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VIPER Tuning Guide

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1 Tuning

“The philosophy of catamaran sailing is pretty simple... ‘It doesn’t matter where you are going as long as you are going there fast.’ The element of truth in this statement is that boat speed is ultimately important. Go fast. Look for pressure then angles; opposite priority compared to dinghy.” Greg Goodall on catamaran sailing

To achieve good results in regattas or just sailing fast, it is important to set up the boat for the conditions of the day.

The VIPER is a very fast, high performance, racing catamaran with impeccable handling qualities. When you first sail one you are aware that everything happens very quickly. This also includes getting into trouble. As a result it is important that the set up of your boat is clean, simple and efficient. Things that tangle or are difficult to adjust should be eliminated. Almost any system can be made to work in light winds but if it doesn’t work in strong winds then you would be better not having it.

1.1 Platform

It is important to have your boat as stiff as possible. Make sure that the beam bolts are tight (no more than 20N/m). Keeping the striker strap and tramp tight will ensure the best platform stiffness. Reseating the beam pads will also improve the boat's stiffness, **see next**.

1.2 Reseating Beam Pads

After years of use the contact between the beam and the beam pad can deteriorate, resulting in reduced platform stiffness. To reseat your pads you will need the following: White Gelcoat, masking tape, mould release wax, sandpaper, acetone and a 50mm paintbrush.

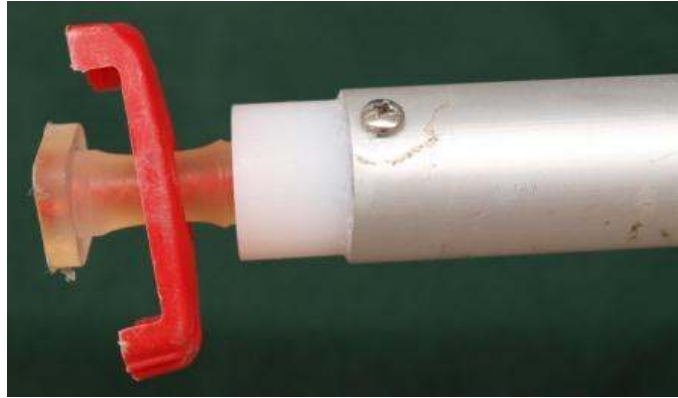
Follow these steps (do one beam at a time so that you have enough time before the Gelcoat gels):

1. Remove the beam by undoing the beam bolts and pulling the beam out.
2. Briefly sand the beam pad to rough the surface and thoroughly clean beam and beam pad with solvent.
3. Wax the beam anywhere it touches the beam pad or gelcoat might touch it (follow the waxing instructions on the packaging).
4. Mask up the edge and area around the beam pad where you don’t want gelcoat to be
5. Mix gelcoat and brush a 2mm thick layer onto the beam pad leaving a 10mm gap around the bolt holes
6. Bolt the beam back into place before gelcoat cures
7. Clean off any excess gelcoat with acetone
8. Repeat on other beam

By waxing the beams you should be able to remove them if you need to, however they will be quite stiff to do so.

1.3 Rudder alignment

Correctly aligning the rudders will have a marked effect on the feel and performance of the boat. The simplest method is to support the boat so that the rudders can be put in the fully down position. Use a tape measure to measure the distance between the leading and trailing edges of the blades at the bottom of the transom. The rudders need to be set up so that they have 2 - 3mm of toe-in; that is the leading edges of the blades are 1 - 3mm closer together.

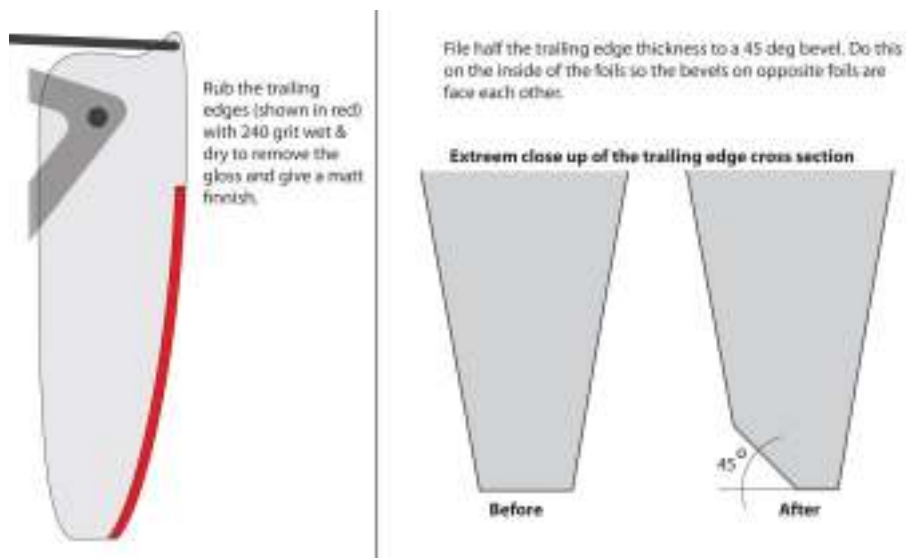


To adjust the alignment; unscrew the small screw that holds the end into the tiller cross bar and slide the white nylon spacer in or out as desired. DO NOT slide the rubber flex joint out of the nylon spacer. You will need to drill a small pilot hole into the nylon so you can re-screw the small screws back into the ends.

1.4 Noisy Foils

Occasionally there will be a foil (rudder or centerboard) that will be very noisy at certain speeds.

Below shows two methods that have proven successful in removing this noise.



1.5 Rig Tension

The rig tension is in general high to avoid the forestay sagging. If the tension is too high then the mast will not rotate easily. The tension will range from 50kg in light winds up to 100kg in windy conditions.

1.6 Mast rake

Mast rake affects the trim and balance of the boat. If the boat is sailed with too much mast rake the boat feels a bit heavy on the rudder and it won't accelerate out in the gusts. Insufficient mast rake on the other hand can induce a feeling of lee helm when sailing the boat.

The mast rake is measured with the forward trapeze wire.

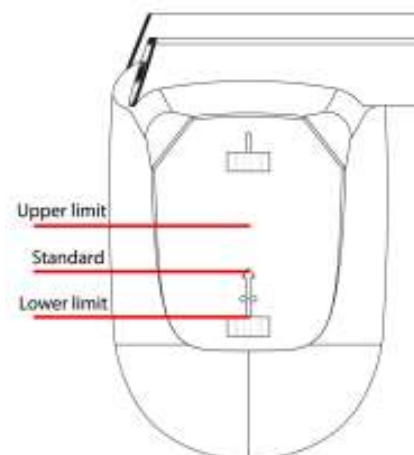
Measure the distance to the attachment point of the forestay (bridle) in the hull. This requires the trapeze to be extended with a rope. Mark the rope where it touches the chain plate

Swing the front trapeze to the back of the boat and take the distance measured to the transom.



The standard setting, for 125 - 140kg crew weights is the top screw on the plastic rudder clip.

The total range is between the top of the lower pintle and halfway between the two pintles. With lighter crews carrying more and heavier crews carrying less mast rake.



1.7 Spreader rake

Spreader rake is a method of tuning the fore-aft stiffness of a mast below the hound fitting. Crew weight affects the required amount of spreader rake as it has a significant effect on the amount power developed by the rig.

To answer how much is sufficient rake can only be determined by sailing the boat and knowing what to look for.

If you have excellent height up wind, but lack boat speed and the boat won't accelerate in the wind gusts, then you need more rake. This helps the mast bend fore and aft which allows the sail to flatten and the leech to open in the wind gusts. (Also see notes on diamond tension.)

If you are lacking height and "grunt" in light to medium weather, then you have too much spreader rake.

The spreader rake is measured by placing a straight edge or string-line between the diamond wires at the spreaders and measure the distance to the back of the mast.

Settings depend heavily on the weight of the crew, with heavier crews generally carrying less rake than lighter crews. The factory setting is 38mm. The range is between (30mm – 45mm)



1.8 Diamond tension

The tension on the diamond wires primarily controls the side bends of your mast. Upwind loose diamonds allow the middle of the mast to bend to leeward and the top of the mast to hook to windward. This tends to cause the boat to heel very easily in wind gusts. Generally speaking, diamond tension is a way of powering or depowering your rig. Wind the tension on to depower and wind them off to power up.

Turning the bolt on the mast base will adjust your diamond tension; this can also be done once the boat is fully rigged.

Diamond tension is run between 32 and 40 on the loose gauge, with the factory setting at 35.



1.9 Pre-bend

Pre-bend of a mast is the result of diamond tension, spreader arms rake and mast stiffness. These days we do not really measure the pre-bend as the same pre-bend can be achieved by varying the amount of spreader arm rake and the diamond wire tension on a given mast.

1.10 Batten tension

Battens should be shaped to match the general curvature of the sail. The battens that are recommended and used are the Fibrefoam battens. These battens are a fiberglass foam sandwich construction that is light, strong and have excellent bend characteristics.

Battens should be tied firmly into the sail to remove creases along the batten pocket when sailing.

- Stiff battens hold the sail flat and help to twist the sail more easily, reducing power.
- A soft batten allows the sail to develop more camber and reduces the leach twist, increasing power.

On the table below is the recommended setting per batten.

Batten number (top-bottom)	Batten length	Stiffness – Batten weight	Drive - From front
1	1150 mm	2.5	42 %
2	1235 mm	2.0	42 %
3	1455 mm	1.4	42 %
4	1665 mm	1.2	42 %
5	1860 mm	1.0	42 %
6	2005 mm	1.0	42 %
7	2075 mm	1.0	42 %

1.11 General settings

The tables bellow show some general settings currently used. These are guide lines that will make you gain control over the boat more quickly. Be encouraged to try new setting as this will help you learn how all the controls affect the boat. Remember, if in doubt, look around, do what top sailors do and ask why they do this. There is no magic, just experience and understanding the elements and your boat.

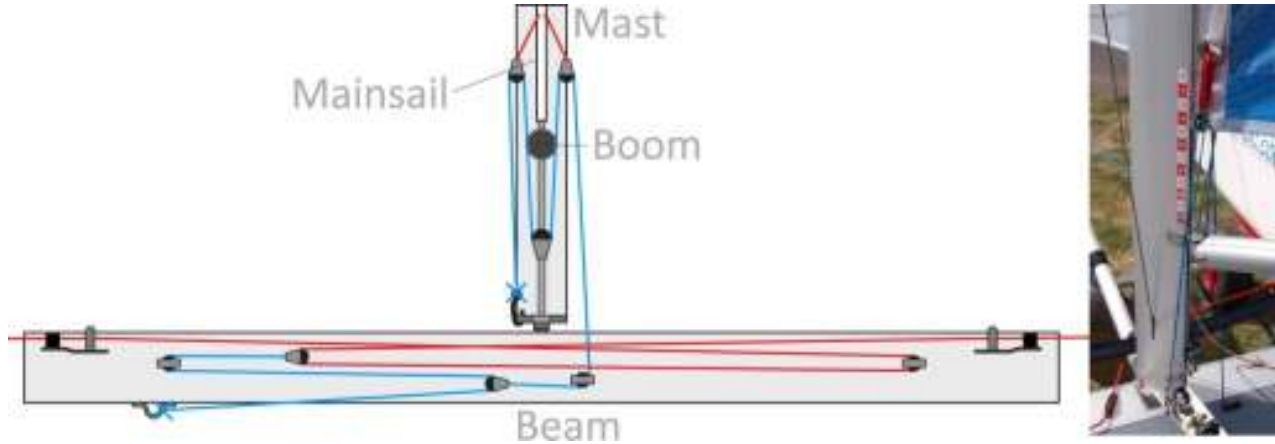
Upwind	Light wind	Medium wind	Strong wind
	1-5 knots	6-15 knots	16-25 knots
Crew	No trapeze	Both trapeze	Both trapeze
Hull attitude	Nose down	Level	Nose up
Main traveler	Middle	Middle	Middle
Main sheet	Medium	Hard	Slightly less hard
Main tell tales	Upper flow correctly	Flowing both sides	Flowing both sides
Main cunningham	Just remove wrinkles	Light - Hard	Extremely hard
Outhaul	100 mm from boom	20-30 mm from boom	Minimum
Mast rotation	Pointing to front of dagger board	Reduce as wind increases	Up to 20 knots 25° Above 20 knots 15°
Jib sheet	Light	Med	Hard
Jib traveler	100mm from the end	50 mm from the end	20mm from end
Jib downhaul	Firm (remove wrinkles)	Firm (remove wrinkles)	Tight
Centerboards	Down	Down	200 - 300mm up

Downwind	Light wind	Medium wind	Strong wind
	1-5 knots	6-15 knots	15-25 knots
Crew	No trapeze	Crew only trapeze	Crew only trapeze
Hull attitude	Nose down	Level	Nose up
Main traveler	Up to 300mm	Middle	Middle 200mm in large waves
Main sheet	light	Medium - Hard	Hard
Main tell tales	Flowing both sides	Flowing both sides	Top windward not flowing
Main cunningham	Just remove wrinkles	Off	Off
Outhaul	Same as up wind	Same as up wind	Same as up wind
Mast rotation	Pointing to front of dagger board	Pointing to front of dagger board	Pointing to front of dagger board
Jib sheet	Light	Light	Jib fully off but not flapping
Jib downhaul	Same as up wind	Same as up wind	Same as up wind
Centre boards	Down	200 - 300mm up	500mm up

2 Systems (Diagrams)

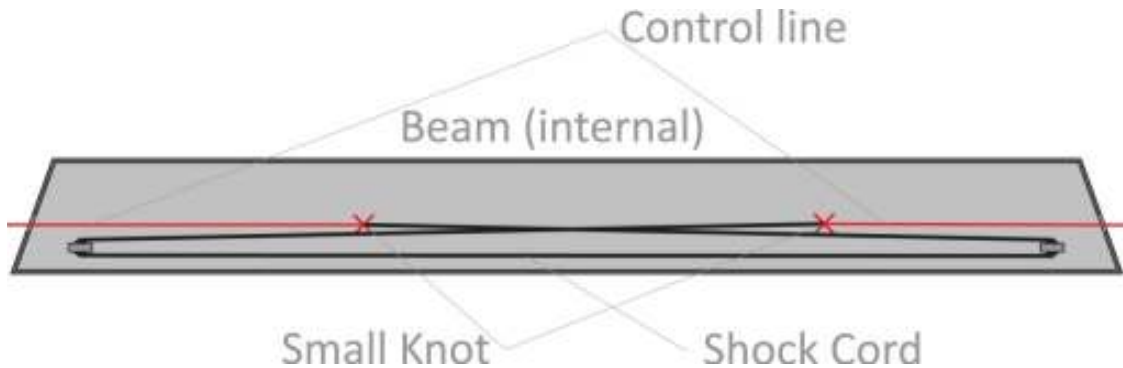
Some of the systems on your boat are extremely complex and others are quite simple. Here we have included diagrams of all the systems so that should you need to dismantle it, rebuilding it will be easy.

2.1 Cunningham

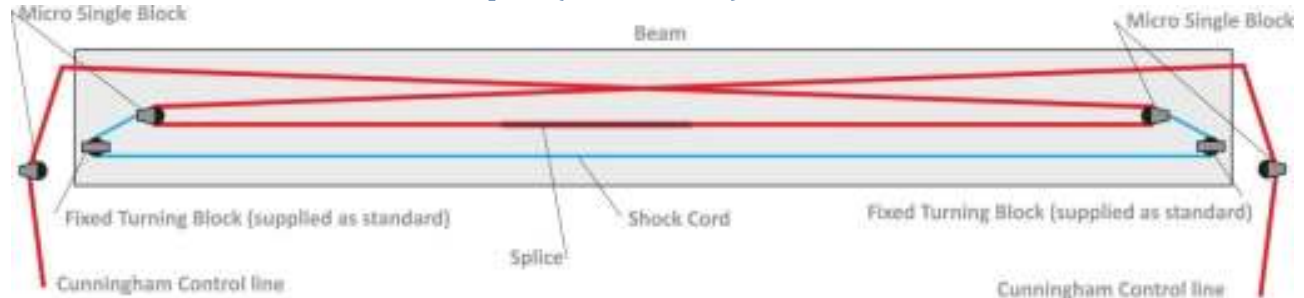


2.2 Control line Retrieval into Front Beam

This is a standard system and will come already threaded up. There may come a time when you have to replace the shock cord or re-thread it. Note that the turning pulleys are permanently attached to the beam reinforcing block. See parts list for shock cord length.



2.2.1 Continuous - To the Crews Trapeze (Not Standard)



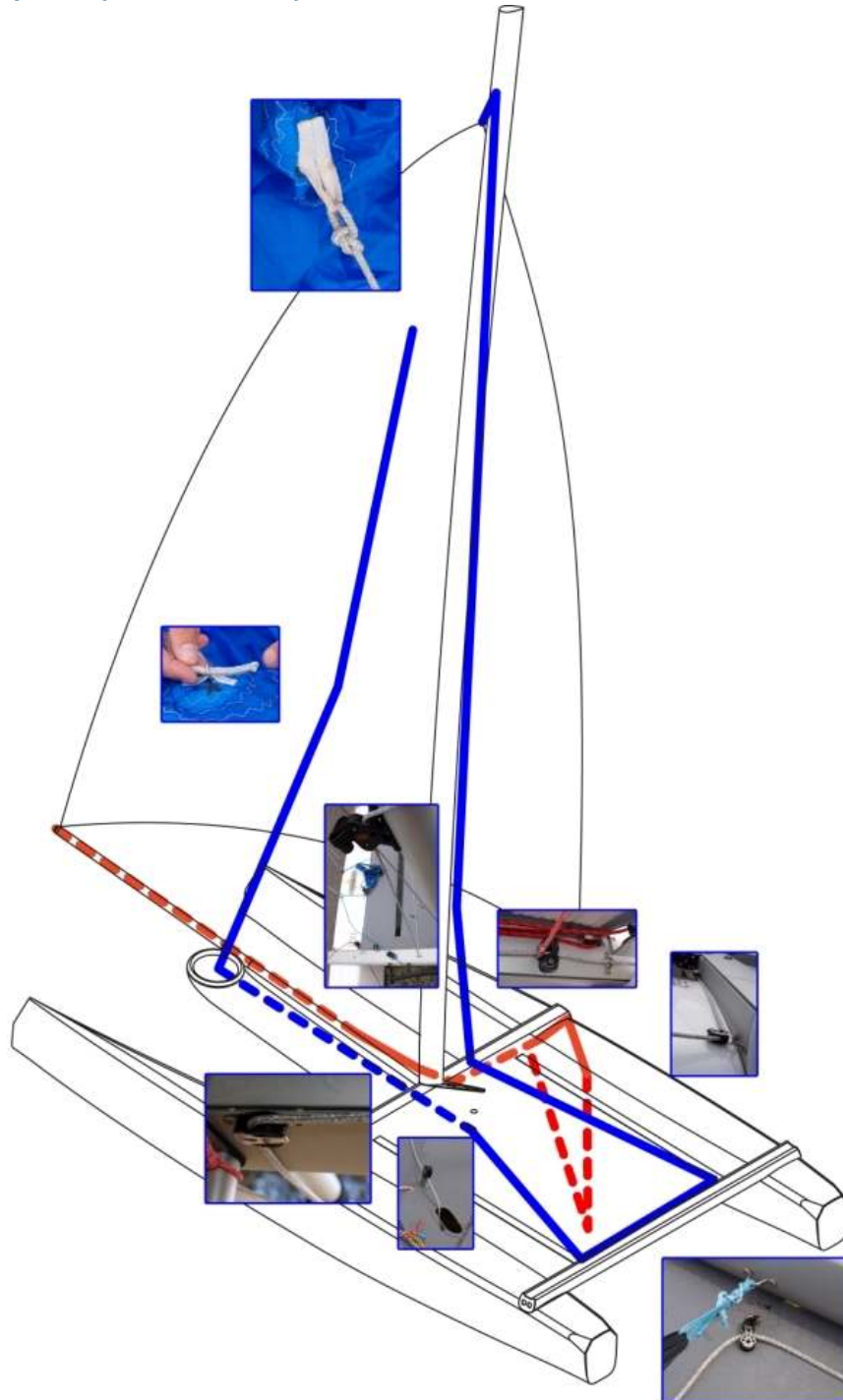
- You will need a longer control line, standard is 10m you will need 13.5m
- The shock cord should be cut at 2.7m. This means in the fully relaxed position the micro Single blocks sit just short of the fixed turning block. This will give you the maximum take up on the control line.
- The splice must be neat enough so that it can run freely through the micro single blocks.
- When in use be careful to keep the splice out of the loaded part of the system as it is weak and may pull apart.
- Tie the second set of micro blocks (shown in the diagram outside the beam) to the crews' trapeze line.
- Small shock cord keepers are required on the cleat to keep the line cleated when the crew is on trapeze, see bellow.



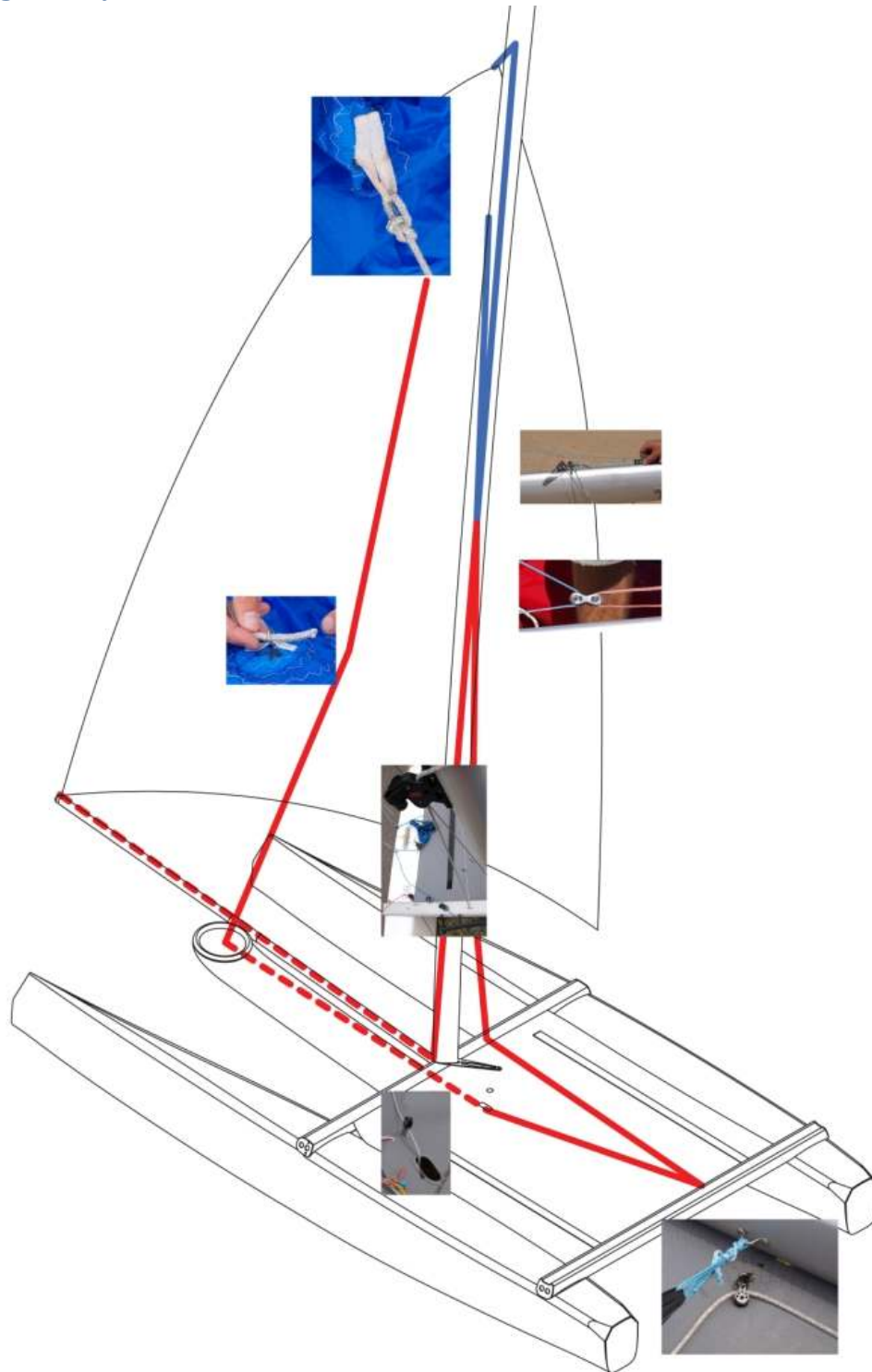
This will require some adjustment to have the keeper tight enough to hold the line in but also soft enough so that it is possible to release the cleat.

2.3 Spinnaker Halyard

2.3.1 Duel line system (With Tack Line)



2.3.2 Single line system



2.3.3 Under Tramp Shock Cord Layout

