

Formula 18 Tuning Guide

By Landenberger Saling

With the World Championships in Erquy being my first F18 regatta, I am not the most qualified to be writing a tuning guide. However the basics are very similar to the Tornado so I can at least give some tips and explanations which may be helpful to some sailors.

With the F18 being a development class with boats, sails, and masts varying quite a lot it is difficult to give accurate numbers which can be applied to the different boats. Therefore it is more important to understand what you are trying to achieve by changing different settings. I will give ranges for the different settings which will always be close but it will be up to you to understand what setup is best for your boat and crew.

Our Sails

The latest mainsail from us has been designed using a very light but strong Apen cloth. This is a very powerful sail which has been designed to perform well across the widest possible wind range. We believe it is a very good all round sail which is particularly easy to control, which leads to very good speed when racing. That is when you have the least amount of time to concentrate on boat speed so it is very important to have a sail which works easily and automatically.

Our Jib is again a very all round design taken from the known Tornado Standard. We plan to work hard in this area over the winter to develop new designs and materials.

The Spinnaker has been well tested and proven. There is little to say about this except that the downwind speed with this spinnaker is exceptional. With very little practice, in the World Championships we were able to come back from some very ordinary top mark positions up to very good results just with excellent downwind speed.

Understanding Your Rig

The topics we will cover in the following article are

Battens

Mast Rotation

Spreader Rake and Pre-bend

Mast Rake

Centerboards and Rudders

Sailing Techniques

- The main batten producers are Scott Anderson 'Fibre Foam' Battens in Austria, and Goran Marstrom 'Sailcenter of Sweden'. Blue Streak from Australia also produce a range of solid fibreglass battens. All these producers offer a very good product, which in the right hands can give excellent speed. The Marstrom battens are lighter and a bit straighter in the back section on average. The Fibre Foam are a little heavier but are very strong and durable.
- The most important thing to understand about the batten shapes is the reaction they give to the sail. In brief, a batten with a hard back section promotes twist (opens the leech) and the soft batten closes the leech. We try to achieve the top of the sail to twist first with the lower part of the sail standing up in the leech. The standard sets of battens are pretty good in achieving this. The weight of the batten is important as this controls the depth of the sail and how it responds to Cunningham tension. The weights I refer to are the amount of pressure it takes to bend the batten. It can be measured by pushing the tip of the batten on a scale. At one point you can keep pushing the batten but the weight hardly changes. That is what we refer to as the 'tip weight' of the batten.

- In our sail I used, from the top 6.5 kg, 5 kg, 3 kg, 2 kg, 1.4 - 1.6 kg the rest of the way down, it gets much less critical here due to the batten length and the Mast stiffness.
- Mast rotation, Spreader rake, and Pre-bend all work together. The most important thing with any rig is that the luff curve of the sail matches the bend of the mast. The angle of rotation on the mast changes the bend of the mast significantly so it gives you a very powerful control to match your mast to your sail. The mast section is much stiffer fore-aft than sideways because of the section shape. That part is obvious. Now think about the mast in two separate parts, above the stay fitting and below where the spreaders are. The top can bend freely, so the more you pull the rotation back, the straighter the mast bend gets in the top. ie the sail gets fuller. Below the stays the mast is supported by the spreaders. When the diamonds are tight, (the windward diamond wire never goes loose while sailing) the mast can not bend sideways. Therefore the only way the mast can bend is forward through its section. Without getting too technical, when the mast rotation is pulled back the mast can bend more forward through its section below the stays. So the point to remember is that when you pull the rotation back you make the mast stiffer in the top and softer in the bottom. Therefore the position of the maximum mast bend moves down as you pull the rotation back or in terms of the sail, the depth moves up.
- When the sail is too flat and twisted in the top and the cunningham is not over tensioned you should pull the mast rotation back until the upper leech starts to stand up. When the top of the sail is how you want it you should check how the bottom looks. Adjusting the spreaders and diamond tension can change the lower part of the sail. I look for very even sail depth from top to bottom.
- The Mast Pre-bend is set by the spreader angle and the diamond tension. It has two major effects.
- In very light wind with no cunningham tension the pre-bend sets the base depth of the sail. It is important to have some pre-bend because if the sail is too full and draft forward in the bottom it will tend to stall and close the slot from the jib. - All together you will be slow with no height. The second effect is how the mast reacts to cunningham pressure. The less pre-bend you have, the more the top bends under cunningham. The more pre-bend you have the more the mast bends down low and the straighter the top of the mast remains. Like the rotation being pulled back 'Pre-bend' helps stiffen the top and soften the bottom. It is just pushing the point of maximum mast bend down.
- If you are not sure where to start, a good number for pre-bend is 35mm. Remember, mast pre-bend is not spreader rake. You can measure the pre-bend by laying the mast on its side and pulling a string line between the boom fitting and the top of the mast. The measurement is always taken from the position of the spreaders. 35mm is a good place to start. Often you will increase it up to 45mm and sometimes go as low as 30 mm. It depends on the mast - sail combination, conditions, and crew weight. It is a good idea to learn how many turns you need on the diamond wires you need to achieve these changes while you have the mast on its side. Then you can make changes on the water and understand how the pre-bend is changing.
- Spreader angle depends entirely on mast stiffness. It can be anywhere from 25mm - 30mm on an Alado mast, and up to 65mm on a Hobie Tiger mast. Measuring it is done by placing a string line or a straight batten across the diamond wires at the position of the spreaders. The distance from the string to the back of the mast is what we refer to as the spreader rake.
- Diamond tension - The numbers people use always depend on the type gauge they use.

With the old style Aluminium Loose Guage the tensions is usually between 42 - 46. I tend to be at the top of that range and even go up to 46.5. The new black Loose Guage is around 35-39. If you don't own a guage, don't worry, it is not that technical. Just remember two rules, First, the windward diamond wire should never go loose while sailing upwind, not even under maximum cunningham. Secondly, if you lay the mast on the ground and put your feet against the mast either side of the spreader, it should be possible to pull the diamond wire out of the spreader. It is not easy but it should be possible.

- When we talk about mast rake, we refer to a point along the rear of the hull where the trapeze wire touches. For those who don't know the system, just take one trapeze wire and tie a piece of line to it so when you swing it around to the front of the boat you are able to touch the point where the bridle wires connect to the hull. Keep this point fixed on the line between your fingers and then swing it back again to the back of the boat. The point on the boat which this point between your fingers touches is the position of the mast rake we often refer to. As all the boats are different, I can only talk about the Tiger. We started at the worlds with the mast rake on the back corner. The feeling was not good on the rudders so the second day we moved the mast forward to about the middle of the inspection hatch. Then we started to go fast. On the Tiger the forestay was in the 4th hole down in the chainplate.
- The important thing is that the boat feels good to steer upwind. With too much rake the boat has too much helm and is always wanting to go into the wind. Then the helmsman is always fighting the boat pulling on the rudder and this is just like putting your foot on the breaks in the car.
- Rig tension - Very simple, as tight as possible without stopping the mast from over-rotating. In light wind it can be looser so the mast goes around easily but as soon as the wind strengthens you must start tightening it.
- Rudders and Centerboards - I will leave the discussion of shapes out of this as every manufacturer has their own ideas and designs. I chose to use the Marstrom rudders simply because the quality of the product is so high. If you have the possibility to rake the rudder blade forward under the boat you can change the feeling of the steering a lot. If the boat feels heavy to steer you can try this. The main thing to get right is the alignment. Some people prefer to have the rudders set exactly parallel to each other. I like to have the blades toed in a little at the front. As a rough guide, on the beach with them kicked back, I set one straight down the center line of the hull and the other, I point at the bridle fitting on the inside edge of the hull. The reason for doing this is to reduce the drag created on the windward rudder. If you go behind a catamaran in a motor boat and watch the windward rudder going in and out of the water you will see that it is almost always turned out slightly. This is because you always pulling on the rudder to steer the boat straight. Toeing them in means the windward rudder is travelling straighter with the direction of the boat. I think this significantly reduces the drag on the windward rudder, particularly when it is entering the water.
- Centerboards - It is a good idea to mark with a line on the board at deck level the position where the centerboard is at its maximum up position with the centerboard still filling the case perfectly. Some boards like the Mystere's are untapered so that is not a problem but a mark is still a good idea for the downwind. Half boards down wind is good and the stronger the wind the less you need. Upwind, you should always use the full board until you are in extreme conditions. Once you have used up all your other options to get the rig depowered

you can lift the boards a little to help. We used the boards up about 20cm in some of the windier races at Erquy.

- Upwind and downwind techniques I will go into at a later date, but as a rule, once you have the boat set up correctly, mainsheet trim and cunningham pressure is about 90% of the work to be fast upwind. Downwind is another story but there is no substitute for practise.
- My basic setting for the Tiger in Erquy
 - 28 mm Spreader rake (Alado Mast)
 - around 35mm Pre-bend
 - Diamond tension - 46.5 on old loose guage
 - Mast rotation usually on the back of the ceterboard case, A little more forward in the light wind and more back in the really strong (rear beam)
 - Mast Rake - Middle of inspection port.
 - Ullman Sails
 - A vey fast crew - Thankyou Philippe