

# Changing a sail drive seal on a Volvo Penta

A saildrive installation looks very simple and there's no sternland to leak. So, can you just forget all about it?

Unfortunately not, as Pat Manley explains

**V**OLVO Penta state quite categorically that 'the rubber seal between the S drive and the engine bed must be replaced every 7 years'. They also tell you that 'before each launching the rubber seal should be checked for any sign of cracks, ageing or wear.' Furthermore, you can be certain that if the seal fails

and the boat sinks, the insurers will check the age of the seal.

So it requires periodic attention. The date of its manufacture is moulded into the seal itself and, hopefully, the engineer who originally fitted it will have made sure the date can be easily seen – very useful if supporting records are no longer available.

Volvo supply a kit of the parts you need to change the seal – the only thing missing being the sealing agent. So make sure you have some 'Permatex' or similar before you start! With the kit comes an excellent illustrated instruction sheet to help you on your way. However, note Volvo Penta's caution that the instructions aren't really

intended for the DIYer.

David Shore, from Ebb Tide Marine – assisted by his 'lad' Jamie – were to change the seal on *Amadeus*, a 7-year old Omega 36 fitted with a Volvo Penta 2003 and a 120 Saildrive. Although this job could be done single handed, it's much easier with two particularly when moving/aligning the engine/leg.

## 1: PREPARATION

■ They were generally pleased with the access to the engine space. There was enough room above and to the sides of the engine but the rear was more awkward. You need about 22in above the diaphragm seal and 12.5in behind it to withdraw the leg. Luckily, the obstructing panelling was fairly easily removed and they soon had the area cleared for action.

The first job was to remove the gearbox dip stick so that the oil would later drain out of the bottom of the leg.

Now under the hull, remove the propeller. If you first select reverse gear, the propeller nut should be easy to remove. The blades of a folding prop will need to be taken off before you can get at the nut. In the case of a fixed prop the cone needs to come off first. Keep all the bits safe in a clean container. There's an outside seal which fairs the hull and protects the main seal. If this also needs to be replaced you can leave the propshaft on because it doesn't matter if it damages it – but Dave usually

removes the shaft at this point. Incidentally, the kit doesn't include a replacement outer seal, which you must buy separately. Take off the anode and then remove the rear bearing housing. This may need to be worked loose as it was probably assembled on Permatex. There's an 'O' ring which keeps the water out of the lower gear housing. Stand back as the housing comes away, since the leg's lubricating oil will splash out if you haven't already drained it.



1 Removing the cone so that the prop can be taken off.



2 Out come the studs of the rear shaft bearing housing.



3 Prise the shaft bearing out of the leg. Watch for the oil.



4 The prop shaft can now be removed.

## 3: SEPARATING THE LEG FROM THE GEARBOX



1 Having cut the locking wire, you can start undoing the studs. Note their positions.

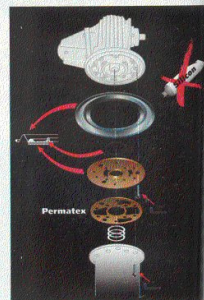


Fig 1: All the components between gearbox and drive leg.



2 Separating the leg from the gearbox. Don't lose the shim washers (count them).

Count them carefully and put them in a safe place. The number and thickness of these shims will have been determined at initial assembly and must never be changed.

The large circular plate is now removed from below the sealing diaphragm, noting the presence of the large 'O' ring. If one is fitted (120SB & 120SC) it must be replaced with the new one from the kit. Figure 1 shows the positioning of all the components that will be



3 Separating the clamp plate and seal from the gearbox. Note the old 'O' ring on the clamp plate.



4 Clean clamp ring and remove the old 'O' ring.

exposed on disassembly and you'll need to check whether your leg is a type 120S rather than a 120SB or 120SC to determine if the large 'O' ring



5 After removing the old seal important to thoroughly the seal housing.

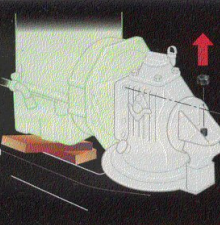


6 Check the new seal will fit into the clamp ring.

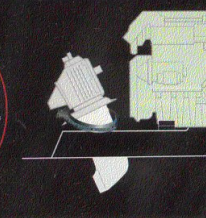
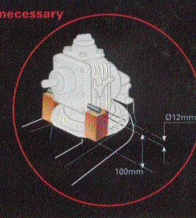
seal is needed or not. With all the loose components safely stowed time to remove the old diaphragm and the ga:

## 2: REMOVING THE GEARBOX AND DRIVE

To remove the gearbox and drive, the engine must be moved forward a few inches to allow room for the gearbox to be disengaged from the engine and the leg tilted back and lifted away.



When necessary



■ Back into the boat to prepare the engine and gearbox. What you need to do will very much depend on accessibility.

The instructions show that the engine needs to come forward 1in, but Dave reckons

3in is more realistic. The gearbox has to be moved aft and the leg tilted about 20° backwards to clear the engine's bell housing. If there's not enough room behind the gearbox, the engine will have to come much further forward

or even be removed completely.

But assuming you don't have to take out the engine only, only the exhaust hose and gear selector cable should need to be disconnected.

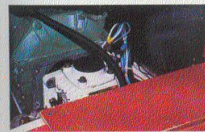
Using a ratchet handle, with one or two long extensions, the bolts attaching the engine mountings to the beds were soon removed. Next it was to the back of the engine to remove the rear engine mounting and the bolts holding the gearbox to the bell housing. The engine was now ready to be pulled forward.

You'll probably find the mounts stuck to the beds and they may need the judicious use of a car jack or wedges to

free up the engine. Wiggle the engine forward whilst the gearbox back – much easier with two people, this case could attack the front of the engine. But because the engine doesn't fall off the beds!

At this point we found there wasn't sufficient room to tilt the leg assembly far enough back to allow the clamping ring to be removed so the complete engine mounting attachment was taken off the back of the gearbox to make this possible.

The unit was now taken down to the tailgate of truck which made a good workbench.



1 Engine has been eased forward (above) leaving a gap between the bell housing and the gearbox, disengaging the drive shaft, allowing removal of the leg and gearbox (right).



2 Engine has been eased forward (above) leaving a gap between the bell housing and the gearbox, disengaging the drive shaft, allowing removal of the leg and gearbox (right).



## 4: PUTTING IT ALL BACK TOGETHER



1 New seal in place on gear box. Don't use any sealing compound.



2 New 'O' ring being placed on to the top of the clamp plate.



3 Attach the clamp plate with the long and short studs.



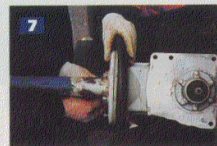
4 Brush sealant on to the clamp plate before fitting the gasket.



5 Fit the gasket and treat its lower face with the sealant ready for refitting to the gearbox.



6 The leg being offered up to the gearbox assembly. Don't forget the shim washers!



7 Bolt the leg to the gearbox. Ensure you tighten the studs in the correct order (see below).



8 The rear of the gearbox and the gearbox plinth waiting for the leg and new seal.

■ Dave stressed the importance of ensuring that all the mating surfaces relating to the new diaphragm seal must be absolutely clean and dry and that the joint uses no sealing compound or lubrication of any sort. The mating surfaces for the new gasket must be thoroughly cleaned but in this case a gasket cement such as Permatex is used on both surfaces. The instructions accompanying Volvo Penta's kit covers this fully. Illustration shows exactly what is required.

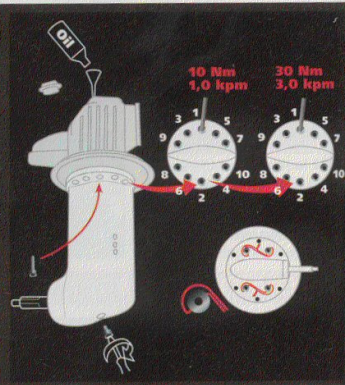
Carefully reassemble the components using the correct length Allen screws at each joint and making sure that all

the shim washers are replaced. Having tightened the screws correctly, re-wire the two screws each side of the leg with stainless steel or monel wire, observing the direction in which the wire lies from the diagram.

If the prop shaft wasn't removed from the lower leg, the oil drain plug can now be replaced and the leg filled with new oil, otherwise this must wait until later.

The leg assembly can now be refitted to the boat – again an easy task for two people. With the gearbox selected into gear, and one person holding the leg vertical and 'jiggling' the gears or propshaft from outside the boat the engine is pushed forward to re-engage the gearbox splined shaft into the flywheel. The top clamp ring of the diaphragm seal goes on next – making sure that the mating surfaces are absolutely clean – and then all the bits you took off initially can be refitted. Make sure that the gearbox cable connection is set up properly and that you remember to

Diagram showing the correct order for tightening the leg to gearbox bolts. The four side studs need to be wired as shown to prevent them shaking free. Refill with oil if prop shaft not removed.



replace the exhaust pipe.

If you're replacing the outer seal, the mating surface on the hull would have been thoroughly cleaned while the leg was out and now it must be cleaned once more with acetone – remembering that it's highly inflammable! Glue the new seal in place and ensure proper contact by using a roller as shown in the

instructions. The air temperature must be above 15°C.

The propeller shaft assembly can now be re-installed using a new 'O' ring between the leg and the rear bearing housing. Finally refit the anode – replace if corroded – and the propeller assembly, remembering to grease the shaft splines.



9 Replace the prop shaft and bearing. Fit a new anode and refill with oil.

## FINALLY

Remember to fill the leg with oil! Whether you use the dipstick hole or the filler on top of the gearbox, this will take some time as the oil is admitted very slowly. And with the boat afloat, check for leaks.

When re-launching check that no water leaks into the boat at the new seal.

## WHERE TO GET THE KIT AND HOW MUCH DO THEY COST?

For details of your nearest Volvo Penta dealer contact: Volvo Penta customer service department, Otterspool Way, Watford, Herts, WD2 8HW. Tel: (01923) 228544. Fax: (01923) 816478. Internet: <http://www.penta.volvo.se>. Saildrive seal kits cost from £220 to £226. The outer fairing rubber costs £50. All prices include VAT.

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