

Quantum Sails J/22 Tuning Guide

At Quantum Sail Design Group, we're always looking for an edge. The ever-increasing level of competition in the J/22 class has made precise tuning of the rig a critical performance ingredient. It's also important to be able to reproduce your settings when you find something that works. That's a winning edge that can set you apart from the competition.

On our tuning guide, you'll get more than just precision tuning tips. Topics include:

- Rig tuning
- Sail settings and trimming
- Shroud tension
- Rig placement
- Boat preparation

Rig Tuning:

Unlike most tuning guides that only give you dimensions and tensions, we want to go a step further and explain why we go through the trouble and why the changes in rig tension have such a drastic effect on the performance of your boat.

There are two things you want to achieve when tuning your mast. First, try to get some weather helm. This is done with the headstay length. The other is to have the ability to change the sail shapes through mast bend while controlling headstay sag.

Before stepping your mast, there are a few things you need to do:

1. Due to the amount of rake you are carrying, we suggest using the angled mast plate. (The flat one puts a lot of tension on the front pin and may cause some cracking around the deck if used.)
2. Clean and lubricate all turnbuckles.
3. Check the distance from the top of the crane head to the spreader tips and make sure they are equal lengths on the shrouds.

Marking the Headstay:

With the mast still down and the headstay attached at the top, lay the headstay down the front of the mast and put a mark on the headstay at the top of the black band at the boom. Use this mark as an easy way to measure and check the headstay length, so make sure you're accurate.

Now, stand the mast in the boat. Nothing will make a more drastic difference in your performance than not having the mast in the center of the boat – check this by measuring back along the side of the boat from the tack horn to the approximate area of the crane head (top of the mast) and make a mark on the toe rail. Then duplicate the recorded measurement on the other side of the boat and make a mark. With a measuring tape hoisted up to the top, center the mast using the marks on the toe rail.

Now that you have the mast up and centered, it's time to adjust your headstay. Measurements from the mark on your headstay to the intersection of the headstay tang at the deck, should be between 4'11 1/2" and 5'1." (It's important to remember that due to the difference in keel shapes and placements, the optimum headstay length may vary from boat to boat.)

This length should be fine-tuned by experimenting. When sailing in 5 knots of wind, you should be able to keep the boat almost flat without getting any lee helm. If you still have lee helm, or no weather helm, increase the rake or headstay length by 1/2" increments until the boat has some weather helm.

Other things to take into account when setting your headstay length include:

- **Wind strength in you sailing area:** In general, the lighter the wind the more rake you will need.
- **Lakes or flat-water areas:** If you sail in relatively flat water, you can use a little less shroud tension. This will increase headstay sag and help your pointing.
- **Bays or areas with chop (real waves or powerboats):** With constant waves, the luff of the jib, as well as the whole rig, may pump if the rig is too loose. You may need to increase the rig tension to dampen the effect of the waves on the rig.
- **Crew weight:** This will have some effect on the rig tension. When sailing a lot lighter than the 605 maximum weight, you may want to increase the rig tension. This will start to depower the rig earlier and help the smaller crews sail the boat flatter before starting to apply backstay.
- **Jib's clew height:** *This is important:* if you increase the rake of the mast by making the headstay longer, the jib clew will get lower. This in turn will move the jib block forward. There will come a point at which the jib clew gets too low to sheet and you cannot get the proper jib lead. The result is the leach being to open, which hurts your pointing.

J/22 RIG SETTINGS: Loos Model A

Wind Speed:	Uppers:	Turns:	Lowes:	Turns:	Headstay #:
0 - 4	23	+1	20	+ 1/2	4
5 - 9	30	+1	24	+ 1/2	6
10 - 13	35	+1	27	+ 1/2	9
14 - 16	39	+1	32	+ 1/2	15
17 - 18	41	+1	35	+ 1/2	19
18 - 25	44	+1	42	+ 1	23

J/22 RIG SETTINGS: Loos Model PT1 (new style)

Wind Speed:	Uppers:	Turns:	Lowes:	Turns:	Headstay #:
0 - 4	15	+1	11	+ 1/2	3
5 - 9	20	+1	15	+ 1/2	5
10 - 13	25	+1	19	+ 1/2	8
14 - 16	28	+1	21	+ 1/2	10
17 - 18	31	+1	25	+ 1/2	13
18 - 25	33	+1	30	+ 1	17

The rig tension numbers are calculated with the small Loos Tension Gauge. When you have the appropriate rig tension, always check your headstay target number. This headstay target number will match the proper headstay sag to the jib for the given wind condition and is very important. These target numbers are based on the headstay length of 4'11 1/2." Less headstay length will result in a tighter headstay, so the shroud tension must be eased accordingly. More headstay length will result in less headstay tension, so more shroud tension must be used to hit the headstay target number.

This change is caused by the amount of rake you carry. Shroud placement on the mast and the chainplates becomes more vertical. The rig is more in line, and the shroud tension is not as quickly transmitted to the headstay.

Always set the rig tension for the lightest wind you expect for the race. Keep records of shroud tensions, along with sheet leads, backstay, and outhaul. These notes should help you duplicate your setting from race to race.

Easing the rig off to the lowest setting is also helpful at the end of the day. It not only takes the strain off the boat, but you know exactly where the rig is set when you arrive at the boat the next morning.

Mainsail Trim:

0–5 knots: Your boat need all the power you can find. Pull the traveler up to about 2" from the windward seats. Ease the mainsheet until the boom is on the centerline. Ease your outhaul so the shelf opens up about half way. Sighting up from the boom, the top batten will be twisted off to leeward or opened about 5°. Make sure the boom vang is loose and backstay is at the top of the "Y." When trimmed properly, the top batten telltale will fly about 60 percent of the time with the lower telltales flowing all the time.

6–8 knots: As the wind begins to increase, flatten the mainsail and remove some of the twist. Start by adding some main sheet until the top batten is parallel to the boom. With the additional main sheet tension, the boom should be a little above the centerline. Drop the traveler down another 2" or so to keep the boom centered. Slowly increase outhaul by about ½." When trimmed properly, the top telltale will fly about 30 percent of the time with the lower telltales flowing all the time.

8–12 knots: By now you should have the traveler about 2" high or on the centerline. Apply enough mainsheet to keep the top batten parallel to the boom and the top telltale will fly only about 15 percent of the time. Also by this time, you may be pulling on some backstay. This will open up the leach and add some twist. You will have to constantly change the sheet tension as you change the backstay tension.

At this wind speed, start to vang sheet the mainsail (his means you are going to use the boom vang to take the place of the traveler). Once the mainsail is trimmed, apply enough vang tension to equal the mainsheet. As the wind increases, the vang tension will increase so that when the mainsheet is eased, the boom doesn't rise up and get too much twist (too much twist in this condition will hurt your pointing).

12+ knots: You are now starting to play the backstay and full on vang sheeting. The vang has now become the traveler. Be careful not to overtrim the main. With about ½" backstay on and the main trimmed in the boom, you will be about 8" below centerline. Play the backstay aggressively in the puffs to prevent the boat from heeling and getting excessive weather helm. Remember that as you pull the backstay on the mainsail, the leach opens up so you will have to adjust mainsheet tension to keep the same top batten angle.

Jib Trim:

To find the proper jib lead position, head up slowly and watch the jib luff and the telltales. If the top starts to luff first, move the jib car forward. Ideally you are trying to get all the telltales to luff at the same time, or get the top telltale to break a little sooner then the bottom. Sheet tension should be enough that, with the luff breaking evenly, you should have the middle batten parallel to the centerline. The leach telltale on the top batten should be flowing all the time.

Too much sheet tension will stall the top, cause backwind in the mainsail, and clog the slot between the main and jib. The length of the headstay will have a lot to do with your lead. The longer the headstay, the lower the clew. If you can't get the proper lead, or the clew is too low, your pointing will suffer. With the jib being so tall and skinny, the leach has a tendency to open up and starts to depower as soon as the jib sheet is eased.

Light Air (0–8 knots): In light air, keep the jib sheet eased almost to the toe rail, and keep an eye on the top leach telltale. Also watch for slight scallops between the jib hanks. The lack of luff tension should keep the draft aft and help pointing. With the backstay off, the headstay sag should give you a wide grove to steer to.

As the wind strength increases, add to the halyard tension so you see only slight wrinkles. Keep in mind, the increased halyard tension will also tighten the leach, so you may need to ease the sheet as you change the halyard.

Medium air (8–12 knots): Sheet tension is critical to pointing. Too little, and the top opens up, hurting your pointing. Too much, and the helm starts to feel neutral. To find your maximum trim setting, slowly trim the jib as you are sailing upwind. As the jib trim increases, the helmsman will feel the helm go dead or neutral. Toward the top end of this wind range, you will start to move the jib lead back about $\frac{1}{2}$ – $\frac{3}{4}$." This will open up the leach and start the depowering process.

Heavy air (12–18 knots): You are now starting to depower the jib. Move the jib leads aft another $\frac{1}{2}$," and increase halyard tension so the luff is smooth. As you start to move in to the middle to upper ranges of this section, you will have the backstay on about $\frac{1}{4}$ " to about $\frac{1}{2}$." This will tighten the headstay and make the jib flatter. The jib trimmer and the helmsman must work together to trim and ease in unison.

When the puff hits, the helmsman will slowly ease the mainsheet to keep the boat flat. This may cause the mainsail to backwind or the entire sail to luff. When this happens, the jib trimmer should ease the jib out 1–3," or until the mainsail starts working again. Easing the jib sheet will twist off the leach and open up the slot between the main and the jib. As the puff ends, you can power up the sails again by trimming it back in.

Crew Placement: Though this tuning guide progresses in wind speed increments, you should also consider where the crew weight is positioned. For example:

0–5 knots: Helmsman should always try to sit to windward even if it is inside on the seat. His or her weight should be in front of the traveler and as far forward as possible. This keeps him in the best place to look at the jib telltales, mainsail trim, and waves.

The jib trimmer should be on the low side or in the companionway hole as far forward as possible. Depending on you individual crew sizes, the jib trimmer may need to sit all the way out on the leeward side. That's fine, because from there he has a better view of the jib and the competition on the low side.

The fordeck, if possible, should be windward (this keeps his eyes looking up the course and able to call the puffs better).

6–10 knots: Helmsman should be on the high side with the bowman sitting up by the shrouds against the cabin side. From there, the bowman can move his weight in and out with very little movement. The middleman can now slowly move into the center of the boat, making sure he stays as far forward as possible.

The jib trimmer should stand on the cabin sole as far forward as he can. Then, if you do get a puff, he can shift his weight down below.

10–15 knots: All the crew should be on the high side. The bowman should be moving aft next to the middleman. The middleman should be even with the winch, keeping the jib sheet in his hand and the handle in the winch (this makes it easier and faster to fine-tune the jib sheet).

If you have enough wind, always sit with your legs out over the side of the boat. This will put the weight further outboard while opening up the view for the helmsman.

Changes to the Stock Boat:

- **Shorten the backstay to accommodate the longer headstay length.*** The South African boats come with a backstay that is adjustable at the top of the "Y." The top of the backstay above the two legs has a loop similar to most stock US boats. The tops of the legs connect to an "O" ring, while the bottom of the legs pin directly to the backstay chainplates on the transom.

The top of the backstay connects to the legs using a short piece of spectra line. **Not all boats will need to make this adjustment.*

- **Upgrade your sheets and halyards.** The newer higher tech lines have lower stretch, and in most cases don't absorb any water. This is especially helpful with the spinnaker sheets. West Marine has supplied a chart of their recommendations. This will help you match the best and lightest lines with the job intended.
- **Move the backstay control line forward.** I prefer to put it just forward of where I sit. This allows the jib trimmer to reach it in case my hands are full.
- **Increase the boom vang purchase from the 4-to-1 to the 8-to-1 allowed by class rules.** The additional power will help even the smallest Bowman get enough tension.
- **Install winch handle pockets on the port and starboard side of the companionway.** This will help the jib trimmer reach them easier while hiking.
- **Add foot braces to the edge of the seats.** A small strip of teak or plastic screwed to the inside top edge of the seat will give the helmsman and crew better footing when the boat heels over.
- **Shorten all lines to minimum lengths.**

At Quantum Sails, we test and tinker with the J/22 sails year round in order to improve their speed, durability, and ease of use. We do our best to share what we learn with all J/22 sailors. If you have any questions about our sails or tuning procedures, or if you've found something that works better, please contact Terry Flynn or your local Quantum Sail loft.