

SIDE-POWER
Thruster Systems

EX Series

EN Installation & User Guide v4.8



EX SINGLE



EX DUAL



EX COMPACT



SLEIPNER MOTOR AS

P.O. Box 519
N-1612 Fredrikstad
Norway

Tel: +47 69 30 00 60
Fax: +47 69 30 00 70

www.side-power.com
sidepower@sleipner.no



Made in Norway

CONTENT

1. PREPARATION		9. OPERATION	
1.1. Introduction	3	9.1. EX series as bow thruster	26
1.2. Safety Regulations	3	9.2. EX series as stern thruster	26
1.3. Necessary Tools	3	9.3. Bow and stern thrusters combined	27
2. PRODUCT CONTENTS		9.4. Operation with multiple control elements	27
2.1. Mounting kit „Basic“	4	9.5. Important User Information	27
2.2. Mounting kit „Adapter“	5	9.6. Maintenance	28
2.3. Electronics and reference sticker	6	9.7. Troubleshooting	28
2.4. Control elements (separately available)	6	10. GUARANTEE BOND	29
2.5. Cable Sets (separately available)	6	11. APPENDIX	
3. MOUNTING GENERAL		11.1. Dimension sheet EX series Single	30
3.1. Mounting Variants	7	11.2. Control Circuit Scheme EX series Single	31
3.2. Restrictions	7	11.3. Control Circuit Scheme EX series Single /AMS	32
3.3. Choice of the mounting position	8	11.4. Dimension sheet EX series Dual	33
3.4. Measuring of the mounting position	8	11.5. Control Circuit Scheme EX series Dual	34
3.5. Main drilling and sealing	9	11.6. Schematic overview, 24V thruster(s) in 12V boat system	35
3.6. The reference sticker	9	11.7. Compatibility with other thrusters	35
3.7. Redox reaction and mounting adjustments	10	11.8. Technical Facts	36
4. MOUNTING KIT BASIC		11.9. Propeller Replacement	37
4.1. Measuring of the mounting bolts	11	11.10. Template for joystick and touch panel	38
4.2. Bolting and sealing	11		
4.3. Mounting illustration GRP	12		
4.4. Mounting illustration steel and aluminium	13		
5. MOUNTING KIT ADAPTER			
5.1. Adapter positioning (round chine)	14		
5.2. Bolting and sealing	14		
5.3. GRP adapter installation	15		
5.4. Mounting illustration GRP	17		
5.5. Mounting illustration steel and aluminium	18		
6. MOUNTING COMPACT	19		
7. MOUNTING Dual			
7.1. General Instructions	20		
7.2. Measuring of the mounting position	20		
8. ELECTRICAL INSTALLATION			
8.1. General Instructions	21		
8.2. EX Single and EX Dual			
Performance Specifications	21		
8.3. Fuse protection and wire cross section	21		
8.4. Choice of battery	22		
8.5. Wiring	22		
8.6. Installation of the i-BOX	23		
8.7. Installation of joystick and touch panel (optional)	24		
8.8. Installation of the radio remote control (optional)	24		
8.9. Installation of multiple control elements	25		

1. PREPARATION

1.1. Introduction

Thank you for choosing Side-Power external bow and stern thruster:

The driving power of the EX series bow and stern thruster depends on the boat length and assembly position: the efficiency, apart from the hull form, depends on various other factors, like, among other things, boat weight, freeboard surface, operational area and wind force.

The indicated power will be achieved under optimal circumstances. In order to ensure this, the choice of the assembly position, the assembly, as well as the electrical installation and wiring should be conducted with care and by specialists.

EX series has a substantial task: To increase safety and comfort on board. Regular maintenance work is not necessary. With professional assembly and with consideration of the recommendations contained in this manual, EX series will soon become indispensable for manoeuvring your boat.

1.2. Safety Regulations

Read this manual carefully. Provide the safety regulations also to all persons who are engaged with the assembly or the operation of EX.

- The electrical installation must principally be accomplished by a specialist!
- During the operation of EX never touch moving parts!
- Do not operate EX, neither in the water nor outside of the water, if there are people standing close to the bow and stern thruster!
- When working on the EX series, always switch off the EX series main switch!
- Always switch the EX series main switch off when the bow and stern thruster is not used for a longer period!
- When craning, the belt may not be placed where it touches the EX series bow and stern thruster!

1.3. Necessary Tools

For the assembly of the EX series bow and stern thruster the following tools are needed depending on the mounting variant:

- Measuring tape
- Cord or levelling rule
- Hand drill
- Drill bits Ø 1,8 mm, 6 mm, 9 mm, 12 mm, 18 mm
- Hole saw Ø 50 - 51 mm
- Pipe wrench size SW46
- Socket wrench size SW13
- Flat wrench size SW10
- Allen wrench size SW4
- Suitable sealant



2. PRODUCT CONTENTS

2.1. Mounting kit "Basic" (Article No. 50151)

Attachment "distance" (Article No. 50395):

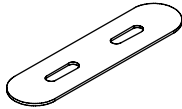
4x safety nut M8



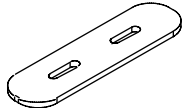
4x disk M8



1x sheet
(B01.M5.003.B3)



1x isolator
(B01.M5.005.B3)



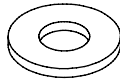
2x sealing D18 12,5 mm
(B01.M5.006.B3)



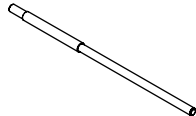
4x sealing D18 25 mm
(B01.M5.004.B3)



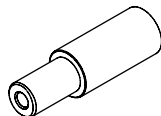
2x tefl on-washer



2x mounting bolt 250
(B01.M3.002.B3)

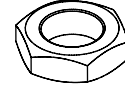


2x distance piece
(B01.M5.001.B3)



Attachment "main connection" (Article No. 50396):

2x hexagon nut



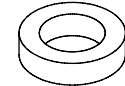
1x disk M30



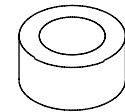
1x disc
(B01.M1.002.03)



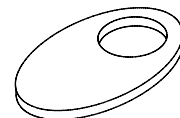
1x sealing D50 12,5 mm
(B01.M1.003.03)



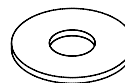
3x sealing D50 25 mm
(B01.M1.004.03)



1x pad
(B01.M1.005.03)



1x isolator
(B01.M7.001.03)



2.2. Mounting kit "Adapter" (Article No. 50152)

Attachment "adapter" (Article No. 50390):

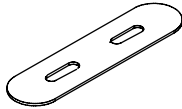
4x safety nut M8



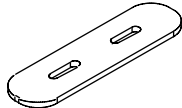
4x disk M8



1x sheet
(B01.M5.003.B3)



1x isolator
(B01.M5.005.B3)



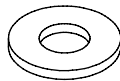
2x sealing D18 12,5 mm
(B01.M5.006.B3)



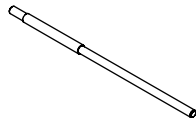
4x sealing D18 25 mm
(B01.M5.004.B3)



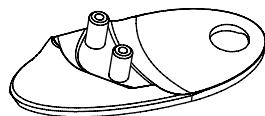
2x tefl on-washer



2x mounting bolt 250
(B01.M3.002.B3)

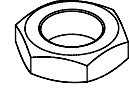


1x adapter
(B01.M3.001.B3)



Attachment "main connection GRP" (Article No. 50391):

2x hexagon nut



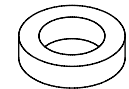
1x disk M30



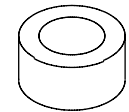
1x disk
(B01.M1.002.03)



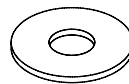
1x sealing D50 12,5 mm
(B01.M1.003.03)



3x sealing D50 25 mm
(B01.M1.004.03)



1x isolator
(B01.M7.001.03)



2.3. Electronics and reference sticker

- 1x i-BOX - Art#: 102250-12V / 102250-24V
- 2x crane operator reference sticker (black)
- 2x crane operator reference sticker (white)



Fig. 2: i-BOX

2.4. Control Elements (separately available)

To operate EX series, one of the following separately available control elements is necessary:

- Control Element „single joystick panel“ (Article No. 8960 G/S):
- Control Element „dual joystick panel“ (Article No. 8940 G/S):
- Control Element „touch panel“ (Article No. 8950)
- Control Element „radio remote control“ (Article No. RC-10)

2.5. Cable Sets (separately available)

Likewise, for the connection between i-BOX and control panel, a control cable with appropriate length is required:

- | | |
|------------|---|
| 6 1277-04M | Control cable 4 meter, 4-lead |
| 6 1277-07M | Control cable 7 meter, 4-lead |
| 6 1277-09M | Control cable 9 meter, 4-lead |
| 6 1277-12M | Control cable 12 meter, 4-lead |
| 6 1277-15M | Control cable 15 meter, 4-lead |
| 6 1277-18M | Control cable 18 meter, 4-lead |
| 6 1277-22M | Control cable 22 meter, 4-lead |
| 6 1274 | Y-connector for multiple control panels, 4-lead |

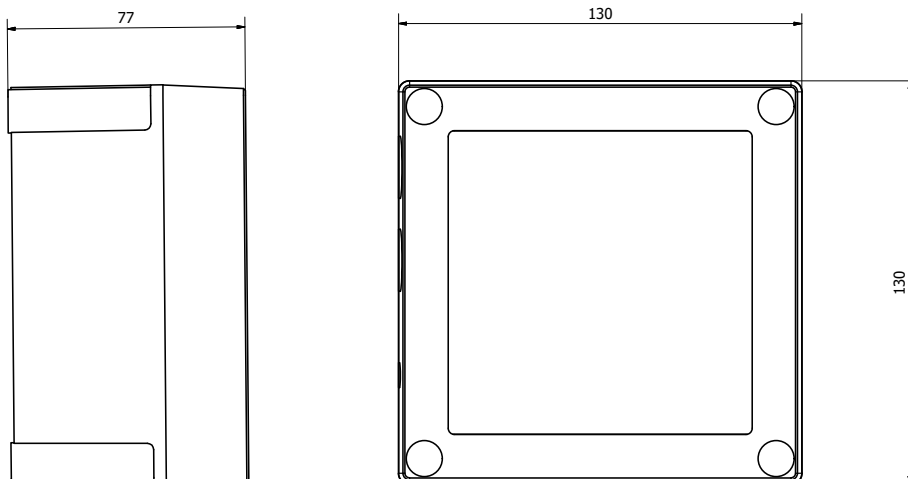
If an automatic main switch is used, a 5-lead cable from control panel to the automatic main switch is required:

- | | |
|------------|---|
| 6 1278-04M | Control cable 4 meter, 5-lead |
| 6 1278-07M | Control cable 7 meter, 5-lead |
| 6 1278-09M | Control cable 9 meter, 5-lead |
| 6 1278-12M | Control cable 12 meter, 5-lead |
| 6 1278-15M | Control cable 15 meter, 5-lead |
| 6 1278-18M | Control cable 18 meter, 5-lead |
| 6 1278-22M | Control cable 22 meter, 5-lead |
| 6 1265 | Y-connector for multiple control panels, 5-lead |

Y-connector for Dual installations (Two thrusters with one panel)

- 6 1266 Y-connector 2 thrusters with 1 panel (Dual)

i-BOX measurements:



3. MOUNTING GENERAL

3.1. Mounting Variant

The areas of application of the respective EX series mounting kits constitute as follows:

Area of application	Mounting kit „Basic“	Mounting kit „Adapter“
bow thruster ROUND CHINE	+	+
bow thruster HARD CHINE	–	+
stern thruster ROUND CHINE	+	+
stern thruster bathing platform	+	+
stern thruster “vertical transom”	+	–

3.2. Restrictions

EX series as bow thruster:

- Bow mounted EX series on high speed cruisers/boats can cause possible unwanted spray. Therefore, it is not recommended.

EX series as stern thruster:

- The mounting on the slide surface of a glider is not permitted!
- On GRP-boats with a speed from 12 knots the hull construction must comply to the guidelines of GL (Germanic Lloyd)!
- It has to be assured that the incident flow of the rudder and drive is not affected!
- The propeller needs free sight at starboard and port, so it is not permitted to mount two EX series side by side in one axis!

CAUTION!

EX series as bow mounting on high speed cruisers/boats can cause possible unwanted spray! It is not recommended.

CAUTION!

The Ex unit must not be mounted where its thrust water flow is obstructed by other objects (EG. the rudder blade)!

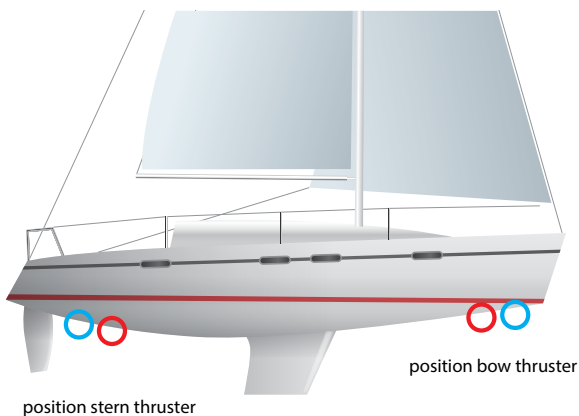
3.3. Choice of the mounting position

The mounting of the EX series bow and stern thruster is unbelievably simple and can be carried out without large expenditure of time. Nevertheless, it should principally be done by a specialist.

In order to achieve the optimal efficiency of EX series when used as bow thruster, it should be positioned as far down and in front as possible, though 30 cm under the waterline is sufficient.

When operated as a stern thruster, naturally, it should be positioned as far down and in the back as possible, however, again, 30 cm under the waterline is sufficient.

Fig. 6: mounting sailboat



Sailing boat
 Length: 6 – 15 m
 ○ EX Single (Bow and/or stern)
 Length: 14 – 20 m
 ○ EX Dual (Bow and/or stern)

Fig. 7: mounting displacement hull boat



Displacement hull
 Length: 6 – 15 m
 ○ EX Compact (transom)
 ○ EX Single (Bow and/or stern)
 Length: 14 – 20 m
 ○ EX Dual (Bow and/or stern)

3.4. Measuring of the mounting position

The EX series bow and stern thruster must be positioned exactly on the middle line of the boat. In order to determine this, it is recommended to draw a line from the keel to the bow or stern with a cord or a measuring tape and fix it. Subsequently, by means of this line, the desired position can be shifted easily forward or backward.

For the choice of the mounting position, it is to be likewise made certain that the required hole with a diameter of 50 - 51 mm is not drilled at an unsuitable position (e.g. bulkhead). The metal sheet to be used (except on steel and aluminium boats) has a width of 80 mm. So that it can be placed without problems, the borehole must be at least 60 mm from the next bulkhead. For the reasons mentioned above, the positioning should be measured exactly in any case before the execution of the drilling, also inside the boat.

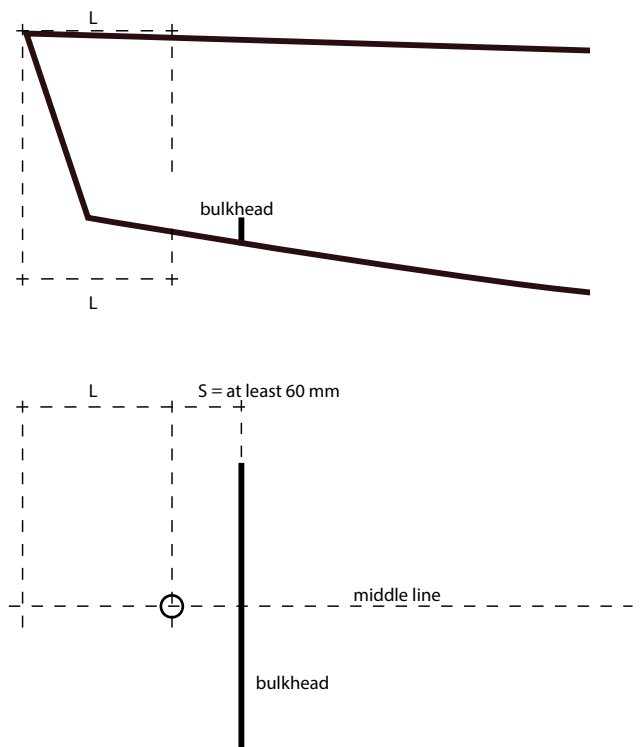


Fig. 8: example measuring

Fig. 8: mounting planning boat



Planning hull
 Length: 6 – 15 m
 ○ EX Compact (transom)
 ○ EX Single (Stern)
 Length: 14 – 20 m
 ○ EX Dual(Stern)

CAUTION!

Bow mounting on planing boats is possible but not recommended. However, on a planing hull, the bottom edge of the EX series has to be clearly above the gliding line! Water spray may occur and must be considered.

3.5. Main drilling and sealing

The drilling for the hollow shaft needs a diameter of 50 - 51mm. It is recommended to use a hand-held drill.

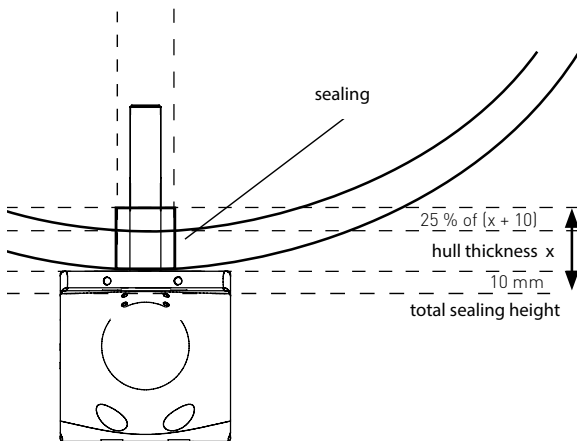


Fig. 10: Drilling and total sealing height

Subsequently, exactly measure the height of the drill hole, it is very important for the sealing. Depending on the hull thickness, several seals must be used. It is to be considered that the seals are compressed by about 25% when tightening the bolts.

The total sealing height results as follows:

$$\text{Hull thickness} \times 1,25$$

Example: Total sealing height with hull thickness of 30mm

$$30 \times 1,25 = 40 \text{ mm}$$

3.6. The reference sticker

After the mounting is complete, mark the installation point of the thruster as a reference for crane operators on both sides of the boat hull. The mark will provide a clear indication where crane straps cannot be positioned when lifting the vessel, not to damage the thruster.

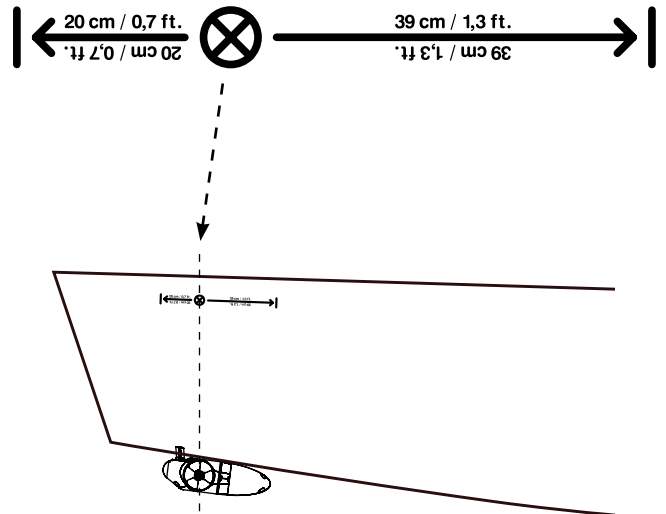


Abb. 11: Attaching the crane operator sticker

CAUTION!

The lifting strap must not be placed where it touches the EX series bow or stern thruster

3.7. Redox reaction and mounting adjustment

It is necessary to pay attention to special material properties to avoid redox reaction between EX series and the boat hull. (see table).

Since mounting with welded bolts is possible on hulls out of steel or aluminium, it has to be adjusted to the respective hull. However, it is recommended to use the provided mounting kits.

	GRP	Steel	Aluminium	Wood
Specifics	none	direct contact prevention between EX series and fastening elements and hull	direct contact prevention between fastening elements and hull	none
Critical range	none	8 mm	2 mm	none
Usage of welded mounting bolts	-	must be isolated from EX series with rubber	must not be isolated from EX series	-
Usage sealing "main connection"	compelling	compelling	compelling	compelling
Usage "isolator"	no	compelling	compelling	no

CAUTION!

On hulls out of steel or aluminium after mounting it has to be verified with a multimeter that there is no direct connection between the EX series bow and stern thruster and the boat hull!!!

4.1. Measuring of the mounting bolts

First the pad (1) must be glued on the bow thruster. Afterwards mount the thruster temporary via the main connection and mark the front boreholes for the mounting bolts.

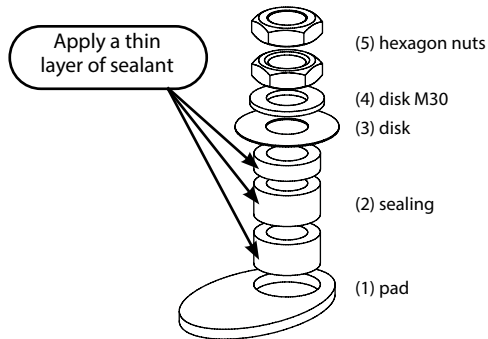


Fig. 12: main connection GRP

Measure the length for the distance pieces (fig. 13) and demount the thruster. Then make the drillings for the mounting bolts with diameter 18 mm and cut the distance pieces as measured before (fig. 14).

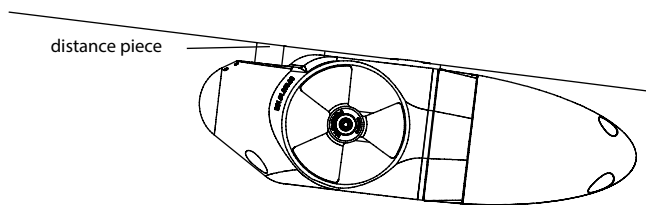


Fig. 13: distance piece length

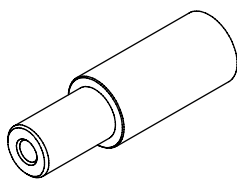


Fig. 14: distance piece

CAUTION!

On hulls out of steel or aluminium it is compellent to use the isolator instead of the metal sheet!

4.2. Bolting and sealing

Bolt down the thruster via the main connection, thereby paying attention to the right number of seals (fig. 10). The sequence corresponds to the one in fig. 12, whereby, depending on the hull thickness, several seals (2) must be used. It is to be considered that those seals are compressed by about 25 % when tightening the bolts (fig. 10).

Ideally, coat the metal sheet (3) at the lower surface with sealant (e.g. Sikaflex). Don't press it to the hull by hand so that the metal sheet can adapt to the hull shape automatically when tightening the bolts. Apply disk (4) and disk M30 (5) and tighten the two hexagon nuts (6) firmly. Thereby the sealings (2) are compressed and fill out the drill hole completely. It is recommended to press against the thruster from the outside to prevent the sealings from being pressed out of the borehole when tightening the bolts. The metal sheet (3) adapts to the hull shape.

On hulls out of steel or aluminium it is compellent to use the isolator instead of the metal sheet (see 4.4. Mounting illustration steel and aluminium)!

Finally plug the distance pieces on the thruster. Insert the mounting bolts like illustrated in fig. 15 cutting them in the boat interior as necessary. Apply seals (2) according to the hull thickness (note: hull thickness + 25 %).

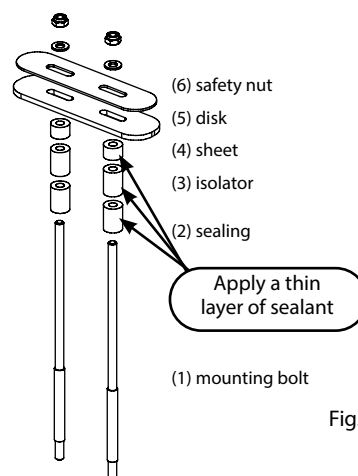


Fig. 15: assembly mounting bolts

Total sealing height for mounting bolts:

hull thickness x 1,25

Example: total sealing height with hull thickness 30 mm:

30 x 1,25 = 37,5 mm

4.3. Mounting illustration GRP

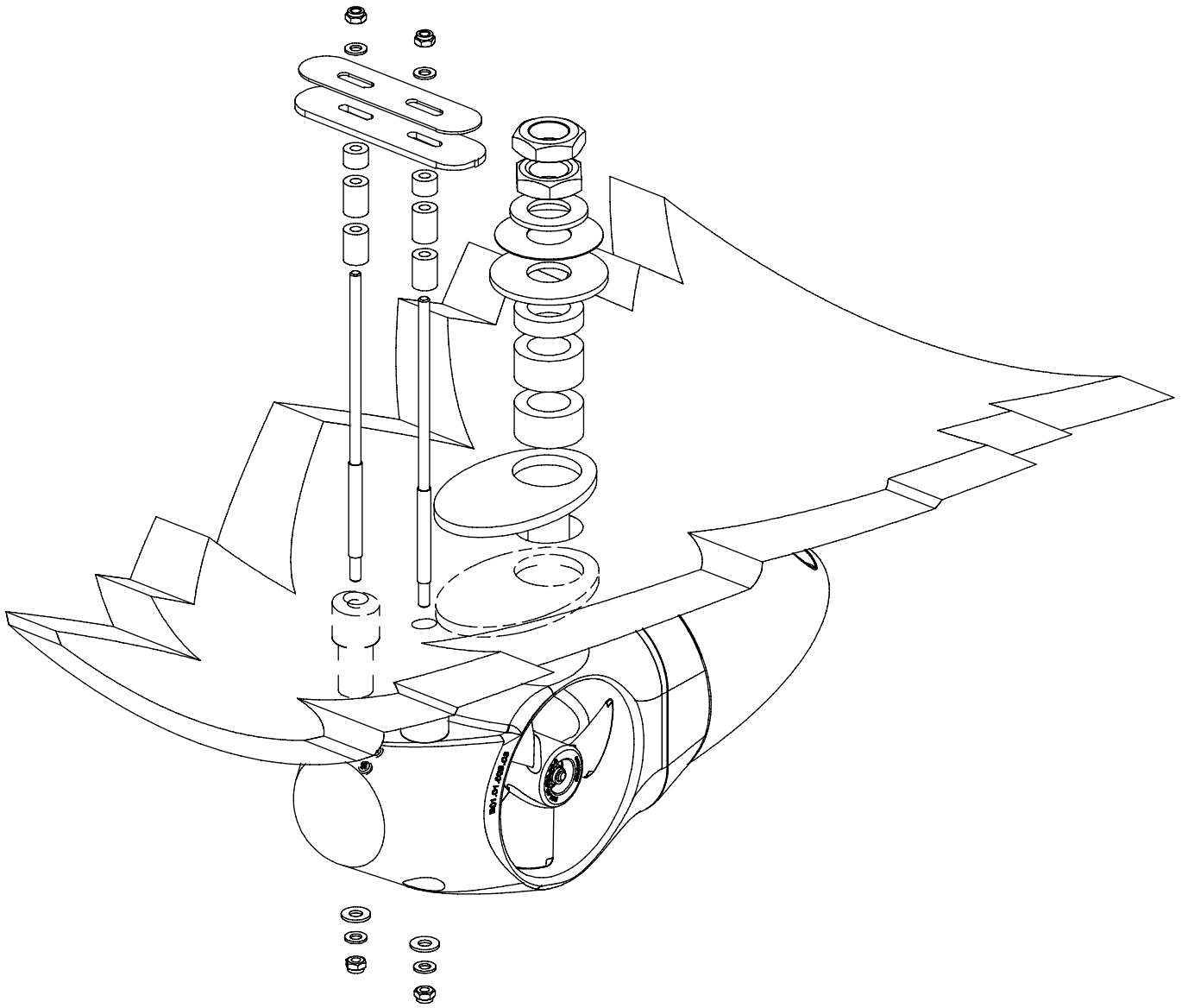


Fig. 16: Mounting „Basic“ on GRP

4.4. Mounting illustration steel and aluminium

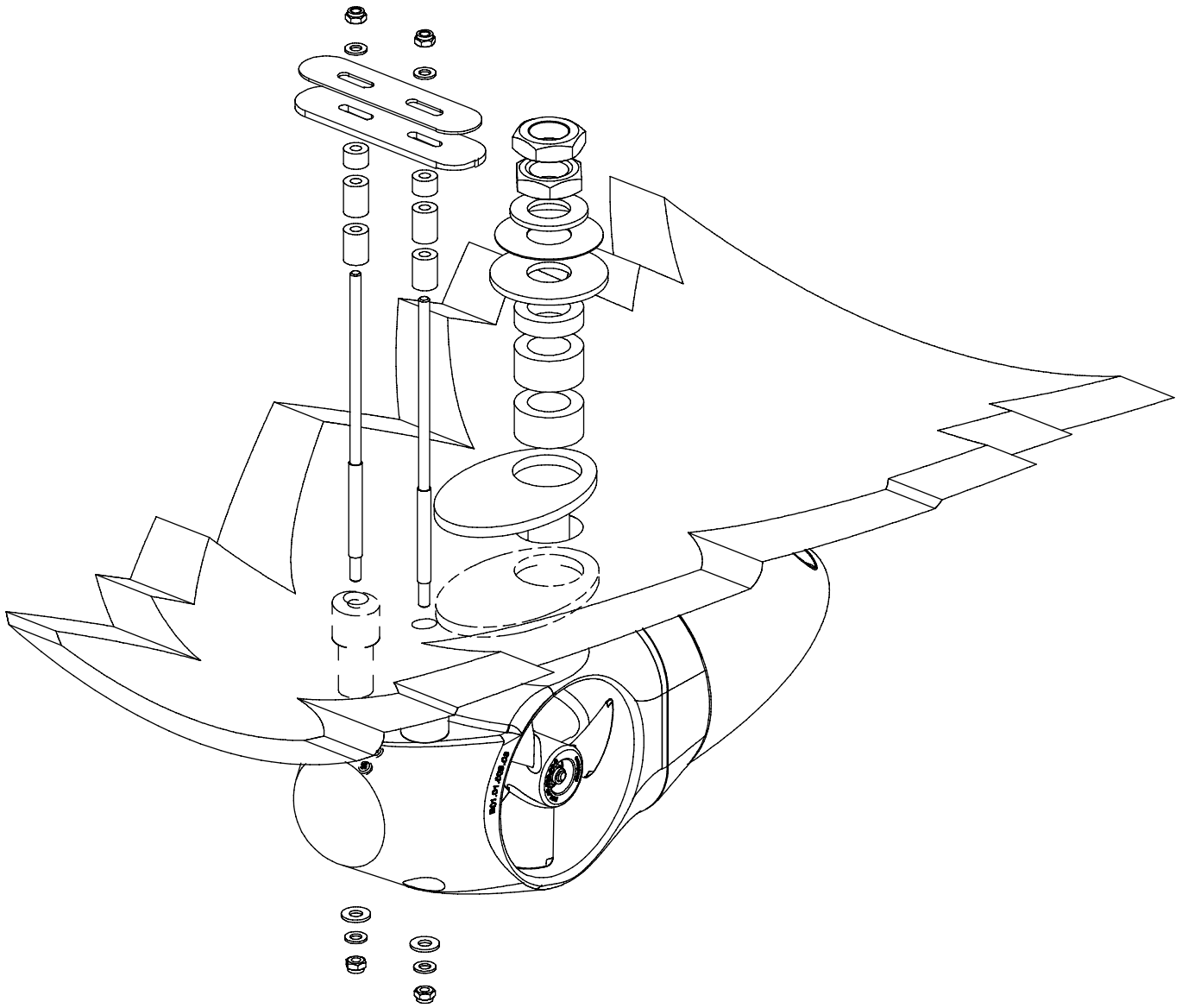


Fig. 17: Mounting „Basic“ on steel and aluminium

5. MONUTING KIT ADAPTER

5.1. Adapter positioning (round chine)

First plug the adapter (fig. 18) on the thruster and mount it temporary via the main connection. Mark the front boreholes for the mounting bolts.

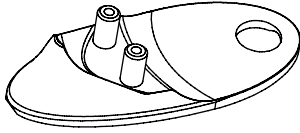


Fig. 18: Adapter

Afterwards turn the thruster with plugged-on adapter to the side and drill the holes for the mounting bolts with diameter 18 mm.

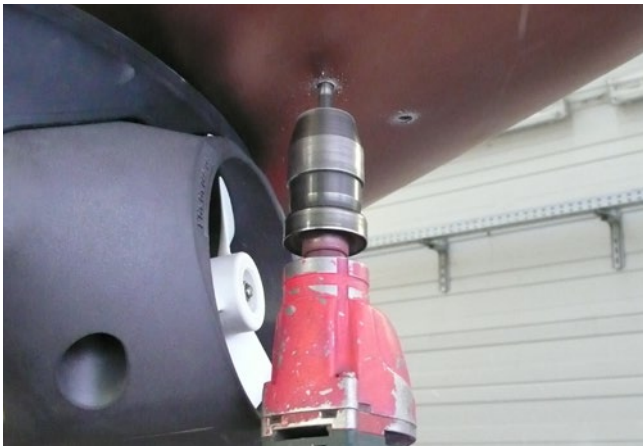


Fig. 19: mounting bolts drilling

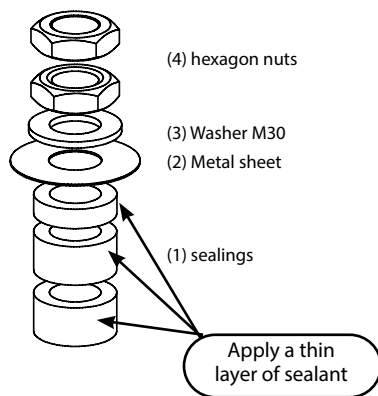


Fig. 20: main connection GRP

CAUTION!

On hulls out of steel or aluminium it is compellent to use the isolator instead of the metal sheet!

5.2. Bolting and sealing

Bolt down the thruster via the main connection, thereby paying attention to the right number of seals (fig. 10) The sequence corresponds to the one in fig. 20, whereby, depending on the hull thickness, several seals (1) must be used. It is to be considered that those seals are compressed by about 25 % when tightening the bolts (fig. 10).

Ideally, coat the metal sheet (2) at the lower surface with sealant. Don't press it to the hull by hand so that the metal sheet can adapt to the hull shape automatically when tightening the bolts. Apply washer M30 (3) and tighten the two hexagon nuts (4) firmly. Thereby the sealings (1) are compressed and fill out the drill hole completely. It is recommended to press against the thruster from the outside to prevent the sealings from being pressed out of the borehole when tightening the bolts. The metal sheet (2) adapts to the hull shape.

On hulls out of steel or aluminium it is compellent to use the isolator instead of the metal sheet (see 5.5. Mounting illustration steel and aluminium)!

Finally screw together the mounting bolts like illustrated in fig. 21 cutting them in the boat interior as necessary. Apply seals (2) according to the hull thickness (note: hull thickness + 25 %).

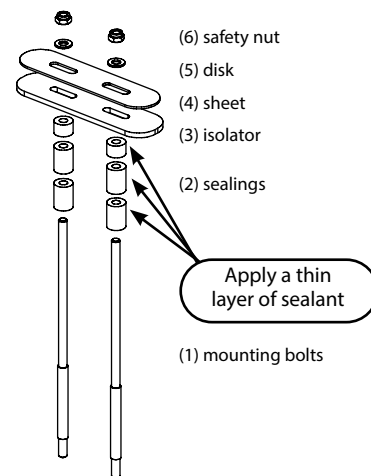


Fig. 21: assembly mounting bolts

Total sealing height for mounting bolts:

$$\text{hull thickness} \times 1,25$$

Example: total sealing height with hull thickness 30 mm:

$$30 \times 1,25 = 37,5 \text{ mm}$$

If there remains a gap between adapter and boat hull it is recommended to fill it out with suitable sealant (e.g. Sikaflex).

Note: In order to protect the outside edges of the drill holes, it is recommended to apply a suitable sealant (e.g. gel coat).

With the mounting kit "Adapter" on a round chine EX series is mountable within one hour (without electrical installation).



Fig. 22: EX series mounted with mounting kit „Adapter“

5.3. GRP adapter installation (see Fig. 23)

1. Determine the installation site and mark the positions on the hull.
2. Align the adapter lengthwise and crosswise on the stern and clamp it using a mounting bracket.
3. Measure the distance to the stern at the front edge of the adapter. Next, using a suitable marking tool (e.g. a compass or a block of wood with a pencil), transfer the measured distance from the contact edge between the adapter and the hull to the adapter at an angle.
4. Saw off the adapter along the line you've drawn using a suitable tool (e.g. an angle grinder or a jigsaw).
5. The foam must also be cut flush with the GRP edge using a suitable tool (e.g. finger polisher or router).
6. Hold the adapter in place against the hull again and examine the fit. Care must be taken that the GRP adapter lies flat against the area of the main stud at the stern. Repeat steps 2 – 5 if necessary.
7. If you have accidentally removed too much foam, it can be replaced by firm filling paste (epoxy or fibre glass bridging filler).
8. Remove the anti-fouling under the adapter and coarsely whet and degrease the hull.
9. Place the adapter on the device, put the seals in place and mount the adaptor together with the device. Waterproof adhesives such as polyurethane sealants should be used in order to achieve adhesion between the hull and the adapter.
10. Remove any adhesive that has leaked, slightly whet the adapter and coat it with epoxy primer and anti-fouling (like on the hull).



Fig. 23: GRP adapter

Next, prepare the contact surface (V-shaped, made of hardwood) for bolting the fastening on the inside (Fig. 24). To do so, drill two holes with a diameter of 8 mm at a distance of 65 mm.

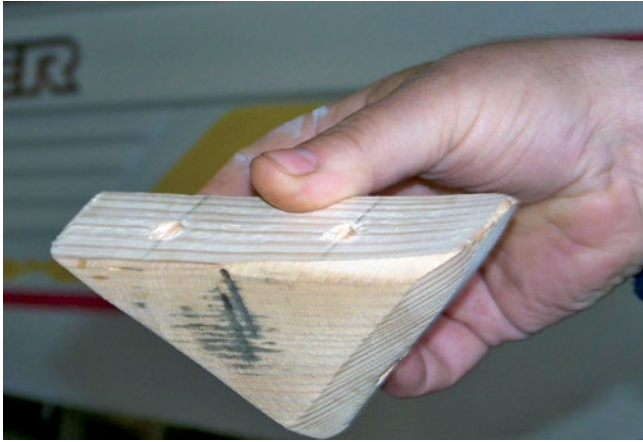


Fig. 24. Contact surface using a wooden wedge as an example

EX series can be mounted on a hard chine hull within five hours using the "Adapter" assembly kit (without electrical installation)



Fig. 26: EX series varnished and mounted



Fig. 25: Screw connection GRP in the boat interior

CAUTION!

It is essential to prevent contact between the adapter and fuel, oil, grease, white spirit, solvents such as toluol, dichloromethane, trichloroethane, cellulose thinner or concentrated nitric or sulphuric acid.

5.4. Mounting illustration GRP

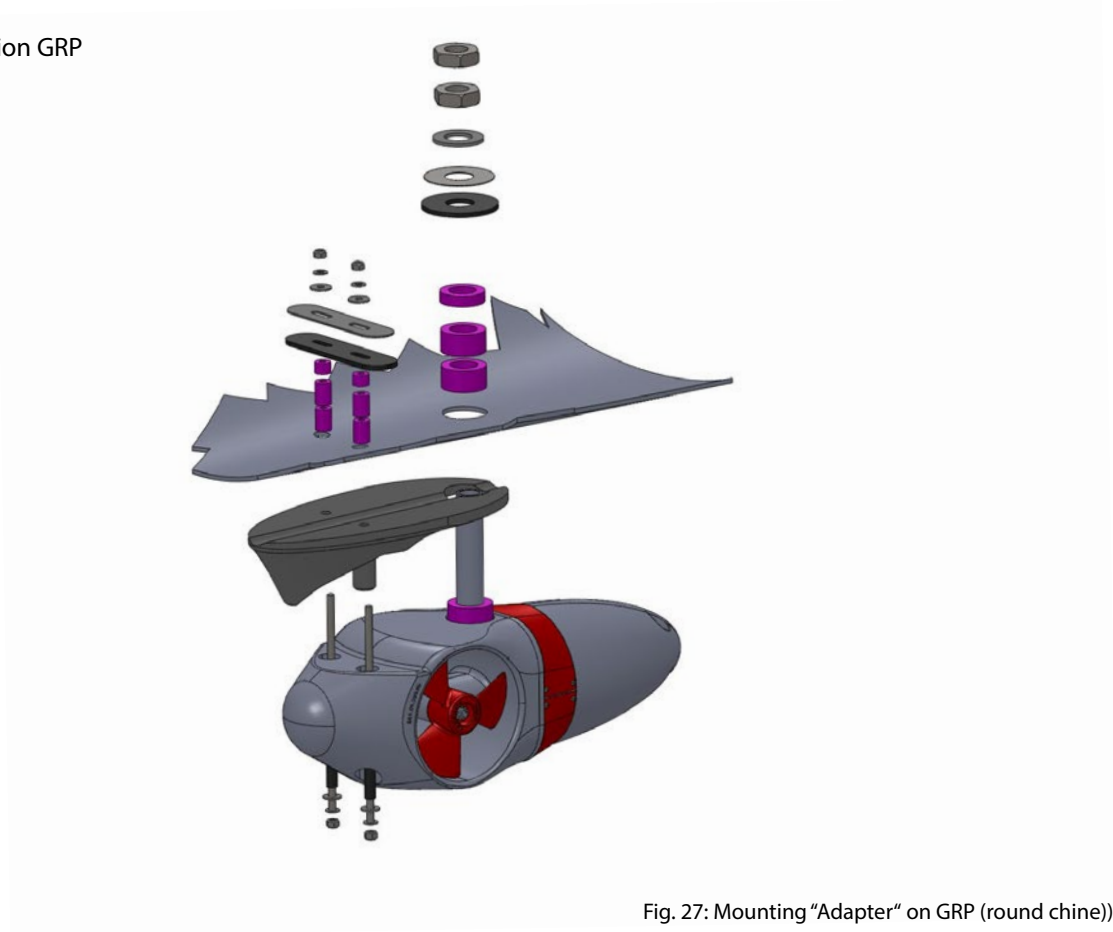


Fig. 27: Mounting "Adapter" on GRP (round chine))

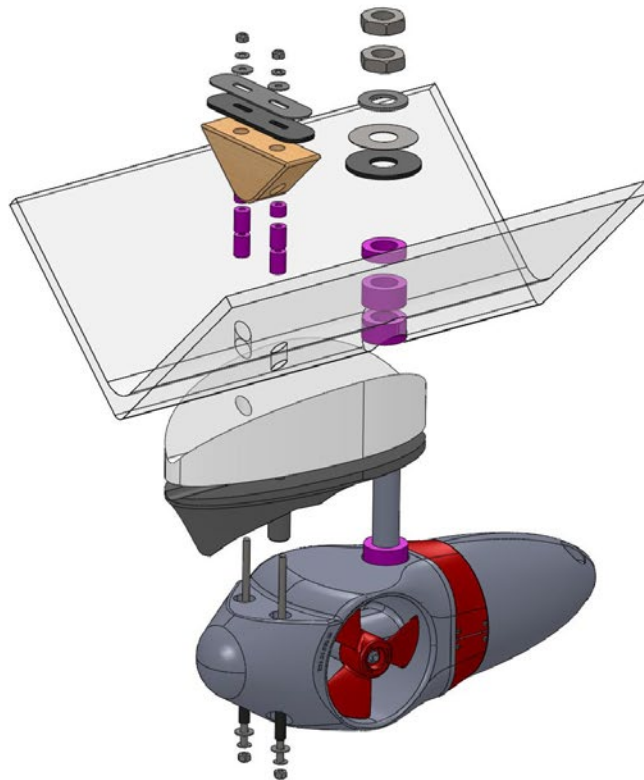


Fig. 28: Mounting "Adapter" on GRP (hard chine))

5.5. Mounting illustration steel and aluminium

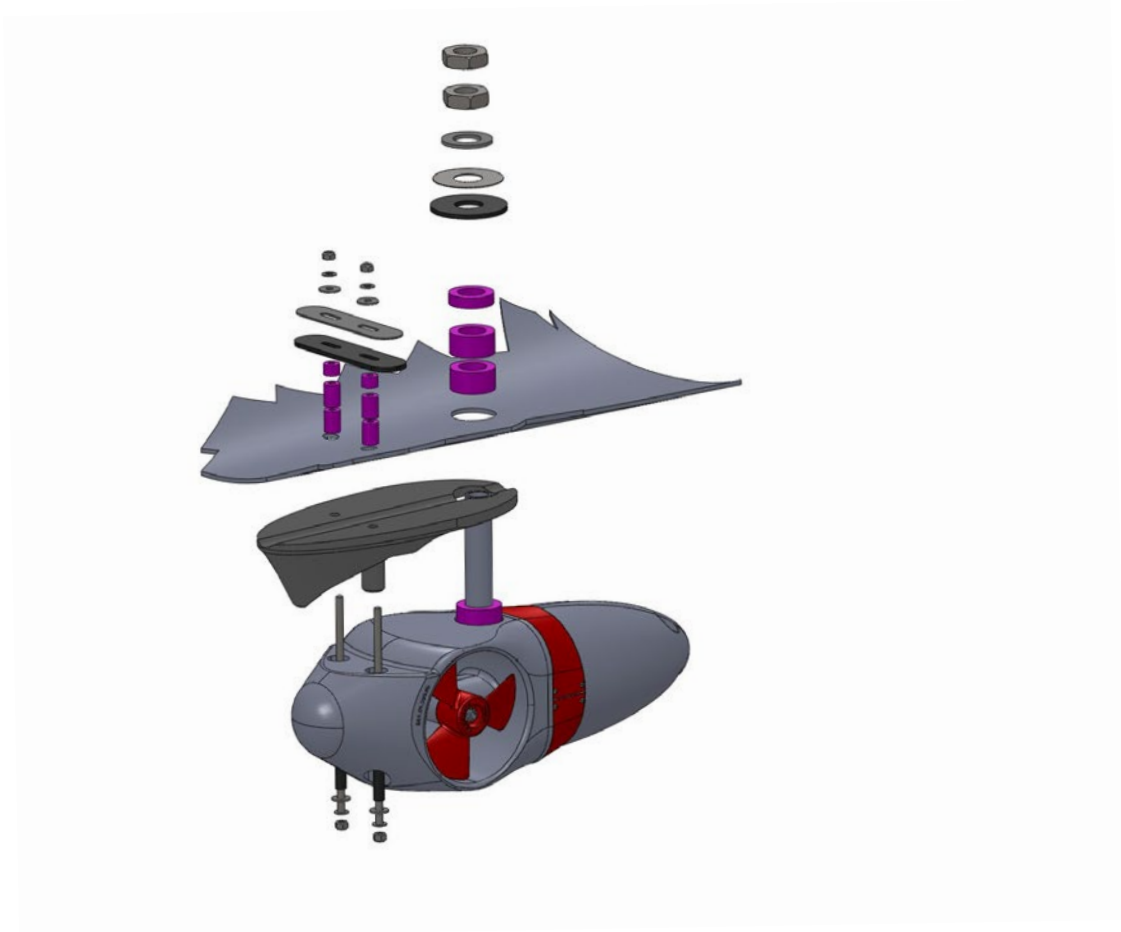


Fig. 29: Mounting "Adapter" on steel and aluminium (round chine)

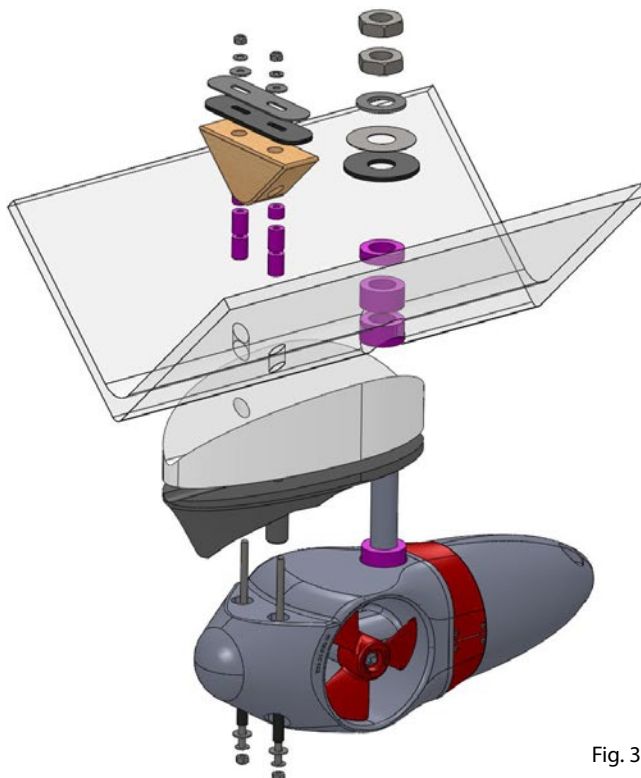


Fig. 30: Mounting "Adapter" on steel and aluminium (hard chine)

7. MOUNTING DUAL

7.1. General Instructions

- The EX series Dual has two motors and therefore is to be handled like two single EX series during mounting.
- The hole center distance of the two hollow shafts has to exactly comply with the dimension sheet (see Dimensions on page 33).
- The mounting surface for the EX series Dual must be in-plane, if necessary a socket has to be developed accordingly (Fig. 32).

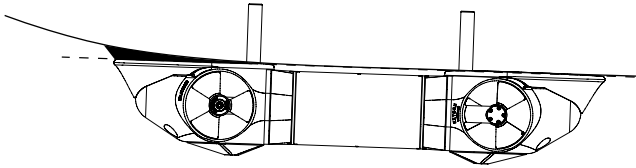


Fig. 32: EX series Dual mounting surface

7.2. Measuring of the mounting position

The EX series bow and stern thruster must be positioned exactly on the middle line of the boat. In order to determine this, it is recommended to draw a line from the keel to the bow or stern with a cord or a measuring tape and fix it. Subsequently, by means of this line, the desired position can be shifted easily forward or backward.

The EX series Dual requires two holes with a diameter of 50 – 51 mm. The hole center distance has to exactly comply with the dimension sheet (see Dimensions on page 33). Check the distance between the boreholes before drilling!

For the choice of the mounting position, it is to be likewise made certain that the required holes are not drilled at an unsuitable position (e.g. bulkhead). The metal sheets to be used (except on steel and aluminium boats) have a width of 80 mm. So that they can be placed without problems, the boreholes must be at least 60 mm from the next bulkhead.

For the reasons mentioned above, the positioning should be measured exactly in any case before the execution of the drilling, also inside the boat.



Fig. 33: EX series Dual mounted

8. ELECTRICAL INSTALLATION

8.1. General Instructions

- The electrical installation is principally to be accomplished by a specialist.
- All contacts, plugs and connections must be installed in a way that they always remain dry.
- The i-BOX must be placed in such a way that it always remains dry.
- All screws must be pulled tight before start-up.

The general instructions refer to EX series Single and also to EX series Dual.

8.2. EX series Performance Specifications

Model	Power (kW)	Thrust (kgf)*	Voltage (V)	Nominal Current (A)
EX 35S	1,3	25-35	12	140
EX 25C	1,3	25-35	12	140
EX 55S	1,8	40-55	12	187
EX 40C	1,8	40-55	12	187
EX 75S	2,3	55-75	24	120
EX 55C	2,3	55-75	24	120
EX 95S	3,0	70-95	24	175
EX 70C	3,0	70-95	24	175
EX 110D	4,0	80-110	12	2x187
EX 180D	6,0	140-180	24	2x175

* Thrust equivalent (kgf x 1.4 due to positional advantages)

8.3. Fuse protection and wire cross section

Model	Fuse (NH00) (A)	Cross Section 0 - 8 m* (mm ²)	Cross Section 8 - 16 m* (mm ²)	Battery recommendation**
EX 35S	100	35	70	1x Optima 900 BlueTop - 55 Ah
EX 25C	100	35	70	1x Optima 900 BlueTop - 55 Ah
EX 55S	125	50	70	1x Optima 900 BlueTop - 55 Ah
EX 40C	125	50	70	1x Optima 900 BlueTop - 55 Ah
EX 75S	80	25	50	2x Optima 900 BlueTop - 55 Ah
EX 55C	80	25	50	2x Optima 900 BlueTop - 55 Ah
EX 95S	100	50	70	2x Optima 900 BlueTop - 55 Ah
EX 70C	100	50	70	2x Optima 900 BlueTop - 55 Ah
EX 110D	2x125	50	70	2x Optima 900 BlueTop - 55 Ah ¹
EX 180D	2x125	50	70	4x Optima 900 BlueTop - 55 Ah ²

* wire length is the sum of + and - wire.

** The several models have been optimized for a runtime of 10 minutes without recharging.

¹ Optima battery bank (2x Optima 900 BlueTop - 55 Ah, connected parallel) or 1x 100 Ah gel battery

² 2x Optima battery bank (2x2 Optima 900 BlueTop - 55 Ah, connected in series) or 2x 100 Ah gel batteries connected in series

8.4. Choice of battery

The overall capacity of the battery must be coordinated with the power setting of the respective EX series model (see 8.2. EX series Performance Specifications and 8.3. Fuse protection and wire cross section). It is recommended to use one or more separate starter batteries (no consumer batteries!) for each EX series and to place these as close as possible to the bow or stern thruster to minimise cable length or cable thickness and power losses.

Always use batteries with matching type and capacity!

With the employment of an EX series model with 24 V with a board voltage of 12 V, it is recommended to connect two 12 V-batteries in series, in order to achieve the necessary voltage for the bow or stern thruster. A 12 V / 24 V battery charger and voltage converter is available on request.

8.5. Wiring

The cable length of EX series is 0,75 m. The i-Box should therefore be placed as close as possible to the bow or stern thruster.

The minimum cable diameter is to be coordinated with the power setting of the EX series model used (see 8.3. Fuse protection and wire cross section), in order to keep the power loss between battery and bow or stern thruster as low as possible.

In order to protect EX series from overloading and to protect the electrical system from short-circuit both a main switch and a protection fuse must be integrated into the positive wiring loom (see 8.3. Fuse protection and wire cross section).

The EX series main switch should be installed in an easily accessible place, thus the power for the bow or stern thruster can be switched off in emergencies, without influencing the other electrics on board. With non-operation, the EX series main switch should generally be switched off.

8.6. Installation of the i-BOX

The i-BOX is the central control element, to which several control panels can be attached. It should be mounted with the cable connections facing down..

Fig. 34

I-box connections :

«B+»:Power supply +12/24V from thruster battery/Main switch/Main fuse

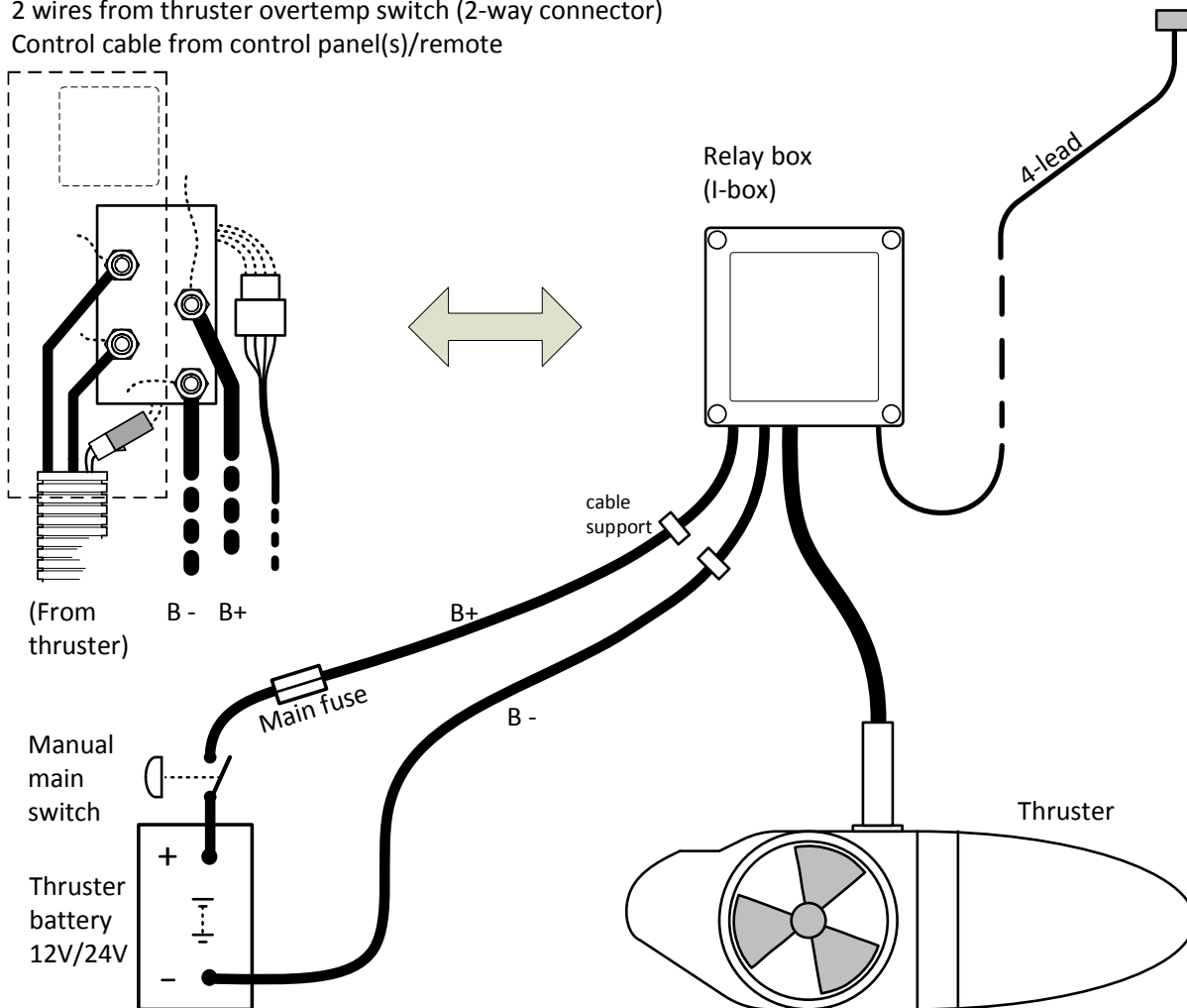
«B- »:Power supply neg from thruster battery

2 motor cables from thruster

2 wires from thruster overtemp switch (2-way connector)

Control cable from control panel(s)/remote

To control panel(s)/remote.



Note: It is not possible to operate two EX series independently by means of one i-BOX!

8.7. Installation of joystick and touch panel (optional)

Find a comfortable position for the panel where it does not obstruct or are obstructed by other controls. Use the enclosed cut-out pattern to mark the area. Cut out the circular area as shown on pattern. If the front surface around your cut out is jagged or chipped, use a sealant to assist the gasket.

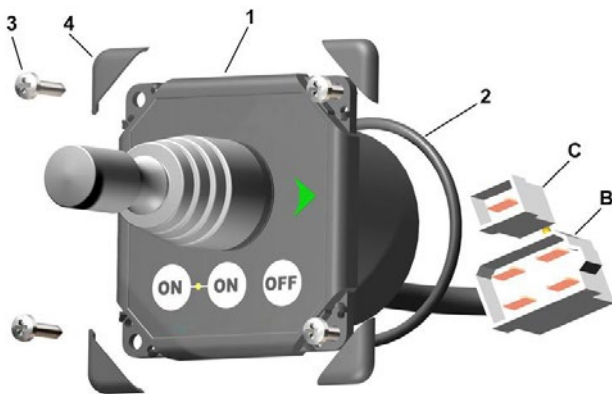
- A Put the gasket (2) in its designated track in the back face of the panel (1).
- B Connect the contact with the control cable from the thruster, use 5-lead control cable if automatic main switch is used.
- C Put the panel (1) in place and screw in and tighten the four screws (3).
- D Press gently each of the four corner clips (4) into their corner slot.

NB ! If the thruster runs the opposite way of the panel, swap positions of the grey and the blue control cables in one contact, either in the i-Box or by the panel.

8.8. Installation of the radio remote control (optional)

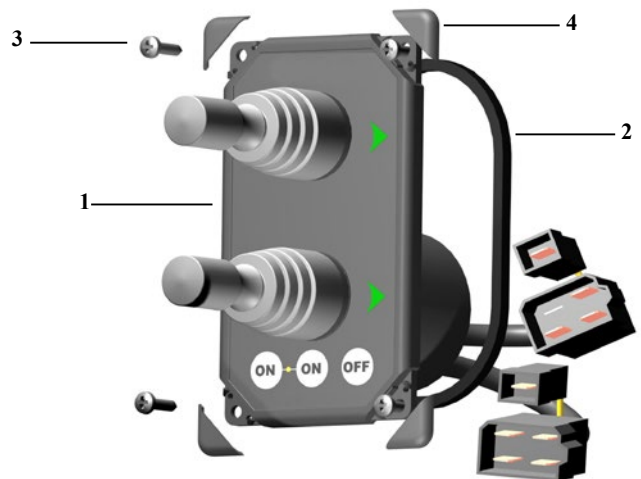
Please refer to the separate radio remote manual.

Fig. 35



Partslist

Ref:	Pcs.	Parts:
1	1 x	Control panel
2	1 x	Gasket
3	4 x	Screws (A4)
4	4 x	Corner clips

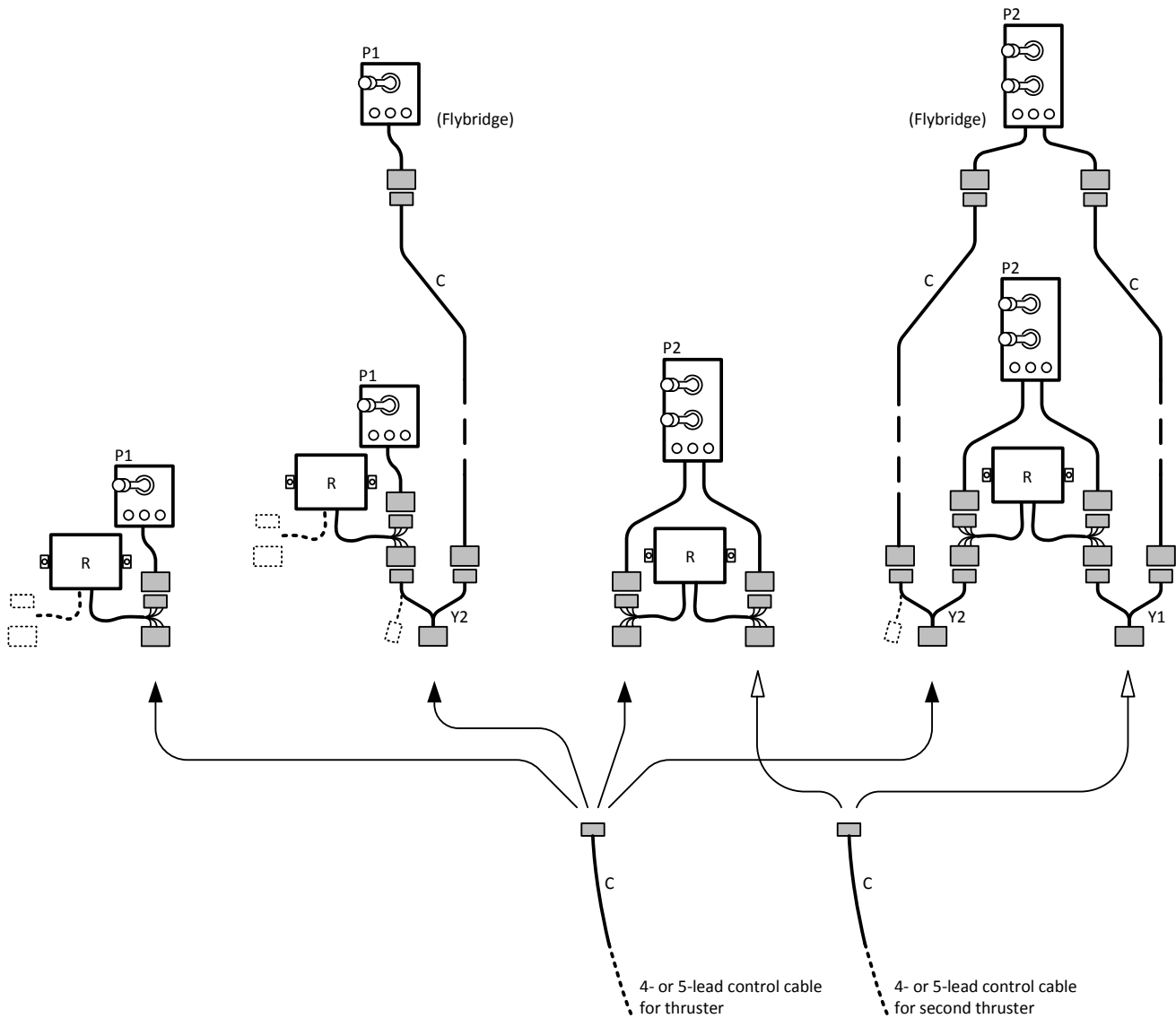


8.9. Installation of multiple control elements

The i-BOX offers the possibility of attaching several control elements (e.g. joystick and touch panel) to the same EX series.

You can install as many panels as you wish by using optional Y-connectors. If two or more panels are operated at the same time in opposite directions, the electronic control box will stop the thruster until it only receives a signal to go in one direction.

Fig. 36



9. OPERATION

9.1. EX series as bow thruster

1. Switch on the EX series main switch.
2. Turn the control panel on by pushing both "ON" buttons on the panel simultaneously. If another type of control is installed, engage the On/Off switch for the bowthruster.
3. The panel will shut off automatically after 6 minutes of inactivity
4. Move the joystick in the respective direction (joystick panel) or push the respective key (touch panel, remote control) in order to manoeuvre the bow in the desired direction:

RED = port
GREEN = starboard

5. Depending on the speed of the movement, stop steering before reaching the desired goal position, as the bow will move a little more in the chosen direction.
6. If necessary, make yourself familiar with the control of EX series on open waters, in order to get a feeling for it.
7. Always turn off the EX series main switch when leaving the boat.

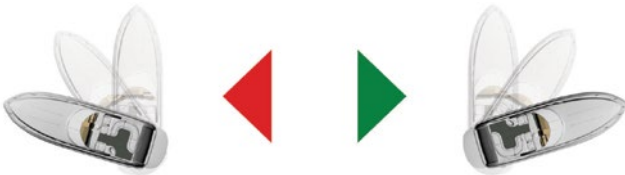


Fig. 37: EX series as bow thruster

9.2. EX series as stern thruster

1. Switch on the EX series main switch.
2. Turn the control panel on by pushing both "ON" buttons on the panel simultaneously. If another type of control is installed, engage the On/Off switch for the thruster.
3. The panel will shut off automatically after 6 minutes of inactivity
4. Move the joystick in the respective direction (joystick panel) or push the respective key (touch panel, remote control) in order to manoeuvre the bow in the desired direction:

RED = port
GREEN = starboard

5. Depending on the speed of the movement, stop steering before reaching the desired goal position, as the bow will move a little more in the chosen direction.
6. If necessary, make yourself familiar with the control of EX series on open waters, in order to get a feeling for it.
7. Always turn off the EX series main switch when leaving the boat.

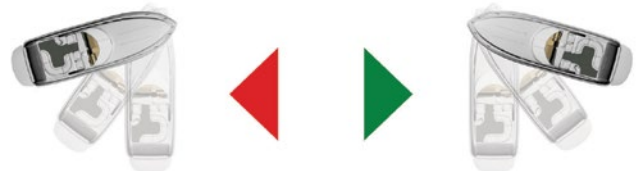


Fig. 38: EX series as stern thruster

9.3. Bow and stern thrusters combined

The use of both a bow thruster and a stern thruster allows the movement of the boat sideways or turns it around its own axis. It is however necessary to install for both EX series to have their own i-BOX (see 8. Electrical Installation).

The operation corresponds to the instructions for EX series as bow thruster and EX series as stern thruster.



Fig. 39: bow and stern thrusters combined

9.4. Operation with multiple control elements

The i-BOX offers the possibility of attaching several control elements (e.g. joystick and touch panel) to the same EX series.

You can install as many panels as you wish by using optional Y-connectors. If two or more panels are operated at the same time in opposite directions, the electronic control box will stop the thruster until it only receives a signal to go in one direction.

9.5. Important User Information

- Do not allow EX series to run for more than 5 seconds when not immersed in water! EX series is not a toy. It is a technical auxiliary motor used to help manoeuvre a ship.
- Do not operate EX series outside of the water if there are people near the bow or stern thruster.
- When working on EX series (e.g. applying antifouling, replacing the propeller) always switch off the EX series main switch.
- **WARNING:** While the thruster is in air, make sure that the propeller has come to a complete stop before performing a direction change of the thruster, as it might cause damage to the thruster.
- If the drive direction of the bow or stern thruster does not correspond to the directions on the control element, the blue and grey wire must be changed on the thruster solenoid in the I-box. (see 11.2 or 11.3)
- EX series has a continuous runtime of approx. 3 minutes depending on the water temperature. Afterwards the overheat protection is activated and the thruster will stop. The thruster will need to cool down before operation can resume.
- It is the owner/captain/other responsible party full responsibility to assess the risk of any unexpected incidents on the vessel. If the thruster stops giving thrust for some reason while maneuvering you must have considered a plan on how to avoid damage to persons or other objects.

9.6. Maintenance

In order to avoid fouling, it is important to coat the bow or stern thruster with antifouling. Therefore use an aluminium primer and then the according antifouling (copper free). Furthermore, existing/installed anode has to be checked regularly (at least once a year).

EX series, except of the plastic parts (covers, propeller), is resistant against all prevalent detergents. For cleaning purposes it is recommended to use a high-pressure cleaner. Persistent dirt should be removed by hand brush!

Change the anode before every season, or when half the anode is gone. Always use a sealant on the screw holding the anode to ensure that it does not fall off. Please observe that in some waterconditions it can be necessary to install an extra anode to ensure that it lasts for the whole period between regular service lifts of the boat. Consult your dealer for information on how to do this. See anode replacement sheet for instructions.

Anode parts:

140295 Kit w/ anode and screw

4 1190 Anode

Note: With work on EX series (e.g. applying antifouling, changing the propeller) always switch off the EX series main switch!

9.7. Troubleshooting

The EX series bow or stern thruster cannot be started:

- The main switch is not switched on.
- The control panel is inactive, no LED light.
- The main fuse tripped.
- The thruster motor is overheated.

The EX series bow or stern thruster runs in the wrong direction:

- Blue and grey wire on the contactor in the i-Box have to be interchanged (see 11.2 or 11.3).

The EX series bow or stern thruster has insufficient power:

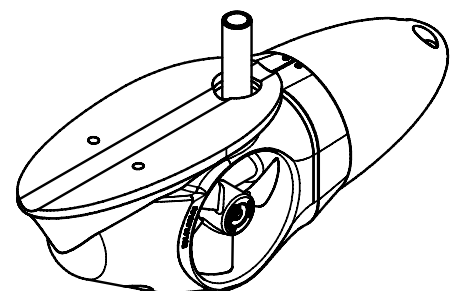
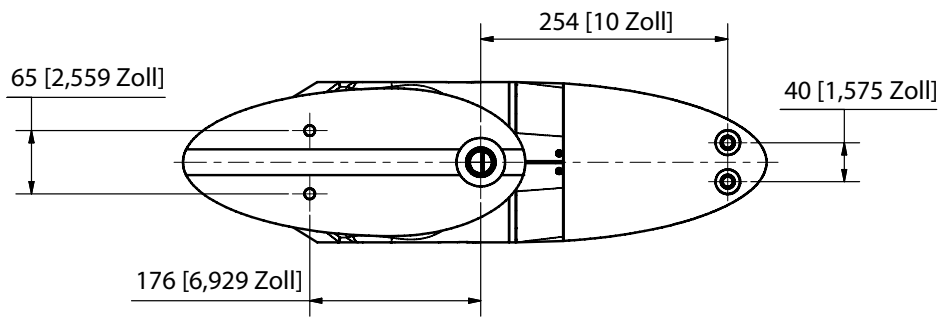
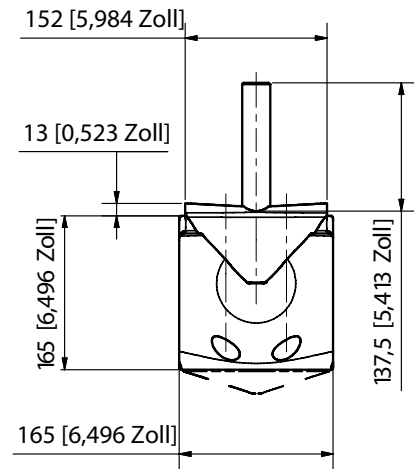
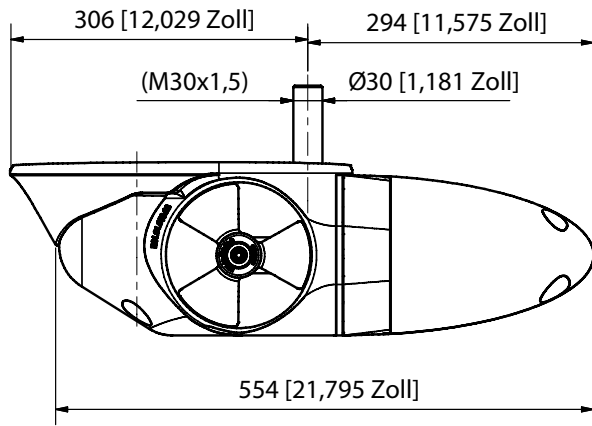
- The battery is not sufficiently charged.
- The electrical connections are bad (e.g. because of corrosion).
- The necessary minimum voltage of 10 V or 21 V is not reached.
- The propeller is blocked (e.g. by fouling, wood, line).

10. WARRANTY STATEMENT

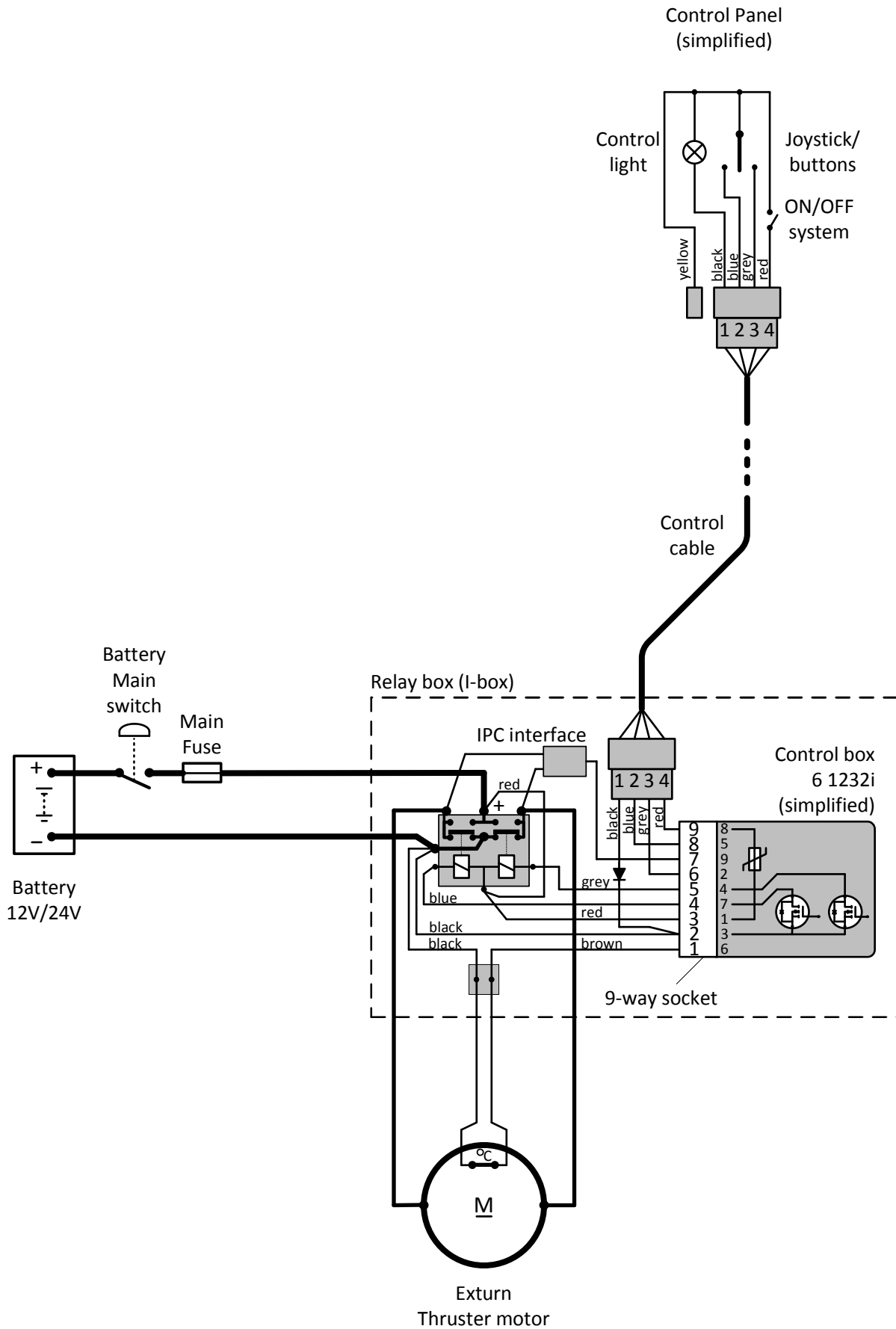
1. The equipment manufactured by Sleipner Motor AS (The "Warrantor") is warranted to be free from defects in workmanship and materials under normal use and service.
2. This Warranty is in effect for of two years (Leisure use) and one year (Commercial use) from the date of purchase by the user. Proof of purchase must be included, to establish that it is inside the warranty period.
3. This Warranty is transferrable and covers the product for the specified time period.
4. In case any part of the equipment proves to be defective, other than those parts excluded in paragraph 5 below, the owner should do the following:
 - (a) prepare a detailed written statement of the nature and circumstances of the defect, to the best of the Owner's knowledge, including the date of purchase, the place of purchase, the name and address of the installer, and the Purchaser's name, adress and telephone number;
 - (b) the Owner should return the defective part or unit along with the statement referenced in the preceding paragraph to the warrantor, Sleipner Motor AS or an authorized Service Centre, postage/shipping prepaid and at the expense of the Purchaser;
 - (c) if upon the Warrantor's or Authorized Service Centre's examination, the defect is determined to result from defective material or workmanship, the equipment will be repaired or replaced at the Warrantor's option without charge, and returned to the Purchaser at the Warrantor's expense;
 - (d) no refund of the purchase price will be granted to the Purchaser, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. Prior to refund of the purchase price, Purchaser must submit 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;
 - (e) warranty service shall be performed only by the Warrantor, or an authorized Service Centre, and any attempt to remedy the defect by anyone else shall render this warranty void.
5. There shall be no warranty for 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. No other express warranty is hereby given and there are no warranties which extend beyond those described in section 4 above. This Warranty is expressly in lieu of any other expressed or implied warranties, including any implied warranty of merchantability, fitness for the ordinary purposes for which such goods are used, or fitness for a particular purpose, and any other obligations on the part of the Warrantor or its employees and representatives.
7. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives for injury to any person or persons, or damage to property, loss of income or profit, or any other consequential or resulting damage or cost which may be claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment, or part thereof.
8. The Warrantor assumes no liability for incidental or consequential damages of any kind including damages arising from collision with other vessels or objects.
9. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.

11. APPENDIX

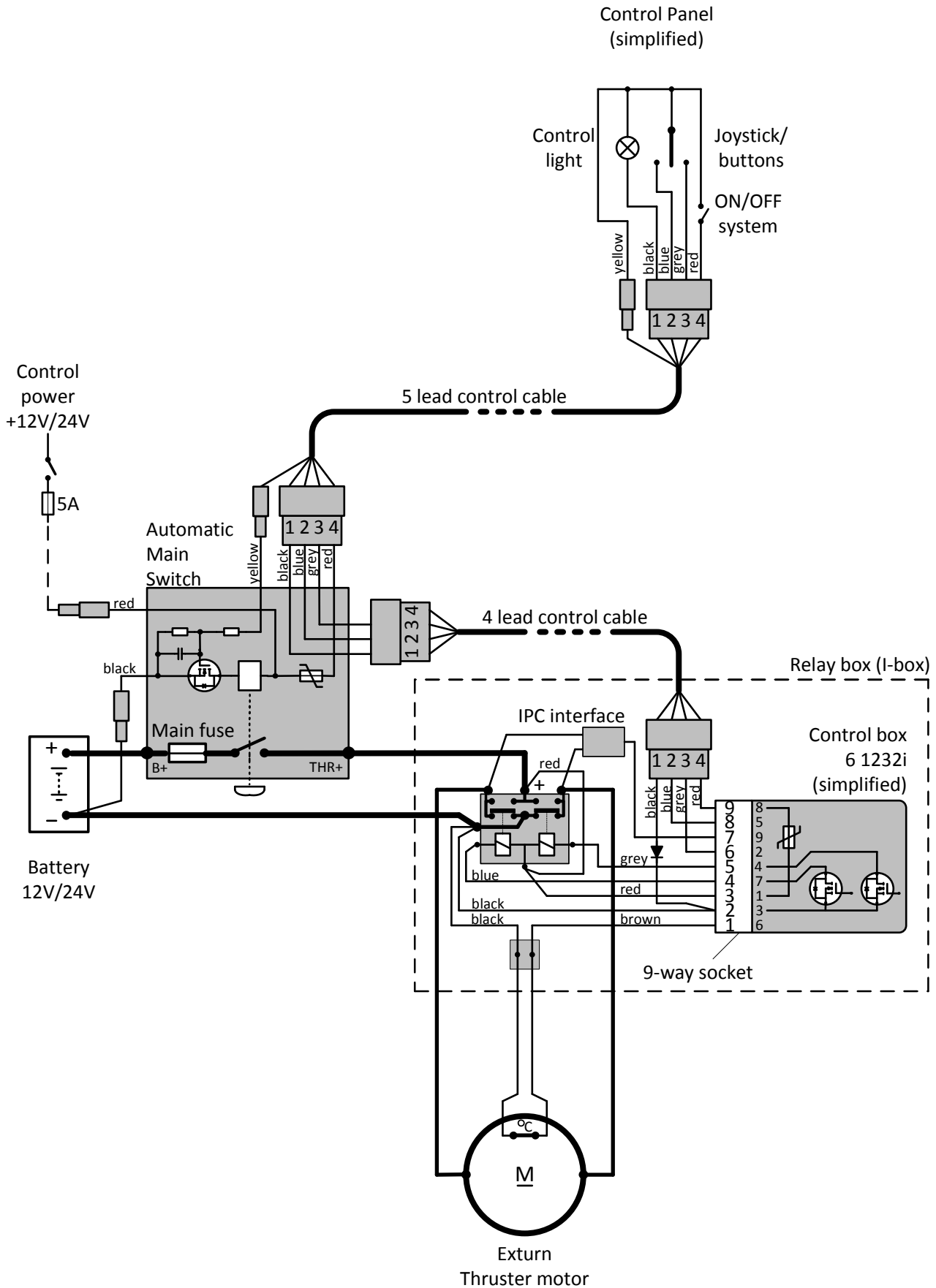
11.1. Dimension sheet EX series Single



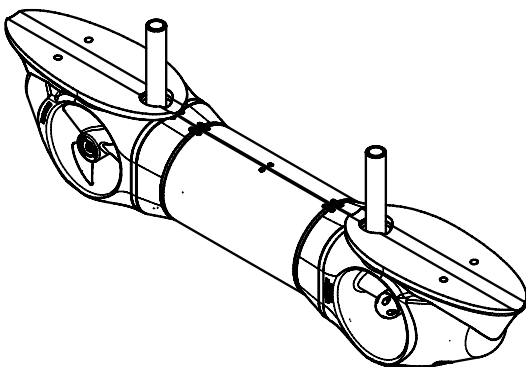
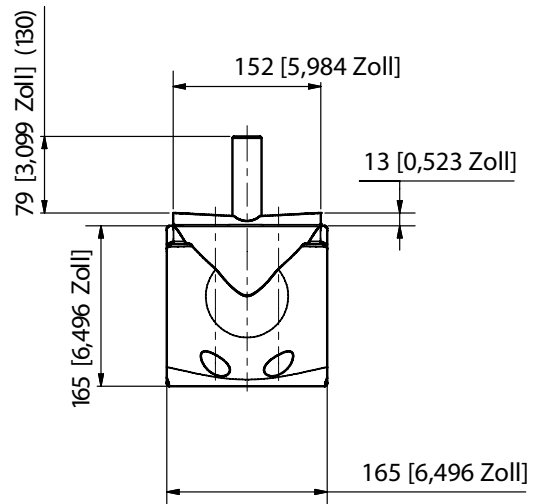
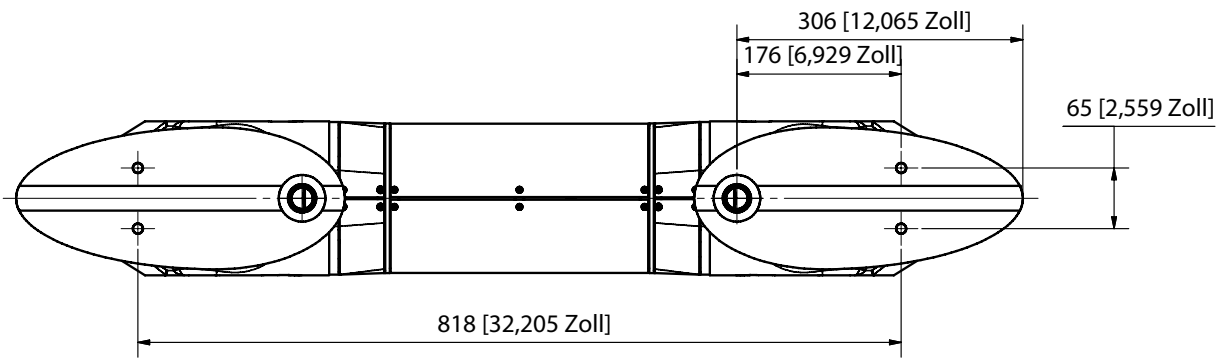
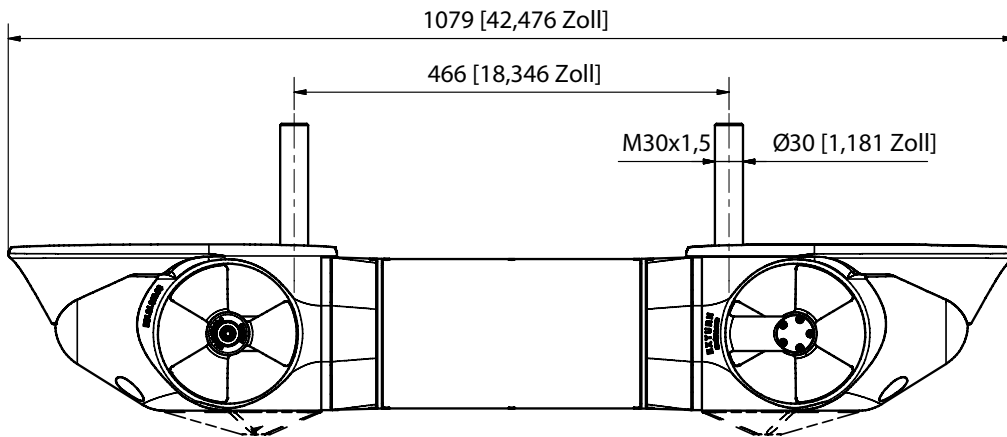
11.2.Wiring diagram EX series Single - Manual main switch



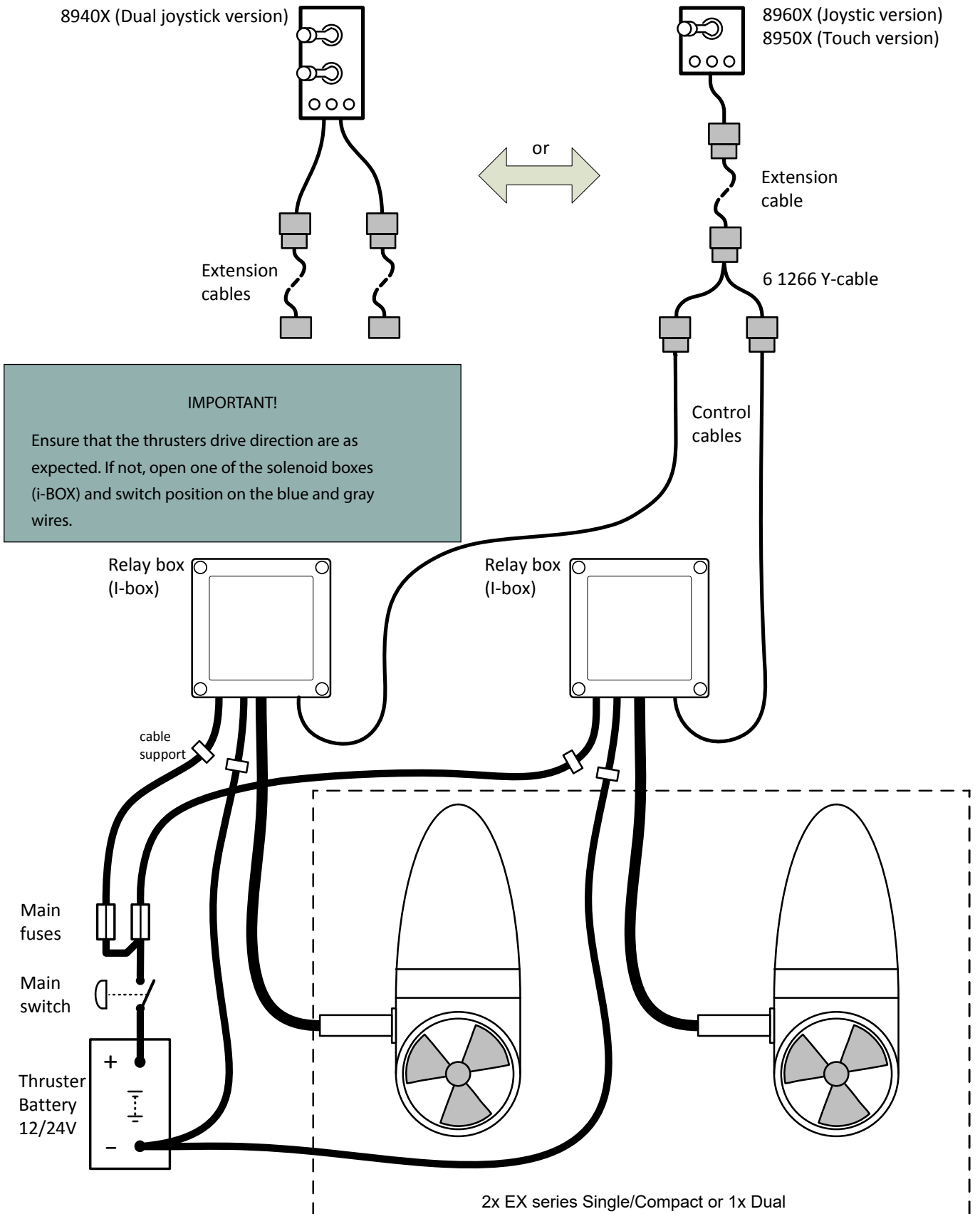
11.3. Wiring diagram EX series Single - Automatic main switch



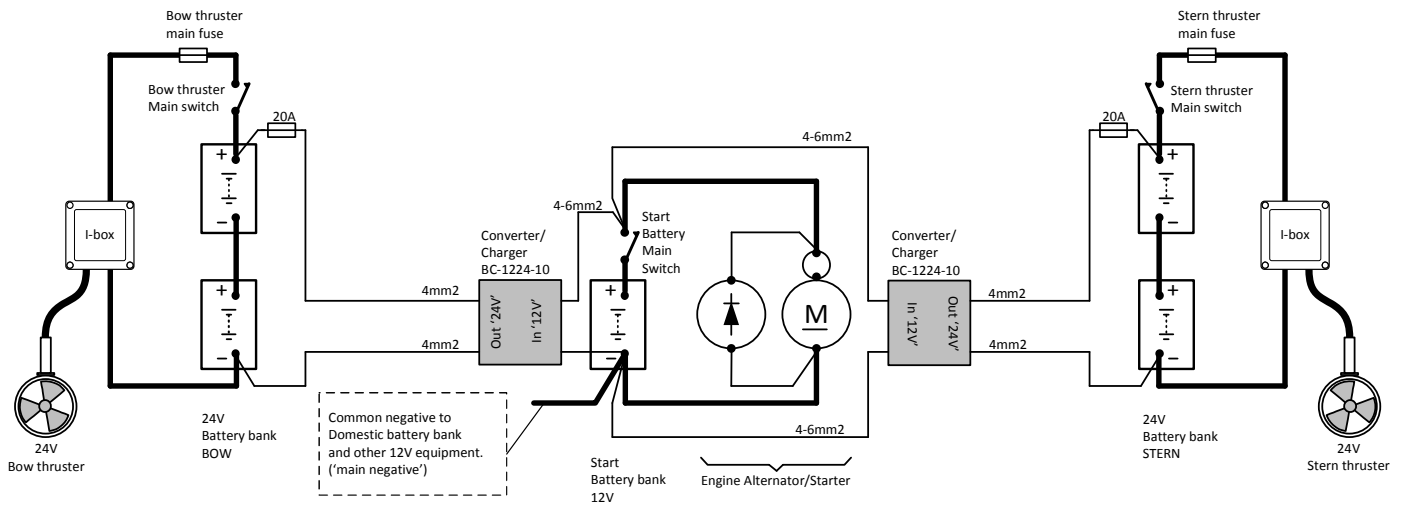
11.4. Dimension sheet EX series Dual



11.5. Control Circuit Scheme EX series Dual



11.6. Schematic overview, 24V thruster(s) in 12V boat system



11.7. Compatibility with other thrusters

The current EX series thrusters featuring the i-Box control system is plug and play compatible with Side-Power thrusters from Sleipner Motor - A combination of EX series and Side-Power thrusters can be controlled by a Side-Power or EX series control panel.

Older EX series thrusters using the E-BOX control system must be upgraded with an i-Box and last generation side-Power control cables/panels before it can be used in combination with the current EX series and Side-Power thrusters.

The upgrade is done by disconnecting and removing the E-BOX and the main relay and then install the i-Box and control panels/control cables as described on page 23 - 25.



Fig. 40: i-Box



Fig. 41: Main relay and E-BOX

11.8. Technical Facts

EX 35 S/25C

Power (kW)	1,3
Thrust (kgf)	25-35
Voltage (V)	12
Nominal Current (A)	140
Length (cm)	55
Weight (kg)	19,5
Diameter (cm)	16,5 x 16,5
recommended boat size (m)	6 - 8,5
recommended boat size (ft.)	20 - 28

EX 55 S/40C

Power (kW)	1,8
Thrust (kgf)	40-55
Voltage (V)	12
Nominal Current (A)	187
Length (cm)	55
Weight (kg)	19,5
Diameter (cm)	16,5 x 16,5
recommended boat size (m)	8 - 10,5
recommended boat size (ft.)	26 - 34

EX 75 S/55C

Power (kW)	2,3
Thrust (kgf)	53-74
Voltage (V)	24
Nominal Current (A)	120
Length (cm)	55
Weight (kg)	19,5
Diameter (cm)	16,5 x 16,5
recommended boat size (m)	9 - 12
recommended boat size (ft.)	29 - 38

EX 95 S/70C

Power (kW)	3,0
Thrust (kgf)	67-95
Voltage (V)	24
Nominal Current (A)	175
Length (cm)	55
Weight (kg)	19,5
Diameter (cm)	16,5 x 16,5
recommended boat size (m)	10 - 15
recommended boat size (ft.)	35 - 48

EX 110 D

Power (kW)	4,0
Thrust (kgf)	80-110
Voltage (V)	12
Nominal Current (A)	374
Length (cm)	98
Weight (kg)	35
Diameter (cm)	16,5 x 16,5
recommended boat size (m)	12 - 16
recommended boat size (ft.)	35 - 53

EX 180 D

Power (kW)	6,0
Thrust (kgf)	140-180
Voltage (V)	24
Nominal Current (A)	350
Length (cm)	98
Weight (kg)	35
Diameter (cm)	16,5 x 16,5
recommended boat size (m)	14 - 18
recommended boat size (ft.)	44 - 59

11.9. Propeller Replacement

The propeller has to be replaced depending on the particular EX series model:

- Propeller EX 25C/40C/35S/ 55S/110D (Article No. 50320)
- Propeller EX 55C/70C/75S/95S/180D (Article No. 50321)

The space between the plastic disk (2) and the sealing of the housing has to be filled with propeller grease (7). It is not necessary to remove pre-existing grease. The space between plastic disk (2) and propeller (4) should not be filled with grease. The thread definitely must stay free from grease.

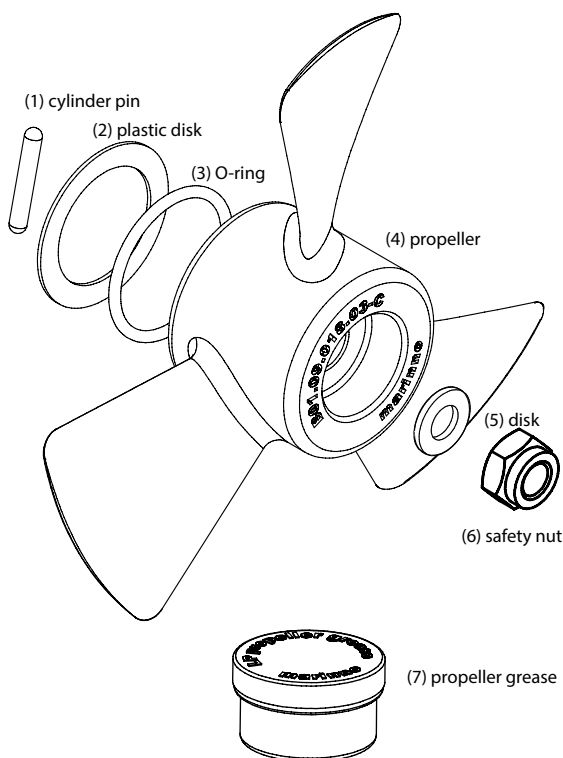


Fig. 42: propeller set

CAUTION!

During propeller replacement it is compellent to fill the space between plastic disk and sealing of the housing completely with propeller grease!

CAUTION!

During propeller replacement always switch off the EX series main switch!

12. Anode Replacement

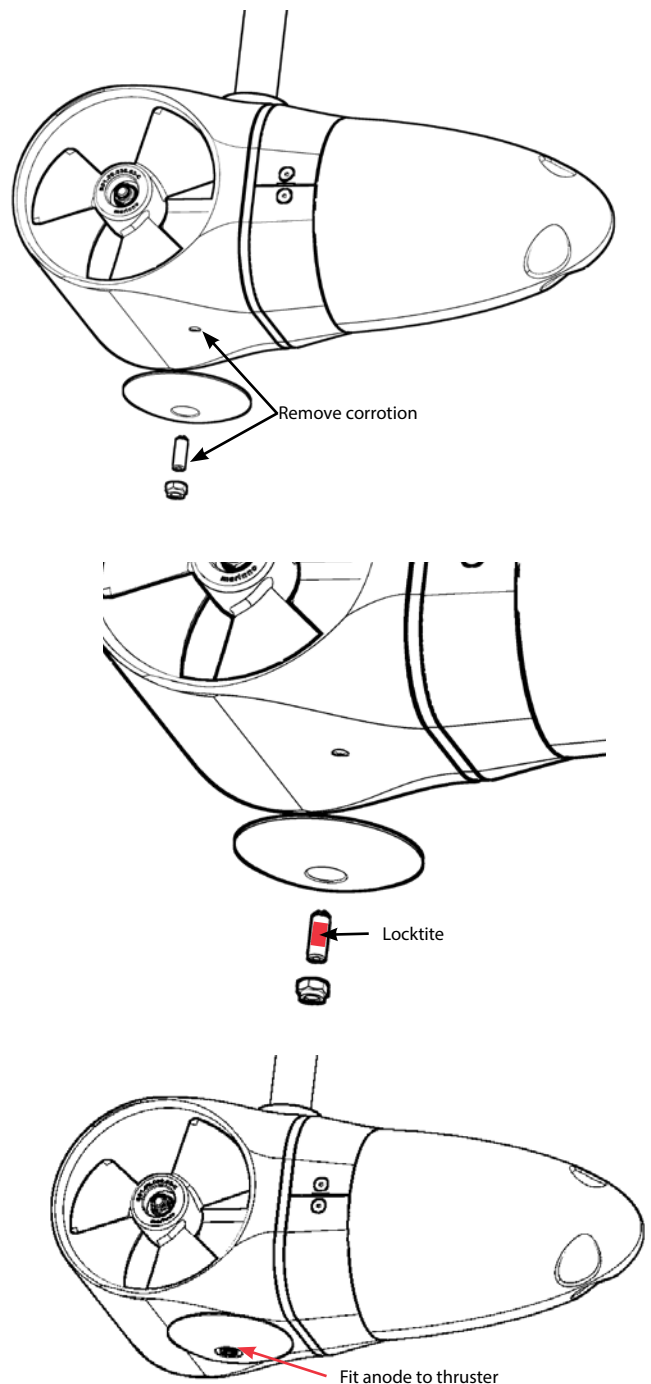
- Anode EX series Art. # 140295
- Anode kit EX series Art. # 4 1190

Remove galavanic corrotion from the threaded hole with a drill bit or a sharp object to establish proper electrical connection

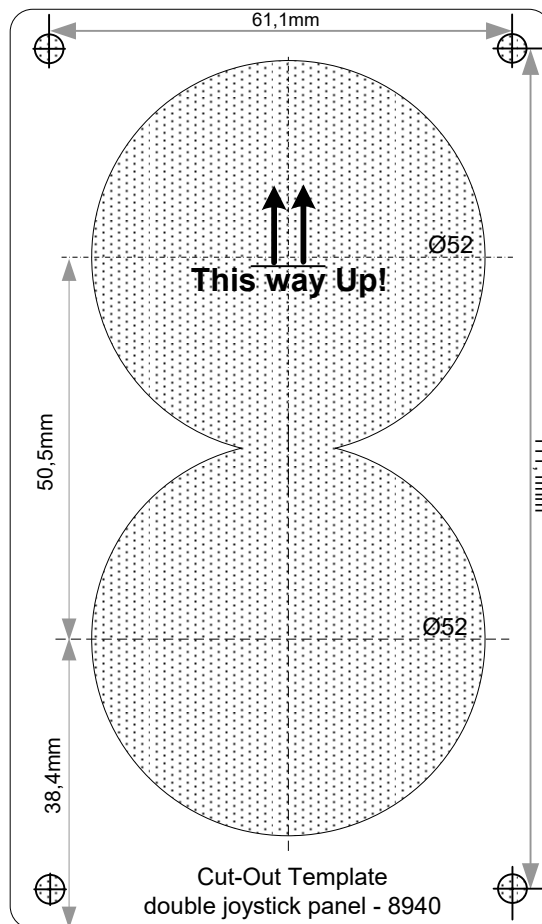
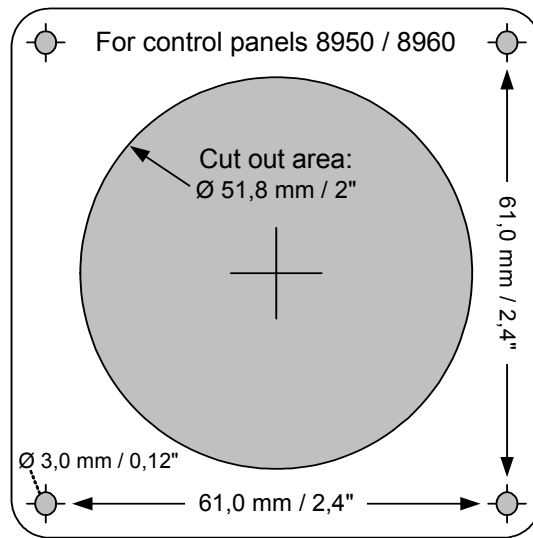
Remove corrotion on bolt if necessary

Apply locktite in the midle of the bolt

Then fit the anode to the thruster



11.10. Measurements for joystick and touch panel



11.11. Spare parts - www.side-power.com

Worldwide sales and service



www.sleipner.no



SLEIPNER MOTOR • AS P.O. Box 519 • N-1612 Fredrikstad • Norway
Tel: +47 69 30 00 60 Fax: +47 69 30 00 70 www.sleipner.no