



Your Made  
furling boom

## OWNER'S MANUAL

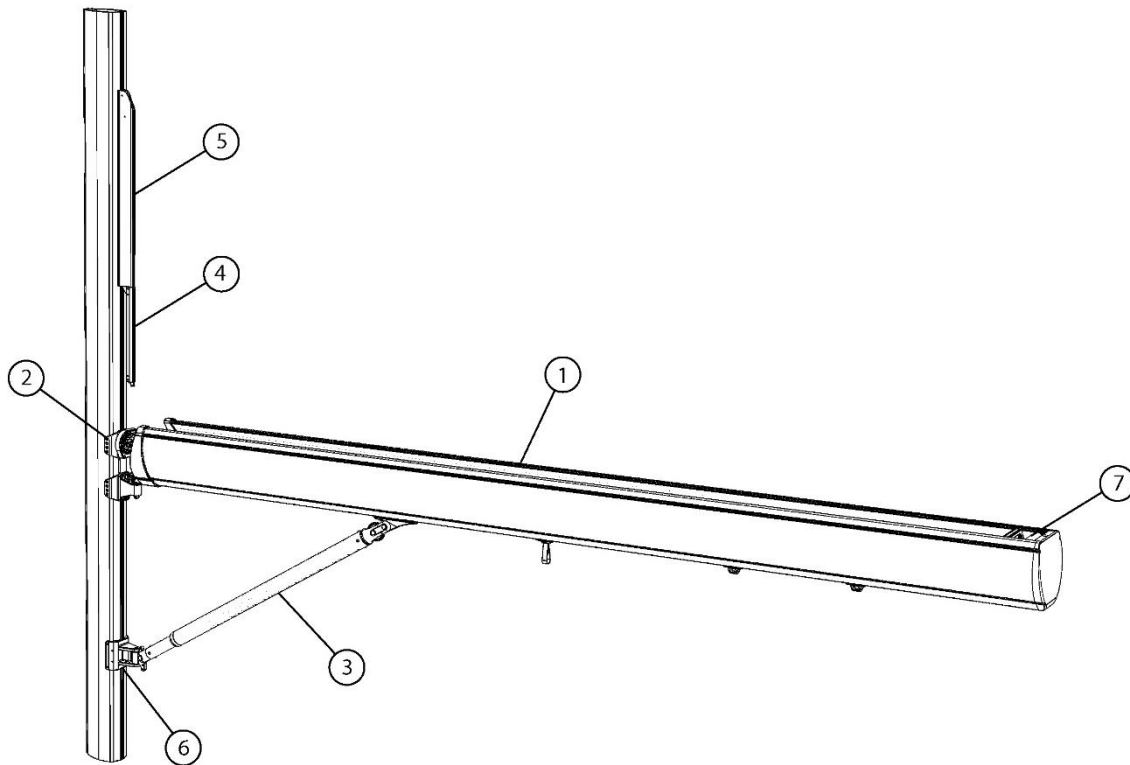
Made Type C in boom furling system

The information contained in this handbook is to be used as a guide for the safe installation, operation and maintenance of the Made Type C in boom furling system.

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## 1. Main components packing list



Pos.	Description	Remarks
1	Type C boom body	Aluminium extruded and welded boom body, natural anodized
2	Mast unit assembly	Aluminium mast unit including endless line unit and gooseneck
3	Boom vang	<b>Option</b> Aluminium boom vang with stainless steel spring, see Made MBV boom vang owner manual
4	Flexible feeder	Nylon flexible feeder, black
5	Mast track	Aluminium extruded mast track, natural anodized, riveted/slug mounted
6	Boom vang bracket	<b>Option</b> custom machined aluminium boom vang bracket
7	Sail cover	Sail cover, integrated and sliding fabric, custom colours

## 2. Installation

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There are 7 stages to fitting the Madesystem:

1. Preparing the mast
2. Fitting the sail track
3. Fitting the mast components
4. Fitting the boom and mandrel
5. Deck lay-out
6. Fitting the sail
7. Checklist after installation

### Important

- It is recommended to unstep the mast and position it horizontally (face down) during step 1-3.
- The area on the aft side of the mast should be clear from obstructions or sharp edges.
- Before removing or installing any component, check this manual for instructions.
- The boom should not be raised or lowered more than  $10^{\circ}$  to its default angle of  $90^{\circ}$  to the mast.
- The sail cover retraction line should always be clamped, so it cannot get caught by the sail when furling.

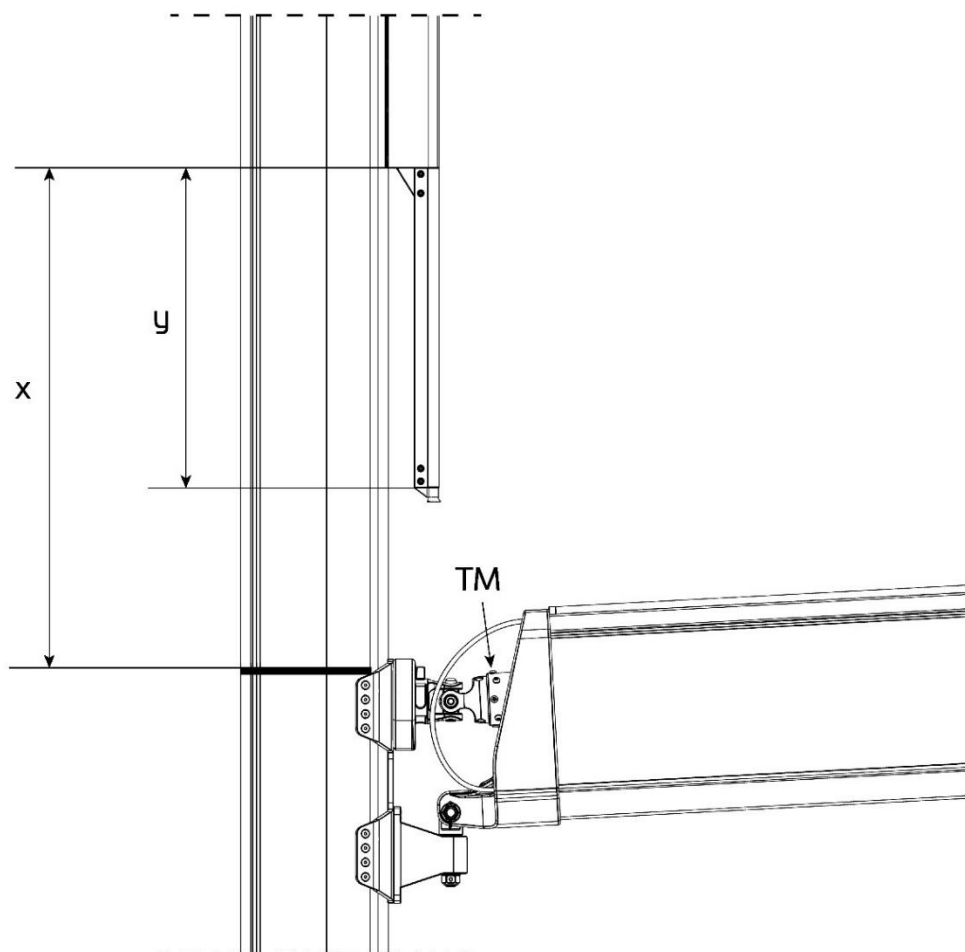
## 2.1 Preparing the mast

Before any parts are mounted to the mast, first mark the P-measures on the mast. "P" refers to the luff length of the mainsail.

At the top of the mast, just below the topping lift sheave, mark "TOP P". Consider the angle the topping lift will exit at so the topper will clear as the boom articulates. Mark "bottom P" on the mast by measuring the luff length from "top P" with a black tape. This mark specifies the sail foot position and correspondences with the top of the mandrel. See below figure. Follow the dimensions of the general arrangement drawing as supplied by Made Engineered.

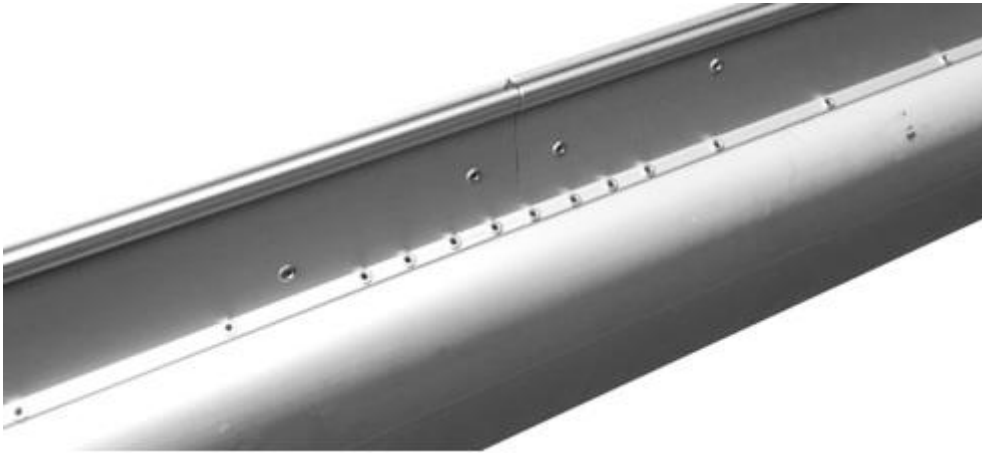
From "bottom P" set marks at the following positions:

- X: the distance between "bottom P" and start of luff track,  $X = 800$  mm
- Y: the distance between luff track and end of flexible feeder,  $Y = 450$  mm
- TM: top of mandrel



## 2.2 Fitting the Made riveted sail track

Position the track on the mast. Use masking tape to secure the track to the mast. Drill on both sides of the track using a 5 mm drill and fit a Monel (diameter 4,8 mm) rivet to each hole before you drill the next. This way the track will not move against the mast, misaligning the holes. Ensure the track ends are free from sharp edges and line up neatly. Luff tape damage could result if misaligned. Drill each track end using 4 rivets on each side at 20 mm centres from the bottom and top edge. Clean all the holes on the mast and radius the edges.



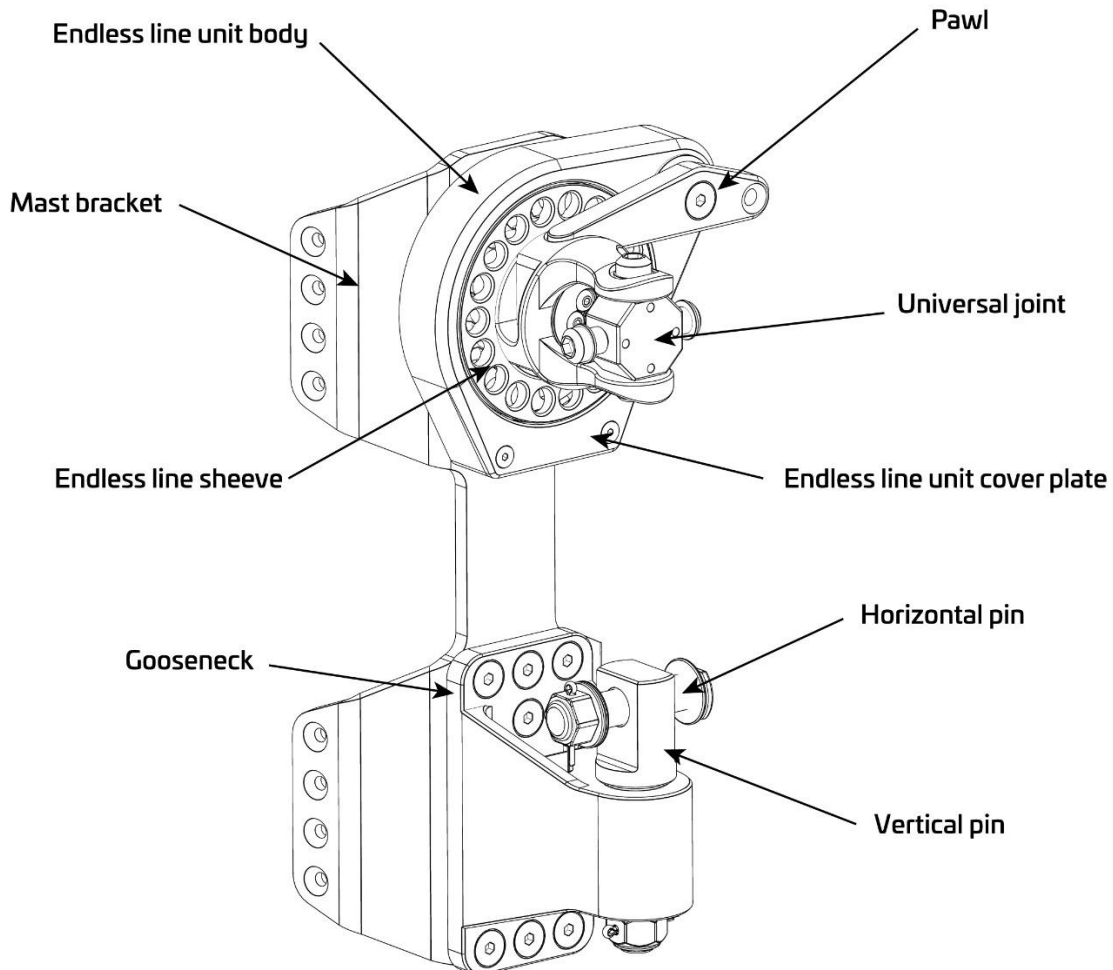
The bottom section of sail track will need cutting to length at the position where the track finishes (mark X). Once cut to the finished length, deburr the track end and radius the sides carefully. Luff tape damage could result if the track end is not deburred and the luff groove is not rounded off.

It is essential that the feeder be correctly positioned at all times, so as to ensure the load of the sail is taken on the feeder, not the sail track. Incorrect alignment may reduce the life of the luff tape, and risks the sail not entering the sail track correctly.

Fit the flexible feeder so that the groove of the flexible feeder and the mast luff track groove are aligned. Make sure that there are no sharp edges on the bolts or nuts of flexible feeder.

## 2.3 Fitting the mast components

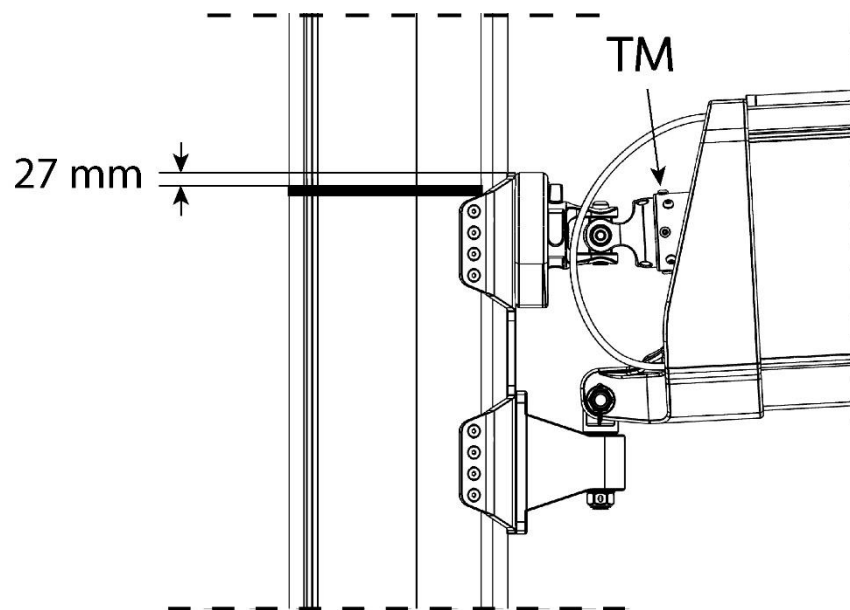
The endless line unit and gooseneck come as complete unit mounted to a bespoke aluminium bracket. Test fit the bracket on the mast and place the bracket at the correct height. See below figures.



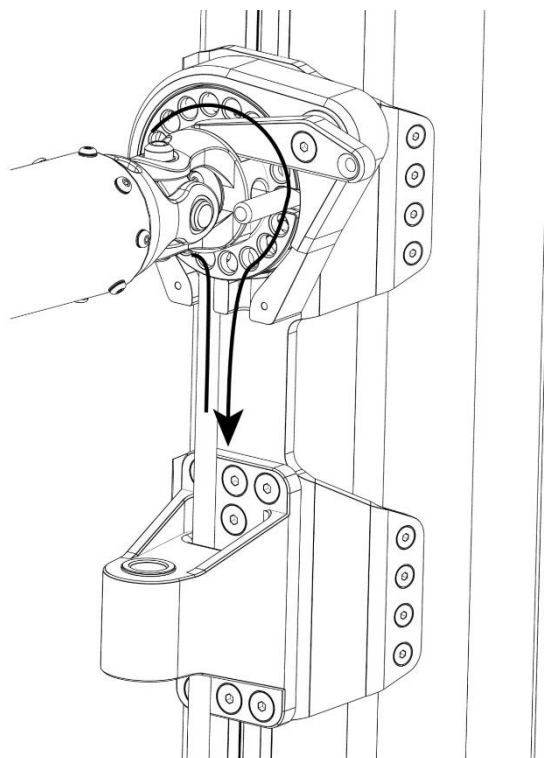
After test fitment drill the first hole and tap a M6 thread. Mount the bracket to the mast and fit the first bolt (M6x25 mm) using an Allen-key, only then drill the other holes. When all holes are drilled and tapped install the bracket. Use Tef-Gel on each bolt to avoid corrosion. It is recommended to apply sealant around the edges of bracket.

### Remarks

Never replace parts of the endless line unit, gooseneck or pins with non OEM parts. Material specifications are key for the safety of the system. Guarantee is only warrant when OEM parts have been used.



Install the endless line using the cavity in the sheave. First, take of the cover plate from the endless line unit using a Allen key. Take a 12 line with a soft mantle and put in the cavity, then turn the sheave around until the line exits the endless line unit. After you set up your deck lay out, slice the line to an endless line. It is very important that the slice is very smooth without any transition from one to another line to ensure a proper working of the endless line. Do not use a smaller line then 12 mm diameter. See below figure.



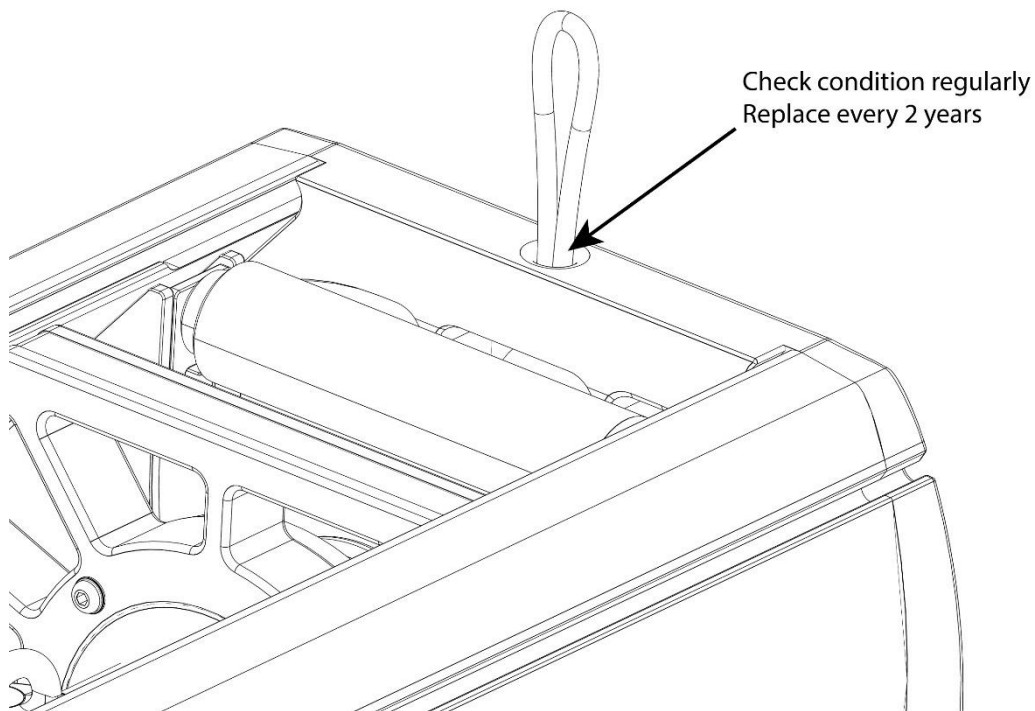


## 2.4 Fitting the boom and mandrel

Preferably, use a crane to host the boom in place. Alternatively, use the halyard to lift the front of the boom and use the topper to lift the aft of the boom, and manoeuvre the front of the boom by hand or with a secured control line to the mast.

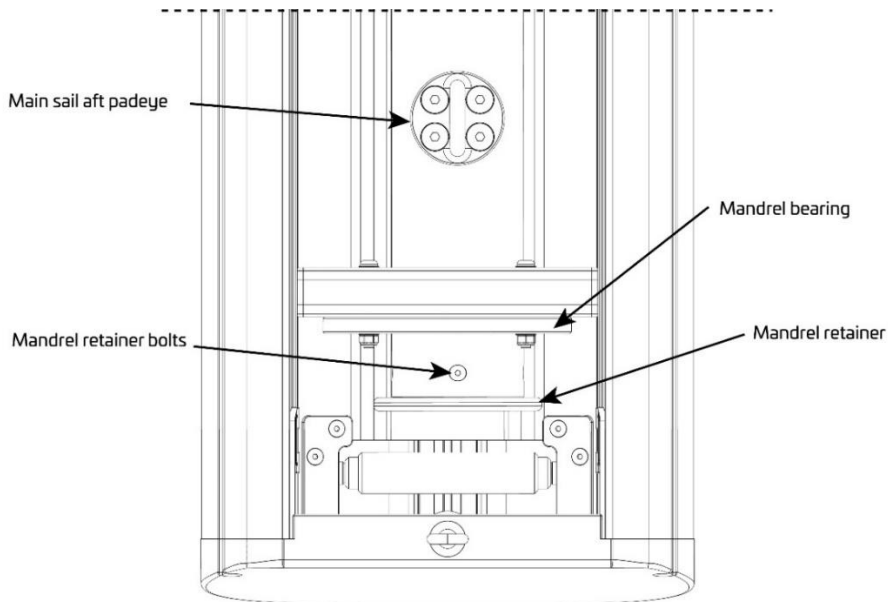
Attach the boom to the gooseneck bracket using the vertical and horizontal pin. The vertical pin must not be over tightened; the vertical must have a clearance min. 0.3mm to max. 0.5 mm. Check after the first sail whether the vertical pin moves freely but does not exceed the tolerance as described above. Make sure all washers are in place to avoid clearance.

Attach the topping lift to the soft eye mounted at the aft end of the boom. Make sure that the topping lift has no sharp edges. Check the Dyneema soft pad regularly and replace it max. after two years Made part number MDL-12120.

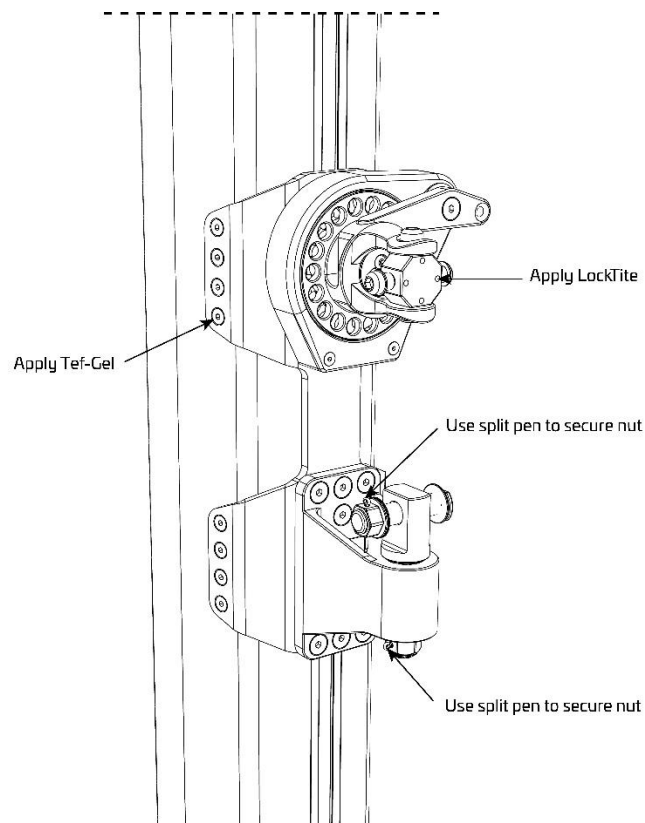


It is important to keep the vertical angle between the boom and mast approximately 90 degrees during and after the installation. This is because the boom and mandrel are installed on the mast independently. So the mandrel will slide inward when the boom is lowered and outward when the boom is raised. The vertical angle between the boom and mast must always stay within the range of 80°-100°.

Before the installation of the mandrel, take off the mandrel retainer using an Allen key. Slide the mandrel in the aft bearing. When the mandrel sits in place, install the mandrel retainer back. Apply Tef-Gel to all bolts before installing them.



Connect the mandrel with the universal joint on the mast bracket. When the 4 pcs M10 bolts are installed (hand tight) fix them using the locking bolts in the center piece of the universal joints. Apply LockTite to secure these locking bolts.

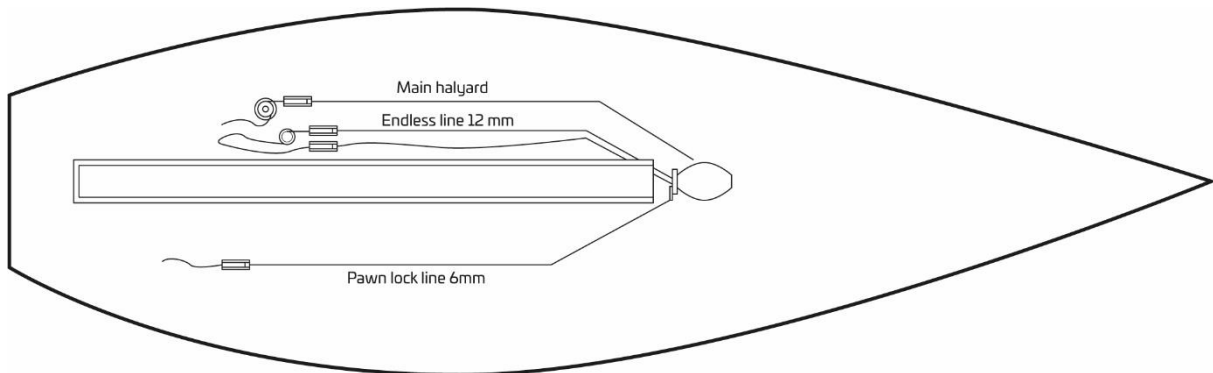


Regularly check whether all bolts are still in place. Rinse the endless line unit and gooseneck assembly with fresh water on a weekly bases to avoid built up of salt or corrosion.

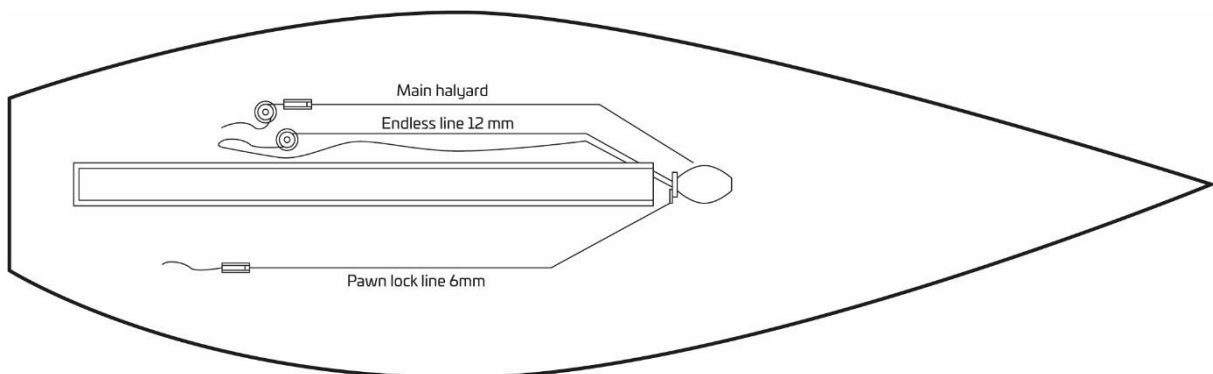
## 2.5 Deck lay-out

Every boat is different so every deck layout is different. For the Made Type C furling boom system it is essential however to have a proper deck layout that matches below schedules. As with every line on board it is important to minimize direction changes because these add extra friction and therefore extra strain in the system.

In any layout a winch or snubber winch is required to control the main halyard and endless line. No friction block is required as the endless line unit will put tension on the endless line. To achieve this pull first on the opposite direction of the endless line (so that the endless line unit turns clockwise) and then on the other line to reef.



Layout with snubber winch (endless line in reefing position)



Layout with two winches (endless line in reefing position)

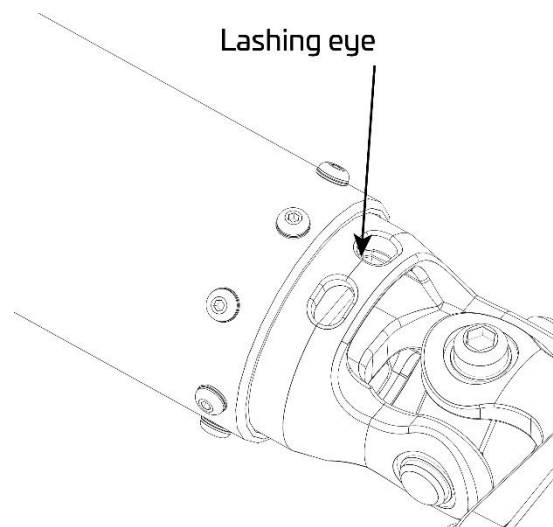
When a snubber winch is used it might be an option to use jammers to lock the endless line, but this is only when the endless line pawl lock fails.

It is essential that the mainsail remains visible during both hoist and furl, so position the operating switch and control lines in the helm in a position to allow this. Generally the winch will be converted to an electric

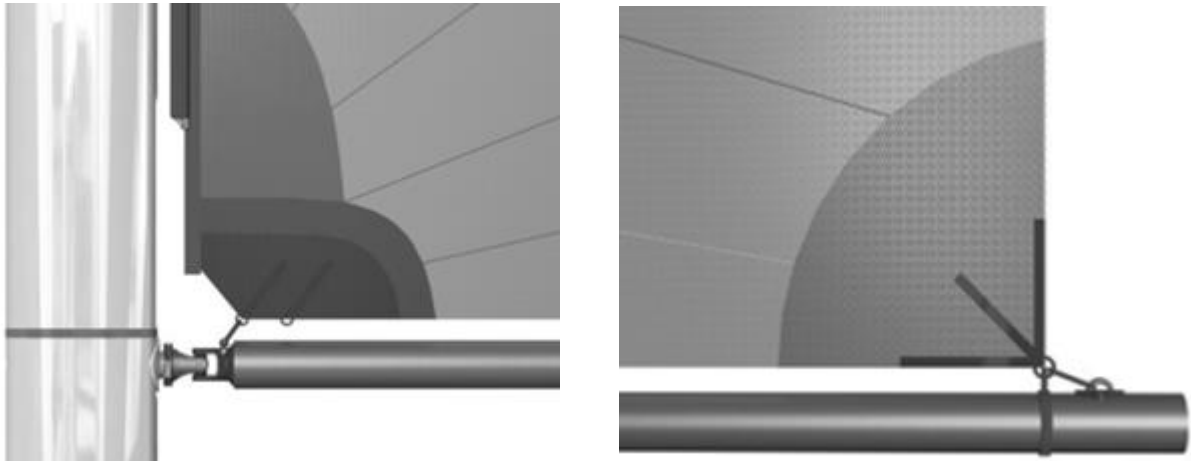
driven winch or capstan. Use of the rope jammer will determine the position for operation. The operating switch should be positioned in such a way to allow the operator the freedom to use both hands for managing the boat. Consider positioning the switch on the helm floor or side wall, and depress the switch using the foot or knee.

## 2.6 Sail fitting instructions

With the sail laid on port side, lift the sail foot up towards the furling mandrel. Then slide the foot bolt rope into the foot track on the mandrel from either forward or aft. Attach first the tack to the furling mandrel, leaving around 30mm between the tack web and tack ring on the universal. separate lashing, pulling the



Now lash the clew to the outhaul saddle on the mandrel. Do not pull the foot out tight, leave fullness in the foot for efficient downwind sailing. The built-in sail controls will generate outhaul tension. Lash also the clew to the furling mandrel using a clew within 10mm of the mandrel.



Hoist the sail using the halyard. When the sail is fully hoisted, reef the sail onto the mandril using the endless line. First, check whether the boom angle is approx. 87 degrees relative to the mast. A good indication is the lowest batten; this must be parallel to the boom. Open the halyard stopper. Control the halyard and give some pressure to ensure the sail will be rolled firmly on the mandrel. When the sail is new it can take 4-5 times before the sail fully fits into the boom. Close the halyard and endless line stopper.

## 2.7 Checklist after installation

If any of the following points are not complete, the system could be damaged.

1. Ensure the halyard sheave is set correctly, with no chance of chafe on either the halyard or topper.
2. Ensure the track joins are aligned and deburred.
3. Ensure the feeder's alignment with the sail track is set up correctly.
4. Ensure the endless line sheave turns freely.
5. Ensure all bolts have been treated with anti-corrosive compound.
6. Ensure there are no objects or sharp edges between the feeder and gooseneck for the sail to catch on.
7. Ensure the endless line runs smoothly from the mast to the cockpit.
8. Ensure the boom angle to mast is not limited by the vang or topper adjustment.
9. Ensure the vang can support the weight of the boom.
10. Never raise or lower the boom more than 10 degrees.

## 3. Operation

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This section explains:

1. Setting up boom height
2. Hoisting the sail
3. Furling the sail
4. Controlling the sail
5. Adjusting the sail

### 3.1 Setting up boom height

To establish the correct operating angle for the boom, once at full hoist, over tension the main halyard. This will give an accurate indication of the tack angle. Pull on the topping lift, tie this off and mark a position for future reference, as this is the correct position for furling. Release now the topper if interfering with the mainsail. It is possible for the topper to stretch, so review the height as above regularly.

Release the load of the main halyard until wrinkles appear at the luff. Engage the main halyard jammer, and mark a position for reference on the main halyard. This position will become the maximum hoist. With the foot track on the mandrel in its uppermost position, ensure adequate fullness has been allowed for. This should now be a full and powerful downwind sail.

With the main halyard jammer still engaged, pull on the furling line. This will flatten the foot and tension the luff, as if an outhaul and cunningham had been applied. This becomes an efficient up wind sail. When the endless line is released, the mandrel will rotate back to the downwind position (only when the locker is not in use - disengaged).

Now set up the reef points for the sail:

- Snub the main halyard around a winch or T cleat, to take the halyard load once the jammer is released.
- Release the main halyard rope jammer, ensuring load on the halyard is maintained.
- Pull in on the endless line, as you ease the main halyard. Apply the desired amount of resistance to the halyard so as to control the amount of "pull back" (see section 3.4: Controlling the sail).
- When each batten is approximately 20mm from the furling mandrel, engage the main halyard rope jammer, then flatten the sail further by pulling in on the furling line, over tensioning the luff each time. The batten should lay along the underside of the mandrel, and the sail should flatten along the foot. The

batten in this position avoids fullness creeping into the foot, so where possible reef on each of the batten positions.

- At each of the reef positions mark the main halyard at the jammer position for future height reference.

## 3.2 Hoisting the sail

Once every 2-3 months we recommend that areas of the bolt rope be coated with Teflon spray, during the hoist, with special attention given to the head of the sail and the batten ends.

Pre check before hoisting the sail:

- Guide the sail into the feeder, and attach the main halyard
- Check that the boom is at the correct angle to the mast
- Ensure the endless line pawl is engaged
- Release the main sheet, and position the yacht head to wind, so as to unload the sail

Sail hoisting:

- Load the halyard winch with the main halyard and release the furling line rope jammer
- Proceed to hoist the sail, allowing the endless line to pull lightly through the hand
- Hoist the sail fully, or to a reef position
- Lock off the endless line pawl by reeling the line
- Tension the main sheet or bear away and proceed to sail

Controlling sail shape (luff tension & outhaul):

The in-built sail controls allow sail shape to be controlled without the use of a cunningham or outhaul, by simply tensioning the furling line.

To flatten the sail for upwind conditions:

Lock off the main halyard rope jammer, then over tension the endless line. This rotates the furling mandrel and draws fullness out of the foot as with an outhaul, at the same time as tensioning the luff as with a cunningham. Do not adjust the main halyard until such time as you wish to furl the sail below this flattened position.

## 3.3 Furling the sail

Check that the boom is at the correct angle to the mast. Release the main sheet, or position the yacht head to the wind, so as to unload the sail.



- Snub the main halyard around a winch or T cleat, to take the halyard load once the jammer is released.
- Release the main halyard rope jammer, ensuring load on the halyard is maintained.
- Pull in on the endless line, as you ease the main halyard. Apply the desired amount of resistance to the halyard so as to control the amount of “pull back” (see 3.4 Controlling the sail).
- Once at the desired reef position, engage the main halyard rope jammer, then flatten the sail further by pulling in on the endless line until the sail is completely flattened.
- Tension the main sheet or bear away and proceed to sail.

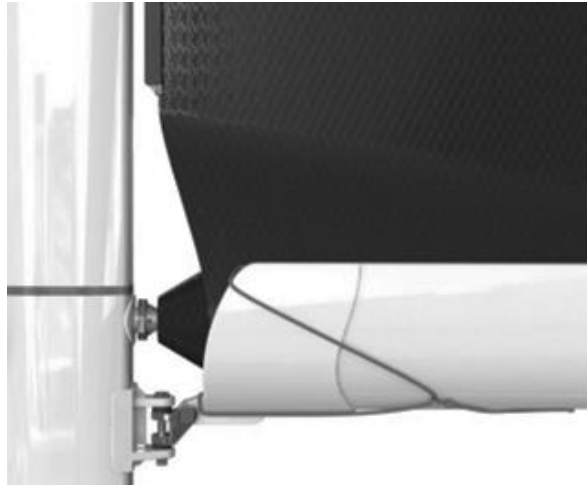
A mandrel locking ratchet has been incorporated into the system so the load can be released from the endless line. It does not have to be used, but when engaged, can be extremely useful in the following circumstances:

- When the sail is to be reefed for a long period of time.
- In the event of deck gear, or endless line failure, bring the yacht head to wind and lower the sail by hand.
- Whilst racing the yacht, when an effective outhaul and cunningham is required, it is useful to engage the ratchet to avoid the creep that will occur. Due to the load on the locker, the system will need to be unloaded prior to the locker being disengaged.

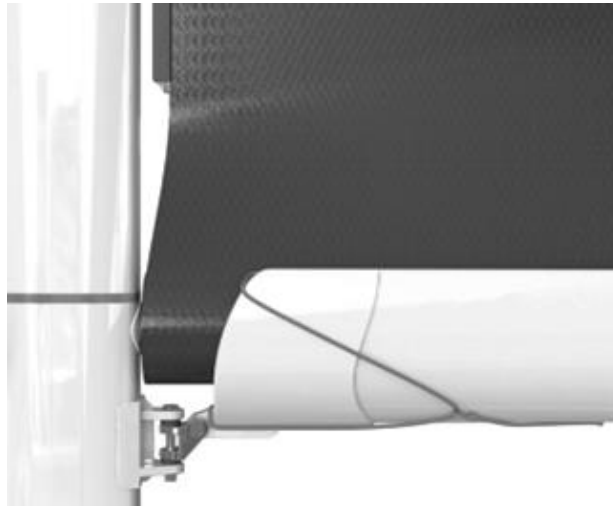
### 3.4 Controlling the sail

Pull back is a term used to refer to the sail gradually working back along the mandrel as it is furled and is visible as lines on the sail, stretching back from the feeder at an angle to the furling mandrel.

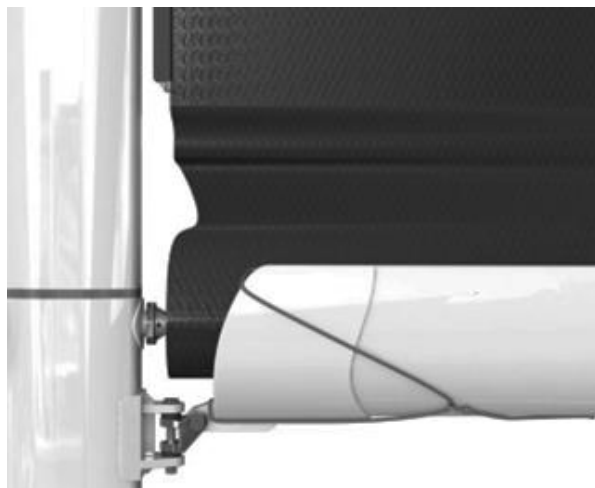
A system that is set up and operated correctly will control the amount of pull back and sail shape. Ideally the sail should always furl neatly and directly under the feeder. Indications that the sail is pulling back excessively will be visible by lines stretching through the sail from the feeder.



If the sail shows these signs of substantial pull back, reduce the resistance on the main halyard. You will immediately notice that the lines of pull back gradually disappear as you continue.



In the instance where the sail works forward, increase the resistance on the main halyard and ensure the sail is unloaded.



Do not release the main halyard in spurts. The balance of resistance is essential for efficient furling.

If the sail does not appear to be controllable as explained consider the following

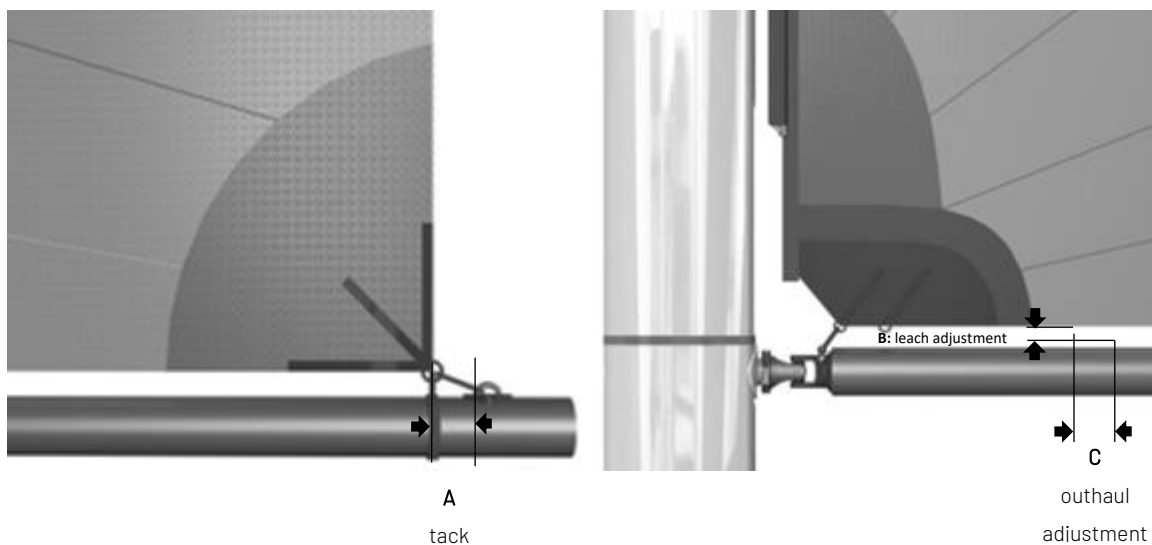
- The boom height is not set correctly
- The sail has not been unloaded
- The sail is not positioned correctly on the mandrel

### 3.5 Sail adjustments

Small adjustments to perfect the furl can be made as follows:

- If the sail shows signs of pull back, without resistance on the halyard, make adjustment at the tack (A), pulling the tack closer into the saddle artificially creates luff round down low. Use the aft tack web if necessary for greater adjustment. This may cause slight distortion at the luff area around the first batten.
- Ease adjustment (C) to return fullness to the foot. Adjustment (B) will not need to be moved from its original setting.
- If the sail works forward as it furls, release adjustment (A) approximately 40mm. Leave adjustment (B) as it is and pull adjustment (C) out by 40mm. Also it may help to pull the topper on a little, past the set mark before furling.

If these adjustments do not rectify the problem, sail modifications may be required. Contact an authorized dealer for further assistance.



## 3.6 Operating tips

### Use of the endless line pawl lock

A endless line pawl lock is built into the system to enable manual furling, without the fear of a counter rotation. It has proven useful also when reefed for extended periods. The ratchet will eliminate "creep" which is experienced on the furling line through stretch, and the rope pulling in on the other turns on the spool. Use of the endless line pawl lock will also remove load from the deck fittings.

### Reef on a batten

Whilst possible to reef at any point of hoist, it remains desirable to reef on a batten as fullness may creep into the foot, and some efficiency lost for up wind sailing.

### Luff tension

Luff tension is essential for efficient sail shape in an up wind heavy weather sail. It is a good idea to over tension, rather than under tension, as sail shape will suffer in the later circumstance.

### Furling down wind

If it is necessary to furl down wind, we introduce a modified procedure to section 3.3 (Furling the sail):

- Square away to a broad reach, or flat run.
- Pull the mainsheet in so the boom is approximately 45° to the centreline.
- Release the vang a little and cause the boom to sky, and pull in on the topper.
- Snub the main halyard off before releasing the main halyard rope jammer. Do not release any of the main halyard.
- Initiate furling without releasing any main halyard, then slowly allow the halyard to pull against the power of the winch. A lot of power will be required.

## 3.7 Trouble shooting

### Sail cannot hoist

- Endless line rope jammer is not disengaged
- Endless line pawl lock is still engaged
- Endless line has a knot in it somewhere
- Sail has not been fed into the feeder correctly

### Sail is hard to hoist

- Sail is partially loaded

- Main halyard is catching somewhere
- Endless line is catching somewhere
- Endless line is jammed in the endless line unit

#### **Sail cannot furl**

- Main halyard rope jammer is not disengaged
- Main halyard is jammed somewhere
- Sail is caught somewhere
- At any stage the sail can be lowered by simply releasing the halyard

#### **Sail pushes forward when furling**

- Sail has not been unloaded
- Boom height is set to low
- Insufficient halyard resistance applied during the furl
- Sail is positioned to far forward on the mandrel

#### **Sail pulls back excessively when furling**

- Boom height is set too high
- Too greater halyard resistance applied
- Sail is positioned to far back on the mandrel

#### **Broken or damaged furling line, deck gear**

- Bring the yacht head to wind, lower the sail by hand.

#### **Broken or damaged furling line, deck gear**

- Bring the yacht head to wind, insert a winch handle in the spool, engage the endless line pawl lock, ease the main halyard as the endless line unit is rotated, at the desired level of hoist engage the main halyard rope jammer, continue rotating the spool to tension the luff and flatten the foot.

#### **System makes a noise whilst at anchor**

- Take the load of the topping lift or attach a shock cord from the support bracket to the topping lift, then pull tight
- If the sail cover rattles at night, pull the cover along the boom to open.

## 4. Maintenance

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### Luff tape

With a new sail on first hoist, apply an even coat of Teflon spray to the full length of the sail on both sides during hoist. After several weeks use, apply a further coat mainly to the head. Thereafter apply to head and luff length of the sail approximately three times a season.

### Components

Check at least once per month:

- Vang tang: ensure that all screws are tight
- Mainsheet tangs: screws are tight
- Preventer tangs: is no sign of movement
- Endless line unit: ensure endless line pawl lock is working well and clean this item weekly with fresh water

### Ropes

Main halyard, furling line, sail cover: check for any signs of chafe at rope clutches, rope guides, sheaves etc. Check retrieving line and where lines are joined.

### Rig

Track: check the attachment slug nuts are tight and control the sheave box at the mast crane.

### Sail

Lashings: check foot lashings for chafe

Inner batten ends, bolt rope: check for any signs of chafe.

## 5. FAQ

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### **Must I always reef with a batten on the mandrel?**

No. You can reef at any point, but the batten on the mandrel is the most efficient position in terms of holding the foot totally flat. The least efficient position is with the batten just outside the boom.

### **Must I go head to wind, to reef?**

No. Under normal circumstances, as with a slab reef, it's desirable to have the main completely unloaded. However, if the boom is out more than 45 degrees though the universal becomes fairly inefficient and quite a lot of power is required.

### **Do I need to snub the endless line when hoisting?**

If the mainsheet is totally free, the endless line only needs to be snubbed if blowing hard. It's good practice to let it run through the hand while hoisting.

### **Does corrugation in the sail roll damage the sails?**

Corrugations are caused by small sail faults, but do not cause any problems. They will gradually disappear as the sail softens up.

### **For racing, can I get degrees of fullness in the foot and still get luff tension?**

Yes. Degrees of fullness can be achieved by pulling small amounts on the endless line but, if this is required, luff tension will need to be achieved with conventional cunningham at full hoist. Remember to ensure it's removed before furling.

### **Do I have foot control after reefing?**

No, it's not required. If correct procedures are followed, the sail will always be totally flat on the foot. If more power is required, simply unwind more sail.

### **Can I still operate the system if my winch should fail?**

Yes. Take controls to another winch.

### **What do I need to watch in very strong winds?**

Only that the mainsheet is totally released and that the bow is not allowed to drop off far enough for the sail to start filling. Also make sure furling line is snubbed when hoisting and main halyard snubbed adequately when furling.

**Can I use a solid vang in place of a topper?**

Yes. Hydraulic or mechanical vang's are quite satisfactory, but the angle has to be watched before furling. If using a gas or spring vang without a topper, there must be considerable upward pressure on the boom at its normal furling height, otherwise in a seaway the boom will start bouncing while furling.

**Can I get away without a boom vang if I only cruise?**

It is possible to furl without boom vang, but the system will be limited. Only reefing when the boat heads into the wind furling is permitted without boom vang.



## 6. Glossary of terms

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Bolt Rope	The rope used in the luff tape
Clew	The outer corner of the sail between the foot and the leech
Cunningham	The rope that tensions the luff of the sail
Down Wind	With the wind aft of the beam
Feeder	the part below the sail track guiding the bolt rope into the track
Flat Run	With the wind directly from the stern
Foot	The edge of the sail that attaches to the boom
Endless line	The line which is used to lower the sail
Gooseneck	The fitting attaching the boom to the mast
Head	The top of the sail
Head to wind	With the bow of the yacht directly into the wind
Leech	The back edge of the sail between the clew and the head
Luff track	The sail track on the aft face of the mast
Luff	The front edge of the sail closest to the mast
Luff Tape	The tape at the sail luff which feeds up the sail track
Topping lift	The rope that holds the boom up from the aft end
Main Halyard	The rope that pulls the sail up the mast
Main Sheet	The rope that pulls the boom in and out
Mandrel	The tube that the sail furls around
Outer Bearing	The bearing at the outer end of the mandrel
Outhaul	The tensioning device on a conventional setup
Ratchet	The mandrel locking device that is located at the drive system
Roach	The area of sail that extends out from the leech
Tack angle	The eternal angle between the foot and the luff
Tack	The corner of the sail between the foot and the luff
Universal	The swivelling joint attaching the mandrel to the drive system
Unload the main	Allow the mainsail (and mainsheet) to become totally slack
Vang	The strut or rope purchase system that controls the boom angle

## 7. Contact details

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### NETHERLANDS

Masterspars  
Neuvel 29  
1693 BN Wervershoofd  
P. 0031 6 106 27 948  
E. sales@masterspars.nl

### REST OF THE WORLD

Made Engineered BV  
Achtievenweg 14  
7951 SK Staphorst  
P. 0031 6 460 70 978  
E. johan@made-engineered.com

### GREECE

Kafetzidakis Sails  
90 Tzavella Avu. Kastella  
GR-18533 Piraeus  
P. 0030 210 413 7438  
E. info@kafetzidakis.gr

### ITALY

G&G Rigging srl  
Via Mazzini 33  
20099 Sesto San Giovanni (Mi)  
P. 0039 226 224 232  
E. walter&gegrigging.com

### MALLORCA

Pro-Rigging  
C/ Bernareggi, 2 bajos  
07014 Palma de Mallorca  
P. 0034 971 592 905  
E. rodrigo@pro-rigging.com

### GREECE

31100Lefkada  
Municipality Marina of Lefkas  
P 0030 26450 21461  
E: info@waypointsails.com

## 8. Disclaimer

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### Installation

Installation should only be undertaken by an experienced rigger. An experienced rigger should have a thorough knowledge and understanding of general rigging installation principles. Use safety equipment during suitable conditions when installing the Made furling boom. Made Engineered BV does not accept liability for personal injury or property damage resulting from faulty installation. Nor does Made Engineered BV accept warranty claims resulting from faulty installation. Do not install a Made boom except on the boat for which it was specifically designed and manufactured.

### Operation

Read this manual before attempting to use the Made furling boom. It contains important operating and sail fitting instructions. Learn how to use the Made furling boom before taking your boat out on open waters. The operator is expected to have prior sailing experience, including knowledge of generally recognized safe sailing procedures. The operator should also have an understanding of such basic sailing techniques as hoisting and reefing a sail. Use the Made furling boom at your own risk. Made Engineered BV accepts no liability for personal injury or property damage resulting from your failure to follow the instructions in this manual or generally follow safe sailing procedures.

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