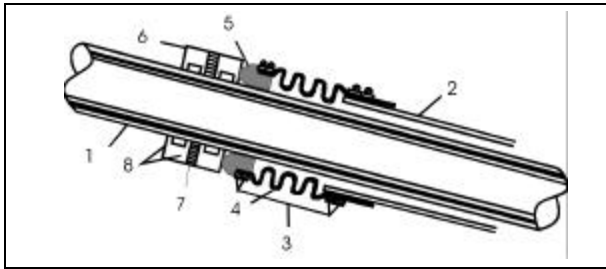


## STANDARD SPEED PSS SHAFT SEAL

Hull Speed Under 12 Knots

Boats with a water injected stuffing box - use high speed

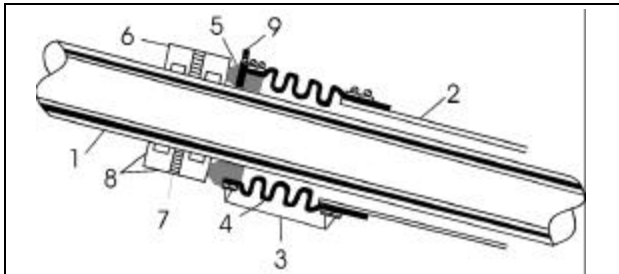


1. Propeller Shaft
2. Shaft Log (Stern Tube)
3. Stainless Steel Hose Clamps
4. Reinforced Bellow (1)
5. Carbon Graphite Flange (1)
6. Stainless Steel Rotor (1)
7. Stainless Steel Set Screws (5 total / 4 for Rotor, 1 Spare)
8. Nitrile O-Rings (2 in Rotor / 2 Spare)

## HIGH SPEED PSS SHAFT SEAL

Hull Speed Over 12 Knots

Boats with a water injected stuffing box



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

## READ INSTRUCTIONS THOROUGHLY

- Do not use grease or oil to slide the stainless steel rotor down the shaft.
- Do not allow petroleum based antifreeze to come in contact with the face of the seal when winterizing the engine.
- Install the PSS ONLY when the boat is out of the water.
- Do not damage the carbon flange or the stainless steel rotor while unpacking and handling them.
- Do not tighten the nylon hose barb fitting or replace it with a stainless or brass barb fitting.

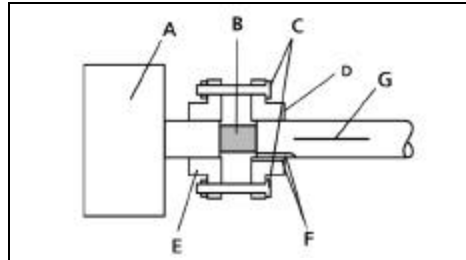
## INSTALLATION INSTRUCTIONS

1. Unbolt the shaft coupling from the transmission coupling.
2. 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.

### REMOVING THE SHAFT



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

The following instructions are for boats with rubber hose stuffing boxes. If your boat is equipped with a bolt-on or rigid stuffing box, please refer to heading: Bolt-on or Rigid Stuffing Boxes. If your boat is equipped with a threaded stuffing box, please refer to heading: Threaded Stuffing Boxes.

3. Remove the old stuffing box and rubber hose to expose the shaft log (stern tube).
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 (1) with very fine sand paper or emery paper (400 to 600 grit), paying particular attention to the shaft keyway to make certain there are no burrs or sharp edges that could tear the O-rings.
6. 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. 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!

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 (3).
9. Slide the stainless steel rotor (6) down the shaft so it just comes in contact with the carbon graphite flange (1). 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 (6), 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 the 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" (22 mm to 30 mm)	3/4" (20 mm)
1 1/4" to 2" (32 mm to 55 mm)	1" (25 mm)
2 1/4" to 3 3/4" (60 mm to 95 mm)	1" (25 mm)

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

Step #11 is only for high speed models (maximum hull speed exceeds 12 knots [14 mph]). High speed models require a water line to the carbon. The water line will cool the carbon and keep the cutless bearing lubricated. If you have a standard speed model skip to step #12 and continue.

11. Tee into the 1" hose running from the thermostat housing to the port exhaust riser and run a hose directly into the hose fitting (9) threaded into the carbon. Installation kits are available from A.R.E. Manufacturing, Inc. for internal hose diameters 3/4" and 1". Another method for venting water into the shaft log is to install an underwater scoop and vent it directly into the hose fitting.
12. When a boat with a standard speed PSS Shaft Seal goes back in the water, an air pocket can be formed in the shaft

log (stern tube). This air pocket must be vented when the boat is launched, 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 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.

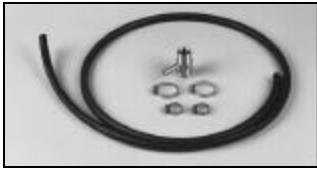
This procedure should be done every time the boat goes back in the water. It is not necessary for high speed seals.

### T-ADAPTERS and T-ADAPTER KITS

A.R.E. T-adapter fittings or T-adapter kits (T-adapter, 6' reinforced hose, 4 hose clamps) are available for 3/4", 1", 1 1/4", and 1 1/2" internal hose diameters.



T-Adapter

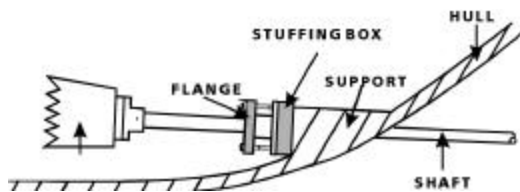


T-Adapter Kit

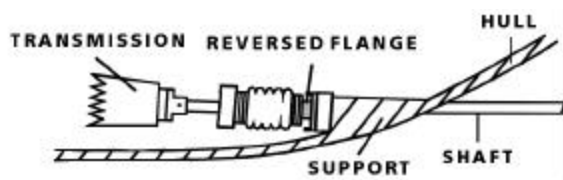
### BOLT-ON OR RIGID STUFFING BOXES

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 fitted over the tube that was used to compress the packing. When completed, proceed with step #4 of instructions.

BEFORE



AFTER



### 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 a 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.

### WARRANTY INFORMATION

Shaft seals purchased from A.R.E. MANUFACTURING, INC. are fully guaranteed against defects in material and workmanship for one year from the date of purchase.

Except as above stated, A.R.E. MANUFACTURING, INC. makes no other warranties of any kind, express or implied, and the extent of A.R.E. MANUFACTURING, INC.'s liability for any breach of warranty shall be limited to the replacement of the product.

A.R.E. MANUFACTURING, INC.'s warranty shall not apply to any other goods that have been repaired or altered by anyone other than A.R.E. MANUFACTURING, INC. The warranty shall not apply to any product subjected to misuse, common negligence, or accident.

**ELBERT'S** 

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## SHAFT SEAL

### INSTALLATION INSTRUCTIONS

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