

HARKEN[®]

SMALL BOAT UNDERDECK FURLER

477, 493, 478

Installation Manual – Intended for specialized personnel or expert users

4428/11-17



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Addresses

Please read these instructions carefully before installing, servicing, or operating the equipment.
This manual may be modified without notice. See: www.harken.com/manuals for updated versions.

PLEASE SAVE THESE INSTRUCTIONS

Safety Precautions/Terms/General Information

Introduction

This manual gives technical information on installation and service. This information is **destined exclusively** for specialized personnel or expert users. Installation, disassembling, and reassembling by personnel who are not experts can cause serious damage to property, injury to users, and injury to those in the vicinity of the product. If you do not understand an instruction, contact Harken.

The user must have appropriate training in order to use this product.

Harken accepts no responsibility for damage or harm caused by not observing the safety requirements and instructions in this manual. See Limited Warranty, General Warnings, and Instructions at www.harken.com/manuals.

Purpose

Harken Jib Reefing and Furling systems are designed for rolling sails on sailboats to reduce size, or to completely roll so wind has little effect on sail. Use of this product for other than normal sailboat applications is not covered by the limited warranty.

Safety Precautions



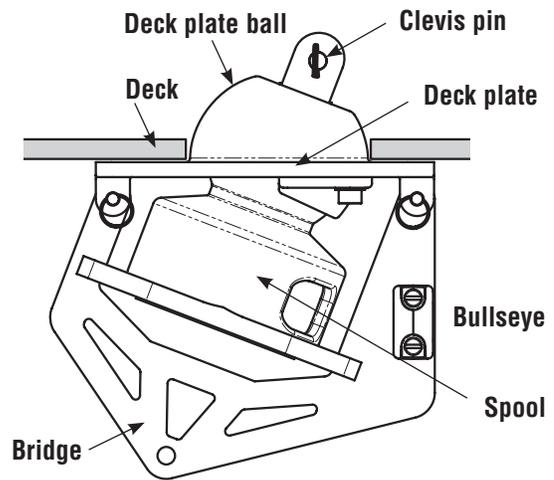
WARNING! Strictly follow all instructions to avoid potential hazards that may kill or hurt you and others. See www.harken.com/manuals for General Warnings and Instructions.



Swivel assembly



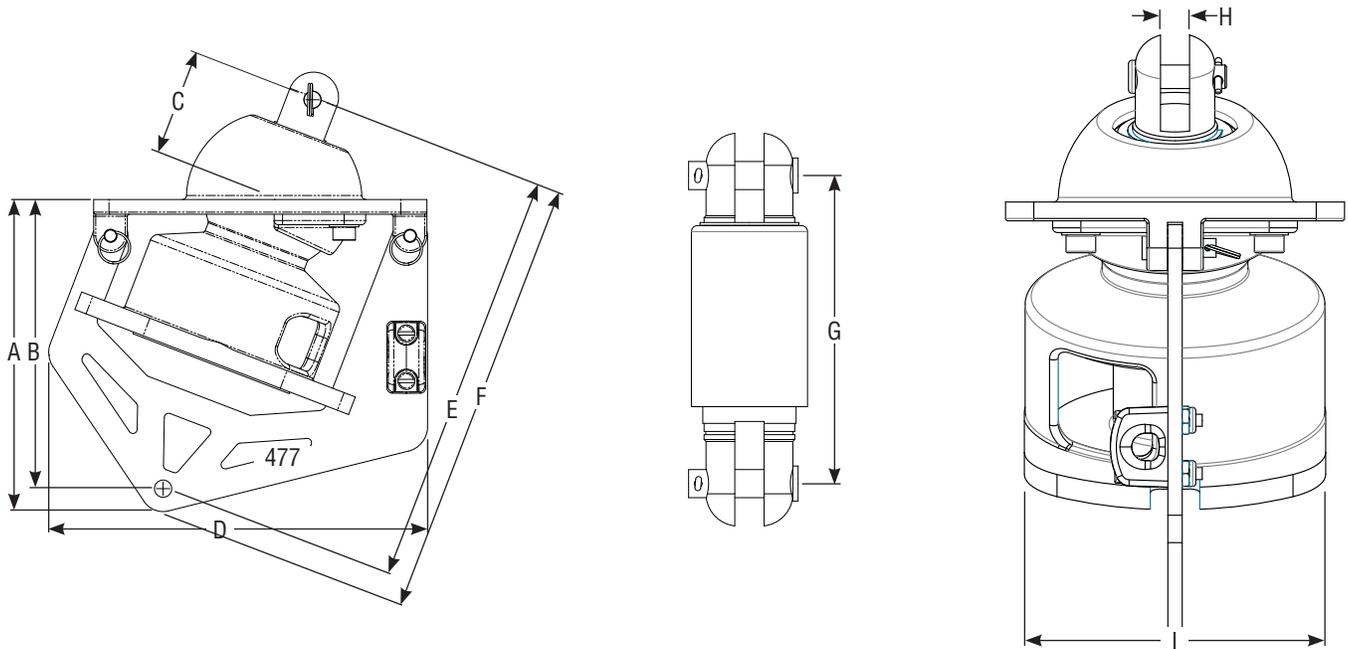
Drum assembly



Furler	Description	Clevis pin Ø		Maximum working load		Line Ø	
		in	mm	lb	kg	in	mm
477	Underdeck furler/small	1/4	6	950	431	1/8-5/32	3-4
493	Underdeck furler/medium	5/16	8	2000	907	5/32-3/16	4-5
478	Underdeck furler/large	7/16	11	3000	1361	3/16-1/4	5-6

Parts Descriptions and Specifications

Furler	A		B		C		D		E		F		G		H		I	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
477	4 ⁹ / ₈	118	4 ⁹ / ₁₆	147	1 ⁹ / ₁₆	40	5 ⁵ / ₈	143	6 ⁹ / ₁₆	157	6 ⁹ / ₁₆	166	2 ¹ / ₂	64	5 ⁹ / ₁₆	8	3	76
493	5 ¹¹ / ₁₆	144	5 ⁷ / ₁₆	135	1 ¹³ / ₁₆	45	7	179	7 ⁷ / ₈	188	7 ¹³ / ₁₆	198	4	102	3 ³ / ₈	9.5	4	100
478	7	177	5 ³ / ₄	147	2 ⁷ / ₁₆	61	9 ⁹ / ₈	238	8 ¹ / ₂	215	9 ¹ / ₂	240	4 ³ / ₄	121	7 ⁷ / ₁₆	11.5	5 ¹ / ₂	140



Components

Furler	Upper swivel Part No.	Hoistable swivel Part No.	Drum Part No.	Weight					
				Upper swivel		hoistable swivel		Drum	
				oz	g	oz	g	oz	g
477	164	464*	HC9226	2.6	74	2.9	82	24	680
493	207	465*	HC10893	9.2	261	8.9	252	42.6	1201
478	HCP141	482*	HC9976	15	431	16.8	477	81	2296

*Hoistable halyard swivels (464, 465, 482) are not included in 477, 493, or 478.



Tangs for Attaching Sail to Lower Unit

Furler	Tack adapter tang Part No.	Pin-to-pin length		Wire Ø		Clevis pin Ø		Weight		Maximum working load	
		in	mm	in	mm	in	mm	oz	g	lb	kg
477	HCP649*	3/4	19	1/8	3	1/4**	6**	—	—	—	—
493	489	1 ³ / ₈	35	5/32	4	5/16**	8**	—	—	—	—
478	479	1 ¹ / ₂	38	5/32	4	5/16**	8**	5.2	147	3000	1361
478	480	1 ¹ / ₂	38	3/16	5	3/8**	10**	5.2	147	3000	1361
478	481	1 ¹ / ₂	38	7/32	6	7/16**	11**	5.2	147	3000	1361

*See parts required below. **Upper tang hole pin size listed.

*The following parts must be ordered with the HCP649

Part No.	Qty	Description
HCP650	2	Neoprene O-ring
HFS118	1	Cotter pin 1/16X.500 18-8
HSB99	1	Clevis pin 1/4 X .672 SS

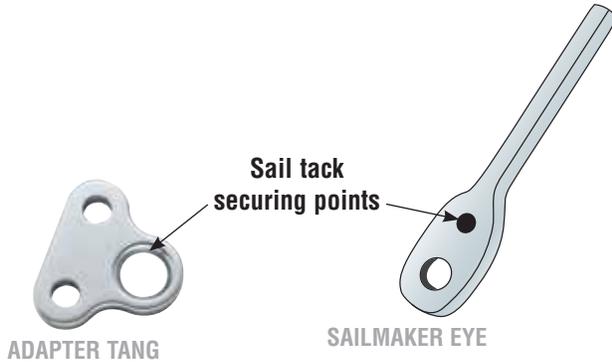


Planning Installation

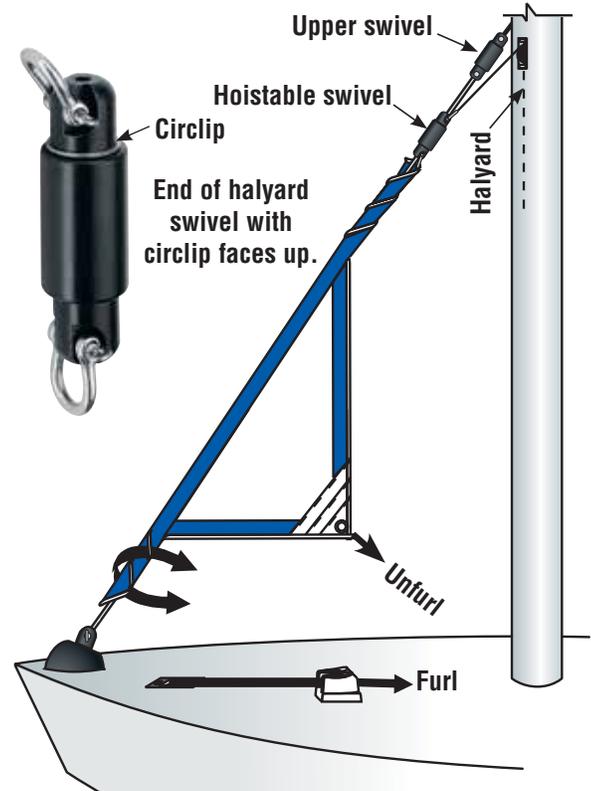
An optional hoistable ball bearing halyard swivel can be installed on your headstay so you can raise or lower the sail without removing the headstay. Hoistable halyard swivels are independent of the headstay, allowing you to tension the luff separately from the mast rake. Hoistable swivels work along with your standard Harken Small Boat furler.

IMPORTANT! Hoistable halyard swivel must be loaded on stay before terminals are made. Make sure the end with circlip is facing up.

Hoistable halyard swivel adapter tangs provide a “Y” attachment to connect both stay and sail tack to the lower unit. A sailmaker eye may also be used. The eye consists of a swage marine eye with a hole designed for lashing or shackling the tack to the terminal.



Hoistable Halyard Swivel



Tools/Parts You Will Need

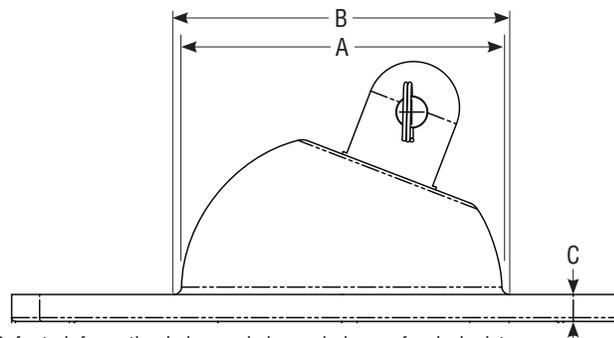


- | | |
|--------------------------|--|
| 1. Hole saw | 5. Deck sealant |
| 2. Center punch | 6. File for beveling |
| 3. Scissors | 7. Wrench for deck plate bolts |
| 4. Rigging or black tape | 8. Power drill/drill bit for pilot holes |



Fasteners for mounting unit to deck (not supplied)		
Unit	Fastener Ø	C-deck plate thickness*
477	5 mm	1/4" (6 mm)
493	6 mm	1/4" (6 mm)
478	6 mm	3/8" (10 mm)

*Add deck thickness to this measurement.



Hole saw size – Refer to information below and choose hole saw for deck plate.

Unit	Deck Plate Ball Ø				Recommended Hole Saw Ø			
	A		B		Requires Some Beveling		Requires No Beveling	
	in	mm	in	mm	in	mm	in	mm
477	2.6	66	2.7	68.5	2.5 or smaller*	65 or smaller*	2.75	70
493	3	76	3.25	83	3 or smaller*	75 or smaller*	3.25	85
478	4.25	108	4.5	114	4.25 or smaller*	110 or smaller*	4.5	115

* A smaller hole than listed may be used to fashion a socket in the deck to conform to the ball shape. This can improve the appearance and reduce the amount of sealant required. See drilling template in Appendix.

Planning Installation

Furler Requires Drained Compartment

The drum assembly keeps most of the water from entering the bow compartment. Water will drip through the furler during rain, or when sailing in heavy weather.

IMPORTANT! Furling compartment must drain.

Assembly

The drum assembly is designed for either transferring the headstay loads to the deck, or for transferring the loads to an underdeck chainplate.

If securing to deck, make sure deck is strong enough and designed for this purpose. A cored deck will not provide adequate strength.

Use stay attachment belowdeck. A turnbuckle is used to connect the chainplate to the bridge on the furler. It must be tensioned carefully as the mast is tensioned to neutralize the load on the deck.

Stay Loading

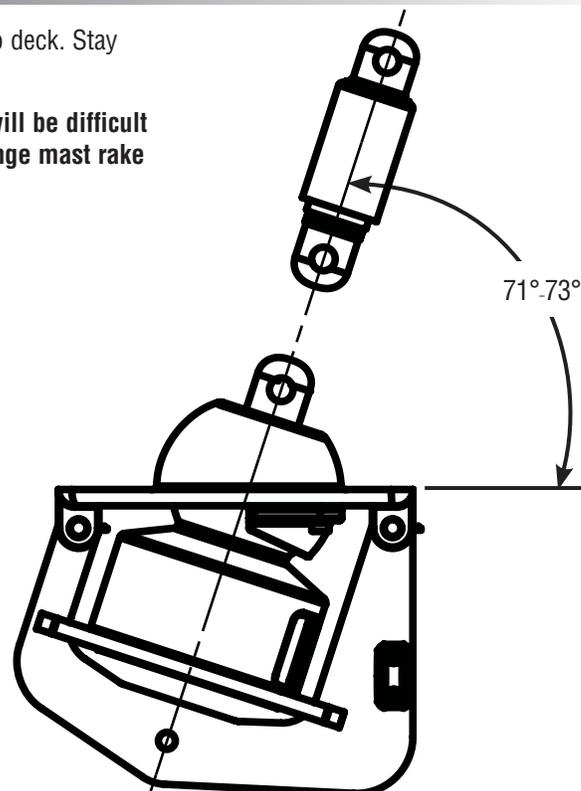


Turnbuckle to bridge

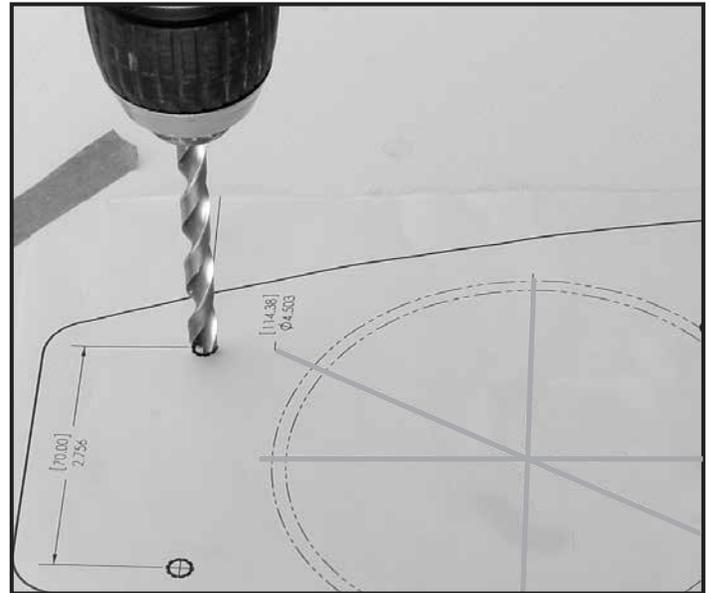
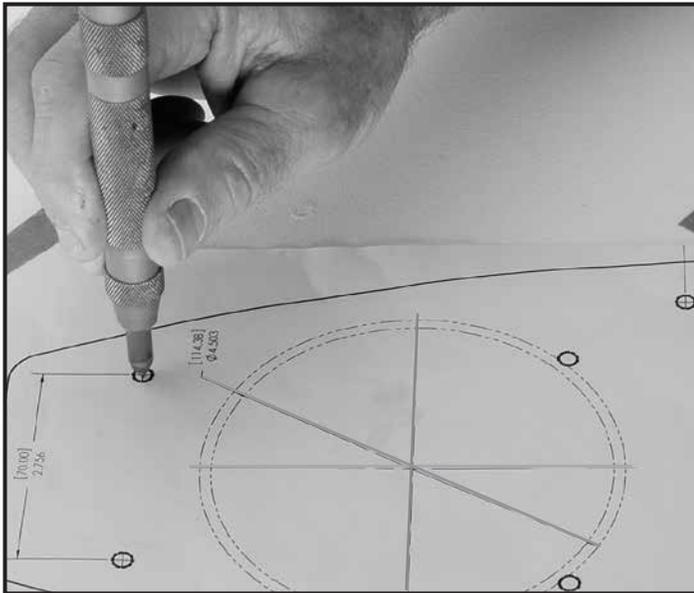
Stay Angle

The Harken deck plate angle matches a stay angle of 72° when compared to deck. Stay angle can vary between 71° and 73° .

IMPORTANT! If stay angle does not fall between 71° and 73° , the furler will be difficult to furl and can create excessive force on deck and furler. To correct, change mast rake or make shims using structural epoxy.



Carefully locate center point in deck to locate deck plate. Line from mast to underdeck chainplate must intersect this center point. Mark center fore/aft and athwartships lines. Line up template accordingly. Mark four (4) outer holes and center pilot hole. Make sure closer pair of holes is forward. **Mark center hole for drilling large hole.**



If using an interior chainplate, check hole position by drilling a pilot hole and running a low stretch line from masthead to chainplate.

Tip: After pilot drill bit clears deck, drill final hole from bottom using pilot hole to line up hole drilled from top. This will prevent glass from chipping.

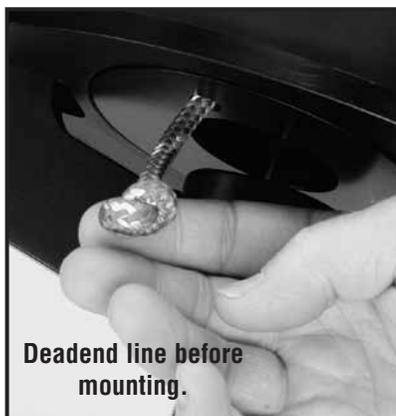
Tip: Run line through fairlead and deadend line into spool before mounting lower unit.

Make sure hole is just large enough so deck plate bears against deck. It is better to make hole slightly smaller and file opening larger to fit. Use template to mark large hole and bolt holes. Once you are certain hole is located in line with chainplate and required shimming complete, drill hole 90° to deck.

Use screws, washers, and deck sealant to fasten lower unit to deck (see chart at right).

Note: Make sure there is sufficient thread engagement into deck plate.

Furler	Minimum thread in deck plate
477, 493	1/4" (6 mm)
478	3/8" (10 mm)

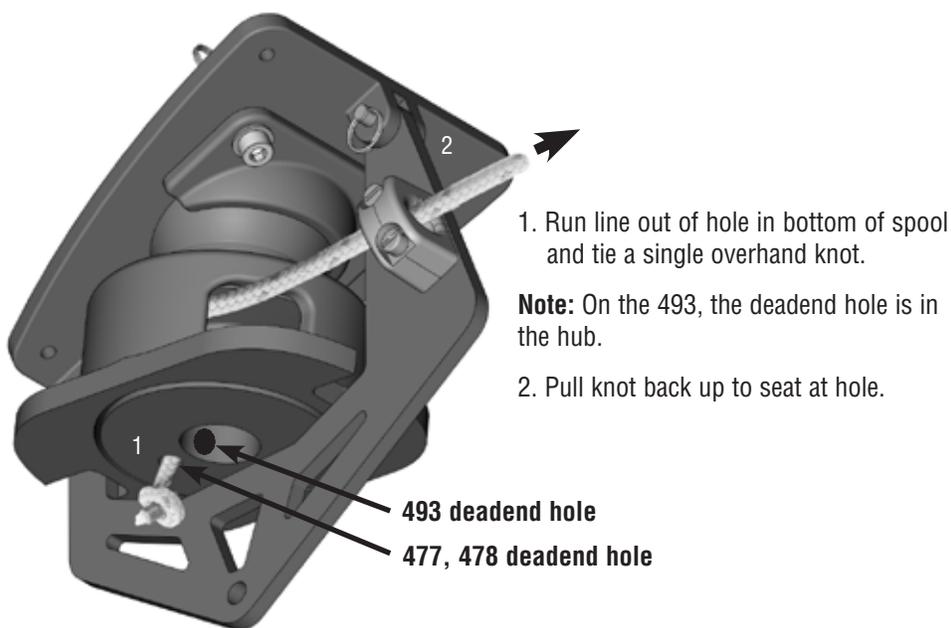


To figure line length, measure the distance from the furler to the furling cleat. Add length indicated below.

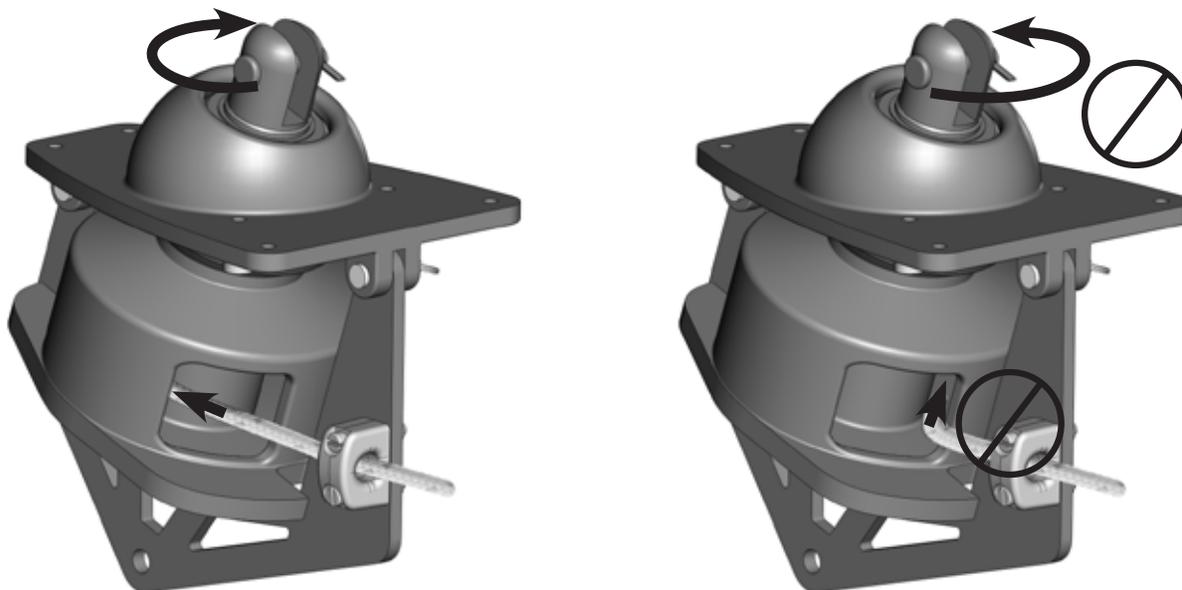
Part No.	Line Ø		Measure distance from furler to cleat and add	
	in	mm	ft	m
477	1/8 - 5/32	3 - 4	10	3
493	5/32 - 3/16	4 - 5	13	4
478	3/16 - 1/4	5 - 6	15	4.5

Feed the line through bullseye and into spool. Run down into deadend hole located on the lower flange of the spool and add a stop knot. Tie an overhand or figure-8 knot in the end. Set up lead block so line runs perpendicular to drum when it leaves bullseye.

The bullseye can correct small differences in line angle. Lead line aft using ball bearing blocks where line makes a turn more than 30°. Install cleat.



Rotate the drum clockwise to charge the spool. Wind 3 - 4.5 m (10 - 15') of line on spool.



Commissioning

Upper Swivel

Attach upper swivel to jib halyard. Fasten head of unfurled jib to upper swivel and attach tack to the top of drum. Hoist sail with halyard, snug up, and cleat. When using hoistable swivel, attach head of sail to shackle.

Operation

Unfurling/Furling

To furl jib, pull the furling line to roll sail up around its own luff. To unfurl, uncleat furling line and pull jib sheet.

Maintenance

Inspect/Clean

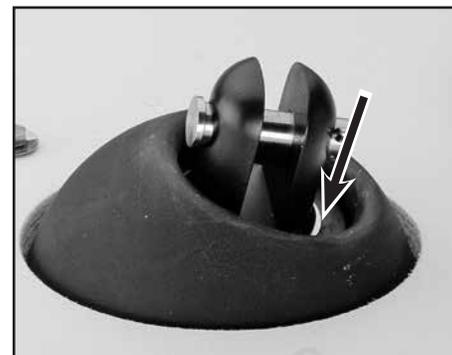
Inspect

- 1) Unit for signs of chafe, wear, or damage.
- 2) Rigging components for signs of stress corrosion.
- 4) Turnbuckle below drum or inside torque tube for signs of loosening.
- 5) Headstay tension for signs of loosening.
- 6) All clevis pins, locking rings, and cotter pins to make sure they are secure.
- 7) Wire for signs of wear or unraveling.

Maintenance

Keep unit clean. When you wash boat, flush unit with soap and fresh water. Occasionally lower sail and flush halyard swivel with soap and fresh water.

To clean drum bearings, squirt a mild detergent and water solution into the small gap between the plastic ball and the spool extension (shown at right). Spin drum and let soak. Flush with hose for one (1) minute.

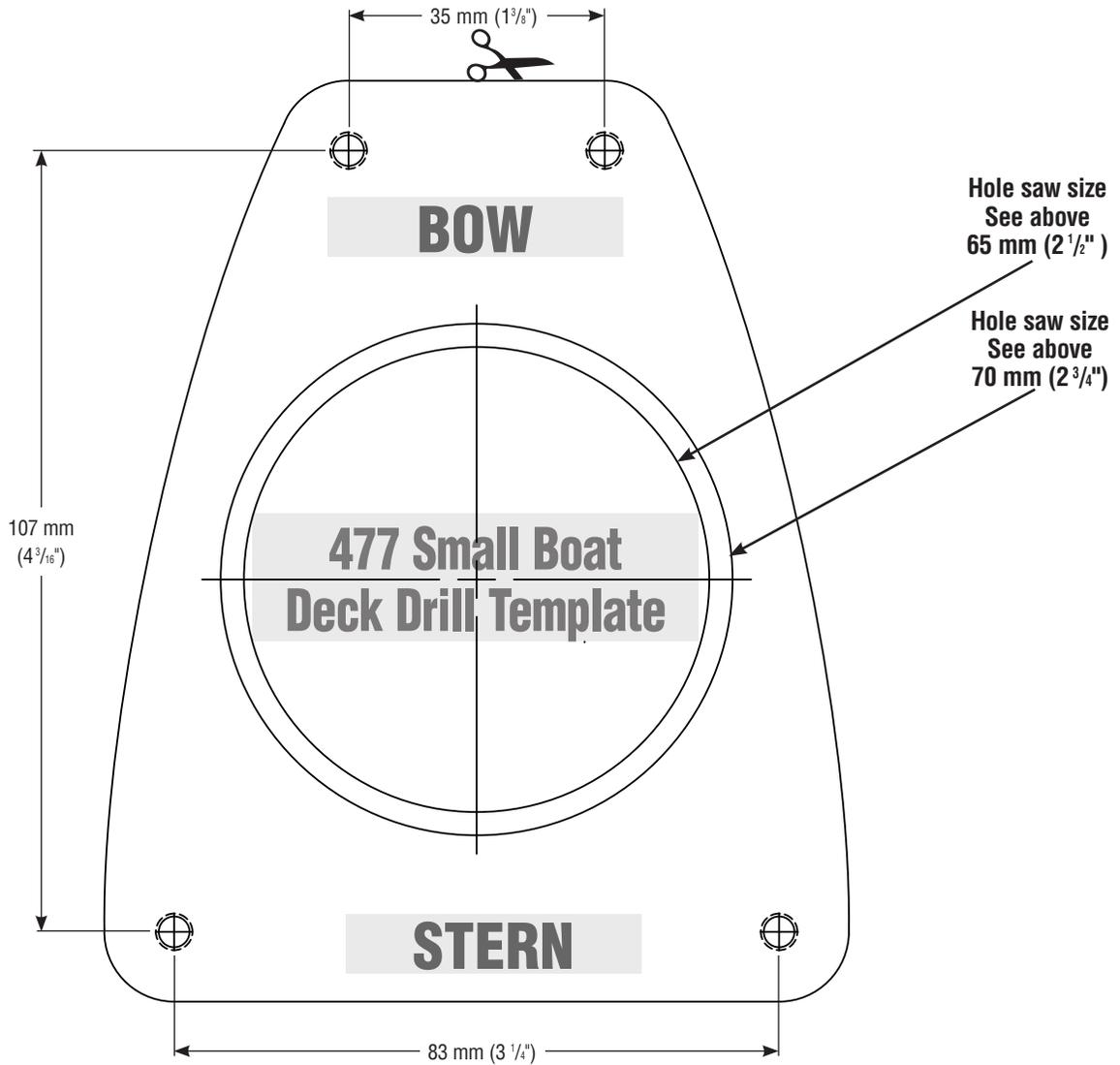


Clean drum bearings.

Hole Saw Size Recommendations. Read before Drilling.

65 mm (2 1/2") – Requires some beveling of bottom edge of deck hole to provide a good fit. Alternatively, a smaller hole can be used to fashion a socket in deck to conform to ball shape. This can improve appearance and reduce amount of water that enters.

70 mm (2 3/4") – Use if no beveling to underside of deck is desired.



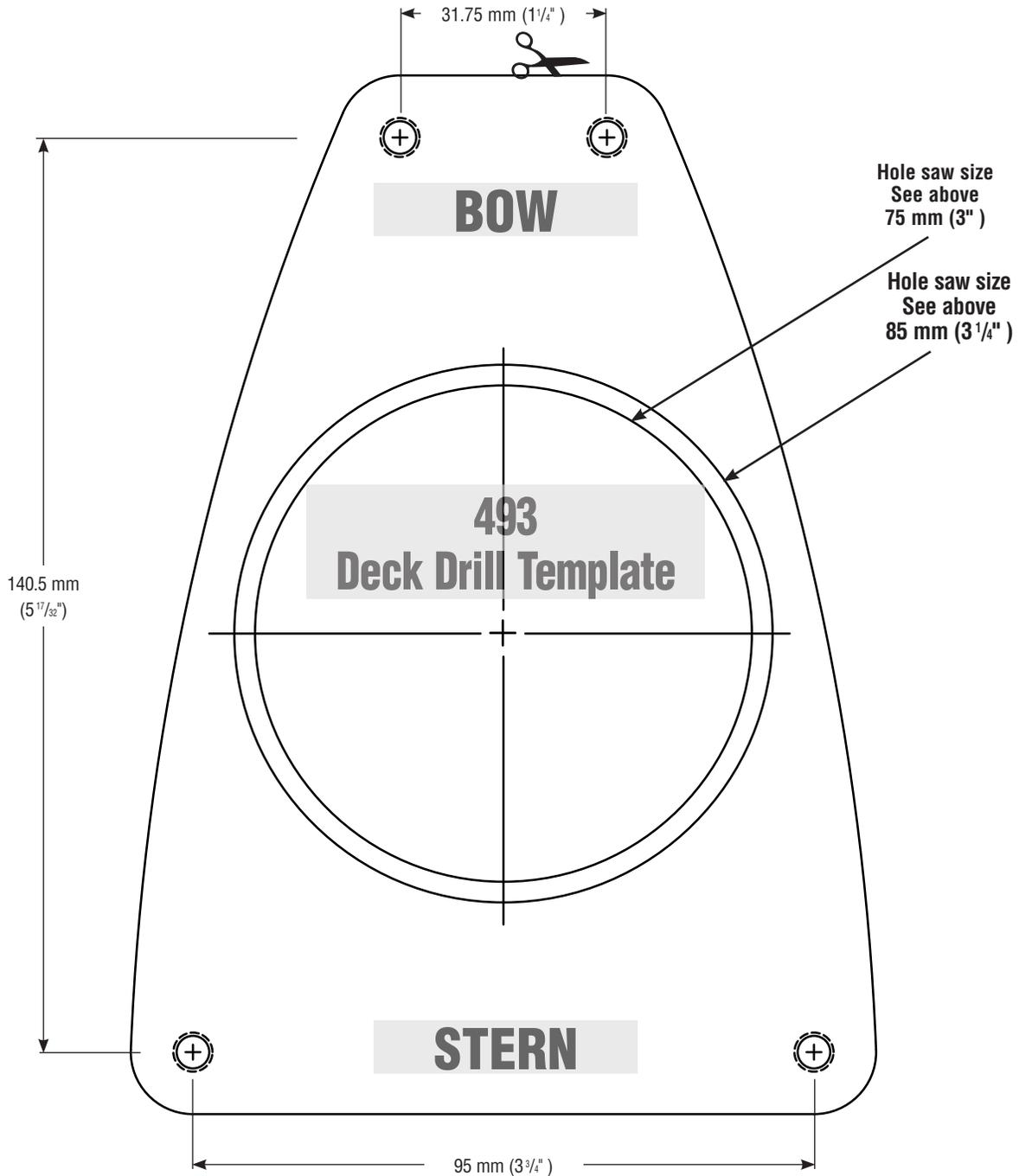
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Hole Saw Size Recommendations. Read before Drilling.

75 mm (3") – Requires some beveling of bottom edge of deck hole to provide a good fit. Alternatively, a smaller hole can be used to fashion a socket in deck to conform to ball shape. This can improve appearance and reduce amount of water that enters.

85 mm (3 1/4") – Use if no beveling to underside of deck is desired.



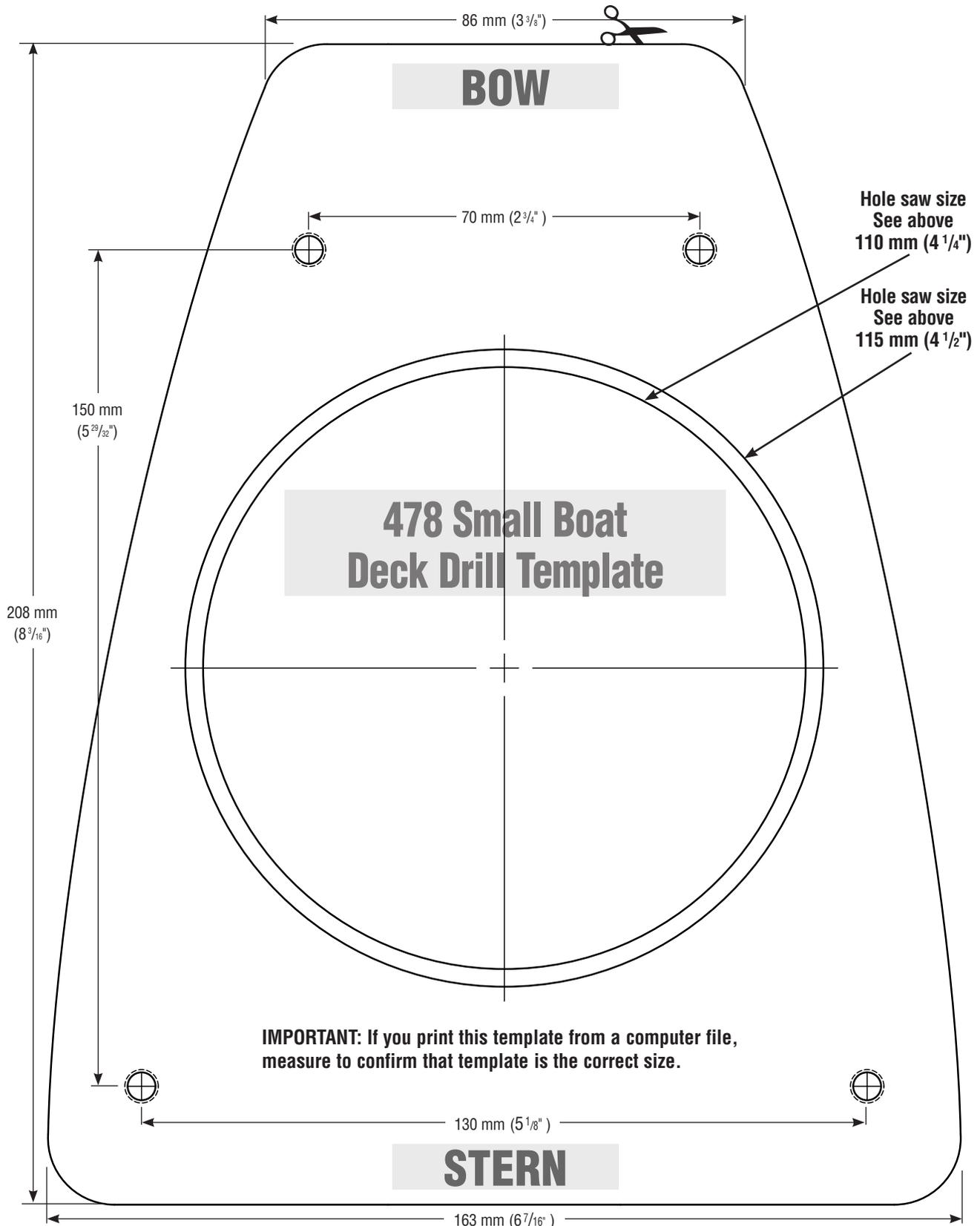
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Hole Saw Size Recommendations. Read before Drilling.

110 mm (4 1/4") – Requires some beveling of bottom edge of deck hole to provide a good fit. Alternatively, a smaller hole may be used to fashion a socket in deck to conform to ball shape. This can improve appearance and reduce amount of water that enters.

115 mm (4 1/2") – Use if no beveling to underside of deck is desired.



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Consult specifications for swivel and drum pin-to-pin lengths to determine luff length deductions. If using optional hoistable halyard swivel, make sure to deduct for this.

Standard Upper Swivel Only

Sailmaker will often install a 1 x 19 stainless steel wire sewn into the luff. Thimbles are secured to the tack and head so they will not turn while furling. In this case, the luff wire becomes the headstay. The jib remains on the boat in its furled position when it is not in use, and a cover protects the sail from UV exposure. Alternatively, a temporary “mast - assist” line is used.

Direction of Wire Lay (All Installations)

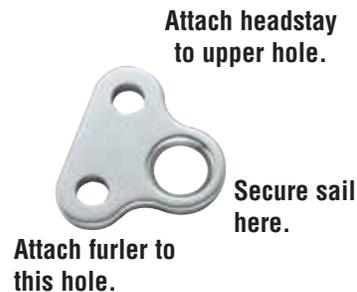
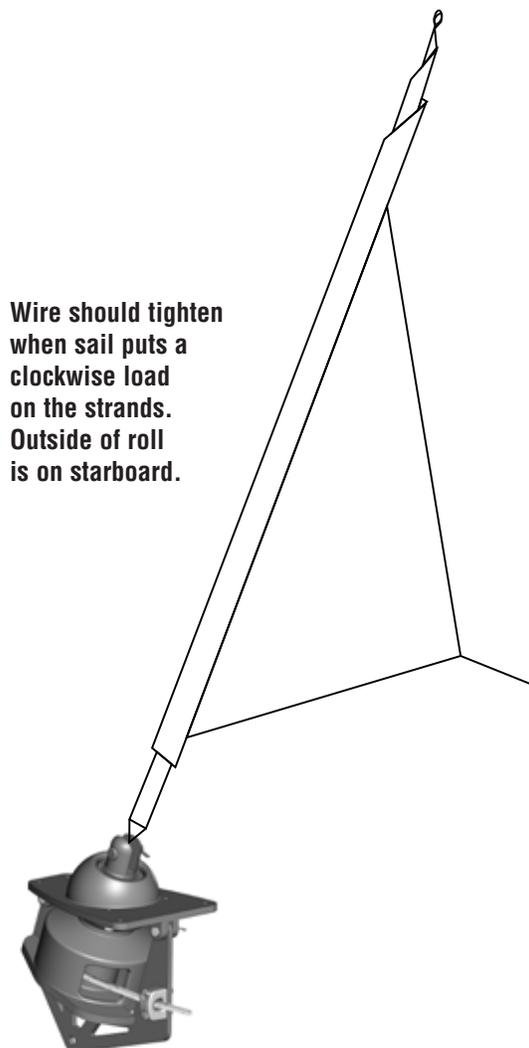
When installing wire, coordinate the lay of the wire with the direction of furling so the twist in the strands is tightening when the sail is pulling aft as it is furled. Spool is charged clockwise. This means that the sail is rolled in a counter-clockwise direction during furling. As a result, the wire should tighten when sail puts a clockwise load on the strands.

Note: The outside of the roll will be on starboard. See diagram below.

Hoistable Halyard Swivel: If a hoistable halyard swivel is used, the sailmaker will use a luff sleeve or small snap straps so the sail can be hoisted onto a permanent stay and removed with the headstay left in place. Make sure the head and tack thimbles are secured to the sail to handle furling loads.

IMPORTANT! Load hoistable halyard swivel onto stay before terminals are assembled.

Use tangs to provide a sail attachment to lower furler. A sailmaker eye may also be used.



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