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Rebuilding A Raw Water Pump

R e b u i l d i n g A R a w W a t e r P u m p

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Pump Removed

This article is going to assume you have the skills to safely and easily remove your own water pump from the engine. This one is easy and uses four bolts and a gasket to mount to the timing gear case on the engine.

In this photo you can see how the pump came off the motor. While not leaking badly the oil seal side was weeping a tiny bit of oil as shown. Also when they installed this motor they used 1" hose on a 7/8" hose barb so there was some water leakage that cause some of the corrosion. This pump appears to have never been rebuilt and the motor has 2878 hours on her so good pumps can last a long time.

This raw water pump is made by Johnson Pump as a specific OEM unit for Westerbeke. Unfortunately Johnson Pump will not sell you parts, other than an impeller, due to OEM agreements.

A new Westerbeke pump is \$480.00 and the rebuild kit is \$130.00. This kit includes literally everything but the pump body!! Rebuilding is the cost effective and obvious choice provided your pump body is in good condition.

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Steve

30-May-2014 02:27

When you take the pump off the motor will oil leak out?

Steve Craft

01-Feb-2014 14:25

Pump Internals

This photo shows the pump shaft, the cam and the water seal.



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Remove The C-Clip

Raw water pumps, while similar, all have a few features in common; a pump body, shaft, impeller, seals and either bushings or bearings.

This particular pump uses two bearings that are

pressed into the pump body then retained with a c-clip.

To remove this clip you will need a set of c-clip pliers of the

type that pinch rather than open when you squeeze the handles. Sears, and other tool retailers, sell these and they are called everything from "retaining ring pliers" to "circlip pliers" to "c-clip pliers".

Removing the c-clip is as easy as it looks. Simply insert the pliers tips into the retaining ring holes, squeeze and then lift out the ring.

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Drive The Shaft Out

Once the c-clip is removed you'll then need to drive out the shaft. On pumps with bushings the shaft generally just slides out but on pumps with internal roller bearings you'll need to press them out. I used a hole in my work bench, that is for my router, to lay the pump on. The hole accepted the shaft & bearings when I tapped it out. Be sure to have something below the hole to catch the shaft or it could land on cement and become damaged or scored.



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Use A Block Of Wood

When driving the shaft out it would be advisable to use a press but most boaters don't have one so I am showing you an



alternative method. If you are of a mechanical mind set and own a lead or brass hammer then it would be OK to tap directly on the shaft as brass and lead are softer than the shaft material. If you do not own a soft metal hammer simply insert a block of wood such as Maple, Oak or Teak, as I have done here, and tap on the wood with a regular hammer.

Please remember this is a light tapping not a smashing or pounding.

If the shaft won't come out, with some gentle taps, add some PB Blaster, let it soak over night, and try again. If you still don't

have any luck drop it at a machine shop and for about \$5.00 or \$10.00 they will press it out for you. I have never seen one that required this but with boats anything is possible..

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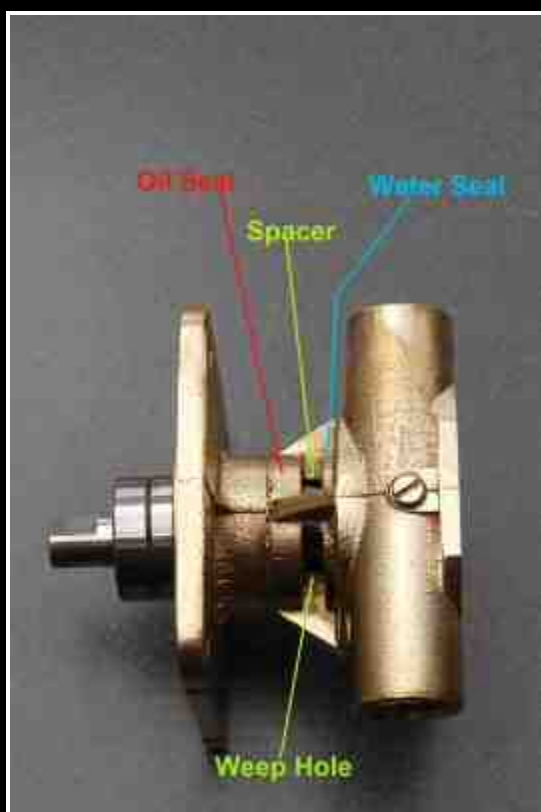
The Shaft Is Out !

Here's a break down of the shaft & bearings. As you can see this shaft uses two bearings which are bathed & lubricated from the motor oil in engine. If you look closely you see the grooves or marks where both the oil seal and water seal spin on the shaft. This pump shaft will not be reused due to the



scoring. While it very well could be re-used, with new seals, there is not much sense going to all this trouble and effort and then not doing it right.

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Seal Locations

This is a well designed pump. The oil seal is isolated by a weep slot or hole from the water side of the pumps and seal. Even if the water seal were to leak the water will just drain out the weep hole. If the oil side weeps it too will simply drain out the weep hole. Neither side of this pump can pressurize or leak into one another.

On occasion I have seen weep holes plugged with dried salt. In theory this could create some pressure that could press through a weak oil seal when the engine was off and the seacock open.

With the engine running the crankcase becomes pressurized and should reject the water. I have yet to see any water in engine oil even with a salt encrusted weep hole. It is quite possible that if water did get in, it was so minimal it was evaporated off with engine heat. Either way if you have dried salt, water leaking or oil leaking you'll need to rebuild the pump.

Unfortunately some pumps, by certain makers, do not have or utilize adequate weep holes so a water side leak could inevitably leak into the engines oil or vice versa.

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The Seals

Here are the actual seals. These two seals, when pressed into the pump body, are constantly separated by the spacer so they do not settle or compress against one another and risk oil/water or water/oil contamination. The spacer sits, and is captive, right over the weep hole to let a leak drain and become visible and detectable.



It is very important that the four little feet on the spacer face the oil seal when reinstalling the seals! The flat side of the spacer faces the water pump seal and the feet face the oil seal.

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The Rebuild Kit

As I mentioned before the replacement for this pumps is \$480.00 but I only paid about \$130.00 for the rebuild kit. This



particular kit contains every single gasket, screw, washer and piece that makes up this pump other than the pump body casting itself. Buying a rebuild kit and doing this job yourself can represent a tremendous savings over buying a new pump.

This kit included the following: Water seal, seal spacer, oil seal, shaft, impeller, impeller lube (Glycerin), cover plate, cover plate gasket, cover plate screws, cam, cam screw, cam washer, c-clip, bearings, shaft & pump to engine gasket.

Sadly, not all pumps have re-build kits available. If not there is a great company in Florida called Depco Pump can usually get you what you need or even sell you a re-built pump.

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How Did It Get So Clean ?

I know some will wonder how this pump went from that grungy old pump look to shiny & new looking. It's easy, I use a brass wheel on my bench grinder and burgundy colored Scotch-Brite discs on my Dremel. I clean the cover plate and pump gasket surfaces with wet sand paper and honing oil on a piece of 3/8" thick glass for a smooth surface.

Putting It Back Together



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The first thing I re-installed was the pump cam. Be sure to use the small copper crush washer that came with the rebuild kit or it will leak out of the screw hole..

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Install The Bearings On The Shaft

This task is perhaps the most difficult of the entire process. The bearings need to be pressed onto the shaft and it's a very tight fit.

I used an old trick I taught to me years ago for doing just this sort of thing. I simply heated the bearings, in the toaster over (my wife doesn't know I cook bearings..), to 200F. At the same time I had the shaft in the freezer.



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Thanks for this session. I have a Johnson pump and the instructions are not exact, but help out immensely.

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