

Tuning Guide for the Supernova with square top sail

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This Tuning Guide is intended to provide instructions for the basic set-up and adjustment of the Supernova with the square top sail.

Everyone sails in their own way, at different weights and heights and on different waters, so you may wish to set up your boat in another way. That's fine, there's no 'right' answer, and we can all learn from each other's experience.

On-shore settings

Mast foot position

The recommended mast foot position is 1100mm measured from the front of the mast foot to the middle of the forestay U-bolt. However, you will see a variety of different mast foot positions in the boat park: some top sailors have recently moved the mast further forward in an attempt to reduce 'weather helm,' (a tendency for the boat to skew up into the wind), while others set it further back at around 1112mm. Not much can be learned from this except that different things work for different people. However, 1100mm won't be far wrong.

Spreaders

Most Supernovas are equipped with 'swinging' spreaders which swing forward on the run to allow the sail to go out a little further. Make sure yours can swing easily. If necessary, use lubricant or gently sand the spreaders around the pivot point with 400-grit sandpaper to make them smooth.

A standard starting point for spreader length is 375mm, measured from the side wall of the mast along the spreader to the centre of the shroud wire where it goes through the hole. This setting will typically have one whole hole showing on the hole-plate. The length can be adjusted by removing the pin and sliding the hole-plate in or out.

Conventional wisdom suggests that you should have the spreaders one hole shorter if you're lighter, or one hole longer if you're heavier. However, the Supernova is unlikely to be very sensitive to spreader length because the leeward shroud is rarely tight.

Mast rake and tension

Mast rake is critical. Sailing upwind in a strong breeze, most top sailors use a lot of rake to depower the rig, with the boom coming very low, such that the kicker must be released a little to tack. However, in lighter winds or when sailing downwind, you'll want the mast more upright to maximise power. Therefore, the on-shore setting should position the mast close to upright, and you can rake it back as required on the water by loosening the forestay.

To set the mast rake accurately, your boat should be equipped with a pair of 'vernier' shroud adjuster plates, which have two lines of holes to allow 'half a hole' increments, (e.g. the Allen A4272). You will also need a long tape measure and a shroud tension gauge. If you don't have a gauge, someone at your club may be able to lend you one. These gauges aren't very accurate, but consistency is more important than absolute accuracy.

Mast rake is measured from the top of the mast to the top of the upper gudgeon on the stern (the upper grey rudder fitting). Remember, you are setting the 'most upright' position here and will usually rake the mast further back than that when sailing.

1. On a calm day, place the boat on level ground, without the sail on the mast. Position the shroud tension gauge at just below shoulder height and tighten the rig tension until the gauge measures 160lbs.
2. Tie your halyard to the end of the tape measure and pull the end to the top of the mast. Measure the distance from the top of the mast to the top of the upper gudgeon on the stern (the upper grey rudder fitting).
3. The ideal measurement is 6075mm. If it's more than 6075mm, temporarily loosen the tension and move the shrouds half a hole down, and then put the tension back on and repeat the measurement. If it's less, do the same but moving the shrouds half a hole up. Keep doing that until it's as close as possible to 6075mm. Make sure the shrouds match!
4. It's a good idea to put a mark (or several marks) so you can easily reproduce the desired rake when on the water. There are various ways of doing this, e.g. using lines on the foredeck or pieces of tape wound around the forestay adjustment.
 - A sensible mid-point is around 6030mm, which will be good for beating in medium winds. At this setting, the leeward shroud will be loose.
 - The greatest rake should be around 5900mm, which is for beating in heavy winds. The leeward shroud will be very loose. (You should ensure that the mast can't fall out of the step if the boat is turtled, i.e. completely upside down.)
 - The least rake is 6075mm, which is for downwind sailing.
 - You may wish to put intermediate marks too, e.g. 6050mm and 6010mm, but this is personal preference.

On the water, you should adjust the forestay progressively and often as the wind picks up and drops off. If you're light, you'll be over-powered sooner on the beat, so in general will want more rake than will heavier sailors.

N.B. Some sailors with more experience of the Class may remember that the traditional mast rake recommendation was 6050mm, not 6075mm. But that guideline was offered without a tension setting. If you set the mast to 6050mm with the shrouds 'finger tight', and then tighten the shrouds to 160lbs, you will find that the mast rake goes to about 6075mm. Therefore, this is not necessarily a change from the earlier recommendation, just a more accurate form of calibration. Either way, you should be able to set the mast upright for downwind sailing and rake it right back for going upwind in a breeze.

Lowern

When you tighten the kicker, you don't only pull the boom down, you also bend the lower part of the mast, which flattens and depowers the sail. The lowers are there to restrict how much the lower part of the mast can bend – more bend equals a flatter sail and less power, and less bend equals a fuller sail and more power.

You will see two types of lowers in the dinghy park. There are top sailors using both types, so it's down to personal preference.

- Some have lowers which can be adjusted on the water. These offer the ability to reduce or increase potential mast bend independently of mast rake. However, this can be tricky to get right, and how best to set them on the water very much depends on your leverage (weight and height) and experience level. This option offers full adjustability, but it's one more rope to pull on, get wrong or trip over.
- Other sailors use lowers which can be adjusted off the water (using 'vernier' shroud plates) but can't sensibly be adjusted on the water. This option offers simplicity, but not perfect adjustability because the tension on the lowers will be determined on the water by mast rake.

For the simplest set up, the lowers tension should be a little less than the shroud tension – in other words, when the shrouds are at 160lbs of tension, the lowers should be 'coming tightish', but definitely less than 160lbs. Lighter sailors are likely to want the lowers very slightly looser than heavier sailors, to flatten the sail a little more.

Batten tension

Batten tension is set by the sailmaker when new, but it's worth checking from time to time. Lay the sail on a flat surface and adjust each batten screw just enough so the batten can't move in the pocket and the wrinkles are taken out, but no more. If you increase the tension too much they won't 'pop' over easily when tacking or gybing in lighter winds, plus you can get an undesirable S-bend in the sail on a run.

Some sailors have started to set the top three battens a tiny bit looser than the others, which may give the very top of the sail more depth. This is a marginal difference, no more than a half-turn of the adjuster screw. However, batten tension can be tricky, and it's wise to stick with the standard tension for a while before making any changes.

Please note that the Class Rules state that battens are defined as a 'major component' of the square top sail. This means that you may not swap the standard battens for third party ones, nor may you file them down or otherwise adapt them in a manner which may affect performance. (This doesn't apply to the previous, non-square sail design).

Mainsheet bridle/strop

The bridle (or strop) is the rope that the final mainsheet block is attached to, and it's usually spliced to eyes on either side of the cockpit.

The standard setting is for the knot to be just ahead of the very front of the daggerboard case when laid on the cockpit floor, which will measure approximately 550-570mm on each side (measured from the eye to the knot). The exact setting depends on your sailing style. Those with a habit of over-sheeting (pulling in too tight) may want to set the strop long enough to go block-to-block without over-sheeting (but make sure you test that with different mast rakes and kicker tensions).

When sailing, you never want the sail pulled in so tight that the boom sits inside the side-deck at the back. In fact, half-way across the side deck at the back is about as close as it should ever come.

Outhaul

The outhaul acts to flatten the bottom third or so of the sail. Outhaul tension is usually measured by the distance from the centre of the boom to the foot of the sail at its widest point (i.e. roughly at the centre of the boom). The outhaul should have enough travel to allow the sail to be pulled completely tight along the boom, but also allow the sail to be at least 300mm from the boom when loose.

As you round the leeward mark, especially among other boats calling for water, it helps to have an easy 'mid-point' reference, so you can set it quickly and know it won't be far wrong. A sensible mid-point setting would be 200mm. You may want to mark that point by sticking a short strip of insulation tape to the mast at the height of the block on the control line.

Many people use 5mm rope for their outhaul control line, such as Marlow Excel Control, which is slightly easier to grab with wet gloves than 4mm.

Kicker

The kicker attaches to the boom via an eye that can slide along the boom track. Straight from the factory, the eye is held with a screw that keeps it in place by friction. This can lead to slippage. You may want to drill a hole in the boom at the appropriate point, so the screw goes into the boom and can be tightened, fixing it permanently in place. A sensible position for the kicker attachment is 59-60cm, measured from the centre of the eye to the front of the metal part of the boom (i.e., not the gooseneck fitting).

There are various ways of attaching the kicker at the lower end. The consensus among top sailors is that it's best to attach the kicker to the mast, rather than the mast step.

Upwind, the kicker acts in two ways. As well as controlling leech tension, it also creates mast bend, which flattens the sail. The sail is quite sensitive to kicker tension, and you'll need to adjust it often, especially in variable winds. You usually want a small amount of twist in the sail, meaning it's very slightly more 'open' at the top than at the bottom (you can easily see this by comparing the angle of each batten to the boom). Judging how much twist to use can be quite challenging, but it's very minimal in all but the lightest winds. The only way is by experience – i.e. trial and error – and then marking the kicker line using coloured tape so you can repeat the settings.

(With many sail designs, including the previous Supernova sail, you can judge the correct leech tension by keeping the top leech tell-tail stalling about 50% of the time. But that doesn't work well with the Supernova square top sail because the kicker doesn't provide much tension to the top two battens. They tend to 'open' automatically in puffs, so the leech tell-tails fly fairly consistently almost regardless of kicker tension.)

On a reach, you may need the kicker to be tighter than with the old sail to stop the leech from opening too much. On a run, the kicker must have enough travel to be let off almost completely in light winds to allow twist.

The higher-tensioned line on the kicker should be 3.5mm Dyneema (or similar), spliced in (because splices are much stronger than knots). For the control line, many people use 5mm rope such as Marlow Excel Control, which is slightly easier to grab with wet gloves than 4mm.

Cunningham

The Cunningham acts to flatten the front and top of the sail. The kicker and Cunningham work in tandem, i.e., more kicker tension should be matched by more Cunningham tension. This enables you to make the sail flatter or fuller as required without moving the draft (curvature) of the sail forward or backwards.

You can use 5mm rope such as Marlow Excel Control, but if you have a 16:1 system you may find a 4mm rope runs through the blocks more smoothly. Rooster EasySplice is a good choice for 4mm. Again, make sure you have enough travel to be able to pull it on tightly or let it off completely.

On-the-water adjustments

The Supernova is very tolerant of a wide variety of weights and heights, so the correct on-the-water settings for you will depend on these factors.

One way to think about on-the-water settings when beating is to understand when you need to shed power and when you need to find more power. This depends on how much leverage you have, i.e. your weight and height. For your particular weight and height, there will be a 'peak power' wind strength – in other words, the wind strength at which you are neither over- nor under-powered on the beat, but are hiking to the maximum comfortable extent, with the sail perfectly filled, the boat totally flat and everything feeling great. In winds above this you are de-powering to stay flat, and in winds below this you are hiking less (or sitting in the boat) searching for more power to go faster. At a very rough average in a Supernova, the 'peak power' point is around 10-12knts of wind for a 78-82kg sailor of average height. You may want to adapt the following guidance based on the 'max power' point for your weight and height.

The following tables provide guideline estimates for light, medium and strong winds:

LIGHT WINDS

	Beat	Reach	Run
Boom position	At or beyond the rear quarter	Play gently as required	As far out as possible, one hand on boom if required
Mast rake (by adjusting rig tension)	Nearly upright (around 6050mm)	Upright (around 6075mm)	Upright, but just loose enough to let the spreader swing forward and the boom go out as far as possible
Kicker	Minimum tension to allow sail to twist – just enough so the boom doesn't lift in small puffs		Loose but not dangling
Cunningham	Loose or just take out wrinkles		
Outhaul (distance of sail from centre of boom)	80mm	120mm	80-120mm
Centreboard	140mm up	250mm up (more if broader reach)	Fully up

MEDIUM WINDS

	Beat	Reach	Run
Boom position	At the rear quarter	Play as required	As far out as possible
Mast rake (by adjusting rig tension)	Medium (around 6030mm rake)	Upright (around 6075mm)	Normally upright. A little looser if running by the lee.
Kicker	Fairly tight, minimal twist	Medium. Tighter if it's a closer reach.	Enough tension to maintain the sail shape. Looser if running by the lee.
Cunningham	Enough to keep the sail shape (in sync with the kicker). Tighter if becoming over-powered.	Remove wrinkles	Loose
Outhaul (distance of sail from centre of boom)	200mm (A little tighter on the sea)	250mm-300mm	200-300mm
Centreboard	140mm up	250mm up (more if broader reach)	350mm up

STRONG WINDS

	Beat	Reach	Run
Boom position	Beyond the rear quarter, and play as required to keep the boat flat	Play as required to keep the boat flat. Bear away in gusts, head up in lulls	Out
Mast rake (by adjusting rig tension)	Loose (5900mm or less rake)	Fairly upright if you can. Rake more if over-powered but keep the boom out of the water.	Fairly upright
Kicker	Tight.	A balance. Fairly tight on a close reach, medium tight on a broad reach.	Medium. Tighten a little if the boat starts to roll to windward. Loosen a little to gybe.
Cunningham	Tight to 'harden' the top two battens	Medium/loose unless over-powered, in which case tighten	Medium/loose. (if too tight, the sail will S-bend)
Outhaul (distance of sail from centre of boom)	30mm or less	150mm unless over-powered, in which case tighten	150mm
Centreboard	200mm up	300mm up	300mm up