

**SIDE-POWER**  
Thruster Systems

**SE80/185T IP**  
**SE100/185T IP**  
**Ignition Protected**  
**thruster assembly**

Keep this  
manual onboard !

## Installation and user manual



**SLEIPNER MOTOR AS**

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Norway  
[www.side-power.com](http://www.side-power.com)

**CE**  
Made in Norway

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### DECLARATION OF CONFORMITY



We, Sleipner Motor AS  
P.O. Box 519  
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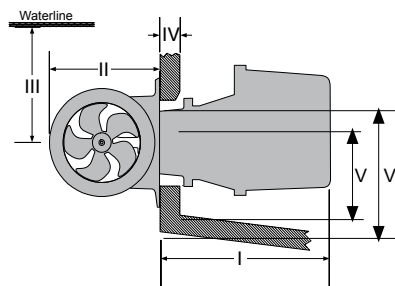
declare that this product with accompanying  
standard remote control systems complies with the  
essential health and safety requirements according  
to the Directive 89/336/EEC of 23 May 1989  
amended by 92/31/EEC and 93/68/EEC.

## Technical specifications

- Motor:** Custom made reversible DC-motor.
- Gearhouse:** Seawater resistant bronze. Ballbearing at propellershaft; combination of ballbearing and slide bearing at driveshaft.
- Motor bracket:** Seawaterresistant aluminium.
- Ignition protection:** Conforms to ISO 8846
- Propeller:** 5 blade skew "Q"-propeller , fibreglass reinforced composite.
- Batteries:** Minimum recommended battery capacity (cold crank capacity by DIN standard)  
See table.
- Max. use:** *S<sub>2</sub> = 3 min. or appr. 7-10% within a limited time frame. All electromotors are protected against overheating.*
- Safety:** Electronic time-lapse device protects against sudden change of drive direction. Electric thermal cut-off switch in electromotor protects against over heating (auto reset when electro motor cools down).
- Flexible coupling between electro-motor and driveshaft protects electromotor and gearsystem if propeller gets jammed.
- If original Sidepower panel is used, the panel shuts off automatically 6 minutes after last use.
- Integrated microprocessor monitors solenoids, reducing wear and risk of solenoid lock-in. Auto-stop of thruster in case of accidental solenoid lock-in or if run signal is continuous for more than 3 minutes.

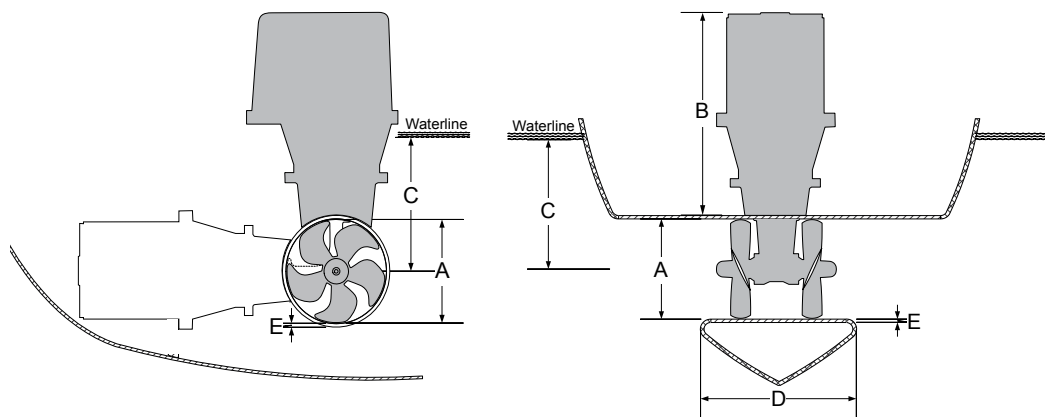
	SE 80/185 T IP	SE 100/185 T IP
Thrust at 10.5V/21V* (kg • lbs)	80 • 176	100 • 220
Thrust at 12V/24V* (kg • lbs)	96 • 212	116 • 256
Typical boat size (ft • m)	35' - 48' • 10 - 15	39' - 55' • 12 - 17
Tunnel I.D. (mm • in)	185 • 7.3"	185 • 7.3"
Propulsion system	Twin	Twin
Power at 10.5V/21V* (kw • Hp)	4.4 • 6	6.3 • 8.4
For DC system (V)	12/24	12/24
Weight (kg • lbs)	20 • 44	31 • 68
Rec. CCA (DIN** 12/24V)	550/300	750/400

Item Code 12V	SE80/185T-12V(-12IP)	SE100/185T-12V(-12IP)
Item Code 24V	SE80/185T-24V(-24IP)	SE100/185T-24V(-24IP)
Item Code 12V PRO*	SEP80/185T-12V(-12IP)	SEP100/185T-12V(-12IP)
Item Code 24V PRO*	SEP80/185T-24V(-24IP)	SEP100/185T-24V(-24IP)



Stern thruster	I	II	III <sub>min</sub>	IV <sub>max</sub>	V	VI	Tunnel width
(mm • in)							
SE80/185S IP	399 • 15.70	256 • 10.1	200 • 7.87	54 • 2.13	200 • 7.8	300 • 11.8	337 • 13.27
SE100/185T IP	407 • 16.02	256 • 10.1	200 • 7.87	44 • 1.73	200 • 7.8	300 • 11.8	337 • 13.27

**Responsible installer must consider and facilitating enough space and access regarding installation, service and maintenance of the thruster.**



Thruster	A	B	C	D	E <sub>min</sub>	F	F <sub>anbefalt</sub>	G <sub>min</sub>	G <sub>max</sub>
(mm • in)									
SE80/185S IP	185 • 7.3	376 • 14.8	262 • 10.3	327 • 12.9	200 • 7.87	170 • 6.7	340 • 13.4	6 • 0.24	8 • 0.31
SE100/185T IP	185 • 7.3	451 • 17.8	308 • 12.1	382 • 15.0	200 • 7.87	170 • 6.7	340 • 13.4	6 • 0.24	8 • 0.31

## Planning and important precautions

**Prior to installation, it is important that the installer reads this guide to ensure necessary acquaintance with this product.**

- ⌚ The electromotor assembly must be handled carefully. Do not lift it by the internal connections or put it down on the driveshaft.
- ⌚ Beware to keep installation within advised measurements.
- ⌚ We advice to paint the gearhouse and propellers with antifouling. PS! Do not paint the anodes, sealings or propellershafts.
- ⌚ Do not finish the inside of the tunnel with a layer of gelcoat / topcoat or simililar. It is only room for a thin layer of primer and two layers of anti-fouling between the tunnel and the props.
- ⌚ With the boat on land, only run the thruster for a fraction of a second, as without resistance it will accelerate very fast to a damaging rpm. Also, while the thruster is in air, make sure that the propellers have come to a complete stop before performing a direction change of the thruster, as it does cause damage to the thruster.
- ⌚ This manual is intended to support educated / experienced staff and is therefore not sufficient in all details for the correct installation.
- ⌚ The thruster IP assembly has been tested to be fully ignition protected so that it can be installed in an area with the possibility of explosive gases in accordance to ISO 8846.
- ⌚ Do not install the thruster in a position where you need to cut a stiffener/stringer/support for the hull integrity without checking with the boatbuilder that this can be safely done.
- ⌚ When installed in boats approved or classified according to international or special national rules, the installer is responsible for following the demands in accordance with these regulations / classification rules. The instructions in this guide can not be guaranteed to comply with all different regulations / classification rules.

***NB ! Faulty installation of the tunnel, thruster or panel will render all warranty given by Sleipner Motor AS void.***

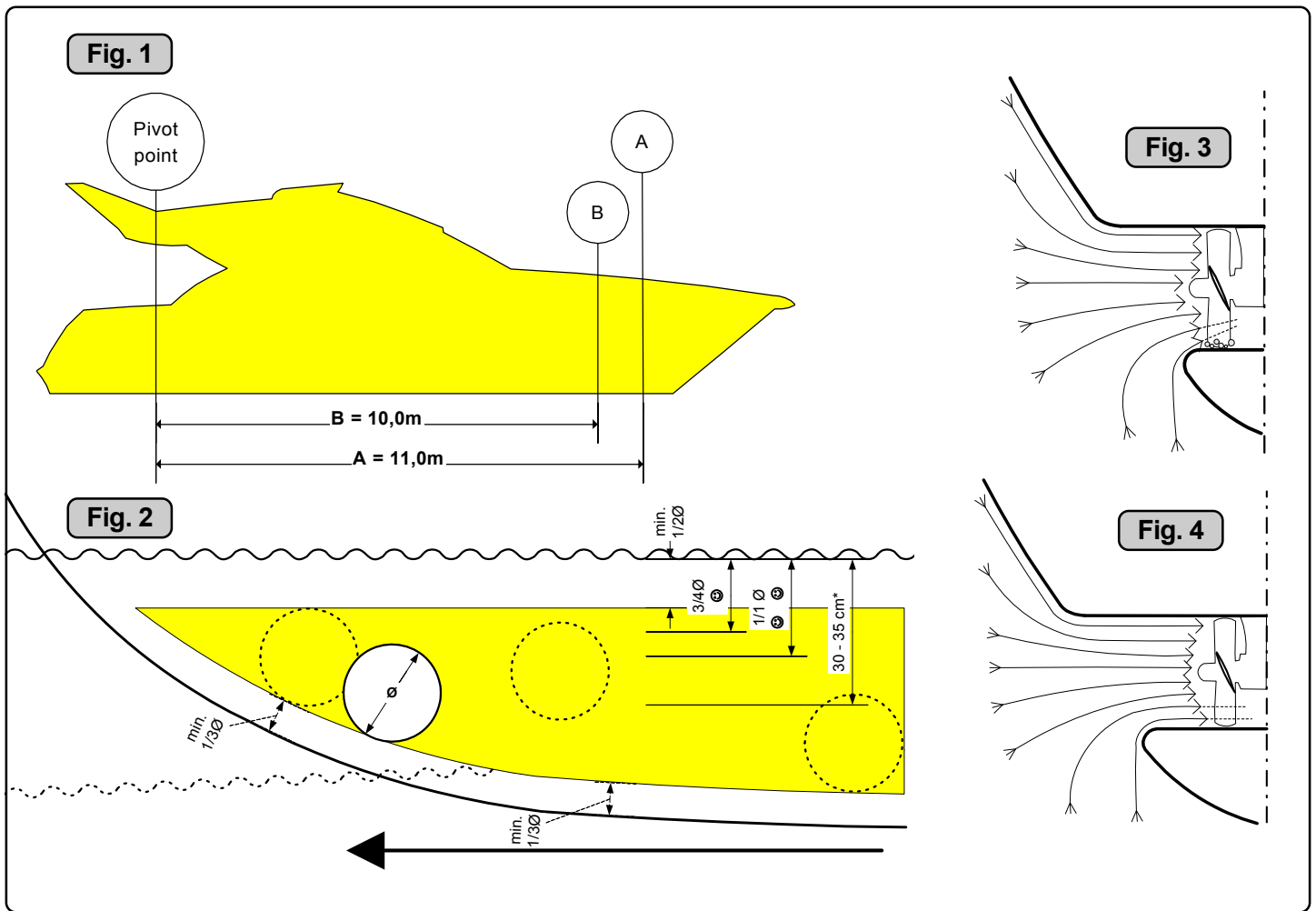
## Stern thruster installation considerations

To achieve maximum effect, reliability and durability from your Side-Power stern thruster, a correct installation is very important.

Please follow the instructions carefully, and make sure that all checkpoints are carefully controlled.

### **Additional considerations for positioning of the stern thruster**

- ⌚ Make sure that the stern-tunnel does not disturb the waterflow under the hull
- ⌚ Ensure that when installed the thruster does not foul exisiting equipment inside the boat like steerage links etc.
- ⌚ Ensure that the water flow from the thruster are not interefferred by sterndrives, trimtabs etc. as this will reduce the thrust considerably.
- ⌚ It is possible to mount the tunnel off the boat's centre line if necessary.
- ⌚ If the stern thickness is to much for the thruster in question you can easily remove hull material in the necessary area to fit the thruster. You only have to reduce the stern thickness down to the max. thickness measurement in the drawing.



**EN Positioning of the tunnel / thruster**

**The Thruster should be as far forward as possible (Fig. 1)**

Because of the leverage effect around the boats pivot point, it is very important for the thrusters actual effect in the boat to get it as far forward as possible. The relative distance change from the boats pivot point to the thruster will be the change of actual thrust for the boat.

*Example:*

A: 55kg thrust x 11m leverage = 605kgm torque to rotate the boat  
 B: 55kg thrust x 10m leverage = 550kgm torque to rotate the boat  
 In position A you will get 10% more thrust to turn the boat around.

**The thruster should be placed as deep as possible (Fig. 2)**

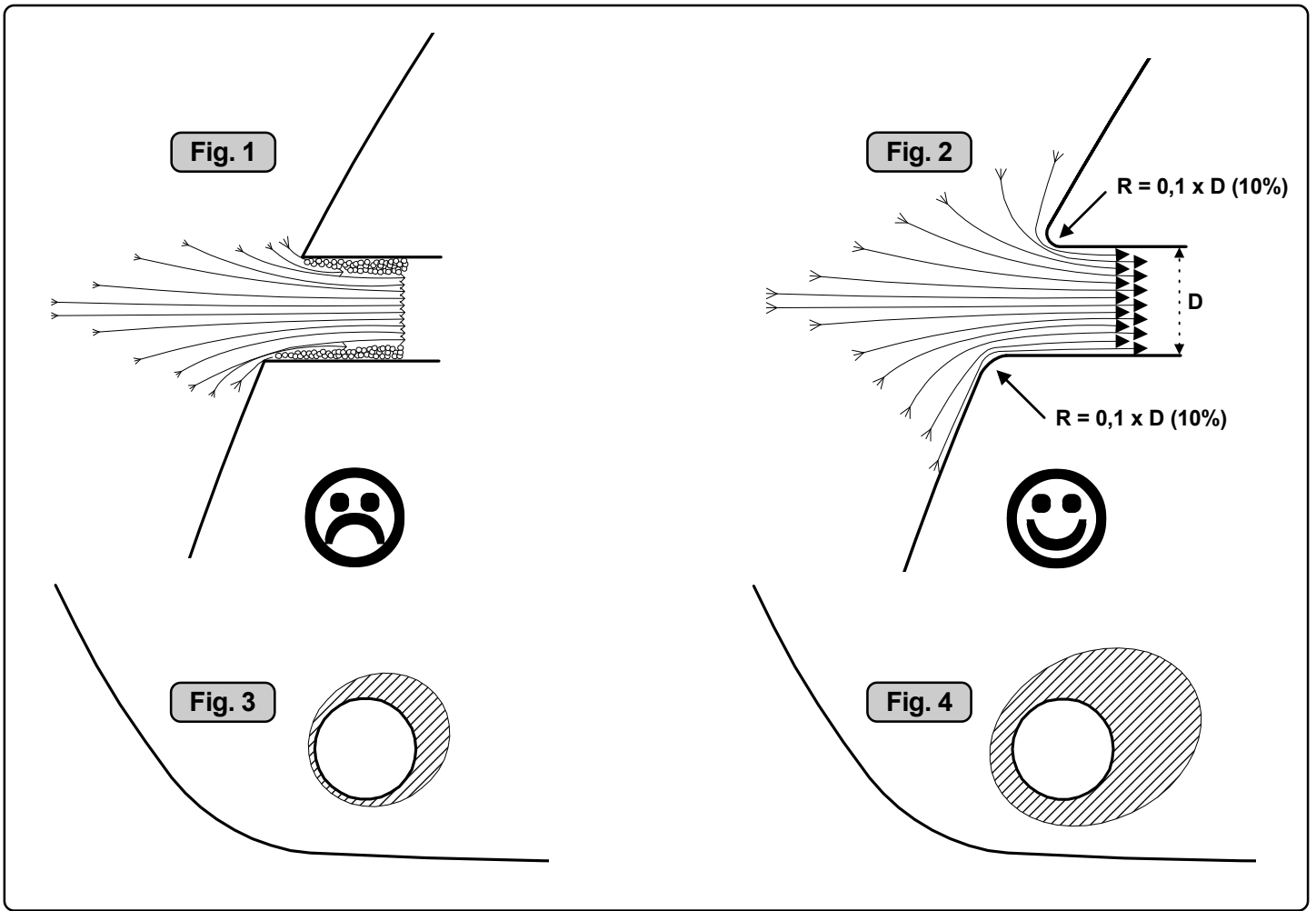
The tunnel should be placed as deep as possible for two reasons:

1. So that it does not suck down air from the surface which will destroy the thrust completely.
2. To get as high as possible a water pressure to get maximum efficiency from the propeller.

Generally the top of the tunnel should be a minimum of 1/2 x the tunnel diameter below the waterline. This is an absolute minimum and we recommend that it is at least 3/4 x tunnel diameter (☺) below the waterline. A really good distance is about 1/1 x tunnel diameter (☺☺) below the waterline. When you get the top of the tunnel 30-35 cm\*/1 feet below the surface, other factors should be considered more important, i.e. moving the thruster further forward.

**Optimal tunnel length**

If the tunnel gets too long, the friction inside will reduce the water speed and thereby the thrust. If the tunnel gets too short (normally only in the bottom section of the tunnel) you can get cavitation problems as the water will not have had time to “straighten” itself before reaching the propeller (Fig. 3&4). This cavitation will reduce performance as well as creating a lot of noise. The optimal tunnel length is 2 - 4 x tunnel diameter and you should avoid tunnels longer than 6 to 7 times the tunnel diameter as the performance reduction is then clearly noticeable.



**EN Tunnel ends**

**Rounded tunnel ends will maximize thrust and minimize noise.**

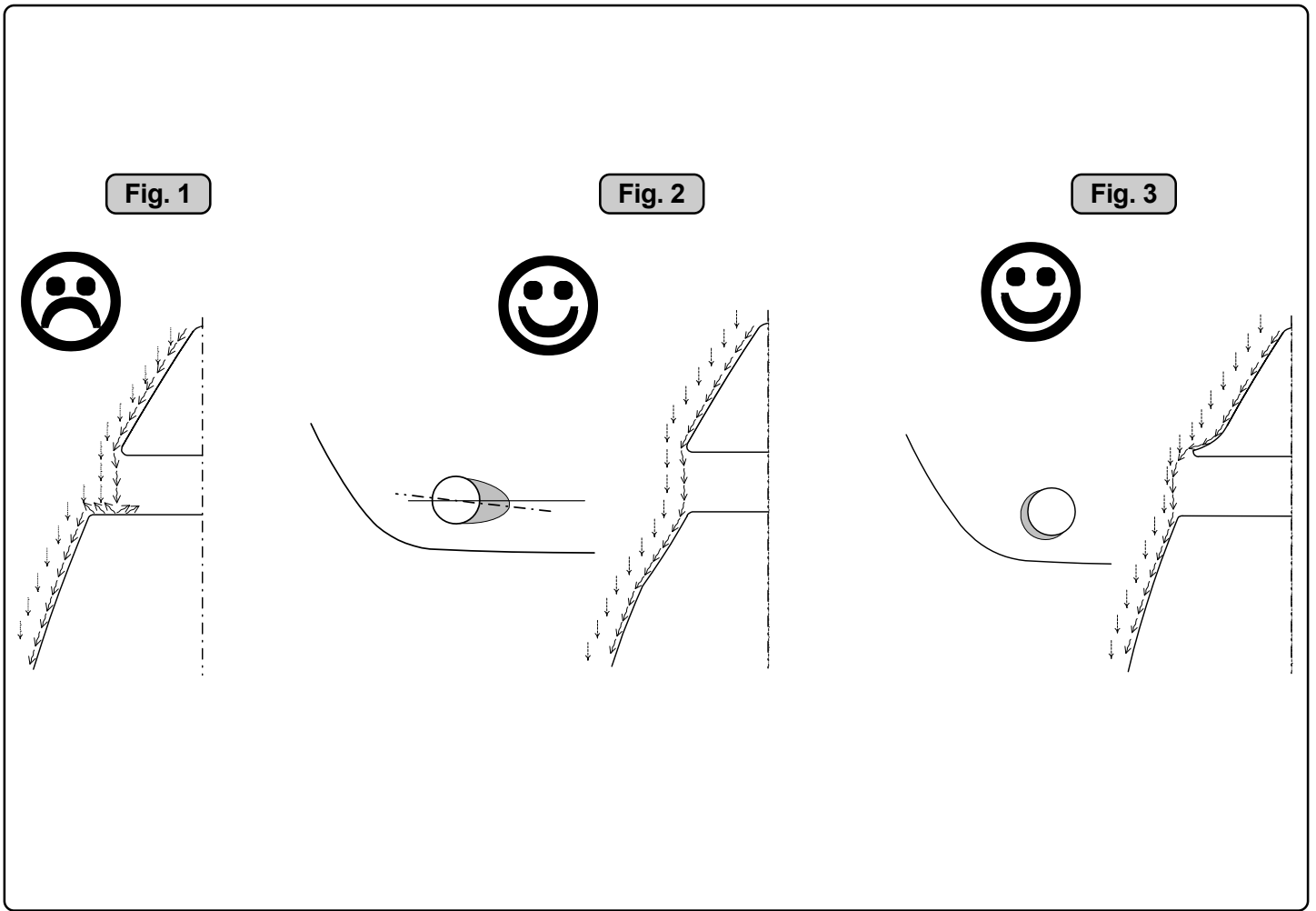
We recommend rounding the tunnel connection to the hull-side as much as possible. The optimum rounding has a radius of 10% of the tunnels diameter.

Important advantages over sharp tunnel to hull connections are:

1. The rounded tunnel end will prevent creation of turbulence/cavitation that will come from a sharp tunnel end when water passes by fast, thereby preventing a double negative impact on the thrust and noise level (Fig. 1 & 2).
  - The turbulence / cavitation blocks the outer area of the tunnel and thereby reduces the effective tunnel diameter and thrust.
  - The turbulence / cavitation hits the propeller and thereby reduce the propellers performance and creates noise.
2. The curved tunnel end makes the thruster take water also from along the hull-side, creating a vacuum that will suck the boat sideways and thereby give additional thrust (Fig. 3 & 4). With a sharp tunnel end, the thruster will be unable to take water from along the hull-side, and you will not get the desired vacuum and additional thrust. This "free" additional thrust can in optimal installations be as much as 30 - 40% of the total thrust.

**NOTE!**  
A Sidepower thruster propeller does not cavitate at working speed so that all cavitation and cavitation noise in the tunnel will be caused by the tunnel installation.

**NOTE!**  
Even if it is not possible to make the perfect rounding, it is very important to round the tunnel end as much as possible. A angled tunnel to hull connection will also do much of the same job as a rounded connection (see page 20, Fig. 1b & 1d).



**EN Prevent drag from tunnel**

A possible problem in sailboats or fast powerboats is that they get a drag from the back face of the tunnel, as this becomes a "flat" area facing the water flow (Fig. 1).

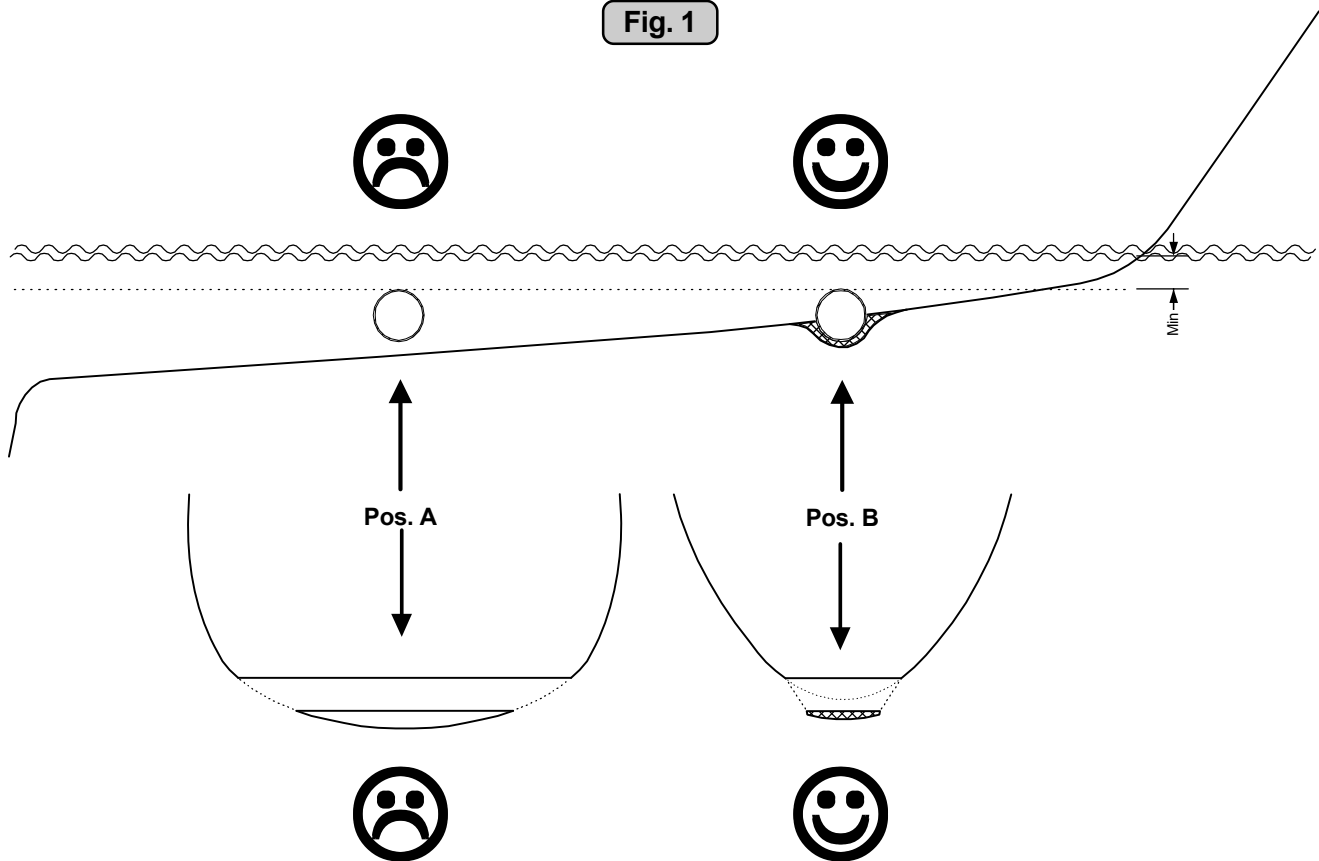
This can also create problems with the thruster spinning (passive) and making noise while sailing or driving the boat with water being pushed through the tunnel at high speed.

This can be solved in two different ways, depending on what is possible or easier to do.

1. The best solution which normally reduces the drag most is to make a recess in the hull at the back of the tunnel. Thereby the back face is gone and about all the drag (Fig. 2). The depth and shape of this recess will depend on the boat. Basically you should not see the back face of the tunnel when standing directly in front of the tunnel at the angle of the boats centreline. The angle up or down backwards of the insert in the hull, depends on the hull shape, but normally it is angled slightly down because of the water flow on this area of the hull.
2. The drag will also be reduced a lot, especially in fast power boats, by making a deflector / spoiler in front of the tunnel. This will push the water flow out from the hull so that most of it passes by the back face of the tunnel (Fig. 3). The shape and size of this deflector will depend on the hull shape. Basically you should not see the back face of the tunnel when standing directly in front of the tunnel at the angle of the boats centreline. The easiest way of making this is to let a part of the tunnel stick out in the lower forward area of the hole, and use this as a support to mould a soft curve/spoiler shape.

*Remember to still round the tunnel ends as much as possible to get optimum thruster performance and minimum noise. For more information on how to practically do this, contact a Naval architect/Boatbuilder.*

Fig. 1



EN

## Tunnel installation in sailboats

Many sailboats have a racing type hull which means that it is very flat bottomed and has a very shallow draft in the bow section. It is thereby very difficult not to say impossible to fit a tunnel thruster the usual way, at least as far forward in the hull as a thruster should be (Fig. 1).

However, it is possible to install a tunnel thruster in most sailboats, even when the hull does not directly support the fitting of a tunnel.

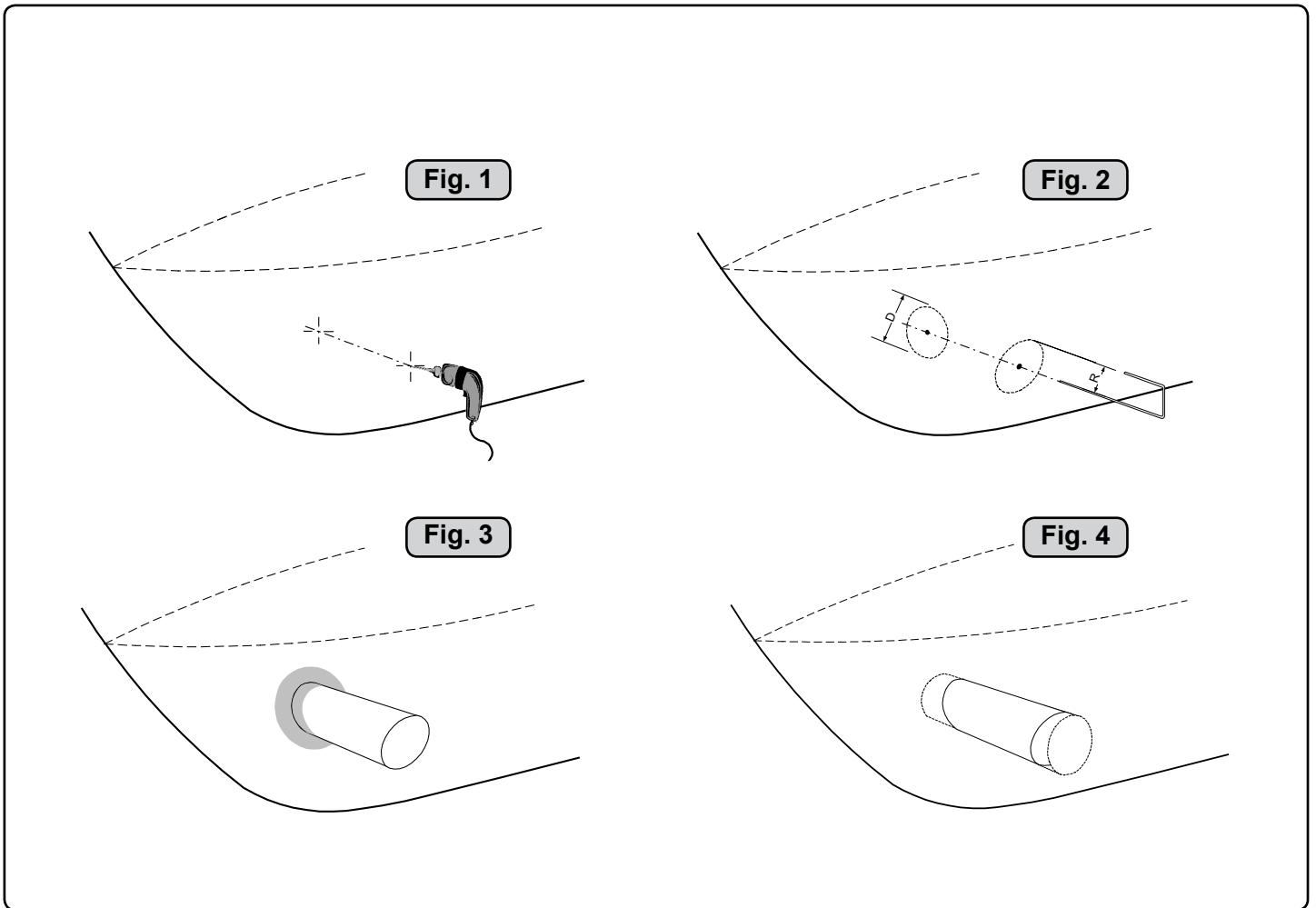
This is done by fitting the tunnel halfway into and halfway under-neath the existing hull and then strengthen it and smoothening the water flow by moulding a bulb around / underneath the tunnel.

This will allow installation in good position on the boat, maintaining the reliability and space advantages of a tunnel thruster.

This installation is being used by some of the world's largest sailboat builders, and has been proven to give little to no speed loss for normal cruising.

This can also be a good installation method for flat bottomed barges to avoid extremely long tunnels and huge oval tunnel openings in the hull.





**EN Tunnel installation**

***We recommend that a professional does the fibreglass fitting of the tunnel. These instructions are only general, and do not explain in any way the details of fibreglass work. Problems caused by faulty installation of the tunnel, are the installers full responsibility.***

Find the position in the boat considering the information given earlier in this manual and the applicable measurements for the thruster model you are installing.

Mark the centre of the tunnel on both sides. Drill a 6mm hole horizontally in these marks (Fig. 1).  
 Bend a  $\varnothing$  5mm steel bar as shown with the "tip" bent back at the tunnel radius and mark the circle for the tunnel opening (outside diameter of the tunnel). Cut the hole with a jigsaw (Fig. 2).

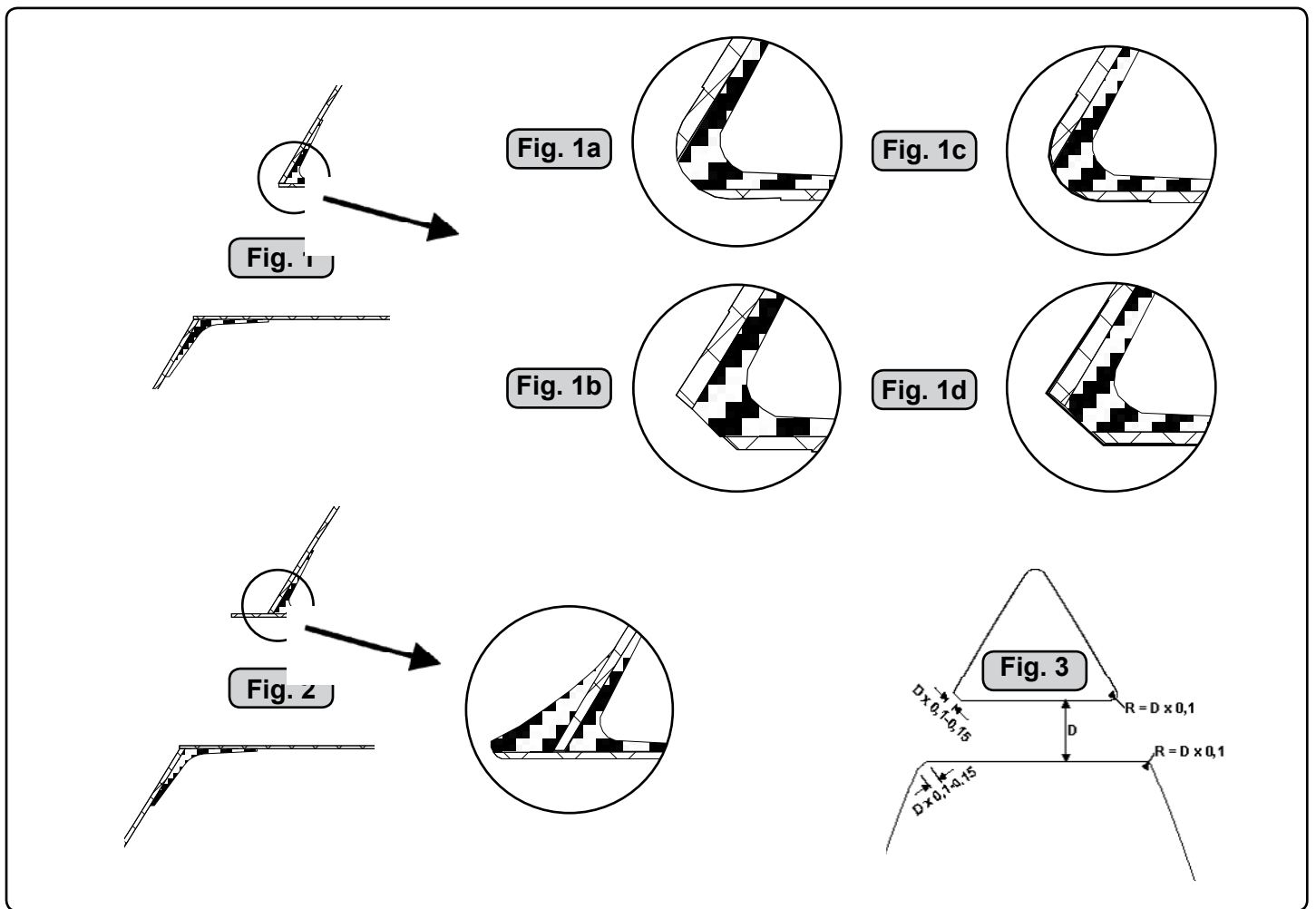
Grind off the gelcoat and polyester so that you are down in the "real fibreglass" in an area of 12cm around the hole both inside and outside in the hull to cast the tunnel to the hull (Fig. 3).

Insert the tunnel and mark its shape to fit the hull (Fig. 4). (if you are installing with a deflector/spoiler, leave a part of the tunnel of the front- and underside of the tunnel to have a base for this (see page 20, Fig. 2). Cut the tunnel ends to the desired shape and lightly sand its surface and clean with acetone or similar where you are going to apply fibreglass.

**NB!** Do not cast/glass on the area were the thruster will be placed.

Then cast the tunnel to the inside of the hull, use at least 8 layers of 300 g glass and resin, preferably alternating mat and rowing types of fibreglass (see page 20, Fig. 1). If you are rounding the tunnel ends to the perfect 10% radius you may in some cases have to make further layers inside to preserve the desired hull thickness.

**NB!** Make sure that any gap between the tunnel and the hull are completely filled with resin/fibreglass. In areas where you can not access to make normal layers of resin/fibreglass, a resin/ fibreglass mixture must be filled in that area.



**EN Tunnel installation**

Soften the edges with a radius of 10% of the tunnel diameter (Fig. 1a) or make a slope with a length of 10-15% of the tunnel diameter (Fig. 1c). If this is not possible, at least round the tunnel end as much as possible.

We advice to also cast two layers on the outside of the tunnel/hull for an 6-8cm area (Fig. 1c & 1d).

You must apply topcoat/epoxy on the areas outside where you have grounded or moulded to again make these waterproof.

**NB! All original Sidepower tunnels are fully waterproof whenthey are delivered.**

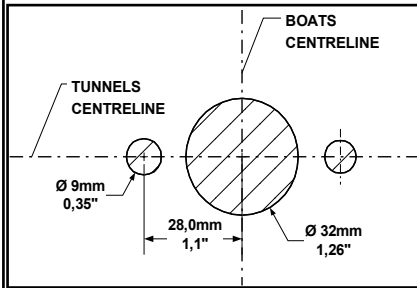
This means that unless you want, because of special reasons, to have another colour on it, you do not have to apply topcoat or the several layers of primer that is necessary on the boats' hull to make it water-resistant.

Sand it very lightly and apply one layer of primer to make the antifouling sit.

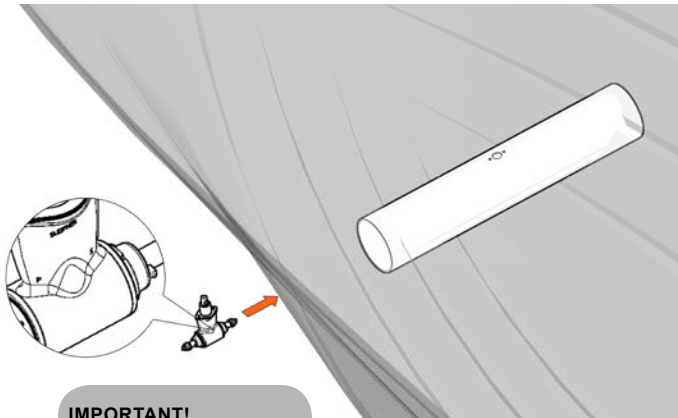
The original Sidepower tube itself is fully water-resistant without treatment except in the areas where you have bonded it to the hull.

Apply topcoat/epoxy paint and primer on the areas where you have grounded or moulded as these areas give the water access to the hull which normally is not waterproof without these applications outside.

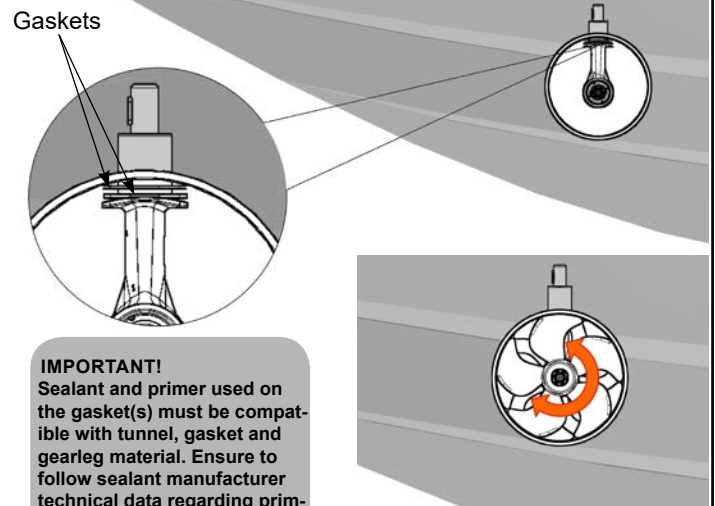
**PS! Avoid all casting where the motor-bracket is to be placed,as this will cause misfit and possible failure of the gearhouse.**

**Fig. 1**

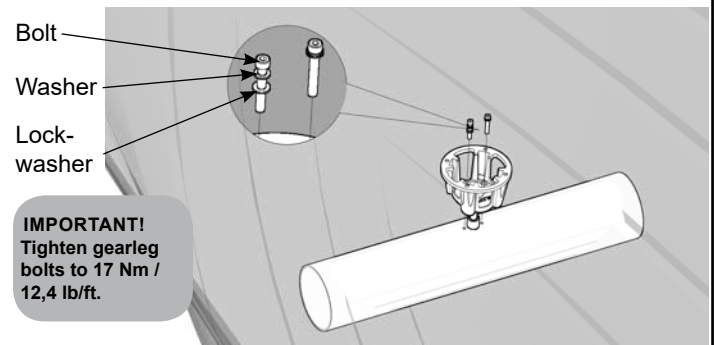
**IMPORTANT!**  
Boatbuilder/Naval architect must be consulted and approve when hull is customized in order to get the thruster tunnel to be installed.

**Fig. 2**

**IMPORTANT!**  
The gearleg must be fitted with the end marked P facing port, and the end marked S facing starboard.

**Fig. 3**

**IMPORTANT!**  
Sealant and primer used on the gasket(s) must be compatible with tunnel, gasket and gearleg material. Ensure to follow sealant manufacturer technical data regarding priming and application of the sealant.

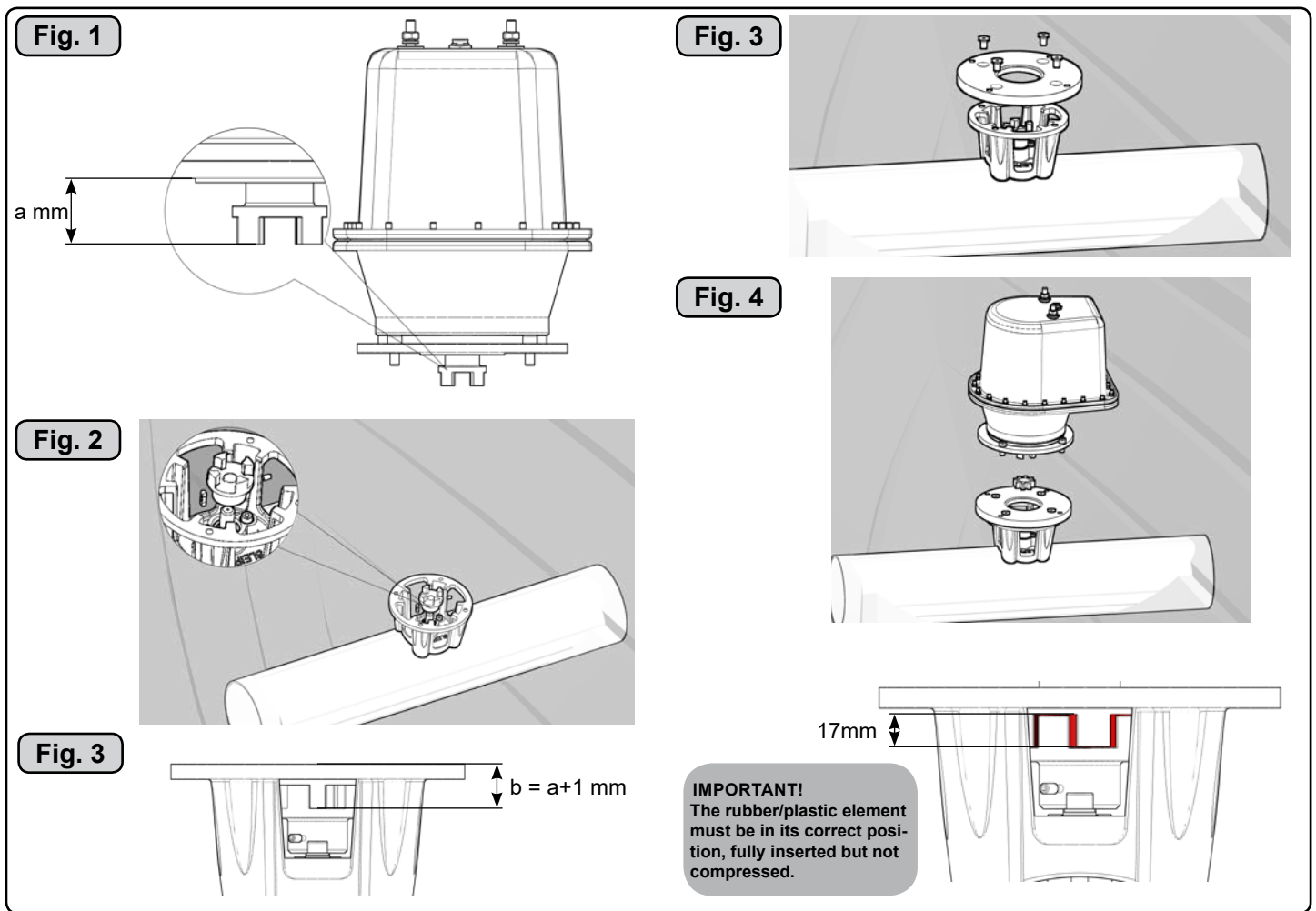
**Fig. 4**

**IMPORTANT!**  
Tighten gearleg bolts to 17 Nm / 12,4 lb/ft.

**EN**

## Bow thruster - Fitting gearleg and motor bracket

1. Mark the centerline of the tunnel and the boats centerline. **Fig.1.**
2. Use the template or gearhouse gasket to mark the centre of the holes and double check the measurements. It is absolutely necessary that all holes are in-line with the tunnels' centreline to ensure precise installation, as the clearance between the propellers and the tunnel is minimal to ensure best possible performance. **Fig.1.**
3. Drill the holes according to **Fig.1.**
4. The gearleg must be fitted with the end marked P facing port and the end marked S facing starboard for the thrust direction to correspond with the control panel. **Fig. 2.**
5. Try the lower-unit in the tunnel (without the propeller) by using the 1mm gasket inside the tunnel. Try on the propeller(s) to ensure it is in the center of the tunnel and turns freely with the same clearance from each blade to the tunnel. If propeller(s) is off center, try to use the other or both gaskets. Use suited sealant to ensure that no leakages occur. **Fig.3.**
6. Apply a thin layer of sealant on both sides of the gasket(s) and place carefully on the gearhouse, ensure no sealant gets into the bolt holes on the gearhouse.
7. Insert the gearleg through the main hole in the tunnel and assemble the gearhouse and motor-bracket gently together. **Fig. 4.**
8. There must be no casting where the motor bracket is placed, as this will cause possible failure of the gearhouse. The motor bracket must fit steady on the tunnel, if the tunnel is not smooth, all uneven surfaces must be grinded smooth.
9. Screw the lower unit and the motor-bracket together with the two provided bolts. **Fig. 4.**



**EN Bow thruster - Fitting the electromotor IP assembly**

**SE100/185T-IP installation**

1. Unscrew the 4 bolts in the motorbracket, and remove the adaptor plate fitted to the motor bracket.
2. Measure the height of the upper flexible coupling unit sitting on the motor shaft according to **Fig.1**.
3. Calculate and position the lower part of the flexible coupling in correct height according to **Fig. 2/3**, and tighten the set screw (Apply blue Loctite). (3mm Allen Key). Ensure that key on axle and keyway in flexible coupling are aligned.

**Example:**

**a height = 24,54mm.**

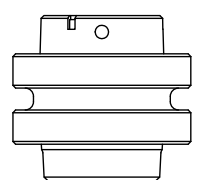
**b height = 24,54mm + 1mm = 25,54mm.** Correct positioning of the lower flexible coupling unit should be 25,54 mm measured from top surface of motor bracket to bottom inner surface of lower flexible coupling. The extra 1mm is added to eliminate the risk for compression of the rubber elemnet/flexible coupling.

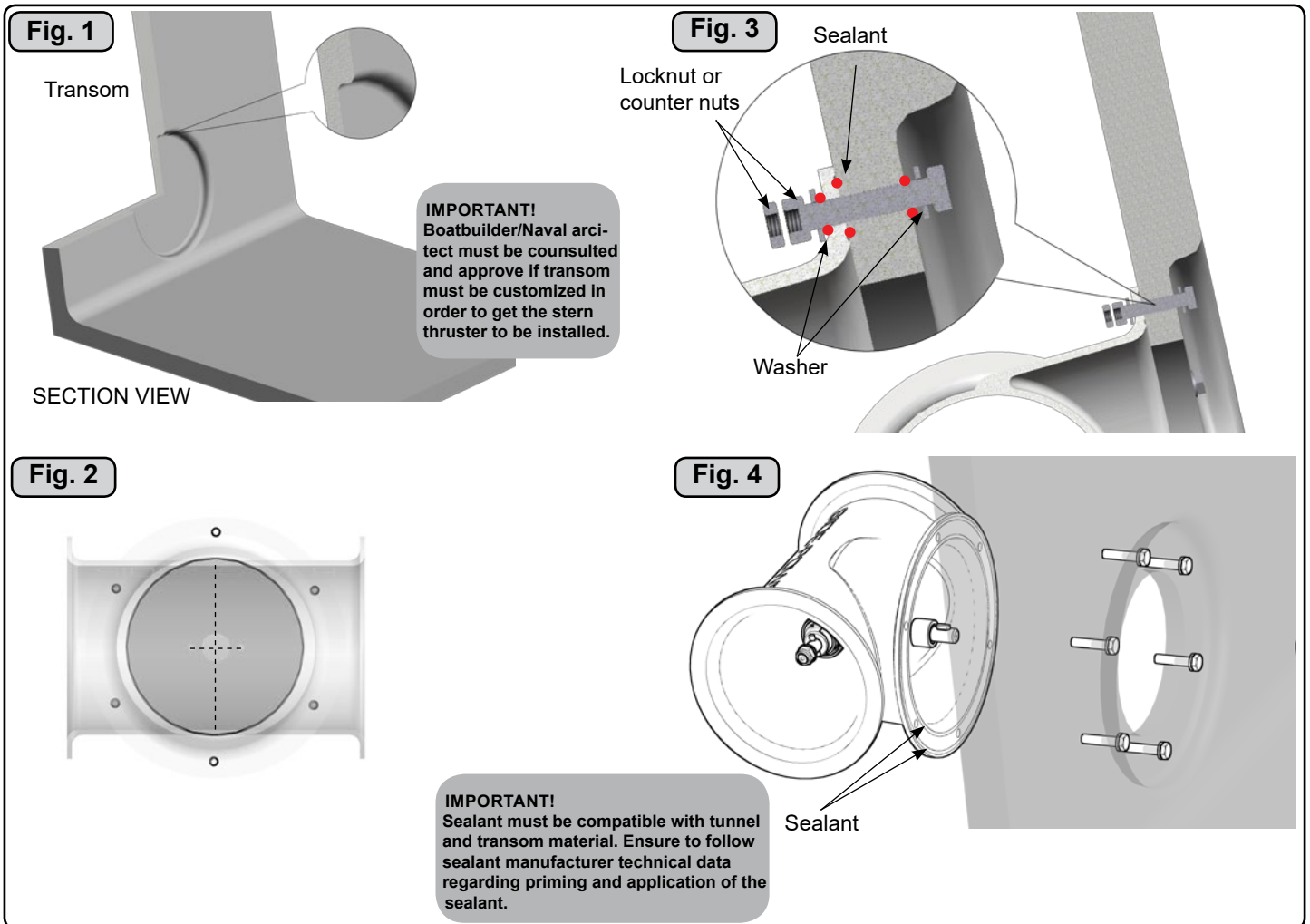
4. Re-fit the adapter plate to the motor bracket and tighten the 4 bolts to **33Nm/24,4 lb/ft.** Place the rubber/plastic element correctly into the lower flexible coupling unit. **Fig.4.**
5. Fit the motor gently to the adaptor plate and tighten the **4 bolts to 33Nm/12,4 lb/ft. Fig.5.**
6. Ensure that the rubber/plastic element is in correct position, fully inserted but not compressed. It should be a 17 mm clearance between inner surfaces of upper and lower flexible couplings.

**SE80/185T-IP installation**

1. Remove the 4 bolts in the motor bracket.
2. Ensure that key on axle and keyway in one-piece coupling are aligned.
3. Place the motor gently on the motor bracket.
4. Fasten the motor to the bracket with the 4 bolts and tighten them. Bolt tightening force: 4x33Nm/12,4lb/ft.

**SE80 One-piece coupling**





### Stern Thruster - Bolt on installation of the stern tunnel

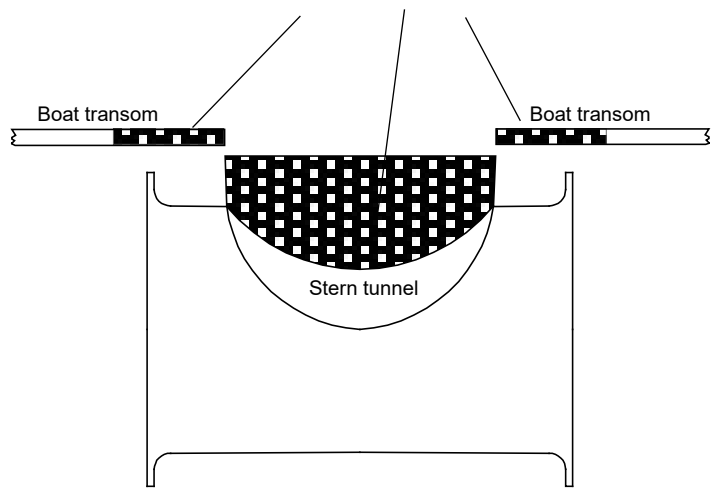
1. Ensure there are enough space both inside and outside the transom of the boat. If transom needs to be customized in order to be able to fit the tunnel flange bolts properly and not to get in conflict with thruster adapter plate, the GRP work must be consulted and approved by a boatbuilder or naval architect. **Fig. 1.**
2. After the installation position has been decided, hold the tunnel in place in the horizontal position and mark the bolt holes. Remove the tunnel and it is then possible to calculate and mark the centre. **Fig.2.**
3. It is important that the tunnel flange sits flush on the transom. If not, the area on the transom will have to be flattened to ensure a flush fit.  
Note! Be careful when grinding as it is very easy to remove too much fibreglass.  
Cut out the centre hole and the transom to the same internal diameter as the tunnel flange and drill the bolt holes. Before bolting on the stern tunnel, the prepared area must be sealed with a gelcoat or similar to ensure there is no water ingress into the hull.
4. Before fitting the tunnel to the transom, fit the lower gear leg to the tunnel as described on page 6.
5. When fitting the tunnel, ensure that there is ample sealant in the sealing tracks of the tunnel flange and around the bolts to make a water tight fitting. **Fig. 3/4.**  
Bolts, washers and nuts are not included as they will vary depending on the transom thickness. We recommend A4 stainless with A4 lock nuts (or counter nuts) and A4 washers of a large diameter on both outside and inside.  
Bolts diameter:  $\varnothing$  10mm or 3/8" stainless steel.

#### NOTE!

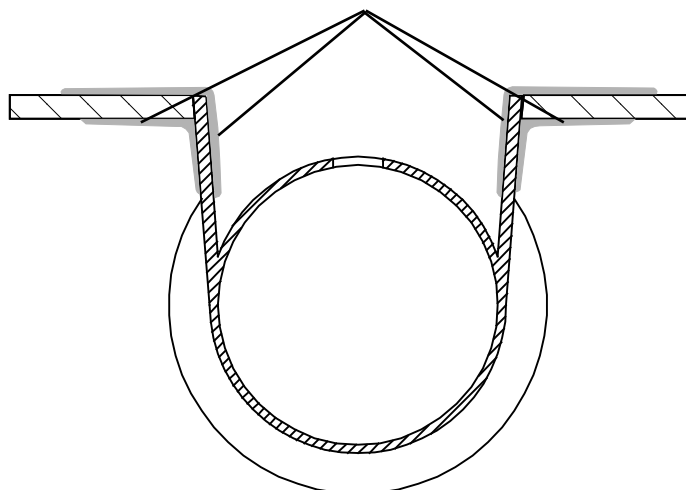
If also a bow thruster is installed, we strongly advice to use separate battery banks for the two thrusters to avoid extreme voltage drop if both thrusters are to be used at the same time. Refer to the section for battery capacity and cable sizes for each thruster.  
Ensure to not have direct connections of both + and - if you have built together controls for both thrusters to avoid current leakage between the separate battery banks.  
If you are installing the standard Side-Power dual joystick panel this is already secured.

**Fig. 1**

**Grind off the bolt flange and the gelcoat both inside and outside in the areas shown.**

**Fig. 2**

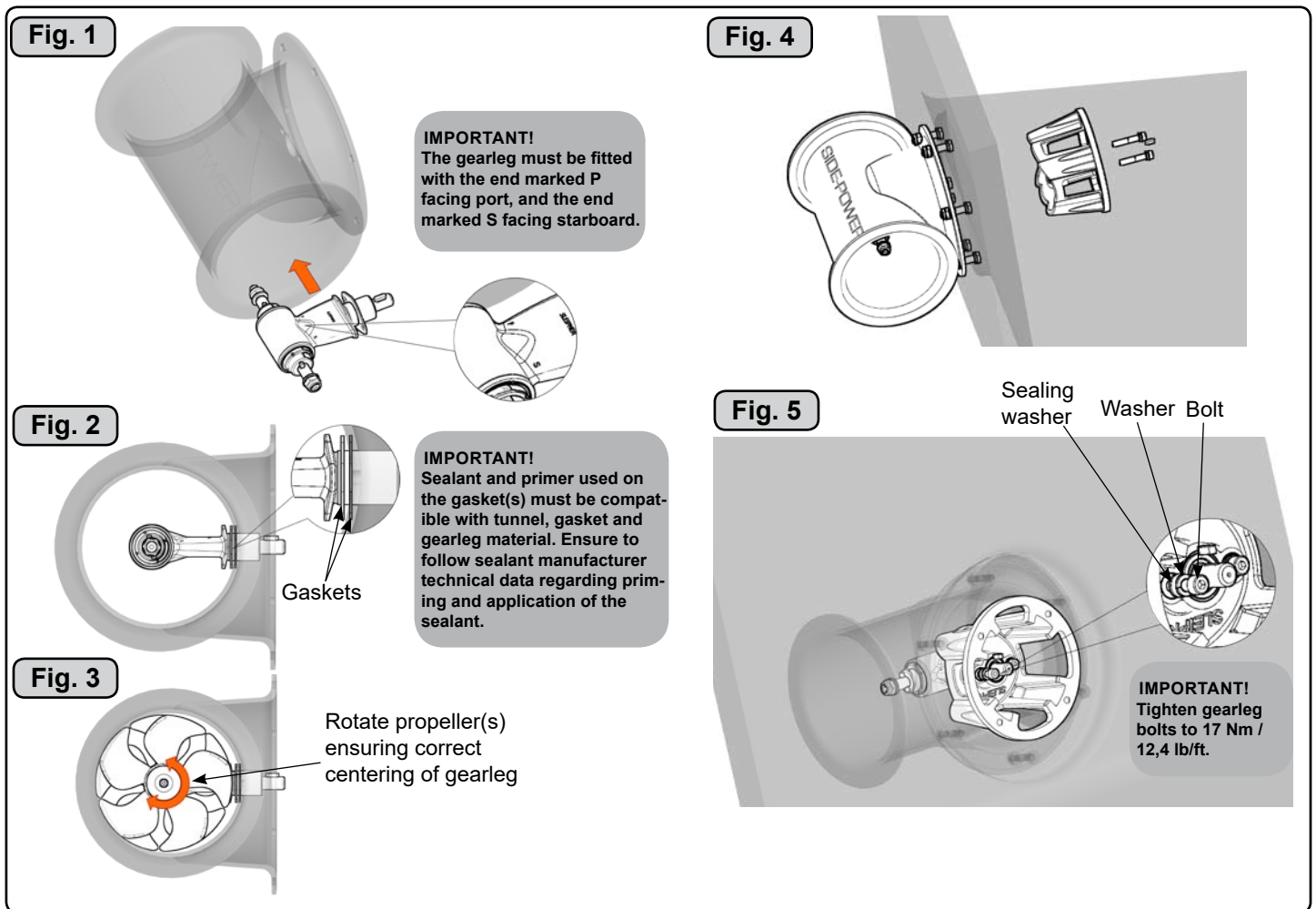
**Bond multiple layers both inside and outside**



### Stern thruster - Mould in installation of the stern tunnel

1. Make sure that there are enough space both inside and outside the transom of the boat.
2. Cut of the bolting flange on the stern-tunnel
3. Grind off the gelcoat both inside and outside the remaining "tube" atleast 10 cm down on the "tube" (Fig. 1).
4. Offer the stern tunnel to the desired position on the transom and mark around the tube.
5. Cut the marked hole in the transom of the boat.
6. Grind off the gelcoat on the transom of the boat in an area of atleast 10 cm / 4" around the hole, both outside and inside (Fig. 1).
7. Offer the stern tunnel to the transom in the desired horizontal position, then bond to the transom with multi layers matt both inside and outside (Fig. 2).  
Take care not to reduce the internal diameter much, as this will make it more difficult to mount the thruster
8. Apply gelcoat or similar on all bonded areas.
9. Install the gear leg on the stern-tunnel as described in the installation manual for the thruster but fit the oil feed pipe first.
10. Basic installation of the motor assembly and electrical installation are described later in this manual.

If a bow thruster is also installed, we advice to use seperate battery banks for the two thrusters to avoid extreme voltage drop if both thrusters were to be used at the same time. Refer to the thruster manuals for adviced battery capacity and cable sizes for each thruster. Also ensure that you do not have direct connections of both + and - if you have built together controls for both thrusters to avoid current leakage between seperate battery banks. If you are installing the standard Sidepower dual joystick panel this is already secured.

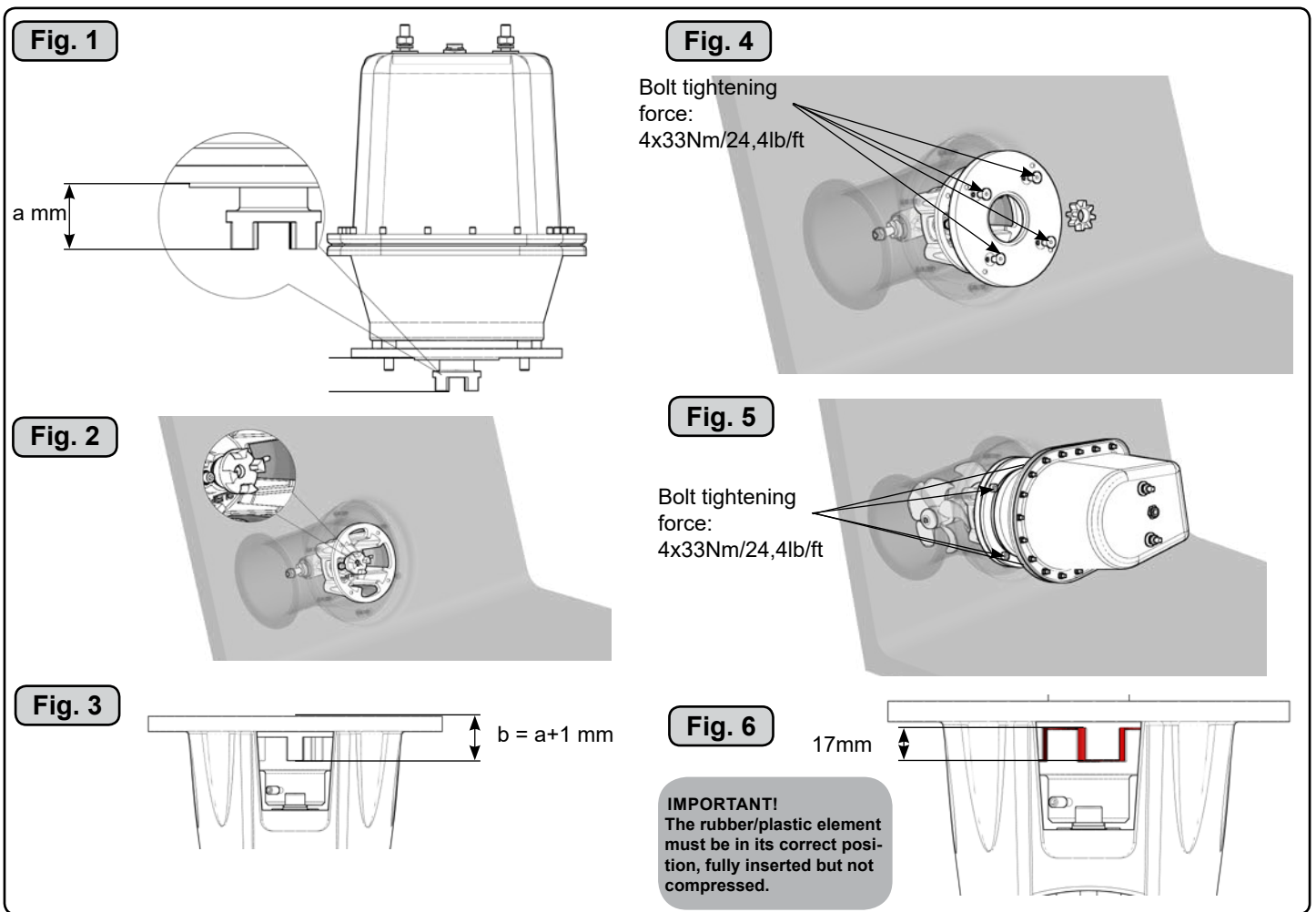


### Stern thruster - Fitting gearhouse and motor bracket

1. Install the gearleg-unit in the tunnel (without the propeller(s) using the 1mm gasket inside the tunnel. Try on the propeller to ensure it is in the center of the tunnel and turns freely with the same clearance from each blade to the tunnel. If propeller(s) is off center, try to use the other or both gaskets. If tunnel surface is not smooth, use suited sealant to ensure that no leakages occur. **Fig 1/3.**

**NOTE!** The gearleg must be fitted with the end marked P facing port and the end marked S facing starboard (Fig. 3) for the thrust direction to correspond with the control panel. **Fig. 1.**

2. Apply a thin layer of sealant on both sides of the gasket(s) and place carefully on the gearhouse, ensure no sealant gets into the bolt holes on the gearhouse. **Fig. 2.**
3. Insert the gearhouse through the main hole in the tunnel and assemble the gearhouse and motor-bracket gently together. **Fig. 4.**
4. Fit the enclosed sealing washers to the bolts and screw the lower unit and the motor bracket together with the two provided bolts. Tighten with 17 Nm / 12,4 lb/ft. **Fig. 5.**



## Stern thruster - Fitting the electromotor IP assembly

### SE100/185T-IP installation

1. Remove the 4 bolts in the motorbracket, and unscrew the adaptor plate fitted to the motor bracket (if needed).
2. Measure the height of the upper flexible coupling unit sitting on the motor shaft according to **Fig.1**.
3. Calculate and position the lower part of the flexible coupling in correct height according to **Fig. 2/3**, and tighten the set screw (Apply blue Loctite). (3mm Allen Key). Ensure that key on axle and keyway in flexible coupling are aligned.

#### Example:

**a height = 24,54mm.**

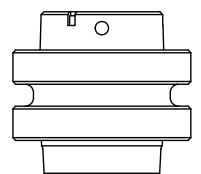
**b height = 24,54mm + 1mm = 25,54mm.** Correct positioning of the lower flexible coupling unit should be 25,54 mm measured from top surface of motor bracket to bottom inner surface of lower flexible coupling. The extra 1mm is added to eliminate the risk for compression of the rubber element/flexible.

4. Re-fit the adapter plate to the motor bracket and tighten the 4 bolts to **33Nm/24,4 lb/ft.** Place the rubber/plastic element correctly into the lower flexible coupling unit. **Fig.4.**
5. Fit the motor gently to the adaptor plate and tighten the **4 bolts to 33Nm/24,4 lb/ft. Fig.5.**
6. Ensure that the rubber/plastic element is in correct position, fully inserted but not compressed. It should be a 17 mm clearance between inner surfaces of upper and lower flexible couplings.

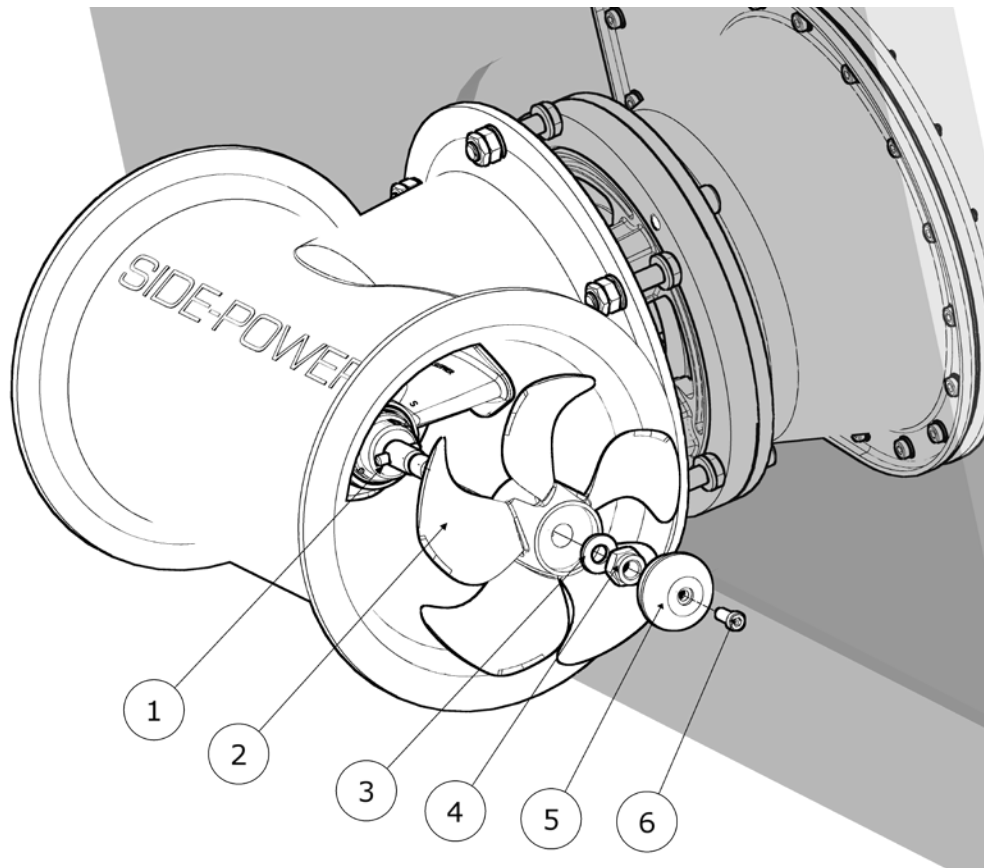
### SE80/185T-IP installation

1. Remove the 4 bolts in the motor bracket.
2. Place the motor gently on the motor bracket.
3. Ensure that key on axle and keyway in one-piece coupling are aligned.
4. Fasten the motor to the bracket with the 4 bolts and tighten them. Bolt tightening force: 4x33Nm/12,4lb/ft.

#### SE80 Flexible coupling





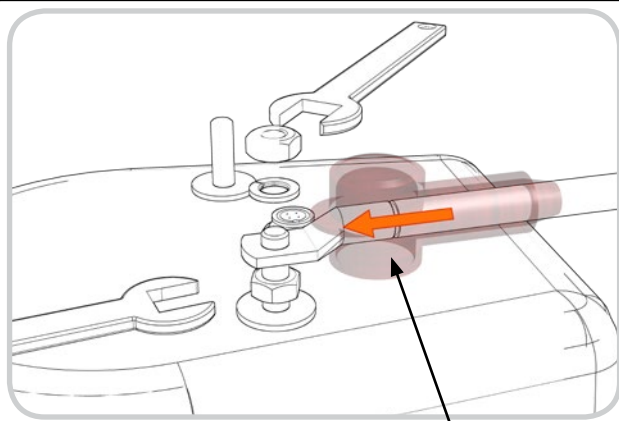


### Fitting propellers

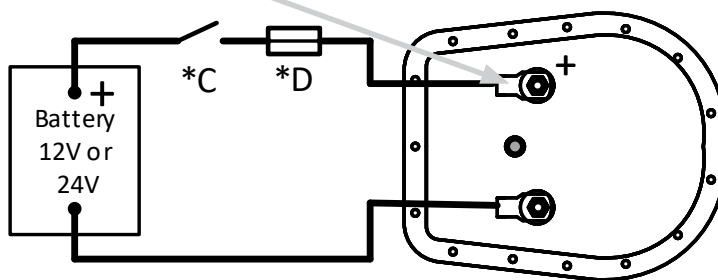
1. Turn the propeller shaft so the drive pin (1) is in a horizontal position and ensure that it is centred in the propellershaft.
2. Insert the propeller(s) (2) to the shaft with the track for the drivepin in an horizontal position (same direction the drive pin), to it's inner position. There should be almost no gap between the propeller hub and the gearhouse.
3. Place the washer (4) on the prop.shaft and then tighten the lock-nut (3) on the propeller shaft.
4. Place the anode (2) in its designated position and tighten the anode holding screw (1). Apply a thread glue (Loctite or similar) to ensure that the anode holding screw does not un-screw itself from the propellers rotation.

#### Parts description:

- 1 : Drive pin for propeller
- 2: Propeller
- 3: Washer
- 4 : Propeller lock nut
- 5 : Anode
- 6 : Screw for anode



**RED +  
Isolation cap**



**Thruster motor  
(IP model)**

Battery & cable recommendations:

Model	Voltage	Nominal current draw	Min. battery CCA	Rec. fuse		<7m total + & -		7-14m total + & -		15-21m total + & -		22-28m total + & -		28-35m total + & -		36-45m total + & -	
						Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.	Min.	Rec.
SE80/185T	12 V	530 A	DIN: 550 SAE: 1045	ANL 400	mm2 AWG	70 2/0	70 2/0	120 3/0	2x 70 2x 2/0	2x 70 2x 2/0	2x 95 2x 2/0	2x 95 2x 3/0	2x 120 2x 4/0	2x 120 2x 4/0	340*	NA	NA
	24 V	260 A	DIN: 300 SAE: 570	ANL 250	mm2 AWG	35 1	35 1	35 1	50 1/0	70 2/0	70 2/0	70 2/0	95 3/0	95 3/0	120 4/0	120 4/0	2x 95 2x 3/0
SE100/185T	12 V	740 A	DIN: 750 SAE: 1425	ANL 500	mm2 AWG	95 3/0	95 3/0	2x 70 2x 2/0	2x 95 2x 3/0	2x 95 2x 3/0	280*	250*	375*	NA	NA	NA	NA
	24 V	340 A	DIN: 400 SAE: 760	ANL 325	mm2 AWG	50 1	50 1/0	50 1/0	70 2/0	70 2/0	95 3/0	95 3/0	120 4/0	120 4/0	2x 95 2x 3/0	2x 95 2x 3/0	2x 120 2x 4/0

Minimum and recommended cable dimensions can be identical due to safety margins and cable heat considerations for short cable lengths.

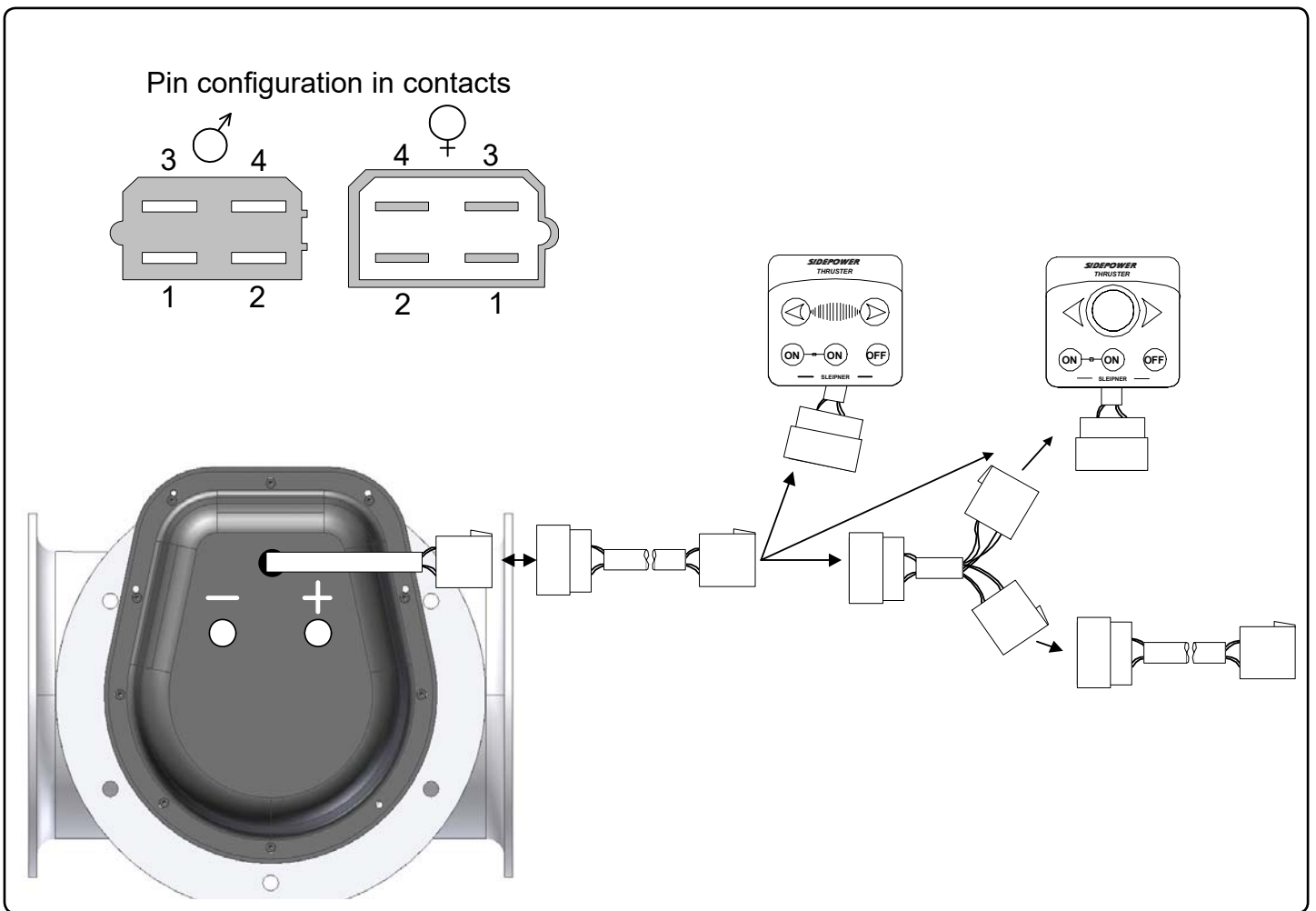
\* Minimum or recommended cable cross section in mm<sup>2</sup>

## Electrical installation

- Explanation of electrical table
  - All cable lengths are the total of + and - (to and from).
  - Battery size is stated as minimum cold crank capacity, not Ah.
  - Use slow fuse rated to hold stated Amp-Draw for min. 5 minutes.
  - \* Cable size and main battery size when an extra bow battery with minimum the CCA mentioned as A is installed.
- It is important that you use a good cable size and batteries with a high cranking capacity to feed the thruster, because it is the actual voltage at the motor while running the thruster that decides the output rpm of the motor and thereby the actual thrust. Please see the list below for advised min. sizes of cables and batteries. You can of course use larger cables for even better results.
- A main switch (\*C) that can take the load without noticeable voltage drop must be installed in the main positive lead so the power for the thruster can be turned off independently of the rest of the system when not on board or in emergencies. This should be placed in an easily accessible place and the boats instructions should include information that this should be turned off like the other main switches of the boat.
- We also advice to install a fuse (\*D) in the positive lead for protection against short circuiting of the main cables. This fuse should be of an adequate quality which normally means that it is physically large as these have less voltage drop than the simple / small ones. It should be of the slow type and sized to take the amperage draw for at least 5 minutes.
- Remember to use ignition protected fuses and switches if fitted in areas that require this feature.
- A circuit breaker can be used instead of the fuse and main power switch as long as the functionality is the same.
- The cable ends must be fitted with terminals and these must be well isolated against contact with anything but the proper connection point.
- If the main switch and fuse are installed in the same gas area they also have to be ignition protected.
- The negative / minus cable connects to the (-) terminal. Bolt M10. Tighten with 25 Nm / 18,43 lb/ft.
- The positive / plus cable connects to the "+" terminal. Bolt M10. Tighten with 25 Nm / 18,43 lb/ft.

**NB! Very important to check the following with main switch in off position:**

After all electrical connections have been completed check with an ohm meter that there is no electrical connection between electro motor flange and positive terminal on the motor and between the electro motor flange and the negative (A1) terminal on the motor. If you feel unsure on how to perform this check, contact skilled personnel for guidance.



## Control panel and control-leads

- 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 controlbox will stop the thruster until it only receives a signal to go in one direction.
- When using original Sidepower equipment it is all "plug & go".
- If the drive direction of the thruster is the opposite of what expected, the blue and grey wire must be changed on each panel.
- The mechanical installation of the panel is described in the manual following the panel.
- The IP thruster is gas proof based on the control panel lead ending outside of the area that requires ignition protection. The prefitted control lead must be fitted in the boat so there is no risk of damage to the insulation, causing explosive gas penetration.
- The thruster control should be placed in a position where it is easy to use, and it is very common to use the thruster at the same time as your gear / throttle lever so it is normally a user friendly solution to be able to access these with one hand for each control.

### Pin configuration of 4 pole AMP contact:

Pin1: BLACK = Ground

Pin2: BLUE = Engages thruster SB solenoid

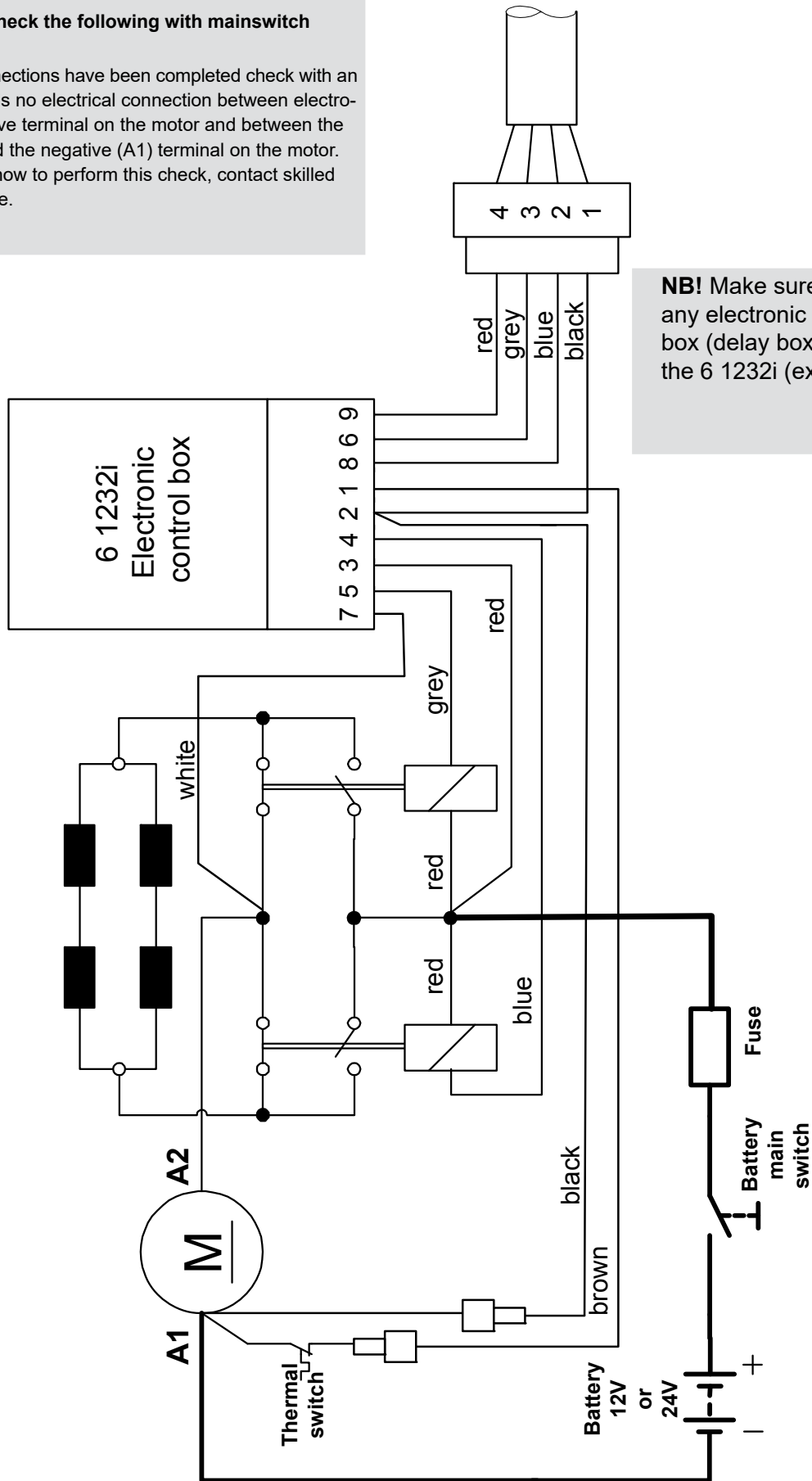
Pin3: GREY = Engages thruster Port solenoid

Pin4: RED = Positive voltage for control panel

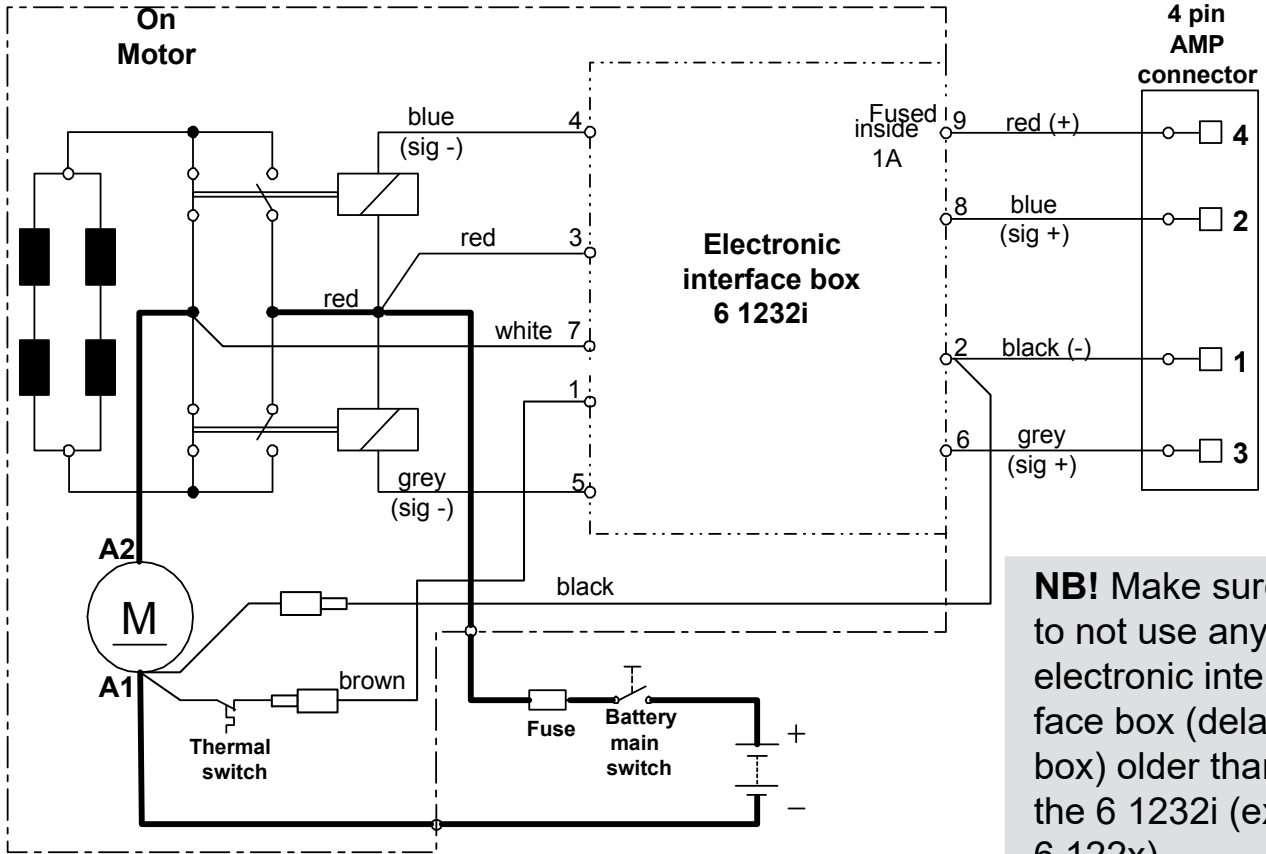
## Wiring diagram

**NB! Very important to check the following with mainswitch in off position:**

After all electrical connections have been completed check with an ohm meter that there is no electrical connection between electromotor body and positive terminal on the motor and between the electromotor body and the negative (A1) terminal on the motor. If you feel unsure on how to perform this check, contact skilled personnel for guidance.



**NB!** Make sure to not use any electronic interface box (delay box) older than the 6 1232i (ex. 6 122x)

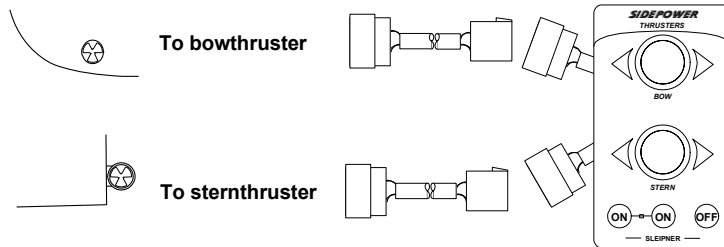


**NB!** Make sure to not use any electronic interface box (delay box) older than the 6 1232i (ex. 6 122x)

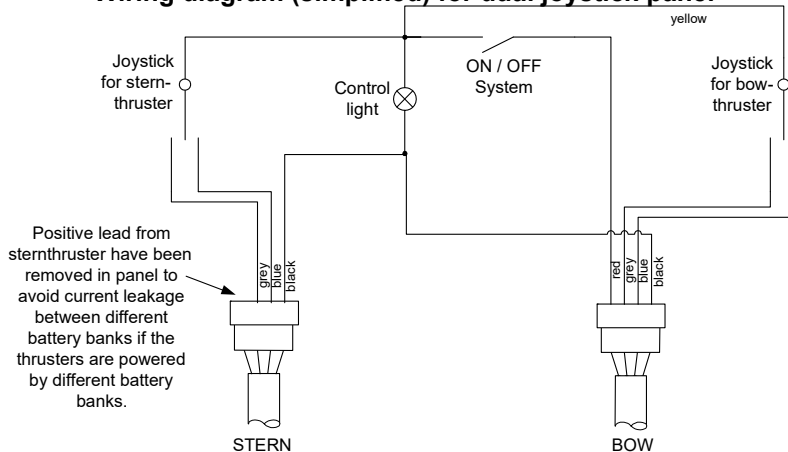
**Electrical installation of stern thruster systems**

- We advice to use different battery banks for each thruster to ensure maximum performance when both are used at the same time.
- When using the original Sidepower control cables just connect them to the corresponding joystick
- There are no plus/positive power connected from the bowthruster

**Visual connection diagram for dual joystick panel**



**Wiring diagram (simplified) for dual joystick panel**



## Checklist

- Propeller is fastened correctly to the shaft.
- Propeller turns freely in tunnel.
- The anode holding screw is tightened well with thread glue.
- There is a sturdy additional support under the electric motor, taking the weight load of the electromotor assembly away from the stern tunnel.
- All electrical wiring, cable sizes and battery capacity is according to the thruster installation manual.
- All bolts are securely tightened and sealant are applied as instructed.
- Anti-fouling have been applied to the gearhouse and propeller but NOT on the anode or the gearhouse lid where the propeller is fastened.
- Correct drive direction as per controlpanel.
- All electrical connections are clean, dry and tight, and the correct cable, fuse and main switch sizes have been used.
- The bolts holding the gearhouse and motorbracket together are tightened correctly.

**Very important for IP protection:**

- The main power cables have securely been connected as described.
- The control lead ends out of the explosive area and has been properly fitted and secured against damage.

*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: ..... Voltage: .....

Serial number: .....

Date of delivery: .....

Correct drive direction as per controlpanel: .....

Voltage at thruster when running: .....

Battery cable size used: .....

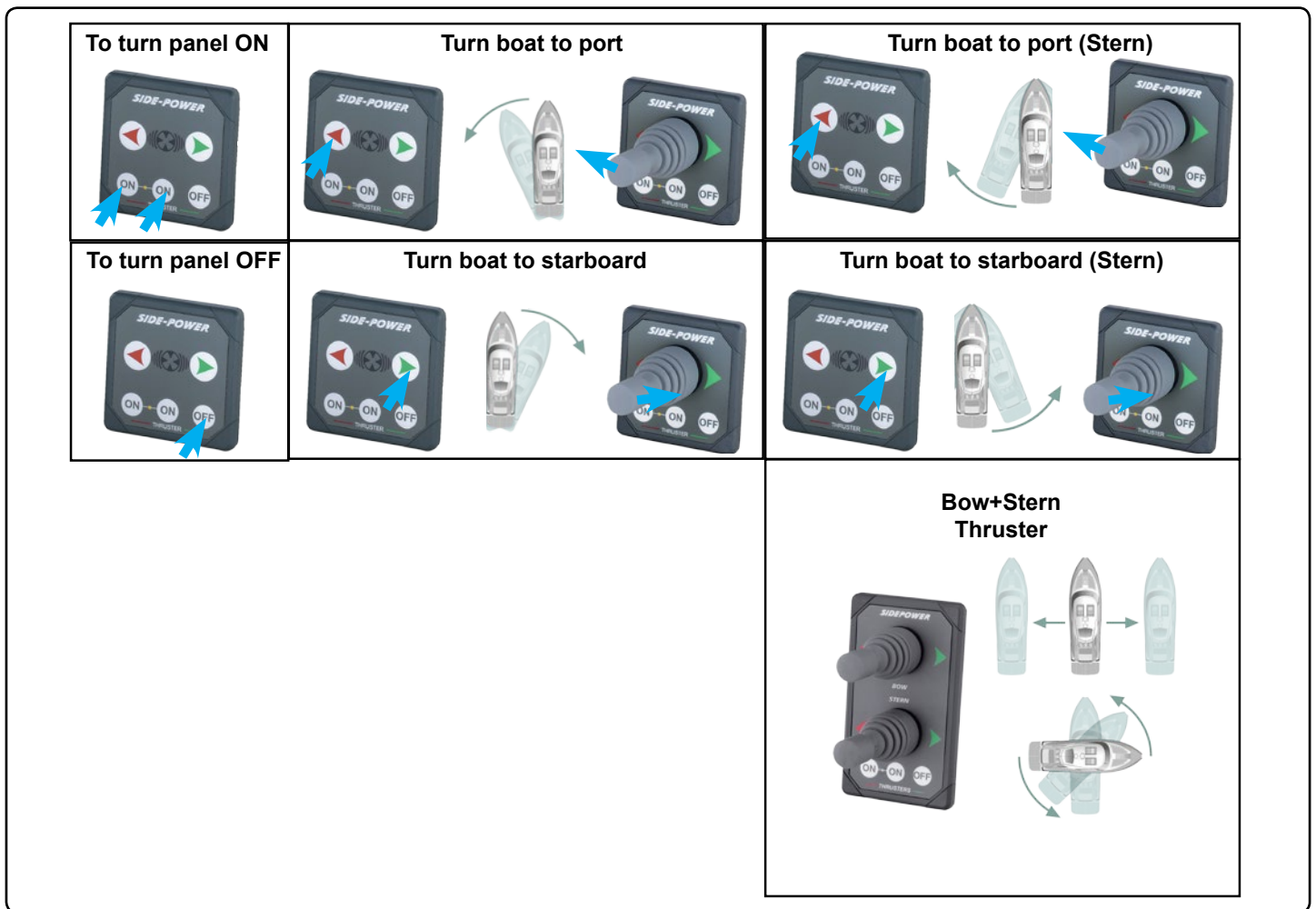
Other comments by installer:

## Important user precautions

- Ensure that you know the location of the main battery switch that disconnects the thruster from all power sources (batteries) so that the thruster can be turned off in case of a malfunction.
- Always turn the main power switch off before touching any part of the thruster, as an incidental start while touching moving parts can cause serious injuries.
- Always turn the control device off when the thruster is not in use.
- The maximum continuous usage time of the electrical thruster is approximately 3 minutes. The electromotor has a built in thermal cut-off switch that will shut off the electromotor if it is overheating and re-engage it when it has cooled down some. This should be considered when planning your maneuvering.
- This also means that the thruster will limit its total running time per time period so that you can not count on the thruster to hold you in a current and side wind for extensive time periods. Depending on the surrounding temperatures etc. the thruster will be able to run approximately 10 % of the time.
- Never use a thruster close to somebody in the water, as the thruster will draw objects close by into the tunnel and contact with the rotating propellers will cause serious injuries.
- With the boat on land, only run the thruster for a fraction of a second, as without resistance it will accelerate very fast to a damaging rpm. Also, while the thruster is in air, make sure that the propellers have come to a complete stop before performing a directions change of the thruster, as it might cause damage to the thruster.
- If the thruster stops giving thrust while the electromotor is running, chances are that there is a problem in the drive-system. You must then immediately stop trying to run it, and turn it off, as running the electromotor for more than a few seconds without resistance from the propeller, can cause serious damage to the electromotor.
- When leaving the boat always turn off the main power switch for the thruster.
- We advice to always keep the main engine(s) running while using a thruster. This will keep the batteries in a good charge condition. This will also give better performance to the thruster, as a higher voltage at the thruster results in a higher torque (power) in the electromotor.
- Please note that the performance of a thruster strongly depends on the voltage available at the electromotor. This voltage will decrease by time because aging batteries have a reduction of capacity. By installing new batteries the effect of the thruster should be back at the original level.
- Make sure that only one control is used at the same time, if two panels are operated in opposite directions at the same time the thruster will not run at all. If they are operated in the same direction the thruster will run in this direction.
- If the thruster is not performing or functioning as usual, the cause for this must be found and corrected as soon as possible so to avoid causing any other or further damage to the equipment. You must also turn off the main battery switch immediately in case the problem is of electric origin.
- Never store anything (e.g. equipment, sails, ropes etc.) in the same compartment as the thruster. When the thruster runs for a longer period it will get hot and will cause damage.
- 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.

### **WARNING!**

- 🔊 **Tampering with the Ignition Protected stern thruster assembly or any attempt to disassemble anything on this thruster assembly inside the boat can cause an explosion with very serious consequences.**
- 🔊 **If there is a problem with your Ignition Protected stern thruster, please contact your dealer.**
- 🔊 **Danger: NEVER Disassemble any part of the Ignition Protected stern thruster assembly**



## EN How to use Side-Power thrusters

### How to use a bowthruster

1. Turn main power switch for the bowthruster on. (Always turn off the main power switch when not onboard.)
2. Please take some time to exercise thruster usage in open water to avoid damages to your boat.
3. Turn the control panel on by pushing both "ON" buttons on the original Sidepower panel simultaneously. If another type of control is installed, engage the On/Off switch for the bowthruster.
4. Turn the bow in the desired direction by pushing the red button for port movement or the green button for starboard movement. If you have a joystick control, move it in the direction you wish the bow to move. Other controls like footswitches or toggle-switches on the throttle can be used. These are normally logically installed, so by engaging the port control, the bow goes port etc. In case of any doubts, try in open waters first.
5. Depending on the sideways speed of the bow, you must disengage the control device shortly before the bow is in the desired direction, as the boat will continue to move after stopping the bowthruster.

### How to use a single stern thruster

Some boats might however have installed a single stern thruster because of space limitation in the bow. In this case the stern thruster is used in the same way as a single bow thruster (see above) for moving the boat's stern.

### How to use a bow and stern thruster combined

The combination of a bow and stern thruster offers total manoeuvrability to the boat and the opportunity to move the bow and the stern separately from each other. This enables you to move the boat sideways in both directions and to turn the boat around its own axis staying at the same place.

- Again, if in doubt, try in open water first!

## N Hvordan bruke Side-Power thruster

### Hvordan bruke en baugthruster

1. Skru på hovedstrømmen (skru alltid av hovedstrømmen når du ikke er om bord i båten).
2. Det er fordel om de prøver baugthrusteren på åpent vann den første gangen.
3. Skru på kontrollpanelet ved å trykke inn begge "on" knappene på Sidepower panelet. Hvis annet en originalt panel brukes må dette skrues på.
4. Snu baugen i ønsket retning ved å trykke rød knapp for babord, og grønn knapp for styrbord. Hvis du har joystickpanel så må stikka dyttes i den retning baugen skal vendes. Andre kontrollenheter som fotbrytere, eller brytere på gass hendel kan også brukes. Disse er vanligvis logisk installert og lette og operere. Ved tvil lønner det seg og prøve på åpent vann først.
5. Avhengig av hvor stor fart baugen får sideveis må thrusteren stoppes før baugen er i riktig posisjon, dette fordi baugen vil fortsette sideveis litt etter thrusteren skruses av.

### Hvordan bruke en enkel hekkthruster

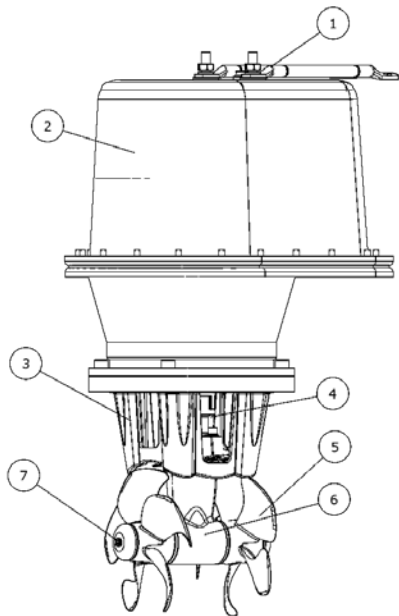
Enkelte båter vil av plassmessige, eller andre hensyn bare installere en hekkthruster. I disse tilfeller brukes hekkthrusteren på samme måte som baugthrusteren.

### Hvordan bruke hekk og baugthruster kombinert

Kombinasjonen av baug og hekkthruster gir en total kontroll over båtens bevegelser p.g.a. muligheten til å bevege hakken og baugen uavhengig av hverandre. Båten kan skyves sidelengs og dreies rundt sin egen akse.

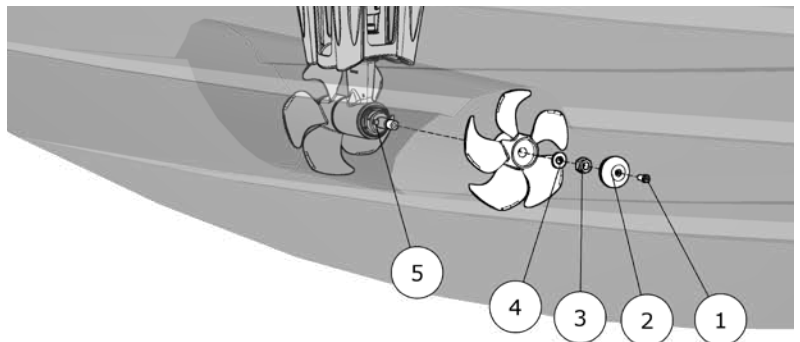
- Det er også her fordel å prøve ut systemet på åpent vann.





- ❶ Power & control cables
- ❷ Ignition protected casing
- ❸ Motorbracket for holding motor and gearhouse together on the tunnel.
- ❹ Flexible coupling secures the electromotor if propeller is jammed. Changeable from inside the boat.
- ❺ 5-blade skew Q-PROP propeller for ultimate performance.
- ❻ Prefilled & sealed gearleg.
- ❼ Changeable anode protects gearhouse from corrosion in seawater.

- ❶ Fastening screw for anode
- ❷ Anode
- ❸ Propeller lock nut
- ❹ Washer
- ❺ Drivepin for propeller



**NOTE! Apply Locktite on screw for anode**

## Maintenance

- » Keep the propeller and gearhouse clean from growth by painting with antifouling before every season.  
**PS! The anode, sealing and propeller shafts must absolutely not be painted. Be careful that you don't fill paint in the "tracks" in the gearhouse that the propeller hub moves in.**
- » Change the anode before every season, or when about 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 water conditions 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.
- » As a part of the seasonal service of your boat, and before every season, always check that:
  - The propeller is securely fastened
  - The bolts holding the electric motor to the motor bracket are fastened correctly.
  - The area where the thruster is installed is clean and dry. If there are signs of water you must try to find the source and eliminate it.
  - All electrical connections are clean and fastened firmly.
  - Make sure that your batteries are in a good condition so that the thruster gets a good voltage. Old or bad batteries will give a reduced performance from the thruster.

### Warning:

- ⚠ Tampering with the Ignition Protected stern thruster assembly or any attempt to disassemble anything on this thruster assembly inside the boat can cause an explosion with very serious consequences.
- ⚠ If there is a problem with your Ignition Protected stern thruster, please contact your dealer.
- ⚠ **Danger: NEVER disassemble any part of the Ignition Protected stern thruster assembly**

## Trouble shooting

Before seeking assistance at the help desk of your Sidepower dealer / distributor please perform these tests and make notes of all measurements to ensure that they have as much information as possible to work on.

**NB! All check points and solutions must be carried out after consulting the relevant information elsewhere in this manual to understand how the system is intended to work. If you are unable to understand what to check, you must consult a professional.**

### Check

### Solution

» **The electromotor runs, but there is no thrust.**

If the flexible coupling between the motor and driveshaft is not fitted correct inside the boat

Check the flexible coupling and the motor installation to ensure correct connection of the flexible coupling before re-fitting the electromotor

Are the propellers in the tunnel fastened correctly on the prop-shaft (key present)

Re-fasten or replace the propeller and/or key.

With the motor removed, turn the driveshaft from inside the boat to feel if the gears are engaging and turning the prop-shaft.

In case of a failure inside the gearhouse, we advice to get a replacement gearhouse instead of attempting to repair the internal gear and bearing system.

» **The thruster does not start at all or works only in one direction.**

Check that the voltage of the electromotor are correct for your installation by their labels.

If wrong, contact your dealer or distributor to obtain parts with the correct voltage.

Check the voltage at the thruster between main minus input (A1 on motor) and main plus input point:

The no load voltage should be:  
12V system = 12,7V / 24V system = 25,4 V. If below 12,3V / 24,6V your batteries are not in a good charge state or worn out and must be recharged or replaced before trying to run the thruster.

Check the voltage at the thruster while you are trying to run it. Keep main engine(s) running to have continous charge to the batteries.

If less than 8,5V at the thruster the voltage is to low for the thruster to operate correctly. In a 24V boat the thruster will operate down to approx. 12V, but the performance will be very bad. Find and correct the reason for this low voltage which will probably be one or more of these points: main battery cable sizes and connections, battery size and condition, fuse and main power switch performance.

If the main solenoids on the thruster are not even trying to engage (clicking) they are probably not getting a "run" signal from the control system. Try to run the thruster without the panel by directly connecting the red and the blue or the red and the grey wires in the controlcable contact coming from the thruster.

If the thruster runs in both directions, try the same in the connector that goes into the back of the control panel. If it also works in this position, check the contact and wires on the back of the panel and try to engage this again by pushing both ON buttons simultaneously. If the panel does not turn on (see control light), measure the voltage between the Red and the Black in the contact going into the thruster. If the voltage is good, chances are that the panel is not working.

If it works by the thruster, and not by the panel there is a bad contact or a broken lead the controlcables between these two test points. Measure that you have the correct voltage between the Red (+) and all the other colours in the contact. If you do not get a reading.

If the thruster does not run at all, or only in one direction in the above tests, check the internal wiring on the thruster motor, solenoids and electronic motor interface box to be in accordance with the wiring diagram and ensure that all connections are clean and tight.

Between main minus (A1 on motor) and the blue and the grey wire connected to the sides of the main solenoids you should have the same voltage as between the main battery cables on the thruster.

If not, check that the internal wiring on the solenoid is ok and measure that there is contact through the magnetising spools of each side of the solenoid (measure between the red and blue on one side, and red and grey on the other side with an Ohm meter.). If there are no contact between these, the solenoid is broken and needs replacing.

» **The thruster has an unexpected low performance.**

Check voltage at thruster when running

If less than 10,5 V / 21V the thruster will not perform at specified effect.

Check that all the brush-springs sits correctly on the brushes in the electromotor.

If one or more brushes are loose/has no tension from the brush-spring, the performance will be low.

Check that the propeller, gearhouse and tunnel is free from growth / barnacles etc.

If there are growth in the tunnel, this will disturb / block the waterflow and especially barnacles on the propeller will greatly reduce performance.

» **The thruster runs for approximately 0,5 seconds every 4 seconds.**

Solenoid flapping, most probable cause: low voltage.

Re-charge battery(ies), if this is not sufficient, replace battery(ies). Check for bad cable connections, if necessary tighten/re-adjust connections. Check cable size in accordance to manual.

» **The thruster runs for approximately 0,5 seconds every 10 seconds.**

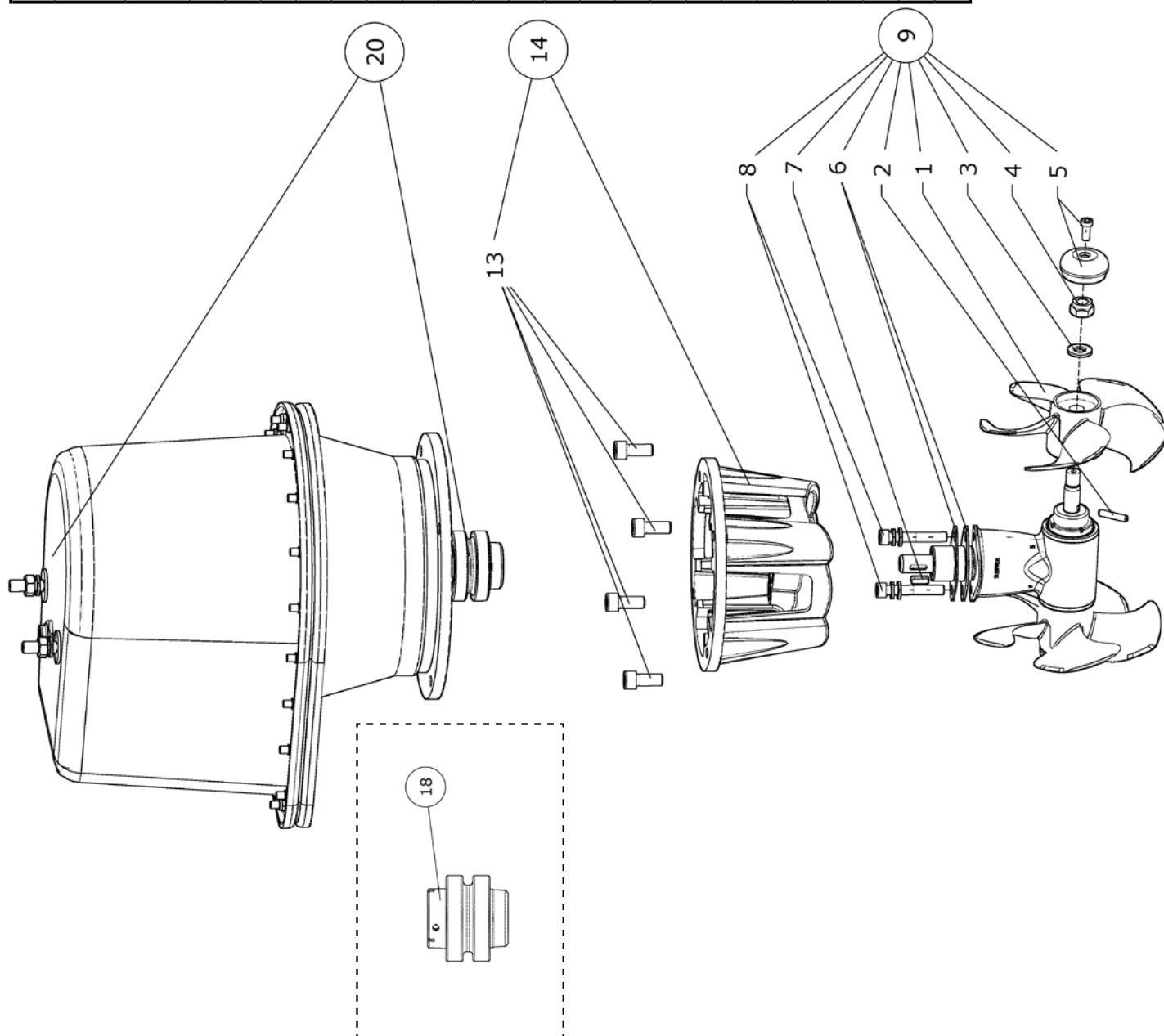
Solenoid lock-in, auto stop of thruster, auto retry every 10 seconds.

Shut off thruster main switch, tap slightly on the solenoid to see if it will release. Turn on thruster main switch. If solenoid is still in lock-in mode, replace solenoid.

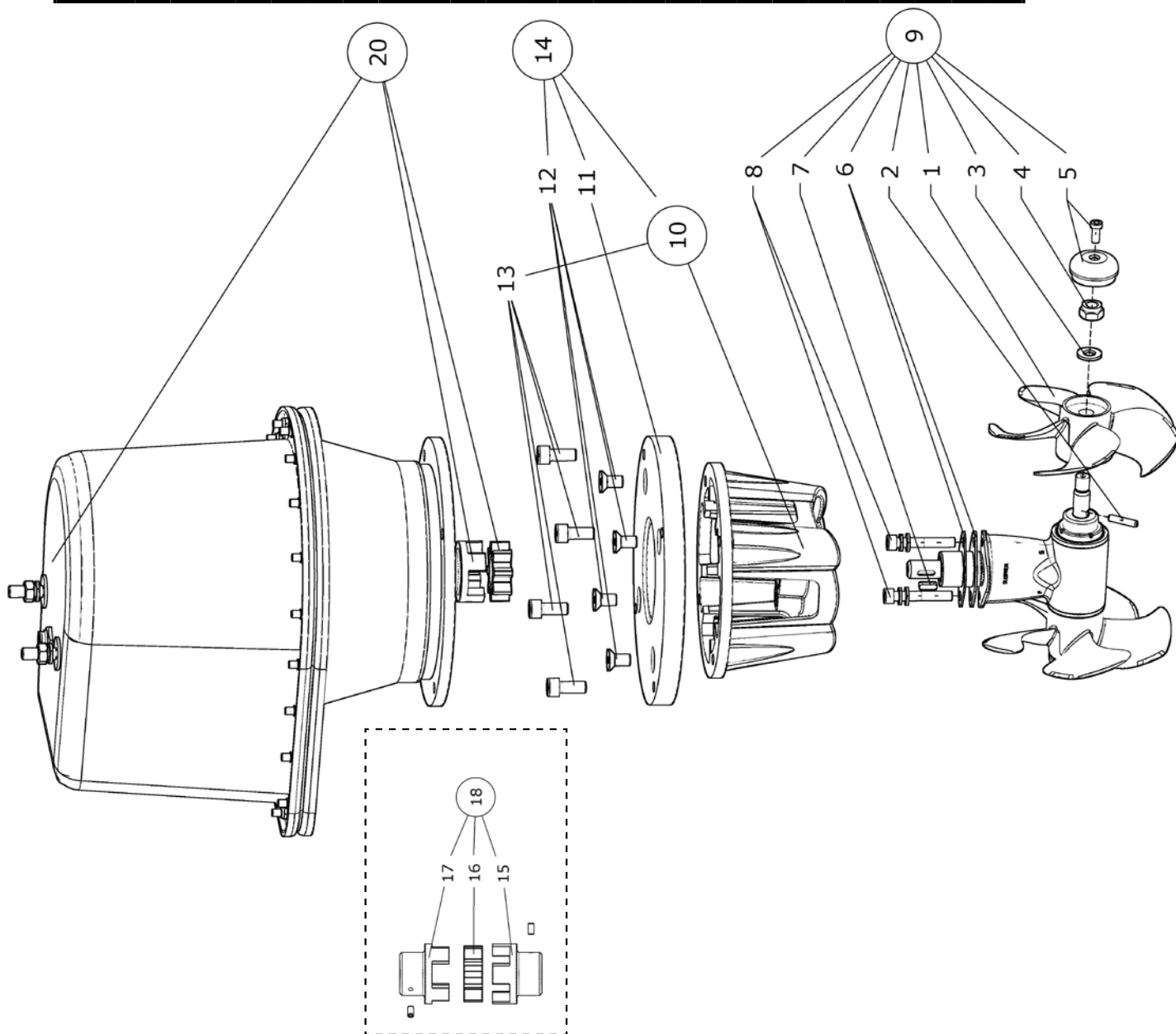
## Warranty statement

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) or 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 transferable 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, address 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.

Pos. #	Description	SE80 IP	
		07/10<	
		12V	24V
20	Complete electric motor assembly	6 0108	6 0108
19	Key for electric motor shaft	12	24
18	Complete flexible coupling	10 1440	
17	Coupling, motor unit	7 1462	
16	Rubber element	N/A	
15	Coupling, gearleg unit	N/A	
14	Complete motor bracket	8 0501	
13	Bolt, motor to flange	10 1360	
12	Bolt, flange to bracket	N/A	
11	Adapter flange	N/A	
10	Motor bracket	N/A	
9	Complete gearleg	8 0601	
8	Gearleg bolt	7 1080	
7	Driveshaft key	6 1440	
6	Gasket	8 0610	
5	Anode	7 1190 A	
4	Locknut	4 1260	
3	Propeller washer	7 1181	
2	Propeller drivepin	6 1241	
1	Propeller	7 1261	



Pos. #	Description	SE100 IP	
		07/10<	
		12V	24V
	<b>Complete electric motor assembly</b>	<b>8 0114</b>	<b>8 0114</b>
<b>20</b>		<b>12</b>	<b>24</b>
<b>19</b>	Key for electric motor shaft	10 1440	
<b>18</b>	<b>Complete flexible coupling</b>	N/A	
<b>17</b>	Coupling, motor unit	7 1457	
<b>16</b>	Rubber element	7 1458	
<b>15</b>	Coupling, gearleg unit	7 1456	
<b>14</b>	<b>Complete motor bracket</b>	N/A	
<b>13</b>	Bolt, motor to flange	10 1360	
<b>12</b>	Bolt, flange to bracket	11031	
<b>11</b>	Adapter flange	921302	
<b>10</b>	Motor bracket	8 0501	
<b>9</b>	<b>Complete gearleg</b>	<b>8 0601</b>	
<b>8</b>	Gearleg bolt	7 1080	
<b>7</b>	Driveshaft key	6 1440	
<b>6</b>	Gasket	8 0610	
<b>5</b>	Anode	7 1190 A	
<b>4</b>	Locknut	4 1260	
<b>3</b>	Propeller washer	7 1181	
<b>2</b>	Propeller drivepin	6 1241	
<b>1</b>	Propeller	7 1261	







# Worldwide sales and service



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