



## Pre-Paint>Fuselage>Interior>Fuel system

### Objectives of this task:

To install the fuel system from the wing tank connectors to the firewall fitting.

The fuel system consists of wing tanks (covered in the *Wings* tasks) that flow to a header tank situated behind the right-hand seat and then through a filter and an electronic pump to a shutoff valve located beside the pilot and then through a firewall fitting to the engine.

Note that the fuel lines to the wing tank fittings and the fuel line to the firewall will all be fitted in this task and then sealed off for later final connection.

### Materials required:

Card # J11 'Fuel Components'

Fuel header tank ►

Blue fuel line, black fuel line and clear fuel line sheathing

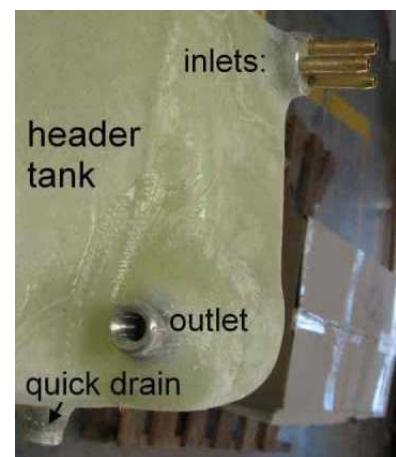
Lock wire

Epoxy Resin and Flock, 5-minute Araldite



### Assemble and test the header tank

Start by assembling the fuel fittings and pressure testing the header tank. Make sure that there are no foreign objects in the tank, then loop the inlets and breather holes (all at the top front of the tank) together with short lengths of line (it doesn't matter in what order – this is just to seal the tank for the pressure test) then fit the quick drain with a drop of Loctite 577 and tighten firmly. Fit an O-ring to the finger filter and fit into the outlet hole, once again with a drop of Loctite 577 and tighten firmly, then connect a short length of line to the finger filter and apply a small amount of pressure by blowing into the line, seal and check for leaks by spraying soapy water over the tank and fittings and check for bubbles.



### Fit the header tank to the enclosure

The header tank sits in the header tank enclosure behind the right-hand seat (the enclosure was fitted in the *Prepare fuselage* task) and is held in place with the enclosure lid, which also forms the luggage floor when it is fitted.

Fit the 2 brass nipple fittings to the inlet and outlet of the pump – in each case use a drop of Loctite. Fit the electronic fuel pump, with the flow arrow facing towards the front of the aircraft, to the floor of the enclosure with 3/16" countersunk screws and Tinneman washers from underneath the fuselage, through the pump mount and secure with Nyloc nuts.

Araldite a square of rubber sheet and a piece of sponge to the inboard side of the pump, the side that will contact the side of the tank. Araldite a 50mm square of rubber sheet to the front of the enclosure and then sit the tank in place and check that the quick drain is centred in the hole. Add more rubber sheet to pack the tank back if required.

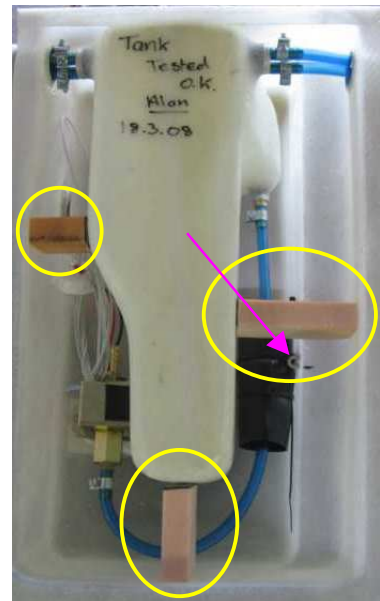
Now fit a length of rubber sheet to the floor of the enclosure that is wide enough to prevent the tank from contacting the floor at any point.

At this point the tank is positioned fore and aft by the quick drain fitting through the floor and the rear of the tank is touching the padded side of the electronic fuel pump, so now you will need to cut dense foam or timber packers to hold the tank from moving sideways or backwards.

The photo at right shows a fitted tank – note the location of the 3 packers (circled): 1 at the rear of the enclosure and 1 on each side. Each packer has a piece of rubber sheet on the end that touches the tank and the other end of each packer is flocked to the side of the enclosure.

Note that the packers do not go all the way to the bottom of the enclosure – the space under the packers is where the fuel line is routed from the tank to the filter and then to the pump.

Cut and fit the packers and when you are satisfied with the fit then flock each packer to the side of the enclosure. When fitted correctly you will be able to take the header tank out of and into the enclosure. Add a strip of foam to the top of the tank where it will touch the lid and the tank is fitted.



### **Plumb from the header tank**

As you can see in the photo above right, the filter is located just behind the right-hand packer, so cut a short length of blue fuel grade tubing to suit, then cut a longer length to run from the outlet of the filter to the inlet of the fuel pump. Check that the filter is correctly positioned, with the flow arrow facing in the direction of the fuel flow, which is from the header tank to the filter and from the filter to the pump, then use the supplied hose clamps to fit each length of tubing into place. Wrap the filter with rubber sheet and fix in place with 2 zip ties. 5 minute Araldite the supplied bracket (arrowed above) in place and zip tie the filter to the bracket.

### **Plumb to the header tank**

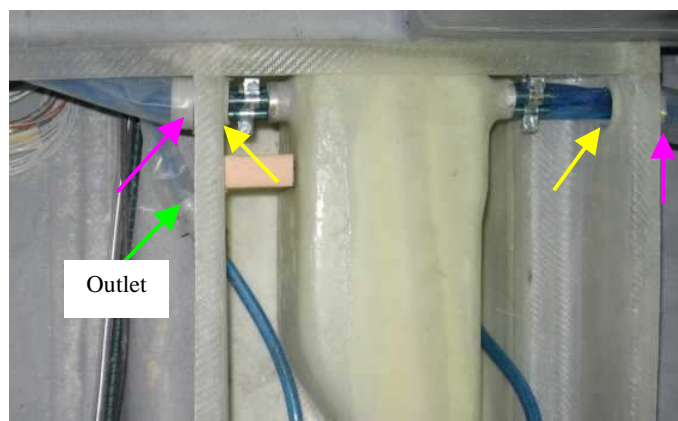
Cut 3 lengths of blue fuel grade tubing at 990mm and another 3 at 1300mm. The shorter ones will run from the header tank to the right-hand connector and the longer ones will run from the header tank to the left-hand connector. Cut 2 lengths of the clear sheathing, 1 at 950mm and 1 at 1250mm.

Fit the 3 shorter lengths of blue fuel grade tubing to the ferrules on the right-hand front of the header tank, and mark the other end of each line by wrapping short length of cloth tape around the line and marking it either **Breather**, **Front** or **Rear** as appropriate.

Fit a hose clamp to each line and tighten firmly.

Feed the lines out through the grey plastic fittings in the upper side of the enclosure (arrowed in yellow at right) and slip the sheathing over the fuel lines and over the grey plastic fitting (arrowed in purple at right) and then lock wire sheath to the grey plastic fitting.

Repeat the process for the left-hand fuel lines, which will pass in front of the support rib as shown at right.



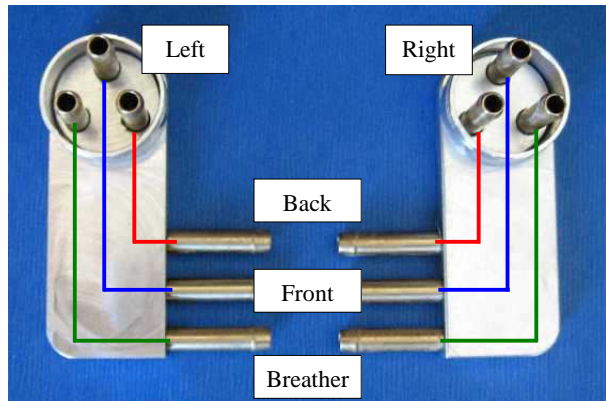
## Fit the tank connectors

The tank connectors must be fitted the correct side of the aircraft: when fitted out through the slots in the tops of the cabin walls the brass ferrules must face forwards, towards the front of the aircraft, while the circular sleeve and ferrules will face downwards inside the cabin, allowing the fuel lines to run smoothly to the header tank.

Working on one side at a time, place the tank connector through the slot in the top of the cabin wall and check the length of the fuel line sheath, which will be slightly too long.

Trim the sheath to length then fit each fuel line to the correct fitting on the circular inboard part of the connector: the **Breather** line connects to the outside ferrule, while the **Front** line connects to the centre and the **Rear** line connects to the inside.

Fit the sheath over the circular ring and lock wire into place as shown at right. Note that the right-hand side connector is shown. Seal the open ends of the connector with tape and repeat the process on the left-hand side.



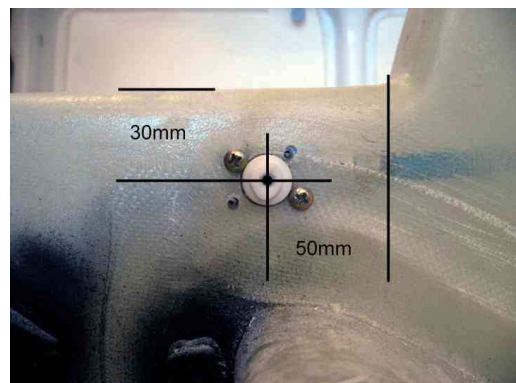
## Fit the fuel tap and fuel line

Remove the lever from the fuel tap and set it aside.

Look for a mark or pilot hole on the left-hand side of the centre console around 50mm in front of the base of the armrest and 30mm below the forward section of the console as shown at right:

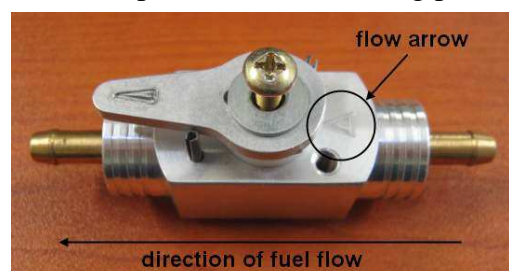
Drill a 16mm hole at that position.

Working through the access hole in the right-hand side of the console, hold the fuel tap in position against the inside of the left-hand side of the console and mark the positions for the alignment pin and screw holes, which will be visible through the fibreglass, then remove the fuel tap and drill the holes. Pre-fit the fuel tap with the two screws and then remove the tap and set it aside.



Cut a length of blue fuel hose of sufficient length to reach from the fuel tap all the way back to the electronic fuel pump outlet plus ~100mm, and a length of black fuel hose of sufficient length to reach from the fuel tap down along the floor and back up to the firewall fitting plus ~100mm.

Fit both fuel hoses to the fuel tap and secure with the supplied hose clips, making sure that the flow arrow on the face of the fuel tap is facing towards the black (outlet) fuel line.



Place a length of fuel line sheathing over both fuel lines and secure with lock wire to each boss on the fuel tap.

Fit the fuel line/sheath and tap assembly: tape over both ends of the fuel lines to prevent foreign objects from entering and then insert the blue fuel line end into the console through the access hole in the right-hand side and feed the blue fuel line down and back towards the rear of the fuselage and into the lower part of the console.

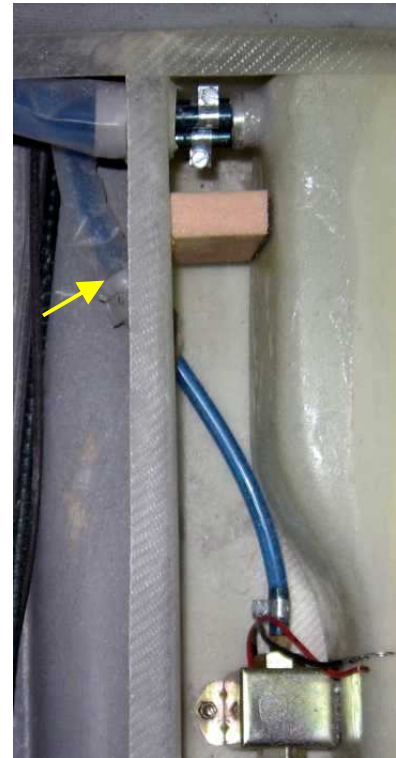
Feed the fuel line back until it can be seen in the hole in the lower longitudinal rib under the beam behind the seats, then, using a length of wire with a hook in one end, lift the fuel line and sheath out of the lower longitudinal rib and run it back beside the header tank enclosure.

Keep feeding the fuel line back until the end of the black fuel line and sheath can be inserted into the access hole in the console and then feed the fuel line/sheath down and forwards, taking care to route the line *under* the trim pivot, until it can be lifted out of the hole in the forward section of the lower console behind the rudder pedals.

Using a length of wire with a hook in one end, reach down into the console through the right-hand access hole and lift the fuel line assembly up and move the fuel tap into position.

Mount the fuel tap to the console with the two screws.

Cut the end of the blue fuel line and sheath to the correct lengths and connect to the electric fuel pump with a supplied hose clip and then lock wire the sheath to the grey plastic ferrule on the header tank enclosure (arrowed at right).



Cut the black fuel line and sheath to length and clamp the fuel line to the firewall fitting and lock wire the sheath to the firewall fitting collar. Cover the open (top) end of the firewall fitting to prevent dust or dirt from entering the fuel system.

## Checks

At this stage you should have connected the fuel lines all the way from the fuel tank connectors through to the fuel header tank, then to the fuel filter, the electronic fuel pump, the fuel tap in the console and the black fuel hose which is connected to the firewall fitting.

Check that all the flow arrows on the fuel filter, the electronic fuel pump and the fuel tap are pointing in the correct direction, which is away from the header tank and towards the engine.

Check that all of the fuel line sheathing is lock wired in place and that the sheathing does seal the fuel lines correctly.

Check that all fuel lines are routed smoothly with absolutely no kinks and that there are no rough edges anywhere nearby that could rub against the fuel lines or sheathing, and then check that all of the open ends of the fuel lines are sealed so that no foreign objects can enter.

Coil the tank connectors and related fuel lines behind the seats where they will not be damaged during construction.

This completes the *Pre-Paint>Fuselage>Interior>Fuel system* task.