



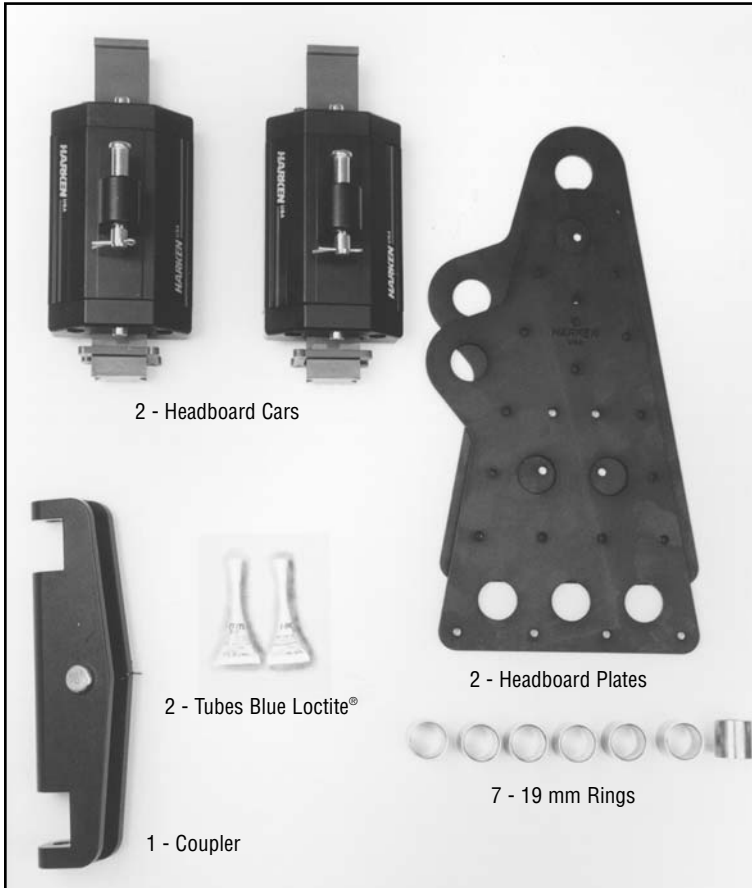
HARKEN[®]
System C Batten Traveler
Installation Manual

Sizing

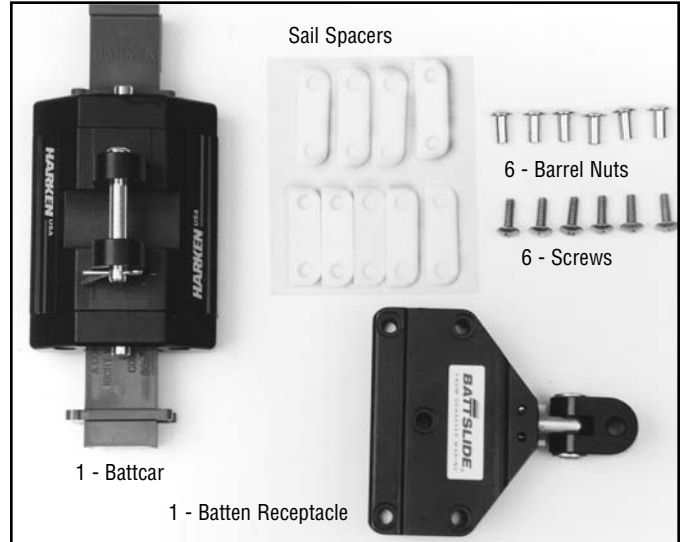
Make sure that you have the correct size Battcar system for your boat.

Maximum Sail Area		Maximum Boat Length	System
Monohull	Multihull		
1400 ft ² 130 m ²	1200 ft ² 111 m ²	80' 24 m	C

Parts List



HEADBOARD ASSEMBLY

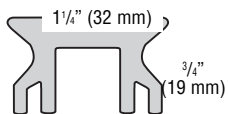


BATTCARS

Flat Battslide® fitting with threaded post is shown. You may have toggle attachment, round batten ends or SDA batten fittings (not included).

LUFF CARS

Luff cars not required if battens are close enough to support sail.
Plastic spacers go to sailmaker



1816 Track: 6'9¹⁵/₁₆" (2.08 m) long track. Number of sections will vary according to luff length.

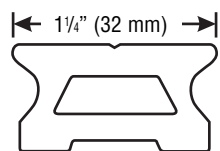
Make sure you have the correct size track. System C track is 1¹/₄" (32 mm) wide.

Track for Drilling and Tapping

516/758/1847 Track: You must use 516/758/1847 track for drilling and tapping. Use 5¹/₁₆" (8 mm) FH screws, not included.

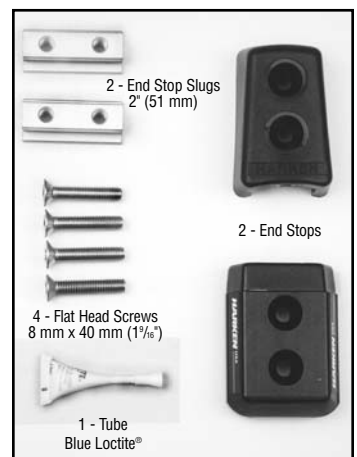
Do not use 1816 open backed track for drilling and tapping the mast. This track must have the support of the mounting slugs.

See page 8 for mounting instructions.



MOUNTING KIT

One required for each track.



END KIT

One required for each system.

Required Tools

Phillips screwdriver	Drill
Tape measure	$2\frac{1}{64}$ " (8.5 mm) drill bit
Putty knife	File
Hacksaw	Tape
Hammer	Socket wrench
Center punch	Power driven screwdriver

Step Ladder: If you are installing the system with the mast up, use a step ladder that can be secured to the boat near the mast.

You will need to work at a hand height of about 7' (2.13 m) above the gooseneck.

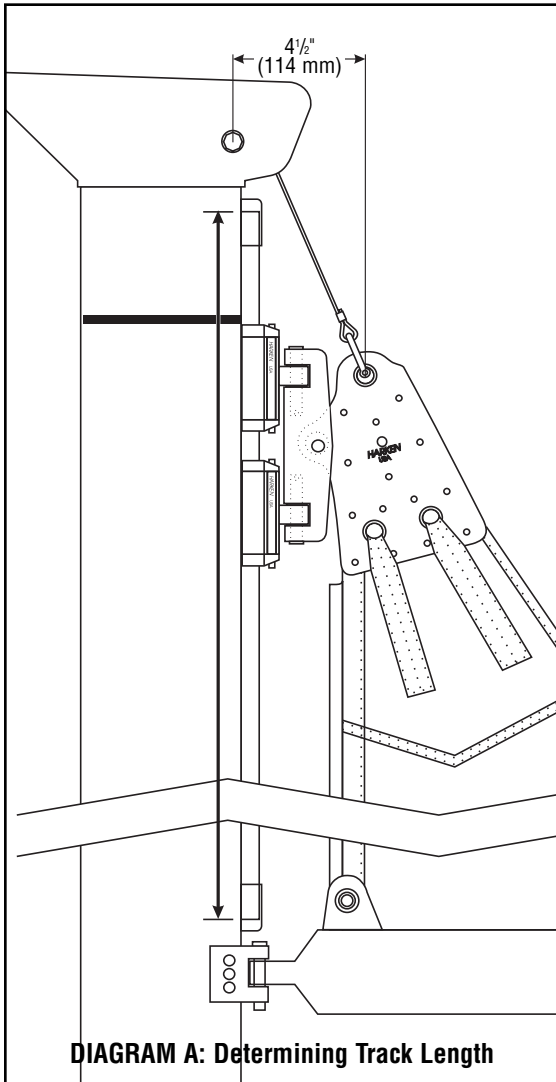


DIAGRAM A: Determining Track Length

Determining Track Length

Note: Track length is *greater than* luff length of sail.

The track must extend at least 9" (229 mm) above the point where the halyard is attached to the Harken headboard. Allow for sail stretch.

Make sure the top of the track does not interfere with the halyard exiting from the mast.

The set back for the halyard from the aft side of the mast is $4\frac{1}{2}$ " (114 mm). See Diagram A.

Remember to leave $\frac{3}{8}$ " (10 mm) beyond each end of the track for the end stops.

At the lower end, the track must extend as close to the gooseneck as possible and ideally below the top of the boom.

Adjusting 1816 Track Length

The length of the track is matched to the mast by adjusting the number of $6'9\frac{15}{16}$ " (2.08 m) track lengths and by cutting the top and bottom track pieces to length.

Consult chart below to determine how many total track pieces you will need.

Consult the charts below to determine whether you need to cut your top track to length.

All mast lengths will require cutting the bottom track. A short bottom track allows cars to be easily loaded. See page 9.

How 1816 Many Track Sections?

Use the chart below to determine the total number of full length $6'9\frac{15}{16}$ " (2.08 m) track sections required for installation.

The variable length top and bottom tracks are included in this number.

Track Length of Mast (As Described in Diagram A)	Number of $6'9\frac{15}{16}$ " (2.08 m) Track Sections Required
56'3" to 61'6" (17.145 m to 18.745 m)	9
61'7" to 68'4" (18.771 m to 20.828 m)	10
68'5" to 75'2" (20.853 m to 22.911 m)	11
75'3" to 82' (22.936 m to 24.994 m)	12
82'1" to 88'10" (25.019 m to 27.076 m)	13
88'11" to 95'8" (27.102 m to 29.159 m)	14
95'9" to 97'2" (29.185 m to 29.616 m)	15

Full Length $6'9\frac{15}{16}$ " (2.06 m) Top Track

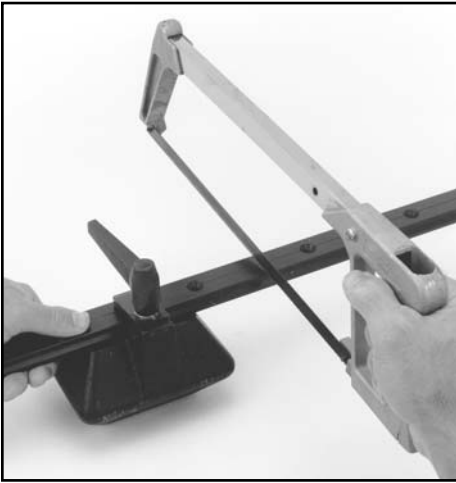
Round your track length to the nearest 1" (25 mm). If your track length is one of the dimensions shown below, your track system does not need a special length top track. A full length $6'9\frac{15}{16}$ " (2.08 m) track is used as the top track.

56'3" (17.145 m)	63'1" (19.228 m)	69'11" (21.311 m)	76' 9" (23.393 m)	83' 7" (25.476 m)	90'5" (27.559 m)
56'4" (17.170 m)	63'2" (19.253 m)	70' (21.336 m)	76'10" (23.419 m)	83' 8" (25.502 m)	90'6" (27.584 m)
56'5" (17.196 m)	63'3" (19.279 m)	70' 1" (21.361 m)	76'11" (23.444 m)	83' 9" (25.527 m)	90'7" (27.610 m)
56'6" (17.221 m)	63'4" (19.304 m)	70' 2" (21.387 m)	77' (23.470 m)	83'10" (25.552 m)	90'8" (27.635 m)
56'7" (17.247 m)	63'5" (19.329 m)	70' 3" (21.412 m)	77' 1" (23.495 m)	83'11" (25.578 m)	90'9" (27.661 m)

Cutting Top Track To Length

Total Track Length (as defined on page 4)							Top Track Length
56' 8"(17.272 m)	63' 6"(19.355 m)	70' 4"(21.438 m)	77' 2"(23.520 m)	84' (25.603 m)	90'10"(27.686 m)	5" (127 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 m)	91' (27.737 m)	7" (178 mm)	
57' (17.374 m)	63'10"(19.456 m)	70' 8"(21.539 m)	77' 6"(23.622 m)	84' 4"(25.705 m)	91' 2"(27.788 m)	9" (229 mm)	
57' 2"(17.424 m)	64' (19.507 m)	70'10"(21.590 m)	77' 8"(23.673 m)	84' 6"(25.756 m)	91' 4"(27.838 m)	11" (279 mm)	
57' 4"(17.475 m)	64' 2"(19.558 m)	71' (21.641 m)	77'10"(23.724 m)	84' 8"(25.806 m)	91' 6"(27.889 m)	13" (330 mm)	
57' 6"(17.526 m)	64' 4"(19.609 m)	71' 2"(21.692 m)	78' (23.774 m)	84'10"(25.857 m)	91' 8"(27.940 m)	15" (381 mm)	
57' 8"(17.577 m)	64' 6"(19.660 m)	71' 4"(21.742 m)	78' 2"(23.825 m)	85' (25.908 m)	91'10"(27.991 m)	17" (432 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 m)	92' (28.042 m)	19" (483 mm)	
58' (17.678 m)	64'10"(19.761 m)	71' 8"(21.844 m)	78' 6"(23.927 m)	85' 4"(26.010 m)	92' 2"(28.092 m)	21" (533 mm)	
58' 2"(17.729 m)	65' (19.812 m)	71'10"(21.895 m)	78' 8"(23.978 m)	85' 6"(26.060 m)	92' 4"(28.143 m)	23" (584 mm)	
58' 4"(17.780 m)	65' 2"(19.863 m)	72' (21.946 m)	78'10"(24.028 m)	85' 8"(26.111 m)	92' 6"(28.194 m)	25" (635 mm)	
58' 6"(17.831 m)	65' 4"(19.914 m)	72' 2"(22.996 m)	79' (24.079 m)	85'10"(26.162 m)	92' 8"(28.245 m)	27" (686 mm)	
58' 8"(17.882 m)	65' 6"(19.964 m)	72' 4"(22.047 m)	79' 2"(24.130 m)	86' (26.213 m)	92'10"(28.296 m)	29" (737 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 m)	93' (28.346 m)	31" (787 mm)	
59' (17.983 m)	65'10"(20.066 m)	72' 8"(22.149 m)	79' 6"(24.232 m)	86' 4"(26.314 m)	93' 2"(28.397 m)	33" (838 mm)	
59' 2"(18.034 m)	66' (20.117 m)	72'10"(22.200 m)	79' 8"(24.282 m)	86' 6"(26.365 m)	93' 4"(28.448 m)	35" (889 mm)	
59' 4"(18.085 m)	66' 2"(20.168 m)	73' (22.250 m)	79'10"(24.333 m)	86' 8"(26.416 m)	93' 6"(28.499 m)	37" (940 mm)	
59' 6"(18.136 m)	66' 4"(20.218 m)	73' 2"(22.301 m)	80' (24.384 m)	86'10"(26.467 m)	93' 8"(28.550 m)	39" (990 mm)	
59' 8"(18.186 m)	66' 6"(20.269 m)	73' 4"(22.352 m)	80' 2"(24.435 m)	87' (26.518 m)	93'10"(28.600 m)	41" (1.041 m)	
59'10"(18.237 m)	66' 8"(20.320 m)	73' 6"(22.403 m)	80' 4"(24.486 m)	87' 2"(26.568 m)	94' (28.651 m)	43" (1.092 m)	
60' (18.288 m)	66'10"(20.371 m)	73' 8"(22.454 m)	80' 6"(24.536 m)	87' 4"(26.619 m)	94' 2"(28.702 m)	45" (1.143 m)	
60' 2"(18.339 m)	67' (20.422 m)	73'10"(22.504 m)	80' 8"(24.587 m)	87' 6"(26.670 m)	94' 4"(28.753 m)	47" (1.194 m)	
60' 4"(18.390 m)	67' 2"(20.472 m)	74' (22.555 m)	80'10"(24.638 m)	87' 8"(26.721 m)	94' 6"(28.804 m)	49" (1.245 m)	
60' 6"(18.440 m)	67' 4"(20.523m)	74' 2"(22.606 m)	81' (24.689 m)	87'10"(26.772 m)	94' 8"(28.854 m)	51" (1.295 m)	
60' 8"(18.491 m)	67' 6"(20.574 m)	74' 4"(22.657 m)	81' 2"(24.740 m)	88' (26.822 m)	94'10"(28.905 m)	53" (1.346 m)	
60'10"(18.542 m)	67' 8"(20.625 m)	74' 6"(22.708 m)	81' 4"(24.790 m)	88' 2"(26.873 m)	95' (28.956 m)	55" (1.397 m)	
61' (18.593 m)	67'10"(20.676 m)	74' 8"(22.758 m)	81' 6"(24.841 m)	88' 4"(26.924 m)	95' 2"(29.007 m)	57" (1.448 m)	
61' 2"(18.644 m)	68' (20.726 m)	74'10"(22.809 m)	81' 8"(24.892 m)	88' 6"(26.975 m)	95' 4"(29.058 m)	59" (1.499 m)	
61' 4"(18.694 m)	68' 2"(20.777 m)	75' (22.860 m)	81'10"(24.943 m)	88' 8"(27.026 m)	95' 6"(29.108 m)	61" (1.549 m)	
61' 6"(18.745 m)	68' 4"(20.828 m)	75' 2"(22.911 m)	82' ((24.994m)	88'10"(27.076 m)	95' 8"(29.159 m)	63" (1.600 m)	
61' 8"(18.796 m)	68' 6"(20.879 m)	75' 4"(22.962 m)	82' 2"(25.044 m)	89' (27.127 m)	95'10"(29.210 m)	65" (1.651 m)	
61'10"(18.847 m)	68' 8"(20.930 m)	75' 6"(23.012 m)	82' 4"(25.095 m)	89' 2"(27.178 m)	96' (29.261 m)	67" (1.702 m)	
62' (18.898 m)	68'10"(20.980 m)	75' 8"(23.063 m)	82' 6"(25.146 m)	89' 4"(27.229 m)	96' 2"(29.312 m)	69" (1.753 m)	
62' 2"(18.948 m)	69' (21.031m)	75'10"(23.114 m)	82' 8"(25.197 m)	89' 6"(27.280 m)	96' 4"(29.362 m)	71" (1.803 m)	
62' 4"(18.999 m)	69' 2"(21.082 m)	76' (23.165 m)	82'10"(25.248 m)	89' 8"(27.330 m)	96' 6"(29.413 m)	73" (1.854 m)	
62' 6"(19.050 m)	69' 4"(21.133m)	76' 2"(23.216 m)	83' (25.298 m)	89'10"(27.381 m)	96' 8"(29.464 m)	75" (1.905 m)	
62' 8"(19.101 m)	69' 6"(21.184 m)	76' 4"(23.266 m)	83' 2"(25.349 m)	90' (27.432 m)	96'10"(29.515 m)	77" (1.956 m)	
62'10"(19.152 m)	69' 8"(21.234 m)	76' 6"(23.317 m)	83' 4"(25.400 m)	90' 2"(27.483 m)	97' (29.566 m)	79" (2.007 m)	
63' (19.202 m)	69'10"(21.285 m)	76' 8"(23.368 m)	83' 6"(25.451 m)	90' 4"(27.534 m)	97' 2"(29.616 m)	81" (2.057 m)	

Cutting Top Track To Length



If your track length is shown in the chart on page 4, use a hacksaw to cut a special length of top track from a 6'9⁵/₁₆" (2.08 m) track.

Round your track length to the nearest 1/2" (10 mm) and extrapolate to determine the top track length.



Use a file to deburr the cut. Slightly round off the corners of the track that will slide against the mast so it will not catch when sliding the track up the mast.

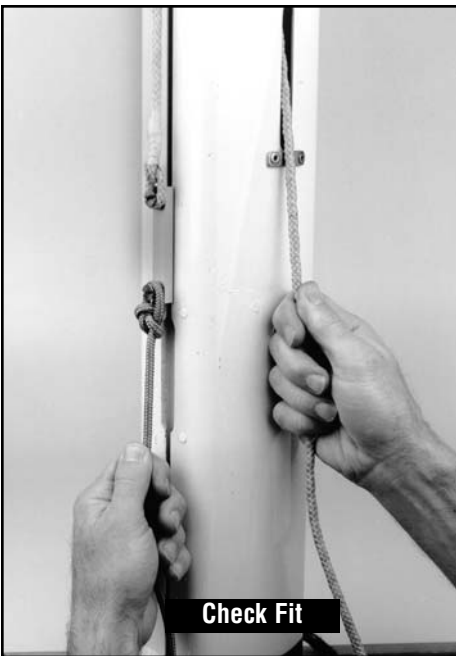


Drill two 2¹/₆₄" (8.5 mm) holes in the cut end of the top track centered at 9/16" (14 mm) and 1⁵/₈" (41 mm) from the track end.

Slip the rubber end stop over the cut end of the top track.

NOTE: You will cut the bottom track in Step 10.

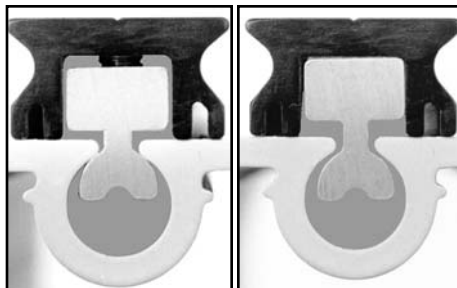
Before You Start...will mounting slugs and cars fit?



Check Fit

Check to make sure the 4¹/₈" (105 mm) long connector slug will fit in the feeder opening. If necessary, use a file to make the feeder opening longer.

Use a halyard to run the 4¹/₈" (105 mm) long connector slug up the entire mast. Use a retrieval line. If it jams, clean the groove. If there is prebend in the mast, you may need to straighten it out somewhat to install the battcar system.

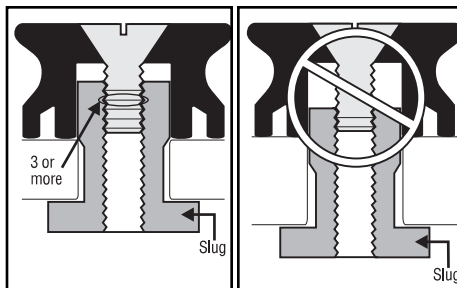


Will Tighten

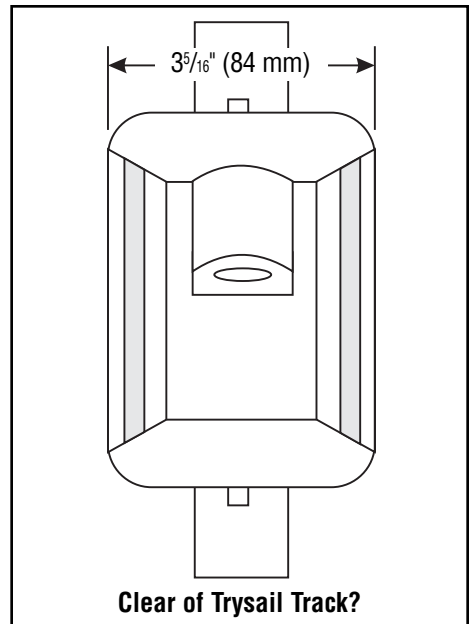
Will Not Tighten

To make sure the track will tighten against mast, put a mounting slug in the groove, a track section on the mast and use a screw to test.

Also, make sure mounting screw is long enough for your mast groove.



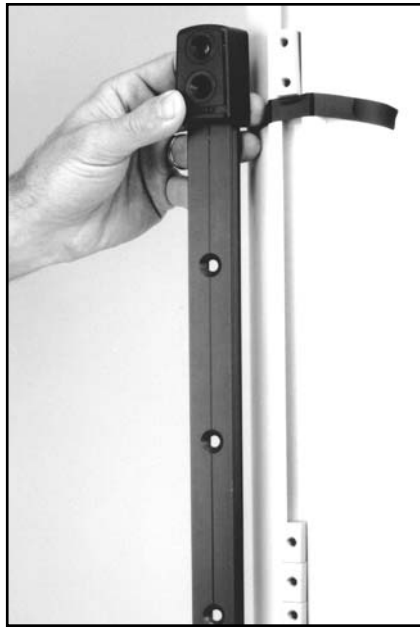
Warning! Screws must have three (3) or more threads engaged to hold track to mast. Make sure screw makes three (3) full 360° rotations after threads engage in slug.



Cars are 2³/₄" (70 mm) wide. Make sure they do not hit trysail track or other obstruction up the entire spar. Note: tracks often converge above the spreaders.

Installing Track

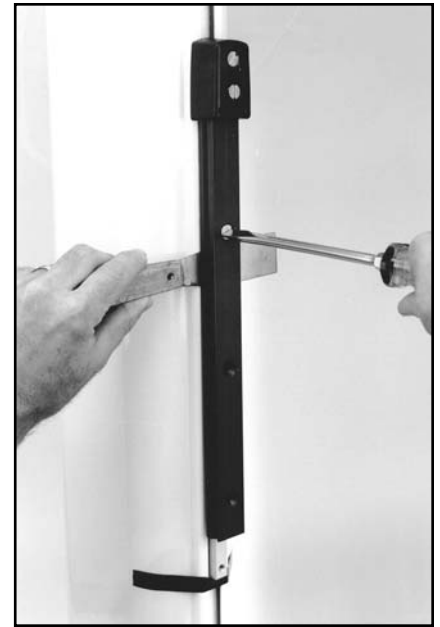
1 Slip the slugs for the top track into the mast groove starting with 2" (51 mm) end stop slug. Make sure the 4 1/8" (105 mm) connector slug is at the bottom. If the mast is up, tape the 2" (51 mm) slug in place so it will be even with the top of the upper track. Tape the other slugs in place.



4 Use a putty knife to slide the next slugs into place and loosely install the 1" (25 mm) screws.

Tip: Use the putty knife as a feeler gauge to make sure the screws are loose enough to slide easily in the groove.

REMEMBER: The tracks may slide up the lower part of the mast but may hang up when they reach a spliced area of the mast.

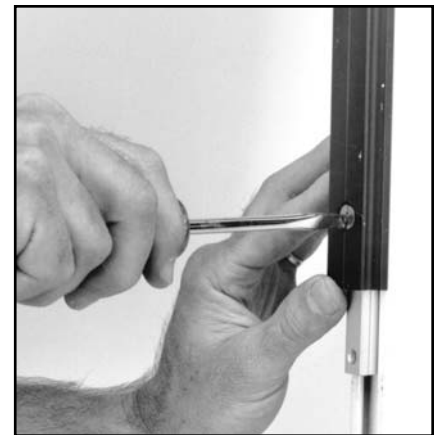


2 Put a drop of blue Loctite into each connector slug hole.



5 Loosen the top screw and slide the top track up far enough to place the next 6'9 5/16" (2.08 m) track in place.

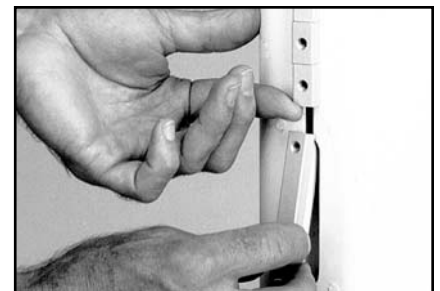
Mast up: tighten bottom screw to hold the track in place.



3 Thread a 1 9/16" (40 mm) long end stop screw through the rubber end stop, track and into end stop slug. If the mast is up, remove the tape and tighten the screw enough to hold the track in place. Loosely install the other 1 9/16" (40 mm) screw.



6 Slide 19 mounting slugs and a connector slug into the mast groove. Mast up: tape in place. Put a drop of blue Loctite® in each hole.



Installing Track

Hold a full-length track piece up to the mast and loosely install the top screw.

Warning! Do not let tracks drop, severe injury can result if the upper track(s) drop down.



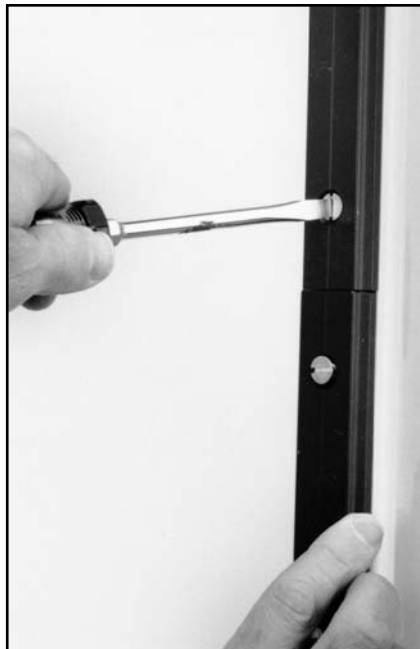
Use a putty knife to slide the next slugs and connector slug in place and loosely install the 1" (25 mm) screws.



7 Slide tracks up far enough to fit the next track.

Mast up: hold upper tracks, loosen screw that holds the tracks in place and slide track up. Loosen screw enough so the track will slide up the mast.

Securely tighten the new bottom screw.

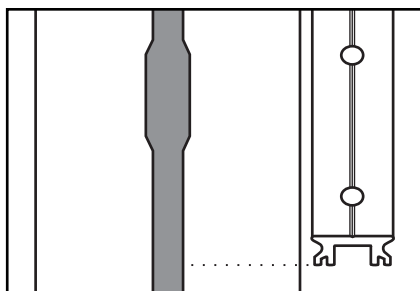


8 Repeat until all full length tracks are installed.

Do not install the 4 1/8" (105 mm) connector slugs at this time.

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

Slip slugs below the gap. Begin with 2" (51 mm) end stop slug, followed by the mounting slugs, and the 4 1/8" (105 mm) connector slug on top.



9 Push tracks up so the 18 7/8" (479 mm) to 22 7/8" (581 mm) bottom track will fit below. See step 10. The rubber end stop extends 3/8" (10 mm) below the bottom of the track.

Do not install the bottom track yet.



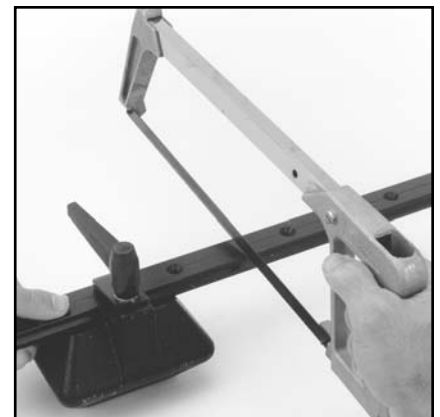
10 Refer to the chart below to find your bottom track length.

From the track that is remaining, measure from the anodized end and cut the track.

Round your track length to the nearest 1" (25 mm). Make the bottom track 18 7/8" (479 mm) if not listed below.					
If your track length is listed below, make the bottom track 22 7/8" (581 mm)					
56'7"	63'5"	70'3"	77'1"	83'11"	90'9"
(17.247 mm)	(19.329 mm)	(21.412 mm)	(23.495 mm)	(25.578 mm)	(27.661 mm)
If your track length is listed below, make the bottom track 21 7/8" (556 mm)					
56'6"	63'4"	70'2"	77'0"	83'10"	90'8"
(17.221 mm)	(19.304 mm)	(21.387 mm)	(23.470 mm)	(25.552 mm)	(27.635 mm)
If your track length is listed below, make the bottom track 20 7/8" (530 mm)					
56'5"	63'3"	70'1"	76'11"	83'9"	90'7"
(17.196 mm)	(19.279 mm)	(21.361 mm)	(23.444 mm)	(25.527 mm)	(27.610 mm)
If your track length is listed below, make the bottom track 19 7/8" (505 mm)					
56'4"	63'2"	70"	76'10"	83'8"	90'6"
(17.170 mm)	(19.253 mm)	(21.336 mm)	(23.419 mm)	(25.502 mm)	(27.584 mm)

11 Drill a 2 1/4" (8.5 mm) end stop hole 9/16" (14 mm) from the cut end of the bottom track.

The other hole will be in the track unless your track length is shown in the chart above. If so, drill the second hole 1 5/8" (41 mm) from the end of the track.



12 Check the fit of the bottom track, **but do not install it.** See step 13–15.

Securely tighten those screws that you can reach from your mounting position. Go to the top of the mast and come down, securely tightening all screws.



Installing Track by Drilling and Tapping

Required Parts

516/758/1847 Track

See page 3, Determining Track Length. The bottom track length needs to be short enough to remove easily to put cars on or take them off the track. We recommend an 18" to 24" (457 mm to 609 mm) bottom track length. **Do not use 1816 track for drilling and tapping.**

5/16" (8 mm) Flathead Screws (not included)

Number of fasteners needed:

516 Track — 3 fasteners/foot of track

758/1847 Track — 10 fasteners/meter of track

1786 Splice Pieces

548 End Stop Set

Before You Remove Old Track

Before taking old track off, scribe a pencil line down either side of track to use as a guide for keeping track straight. If the track is off the mast, use a string attached to the mast to help line up the track while installing.

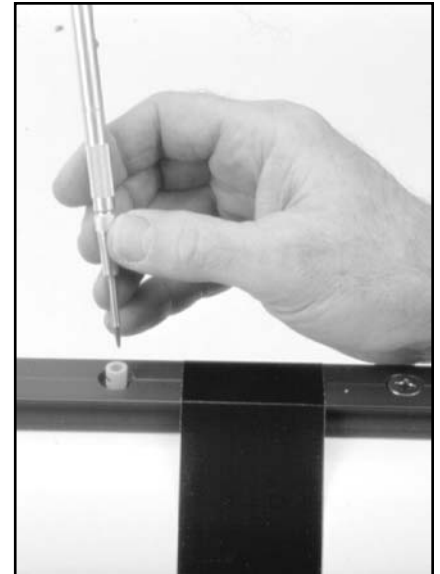


Drilling and Tapping

Start at one end of track and work down: drilling, tapping and screwing. Do not drill and tap both track ends and then expect to drill and tap the center holes.

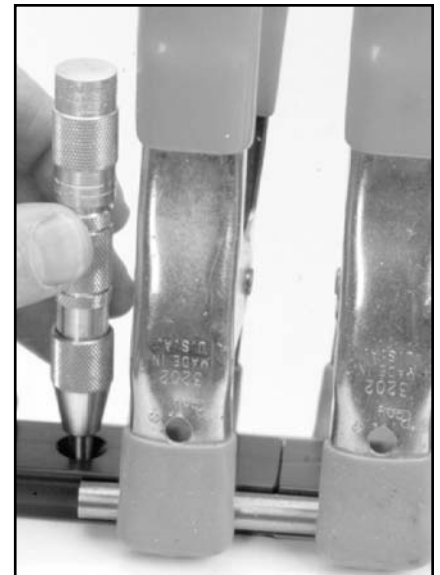
Clamp or duct tape track in place on mast. Center punch hole being careful to locate center of track hole.

Tip: For accuracy and ease of punching use a spring loaded machinist's center punch. Use the narrow shaft model with a centering tube fashioned from a piece of plastic tubing.



Drill through track hole, making sure drill is perpendicular to face of mast. Take care to not let the chuck hit the track. Tap threads and install screws using blue Loctite®.

Aligning track at joints: The 1786 splice pieces will help align the track as you are installing the track. In addition, use round rods or dowels to align tracks. Use spring clamps or "C" clamps to hold them in place until the track is drilled, tapped and screwed in place. Follow instructions on page 9 regarding loading cars and installing bottom track.



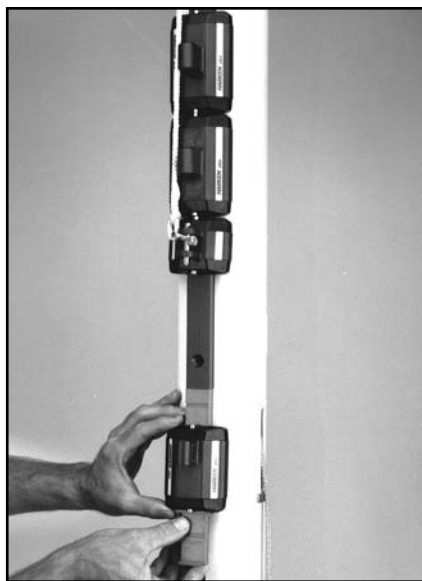
Loading Cars On Track

13 Slide cars onto the track beginning with the two headboard cars (1782 headboard cars have lug in the center).

Slide Battcars onto the track. 1784/1795: make sure that the housing for the vertical shaft is at the top of the car.

If the mast is up, use a halyard to hold the cars.

Tip: Hold car loader against the track firmly until the car is completely on the upper tracks.

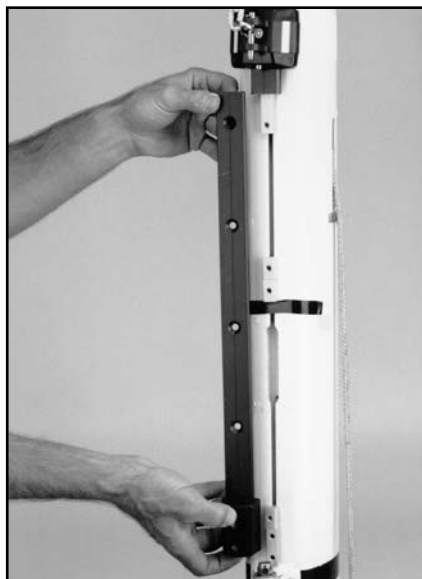


16 Ease cars onto bottom section.



14 Slip the connector slug into the mast groove and install this on the bottom full length track piece.

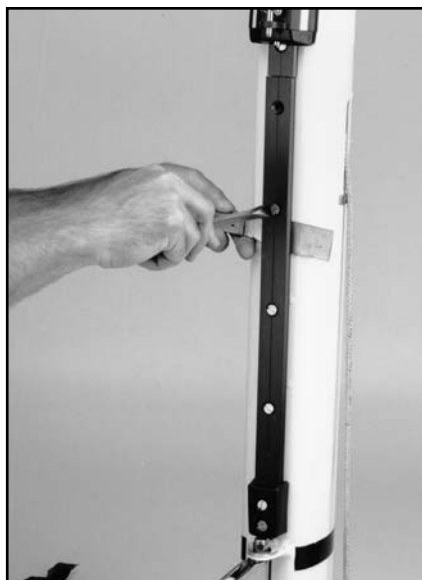
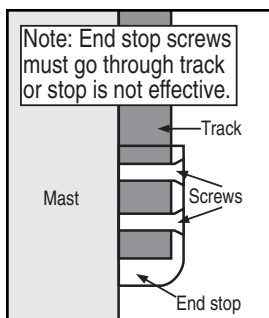
Slip the remaining three or four mounting slugs and end stop slug in place and tape them if necessary.



17 Install the headboard coupler so that the cotter pin end of the clevis pin is toward the middle of the coupler.



15 Install bottom track and lower end stop using blue Loctite on screws. Securely tighten all screws.



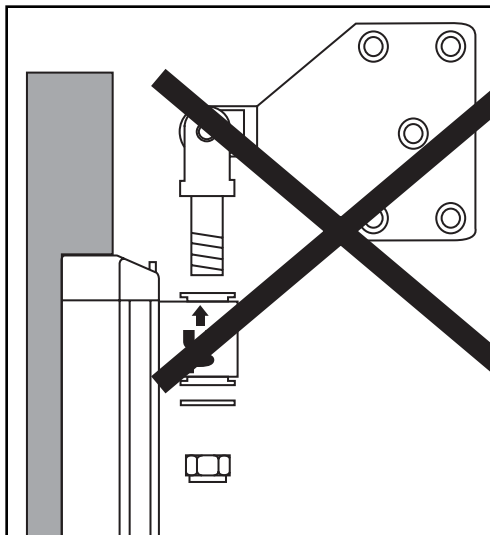
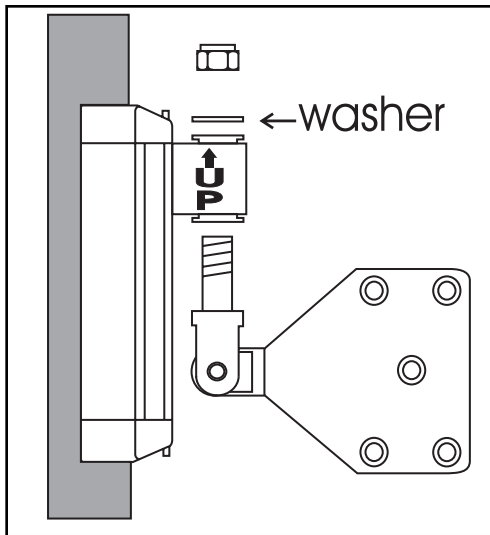
Loading Sail On Car

1 Load the sail beginning with the lower cars. Luff cars: remove clevis pin, slip plastic center sleeve between tangs. Slip clevis in place. Secure with a cotter pin. Make sure webbing is not twisted.

2 1784 or 1795 cars: slip plastic bushing into each end of car lug. Insert shaft of Battslide® fitting into barrel so threaded end points up. You must use $\frac{3}{8}$ " (10 mm) washer between plastic shaft bushing and nut. See Diagram B.



Diagram B:
1784/1795 cars.

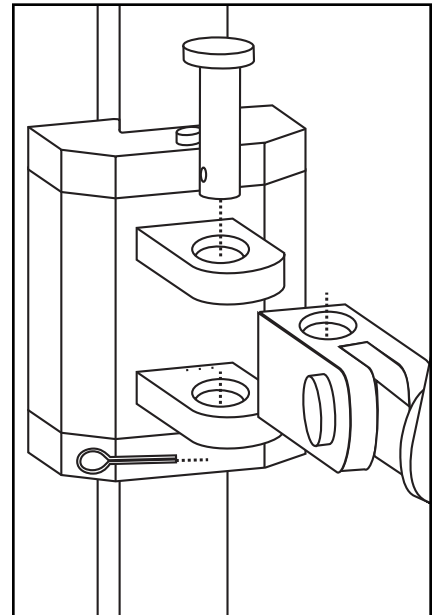


3 1784 or 1795 cars: tighten the locknut until you begin to feel shaft of Battslide® bind when you rotate it in car. Loosen the locknut 1/8th turn from this point.

Tightening the locknut too tightly or failing to use a washer will damage the plastic liner.



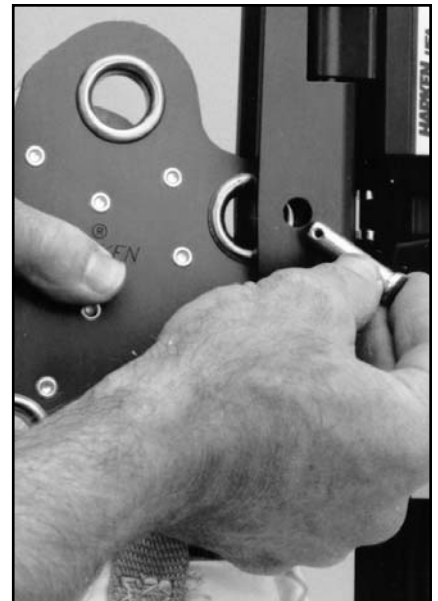
4 1828/1829/1903 cars: slip batten receptacle tang into toggle forks. Secure with clevis pin and cotter pin.



5 Attach headboard of sail to the headboard coupler.

Raise sail and check to make sure that sail is not too tall.

If necessary, have sail shortened.



Lazy Jacks

Use shock cord to hold lazy jacks open so that the battcars and battens will not catch on them. This will also help stop slapping of lazy jacks on sail.

Attach one end to the lower spreader tips and the other to the lazy jacks.

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

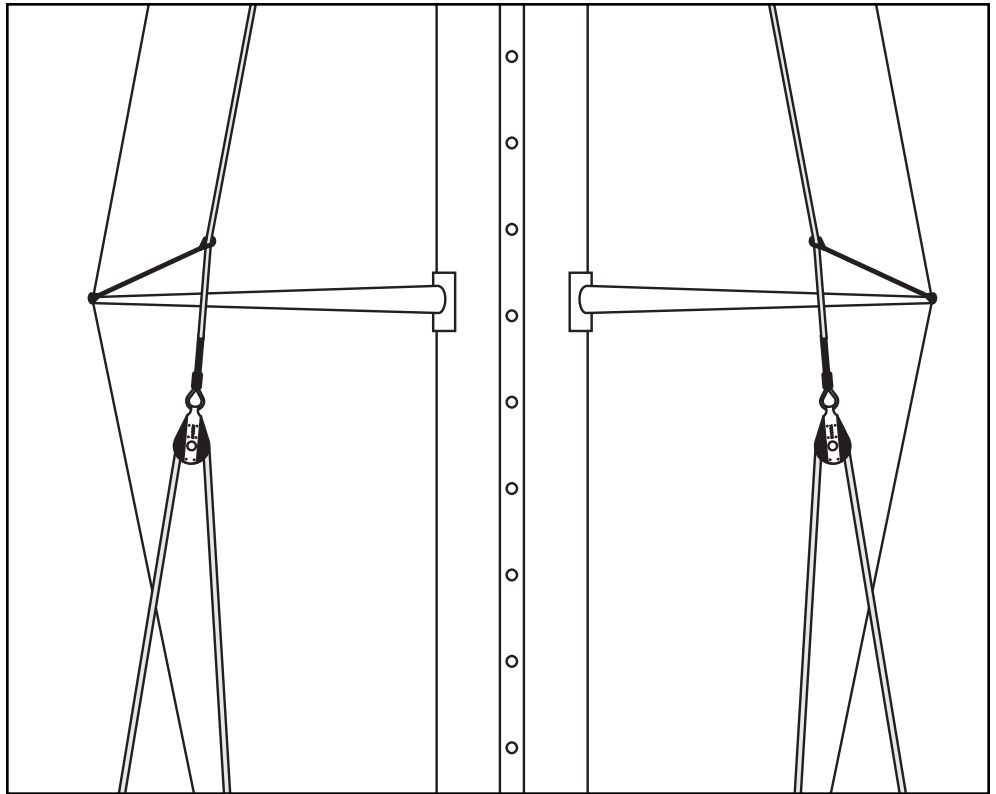


DIAGRAM C

Operating Precautions

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

Maintenance

Clean the cars at the beginning of the season or if the cars begin to bind. Squirt detergent and water into the ball bearings and move the cars up and down to circulate the detergent. Let the detergent sit a few minutes and then spray water into the balls and circulate to remove detergent. Do not use spray lubricants on cars or tracks.

Clean tracks by washing with detergent and water. After the track is dry you may apply a dry spray lubricant like McLube®.

Inspect Battcar fittings for signs of locknuts loosening or plastic bushings wearing. If $\frac{3}{8}$ "-16 locknuts are not holding, replace them. Inspect batten receptacles for signs of screws loosening.

Inspect plastic bushings in Battcars for wear. Replace bushings if necessary.

If it is necessary to remove the cars for any reason, use a car loader. See step 13.

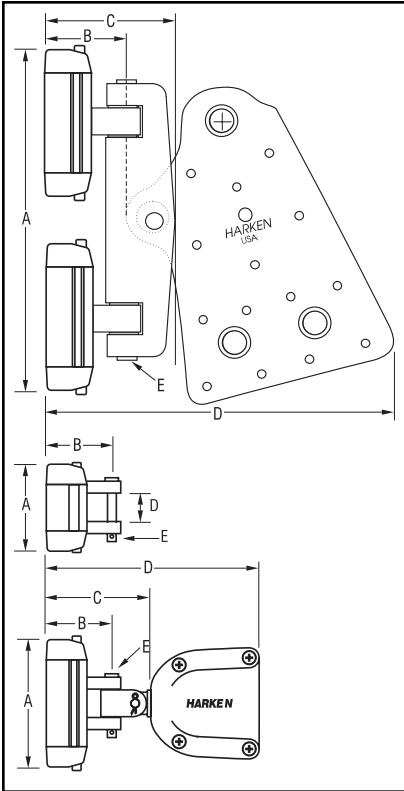


Removing Sail

1784/1795

Taking care not to lose the stainless steel washer and plastic bushings, remove nut and slide the vertical post out of the Battcar. See page 10. Note: replace $\frac{3}{8}$ " nut after two uses.

Sailmaker's Instructions



Part No.	Description	Max Batten Width or Diameter	Max Thickness Batten w/Cloth	Batten Shape	A	B	C	D	E
1782	Headboard car assembly w/headboard	—	—	—	11 ³ / ₁₆ " 284 mm	2 ¹ / ₁₆ " 53 mm	4 ⁵ / ₁₆ " 117 mm	10" 254 mm	1 ¹ / ₂ " 12 mm
1784	Battcar w/aluminum Mega Battslide®	3 ¹ / ₈ " 79 mm	5 ⁵ / ₈ " 16 mm	Flat	4 ³ / ₄ " 121 mm	2 ⁵ / ₁₆ " 59 mm	3 ³ / ₁₆ " 81 mm	5 ¹³ / ₁₆ " 148 mm	3/8-16
1785	Luff car	—	—	—	4" 102 mm	2 ⁵ / ₁₆ " 59 mm	2 ¹¹ / ₁₆ " 68 mm	1 ¹ / ₈ " 29 mm	5 ⁵ / ₁₆ " 8 mm
1795	Battcar w/adjustable Battslide® (round batten)	3 ³ / ₄ " 19 mm	—	Round	4 ³ / ₄ " 121 mm	2 ⁵ / ₁₆ " 59 mm	3 ³ / ₁₆ " 81 mm	8 ³ / ₄ " 222 mm	3/8-16
1827	Battcar w/12 mm stud for SDA fitting	1" 25 mm	—	Round	4 ³ / ₄ " 121 mm	2 ⁵ / ₁₆ " 59 mm	2 ¹¹ / ₁₆ " 68 mm	—	5 ⁵ / ₁₆ " 8 mm
1828	Battcar w/pivoting adjustable Battslide® (round batten)	3 ³ / ₄ " 19 mm	—	Round	4 ³ / ₄ " 121 mm	2 ⁵ / ₁₆ " 59 mm	3 ³ / ₁₆ " 81 mm	9 ¹ / ₂ " 241 mm	5 ⁵ / ₁₆ " 8 mm
1829	Battcar w/pivoting Mega Battslide®	3 ¹ / ₈ " 79 mm	5 ⁵ / ₈ " 16 mm	Flat	4 ³ / ₄ " 121 mm	2 ⁵ / ₁₆ " 59 mm	3 ³ / ₁₆ " 81 mm	6 ³ / ₈ " 162 mm	5 ⁵ / ₁₆ " 8 mm
1903	Battcar w/pivoting adjustable Battslide® (large round battens)	1" 25 mm	—	Round	4 ³ / ₄ " 121 mm	2 ⁵ / ₁₆ " 59 mm	3 ³ / ₁₆ " 81 mm	12" 305 mm	3/8" 16 mm

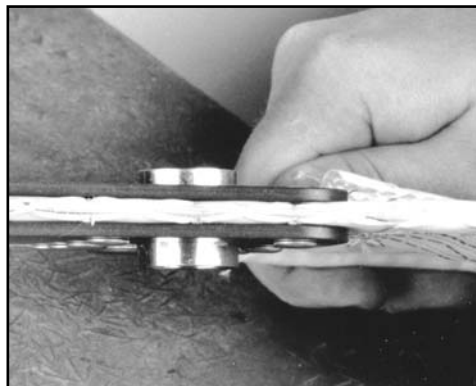
Installing 1782 Headboard Plates



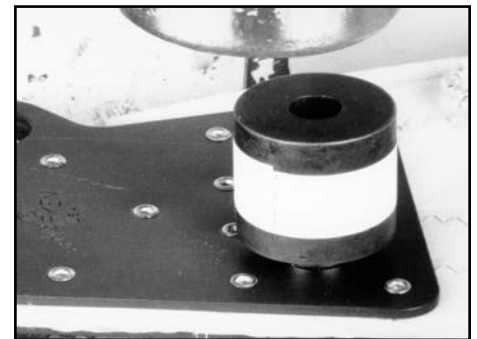
Make sure that height of sail is correct and setbacks are uniform. Refer to the chart above for the correct setbacks and alignment of the headboard.

Install headboard with narrow corner facing upwards.

Use 3/16" aluminum semi-tubular rivets in the 20 smaller holes.



Place the liner in the headboard so it is equally spaced above and below the headboard.



Use a closing tool for the 19 mm stainless liners supplied with the headboard.

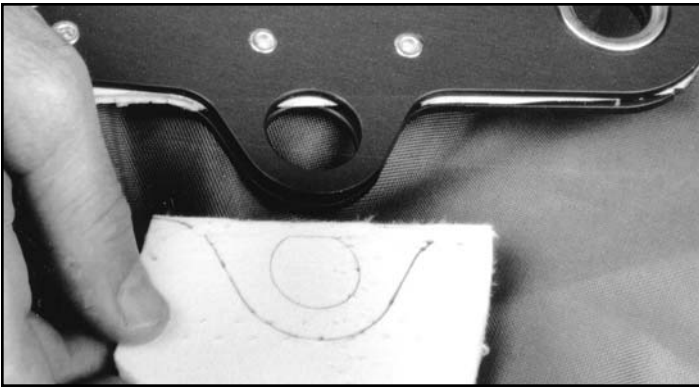
Closing Tools:

Rutgerson 19 mm closing tool.

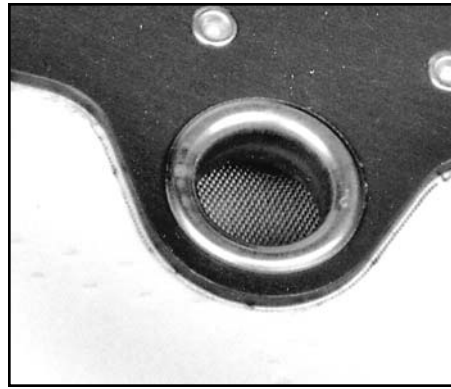
C423 Howe & Bainbridge for 7/8" ring (used with #23 ring).

C410 Howe & Bainbridge for 7/8" ring (used with 210 Innox ring).

Sailmaker's Instructions



Use a cloth to fill in the space between the ears of the headboard plates.



Use enough pressure so rings will fit in coupler. The inside dimension of the coupler is 11/16" (18 mm).

Make sure the ring fits inside the coupler.



Distance Between Attachment Points

Battens and luff cars should be placed according to sailmaker's discretion. Usual distance between attachment points is 4' to 4'6" (1.2 m to 1.35 m).

The distance may be greater if luff is stiffer. If attachment distance is greater, pretension the boltrope so that there is no flapping between attachment points.

Setting Up Reef Points

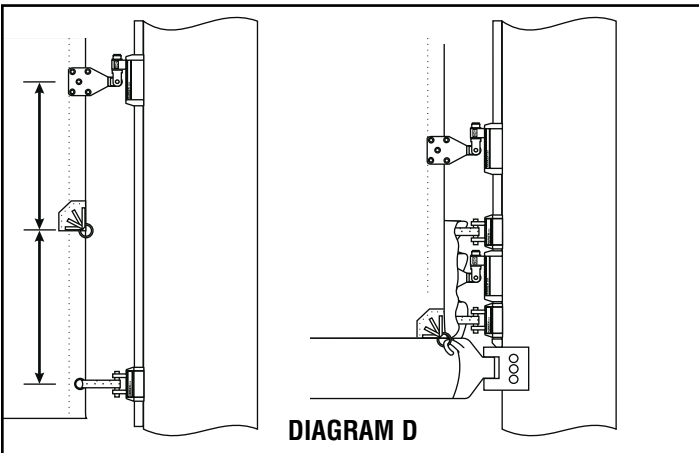


DIAGRAM D

Space reef points so that they are halfway between sail attachment points. Especially with upper reef where sail needs to extend past the stack of cars to the reef tack fitting. Battens or reef points may need to be moved to allow this.

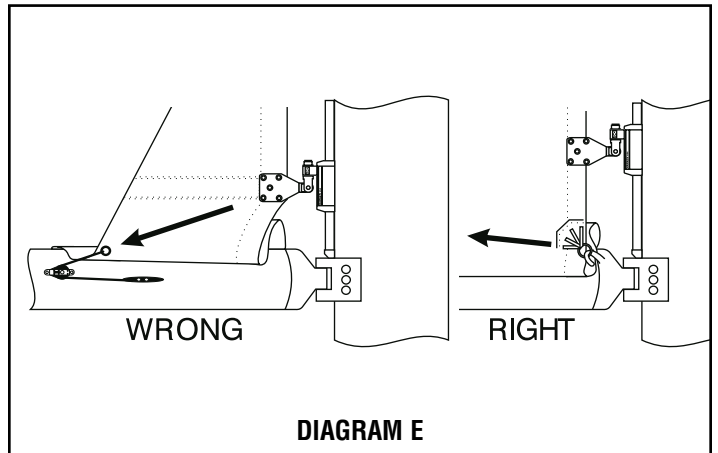


DIAGRAM E

NOTE: The batten fittings cannot handle reefing outhaul or downhaul loads. Make sure these loads are transferred to a tack fitting such as a reefing hook.

Attaching Sail to Luff Cars

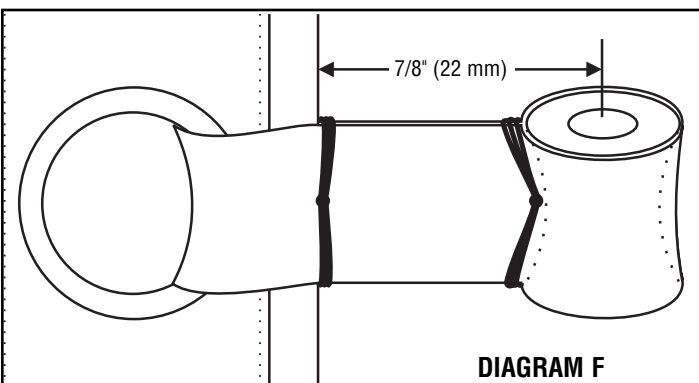


DIAGRAM F

The sail setback from the luff tape to the bearing point of the luff car is 7/8" (22 mm).

Plastic hourglass-shaped spacers are shipped on the luff cars. Seize the spacer to the webbing by stitching just behind the plastic spacer. This will make it easier to slip the pin into the strap and will reduce wear on the strap. See diagram F.

Also seize the webbing to the sail by stitching up against the sail.

Assembling Harken 1784 Battcar and 1829 Mega Battslide®

1784 and 1829 fits battens with widths up to 3 1/8" (80 mm).

Battens wider than 2 1/2" (64 mm) require tapering.

Note: Remove sharp edges from the forward end of battens with a file or sanding block.

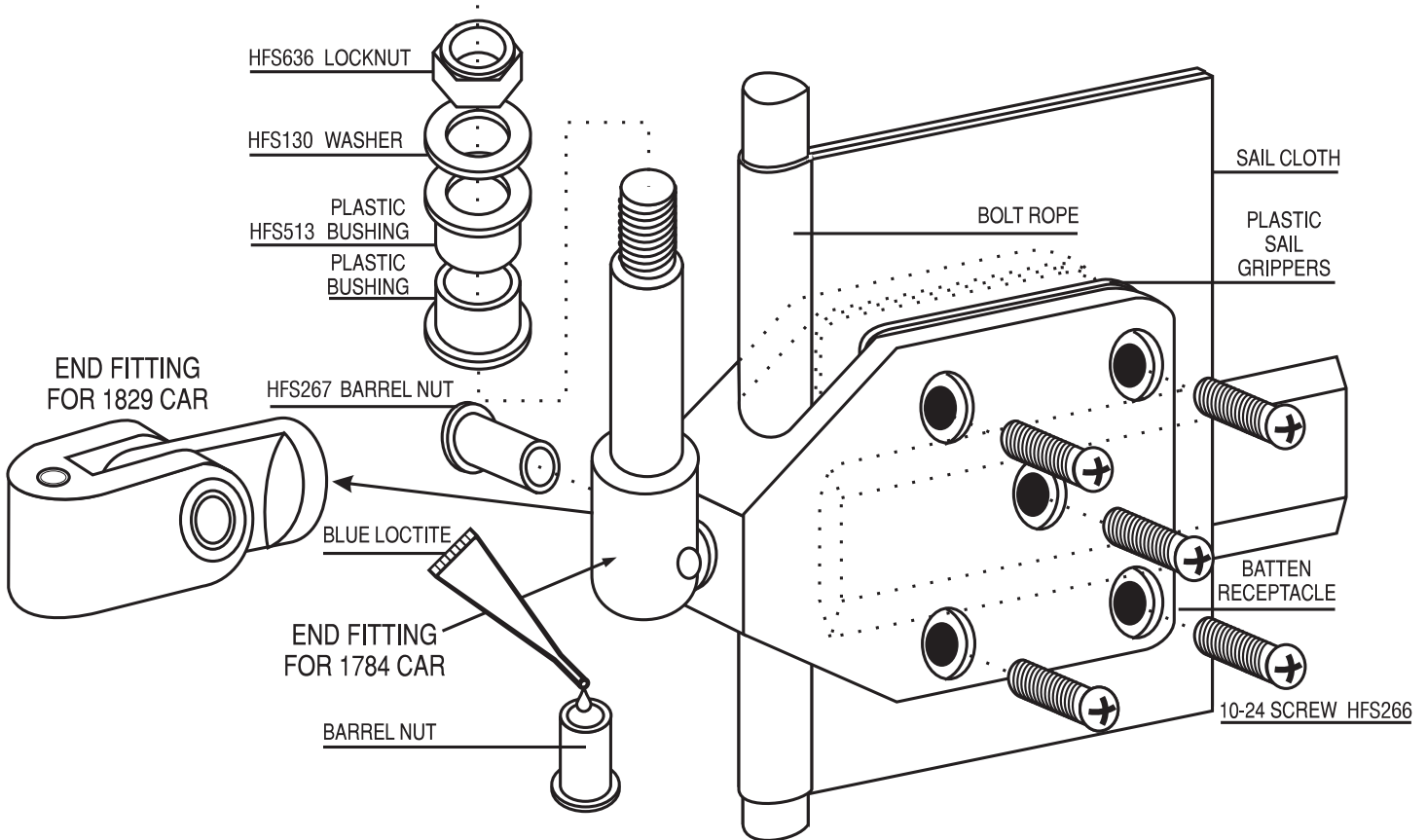


DIAGRAM G

1 With batten installed loosely in pocket, place Battslide® batten receptacle over boltrope, centered on batten pocket tape. Make sure receptacle is snug against boltrope and that bolt rope is straight.

2 Mark the mounting screw holes. Punch them with a 1/4" or 5/8" (7 mm) punch.

3 Choose a combination of plastic sail grippers that suit the thickness of the sail. Put at least one gripper on each side of the sail. Grippers should fit as snugly as possible with no space between them and the cheeks of the batten receptacle.

4 Install a barrel nut and 10-24 screw through one of the forward holes; align the sail grippers and tighten the first screw to maintain position of entire assembly. Use blue Loctite® on barrel nuts.

5 If there is slack between the side of batten and receptacle cheek, fill it with appropriate thickness of green laminated batten material.

6 Install the remaining barrel nuts, sail grippers and screws. Tighten firmly. Note: when using tubular battens, **do not overtighten** to the point of cracking the batten.

7 The fifth (center) hole is an optional bolt hole for flat battens. This is recommended.

Sailmaker's Instructions

Assembling Harken 1795, 1828 and 1903 Battcars with Adjustable Round Batten Battslides®

Harken 1795, 1828 and 1903 Battcars fit round battens up to $\frac{3}{4}$ " (19 mm) diameter. Sleeves are included for battens below $\frac{3}{4}$ " (19 mm).

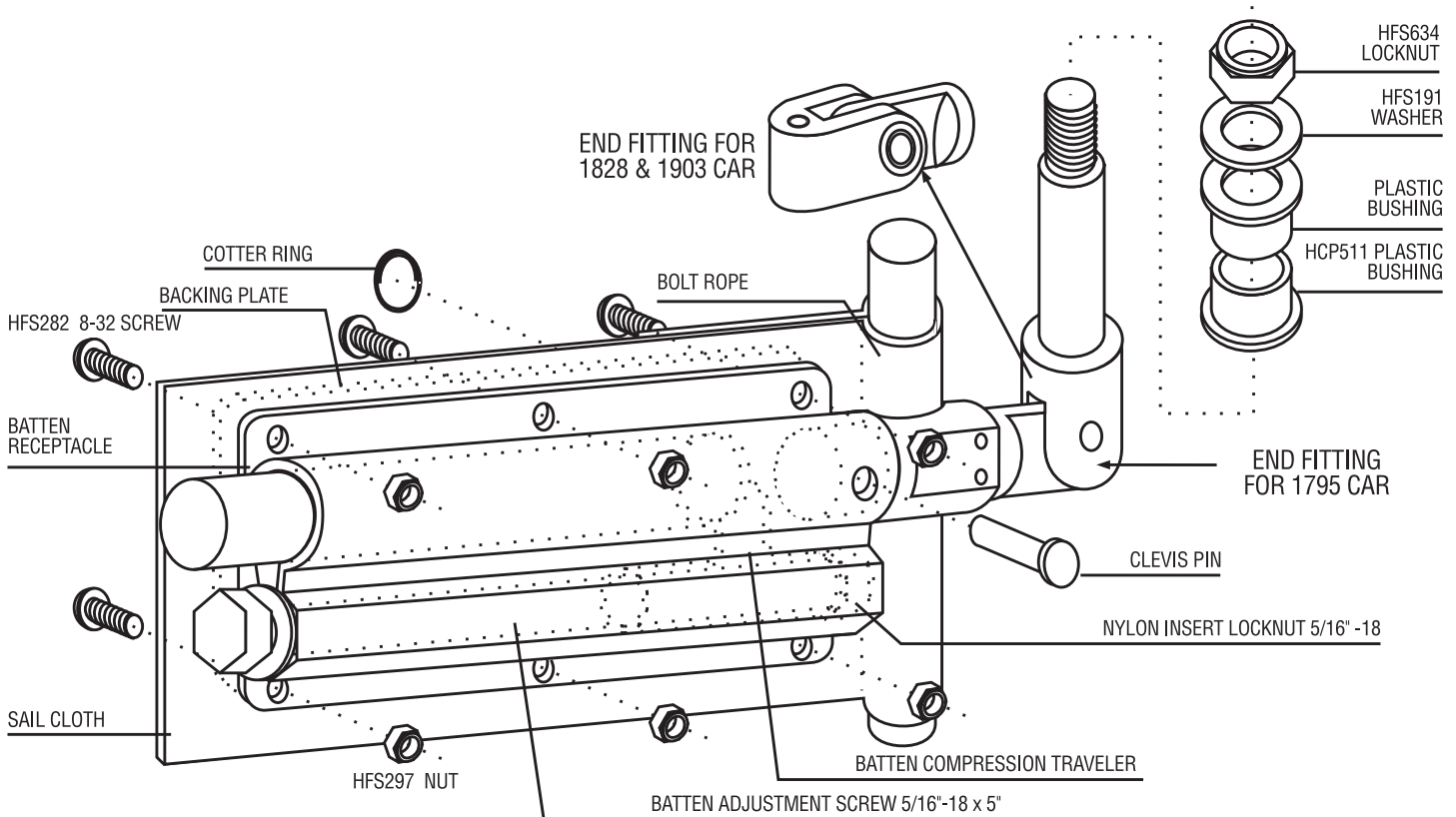


DIAGRAM H

1 Determine which side of sail to mount battens. The batten receptacle may be installed on the port or starboard side of the sail.

The receptacle is shipped for starboard side installation. For port-side, reverse the batten compression assembly and install the link holder on the opposite end of the batten receptacle.

Port or starboard batten location is a matter of preference, but may be influenced, for example, by the location of a storm trysail track along one side of the mast.

2 Align the Battslide® fitting with the batten pocket and with the bolt rope. Make sure the round batten chamber is above the hexagonal chamber.

Mark and punch six holes for the 8-32 mounting screws and one larger hole at the forward end for the inch diameter clevis pin.

1794 Battslides® are intended primarily for use on sails with horizontally-oriented battens; however, if the upper battens are slightly inclined, the Battslides® will accommodate this.

3 Use six 8-32 screws and locknuts to sandwich the sail between the backing plate and the batten receptacle.

The screw heads must be on the backing plate side, and the nuts on the receptacle side, as shown in the illustration.

4 To fit the battens, loosen the batten adjustment screw and remove the batten compression traveler.

Round the aft end of the batten, insert it through the forward end of the receptacle and push it as far aft into the leech end of the batten pocket as possible.

With a pencil, mark the batten at the forward end of the receptacle. Pull the batten out of the receptacle a slight distance and cut it off about 1" (25 mm) aft of the pencil mark to allow room for the batten compression traveler and the link holder.

Note: If the diameter of the batten is less than $\frac{3}{4}$ " (19 mm), use enclosed 3" long cylinders to sleeve the batten.

Glue sleeves to the forward end of the battens.

Sleeves are available from Harken in limited sizes or they can be fabricated from plastic tubing.

5 Reinstall the batten compression traveler and 5/16"-18 locknut.

Tighten the traveler about $\frac{1}{4}$ " (6 mm) after it contacts the batten. Align the $\frac{1}{4}$ " (6 mm) holes in the receptacle, backing plate and link holder. Install the clevis pin with the head on the receptacle side and secure it with the cotter ring.

6 The batten compression can be adjusted using a $\frac{1}{2}$ " socket wrench with a 3" (76 mm) extension. Some adjustment will be required after the first sail.

Installation Troubleshooting

Problem	Probable Cause	Solution
Tracks do not butt up against each other	Cut end of top or bottom track is at joint Track weight pulling tracks apart	Make sure the anodized end is towards 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
	Paint or other material clogging mast groove	Clean out groove
Headboard coupler does not fit	Cars are loaded on mast in the wrong order	Remove cars onto car loaders and load in the correct order
Cars do not fit on track	Track and cars are not the same size	Contact your dealer or Harken
	Balls are missing	Remove cars onto car loaders, 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	Batten receptacle upside down	Remove nut on batten receptacle post, install so nut is at the top of the car
	Car is on upside down	Remove cars onto car loader and install so barrel is near the top of the car
	Balls missing from car	Remove cars onto car loader, load balls and slide cars back on track
	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
Nut on Battcar is not holding	Locknut has been used too many times	Get new 5/8" - 18 locknut
Batten receptacle does not rotate	Nuts are too tight	Loosen nuts slightly
Plastic bushings in Battcar are breaking	Washer not used	Install washer under nut for vertical post
Cars jam when raising sail	Headboard or cars are catching on lazy jacks	Use topping lift or rod vang and shock cord to pull lack 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	Have sailmaker move reef point or change reef tack fitting



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