SLEIPNER
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Installation Guide

For Electric Retractable Thruster Models

SRAC 320

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IM

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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

WARNING

Failure to follow any considerations and precautions can lead to serious personal injury, death and/or damage your product.
Failure to follow any considerations and precautions will render all warranties given by Sleipner Motor as VOID. MC_0411

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 installers 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, Sleipner products 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 modification of hull stiffeners or stringers. This might 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. The propeller will reach extremely high speed, damaging the thruster.
- The thruster motor must be handled with care. Do not rest the motor on its drive shaft, as its weight can damage it.

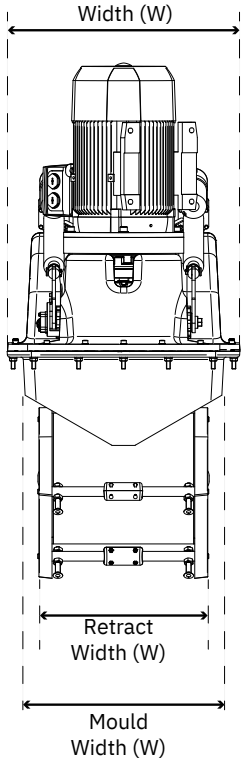
For on-board electric motor driven systems: MC_0031

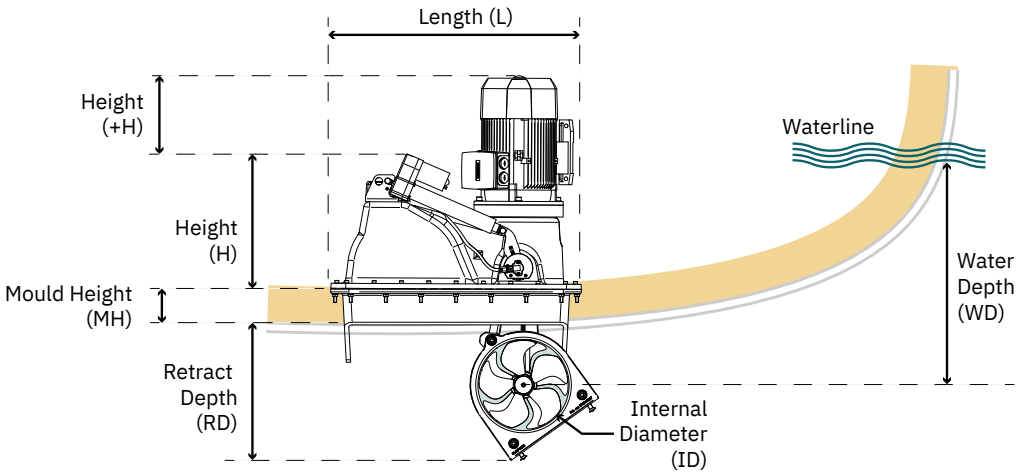
- Ensure motors installed in small compartments are dry and well-ventilated to allow the electric motor to cool.
- The electric motor, components, and cables must be mounted to remain dry.
- The electric motor can reach over 100°C before activating the temperature switch. Any loose items near the thruster motor are a potential fire hazard and can cause short-circuiting.
- The thruster power supply circuit must include the recommended sized fuse and a battery isolation switch.
- Avoid running cables near any heat sources since this might damage the insulation. Broken insulation could potentially lead to hazards and damage products.

For Sleipner S-Link™ systems: MC_0105

- Only Sleipner S-Link™ products or authorized 3rd party control equipment can be directly connected to the S-Link™ bus. Non-authorized 3rd party equipment must always be connected through a Sleipner interface product.
- Any attempt to connect to the S-Link™ bus without an authorized 3rd party control equipment will void all warranties for the connected Sleipner products.
- If 3rd party control equipment is interfaced the S-Link™ bus through a Sleipner interface product, it is required to install at least one Sleipner control panel to enable efficient troubleshooting.

Measurement code	Measurement description	SR AC*320 mm	SR AC*320 inch
L	Length	843	33.19
+ H	Additional Height	266	10.47
H	Height	454	17.87
MH	Mould height (Flange height)	106	4.17
RD	Retract depth	453	17.83
ID	Internal Tunnel Diameter	300	11.81
RW	Retract width	413	16.26
MW	Mould width	480	18.9
WD	Water depth	300	11.81
W	Width	580	22.83





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Thruster Specifications

MC_0222

Specifications	
Voltage range, 3-Phase supply	208-240/380-440V
Thrust, continuous (kg • lbs)	280 • 617
Thrust, max. (kg • lbs) *	320 • 705
Typical boat size (m • ft)	17-31 • 55-100
Propulsion system	Twin Counter
Motor output (kW • Hp)**	21 • 27
Tunnel inside diameter (mm • in)	300 • 11.8

Current draw max: ***	
230V Systems:	80A
400V Systems:	46A
Generator load max:****	29 kVA

Features	
CE approved	Yes
DNV-GL type approved	Yes
Proportional speed	Yes
Lubrication	Sealed
Galvanic separation	No

*) Max thrust is available until the motor winding temperature exceeds 130°C and the dynamic thrust limitation gradually decrease the thrust to continuous rated performance.
**) Motor output @ 230/400V supply. Actual value may vary depending on supply voltage and thruster install.
***) Current draw values are max values set in the VFD parameter setup.
****) Listed generator load is the maximum load value at standard thruster setup. Note that this value is different from the required generator capacity. Required generator capacity will wary depending on generator characteristics and other loads on the system and have to be selected in cooperation with generator supplier. Side-Power SAC thrusters are in standard version powered by standard Variable Frequency Drives. Low harmonic drives (THD <5%) can be supplied on request.

Technical Specifications

MC_0232

Technical specifications	
Motor	AC Electric type, IP55.
Gear housing	Seawater resistant bronze.
Gears	Hardened precision gears.
Material	Seawater resistance bronze, protected with anodes.
Motor bracket	Seawater resistance aluminium.
Tunnel	Cross spun with rowing G.R.P tunnel.
Propeller	5-blade skewback “Q-prop” propeller, fibreglass reinforced composite.
Control system	S-LINK. Cables and control panel not included.
Safety	Flexible coupling between AC motor and drive shaft protects gear system against peak loads.

Measurements, PDC

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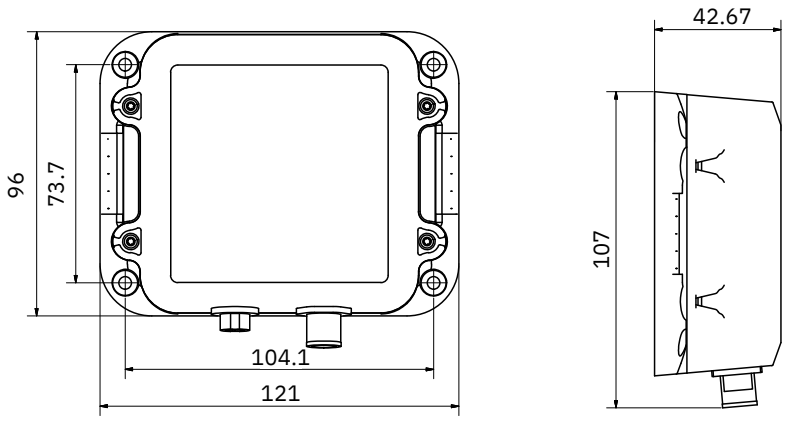


Measurements, VFD

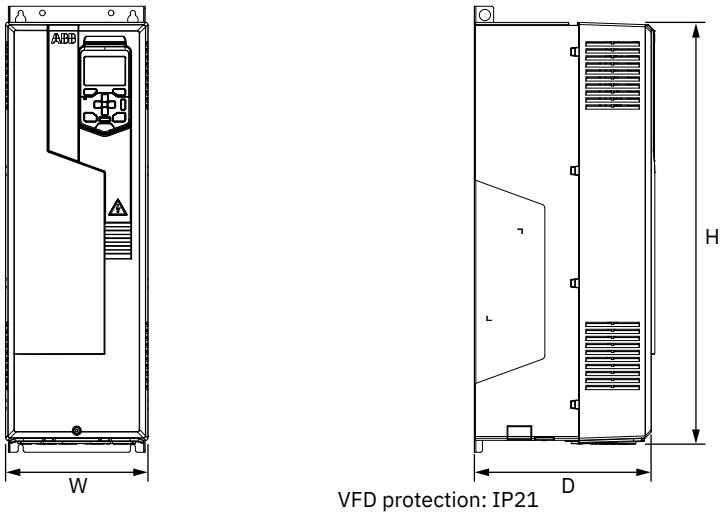
MC_0638_1

Thruster model	VFD model	Frame size	Weight Kg	D mm	W mm	H1 mm
SAC320/300-C-2	ACS580-01-089A-2	R5	28.3	295	203	732
SAC320/300-C-4	ACS580-01-046A-4	R3	11.8	228	203	454
SAC320/300-C-4L	ACS580-31-046A-4	R6	61	383	252	771

-2 *for 208-240V version*
-4 *for 380-480V version*

-C *operation mode*
-I *operation mode. See specification table*

SRAC320/300 *thruster model*



VFD protection: IP21

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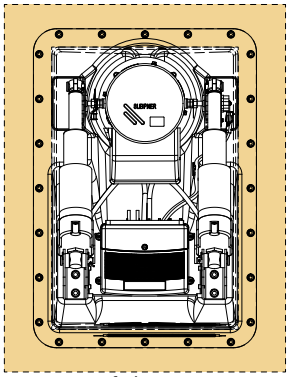
Positioning of the retract thruster

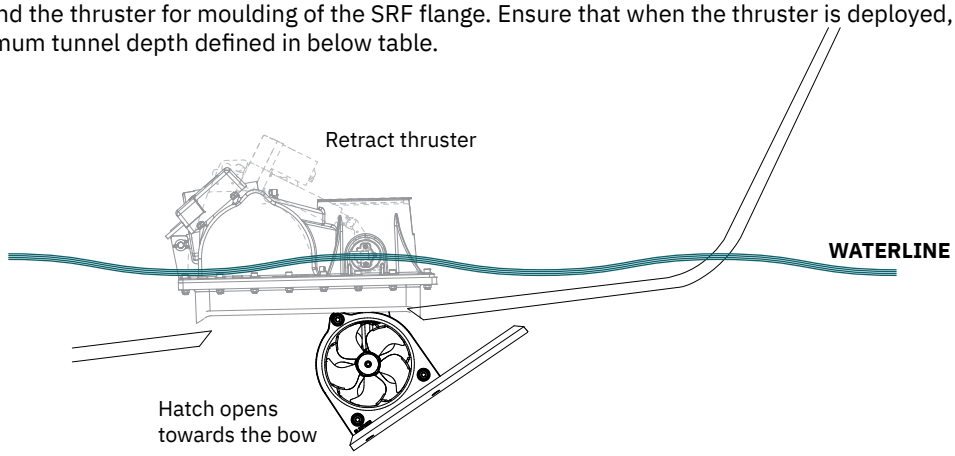
Retract Thruster

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.

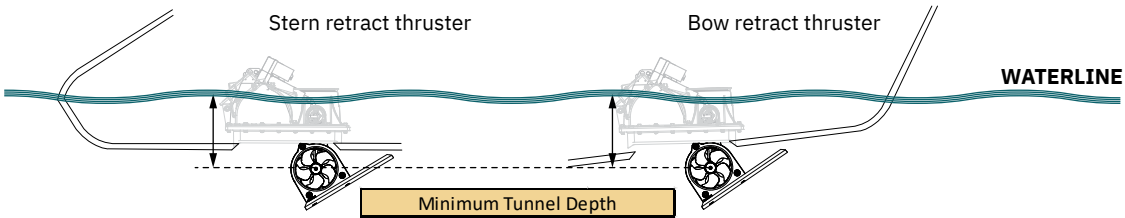


100mm of clear space around the thruster for moulding of the SRF flange.



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.



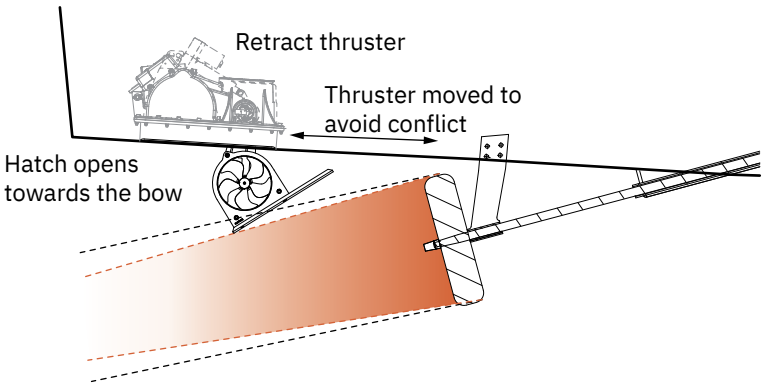
Minimum Tunnel Depth	
Retract system 80 to 100	185mm
Retract system 130 to 240	250mm
Retract system 250 to 300	300mm
Retract system 650	386mm

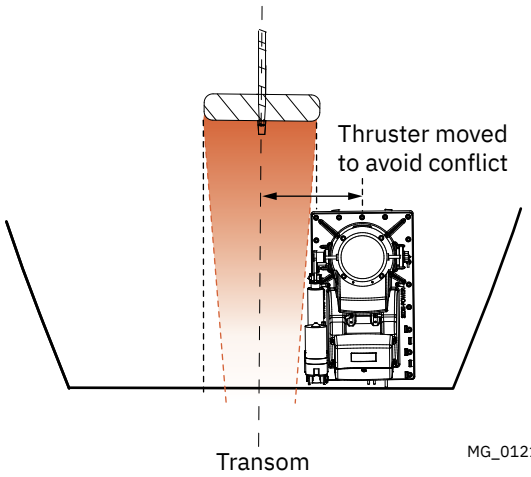
Bow installation

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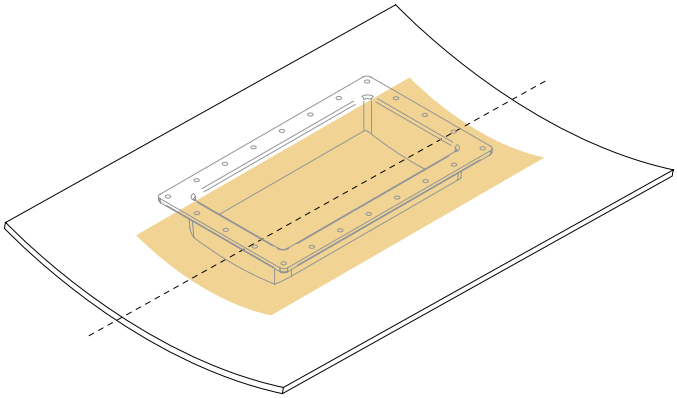
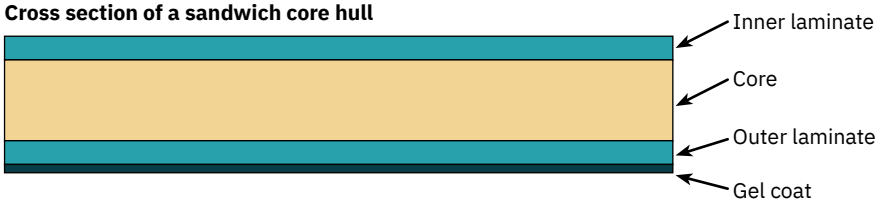
- Ensure to have a minimum of 100mm space around the thruster installation to have service access.
- Bow thrusters must be positioned on the boat center line.
- Stern thrusters can be positioned off the centre line.

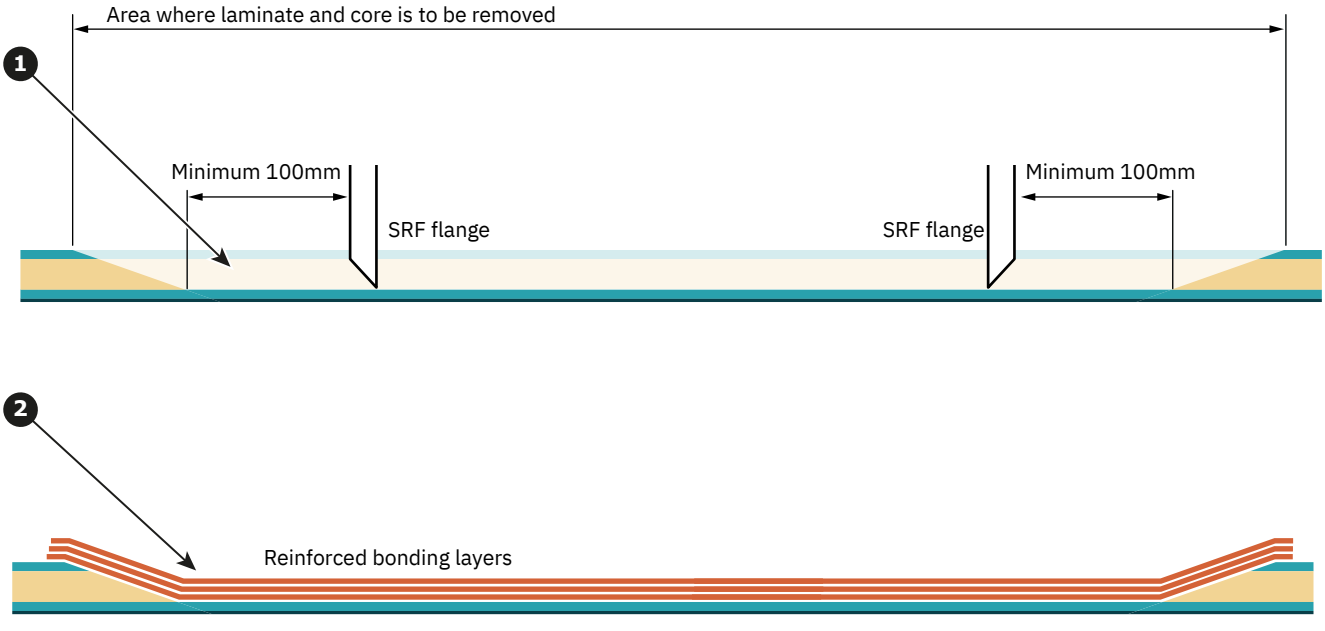


For vessels with sandwich hull construction, additional reinforcement of the area around the SRF flange is required.

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**).



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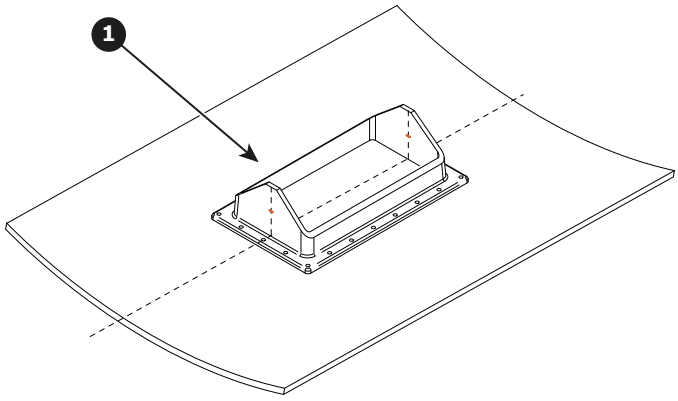
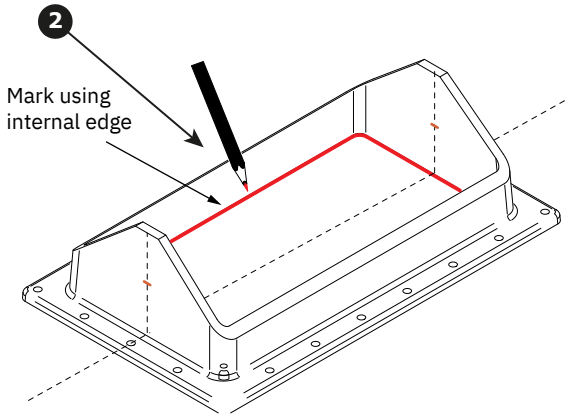
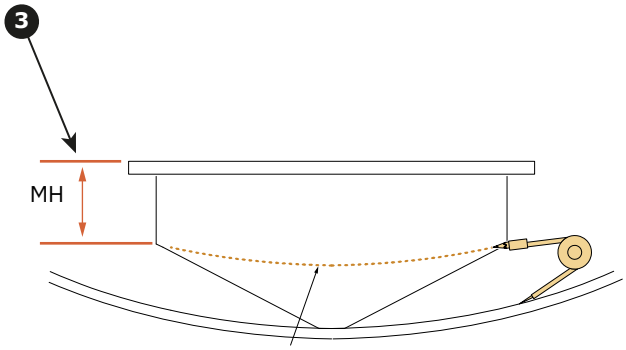
Marking and trimming of the SRF flange

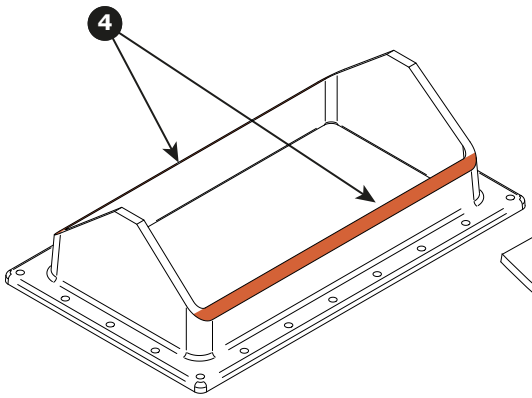
- Flip the SRF flange upside down and position it at the identified installation location. (**Reference 1**).
  - For bow thrusters, this is usually symmetrical about the vessel centerline.
  - For stern thrusters, the position of the thruster may deviate from centerline.
- Use the internal edge to mark were to cut out the thruster hatch from the hull. (**Reference 2**).
- The SRF flange must be adapted so that the two longitudal 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**)

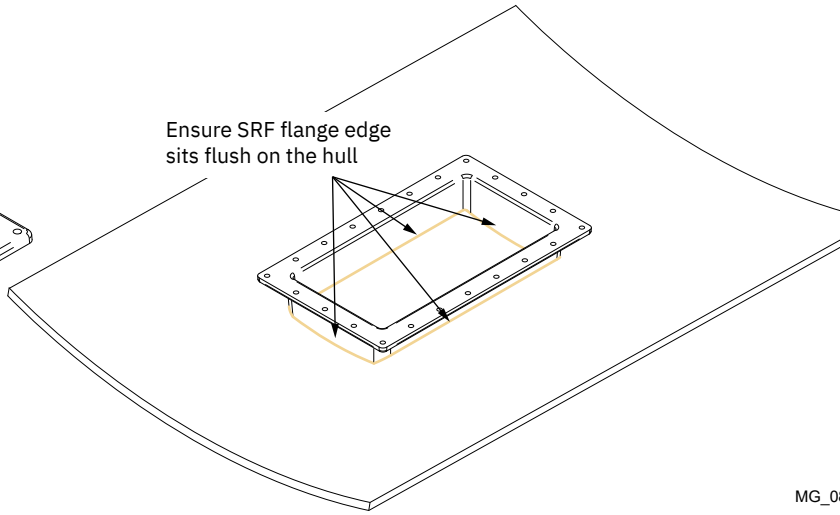






Important
The minimum SRF flange height is stated on the product measurment page (MH)
-Ø185mm = 72mm
-Ø250mm = 97mm
-Ø300mm = 115mm
-Ø386mm = 148mm

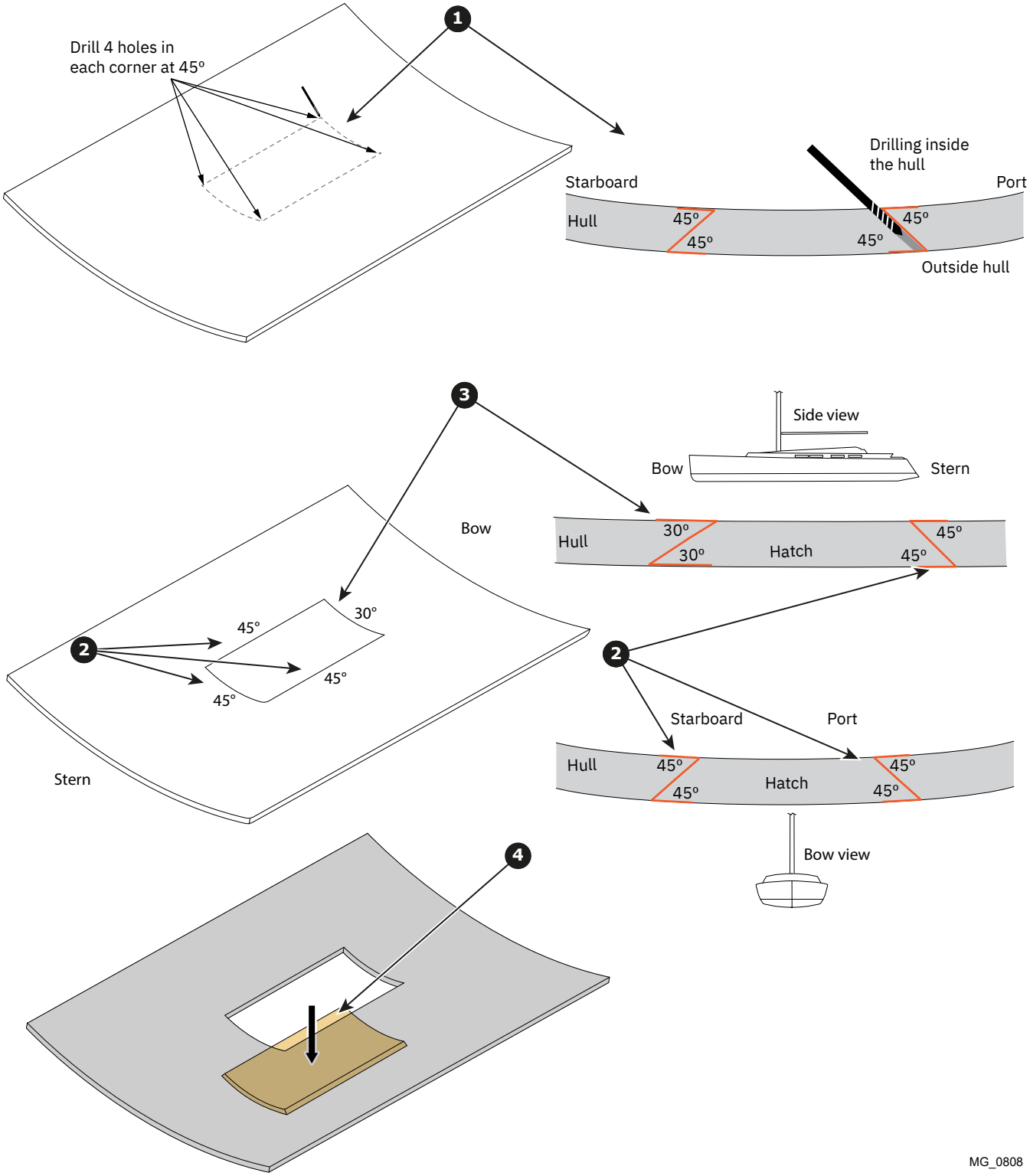




MG_0

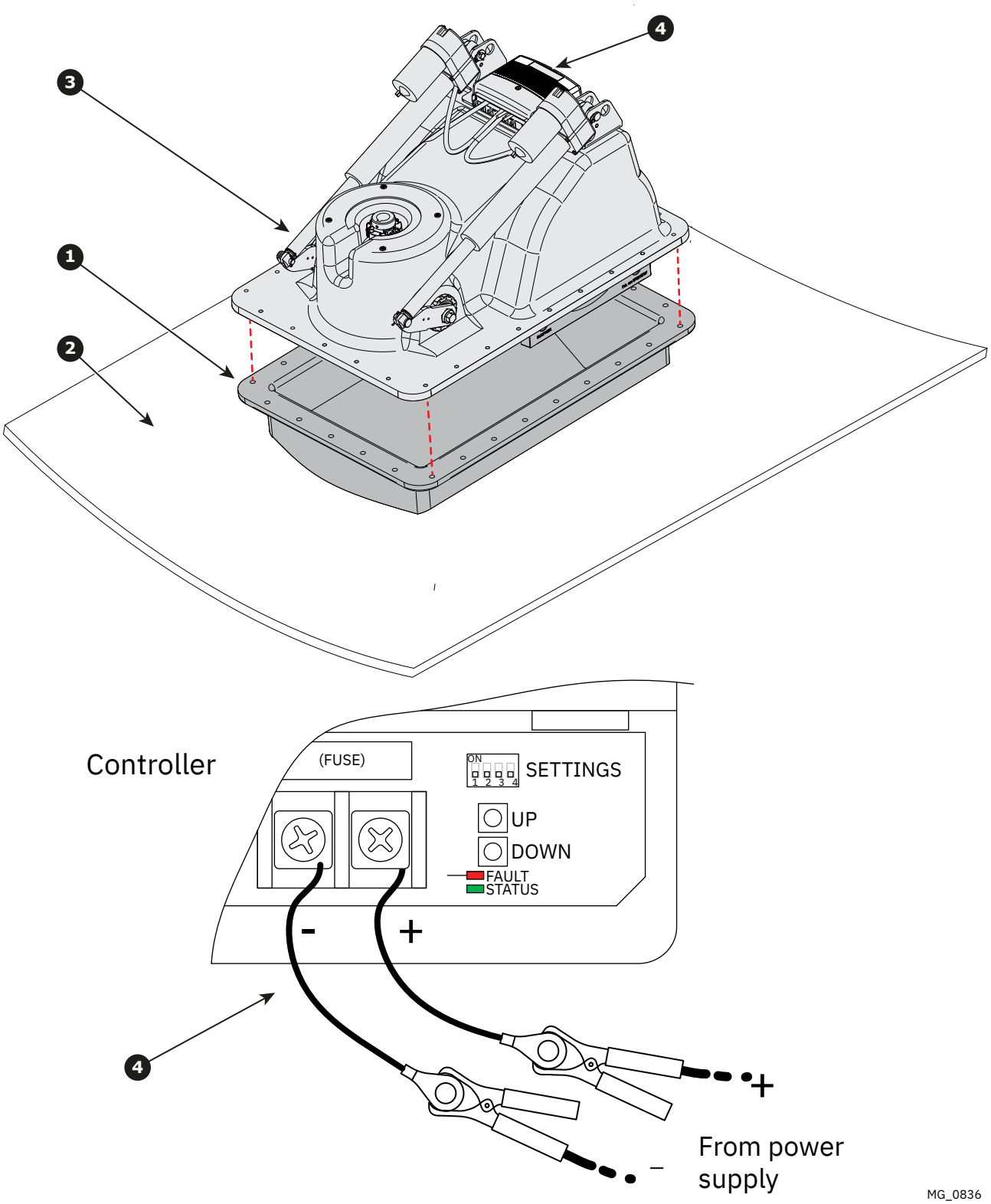
Cut out the hatch

- 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**).



Pre- mount the SRF flange and thruster housing

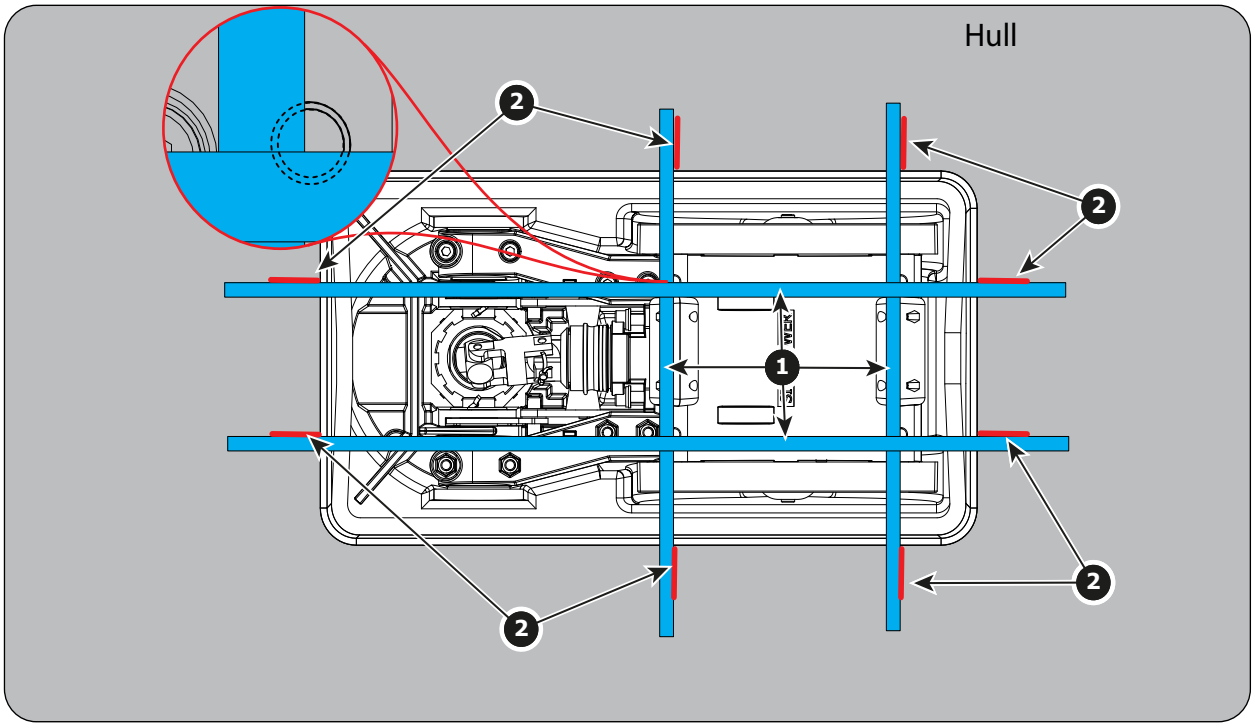
- Position the trimmed SRF flange (**Reference 1**) in the correct position over the hatch cut-out in the hull (**Reference 2**).
- Install the thruster housing (**Reference 3**) provisionally on the SRF flange, and secure it with 4 screws. Verify that the complete thruster assembly (SRF flange and thruster housing) is still inn 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.

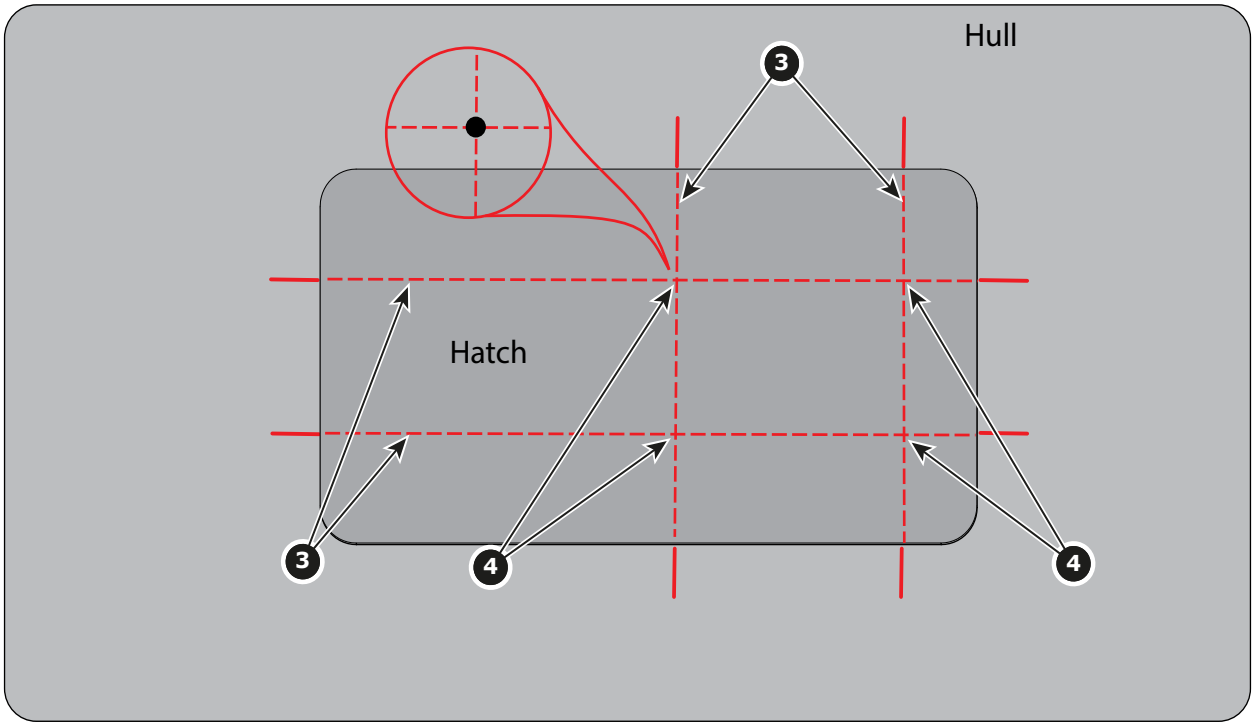


Positioning of the hatch attachment holes

MC_0776

- 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**).





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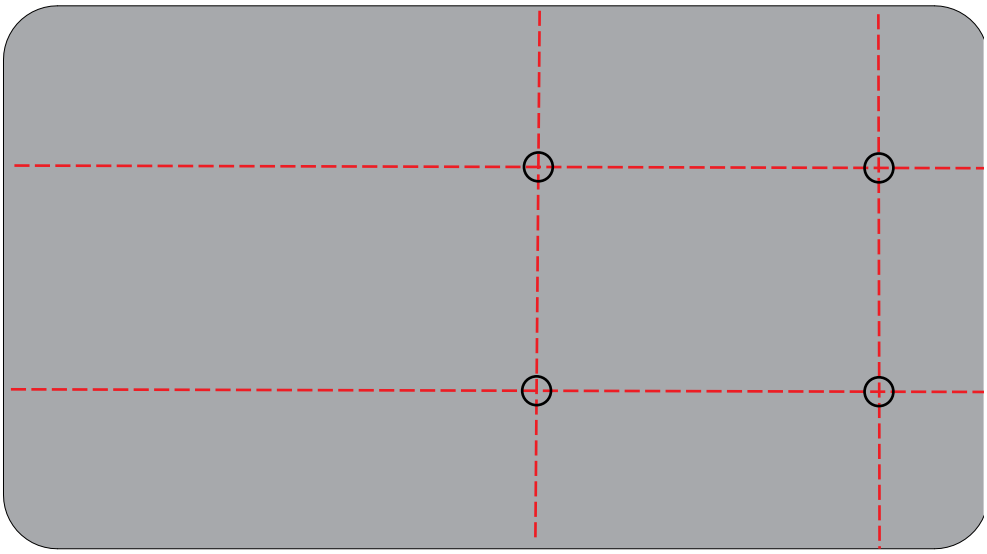
Drilling the attachment holes in the hatch

MC_0778

- Drill four Ø11mm holes in the center of each marking created in the previous step.
- It is recomended 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

Pre-install the hatch

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 egdes 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.

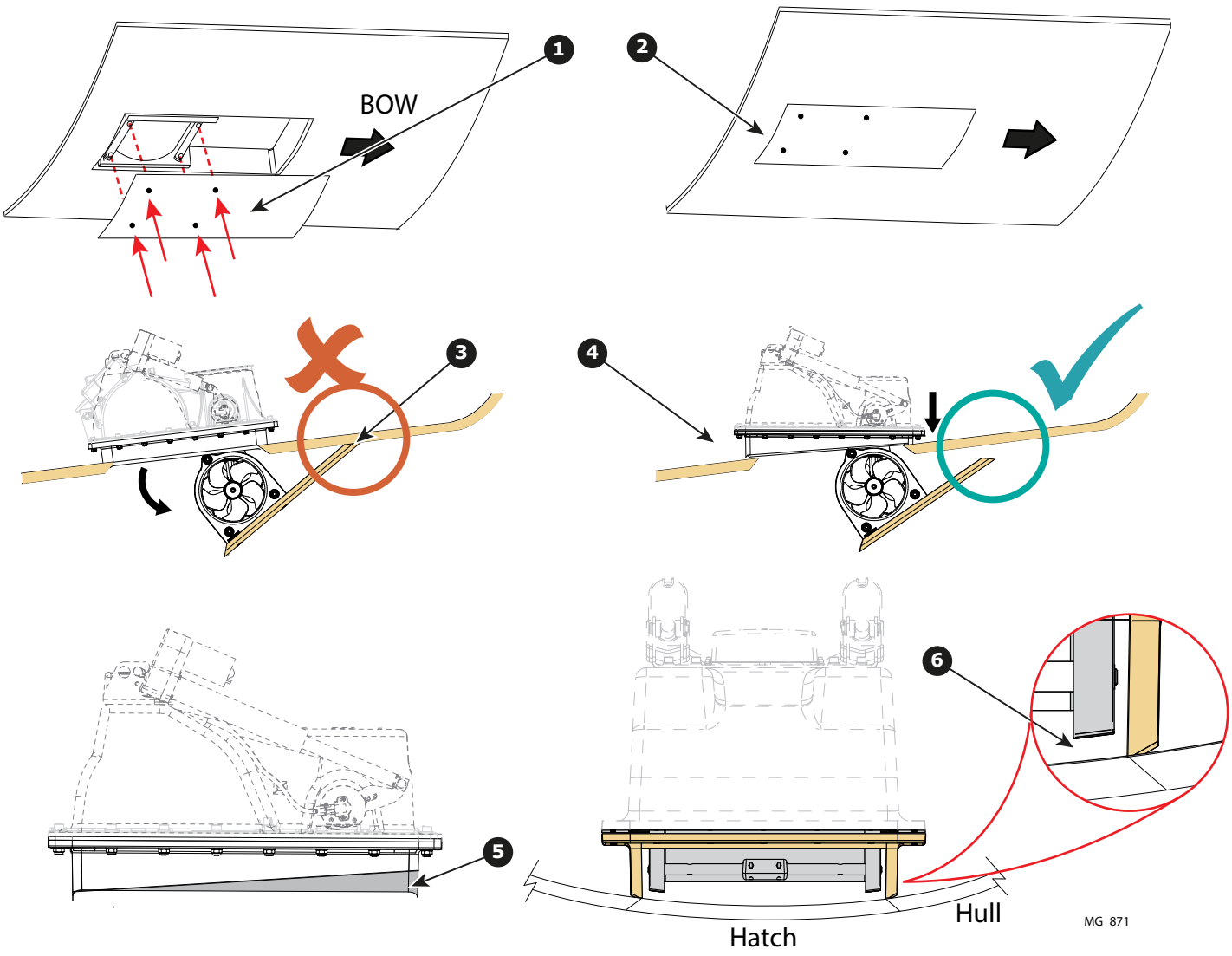
IMPORTANT

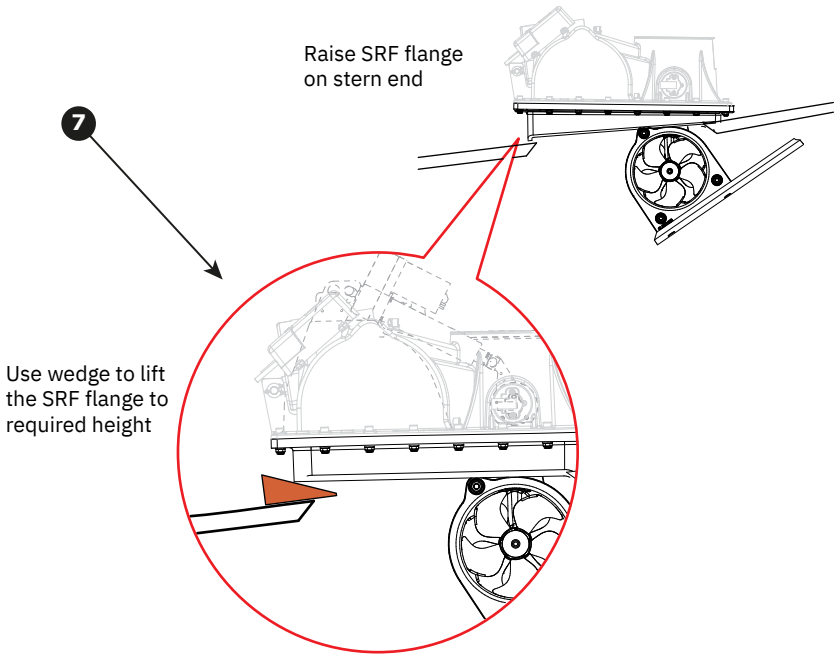
The hatch contact edges and the hull contact edges MUST work as the mechanical end stop. During cruising, slamming forces from the water must be absorbed by these areas, not the thruster.

CAUTION.

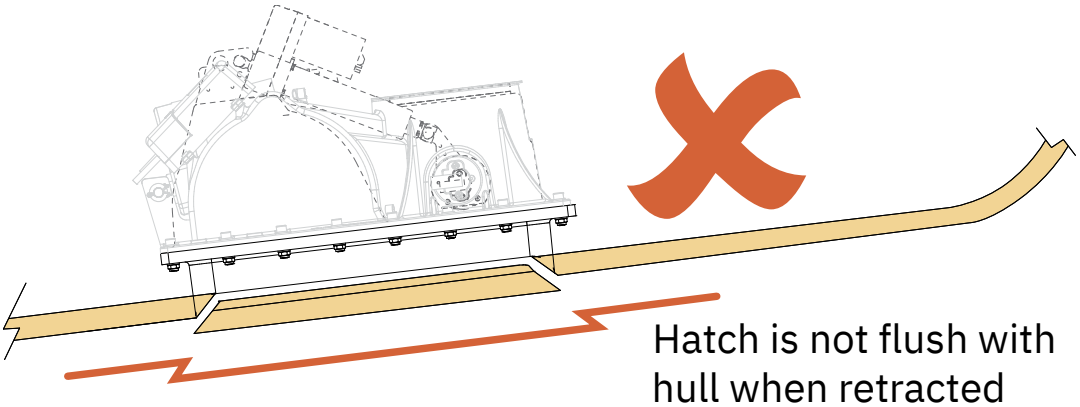
Accidential activation of the retract mechanism can cause serious injury due to the high pressure force used for moving the hatch. Use caution when performing any work or maintenance around or inside the retract mechanism / hatch.

Pre-install the hatch

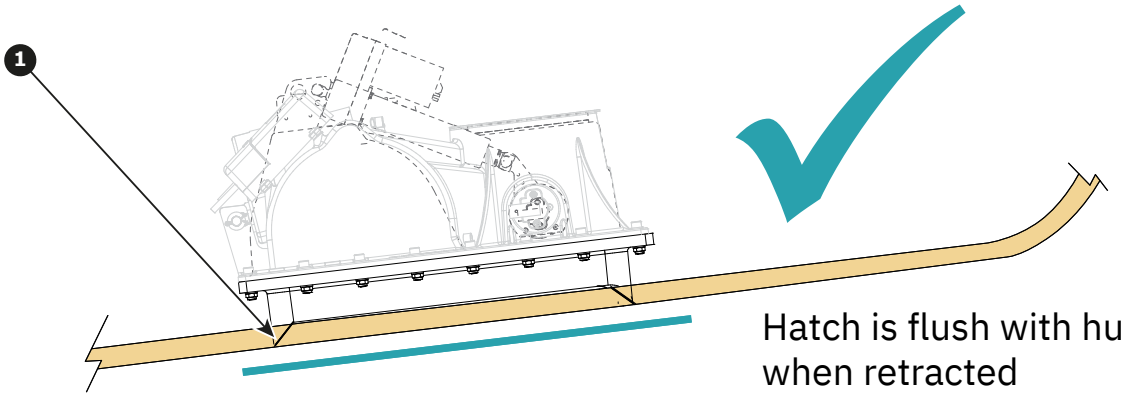




- Press “UP” to retract the tunnel.
- Ensure that the hatch is fitted in the hatch opening, and that the hatch is aligned flush with the hull at all edges. (**Reference 1**).
- Ensure that there is pressure on all the contact surfaces between the hatch and the hull when the hatch is closed.
- If the 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.



Hatch is not flush with hull when retracted



Hatch is flush with hull when retracted

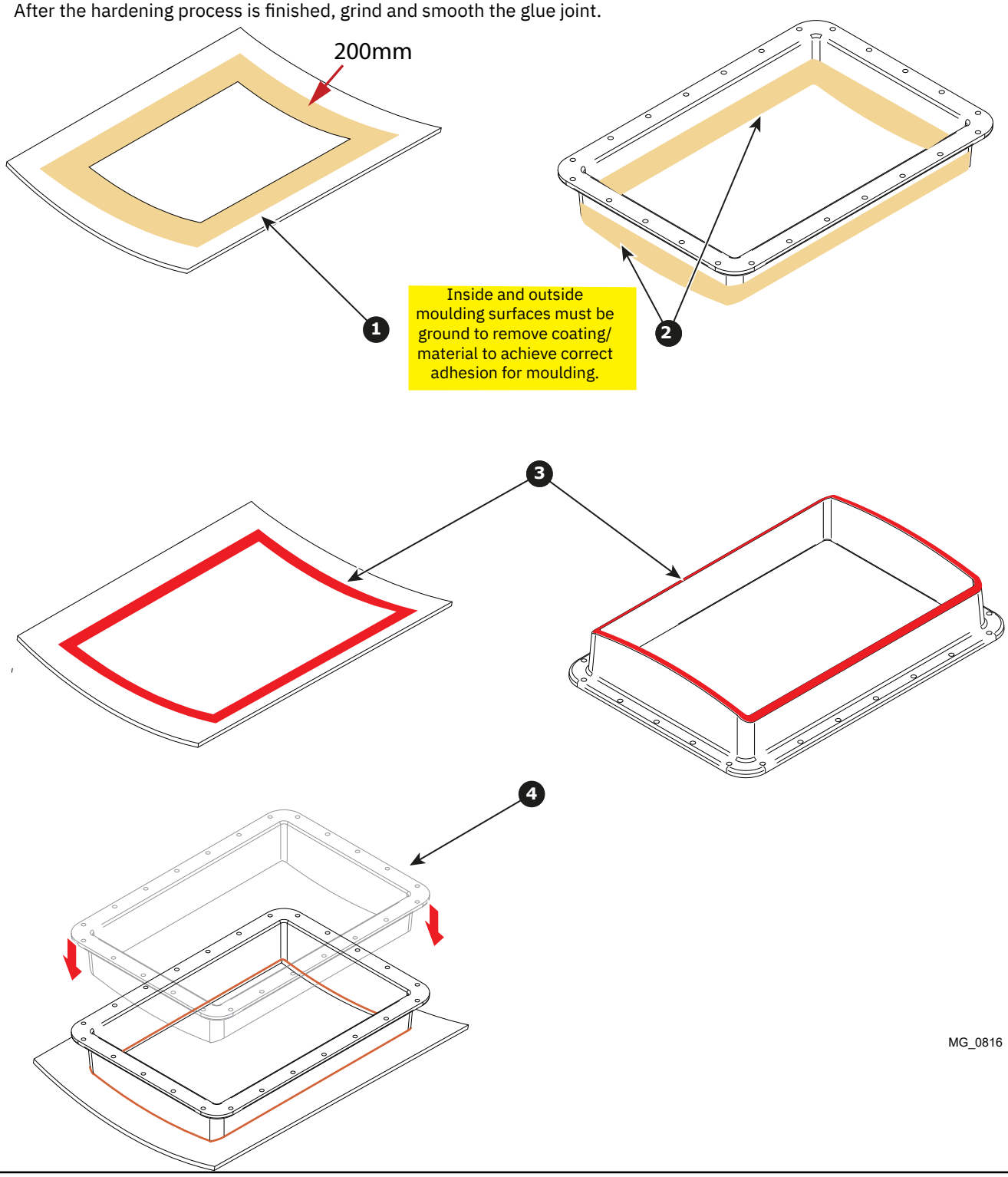
MG_0815

SRF flange installation

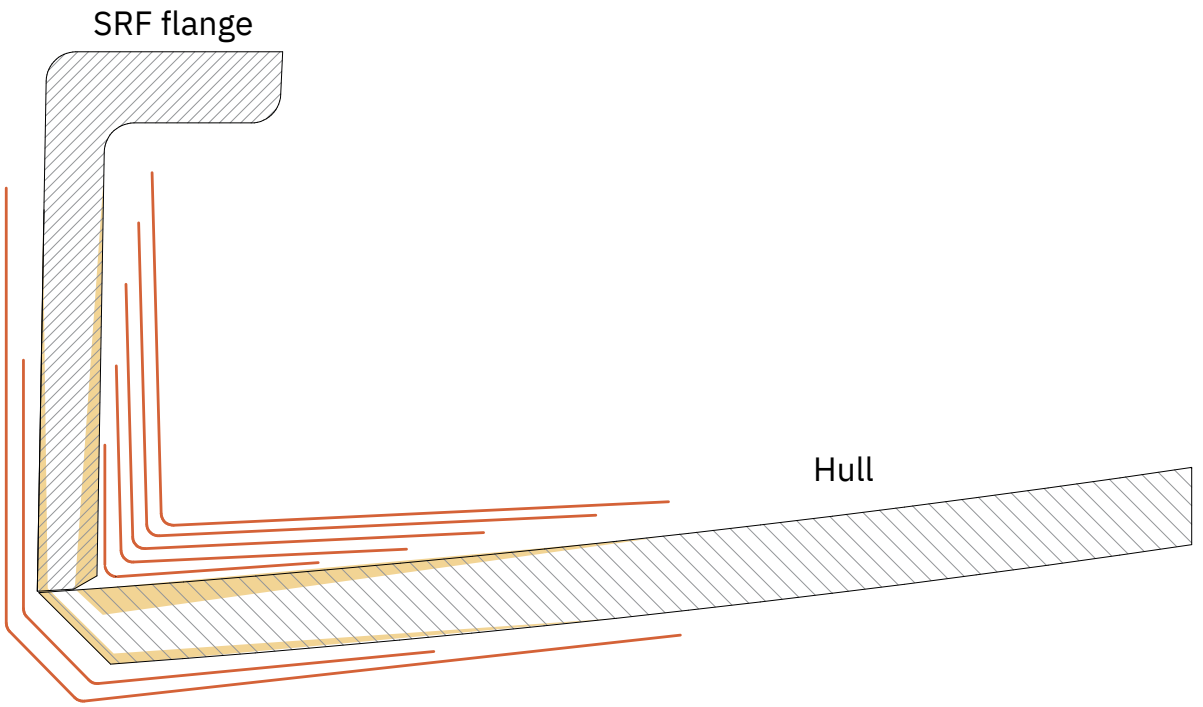
MC_0782

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 positined correctly, remove the excessive glue before the hardening process starts.
- After the hardening process is finished, grind and smooth the glue joint.



- 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 ares has cured properly, smooth all moulded surfaces and apply coating.
- Apply putty before coating if necessary.

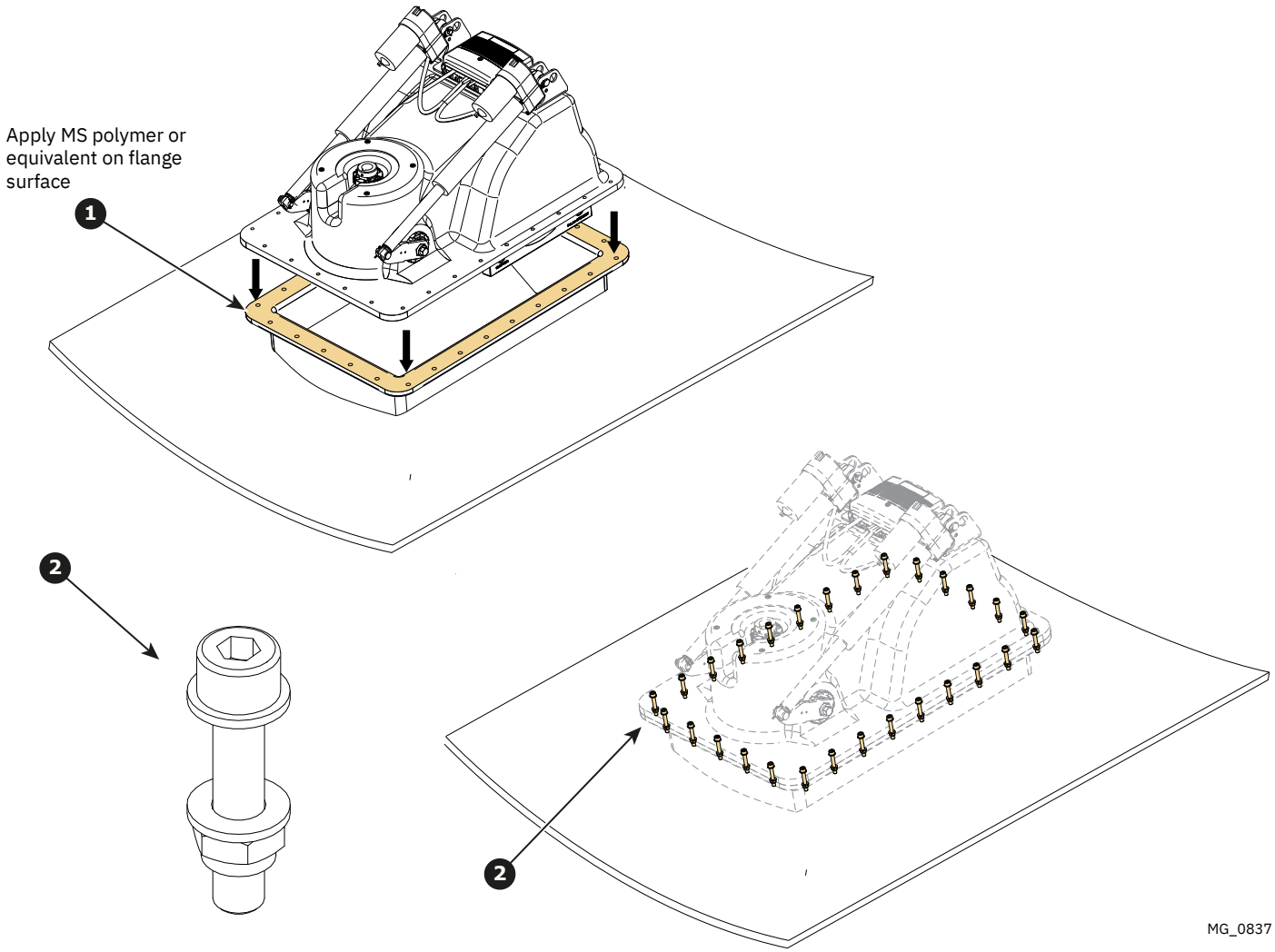


MG_0818

Thruster housing installation

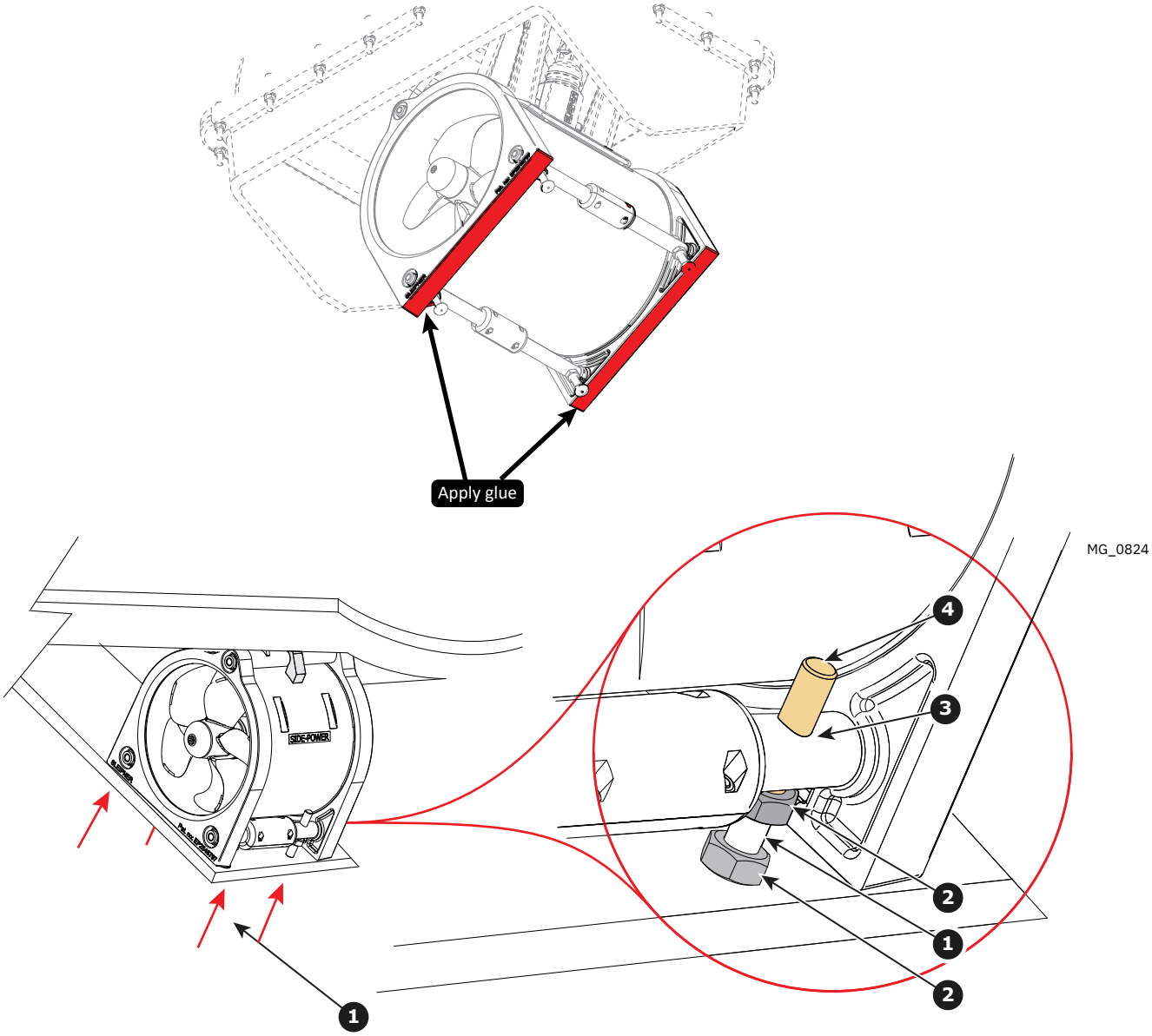
MC_0784

- 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.

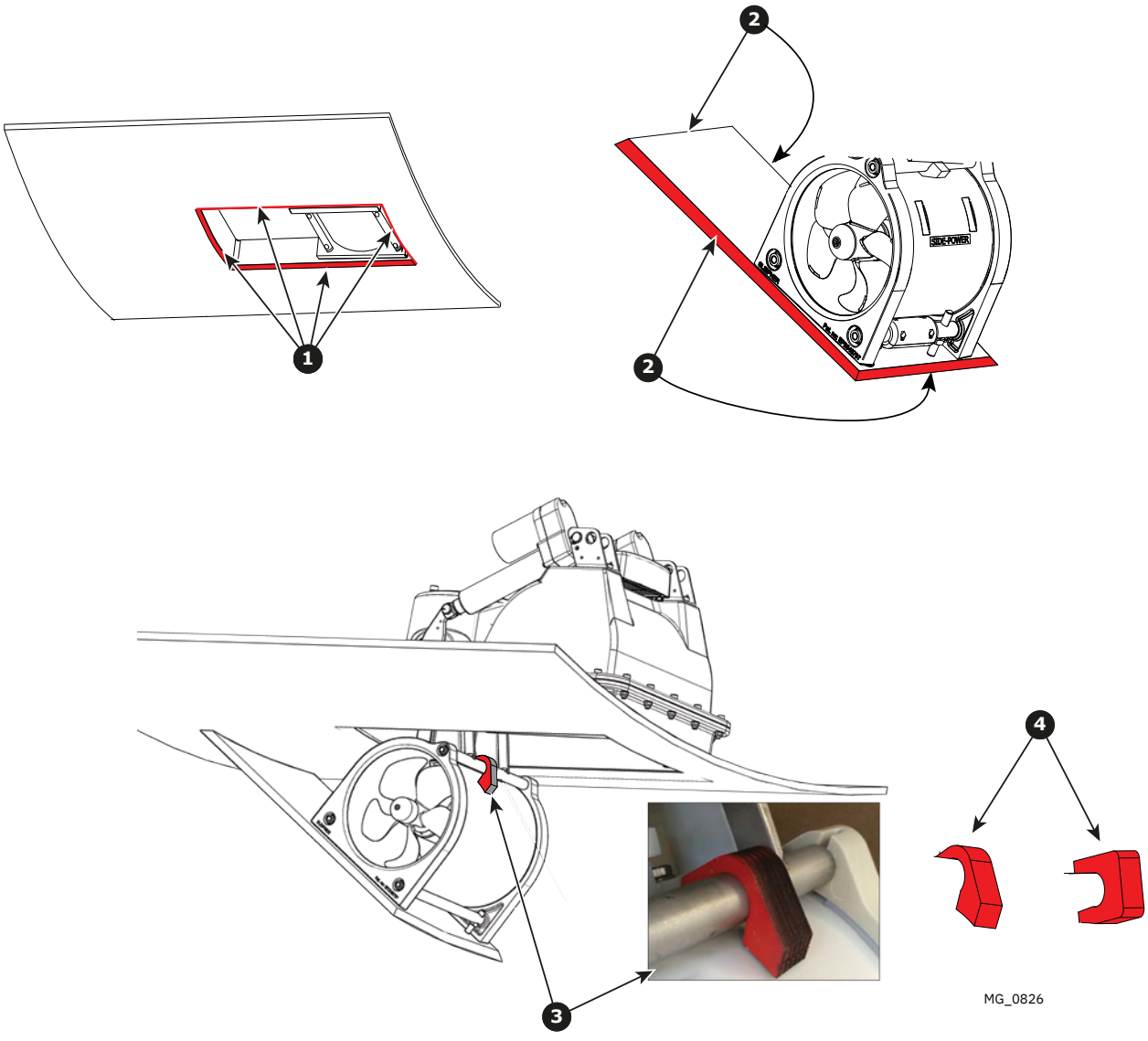


MG_0837

- 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: Several types and numbers of spacer block may be used. (**Reference 4)**.

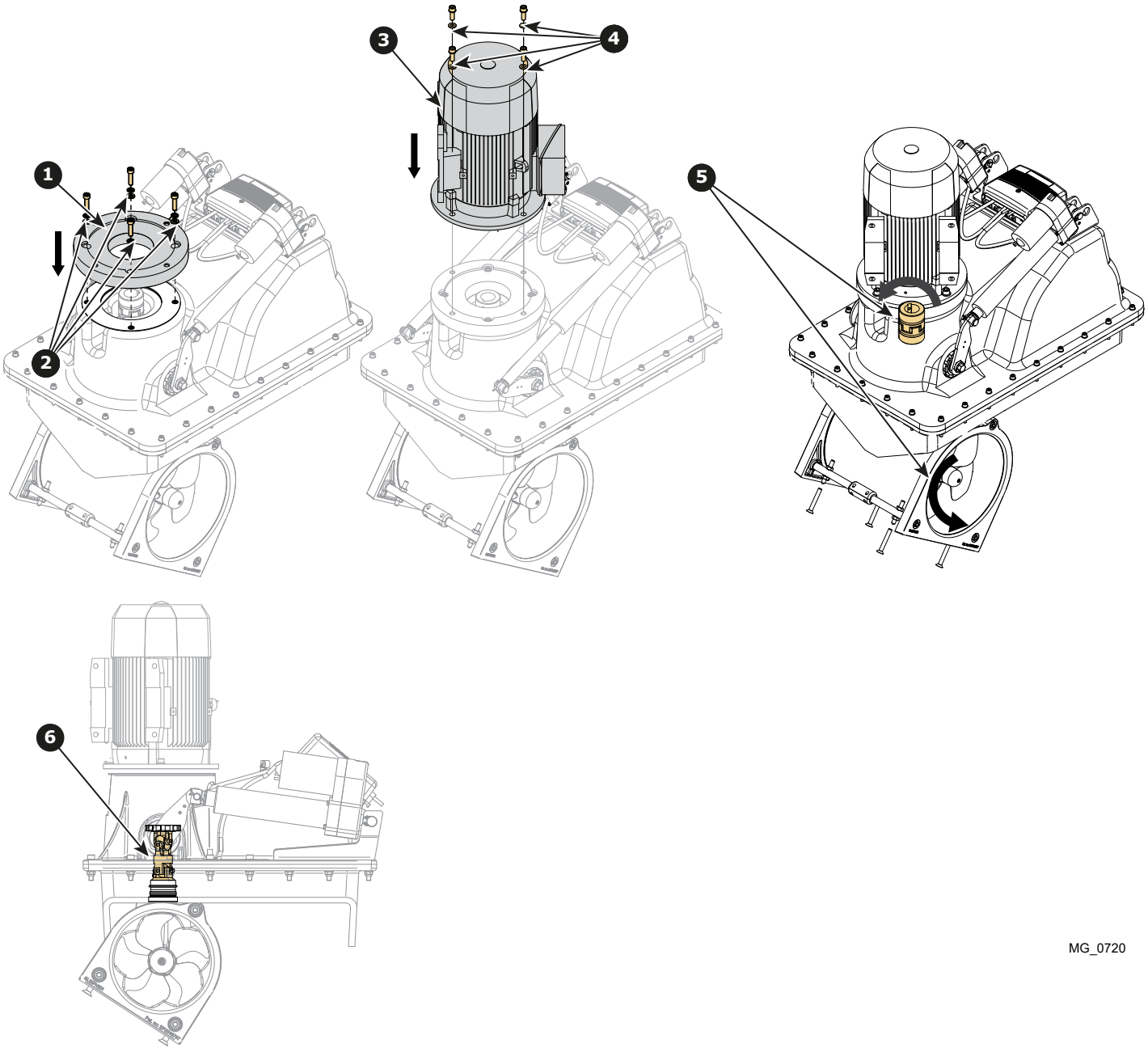


MG_0826

V-motor to house installation

- Install the motor bracket (**Reference 1**) to the thruster housing, using the 4 bolts and washers (**Reference 2**). Tightening torque 33Nm (24lb/ft)
- Install the motor onto the motor bracket ensuring the couplings and the drive shafts have locked together. (**Reference 3**).
  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 4**). Tightening torque 33Nm (24lb/ft)
- Check the drive shafts engage by rotating the propeller. (**Reference 5**). It is required that 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 6**). 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. After fabrication maintenance operations have ceased the cover must be removed before operating the thruster.)



MG_0720

PDC 301

MC_0157

The PDC 301 proportional drive controller controls the speed and direction signals for the Variable Frequency Drive (VFD) controlling the electric motor. The user control panels transmit this information to the Controller. VFD status and alarm signals, as well as motor speed feedback is received by the PDC 301 and transmitted to the control panels. ***(NB: Installation of the VFD must be done by certified electricians, and according to the VFD installation manual.)***

PDC-301 Controller Technical Specifications:

Supply Voltage	9-31V, Powered from the S-link bus
Power consumption	Less than 1W
Operating temperature	-20°C to 70°C (-4°F to 158°F)
Weight	150g/5.3oz
IP Rating	IP-66

S-Link LED status

Continuous GREEN	Flashing GREEN
S-link communication is OK	No S-link communication

VFD (RS-485) LED status

Continuous GREEN	Flashing GREEN
communication with VFD is OK	No communication with VFD

MG_0170

Startup and Commissioning

MC_0412

Before the first start ensure the propeller shaft rotates freely, and the thruster is safe to operate. ***(NB: The ABB variable frequency drive-controlling the motor will perform a motor ID run on the first start.)***
If the control panel displays the "Set-up Assistant", select "Exit & don't show at power up". The drive is already correctly set up before delivery.

1. Place the VFD in local mode on the front panel by pressing the Loc/Rem button. ***(NB: The panel should display Local in the upper left corner.)***
2. Start the drive by pressing the Start button on the VFD panel. The panel will indicate that the ID run is in progress and when it has completed. ***(NB: This procedure takes a few seconds.)***
3. Press the Stop button when the ID run is complete.
   Configure the drive in Remote mode by pressing the Loc/Rem button. After being placed in Remote mode, the thruster can now operate from the Side-Power joystick panels.

(NB: The PDC-301 drive controller is configured as a bow thruster By default. If operated as a stern thruster or in a catamaran configuration, change the thruster instance from the setup menu of the PJC-2xx control panel.)

PMS (Power Management System) ~ Optional:

The thruster control system comes preconfigured for the thruster, but additional configuration is required if integration to a Power Management System.

For ACS580 to activate PMS, the VFD parameter 20.12 “Run enable 1 source” must be set to DI1. It is set by default to “Not selected”.
For ACH580 to activate PMS, the VFD parameter 20.40 “Run permissive” must be set to DI1. It is set by default to “Not selected”.
For ACS880 to activate PMS, the VFD parameter 20.12 “Run enable 1 source” must be set to DIIL. It is set by default to “Not selected”.

When any panel is turned on the PDC-301 will activate the relay output on the VFD for Thruster power request from PMS. Then when the PMS is ready it sends a Thruster Enable signal back to the VFD as a “ready signal” before the thruster can run. If the PDC-301 is not getting the “Thruster Enable” signal within 60 seconds, it will fault displaying fault code 36101.1.200 VFD PMS TIMEOUT. If the Thruster enable signal is lost while the thruster is running it will fault displaying fault code 36101.1.204 PMS SIGNAL LOST.

Motor protection functions:
Dynamic thrust limitation:
If the electric motor winding temperature exceeds 130°C, the PDC 301 limits the maximum thrust output. The maximum thrust permitted will decrease proportionally to increasing temperatures higher than 130°C. ***(NB: Joystick panel will give an alert when the temperature exceeds 130°C. In this situation, the thruster can still be operated. Motor temperature can be monitored from the PJC panel)***

Motor over temperature shut-down:
If the electric motor winding temperature exceeds 150°C the motor will stop and 'Motor Over-temp' is displayed on the connected control panels. The thruster is prohibited from running until the motor has cooled down.

Limited Power ~ Optional:
By default, the digital input DI2 on the VFD is set to limit the power by limiting the VFD torque when the input is +24V.
When in "Limited Power" mode a flashing "LIMITED POWER" text alert will display on the PJC panel.
To change the torque level, change these VFD parameters:
30.23 Minimum torque 2 -50.0 % (default value)
30.24 Maximum torque 2 50.0 % (default value)

Emergency Stop:
Where an Emergency Stop circuit is required, Sleipner recommend implementing the circuit based on the ABB STO(Safe Torque Off) function.
This safety circuit require two parallel circuits switching simultaneously. The circuit diagram can be found in figure xx.
For further information on the STO circuit, refer to ABB HW manual for the drive model installed, where the Safe Torque Off function is described in detail.

Power Cable Dimensions

MC_0158

			Minimum power cable dimensions	
			Temp class 70	Temp class 90
Item no.	Supply Voltage	Max current draw A	Multi core mm²	Multi core mm²
SRAC320/300-2	208-240V 3-phase	80	35	25
SRAC320/300-4	380-440V 3-phase	46	16	10

IMPORTANT
Installation must be done by certified electricians, and according to the VFD install manual.
This table is a general recommendation and installer must consider relevant regulations, temperature conditions and cable lengths.

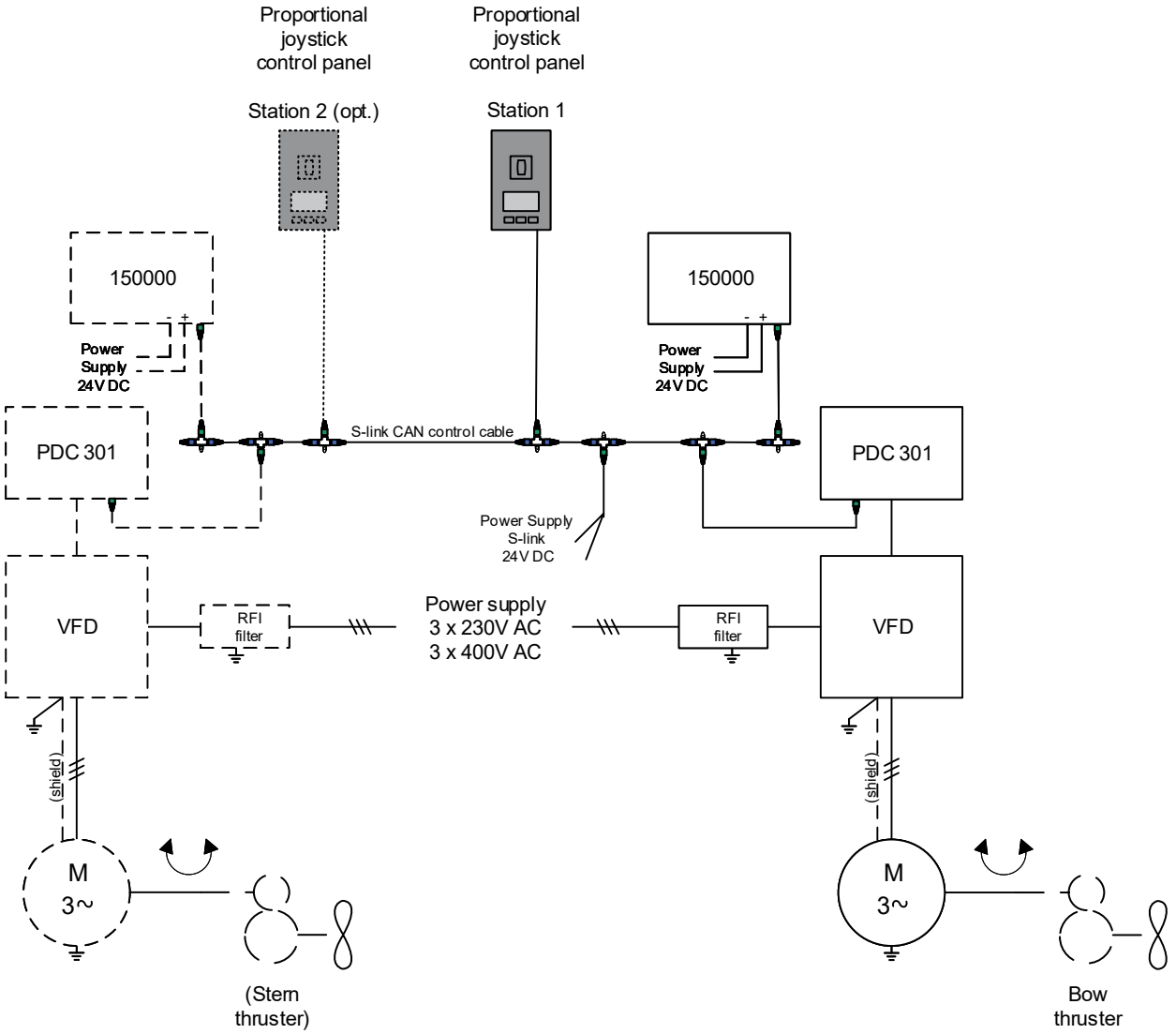
Control Panel Cable Installation

MC_0233

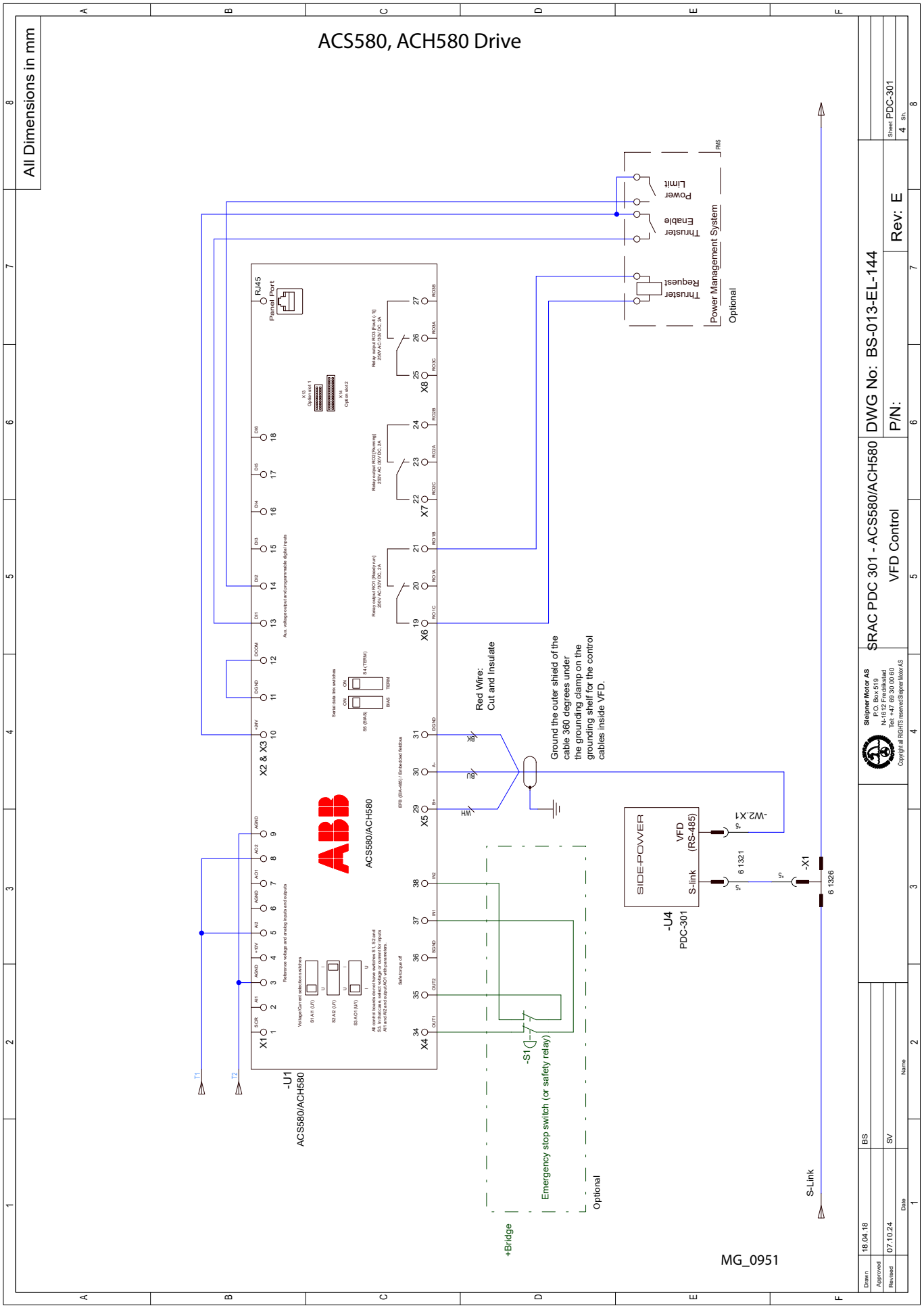
! *Please refer to the graphic for special considerations relating to your model* !

- Many control panels can be installed using optional Y-connectors or T-connectors if installing an S-link proportional power system. ***(NB: If two or more control panels are operated at the same time in opposite directions, the electronic control box will stop the thruster until it receives a single signal or thrust in one direction.)***

- When using original Sleipner equipment it is entirely “plug & go” and no additional configuration setup is required.



MG_0250


ACS580, ACH580 Drive
All Dimensions in mm
SRAC PDC 301 - ACS580/ACH580
VFD Control
DWG No: BS-013-EL-144
P/N:
Rev: E
Sheet PDC-301
4
Sliepner Motor AS
P.O. Box 519
N-6501 Kristiansund
Tel: +47 69 30 00 60
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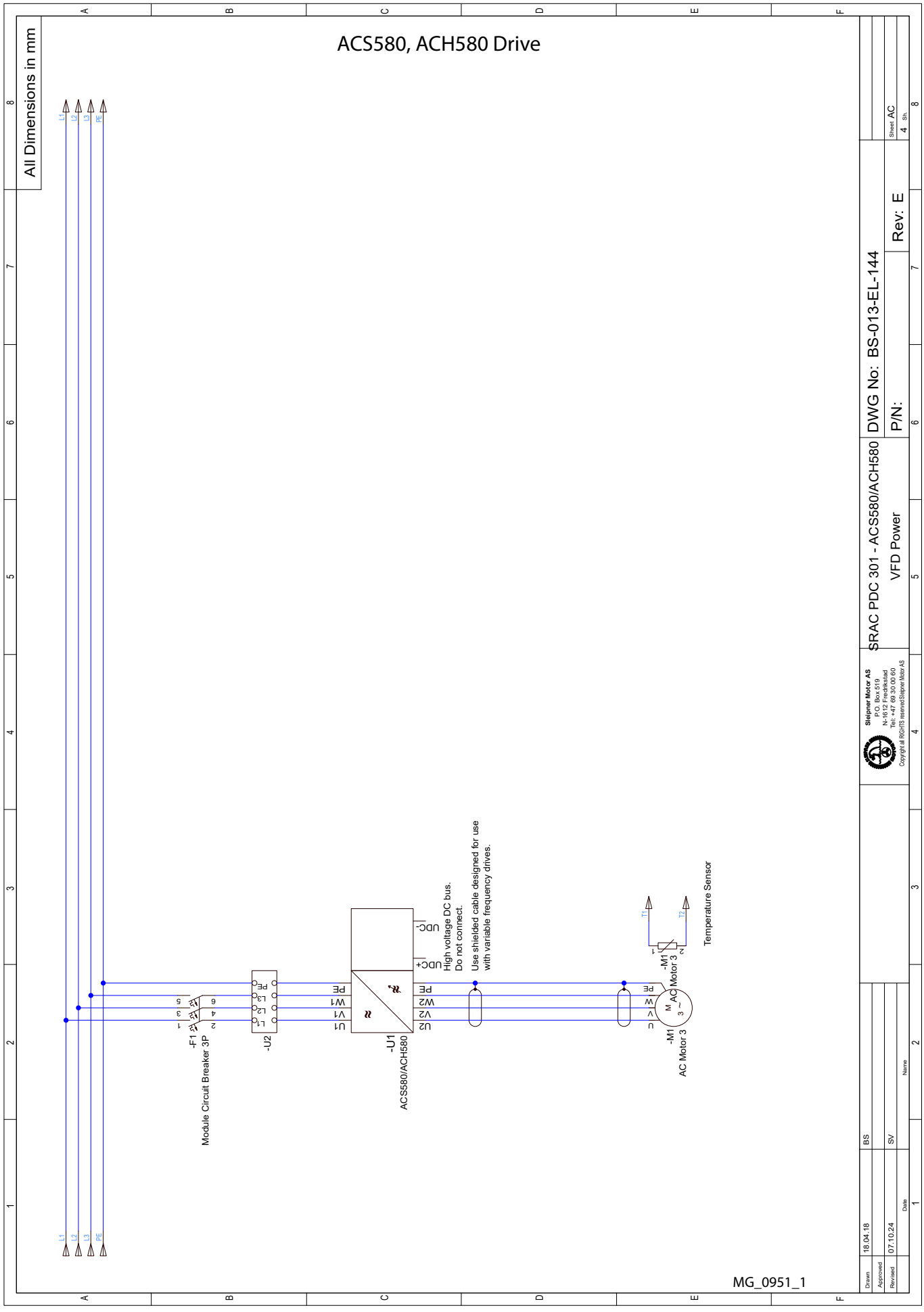
Drawn
Approved
Revised
18.04.18
07.10.24
BS
SV
Date
Name
ACS580/ACH580
-U1
ACS580/ACH580
X1
X2 & X3
X4
X5
X6
X7
X8
RJ45
Panel Port
Power Management System
Optional
Thruster Request
Thruster Enable
Power Limit
Red Wire:
Cut and Insulate
Ground the outer shield of the cable 360 degrees under the grounding clamp on the grounding shelf for the control cables inside VFD.
SIDE-POWER
VFD
S-link
(RS-485)
-U4
PDC-301
-WZ-X1
6 1321
-X1
6 1326
-S1
Emergency stop switch (or safety relay)
Optional
+Bridge
S-Link
MG_0951


ACS580, ACH580 Drive
All Dimensions in mm
L1
L2
L3
PE
-F1
Module Circuit Breaker 3P
-U2
-U1
ACS580/ACH580
UDC-
UDC+
High voltage DC bus.
Do not connect.
Use shielded cable designed for use
with variable frequency drives.
-M1
AC Motor 3
Temperature Sensor
T1
T2
MG_0951_1
SRAC PDC 301 - ACS580/ACH580
VFD Power
DWG No: BS-013-EL-144
P/N:
Rev: E
Sheet AC
4
Steiner Motor AS
P.O. Box 519
N-1612 Fredrikstad
Tel: +47 69 30 00 60
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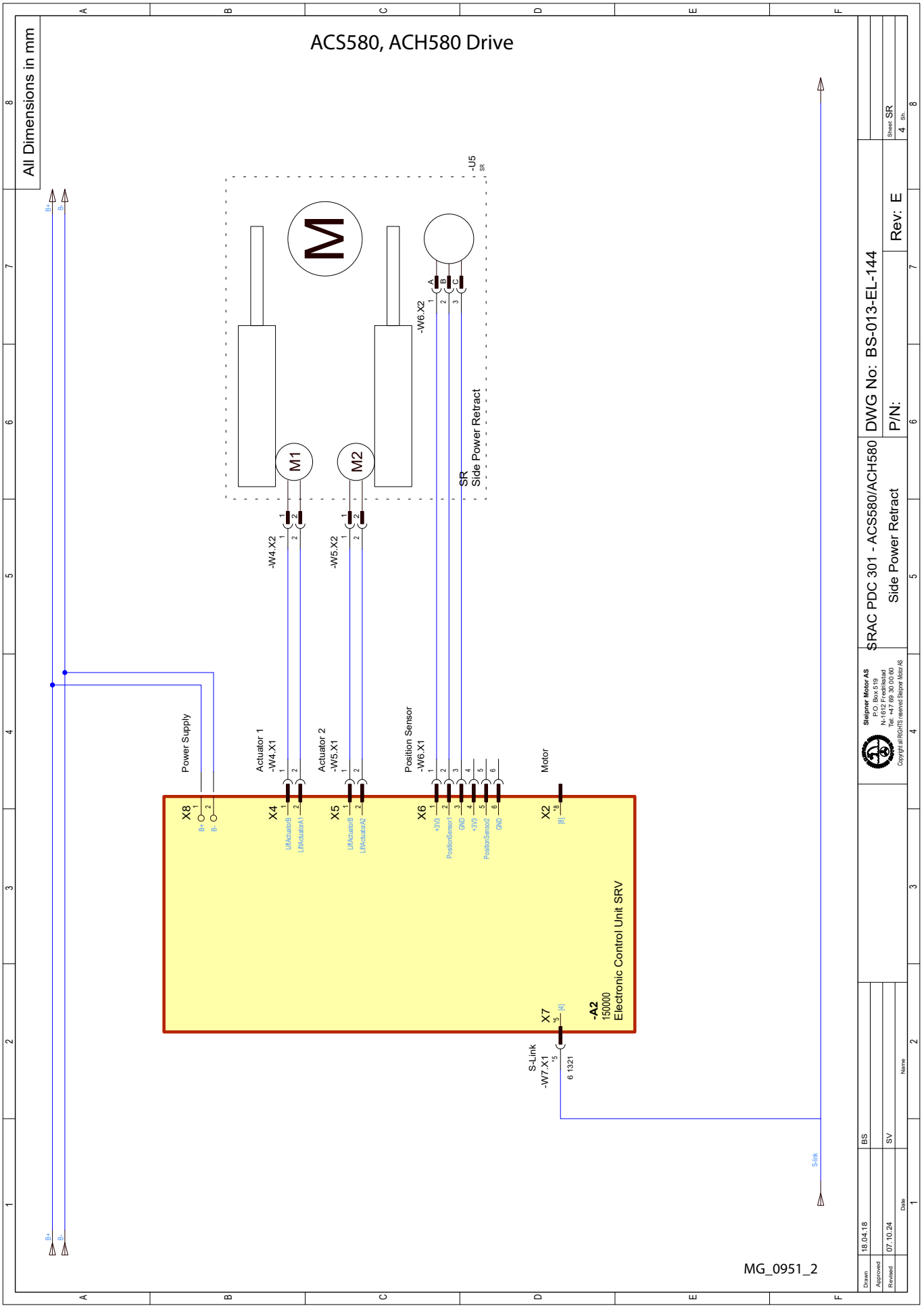
Revised
18.04.18
07.10.24
BS
SV
Date
Name


ACS580, ACH580 Drive
All Dimensions in mm
-U5
SR
Side Power Retract
M
M1
M2
-W6.X2
-W4.X2
-W5.X2
Power Supply
Actuator 1
-W4.X1
Actuator 2
-W5.X1
Position Sensor
-W6.X1
Motor
X8
X4
X5
X6
X2
X7
-A2
150000
Electronic Control Unit SRV
S-Link
-W7.X1
MG_0951_2
SRAC PDC 301 - ACS580/ACH580
Side Power Retract
DWG No: BS-013-EL-144
P/N:
Rev: E
Sheet SR
4 Sh.
Stalpner Motor AS
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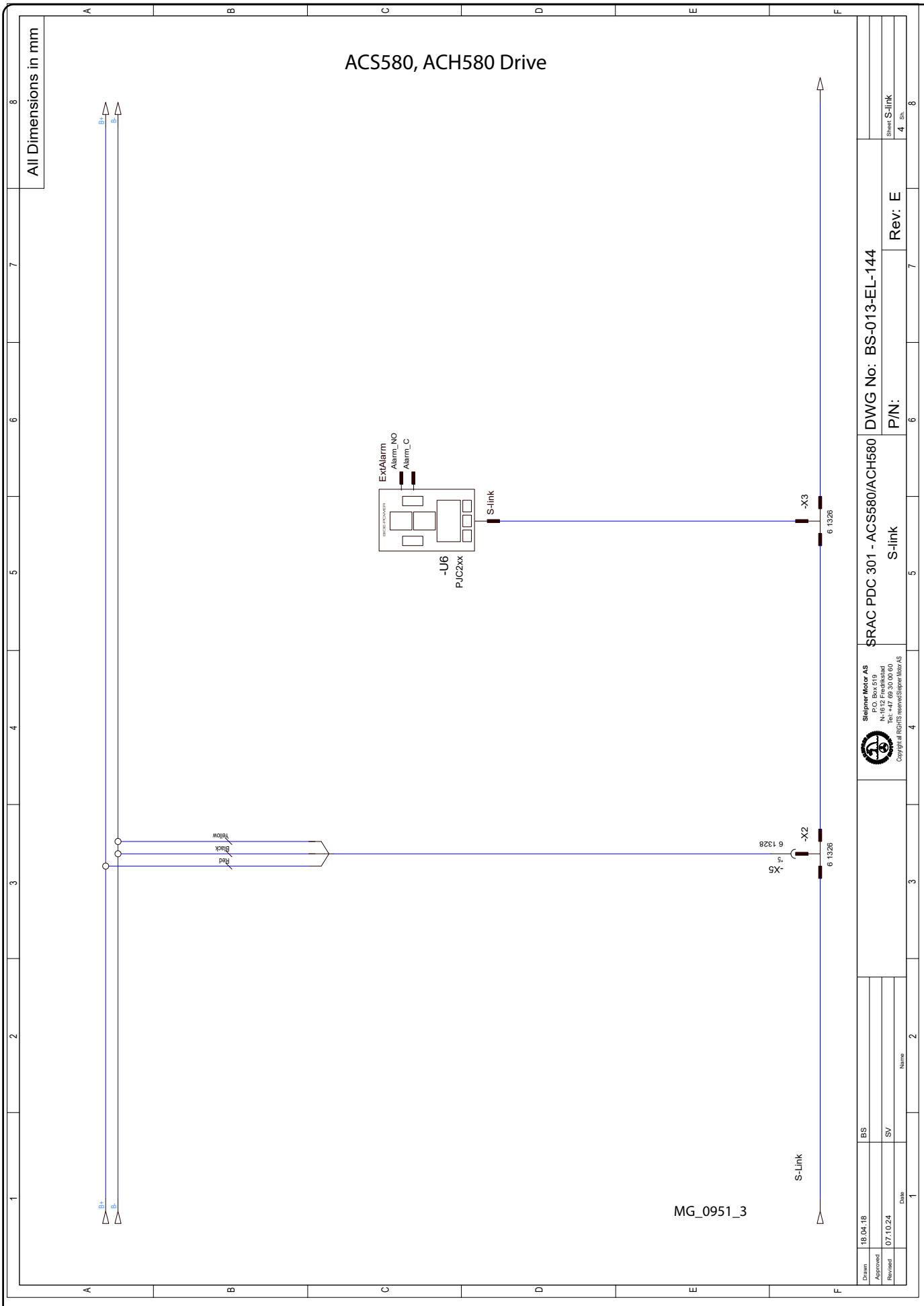
Approved
Revised 07.10.24 SV


ACS580, ACH580 Drive
All Dimensions in mm
ExtAlarm
Alarm_NO
Alarm_C
S-link
-U6
PJC2xx
-X3
6 1326
-X2
6 1328
-X5
6 1326
Yellow
Black
Red
S-Link
MG_0951_3
SRAC PDC 301 - ACS580/ACH580
S-link
DWG No: BS-013-EL-144
P/N:
Rev: E
Sheet 4 Sh. S-link
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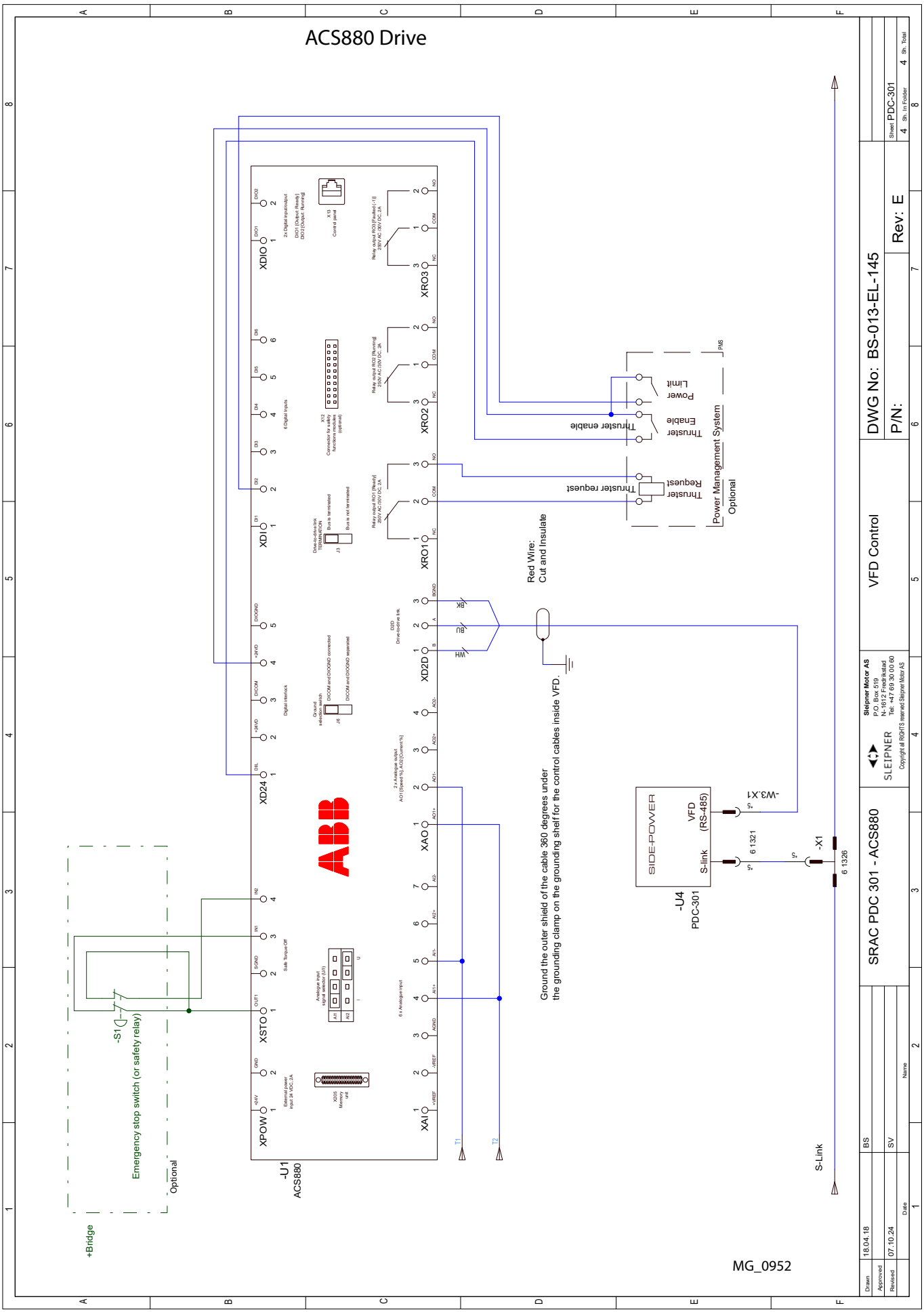
Drawn 18.04.18 BS
Approved SV
Revised 07.10.24
Date Name


ACS880 Drive
VFD Control
DWG No: BS-013-EL-145
P/N:
Rev: E
SRAC PDC 301 - ACS880
Sleipner Motor AS
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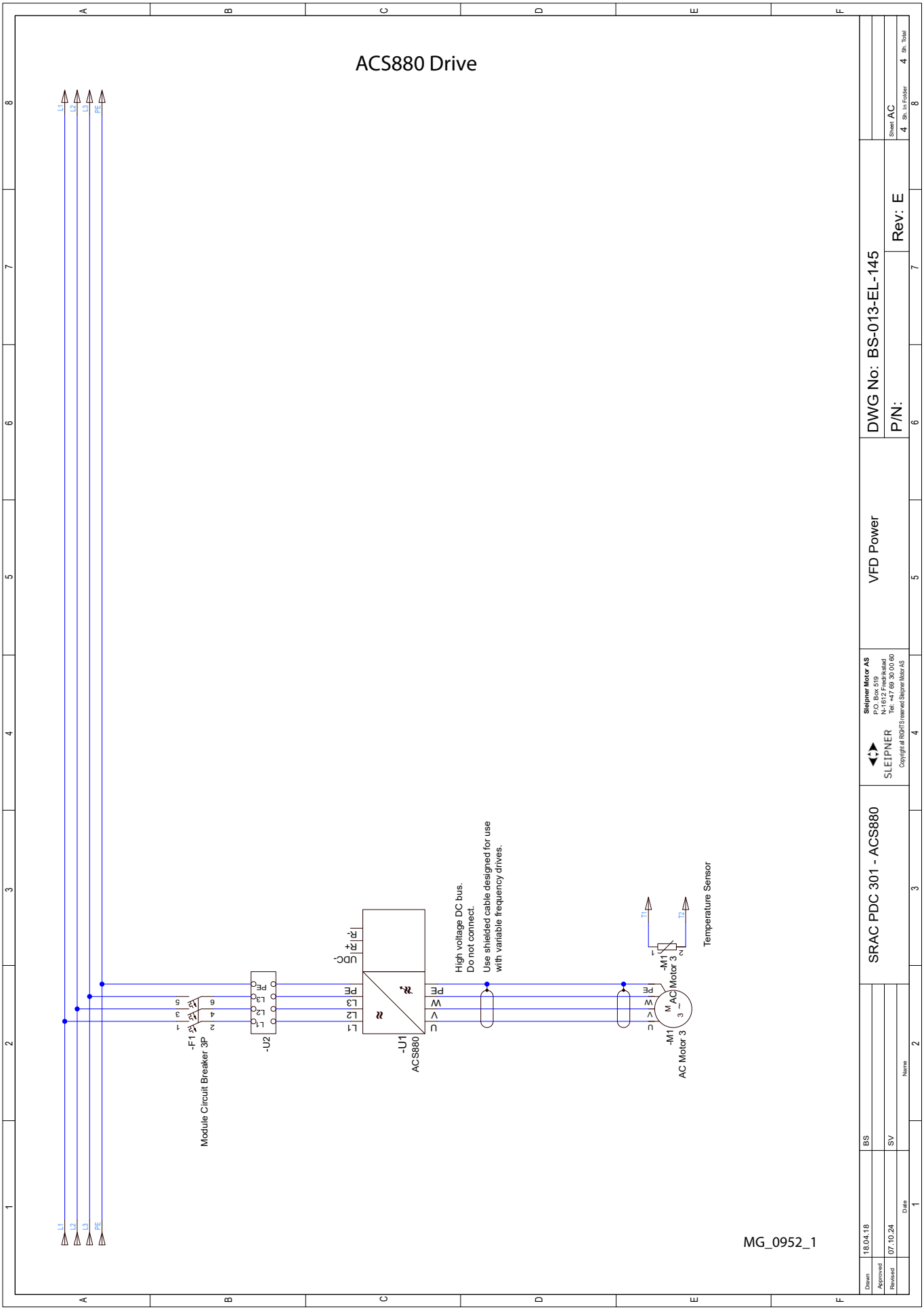
Drawn 18.04.18 BS
Approved 07. 10. 24 SV
Revised
Date Name
Sheet PDC-301
Sh. In Folder 4
Sh. Total 4
-U1
ACS880
XPOW
XAI
XAO
XSTO
XD24
XDI
XD2D
XRO1
XRO2
XRO3
XDIO
-S1
Emergency stop switch (or safety relay)
Optional
+Bridge
Thruster enable
Thruster request
Power Management System
Optional
Power Limit
Thruster Enable
Thruster Request
PMS
Red Wire:
Cut and Insulate
Ground the outer shield of the cable 360 degrees under
the grounding clamp on the grounding shelf for the control cables inside VFD.
-U4
PDC-301
SIDE-POWER
VFD
(RS-485)
S-Link
-W3.X1
6 1321
-X1
6 1326
S-Link
MG_0952


ACS880 Drive
L1
L2
L3
PE
-F1
Module Circuit Breaker 3P
-U2
-U1
ACS880
UDC-
R+
R-
High voltage DC bus.
Do not connect.
Use shielded cable designed for use
with variable frequency drives.
-M1
AC Motor 3
Temperature Sensor
MG_0952_1
SRAC PDC 301 - ACS880
VFD Power
DWG No: BS-013-EL-145
P/N:
Rev: E
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Name
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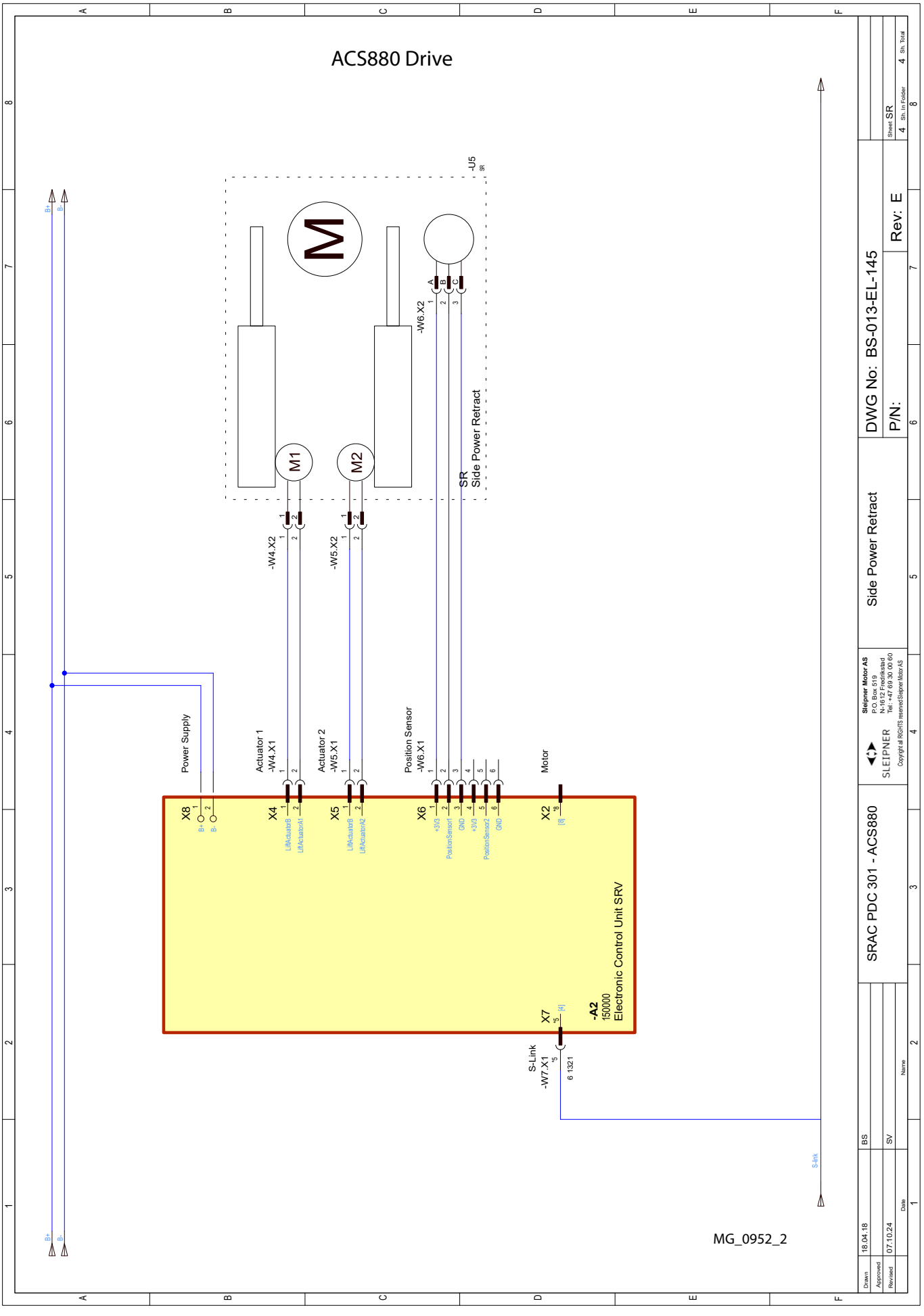
ACS880 Drive
-U5
SR
Side Power Retract
M1
M2
-W6.X2
-W4.X2
-W5.X2
Power Supply
Actuator 1
-W4.X1
Actuator 2
-W5.X1
Position Sensor
-W6.X1
Motor
X8
X4
X5
X6
X2
X7
-A2
150000
Electronic Control Unit SRV
S-Link
-W7.X1
MG_0952_2
SRAC PDC 301 - ACS880
Side Power Retract
DWG No: BS-013-EL-145
P/N:
Rev: E
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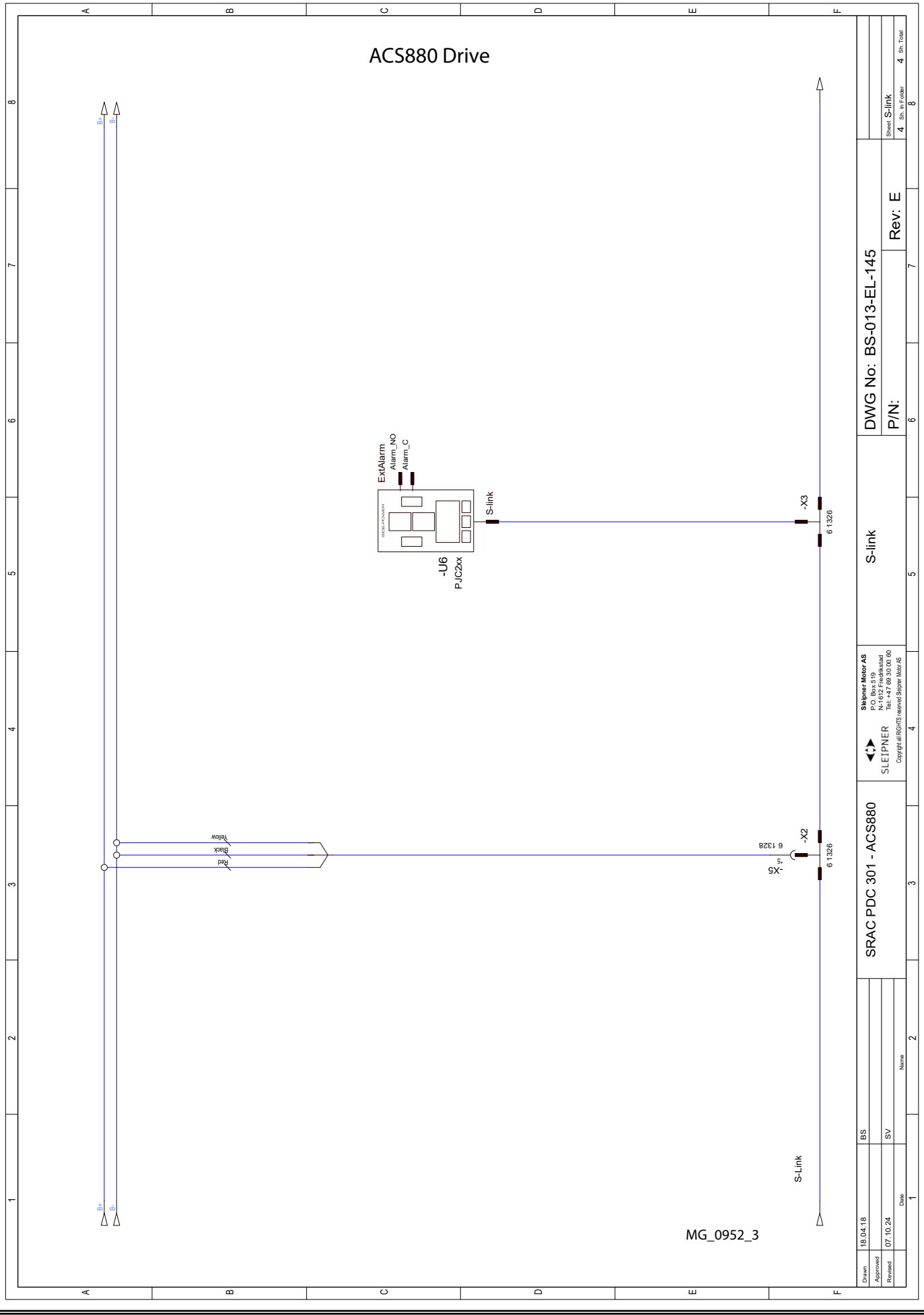
ACS880 Drive
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Alarm_C
S-link
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PJC2xx
-X3
6 1326
-X2
6 1328
-X5
6 1326
Yellow
Black
Red
B+
B-
S-Link
MG_0952_3
SRAC PDC 301 - ACS880
S-link
DWG No: BS-013-EL-145
P/N:
Rev: E
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Name
Date

S-Link system description

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.

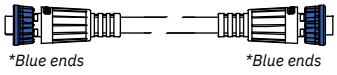
Main advantages of S-Link system:
- Compact and waterproof plugs.
- BACKBONE and SPUR Cables have different colour coding and keying to ensure correct and easy installation. BACKBONE Cables have blue connectors and SPUR Cables have green connectors.
- Different cable lengths and BACKBONE Extenders make 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 recommended to install cables in such a way that water and condensation do not flow along the cables into the connectors. This can be done for example by introducing a u-shape bend before the cable enters the product connector.

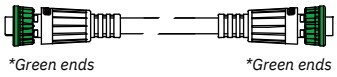
Ideally, the POWER Cable should be connected to the middle of the BACKBONE bus to ensure an equal voltage drop at both ends of the BACKBONE Cable. The yellow and black wire in the POWER Cable shall be connected to GND and the red wire connected to +12VDC or +24VDC.

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.

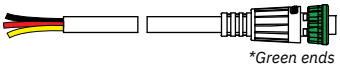
SPUR cables can be left unterminated to prepare for the installation of future additional equipment. In such cases, ensure to protect open connectors from water and moisture to avoid corrosion in the connectors.



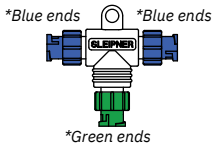
BACKBONE Cable
Forms the communication and power bus throughout a vessel. Available in different standard lengths.



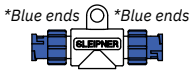
SPUR Cable
Used to connect S-Link compliant products to the backbone cable. One SPUR Cable must be used for each connected component, with no exceptions. Recommended to be as short as practically possible. Available in different standard lengths.



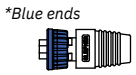
POWER Cable
Required in all installations for connection of BACKBONE Cable to a power supply and should be protected with a 2A fuse.



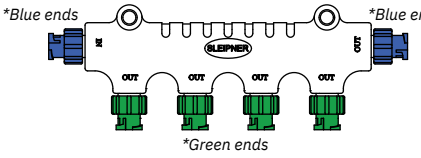
T-Connector
Used for connection of SPUR or POWER Cable to the BACKBONE Cable. One T-Connector for each connected cable.



BACKBONE Extender
Connects two BACKBONE Cables to extend the length.

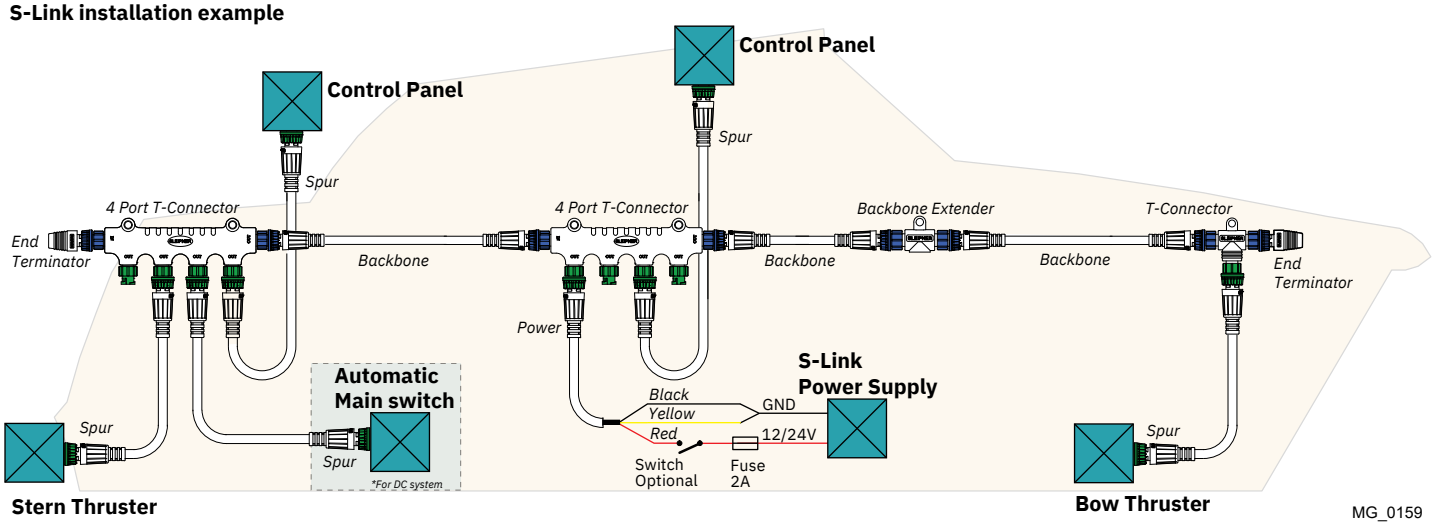


END Terminator
Must be one at each end of the BACKBONE bus.



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



MG_0159

Check drive shaft alignment

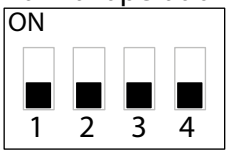
MC_0069

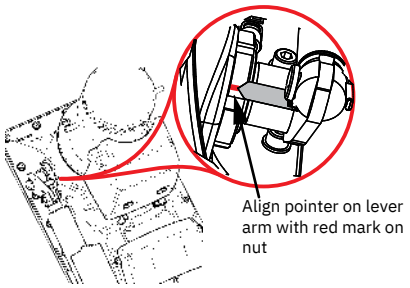
IMPORTANT

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

1) Connect power to thruster and S-link system.
2) Sett 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





Calibrate drive shaft alignment

MC_0069

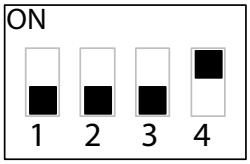
(NB: The drive shaft is correctly aligned when manufactured)

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.

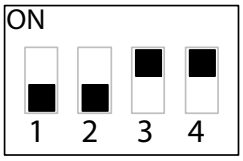
(NB: If FAULT LED light-up red, then the calibration is out of position (wrong align mark).

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

Service mode



Calibration mode

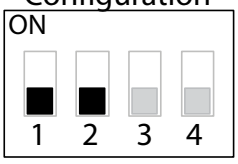


Actuator configuration

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:

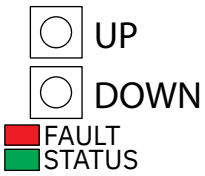
Red light fast blinking: Dip-switch in an invalid position.
Red light short flash every 2 seconds: Shaft not calibrated, or shaft calibrated out of range.

Continuous green light:

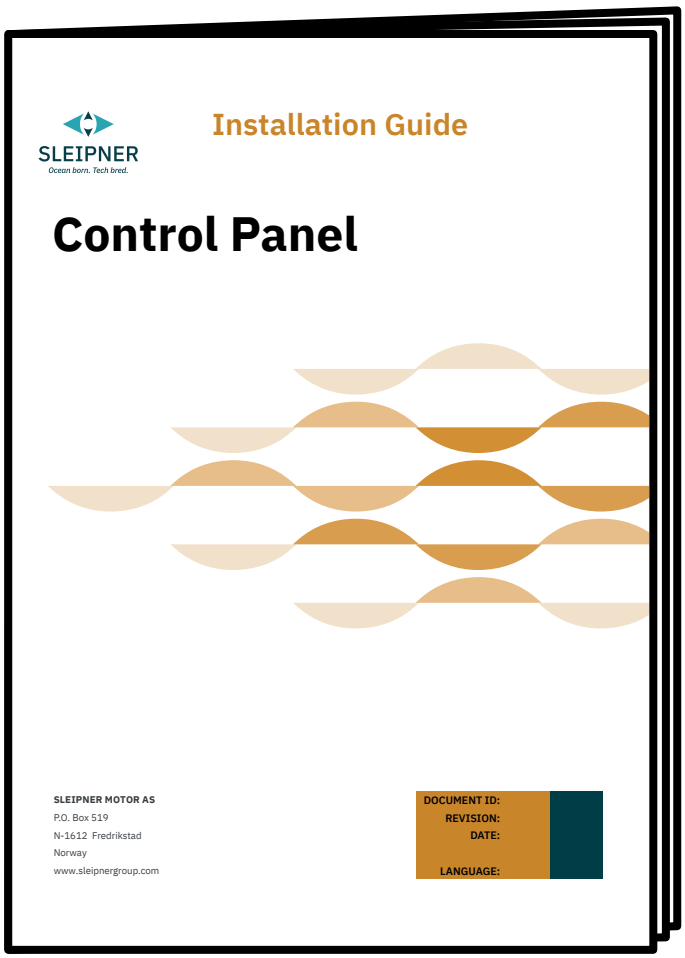
Normal mode, Service mode (actuators operated by UP/DOWN buttons).
Re-calibrated "down"-position.

Flashing green light:

No S-Link communication.



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



□..... Propeller is fastened correctly to the shaft.

□..... Propeller turns freely in tunnel.

□..... Lower-unit is filled with gear oil.

□..... Oil-drain screw is tightened and the copper seal is present.

□..... The anode holding screw is tightened well with thread glue.

□..... Anti-fouling have been applied to the gear house and propeller but NOT on the anode or the gear house lid where the propeller is fastened.

□..... Correct drive direction as per control panel.

□..... The bolts holding the gear house and motor 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 the boat for potential water leakage around installation areas.

[]..... 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: .....

Extra pre-delivery tests by installer / yard who does not use other quality control systems !

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: .....

Sleipner Group Waste Disposal and Recycling Guide

MC_0848

Introduction:
At Sleipner Group, we prioritize sustainability and encourage the repair and re-manufacturing of products to extend their life cycles. If disposal is necessary, please follow these guidelines to recycle and manage waste responsibly, ensuring our efforts align with environmental protection efforts.

Electric Motors and Electronics:
- Disconnect from any power sources and dismantle them carefully.
- Recycle components through certified e-waste recycling centers that can adequately handle and recover electronic materials.
- Dispose of any non-recyclable electronic parts according to local environmental regulations.

Metals:
- Collect and sort metal parts for recycling as scrap metal.
- To increase recycling efficiency, ensure that metals are clean and free from non-metal attachments.

Plastics:
- Identify recyclable plastics based on local recycling guidelines.
- Remove any non-plastic components and clean them before recycling to improve the quality of the recycled material.

Hazardous Materials:
- Correctly identify any hazardous substances within components, such as batteries or capacitors etc.
- Follow local regulations for the safe disposal of hazardous materials to prevent pollution and protect environmental health.

General Disposal Instructions:
- Consult local recycling programs to determine the acceptability of various materials.
- Use authorized disposal services to ensure compliance with environmental standards.

Safe Disposal Practices:
- Adhere to local laws and regulations for waste management to minimize environmental impact and ensure community safety.

This guide is designed to help reduce our products' environmental footprint through responsible end-of-life management. Please contact your local waste management supplier or our support team for more specific disposal information or further assistance.

Service and support

MC_0024

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

Product spare parts and additional resources

MC_0024

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

Warranty statement

MC_0024

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.sleipnergroup.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

MC_0024

At Sleipner we continually reinvest to develop and offer the latest technology in marine advancements. To see the many unique designs we have patented, visit our website www.sleipnergroup.com/patents

Learn more about our products at www.sleipnergroup.com

SLEIPNER
Ocean born. Tech bred.

SLEIPNER MOTOR AS
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Norway
www.sleipnergroup.com
Made in Norway

MC_0030