

# HARKEN®

## BATTCAR SWITCH SYSTEM INSTALLATION MANUAL

### 18 mm

Installation Manual – Intended for specialized personnel or expert users

4679 11/14



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

PLEASE SAVE THESE INSTRUCTIONS

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 may cause serious damage to property, injury to users, or 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](http://www.harken.com/manuals).

## Purpose

Harken Battcars are designed to reduce the size of, or to completely drop the mainsail on a sailboat so wind has little effect on the sail. Use of this product for other than normal sailboat applications is not covered by the limited warranty.

## Safety Precautions



**WARNING!** This symbol alerts you to potential hazards that can kill or hurt you and others if you don't follow instructions. The message will tell you how to reduce the chance of injury.

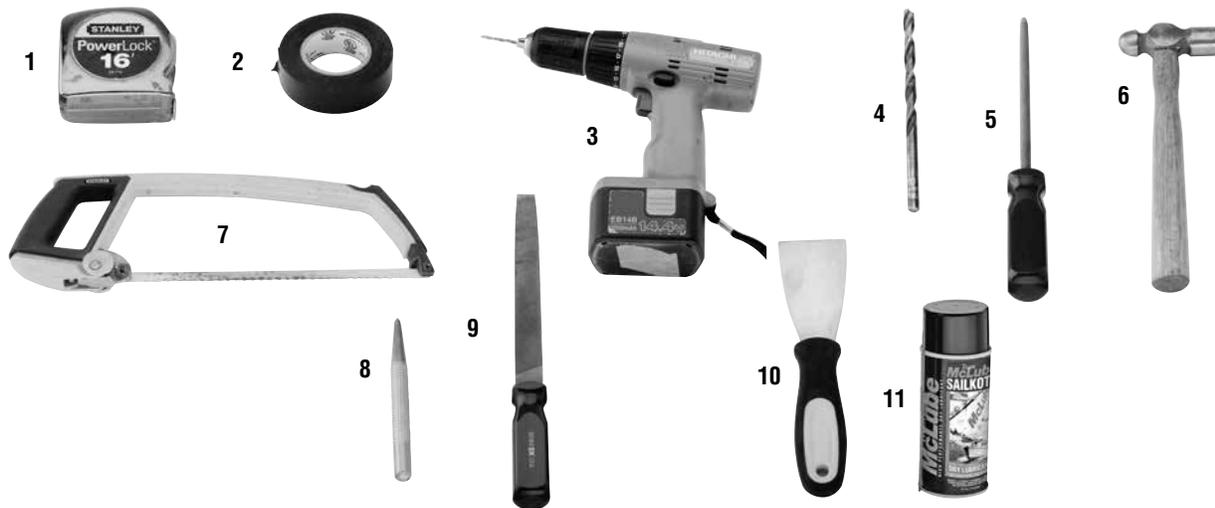


**CAUTION!** This symbol alerts you to potential hazards that can hurt you and others if you do not follow instructions. The message will tell you how to reduce the chance of injury.



**WARNING!** Strictly follow all instructions to avoid potential hazards that can kill or hurt you and others. See [www.harken.com/manuals](http://www.harken.com/manuals) for General Warnings and Instructions.

## Tools



1. Tape measure	8. Center punch
2. Tape (slug mount)	9. File
3. Power drill (screwdriver)	10. Putty knife (slug mount)
4. Drill - 5 mm ( <sup>1</sup> / <sub>32</sub> " (slug mount)	11. McLube® Sailkote™ dry lubricant
Drill - 4.2 mm ( <sup>9</sup> / <sub>32</sub> " (drill/tap)	
5. Phillips screwdriver (slug mount)	10-32 or 5 mm tap (drill/tap) – not shown
6. Hammer	Transfer punch 5 mm ( <sup>3</sup> / <sub>16</sub> " (drill/tap) – not shown
7. Hacksaw	
<b>Mast-up installation:</b> stepladder secured to the boat.	
<b>Work height:</b> 2.13 m (7') above boom	

HEADBOARD CAR  
(ASSEMBLY)



BATTEN CARS  
WITHOUT RECEPTACLE



INTERMEDIATE  
CARS



SPARE CAR SCREWS

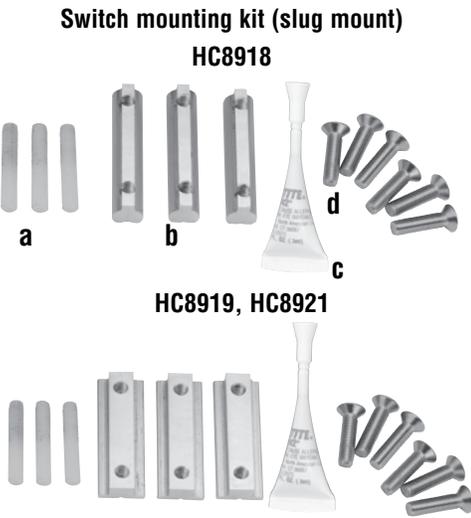
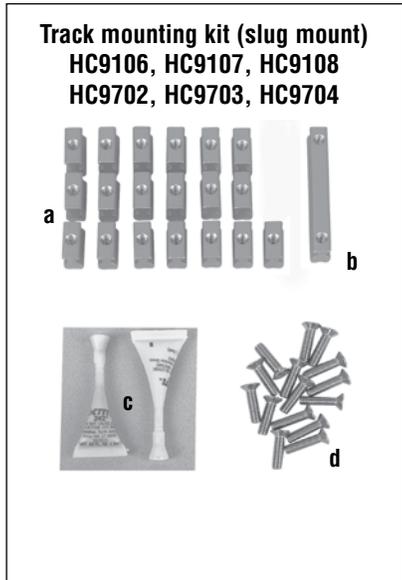


**Important! Do not overtighten screw and nut. Car will bind and may warp permanently.**

**Cars**

Part No.	Description	System	Comments
HC7906	Headboard car assembly	Low-load	Use regular headboard.
HC7905	Intermediate car		Consult sailmaker for quantity required.
HC8537	Batten car		10 mm threaded stud. Purchase batten receptacle separately.
HC7906HL	Headboard car assembly	High-load	Use regular headboard. Uses low friction slider insert.
HC7905HL	Intermediate car		Consult sailmaker for quantity required. Uses Delrin® slider insert.*
HC8537HL	Batten car		10 mm threaded stud. Purchase batten receptacle separately. Uses low-friction slider insert.
HC7904HL	Batten car		12 mm threaded stud. Purchase batten receptacle separately. Uses low-friction slider insert.

\*If receptacle is removed, do not mix base intermediate car with batten receptacle cars. See page 16.



**Switch/Track (Slug Mount)**

Part No.	Description	Comments
<b>HC8798</b>	Switch (short)	Length: 605 mm ( $23\frac{13}{16}$ "); 1 x switch; 2 x screw-pin endstops; 1 x flathead screw HFS320 (5 x 25 mm); 1 x upper stop H-42662
<b>HC8799</b>	Switch (long)	Length: 857 mm ( $33\frac{3}{4}$ "); 1 x switch; 2 x screw-pin endstops; 1 x flathead screw HFS320 (5 x 25 mm); 1 x upper stop H-42662
<b>HC8918, HC8919</b> <b>HC8921</b>	Switch mounting kit	<b>(a)</b> 3 x plastic locator screws HFS1170 (5 X 10 mm); <b>(b)</b> 3 x mounting slugs; <b>(c)</b> 1 x blue Loctite® adhesive; <b>(d)</b> 6 x flathead screws HFS862 (5 x 10 mm). Purchase 1 kit for each section of track.
<b>HC8800, HC8811</b>	Track	Length: 2051 mm ( $801\frac{3}{16}$ "); HC8800 hole spacing: 100 mm; HC8811 Hole Spacing: 50 mm; Note: HC8811—order additional slugs and screws for 50 mm hole spacing.
<b>HC9106, HC9107</b> <b>HC9108</b>	Track mounting kit	<b>(a)</b> 19 x mounting slugs 19 mm ( $\frac{3}{4}$ "); <b>(b)</b> 1 x splice slug 67 mm ( $2\frac{5}{8}$ "); <b>(c)</b> 2 x blue Loctite; <b>(d)</b> 21 x HFS1015 flathead screws (5 x 20 mm).
<b>HC9702, HC9703</b> <b>HC9704</b>	Extra slugs for HC8811	<b>(a)</b> 10 x mounting slugs 19 mm ( $\frac{3}{4}$ "); <b>(b)</b> 1 x splice slug 67 mm ( $2\frac{5}{8}$ "); <b>(c)</b> 1 x blue Loctite; <b>(d)</b> 10 x HFS1015 flathead screws (5 x 20 mm). *For sail headboard location at full hoist and when sail is reefed.

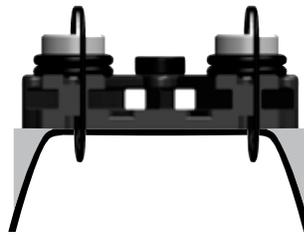
**Switch/Track (Drill and Tap)—Use for masts without grooves or when slugs will not fit**

Part No.	Description	Comments
<b>HC8230</b>	Splice link	Joins HC7827 track sections; purchase two (2) for each section of track
<b>HC10417</b>	Switch	Length: 857 mm ( $33\frac{3}{4}$ "); Switch may be shortened to 605 mm ( $23\frac{13}{16}$ "); 1 x switch; 2 x screw pin endstops; 1 x upper stop H-42662
<b>HC7827</b>	Drill/tap track	Length: 3000 mm ( $118\frac{1}{8}$ "); hole spacing: 100 mm; purchase stainless steel #10 (5 mm) screws separately (quantity 13.333 fasteners/meter of track). Do not use open-backed HC8800 or HC8811 track (requires mounting slugs). See page 12 for drill/tap sizes and mounting instructions.
<b>HC9597</b>	Drill/tap track	Length: 2000 mm ( $78\frac{3}{4}$ "); hole spacing: 50 mm; purchase stainless steel #10 (5 mm) screws separately (quantity 13.333 fasteners/meter of track). Do not use open-backed HC8800 or HC8811 track (requires mounting slugs). See page 12 for drill/tap sizes and mounting instructions.

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**Sizing**

Note width and shape of switch and build a platform on mast to mount.



**Sizing**

Make sure you have the correct size Battcar system for your boat.

System	Maximum sail area		Part No. Headboard car	Part No. Batten car	Part No. Intermediate car
	Monohull	Multihull			
18 mm	41 m <sup>2</sup> (450 ft <sup>2</sup> )	30 m <sup>2</sup> (325 ft <sup>2</sup> )	HC7906	HC8537	HC7905
18 mm HL	56 m <sup>2</sup> (600 ft <sup>2</sup> )	46 m <sup>2</sup> (500 ft <sup>2</sup> )	HC7906HL	HC8537HL, HC7904HL	HC7905HL

**Track Length and Switch Height Considerations**

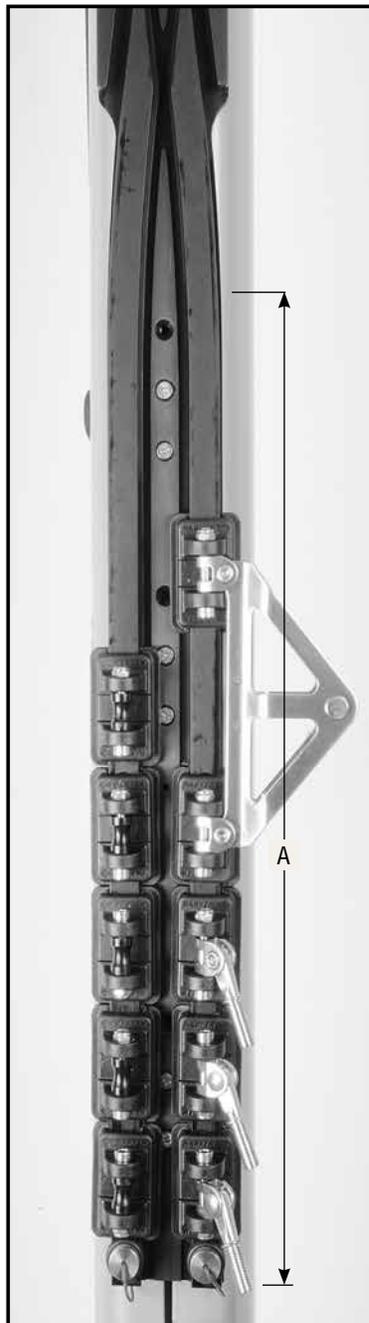
Switch height is determined by the number of cars required for system and the length of the storage track.

**Note:** Cars will not pass each other if top of car is higher than “A” distance. See chart below.

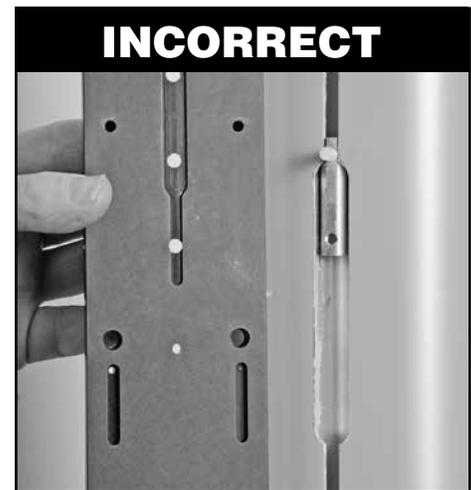
Switch	A	
	mm	in
HC8798 HC8218	286	11¼
HC8799 HC8219	540	21¼



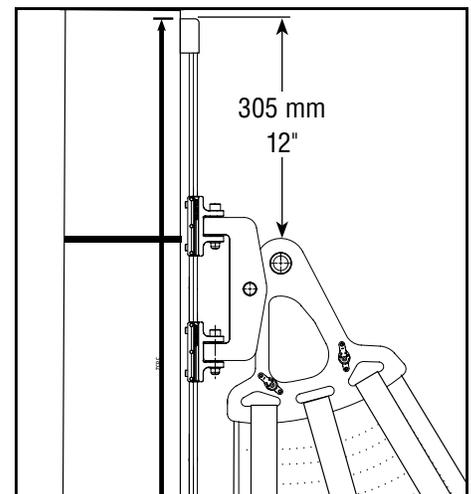
Cars can pass each other if not higher than “A”.



Allow 63 mm (2½”) below track to remove car.

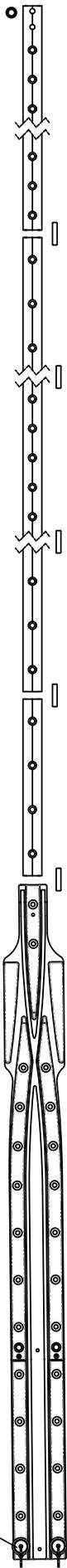


Locate switch so feeder gap does not interfere with mounting slugs.



Make sure track is longer than sail luff to allow for stretch as sail ages. Track must not block halyard exit.

Layout system using charts to plan track location and lengths.



A	<b>Top track—variable-length</b>		
	Length		Hole Spacing
	mm	in	mm
			75

Total Track Length \_\_\_\_\_  
 - SUM \_\_\_\_\_  
 Top Track Length A \_\_\_\_\_

\_\_\_\_\_ X  $\frac{1}{\text{Quantity}}$  = \_\_\_\_\_  
 Length

B	<b>Standard track—slug-mount</b>		
	Length		Hole Spacing
	mm	in	mm
	2051	$80^{13/16}$	100
	<b>Standard track—drill and tap</b>		
	Length		Hole Spacing
3000	$118^{1/8}$	75	

+

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 Length Quantity

C	<b>High-load track—slug-mount</b>		
	Length		Hole Spacing
	mm	in	mm
	2051	$80^{13/16}$	50
	Place in reefed headboard areas on larger boats.		
	<b>High-load track—drill and tap</b>		
2000	$78^{3/4}$	50	

+

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 Length Quantity

D	<b>Switch—slug-mount</b>		
	Length		—
	mm	in	—
	605	$23^{13/16}$	—
	857	$33^{3/4}$	—
	<b>Switch—drill and tap</b>		
	Length		—
	mm	in	—
	605	$23^{13/16}$	—
	857	$33^{3/4}$	—
Short drill and tap switch is created by shortening switch.			

+

\_\_\_\_\_ X \_\_\_\_\_ = \_\_\_\_\_  
 Length Quantity

+

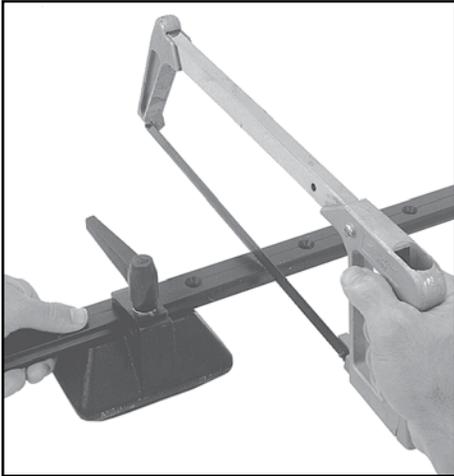
$\frac{1}{\text{Quantity}}$  = \_\_\_\_\_

SUM

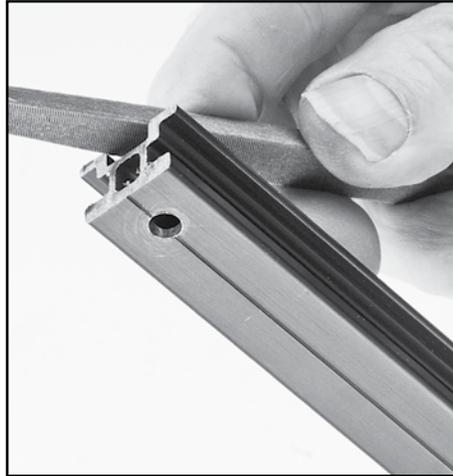
Enter SUM above to calculate Top Track Length.

## Assembly—Slug-Mount

## Cut Top Track to Length

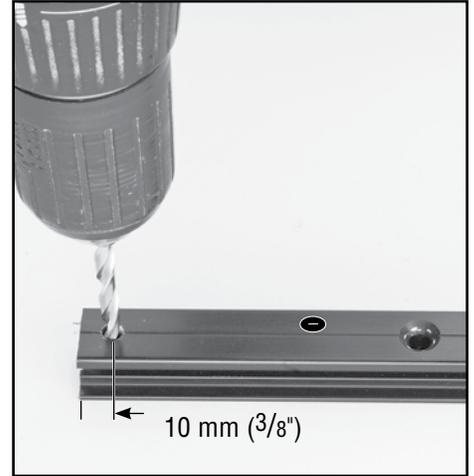


Cut variable length top track.



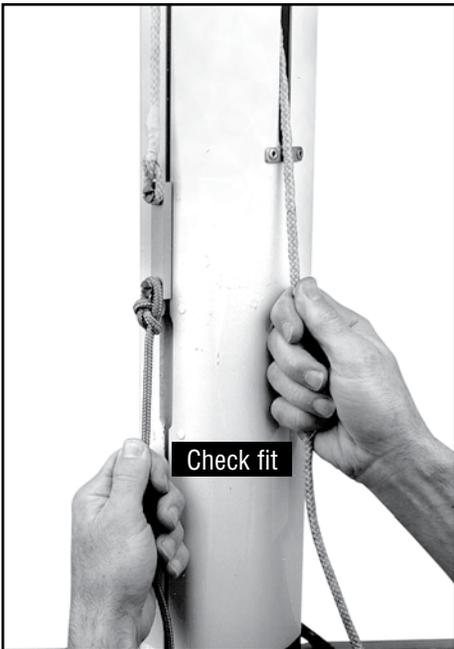
Deburr cut.

Slightly round track corners that will slide against mast.



Drill 5.5 mm ( $7/32$ " ) hole in cut end of track for endstop.

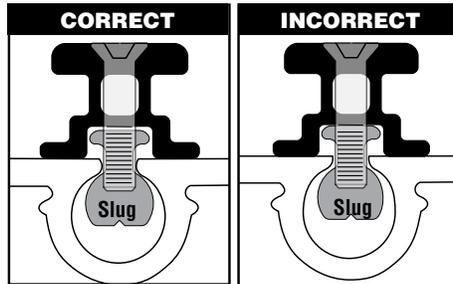
## Check Fit of Mounting Slugs and Car



67 mm ( $2\frac{5}{8}$ " ) splice slug must fit feeder opening. File opening to make longer.

Use halyard with retrieval line to run 67 mm ( $2\frac{5}{8}$ " ) splice slug up mast to check for burrs in groove.

Mast prebend: Might require straightening before installation.

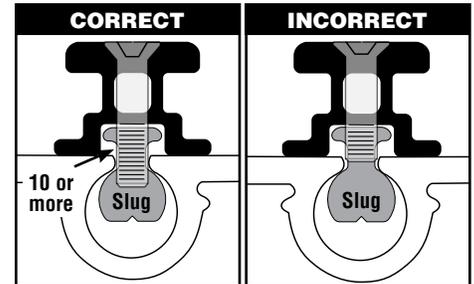


Will Tighten

Will Not Tighten

**Test track:** Put mounting slug in groove, track section on mast. Tighten with screw. Make sure track will tighten to mast before slug contacts track underside.

Mounting screw must be long enough for mast groove. If necessary, purchase longer screws.



**Warning!** Some masts might not allow enough screw engagement into slug. Screws need a minimum of 10 threads (turns) engaged to hold track to mast.

**Turn screw 360° at least 10 times after threads engage slug.**

## Clear of Trysail Track?

Cars must clear storm trysail track. Tracks often converge above spreaders.

Aft face of mast must be flat or convex.

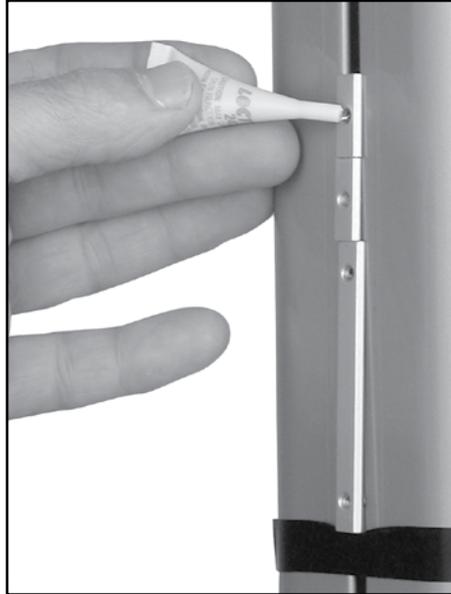




Slip top track slugs into mast groove. Use 32 mm (3/4") mounting slug for top stop.

**Mast-up:** Tape top stop slug even with top of upper track. Tape other slugs in place.

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One drop blue Loctite® adhesive into each splice slug hole.



Thread 5 mm x 25 mm endstop screw through endstop, track, and into slug.

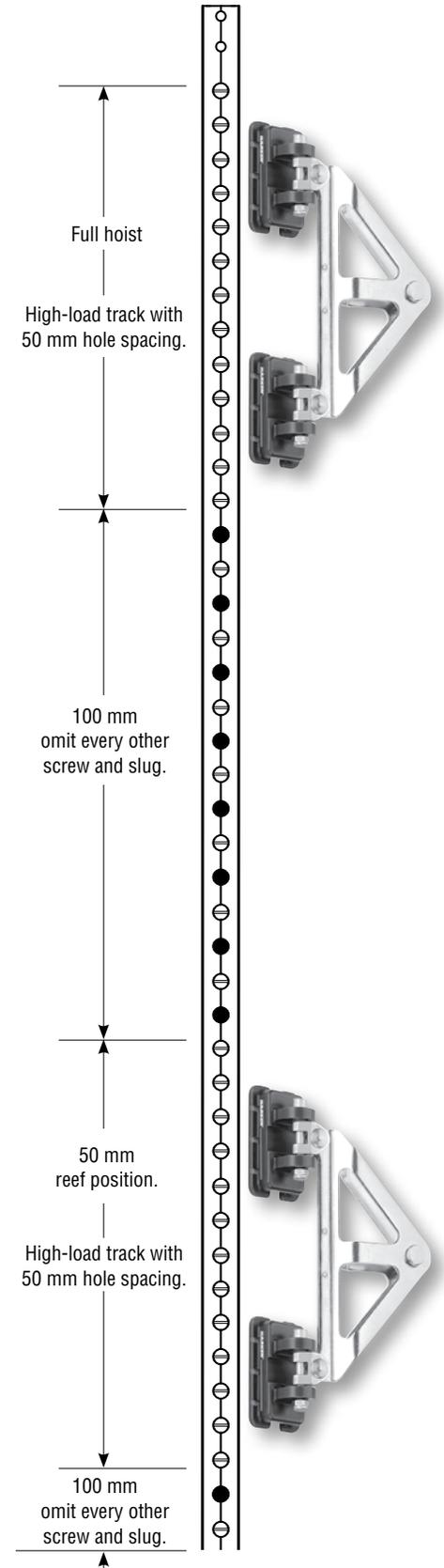
**Mast-up:** Remove tape. Tighten screw to hold track.



Slide slugs into place with putty knife. Loosely install 5 mm x 20 mm screws.

**Tip: Use putty knife to see if screws are loose enough to slide in groove. Remember: Tracks may stick when reaching a spliced area on mast.**

**Note:** When using HC8811 track, put slugs at 50 mm intervals at sail headboard location at full hoist and when sail is reefed. Otherwise skip holes so slugs are at 100 mm hole spacing.





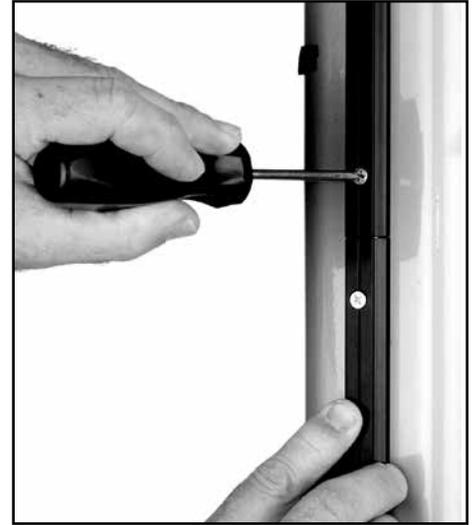
Hold full-length track piece up to mast. Loosely install top screw.

Use putty knife to slide additional slugs and splice slug into place. Loosely install all nineteen 5 mm x 20 mm screws.



Slide tracks up enough to fit next track.

**Mast-up:** Hold upper tracks. Loosen screw that holds tracks. Slide track up. If screws bind in mast groove opening, loosen them until track slides. Tighten new bottom screw securely.



Repeat until full-length tracks installed.

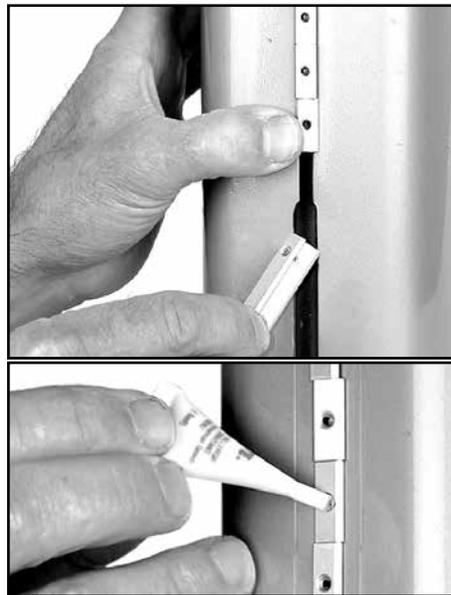


**CAUTION!** Do not let tracks drop. Severe injury to hands and/or fingers can result.



Loosen top screw. Slide top track up and position next 2.05 m (6'8 7/8") track.

**Mast-up:** Tighten bottom screw to hold track.



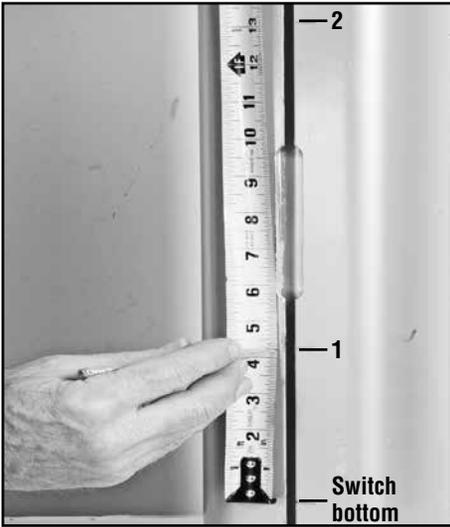
Slide 19 mounting slugs and splice slug into mast groove.

**Mast-up:** Tape in place.

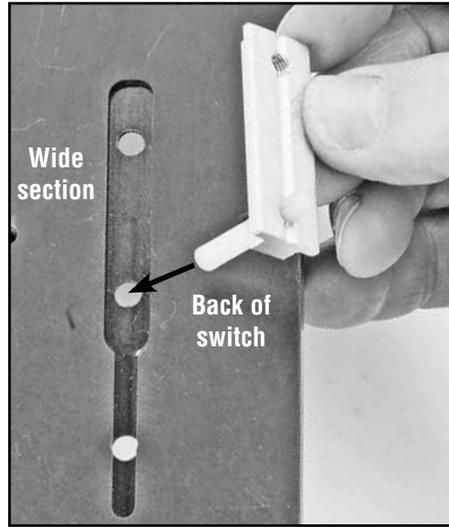
One drop blue Loctite® adhesive into each hole.



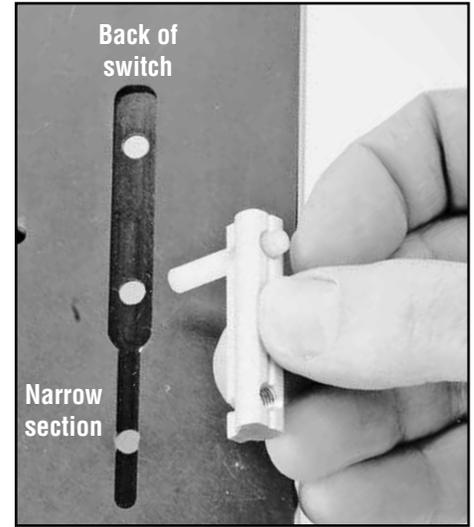
Hold switch in place and make sure there is 64 mm (2 1/2") below for loading cars.



Note location of bottom of switch and storage tracks on mast. Refer to chart below and put marks on mast at two (2) or three (3) locations as shown. Make sure slug is not located at feeder gap. See page 6.



**Flat slug:** Load slug into mast so plastic locator screw is at bottom. Slug will fasten in “wide section” of slot.



**Round slug:** Load slug into mast so plastic locator screw is at top. Slug will fasten in “narrow section” of slot.

Part No.	Switch length	1		2		3	
		mm	in	mm	in	mm	in
HC8798	603 mm (23 <sup>3</sup> / <sub>4</sub> )	79	3 <sup>1</sup> / <sub>8</sub>	219	8 <sup>5</sup> / <sub>8</sub>	—	—
HC8799	857 mm (33 <sup>3</sup> / <sub>4</sub> )	108	4 <sup>3</sup> / <sub>4</sub>	335	13 <sup>3</sup> / <sub>16</sub>	475	18 <sup>11</sup> / <sub>16</sub>



Load slugs.



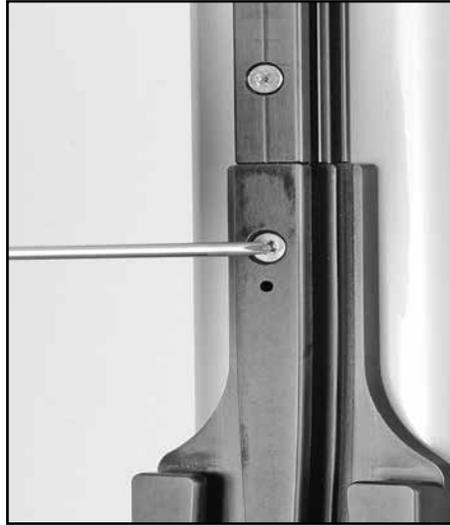
Tighten screw so slug stays in place at location from chart above.



Check fit (round slug shown).



Install switch over slugs so plastic locator screw is through center hole.



Install connector screw using blue Loctite® adhesive on screw. If necessary loosen plastic locator screws.



Install screw in open slug hole using blue Loctite adhesive.

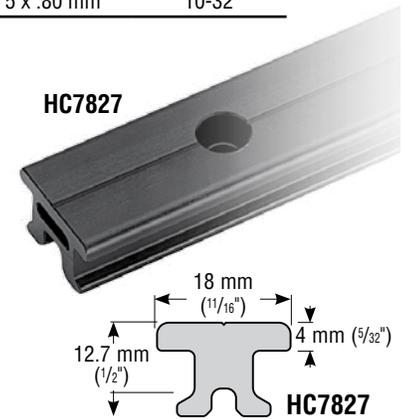
Round slug will go below/flat slug above.



Remove plastic locator screw and replace with mounting screw. Use blue Loctite adhesive.

Part No.	Comments
<b>Track</b>	
HC7827	Length: 3000 mm (118 <sup>1</sup> / <sub>8</sub> " ) Determine track length. See page 6. Do not use HC8800 or HC8811 for drill and tap.
<b>Track Fasteners</b>	
—	#10 (5 mm) flathead screws (not included); 13 <sup>1</sup> / <sub>3</sub> fasteners/meter of track.
HC8230	Splice links. Order one per section of track.
<b>Switch</b>	
HC8218	Length: 605 mm (23 <sup>13</sup> / <sub>16</sub> " )
HC8219	Switch: 605 mm (23 <sup>13</sup> / <sub>16</sub> " ) and storage track: 252 mm (9 <sup>15</sup> / <sub>16</sub> " ). Includes two screw-pin endstops and one upper stop.

	Drill and Tap Sizes	
	mm	in
<b>Drill</b>	4.2 mm	5/32
<b>Tap</b>	5 x .80 mm	10-32



## Removing Old Track

**Track on mast:** Before removing, scribe pencil line down either side of track.

**Track off mast:** Attach string to mast to line up track during installation.

## Mount Track to Carbon Mast

Consult with mast builder. Use suitable reinforcing plates when fastening track to carbon spars.

## General Instructions

When mounting tracks, work using a straight edge reference line along mast. Do not let tracks vary from this line. Tape track in place and center punch hole at bottom using a transfer punch.

**Tip: Use low-speed drill with tap for cutting threads.**

**IMPORTANT!** Use blue Loctite® adhesive instead of oil to lubricate tap.

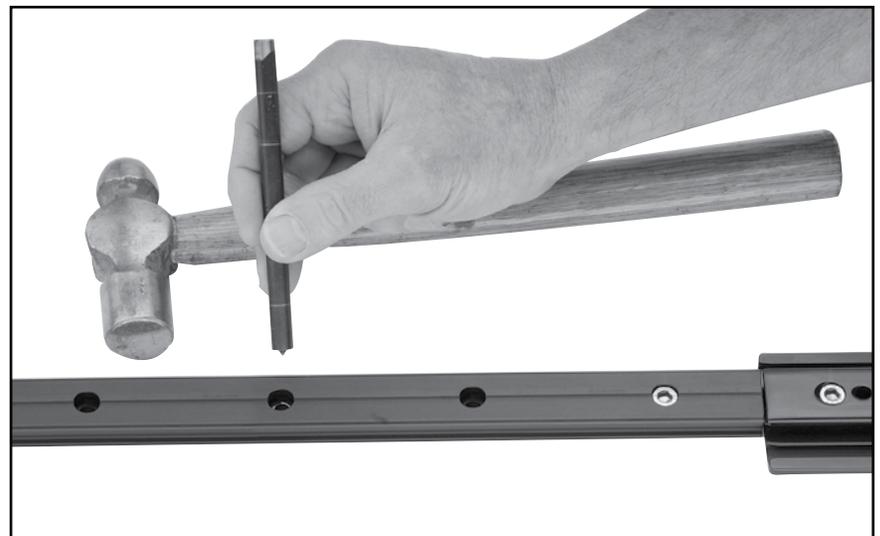
Drill and tap single hole. Fasten track using this single screw and align side-to-side correctly. Use tape to hold in place.

Move up several holes and use transfer punch to mark a second hole. Remove track. Drill and tap hole.

Fasten track using two screws. Mark all remaining holes using punch. Remove track. Drill and tap all holes. Before installing track make sure upper end has splice piece inserted.

Use threadlocker or epoxy to secure screw.

Specific instructions follow.



Insert splice link into switch track.  
Using a plastic hammer, tap link into place.



Carefully align track and tape in place.  
Use a transfer punch to mark a single hole.

Remove track. Drill and tap. Fasten with  
single screw, no adhesive.

Realign track and mark a second hole using  
transfer punch. Screw to mast using two  
screws, no adhesive.

Mark remaining holes using transfer punch.  
Remove track. Drill and tap remaining holes.

Mount switch to mast using threadlocker  
or epoxy on screws as required.



**HC10417 only**

If shortening is required, use lines scribed on switch track to indicate cut line. Make sure you add 254 mm (10") to the upper track length. Before mounting track, move endstops and tether to new locations.

**Tip: Move one at a time so you can see how the line is run through the deadend hole.**



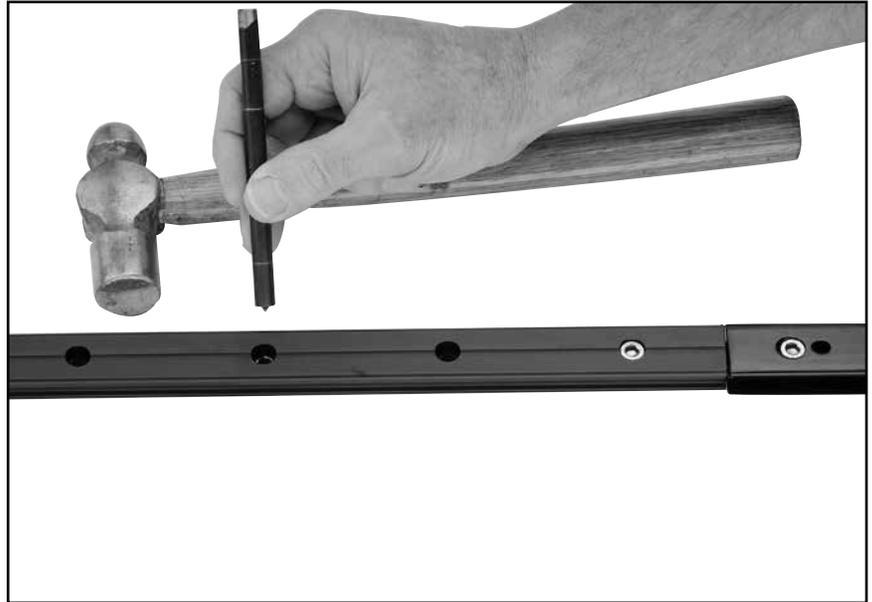
Carefully align track. Use transfer punch to mark holes. Drill, tap, and mount as directed above.

**Important! Do not use epoxy or threadlocker on screws because gate track is removed for loading cars.**



With track off mast, tap upper splice link into track using procedures outlined above.

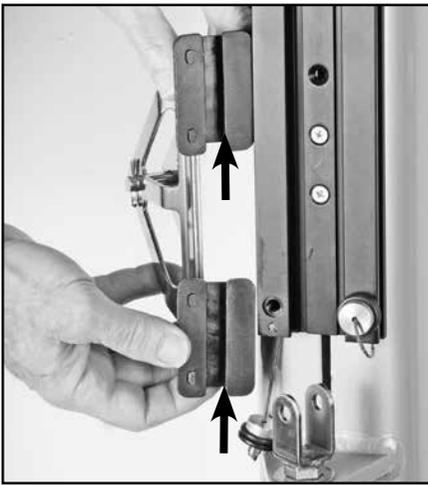
Follow general instructions (page 15) for drilling and taping a single hole. Always make sure tracks are aligned.



**Install Top Stop**

Use H-42662 as top stop.





**Lubricate cars onshore before loading.**

Before bringing headboard assembly or cars onboard boat, spray underbody track slot (see arrows above) with a light coating of McLube® Sailkote™ adhesive.



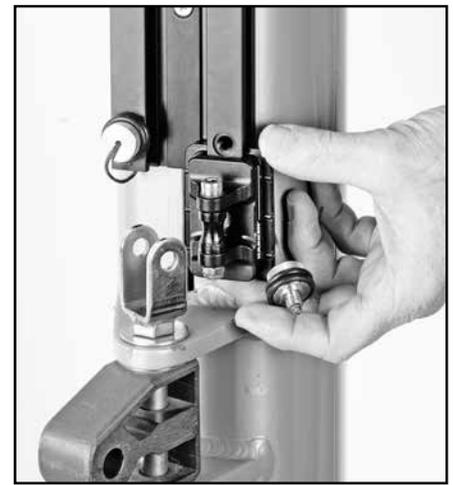
**WARNING! Overspray from McLube will cause slippery decks which can result in loss of footing. Cover decks or spray cars off boat.**



**Loading headboard assembly.**

Note location of guide pegs on the feet of cars. Guide pegs must be on same side. Also cars must be loaded so pegs are on inside of switch. Plain foot will be on outside. If loading on left, plain foot must be on left. If loading on right, plain foot must be on right.

**Tip: To load headboard car assembly, angle headboard. Roll car onto tracks. If necessary, remove headboard assembly.**



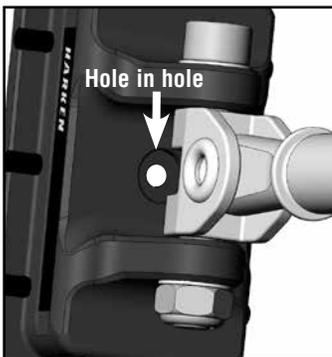
**Loading cars.**

Pegs on foot of car guide it to correct side. Pegs must be on inside.

**Tip: Load cars on right track – plain foot on right; left track – plain foot on left.**

**IMPORTANT! When all cars are aluminum, do not mix intermediate cars with other cars. See below.**

**Batten/headboard car with low friction slider.**

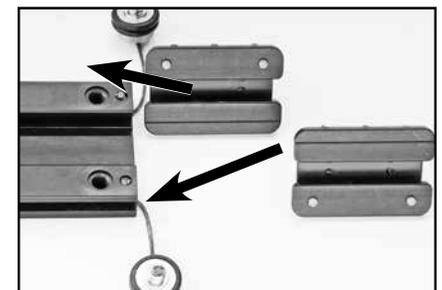


**Intermediate car with Delrin® slider.**



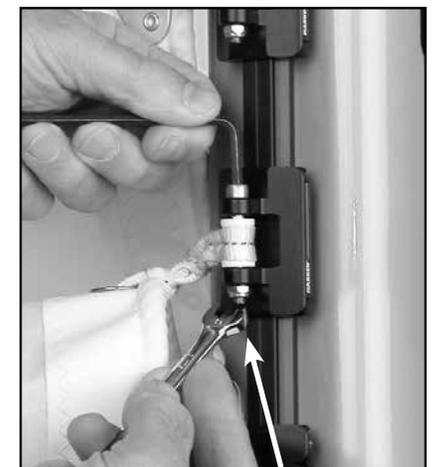
If cars are off track and sail attaching hardware removed, do not mix intermediate base cars with batten or headboard base cars. All cars have center hole in aluminum car. Low friction sliders have a hole in the plastic visible from below and from hole in aluminum car.

Part No.	Description	Slider Material	Hole in Plastic Slider
HC7904HL	12 mm batten car	Low friction	Yes
HC8537HL	10 mm batten car	Low friction	Yes
HC7906HL	Headboard cars	Low friction	Yes
HC7905YHL	Intermediate car	Delrin	No



**Attaching sail**

**Important:** Tighten until screw is even with plastic insert in nut. Do not overtighten. Car will bind and can warp permanently.

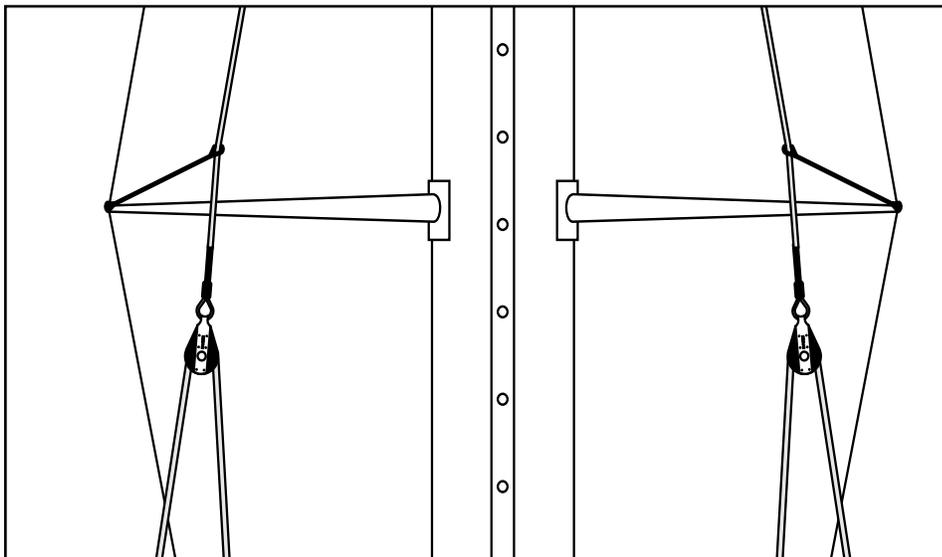


If screw extends below nut, it is overtightened.

McLube is a registered trademark of McGee Industries, Inc. Sailkote is a trademark of McLube, a division of McGee Industries. Delrin is a registered trademark of E. I. du Pont de Nemours and Company or its affiliates.

Use shockcord to hold Lazy Jacks open so Battcars and battens will not catch on them. This will also help stop slapping of Lazy Jacks on sail.

Attach one end to lower spreader tips and other to Lazy Jacks. Make sure shockcord is long enough so boom can swing all the way out without damaging spreaders.



## Operation

## Raising Sail

When raising, lowering, or reefing sail, make sure sail is not loaded and cars pass easily through switch. Watch sail and cars carefully. Stop hoisting immediately if any binding is detected.

### Possible sources of binding:

Cars bind at switch.

Reef line binds on fingers.

Reef line binds between car and switch.

Headboard binds on Lazy Jacks.

Correct the binding problem or luff sail before resuming hoist. If forced, the fingers that extend into switch may be damaged, requiring expensive switch and car replacement. Lazy Jacks may also be damaged.

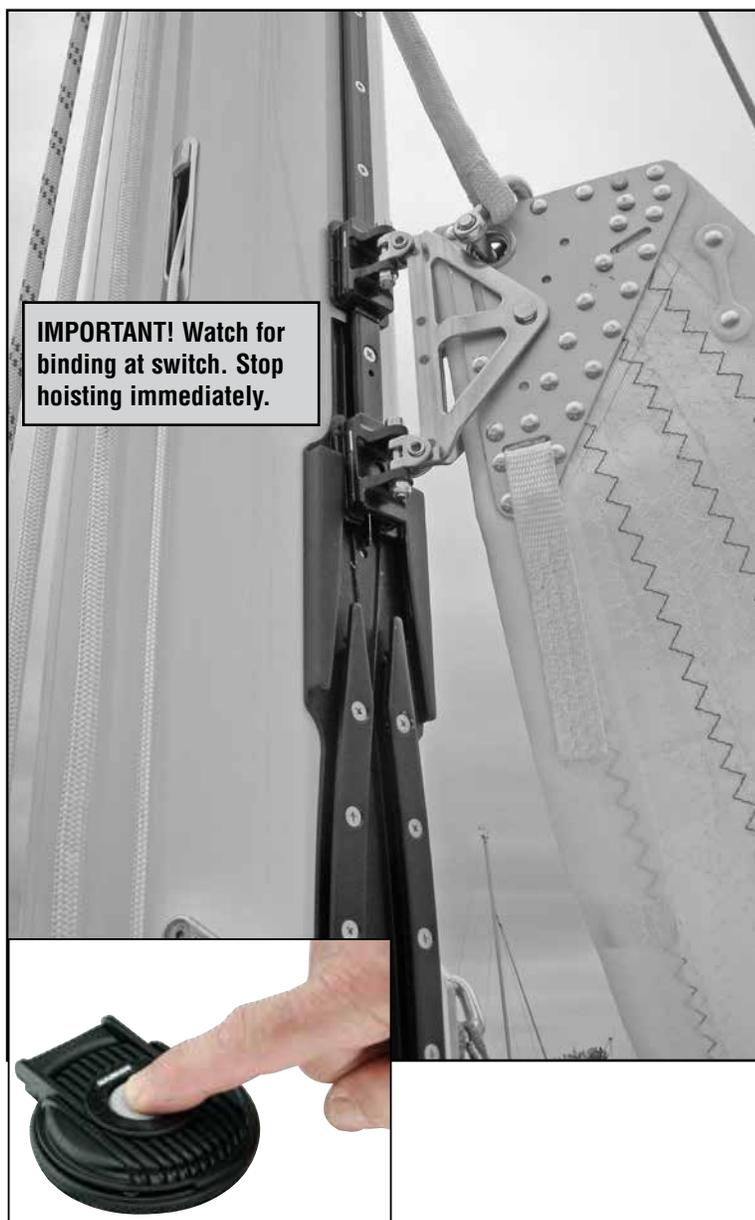
**Important! When using an electric halyard winch, be especially vigilant when raising sail. Luff sail. Watch for any binding or jamming at the switch. Stop hoist immediately if any occurs.**

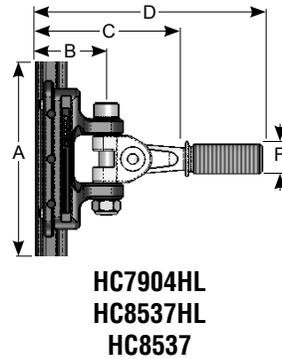
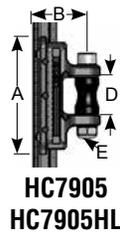
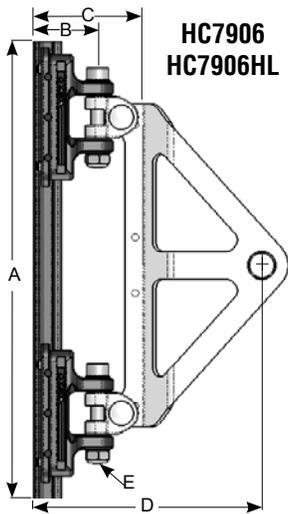
**If winch operator does not have a good view of switch cars, station a crew member with a good view and communication to operator.**

**Crew member must be able to communicate problems to the winch operator immediately.**

**If there is a jam, damage to switch and cars will occur very quickly resulting in expensive repairs unless hoisting is stopped.**

**Important! Make sure reef outhaul loads are not applied to cars when in switch. Damage to switch and cars will occur, resulting in expensive repairs.**





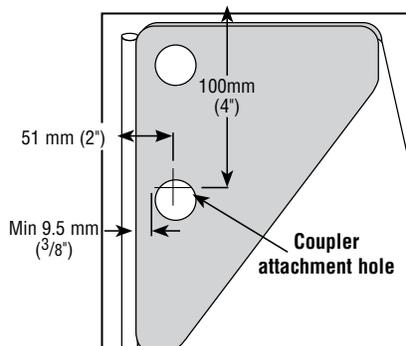
**Dimensions (measured from aft face of mast)**

Mounted on slug mount track												
Part No.	Description	A		B		C boltrope setback		D		E pin Ø	F stud Ø	
		in	mm	in	mm	in	mm	in	mm			
HC7906	Headboard car	7 <sup>13</sup> / <sub>16</sub>	198	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	4 <sup>3</sup> / <sub>16</sub>	106	6	—	
HC7905	Intermediate car	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>3</sup> / <sub>4</sub>	19	6	—	
HC8537	Batten car (10 mm stud)	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>9</sup> / <sub>16</sub>	90	6	10	
HC7906HL	Headboard car	7 <sup>13</sup> / <sub>16</sub>	198	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	4 <sup>3</sup> / <sub>16</sub>	106	6	—	
HC7905HL	Intermediate car	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>3</sup> / <sub>4</sub>	19	6	—	
HC7904HL	Batten car (12 mm stud)	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>3</sup> / <sub>4</sub>	95	6	12	
HC8537HL	Batten car (10 mm stud)	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>4</sub>	31	2 <sup>9</sup> / <sub>16</sub>	65	3 <sup>9</sup> / <sub>16</sub>	90	6	10	

Mounted on drill tap track												
Part No.	Description	A		B		C boltrope setback		D		E pin Ø	F stud Ø	
		in	mm	in	mm	in	mm	in	mm			
HC7906	Headboard car	7 <sup>13</sup> / <sub>16</sub>	198	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	4 <sup>1</sup> / <sub>16</sub>	103	6	—	
HC7905	Intermediate car	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	3 <sup>3</sup> / <sub>4</sub>	19	6	—	
HC8537	Batten car (10 mm stud)	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	3 <sup>7</sup> / <sub>16</sub>	88	6	10	
HC7906HL	Headboard car	7 <sup>13</sup> / <sub>16</sub>	198	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	4 <sup>1</sup> / <sub>16</sub>	103	6	—	
HC7905HL	Intermediate car	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	3 <sup>3</sup> / <sub>4</sub>	19	6	—	
HC7904HL	Batten car (12 mm stud)	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	3 <sup>5</sup> / <sub>8</sub>	92	6	12	
HC8537HL	Batten car (10 mm stud)	2 <sup>1</sup> / <sub>2</sub>	63	1 <sup>1</sup> / <sub>8</sub>	29	2 <sup>15</sup> / <sub>32</sub>	62	3 <sup>7</sup> / <sub>16</sub>	88	6	10	

**Installing Headboard Car Assembly**

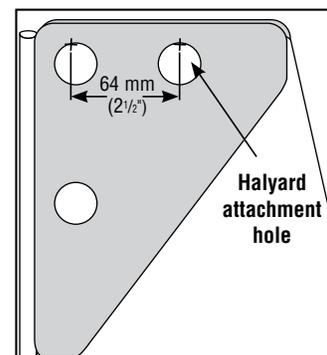
Headboard coupler attaches to standard headboards. Some headboard modification required. Maximum thickness of headboard plates and sail: 14 mm (9/16").



**Coupler attachment hole**

Drill 11 mm (7/16") coupler attachment hole so center is 101 mm (4") from top of headboard and 51 mm (2") from front edge of boltrope.

Leave at least 9 mm (3/8") between front of headboard plate and front edge of coupler attachment hole.



**Halyard attachment hole**

Use aft hole if headboard has two (2).

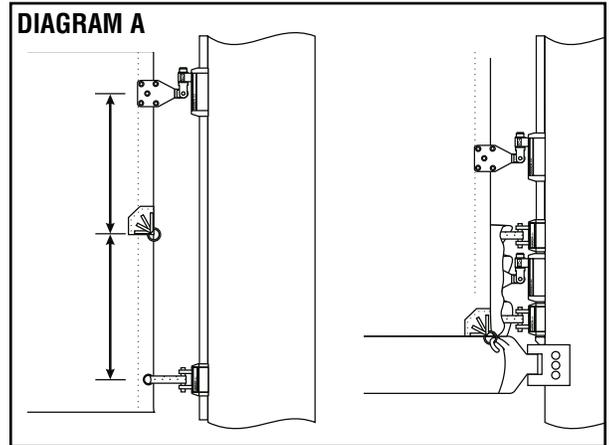
If not, drill second hole to accept halyard shackle pin. Locate hole approximately 64 mm (2 1/2") aft of existing hole.

**Distance Between Attachment Points**

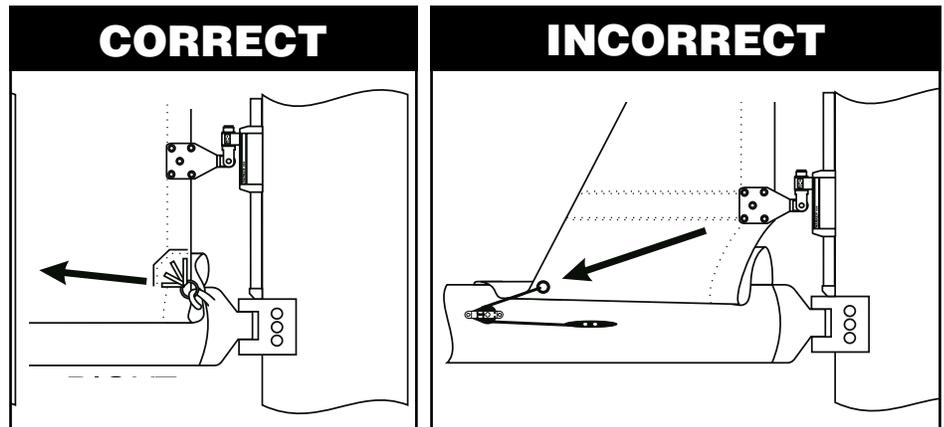
Battens and intermediate cars placed at sailmaker's discretion.  
 Maximum distance between attachment points is 1.2 m - 1.35 m (4' - 4'6").

Distance may be slightly greater. Contact Harken to discuss sail reshaping to eliminate luff flutter.

**Note:** Adding battens may reduce stack height by eliminating luff cars.



Loaded cars must not ride in this area while sailing.



**DIAGRAM B**

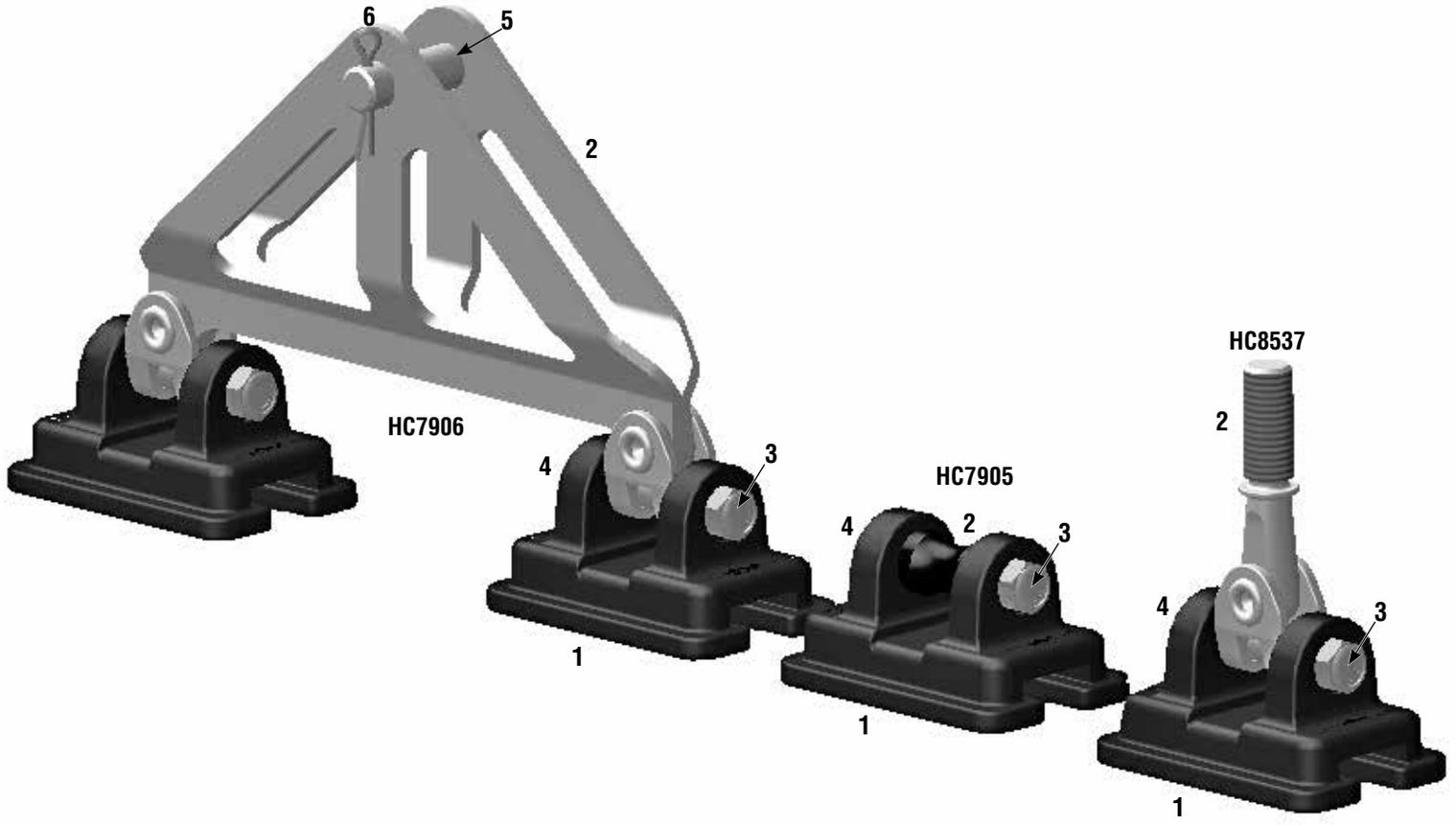
**Setting reef points**

Space reef points halfway between sail attachment points. Battens or reef points may need to be moved. Diagram A.

**Note:** Batten fittings and cars cannot handle reefing outhaul or downhaul loads. Transfer loads to a tack fitting. Diagram B.

**Important!** When setting up reef, make sure cars are not loaded when they are in the switch area. If reef outhaul loads are applied to switch, switch and cars will be damaged resulting in expensive repairs. Instruct operators not to raise or lower sails with high loads on cars while in the switch area. Harken is not responsible for damage to the switch area due to reef loads, or for raising or lowering a sail when the sail is loaded.

# Replacement Parts



### HC7906

	Part No.	Qty	Description
1	H-40882	2	Car
2	H-36184B	1	Headboard receptacle
3	HFS1059	2	Screw SHCS M6 x 40 mm*
4	HFS852	2	Nut M6 locking
5	H-24211A	1	Clevis pin
6	HFS181	1	Cotter pin

\*SHCS = Socket head cap screw.

### HC7905

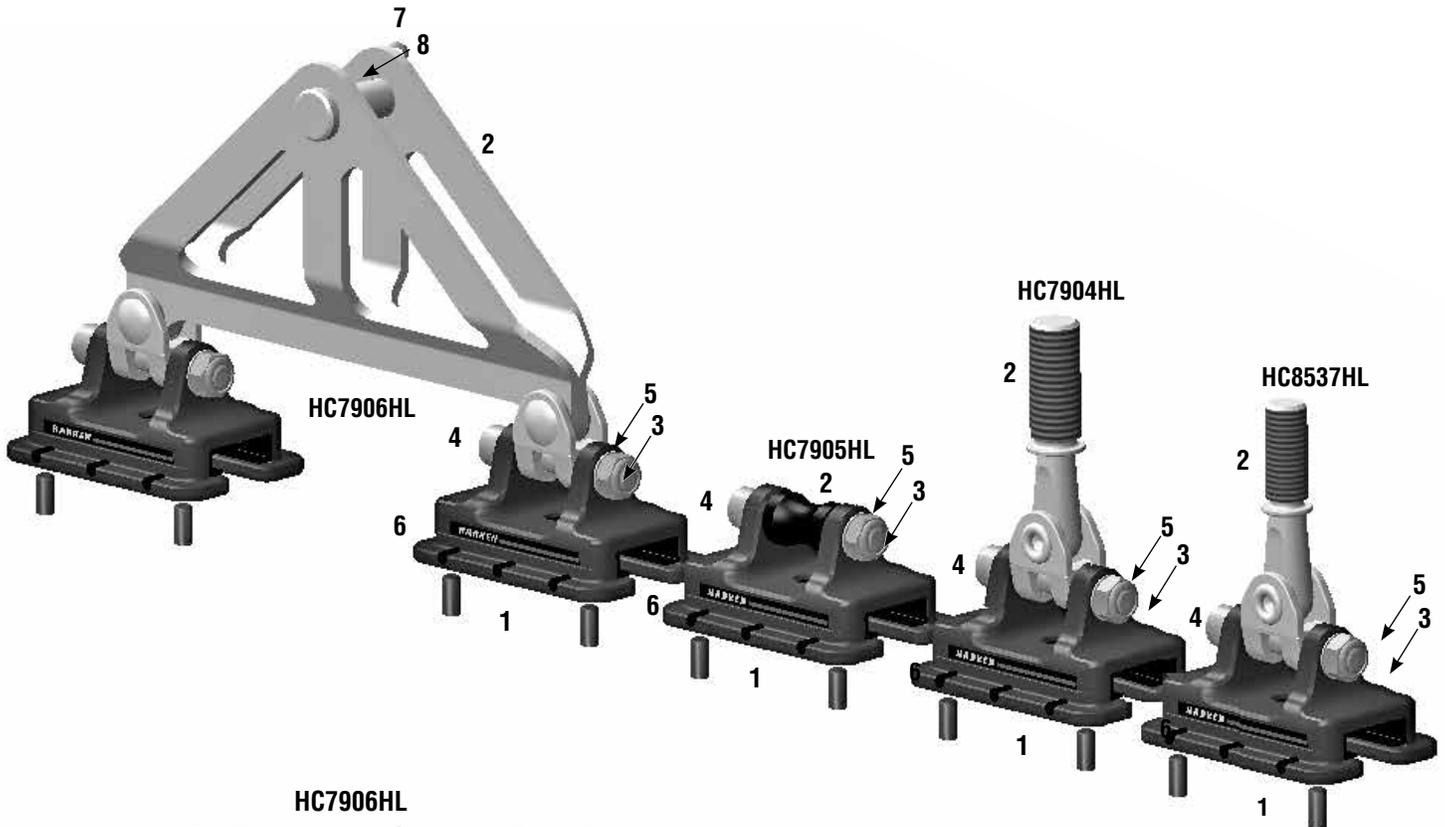
	Part No.	Qty	Description
1	H-40882	1	Car
2	MP-0708	1	Delrin® roller
3	HFS1059	1	Screw SHCS M6 x 40 mm*
4	HFS852	1	Nut M6 locking

### HC8537

	Part No.	Qty	Description
1	H-40882	1	Car
2	H-36490A	1	Threaded stud
3	HFS1059	1	Screw SHCS M6 x 40 mm*
4	HFS852	1	Nut M6 locking

\*SHCS = Socket head cap screw.

## Replacement Parts



### HC7906HL

Part No.	Qty	Description
1	2	Car with guide pegs
2	1	Headboard receptacle
3	2	Screw SHCS M6 x 40 mm*
4	2	Nut M6 locking
5	4	Igus bushing
6	4	Harken label
7	1	Cotter pin $\frac{3}{8}$ x 1.1"
8	1	Clevis pin

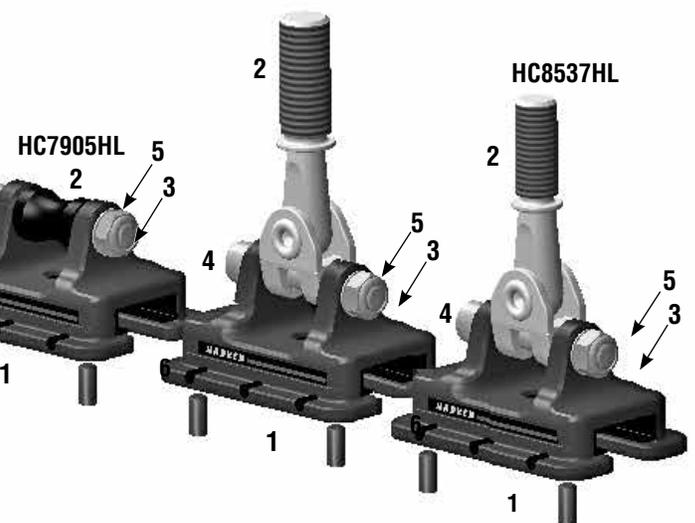
\*SHCS = Socket head cap screw.

### HC7905HL

Part No.	Qty	Description
1	1	Car w/guide pegs
2	1	Delrin <sup>®</sup> roller
3	1	Screw SHCS M6 x 40 mm*
4	1	Nut M6 locking
5	2	Igus bushing
6	2	Harken label

\*SHCS = Socket head cap screw.

### HC7904HL



### HC7904HL

Part No.	Qty	Description
1	1	Car with guide pegs
2	1	Threaded stud
3	1	Screw SHCS M6 x 40 mm*
4	1	Nut M6 locking
5	2	Igus bushing
6	2	Harken label

\*SHCS = Socket head cap screw.

### HC8537HL

Part No.	Qty	Description
1	1	Car with guide pegs
2	1	Threaded stud
3	1	Screw SHCS M6 x 4 mm*
4	1	Nut M6 locking
5	2	Igus bushing
6	2	Harken label

\*SHCS = Socket head cap screw.

Problem	Probable Cause	Solution
Tracks do not butt up against each other.	Cut end of top or bottom track at joint.	Make sure the anodized end is toward the full-length track.
	Track weight pulling tracks apart.	Tracks will come together when you loosen the bottom screw and push the tracks up the mast.
Mounting slugs do not fit.	Slugs wrong size.	Different size slug required. Contact your dealer.
Mounting screws will not tighten.	Incorrect mounting slug used.	Different size slug required. Contact your dealer.
Track will not slide up mast.	Slugs catching on mast splice.	Loosen screws slightly. If necessary have someone at splice area to wiggle the slug past the splice.
	Corners of cut track catching.	Use file to round off corners of track.
	Mast has too much prebend.	Ease backstay and/or straighten mast.
	Paint or other material clogging mast groove.	Clean out groove.
Sail headboard does not fit inside coupler.	Ring was not pressed far enough.	Take sail to sailmaker.

## Troubleshooting

Problem	Probable Cause	Solution
Cars bind.	Slider damaged or missing.	Check and/or replace slider.
	Too much friction.	Spray a small amount of McLube® Sailkote™ lubricant in underbody track slot of all cars. If possible spray cars off boat. If this is not possible, use a drop cloth to keep overspray off deck. McLube will cause slippery decks which can result in loss of footing (page 16).
	Stud threaded too tightly into receptacle.	Back off threaded stud two turns.
	Cap screws and nuts are overtightened on plastic cars.	Loosen nut until screw end is even with plastic in nut.
Can't raise sail, cars stop at switch.	Car loaded upside down. Pins in car on wrong side.	Remove car, flip it around and reload.
Nut on Battcar is not holding.	Locknut has been used too many times.	Get new 6 mm locknut.
Batten receptacle does not rotate.	Nuts are too tight.	Loosen nuts slightly.
Cars jam when raising sail.	Headboard or cars are catching on Lazy Jacks.	Use topping lift or rod vang and shockcord to pull Lazy Jacks out to shrouds.
Sail will not go all the way up.	Sail is too tall or sheave is too far forward.	Have sail shortened or move sheave aft.
Vertical post or pin on batten receptacle bending.	Reef loads are being transferred to batten receptacle.	Transfer reef downhaul and outhaul loads to mast or boom gooseneck.
Reef tack fitting will not reach reef hook.	Reef point too close to sail attachment.	Move intermediate car sail attachment.

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## Maintenance

Harken equipment is designed for minimal maintenance, but some maintenance is required for optimum and safest possible operation and to comply with the Harken limited warranty. In general, the most important aspect of maintenance is to keep your equipment clean by frequently flushing with fresh water. In corrosive atmospheres, stainless parts may show discoloration around holes, rivets, and screws. This is not serious and may be removed with a fine abrasive. With the exception of winches, do not use grease unless specifically recommended in the instruction sheet. Flush blocks thoroughly with fresh water. Periodically, disassemble the blocks and clean with detergent and fresh water. Lubrication is not required.

**IMPORTANT! Exposure to some teak cleaners and other caustic solutions can result in discoloration of part and is not covered under the Harken warranty.**

## Warranty

For additional safety, maintenance, and warranty information: [www.harken.com/manuals](http://www.harken.com/manuals) or the Harken catalog.

# Ultimate Sail Control

## HOW CAN I REDUCE HEEL AND GET BETTER CONTROL WITH A REEFED SAIL?

Harken MKIV roller reefing and furling units solve the inefficient shape of reefed sails with independent head and tack swivels. The independent swivels allow the middle to furl first, flattening the sail and reducing heel.



## FURLING Q&A

TOP 25 FURLING Q&A:  
[www.harken.com/usa](http://www.harken.com/usa)

## WITH HARKEN MKIV JIB REEFING AND FURLING

### Easy Shorthanded Cruising

Instead of changing sails, simply furl or unfurl to suit the conditions.

### Safe and Convenient

The ability to reef makes it easy to reduce speed and gain visibility off the bow—all from the safety of your cockpit.

Small outer drums fit on narrow bows

9 rows of ball bearings cut friction and evenly distribute the load

Large inner spool diameter increases pulling power

Bob Grieser Photo

# FURLING

### TECH TIP #4

You can have total sail shape and reefing control from your cockpit by adding ball bearing genoa lead cars to your low-friction Harken furling system.



**HARKEN**<sup>®</sup>  
INNOVATIVE SAILING SOLUTIONS

Our Tech Service Team is ready to answer your furling questions. Call 262-691-3320 or email [harken@harken.com](mailto:harken@harken.com)

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