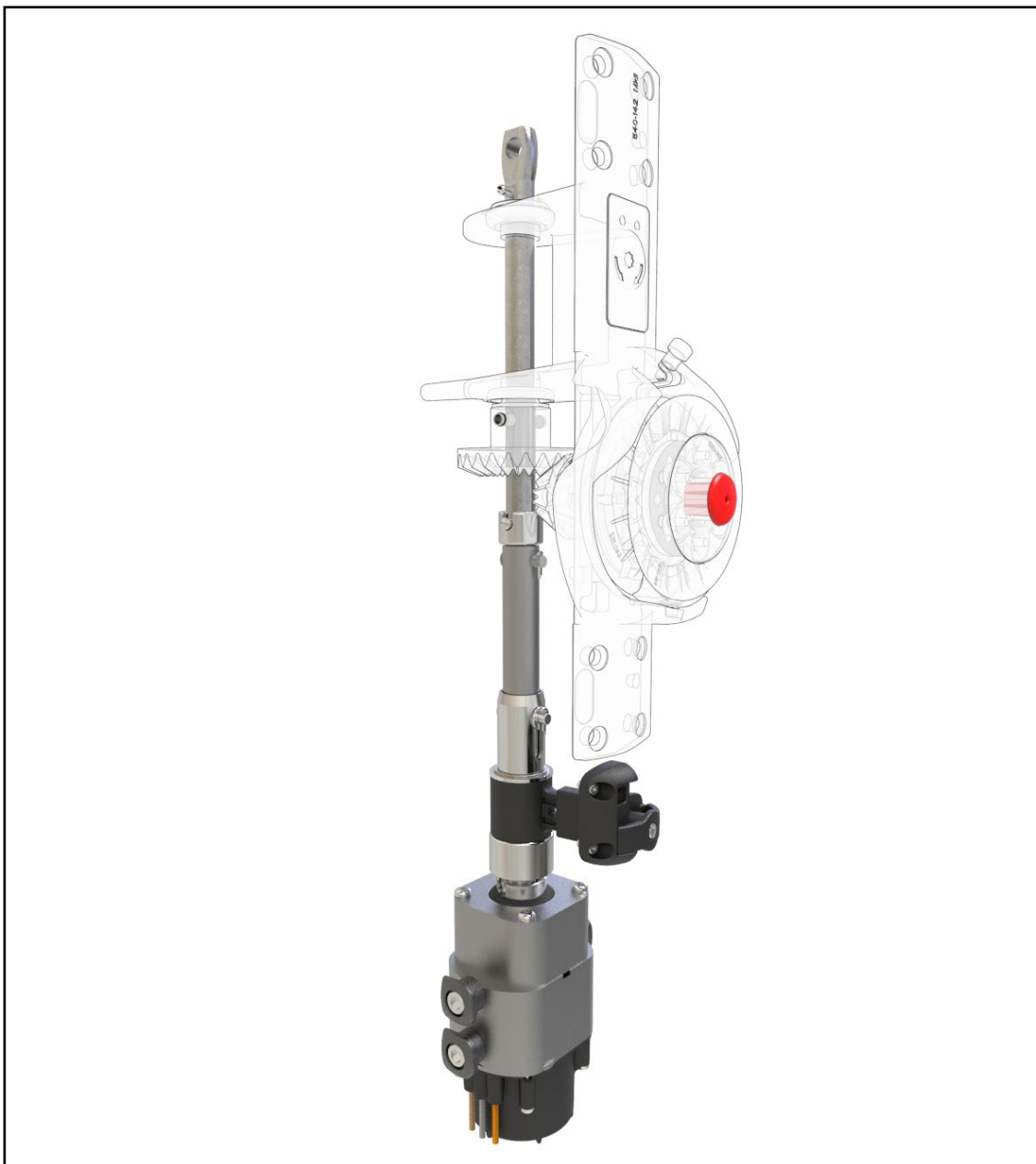


SMF

SYNCHRONIZED MAIN FURLING

User guide and installation manual for SMF retrofit kit Type RB



Contents

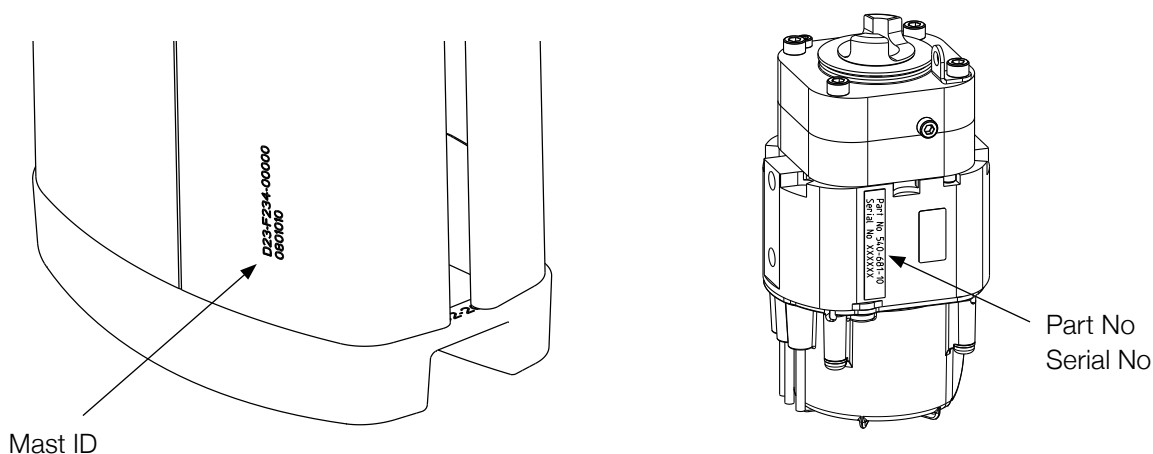
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1. Introduction

Congratulations on the purchase of your new SMF retrofit kit, type RB.

This manual covers operating guidelines for the system and installation instructions for the electric retrofit kit on mast sections R232, R260, F228, F246, F265, F286, F305, F217, F234, F252. 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.



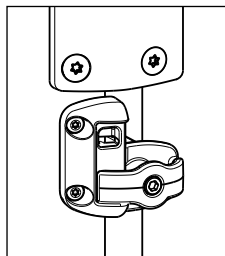
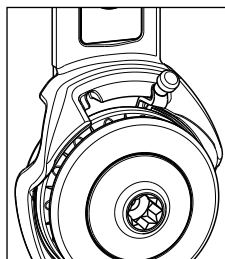
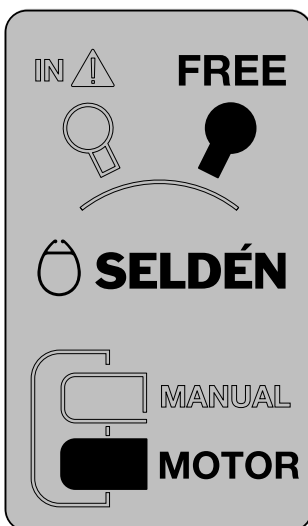
Turn off the electric power when the system is not in use to prevent unintentional activation.



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.



The electric motor can be disengaged and engaged by shifting the clutch plunger position between MOTOR and MANUAL. When set to MANUAL, use a winch handle in the winch handle socket to manually operate the furling gear.

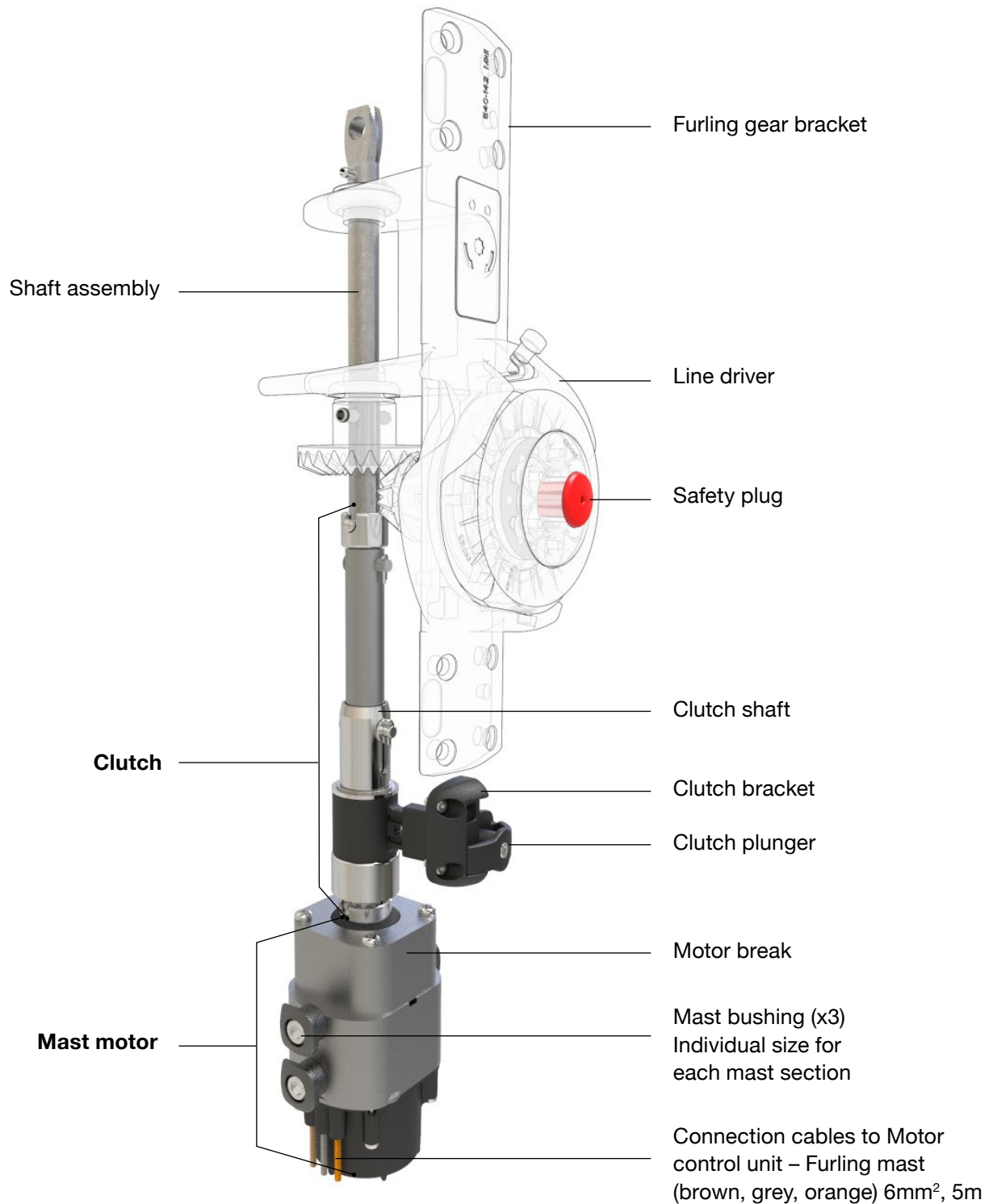


The manual gear should be set to “FREE” when connected to the electric motor.

2 Synchronized Main Furling

2.1 SMF Retrofit kit – mast motor and clutch

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



2.2 Power supply and SEL-Bus system

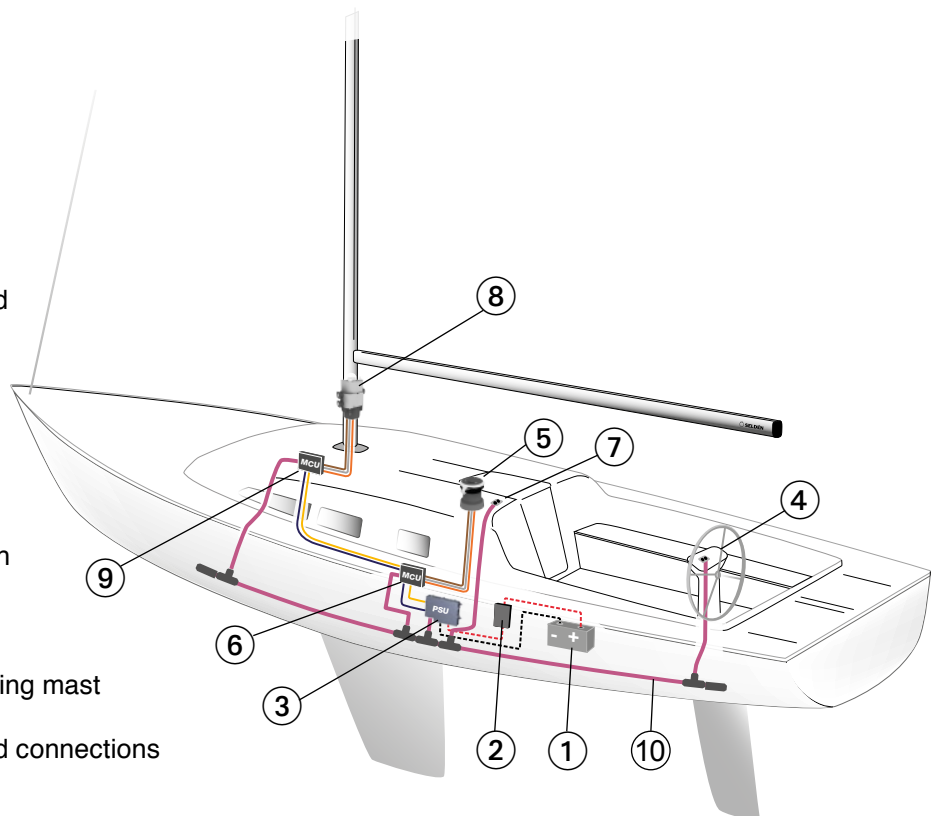
SMF retrofit is used together with a Seldén Power supply and SEL-Bus system, and a Seldén electric winch for synchronized outhaul.

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

Mast motor	OUT	IN
Total Gear Ratio	81:1	
Peak Torque	8Nm	89Nm
Low speed (max)	49 RPM	37 RPM
High speed (max)	74 RPM	74 RPM
Max power (full torque)	144W	600W
Full load current* 12V 24V	12A 5,5A	50A 23A
Nominal current* 12V 24V	12A 5,5A	16A 7,5A

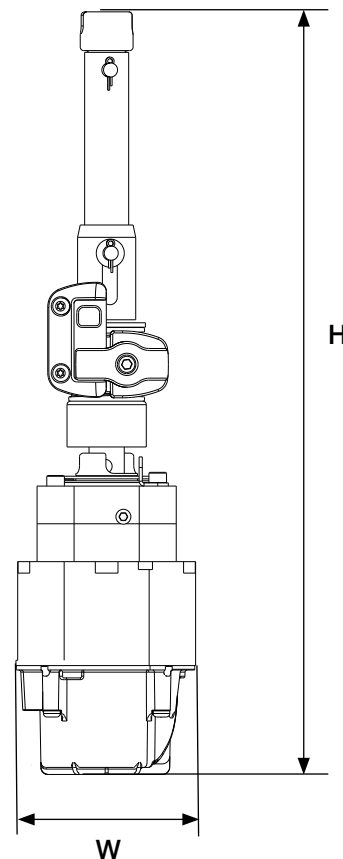
*Consumption incl. MCU and PSU.

Synchronized winch	OUT
Limited outhaul force**	1800N

**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]	433
Width, W [mm]	102
Weight [kg]	5

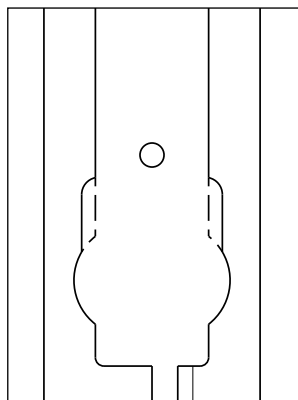
Mast motor and clutch fit inside the mast section.



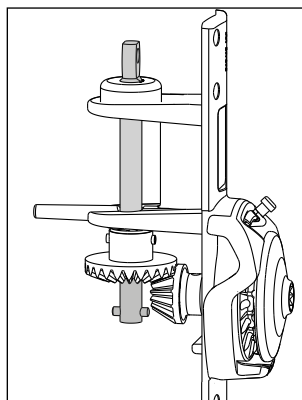
3 Retrofit installation

3.1 Installation preparations

It is recommended to perform the motor unit installation on an unstepped mast, as this allows access through the lower end of the mast section (chapter 3.3 section A). For stepped masts or masts that do not have free access to the furling gear (e.g. keel stepped mast), the motor unit can be installed via modification of the existing furling gear cut out (chapter 3.3 option B).



Extended gear cut out



Extended furling gear shaft



Some furling masts are already prepared for electric motor installation.

Note: If your mast already has the **extended gear bracket cut out** ignore section 3.3 option B step 1 and/or the **extended furling gear shaft** ignore section 3.2 step 7-10.



Carefully review the cut out drawing before starting installation. Remove any fittings that will interfere with the fixing holes on starboard and port sides (e.g. winch handle pocket, cleats).



This instruction does not cover how to route the motor connection cables out of the mast as this may be unique to each installation e.g. mast type, mast heel/base configuration and individual preferences.

Installation Cut out drawing per Mast section

R232	597-831	<i>The mast section is identified by the mast ID, engraved on port side at the bottom of the mast extrusion (see page 3).</i>
R260	597-832	
F228	597-833	<i>The cut out extension is only needed if the motor assembly is installed via the gear cut out (option B).</i>
F246	597-834	
F265	597-835	
F286	597-836	
F305	597-837	
F217	597-838	
F234	597-839	
F252	597-840	

Tools needed:

Screwdriver - Flat
Torx key set
Hex key set
File (half round, medium/coarse)
Hammer
Punch
Pliers (e.g. jaw pliers/adjustable spanner and long nose pliers)
Power drill
Drill bit Ø4.2, Ø6.4
Hole saw (24mm)
Tap M5
Wedges (included in package)
Pencil
Measuring tape
Line for lifting the mast motor during assembly (option B)

Pop rivet gun.
-to replace mast heel, option "A".
-to replace any removed fittings if needed.

Drill bit for pop rivets.
-To remove mast heel, option "A".
-To remove interfering fittings if needed.

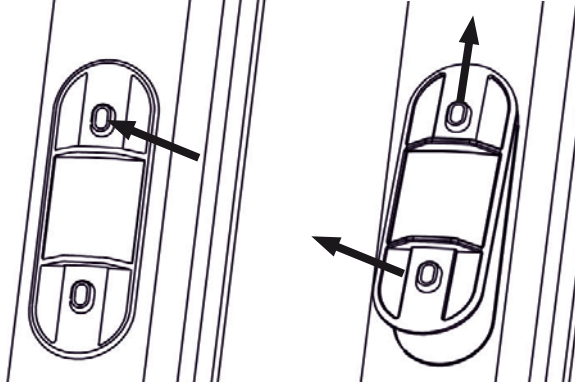
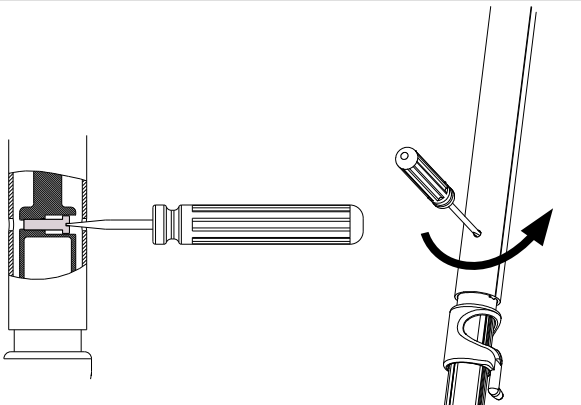
Jigsaw
-to extend gear bracket cut out (option "B")

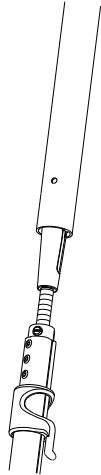
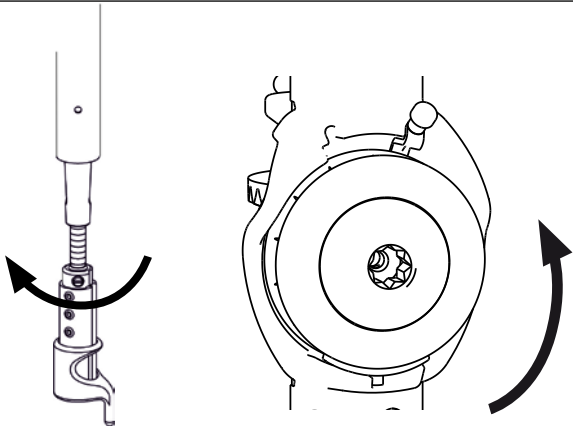
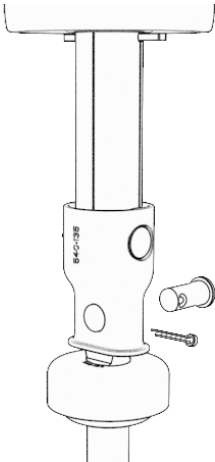

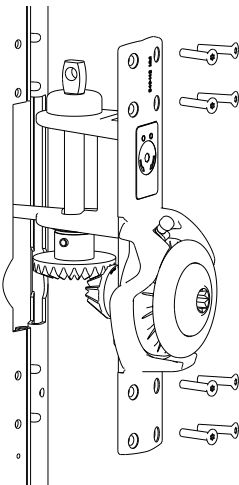
Ethanol
Heat gun and shrink tube (to protect cables)
Cleaning spirit, cleaning cloth
Seldén grease 312-501 (included)
Locking adhesive, 312-305 (included)
Locking adhesive, medium strong
Lubricant (WD-40 or similar)

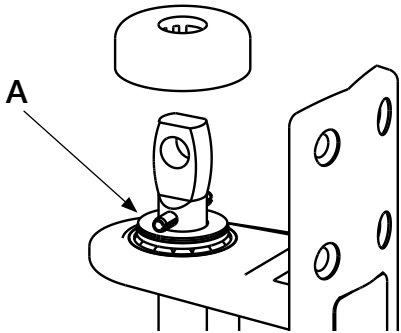

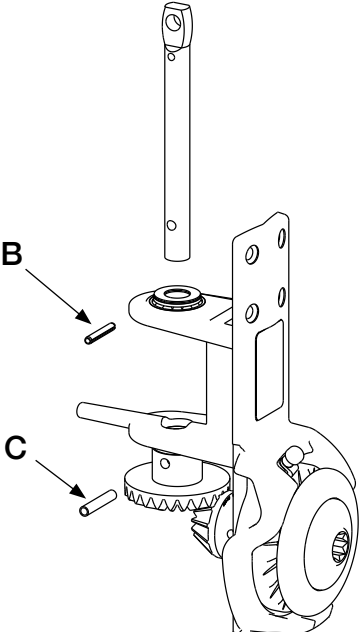
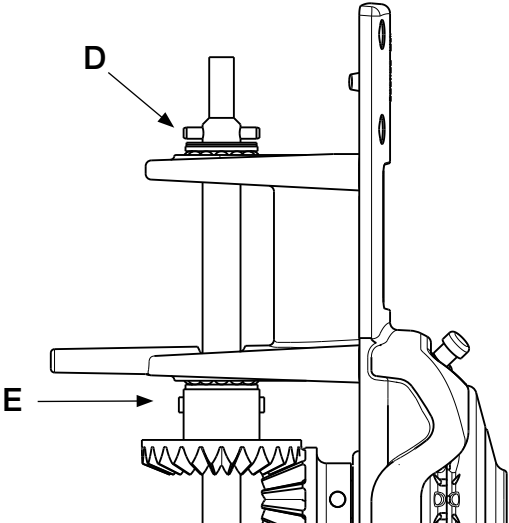
3.2 Dismantle manual gear

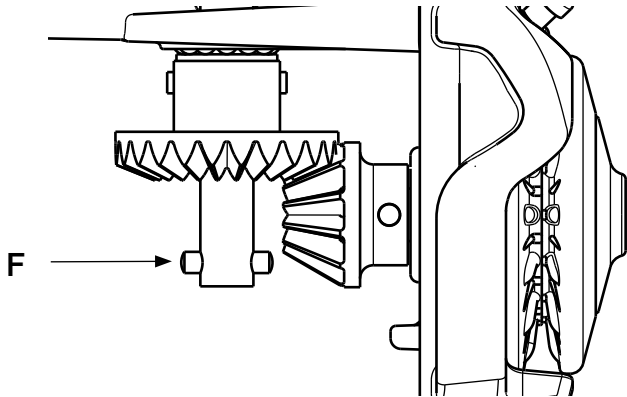
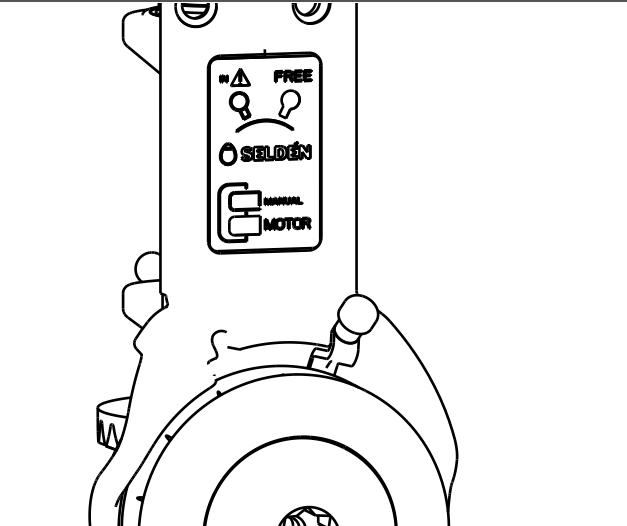
Free gear shaft from luff extrusion

! Release backstay tension if working on a stepped mast.

<p>1. Remove the access cover and grease plug on the port side.</p>	
<p>2. Unscrew the retainer screw and push the locking tube upwards above the sail feeder.</p> <p>! Spray a small amount of lubricant at the top of the locking tube to facilitate sliding.</p>	

<p>3. Lock the tube in the upper position and prevent the luff extrusion from turning.</p>	
<p>4. Insert a winch handle in the linedriver and turn it anti clockwise until the luff extrusion is slack.</p>	
<p>5. Through the lower greasing hole on the port side, remove the split pin and clevis pin from the gear shaft adapter.</p> <p>Save the split pin and clevis pin.</p>	
<p>6. Remove screws and demount the furling gear bracket from the mast.</p> <p> Releasing the rig tension can facilitate dismounting of the furling gear bracket, if needed.</p>	

<p>7.</p> <p>Remove the rubber cover.</p> <p>Note quantity and position of any washers and shims (A).</p>	 <p>A technical line drawing showing a shaft assembly. A rubber cover, labeled 'A', is being removed from the top of the shaft. The shaft is supported by bearings and a housing. The cover is shown in two positions: one where it is being lifted off and another where it is fully removed, revealing the shaft and its components.</p>
<p>8.</p> <p>Remove the spring pins from the shaft top (B) and vertical gear (C) with a hammer and punch or equivalent.</p> <p>Carefully remove the shaft, saving the free bearing balls, races and washers.</p> <p>Spring pins will not be reused.</p> <p> Work on a surface where the loose bearing balls will not get lost. There should be 12 bearing balls in each ball race.</p>	 <p>A technical line drawing showing the removal of spring pins. Label 'B' points to a spring pin being removed from the top of the shaft. Label 'C' points to a spring pin being removed from the vertical gear. The drawing shows the internal components of the assembly, including the shaft, bearings, and gears.</p>
<p>9.</p> <p>Clean and apply grease on the ball bearings. The grease in the ball bearings will help keep the balls in position during reassembly.</p>	
<p>10.</p> <p>Fit new upper spring pin Ø6x40 on (D) the new shaft (166-480-01).</p> <p>Install the new shaft and remount ball bearings and washers.</p> <p>Remount the bevel gear. The hole in the bevel gear should be aligned with the hole in the shaft. Fit new spring pin: Ø8x45 (E).</p>	 <p>A technical line drawing showing the installation of new components. Label 'D' points to a new upper spring pin being installed on the shaft. Label 'E' points to a new spring pin being installed on the vertical gear. The drawing shows the shaft, bearings, and gears being reassembled.</p>


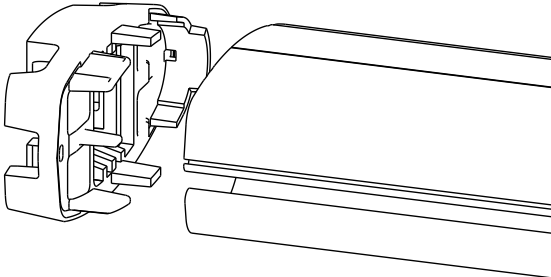

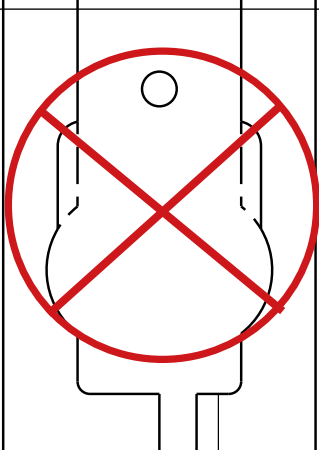

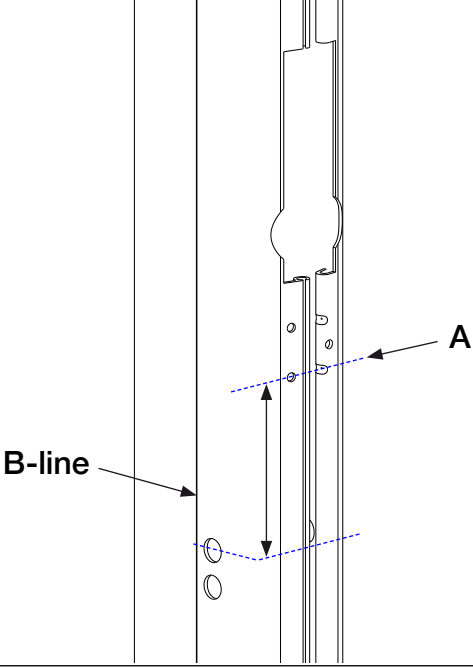
<p>11. Install new solid pin Ø8x29 (F) at the lower end of the shaft. Clean pin and apply included Locking Adhesive 312-305. The pin should be centered in the shaft.</p>	
<p>12. Remount the rubber cover.</p>	
<p>13. Replace the old label on gear bracket with the new included label for electric furling mast.</p>	
<p>14. Apply grease on the gears.</p>	

3.3 Installation of motor unit

To install mast motor and clutch assembly, follow one of the two following sections:

A: Installation through mast end.

B: Installation through gear cut out.

A. Installation through mast end	
<p>1.</p> <p>Remove the mast heel (if deck stepped) or mast head and luff extrusion (if keel stepped). Make sure there is free access from the mast end to the gear.</p> <p> If installing via mast top, be careful while dismantling mast head not to twist halyards etc.</p> <p>The order of the steps in this section is based on installation through the lower end (deck stepped).</p>	
<p> When installing through the mast end, gear cut out extension is not required but can be added to simplify serviceability.</p>	
<p>2.</p> <p>Drill locating holes for the drive unit to the dimensions found in the installation cut out drawing. Two holes on the port side, one hole on the starboard side.</p> <p>Use the center of the lower screw hole of the furling gear cut out (A) as the reference for the vertical dimension.</p> <p>Use the B-line (vertical recess at the mast widest point) as the reference for the horizontal dimension.</p> <p> Measure hole distances to the end of the extrusion on starboard and port sides to control horizontal alignment.</p> <p>Chamfer the holes carefully with a file.</p>	

Continue A. (Installation through mast end)

(3)

Prepare for cable routing if needed.

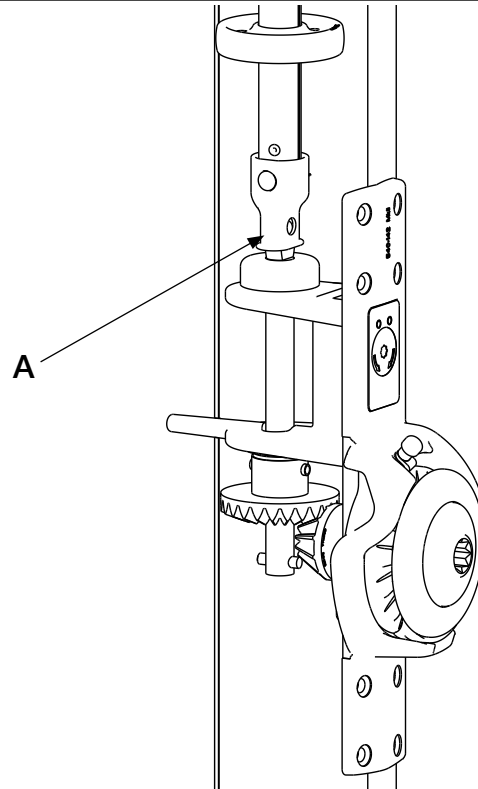
Note: On many mast versions an additional cut out is not required as the cables can be routed through the mast heel.

4.

Re-install furling gear bracket.

Make sure the shaft top engages the adapter (A).

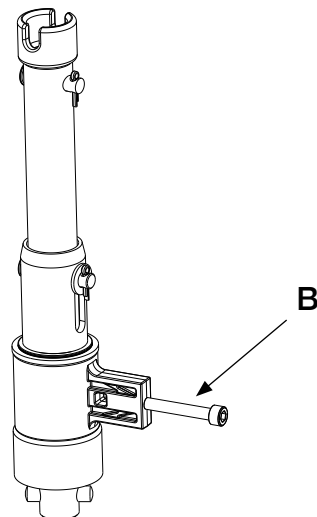
Apply grease on screws and fasten.



5.

Insert clutch assembly through the mast end with the clutch arm facing towards the sail groove.

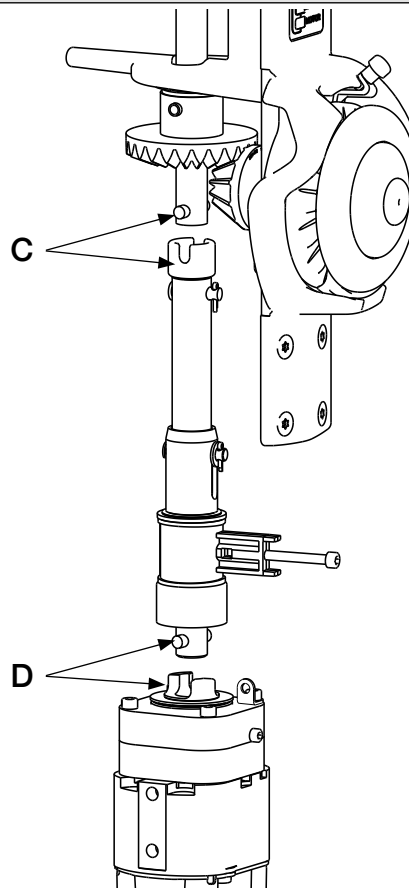
Temporarily attach the M6x60 screw (B) to the clutch arm to facilitate guiding of the assembly through the sail groove.



Continue A. (Installation through mast end)

6.
Insert mast motor through end of mast.

Simultaneously position the Clutch assembly and mast motor so that the clutch top engages the gear shaft pin (C) and the clutch bottom engages the top of mast motor (D).

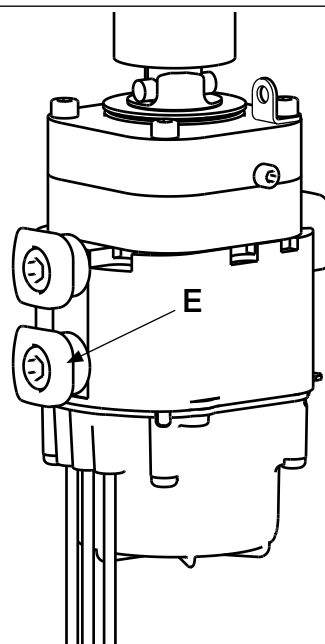


7.
Fix the motor unit in the mast wall with included bushings and M10 screws.

Use a jaw pliers/adjustable spanner to keep the bushings from rotating. The thicker flange edge (E) should be facing aft. (Tape pliers to prevent shafing the bushings.)




Check the clutch function as described in section 3.4 before applying medium strong locking adhesive to screws.

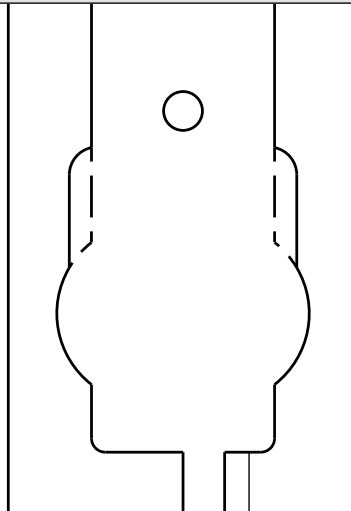


B. Installation through gear cut out

1.
Clean the cut out area.

Expand the gear cut out according to the provided installation cut out drawing. Grind edges carefully along the whole edge.


 Be careful to follow the drawing geometry. No sharp corners allowed as these can initiate fatigue cracks.



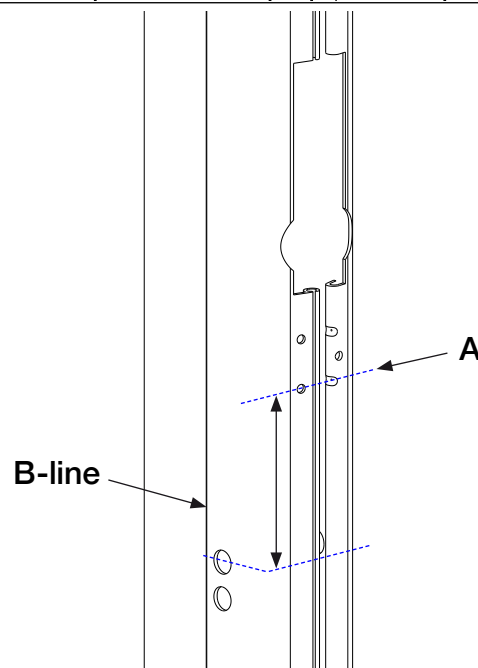
2.
Drill locating holes for the mast motor to the dimensions found in the installation cut out drawing. Two holes on the port side, one hole on the starboard side.

Use the center of the lower screw hole of the furling gear cut out (A) as the reference for the vertical dimension.

Use the B-line (vertical recess at the mast widest point) as the reference for the horizontal dimension.

 Measure hole distances to the end of the extrusion on starboard and port sides to control horizontal alignment.

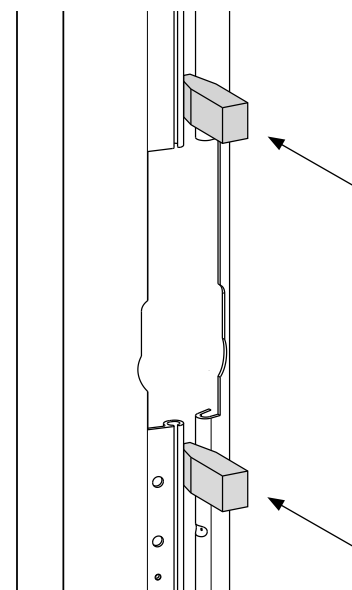
Chamfer the holes carefully with a file.



3.
Open the mast profile with wedges, one on each side of the gear cut out to further expand the mast cut out.

For mast section F228/F217:

Depending on the mast profile and rig design, the kicker bracket and/or boom bracket might need to be dismantled to increase the flexibility of the mast. Contact your authorized Seldén dealer for details.

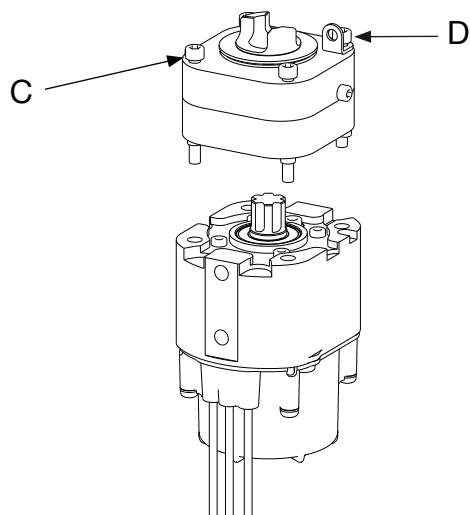


cont. B (Installation through gear cut out)

4.

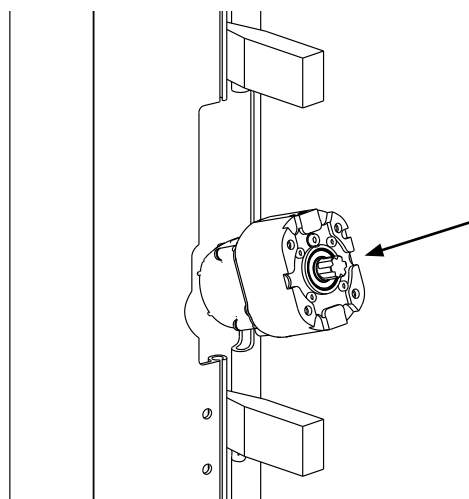
Undo the four top screws (C) of the mast motor and dismantle the motor break.

Prepare the motor break for later by attaching a line in the lifting eye (D).



5.

Insert the motor assembly through the expanded hole.

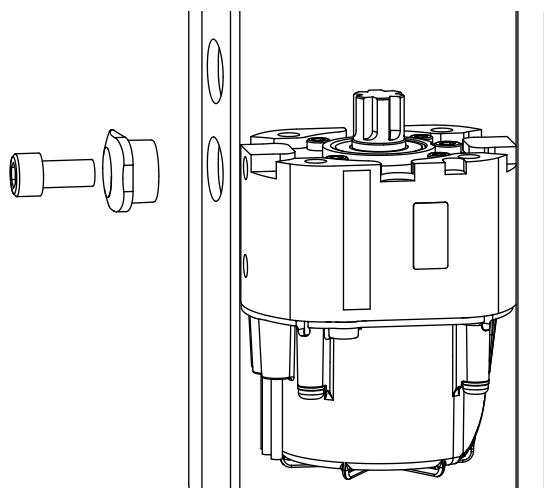


6.

Temporarily fasten the motor assembly using the bushing and screw in the lower hole on the port side of the mast and the upper port hole of the motor assembly i.e. the motor assembly is positioned 37mm lower than its final position.

(The lower position is needed to be able to fit the clutch after the motor break is installed).

Remove wedges.



7.

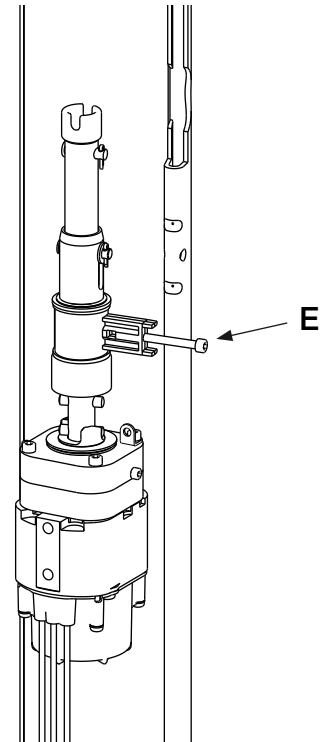
Reinstall the motor break through the gear cut out. Use grease on screws if needed. Tightening torque=7Nm.

cont. B (Installation through gear cut out)

8.

Insert clutch assembly through the cut out and position on top of the mast motor with the clutch arm facing towards the sail groove.

The M6x60 screw (E) can temporarily be attach to the clutch arm to facilitate guiding of the clutch through the sail groove.

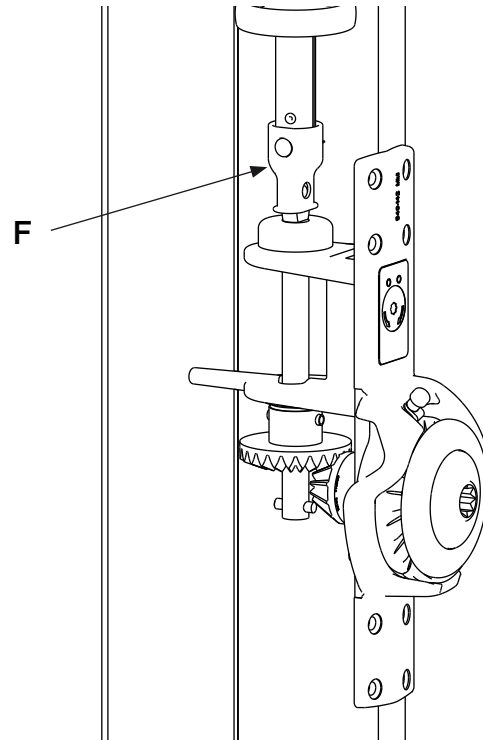


9.

Re-install the furling gear bracket through the cut out.

Make sure the shaft top engages the adapter (F).

Apply grease on screws and fasten.

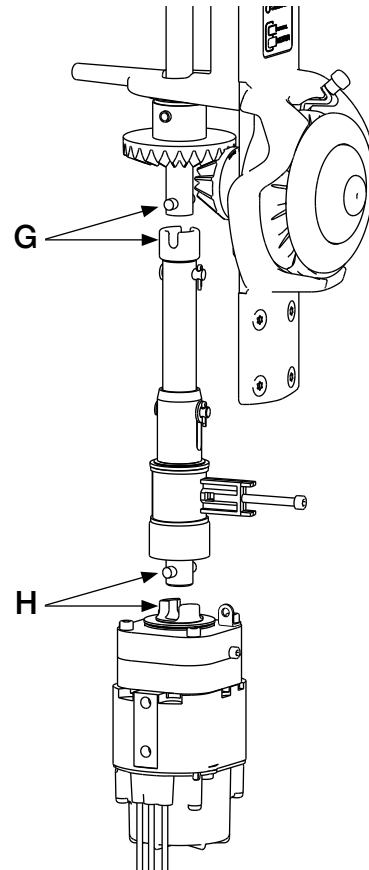


cont. B (Installation through gear cut out)

10.

Keep the mast motor in place using the line in the lifting eye and/or pliers through the sail groove. Release the temporary M10 screw and bushing.

Simultaneously move the Clutch assembly and mast motor up towards the gear so that the clutch top engages with the gear shaft pin (G) and the clutch bottom engages with the top of mast motor(H).



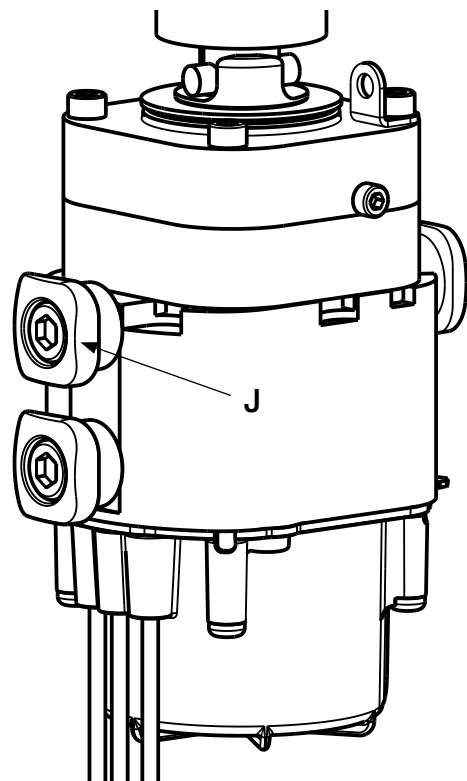
11.

Fix the mast motor in the mast wall with included bushings and M10 screws.

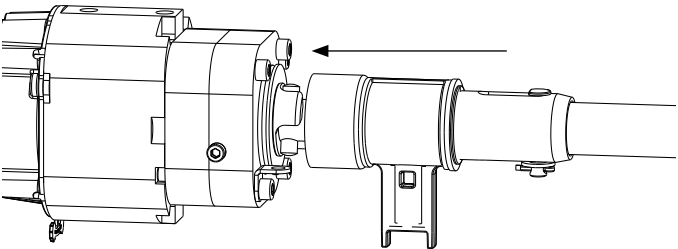
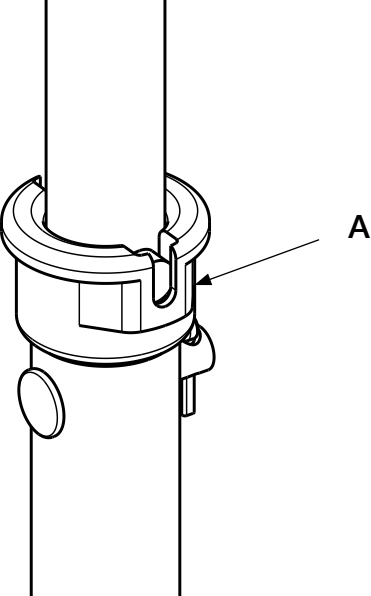
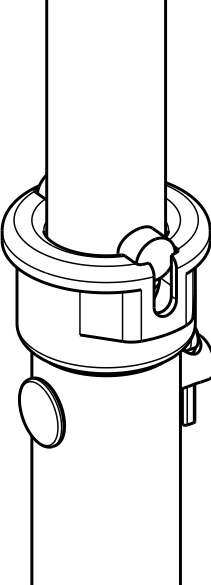
Use a jaw pliers/adjustable spanner to keep the bushings from rotating. The thicker flange edge (J) should be facing aft. (Tape the pliers to prevent shafing the bushings).



Check the clutch function as described in section 3.4 before applying medium strong locking adhesive to screws.



3.4 Clutch adjustment

<p>(1) On an unstepped mast, push the clutch towards the mast motor (to simulate that it is standing on top of the mast motor).</p>	 A line drawing showing a side view of a mast motor on the left and a clutch assembly on the right. An arrow points from the clutch towards the motor, indicating the direction of adjustment.
<p>2. Through the greasing hole, inspect the junctions between the mast motor, clutch assembly and shaft pin.</p> <p>The clutch pins should properly engage in their seats A.</p>	 A line drawing showing a top-down view of the clutch assembly on a shaft. Two pins are visible, each with a label 'A' and an arrow pointing to its seat.
<p>3. The fit of the clutch assembly can be adjusted by lengthening or shortening the clutch shaft.</p> <p>To lengthen the clutch shaft:</p> <p>Demount the gear house and clutch assembly. Follow step 4.</p>	 A line drawing showing a top-down view of the clutch assembly on a shaft, similar to the previous diagram but with a different pin engagement. <div data-bbox="1222 1447 1289 1509"></div> <p data-bbox="1219 1541 1340 1570">Not good.</p> <p data-bbox="1219 1610 1366 1673">Lengthen clutch shaft!</p>

(4)

Remove the split pin, washer and clevis pin (A).

Remove torque tube (B).

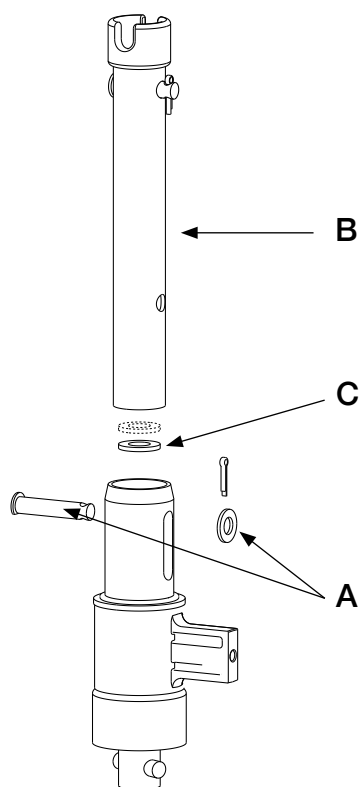
By default, one washer (C) is located between the torque tube and the clutch shaft.

-To lengthen the clutch assembly 2mm, add a second washer,
(WASHER Ø20/10.5-2 (M10) ST), included in misc pack bag.

- To shorten the clutch assembly 2 mm, remove the default washer (C).

Remount the torque tube, clevis pin, washer and split pin.

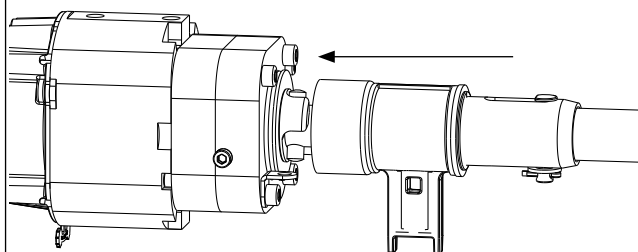
Remount the clutch assembly and gear bracket in the mast.



3.5 Installation of clutch plunger and bracket

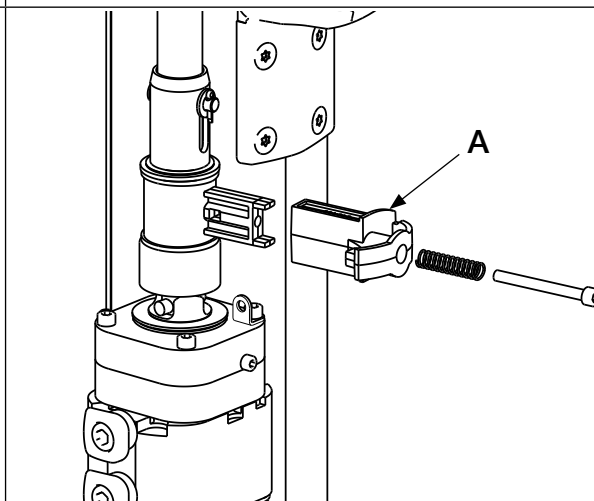
(1)

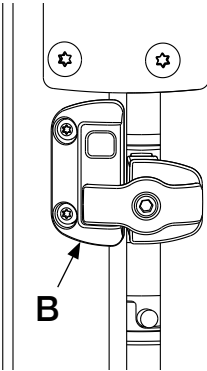
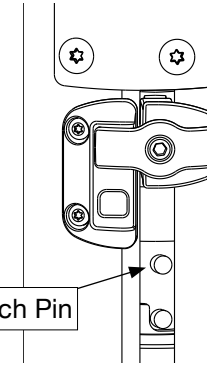
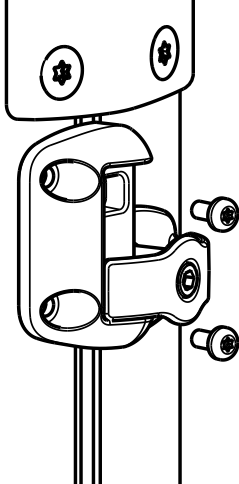
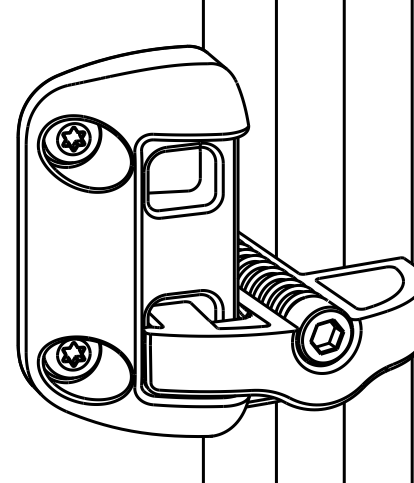
On an unstepped mast, push the clutch towards the mast motor (to simulate that it is standing on top of the mast motor).

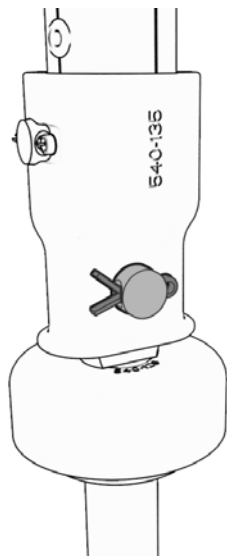

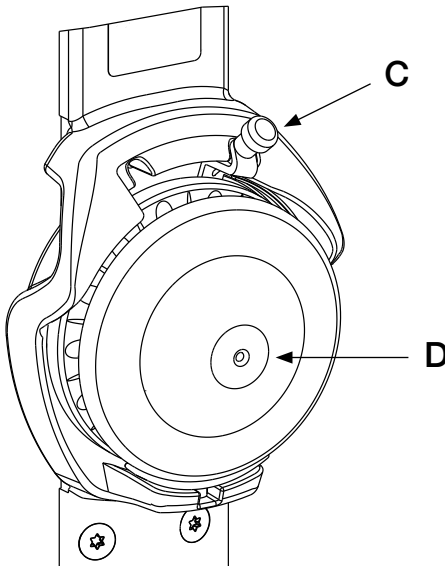


2.

Through the sail groove, mount the clutch plunger (A) on to the clutch lever with screw and spring included in misc pack.

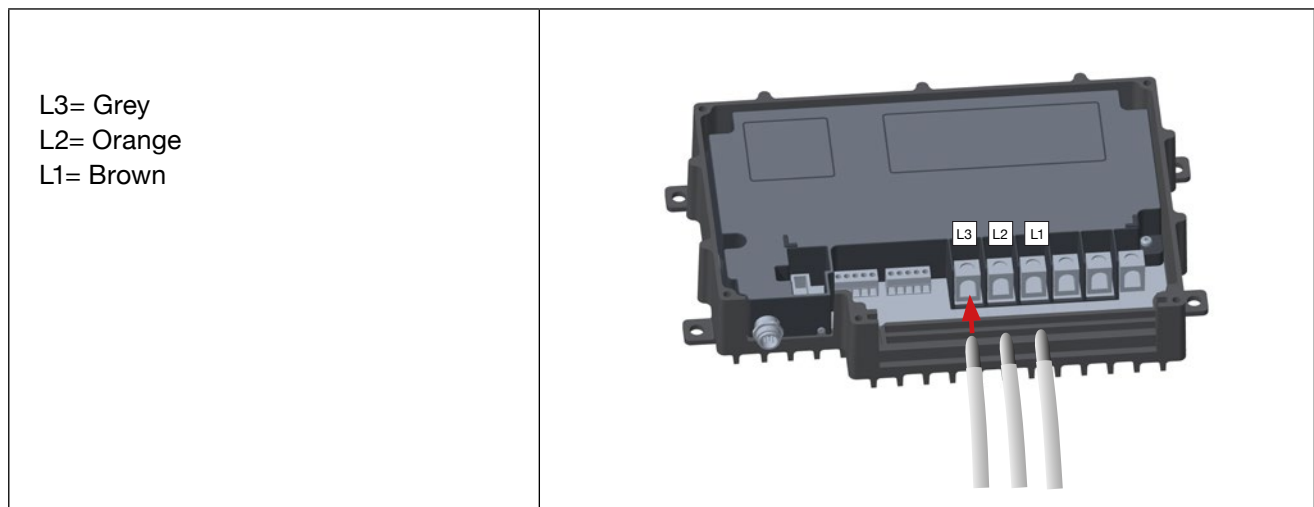


<p>3.</p> <p>Place the clutch bracket (B) on the mast wall, with the clutch plunger placed in the lower position “motor”.</p> <p>Make sure the clutch, clutch plunger and bracket is positioned as low as possible. Mark hole positions.</p> <p>Control position of the clutch bracket holes by changing between Motor and Manual mode. In Manual mode the upper clutch pin should be completely disengaged from the clutch shaft.</p>	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Motor</p>  </div> <div style="text-align: center;"> <p>Manual</p>  </div> </div> <p style="text-align: center;">Clutch Pin</p>
<p>4.</p> <p>Drill and tap 2xM5 holes.</p> <p>Fasten the clutch bracket, use locking adhesive.</p>	
<p>5.</p> <p>Remount the clutch screw with medium strong locking adhesive and align the screw head with the clutch plunger.</p>	

<p>6.</p> <p>Remount the clevis pin and split pin to fix the gear shaft to the adapter.</p> <p>Open the split pin to min 20°</p> <p>Re-tension luff profile to correct tension according to chapter 4.1.</p>	
<p>7.</p> <p>Control that the gear controller arm is set in FREE mode (C) and put plug in winch socket (D).</p> <p> The manual furling gear should always be set to FREE when connected to the mast motor.</p> <p>Reassemble plugs and covers for greasing and access holes on mast.</p>	
<p>8.</p> <p>Guide the mast motor connection cables out of mast. Remount mast heel, if applicable.</p>	

3.6 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:



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.

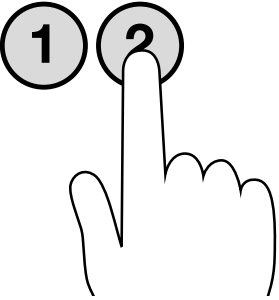
For correct positioning of the Motor Control Unit, installation of the complete Power supply and SEL-Bus system, see separate manual 597-275-E.

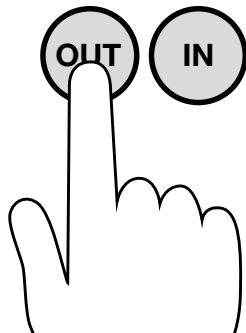
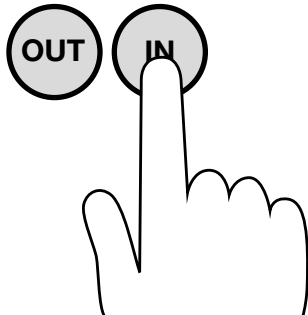
3.7 Configuration of control buttons for Synchronized Main Furling

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.

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

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



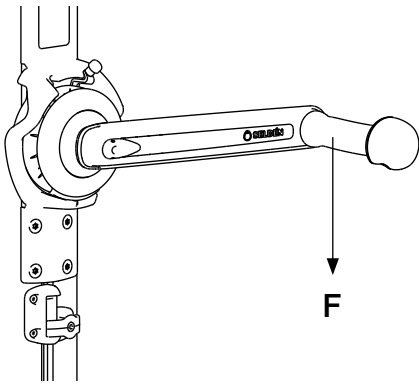
If the signal tone is generated when the Power supply and SEL-Bus system is turned on (without any button being pressed) turn the power off immediately. Inspect the push button connections; cables from SEL-Bus converter to push button must be installed as “normally open” not “normally closed”.

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.

Type	Torque	Force (F) Measured with 10" winch handle	
RB system	5 Nm	20 N	



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

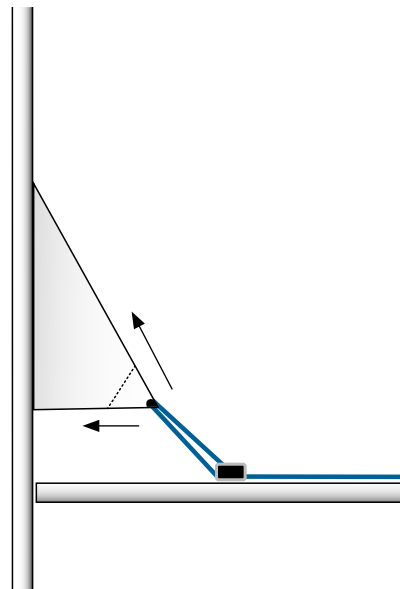
Furling in and out will work best on a mast tuned with limited pre bend.

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.

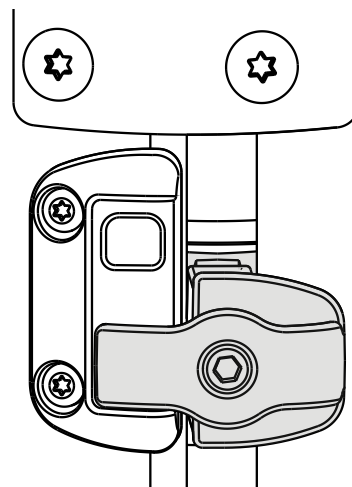
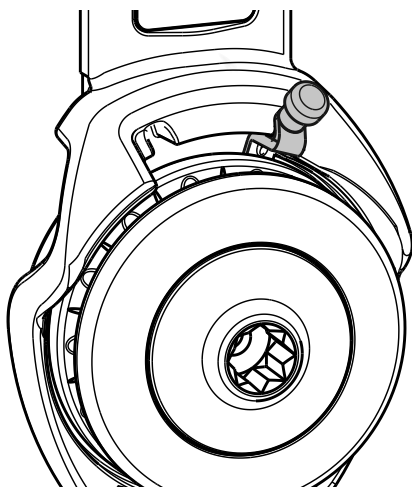
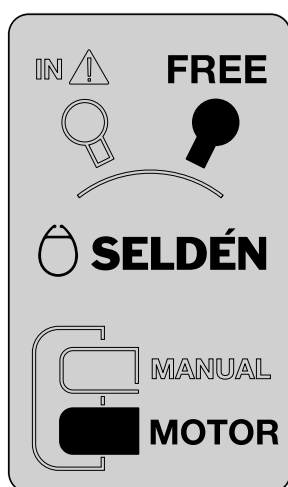
Synchronized outhaul winch



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

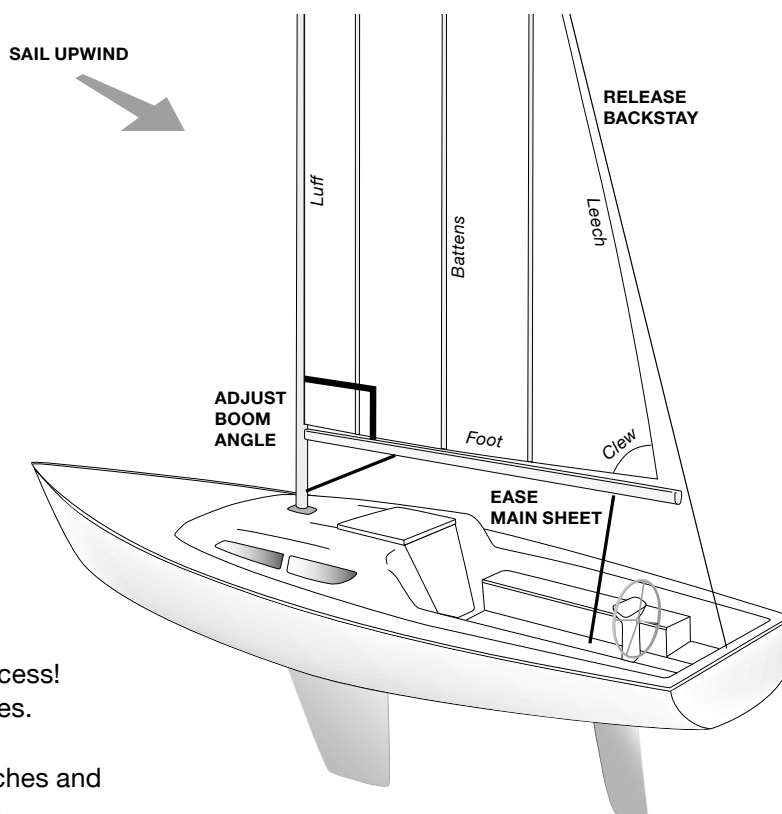
The manual furling gear must be set to FREE when connected to the electric motor. The clutch plunger should be positioned in the lower seat (MOTOR).



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 and increase the tension in the luff extrusion.
3. Adjust the boom angle to keep the leech tight and battens parallel to mast. Use kicker/topping lift.
4. Ease the main sheet.

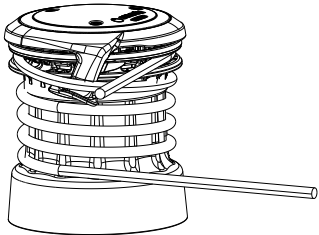

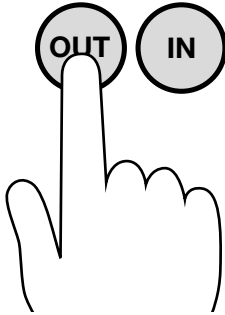
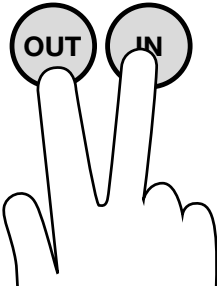


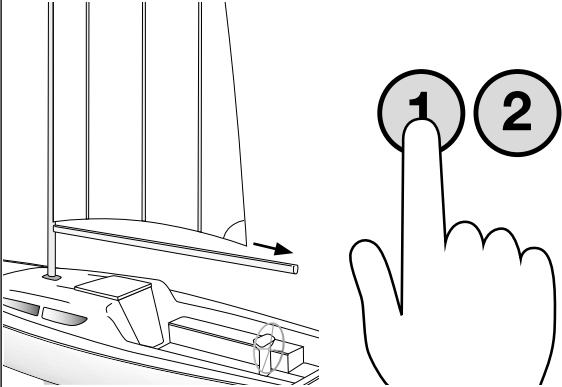


Always observe the entire furling process!
Stop immediately in case of any issues.

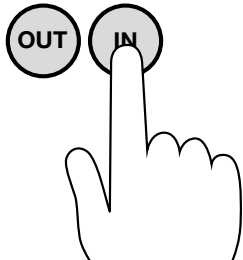
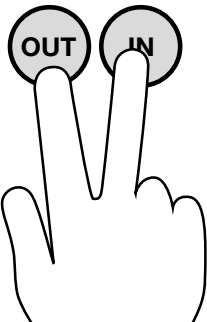

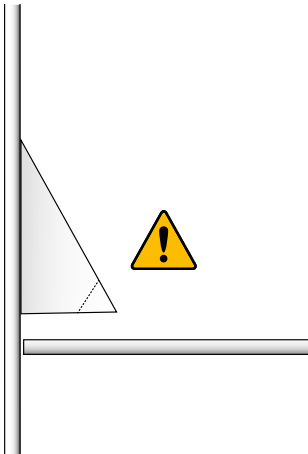


Keep away from the sail groove, winches and
any other moving parts during furling.

5.2 Unfurling

<p>1. Apply and secure the outhaul to the synchronized electric winch.</p>	
<p>2. Press “Furl Out”.</p> <p>The outhaul winch will make a short warning signal before starting to run.</p> <p> 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.</p>	
<p>3. Whilst holding down “OUT”, press the second button to increase the speed, if wanted.</p>	
<p>4. Full sail Hold button(s) pressed. The synchronized system will recognize a fully unfurled sail and stop automatically.</p> <p>Reduced sail area Release button(s) when sail is in desired position.</p>	<p> The motor will make a short rotation when unfurling is finished, to activate the break mechanism.</p>
<p>(5) If needed, the outhaul can be trimmed using the winch buttons.</p> <p> Be careful when using the winch buttons, as this activates the full power of the winch.</p>	


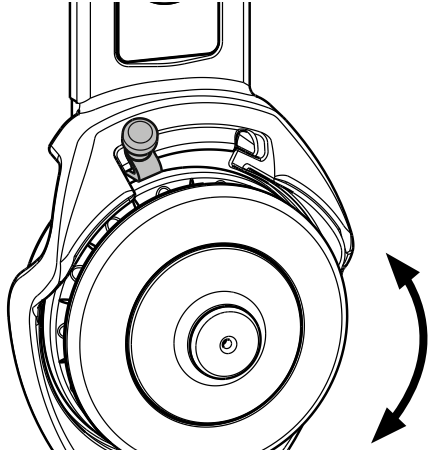
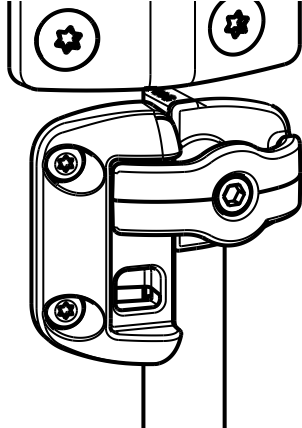
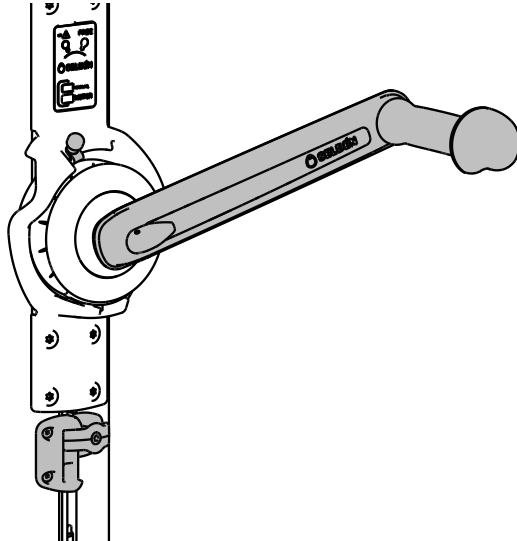

5.3 Furling

<p>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.</p>	 A line drawing of a right hand with the index finger pressing a circular button labeled 'IN'. To the left of the 'IN' button is another circular button labeled 'OUT'.
<p>2. Whilst holding down “IN”, press the second button to increase the speed.</p>	 A line drawing of a right hand with the index finger pressing the 'IN' button and the middle finger pressing the 'OUT' button.
<p>3. Release the button(s) and stop reefing at desired sail area or when sail is fully furled in.</p> <p> 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.</p>	 A diagram showing a vertical mast on the left and a horizontal outhaul line extending to the right. A triangular sail is partially furled against the mast. A yellow warning triangle with an exclamation mark is placed near the outhaul line. The outhaul line has a small block at its end.

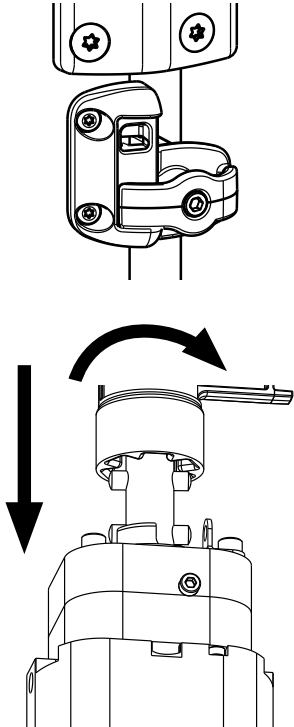

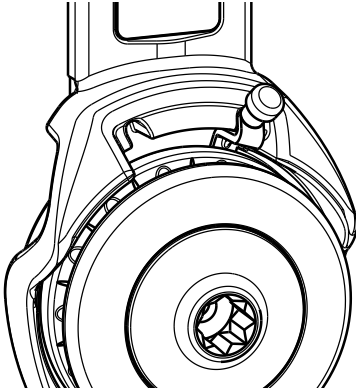
5.4 Manual drive

In case of electric or mast motor failure, the sail can be manually reefed by disengaging the motor from the manual gear:

Disconnect mast motor

<p>1.</p> <p> Turn power off!</p> <p>Wiggle the line driver by hand to remove initial stress from the clutch.</p> <p>Furling/reefing: Put controller to the port side ("in"). This engages the ratchet function in the manual gear winch.</p> <p>Unfurling: Keep controller in "free" position.</p>	
<p>2.</p> <p>Pull the Clutch Plunger out and up, switching to the upper position.</p> <p>The mast motor is now disconnected from the furling gear.</p>	
<p>3.</p> <p>Furling/reefing: Remove the safety plug from the winch socket. Use a winch handle to manually furl in the sail at the mast.</p> <p>Unfurling: Pull the outhaul line manually or carefully use the electric winch. Do not use a winch handle in the line driver, as this will rotate very quickly if the wind catches the sail.</p> <p>For more frequent use without using the motor, a control line can be fitted like on any Seldén Manual furling gear.</p>	
<p>4.</p> <p> Remove winch handle from socket when done.</p>	

Reconnect electric motor:

<p>1.</p> <p>Pull the Clutch Plunger out and down.</p> <p>If needed, rotate the linedriver to adjust the angle of the clutch shaft inside the mast, until the shaft connects to the motor.</p>	
<p>2.</p> <p>Put furling gear in FREE mode</p> <p> The gear should always be in FREE mode when motorized.</p>	
<p>3.</p> <p>Put the safety plug back into the winch socket.</p>	

5.5 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
<p>Mast motor makes a constant signal tone when Power Supply and SEL-Bus system is turned on.</p> <p>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.</p>	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.	<p>Disconnect mast motor from manual gear (see section 5.4).</p> <p>Remove outhaul line from winch.</p> <p>Idle run mast motor “IN”, minimum 30 sec.</p> <p>Idle run winch on high speed, minimum 30 sec.</p>

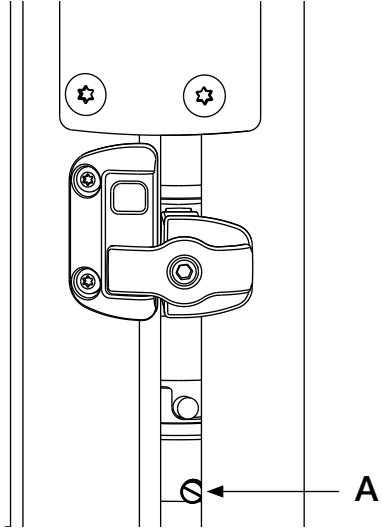
For trouble shooting of Seldén Power supply and SEL-Bus system, see installation and trouble shooting guide 597-275-E.

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

<p>1. Through the sail groove, remove the screw to the lubrication hole (A).</p>	 A technical line drawing of a mast motor assembly. The drawing shows a vertical mast with a motor housing at the top. Two screws are shown at the top of the housing. Below the housing, a bracket is attached to the mast. A screw, labeled 'S', is shown being removed from the mast through a hole labeled 'A'. The hole 'A' is located in the mast, and the screw 'S' is shown being removed from the mast through a hole labeled 'A'.
<p>2. Apply WD-40 in the hole and simultaneously rotate the mast motor minimum one turn.</p> <p>Remount screw.</p>	

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.



www.seldenmast.com