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## FUEL SYSTEM INSTALLATION

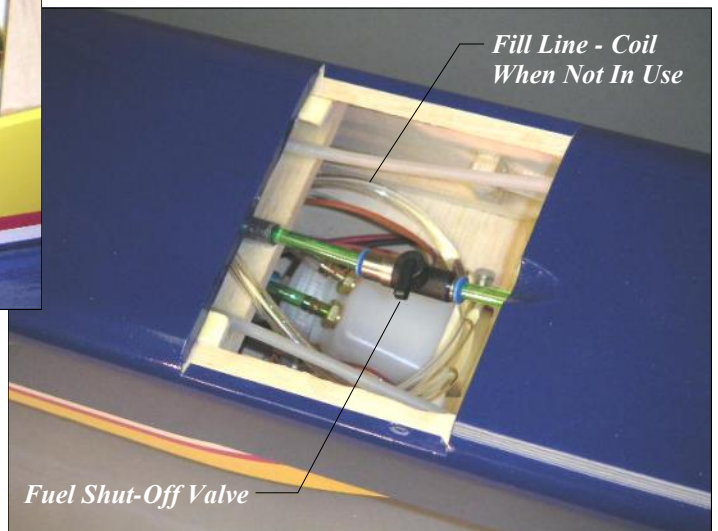
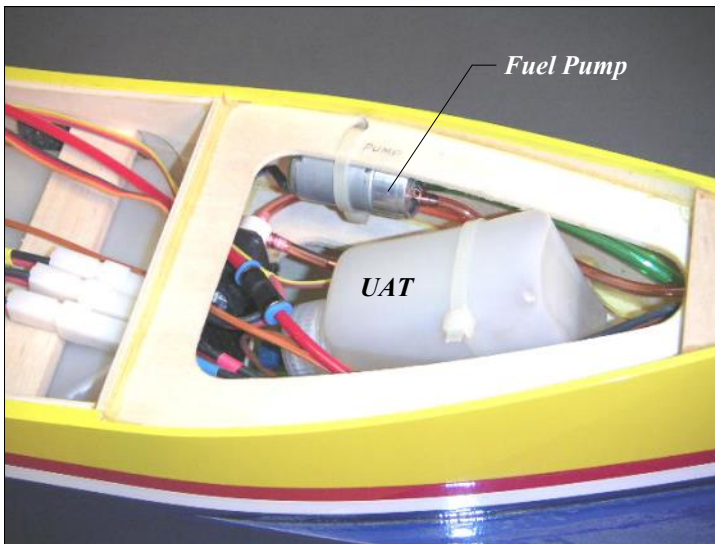
*The remainder of this booklet is less like instructions and more like a show-and-tell. Even though you may use a different turbine, radio, and accessories, you might find the descriptions here useful.*

**Fuel System Overview** - The manual supplied with your turbine most likely contains info on the recommended fuel system arrangement. Be sure to follow their recommendations for fuel line sizes and sequence of tanks, solenoids, pump, and filter. For a jet, the Reaction 54 uses a very simple fuel system. The single main tank feeds a header tank that feeds the fuel pump. The positions of the main tank and a UAT header tank are shown clearly on the plans. You can position your other components as shown in these photos, or differently to suit your taste. BTE offers a Fuel System Accessory Package that will come in handy for your installation (see Appendix B for more info).

**Main Fuel Tank** - Assemble the 60 oz. Du-Bro Tank included with your kit, being sure to use the kerosene-friendly brown rubber stopper with the molded "0". The tank needs only two lines - one is the feed line (with the clunk) and the other is the vent line. The kit also includes a soft foam pad that goes at the top of the fuel tank compartment. It doesn't have to be glued in, but you can epoxy it in place if you wish. The foam isn't there to absorb vibration; it's meant to compress when the tank is mounted with the two 1/4" x 1" balsa sticks as shown on the plans. The balsa sticks are wedged above the cutouts in the fuselage doublers, and can be left unglued. A neoprene rubber pad is also provided in the kit to provide a small cushion at the front of the tank. In the event of a crash, the neoprene pad might just be the difference between a ruptured fuel tank or not. Use epoxy to glue the pad to the back of F-5.

**About the Main Fuel Tank Orientation** - The plans show the main tank with the stopper aft and the clunk forward. I've never had any trouble with it that way, but some builders prefer to switch it around so the clunk is at the rear. Either way works fine, so if it seems more natural to have the clunk aft, go ahead and install it that way.

**Header Tank** - The UAT is my header of choice for this model. With a UAT, the total fuel capacity of the Reaction 54 is 64 oz. There is plenty of room for a larger header tank if you wish, but keep in mind that extra fuel not only adds to your flight time, it increases the overall takeoff weight. A larger header tank will also require extra nose weight if its position is kept behind the CG. Whatever you choose for a header tank, make sure it is mounted securely. There are three lines attached to the header tank - the first one is connected to the



feed line from the main tank, the second one goes to the shutoff valve and on to the fuel pump, and the third is for filling. Keep the fill line plugged at all times except for when you are actually fueling (or de-fueling) the model.

## Fuel System Installation Tips and Notes

- Use kerosene-compatible tubing for your vent line, such as Tygon. The vent line can be routed anywhere you wish. My preference is to route it to the bottom of the fuselage ahead of the wing. Keep in mind that the vent line also serves as the overflow line when fueling. Add a small O-ring to keep the vent line from sliding up into the fuselage.
- The vent line from the main fuel tank must always be open during fueling and turbine operation. However, it's been my (unpleasant) experience that kerosene will find a way to drip from the vent any time you put it in your vehicle, or even when you turn the model over for assembly. For that reason, you should plug the vent when you are transporting or doing maintenance. Add a red streamer on the plug so it's more visible.
- The fuel pump can be strapped to the boat tail former with a tie-wrap as shown in the photo on the previous page. Fuel pumps are small electric motors and have been known to create RF "noise" that can cause problems with your radio. Make special efforts to keep the pump as far away as possible from any wiring, particularly your radio antenna.
- One thing you do not want in a turbine model is fuel leaks. Take the time to secure every connection in your fuel system, even the clunk line inside the main tank. I use safety lock wire, wrapped twice around the tubing then twisted. Others like to use small tie wraps; two on each connection with the heads aligned 180° apart.
- Festo fittings are commonly used in turbine models, and they work great when properly installed. To avoid air leaks, be sure to cut the ends of the fuel tubing that will go into the Festo fitting clean and straight with a razor blade. Also try to route your fuel line so that it is straight when it goes into the fitting. Festo fittings have been known to leak when positioned where the fuel line is making a tight bend.
- If your turbine uses external solenoids, they can be mounted to the model with tie wraps or Velcro. If you use stick-on Velcro, be sure to apply a thin layer of epoxy or CA to the wood and allow it to dry before applying the Velcro. It will stick much better to the dry glue than to bare wood.
- To help extend flight time, jet modelers commonly use an overflow or "taxi" tank. This is a separate fuel tank (typically 10 - 20 oz.), external to the model, that is hooked up to the main tank's vent line during startup. With this arrangement, the main fuel tank remains full until the taxi tank is removed just before takeoff. Taxi tanks are popular at jet fly-ins where you sometimes have to wait a considerable time for the runway to clear.



## Installing the Gas System

In addition to the fuel system, some older-style turbines use a completely separate propane gas system for starting. The turbine ignites and runs on the propane/butane gas for a few seconds before switching over to the kerosene fuel system. The tank for the gas system is usually a small metal canister that needs to be mounted vertically. The photo shows my propane tank (looks like a CO2 cartridge) secured with a plywood bracket. It was mounted well forward in an attempt to keep as much weight toward the nose as possible. The plans show an alternative location next to the ECU that would also work. The fill line on your propane tank should be secured during flight by strapping it under one of the rubber bands on your wiring rack.

Another option is to arrange an external system where the propane is hooked up just for starting, then removed from the model once the turbine is running. Again, check your turbine instructions for details.

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