

HARKEN®

Unit 0 Long Link Plates With Toggle

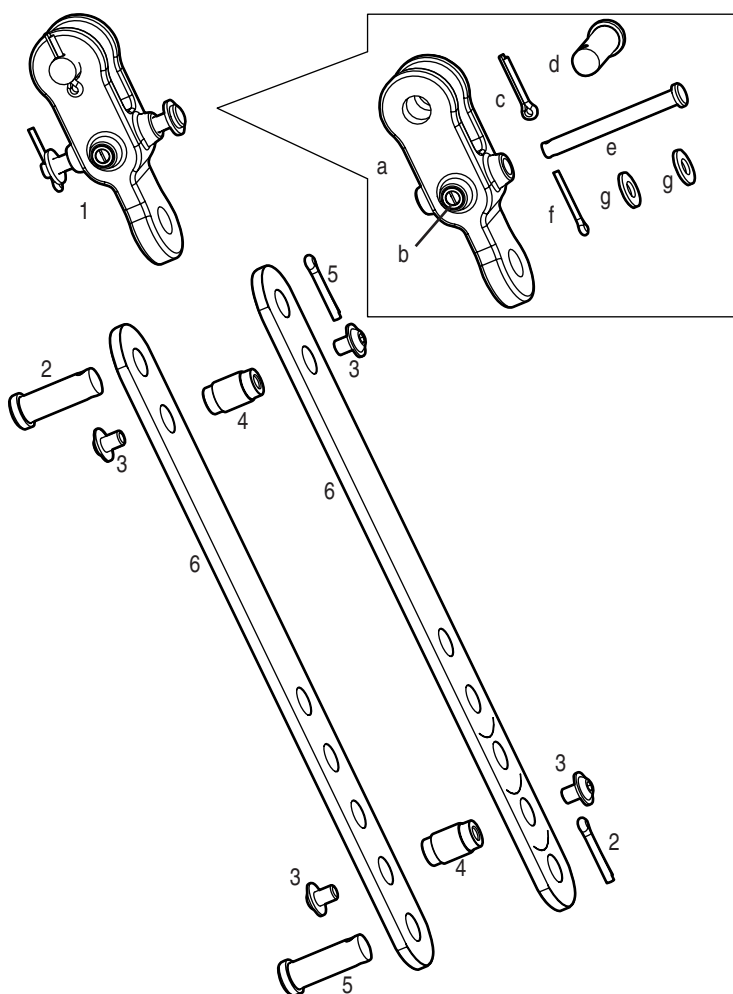
Supplement to 4416 MKIV and
5389 Ocean Furler Manuals

7310.21 5/16

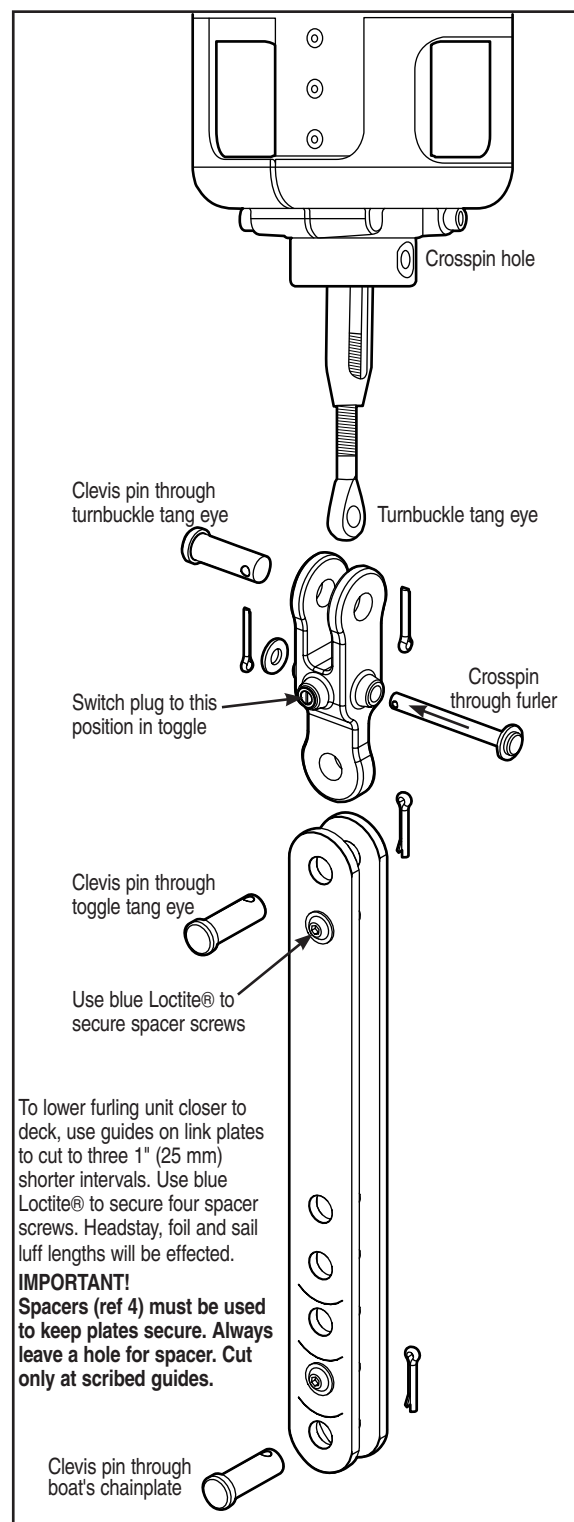
7310.21 3/8

7310.21 7/16

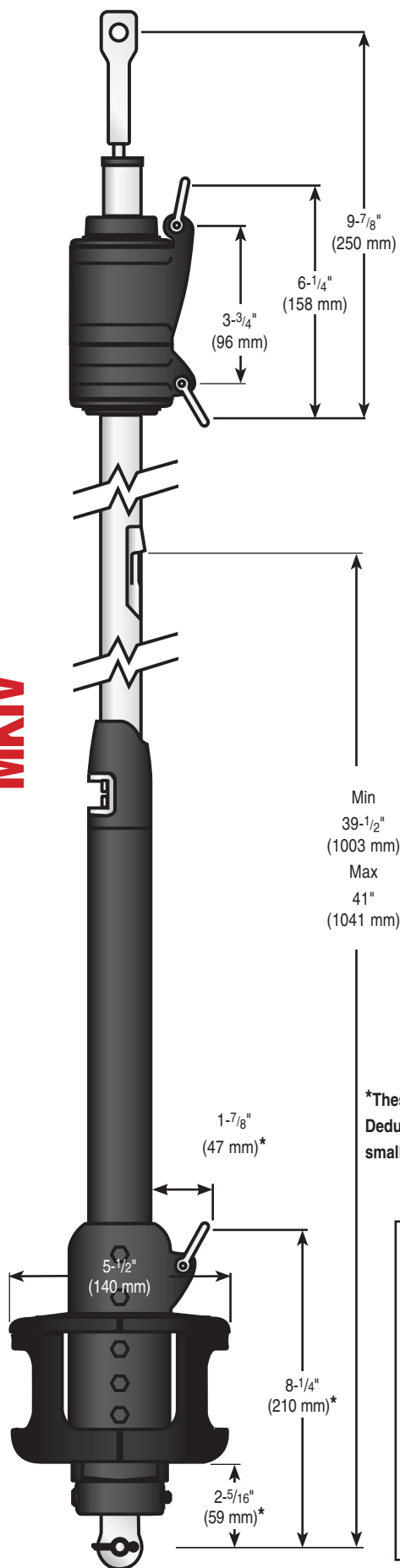
PARTS LIST



Ref	Description	7310.21 5/16	7310.21 3/8	7310.21 7/16
1	Toggle assembly	7410.20 5/16	7410.20 3/8	7410.20 7/16
a	Toggle	H-63528	H-37687C	H-37686C
b	Plug (2)*	H-42050	H-42050	H-42050
c	Cotter pin	HFS680	HFS181	HFS181
d	Clevis pin	SP-039	H-42400	H-42399
e	Cross pin	H-42401	H-42401	H-42401
f	Sm cotter pin	HFS181	HFS181	HFS181
g	Nylon washer (2)	HFS1108	HFS1108	HFS1108
2	Cotter pin (2)	HFS680	HFS680	HFS680
3	Flanged buttonhd (4)	H-91922	H-91922	H-91922
4	Spacer (2)	H-92593	H-92594	H-92595
5	Clevis Pin (2)	H-93402	H-42400	H-42399
6	Strap (2)	H-92585	H-92587	H-92589
	Blue Loctite®	833	833	833



MKIV



Luff Length

Note offsets above and below the sail.

A shorter luff may be required if a halyard restrainer is necessary (page 26) or a toggle or long toggle assembly is used to raise drum.

If the luff of sail is not long enough to put the halyard swivel near the top of the headstay foil, a pendant must be added (see page 26).

Tack Setback

Note setback for the tack shackle and cut the sail accordingly.

Luff Tape Size

Unit 0 requires #6 (6/32" or 5 mm) luff tape.

Luff Tape Length

Cut off top of luff tape so it is 18" to 24" (450 to 600 mm) below head of sail. This allows head to lag behind rest of sail to help flatten sail. It will also help head to roll more smoothly.

Note feeder height and extend the bottom of the luff tape downwards so it is below the feeder. This will prevent the luff tape from catching in the feeder as the sail is lowered.

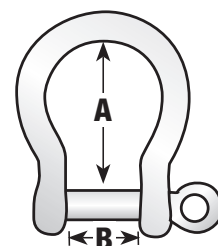
Tack and Head Shackles

Make sure tack and head shackles fit the sail rings.

The minimum inside dimensions of the standard head and tack shackles are:

(A) 1-1/16" (27 mm)

(B) 1/2" (13 mm)



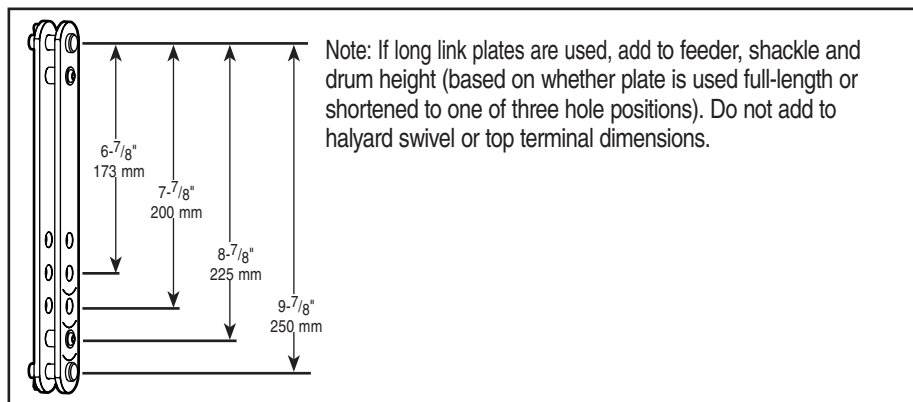
Sun Cover

Sun cover may be installed on either side of the sail. However, make sure you match other sails in the customer's inventory.

*These three dimensions are for the 7/16" (11.1 mm) toggle.

Deduct 5/16" (8 mm) from these dimensions for

smaller 5/16" (7.9 mm) or 3/8" (9.5 mm) toggles.



Luff Length

Note offsets above and below sail.

A shorter luff may be required if a halyard restrainer is necessary (page 23) or a toggle or long toggle assembly is used to raise drum.

If luff of sail is not long enough to put halyard swivel near top of headstay foil, a pendant must be added (see page 23).

Tack Setback

Note setback for tack shackle and cut the sail accordingly. Feeder height depends upon up/down foil position in lower unit.

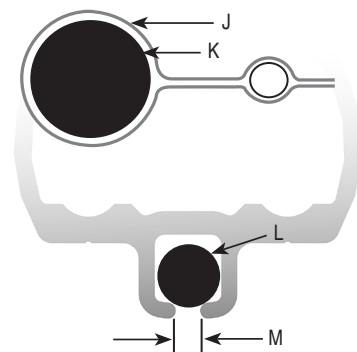
Luff Tape Size -6 (5 mm or 6/32")

J – Finished luff tape size: 5.5 mm (0.215")

K – Luff rope size: 4.8 mm (6/32", 3/16")

L – Max Ø in sail groove: 6.1 mm (0.24")

M – Gap in sail groove: 2.4 mm (0.096")



Luff Tape Length

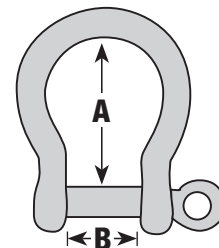
Note feeder height and extend bottom of luff tape downward so it is below feeder. This will prevent luff tape from catching in feeder as sail is lowered.

Tack and Head Shackles

Make sure tack and head shackles fit sail rings. Minimum inside dimensions of standard head and tack shackles are:

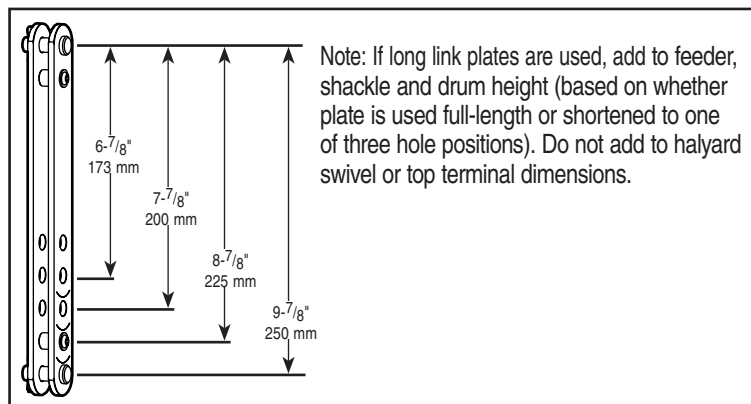
(A) 1-1/16" (27 mm)

(B) 1/2" (13 mm)

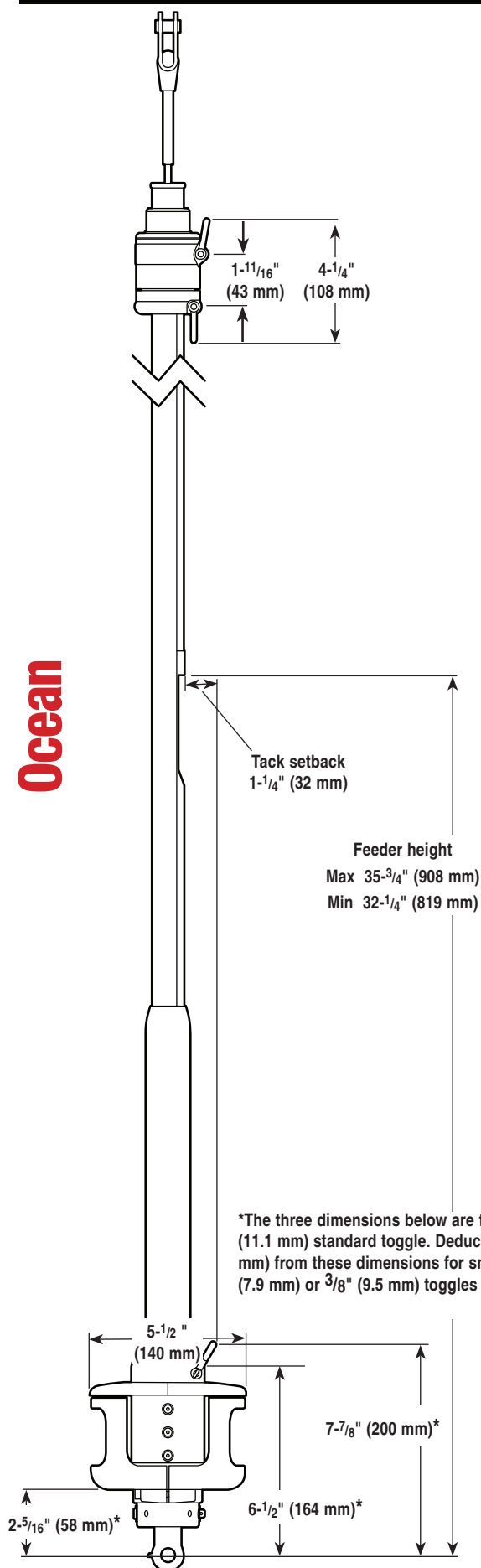


Sun cover

Sun covers may be installed on either side of the sail. Be sure to match other sails in the customer's inventory.

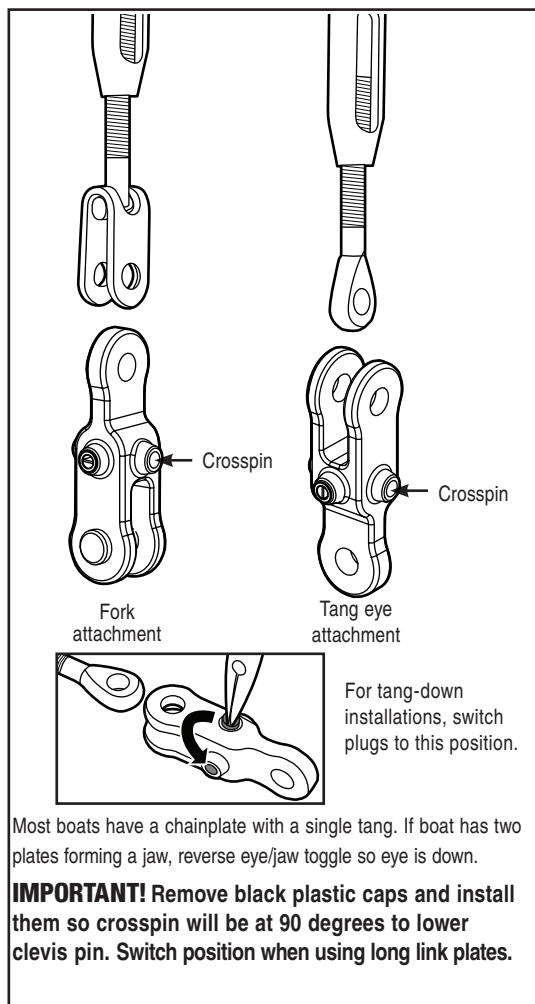


Note: If long link plates are used, add to feeder, shackle and drum height (based on whether plate is used full-length or shortened to one of three hole positions). Do not add to halyard swivel or top terminal dimensions.



Use dimensions of Harken toggle below to build stay to correct length.

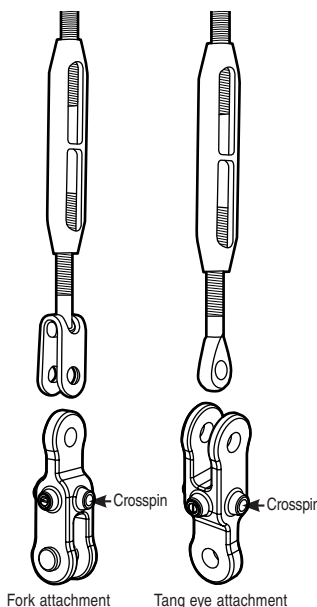
Tip: Turnbuckles should be 1/2 to 2/3 open to allow shortening for new wire stretch and for fine-tuning mast rake.



Standard Toggle

Clevis Pin	Pin-to-Pin Length
5/16" (7.9 mm)	2-1/8" (54 mm)
3/8" (9.5 mm)	2-1/4" (57 mm)
7/16" (11.1 mm)	2-7/8" (73 mm)

2-1/8" (54 mm)
or
2-1/4" (57 mm)
or
2-7/8" (73 mm)



Long Link Plates

Clevis Pin	Pin-to-Pin Length
5/16" (7.9 mm)	12" (305 mm)
3/8" (9.5 mm)	12" (305 mm)
7/16" (11.1 mm)	12-3/4" (324 mm)

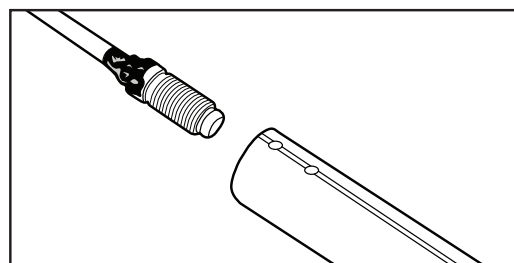
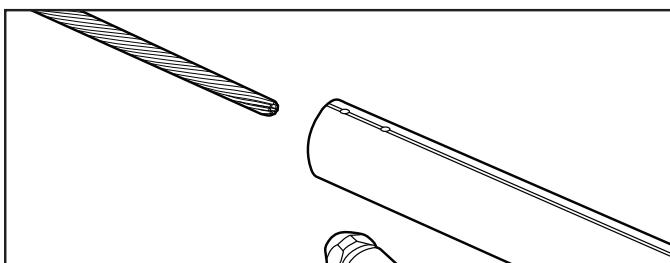
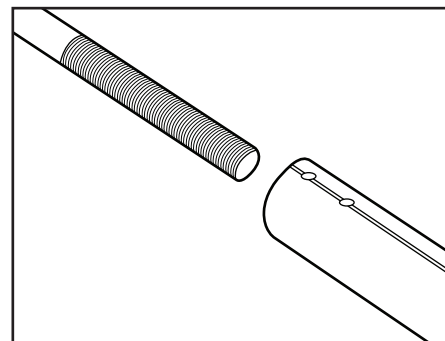
IMPORTANT!
Link plates can shorten by three 1" intervals. Stay will be longer the more link plates are shortened.

Options for Snaking Stay into Foils

1. Swage stud at end of wire.
2. Open end of wire and install Norseman or Sta-Lok® stud after foil is assembled.
3. Rod adapter nosepiece for Harken rod adapter stud: Threaded nosepiece must have a positive lock as well as adhesive. Use Harken stud with cotter pins (see page 19).



WARNING! Using a threaded nosepiece with only adhesive at the upper rod eye terminal may result in headstay system failure. Make sure there is a mechanical lock.

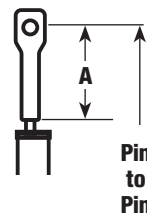


Measure A and add to this chart and length chart below		
	Inches	mm
A		
B	.4	10
E*	24.0	610
F	16.25	413
G		
Total A+B+E+F+G		

*Add 1" (25 mm) if halyard deflector is used (see Page 10).

Make sure upper measurement points of A and pin-to-pin are the same.

Alternate measurement point



TOP FOIL LENGTH WORKSHEET

1	Pin-to-Pin Length											
2	Subtract ABEFG	-										
3	Result (Pin-to-Pin — ABEFG)											
4	Subtract D	-										
To find "D" pick number from chart below that is closest to, but not greater than total from step 3. <table border="0"> <tr> <td>Inches</td> <td>mm</td> </tr> <tr> <td>3 X 84 = 252</td> <td>3 x 2133.6 = 6400.8</td> </tr> <tr> <td>4 X 84 = 336</td> <td>4 x 2133.6 = 8534.4</td> </tr> <tr> <td>5 x 84 = 420</td> <td>5 x 2133.6 = 10668</td> </tr> <tr> <td>6 x 84 = 504</td> <td>6 x 2133.6 = 12801.6</td> </tr> </table> Example—If result from Step 3 is: 500 inches "D" = 420 inches 12,000 mm "D" = 10668 mm			Inches	mm	3 X 84 = 252	3 x 2133.6 = 6400.8	4 X 84 = 336	4 x 2133.6 = 8534.4	5 x 84 = 420	5 x 2133.6 = 10668	6 x 84 = 504	6 x 2133.6 = 12801.6
Inches	mm											
3 X 84 = 252	3 x 2133.6 = 6400.8											
4 X 84 = 336	4 x 2133.6 = 8534.4											
5 x 84 = 420	5 x 2133.6 = 10668											
6 x 84 = 504	6 x 2133.6 = 12801.6											
5	Result (C) Top Foil Length											

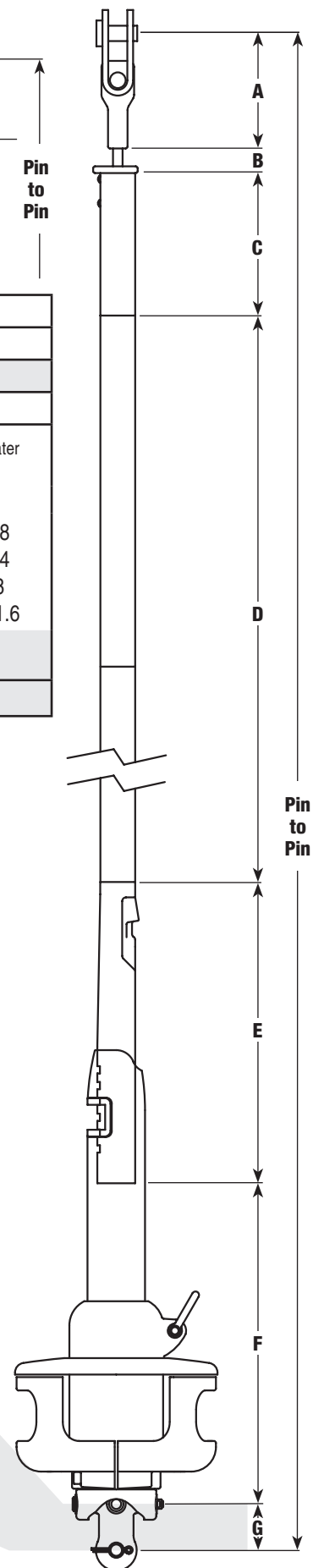
MKIV

Length Check

After completing worksheet above fill in A, C, D, and G below. Add "A" through "G" to confirm total equals your pin-to-pin measurement.

Length chart		
Dimensions	Inches	mm
A Center of Pin to Bottom of Terminal		
B Bottom of Terminal to Top of Foil	0.4	10
C Top Foil Length		
D Number of Foils _____ x 84" (2133.6 mm)		
E Bottom Foil	24.00	610
F Bottom of Foil to Crosspin	16.25	413
G Crosspin to Clevis Pin		
Pin-to-Pin Length		

G Toggle distance from lower clevis pin to crosspin hole					
Toggle Part No.	Type	Clevis Pin		G Distance	
7410.20 5/16	Eye/Jaw	5/16"	7.9 mm	1.1"	27 mm
7410.20 3/8	Eye/Jaw	3/8"	9.5 mm	1.1"	28 mm
7410.20 7/16	Eye/Jaw	7/16"	11.1 mm	1.4"	37 mm
7310.21 5/16	Long link plates with toggle	5/16"	7.9 mm	10.9"	277 mm
7310.21 3/8	Long link plates with toggle	3/8"	9.5 mm	11"	280 mm
7310.21 7/16	Long link plates with toggle	7/16"	11.1 mm	11.3"	287 mm
Note: If long link plates are shortened, dimension must be changed or foil will be too short. Measure distance from crosspin down to where clevis pin attaches toggle to boat and use this dimension in G above.					



Supplement to 5389 Ocean Furler Manual - Top foil length - page 8

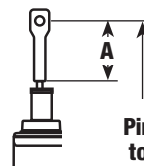
Measure A and add to this chart and "length chart" below

	Inches	mm
A		
B	.4*	10*
E	24.0	610
F	13.9	354
G		
Total A+B+E+F+G		

*Add 1" (25 mm) if using a 7301 halyard deflector. See page 10.

Make sure upper measurement points of A and pin-to-pin are the same.

Alternate Measurement Point



1	Pin-to-Pin Length	
2	Subtract ABEFG	–
3	Result (Pin-to-Pin – ABEFG)	
4	Subtract D	–

To find “D” pick number from chart below that is closest to, but not greater than total from step 3.

Inches	mm
3 X 84 = 252	3 x 2133.6 = 6400.8
4 X 84 = 336	4 x 2133.6 = 8534.4
5 x 84 = 420	5 x 2133.6 = 10668
6 x 84 = 504	6 x 2133.6 = 12801.6

Example—If result from Step 3 is:
500 inches “D” = 420 inches 12,000 mm “D” = 10,668 mm

5	Result (C) Top Foil Length	
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Ocean

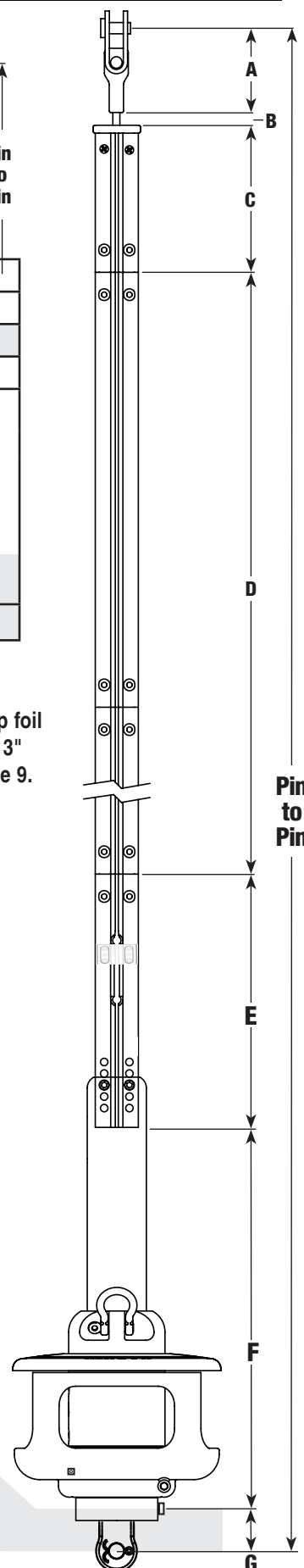
IMPORTANT! If top foil length is less than 3" (76 mm), go to page 9.

Length Check

After completing worksheet above fill in A, C, D and G below. Add "A" through "G" to confirm total equals your pin-to-pin measurement.

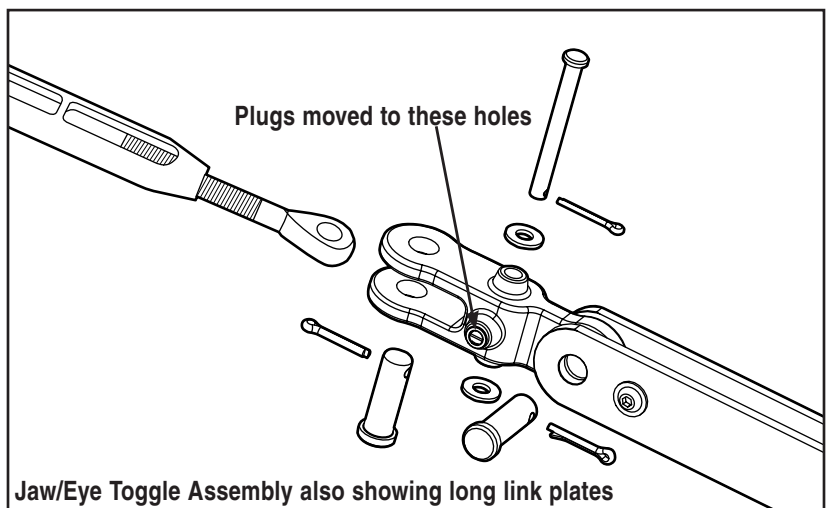
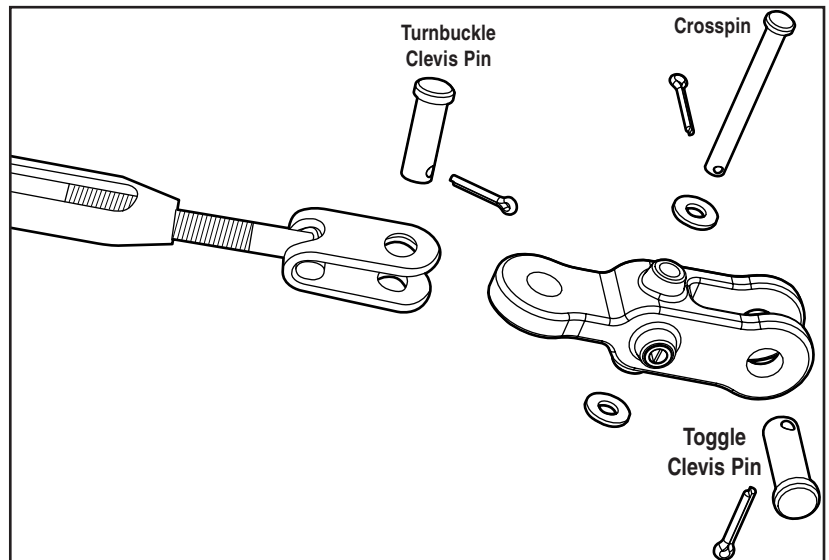
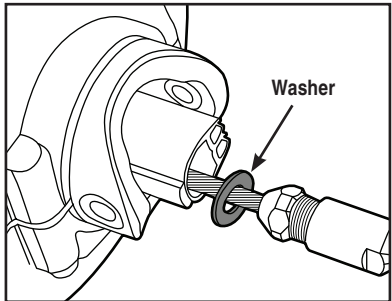
Pin-to-Pin Length Worksheet			
Dimensions	Inches	mm	
A Center of Pin to Bottom of Terminal			
B Bottom of Terminal to Top of Foil	.4	10	
C Top Foil Length			
D Number of Foils _____ x 84" (2133.6 mm)			
E Bottom Foil	24.0	610	
F Bottom of Foil to Crosspin	13.9	354	
G Crosspin to Clevis Pin			
Pin-to-Pin Length			

G Toggle Distance from Lower Clevis Pin to Crosspin Hole					
Toggle Part No.	Type	Clevis Pin		G Distance	
7410.20 5/16	Eye/Jaw	5/16"	7.9 mm	1.1"	27 mm
7410.20 3/8	Eye/Jaw	3/8"	9.5 mm	1.3"	33 mm
7410.20 7/16	Eye/Jaw	7/16"	11.1 mm	1.4"	36 mm
7310.21 5/16	Long link plates with toggle	5/16"	7.9 mm	10.9"	277 mm
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7310.21 7/16	Long link plates with toggle	7/16"	11.1 mm	11.3"	287 mm
Note: If long link plates are shortened, dimension must be changed or foil will be too short. Measure distance from crosspin down to where clevis pin attaches toggle to boat and use this dimension in G above.					



Assemble turnbuckle and attach Harken toggle.

Note: If using Sta-Lok® or Norseman® stud, you must use a washer above stud as shown below.



HARKEN®

Country of Manufacture - USA

Manufacturer - Harken, Inc.

N15W24983 Bluemound Rd., Pewaukee, WI 53072 USA

Telephone: +1 262 691-3320

Web: www.harken.com

Email: harken@harken.com

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