

To: Yacht Owner

Thank you for choosing "*FURLBOOM*" for your yacht.

FURLBOOM was developed by leading yachtsmen and sailmakers, after years of experience with other furling systems. *FURLBOOM*, when combined with a specially designed and cut sail requires no compromises in sail shape when compared to a conventional sail. In fact, it offers superior performance and tuning over a normal sail.

Unlike its in-boom competitors, the vessel will have a perfectly set sail with full control over luff and foot tension, sail shape, and fullness. And unlike in-mast systems *FURLBOOM* accommodates a fully battened sail with a full roach.

When reefed the sail will have progressive flattening of the sail shape. Further the appearance of the rig is of a clean sail and boom without the bags of excess sail lashed to the boom to catch wind and water.

Importantly, *FURLBOOM*'s ease of operation from the cockpit will allow you and your crew to increase your sailing pleasure and safety.

FURLBOOM provides quick and simple furling at the end of the day, without having to handle the sail, boom, sail covers, lazy jacks, reef lines, etc. The furling system combined with a built in integrated sail cover will have your sail stowed and covered in less than a minute. Sail life is extended because the sail is rolled as it is stowed and reefed, rather than crushed and folded. In most cases lighter sail fabrics can be used because they are not subjects to the abuse associated with handling a conventional sail.

Boom angle is critical. Accordingly we recommend that you install a hard vang to support the boom. We have had excellent results with Rigid Gas Strut type vangs. One should note that vangs are designed to pull the boom down as a tensioning device, and not as a support device. Therefore under certain conditions the vang alone will not provide sufficient support for the boom. Accordingly we recommend that you leave the topping lift installed or install one as this should be used to stop the boom bouncing in heavy weather and to support boom awnings.

We also recommend you fit your *FURLBOOM* with a good quality boom brake, as we do not warrant the gooseneck from damage by “flying jibes”.

You must use an all rope main halyard and topping lift of either low stretch or Spectra rope. Do not use wire halyards or topping lifts.

With its Patented back of the mast mounted drive unit, simple mast track, feeder system, and outhaul (sail foot tensioner), *FURLBOOM* is the simplest and easiest boom furling system to install. Notwithstanding its simplicity, careful attention to detail is required to get the most out of the *FURLBOOM* system

FURLBOOM can be installed by two people with good mechanical ability and knowledge of sailing. In the case of existing standing rigs, installation requires working the length of the mast in a bosun’s chair or other suitable lift. Accordingly, we suggest that the rigging be done by experienced riggers familiar with *FURLBOOM*. The fitting charges will be a fraction of the cost of the boom and will ensure perfect operation.

Read the instructions fully from beginning to end before starting, and when fully understood, follow them carefully step-by-step. Installation is a two-person job and you will need somebody who is familiar with hauling a person safely up and down a mast is required. Do not have the second person near the base of the mast when someone is working above.

REMEMBER FALLING TOOLS and PARTS HURT!

IMPORTANT NOTE

MAKE SURE YOU READ THE SAFETY INSTRUCTIONS AT THE END OF THIS BOOKLET. They describe how to lower the mainsail in the event any sort of hardware failure.

RIGGERS, when fitting FURLBOOM for the first time, you should read these instructions also.

Read these instructions from beginning to end and be sure you understand them BEFORE you commence installing the *FURLBOOM* system.

If there is something you are not clear about reread the instructions. If you are still not clear contact your local dealer. In the USA or Europe, call Yachting Systems America, LLC at 949-642-9530, Fax 949-642-9550, or look at www.furlboom.com. Please quote your boom serial number (located inside the boom at the forward end, and on cover page of these instructions). If you feel there is something we have not made clear or we have left out, we would love to hear from you.

Installing the *FURLBOOM* systems involves the following five steps:

Installing the top sheave, mast foils, bottom feeder and PVC insert on the back of the mast. This can be done on a stepped or unstepped mast. The former requires someone to ascend the mast several times.

Installing the drive box unit on the back of the mast and attaching the rope drive unit.

Attaching the boom to the drive box and the mandrel to the drive mechanism on a stepped mast.

Installing or attaching a boom vang.

Installing the sail and aligning the boom followed by fine-tuning the installation.

Thank you again and enjoy safe, fast, and pleasant sailing.

FITTING BOOM AND TRACK TO MAST

NOTE: ALL fastenings into the mast or boom or any other aluminum part must be liberally coated with anti-corrosion compound such as Duralac or equivalent. All mast foil track screws must have thread locking material such as Loctite 242 or equivalent liberally coated on the screws to prevent them coming loose.

1a. Mark the tack position on mast before starting installation. If replacing existing boom, mark top of old boom or tack position on mast before starting installation.

NOTE: FURLBOOM is usually deeper than conventional booms and allowing for rolling adjustment reef droop etc., a minimum clearance over cabin tops, targa bars, gallows, dodgers, cockpit head height etc., to the bottom of the boom should be no less than 200 mm (8"). Mainsheet block-to-block clearances must also be maintained to same measurement.

NOTE: The tack position on FURLBOOM is not the top of the boom. The approximate tack position is the top of the mandrel (rolling spar), which is in the center of the boom plus half the mandrel diameter above.

1b. Ensure mast is not inverted. If the mast carries a large "prebend", then foil should be fitted with mast in maximum prebent shape. Maximum prebend is 200mm (8").

NOTE: Sailmakers, please ensure P maximum is sufficiently below the minimum measurements of A & B (refer Figure 2).

2. Put marks on the mast for the maximum and minimum feeder height as per Figure 1.

3. Check the fit of the slug or T slide in the mast. Some slugs may require a flat or two small flats ground on them to fit.

NOTE: Do not use slugs smaller than 9.5mm (3/8") and screws smaller than 6mm (7/32"). If the screws do not slide up your track then each foil will need to be drilled and tapped into the back of the mast starting at the top of the mast. Refer to Figure 1. All tapped screws must be liberally coated with thread locking material (Loctite or equivalent) before being screwed into the back of the aluminum mast or track.

Locate the top sheave assembly and the top foil section from amongst the foils in the shipping crate. The top foil has a single hole at one end (with a clevis pin in it) through the groove where the PVC extrusion goes. Remove top sheave from top sheave assembly. Remove the clevis pin from the top foil section.

NOTE: The sheave assembly is the first part to install. Note how it mates with the top foil (the lower tab fits inside the void of the extrusion) and shares a screw hole with that foil. There are 2 more attachment holes for the sheave housing. All three are necessary to secure this high load area. Next follow with the top foil section. Check screws are the right length to suit your mast section and track. The screws should not be too long to bottom out but should have plenty of thread in the slug, especially when foil is loose to slide up the mast.

4. Fit screw and slug to each end of each foil section using the biggest Phillips head screwdriver shaft that will fit through the access hole. Fit foil joiners if supplied, to one end of each foil (this will be the top end) except the top sheave foil. The correct size screwdriver should be a very neat fit in the access hole.

NOTE: Ensure size of slug is correct to mast track type (round for round track, flat for square track) "T" type tracks have special slugs to suit.

WARNING EXTREME DANGER! BEFORE FITTING FOIL SECTIONS TO MAST attach a rope or cord (1/8"-1/4"/4.0-6.5 mm) to main halyard and pull to the top of the mast. Feed it through the large cavity of EVERY piece of foil as it is slid up the mast, temporarily tying it off (e.g. to a stay) as each piece is fitted. This is to prevent mast foil sections falling if screws come loose during the sliding of the foil sections up the mast.

5. After inserting safety cord, slide the aluminum foil sections up mast one at a time, joiner end up, inserting the slugs into the mast track. Fit the sheave and top foil first. Push up as many foils as you can (do not have the foils too loose) and temporarily tighten the bottom screw on the bottom foil. Pull this group of foils up to your man in the bosun's chair using the safety rope. Retighten the bottom screw and lower the line to start a new group of foils. Be sure to leave the top foil down about a foot and a half. Leave a gap between each group of foils. Keep loading foils until you fill up the luff length.

6. Go up the mast in a bosons chair on the topping lift and temporarily tighten the top most screw only on each foil on the way up. When reaching the top of the mast remove the safety rope from within the foils and lower the main halyard to the deck. Tighten the three screws on the top most foil with the top foil set at the minimum distance shown in "figure 2". Coat the screw threads with thread locking material (use of a small syringe will make this easier) before tightening them to prevent them coming loose.

7. Go slowly down the mast and loosen the top screw on each foil and coat the screw thread with Loctite (Use of a small syringe would be beneficial here). With a 30cm (12") gap between, first remove the joiner; you can then coat the bottom screw on the upper foil, and the top screw on the lower foil before sliding the lower foil upwards. Slide the foil up and aligning it to the foil above, and leaving

approximately a 1MM (1/16") gap between each foil, tighten the bottom screw of the upper foil and the upper screw of the lower foil, making sure first that they are straight, and perfectly aligned with each other. After being lowered approximately 60 cm (2 feet) put Loctite on the bottom screw thread and tighten. Repeat these steps until three foils from the bottom. Use a rubber mallet if necessary to tap the foils and joiners together.

NOTE: Continually look up and check that the foils are straight up and down the mast, if not, go back up and loosen and retighten if necessary. Use of a tight string line might help!

Remember: Poor alignment makes a lot more friction when pulling/pushing the PVC sail extrusion into place!

8. Measure up from your tack position 16 to 24 inches. Mark the mast. You will need to measure down 56.25 inches (length of 2 foils+ the feeder) from the last foil on the mast to see if you need to cut the third foil up from the bottom. If 56 inches falls between your 16 to 24 inch marks, you don't need to cut. If not, you will have to cut a foil, de-burr the edges (especially in the round slot where the PVC goes), and drill a 1/4" hole like on the uncut end (again de-burring the hole in the PVC slot).

9. The wedges go under the lowest 2 foils and the separate feeder assembly. Be sure you locate and use the bottom foil section, which is labeled, or you will have to elongate (drill to an angle) some of the screw holes to accommodate the longer screws necessary to go through the wedges. If your attachment points are no longer over the mast slot, you will have to tap these screws into the mast.

10. The PVC track is inserted into the installed mast foils before you install the feeder assembly. File the edges of the end of the plastic insert where it is going to go in the aluminum foil so it doesn't catch on the joints in the aluminum foil as it is slid up the mast. Putting a lubricant (such as silicone sail lubricants) on the plastic insert extrusion, slide plastic extrusion up the foil until it reaches the top.

11. Using small vise-grips, pinch the top of the PVC extrusion together at the very beginning. This will make the leading edge less likely to catch on the joints. When transiting joints, a slight pull on the grips will help it through. A man in the bosun's chair pulls the top of the PVC up while the assistant pushes up while lubing the PVC. There are other ways to install the PVC and this is just one of them. You can also cut away the middle so you have two sides only, drill them, and tie them onto a halyard to help pull the PVC up.

12. Get a 15cm (6") long piece of cord and wrap it around the halyard sheave and tape it together so you don't drop the sheave.

13. Go back up the mast on the topping lift. Check the plastic is 2cm (3/4")

minimum above the lower pinhole in the top foil, but not too high that it hits the sheave. Cut off any part of the PVC that is damaged. Refit top sheave into assembly with main halyard over sheave and under sheave cover. Hold the sheave with the taped cord and install it in the assembly. Drill a hole through the plastic and fit the clevis pin and the split pin.

NOTE: Newer models will have a separate top sheave assembly. In which case, slide sheave up, cut off PVC flush with top, re-fit sheave in place, and run main halyard through fairlead. If you have to cut off damaged PVC, do so above the sheave housing and then pull it back down flush with the top foil. Make sure to drill through PVC and Clevis pin the top!

14. After making sure the plastic has settled inside the foils (not stretched nor too compressed), cut off the plastic insert flush with the bottom feeder foil. With a round file smooth the insides where sail slides in and file off any sharp corners on the outside. **Make sure the outside is well rounded top to bottom.**

15. Fit feeder under bottom foil. Use the long counter-sink bolt for the bottom feeder bolt. Normally on a stepped mast you are required to drill and tap the two screws that hold the feeder assembly as it is difficult to push a T nut up the mast slot.

16. Fit the drive box to mast after removing Rope Drive Unit (if fitted). Locate centerline of top shaft, half the diameter of the mandrel (furling spar) below tack position or top of old boom, marked on mast in step 1. Next mark and drill holes for gearbox.

NOTE: These are threaded holes so ensure holes are correct size (1/4" for 5/16" thread). Fit drive box to back of mast after sufficiently coating threads with Duralac corrosion inhibitor. It is suggested to drill and tap two holes first (between the gooseneck tangs), fit the drive box and double check all measurements, fit boom if necessary to check heights etc. Refit the Rope Drive unit.

17. Fit mainsheet and vang brackets if not fitted in T slot by removing forward or aft end casting. Do not hit the castings with a hammer. Use a block of wood and rag, on the inside (inside the boom) and on the outside. Hit the block of wood with the hammer. Coat screws with Duralac before refitting screws. Do not drill into place the hangers until the boom is fitted (refer to 24).

18. Normally the mandrel is installed. If it is not, grease axle shaft at aft end of boom. Grease bronze bushing at aft end of mandrel before sliding mandrel over axle shaft.

19. Lift boom by the topping lift at the aft end and by the main halyard at the forward end. Tie a rope from the aft end of the boom or topping lift shackle, to

the backstay to hold the boom back from the mast when it is being lifted. Fit forward end of gooseneck swivel to drive box, ensuring large plastic washers are fitted either side of swivel to ensure as small a gap as possible. The stainless washers go under the bolt heads and the nuts with the small plastic washers between the alloy and the stainless parts or washers. Fit bolt and nut and washers each side and tighten so there is minimal rocking of the boom on the gooseneck.

19a. Next, push the u-joint over the output shaft making sure the plastic cone is over the outside. Align the holes and screw in the 5/16" socket head screw to secure it.

20. Put a winch handle in the gearbox and rotate the gearbox with ratchet on and off, clockwise and counter-clockwise. With a grease gun, grease the mandrel at the aft end through grease nipple. The boom should rotate freely by turning mandrel by hand.

21. *No longer in use.*

22. Fit turning block for rope drive unit. The turning block should be located on either side of the boom vang and in a position so when the block is taught the rope coming off the block is mid way (in the fore and aft direction) on the rope drive drum. This should be approximately 125 mm (5") from the back, of the mast and far enough to the side so the rope just clears the vang when the boom is at 45 degrees, approximately 100-125mm (4-5").

NOTE: This is the ROPE position, not the block. Allowance must be made for the block angle to the base depending on if the rope is leading to the port or starboard side, aft angle etc. The rope must not rub on the inside of the rope drive cover so do not fix the block too far towards the port side of the boat.

23. The small turning block for the ratchet pin trip line should be approximately near the centerline of the aft face of the mast and approximately 30 mm (1 1/4") back. The rope can go either through the vang bracket or either side. The cord can be run up through the block attached to the ratchet pin ring and back down again giving a 2-1 purchase on the pin, increasing the rope travel. A cleat can be fitted in the cockpit to secure the cord from the ratchet.

24. IMPORTANT

1. **Close the sail cover on boom before drilling holes in the bottom of the boom.** Slide the mainsheet brackets to their correct positions.
2. Observe the mainsheet location bracket instructions.
3. Mark the holes with a 3/16-starter hole through the threaded holes in

the brackets. Slide the bracket to one side and drill 1/4" holes through.

4. Do not drill too far or you will drill through the internal liner that separates the sail from the sail cover when it is open.
 5. Only drill vang bracket after fitting sail and achieving correct boom angle.
 6. Always have topping lift on and cleated to stop boom falling too far until all four screws are drilled for vang bracket in final place.
25. The mainsheet brackets must use two brackets MINIMUM, and must be fitted as per the following formula, measured along the length of the boom extrusion (BL), not including the forward and aft castings.

Center measurement, 90-100% of BL, hangers minimum 250mm (10") apart.

Center measurement, 75-90% of BL, hangers minimum 450mm (18") apart.

Center measurement, 50-75% of BL, hangers minimum 600mm (24") apart.

NOTE: No mainsheet hanger is to be forward of 45% of BL.(Boom length)

A single mainsheet bracket can be used at 90-100% of BL.

The third bracket supplied is for a third mainsheet block position, a preventer fitted at the aft end of the boom, or a boom brake which can be fitted forward or aft of the vang bracket, but no further forward than 25% of BL.

26. The boom vang bracket is fitted at 25-35% of the length of the boom section, to support the weight of the boom with the sail enclosed. The vang bracket has a rear hole for a mainsheet block, to be lead forward. This bracket is NOT to be used as part of the main purchase for the mainsheet system, (block to traveler). It can be used to run the sheet forward and down.

FITTING SAIL TO BOOM

1. Fit mainsail on a day with little or no breeze. Head to wind.
2. Slide foot of sail onto mandrel track.

There are four adjustments to make the sail reef and furl properly.

- a. Boom angle. This determines if the sail winds too far aft or too far forward. This is adjusted by the boom vang strop or block and tackle or topping lift.
 - b. Tie off, of the tack and clew, in the forward and aft direction. This determines where the sail will start to wind onto the mandrel and presets the auto foot tension for upwind and downwind.
 - c. Tie off, of the tack height and,
 - d. Tie off, of the clew height. These both adjust the angle of the sail when it winds on to the mandrel. This helps reduce wrinkles and tension lines from the clew and assists the battens to wind level into the boom.
3. Lash tack of sail to tack ring with at least 8 turns of the cord supplied leaving about 30cm (12") of Spectra cord.
 4. Tie clew ring of mainsail to mandrel with at least 6 turns around mandrel with the spectra line supplied and tie off. Do not have the turns crossing over each other around the ring or the mandrel. Tie the line off securely at both ends to the clew ring. Leave about 60cm (24") of line. The line must be free to slide around the mandrel with the clew of the sail attached.
 5. Tie clew ring to eyestay (saddle) with at least 8 turns of the remaining cord from step 4. Leave 20mm (3/4-1") of slack in the line.
 6. Roll sail on boom by turning with winch handle (using manual operation motor drive units). Gently pull sail forward or aft so it rolls properly onto boom not too far aft or too far forward of directly under the feeder. The sail can also be raised straight off the deck up the mast, and then rolled into the boom. This is the preferable and best way to do it, but take care to make sure the sail is guided by hand into the feeders.
 7. Slide head of mainsail into feeder and raise sail by main halyard.
 8. With main halyard moderately tensioned, rotate gearbox 90 degrees (one click of ratchet) and then to 180 degrees (another click of ratchet). The foot should be at half tension at 90 degrees and almost full tension at 180 degrees.

Tighten or loosen line from clew saddle to get desired tension. You will note the sail tack cord has slid 180degrees from one end of the tack attachment half ring to the other.

NOTE: Do not make foot of sail too tight as this decreases fullness along foot for down wind sailing.

NOTE: If there is insufficient movement of the out haul function, check the sail is within approximately 60-100mm (2.5-4in.) (Series 1, 2, & 3) or 100–130mm (4-5in.)(Series 4) to the saddle. If it is greater than the measurements, undo the screw on the mandrel and move the saddle forward to the next set of holes.

Note: The CSK (Countersink) screw goes to the forward side (round head aft).

9. For downwind sailing, reversing the mandrel gives correct foot tension. You must always disengage the ratchet pin before reversing the mandrel. For high load Cunningham tension, a tape loop can be fitted to the luff for a snatch block (must be removed before furling).

10. When sail is set correctly at upwind position (180 degrees rotation) there may be some slight creases in the sail coming from the feeder going down the luff in a slightly aft direction. If there is excessive stretching of the sail from the feeder loosen the clew outhaul cord slightly and take up the same amount on the tack lashing.

NOTE: Do not have severe creases coming from feeder as this can damage the sail and the feeders.

11. With slight tension on topping lift furl sail onto boom.

NOTE: Boom angle should be same as mainsail foot, approximately 87 degrees). The sail furls in a counter-clockwise direction.

When furling the sail do not let halyard go. Keep a turn of the main halyard on the winch, and keeping light tension on the main halyard, furl the mainsail into boom. This keeps the roll tight. Sail should roll onto boom without rolling too far aft or too far forward. Roll 1-2 meters (3-6 feet) of sail into the boom to try at first. If the sail rolls too severely aft, lower the topping lift. If the sail rolls too far forward raise the topping lift slightly. It is normal for sail to roll slightly forward and backward during the rolling of the sail on to the mandrel, but it should always be no closer than approximately 5cm (2") back from the lip on the plastic cone and be no further back than 10cm (4") from the lip on the plastic cone). If it is not correct re-hoist the sail, and adjust the topping lift and try again. Do not keep rolling more sail into the boom. When correct roll the whole sail into the boom observing the above.

If there is excessive tension lines from the clew or the battens are rolling in at the aft end first ease the cord around the mandrel at the clew end.

NOTE: Measure the length of the cords going to the outhaul saddle so you don't have to reset up the outhaul again. If the battens roll in at the forward end tighten the cord around the mandrel at the clew end, but do not have major creasing or tension lines coming from the clew up into the sail (refer above).

NOTE: You may have to readjust the boom angle.

NOTE: When mainsail is being rolled onto boom there should not be excessive pressure on the feeder with the sail pulling too far aft. This will damage the feeder and/or the sail. The foot of the sail can also be eased forward but not so that the luff of the sail winds too far forward. Be particularly careful of this.

12. When satisfactory rolling is achieved temporarily mark the topping lift or vang.

13. With the sail now rolled in the boom, take 3 to 4 feet of core out of the furling line and seal the end with thought to the fact that it must fit through the hole in the hub of the rope spool. Manually wrap 3 to 5 turns in a clockwise direction and then push end through hole in spool. Tie a single overhand knot to prevent the line from pulling out. The idea is to pull on the line wrapped around the spool and not the knot. Also you don't want to run out of line before you have fully furled the sail. **Check your extra wraps after each furling for the next few times to make sure you still have enough.**

14. The adjustments may have to be performed a few times until the sail is correct in all breezes. Once achieved you have a system that gives total and easy control with no disadvantages as are associated with other furling systems especially in mast systems. Because there is no crushing of the sail, sail life should improve markedly.

When you are satisfied with the operations permanently mark the halyard topping lift and vang. Cut off the excess from the three lengths of cord at tack and clew, and burn off. Fit rope to rope drive if fitted. Use 3/8 (10mm) nominal yacht line. Actual diameter no bigger than 11mm.

15. It is recommended that the optional spring or gas-assisted vang is used as this can eliminate the need for the topping lift and improves light wind performance by taking boom weight off the leech of sail (applies to any boom). It also allows boom height to be fixed by the vang control eliminating the topping lift for all but mooring or very heavy weather. A gas vang holds the boom at the correct height and angle but still allows the boom to be pulled down by the mainsheet, overcoming the major problem with fixed vangs. For racing sailors who want to put vang loads on the boom the turnbuckle is removed and replaced

with the conventional rope and the optional indicator bracket.

If fixing the vang to a permanent, non-adjustable length the vang must be fitted with the topping lift holding the boom in the correct position, after steps 1 to 11 above. The wire on the boom vang must be measured and cut to suit the turnbuckle or lashing (supplied by installer). Fit the turnbuckle to the aft side of the lower bracket. The turnbuckle should be at slightly past its middle adjustment i.e. just past halfway, in and out, with the gas strut vang 30% of its travel compressed. The wire should be cut and swaged so it is fitted correctly to the turnbuckle in this position. Take up the slack in the wire by adjusting the turnbuckle. This will now give you the correct position for furling or reefing by just easing the mainsheet until the wire on the vang goes taut. The spring or gas strut in the vang will support the boom in all but very heavy weather (if the boom is bouncing) or when the yacht is moored. Minor adjustments of the boom angle can be achieved by adjusting the turnbuckle in or out.

NOTE: Vang Bracket should be 33-36% aft of the mast. Drill vang bracket (refer 24 “boom fitting instructions”).

RAISING, REEFING AND FURLING THE MAINSAIL

1. We will use the terms furling and reefing to mean two separate operations. Furling is the act of rolling the sail completely inside the boom for stowage. Reefing is merely the act of shortening and depowering sail to adjust for wind conditions. The two should not be confused because it is very rare that one can furl the sail in any position but close hauled or higher with the main fully luffing.

However, the main can be reefed off the wind as long as the boom is not let out farther than about 45 degrees so as not to overload the U-joint.

NOTE: The ratchet pin must always be released before raising sail.

NOTE: The topping lift or boom vang must be engaged at the correct mark before raising or lowering sail.

NOTE: If using a rigid vang such as a Selden gas vang the mainsheet must be eased until the vang pushes the boom up and the strop goes tight or the rope is at the correct mark.

2. On FURLBOOM manual models (winch handle drive or rope drive) the ratchet pin has to be released before rotating gearbox in backwards direction or to unfurl sail from boom.

3. When raising sail keep light tension on the furling line if fitted. This helps the rope roll neatly onto the drum. Place the main halyard on the winch, and start winding the sail out of the boom until the sail reaches the top and is fully unwound.

4. When raising sail from a reefed position, the ratchet must always be in the release position. The ratchet will not release unless the halyard is eased to release luff tension. If the ratchet still does not release because of high side loading pull, on the furling line slightly until the ratchet releases.

5. The best furling and reefing can be achieved by being head to wind up to a maximum of 45 degrees off the wind, over 45 degrees the universal becomes inefficient and it's hard to turn the mandrel. The closer to head to wind the easier it is to operate.

To furl or reef engage the topping lift or ease the mainsheet, put the furler line into the winch (or engage the winch handle for manual models). Place the main halyard on a winch or a cleat with a single turn and release the clutch. Keeping a light to moderate pressure on the main halyard (to tail), wind the furler line using the winch, until the desired reef position or the sail is wound entirely into the boom. Mainsail shape is best when it is reefed so a batten is at the bottom of, or close to the mandrel. If the reef is too deep the batten can be left just

outside the boom. Do not have a batten half in and half out of the boom or rubbing on the edge of the boom, as damage to the batten pocket may result. It is also best that the ratchet is engaged so sail does not creep.

When reefing downwind, pull the boom into about a 45-degree angle. This keeps the sail and battens off the rigging, put more than normal furling weight on the main halyard and reef the sail. It is essential to keep a higher load on the main halyard when reefing downwind to prevent the sail from being blown forward when it is rolling down.

If the load is too high, ease the halyard enough to enable reefing without excessive tension. This may happen if you are over sheeted because you pulled the boom in far enough for the U-joint to operate due to sailing at a broad angle. Once you have rolled up enough sail, then you can ease the sheet to lessen the load and pull up on the halyard for luff tension (at this point you are no longer going to spin the mandrel or U-joint). Remember that the ratchet can be engaged while reefing because it will free ratchet in this direction.

NOTE: It is not recommended to furl the sail dead square downwind. Very high loads are put on the universal joint that can cause damage. Note universal joints are not designed to rotate at 90-degree angles.

6. Sometimes when sailing downwind in light weather it may be necessary to go forward and after manually releasing the ratchet pin use a winch handle to rotate the gearbox backward to completely release the foot outhaul tension for downwind. This also ensures the foot of the sail has been released. Although the track on top of the mandrel is there to ensure the foot of sail does not fold during rolling, maximum foot fullness is when the foot track on the mandrel is vertical on the top of the mandrel. This method will allow you to reef a little more than half of your sail before the main rolls too far forward and rubs on the mast.

If you have reefed your sail, you should not furl it for storage without hoisting it all the way up and furling it head to wind. The distortion of the roll due to reefing combined with a loose furl of the remainder is a good way to have a jam on your next hoist. If you should jam on the way up, easing the halyard 6" to a foot will generally ease the tension. If this should not be enough, ease the halyard and manually pull the sail out of the boom past the jam and proceed to hoist normally.

When furling away at the end leave the ratchet disengaged until close to the reef position or when the sail is in the boom. This makes the operation quieter and reduces wear on the ratchet mechanism.

7. If ever a problem occurs with the system carefully go back over the steps. It is usually a step has been missed. If not simply drop the sail to the deck and lash to the boom or roll from deck into the boom and re-hoist later when the

problem is rectified.

8. When sail is fully hoisted release topping lift (if used) to reduce chafe on the sail.

NOTE: Before altering sail again re-tension the topping lift to its correct position.

NOTE: Do not place main halyard on the aft end of the boom when moored unless you have checked that the halyard does not chafe on the top sheave cover. In the alternative, use the topping lift only to support boom, awnings, etc.

COVER

To pull cover over sail pull the top two cords which will bring the cover along the boom to the forward end. Be careful the cover goes over the claw casting without catching.

To open cover pull lower two cords until the cover reaches the aft end. When finished ensure the two top cords are inside and behind the forward rollers passing over the top of the boom (preventing the sail from catching them) before engaging the cords on the hook on the underside of the boom.

IMPORTANT SAFETY INSTRUCTION

for Lowering the Mainsail

PLEASE READ

These instructions apply to boats with electric or hydraulic winches (not conventional manual systems), or in cases where the furling line or deck hardware fails.

NOTE: It is normally a power failure on the yacht that will cause the manual backup procedures to be utilized. It is therefore very important to practice the following on a calm day so you are familiar with the backup manual procedures.

If a problem ever occurs and you cannot roll the sail into the boom using the furling line in the cockpit, do not become alarmed. The first step is to find the problem. If the problem is not found, one of two easy steps can be taken to lower the sail.

1. Manual Rope Furling: The sail can be furled at the drive box attached to the back of the mast. Go forward and place a winch handle into the drive on the aft side of the furler drum housing. Holding the main halyard (or have somebody hold it for you) slowly ease it around a winch or other suitable object to provide some drag, while at the same time turn the furler drum with the winch handle. Every few revolutions pull the excess furling line that is unwinding off the furler drum out of the drum housing. You must do this or the rope may jamb the system.

2. Drop the Sail the Old Fashion Way: If for some reason the sail is not completely furled by the method described in item 1 above, then lower the sail to the boom or the deck with the halyard as you would with a conventional rig. Use any unused excess line to lash the sail to the boom or to bundle it up on the deck to prevent the wind from abusing it.

OPTIONAL EXTRA EQUIPMENT

- Boom Brake
- Manual Outhaul
- Automatic Ratchet Disengage
- Vang Adjustable Tackle
- Internal Mainsheet Bracket
- Carbon Fiber Boom Section
- Lightweight Aluminum Boom Section
- Electric Drive Unit
- Hydraulic Drive Unit

MAINTAINANCE (for system usage up to twice a week)

Every three months:

1. Grease the grease nipple on the aft end of the spar.
2. Check the tack and clew cords for chafe.

Every twelve months:

1. Inspect the system for wear, especially in the feeder area.
2. Remove the sail and check for chafe pay particular attention to the luff boltrope.
3. Rotate the spar and the drive unit by hand and listen and feel for any binding or grinding.
4. Replace the tack and clew cords when refitting the sail.

Every two years:

1. Remove the sail.
2. Do all items in the above schedules.
3. Remove the boom vang if fitted. This is done by disconnecting the top pin of the vang, after taking the weight of the boom with the topping lift.
4. Remove the boom from the mast (this can achieved by placing the main halyard around the forward end of the boom to form a sling and taking the weight on the main halyard. Tie the aft end to the backstay.

Remove the gooseneck bolt from the boom tangs being careful not to lose the plastic washers. Undo the Allen screw head bolt from the drive shaft cone and slide the mandrel spar aft until it clears the main output shaft. Put a rag under the spar at the forward casting to prevent damage to the spar and the boom. Tie a rope to the aft end of the boom and pull it backwards away from the mast and tie off. Tie a rope from the forward end of the boom and tying to the lowers or *capstays* pull the forward end of the boom sideways away from the mast so it is clear of the mast. Tie to other side as well. The boom should be now secure and free of movement.

5. Check the bush in the aft end of the spar by sliding it off the aft axle. If OK grease it and replace on the aft axle.

7. Putting a winch handle in the lower shaft rotate the rope drive unit with the ratchet pin disengaged. Listen and feel for any grinding or binding. Pull the rope as it is unwinding. Repeat with the ratchet pin engaged turning anti clockwise. Holding the top shaft in vice grips or multi grips rotate the lower shaft using a winch handle back and forwards to check for excessive movement. If there is any excessive movement or grinding or binding return the drive unit complete to your nearest agent for servicing. The rope drive unit will need to be removed first.

8. Grease the rope drive unit needle roller bearing, by the following steps 1, 2, 3, and 6.

REMOVING ROPE DRIVE UNIT AND GEARBOX

1. To remove and disassemble the rope drive unit from the gearbox, first undo the screws holding the drum cover to the rear backing plate.

2. Remove drum taking care not to lose the small thrust washer or the bearing.

3. Remove shaft and drum together from gearbox.

4. Remove rear-mounting plate by undoing the 4 screws.

5. Remove gearbox (don't forget Duralac on screws).

6. Refitting is the reverse of steps 1-4.

NOTE: All screws to be coated with Duralac prior to assembly.

NOTE: After two weeks check all fastenings including the drive box for tightness.

Remove the drive unit from the mast (refer below). Remove the ratchet pin lid and remove the ratchet pin and spring, taking note which way the angle on the sprocket end of the pin is facing. Remove backing plate from main housing (6 screws). Wipe the grease from the back of the chain and the sprockets mark all parts with a marking pen or metals scribe so everything goes back exactly as already assembled. This is most important as if you neglect to do this, the top drive (output shaft) can be reassembled out of alignment with the lower ratchet sprocket. Disassemble all parts and bearings check for wear and refit and re-grease (with white grease) the entire assembly. Replace the backing plate. Putting plenty of white grease in the ratchet pin cavity and inside the drive unit replace the pin and spring ensuring it is the right way around.

PAINTING INSTRUCTIONS

Read entire instructions before disassembly/assembly.

Painting: Gearbox (3 parts) and boom. Do not paint mandrel.

1. Gearbox must be dismantled. Ensure alignment of shafts, gears, chains, and universal are marked (marking pen) BEFORE disassembly.
2. Remove axle shaft from aft end of boom.
3. DO NOT paint bearings or bearing surface inside gearbox, or pin shaft.
4. During and after reassemble grease end of mandrel bearings (at grease nipple), shafts, chain, gears and the ratchet pin and spring then replace rear cover and ratchet pin lid.

NOTE: Ensure ratchet pin has long side facing sprocket teeth.

5. Replace floating axle shaft and replace bolt and Nylock nut.