

## Rudder removal and installation, HR312 S/N 568

First of all, check with Hallberg-Rassy if they have the parts you need or if you have to find them elsewhere. In my case replacing the pin took care of all the play in the lower hinge. You will also need to have the locking key or “anti-rotation” pin that prevents the upper rudder fitting from rotating on the shaft. It’s a oblong rectangular piece of the same material as all the other rudder components, salt water resistant brass.

In my case I don’t think the rudder had been removed since it was first installed at the factory back in 1988, which means that nobody had tampered with the hinge pin or fittings making an oversize pin or hole.

The cylindrical pin measures 35 mm in diameter and is 115 mm long. The locking key is 10 x 8 mm and 136 mm long.

My contact at [info@hr-parts.com](mailto:info@hr-parts.com) was Vickie Vance and for boat parts the cost was next to nothing.

Start by removing the tiller at the top of the rudder shaft. Then remove all the things attached to the shaft within the hull. There’s a steering stop near the top (picture below) and perhaps an autopilot attachment. If you have wheel steering there’s also a bell-crank for the steering cables. The grease stuffing box/rudder shaft bearing (second picture below) does not have to be removed. The rudder shaft will eventually have to be pulled upward so that the rudder may be removed aft.



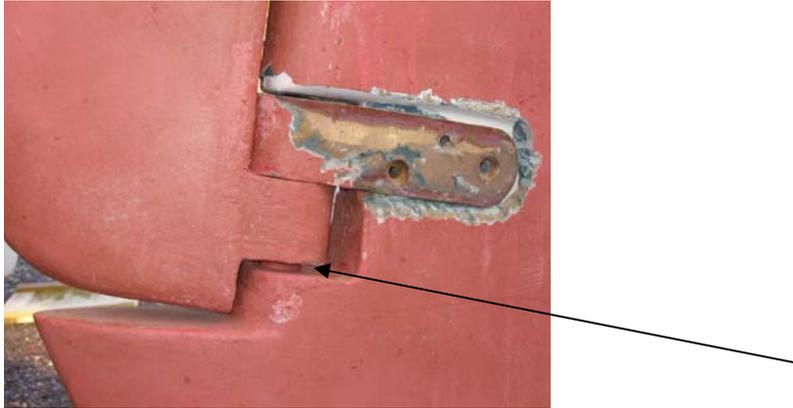
To remove the steering stop (or limiter), loosen the 2 bolts and slide the stop arm downward. There’s a locking key made from steel that prevents the arm from turning on the shaft. You may leave the arm halfway down the shaft.



The cavity where the nut is found is covered with fibreglass putty. Use a lightweight hammer and small chisel to remove this. Be careful not to damage the gelcoat surface of the rudder. The upper rudder fitting does not have to be removed so unless the putty covering the tangs that attach it to the rudder is cracked and you want to replace it, you may leave it as is. The cracks will probably also hold

a bit of water that takes some time to dry out. My guess is that since the upper fitting is the thing that actually transfers the turning torque from the shaft to the rudder blade, the putty covering the tangs may crack with time. This is only cosmetic though.

The aft lower fitting is attached to the rudder by 3 screws that extend through the rudder, from one tang to threads in the other, two from left to right and one from right to left. The putty covering these will also have to be removed. These screws are of a fairly large diameter and the screw slots are a little less than 3 mm wide and 15 mm long. You will need a screwdriver that fits the slots as exactly as possible and to which you can attach a wrench for maximum turning torque. You may also need an assistant preventing the rudder from turning when you apply pressure and torque to loosen the screws. Only loosen the screws at this time, do not remove them.



This picture also shows the hinge pin resting on a “ledge” which is part of the rudder (the skeg is to the left). This means that the pin will fall out of the fitting when the rudder is removed aft. The lower fitting itself will also drop to the ground once the pin falls away.

The nut at the bottom of the shaft is secured by a large split pin (cotter pin), also made from salt water resistant brass. Be careful when you remove this. I never checked if Hallberg-Rassy had these for sale so as it looked OK I used the same one when I fitted the rudder.

Loosen the nut. The same goes for the nut, I never checked if Hallberg-Rassy had this for sale either so I used the same one when I fitted the rudder. It is made from the same material as the rest of the items. I sorry but I don't remember the size of wrench needed.

The rudder shaft is conical where it enters the upper fitting and the oblong locking key mentioned above is found along the forward edge of the upper fitting.

There's a gap between the lower end of the shaft and the rudder blade and this is where force has to be applied to the shaft to be able to pull (or push) it out of the upper fitting.

Unscrew the nut so that it is a little lower than flush with the end of the shaft. It's better to use the nut to take the force applied, than the shaft and thread. Brass is not as hard as steel. Protect both the rudder GRP part and the nut by pieces of steel sheet metal or something similarly solid. Basically what you want to do is to pry the rudder shaft out of the upper fitting. I used two flat chisels whose sharp ends were flat and wedge shaped (see picture below). I entered one from each side and used a hammer to force the chisels inwards. The cone shaped shaft having been in position for a long time needed a sharp “crack” to let go of the inside of the fitting and start moving upwards. As I've only seen one rudder installation it's possible that the gap, or rather the distance between the GRP and the shaft, is not the same. You might need more material to fill the gap so that the chisels will be able to pry the parts apart. Also, try to center the force you apply straight along the axis of the shaft so that it doesn't bend. The brass shaft is not solid as steel. I think I bent the threaded portion of my yacht's rudder shaft just a little.



My steel chisels are 12 mm thick each.

Take great care not to damage the shaft or the nut. To keep pushing upwards on the shaft the nut must be removed. I then used several sockets from my toolbox to act as distance pieces to push on until the shaft was so loose it could be pulled from topsides.

Once I was able to move the shaft upward I had to start with removing some old anti-fouling paint that had accumulated on the visible portion of the shaft over the years so that this old paint wouldn't damage the bearing and stuffing box inside the hull.

When the shaft is loose and moveable inside the fitting you may encounter another problem. In my case the locking key or "anti-rotation" pin I mentioned earlier was stuck to the groove in the shaft and loose from the corresponding groove inside the upper fitting, it moved upward together with the shaft. I had to find a way of stopping this locking key from entering and damaging the hull bottom as the shaft moved upwards.

What I did was to use an electric rotating file of a rather small diameter and thanks to the gap between the upper part of the rudder and the hull I was able to grind away the protruding part of the locking key little by little, pushing the shaft upwards a little bit at a time. The remains of the locking key was flush with the shaft surface and did not do any damage to the rudder shaft bearing inside the hull. Once the rudder was removed I let the shaft drop into position again and it was easy to remove the remains of the key.

The threaded end of the shaft has to come entirely out of the upper fitting so that the rudder can be removed by pulling it aft. Once the shaft clears the top of the fitting you'll need to support the rudder so that it doesn't tilt aft and causes damage the lower fitting.

Now activate your assistant again, remove the screws in the lower fitting, push or pull the shaft out of the upper fitting and pull the entire rudder aft and away. Careful! It's easy to damage the gelcoat around the attachment fittings. The 3 screws are different in length so it might be wise to mark them if you want to put them back in the same holes. I think the rudder weighs between 25 and 35 kilos, 50 – 60 lbs so you will definitely need help to lift it away. I also remember that the lower fitting was very tight on the rudder surface underneath the two tangs.



This is what it looked like once the shaft was pushed upwards with the threaded bottom end out-of-sight into the upper fitting.



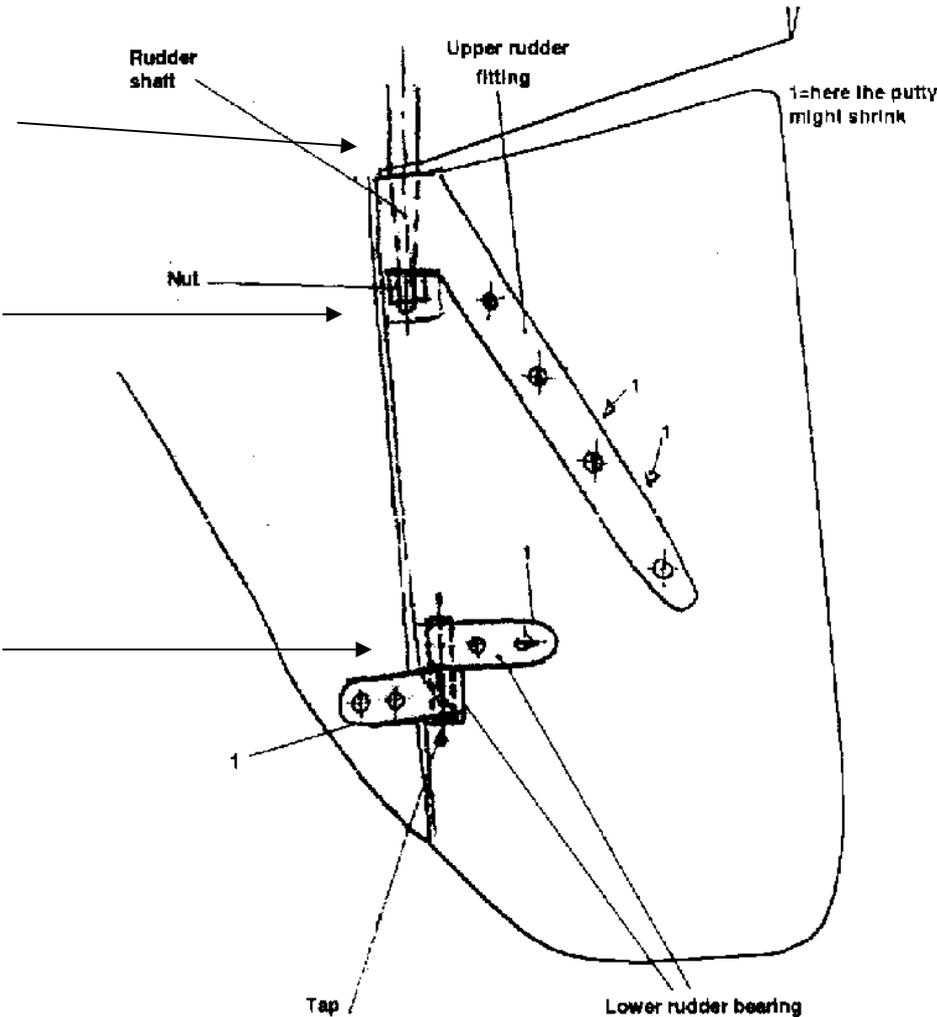
This picture shows what the shaft looked like once the rudder was removed. The shaft is rotated 90 degrees for visibility. As you notice, the shaft surface was a little damaged by the rotating file but I don't think it matters much. The locking key did not want to let go of the axial slot and I could not think of any other way to do it.



This shows the rudder as removed. Looking closely the vertical slot for the locking key is just visible along the forward edge of the hole.

The forward part of the lower fitting does not have to be removed unless you have to enlarge the holes in the lower fitting to accommodate a larger diameter, oversize, pin.

The sketch below was sent to me from Hallberg-Rassy. The term "Tap" is an inaccurate translation from Swedish and should really be pin.



I've added 3 arrows.

The top one indicates the stuffing box/lower hull rudder shaft bearing inside the hull.

The second arrow down indicates the cavity with the nut and split pin.

The third arrow down indicates the lower fitting.

Finish the removal process by carefully cleaning the shaft and the inside of stuffing box/lower hull rudder shaft bearing.

### **Installation**

The installation process is basically the removal done backwards.

However, a few reminders:

Use a piece of sticky-tape to assemble the aft lower fitting and hinge pin to the forward fitting before the rudder is in place. With the rudder in place, remove the tape and the pin will rest on the ledge.

Use grease on all moving parts but be careful not to get any on the surfaces where you will want to apply putty. It won't stick to greasy surfaces.

You'll need your assistant again to lift the rudder in place. Be careful not to damage the gelcoat surfaces.

Don't forget to put the long brass locking key in place before the shaft is pushed down into the upper fitting and make sure it stays in position until the shaft is all the way down. The nut with its split pin hole fits in one position only. You'll need to tighten the nut until the holes align. There's a washer that goes under the nut.

Use some WD-40 or equivalent on the steel locking key for the steering limiter to avoid future rusting.

It was somewhat difficult to get the fibreglass putty in place and with a smooth surface. One mistake I made was that I forgot to paint the new putty with epoxy and a layer of anti-fouling in the wet epoxy. When my yacht was lifted ashore in October almost all the anti-fouling was gone from the putty surfaces. Cosmetics!

One of the last things to do during installation is to make sure there's plenty of grease in the rudder shaft bearing stuffing box. Also make absolutely sure there is no water leakage when your yacht is put back in the water!