U.S.SPARS
Operational Manual

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

US SPARS is a part of group Z-Spars, the world's largest spar builders. From a small shop in Paris making bows and arrows to the largest spar producing group on the planet, the Z-Spars Group is now at the forefront of spar design. The Z-Spars Group has been supplying custom and production spars and rigging since 1973 and now supplies sailing enthusiasts and boat builders of the world with over 6,000 spars annually. With a network of smaller agents, we can supply products to every country in the world.
Established in 1998, US SPARS extends the Z-Spars line of boating products to better serve our US customers. US SPARS staff takes pride in the exceptional customer service and individual attention given to all our customers.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

LET'S GET STARTED:

Equipment necessary in the preparation of the mast

- Metric Allen key set
- Drill
- Drill bits
- Hammer
- Pliers
- Socket set
- Screw driver
- 2 sawhorses
- Self amalgamating tape
- Knife

It is necessary to check the state of the mast, the boom, the spin pole immediately upon its arrival. For the slightest damage take a photo and report it to the driver and your dealer. Try and unpack the mast and the boom before the transport leaves!

1. **Put the mast on sawhorses.**
2. **Remove packing.**
3. **Check that nothing stays in the packaging. (Keep packing up to the stepping).**
4. **Install halyards, be careful that the line does not drag on the ground.**
5. **Rinse any dust away.**
6. **Lubricate all sheaves with W40 or Mac lube.**
7. **Set up optional halyards**
    - Most masts are equipped with messenger lines for spinnaker and spinnaker topping lift halyard.
    - Slacken the messenger lines.
    - Tie halyard to the messenger, and pull through mast, make sure the spinnaker halyard passes through the spinnaker deflector.
8. Installation of lazy jack halyards
    - Pass the top lazy jack line through top spreader feeder and attach it on the stainless-steel pad eye on the mast with a bowline.

    - Don't let lazy jack halyard drag on the ground.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

9. Balance the spreader through bar.

- Take off all padding or protection.
- Move the through bar until there is the same distance on each side.

10. Fit spreaders

- Fit the insert in the through bar, check that threaded hole is towards the mast wall.

- Screw in short screw without tightening (on each side of the bar) Use Loctite to secure.
- Slide spreaders against the mast wall, making sure that spreader bar stay in centered position.
- Push both spreaders against the mast wall without any play.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

- Tighten spreader screws to lock spreader in place.
- Drill spreader bar with the appropriate drill bit, using spreader hole as a template, fit bolt through spreader and fit nut. Depending on your spreader size use a 6mm drill bit for Z65/Z80/Z95 and use an 8 mm drill bit for Z240 spreaders.
- To get a tight fit between spreaders and mast you can remove the fixing plate and drill 2 holes through spreader bar and fix spreader with 2 through bolts. Bolt size is 8mm or 5/16" for Z240 and 6mm or ¼" for Z65/Z80/Z95. Just a note for fitting spreaders, place a string or messenger completely around the spreader tips and mast, loop and pull tight together and tie off before drilling. This will ensure a tight fit of spreaders to the plates.

- Troubleshooting:
  - If the edges of the through bar are damaged due to transport or stocking, you can file smooth the edges of the bar to make spreaders fit.
  - Check if the through bar is balanced, if not you will have a gap between spreader and mast. Then you must undo the assembly and check spreader bar position again.

11. Fit the standing rigging

- Set up cables along the mast
- We recommend applying a stainless-steel cleaner to cables and swages to avoid any pollution.
- Withdraw the cotters pins from turnbuckle and keep them in a safe place.
- Keep any turnbuckle plastic cover in place, these will protect the mast when it is raised.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

- Unscrew the backing shell screws.
- Slide shells into the mast holes.

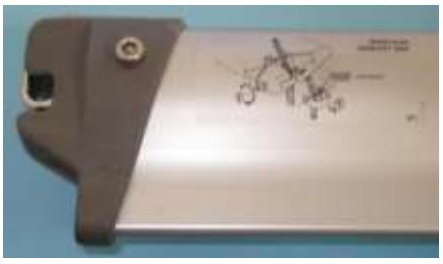




- Fit screws to hold shells in the mast, do not forget to use Duralac and Loctite on screws.

- Unscrew spreader tip hooks.
- Take off hook from spreader tips.
- Put cables in the tip.
- Replace the hook using some Loctite.
- Screw it on making sure that cables are not locked.





- It will be necessary to lock cables when the final rigging tuning is done.
- Once tighten the hook it will have to be secured with tape to protect the tips and avoid the screws coming loose with engine vibrations.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Forestay

- Fit your furling genoa on the forestay (follow furling genoa supplier instruction)
- Fit forestay to mast
- Do not forget to bend back the cotter pin of forestay toggle.



- Fit tape or sealant around toggle, toggle pin and cotter pin.
- Be sure that the genoa halyard diverter is in position following the recommendations of the furling genoa manufacture.

Double backstay

- Withdraw backstay pin or bolt.
- Fit marine eye in between masthead cheeks.
- Replace backstay pin in the masthead.
- Do not forget to bend back the cotter pin or fit nuts to bolt.

Single backstay

- Remove backstay toggle pin.
- Fit the marine eye into the toggle.
- Replace the backstay toggle pin with the toggle.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

- Do not forget to bend back the cotter pin.

12. Fit electronic wires

- An extra messenger line is installed in the electric conduit tubes, use the messenger to pull in any new electronic wires.
- Tie messenger line firmly to the electronic wires and fit a new messenger with the electronic wire (this one will serve for a future use)
- Secure the messenger to the electronic wire with tape.
- In case of blockage do not force, pull back and re-try slowly.
- If it still jams make a cone with the tape and try again.
- Always leave a messenger in the electronics tubes.

- When an electronic tube is full, do not force any additional wire in it as you will tear the tube off the track. You can change the size of the tube or add one.
- When you are drilling the masthead for the installation of electronics, check that you don't drill into a sheave, a halyard, a messenger or an electrical wire.
- During the installation of the radar check that the radar wire and its connection passes through the conduit.

13. Fit mast lights and electronics

- Unscrew masthead light screws.
- Connect light to electrical wires.
- Screw top light to masthead
- Fit steaming light to the mast
- When the mast is rigged, and all electronics are connected it is absolutely necessary to test the mast and the standing rigging to look for possible electricity leaks.
- **Check all electric wires are not going to get jammed under mast step.**

14. Fit Mast lifting straps

- The fitting of the mast lifting straps is the responsibility of the crane operator.

15. Step the mast with a crane.

- Never step the mast under a high voltage line or an electrical line
- The installation of the mast comes under the supervision of the crane operator at all times.
- When the mast is going up check halyards and cables to avoid them lying on the ground.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

- **Never** stand under the mast or the rigging during lifting of the mast. Wear a hard hat protection and gloves to make a safe and protected job.

16. Attach standing rigging to boat

- Fit forestay to stem head chain plate first.
- Grease all turnbuckles.
- Check threads of turnbuckle.
- Fit cap shrouds to chain plate
- Fit intermediates to chain plate
- Fit lower shroud to chain plate.
- Fit backstay to chain plate
- It might be difficult to connect the backstay to its chain plate, tighten cap shroud hard then connect backstay to its chain plate.
- Check all rigging is connected and secure.
- Make sure crane operator is happy that the mast is safe and let him detach lifting straps.

- You must be certain that all rigging is connected and safe before you climb the mast. **Never use snap shackles to attach your bosons chair. Always tie a bow line and use a second halyard to secure your climbing.**

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 damage 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.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

- Lubricate sheave and pins with W40 or Mac lube.

18. Fit rigid vang

- Rinse and clean the rigid vang.
- The large tube must be fitted to the boom, so that water cannot collect on the spring.
- Do not forget to bend back the cotter pins and tape them.
- Lubricate sheaves and pins with W40 or Mac lube.
- Check that the block which leads the vang line to the cockpit runs without chafe. If the line is allowed to over tension during a jibe or tack you will risk damaging the mast, boom, or the rigid vang.

19. Fit main sheet system to eyes under boom.

20. Main sail, lazy bag, lazy jack installation on mast and boom

When the main sail is hoisted and stretched, check that the main sail is located in between the two black bands. A larger main sail which exceeds these marks can create wear on main halyard and reef lines.

21. Lead reef lines into main sail and reef pad eyes

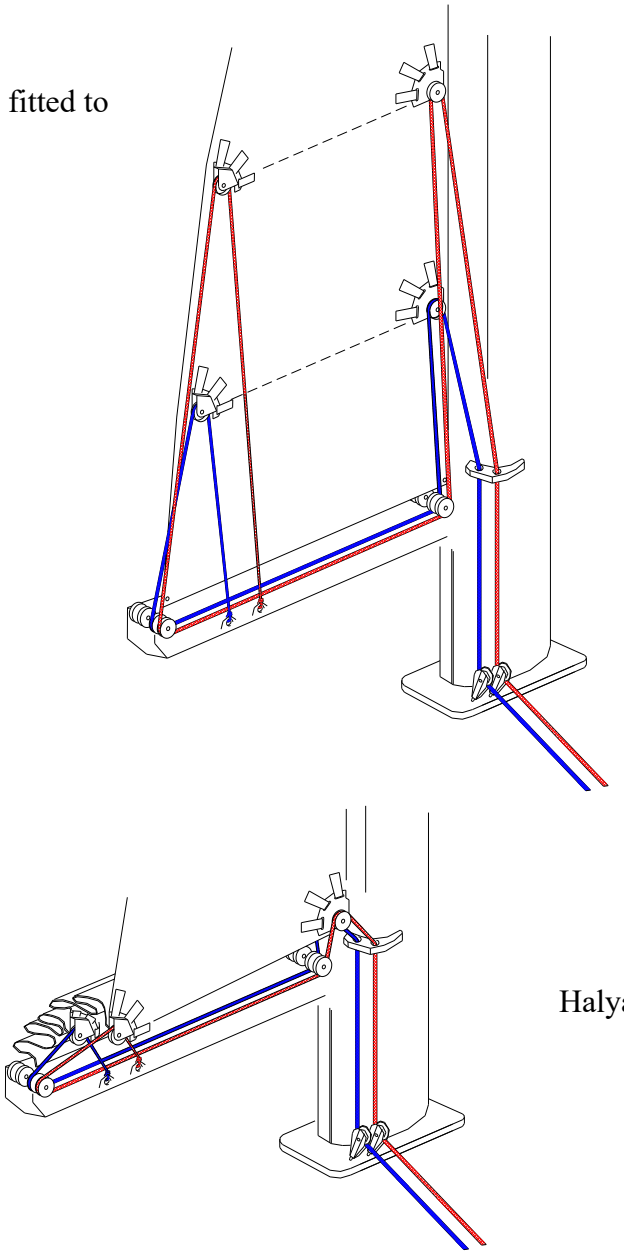
Tack point

Clew point

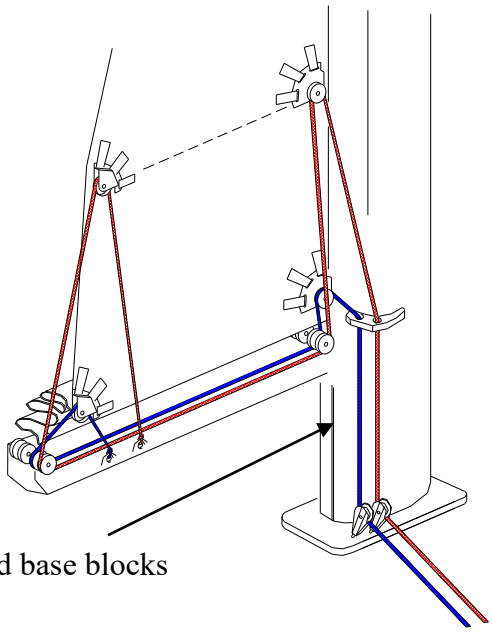
U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

SINGLE LINE REEFING SYSTEM

Clew blocks fitted to sail.



Blue: Reef 1
Red: Reef 2



Halyard base blocks

22. Lead halyards, main sheet, vang, and reef line through the mast base blocks.

- Put the mast base blocks in good alignment with the lines.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

MAST TUNING

The modern sailing boat uses masts and rigging that have been simplified but still require tuning.

Fractional rig double sweep back spreader

Tuning in the harbor

1. If the mast is stepped on keel check that the mast rake is in keeping with the position of the base on the keel.
2. Tension the cap shroud and lower shroud to 15% of wire breaking load.
3. Increase the cap shroud tension to 20% of wire breaking load by counting the number of turnbuckles turns necessary for this increase. (Tension the same port and starboard)
4. Tension backstay to 20% of wire breaking load
5. Tension again the cap shroud to 20% of wire breaking load (the backstay tension may loosen the cap shroud)
6. Release the backstay, this will tighten cap shrouds.

Tuning under sail

Sailing condition: 15 to 18 knots of wind for 20° boat heeling

1. Check the lateral condition of the mast, the windward cap shroud should not be loose. The leeward cap shroud will be slightly looser.
2. Now re-tighten cap shroud, and lower shroud, if necessary, tension the leeward side so you don't seize up turnbuckle (count the turns), Now check the cap shroud after tacking.
3. Take one reef to check that the mast remains straight laterally otherwise re-tighten the lower shroud.

ATTENTION: the backstay should never be loose, tension is necessary to prebend the mast, if the rig does not have forward lower shroud or baby stay. NEVER let the mast be reversed or inverted.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Loose gauge tension Tool

In preparation for rig tuning, it is recommended to equip yourself with a tension gauge.
On a new rig, re-check the shroud tension after some sailing with good wind, you can use a tension gauge again.

On a new rig, it will be necessary to tension again the rigging after around 48 hours of sailing using your gauge. You must never tension more than 30% of the breaking strength of the wire, and always use your good sailor judgment.

23. **Check that all cotters' pins are properly secured and tapped/sealed before sea trial. Fitting some black tape on all the cotter pins once opened will help you to check that all of them have been secured.**
24. **Cotters pins protected with tape before sea trial will avoid the wear on sails or a sheet tearing on a cotter pin!**
25. We recommend finalizing the tuning of the mast on test sail with a wind of 15 - 20 knots (never over 25 knots of wind for a first sail).
26. To keep track of your tuning value, you might measure the distance between the turnbuckle studs or from pin to top of the swage. Keep track of these dimensions in your logbook. This will help you to quickly find the setting after maintenance or stepping.
27. To make easier functioning, especially with continuous reefing, it is mandatory to mark mainsail halyard to first and second reef level. This will help your crew to reef quickly and efficiently.

28. **Advice from team Z**

- Do not sheet in too much on your genoa on to your spreader. Keep a safe distance between the genoa, main and the spreader tips of 50mm.
- Always fit protective tape at spreader tips.
- Use tape on all pins and cotter pins and apply a corrosion block to all screws.
- Never go up on a folding mast step without being secured with a halyard.
- The cotter pins must be open only once. You must replace them after one use.
- Nylock lock nuts must be used only once. The plastic ring loses its function of locking during unscrewing.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

- Check all electrical or electronic connections, any electrical leaks through the mast or rigging can deteriorate and damage either anodized or painted aluminum section and fitting. This is especially important with stainless steel fitting and notably the standing rigging.

□□ Do not change structural Z-Spars fitting with other fittings without our agreement.

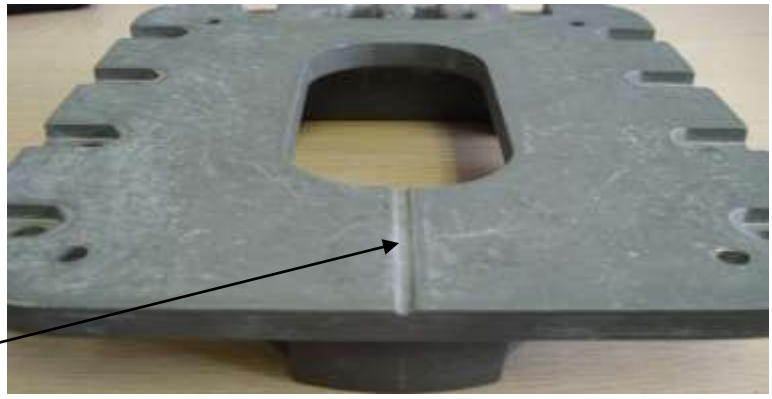
□□Do not jump on the spreaders EVER!

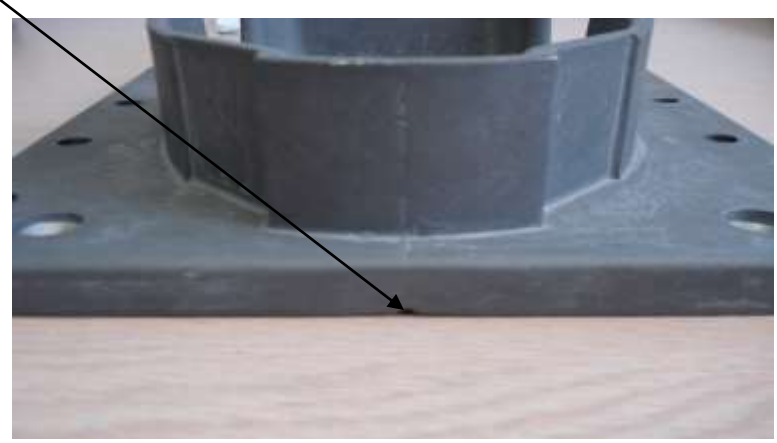
□□ Do not tighten the boom topping lift by tightening the main sheet or you will risk damaging the boom outboard end, the rigid vang or rigid vang bracket on the mast.

- Always tape cotters pin which links up the mast with the standing rigging (forestay, backstay, Etc.)
- We recommend using only Z Spars fittings and equipment such as spin pole, bow sprit or rigid vang. Our optional equipment has been made to fit on our sections. This will ensure you and your crew of safe and reliable products.

- Check the drain groove under the base plate to keep it clear and let water flow out. This is VERY IMPORTANT to eliminate water collection in mast section and prevent freeze damage in extreme climates. On keel stepped masts there will be a drain hole above the internal water seal and this is essential to keep clean for two reasons: 1. Water will not be transmitted to the cabin and again freeze damage in extreme climates will not occur.

Drain grove:





U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Z Spar Furling Mast

Installing the Outhaul Rope:
This rope attaches to the front of the boom traveler, it leads around the clew block in the mainsail, underneath the pulley on top of the boom traveler, around the sheave in the boom outhaul end casting, through the halyard exit under the boom (or over the sheave in the front end of the boom) through a pulley behind the kicker and forward to a swivel pulley at the base of the mast. This leads aft in the same way as the furling rope.

Installing the Furling Rope:
Inside the drum underneath the gooseneck, it is possible to see the coils of rope wound on the furling drum. Make sure the rope is fully wound on the drum then unwind three turns. Lead the rope from this slot around the pulley situated under the boom just in front of the kicker/boom vang fitting, then through the swivel pulley attached to the mast base and back to a self-tailing winch on the coach roof via the halyard organizer.

Installing the Mainsail:
Open and remove all four inspection covers. At the top set of openings, you will see the main furling foil and below it the foil connection rod that connects it to the furling drum. Feed the head of the sail through the mast slot and into the main foil. Lower the mail halyard down to allow the shackle on the halyard swivel to be attached to the strap sewn into the head of the sail using an allen key.
Continue to feed the sail into the slot whilst the main halyard is being hoisted. Do not attempt this with the wind astern. (This task is best attempted in little or no wind). Once the sail is hoisted to a point where the tack web loop is almost level with the large tack shackle stop. You now must back the remaining luff down the foil from the sail entry until you can connect it to the tack shackle. It is important to have the full length of the luff in the foil form shackle to shackle with no cut away below the sail entry. Connect the bottom web of the sail to the base of the furling extrusion with the shackle provided, by gaining access through the lower inspection holes. Please note that this tack shackle also connects the furling extrusion to the furling drum. Refit inspection covers. Complete the installation by applying moderate tension to the main halyard.

Furling the Sail:
Release vang and mainsheet so that the leach has little or no tension.
Maintaining a slight tension on the outhaul line, furl the sail into the mast with the inhaul line try and keep the wind ahead. (A slight pressure from the wind will prevent creases in the sail). Ensure that the furling drum has two or three turns of rope left on it when the sail is fully furled. The sail will only furl as far as the reinforcement patch.
With new sails you will need to make some VERY tight furls by holding back on the outhaul line when furling in the sail.
Always keep the vertical batten pockets parallel to the mast.
Keep equal tension on the foot and leech of the sail when furling in, this will avoid bunching when unfurling.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Changing the Furling Rope:
Open the lower inspection covers and remove the tack shackle. This will disconnect the furling drum from the furling foil. Remove the machine screws holding the furling mechanism to the mast. These are located two at the top of the drum and two at

the bottom of the drum. On some models there will be two additional screws or rivets on the side of the mast to be removed. Using a large screwdriver, leaver the furling drum away from the mast at the bottom end. The furling rope is retained by a simple knot inside the furling screw. Push the rope towards the drum and the knot will appear at the bottom of the furling screw, undo the knot.

Remove rope and replace. We recommend a 10mm braid on our larger gears (Beneteau 40 to 46) and an 8mm on our smaller gears (Beneteau 31-37) this braid must be of a good quality that will not flatten. This operation is made easier with the sail removed.

Maintenance:
Z spar furling masts require minimum maintenance.
The boom traveler should be flushed with detergent and fresh water regularly.
The furling rope should be replaced every four years or as required. Clean and flush the top and bottom of furling mechanism regularly and spray with WD 40 or Harken lube (the ball bearings in the furling mechanism and halyard swivel are all stainless steel so need minimum maintenance).
Remove the mainsail every year for inspection and every 3-4 years it is recommended that you let your local sailmaker inspect and service the sail.

Trouble Shooting:
When unfurling the sail if there is resistance for the boom traveler to move, the most likely course will be excessive mainsheet or vang/kicker tension. Check also for friction within the halyard organizers or at the mast base blocks, if these do not move freely it will cause slowing of the gear.
If the sail is not new there may be localized hardening of the head reinforcement, or fraying at the leach, which can cause friction. It is worth having the sail checked every year to avoid such problems.
When unfurling the sail if there are creases originating at the luff, and if these cannot be removed by increasing the main halyard tension, the most likely cause is that the sail maker has made the luff too long, (too much halyard tension will also cause friction at the halyard swivel).
Alternatively, the sail may have been furled with too much kicker tension.
With any furling mast it is important that prebend be kept to a minimum, although a small amount of bend can help stabilize the middle of the mast the straighter a furling mast is the better it will work, please refer to our tuning guide for help with mast set up.
If you are having ongoing problems with furling it is a good idea to remove the sail and then try turning the furling system to establish if your problem stems from the furling system or the sail. If you find the system works well without the sail it is advisable to have a sailmaker, check the sail. We recommend Neil Pryde Sails Int, 203-874-6984 as a very reliable sailmaker who has a good knowledge and experience with our system.
If you find the system is not turning as free as it should then removing the drum is advisable, with the drum removed you can clean and inspect it for damage. If you have time, you can send the drum to our facility in Florida where we can service the system and replace any necessary parts. The base cost for this service is approximately $240.00 plus return shipping.
It is necessary to change to furling inhaul line regularly; this line can harden and flatten after just a season or two. If this line is not inspected and replaced when required, it can jump the grooves in the drum and damage the back plate. We recommend the use of a good quality line with high abrasion resistance. Your system will come fitted with metric line but if you must use imperial line then replace 8mm with 5/16” and 10mm with 3/8”.

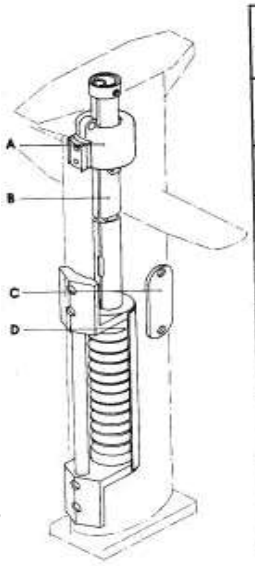
U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Remember when furling or unfurling is that you are trying to keep equal tension on the foot and leach of the main, if one has vastly different tension the sail will furl uneven.
Releasing all leach line tension will help when furling.

More furling help:

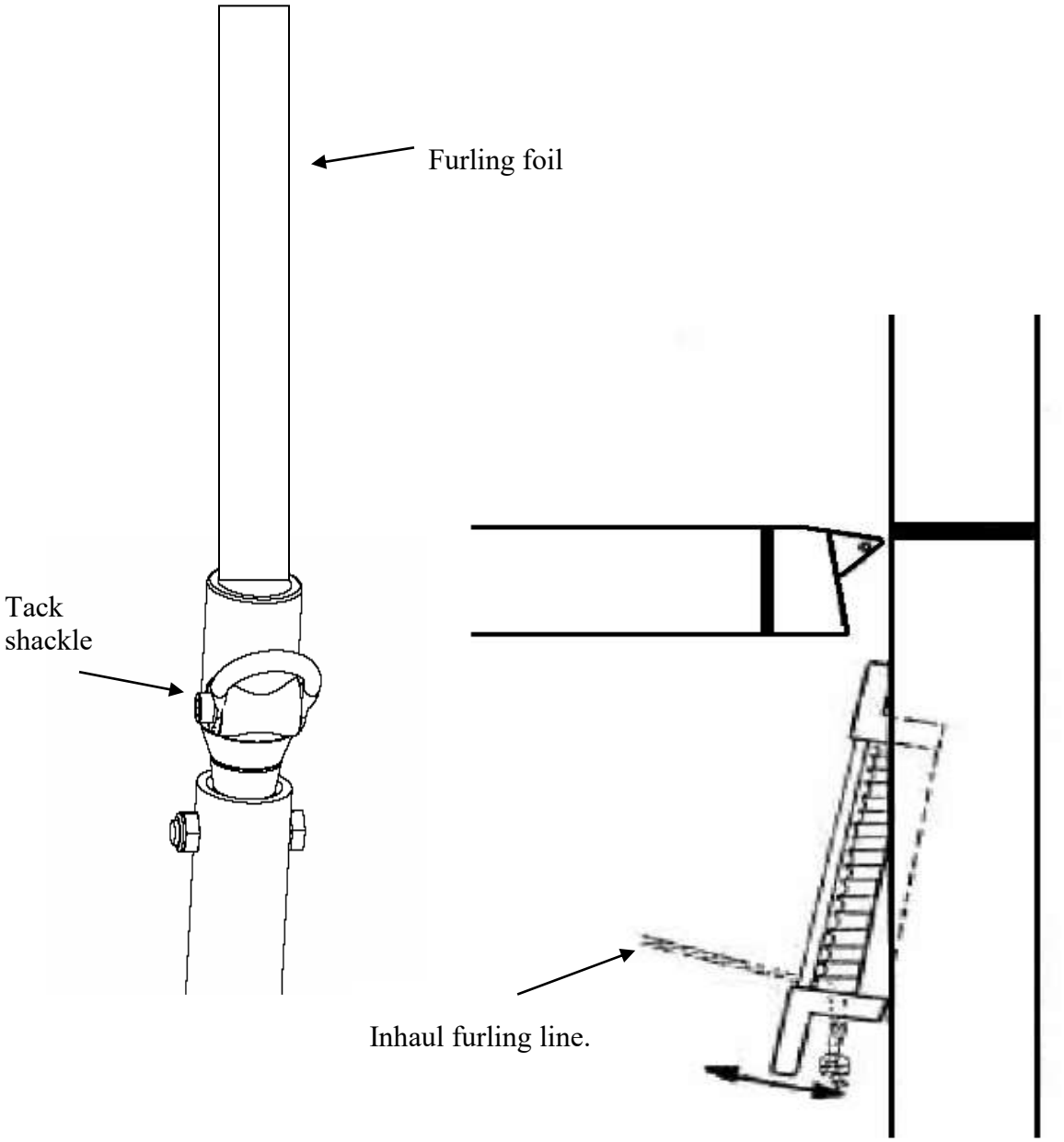
Our system uses a halyard swivel which takes the sail up the mast as the top bearing, there is nothing connecting the foil (tube inside the mast that the sail goes in) at the top of the mast. Without a sail the foil will bang around inside the mast. So, no need to go up the mast this time!! Furling problems may be a culmination of a few things. The furling drum unit (where inhaul line goes just under the boom) needs a service; this unit can be removed with the mast up. You can clean and service it yourself or send it to us for a complete strip down service. When you remove the mainsail the halyard swivel is now at the bottom of the mast and can be sprayed with water and lube from one of the 4 side openings above the boom. The boom car must run smoothly, it needs to be clean and if it does not run smooth an upgrade to our new car system might be a good idea, it fits the same track. We are now also offering a Harken ball bearing car which also fits your standard U.S. Spars boom track, please contact us for details.
The mast must be as straight as possible (only 3" of pre-bend) the main halyard must NOT be too tight when you put the sail back in.
Now as for the sail 7-8 years of use with a furling mast I would be very surprised if it didn't need to be replaced, or at least serviced, cleaned, and checked, and possibly have some of the hollow/ middle taken out to flatten the sail. You can also ask the sail maker to check the leach line and make sure it is as small as he can make it; you also do not need to tension this when furling.
Let the boom do what it wants when furling, release vang and mainsheet before furling. We find when furling in the boom need to be raised about 20* and when furling out bring it down 20* below horizontal. Also keep load on the opposing line when furling.

MAST FURLING MECHANISM



Section	Z 230 E	Z 300 E	Z 400 E	Z 500 E	Z 600 E	Z 700 E	Z 800 E	Z 900 E	Z 1100 E	Z 1400 E	Z 77	Z 110
Furling extrusion B	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55	Z 55
Halyard swivel A	3503	3504	3164	3164	3165	3165	3165	3166	3159	3505	3167	3165
Furling mechanism D	3623	3624									3217	3214
Furling mechanism with screw D		3626	3626	3626	3625	3625	3625	3627 VL 3622 VC	3627	3627	3623	3138
Mechanism maintenance cap C	3247	3247	3247	3247	3247	3247	3247	3247	3245	3245		
Clew shackle	3208	3208	3208	3208	3208	3208	3208	3208	3208	3208	3208	3208
Halyard swivel shackle	3168	3168	3168	3168	3168	3168	3168	3168	1562	1562	3168	3168

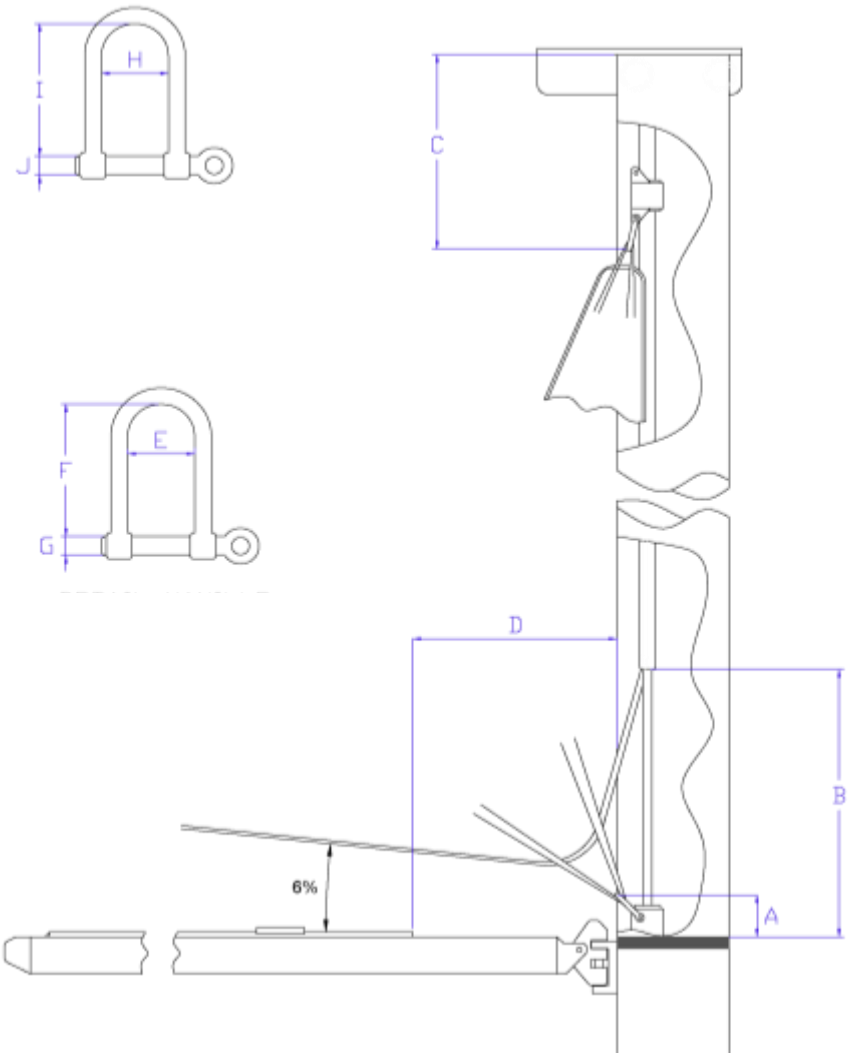
U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com



U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Headboard shackle

Tack shackle



Max bolt trope 6mm

Max Leach line 4mm

Section	A	B	C	D	E	F	G	H	I	J
Z300E	60	467	300	800	33	28	6	Hook shackle		
Z400E	60	467	400	800	33	28	6	10	27	5
Z500E	60	467	400	800	33	28	6	10	27	5
Z532E	60	467	400	1000	33	28	6	10	27	5
Z602E	60	467	400	1000	33	28	6	10	27	5
Z702E	60	467	400	1000	33	28	6	10	27	5
Z902E	60	467	450	1200	33	28	6	17	30	8
Z1100E	60	452	450	1500	33	28	6	17	30	8
Z1252E	60	467	450	2000	33	28	6	17	30	8

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

U.S Spars Routine Maintenance for In-Mast Furling System

Although your U.S Spars mainsail furling system needs minimum maintenance there is a need to implement a schedule of preventative service. From the first sail of your boat, you will need to start your routine maintenance schedule to keep your furling mast in top working order. These simple steps that follow will keep your system working in the best condition possible, giving you years of service.

1. Once your mast is exposed to the elements, air born particles will start collecting on the ball bearing races in your furling drum and boom car. These particles can compact around the bearing housing and significantly disrupt the smooth operation of your system. We recommend that you flush the bearings in the drum or drive unit located in the aft face of the mast just below the boom. You can see the ball bearings at the lower and upper end of the drum; it is these bearings that you must flush. You will get the best flushing results if you unfurl and furl the sail while you flush the bearings. It is best to carry this out with no or little breeze as possible. All you need to flush is fresh water. If you happen to be in a marina, then a hose can increase pressure which will help disperse any debris build up. Your ball bearing boom car should receive the same treatment. You should also clean the boom track as regularly as possible.

2. The halyard swivel, which is the unit that the head of your sail attaches to and is then raised with the sail, needs very little maintenance as it is well protected by the mast. As part of your maintenance schedule, you should remove your mainsail every year and at this time the halyard swivel will be lowered, you can access this unit from one of the four inspection holes above the boom. You can see the lower bearing set in the swivel, this needs to be flushed as you did for the drum.

3. After flushing you will need to lubricate the bearings of the drum, halyard swivel and boom car. There are many different lubricants on the market, we have found that simply using WD40 on the drum and swivel works well, you should be careful of overspray with this product. For the boom car which has Torlon bearings we have found Mc Lube works well. You should avoid any heavy grease lubricant as this will attract more dirt and debris.

4. Changing the furling inhaul line that wraps around the drum is generally needed every couple of years, but this does depend on the condition of the line. If you notice a deterioration of the line, then you should replace it. You will need to identify your system to establish the correct line size. Our small unit used on your Hunter 31 uses 8mm or 5/16” line you will need 60’ of line. To replace the line, you will need to remove the mainsail, pull all the line off the drum, you will see a hole on the side of the mast in line with the end of the furling drum, through this hole you will see a knot that secures the line. Use a hook or long nose pliers and pull out the knot and undo it.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

5. To re-install a new furling line the procedure is the reverse of the line removal instructions. Push the new line in the drum and out of the hole in the side of the mast. Tie the knot, and pull the line back into the mast, at this point you will need to wined turns of line on the drum, this is done by turning the foil through one of the side inspection holes above the boom. It is advantageous to completely fill the drum with line, if you discover after sailing that you don't need a full drum you can pull some turns off the drum.

6. After a few seasons of sailing you may decide a full service of your furling drum would be of interest. We offer a service whereby you can completely remove the drum and send it to our factory in Florida for a full strip down service. Your drum will be completely stripped down and re-built; the line will be replaced along with any worn parts. The service will take no more than a day, and with UPS air services we can have it back to you the very next day. To completely remove the drum, follow the instruction to replace the line, but this time ensure the large tack shackle is removed as this shackle also connects the foil to the drum. As you start to pull the drum away from the mast, keep going, the bottom of the drum will clear the mast, at this point pull the drum towards the deck you will need to support the rod while the drum is being removed, this is best achieved by tying a small line around the foil at one of the inspection windows and then around the mast. Once the drum is all the way out you can lower the foil to the deck, with keel stepped masts it would be best to leave the foil tied. The procedure to replace the drum unit is the reverse of the removal.

7. Your mainsail will need regular inspection for damage. Generally, sail longevity is affected by location, U.V. degradation and use. Having your sail inspected by a qualified sailmaker every two years is good practice. They can determine if any small items warrant repair and can offer sail cleaning as well.

If you keep your furling system in good order you will have hours of great sailing without effort. The advantage of a furling main comes into its own when you are out on the water, the wind is blowing, and your boat wants to be let free and all you must do is pull that line and hold on.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Attach the head of the sail to the halyard swivel.

Feed the head of the mainsail into the opening in the luff foil.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

RIGID VANG

Set-Up Guide

1) The optimum angle for your U.S.SPARS vang to be effective is 30*. This is governed by the position of the mast and boom fitting.

2) The mast attachment is best located as close to the deck as possible; We recommend 80mm above deck to the underside of the bracket.

3) Your U.S.SPARS rigid vang will come to you overlong and may need to be shortened to achieve the correct boom support. Shortening the vang is simply a case of reducing the length of the inner or smaller tube by pulling the two tubes apart and cutting the inner tube.

4) Fit the vang to the mast and boom fittings, large tube to the boom leaves the boom fitting loose in the track (use the boom topping lift to raise the boom enough to install the rigid vang).

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

5) With the sail installed release the topping lift and with no tension on the vang line check the boom angle. You may need to move the vang boom fitting aft to lower the boom, keep in mind the 30* optimal angle.

6) Once you are happy that your vang is supporting the boom above horizontal pull the boom down using the mainsheet until it grounds out, this is the maximum compression of the vang, and the boom should now be approximately 4* under horizontal. If the vang bottoms out before the boom is under horizontal, then the vang is too long, and damage will occur if used.

7) Shorten vang as required.

8) Once you have achieved the desired vang length fit the boom fitting in place (to check that the position is correct we recommend a temporary fixing and test the vang under sailing conditions before final positioning).

9) The vang comes with its own 4-1 purchase installed; the rope must exit the final sheave at the boom end and run back to the base of the mast. Use a base block to run the vang line aft to the cockpit if required.

10) When boat is at rest at its berth, attach the boom lift and release pressure from the vang.

11) If you have any question regarding the installation of your U.S. Spars vang, please
Contact our technical department on 386.462.3760. U.S. Spars can hold no responsibility for incorrect installation of the vang and any subsequent damage this will cause.

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Mast and boom sections

Section	Dimensions mm	Inertia cm4 YY	Inertia cm4 XX	Weight kg/mt
Z145	81/68	45	29	1.45
Z170	98/68	65	33	1.64
Z190	108/78	94	50	1.92
Z230	122/82	143	69	2.29
Z265	143/96	238	118	2.72
Z301	160/105	343	149	3.02
Z351	160/105	391	173	3.44
Z401	179/119	601	260	4.1
Z501	189/125	760	326	4.6
Z532	201/124	998	380	5.38
Z602	223/138	1411	518	6.21
Z702	240/146	1951	726	7.61
Z902	257/160	2641	1022	8.96
Z1001	290/175	3677	1452	9.77
Z1250	310/182	4994	1838	11.76

Booms

Section	Dimensions mm	Inertia cm4 YY	Inertia cm4 XX	Weight kg
Z120	71/61	45	24	1.2
Z160	94/68	64	30.27	1.56
Z204	118/86	153	73	2.28
Z360	145/105	332	155	3.29
Z362	170/95	466	180	3.50
Z480	180/125	730	324	4.82
Z482	190/101	824	295	4.85
Z690	232/142	1661	463	6.24

U.S.SPARS
3620 NW 123 Place
Gainesville Florida 32653
www.usspars.com
Tel : 386-462-3760
Fax : 386-462-3448
Email : info@usspars.com

Furling Masts

Section	Dimensions mm	Inertia cm4 YY	Inertia cm4 XX	Weight kg
Z300E	160/105	400	162	3.5
Z400E	183/117	585	280	4.9
Z500E	200/124	808	378	5.77
Z532E	201/125	887	409	5.95
Z602E	223/138	1286	544	6.85
Z702E	240/145	1624	731	7.88
Z902E	257/160	2301	1032	9.54
Z1100E	293/176	3550	1526	11.48
Z1250E	310/180	4688	1857	13.18
Z1400E	340/200	6125	2613	14.77
Z1600E	390/230	10198	4414	18.88

Our masts cope with the pressures of modern sailing with the highest quality materials. We use 6061, T6 Alloy anodized to 0.25 microns.
Our versatile aerodynamic boom sections can cope with the high tech one design racing as well as long distance blue water cruising. The lightweight alloy is designed with high inertia figures to cope with modern sailing demands.