J70 Tuning Guide

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BEFORE STEPPING MAST

- Install trim marks on the spreaders at the mid-point aligned with the center of the hull.
- We like the one single spreader reference mark positioned in the middle of the aft edge of the spreader that is parallel with the centerline of the boat. The spreader mark should be centered 21" (53.5 cm) from the notch at the inboard end of the spreader.
- Install the windex to the side of the backstay crane. Windex is not required (optional).
- Consider upgrading to shroud keepers.
- Consider backstay whip - helps for light air.
- Mark the headstay at the top of the lower band with a reference mark to be able to monitor mast rake.
- Imperative to remove the mast step casting and coat it with zinc chromate paste to prevent galvanic corrosion.

ONCE MAST IS RAISED

- Coat turnbuckle threads in lanolin oil to prevent galling of the turnbuckle barrel.
- Attach the headstay and start with the headstay turnbuckle open with just enough thread showing to install O-rings or cotter pins. Check the headstay length from the reference mark. With the Seldon mast on US built boats, the target headstay length 57.5" (146 cm) from top of mark to lower pin on furler.
- Start with the lower and upper shroud turnbuckles open so thread is just not showing inside the barrel of the turnbuckle. The uppers should then be adjusted by counting an even number of turns on each side.
- Count 20 full turns on both uppers to get close to base setting (Loos Gauge PT-2 should read 19 or 20 on the uppers). Use calipers (available at Home Depot) to check the gap inside the turnbuckle barrel. (We have 51mm gap at base setting.) Make the uppers have the same gap on each side.

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- Sight up the aft edge of the mast to check for side to side straightness before taking equal turns up on the lowers until just firm. Once again sight the mast for straightness. Adjust lowers so mast is straight until the load reads 10 on the Loos gauge PT-2. This will be your base setting (10-11 knots). ***The backstay should be detached on one side of the transom when measuring the rig tension so it does not affect the reading on the Loos Gauge PT-2 readings***. Recheck uppers with the calipers to make sure uppers are even.
- Still with the backstay detached at the dock, look for only 1.25" (3 cm) and not as much as 1.5" max of prebend while at base.
- As wind speed increases above 10 knots, add 2 full turns to the upper shroud turnbuckle for every 1 turn of the lower shroud turnbuckle. The ratio of upper turns to lower turns changes as wind increases. The Tuning Matrix below is a good reference when adding or subtracting settings. Although we have honed in on suggested adjustments, the tuning matrix is always kept up to date with minor tweaks, so please refer to the most current matrix.

2020

J/70 Tuning Imperial Matrix

(Applicable to both Southern & Selden Mast)

Detach backstay when checking shroud tension

WIND SPEED (knots)	FORESTAY LENGTH (Mark top of the LB to pin)	Loos Gauge PT-2		Upper Turns each setting	Lower Turns each setting	Turns from Base	BACKSTAY TENSION	OUTHAUL TENSION (From Band)	TRAVELER POSITION above center	JIB LEAD POSITION FROM BACK	INHAUL W/ WEATHER JIBSHEET
		LOWER TENSION	UPPER TENSION								
1-4	57.5" top of LB to lowest Pin on Furler (generally requires a toggle in headstay)	Slack	12	-1	-1	3- | 3-	Slack	-1.5"	Max raised 15" (close hauled)	9-11 Holes	Use None
5-6				-1	-1	2- | 2-				Hole 8	Max In-haul weather sheet to edge of cabin house: 10" of windward sheet
7-8				-1	-1	1- | 1-	1/4 on	-1"		Hole 7	
9-10		9 or 10	18 or 19	Base	Base				Raise 6"-12"	Hole 7 or 6 (6 or 5 holes showing)	
11-12				+2	+1	2+ | 1+	1/2 on	-.75"	Up 3"-6"		
12-13				+2	+2	4+ | 3+	3/4 on	-.5" from band max outhaul			7"-10" inhaul
13-14				+1	+1	5+ | 4+					5"-8" inhaul
15-16				+1	+1	6+ | 5+	7/8 on				3"-6" inhaul
16-17				+1	+1	7+ | 6+	MAX			Hole 6 (5 showing)	1 - 4" inhaul
18+		29	30	+1	+1	8+ | 7+					0 - 2" inhaul

* Note that all batten ends have rocket tensioners. If no tension in breeze, could fall out *

WHEN SAILING

- **Jib Leads.** For 5-6 knots, we use hole 8 (7 showing behind), 7-8 knots, we use hole 7, while for base-16 knots, we use hole 7 or 6 and hole 6 for 16+. For very light air below 5 knots, the jib lead can be moved forward to hole 9, 10, or 11 (8, 9 or 10 holes showing behind) when not using the in-hauler.

- Class rules do not allow you to adjust the standing rigging (including course backstay bridle adjuster) while racing (from the prep signal at 4 minutes to the gun until the finish of that race). Headstay cannot be changed once off the dock.

- It is important to assign only one person to adjust the rig tension to ensure it is even on both sides and at the end of the day, one person is responsible for the rig tension.

- **Determining Proper Rig Tension for Very Light Air.** Rig tension needs to be set for the lowest wind speed expected for each race since the shroud tension cannot be adjusted while racing (full two settings below base: -2 turns uppers and -2 turns lowers from base). Getting caught with the rig too tight in a dying breeze causes the headstay to get too firm which in turn flattens the jib in just the condition where it needs to be the fullest. A good way to judge the correct shroud tension for the conditions is to look at the leeward shrouds while sailing close-hauled.

- **Determining Proper Rig Tension for Fresher Wind Speeds.** If the leeward shrouds are slack, most of the time the rig tension should be increased a setting or maybe two. Add 2 turns on uppers and 1 turn on lowers. When adding tension above base setting, as a guide, if the helmsman is fighting with the backstay and mainsheet to depower the boat, then the rig tension is too loose. Conversely if the backstay is generally just slack all the time and you're searching for more power, then the rig tension is probably too tight.

- **Determining Upper Tension.** The best way to determine the correct upper tension is while sailing with the main and jib sheeted in on a close hauled course. The leeward upper shroud should just be just firm in each wind speed. If the upper feels too tight, then ease the rig one setting; then check the firmness of the leeward shroud again. Conversely, if the uppers are too floppy, tension the rig one setting and repeat that ratio on both sides until leeward shroud has slackness removed. If the rig tension is too loose as the wind speed freshens to 15+ knots, then the headstay will be too saggy and the main will wash out and overpower the boat.

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- **Tight Rig.** If the rig is too tight in a dying breeze it is essential to anticipate before racing and ease off the rig to a lower setting. It is also important to have a slack vang and ensure the backstay and cunningham are slack as well (may have to reach to flick them if loose). The headstay will also be too bound up in this scenario and the boat will be underpowered. This is why it is essential in under 10 knots to drop the rig tension off to increase power in the headsail to keep the crew on the rail in max power and below. Having the rig too tight is slow in light air.

- **Loose Rig.** If caught with the rig too loose the headstay will be too saggy and the jib will get too full and overpower the boat. The backstay, cunningham and vang can be used to help depower the sail plan and vang sheeting can be used to maintain correct heel angle. In over 15 knots it is better to be tight enough so the leeward upper is not going slack when backstay is on hard. Having the rig too loose is slow in heavy air because the mast will over bend when depowering with the backstay and the headstay will still be too saggy.

- **Backstay Setup.** After shrouds are tensioned for the conditions, make sure the backstay bridle is just slack when it's not cleated. As the wind speed increases, the backstay bridle should be shortened to take most of the excess slack out of the backstay before tensioning so you will not bottom out the backstay too quickly as the wind speed increases. Conversely when the wind is lightening, make sure to ease the backstay bridle so headstay does not get too bound up in the light spots.

- **Backstay Tension.** The backstay can only be tensioned as much as the mainsail can tolerate for the given shroud tension. Once the main starts to show an inversion crease starting from the middle stripe at the mast toward the clew, then the backstay is at max (or should be eased a touch) for that given shroud tension. This implies it is critical to quickly increase the shroud tension as the wind speed builds which will allow for more backstay tension and better headstay support. The backstay should not be over tensioned to cause an inversion crease to form toward the clew (washing out the main).

- **Gear Changing Controls.** Once the shroud tension is selected, the backstay, traveler, mainsheet and vang controls are the best ways to depower. After tensioning the backstay the vang is also a good way to depower the main. Changing gears as the velocity changes often requires the crew to play the vang upwind, just firm in wind speeds over 12 knots. In less than 12 knots, the vang should be just slack upwind. Be careful to not have too much vang in the variable 12-14 knot range. Vang tension has to be adjusted as wind speed changes. The vang helps flatten the main in puffs. Too much vang will over flatten the main when wind lightens below 12 knots. The traveler can be adjusted between 3"-6" (7.5 - 15 cm) above centerline to allow for more mainsheet tension as wind speed increases over 12 knots.

MAINSAIL TRIM

- The stock 5 to 1 mainsheet purchase seems fine.
- **Outhaul.** The outhaul should be pulled to within 1.5" (4 cm) of the boom white band for upwind sailing. Tighten as wind speed increases to within .75" (2 cm) The mark on the outhaul tail was good for repeating proper settings. Ease the outhaul when the wind speed drops below 8 knots for power (-2" / 5 cm from band).
- **Traveler.** The traveler is a good helm control when close hauled. For light air up to 8 knots, the traveler should be positioned all the way to weather so the boom is on or just above centerline. The traveler should be lowered toward quickly 6" - 12" (15-30 cm) above centerline as wind speed builds to 9 or 10 knots. In 11+ knots, the traveler should be 3" (7.5 cm) above centerline in smoother conditions and 6" (15 cm) above in waves.
- **Trimming.** Sheet the main enough so the top batten telltale is stalling but all other leech telltales are flowing. The main can be sheeted quite hard in 8-12 knots. Adjust the mainsheet and traveler for wind speed and puffs.

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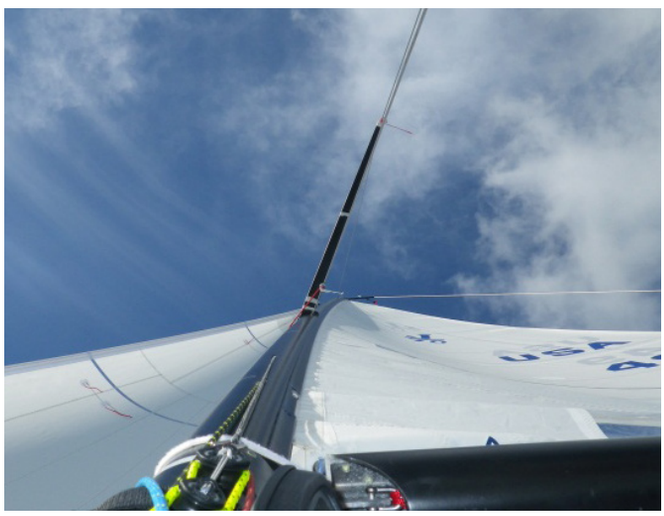
- **Batten Tension.** Doyle mains come with rocket tensioners on each of the 5 battens that can be adjusted with the provided screw driver. If completely untensioned in heavy breeze with a flogging main, you may lose a batten. Battens 1 (top gaff), 2, and 3 should be adjusted daily and can be pretty tight: tightened in heavy air and looser in light air. The difference is only a couple of turns. Battens 4 and 5 at the bottom are flex tip and will be distorted on inboard end if over tightened.

* **Vang.** The vang will just be slack in light air upwind when sailing close hauled. Once the wind speed increases to 12+ knots you can start just firming the vang upwind to take out any bounce. The main should be eased in puffs to keep the boat from heeling over too much; trim main back slowly after the puff. The vang and mainsheet tension is very critical upwind and needs to be adjusted constantly as wind speed changes to keep the boat at the correct angle of heel.

- **Vang Sheeting.** When vang sheeting in fresher conditions, the mainsheet becomes the best way to maintain the right angle of heel. The correct amount of vang and mainsheet tension is the trickiest to get right in puffy conditions. We like the vang just firm upwind in breeze. The vang needs to be eased when bearing off to duck a boat or to round a windward mark. The traveler car should be on center when vang sheeting.

- **Cunningham.** Once vang sheeting, the cunningham should be tensioned. Conversely, when it lightens below 12 knots, the vang should be eased to just slack upwind, then the cunningham needs to be slacked off.



JIB TRIM

- **Jib Leads.** For 5-9 knots, we use hole 7 (6 showing behind), while for base and above, we use hole 6 (5 holes showing behind.) For very light air below 5 knots, the jib lead can be moved forward to hole 10 or 11 (9 or 10 holes showing behind) when not using the in-hauler.

Very Light Air. In a dying breeze, the in-hauler (weather jib sheet) needs to be eased *completely* since the tacking angles get wider and the apparent wind goes aft as the wind speed drops below 4 knots. Then the jib cars need to be *moved forward* several holes (to hole 10 or 11) since the in-hauler is not pulling the clew forward.

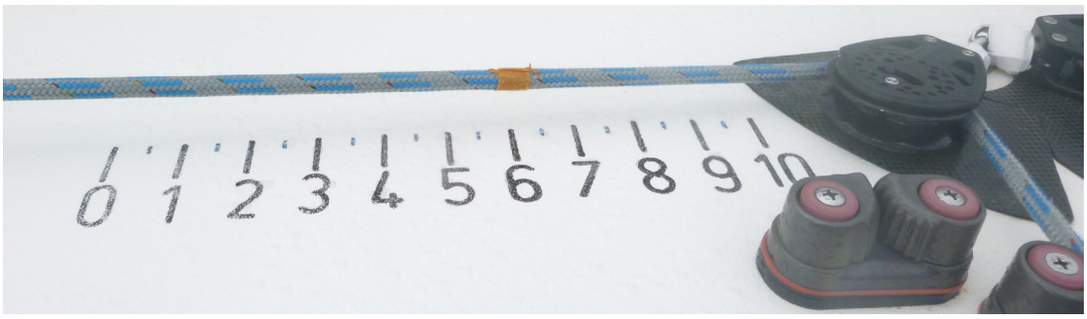
- Jib trim is the most critical and hardest to maintain from the rail. The jib halyard mark on the fine tune halyard purchase is critical to monitor small changes. The jib sheet and in-hauler marks are critical for repeating fast settings from the rail, so if the clew blocks change, it can change the marks quickly.

- **Luff Tension.** Start with the luff tension softer with some wrinkles in the luff in lighter air. You'll still have some wrinkles in the luff in 8 knots. In 10+ knots the wrinkles can just be removed with halyard tension.

- **Leeward Shroud Tension.** It is critical to monitor the leeward upper shroud before racing to make sure the rig is adjusted properly for those conditions. If they are too tight, then the headstay will be too firm and flatten the jib too much. Conversely, if the shrouds are too loose, the headstay will sag too much and cause the jib to be too full.

- **Trimming.** Trim the jib into the spreader mark but not so tight as to stall the leech telltales.

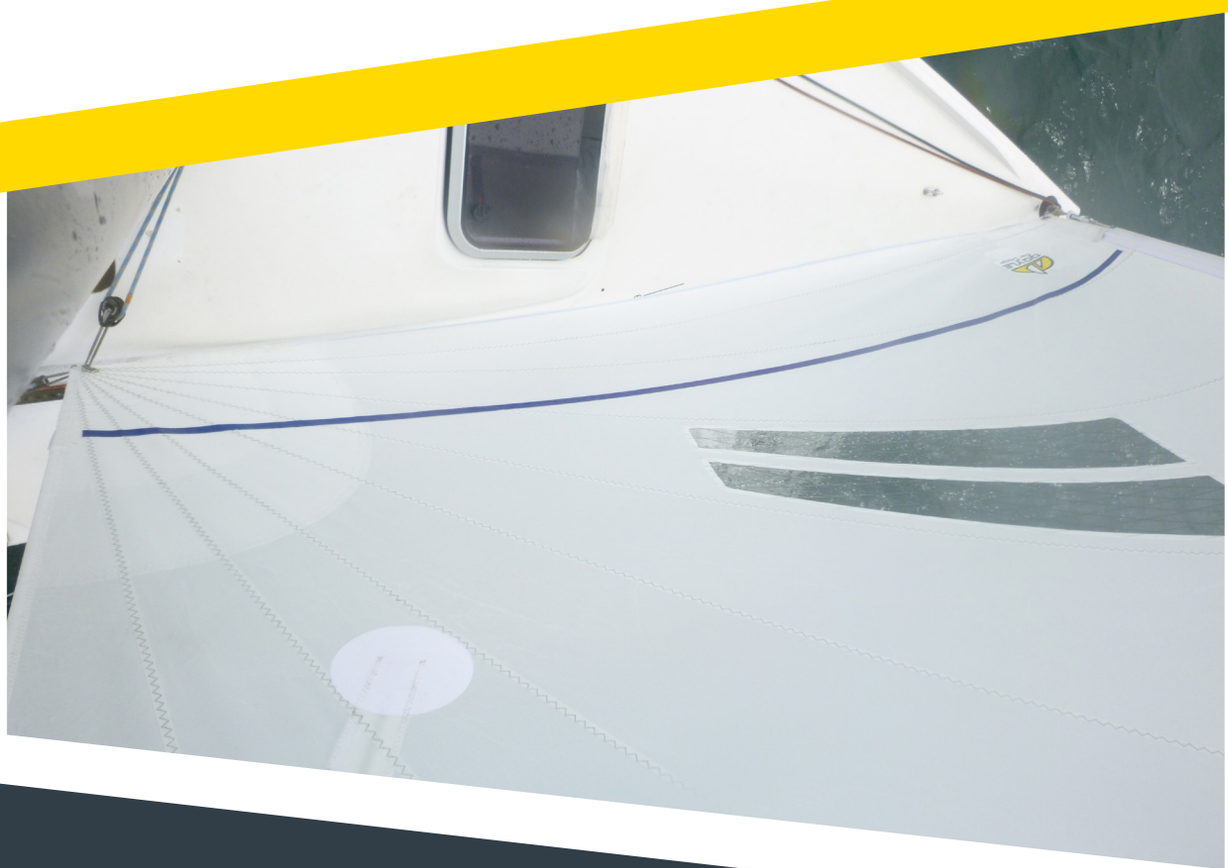
- **In-hauling.** In 5-18 knots, the weather jib sheet should be tensioned to in-haul the clew. In 5-12 knots, tension the weather sheet so that the clew is into the corner of the cabin house (10 degree sheeting angle), equivalent to about 10" of inhaul, letting off a couple inches for each incremental wind increase, as shown in matrix table. In heavy air puffs, ease off the in-hauler completely. Re-tension after the wind lightens under 16 knots.



- **Jib Sheet Reference Marks.** We recommend marking the jib sheets with reference marks The first pair of marks will be a close reference and seen in front of the turning block on the leeward side for repeating fast settings. You can combine this with trimming to the spreader reference mark on each tack upwind. Make sure the clew block strop is positioned evenly so the blocks are the same distance from the jib clew when under load.

- The in-hauler marks are designed to be trimmed to the cleat on the windward side. This will position the jib clew in line with the edge of the cabin when sailing upwind in 4-17 knots. In the puffs of 18+ knots, ease the in-hauler off all the way until the puff subsides and then the in-hauler can be re-tensioned some in the lulls

- **Jib Furling.** When rolling (furling) the jib, make sure the jib sheets are eased and the jib is unloaded so that it rolls smoothly. If you attempt to furl the jib when loaded, the jib will crease badly and rolling will mangle the jib. Another trick is to tension the jib halyard fine tune to furl and then ease it back off to the reference mark after the furl is complete. Jib furls best on starboard tack.



CREW WEIGHT

- **Upwind.** The crew weight upwind generally revolves around having the heavier crew members with their legs out, and the lightest crew member available to help tack the traveler and play the backstay. It is good to keep weight as far forward as possible and as weight is moved off the rail, all crewmembers should then move as close as possible to the bulkhead. The helmsman should move forward of the traveler up against the winch and only move back for tacking or gybing.

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SPINNAKER TRIM & HANDLING

- The tack should be two-blocked at the end of the sprit. The factory sprit line is too small for the cleat and can slip in heavy air. It should be replaced.

- There is no need for a clew pennant on the sheets for inside gybing.

- **The luff cord** should be adjusted on a daily basis the first practice run of the day. Nylon spinnaker cloth is hygroscopic and will change as it absorbs moisture and also shrink in hot temperatures. *As a general rule, the luff cord needs to be tightened in light air because it can become unstable and end up overtrimmed.* In heavy air, the spinnaker stretches, so you need to ease the luff cord to match - which is somewhat counter intuitive. It helps to mark the luff cord in cm increments to keep track of adjustments you make on the water. The leech & foot also have internal cords, which require less attention. The foot should have only the same tightness as the sail and the leech should never be too tight.

- In general, the asymmetrical sail should be flown with very little curl in the luff. You can ease until it curls at times just to make sure that you aren't over trimmed, but constant easing and trimming to maintain a curl is not needed unless soaking at lower angles.

- In light air, the jib should be furled after the spinnaker is flying. In planing conditions, the jib should be flown with telltales streaming, but not ever over-trimming the jib since that would blanket the spinnaker.

- **Jib Furling.** Don't rush to roll up the jib after the set or you will risk creasing the luff badly. First make sure the windward jib sheet is very slack. Start by easing the jib so that the luff telltales are streaming. Then the jib can be gently rolled if it's not planing conditions.

- **Dousing.** For windward spinnaker drops (port tack approach to either gate where the spinnaker is taken down on the port side) the jib must remain furled to prevent the jib cloth from getting crumpled by the clew being dragged around the headstay. Once the spinnaker is fully on the port side while dousing and the spinnaker sheet is not being dragged around the headstay, then the jib can be deployed. The jib also needs to be furled for light air gybing and takedowns so that the clew and the sheet do not crumple the jib against the headstay as the clew and sheet are being pulled around the headstay. This is particularly an issue in very light air since the spinnaker does not fly out away from the headstay in the light air gybes.

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There are essentially four downwind “modes” for crew placement that we’ll refer to as displacement, wing on wing, displacement/planing, and planing.

DOWNWIND MODES

• **Displacement Mode.** In lighter breeze you’ll be sailing in “displacement mode” in which case the boat will not be planing even when in the best pressure. If that is the case, you’ll want the weight as far forward as possible and the boat relatively flat. You may allow for slight heel to leeward in the light spots to keep the sail full and a slight heel to weather when sailing deep in pressure.

* **Wing on wing.** Ideal conditions for wing on wing are 10 to 14 knots. Above that you would likely decide to plane and below that, transition to displacement mode. A good rule of thumb is to have the windex pointed back kite side at outermost point of transom and have some windward heel.

• **Displacement/Planing Mode.** The moderate breeze range when a downwind leg might be a mixture of planing and displacement sailing, the boat is extremely sensitive to weight placement. In this “displacement/planing mode” you’ll need to adjust given the conditions. For this reason, you can’t be too quick to send crewmembers to their aft-most planing positions. Instead, everyone should just shift back while in their normal order front to back, and be ready to move forward when the pressure drops again. This is the preferred planing mode.

• **Planing Mode.** Lastly, while in “big breeze planing mode”, with 20+ knots, it is important to move the crew weight way back and keep the jib out flying. You can put the lightest person behind the helmsman to weather and have the spin trimmer slide aft of the winch in freshest breeze. The jib trimmer can cleat the jib so the bottom half is flying even if the top is soft and then flies the kite. The aft crew trims the main from the last part of the boom with light vang tension to twist the head open, traveler dropped to leeward for planing, and play the mainsheet over the cockpit (generally inside the rail.) The load on the mainsheet increases a lot when trimmed in over the cockpit while planing and eased when overpowered. This technique allows the helmsman to sail the boat closer to the edge of max power while planing without heeling the boat too much in the puffs. We have found most of the top teams sailing this way effectively in the planing conditions. When the aft main trimmer trims main off the last part of the boom they should take a lot of slack out of the uncleated mainsheet swivel. The mainsheet can then be looped over the helmsman’s head (around back) so the helmsman can gybe without tripping over the mainsheet.

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