

FARR 400 OD

OWNERS INFORMATION PACK



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COMPOSITE SPARS & RIGGING | COMPONENTS | GLOBAL SERVICE

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INTRODUCTION:

CONGRATULATIONS ON BECOMING THE OWNER OF A FARR 400 ONE DESIGN!

Southern Spars is the licensed supplier of the Farr 400 One Design masts. The female moulded mast is made from 100% standard modulus carbon and is laminated with nano resin for added strength. All fittings are either manufactured in-house or sourced from international suppliers.

This rig is available exclusively from Farr Yacht Sales or Premier Composite Technologies L.L.C

Strict quality control systems are used to ensure consistency of: bend, weight and CG. 'Bend' is determined by the tube stiffness, spreader angle and spreader stiffness, while weight and CG are controlled through strict quality control of materials.

In addition, the mast has been engineered in such a way that we were able to incorporate our unique regatta splice which facilitates ease of transport whilst still ensuring that the mast conforms to the strict measurement requirements of the Farr 400 One Design Class.

Your mast, boom & spreaders are marked with a unique ID number, please use this as a reference for any future correspondence. This number is engraved just above the mast heel as well as on the head, spreaders & boom.



For more information about Southern Spars, visit the website @ www.southernspars.com

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CARE:

WASHDOWN

Ensure the spar is washed down regularly and all salt has been removed. This will help prevent corrosion of parts.

The mast should be thoroughly washed down once a month to keep it in top condition.

PAINT SCRATCHES

As part of your maintenance program, it is advisable to touch up any paint scratches.

An Awlgrip finish has been applied as follows:

Flatblack G2002

Converter G3010

Reducer T0003

Mixing Ratio: 2:1:10% reducer

Please visit the website: www.awlgrip.com to locate your nearest supplier.

TRAVEL

When shipping your mast, or travelling by road, it is important to package it well.

Ensure that rigging is removed to prevent the shrouds from wearing or banging against the mast. It is recommended a full inspection is performed when re-rigging the mast.

RIG INSPECTIONS:

REGULAR BASIS

Please check that all of the join fasteners are securely in place.

MONTHLY INSPECTIONS

Check to see that all sheaves are free turning and well lubricated

Check for wear on stays and spreaders

Check fasteners at mast join for signs of wear & tear

Inspect your jacking system & service if required.

BI-ANNUAL INSPECTION & RE-RIGGING INSPECTION

Check all fittings for wear

Check mast tubes and all composite parts for any damage caused during sailing

NOTES:

Any replacement mast fittings should be seated using a product like Duralac between the fitting and the mast to prevent galvanic corrosion.

Turnbuckles should be lubricated using nickel paste.

Remember to tape any clevis pins or sharp edges to prevent tearing of the spinnaker.

SAIL MAKERS NOTES:

Rig Dimensions	
I=	15600mm
J=	4450mm
P=	16150mm
E=	5800mm
Head stay Length (Rod tip to Pin)=	16053mm
Luff Groove Inner Diameter=	12mm
Genoa Tack Set Back	33mm
Head foil Height Above Deck	750mm

Please note the above figures are for reference purposes only, for detailed sail making information, please contact our offices.



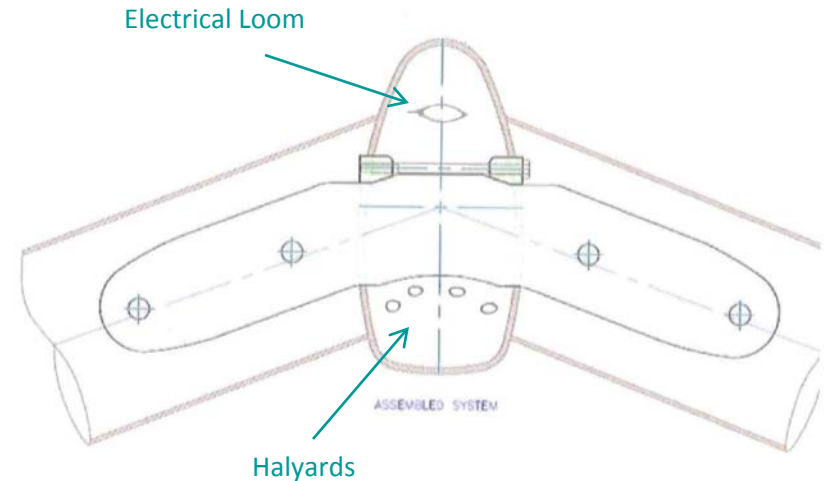
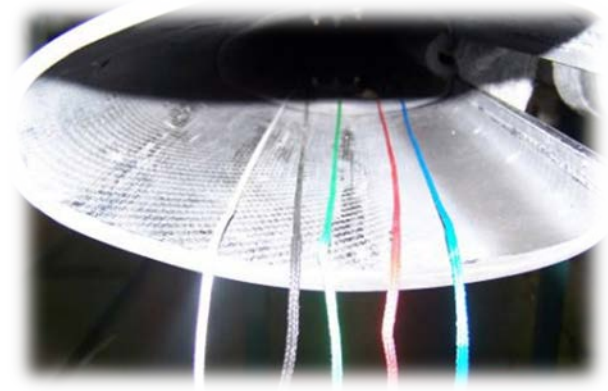
ASSEMBLY NOTES:

JOINING THE MAST:

The mast has been engineered to incorporate a join in order to facilitate the transportation of the mast in two pieces.

To assemble the mast, please follow the below guidelines:

1. Wipe down both join surfaces with a dry cloth to remove any particles of dust, dirt or greasy residue. Apply a generous amount of *dry lubricant* such as Sailkote McLube to both join surfaces.
2. Connect the colour-coded messenger lines inside the mast - ensuring that they are not tangled and that they run aft of the spreader bar (applicable if your spreader bar is already in place.)
3. Uncoil the Dacron electrical conduit (found in the top section) and securely connect it to the messenger line that runs from the electrical exit in the lower end of the bottom section to the top of the bottom section. Tension the messenger line until the Dacron conduit has been run through the bottom section. Remember to tie off the messenger line on the saddle provided for future ease. (** NB. The electrical conduit is always run forward of the spreader bars)
4. With at least 3 people on hand, line up both sections of the mast on stands of equal height, making sure that the mainsail track is facing upwards.



ASSEMBLY NOTES cont.

5. Whilst one or two people hold the top section stationary, a third person should sight up the bottom section to ensure straightness. Using the joining spanner provided, insert the spanner into the join cutout on the top section & turn handle 90 degrees in order to flare the sleeve. Once the two sections are correctly aligned, offer up the bottom section to the top section and gently but firmly push the first portion of the join together. Remember to ensure that mainsail tracks on both sections are properly aligned.
6. Move back a meter from the join, grip the bottom section securely in both hands and push the two sections firmly together until the join is complete. **Warning: Use of excessive force, clamping or hammering the mast in any way might cause damage to the mast. If the join is tight - separate the two sections & establish the cause of the binding.**
7. Insert the join fasteners. Each fasteners thread should be coated with a small drop of *Duralac* before insertion. A Ph2 Phillips head screwdriver will be required.
8. Tighten the fasteners one at a time, moving from the forward face of the mast towards the aft face. The longer fasteners are used on the forward face whilst the shorter ones are used for the sides of the join. Please exercise caution not to over-tighten the fasteners thus stripping the stainless steel inserts inside the mast.



**** The fasteners are an essential element to the structural integrity of the mast. DO NOT step the rig or attempt sailing if any of the fasteners are missing or have damaged threads. Check the heads for sign of wear & tear or corrosion & replace if necessary.**

Applying Duralac to your fasteners acts as both a barrier paste as well as a non permanent thread locker, helping to ensure that your fasteners remain in position. Duralac should be applied to all new fasteners & to all fasteners once per season thereafter.

SPLITTING THE MAST FOR TRANSPORT:

1. Prepare the mast by removing the standing rigging, spreaders, spreader bars & halyards. (remember to replace the halyards with the messenger lines provided)
2. Place the mast on stands of equal height, ensuring that the top section is supported in at least 2 places and held securely in place.
3. Remove all of the join fasteners using a screwdriver. Place them in a container to avoid losing them.
4. Whilst two people keep the top section static, one person can insert their fingers into the spreader bar slot and pull on the bottom section. Ensure that the bottom section is able to slide freely on its support.
5. If the mast becomes stuck half way, pour some fresh water onto the join to lubricate it, push the two pieces together again & then try pulling them apart.
6. Once your mast is in two pieces, make sure that all of the messenger lines are tied off securely and that the mast is washed out & inspected for any signs of wear or damage.



DRESSING YOUR MAST:

The following pages contain notes on dressing your mast, namely attaching your spreaders, standing rigging, boom & vang system as well as how to achieve basic dock tune.

It is recommended that your mast be supported on padded stands, with the mainsail track facing downwards whilst you dress your mast.

NB: The main halyard jammer & cleat need to be removed when stepping & un-stepping the mast. Please make sure to keep them in a safe place & to use a barrier paste when re-fitting them.

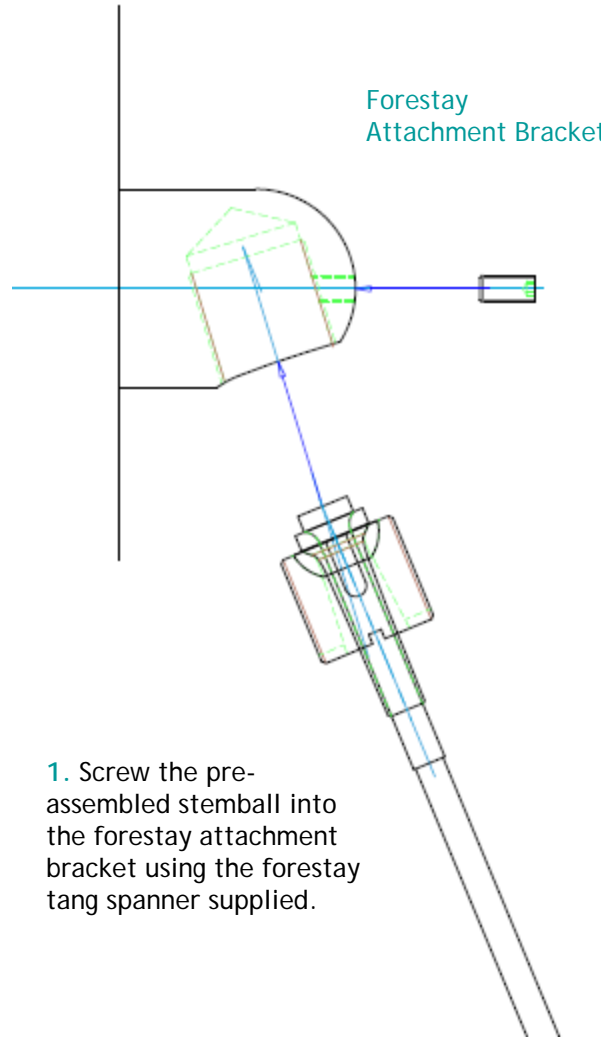
If you do not have experience in stepping masts such as this one, please contact us to discuss stepping & sea trialling with one of our highly skilled riggers.

Alternatively, we can recommend trusted rigging companies that we have worked with in your area.



FORESTAY FITMENT:

1. Screw the pre-assembled stemball into the forestay bracket using the forestay tang spanner supplied.
2. Fasten the grub screw to secure the stemball assembly into the forestay attachment bracket as indicated in the drawing.
3. It is suggested that a drop of Blue Loctite is applied to the thread of the grub screw to keep it in place.



1. Screw the pre-assembled stemball into the forestay attachment bracket using the forestay tang spanner supplied.

2. Fasten the grub screw to secure the stemball assembly.



Forestay Tang Spanner

ASSEMBLING YOUR CAP TANGS – CAP TANG SYSTEM:

When assembling your cap tang, it is very important that your cap tang tie bar is centered in the mast.

Using a tape measure or vernier, measure the distance between the external mast wall bushes at the cap tang – [Measurement A](#).

Screw in one end of the cap tang tie bar into an eye tang socket until the measurement from the tie bar centre mark to the eye tang shoulder is equal to [A/2](#).

Mark this position on the tie bar thread using plastic tape or a marker pen.

Unscrew this partial assembly. Lubricate the stemball seat of one cap tang socket using Tefgel then thoroughly clean all surfaces on which Loctite will be applied before applying Red Loctite 271 to the marked end of the tie bar as well as into the cap tang socket.

Screw the tie bar into the cap tang socket until you reach your mark.

Please allow sufficient time for the Loctite to cure in the loctited cap tang socket, thus ensuring that the tie bar is securely locked in place

After the Loctite has cured, take the partial assembly and insert the cap tang tie bar into the cap tang aperture in the mast, pushing the cap tang shoulder up against the mast wall bush.

Screw the opposing cap tang socket onto the opposite end of the tie bar until it is up against the mast wall. In order to line up your shrouds with the spreader ends, you might need to back off (unscrew) the cap tang socket (this will be less than 1 full revolution).

If there is a gap between the cap tang shoulder and the mast wall once everything is aligned, you will need to shim using the most suitable combination of supplied washers in order to minimize floating of the tie bar.

If only one washer is required, insert it on the current side. If two washers are necessary, use one on either side of the mast.

Once you know which washers are required for your particular assembly, you can now proceed with the final assembly.

Unscrew the assembly and remove the cap tang tie bar from the mast.

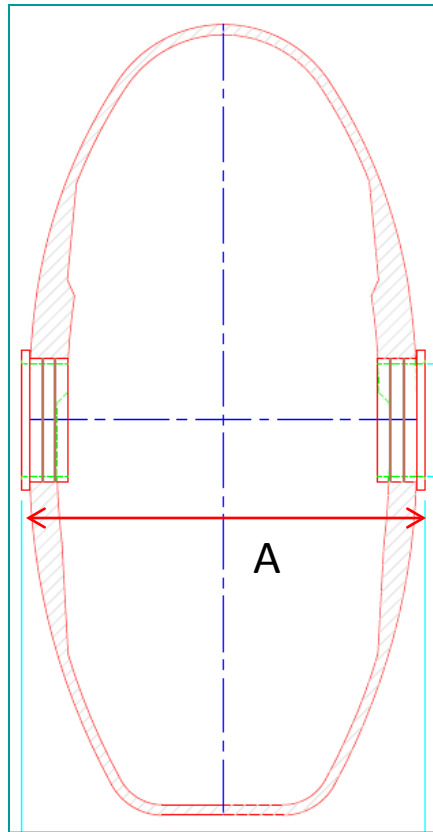
Apply Tefgel to the stemball seat, cap tang bearing surface and the cap tang shoulder

If two washers are required, put one on the tie bar and then insert the tie bar into the cap tang aperture in the mast.

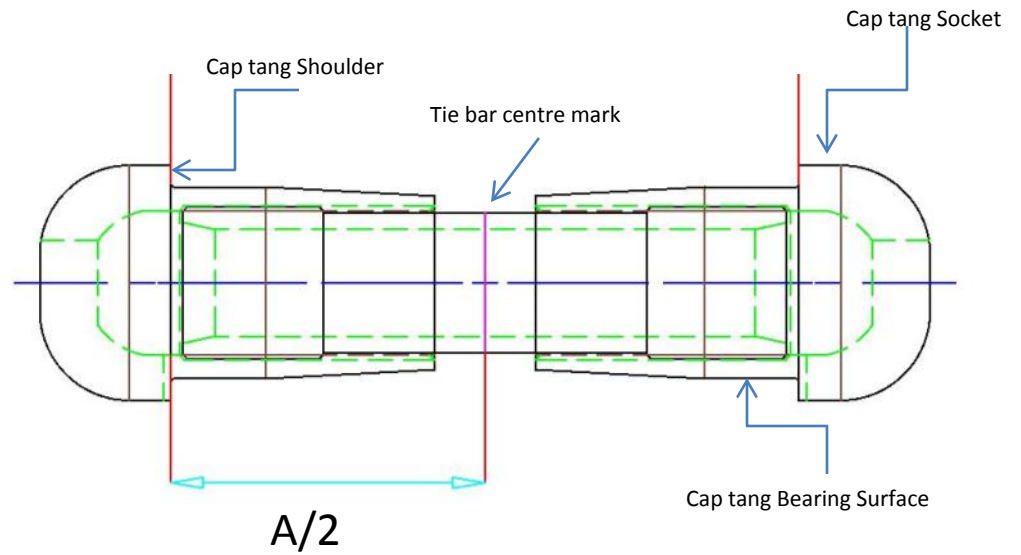
Put the second washer onto the protruding end of the tie bar & coat the shoulder & bearing surface of the cap tang as well as the thread on the tie bar with Tefgel and screw together.

**** It is recommended that you perform a dry fit of the assembly prior to applying any Tefgel**

ASSEMBLING YOUR CAP TANGS - CAP TANG SYSTEM:



Measurement A: From Exterior of mast wall bush to exterior of opposite mast wall bush.



Centre Mark



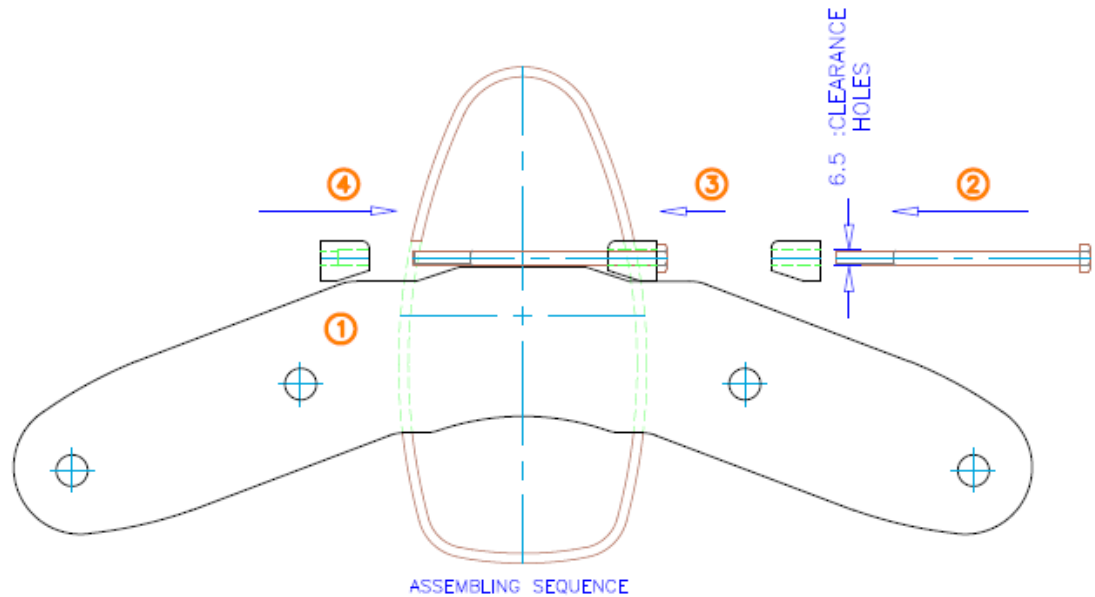
Example of a Cap tang Tie bar showing threaded ends & centre mark



Picture of a cap tang system care of BSI DK

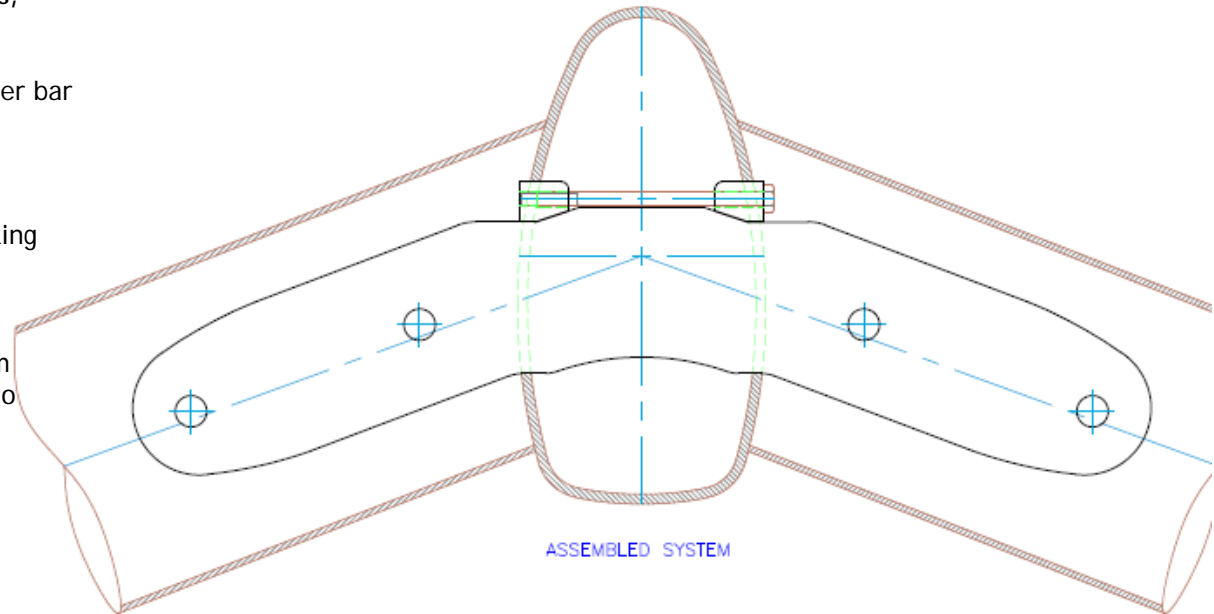
FITTING THE SPREADER BARS:

1. Slide the spreader bar (ref # 1) through the lower spreader slot in the mast
2. Insert the supplied M6 bolt through the locking wedge with the clearance hole (ref # 2)
3. Insert the assembly in front of the bar (ref # 3) and then insert the second locking wedge (tapped for M6 Bolt) in from the other side (ref # 4)
4. Tighten the wedges to remove any play in the spreader bar - **** take care not to over-tighten ****
5. **The wedges are designed to perform optimally with between 7mm-0mm's protruding beyond the mast wall. If you exceed these limits, please contact our offices.**
6. Repeat the process for the second spreader bar



REMOVING THE SPREADER BARS:

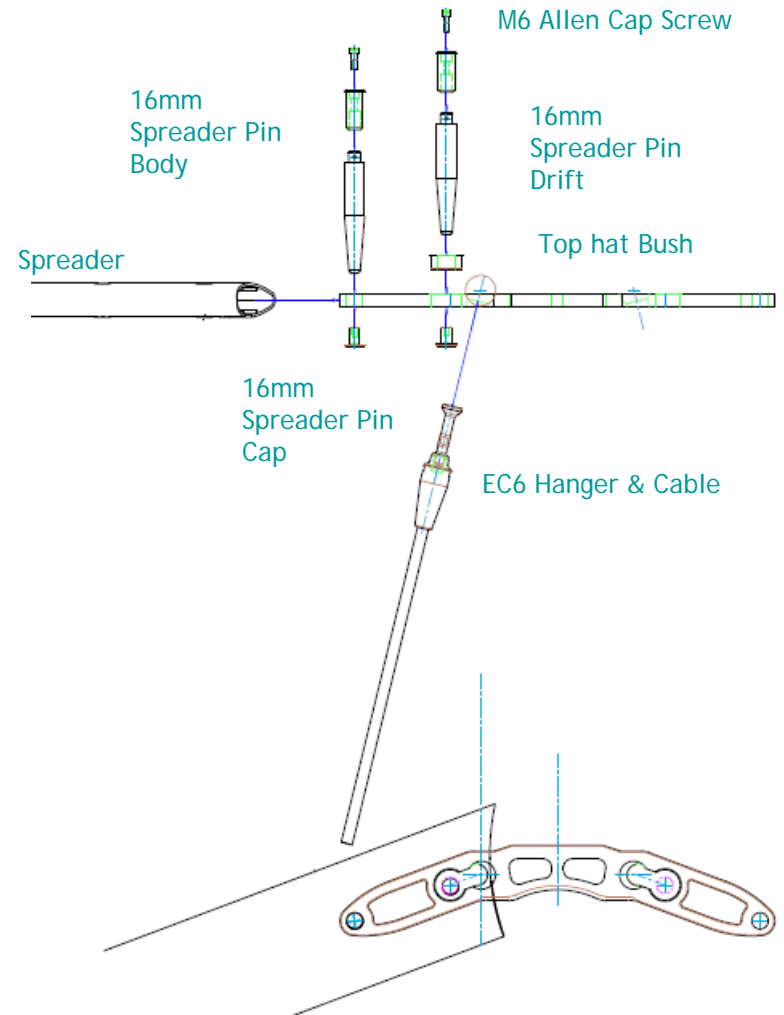
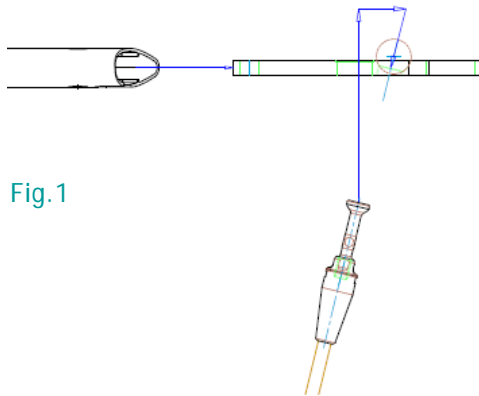
1. Unscrew the M6 bolt and remove the locking mechanism from in front of the spreader bars.
2. Make sure to place the locking mechanism in your toolkit when not in use so as not to lose any of the parts.
3. Remove the spreader bars from the mast, taking care not to lose the spreader bar bushes.



FITTING THE SIDE RIGGING & SPREADERS

1. Slide EC6 hanger into slot and then across to locate it in the stemball seat as shown in Fig.1
2. Lubricate stemball seat using Tefgel.
3. Slide top hat bush into the hole
4. Locate Spreader 1 on spreader bar
5. Locate 16mm spreader pin drift in the hole and place 16mm spreader pin body on top of the drift.
6. Insert 16mm spreader pin body into hole from above by tapping with a hammer.
7. Insert 16mm spreader pin cap into hole from the underneath
8. Fasten spreader pin body & cap with M6 Allen cap screws from the top.

** Please note the same procedure applies to the D1 & D2

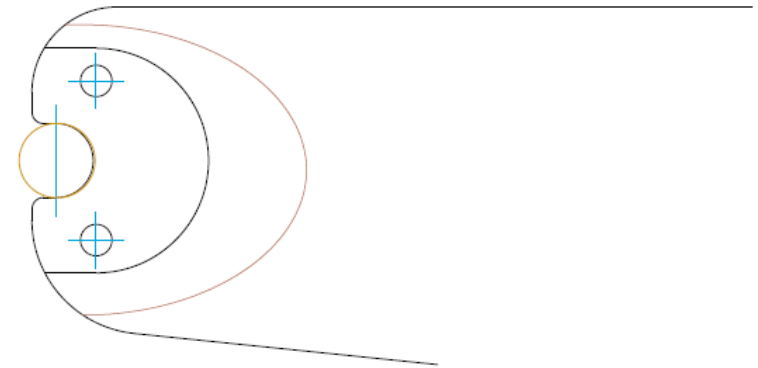


FITTING THE SIDE RIGGING & SPREADERS - OUTBOARD END DRAWING 1:

Your shrouds are continuous & are designed to be seized onto the spreader ends using seizing wire.

Always ensure that your spreaders are the same height as each other after you have seized on the shrouds.

Detailed instructions on how to fit your EC6 rigging can be found on the following pages.



REMOVING THE STANDING RIGGING

Your standing rigging & spreaders should be removed from the mast & inspected whenever you un-step or transport the mast.

To remove the standing rigging - simply reverse the assembly processes explained in the previous pages.

Ensure that you store all loose fittings in a safe place & identify your shrouds for ease of assembly in the future (pieces of sail repair tape work well)

Any fittings coated with Tefgel should either be stored in a plastic bag to keep them free of dirt or else cleaned off and Tefgel reapplied next time.



REMOVING THE SPREADERS

1. To remove your spreaders, first ensure that all rigging has been disconnected.
2. Remove spreader pin caps by unscrewing the M6 Allen cap screws in the spreader pins.
3. Insert the spreader drift pin into the hole in the spreader pins from the underside
4. Using a mallet, tap the drift until the spreader pin has been knocked out of the top of the spreader.
5. Carefully slide your spreader off the spreader bar, taking care to ensure that the top hat bushes & spreader pins don't get lost in the process



Detailed EC6+ Rigging Guide: Version 13.03.2011. The following information is confidential

SPECIFICATION:

Quantity	Item	Description
D3		
2	D3-T800x1-47 -15	T800x1 Cable - Titanium End Fittings - Black Poly Braid Jacket - Length = 15.793m
1	RCTS170105	D3 Additional Interface - -17 BSI Cap Tang
2	FH14-M15-23	D3 Upper Interface - Diagonal Tang Hanger -17 BSI Tang Hanger
2	250-01207-0115	D3 Upper Adaptor - Collar Nut
D2		
2	D2-T800x1-26 -7	T800x1 Cable - Titanium End Fittings - Black Poly Braid Jacket - Length = 11.145m
2	FR64006108-M23	D2 Upper Interface - Diagonal Tang Adjustor, -8 BSI SL5 Diagonal Turnbuckle
Deck Fitting		
2	DF-T800x1-73 -21	T800x1 Cable - Titanium End Fittings - Black Poly Braid Jacket
2	FB63011159-M31	DF Lower Interface -17 BSI SL5 B.P. Turnbuckle, 5/8" Pin
D1		
2	D1-T800x1-43 -12	T800x1 Cable - Titanium End Fittings - Black Poly Braid Jacket - Length = 5.878m
2	FH11-M12-20	D1 Upper Interface - Diagonal Tang Hanger -12 BSI Tang Hanger
2	250-0149	D1 Upper Adaptor - Collar Nut
2	FB63009127-M23	D1 Lower Interface -12 BSI SL5 B.P. Turnbuckle, 1/2" Pin
Topmast Backstay		
2	TM-K49-03	Aramid K49 03 Cable - Aluminum End Fittings - Black Jacket
2	228-03001-0003	TM Upper Interface - Lashing Eye with 640mm Loop in Basket arrangement
2	228-03001-0003	TM Lower Interface - Lashing Eye with 640mm Loop in Basket arrangement



THE SCIENCE BEHIND EC6+:

Element C6 cables (EC6) are made up of a bundle of small diameter pultruded T800 carbon rods terminated in an epoxy resin cone at each end. The rods are splayed out in the cone and distributed evenly to ensure effective bonding to each rod is achieved. Controlled spread of the rods and a milled carbon fiber additive reinforce the epoxy resin cone. A titanium fitting fits over the cone with a female threaded end to accept adaptors. The fitting itself is over wrapped with pre-impregnated T300 carbon tow to contain the hoop loads generated by the wedging affect of the cone.

The cables are jacketed in a full coverage polyester braid and coated with a proprietary coating. The polyester jacket is bonded to the rod bundle over a nominal length at the ends along with a whipping to keep it in place. Shrink tube is used at the ends to give a cleaner appearance and cover the whipping.

Element C6+ continuous rigging (EC6+) takes EC6 cables one step further by combining the cables into a harness of all of the cables that make up each side of rigging (excluding the D1). The carbon pultruded rods are continuous from their attachment point at a diagonal tang in the mast over any number of spreaders down to the deck fitting. Each diagonal joins the bundle of the ones above it to form the vertical bundle between the spreaders.

As with any composite cable, it is extremely important each fiber is evenly loaded. To achieve this, the continuous rigging harness is assembled in a jig that lays out the entire mast and spreader configuration full size. The position of each diagonal tang and spreader tip is located on the assembly table in its actual location. The rods then run from tang to spreader tip(s) to the bottom terminal along a path that takes into account changing arc lengths through the thickness of each bundle and builds in the correct bend angles for each cable.

THE VERTICAL & DIAGONAL JOIN

The rods from the diagonal join those coming down from above to form a circular bundle in the vertical below. The curved length of the diagonal is infused with an epoxy adhesive (Spabond 345) as is the complete bundle for a length below the join to give a bond sufficient to transfer shear loads between the diagonal and vertical.

This join is reinforced with an epoxy resin impregnated Kevlar braid over the bonded vertical section. Because the diagonals are sized for the maximum load in different load cases the vertical stays would become oversized when the diagonals are combined resulting in larger diameter stays and potentially larger deck end fittings.

To remedy this specific rods around the bundle perimeter are removed proportionally from the vertical and diagonal above. This occurs beyond the bond at the spreaders which is sufficient to terminate individual rods. For top spreaders where there is no diagonal joining the bundle the curved section of the bundle is still infused as for diagonal joins and reinforced by resin impregnated Kevlar braid.



MAST ATTACHMENTS

The External End Fittings accept a range of interface fittings to attach to the mast and deck in a number of configurations. All interface fittings that thread into the End Fittings have molybdenum grease on threads. The tapped hole in the threaded section of the End Fitting has a grub screw, that screws into a spot drill hole to lock the fittings together. The grub screw has Blue Loctite 242 on the threads.

Note if the interface fitting does not have a dimple on the thread for the grub screw this needs to be done prior to final assembly. Once the dimple is created lubricate the threads and install the interface into the fitting. During this assembly attention needs to be paid to keeping the threads of the grub screw and the interface dimple clean.

THE THREADS MUST BE CLEAN TO ENSURE THAT BLUE LOCKTITE CAN SECURE THE GRUB SCREW IN THE END FITTING.

On the D1 End Fittings that do not have a grub screw, a different assembly procedure is required.

Firstly, remove interface from end fitting & ensure the threads are clean. Dry fit the interface into the end fitting to ensure a nice, snug fit with no gaps. If required, clean the threads using degreaser then remove the degreaser using denatured alcohol & a rag.

Next, apply Molly paste (molybdenum grease) on the deepest 3/4 of the female threads on the End Fitting (fig 1).

Thread the interface into the end fitting until 3-4 threads remain exposed. Apply Blue Loctite 242 to the remaining threads as well as to the mating flat surfaces of the fitting and interface. (fig 2)

Completely screw the interface into the end fitting - there should be Blue Loctite seen in the seam (fig 3).

Clean the fitting & interface of any excess grease & Loctite using denatured alcohol & a rag.



Fig. 1



Fig. 2

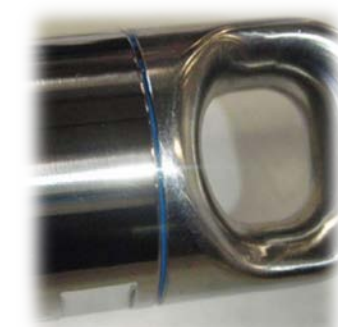


Fig. 3

MAST ATTACHMENTS CONT.

For the top of the D1 and D3, 'Collar Nuts' thread into the End Fittings to step the thread size down to that of the 'Diagonal Tang Hangers'. These hangers are made of Ni50 rod and have the appropriate head geometry and length for the tang or respective spreader bar. The hangers are supplied dry fitted to the titanium Collar Nuts and spot drilled for the locking screw. Install the hanger with corrosion inhibiting grease and the locking screw with Blue Loctite. When tang washers are used it is acceptable to bore out the holes slightly to allow the hangers to pass through.

For the top of the D2 'Tip Turnbuckle Bodies' thread into the End Fittings to accept 'Diagonal Tang Adjustors' for diagonal tangs, to provide adjustment. Turnbuckle Bodies are made of high strength stainless steel and Diagonal Tang Adjustors are made of cold worked Ni50. The Turnbuckle Bodies have two grub screws that when fully threaded into the body press down into flats in the shaft of the adjustor. To adjust, unthread the grub screws.



Wind the adjustor in or out of the body as required stopping when the flats align with locking screws, then thread the grub screws back on making sure the screws press onto the flats correctly (Figure 1). The threads are lubricated with corrosive inhibiting grease. Care must be taken while making adjustments to insure that the cables are not twisted so that the individual rods making up the bundle remain straight.



Figure 1: Turnbuckle locking screws just visible under locking cap

SPREADER ATTACHMENT

For top spreaders (without a join) a loop is formed using small diameter spectra braid buried flat under the spectra jacket above and beneath the spreader. Using two separate pieces of Spectra lashing, firstly with the spreader resting centered on the ledge, lash from the loop under the spreader, up through the spreader then around the outside of the cable and back down with three laps. Then repeat for the loop above the spreader lashing down through the spreader and around the outside of the cable and back up, locking the cable into the spreader (Figure 2). Seizing wire can be used to assist threading the lashing through spreader tip holes.

Figure 2: EC6+ top spreader tip lashing



Figure 3a & 3b: EC6+ top spreader tip lashing



For spreaders with diagonal joins the harness provides a convenient “V” to lash through. This lashing prevents the spreader moving down the cable with the spreader prevented from going up by the presence of the diagonal. At least three laps of 1.7mm diameter spectra should be used lashing through the loops or “V” through the spreader and around the outside of the bundle beneath the spreader. Another two laps should go around the outside of the bundle above the spreader through spreader and again around the outside of the bundle beneath spreader (Figure 3). There is material bonded to the inside of the cable under the jacket forming a small ledge for the spreader to sit on. The lashing is to be tied very firmly, leaving the spreader almost resting on the ledge, and made off securely. The lashing may drag the jacket in the area of the “V” down slightly before it rests on the reinforcement of the join.

DECK ATTACHMENT

At the bottom of the V1 and D1 Single Acting 'Deck Turnbuckle Bodies' are used. A BSI high strength stainless steel turnbuckle assembly is threaded into the end fitting. The eye is machined to accept the specified barrel pin and fit the chainplate. These turnbuckle assemblies use locking screws to secure settings. To adjust firstly unscrew both locking screws half way out. With one wrench keeping the body immediately underneath the End Fitting stationary use another wrench on the adjustor to turn it clockwise looking down towards the deck to shorten the turnbuckle and anti-clockwise to lengthen. Stop when the flats align with locking screws, and then thread them back in making sure they press onto the flats correctly. The threads are lubricated with corrosive inhibiting grease. The Aramid Topmasts have Aluminum 'Extended Eyes' threaded into the end fitting to be lashed to the runner block and rig.

HANDLING

Prudent care should be taken with all composite rigging. The EC6+ rigging will be in a nominal 1.8m (6 foot) coil when delivered; this is an appropriate method for storage when not attached to the mast. All cables are in plastic tubing and fittings are appropriately protected, it is suggested that this protection should be left on and only removed just before stepping. Care should be used not to twist the cables, bend them excessively, drag them on the ground or generally mishandle them when uncoiling or handling them in general. The spreader bonds are designed and manufactured only to be loaded in the bonded direction under normal sailing loads. To maintain the integrity of the spreader bonds do not apply any other form of loading to the stays at the bond.

DRESSING

When dressing the rigging the verticals must not be twisted between spreaders. The rigging should naturally lay out untwisted but the guide line taped to the cable can be followed to make sure. With the rigging laid out correctly next to the mast, attach the diagonals starting at the top of the mast. If the tang cap is not already on the Diagonal Tang Hanger, unthread the hanger from the Collar Nut, put it through the tang cap and then thread the tang cap into mast. Secure the hanger back into the Collar Nut with grub screw using Blue Loctite.

For the intermediate diagonals that have Diagonal Tang Adjustors put them through the spreader bar then into the Tip Turnbuckle Body noting the adjustment notes and lubrication with corrosive inhibiting grease.

Note if the rigging is received without the interface hardware, all parts threading into End Fitting require additional work. On all End Fittings that have a set screw hole the corresponding interface hardware needs to be spot drilled. Once spot drilled the thread of the part needs to be lubricated with corrosive inhibiting grease and the set screw secured with blue Loctite. For End Fittings that do not have set screws apply corrosive inhibiting grease to the threads of the End Fitting leaving approximately $\frac{1}{4}$ of the outer threads clean. Screw in the interface hardware into the End Fitting applying blue Loctite on the threads and the mating faces of the parts.

With all diagonals attached to the mast, lash the joins in place in the spreader tip slots as described in the *Spreader Attachment* section. The rigging can be tied up loosely by the Turnbuckle Eyes of the V1 and D1 to the base of the mast, preferably with a cross beam, so that it is not hanging on the ground until stepping.

STEPPING

When attaching the V1 Turnbuckle Eyes to the chainplates for the first time, attention needs to be paid to the seat of the End Fitting on the cone on the cable so that the pin alignment is correct. Unlike EC6 rigging which is seated and proof tested to half the breaking strength of the cable prior to leaving the factory, EC6+ rigging has seen only nominal load. This means that each End Fitting will seat on the cone approximately 2mm. This has a number of affects when stepping the rig for the first time.

Firstly, a number of moderately loud clicking sounds will be heard from the fittings through the rig and rigging when jacking up the mast, and as the rig gets loaded up during sailing for the first few times on each tack. Each cable will also get longer by the amount the cone seats and may be visually seen as a gap between the shrink tube and end fitting.

This means that a turn may need to be taken up on each of the turnbuckles at the top of the intermediate diagonals and on the turnbuckle at the bottom of the V1. The shrink tube should also be carefully re-heated, making sure no direct heat is applied to the polyester jacket as it has a low melting point and will be damaged, and slid back down, or up, to touch the End Fitting.

Despite the continuous nature in the manufacturing of EC6+ rigging the harness performs and is tuned like discontinuous rigging. The composite harness is designed to have the same stretch characteristics as stainless steel rod rigging so initial dock tuning and subsequent sea trial tuning will be similar and should be completed as for rod rigging. The spreader location on the cable at each join should be checked to make sure they are just touching the ledge beneath and the lashing is still firm. If they require adjustment the rig may need to be de-jacked enough to unload the rigging.

Care should be taken so as not to let the rigging come out of the slot in the end of the spreader. It is prudent to have a tensioned halyard from the rig down to the deck on the side being adjusted as a precaution. It is recommended to let the rig sit overnight and any loss of pretension to be made up prior to finishing the dock tune.



SEA TRIALING

Sea trialing should be completed as for any new rig and rigging package, the rigging should be gradually loaded up starting first with just the mainsail, then if the rigging and mast is performing correctly moving onto jibs and finally off wind sails. A small number of moderately loud clicking sounds from the fittings through the rig and rigging should be expected as the rig gets loaded up for the first few times on each tack. Once seated there will not be any further noticeable seating or creep in the rigging. The rig tune should be monitored as changes in tune can indicate the need for more detailed inspection.

INSPECTIONS

The carbon composite standing rigging should be inspected regularly for:

- Jacket chafe
- Unscrewed fittings
- Damage to carbon wrap on end fittings
- Spreader Tip lashing tension and integrity
- Spreader Tip movement

Inspection Schedule:

- Top to bottom visual inspection after each days racing
- Top to bottom visual inspection after long ocean passages
- Jack pressure check every four months
- Full service with rig un-stepped yearly
- Non destructive testing of metal components such as turnbuckle screws and hangers at 40,000 mile intervals

MAINTENANCE

Chafe of the cables is commonly the biggest concern, however trials have shown the carbon rods to be quite durable, and in instances where the jacket has been chafed clear through minimal structural damage has occurred. While the carbon rods will not suffer from moderate UV and visible light exposure, or moisture incursion like other composite cables, any exposed rods should be covered to prevent unnecessary wear or damage.

Hanger seats and turnbuckle threads should be lubricated regularly per normal rigging procedures.

Spreader tip lashings should be replaced if signs of chafe are seen.

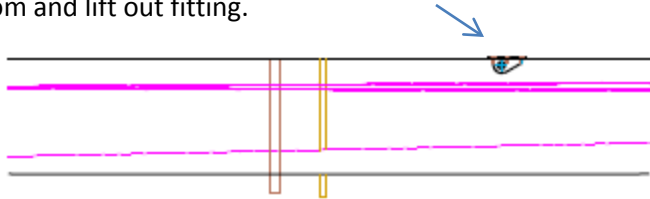
SPARES

For spare parts, please contact onedesign@southernspars.com

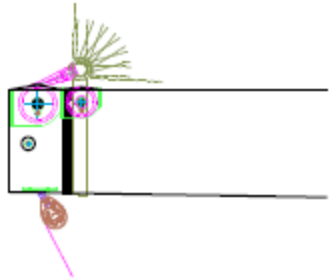
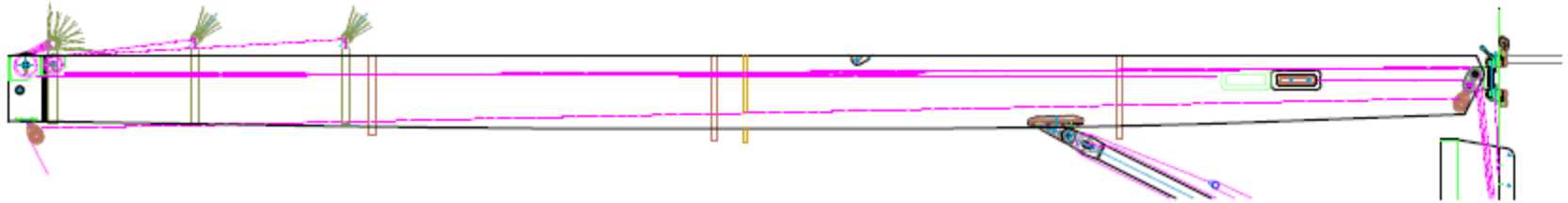
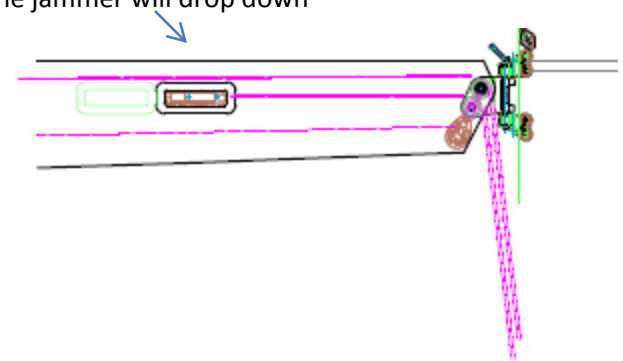


NOTES ON YOUR GRAND PRI BOOM:

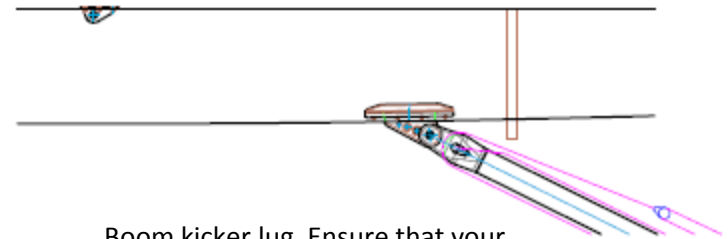
Southern Spars Custom take off point.
To gain access, remove the fasteners on the topside of the boom and lift out fitting.



Spinlock XCS 08/14 jammer. It is advisable to service it on a regular basis to prevent jamming. Unfasten the screws & the jammer will drop down for removal.

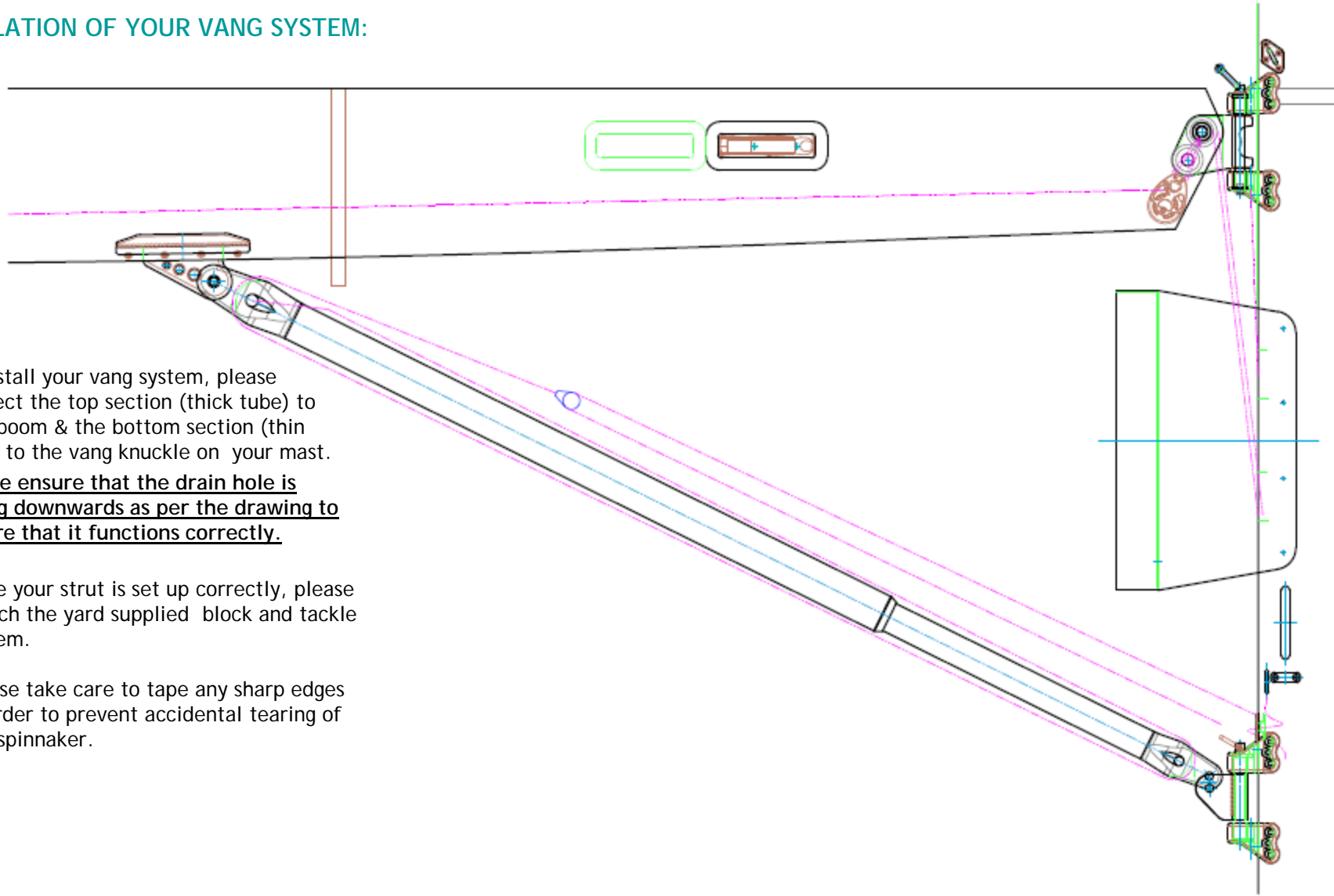


Dynex strop with customer supplied mainsheet block. To replace the strop, you will be required to unfasten your IBE pin using the boom spanners provided – please take care to replace all the washers & fasteners when re-assembling.



Boom kicker lug. Ensure that your pin is taped to prevent accidental tearing of your spinnaker.

INSTALLATION OF YOUR VANG SYSTEM:



1. To install your vang system, please connect the top section (thick tube) to your boom & the bottom section (thin tube) to the vang knuckle on your mast.
Please ensure that the drain hole is facing downwards as per the drawing to ensure that it functions correctly.
2. Once your strut is set up correctly, please attach the yard supplied block and tackle system.
3. Please take care to tape any sharp edges in order to prevent accidental tearing of the spinnaker.

NOTES ON YOUR ELECTRONICS:

The following items have been supplied & installed:

- 15" Windex & windex light
- Mantagua LED Tri-colour light (Mantagua part # 00017)

NOTES ON YOUR INTERNAL JACK:

SPECIFICATION

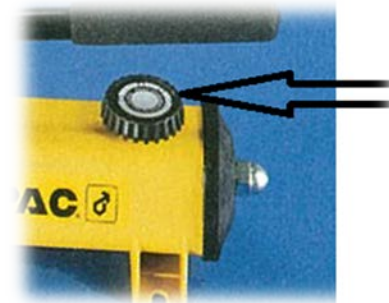
- Internal Enerpac RC-15 15Ton hydraulic jacking cylinder
- Hand pump, gauge, hose & coupling provided
- For more information visit www.enerpac.com



Example of Enerpac Cylinders

It is important to make sure that the air release valve located at the rear of the pump is open when dropping the rig - this allows the air to escape as the oil is forced back into the pump. Please close the air release valve when the pump is not in use in order to prevent any oil leaks.

Air Release Valve



HINT:

It is recommended that you regularly service your jacking cylinder & accessories & maintain acceptable levels of hydraulic fluid.

IMPORTANT INFORMATION: The mast jacking system is not designed to be used whilst sailing. Adjustments should be made beforehand.

DOCK TUNE GUIDE: Jack Pressures indicated are maximum target pressures

PROJECT: FARR 400
 JOB # : 2504 (NZ)
 REVISION: B
 DATE: 2011/03/14
 DESIGNER: J KNOPP

Jacking Pressures

Jack model	RC-15*	T cm ²
capacity	15.0	
cylinder area	20.3	
number of jacks	1	
Total cylinder area	20.3	cm ²

Jacking Sequence	Compression Including Rig Weight (kg)	Required pressure		Action
		PSI	Bar	
All V's and Headstays	5,427	3,803	262	Tighten V1
All V's, Headstays & D1 A	6,883	4,823	333	Tighten D1
All V's, Headstays & D1-2	7,880	5,522	381	Tighten D2

IMPORTANT INFORMATION: The mast jacking system is not designed to be used whilst sailing. Adjustments should be made beforehand.

Mast Prebend

	Elevation Above Deck (m)	Prebend @ Dock (mm)	Offset from Aft Face to Main Hal pulled down to BAS (mm)**	Prebend Offset to Main Hal (mm)
P BAND	17.54	0	39	39
HEADSTAY	15.53	31	34	65
S2	10.80	94	23	117
S1	5.56	85	11	96
BAS	1.39	0	0	0
				Note: Prebend offset excludes any mainsail ramp offset

** Measure prebend with backstay off **

Notes

4° Docktune rake = 1193mm Plumb drop measure at black band height off main haly sheave.

** Rig Weight not included in Jacking pressures, allow 8bar for 165kg mast and rigging

FINE TUNE SHIM STACK:
 The following shims have been provided:

- 1 x 20mm
- 1 x 16mm
- 1 x 6mm
- 1 x 4.5mm
- 1 x 3mm
- 1 x 2mm
- Total = 51.5mm**



UPDATES:

NB: Over time there will be updates in some of the fittings used and other detail changes to the rig. These will originate from sailors feedback and new ideas. Any changes are agreed to by the Farr 400 Class Association & its members and these changes will not affect the performance of the rigs. The tube bend and weight will remain within the agreed tolerances and will comply with the class rules.

DATE	UPDATE DETAILS	EXPLANATION

SERVICE:

DEALERS

All rigs and spare parts are available exclusively from the following licensed dealers:

Premier Composite Technologies L.L.C. - sales@farr400.com

FARR Yacht Sales - info@farryachtsales.com

RBK-Yachting GmbH - info@rbk-yachting.de

Boat Sales International Ltd - info@boatsales.co.uk

Australasian Sales - salesausnz@farr400.com

WARRANTY

Southern Spars will remedy faulty workmanship provided that any claim by the Customer for remedy of workmanship was notified to Southern Spars in writing within 12 months of the delivery date of the mast.

Southern Spars will, if requested to do so, use reasonable endeavours to assign to the Customer the benefit of guarantees and warranties given to Southern Spars by third party suppliers or manufacturers.

The warranties above do not extend to and Southern Spars shall not in any event be liable for any failure or damage arising from fair wear and tear.

Any claim shall be made directly to the Dealer from whom the rig was purchased.

Warranty claims must be made on the correct form before any work is undertaken on the part concerned. Warranty Request Forms can be obtained from your Dealer.

ABOUT SOUTHERN SPARS

Southern Spars has established its place as a world leader in the design, construction, installation and servicing of carbon fibre masts, booms, composite components and rigging. Its rigs power a wide range of yachts, from one-design class yachts to grand prix racing yachts, cruising yachts and super yachts.

Innovation, quality and an insatiable desire to produce what the customer requires runs through the company's culture. These qualities have contributed to producing product for numerous race victories, including the Volvo Ocean Race, Vendee Globe, America's Cup, Sydney-Hobart, plus supplying rigs to some of the hottest one-design classes like the Olympic 49er, Elliott 6m, Melges 20, 24 & 32 & the Farr 30 & 40. The same design expertise, manufacturing methods, materials and components utilised on these racing rigs are applied to every rig built by Southern.

Southern Spars also operates a rig service network and is manufacturing composite rigging. The specialist rig service business Rig Pro, has service centres worldwide. The Composite Rigging division, manufactures custom lightweight rigging products, including EC6+ carbon rigging, Aramid rigging and the Luff Rope.

Southern Spars has centres in the USA, Europe, South Africa, Sri Lanka and headquarters in Auckland, New Zealand. It is supported by the North Marine Group and shares the resources of that group of companies.

For more information visit www.southernspars.com