

**A Lazair Fuel System Tutorial** by Shannon Whittaker  
*based on an e-mail exchange between Shannon and Tyler Paradis*

*I made this document so that Shannon won't have to re-type all of this absolutely priceless information*  
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This is the basic fuel line method I use on my Series 3 with Rotax 185's. As I remember the JPX engines used the same basic fuel line layout. It has been quite a few years since we owned a JPX powered Lazair so forgive me if I miss a few details.

I use blue 3/8 or 5/16 O.D. type fuel line that you can get from any motorcycle shop. I don't use primer bulbs and never will, some guys do. The primer bulbs were not recommended by Lazair and increase your chance for air entering the fuel lines from the multiple splices and connections. The optimal set-up for your fuel line is one continuous unbroken line from tank to carburetor or fuel pump inlet. Being that you have JPX's you shouldn't need primer bulbs as the JPX's have strong "Impulse" fuel pumps to suck the gas up from the tank. The filters used on the 185's are in-tank brass check ball filters. I think the JPX's also used the same filters. Do not use brass in tank the filters with part number FUF02. These look like the original Lazair brass filters but they cause problems. You can get the original Lazair type brass check ball filters from A.S.A.P. aircraft supply in Canada and other suppliers. The description of the original Lazair filters is as follows. "In-tank, Brass, Check Ball, filters". I do not have a part number for the original filters. Just remember do not to get the FUF02 brass filters.

Yes the filters go directly in the tank. Measure out your fuel lines and install them so that your filters will be near the bottom of the tank. Do not install the fuel lines with extra length or the fuel lines will "Curl up" in the bottom of the tank thus robbing you of useable fuel. You can add some spare brass fittings of any sort as weights "sinkers" to ensure that the filters stay at the bottom of the tank. On my lines I safety wired on a few brass "hunks" just above the filters to keep the lines down in the tank.

Drill two holes in your nalgene tank cap. Locate the proper length of your lines and add some sort of stop inside the gas cap to prevent the lines from coming out of the gas cap. Use your imagination as you can use safety wire or small hose clamps to keep the lines in place for example. The whole objective is to keep the fuel lines stationary in the gas cap to assure their proper depth in the tank. There are no exact instructions for the fuel lines on your plane. This is one area where you come up with your own ideas to keep the lines in the tank and at the proper depth.

To install the fuel lines themselves on your filters and carb inlets heat up the ends of the lines with a cigarette lighter. Insert needle nose pliers into the "hot" line and pull the arms of the pliers apart. This will stretch the lines enough to slip the ends of the fuel lines over the "Barbs" of the filters and carb inlets or fuel pump inlet.

When everything is installed you will notice that you will need to "Pre-twist" the gas cap before you actually try to tighten it down on the tank. Basically put about 3 twists on your gas cap and lines before you actually set the cap on the gas tank threads. After a few tries you will get the hang of it. No big deal.

Also you need to safety wire your fuel lines at your carburetor barb inlet or fuel pump inlet.

Now there is one thing to consider. I personally like being able to remove the tank. We know that water and trash settle to the bottom of the tank and that 2-stroke oil mixed gas will go stale and separate if left in the tank for very long. I personally will pour the gas out (use it in my junky lawn mower even though you aren't supposed to use oil mixed gas in a 4-stroke, he he) if it has been in the tank longer than 2-3 weeks. If you can incorporate your "Hard Pipe" in your tank and still be able to remove the tank without much trouble you will have a winner.

Engines that have sat around for a decade can be problematic. Nothing worse than a dead engine when you are all set to fly. You don't have to worry about those JPX's 4-stroking too much, they are ultra- smooth, powerful, quiet, and some very rugged engines.

The method I've described surely isn't the only way you could run your lines. I also think you could use all sorts of other fuel filters, stop cocks, valves, back flow preventers, and primer bulbs on your lines. I've seen a wide variety of fuel lines and components on the planes. The opinions vary greatly on this subject.

The method I've presented is what has worked well for us for many years with our Rotax's. It is the most simple and straight forward approach to getting fuel to the engines. Again using this method provides for continuous lines from tank to carbs. This effectively eliminates the chance of air entering the fuel system. Air in a 2-stroke engine fuel delivery system is a sure bet for having an engine failure.

I will add that if you do not plan on using "in-tank" filters you will definitely need to take extra steps to prevent the lines from curling up or floating in the tank. It is very important that you use "something" to weigh or "keep" the lines down and resting on or near the bottom of the tank. The lines by themselves would probably float if they didn't have weight on the ends.

Yes you could definitely experiment with the coat hanger, or other similar experimental method. Like I said this is one area of the plane that is open to individual interpretation and experimentation. As long as there is no chance that your lines will come out of the fuel it should work fine.

As a very important precaution look for unusual air bubbles in your fuel lines. If you see anything other than very tiny bubbles migrating up your lines you could have a problem. It is normal to have tiny bubbles in your fuel lines. According to Lazair the bubbles were actually gas vapor bubbles from the pressure differential between the filters and the carb inlets. If you notice bubbles about half the size of pencil erasers or greater you could have an air leak. This can and will cause engine failure. These large bubbles are typically what you will see if you have an air leak or bad primer bulb. I strongly recommend that you stay away from primer bulbs if it is at all possible.

Another thing that you will need to be aware of in the future is your fuel burn. The JPX's burn more gas than 185's thus you narrow your flight time down a good bit. You should be familiar with exactly how much flying time you will have with a full tank. I have found that there is a wide difference in fuel burn when you compare an economy cruise flight against a flight with much wide open throttle operation.

A Series 3 for example has a factory stated fuel burn of 1.2 gph @75% power. This is a very conservative estimate as the actual fuel burn is closer to 2.0 gph when doing lots of swooping and diving, and climbing.

An Elite equipped with JPX's has a factory stated fuel burn of 2.0 gph @ 75% power. The actual fuel burn could be closer to 3.0 gph with lots of full power usage. With the Nalgene tank "topped off" your looking at less than 2 hrs endurance with a heavy hand on the throttles.

Yes doing some test runs on the engines is a great idea. If your engines have been sitting up a long time then you need to run them at least 2-4 hours before you actually fly with them.