Mast Assembly Manual for J105
MAST ASSEMBLY MANUAL

Introduction

Welcome to the Hall Spars owners family. Our spars are designed for strength, function, and reliability. Please read this assembly manual thoroughly to insure that your spars give you years of service. It is important that you, the owner, familiarize yourself with this manual, even though dealers or rigging services prepare your mast. Hall products are designed to be readily serviceable. Assembly and disassembly are quite simple.

Please remember, Hall Spars manufactured your spar without using force, so never try to forcibly fit any part. If you have any fit problem, use the phone and call us. Leave the hammer in the toolbox!

As a yacht owner you are ultimately responsible for your boat and crew. Part of this responsibility is knowing your boat and the basic operation of your gear.

If you read this manual carefully, you can acquaint yourself completely with your Hall Spars products in a very short time.

Assembly and Tuning Sequence

Installing your spars and rigging should follow this basic sequence:

A. Mast Assembly
   1. Preparation and Set Up
   2. Installing Conduit
   3. Installing Spreader Bars
   4. Attaching Shrouds to Mast
   5. Installing Spreaders
   6. Attaching Shrouds to Spreaders
   7. Attaching Headstay and Backstay
   8. Preventing Chafe
   9. Inspection

B. Stepping

C. Boom Assembly
   1. Inboard End

D. Tuning
   1. Dockside Tuning
   2. Inspection
   3. Tuning Under Sail
   4. Final Inspection

E. Reefing

F. Sail Control Bend

G. Maintenance

H. Care of Coating
Mast Assembly

Preparation and Set up
Find a clean, level assembly area near the stepping crane. Set up the mast with the track-side down on at least three strong saw horses. Remove polybag by carefully (don’t scratch the paint!) cutting it away with a razor knife.

The following tools will be useful:
1. Large adjustable wrench
2. Small adjustable wrench
3. Large screwdrivers (both Phillips and slot type)
4. Small screwdrivers (both Phillips and slot type)
5. Medium or large size vice grips
6. Medium size pliers (or large needle nose pliers)
7. Large wood clamp (or C-clamp with opening larger than the width of the mast section)
8. BLUE LOCTITE®
9. Navtec RIG LUBE® or similar anti-seize lubricant
10. A few rolls of 3-M® No. 35 vinyl tape (sold in many colors)
11. Allan key set (some spars)
12. 4:1 Block and Tackle is helpful
Installing Conduit

Sleeving Conduit

Layout wires and conduit next to each other and insert wire.

Mid Mast Wire Exit

Tape wire exiting conduit at exit height.

Note:
Snip away rail before taping.
Run messenger to mid-mast.

Attach messenger to wire.

Take up messenger slack as conduit is inserted.
**Installation Tips:**
Add a pad eye and knot wire at masthead to support wire harness weight.

Add a round head screw to hold conduit from slipping down.
Installing Spreader Bars

Note:
Always insert spreader bar from starboard side.

Note:
At this point the bar will tend to stick due to its bend. Free the bar by lightly tapping its end with a hammer. Place a scrap wooden block against end before tapping with hammer to avoid any damage to the bar.
**CAUTION:**
Messenger line can jam the spreader bar.

**Main, genoa, spinnaker halyards**
Most messengers will be aft of spreader bar

**Messenger line caught by spreader bar chafe strip**

**Solution:**
Hold messenger line away from trim bar with a small screw driver while inserting bar.
Attaching Shrouds to Mast
Attach all diagonal shrouds first before attaching spreaders.

Spreader Bar Tang
Attach upper shroud to upper shroud tang.

Schaefer tang with Navtec stemball terminals
Installing Spreaders

Attach starboard spreader.

Slide on starboard spreader first

Insert pins

Correct

Wrong!

Check that spreader contour matches mast wall

Dangerous!

Correct

Attach port spreader. Use a clamp to make this operation easier.

USE a rag (and wood blocks if using a "C" clamp) to prevent marring surface

Attach wooden clamp above spreader, tighten slightly
Reason for Using Clamp:

**CAUTION:**
Do not try to force spreaders into place with a hammer.

Do not open up holes in spreaders to allow pins to fit or spreaders will be loose after installation.

Never!!
Permanent tip damage will result!
Attaching Shrouds to Spreaders

Upper Spreaders

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Upper Spreader (Rod Rigging)

**Attaching Headstay and Backstay**
Attach headstay, backstay jaw toggle.

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Preventing Chafe
Tape or silicone all sharp edges to prevent sail chafe.

Inspection
Inspect the mast at this point. Confirm proper installation of all spreaders, shrouds, and stays. Insure proper fits, tight screws, and spread cotter pins. Make sure all sharp corners are liberally taped.

Your Hall Spars mast is now ready to step.
Stepping

Lift at or near balance point with mast on its longitudinal axis.

**Note:**
Only qualified yard personnel should attempt to step your mast.

**Important:**
Hold mast with crane until all shrouds and stays are pinned with cotter pins to chain plates.

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Boom Assembly

**Inboard End**

![Diagram of boom assembly](image)
Tuning

Dockside Tuning
Set rake to yacht designers specifications.

Set prebend, making sure not to exceed prebend shown below. Set prebend using one of the three methods on the following page.
Inducing Pre Bend: *Three Methods*

Backstay Tension

Block mast forward at partner.

Move step aft.
Center mast in boat. The mast is centered when dimension A is same Port and Starboard. Make sure mast is firmly held in partners with chocks or hard rubber.

Ease all diagonal shrouds to very loose. Spray turnbuckles with RIG LUBE®. Tighten vertical shroud turnbuckles equally from side to side as much as possible with normal-size tools. Large tools or pipe extensions to tighten turnbuckles easily cause damage.

CAUTION:
Never use excess force tightening turnbuckles. Use lubricant.
**Inspection**

Once vertical shrouds are tight, make sure diagonal shrouds are “loose.”

Your rig is now ready to tune under sail.

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**Tuning Under Sail**

**Important:**
Your mast is still relatively untuned, so caution is advised at this stage.

Under mainsail alone, check vertical shroud tension and transverse straightness of mast.

On one tack, tighten leeward vertical shroud as tight as possible counting turns. Then repeat on opposite tack with an equal number of tightening turns. Hand tighten lower (D1) to hold mast sideways centered at first spreader. Unless mast is bending sharply, do not adjust upper diagonals (D2 and up) yet.

Put up a number 3 jib or similar working jib and repeat sequence above. Check sideways bend.

Repeat with genoa, if not too windy. The leeward shrouds should be firm, not floppy at 20° heel.

Now adjust diagonals to straighten mast sideways.
Repeat for other diagonals. At this point your Hall Spars rig is ready.
Final Inspection

**Important:**
Send someone aloft in a bosun’s chair to inspect all rigging.

It is good practice to inspect your rig after a race, passage, or cruise.

Reefing

1. Ease main halyard; hook in tack; tighten main halyard
2. Pull aft reefline tight
3. How to tie aft reef line
Sail Control Bend

Mast bend is used for sail control. All mainsails have luff curve which creates sail shape. With the mast straight the sail will have shape. If you bend the mast to exactly fit the luff the sail will be almost dead flat. In light to medium air especially in a chop use only a little bend and “power up” the main. In heavy air, bend the mast more and the sail will depower allowing the boat to stand up better and be easier to handle. A good rule of thumb is to limit mast bend deflection to amount equal to the fore and aft dimension of the mast. (On extreme racing masts, this number is regularly exceeded.)
Controlling Sail Control Bend

Backstay

Babystay

Running backstays and checkstays

At this point your rig is ready.

Final Inspection

Important:
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MAST:

Mast should be unstepped at least once a year and inspected. The following lubrication should be done once a year.

1. Remove, inspect, and lube sheaves (Harken sheaves do not require lubrication).

2. Remove headstay and backstay and inspect mast; clean and lube pins and reinstall.

3. Visually check alignment of shrouds in upper tang. Misalignment especially in rod is a cause of fatigue.

4. Tip Cups: Remove set screws and flattened balls, unscrew collar. RIG LUBE® threads. Screw on collar, reinstall set screws with new plastic balls.

5. Turnbuckles: Note tuned position, remove cotter pin, totally loosen. Spray threads with RIG LUBE®. Retighten to tuned position, insert cotter pin.

**Note: Easing and tightening turnbuckles must be done under sail unless mast is fitted with hydraulic jack.**

6. 1 x 19 Wire Stays: Visually inspect swages for longitudinal cracks or wire strand failure at top of swage.

7. Visually inspect spreader tips and roots for damage or wear.

8. Inspect mast for sharp edges and silicone or tape as needed.

BOOM:

1. Check gooseneck lugs for cracks or hole elongation.

2. Inspect vang and sheet bails.

3. Inspect condition of outhaul wire.

4. Check function of outhaul car. If it slides with difficulty call Hall Spars for fix.
Care of Coating

Your spars are coated with AWLGRIP®, a paint originally developed for aircraft. It is a tough paint with excellent gloss retention. But it can be damaged. Here are some hints.

1. Use care when servicing mast. Cover areas adjacent to work area with cloth rags.

2. Cleaning Mast: Use light detergent (SOFTSCRUB® or similar - NO abrasive cleansers!). For especially tough grease smudges Acetone or Toluol may be used if mast is over one month old (AWLGRIP® fully cured).

3. Touch Up:
   - Small scratches: using AWLGRIP® touch up kit available from Hall Spars, mix parts 1 to 1 and apply carefully in scratch with modeler’s brush.
   - Large scrapes: repair should be done by professional painters using AWLGRIP®

(A paint scratch is a cosmetic problem with no danger of corrosion leading to structural damage. If metal is gouged, call Hall Spars for advice.)

4. Paint bubbling at stainless parts: This will happen sooner (in southern climates or marinas with imperfectly engineered electricity) or later. Merely sand bubbled area and touch up or respray. Again this will not be a structural problem unless aluminum is excessively corroded.

Notes