

TOR≡MARINE

INSTRUCTION MANUAL SHAFT SEAL

TOR≡MARINE

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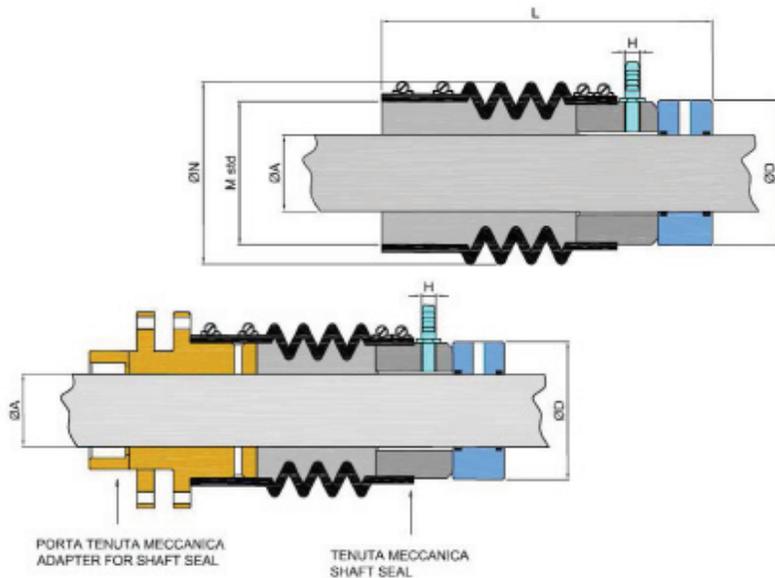
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SHAFT SEAL



1. Components of shaft seal

The shaft seal is composed by the following components :

QTY COMPONENT

- | | |
|---|--------------------------------------|
| 4 | Stainless Steel Hose Clamps |
| 1 | Nitrile Bellow |
| 1 | Carbon Graphite Flange |
| 1 | Stainless Steel Rotor |
| 6 | Stainless Steel Set Screws for rotor |
| 2 | Nitrile O-Rings in rotor |
| 1 | Nylon Hose Barb Fitting |

6. Product Guarantee

TOR MARINE S.r.l. shall guarantee the absence of defects with regard to both its own processing as well as the materials utilized and in virtue of above, shall commit itself to intervene in order to eliminate the defect, should claim be received within one year from delivery, provided that in the meantime no interventions have been carried out by third parties, or the flaw or defect has been caused by improper use of the product, inadequate maintenance or improper repairs. Any contestation and request for guarantee work must be made in writing and contain the most detailed description possible of the anomalies encountered and the photos of defects.

The goods should be send back to TOR MARINE S.r.l. and the transport of products shall be charged to the Costumer, once manufacturing defect has been established, TOR MARINE S.r.l. will replace or repair and transport the product to the place of origin at its own expenses.

- Dripping at rest: If the Shaft seal drips while at rest then it is likely that foreign material is on the face of the seal between the stainless steel rotor and the carbon flange. To clean this foreign material from the seal, insert a clean rag carefully between the two faces (Note: some water will come into the boat at this time if the boat is in the water) and work the rag around the seal. As you do this, the incoming water will flush the impurities. Remove the rag from the seal and the leak should stop.

- High-pitched squeal: If you hear a high-pitched squeal from the shaft seal during operation, the seal may not be getting water. Review and correct plumbing to the seal. Take care because if the seal has run dry the faces (stainless steel rotor and carbon) may be very hot.

5. Break-in period

Usually, the Shaft Seal requires approximately one hour of break in time, which allows the carbon flange to polish the mating face of the stainless steel rotor. During the break in period you will experience a very fine mist, sometimes associated with a back dust coming from the Shaft Seal. Under normal conditions, this will stop after an average of one hour running time.

2. Instruction of use

- 1.** The OMM Shaft Seal you are preparing to install is a through-hull fitting that protects against water from entering the boat where the shaft enters the hull. Make sure that you or your designated Installer is a qualified professional, knowledgeable and skilled to install the Shaft seal correctly, and you have all the required tools on hand before beginning installation.
- 2.** The installation must be do with the boat out of water.
- 3.** Don't use any oil, grease or silicone products simply use soap and water to lubricate the o-rings of the rotor.
- 4.** Clean the seal area of your boat so you do not contaminate the seal surface with dirt or other foreign matter.
- 5.** Be careful to not damage or scratch the surface of the carbon or the surface of the stainless steel rotor while you unpack or install the SHAFT SEAL.
- 6.** There should be a total of six set screws in the two holes of the rotor (2 sets screws in each hole). If you must move the stainless steel rotor, make sure to remove the top set screws in order lo access the bottom two set screws.
- 7.** There should be a total of 4 hose clamps securing the bellows ends.
- 8.** Do not re-use the supplied cupped pointed set screws if these are damaged.

9. Do not tighten or replace the installed nylon hose barb fitting with a metallic fitting.
10. Do not slide the aft bellow cuff too far down over the stern tube. The leading edge of the stem tube could cause damage the inner part of the bellow and limit its movement.
11. If fitting a vent line -boats under 12 knots-, do not run a loop at the top end of the hose as this could promote a siphon and water could enter in the boat.
12. If the boat sits idle for a long , it is necessary to move the carbon face back to allow a small amount of water to enter the boat.
13. As with any hose under the waterline, the Shaft Seal bellows must be inspected on a regular basis (at least every 6 months under most circumstances) and checked for any signs of deterioration , at the first sign of deterioration the bellow must be replaced, also, for security reason the bellow should be replaced no less than every five years, regardless of its apparent condition.
14. Do not allow any petroleum-based liquid or corrosive material to come in contact with the Shaft Seal.
15. Do not use an ozone generator (e.g. air cleaner) in or around your boat. The extra ozone will speed up the deterioration of any rubber product.
16. The bellows will need more frequent inspection and replacement in an environment where non-sealed batteries emit sulfuric acid vapors, these will accelerate deterioration of any rubber materials.

WARNING: All plumbing must follow the standards and practices of proper boat plumbing be installed.

TESTING - When launching the boat, inspect the Shaft Seal and make sure the Shaft Seal is properly in place.

Water should not be entering the boat from the Shaft seal area. Run the engine in gear as in a normal operation. It is normal at this time to notice a very fine spray or mist coming from the seal and some carbon dust, as the Shaft Seal requires a break in period (see below). The Shaft Seal should not be leaking at rest and should never spray more than just a fine spray or mist.

4. Troubleshooting

- Spray or mist during operation after the break in period:

The EXACT compression amounts required can vary due to different types of engine mounts and water pressure being fed to the seal. If you experience any spray or mist following the break in period, make sure that the bellows had been compressed properly.

If so, add an additional 14 of compression to the seal and soon the mist should disappear. Keep adjusting until the spray or mist stops.

Do not run a loop at the top end of the vent hose as it could start a siphon action in some extreme conditions. Also, make sure the vent hose is properly secured from falling below the waterline. If the vent hose were to fall down below the waterline, water would come in the boat. Also, do not plug or block the end of the vent hose, as this would prevent the line from venting.

B - High-speed boats: (Over 12 knots of boat speed under power).

Note: For twin engine boats: Boats that can exceed 12 knots on a single engine must run a crossover line between seals to ensure both seals maintain water flow. For high-speed vessels it is required that a water supply be plumbed to the Shaft Seal for the purpose of cooling and lubricating the seal faces because, at over approximately 12 knots of speed, a vacuum is created in the stern tube and water is drawn away from the Shaft Seal resulting in a loss of cooling water that may cause the carbon to over heat. There are multiple sources of water for this supply. The following are some examples:

- T-off the engine raw water-cooling line.
- Thread a barb fitting into the drain plug of the heat exchanger if applicable.
- Thread a barb fitting into the drain plug of the exhaust manifold if the manifold is raw water-cooled.
- Add a small scoop under water for keel-cooled boats or t-off another water pickup. (Note: In this case a valve must be installed to regulate the water flow as too high a water flow may over pressurize the Shaft seal).

3. Installation instructions

NOTICE:THE INSTALLATION MUST BE DO WITH THE BOAT OUT OF WATER!!

- A.** Unbolt the shaft coupling from the transmission coupling.
- B.** Remove the shaft coupling from the shaft. Coupling styles will vary by manufacturer. Make sure to always use the appropriate tools.
- C.** Remove the old stuffing box and packing material. There are three types of packing glands that can be found on most boats: “Classic”, “Bolt On” and “Threaded”.
- D.** Clean the entire exposed portion of the shaft with very fine sand paper in order to remove any debris or rough edges. Pay particular attention to the keyway located at the forward end of the shaft, where the stainless steel rotor will pass. The shaft and keyway must not have any sharp edges that could damage the o-rings upon installation.
- E.** Slide the open end of the bellow and its hose clamps down the shaft and onto the bare stern tube and make sure the bellow has a proper fit over the shaft log. Once in place the bellow should overlap the stern tube by the same amount as bellow cuff so the hose clamps will properly tighten the bellow to the shaft log. Take care to do not slide the bellow cuff too far down and over the stern tube. If the bellow is slid too far onto the stern tube the forward edge of the stern tube could damage the inner ribs of the bellow and limit its movement. Tighten the hose clamps to secure the bellow to the stern tube.

F. Make sure the carbon flange is in place on the forward end of the bellow and that the two hose clamps properly secure it. Also confirm that the carbon is free of any defects or imperfections on its polished face.

G. Verify that there would be two o-rings placed into the o-ring grooves inside the bore of the rotor. Confirm that the mating surface of the rotor is free of any defects or imperfections. Take two of the set screws and thread them into the rotor holes until the cupped part of the screw protrude in the inside bore. Save the remaining set screws for use later during installation.

H. Lubricate the shaft and o-rings of the rotor, and slide the stainless steel rotor down the shaft. Use a petroleum free liquid (e.g. a dish soap or a water solution works well) as the lubricant. Do not use oil, grease or silicone as the lubricant.

I. Attaccare il mancone all'asse e alla trasmissione, assicurandosi che tutti i dispositivi di sicurezza forniti dal produttore siano correttamente posizionati.

J. Re-attach the shaft coupling to the shaft and make sure that all the safety devices provided and recommended by the coupling manufacturer are in place.

K. Once the shaft is in place, verify that the carbon is centered on the shaft (note the carbon ring is bored at a larger diameter than the shaft), verify that the bellow cuff is properly placed on the stern tube and verify that the shaft is near center in the shaft log. Tighten all the hose clamps around the stern tube and the carbon. Slide the stainless steel rotor down the shaft until it just touches the carbon. Mark this position on the shaft as the "neutral" position with a marker or a piece of tape on the shaft just in front of the rotor.

L. Sliding the stainless steel rotor aft, compress the bellow by about 25 mm for shaft with a diameter until 55 mm and about 30 mm for shaft with a diameter until 80 mm, using the "neutral" mark as a reference point. While keeping the bellow in the "compressed" position, tighten the two set screws against the shaft with a allen wrench (Use approximately 6 foot pounds of torque for shafts 3/4" to 1 3/8" and 8 foot pounds of torque for shafts 1 1/2" to 3 3/4").

M. Use the two additional set screws to lock the first set screws.

3a. Plumbing the system

A - Low speed boat (Under 12 knots of boat speed under power and no bearing in the shaft log).

Note: Sailboats or displacement powerboats with a powering speed below 12 knots can use either method A or B. Using a 3/8"(8-9 mm) ID "underwater rated" hose (not provided), connect the hose to the hose barb fitting installed on the carbon and secure the hose with two hose clamps. Run the hose to a point in the boat at least two feet above the waterline, making sure that the hose does not apply any load on the carbon part of the seal. Keep the hose as close as possible to the centerline of the vessel so the top of the vent hose is never below the waterline, even if the boat heels. Secure the hose in place with the necessary fittings that insure it will not pull free and drop. In this way, this hose is now a venting hose that will help ensure that no air is trapped in the seal.