Laser 4000

handbook

handbook

contents

Introduction

Many congratulations on purchasing your Laser 4000. This premium product will give you many years of sailing pleasure.Laser are totally committed to you receiving maximum benefit from your purchase.

The Laser 4000 handbook contains all the information you will need to get your new boat rigged and ready to race. Within the rigging manual is a glossary of parts and the corresponding part numbers allowing no room for error when re—ordering any equipment. You will also find the specification and lengths of lines and rigging ensuring ease of replacement.

Furthermore the Class constitution and rules will allow you to understand the philosophy and structure of Laser 4000 sailing worldwide.

Once again many congratulations and good sailing.
Laser 4000 Product Manager

stage one

unpacking and mast stepping

The boat arrives with gybing lines and control lines threaded if however these are not attached then refer to the diagrams at the rear of this handbook. Once you have unpacked the hull from the covers or the plastic wrapping and the mast from its plastic wrapping, there are only two tasks you will need to complete before stepping the mast.

These are:—

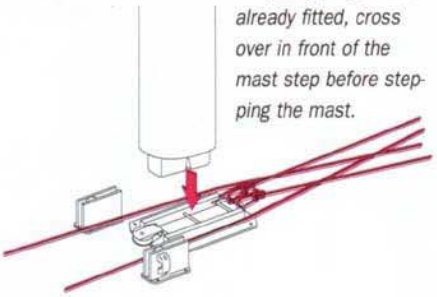
i. Attach one set of shroud adjusters (which are in the fittings pack) to the upper shrouds. Begin with them in the second hole down at the front.

ii. Remove the lower shrouds from mast completely.

The foredeck area is a foam sandwich construction (excluding the channels that the pole runs in) and is supported by a cross beam structure inside the hull. The deck therefore, is absolutely capable of supporting the load of someone standing in the boat.

Therefore with one crew member stood in the boat and the other holding the mast upright from outside the boat, simply step the heel of the mast into the mast step ensuring the slot in the mast heel sits over (straddles) the bolt in the middle of the mast step.

N.B: Take care that the pole gybing lines, already fitted, cross over in front of the mast step before stepping the mast.



1. Attach the upper shrouds to the shroud U bolts using the shroud adjusters.

2. Take one of the trapeze wires forward and attach it to the trolley as shown.

This acts as a forestay on shore. (The Laser 4000 does not have a permanent forestay as this would snag on the gennaker as it blows around the luff of the jib when gybing and inevitably would cause the gennaker to tear).

3. Tension the trapeze adjuster so that the shrouds are under tension and the mast is secured.

4. Key the lower shrouds back into the mast and attach the second set of shroud adjusters to the eyelet at the lower end. Begin with the lower shrouds in the middle of the adjusters and secure the adjusters to the plate inside the U bolt.

stepping the mast

stage two

tack line and gennaker halyard

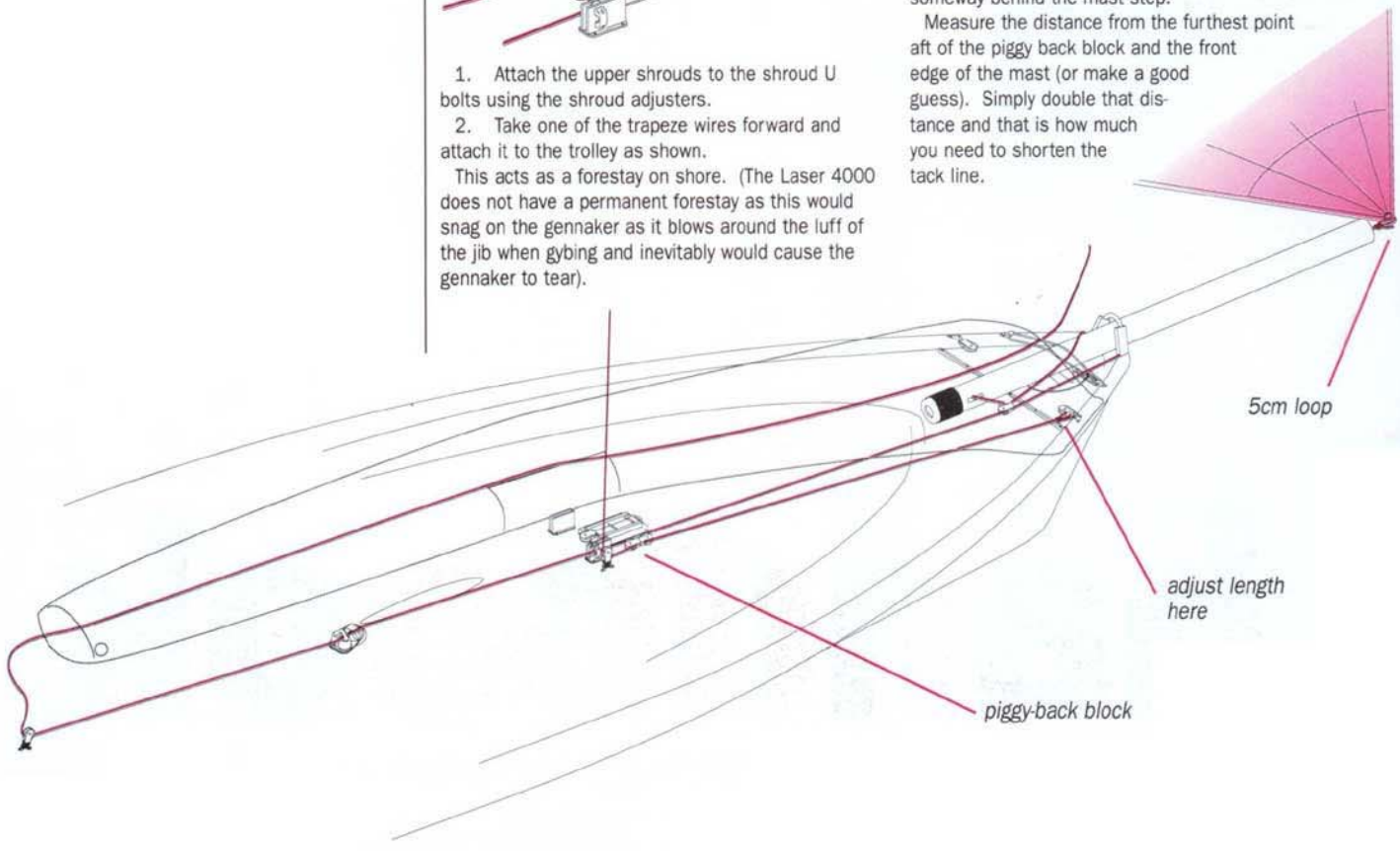
Adjusting the length of the tack line

1. Begin by tying a bowline with a 5cm loop in the end of the tack line.

2. Then take the piggy back block (2 x in line pulley block) and pull it as far aft as possible i.e. until the pulley at the inboard end of the spinnaker pole and the forward turning block are in line, in other words the pole is fully extended.

3. At this stage the piggy back block will be someway behind the mast step.

Measure the distance from the furthest point aft of the piggy back block and the front edge of the mast (or make a good guess). Simply double that distance and that is how much you need to shorten the tack line.



4. The adjustment to the tack line is made at the eyelet underneath the chute mouth on the starboard side of the boat. Try and tie your bowline within 10cm of this eyelet.

N.B: If you make your tack line too long then the pole will not fully retract — if it is too short then the pole will not fully extend and the piggy back block and the spinnaker halyard turning block will jam up against each other.

know your sail terms

— the anatomy of a sail. the gennaker is shown here, but these terms apply to all of the three sails.

Threading the gennaker halyard

The gennaker halyard and pole are both hoisted using a single line and therefore are connected in the following manner.

1. Take the spinnaker halyard from the low profile lacing on the mast and thread it from back to front through the spinnaker halyard turning block on the deck.
2. The halyard then goes forward and threads from starboard to port through the aft part of the piggy back block.
3. The halyard then comes back and through the small black eyelet on the outboard edge of the starboard stand up control line organiser.
4. The halyard then goes over the top of all control lines and threads through the eyelet on the swivel base and cleat.
5. The halyard then runs further aft in between the mainsheet bridal, over the top of the toestrap elastic, through the swivel block at the front of the mainsheet hog, back forward through the mainsheet bridal and then up the spinnaker sock.

N.B: use either a mainsail batten or your extended tiller extension to pull the spinnaker halyard through the sock.

stage three

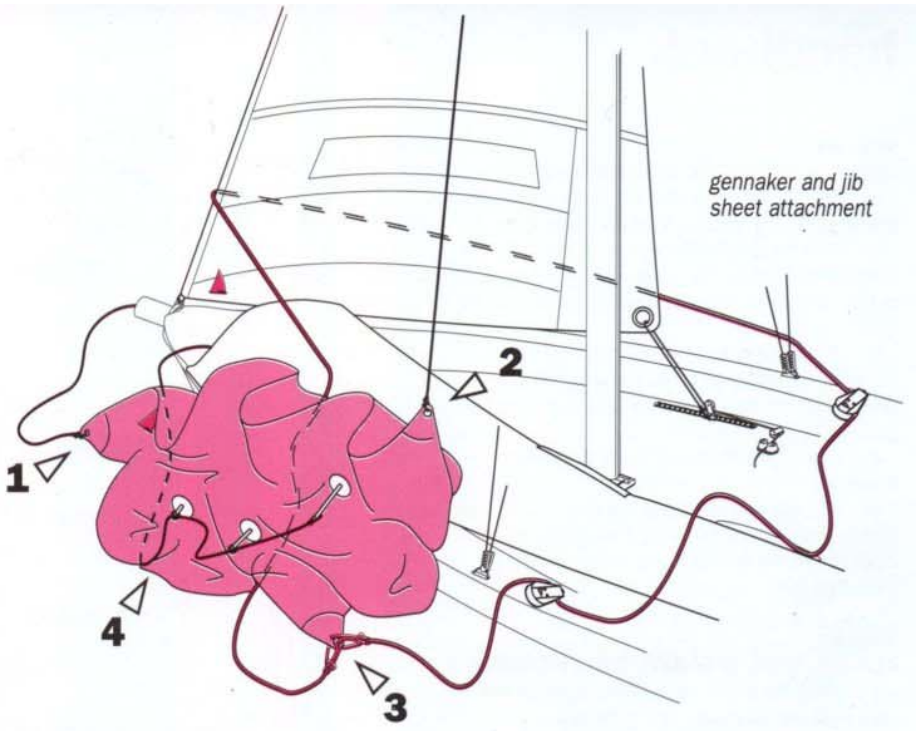
hoisting the jib

jib tension applied

1. Shackle the tack of the jib to the shackle on the A shaped bar at the bow ensuring that the shackle key is facing aft. (If this key is facing forward it may rip the gennaker).

The eyelet at the jib tack is finished so that it "sits" at right angles to the centre line of the boat so take care that you do not attach this eye 180˚ out. You will know if it is incorrect as there will be a crease in the jib cloth in this area when the sail is hoisted.

2. Work your way up the luff until you get to the head.



gennaker and jib sheet attachment

The eyelet in the jib wire at the head of the sail is attached to the cloth using a piece of white webbing. Take care that the wire has not twisted around with webbing before you attach the jib to the jib halyard.

3. Before finally attaching the jib to the halyard look aloft at the two parts to the jib halyard. Check the halyard is not twisted around itself and that it is inside the blue elastic that is attached to the shroud. (This elastic will prevent the gennaker from jamming in the triangle formed between the mast and jib halyard).
4. Cover the split pin and shackle with tape (if you don't then you will rip your gennaker).
5. When hoisting the jib for the very first time, take the soft loop in the jib halyard wire and "nip" the very end between your fingers, this will prevent the eye getting jammed at the jib halyard box in the mast.
6. The jib halyard exits from underneath the gooseneck at the back of the mast.

Hoist the jib (on windy days one crew should hold the jib luff forward to prevent the jib blowing underneath the spreaders).

7. When the soft loop emerges hook the rig tension system to the loop as shown and apply rig tension cleating the system off on the mast. (Fine tuning for different conditions is obviously important, but for now a two handed pull is good enough.
8. Tidy up the tail of the jib halyard and the excess of the rig tension system and place them in the halyard bag on the gennaker sock.
9. With the jib hoisted, it is now possible to untie the trapeze wire from the trolley, and attach both of them to the elastic as shown.

stage four

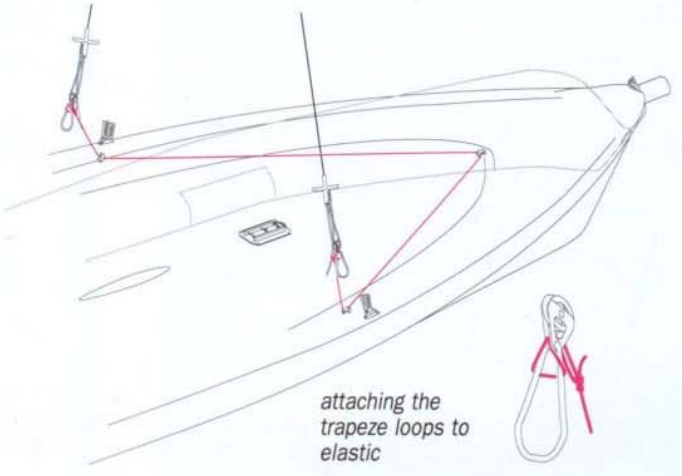
jib sheets

1. Attach one end of the jib sheet to the eyelet on the jib track slider, then thread through the eyelet in the jib clew back through the pulley on the jib track slider and around the cheek block. Jib sheets then go across the boat over all lines (inc the spinnaker halyard) and threaded through in reverse to be symmetrical with the side just threaded.

Gennaker Attachment

Unfold the gennaker and work you way to the tack. (The "red boat" logo is attached at the tack).

1. Tie the tack line (with the same 5cm loop as used before) to the gennaker tack.
2. Work your way up the luff (using the red boat as a reference) until you arrive at the head. Attach the spinnaker halyard with a bowline and then work your way down the leech until you arrive at the clew.
3. Attach with a bowline one end of the gennaker sheet and then thread the other end of the gennaker sheet through the ratchet block (arrow on ratchet block, points towards transom) across the boat above all control lines (and spinnaker halyard) careful not to "knit" the gennaker sheets with the jib sheets, through the opposite ratchet block (again arrow points towards the transom) then outside the shrouds, around the jib luff, inside the spinnaker and attach to the clew with a bowline.
4. Now take the spinnaker downhaul (previously threaded up through the gennaker sock). This downhaul line should exit out of the chute mouth on the port side of the jib. Take the line underneath everything (both sheets and gennaker) and thread through the three downhaul patches. (First patch is an eyelet attached directly to the sail, second patch is an eyelet on a webbing strap and third patch is just a webbing strap) the downhaul line ties to the third patch (the webbing strap) with a bowline.
5. If there is not too much wind it is worth hoisting to check, otherwise just spend a little more time following the above technique to prevent any mistakes.

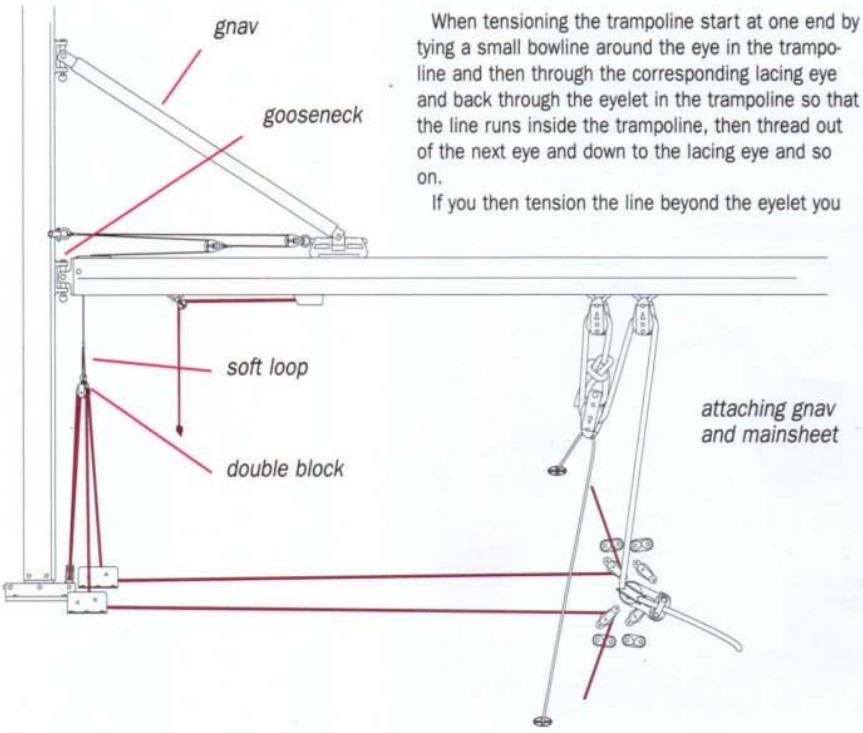


attaching the trapeze loops to elastic

stage five

boom, gnav & mainsheet

1. Take the inboard end of the boom and pin the gooseneck to the fitting on the back of the mast.
2. Slide the gnav up the boom, via the slot at the outboard end and pin the inboard end of the gnav bar to the fitting above the gooseneck on the back of the mast.
3. Attach the wire purchase system as shown. You will find it easier to thread the soft loop in the wire through the boom if you nip it between your fingers.
4. Attach the soft loop (with the shackle from the fittings pack) to the double block.
5. Take the mainsheet and thread as shown, take care to ensure the sheet is put through the ratchet block so that the ratchet engages when easing the mainsheet out.



attaching gnav and mainsheet

stage six

racks and weight correctors

1. Using the weight equalisation matrix on the back page establish your rack settings and how many of the weight correctors you need to carry:

i.e.

Helm 75 kilos (in sailing clothes)

Crew 67 kilos (in sailing clothes)

Rack setting 7, with no corrector weights 3.

The rack settings are counted from 1 (the most inboard hole) through to 8 (the most outboard hole).

3. Therefore, untie the trampoline from the lacing eyes and slide the racks outboard until the hole in the inner rack marries up with the 7th hole in the outer rack (one in from the most outboard hole).
4. Fix the forward rack with the pin and ring. For the aft rack use the pin and "P" clip as shown to attach the toestrap and set the racks, securing the pin with the ring. (This way, as the racks move inboard then the toestraps move correspondingly). If however you find this is too far outboard then simply keep the racks where they are (by using an extra pin) and move the toestraps in a couple of holes.
5. Therefore with the racks secured set your trampoline i.e. slide the trampoline in either the upper or the lower grove of the footrail as shown and wrap the trampoline around itself until the attachment holes in the trampoline are within 10cm of the lacing eyes attached to the deck.

Use the table below to save you time setting up your trampoline.

Rack	Upper/Lower Groove	Number of Turns
8	Lower	0.5
7	Upper	1
6	Lower	1.5
5	Upper	2
4	Lower	2.5
3	Upper	3
2	Lower	3.5
1	Upper	4

When tensioning the trampoline start at one end by tying a small bowline around the eye in the trampoline and then through the corresponding lacing eye and back through the eyelet in the trampoline so that the line runs inside the trampoline, then thread out of the next eye and down to the lacing eye and so on.

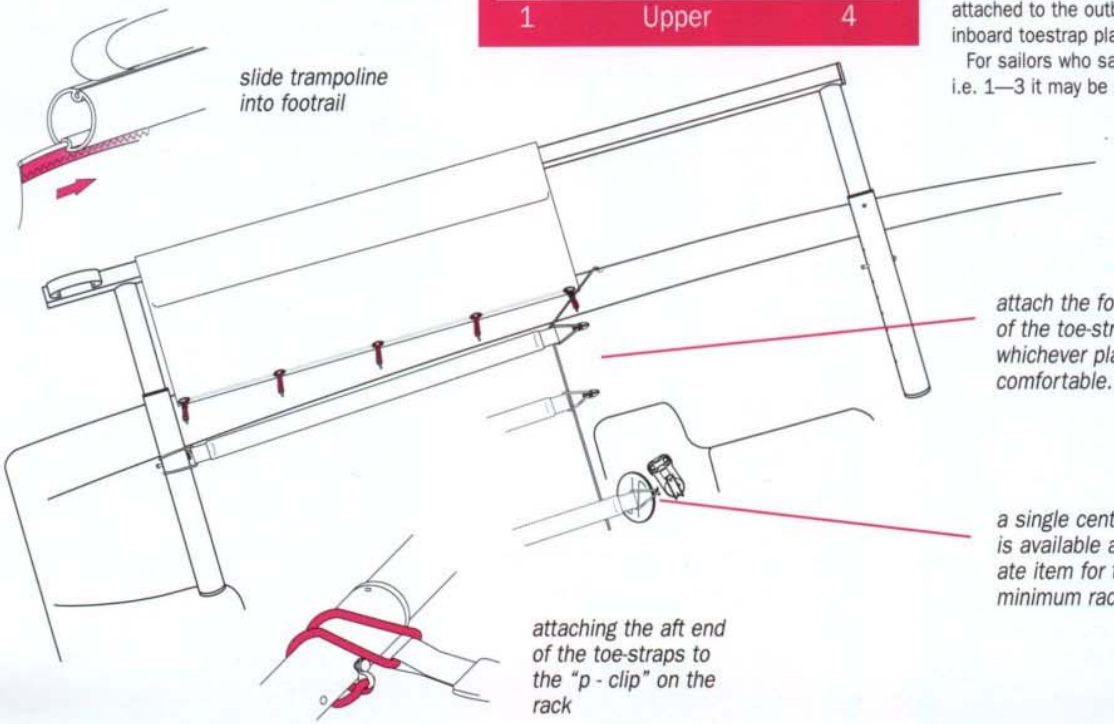
If you then tension the line beyond the eyelet you have just threaded you will find that the line will cleat itself allowing you to thread the next eyelet without worrying about losing tension.

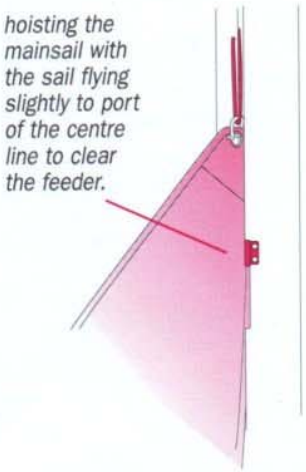
Work all the way through each eye using this method and then secure once you arrive at the opposite end of the trampoline.

You must now add your lead weight correctors (see section 6 Class rules) Unscrew the weight bar that is presently holding a white foam pad and place correct number of weight correctors on the rubber pad. (Cut the corresponding piece from the foam pad and placing the remainder back with the lead then place the bar back in position and secure with the bolt provided).

The aft end of the toestraps are attached to rack as previously shown the forward end can either be attached to the outboard toestrap plate or the inboard toestrap plate, whichever is more convenient.

For sailors who sail on the minimum rack settings i.e. 1—3 it may be necessary to use a centre





toestrap which attaches directly to the eyelet behind the mainsheet ratchet and then aft to the eyelet on the moulding at the transom.

N.B:

This toestrap is supplied as a separate item.

stage seven

attaching the outhaul

1. Place mainsail clew slug in the track on the upper side of the boom.
2. Feed the outhaul through the clew eye. Then tie a stopper knot in the end of the rope, and secure this in the "vee" on the boom end.

stage eight

hoisting the mainsail

1. The main halyard is 2:1 purchase, running through a shackle which attaches to the head of the mainsail. Before attaching the shackle, look aloft to check there are no twists in the halyard. Once attached, feed the head of the mainsail's bolt rope into the sail feeder (above the gnav attachment point on the mast).
2. It is essential that one person hoists the halyard as the other person stands in the boat and keeps the luff tight to the mast below the feeder. Place the halyard to one side of the cleat at the base of the mast to prevent it chafing whilst hoisting.

This is easier if the boat is positioned such that the main will fly slightly to port of the centre-line. This aids the feeding of the bolt rope into the mast track.

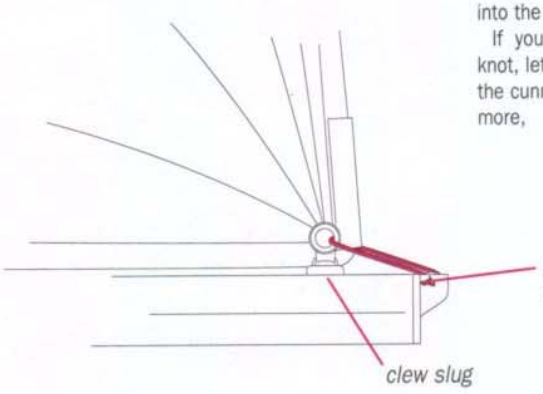
3. Finally, when the mainsail has reached the top of the mast, cleat the halyard and place the coiled halyard tail in the halyard bag on the gennaker sock.

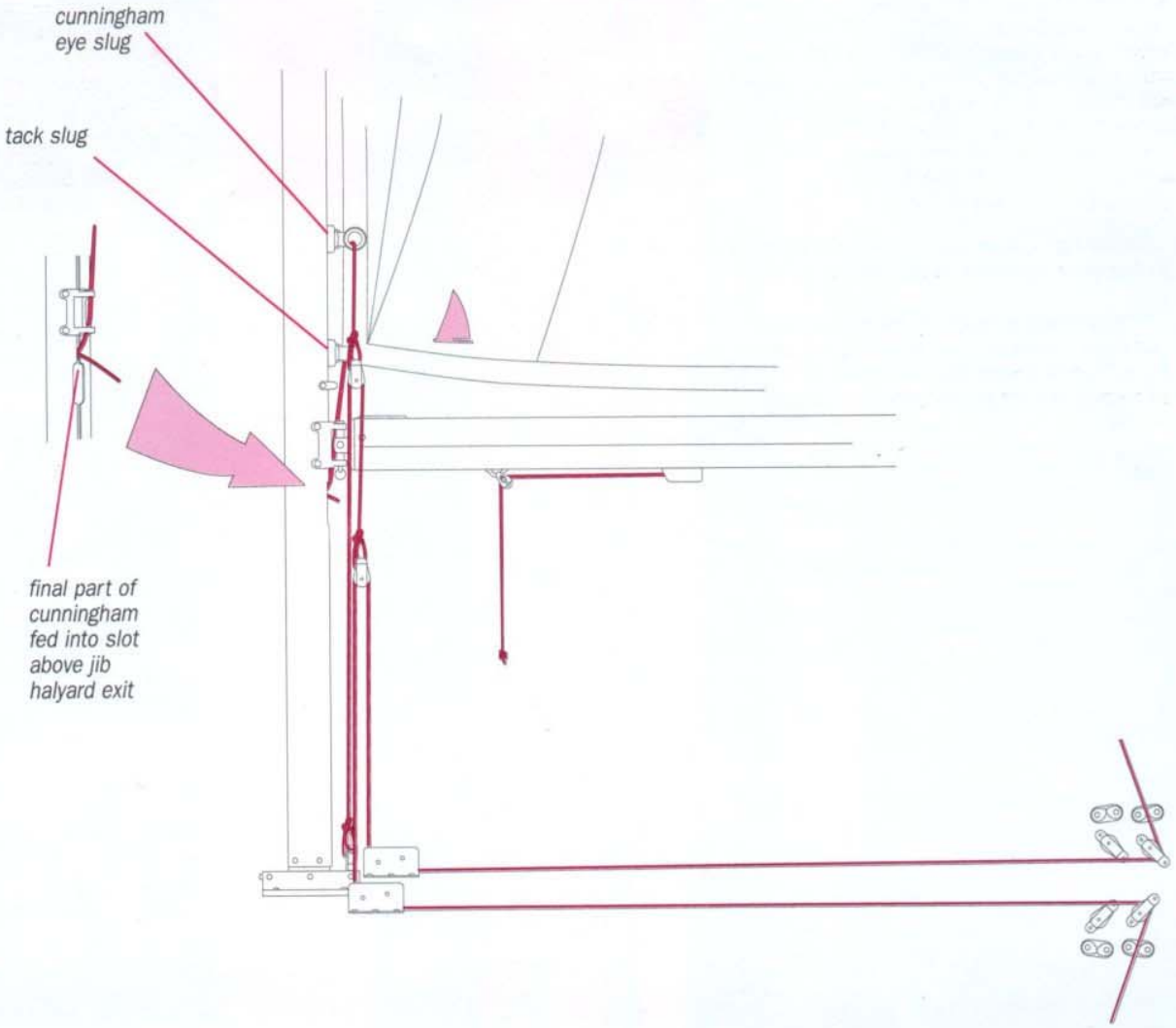
stage nine

cunningham

1. On delivery, the cunningham purchase system will already be rigged on you boat. If however this is not the case then refer to the diagram opposite.
2. Once the mainsail is fully hoisted and cleated, feed the tack slug down into the entry below the gnav bar attachment point and then the cunningham eye slug.
3. Now thread the final part of the cunningham purchase (stripped dyneema) through the cunningham eye and simply knot the end and feed the knot into the slot in the mast at the jib halyard exit.

If you have difficulty reaching this slot with your knot, let a little main halyard slip, secure the end of the cunningham, and then fully hoist the main once more,





Rigging Specifications

Following is the specification of Laser 4000 rigging, as supplied. This is to assist in replacement of worn items.

Item	*Length*	*Diameter*	*Specification*
Mainsheet	6m	9mm	16 plait rope
Jibsheet	10m	6mm	SD3R rope
Spinnaker sheet	12.5m	8mm	Marlow braid
Cunningham control line	10m	4mm	8 plait rope
Kicker control line	10m	4mm	8 plait rope
Cunningham end	0.75m	4.5mm	Uncovered SD3R
Cunningham purchases	1.2m	4mm	SD3R
Centreboard retaining line	1.5m	5mm	Shockcord
Jib halyard*	5.544m	3mm	7x19 Rigging wire
Spinnaker halyard	17m	4mm	8 plait rope
Main halyard	19.5m	4mm	Spectra
Shrouds (x2)	5.021m	3mm	1x19 Rigging wire
Lower shrouds (x2)	1.607m	2.5mm	1x19 Rigging wire
Trapeze wires (x2)	4.435m	2mm	1x19 Rigging wire

The wire rigging is measured between the bearing surface of the "t-terminal" to the inner surface of the eye.

*The jib halyard is measured from the bearing surface of the "t-terminal" to the end of the soft loop. The soft loop is 650mm long. The halyard block must be made up onto the halyard before the ends are swaged.

Class Measurement Rules

Appendix 1
Rigging Diagrams

handbook

diagram i plan

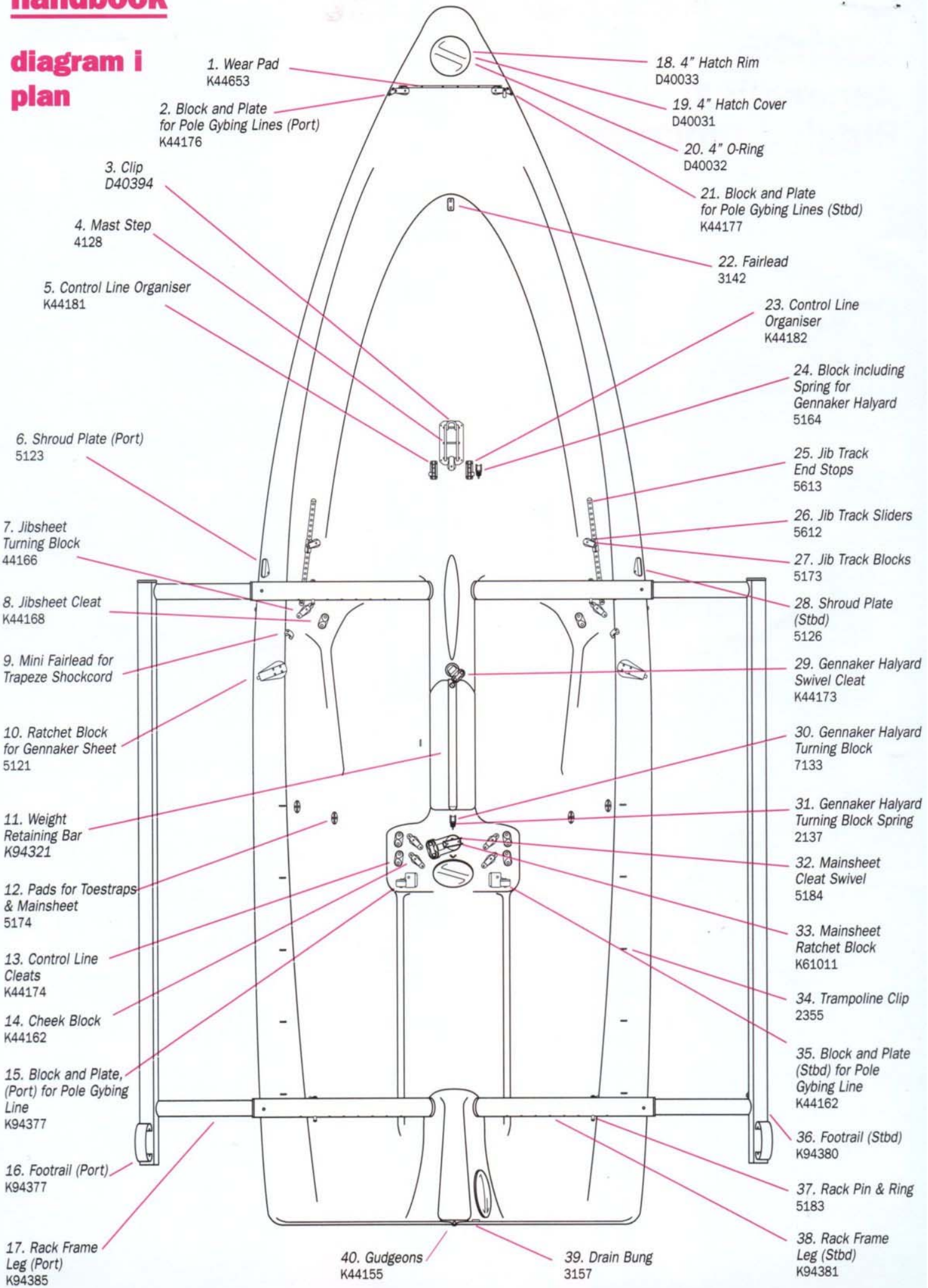


diagram ii
gnav & mainsheet

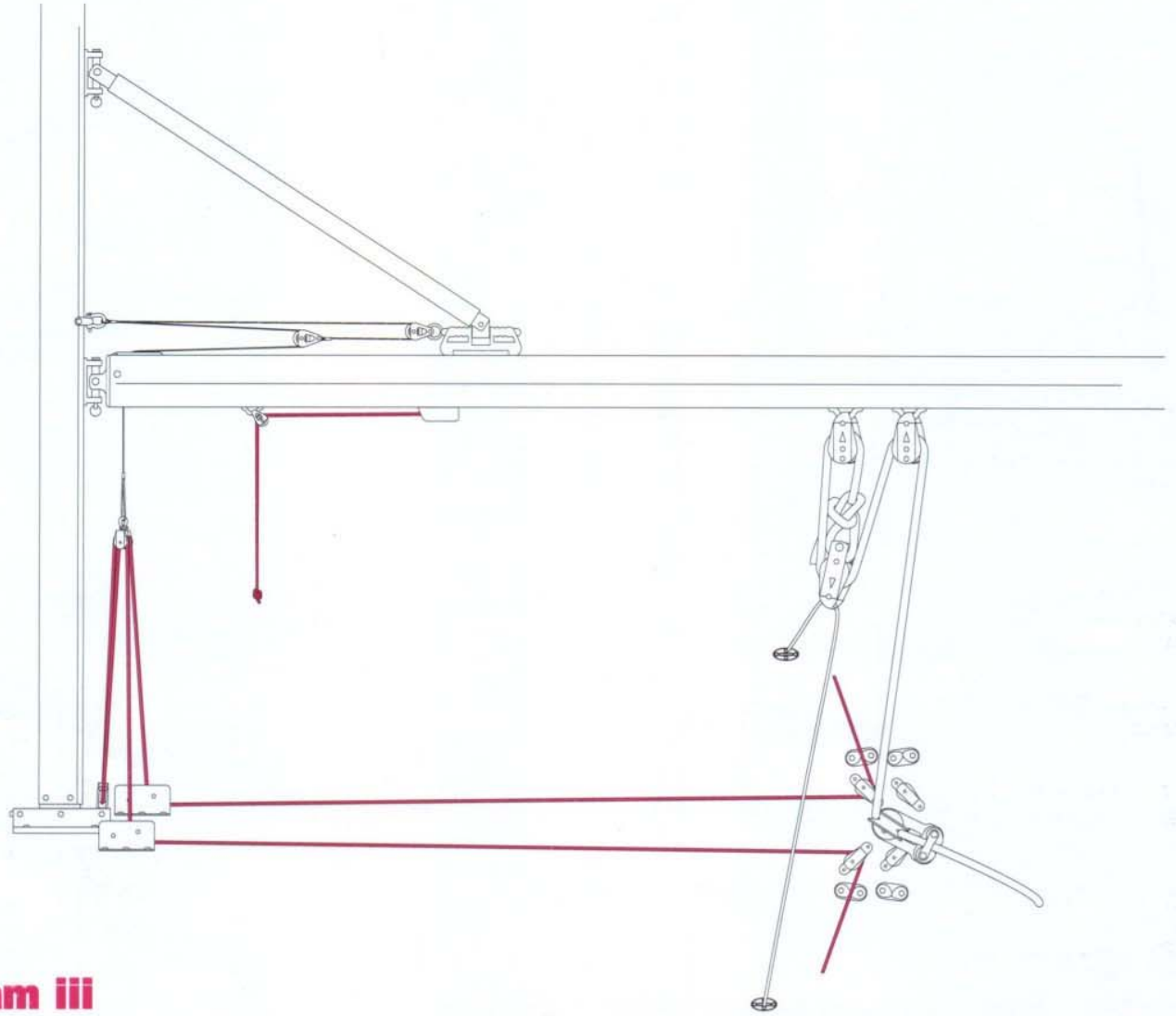


diagram iii
pole gybing lines

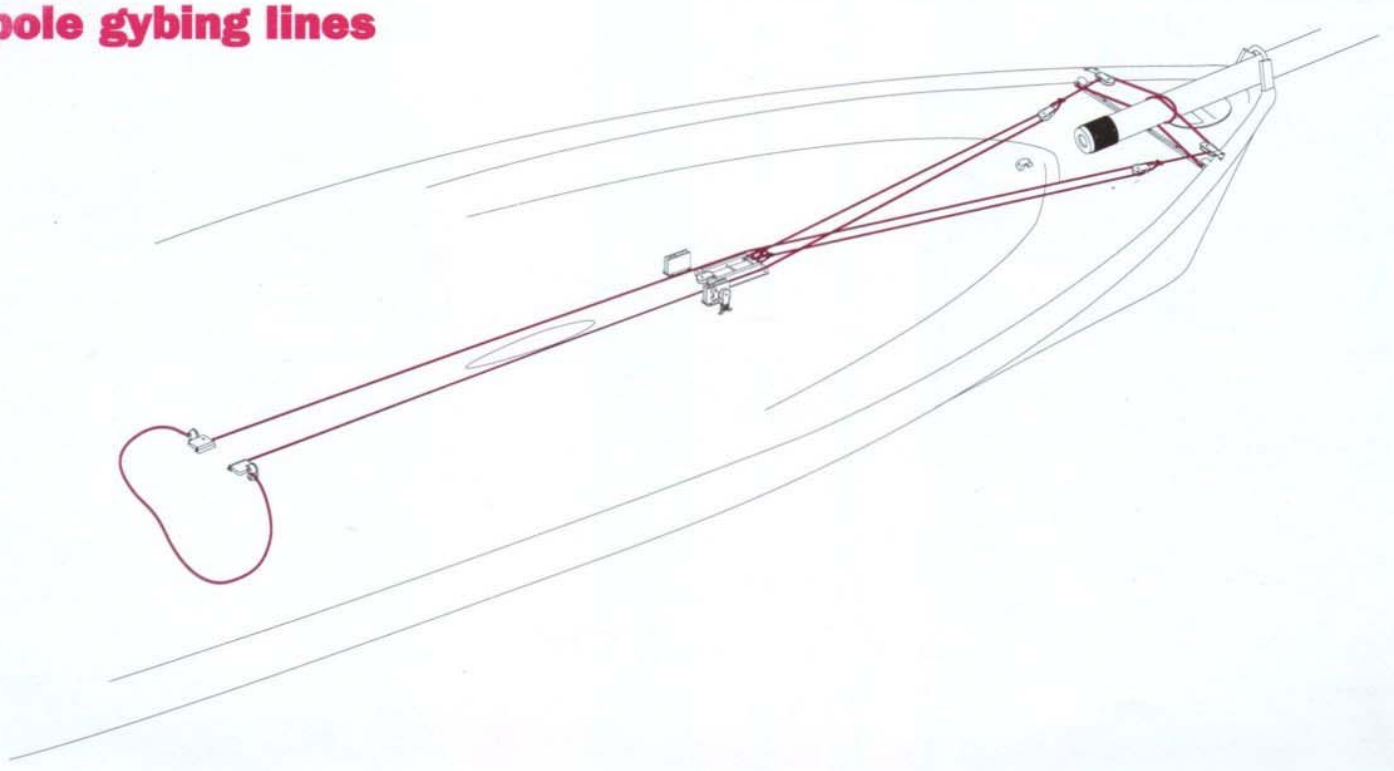


diagram iv
cunningham & outhaul

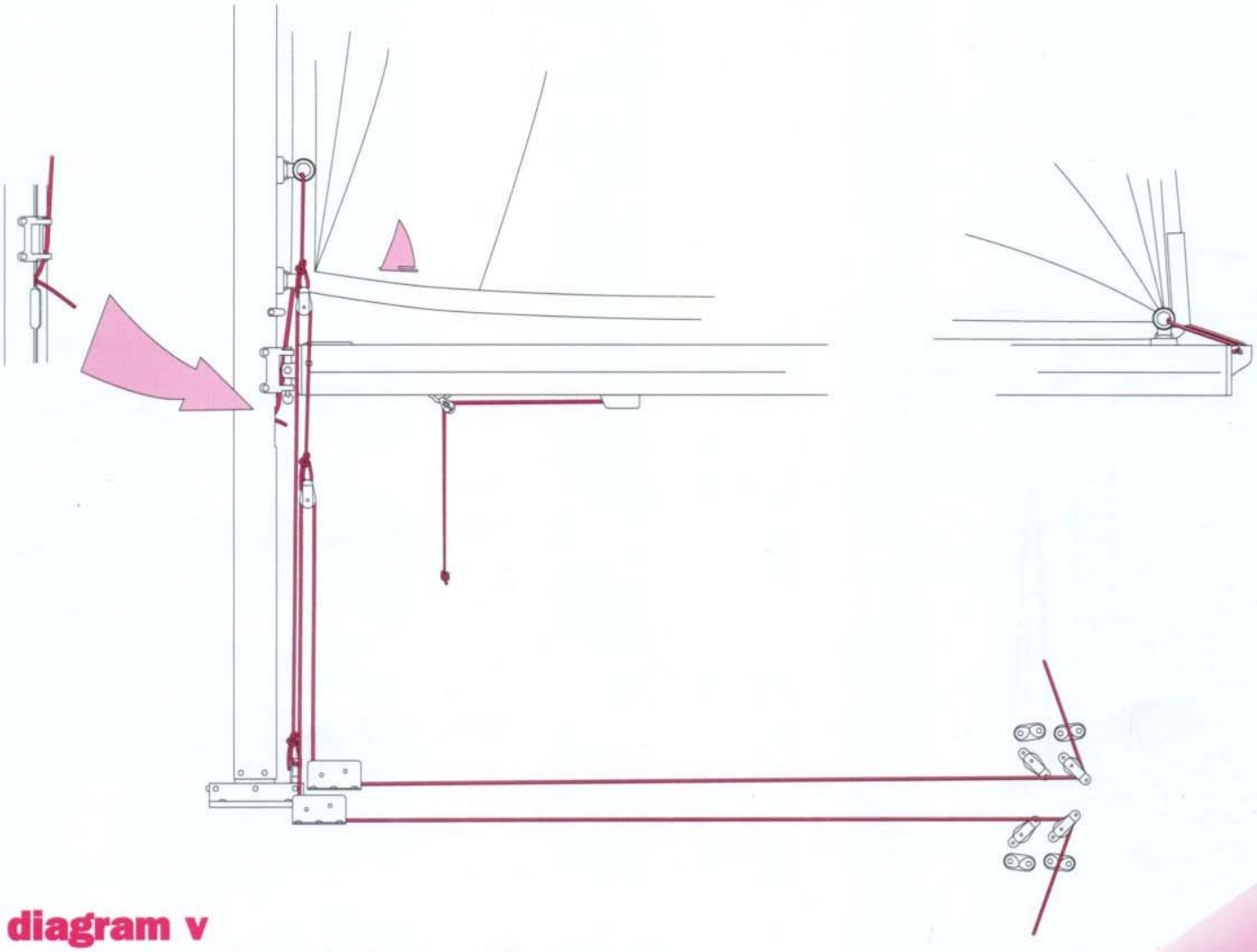


diagram v
spinnaker & pole launching system

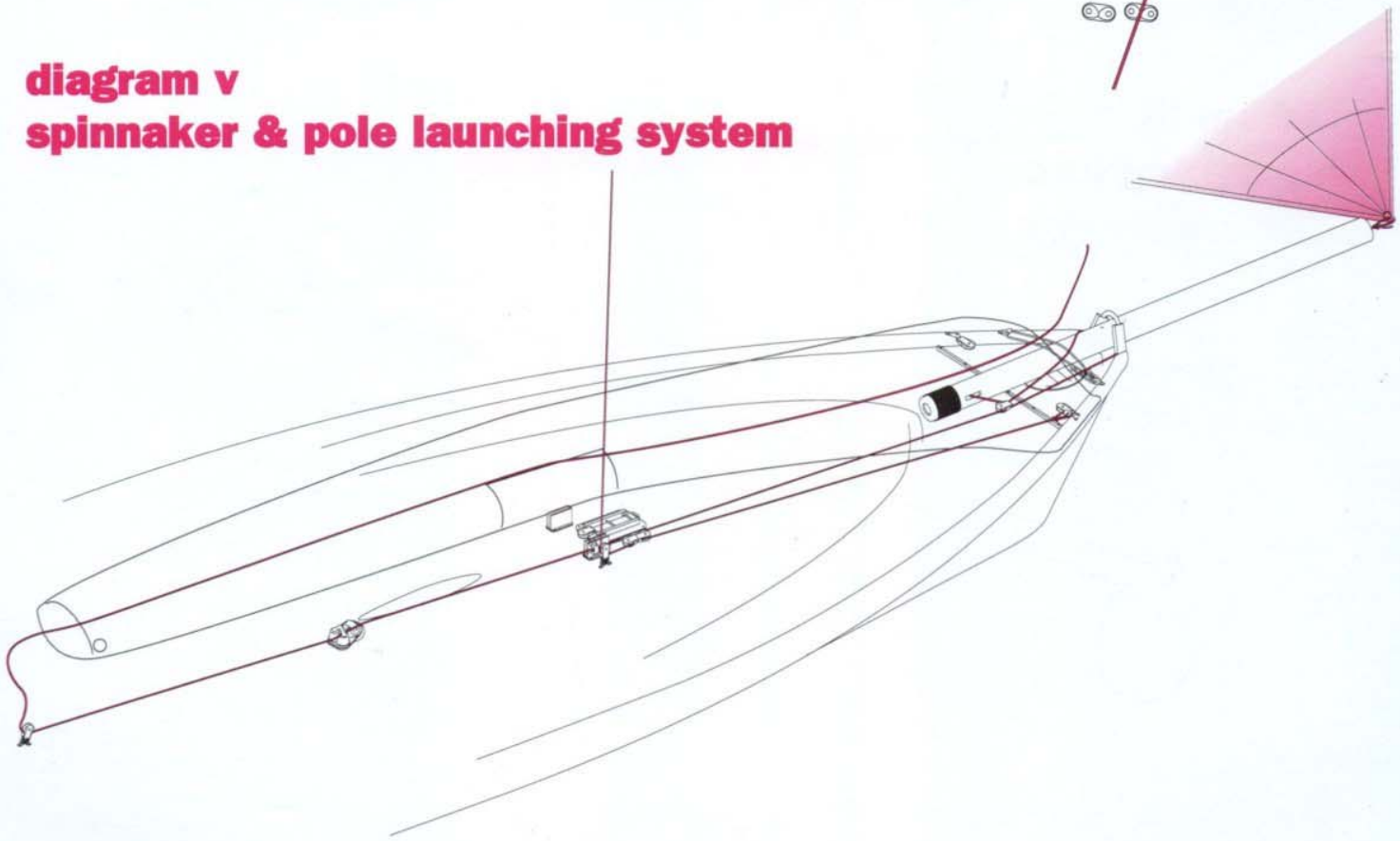
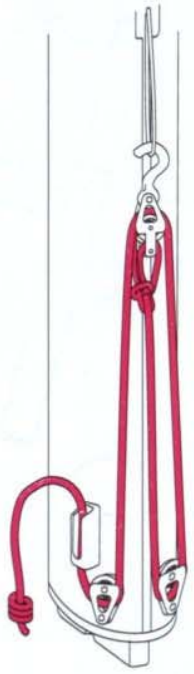


diagram vi
mast rigging



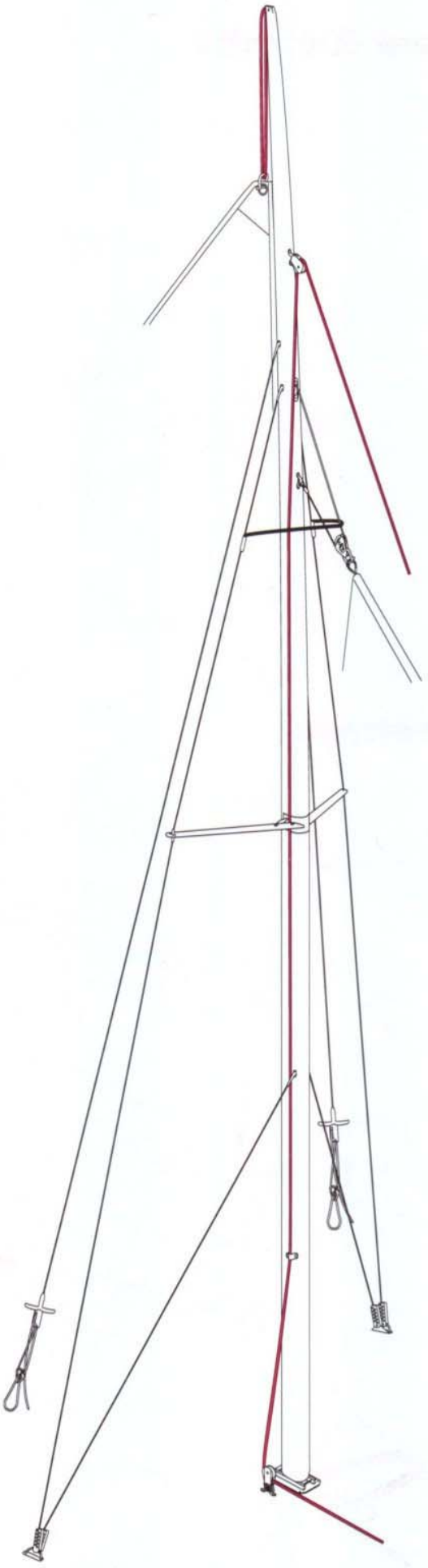


diagram vii
trapeze adjustment & elastic

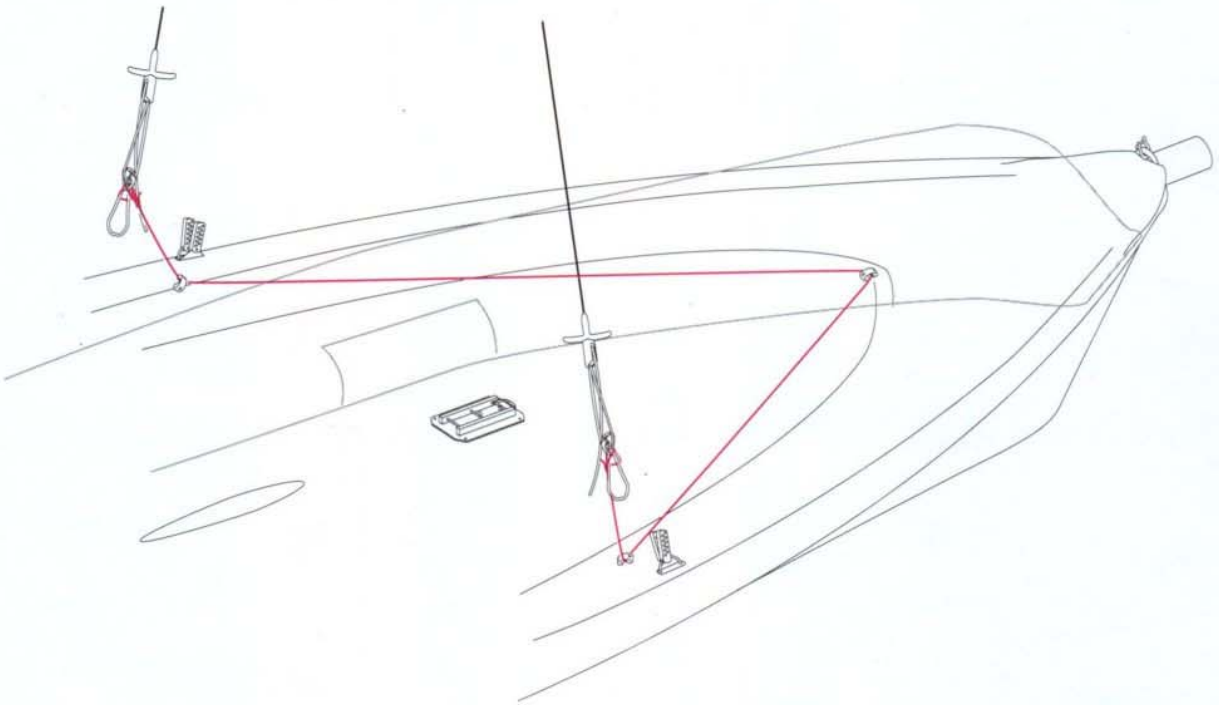


diagram viii
trampoline & toe-straps

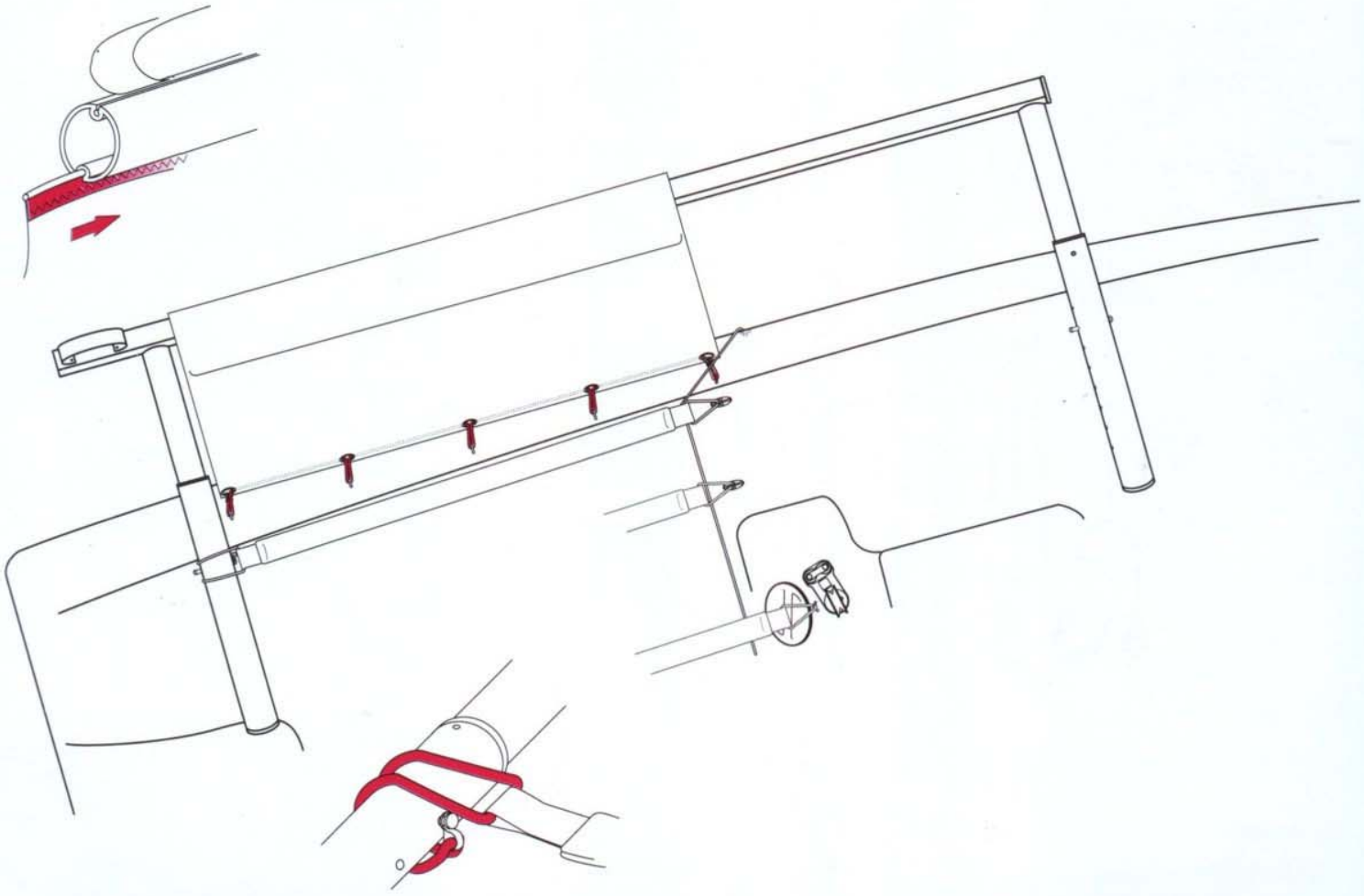


diagram ix
sail numbers

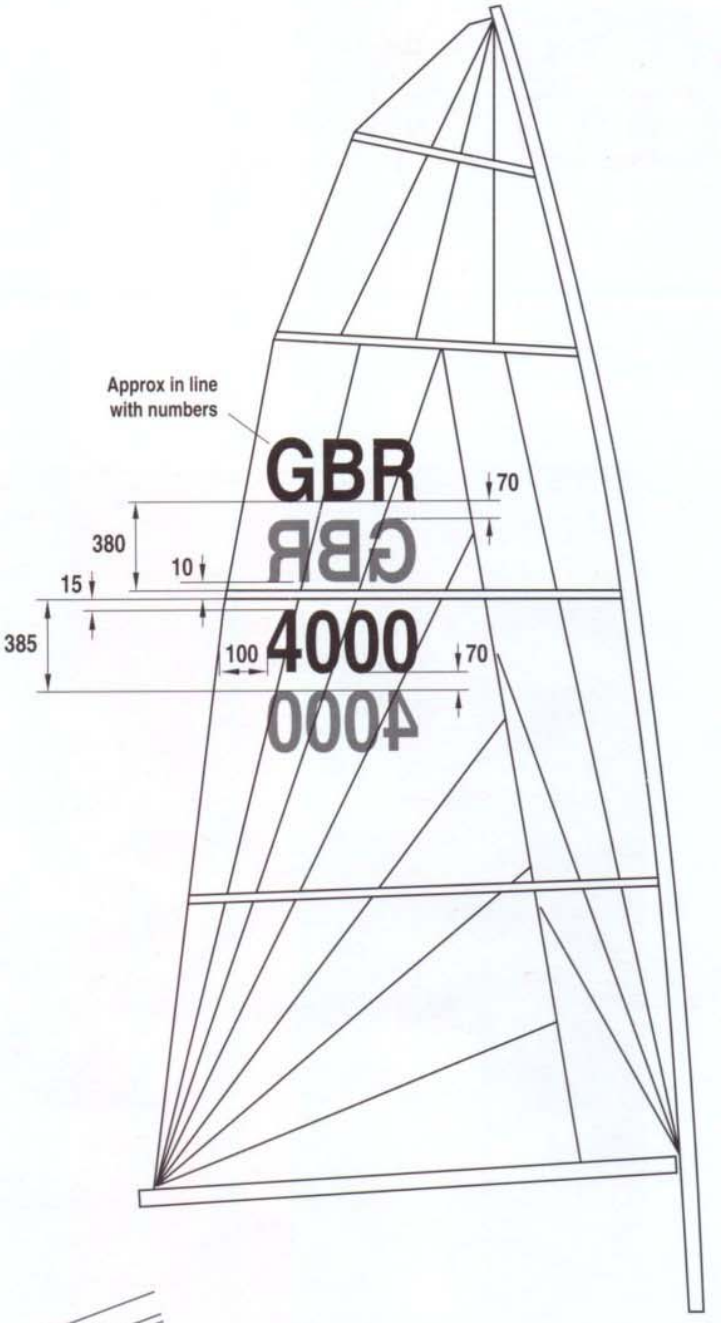
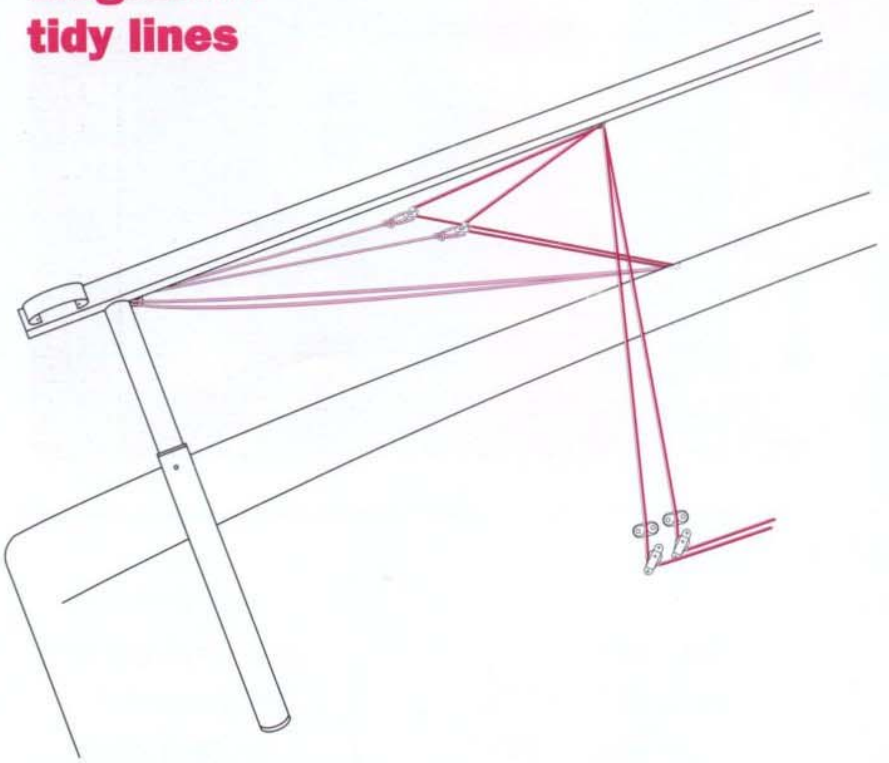


diagram x
tidy lines



Laser 4000

Appendix 1

weight equalisation chart

Crew weight

(in sailing gear) kg

Helm weight (in sailing gear) kg	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
59	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	7	6	6	6	5	5	5	4	4	4	4	3	3	3	2	2	2	2
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74	8	8	8	8	8	8	8	7	7	7	7	6	6	6	5	5	5	5	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1
75	8	8	8	8	8	8	8	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1
76	8	8	8	8	8	8	7	7	7	7	6	6	6	5	5	5	5	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
77	8	8	8	8	8	8	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1
78	8	8	8	8	8	7	7	7	6	6	6	6	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1
79	8	8	8	8	8	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1
80	8	8	8	8	7	7	7	6	6	6	6	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1
81	8	8	8	7	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1
82	8	8	8	7	7	7	6	6	6	6	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1
83	8	8	7	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
84	8	8	7	7	7	6	6	6	6	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
85	8	7	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
86	8	7	7	7	6	6	6	6	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
87	7	7	7	6	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
88	7	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
89	7	7	6	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1
90	7	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
91	7	6	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
92	7	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
93	6	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
94	6	6	6	5	5	5	5	4	4	4	4	3	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

To see how you should sail your Laser 4000, read of the weights of helm and crew. This will give:

1. **Your rack setting.**
2. **How many weight correctors to carry.**

Example:

Helm weight **77**kg
Crew weight **66**kg

} would sail on — rack position **7** carrying **3** weight correctors