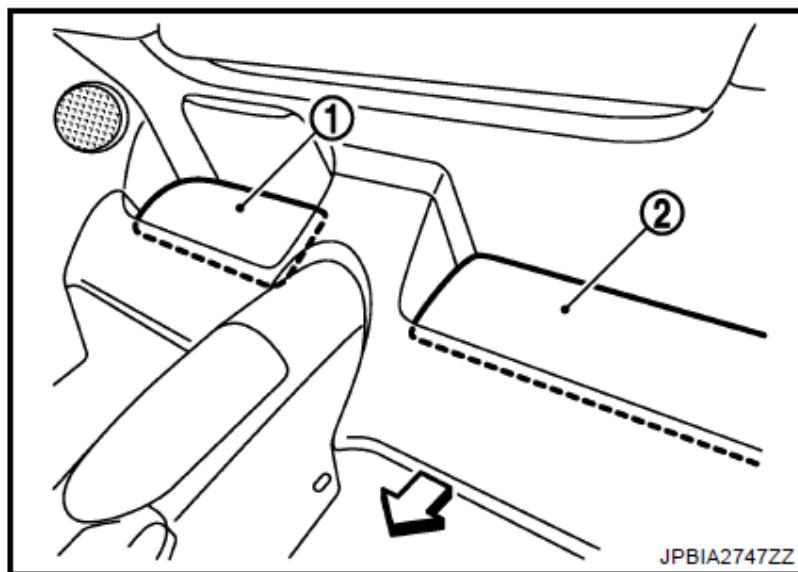
Open both windows all the way, open the doors all the way, and open the hatch.

Disconnect negative terminal of battery.

Remove both seats. Don't forget to unplug any connectors before lifting out. Protect your door sill areas from being scratched by the seat brackets.

Remove fuel filler gas cap and set aside.

Remove both rear parcel shelves.

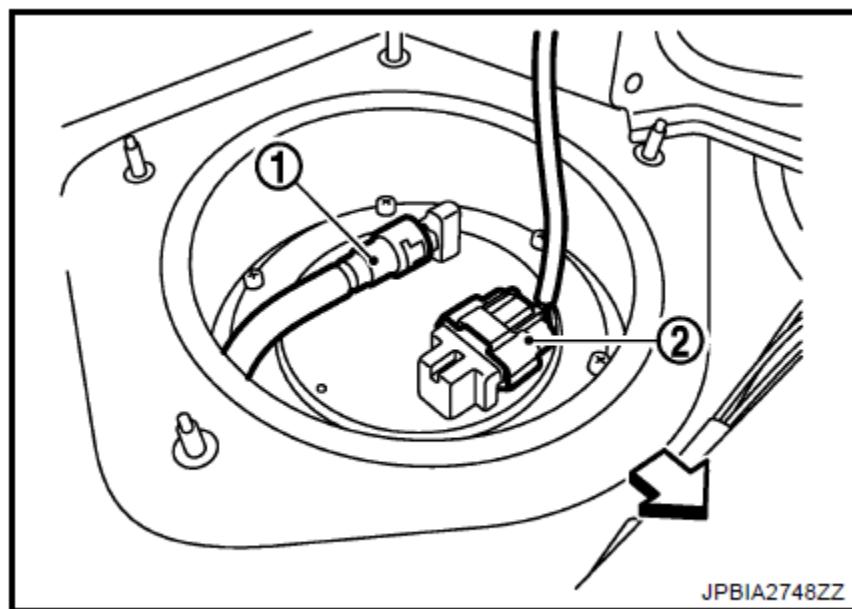


Expose the access panels by removing the sound deadening sheet found under the shelf on each side. You may wish mark them with a Sharpie to indicate forward direction and which side they are from. They are larger than they look like they are going to be, and if you want them back in just right you want alignment marks on them.

With the sound deadening sheets removed, unfasten the 4 (10mm) nuts securing each access panel. You may wish to put orientation marks on the panels before removing. Lift up the access panel enough to reach in and unplug the connector on each side. Pull the

wiring grommet and connector through the panels so that you can completely remove them from the vehicle to set aside.

On the passenger side you will find the factory fuel pump output connector (**1 below**). Dress the area with rags or paper towels in preparation for the fuel that is going to leak out. It is recommended to protect the black undercoating on your fuel tank from the gasoline. While it is not very important in this location, gasoline will remove the coating right away. You will also want to have rags surrounding the top of the fitting when you disconnect it, or it may spray at you or your interior. There will not be very much fuel loss from this disconnect, but if the fuel system still has pressure, it will have a very momentary blast of pressure and then a residual drip.



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Use your right hand to pinch in the 2 tabs on the connector. Use your left hand to:

1. Hold a rag over top of the fitting and your right hand to protect your face from a blast.
2. Push the connector in just a little bit to help the tabs release.
3. Then pull away, to disconnect while your right hand is pinching the tabs.
4. Squeeze rag tightly around the fitting area to absorb residual fuel leakage.

Get as much fuel out of the hose/fitting as you can and then zip tie a rag and plastic baggie around it to prevent further leakage.

Tuck the hose out of the way.

Reference the next photograph before going any further. This way you are prepared for the next set of procedures.

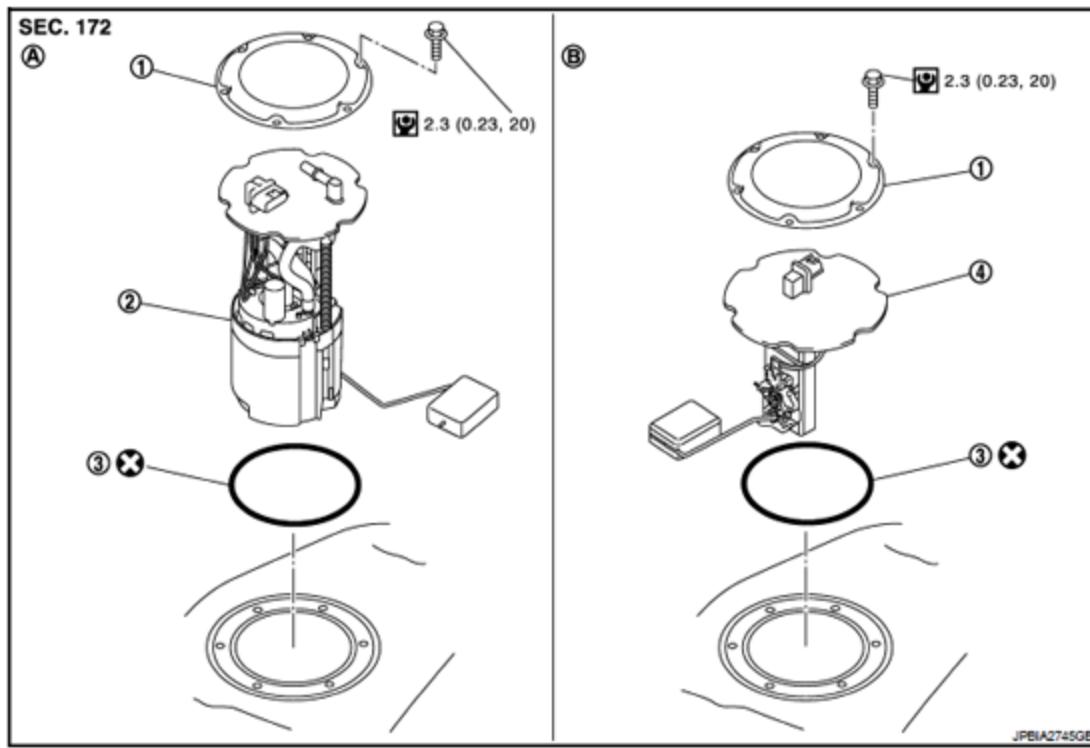


Illustration A (**above**) is the passenger side. Note the components:

1. Retainer Ring
2. Fuel Pump Assembly (integrated level sensor, filter, regulator, and pump)
3. O-Ring

Illustration B (**above**) is the driver side.

1. Retainer Ring
2. Sub Level Sensor Assembly
3. O-Ring

First and foremost, you need to know that the O-rings should not make much direct contact with gasoline. Nissan has used a rubber that can swell with gratuitous gasoline contact, and it can become difficult to reuse these O-rings if you let them swell. So it is a goal to get them out of the area as soon as possible.

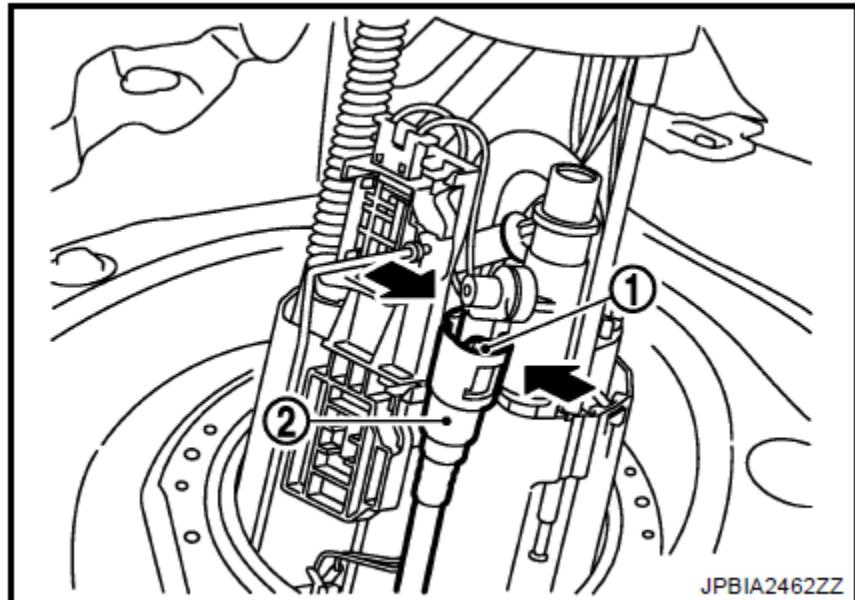
Start on the driver side because it is easier and you will see how it works before going to the other side. Draw a forward arrow on the retainer ring, and on the top of the assembly. Remove the 6 (8mm) bolts holding on the retainer ring. Lift up the assembly gently and attempt to determine if the O-ring is stuck to the bottom side of the assembly, or if it is where it belongs in the O-ring groove of the fuel tank opening. Just make sure it doesn't drop into the tank or touch the level sensor if it's still wet with fuel.

Navigate the sub assembly all the way out of the tank without breaking the level sensor and set it aside.

Move on to the passenger side. Draw a forward facing arrow on both the retainer ring and the main assembly. This is where it becomes different than the other side. The main assembly is spring loaded and trying to push up. So you will want to just remove 4 of the (8mm) bolts and leave 2 opposing side bolts installed. Use one hand to hold downward pressure on the retainer ring (not much, it's not a very strong spring at all). While pressing down, use your available hand to remove the remaining 2 (8mm) bolts and then let the assembly decompress. It will probably rise about a half inch to an inch, or maybe it's seized and doesn't rise at all.

Read the entire highlighted area below \*before\* beginning the steps inside it.

Set aside the retainer ring and gently raise the main assembly just a couple inches. Locate the O-ring seal. Beware of dripping fuel as you move forward and don't let it get wet. Notice the hose connection illustrated below.



This hose connection is like the one atop the unit that you already disconnected. This one will NOT have any pressure in it, so feel free to just remove it. While lifting this assembly, it is a tight fit and will be snagging on the opening of the gas tank. At the same time, there is another level sensor float on this assembly, and it may snag on things. Do NOT use any force when lifting and removing this unit. You will risk damaging the level sensor.

Cover the pathway out of the vehicle with towels before removing, as this unit will be dripping fuel the entire way out. Excellent work, this section is complete.

## Section 4: Tank Preparation

Become familiar with the layout of the gas tank before moving forward.



This photograph displays a demonstration cut-open fuel tank that will be used from here forward to demonstrate the installation. You will not be able to see very well into the 2 openings you have access to, so these photos will help you see what you are working with.

The interior of the fuel tank has 3 baffles inside of it. Each opening of the tank has a vertical baffle just behind it. The 3<sup>rd</sup> baffle is horizontal across the front side of the tank and ends just before each tank opening. The vertical baffles are poorly secured by a couple spot welds at their top. They will not require any attention for the installation. The front baffle will require modification.



This photograph is displaying the **passenger** side of the fuel tank, looking in from the cutaway in the demonstration tank. Recognize the following objects:

- Circular passenger-side tank opening at the top.
- In-tank siphon hose which you disconnected from the main assembly.
- Vertical baffle just behind the tank opening.
- Front baffle (left baffle in photo).

What cannot be seen in this photograph is that the in-tank siphon hose is connected to a metal pipe just behind the front baffle.



This photograph is displaying the **driver** side of the fuel tank, looking in from the cutaway in the demonstration tank. Recognize the following objects:

- In-tank siphon pipe on the floor of the tank.
- Vertical baffle just behind the tank opening.
- Front baffle (right baffle in photo).

We can now begin to prepare the fuel tank for installation.

The front baffle requires modification in order for the sub level sensor float arm to maintain full swing and proper fuel level gauge readings in its new location.

Additionally, 3 hoses will be used to transfer fuel between the main pump assembly and the new sub assembly (CJM Road Race Fuel Pump). The stock in-tank siphon hose/pipe will remain untouched, but it will be reconnected as it was. The 3 additional hoses will follow the stock in-tank pipe across the front of the tank.

Use pliers to bend away the \*driver side\* of the front baffle. See the following photographs.



It is required to bend very generously in this area. The next photo skips ahead a little just to demonstrate the purpose behind bending this. The factory sub level assembly hangs the level sensor in the center of the tank opening. The CJM Road Race Fuel Pump sub assembly positions the sensor to the front side of the opening, causing interference with the front baffle.



The photo above shows the final assembly with the float in the highest position. If the baffle were not bent, the float would hit it, and the gauge would not read correctly.

This front baffle in the tank is almost pointless. Do not feel bad, bend it clear and far out of the way, there will be no side effects. Make sure that when you bend it, you are bending the slack towards the REAR of the vehicle, because the hoses will run in front of the front baffle and you do not want to block the passage. Later on, you will confirm that the baffle is bent enough.

Study and prepare the provided RRP 3-hose assembly for installation to the fuel tank.

Each in-tank hose in the group is about 4' of solid Nylon hose that transitions to several inches of Gates Submersible soft-line. The soft-line ends are open, and the Nylon ends have Quick-Disconnect fittings pre-installed. The Quick-Disconnect ends will interface with the RRP manifold on the driver-side of the fuel tank, leaving the soft ends to interface with the factory fuel pump module on the passenger side of the tank.

Assign each of the 3 hoses identification at both ends. You can temporarily use zip-ties, or colored tape, or Sharpie. You want to indicate each hose at both of its ends as hose #1, #2, and #3. Each hose is constructed the same, so it does not matter which one is assigned which number.

The purpose of the number assignment is so that you don't lose track of which hose is which once they are installed into the fuel tank.

**Hose #1:** This hose will be a medium pressure line connecting the factory fuel pump output to the RRP inlet port. This is how the factory fuel pump fills the RRP canister.

**Hose #2:** This hose will be a high pressure line connecting the RRP's internal Walbro 255lph fuel pump to the fuel filter inlet on the factory fuel pump module.

**Hose #3:** This will be a low or zero pressure overflow hose. This is used so that surplus fuel in the RRP canister can overflow back to the factory fuel pump module to assist in preventing the factory pump from starving to begin with, thus improving its lifespan.

Before the next step, you might consider using masking tape to cover over the sharp edges of the circle fuel tank openings to protect the hoses.

Route all 3 hoses across the fuel tank. They must be routed in FRONT of the front baffle, alongside the OEM siphon pipe. The soft ends should be on the passenger side, and the 90 degree quick-disconnect ends on the driver's side.

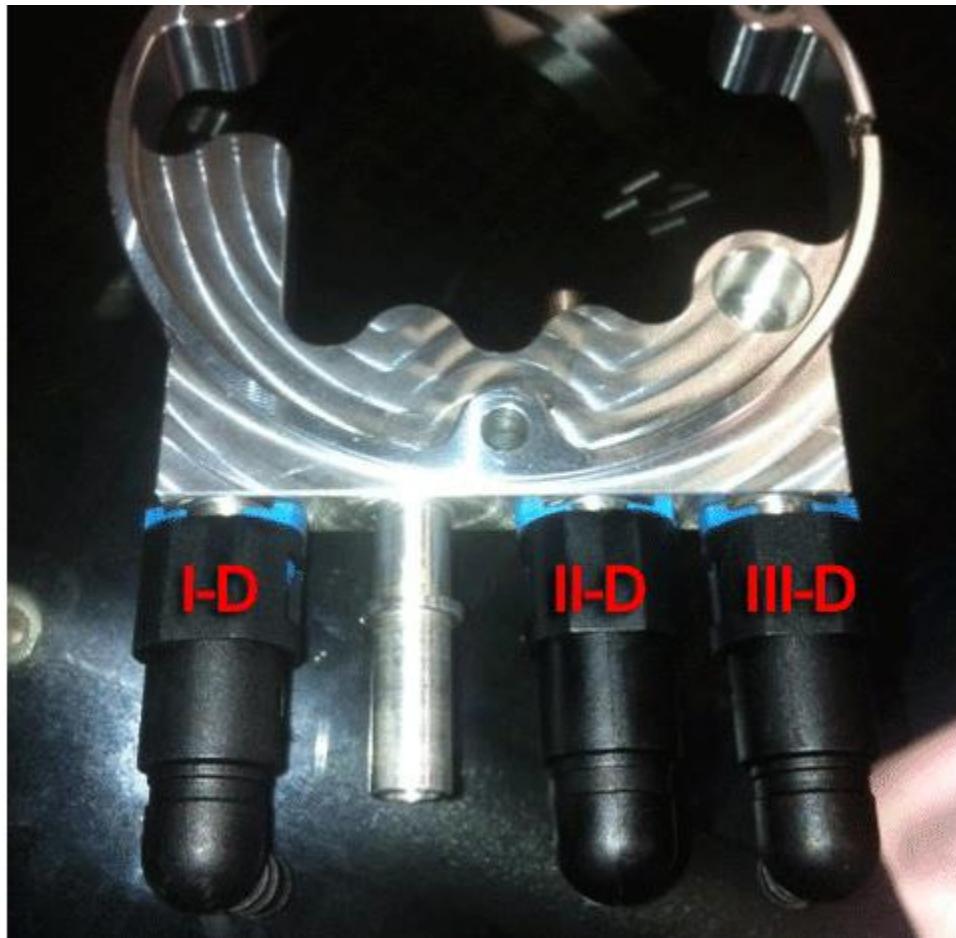
You will need to take a lot of care to not damage/cut the hoses on the sharp edges of the fuel tank. The Nylon hoses are easy to cut and difficult to repair, so you really want to be careful with them. If you accidentally kink a Nylon hose from bending during navigation into the tank, fear not. The kink will later work itself out during operation as the fuel heats up and the Nylon becomes warm and pliable.

Use supplied cable ties on the driver-side at locations shown. Do not tighten the cable ties just yet, keep them loose enough to just guide the hoses.



Install just the RRP manifold spacer into the driver-side of the tank, making the hose connections as shown below. Make sure you do not have the manifold upside-down when making the hose connections.

Use gasoline or oil to lubricate the male fittings on the manifold before inserting the quick-disconnect fittings. This is to prevent tearing of the o-rings inside the 90 degree fittings.



With the connections all secured, hold the manifold near its installed position as shown below. While in this position, you can set and adjust the hose slack on this side of the tank. Have each of the 3 hoses aiming forward and downward, and towards the front of the tank enough to not interfere with the RRP canister that will stand vertical and concentric with the tank opening once later installed.

Determine any final adjustments to slack, tighten the cable ties, and cut off the extra cable tie slack.



Leave the manifold installed and hose connections completed on the driver-side, there is no need to remove it. Set the manifold to the side in the fuel tank.

Secure the hoses on the passenger side with a cable tie securing the hose to the location as shown below.



Adjust the cable tie so that the hoses are not dangling around, but it doesn't need to be super tight. Cut off the extra slack from the cable tie. There are extra cable ties provided to secure the hoses as you see fit.

This section is complete.

## Section 5: Main Sending Unit Preparation

Turn your attention to the factory fuel sending unit. Take note of the wiring connections. These will remain unchanged but you may find it easier to remove some of the connections to perform the work. Take photos of which wire connects to where so that you do not forget.

Remove the retaining clip holding the top plate to the fuel pump assembly. It will require a pair of small tools to pry it outward on both sides.



Set aside the retaining clip, and the spring and spacer. Be careful not to misplace, they are important.



Remove the surge canister from the fuel pump assembly by spreading the pair of locks apart on either side of the assembly while gently pulling the canister off. It may require a little bit of rocking the canister while pulling on it. Be very careful not to break off the tabs for the locks.



Cut the hose leading from the fuel pump output to the filter assembly inlet.



Release the pump from the assembly by pressing the two tabs circled in red and rotating it free. It can now be dropped out the bottom of the filter housing.



Remove the remainder of the fuel pump hose by using a blade to split open the hose along the barbed output of the fuel filter inlet. Once its split open vertically along the entire barbed fitting it will come off easily. Remove this from the fuel pump as well.



Inside the fuel pump bore, use a blade to cut the 3 attachment points for the OEM fuel pump retainer ring. Use a file to file the 3 areas smooth. The result should look like this picture.



Locate the 3 provided pre-cut short hoses.

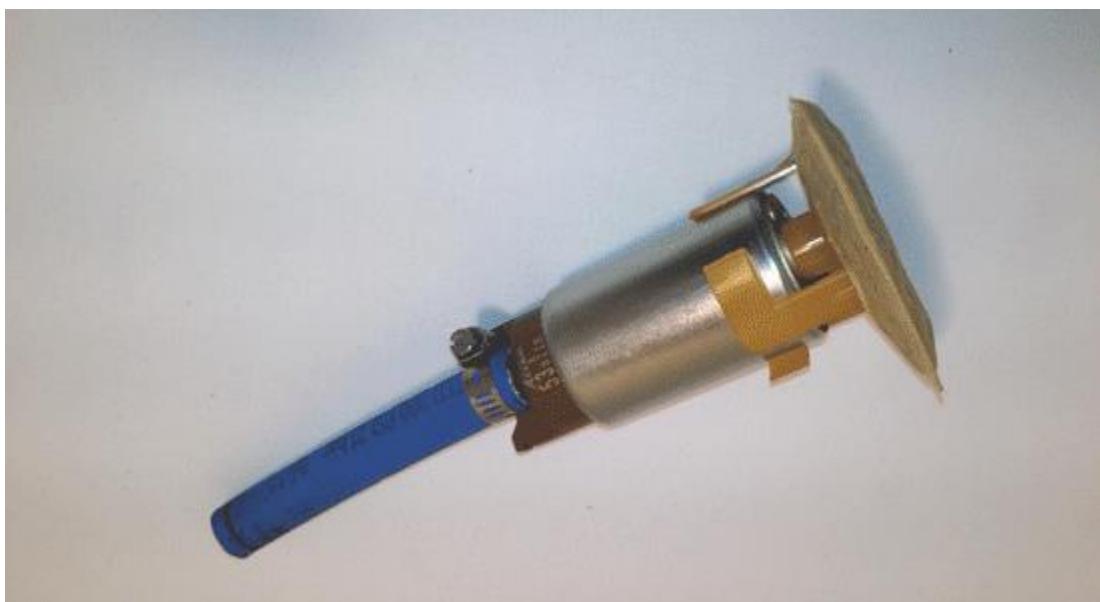
Hose 1: ~4.00"

Hose 2: ~2.50"

Hose 3: ~2.75"

Mark each hose with identification numbers 1-3 respectively.

Install Hose 1 to the fuel pump with the clamp in the position as shown.



Put the surge canister and pump and filter housing back together.



Reinstall the retaining clip, spring, spacer, etc.

Install the fuel pump support clamp and remaining hoses and brass 90 degree fittings as shown. Hose 3 does not connect to anything; just tie it to hose 1 to support it.



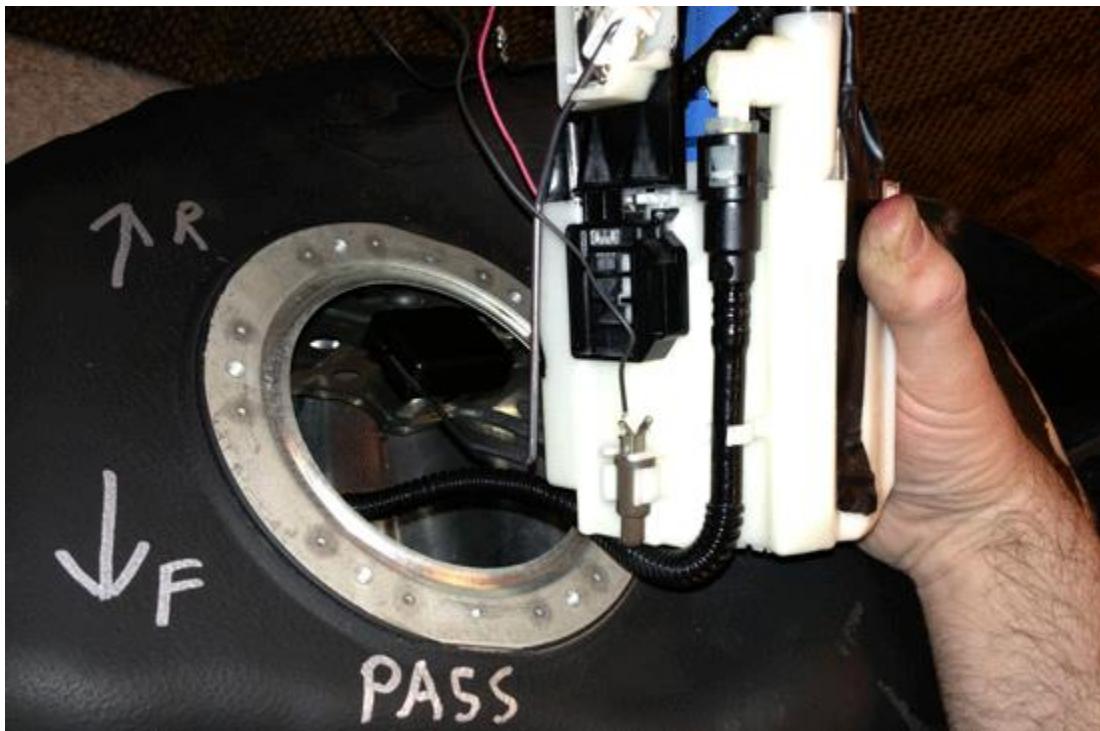
Double check all clamps are snug, wiring is connected, level sensor installed, and this section is complete.

## Section 6: Installation

### [Begin Hard Part]

Cable tie together all 3 hoses on the passenger side roughly 6" from the end. Tie a string to the ends of the soft hoses and route the string outside the fuel tank. You will use this string to pull the hoses towards you once the fuel pump module is halfway in.

Install the stock fuel pump sending unit back into the tank. Remember to first pull out and connect the factory siphon hose end. Don't forget that when you go into the tank with it, the level sensor will be on the back side of the assembly, facing the rear of the car, with the float arm reaching towards the center of the car.



Lower the module into the tank just until the brass fittings are about level with the opening. Use the string to bring the soft-line hose ends up to you.

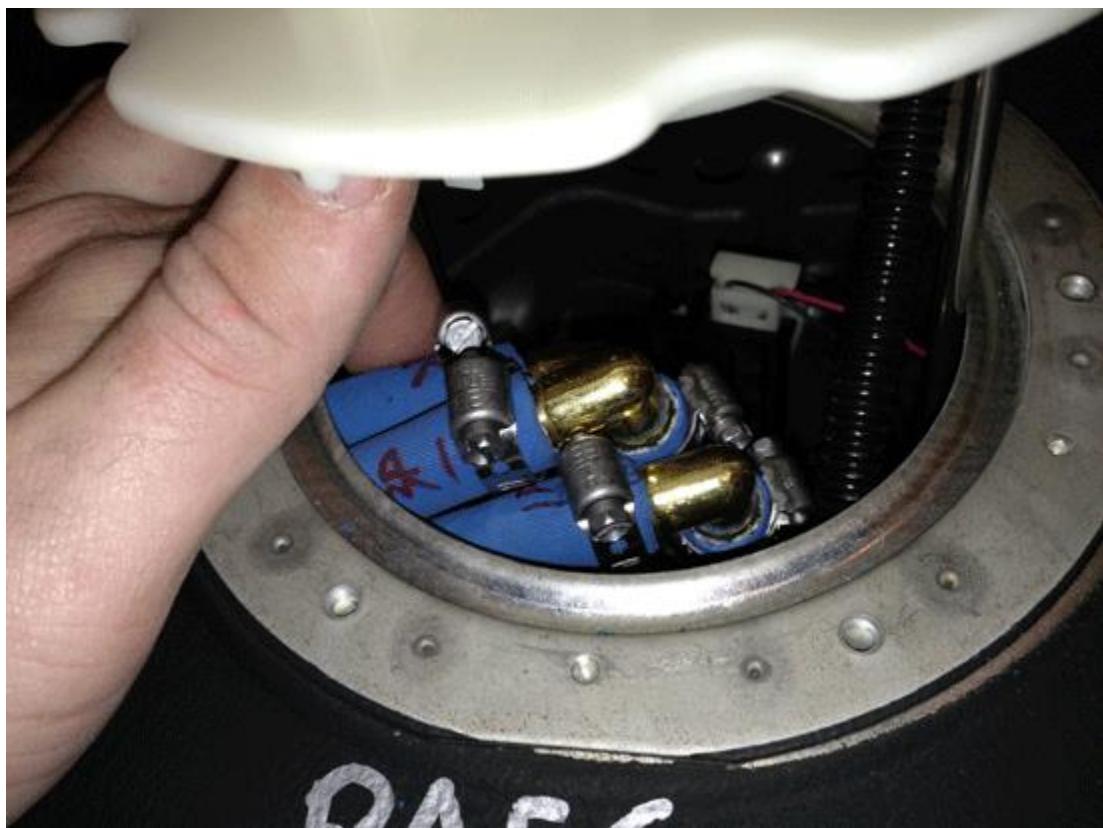


You need to connect them to their respective hose on the fuel pump assembly. DON'T FORGET to slide the hose clamps on the soft-lines first; it is hard to remove the hoses again to put them on if you do. It is also recommended to lubricate the brass barbs with engine oil or gasoline so that it's easier to push the hoses on.

It is recommended to put the clamp on each hose one at a time just before you push it on the 90 fitting, so you do not drop a clamp into the tank, which would be difficult to fish out at this point.

Put them on in whatever order works best for you.





This last photo represents your final goal. You won't be able to see this from outside the tank, but it might help if you knew what you were going for.



At this point, replace the tank sealing o-ring by going over the top of the sending unit flange and place it into its groove on the tank where it came from. Lower the assembly all the way, and reinstall the retainer ring and bolts. You may plug in the electrical connector and reassemble this area as you see fit.

Don't forget to connect the fuel line back on the top of the assembly.

This side is complete.

**[END HARD PART]**

Remove the level sensor from the sub assembly and cut off the terminals that are connected to the tank flange. Leave 1" of wire with the terminals just in case you ever need to go back. Extend the level sensor wires with the provided fuel safe wire, heat shrink, and crimp on 2 of the provided terminals to the end.

Now you can double check your sub level sensor resistance sweep, and check for baffle interference.

Use painter's tape or similar to tape the level sensor to a paint mixing stick or ruler. Make sure it is straight up and down, and then measure and mark a point 3.25" above the lock point. Tape it in a way that doesn't interfere with the level sensor motion.



Use this assembly you have created to test the sensor sweep. The purpose here is to simulate the installed position of the level sensor when its attached to the RRP, and swing its arm up and down to make sure it does not make contact with the baffle.



Move the float up and down in its travel and make sure it is not contacting the baffle or the hoses. Make sure it is plenty of space all around, since it may be in a slightly different position at final installation than it is while you are holding it here. This is just a rough estimate to give you an idea. Rotate it a few degrees counter-clockwise from straight forward and check it again. Be aggressive about giving it space to swing.

With that done, you can take the level sensor off the test stick.

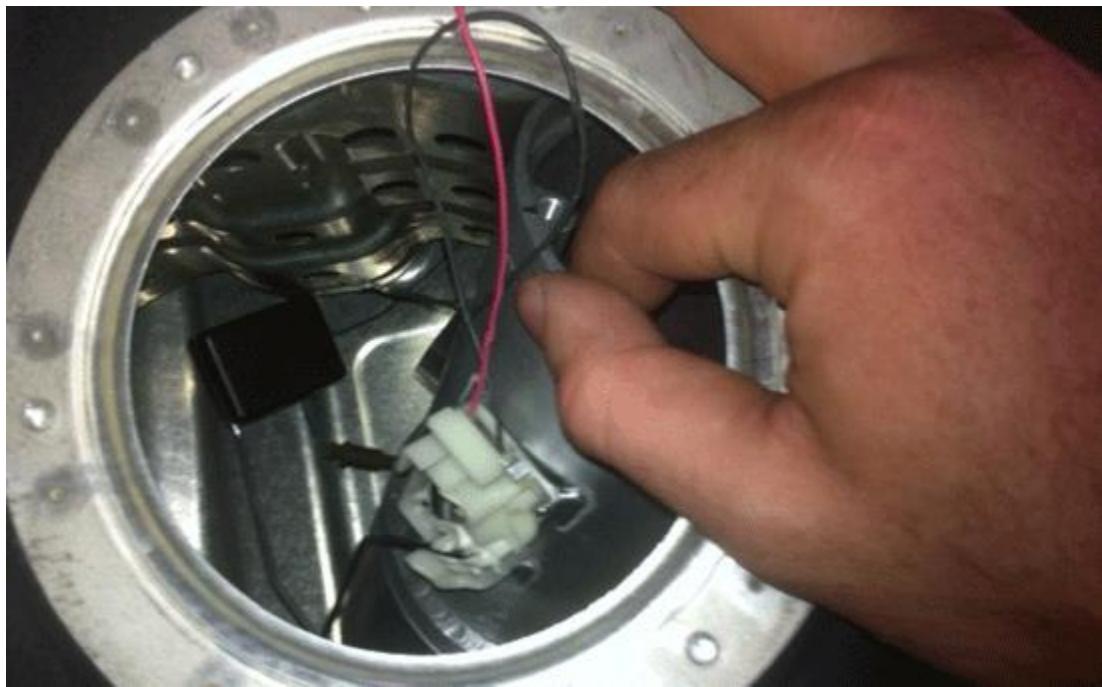
Before proceeding, test the OHMs of the level sensor at the full (top) position, and at the bottom, and write down your specs. You should find that the resistance measured in ohms is about  $3.0 \Omega$  at the full position (top) and about  $41 \Omega$  at the empty position.

Now test fit the level sensor to its mount on the RRP to make sure it fits well. There is some inconsistency in these sensors and some are tighter than others. If there is any filing or tweaking to do to make it easier to install, you want to figure that out now before putting the RRP into the tank.

Remove the 3 studs from the top of the RRP canister, and install the surge canister into the tank and hold it at an angle like shown.

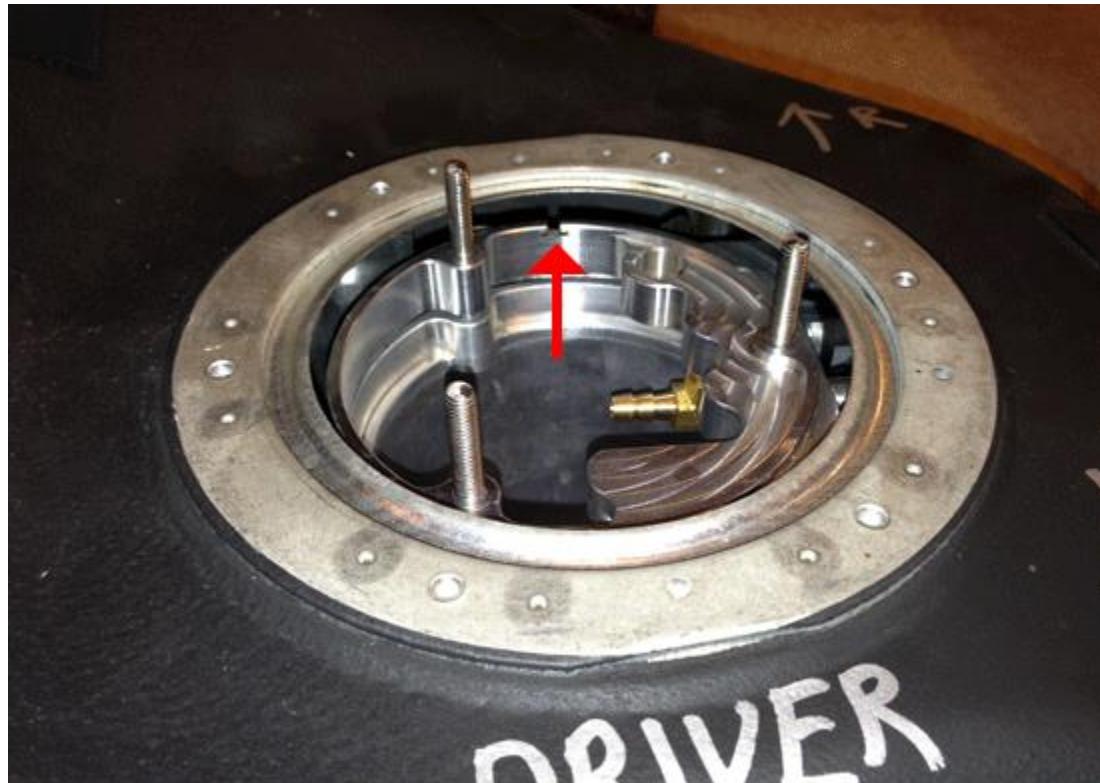


Sneak the level sensor in there and install it fully. Make sure the snap locks in.



Stand up the surge can upright, and rotate it so that the level sensor mount is facing directly forward, and the float arm is swinging towards the inside of the car.

Now lean the top of the surge can to the right, and reach in for the manifold and bring it up around top of the surge can, and hold it in place by threading in 1 or 2 studs, while bringing the level sensor wires into the canister through the wire notch shown by the red arrow. Finish installing all 3 studs.

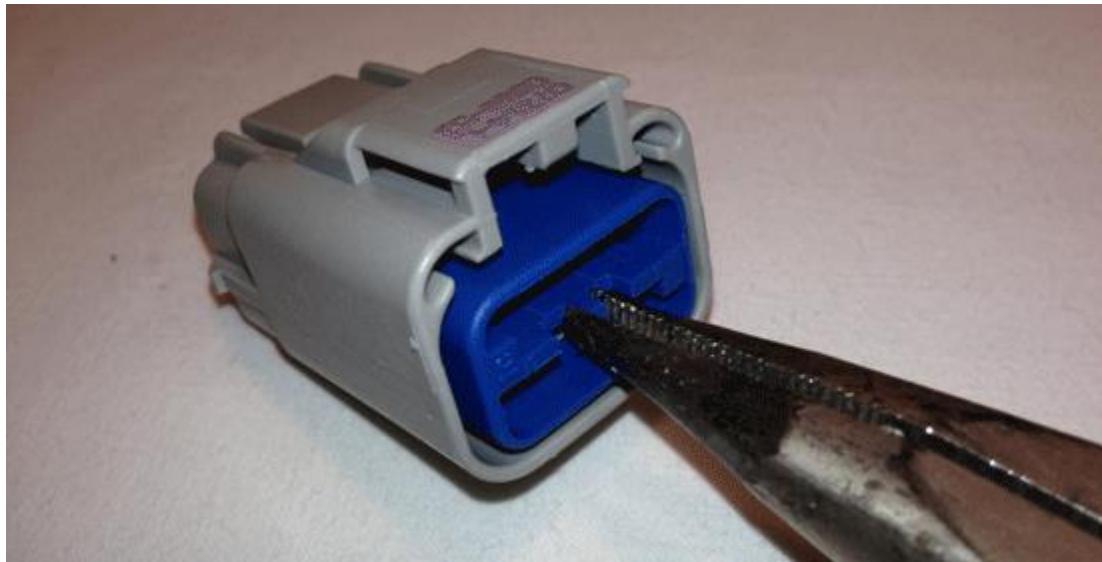


The level sensor mount should be facing the front of the car, swing arm swinging towards the middle of the car, and manifold quick-disconnect fittings facing the outside of the car, with all 3 in-tank hoses connected to the manifold in their respective positions.

You may now connect the RRP's fuel pump hose inside the canister to the brass barbed fitting on the inside of the RRP manifold. Loosen the pre-installed clamp, make the hose connection, then tighten the clamp again.

Remove the inside tank connector from the bottom side of the surge canister tank flange.

Use needle nose pliers and remove the blue terminal lock.



Insert all 4 wires from inside the RRP into any 4 of the six available terminal positions.



Push them in all the way until you get a click. Reinsert the blue terminal lock.

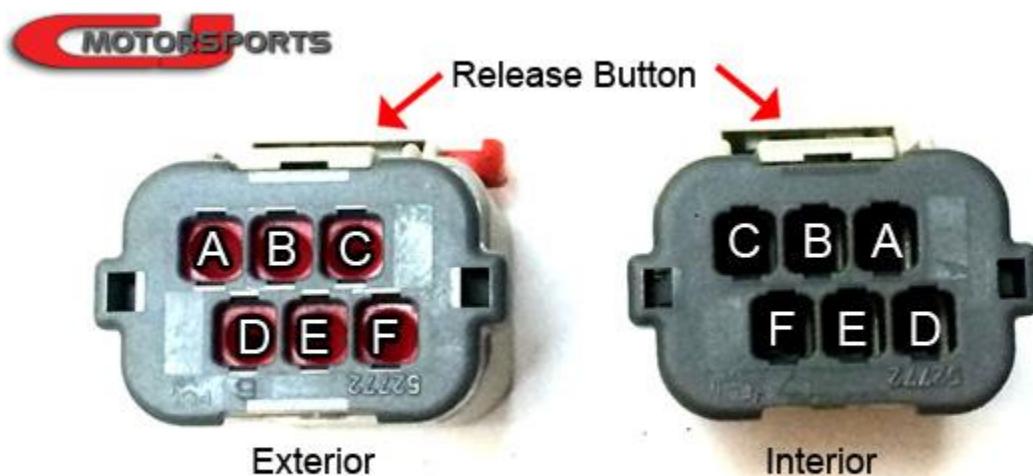
Now construct yourself a simple wiring chart based on the terminal positions you chose for each of the 4 interior wires. Circle the terminal position letter that you used for each wire, as indicated by the "INTERIOR" (right side) position chart shown in the following image.

FUEL PUMP + (RED): C B A F E D

FUEL PUMP - (BLACK): C B A F E D

LEVEL SENSOR + (RED): C B A F E D

LEVEL SENSOR - (BLACK): C B A F E D



CJM Fuel Pump Connector: Terminal Position Relationships

With your pin-out complete, you can install the tank flange.

Place the gas tank sealing o-ring in its groove on the tank, and then plug in the interior connector to the bottom of the tank flange.

Tuck all the wire slack down into the canister. Align the tank flange over the 3 studs and lower it down. Perhaps double check your gas tank o-ring just before you lower it completely.

Thread on the 3 (10mm) nuts with washers just finger tight.



Install the 6 supplied (8mm) tank flange bolts with washers. **Do not leave out the washers, they are important.**



Gradually turn each of the 3 (10mm) nuts half a turn, until the surge can is seated and the nuts are tight. Gradually turn each of the 6 (8mm) bolts until they are tight. Do not over-tighten these.

Lastly, one at a time:

- Remove one of the 10mm nuts
- Apply thread sealant to the threads where the nut belongs
- Reinstall the nut and tighten.

While the aluminum washer seals the bottom of the nut, the thread sealant is required to prevent gasoline inside the can from wicking up the threads and seeping on the exterior of the fuel tank flange.

This section is complete.

## Section 7: Relay and Wiring Notes

Cut off the plug for the sub level sensor and leave an inch of wiring with it. Store it away in a safe place just in case you ever return to stock.

Crimp a supplied terminal to each level sensor wire. Remove the blue terminal lock from the outside tank connector and insert the 2 level sensor terminals into the corresponding terminal positions indicated by your pin-out. Polarity shouldn't matter with the level sensor. Now only the RRP internal pump needs to be wired.

Determine a location to mount the relay which is not only close to the RRP, but close to a suitable metal chassis ground.

The wiring & relay kit will come with its own instructions. But some extra guidelines are provided below:

(Please note that wire colors are subject to change in the wiring kit due to it being manufactured by external suppliers.)

The kit will have 4 wires:

Black (short): By providing 12v power to this wire, the relay is activated to turn on the RRP. You should splice this wire into the positive wire for the stock fuel pump so the RRP turns on when the stock fuel pump turns on.

Yellow (short): This wire provides power to the RRP. You will connect it to the corresponding exterior RRP connector terminal letter that your positive RRP fuel pump wire is connected to on the interior.

White with Black extension: Relay ground. This wire needs to be attached to a metal chassis ground point so that the relay is able to function.

Blue with Red extension and Fuse: Battery power supply. This wire needs to connect to a quality source of power for the RRP fuel pump. You can run this all the way to the battery (+) terminal or connect it in to any high amperage circuit you find suitable.

Mount the relay, and if the relay is mounted to a chassis ground, you may include the relay ground wire (white with black extension) to the mounting screw. If the relay isn't mounted to a ground point, attach the ground wire to a suitable near-by ground point. Trim the relay ground wire to appropriate length before grounding.

Use the cut-off section of relay ground wire to ground the RRP fuel pump. Crimp a provided terminal to an end and insert into the RRP exterior connector in the terminal position corresponding to your RRP Fuel Pump ground. Connect the other end of this wire to the chassis ground after routing through the access panel grommet.

The yellow wire will be the (+) for the fuel pump. Run this wire through the wiring grommet and to the new connector. Extend as required or cut it to length and crimp on a terminal and insert it into the connector into the corresponding pump (+) position indicated by your pin-out chart.

Reinstall the terminal lock, and plug the outside connector into the surge can.

The short black wire is the switched power for the relay. Run this wire to the passenger side fuel pump area. You will splice it into the stock fuel pump (+) wire. This wire should be terminal #1 of the fuel pump connector, the heavier gauge wire on one end of the 5-pin connector. This will trigger the surge can to activate any time the stock fuel pump activates. This wire will likely need to be extended to reach.

Lastly you will run the large blue with red extension wire from the relay socket to the battery (+) or a suitable power source if you have added one to your vehicle (such as a stereo amp cable). If the cable needs to be shortened, be sure to re-integrate the inline fuse to the circuit, very close to the spliced power source.

You can now connect the negative battery terminal.

Wiring is complete.

## Section 8: Final Notes

Add a gallon of fuel and close the gas cap.

Start the engine and check for any leaks. It may take a couple tries for the engine to start as the fuel system and surge canister prime. If it takes more than a couple tries, begin to consider what may be incorrect.

DO NOT drive the vehicle before reinstalling the seats.

Reinstall the various interior when you are comfortable that the system is correctly installed and confident that you will not have to go back into the fuel tank.

Drive the vehicle at least a few miles before filling the tank. Go in circles and stay close to your service location. After you are more confident in a correct installation, fill the tank completely and check for correct level sensor function. If the fuel level gauge does not reach the top when you have filled the tank, check the resistance of the level sensor on the driver's side and it should be around  $3\ \Omega$  with a full tank. Make sure the outside tank connector is UNPLUGGED while checking the resistance of the 2 level sensor pins.