CII Rigging suggestions

This mini-manual uses photographs of the final prototype sail and the final pre-production mast. Where changes occurred between these and the production units, they are described below

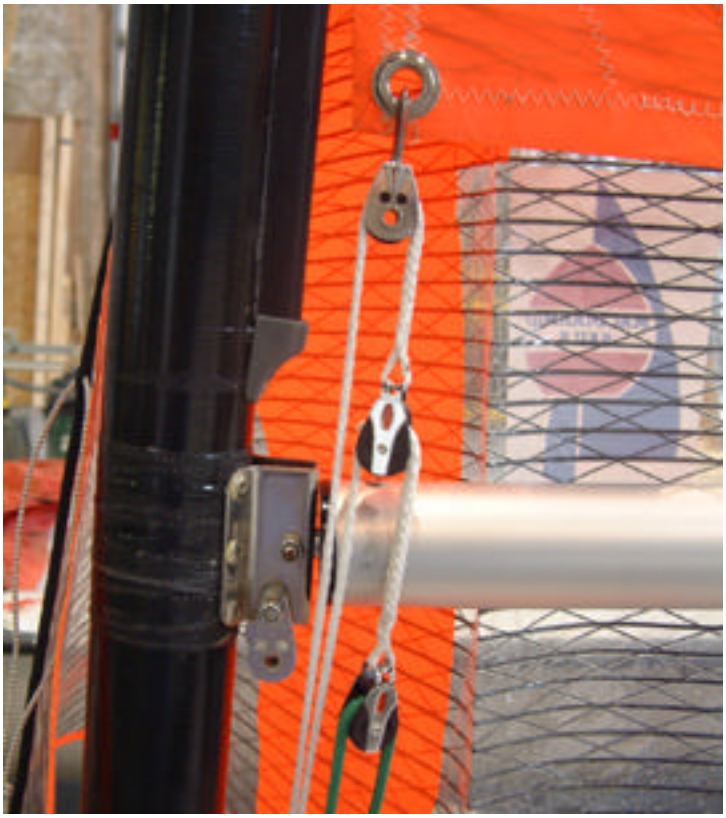
The sail needs to be hoisted very near to the sheave so do not tie a long bowline in the halyard. Do a single overhand knot then follow with another overhand as shown. The final sail has a grommet in the head instead of the tape (see at right) and you should still use this knot.

Feed the bolt rope in from the side of the gooseneck. The feeder has been placed very close to the gooseneck because the tack of the sail needs to be held against the mast to take the tension load from the outhaul. The feeder in the picture was a little too close, making the hoisting difficult and it has since been raised one inch. A little sunscreen lotion on the bolt rope, or sail track lubricant, greatly eases the hoisting operation. Hoist the sail until the top of the head is even with the top of the black laminate. See above. For every 1" you are lower, the bottom block of the cunningham will travel 4" lower until, finally, it will hit the deck before the cunningham is fully tightened. The cunningham is the accelerator on the CII and you MUST be able to tighten it completely to fully depower the sail. Once the sail is set up on shore, sheet the main in lightly and cleat it. Now pull on the cunningham and observe the mast bending in response, the main flattening out and the complete lack of tension in the leech because there has been no mainsheet or vang tension applied. This means that it will open easily and quickly in response to the wind pressure. If you need more power, just release the cunningham.

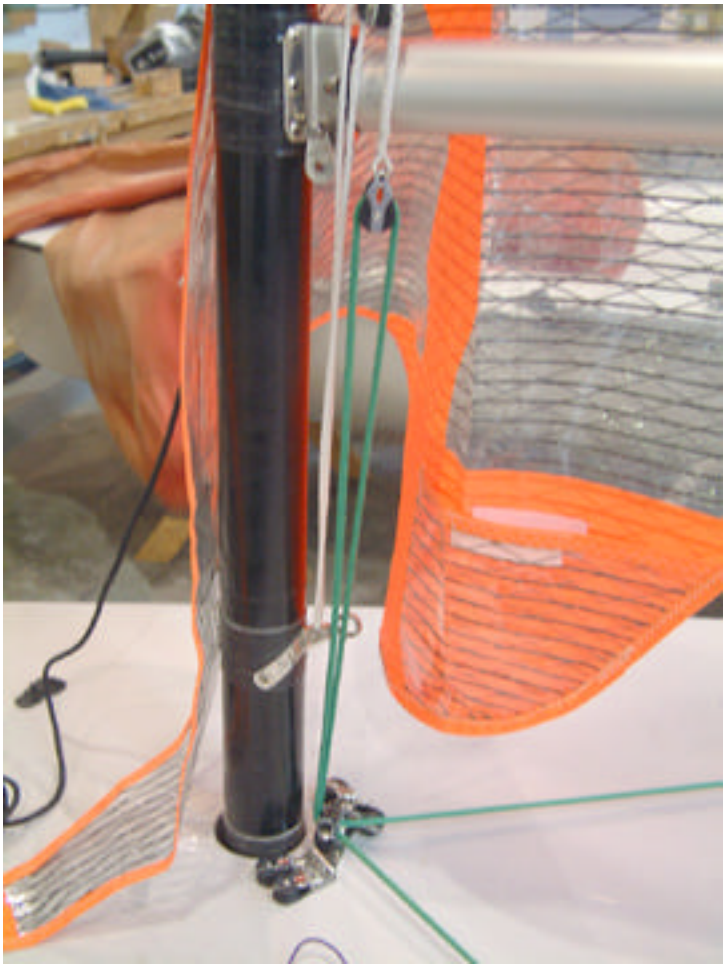
The pictures show the recommended cunningham arrangement. A loose spectra braid has been used which is easily spliced even by an amateur. A loop has been created in the middle of the line and this is hooked over the pin of the twist shackle that holds the vang.

Attachment point in place.

The existing system of a rope passing through the grommet and terminating in a block can still be used but the system shown, using a hook block is simpler and allows easier de-rigging as the whole system can stay with the mast.



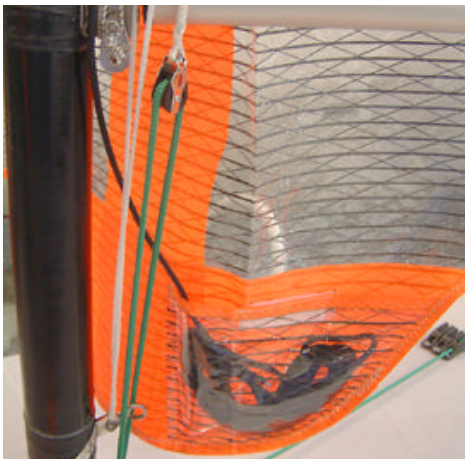
This shows the complete 8:1 system in place. Note that the tack of the sail is well up above the boom for light air. In heavy air, it will be down very near, or at, boom level.



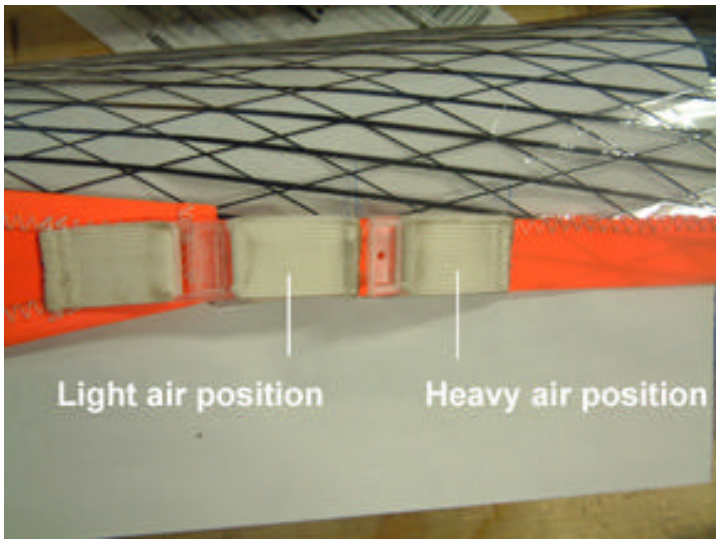
The final 2:1 purchase uses the existing cunningham deck line (shown in green) which is shown here being fed through the bullseye. **Some owners are feeding the final purchase through the blocks and use the bullseye for the outhaul. This makes the cunningham even easier to operate.**

In all the pictures, the vang has been removed for clarity but it is the standard Byte vang. You might have to shorten some of the falls in your vang because the gooseneck is about 50 mm (2”) lower on the carbon spar but the vang tang (attachment point) is at the same height off the deck.

You can use your existing halyard but we suggest you rig it as follows. After the main is fully hoisted, flick the fall of the halyard into the open hook pictured below at the top of the lower section, hold the halyard close to the goose-neck and push a piece of light 1/16" shockchord through the rope at approxi-mately the top of the gooseneck fitting. See picture at left. Make about a 6" loop . Pass the loop under and over the fitting then back down and hook onto the nut of bolt holding the blocks. Reverse the bolt if necessary



The halyard is shown secured on the starboard side of the spar in these pictures for ease of illustration. It should be passed through the open hook at the top of the lower mast then brought down and tied off as shown **but on the port side of the mast** since the pocket is on that side. Now stow the tail, as shown in the picture, in the pocket at the bottom of the cuff.



The Cuff

There are two positions on the foot of the sail to secure the tail of the cuff. Use the aft one in strong winds and the forward one in light airs: it makes it easier to shape the foot of the sail.

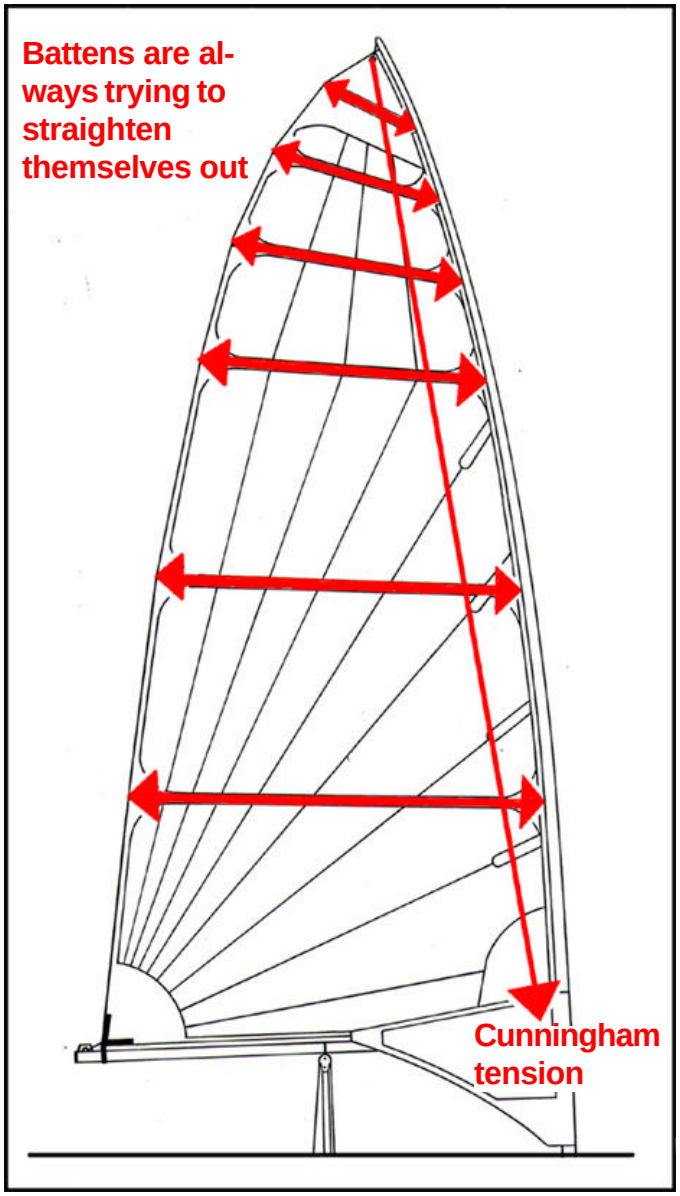
The cuff has been demonstrated to be increasing the aspect ratio of the sail and to significantly lighten the helm in strong winds. If not enough tension is on the cuff in strong winds, it will "suck" out to leeward of the mast indicating that the area is in lift. It is also reducing the drag from all the control lines in the area.

Sailing the CII rig

Firstly, if you have been sailing the standard rig there are a few things you MUST un-learn!!

Standard rig

In order to de-power the standard rig it is necessary to bend the spar to flatten the sail or it will be too full and will heel the boat. The **only** way to do this is with mainsheet tension or vang tension. Typically sailors will sheet the main hard then set up the vang to keep the mast bent if they release the mainsheet (vang sheeting) or keep the sheet tension on and play with the traveller (traveller sheeting). The problem with this is that the leech is always board tight and the mast is not flexible enough to bend further in a gust to allow the leech to open nor is the leech big enough to generate the force necessary to open itself up. The only way to de-power is to let the boom down to leeward but there will still be virtually no twist in the leech. This lack of twist makes it very hard for a lighter person in heavy air and it is the same problem that exists with the Laser, the Radial and the Europe.



CII rig

To understand the CII rig and it's de-powering mechanism, think of a batten not as something that puts shape in the sail but rather as a loaded strut in the sail that is always trying to straighten itself out which, if you think about it, is its relaxed state. Because there is always a pre-bend in the CII spar, tension on the cunninham puts an additional load on the tip and bends the spar acting much like tightening a bowstring. See diagram at left.

It will not do this in an unbattened sail as the tension from the cunningham is simply absorbed by the cloth which eventually forms a huge vertical wrinkle just behind the spar. However, with full length battens preventing the sail fabric from forming this wrinkle, the load then transfers directly to the tip of the spar and causes the mast to bend . As the spar starts to bend, the battens keep trying to straighten themselves out, pushing on the bolt rope track, and this batten pressure helps to increase the bend in the spar. As the bend increases, the leech starts to open and, at the same time, the sail gets flatter.

Also importantly, at this point there is still flexibility remaining in the spar so that, when a gust arrives, the leech opens up further.

On the following page, the overlapped pictures are taken in the shop with the boat on its side and with the camera fixed. The picture on top has no Cunningham tension and you will notice that the leech is well set up. The one below has nearly full Cunningham tension applied and you will notice that the leech is now completely open and the battens are considerably flattened. This has occurred without any wind in the sail, which will further open the leech. More importantly it has been done WITHOUT ANY MAINSHEET TENSION OR VANG!! The implication of this is that the mast has bent to flatten the sail but it has done so with CUNNINGHAM ALONE and without any load being applied to the leech. The sheet is then tensioned enough to bring the boom in over the corner of the transom.

Just because the rig is easier to depower for the lighter person, it does not mean that it will not have enough power for the heavier person in light air. The tuning procedure for the heavier person, therefore, is to use minimum cunningham tension and enough mainsheet tension to a), close up the leech to suit their weight and b), bring the boom "over the corner" but not so much tension that one starts to bend the mast as that will start to depower the rig. This means that, **in lighter air, it is imperative to sheet the traveller to weather.** (This applies to the lightweights as well). This way the mainsheet will bring the traveller in "over the corner" without putting too much load on the leech and without over bending the spar.The boom must be "over the corner" in order to point to the maximum.

The lighter person will have increasing cunningham tension as the wind increases, until fully maxed out, and NO vang upwind (only enough to snug it up). Mainsheet will be adjusted to bring the boom "over the corner" and, if that closes up the leech too much in moderate air, release a little tension and bring the traveller up to weather a little. The outhaul in all this should be handled the same way as the standard rig with the exception that you can probably carry a little more more fullness in the foot than normal because of the ease with which the top de-powers.

The picture below, left, shows the traveller to windward and a nice full sail in about 5 - 6 knots sailed by 120 lbs (54.4 kgs). The boom is not "over the corner" and it's difficult to tell from the photograph but she either needs more mainsheet tension (will close the leech a bit but NEVER remove all the twist!) or the traveller should go up to weather further. To this end always tie the ends of your traveller ropes together and make sure you have fairleads on the deck jam cleats so that you can uncleat the leeward control line if necessary. The picture at lower right is in about 8 knots with the boat sailed by 154 lbs (70 kgs). The rig is very well powered up and she is fully hiked. The traveller is to weather, the boom is "over the corner", the foot has lots of draft and the leech is set up to provide a deep, powerful sail that still carries a nice twist and will never stall. This set-up is very fast.

Off the wind, the set-up is much like the standard rig. The more open the leech on a run, the faster the boat but the more hairy it gets! Use vang to set up your leech so you are not fighting the helm on a reach but remember, if the leech is very soft and open, the boom will be well across the centreline of the boat before the upper leech gybes! We suggest putting on a little vang before gybing in this case, particularly on dead downwind gybes.