DISASSEMBLY AND REASSEMBLY OF THE 1501 GEAR BOX
FOR ALL SERIES 1501 – I & II

Remove chain stripper by removing the forward two mounting bolts. Remove the hawse cover nut by removing the aft mounting screw from the under side of deck. At each end of the axle on which capstans and chain gypsy are mounted, note the hex socket for manual override. Inside of socket is a 10-32 FH screw, which secures the socked to the splined shaft; remove the socket from the shaft ends both port and starboard. Unscrew the three-pronged clutch handle off the end of the shaft and slide the chain wheel and two clutch plates off the axel. Remove the threaded nut with two spanner holes from the capstan side by unscrewing counter clockwise, and then remove the capstan and key by sliding them off the shaft. Now we will remove the motor: Note the three 5/l6" socket set screws on the motor adapter housing securing the motor to the down tube, remove these screws, this is all that holds the motor to the windlass the motor and drive shaft assembly should now separate from the windlass allowing the removal of the windlass from the deck. **IF MOTOR ADAPTER WILL NOT SEPARATE FROM DOWN TUBE SEE ADDL SPECIAL INSTRUCTION AFTER Pg 4.** Remove capstan and chain gypsy from shaft. Remove upper kedging socket seal by depressing the kedging socket fully onto the spline and using a flat screwdriver and the socket as the fulcrum pry the kedge socket seal from the top of the gear box.

Turn winch upside down with rubber pad removed, you will see eight (8) socked head cap screws securing the base plate to the winch body, six (6) are 3/8", two (2) are ¼" size. Remove these screws and lift off base plate, clear of down tube. Now using a blade type screwdriver pry the down tube out of the body using the snap ring on the down tube for leverage, be careful no to lose the ¼" key which located the down tube and remember its orientation. With the down tube removed, you will see an oil seal pressed into the end of the down tube, we will be replacing his also. Do not yet remove the worm from the gearbox. Now place the gearbox on its side with the shaft on the opposite side protruding through a surface that will not interfere with its removal. You will note one side of the round protrusion of the gear box is embossed "Lighthouse USA" or you will see three screws located at 120 degrees on this side, Face this side up for disassembly

THE FOLLOWING APPLIES TO UNITS MFG PRIOR TO 2002

To remove the round access door from the gear case it is necessary to unscrew the three screws, which are visible on this side. You will note that the screws are not threaded into the case but threaded into shaped aluminum dogs. Once the door is removed, the main gear will be visible and can be removed by lifting upward using the main shaft to raise the entire gear assembly, the large ball bearings will probably only need cleaning and relubricating. At this time I would not advise removing the shaft from the over running mechanism in the gear hub, just clean it up and leave it together. **ON UNITS MFG AFTER 2002 SEE SUPPLEMENTAL INSTRUCTIONS ON LAST PARA OF PG 4…**

Now remove the worm from the gear case by removing it from the bottom of the gear case. Remove what is left of the upper bearing from the worm shaft, remove the lower bearing and clean the worm using mild abrasive or phosphoric acid, try
To polish the areas the seals ride on using a polishing compound, toothpaste will work.
The upper worm-bearing race is removed by piercing the race with an acetylene-cutting torch and removing the slag. Note: The SS gearbox will not be affected during this process as the bearing race stores all the transferred heat. Access the upper race from the large 'door; opening through the worm slot aiming the cutting torch at the bearing race material where it can be visible when the bearing race is pierced.
Remove the seal from both the gear case and the door that the main shaft goes through
REASSEMBLY: The following parts are required

1 Upper kedging socket oil seal
1 Upper worm oil seal
1 Lower worm oil seal
2 Gear case seals and 1 Door O ring
Ordered as 1501 Seal Kit

1 Upper worm bearing & race
1 Lower worm bearing
TOOLS REQUIRED FOR DISASSEMBLY & REASSEMBLY:

3/16" allen wrench
¼" allen wrench
5/16" allen wrench
Blade screwdriver
Snap ring pliers, expanding type
¾" wrench for removal of mounting bolts
Tube of clear silicone sealant
3 lbs Lithium based grease

ASSEMBLY: Clean all parts with a solvent solution to remove old grease silicone, any hard to get places can be washed in white vinegar to neutralize any residual salt deposits.

After removing any debris and cleaning the gear case in the area the upper bearing race resides. Locate an aluminum o hardwood dowel long enough to reach the upper bearing seat and extend out of the gear case and approximately one and one half inches (1 ½") or (37/38 mm) in diameter. Using this dowel and a suitable hammer, seat the conical race firmly against the seat in the gear box making certain that he smaller opening in the race is at the top of the gear case and the widest part of the taper is facing down or toward the base of the winch.

Pack upper conical bearing full of grease, by depositing a quantity of grease in one hand and forcing grease into roller cage assembly of bearing with the other hand.

Install upper worm seal in top cavity of gear case using silicone sealant on the seal outer dimension to insure sealing. Install seal with gear box flat on work surface and pressing straight down with a ¾" to 1" diameter pushing mandrel (wood or a socket wrench might suffice)

Install grease packed worm bearing on worm shaft. Lubricate lip of upper worm seal. Push worm shaft & bearing assembly into gear case and through upper seal. Do not yet install lower bearing.

Pack large ball bearings with grease. Fill outer cavity surrounding baring retainer with grease. Install bearing in bearing retainer in case. You should now have the gear, hub & shaft assembly with one bearing still in place. Slide the gear, hub, shaft assembly into the side bearing in the gear case. Engage the worm shaft teeth with the gear teeth and move the worm shaft upward to seat the conical bearings in its race. Now we will install the lower worm ball bearing by sliding the new bearing onto the keyed portion of the worm and then further up the worm shaft until the bearings progress is stopped by the gar case. Using the coupler & shaft assembly turn the worm right and then left with pressure always exerted upward toward the conical bearing. With the gear case on its port side, fill the bear cavity with grease and pack the large ball bearings with grease as well.

We will now close up the gear box with the door. The three ¼-20 screws are engaged in the aluminum dogs approximately 3 turns, this will secure the dogs or clips in the slots in the door with the blade pointed up and the radius coming in contact with and facing the bearing retainer of the door, this is done on all three of the door clip dogs. The reason for the radius shape of the clip dogs provides the simultaneous upward and inward movement of the clips as the ¼" screws are tightened. The flat outer edge of the clip dogs engage in the square slot machined radially in the gear case.

We will now install the down tube and the base plate. First, install the new oil seal in the down tube to the same depth as the seal being removed. Wipe the seal lip surface and the worm shaft liberally with grease in the area of seal friction. With the large snap ring in place on the down tube, slide the down tube into the worm bore, making sure that the snap ring does not extend below the base of the gear case. Use a straight edge to determine that the snap ring will not pre load the bearing when the base plate is bolted on.Remove the down tube and apply a coating of silicone to the engagement portion of the down tube, now install the key, making certain it goes back precisely as it was removed. (Ordinarily the keys are thinner in one dimension; The thin dimension being orientated fore & aft) Apply a coating of silicone to the base surfaces of the gear case and bolt the base plate back in place with the eight screws.
To prepare axel for seal installation and reduce possibility of damaging oil seal lip, apply a layer of transparent packaging tape over threads and keyway of shaft.
To install side case oil seals, after assembly is complete, we will need a 3" length of 1" plastic (PVC) pipe. Slip lubricated oil seal over shaft, flat side out up close to gear case on both port & starboard side. Apply silicone sealant around circumference of oil seals. Slip 3" length of 1" PVC pipe over shaft. Using your three levered clutch nut, thread onto shaft allowing plastic pipe to press side seals into gear case, only until flush with outside case. Unscrew clutch nut, remove PVC pipe and reinstall capstan & gypsy.

SUPPLEMENTAL INSTRUCTIONS ;

On units mfg after 2002 the access door is threaded as is the gear box case therefore the Large nut cast into the door is used by turning counter clockwise to remove. **NOTE; first remove the 10-32 locking screw from the base of the gear case on the starboard side of the base under the base plate to permit the door to be rotated without damaging the threads.**

REINSTALLATION OF DOOR; Lubricate threads on door and gear body with anti-seize compound install **0'Ring** in groove machined in door before start of threads then rotate door to start thread and secure door to 45 inch lbs torque. Then replace 10-32 locking screw in base.

IF DIFFICULTY IS EXPERIENCED REMOVING MOTOR; There are several ways to free motor from down tube: **Do not use liquid wrench or similar products.** If corrosion is present, use LIME-A-Way or a phosphoric based acid cleaner to saturate the down tube/motor adapter joint this will dissolve the corrosive salts and should allow the motor to be freed from the tube by rotating the motor using a strap wrench or oil filter pliers until the motor drops off. If this does not result in motor removal then the motor will separate by removing the two ¼-20 socket head screws attaching the motor to the motor adapter housing. Then adding heat to the adapter housing to allow the Silicone sealant to become pliable and release the motor. This leaves the adapter housing still on the tube. Now using a hacksaw blade or holder cut a slot starting at the perimeter of the adapter housing to within 1/32" of the down tube, insert a screwdriver blade into the slot using a hammer strike the screw driver, the adapter will crack off the tube.