Custom Operating Manual for Our Hunter 23.5 Sailboat

Created by Evan McDonnell

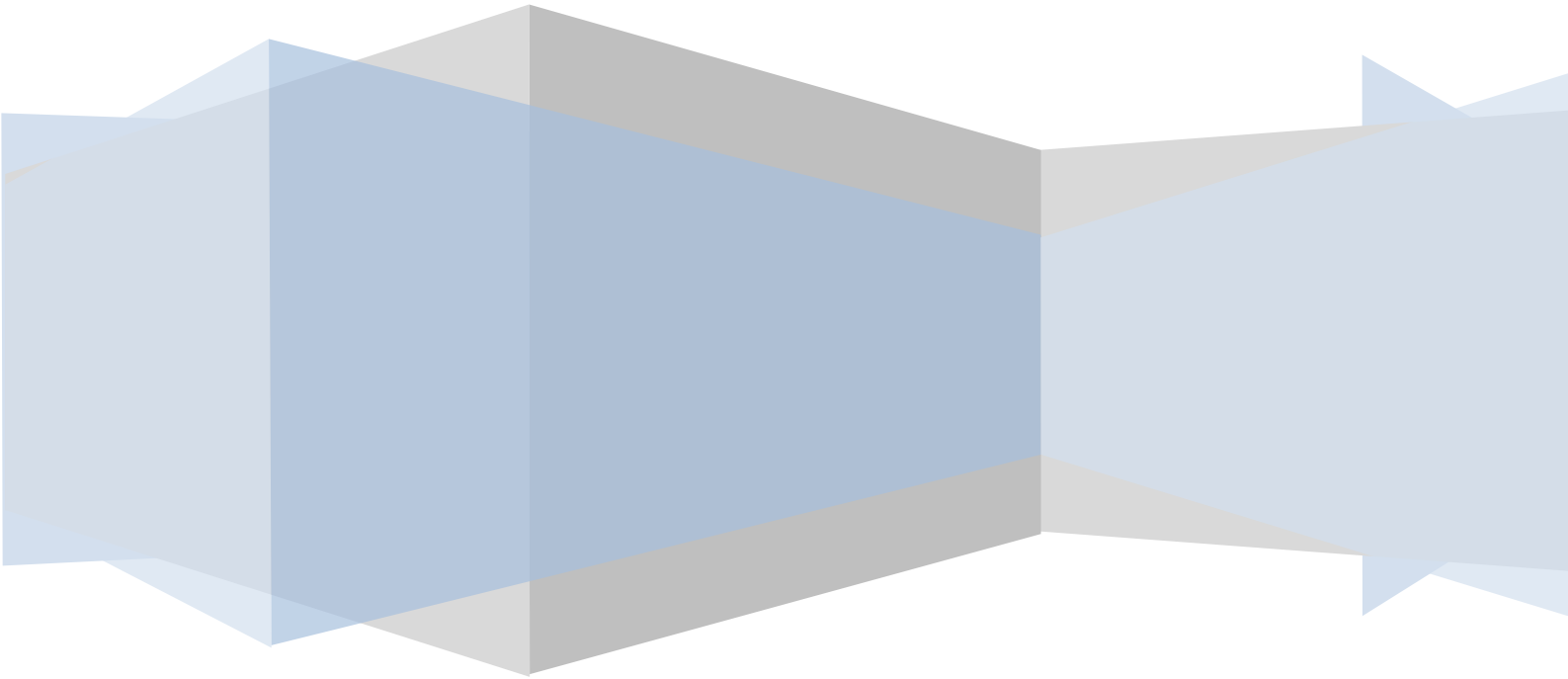


Table of Contents

Hunter 23.5 Operating Manual

1. Overview

Our sailboat is a 1993 Hunter 23.5, purchase used in October of 2014. It came with a roller furler jib and Lazy Jacks.

This is a guide to get the boat from trailering and transport with the mast down and boom off all the way ready to sail. The picture below shows what the boat looks like when it's packed up to transport. The mast is down, sails off, roller furling and boom laid against the mast with everything secured by bungee cords (can also wrap in shrink wrap – used for boxes and moving). The mast-raising pole is laid on the deck in this picture. It would be stowed inside the boat before transport. (There are more pictures and a video of the boat packed for transport on the home computer.)

2. Understanding Everything Connected to the Mast

Before you can think about raising the mast, you have to understand all of the components that are attached to the mast or run through the mast. Each needs attention before the mast can be raised.

2.2.1.Shrouds and Stays (The "Standing Rigging")

The shrouds are cables that connect from the top of the mast to the port and starboard side. The stays connect from the top of the mast to the bow and stern. Our Hunter 23.5 has a fractional rig which means that there is no back stay, only a front stay.

Side Shrouds

Our boat has upper shrouds that run around spreaders and lower stays that connect to the mast below the spreaders. The lower shrouds have cables with "T-Balls" at the ends. The mast has rubber linings in the holes for these shrouds, but they are missing on one side. We need to jury rig something such as a piece of old tire tube wrapped around the T-Ball to keep it in place while raising the mast.

Front Stay

On our boat the roller furler acts as the front stay. It connects a few feet below the masthead. See later sections for complete information on the roller furler.

2.2.2.Halyards (Part of the "Running Rigging")

Our boat has one halyard for raising the mast and one for raising the jib. Both run through the mast and come out over **sheaves** (*sheave = "grooved wheel in a block or spar for a rope to run on"*) in the upper section of the mast. The other ends of these lines come out of slots in the mast near the bottom so they can be run through the winches to tighten and tied off on cleats to secure in place.

The mainsheet halyard comes out the aft end of the mast at the very top. It is 73 feet long. The jib halyard (sometimes also called the "Genoa Halyard") comes out of the bow end of the mast a few feet below the masthead. It is 65 feet long.

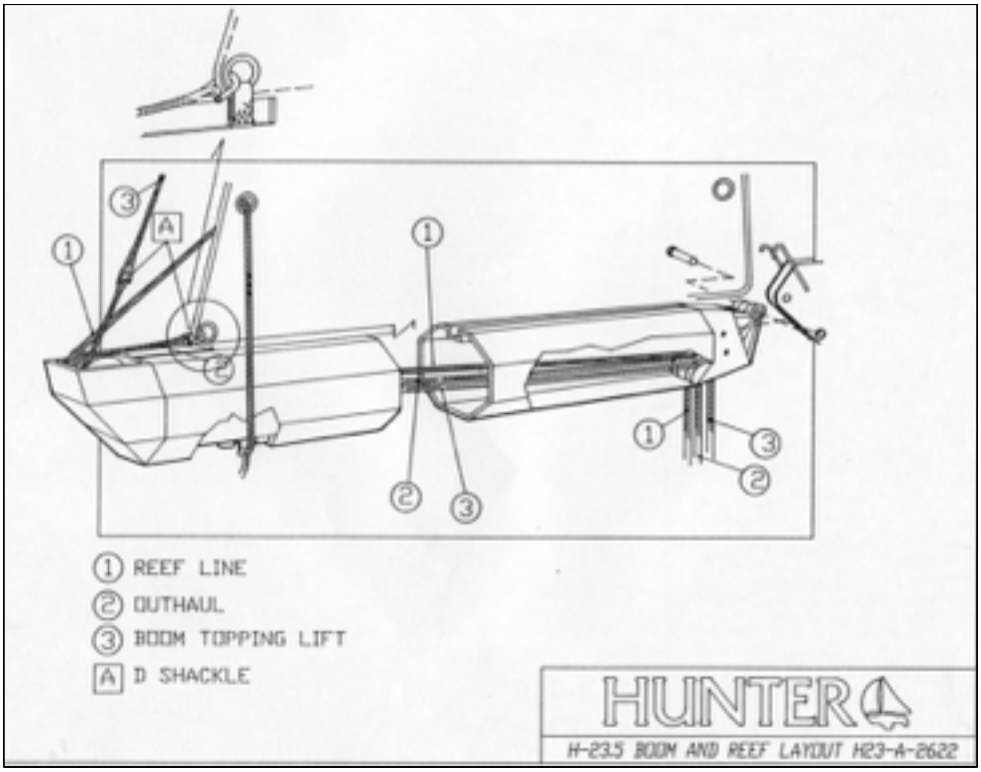
The jib halyard plays a key part in the mast raising process. It gets connected to the top of the mast-raising pole. When the mast is up and the raising line secure, the roller furler gets connected to the deck to become the forestay. Later the jib halyard will help raise the jib inside the roller furler system.

2.2.3.Boom Topping Lift (Part of the "Running Rigging")

The topping lift (or uphaul) is a line that applies upward force on a boom on a sailboat. Topping lifts are primarily used to hold a boom up when the sail is lowered. It runs from near the free (stern) end of the boom forward to the top of the mast. The line may be run over a block at the top of the mast and down to the deck to allow it to be adjusted (*don't believe it works this way on our boat*). When the sail is raised again, the topping lift is loosened or removed.

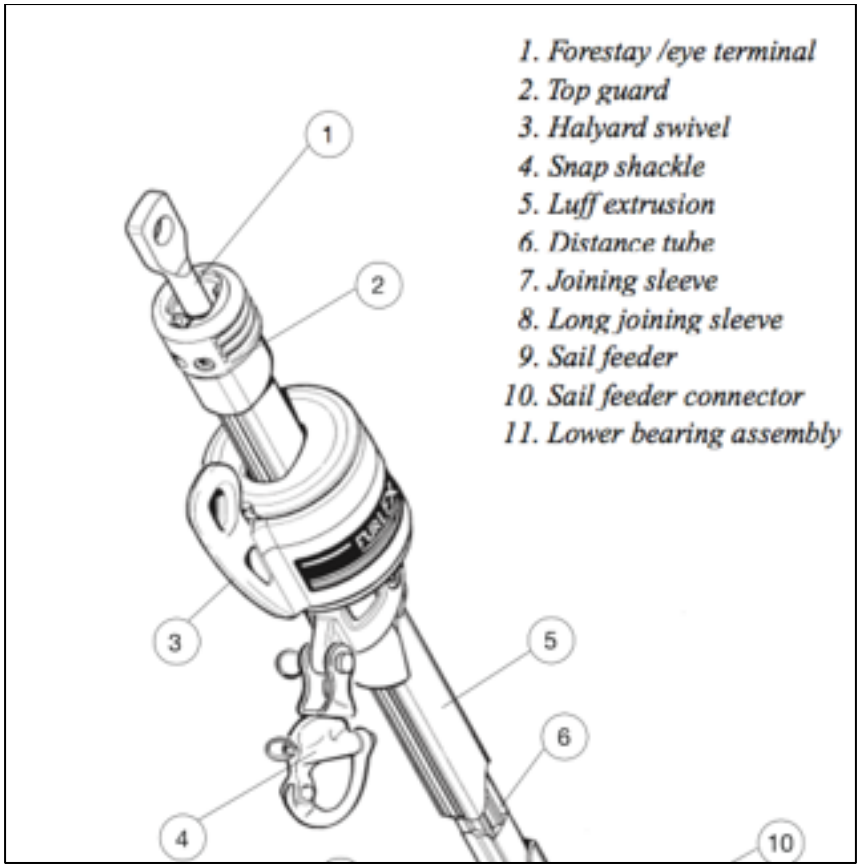
The first part of the topping lift runs from the top (?) of the mast and has a shackle end that connects to the portion of the topping lift inside the boom. This portion is 27 feet long and has a shackle attachment. [*Evan's note: I imagine this line just connects to the top of the mast and doesn't run through the mast for adjustment. All adjustment is done on the boom end. Need to verify when checking out the boat.*] The other end of the boom topping lift runs inside the boom and has cams that allow for adjustment and keep it secure. This portion is 13 feet long.

The boom has three lines running through it. Only one connects upward to the top of the mast. All three go down to the deck from the front of the boom near the mast. The other two lines that run inside the boom are the **Outhaul** which is used to pull the clew (*clew = "aft corner of sail"*) of the sail tight (it has a "D" shackle to connect to the clew), and the **Reef Line** which is used in reefing the sail in high winds. Neither of these lines has a connection to the mast so they are of no concern in the mast raising process.

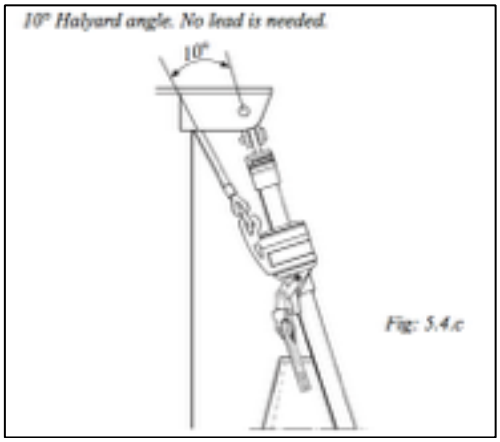


2.2.4.Roller Furler Jib

Our boat has a Furlex Model 200 roller furler for the jib (*Evan's note*: *Need to verify the model number*). The forestay/eye terminal attaches to the mast. It is disconnected for trailering so it should just need to be pinned in place. The **halyard swivel** (#3 in the diagram below) is the main portion of the roller furler on the top of the unit.



It is vitally important that the angle between the halyard and the forestay be between 5 and 10 degrees. If this angle is less the halyard may wrap around the luff section when the sail is being furled which can cause a lot of damage. To avoid halyard wrap, during installation, either halyard leads or a halyard sheave box is installed on the mast. [*Evan's note*: *Need to check and see what set up we have*.]



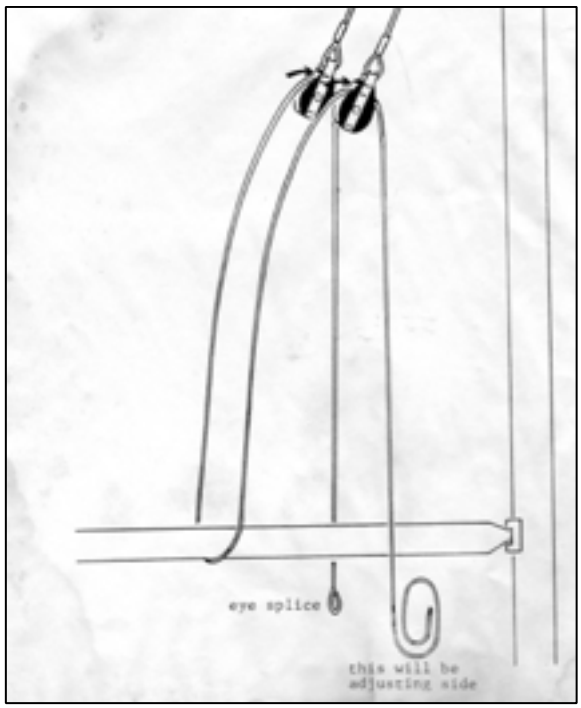
The roller furler connects to the forestay attachment and essentially becomes the forestay. It is described fully in a later section.

2.2.5.Lazy Jacks

Our boat is equipped with Lazy Jacks. They are a type of rigging that assists in sail handling during reefing and furling. They consist of a network of cordage which is rigged to a point on the mast and to a series of points on either side of the boom; these lines form a cradle which helps to guide the sail onto the boom when it is lowered, reducing the crew needed to secure the sail.

The mast tang (*"tang" = strong metal fitting by which standing rigging is attached the mast or other spar*) and wire assembly of the Lazy Jack system are connected to the upper part of the mast, one on either side. These are already in place. Since the plan is to raise the mast with the boom not connected, we are not trying to string the control lines ahead of time. [*Evan's note: Need to measure how high off the deck the ends of the control lines will be after the mast is raised. May make sense to run the control lines through the sheaves and tie off so it's easy to connect to the boom once the boom is in place.*] The wire assemblies should be secured to the mast so they don't flop around during mast raising.

When it is time to string the control lines for the Lazy Jacks, need to take note of whether the adjusting block and cleat are on the port or starboard side of the boom. The end of the control line without the eye splice will be on the side of the boom where you will adjust the Lazy Jacks.



Directions to string the control lines are as follows. With the middle of the control line draped under the boom, pass the ends of the line up and run each end of the line through the blocks that are suspended from the wire (eye splice on side of boom with cleat). The line should be run through the blocks from stern to bow. Lazy Jacks may be adjusted to the proper tension at the dock. Raise the mainsail and make sure the adjusting line of the Lazy Jacks is uncleated at the boom. Tighten the mainsheet as tight as it would go to find the maximum distance that the boom would be lowered while under sail. Next tighten the adjusting line and slack it off 2 inches. The system should now be set at a reasonable tension so it will not interfere with sail shape, yet it will contain the sail when lowered onto the boom. Swing the boom to either side to make sure the Lazy Jacks will not catch on the spreaders. Lift and shake the boom to see if the Lazy Jack lines are apt to swing behind the spreaders. Later, look aloft while sailing downwind to see if the Lazy Jacks catch behind the spreaders.

When hoisting the sail check to make sure the sail does not get caught in the Lazy Jacks. It will help to have the boat facing directly into the wind. You can minimize the risk of catching by using the topping lift to temporarily put some slack in the Lazy Jacks.

3. Raising (or "Stepping") the Mast

The mast will be raised without the boom attached nor any sails in place.

3.1. Slide the Mast into Position and Pin to Mast Step

When trailering, the top of the mast will sit in the removable mast crutch at the stern and the bottom of the mast will fit in the depression built for it in bow stanchion (stanchion = *"upright metal post bolted to the deck to support guard rails or life lines"*). To position the mast to be raised, the mast has to be walked back so that the base of the mast is right on top of the mast step on the deck. Line up the mast foot with the back of the mast step and **put the pin through to secure it in place and add a cotter ring to secure**. *(Note: Owner's manual says here, "Be sure to put the "D" shackle in place for vang." A boom vang is a strap or line that exerts downward pressure on the boom near where it joins the mast of a fore-and-aft rigged sailboat. I don't think our boat has a vang.)*

3.2. Secure Topping Lift

The portion of the boom topping lift that is attached to the top of the mast should be secured to the base of the mast so it doesn't snag anything during mast raising.

3.3. Secure Lazy Jacks

The wire assemblies of the Lazy Jack system need to be secured to the mast so they don't flop around while raising. It may make sense to run the control lines through the sheaves at the end of the wire assemblies to make it easier to fit the lines around the boom once attached. [*Evan's note: Given that the control line needs to be fed through a guide on the boom, putting the lines in place with the boom not attached probably won't help. Alternative is to attach the boom first. Probably best to plan to attach later, using a step stool if needed.*]

3.4. Check Windex at Top of Mast

Be sure the Windex is in place and can move freely.

3.5. Prepare Shrouds

Make sure the stays are connected to the U-bolts (upper shroud is forward, lower shroud is aft), the turnbuckles are very loose, the upper shrouds are running correctly over the spreaders, and the rubber boots are covering the turnbuckles to prevent bending. The lower shrouds need to be connected to the mast (*one needs a piece of bicycle tube and tape over it to make sure it stays in place while raising*).

3.6. Attach the Mast-Raising Bridle Wires

The mast-raising bridle wires attach from eyes in stanchion base to holes about 55 inches up the mast. They provide lateral stability while the mast is going up

I do not have the original mast raising bridle wires. In the rigging specifications section of the Hunter 23.5 owner's manual, these are noted as being made of 1/8" wire, overall length of 61", with a hook on the upper end and Pelican Hook on the lower end. The directions call for the mast raising bridle wires to be inserted into slots on the mast 54" above the mast base with the other end (Pelican Hook) hooked to eyes on the forward stanchion legs.

I created my own bridle wires using 3/16" wire rope, turnbuckles with hook ends, and utility hooks at the other end. The picture below shows the eye location and the mast raising bridle wire substitute I created. (My substitute pictured below needs to have the loops taken off and replaced with utility hooks that can be clipped into the loop. Overall

length will be set to 61” with the turnbuckle set mid-way to allow for adjustments.) [NEED TO UPDATE PICTURE WITH UTILITY HOOKS.]

The picture below shows my mast-raising bridle wire substitute with hook on turnbuckle set into hole about 54” up the mast.

Insert hook end (on turnbuckle) of bridle wires into holes on either side of the mast (about 54” up from the base). Clip other end of bridle wires to eyes in stanchion with utility hooks. **Make sure the bridle wires and equally snug port and starboard.**

3.7. Insert Mast Raising Pole

I have the mast-raising pole that came with the boat. It fits well inside the hole in the bow side of the mast, securing so that one eye at the end faces to the stern and one to the bow in the upright position when at 90 degrees to the mast. It has about 10 degrees of play forward and aft at this point. The picture below shows the mast raising pole in its hole, but before the mast has been moved into position for raising.

Insert the mast-raising pole into the hole in the mast and rotate until it's secure with one loop at the end facing the bow and the other facing the stern.

3.8. Secure Halyards and Set Jib Halyard for Mast Raising

Mainsheet halyard needs to be pulled down to where the boom will connect and the D-shackle secured to the mast. The other end of the halyard needs to be tied off (preferably to the mast). This halyard plays no role in mast raising.

The jib halyard should be pulled down and the shackle end connected to the stern-facing loop of the mast-raising pole. The other end should be tied off to a cleat on the starboard side of the mast about 40 inches up from the base. The length of the jib halyard should be such that the mast-raising pole angles about 10 degrees towards the stern so it will be off the deck when the mast is raised. Be certain there is no slack or tangle in jib halyard.

3.9. Connect the Roller Furler and Make Sure it is Secured

The roller furler gets connected to the forestay attachment near the top of the mast. Everything else about setting up the jib sheet on the roller furling comes after mast raising. During mast raising, the roller furling will flop around so it's best to put a line on it and assign a person to monitor it as the mast is going up and pull it to the bow when the mast is fully raised. Once the mast is up, that person needs to pin the bottom of the roller furler to the plate on the deck near the bow which fully secures the mast and completes the raising process. **Be sure this person has the pin in hand to put it in when the mast is up.**

3.10.Connect Main Sheet Block Assembly for Mast Raising

Take the main sheet block assembly and connect the cam end to the V-bolt in the anchor well and the other end to the forward loop on the mast raising pole. Run the sheet back into the cockpit where it can be wound around a winch.

3.11.Raise the Mast

Take the main sheet block assembly and connect the cam end to the V-bolt in the anchor well and the other end to the forward loop on the mast raising pole. Run the sheet back into the cockpit where it can be wound around a winch. Double check to make sure that no halyards or stays will foul when the mast goes up and continue to check the turn buckles and rigging as the mast is raised. Run the main sheet around a winch about 3-4 times and pull on the main sheet until the mast is upright. Secure the sheet and be sure it won't come undone accidentally. Pull the roller furler bottom unit up to the plate on the deck at the bow where it can be pinned. Once it's pinned, remove the jib halyard from the mast raising pole and connect to the roller furler's halyard swivel which should be sitting right on top of the bottom part of the Furlex.

3.12.Remove and Stow the Mast Raising Equipment

Remove the bridle wires, mast-raising pole, and mast crutch and stow away. Unhook the mainsheet assembly and put back in the cockpit.

4. Tune the Fractional Rig

With the mast up, the standing rigging needs to be tightened and tuned for optimal performance. Here are the steps to follow.

4.1. Ensure the Mast is Centered

Take the main halyard to a point on the starboard side and tighten so that it just touches. Take the halyard to the same spot on the port side. Adjust the upper stays until the halyard takes the same amount of pressure on either side to touch the original point.

4.2. Tighten the Shrouds

Tighten the upper shrouds by adjusting the turnbuckles until they are tight. Tighten the lower shrouds until snug. Sight up the mast sail track to make sure the track is straight. Adjust as necessary. Tighten lowers further, but never make them tighter than uppers.

5. Setting Up the Boom and Hoisting the Main Sail

Attach the boom to the mast and related items and then get the main sail in place.

5.1. Connect the Boom to the Mast

The best instructions I can find for connecting the boom to the mast come from this US Spars Operations Manual. Don't know if it matches our boat.

17. Fit boom to mast

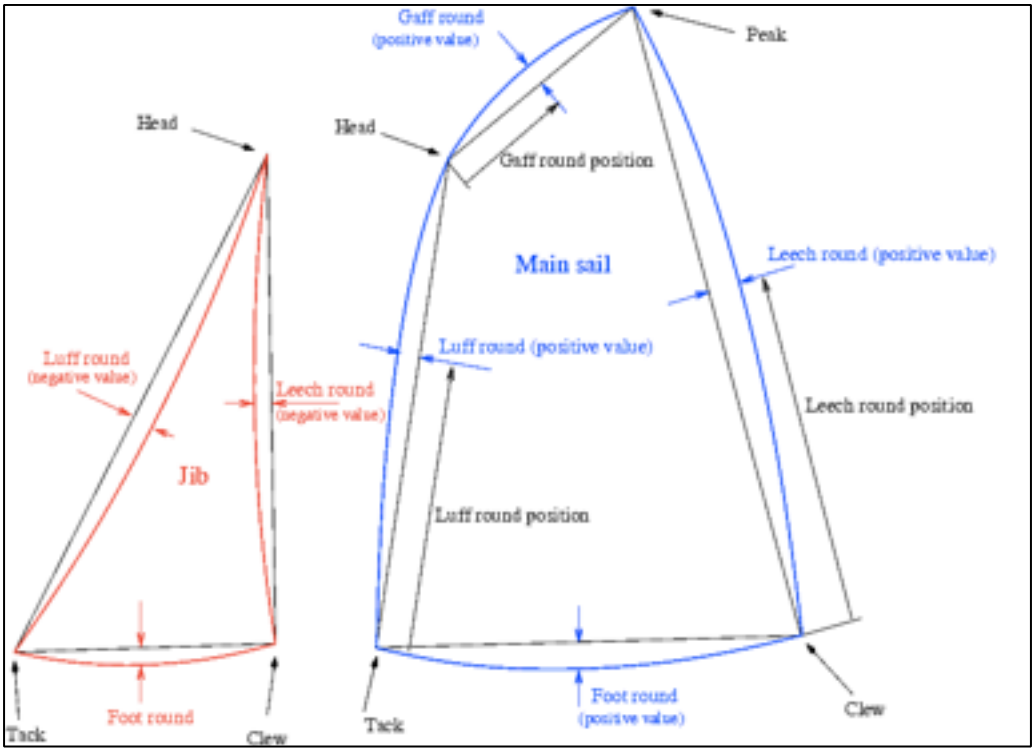
- Rinse and clean the boom
- Bring the boom on the boat deck
- Attach the boom topping lift to the aft end of the boom
- Raise the boom with the boom topping lift, one person can hold the front of the boom to avoid any damages to the deck.
- Unscrew the fixing bolt from the gooseneck
- Fit the inboard end into the gooseneck toggle
- Replace the bolt into the gooseneck, it is necessary to fit washers and lube all moving parts.

Rev 8/13

8

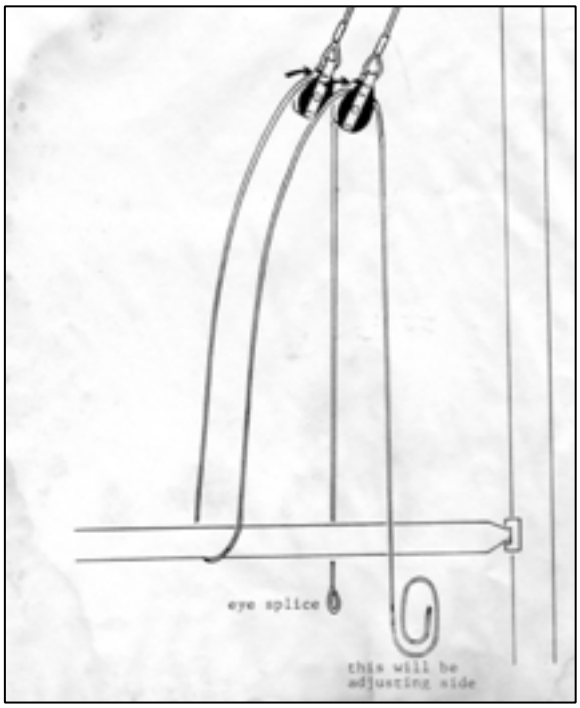
5.2. Attach the Topping Lift and Make the Boom Level

Use the D-shackle to connect the upper part of the boom topping lift to the lower part that runs through the boom.



5.3. Install Lazy Jack Control Lines

Directions to string the control lines are as follows. With the middle of the control line draped under the boom, pass the ends of the line up and run each end of the line through the blocks that are suspended from the wire (eye splice on side of boom with cleat). The line should be run through the blocks from stern to bow. Lazy Jacks may be adjusted to the proper tension at the dock. Raise the mainsail and make sure the adjusting line of the Lazy Jacks is uncleated at the boom. Tighten the mainsheet as tight as it would go to find the maximum distance that the boom would be lowered while under sail. Next tighten the



adjusting line and slack it off 2 inches. The system should now be set at a reasonable tension so it will not interfere with sail shape, yet it will contain the sail when lowered onto the boom. Swing the boom to either side to make sure the Lazy Jacks will not catch on the spreaders. Lift and shake the boom to see if the Lazy Jack lines are apt to swing behind the spreaders. Later, look aloft while sailing downwind to see if the Lazy Jacks catch behind the spreaders.

When hoisting the sail check to make sure the sail does not get caught in the Lazy Jacks. It will help to have the boat facing directly into the wind. You can minimize the risk of catching by using the topping lift to temporarily put some slack in the Lazy Jacks.

5.4. Put the Main Sail On

Thread the clips on the foot of the sail through the boom and attach to Outhaul. Thread clips on the leach of the sail up the mast and install screw to keep them from coming out when main sail is lowered. Connect the mainsheet system in the cockpit. Secure the main sheet until the boat is in the water and you're in deep enough water to lower the swing keel.

6. Setting Up the Roller Furler and Hoisting the Jib

At this point, the halyard swivel of the roller furler assembly will be sitting right on top of the bottom part of the assembly with the jib halyard attached.

6.1. Get Line on the Furler Drum

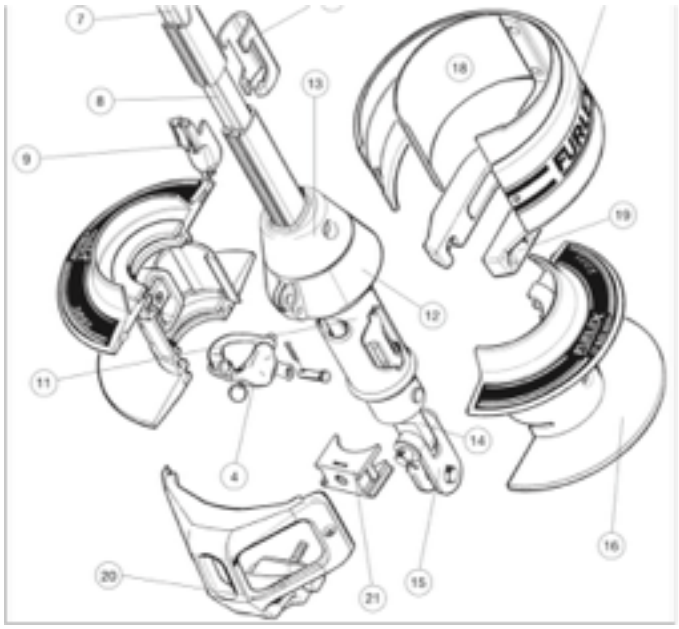
As the sail unfurls, the furling line is wound onto the line drum. Before the jib is put on the forestay, the drum should be set up and pre-loaded. Do this by turning the luff extrusion by hand winding approximately 30 turns of the furling line onto the drum. If the sail's ultraviolet protection is fitted on the starboard side, the furling line shall exit on the port side of the line drum. Turn the luff extrusion clockwise. If the ultraviolet protection is fitted on the port side, turn the extrusion counter-clockwise. The line will then exit on the starboard side. [Evan's note: Need to figure out which side the UV protection is sewn on our jib.] Secure the line in the tack snap shackle to prevent accidental unfurling. There should be lead blocks attached to the stanchions to route the furling line back to the cockpit. It's important that this line gets secured completely so that the sail doesn't accidentally unfurl.

6.2. Hoist the Jib

Here are the instructions to get the jib completely set up.

1. Tension the forestay for hard close-reach sailing before the sail is hoisted.
2. Lay the sail on the deck. It should be carefully flaked down with the tack turned forward.
3. Turn the **tack ring** counter-clockwise if the furling line exits on the port side of the drum or clockwise if it exits on the starboard side.
4. Attach the tack of the sail to the tack snap shackle.

5. Attach the sheet to the clew. Take the sheet through the lead block and then onto the cockpit. Put a figure eight know in the ends.
6. ~~Tie the prefeeder rope to the hole under the tack shackle or through the tack shackle.~~ [*Evan's note: I don't think I have this so will need to just manually feed the luff tape*.]
7. Attach the halyard to the upper eye of the halyard swivel.
8. Hoist the sail in the correct groove through the sail feeder. If the furling line exits on the port side of the line drum, the sail should be hoisted in the starboard groove. If the line exits on the starboard side, use the port groove.
9. Hoist the sail. ~~The pre-feeder assists luff tape feed by steering the sail in towards the luff extrusion and sail feeder at a small angle~~. Tension the halyard until a vertical crease appears in the luff of the sail, then slacken off until the crease disappears. Belay (secure) the halyard.
10. ~~After hoisting the sail, remove the prefeeder completely.~~
11. Furl the sail on the Furlex luff section by pulling on the furling line. It is important to furl the sail tightly and evenly as a sail that if furled too loosely may blow out or tear.
12. Check the number of turns of the furling line remaining on the line drum. When the sail is furled tightly, there should be 3-5 turns left. To adjust the number of turns, detach the sheet and turn the Furlex luff extrusion by hand until the correct number of turns are on the drum.
13. Check that the halyard swivel is at least two inches from the top guard and that the halyard angle satisfies the 5-10 degree requirement.
14. Once everything has been checked, mark the halyard to prevent over-tensioning by a winch or forestay adjustment.



12. Tack ring
13. Adapter
14. Terminal part or rigging screw
15. Fork / fork toggle
16. Line drum half
17. Line guard housing
18. Line guard
19. Line guard bracket
20. Line guide fitting
21. Locking block

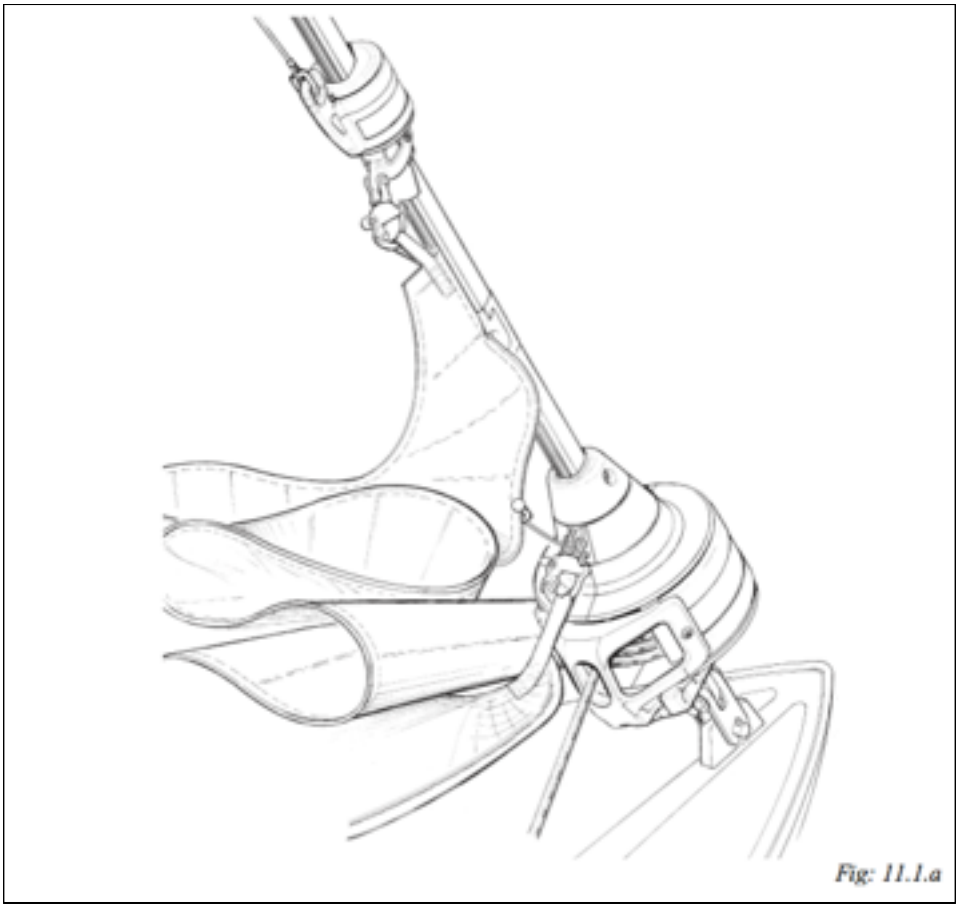


Fig: 11.1.a

[*The following is likely related to installation and therefore not likely to be a part of our operations*.] Attach the head of the sail directly to the halyard swivel. Tack the sail at deck level with a piece of rope between the sail tack and the tack snap shackle on the lower bearing assembly. Hoist the sail, adjust the rope length at the tack so that the halyard swivel attains its top position (the 5-10 degrees requirement is satisfied) and there is at least two inches clearance between the top of the halyard swivel and the top guard when the sail is fully tensioned. (This is for determining the length of the pendant. The wire pendant should be connecting the tack of the sail to the tack snap shackle on the lower bearing assembly.)

7. Put the Boat in the Water

With the mast up and sails and lines in place, it's time to dunk the trailer and get the boat in the water.

7.1. Launch the Boat

Dunk the trailer and get it in the water. Move to the slip.

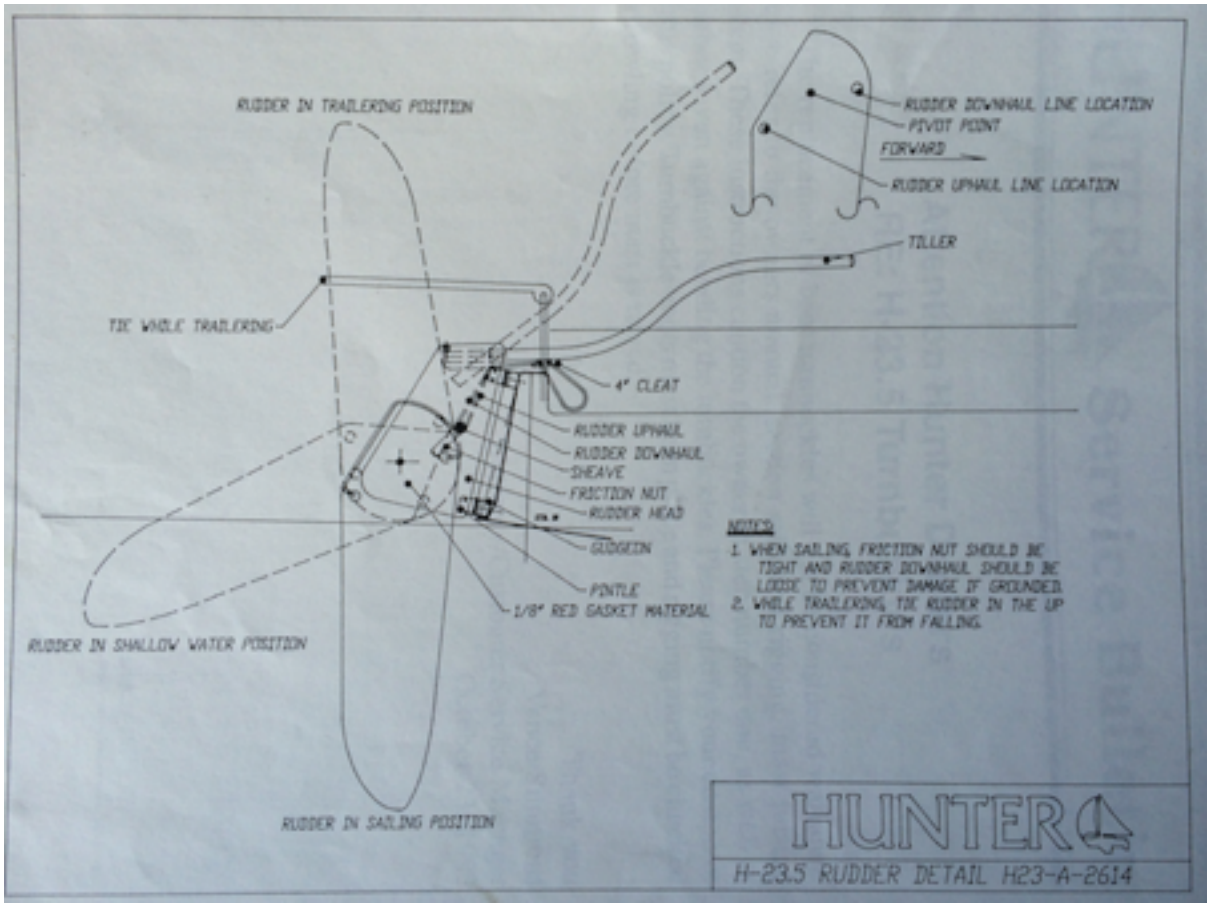
7.2. Fill the Ballast Tank

Remove the vent plug. Open plunger by turning the wing nut and pushing down to assure open. Allow tank to fill (full when no more air is coming out of the vent). Replace vent plug. Tighten wing nut on plunger. To drain the tank, get the boat up on the trailer but still in the water. Remove the vent plug and loosen the wing nut on plunger and push

down. Pull boat out of water and tank will drain. Replace vent plug. (Plunger may be left open for next time.)

7.3. Get the Rudder Down into Sailing Position

See picture below for key points of operation to control the rudder.



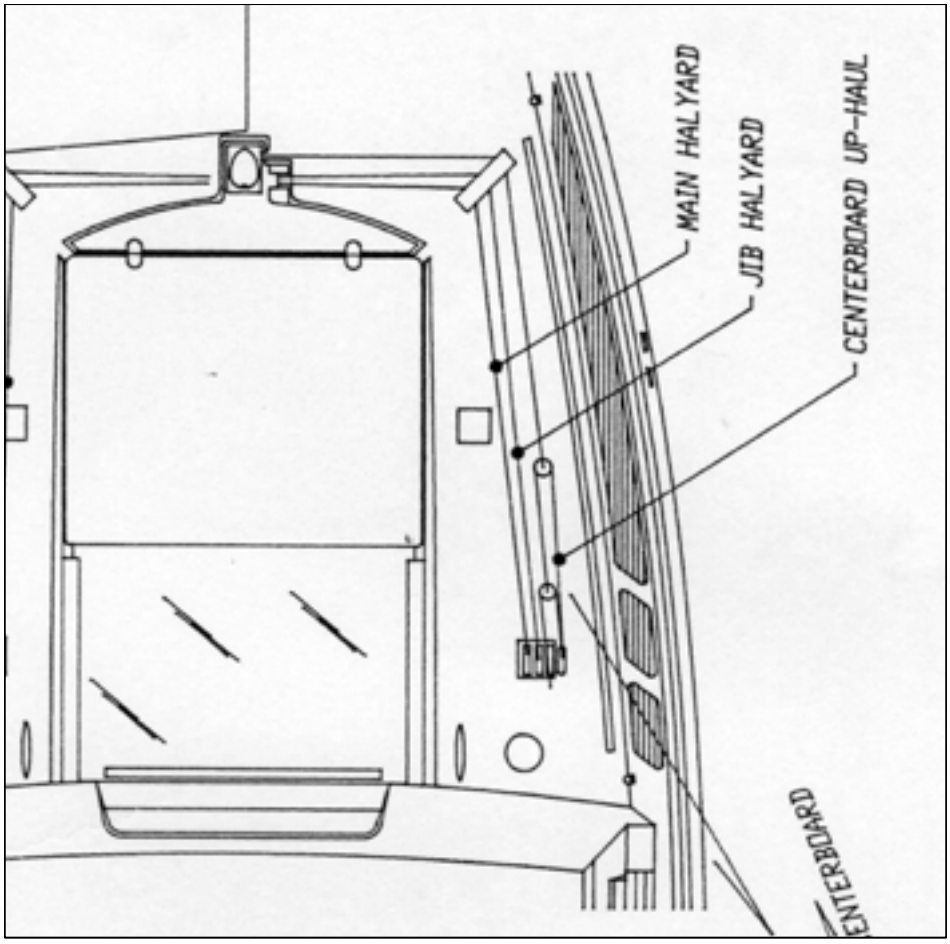
7.4. Use Outboard Motor to Get to Deep Enough Water to Drop Swing Keel

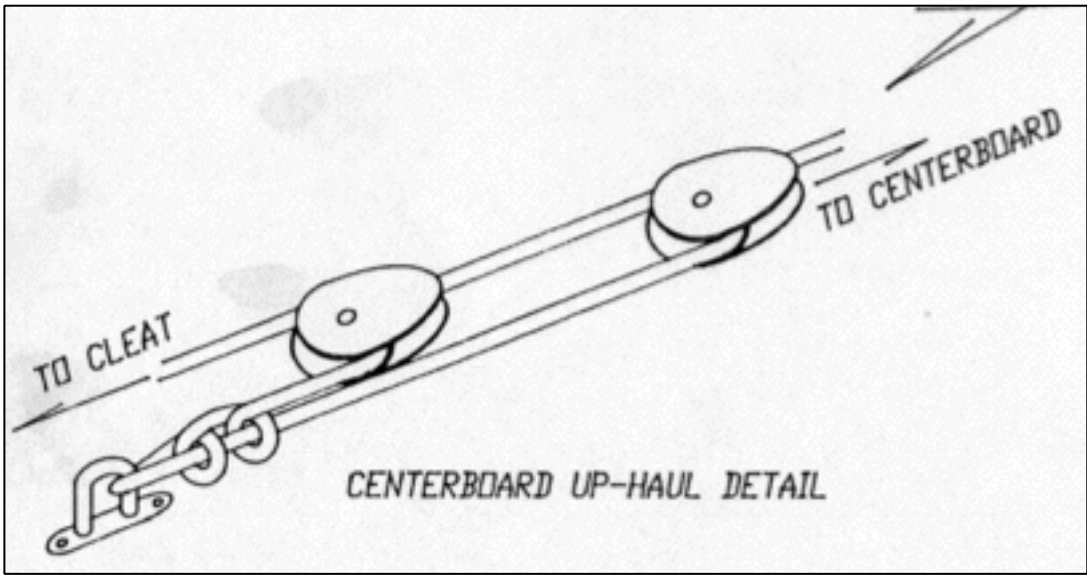
8. Lower Centerboard Once in Deep Water

The boat draws 18 inches when the centerboard is up and 5 feet 6 inches when the centerboard is down.

8.1. Using the Centerboard Uphaul

Don't have any great instructions. Need to get pictures of how the uphaul line gets secured.


MAIN HALYARD
JIB HALYARD
CENTERBOARD UP-HAUL
ENTERBOARD


TO CENTERBOARD
TO CLEAT
CENTERBOARD UP-HAUL DETAIL