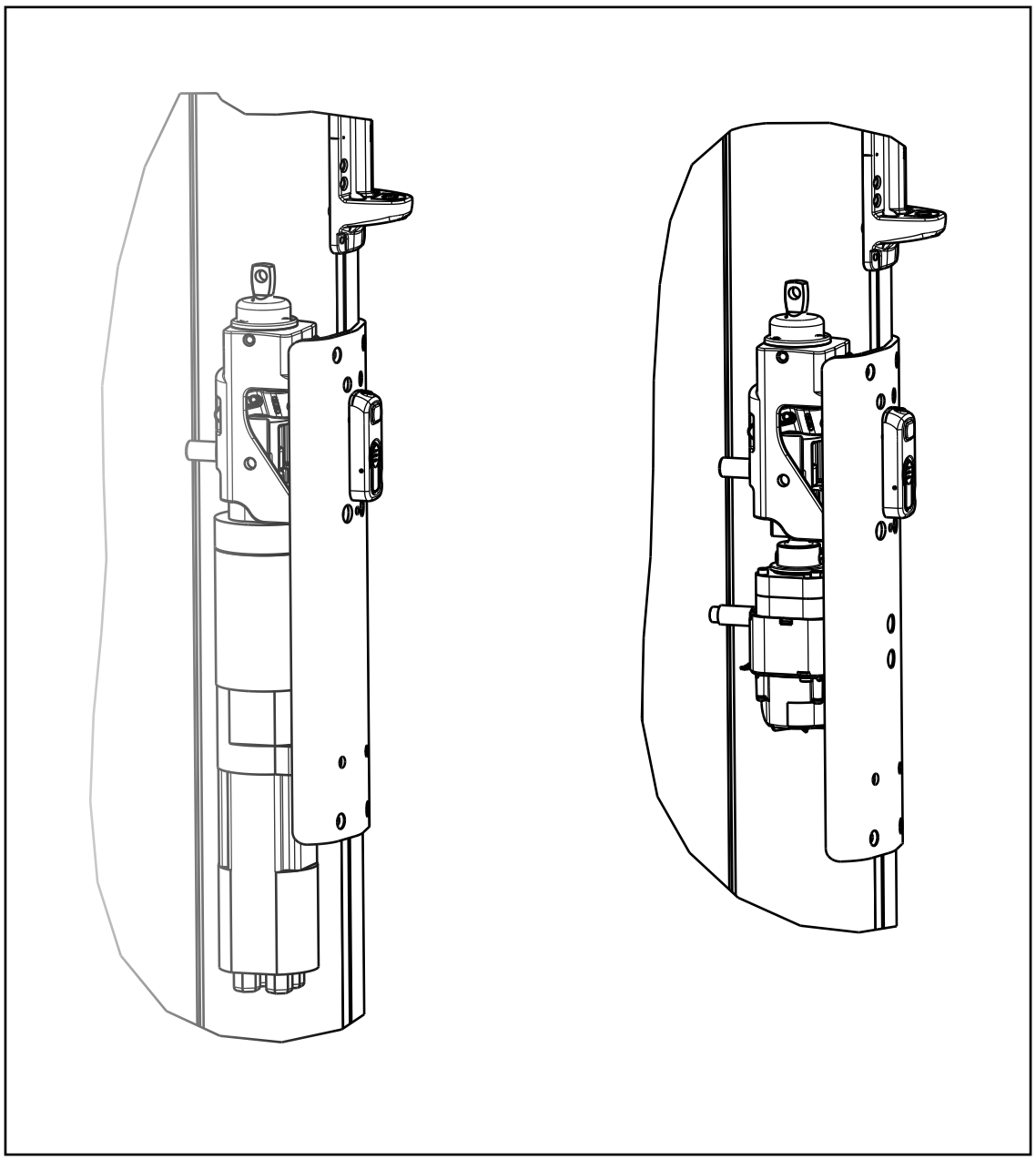
597-519-E
2024-05-06

SMF

SYNCHRONIZED MAIN FURLING

User guide and installation manual for SMF retrofit on 12/24 V electric system, RB & RC



SELDÉN

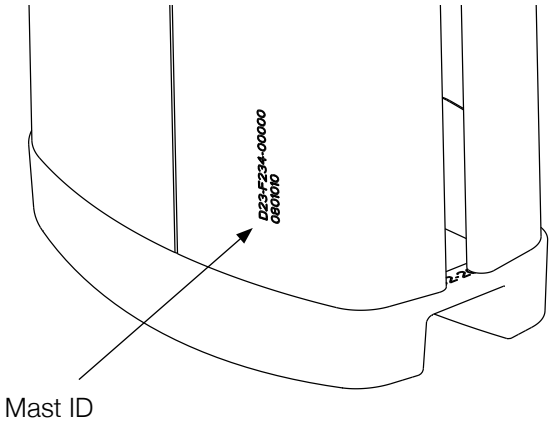
Contents

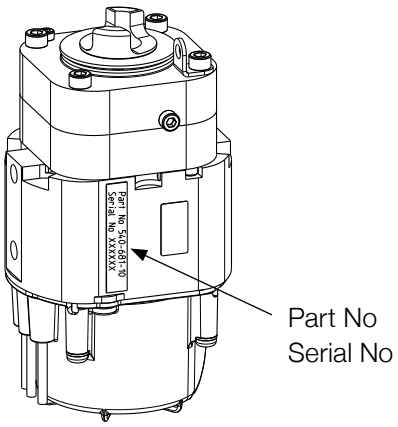
1. Introduction

Congratulations on the purchase of your new SMF retrofit kit.

This manual covers operating guidelines for the system and installation instructions for the electric retrofit kit on mast sections R232, R260, R290, F228, F246, F265, F286, F305, F324. The mast section is identified by the mast ID, engraved on port side at the bottom of the mast extrusion.

The part number and serial number of the mast motor is found on the aft side of the mast motor facing the sail groove. Always use the mast ID and part and serial number of mast motor as reference in any support case.





Please read the entire manual before installation and use of the product and keep it available for future reference. The latest version is available at www.seldenmast.com.

Related installation manuals and user guides:

597-275-E Installation of Seldén Power Supply and SEL-Bus system

597-283-E Seldén Power Supply and SEL-Bus system order guide

595-540-E Hints and Advise

Installation of SMF retrofit kit

All Seldén dealers are listed at www.seldenmast.com and divided in categories describing their competence. For SMF retrofit installation we recommend dealers in the category “Advanced technical installations”.

Safety notes

Carefully pay attention to, and follow the instructions with the following symbols:

ATTENTION

This symbol indicates a critical moment in the assembly or technical advice.

WARNING

This symbol indicates a potentially hazardous situation. If not avoided, this could result in serious personal injury or damage to property.

Turn off the electric power during installation of the electrical equipment.

Turn off the electric power when the system is not in use to prevent unintentional activation.

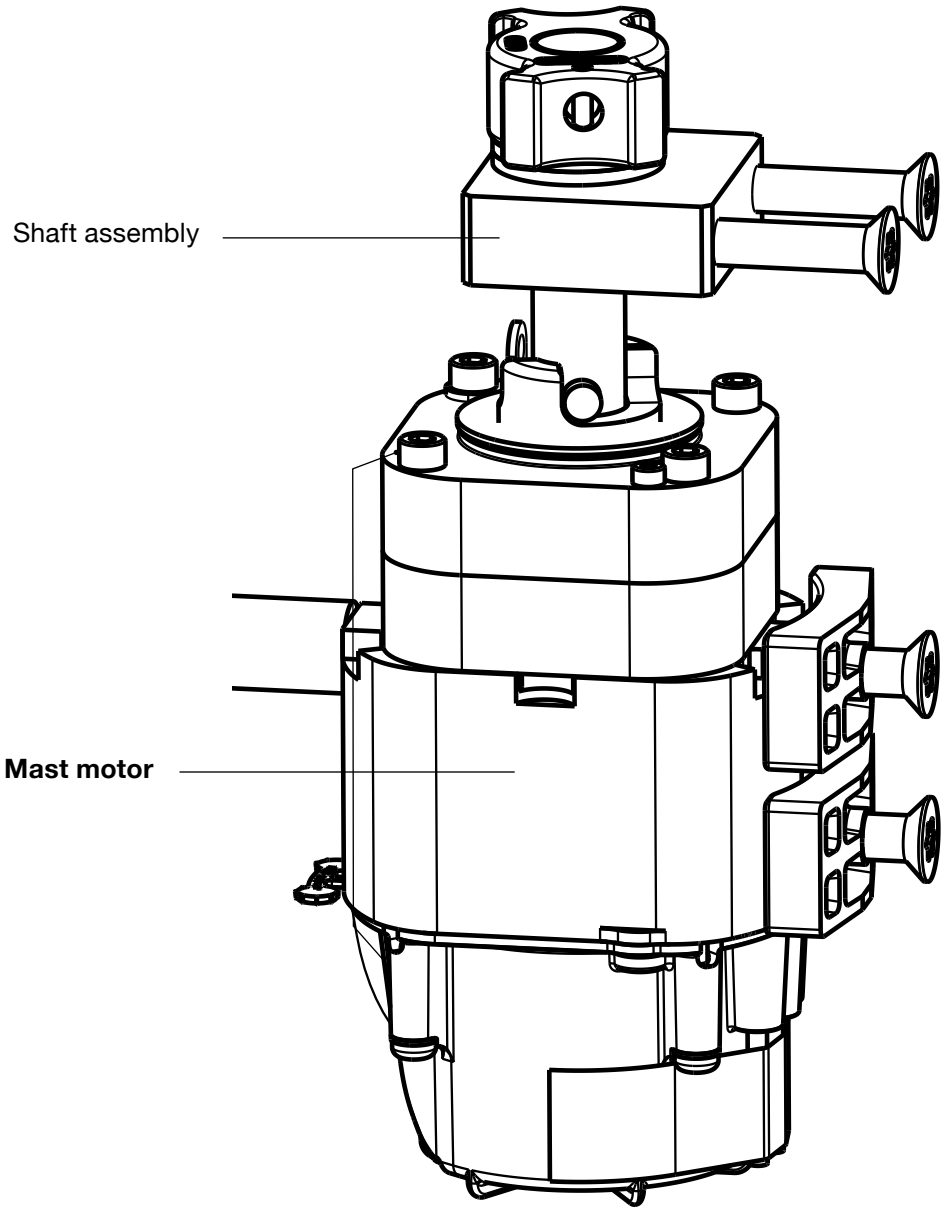
Always monitor the entire furling process! Stop immediately in case of malfunction.

Keep body parts away from the sail groove, winches and any other moving parts during operation.

2 Synchronized Main Furling

2.1 SMF Retrofit kit – mast motor and clutch

The SMF retrofit kit contains the electric mast motor and shaft assembly required to upgrade your existing electric drive unit. The mast motor is installed inside the existing cover and controlled by connection cables linked to the Seldén Power Supply and SEL-Bus system.



2.2 Power supply and SEL-Bus system

SMF retrofit is used together with a Seldén Power supply and SEL-Bus system, and a Seldén electric winch for synchronized outhaul.

The mast motor is connected to motor control unit (MCU) for furling mast. Via the SEL-Bus network, the furling mast MCU can communicate with winch MCU and OUT/IN control buttons. Seldén electric winch and all power supply and SEL-Bus system parts are sold separately. Parts and packages are described in Seldén Power Supply and SEL-Bus system: Order guide 597-283-E.

System illustration

The illustration shows an example of a Synchronized Main Furling network installation. The complete Power Supply and SEL-Bus system of each customer will vary and can include additional units and functions.

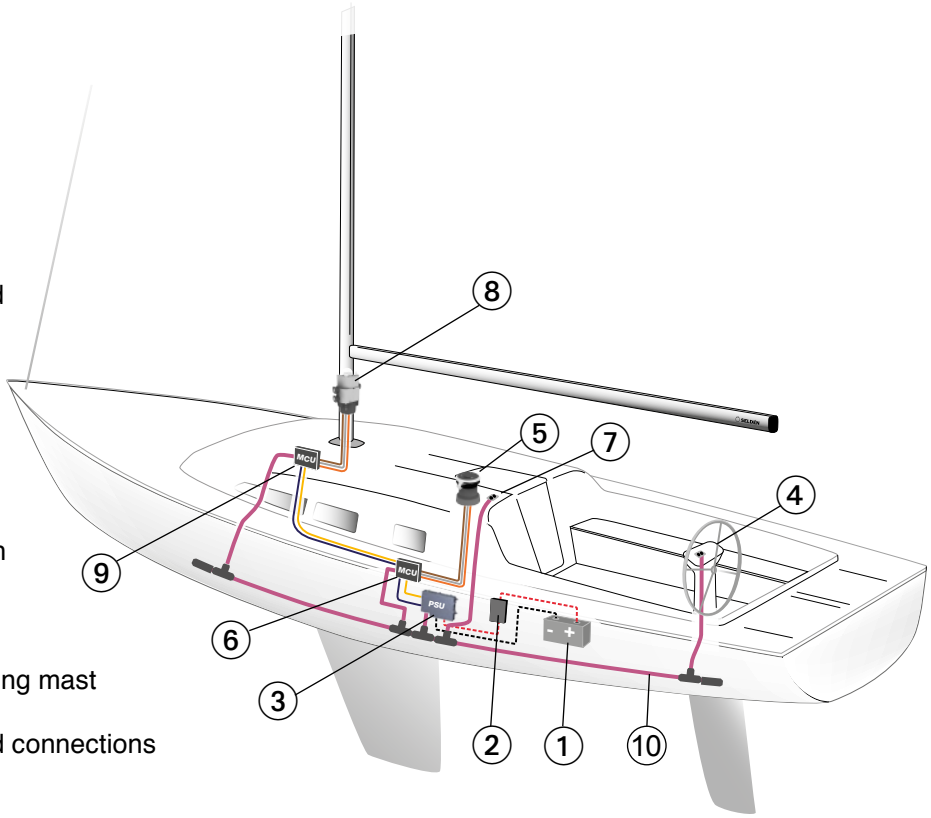
1. Battery (not included)
2. Main switch/fuse
3. Power supply unit (PSU)
   Converts 12/24V to 42V
4. Push buttons for Synchronized Main Furling
5. Electric winch
6. Motor Control Unit (MCU), Electric winch

7 Push buttons for Electric winch

8 Mast motor

9 Motor Control Unit (MCU) Furling mast

10. SEL-Bus backbone cables and connections



2.3 Technical specification

Furlin system	**RB**		**RC**	
Mast motor direction	OUT	IN	OUT	IN
Total Gear Ratio	81:1	81:1	81:1	81:1
Peak Torque	8Nm	89Nm	16Nm	170Nm
Low speed (max)	49 RPM	37 RPM	37RPM	37RPM
High speed (max)	74 RPM	74 RPM	74RPM	74RPM
Max power (full torque)	144W	600W	175W	740W
Full load current* 12V	-	50A	-	60A
Full load current* 24V	-	23A	-	29A
Nominal current* 12V	12A	16A	15A	20A
Nominal current* 24V	5,5A	7,5A	7,5A	10A

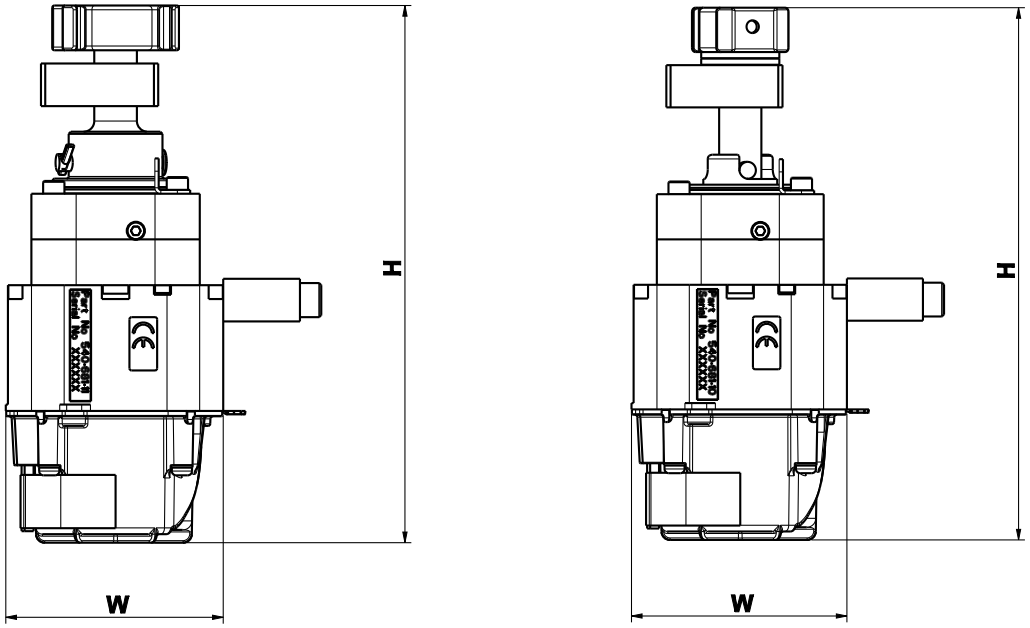
*Consumption incl. MCU and PSU.

Synchronized winch	**OUT**		OUT	
Limited outhaul force**	1800N		2200N	

**When used as an outhaul winch (using the MAIN control button “OUT”), the force is limited.
When run as a standard winch (using the winch buttons ”1” and ”2”), the winch will not be limited or synchronized with the furling mast motor. For technical data of the winch, see separate winch manual.

Mast motor and clutch assembly	
Height, H [mm]	252
Width, W [mm]	102
Weight [kg]	4,2

Mast motor and clutch fits inside the mast section.

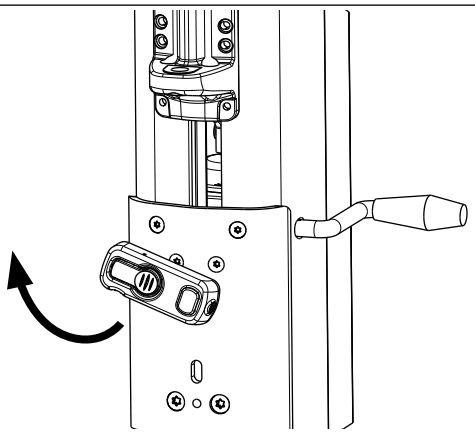
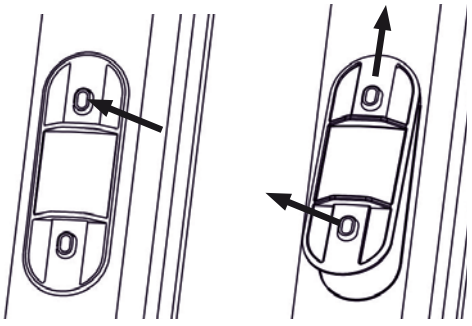
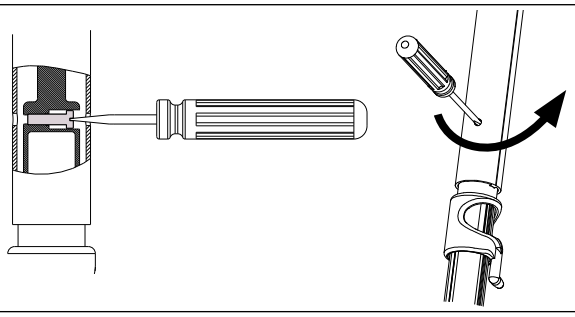


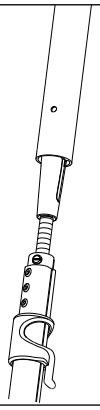
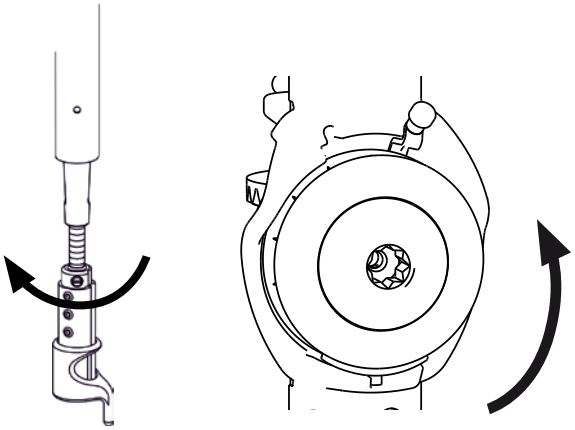
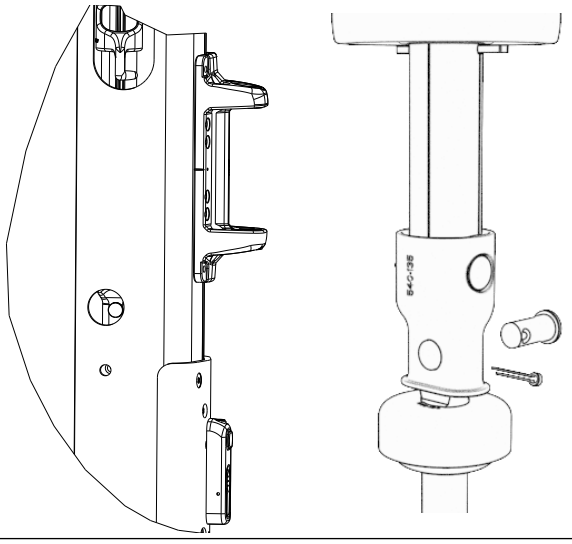
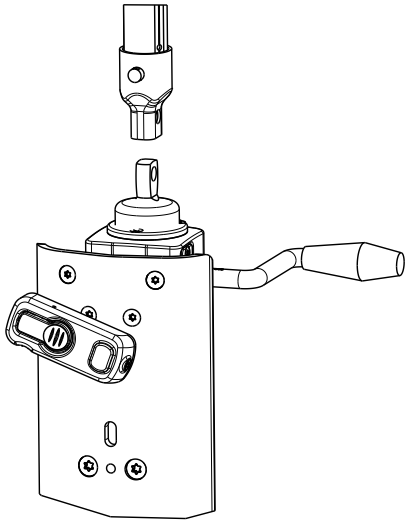
3 Retrofit installation

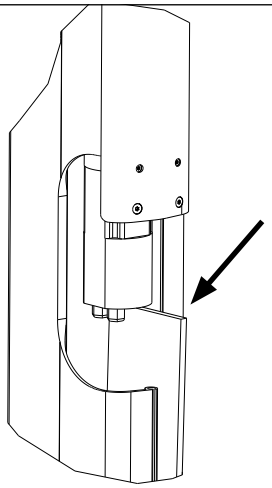
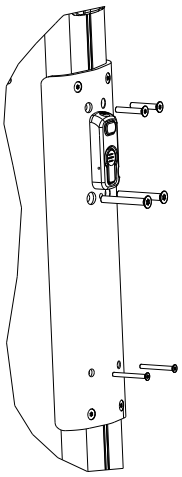
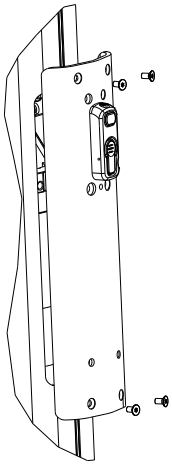
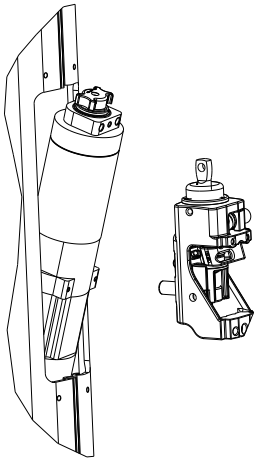
3.1 Retrofit preparations

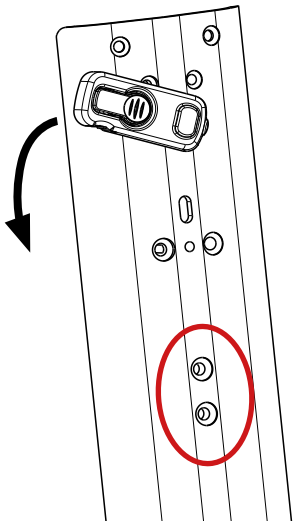
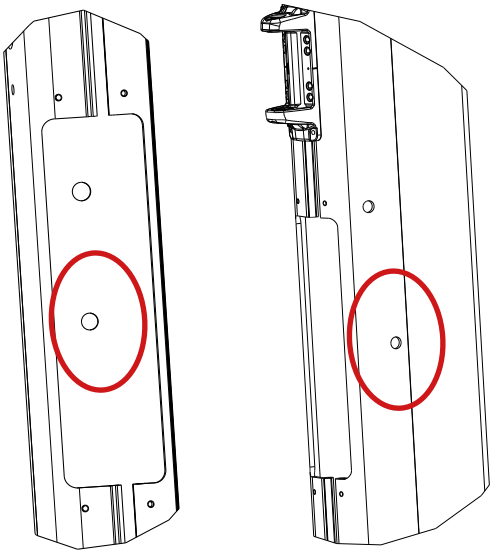
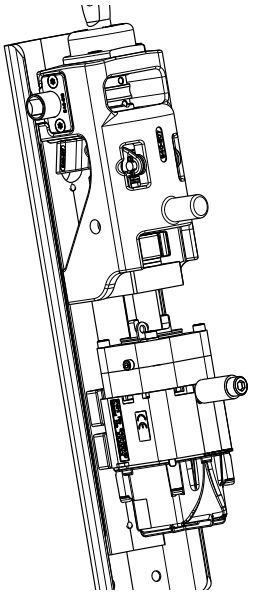
Tools needed:

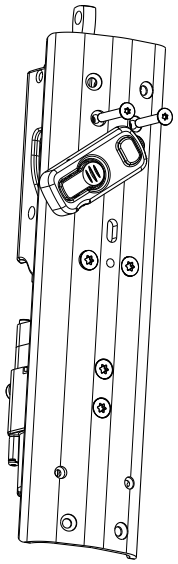
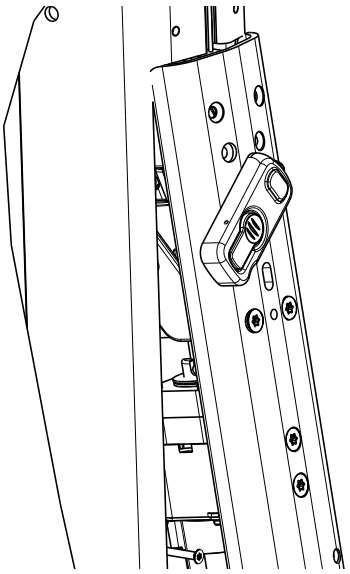
Screwdriver - Flat
Torx key set
Hex key set
Pliers (e.g. jaw pliers/adjustable spanner and long nose pliers)
Power drill
Drill bit Ø10.2 mm, Countersink drillbit Ø19 mm
Hole saw (20 mm)
Pencil
Measuring tape
Heat gun and shrink tube (to protect cables)
Cleaning spirit, cleaning cloth
Locking adhesive, medium strong
Adhesive tape 150x1000mm, 10-15mm thick board to support motor during disassembly.
Marine Adhesive sealant

Release backstay tension	
1. Insert emergency handle and turn clockwise as you push inwards to engage worm gear. Turn until handle is fully engaged. Turn clutch handle to position shown in picture to disengage luff profile from motor.	
2. Remove the access cover and grease plug on the port side.	
3. Through the lower access hole, unscrew the retainer screw and push the locking tube upwards above the sail feeder.	

4. Lock the tube in the upper position with a piece of tape.	
5. Grip luff profile through upper access hole to prevent it from rotating. Push emergency handle inwards and turn it anticlockwise to rotate tack assembly and release luff profile tension.	
6. Through the lower greasing hole on port side, remove split pin and clevis pin from gear shaft adapter. Save the split pin and clevis pin.	
7. Again, push emergency handle inwards and turn it anticlockwise to separate tack assembly from clutch. Remove handle.	

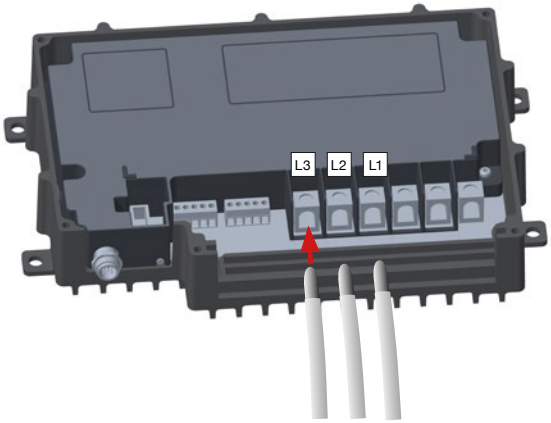
8. Insert a support underneath the motor to keep it from falling down when removing the screws.	
9. Remove screws holding clutch and motor. The motor and the clutch mechanism are now loose.	
10. Remove screws holding the cover and carefully remove the cover while supporting clutch and motor preventing these from accidentally falling out.	
11. Lift out Clutch and motor.	

11. Prepare cover with 2x new holes for fitting new motor unit, see instruction 597-846	
12. Drill ø20mm holes in mast wall for motor support and hole for lubrication access, see instruction 597-846. Grind edges.	
13. Fit clutch and new motor unit on cover, see instruction 597-846. Don't forget to apply marine adhesive sealant or anti corrosion jointing compound to the new holes in cover to prevent corrosion under screw heads. Clutch is only fitted temporarily. Check clutch function.	
14. Replace old electric cables with new.	

15. Remove upper screws for clutch, A, and loosen the lower screws, B, 3-4 turns. This is done to facilitate mounting of cover onto mast with motor and clutch fitted.	
16. Fit cover with motor and clutch. Avoid damaging the cables.	
17. Fit all screws with loctite.	
18. Reconnect luff extrusion and tension luff profile.	

3.2 Connection to Seldén Power Supply and SEL-Bus system

Install the three control cables from the mast motor to the motor control unit (MCU) “Furling mast”. Carefully note the position of cable colour and connector:

L3= Grey L2= Orange L1= Brown	

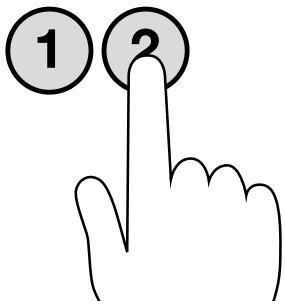
The cables need to be connected to the MCU in the correct position/sequence. Incorrect positioning of the cables can damage the mast motor and break mechanism.

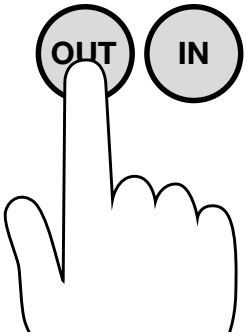
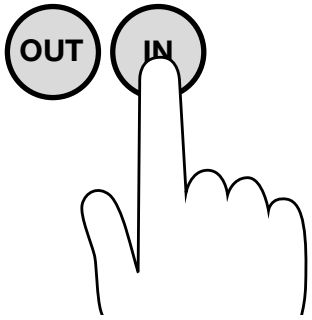
For correct positioning of the Motor Control Unit, installation of the complete Power supply and SEL-Bus system, see separate manual 597-275-E.

3.7 Configuration of control buttons for Synchronized Main Furling

For synchronized main furling, configuration of the control buttons for both the winch and furling mast must be done in the following order.

For complete information about how to configure Motor control unit, MCU, to the control buttons, read installation manual 597-275-E.

A. Configure winch MCU to winch buttons	Press the configuration button on **Winch MCU**. Push and hold winch button 1 or 2 until the winch generates the start-up signal.	

B. Configure winch MCU to the MAIN OUT button (for synchronized outhaul)	Press the configuration button on **Winch MCU**. Push and hold MAIN OUT until the winch generates the start-up signal. 
C. Configure furling mast MCU to the MAIN OUT/IN buttons	Press the configuration button on **Furling mast MCU**. Push and hold IN until the mast motor generates the start-up signal. 

If the signal tone is generated when the Power supply and SEL-Bus system is turned on (without any button being pressed) turn the power off immediately. Inspect the push button connections; cables from SEL-Bus converter to push button must be installed as “normally open” not “normally closed”.

4 Preparations before sailing

4.1 Tensioning the luff extrusion

It is important that the luff extrusion inside the mast is correctly tensioned. An untensioned or over-tensioned luff extrusion can lead to increased furling load or unnecessary wear of the system. Control and adjustment of luff tension can be made on both a stepped and unstepped mast.

The luff extrusion should be prevented from rotating. Use a torque wrench in the furling gear winch handle socket to measure the tensioning torque. Alternatively, measure the torque with a spring balance or similar combined with an ordinary winch handle. Tension to the correct value as required. It is important that the mast is straight while tensioning.

Always release backstay tension before adjusting luff extrusion. Tensioning the luff extrusion with the backstay tensioned can damage the luff extrusion joints when the backstay tension is released.

4.2 Rig tuning

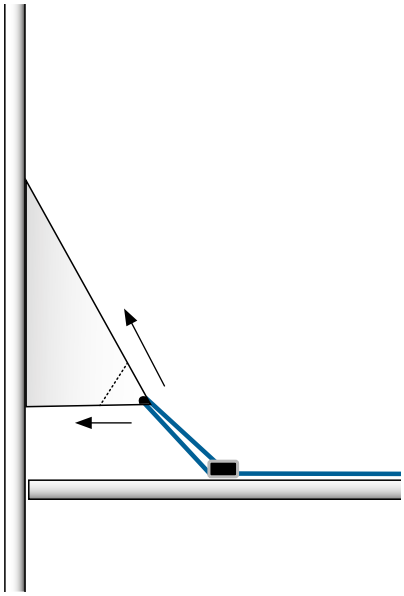
Furling in and out will work best on a mast tuned with limited pre bend.

Read 595-540-E Hints and Advise for tuning instructions.

4.3 Outhaul car stop

The position of the outhaul car stop on the boom will affect tension in the sail foot and leech. E.g. if the outhaul is positioned too far aft, the force from the outhaul clew will keep the foot tighter than the leech which can cause the sail to jam in the top of the mast.

The ideal position can vary between boats due to rig, sail and batten designs. It is recommended to place the outhaul stop 500 mm from the aft mast wall as default, and then adjust it forward or aft if necessary.



4.4 Outhaul routing

Examine outhaul car and outhaul turning points for excessive friction. Replace old and worn blocks if needed. Outhaul routing with as low friction as possible will improve the unfurling process.

Synchronized outhaul winch

The force limit in the synchronized outhaul winch is based on the line force at winch entry. High friction in the outhaul routing will result in the actual force in the outhaul clew being significantly lower than at the winch, which can negatively affect the synchronization.

5 Sailing with Synchronized Main Furling

5.1 Preparations for furling and unfurling

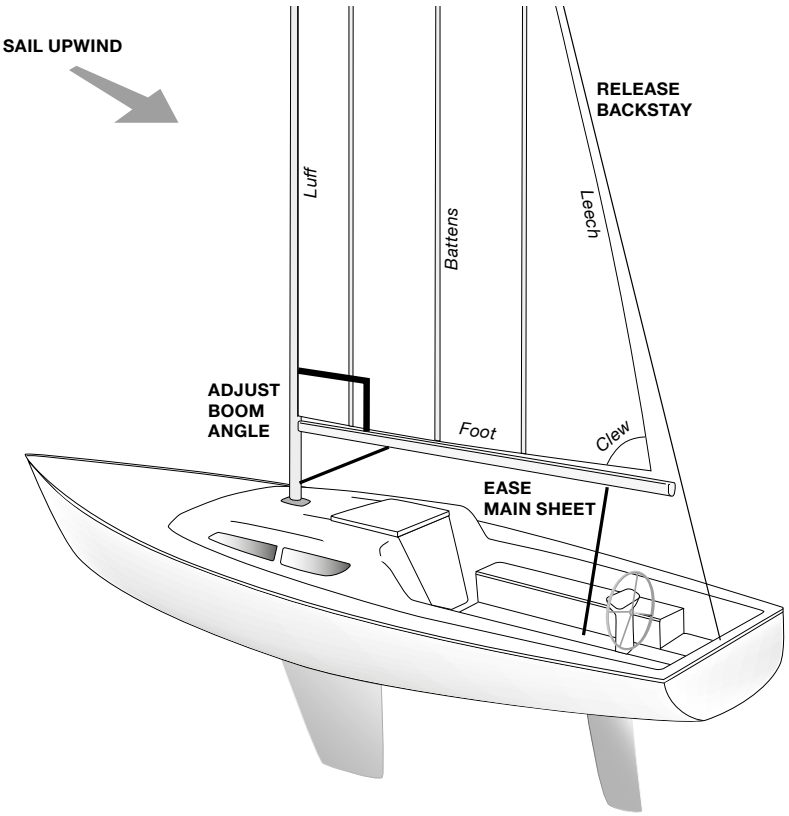
There are many factors to consider for a successful furling operation. Get familiar with the furling system in light conditions and pay attention to the following details before furling out and in. How important these adjustments are for the furling result can vary between boats, sail designs and other factors.

1.
Sail upwind.

2.
Release backstay tension (if very tight) to straighten the mast.

3.
Adjust the boom angle to keep the leech tight and battens parallel to mast. Use kicker/topping lift.

4.
Ease the main sheet.



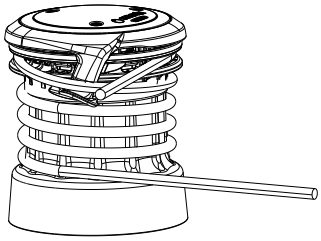
Always observe the entire furling process! Stop immediately in case of any issues.

Keep away from the sail groove, winches and any other moving parts during furling.

Avoid reefing to a position where the battens are riding on the sail slot.

5.2 Unfurling

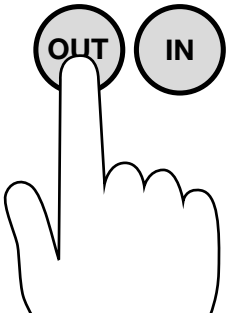
1.
Apply and secure the outhaul to the synchronized electric winch.



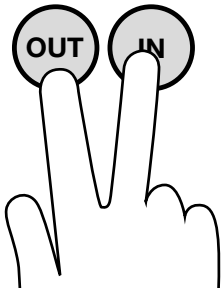
2.
Press “Furl Out”.

The outhaul winch will make a short warning signal before starting to run.

Remote control of a sailing winch is hazardous. Always observe the unfurling process and ensure nothing can interfere with the winch, outhaul line or sail groove in the mast.



3.
Whilst holding down “OUT”, press the second button to increase the speed, if wanted.



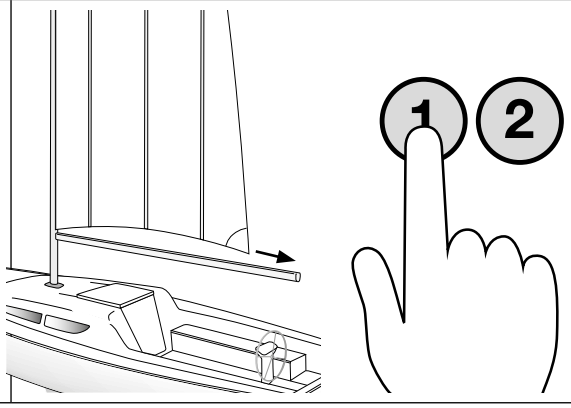
4.
Full sail
Hold button(s) pressed. The synchronized system will recognize a fully unfurled sail and stop automatically.

Reduced sail area
Release button(s) when sail is in desired position.

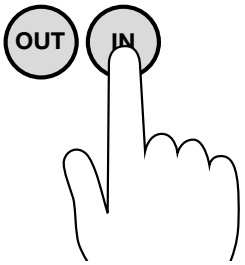
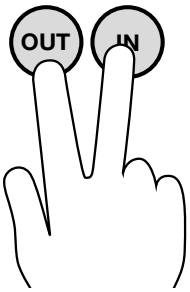
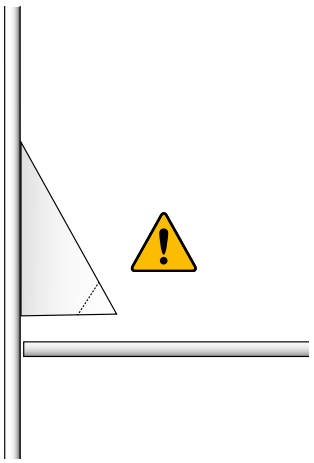
The motor will make a short rotation when unfurling is finished, to activate the break mechanism.

(5)
If needed, the outhaul can be trimmed using the winch buttons.

Be careful when using the winch buttons, as this activates the full power of the winch.



5.3 Furling

1. Free the outhaul and keep it tensioned (about one turn on the winch). Press “IN” and simultaneously slacken the outhaul line while the sail is reefed.	
2. Whilst holding down “IN”, press the second button to increase the speed.	
3. Release the button(s) and stop reefing at desired sail area or when sail is fully furled in. The motor will **NOT** automatically stop during furl in. Run the last turns with low speed and keep attention to the position of the outhaul block to prevent it from being pushed into the sail groove and damage the mast.	

5.4 Furling without synchronized winch

If the synchronized winch is not to be used, the outhaul can be pulled manually without disconnecting the furling mast motor.

1. Press and hold “MAIN OUT”. The mast motor will start to rotate but pauses automatically if the outhaul is not pulled, to avoid the sail being unfurled inside the mast.

2. Keep “MAIN OUT” button pressed. Pull the outhaul manually. The furling motor will start to rotate when it detects that the outhaul is being pulled. Proceed until desired sail area is reached. When OUT button is released, the mast motor will activate the rotation break.

6 Trouble shooting

Problem	Problem cause	Action
Mast motor makes a stuttering sound and unfurling does not work	Incorrectly installed connection cables to MCU.	Change position of connection cables in MCU according to section 3.6
Mast motor makes a constant signal tone when Power Supply and SEL-Bus system is turned on. Mast motor starts to run when Power Supply and SEL-Bus system is turned on, and stops when Furling MAIN OUT/IN button is pressed.	Cables from SEL-Bus converter to push button is installed as “Normally closed” instead of “Normally open”.	Change position of push button cables to “Normally open”, see separate instruction sheet for push button.
Synchronized unfurling is not smooth.	Incorrect tension in luff profile, rig tuning, outhaul car position, outhaul routing.	See chapter 4.
Top of sail is jamming	Incorrect tension in luff profile, rig tuning, outhaul car position, outhaul routing.	See chapter 4.
Unfurling is unusually slow (in cold conditions).	Cold motors.	Disconnect mast motor from manual gear (see section 5.4). Remove outhaul line from winch. Idle run mast motor “IN”, minimum 30 sec. Idle run winch on high speed, minimum 30 sec.

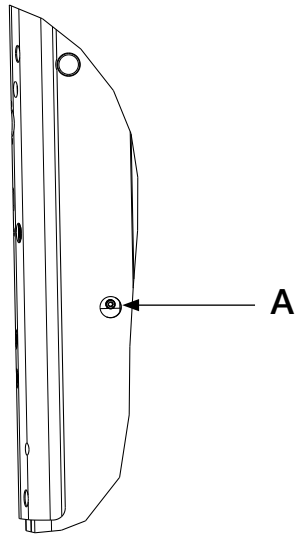
For trouble shooting of Seldén Power supply and SEL-Bus system, see installation and trouble shooting guide 597-275-E.

7 Service and maintenance

Always keep the manual furling system in good condition, following the service and maintenance procedures described in each respective manual furling mast instruction.

7.1 Annual maintenance

Lubricate motor break

1. Through the starboard side hole, remove the screw to the lubrication hole (A). Use some guiding device to prevent the screw from falling in between mast wall and motor unit.	
2. Apply WD-40 in the hole and simultaneously rotate the mast motor minimum one turn. Remount screw.	

7.2 Extended maintenance

Professional service should be made on the mast motor every 5th year. Contact an authorized Seldén dealer for service management.

8 Disposal

The crossed out wheelie bin symbol on the product or product package means that used electrical and electronic equipment (WEEE) should not be mixed with general household waste. For proper treatment, recovery and recycling, please take this product(s) to designated collection points where it will be accepted free of charge. Alternatively, in some countries, you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point.

9 Warranty

Seldén Mast AB guarantees SMF retrofit kit for 2 years. The guarantee covers faults arising from defective design, materials or workmanship.

The guarantee is only valid if the SMF retrofit kit is assembled, operated and maintained in accordance with this manual and is not subjected to loads in excess of those indicated in the brochure and instructions.

Complete shipment and warranty conditions are to be found on Seldén's website www.seldenmast.com.
See Resources/Partners information/General information/General conditions of sale (595-546-E).
If the system is repaired or modified by anyone other than Seldén Mast AB or one of our authorized dealers, the guarantee ceases to be valid.

Seldén Mast AB reserves the right to alter the content and design without prior warning.

SELDÉN

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