

HARKEN®

BATTCAR INSTALLATION MANUAL

System C CB

Installation Manual – Intended for specialized personnel or expert users

4637 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: www.harken.com/manuals for updated versions.

PLEASE SAVE THESE INSTRUCTIONS

Introduction

This manual gives technical information on installation and service. This information is **written exclusively** for specialized personnel or expert users. Installation, disassembling, and reassembling by personnel who are not experts can cause serious damage to property, or injury to users and 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 in www.harken.com/manuals.

Purpose

Harken Battcars are designed to reduce the size of, or 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.

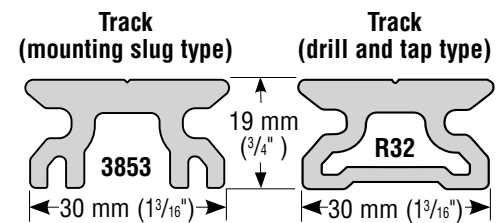
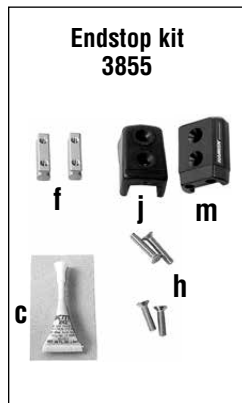
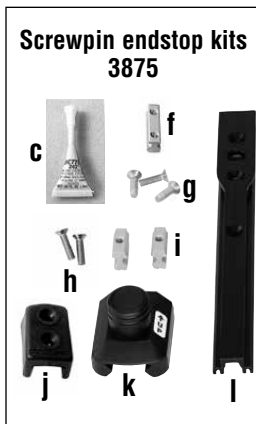
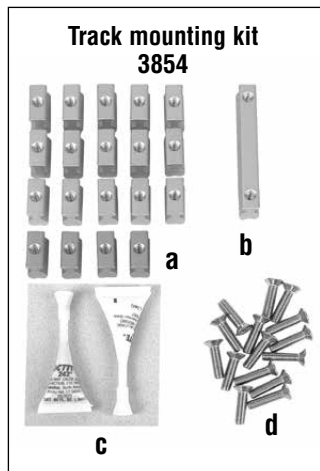
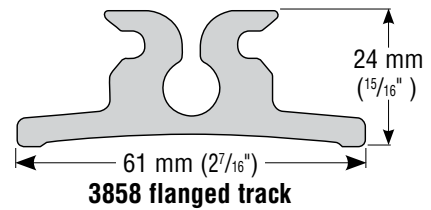


WARNING!

Strictly follow all instructions to avoid potential hazards that can kill or hurt you and others: www.harken.com/manuals for general warnings and instructions.

Thank you for purchasing Harken's C Battcar system. Please read manual *before* assembling system.

Headboard cars (assembly)



Parts

Part No.	Description	Comments
3867	Headboard cars	3867 must use 3876 or 3877 headboard.
3871	Intermediate cars	Consult sailmaker for quantity required.
3868	Batten car	12 mm threaded stud. Purchase batten receptacle separately.
3869	Batten car	14 mm threaded stud. Purchase batten receptacle separately.
3870	Batten car	16 mm threaded stud. Purchase batten receptacle separately.
3872	Universal Battcar	Purchase batten receptacle and threaded stud separately.
3873	Reef tack car	Double up track screws at reefed car position.
3876	Standard web-on headboard	See sailmaker instructions, page 12 - 13.
3877	Square-top web-on headboard	See sailmaker instructions, page 12 - 13.



1. Tape measure
2. Tape
3. Power drill (screwdriver)
4. Drill bit -8.5mm (21/64")
5. Phillips screwdriver
6. Hammer
7. Hacksaw
8. Center punch
9. File
10. Putty knife
11. Welders clamp

Mast-up installation: Stepladder secured to the boat.
Work height: 2.13 m (7') above boom

Track and Accessories

Part No.	Description	Includes
3854	Track mounting	(a) 19 mounting slugs 25 mm (1"); (b) 1 connector slug 105 mm (4 1/8"); (c) 2 tubes blue Loctite® adhesive; (d) 21 HFS319 flathead screws 8 x 25 mm.
3875	Pinstop end kit	(c) 1 tube blue Loctite; (f) 1 top stop slug 51 mm (2"); (g) 4 HFS319 flathead screws 8 x 25 mm; (h) 2 HFS323 flathead screws 8 x 40 mm; (i) 2 mounting slugs 25 mm (1"); (j) 1 top endstop 548A; (k) pinstop; (l) 1 end track.
3855	Endstop kit	(c) 1 tube blue Loctite; (f) 2 stop slugs 51 mm (2"); (h) 4 HFS323 flathead screws 8 x 40 mm; (j) 1 endstop 548A; (m) 1 HBB185 high-load endstop.
3853	Track (slug type)	Section length: 2.08 m (6'9 15/16"). Number of track sections depends on luff length of mainsail.
R32	Track (drill and tap type)	Use for masts without grooves or when slugs will not fit. Purchase stainless steel 10 mm or 3/8" screws separately. 3853 track requires mounting slugs. See page 8 for drill/tap sizes and mounting instructions.

Sizing

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

Maximum sail area Monohull	Maximum sail area Multihull	Part No. Headboard cars	Part No. Battcars	Part No. Intermediate cars
139 m ² 1500 ft ²	116 m ² 1250 ft ²	3867	3868, 3869, 3870	3871

Sail Modifications (See page 12)

Headboard

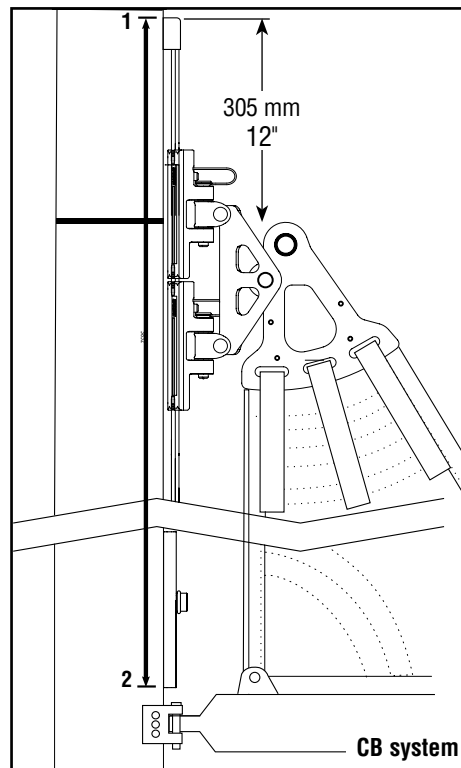
Web-on headboard.

Batten receptacle on sail to accept 12, 14 or 16 mm threaded stud. **Note:** Harken does not supply receptacle.

Becket spacer on sail for 3871 intermediate cars.

CB/Slider Systems

Track Length



Number of Track Sections

Bottom 432 mm (17") endstop track and variable length top track included. Extra track may be required if using 3855 endstop kit.

Track Length	Number of 2.08 m (6'9 15/16") Track Sections
17.120 m to 19.152 m 56'2" to 62'10"	9
19.202 m to 21.234 m 63'0" to 69'8"	10
21.285 m to 23.317 m 69'10" to 76'6"	11
23.368 m to 25.400 m 76'8" to 83'4"	12
25.451 m to 27.483 m 83'6" to 90'2"	13
27.534 m to 29.566 m 90'4" to 97'0"	14

Determine Track Length

Measure track length from point 1 to point 2. See diagram at left. Use this measurement in two charts to follow.

1. Upper end— 305 mm (12") above black band. Track is longer than sail luff length to allow for stretch as sail ages. Track *must not* block halyard exit.

2. Lower end, using 3875—Bottom of track will be approximately 13 mm (1/2") above gooseneck fitting. When installed, track should be as low as possible yet you should still be able to install long headboard cars. Test measurement by using long headboard car. See photo above.

3855, 3851 endstop kit—Cut a 432 mm (17") piece from finished end of one of the 2.08 m (6'9 15/16") 3853 tracks. You will remove this track when loading cars so it can be lower on mast. **See page 8, step 11.** Drill lower hole for stop. **See page 6, step 3.**

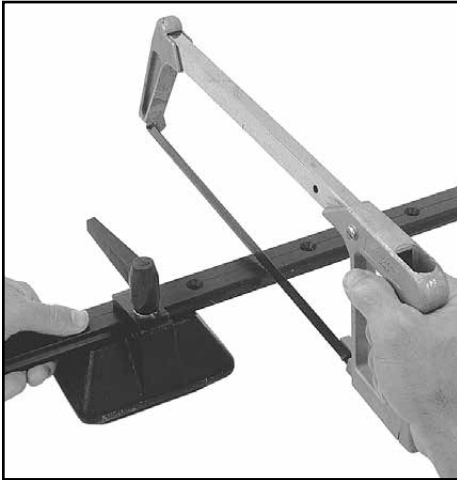
Round track length to nearest 25 mm (1").

Note: Chart is based on using a 3853 tack—length 2.08 m (81⁵/₁₆") and a 432 mm (17") 3875 pinstop end track. Chart will also work with 432 mm (17") piece cut from 3853 or 3154 track for use with 3855 stop.

56'-2"	17.120 m	63'-0"	19.202 m	69'-10"	21.285 m	76'-8"	23.368 m	83'-6"	25.451	90'-4"	27.534	2 1/8"	54 mm
56'-3"	17.145 m	63'-1"	19.228 m	68'-11"	21.006 m	76'-9"	23.393 m	83'-7"	25.476	90'-5"	27.559	3 3/16"	81 mm
56'-4"	17.170 m	63'-2"	19.253 m	70'-0"	21.336 m	76'-10"	23.419 m	83'-8"	25.502	90'-6"	27.584	0'-4"	102 mm
56'-6"	17.221 m	63'-4"	19.304 m	70'-2"	21.387 m	77'-0"	23.470 m	83'-10"	25.552	90'-8"	27.635	0'-6"	152 mm
56'-8"	17.272 m	63'-6"	19.355 m	70'-4"	21.438 m	77'-2"	23.520 m	84'-0"	25.603	90'-10"	27.686	0'-8"	203 mm
56'-10"	17.323 m	63'-8"	19.406 m	70'-6"	21.488 m	77'-4"	23.571 m	84'-2"	25.654	91'-0"	27.737	0'-10"	254 mm
57'-0"	17.374 m	63'-10"	19.456 m	70'-8"	21.539 m	77'-6"	23.622 m	84'-4"	25.705	91'-2"	27.788	1'-0"	305 mm
57'-2"	17.424 m	64'-0"	19.507 m	70'-10"	21.590 m	77'-8"	23.673 m	84'-6"	25.756	91'-4"	27.838	1'-2"	356 mm
57'-4"	17.475 m	64'-2"	19.558 m	71'-0"	21.641 m	77'-10"	23.724 m	84'-8"	25.806	91'-6"	27.889	1'-4"	406 mm
57'-6"	17.526 m	64'-4"	19.609 m	71'-2"	21.692 m	78'-0"	23.774 m	84'-10"	25.857	91'-8"	27.940	1'-6"	457 mm
57'-8"	17.577 m	64'-6"	19.660 m	71'-4"	21.742 m	78'-2"	23.825 m	85'-0"	25.908	91'-10"	27.991	1'-8"	508 mm
57'-10"	17.628 m	64'-8"	19.710 m	71'-6"	21.793 m	78'-4"	23.876 m	85'-2"	25.959	92'-0"	28.042	1'-10"	559 mm
58'-0"	17.678 m	64'-10"	19.761 m	71'-8"	21.844 m	78'-6"	23.927 m	85'-4"	26.010	92'-2"	28.092	2'-0"	610 mm
58'-2"	17.729 m	65'-0"	19.812 m	71'-10"	21.895 m	78'-8"	23.978 m	85'-6"	26.060	92'-4"	28.143	2'-2"	660 mm
58'-4"	17.780 m	65'-2"	19.863 m	72'-0"	21.946 m	78'-10"	24.028 m	85'-8"	26.111	92'-6"	28.194	2'-4"	711 mm
58'-6"	17.831 m	65'-4"	19.914 m	72'-2"	21.996 m	79'-0"	24.079 m	85'-10"	26.162	92'-8"	28.245	2'-6"	762 mm
58'-8"	17.882 m	65'-6"	19.964 m	72'-4"	22.047 m	79'-2"	24.130 m	86'-0"	26.213	92'-10"	28.296	2'-8"	813 mm
58'-10"	17.932 m	65'-8"	20.015 m	72'-6"	22.098 m	79'-4"	24.181 m	86'-2"	26.264	93'-0"	28.346	2'-10"	864 mm
59'-0"	17.983 m	65'-10"	20.066 m	72'-8"	22.149 m	79'-6"	24.232 m	86'-4"	26.314	93'-2"	28.397	3'-0"	914 mm
59'-2"	18.034 m	66'-0"	20.117 m	72'-10"	22.200 m	79'-8"	24.282 m	86'-6"	26.365	93'-4"	28.448	3'-2"	965 mm
59'-4"	18.085 m	66'-2"	20.168 m	73'-0"	22.250 m	79'-10"	24.333 m	86'-8"	26.416	93'-6"	28.499	3'-4"	1,016 mm
59'-6"	18.136 m	66'-4"	20.218 m	73'-2"	22.301 m	80'-0"	24.384 m	86'-10"	26.467	93'-8"	28.550	3'-6"	1,067 mm
59'-8"	18.186 m	66'-6"	20.269 m	73'-4"	22.352 m	80'-2"	24.435 m	87'-0"	26.518	93'-10"	28.600	3'-8"	1,118 mm
59'-10"	18.237 m	66'-8"	20.320 m	73'-6"	22.403 m	80'-4"	24.486 m	87'-2"	26.568	94'-0"	28.651	3'-10"	1,168 mm
60'-0"	18.288 m	66'-10"	20.371 m	73'-8"	22.454 m	80'-6"	24.536 m	87'-4"	26.619	94'-2"	28.702	4'-0"	1,219 mm
60'-2"	18.339 m	67'-0"	20.422 m	73'-10"	22.504 m	80'-8"	24.587 m	87'-6"	26.670	94'-4"	28.753	4'-2"	1,270 mm
60'-4"	18.390 m	67'-2"	20.472 m	74'-0"	22.555 m	80'-10"	24.638 m	87'-8"	26.721	94'-6"	28.804	4'-4"	1,321 mm
60'-6"	18.440 m	67'-4"	20.523 m	74'-2"	22.606 m	81'-0"	24.689 m	87'-10"	26.772	94'-8"	28.854	4'-6"	1,372 mm
60'-8"	18.491 m	67'-6"	20.574 m	74'-4"	22.657 m	81'-2"	24.740 m	88'-0"	26.822	94'-10"	28.905	4'-8"	1,422 mm
60'-10"	18.542 m	67'-8"	20.625 m	74'-6"	22.708 m	81'-4"	24.790 m	88'-2"	26.873	95'-0"	28.956	4'-10"	1,473 mm
61'-0"	18.593 m	67'-10"	20.676 m	74'-8"	22.758 m	81'-6"	24.841 m	88'-4"	26.924	95'-2"	29.007	5'-0"	1,524 mm
61'-2"	18.644 m	68'-0"	20.726 m	74'-10"	22.809 m	81'-8"	24.892 m	88'-6"	26.975	95'-4"	29.058	5'-2"	1,575 mm
61'-4"	18.694 m	68'-2"	20.777 m	75'-0"	22.860 m	81'-10"	24.943 m	88'-8"	27.026	95'-6"	29.108	5'-4"	1,626 mm
61'-6"	18.745 m	68'-4"	20.828 m	75'-2"	22.911 m	82'-0"	24.994 m	88'-10"	27.076	95'-8"	29.159	5'-6"	1,676 mm
61'-8"	18.796 m	68'-6"	20.879 m	75'-4"	22.962 m	82'-2"	25.044 m	89'-0"	27.127	95'-10"	29.210	5'-8"	1,727 mm
61'-10"	18.847 m	68'-8"	20.930 m	75'-6"	23.012 m	82'-4"	25.095 m	89'-2"	27.178	96'-0"	29.261	5'-10"	1,778 mm
62'-0"	18.898 m	68'-10"	20.980 m	75'-8"	23.063 m	82'-6"	25.146 m	89'-4"	27.229	96'-2"	29.312	6'-0"	1,829 mm
62'-2"	18.948 m	69'-0"	21.031 m	75'-10"	23.114 m	82'-8"	25.197 m	89'-6"	27.280	96'-4"	29.362	6'-2"	1,880 mm
62'-4"	18.999 m	69'-2"	21.082 m	76'-0"	23.165 m	82'-10"	25.248 m	89'-8"	27.330	96'-6"	29.413	6'-4"	1,930 mm
62'-6"	19.050 m	69'-4"	21.133 m	76'-2"	23.216 m	83'-0"	25.298 m	89'-10"	27.381	96'-8"	29.464	6'-6"	1,981 mm
62'-8"	19.101 m	69'-6"	21.184 m	76'-4"	23.266 m	83'-2"	25.349 m	90'-0"	27.432	96'-10"	29.515	6'-8"	2,032 mm
62'-10"	19.152 m	69'-8"	21.234 m	76'-6"	23.317 m	83'-4"	25.400 m	90'-2"	27.483	97'-0"	29.566	6'-10"	2,083 mm

Preassembly

Cut Top Track to Length

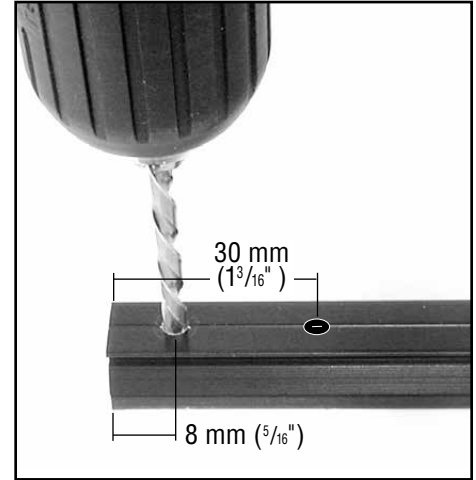


1. Cut special length top track from 2.08 m (6'9 15/16") track.



2. Deburr cut.

Slightly round track corners that will slide against mast.

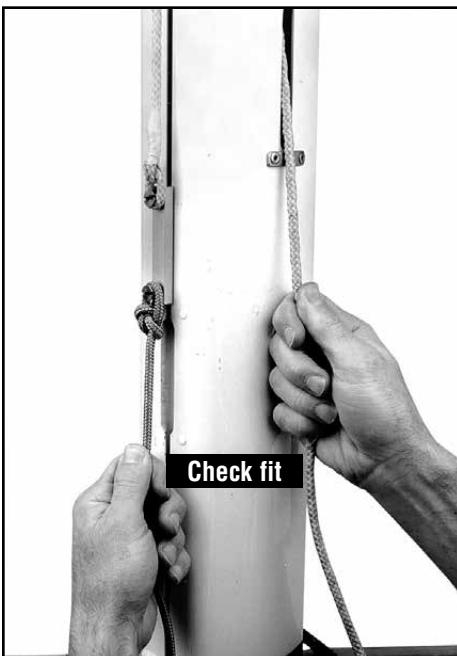


3. Drill two 8.5 mm (21/64") holes in cut end of track. Center at 9.5 mm (3/8") and 36 mm (1 7/16").

Short top track lengths

54 mm (2 1/8")	Use existing hole. Do not drill second hole.
81 mm (3 3/16")	Use existing hole, drill hole 9.5 mm (3/8") from cut end.

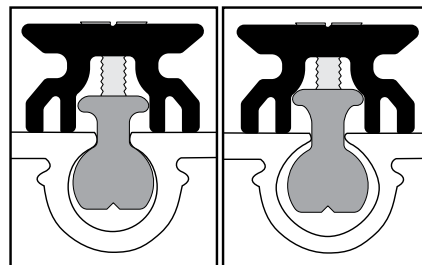
Check Fit of Mounting Slugs & Car



105 mm (4 1/8") connector slug must fit feeder opening. File opening to make longer.

Use halyard with retrieval line to run 105 mm (4 1/8") connector slug up mast to check for burrs in groove.

Mast prebend: May require straightening before installation.

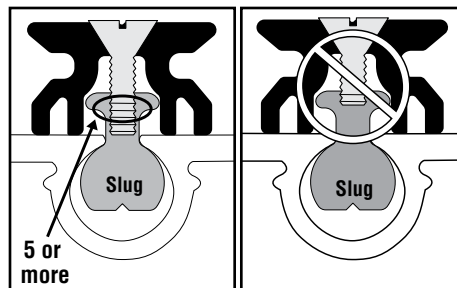


Will tighten

Will not tighten

Test track: Put mounting slug in groove, track section on mast. Tighten with screw.

Mounting screw must be long enough for mast groove.



Warning! Avoid personal injury or death. Screws need minimum five (5) threads (turns) engaged to hold track to mast.

Turn screw 360° five (5) times after threads engage slug.



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

Aft face of mast must be flat or convex.



1. Slip top track slugs into mast groove. Use 51 mm (2") mounting slug for top stop.



2. One drop blue Loctite® adhesive into each connector slug hole.



3. Thread a 8 x 40 mm screw through endstop, track, and into endstop slug.

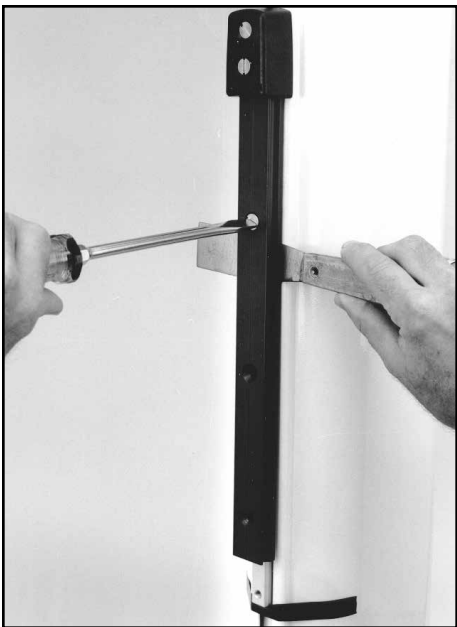
Short top track lengths	Top slug
54 mm (2 ¹ / ₈ "	105 mm (4 ¹ / ₈ "
81 mm (3 ³ / ₁₆ "	25 mm (1"

Short top track lengths	
54 mm (2 ¹ / ₈ "	Use one screw in stop.
81 mm (3 ³ / ₁₆ "	Use both screws.

Install 76 mm (3") connector slug at bottom.

Mast up: Tape 51 mm (2") slug even with top of upper track. Tape other slugs in place.

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



4. Slide slugs into place with putty knife. Loosely install 8 x 25 mm screws.



5. Loosen top screw. Slide top track up and position next 2.08 m (6'9 15/16") track.

Mast up: Tighten bottom screw to hold track.



6. Slide 19 mounting slugs and connector slug into mast groove.

Mast up: Tape in place.

Put one drop blue Loctite into each hole.

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.

Loctite is a registered trademark of Henkel AG & Company KGaA.



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

Use putty knife to slide additional slugs and connector slug into place. Loosely install all nineteen 8 x 25 mm screws.

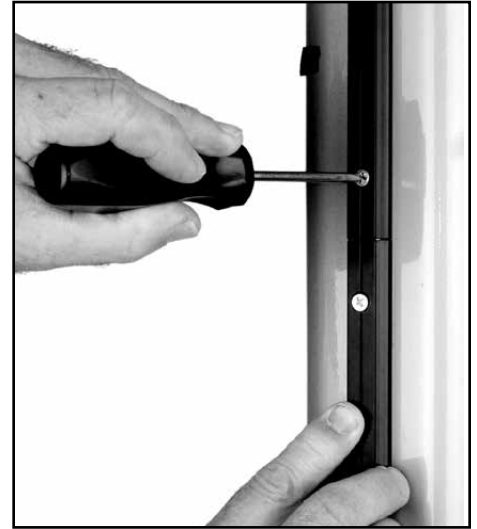


8. Slide tracks up enough to fit next track.

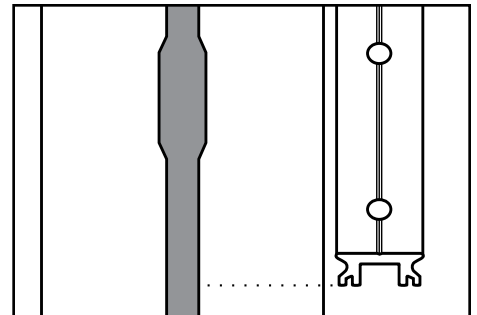
Mast up: Hold upper tracks. Loosen screw that holds tracks. Slide track up. If screws bind in mast groove opening, loosen them until track slides. Tighten new bottom screw securely.



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



9. Repeat until all full-length tracks installed.



Note: If bottom full-length track blocks feeder gap, load bottom track slugs before installing track.



10. Raise tracks so 432 mm (17") bottom feeder track fits.

11. Install bottom feeder track with stop.



3855 endstop kit—leave bottom 432 mm (17") track off until cars are installed.

Required Parts

R32 track

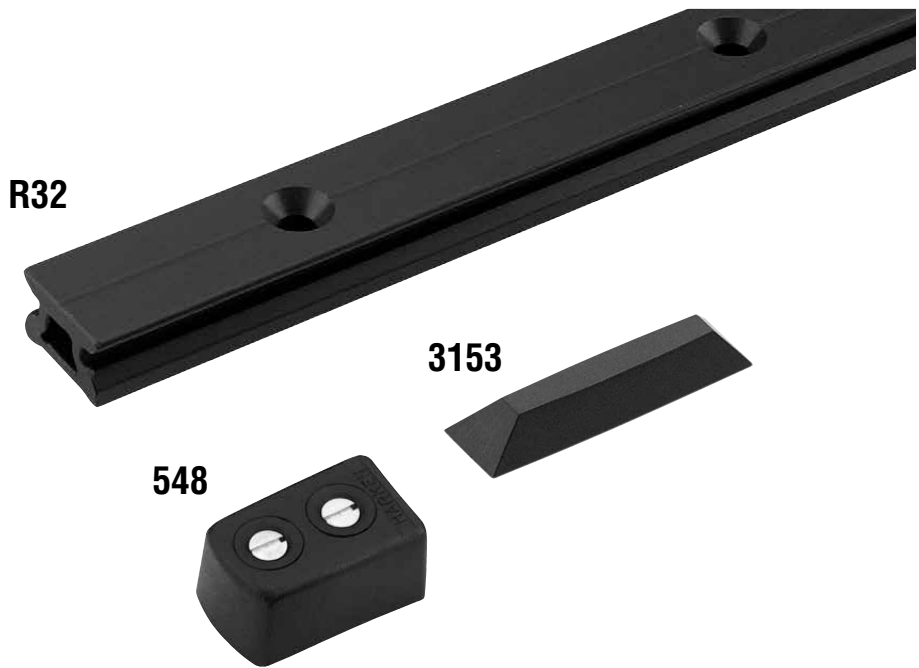
Determine track length.

Bottom track must be short enough to remove easily. Use 457 mm to 609 mm (18" to 24") length. Do not use 3853 track for drilling and tapping.

10 mm (3/8") flathead screws (not included) 10 fasteners/meter of track

3153 splices

548 endstop set

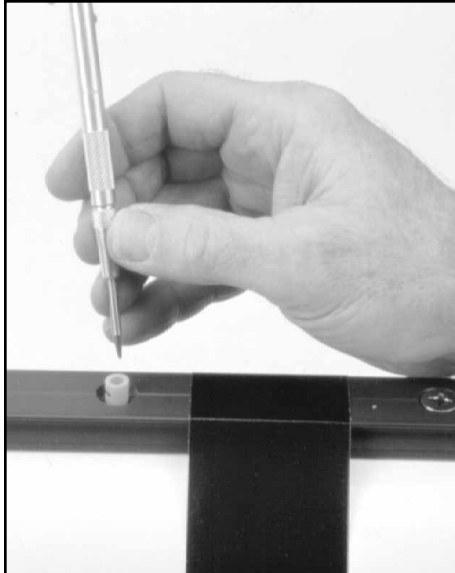


	Drill and tap sizes	
	Metric	U.S. Imperial
Drill	8.5 mm	5/16"
Tap	m10 x 1.5	3/8" - 16"

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.



1. Drilling, tapping, screwing: Start at one end of track and work down: Do not drill and tap from both track ends

Clamp or duct tape track on mast.
Center punch hole in center of track hole.

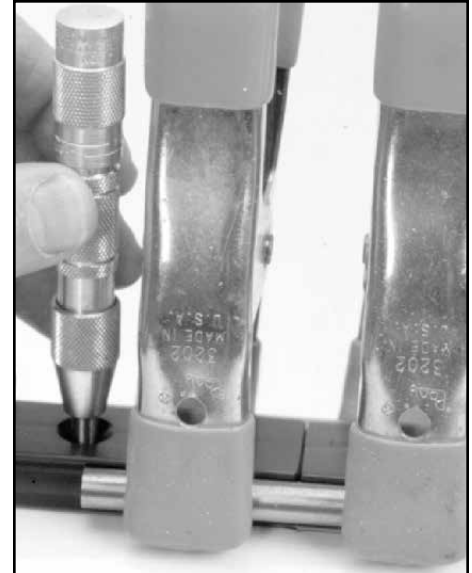
Tip: Use narrow shaft spring-loaded machinist's center punch with plastic centering tube or transfer punch.



2. Drill track hole, holding drill perpendicular to mast face. Tap threads and install screws using blue Loctite® adhesive.

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

Important: Use blue Loctite instead of oil for tapping lubricant.



3. Align track at joints: Use 3153 splice pieces and round rods or dowels to align track during installation. Hold in place with spring or "C" clamps until track is secured.

Load all cars before installing bottom track and endstop.

Important: To keep balls captive, we recommend loading cars onto track without sail installed. Chart below shows correct number of balls for each car.



1. Headboard car: Hold car so clevis fast pin head faces up. Align car on guide section of loader track and gently roll onto upper tracks. If cars stick, realign and roll onto track.



2. Load intermediate car (if used). Alternate with batten cars until all cars are loaded.

Mast up: Use halyard to hold cars.



3. Install screw stop.



3855 endstop kit—Remove bottom 432 mm (17") track and install cars.

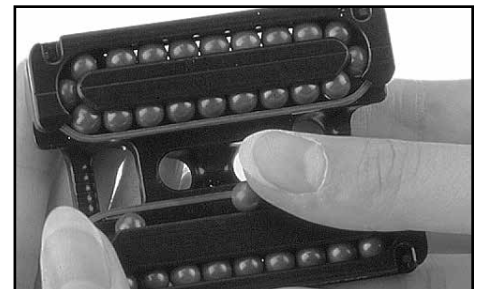
Tip: Use halyard to hold cars up.

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

Lost Balls

Consult ball chart below to find number of balls for each car. To load balls, place car on edge with retaining clip in place. Insert balls one-by-one from center of clip and roll into race. **Do not overfill car.**

Part No.	Car type	Length		Color	Qty/ car	Bearing material	Part No.	Balls/ set	Ball Ø	
		in	mm						in	mm
3867	Headboard cars (2)	9 ¹ / ₈	231	Brown	90	Torlon	547	25	3 ³ / ₈	10
3868	Battcar w/12 mm threaded stud	5 ³ / ₈	136	Brown	50	Torlon	547	25	3 ³ / ₈	10
3869	Battcar w/14 mm threaded stud	5 ³ / ₈	136	Brown	50	Torlon	547	25	3 ³ / ₈	10
3870	Battcar w/16 mm threaded stud	5 ³ / ₈	136	Brown	50	Torlon	547	25	3 ³ / ₈	10
3871	Intermediate car	3 ³ / ₄	95	Brown	32	Torlon	547	25	3 ³ / ₈	10
3872	Universal car	5 ³ / ₈	136	Brown	50	Torlon	547	25	3 ³ / ₈	10
3873	Reef car	9 ¹ / ₈	231	Brown	90	Torlon	547	25	3 ³ / ₈	10



Torlon is a registered trademark of Solvay Advanced Polymers L. L. C.

Load Sail on Cars

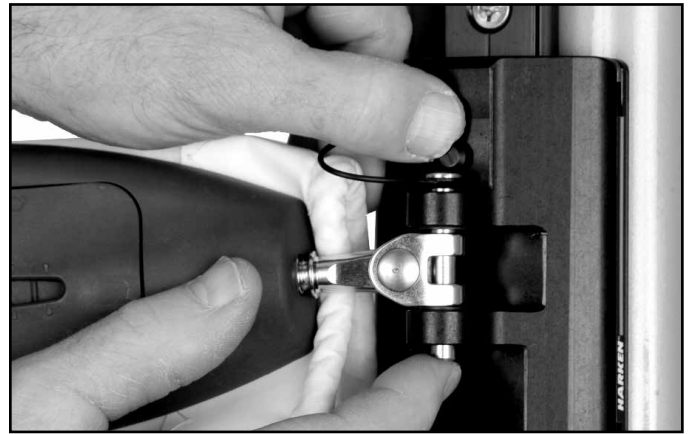
Attach sail to system beginning with lowest car. Line up toggle and insert clevis pin.

If it is a “no wind” day, start at headboard and hoist mainsail as you attach sail to cars.



Operation

Remove clevis pin. Press quick-release button and push up on bottom of pin.



Remove Sail

When lowering sail, do not let halyard go. Ease cars down by keeping a wrap on winch.

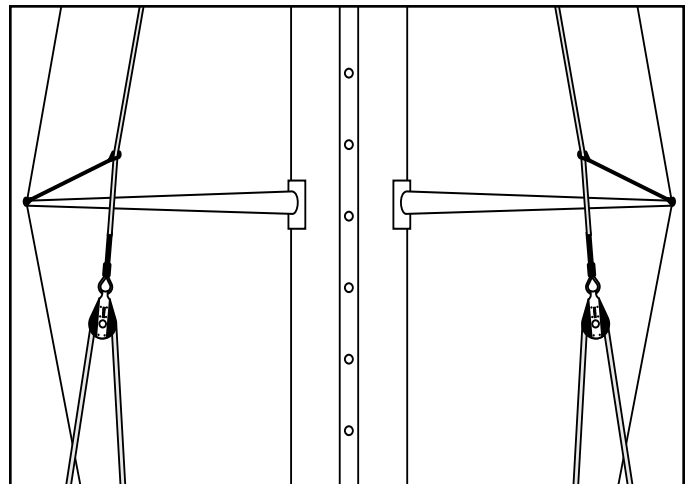
On boats with unstayed masts, vang must be used to prevent over rotation of upper part of sail. Over-rotation can damage batten receptacles.

Precautions

Use shock cord 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 the other to Lazy Jacks.

Make sure shockcord is long enough so boom can swing out all the way without damaging spreaders.

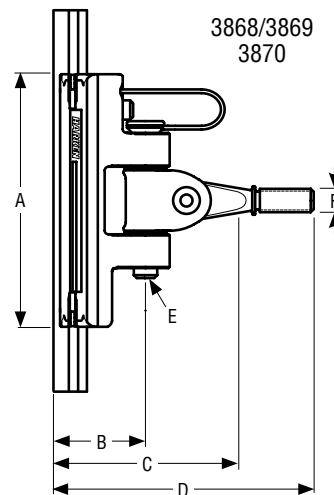
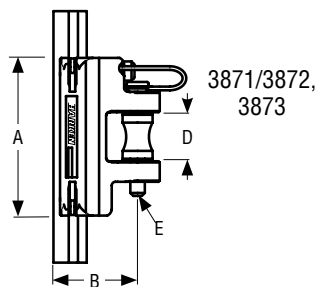
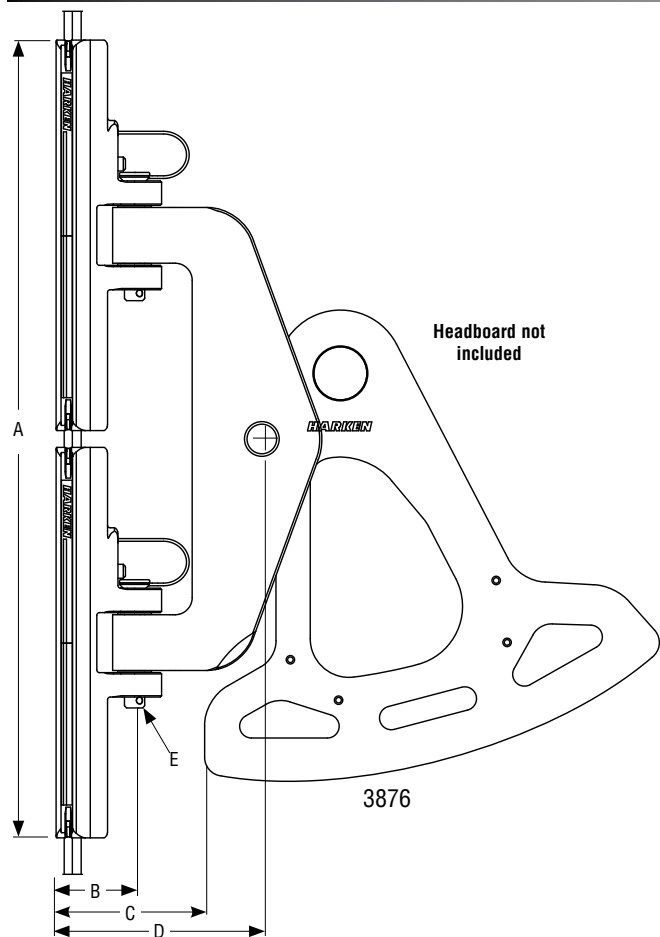


Lazy Jacks

Clean beginning of season, or if cars bind. Squirt detergent and water into ball bearings. Circulate by moving cars up and down. Let stand. To remove detergent, spray water into ball bearings and circulate. Clean tracks with detergent and water.

Inspect Battcars for wear. Inspect batten receptacles for loose fasteners.



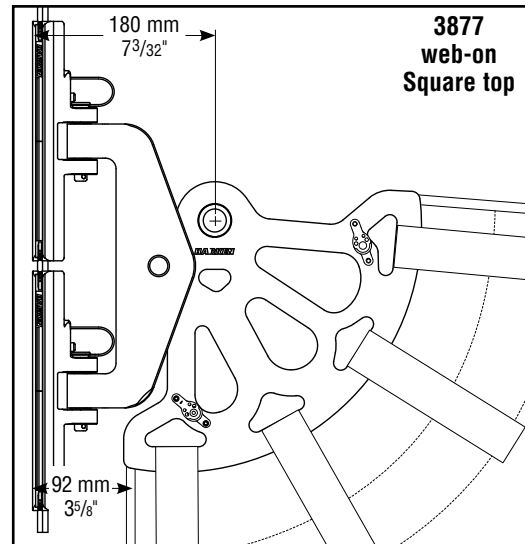
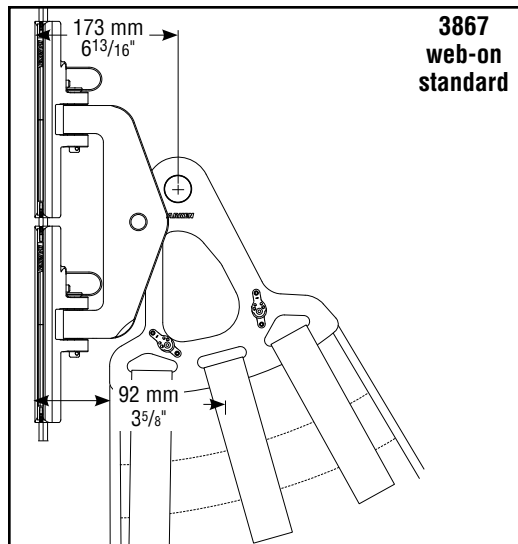


Dimensions (measured from aft face of mast)

Part No.	Car Type	A		B		C		D		E (Pin Ø)		F (Stud Ø)
		in	mm	in	mm	in	mm	in	mm	in	mm	mm
3867	Headboard cars (2)	18 ⁵ / ₈	473	2	51	3 ⁵ / ₈	92	5	126	1/2	12	—
3868	Battcar w/12 mm threaded stud	5 ³ / ₈	136	2	51	3 ⁵ / ₈	92	5 ¹ / ₁₆	128	1/2	12	12
3869	Battcar w/14 mm threaded stud	5 ³ / ₈	136	2	51	3 ⁵ / ₈	92	5 ¹ / ₁₆	128	1/2	12	14
3870	Battcar w/16 mm threaded stud	5 ³ / ₈	136	2	51	3 ⁵ / ₈	92	5 ¹ / ₁₆	128	1/2	12	16
3871	Intermediate car	3 ³ / ₄	95	2	51	—	—	1	26	3/8	10	—
3872	Universal car	5 ³ / ₈	136	2	51	—	—	1 ⁵ / ₁₆	33	1/2	12	—
3873	Reef car	9 ¹ / ₈	231	2	51	—	—	1 ⁵ / ₁₆	33	1/2	12	—

Installing Headboard Car Assembly

Use 45 mm (1³/₄" webbing. Holes in headboard accept 416 16 mm cheek blocks for leech line. Use 4 mm x 10 mm fasteners. If more reinforcement is necessary, web through lightening holes.



Distance Between Attachment Points/Reef Points

Distance Between Attachment Points

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

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

NOTE: Adding battens can reduce stack height by eliminating intermediate cars.

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.

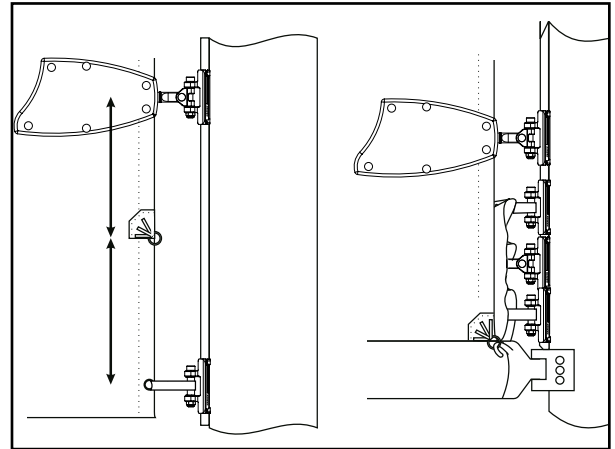
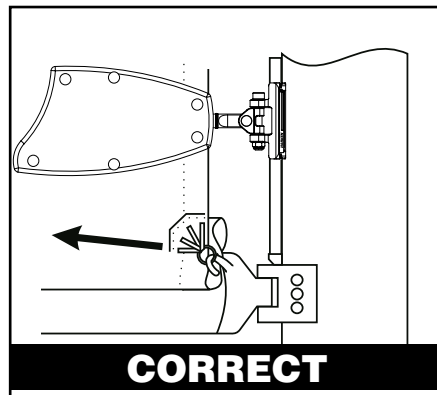
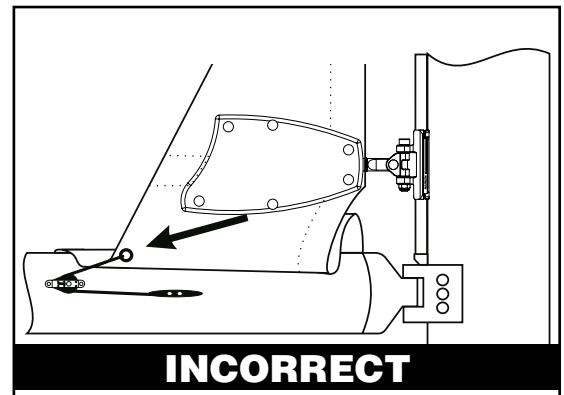


DIAGRAM A



CORRECT



INCORRECT

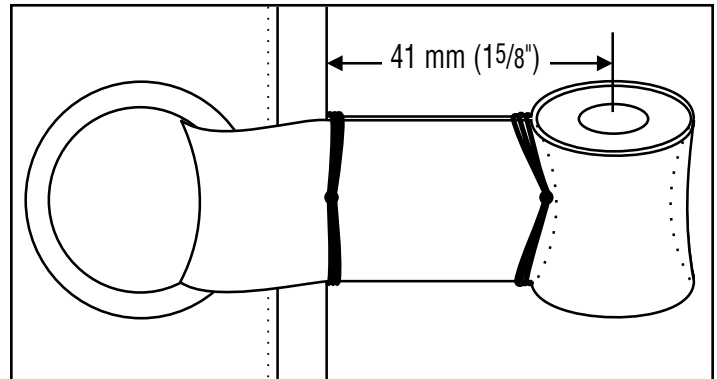
DIAGRAM B

Attaching Sail to Intermediate Cars

Sail setback from luff tape to intermediate car clevis pin:

Intermediate car	3871	92 mm (1 ⁵ / ₈ ")
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Plastic spacers come with 3839 and 3836 intermediate cars. Seize spacer to webbing by stitching just behind plastic spacer. Seize webbing to sail by stitching up against sail.



Installation Troubleshooting

Problem	Probable Cause	Solution
Tracks do not butt up against each other.	Cut end of top or bottom track at joint. Track weight pulling tracks apart.	Make sure the anodized end is toward the full-length track. 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.
CB/slider cars do not fit on track.	Track and cars are not the same size.	Contact your dealer or Harken.
CB cars do not fit on track.	Balls are missing.	Remove cars, load balls, and slide cars back on track.
Sail headboard does not fit inside coupler.	Ring was not pressed far enough.	Take sail to sailmaker.

Operation Troubleshooting

Problem	Probable Cause	Solution
Cars bind.	Dirt in cars.	Use detergent and fresh water to flush dirt out of cars; move cars up/down to circulate; follow with high-pressure water; clean track grooves.
	Stud threaded too tightly into receptacle.	Back off threaded stud two (2) turns.
	Balls missing from car.	Remove cars, load balls, and slide cars back on track.
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 shock cord 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.

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, but lubricants which will not attract dirt may be used like McLube® OneDrop™ ball bearing lubricant and conditioner.

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

McLube is a registered trademark of McGee Industries, Inc.

OneDrop is a trademark of McLube, a Division of McGee Industries.

Warranty

For additional safety, maintenance, and warranty information see www.harken.com or the Harken catalog.

HARKEN®

Corporate Headquarters

N15W24983 Bluemound Rd, Pewaukee, WI 53072 USA
Telephone: (262) 691-3320 • Fax: (262) 701-5780
Web: www.harken.com • Email: harken@harken.com

Harken Australia Pty, Ltd.

1B Green Street, Brookvale, N.S.W. 2100, Australia
Telephone: (61) 2-8978-8666 • Fax: (61) 2-8978-8667
Web: harken.com.au • Email: info@harken.com.au

Harken France

ZA Port des Minimes, BP 3064, 17032 La Rochelle Cedex 1, France
Telephone: (33) 05.46.44.51.20 • Fax: (33) 05.46.44.25.70
Web: harken.fr • Email: info@harken.fr

Harken Italy S.p.A.

Via Marco Biagi, 14, 22070 Limido Comasco (CO) Italy
Telephone: (39) 031.3523511 • Fax: (39) 031.3520031
Web: harken.it • Email: info@harken.it

Harken New Zealand, Ltd.

158 Beaumont Street
Unit 11, Orams Marine Centre
Westhaven, Auckland, 1010, New Zealand
Telephone: (64) 9-303-3744 • Fax: (64) 9-307-7987
Web: harken.co.nz • Email: harken@harken.co.nz

Harken Polska SP ZOO

ul. Rydygiera 8, budynek 3A, lokal 101, I piętro, 01-793 Warszawa, Poland
Tel: +48 22 561 93 93 • Fax: +48 22 839 22 75
Web: harken.pl • Email: polska@harken.pl

Harken Sweden AB

Main Office and Harken Brandstore: Västmannagatan 81B
SE-113 26 Stockholm Sweden
Telephone: (46) 0303 61875 • Fax: (46) 0303 61876
Mailing address: Harken Sweden AB, Box 64, SE -440 30 Marstrand
Web: harken.se • Email: harken@harken.se

Harken UK, Ltd.

Bearing House, Ampress Lane, Lymington, Hampshire S041 8LW, England
Telephone: (44) 01590-689122 • Fax: (44) 01590-610274
Web: harken.co.uk • Email: enquiries@harken.co.uk

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