

RECKMANN

operation manual

EF90
electric furling system
aluminium foils
wire / rod
DS



Stand: 15 March 2011

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1 Introduction

1.1.1 Packing list EF90

Date _____

Customer _____

Dealer _____

Order number _____

Type: EF90 _____

headstay type:	-	size (mm, -):	_____
headstay length: D=	_____ mm	unshortened foil length P:	_____ mm
rod collets/ swage terminal:	1 pc	topterminal:	_____
halyard swivel:	1 pc	___- shackle	_____ pcs
tack slider	_____	Shackle size:	_____
Manual:	1 pc	foil type (R/S):	_____

1 Furling unit with toggle

1 Feeder section*	<input type="checkbox"/>	3000 mm	<input type="checkbox"/>	5980 mm
___ Standard section	<input type="checkbox"/>	3000 mm	<input type="checkbox"/>	5980 mm
___ Standard section		1500 mm		
___ Top section		_____mm		

*length without furler spline and sliding tube

Introduction

R10 up to R40

- _____ Hose 200 mm
- _____ Hose 340 mm
- _____ Hose 500 mm (red marked)
- _____ Hose 600 mm
- _____ Hose 1740 mm
- _____ Top hose _____ mm

R50 and R5 up to R8

- _____ Spacer tube 240 mm (at some sizes slotted)
- _____ Spacer tube 1660 mm (at some sizes slotted)
- _____ Splice bearing with two screws (at some sizes split)
- _____ Bottom bushing
- _____ Bearing for foil reinforcement (at some sizes split)

- _____ Bottom foil reinforcement
- _____ Foil connectors (at some sizes split)
- _____ Delrin bearings (2 spares up to R40), (at some sizes split)
- _____ SS inserts for foil connectors (1 spare)
- _____ Screw for foil connectors (2 spares)
- 1 Top cap with screws (split)
- 1 Bottom threaded plates with screws
- 1 Sail feeder
- _____ Key for stay adjustment
- 1 Set socket wrenches
- _____ Winch handle



- 1 Connecting box
- 1 Control box
- 1 Two button panel
- 2 Through deck fitting for wire

Additional equipment:

Packed by

Introduction

Dear Reckmann customer,

With the EF90 reefing system you have purchased the latest reefing system which you can rely on. This unit is manufactured using the latest technical innovations and uses the best materials. It is a successful combination of design, performance and safety. We are confident that the EF90 reefing system will provide you with enjoyment for many years.

1.1.2 How to use this manual

Read this manual carefully before assembly and operation of your Reckmann gear.

Points that need additional attention will be marked in the following way:



Note!

This sign marks points which need special attention.



Warning!

This sign marks the risk of injuries or other significant danger.



Tip

this triangle marks useful tips.

1.1.3 Important remarks

After your furling system was installed accordingly to this manual, we recommend to read the following notes carefully before you set your furling system into operation.



Note!

Improper use according to this manual of the furler may cause loss of warranty.

Consult a Reckmann service partner in any case of problems.



Warning!

Any modification or damage may influence the safe operation of the furler.

Please make sure that the furling system is in a well condition according to this manual.



Warning!

Adjusting with load on the sheet may damage the profile.

Adjust only when sheet is unloaded.

1.1.4 Cover for transportation

Your Reckmann furling gear is protected by a leather transportation cover. Remove this protection cover immediately after the furler is installed. Not removing the cover may cause, especially in combination with sea water, heavy corrosion. The Reckmann warranty does not cover corrosion problems due to installed transportation covers.

**Warning!**

An installed transportation cover may cause heavy corrosion at the gear body.
Remove the cover directly after installation of the furler.

**Tip**

You can use the protection cover to protect your furler during its winter storage.

Release the sheet before the sail is furled.

**Warning!**

Furling the sail against a tensioned sheet may cause damages of the furler.
Release the sheet before you start furling the sail.

**Warning!**

Please note: do not use the furler to trim the sail flat. Use your sheet winches for flattening sails.

Improper use may cause damage to the furler.

**Tip**

Too low halyard tension may cause a halyard wrap.
A halyard wrap blocks the furling gear and may cause damages of the foils.
Make sure that the halyard is under sufficient tension.



Tip

The genoa halyard has to be equipped with a swivel shackle. If the halyard gets twisted around the foil, the functioning of the furler will be impaired.

As mentioned above, the swivel shackle enables the halyard to lose its twist.



Tip

Too low headstay tension causes sag of the headstay which reduces the performance of the boat.

Please make sure that your headstay tension is sufficient.

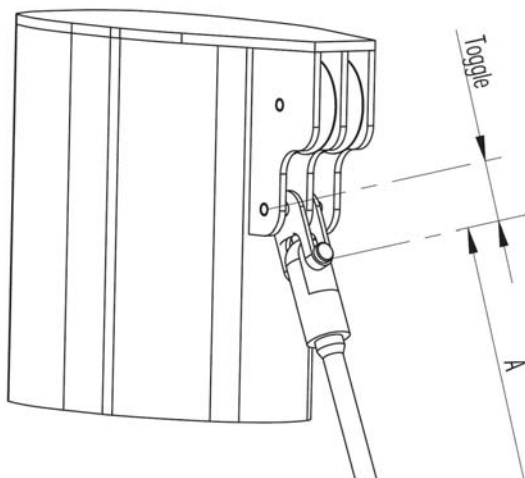
1.1.5 Toggle

The EF90 was shipped with a bottom stay toggle. Make sure that the top end of the stay is also equipped with a toggle. It is necessary that a toggle is installed at both stay ends. Without toggle, the stay terminals would be damaged by fatigue due to bending moments.



Warning!

A forestay without toggle could break due to fatigue. Make sure that a toggle is installed at both stay ends.

**Note!**

Luff tape remaining in the sail feeder at a fully hoisted sail may damage the feeder.

Make sure that the luff tape ends above the feeder at a fully hoisted sail.

1.2 Maintenance of the furler

To keep the furler in a good optical and technical condition, a regular service is required. Maintenance of the furler consists of two basic points:

- Regular maintenance by the customer
- Regular Service performed by one of our service partners



Tip

Proper operation can only be ensured by regular service. Make sure that the maintenance plan of your furler is carried out carefully.

1.2.1 Maintenance to be carried out by the customer

Clean your furling gear regularly. Wash carefully all salt from the furler. Stainless steel parts can be treated with special care product. Additional for all electric and hydraulic furling units, the function of the manual backup drive and the condition of all hydraulic hoses / electric wires should be checked regular.

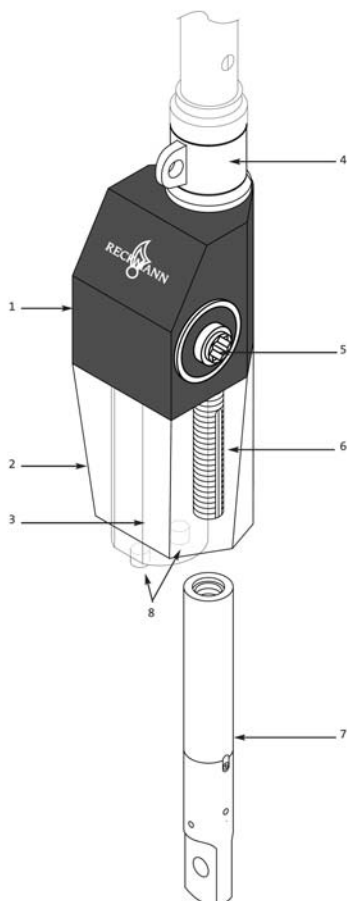
1.2.2 Maintenance to be carried out by a Reckmann service partner

To ensure the safe and proper operation of the furler, it has to be serviced every five years by an authorized Reckmann service partner. A table of all authorized Reckmann service partners can be found at the end of this manual or at www.reckmann.com

2 Product description

The following parts belong to the electric furling system:

1. black anodized gear box
2. stainless steel cover
3. covered electric motor
4. tack ring
5. manual backup drive
6. Threaded main axle
7. adjuster
8. wire connectors



3 Assembling the furling unit

3.1 Tools required for assembly

Before assembling the reefing system, ensure that you have all the tools necessary. In addition to the allen keys enclosed with the system you will need:

- screwdriver
- cross head screwdriver
- drill
- 3.0 mm drill bit for R10 to R20 and
- 4.0 mm drill bit for R30 to R40
- 4.0 mm drill bit for S1 to S3
- 5,2mm drill bit for R50 and R5 to R8
- M6 thread drill for R50 and R5 to R8
- hacksaw
- sharp knife

3.2 Calculation of stay measurements

Please fill in the requested values in the calculation below to get the headstay length D, foil length B and the measurement C. The required values can be found in the following tables and in the pack list on page 2 following. **All measurements in mm!**

$$D = A - E - T$$

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$B = D - F - G - H$$

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} - \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

$$C = B - P$$

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}}$$

Assembling the furling unit

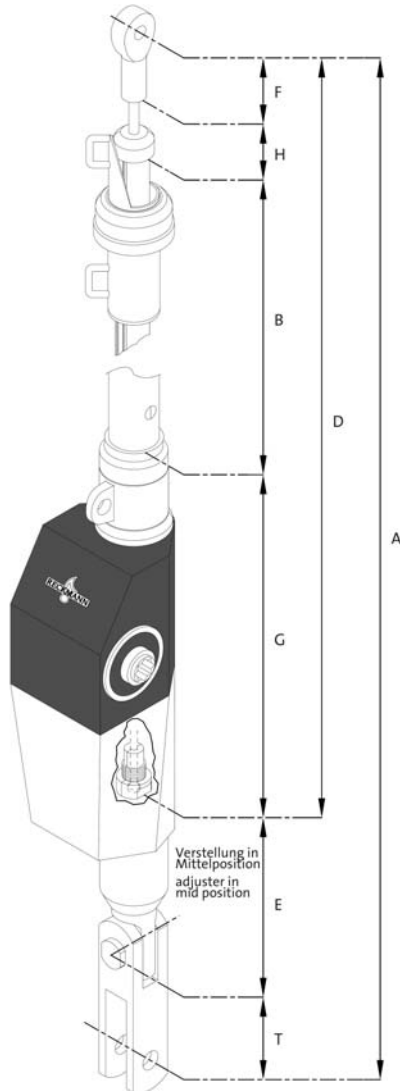
3.3 Deductions to calculate the stay and luff length

The measurements T and F are depending on toggle and top terminal

		E mm	G mm
EF90-2	Draht / wire	300	247
	rod	308	237
EF90-3	Draht / wire	367	283
	rod	377	273

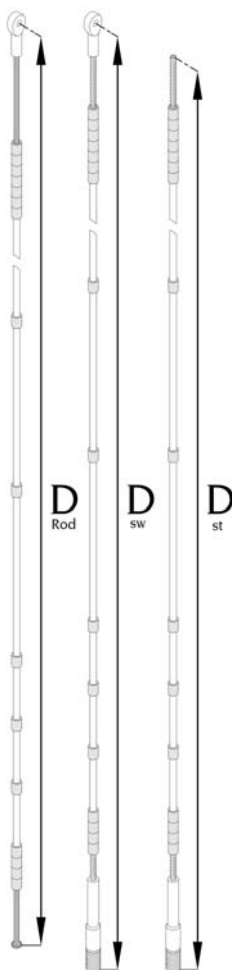
For rod and wire stays:

Profil / foil	H
R20/R30/R40	90mm
R50/R5/R6/R7	100mm
S2 / S2.5	90mm
S3...S7	100mm
S8...S9.5	150mm



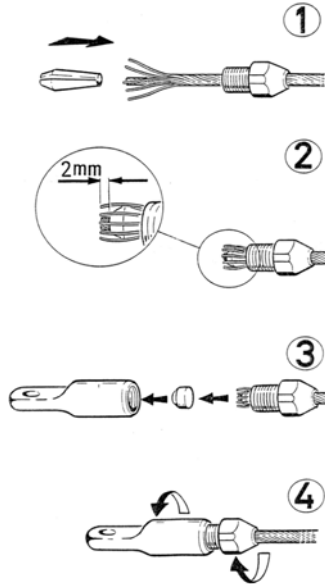
3.4 Headstay length D

The length of the headstay was calculated in the chapter „calculation of stay measurements“. The meaning of the measurement D can be found, according to your headstay geometry (rod stay, wire stay, swage- or swageless top terminal) in the picture on the right.



3.5 Assembly of swageless fittings

Cut the wire headstay at the top end to the length D. Install the swageless fitting according to the instructions of the manufacturer.



3.6 Foil size

The next steps of foil assembly are depending on the foil size. Please jump to the chapter which describes the assembly of your foil size!

R10 up to R40, including foil reinforcement (please see note below)

R50, R5 up to R8



Note!

Please follow the description for the assembly of your foil size!

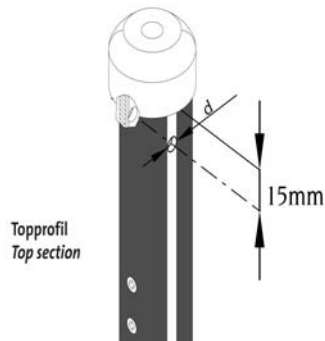
Note!

If your system is equipped with a R10 up to R40 foil reinforcement, please note the reinforcement chapter behind the foil assembly chapter.

3.7 Foil assembly from R10 up to R40

3.7.1 Preparation of the top cap

Insert both half of the top cap into the top section and carefully drill a pilot hole (see table for d in the chapter preparations) on each side for the screws provided. Remove the top cap for installation later.

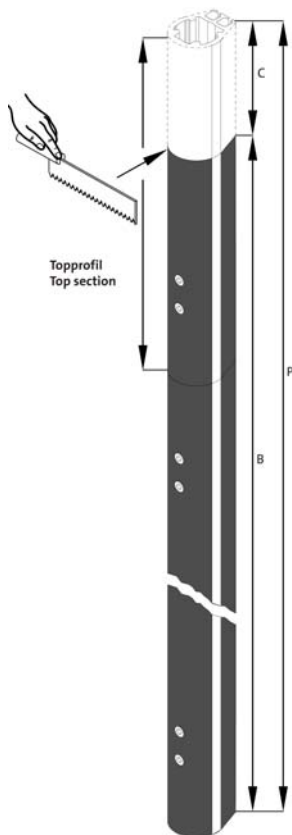


Required drill bit diameter for top cap assembly

R10	3 mm
R20	3 mm
R30	4 mm
R40	4 mm

3.7.2 Shortening the top foil

Shorten one of your 3000mm standard foils by the measurement C. This shortened foil is now your top foil.



Assembling the furling unit

3.7.3 Shortening the top hose

Shorten the top hose by the measurement C..



3.7.4 Assembly of bushings and spacer tubes

If your system was delivered with reinforced profiles please continue with the next chapter for the assembly procedure:

Rod headstay:

After assembly of the eye terminal and before cold heading the rod, slide the bushes and spacer tubes onto the forestay from the bottom to the top as shown in the diagram. Fit the 7 top bushes first and then the top spacer which was cut to match the top section. It is important that the order and numbers of bushes and spacer tubes are fitted as shown in the diagram. This will ensure that the 500 mm spacers, which are marked red, will be correctly positioned for each foil section join. With some systems, depending on the total section lengths supplied, there may be a 1500 mm long section of foil. The bush and tube spacings for this particular section are fitted to the lower end of the stay, as illustrated, ensuring that it is situated on final assembly immediately above the feeder (bottom) section. Finally, after fitting all the bushes and spacer tubes in the correct sequence, fit the bushings and hoses for the feeder section according to the following diagram.

Wire headstay:

After fitting the lower terminal and before assembly of the top terminal, the bushes and spacer tubes are fitted from the top to the bottom as shown in the diagram above. Fit the bushings and hoses for the feeder section first. It is important that the order and numbers of bushes and spacer tubes are fitted as shown in the diagram. This will ensure that the 500 mm spacers, which are marked red, will be correctly positioned for each foil section join. With some systems, depending on the total section lengths supplied, there may be a 1500 mm long section of foil. The bush and tube spacings for this particular section are fitted to the lower end of the stay, as illustrated, ensuring that it is situated on final assembly. Finally after fitting all bushes and spacer tubes in the correct sequence, fit the top spacer and 7 bushes to the top end. Before fitting the top terminal, ensure that all the bush spacing is correct and will match the foil join positions.



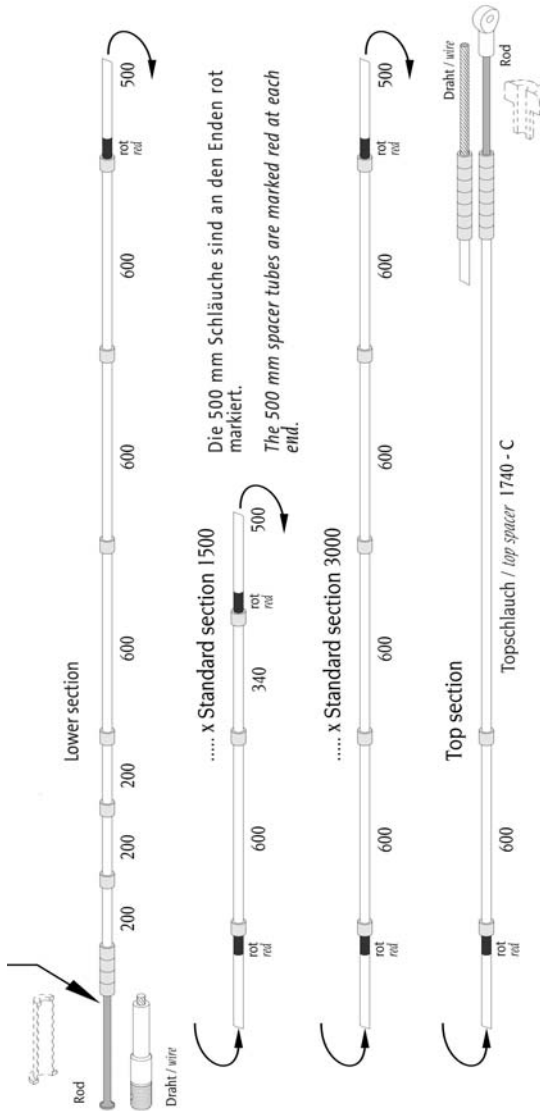
Note!

For foils R10 and R20 two additional bushings have to be placed at the bottom stay end.

Assembling the furling unit



Two additional bushings at R10 and R20



3.7.5 Foil assembly / split foil connectors

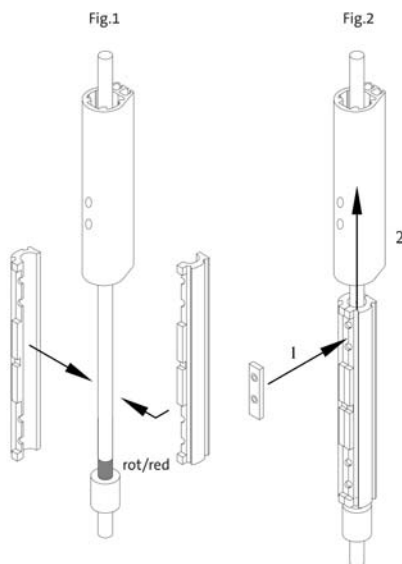
After the assembling of the bushes and hoses on the forestay and the shortening of the top profile start to assemble the profiles.

Sequence of the profiles:

Top section -- x Standard section 3000 -- x

Standard section 1500 -- Lower section

From the bottom end of the stay, slide on and feed the top profile along to the top end of the stay. When in place, assemble a pair of split join sleeves over the stay at the spacer tube, marked red, directly under the top section (fig. 1). Insert a stainless steel plate (1) into the recess on the top half of the join sleeve and make sure that the holes of the plate and the join sleeve are on the same side. Push the join sleeve half of its length into the upper foil section (2). (fig. 2).

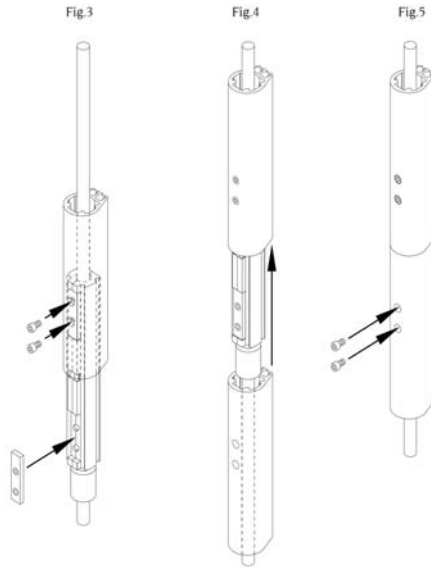


Note!

Ensure that the holes of the connector plate and foil are aligned. Otherwise the Tuff-Lock screws won't fit.

Assembling the furling unit

Secure the join sleeve with 2 tuff-lock screws (fig. 3). Slide the next piece of extrusion from the bottom end over the stay up to the join sleeve. Insert the lower stainless steel plate into the recess in the join sleeve (fig. 3). Slide the foil section over the join sleeve (fig.4) until it butts cleanly with the upper section and then secure it with 2 tuff-lock screws (fig.5). This process is repeated until all the foil sections are in place.



3.8 Installation of the foil reinforcement (optional)

3.8.1 Preparation of the headstay

In some cases a reinforcement of the feeder section is required. The differences regarding the assembly are described in this chapter. If your stay is already assembled, begin as followed:

Unscrew the two security screws of the lower section (fig01) and slide it down off the stay (fig02).

Disassemble the marked bushes and hoses (fig03), they are no longer needed. .

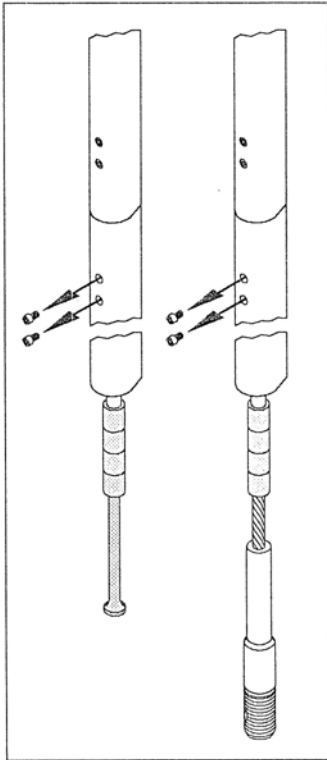


Bild 1 / fig. 1

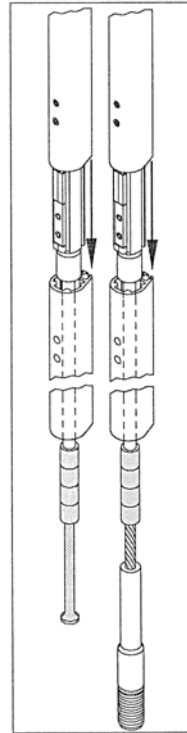


Bild 2 / fig. 2

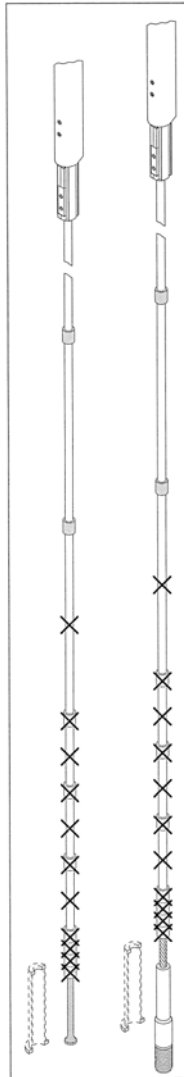


Bild 3 / fig. 3

3.8.2 Reinforcement assembly

Place the reinforcement on the stay in the area, in which you have disassembled the bushes and hoses (fig04)

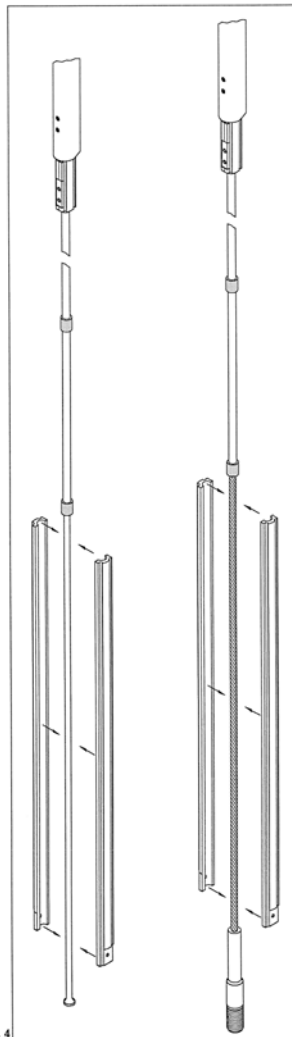


Bild 4 / fig. 4

Assembling the furling unit

Thread one end of the small rope through the two holes at the bottom end of the reinforcement and make a loop to knot it.

Thread the other end of it from the top to the bottom end of the lower section. .

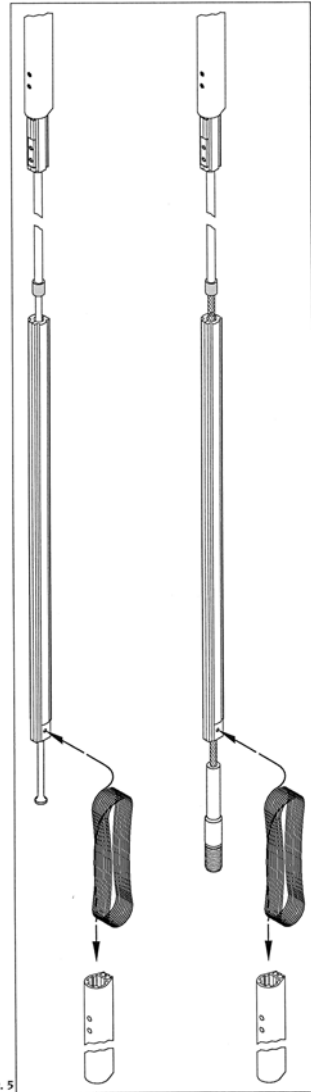


Bild 5 / fig. 5

Slide the lower section onto the stay and the reinforcement up to the following section. During this action hold the reinforcement in place at the bottom end of the stay using the small rope. (fig 06)

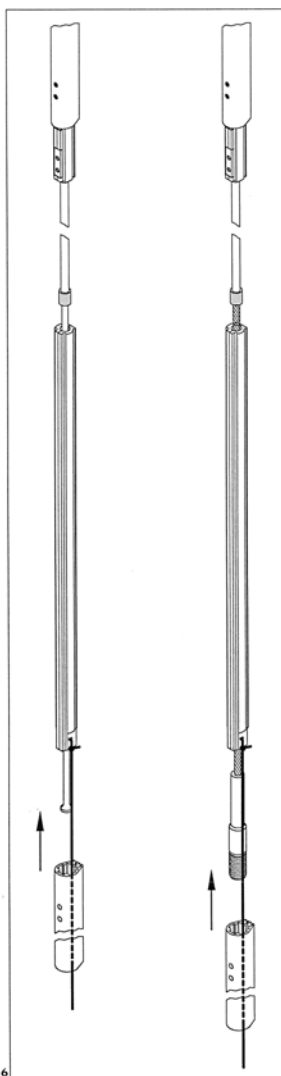
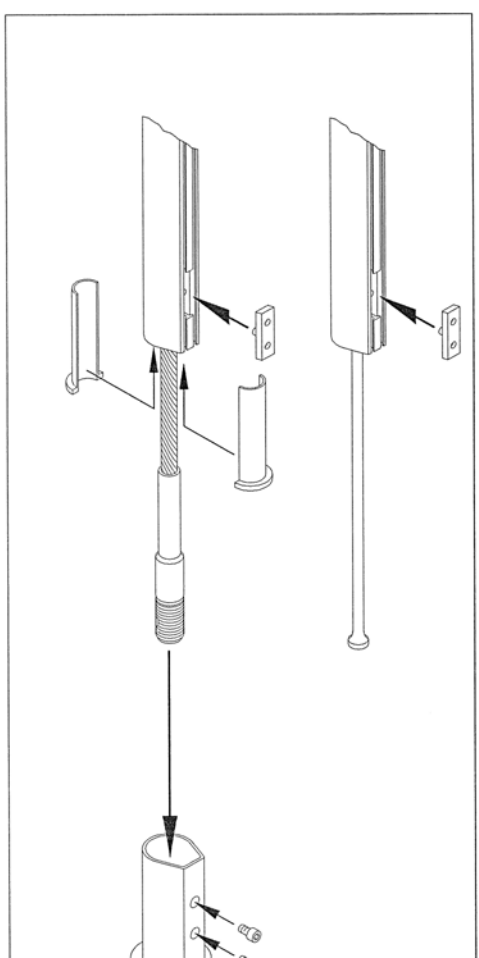


Bild 6 / fig. 6

Assembling the furling unit

Remove the small rope from the reinforcement. Insert the lower split bearing into place as shown in the drawing. Push the stay through the furler and insert the lower foil section into the flange. Secure the foil in the flange with the two cap screws provided. (fig07)

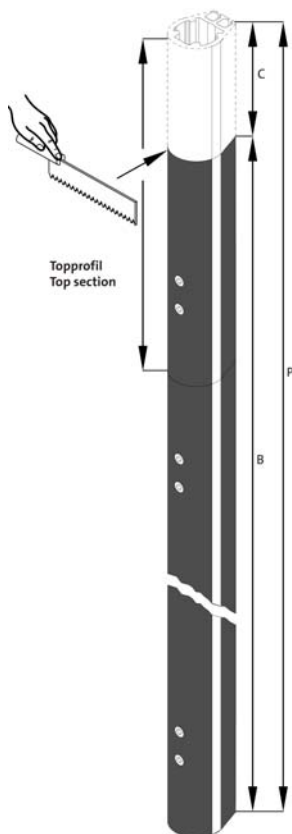
Then secure the stay inside the furler, please follow the description in the furler manual.



3.9 Foil assembly R50, R5 up to R8

3.9.1 Shortening the top foil

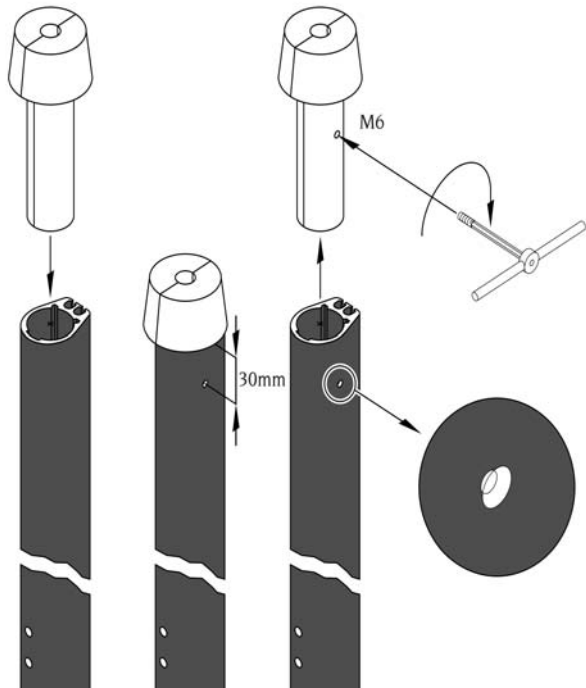
Shorten one of your 5980mm standard foils by the measurement C. This shortened foil is now your top foil.



Assembling the furling unit

3.9.2 Preperation of the top cap

Insert both halves of the top cap into the top section and carefully drill a pilot hole dia 5,2mm on each side for the screws provided. Remove the top cap for installation later. Make a thread of M6 in both of the top cap halves and suit the boreholes for the counter-sunk screws.



3.9.3 Sliding the top foil onto the stay

Step 1

From the bottom end of the stay, slide on and feed the top section along to the top end of the stay. (Fig. 1)

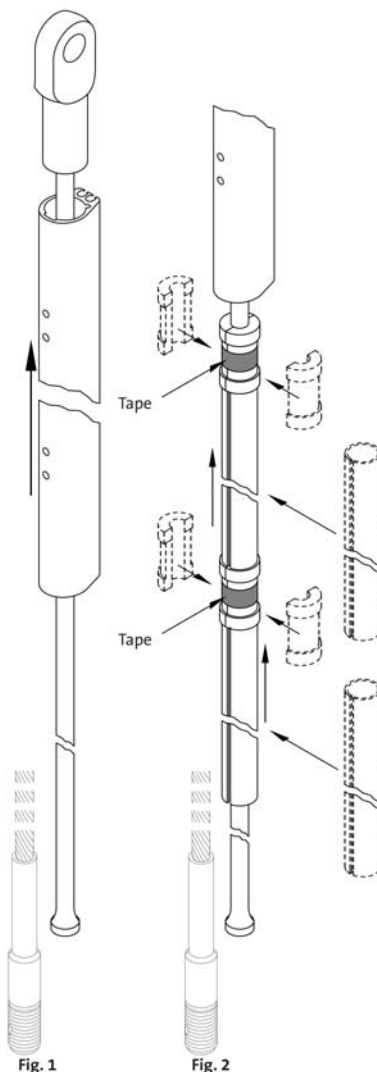
Step 2

There are four possibilities for installation a.) , b.) , c.) or d.) . Which is correct for your application depends on the measurement C, calculated on page 20:

a.) measurement C < 2150mm: Place two big split bushes and two long spacer tubes on the stay. Secure the bushes with tape and push them together into the top section. (Fig. 2)

b.) measurement C > 2150mm : Place only one big split bush and only one long spacer tube on the stay. Secure the bush with tape and push them together into the top section. c.) measurement C > 3850mm : You need no bush and no spacer tube for the top section, go ahead with step 3 of the further installation explained on the next page.

d.) measurement C > 5590mm : You need no bush and no spacer tube for the top section. Either you have to cut the join sleeve or you leave out the top section. If you leave out the top section follow the



Assembling the furling unit

installation on page 24 with step 5.

3.9.4 Fasten a connector on the stay

Step 3:

Put a join sleeve on the stay directly under the top section and assemble one split splice bearing at each end. Fix the splice bearings with the correct delrin screws. (Fig. 3)

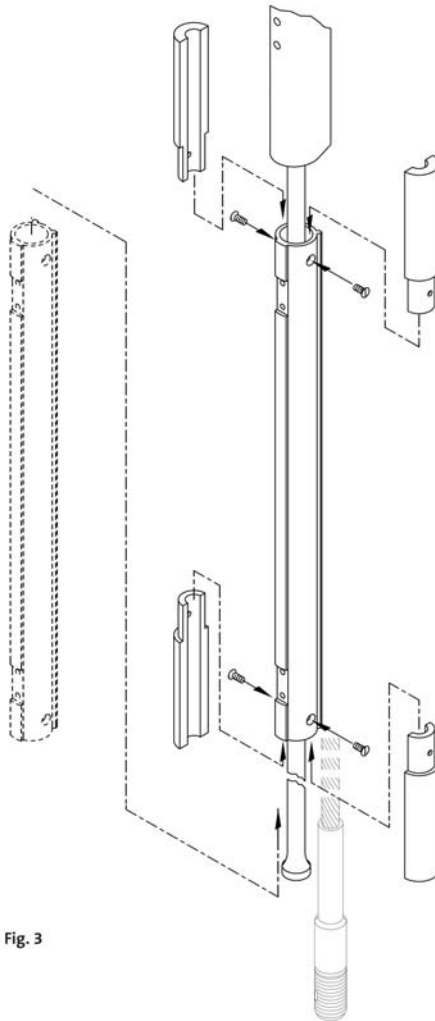


Fig. 3

3.9.5 Inserting a threaded plate

Step 4

Insert a stainless steel plate into the recess on the top half of the join sleeve. Push the join sleeve half of its length into the upper foil section. Secure the join sleeve with the given tuff-lock screws. (Fig. 4)

Step 5

Slide the next piece of extrusion from the bottom end over the stay up to the join sleeve. Insert the lower stainless steel plate into the recess in the join sleeve. Slide the foil section over the join sleeve until it butts cleanly with the upper section and then secure it with the given tuff-lock screws. (Fig. 5)

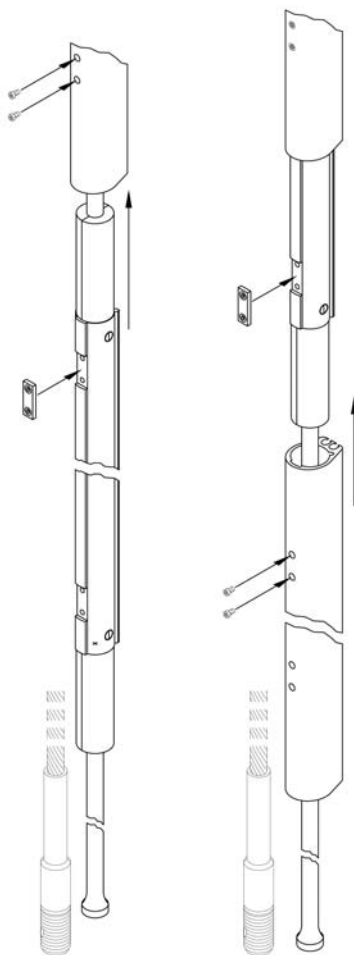


Fig. 4

Fig. 5

3.9.6 Sliding the remaining foils onto the stay

Step 6

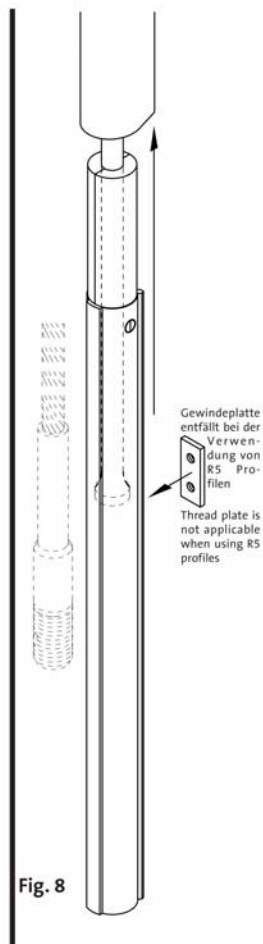
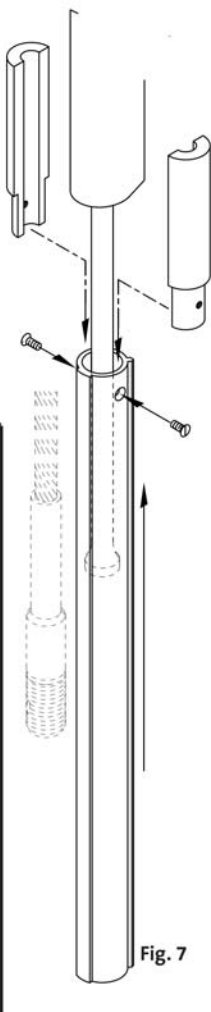
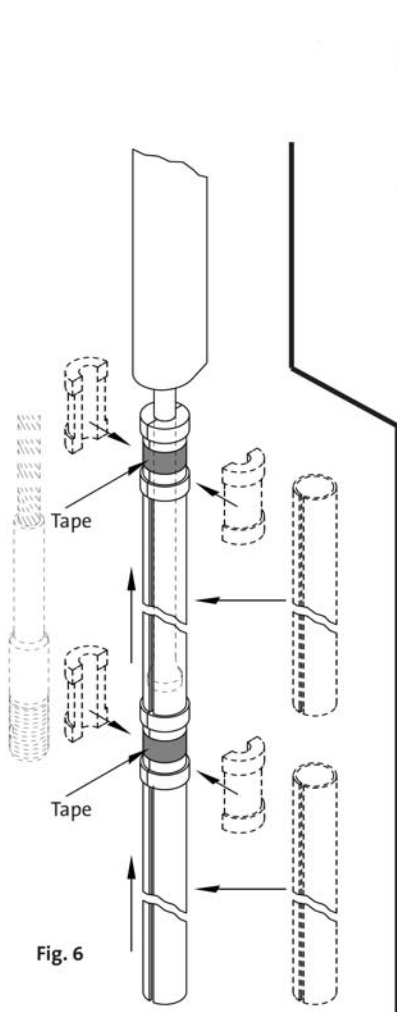
Repeat step 2a to step 5 until all of the foil sections are in place. (you don't have to take measurement C into consideration when repeating step 2a)

Step 7

After fitting the last two big bushes and long spacer tubes (Fig. 6), assemble the lower reinforcement on the stay and fit a split splice bearing on its top end. (Fig. 7)

Step 8

Insert the sail feeder thread plate (not applicable for R50 and R5) into the recess on the reinforcement and push the ready assembled reinforcement completely into the last foil section. (Fig. 8)

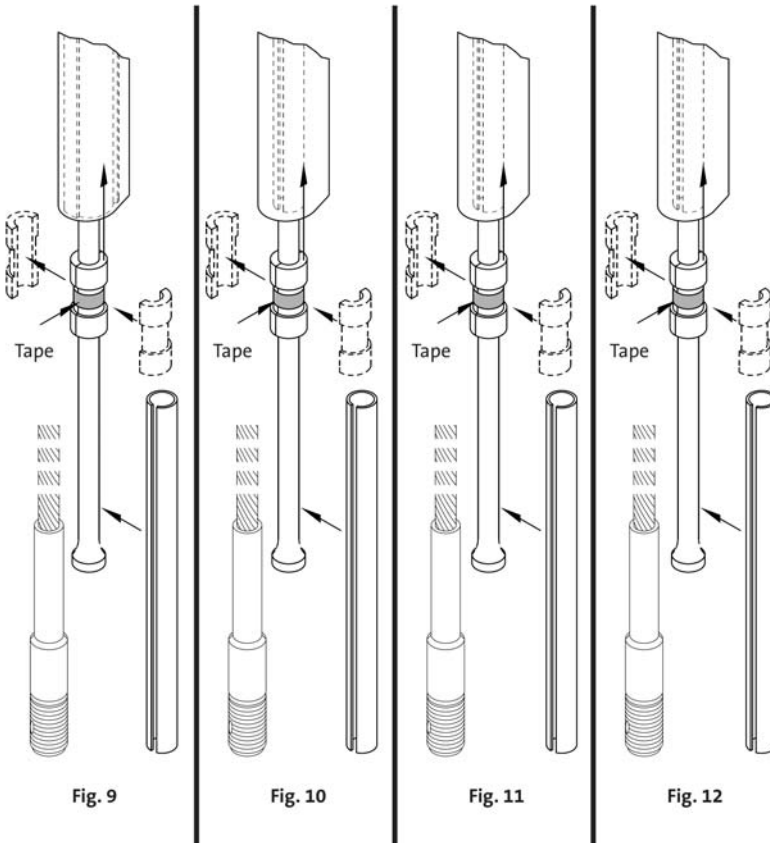


Assembling the furling unit

3.9.7 Assembly of the feeder section

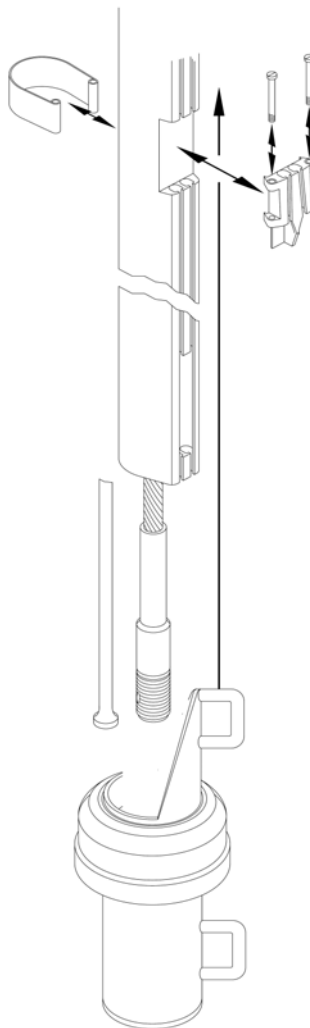
Step 9

Assemble one small split bush and one short spacer tube. Secure the split bush with tape and push them together into the upper foil section (Fig. 9). Repeat this for R50, R5, R6 and R7 three times, for R8 two times. (Fig. 10 to Fig. 12)



3.10 Assembly of halyard swivel and sail feeder for foils R10 up to R50

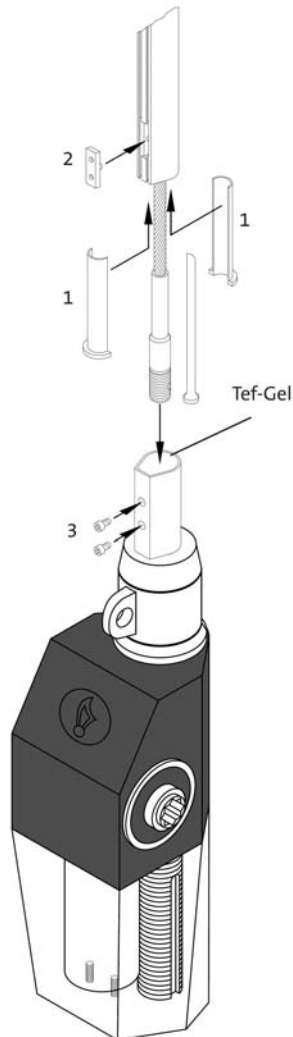
When the halyard swivel is on the profile lay the sail feeder in its recess in the foil. Secure it with the clamp and the two provided screws as it is shown on the picture.



3.11 Assembly of stay, foils and furler

3.12 Securing the foils

Insert the split bottom bearing (1) into the lower foil section, then insert the bottom thread plate (2) into the recess. Push the forestay together with the lower foil section, **coated with Tef-Gel at its bottom end**, into the profile adapter. Secure the foil and the adapter with two cap screws (3) provided (3 screws for R6 + R7 profiles).

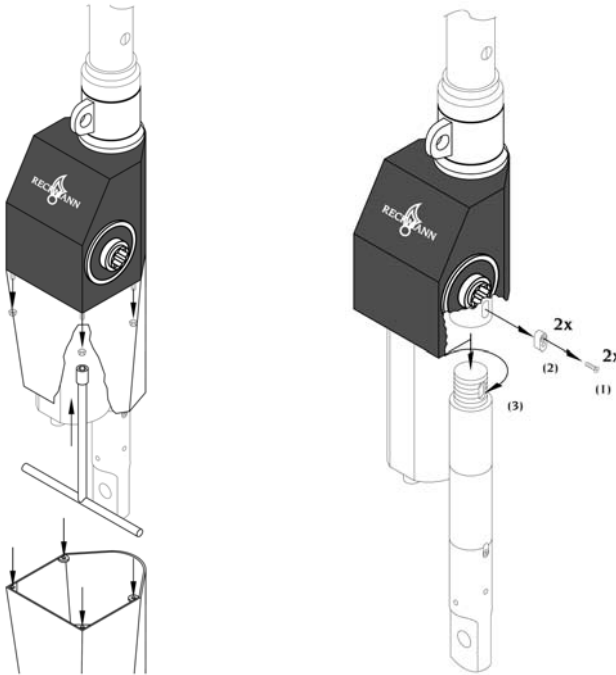


**Note!**

To avoid corrosion of the bottom foil end, apply Tef-Gel or similar before the foil is slid into the foil adapter.

3.13 Removing the adjuster

For easy installation of the gear box, lay it beside the bottom end of the forestay sections. First remove the 4 stainless steel cover locking nuts and slide the cover down. To remove the adjuster take the two keys (2) apart. Therefore use the two locking screws (1) unscrewed before. Screw the two screws (1) in the lower thread holes of the keys, by this operation the key will be pushed out. At least unsecure the adjuster(3) and safe all the parts until the reassembly.



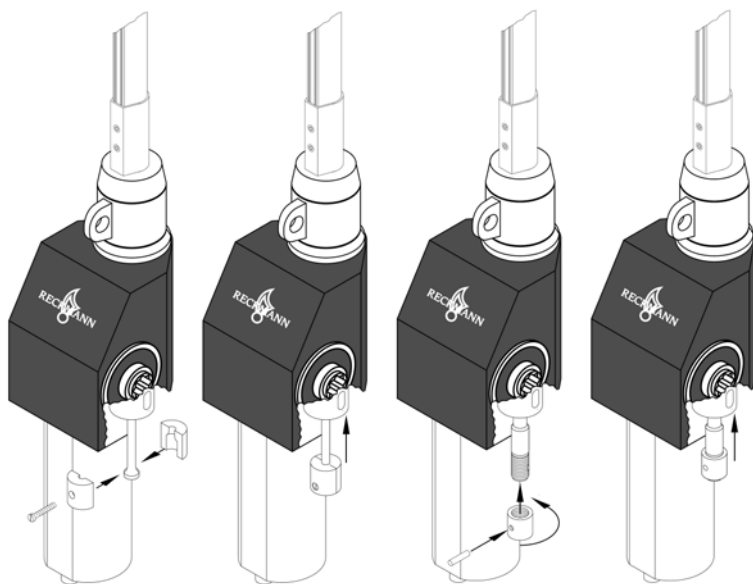
3.14 Connection of forestay and gearbox

Rod:

Slide the forestay out of the flange as far as it will go. (It may be necessary to push the rod quite firmly from the top end). Fit the split retaining brackets around the rod head and fix both halves with the screw provided. After greasing push them firmly back into their seat inside the flange.

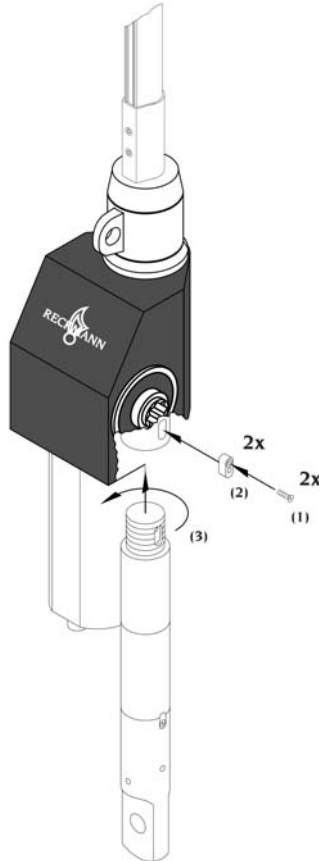
Wire:

Slide the forestay out of the flange as far as it will go. (It may be necessary to push the wire quite firmly from the top end). Screw on the special nut and secure with the pin provided. Pull the headstay from the top as far as possible to ensure that the bottom end is seated correctly into its seat inside the flange.



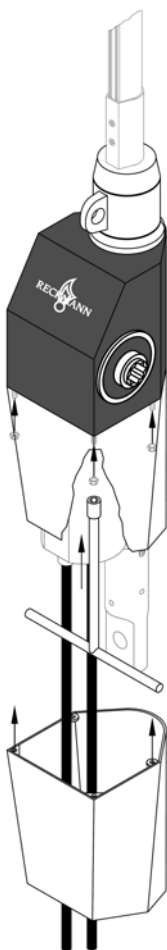
3.15 Assembly of the adjuster

Screw the adjuster (3) into the flange until the key ways are non overlapping. Insert the two keys (2) and secure them with the two screws (1) provided..



3.16 Assembly of the stainless steel cover

Re-install the cover in the opposite direction as described in the chapter „removing the adjuster“.

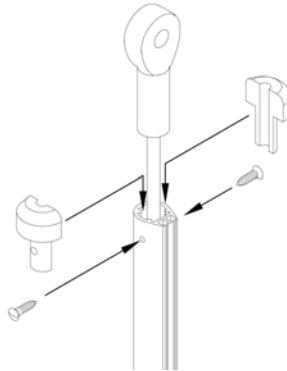


Assembling the furling unit

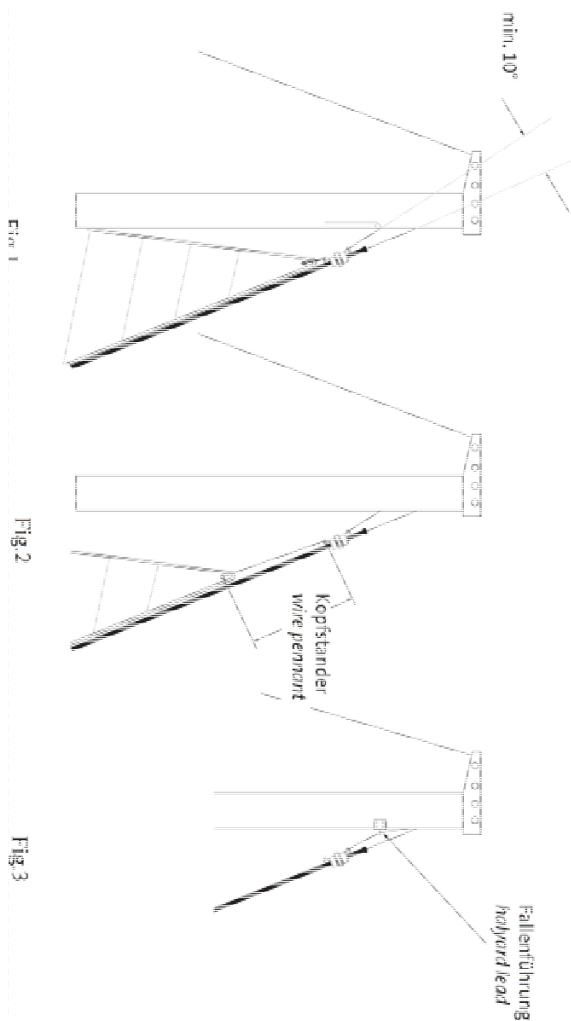
3.17 Assembly of the top cap

(as an option)

Ensure that all the delrin bushes are inside the foil section and then insert the top cap into the top profile and secure in place with the two screws provided.



3.18 Configuration of the head



Assembling the furling unit

Halyard leads

To prevent the genoa halyard from twisting around the forestay, the angle between forestay and halyard must be at least 10° (fig. 1). If this requirement is not fulfilled, a halyard lead must be fitted.

(fig.3)

Position of the halyard swivel If the boat is equipped with more than one headsail, each one should be given equal luff length so that the halyard swivel will be located at the same level when the sail is hoisted. It is imperative that the halyard shackle is always at the same position at the top, i.e. approx. 20cm from the halyard sheave. If the sails are not cut to the same length, a wire pennant must be fitted to ensure that the halyard swivel is always at the same height when the sail is hoisted. (fig 2)



Note!

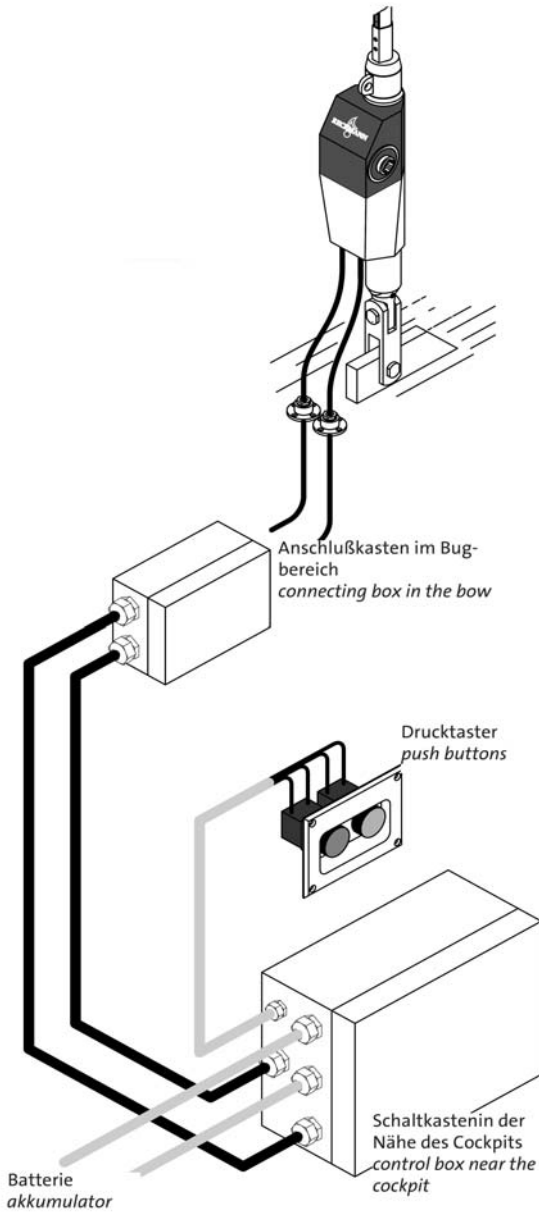
The angle between halyard and headstay has to be at least 10° . If the angle is less than 10° a halyard lead has to be installed.

4 Wiring of the system

4.1 Wiring scheme

The electric furling system has to be wired according to the following scheme. Please note that the picture of the furler has to be understood as a symbol for your furling system.

Wiring of the system



4.3 Electric control box

The control box should be placed close to the cockpit. For wiring notice the wiring diagram on the following pages.

For the connection of battery and connecting box we recommend the following cable sizes. The size of the cable depends on the distance between battery and furler. The required length is **twice** the distance between battery and furler.

24V

up to 10m length => size 35mm²

up to 20m length => size 50mm²

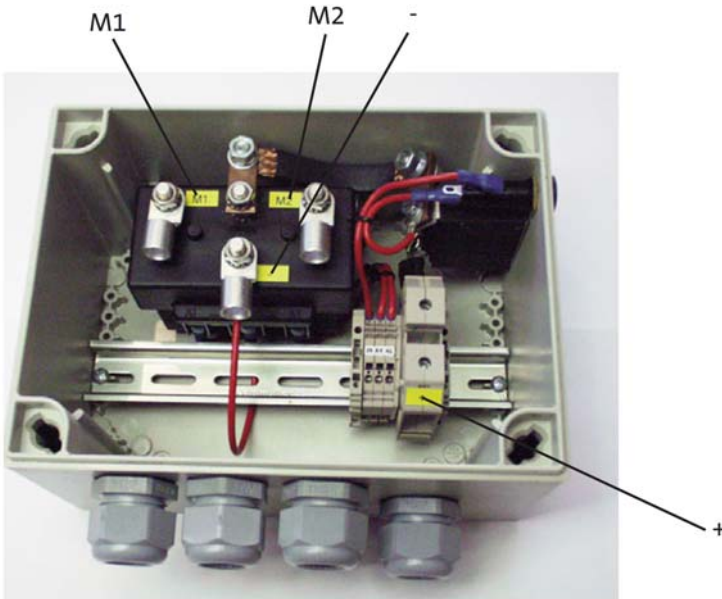
up to 30m length => size 70mm²

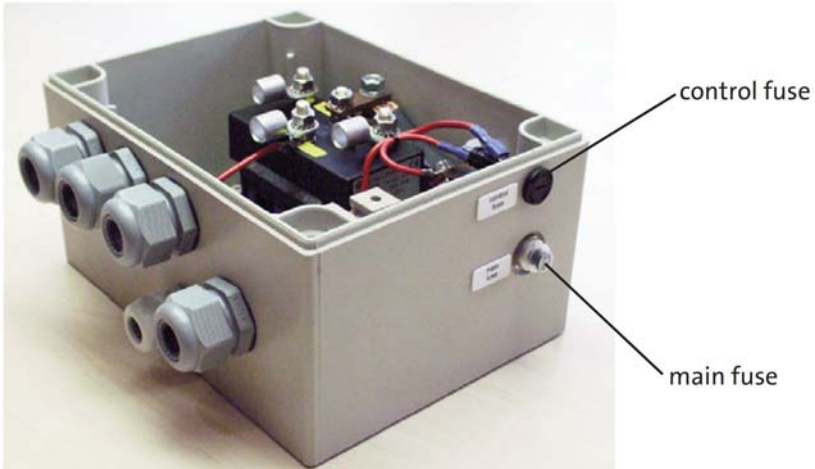
12V

up to 10m length => size 70mm²

up to 20m length => size 95mm²

up to 30m length => size 150mm²

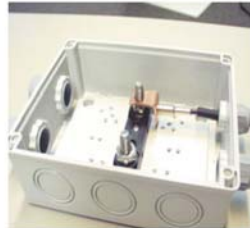




Wiring of the system

4.4 Wiring the furler / connection box

First install the through deck fittings, a hole of \varnothing 15mm is required to feed the wires under deck. To seal the through deck fitting to the deck an O-ring is provided, alternatively an additional sealing with SIKAFLEX is recommended. Cut the wires to the required length and press the provided end fittings on each end after withdrawing the insulation. Slide the wires from outside through the deck and fix them inside the connecting box on the screw port with the copper fittings provided. Please note that it is not possible to disassemble the wires from the electric motor. Therefore an easy disassembly of the wires under deck is required. (for service and disconnecting the headstay)





Note!

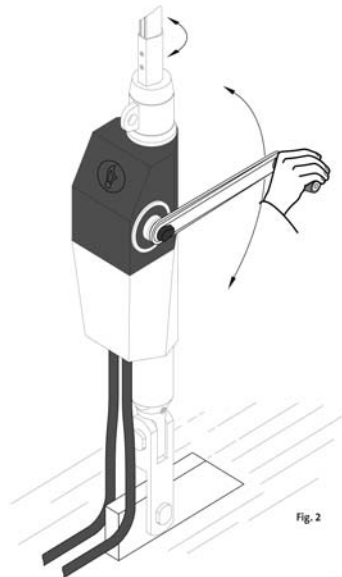
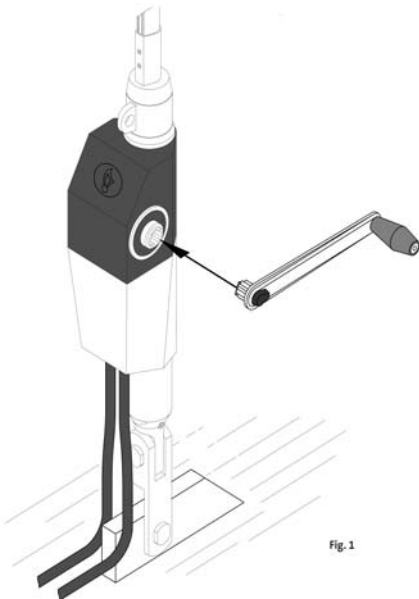
It is not possible to disassemble the wires from the electric motor. Therefore an easy disassembly of the wires under deck is required. (for service and disconnecting the headstay)

5 Operation of the furler

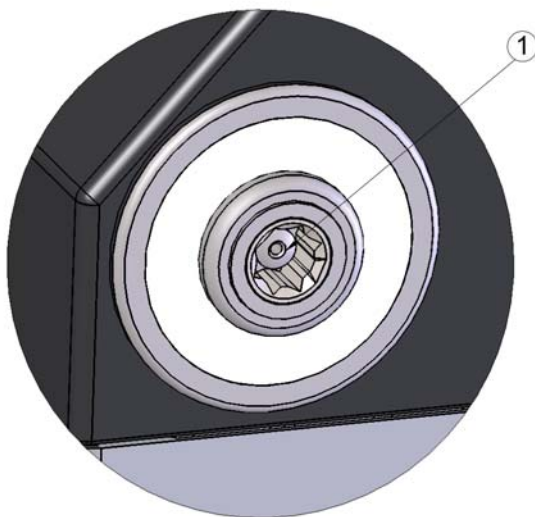
5.1 Operation of the manual backup drive

If a defect affects a normal operation of the furler impossible, sails can be furled manually by hand. Manual handling requires a standard winch handle inserted into the winch socket. Insert the handle completely into the socket, it has to be locked in place, otherwise the drive is not separated from the gear. If problems arise when inserting the handle into the socket, try to turn the handle while inserting to allow easier coupling of the parts. We would like to point out that there is no power transmitted to the handle at any time, due to the special gear construction. It is possible to take the hands off the handle in any position without recoil.

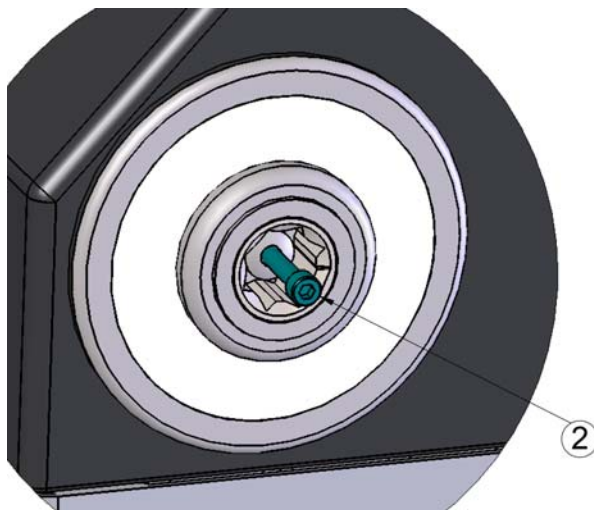
Please note! Make sure that the winch handle is always completely connected with the socket during the manual operation. The emergency manual drive is automatically switched off by pulling the handle out of the winch socket.



The manual backup drive is switched off when the pin (1) moved out after the winch handle is pulled out.



If the pin doesn't move out by itself it can be easily pulled out with the help of M5 screw (2)



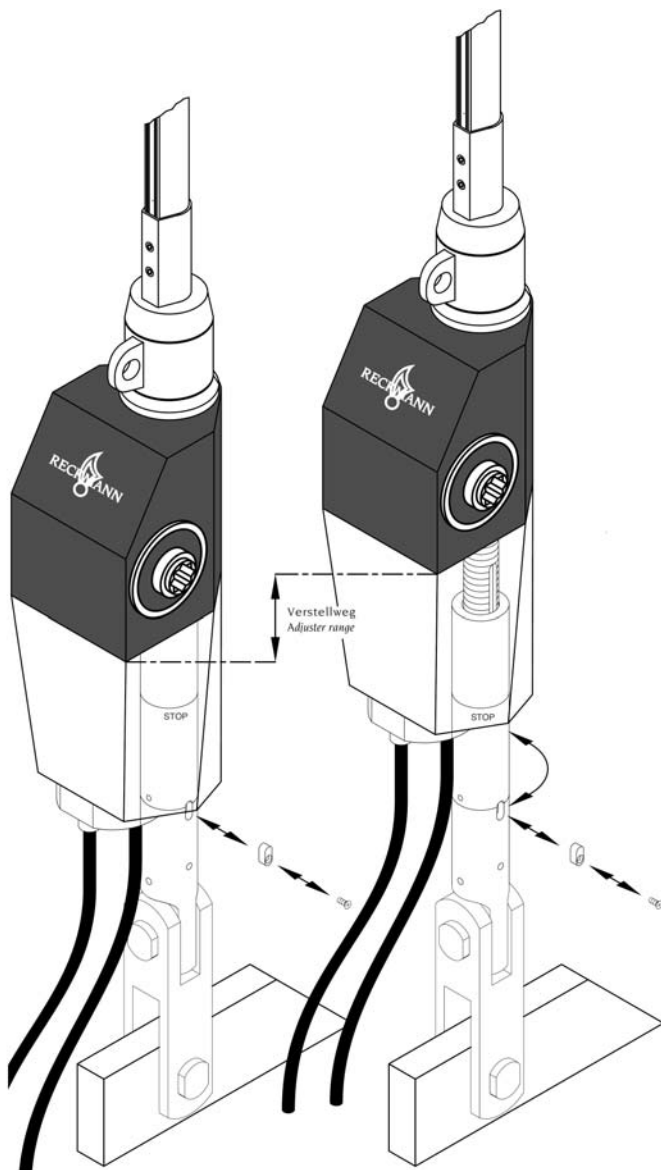
5.2 Using the dock side adjuster

After connecting the furler to the deck chainplate, rotate the adjuster (2) with the provided hook tool to obtain the required forestay length and tension. First withdraw the security screw (1) and the key (2). To push out the key use the M6 thread pin provided and screw it in the hole of the key. The maximum furler length is reached, when the mark "STOP" on the adjuster is visible to the front of the outer cover. Remember to secure the adjuster with the key (2) and the cap screw (1) after making any adjustments.



Warning!

If the adjuster is extended more than the „STOP“ mark, the stay load could cause it to break.
Do not extend the adjuster exceeding the “STOP” mark.



6 Specifications

EF90-2DS

		foil type		R20	R30	S2.5
stay and sail	max. headstay	rod	[-]	-17	-30	-30
		wire	[mm]	10	12	-
	max. length of headstay		[m]	18	23	23
	max. sail area		[m ²]	75	120	120
	max. sheet load		[kg]			
	max. halyard load		[kg]			
max. tack load		[kg]				
electric details	max. rated power		[W]	800		
	required batt. capacity at 12V		[Ah]	140		
	required batt. capacity at 24V		[Ah]	70		
	max. furling speed		[1/min]	45		
	max. torque		[Nm]	190		
	required cable section		[mm ²]	see referring chapter		

EF90-2DS

Adjuster	function		[RT / DS]	DS
	stroke		[mm]	70
	max. pressure		[bar]	-
	at stay load		[kg]	-
	max. stay SWL		[kg]	-
	thread ML		[-]	-
	thread CL		[-]	-
	fitting ML		Parker	-
	fitting CL		Parker	-
	po-check valve		[-]	-

Specifications

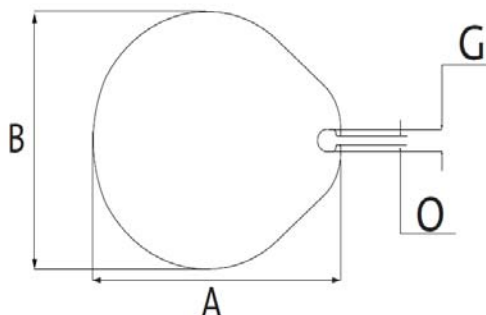
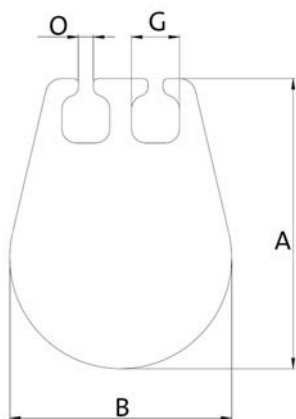
EF90-3DS

		foil type		R40	R50	S3	S4/4.5
stay and sail	max. headstay	rod	[-]	-48	-60	-48	-60
		wire	[mm]	14	16	-	-
	max. length of headstay		[m]	27	31	27	31
	max. sail area		[m ²]	160	220	160	220
	max. sheet load		[kg]				
	max. halyard load		[kg]				
max. tack load		[kg]					
electric details	max. rated power		[W]	1200			
	required batt. capacity at 12V		[Ah]	-			
	required batt. capacity at 24V		[Ah]	70			
	max. furling speed		[1/min]	37			
	max. torque		[Nm]	250			
	required cable section		[mm ²]	see referring chapter			

EF90-3 DS

Adjuster	function	[RT / DS]	DS
	stroke	[mm]	70
	max. pressure	[bar]	-
	at stay load	[kg]	-
	max. stay SWL	[kg]	-
	thread ML	[-]	-
	thread CL	[-]	-
	fitting ML	Parker	-
	fitting CL	Parker	-
	po-check valve	[-]	-

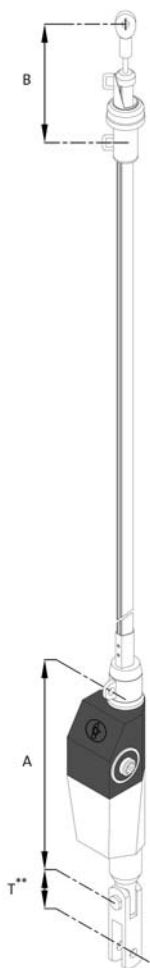
6.1 Reckmann aluminium foil sections



Größe / size	Nut / groove	G (mm)	O (mm)	A (mm)	B (mm)
R10	double	6,4	2,3	31,4	24,1
R20	double	6,4	2,3	35,8	28,8
R30	double	7,5	3,0	45,5	36,1
R40	double	7,5	3,0	49,1	38,7
R50	double	8,0	3,5	54,0	42,0
R5	single	7,5	3,5	60,0	47,0
R6	single	7,5	3,5	72,0	60,0
R7	single	7,5	3,3	85,0	72,0
R8	single	8,0	3,2	107,0	93,0

6.2 Deductions to calculate the luff length

The measurement T depends on the toggle length.



		A* mm	B mm
EF90-2	R20	498	350
	R30	498	450
EF90-3	R40	603	500
	R50	603	550

* Verstellung in Mittelposition / *adjuster in mid position*

** Abhängig von Toggelänge / *depends on the toggle dimensions*

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