

# XV1900

## Cracked fuel pump housing bypass

*An alternative approach to fixing  
fuel pressure loss  
at the fuel pump housing*

*This how-to was designed around the Yamaha Raider XV1900. Although the Stratoliner and Roadliner share the same fuel pump housing, those motorcycles might not have the same available free space around the sub-tank as the Raider. Therefore some adjustments may be required to get the parts to fit on Stratoliners and Roadliners.*

## **WARNING**

### **FLAMMABLE MATERIAL**

**Always take the necessary precautions when working with or around fuel and fuel system components.**

**Avoid sparks and open flame.**

## **DISCLAIMER**

**By performing this modification you acknowledge awareness of the dangers involved, and therefore take full responsibility for your actions. The author will not be held liable for any injury or property damage which could result from this modification.**

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Over the years, many of you have experienced an all too common fuel system problem : the dreaded fuel pump housing crack. And when that happens you're left with very few options. Either you replace the expensive housing assembly, or you try to patch it up somehow. And most of the time, the patches don't last.

So today I'm proposing a different option: Taking the housing out of the equation. There is a bit of elbow grease involved, and yes you will have to spend some money on parts, but once it's done you will never worry about having the housing crack again.

So far, I have ridden 2 full seasons (*April to November in my part of the world*), during which I have done 2 Iron Butt rides (*20 hours and 19 hours*) and multiple day rides (*ranging from a few hours up to 8 hours*) with a modified housing. The fuel pressure is still as high today as it was on day one.

Personally, I've never experienced fuel pump housing failure. But after hearing about so many people having this issue, I figured that if I looked into this I might find something to help solve the problem. So I had a fellow Raider owner ship me a failed housing and started imagining possible solutions.

Apart from wanting to fix this problem, I had 3 very important goals:

1>> Come up with something simple that doesn't require specialized equipment or skills. I wanted anybody to be able to do it. And if you don't feel confident enough to do it yourself, you probably have a friend or family member that does.

2>> Use only available parts. I didn't want this to require any fabricating. And the parts had to be relatively easy to get.

3>> This had to be fully reversible, which meant no modifications to the bike. Only the housing was to be touched and nothing else. That way, if you ever need to get the bike back to stock, all you will have to do is replace the housing and remove the added parts.

I think I achieved my goals.

So is this the best way to fix the pump housing? Maybe not. I'm simply proposing another option. You decide what's best for you and your bike.

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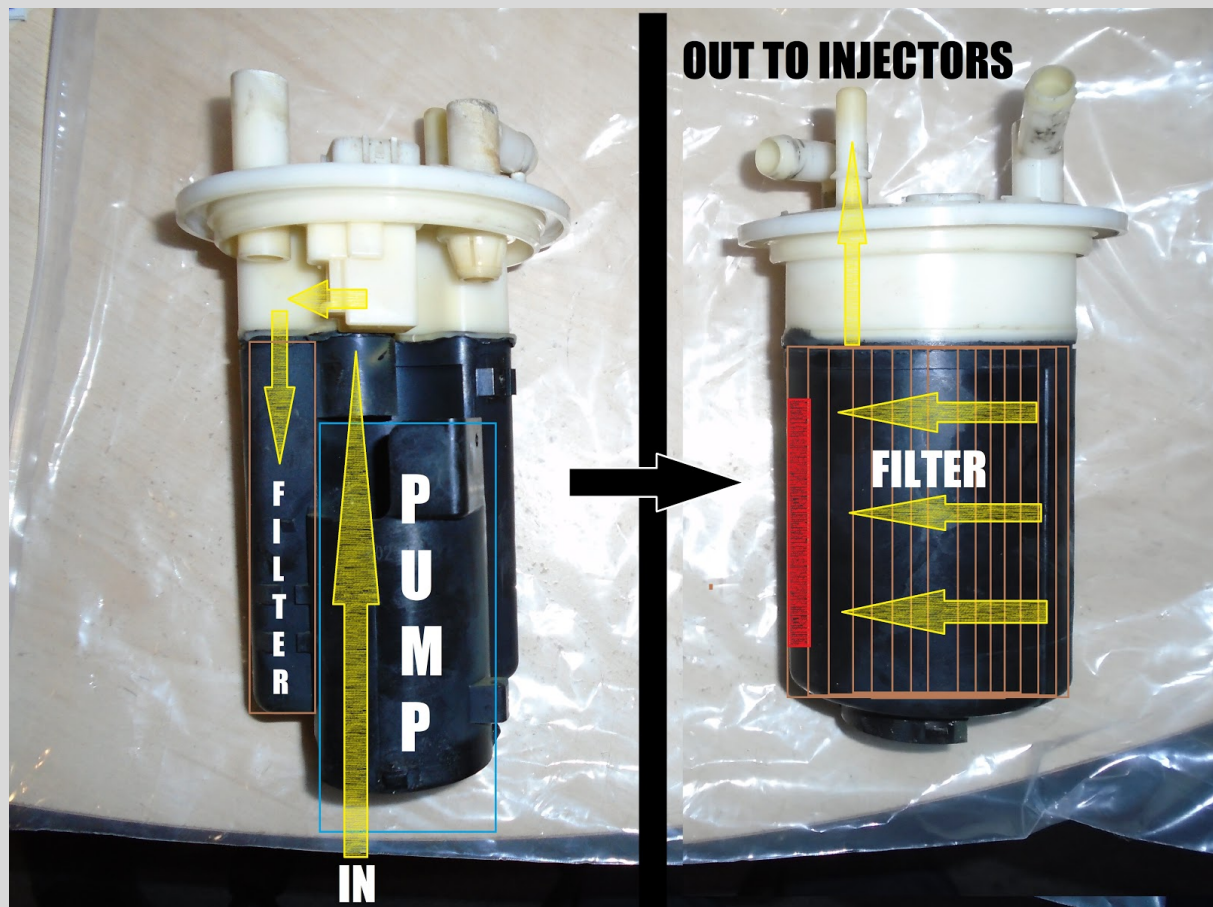
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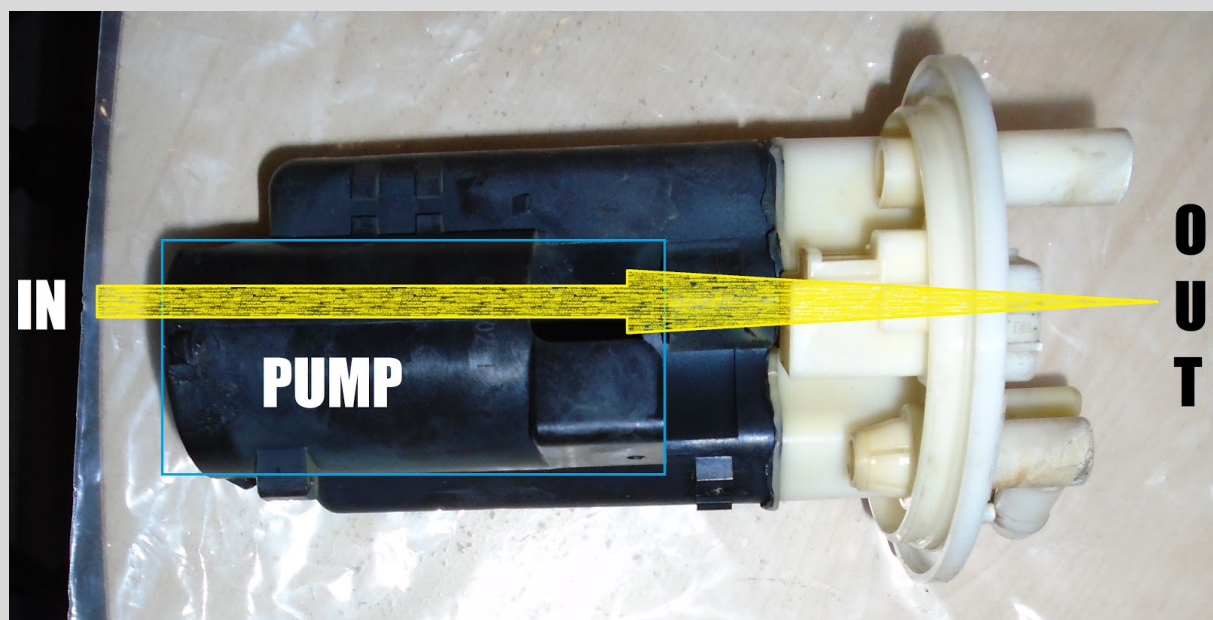
A quick explanation of the modification you will be performing:

This is the path taken by the fuel through the fuel pump housing. Fuel gets sucked in by the pump and pushed up into the housing, then turns back down into the fuel filter, goes through the filter, and finally up and out of the housing. The red section is where the housing always cracks.





You will be cutting out parts of the housing, eliminating the internal pathway. The fuel will directly exit the top of the housing after passing through the pump.





Once the fuel is out of the sub-tank, it will be directed through a new external fuel filter before going back into the OEM fuel line.

Before you start, you will need to gather some parts.



- 4 > Russell 90° AN6 fittings # 624163
- 1 > Russell 5/16" push on fitting #640930
- 1 > Russell fuel filter #650133 (temporary choice for test purposes)
- 1 > Bulkhead fitting AN6 to 5/16" barb (got mine here <https://stmtuned.com/products/stm-6an-black-anodized-e85-safe-fuel-bulkhead-fitting>)
- 1 > Viton O-ring approx 3/4"X 9/16"X3/32"(from a kit of mixed sizes)
- 1 length of 5/16" **SUBMERSIBLE fuel line Gates #27093**
- At least 6" of EFI rated fuel line (temporary choice for test purposes)
- 8 > 5/16" stainless steel hose clamps



**SUBMERSIBLE FUEL LINE** is **extremely important**. It is the only line that will survive inside a fuel tank. Standard fuel line is only fuel compatible on the inner layer. If standard fuel line is submerged in fuel, the outer layers will deteriorate and contaminate the entire fuel system.

This line is more expensive, but do not cheap out on this part. Look for SAE rating 30R10.

DO NOT USE THIS LINE OUTSIDE OF THE TANK. The fuel resistant material is incompatible with air pollutants.

And that's all the parts you'll need. I found all the parts at auto parts supply stores and speed shops.

Side note: Since this was initially a test, the fuel filter and FI fuel line were budget choices. I wanted a 10 micron serviceable filter but they didn't have any in stock at the time, plus they're much more expensive. And the elbows normally use more expensive twist-lock fuel lines, but I figured I'd be doing a lot of disassembly/reassembly during testing.

That's why it says "temporary" on the parts list.

Those parts are still on the bike. They've been working well so far, and I want to see how long they'll last.

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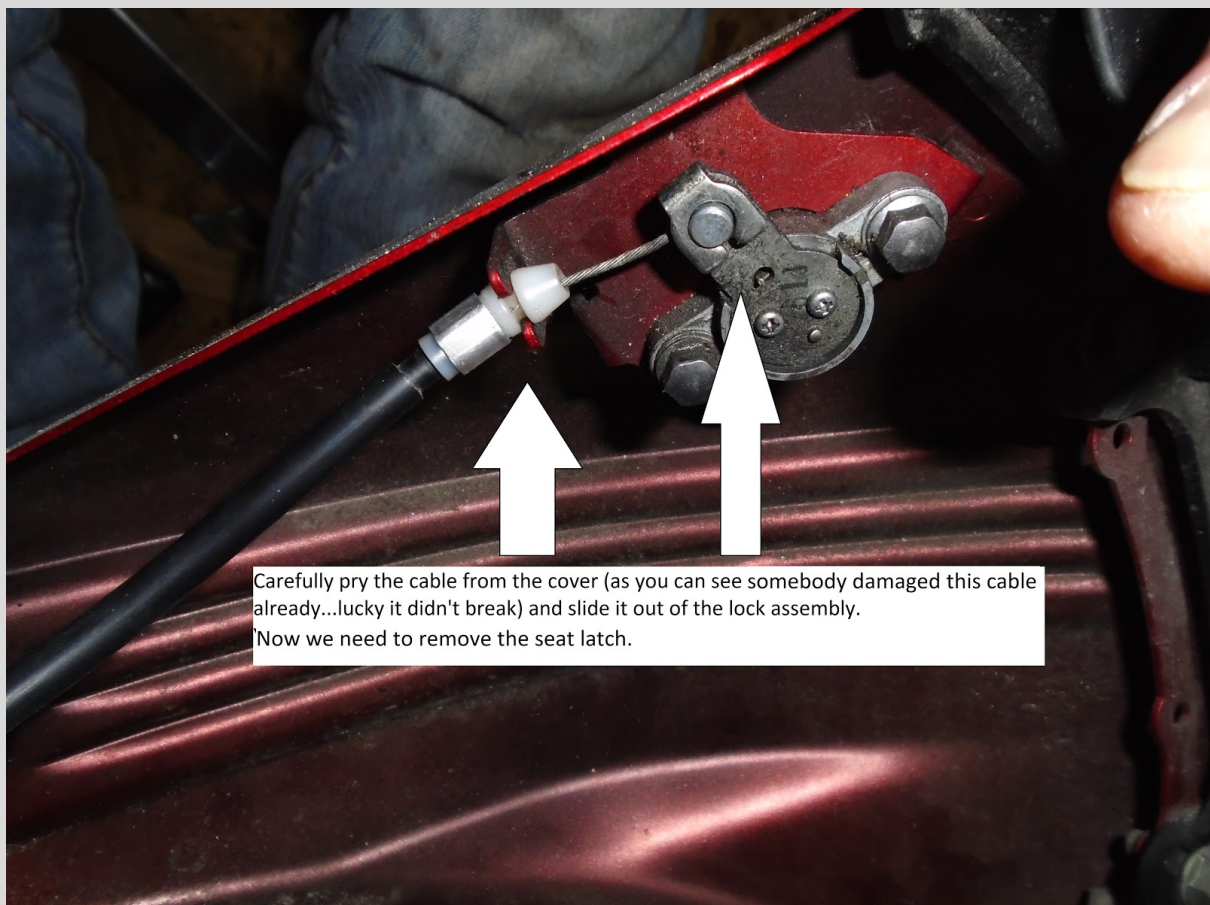
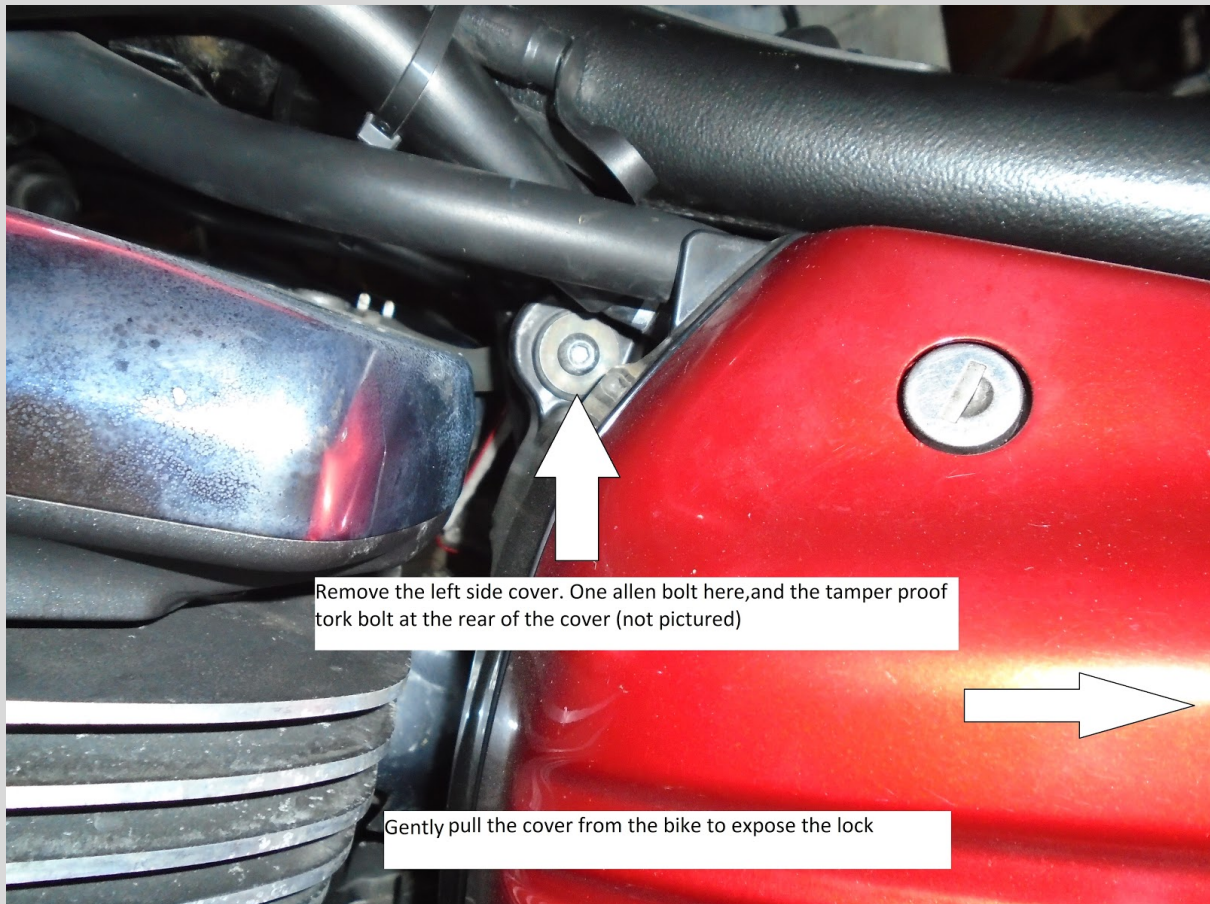
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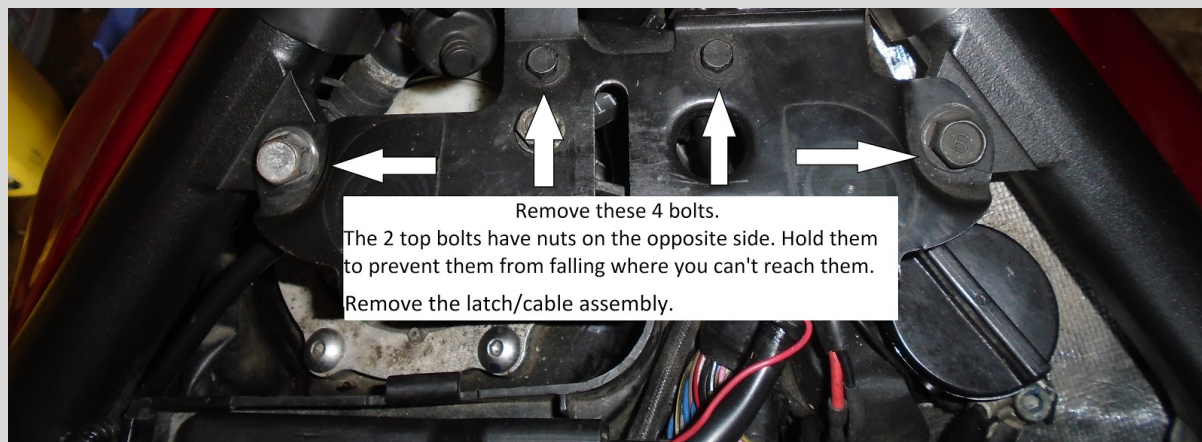
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Let's get started. First, you will need to gain access to the sub-tank.



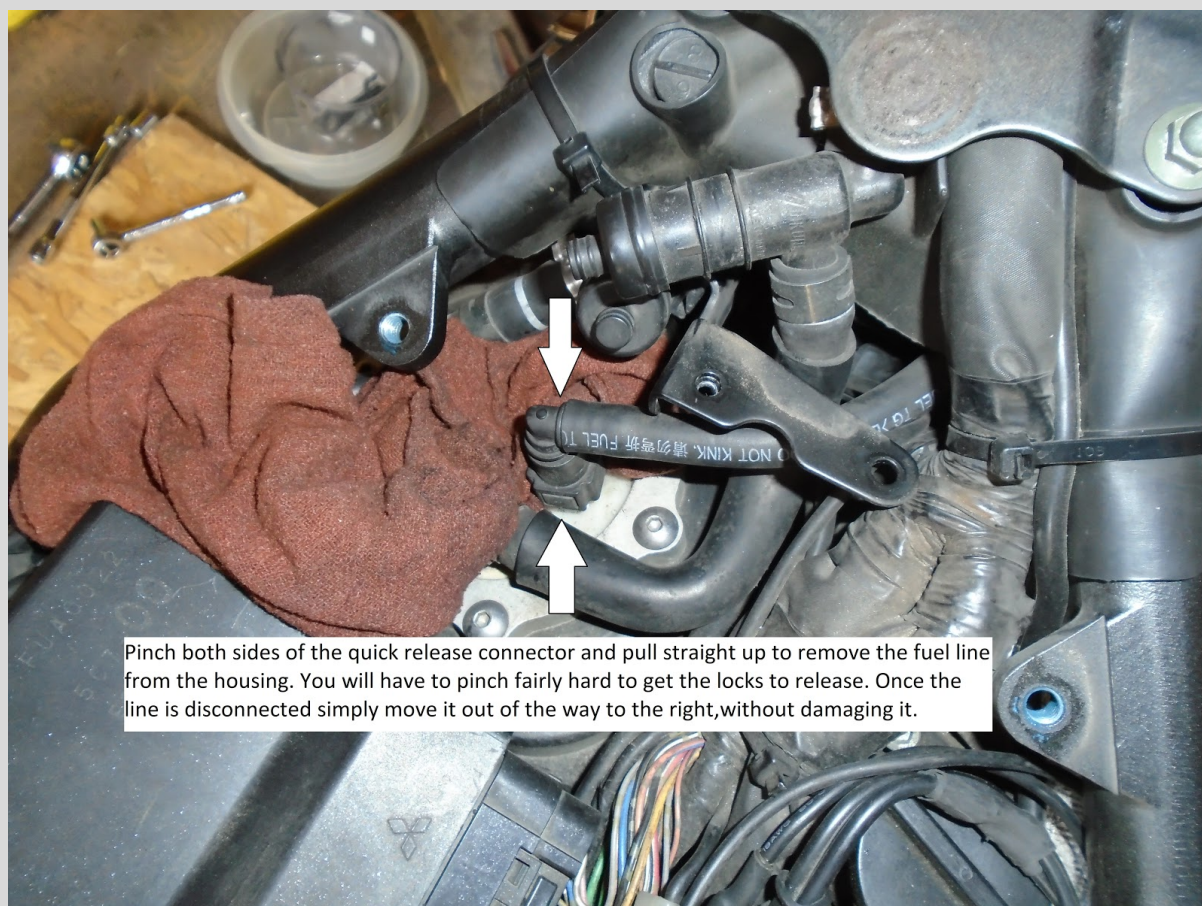






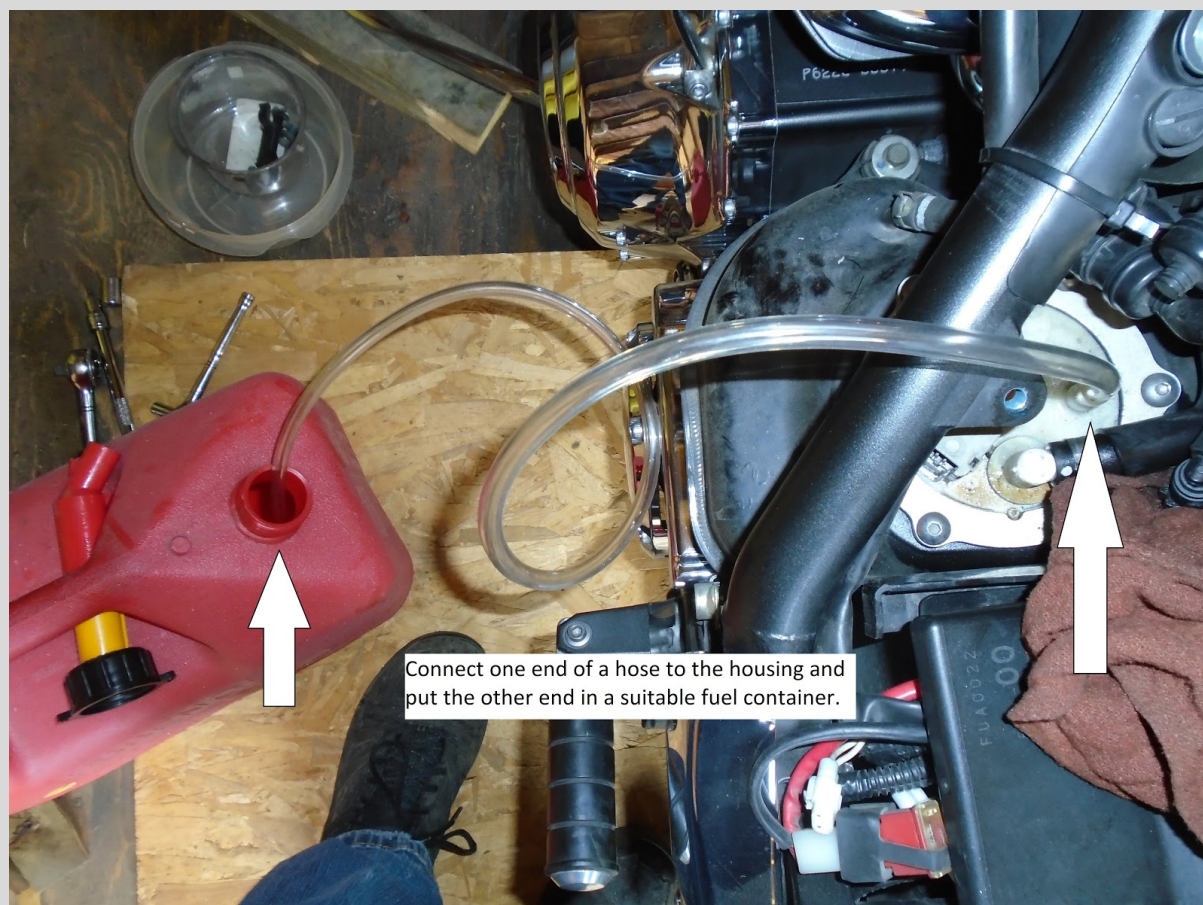
Remove these 4 bolts.  
The 2 top bolts have nuts on the opposite side. Hold them  
to prevent them from falling where you can't reach them.  
Remove the latch/cable assembly.

The next step involves removing the fuel pressure line. There could be residual pressure so expect fuel to spill out. I recommend putting a rag around the line before disconnecting it. And of course, **AVOID SPARKS AND OPEN FLAME.**



Pinch both sides of the quick release connector and pull straight up to remove the fuel line from the housing. You will have to pinch fairly hard to get the locks to release. Once the line is disconnected simply move it out of the way to the right, without damaging it.





To empty the tank, put the bike in diagnostic mode 09.

To enter diagnostic mode:

- > Press and hold the RESET switch (on the dash)
- > Turn ignition ON (the engine shut off switch should also be ON) and wait for the gauge to display DIAG
- > Release RESET switch
- > Simultaneously press and hold the SELECT switch (on left hand controls) and the RESET switch until d01 is displayed
- > Press the SELECT switch to scroll up to d09. (You can use RESET to scroll down if you overshoot it)

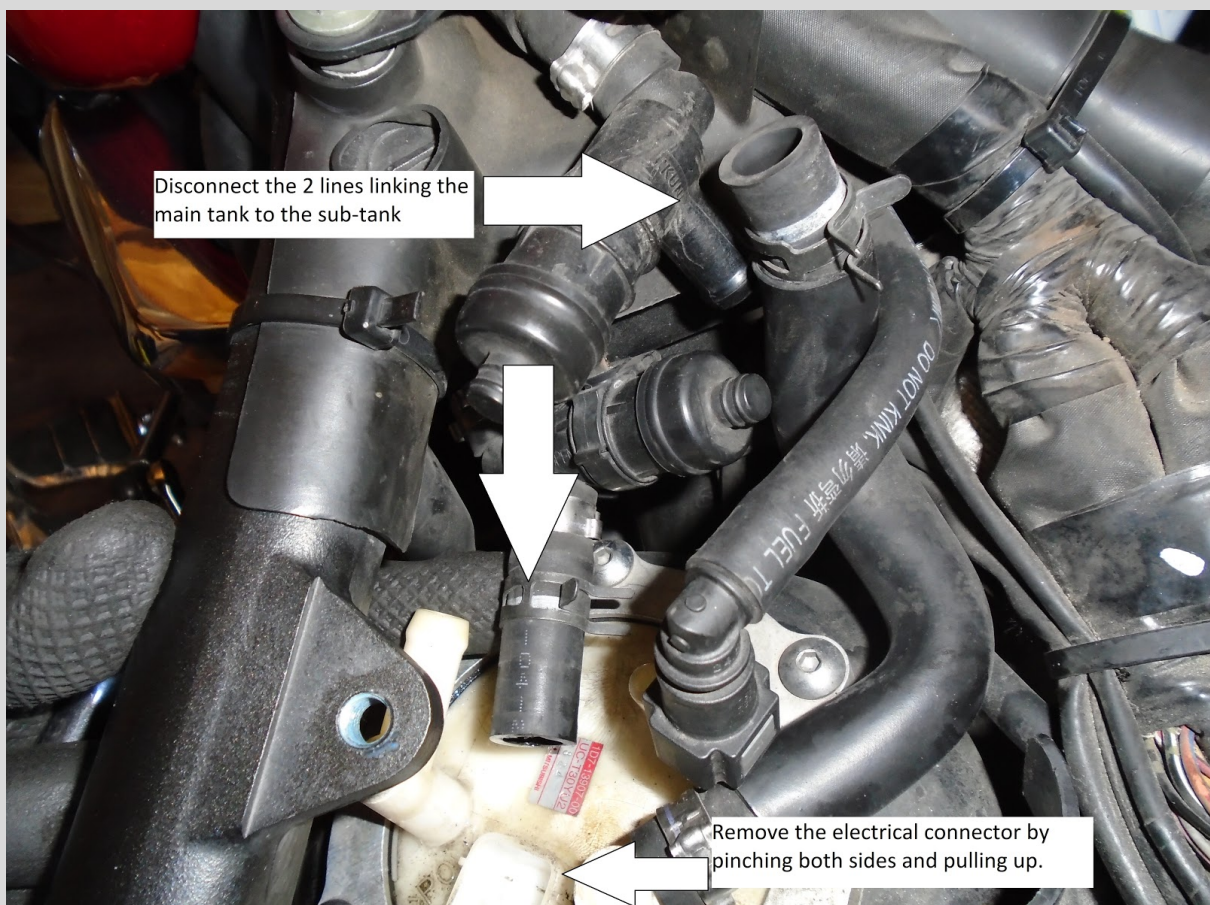
The fuel pump will run continuously until you exit mode 09 or turn off the ignition. To avoid damaging the pump, stop it as soon as you start to see air bubbles.

Remove the hose and cap off your fuel container.



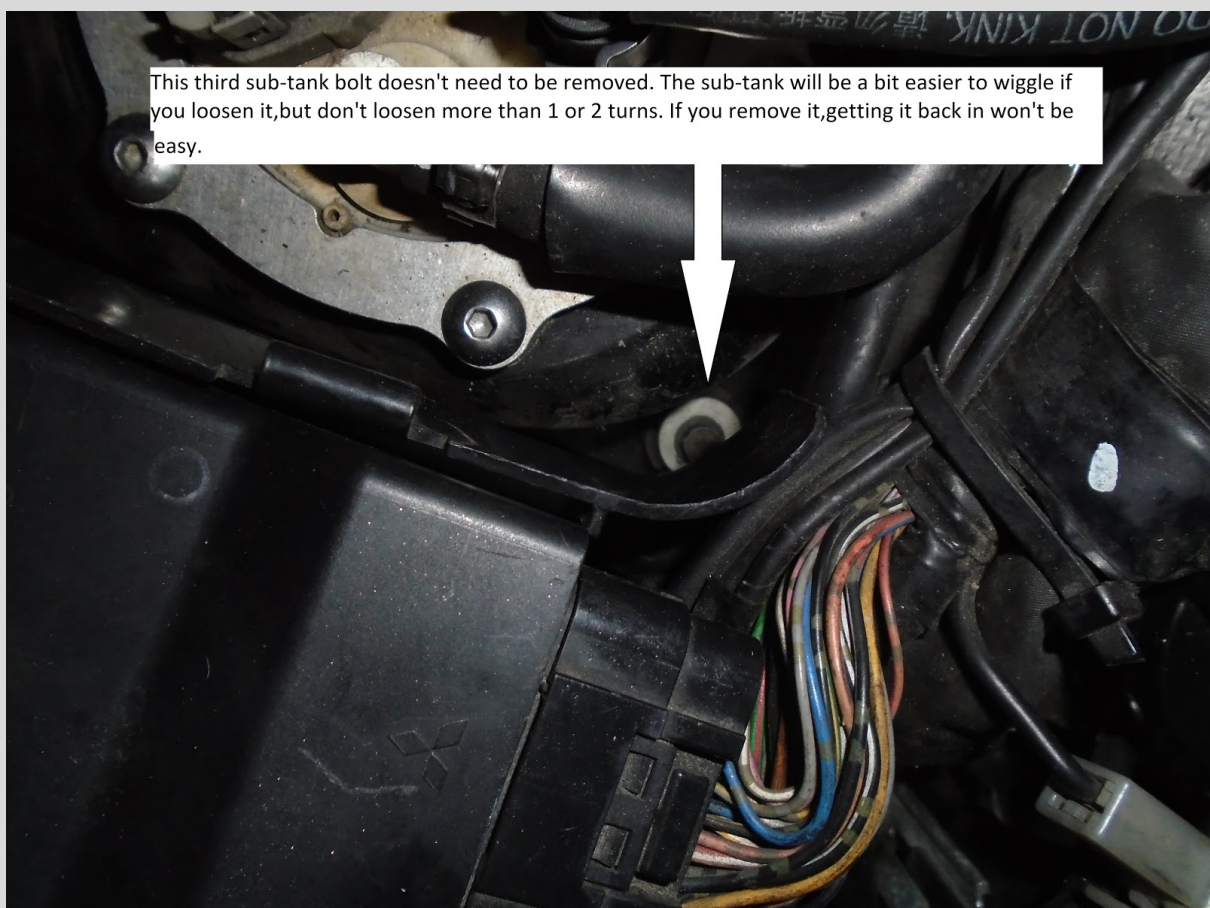


I know this sounds redundant since you just emptied the tank, but there could be some fuel left in there. Why risk spilling it all over your bike?

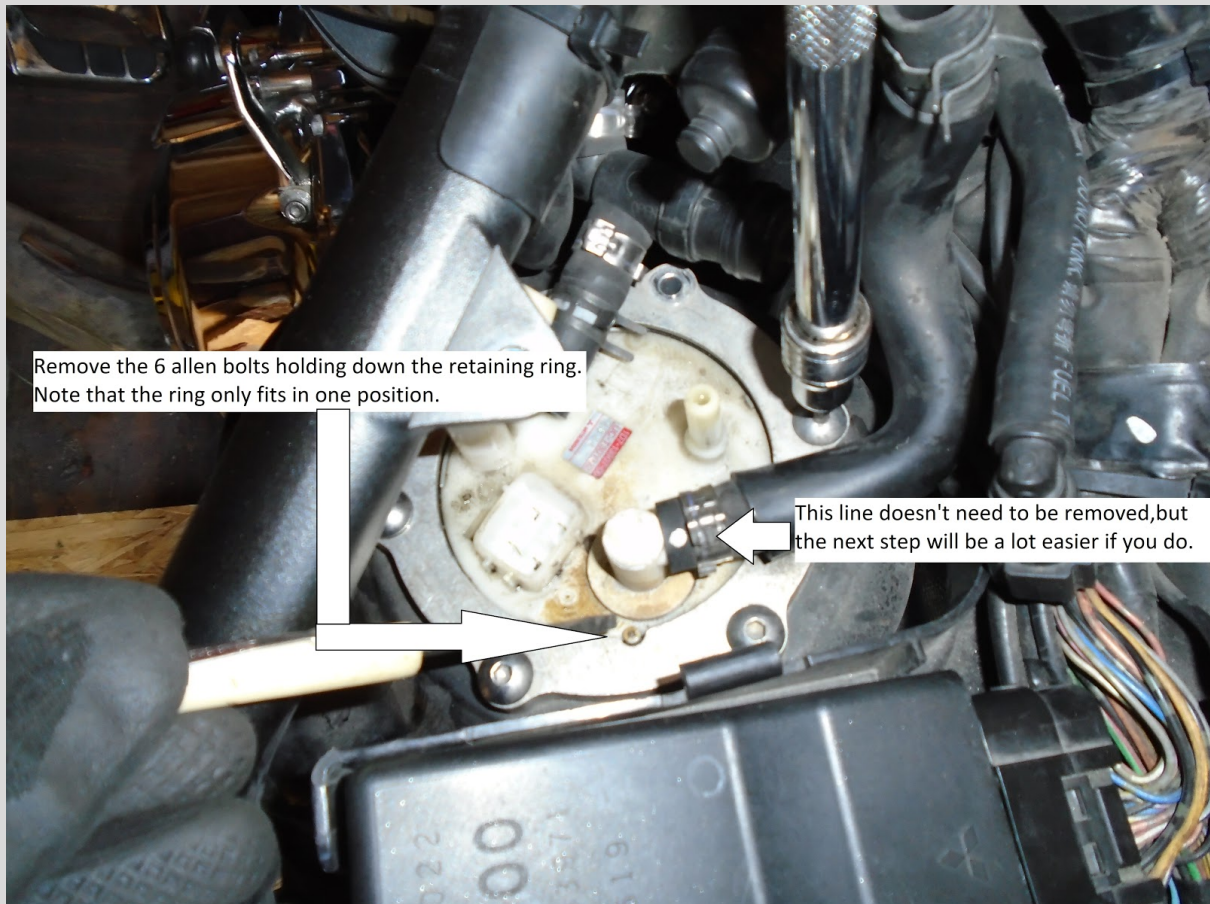


You can remove the main fuel tank. This isn't absolutely necessary, but it does give you a little more clearance. I left mine in place.











Grab the pump housing and start pulling it up and out of the sub-tank. You will need to tilt the sub-tank to the right, while wiggling and rotating the housing to get it to clear the frame. Go slow and pay attention to the housing's position as you pull it out. This will be very helpful when it's time to reinstall it.





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Now we'll start cutting into the housing. At this point, unless you've been letting it air out a few weeks, the housing still has fuel inside. Again **avoid sparks and open flame**.

Remember to take your time when you do this. This will keep you from going overboard. But worse case scenario, IF you do mess it up, you will need a new pump housing assembly, which you would have needed anyway.



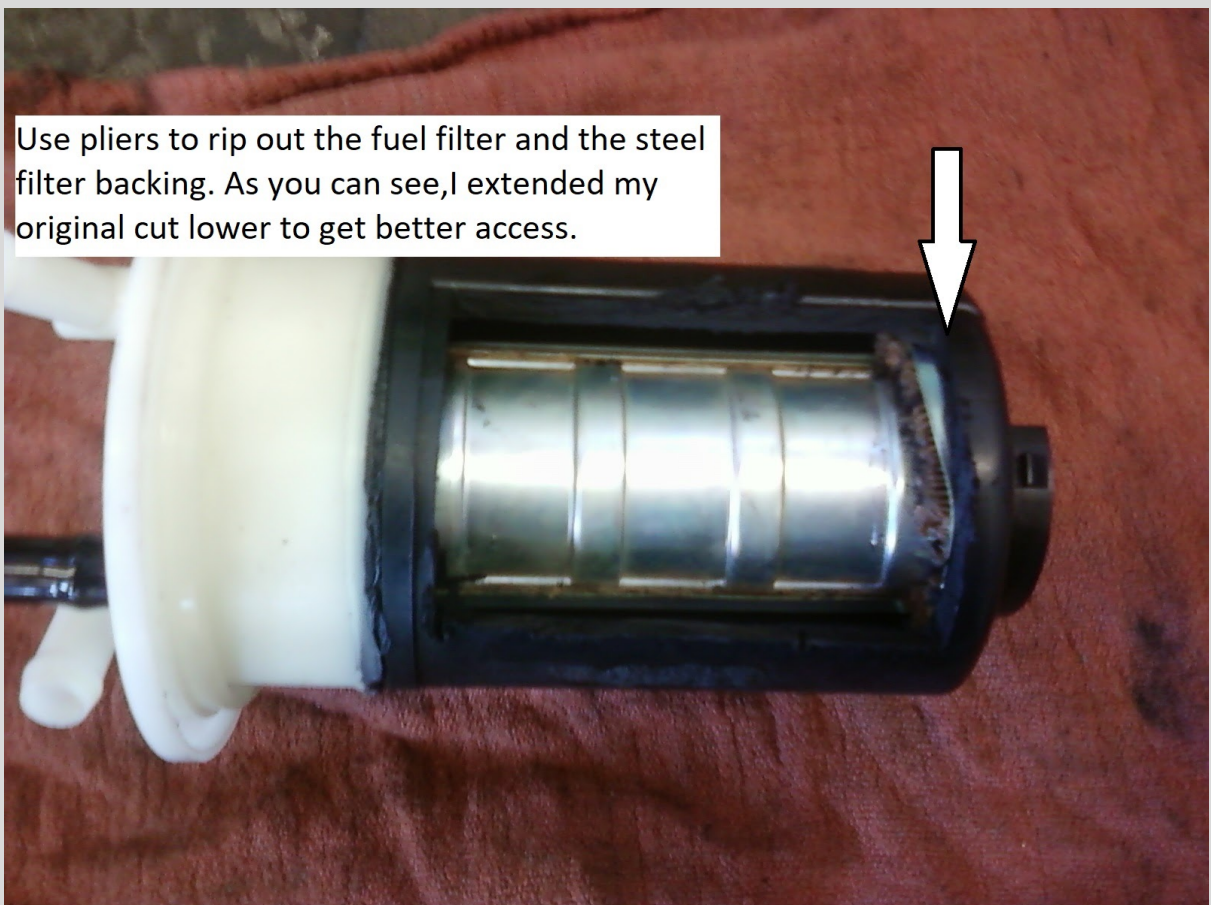
This is what I used to make my cuts and smooth out my work: A Dremel type rotary tool and a 1.25" carbide cutting/shaping wheel (Dremel #543).



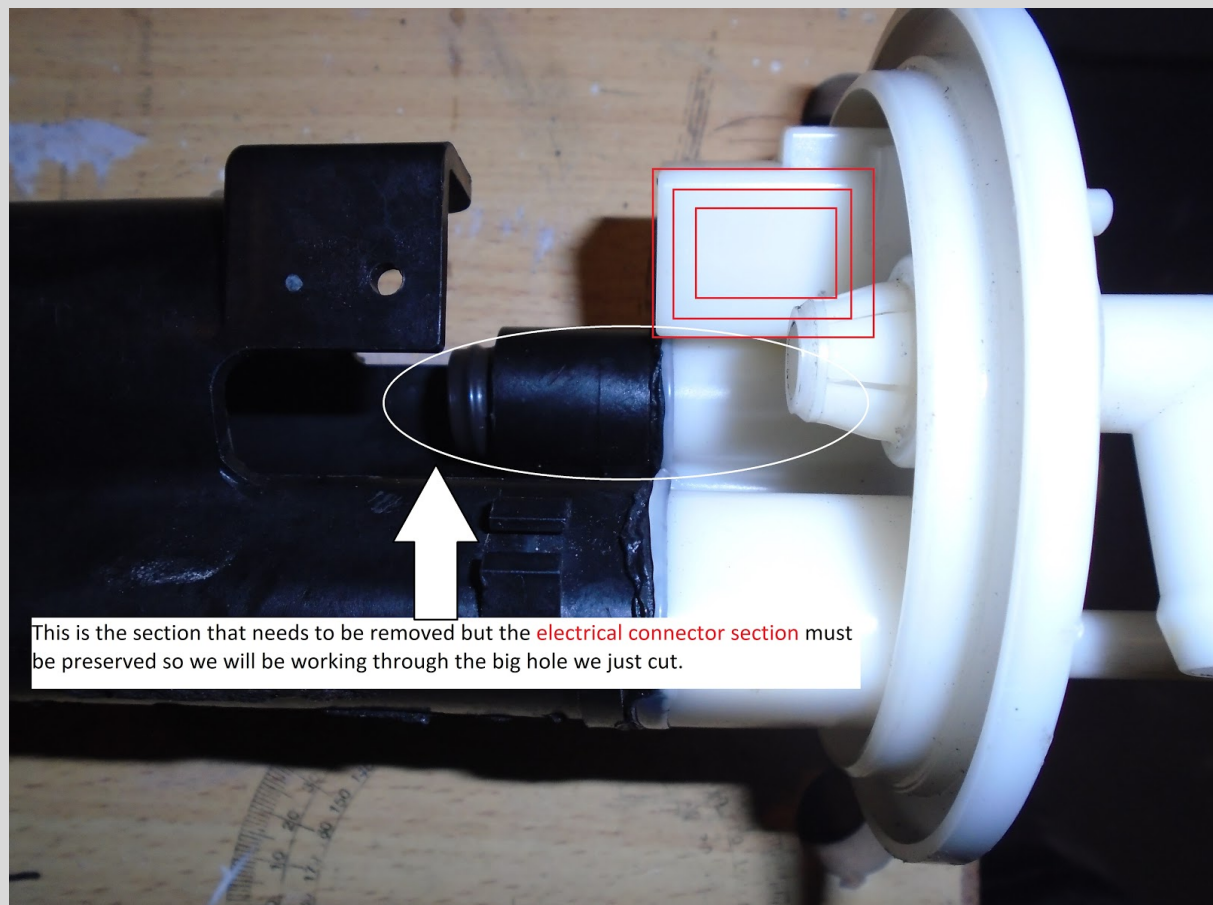
Since I didn't know what to expect, my first cut was relatively small. The final cut ended up being about where the grey line is. You can see that this housing had cracked and the previous owner attempted to fix it by melting the plastic (green line).



Use pliers to rip out the fuel filter and the steel filter backing. As you can see, I extended my original cut lower to get better access.

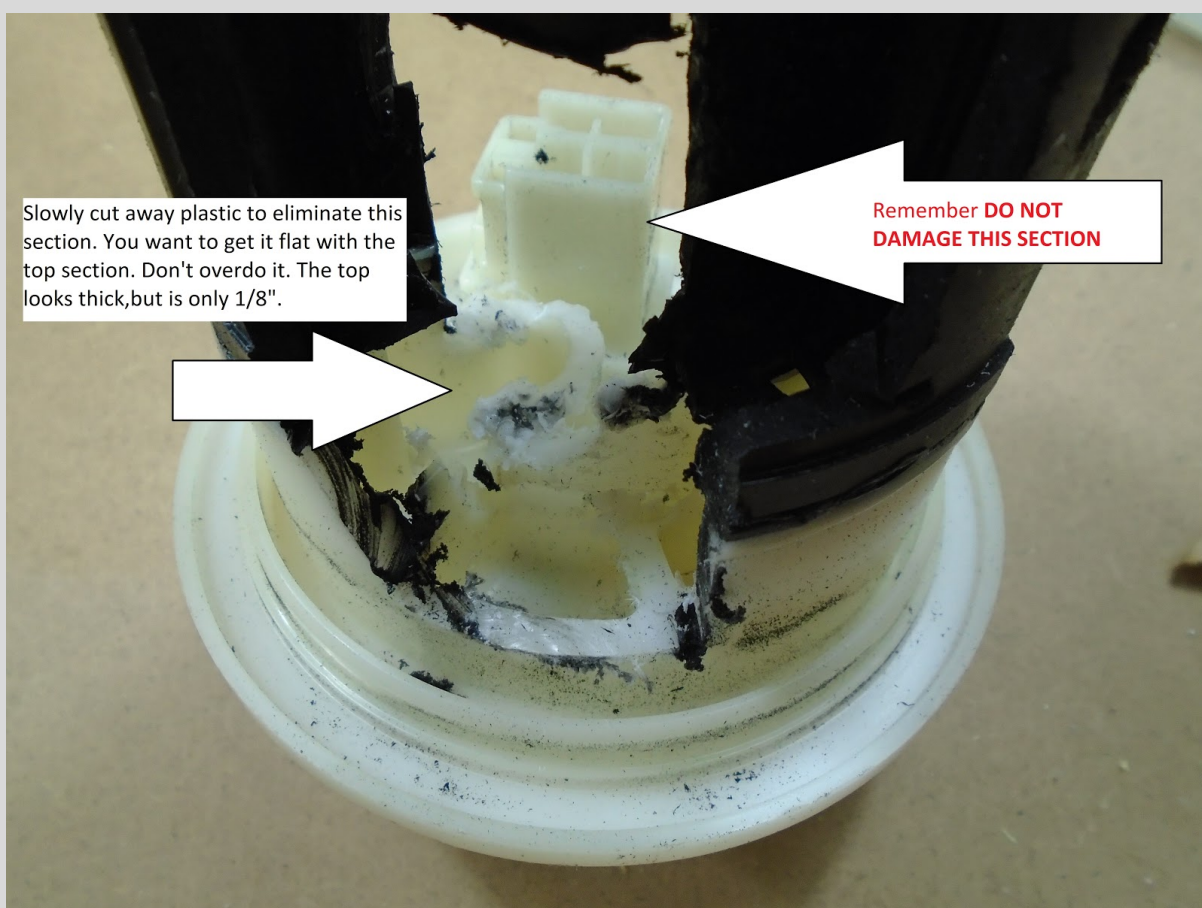




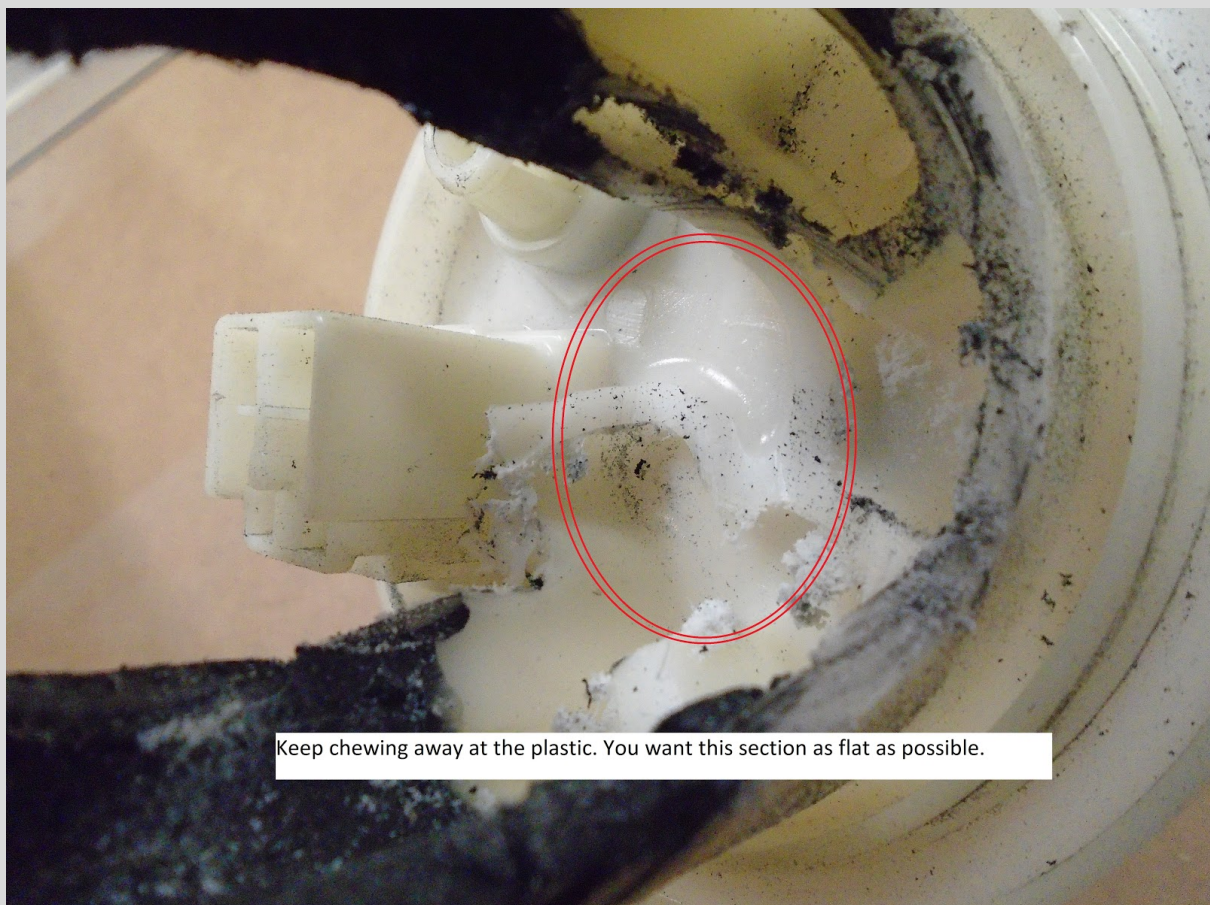
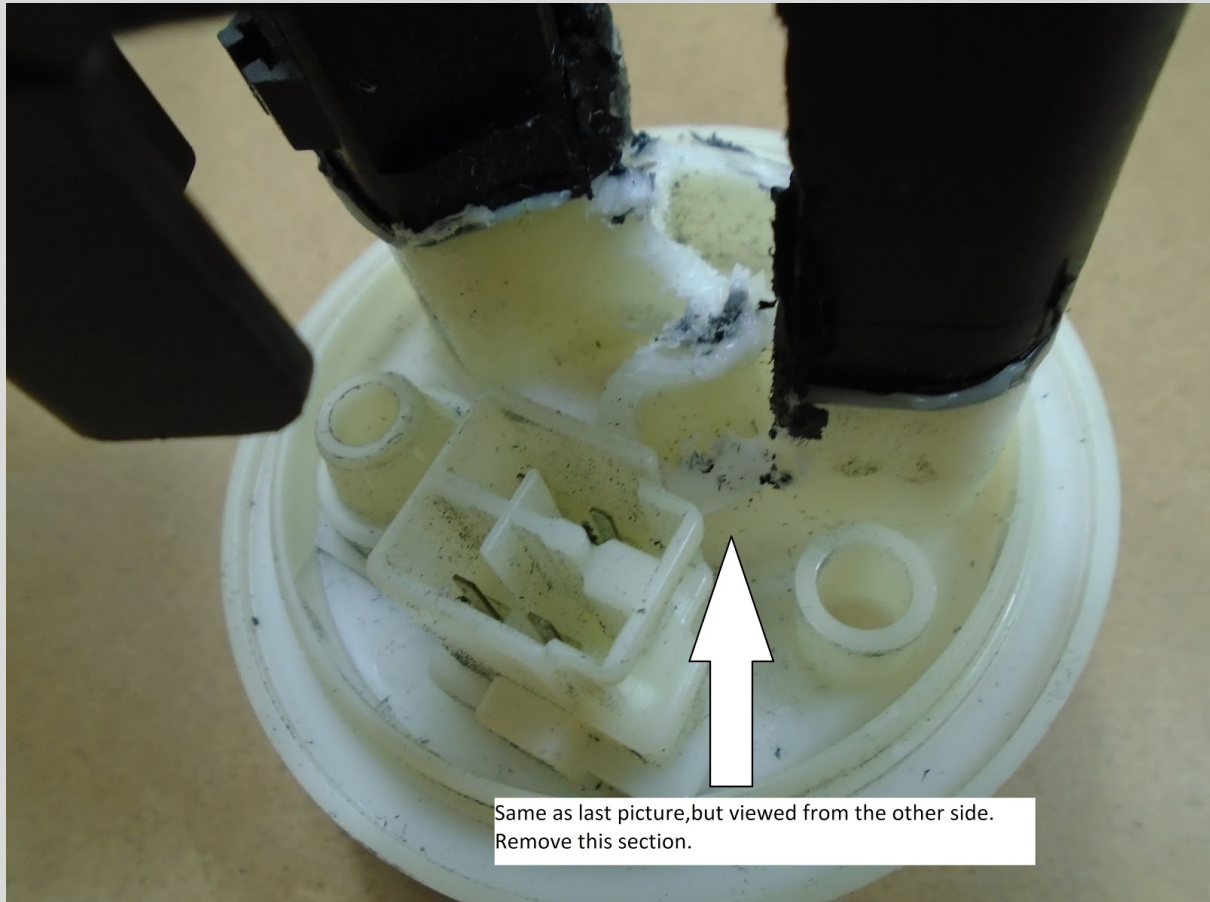


Now it's time for some serious cutting. The circled section above has to be removed completely, and for that you need to open up some room to work. Enter from the hole you just cut. A fair amount of material can be removed, but proceed in small sections just to be safe.

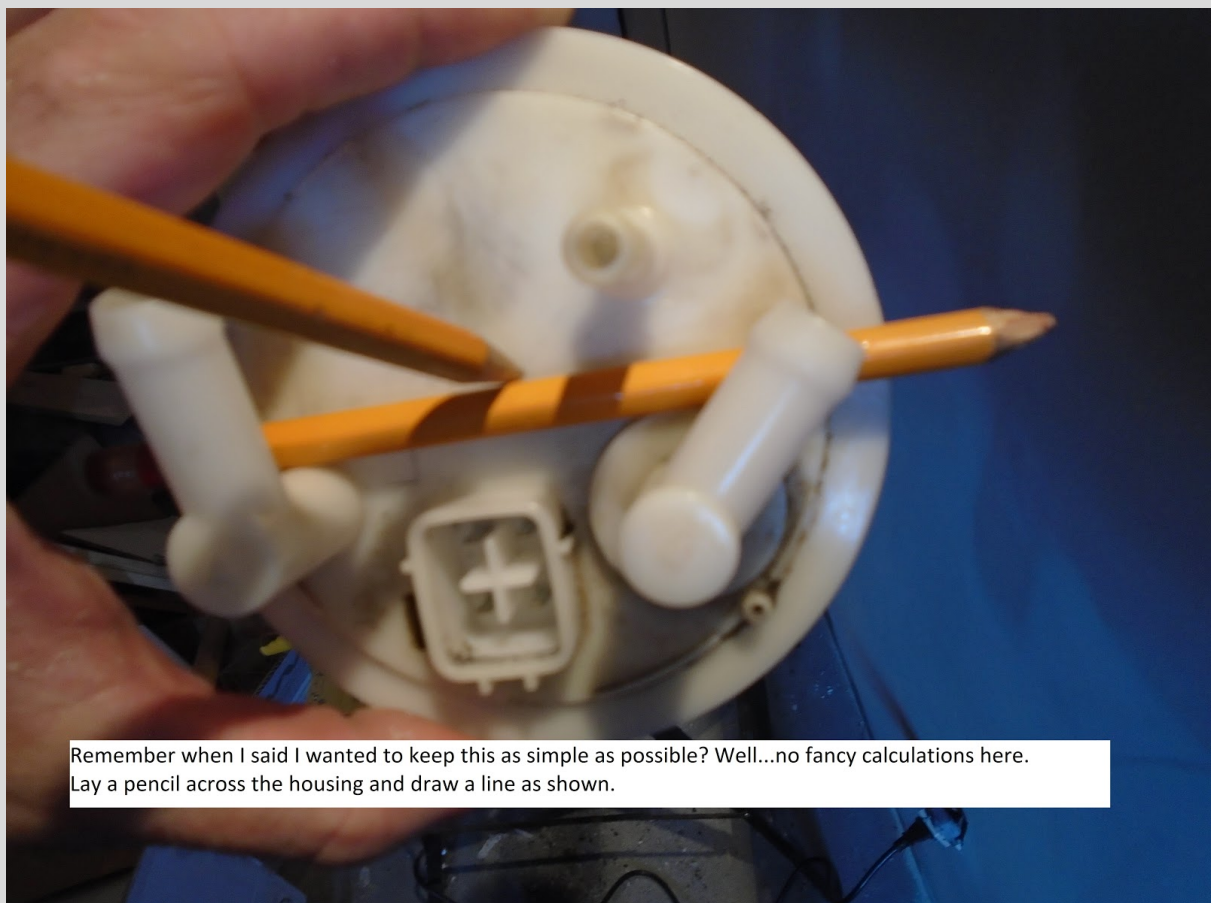
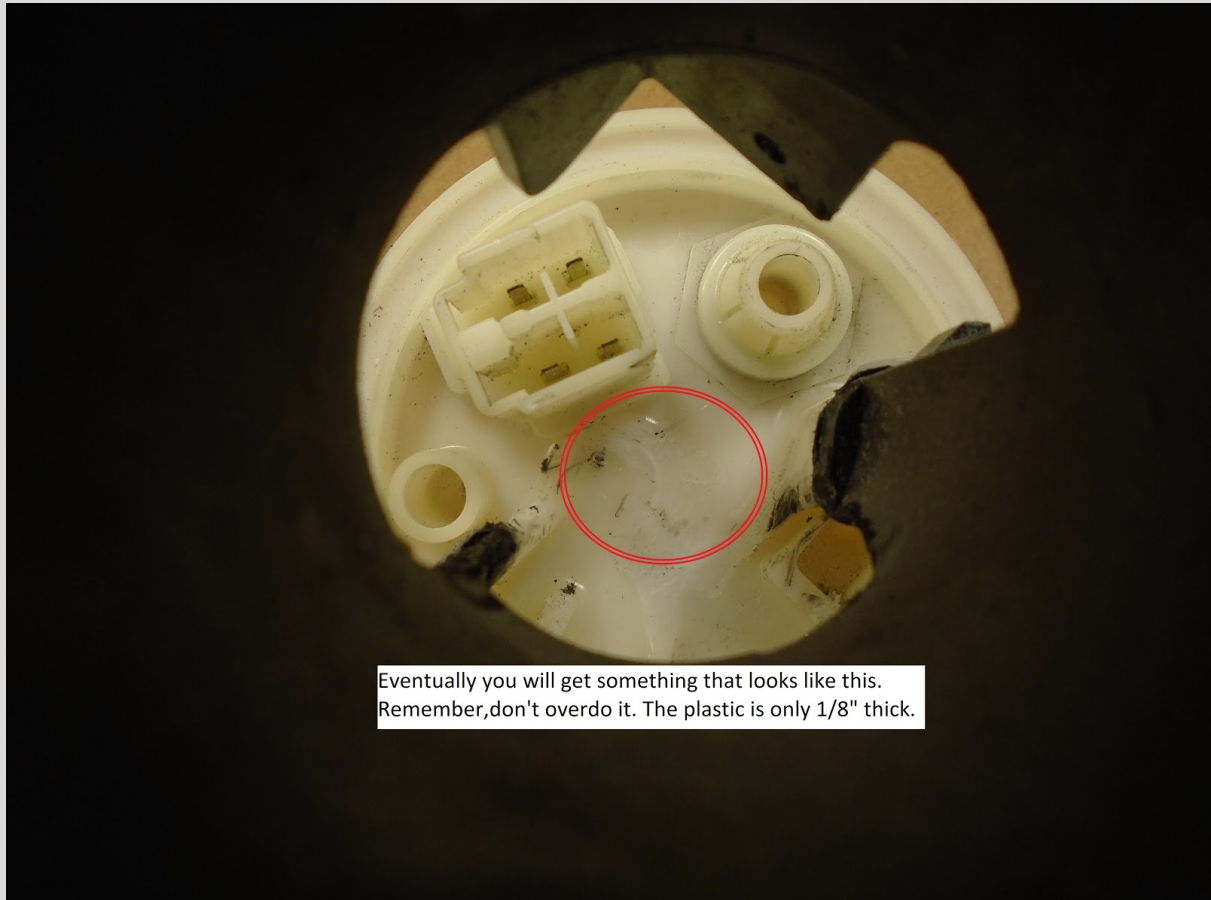
Basically you have to open up a hole in the white portion (picture below) to reach the section where the fuel pump grommet fits. You also have to cut some of the black plastic out (orange line) to give you room to work. You can enlarge your initial cut to the red line, but again don't overdo it. The idea here is to make room to work with your cutting tool, while keeping enough material to ensure structural integrity. The housing will still be supporting and positioning the fuel pump in the sub-tank when you're done.

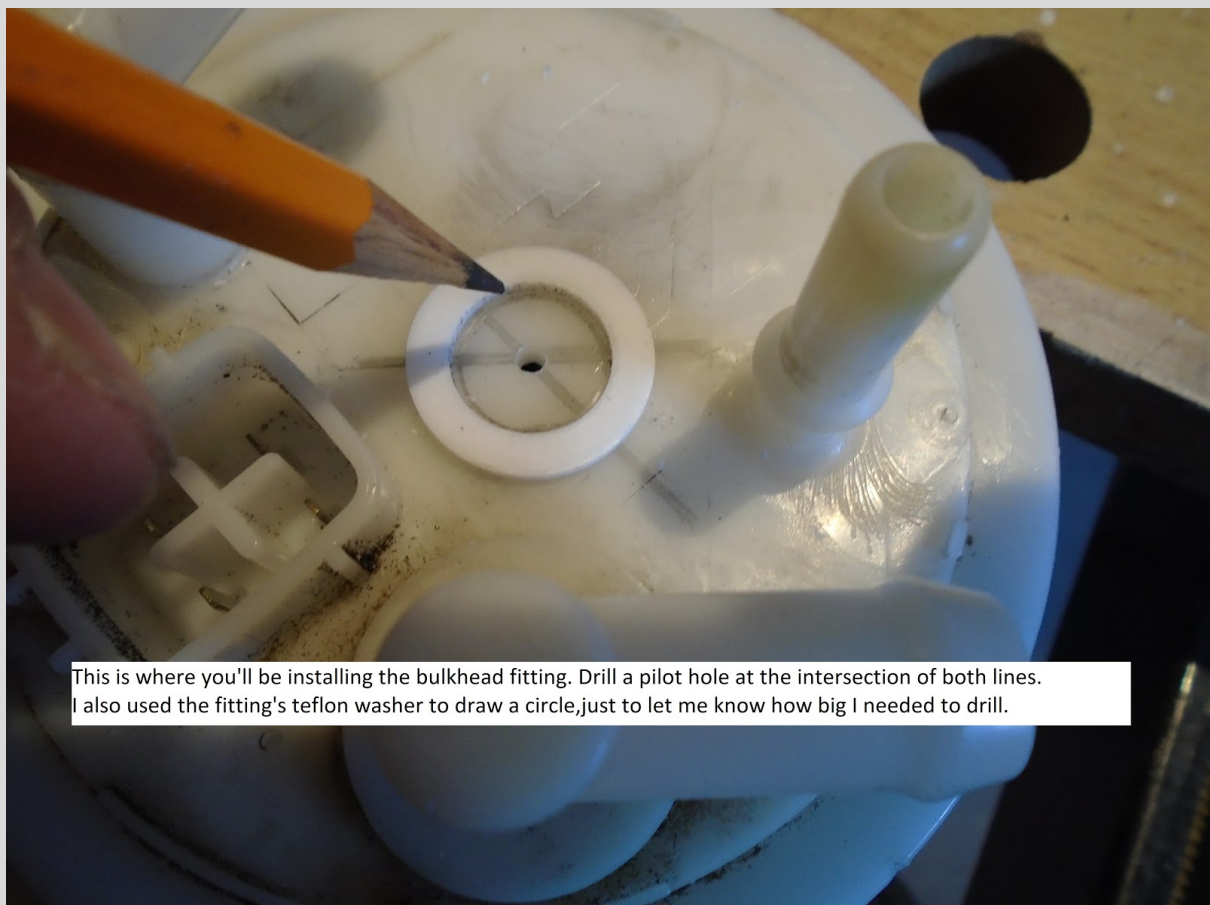












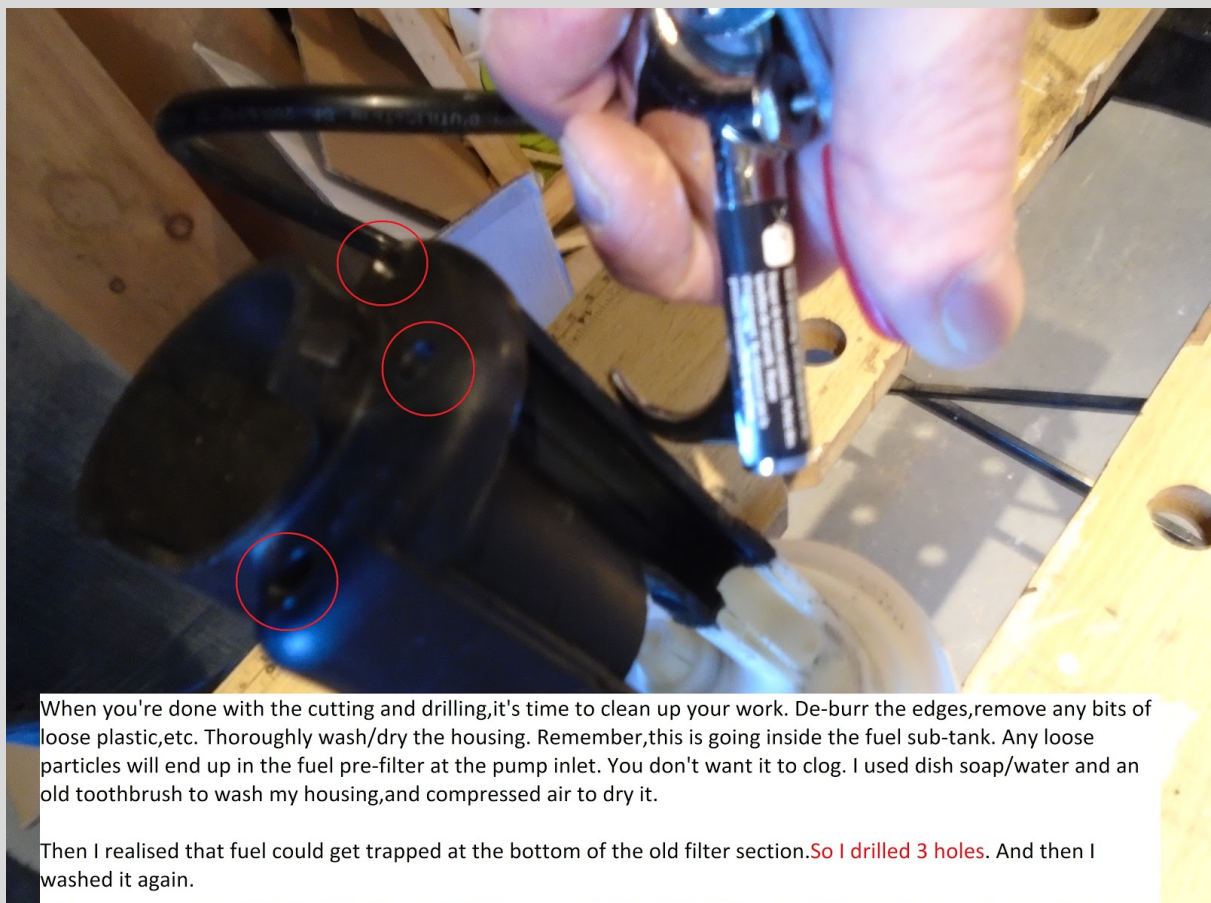








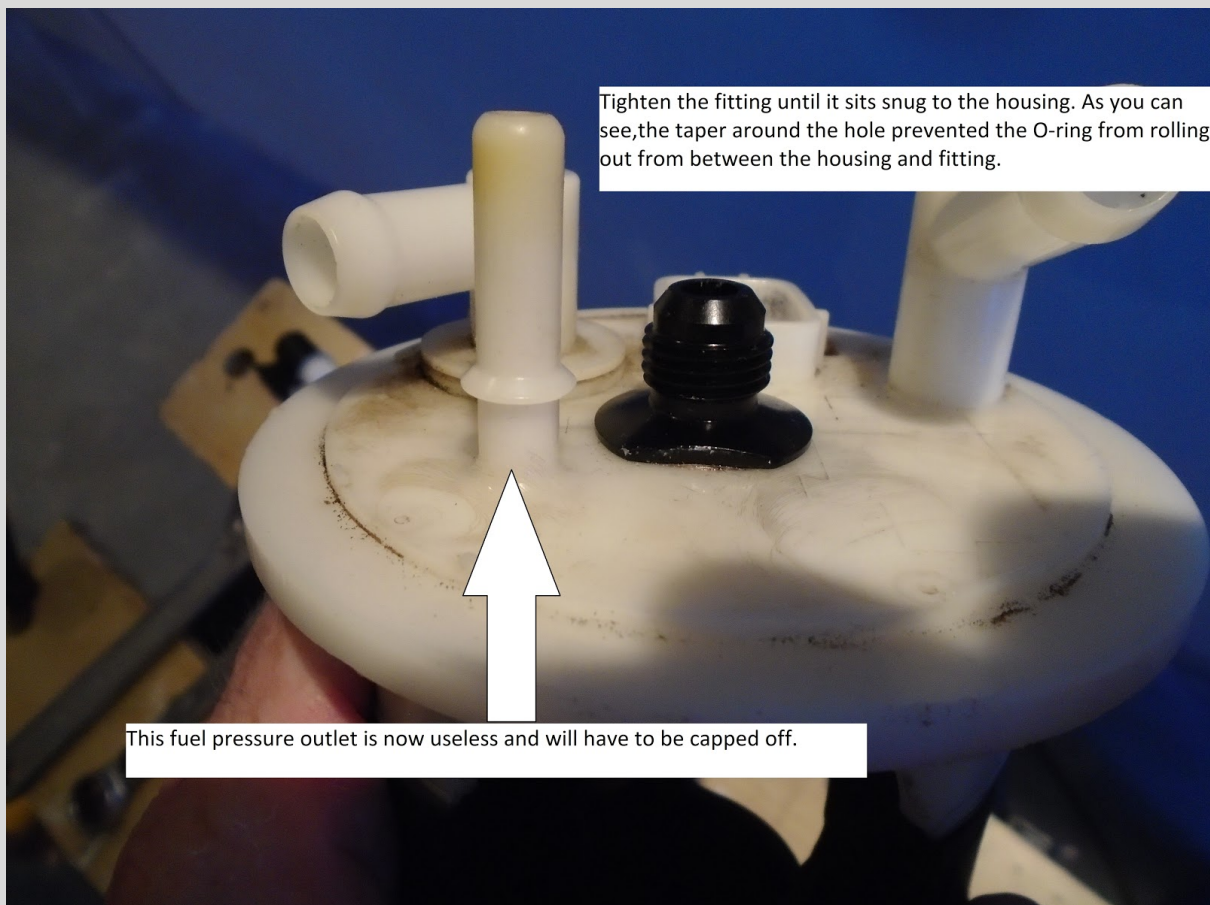
I drilled in multiple steps, stopping to check how deep the O-ring would sink into the housing. I wanted about half of the O-ring to be exposed with the fitting still loose.



When you're done with the cutting and drilling, it's time to clean up your work. De-burr the edges, remove any bits of loose plastic, etc. Thoroughly wash/dry the housing. Remember, this is going inside the fuel sub-tank. Any loose particles will end up in the fuel pre-filter at the pump inlet. You don't want it to clog. I used dish soap/water and an old toothbrush to wash my housing, and compressed air to dry it.

Then I realised that fuel could get trapped at the bottom of the old filter section. So I drilled 3 holes. And then I washed it again.

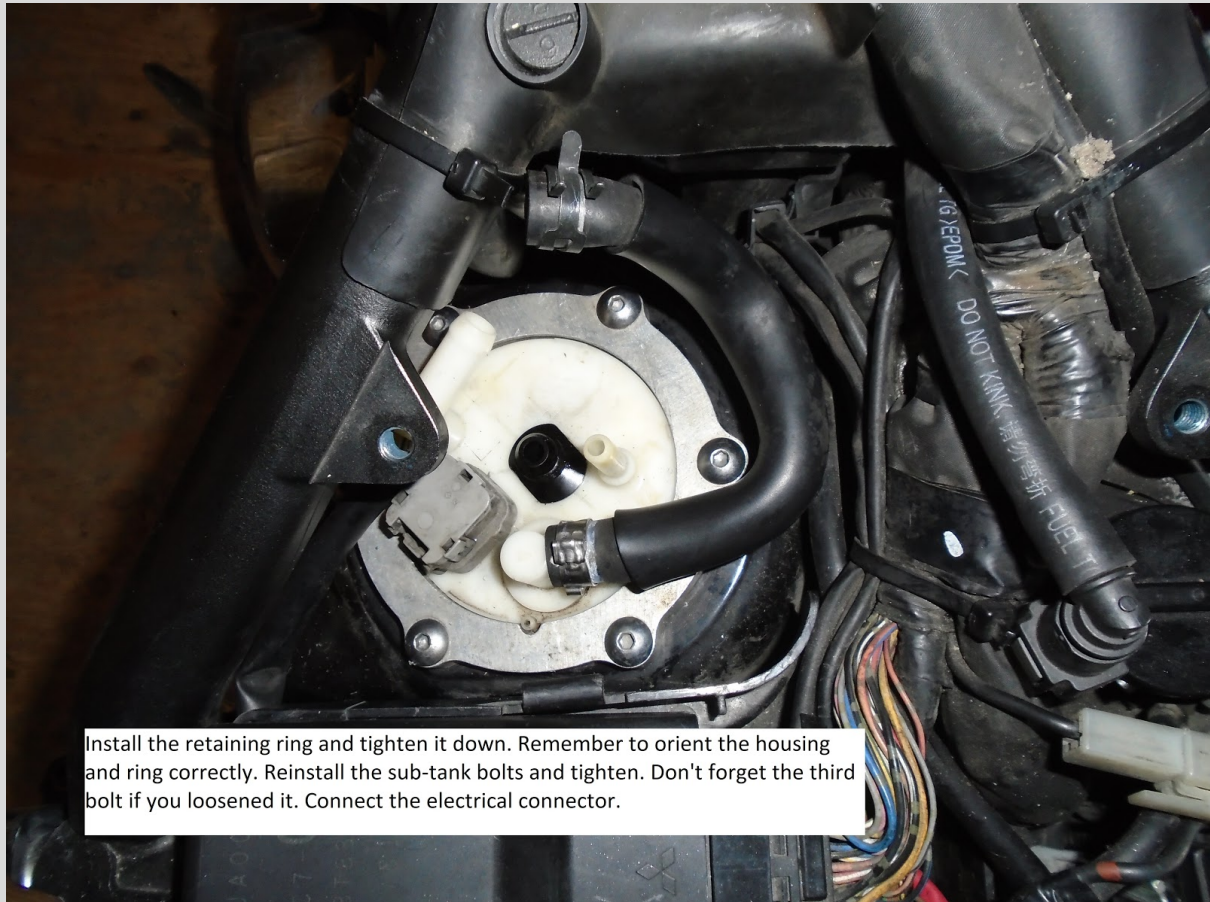












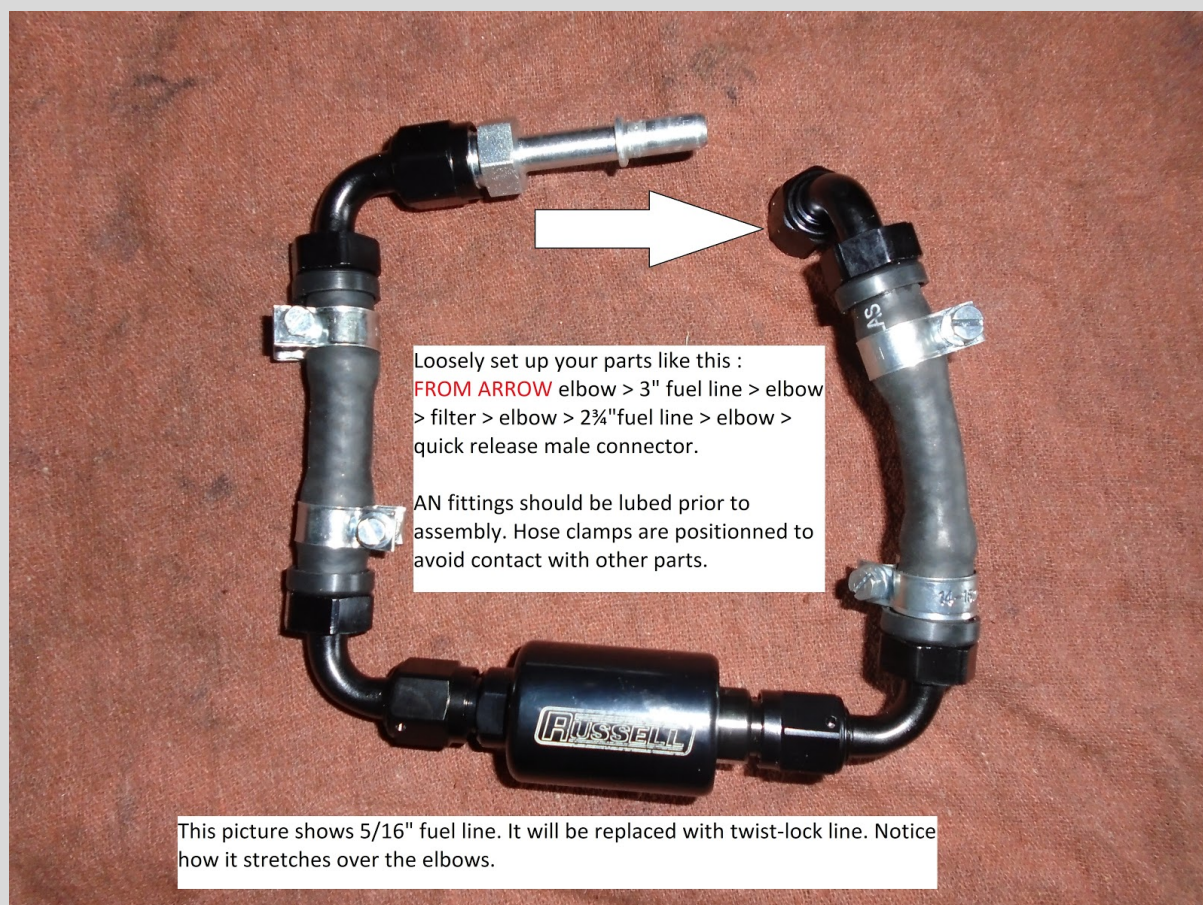
Retaining ring bolt torque 3.6 ft-lb.

Sub-tank bolt torque 7.2 ft-lb.



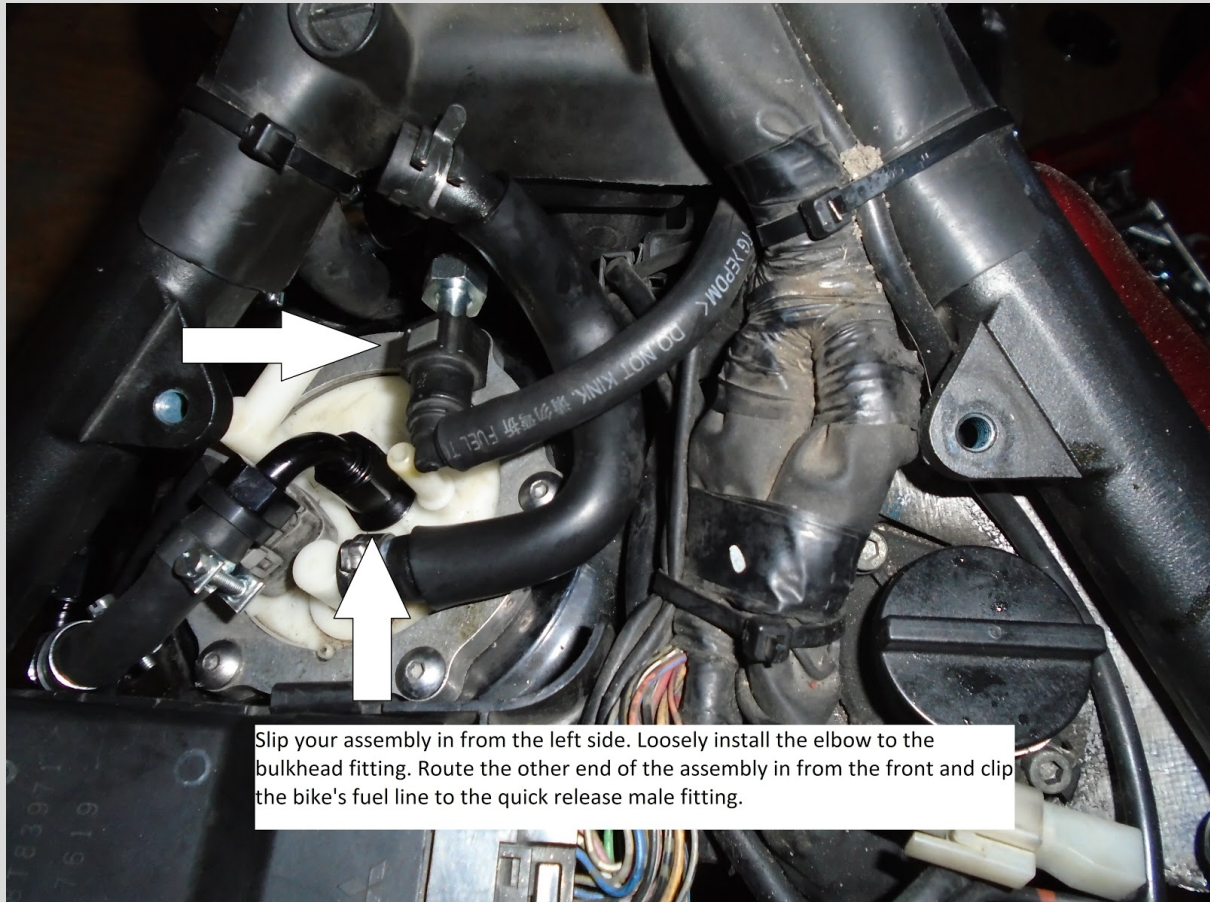


Now it's time to assemble the rest of your new parts.



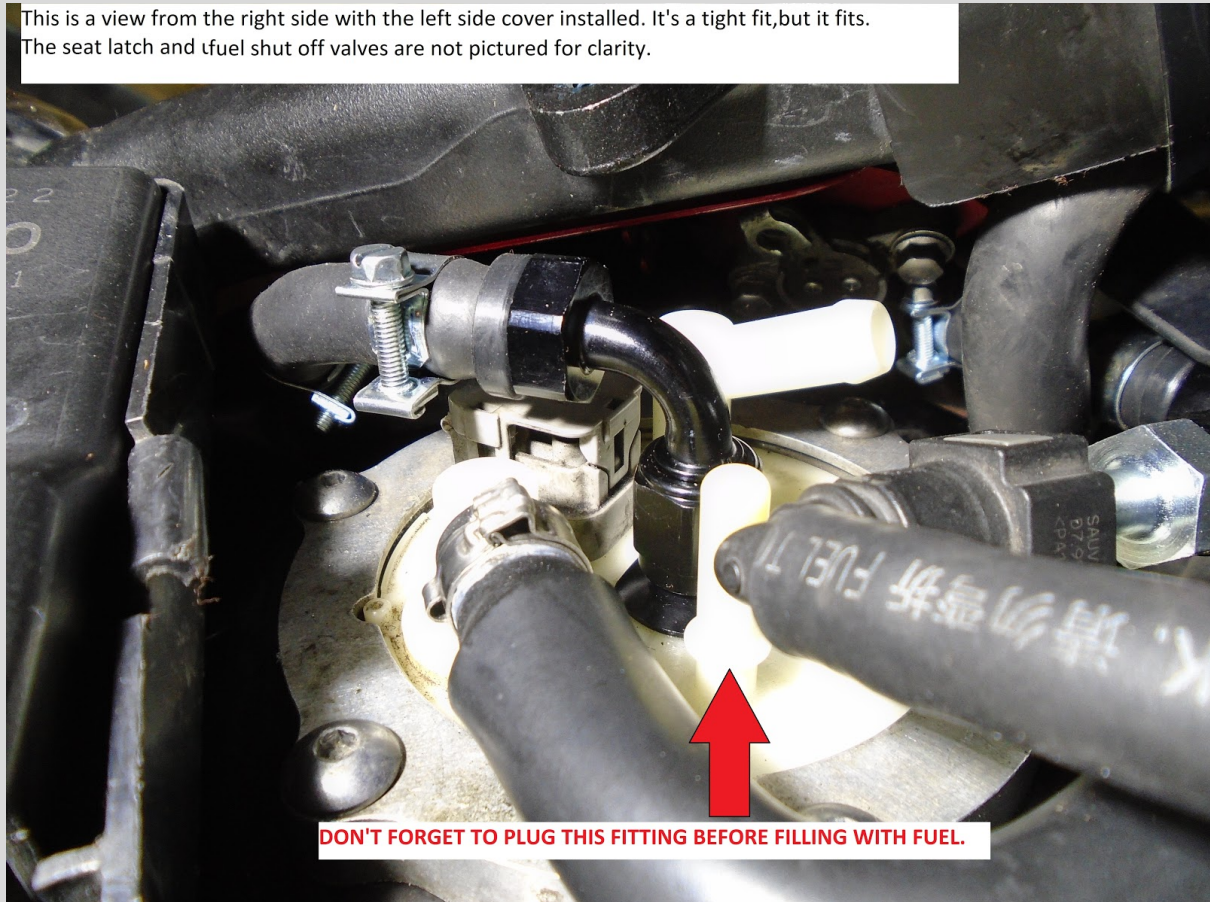
**Remember:** Do not use the SAE 30R10 submersible fuel line here.  
Use only regular FI rated fuel line.







This is a view from the right side with the left side cover installed. It's a tight fit, but it fits. The seat latch and fuel shut off valves are not pictured for clarity.



Reinstall the fuel tank, connect the lines and open the shut off valves. Before adding any fuel to the system, **plug the old fuel pressure fitting on the housing**. I used a piece of FI fuel line with a bolt inside and 2 clamps. I don't recommend using carburetor vacuum port plugs because they were designed for vacuum, not fuel. They will deteriorate from fuel contamination over time.

I know I'm repeating myself here, but **DON'T FORGET TO PLUG THE OLD PRESSURE FITTING ON THE HOUSING BEFORE ADDING FUEL.**

Is it plugged yet? Okay.

Add fuel. You don't need to fill it yet. Just add enough to make sure the pump won't be starved for fuel.

Turn the ignition ON, let the gauges cycle, then turn the ignition OFF. Repeat 3-4 times. Check all your fittings and connections for leaks.

If everything is dry, start the engine and let it idle. Again check for leaks. If nothing is leaking, you can stop the engine and fill up the tank. While filling, check for leaks around the sub-tank/housing seal.

Once you're certain that the fuel is properly contained, you can reassemble the seat latch and side cover. Don't forget to reconnect the seat latch release cable.

Over the course of the next few weeks, I strongly recommend that you keep an eye on your installation to ensure that it doesn't develop a leak.

My experience with this mod has been 100% problem free.  
I hope yours will be the same.

