



North Sails Gulf Coast

1320 20th St. North, St. Petersburg, FL 33713
727-898-1123, fax 727-898-0211
ethan@sales.northsails.com

WINDMILL TUNING NOTES

INTRODUCTION - The following tuning guide is meant to be a good starting point in setting up your boat. Depending on your crew weight, strength, sailing style and local conditions, you may have to alter your rig slightly. As you read this, write down any questions you may have, and we will be happy to discuss them with you in more detail.

We are trying to achieve a rig set-up that is fast in all conditions; upwind, reaching and running, and is very easy to adjust or change gears. Your new North Sails are designed around this all-purpose philosophy.

INITIAL SETTINGS - The first item that should be checked is the mast step. It should be placed at about 59-60" from station 0. Make sure that your mast is tight in the step and will not twist in the step.

MAST RIGGING - The standard height for spreaders is between 104 to 106" above the theoretical top of keel. In checking the fleet, I have found some as high as 117". While this is quite high, it seems to balance the mast bend nicely, and allow the jib to be sheeted inside the shrouds if you'd like and not foul on the spreaders.

The length and angle the spreaders are set to determine the deflection that the shroud is moved away from a straight line between the mast and the chainplates. These factors control the stiffness of the mast. The spreader length should be set to deflect the shrouds about 2.5" to 3" outboard to restrict side bend and pinned to deflect the shroud about 1.5" to 2" forward which restricts fore and aft bend. These are checked at the light air rake settings. When measured from a straight line between the shrouds, the distance to the aft edge of the mast should be about 5" for a Kenyon "A" section, and 6.5" for a Proctor Lambda or Alpha Minus. Spreader length of about 15.5" from the surface of the mast works well with the spreaders at 106" and the chainplates inboard. With the spreader bracket at 117" above the keel, a length of 15.5" works well with the chainplates close to the gunwhale. These numbers will vary depending upon the location of the chainplates and height of the spreader brackets, but the overall deflection is the key. When sailing upwind in 8 to 10 knots, with the boom close to centerline the mast should be straight up to the forestay. If the spreader area goes to leeward, you need to either loosen the rig if it's tight, or shorten the spreaders. It is also a good idea to have nicopress stops under the spreaders so the spreaders don't drop in angle.

CENTERING THE MAST - Before calibrating your mast rake, check that the mast is even in the boat athwartships. You can do this by hoisting a jib and tensioning the rig until the shrouds are tensioned. Attach a tape measure to the end of the main halyard and raise it to full hoist. Check the distance to each chine directly below the chainplates, and adjust the shrouds until the mast is in the center of the boat. Next sight up the back edge of the mast to ensure that it's straight athwartships. If the measurement to the gunwales is even, and the mast isn't straight side to side, then either the spreaders are uneven in length or the mast partners at deck level are uneven and pushing the mast to one side. It is important that the mast is straight in the boat and nominally tight in the partners. Any side to side play in the partners depowers the rig too early.

MAST RAKE - Mast rake and rig tension are the two very important tuning variables. We use a "boom band radius system" to measure and calibrate your rake, which uses your forestay. Hoist your jib without attaching the hanks to the forestay. Detach the forestay from the headstay fitting at the bow. Swing the headstay back to the mast, and mark the stay with tape where the wire is even with the top edge of the sail black band at the boom. This is your "zero point." If your spar has two bands, use the upper band. If you are not confident that the band is in the right place, check the class rules and re-measure it. Now swing the wire back forward, attach a tape to the "zero point", and measure down to the upper forward intersection of the deck and the bow.

In light air and full power, this number should be about 34.5"

An average light air setting would be 36".

For lighter crews or increasing breeze, rake back to about 37".

In heavy air rake back to about 38"

To set the shroud tension, at your light air rake setting the shrouds should have about 150 lbs of tension, as measured on a Loos Gauge. If you don't have a Loos Gauge, this is moderately tight where the shroud can be wiggled in a small circle without too much trouble. Heavier crews can use more tension to restrict mast bend, and lighter crews can sail with looser shrouds to allow more mast bend.

As the breeze builds and you get more overpowered, just ease the jib halyard off to increase aft rake. This depowers the main through more athwartship and fore and aft bend. As a guideline, if you are pointing too much and going too slow, increase rake and loosen the helm up. If you are fast but not pointing, decrease your aft rake.

With the mast in the 3'0" rake setting and the jib up, block the mast to have about 1/2" to 1" of pre-bend, that is where the middle of the mast bends forward.

DAGGERBOARD - In my limited experience, it appears that the board should be as stiff as possible. It is also important that the board fit tightly in the trunk. The trunk can be shimmed within the WCA class rules with carpet, which will protect the daggerboard and keep it snug in the trunk. In conditions up to a full hiking breeze, keep the board

all the way down and even forward in light air. As weather helm increases with the windspeed, you can balance the helm by either raising the board and/or angling the board aft.

MAINSHEET TENSION AND BOOM VANG - Generally, the vang should just go slack when the mainsheet is at maximum tension. In light to medium conditions, trim your mainsheet so the top batten is about parallel to the boom. If you are sailing in very smooth water, trim hard enough to hook the top batten 5 degrees to windward.

The boom vang is a powerful tool in that it will increase the mast bend and flatten the main. When sailing upwind, if you have speed with no pointing, try reducing aft rake, getting the traveller closer to the centerline, or vanging harder to tighten the leech and flatten the main. If you have pointing with not enough speed through the water, try increasing your aft rake, easing the traveller, bending more, or checking to see that you are not vanged too hard. Or just hike harder and sail the boat flatter!

MAIN CUNNINGHAM - The main cunningham should be slack up to 10 knots. Above 10 knots, tighten enough to remove wrinkles along the luff. Always be aware that the cunningham pulls the draft forward and depowers the leech, which is not always good.

OUTHHAUL - Our sails are designed with a shelf foot, which makes the sail sensitive to outhaul control. Ease the outhaul 2-3" for power in a chop, and for offwind legs. Tighten in heavy air or overpowered conditions.

JIB LEAD POSITION - As a starting point, your jib leads should be positioned so that the bearing point on the blocks is about 83" aft of the jib tack pin. Another guide is to set your leads so that the jib sheet lines up with the trim line on the clew of the jib. In choppy conditions it may be faster to move the lead forward from this point, and sheet just a little looser. If your sail does not have a trim line, you can install a line on the clew, defined by the center of the clew and intersecting the luff midway between the tack and the head. This is a good starting point. Move the jib lead aft as the wind increases, and/or more rake, to accomplish the same end result of twisting off the top of the sail. If you have speed with no pointing, try moving the leads forward. If you have pointing with not enough speed through the water, try moving the leads aft. Experiment with different lead positions, especially in stronger breezes, as changes are readily felt.

The leads should be about 16" to 17" from the centerline. This can be adjusted by changing the length of the shackles that hold the ratchet blocks to the track slider. Generally, 16" is best for light air, and 18" or so best for heavy air.

Good luck and sail fast! If you have any questions or suggestions call Ethan Bixby of North Sails Gulf Coast, 727-898-1123, Fax 727-898-0211, or e-mail at ethan@sales.northsails.com. Updated 08/22/02

Some data to incorporate:

With all sections, the spreaders should deflect outboard by about 1.5". With chainplates at sheer line, the spreaders should be about ___" long, deflect outboard about 1.5" from a straight line. Measuring from a straight line between the shrouds, for a Kenyon mast the measurement should be 6.5", and for a stiff mast like a Proctor Alpha - or Lambda, the measurement should be about 7.5". W/o spreaders attached, and the shrouds free, with the rig tensioned and the rake at 36", for a Kenyon the shrouds are at about 22" and the mast is 5.5" forward of the shrouds. Attached, the sweep is 6.5", 25" tip to tip.

Alpha Minus- E's mast = Spreaders: 3.5" out outboard of straight line, spreaders loose to swing to be ½" aft of straight line, which is 7.5" to back of mast.

Approximate measurements:

Forward edge of DB trunk to centerline of mast step = 18"

Forward edge of DB trunk to forward limit of mast = 20"

Outside of transom at hull (measured through the drain plug) to the centerline of the mast step = 124.3"

Outside of transom at hull (measured through the drain plug) to the inside forward edge of the DB slot = 106"