PYI INC.

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PACKLESS SEALING SYSTEM
SHAFT SEAL

INSTALLATION INSTRUCTIONS

For shafts 4” – 6” or 100mm – 150mm

Read instructions thoroughly before installing the P.S.S. Shaft Seal.

*** Install the P.S.S. only when the boat is out of the water.**

*** Do not damage the carbon flange or stainless steel rotor while unpacking and handling.**

*** Do not use grease or oil to slide the stainless steel rotor down the shaft.**

*** Do not allow foreign material such as lubricants or petroleum-based antifreeze to come in contact with face of seal.**

*** If changing hose barb fittings, do not over-tighten. A tapered pipe thread is used and over-tightening the fitting can damage the carbon.**

*** If requested, PYI will insert stainless steel hose barb fittings instead of nylon fittings in the carbon. If stainless steel hose barb fittings are used, these fittings must be inspected on a 6 month basis for any signs of corrosion.**

PYI, Inc.

LIMITED WARRANTY / LIMITATIONS OF REMEDIES AND LIABILITY

P.S.S. (Packless Sealing System) Shaft Seal

Grant of Limited Warranty. The PSS (Packless Sealing System) Shaft Seal ("PSS") is warranted by PYI, Inc. ("PYI") to the original purchaser only to be free from effects in material and workmanship, will either be repaired or replaced by PYI or its authorized agent, at its sole option, free of charge, except for shipping and handling charges and dealer labor charges (if applicable), which charges are not covered by this limited warranty. The warranty on any part repaired or replaced under this limited warranty expires at the end of the original warranty period.

Limitations of Limited Warranty. This limited warranty does not cover and does not apply to any PSS: (i) altered in any way inconsistent with the shaft seal design as provided, (ii) improperly installed and/or maintained, (iii) incompatible with any portion or component of any boat or application that is not supplied by PYI, regardless of the cause of the failure or incompatibility of such portion or component, (iv) used for purposes other than those for which it was designed, and/or (v) subjected to misuse, neglect or accidents. In order to obtain warranty service, the PSS, together with the bill of sale or other dated proof-of-purchase document identifying the shaft seal model number, must be presented to an authorized PSS dealer during the warranty period. For assistance in locating an authorized PSS dealer, please contact PYI at:

PYI, Inc.
12532 Beverly Park Road
Lynnwood, WA 98087
Phone: 425-355-3669

Except for the limited warranty expressly provided above, to the maximum extent permitted by applicable law, PYI and its suppliers make no warranties, express or implied, and disclaim all warranties duties and conditions, whether express, implied or statutory, with respect to the PSS, including, without limitation, any implied warranties of merchantability, against latent defects, fitness for a particular purpose, or correspondence to description.

Limitation of Remedies. In the event of a breach of the limited warranty set forth above, PYI or its authorized agent will only be obligated at PYI's sloe option to either repair or replace the failed PSS. If after written notice to PYI of each defect, malfunction or other failure and a reasonable number of attempts to correct the defect, malfunction or other failure and the remedy fails of its essential purpose, PYI shall refund the purchase price paid to PYI in exchange for the return of the sold good(s). Said refund shall be the maximum liability of PYI. THE FOREGOING REMEDY IS THE SOLE AND EXCLUSIVE REMEDY OF THE BUYER AGAINST PYI REGARDLESS OF THEORY, WHETHER ARISING IN CONTRACT, BREACH OF ANY WARRANTY, TORT, INCLUDING STRICT LIABILITY OR NEGLIGENCE, OR OTHERWISE.

Limitation of Liability. To the maximum extent permitted by applicable law, PYI and its suppliers expressly disclaim and exclude any liability for any incidental, special, indirect or consequential damages resulting from any reason whatsoever. This exclusion applies to all legal theories under which damages may be sought.

Note: This limited warranty gives you specific legal rights and you may also have other rights which may vary from state to state.

Please refer to the P.S.S. Shaft Seal Instruction Booklet for installation instructions.

Break-in period:

There is a break-in period when the carbon graphite flange will polish the face of the stainless steel rotor. During this break-in period there will be a very fine black mist being

emitted when shaft is turning at high Rpm's and a few drops of water may be coming through. This break in period varies with each installation but should not exceed 100 hours.

Troubleshooting:

1. Spray or mist during operation:
If you should experience any spray or misting during high-speed operation (after break-in period), add an additional 1/8" compression to the bellow with the rotor and repeat until the spray has stopped. Also check for run out across the face of the Stainless Steel Rotor, it should have less than .002 run out of misalignment when installed.

2. Dripping while not operational:
If the seal leaks when the shaft is not turning, some foreign material such as grease or oil may be prohibiting the two faces from seating properly. To clean this foreign material from the two faces, insert a clean cloth rag between the carbon graphite and stainless steel rotor and rotate it around the shaft vigorously. As you do this, water will flush both faces of any impurities. Remove the rag from the seal and the leak should stop.

Installation instructions: (Items 1, 2 and 3 are for retrofit installation)

1. Unbolt the shaft coupling from the transmission coupling.

2. Remove the shaft coupling from the shaft.

3. Remove the old stuffing box and all attached fittings. There are many stuffing box styles and types of attachment to the boat for these large shafts, so by this time you will have already checked with your PSS dealer for the PSS requirement at the stern tube end.

4. Clean the shaft with very fine sand paper or emery paper (400 to 600 grit), paying particular attention to the shaft key way to make certain there are no burrs or sharp edges that could tear the o-rings upon assembly.

5. Slide the open end of the bellow and two hose clamps over the shaft log. The carbon flange will already be securely attached to the bellow by 2 T-bolt style clamps.

6. Slide the stainless steel rotor onto the shaft. Only use a water-soluble lubricant like dish soap to help the rotor and o-rings slide easily. **Do not use grease or oil!** Make sure the o-rings are positioned in the grooves of the rotor (spare o-rings are provided) and that the locking clamp collar is not tightened to the Stainless Steel Rotor.

7. Re-attach the shaft to the shaft coupling and the shaft coupling to the engine using the manufacturer recommendations.

8. Position the bellow on the stern tube so the carbon is centered with the shaft. **Caution:** The forward end of the stern tube should not extend beyond the aft cuff of the bellow. Clamp the cuff of the bellow to the shaft log with the two stainless steel t-bolt hose clamps.

9. Start the stainless steel rotor down the shaft (side with holes drilled towards the engine) and slide down the shaft so the rotor just comes in contact with the carbon flange. Mark this "no load" position on the shaft just in front of the stainless steel rotor with a marker or tape as a reference point.

10. By sliding the stainless steel rotor further back down the shaft, **compress the bellow 1"** (the "no load" mark on the shaft is used as a reference to measure amount of compression). A special tool may be needed for this operation, as the bellows are fairly stiff. The installer can decide the tool required but in no case can this tool touch the working faces of the seal. To assist sliding the rotor down the shaft the installer can thread bolts (3/8" x 16) into the holes on the O.D. of the rotor. These bolts will make a "handle" to better grip the rotor. If the rotor tends to slide back on the shaft after compressing the bellow, use the provided set-screw and thread it into the hole that is tapped all the way through to the bore of the rotor (only one out the 4 holes is drilled and tapped all the way). This screw will **temporarily** hold the rotor in place while the clamp assembly is fit in front of the rotor. **Important: Back-off this set-screw once the clamp assembly is slid into position with the screws snug.**
Note: The amount of compression required may vary depending on motor mounts and shaft misalignment. The suggested 1" of compression is an average load. Up to 1 ½" of compression can be applied, if necessary.

11. Align the holes that are drilled and tapped in the clamp assembly with the holes drilled on the face of the rotor.

12. Fit the clamp assembly in front of the rotor assembly to the shaft, making sure that the driver screws will align with the holes in the face of the rotor. Secure clamp assembly to the shaft and make sure driver screws are inserted into the holes on the face of the rotor.

13. Check if the rotor runs true to the shaft using a dial indicator. A tolerance of 2,000th inch (.002") is acceptable. If the rotor is not true to the shaft, align it by working with the locking assembly and a mallet.

14. The seal has two hose barb fittings that require water to be plumbed into the seal to cool and lubricate it. This water flow is required. If there is a shaft bearing in the stern tube limiting the exhaust of the water flow, the second barb fitting may be vented overboard to eliminate excess pressure. On a twin-screw application, if there is no shaft bearing in the stern tube, the second barb fitting can be used as a jumper between engines to assure water flow even if one engine is shut down. **This plumbing must be done respecting the rules of underwater plumbing.** The water can come from the engine cooling raw water system, from a pump or from a scoop. A maximum pressure of 10 PSI is allowed.