12v fuel transfer pump ideas and sources (and notes about aircraft fueling safety)

Described below are details about a portable 12v fuel transfer pump that we use, and where the components can be obtained.

Summit fuel pump, model SUM-G3136-0, 2.3 gallons per minute...
https://www.summitracing.com/int/parts/sum-g3136-0/overview/
this fuel pump uses 3/8" NPT fittings

blue plastic tub...
https://www.amazon.com/gp/product/B00021LQ0U/ref=oh_aui_detailpage_o01_s00?ie=UTF8&psc=1

12v battery (that fits in the tub rather nicely)...
https://www.amazon.com/gp/product/B00A82A2ZS/ref=oh_aui_detailpage_o00_s00?ie=UTF8&psc=1

fuel lines...
In our photos, we are showing the pump with regular clear vinyl lines. These are OK short-term but they are a bit stiff and will get stiffer when cold and old. So, after testing the flow-rates of the 3/8" and 1/2" ID tubing, we find they are the same. And for much better flexibility and to be a more compact package, we recommend using the Tygon F-4040-A yellow fuel-resistant tubing in 3/8" ID (1/2" OD). From U.S. Plastics this costs $1.67/foot.... http://www.usplastic.com/catalog/item.aspx?itemid=34382&catid=864

The **brass fuel line fittings** are typical hardware store items, with 3/8" NPT threads and with 3/8" barb fittings (to work with 3/8" ID plastic line). You can see in the attached photos we were using 90-degree fittings. However, since taking these photos, we have switched to straight fittings, and run the intake and outflow fuel lines through holes we drilled in the sides of the blue plastic tub. This works better.

You can see in the photos that we attached a **cigarette lighter socket** to the 12v battery. This way, it is a simple plug-in deal to charge the battery. I think a little neater than not having this and using the 12v charger with the alligator clips, but this is not necessary.

handy low-cost 12v charger...
https://www.amazon.com/gp/product/B0051D3MP6/ref=oh_aui_detailpage_o05_s00?ie=UTF8&psc=1

We also put an **inline fuse** in the 12v wire from the battery going up to the switch and back down to the electric pump.

The most difficult thing is to make a good, safe remote-control switch. We did the one on our pump by taking a heavy-duty extension cord and cutting a section of appropriate length, and installing a momentary contact switch (placed in the end of a plastic tube to provide a "handle") and wiring appropriately. How to do this properly and provide a safe switch and wiring is not something easy to explain, so unless you are experienced and good with wiring work of this sort you should not attempt it or get some help. The pushbutton switch should be momentary contact, so the pump will only run while you are holding down the button -- otherwise, if you were to drop the switch the pump would continue to run and this would be very dangerous.

WARNING: We are showing the 12v fuel transfer pump we have made and use, but we do NOT and cannot attest to the safety of this or similar equipment and use of such a fuel transfer system. This fuel transfer pump does not "ground" the aircraft to the fuel pump and the fuel lines we use are not conductive and so there is a possibility of static electricity sparks and fire. (of course, there are generally the same concerns about using a plastic gas can to hold up above the wing and pour fuel into the wing tank...) So, if anyone makes their own 12v fuel transfer pump-system identical to or similar to what we've done, it must be understood that it is entirely experimental, and entirely at your own risk and your own responsibility.

NOTE: When fueling the aircraft, even with a fuel transfer pump it is essential that the pilot be up on a step-ladder and carefully watching the fuel level rise -- to not over-fill and over-flow and spill fuel.

NOTE: Avoid filling the wing tanks completely full. Fuel expands when it gets warmer. If you fill-up your wing tanks when it is cool or cold, and then park your plane out in the sun -- the gasoline will expand and if your wing tank is already very full then the expanding gasoline can start coming out of the fuel cap vent and get on your wing and even onto your skylight or door or other polycarbonate panels and damage them.

NOTE: Don't park your plane where it is on a slant (i.e., one wing higher than the other) because fuel will cross-feed and flow from the higher tank into the lower tank -- and cause fuel to overflow from that wing tank fuel cap vent tube. To prevent this, shut-off both wing tank valves unless you are parked with the wings level.

IMPORTANT SAFETY NOTE: To make fueling your aircraft more safe, it should not be done inside a hangar. If you are outside, then if fuel is spilled or if for any reason a fire starts, then it will be easier to get away from the fire and also not burn-down your hangar and perhaps all adjacent hangars and aircraft and equipment.

FURTHER NOTE: Having said all of these things and the important cautions and warnings, we have to mention that it also can be risky to climb up a step-ladder and hold a gas tank over the wing and pour fuel into the wing tank. Even with care, it is easy to make a mis-step on the ladder and have a fall, and it is quite easy to spill fuel or drop a tank and damage a wing.