

Bilge Pump Service Project

Model 37202-0000

Service Kit 37182-0000

Boat: 1997 Catalina 320

PAR Electric Bilge Pump

12 volt DC

4.5 GPM

8.0 Amps

Prepared by:

Ted Harrison





History:

- Just before haul out the bilge pump stopped working. I removed the intake line from the pump. There was little suction from the pump
- It was becoming very loud / noisy before it failed
- The pump is located in the port lazarette
- It sits on a level wood frame. The suction line runs from the pump into the bilge

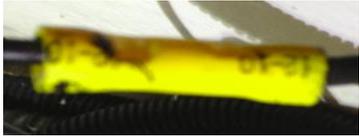
Followed the wires from the pump to their connect points.



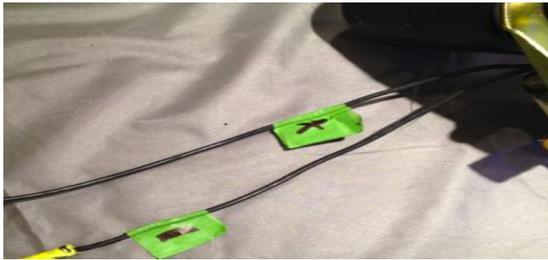
Positive Connect



Negative Connect



Pump wires Labelled



Safety always comes first

- Label and take pictures, you will notice that I have labelled the black wires from the pump to their connection points.

- If you do not know / or are not sure about the power ask for help or assistance from a professional

- Before I started the project I turned off the power and tested the wires for power with a volt meter

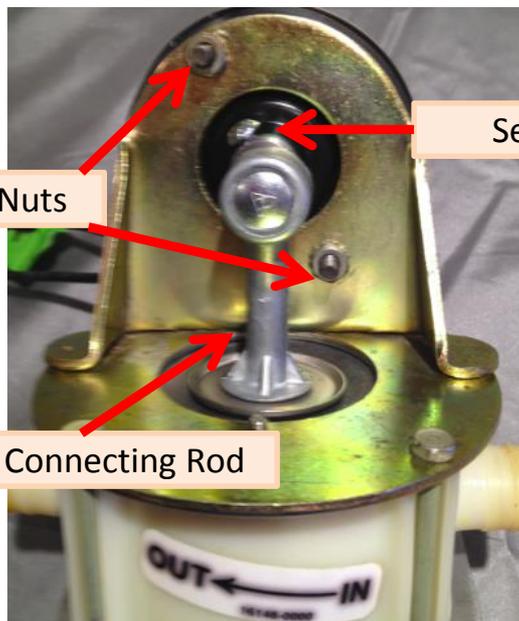
-The picture shows the positive and negative wires. Normally red for positive and black for negative. You must always check because you never know who has completed wiring on the boat.



Remove the pump

- Disconnect the output line (discharge)
- Removed the three screws the hold the pump in place
- I place the screws in a zip plastic bag, and label the bag
- In this picture the screws have been removed

Objective: Replace inlet value, outlet value, and pulsation dampener



Nuts

Set Screw

Motor shaft –
flat edge

Connecting Rod



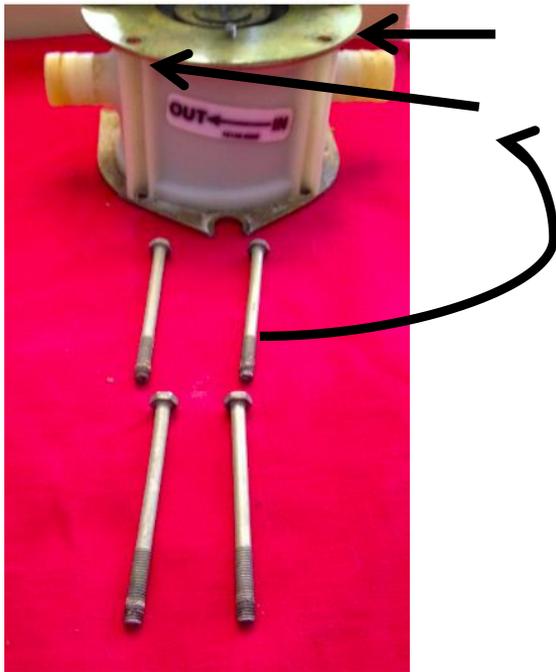
Motor Mount

Bolt that holds the
mount to the base
(there are four)

Base

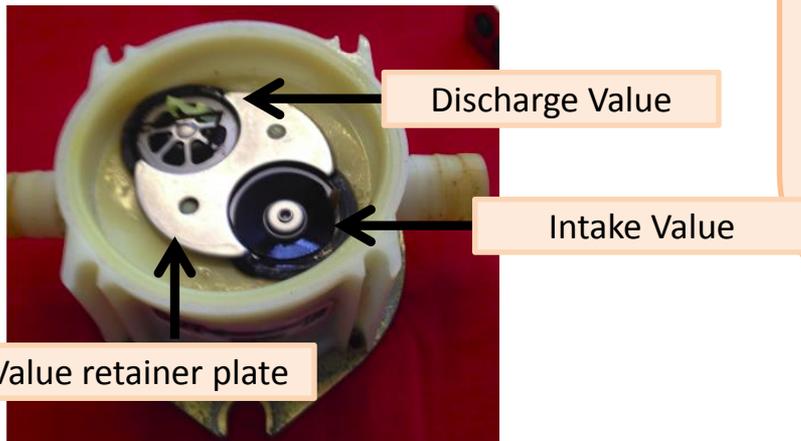
Remove the Motor from Motor Mount

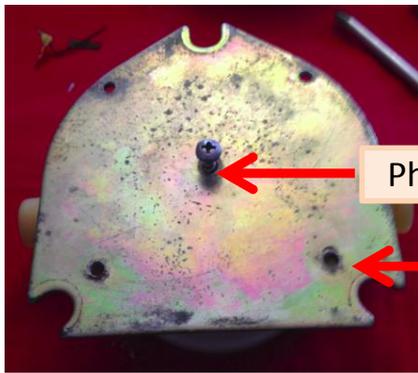
- I set the pump motor on the side of my son's tool box to support the unit (so it is level)
- Loosen the set / lock screw on top of the connecting rod with a flat screw driver. Notice the flat side or edge on the motor shaft
- Remove the two 3/8 nuts that hold motor to the motor mount
- The bottom picture is with the motor removed



Remove base from motor mount

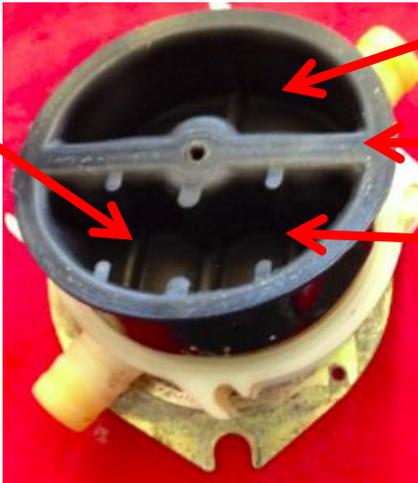
- Remove the 4 bolts, with a 5/16 inch wrench, they hold the base in place
- Two bolts are under the motor on the back side, not shown in the picture. Notice the bolts run on the outside of the base and into the bottom plate
- Play attention to the orientation of the base and in general all parts. The intake is on the right and output or discharge is on the left
- This is important so that you place the valves correctly as shown in this diagram





Philips Screw

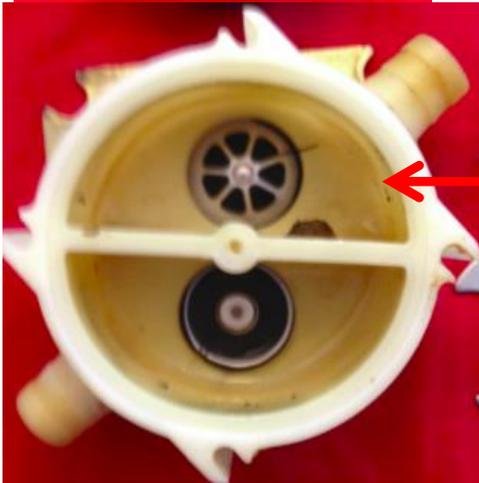
Bottom Plate



One rib

Pulsation Dampener

Three ribs



Base with
Pulsation
Dampener
removed

Parts Removed

- One screw remains holding the bottom plate to the base
- Pay attention to the three ribs on the discharge side of the pulsation dampener and the single rib on the intake side
- The Pulsation Dampener just pulls out
- The valve retaining plate and valves just lift out or you can just push them out from the under side

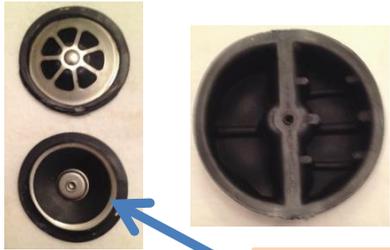
Clean all parts

I cleaned and examined all the parts

I used dish soap and hot water and in some cases Vim to remove grease

I used a brass wire bush to clean nuts, butts, and plates. The wire bush actually removed the brass finish on the plates!

- One picture shows the particles that I found in the pump
- The pulsation dampener was not collapsed and did not appear ruptured, it is now a spare part
- The valves looked in rough shape and replaced. The inlet and outlet valves are identical, rubber flapper is up on the intake side and down for the output / discharge side
- The connecting Rod was worn out



Rubber flapper



Debris found in unit



Broken Connecting Rod,
no wonder the unit was
noisy



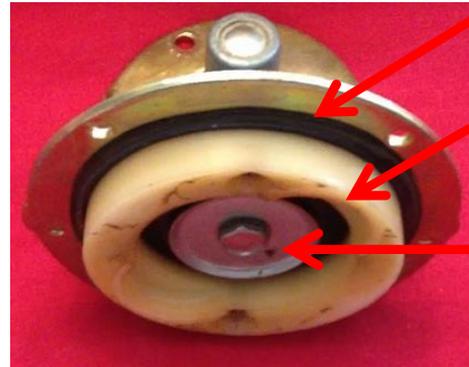
Parts are assembled

- Pulsation Dampener pushed in place
- Valves just sit in place, inlet rubber flapper up, outlet rubber flapper down
- Valve retaining plate sits between the valves, two plastic dimples hold it in place
- I attached the four bolts on the base and bottom plate before I tightened the bottom screw onto the base. This insures the alignment is correct

Objective: Replace diaphragm and connection rod



Top view of the diaphragm



Black is the diaphragm

Diaphragm retainer

Bolt through the diaphragm and to the connecting Rod



Diaphragm removed

Diaphragm Plates

Orientation – smooth side

Replacing the Diaphragm

- The Diaphragm is connected to the Connecting Rod by a bolt and a plastic Retainer by two Philips screws
- Remove the bolt and screws
- Peel the two Diaphragm Plates from the diaphragm. Notice the orientation. The smooth side go against the Diaphragm



Motor mount

Retainer



Diaphragm



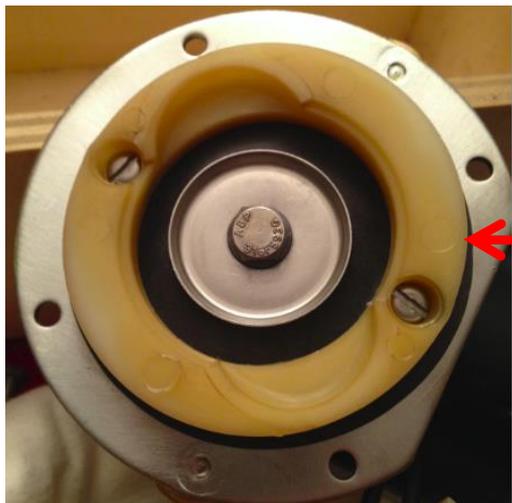
Diaphragm Plates



Connecting rod



Thread locker



Reassembled unit

Parts are Cleaned and ready to re-assemble

- Make sure you have the parts in the right orientation, for correct and quick assembly
- Place the Diaphragm Plates on the new Diaphragm and push the bolt through the center hole.
- I place a small drop of “blue” Thread locker on the bolt, attach to the connecting rod, very loose at this time
- Attach the Diaphragm to the Retainer and onto the Motor Mount. Place a small amount of Thread locker on the screws
- Tighten screws in equal turns until tight,
- Tighten the Connecting Rod bolt

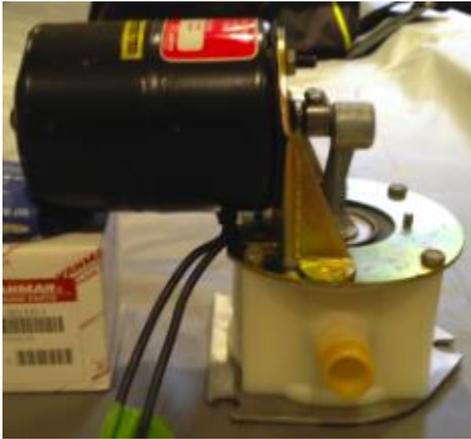


Re-assemble Motor to Motor Mount

- Make sure you had the parts in the right orientation
- Motor is supported in a level position so that I get a level, straight connections
- Attach Motor to Mount with the two nuts
- I place a small drop of “blue” Thread locker on the bolt threads
- Tighten nuts in equal turns until tight

Re-assemble Connecting Rod to Motor shaft

- Slide the Connecting Rod onto the Motor shaft
- Tighten the set screw onto the flat surface of the motor shaft
- I did not apply Thread locker on the screw



Re-assemble Base to Motor Mount

- Make sure you had the parts in the right orientation, unit is supported in a level position to get a level, straight connections
- Slide the two back bolts through the Motor Mount first
- Then slide the Base under the Motor Mount and slide in the front screws
- Then put the bolts into the mount just one or two turns. This ensures the bolts are all connected
- I place a small drop of “blue” Thread locker on the bolt threads. Do not put the thread locker on the plastic
- I tighten the bolt in equal tension, like one turn each in a cross tightening rotation
- Unit is ready to be tested and then back on the boat

