

PROFURL IN-BOOM REEFING SYSTEM

MK 0R

SERIAL NUMBER :

INSTALLATION MANUAL

IMPORTANT NOTICE TO RIGGERS :
PLEASE GIVE THIS MANUAL TO THE BOAT OWNER AND ASK HIM (HER) TO CAREFULLY READ IT BEFORE USING THE SYSTEM.

RECEIPT OF GOODS
All goods must be checked on delivery and the Buyer should claim from the carrier verbally within three days in the event of loss or damage, and in writing within seven days.



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Congratulations for the purchase of your PROFURL® in-boom reefing furling system. Please read carefully this manual. It will give you to all information for fitting and using your system in order to give you many years of dependable service.

IMPORTANT WARNING FOR USING YOUR SYSTEM :



- The PROFURL boom is obviously heavier than a conventional boom.

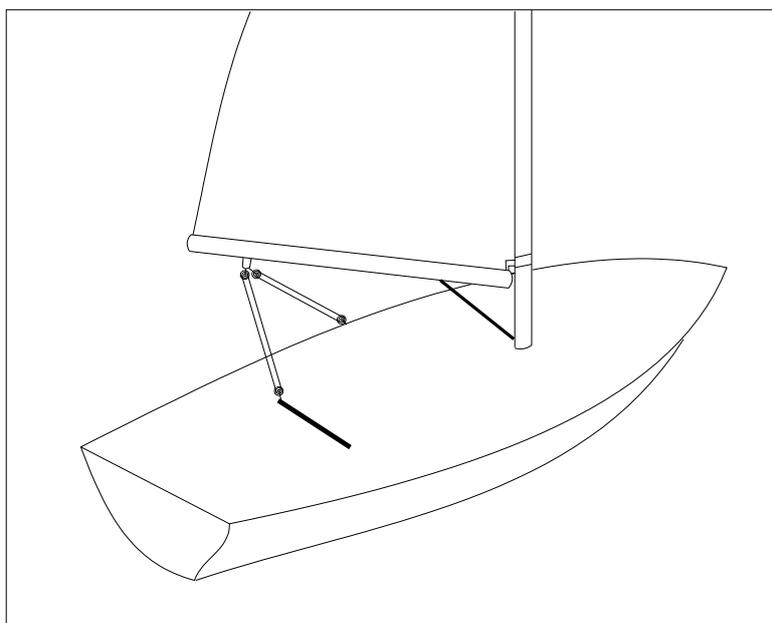
Avoid uncontrolled gibing, specially with strong wind, as you could permanently damage your system.

Reminder to gibe :

- 1 - take in or winch your main traveller and main sheet
- 2 - turn your boat to gibe
- 3 - gradually release your main traveller and main sheet.

You can even better fit a tackle as **boom preventer** (see drawing).

You can also fit a **boom brake**, but you must not forget to **completely release** it each time you want to operate your system.



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PRELIMINARY CAUTIONS

The PROFURL in-boom mainsail reefing system is not designed to be installed on wooden masts, or aluminium masts with track added with screws, rivets, glue or any similar assembly. Fitting on a carbon mast is not recommended as it requires specialized knowledge and skills. Please contact us.

Please check that there is no sign of corrosion on the mast which may compromise the strength of the assembly.

The person in charge with fitting will be fully responsible for installation and adaptation on board according to the specifications shown in this manual.

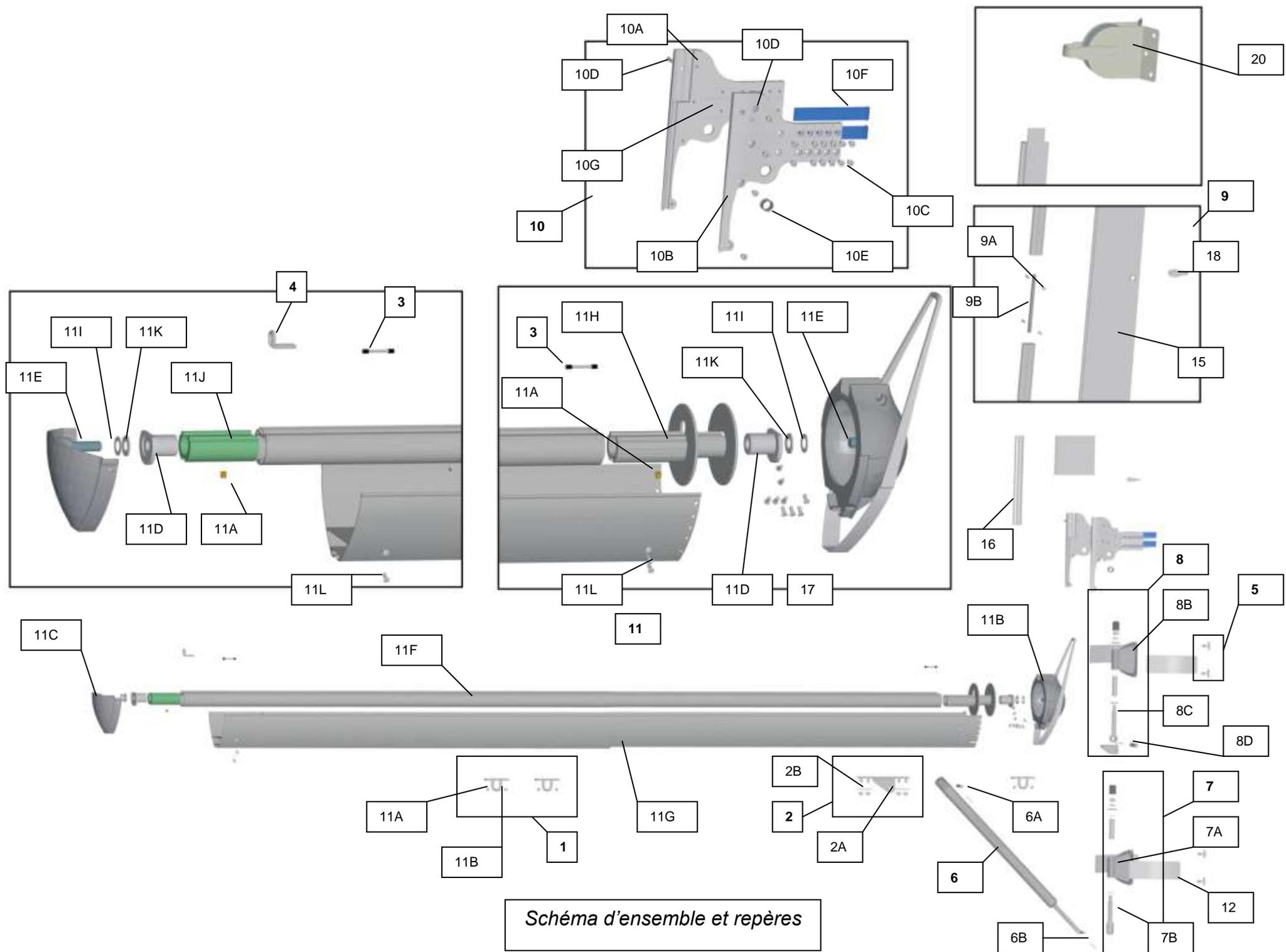
I. PRELIMINARY

I.1 General description

Note : names in bold refer to parts shown on the exploded view page 5

The PROFURL MK0 / R in-boom furling system includes :

1. One set of plastic **luff sections** (16), each being 3 meter long, a sailcloth **luff triangle** (15), and a **feeder** (10). (15) and (10) are linked to the mast with conventional mast slugs (not provided).
One of the luff section (1) and the lower end of the **luff triangle** (2) will be re-cut to length to match the expected luff length of the mainsail.
2. **Joiners** (9) are used to connect the various **luff sections** (16). They are locked by mean of **screws- washers and nuts** (9B).
3. The bottom end of the **luff sections** (16) are screwed (10D) to the **feeder** (10). The **luff triangle** (15) is linked to the **foil sections** by a luff rope.
4. The **luff triangle** (15), the **mast slugs strap** (10F) and the feeder (10) are assembled by threading (10C) of the two half feeder. The strap (10F) immobilization during assembly is made with adhesive (10G).
5. The assembly **luff section + luff triangle + feeder** is pulled up on masthead with the topping lift or a lashing. The **stretch strap** (17) passing by **the mainsheet bails** (1) keep the luff section tight.
6. A **gooseneck** (8) fit on the mast with 2 **slide screws** (5), and two **gooseneck plates** (13) bent to the mast's shape while fitting, and then riveted onto the mast with the **pop rivets** (14) supplied.
7. A **boom section** (11G) standard length 3.20 meter (10' 6"). It may be necessary to re-cut the boom profile to length.
8. A **mandrel** (11F) turns on **bearings** (11D) rotating around a **bearing holder** (11J) at the rear end of the boom, and on the **drum-bearing holder** (11H) at the front, turning around a pin (11E) inserted in each of the **boom end fittings** (11B and 11C). When re-cutting the **boom profile** (11G) to length, the **mandrel** (11F) should also be re-cut by the same amount.
9. A **drum boom end fitting** (11B) includes the **drum-bearing holder** (11H) fitted into the **mandrel** (11F) :when the drum is loaded with the furling line, pulling on the furling line while releasing the mainsail halyard will rotate the **mandrel** (11F), which will furl the sail.
10. 3 adjustable **mainsheet bails** (1) : 2 to fix main sheet blocks, or a boom brake or a boom preventer, and 1 to fix the **stretch trap** (17).
11. A special **boom strut** (6). It is attached :
 - to the mast by means of a **boom strut attachment** (7), including a **gooseneck** (7A) attached to the mast with 2 **slide screws** (5) and two **gooseneck plates** (12) which will be bent and riveted to the mast with the **pop rivets** (14) supplied. The boom strut upper end will be attached onto an **articulation fitting** (7B) rotating in the boom vang gooseneck.
 - to the boom with an adjustable **boom vang hound** (2).



I.2 TOOLS NEEDED FOR FITTING

In all cases of fitting

- A tape line
- An electric drill
- A set of drills
- A hack saw with a (new) blade with small teeth
- A file
- A pencil
- A plastic hammer
- Metrics 6 mm, 10 mm, 17 mm pipe-wrench.
- A dynamometrical wrench (1daN/m)
- 1 set of Allen wrenches (supplied)
- 2 clamps with a minimum opening 250 mm (9 27/32")
- Universal pliers
- A cutter blade (with new blades)
- A large sheet of paper with corners perfectly at 90° and adhesive tape
- Several small plywood or rubber shims.
- A pop rivet gun for Ø5 mm rivets.
- A cross recess screwdriver
- A hollow punch (supplied)
- 2 standard mast slug 32 (1 17/64") long max (non supplied) fitted to the mast.

Note : the plates to fit the gooseneck and boom vang attachments are 4 mm thick and made out of aluminium. A convenient set of clamps with minimum 150 mm (6") opening should be used to bend them at the mast shape

If the fitting is made on a standing mast

- A Boson's chair (while assembling the halyard spreader (20)).
- Some short ropes of 6 or 8 mm (1/4" or 5/16") diameter

| Please purchase a 6 mm furling line and a ball bearing block to lead the furling line to the cockpit.

II. PREPARATION

II.1 Unfitting the hardware FROM the mast

II.1.A - Dismantle the original gooseneck, as well as cleats, winches and winches brackets on the mast, as well as any piece of equipment which would interfere with the fitting of the new gooseneck and with the ability for the forward boom end fitting to rotate when the boom will swing from one side to the other.

Please see § III.1. and drawing 1 for dimensions of the new gooseneck in relation with mark « C » on the mast.

II.1.B - The original boom vang attachment should not be used, as the rotation axis of the boom and of the new gooseneck need to be in line, which would never be the case with the original boom vang attachment.

II.1.C - Dismantle the original feeder (if any) at the mast track entrance.

II.1.D - Check that the slide screws (5) supplied have suitable dimensions for the mast track. If not, their width should be modified (turned, machined, grinded, filed) accordingly.

In all other cases please contact us.

III. INSTALLATION

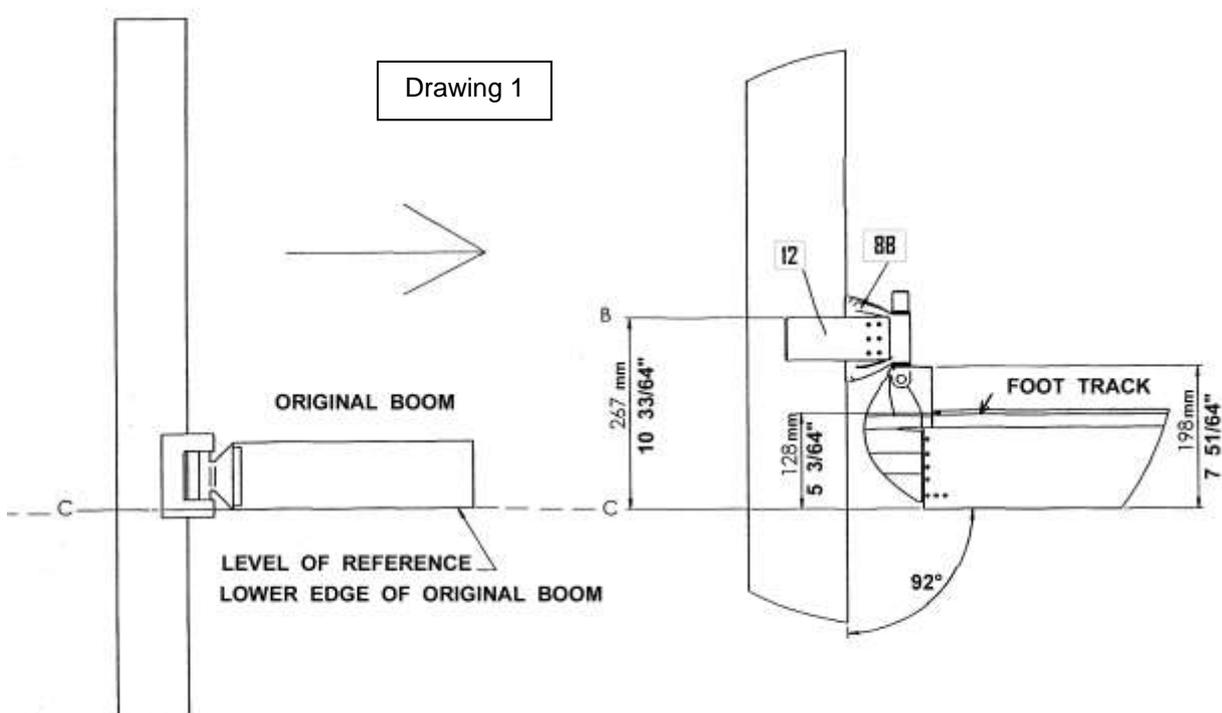
III.1 DETERMINING THE HEIGHT OF THE GOOSENECK

III.1.A -To avoid any potential conflict between the boom and the cabin top, a bimini, a lifeline or any other piece of equipment, please accurately mark the level of the lower edge of the original boom. See drawing 1. and draw the line "C" on the mast.

III.1.B - Check that the boom vang (6) delivered with your system will make once installed a minimum 30° angle with the mast and the boom. Should it not be the case, the position of the new gooseneck (8) must be raised on the mast in order to obtain at least this 30° angle .

Note pin to pin boom vang length : 1100 mm (5' 8 7/8") open / 1005 mm (5' 3 3/16") closed

III.1.C - Draw a line « B » on the mast at **267mm (10' 2 33/64")** above line « C ».The line « B » will correspond to the level of the upper edge of the gooseneck plates (12) once fit on the mast.



III.2 FITTING THE SLIDE SCREWS INTO THE MAST TRACK

III.2.A - 2 slide screws (5) are needed for the boomvang attachment (7)(See Drawing 7). Slide these slide screws (5) down to the mast foot to later fit the boom vang attachment (7) (See §III.8 p 18).

III.2.B - Slide 2 extra slide screws (5) into the mast track for fitting the gooseneck(8).

III.3 FITTING THE GOOSENECK

III.3.A - Attach the gooseneck (8) at the convenient height (§ III 1) with the 2 corresponding slide screws (see § III.2.B), washers and locknuts (5). Tightening torque must be 1 daN/m.

III.3.B - Bend the aluminium gooseneck side plates (12) with clamps to accurately camber them to the mast shape. During bending please protect the plates from dings and dents.

III.3.C - Draw lead lines for drilling (\varnothing 5mm 13/64" drill) on the side plates (12) (suggested jig drill on annexe 1). Press the side plates on the mast with clamps (please protect the plates with any convenient means). There should have at least 6 pop rivets (13) on the mast on each side plate (12).

III.4 FITTING THE HALYARD SPREADER

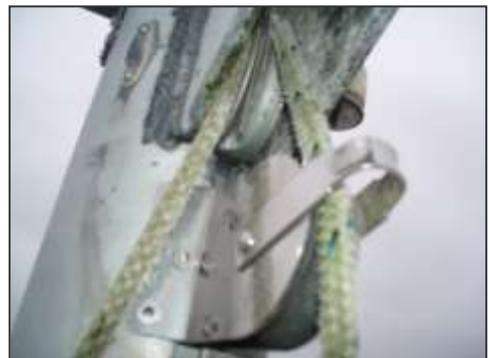
The halyard spreader (20) is necessary if the sheave from the mast crane don't carried out enough (50mm 1 31/32" minimally) the halyard from the mast bottom part.

ADVISING :we recommend to contact a rigger or to use a specific climbing equipment.

III.4.A – Position the halyard spreader on the mast (the highest possible).

III.4.B – Point the mast according the drill on the halyard spreader and bore at \varnothing 5mm (13/64").

III.4.C – Hang the halyard spreader to the mast with pop rivet (supplied).



III.5 ASSEMBLING THE LUFF SECTION & LUFF TRIANGLE & FEEDER

III.5.A – Pull up the main sail halyard to the masthead and measure with tape line length “X” to the “C” drawing previously marked. Deduct 520mm (1’8 15/32”) from this value :

$$Y = X - 520\text{mm}$$

$$Y = X - 1' 8 \frac{15}{32}''$$

Caution : Ensure that “Y” measure do not occur with the mast luff track entrance. If it is the case, you would increase or decrease the “Y” value of 100mm (3 15/16”).



III.5.B – Cut carefully with cutter blade the lower part from the luff triangle (15) to the “Y” value from the upper part (Picture A). Cut up the luff line 50mm (1 31/32”) shorter than the cut (Picture B and C).



Photo A



Photo B

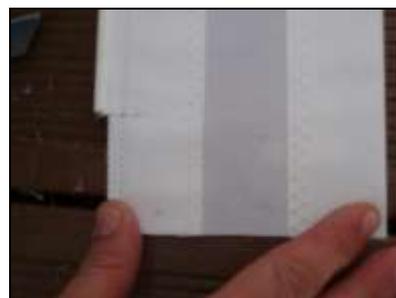


Photo C

III.5.C – Thread the luff section (16) on to the luff tape of the luff triangle (15) (Picture D) and assemble them with the connector (9) (Picture E). Fit the connector's screw (9B) (Picture G) after coating the end part of the threading with Profurl adhesive 52052 (Picture F).



Photo D



Photo E



Photo F



Photo G

III.5.D – Position then this foil section so as it rise to the surface to the extremity part of the luff line in the lower part of the luff triangle (15) (Picture H). Cut surplus foil section (16) exceeding on upper part : it end would have to respectively raise the high end of the luff triangle (Picture I). Burr the cut (Picture J).



Photo H

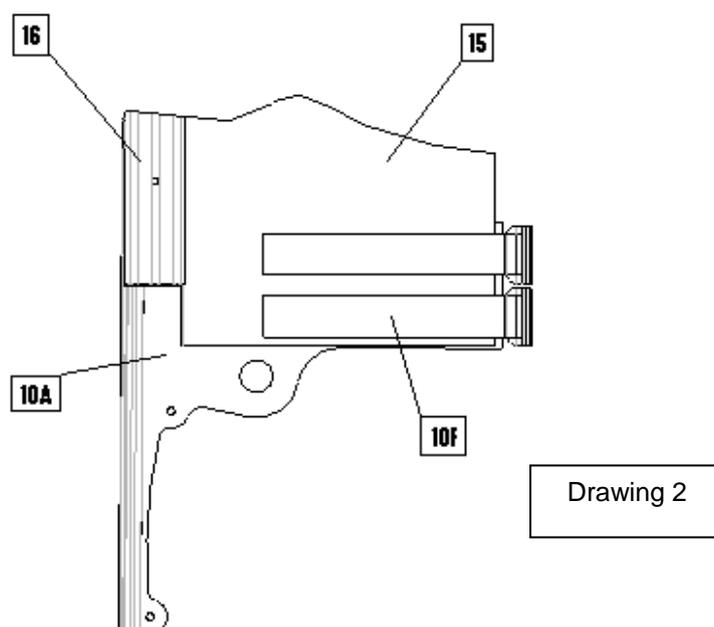


Photo I



Photo J

III.5.E – Feeder fitting : Most of the time the front part of the feeder (10) will have to be recur (Picture K). The feeder will have to be shortened so as been the luff triangle (15). The cut will be done according the appropriate groove (closest upper groove) so as to the **drawing 2** arrangement.



Drawing 2

Position temporarily the 2 half-feeder (10A and 10B) to identify the cutting groove (Picture L). Cut and burr.



Photo K



Photo L

III.5.F – Arrange the double coated tape adhesive (10G) onto the 2 half feeder nick design for (Picture M). Shorten it if necessary (Picture N).



Photo M



Photo N

III.5.G – Arrange the two half feeder (10A and 10B) in opposite (Picture O). Get pass the mast slugs strap (10F) onto mast slugs (not provided) (Picture P).



Photo O



Photo P

Put the strap flatly onto the two half feeder neck designed. Cut off the extra length of the strap (Picture Q) if necessary so as, while the feeder is closed, to keep the mast slugs at 5mm (13/64") from the feeder mast part extremity (Picture R). Take out the protection from the double coated tape adhesive and stick definitively the strap on.



Photo Q



Photo R

III.5.H – Close the two half feeder (10A and 10B) to shut away the lower part of luff triangle (15) and the foil section (16) into the corresponding shape (Picture T). The two lower parts, from the luff triangle and from the feeder will have to coincide (Picture S). If a grommet from the luff triangle hampers the feeder closing, just suppress it tidily.



Photo S



Photo T

III.5.I – Fit the two half feeder (10A and 10B) with the self-tapping screw provided (10C) (Picture U). Do not force the binding!

III.5.J – Position and crimp the thimble (10E) with the hollow punch (provided) (Picture V).



Photo U



Photo V

III.5.K – Drill the lower part, $\text{Ø}4$ mm ($5/32''$) hole of the foil section (16) according to the feeder shaped hole. Fit by screw and nut (10D) the feeder (10) and the foil section (16) (Picture X).



Photo W



Photo X

III.5.L – Mast slide: Take out the mast slide from the original main sail. Caution: Keep this mast slide as it will be fitted on the front part of the luff section (15) thanks to the snap-in shackles provided (Picture Y). (See mainsail design specification IX.2.D)



Photo Y

III.6 CUTTING THE BOOM SECTION AND THE MANDREL TO LENGTH

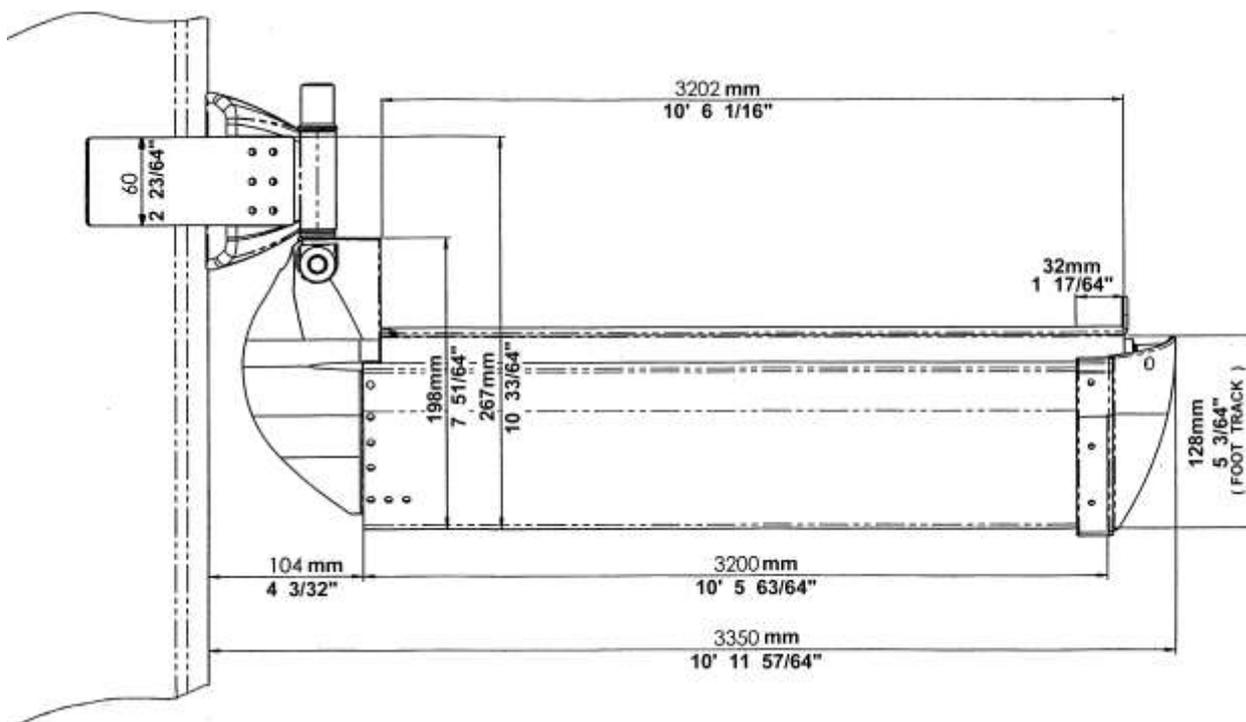
III.6.A How to calculate the length of the boom SECTION.

Case # 1: PROFURL took care of cutting the boom for you to your specific length

Case # 2: The PROFURL boom being delivered in over length (standard length), the opportunity may be taken to make the boom longer. *Caution : changing the boom length and foot length of the sail will affect the balance at the helm when sailing under sails.* In this case check that the aft end of the boom cannot touch the backstay or any other piece of equipment on board.

Drawing 3 refer to case #1 for dimensions.

Drawing 3



The PROFURL in-boom reefing system is delivered pre-assembled. In case #2 the boom section (11G) and the mandrel (11F) may have to be re-cut to length to match the boat's requirements when fitting the system.

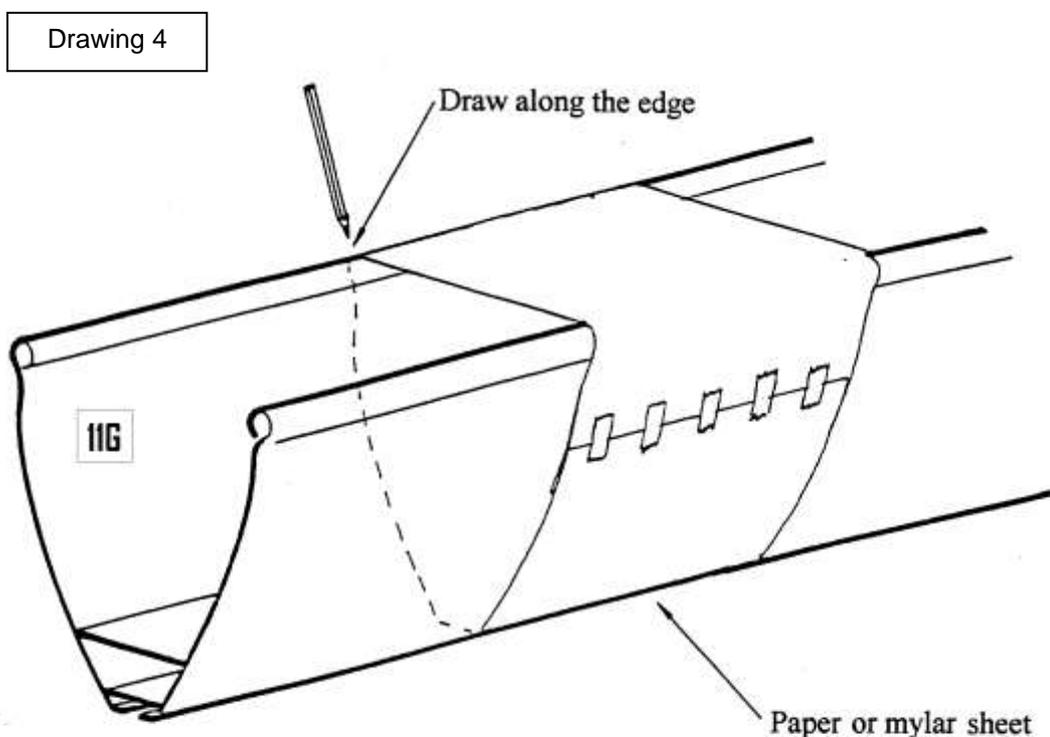
CAUTION : should the complete length of the boom profile be used, the rear boom end fitting is just temporarily attached to the boom profile for shipping. Please follow the rear end boom fitting assembly procedure from § III.6.C.5 and on as if the boom profile had been re-cut.

III.6.A.1 - To cut the boom section (11G) and the mandrel (11F) to length, first dismantle the rear boom end fitting (11C) from the boom section and pull out the mandrel (11F) from the boom section.

Caution : during dismantling, the mandrel (11F) will not be held any more. Please control the mandrel as it potentially may fall down, when pulled backwards. Also take care not to lose the washers (11I & 11K) located forward of the drum (11H).

III.6.A.2 - To re-cut the boom section (11G) to length, and to make sure that the cut is accurately perpendicular to the section, wrap a sheet of paper or Mylar (with accurate right angle corners) so that the edges are in perfect line, and attach it with adhesive tape. Please see drawing 4. Draw a line on the boom profile, following the edge of the sheet where the boom profile will be cut.

III.6.A.3 - Cut the boom profile according to the line and file smooth.



III.6.B Cutting the mandrel (11F) to length

The mandrel (11F) should be re-cut of exactly the same length of the one having been cut off from the boom section.

III.6.B.1 – Remove the bearing holder (11J) + bearing (11D) assembly from the rear end of the mandrel (11F).

III.6.B.2 - Cut the mandrel (11F) at its rear end with the same method as the one having been used for cutting the boom section (11G). Same as § III.6.A.2, File the rear (cut) end of the mandrel and foot track ends smooth.

Caution : the forward (drum) end of the mandrel (11F) must not be cut !

III.6.B.3 - Fit again the bearing (11D) and bearing holder (11J) into the cut/rear end of the mandrel. Drill at 7mm and tap at M8 (8mm) at 30 mm (1 3/16") from the cut end. Fit and tighten the set screw (11A).

III.6.B.4 - In case the mandrel has been cut a little too short, the fore and aft play must be reduced to a minimum. To do this, loosen screw (11A), push the mandrel forward, and then pull out the bearing holder (11J) so that the washer (11I) touches backwards, tighten again screw (11A).

III.6.C Fitting the mandrel onto the boom

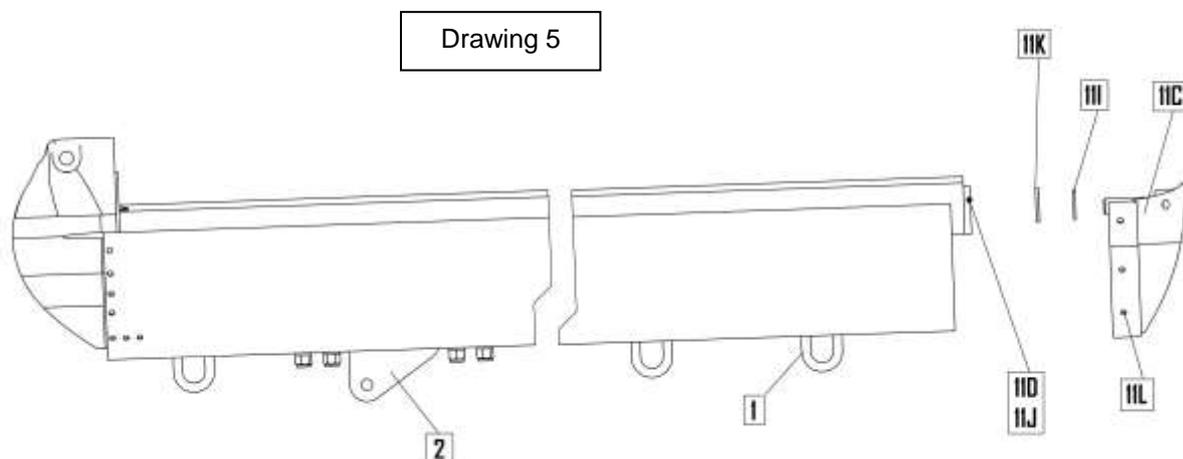
III.6.C.1 - Fit the mandrel (11F) into the boom section (11G), fit the washers (11I and 11K), the drum (11H) and the drum bearing (11D) onto the stainless steel pin (11E) inserted in the drum boom end fitting (11B).

III.6.C.2 - Check that the mainsheet bales (1) and boom vang hound (2) are properly fitted in the bottom track of the boom section as shown on drawing 6.

III.6.C.3 - Slide the bearing (11D and 11J) and the washers (11I and 11K) located at the rear end of the mandrel (11F) onto the stainless steel pin inserted in the rear boom end fitting (11C).

III.6.C.4 - Completely insert the rear boom end fitting over the rear (cut) end of the boom profile (11G). *A ratchet tie down strap is a handy and powerful tool to achieve this if necessary.*

III.6.C.5 - Drill holes \varnothing 5mm (13/64") at the rear end of the boom profile (11G) through the pre-drilled holes of the rear boom end fitting (11C). Fit the corresponding pop rivets (11L) supplied into these holes to permanently attach the boom end fitting onto the boom profile.

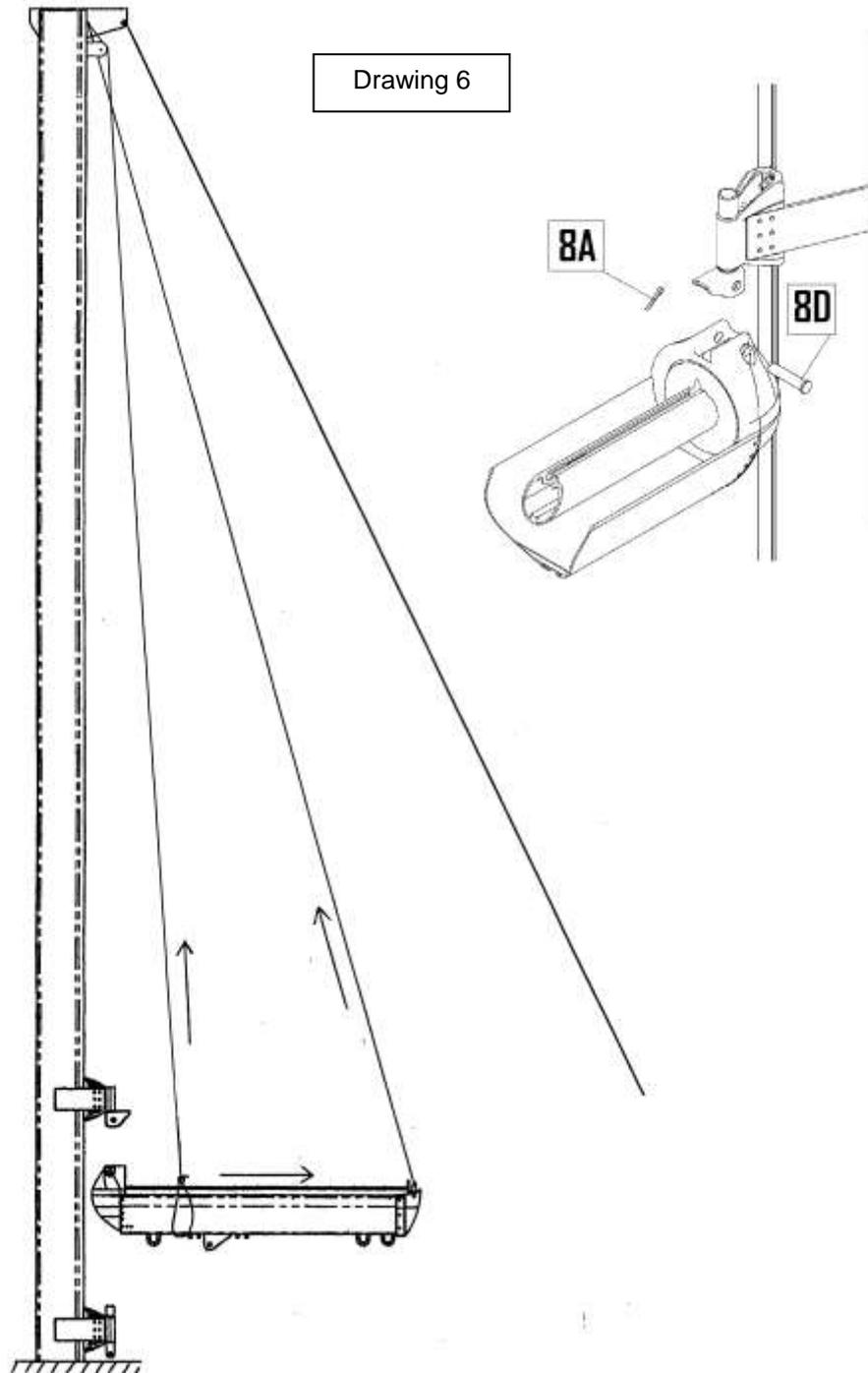


III.7 Fitting the boom onto the gooseneck

III.7.A - Hoist the boom with a halyard and a topping lift (see drawing 6) by keeping it as horizontal as possible.

III.7.B – Fit horizontal pin (8D) . Fit and open split pin (8A).

Caution : do not drop or raise the boom more than 15° from horizontal position as it could cause permanent damage to the gooseneck (8).



III.8 FITTING THE BOOMVANG HOUND AND THE BOOMVANG

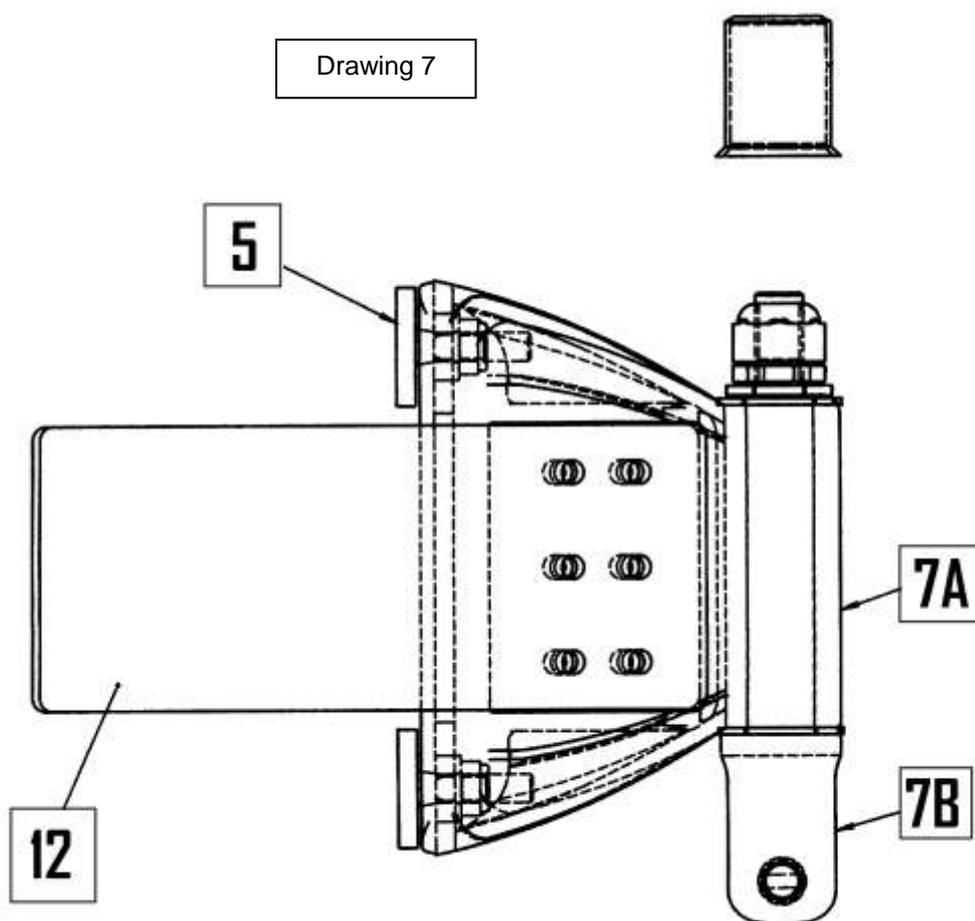
Reminder: the ideal working angle of the boomvang being 45° the boomvang must not angle less than 30 ° with the mast or boom.

III.8.A - Fit the boom vang attachment (7) with the 2 slide screws (5) which had been stored at the mast foot (please see § III.2.B).

III.8.B - Bend the aluminium gooseneck side plates (12) to the mast shape. During bending please protect the plates from dings and dents.

III.8.C - Draw lead lines for drilling on the side plates (12) (suggested jig drill on annexe 1). Drill at Ø 5 mm (13/64") and fit the pop rivets (13) on the side plates. There should have at least 6 pop rivets (13) on the mast on each side plate.

III.8.D - Fit the boom vang (6) onto the articulation eye (7B) and onto the boom vang hound (2). Fit the pins (6A and 6B) and the split pins.



III.9 FITTING OF THE LUFF TRIANGLE ON THE MAST

III.9.A – Insert the mast slug into the mast luff track and pull up the luff triangle to masthead.

During this step avoid excessive bending from the foil section. Side mast approach is advised.

III.9.B – Pass the stretch strap (17) into the feeder's thimble (10E) and into the mainsheet bales on mast side. Close and stretch moderately the stretch strap buckle. (Picture Z1 and Z2).



Photo Z1



Photo Z2

III.9.C – Move backwards the mainsheet bales (1) to hardly stretch the strap (17) and immobilize it with its two set screws (1B).

III.10 ADJUSTING THE POSITION OF THE MAINSHEET BALES (1)

III.10.A - Adjust the position of the mainsheet bales (1) with the set screws which can be reached from underneath the boom section. Fasten the mainsheet blocks on the mainsheet bales.

CAUTION: on boats with a mainsail track or mainsail block attachment on deck ahead of the main hatch the mainsheet bales (1) must be re-positioned as far backward as possible.

III.10.B - Push the boom by hand over the lifelines as far as possible and tie a knot on the mainsheet so that in no case the boom section can be damaged by the rearmost shrouds when running downwind or jibing.

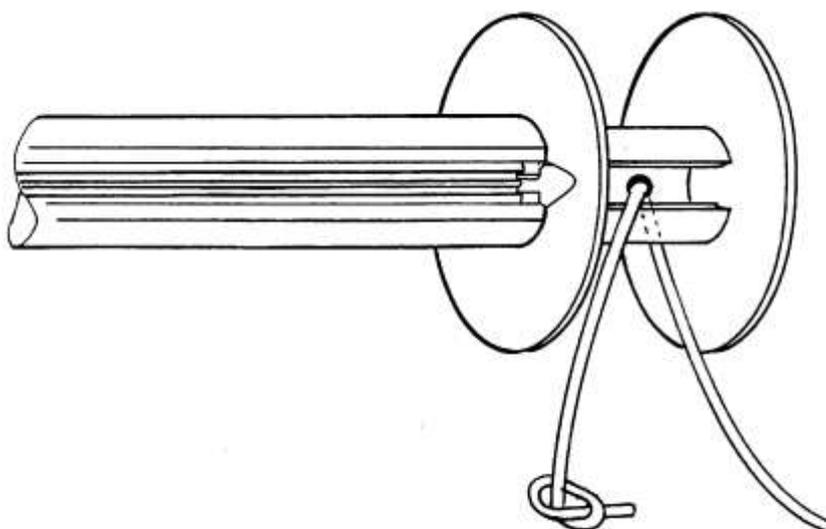
III.11 INSTALLATION OF THE CONTROL LINES TO THE COCKPIT

REMINDER TO AVOID FRICTION

1. Only use good quality ball bearing blocks, which will have to be cleaned and lubricated from time to time as per manufacturer's specifications.
2. Use ball bearing blocks with a sheave of large diameter.
3. Reduce as much as possible the number of lead blocks between the drum and the cockpit.
4. Reduce as much as possible the angle of deviation of the control lines.

III.11.A- Attach on starboard a ball bearing block (not supplied) to the mast foot at the convenient position to lead the line into the middle of the drum at 90° angle.

III.11.B - Pass the furling line from underneath through the block, then through the hole of the drum's shaft and a tie small knot at its end so that the knot will be completely hidden inside the drum's shaft. Please see drawing 8.



Drawing 8

III.11.C - To fill the drum with line turn the mandrel (11F) by hand anti clockwise (seen from above): the furling line should exit from the drum on the starboard side.

III.11.D - Fit another ball bearing block at the mast foot to lead the mainsail halyard to the cockpit. Remind to use the right type and dimensions of blocks.

III.11.E - Check that the exit from the mast of the mainsail halyard does not bring too much chafe. If necessary change for a new less aggressive halyard exit, or change position of the mast foot block to keep the halyard on line with the exit.

IV. FITTING THE MAINSAIL

⇒ Please check again that the foot track rear end has been smooth filed before starting inserting the foot tape into the mandrel's foot track.

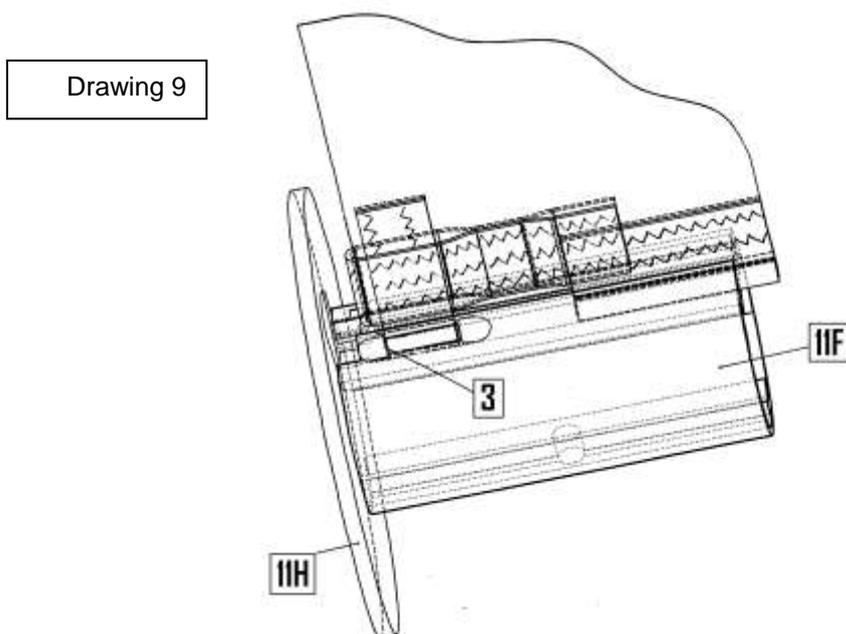
CAUTION : before operating the PROFURL in-boom reefing system please make sure that :

- 1) the mainsail construction and design are in accordance with the attached specifications. Please refer to attached mainsail design specifications.
- 2) the boomvang (6) angle adjustment (see § V) is correct. This adjustment is an essential point to get a good quality furling of the mainsail as well as ease of operation.

IV.1 - Turn the mandrel (11F) by hand so that the track of mandrel is upwards.

IV.2 - Do not yet insert the mainsail battens into the batten pockets.

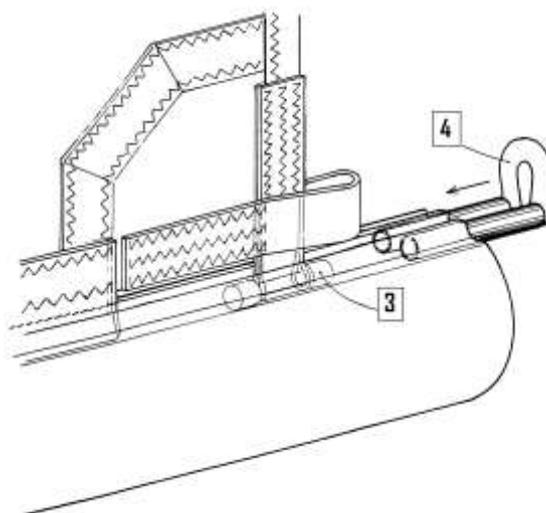
IV.3 - Insert the tack slide (3) into the tack webbing of the sail. Please see drawing 9.



IV.4 - Insert together both webbing and tack slide (3) into the port side foot track. Insert the bolt rope foot tape into the mandrel (11F) track and gently pull the sail forward.

IV.5 - Once almost at the end insert the second clew slide (3) into the clew webbing so that the webbing is locked between the two small plastic cylinders of the clew slide (3), and insert the clew slide into the track of the mandrel (16). Please see drawing 10.

IV.6 – Push the tack slide (3) to the front.



Drawing 10

IV.7 – Tie a knot on the lashing line (4 mm diameter supplied) and insert the knots in the slot of the mandrel (11F) so as to include the clew webbing and the buckle created. (Picture AA) The length between the two knot of the reef point so as the mainsail luff line set out with the feeder entry (10).



Picture AA

IV.8 - Lash the $\text{Ø}4$ (5/32") line between the clew webbing and the ring of the clew pin (4) and adjust foot tension. Check to tie or cut any loose extra length of lashing line.

IV.9 - Insert the battens into the batten pockets.

IV.10 - Attach the halyard onto the head of the mainsail.

IV.11 – Insert the mainsail luff line into the feeder and pull it up.

V. ADJUSTMENT OF THE BOOMVANG ANGLE TO THE MAST

This essential procedure must be achieved either with no wind at all, or with extremely calm wind and the boat heading into the wind.

V.1 - Hoist the sail as previously described and tension your halyard quite hard.

V.2 - Completely loosen the nuts of the boom vang hound (2A), and make sure the hound (2) is totally free to move fore and aft in the lower track of the boom.

V.3 - Make sure the mainsheet is completely loose and let the boom hang in this position, just held by the mainsail.

V.4 - Tighten again the nuts of the boom vang hound (2A) with the boom in this position.

V.5 -The sail can now be furled by gently releasing the halyard and pulling together on the furling line.

V.6 - Fine tuning of the boomvang position adjustment may be necessary :

1. If the luff tape rolls too much backwards, adjust the boom vang hound (2) position so that the boom angles up a little more.
2. If the luff tape rolls too much forward, adjust the boom vang hound (2) position so that the boom angles down a little more.

VI. USING THE PROFURL IN-BOOM REEFING SYSTEM

IMPORTANT WARNING: when gibing please keep constant control of the boom with the mainsheet.

You can also install a boom brake. If a boom brake is added release it each time before operating the system.

VI.1 Rules of thumb :

1. Make the boat's angle with the wind corresponding to a broad reaching or closer to the wind.
2. Before using the system completely release the mainsheet so that the boom vang push effect brings back the angle between the boom and the mast to its « operating » position.
3. If the mainsail is not properly do not attempt to correct this immediately, but hoist the sail completely, check points as per §V.6 and try again.

After a short period of time you will feel how much drag is to be given to the halyard to get the right tension to obtain a smooth furling of the sail.

During hoisting the sail a slight drag should be applied to the furling line in order to allow the furling line to be rolled tight enough in the drum: this will make next furling easier.

Should you wish to just reef your sail, please carefully check that the head of the sail is just above a connector/articulation in order to prevent the luff profile to sag too much. Please stick insignia reefing marks on the luff of the sail which will be at feeder level to show when the head is at the convenient position.

When in **harbour**, or **sailing under power**, please **remove the halyard** from the head of the mainsail, **attach it** onto the rear end of the boom and **tension it**.

VI.2 LIMITS FOR USING THE SYSTEM IN RELATION WITH APPARENT WIND

Some boats have spreaders at 90° from boat's axis, some other have spreaders angling backwards. Some other have aft shrouds.

In these last cases the sail will drag on the standing rigging earlier than with boats having spreaders at 90°. This means that the sailcloth will touch the standing rigging sooner or later depending on each boat. A smooth operation is obtained as long as the sail is not touching any shroud or spreader when the mainsheet is completely released. In other terms it is necessary to come into the wind to reef or furl the sail just as you would have done with conventional mainsail reefing.

However in case of emergency the sail can be rolled at larger angles to the wind till the stage when the friction on the standing rigging will make the system more and more difficult to operate. Friction would also obviously increase with the wind's speed. In this case a smooth furling can't be guaranteed

VII. WARRANTY

1- The PROFURL in-boom reefing system is warranted for 3 years from date of purchase against parts and materials, provided the warranty card is returned within fifteen days from date of purchase. The warranty covers the original owner and is not transferable.

2 -The warranty is limited to the repair and replacement of defective parts only by an authorised PROFURL dealer and only after the written consent of PROFURL France or PROFURL USA .

3 - This warranty covers only the PROFURL parts and materials. Any accidental damages or expenses are not covered.

4 - This warranty is void if the system is modified or repaired without prior written notification to PROFURL France/USA.

5 - This warranty does not cover damages caused by systems which has not been properly installed.

6 - This warranty does not cover the malfunctioning of the system due to a sail having been made without strictly following the attached specifications.

7 - After installation the customer should check the following :

- the sail dimensions are accurately adapted to the system's dimensions.
- the sail has been designed and made according to the attached specifications.
- all screws are properly tightened.
- the fitting and adjustment procedures described in this manual are strictly followed.

✂-----

Please return this portion within 15 days of purchase to :

WICHARD
 ZA Pornichet Atlantique
 16 rue du Gulf Stream
 44380 – Pornichet
FRANCE
 Tel : +33 (0)4.73.51.65.00
 Fax : +33 (0)4.73.80.62.81
 E mail : hotline@wichard.com

WICHARD, Inc
 148a Bryce Blvd
 Fairfax – VT05454
USA
 Tel : +1 401 683 5055
 Fax : +1 802 655 4689
 E mail : info@wichard-usa.com

WICHARD Pacific
 PO Box 712
 Edgecliff NSW 2010
AUSTRALIA
 Free call : 1800 639 767
 Tel + 61 2 9516 0677
 Fax +61 2 9516 0688
 Email: info@wichard.com.au

Owner's name :

Date of purchase :

Boat's type.....

Boat's length.....

Boat's displacement.....

Mainsail's luff length.....

Mainsail's foot length.....

Installed by.....

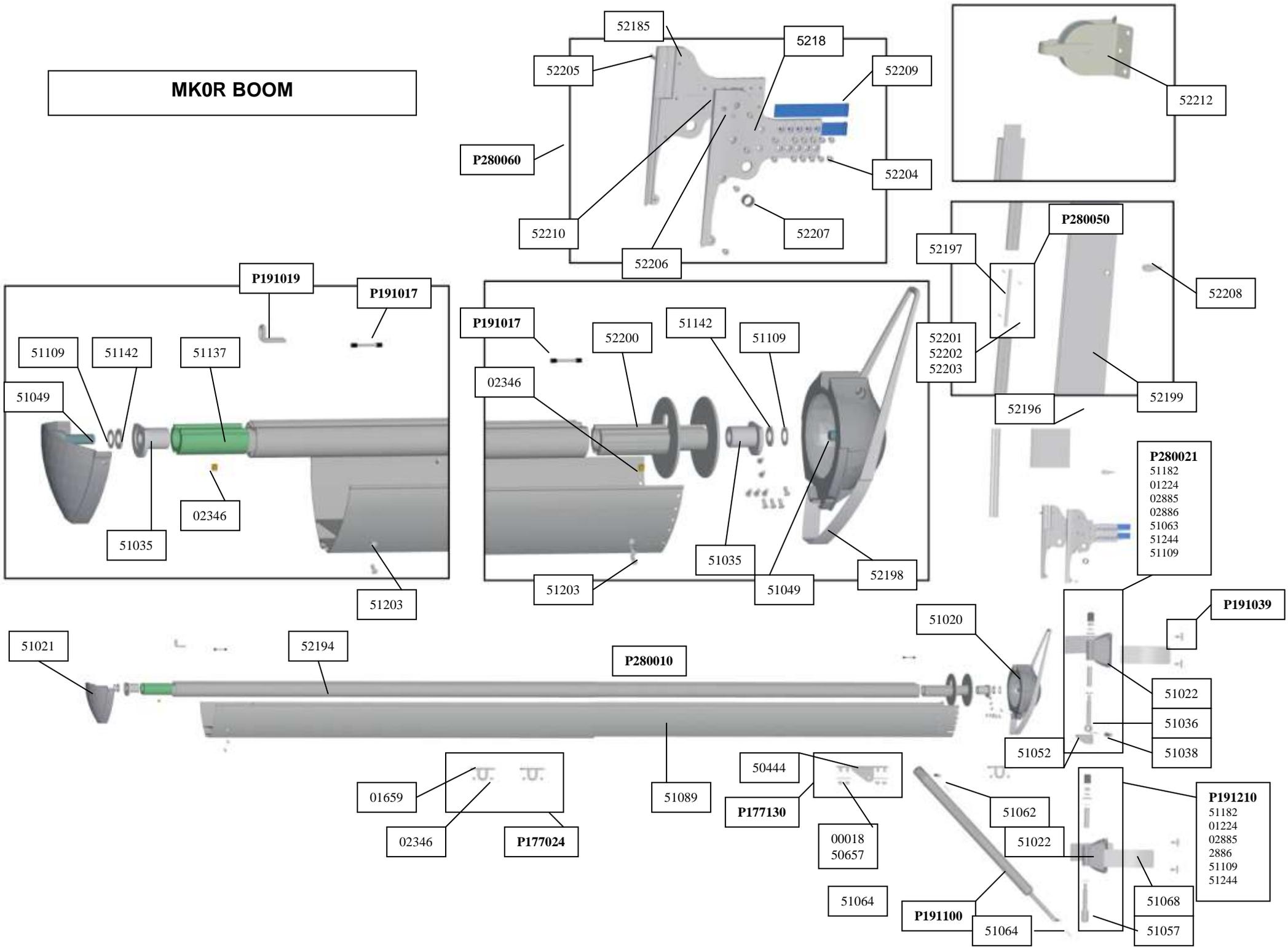
Date.....Owner's signature :

VIII. MKOR SPARE PARTS LIST

Ref Sous Ensemble	Ref pièces	Désignation	Repère
	51068	GOOSENECK SIDEPLATES	12
	51203	POP RIVET MAGNALOK MGLP B6 7 ALU	13
	51203C	POP RIVET MAGNALOK MGLP B6 4 ALU	14
	52199	LUFF TRIANGLE 12600 MM	15
	52196	LUFF SECTION 3M LONG	16
	52198	STRETCH STRAP	17
	52208	SNAP-IN SHACKLE	18
	52211	LASHING LINE (Ø4mm)	19
	52212	HALYARD SPREADER	20
P177024		MAINSHEET BALE	1
	01659	MAINSHEET BALE RING	1A
	02346	SET SCREW STHc M8x8	1B
P177130		COMPLETE BOOMVANG HOUND	2
	00018	LOCKNUT M8	2A
	50444	BOOMVANG HOUND	2B
	50657	WASHER LN 8	
P191017		CLEW SLIDE	3
P191019		CLEW PIN	4
P191039		SLIDE SCREWS	5
P191100		COMPLETE BOOMVANG	6
	51062	HIGH PIN	6A
	51064	LOW PIN	6B
	51097	SPLIT PIN d2,5x20	
P191210		COMPLETE BOOMVANG ATTACHEMENT	7
	01224	LOCKNUT M10	
	02885	LOCKNUT HM M10	
	02886	WASHER M10 TYPE Z- STAINLESS STEEL	
	51022	GOOSENECK ONLY	7A
	51057	ARTICULATION FORK	7B
	51109	WASHER NYLON 15,2x26x1,4	
	51182	LOCKNUT CAP KAPSTO	
	51244	GOOSENECK SHEATH	

Ref Sous Ensemble	Ref pièces	Désignation	Repère
P280021		COMPLETE GOOSENECK ARTICULATION	8
	01224	LOCKNUT M10	
	02310	SPLIT PIN V 3,2x20	8A
	02885	LOCKNUT HM M10	
	02886	WASHER M10 TYPE Z- STAINLESS STEEL	
	51022	GOOSENECK ONLY	8B
	51036	VERTICAL GOOSENECK PIN	8C
	51038	HORIZONTAL GOOSENECK PIN	8D
	51052	GOOSENECK TOGGLE	
	51063	WASHER PA6 24/14,2 EP=5	
	51109	WASHER NYLON 15,2x26x1,4	
	51182	LOCKNUT CAP KAPSTO	
	51244	GOOSENECK SHEATH	
P280050		LUFF SECTION CONNECTOR	9
	52197	LUFF SECTION JOINER	9A
	52201	SCREW M3x16 POZZI DIN 965	9B
	52202	NUT HU M3 DIN 934	9B
	52203	WASHER M3,2 DIN 125	9B
P280060		FEEDER	10
	52185	PORTSIDE HALF FEEDER	10A
	52186	STARBOARD HALF FEEDER	10B
	52204	SELF TAPPING SCREW M10*13 DIN 7981POZI	10C
	52205	SCREW TRHC M4x20 A2	10D
	52206	NUT HmM4 DIN 439B	10D
	52207	THIMBLE	10E
	52209	POLYESTER STRAP 20x270	10F
	52210	DOUBLE COATED TAPE ADHESIVE 20x130	10G
P280010		MKOR-COMPLETE BOOM	11
	02346	ST SCREW STHc M8x8	11A
	51020	DRUM BOOM END FITTING	11B
	51021	REAR BOOM END FITTING	11C
	51035	REAR BUSHING	11D
	51049	BOOM END PIN	11E
	52194	MANDREL	11F
	51089	BOOM PROFILE	11G
	52200	DRUM ONLY MKOR	11H
	51109	WASHER NYLON 15,2x26x1,4	11I
	51137	BEARING HOLDER	11J
	51142	WASHER 14 TYPE M STAINLESS STEEL	11K
	51203	POP RIVET MAGNALOK MGLP B6 7 ALU	11L

MKOR BOOM





IX. MAINSAIL DESIGN SPECIFICATIONS

IX.1 GEOMETRY

IX.1.A Luff curve design

The luff curve design is one of the most essential points in the design of the mainsail as it will determine how the sail will roll back and forth on the furling mandrel to avoid overlapping of the luff tape, avoiding also the rear end of the boom to go down when the sail is being rolled.

Starting with the mainsail fully hoisted :

Stage 1 : when beginning to roll the luff tape has to move backwards up to the stage where a small crease appears between the feeder and the clew.

Stage 2 : the luff tape has to move to forward till the stage where the luff tape gets close to the forward end of move backwards till the sail is completely furled.

Luff curve:

In reference with a straight line between the tack and the head, if the angle due to the luff curve is backwards the luff of the sail will roll backwards.

- Luff curve has to be "S" shaped from tack to head: negative in the lower part of the luff, positive in the upper part.
- Maximum value of the curve (from straight line between head and tack) in % : 0.2% of luff length. **If the mast has a camber just follow the same correction to luff curve as you would do with a conventional sail.**
- Point of maximum negative curve at 20% of luff length measured from the tack.
- Point of maximum positive curve at 60% of luff length measured from the tack.

IX.1.B Foot curve design.

Value : maximum 1% of foot length at 50% of foot length.

IX.1.C Roach

Value: **maximum 6% of leech length** measured at 50% of leech length.

Angle between luff and foot (luff and foot being a straight line) : **88°**

IX.2 FINISH DESIGN

IX.2.A Luff tape material

Luff tape material must be made with a plastic PVC material with 5,5mm diameter, and sailcloth tape with Teflon, to obtain a Ø6mm finished luff tape diameter.

IX.2.B Foot tape diameter

Finished 6mm

IX.2.C Luff and foot TAPE diameter

- As with any reefing sail, the fullness of the mainsail is to be somewhat flatter than with a conventional sail.
- On the leech broad seams are as usual.
On the luff broad seams are to be design to obtain the suitable sail profile in relation with the luff curve as described above.

IX.2.D battens

- 4 battens are to be used
- Mainsail will be semi-fully battened (please see drawing)
- Batten pockets must be sewn on the **port side of the sail**.
- Batten pockets nose should not go further than 6mm (15/64") from the front edge of the luff tape to allow for the luff tape to pass over the feeder (please see drawing).
- Flat battens should be used, at equal distance from each other (please see drawing).
- Angles between batten pockets and luff : please refer to drawing. Note : these angles refer to the straight line between head and tack.

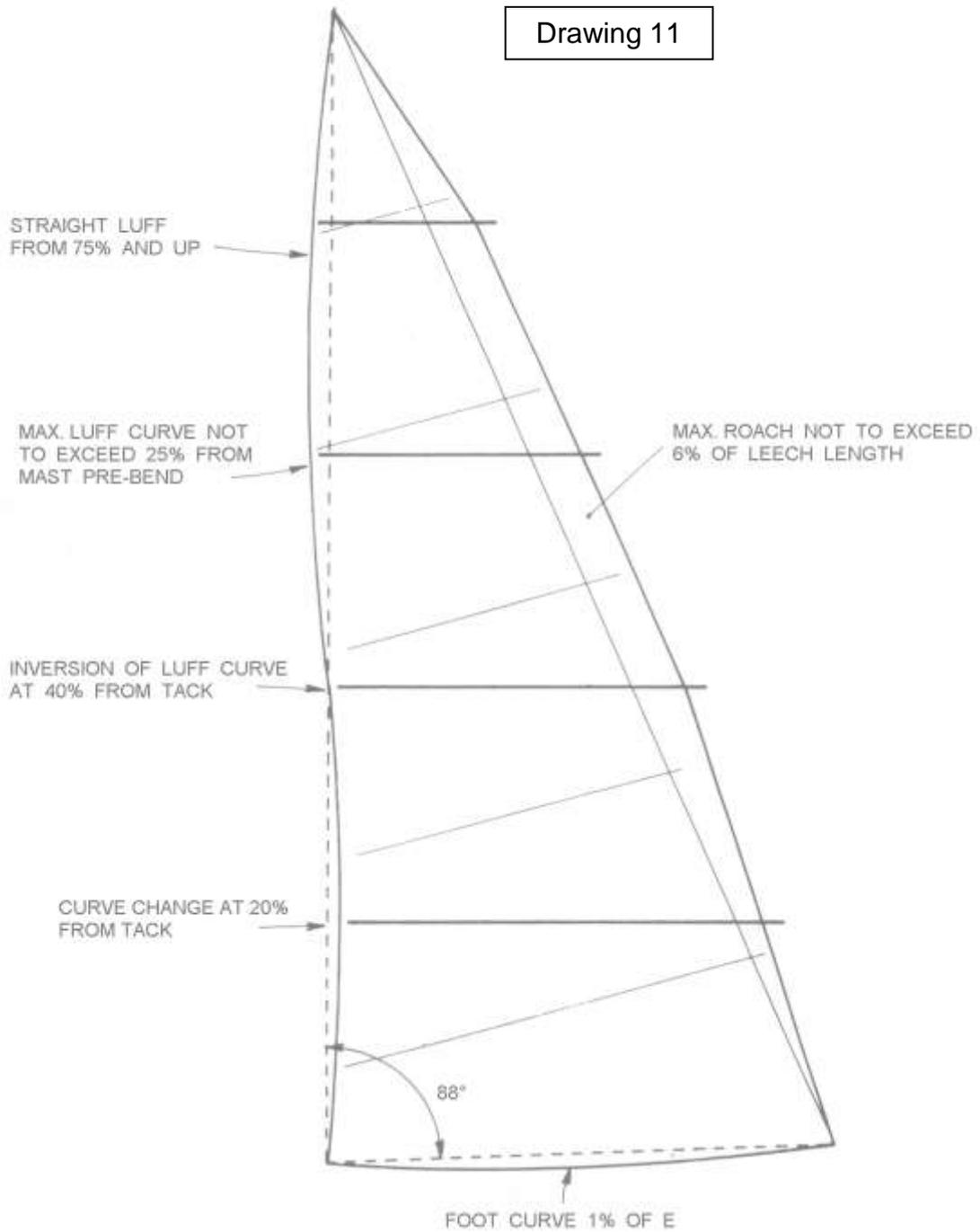
IX.2.E Clew tack and head assembly

Please see drawings.

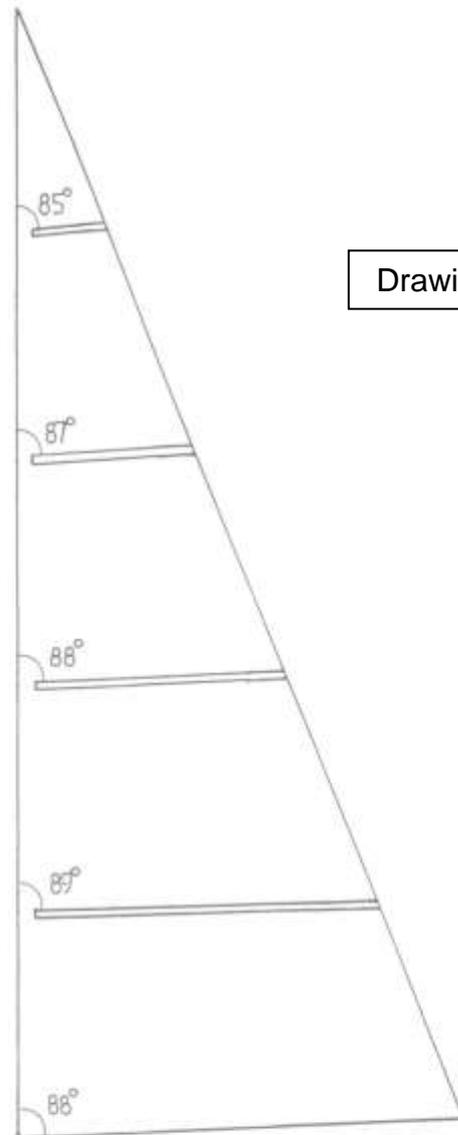
No grommets should be used, but webbing straps only for attachments at the 3 corners of the sail.

4 BATTEN MAINSAIL
LUFF CURVE DESIGN

Drawing 11

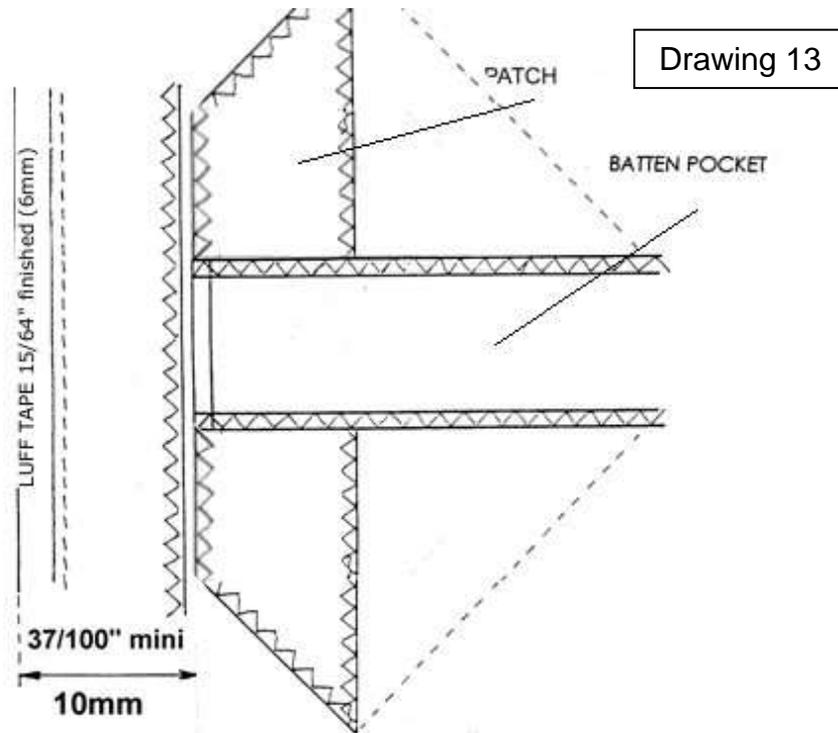


BATTENS ANGLE TO THE LUFF
CONSIDERED AS A STRAIGHT LINE

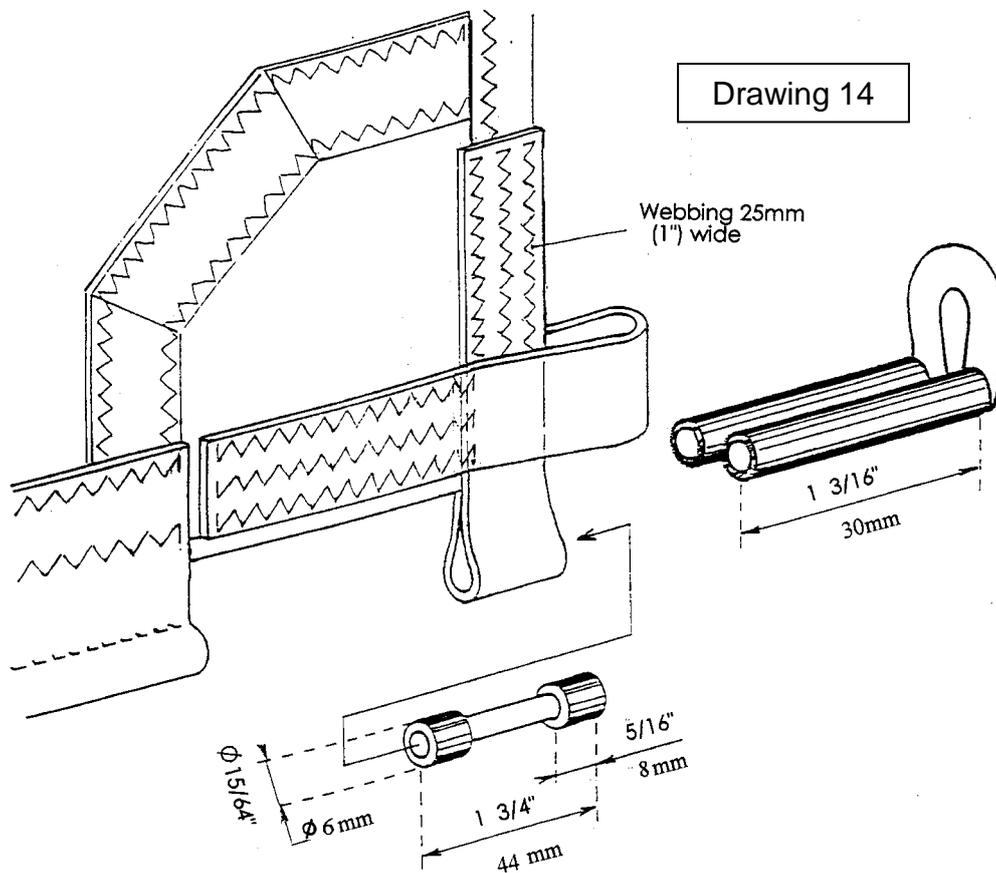


Drawing 12

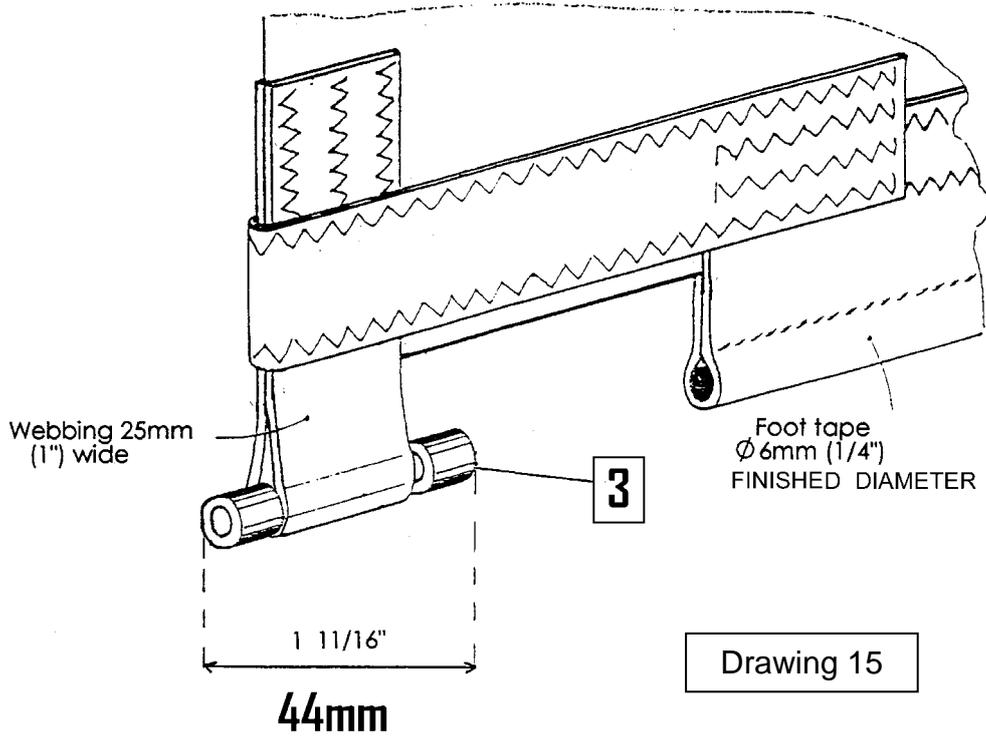
BATTEN POCKET CONSTRUCTION



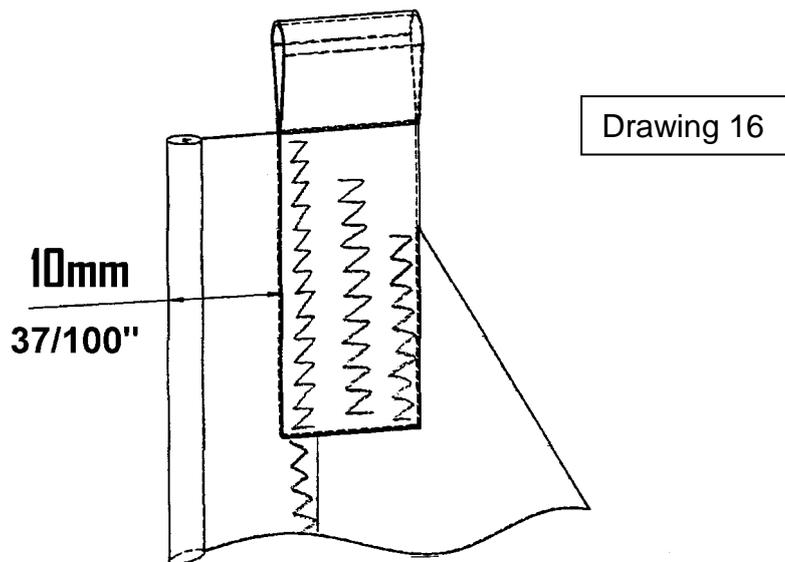
CLEW



TACK



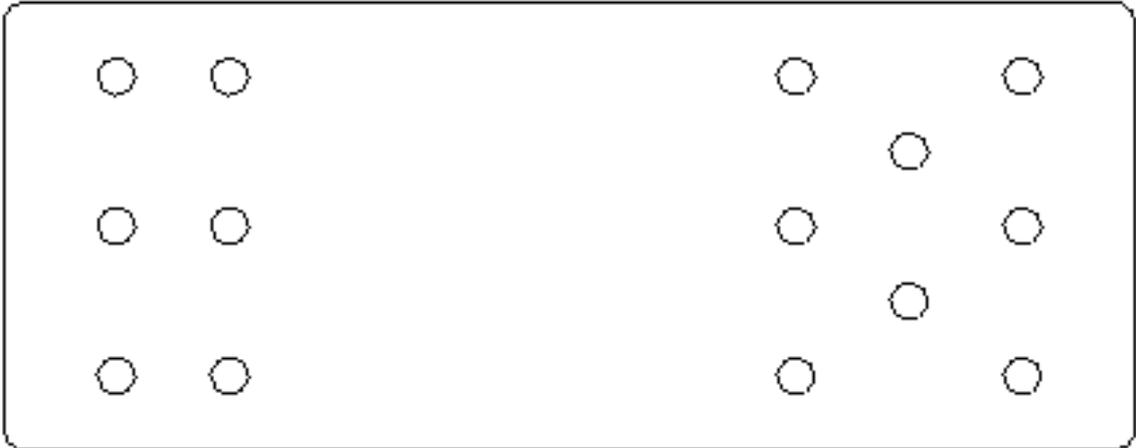
HEAD CONSTRUCTION



ANNEXE 1

JIG

HAS TO BE ADAPT TO YOUR MAST CONFIGURATION



GOOSENECK SIDE

MAST SIDE