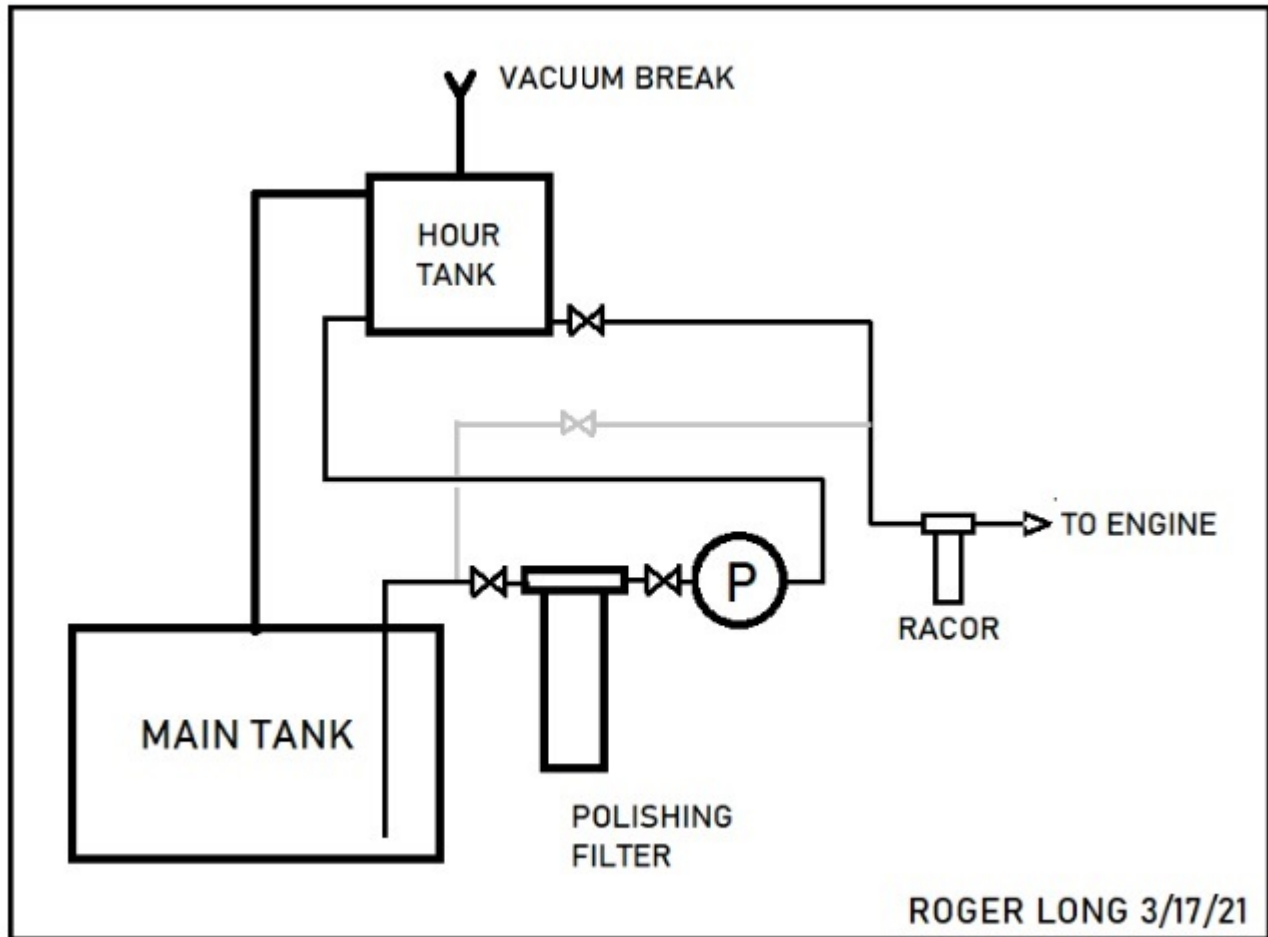


Simple Fuel Polishing System

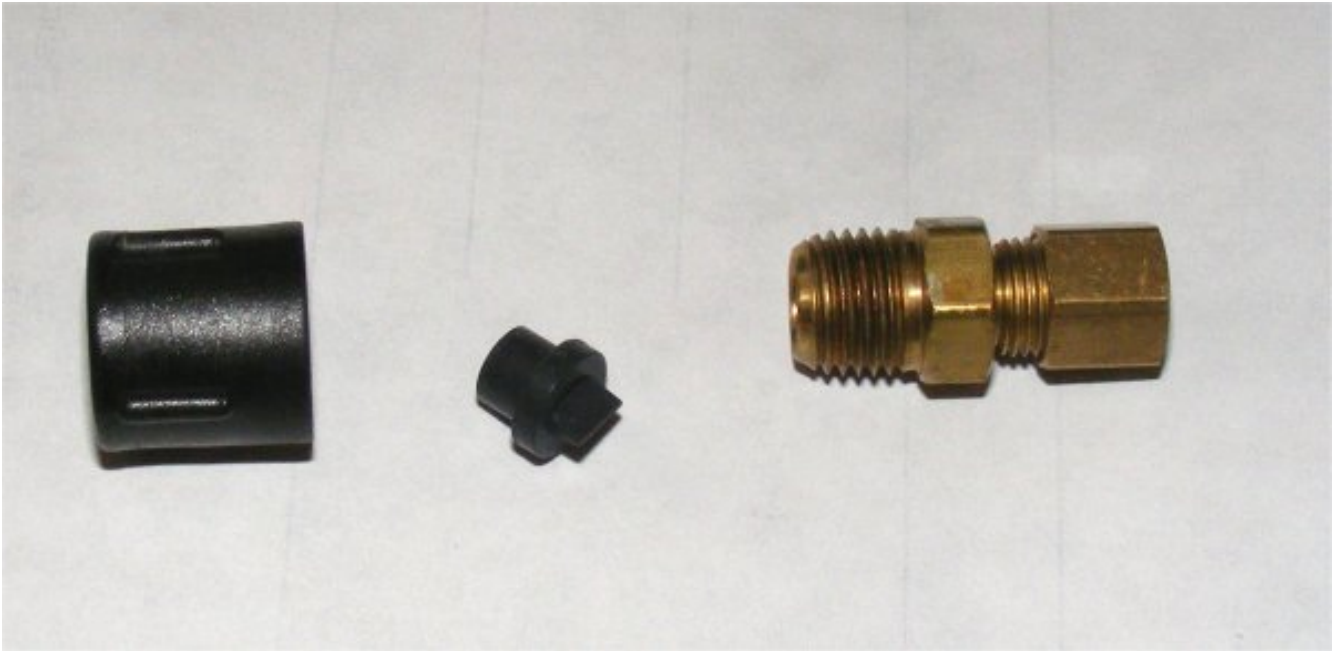
Roger Long 3/17/2021

I installed a system with several of these elements on my sailboat over a decade ago and it has functioned without problems since. A system essentially like this one was installed by a friend a few years ago and has also worked as intended. It resolves many of the difficulties of retrofitting additional piping fittings to existing tanks.



The Hour Tank is a steel or aluminum tank sized to approximately the engine's hourly consumption and located at or above the level of the mechanical pump on the engine. This will reduce the load on that component as the engine will be gravity fed. The return line at the top of this tank should be about twice the cross section area of the inlet piping from the pump and filter.

This tank has a vacuum break. A simple one can be made from a 1/4" copper compression fitting with as long a length of 1/4" tubing as possible ending in another fitting into which a Forespar Marlon MF 841 Vent/Duck Bill replacement will fit like it was made for it.



The air bubble at the top of the tank and in the tube will prevent fuel from ever reaching the duckbill. The one on my former sailboat is still working years later.

If it is not practical to install another fitting for the Hour Tank return line, the elbow fitting at the top of the main fuel tank can be replaced with a tee or a tee inserted in the fill hose just before the tank. This violates some elements of best practice for fuel systems but never caused an issue on either of the two boats where I have used this system. If it is possible to install a new tank penetration, the return line should have a dip tube that extends to near the bottom of the fuel tank according to best practice. Engine fuel return lines should as well but few boats have them.

The filter should be a large industrial unit and not a paper element one such as a Racor. The cast iron Shelco FOC-394 series is a good and inexpensive choice. They are available in 5", 10", and 20" cartridge lengths. Use the longest that will fit in your boat. The advantages of these filters is that elements are about 1/10 the cost of elements for Racor's and they will hold a lot more contaminants. You can use either string wound elements that do a better job of removing water or Hytrex blown plastic elements which have more capacity. The standard Racor in the system will remove water which can be drained from the sediment bowl so I used the Hytrex elements.

The pump should be a marine unit rated for continuous operation and sized to circulate the contents of the main tank as often as the piping sizes allow. You may need to obtain further advice on this point. I am not prepared to offer it. The pump is wired into the engine system to start whenever the electrical system for the gauges and starting is energized. You can also install a switch to run the pump with the engine off in case you need to clean up a bad batch of fuel. You'll be glad for that big box of cheap filter elements in that case.

The gray line shows an emergency cross over in case there is a failure of the polishing pump or the large filter clogs. Note that the Hour Tank should provide enough running time to change the polishing filter in the event that the vessel must be kept underway. A level gauge and alarm on the Hour Tank to alert you if it had stopped receiving fuel would be a good refinement to this system as the fuel will

otherwise keep flowing to the engine until the tank runs dry and the engine starves.

Note: The engine's fuel return line should go back to the main tank as the return fuel from many engines is warm enough to make the fuel in the small tank too hot. Some engines could have the return line go to the Hour Tank in which case the pump could be smaller but you would need to consult with the engine manufacturer on this point.