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## Furling masts

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### CHARLESTON-SPAR recommendations

#### Setting - tuning - maintenance

Hand operated CHARLESTON-SPAR furling masts use exclusively furling systems equipped with endless screws. This system is the only one allowing for a safe guidance of the furling control while avoiding overfurling, and also it is the only one which may be operated by a single person ( two hands control).

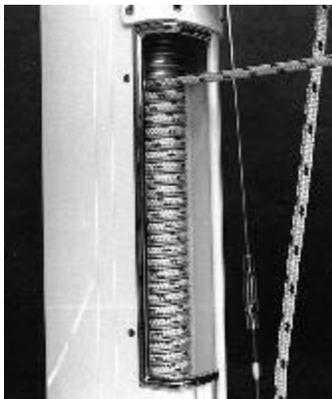
The diameter of the endless screws has been optimized in order to reduce furling stress under load. They are made out of anodized aluminium and fitted on stainless steel roller bearings with a special protection.

The surface treatment of the furling cavity is the same as the one applied to the mast ( anodization or painting) in order to prevent any rusting which might in the long term stain the sail and damage the mast.

The furling rod is left floating within the cavity, with no interior tensioning cable .

With this type of assembly there is no increase in the compression inside the profile (and thus a weight decrease) and a guarantee for a perfectly smooth furling.

The furling rod diameter is much larger than the sail's clearance in the mast profile and therefore can in no way get blocked or ejected.



The swivel block 's upper part is fitted to the mainsail halyard and its lower side receives the mainsail. The swivel block acts as guide for the furling rod in the upper section. It is possible to remove it from the furling mast for maintenance purposes.

The furling control sheet is rolled onto the endless screw in the plant. It is easy to replace ( refer to maintenance instructions).

#### Specific features

A furling mast comprises two cavities, forward the mast portion with all its components and aft a fairing protecting the furling system and the mainsail.

No camber shall be introduced during tuning of the furling mast. However it may be fitted with a slight rake in order to grant smooth steering. Because of the mainsail reduced surface, a yacht equipped with a furling mast is always easier to steer than one equipped with a standard mast carrying a larger sail surface.

### Mast setting

The preparation and installation operations regarding a furling mast are the same as for standard masts. However, as the aft part of the mast is open, it is important not to exert any overpressure on it during lifting, in order to avoid distortions. The best trick to prevent this is to introduce a wooden wedge into the cavity at the level of the sling. The wedge will be removed once the mast is secured by the rigging.

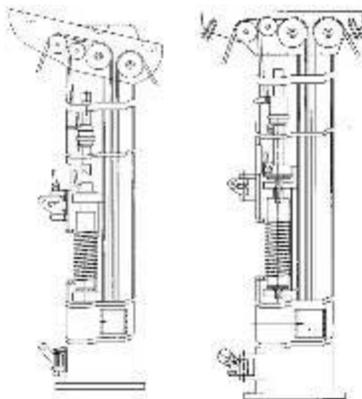
### Sail installation

The mainsail is installed only once the mast has been tuned and the boom set in place. The mainsail halyard is attached to the swivel block, the sail headboard is then rigged on the swivel lower shackle. The mainsail is then set carefully while guiding the halyard at the level of the rod trap. Once the mainsail is almost fully hoisted absolutely before sweating it up it is necessary to rig the tack to the mast ( furler nose) Once the tack has been fixed to the furler's nose, the mainsail shall be pulled out until a slight vertical fold appears along the rod. The foot of the sail shall be inserted through the outhaul carriage then through the clew pulley before being returned and fastened on the outhaul traveller ( ball traveller). The mainsail may then be pulled out on the boom.



### Furling operation

The mainsail is now set. Before furling, make sure that the boom is positioned slightly over the horizontal plane by means of the rigid downhaul or by the topping lift.



1. Ease out the mainsail sheet
2. Hold the furling control and while paying out, carefully control the foot tightness
3. Once you have rolled in the mainsail surface you wanted, secure the furling control and pull out the foot.
4. Ease out the boom topping lift and tune the boom downhaul so that the mainsail leech is taut.

It is necessary to check on the furling along with the foot pulling out in order to make sure that the sail is properly rolled on the furling profile.

### Unfurling operation

As for the furling, the boom has be placed slightly higher than the horizontal plane by means of the rigid topping lift or the boom downhaul.

1. Keep the boat facing the wind, with the mainsail sheet eased out
2. Hold the foot outhaul while checking on the unfurling process of the furling control
3. Once you have unfurled the planned surface, secure the furling control and pull out the foot
4. Trim the downhaul so that the mainsail leech is taut.
5. bear away and sheet in the mainsail.

Never let the sail unfurl freely without checking the furling control, as this could damage the system.

### Maintenance

The maintenance of a furling mast is the same as for a standard mast, but some of the mechanical parts require a yearly verification. The mainsail has to be taken out once a year. At this time the halyard swivel and the endless screw will be checked. Halyard swivel. The adequate rotation of this part will be checked once a year. There shall be no hard point during rotation. Rinsing the part is sufficient. If you need to remove the swivel, unlock the furler's nose and lift the rod to have the swivel slide out of the furling cavity. On some models, the rod will be first pushed to the side before being lifted. The furling control sheet is made out of 10 or 12 m pre stretched double braid depending on the mast type. Changing this control is very easy.

Endless screw: Hardly any maintenance is required for the endless screw. Once a year check that it rotates correctly. Should it block, return it to a CHARLESTON -SPAR agent for examination.

### Furling control line replacement

1. Remove the sail
2. Fully unroll the control from the endless screw.
3. Loosen the furling control locking screw on the endless screw
4. Remove the furling control from its housing
5. Install the new control and make sure that it is flush, but not sticking out.
6. Lock the new control with the locking screw.
7. Proceed with rotating the endless screw with the number of rotations required to roll in the new furling control
8. Re -set the mainsail.

### Electric/hydraulic equipment

Some of the CHARLESTON-SPAR furling masts are equipped with electric or hydraulic engines. The operating principle is the same as for manual furlers. Though efforts are not felt



during operation, the recommendations given in these instructions apply in the same way. When operating with an engine, make sure that you never come to stop against the downhaul traveller when furling or unfurling. This may damage the furling system. It is also important to check that the boom is in a right position during these operations. With a boom too low, the leech is going to be under stress and this will result in large folds in the sail lower portion. The power produced by the engines will allow for furling but the sailcloth will be marked permanently.

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