THE FLYING SCOT

A BASIC GUIDE

TO

TUNING AND SAIL TRIM

By Harry Carpenter

Tuning the Flying Scot Rig

Boat set up

In setting the mast rake on a Flying Scot, most Scot sailors run a tape measure up the mast to measure the distance between the top of the mast and the center of the aft deck where it turns over the transom. This is not science. There are too many variables to worry about nailing this down to the $1/16^{th}$ of an inch. If you are within an inch of what the sailmaker is saying in the tuning guide, you are close enough. I like to see no less than 28' 3" for this measurement. I try to sail with it at 28' 5".

If you sail with at tight rig, this is the only number you need to worry about. The distance should be around this number with the rig tensioned.

If you sail with a loose rig, this is the number you are looking for with the mast pulled aft and the forestay tight. When you push the mast forward against the shrouds, you want 4 to 5 inches of travel. So if the distance from the top of the mast to the transom is 28' 5" with the mast back, you want it to be around 28' 10" with the mast pushed forward against the shrouds.

The Procedure – Loose rig

Set the shrouds at the middle and top setting. Put the mast up. Use the jib halyard hooked to the bow plate to hold the mast forward without hooking the forestay up until you get the shrouds set. Run the tape measure up the mast. Lock the halyard at the point where the shackle is just at the top sheave of the masthead without being pulled over the sheave. Measure the distance to see how close it is to the 28' 10". If it is within an inch it is close enough. If not, move the shroud adjusters so that it is close to the 28' 10" measurement.

Note - You can adjust the shrouds with the mast up if you have two people. Slack the jib halyard a few turns on the winch so that the mast rocks back on the step and the shrouds get plenty of slack. One person should stand on the deck and pull the mast hard to one side. The other person should make the shroud adjustment to the shroud that is slack. Pull the mast the other way and adjust the other shroud.

It is most likely that you will need some type of forestay adjuster to make the forestay long enough to get the mast back to the 28' 5". Go under the deck and disassemble the turnbuckle. Re-assemble so that you have at least 5 full turns on the turnbuckle. (I like to put 7 on mine to be sure.) Put the forestay together with the forestay wire that comes out of the deck, pull back hard on the mast and check the measurement. If it is more than the 28' 5", you will need to use an extender. This can be something simple like a flat stainless tang with a hole at each end or a more sophisticated stainless channel with multiple holes. (If you get a multi-holed adjuster, be sure to get it with 3/16" clevis pins.) Set the forestay length so that the distance from the top of the mast to the center of the aft deck where it turns over the transom is about 28' 5". You can use the turnbuckle for fine adjustments if necessary. When you are happy with the setting be sure to lock off the turnbuckle with the safety wire so that it can't change accidentally.

The Procedure – Snug rig

Mast rake should be around 28'4". We do not measure tension with the Loos gauge for this setting. You should tighten the jib halyard as tight as you can without breaking the aluminum crank and then connect the forestay.

The Procedure – Tight rig

Check the jib halyard and jib halyard block to be sure they are sound. Set the shrouds at the middle and bottom setting. Put the mast up. Use the jib halyard hooked to the bow plate to hold the mast forward without hooking the forestay up until you get the shrouds set. Run the tape measure up the mast. Lock the halyard at the point where the shackle is just at the top sheave of the masthead without being pulled over the sheave. Measure the distance from the top of the mast to the center of the aft deck where it turns over the transom. It should be about 28' 2" before there is any hard tension on the rig. If it is within an inch it is close enough. If not, move the shroud adjusters so that it is close to the 28' 2" measurement. If you cannot get the shrouds shortened enough to get the mast back to the 28' 2" measurement, you may need to modify the hardware.

Flying Scot, Inc. has shroud tangs available with an extra hole drilled ½" higher. (These may not work if your shroud fittings are not the fork and ball style.) Getting the tang bolt off on newer boats can be difficult. You may want to get a new tang bolt as well if you decide to replace the shroud tangs. You can drill the extra holes in your shroud tangs, but it is difficult to drill stainless steel. You can also cut the bottom of the adjusters so that you can get them down to the top and top setting. If you are having trouble getting the shrouds set short enough to get the 28' 2" measurement, call us to discuss options (800-864-7208).

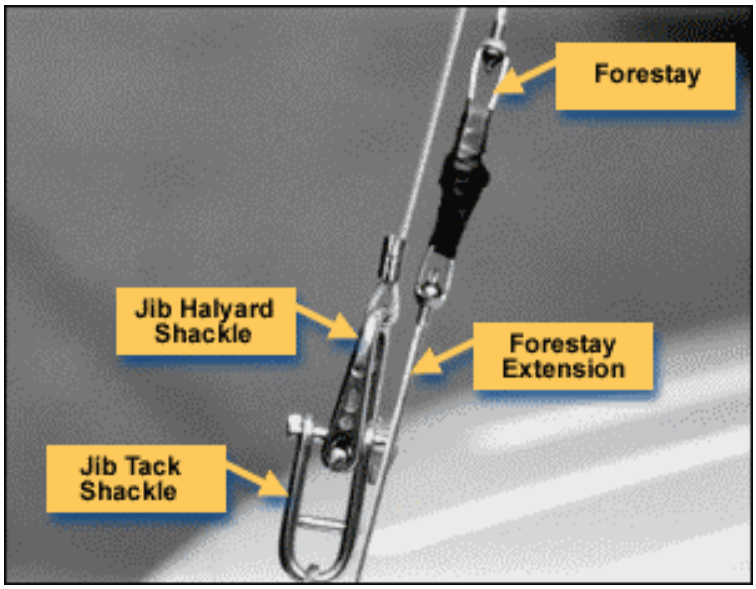
You will need a Loos gauge for 3/32" to 5/32" wire or something similar to measure the shroud tension. I like the professional version because you can hang it on the shroud and watch the needle climb as you tension the jib halyard. This gauge cost around $70 from West Marine. It wouldn't be a bad idea for a fleet to purchase one that could be shared in lieu of each owner buying one. Once you have the rig set, you won't need the gauge each time you rig the boat.

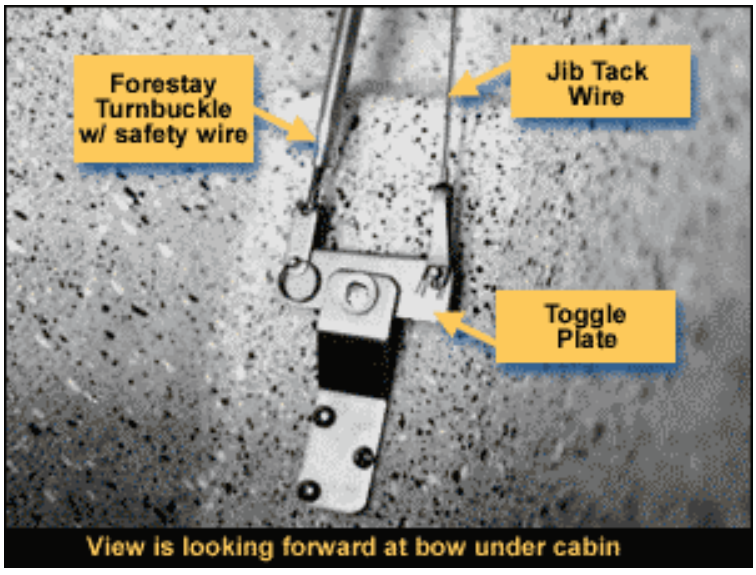
There are a number of ways to pull the mast forward to tension the rig. I like to put a 1/2" socket drive with a 3/8" reducer into the jib halyard winch. This will give you enough leverage to tension the rig. You can also attach the jib halyard to the trailer winch. (Make sure the boat is secure and cannot slide off the trailer before releasing the trailer winch from the bow eye.) Hang the Loos gauge on the shroud and tighten the jib halyard until the gauge reads about 35.

Note – The ambient temperature and the angle of the boat on the trailer will affect the tension reading. Try to have the boat sitting as it would sit in the water and rig the boat when the temperature is about what it will be while sailing.

The distance from the top of the mast to the center of the aft deck where it turns over the transom should be a little more than 28' 5". If it is within an inch, it is close enough. It is most likely that you will need some type of forestay adjuster to make the forestay long enough to get it long enough to connect to the extension that comes out of the deck. Go under the deck and disassemble the turnbuckle. Re-assemble so that you have at least 5 full turns on the turnbuckle. (I like to put 7 on mine to be sure.) If the forestay and extension will not come together, you will need to use an extender. This can be something simple like a flat stainless tang with a hole at each end or a more sophisticated stainless channel with multiple holes. (If you get a multi-holed adjuster, be sure to get it with 3/16" clevis pins.) Install the extender so that it is easy to remember what hole to use each time you rig the boat. I like to use the bottom hole of the adjuster to the wire extender that comes out of the deck. I pull this pin every time I rig the boat so that I know it always goes in the bottom and the rig tension is the same without using the Loos gauge to check it. If there is now some slack in the forestay, go below to tighten the turnbuckle and tighten the forestay. Turn it as tight as you can without using tools. Ease the tension on the jib halyard and check the tension on the forestay with the Loos gauge. It should be somewhere between 200 and 250 lbs. and the distance

from the top of the mast to the center of the aft deck where it turns over the transom should be around 28’ 5”. When you are happy with the setting be sure to lock off the turnbuckle with the safety wire so that it can’t change accidentally.


Forestay
Jib Halyard Shackle
Forestay Extension
Jib Tack Shackle


Forestay Turnbuckle w/ safety wire
Jib Tack Wire
Toggle Plate
View is looking forward at bow under cabin

Boat Preparation

Internal Layout

The layout of your Flying Scot should be such that it is comfortable and easy for you and your crew. To this end, keep the layout simple and remove all unnecessary gadgets. No one rigging layout is right for every boat. In my opinion, sailors spent too much time and money on the way the boat is rigged. It doesn't make that big of a difference. Make sure the running rigging is as friction-free as possible.

Check rigging and hardware often – especially before a heavy wind race. Look at the gooseneck checking for cracks in the stainless fittings or the gooseneck track on the mast. Check for cracks in the boom near the vang attachment point. Check that all shackles and fittings are tight.

Bottom and Centerboard Finish

The quality of the finish you require on the bottom and centerboard of your Scot depends upon your demands on the boat, i.e. upon the standard of racing of your fleet and where you would like to place within the fleet. This is a good place to spend time and money on the boat. I sand and wet sand the bottom to a 1200 grit finish. The board should be smooth without dings and sanded to the same grit as the bottom. The gasket should be smooth as well. The rudder blade should be smooth, but is not as important as the board.

Key Controls for Proper Sail Trim

Main and jib halyard and cunningham

When you hoist the main and jib at the dock, you can't really see the amount of cloth tension you have in the luff of the sails. Be sure you do not hoist the main so high that the nico sleeve is on the sheave at the masthead. This can lead to a broken main halyard. When you look at the top of the mast after the main is hoisted, you should be able to see just a small amount of wire above the shackle.

When you get to the starting area, sail up wind and look at the luff of the main and jib. With North sails, adjust the halyard so that there are wrinkles in the luff of the main up to the numbers. When it is windy, it may be necessary to use the cunningham to get enough tension on the luff. Do not over hoist the halyard! I have found that Schurr sails perform better with more luff tension. I try to get all of the wrinkles out of the luff with Schurr sails. If you have sails by a different manufacturer, contact them for their recommendations.

When the wind is up and it is hard to keep the angle of heel flat, tighten the cunningham so that the luff of the mainsail is tight. It is desirable to pull the draft forward in the main when you have to luff the main back to the battens to keep a low angle of heel.

I like the entry on the jib to be flat. This requires a low amount of cloth tension. We no longer worry about sailing with the toggle level. We sail with the entire load of the mast on the forestay and use the jib halyard to control the cloth tension. While sailing upwind, ease the jib halyard until the luff of the jib starts to sag between the snaps. Tighten the halyard just enough to remove the sag scallops from the luff. You should be able to see wrinkles at each of the snaps.

While sailing down wind with the loose rig, I like to crank up on the jib halyard to pull the mast forward and keep the rig from bouncing around. We count the clicks on the winch as we tighten the jib halyard so that we can let it off by the same amount before we get to the leeward mark. This way we will have the proper jib luff tension on the up wind leg.

Outhaul

I like to pull the outhaul out to its maximum and make a mark on the boom with a pencil at the edge of the nico sleeve on the port side of the boom. If you don't have a wire outhaul, find a way to mark the outhaul so that you can have a visual indication of the setting. With North and Schurr sails, I believe too tight is better than too loose. Start with it tight and experiment with easing it a bit. Never sail with vertical wrinkles in the foot. Remember that a small adjustment goes a long way with the outhaul.

Mainsheet/Boom Vang

The mainsail steers the Flying Scot almost as much as the rudder. The mainsheet trimmer should always hold the sheet in hand so that it can be eased and trimmed quickly as the angle of heel changes. In general, you want to sail the Flying Scot with an angle of heel of 5º or less. In drifting conditions, heel the boat as much to leeward as possible to reduce wetted surface and help the sails hold a better shape.

Mainsheet tension is critical to boat speed. In light to medium air trim the mainsheet until the top batten is parallel to the boom. I like to mark the mainsheet midway between the midboom block and the swivel cleat. This gives me a visual indication of mainsheet tension. After a tack or in a lull in wind speed ease the mainsheet a bit to let the top batten to fall slightly to leeward. This is a more powerful trim setting that will get the boat moving out of a tack or keep it moving through a lull. As the boat speed increases, trim the mainsheet so that the top batten is once again parallel to the boom. This trim setting will keep the boat pointing high. Remember that small adjustments make a big difference. If you get the feeling that the boat isn't moving well, try easing the sheets to a more powerful trim setting. If you feel like you have to choose between speed and pointing, go for speed.

In drifting conditions, the weight of the boom will make it impossible to keep the top batten parallel to the boom. Ease the mainsheet so that the top batten is parallel to the centerline of the boat. As before, go for speed first and worry about pointing later.

When the wind picks up so that you need to ease the mainsheet and luff the mainsail to keep a low angle of heel, you will need to use the boom vang to keep the top batten parallel to the boom. Vang tension upwind will bend the mast and flatten the sail. It will also take some of the pressure off of the mainsheet so that it will be easier to trim the mainsheet.

Note – Be sure to ease the vang before bearing away. As you bear off, all of the pressure shifts to the vang and you could bend or break the mast or boom if the vang is too tight.

Jib Sheet Trim

In most conditions, keep the jib leads all the way forward on the tracks. In heavy winds or in drifting conditions, you may want to pull the leads aft because the mainsail is eased in these conditions and pulling the leads back will help keep the slot between the main and jib open.

Proper leeward and windward jib sheet tension are important for upwind performance in the Flying Scot. The windward sheet is tensioned up wind in order to pull the clew of the jib to windward and help narrow the slot between the jib and main.

To trim the jib for up wind sailing, pull on jib sheet until the foot of the jib is slightly curled. Tension the windward sheet so that the clew of the jib is pulled inboard to a point that is midway to the width of the leeward seat. At this point, the jib should be full and able to help the boat accelerate. Trim the leeward sheet so that the top batten in the jib is parallel with the centerline of the boat. As with the mainsheet, easing the leeward jib sheet slightly will allow the top batten in the jib to fall outboard. This is a more powerful trim setting that will get the boat moving out of a tack or keep it moving through a lull. As with the mainsheet, remember that small adjustments make a big difference. We do not play the windward sheet at all until we get into drifting conditions when we release it completely.

We like to tie the jib sheet to the jib so that the knot is about 6" away from the clew. This may help to keep the pull on the windward sheet more from the side and less down. We also like to use 2:1 purchase on the jib sheet to make it easier to adjust.

Centerboard

While sailing up wind, lower the board until the rollers are at the bottom of the hump and then force the rollers back so that there are a couple of inches between the bottom of the hump and the rollers. This will help balance the helm and provide the best upwind performance. Off the wind, adjust the height of the board to balance the helm. I never pull the board all the way up. A slight skeg will make the boat much easier to control. When raising the board off the wind, I always pull it up and then lower it slightly to be sure the gasket is pushed out to the most streamlined position.

Spinnaker trim

We like to sail with the guy cleated and trim the sheet so that the spinnaker has a 6" to 12" curl in the luff. Careful concentration is necessary. Keep the clews of the spinnaker even at all times by adjusting the height of the pole with the pole topping lift. If you can't see the leeward clew, you can look at the center vertical seem in the spinnaker to see if it is parallel to the mast. I like to heel the boat to windward as much as possible when sailing down wind to help balance the helm. I like to keep the crew weight a little forward if the boat is not planing. Once we get onto a plane, we move aft as far as possible.