

Installation Guide

For E-vision Electric Retractable Thruster Models
ER-L&V130, ER-L&V170, ER-V210



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Accidental activation of the retract mechanism can cause serious injury due to the high-pressure force used for closing the hatch. IF operating the hatch during any work/ maintenance around or inside the retract hatch, USE CAUTION.

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Failure to follow the considerations and precautions can cause serious injury, damage and will render all warranties given by Sleipner Motor as VOID.

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Responsibility of the Installer

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The installer must read this document to ensure necessary familiarity with the product before installation.

Instructions in this document cannot be guaranteed to comply with all international and national regulations. It is the responsibility of the installer to follow all applicable international and national regulations when installing Sleipner products.

The recommendations given in this document are guidelines ONLY, and Sleipner strongly recommends that advice is obtained from a person familiar with the particular vessel and applicable regulations.

This document contains general installation instructions intended to support experienced installers. If you are not skilled in this type of work, please contact professional installers for assistance.

If required by local regulation, electrical work must be done by a licensed professional.

Appropriate health and safety procedures must be followed during installation.

Faulty installation of Sleipner products will render all warranties given by Sleipner Motor AS as void.

Ensure appropriate access to Sleipner products during installation planning for service, inspection and component replacement.

General Installation Consideration and Precaution Guidelines

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For retract thrusters

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- Stern mounted retract thrusters must not be installed to conflict with propulsion propellers or its water trail. **(NB: consult a naval architect for an exact position.)**
- Paint inside the retract housing with anti-fouling. **(NB: Do not paint the drive shaft.)**

For thruster systems

MC_0425

- Do not install the thruster in a position where you need to cut a stiffener/ stringer/ support that may jeopardise the hull integrity without checking with the boat builder this can be done safely.
- Paint the gear leg and propellers with anti-fouling. **(NB: Do not paint the anodes, sealing, rubber fittings or propeller shafts)**
- There is only room for a thin coat of primer and two layers of anti-fouling between the tunnel and the propellers.
- Never run the thruster out of water without load. Operated at no load, the thruster can reach extremely high speed, damaging the system.

Lithium Batteries for proportional thrusters models

MC_0502

If a lithium battery system is installed to supply proportional thrusters such as SEP and E-series thrusters, ensure the battery is designed to output a continuous supply of the required thruster current. An under-rated battery management system can suddenly disconnect the load which may lead to dangerous situations. Ensure that you operate with high-quality batteries intended for maritime use.

- All Sleipner proportional thrusters will work well with Lithium batteries, as the included PPC unit will control the output voltage to safe levels for the thruster. **(NB: Ensure you have the latest embedded software installed. The firmware version of the Proportional Power Controller (PPC) must be of version 1.033 or later if the PPC is connected to a lithium battery).**
- All Sleipner eVision / E-series thrusters have built-in functionality to limit the maximum voltage delivered to the thruster.

(NB: Operating the thruster outside specified ratings will void the warranty).

When installing an S-Link™ system connect ONLY original Sleipner S-Link™ products or other authorized control equipment directly to the S-Link™ bus. Connecting non-authorized third-party equipment, it must always be connected through a Sleipner supplied interface product. Any attempt to directly control or connect into the S-Link™ control system without a designated and approved interface will render all warranties and responsibilities of all of the connected Sleipner products. If you are interfacing the S-Link™ bus by agreement with Sleipner through a designated Sleipner supplied interface, you are still required to install at least one original Sleipner control panel to enable efficient troubleshooting if necessary.

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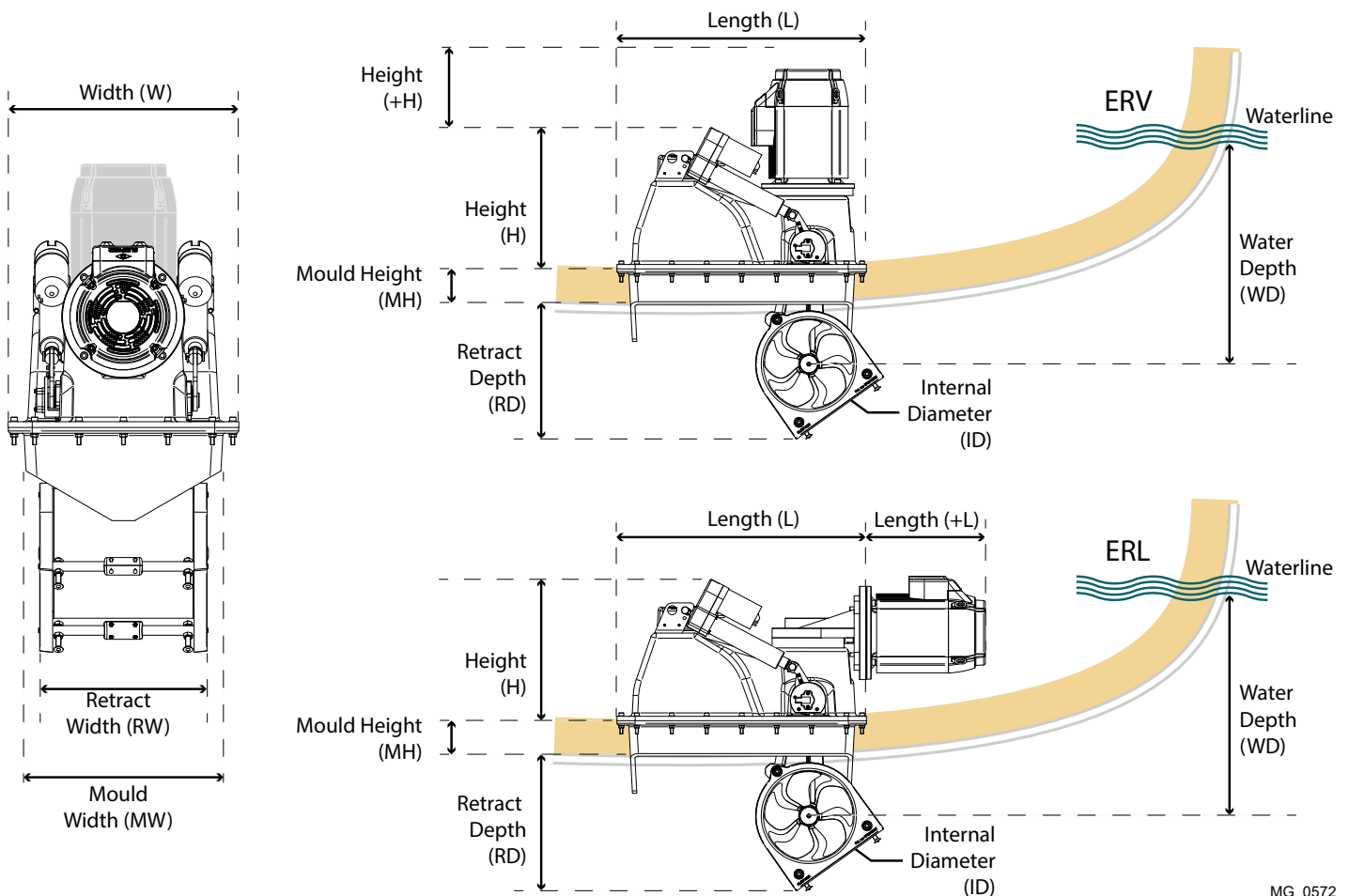
For Sleipner eVision electric motors

MC_0452

- When installing the thruster electric motor in small compartments, ensure the compartment is well ventilated to allow for cooling of the electric motor.
- If the height of the room you are installing the thruster is limited, the thruster can be installed horizontally or at any angle in-between.
 - If the electro motor is positioned more than 30 degrees off vertical, it must be supported separately.
 - Beware of keeping installation within advised measurements. No part of the propeller or gear house must be outside the tunnel.
- The electric motor, components and cables must be mounted so they remain dry at all times.
- Do not finish the inside of the tunnel with a layer of gel-coat/ topcoat or similar. There is only room for a thin coat of primer and two layers of anti-fouling between the tunnel and the props.
- Do not install the electric motor close to easily flammable objects or equipment
- Do not store items close to the thruster motor. Any loose items near the thruster motor is a potential fire hazard and can cause undesired short-circuiting.
- Do not lift it by internal cable connections, main terminals.
- The thruster power supply circuit must include the recommended sized fuse and a battery isolation switch.
- The electric/ hydraulic motor must be handled with care. Do not rest the thruster motor on its drive shaft as its weight can damage the shaft.
- eVision Thruster Motor must be upgraded to firmware version V1.015 or newer. eVision Thruster Motors shipped before November 28, 2022 needs to be upgraded.
- Control panel PJC2xx must be upgraded to firmware version V3.018 or newer. Control panel PJC2xx with hardware V2.000 or older will not support eVision Thruster Motors. Sleipner stopped the production of PJC2xx with HW version V2.000 in Q2 2020. Note that no mechanical modifications are required to replace older PJC2xx panels with PJC2xx HW version V3.000 or newer. Hardware version can be found in the panel info menu or using S-Link programmer. From HW version V3.000, the version is printed on the serial number label. Control panel PJC42x must be upgraded to firmware version V1.002 or newer. Control panel PJC3xx will not support eVision Thruster Motors.
- Retract controller SR150000 must be upgraded to firmware version V1.036 or newer. Function must be configured to “ERV/ERL” on both SR150000 and eVision Thruster Motor. Retract controller SR 6 1242 will not support eVision Thruster Motors.
- Automatic Main Switch works with eVision Thruster Motor without additional firmware update. But an upgrade to the latest firmware is always recommended.
- Gateway works with eVision Thruster Motor without additional firmware update. But an upgrade to the latest firmware is always recommended.
- ESI-1 works with eVision Thruster Motor without additional firmware update. But an upgrade to the latest firmware is always recommended.
- S-link remote controller works with eVision Thruster Motor without additional firmware update. But an upgrade to the latest firmware is always recommended.

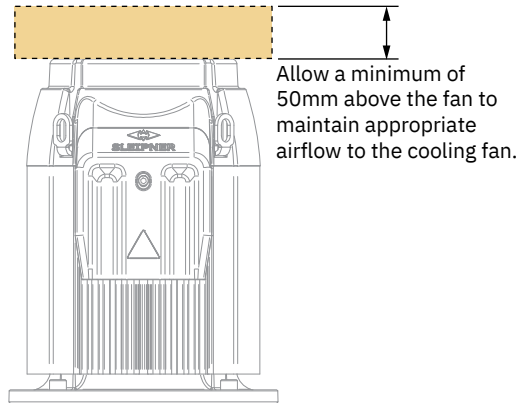
Measurement code	Measurement description	ERV130 _{24V}		ERV130 _{48V}		ERV170 _{24V}		ERV170 _{48V}		ERV210 _{24V}		ERV210 _{48V}	
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
L	SRF flange & motor housing length	687	27,04	687	27,04	687	27,04	687	27,04	687	27,04	687	27,04
+H	Motor supplementary measurement (Height)	120	4,72	120	4,72	120	4,72	120	4,72	159	6,2	159	6,2
H	Motor housing height	389	15,3	389	15,3	389	15,3	389	15,3	389	15,3	389	15,3
MH	SRF flange height	97	3,8	97	3,8	97	3,8	97	3,8	97	3,8	97	3,8
RD	Retracted hatch supplementary measurement	371	14,6	371	14,60	378	14,6	378	14,6	378	14,6	378	14,6
ID	Tunnel diameter	250	9,84	250	9,84	250	9,84	250	9,84	250	9,84	250	9,84
W	SRF flange & motor housing width	481	18,9	481	18,9	481	18,9	481	18,9	481	18,93	481	18,93
RW	Retracted hatch width	349	13,7	349	13,7	349	13,7	349	13,7	349	13,7	349	13,7
MW	SRF flange inner frame width	417	16,4	417	16,4	414	16,29	414	16,29	417	16,4	417	16,4
WD	Water depth - surface to tunnel center	250	9,84	250	9,84	250	9,84	250	9,84	250	9,84	250	9,84

Measurement code	Measurement description	ERL130 _{24V}		ERL130 _{48V}		ERL170 _{24V}		ERL170 _{48V}	
		mm	inch	mm	inch	mm	inch	mm	inch
L	SRF flange & motor housing length	687	27,04	687	27,04	687	27,04	687	27,04
+H	Motor supplementary measurement (Height)	9	0,35	9	0,35	9	0,35	9	0,35
H	Motor housing height	389	15,3	389	15,3	389	15,3	389	15,3
MH	SRF flange height	97	3,8	97	3,8	97	3,8	97 </td <td>3,8</td>	3,8
RD	Retracted hatch supplementary measurement	378	14,7	378	14,7	378	14,7	378	14,7
ID	Tunnel diameter	250	9,84	250	9,84	250	9,84	250	9,84
W	SRF flange & motor housing width	480	18,9	480	18,9	481	18,93	481	18,93
RW	Retracted hatch width	349	13,7	349	13,7	349	13,7	349	13,7
MW	SRF flange inner frame width	417	16,4	417	16,4	417	16,4	417	16,4
WD	Water depth - surface to tunnel center	250	9,84	250	9,84	250	9,84	250	9,84



IMPORTANT

This product has clearance considerations extending the base product footprint. Follow the clearance requirements when planning your installation.



MG_0706

Product Specifications

MC_0500

Product	Nominal Operating Voltage	Maximum Operating Voltage	Thrust is kg / lbs at (V)	Power Output kW / Hp	Weight kg / lbs	Maximum Operation Time
ERV130 24V	21V	31V	130 kg / 284 lbs (21V)	5.1 kW / 6.8 hp	TBA	Runtime @ 100% thrust: 2-3min duty cycle at 20°C.
ERV130 48V	42V	62V	130 kg / 284 lbs (42V)	5.1 kW / 6.8 hp	TBA	
ERL130 24V	21V	31V	130 kg / 284 lbs (21V)	5.1 kW / 6.8 hp	TBA	
ERL130 48V	42V	62V	130 kg / 284 lbs (42V)	5.1 kW / 6.8 hp	TBA	
ERV170 24V	21V	31V	170 kg / 374 lbs (21V)	7.3 kW / 9.9 hp	TBA	
ERV170 48V	42V	62V	170 kg / 374 lbs (42V)	7.3 kW / 9.9 hp	TBA	
ERL170 24V	21V	31V	170 kg / 374 lbs (21V)	7.3 kW / 9.9 hp	TBA	
ERL170 48V	42V	62V	170 kg / 374 lbs (42V)	7.3 kW / 9.9 hp	TBA	
ERV210 24V	21V	31V	210 kg / 462 lbs (21V)	10.4 kW / 14 hp	TBA	
ERV210 48V	42V	62V	210 kg / 462 lbs (42V)	10.4 kW / 14 hp	TBA	

Hull Specifications

MC_0609

Use sealants, adhesives or bonding material compatible with the materials of your vessels hull and Sleipner product. For information regards the material in Sleipner products, see table.

Product		Resin
Housing	SR(P)80/100	Polyester
Flange	SRF-185-GRP	Polyester
Flange	SRF-250-GRP	Polyester
Flange	SRF-300-GRP	Polyester
Flange	SRF-386-GRP	Polyester

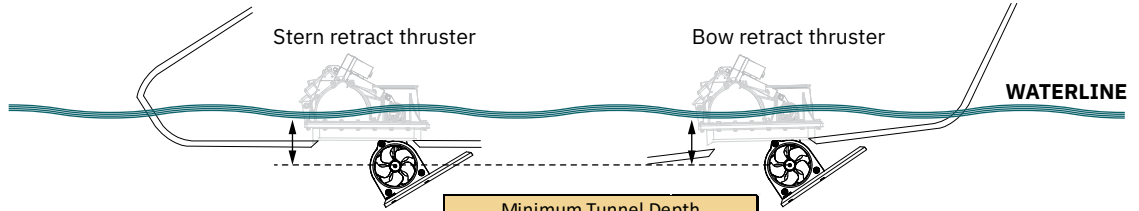
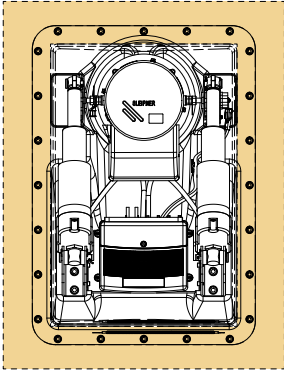
Positioning of the Retract Thruster

Retract Thruster

Ensure enough space for the complete retract unit including room for installation of SRF flange and for future service. Allow 100 mm of clear space around the thruster for moulding of the SRF flange. Ensure that when the thruster is deployed the depth of the propeller exceeds the minimum tunnel depth defined in below table. The thruster must always be installed so the hatch is opened towards the bow.

Installing the thruster below the waterline as outlined is important for two reasons:

1. Avoid drawing air from the surface which will reduce performance and increase noise levels.
2. To get as much water pressure as possible to achieve maximum thrust.

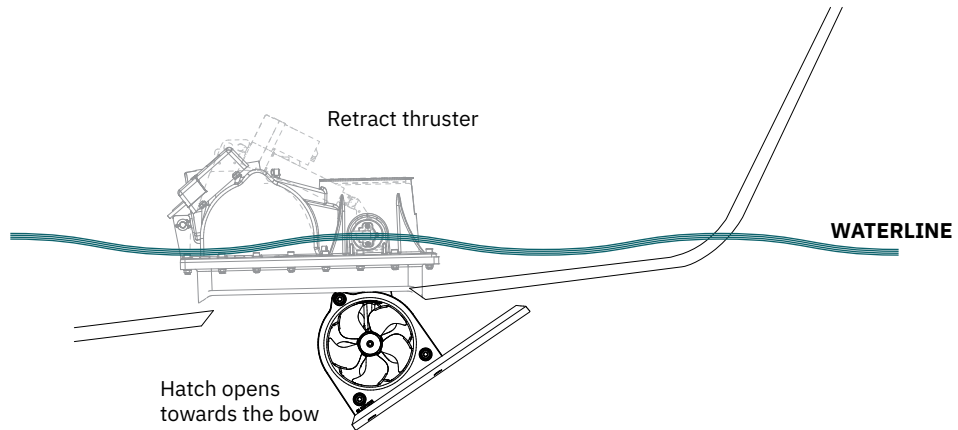


100 mm of clear space around the thruster for moulding of the SRF flange.

Minimum Tunnel Depth	
Retract system 80 to 100	185 mm
Retract system 130 to 240	250 mm
Retract system 250 to 300	300 mm
Retract system 650	386 mm

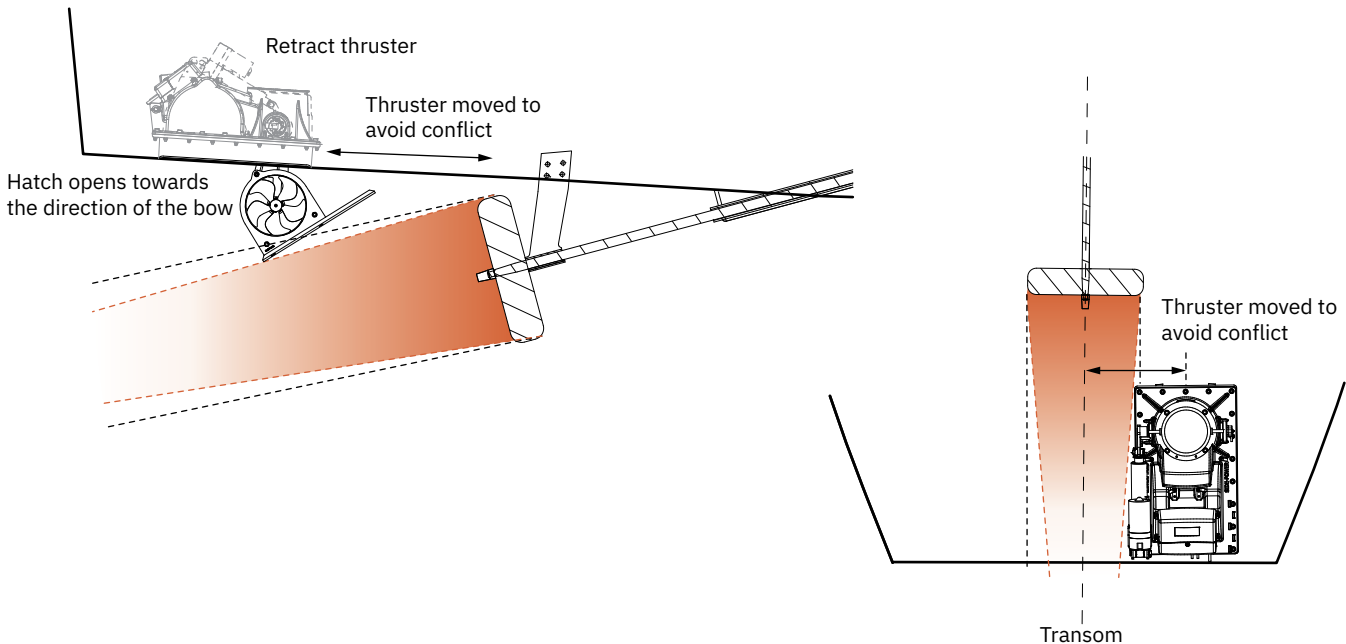
Bow installation

The thruster must be installed in the center line of the keel and as far forward as possible while following the minimum tunnel depth requirement.



Stern installation

To avoid conflict between the thruster and propulsion propellers, trim tabs or rudders the stern installation can be offset from the keel center line.

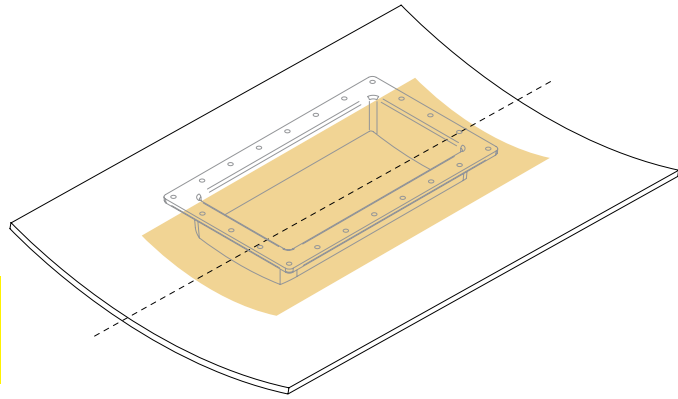


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Identify the location of the thruster considering space required for installation, operation and future maintenance.

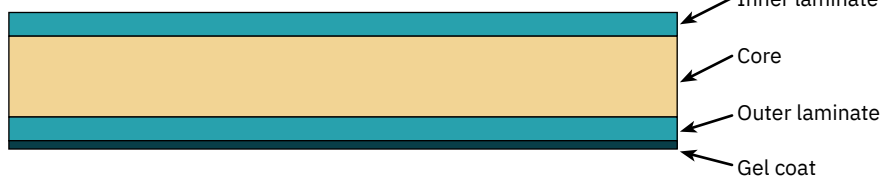
Ensure to have a minimum of 100mm space around the thruster installation to have service access

Bow thrusters must be positioned on the boat centre line. Stern thrusters can be positioned off the centre line.



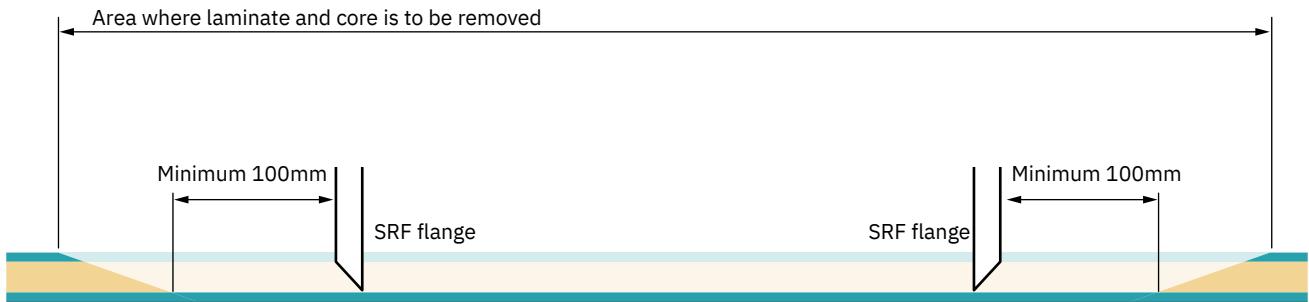
For vessels with sandwich hull construction, additional reinforcement of the area around the SRF flange is required.

Cross section of a sandwich core hull



1. To achieve maximum strength and bonding in the area around the installation of the SRF flange remove the inner laminate and core material to expose the outer laminate. Remove enough area for a 100mm (minimum) clearance surrounding the SRF flange.
2. Reinforce the area by applying several bonding layers to strengthen the hull for the operation of the retract thruster.

1

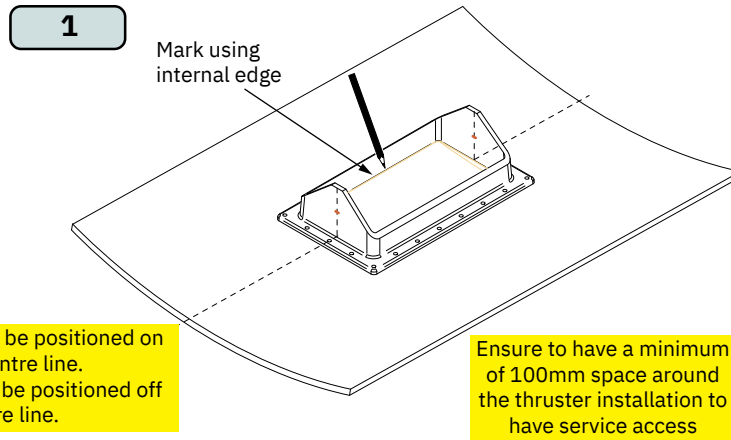


2



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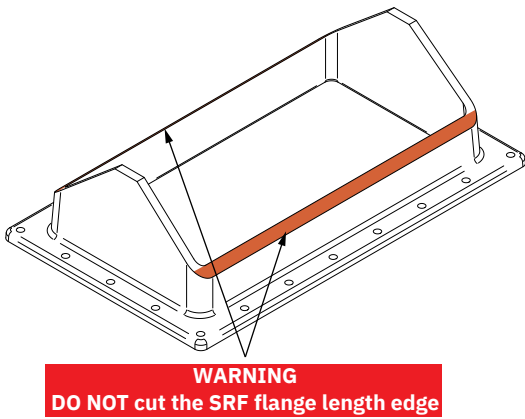
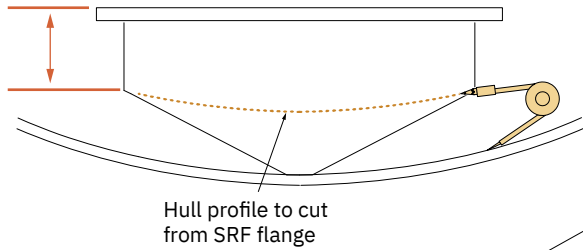
1. Flip the SRF flange upside down and position it at the identified installation location. Use the internal edge to mark where to cut out the thruster hatch from the hull.
2. The SRF flange must sit so the two side rails run flush with the hull. To do so the SRF flange must be trimmed down to match the hull profile curvature. **(NB: For guidance or methods to transfer the hull profile to the SRF flange for cutting, consult a naval architect. DO NOT cut the SRF flange length edge.)**



2

Important
The minimum SRF flange height is stated on the product measurement page (MH)

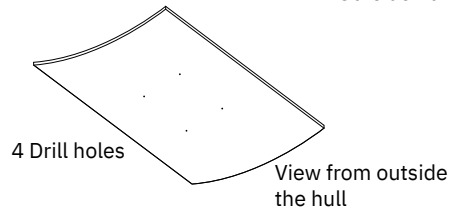
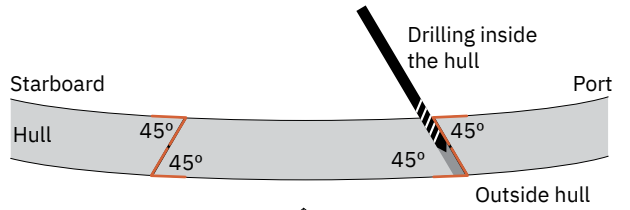
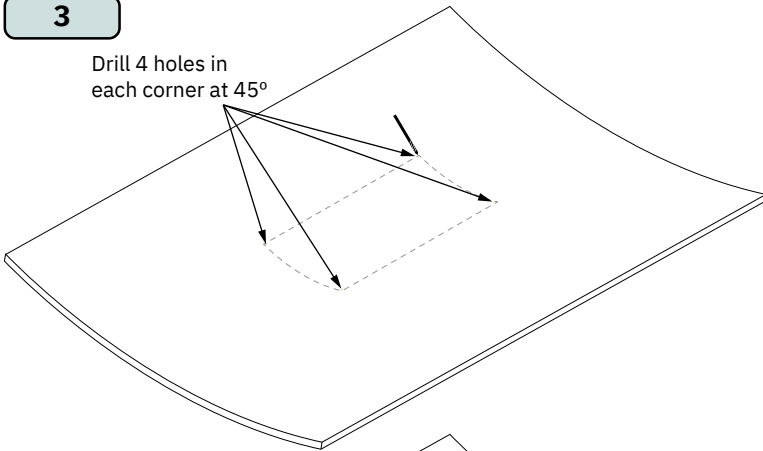
- Ø185mm = 72mm
- Ø250mm = 97mm
- Ø300mm = 115mm
- Ø386mm = 148mm



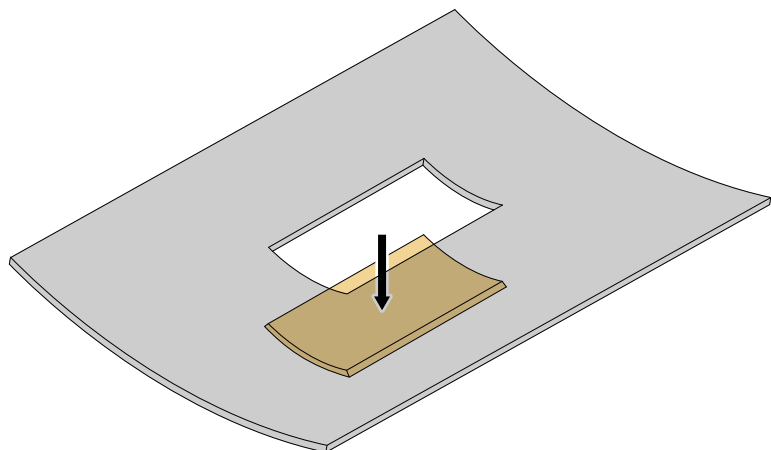
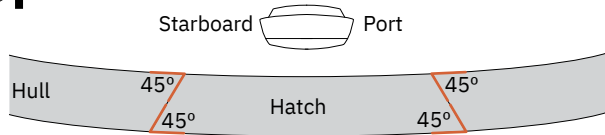
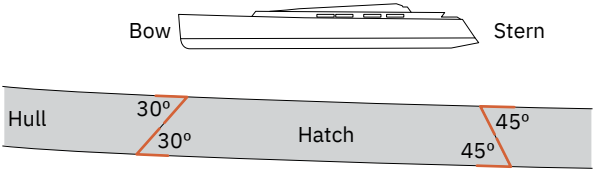
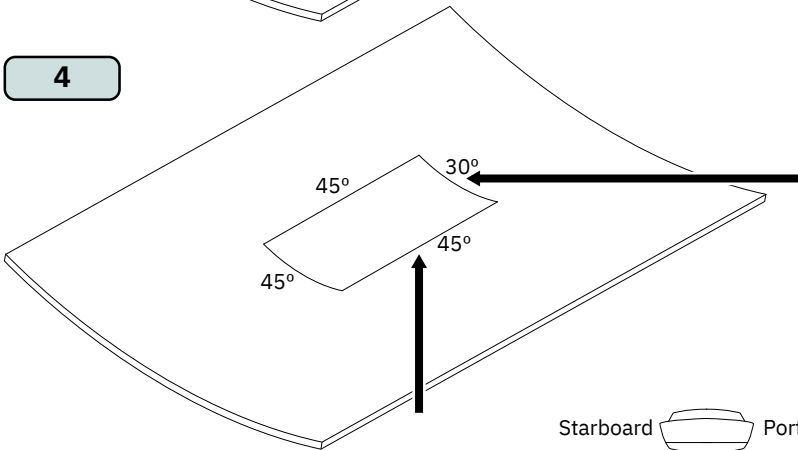
- If cutting from outside, prepare for cutting by drilling 4 holes at 45° angle towards starboard and port side.
- The hatch opening must be cut at an angle of 45° on three sides and 30° on the side facing the bow. This ensures that forces from water hitting the closed hatch is absorbed by the surrounding hull. **(NB: Use a suitable cutting tool able to be set to the desired angle.)**

3

Drill 4 holes in each corner at 45°



4



Perform a temporarily installation to verify that there is no mechanical conflict when deploying and retracting the thruster.

1. Attach the retract housing to the SRF flange with 4 bolts, position the thruster over the hull opening. Temporarily attach the hatch to the twistings.
(NB: Ensure correct orientation for the thruster to open the hatch facing the direction of water flow. Remember attachment is for temporary checking of thruster operation only.)
2. Temporarily connect DC cables **(NB: Refer to the label on actuators for correct voltage)** to the cables on the terminals on the controller. Set switch no. 4 on the DIP-switch marked "SETTINGS" to ON. and deploy thruster.
3. Press "DOWN" to extend the tunnel and check the hatch opens fully without touching the hull. If the hatch is obstructed by the hull in the front, lift the aft end of the SRF flange maintaining the reference height in front - until the hatch clears the hull when opened.
4. Press "UP" to retract the tunnel.

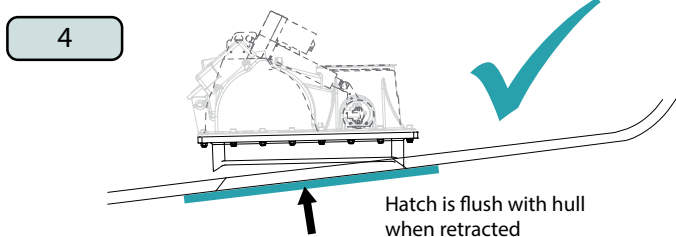
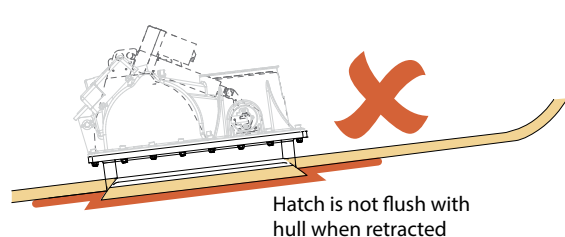
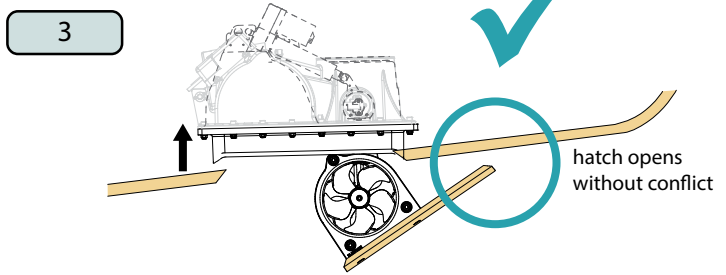
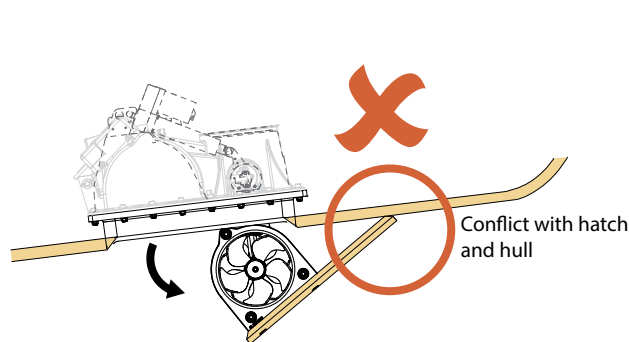
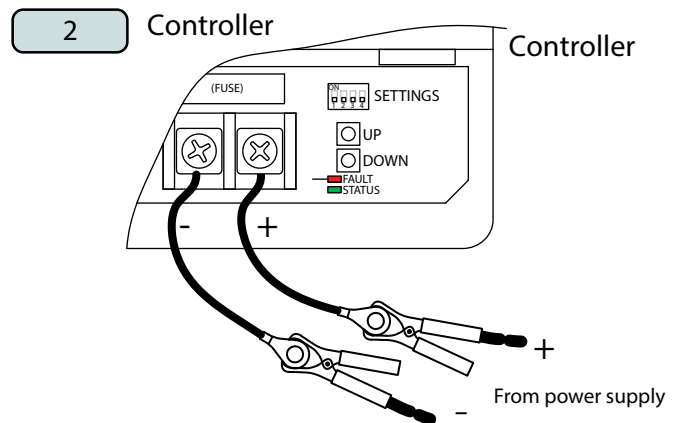
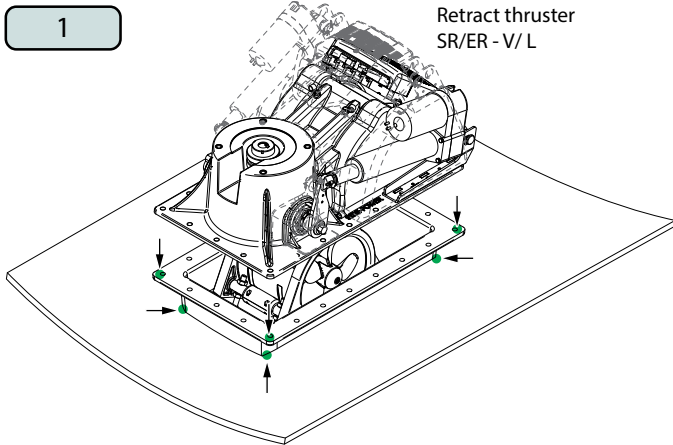
IMPORTANT

The hatch contact edges and the hull contact edges **MUST** work as the mechanical end stop. During cruising, slamming forces from the water must be absorbed by these areas, not the thruster. Therefore ensure that there is pressure on the contact edges between the hatch and the hull when the hatch is closed. Raise the SRF flange until this is achieved.



Accidental activation of the retract mechanism can cause serious injury due to the high-pressure force used for moving the hatch. IF operating the hatch during any work/ maintenance around or inside the retract hatch, USE CAUTION.

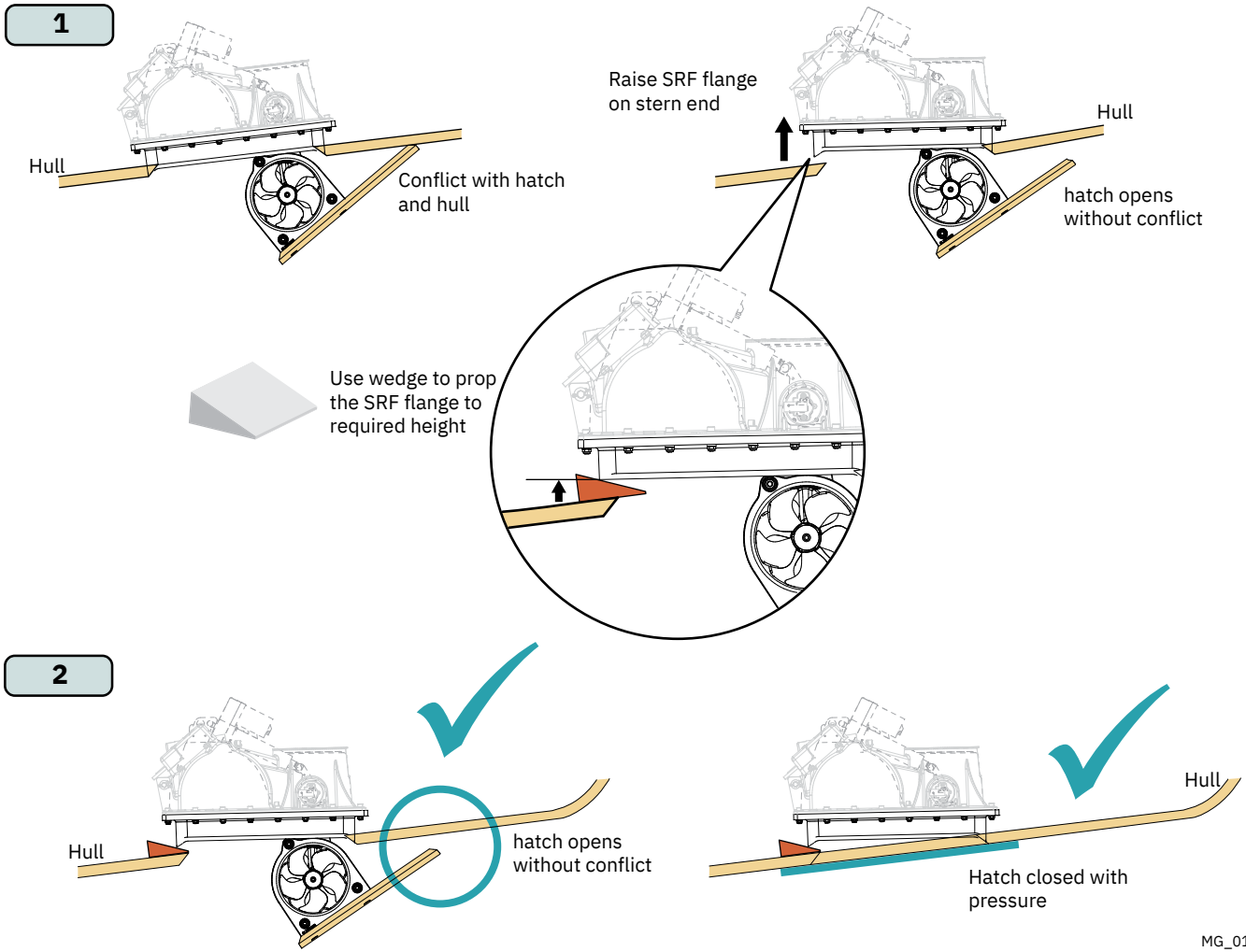
After all, pre-checks are completed the retract system can be installed.



! Please refer to the graphic for special considerations relating to your model !

To increase the space between the hatch and the hull the entire SRF flange and motor must be raised at the stern end.

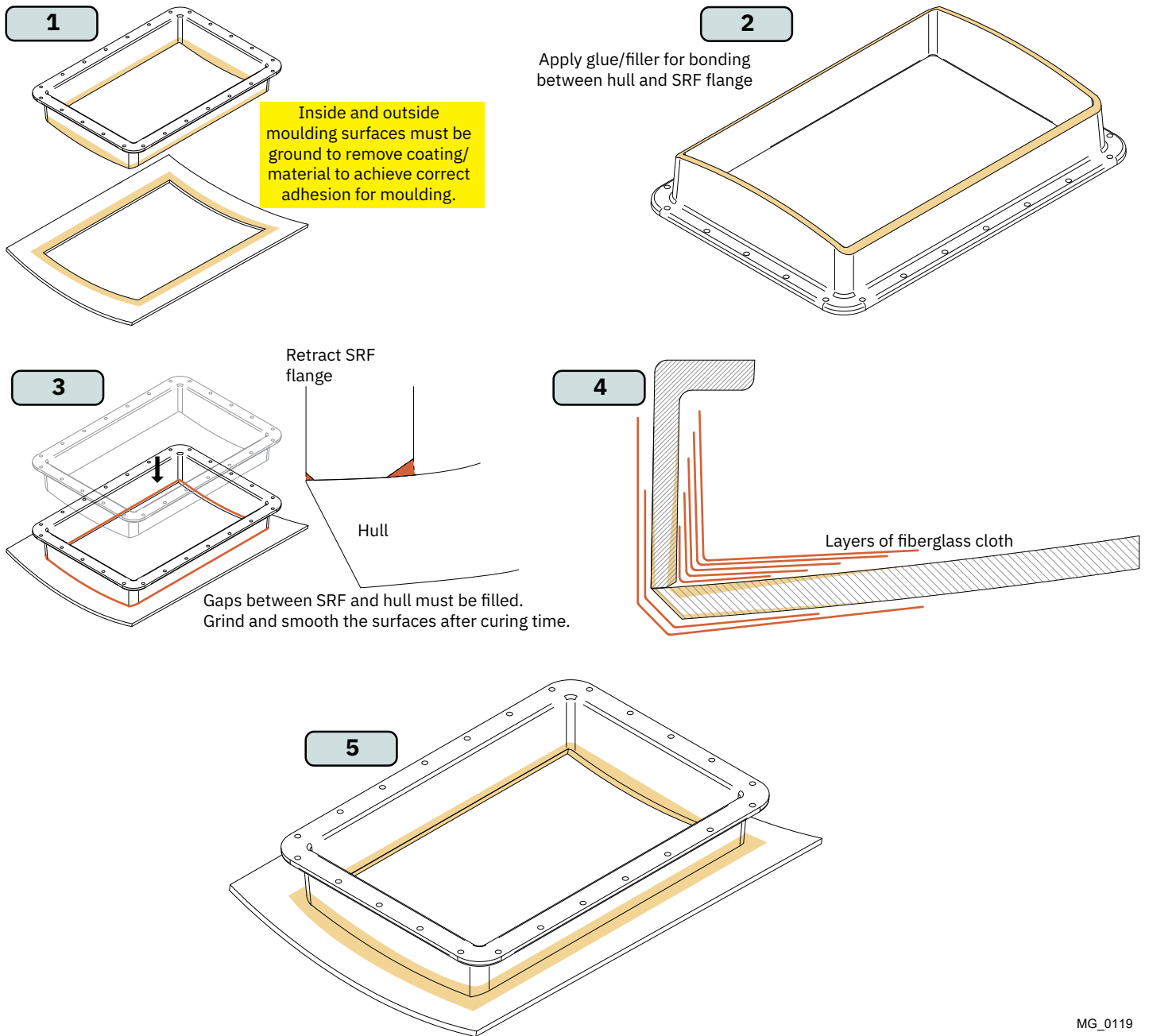
1. With the hatch in the open position raise the stern end of the SRF flange and motor until the appropriate clearance is achieved. Use a wedge to keep the thruster stable.
2. Open and close the hatch to ensure:
 - Clearance between the hull and hatch when the thruster is open
 - Hatch closes flush with the hull with full contact between hatch and hull.
3. Record the height and keep the wedges in place and secure the position of the SRF flange with filler in the corners.



MG_0133

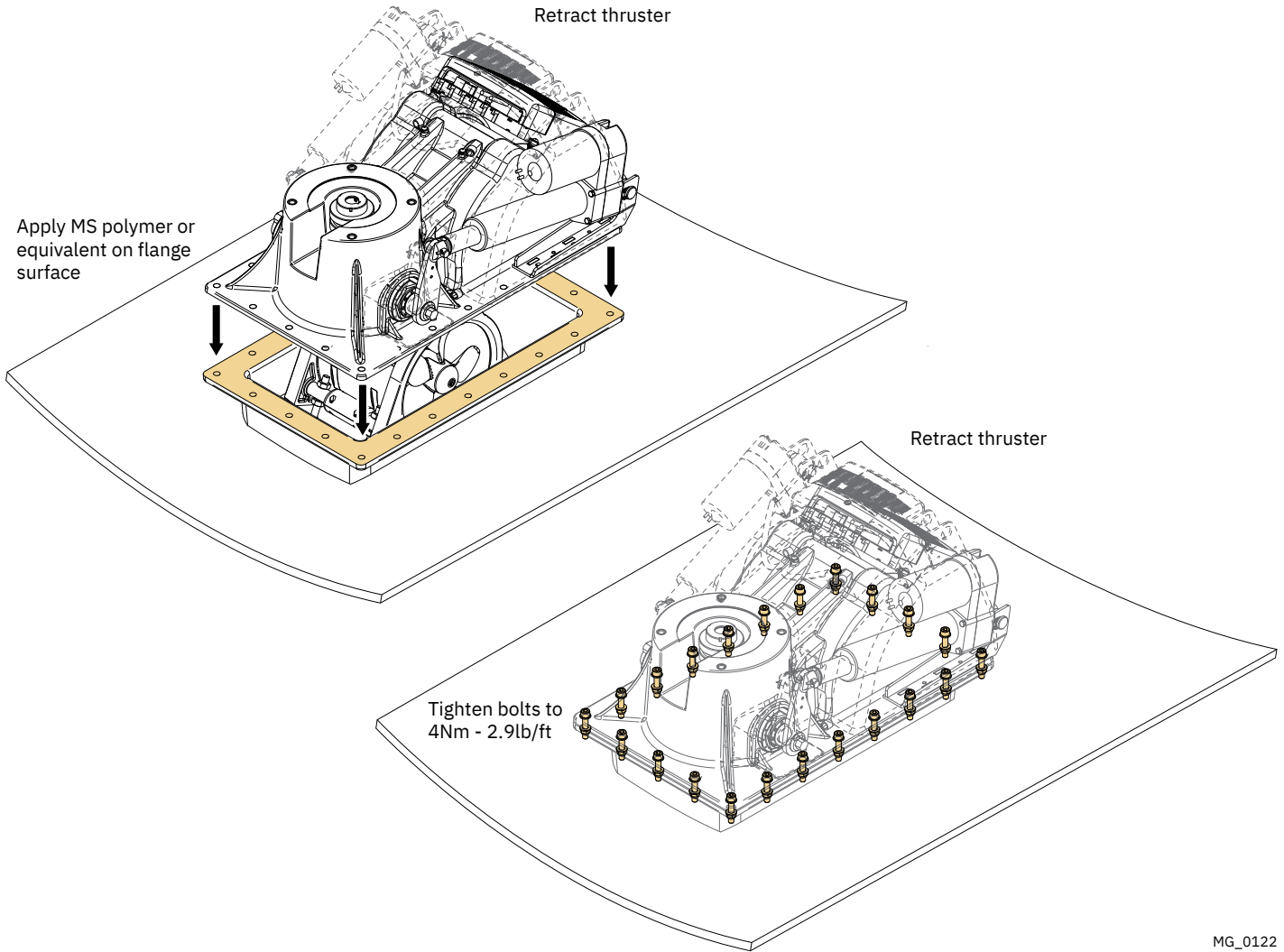
1. Before grinding of hull and SRF flange, precautions must be taken against grinding dust inside the boat. Surfaces to be moulded/bonded must be ground to remove coating and material to achieve sufficient adhesion.
2. Apply glue/filler on bottom edges of SRF flange or on the hull for bonding between connection surfaces. Ensure the filler is compatible with hull materials.
3. Place the SRF flange into position ensuring the correct orientation. Gaps between SRF and hull must be filled. Grind and smooth the surfaces after curing time.
4. Laminate the inside and outside of the SRF flange to the hull by applying several layers of fibreglass and ensure that the resin and fibreglass is compatible with hull and flange materials.
5. After curing time, smooth all moulded surfaces and apply coating. Apply putty before coating if necessary.

Once the coating has cured the retract housing can be installed.



! Please refer to the graphic for special considerations relating to your model !

1. Apply MS Polymer or equivalent on SRF flange top surface to seal and avoid water leakage. **(Ensure that the glue is compatible with the flange and retract housing materials.)**
2. Place the thruster housing on the SRF flange.
3. Insert and fasten bolts. Start with the 4 corner bolts followed by the remaining to required torque.



! Please refer to the graphic for special considerations relating to your model !

1. Fit pin bolts to the lower tunnel rods. The ends of the bolts must be sharp to create marks in the hatch. The pin bolts must be at the correct height so the hatch will fit in its inner position.
2. Place hatch in its inner position, then press or tap with a hammer to create punch marks inside of the hatch.
3. Drill 4 marked holes and countersink the outer hull side. **(NB: drill holes vertical to the hatch surface.)**
4. Bolt the hatch to the tunnel. Ensure the bolts do NOT conflict with the propeller tunnel. **(NB: Bolts can be cut, depending on hatch thickness.)**
5. Apply a layer of aluminium or duct tape on hatch opening edges on the hull. Apply filler or equivalent to hatch edges to create a perfect seal between hatch and hull.
6. Operate the thruster to "IN" position. Smooth out the filler and add more if needed. After curing time, grind and smooth the surface.
7. Apply glue on twist rings contact surface. Tighten bolts so hatch will fit properly.
8. Apply coating inside and outside of the hatch and on the hull.
9. Remove the red spacer block located above the tunnel.

1

Pin bolts with sharp ends to punch mark the hole pattern to hatch

2

Tap/ press to get punch marks of hole pattern

3

Drill holes

Inside of hatch

Countersink all 4 holes

Outside of hatch

4

5

Apply a layer of aluminium or duct tape on hatch opening edges

Apply filler on hatch edges

6

Run the tunnel IN with filler on hatch edges

Smooth out filler and add more if needed. After curing time grind and smoothen the surface

Ensure to adjust the hatch bolts so they do NOT conflict the tunnel. Bolts must be tightened firmly.

7

The hatch contact edges and the hull contact edges MUST work as the mechanical end stop. During cruising, slamming forces from the water must be absorbed by these areas, not the thruster.

Apply coating

Tighten bolts and nuts

Glue twist rings to hatch before tightening bolts

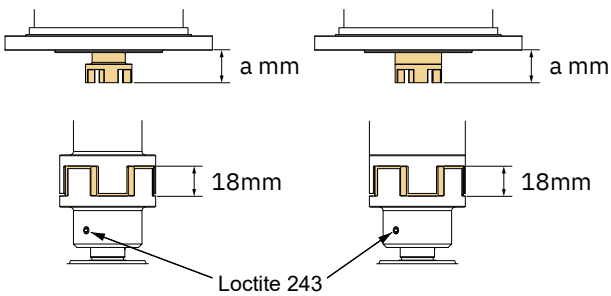
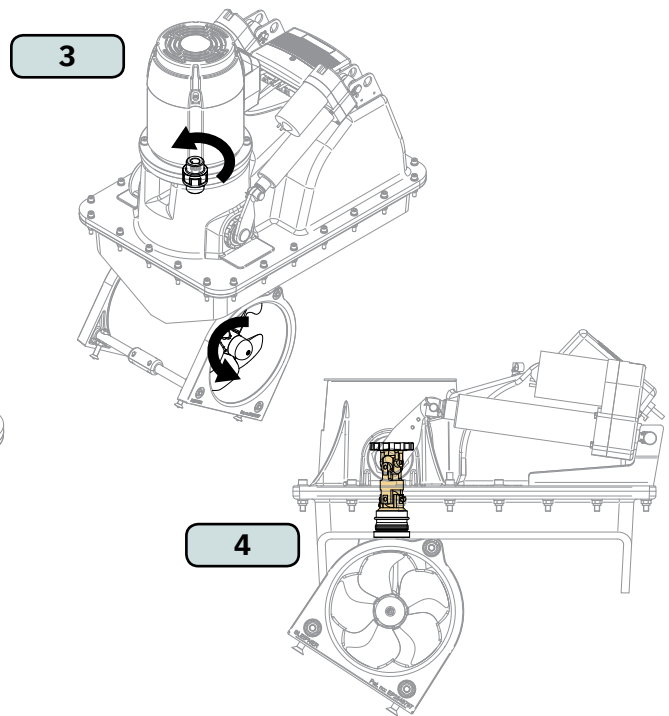
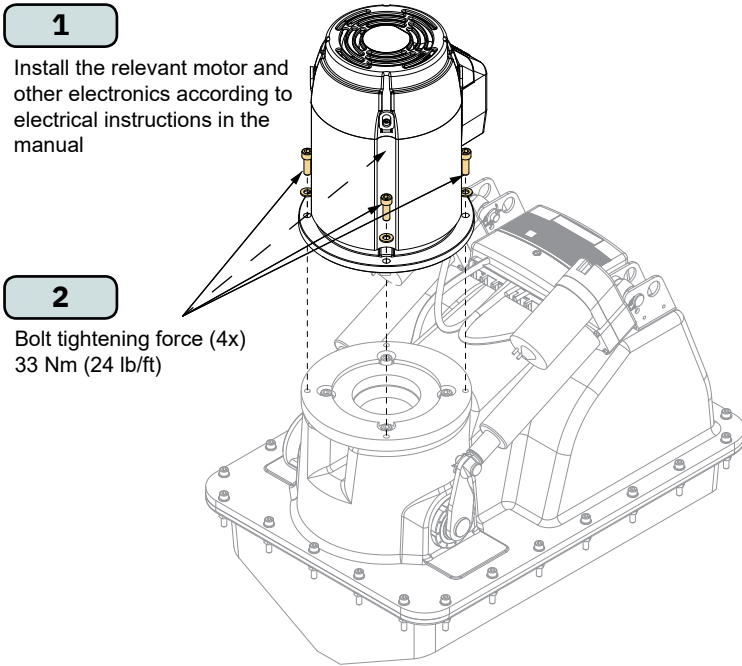
9

Remove red distance part

! Please refer to the graphic for special considerations relating to your model !

1. Install the motor onto the motor bracket ensuring the couplings and the drive shafts have locked together. **(NB: depending on your coupling you may need to wiggle the motor into place. Ensure the couplings are engaging correctly. Ensure the motor cable terminals are accessible for electrical installation later.)**
2. Fasten the bolts holding the motor to the motor bracket with the defined torque.
3. Check the drive shafts engage by rotating the propeller. It is required the propeller can rotate via hand power. **(NB: Rotating the propellers can be hard because of the gear reduction and the motor.)**
4. Apply grease to the internal drive shaft. We advise painting the gear house and propellers with anti-fouling. **(NB: Do not paint the anodes, sealing, rubber fittings or propeller shafts)**

(NB: The motor must be covered to avoid dust from fabrication/ maintenance operation entering the motor or the solenoids. After fabrication maintenance operations have ceased the cover must be removed before operating the thruster.)



Example:
height A = 47mm - 48mm.
The correct placement of the lower flexible coupling unit should be measured from the top surface of the motor bracket to the bottom inner surface of the lower flexible coupling. **(NB: The extra 1mm is added to eliminate the risk of compression to the rubber element between the two couplings.)**

IMPORTANT!
The rubber/plastic element must be in its correct position, fully inserted but not compressed.

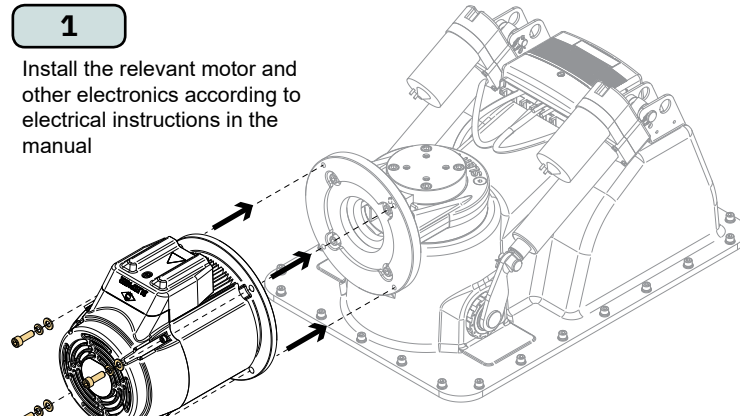
! Please refer to the graphic for special considerations relating to your model !

1. Install the motor onto the motor bracket ensuring the couplings and the drive shafts have locked together. **(NB: depending on your coupling you may need to wiggle the motor into place. Ensure the couplings are engaging correctly. Ensure the motor cable terminals are accessible for electrical installation later.)**
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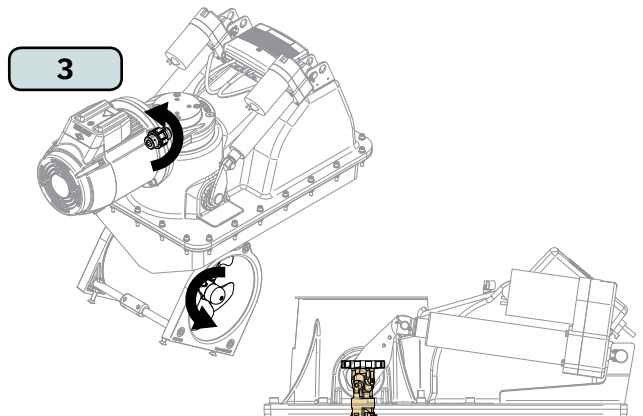
(NB: The motor must be covered to avoid dust from fabrication/ maintenance operation entering the motor or the solenoids. After fabrication maintenance operations have ceased the cover must be removed before operating the thruster.)

1

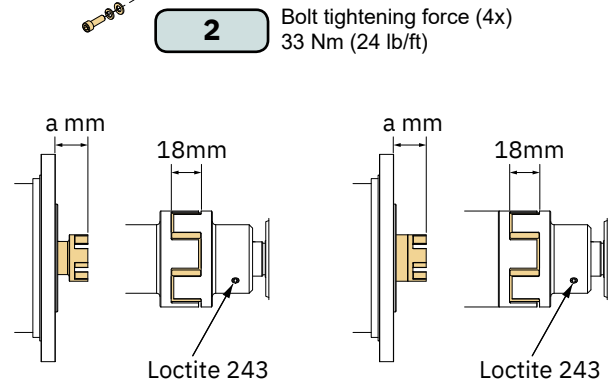
Install the relevant motor and other electronics according to electrical instructions in the manual



3

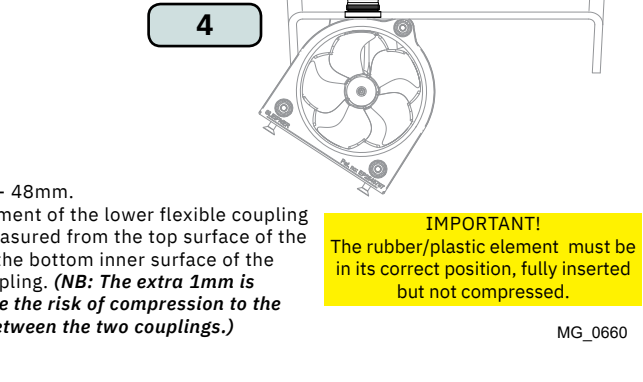


2 Bolt tightening force (4x)
33 Nm (24 lb/ft)



Example:
height A = 47mm - 48mm.
The correct placement of the lower flexible coupling unit should be measured from the top surface of the motor bracket to the bottom inner surface of the lower flexible coupling. **(NB: The extra 1mm is added to eliminate the risk of compression to the rubber element between the two couplings.)**

4

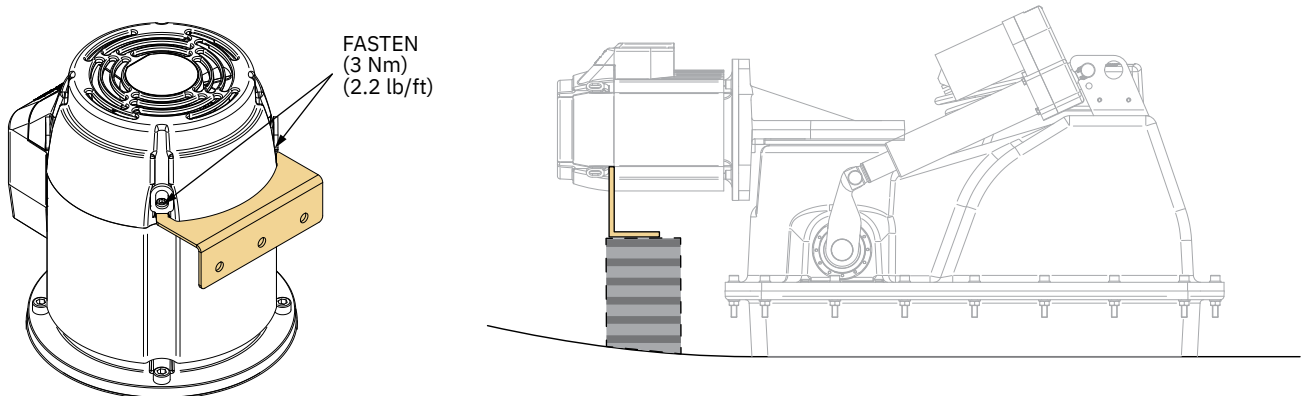


IMPORTANT!
The rubber/plastic element must be in its correct position, fully inserted but not compressed.

MG_0660

Support For the Motor

If you are installing the motor at an angle of more than 30 degrees off vertical, the motor will require separate/ additional support.



FASTEN
(3 Nm)
(2.2 lb/ft)

1. Plan the location of electrical components before starting with the electrical installation. Main electrical components will typically consist of battery, fuse, main switch and thruster motor, see Wiring Diagram chapter for an overview.

Sleipner offers both manual main switches and Automatic Main Switches (AMS). Sleipner AMS is controlled by the control panel in addition to the option of manual operation. Turning on the control panel also turn on the automatic main switch. When the control panel is turned off the automatic main switch is turned off. This ensures that the control electronics and motor are only energized when the control panel is turned on. Sleipner offers AMS supporting either S-Link or ON/OFF control panels. Note that the AMS requires a separate power supply which should be protected by a dedicated fuse. Ensure to select an AMS with a voltage rating according to the chosen motor- and battery voltage.

Electrical products installed in gasoline engine spaces or other areas potentially exposed for explosive gases must be Ignition Protected. Products installed in such locations should conform to the ISO 8846, SAE J1171 or UL 1500 standard.

2. Estimate the total length of the power cables to determine the recommended cross-section. The total power cable length is defined as the distance from the positive battery terminal, via fuse, main switch, and thruster motor, and all the way back to the negative battery terminal.
3. Find the recommended power cable cross-section for the installation by using the estimated total power cable length and the table shown in the chapter Electrical Reference Guide.
4. Select the recommended fuse size by using the table shown in the chapter Electrical Reference Guide.
5. Use an appropriate dimensioned battery with Cold Cranking Amps (CCA) according to recommendations given in the Electrical Reference Guide chapter. Battery voltage must be compliant with the voltage rating of the thruster motor and control circuitry. The capacity and rated discharge current of the battery should be according to the rated nominal current drawn and the typical duty cycle for thruster operation. The nominal current drawn is listed in the Electrical Reference Guide chapter.

The actual voltage at the motor while running the thruster determines the motor current draw. Using a smaller cross-section than recommended or a low-capacity battery could reduce performance and efficiency.

Installing a battery close to the thruster reduces the length of the power cables and potentially increases the performance, due to lower voltage drop in the power cables. For installations on large vessels with bow and stern thrusters or catamarans a dedicated battery for each thruster should be considered.

6. Install the cable from the retract mechanism as described in the chapter Retract Thruster Controller Cable Installation.
7. Install and connect the electrical components according to the applicable Wiring Diagram chapter.

For safety reasons it is always recommended to install a fuse and a main switch on the power cables and as close as possible to the positive battery terminal. The main switch must be installed such that it is easily accessible so that the thruster can be electrically disconnected to a safe state when not on-board or in the case of an emergency.

For dual thruster systems using only one battery bank a dedicated fuse and main switch should be installed for each thruster. These should be installed close to the battery bank.

Follow the instructions in the Motor Lug Connection chapter when fastening the power cables to the motor.

WARNING

Battery terminal polarity must be observed and connected correctly

8. Fuse and main switch should be installed according to the installation manual accompanying the products.
9. Install the control panel according to the instructions in the Installation Guide included with the control panel.
10. See the S-Link System Description chapter for detailed information on the installation of the S-Link Power cable and additional S-Link components.

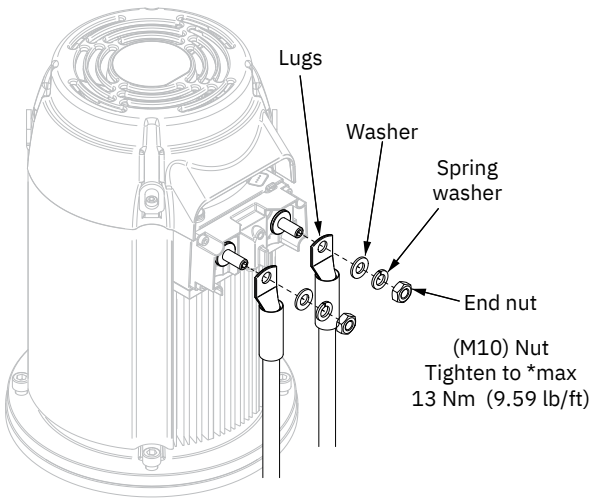
WARNING

After all electrical connections have been completed, turn off main switch and check the following with an ohmmeter:

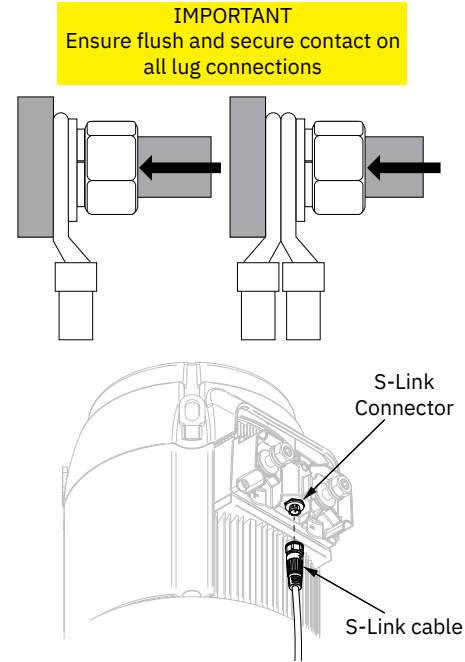
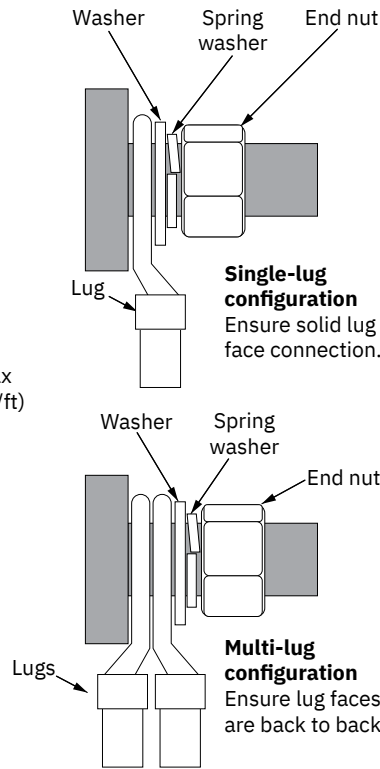
1. There is no electrical connection between motor flange and the positive terminal on the motor.
2. There is no electrical connection between motor flange and the negative terminal on the motor.

If unsure contact skilled personnel.

Motor Lug Connection



IMPORTANT
Do NOT use washers between lugs, this causes overheating and fire. Spring washers must be placed in the outer position before tightening the nut.



MG_0523

Electrical Reference Guide

MC_0532

Model Size	System Voltage	Nominal current	*Min. battery CCA	Rec. fuse	Cross Section Guide for Power Cables												
					Unit	<7m total + & -		7-14m total + & -		15-21m total + & -		22-28m total + & -		28-35m total + & -		36-45m total + & -	
						Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.
ERV/L 130/250	24V	300 A	DIN: 300 SAE: 570 EN: 510	ANL 250	mm ²	50	50	50	70	70	95	95	120	120	2 x 70	2 x 95	2 x 95
					AWG	1/0	1/0	1/0	2/0	2/0	3/0	3/0	4/0	3/0	2 x 2/0	2 x 3/0	2 x 3/0
ERV/L 130/250	48V	180 A	DIN: 180 SAE: 342 EN: 306	ANL 125	mm ²	50	50	50	70	70	95	95	120	120	2 x 70	2 x 95	2 x 95
					AWG	1/0	1/0	1/0	2/0	2/0	3/0	3/0	4/0	3/0	2 x 2/0	2 x 3/0	2 x 3/0
ERV/L 170/250	24V	420 A	DIN: 420 SAE: 798 EN: 714	ANL 400	mm ²	70	70	70	95	95	120	120	2 x 95	2 x 95	2 x 95	2 x 120	2 x 120
					AWG	2/0	2/0	2/0	3/0	3/0	4/0	4/0	2 x 3/0	2 x 3/0	2 x 3/0	2 x 4/0	2 x 4/0
ERV/L 170/250	48V	225 A	DIN: 225 SAE: 428 EN: 383	ANL 200	mm ²	70	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95	2 x 120	2 x 120
					AWG	2/0	2/0	2/0	3/0	3/0	4/0	4/0	2 x 2/0	2 x 2/0	2 x 3/0	2 x 4/0	2 x 4/0
ERV 210/250	24V	600 A	DIN: 600 SAE: 1140 EN: 1020	ANL 500	mm ²	95	95	95	120	120	2 x 70	120	2 x 95	2 x 95	2 x 95	2 x 120	2 x 120
					AWG	3/0	3/0	3/0	4/0	4/0	2/0	4/0	2 x 3/0	2 x 3/0	2 x 3/0	2 x 4/0	2 x 4/0
ERV 210/250	48V	320 A	DIN: 320 SAE: 608 EN: 544	ANL 300	mm ²	70	70	70	95	95	120	120	2 x 70	2 x 70	2 x 95	2 x 95	2 x 120
					AWG	2/0	2/0	2/0	3/0	3/0	4/0	4/0	2 x 2/0	2 x 2/0	2 x 3/0	2 x 3/0	2 x 4/0

eVision thrusters have high efficiency and can therefore offer long run times. The proposed cable cross sections in above table are only for reference. Dependent on system voltage, the stated nominal current is measured with 21V or 42V at the motor terminals.

Lower voltage level at the motor terminals will increase the current drawn by the thruster. To avoid significant voltage drop and excessive heat generation in cables and other system components selection of battery and cable cross section is critical.

Higher current consumption can also be caused by incorrect thruster installation and marine growth in the tunnel and on the propeller.

Current draw will depend on many factors such as but not limited to:

- Voltage drop
- Battery health
- Cable lengths and dimensions
- Performed tunnel installation
- Ventilation
- Obstructing marine growth

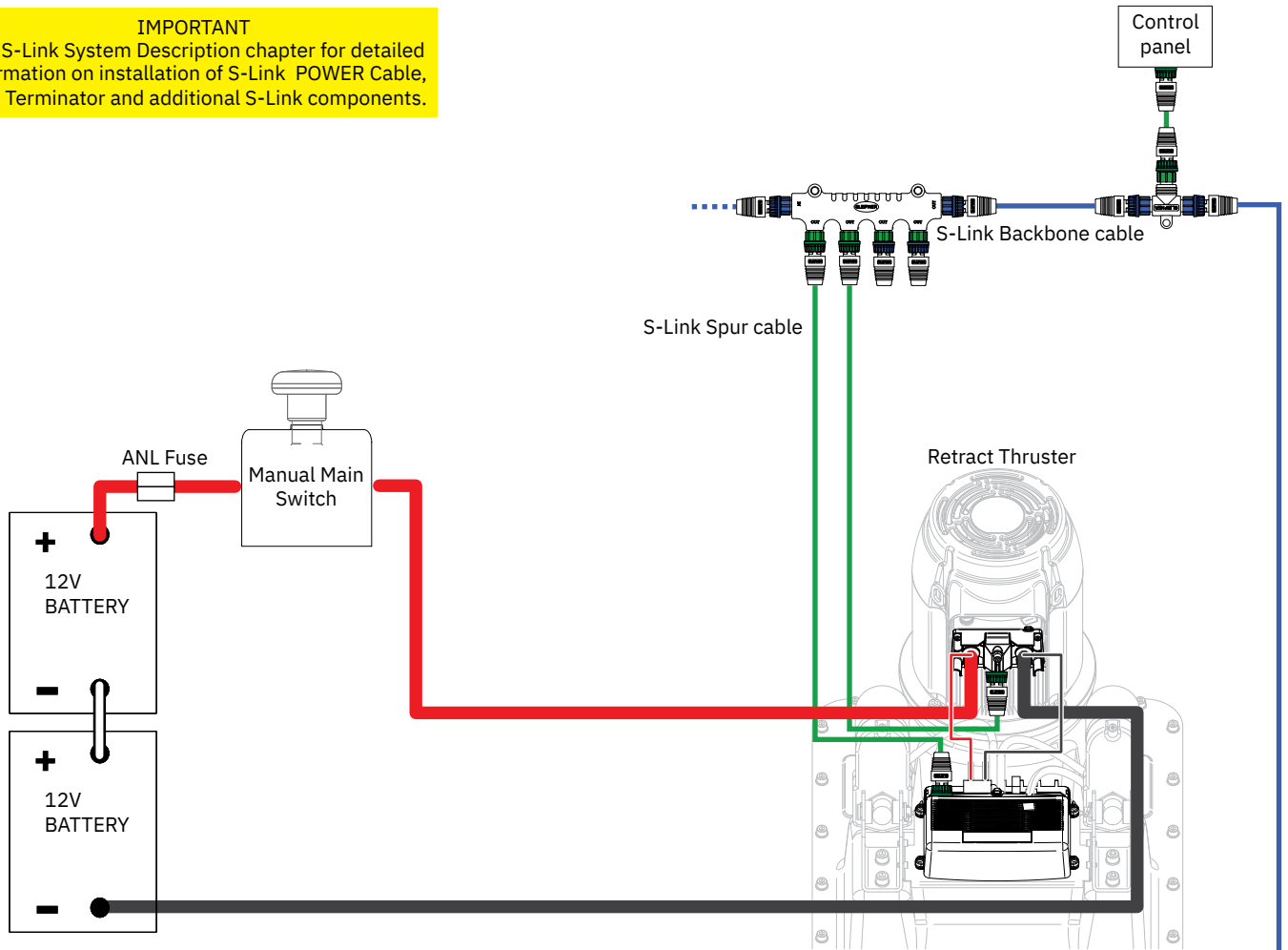
For each installation an experienced electrician should be consulted for cable cross section calculations and selection of fuses, main circuit and batteries.

Manual Main Switch Wiring Diagram 24V Retract Thruster

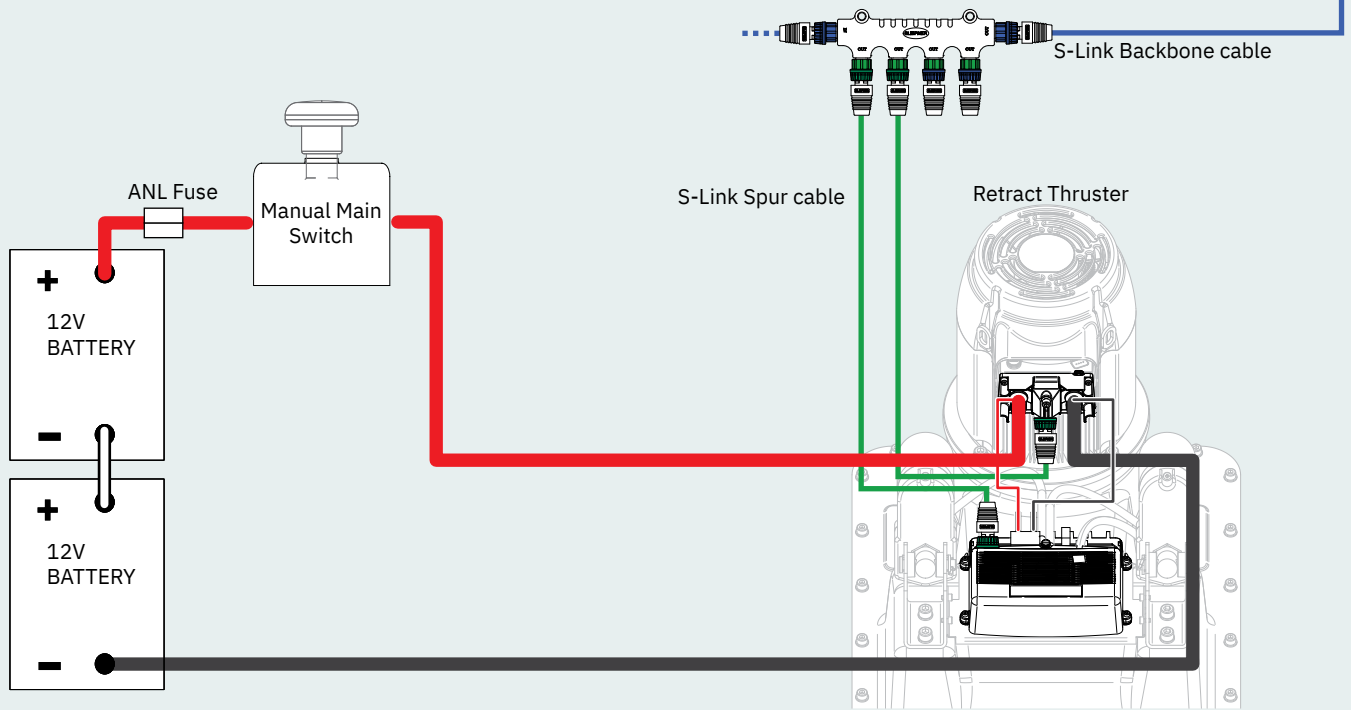
The Top wiring diagram is for a single bow or stern thruster system

IMPORTANT

See S-Link System Description chapter for detailed information on installation of S-Link POWER Cable, END Terminator and additional S-Link components.



The top and bottom wiring diagram is for a dual thruster system, for example a bow and stern installation.

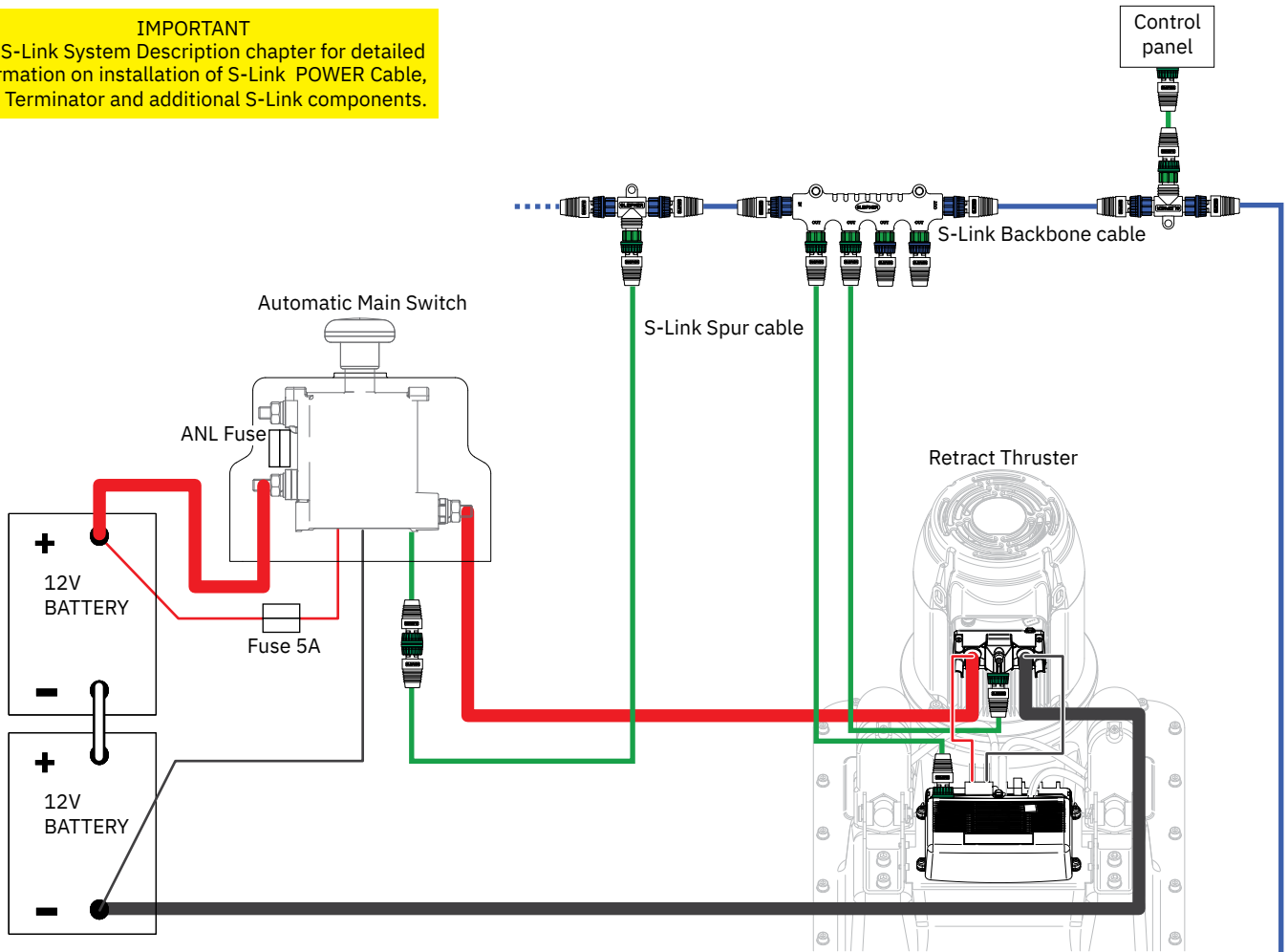


MG_0625

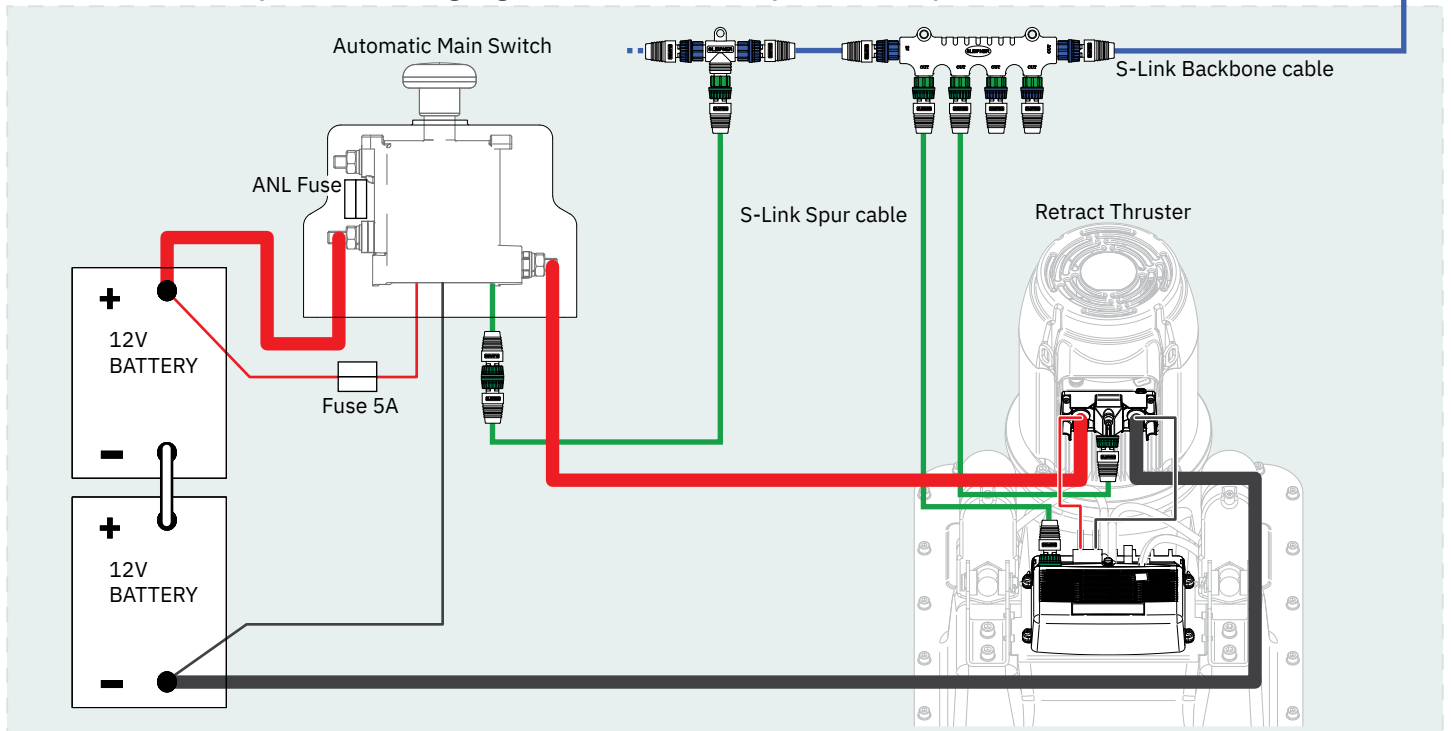
Automatic Main Switch Wiring Diagram 24V Retract Thruster

The Top wiring diagram is for a single bow or stern thruster system

IMPORTANT
See S-Link System Description chapter for detailed information on installation of S-Link POWER Cable, END Terminator and additional S-Link components.



The top and bottom wiring diagram is for a dual thruster system, for example a bow and stern installation.



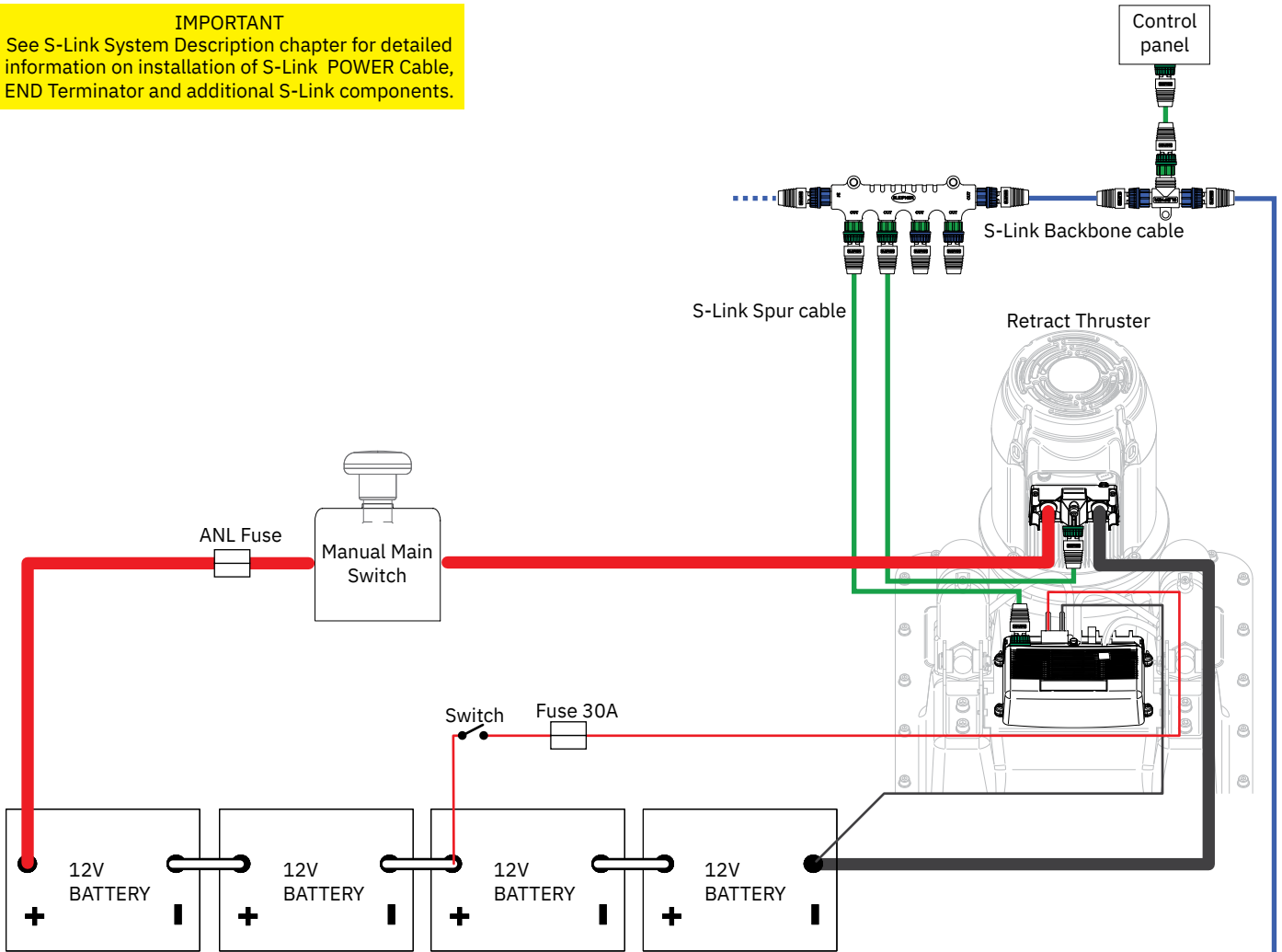
MG_0585

Manual Main Switch Wiring Diagram 48V Retract Thruster

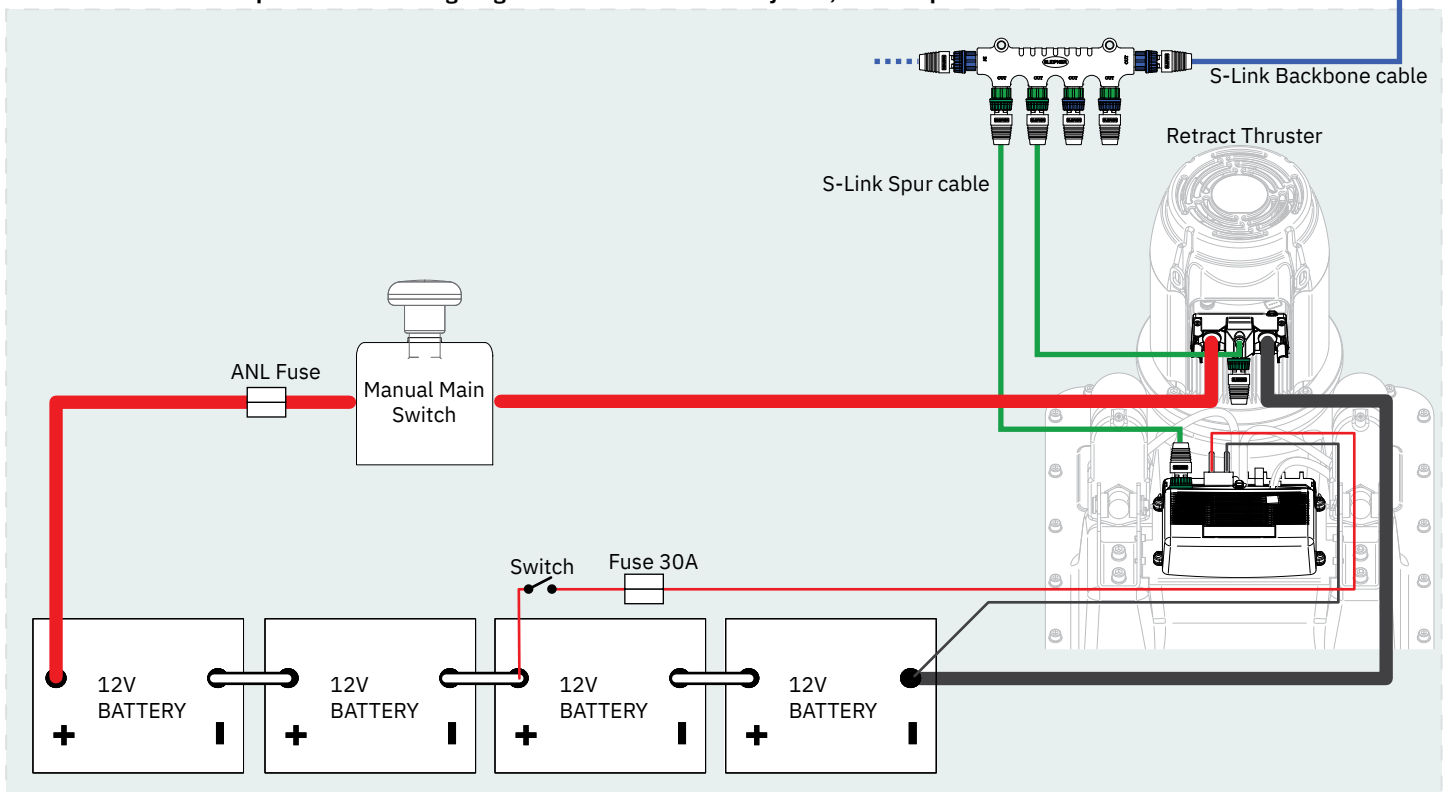
The Top wiring diagram is for a single bow or stern thruster system

IMPORTANT

See S-Link System Description chapter for detailed information on installation of S-Link POWER Cable, END Terminator and additional S-Link components.



The top and bottom wiring diagram is for a dual thruster system, for example a bow and stern installation.



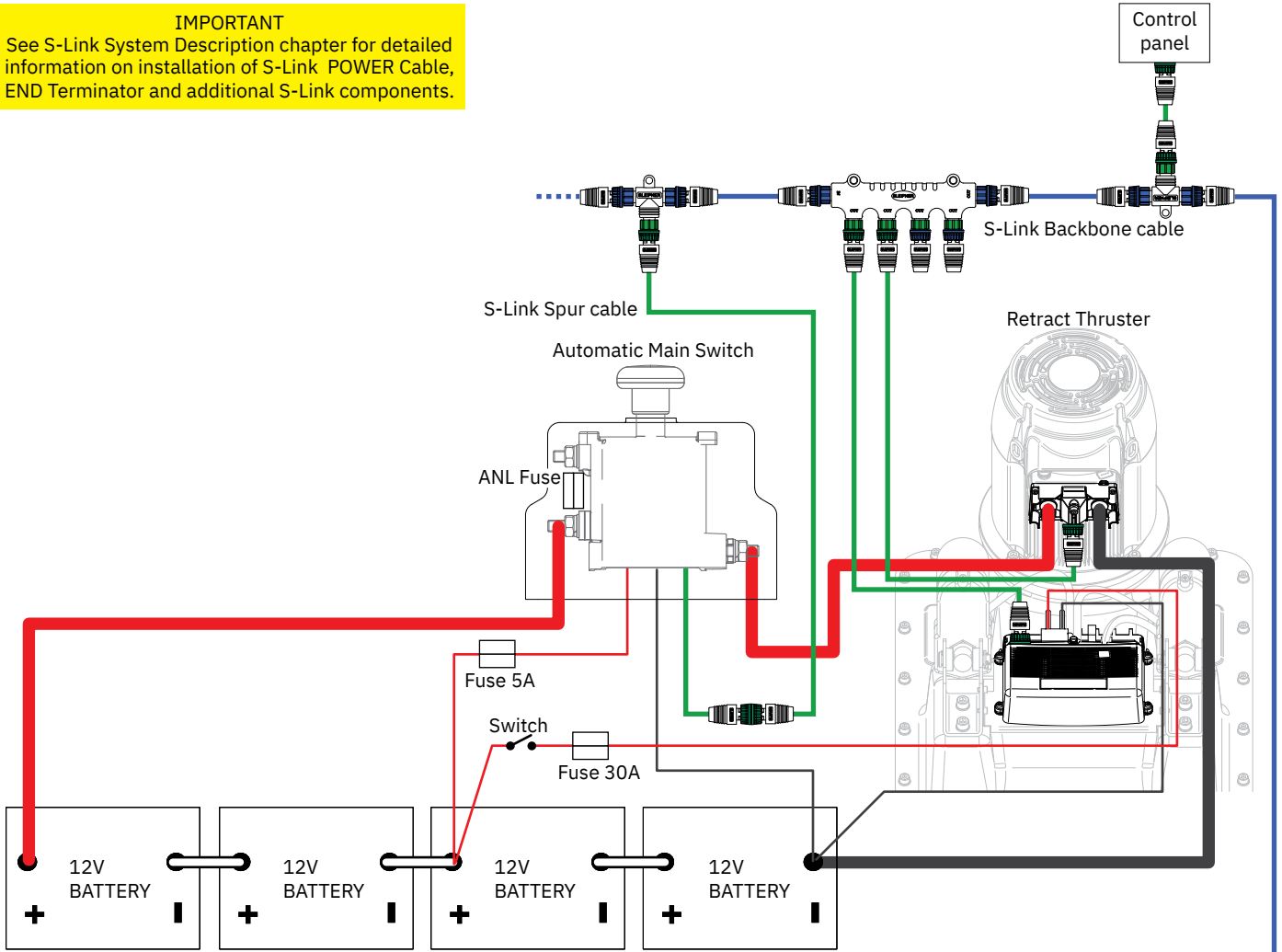
MG_0626

Automatic Main Switch Wiring Diagram 48V Retractable Thruster

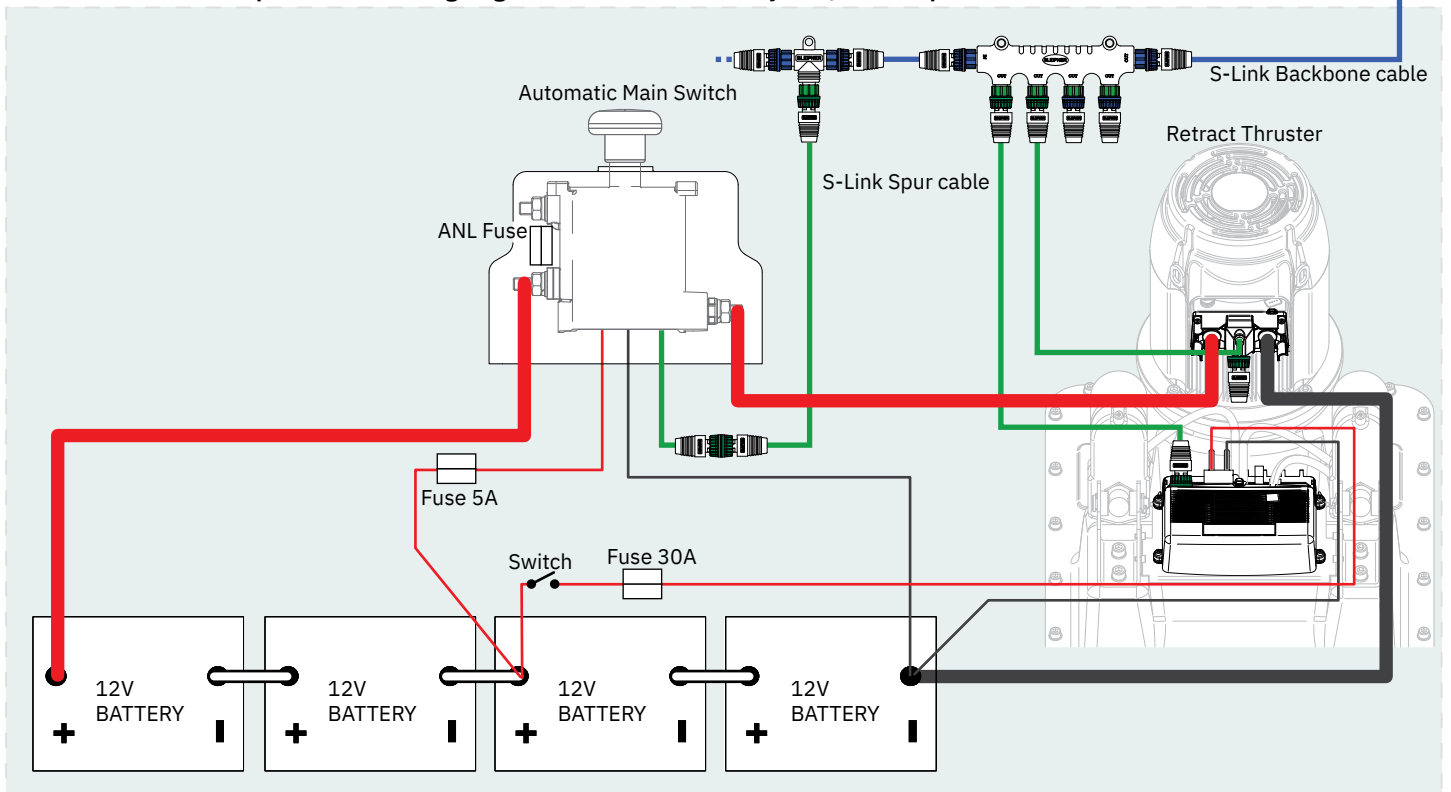
The Top wiring diagram is for a single bow or stern thruster system

IMPORTANT

See S-Link System Description chapter for detailed information on installation of S-Link POWER Cable, END Terminator and additional S-Link components.



The top and bottom wiring diagram is for a dual thruster system, for example a bow and stern installation.



MG_0586

S-Link is a CAN-based control system used for communication between Sleipner products installed on a vessel. The system uses BACKBONE Cables as a common power and communication bus with separate SPUR Cables to each connected unit. Only one S-Link POWER cable shall be connected to the BACKBONE Cable. Units with low power consumption are powered directly from the S-Link bus.

Main advantages of S-Link system:

- Compact and waterproof plugs.
- BACKBONE and SPUR Cables have different colour coding and keying to ensure correct and easy installation. BACKBONE Cables have blue connectors and SPUR Cables have green connectors.
- Different cable lengths and BACKBONE Extenders make the system scalable and flexible to install.

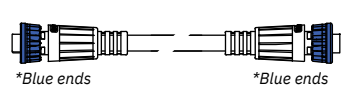
Installation of S-Link cables:

Select appropriate cables to keep the length of BACKBONE- and SPUR Cables to a minimum. In case of planned installation with total BACKBONE Cable length exceeding 100 meters please consult your local distributor. The S-Link cables should be properly fastened when installed to avoid sharp bend radius, cable chafing and undesired strain on connectors. Locking mechanism on connectors must be fully closed. To ensure long lifetime, cables, T-Connectors and Extenders should not be located so that they are permanently immersed in water or other fluids. It is also recommended to install cables such that water and condensation do not run along the cables and into the connectors.

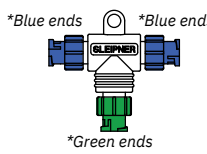
The POWER Cable should ideally be connected around the middle of the BACKBONE bus to ensure an equal voltage drop at each end of the BACKBONE Cable. The yellow and black wire in the POWER Cable shall be connected to GND and the red wire connected to +12VDC or +24VDC.

To reduce the risk of interference, avoid routing the S-Link cables close to equipment such as radio transmitters, antennas or high voltage cables. The backbone must be terminated at each end with the END Terminator.

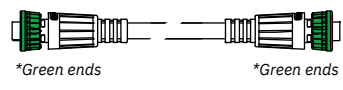
SPUR cables can be left unterminated to prepare for the installation of future additional equipment. In such cases, ensure to protect open connectors from water and moisture to avoid corrosion in the connectors.




BACKBONE Cable
Forms the communication and power bus throughout a vessel. Available in different standard lengths.



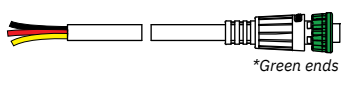
T-Connector
Used for connection of SPUR or POWER Cable to the BACKBONE Cable. One T-Connector for each connected cable.



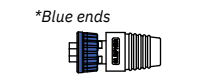
SPUR Cable
Used to connect S-Link compliant products to the backbone cable. One SPUR Cable must be used for each connected component, with no exceptions. Recommended to be as short as practically possible. Available in different standard lengths.



BACKBONE Extender
Connects two BACKBONE Cables to extend the length.

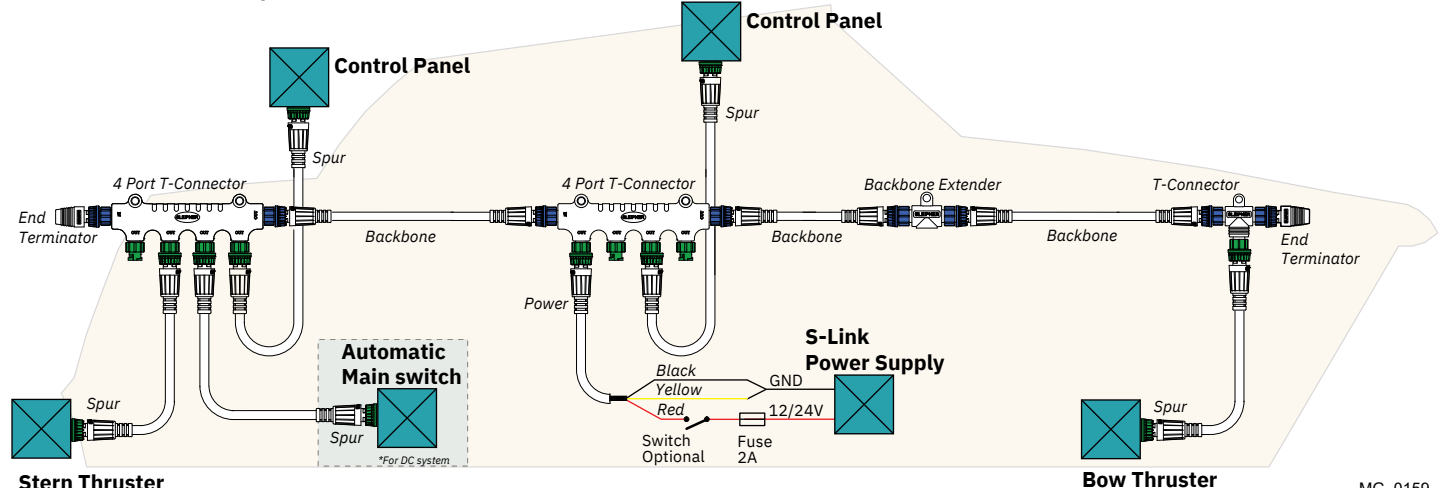


POWER Cable
Required in all installations for connection of BACKBONE Cable to a power supply and should be protected with a 2A fuse.



4-Port T-Connector
The 4-PORT T-connector allows multiple SPUR Cables to be connected. The 4-PORT T-connector comes with two sealing caps to protect unused ports.

S-Link installation example



Check drive shaft alignment

MC_0069

IMPORTANT

Before the thruster motor is operated, check the drive shaft alignment is completely straight when it reaches the end position from the control panel operation:

- 1) Connect power to thruster and S-link system.
- 2) Set DIP-switch on the controller to 0000.
- 3) Turn on the panel. (The thruster deploys.)
- 4) The actuator lever arm is set to alignment marking on the nut
- 5) If marks align, turn panel off. The thruster retracts.
- 6) If the marks do not align, proceed to calibrate drive shaft.

Calibrate drive shaft alignment

MC_0069

(NB: The drive shaft is correctly aligned when manufactured)

- 1) With dip-switches select 'Service Mode'.
- 2) Align the arrow on the actuator arm with the calibration mark, using the UP/DOWN buttons.
- 3) With dip-switches select 'Sensor Calibration Mode'.
- 4) Press and hold both UP and DOWN buttons until STATUS LED light up green.

(NB: If FAULT LED light-up red, then the calibration is out of position (wrong align mark).

- 5) With dip-switches select 'Operation Mode', thruster retracts.

Actuator Configuration

MC_0069

Dip-switch number 1 & 2 configures the actuator(s).

No.1 set to OFF when the retract has two actuators.

No.1 set to ON when the retract only has one actuator.

No.2 set to OFF when the retract does not have P8 type actuator(s).

No.2 set to ON when the retract has the P8 type actuator(s).

If dip-switch no.2 is set to ON and the actuator gives a rattling noise when the door closes, then there probably is not P8 actuator(s) and dip-switch no.2 needs to be set to OFF.

The actuator is a P8 type:

- If the actuator has a plastic cap at the back where you can adjust the actuator manually.
- If it is marked with a sticker with P8
- If the manufacturer label says P8

LED Indication

MC_0069

Continuous red light:

Motor over-temp, Controller over-temp, Controller no communication, Motor relay failure, Low battery voltage, Position sensor failure, No power to actuators, Retractable unit failure, Temp sensor open circuit.

Flashing red light:

Red light fast blinking: Dip-switch in an invalid position.

Red light short flash every 2 seconds: Shaft not calibrated, or shaft calibrated out of range.

Continuous green light:

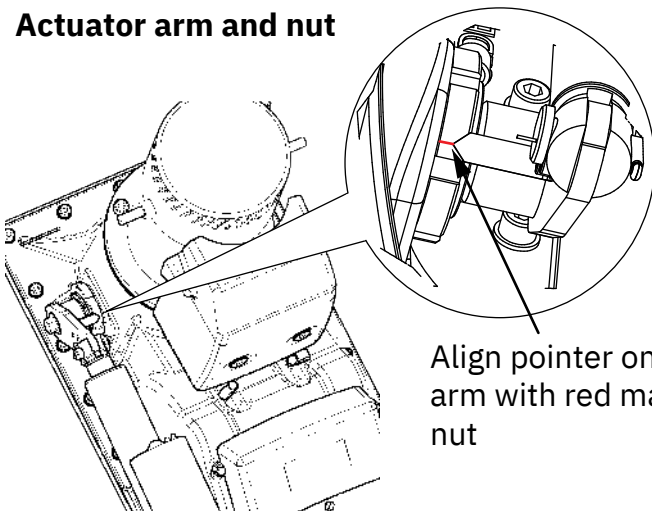
Normal mode, Service mode (actuators operated by UP/DOWN buttons).

Re-calibrated "down"-position.

Flashing green light:

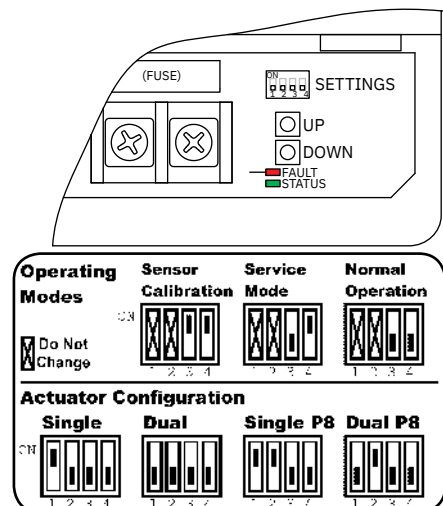
No S-Link communication.

Actuator arm and nut



Align pointer on lever arm with red mark on nut

Controller



MG_0108

For **Control Panel** installation please refer to the Installation Guide accompanying the control panel to be installed.



Find your local professional dealer from our certified worldwide network for expert service and support. visit our website www.sleipnergrouper.com/support

Product Spare Parts and Additional Resources

For additional supporting documentation, we advise you to visit our website www.sleipnergrouper.com and find your Sleipner product.

Warranty statement

1. Sleipner Motor AS (The “Warrantor”) warrants that the equipment (parts, materials, and embedded software of products) manufactured by the Warrantor is free from defects in workmanship and materials for purpose for which the equipment is intended and under normal use and maintenance service (the “Warranty”).
2. This Warranty is in effect for two years (Leisure Use) or one year (Commercial and other Non-leisure Use) from the date of delivery/purchase by the end user, with the following exceptions:
 - (a) For demonstration vessels, or vessels kept on the water, the dealer is considered as the end user from 6 months after their launch of the vessel;
 - (b) The warranty period starts no later than 18 months after the first launch of the vessel.
 Please note that the boat manufacturer and dealer must pay particular attention to correct maintenance and service both by the products manuals as well as general good practice for the location the boat is kept in the period the boat is in their care. In cases where the 6 and 18 months grace periods for boat builders and dealers are passed, it is possible to obtain a full warranty upon inspection and approval of the warrantor or such representative.
3. Certain parts, classified as wearable or service parts, are not covered by the warranty. A failure to follow the required maintenance and service work as described in the product manual render all warranty on parts or components directly or indirectly affected by this void. Please also note that for some parts, time is also a factor separately from actual operational hours.
4. This Warranty is transferable and covers the equipment for the specified warranty period.
5. The warranty does not apply to defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically designed as waterproof.
6. In case the equipment seems to be defective, the warranty holder (the “Claimant”) must do the following to make a claim:
 - (a) Contact the dealer or service centre where the equipment was purchased and make the claim. Alternatively, the Claimant can make the claim to a dealer or service centre found at www.sleipnergrouper.com. The Claimant must present a detailed written statement of the nature and circumstances of the defect, to the best of the Claimant’s knowledge, including product identification and serial nbr., the date and place of purchase and the name and address of the installer. Proof of purchase date should be included with the claim, to verify that the warranty period has not expired;
 - (b) Make the equipment available for troubleshooting and repair, with direct and workable access, including dismantling of furnishings or similar, if any, either at the premises of the Warrantor or an authorised service representative approved by the Warrantor. Equipment can only be returned to the Warrantor or an authorised service representative for repair following a pre-approval by the Warrantor’s Help Desk and if so, with the Return Authorisation Number visible postage/shipping prepaid and at the expense of the Claimant.
7. Examination and handling of the warranty claim:
 - (a) If upon the Warrantor’s or authorised service Representative’s examination, the defect is determined to result from defective material or workmanship in the warranty period, the equipment will be repaired or replaced at the Warrantor’s option without charge, and returned to the Purchaser at the Warrantor’s expense. If, on the other hand, the claim is determined to result from circumstances such as described in section 4 above or a result of wear and tear exceeding that for which the equipment is intended (e.g. commercial use of equipment intended for leisure use), the costs for the troubleshooting and repair shall be borne by the Claimant;
 - (b) No refund of the purchase price will be granted to the Claimant, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. In the event that attempts to remedy the defect have failed, the Claimant may claim a refund of the purchase price, provided that the Claimant submits a statement in writing from a professional boating equipment supplier that the installation instructions of the Installation and Operation Manual have been complied with and that the defect remains.
8. Warranty service shall be performed only by the Warrantor, or an authorised service representative, and any attempt to remedy the defect by anyone else shall render this warranty void.
9. No other warranty is given beyond those described above, implied or otherwise, including any implied warranty of merchantability, fitness for a particular purpose other than the purpose for which the equipment is intended, and any other obligations on the part of the Warrantor or its employees and representatives.
10. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives based on this Warranty for injury to any person or persons, or damage to property, loss of income or profit, or any other incidental, consequential or resulting damage or cost claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment or damages arising from collision with other vessels or objects.
11. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.

Patents

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