6-XXX-20FST
2.0 Liter Staged Fuel Cell Surge Tank Installation Guide

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Included Parts List:

- 2.0 FST Top Hat Assembly
- 2 Liter Surge Tank Assembly
- 1 6-Bolt Fuel filler Block-off Plate
- 1 6-Bolt Gasket
- 1 5-Bolt Fuel Level Block Off Plate
- 1 5-Bolt Gasket
- 2 Fuel Pump Delete Plugs
- 4 39mm Pump Adapter Sleeves
- 3 -6 AN ORB Plugs
- 1 -8 AN ORB 90° to ½ Inch Hose Barb Fitting
- 2 5inch (125mm) Support Rods
- -8 AN ORB to ½ Inch Hose Barb
- -6 ORB AN 90° to 3/8 Hose Barb
- 24 PTFE Washers
- 24 ¼x28x1inch Mounting Bolts
- 1 2.0FST Mounting Gasket
- 4 Pre-filters for 39mm Pumps
- 8 14-Gauge Ring Terminals
- 6 12-Gauge Ring Terminals
- 1 1/2x12 Inch Hose
- 3 Clamps for ½ Inch Hose
- 1 3/8x6 Inch Hose
- 3 Clamps for 3/8 Hose
- 1 5/16-3/8x4 Inch Hose
- 2 5/16 Clamps

Note: Picture of all parts included (Minus surge tank, top hat assembly, mounting gasket, and mounting bolts)

Optional Parts Not Included:

- -8 AN ORB Roll Over Valve PN: **6-02-0741-B**
- 6 Bolt Straight Filler Neck w/Cap PN**: 6-03-FST-STRAIGHT**
- 6 Bolt 45° Filler Neck w/Cap PN: **6-03-FST-ANGLE**
- 125mm Standard Support Rod **(For Reference Only)**
- 255mm Support Rods PN**: 6-03-FST-EXT2**
- DW100 Fuel Pump and Install Kit: **9-101-1000**
- DW200 Fuel Pump and Install Kit: **9-201-1000**
- DW300 Fuel Pump and Install Kit: **9-301-1000**
- DW400 Fuel Pump and Install Kit: **9-401-1001**

Note: All optional parts shown minus pump kits.

Suggested Tools

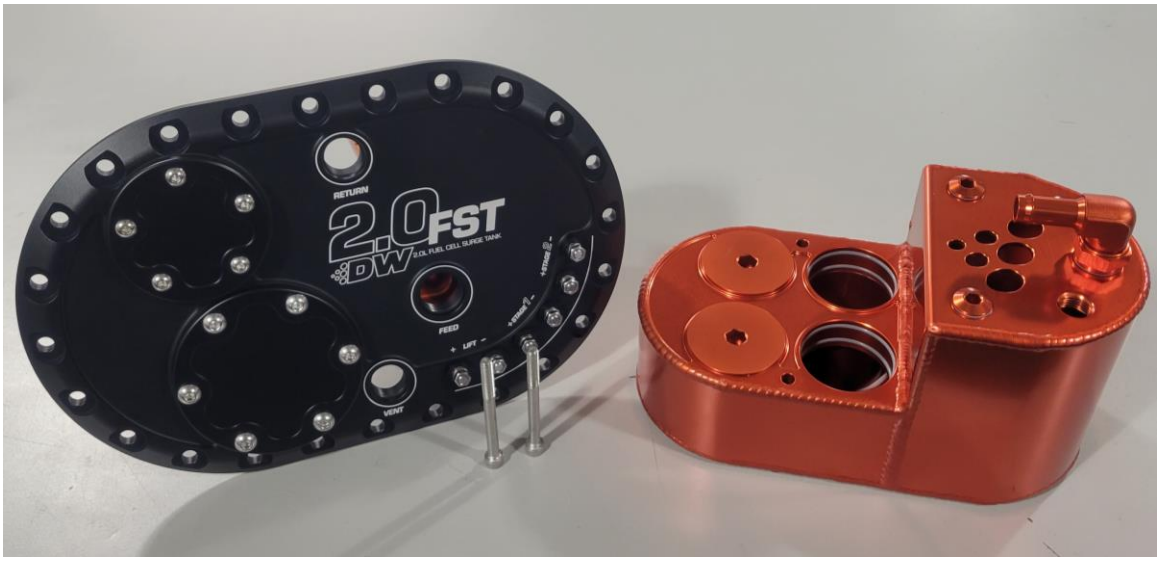
- Wire Stripper and Crimper Tool
- Rubber Hose Cutter
- Screwdriver (Flathead)
- 3/8” Allen Wrench
- 1/4” Allen Wrench
- 3/16” Allen Wrench
- 5/32” Allen Wrench
- 1/8” Allen Wrench
- 5mm Allen Wrench
- Tape Measure or Ruler
- A set of wrenches or AN Tools (6-02-1009)
- 5/16” socket or wrench
- Pair of Side Cutters, Flat Cutters, or Hose Crimp Tool

Assembly for Reference

Disassembly and Prep for Install

1 – Remove the 2.0FST from the box and make sure all parts are accounted for. Page 2 has a list of all included parts. Some may be bolted to the 2.0FST. To Install the pumps, we will need to remove the surge tank assembly. Remove the mounting bolts with a 5mm Allen wrench.

2 – Here is the surge tank and the top hat assembly disassembled. You do not have to remove the support rods for install. Place the surge tank mounting bolts to the side in a container for safe keeping as those will not be needed until the last couple steps.



39mm Pump Installation (DW100, DW200, DW300)

3a – The following steps will involve installing the 39mm pumps into the surge tank assembly. Move the top hat and any additional parts to the side. Then grab your DW100/200/300 pump kits for install.

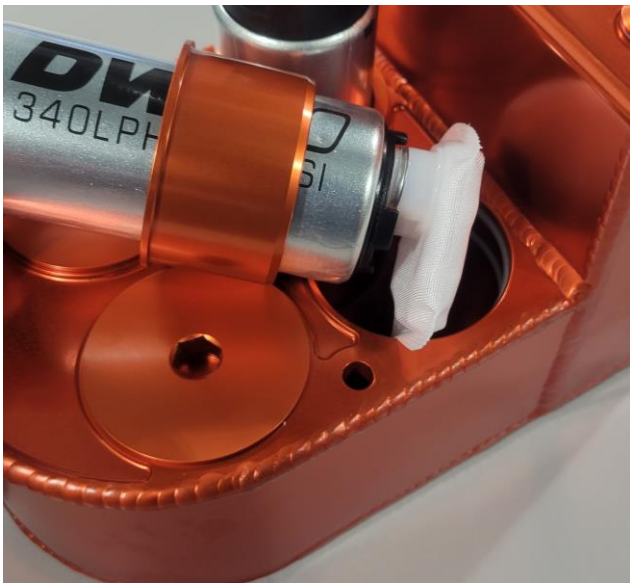
4a – Remove the pump and install kit from the box. It's best to do this one at a time to avoid losing parts. You will be replacing the filter sock that is in that kit with one that comes supplied with the 2.0FST. Please keep the wiring, hose, and clamps handy as we will use that later. For now, you can set those aside.

5a – You do not have to remove the plastic sleeve on the pumps. If you find it difficult to install the 39mm pump adapters, you may do so. Make sure to remove the inlet and outlet caps before installation.

6a – We will now be installing the feeder pump. This pump will go into the slot that is all the way through the surge tank. Install the supplied pre-filter onto the inlet of the pump. Slot the pump into the empty hole from the bottom allowing the filter to slightly stick out. We want this pump to be the lowest in the tank to make sure it can keep the surge tank always supplied with fuel.

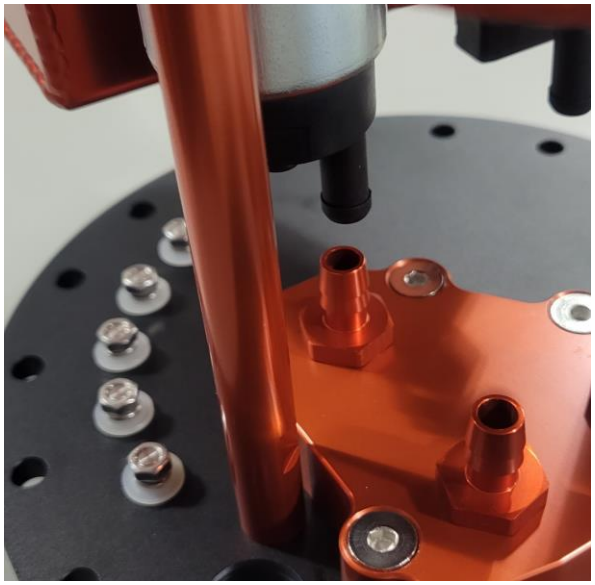
7a – Take the 39mm pump adapter sleeve and install it over the pump. Push until the sleeve is flush against the tank. This will hold the pump in place. With that the feeder pump is now installed into the surge tank.


8a – We will now be installing the pressure pumps. Grab another one of your DW100/200/300 pumps and install the filter sock. Grab an additional 39mm pump adapter sleeve. Pre-install the sleeve onto the pump this time shown like in the 2nd picture. You will need to install the pump at an angle to get the filter sock into the surge tank.



9a – Work the filter into the surge tank and try to avoid the o-rings. You can remove the lower o-ring in the slot to make the install slightly easier. Slide the pump into the surge tank.


10a – Temporarily install the top hat and verify the pumps are aligned with their corresponding nipple. If not spin the pumps until they line up. This will make installing the hoses easier.

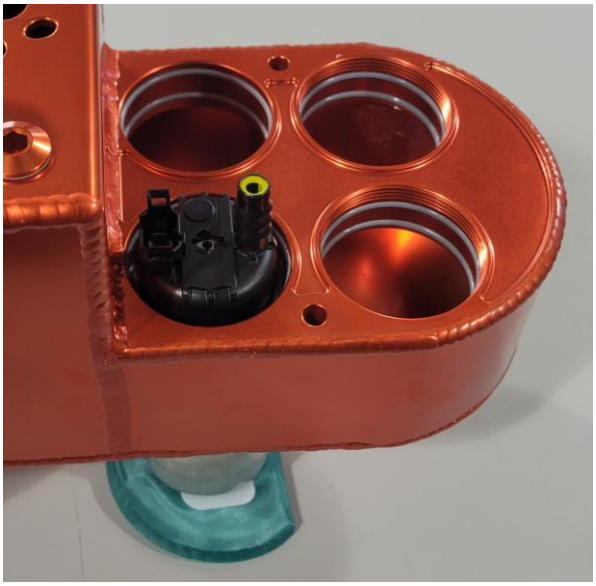
46mm Pump Installation (DW400)

3b – The following steps will involve installing DW400 pumps into the surge tank assembly. Move the top hat and any additional parts to the side.

4b – Remove the pump and install kit from the box. It's best to do this one at a time to avoid losing parts. You will be not using one of the hoses supplied. One is 3/8" and the other is 5/16". You will only be using the 3/8 hose.

5b – Make sure to remove the pump cap. You can remove the sleeve, but it should not hinder installation.

6b – Install the pump pre-filter on the feeder pump, then slot the pump into the bottom of the surge tank. Push the tank all the way down the pump until the sock is seated at the bottom of the tank.

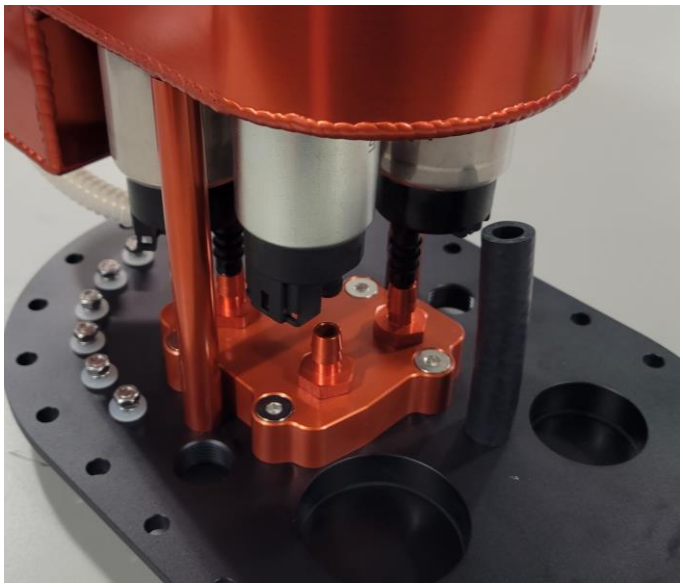


7b – Grab another one of your DW400's and install the pre-filter. To install the pump into the surge tank you will need to pinch the filter sock to fit into the tank. Shown in the 2nd picture.

8b – You will need to pinch the filter and install at an angle like so. You can remove the lower o-ring in the surge tank to make installation easier. You may need to rotate and push the filter to get it into place.

9b – Push the pump down until seated at the bottom of the tank. Now turn the pump at roughly a 45° angle to align it with the top hat.


10b – Attach the top hat temporarily to make sure the pump nipples and the nipples on the top hat line up. This will make the hose and clamp installation later easier. The pumps can be spun by hand to line up the nipples.



Pump Port Block Off Installation and Removal

*Note: this is only if you are not using all 4 pumps

11 – To install multiple pumps you will need to remove the block off plates. Use a 3/8” Allen wrench to remove to loosen the block offs. Once they spin freely pull up on them to remove.


11a – If you are going to be running less than 3 pressure pumps, be sure to remove the corresponding nipple and block off that port. If you do not have any -6 AN ORB plugs (DW# 6-02-0717) you can use ones from the top of the surge tank. This will not hurt anything as the holes on the top are to allow for overflow from the tank. You will need a 1/4“Allen wrench to remove the plugs.


11b – Remove the nipple that corresponds to the pump block off. You can temporarily assembly it to verify you are removing the correct nipple. If you were going to use the configuration of 2 pumps (1 feeder and 1 pressure), this would be the recommended setup. Notice the dual block offs installed and the 2 -6AN ORB plugs installed into the top hat in the 2nd picture.

11c – The picture shown below would be the configuration of 4 pumps (1 feeder and 3 pressure).

Feeder Pump Hose Plumbing

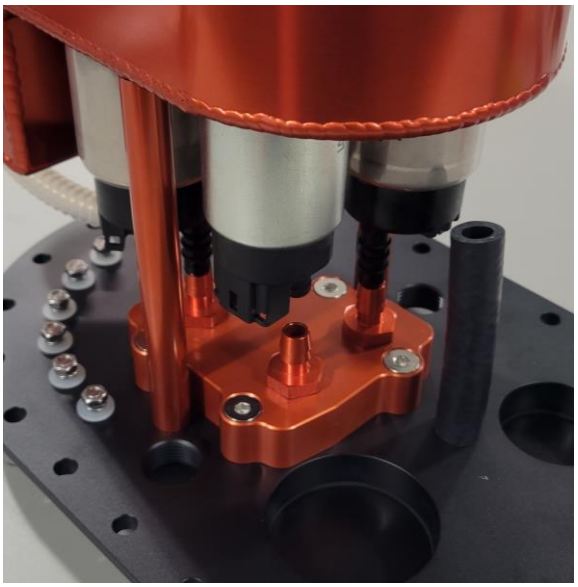
12 – The feeder (shown with white arrow) pump will need the -6 AN ORB to 90° 3/8 fitting installed. You can use any of the 4x -6 AN ports on the top of the surge tank. I will be using the bottom left one (shown with **black** arrow). The 2nd picture is showing the fitting installed.

13 – Because the DW400 pump has a 3/8" outlet, we have included two different hoses for the feed pump. One hose is 3/8" on both sides use this hose for the DW400 feed pump applications, and the other longer hose is 3/8" on one side and 5/16" on the other, use this hose for DW100, 200 or 300 applications. Use the 5/16" end on the pump and the 3/8" side on the return fitting.

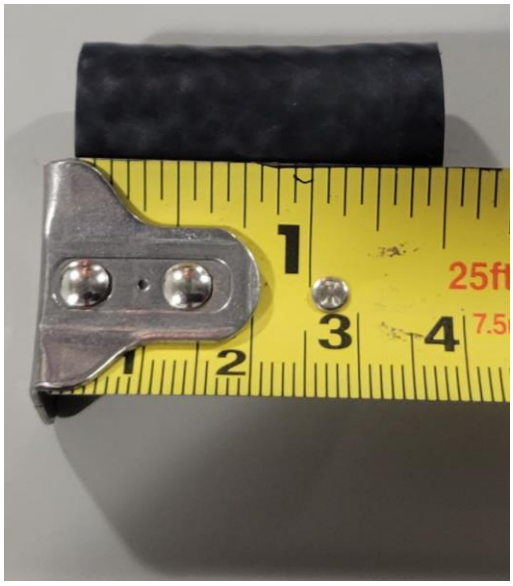
14 – Installing the feeder pump hose on the tank you can have multiple options. I have routed the feed hose below to make the package as compact as possible. You can use any of the 4 ports on top of the tank for the feeder pump.

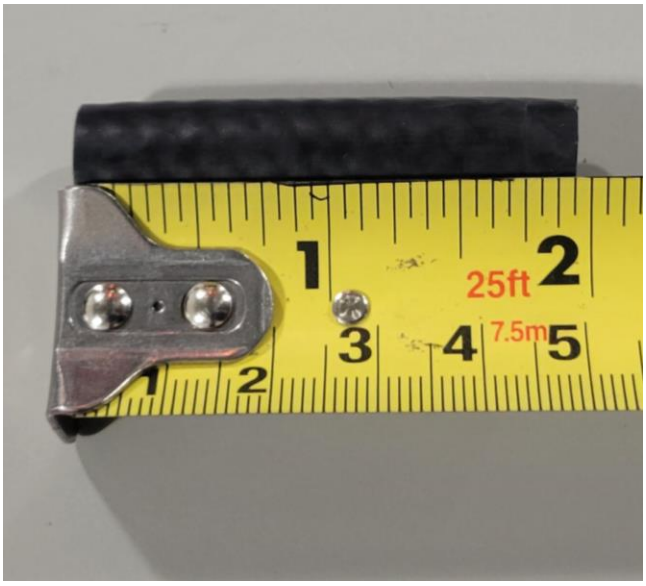
Pressure Pump Hose Installation

15 – Temporarily bolt the tank on to verify the barbs on the pump and top hat align. If not rotate the pumps in the surge tank until they do. Now grab the hoses from the install kits that came with the pump.

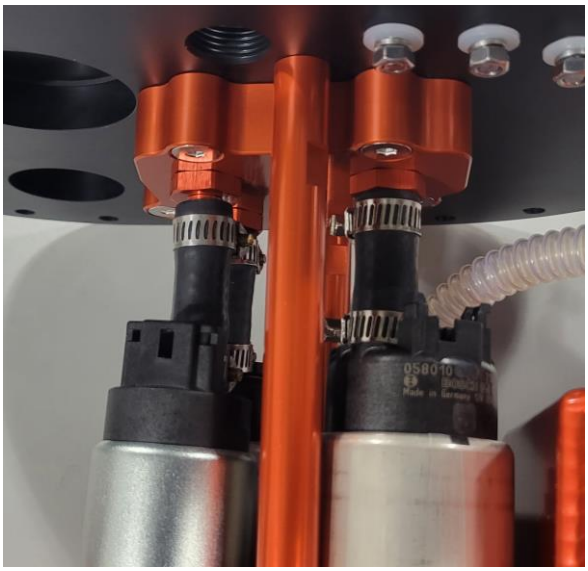


16 – Measure the distance from the bases of each barb and cut the hose accordingly. The picture on the left is the suggested length if you are using the stock rod length and a DW400. The picture on the right is the suggested length for a DW100/200/300 with stock rod length.

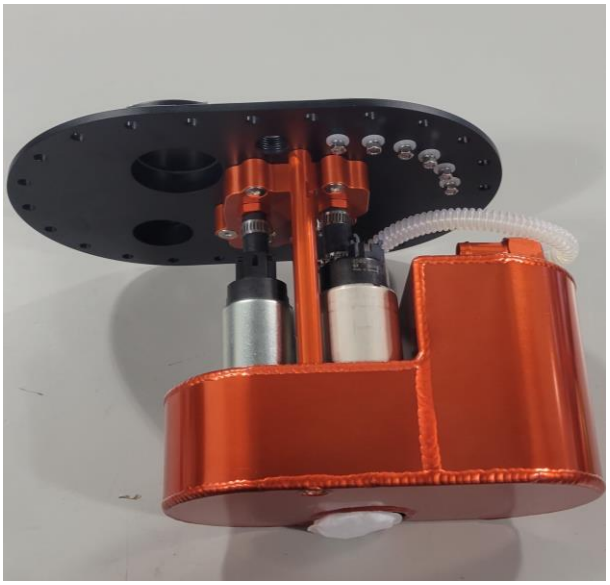




17 – Gather up the clamps that came with the pump install kit. Remove the surge tank from the top hat and install the hoses onto the pumps. Take the pumps with the surge tank assembly, align the hoses and push them onto the top hat. Lube may be necessary to make this step a little easier. Below is a picture of the finished result. Tighten down each clamp once in place.



18 – The feed pump may be pushed down a bit to ensure on installation it sits on the bottom the tank. If you are installing into a 7” deep tank the pump will rest into this position. If you need a longer rod, please see the list of optional parts on page 3.

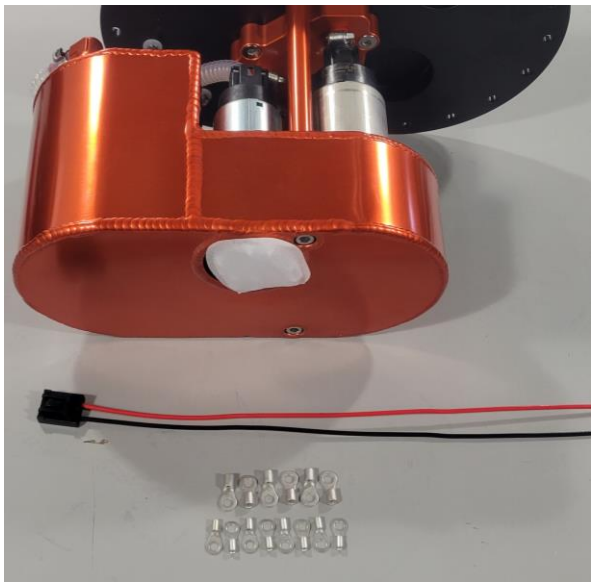


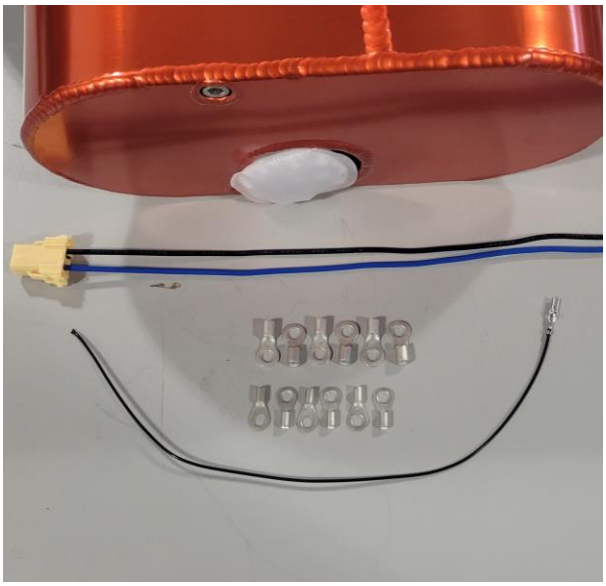
19 – Now you should have the hoses and pumps installed into the surge tank and the hoses run to the top hat. This is what the assembly should look like in your current configuration.

Wiring the Pumps

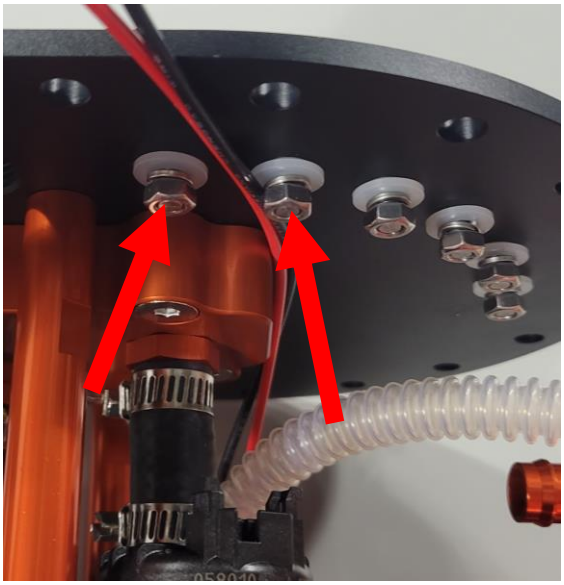
20 – Gather up the eyelets supplied with the 2.0FST install kit. You will have 6x 12-gauge eyelets and 8x 14-gauge eyelets. The 6x 12-gauge eyelets will be placed the side as they are use on the top of the assembly for pump power and ground. The 8x 14-gauge will be use for the pumps inside the tank.

21 – For wiring the pumps you will be using the wiring pigtails supplied with the pump kits. The pigtail on the right is for any DW100/200/300 and the pigtail on the right is for the DW400. The DW400 has an additional small black wire, remove this by cutting it as close to the connect as possible. This is not needed and can be discarded.

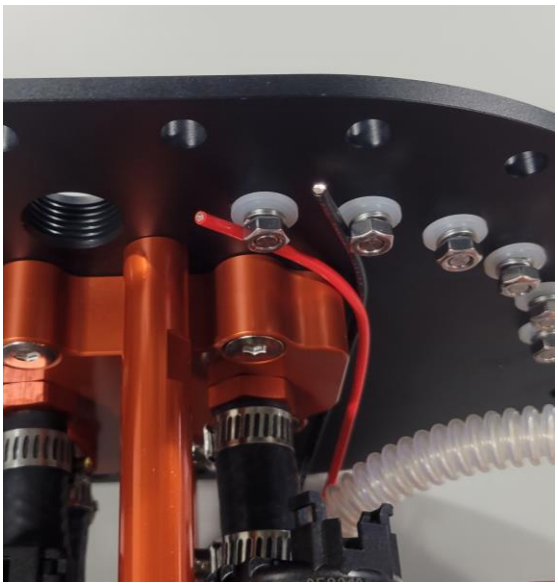




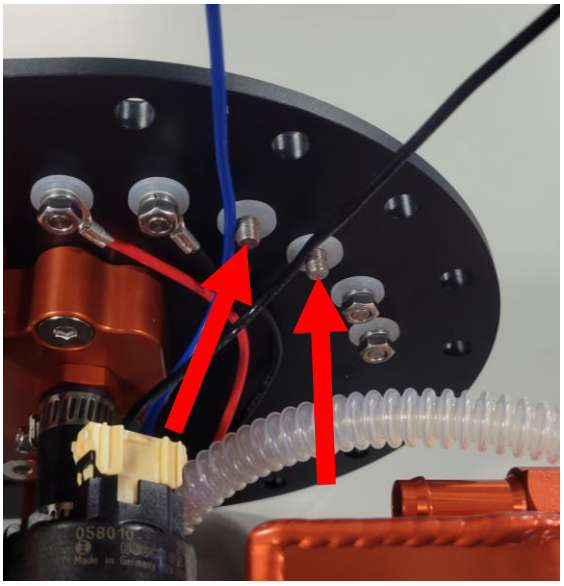
22 – Plug the pigtail into the pump. Run the wiring over to the to appropriate terminals needed. This is the feeder pump so we will be using the first 2 terminals in the 2nd picture. Power being the 1st one and ground being the 2nd. This is the same setup for the remaining pumps power then ground etc.

23 – Position the wire to where it is going to be routed to. Pull the wire and an inch or so to have excess. Cut the wire where you marked. Strip the wire with wire strippers and install the supplied 14-gauge eyelets. Place the eyelets onto their respective terminals. Tighten the terminals to 15 Inch/lbs.

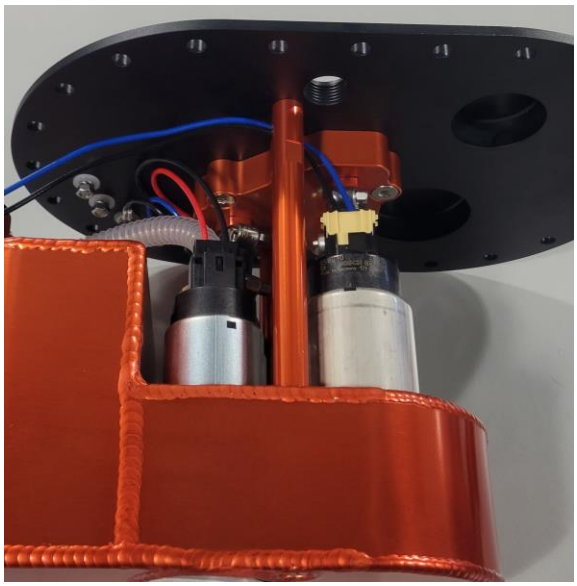
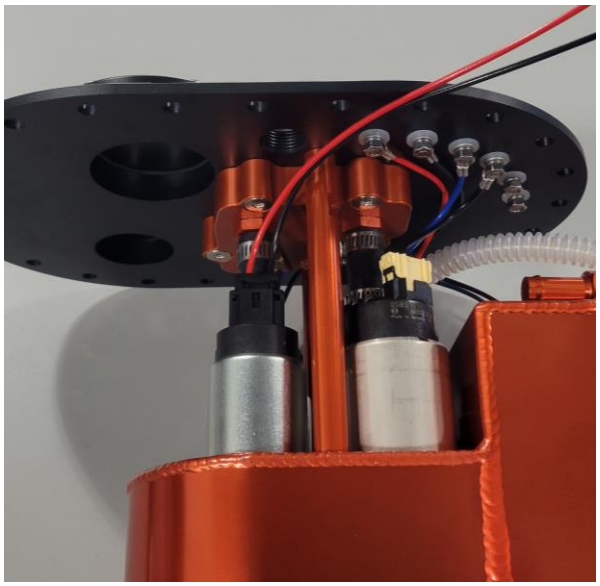



24 – For the main pressure pump you will be wiring the pump to the 3rd and 4th terminals. Plug the harness in like before. Route the wiring to the desired 3rd and 4th terminals. Be sure to leave an inch or so then cut the pigtail. Strip the wire and install supplied 14-gauge eyelets. Tighten nuts to 15 inch/lbs.

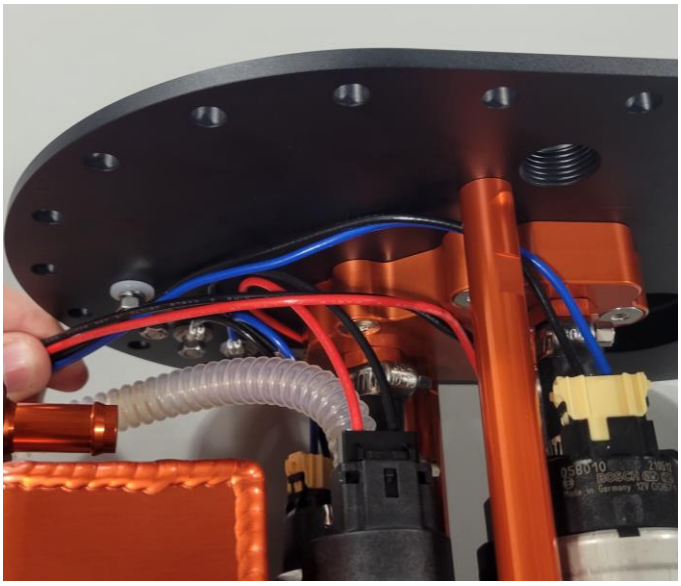
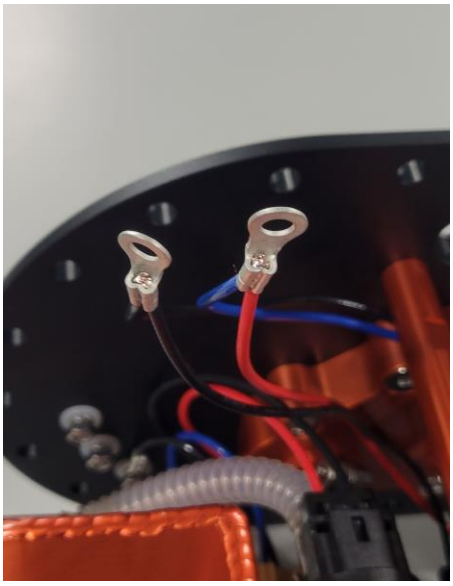



***Note:** If you are only running a single pressure and feeder pumps then this ends your wiring section, move onto step **28.**

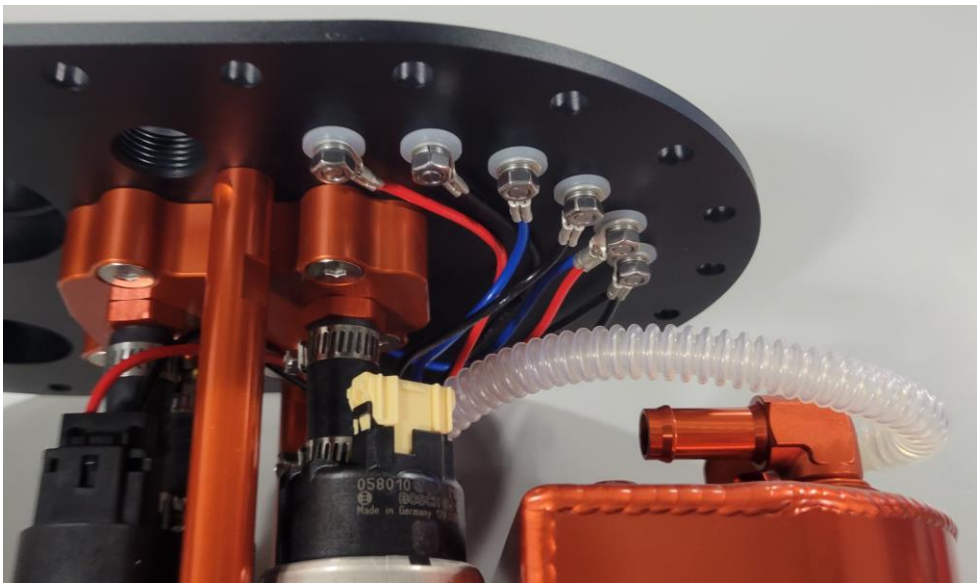
25 – If you are running a single or dual pump on your stage 2 you will be wiring them to the final 5th and 6th terminal. Plug in the harnesses for the remaining pumps.

26 – Route the pump or pumps wiring over to the desired 5th and 6th terminal. I preferred to run the wiring into one eyelet. If you have a 12-gauge eyelet spare you can do this. You can also do each pump individually and overlap the eyelets.

27 – Install the 5th terminal for power and the 6th terminal for ground on your staged pump(s). Tighten nuts to 15 inch/lbs.

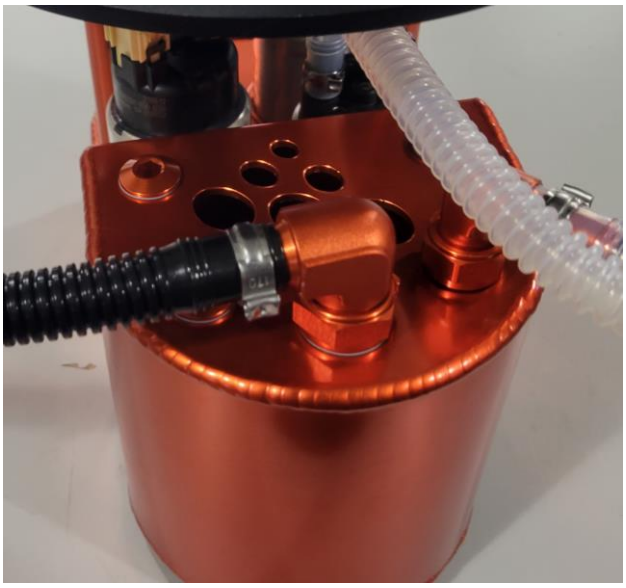


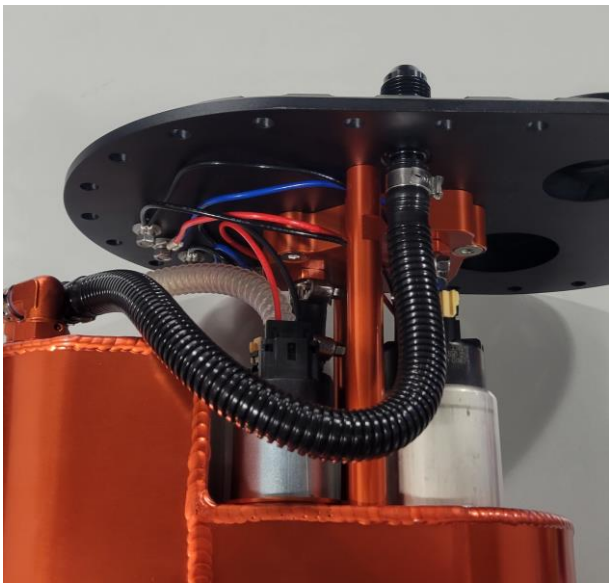
Plumbing the Return Hose and Fittings

28 – Plumbing the return in the tank will require the 1/2” x 12” hose and 17mm clamps supplied in the 2.0FST install kit. You will also need the -8 AN ORB to 1/2” barb fitting for the top hat.

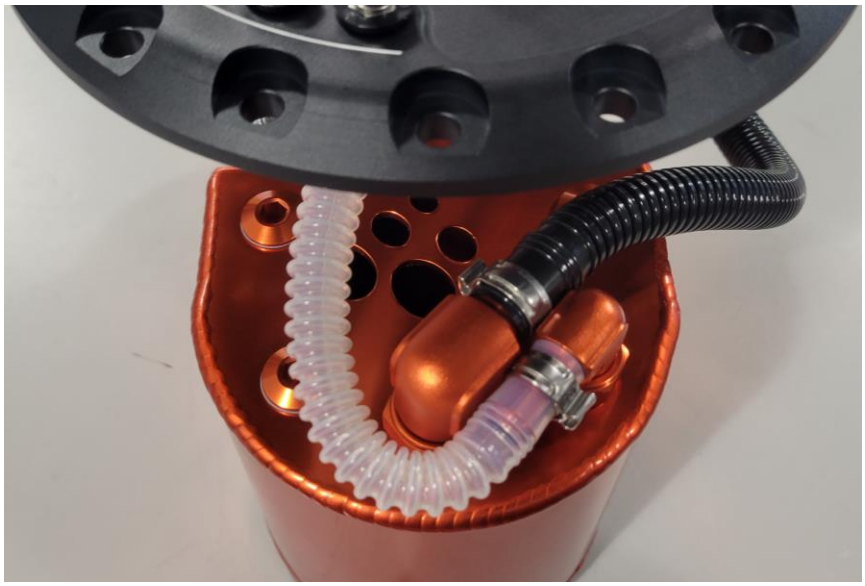
29 – Install the fitting into the top hat like so. Tighten down and the barb should protrude from the bottom of the top hat. Take the 1/2” hose and slip it over the Barb on the back of the sure tank. You do not need to install the clamps first as they can slide over the whole hose.

30 – Slip the clamp over the hose and slide it till it is over the barb of the of the fitting. Tighten clamp by using side cutters, end cutters, or hose crimping tool. Pinch until secure. Make sure to slide the 2nd clamp onto the hose now. Route the return hose up to the return fitting on the top hat. You can choose however you would like to do this. You may use heat to soften the hose to make it a little more pliable to install onto the fittings. Pinch clamp over the hose on the return fitting once hose is installed.





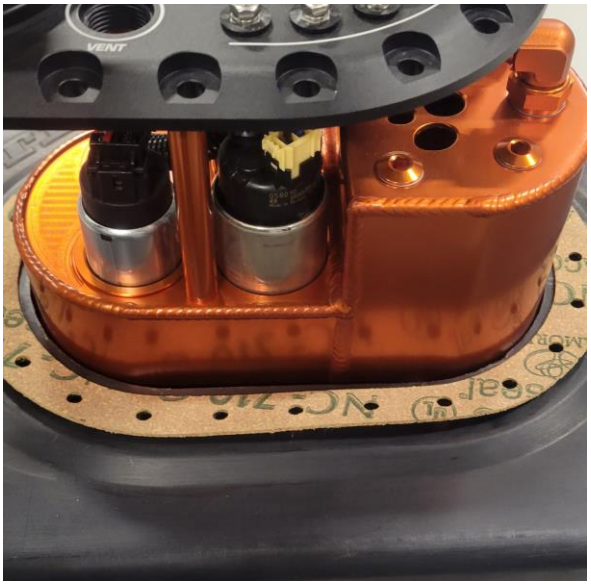
31 – Here is how the hoses look once complete if you choose similar routing. Routing the hoses is completely up to you and may have a different looking result.

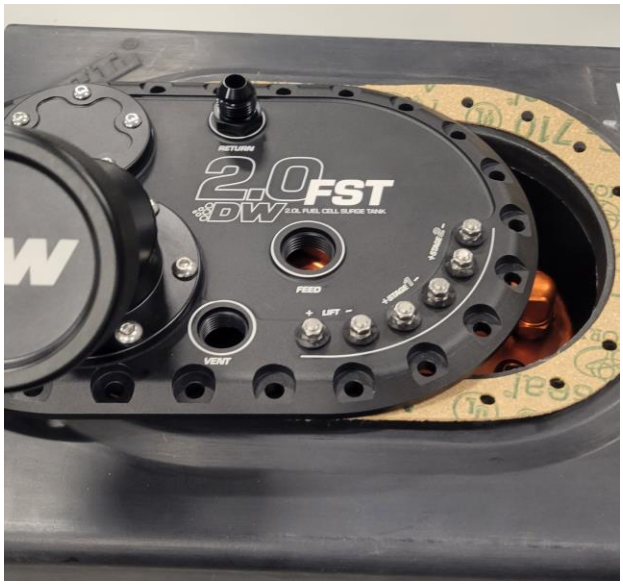


2.0 FST Completed Module

Installation into a Fuel Cell

32 – Place the gasket supplied with the fuel cell or with our 2.0FST onto the tank. Slide the surge tank assembly down into the tank.





33 – Once the assembly is in. Slide over while keep the gasket held in place. Line up the bolts and you can use our supplied Allen head bolts or the ones that come with the tank. Install each bolt in a star pattern torquing in steps.

Roll Over Vent Valve Installation

1 – Roll Over Vent Valve: PN# **6-02-0741-B** can be purchased and installed into the -8AN ORB vent location on the tank.

Filler Neck Installation

2 – Straight Filler Neck w/ Cap: PN# **6-03-FST-STRAIGHT** and 45° Filler neck with cap: PN# **6-03-FST-ANGLE** can be purchased and installed onto the top hat via the 6-bolt flange. Remove the 6-bolt block off plate with a 5/32" Allen wrench. Then install the filler neck with either the replacement bolts or the original bolts. Be sure to use the new gasket to ensure a no leak seal.

3 –Then install the filler neck with either the replacement bolts or the original bolts. Be sure to use the new gasket to ensure a no leak seal. To Install the 45° filler neck may require a modified 5/32” Allen wrench to reach the bolts under the neck.

Fuel level Sender Install

4 – To Install the fuel level sender, you will need to install the module into the tank first. Follow step: **32 & 33** for 2.0FST Install. From here remove the 5 bolts that hold in the block off plate using a 1/8” Allen wrench. You will need the supplied bolts for the fuel level sender. This bolt pattern works with most 5 bolt fuel level senders.

Wiring the 2.0 FST

The 2.0FST Module is designed so you have the ability to turn 1, 2, or 3 pumps on in stages. Running all 3 pumps at the same time is not necessary for light throttle driving or cruising or idling a car, doing so will add excess heat to the fuel system. By running a single pump for 90% of the driving until you need more fuel flow you can lessen the heat and load on the fuel system. Our 2.0FST is designed with 2 stages in mind. Stage 1 for your primary pump to carry the load of idle, cruising and daily driving, and Stage 2 for up to two additional pumps to carry the load of extreme boost or race applications.

NOTE: It is possible to run a smaller lower flowing pump as your Stage 1 Primary pump, and a larger higher flowing pump/s as your Stage2.

Wiring:

- Lift Pump: This pump will need to be wired to 12v on or switched source. **Please note:** this pump needs to be on at all times to keep the surge tank supplied with fuel.
- Stage 1 (Primary): This pump should be wired to activate along with the OEM in-tank feeder pump. It is recommended you use a hardwire kit for this, using the OEM in-tank pump to trigger the Primary Stage 1 pump.
- Stage 2 (Secondary): This stage can be triggered several different ways depending on your vehicle's setup. Boosted applications can trigger the second stage with a Hobb type switch that activates at a low boost pressure typically 0-5psi. This stage can also be triggered with a WOT switch for a Naturally Aspirated setup, or a window switch like a nitrous setup. The best solution if you are running a standalone style ECU would be to setup a second pump output and use that wire to trigger the stage. Using the standalone setup should give access to safety features and other options to trigger like RPM, Load, Injector Duty etc. It is imperative that Stage 2 be wired with a hardwire kit (PN# FPHWK) due to the current draw of two pumps.

Pump Selection

Due to the nature of the surge tank, the lift pump sees little to no pressure so even a small OEM fuel pump see's an increase in flow. Calculating the flowrate of a feed pump for your surge tank can be difficult, due to the increased flow of the feed pump and the returning flow of unused fuel from the rail. We have the following suggestions for feeder pumps with our DW 2.0FST Tank.

- DW100 x 3 inside the 2.0FST, Suggested feeder pump is a single DW100
- DW200 x 3 inside the 2.0FST, Suggested feeder pump is a single DW200
- DW300 x 3 inside the 2.0FST, Suggested feeder pump is a single DW300
- DW300 x1, DW400 x2 inside the 2.0FST, Suggested feeder pump is a DW400
- DW400 x 3 inside the 2.0FST, Suggested Feeder pump is a DW400.