RECKMANN

operation manual

UDs
hydraulic furling system
aluminium foils
rod
RT

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Stand: 20 January 2011

1 Introduction

1.1.1 Packing list UDs

Date _____

Customer _____

Dealer _____

Order number _____

Type: UDs _____

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 gear unit with hydraulic motor
_ rod link with rod nose / jaw fitting
1 manual backup system including pump
1 foil adapter
1 piston position indicator
__ long bottom bushing

1	Feeder section*	☐	3000 mm	☐	5980 mm
___	Standard section	☐	3000 mm	☐	5980 mm
___	Standard section		1500 mm		
___	Top section		_____mm		

*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 _____

_____

2 Introduction

Dear Reckmann customer,

With the UDs 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 UDs reefing system will provide you with enjoyment for many years.

2.1.1 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.

2.1.2 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.

For stay tensioning purposes, your Reckmann furling gear is equipped with a hydraulic real time adjuster. The adjuster pulls the stay in relation to the foils. This means that the distance between the tack point at the furler and the halyard sheave / or lock varies during stay adjustment:
Releasing the stay: distance gets longer – luff is tensioned
Tensioning the stay: distance gets smaller – luff becomes loose

Please make sure that the distance change cannot damage any items by releasing the halyard or easing the cunningham before the real time adjuster is used. Please refer to the corresponding chapter of this manual.

Note!

Risk of damages of the sails during real time adjuster operation. Please refer to the corresponding chapter of this manual.

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

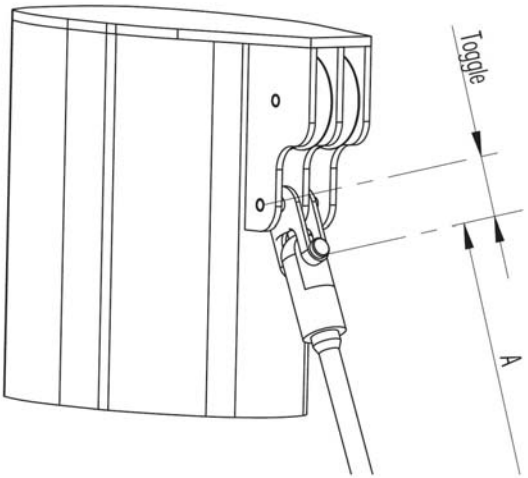
Too low headstay tension causes sag of the headstay which reduces the performance of the boat.
Please make sure that your headstay tension is sufficient.

2.1.3 Toggle

Please ensure that a toggle is installed at the top stay end. If there is no toggle installed, bending loads in the top terminal may cause the failure of the stay due to fatigue.

Warning!

Forestays without top toggles could break due to fatigue.
.
Make sure that a top toggle is installed.



Note!

The deck flange of the furler is not watertight. To avoid flooding of the boat, the furler has to installed in a drained compartment.

The Reckmann furling unit is installed directly to the deck. The deck has to tolerate the entire stay load.

Warning!

Make sure that the deck is strong enough to carry the entire stay load.

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.

2.2 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.

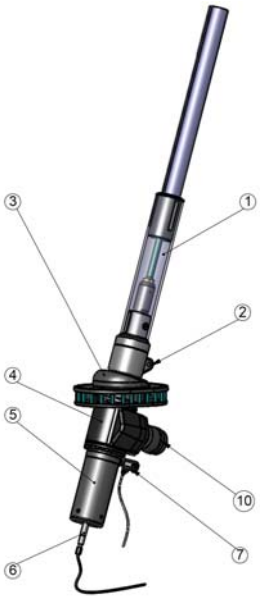
2.2.1 Maintenance to be carried out by the customer

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.

2.2.2 Maintenance to be carried out by a Reckmann service partner

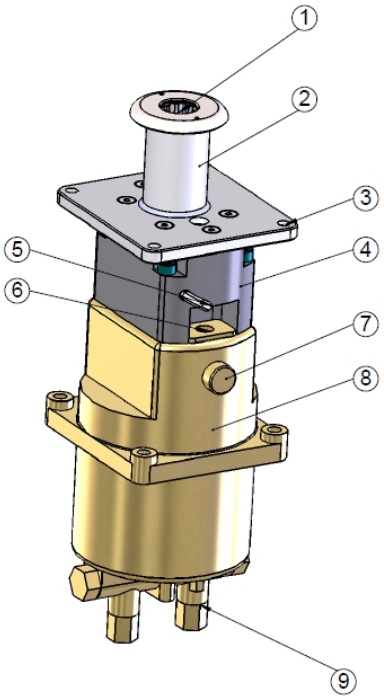
To ensure the safe and proper operation of the furler, it has to be serviced every five years by an authorized Reckmann service partner. A table of all authorized Reckmann service partners can be found at the end of this manual or at www.reckmann.com

3 Product description



1	Foil adapter	7	Hydraulic ports
2	Tack ring	10	Motor
3	Spherical deck bearing	12	Rod link
4	Gear unit		
5	Adjuster		
6	Piston position indicator		

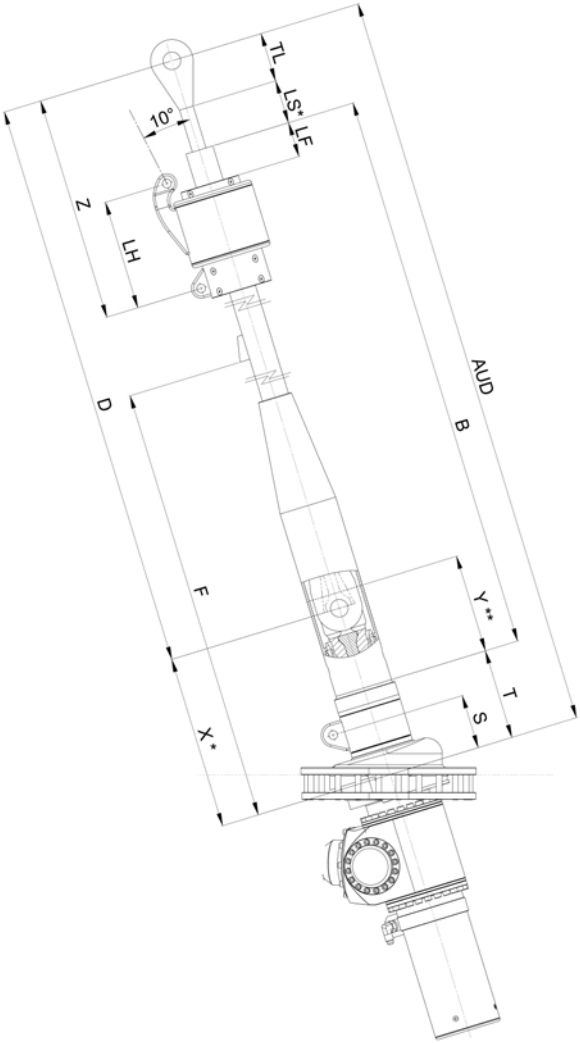
3.1 components of the manual backup drive



1 Socket for winch handle
2 Deck flange
3 Bolt holes for deck attachment
4 Pump flange box
5 Allen key for pump volume adjustment
6 Socket for pump volume adjustment
7 Oil fill cap
8 Backup pump
9 Hose connectors with integrated check valves

4 Assembling the furling unit

4.1 Calculation of stay and foil length



Unit	Swivel	Stay	Foil	AUD	X *	Y **	T	LS *	LF	F	S	Z	LH	stroke
UD3s	FS R40	Rod	Alu	measurement centerline upper fitting (without toggle) - intersection point stay/deck	254	215	128	50	50	1830	77	depends on upper fitting dimensions	221	100
			Carbon					220						
		PBO	Carbon		246	140		220						
		EC6			***	***		***						
	FS R50	Rod	Alu		254	215		50					234	
			Carbon					220						
		PBO	Carbon		246	140		220						
		EC6			***	***		***						
	FS R5H MKIII	Rod	Alu		254	215		50					156	
			Carbon					220						
		PBO	Carbon		246	140		220						
		EC6			***	***		***						
UD4s	FS R50	Rod	Alu		294	215	185	50		1885	112		234	150
			Carbon					220						
		PBO	Carbon		326	170		220						
		EC6			***	***		***						
	FS R5H MKIII	Rod	Alu		294	215		50					156	
			Carbon					220						
		PBO	Carbon		326	170		220						
		EC6			***	***		***						
	FS R6H MKIII	Rod	Alu		294	215		50					194	
			Carbon					220						
		PBO	Carbon		326	170		220						
		EC6			***	***		***						
UD5s	FS R6H MKIII	Rod	Alu		340	270	206	50		2105	140		194	200
			Carbon					300						
		PBO	Carbon		390	220		300						
		EC6			***	***		***						
	FS R7H MKIII	Rod	Alu		340	270		50	100				235	
			Carbon					300						
		PBO	Carbon		390	220		300						
		EC6			***	***		***						
	FS R8H MKIII	Rod	Alu		340	270		50					302	
			Carbon					300						
		PBO	Carbon		390	220		300						
		EC6			***	***		***						
	FS R8L	Rod	Alu		340	270		50					369	
			Carbon					300						
		PBO	Carbon		390	220		300						
		EC6			***	***		***						

*	measurement with adjuster fully down! Max. length = X or LS + stroke
**	required length to reach the lower stay connection - slidable foil tube supplied with alu foils only
***	no standard - to be confirmed

For the calculation of the required stay length D and the required foil length B use the values in the table above. Please use the following calculations to determine the measurements. F means sail feeder height. Ensure that your furler is not customized. All measurements with real time adjuster fully down. All measurements in mm.

Note!

All measurements with real time adjuster fully down.

B=AUD-TL-T-LS

with
AUD= length reference, measured from cl / deck cut out to the cl of top terminal pin. Note: Please refer to the notes mentioned in the “toggle” chapter.
TL= terminal length, depending on your topterminal
T= bottom deduction, see table above
LS = top deduction, see table above
B = required foil length including foil adapter tube. Sliding torque tubes in lowest position!

C=P-B

with
C = the foil package has to be shortened by this measurement.
B = see text above
P = unshortened (shipped)foil length, see packing list

The required stay length D is calculated as following:

D = AUD – X

Note!

The provided rod nose has to be in the right direction on the bottom end of the stay when using a rod headstay. Ensure that the nose is on the stay before the cold head is pressed.

4.2 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

4.3 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!

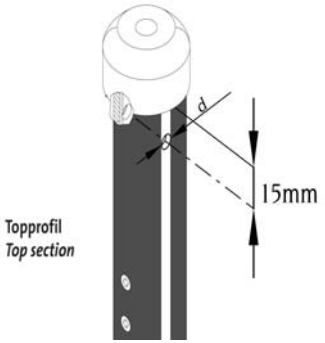
Note!

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

4.4 Foil assembly from R10 up to R40

4.4.1 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.

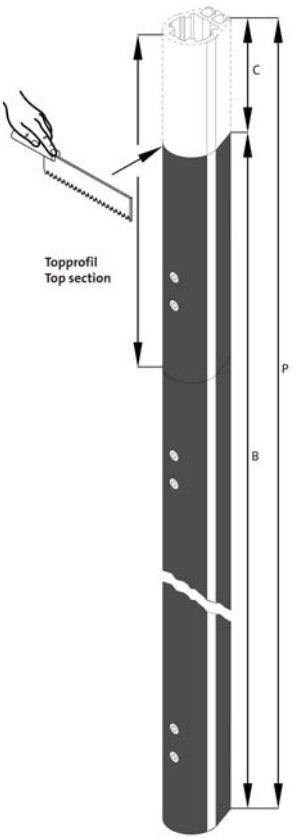


Required drill bit diameter for top cap assembly

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

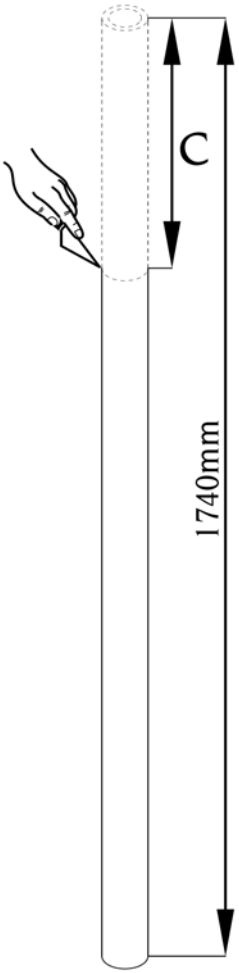
4.4.2 Shortening the top foil

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



4.4.3 Shortening the top hose

Shorten the top hose by the measurement C..



4.4.4 Assembly of bushings and spacer tubes

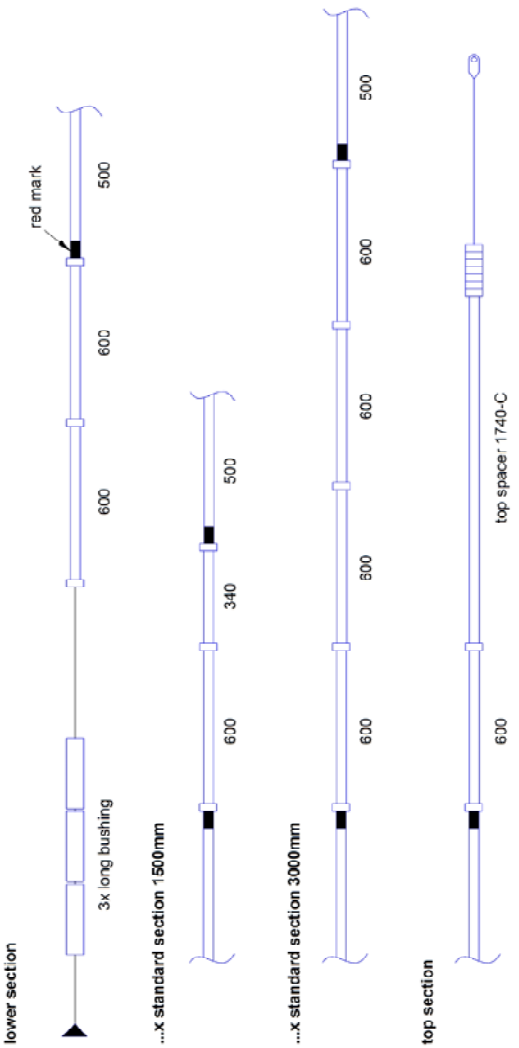
If your system was delivered with reinforced profiles please continue with the next chapter for the assemblyprocedure:

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.


lower section
3x long bushing
red mark
500
600
600
...x standard section 1500mm
600
340
500
...x standard section 3000mm
600
600
600
600
500
top section
600
top spacer 1740-C

4.4.5 Foil assembly / split foil connectors

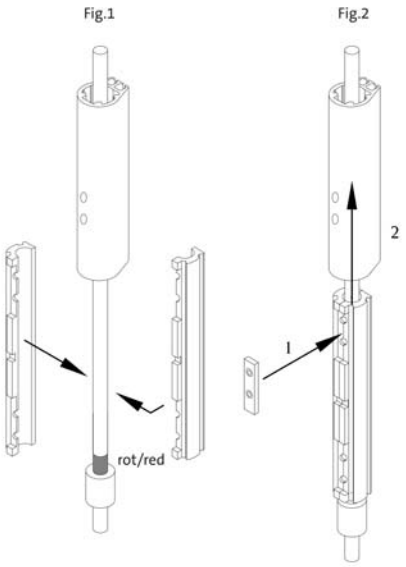
After the assembling of the bushes and hoses on the forestay and the shortening of the top profile start to assemble the profiles.

Sequence of the profiles:

Top section -- ..... x Standard section 3000 -- x

Standard section 1500 -- Lower section

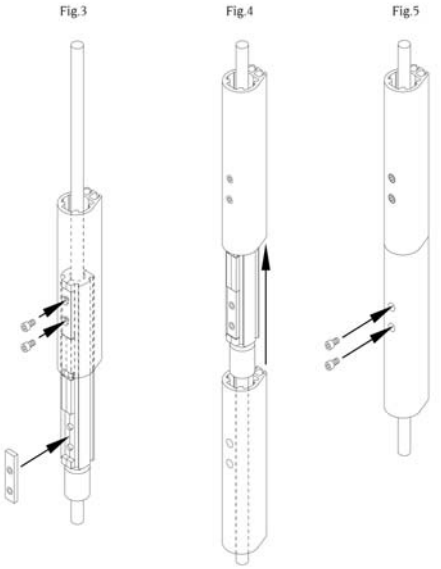
From the bottom end of the stay, slide on and feed the top profile along to the top end of the stay. When in place, assemble a pair of split join sleeves over the stay at the spacer tube, marked red, directly under the top section (fig. 1). Insert a stainless steel plate (1) into the recess on the top 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.

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.



4.5 Installation of the foil reinforcement (optional)

4.5.1 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. .

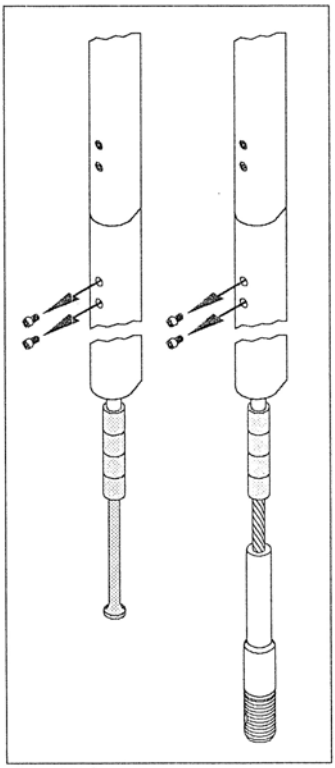


Bild 1 / *fig.* 1

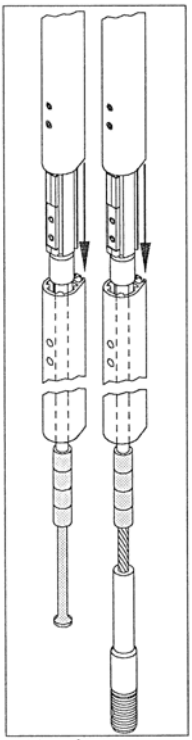


Bild 2 / *fig.* 2

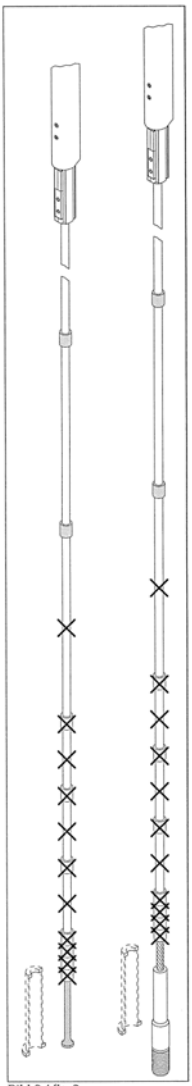


Bild 3 / *fig.* 3

4.5.2 Reinforcement assembly

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

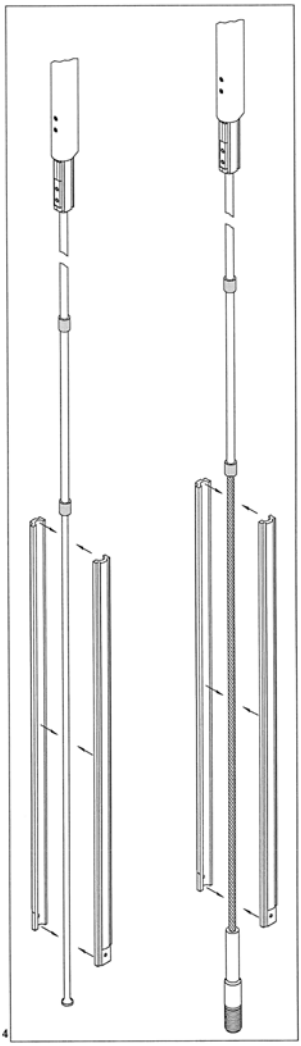


Bild 4 / *fig.* 4

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. .

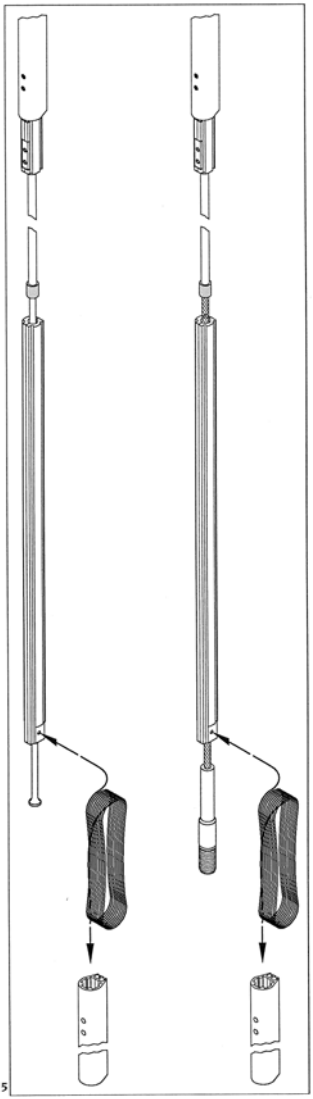


Bild 5 / *fig. 5*

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)

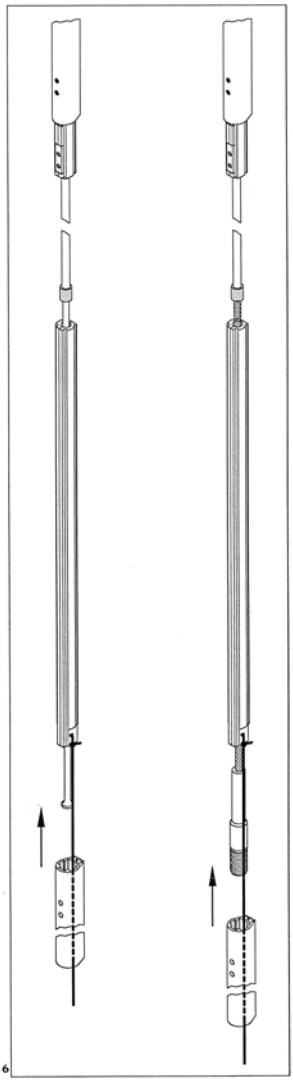
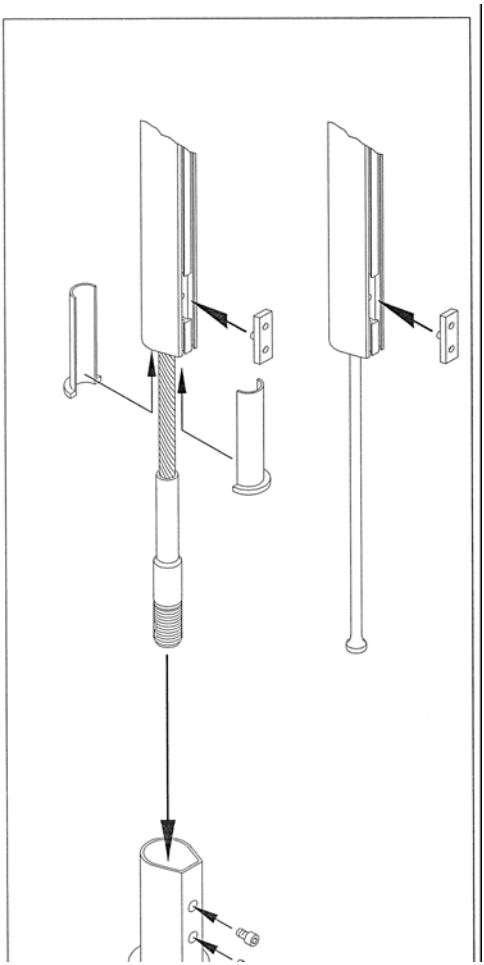


Bild 6 / *fig.* 6

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)

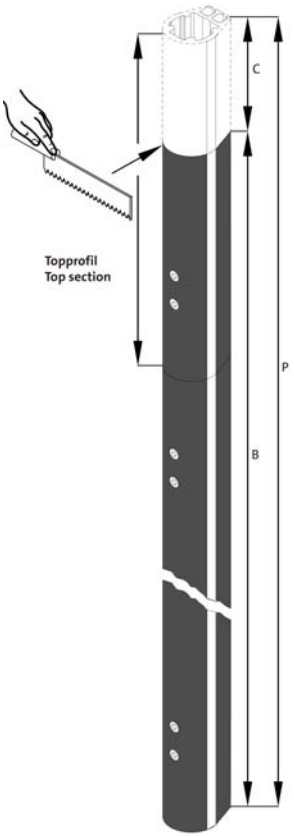
Then secure the stay inside the furler, please follow the description in the furler manual.



4.6 Foil assembly R50, R5 up to R8

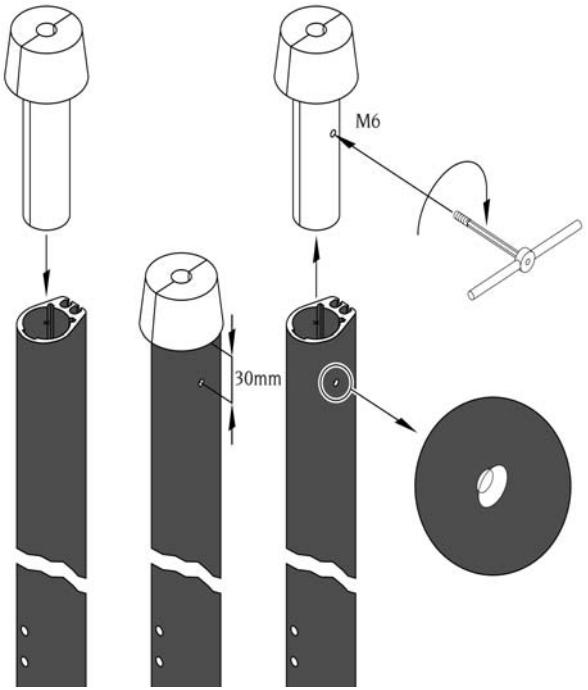
4.6.1 Shortening the top foil

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



4.6.2 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.



4.6.3 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

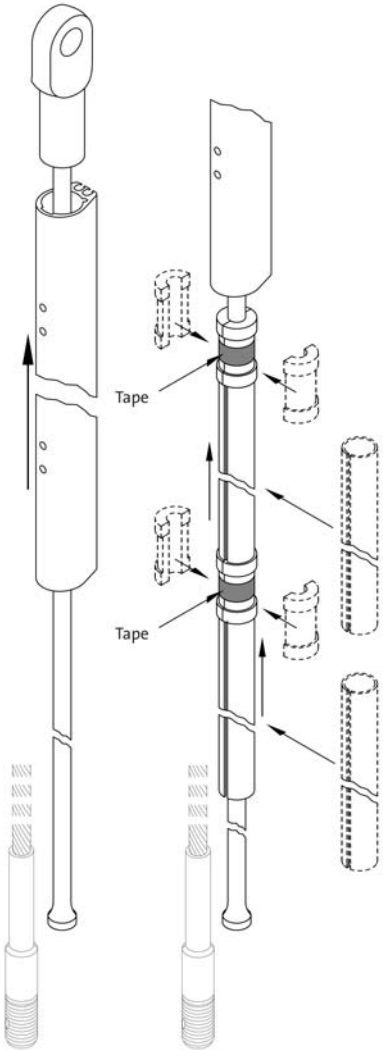


Fig. 1 Fig. 2

installation on page 24 with step 5.

4.6.4 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)

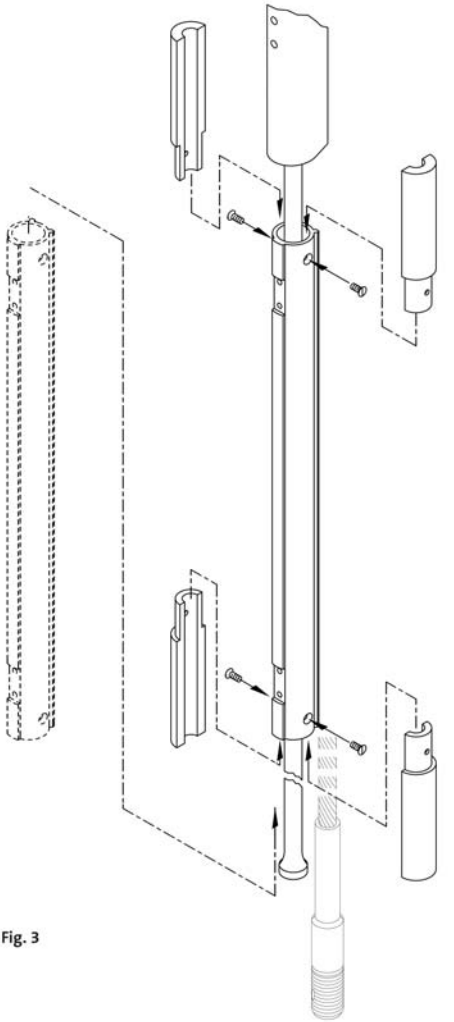


Fig. 3

4.6.5 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)

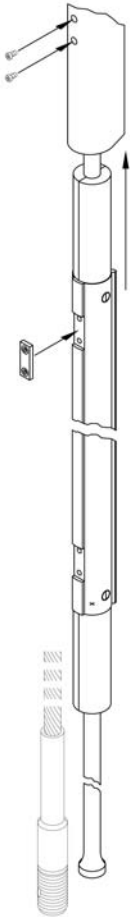


Fig. 4

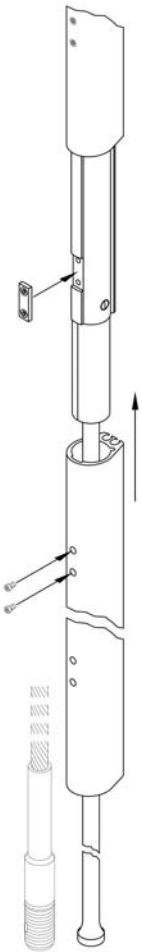


Fig. 5

4.6.6 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)

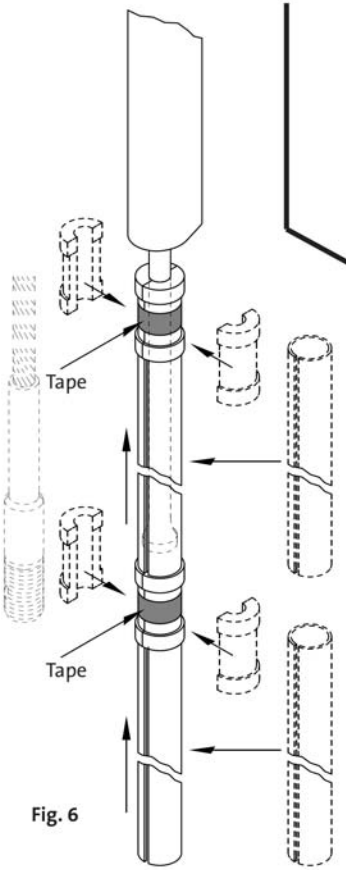


Fig. 6

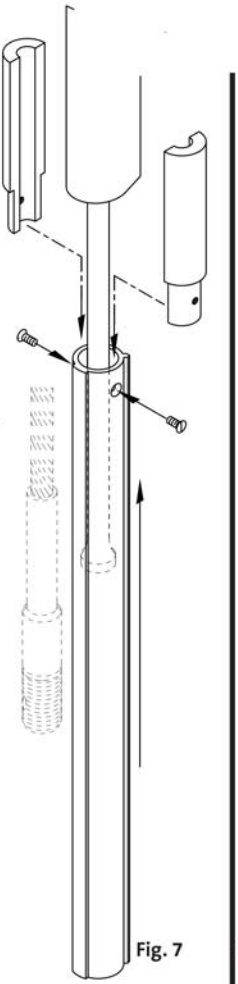


Fig. 7

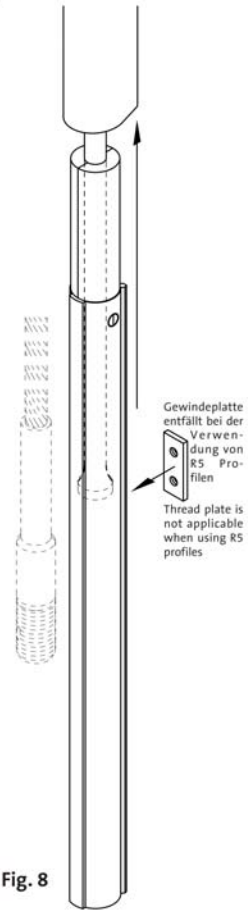


Fig. 8

4.6.7 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)

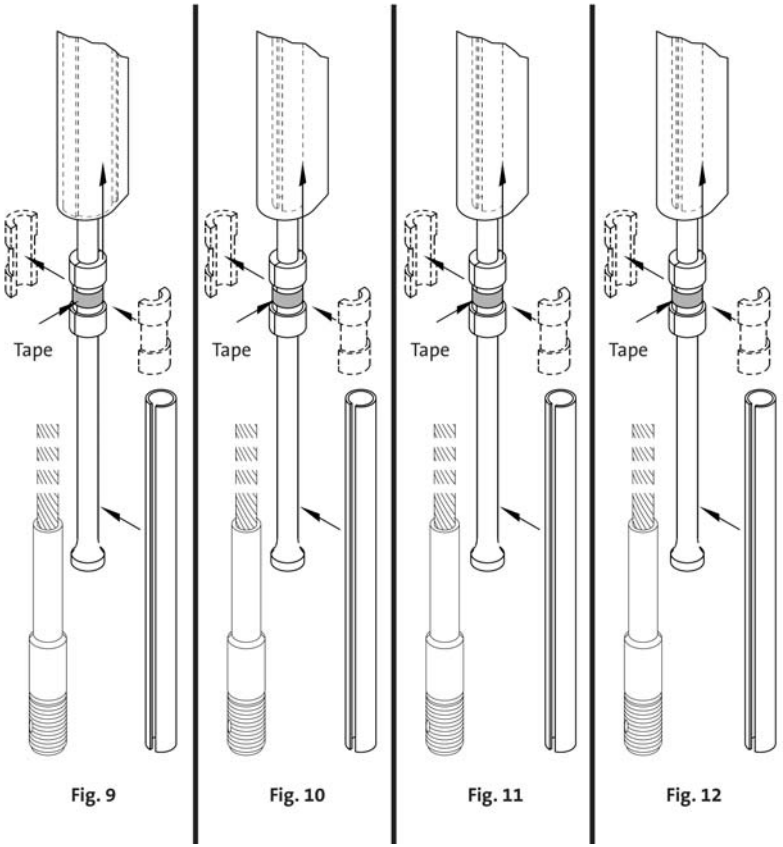
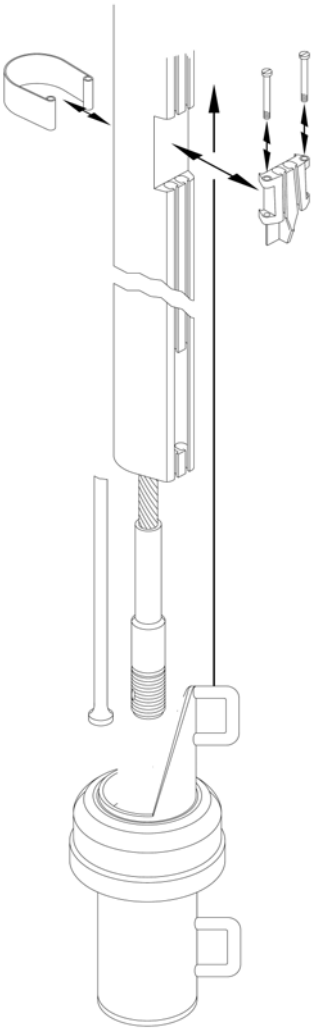


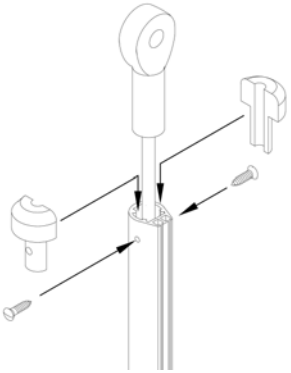
Fig. 9 Fig. 10 Fig. 11 Fig. 12

4.7 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.



4.8 Assembly of the top cap



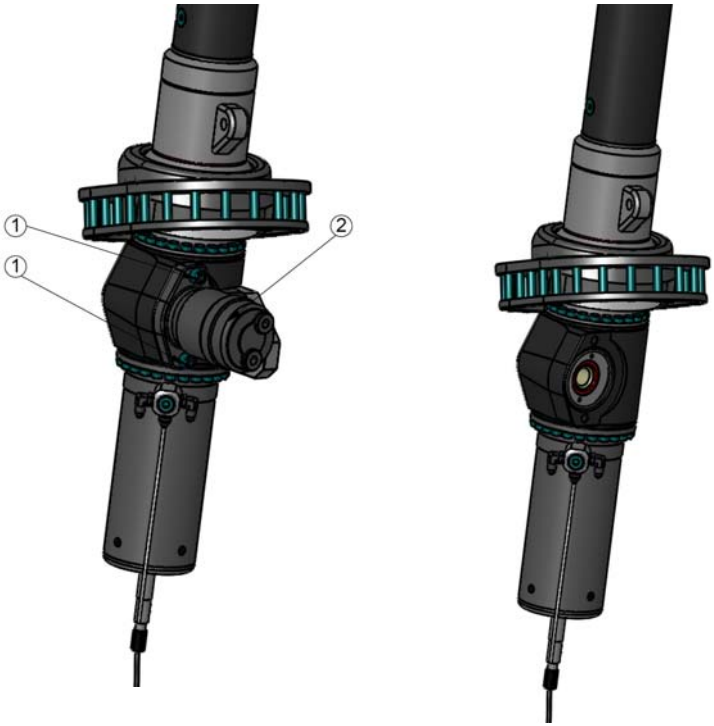
(as an option)

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.

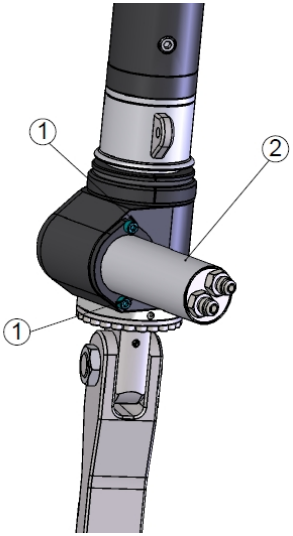
4.9 removing the hydraulic motor

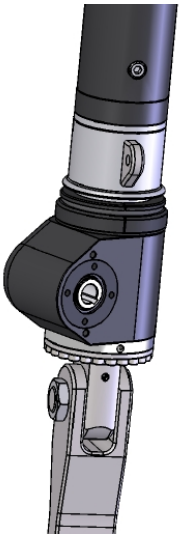
In particular cases, the hydraulic motor needs to be disassembled prior the furler can be attached to the deck or the chainplate. Release both motor fastening screws (1) and pull the motor (2) out of the furler. The gear is still sealed, so no oil can leak out of the gear. After the furler is installed to the deck, the motor can be reassembled.

deck attached units:

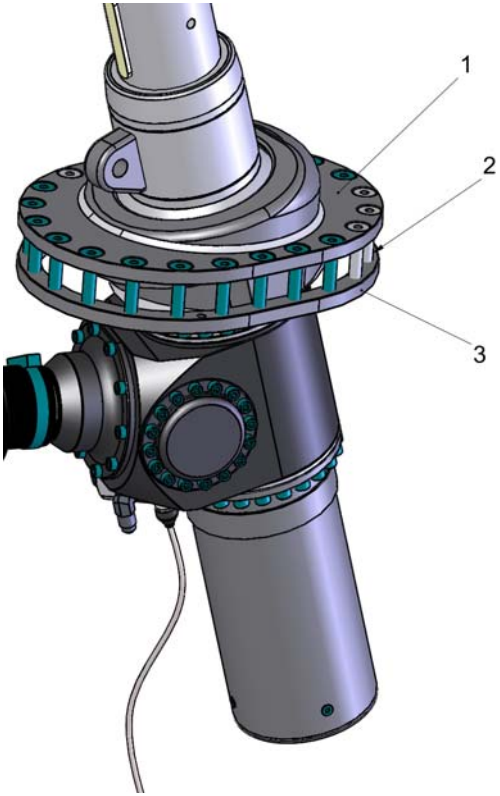


Chainplate attached units:





4.10 Installation of the furler to the deck



The under deck furling unit UDs is flanged to the deck. It is bolted to a special threaded ring below deck. Please ensure that the deck is able to tolerate the entire stay load.
The following parts belong to the deck flange assembly:

- Spherical deck flange (1) with installed secondary gear
- Threaded ring (3)
- Bolts (2)

To transmit the high torque from the furler to the deck, it is necessary that the holes of the flange and the threaded backing plate align exactly. We can provide a drilling template on request.

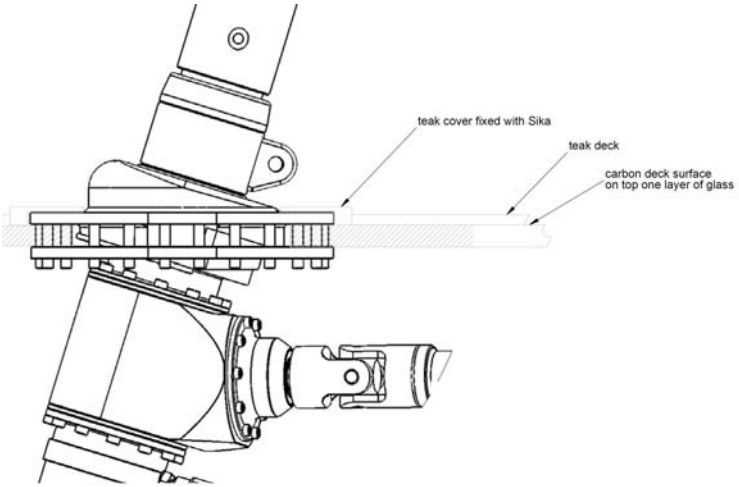
Note!

Under deck furling unit may only be installed to decks with a maximum thickness named in the table below. If the deck thickness is larger, the furler may be damaged due to stay sag.

Max. deck thickness: :

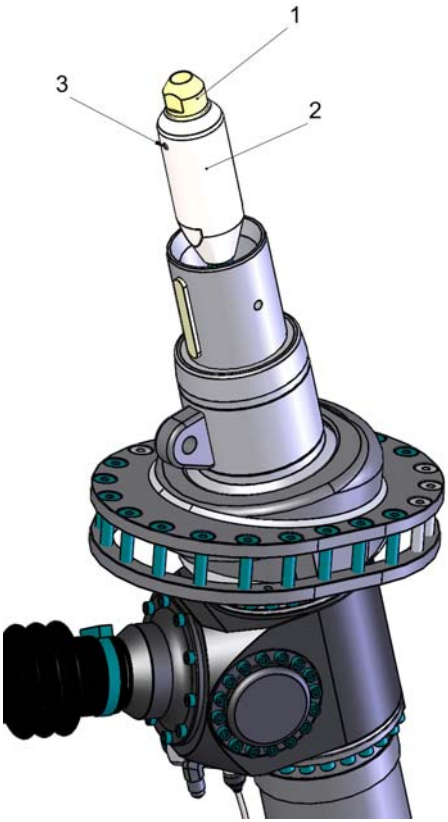
UD-2	UD-3	UD-4	UD-5
15 mm	25 mm	35mm	40 mm

Components of the deck flange:



4.11 Assembly of stay, foils and furler

4.12 Connection of stay and furler



After the secondary gear unit was installed to the deck, the headstay can be connected to the furler.
Apply Tef-Gel or similar to the thread of the rod nose. Screw the rod nose (1) into the connector until no thread is visible above the connector (2). Secure the connection with both provided grub screws (3).

Note!

After the nose is srewed entirely into the connector, no thread may be visible above the connector.

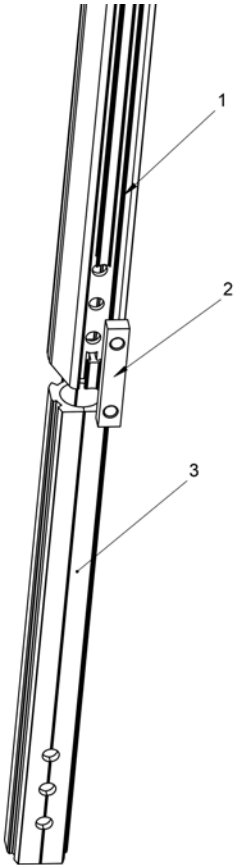
Note!

Risk of seizing of the thread!
Apply Tef-Gel or similar to the thread before the nose is screwed into the connector!

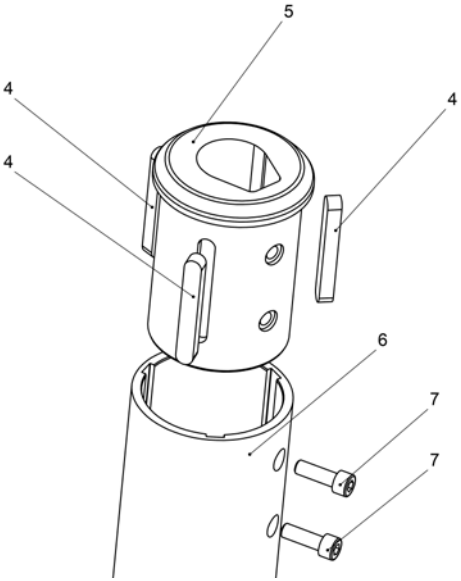
4.13 Connection of foils and furler

Please follow the steps below to connect foils and furler.

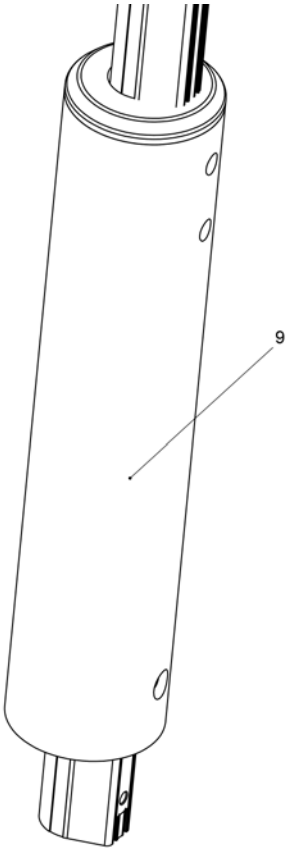
Make sure that the foil reinforcement (3) is entirely slid into the feeder section. Please note the foil reinforcement chapter of this manual. Now put the key(2) into the referring recess at the bottom of the feeder section. Coat all contact areas with Tef-Gel to avoid corrosion. Secure the key with a thin layer of tape (Tesa or similar).



Now put the keys (4) into the recesses in the foiladapter(5). Now slide the adapter (5) into the torque tube (6).

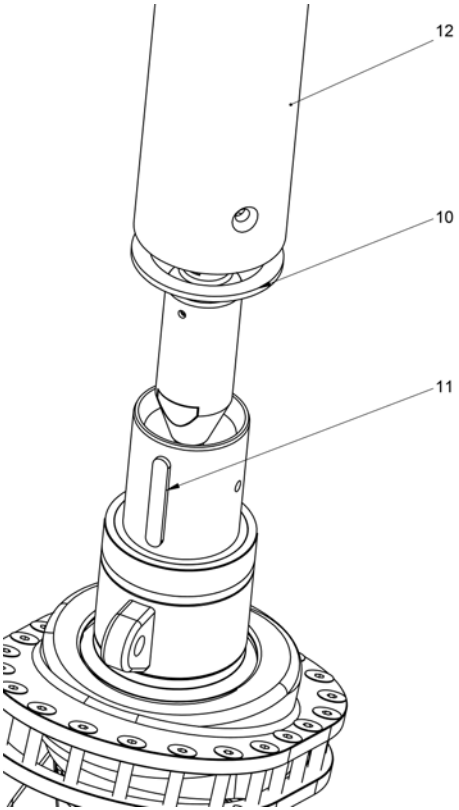


Now the entire torque tube assembly (9) can be slid onto the foil. Please make sure that the key is in its position on the feeder section.



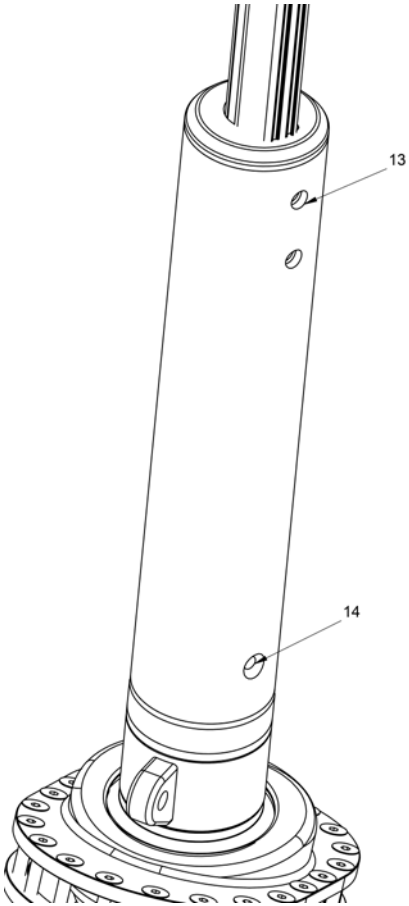
Make sure that the spacer ring (10) is on its position on the foil drive. Now the stay can be connected to the furler. Please refer for the stay connection to the referring chapter of this manual.

Now put the keys (11) into the keyways and slide the entire assembly onto the foil spline of the furler.



Now foils and and torque tube can be secured with the provided screws (13) and (14).

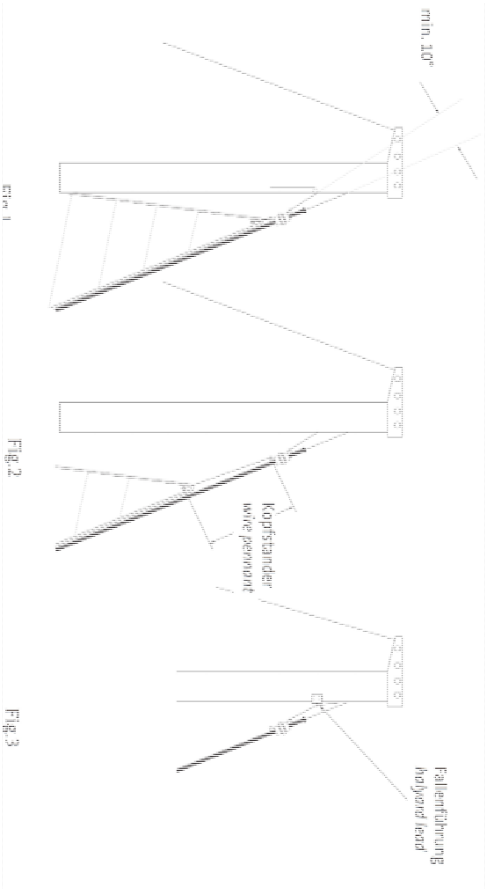
Please apply Tef-Gel to avoid corrosion.



Note!

Apply Tef-Gel to all connections to avoid corrosion between all joined parts.

4.14 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°. If the angle is less than 10° a halyard lead has to be installed.

.

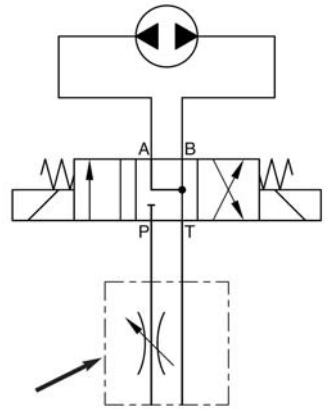
4.15 Valve configuration of the motor

The UDs 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 UDs-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 UDs-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.

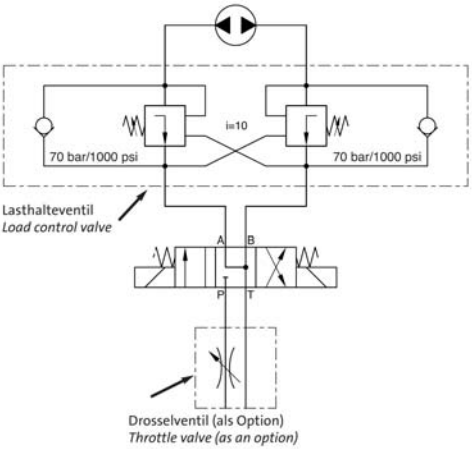
Warning!

Exceeding the maximum values of oil flow and pressure may cause damages of the furler. Make sure the max. values named in the spec. sheet at the end of this manual are not exceeded.

Gears up to UDs-3



Gears from UDs-4 up

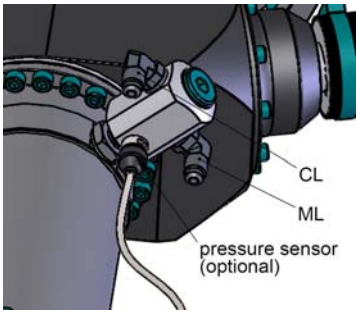


4.16 Connection of the hydraulic hoses to the real time adjuster

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 ¼‘

CL 1/8‘



4.17 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.

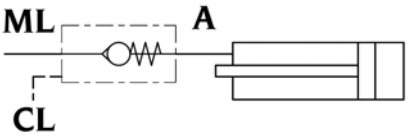
Tensioning the stay:
Pump oil into the main line (ml) port of the adjuster to tension the stay. The po-check valve (if installed) is unlocking in this direction automatically. Information regarding the adjuster stroke can be found in the technical specification table at the end of this manual.

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 dies 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

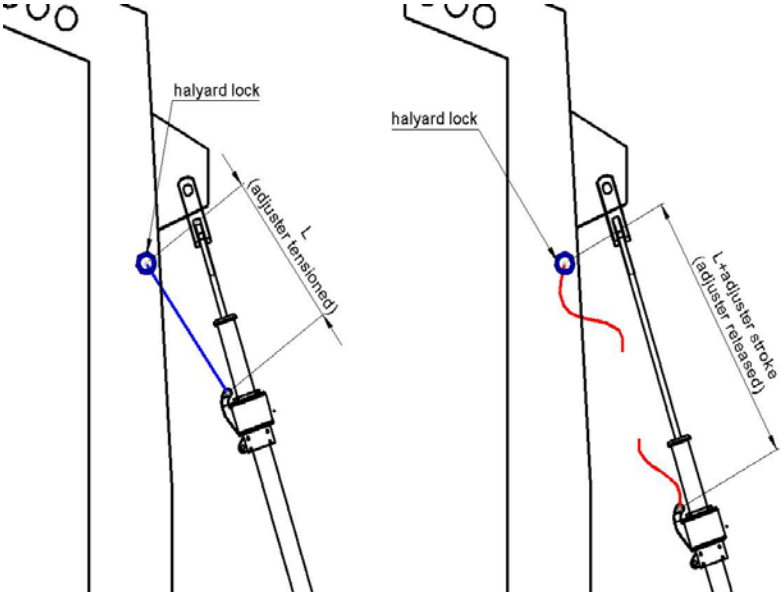
Function diagram of the po-check valve:



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.

4.17.1 Stay adjustment in relation to halyard tension

The real time adjuster is tensioning the stay in relation to the foils. The stay retratcts topside of the profiles when tensioned (fig.1) and expands out of the foils when eased (fig. 2). While easing the distance between top end of the foil and the halyard lock enlarges.
Now if neither the halyard nor the cunnigham is eased, while the real time adjuster released, the luff of the sail will be loaded.



When you are operating a halyard lock you need to ease the Cunningham when the real time adjuster is released.
If you do not have a halyard lock you have to ease the halyard.
Please make sure you only adjust the stay while the sail is unfurled.

Operating safe is a simple step by step process, which can de done either with PLC logic or manual.

Please follow these steps to adjust the stay tension:

Tensioning the stay:

1. Unfurl the sail completely
2. Tension stay (without load)
3. Tension Cunningham (without sheet load)

Easing the stay:

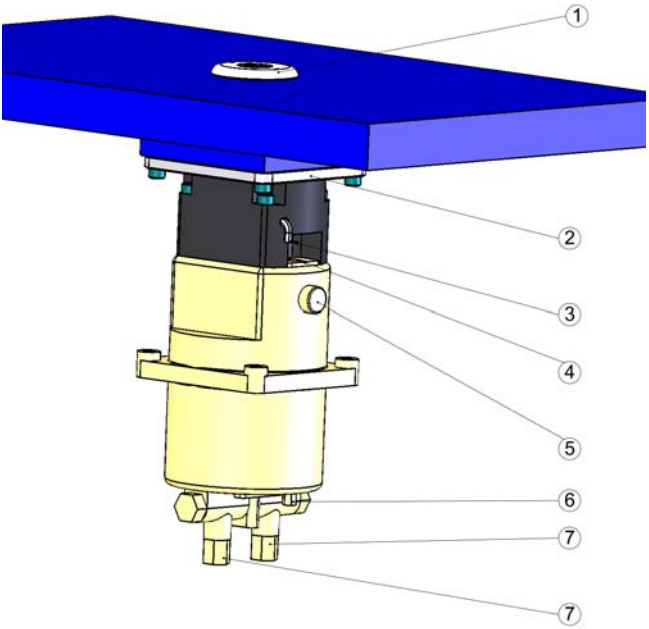
1. Unfurl the sail
2. Ease Cunningham (without sheet load)
3. Ease stay (without sheet load)

Tip

Each function should be locked until the previous function is completed or
eased/tensioned to a predetermined point/pressure.

4.18 Installation of the hydraulic manual backup system

Components of the system:

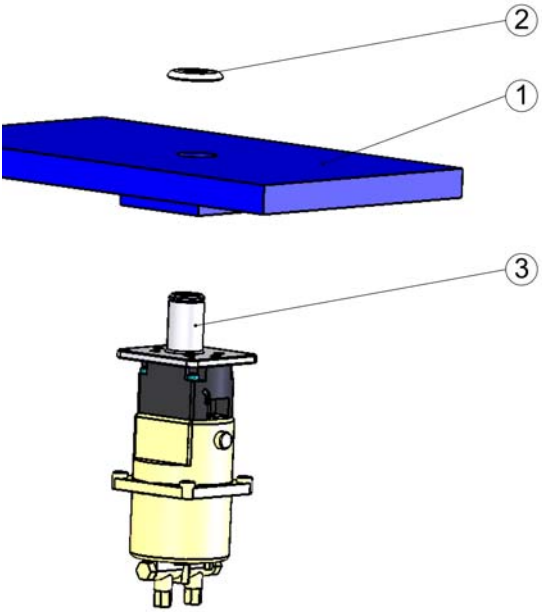


1 Deck ring / winch handle socket
2 Deck flange
3 Hex key for ratio adjustment
4 Socket for ratio adjustment
5 Oil filler cap
6 Oil flush plug
7 Main line plug

The Reckmann manual backup drive consists of a manual hydraulic pump which is connected to the hydraulic system of the boat. The Pump is driven by

a standard winch handle. The pump can be installed somewhere below deck or through the deck to be driven from above deck. The pump is made of bronze and is additionally sealed with an epoxy finish against corrosion. The shaft is made of stainless steel.

Installation of the pump:

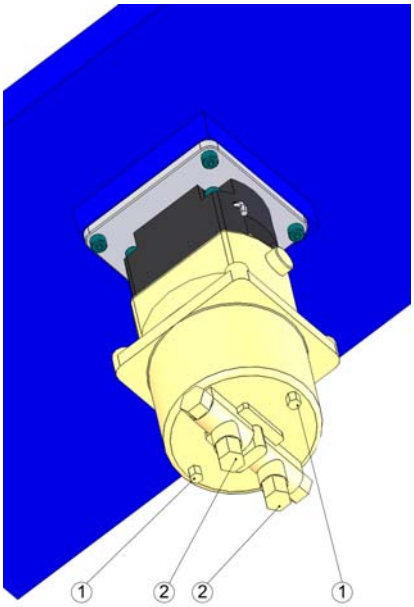


Slide the pump unit (3) from the bottom side through the deck (1) cut out. Apply Sika-Flex or similar between the deck and the pump to seal the connection. Secure the Pump to the deck with the cap screw (2) and four M8 bolts at the flange.

Hydraulic connection:

The pump is simply connected to the A and B lines between manifold and furler. Please make sure that a set of po check valves avoids oil flow from the pump into the manifold (pls. see the following diagram). The pump is protected against pressure from the A and B line by an integrated po check valve. There are two possibilities to ensure that the pump is supplied with oil at every time:

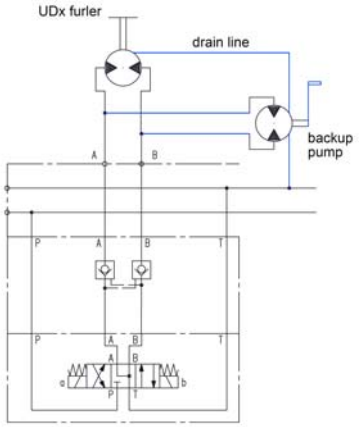
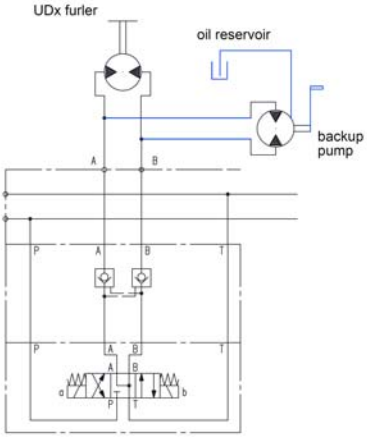
The first possibility is an external oil tank with a volume of at least 1l. The tank has to be placed above the pump and is connected to port(1). In this setup, the drain line of the motor of the furler may not be used. This solution has some disadvantages: The pump has to be placed on the same level as the furler, you have to ensure that the tank is always filled and at least you have to make sure that the tank does not leak due to heel of the boat.



We recommend to fill the pump with the oil from the furler drain line. In this setup, the pump can be installed either above nor below the furler in any position. The drainline from the motor is installed at the lower no. 1 port, the line to the tank at the higher no. 1 port.

The A and B lines to the furler have to be installed to the ports (2) in both cases.

Wiring diagram:

Using the drainline:	Without using the drainline:
	

Port sizes of the pump:

For UD-2 and UD-3 furler:

A and B lines: 7/8’-14 UNF (O-ring fitting)
drain line / tank holes ¼ NPT

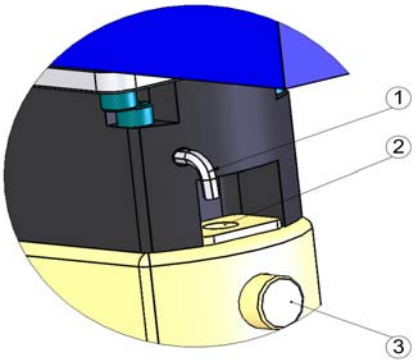
For all sizes above:

A and B lines: 9/16'-18 UNF (O-ring fitting)
drain line / tank holes: 1/4 NPT

4.19 Operation of the manual backup

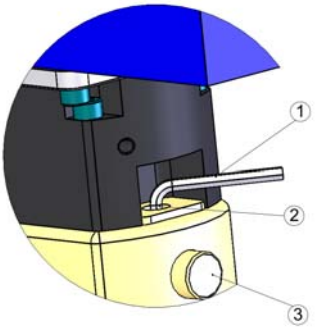
To operate the manual backup you just have to rotate the pump with the help of a standard winch handle which has to be sticked to the socked above deck level. The pump works in both directions, to change the direction of rotation of the furler just rotate the pump in the opposite direction.

If the force on the handle is too large, you can simply adjust the volume per revolution of the pump with the provided hex key: Larger volume per revolution means higher force on the handle but more furling speed. Less volume means less force at the handle and less furling speed.



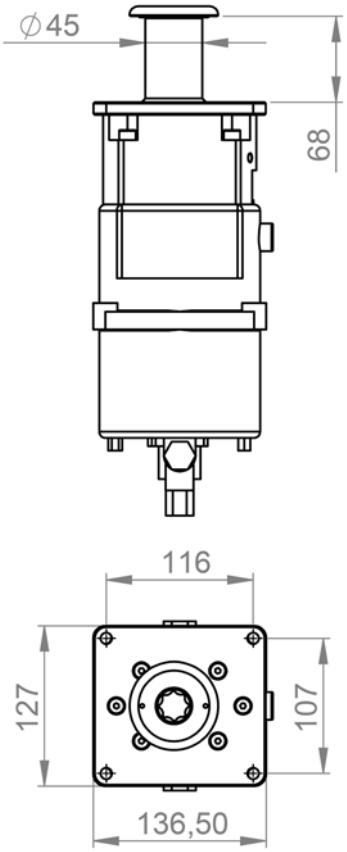
To adjust the pump volume, simply pull the hex key (1) out and stick it into the socket (2).

Now the pump volume and following that, the ratio of the manual backup drive can be adjusted.

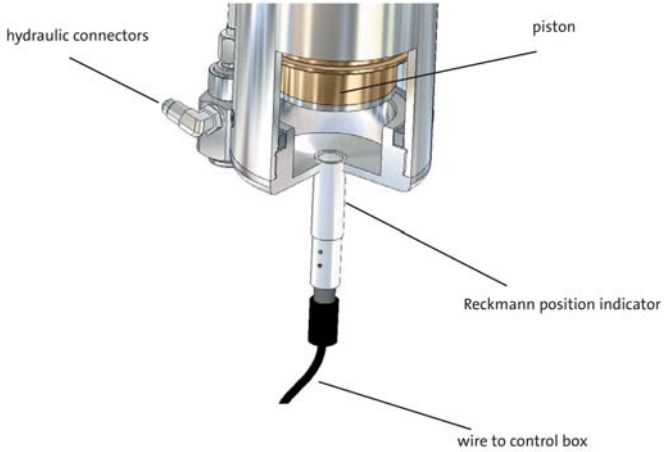


4.20 Additional installation information

The following sketches may help you during the installation of the pump:

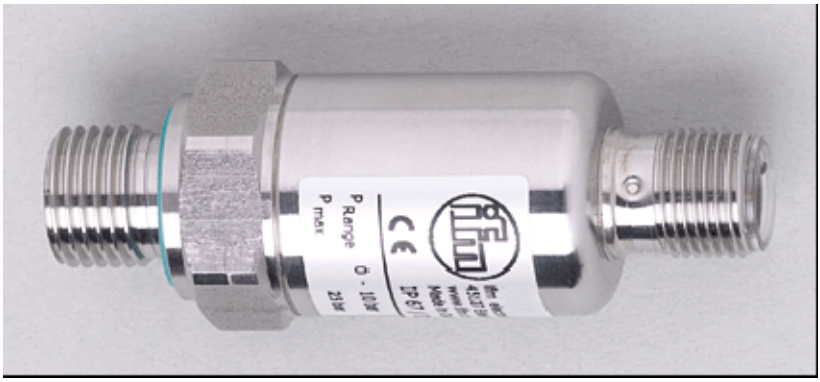


4.21 Piston position indicator (as an option)

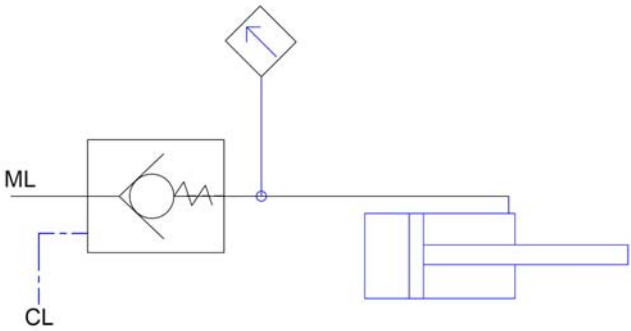


To report the position of the piston of the real time adjuster to the helmsman, Reckmann uses a special electronic sensor. The sensor is situated at the bottom of the adjuster. It is easily accessible for cleaning or changing. The sensor can be connected to the electronic system available on the yacht, for example B&G Hercules or Hydra servers. The sensor has the following technical specifications:
operating voltage: from 10V up to 30V dc
electric power: 40 mA
output: linear analog voltage / current
0V up to 10V dc, rising characteristic / 4..20 mA rising characteristic
wiring: pin 1: +10 up to +30 V dc (brown)
pin 2: signal, 0 up to 10 V dc / 4..20 mA (white)
pin 3: gnd (blue)

4.22 Pressure sensor (as an option)



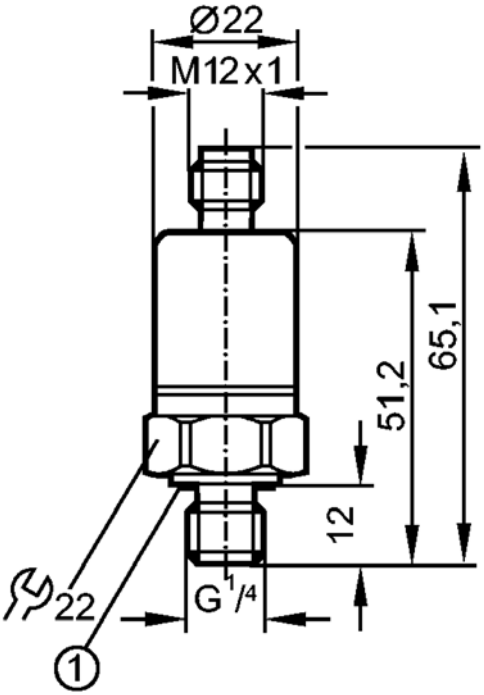
As an option we provide a pressure sensing unit to monitor the pressure in the adjuster. This value is corresponding with the load on the stay. The pressure can be measured as long as the adjuster is not in top position. There are two versions of the pressure sensor: one with 0...10V output and one with 4...20mA output. Please find the specs referring to your sensor on the following pages.
Hydraulic connection of the sensor:



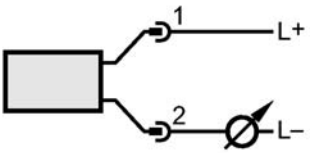
Note!

The sensor cannot measure the pressure inside the adjuster when it is fully extended.
Do not fully extend the adjuster to ensure a proper function of the sensor.
.

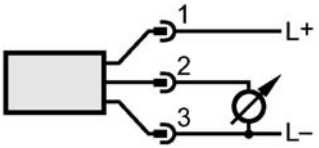
dimesions of the sensor:



Wiring:
PT3540 (mA output)



PT9540 (Voltage output)



Specifications:

	PT3540	PT9540
Operating Voltage	8,5 … 36V	16V … 36V
Reverse polarity protection	yes	yes
Analogue output	4…20mA	0…10V
Pressure rating	600 bar	600 bar
Bursting pressure	1600 bar	1600 bar
Connection	M12	M12
Materials	316L / 1.4404	316L / 1.4404

5 specifications

UD3s

	foils			R40	R5	S3	S4/S4.5
stay and sails	headstay	rod	[-]	30 up to 48	48 up to 60	30 up to 48	48 up to 60
		wire	[mm]	14 up to 16	16	-	-
	max. stay length		[m]	27	33	27	33
	max. sail area		[m²]	175	230	175	230
	max. sheetload		[kg]				
	max. halyard load		[kg]				
	max. tack load		[kg]				
hydraulic specifications furler	max. pressure		[bar]	140			
	at torque		[Nm]	448			
	max. oil flow		[l/min]	17			
	at rpm		[1/min]	29			
	thread ML		[-]	R3/8			
	thread DL		[-]	-			

UD3s

Adjuster	function	[RT / DS]	RT
	stroke	[mm]	100
	max. pressure	[bar]	250
	at stayload	[kg]	12175
	max. swl stay	[kg]	-
	thread ML	[-]	1/4'
	thread CL	[-]	1/8'
	Fitting ML	Parker	6F42EDMXSS
	Fitting CL	Parker	4F42EDMXSS
	po-check valve	[-]	RHC1

UD4sc

	foils			R5	R7	S5	S5.5
stay and sails	headstay	rod	[-]	60 up to 76	76 up to 91	60 up to 76	76 up to 91
		wire	[mm]	19	21	-	-
	max. stay length		[m]	36	38	36	38
	max. sail area		[m²]	275	320	275	320
	max. sheetload		[kg]				
	max. halyard load		[kg]				
	max. tack load		[kg]				
hydraulic specifications furler	max. pressure		[bar]	175			
	at torque		[Nm]	960			
	max. oil flow		[l/min]	30			
	at rpm		[1/min]	39			
	thread ML		[-]	R3/8'			
	thread DL		[-]	-			

UD4sc

Adjuster	function	[RT / DS]	RT
	stroke	[mm]	150
	max. pressure	[bar]	350
	at stayload	[kg]	-
	max. swl stay	[kg]	-
	thread ML	[-]	1/4'
	thread CL	[-]	1/8'
	Fitting ML	Parker	6F42EDMXSS
	Fitting CL	Parker	4F42EDMXSS
	po-check valve	[-]	RHC 1/0

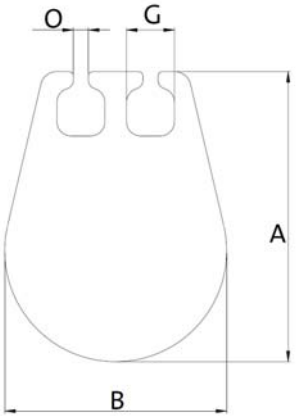
UD5sc

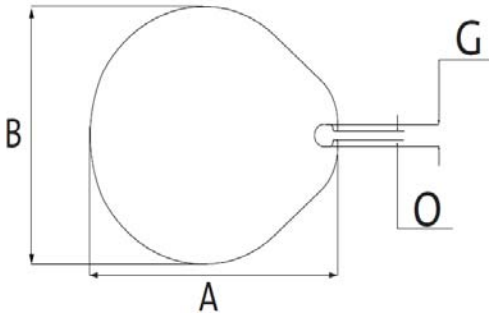
	foil			R6	R7	S6	S6.5/S7
stay and sails	headstay	rod	[-]	91	115 up to 150	91	115 up to 150
		wire	[mm]	26	28 up to 32	-	-
	max. stay length		[m]	40	50	40	50
	max. sail area		[m²]	350	500	350	500
	max. sheetload		[kg]				
	max. halyard load		[kg]				
	max. tack load		[kg]				
hydraulic specifications furler	max. pressure		[bar]	175			
	at torque		[Nm]	1102			
	max. oil flow		[l/min]	40			
	at rpm		[1/min]	44			
	thread ML		[-]	R3/8'			
	thread DL		[-]	-			

UD5sc

Adjuster	function		[RT / DS]	RT
	stroke		[mm]	200
	max. pressure		[bar]	350
	at stayload		[kg]	-
	max. swl stay		[kg]	-
	thread ML		[-]	1/4'
	thread CL		[-]	1/8'
	Fitting ML		Parker	6F42EDMXSS
	Fitting CL		Parker	4F42EDMXSS
	po-check valve		[-]	RHC 1/0

5.1 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

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7 Index