

49er Rigging Manual

Rigging the Mast

After unpacking the mast but prior to disposing of the packaging check that you have located:

1. The topmast and lower mast which will be attached via the 3 halyards.
2. Two sets of spreaders with wires attached.
3. 12 x 3/16" Metal Thread Screws.
4. 4 x #6 gauge screws.

Once you have these you should dispose of the packaging in an environmentally friendly manner.

Assembly of Lower Mast and Topmast

1. Sleeve the Topmast into the Lower mast until the track ends are aligned and lie 1mm apart. (They must not touch, else they will buckle when the mast bends.)
2. Drill 5/32" through the four holes marked in Step 21. Tap 3/16", and lock the topmast into the lower mast with 4 - 1/2 x 3/16 PH MTS.
3. Drill the sailtrack with four further 1/8" holes at app. 15 and 50mm above and below the sail track ends. Secure with 4 - 3/4" x #6 CSK PH screws.

Spreader Assembly

In the factory, we find it convenient to set up a mast step channel vertically on a wall. This holds the mast centreline truly vertical, and makes it easy to set the spreaders horizontally by sighting against a horizontal mark on the wall. This method is described.

1. Set up the mast, centreline vertical, with the sail track uppermost.
2. Fit the lower spreaders around the base of the topmast with the band against the top of the lower mast. Use a spanish windlass to pull the spreader tips together until the band clamps the topmast firmly.
3. Fit the upper spreaders around the reinforcing at the hounds, with the bottom of the band just touching the upper rivet of the forestay keyplate. Again, tighten the band with a spanish windlass.
4. Use a spirit level, or horizontal mark on the wall, to adjust the windlass cords of both spreaders level and level with each other.

5. Drill 5/32". Tap 3/16". Secure with 8 - 3/16" x 1/2" PH MTS.

In the field, the recommended method is to set the boat on its side, and adjust until the centreline is horizontal. The spreaders can then be set true vertically with a spirit level.

When the mast is stored, the shrouds should be attached to the travel saddles near the mast base.

Stepping the Mast

Now that the mast is together it is time to step it in the boat. The recommended method of stepping is as follows:

1. Carry the mast with the track facing downwards and the tip aft until the mast plug talon is positioned above the mast step, then pin the talon to the step with the 6mm / 1/4" clevis pin through the third hole from aft end of step.
2. Prop up or get someone to continue to hold the mast and spreaders clear of the deck of the boat. If the mast is held at the lower spreaders then the weight of the mast will naturally bend the mast allowing the shrouds to be easily removed.
3. The cap shrouds (which run from the top of the mast) and the primary shrouds (which run from the hounds) are attached to the same adjustable fitting. Remove the caps and primary shrouds from the travel saddles and attach them to the chainplates.
4. Run the lower shrouds and attach them to the inner chainplates.
5. Uncoil the forestay and fit the T-ball into the key-plate at the hounds.
6. Uncoil the trapeze wires and attach them to their respective key plates, also run one of the trapeze wires on each side, outside the primary shrouds but inside the cap shrouds, forward and tie the end of the spinnaker sheet to the trapeze rings.

(NB: The trapeze wires should run straight from the mast forward, they should not be around anything. Their "lie" out of the mast looks a little "uncomfortable" in this position but it appears to have no adverse effects on their life or performance.)

7. With the spinnaker sheets in hand attached to the trapeze wires, walk to the front of the boat and pull firmly on the spin. sheets. The person holding the mast may either throw the mast upwards, or walk the mast up.
8. Pull the spin sheet quickly so that the mast is pulled forward and held by the shrouds without any chance of the mast going sideways and falling over.
9. Attach the "boat bender" to the forward most hole in the forestay fitting and attach the other end to the trapeze rings. If you have the adjustable trapeze system it is advisable to allow the trapeze adjuster rope out to full extension so that the load is taken on the knots and not the cleats. This will prolong the life of the adjuster cleats and ropes.

10. Tension the boat bender until you can attach the forestay. Then release the boat bender and allow the forestay to take the load.
11. Remove the boat bender.

Setting Up the Rig

Fig 4.1 gives the recommended initial set-up tensions for all crews in winds of 8 to 12 kts, using a Loos Tension Gauge for calibration.

Rigging for Sailing

After the boat has been assembled and set up with the shroud tensions recommended above:

1. Place the hull on its trolley or cradle headed into wind.
2. Step the mast as described above.
3. Insert the battens. These go in tight. They are not adjustable. They stay in the sail. They stay under full tension during storage unless you are not going to sail for several weeks.

In the days of cotton sails such behaviour would have been unthinkable. With dacron sails all that might happen was that the sail might stretch fractionally. Kevlar and carbon-reinforced Mylar sails do not stretch, and there is no longer any need to ease batten tension when off the water.

4. Hoist the mainsail, pull the halyard very tight, and hook the bight onto the rack.
 - Offer the boom fitting into the mast gooseneck, and secure by engaging and securing the clevis pin.
 - Hook the outhaul hook into the small tape loop at the clew of the sail, and let the outhaul control go loose. This will allow the boom to hang about 300mm below the clew.
 - Engage the pin to secure the ram vang arms to the vang lever.
 - Lift the aft end of the boom, and slip the large tape loop around it to hold the clew to the boom. Tighten the outhaul. At this stage, do not zip up the cuff.
5. Hoist the jib. Hank it to the forestay as it hoists. Set the luff tension with the halyard. It should be almost slack in light airs, grading to very tight in really strong winds. Make up the common rope halyard fall, stow it in the pocket inside the mainsail cuff, zip up the cuff, and hook in the two downhaul hooks.
6. Tie the jib sheet to the clewboard. Use the middle hole for winds up to 12 knots, and progressively lower holes for stronger winds.
7. Set the jib track traveller limit pins in the curved track in the innermost holes for winds up to about 12kts and flat water, a little further out for stronger winds and/or rougher water.

8. Set cap shroud tension as recommended in "setup" for winds up to about 11/12kts (stronger for heavier crews). Set progressively tighter to flatten the mainsail for progressively stronger winds. The cap shrouds are easy to adjust, simply apply severe vang and downhaul and sheet tensions and they become slack and can be taken down one hole, or two holes, or whatever you find fits your weight and technique in the wind and seastate conditions expected or experienced on the day.
9. Check that the spinnaker is smoothly stowed and that the runs of its halyard and sheets are clear, that the tiller extension swivels are taped to the tiller, the trapezes are adjusted "high" (best for manoeuvring through moored boats, etc.) the foils are on board, and that the boat is ready in all respects for sea.

Handling On the Beach

The golden rule for light sailboats with their sails up is - *never turn your back on a rigged boat, and never leave it unattended.* The following practices are strongly recommended:

For brief periods between sailing.

At least one crew stays with the boat. Ease both the vang and downhaul. If the main starts to flog then tighten the vang a little until it comes under control. A flogging jib is the quickest way to destroy it. Try and stop the jib from flogging by tightening the jib sheet just enough to quiet it.

For short term absence.

Tie the boat down and pin the jib traveller to windward and sheet the jib in loosely so as to set the jib and stop it flogging, plenty of twist is a good thing. With the main, drop the boom off and ease the downhaul and it should just sit there. But stay close enough to hold the boat should an unexpected gust occur.

For extended absence.

Drop the sails and make fast, ease off the rig tension and ensure that the boat is well secured. Tie it to some strong ground point as a minimum precaution so that if a strong wind does come through, damage will be avoided.

(Example - At the first worlds at Cascade Locks boats were left overnight on their sides, wings retracted. One midnight a gust swept through, flipped several boats and broke one mast. Subsequently the mastheads were tied to a low fence.)