

## CHANGING THE SAILDRIVE RUBBER SEAL ON A MOODY S31

*This is a composite article, based on the experiences of two different owners who changed the seal on the 120S saildrive leg on two different Moody S31's.*

*Volvo-Penta recommend that these seals are changed every seven years. Service kits are available either from V-P dealers, or from other outlets such as Keypart.*

*Owners not familiar with the S31 need to be aware that access to the engine space on this boat is not as easy as some others.*

*Note that V-P apparently do not recommend this seal-change as a job suitable for DIY. However, plenty of owners, not just of Moody yachts, have done the job successfully. In the opinion of the authors, the job is straightforward for anyone with good DIY mechanical skills and a reasonable tool-set.*

***However we must make the obvious point that the security of your boat will be at risk if the job is not done competently; you should give careful consideration before deciding who should do it.***

*If all goes well it can all be done in one day, but taking two days over it makes it less stressful!*

### **Please take note:**

The job needs two people! In particular, be aware that the gearbox/leg assembly is awkward to hold, weighs 50lb, and has to be withdrawn upwards into the boat.

A full Volvo kit of parts is available, which is suitable for several different models of the 120S. It contains everything required, except the adhesive to glue the external rubber fairing to the hull. Included instructions are comprehensive. The part number is 21112450, and in February 2009 it was available from Keypart for £147.86.

Note that when the engine is slid forward from the gearbox, the rear of it will no longer be supported. Even though the front mounts are a little way back from the front of the engine, the weight of the rear is substantial. Space constraints make it difficult or even impossible to chock it as shown in the drawings that come with the Volvo kit of parts. It could perhaps be suspended using a crossbar and rope. We chose, however, to fill the recess below the sump with short pieces of timber, topping off with a longer wide piece fitted tightly beneath the sump and butted against the forward engine box bulkhead. We were still surprised at how much the engine dropped when detached from the gearbox.

Two very useful items that make the job easier:

A small DIY-size trolley jack.

Threaded studs to assist in lining up the gearbox on re-assembly (see text).

### **Removing the Saildrive Leg**

Preparation outside -

Drain gearbox oil. Replace plug when empty.

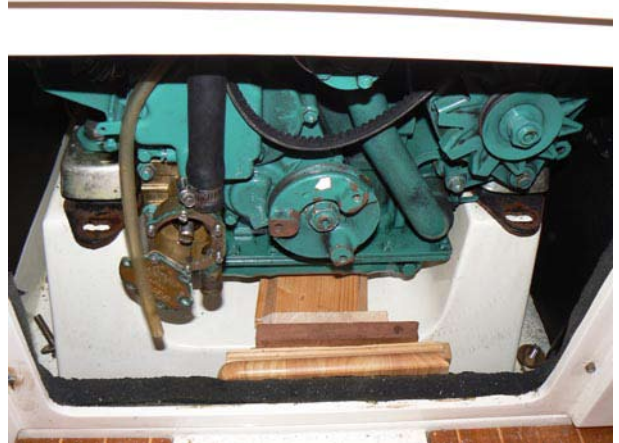
Remove propeller.

Peel away external saildrive rubber fairing from hull and discard if you are replacing it with new (a new one comes in the kit). Otherwise you can leave it in place if you want.

Set up chocks or workbench (Black and Decker style may be suitable) on a firm surface beneath the saildrive, and take its weight – a small trolley jack is ideal for this.

1. Remove the aft bunk cushions, and protect the GRP base of the bunk with e.g. cardboard.
2. Remove the aft hinged engine box cover.
3. Remove the front engine cover that carries the bottom companionway steps.
4. Remove any water pipes, exhaust, cables etc, anything that will restrict the engine moving forward by about 2". In a standard S31 installation, this might only be the cooling water hose leading to the pump, the gear-change cable, and the exhaust. Just unscrew the exhaust water-trap from the floor. The gear-cable must also be unclamped from the rear engine mount. Disconnect or isolate the engine start battery to safe-guard against shorting out when using spanners beneath the engine.
5. Remove the two bolts that hold each front engine mounting to the bearers.
6. Remove the six bolts holding the gearbox to the engine.

7. Having supported the rear of the engine if necessary (see Notes above), one person at the front of the engine pulling, and the other behind the engine pushing, should now easily slide the engine forward. Take care it cannot fall off the front of the bearers, but in practice we found it came to a safe stop, impeded by the end of the heat exchanger assembly meeting the front of the engine box.
8. The rear engine mount may be one or other of two different designs. Detach it from the floor of the boat.
9. Totally remove the rear mounting assembly from gearbox (it makes it easier to lift out the gearbox). Note that you really must have drained out the oil first, as the rear mounting assembly includes the back-plate of the gearbox!
10. Remove all the other bolts that clamp down the saildrive seal.
11. Using the jack to assist, raise the saildrive leg a few inches, the operator inside pulling the top aft so it clears the rear of the engine.
12. You should now be able to lift off the clamping ring and set it aside, then continue the lift of the leg assembly, bringing the top aft to allow the drive shaft to clear the hole in the boat. Some wriggling of the unit may be necessary to get the rubber seal past electric and control cables, and hoses.
13. Take the assembly right out of the boat – for safety it may be better to lower it to the ground with a rope rather than carry it down the ladder.



### Fitting the New Seal to the Leg

*The kit includes a separate instruction booklet for fitting the seal to the leg. The leg will be one of at least two different models – 120SD or 120SE. According to the diagrams, the process is the same for both. Other models of Moody may well have other models of saildrive unit.*

*At some stage the whole unit will need to be clamped in a work-bench to facilitate the job. The following briefly describes the process used for one of the units, a 120SD. It really is a matter of following the instructions, and ensuring the interior of the unit stays clean.*

1. Lying the unit on the bench, cut the locking wires and removed them from the Allen screws on each side, then slightly loosen all 10 screws.
2. Clamp the leg right-way up in a soft-jawed vice. One person should also support it if necessary, while the 10 Allen screws are completely removed. Note the location of the four that have holes for locking wire, also the location of the two longer screws.
3. Carefully lift the gearbox off the leg. There are three shims which live in a recess in the top of the leg, watch that these do not get displaced. Discard the gasket.
4. Three more Allen screws are now exposed, holding the round baseplate and the saildrive seal itself to the bottom of the gearbox. Undo these and remove the baseplate (noting which way round it fits) and the saildrive seal.
5. Carefully clean all the mating surfaces. Pay attention to the waterways in the leg and gearbox - mussels have been known to flourish in there!
6. Identify the sealed pack in the kit which contains a gasket, an O-ring, and the locking wire. Check the gasket is correct for your unit.
7. Replace the O-ring, which fits in a recess in the base of the gearbox.





8. Place the new saildrive seal in position at the base of the gearbox, fit the baseplate, and tighten all three screws.
9. With the leg clamped upright again in the soft-jawed vice, fit the new gasket, lightly greasing it if necessary and ensuring it is in the correct position.
10. Carefully place the gearbox/seal assembly back on top of the leg, and replace each Allen screw in its correct location, finger-tight, and again taking great care that the gasket is in the correct position.
11. Finally, tighten all the Allen screws, and add the locking wire to the two inner screws on each side.

### Other Jobs on the Leg

Now is a good time to tidy the leg up, perhaps removing all old anti-fouling, and touching up any areas of bare metal that are showing through the primer

### Prepare Hull for new External Fairing Seal

If you removed the fairing seal, it is much easier to clean the old glue off the hull without the leg in place. Whatever Marine Projects used to stick the fairing on, it's certainly tenacious. It took about an hour to clean up, softening the old adhesive with acetone (taking appropriate safety measures with the latter) and using a wide chisel.



### Refitting the leg back into the boat

1. Thoroughly clean the GRP surface that the gaiter will bed down onto. No sealant is going to be used, and it is essential that this surface is scrupulously clean. Acetone will do the job.
2. Insert the leg assembly downwards through the hole, remembering to include the grey s/s clamping ring. May well be a fiddle to get it all back in past the various electrical and control cables, but it will go.
3. Support the leg using the jack outside again.
4. Grease the gearbox splines.
5. Use two threaded studs in the top hole each side on the engine block, where the two top gearbox-to-engine bolts will fit. These studs should be 50mm long, and have a screwdriver slot cut on the end so they can be easily removed. These are not essential, but are a huge help to alignment.
6. Right now the back end of the engine is probably lower than its normal position, Outside, swing the bottom of the saildrive leg forwards, and adjust its height until the threaded studs enter the top holes

on the gearbox flange, and the front face of the gearbox and the rear face of the engine are parallel. It should now be possible for the person inside to tug the engine back slightly, and push the gearbox forwards, so the two fully mate. If they won't go together, put the gearbox into gear, and ask the person outside to turn the prop shaft slightly while keeping the forward pressure on the gearbox – this will allow the splines to line up.

7. Put in the four bottom gearbox bolts, and nip them fairly tight, then remove the studs and screw home the top two bolts, again fairly tight.
8. Now jack up the saildrive leg, and the whole rear of the engine/gearbox assembly will rise to allow the saildrive seal to be correctly positioned, with the clamping ring. This will involve moving the engine from the front until the mounts are back in their original position (it helps not to have cleaned the rusty marks off the engine bearers!)
9. Fit the rear cover back onto the gearbox, preferably using a new O-ring seal. The O-ring should be lightly oiled. Don't forget the support bracket for the gear cable.
10. Having checked that the rear mounting bolts are lined up correctly, refit the four bolts in the front engine mounts and fully tighten. Loosely tighten the rear mounting bolts.
11. Fit all the clamping-ring bolts, using Loc-tite or similar, and tighten them in turn (opposites), together with the two rear-mounting bolts. Check the Volvo instructions for torque settings. Note that it is impossible to use a torque-wrench on some of these bolts – tighten them as much as you can with a spanner.
12. Finally check that all bolts are torqued up correctly, including those holding the gearbox to the engine.
13. Re-connect the gear-change cable and anything else that has been detached.
14. Re-fit the aft engine-box cover.
15. Re-fill the leg/gearbox with the specified oil.
16. Glue the external rubber fairing seal onto the hull. The glue for this is a two-part adhesive, Bostik 2402, for which the instructions should be followed carefully. Bostik 2402 may be hard to find but is available through internet sellers. An alternative may be available at your chandlers in the form of any two-pack glue for rubber dinghy repairs, however you will need to check its suitability.

*Written by Ian McLaren (2006) and expanded by Dick Holness (2009).*

*All photographs © Dick Holness 2009*