



Evolution Sails Lightning Tuning Guide fall 2021

congratulations on your purchase of Evolution Lightning sails!

We have focused our Fisher sail designs and tuning guidelines on a “Set it and forget it” philosophy. We feel that in a challenging and competitive race the less distraction from rig tuning, fine adjustment and wonder if the boat is in the right mode, will ultimately lead to a better finish! And frankly, the results our believers have accumulated over the last 20 years support this conviction!

This guide for the Lightning has been developed through extensive testing, tuning and practical racing experience by some of the top Lightning sailors in the country.

Please read through these 10 steps and set your boat as close to the suggested numbers as possible. While we cannot guarantee immediate victory by following this guide, we can assure you that you will be taking big steps in the right direction!

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The Fisher tuning steps- Step by Step

Grab your tools

You will need a 50' tape measure, a sharpie, electrical/ rigging tape, a PT-1 Loos Tension gauge (this is the newer black gauge and is much more consistent than the older silver Model A). A couple pair of smaller vise grips and an adjustable crescent wrench really make the job of adjusting the turnbuckles easier!



Step-1 Set the mast butt position.

Set the butt maximum forward in the step except in the Nickels boats (all vintages except after newer boats after 15300) where the mast should be positioned 1 hole (about 1/2") aft of max forward.

Step-2 Mark your headstay

Lay your headstay along the front of the mast and mark with your sharpie or a piece of tape that point at the top of the white band at the gooseneck. You can also mark this with the mast up with the uppers/ and or blocks in place.

Step-3 Step the mast and set the forestay turnbuckle

With the mast up, forestay attached but no shrouds, measure from the mark/top of the tape on the forestay to the intersection of the stem/deck at the forward edge of the bow. Adjust the turnbuckle so this measurement is 44" for older Nickels (pre-15000) or 44 1/2" for Allen boats and newer Nickels.

Note: Important! Do not lock the turnbuckle in place, as it will be fine-tuned in the tuning process we will describe later. This setting is a rough adjustment at this stage.

Step-4 Attach and tension the upper shrouds

Without the lower shrouds attached, attach the upper shrouds, and adjust the tension so they read close to 220 lbs-19 on the Pt-1 gauge (we will fine tune later).

Note! This initial upper shroud setting is intentionally below the class maximum of 250lbs. Do not over tension.

With only the side blocks in place (if tuning an Allen), and again, no lowers attached, sight up the back of the mast. To properly start the tuning process, we need to be sure the mast is straight laterally. There should be no hook/curve to either side (more important to overall speed than being precisely centered in the boat). If the mast is bending to starboard (tip further to the right), loosen the starboard upper slightly and tighten the port until the mast is straight and the tension close to 230 on each side. If hooking to port start easing the left side. Double check that the mast is indeed straight!

LOOS PROFESSIONAL TENSION GAUGE MODEL PT-1 LBS. TENSION % BREAK STRENGTH			
SCALE	3/32		
5	70	6%	
8	100	8%	
10	125	10%	1/8
13	160	13%	5%
16	200	17%	7%
18	240	20%	9%
21	300	25%	11%
24	300	14%	200
26	345	17%	245
28	390	19%	300
30	450	22%	335
32	500	24%	390
35			480
38			610

Step-5 Hoist your tape measure on your main halyard

With your tape hoisted to the top and hooked in the upper ball on your halyard, take your tape down to the chine below the upper shroud chainplate. If the measurement is more than ½” different from side to side your mast may not be sitting square in the step. Add a very thin shim between the mast butting casting and the step under the opposite side that the top of the mast is bending towards.

The need for adding a shim under a side of the butt is very unusual and again, if your side-to-side measurement is close to ½” difference side to side, that is fine enough. *But if you have any questions, we urge you to give us a call.*

Step 6- Attach your lowers

Now attach your lower shrouds and tension them to approximately 80lbs. (10 on the PT 1 gauge). Your upper shrouds should increase only to 250lbs. when the lowers are tensioned to 80. If the uppers are tighter or looser than 250, adjust each side evenly and accordingly to reach 250lbs. There should be a slight negative fore and aft bend in the mast. Recheck the lowers that they are at 80lbs while the uppers are at 250lbs.

Sight up the back of the mast and check the lateral straightness. If the mast is bowing to starboard in the middle (middle of mast is to starboard of the top and bottom), loosen the starboard side lower and tighten the port side- and vice versa if bowing to port.

Again, a reminder that your upper shrouds will be set lower than the class allowed maximum tension. This is important to allow the proper flexibility in the mast above the lower shrouds.

Step 7- Push the mast forward and place the blocks behind

Now push the mast forward at the deck and place almost all your mast blocks behind the mast. This will need some pressure! Push until the lower shrouds read 300lbs-24 on the gauge (on older Nickels the lowers should be 250lbs-22).



Step 8- Fine Tune your shroud tension and mast prebend

With the blocks in place, the lowers close to 300 lbs., the uppers will drop to 165-190lbs-17-19 AND there will be 1 ¾”-2” of prebend at the spreaders. (Pulling the main halyard down to the gooseneck and checking the distance from the wire to the back of the mast at the spreaders will help gauge the proper prebend.)

If your lower shrouds are lighter than 300lbs, your boat may not develop the proper prebend, so more tension equally set on both sides is in order. If tighter than 300lbs, back them off.

If your upper shrouds are greater than 190lbs, back them off slightly and evenly. If less tighten them up. Do not tension above 190lbs!

Step 9- Grab your tape measure still hanging on your main halyard

Take the tape back to middle of the transom where the transom and deck meet. Pull just enough tension to just remove slack in the tape measure, BUT do not pull tight enough to pull the mast aft. We are looking for the measurement when the mast is relaxed as well as the tape tension.

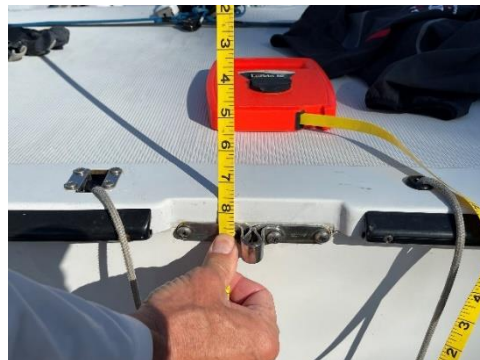
For the Allen and newer Nickels boats this “relaxed” rake measurement should be 26’6 ½”-26’7 ½”

For the older Nickels, this relaxed measurement should be 26’5 ½”-26’6 ½”

For the older Lippincott/Carson boats, the rake should be 26’3” to 26’4”.

If your relaxed rake is out of the suggested range above simply adjust your blocks and lower shrouds to adjust it to the ranges above. If too far forward, pull a small block from behind and tighten the lowers back to 300lbs. If too far back, place another block behind the mast and ease the lowers to 300.

Record your rake number! We’ll need it next.



Step 10- Set your forestay and headstay sag

Remember we suggested not to lock your forestay as we’ll fine tune it later?

Grab your backstay and pull aft until the forestay just goes taught and record that number. The “change” between the relaxed rake number and the number when pulled aft against the taught forestay should be 3 ½”. If not, ***simply adjust the forestay turnbuckle***, tighter or looser, until the difference is 3 ½”.



If your rake was 26’7 ½”, then adjust the forestay turnbuckle so that the forestay taught number would be 26’ 4”.

In summary- most important tuning settings in order

1. Prebend of 1 ¾”-2” (double check “overbend wrinkles” described in Main Trim section below)
2. “Change” number from relaxed rake to forestay taught of 3 ½”
3. Uppers close to 180lbs, lowers close to 300lbs
4. Mast straight laterally
5. Rake close to your boat’s suggested number. I.e.: 26’ 7 ½”

Now just set it and forget it! Don’t worry about changing your blocks or your shrouds!

There is no need to retune each time to un-step and the re-step the mast.

On the water and sailing

Main Trim

Mainsail shape-overbend wrinkles

Before discussing the various controls and settings for the mainsail, we should first describe the goal and guide for proper tuning and trim.

“Overbend” wrinkles in the mainsail are an excellent and consistent guide to confirming our tuning set up and ideal backstay tension.

When perfectly set up in every condition there should be visible diagonal wrinkles in the lower ¼ of the main, from the mast towards the clew. These wrinkles should start just behind the mast and stop ½ back on the boom. In the Backstay section we will describe how these wrinkles are the ideal indicator of perfect tension.



Mainsheet trim

The most dynamic trimming tool on the Lightning by far is, of course, the mainsheet. It not only controls the angle of the battens and the leech profile, but also helps balance the helm/boat. Proper mainsheet trim is determined by the angle of the top batten, and of course, feel on the helm.

Constant and consistent mainsheet adjustment is critical to help maintain top speed and acceleration.

When the boat feels stalled, has a healthy “tug” on the tiller (indication too much windward helm), is developing power while accelerating off the start, tacking or after hitting waves, ease the sheet so the top batten is angled past parallel 10-15 degrees. The top telltale off the leech will flow.

In flatter water and ideal boat speed and pointing conditions, the sheet will be tensioned so the upper batten is often hooked to windward as much as 10 degrees. The upper leech telltale will be stalled nearly 70% of the time.

In heavy winds with maximum backstay, the mainsheet will be trimmed so the upper leech is more open to 10-15 degrees and the top telltale will flow.

The choppier the water, the shiftier the breeze and the more challenging the steering, the more ease on the mainsheet is in order. While “twist” in the main compromises pointing ability for a wider, less “fragile” steering groove, it is often the proper trim to help the boat sail powered up and at top speed.

Backstay

Proper backstay tension is important to controlling proper fullness in both the main and jib. More tension will bend the mast and flatten the main. At the same time as the mast is pulled aft, the forestay/jib luff is tightened, sag removed, and the jib is flattened as well.

With Fisher tuning system, backstay adjustment is straightforward but does require consistent adjustment.

In light/medium winds when the boat is **not** overpowered, the backstay should just be tensioned so there is a slight “wiggle” of 4-6” in the backstay. If there is too much tension the mast will be pulled aft and will reduce headstay sag, and power, in the jib. If the backstay is too loose and sloppy, when



the mainsheet is eased to accelerate, the mast will move forward and too much headstay will develop. So, the backstay does need to be adjusted, but is not as dynamic as when the boat is sailing in overpowered conditions.

Once overpowered, pull the backstay to flatten the mainsail and balance the helm. Too much backstay tension will be indicated by overbend wrinkles above the spreaders. A good guide is to pull the backstay until the diagonal wrinkles above the spreader just appear and then ease until they just disappear. Don't forget to ease the backstay

downwind!

Cunningham

The Cunningham is the most under-utilized adjustment on the Lightning yet deserves to be one of the most dynamic. The Cunningham plays an important role in positioning the draft in the main. Tighter, will move the draft (maximum depth) further forward, while an eased Cunningham will allow the draft to move aft. In theory, every time the mast bends (when the backstay and/or mainsheet is adjusted) the Cunningham should be adjusted to match. More trim, more mast bend, will relate to more Cunningham tension.

In practice this should not be distracting as adjusting the Cunningham should become automatic and consistent watching for wrinkle placement in the luff of the main.

While the draft position should be near 45-48% aft, it is difficult (and unnecessary) to truly gauge the actual position.

Instead look to have a smooth luff (few wrinkles) from the head to the spreader window in all but the very lightest wind- when there will be wrinkles all the way along the luff, or in heavy breeze when the total luff will be smooth except for the previously described overbend wrinkles.

But it is important to ease the Cunningham totally downwind!

Outhaul

Outhaul will adjust the fullness in the lower section of the mainsail. To gauge proper outhaul tension, pull the outhaul so that there is maximum a 1 ½"-2" gap between the side of the boom and the shelf foot seam near the center of the foot. Once overpowered and maximum boom backstay is applied, the outhaul will be pulled tight enough that the shelf seam is flush against the side of the boom. Note that it is easy to over tension the outhaul and only in the heaviest winds (18+) will there ever be a crease in the sail from tack to clew. If the outhaul is too tight, pointing ability will suffer, if too loose and the main will stall.

On a reach ease the outhaul so the shelf seam is a few inches off the side of the boom (not more!). Dead downwind the outhaul should be left in the upwind position.

Unlike the backstay, traveler and Cunningham, the outhaul is not as dynamic an adjustment that is necessary to constantly adjust.



The Traveler

In heavier winds/puffs the bridle traveler should be considered a rough trim to help balance the boat (actually the helm). The traveler will be eased to leeward as much as 10-12" and the mainsheet played to fine tune the balance. In lulls, the traveler will be quickly pulled back up, all the while adjusting the mainsheet.

In light winds, when not tacking a great deal, pull the traveler to weather of center a few inches to keep the boom near centerline while maintaining proper mainsheet and sail trim. Having a crew member lean up to check the position of the boom relative to center will help proper positioning.

Never sail with the *boom* above centerline.

The height of the bridle should be set so that the traveler block and the block on the boom are always roughly 4-6" apart. This distance is important to allow tighter trimming in puffs or while tacking without two-blocking trim. While the bridle height does require adjustment in changing breezes, it is not a critical adjustment and not deserving constant attention.

While constant adjustment to the mainsheet is always imperative, it is unusual that a super active traveler provides benefit to speed.

Boom vang

Upwind in very puff shifty conditions (small inland lakes) consider tensioning your boom vang hard upwind so the mainsheet can be played like a traveler. Play the sheet aggressively to keep the helm balanced and the boat flat.

Downwind be conscious of over trimming the vang tension in light winds, and under trimming in heavy. Set your boom vang tension so that the upper batten is angled slightly outboard from parallel to the boom. When set properly the leech telltale should fly straight off the leech. The vang deserves constant attention downwind

Your battens

Your new Evolution main has been delivered with 4 battens. There will be 2 for the top (std. and heavy), 1 for the middle pocket and 1 for the bottom that is quite stiff. We suggest placing the heavy top batten in the sail when all three crew are hiking, and backstay is tight.



Jib Trim.

Steering.



The “groove” refers to that area where the boat feels the most comfortable sailing upwind. The lower end of the groove, when both the windward and leeward jib luff telltales flow, is when the boat is building speed and power. Acceleration, punching through waves, rolling out of a tack are all times when both telltales should stream.

When the boat is at speed, the windward telltale will lift and indicates the boat is steering the middle of the groove.

In breeze, or when the boat is overpowered and has more power than speed, steer higher for brief periods of time to burn that power with both telltales stalled and at times, the luff breaking/luffing.

However, the boat will never sail in one area of the groove for long. The boat should constantly be steered up in puffs, down in lulls, waves and

all the while the mainsheet is played to maintain the balanced helm.

Jib Halyard Tension

Your Evolution jib will perform best when your jib halyard is always tensioned so the luff wire in the jib is always slightly tighter than the forestay. The forestay will always carry some curve or “snake” and will clearly be looser than the jib luff wire (inside the jib luff). ***The jib halyard adjustment is important to adjust consistently as the conditions change and will move through a range of almost 3” from light to heavy breeze.***



Sheet tension

The range of jib trim for your jib will be 4" inside the spreader tip in less challenging conditions (flatter water, medium winds) to 1" in extremely tough sailing (light shifty or very windy and lumpy) when the steering is tough.

Remember, though, the sheet will be adjusted often to help the boat "change gears".

While the spreader marks and trim points can be a good starting point, watching the telltales on the top batten of the jib are the most accurate and the final guide point as they should always flow (unlike the top telltale on the main). We urge you to trim until the jib leech telltales start to stall and then ease back out until they just flow. You may find you are able to trim harder than you have previously and find better height and speed! But certainly, a flowing leech telltale will ensure the jib is never over trimmed.



Jib Lead position

Your Evolution jib has a trimline drawn on the clew. Position your jib lead so the jib sheet is an exact extension of the trim line. In heavy breeze, when overpowered, move the lead aft 1" of the extension of the trimline position.

To eyeball this alignment, lay a piece of line or straight edge on the sheet to check it is straight. But using the trimline will ensure your lead is precisely in the correct spot no matter what type of jib lead block set up you have or the rake of your mast.



Sail the boat flat

Resist the urge to sail the Lightning with too much heel. More heel than just clearing the windward chine from the water will create too much weather helm. Even in chop, the boat will struggle to sail as high, and fast, fast as possible.



Spinnaker Trim.

Set the topping lift so that your pole height will a) set the two clews even and b) the center seam of the spinnaker is parallel to the mast. Encourage the pole height up to a position that will set the skirt along the bottom of the spinnaker approximately 3-4' away from the forestay. There is flow out the bottom of the spinnaker and we want to avoid stalling the airflow exit. Constant and consistent adjustment to the pole height and fore/aft position is key, especially in light to medium breeze. A droopy leeward clew in light winds is very slow!

Play the sheet and pole position together with the pole position nearly perpendicular to the breeze. The sheet will be adjusted so there is an even 6-8" curl in the luff of the spinnaker nearly all the time. Be gentle with gradual trims and eases and avoid sharp jerks in and out to maintain flow over the spinnaker.

We suggest tying the halyard of your spinnaker with a long bowline so that the head is always 3-5" off the front of the mast which will help open the narrow slot up top between the spinnaker and the main.

Good luck and enjoy your Lightning sailing! Please contact us with any questions!