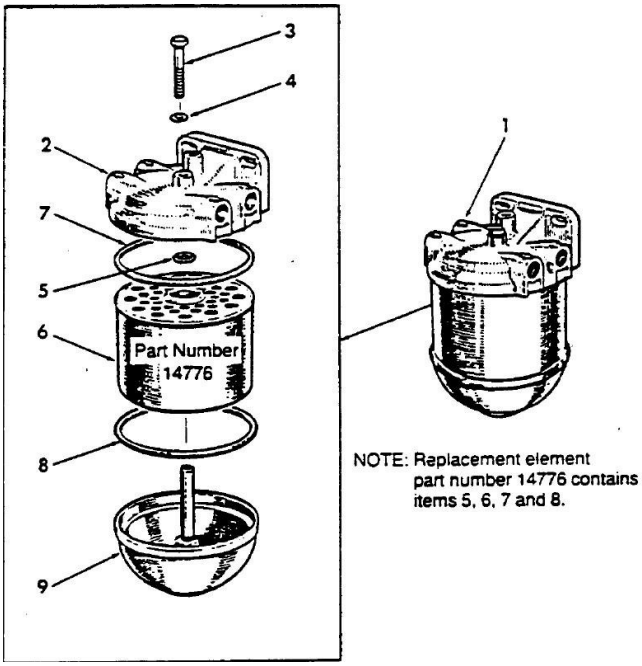
Next comes the task of changing the Fuel Filter and Bleeding the big *Red Beast*



Replacing the Secondary Filter

Begin by drying and cleaning the base, the O-ring seat in the base (#9) and the top (#2) O-ring seat. Next re-assemble the secondary filter noting that the LARGER O-ring should be placed in the top (#2).

Finally, the fuel system must be bled... This can be a messy job if care is not taken.

The bleeding process is outlined below.

I begin by collecting the necessary tools and parts.

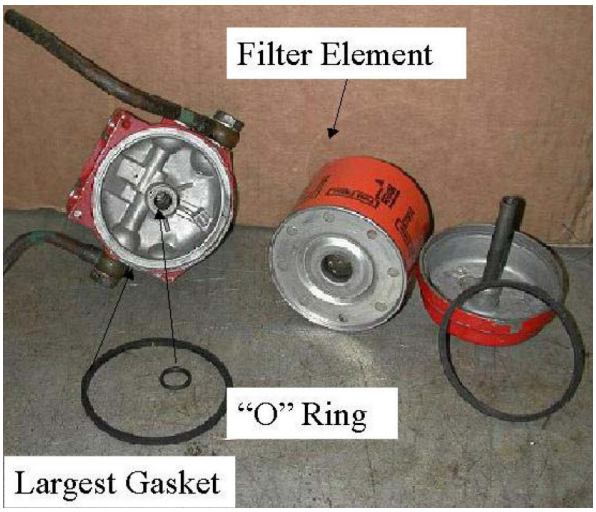
- 5/8 open end & Box end wrench
- 5/16 inch open end & box end wrench
- 2 large zip lock bags (1 gallon)
- Roll of paper towels
- New fuel filter (Fram C119)

Replacing the fuel secondary filter can be a messy process on***Sea Dragon*** but it is scheduled for replacement every 50 hour of usage or each season. So it must be done.

The **first** step is to take a large zip lock bag (the stiff top makes it easier to work around the filter) put a wad of paper towels in the bottom of the bag then slip it around the filter.

Next remove bolt #3 and drop the filter and base into the bag. The paper towels will prevent the fuel from spilling out of the bag.

Remove the base #9, seal the bag, and dispose of properly.



There are four basic steps plus one optional step. Each is detailed below.

1. Bleed fuel line from Racor to secondary filter

2. Bleed secondary filter

3. Bleed fuel injector pump

4. Bleed high pressure lines

5. Cross fingers (hope you did right the first time)

Start engine.

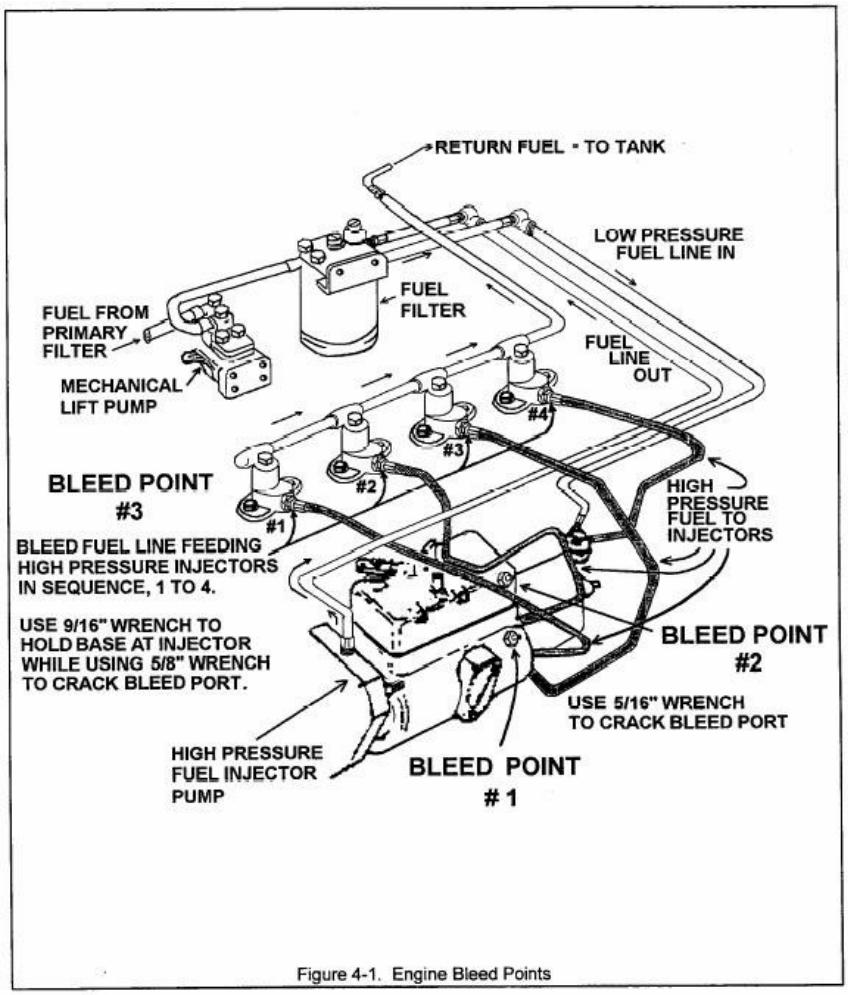
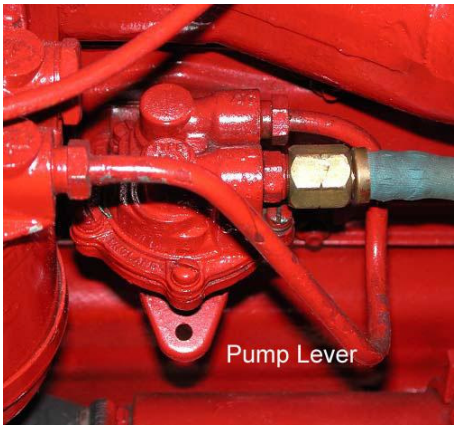


Figure 4-1. Engine Bleed Points



Begin by placing a wad of paper towels in the second zip lock bag and placing it around the fuel filter as high as possible. This time the bag should fit loosely and as high as possible on the filter. This will catch the large amount of fuel that will be pumped from the filter.

First bleed the air from the portion of the fuel line from the Racor to the *secondary filter*. To do this, pump the lift pump for approx 1 minute. *Note: move the pump lever up and down using slow, smooth full strokes at the rate of one stroke per second.*

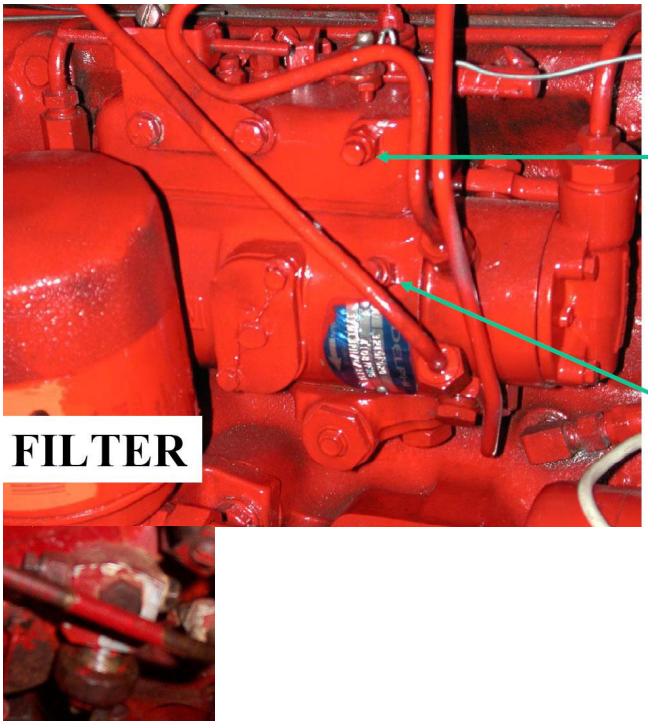
Next, bleed the air from the new filter by first loosing the banjo bolt shown at the right. Using the pump lever, pump until the filter is free of all air. This takes some time, so pump until **NO AIR** bubbles can be seen.. I am always surprised how much fuel will be pumped into the catch bag.

Once the air is expelled tighten the banjo bolt, remove the bag, seal, and dispose of properly.

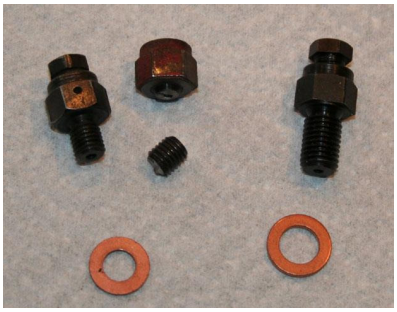
Now the fuel injector pump must be bled. I begin with a hand full of paper towels

Beginning with bleed point #1, open the 5/16 inch bleed point (a needle valve). Place the wad of paper towels around the open bleed point. Once again, I surprised how much and how far the fuel will spray if not stopped by the towels.

Once again with steak slow strokes, bleed all air from point #1 (don't fooled by the first signs of fuel, **PUMP** until **NO AIR**comes out).



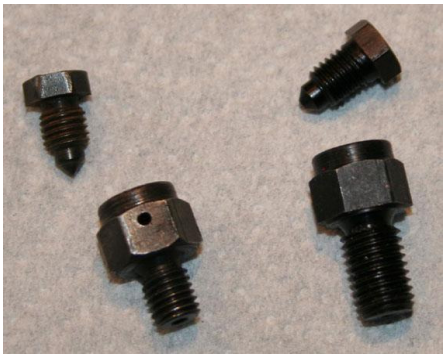
Note Bleed point 1 on Sea Dragon is located on the fuel pressure sensor (see small picture above)



Take your time!!!! Be Careful!

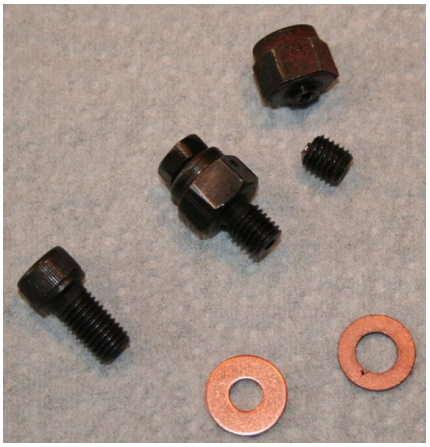
Westerbeke used two different bleed screw assemblies on the W40. The broken one on the left has threads of 1/4 inch by 28 and is the most difficult to find if a replacement is needed. And the one on the right is 3/8 by 28 thread and is the most common.

Oh by the way.... $30.00



Above you can see the assembly and how it works

In case of an emergency I found an allen screw that matches the thread size.
I have cut the screw to length and I keep it in my spare parts kits as a backup.



Close the Bleed point #1, *CAUTION use care the bleed assembly is easily broken (see below).*

Now, open Bleed Point #2 and repeat the bleeding process. This step always takes longer than I expect, so do not be fooled by the first sign of fuel.. Do it right.

Back to bleeding the engine.

Now with all fuel wiped up, it is time for the final step.

Loosen the high pressure lines leading to ALL four injectors... **Do NOT** remove **ONLY** about 1 or 2 turns. Place the paper towels around each open injector nut.

With the throttle in full open, use the starter to crank the engine until fuel spurts from each injector high pressure lines.

I place white paper towels around each loose nut and check for signs of fuel on the towel... The red dye in the marine fuel is easy to see from the companion way.

CAUTION: DO NOT crank the engine for long periods of time. Excessive cranking will cause the starter to over heat and will fill the exhaust with sea water.

Next retighten each of the four high pressure lines.

With the throttle still in the full open - start the engine normally.. Several attempts may be needed... take your time.