



Installation Guide

For E-vision Electric Retractable Thruster Models
ER-L&V100



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MI

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Installation Manual

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WARNING

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.



MC_0627

MC_0020

Responsibility of the installer

MC_0038

General:

- The installer must read this document to ensure necessary familiarity with the product before installation.
- Directions outlined in this document cannot be guaranteed to comply with all international and national regulations, including but not limited to health and safety procedures. It is the installer's responsibility to adhere to all applicable international and national regulations when installing Sleipner products.
- This document contains general installation guidelines intended to support experienced installers. Contact professional installers familiar with the vessel and applicable regulations if assistance is required.
- If local regulation requires any electrical work to be performed by a licensed professional, seek a licensed professional.
- When planning the installation of Sleipner products, ensure easy access to the products for future service and inspection requirements.

Responsibility of the installer

MC_0440

For retract thrusters:

MC_0474

- The installation position of stern-mounted retract thrusters must not conflict with the propulsion propellers or their 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 Sleipner thruster systems:

MC_0425

- Do not install the thruster system in any position that requires modifying the stiffener/ stringer/ supports, which may jeopardize the hull integrity. Consult with the boat builder to see if this can be done safely if absolutely necessary.
- Never run the thruster out of water without load. Without load or resistance, the thruster propeller RPM will reach extremely high speed, damaging the system.
- The thruster motor must be handled with care. Do not rest the thruster on its drive shaft, as its weight can damage it.

For lithium batteries for proportional thruster systems:

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).

For Sleipner S-Link™ systems:

MC_0105

- When installing an S-Link™ system, connect ONLY original Sleipner S-Link™ products or other authorized control equipment directly to the S-Link™ bus. When connecting non-authorized third-party equipment, it must always be connected through a Sleipner-supplied interface product.
- Any attempt to directly control or connect to the S-Link™ control system without a designated and approved interface from Sleipner will void all warranties and responsibilities of the connected Sleipner products. If you interface 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.

For Sleipner eVision electric motors:

MC_0452

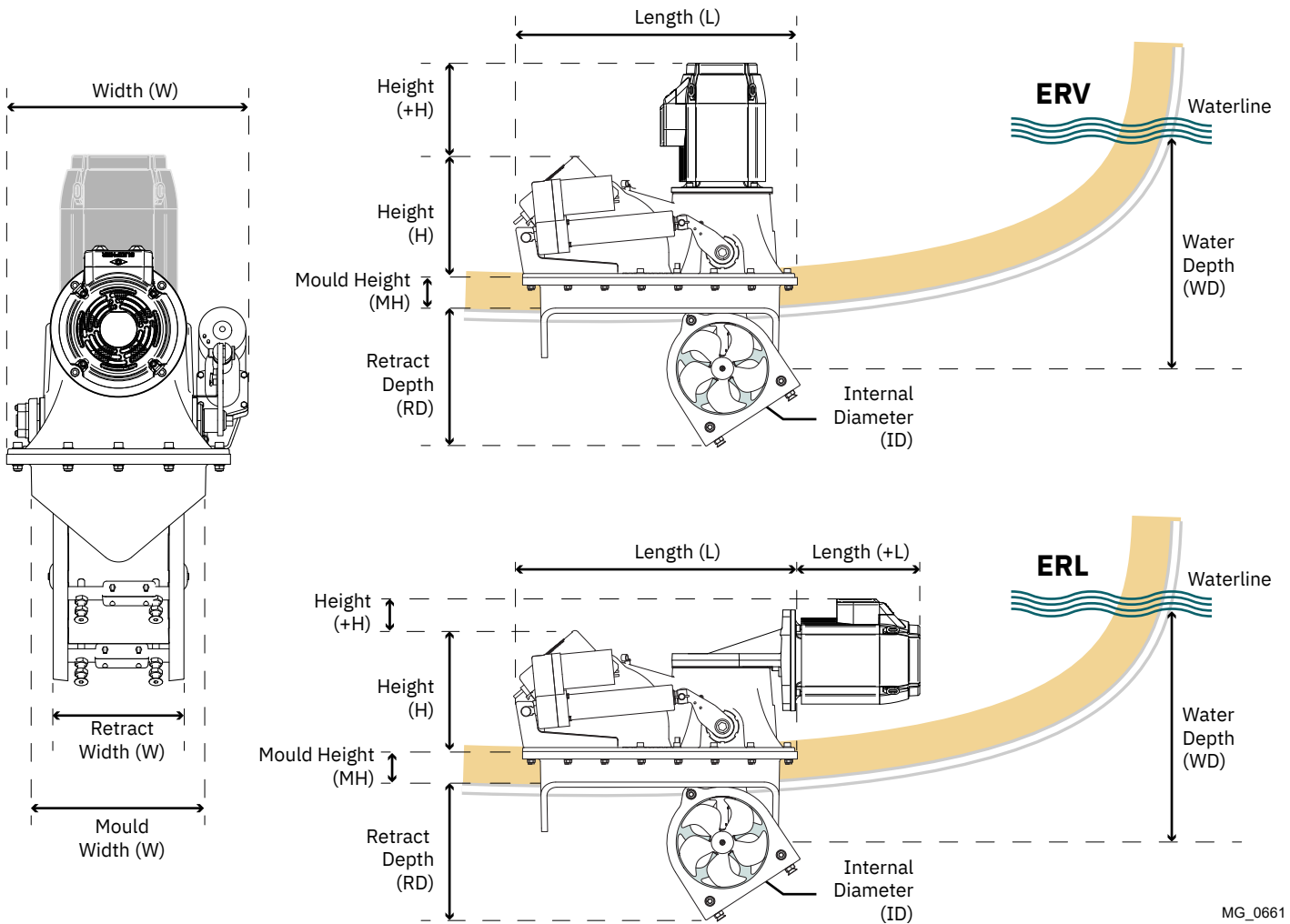
- When installing the thruster electric motor in small compartments, ensure the compartment is well ventilated to allow for cooling of the electric motor.
- If the height of the room you are installing the thruster is limited, the thruster can be installed horizontally or at any angle in-between.
 - 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 150000 must be upgraded to firmware version V1.036 or newer. Function must be configured to "ERV/ERL" on both 150000 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.

Do NOT remove the Red spacer block until the installation is completed.



| Measurement code | Measurement description | ERV100 ^{24V} | | ERV100 ^{48V} | |
|------------------|---|-----------------------|------|-----------------------|------|
| | | mm | inch | mm | inch |
| L | SRF flange & motor housing length | 563 | 22 | 563 | 22 |
| +H | Motor supplementary measurement (Height) | 232 | 9,1 | 232 | 9,1 |
| H | Motor housing height | 245 | 9,6 | 245 | 9,6 |
| MH | SRF flange height | 62 | 2,4 | 62 | 2,4 |
| RD | Retracted hatch supplementary measurement | 271 | 10,5 | 271 | 10,5 |
| ID | Tunnel diameter | 185 | 7,3 | 185 | 7,3 |
| W | SRF flange & motor housing width | 356 | 14 | 356 | 14 |
| RW | Retracted hatch width | 195 | 7,7 | 195 | 7,7 |
| MW | SRF flange inner frame width | 265 | 10,4 | 265 | 10,4 |

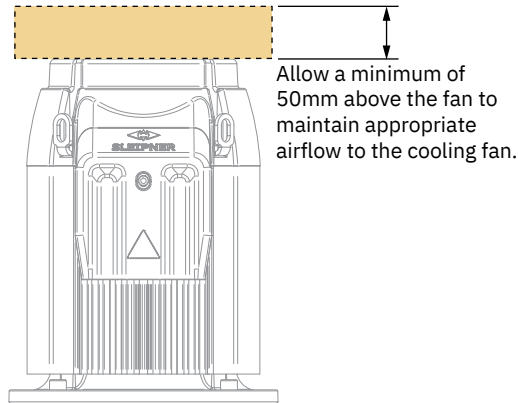
| Measurement code | Measurement description | ERL100 ^{24V} | | ERL100 ^{48V} | |
|------------------|---|-----------------------|------|-----------------------|------|
| | | mm | inch | mm | inch |
| L | SRF flange & motor housing length | 563 | 22 | 563 | 22 |
| +H | Motor supplementary measurement (Height) | 94 | 3,7 | 94 | 3,7 |
| H | Motor housing height | 245 | 9,6 | 245 | 9,6 |
| MH | SRF flange height | 62 | 2,4 | 62 | 2,4 |
| RD | Retracted hatch supplementary measurement | 275 | 10,8 | 275 | 10,8 |
| ID | Tunnel diameter | 185 | 7,3 | 185 | 7,3 |
| W | SRF flange & motor housing width | 359 | 14,1 | 359 | 14,1 |
| RW | Retracted hatch width | 195 | 7,7 | 195 | 7,7 |
| MW | SRF flange inner frame width | 265 | 10,4 | 265 | 10,4 |



Product Clearance Requirements

MC_0672

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 |
|------------|---------------------------|---------------------------|---------------------------|----------------------|-----------------|---|
| ERV100 24V | 21V | 31V | 100 kg / 220 lbs (21V) | 6.3 kW / 8.4 hp | TBA | Runtime @ 100% thrust: Continuous @ 22°C ambient, typically limited by battery capacity |
| ERV100 48V | 42V | 62V | 100 kg / 220 lbs (21V) | 6.3 kW / 8.4 hp | TBA | |
| ERL100 24V | 21V | 31V | 100 kg / 220 lbs (21V) | 5.6 kW / 7.6 hp | TBA | |
| ERL100 48V | 42V | 62V | 100 kg / 220 lbs (21V) | 5.6 kW / 7.6 hp | TBA | |

Hull specifications

MC_0609

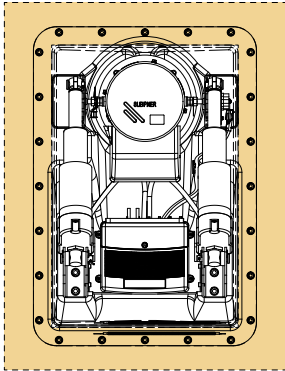
Use sealants, adhesives or bonding material compatible with the materials of your vessels hull and Sleipner product.
For information regards the material in Sleipner products, see table.

| 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 |

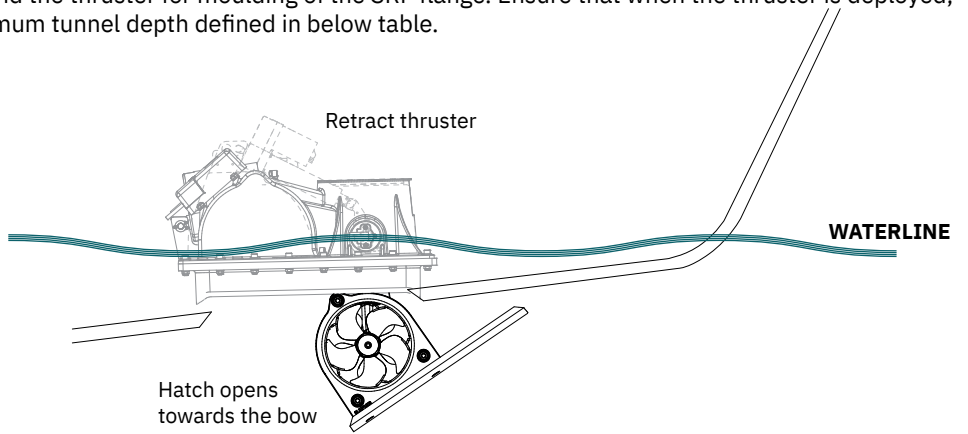
Positioning of the retract thruster

Retract Thruster

The thruster must always be installed so the hatch is opened towards the bow. Ensure enough space for the complete retract unit including room for installation of SRF flange and for future service. Allow minimum 100mm 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.



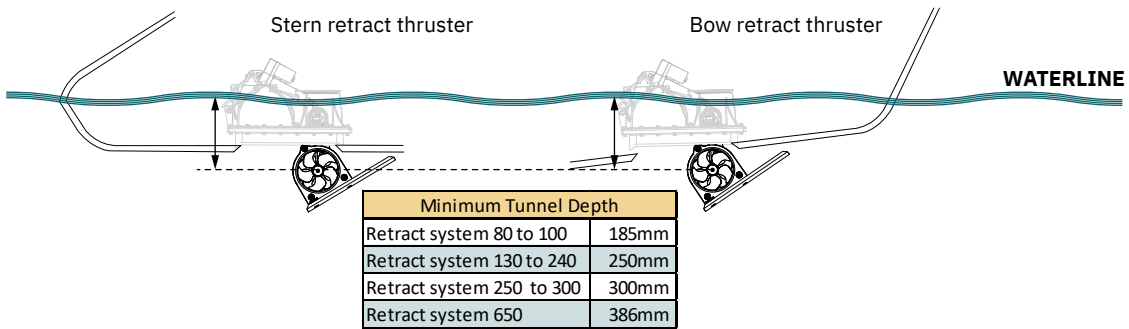
100mm of clear space around the thruster for moulding of the SRF flange.



Hatch opens towards the bow

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

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

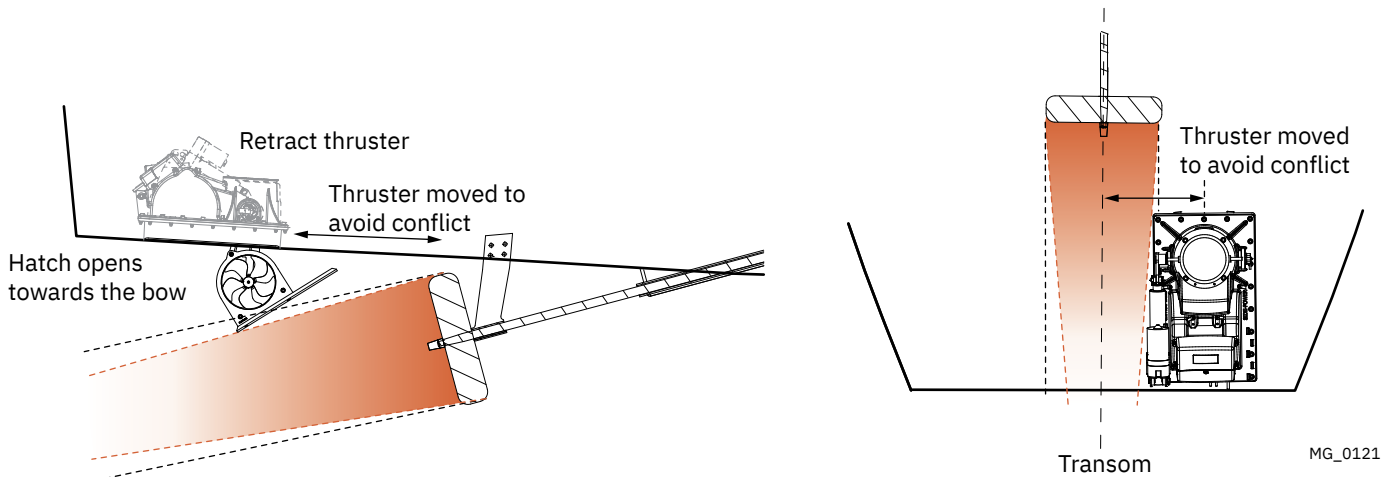


Bow installation

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.

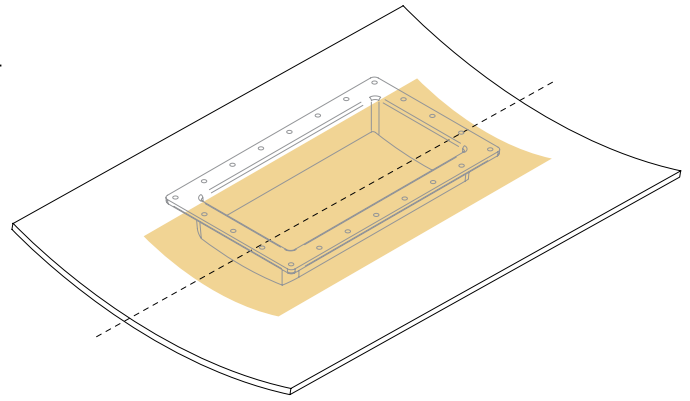
Stern installation

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



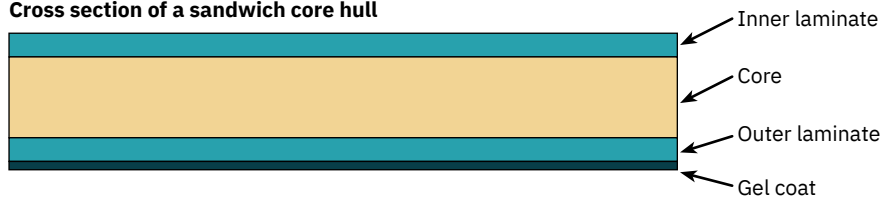
MG_0121

- Ensure to have a minimum of 100mm space around the thruster installation to have service access.
- Bow thrusters must be positioned on the boat center line.
- Stern thrusters can be positioned off the centre line.

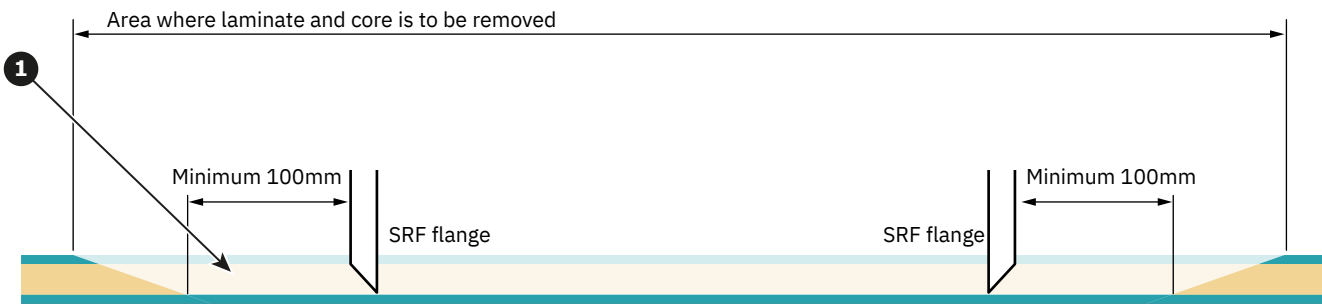


For vessels with sandwich hull construction, additional reinforcement of the area around the SRF flange is required.

Cross section of a sandwich core hull



- 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. (**Reference 1**).
- Reinforce the area by applying several bonding layers to strengthen the hull for the operation of the retract thruster. (**Reference 2**).

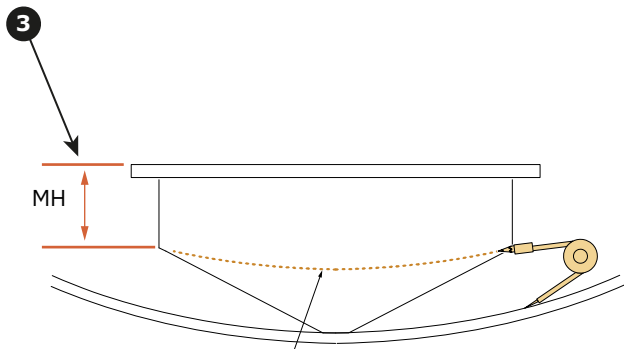
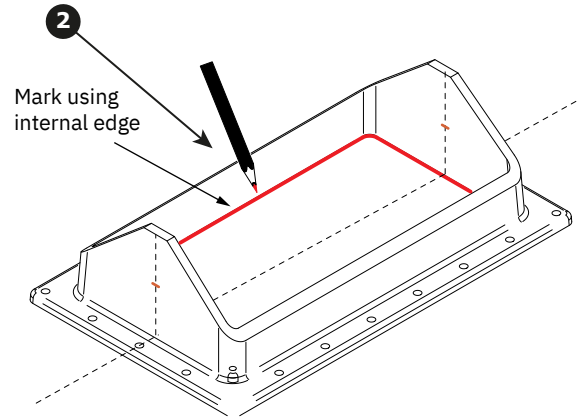
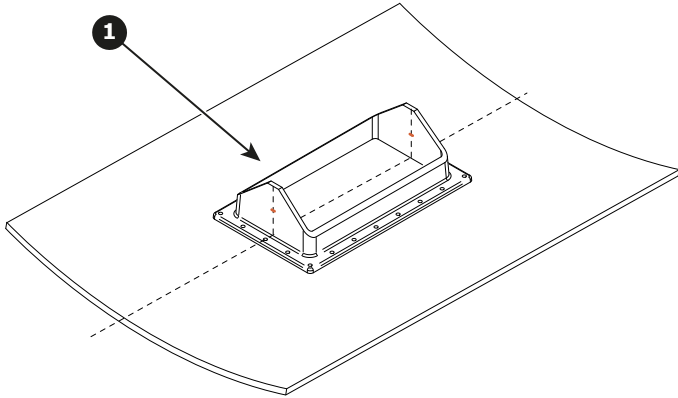


MG_0831

- Flip the SRF flange upside down and position it at the identified installation location. **(Reference 1)**.
 - For bow thrusters, this is usually symmetrical about the vessel centerline.
 - For stern thrusters, the position of the thruster may deviate from centerline.
- Use the internal edge to mark where to cut out the thruster hatch from the hull. **(Reference 2)**.
- The SRF flange must be adapted so that the two longitudinal edges on the SRF flange run flush with the hull. To do so the SRF flange must be trimmed down to match the hull profile curvature. Use a suitable tool to mark the cutting line on the SRF flange. **(Reference 3)**.

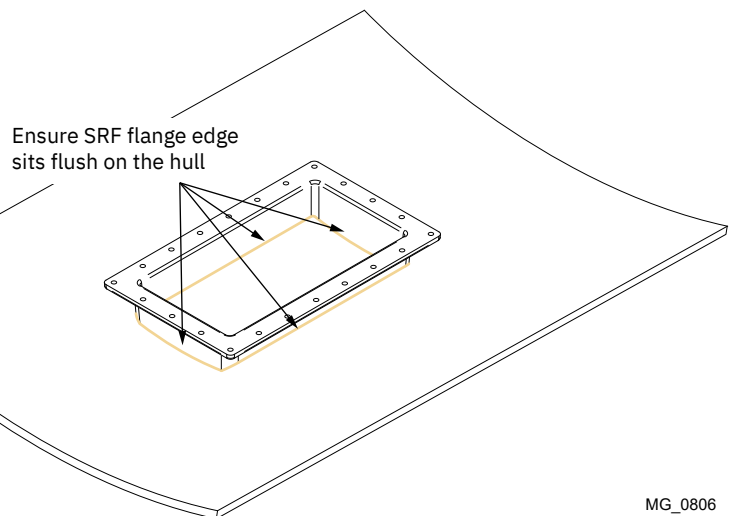
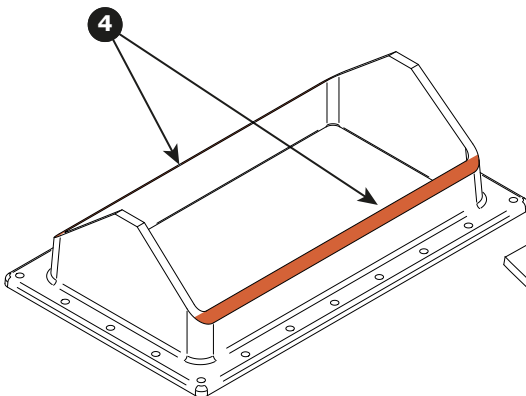
Important: The cutting line position must be according to the MH measurement for the actual thruster model. See table in topic "Thruster measurement".

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 at this stage. **(Reference 4)**

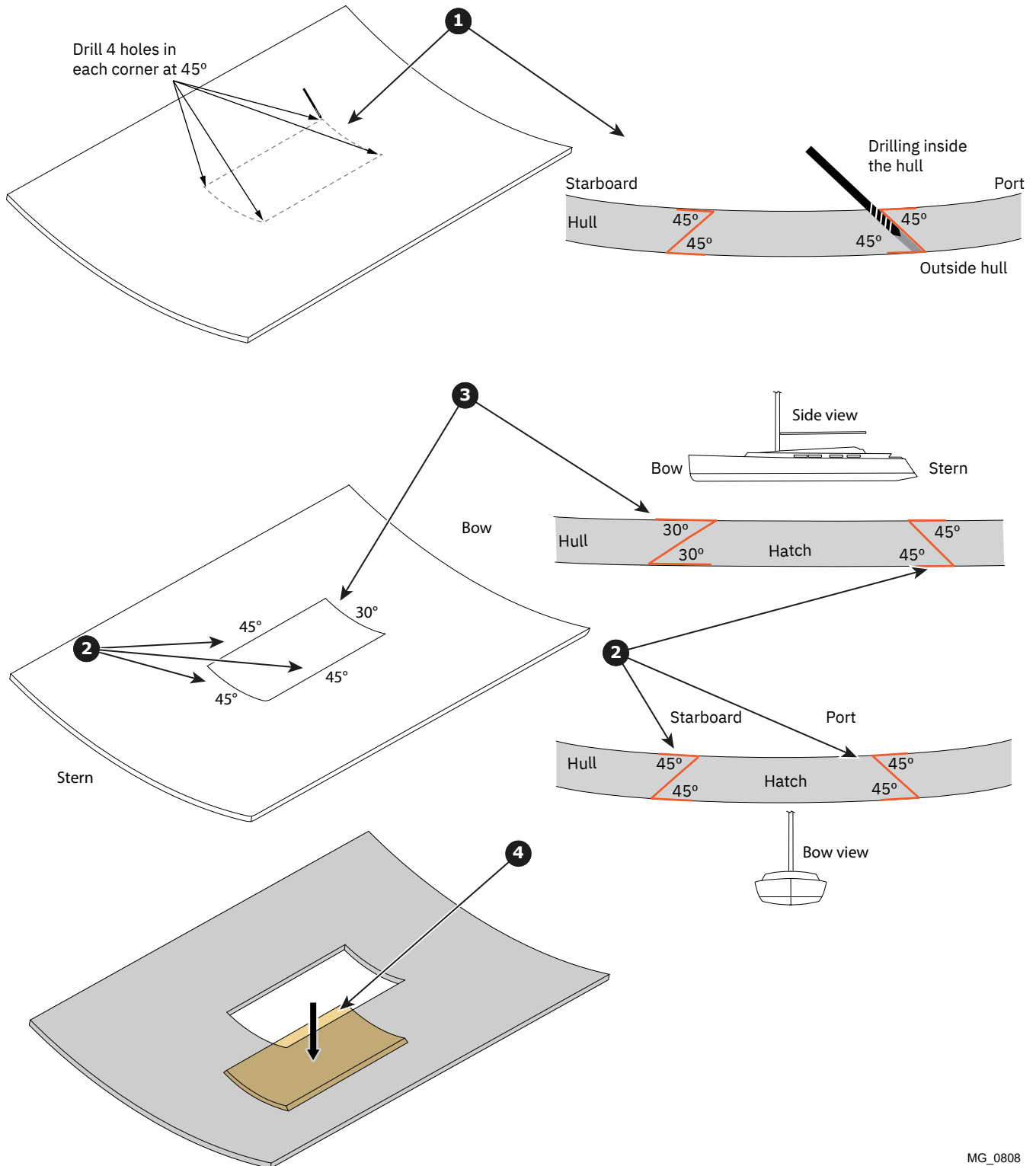


Important
 The minimum SRF flange height is stated on the product measurement page (MH)

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

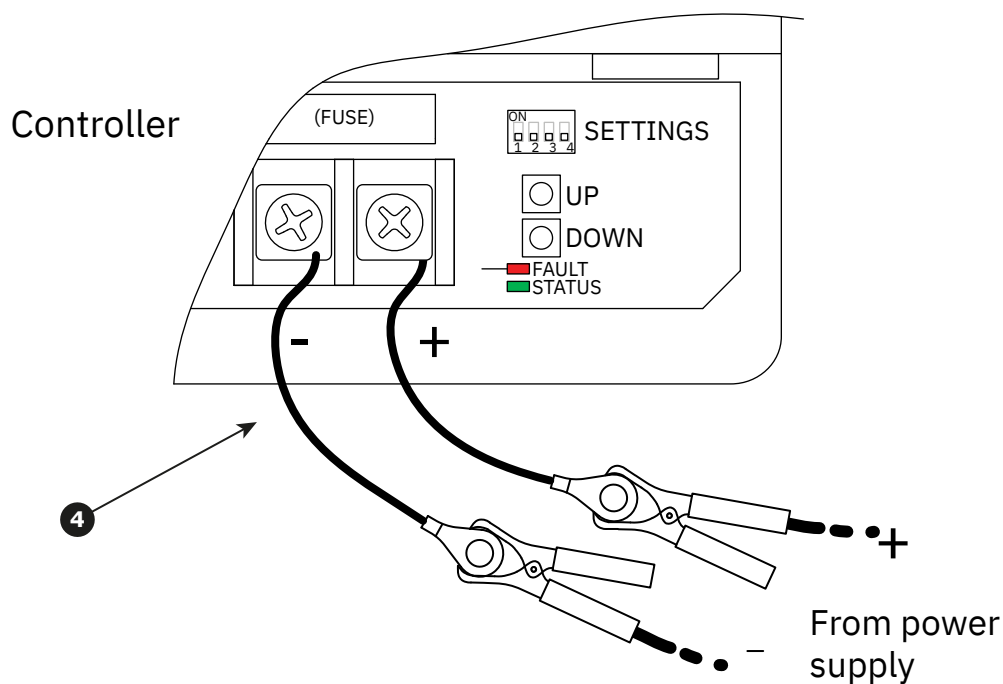
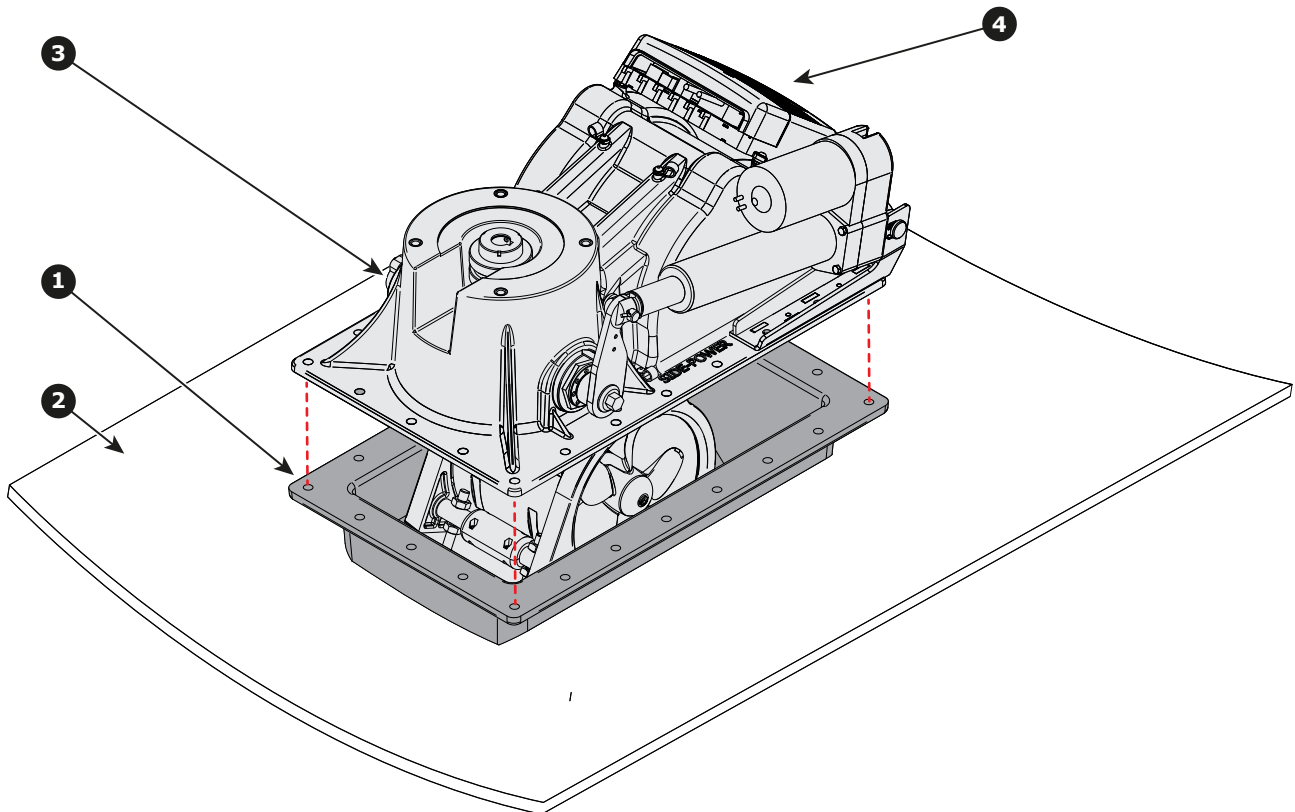


- When cutting from inside, prepare for cutting by drilling 4 holes in each corner of the marked area at 45° angle inwards against the centerline (**Reference 1**).
- The hatch opening must be cut at an angle of 45° on starboard, port and stern sides, (**Reference 2**), and 30° on the side facing the bow (**Reference 3**). This ensures that forces from water hitting the closed hatch is absorbed by the hull. **NOTE: It is of great importance that these cutting angles are correct. Otherwise the hatch will jam during opening. Use a suitable cutting tool able to be set to the desired angle, e.g. a jigsaw.**
- Remove the hatch from the hull. Prevent the hatch from falling down, ensure proper support to the hatch when cutting. (**Reference 4**).

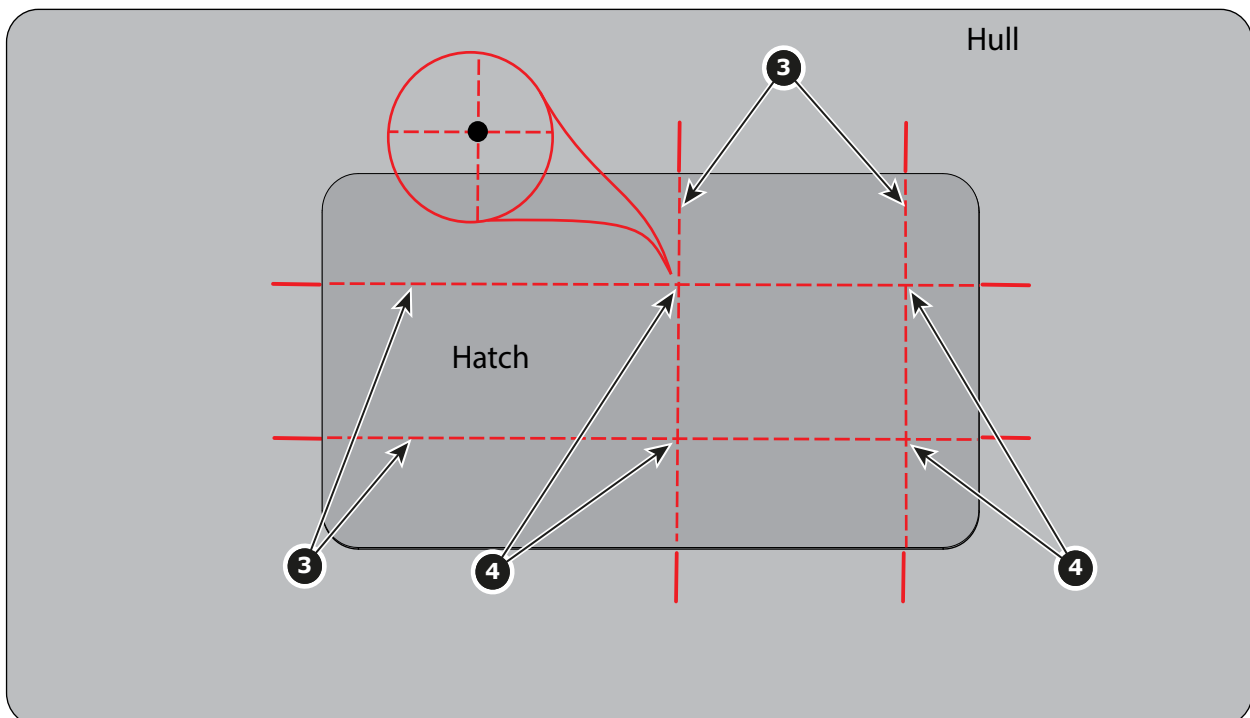
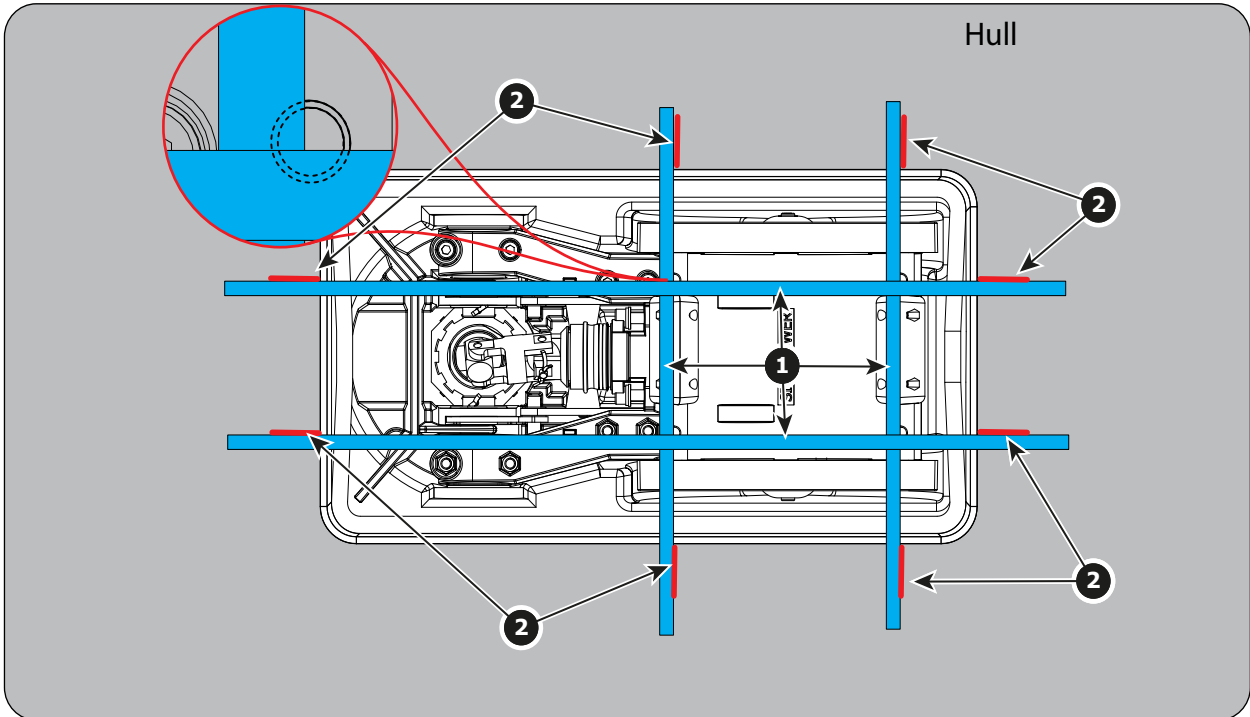


MG_0808

- Position the trimmed SRF flange (**Reference 1**) in the correct position over the hatch cut-out in the hull (**Reference 2**).
- Install the thruster housing (**Reference 3**) provisionally on the SRF flange, and secure it with 4 screws. Verify that the complete thruster assembly (SRF flange and thruster housing) is still in correct position.
- Prepare two power supply cables from the retract controller (**Reference 4**). Do not connect to the power supply yet.
- **Tip:** For some thruster models, the motor is mounted on the thruster housing when delivered. The pre- mount process may be easier if the motor is removed from the housing before the pre- mount process is performed as shown in the figure below.

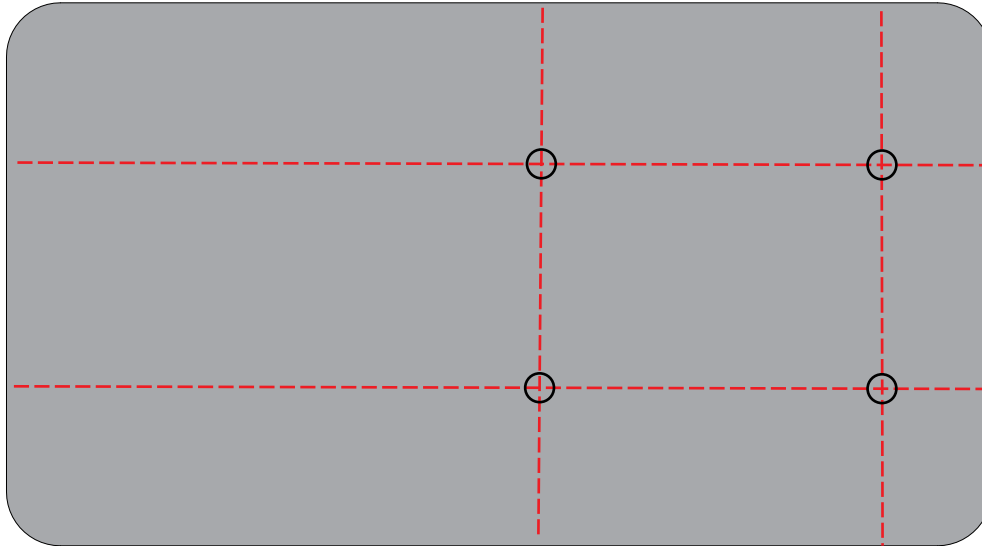


- Ensure that the SRF flange and the thruster housing are positioned correctly inside the hull. (See the previous topic).
- Use a suitable aid, e.g. adhesive tape, straight edge, laser or other adequate aid to follow a straight line over the center of the hatch bolt holes, in two directions. (**Reference 1, and detail bubble**).
- Apply marks on the hull, at the edges of the used aid, on the side facing the center of the bolt holes. (**Reference 2**)
- Remove the adhesive tape (or other used aid).
- Position the pre-cut hatch in the opening in the hull, and support it in its position.
- Use a flexible ruler or similar to draw extended lines on the hatch, between the marks created on the hull. (**Reference 3**).
- The correct position of the hatch attachment holes are now in the intersection of the extended lines on the hatch. Make a mark in each intersection (**Reference 4**).



MG_0807

- Drill four Ø11mm holes in the center of each marking created in the previous step.
- It is recommended to use a pillar drill with a proper construction surface to ensure that the holes are drilled perpendicular to the hatch.
- Countersunk the holes after drilling.



MG_0811

Temporarily setting up the complete installation to ensure no conflicts during the final operation of the thruster.

- Temporarily attach the hatch to the thruster housing by using the M10 countersunk bolts through the drilled holes in the hatch and screw them in to the hatch bolt holes. **(Reference 1)**.
NB: Ensure correct orientation for the thruster to open the hatch facing the bow. Remember attachment is for temporary checking of thruster operation only.
- Ensure that the hatch is in proper place **(Reference 2)**.
- Connect the prepared power supply cables from the thruster controller to a power supply.
(NB: Refer to the label on actuators for correct voltage)
- Set switch no. 4 on the DIP-switch marked "SETTINGS" to ON.
- 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, **(Reference 3)**, the SRF flange must be adapted so that the hatch does no longer touch the hull when in open position. **(Reference 4)**.
- If necessary:
Grind the front and side edges of the flange a necessary amount to obtain space between the hull and the hatch. **(Reference 5)**. Note that the reference 5 illustration shows an excessive grind down in the shaded area to clarify the operation.
- Ensure that there is a space between the twist ring and the hatch during the grinding process. **Do not allow this space to be zero. (Reference 6)**.

IMPORTANT

- If the space between the hull and the hatch is not obtained by the grinding process alone, (still with a space between the twist ring and the hatch), the flange must in addition be lifted in the aft end. Use wedges to obtain the correct height **(Reference 7)**. When correct position is obtained, mark the wedge positions, and note the distance between the flange and the hull.

IMPORTANT

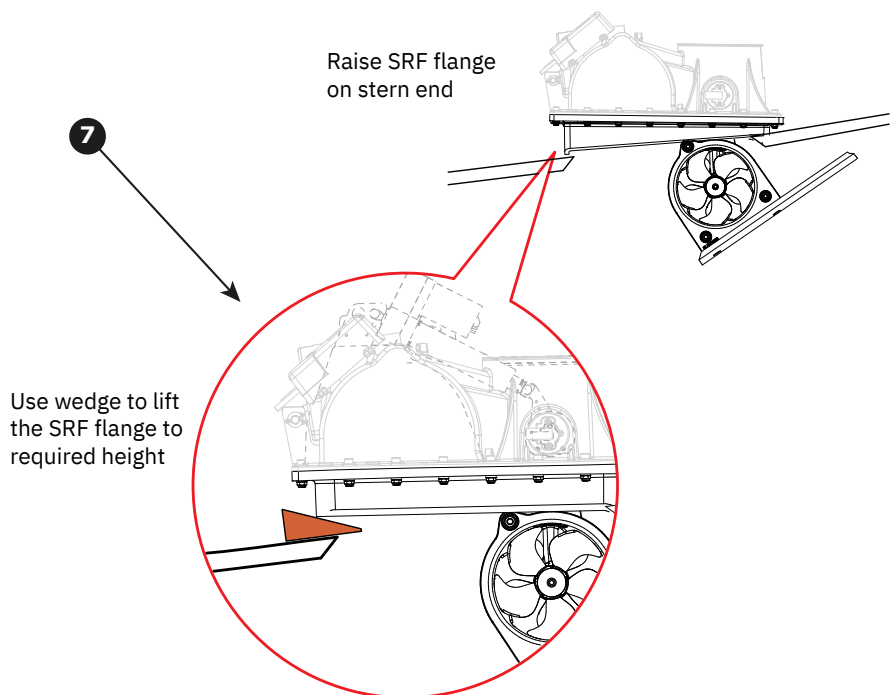
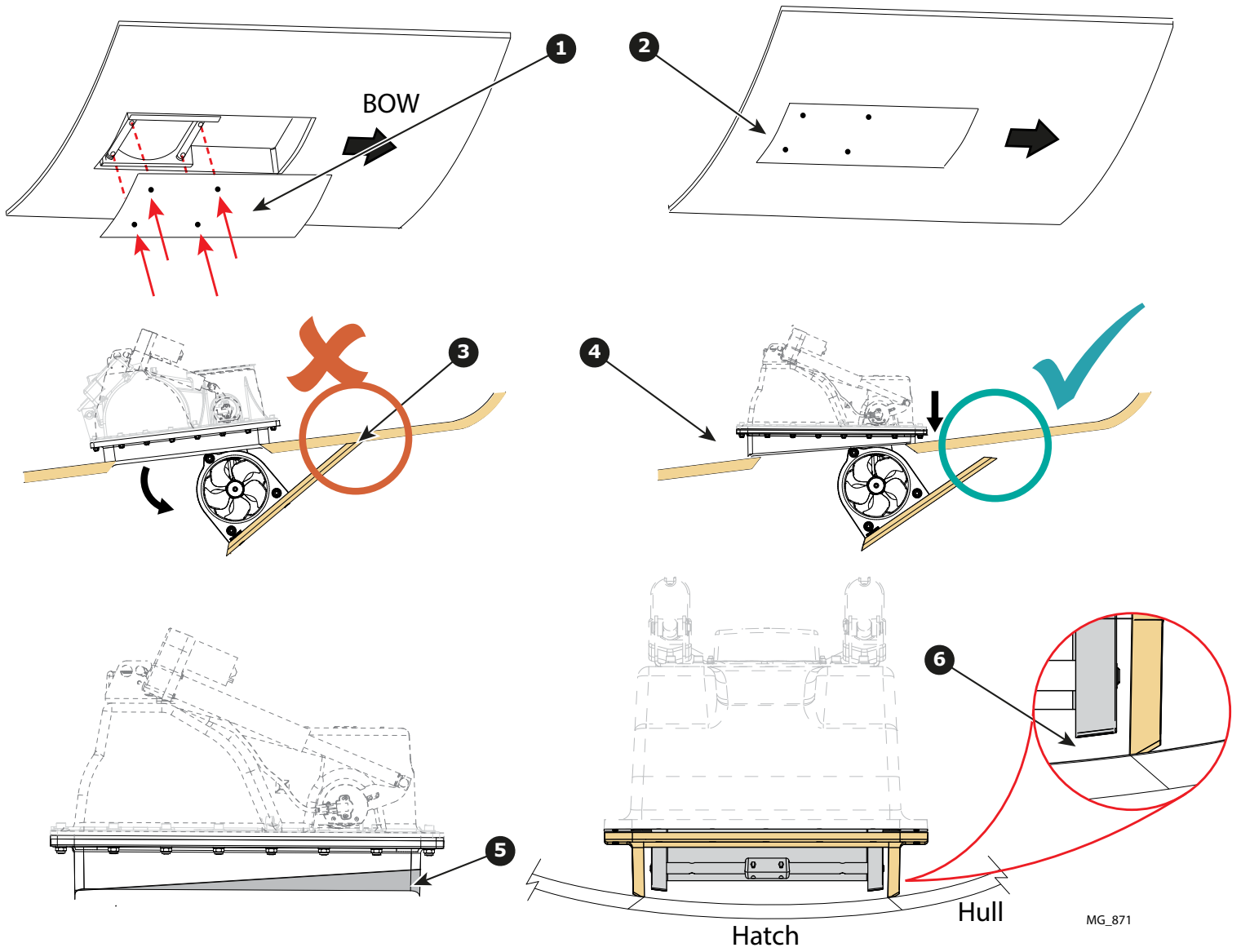
The hatch contact edges and the hull contact edges MUST work as the mechanical end stop. During cruising, slamming forces from the water must be absorbed by these areas, not the thruster.



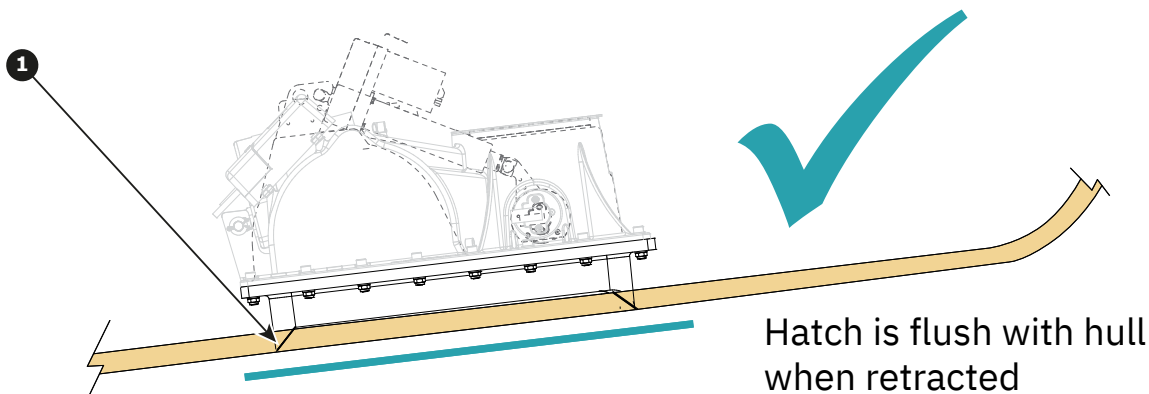
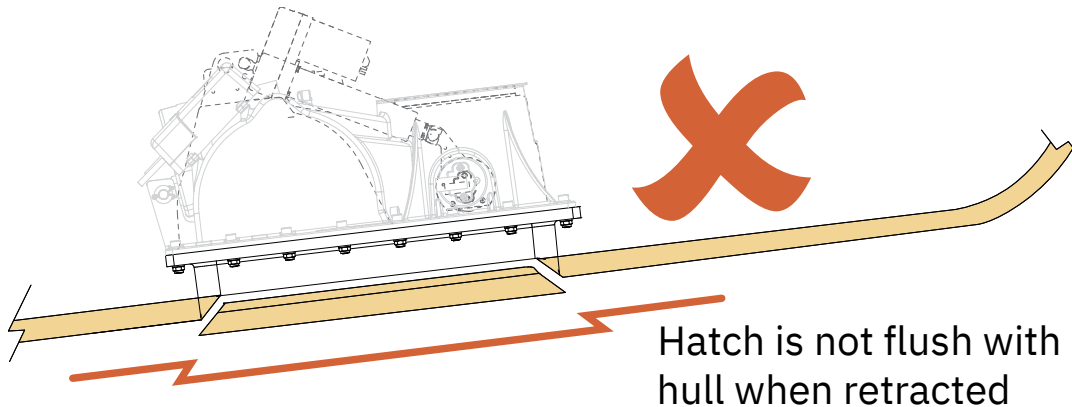
CAUTION.

Accidental activation of the retract mechanism can cause serious injury due to the high pressure force used for moving the hatch. Use caution when performing any work or maintenance around or inside the retract mechanism / hatch.

Pre-install the hatch



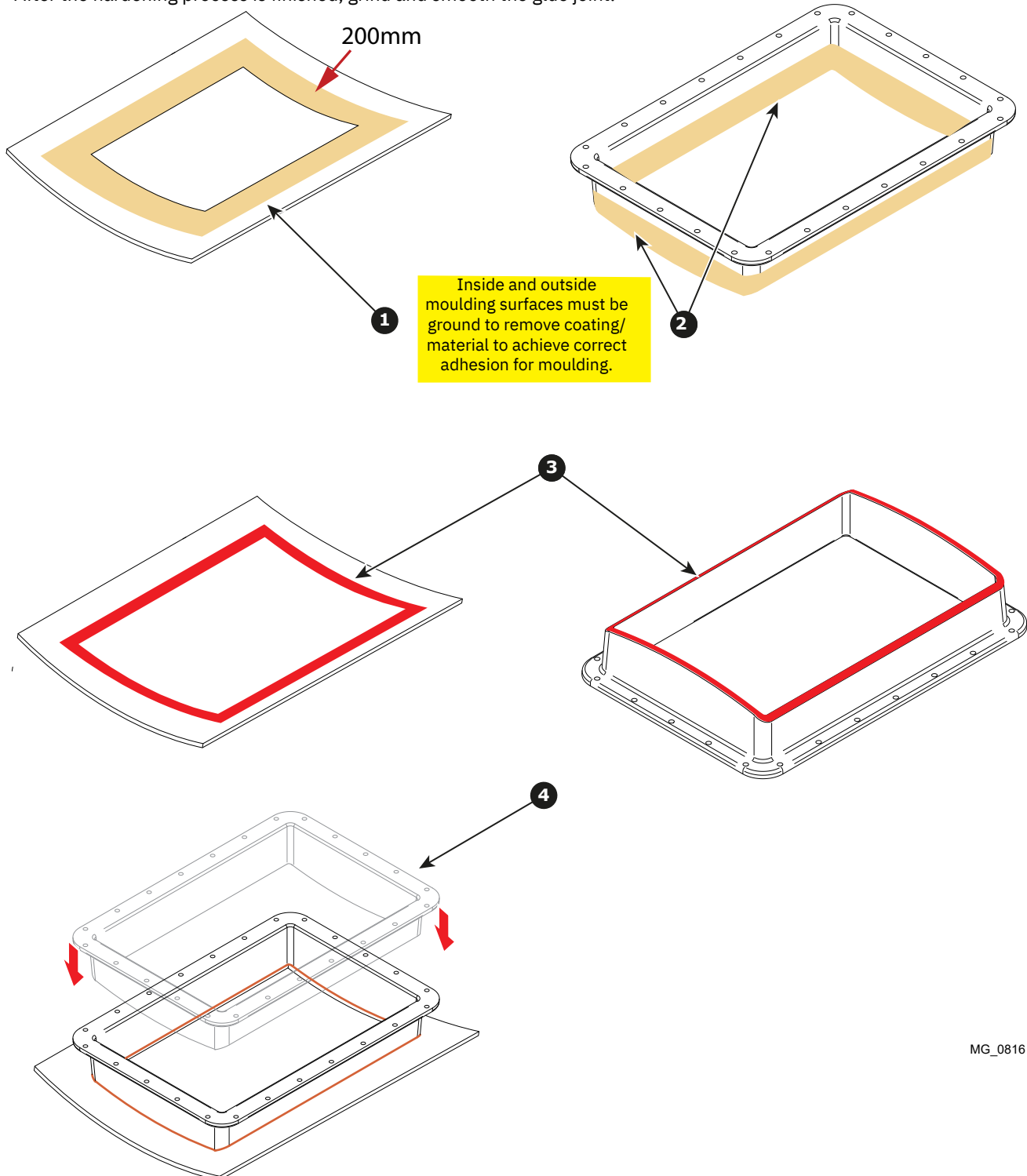
- Press “UP” to retract the tunnel.
- Ensure that the hatch is fitted in the hatch opening, and that the hatch is aligned flush with the hull at all edges. (**Reference 1**).
- Ensure that there is pressure on all the contact surfaces between the hatch and the hull when the hatch is closed.
- If the hatch is not closing with pressure on all the contact surfaces, the entire SRF flange must be raised to obtain this.
- When the thruster is operating as required, ensure that the position of the SRF flange can be recreated by adding position marks and leveling measurements.
- Remove the thruster housing from the SRF flange.



MG_0815

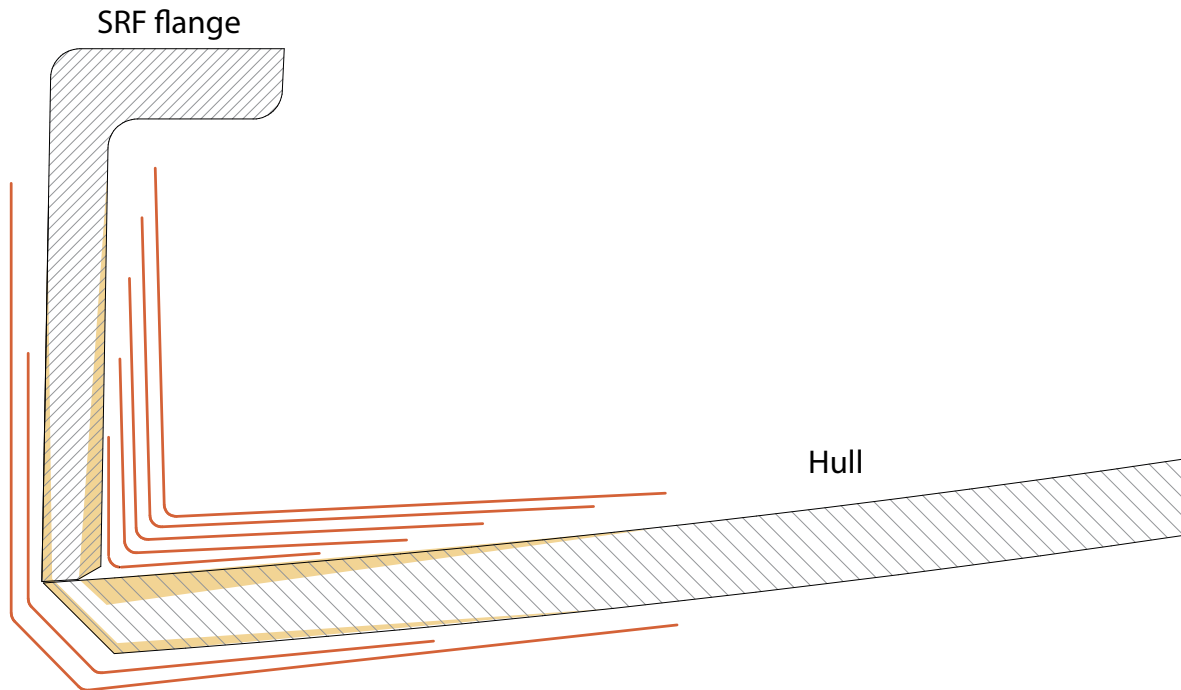
Before grinding of hull and SRF flange, precautions must be taken against grinding dust inside the boat. Surfaces to be moulded/bonded must be ground to remove coating and material to achieve sufficient adhesion.

- Grind and smooth the area inside the hull opening to remove the gelcoat. Remove the gelcoat in a width of 200mm. **(Reference 1).**
- Grind the inside and outside of the SRF flange to remove the gelcoat **(Reference 2).**
- Apply appropriate glue / adhesive inside the hull opening and on the bottom of the SRF flange **(Reference 3).** Apply enough glue to fill the possible space between the raised SRF flange and the hull. Reinstall the wedges from the pre-install procedure if used to obtain the correct height in the aft end of the flange.
- Lower the SRF flange on to the hull, and position it according to the marks and measurement performed in the previous steps. **(Reference 4).**
- After the SRF is positioned correctly, remove the excessive glue before the hardening process starts.
- After the hardening process is finished, grind and smooth the glue joint.



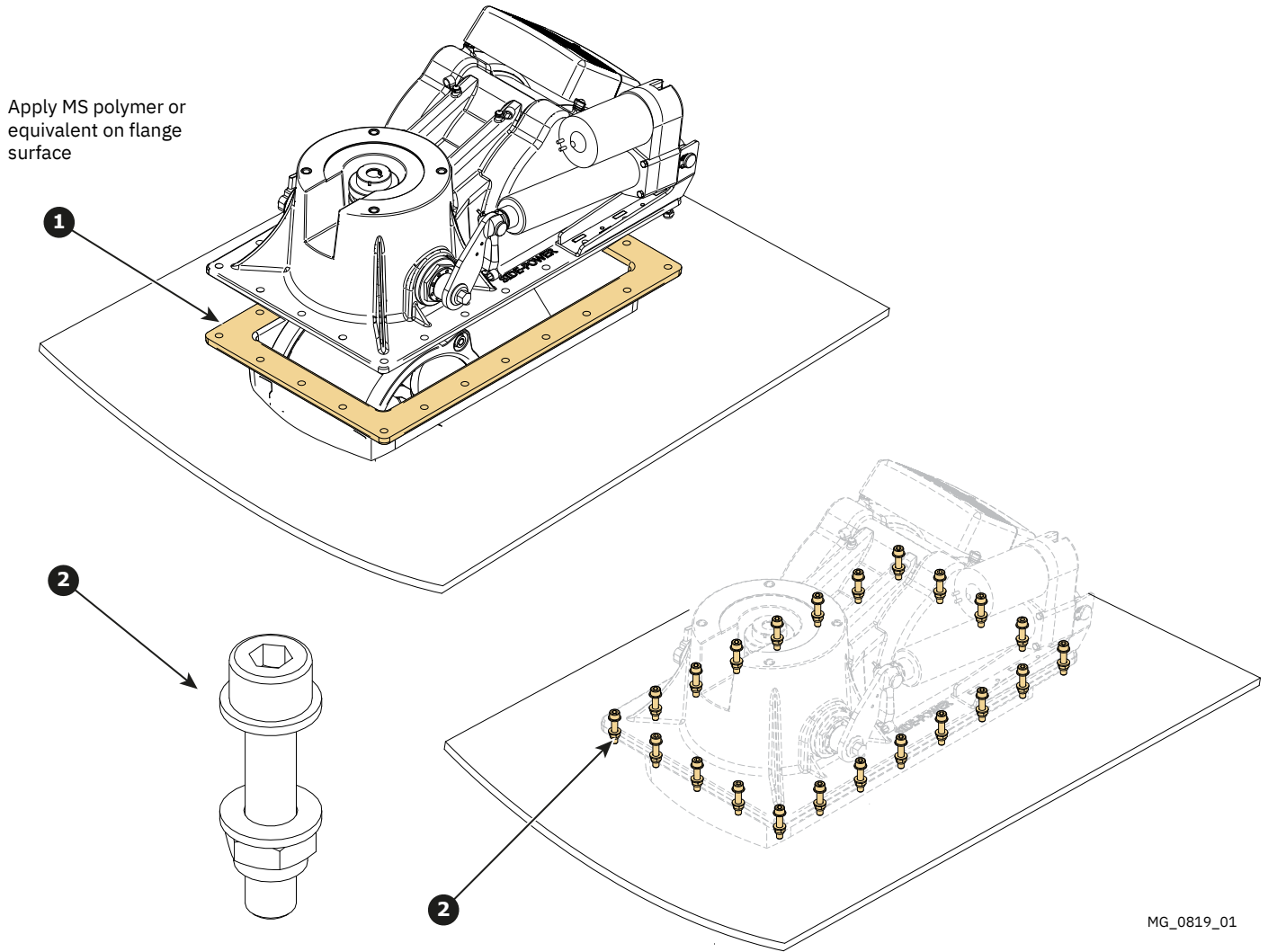
MG_0816

- After the glue / adhesive has hardened completely, the inside and outside of the SRF flange and hull must be laminated. Apply several layers of fibreglass and ensure that the resin and fibreglass is compatible with hull and flange materials.
- When the laminated area has cured properly, smooth all moulded surfaces and apply coating.
- Apply putty before coating if necessary.

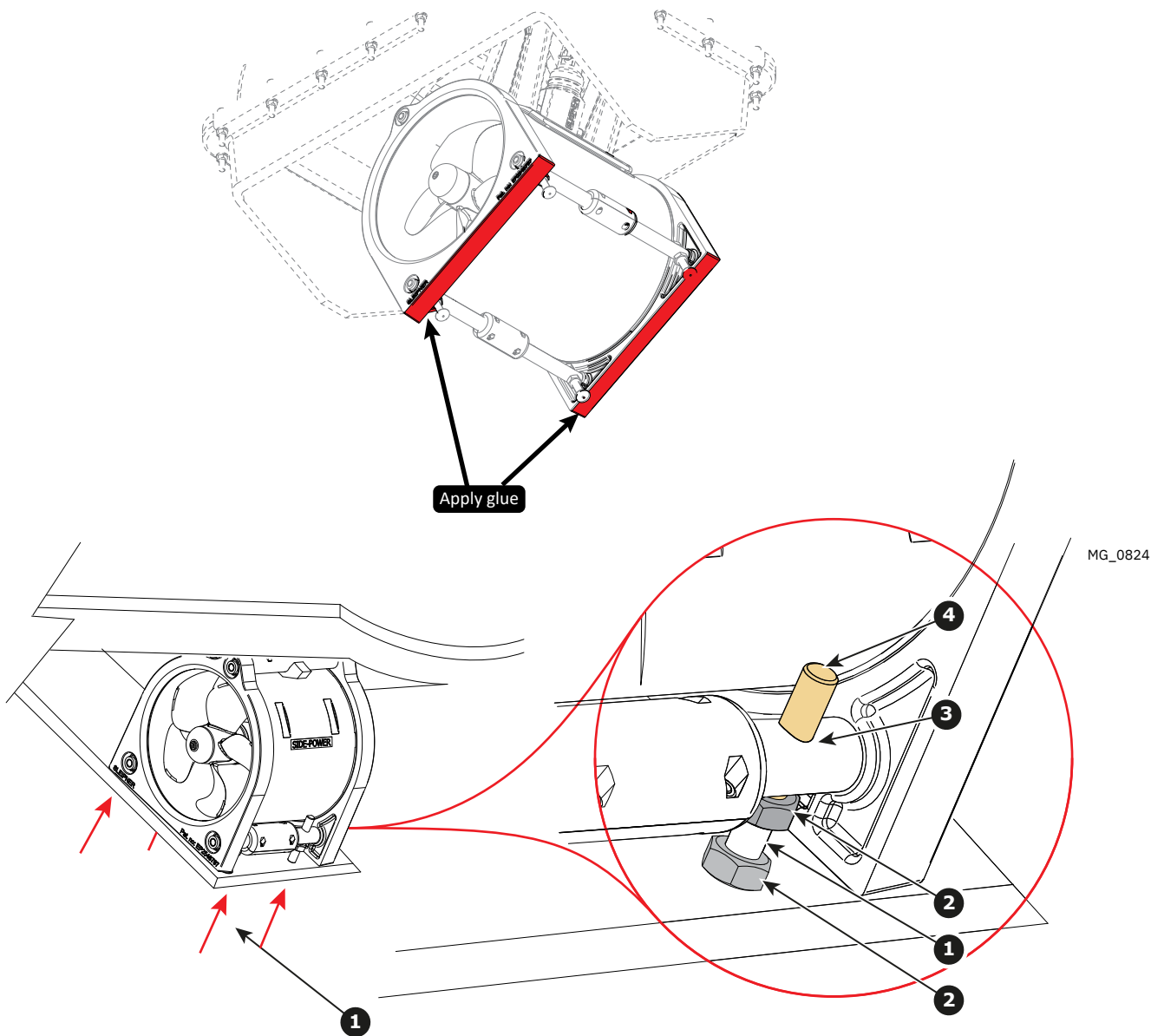


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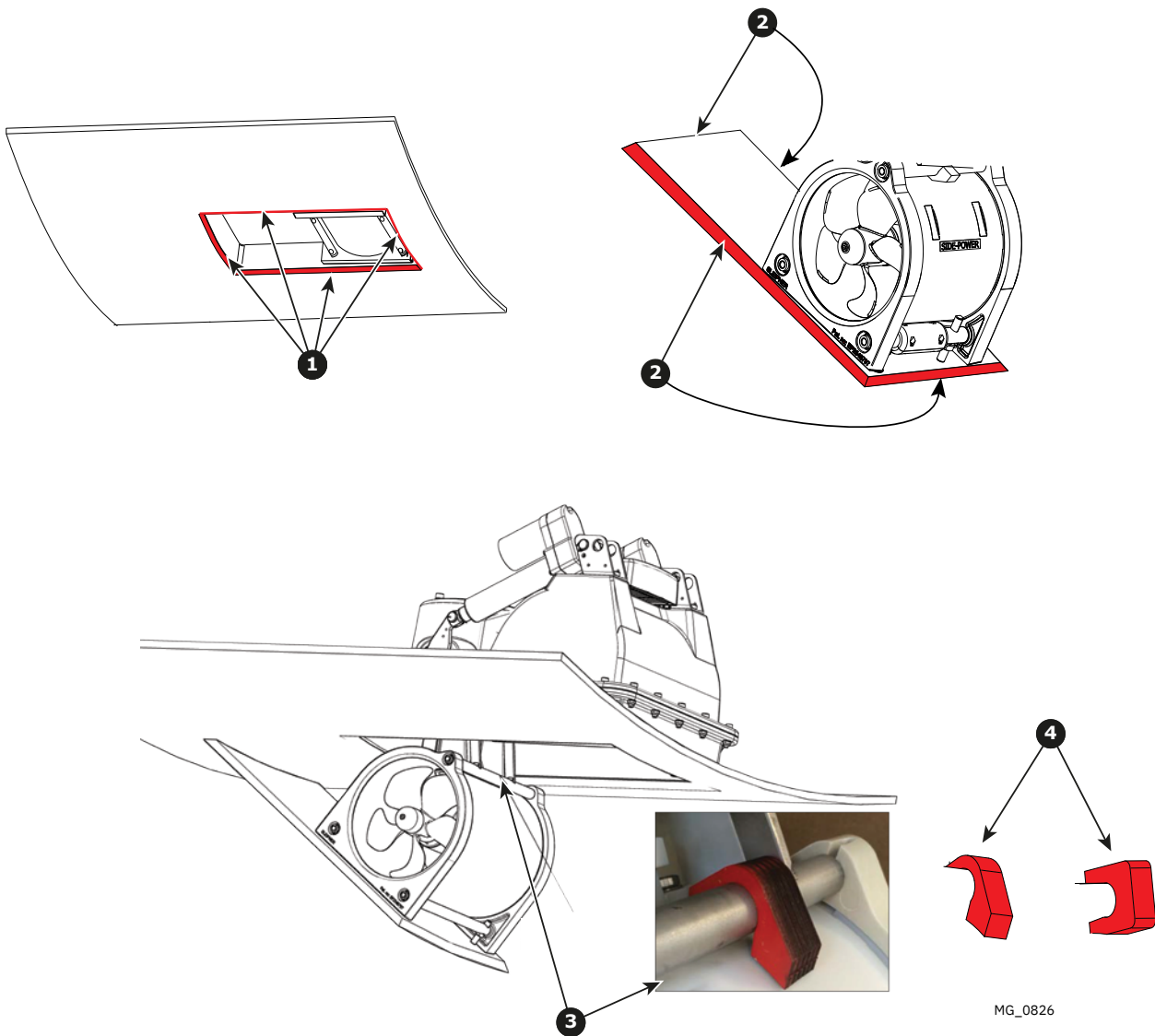
- When the lamination process is completed, the thruster housing can be installed.
- Apply MS polymer or equivalent on the SRF flange surface (**Reference 1**).
- Lower the thruster housing down on the SRF flange.
- Install bolts, washers and nuts (**Reference 2**) in each mounting hole.
- **NOTE: It may be necessary to insert some of the bolts from the underside of the SRF flange with the nut then on the top to avoid conflict with the position sensor and actuator bracket. (For SR L&V 80 and 100 variants only).**
- Tighten the bolts with a torque of 4Nm - 2,9lb/ft. Start with a corner bolt, then continue tighten the bolts in a cross pattern.



- Ensure that the thruster is in the outer position
- Apply glue on the twist ring facing the hatch.
- Enter the hatch bolts through the hatch, (**Reference 1**) and enter the lock nuts (**Reference 2**) on the bolt. Position the nuts close to the inside of the hatch, but do not tighten.
- Enter the bolts in to the bolt holes in the thruster housing (**Reference 3**).
- Bolt the hatch to the tunnel. Ensure the bolts do NOT conflict with the tunnel. (**Reference 4**).
(NB: Bolts can be cut, depending on hatch thickness.)
- When all four bolts are tightened so that the hatch is in tight connection to the twist rings, tighten the lock nuts (**Reference 2**) to the hatch and bolt holes in the tunnel housing respectively.
- Retract the thruster to verify that the movement is smooth, and that the hatch is in correct position when the thruster is in both open and closed position.

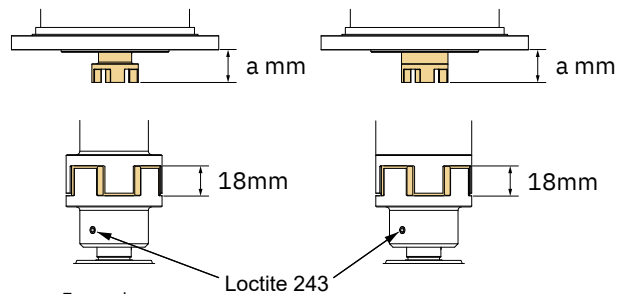
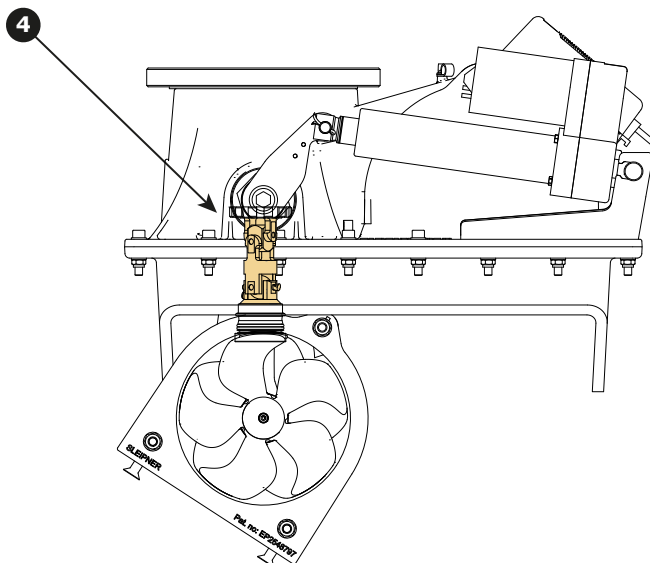
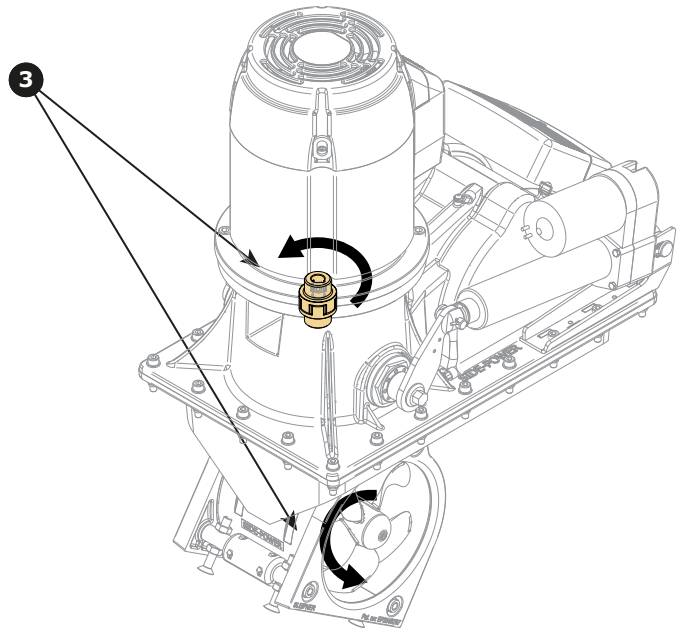
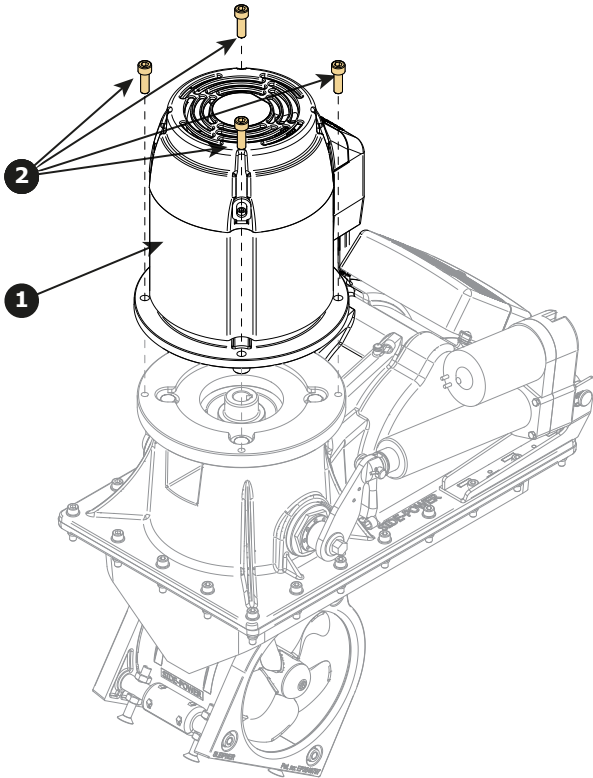


- Lower down the thruster.
- Apply a layer of aluminium or duct tape on hatch opening edges on the hull. (**Reference 1**). This is for masking out for the adhesive in the next step.
- Apply filler or equivalent to hatch edges in such amount that it will fill the gap between the hull and the hatch. (**Reference 2**).
- Operate the thruster to "IN" position. Smooth out the filler and add more if needed. After curing time, grind and smooth the surface. Apply glue on twist rings contact surface.
- Apply coating inside and outside of the hatch and on the hull to cover the fiberglass and filler.
- Remove the red spacer block located above the tunnel. (**Reference 3**). Note: Two types of spacer block is used. (**Reference 4**).




- Install the motor onto the motor bracket ensuring the couplings and the drive shafts have locked together. **(Reference 1)**. **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.**
- Enter the bolts with washers holding the motor to the motor bracket. **(Reference 2)**. Tightening torque 33Nm (24lb/ft)
- Check the drive shafts engage by rotating the propeller. **(Reference 3)**. 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.)**
WARNING. The propeller blades may be sharp.
- Apply grease to the internal drive shaft. **(Reference 4)**. 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.)



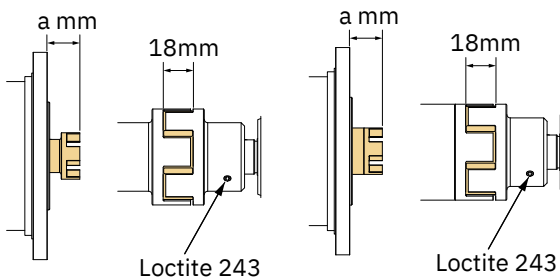
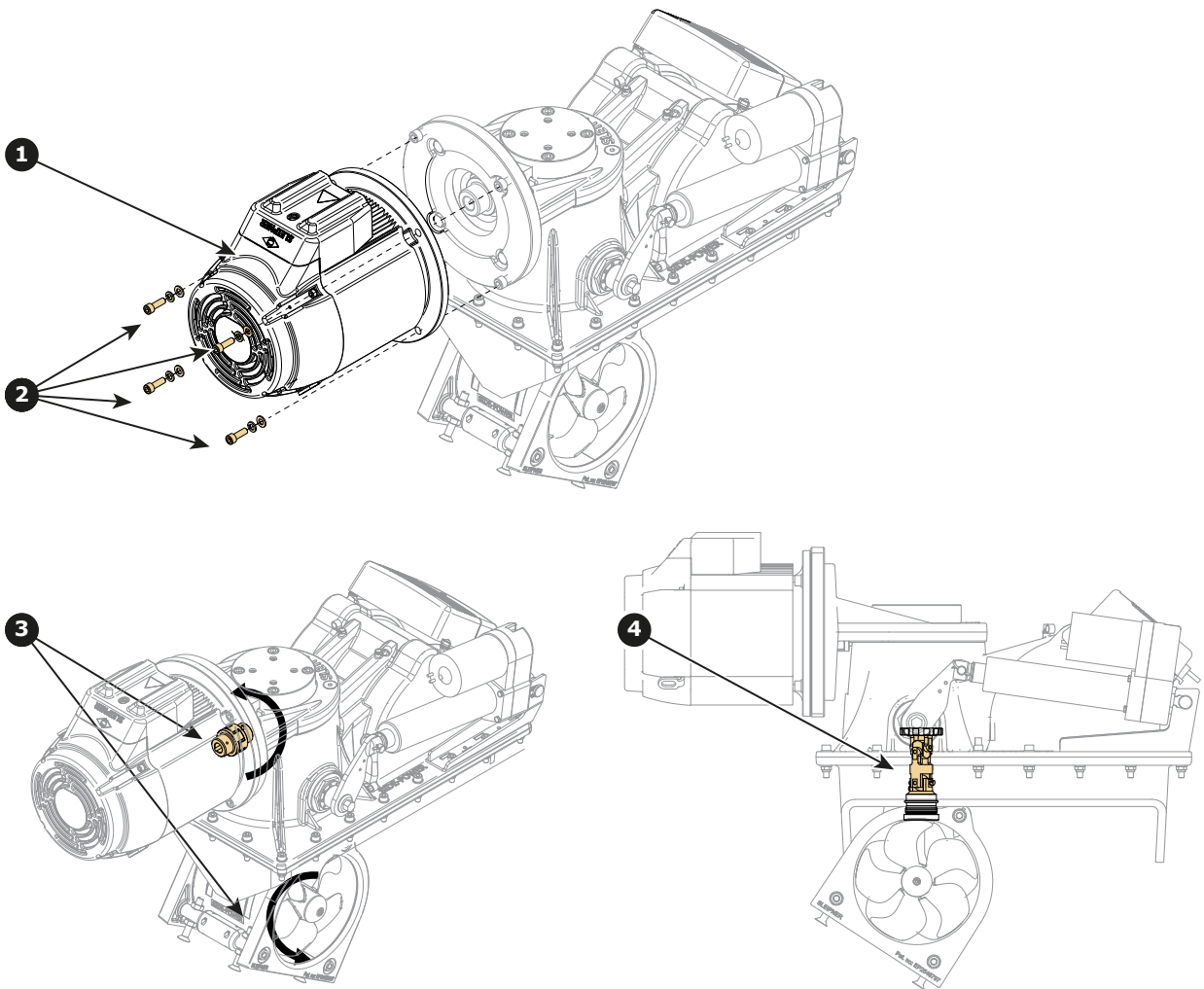
Example:
height A = 47mm - 48mm.
The correct placement of the lower flexible coupling unit should be measured from the top surface of the motor bracket to the bottom inner surface of the lower flexible coupling. **(NB: The extra 1mm is added to eliminate the risk of compression to the rubber element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

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

CAUTION
 Always handle the shaft ends with care. Do not hammer or drop shaft/coupling ends in any circumstances.

- Install the motor onto the motor bracket ensuring the couplings and the drive shafts have locked together. **(Reference 1).**
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.
- Enter the bolts with washers holding the motor to the motor bracket. **(Reference 2).** Tightening torque 33Nm (24lb/ft)
- Check the drive shafts engage by rotating the propeller. **(Reference 3).** 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.)**
WARNING. The propeller blades may be sharp.
- Apply grease to the internal drive shaft. **(Reference 4).** 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.)**

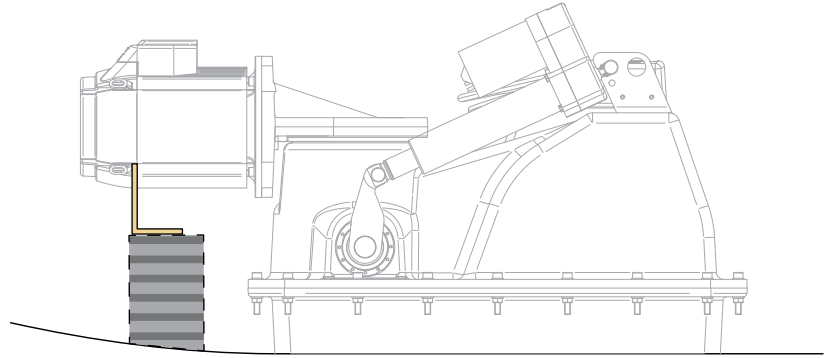
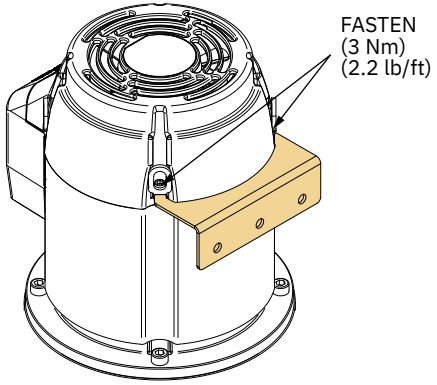
IMPORTANT
The rubber/plastic element must be in its correct position, fully inserted but not compressed.

CAUTION
Always handle the shaft ends with care. Do not hammer or drop shaft/coupling ends in any circumstances.

MG_0934

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.



MG_0573

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.

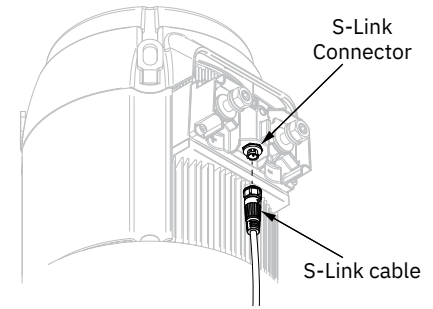
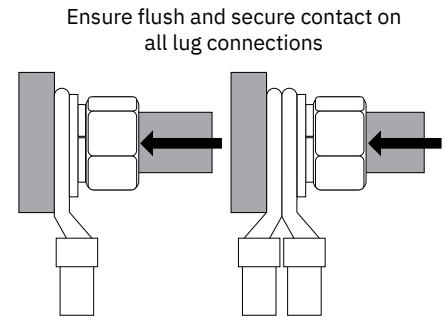
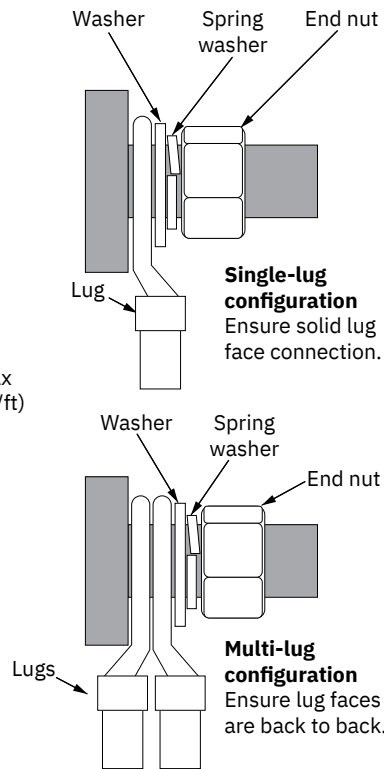
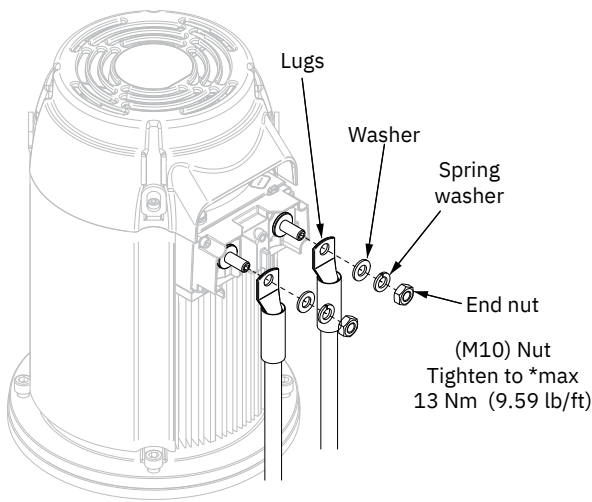
WARNING

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



MG_0523



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

Electrical Reference Guide

MC_0667

| 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. | |
| ERLV 100/185T | 24V | 300 A | DIN: 300 SAE: 570 EN: 510 | ANL 250 | mm ² | 50 | 50 | 50 | 70 | 70 | 95 | 95 | 120 | 120 | 2 x 95 | 2 x 95 | 2 x 120 | |
| | | | | | AWG | 1/0 | 1/0 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 | 4/0 | 4/0 | 2 x 3/0 | 2 x 3/0 | 2 x 4/0 | |
| | 48V | 150 A | | DIN: 150 SAE: 285 EN: 255 | ANL 125 | mm ² | 50 | 50 | 50 | 70 | 70 | 95 | 95 | 120 | 120 | 2 x 95 | 2 x 95 | 2 x 120 |
| | | | | | | AWG | 1/0 | 1/0 | 1/0 | 2/0 | 2/0 | 3/0 | 3/0 | 4/0 | 3/0 | 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

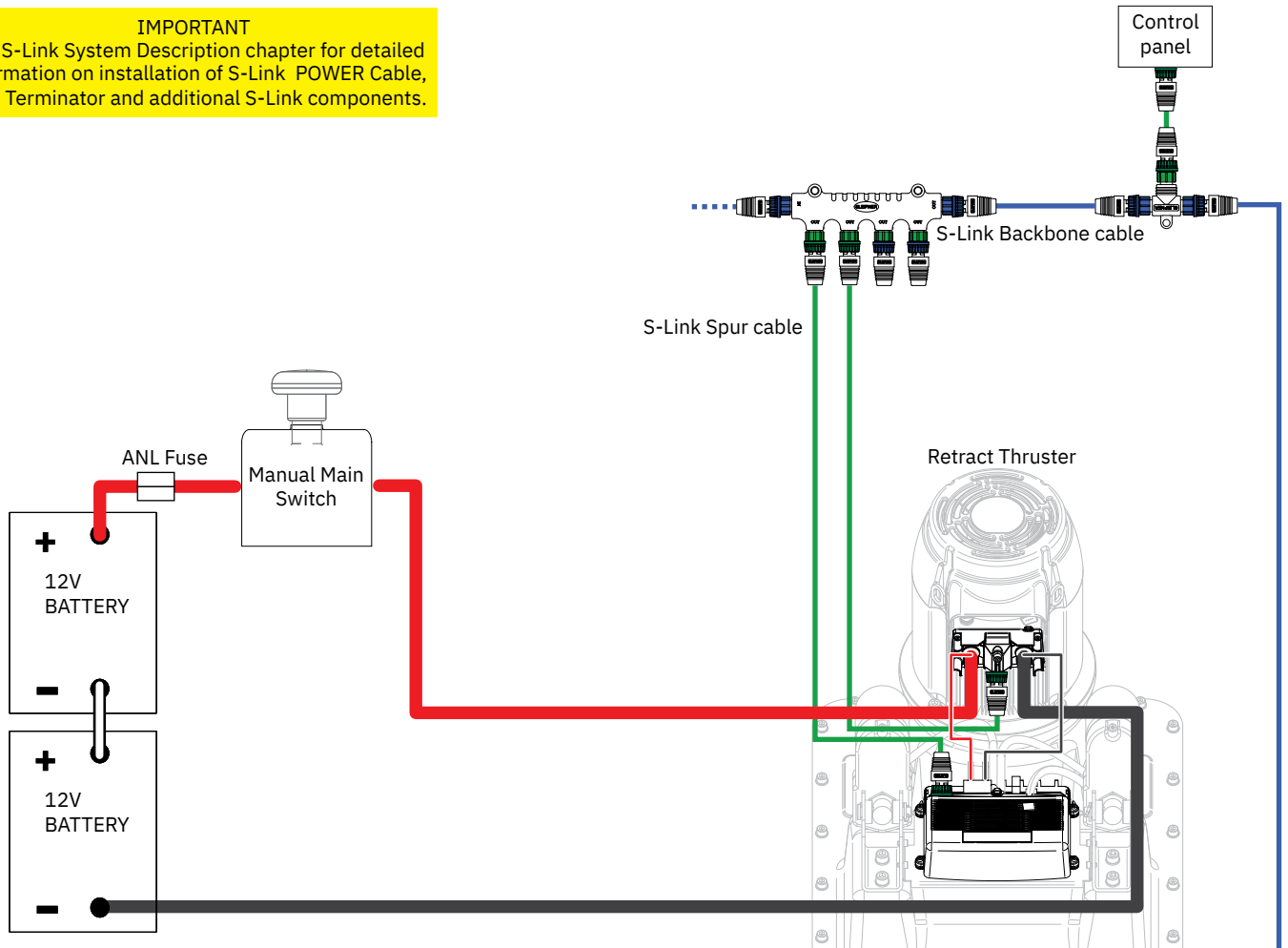
For each installation an experienced electrician should be consulted for cable cross section calculations and selection of fuses, main circuit and batteries.

Manual Main Switch Wiring Diagram 24V Retract Thruster

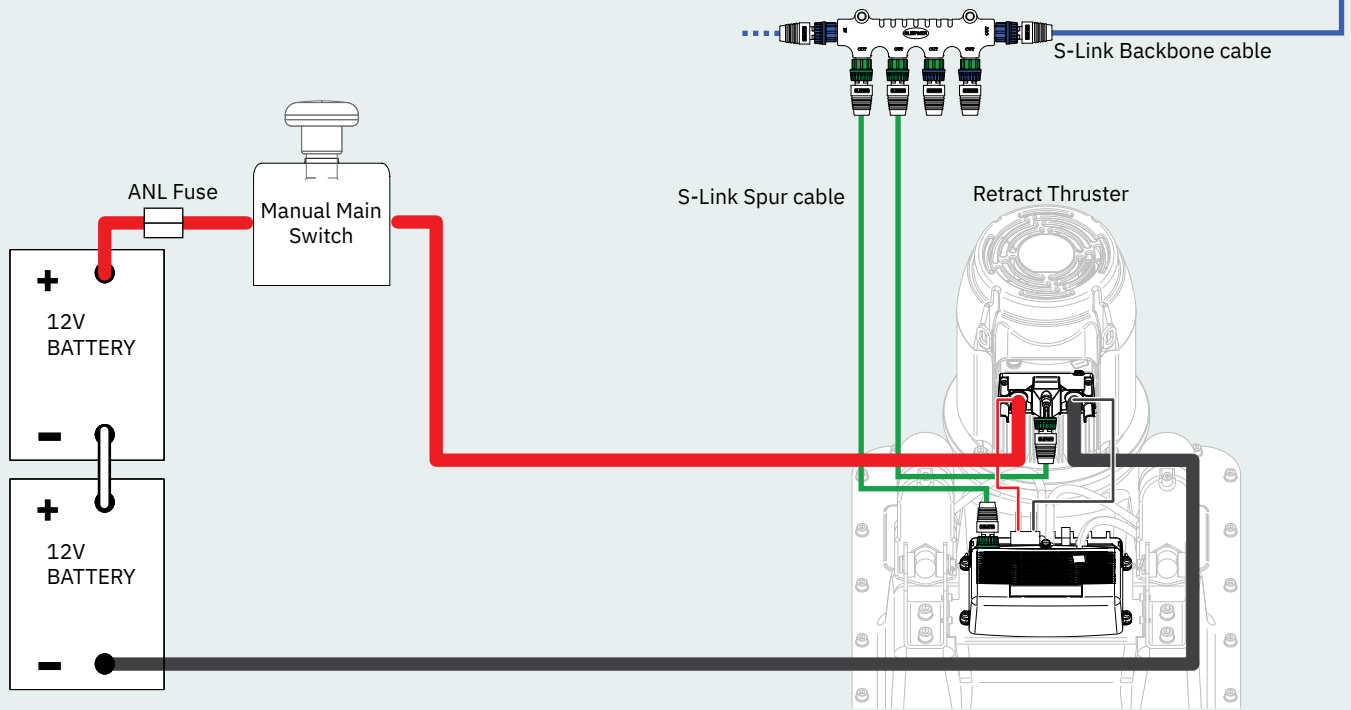
The Top wiring diagram is for a single bow or stern thruster system

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.



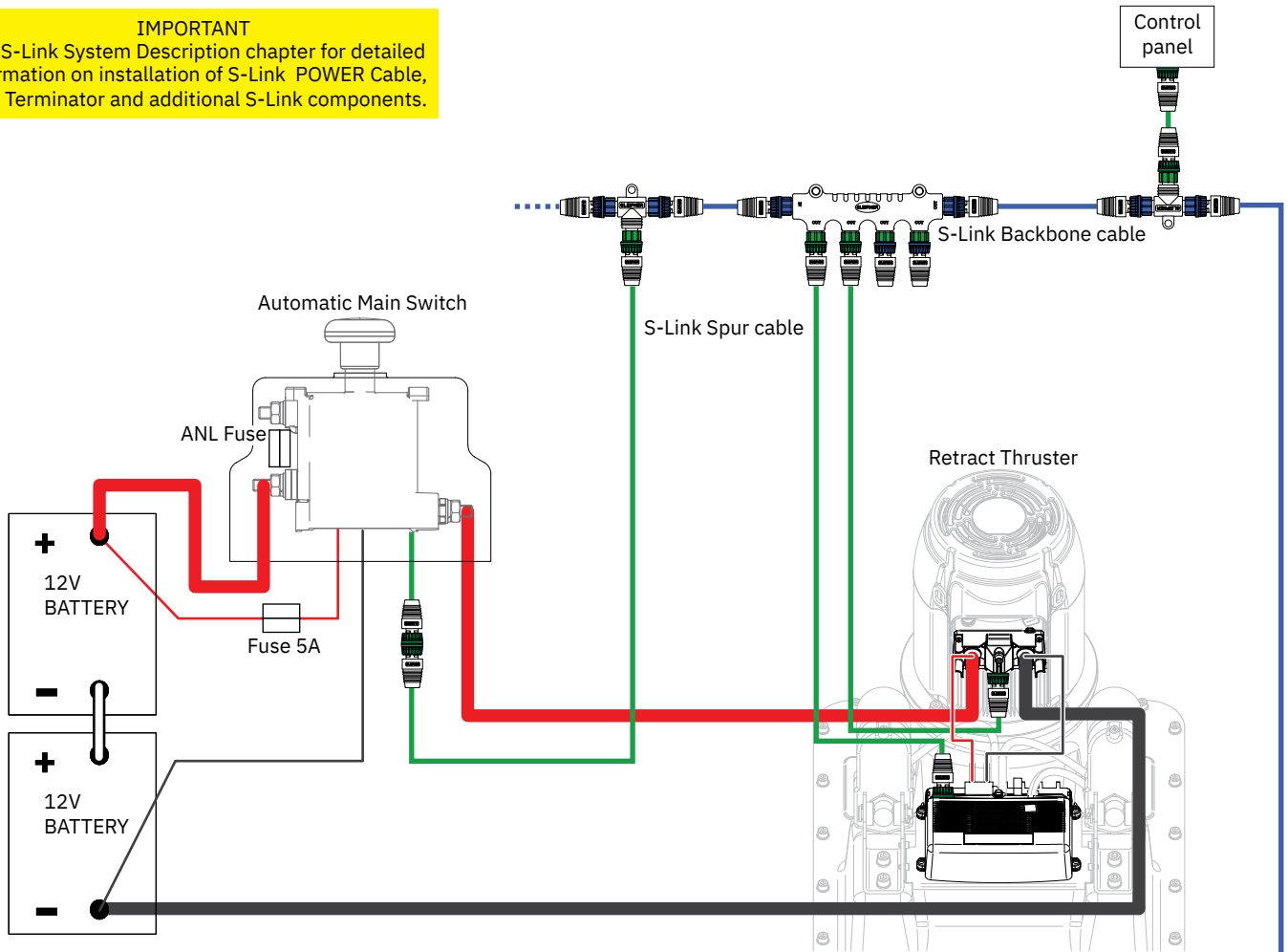
MG_0625

Automatic Main Switch Wiring Diagram 24V Retract Thruster

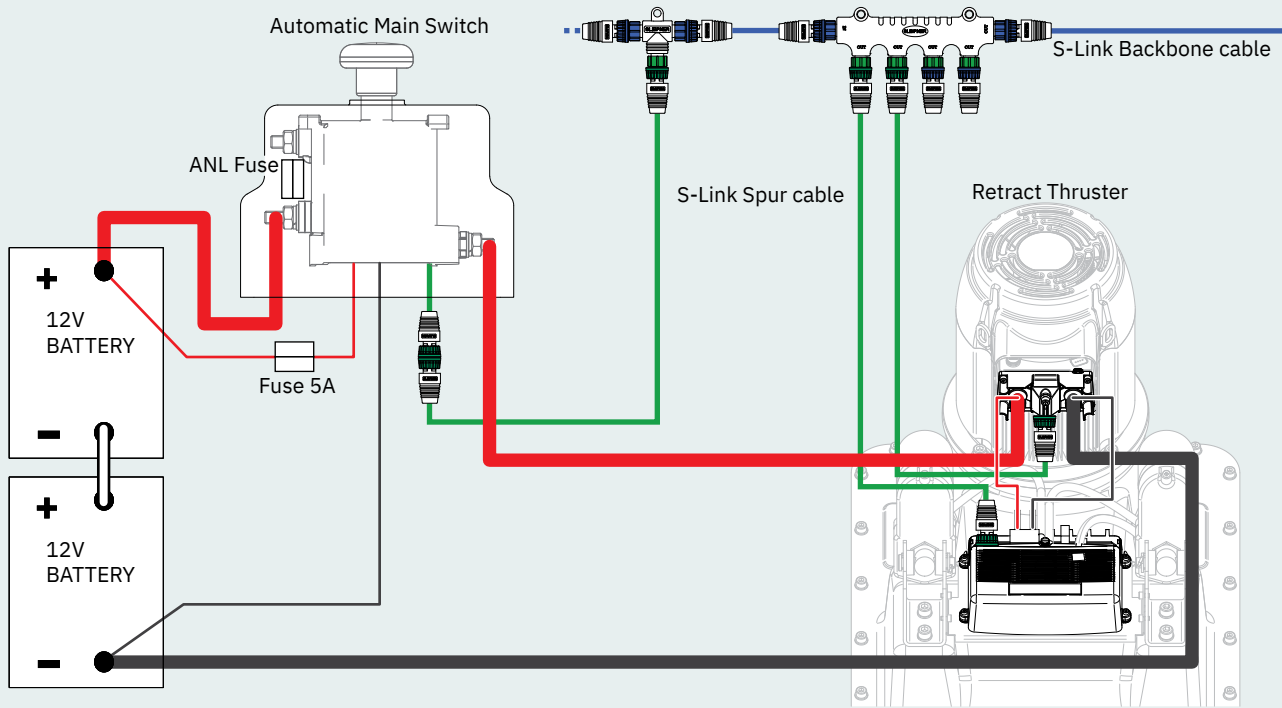
The Top wiring diagram is for a single bow or stern thruster system

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.



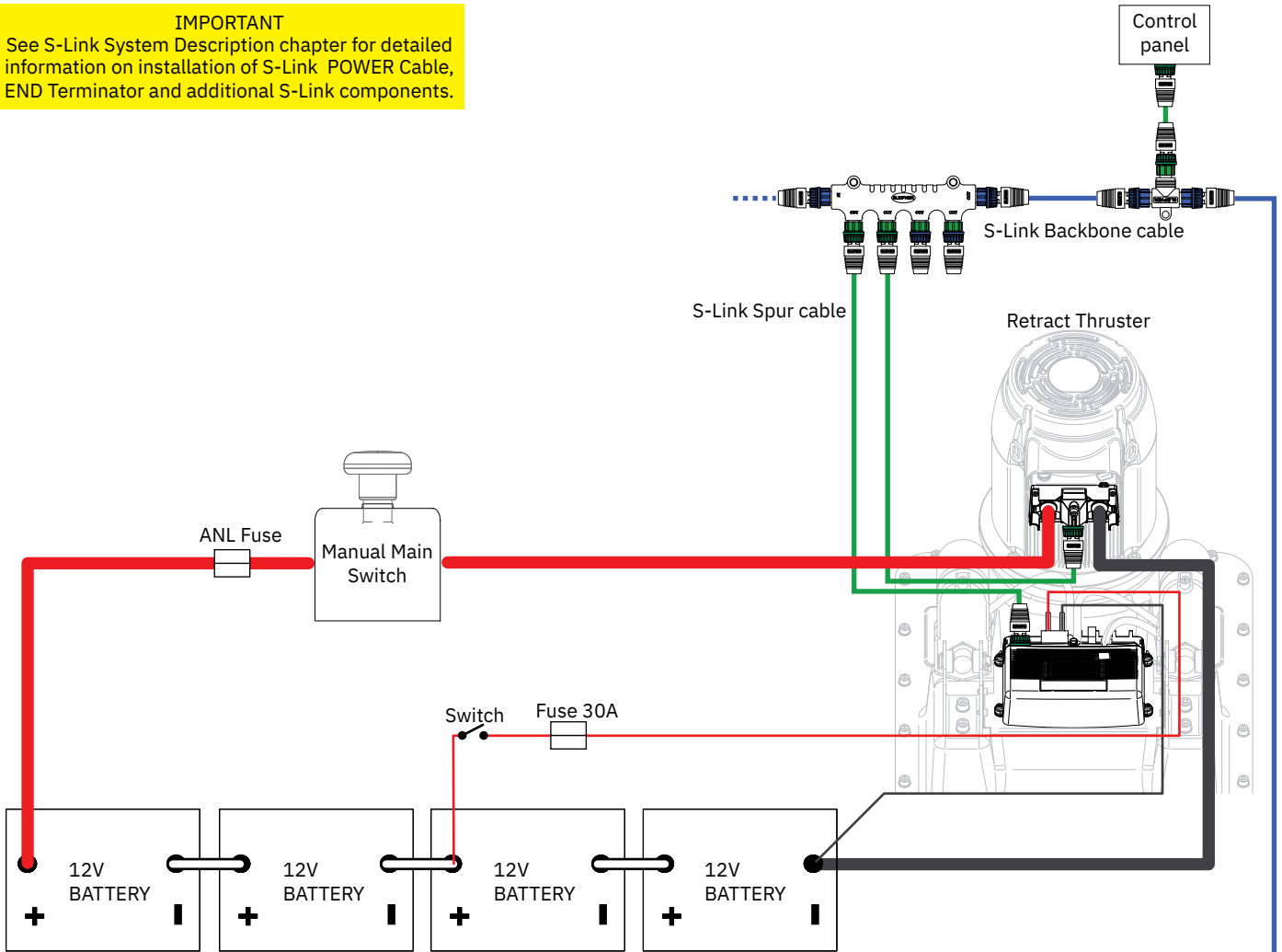
MG_0585

Manual Main Switch Wiring Diagram 48V Retract Thruster

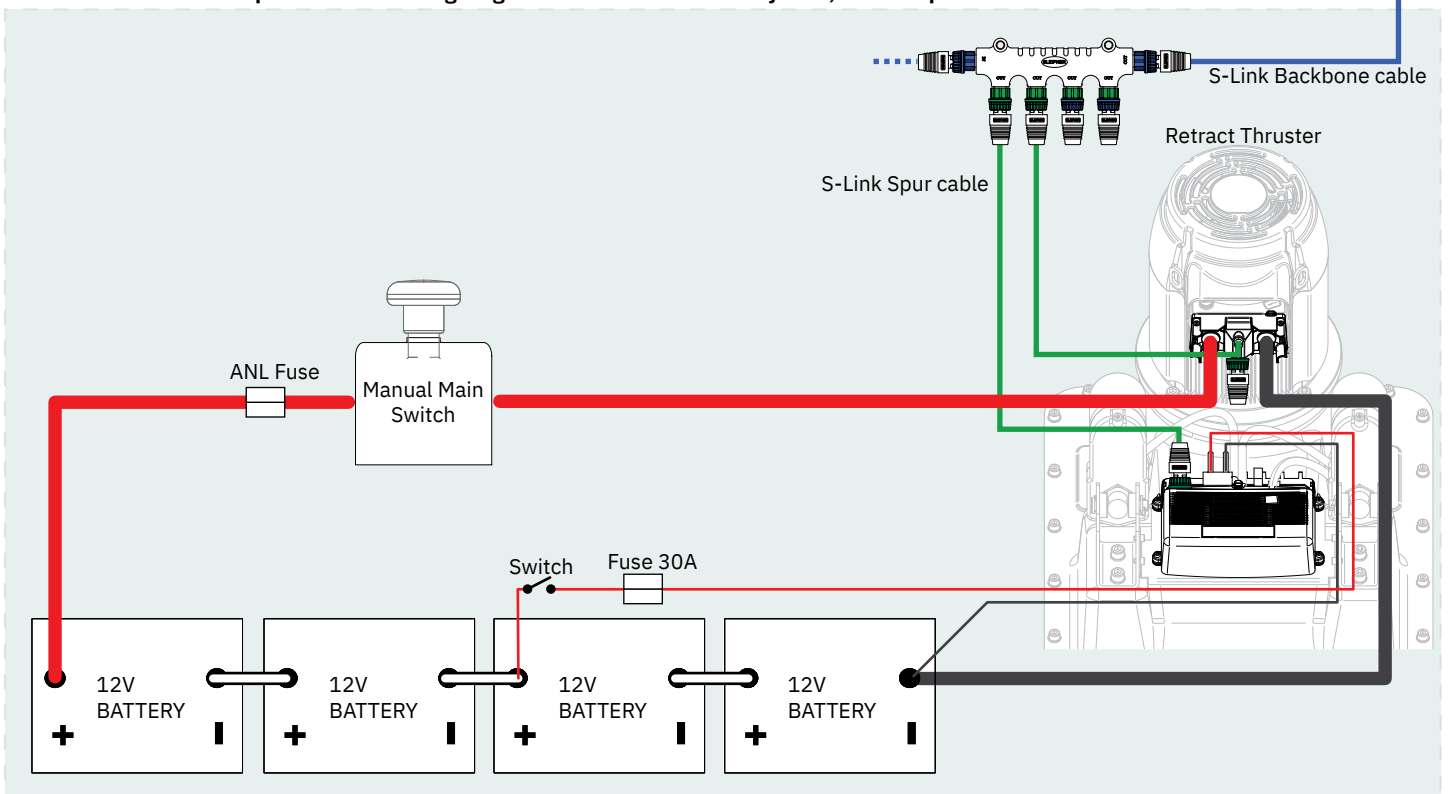
The Top wiring diagram is for a single bow or stern thruster system

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.

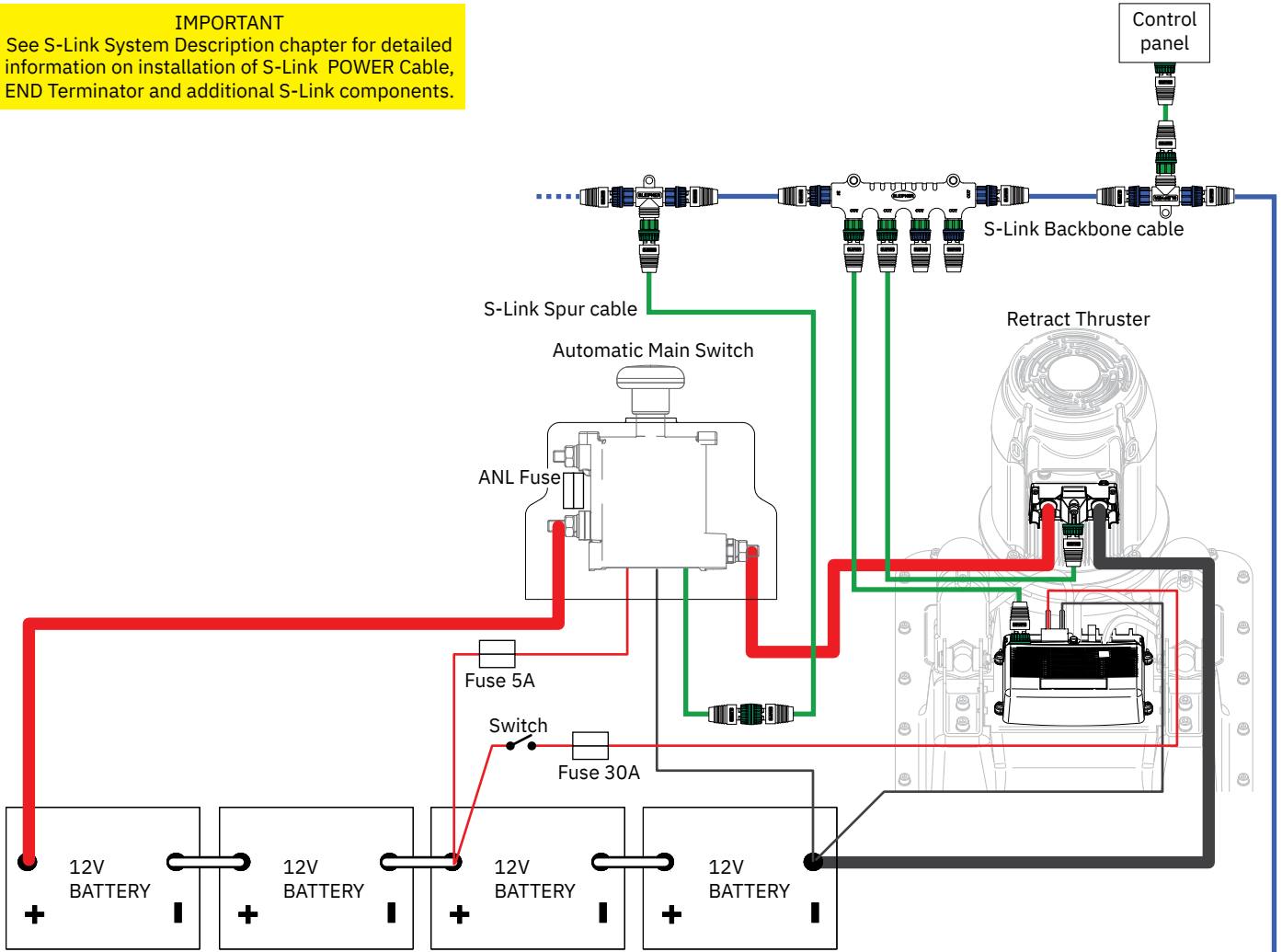


Automatic Main Switch Wiring Diagram 48V Retract Thruster

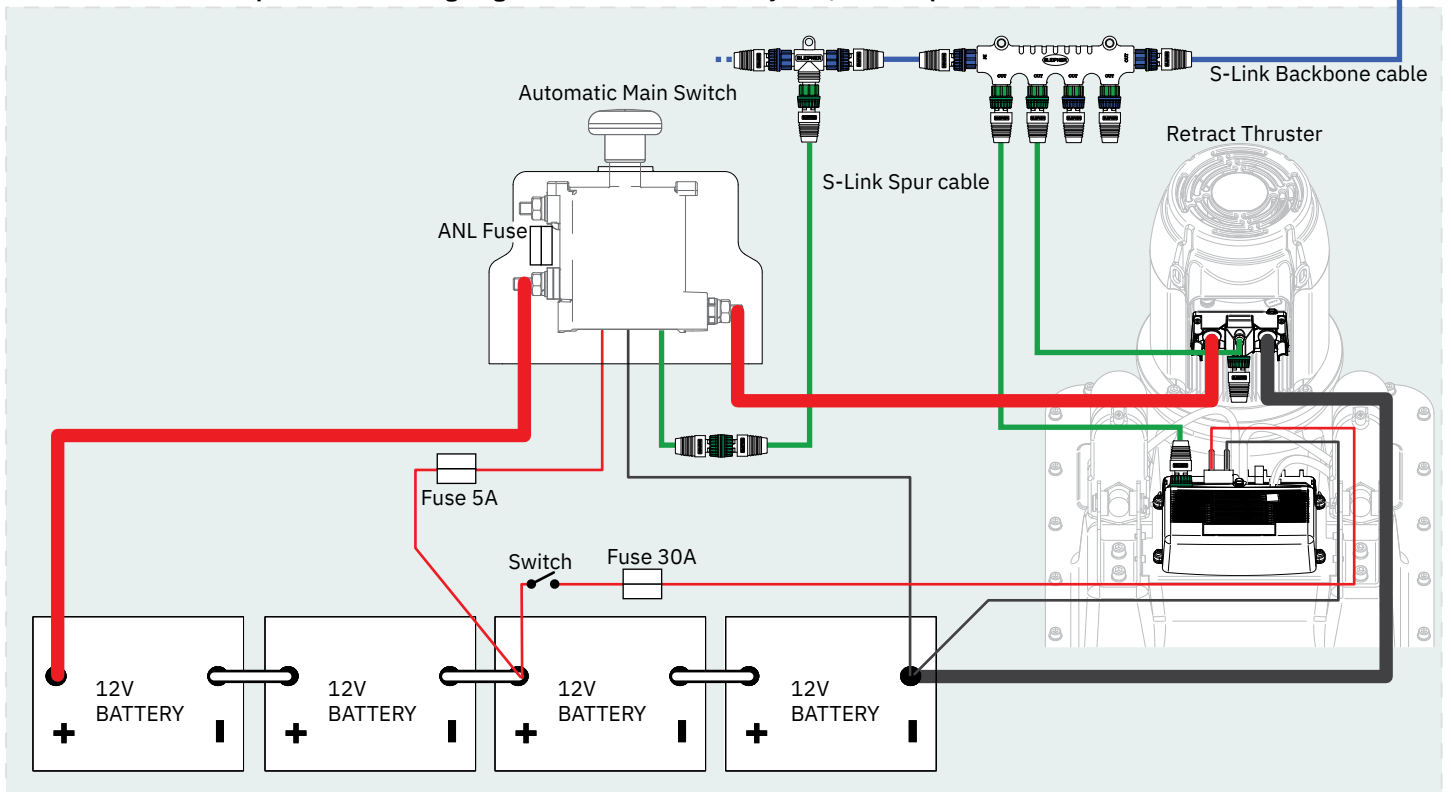
The Top wiring diagram is for a single bow or stern thruster system

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_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.

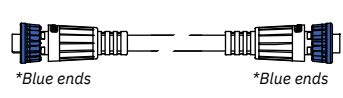
Installation of S-Link cables:

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.

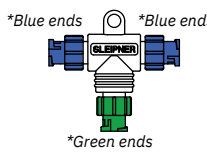
The POWER Cable should ideally be connected around the middle of the BACKBONE bus to ensure an equal voltage drop at each end of the BACKBONE Cable. The yellow and black wire in the POWER Cable shall be connected to GND and the red wire connected to +12VDC or +24VDC.

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.

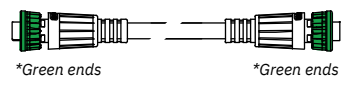
SPUR cables can be left unterminated to prepare for the installation of future additional equipment. In such cases, ensure to protect open connectors from water and moisture to avoid corrosion in the connectors.



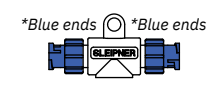
BACKBONE Cable
Forms the communication and power bus throughout a vessel. Available in different standard lengths.



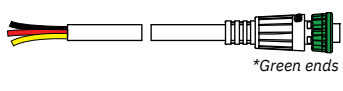
T-Connector
Used for connection of SPUR or POWER Cable to the BACKBONE Cable. One T-Connector for each connected cable.



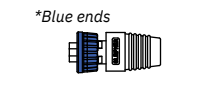
SPUR Cable
Used to connect S-Link compliant products to the backbone cable. One SPUR Cable must be used for each connected component, with no exceptions. Recommended to be as short as practically possible. Available in different standard lengths.



BACKBONE Extender
Connects two BACKBONE Cables to extend the length.

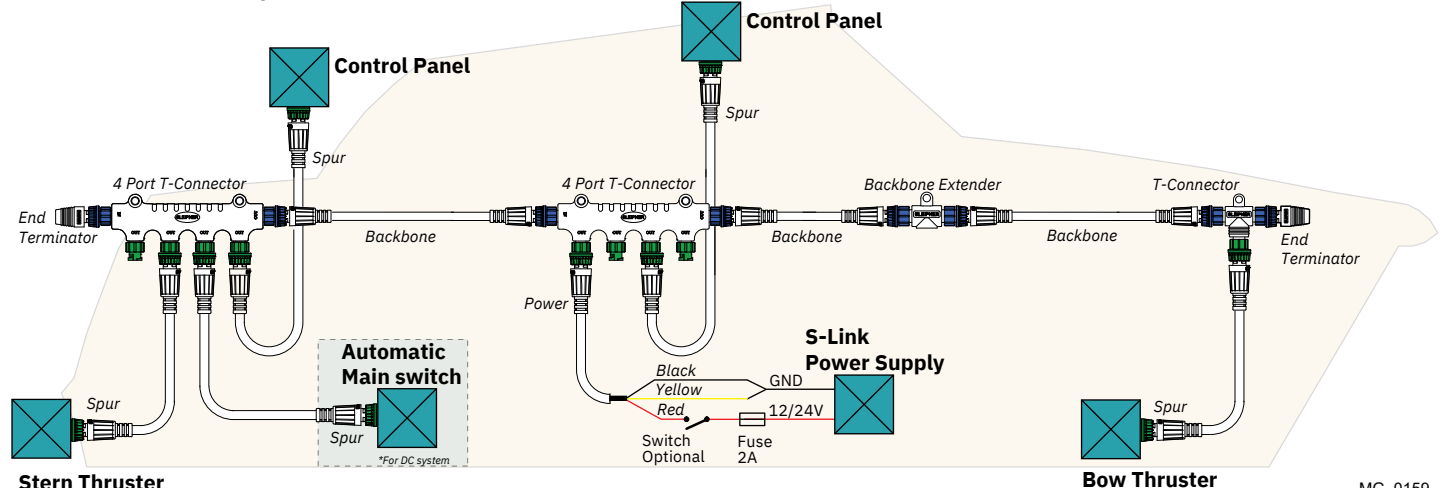


POWER Cable
Required in all installations for connection of BACKBONE Cable to a power supply and should be protected with a 2A fuse.



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

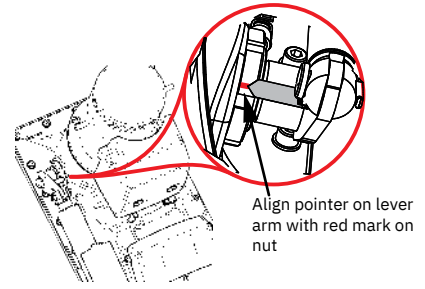
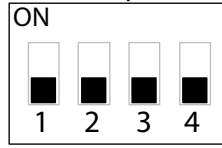


IMPORTANT

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 OFF.
- 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.

Normal operation



MC_0076

Calibrate drive shaft alignment

MC_0069

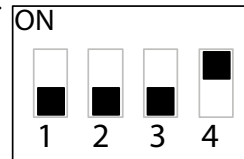
(NB: The drive shaft is correctly aligned when manufactured)

- 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.

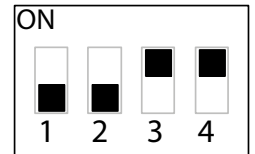
(NB: If FAULT LED light-up red, then the calibration is out of position (wrong align mark).

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

Service mode



Calibration mode



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.

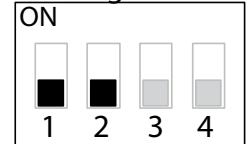
The actuator is a P8 type:

-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

Configuration



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.

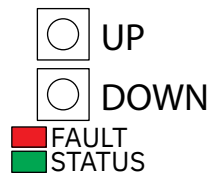
Continuous green light:

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

Re-calibrated "down"-position.

Flashing green light:

No S-Link communication.



- The bolts holding the gear leg and main bracket together are tightened correctly.
- The bolts holding the motor to its bracket are tightened correctly.
- All electrical connections are clean, dry and tight, and the correct cable, fuse and main switch size.
- Check that there is no electrical connection between the electro motor body and positive terminal on the motor, and between the electro motor body and the negative terminal on the motor with an ohm meter.
- Anti-fouling has been applied to the gear leg and propeller but NOT anodes, sealing/ rubber fittings or propeller shafts.
- Propeller is fastened correctly to the shaft.
- Propeller turns freely in tunnel.
- The anode and/ or holding screw is tightened well with thread glue.
- Check the boat for potential water leakage around installation areas.
- Correct drive direction as per control panel.
- User Manual is supplied to the owner.

The thruster has been installed as per the instructions in this manual and all points in checklist above have been controlled.

Signed:

Date:

Thruster type:

Serial number:.....

Date of delivery:.....

Correct drive direction as per control panel:

The compartment for the thruster has been isolated from general bilge water and has no obvious or suspected risks for flooding:

.....
.....
.....

Other comments by installer:

.....
.....

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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