

PACKLESS SEALING SYSTEM SHAFT SEAL



INSTALLATION INSTRUCTIONS

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Installation Instructions

For Shafts: 3/4" to 3 3/4" (22mm to 90mm)

Please read instructions thoroughly before installing the P.S.S. Shaft Seal.

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.
- 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 re-use cupped point set crews. If the cupped point has been flattened replace screws.
- Do not replace nylon hose barb fitting with stainless or brass.
- Do not use a ozone generating device around the PSS Shaft Seal it can cause irreparable damage and failure to the rubber bellow.

Beginning of Installation Instructions

1. Unbolt the shaft coupling from the transmission coupling.

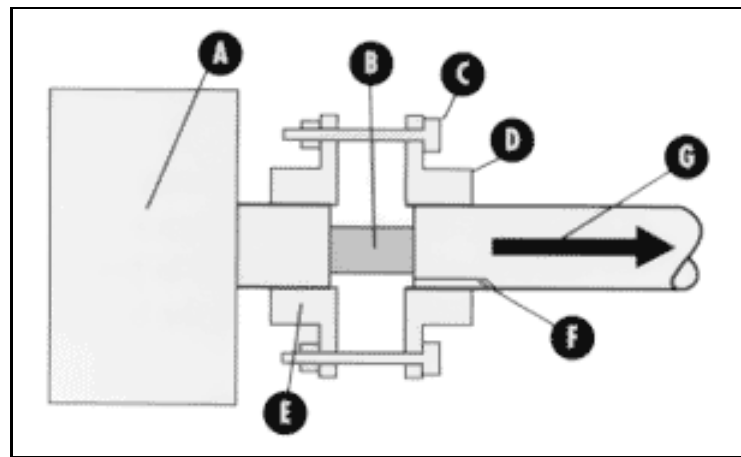
REMOVING THE SHAFT COUPLING

- Remove the shaft coupling from the shaft (on most installations the coupling is fixed to the shaft by two set screws that are wired together).

Helpful hint: Removing the shaft from the shaft coupling may be difficult. The drawing below shows the use of a spacer as a press between the propeller shaft and the transmission coupling.

A. Insert a spacer (with a diameter smaller than the shaft) between the shaft and transmission coupling.

B. Bolt the transmission coupling and shaft coupling back together with the spacer fit between (note: this may require longer bolts). The spacer will act as a press to drive the shaft from the shaft coupling as the bolts are tightened.



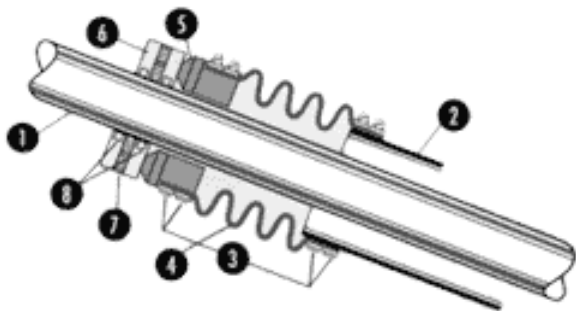
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|--------------------------|---------------------------------|
| A. Transmission | E. Transmission Coupling |
| B. Spacer | F. Key |
| C. Bolts | G. Shaft |
| D. Shaft Coupling | |

- Remove the old stuffing box and rubber hose to expose the shaft log (stern tube).

- If your boat is equipped with a bolt-on or rigid stuffing box, please refer to heading: for bolt-on or rigid stuffing boxes.
- If your boat is equipped with a threaded stuffing box, please refer to heading: for threaded stuffing boxes.

STANDARD SPEED P.S.S. SHAFT SEAL

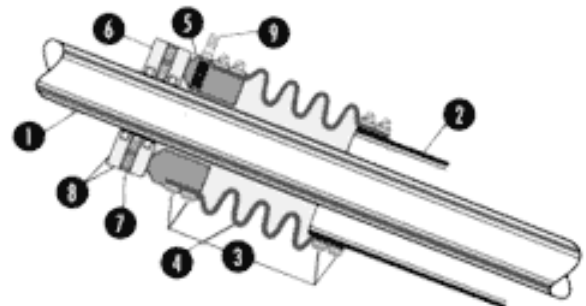
Hull Speed Under 12 Knots.
(Boats equipped with water injected stuffing box, use high speed.)



- | | |
|------------------------------------|--|
| 1. Propeller Shaft | 5. Carbon Graphite Flange (1) |
| 2. Shaft Log (Stern Tube) | 6. Stainless Steel Rotor (1) |
| 3. Stainless Steel Hose Clamps (4) | 7. Stainless Steel Screws (5 total/4 for Rotor, 1 spare) |
| 4. Reinforced Bellow (1) | 8. Nitrile O-Rings (2 in Rotor/2 spare) |

HIGH SPEED P.S.S. SHAFT SEAL

Hull speed over 12 Knots and boats with water injected stuffing box



- | | |
|------------------------------------|--|
| 1. Propeller Shaft | 6. Stainless Steel Rotor (1) |
| 2. Shaft Log (Stern Tube) | 7. Stainless Steel Screws (5 total/4 for Rotor, 1 spare) |
| 3. Stainless Steel Hose Clamps (4) | 8. Nitrile O-Rings (2 in Rotor/2 spare) |
| 4. Reinforced Bellow (1) | 9. Nylon Hose Barb Fitting |
| 5. Carbon Graphite Flange (1) | |

4. Slide the open end of the bellow and two hose clamps over the shaft log. The carbon flange (5) should already be securely attached to the bellow.
5. 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.
6. Slide the stainless steel rotor (6) onto the shaft using a water soluble lubricant like dish soap to help the rotor slide easily. Do not use grease or oil! Make sure the o-rings (8) are positioned in the grooves of the rotor (spare o-rings are provided) and that the set screws (7) are backed out so that they do not extend into the inside bore of the rotor.
7. Attach the shaft and shaft coupling (do not forget to secure coupling with set screws). Wire set screws together to avoid loosening.
8. Position the bellow on the stern tube so the carbon is centered around shaft (the carbon graphite flange is bored larger than the shaft to compensate for vibration or misalignment). Clamp the cuff of the bellow to the shaft log (2) with the two stainless steel hose clamps.
9. Slide the stainless steel rotor (6) down the shaft so it just comes in contact with the carbon graphite flange (5). Mark this "neutral" position on the shaft just in front of the stainless steel rotor with a marker or tape.
10. Using the stainless steel rotor, compress the bellow (4) the amount indicated on the bellow compression chart (the "neutral" mark on the shaft is used as a reference to measure amount of compression). While keeping the bellow compressed, tighten the two set screws to secure the rotor to the shaft. Once these set screws are secured, a second pair of screws are stacked on top of the first to act as locking screws to prevent the lower screws from possibly backing away from the shaft.

BELLOW COMPRESSION CHART

Shaft diameter	Compression amount
3/4" to 1 1/8" (22mm to 30mm)	3/4" (20mm)
1 1/4" to 2" (32mm to 55mm)	1" (25mm)
2 1/4" to 3 3/4" (60mm to 95mm)	1" (25mm)

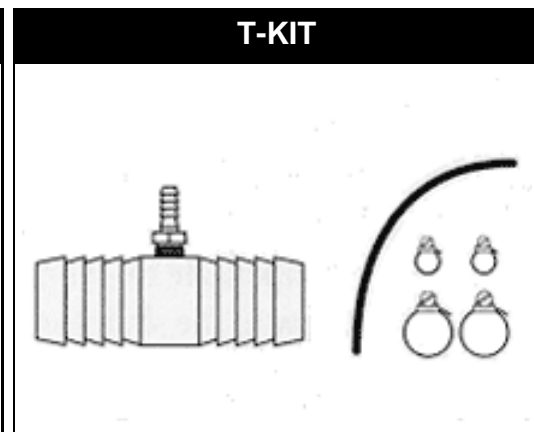
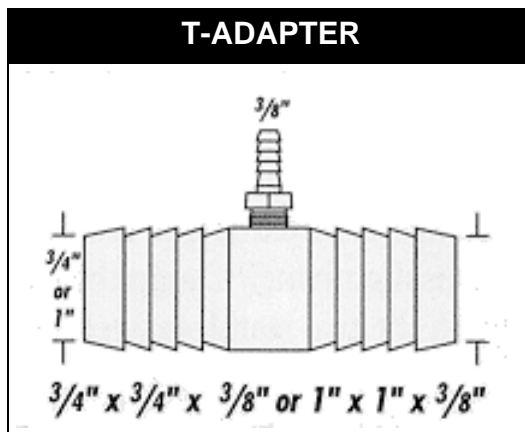
Note: amount of compression may vary depending on motor mounts and shaft misalignment.

11. High speed seals with nylon hose barb fitting reference 11-a. Standard speed seals reference 11-b

11-a. High speed seals with a nylon hose barb fitting require that water be plumbed into the seal to cool and lubricate it and the cutless bearing. Three methods for plumbing water into the seal:

1. Remove plug from heat exchanger and replace plug with a hose barb fitting (this plug would normally be used to drain water from the engine). Run a reinforced hose to shaft seals nylon hose barb (3/8"). Secure both with hose clamps.

2. Cut into the exhaust line of the cooling system before hot water is discharged overboard. Fit T-adapter into line and plumb water into shaft seal nylon hose barb (3/8"), using reinforced hose. Secure all connections with hose clamps.



Note: P.Y.I. T-adapter fittings or T-adapter kits (T-adapter, 6" reinforced hose, 4 hose clamps) are available for 3/4" or 1" internal hose diameters.

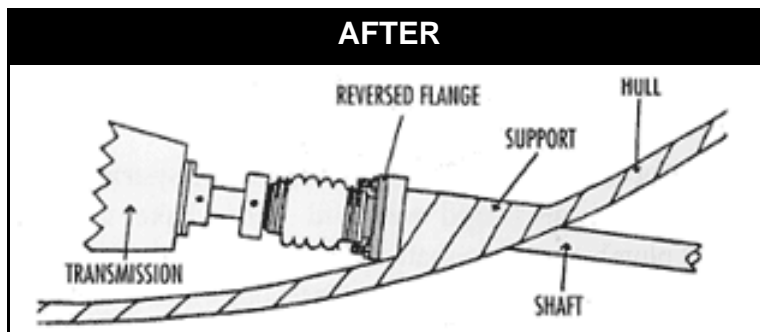
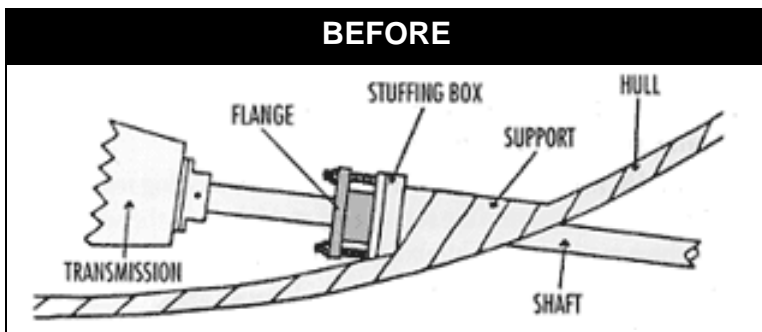
11-b. Standard speed seals

When a boat with a watertight (P.S.S.) seal goes back in the water, there will be an air pocket trapped in the shaft log (stern tube). This air pocket must be vented so water can reach the face of the seal to help cool and lubricate it. To vent the air pocket, simply compress the bellow (push the carbon away from the stainless steel rotor with your hand) so that water fills the shaft log (stern tube). A small amount of water will enter the boat at this time and will stop as soon as you release the bellow, allowing the two faces to come back in contact.

This procedure should be done every time the boat goes back in the water and is not required with high speed seals.

BOLT-ON OR RIGID STUFFING BOXES:

If your stuffing box is a bolt-on or rigid type, you will need to reverse the flange that was used to compress the packing. This flange will be bolted to the face of the bolt-on stuffing box and sealed with a gasket so no water can leak through. Once reversed, the bellow can be fit over the tube that was used to compress the packing. When completed, proceed with step #4 of instructions.



THREADED STUFFING BOXES:

If your old stuffing box was threaded directly into the hull, you will need to cover the threads with a liquid gasket material like "form-a gasket" to prevent the threads from cutting into the bellow. When completed, proceed with step #4 of instructions.

BREAK-IN PERIOD:

There is, on average, a 10 minute 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 R.P.M.'s.

TROUBLESHOOTING:

1. Spray or mist during operation:

Dimensions provided in the bellow compression chart are an average and should act as a guide. 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.

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.

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