

Tuning of Nacra F18 catamaran. (2003 & 2005 model)

There are many controls for adjustment in a modern catamaran, these notes will detail each one and the effect that it has on performance. They must be read as a general guide, as each sailor will have their own preferences. It is important that you measure your catamaran and know where your settings are, so that they can be reproduced in any given wind range.

The mast is the critical factor to achieve performance:

Rig tension.

Rig tension, slacker in lighter winds and tighter in heavier, slack is with, say 70 to 80 kgs pulling back towards the stern of the catamaran. At this tension, the leeward shroud will appear slack when going up wind. This will also allow the forestay to "fall away" causing loss of pointing ability. Sailmakers now cut jibs allowing for this to happen, but don't let it happen too much. As wind increases then increase the rig tension, but remember with a rotating mast, it will always want to stay "in the middle", which means that the rig is going marginally tighter each time the mast turns hence wanting to return to central "neutral" position. Now if you are too tight in light winds, the mast will not rotate enough, so slacker rig in light winds.

Slack, as a general guide, is when you can hold the shroud and rotate your hand through 45 degrees.

If you go too tight, then the mast will not rotate freely due to excess pressure on the mast ball, and the catamaran just won't feel right.

Don't forget, pull with the same person in the same conditions, then you can re-produce where you started.

Mast Rake.

Take the forward trapeze and add a short piece of line, then stretch tight down to bridle fastening to hull. Measure that distance, with trapeze wire taught, then take trapeze wire to stern and length ought to be in the middle of the hatch cover for lighter winds, to the "back end" of the hatch housing for heavier and finally half way from back of hatch housing to the transom for seriously heavy wind.

Moving the mast aft, decreases power and makes the catamaran easier to handle, hence further back in heavier winds. Also the lighter the crew, the further back the mast and visa-versa.

Also moving the mast aft, allows the center of effort on the sails to move

further aft and so will encourage the boat to point higher. BUT this might mean that you feel "weather helm" through the tiller, if so, "tuck" the rudders further underneath the catamaran by adjusting the screw thread on the rudder casting. When sailing upwind, with two on trapeze, you ought to be able to rest the extended tiller on the top of your index finger and the catamarans should slowly climb up into the wind.

Spreader rake.

The third crucial factor in tuning masts. Broadly the rake is set for the weight of the crew, and the tension for the wind conditions, when sailors feel that they are single and double trapezing in the right conditions. With the Nacra F18, the settings are further back than usual, with lighter crews going to 45 to 50mm, heavier from 35 to 45mm. (Peter Vink who makes the sails suggests 50 to 60 mm for lighter and 40 to 50mm for heavier!!!) Now, when the spreader rake is increased, it means that the tension of the spreader wires "bends" the mast aft, hence flattening off the sail therefore de-powering the boat. This adjustment is made on the land by turning the bottle screw at the base of the diamond spreaders. ALWAYS know this measurement!! Then as the wind increases you can increase a set number of turns, remember this setting and then the catamaran will reduce power in strong winds and increase power by reducing (slackening the spreader wires) the number of turns in light breezes. The technology in the new Nacra F18 mast is considerable and the mast is lighter but stiffer in the "sideways" bend, but achieves more variation in the "backwards" bend. This stiffness sideways allows the main to stay fuller at lower levels, hence giving more upwind drive and less heeling moment.

(The medium (middle) setting is 36 on the Loos gauge. (about 175 kgs)
When practicing your sailing, always try and get accurate wind strength measurement, I know it isn't easy but try, that will help you reconstruct the settings again on another day.)

Sail batten tension.

Do no more than fit the battens and tie in snugly. Do NOT try and over tighten, all you are doing is stretching sailcloth that doesn't want to stretch! When you have put them in "snugly" just feel the tension in the batten cords when you have down hauled and sheeted in the main.

There is wisdom in lighter breezes to increase sail shape by increasing the batten tension, but it is the natural curve of the batten that gives most sail shape, not tension.

You will find that the top two are very stiff and short, but they are also high up, and it is windier up there!! So in lighter breezes, or with heavier crews, you may want more shape at the top of the sail.

Cunningham (Downhaul).

Another critical setting to learn and to be able to re-produce. Increasing downhaul "flattens" the mainsail and decreases power, as the mast is "bent backwards" the bolt rope takes up that mast curve, flattening the main, but critically "opening" the top of the sail and so reduces power as the head of the sail "falls away" from the wind.

With modern 8:1 downhaul systems, it is important to learn the subtleties; it isn't a question of "full on or full off".

Remove all Cunningham tension on downwind legs when spinnaker is flying.

Mast rotation control.

Another factor influencing on sail power. To achieve maximum power, the mast rotation control yoke wants to be pointing at the shrouds, (or in light winds marginally in front). This will yield the perfect airflow over the mast then on to leeward side of the mainsail, hence most power. In stronger breezes, by moving the yoke further aft, that perfect air flow will be interrupted, leading to a reduction in power. So maximum power with yoke pointing at shrouds and pointing at "red traveller stop" on back beam for reduced power. (All this is assuming that the boom is in the middle of the back beam.)

The Nacra F18 is equipped with two lines that hold mast rotation on downwind legs when spinnaker is raised. These are invaluable on long downwind legs especially in light breezes, BUT BUT make sure that they are removed BEFORE gibing.

Out haul controls.

The next important control. In normal circumstance try and get a "handspan" between the boom and the loose footed sail. ie about 10 cms. In lighter winds especially if there is swell, increase as this will give increased drive. When seriously windy, reduce sail shape so that the mainsail loose foot runs parallel to the boom.

The Nacra F18 is fitted with a "limiter" line to stop sailors over out hauling the mainsail, as there is a risk that if the mainsail is out hauled severely, then 8:1 down hauled, the bolt rope might be pulled out of the mast track. If it is done in the reverse order then all is well.

Mainsheet tension.

Sailors will notice that if they "oversheet" then the mainsail "hooks" to windward and the boat sails appallingly, over sheeting is one of the most common causes of poor sail performance. Ensure that the telltales are flowing, indicating the even air flow over both sides of the mainsail. The

general guide is: ease mainsheet tension and make sure that leeward tell tales are flowing smoothly, then increase tension and get the windward telltales to fly evenly!

Don't forget that you **MUST** keep some mainsheet tension when you fly the spinnaker. Your main sail acts as your backstay. Failure to do this could well finish with a damaged mast.

Traveller positioning.

Upwind, keep traveller as close to the center of the back beam as possible, if it gets windier then allow the traveller to move out, and at the same time keep mainsheet firm, as this will keep a more even sail shape throughout the height of the sail.

Most F18 sailing is done with traveller in the center for both upwind and downwind spinnaker legs.

Dagger boards.

As a "Golden rule" dagger boards are down going upwind and 50 to 75% up when going downwind. However, they can serve as a very useful depowering adjustment when over powered going upwind. Raising the boards will allow the catamaran to "slip" to leeward and this will give the feeling of less power coming from the mainsail. This will be most noticeable in gusty conditions.

The jib.

Like the main, it is important to have the jib tuned to the winds. If stronger breezes, then increase downhaul tension on the luff, and visa versa, so in light winds it is acceptable to have slight "creases" around the luff, that will mean that the high aspect sail stay fuller. Be careful to ensure that you don't put tight luff tension of the jib if you have slack rig tension on the boat as this will mean that when you go sailing ALL weight is held by the jib cloth!!

The positioning of the jib is critical to give the "slot effect", the jib is very high aspect and not very large in its own right, but "deflects" air over the main, and so massively increases the speed of those air. There are three standard settings, but try with the jib traveller car at about 38 to 40 cms. from the center of the mast. This will give an ideal point to start.

In lighter breezes bring the jib carriage in and out when wind picks up. If it is too tight then the air can't flow "through" the catamaran, causing her to heel and not drive.

Next comes the Jib clew position. There are three positions, use the middle one to start with, but the bottom one will tighten the foot and free the leech and the top one will close the leech and open the foot of the jib. If windy then a free (open) leech will reduce power and reduce boat heeling, as the air can

flow "through" the boat more easily, whereas in light conditions, closing the leech will increase power as will increasing the sail shape in the foot both achieved by using the lower fitting. The "slot" effect of jib and main are crucial to boat speed, they must be working in total unison.

The rudders.

Run the rudders parallel. Some used to think of marginal toe-in, but it is easier to have them parallel. With the boat on the land, a simple device that does work is point the rudders direct down the boat so that they are in line with the hulls. Then fasten in the grub screws into the flexible rubber joints and the job is done ensuring that the tiller cross bar is equi-distant from the rudder arms. ie there is equal rubber jointing showing at both sides. Rudder rake depends upon mast rake, further back the mast, the further forward the rudders and visa versa.

The trampoline.

The trampoline wants to be as sensibly tight as you can get it. There are those sailors who get bars of wood to gain even greater tension. I am not one of those, but don't have it slack either. The Nacra F18 has deep bows and that keep sailors well off the water, but water hitting the underneath of trampoline is cold, wet and slow!! You will find it very slippery to start with but that only lasts a few days.(Leave the cover off for the first two weeks and it will be fine then!)

The Front beam.

Ensure that the front beam has about 5 mm of upward bend when the mast is not on the boat. Also make sure that the stainless steel threads are fully greased and tight. (you may have to get them undone one day!)
Ensure that the eight hulls bolts are firmly tight, about 17/18 ft.lbs. Make sure that if you ever take them out, then re-grease on subsequent assembly.

Catamaran balance.

Try and make sure that the catamaran is balanced both fore and aft and also "side to side". You want the boat level with the water fore and aft, so keeping the bows well down when going upwind. The Nacra F18 has very fine entry bows and points very high compared to others, this will mean that you are well forward going upwind therefore using water line length and move weight back when reaching BUT sailing with spinnaker means that the buoyancy in bows presents little problem, and the boat can be driven very hard downwind with low levels of concern.

Catamarans have a low wetted area, for it is wind that drives and water and weight that slow!! So try and keep one hull in the water and one hull just

"kissing" the surface, this is on all points of sail! At this point, you will achieve the compromise of a mast that is upright and a reduced wetted hull area therefore achieving maximum speeds.

So record all your settings, so that you can set to your breeze conditions. Hours and hours of work have gone into getting the catamaran to this stage. She is seriously very quick. We want sailors to get the best out of her!! Be happy on board. I have always found that "happy" catamarans are usually quite quick.

Summary of the 12 commandments:

For more power and opposite for less power:

1. Mast more upright.
2. Spreaders with less rake.
3. Diamond wires less taught.
4. Less downhaul tension.
5. More sail shape from battens.
6. Dagger boards down going upwind.
7. Mast rotation yoke pointing at shrouds or just in front.(light breezes)
8. Outhaul controls allowing shape in foot of mainsail.
9. Mainsheet tension firm but not excessive.
10. Traveller in central position.
11. "Jib slot" allowing air to flow "through" the catamaran.
12. Catamaran balanced port/starboard and bow to stern, one hull in the water and one just "kissing!"