



Version 1



KEEL BOAT

PRODUCT CATALOGUE



Cover: Dan Ljungsvik. CB 66.

The information and specifications contained in this catalogue are subject to change without prior notice.



Photo: Bernard Galeron. Dingo 2.

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No matter what your preferences are, racing or cruising, the rig system can make a great contribution to your sailing experience. It has to be figured out in detail to be the perfect link between the boat and the sails.

Seldén has become the world's largest manufacturer of mast and rigging systems partly by allowing pure sailing experience be the driving force in the product development. Our focus is on race winning sail handling by attention to detail. Materials, quality control during production and a worldwide service organisation have made Seldén an obvious choice for thousands of sailors.

Welcome aboard!

Right from the start



Photo: Seldén. Ohlson 8:8

Heeling test in 1971. The righting moment of the boat is measured at 30° heel.

Seldén was founded in 1960 and has grown from a small company into the world leader, with manufacturing in Europe, the USA and Asia. Precise, meticulous approach has always been a characteristic of Seldén. Our manufacturing methods, tools and instruments have been developed to meet the demands of large-scale, cost-effective production, but our focus on quality and function remains the same as back in the 1960's. We started by doing things in the right way, and that is how we have continued.

Attention to detail

In our search for perfection, no detail is considered too small. This applies to everything, from the choice of materials to stringent testing of the finished product. Seldén's business philosophy can be summed up as a continuous quest to achieve the best possible function for each product.

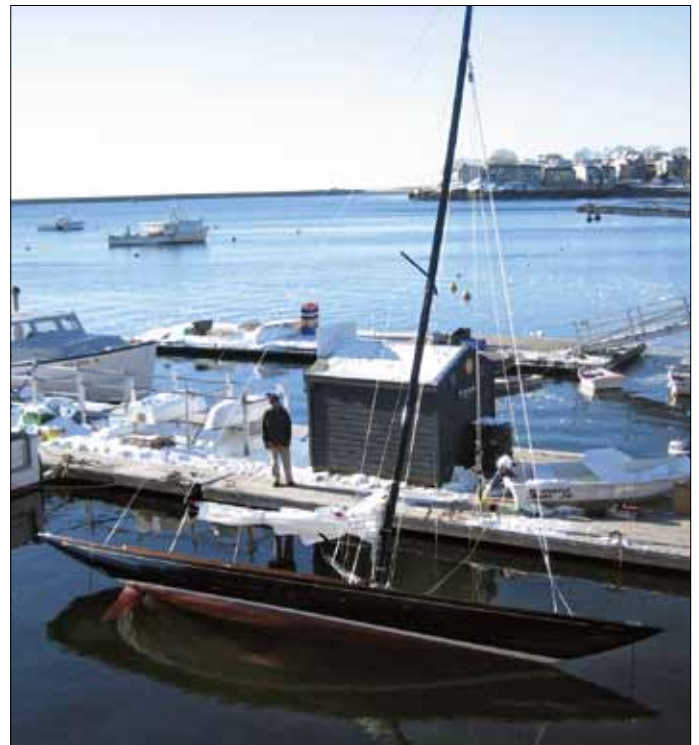


Photo: Billy Black. CW Hood 32

Heeling test today. Materials change. Good methods don't.

A well-functioning whole

Each rig is carefully designed and sized for the boat in question. We base our mathematical dimensioning on the righting moment at 30° heel and the boat designer's proposed sail plan. The wishes of the boat owner determines the way the rigging system is equipped. With nearly 50 years of experience, we have built up a wealth of knowledge that is available to our designers. As a result, the boat and rig form a well-functioning whole.

Each mast and boom from Seldén has a unique serial number. This is engraved in the lower end of the mast extrusion and the front end of the boom extrusion. Quote this number if you want to discuss details relating to your rig.

What is a keelboat?

Seldén's definition of a "keelboat" is a boat sized in between a dinghy and a yacht, with a length of approximately 18-28'. These boats often have a 50% ballast ratio. Consequently, the weight of the keel represents half of the total displacement.



Photo: Richard Langdon/Ocean Images. Rustler 24

Give us the facts

The key to a correct rig calculation is the quality of the input data at our disposal. This data consists of hard facts, plus what we can learn by listening very carefully when talking to the customer.

The "Seldén Rig Fact sheet" has proven to be a simple and effective way of gathering all the facts required to calculate the optimum mast, boom and standing rigging sizes. It is where you note the data on the type of rigging, the main dimensions of the sail plan, the location of the chainplates and the righting moment of the boat (or the correct information to help us calculate the righting moment). "Seldén Rig Facts, Keelboat" is available on our web site, www.seldenmast.com.



All our standard rigs are custom made

Seldén offers a full range of masts and rig equipment in both aluminium and carbon including booms, spinnaker poles and bow sprits. In addition, there are Rodkicker rigid vang, furling systems, rig fittings and deck hardware. All rigs are custom-made, through every calculation and detail, for each individual boat type. We know how much depends on the rig, and there is no room for compromise.

MASTS



Photo: Alison Langley. Landing School 30.

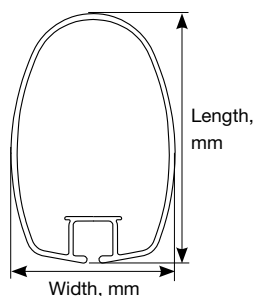
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Aluminium masts

Tradition and development

From the very beginning in the 1960's, Seldén produced a comprehensive range of aluminium yacht masts. Since then, the range has developed and expanded. The seven new keelboat sections feature a wealth of sophisticated and functional solutions, originating from the dinghy range and the yacht range.

The sections are extruded and anodized and they are all available with a tapered top. When tapering the mast section, a wedge shaped piece of the section is cut out and the section is squeezed together and welded. This process does not affect the strength of the mast section as it takes place prior to the hardening process of the section. The taper is parabolic which means it has a fair curve over its entire length. A tapered top results in lower weight aloft, with less windage and improved response to gusts.



A Mast ID number is engraved into the lower end of the mast section, for example D14-C126-0584. This mast is made from a C126 section. This is vital information when looking for mast parts in this catalogue.

Aluminium mast sections

	Mast section	Length/Width, mm	Iy, cm ⁴	Ix, cm ⁴	Wall thickness, mm	Weight, kg/m	Wy, cm ³	Wx, cm ³	Sail groove, mm	Bolt rope, Ø mm	Sail slider Art. no.
	C080	79/60	37.0	22.0	2.0	1.49	8.6	7.4	4.5	10	511-601
	C087	87/64	49.8	27.5		1.67	10.6	8.74			
	C096	96/69	65.7	34.6		1.79	12.67	10.15			
	C106	106/71	92.6	44.1	2.3	1.97	15.95	12.63	5.0		511-602
	C116	116/75	126.4	57.2		2.26	19.88	15.41			
	C126	126/79	172.2	74.6		2.4	25.37	18.99			
	C139	139/85	237.4	99.0		2.5	31.33	23.33			



Photo: Billy Black. CW Hood 32.

Carbon masts

The future is black and beautiful

All Selden carbon masts use custom designed laminates to suit the particular application. The combination of meticulous care, long experience and exact specifications enable us to achieve optimum performance for minimum weight. The purpose is to make each individual boat go faster.

The main characteristic of a carbon mast is the high longitudinal and lateral stiffness in relation to weight. The stiffness is customised to suit each individual boat and the crew can fine tune the prebend and the forestay tension to achieve a higher precision in the sail trim.

The weight of a carbon mast is considerably lower than the equivalent aluminium section. When designing a new boat, the designer has the option to select a lighter keel for the same righting moment as when using an aluminium mast. Alternatively, he keeps the standard keel and gains righting moment, a great advantage for a short handed crew with no crew members on the windward rail.



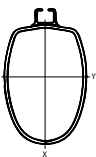
Seldén use unidirectional carbon fibre, pre-impregnated in epoxy for optimum resin content. Black pigment in the epoxy protects against UV radiation damage and

preserves the mast appearance. The carbon tows are wound around a mandrel producing a seamless uniform quality masts. During the design process the position and alignment of each fibre is precisely calculated so as to meet the required bend characteristics. Our CNC winding process makes for high repeatability, an important issue when producing one design masts. It is a highly developed and efficient process when compared to older manual processes such as female moulding.

In addition to the base laminate, Seldén apply local reinforcement as required e.g. in areas for cut-outs or along the front edge if further stiffness is requested. The laminate is compressed and cured by the means of vacuum, pressure and heat in an autoclave making it compact and light. The cured tube is separated from the mandrel and fitted out to customer specification. Masts can be clear coated or painted as required.

Carbon fibre masts from Seldén are characterized by their “viper” pattern. Feared by the opponents, appreciated by winners.

Carbon mast sections

	Mast section	Section dim. incl. track, mm	EI_y (GNmm ²)	EI_x (GNmm ²)	Wall thickness, mm	Weight, kg/m	W_y cm ³	W_x cm ³	Bolt rope	Sail slider Art. no.
	CC077	94/62	28-31	18-23	2.1-2.4	0.9-1.0	8.5-10	7-9	8	N/A
	CC086	100/62	30-47	18-30	2.4-3.0	1.0-1.3	13-16	9-11	8	N/A
	CC095	109/68	41-63	24-39	2.4-3.0	1.0-1.4	16-19	11-14	8	N/A
	CC105	121/71	72-110	41-56	2.4-3.0	1.3-1.7	19-23	13-16	10	511-602
	CC115	131/75	92-139	36-67	2.4-3.0	1.4-1.8	22-27	15-19	10	511-602
	CC125	140/79	148-206	61-98	3.0-3.6	1.8-2.2	32-37	22-26	10	511-602
	CC138	155/86	194-269	76-121	3.0-3.6	1.9-2.3	37-44	26-31	10	511-602

The above table shows data for typical Seldén sections using our standard tracks. CC077-CC095 use our PVC extruded bolt rope track as standard, CC105-CC138 use our aluminium extruded track. Other track options are available for particular applications.

Seldén use standard modulus carbon fibre as standard for mast sections and boom sections. For special applications, please consult Seldén if higher specifications material is required.

Carbon boom sections



	Boom section	Section dim., mm	EI_y (GNmm ²)	EI_x (GNmm ²)	Wall thickness, mm	Weight, kg/m	W_y cm ³	W_x cm ³
	BC086	87/62	40	21	2.4	0.9	13	9
	BC115	115/74	110	36	2.4	1.3	26	15



Photo: Olivier Blanchet. Heol 7.4.

Head box, fractional rig

The head box is manufactured from an extruded aluminium section and prepared for a variety of functions. An integrated groove in the top edge of the head box fitting helps in the installation of instrument brackets and backstay flicker, see page 16. To reduce the weight, the head box has four lightening holes.

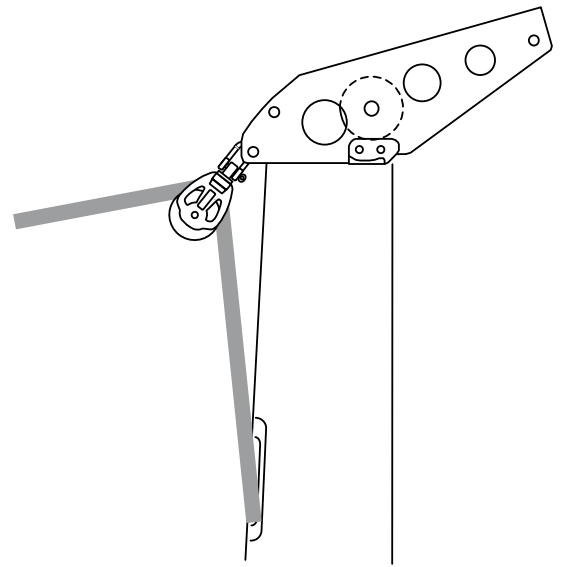
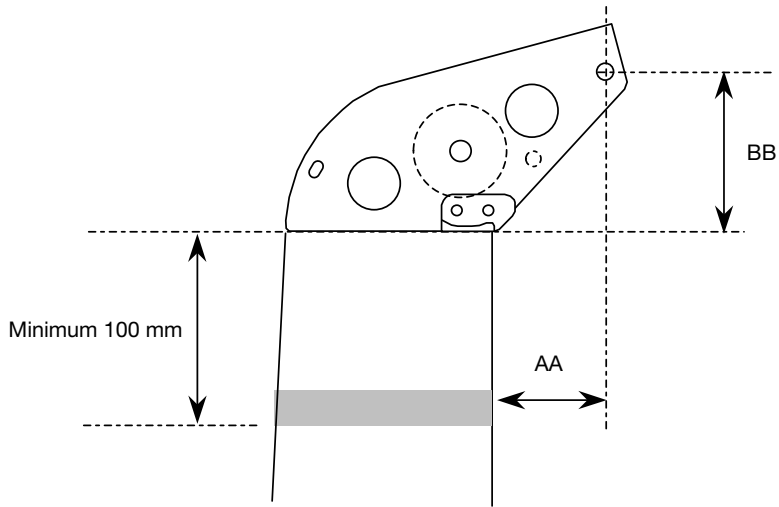


Head boxes for un-tapered sections, with back stay

Mast section		Art. no.		Weight, gr	AA, mm		BB, mm	Clevis pin for back stay		Back stay Max. dia., mm (wire)	Main halyard Max. dia., mm (rope)
Alu.	Carbon	Aluminium	Carbon		Alu	Carbon		Dim., mm	Art. no.		
C087 C096	CC086 CC095	501-123-01	501-153-01	415	65	50	75	6	165-005	4	8
					56	40					
C106 C116	CC105 CC115	501-127-01	501-157-01	473	80	65	85				
					70	55					
C126 C139	CC125 CC138	501-131-01	501-161-01	549	95	80	90	8	165-113	5	
					82	65					

Head boxes for tapered sections, with back stay

Mast section		Art. no.		Description	Weight, gr	AA, mm		BB, mm	Clevis pin for back stay		Back stay Max dia., mm (wire)	Main halyard Max dia., mm (rope)		
Alu.	Carbon	Aluminium	Carbon			Aluminium	Carbon		Dim., mm	Art. no.				
C087 C096	CC086 CC095	501-124-01	501-154-01	Standard head box	336	C087: 58	CC086: 45	65	6	165-005	4	8		
						C096: 52	CC095: 40							
		501-125-01	501-155-01	Long head box	422	C087: 149	CC086: 135	90						
						C096: 143	CC095: 130							
		501-126-01	501-156-01	Long head box with block attachment for masthead spinnaker	403	C087: 99	CC086: 85	75						
						C096: 93	CC095: 85							
C106 C116	CC105 CC115	501-128-01	501-158-01	Standard head box	377	C106: 70	CC105: 55	70						
						C116: 63	CC115: 50							
		501-129-01	501-159-01	Long head box	504	C106: 180	CC105: 165	100						
						C116: 173	CC115: 160							
		501-130-01	501-160-01	Long head box with block attachment for masthead spinnaker	448	C106: 105	CC105: 90	80						
						C116: 99	CC115: 84							
C126 C139	CC125 CC138	501-132-01	501-162-01	Standard head box	448	C126: 83	CC125: 70	85	8	165-113	5			
						C139: 74	CC138: 60							
		501-133-01	501-163-01	Long head box	594	C126: 212	CC125: 195	120						
						C139: 203	CC138: 190							
		501-134-01	501-164-01	Long head box with block attachment for masthead spinnaker	529	C126: 127	CC125: 112	100						
						C139: 118	CC138: 103							



Long head box with block attachment for masthead spinnaker.

Head box, no back stay

Mast section	Art. no.	Weight, gr	Main halyard Max. dia., mm (rope)
C080-C106	501-101-01	136	8

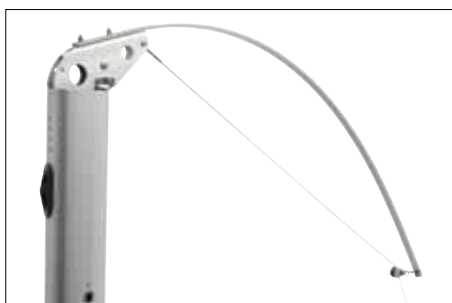


Photo: www.sail-box.ch. Mocean.

Accessories, fractional rig

Mast section		Bracket for instrument and lights Art. no.	Tricolour light, incl. screws, Art. no.	Tricolour light + anchor light, incl. screws, Art. no.	Bracket for Windex or VHF antenna Art. no.	Backstay flicker 1200 x 20 mm Art. no.
Aluminium	Carbon					
C080 – C139	CC077 – CC138	508-303-01	526-020-01	526-021-01	508-334-01*	511-120-03

* cannot be combined with backstay flicker



The backstay flicker lifts the backstay to avoid damage to the leech of the sail when gybing and tacking.



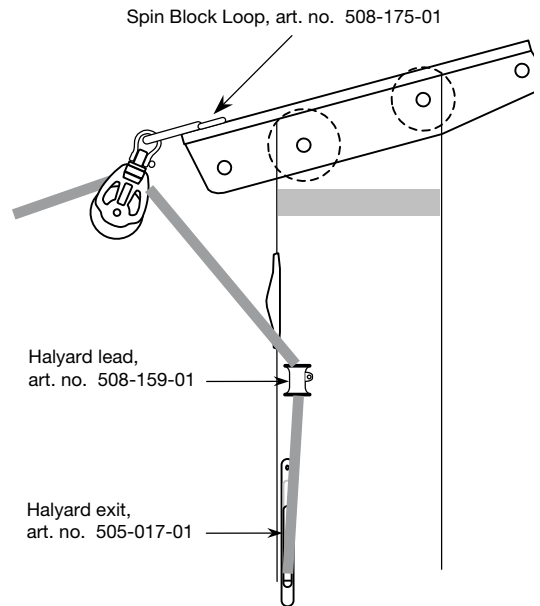
508-303-01
Bracket for instruments and lights (Ø 65 mm).



508-334-01
Bracket for Windex or VHF antenna




Head box, masthead rig

This head box fitting is also manufactured from an extruded aluminium section. It is mounted with a 15° angle and features two sheaves forward for jib/genoa halyards and two aft sheaves for main halyard and topping lift.




Accessories, Masthead rig

Mast section		Art. no.	Weight, gr	Halyard Max. dia., mm (rope)	Forward sheaves,	Aft sheaves,	Loop for spinnaker halyard block Art. no.	Halyard lead Art. no.	Halyard exit for spinnaker-halyard Art. no.	Furlex halyard box Art. no.
Aluminum	Carbon				Art. no.	Art. no.				
C126 C139	CC125 CC138	501-028-01	979	8	504-326 (Ø 70 x 13 mm)	504-324 (Ø 57 x 13 mm)	508-175-01	508-159-01	505-017-01	505-072-01

Mast section		Bracket for Windex or anchor light Art. no.	Bracket for Tricolour light, incl. screws, Art. no.	Instrument base Art. no.
Aluminium	Carbon			
C126 – C139	CC125 – CC138	508-549-01 (20 x 30 mm)	508-560-01 (60 x 30 x 63 mm)	508-563-01 (100 x 40 mm)
				

Forestay toggles and back stay toggles

Wire dia., mm	Art. no.	Clevis pin dia., mm
3	517-001-02	6
4	517-001-01	8
5		
6	517-002-01	10



Forestay attachments and halyard routing, fractional rig

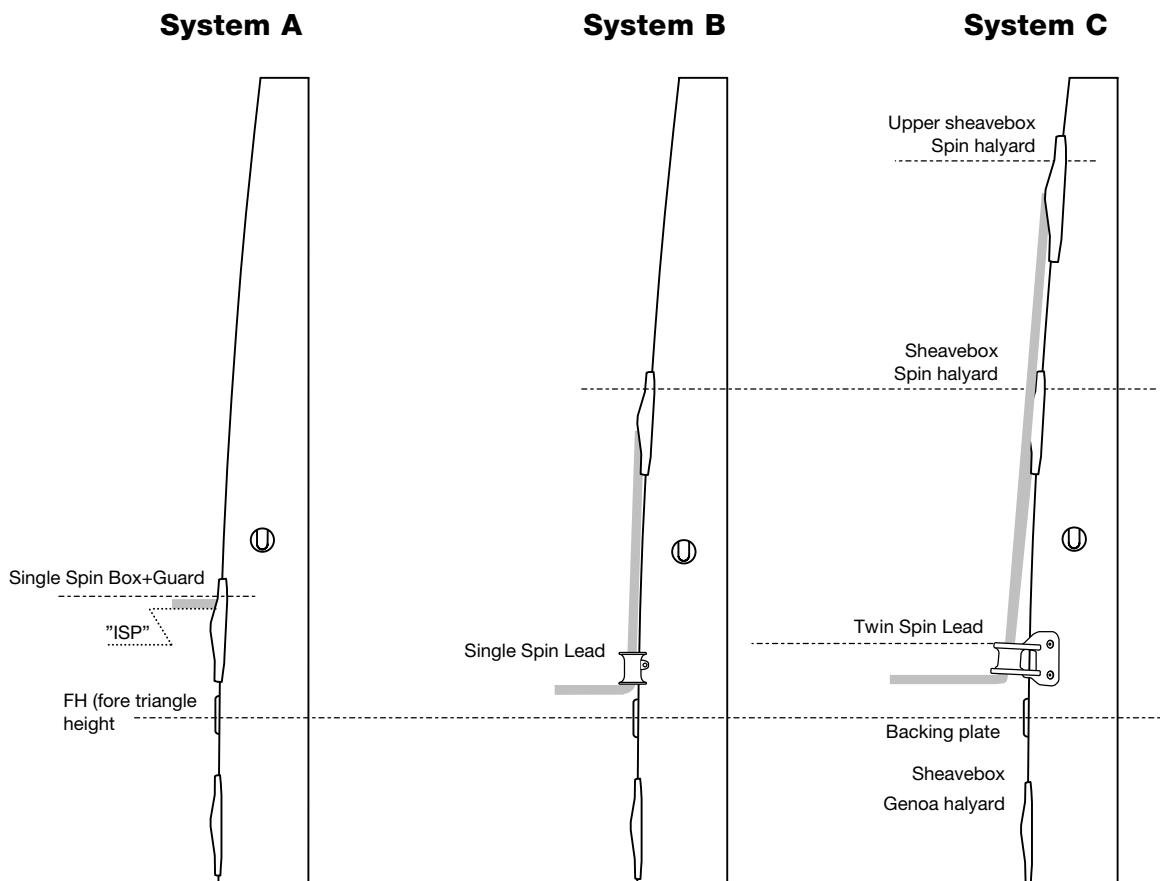
Backing plate for T-terminal

The most common type of forestay attachments is a T-terminal in the top end of the wire and a backing plate in the mast. The backing plate is located inside the mast so the rig load is properly distributed on the mast section. The middle part of the fitting protrudes through the section forming the female part in the forestay attachment. The forestay has full articulation, which ensures correct alignment and provides a secure and low fatigue attachment.

Halyard box

All boxes are made of a glass fibre reinforced polyamide composite. When used for a spinnaker halyard coming straight out of the box, Seldén supplies a stainless wear guard. This protects both the halyard and the box. Halyard boxes combined with Ø 3-5 mm forestays are available both with plain bearing sheaves as well as ball bearing sheaves.

Seldén offers three basic systems



System A

Forestay dia., Ø mm	Backing plate	Halyard box with wear guard for spinnaker halyard, plain bearing sheave. Art. no.	Halyard box with wear guard for spinnaker halyard, ball bearing sheave. Art. no.	Halyard box for jib halyard Art. no.
3	507-553-01	505-061-12	505-061-16	505-061-03
4	507-551-01			
5	507-552-01			
6	507-560-01	-	-	505-072-01



Halyard box with wear guard

System B

Forestay dia., Ø mm	Backing plate	Halyard box for spinnaker halyard, plain bearing sheave. Art. no.	Halyard box for spinnaker halyard, ball bearing sheave. Art. no.	Halyard lead Art. no.	Halyard box for jib halyard Art. no.
3	507-553-01	505-061-03	505-061-10	508-159-01	505-061-03
4	507-551-01				
5	507-552-01				
6	507-560-01	505-072-01	-		505-072-01



Single halyard lead

System C

Forestay dia., Ø mm	Backing plate Art. no.	Upper Halyard box for spinnaker halyard, plain bearing sheave. Art. no.	Lower Halyard box for spinnaker halyard, plain bearing sheave. Art. no.	Lower Halyard box for spinnaker halyard, ball bearing sheave. Art. no.	Double Halyard lead Art. no.	Halyard box for jib halyard Art. no.
5	507-552-01	505-072-01	505-061-03	505-061-10	508-734-01	505-061-03
6	507-560-01			-		505-072-01



Double halyard lead

Three functions in one fitting

With a Triple combi box the sheaves for the spinnaker halyard and the jib halyard are combined with the forestay attachment. This fourth system is available for mast section C106 - C139. The exits for the halyards are well rounded to prevent wear. The sheave for the spinnaker halyard is of larger diameter than the sheave for the jib halyard. This separates the halyards inside the mast and makes for smooth low friction operation.

Triple-combi box

Forestay dia., mm	Triple-combi box, Art. no.	Spinnaker halyard, max. dia., mm (rope)	Jib halyard, recommended dia., mm (rope)	Halyard lead for Furlex Art. no.
4-5	505-011-01	10	8-10	508-159-01

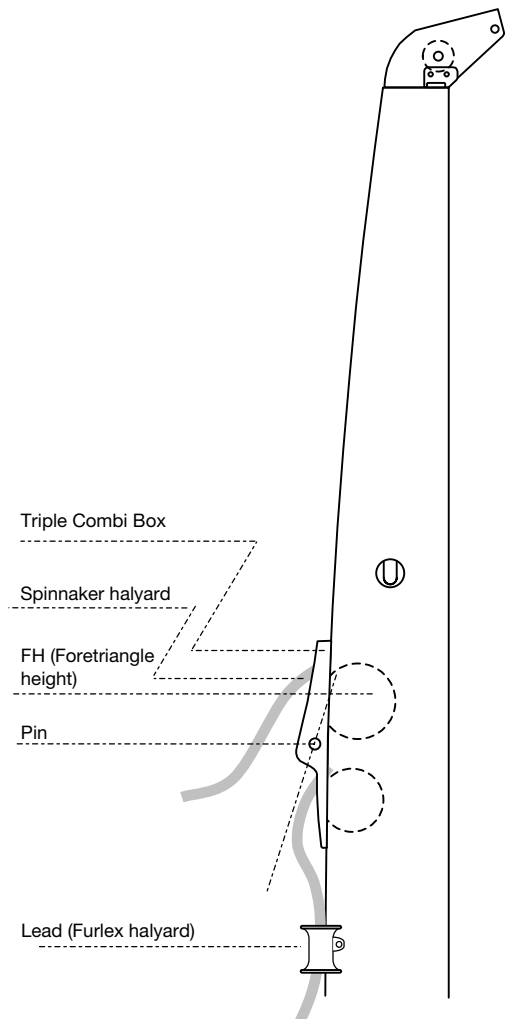


Photo: Fiona Brown. Quarter tonners.

Halyard boxes

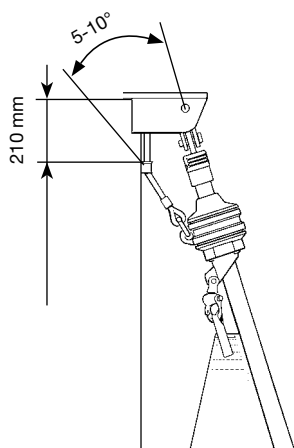
Well thought out routing of halyards not only reduces friction, but will also prolong rope life. It makes for safe and fast sail setting and dousing, equally important for the cruising sailor as well as for the racing sailor. It's all about quick and controlled sail handling.

Seldén halyard boxes for halyards and spinnaker lift are designed to satisfy very high demands for functionality, strength and light weight.

Halyard lead

The single halyard lead guides the halyard vertical and into the halyard box. It prevents chafe on the halyard and on the halyard box. The location of the halyard lead determines the maximum spinnaker hoist. The Seldén halyard lead is U-shaped, hence it can be retrofitted without pulling out the halyard from the mast. The material is chromed bronze which is kind to a wire halyard. Of course, the lead works well with rope halyards too. Two halyard leads can be fitted side by side to handle two halyards.

Halyard routing is particularly important when a jib furling system is fitted. It prevents the halyard wrapping around the luff extrusion when furling or unfurling the sail. A so called halyard-wrap can seriously damage the furling system, the forestay and the halyard.



1 2 Halyard

The double halyard lead fitting consists of a stainless bracket with two integrated stainless rings. The bracket has the same radius as the front of the mast. The rings are well rounded and have flared entry/exit for minimum friction, promoting fast spinnaker handling.



3 Double halyard

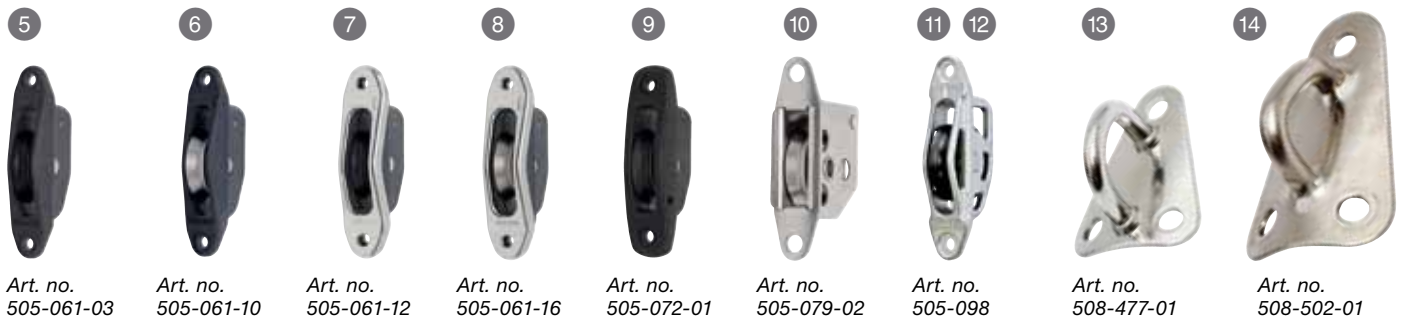
Halyard exit

A halyard exit is used to lead the halyard out of the mast and further down to a cleat or a block at deck level. The fitting prevents chafe between a halyard and the cut-out in the mast. The location of exits is a very important factor in smooth and effective halyard routing. They must be located with a certain distance from each other, not to weaken the mast and at the correct height for effective sail hoisting. Seldén has a standard set-up for halyard slots, but we will incorporate custom solutions to suit to a specific deck layout.

To prevent corrosion, all fittings made of bronze or stainless steel are insulated from the aluminium mast section. With carbon fibre masts the insulation protects the fittings from corroding.

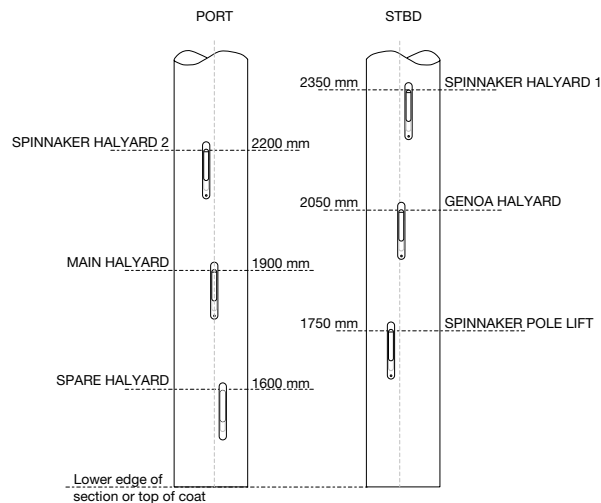
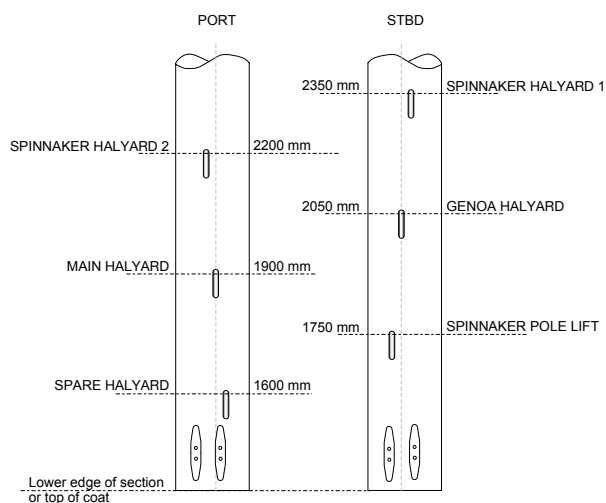


4 Halyard exit



Halyard leads, halyard boxes and halyard exits

	Art. no.	Description	Application	Weight, gr	Max. rope dia., mm	Safe working load, kN	Max. RM at 30°. kNm	To be combined with forestay dia., mm	Fasteners included
1	508-159-01	Single halyard lead in chromed bronze	Spinnaker, jib and genoa	67	12	-	-	-	2 pop rivets 167-004 (Ø 6.4 x 12.7 mm) and insulating washer.
2	508-159-03	Single halyard lead in chromed bronze		67	-	-	-	-	Ø 5.3 mm drill-bit, self tapping M6 skruv and insulating washer.
3	508-734-01	Double halyard lead in stainless steel	Spinnaker	182	12	-	-	-	4 pop rivets 167-004 (Ø 6.4 x 12.7 mm)
4	505-017-01	Halyard exit in stainless steel	Halyard, spinnaker lift	42	8	-	-	-	1 pop rivet 167-007 (Ø 4.8 x 9.9 mm). The fitting must be laquered for insulation.
5	505-061-03	Composite box. Ø 35 mm plain bearing sheave	Spinnaker, jib and genoa	50	8	6	16.0	3-5	2 pop rivets 167-006 (Ø 4.8 x 16.5 mm)
6	505-061-10	Composite box. Ø 35 mm ball bearing sheave		91					
7	505-061-12	Composite box with chafe guard in stainless. Ø 35 mm plain bearing sheave		85					
8	505-061-16	Composite box with stainless chafe guard. Ø 35 mm ball bearing sheave		126					
9	505-072-01	Composite box with Ø 45 mm plain bearing sheave	Spinnaker, jib and genoa	94	12	8	-	6	2 pop rivets 167-004 (Ø 6.4 x 12.7 mm)
10	505-079-02	Stainless box. Ø 25 mm ball bearing sheave	Spinnaker lift for mast section C080- C087	45	5	1	-	-	2 pop rivets 167-007 (Ø 4.8 x 9.9 mm)
11	505-098-03	Stainless box Ø 35 mm plain bearing sheave	Jib halyard	119	8	8	16.0	4-6	2 pop rivets 167-006 (Ø 4.8 x 16.5mm)
12	505-098-06	Stainless box Ø 35 mm plain bearing sheave		159					
13	508-477-01	Stainless loop for attachment of block 403-101-01	External spinnaker lift. Mast section C080-C096	16	-	-	-	-	3 pop rivets 167-018 (Ø 4.8 x 12.7 mm)
14	508-502-01	Stainless loop for attachment of block 404-101-01	External spinnaker lift. Mast section C106-C139	35	-	-	-	-	3 pop rivets 167-004 (Ø 6.4 x 12.7 mm)

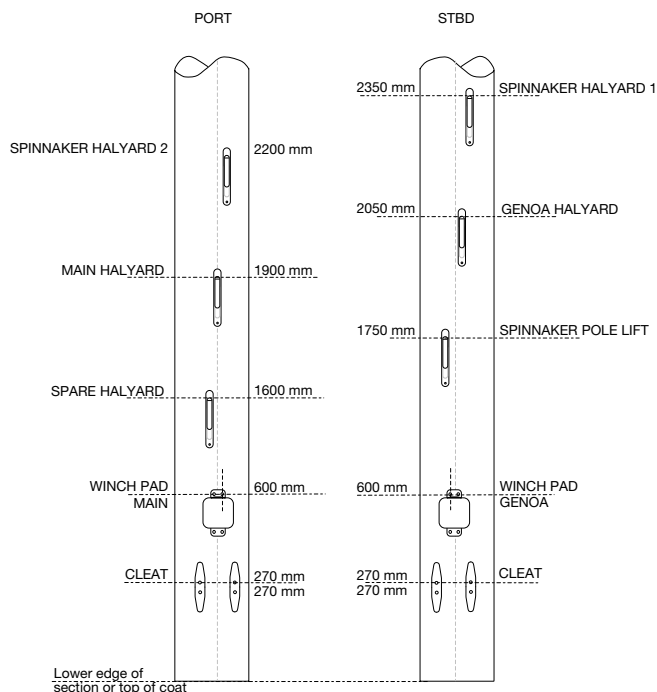


Standard layout, C080, CC077

For these small sections no slot fittings are used. A 50 x 8 mm cut-out is thoroughly chamfered to prevent chafe on the halyards.

Standard layout, all ropes to cockpit

C087-C139, slot fitting 505-017-01
CC086-CC138, slot fitting 505-017-51



Location of halyard exits

Aluminium masts and carbon fibre masts

The standard Seldén layout of the halyard exits is based on long experience of how to handle halyards, and other parts of the running rig, in the most efficient way. Amongst other things, we assume that the mast man prefers to stand on the starboard side of the mast when hoisting the spinnaker and adjusting the spinnaker lift. As exceptions do occur, we can adapt our standard arrangements to suit specific deck layouts.

Standard layout, main halyard and genoa halyard to be handled at the mast.

C106-C139, CC105-CC138

Slot fitting art. no. 505-017-01
Cleat art. no. 511-016-01
Winch pad art. no. 523-043-01



Photo: Karin Herrström. H-Boat.

Spreaders and spreader brackets


Aluminium sections C080-C096 and carbon CC077-CC095 feature external stainless spreader brackets. These fittings feature a wide base to transfer spreader loads to the mast extrusion. This makes for a rigid connection, low windage and low weight.



The spreader brackets are angled 6° for optimum rig support.

C080; CC077

With the clevis pin vernier adjuster system, the spreader angle can be set anywhere from 0° to 34°, with adjustment increments as small as 2°. This allows rapid and repeatable tuning to suit weather conditions.

Mast section		Spreader bracket starboard and port side, Art. no. Alu. /Carbon	Width of spreader, mm	Spreader angle	Length, mm	Pair of spreaders excluding end plugs, Art. no.		End plug, Art. no.
Aluminium	Carbon					Blue anodised		
C080	CC077	522-168-01/-51	P-35	0 - 34°	285		503-770-11	500-801-01
					335		503-771-11	
					375		503-772-11	
					435		503-773-11	
					485		503-774-11	
					535		503-775-11	
					585		503-777-11	

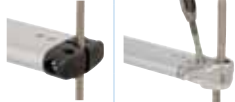


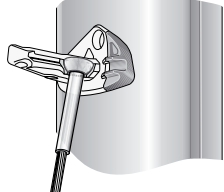
C087-C096; CC086-CC095

This is a larger and stronger version of the vernier adjust type listed above, but with fixed angle spreaders. This is often required to comply with individual Class rules. Spreaders are custom made to give the correct sweep.

Mast section		Spreader bracket starboard and port side, Art. no. Alu. /Carbon	Width of spreader, mm	Spreader angle	Length, mm	Pair of spreaders excluding end plugs, Art. no.		End plug, Art. no.
Aluminium	Carbon					Silver anodised	Black anodised	
C087 C096	CC086 CC095	522-193-01	P-50	0° - 19° 0° - 15°	250	503-730-01	503-610-01	500-545-01
C087	CC086	522-169-01/-51			20° - 30°	300	503-731-01	
C096	CC095	522-170-01		16° - 30°	350	503-732-01	503-612-01	
					400	503-733-01	503-613-01	
					450	503-734-01	503-614-01	
					500	503-735-01	503-615-01	
					550	503-736-01	503-616-01	
					600	503-737-01	503-617-01	
					650	503-738-01	503-618-01	
					700	503-739-01	503-619-01	
					750	503-740-01	503-620-01	
					800	503-741-01	503-621-01	
					850	503-742-01	503-622-01	
					900	503-743-01	503-623-01	
					950	503-744-01	503-624-01	
					1000	503-745-01	503-625-01	
				1050	503-746-01	503-626-01		
				1100	503-747-01	503-627-01		
				1150	503-748-01	503-628-01		
				1200	503-749-01	503-629-01		

C106 – C139; CC105 – CC138

This type of spreader bracket is a through-bar design which provides strength as well as a smooth and elegant appearance. The shroud fittings for the lower shrouds are integrated into the spreader bracket. This reduces the number of fittings on the mast, minimising weight and windage.

Mast section		Spreader bracket starboard and port side, Art. no.	Width of spreader, mm	Spreader angle	Stemball-cup		Length, mm	Pair of spreaders excluding end plugs, Art. no.		End plug, Clamped Art. no.	Linked end plug, Art. no.	
Aluminium	Carbon				Wire, dia., mm	Cup		Silver anodised	Black anodised			
C106	CC105	522-171-01	T-60	0° - 30°	3 – 5	R9	300	503-174-01	503-634-01		500-629-01	500-630-01
C116	CC115	522-172-01					350	503-175-01	503-635-01			
C126	CC125	522-173-01			3 – 6	R11	400	503-176-01	503-636-01			
C139	CC138	522-174-01					450	503-177-01	503-637-01			
					500	503-178-01	503-638-01					
					550	503-179-01	503-639-01					
					600	503-180-01	503-640-01					
					650	503-181-01	503-641-01					
					700	503-182-01	503-642-01					
					750	503-183-01	503-643-01					
					800	503-184-01	503-644-01					
					850	503-185-01	503-645-01					
					900	503-186-01	503-646-01					
					950	503-187-01	503-647-01					
			1000	503-188-01	503-648-01							
			1050	503-189-01	503-649-01							
			1100	503-190-01	503-650-01							
			1150	503-164-01	503-651-01							
			1200	503-165-01	503-652-01							
			1250	503-166-01	-							
			1300	503-167-01	-							
			1350	503-168-01	-							
			1400	503-169-01	-							

Clevis pins for spreader brackets

Mast section		Spreader bracket starboard and port side, Art. no.	Width of spreader, mm	Inner clevis pin, mm			Outer clevis pin, mm			Split ring Art. no.	Split pin Art. no.
Aluminium	Carbon			Alu. /Carbon	Ø	L	Art. no.	Ø	L		
C080	CC077	522-168-01/-51	P-35	4.75	14	165-608	M5 bolt M5 nut	-	155-049 158-004	301-527 (Ø 10 x 1.5 mm)	
C087	CC086	522-193-01	P-50	8	32	165-105	8	32	165-105	301-528 (Ø 15 x 1.5)	
		522-169-01/-51									
C096	CC095	522-193-01	T-60						165-113		301-049 (Ø 2.9 x 16/19 UEL)
		522-170-01									
C106	CC105	522-171-01					8	27			
C116	CC115	522-172-01									
C126	CC125	522-173-01									
C139	CC138	522-174-01									

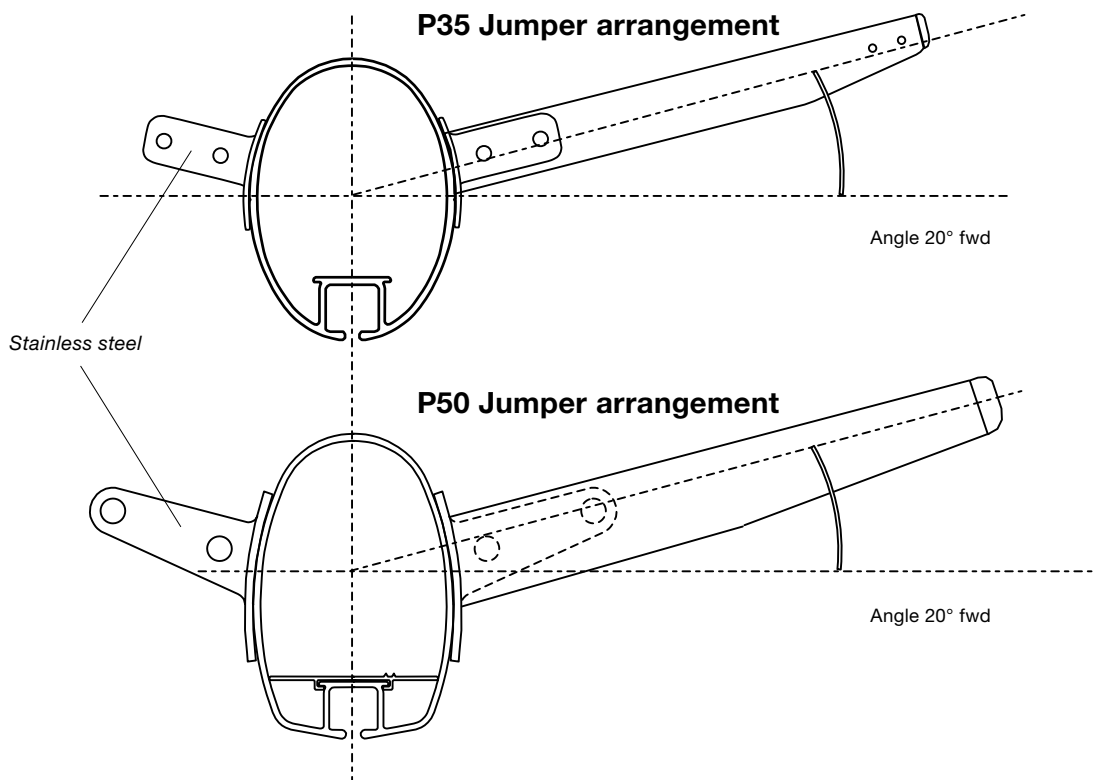
UEL = Un Equal Length



Jumper arrangement

A jumper arrangement is a pair of spreaders in the top of the mast, angled 20° forward. Jumpers increase the longitudinal and lateral stiffness of the mast, and are sometimes required if a high hoist gennaker/spinnaker is used, or to stabilize the head of the mainsail.

Mast section		Jumper bracket, starboard and port side, Art. no. Alu. /Carbon	Width of spreader, mm	Length, mm	Pair of jumpers incl. end plugs, Art. no.		Pair of jumpers excl. end plugs, Art. no.		Clevis pin, (mm) Art. no.	Split ring, Art. no.	End Plug, clamped, Art. no.
Aluminium	Carbon				Blue	Black	Silver anodised	Black anodised			
C080-C096	CC077-CC095	522-200-01/-51	P-35	Cut to length	503-758-11	503-784-11			165-607 (Ø 4.7 x 8.9)	301-527 (Ø 10 x 1.5)	500-801-01 (for Ø 2-3 mm wire)
C106-C139	CC105-CC138	522-199-01/-51	P-50	250			503-730-01	503-610-01	165-105 (Ø 8 x 32)	301-528 (Ø 15 x 1.5)	500-545-01 (for Ø 3-6 mm wire)
				300			503-731-01	503-611-01			
				350			503-732-01	503-612-01			
				400			503-733-01	503-613-01			
				450			503-734-01	503-614-01			
				500			503-735-01	503-615-01			

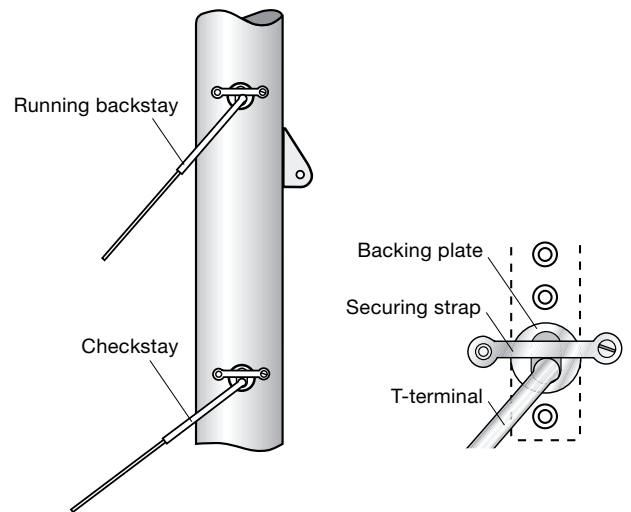


Attachment of the lateral rigging

The attachment for a running backstay or check stay is a backing plate with a securing strap. The strap ensures that the unloaded lee-ward stay does not disengage from the backing plate.

Backing plate including securing strap

Wire dia., mm	Aluminium mast Art. no.	Carbon mast Art. no.
3	507-553-02	507-553-52
4	507-551-02	507-551-52
5	507-552-02	



T/Eye toggle for low weight rope runners

Rope runners make for lower weight as well as less chafe on mast and sail compared to traditional wire runners.

Wire dia., mm	Art. no.
3	174-136
4	174-137
5	174-138



When replacing traditional wire runners with lightweight runners, in for example HMPE, keep your existing backing plate and add a T/Eye toggle.



Lower shrouds attached to through bar spreader bracket. C106-C139, CC105-CC138

Shroud attachments

The lower shrouds are attached to the mast with a backing plate if the spreader bracket is an external type. For a mast with through bar spreader brackets, the aft lowers are fitted in the brackets and the forward shrouds in separate backing plates.

Wire dia., mm	Backing plate Art. no. Aluminium/Carbon	Min. mast section	Location of the lower shroud below the spreader bracket, mm
3	507-553-01/-51	-	180
4	507-551-01/-51	-	
5	507-552-01	C116	
6	507-600-01	C126	
7	507-601-01	C139	



Lower shroud attached with backing plate. C080-C096, CC077-CC095

Attachments of lower diagonals

When using a GNAV the lower part of the mast is supported by lower diagonals. The attachment point is a stainless bracket on the front side of the mast. Read more about GNAV at page 50.

Wire dia., mm	Aluminium, mast section	Art. no.
3	C080-C139	518-081-01
4		518-078-01

Wire dia., mm	Carbon, mast section	Art. no.
3	CC077-CC086	518-081-51
	CC095-CC105	518-081-52
4	CC077-CC138	518-078-01

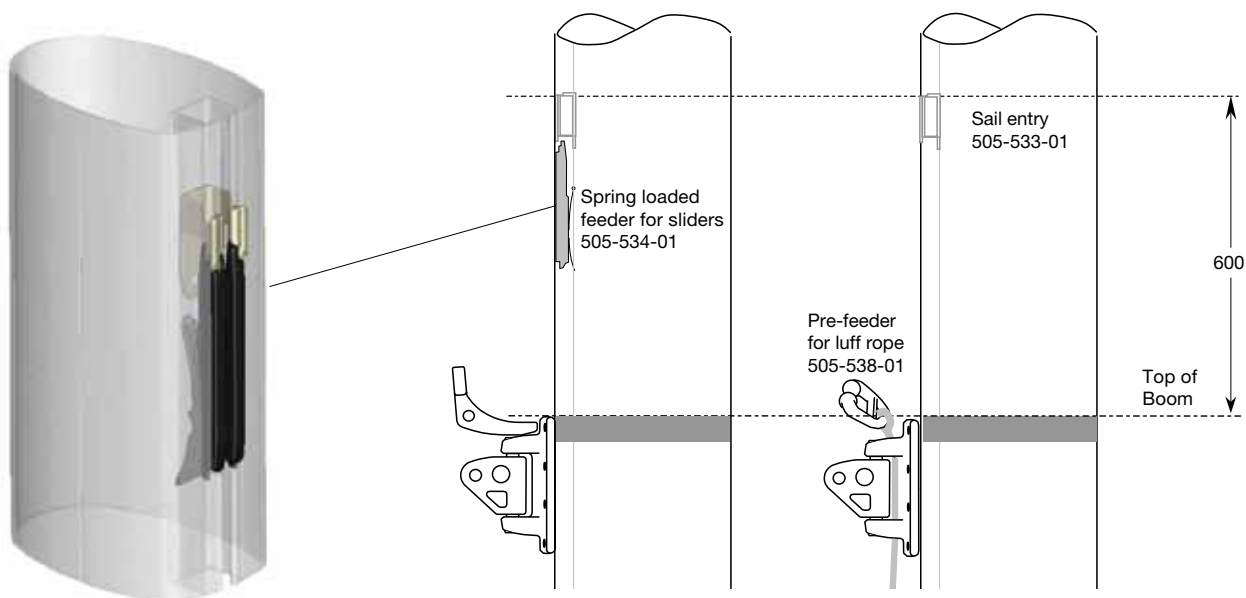


Photo: G-Force Yachts. Xtreme 25.

Sail entry

The sail entry is a smooth stainless fitting and accepts both bolt rope and sliders. Combined with a prefeeder fitted to the boom bracket, hoisting a sail with bolt rope becomes really smooth. For sails with sliders, a spring loaded feeder is inserted in the luff groove.

The feeder allows for the sliders to pass the sail entry and all the way down to the boom bracket when the sail is reefed or doused. To select the correct size slider, please see page 10.



Feeding a sail with sliders



1) Feed all sliders into the sail entry.



2) The sliders will pass the sail entry all the way down to the tack.



3) The sliders always connect the sail to the mast, simplifying hoisting and reefing.

Feeding a sail with luff rope



1) Tie the pre-feeder to the boom bracket.



2) Feed the luff rope into the sail entry.

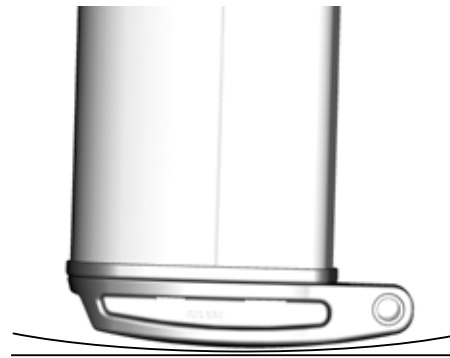
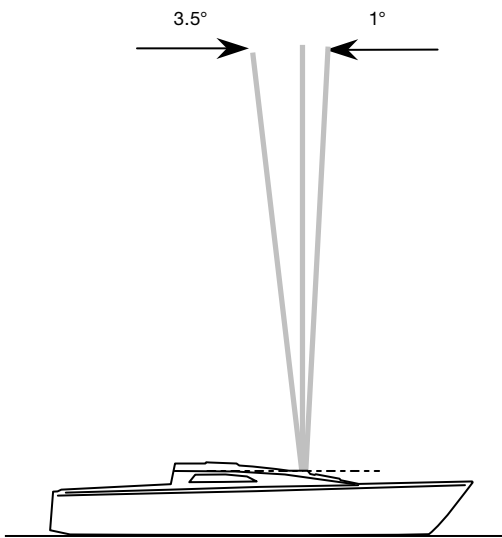


3) Hoist the mainsail.

Deck-stepped masts

Load distribution

A convex heel plug at the lower end of the mast section allows the mast to be raked $3,5^\circ$ aft and 1° forward, and still evenly transfer compression load to the mast section. This concept is far from new but nevertheless, brilliant. It was introduced by Seldén early 70's.



Convex heel plug distributes compression load evenly on the mast section.

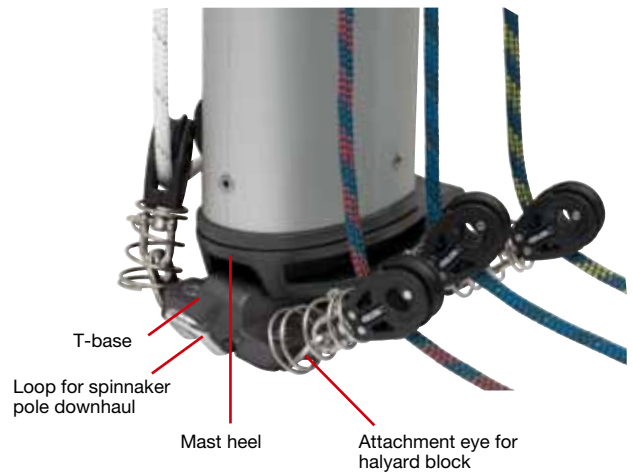
It is easy to step the mast

The aft end of the heel plug is connected to the T-base with a clevis pin. This clevis pin works as a hinge and allows for controlled raising and lowering of the mast, a great help for sailors who frequently un-step their mast. For the owner of a trailer boat the advantage is obvious.



T-base, heel and attachments for deck blocks

Ropes leaving the mast through halyard exits continue down and then lead aft to clutches, Cam cleats or Valley cleats® located within reach of the crew in the cockpit. The mast stands on an aluminium T-base, which is bolted to the deck. Six stainless attachment eyes, three on each side, can be fitted between the T-base and the deck for attachment of lead blocks. This enables ropes to be efficiently routed to the cockpit. In addition, the T-base comes with two centre line attachment loops, one forward and one aft. These loops are mainly used for spinnaker pole downhaul and the kicking strap.

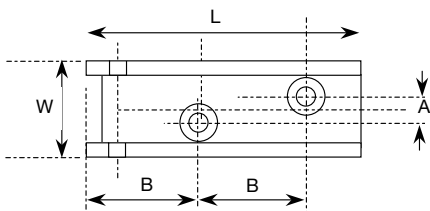


Mast heel without sheaves

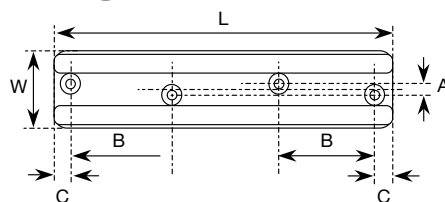
Mast section		Heel plug, Art. no.	T-base, Art. no.	Attachment eye, Art. no.	Loop, Art. no.	L mm	W mm	A mm	B mm
Aluminium	Carbon								
C080	CC077	502-560-01	① 510-158-01	-	-	100	35	10	40
		502-560-02 (sheaves)	② 510-155-01 (adjustable)	-	-	150	40	7	44
C087	CC086	502-561-01	③ 510-161-01*	508-497	508-459	120	70	50	90
C096	CC095	502-562-01				150	70	50	120
C106	CC105	502-563-01	④ 510-171-01*						
C116	CC115	502-564-01							
C126	CC125	502-565-01							
C139	CC138	502-566-01							

*Including attachment eyes and loops.

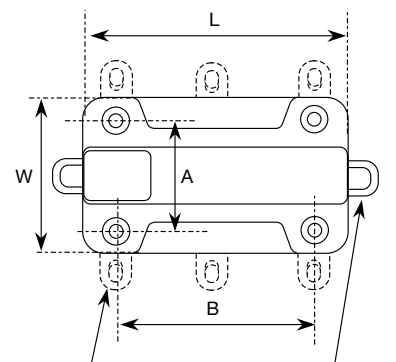
① T-Base



② Adjustable T-base



③ ④ T-Base, attachment eye and loop



Attachment eye, Art. no. 508-497

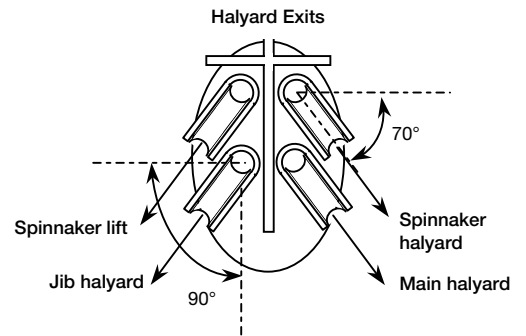
Loop, Art. no. 508-459



Read more about Seldén's blocks, Cam cleats and Valley cleats® in our Deck Hardware catalogue, art. no. 595-905-E.

Mast heel with integrated sheaves

An alternative to halyard exit slots is to run the halyards out through the mast heel. Seldén offers this solution by adding a fitting with four integrated sheaves between the mast section and the heel. The sheaves are fitted in adjustable cages that can be individually angled towards a deck organiser or direct to a Cam Cleat in the cockpit area. In the top of the stainless cages, rubber o-rings preserve the cage alignment when the rope is unloaded. They also prevent rattling.

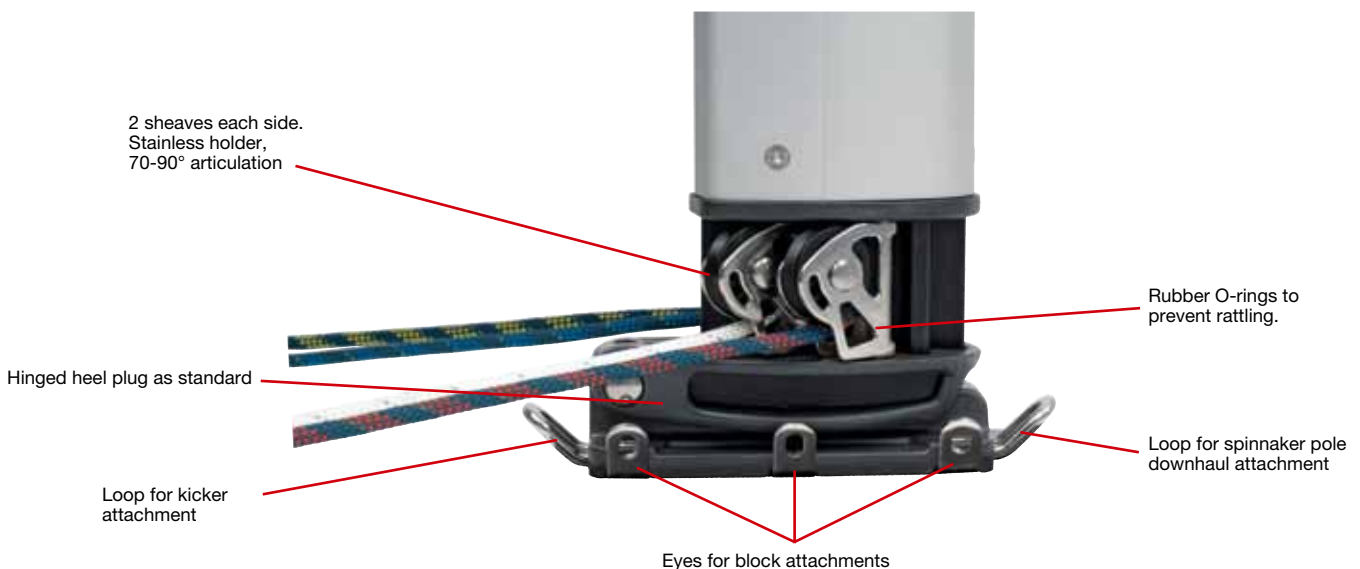


Ball bearing sheaves are available for some of the sections.

When needed, additional attachment eyes and loops can be fitted underneath the T-base.

Mast heel with sheaves

Mast section		Mast heel with four plain bearing sheaves, Art. no.	Mast heel with four ball bearing sheaves Art. no.	Height of ropes above deck
Aluminium	Carbon	Aluminium/Carbon		mm
C080	CC077	502-560-02	-	33
C087	CC086	502-561-02/-52	502-561-03	50
C096	CC095	502-562-02/-52	502-562-03	
C106	CC105	502-563-02/-52	502-563-03	
C116	CC115	502-564-02/-52	502-564-03	
C126	CC125	502-565-02/-52	-	52
C139	CC138	502-566-02/-52	-	



Keel-stepped masts

The aluminium deck ring comes with six stainless attachment eyes, three on each side. Blocks for halyards are attached to the eyes to lead ropes back to the cockpit. There are also two stainless loops fitted to the deck ring, one forward and one aft. These are intended for the spinnaker pole downhaul and kicking strap.

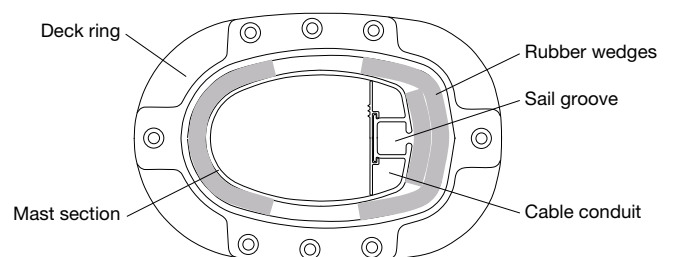
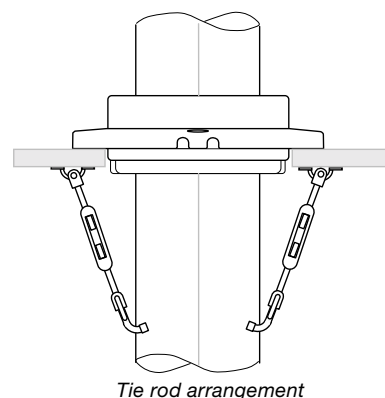
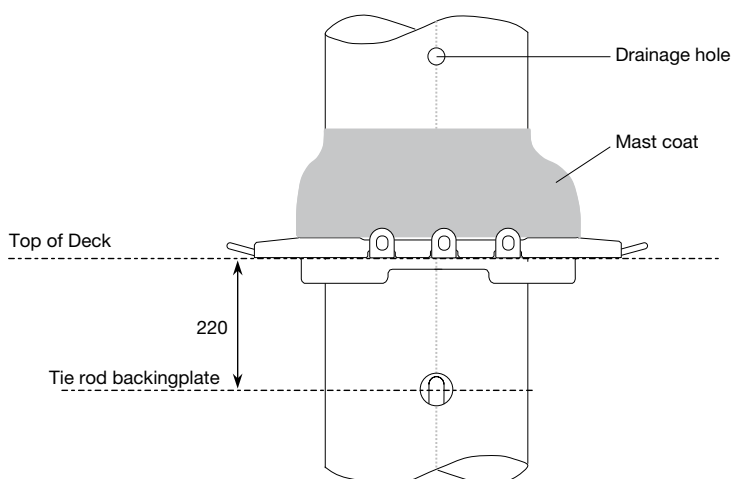
The mast is secured in the deck ring by rubber wedges.

To prevent lifting the deck by the halyard loads, Tie-rods are fitted in backing plates in the mast section and connected by rigging screws to attachment loops in the solid deck laminate.

A keel-stepped mast has, as standard, an internal seal in order to minimise water leaking into the bilge. The cable conduits are open to simplify installation of additional cables but they can be sealed afterwards if required. Externally, a flexible mast coat prevents water leaking through the deck.

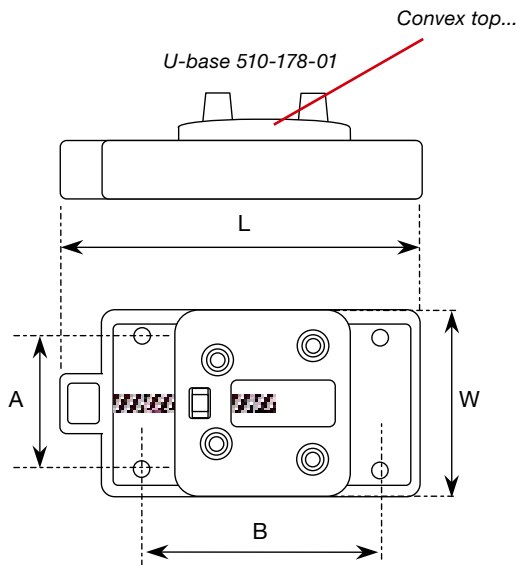
Deck ring

Mast section		T-Base, Art. no.	Deck ring including attachment eyes, loops, backing plates for Tie-rods and rubber wedges, Art. no.	Mast coat, Art. no.	Hose clip, Art. no.	Attachment eyes, Art. no.	Loops, Art. no.	Rubber wedges, Art. no.
Aluminium	Carbon							
C116	CC115	510-171	533-034-01	530-063	312-202	508-497	508-459	2 x 530-239 2 x 530-240
C126	CC125	-		530-064				2 x 530-239 1 x 530-240
C139	CC138	-		530-065				2 x 530-239

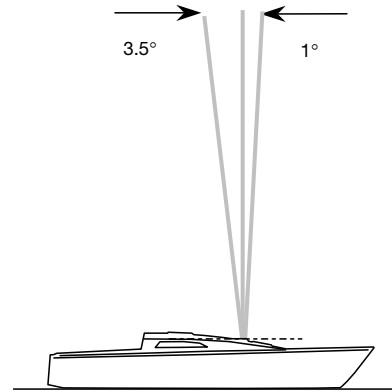


U-base

Mast section		U-base, Art. no.	L mm	W mm	A mm	B mm
Aluminium	Carbon					
C116	CC115	510-178-01	180	85	50	120
C126	CC125					
C139	CC138					



... allows the mast to be raked 3,5° aft and 1° forward, and still evenly transfer compression load to the mast section.



Adjustable mast heel (C126-C139, CC125-CC138)

The U-Base allows for +/- 25 mm longitudinal adjustment of the mast heel. Pre bend and rake can therefore be trimmed for ultimate performance.

Differing from deck stepped masts, the heel plug has a straight lower edge, whereas the upper part of the U-base is convex. The mast can be raked 3.5° aft and 1° forward without subjecting the mast section to uneven compression loads.

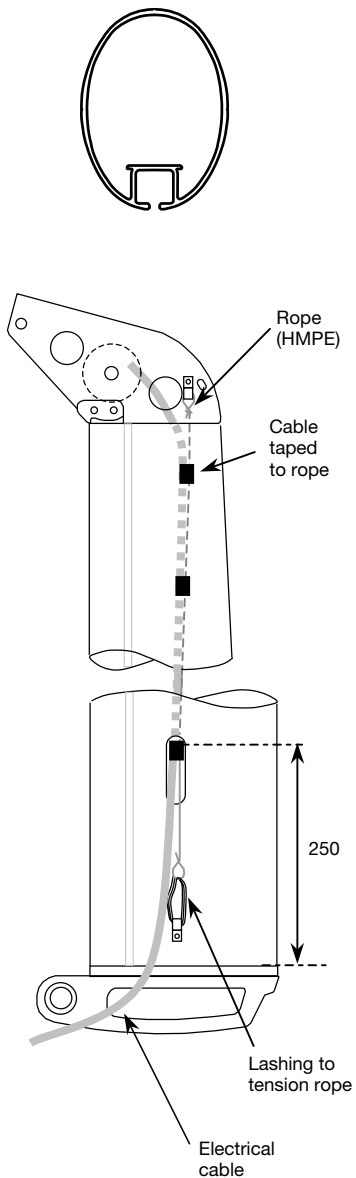


Cables in the mast

When required, Seldén will install cables in the mast for electrical equipment such as VHF antennae, navigational lights, windex light or wind instruments.

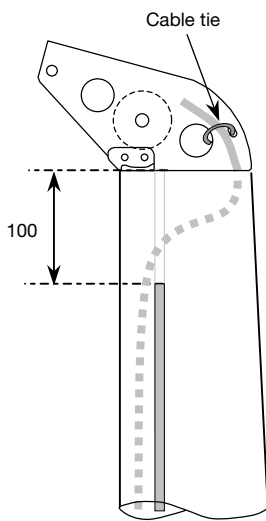
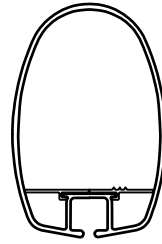
Aluminium C087 - C096 Carbon CC077 - CC138

Low weight installation of cables is an essential requirement with these sections. Limited space in the smaller sections also calls for a tight installation. Seldén attaches the cables to a $\varnothing 3$ mm tensioned rope inside the mast. The rope is fixed in the top with a stainless loop and the lower end is tensioned with a lashing.

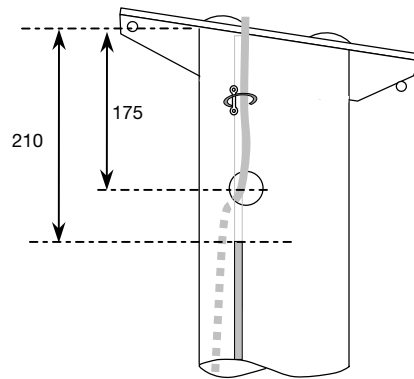


C106 - C139

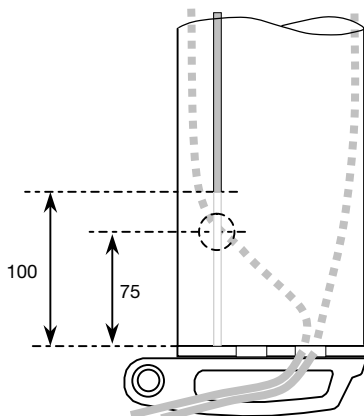
A flat PVC extrusion slides on to a track in the aluminium section. This is an inspired solution keeping the weight down while creating two spacious conduits.



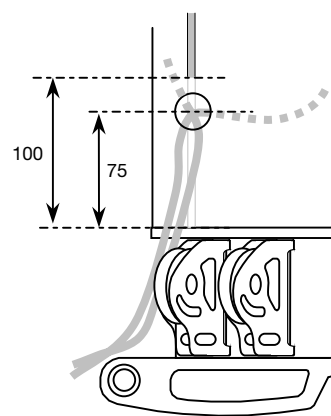
C106 - C139, fractional rig. The cables exit at the top between the mast section and the head box and are fixed with a cable tie.



C126 - C139, masthead rig. The cables exit through a well rounded Ø 20 mm hole and are fixed with a cable tie.



C106 - C139. The cables exit through the heel plug, or alternatively through a Ø 20 mm hole.



C106 - C139 with sheaves integrated in the heel. The cables exit through a well rounded Ø 20 mm hole.



BOOMS

Kicking strap, Rodkicker and Gnav



Photo: Fiona Brown. Quarter tonner.

Aluminium booms	40
Boom sections choice	41
Slab reef and Single Line Reef	44
Boom brackets	46
Kicking strap	48
Rodkicker rigid vang	49
Gnav	52

Aluminium booms



D-shaped head of clevis pin.



The split pin sits in a recess preventing damages to sailcloth.



Outboard end with integrated sheaves for two reefs and outhaul.

Seldén booms have a wealth of sophisticated features and can be equipped with a variety of reefing systems and outhaul systems to suit the needs of different sailors.


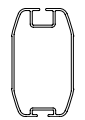
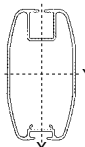
The ends

The inboard end and the outboard end for the B087 and B104 booms are manufactured from composite. The B120 ends are cast aluminium.

Integrated sheaves for two reefs and outhaul are standard with all models. The horizontal pin connecting the inboard end to the boom toggle has a D-shaped head in order to prevent it from rotating. The advantage with this is that the split pin on the other side of the boom is not affected by the vertical movements of the boom. This seemingly small detail has a great importance to the safety on board. Also, the split pin sits in a recess so the spinnaker is never at risk when setting it or taking it down.

The well rounded and smooth outboard end is secured with screws to make it easier to replace sheaves and ropes.

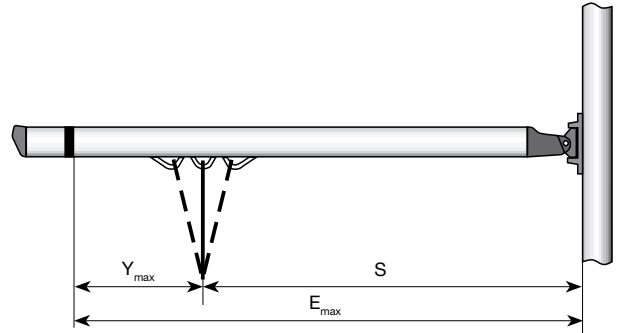
Boom sections

	Boom section	Dim., mm height/width	I_y cm ⁴	I_x cm ⁴	Wall thickness mm	Weight kg/m	W_y cm ³	W_x cm ³	Sail groove mm
	B087	87/60	60.2	27.7	2.0	1.55	13.4	9.3	5.5
	B104	104/60	97.5	33.6	2.0	1.71	18.5	11.2	5.5
	B120	120/62	155	42.5	2.2 - 2.6	2.12	24.8	13.7	5.5

Boom sections choice

To select the correct boom section, you will need to know the sail foot length (E) and righting moment (RM). If the RM is not known, displacement is an alternative.

The Y measurement must also be known for dimensioning purpose. The length of the boom is sometimes determined by other factors than E and therefore we need the S measurement as well.



Masthead rigs, E_{max} and Y_{max} (m)

Section	B087		B104		B120			
	RM 30° kNm	Displ. tonnes	E_{max}	Y_{max}	E_{max}	Y_{max}	E_{max}	Y_{max}
6	1.2		3.3	1.7	4.0	1.8	4.1	2.1
8	1.6		3.3	1.4	4.0	1.6	4.1	1.8
10	2.0		3.3	1.3	4.0	1.4	4.1	1.6
12	2.4		2.9	1.2	4.0	1.3	4.1	1.5
14	2.8		2.6	1.1	3.5	1.2	4.1	1.4
16	3.2				3.2	1.1	4.1	1.3
18	3.6				3.0	1.1	4.1	1.2
20	4.0				2.8	1.0	3.8	1.1
25	5.0				2.4	0.9	3.3	1.0
30	5.7						2.9	0.9
35	6.3						2.6	0.9

Fractional rigs, E_{max} and Y_{max} (m)

Section	B087		B104		B120			
	RM 30° kNm	Displ. tonnes	E_{max}	Y_{max}	E_{max}	Y_{max}	E_{max}	Y_{max}
6	1.2		3.3	1.4	4.0	1.6	4.1	1.8
8	1.6		3.3	1.2	4.0	1.4	4.1	1.6
10	2.0		2.8	1.1	3.7	1.2	4.1	1.4
12	2.4		2.5	1.0	3.3	1.1	4.1	1.3
14	2.8		2.2	0.9	3.0	1.0	4.1	1.2
16	3.2		2.0	0.9	2.7	1.0	3.7	1.1
18	3.6				2.5	0.9	3.4	1.0
20	4.0						3.2	1.0
25	5.0						2.7	0.9



Photo: Fiona Brown. Quarter tonner.

Outhaul systems


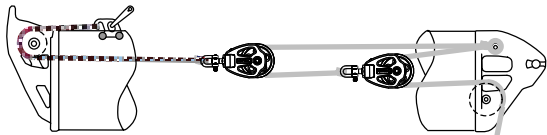
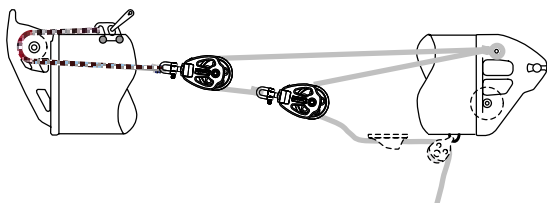

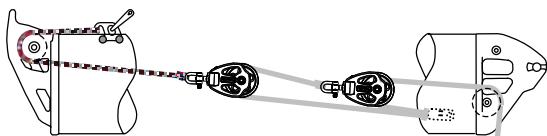
The outhaul can be handled from the cockpit or at the mast and is available with different purchase ratios. Big purchase means less load for the mainsail trimmer to tension the outhaul, but more rope to handle.

If fast adjustment is preferred, both when tensioning and releasing the outhaul, a system with less purchase should be selected.

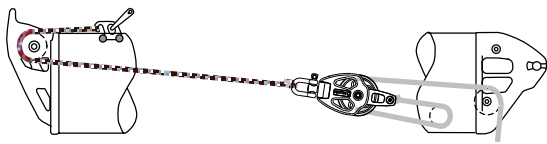

The Seldén Ball Bearing blocks (BBB) come with stainless ball bearings, hence, high working load in relation to the size of the block. Small size, low weight, low friction and long service life are key factors for superior function.

A low weight and low stretch HMPE rope connects the aft slider with the clew of the sail.

B087, B104

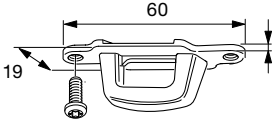
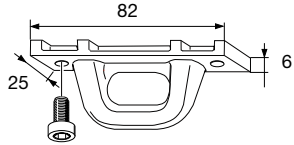
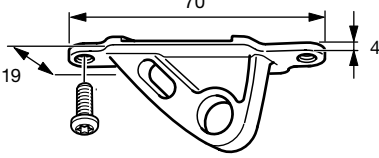
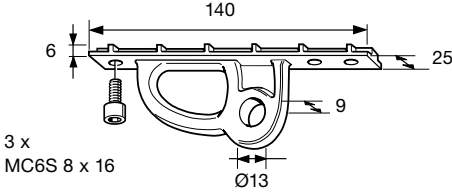

Function	To be combined with...	
2:1 purchase, operation from the cockpit	Slab reef or 1 single line reef	
4:1 purchase, operation from the cockpit		
4:1 purchase, operation at the mast		
2:1 purchase, operation from the cockpit	2 Single line reef	
4:1 purchase, operation from the cockpit		

B120

Function	To be combined with...	
3:1 purchase, operation from the cockpit	Slab reef or Single line reef.	
4:1 purchase, operation from the cockpit		

Main sheet sliders and kicker sliders

The sliders are fitted in the integral track in the underside of boom.

Function	Boom section	Art. no.	
Main sheet slider	B087-B104	511-641-01	
	B120	511-571-01	
Slider for kicking strap or Rodkicker	B087-B104	511-643-01	
	B120	511-800-01	
Slider locating reef lines* and lazy jacks.	B120	511-636-01	

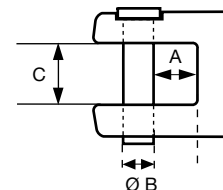
* The reef line shall be tied around the boom. The slider locates the reef line in the correct position, 100 mm aft from the vertical location of the reef cringle. This ensures that the correct angle is created and the sail will be flattened out.

Booms for slab reef or Single Line Reef

After you have determined the correct boom section for your yacht (previous tables), all you have to do is decide what kind of reefing system you prefer. Then check the tables below to find the complete boom in question. If you are in any doubt about which boom to choose, please contact your Seldén dealer for expert advice. When fitting a Seldén boom to a mast of another brand, check the existing toggle's dimensions for compatibility.

Inboard end

Boom section	A mm	B mm	C mm
B087	8	8	16
B104	8	8	16
B120	14	10	20

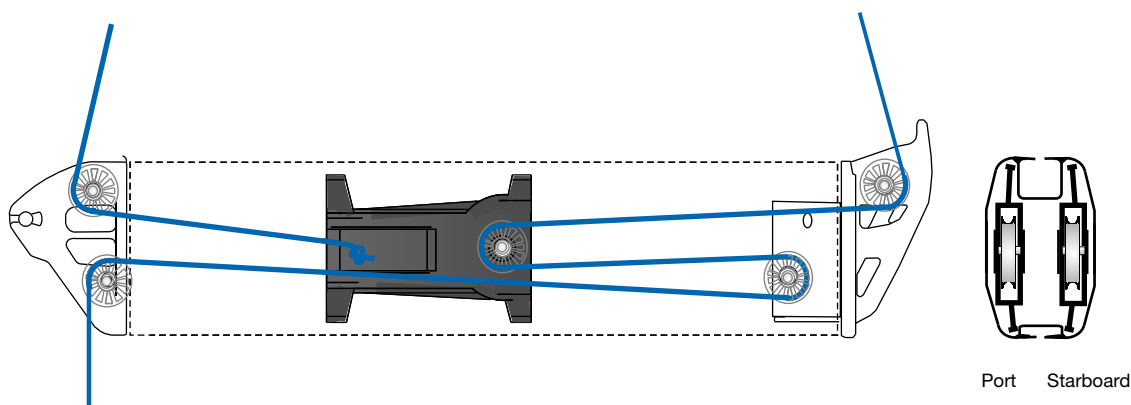


Seldén booms are prepared for either slab reef, or one or two Single line reefs. Single line reefing simplifies reefing considerably. The halyard is released to a calibrated mark, and the reef line tensioned. That's all. The luff and the leech are reefed simultaneously while all the crew stay in the cockpit during the whole manoeuvre.

Art. no.	Boom section	E _{max} mm	Remarks
BS087-01	B087	3365	Outhaul (2:1) + 2 reefs, aft
BS087-21		3365	Outhaul (4:1) + 2 reefs, cleat
BS087-61		3365	Outhaul (2:1) + 2 Single Line Reef, aft
BS104-01	B104	3515	Outhaul (2:1) + 2 reefs, aft
BS104-02		4015	Outhaul (2:1) + 2 reefs, aft
BS104-21		3515	Outhaul (4:1) + 2 reefs, cleat
BS104-22		4015	Outhaul (4:1) + 2 reefs, cleat
BS104-61		3515	Outhaul (2:1) + 2 Single Line Reef, aft
BS104-62		4015	Outhaul (2:1) + 2 Single Line Reef, aft
BS120-02B	B120	3640	Outhaul (3:1) + 2 reefs, aft
BS120-03B		4040	Outhaul (3:1) + 2 reefs, aft
BS120-22		3635	Outhaul (3:1) + 2 reefs, cleat
BS120-23		4135	Outhaul (3:1) + 2 reefs, cleat
BS120-62B		3540	Outhaul (3:1) + 2 Single Line Reef, aft
BS120-63B		4040	Outhaul (3:1) + 2 Single Line Reef, aft

Aft = All lines to cockpit
Cleat = Outhaul operated at the mast, reef lines to cockpit

Single Line reefing, this is how it works



- 1) Ease off the main halyard to a premarked reefing point.
- 2) Tension reef line 1 (blue) or reef line 2 (red). The luff and the leech are reefed at the same time. Done!



Photo: Dan Ljungsvik.

Boom brackets

Fixed boom brackets

The Seldén boom brackets and toggles are manufactured from cast aluminium and come with tack attachment and, if required, reef hooks.

Boom section	Mast section		Boom bracket, Art. no. Aluminium mast/Carbon mast		Dimension mm	Fasteners, Aluminium masts Art. no.	Fasteners, Carbon masts Art. no.
	Alu.	Carbon	Toggle and tack attachment	Toggle, tack attachment and reef hooks			
B087	C080-C096	CC077-CC095	508-732-03/53	508-732-05/55	Bracket Height: 70 Width: 62 Toggle (528-094) Width: 15 Hole: Ø 8	8 pop rivets 167-018 (Ø 4.8 x 12.7)	8 pop rivets 167-033 (Ø 4.8 x 6-8.5)
	C106-C126	CC105-CC125	508-731-03/53	508-731-05/55	Bracket Height: 97 Width: 47 Toggle (528-094) Width: 15 Hole: Ø 8		8 pop rivets 167-053 (Ø 4.8 x 8.5-11)
	C126-C139	CC125-CC138	508-788-03/53	508-788-05/55	Bracket Height: 130 Width: 55 Toggle (528-109) Width: 15 Hole: Ø 8	10 pop rivets 167-006 (Ø 4.8 x 16.5)	10 pop rivets 167-053 (Ø 4.8 x 8.5-11)
B104	C080-C096	CC077-CC095	508-732-03/53	508-732-05/55	Bracket Height: 70 Width: 62 Toggle (528-094) Width: 15 Hole: Ø 8	8 pop rivets 167-018 (Ø 4.8 x 12.7)	8 pop rivets 167-033 (Ø 4.8 x 6-8.5)
	C106-C139	CC105-CC138	508-731-03/53	508-731-05/55	Bracket Height: 97 Width: 47 Toggle (528-094) Width: 15 Hole: Ø 8		8 pop rivets 167-053 (Ø 4.8 x 8.5-11)
	C126-C139*	CC125-CC138*	508-788-03/53	508-788-05/55	Bracket Height: 130 Width: 55 Toggle (528-109) Width: 15 Hole: Ø 8	10 pop rivets 167-006 (Ø 4.8 x 16.5)	10 pop rivets 167-053 (Ø 4.8 x 8.5-11)
B120	C106-C116	CC105-CC125	508-731-04/54	508-731-06/56	Bracket Height: 97 Width: 47 Toggle (528-036) Width: 20 Hole: Ø 10	8 pop rivets 167-018 (Ø 4.8 x 12.7)	8 pop rivets 167-053 (Ø 4.8 x 8.5-11)
	C126-C139*	CC125-CC138*	508-788-04/54	508-788-06/56	Bracket Height: 130 Width: 55 Toggle (528-108) Width: 20 Hole: Ø 10		10 pop rivets 167-006 (Ø 4.8 x 16.5)

*Max RM 10 kNm.

Separate reef hooks/tack attachment

Boom bracket, Art. no.	Reef hook, Art. no.	Tack attachment, Art. no.
508-731- 508-732-	536-115	536-117
508-788-	536-118-01	536-119-01



Boom bracket with tack attachment and reef hooks for slab reef booms.



Boom bracket with tack attachment for Single Line booms.

Sliding boom bracket

This bracket slides in the sail groove. A stop rivet is fitted to the mast in order to prevent the upper edge of the boom from being below the measurement band. A downhaul can be attached to the lower end of the bracket.



This type of boom bracket is specified in some class rules.

Boom section	Mast section	Boom bracket, Art. no.		Dimension, mm
		Toggle and tack attachment, Art. no	Toggle, tack attachment and reef hooks, Art. no.	
B087- B104	C080- C139	511-518-01	511-518-02	Bracket (AL) Height: 60 Toggle Width: 15 (ST) Hole: Ø 8



Photo: Fiona Brown. Quarter tonner.

Kicking strap

The main function of the kicking strap is to prevent the mainsail lifting the boom too high when sailing down-wind. If the boom is lifted, the projected area of the main sail becomes smaller. The sail also develops a twist, which reduces efficiency and can promote rolling.

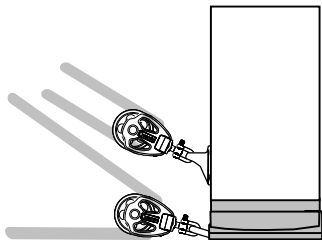
On a broad reach it is sometimes necessary to release the kicker to avoid a “broach”, the situation when the boat heels enough for the rudder to stall and the boat rounds up out of control.

Kicking strap attachment

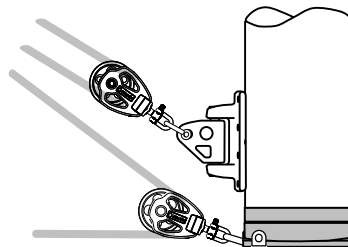
The kicking strap should be fitted to a fixed kicking strap attachment or to an articulating toggle, as low as possible on the mast section. A separate final turning block can be attached to the stainless loop of the T-base/deck ring. This loop is only dimensioned to handle the turning block, not the entire load of the kicking strap tackle.

Mast section		Fixed kicking strap attachment Art. no.	Kicking strap attachment with articulating toggle, Ø 8 mm hole for shackle Art. no.
Aluminium	Carbon	Aluminium/Carbon	Aluminium/Carbon
C080-C096	CC077-CC095	508-508-01/-51	508-732-01/-51
C106-C139	CC105-CC138	508-509-01/-51	508-731-01/-51*
C126-C139	CC125-CC138	508-509-01/-51	508-788-11/-61

* Max RM 10 kNm

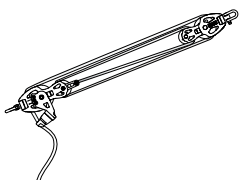


Fixed attachment of the kicking strap.



Articulating attachment of the kicking strap.

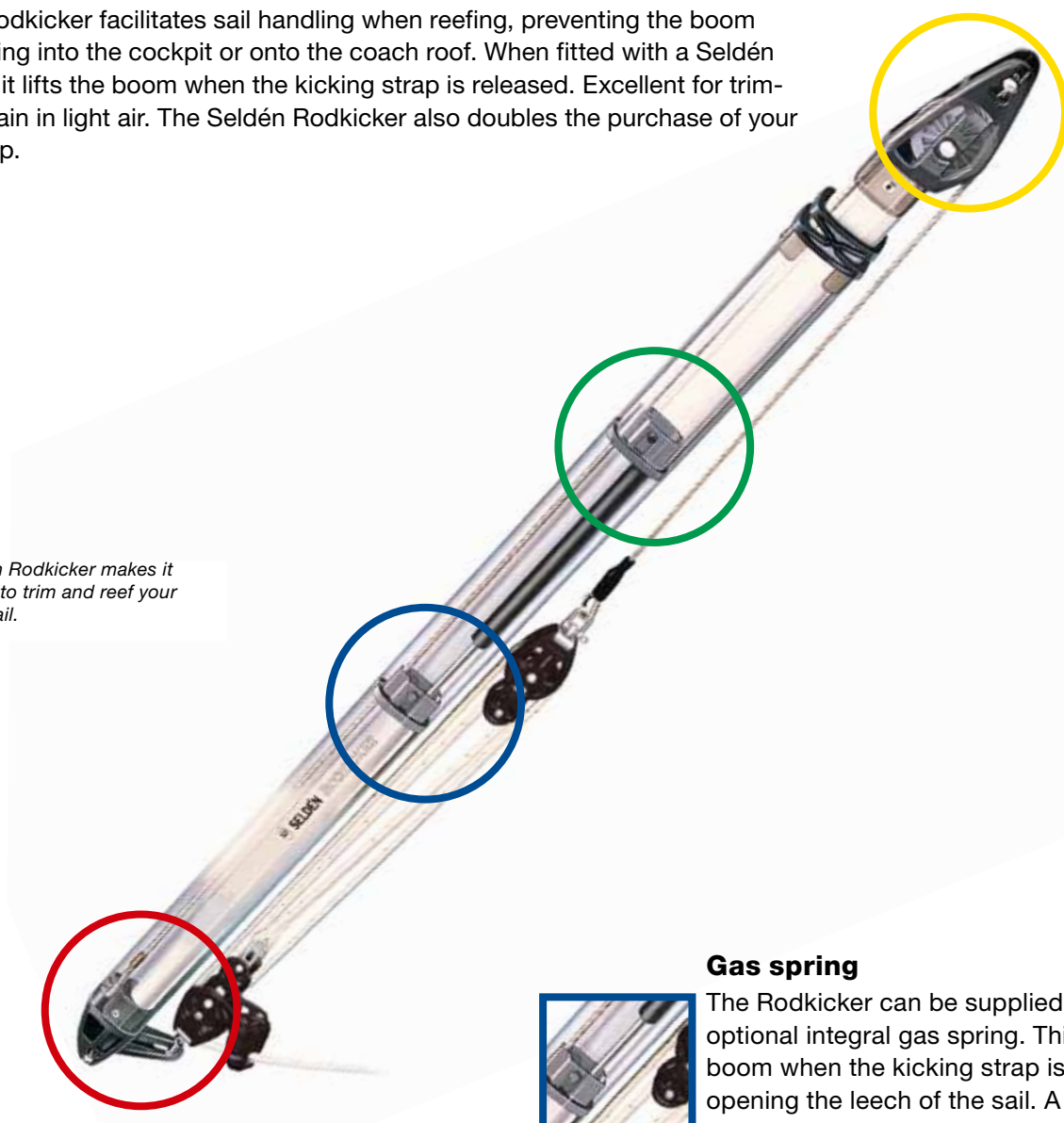
Kicker tackle, 4:1 purchase

Max RM 30°, kNm	Approx. displacement, tonnes	Operation at the mast Art. no.	Description	Operation from the cockpit Art. no.	Description
9	1.8	400-005-02R			
				PBB50 blocks, 10 m of Ø 8 mm white PE rope with 24 plait cover	400-005-01R
16	3.2	400-006-02R			
			PBB60 blocks, 12 m of Ø 10 mm white PE rope with 24 plait cover	400-006-01R	PBB50/60 blocks, 12 m of Ø 10 mm white PE rope with 24 plait cover

Rodkicker rigid vang

A Seldén Rodkicker facilitates sail handling when reefing, preventing the boom from dropping into the cockpit or onto the coach roof. When fitted with a Seldén gas spring, it lifts the boom when the kicking strap is released. Excellent for trimming the main in light air. The Seldén Rodkicker also doubles the purchase of your kicking strap.

Seldén Rodkicker makes it easier to trim and reef your mainsail.



End-fitting



The rounded end-fitting, with enclosed sheave and recessed split pin, is designed to avoid snagging sails or crew.

Extrusion



The inner extrusion end plug acts as an easy-slide bushing and prevents metal to metal contact. The upper sliding bearing also acts as an elastic buffer to dampen the shock if the kicker suddenly bottoms.

Gas spring



The Rodkicker can be supplied with an optional integral gas spring. This lifts the boom when the kicking strap is released, opening the leech of the sail. A Rodkicker with a gas spring replaces the topping lift, making reefing fast and simple. The gas spring is easily retrofitted to a Rodkicker that does not have a spring.

Easily installed, easily operated



The extended block attachment lug allows the block to turn, enabling the tackle to be operated from either port or starboard. The Rodkicker is supplied with detailed instructions and is easily fitted. If a Rodkicker is retrofitted to an existing rig, the original kicking strap tackle can still be used. Seldén Rodkickers are made of anodised aluminium and are carefully tested to meet stringent quality and performance standards.



Operation from the cockpit.




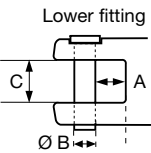
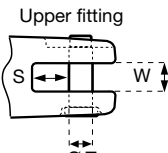


Operation at the mast.

Choosing the right Rodkicker

The choice is based mainly on the righting moment of the yacht, a measure of its ability to carry sail. This is approximately proportional to displacement. The second input is the rig type (masthead or fractional).

Gas springs are available in a range of strengths, to cover variations in boom weight (including the stowed sail) and the Rodkicker angle. The angle varies with gooseneck height and kicker length. If in doubt, ask your dealer for more information.

		Type 05		Type 10	
	Max. righting moment:	fractional rig	12.5 kNm	25 kNm	
		masthead rig	15.0 kNm	35 kNm	
	Max. displacement:	fractional rig	2.5 tonnes	5 tonnes	
		masthead rig	3.9 tonnes	6 tonnes	
Current Seldén boom section			B087-B120	B087-B152	
Previous Selden/ Kemp boom section			86/59-111/75	86/59-111/75, 128/90	
	Height of boom (XBH)		< 900 mm	≤ 1100 mm	
	Type of Rodkicker		05 Standard	10 Standard	
	Min. length (L)		1150 mm	1360 mm	
	Without gas spring	Art. no.	058-036-05*	058-036-10*	
	With gas spring (normal)	Art. no.	058-036-06*	058-036-11*	
		Spring force	0.7 kN	0.6 kN	
	With gas spring (hard)	Art. no.	-	058-036-12*	
		Spring force	-	1.2 kN	
With gas spring (extra hard)	Art. no.	-	058-036-16*		
	Spring force	-	2.5 kN		
Safe working load			8 kN	12 kN	
	Supplementary kit with normal gas spring	Art. no.	308-038-03	308-070-03	
		Spring force	0.7 kN	0.6 kN	
	Supplementary kit with hard gas spring	Art. no.	-	308-071-04	
	Spring force	-	1.2 kN		
Supplementary kit with extra hard gas spring	Art. no.	-	308-072-05		
	Spring force	-	2.5 kN		
 		Lower fitting	A = 9, Ø B = 10, C = 20	Lower fitting	
			Clevis pin 165-207	A = 9, Ø B = 10, C = 20	
		Upper fitting	S = 7, Ø T = 10, W = 12	Upper fitting	
			Clevis pin 165-205	S = 7, Ø T = 10, W = 12	
				Clevis pin 165-205	

* Kicking strap tackle not included.

Choosing the right gas spring

Boom section	86/59	B087	B104	B120	B120
Weight, kg/m	2	1.75	2.0	2.5	2.5
Circumference, mm	240	240	300	330	330
XBH, mm	Max. E normal spring/hard spring/extra hard spring				
Rodkicker	Type 05			Type 10	
600	3.4	3.6	3.4	3.1	3.0/4.0/5.4 (S)
700	3.7	3.8	3.7	3.4	3.3/4.4/- (S)
800	3.9	4.0	3.9	3.6	3.4/4.6/- (S)
900	4.0	4.1	4.0	3.8	3.6/4.8/- (S)
1000					3.7/5.0/- (S)

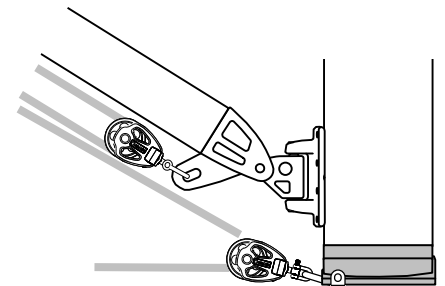


Rodkicker 05 operated at the mast.

Rodkicker mast bracket

Mast section		Rodkicker, attachment Art. no.	Toggle dimensions, mm
Aluminium	Carbon	Aluminium/Carbon	
C080-C096	CC077-CC095	508-732-02/-52	Width: 20 Hole: Ø 10
C106-C139	CC105-CC138	508-731-02/-52*	Width: 20 Hole: Ø 10
C126-C139	CC125-CC138	508-788-12/-62	Width: 20 Hole: Ø 10

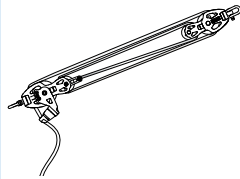
*Max RM 10 kNm



Rodkicker operated from the cockpit.

Tackle for Rodkicker, 4:1 purchase

Total purchase 8:1 when fitted to the Rodkicker

Max RM 30°, kNm	Approx. displacement, tonnes	Operation at the mast Art. no.	Description	Operation from the cockpit Art. no.	Description
16	3.2	400-004-02R		400-004-01R	BBB40 blocks, 12 m of Ø 7 mm grey PE rope with 24 plait cover
26	5.2	400-005-02R		400-005-01R	PBB50 blocks, 10 m of Ø 8 mm grey PE rope with 24 plait cover

Gnav

Gnav (a new sailing word, being an upside down VANG)

This is a new concept when it comes to kickers. It originates from sailing dinghies, and keelboat classes like Laser SB3, where it allows more space for the crew to move underneath the boom, close to the mast. As the Gnav is fitted above the boom it is out of the way and you will experience a huge gain in cockpit space.

A Gnav is a fixed aluminium compression strut fitted between a hinged or fixed fitting on the aft side of the mast and a slider in the sail groove of the boom. The sail must be loose footed as the sail groove is occupied by the Gnav slider. A strap from the slider is lead down to the cockpit. When the strap is tensioned, the slider moves forward and the boom is pushed down. Release the strap and the mainsail will lift the boom.

The Seldén Gnav system is way ahead of its time and is the only production Gnav solution on the market.

As a Gnav will push the lower part of the mast forward, lower diagonals are needed to support this part of the mast. See page 29. For carbon masts this can often be avoided by a customized lamination in this area.



Mast section		Gnav, mast fitting Aluminium/Carbon	Gnav incl. strut, toggle and slider
Aluminium	Carbon	Art. no.	Art. no.
C080-C096	CC077-CC095	508-732-10/-60	038-038-20
C106-C139	CC105-CC138	508-731-10/-60	

This is how it works

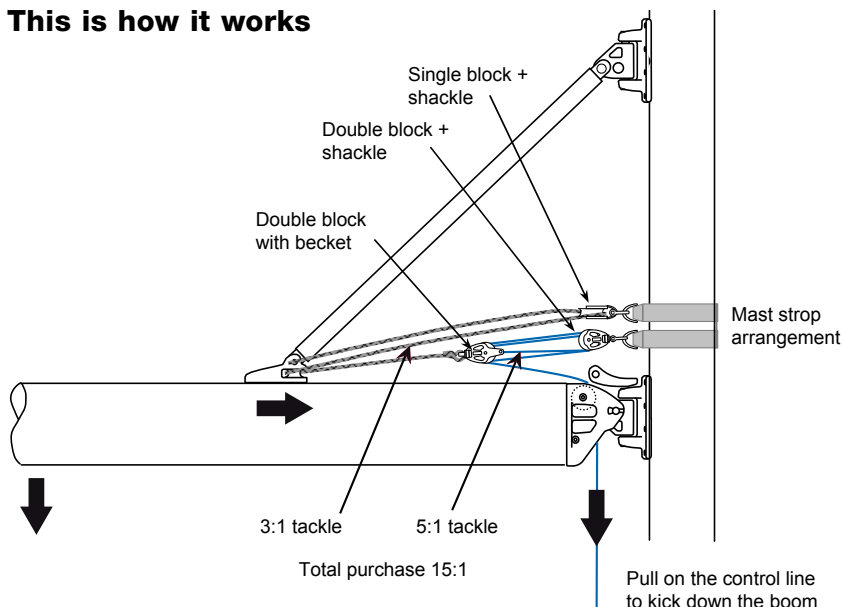




Photo: Richard Langdon/Ocean Images. Laser SB3.



SPINNAKER



Photo: Fiona Brown.

Aluminium spinnaker poles	57
Carbon spinnaker poles	59
Selecting the right pole	60
Spinnaker pole kits	62
Spinnaker pole attachments	64



Seldén offer a full range of spinnaker equipment for keelboats. It consists of five aluminium pole sections, three carbon fibre sections, low weight composite end fittings, telescopic whisker poles, jockey poles and mast fittings. Dimensioning correct size of pole is easy and they are available as build-it-yourself kits or custom made by Seldén.

Aluminium spinnaker poles



Photo: Fiona Brown.



Art. no. 534-900. Used for section S038, S050 and S063.



Art. no. 534-865. Used for section S048 and S060. A bridle is used to attach the downhaul.

Section data, parallel aluminium tubes

These tubes are fitted with pole savers to shield the pole against damage from forestay and shrouds.

Section	Diameter, mm	I_y cm ⁴	I_x cm ⁴	Wall thickness, mm	Weight kg/m
S038	38	3.1	3.1	1.6	0.5
S048	48	7.65	7.65	2.0	0.75
S060	60	15.4	15.4	2.0	1.00

Section data, tapered aluminium tubes

Section	Diameter, mm	I_y cm ⁴	I_x cm ⁴	Wall thickness, mm	Weight kg/m
S050	50	9.26	9.26	2.0	0.84
S063	63	18.5	18.5	2.0	1.06

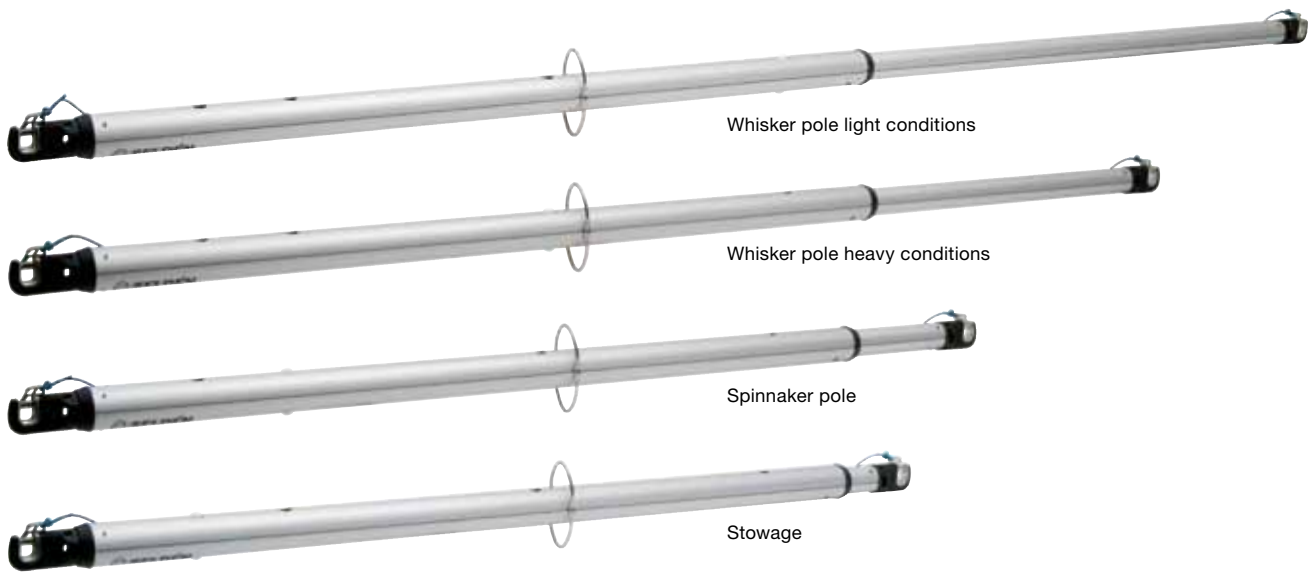
Composite spinnaker pole fittings

The end fittings are made of glass fibre reinforced polyamide composite. This material makes for a combination of low weight and strength and it also prevents damage to boat or mast when the pole is on the fore deck. The claw has a well rounded stainless chafe guard, preventing damage to sheet and guy. The stainless, spring loaded plunger is operated at the end fitting or with the release line. Spinnaker pole lift and downhaul are attached to lift eyes in the middle of the pole or to a bridle.

Telescopic poles

A telescopic pole can be extended to 150% of normal spinnaker pole length, a must when poling out a large genoa or a gennaker. It can be telescoped down for easier stowage.

Art. no.	RM 30° kNm	Displ. tonnes	Section dia., mm		Min. length for stowage mm	Spinnaker pole position, mm	Whisker pole heavy conditions, mm	Whisker pole light conditions, mm
			Inner	Outer				
060-060-58	18	3.6	48	60	2530	3000	3600	4500



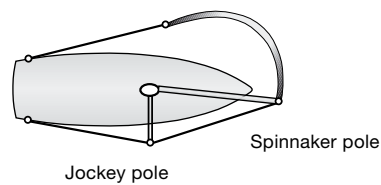
Telescopic pole. Maximises your downwind performance. Minimises your stowage problem.

Jockey poles

The jockey pole reduces the loads and minimises the wear on guys and life lines.



Art. no.	RM 30° kNm	Section	Total length mm
048-048-56	16	S048	1570
060-060-55	26	S060	1810



Carbon spinnaker poles



Seldén spinnaker poles are designed to make light work of spinnaker handling. The big advantage of carbon fibre is its low weight. The weight savings enable the crew to handle the spinnaker faster, with less effort.

Photo: Fiona Brown. Quarter tonner.

Seldén quality

We have developed our own CNC-controlled manufacturing method in which pre-impregnated carbon fibre tows are wound onto a mandrel prior to oven curing. The cured tube is then separated from the mandrel. This method enables us to exercise full control over every stage of the manufacturing process and guarantees products of consistently high quality.



Carbon spinnaker poles with small composite end fittings and HMPE bridle.

Seldén carbon spinnaker poles

Section	Diameter, mm	Weight kg/m	Inertia, Al-equivalent cm ⁴
SC047	47	0.33	5.4
SC059	59	0.42	10.8
SC061	61	0.59	18.5

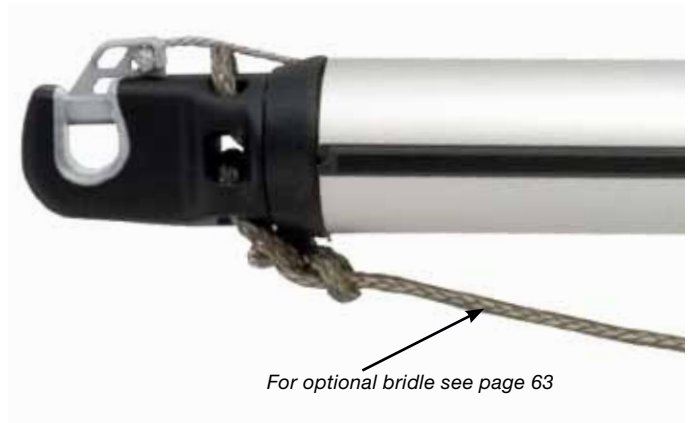


Twaron protection can be supplied as an option for 59 mm and 61 mm poles. It protects the pole from damage caused by the forestay and shrouds.

Selecting the right pole

Just look in the appropriate table for your yacht's displacement or righting moment (RM) at 30° heel, then look right for the value exceeding your SPL value.

Example: For an aluminium spinnaker pole.
Yacht displacement 2.8 tonnes, SPL is 3000 mm.
The correct section is S060.



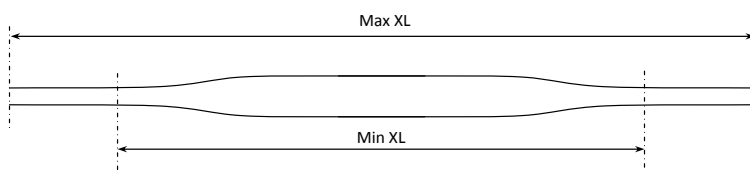
Aluminium spinnaker pole selection

max. SPL (mm)

RM30° (kNm)	Displ. (tonnes)	S038	S048	S050	S060	S063
2	0.5	3120				
3	0.7	2900				
4	0.9	2650				
5	1.0	2450				
6	1.2	2250				
7	1.4	2050				
8	1.6	1910	3000			
9	1.8	1820	2850			
10	2.0	1720	2700			
12	2.4	1600	2500	2470	3600	3120
14	2.8		2400	2470	3500	3120
16	3.2		2350	2470	3400	3120
18	3.6		2300	2470	3300	3120
20	4.0			2470	3200	3120
25	5.0			2320	3000	3120
30	5.7			2200	2850	3080
35	6.3				2730	2900
40	7.0				2600	2750

1. Selections shown above assume the downhaul is attached via a bridle or at outboard end. If a central downhaul attachment is used, the pole diameter must be increased to the next size up.
2. S038, S048 and S060 poles are parallel
3. S050 and S063 pole are tapered.

Tapered pole section, S050 and S063



There is a limited opportunity to cut from the parallel tube end.
S050: Min SPL length= 2180 mm, Max SPL length =2470 mm
S063: Min SPL length= 2520 mm, Max SPL length =3120 mm

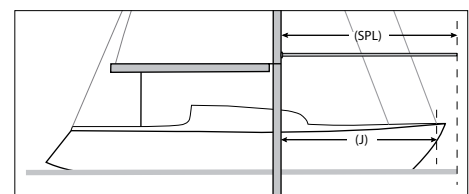
Aluminium whisker pole selection

max pole length (mm)

RM 30° kNm	Displ. tonnes	S048	S060
12	2.4	3200	
14	2.8	3200	
16	3.2	3200	
18	3.6	3200	
20	4.0	3150	4700
25	5.0	2800	4700
30	5.7	2550	4700
35	6.3		4400
40	7.0		4100
45	7.7		3800
50	8.2		3650

Table terminology

RM: Righting moment at 30° of heel.



SPL: Maximum spinnaker pole length. Often, but not always, equal to J.

A whisker pole should be approximately as long as the foot of the sail you intend to pole out.



For optional bridle see page 63

Carbon spinnaker pole selection

max. SPL (mm)

RM 30° kNm	Displ. tonnes	SC047	SC059	SC061
8	1.6	2580		
10	2.0	2610	3710	
12	2.4	2430	3450	4490
14	2.8	2280	3420	4220
16	3.2	2160	3070	4000
18	3.6	2070	2930	3820
20	4.0		2810	3660
25	5.0		2750	3350
30	5.7		2390	3110
35	6.3			2930

Carbon whisker pole selection

max. pole length (mm)

RM 30° kNm	Displ. tonnes	SC047	SC059	SC061
8	1.6	3700		
10	2.0	3700	5230	5230
12	2.4	3580	5100	5230
14	2.8	3380	4800	5230
16	3.2	3200	4550	5230
18	3.6	3060	4340	5230
20	4.0	2930	4160	5230
25	5.0	2680	3810	4950
30	5.7	2480	3540	4600
35	6.3	2340	3330	4330
40	7.0	2210	3150	4100
45	7.7		3000	3920
50	8.2		2880	3750
55	9.0			3610



"Flush Poker, Latitude-Voile". Winner of 2009 HN Brittany Race. Seldén rig and deck hardware.

Spinnaker pole kits

There is no need to wait for Seldén to build your customized spinnaker pole. You can easily build it yourself from one of our kits. Your local Seldén dealer will, of course, be happy to do the job for you.



Aluminium spinnaker pole kits

Art. no.	Section	Type of section	Min. SPL, mm	Max. SPL, mm	End fittings Art. no.	Adaptors Art. no.	Fasteners Art. no.
038-038-54	S038	Parallel	-	3120	2 x 534-900-02	-	3 x 167-006 pop rivets Ø 4,8 x 16,5 mm
048-048-54	S048	Parallel	-	3220	2 x 534-865-02	-	10 x 171-023 self tapping screws, Ø 4,6 x 12 mm
050-050-54	S050	Tapered	2180	2470	2 x 534-900-02	-	3 x 167-006 pop rivets Ø 4,8 x 16,5 mm
060-060-54	S060	Parallel	-	3760	2 x 534-865-02	2 x 534-779	6 x 171-024 self tapping screws, Ø 4,6 x 16 mm
060-060-68			-	5260			
063-063-54	S063	Tapered	2520	3120	2 x 534-900-02	-	3 x 167-006 pop rivets Ø 4,8 x 16,5 mm

Carbon spinnaker pole kits

Art. no.	Section	Max. spinnaker pole length, mm	End fittings	Adaptors Art. no.	Fasteners Art. no.
047-047-01	SC047	2680	2 x 534-865-02	8 x 534-802 spacer shims	8 x 167-007 pop rivets Ø 4,8 x 9,9 mm
047-047-02		3180			
047-047-03		3680			
059-059-01	SC059	3220	2 x 534-779 adaptors 8 x 534-802 spacer shims	8 x 167-006 pop rivets Ø 4,8 x 16,5 mm	
059-059-02		3720			
059-059-03		4220			
061-061-01	SC061	3220	2 x 534-779 adaptors 8 x 534-802 spacer shims		
061-061-02		3720			
061-061-03		4220			
061-061-04		5220			

Bridle kit

Includes Ø 4 mm HMPE rope and stainless steel ring.

Art. no.	For max spinnaker pole length, mm
613-051-04	3250
613-051-05	4500

Tools for working with carbon fibre

Warning: Always use breathing protection and eye protection when drilling or cutting carbon products.

Art. no.	Description	Used for section, mm
592-080	Drill ø 4.8 mm	SC047, SC059, SC061
592-102	Hacksaw blade	All

Twaron protection

Protects the pole from damage from the forestay, rail impact, etc.

For section, mm	Two protectors, for end-for-end gybing Art. no.
SC059	535-586-02
SC061	535-593-02



Photo: Fiona Brown. Quarter tonners.

Spinnaker pole attachment

Fixed U-shaped loop, Ø 30 mm

To prevent catching the jib sheet when tacking, this stainless spinnaker pole attachment fitting has parallel sides. The risk of losing expensive seconds when rounding a mark is eliminated, very important for the racing sailor. From a safety point of view, sudden dangerous trips to the foredeck are avoided. Important for all sailors.

Mast section	Art. no.
C080 - C116	534-530-01
C126 - C139	534-531-01



An insulating nylon washer is included to prevent galvanic corrosion.



Parallel sides. The jib sheet will not get caught when tacking.

Spinnaker pole stowage

An ideal way to stow the spinnaker pole is alongside the boom. The pole lift and downhaul can remain connected, so the spinnaker pole is always ready for action. The forward and aft fittings are easily attached to the boom grooves.

	Art. no.	Description	Boom section
Forward fitting	508-724-01	Stainless steel double bracket with Ø 30 mm rings each side. Two M5 bolts and internal nut plates included.	B087 – B120
Aft fitting	508-725-01	Stainless steel double stowage bail, 200 x 270 mm. Two M5 bolts and internal nut plates included. A loose footed mainsail is required.	



Forward fitting. Can be fitted in the lower end track...



...or in the sail groove.



Aft fitting



**GBR
502**

Photo: Fiona Brown. Quarter tonner.

Furlex 50S

jib furling system for boats 18-26 ft

The Furlex 50S is the perfect choice for every sailor who wants a compact, low weight furling and reefing system. It shares many features with the larger members of the world-famous Furlex family.

The patented load distributor in the halyard swivel and the full length distance tubes for smooth rotation are the same as on all the other Furlex models.

Furlex 50S is supplied as a complete kit including forestay wire, halyard lead, stanchion block, prefeeder and furling line. Easy to order and easy to install.



Photo: Dan Ljungsvik.

Complete kit containing everything you need:



- Forestay wire
- Wire terminal
- Halyard swivel
- Lower bearing part
- Line guide fitting
- Line drum housing
- Furling line
- Halyard lead, insulating sheet, screws
- Drill bit
- Torx bit set
- Stanchion block
- Locking adhesive
- Lubricating grease
- Top guard
- Luff extrusion
- Joining sleeves
- Connecting feeder
- Sail feeder
- Prefeeder
- Manual, spare parts list
- Certificate of guarantee

Ball bearings and ball bearing rings in marine grade stainless steel

Stainless steel reinforcement in moulding

HMPE lashing

Patented load distributor for easy furling and long service life



Halyard swivel in composite with stainless steel reinforcement. Low weight (230 g). Low friction due to the load distributor.



Stainless steel sail feeder for smooth hoisting of sail

Composite sail feeder connector

Uniform cross-section of extrusion from head to tack for better performance of a reefed sail

Single groove extrusion for 5 mm luff tape

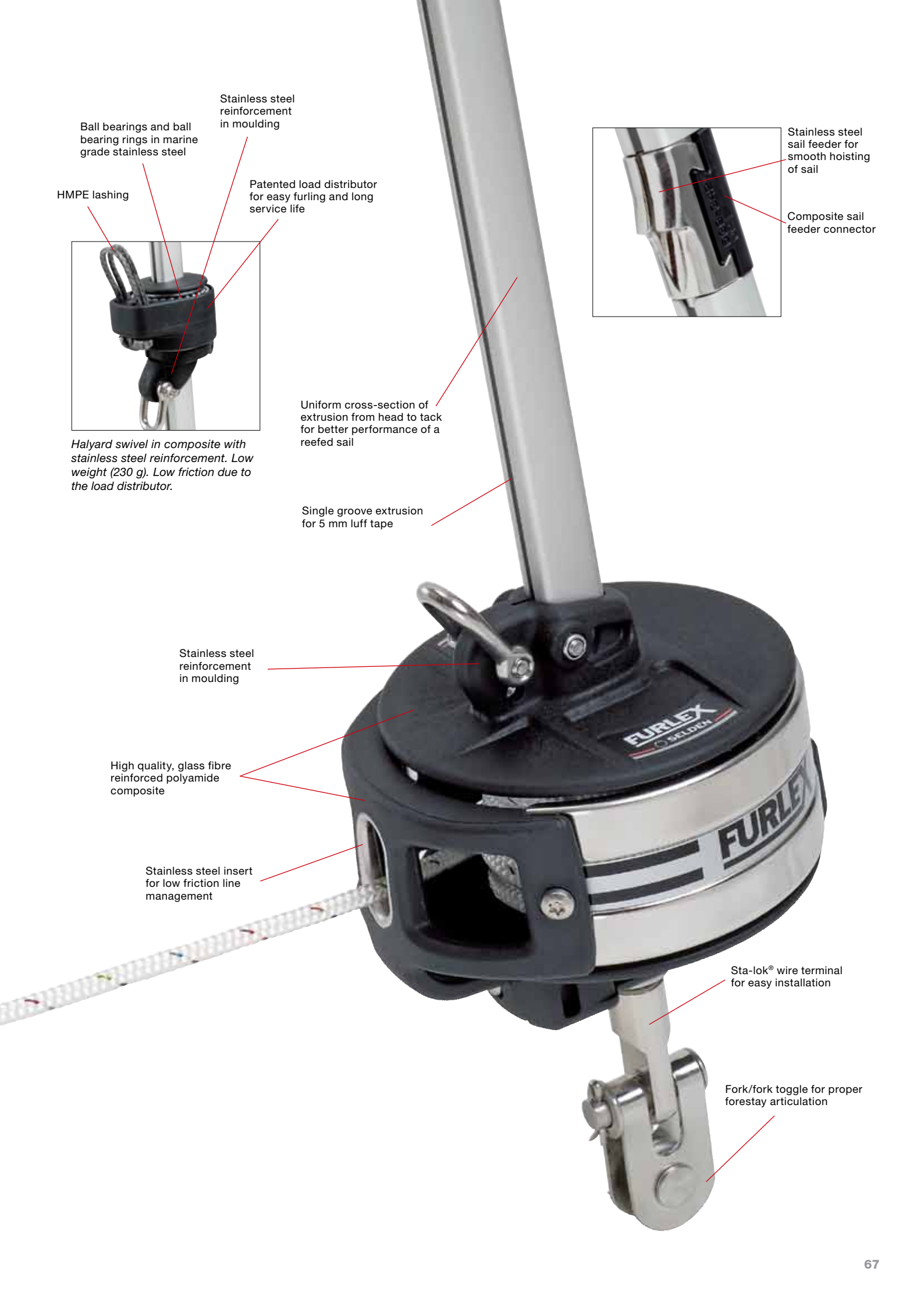
Stainless steel reinforcement in moulding

High quality, glass fibre reinforced polyamide composite

Stainless steel insert for low friction line management

Sta-lok® wire terminal for easy installation

Fork/fork toggle for proper forestay articulation



Technical information

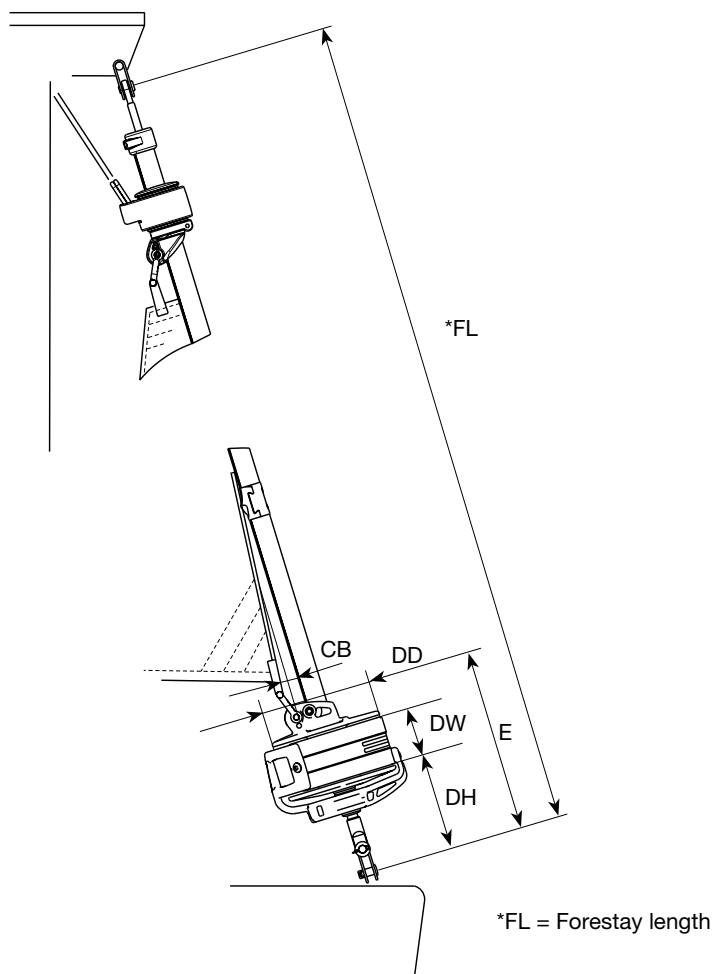


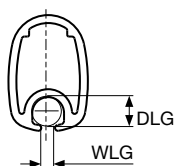
Photo: Dan Ljungsvik.

Choose the right Furlex

Furlex series	Fore-stay, dia., mm	Max righting moment (kNm) at 30° heel		Approx. displacement, tonnes		DH mm	DW mm	DD mm	CB mm	E mm	Halyard sheave box Art. No.
		Masthead rig	Fractional rig	Masthead rig	Fractional rig						
50S	4	6.5	8	1.4	1.7	100	60	120	25	215	505-004-10
	5	8.5	11	1.8	2.5	100	60	120	25	215	505-004-10

Furlex series	Forestay, dia., mm	Max forestay length (FL), m	Furlex system Art. No.
50S	4	7.7	022-015-51
	4	10.1	022-015-52
	5	7.7	022-015-53
	5	10.1	022-015-54
	5	12.5	022-015-55

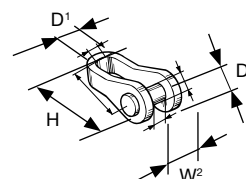
Furlex series	Internal diameter of luff groove (DLG), Ø mm	Width of luff groove (WLG), mm
50S	6.0	2.6



Eye/fork toggle

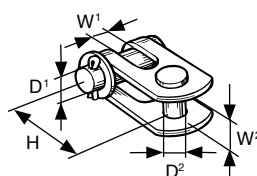
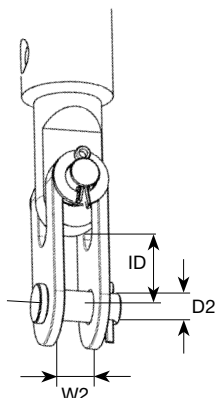
Forestay dia., mm	Art. no.	Length H mm	Ø Clevis pin D ² mm	Fork width W ² mm	Ø Eye D ¹ mm
4	174-102-01	25	8	8	8
5	174-103-01	35	9.5	10	10

Can be used to lengthen a Furlex system. Fit it underneath the standard fork/fork toggle or at the top end of the Furlex wire.



Standard Furlex fork/fork toggle

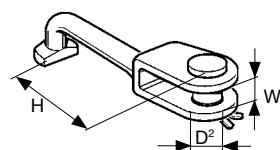
Forestay dia., mm	Art. no.	Length H mm	Ø Clevis pin D ¹ mm	Ø Clevis pin D ² mm	ID mm	Fork width W ¹ mm	Fork width W ² mm
4	517-056-02	25	8	8	17	7.5	7.5
5	517-054-02	30	10	10	19	10	11



T/fork toggle

Forestay dia., mm	Art. no.	Length H mm	Ø Clevis pin D ² mm	Fork width W ² mm
4	174-127-01	60	8	8
5	174-128-01	70	9.5	10

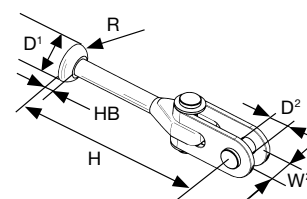
Needed to connect the Furlex to a Seldén backing plate for T-terminals.



Stemball/Eye toggle with Fork/fork toggle

Forestay dia., mm	Art. no.	Length H mm	Ø Clevis pin D ² mm	Fork width W ² mm	Height HB mm	Radius R mm	Ø Stemball D ¹ mm
5	517-065-01	138	10	11	8.5	10	26

Needed when fitting Furlex to some masts of other origin than Seldén.



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The Seldén Group is the world's leading manufacturer of mast and rigging systems in carbon and aluminium for dinghies, keelboats and yachts. The range was extended with deck hardware in 2008.

The Group consists of Seldén Mast AB in Sweden, Seldén Mast A/S in Denmark, Seldén Mast Ltd in the UK, Seldén Mid Europe B.V. in the Netherlands, Seldén Mast SAS in France, Seldén Mast Inc. in the USA and Seldén Mast Asia Ltd in Hong Kong.

Our well known brands are Seldén and Furlex. The worldwide success of Furlex has enabled us to build a network of over 750 authorised dealers covering the world's marine markets. So wherever you sail, you can be sure of fast access to our service, spare parts and know-how.

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