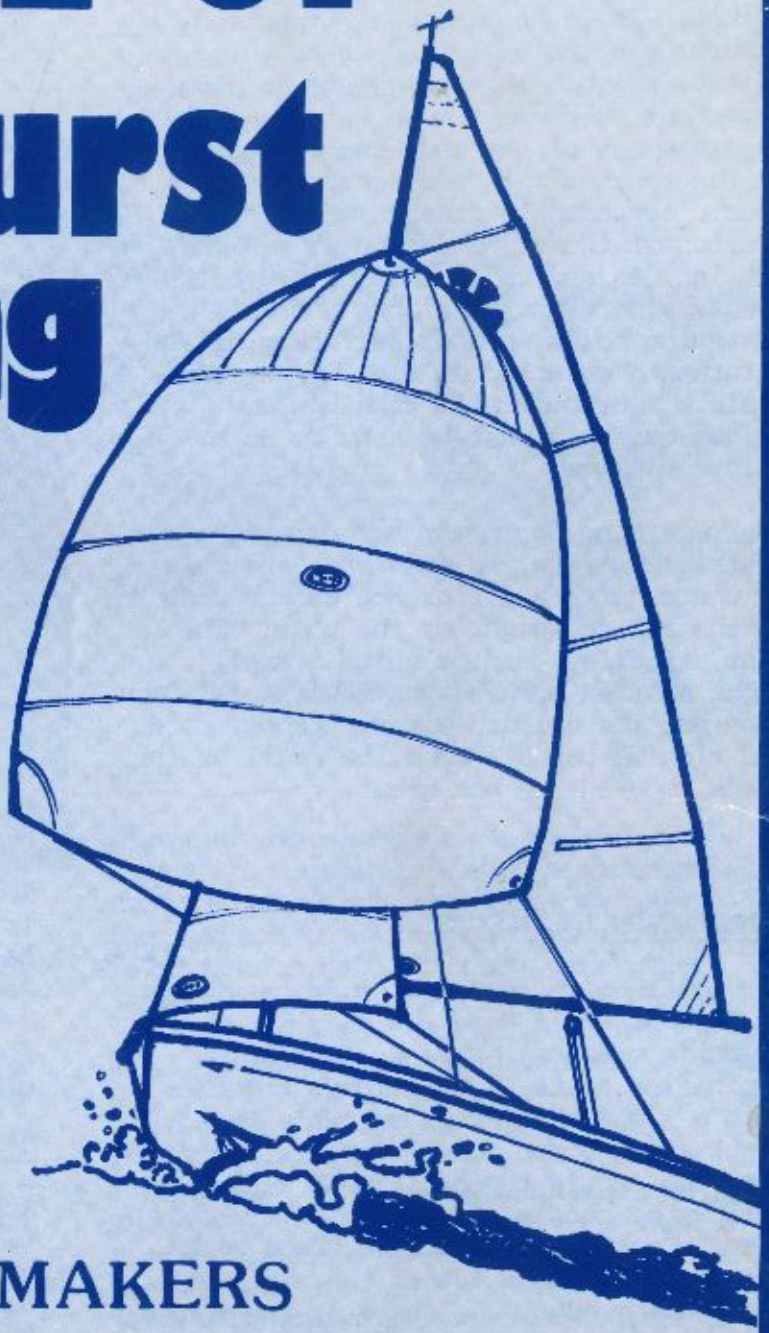
TUNE UP

sunburst tuning guide



HOOD SAILMAKERS

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SUNBURST IN SYMPHONY

The Sunburst is a great little sailing dinghy and is ideal as a father and son or junior training boat. However I believe any sailboat is much more of a pleasure to sail if well tuned, apart from the obvious advantage of then being competitive for those who wish to race.

WEIGHT : The all-up minimum weight of the hull with all fixtures, but minus rudder, centreboard, spars, sails and sheets is 77 kgs. It is of paramount importance to ensure that the hull is down to this weight. Within this weight it is also important to keep as much weight as possible out of the ends and concentrated in the centre. All necessary measures should be taken to prevent water penetration of the timber, such as sealing the insides and undersides of ply bulkheads, side tanks or floors and all fastening holes, proper surfacing of joints and covering or sealing any end grain. Your boat will take up some weight but this must be kept to an absolute minimum.

The remaining equipment has no weight restrictions, only dimensional and this is where quite a difference can be made to the all-up weight of the boat. The mast, if alloy, can be quite a small light section such as the Baverstock 50mm tube but the halyard wires, strops, cords and rigging can all be quite small as the loads imposed are not great.

CENTREBOARD AND RUDDER

The centreboard need not be as heavy as lead to be stiff (and rigidity is of prime importance). Various forms of laminating quite light timbers together with a light skin of glass can make a light stiff board. Don't forget to cut away the centre top of it when made and hollow the handle sides. The centreboard should be aerofoil in shape with the maximum camber 40% of the width from the leading edge. The shape at the forrard end should be reasonably bluff with the aft shape only slightly more curve than a straight line back to a squared off trailing edge 2mm thick.

Likewise the rudder blade should be kept as light as possible bearing in mind that it must fit within the template but not necessarily as large as the template. A straight blade 210mm in width is sufficient strength in the required thickness a light timber can really be used. Make sure the leading edge of the blade when set for sailing is square to the waterline to avoid weather helm. The gudgeons can be strong also without being heavy. Rules do not allow these to be set out from the stern.

Tiller:

This should be either fixed to the rudder or have a very positive fit so that there is no slop when sailing as this can be very disconcerting to the helmsman. The tiller extension can be of many types but usually consists of a 12mm alloy tube with a universal joint at the for'ard end of the tiller and a pin through it approximately 25mm in from the aft end. A small nylon or s/s clip near the aft end on the tiller will keep it in place when not being used. Use a locktite nut on the tiller extension bolt as it can be most disconcerting to have it come out in your hand and end up deserting ship!

THE RIG

MAST

The maximum length of the mast measured from the top of the gunwale to the main halyard sheave is 5080mm. Make sure this maximum length is maintained as it gives reasonable clearance under the main boom for manouvering inside the boat, particularly if false floored.

MAIN HALYARD

A short wire 2mm 6 x 19 or 7 x 7 s/s flex strop (approx. 450mm) shackled to the headboard and terminated at a halyard lock on the for'ard face of the mast is the normal system for the main halyard. Make sure when locked in place The headboard is as close to the masthead sheave as possible. This gives the maximum bending moment to the spar, particularly important with this untapered extrusion.

FORESTAY

2mm 1 x 19 s/s wire. The attachment point for this and the tack of the jib should be kept as close to the stem as possible.

Side Shrouds

3mm s/s 1 x 19. Mast shackles can be 3mm diameter with perhaps the side shrouds and forestay requiring 4mm diameter. The main boom needs to be light and stiff with only enough length beyond the stretched foot of the main to house a sheave for the outhaul wire; an extrusion cut to a length of 2470mm. The spinnaker boom can be made from 30mm x 1mm tube and it is wise to seal the ends so that it will float if dropped overboard.

Forestay Attachment

SPINNAKER HALYARD

Preferably internal, fix this at the maximum allowable height but put a mark on the halyard at the cam cleat with the head of the spinnaker approx. 150mm from the sheave. This provides a better slot effect between spinnaker and main when reaching and helps project the spinnaker further to windward when running. Terylene braid approx. 4.5mm diameter makes the best halyard (Donaghy's 140c) and can be continued from the cam cleat on the (starb'd) side of the centre case aft to a pulley at the mainsheet traveller and then for'ard through a launcher tube to a retriever patch in the centre of the spinnaker. Use a metal cam to prevent slipping (make sure the teeth of the cam come together when closed as some do not).

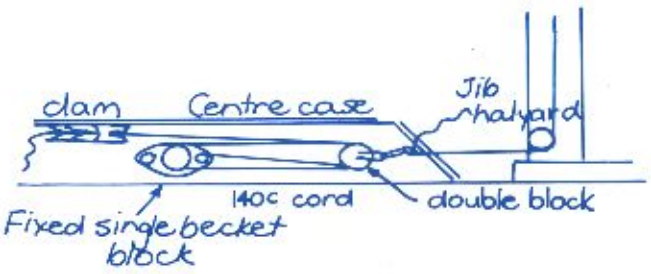
JIB HALYARD

There is no restriction on the height of the jib halyard attachment and if this is located approx. 1700mm below the masthead with the shroud attachments at 1550mm it gives some bending moment to the spar when under tension.

The best system I have seen for jib halyard tension is to exit the jib halyard wire at a sheave box in the base of the mast and shackle to a block and tackle system on the port side of the centrecase.

When the jib halyard is tensioned, the forestay must be quite slack so as not to share any of the load which would cause jib luff sag. Jib luff tension is increased progressively from light to heavy airs.

If a roller jib is used, the attachment point shall not be below 1550mm from the masthead in which case the side shrouds are best placed at 1500mm. Jib halyard wire 2.5mm 7 x 7 or 6 x 19 s/s flex.



Jib Halyard Tension System

RAKE

Assuming the mast is made to maximum length, I suggest the rake as measured from the masthead to the centre top of the transom to be between 5550mm and 5520mm. As a rule of thumb, more rake improves windward performance while more vertical is faster downwind. However, too much rake can develop weather helm.

SPINNAKER BOOM SYSTEM

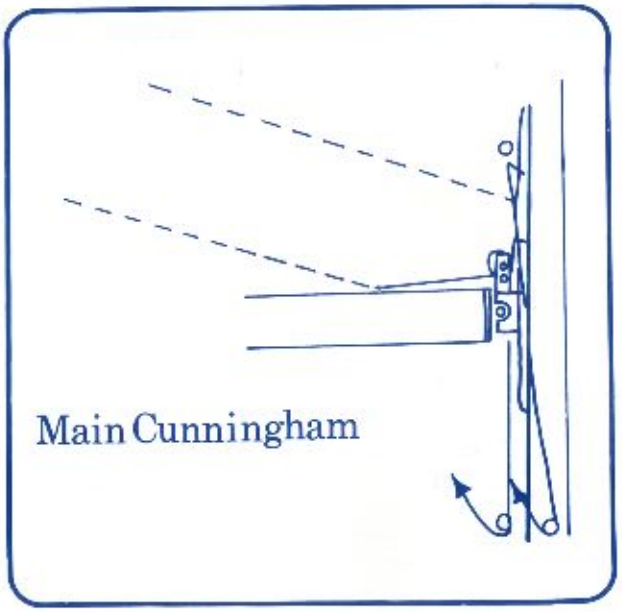
The best spinnaker boom system system I have seen has a jaw on each end of the spinnaker boom, one horizontal, one vertical, with a groove in the centre just large enough for the spinnaker sheet. This avoids the problem of having to clip and unclip the spinnaker boom on to a becket on the mast. A plastic oar sleeve with the lip down and a piece of plastic hose wrapped around the sleeve approx. 50mm above the lip keeps the pole in

position. The positioning of the spinnaker boom on the mast needs to be approx. 300mm above the gooseneck. If the spinnaker boom is carried on the main boom, the topping lift can be left attached by using a circular fitting on the pole for attachment of same. A stud protrudes from the side of the spinnaker boom so that the ring when turned one way passes over it to allow the ring (with the topping lift attached) to slide to the for'ard end of the pole when stowed on the main boom. The stud should pass through the spinnaker boom on the diagonal or have two studs - one horizontal and one vertical. To keep the spinnaker boom on the main boom it requires a metal or rigid plastic hoop fixed approx. 1650mm aft of the gooseneck to the side of the boom for the aft end of the pole and a rigid hook (an off cut from the main boom using 2/3 of the shape is sufficient) just aft of the gooseneck (200mm). The latter holds down the spinnaker boom against the pull of the shock cord on the topping lift. Twisting and sliding it back over the knotch when gybing, locates it on the outboard half of the boom on the new gybe. A short piece of shock cord with a cord attached to it is a simple system for the topping lift. This should be set so as to give spring to the pole but prevent it from dropping below the horizontal when the shock cord is extended to maximum. The downhaul fixed to the ring on the spinnaker pole leads down to a saddle at the for'ard edge of the mast, then aft to a clam on the centre case.

SHAPE CONTROL

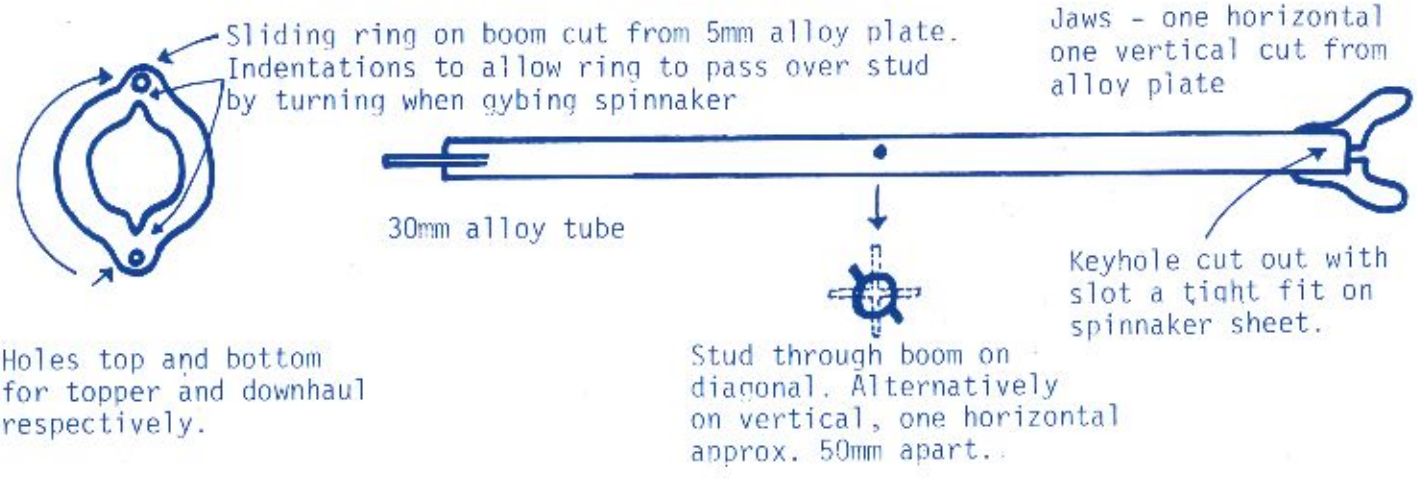
MAIN CUNNINGHAM

Although the gooseneck is usually on a slide, it is difficult to adjust when sailing, so a cunningham eye is an advantage. A simple single or double-sided system can be used; either way it needs to be able to be adjusted easily while sailing.



MAIN BOOM OUTHAUL

Wire is preferable for positive adjustment due to lack of stretch. A double purchase is essential so that a young crew can handle it. The illustration shows two systems commonly in use but there are many other variations of these.

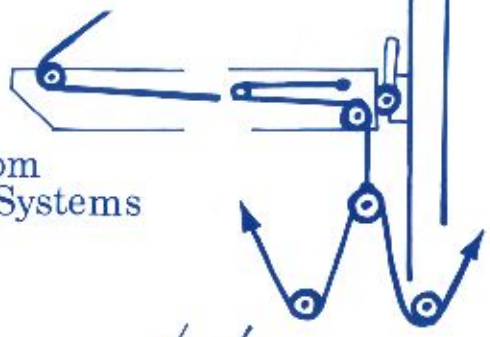


SPINNAKER BOOM SYSTEM

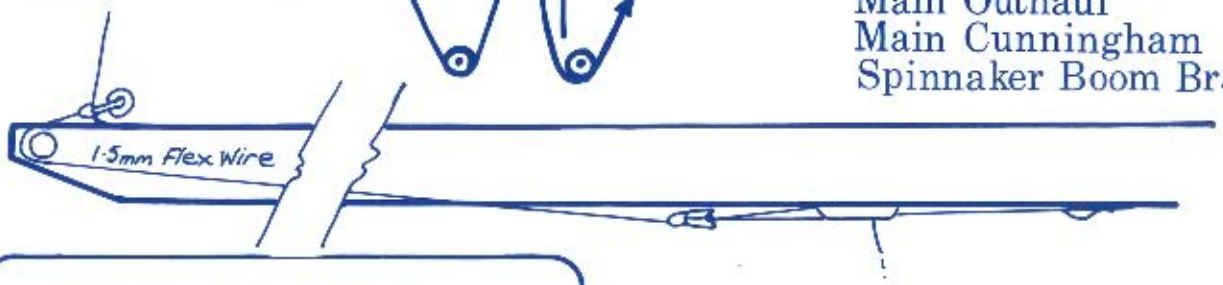
1. Shackle the wire on to the clew, pass round a sheave in the end of the boom and terminate under the boom at a small pulley. A cord can then dead-end further for'ard on the boom, go aft through the pulley and back for'ard to a clam cleat.

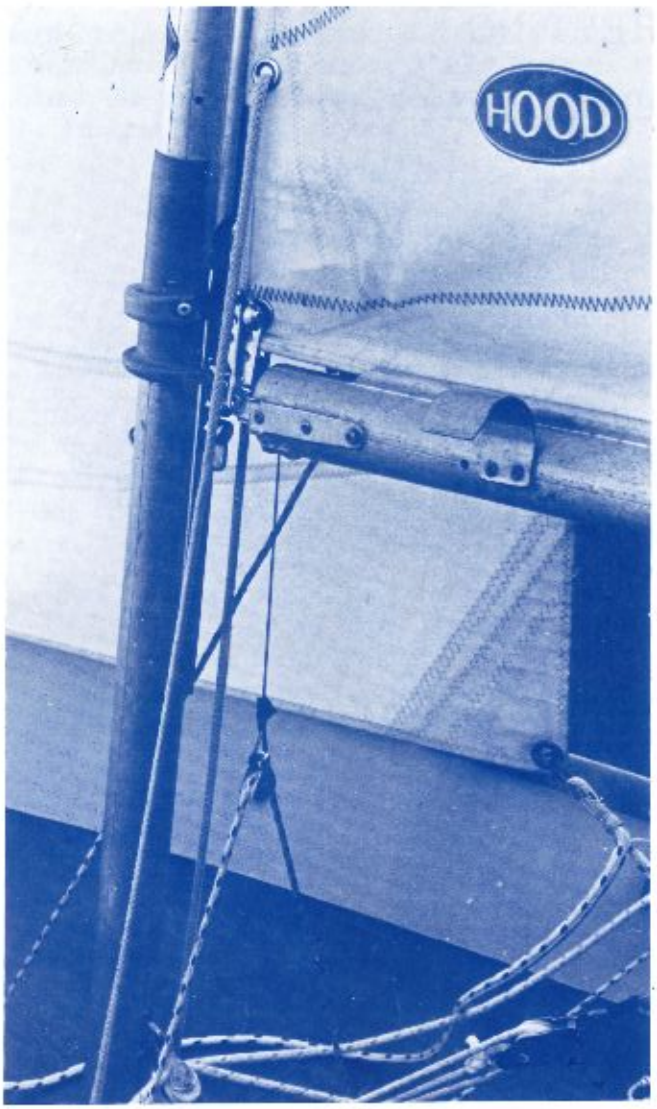
2. The same as '1' at the outboard end then the wire terminates at a pulley inside the boom. A further wire dead ended on one of the gooseneck bolts passes through this pulley and out of the for'ard end of the main boom through another sheave box and terminates at another pulley below the gooseneck. A cord passing through this connects via pulleys at the base of the mast to each side of the boat. This provides the for'ard hand with the ability to adjust this when sailing with little effort on either tack or gybe.
1.5mm s/s flex with 4mm braid tail.

Draft scales (numbered adhesive strips) can be attached to both sides of the mainboom at the clew position so that once the most efficient position is found for a given set of conditions, it can be repeated with ease.

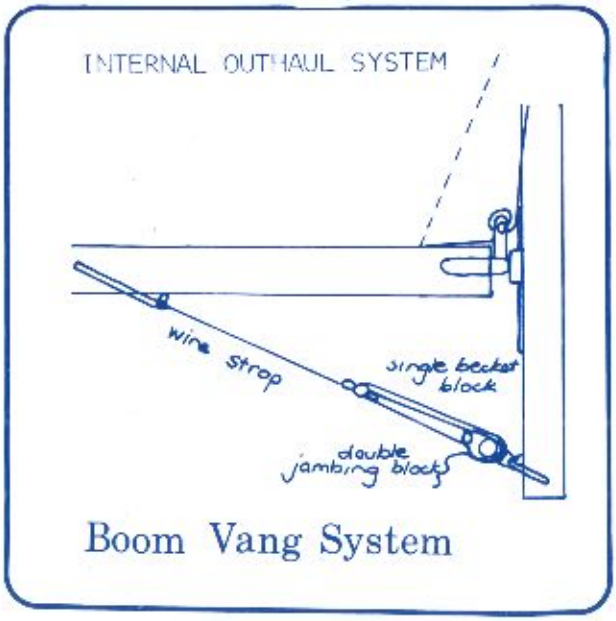


Main Boom
Outhaul Systems





Main Outhaul
Main Cunningham
Spinnaker Boom Bracket



Boom Vang System

BOOM VANG (KICKER)

The boom vang should be wire (to avoid stretch) for most of its length, then terminate with a block and tackle system. More sophistacated drum type systems are not permitted. Be careful not to have the vang too tight in the light and it should be slack to windward in the light. In a fresh breeze it can be used to help hold the leech of the main allowing the use of the mainsheet for athwartship control (like having an extra long traveller) This will bend the mast considerably low down which may not necessarily be a good thing. In other words, make sure the mast can take it.

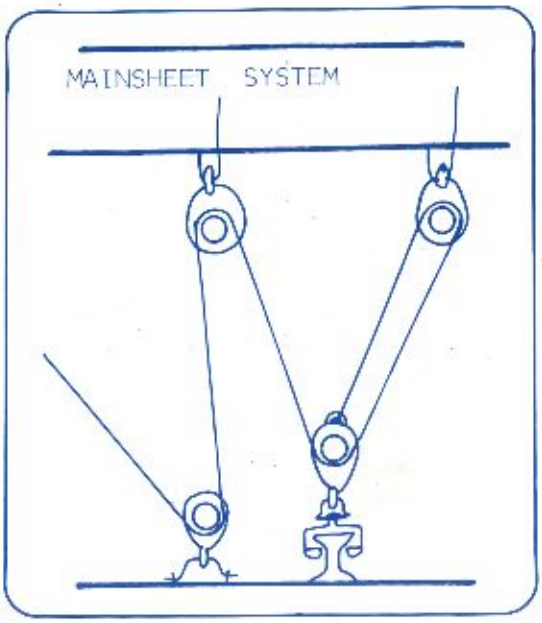
SHEETING

MAINSHEET SYSTEM

I believe central sheeting is the best method for a Sunburst mainsheet both for trimming and for ease of handling. A braid of 8mm diameter should be used as being the smallest size which can be easily handled yet run freely through the blocks. The smaller size also avoids extra weight when wet. A single four part purchase system as laid out below is effective. I would suggest a couple of marks on the mainsheet where it comes out of the last boom block as a guide to sheet tension. This way when the boat is performing well the tension can be repeated from tack to tack. The position of the traveller can vary but I prefer it at 900mm from the stern as further for'ard necessitates adjusting it to weather of centre in light breezes or too much tension is applied to the centre of the boom.

With the traveller in this position and the lazy block a further 100mm for'ard it facilitates tacking with the skipper crossing the boat between the traveller and the centrecase. This is important when the skipper is an adult or similar heavy person as it keeps the weight out of the stern which would slow the tacking manoeuvre. If the skipper is light as with two young people this is not so critical and so the traveller can be mounted at 1130mm from the stern with the lazy block 150mm aft of the traveller. This latter system is more convenient as the skipper is then in close contact with tiller in the tack as opposed to having to go round for'ard of the mainsheet and pick the tiller up on the other side. I prefer a ratchet block as the lazy block so that this can be hand held most of the time and adjusted consistently. A cam cleat can be mounted on, or just inside, the gunwale on each side for when the mainsheet needs to be cleated.

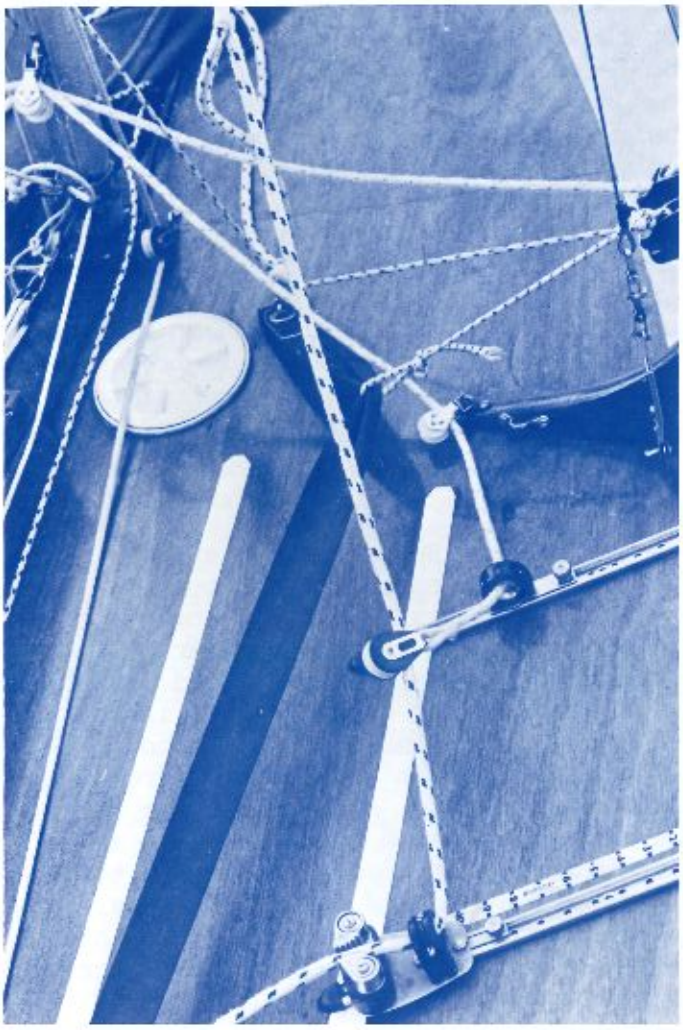
For side tank boats the traveller is best mounted approx. 100mm above the floor. Sheet length required 8m



JIB SHEETING

The stemhead fitting should be as low as possible to the stem as this keeps the tack of the jib low down and provides the maximum clearance of the head of the jib from the mast and therefore the mainsail. The sheeting position for the jib should be approx. 1650mm from the bow and 450mm from the centre of the case giving an effective sheeting angle of 15 degrees. This is taken off a false floored boat with the floor at the centre case 110mm below the top of the case. If a side tank version, this point will be a little further for'ard of this. If the jib sheeting track is run along the boat it should be approximately along this angle. This may vary from boat to boat because of the variation in mast position and from jib to jib depending on sizes, make and type of cut, but this gives a starting point from which to work. An alternative is to have two tracks running athwartships, one with the fairlead and cam and one with the barberhaul line to a clam where it can be adjusted by the for'ard hand. The sheet size should not be more than 8mm.

Basically the jib should be sheeted slightly further aft than normal for very light or fresh airs. Sheet length required 7.5mm.



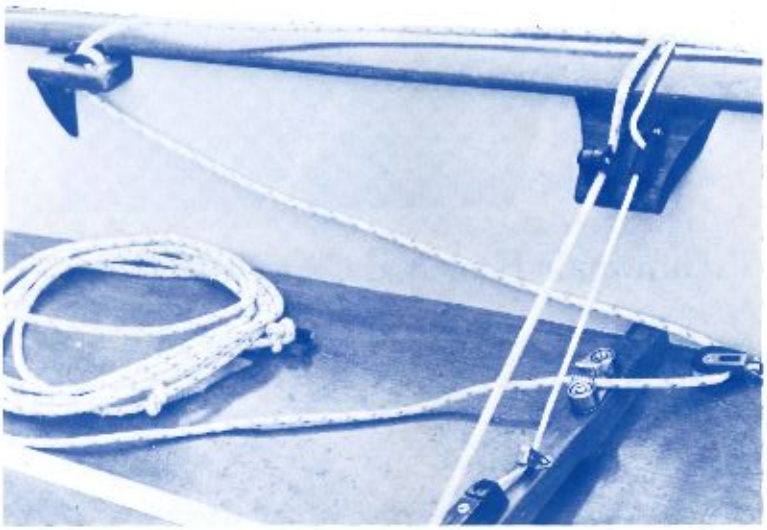
Jib Sheeting

SPINNAKER SHEETING

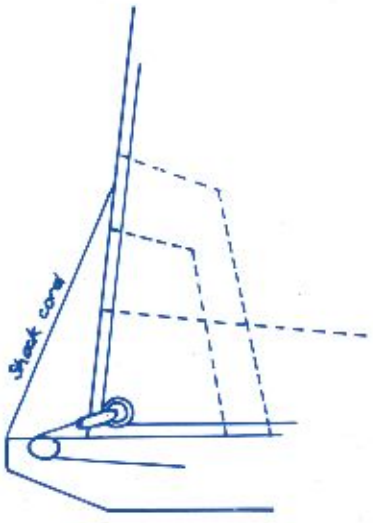
The spinnaker sheeting pulley should be located 600mm from the stern in order to carry the spinnaker shy, effectively.

If this pulley (a roller bearing block) is mounted just inside the gunwale, the sheet can then lead for'ard to another roller bearing block on the edge of the false floor (on top of the seat outboard) for ease of handling by the for'ard hand. It is also easier for the skipper for handling it in the gybe because he is facing for'ard when doing so. Cams can be mounted on blocks (or an extension of the traveller) facing aft within easy reach of the helmsman if he needs to cleat them. When gybing the skipper puts the tiller between his legs and handles the sheets with the for'ard hand gybing the main. This way the spinnaker can be kept setting while the for'ard hand ducks under the main boom. Gunwale hooks should be placed in the vicinity of the chainplates (a little aft) for shy reaching and the leeward one is an advantage for the sheet when running dead downwind to help keep the clews of the spinnaker approximately level. If the sheet is too high (sheeting too far aft) the luff will break early and the spinnaker will need to be over-trimmed to set. If the sheet is too low (sheeting too far forward) the leech will be too tight causing mainsail backwind, the boat to go sideways and be difficult to control.

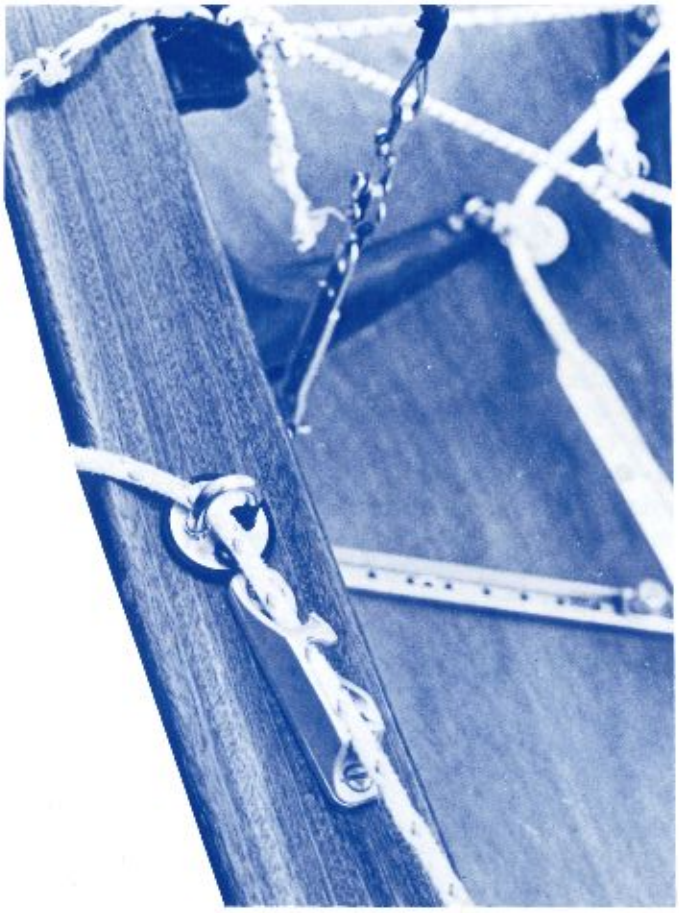
Open sided clam cleats mounted just aft of the gunwale hooks act as cleats for the brace (guy). Spinnaker sheet size needs to be 5-6mm for ease of handling, length required 11.6m. Apiece of fine shockcord from the leech of the main just above the boom to the end tip of the boom will prevent the spinnaker sheet being caught around it.



Spinnaker Sheet/Brace



Spinnaker Sheet Preventer

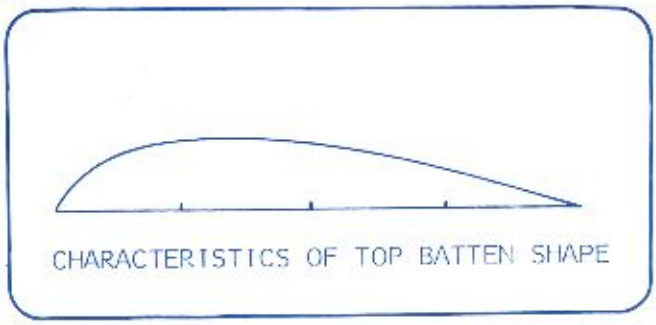


Gunwhale Hook and Clam

SAILS

MAIN

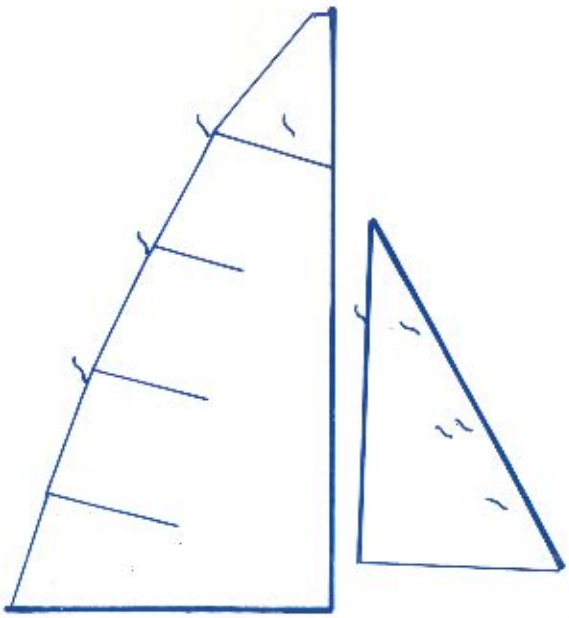
The Sunburst, unlike most other dinghy classes today has a non-tapered alloy mast extrusion (unless wood when it can be tapered) and the main has to be cut specifically with this in mind. As a result the top batten is critical to the boat's performance because it has to achieve a similiar effect of dropping off the head of the sail in a gust that the tapered mast would do. To do this the top batten should be stiff for the aft two-thirds of its length with the maximum bend (quite soft) in the for'ard third which can best be achieved with a fibre-glass batten.



The second batten down should be soft for the for'ard third and stiffer up to the leech. The third and fourth battens down should be quite stiff throughout their length but tapered at the inboard end to prevent a hard spot forming at this part of the sail. The racing main is made from a wide panel dacron fabric 3.8oz in weight. This sail is made with a reasonable amount of shape at the foot but should have some foot tension applied to the outhaul in all except light breezes and a jobbly sea where it is better to drive off a little to gain boat speed.

JIB

The jib for the Sunburst is a special sail with its own characteristics peculiar to the Sunburst. This is mainly because of three factors; it is a particularly small sail with a high aspect ratio and has no leech battens. For these reasons it is cut from a hard finish 3.8oz dacron in a particular way that is different from most other classes. As a result, to get the best performance from the boat, a certain amount of leech flutter has to be tolerated to windward in most breezes. To sheet the jib for'ard and eliminate this will jam the slot with a resultant decrease in boat speed. Because of its size and shape a luff cunningham is not really necessary.

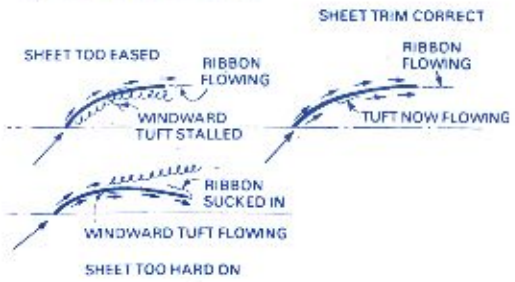


Telltale Positions

TELLTALES

The telltales on the main should be placed just above (or below) each batten pocket and another one halfway across the sail just above (or below) the top batten. To windward in a moderate breeze it should be possible to keep the lower leech telltales flowing. The centre one at the head is a guide to boom vang tension (therefore twist in the upper portion of the main) and main boom position when reaching. It is a difficult telltale to set and it often seems that the main is further eased than it should be to keep it flowing. The mainsheet should be seized or shackled to its appropiate main sheet block so that it provides a constant and then one or two marks on the mainsheet to indicate the trimmed position when sailing to windward, usually best situated near one of the mainboom pulleys. The upper leech telltale should flow on and off in all but very light breezes.

How the mainsail, in section, behaves at the top wool tufts and ribbon.



JIB TELLTALES

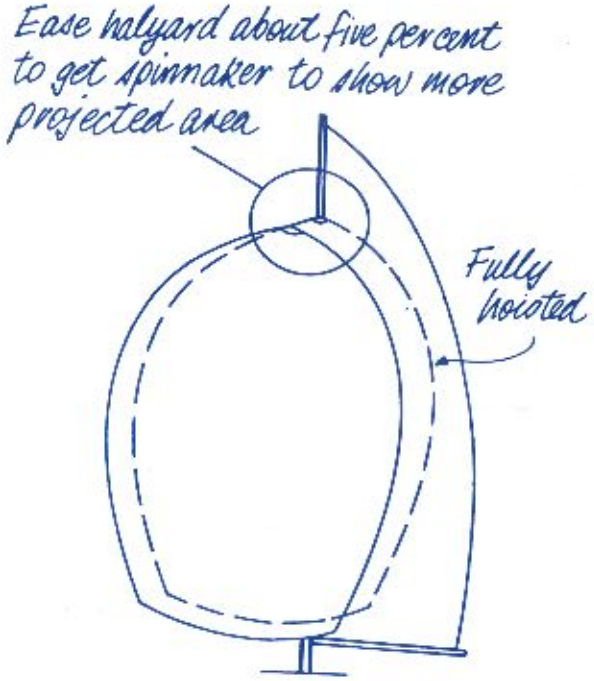
Four positions are necessary for the telltales as shown, with two being placed at the centre position. In some conditions it is possible to have one of these lifting while the other is streaming. This can give a finer degree of pointing depending on conditions. The three for'ard telltales should be set approx. 80mm aft of the luff with the aft centre one a further 50mm behind the for'ard one. I prefer wool telltales to nylon or plastic as they are less volatile. The only problem being that they stick to the sail when wet. This can be partly overcome by spraying with hair spray.

A telltale on the upper leech of the jib assists in trimming the jib for the right amount of twist in the leech. This should flow in all but very light breezes and is usually a factor of sheet tension once the sheet lead is in the right place.

SPINNAKERS

These have gone through quite an evolution since we started experimenting with them several years ago. Originally cross-cut in configuration we then developed a mitre cut head to remove upperleech distortion of the cloth without excessive wastage. We have now developed a radial head design to try to achieve a slightly firmer upper centre section and a more uniform elliptical shape through the head of the sail. The spinnakermust be a good all-round sail as only one is allowed to be carried in the boat during a race.

There is a choice of cloth weight, either .5 oz or .85 oz. The .5 oz is very good for light air racing but suffers from distortion both temporary and permanent (depending on the weight of wind) when shy reaching. For a general all-round spinnaker the .85 oz is also necessary to avoid having to replace the .5 oz each season by using it in fresh breezes, or moderate breezes very shy.



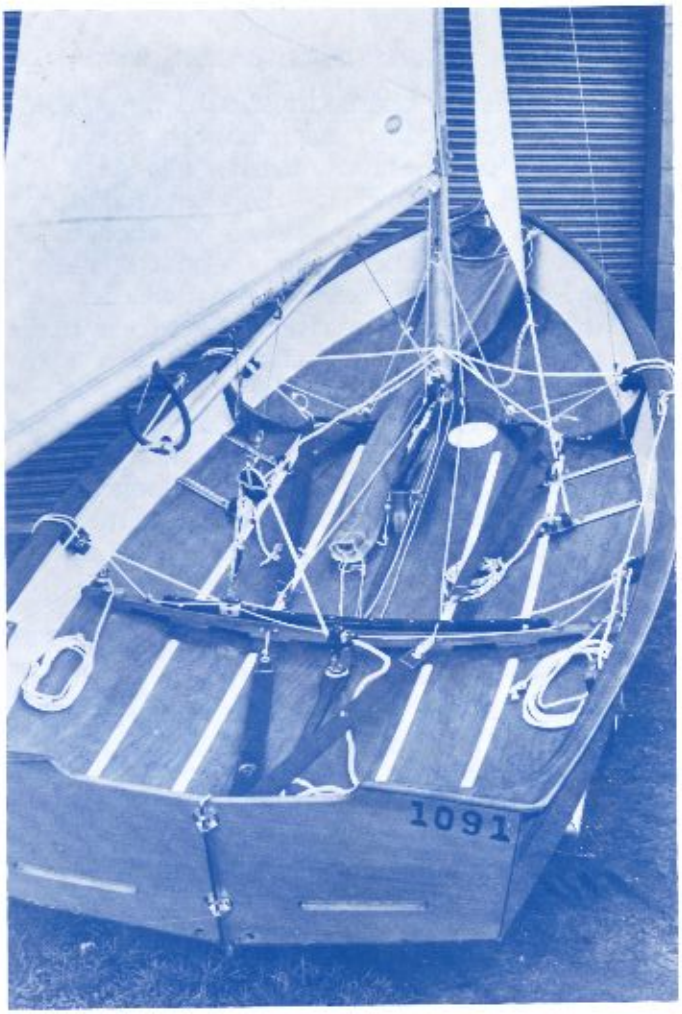
The trend is to launcher tubes in most boats today and this can certainly make for faster spinnaker handling, particularly with untrained crews, as the skipper helps take the spinnaker down while the crew stows the spinnaker pole. A fibreglass model is available for side tank boats and a nylon one for false floors.

TRIM

Because the Sunburst has quite a wide, flat stern, crew weight should be concentrated quite well for'ard in light to moderate breezes. I find that only in fresh breezes am I situated just aft of the traveller either to windward or downwind otherwise I am astride it or for'ard of it. This is with a skipper weight of 80kgs and a crew weight of 45kgs. Gybing I stay aft while my daughter goes for'ard of the mast. Tacking to windward I go between the mainsheet and the centre case (except in fresh breezes) while my daughter goes across thecentre case. Running in light airs I have found it an advantage to have the boat heeled slightly to weather which probably presents a flatter and slightly less wetted surface area to the water. On the wind I try to stay on the gunwale and let my daughter balance the boat. Downwind she stays to weather and trims the kite while I balance the boat, going to leeward if necessary.

STACK STRAPS

These are usually made from 50mm car safety belt webbing or similiar. They should be set up separately for skipper and crew as if in one length with fastening only at each end the height they will go will be dependent on whether one or both the crew are stacking. They also stretch when wet and the longer the length without fastening, the greater the stretch under load. One length can be utilised but an intermediate fastening-down point should be used approximately between where the crew sit. These can be held off the floor by using shock cord at the ends to hold them up and so make it easier and quicker for the crew to get their feet underneath, yet still retract to the floor if stood on.

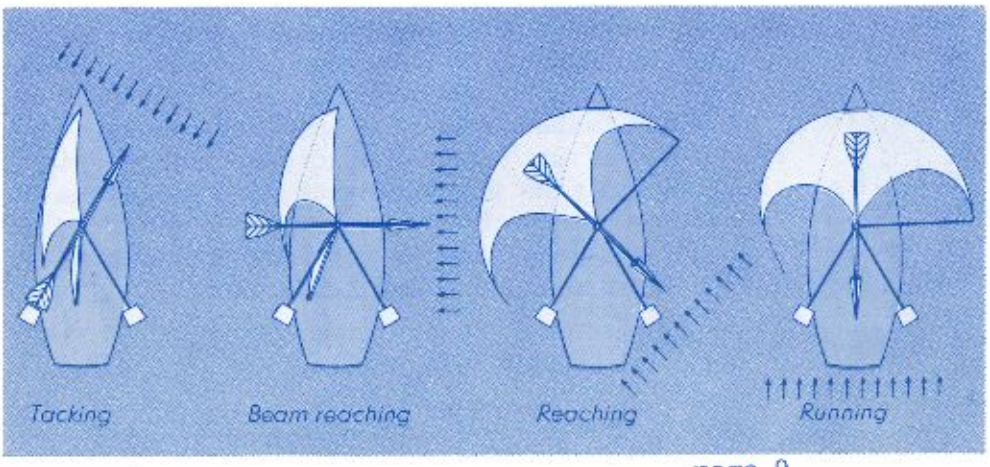


PENNANT

A wind pennant, preferably of the windex type, should always be used and should stand proud at the top of the mast at least 180mm. Its major application is for downwind work for setting the spinnaker and mainsail to the greatest advantage.

I hope this information will be of assistance to my fellow Sunburst sailors and should any further help be needed, drop me a line.

Windex vane positions at different apparent wind directions



Happy Sailing,

Tony Bouzaid.

Sunburst Sail Quote / Order Form

NAME _____ DATE _____

ADDRESS _____

_____

PHONE _____

MAIN....YES/NO NUMBERS....YES/NO NO: _____ $_____

TAPERED GLASS BATTENS....YES/NO $_____

FIBREGLASS LAUNCHER .....YES/NO NYLON LAUNCHER.....YES/NO

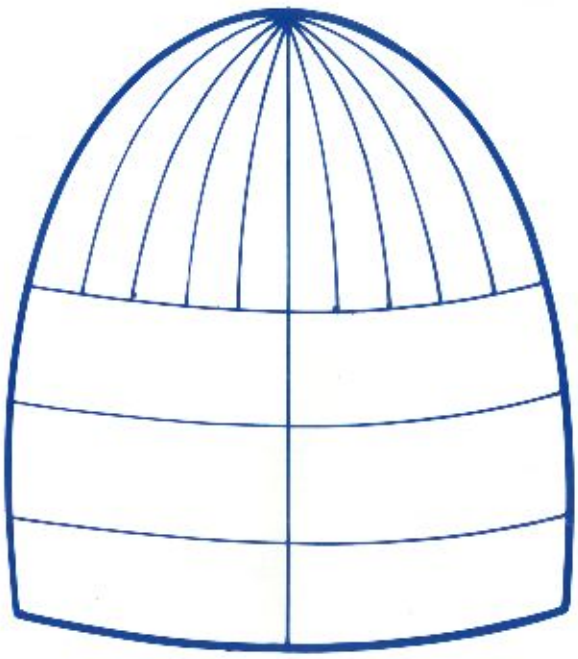
JIB .... YES/NO $_____ LUFF WIRE/JIB CLIPS

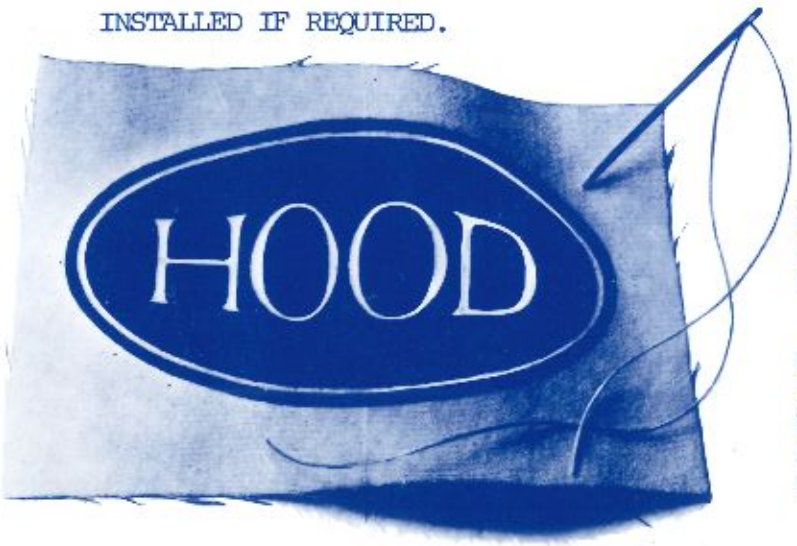
SPIN .... YES/NO $_____

DEPOSIT ... $_____

Remove Here

THE MAIN IS DESIGNED TO SUIT
A BAVERSTOCK 2" TUBE MAST AND
COMES COMPLETE WITH ENSIGNIA.
THE JIB IS DESIGNED WITH A
LUFF WIRE INCORPORATED OR
JIB CLIPS.
THE SPINNAKER COMES WITH
RETRIEVER LINE PATCH
INSTALLED IF REQUIRED.





SPINNAKER PANEL DESIGN
(indicate colour scheme required)

HOOD NEW ZEALAND LIMITED
23 Poore Street, St Marys Bay,
P.O. Box 415, Auckland, N.Z.
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