

# RECKMANN

---

operation manual

RF90  
hydraulic furling system  
aluminium foils  
wire / rod  
RT



Stand: 6 September 2011

**Copyright by**  
Reckmann Yacht Equipment GmbH  
Siemensstr. 37-39  
D-25462 Rellingen

1	Introduction .....	5
1.1.1	Packing list .....	5
1.1.2	How to use this manual .....	9
1.1.3	Important remarks .....	10
1.1.4	Cover for transportation .....	11
1.1.5	Toggle .....	12
1.2	Maintenance of the furler .....	13
1.2.1	Maintenance to be carried out by the customer .....	14
1.2.2	Maintenance to be carried out by a Reckmann service partner .....	14
1.2.3	maintenance plan .....	15
2	Product description .....	16
3	Assembling the furling unit .....	17
3.1	Tools required for assembly .....	17
3.2	Calculation of stay measurements .....	18
3.3	Headstay length D .....	20
3.4	Assembly of swageless fittings .....	20
3.5	Foil size .....	21
3.6	Foil assembly from R10 up to R40 .....	22
3.6.1	Preparation of the top cap .....	22
3.6.2	Shortening the top foil .....	23
3.6.3	Shortening the top hose .....	24
3.6.4	Assembly of bushings and spacer tubes .....	25
3.6.5	Foil assembly / split foil connectors .....	27
3.7	Installation of the foil reinforcement (optional) .....	28
3.7.1	Preparation of the headstay .....	28
3.7.2	Reinforcement assembly .....	31
3.8	Foil assembly R50, R5 up to R8 .....	35
3.8.1	Shortening the top foil .....	35
3.8.2	Preperation of the top cap .....	36
3.8.3	Sliding the top foil onto the stay .....	37
3.8.4	Fasten a connector on the stay .....	38
3.8.5	Inserting a threaded plate .....	39

---

3.8.6	Sliding the remaining foils onto the stay .....	40
3.8.7	Assembly of the feeder section .....	42
3.9	Assembly of halyard swivel and sail feeder for foils R10 up to R50	43
3.10	installation of the hydraulic gear box .....	44
3.11	Securing the foils .....	46
3.12	Connection of forestay and the hydraulic gear box .....	47
3.13	reassembly of the adjuster .....	49
3.14	Assembly of the top cap .....	51
3.15	Configuration of the head .....	52
4	Hydraulic connection of the motor .....	54
4.1	Valve configuration of the motor .....	55
4.2	Connection of the hydraulic hoses to the real time adjuster .....	57
5	Operation of the furler .....	59
5.1	Stay adjustment with the real time adjuster .....	59
5.2	draining the top of the real time adjuster .....	60
5.3	Operation of the manual backup drive .....	63
5.4	Deductions to calculate the luff length .....	65
5.5	Reckmann aluminium foil sections .....	66
6	Specifications .....	67
7	Dealer network and service stations .....	71
8	Index .....	77

# 1 Introduction

## 1.1.1 Packing list RF90

Date \_\_\_\_\_  
 Customer \_\_\_\_\_  
 Dealer \_\_\_\_\_  
 Order number \_\_\_\_\_

Type: RF90 \_\_\_\_\_

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		

## Introduction

---

\*length without furler spline and sliding tube

### **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



Additional equipment:

---

---

Packed by

---

---

## Introduction

---

Dear Reckmann customer,

With the RF90 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 RF90 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.



#### **Note!**

Make sure that at least one end of the headstay can be pulled through the foils. Otherwise revision of the stay and replacing of broken foils is not possible without destruction.

### 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.



#### **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.

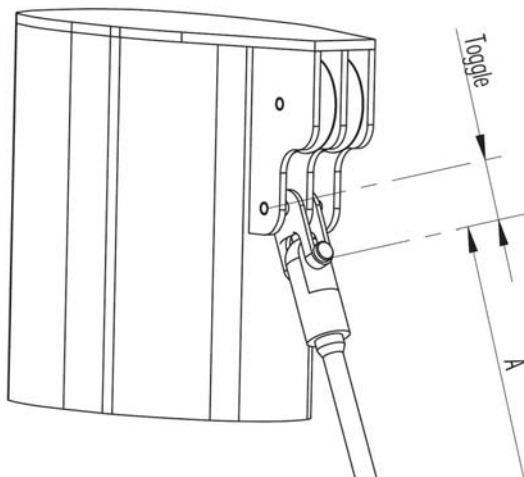
### 1.1.5 Toggle

The RF90 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](http://www.reckmann.com).

## 1.2.3 maintenance plan

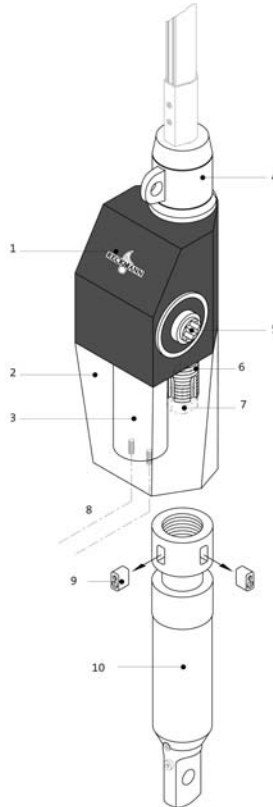
Please see the following maintenance plan for a detailed schedule:

		before use	after use	monthly	once a year	every five years	when necessary	note
halyard swivel	clean with fresh water	x						
	polish stainless steel parts			x				
	check sliding inserts for damages			x				
	check ropes and lashings	x						
	replace ropes and lashings				x	x		or when damages are visible
	Reckmann in-house service				x	x		
foils	clean with fresh water		x					
	optical inspection	x						
	revision of the stay			x				
tackling	clean with fresh water		x					
	polish stainless steel parts				x			
	check ropes and lashings	x						
	replace ropes and lashings				x	x		or when damages are visible
gear box	clean with fresh water		x					
	polish stainless steel parts				x			
	check function of manual backup drive	x						
	Reckmann in-house service					x	x	
adjuster	clean with fresh water		x					
	polish stainless steel parts				x			
	Reckmann in-house service					x	x	
drum unit (manual units)	clean with fresh water		x					
	polish stainless steel parts				x			
	optical inspection of furling line	x						
	Reckmann in-house service						x	
hydraulic connectors	optical inspection of fittings	x					x	
electrical connections	optical inspection of cables and connections			x		x	replace when necessary	

## 2 Product description

The hydraulic furling unit RF90 consists of the following parts:

1. gear body
2. stainless steel cover
3. hydraulic motor
4. tack ring
5. winch socket for manual backup
- 6.hydraulic adjuster flange
7. headstay adjuster
8. couplings for hydraulic hoses
9. keys to fix the adjuster to the unit
10. hydraulic adjuster



### 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!**

$$D = A - E - T$$

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

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

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

$$C = B - P$$

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

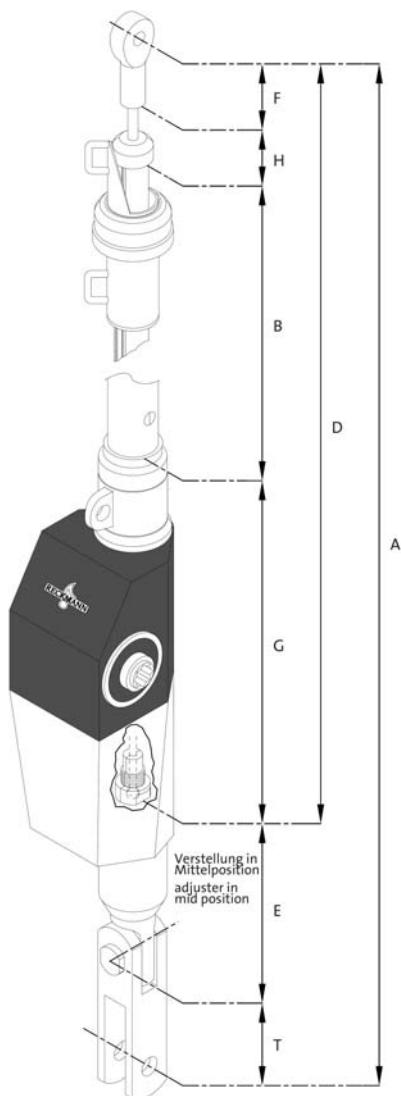
Using a rod-headstay:

Bei Verwendung eines Rod-Stages  
By using a rod-stay

Typ / type	E	G	F	T
RF90-2rt	320	283	abhängig von Pütting und Terminal	
RF90-3rt	471	340		
RF90-4rt	612	413	depends on stem- head and terminal	
RF90-5rt	714	542		

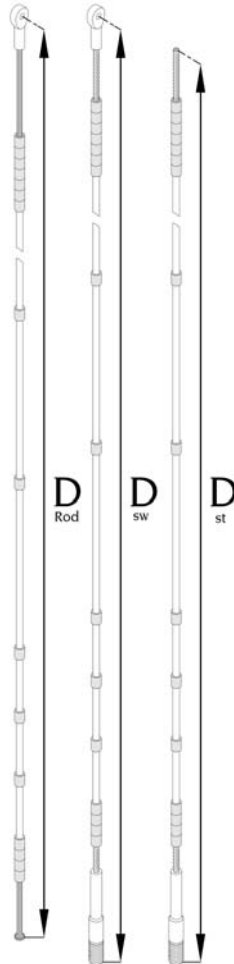
(Alle Maße sind in mm angegeben)  
(All measurements are in mm)

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



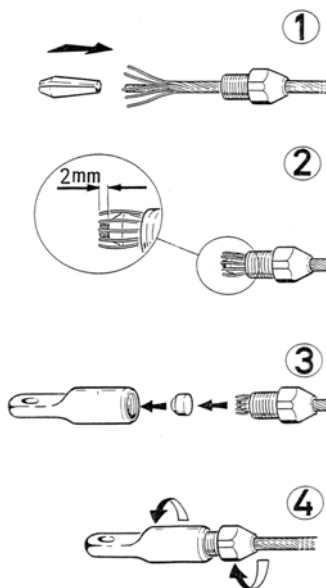
### 3.3 Headstay length D

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.



### 3.4 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.



### 3.5 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!

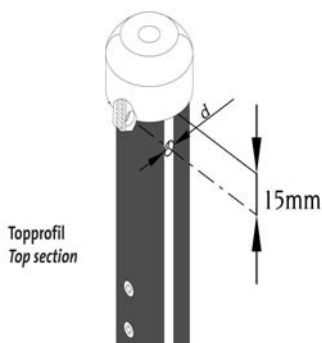
#### **Note!**

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

### 3.6 Foil assembly from R10 up to R40

#### 3.6.1 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.

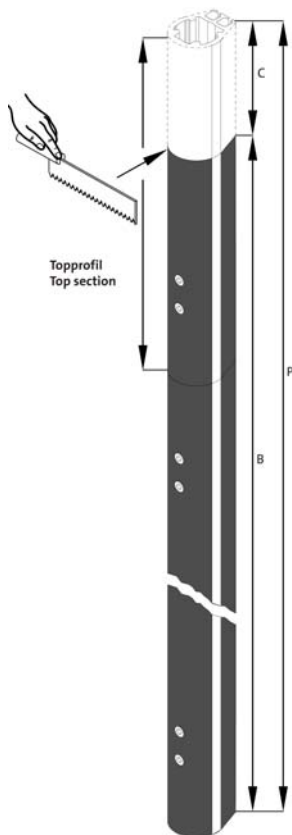


Required drill bit diameter for top cap assembly

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

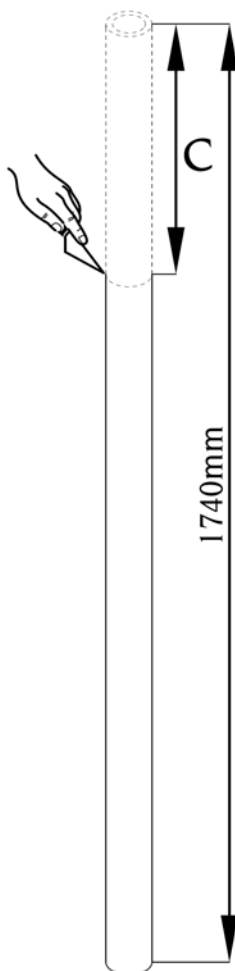
### 3.6.2 Shortening the top foil

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



### 3.6.3 Shortening the top hose

Shorten the top hose by the measurement C..



### 3.6.4 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.



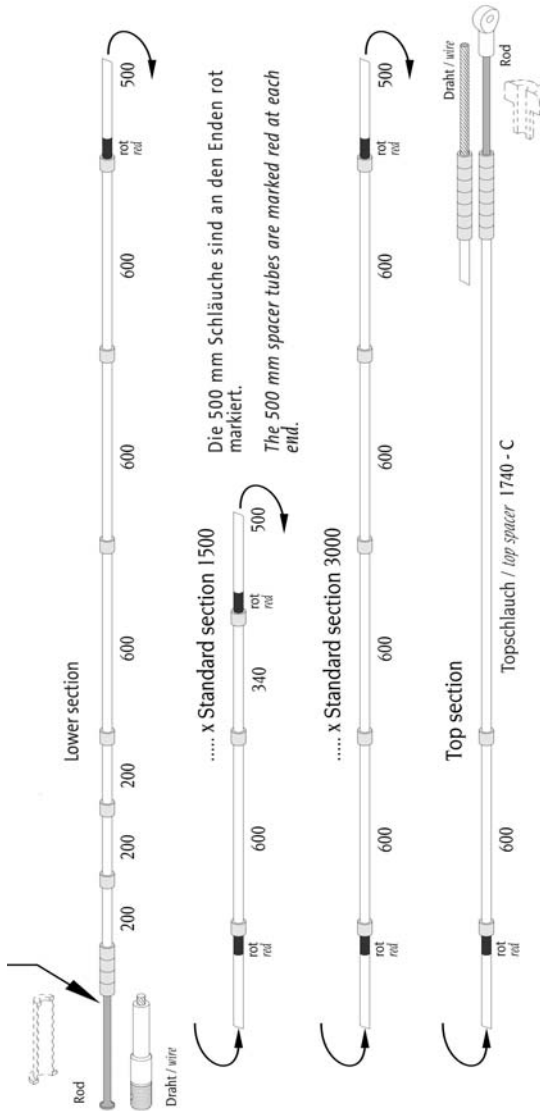
#### **Note!**

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



### 3.6.5 Foil assembly / split foil connectors

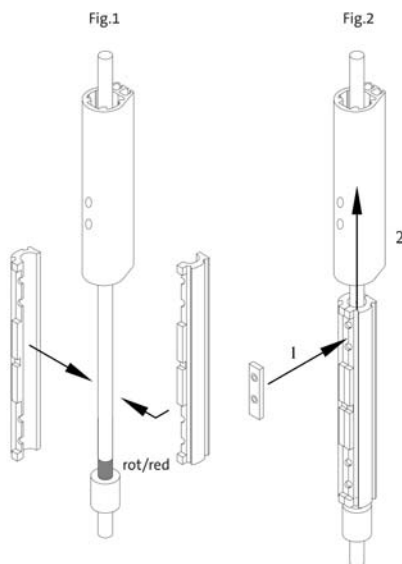
After the assembling of the bushes and hoses on the forestay and the shortening of the top profile start to assemble the profiles.

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 ).

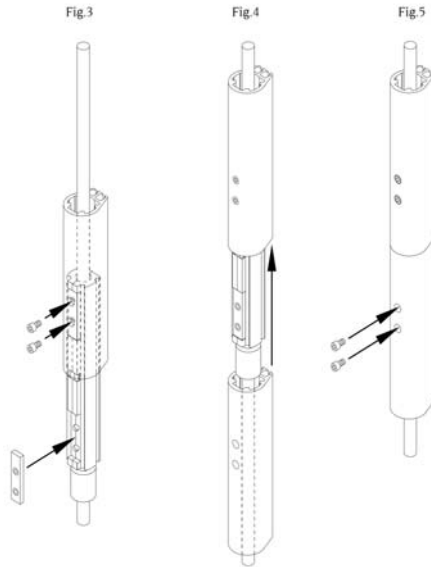


#### Note!

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.



## 3.7 Installation of the foil reinforcement (optional)

### 3.7.1 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. .

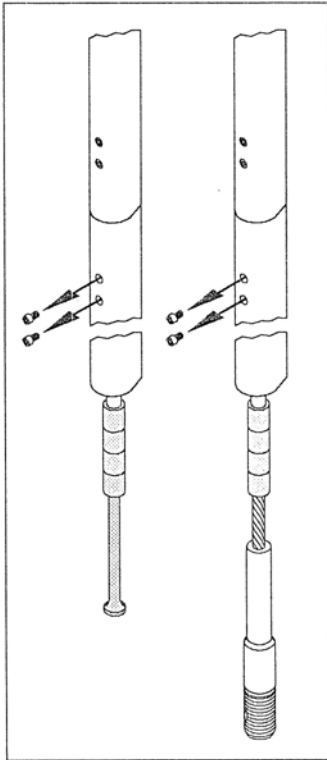


Bild 1 / fig. 1

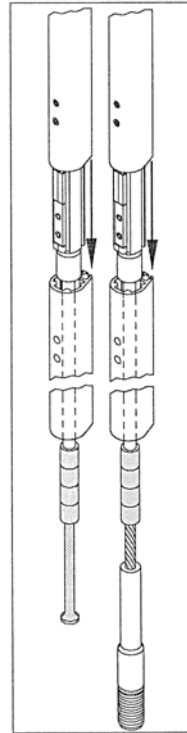


Bild 2 / fig. 2

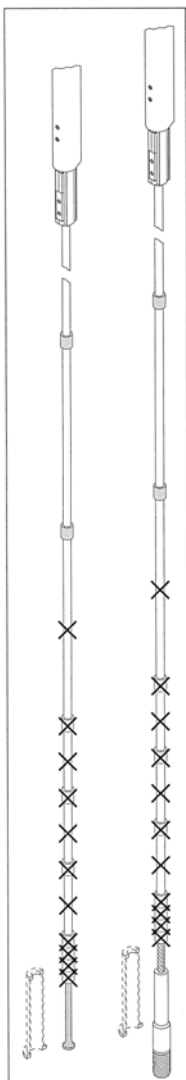


Bild 3 / fig. 3

### 3.7.2 Reinforcement assembly

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

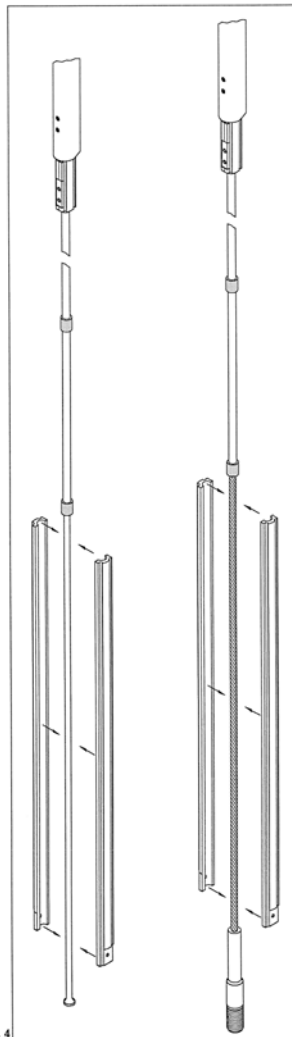


Bild 4 / fig. 4

## 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. .

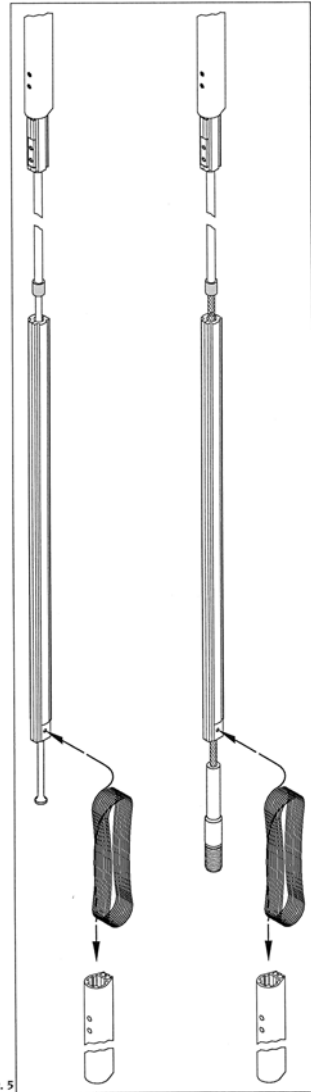


Bild 5 / fig. 5

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)

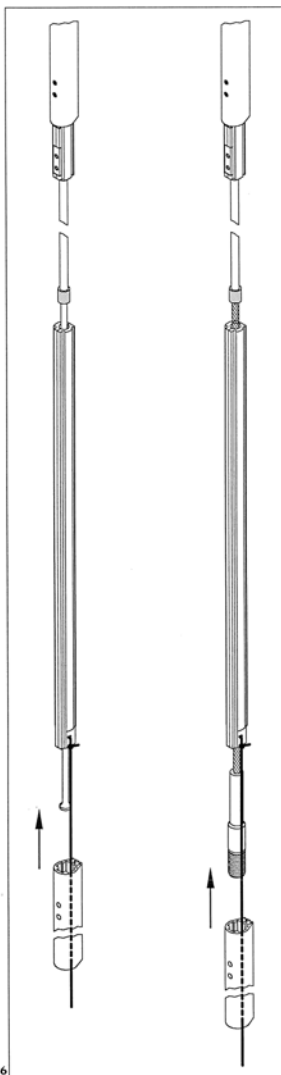
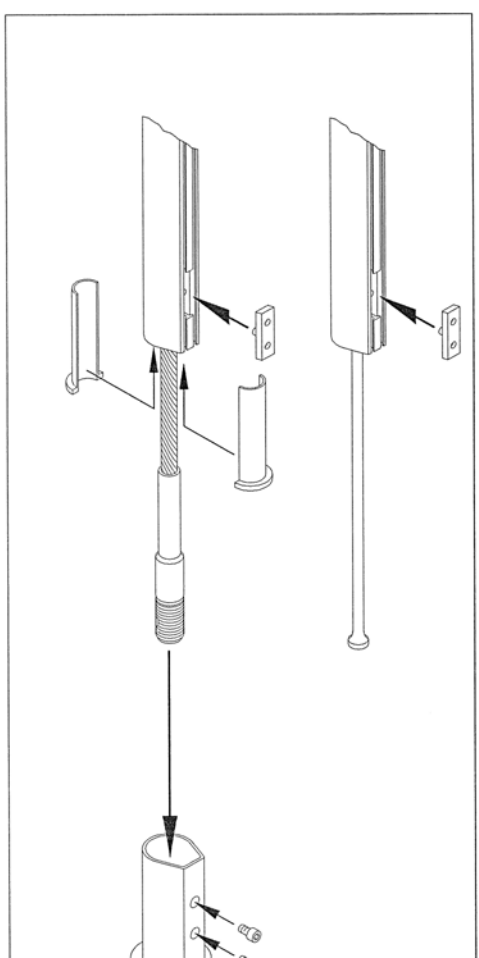


Bild 6 / fig. 6

## 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)

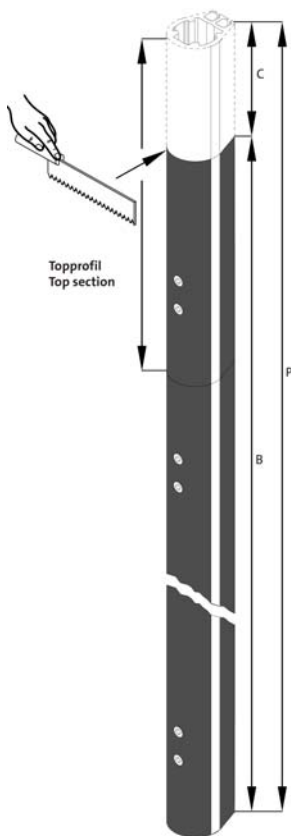
Then secure the stay inside the furler, please follow the description in the furler manual.



### 3.8 Foil assembly R50, R5 up to R8

#### 3.8.1 Shortening the top foil

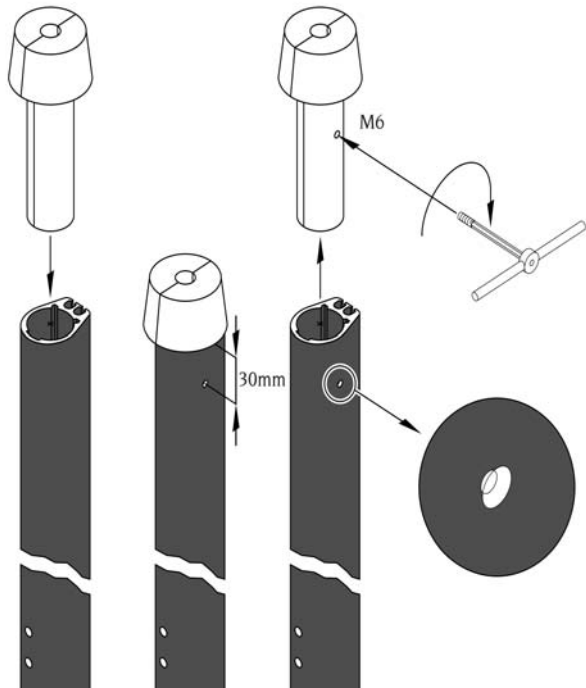
Shorten one of your 5980mm standard foils by the measurement C. This shortened foil is now your top foil.



## Assembling the furling unit

### 3.8.2 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.



### 3.8.3 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 )

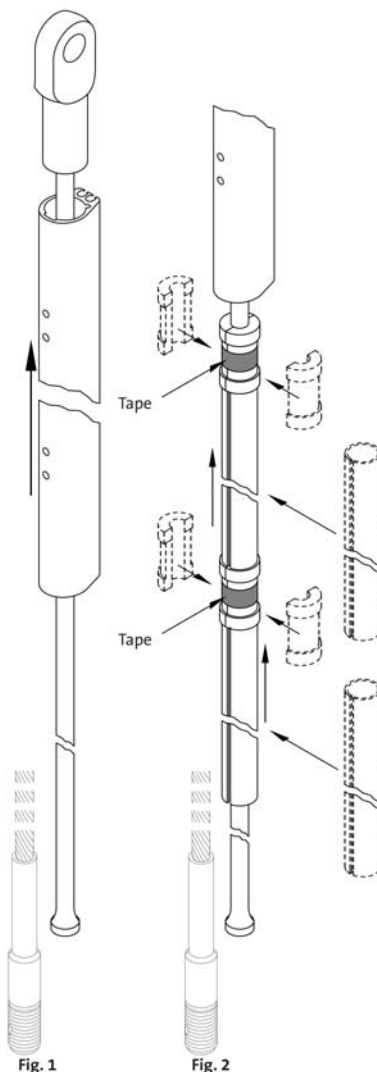
#### Step 2

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  $C < 2150\text{mm}$ : 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  $C > 2150\text{mm}$  : 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  $C > 3850\text{mm}$  : 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  $C > 5590\text{mm}$  : 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.

### 3.8.4 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 )

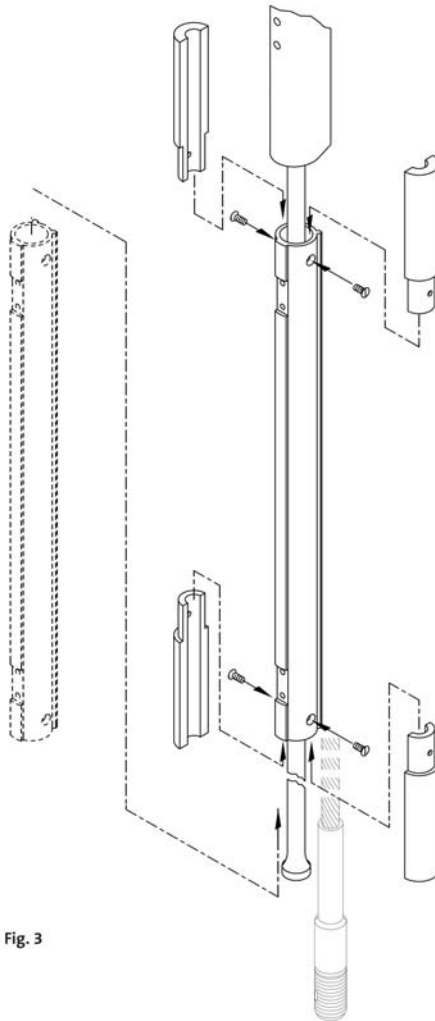


Fig. 3

### 3.8.5 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 )

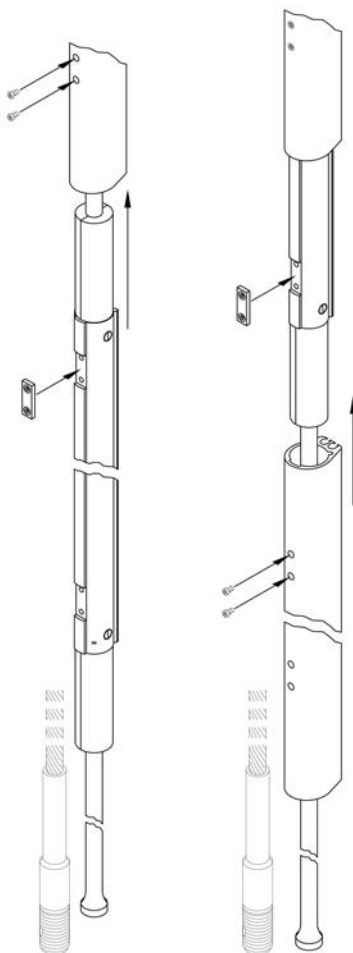


Fig. 4

Fig. 5

### 3.8.6 Sliding the remaining foils onto the stay

#### *Step 6*

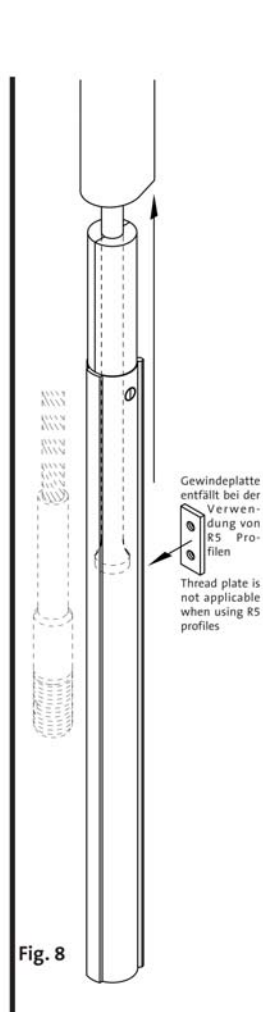
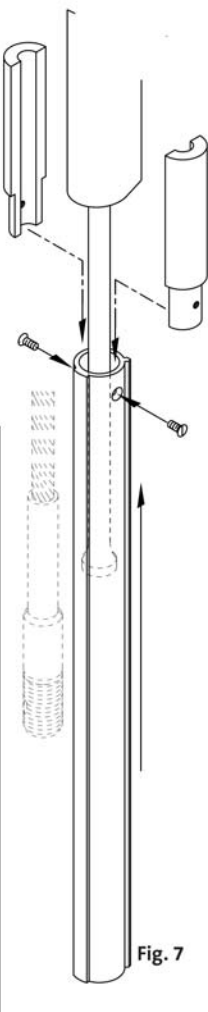
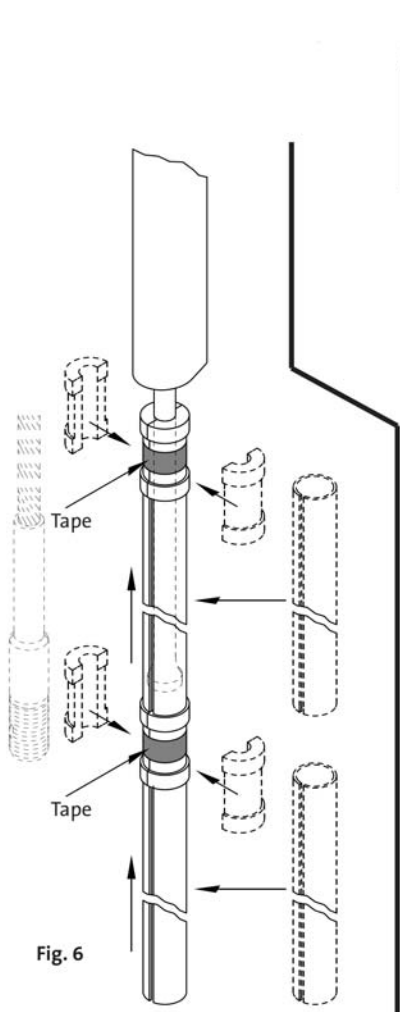
Repeat step 2a to step 5 until all of the foil sections are in place. ( you don't have to take measurement C into consideration when repeating step 2a )

#### *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 )

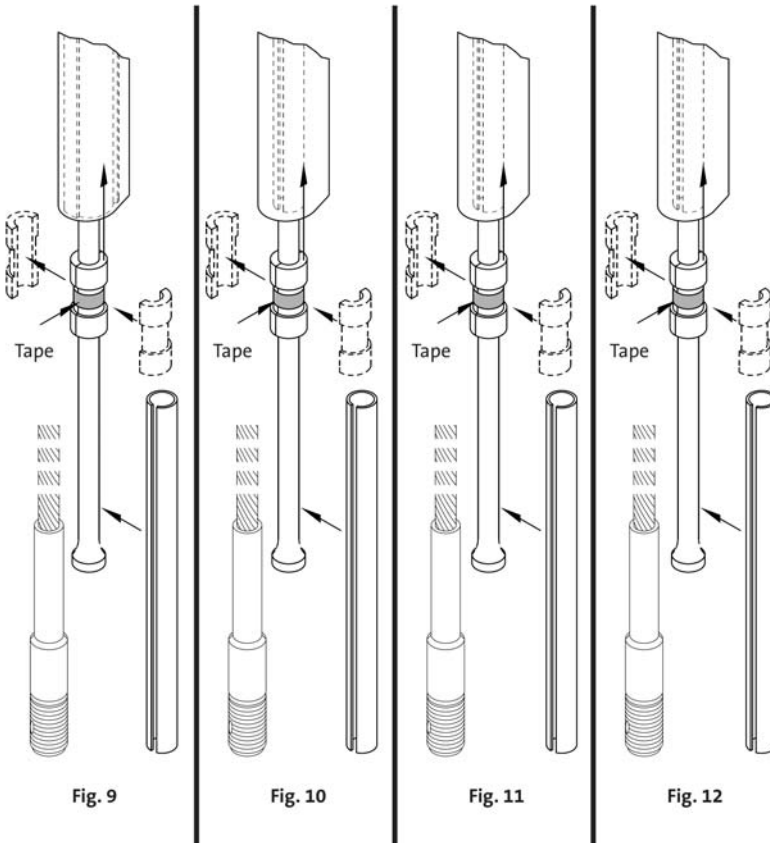


## Assembling the furling unit

### 3.8.7 Assembly of the feeder section

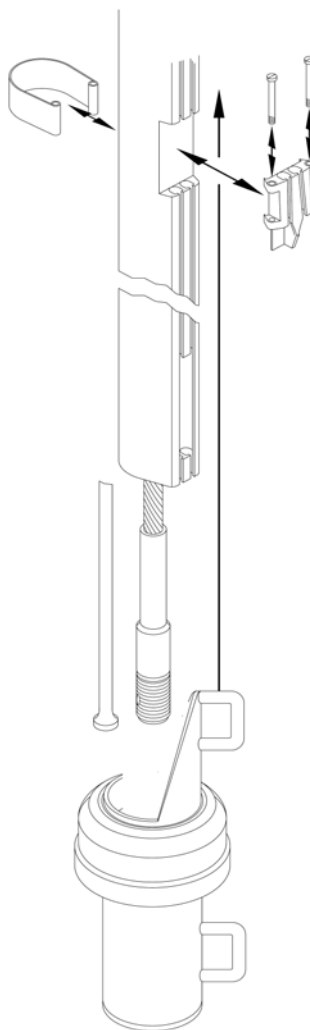
#### Step 9

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 )



### 3.9 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.

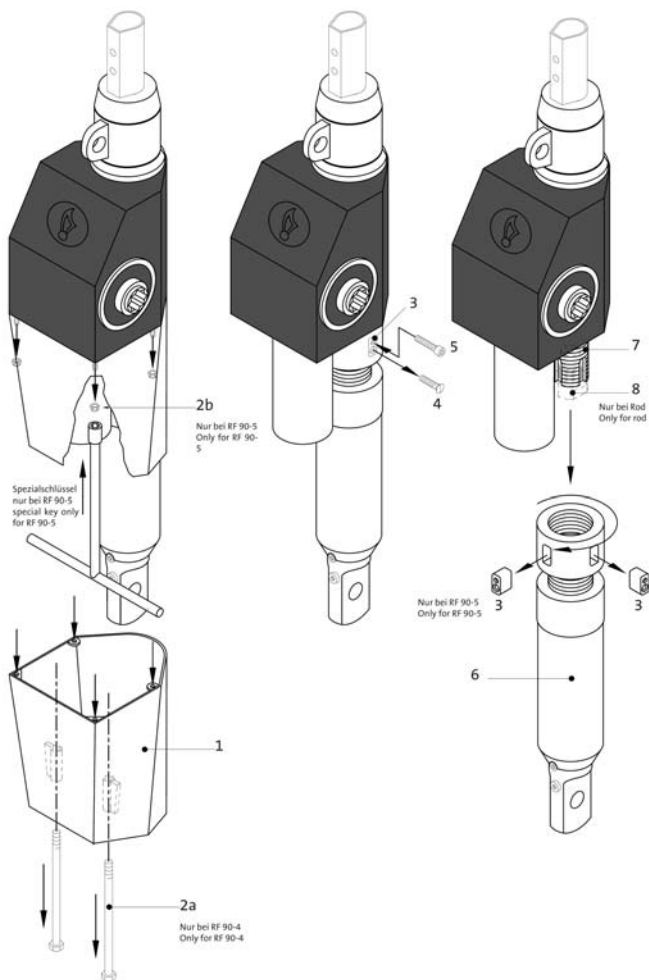


### 3.10 installation of the hydraulic gear box

For easy installation of the hydraulic gear box, lay it beside the bottom end of the forestay sections.

First dismantle the cover (1). For the RF90-4rt do this by removing the two cover locking screws (2a) and for the RF90-2/3/5rt by removing the four nuts (2b) with the special key provided. Next slide the cover (1) down as shown in the diagram on the next page. Now dismantle the key insert (3) (for RF 90-5 two keys). To remove the key unlock the securing screw (4) and insert a new screw (5) (size M6 x 40) in the upper hole, by turning this screw (5) the key will be jacked out. When the key is free from the adjuster extract the screw (5). Unscrew the adjuster (6) from the adjuster flange (7).

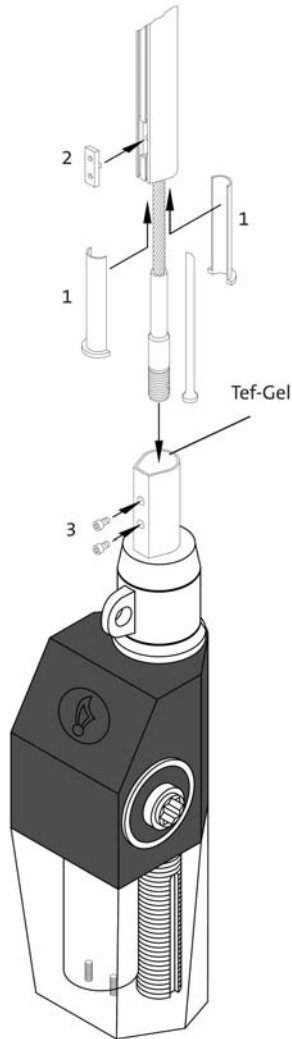
Rod: For installation of the forestay unscrew the split retaining brackets (8).



## Assembling the furling unit

### 3.11 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).

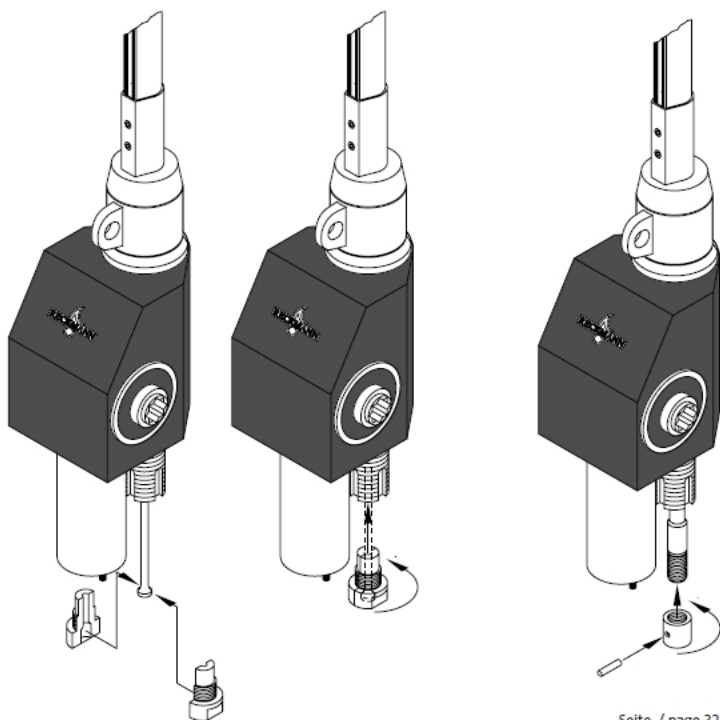




### Note!

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

## 3.12 Connection of forestay and the hydraulic gear box



Seite / page 32

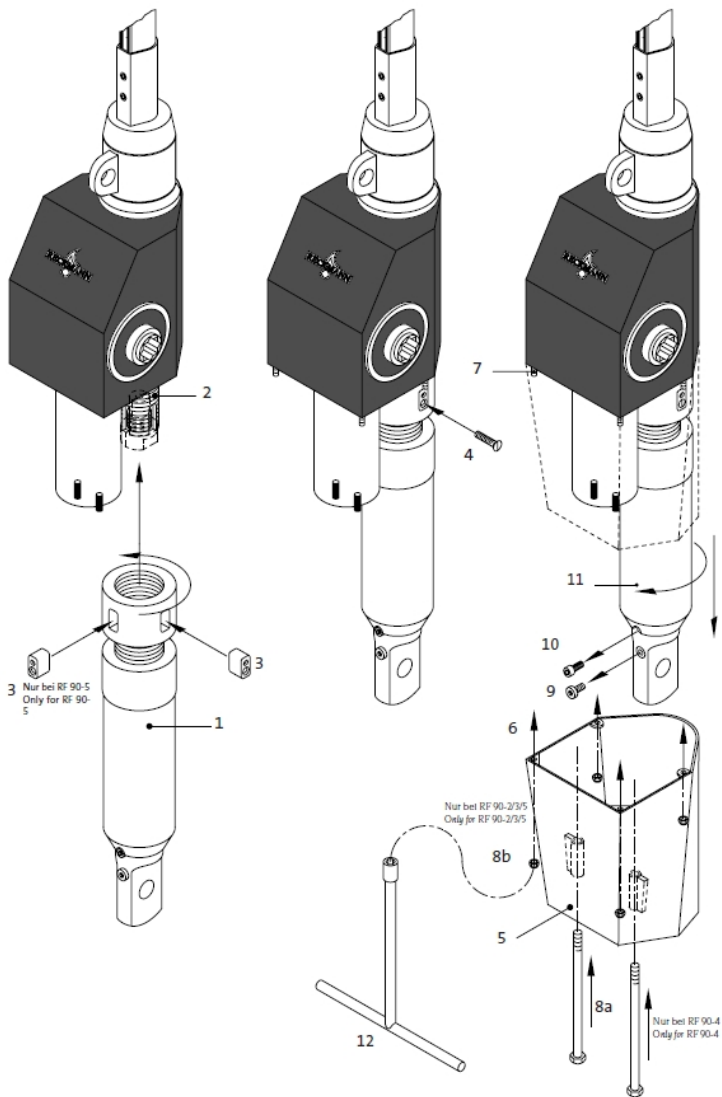
**Rod:** Slide the forestay out of the drum axle as far as it will go. (It may be necessary to push the rod quite firmly from the top end). After greasing the split retaining brackets fit them around the rod and screw them firmly back into the adjuster axle. Push the rod back until the cold head fits into the split brackets.

## Assembling the furling unit

---

**Wire:** Slide the forestay out of the gear box 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 within the adjuster axle.

## 3.13 reassembly of the adjuster



## Assembling the furling unit

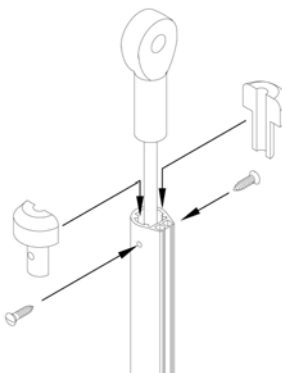
---

Screw the adjuster (1) back on the adjuster flange (2). Reassemble the key insert (3) (for RF90-5 two keys, they are allocated to their holes by numbers) make sure that the thread hole of the adjuster axle and the threadless hole of the key are on the same side. Secure the key with the proper screw (4). Next remount the cover (5) and locate it with the four holes (6) on the four pins (7) at the bottom of the gear box. When in place secure it for the RF90-4 with the two screws (8a) and for the RF90-2/3/5 with the four nuts (8b).

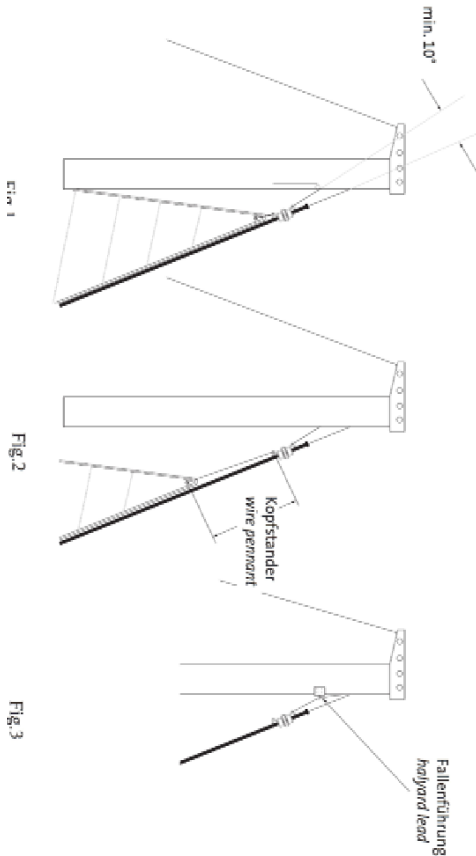
### 3.14 Assembly of the top cap

(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.



### 3.15 Configuration of the head



#### 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!**

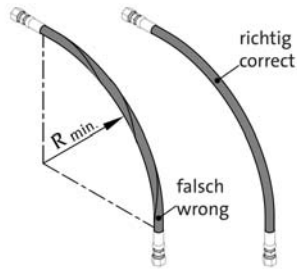
The angle between halyard and headstay has to be at least  $10^{\circ}$ . If the angle is less than  $10^{\circ}$  a halyard lead has to be installed.

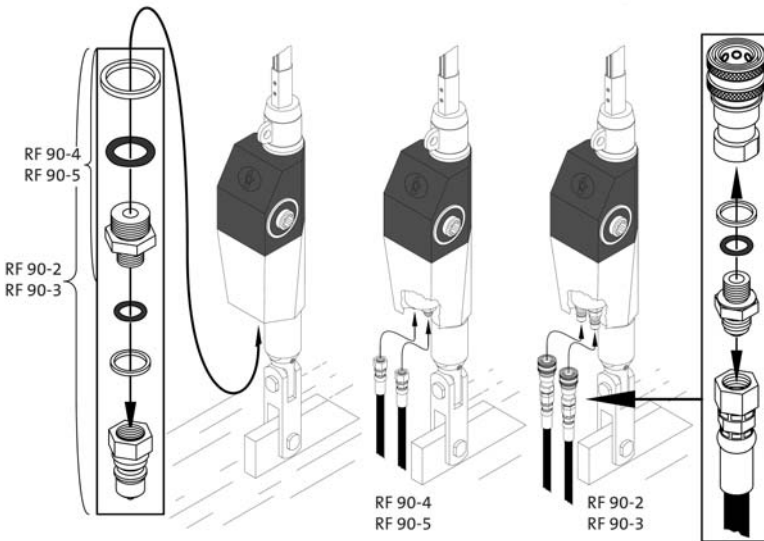
### 4 Hydraulic connection of the motor

The RF 90 series furlers are supplied with oil via two hydraulic hoses. The direction of flow is electrically controlled by the power pack. The RF 90-2 and RF 90-3 are fitted with female quick release couplings. The male couplings are located at the base of the hydraulic gear box and are accessible without removing the outer cover. The RF 90-4 and RF 90-5 are fitted with R3/8" female thread connections at the hydraulic gear box. The quick release couplings have to be placed at the through deck fitting.

**Please note:** Try to avoid twisting the hoses while fitting, when under pressure twisted hoses could break away from the swage couplings. Ensure that the minimum bend radius (listed in the table below) is kept and that the hoses cannot chafe on deck

Schlauch-Größe hose size	R <sub>min</sub> (mm)
540 N-5	114
540 N-6	127
540 N-8	178





### 4.1 Valve configuration of the motor

The RF90 series furlers should be controlled by a 4/3 directional control valve with symbol 4. In dependence of the power pack flow rate, a throttle valve is required in line P. The oil flow should not exceed the number mentioned in the spec sheet at the end of this manual, otherwise the hydraulic drive could be damaged. From RF90-4 up, a load control valve is required in the line from the directional valve to the hydraulic drive. We recommend to place this valve block close to the hydraulic drive and not direct on the power pack. If you run furlers from RF90-4 up without a load control valve, a safe operation is not guaranteed. The required valve block includes two load control valves with a control ratio of  $i=10$  and an adjustable control pressure between 70 bar and 175 bar. We offer this load control valve block with an aluminium housing and two valve cartridges as an option. The thread size for the hydraulic line fittings is 1/2". If you like us to deliver this block, please contact us.



#### **Warning!**

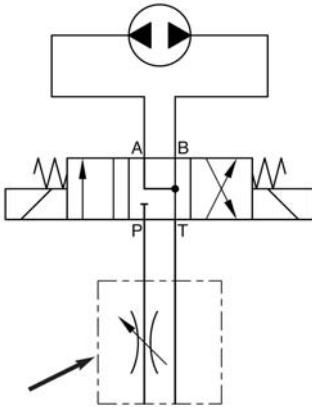
Exceeding the maximum values of oil flow and pressure may cause damages of the furler.

## Hydraulic connection of the motor

---

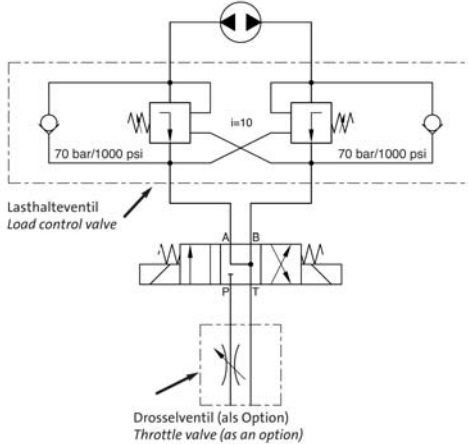
Make sure the max. values named in the spec. sheet at the end of this manual are not exceeded.

Gears up to RF90-3



Drosselventil (als Option)  
Throttle valve (as an option)

Gears from RF90-4 up



Drosselventil (als Option)  
Throttle valve (as an option)

## 4.2 Connection of the hydraulic hoses to the real time adjuster

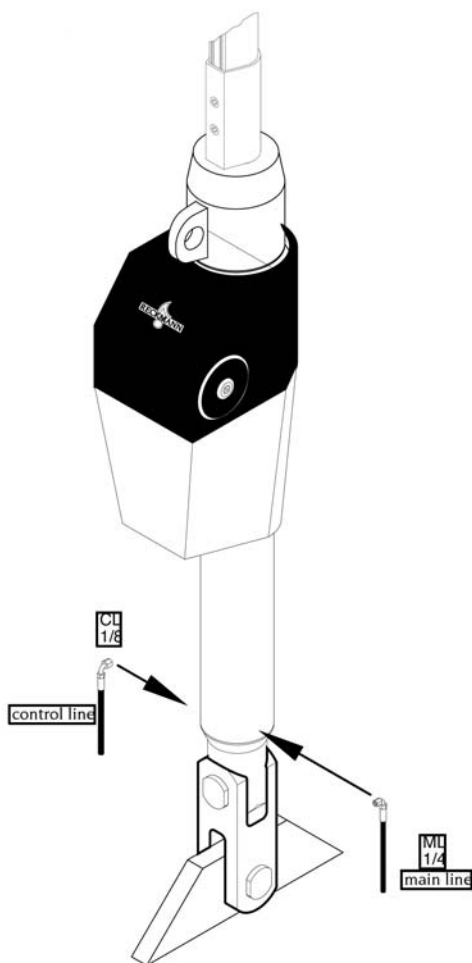
The Reckmann real time adjuster has a main line (ML) and a control line (in case of an installed po-check valve).

Both protection caps need to be removed from the ports before the hoses can be connected.

Both ports can be identified by their thread size:

ML  $\frac{1}{4}$ "

CL  $\frac{1}{8}$ "



## 5 Operation of the furler

### 5.1 Stay adjustment with the real time adjuster

Depending on the scope of supply of your furler, it is equipped with a load control valve. Please see the specification sheet at the end of the manual for this information.

Make sure that both (when the adjuster is NOT equipped with a po-check valve just one) ports are connected proper.



#### Warning!

The real time adjuster is a tool for stay tension adjustment. Its high load level may cause damages of the foils and sails when not complete disconnected. Release the halyard or ease cunningham before operation of the real time adjuster.

#### Tensioning the stay:

Pump oil into the main line (ml) port of the adjuster to tension the stay. The po-check valve (if installed) is unlocking in this direction automatically. Information regarding the adjuster stroke can be found in the technical specification table at the end of this manual.



#### Warning!

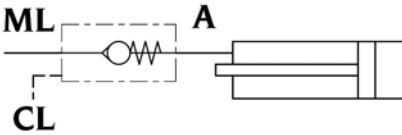
Exceeding oil flow and pressure may cause damages of the furler. Make sure that the max. cont. pressure in the adjuster does not exceed **350 bar (250 bar for UD3)** and the max. oil flow does not exceed 2l/min.

If your adjuster is equipped with a po-check valve, you can make the main line pressure free. The po-check valve will keep the pressure in the adjuster.

#### Releasing the system

## Operation of the furler

Function diagram of the po-check valve:



If a po-check valve is installed, it has to be unlocked for releasing the stay tension. The piston will be pulled out by the stay load.

To unlock the po-check valve, the control line cl needs to be pressurized. Due to the proportion of area in the valve, the required pressure to unlock the valve can be calculated in the following way:

$$P_{cl} = (p_a / 2,6) + 2,5$$

Due to leakage in the valve, it can be necessary to adjust the pressure in the control line.



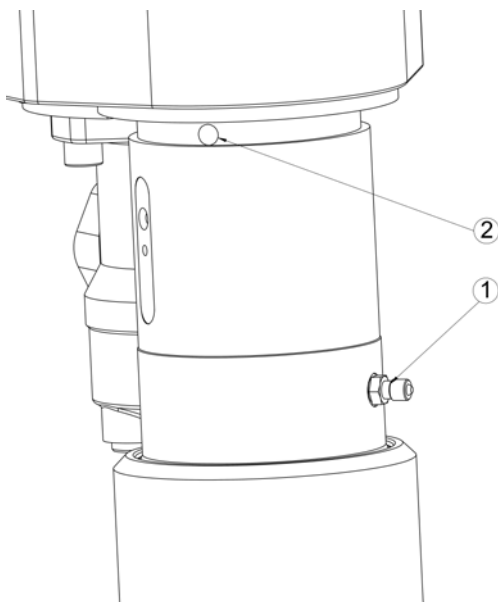
### Warning!

Adjusting with load on the sheet may damage the profile.

Adjust only when sheet is unloaded.

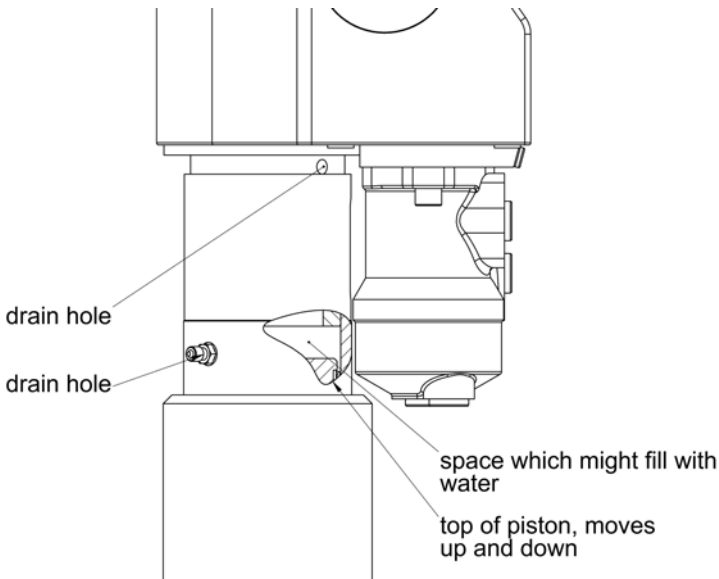
## 5.2 draining the top of the real time adjuster

Water which runs down the foil is drained through drain holes below the gear box on top of the real time adjuster. Depending on the furler age and size, there may be several holes (2) or a fitting for a drain line (1).



Due to the design of the real time adjuster, water may stand on the piston when the realtime adjuster is not fully tensioned. (please refer to the following sketch).

When the realtime adjuster is tensioned, this water may be pressed out through the drain holes. There might be a small amount of hydraulic oil from the surface of the cylinder and the piston in this water.



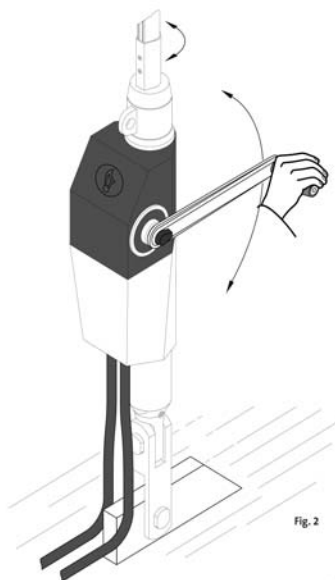
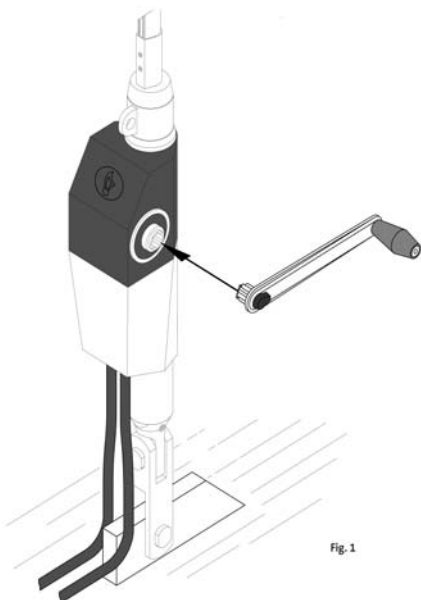
### Procedure to drain this space:

This space should be drained regular, especially after a period with strong rain or when the boat was unused for a while. To drain this space, the real time adjuster needs to be fully tensioned a couple of times. Please make sure that halyard and sheet are released and ease the backstay and runners before you operate the real time adjuster.

### 5.3 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.

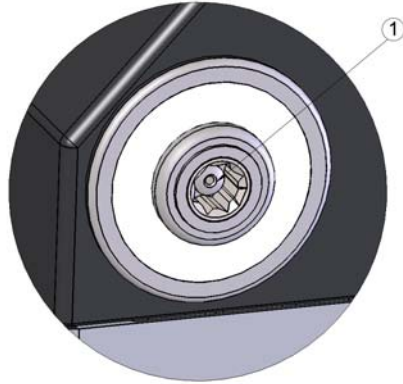
Please note! Make sure that the winch handle is always completely connected with the socket during the manual operation. The emergency manual drive is automatically switched off by pulling the handle out of the winch socket.



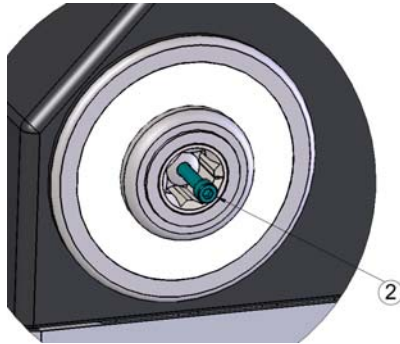
## Operation of the furler

---

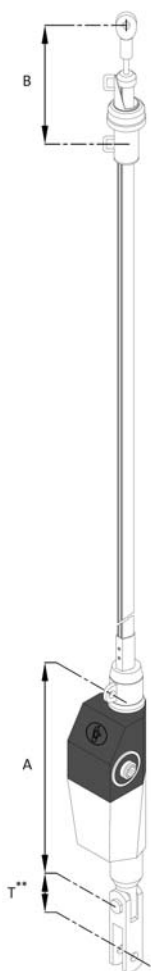
The manual backup drive is switched off when the pin (1) moved out after the winch handle is pulled out.



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



## 5.4 Deductions to calculate the luff length

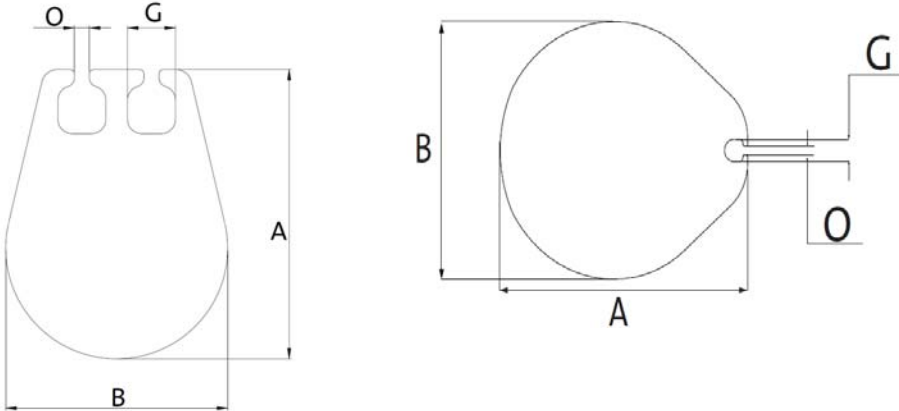


		A(mm)*	B(mm)
RF 90-2rt	R20	557	350
	R30	557	450
RF 90-3rt	R40	756	500
	R5	756	550
RF 90-4rt	R5	936	550
	R6	936	650
RF 90-5rt	R6	1173	650
	R7	1173	900

\*Verstellung in Mittelposition  
adjuster in mid position

\*\*Abhängig von der Toggle-Länge  
depends on the toggle dimensions

## 5.5 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 Specifications

**RF90-2RT**

		foil type		<b>R20</b>	<b>R30</b>	<b>S2</b>	<b>S2.5</b>
<b>stay and sail</b>	headstay (max.)	rod	[-]	-17	-30	-17	-30
		wire	[mm]	10	12	10	12
	max. headstay length		[m]	18	24	18	23
	max. sail area		[m <sup>2</sup> ]	75	130	60	150
	max. sheetload		[kg]				
	max. halyard load		[kg]				
	max. tack load		[kg]				
<b>hydraulic details</b>	max. working pressure		[bar]	140			
	at torque		[Nm]	148			
	max. oil flow		[l/min]	7,5			
	at furling speed		[l/min]	40			
	thread ML		[-]	R3/8 with quick release coupling			
	thread DL		[-]	-			

**RF90-2RT**

<b>adjuster</b>	function		[RT / DS]	RT
	stroke		[mm]	100
	max. pressure		[bar]	350
	at stayload		[kg]	5500
	max. stay SWL		[kg]	6800
	thread ML		[-]	1/8"
	thread CL		[-]	-
	fitting ML		Parker	4F42EDMXSS
	fitting CL		Parker	-
	po-check valve		[-]	-

## RF90-3RT

		foil type		R40	R5	S3	S4/4.5
stay and sail	headstay (max.)	rod	[-]	-48	-60	-48	-60
		wire	[mm]	14	16	14	16
	max. headstay length		[m]	27	36	27	36
	max. sail area		[m <sup>2</sup> ]	175	230	175	230
	max. sheetload		[kg]				
	max. halyard load		[kg]				
max. tack load		[kg]					
hydraulic details	max. working pressure		[bar]	140	140		
	at torque		[Nm]	315	448		
	max. oil flow		[l/min]	11	17		
	at furling speed		[1/min]	45	29		
	thread ML		[-]	R3/8 with quick release coupling			
	thread DL		[-]	-			

## RF90-3 RT

adjuster	function		[RT / DS]	RT
	stroke		[mm]	150
	max. pressure		[bar]	350
	at stayload		[kg]	11300
	max. stay SWL		[kg]	13600
	thread ML		[-]	1/4'
	thread CL		[-]	1/8'
	fitting ML		Parker	6F42EDMXSS
	fitting CL		Parker	4F42EDMXSS
	po-check valve		[-]	RHC1

**RF90-4 RT**

		foil type		R5	R7	S5	S5.5	
<b>stay and sail</b>	headstay (max.)	rod	[-]	-76	-91	-76	-91	
		wire	[mm]	19	22	19	22	
	max. headstay length		[m]	36	42	36	42	
	max. sail area		[m <sup>2</sup> ]	275	320	275	320	
	max. sheetload		[kg]					
	max. halyard load		[kg]					
	max. tack load		[kg]					
<b>hydraulic details</b>	max. working pressure		[bar]	140				
	at torque		[Nm]	918				
	max. oil flow		[l/min]	37				
	at furling speed		[l/min]	33				
	thread ML		[-]	R3/8'				
	thread DL		[-]	-				

**RF90-4 RT**

<b>adjuster</b>	function	[RT / DS]	RT	
	stroke	[mm]	200	
	max. pressure		[bar]	350
	at stayload		[kg]	16500
	max. stay SWL		[kg]	20400
	thread ML		[-]	1/4'
	thread CL		[-]	1/8'
	fitting ML		Parker	6F42EDMXSS
	fitting CL		Parker	4F42EDMXSS
	po-check valve		[-]	RHC 1/0

## RF90-SRT

foil type			R6	R7	S6	S6.5/S7	
stay and sail	headstay (max.)	rod	[-]	-91	-115/-170	-91	-115/-170
		wire	[mm]	26	32	26	32
	max. headstay length		[m]	42	50	42	50
	max. sail area		[m <sup>2</sup> ]	350	500	350	500
	max. sheetload		[kg]				
	max. halyard load		[kg]				
	max. tack load		[kg]				
hydraulic details	max. working pressure		[bar]	175			
	at torque		[Nm]	1102			
	max. oil flow		[l/min]	40			
	at furling speed		[1/min]	44			
	thread ML		[-]	R3/8'			
	thread DL		[-]	-			

## RF90-SRT

adjuster	function		[RT / DS]	RT
	stroke		[mm]	250
	max. pressure		[bar]	350
	at stayload		[kg]	23000
	max. stay SWL		[kg]	34000
	thread ML		[-]	1/4'
	thread CL		[-]	1/8'
	fitting ML		Parker	6F42EDMXSS
	fitting CL		Parker	4F42EDMXSS
	po-check valve		[-]	RHC 1/0

## 7 Dealer network and service stations

### Denmark

Southern Spars  
Torben Jacobsen  
Bergensvej 6  
DK-6230 Rødekro  
T.: +45 74 620060  
F.: +45 74 630543  
info@southernspars.com

With Marine A/S  
Leangbutka 31  
N - 1392 Vette  
T.: +47 66 79 89 14  
F.: +47 66 79 74 83  
info@withmarine.no

Quantum Sail Design Group  
Jan Hansen  
Amager Strandvej 50  
DK-2300 København  
T.: +45 7026 1296  
F.: +45 3296 1276

Elvstrøm Sobstad Norge A/S  
Espen Kamperhaug  
Sjøsenderet Vallø-PO Box 148  
N - 3166 Tolsvrød  
T.: +47 3341 4141  
F.: +47 3341 4142  
info@elvstrom-sobstad.no

### Sweden

Sellpower Nordic AB  
Magnus Wosse  
Baggakersgatan 4a  
SE - 43153 Mölndal  
T.: +46 31 761 85 80  
F.: +46 31 876 535  
info@sellpower.se

## Dealer network and service stations

---

### Norway

Southern Cross Spars A/S  
Sandviksvn 120  
N - 1363 Høvik  
T.: +47 959 77482  
F.: +47 9720 18 18  
ed@southerncross.no

### United Kingdom

HYS Rigging  
Dennis Fisher  
Port Hamble  
GB- Hampshire SO31 4NN  
T.: +44 2380 454111  
F.: +44 2380 455682  
rigging@hambleyachtservices.co.uk

### Netherlands

A+ Rigging Nederland B.V.  
Zeldenrust 7  
NL-1671 GW Medemblik  
T.: +31 227-544096  
F.: +31 227-544158  
info@aplusrigging.nl

### Italy

G&G Rigging srl  
Walter Giovanelli  
Via Mazzini 33  
I-20099 Sesto S. Giovanni  
T.: +39 02 454 811 90  
F.: +39 02 365 138 95  
info@gegrigging.com

### France

Gréement Import  
13 Rue du Chêne Lassé - BP  
F-44803 Saint - Herblain  
T.: +33 2 28 03 01 01  
F.: +33 2 28 03 19 91  
bb@greementimport.fr

### Spain

Yachttech  
Oliver Blume  
C /Ca'n Valero 40, Nave  
E-07011 Palma de Mallorca  
T.: +34 971 200052  
F.: +34 971 296504  
info@yachttech.net

### **Croatia**

ASPAR Rigging  
Luzine bb  
CRO-51000 Rijeka  
T.: +385 51 674 031  
F.: +385 - 51 674 031  
aspar-rigging@ri.t-com.hr

Sinera Rigging  
Psg. Joan de Borbó 92  
E-08039 Barcelona  
T.: +34 932 254 934  
F.: +34 932 251 949  
info@sinerarigging.com

### **Slovenia**

DNA d.o.o.  
Miha Spendal  
Kantetova 85  
1000 Ljubljana  
T.: +386 41 730 970  
F.: +386 12776 606  
dnamsp@siol.net

### **Malta**

XS Marine Ltd.  
James Xuereb  
26, Paul Borg Str.  
Attard, Atd 2632  
T.: +356 7900 9300  
F.: +356 2141 3894  
info@xs-marine.com

### **Greece**

Kafetzidakis Sails  
Kostas Kafetzidakis  
90 Tzavella  
GR-18533 Piraeus  
T.: +30 210 413 74 38  
F.: +30 210 413 16 24  
info@kafetzidakis.gr

### **Turkey**

UTL / Skiper  
Muhane cad. Akce sokak no 10/4  
Karakoy  
Istanbul  
T.: +90 212 292 90 98  
F.: +90 212 292 91 93  
info@skiper.org

## Dealer network and service stations

---

### **New Zealand**

Southern Spars Ltd.  
15 Jomac Place  
Avondale  
NZ-1026 Auckland  
T.: +64 9 8457200  
F.: +64 9 3583309  
info@southernspars.com

New Zealand Rigging Ltd.  
31 Woodside Ave - Northcote  
NZ- Auckland  
T.: +64 9 480 8090  
F.: +64 9 480 9190  
bart@nzrigging.com



## Dealer network and service stations

---

### **Australia**

Riggtech  
Phill Bate  
Royal Prince Alfred Yacht Club  
2/16 Mitala Street,  
P.O. Box 812  
AUS - 2106 Newport Beach  
T.: +61 2 9997 8100  
F.: +61 2 9979 6848  
info@riggtech.com.au

### **Caribbean**

Antigua Rigging Ltd.  
Stan Pearson  
English Harbour  
Antigua, West Indies  
T.: +1 268 4638575  
F.: +1 268 5621294  
info@antiguarigging.com

FKG Marine Rigging  
Kevin Gavin  
37 Wellington Road  
99998 St. Maarten  
Netherlands Antilles  
Tel. +599 544 4733  
Fax. +599 544 2171  
kevin@fkg-marine-rigging.com

### **USA**

Nance and Underwood  
262 Southwest 33rd st.  
USA - FT Lauderdale, FL 33315  
T.: +1 954 764 6001  
F.: +1 954 764 5977  
nanceandunderwood@aol.com

Euro Marine Trading, Inc.  
Siebe Noordzy  
62 Halsey Street, Unit M  
USA– Newport, RI 02840  
T.: +1 401 849 0060  
F.: +1 401 849 3230  
info@euromarinetrading.com

Florida Rigging & Hydraulics, Inc.  
3905 Investment Lane, Suite 9  
USA– Riviera Beach, FL 33404  
T.: +1 561 8637444  
F.: +1 561 8637711  
cehinger@rigginghydraulics.com

## Dealer network and service stations

---

Offshore Spars  
Mike Feldmann  
50200 E.Russell Schmidt Blvd.  
USA– Chesterfield, MI 48051  
T.: +1 586 598 4700  
F.: +1 586 598 4705  
mike@offshorespars.com

Rigworks Inc.  
Ray Pope  
2540 Shelter Island Drv.  
USA - San Diego , CA 92106  
T.: +1 619 223 3788  
F.: +1 619 223 3099  
info@rigworks.com

Rigg Pro  
14 Regatta Way  
USA - Portsmouth, RI 02871  
T.: +1 401 683 2151  
F.: +1 401 683 7878  
john.b@southernspars.com

## 8 Index

- Assembling the furling unit 16
- Assembly of bushings and spacer tubes 25
- Assembly of halyard swivel and sail feeder for foils R10 up to R50 48
- Assembly of swageless fittings 20
- Assembly of the feeder section 47
- Assembly of the top cap 56
- Calculation of stay measurements 18
- Configuration of the head 56
- Connection of the hydraulic hoses to the real time adjuster 61
- Connection of forestay and the hydraulic gear box 52
- Cover for transportation 11
- Dealer network and service stations 74
- Deductions to calculate the luff length 69
- draining the top of the real time adjuster 64
- Fasten a connector on the stay 42
- Foil assembly / split foil connectors 29
- Foil assembly from R10 up to R40 22
- Foil assembly R50, R5 up to R8 36
- Foil size 21
- Headstay length D 20
- How to use this manual 9
- Hydraulic connection of the motor 58
- Important remarks 10
- Inserting a threaded plate 44
- Installation of the foil reinforcement 30
- installation of the hydraulic gear box 49
- Introduction 5
- Maintenance of the furler 13
- maintenance plan 15
- Maintenance to be carried out by a Reckmann service partner 14
- Maintenance to be carried out by the customer 14
- Operation of the furler 63
- Operation of the manual backup drive 66
- Packing list 5
- Preparation of the headstay 30
- Preparation of the top cap 22
- Preperation of the top cap 38
- Product description 15
- reassembly of the adjuster 54
- Reckmann aluminium foil sections 70
- Reinforcement assembly 33
- Required drill bit diameter for top cap assembly 22

## Index

---

- Securing the foils 51
- Shortening the top foil 23, 36
- Shortening the top hose 24
- Sliding the remaining foils onto the stay 45
- Sliding the top foil onto the stay 40
- specifications 71
- Stay adjustment with the real time adjuster 63
- Toggle 12
- Tools required for assembly 16
- Valve configuration of the motor 59