

**SIDE-POWER**  
Thruster Systems

**SE 40/125S2 IP**  
**Ignition Protected**  
**thruster assembly**



Keep this  
manual onboard !

## Installation and user manual



**SLEIPNER MOTOR AS**

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### DECLARATION OF CONFORMITY

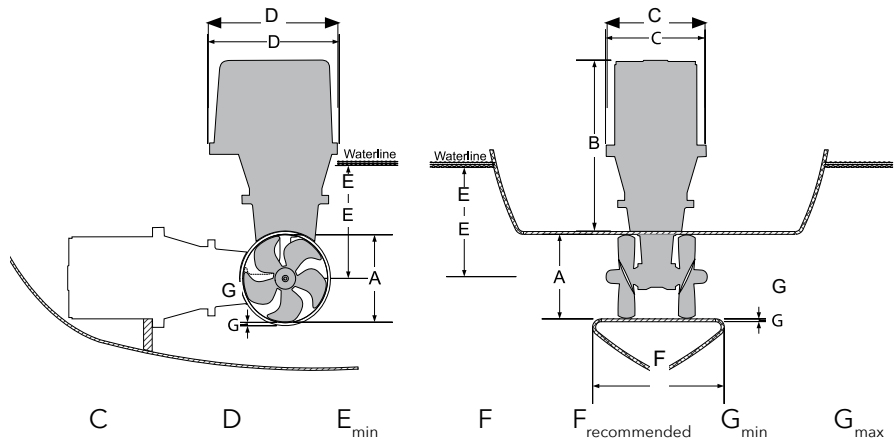


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Declare that this product with accompanying standard control systems complies with the essential health and safety requirements according to:

DIRECTIVE 2013/53/EU  
DIRECTIVE 2014/30/EU  
DIRECTIVE 2014/35/EU

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



**Bow Thruster**

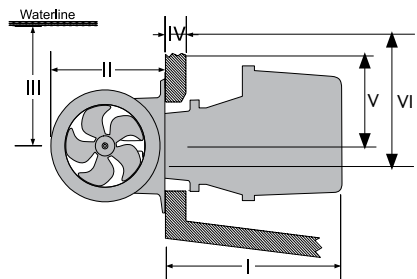
(mm • in)

	A	B	C	D	E <sub>min</sub>	F	F <sub>recommended</sub>	G <sub>min</sub>	G <sub>max</sub>
SE40/125S2 IP	125 • 4.92	245 • 9.6	226 • 8.9	230 • 9.1	125 • 4.92	92 • 3.6	184 • 7.25	4 • 0.16	5 • 0.20

**Stern thruster**

(mm • in)

	I	II	III <sub>min</sub>	IV <sub>max</sub>	V	VI	Tunnel Length
SE40/125S2 IP	220 • 8.66	190 • 7.48	135 • 5.31	14 • 0.55	160 • 6.3	217 • 8.5	197 • 7.76



**Technical specifications**

**IP Series**

**SE 40/125S2-IP**

Thrust at 12V/24V* (kg • lbs)	48 • 105
Thrust at 10.5V/21V* (kg • lbs)	40 • 88
Typical boat size (ft • m)	26' - 34' • 8 - 10.5
Tunnel I.D. (mm • in)	125 • 4.92"
Propulsion system	Single
Power at 10.5V/21V* (kw • Hp)	2.2 • 3
For DC system (V)	12
Weight (kg • lbs)	10 • 22
Min. Batt. Cap (CCA** 12/24V)	300

Item Code 12V	SE40/125S2-IP
Item Code 24V	
Item Code 12V PRO	SEP40/125S2-12IP
Item Code 24V PRO	SEP40/125S2-24IP

- 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-back design "Q-prop" propeller, reinforced composite.
- Batteries:** Minimum recommended battery capacity (cold crank capacity by DIN standard)  
See table
- Max. use:** *S2 = 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 gear system if propeller gets jammed. If original Side-Power panel is used, the panel shuts off automatically 6-9 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.

## 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 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 zinc anodes, sealings or propellershafts.
- ⌚ Do not finish the inside of the tunnel with a layer of gelcoat / topcoat or similiar. 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 to avoid direction changes while the thruster is still running, as it might 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.**

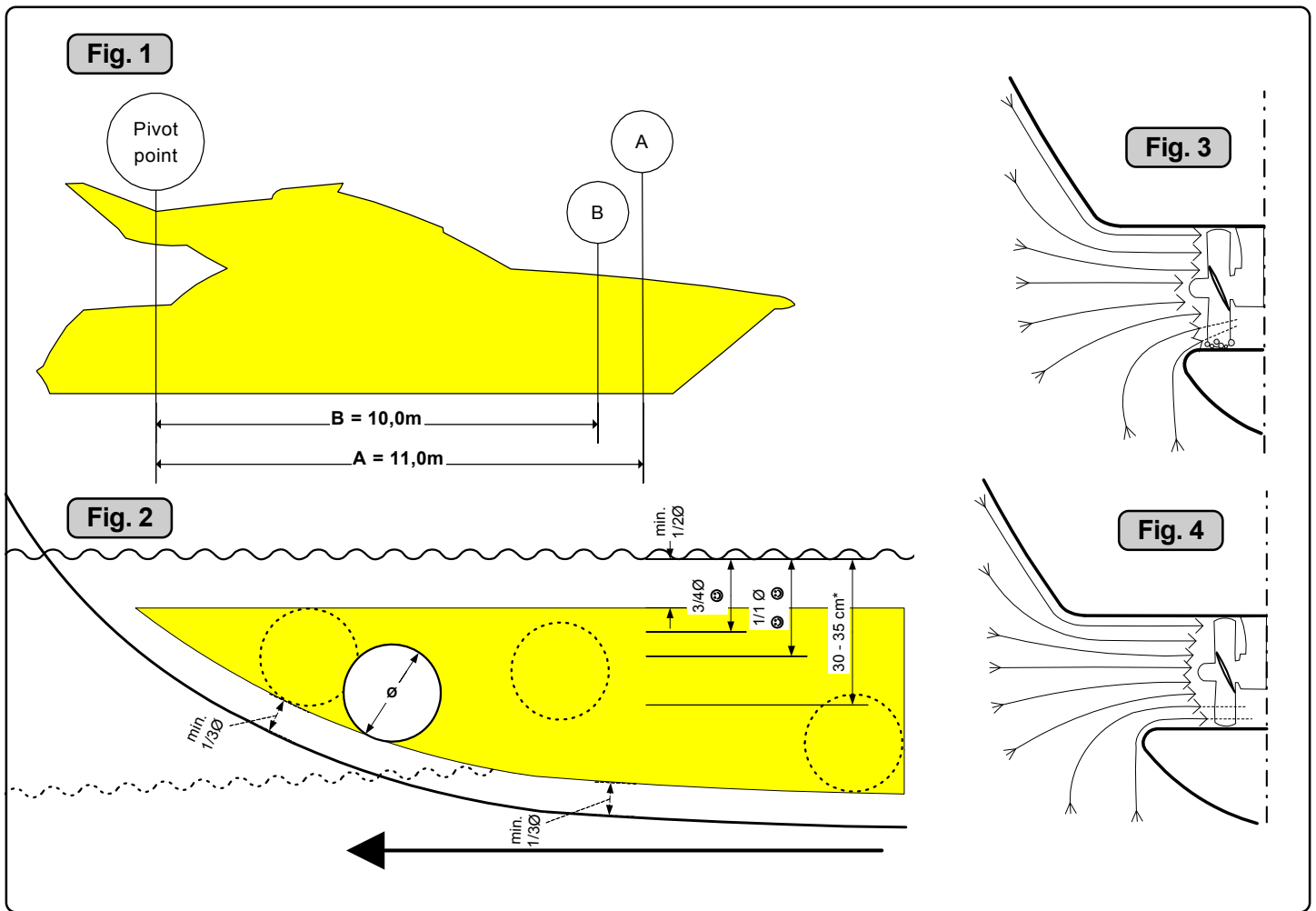
## Stern thruster installation considerations

To achieve maximum effect, reliability and durability from your Sidepower 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 existing equipment inside the boat like steerage links etc.
- ⌚ Make sure that the water flow from the thruster are not interfered too much 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: 100kg thrust x 11m leverage = 1100kgm torque to rot. the boat  
 B: 100kg thrust x 10m leverage = 1000kgm torque to rot. 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. Thrust will be reduced dramatically due.  
 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 to 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.

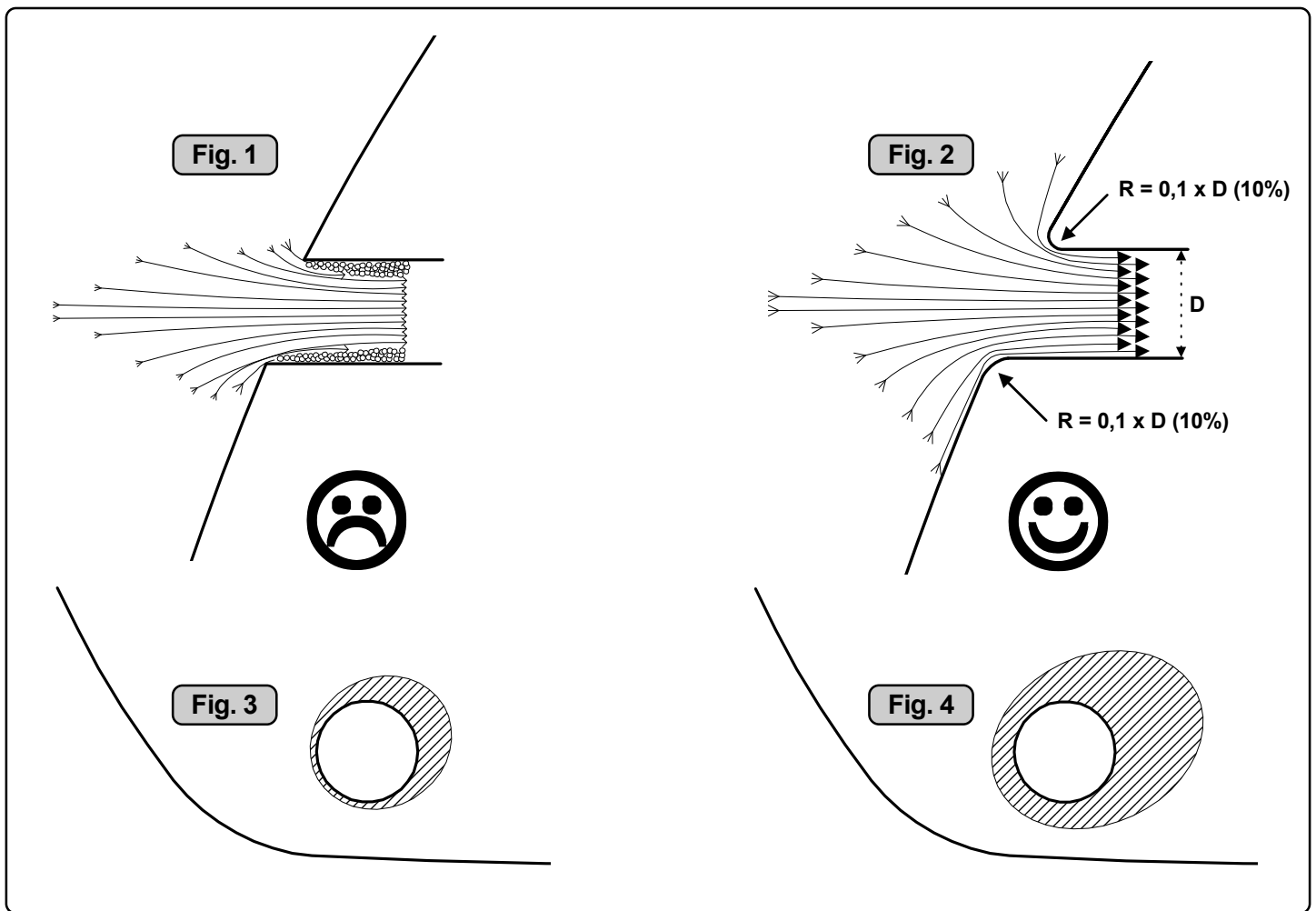
**NO Plassering av tunnel og thruster**

**Tunnelen bør plasseres lengst mulig frem i baugen (Fig. 1)**  
 For å oppnå mest mulig moment rundt båten dreiepunkt, er det meget viktig å plassere tunnelen så langt fremme som mulig. Avstanden fra båten dreiepunkt til thruster vil ha stor betydning på thrusterens effekt.

*Eks.:*  
 A: 55kg skyvekraft x 11m moment = 605kgm skyvekraft  
 B: 55kg skyvekraft x 10m moment = 550kgm skyvekraft  
 Posisjon A vil gi 10% mer skyvekraft til rotasjon.

**Tunnelen skal plasseres dypest mulig (Fig. 2)**  
 Tunnelen skal plasseres så dypt som mulig av to grunner:  
 1. Så luft ikke suges ned i tunnelen og ødelegger skyvekraften.  
 2. Ved å øke vanntrykket jobber propellen mer effektivt.  
 Hovedregelen er at tunnelen skal plasseres minimum 1/2 x tunnelen dia. under vannlinje. Anbefalt dybde er minst 3/4 x dia. under vannlinje (☺). Når tunnelen er plassert 33-35 cm under vannlinjen bør andre faktorer vurderes som viktigere, d.v.s. å plassere tunnelen lengre frem.

**Optimal tunnel lengde**  
 Dersom tunnelen blir for lang vil friksjonen i tunnelen redusere vannhastigheten og derved effekten.  
 Dersom tunnelen blir for kort (normalt bare i nedre del av tunnelen) kan det oppstå kavitasjons problemer da vannet ikke har tid / av-stand til å «rette opp strømningsretningen» før det treffer propellen (Fig. 3&4). Denne kavitasjonen vil redusere effekten og lage mye støy.  
 Den optimale tunnel lengden er 2 til 4 ganger tunnel diameteren og dersom tunnelen blir så mye som 6 til 7 ganger diameteren i lengde vil effekt tapet bli klart merkbart.



**EN Tunnel ends**

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

We recommend to round 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.

NB! 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.

NB! 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).

**NO Tunnelåpninger**

**Avrundede åpninger vil minke støy, og maksimere effekt.**

Vi anbefaler å avrunde tunnelåpningene mest mulig.

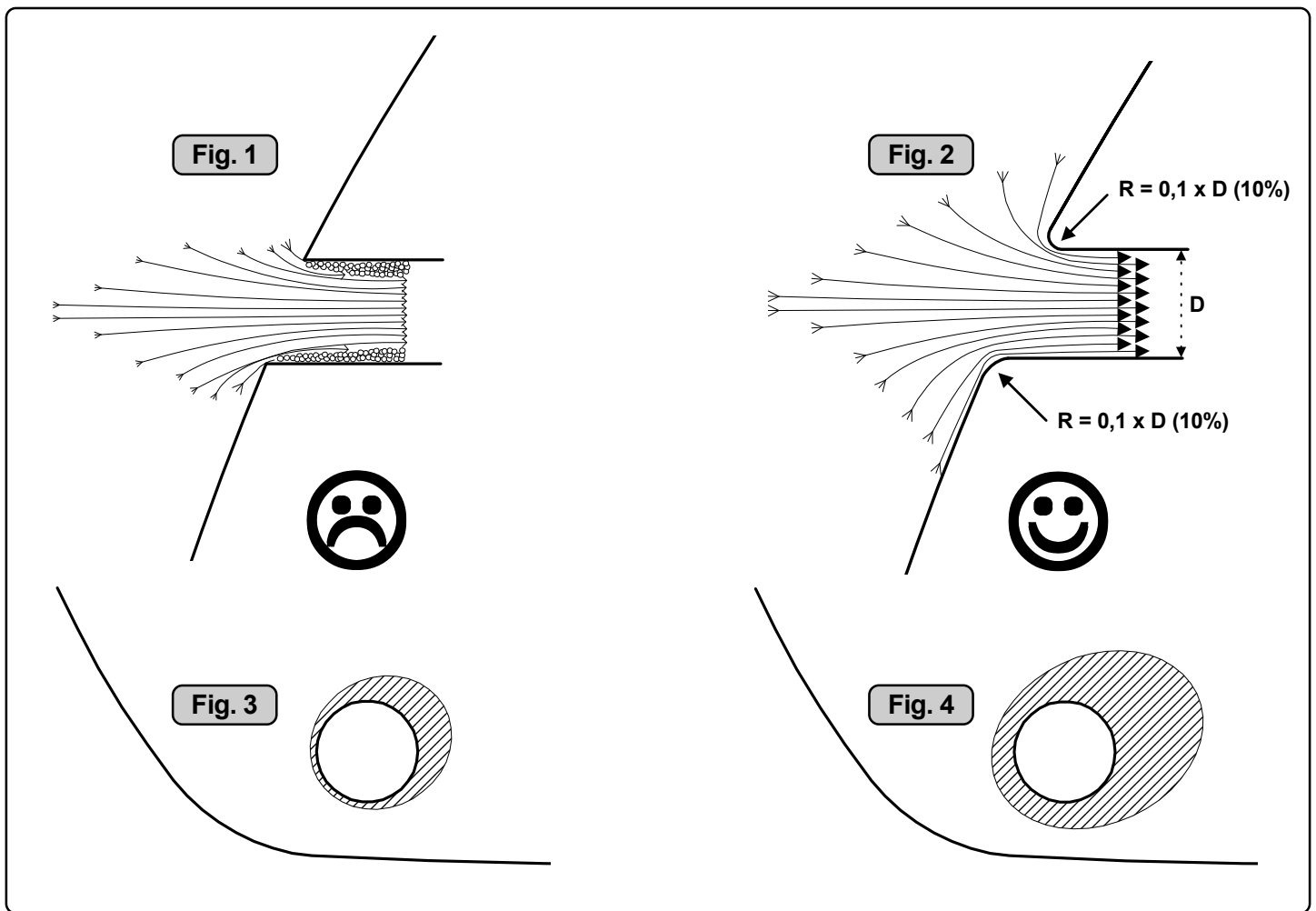
Den optimale avrundingen har en radié som er 10% av tunnelens diameter.

Hvorfor er en avrundet tunnelåpning så viktig?

1. En avrundet tunnelåpning vil forhindre at det oppstår turbulens / kavitasjon, noe som vil oppstå ved en installasjon med skarpe kanter. Turbulensen forårsaker mer støy, og begrenser skyvekraften.
  - Turbulensen / kavitasjonen blokkerer tunnelen og svekker skyvekraften.
  - I det kavitasjon og turbulens når propellen påvirkes ytelsen til denne og øker støyen.
2. En avrundet tunnelåpning gjør også at thrusteren suger vann langs skroget på båten. Dermed oppstår det et lavtrykk som vil hjelpe å suge båten i dreieretningen. Med skarpe åpninger klarer ikke thrusteren å suge vann langs skroget, og lavtrykket uteblir. Så mye som 40% av skyvekraften har blitt målt til å ligge her på noen installasjoner.

NB! Propellene til Side-Power thrustere kaviterer ikke på arbeidshastighet, så kavitasjon og støy som oppstår som følge av kavitasjon, skapes av tunnelinstallasjonen.

NB! Selv der en perfekt avrunding ikke er mulig er det viktig å runde av kantene så mye som mulig, en tunnelåpning med skråkant vil ha stor effekt fremfor en med skarpkant (se side 20, ill. 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 more easy 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 hullshape, but normally it is angled slightly down because of the waterflow 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 waterflow 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. More information on how to practically do this on pages 6.

**NO Motstand forårsaket av tunnel**

Et mulig problem for seilbåter eller meget hurtiggående båter er motstand i tunnelen. Aktre ende på tunnelen vil være en liten lodrett flate mot vannstrømmen som skaper uønsket motstand.

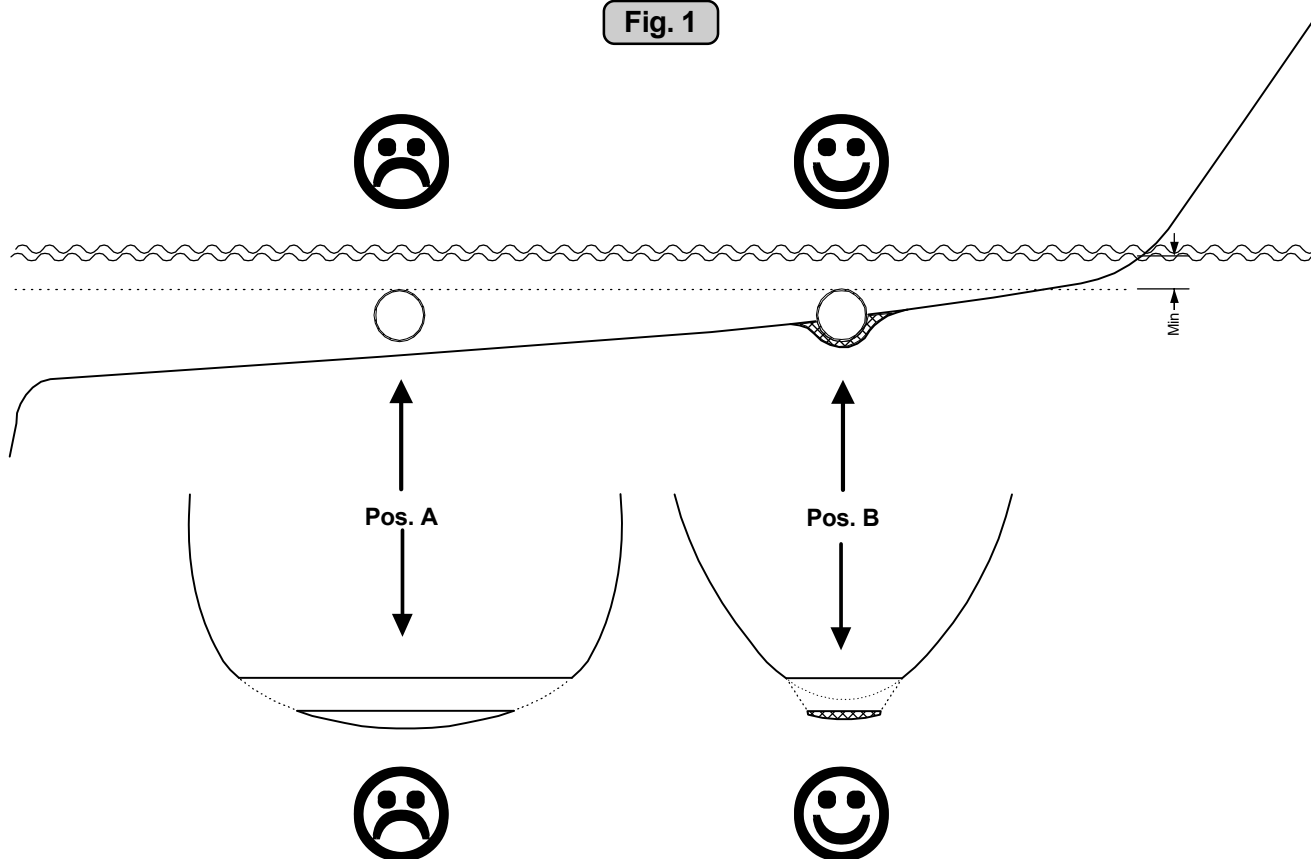
Denne flaten kan også forårsake problemer med at vann føres inn i tunnelen under seilas, eller kjøring i høy fart og får da propellen til å rotere, dette skaper uønsket støy.

Det er to mulige løsninger på problemet, avhengig av hva som er enklest å få til på båten.

1. Den løsningen som vanligvis reduserer motstanden mest er å lage en fordypning i skroget i aktre ende av tunnelåpningen. Den lodrette flaten vil da forsvinne og dermed motstanden. Hovedregelen å følge er at bakkanten av tunnelen ikke skal synes når man står rett foran båten og titter akterover langs båten senterlinje. Dybden, utformingen og vinkling av fordypningen avhenger av båttypen, og hvordan vannet følger skroget, men de fleste båter vil være tjent med en fordypning som vinkler lett nedover (Fig. 2).
2. Motstanden vil også reduseres av en spoiler i forkant av tunnelen. Spoileren fører det meste av vannstrømmen rundt og forbi tunnelen. Størrelsen og utformingen på spoileren avhenger av båten. Hovedregelen er at bakkanten av tunnelen ikke skal synes når man står rett foran båten og titter akterover langs båten senterlinje. Den enkleste måten å lage spoileren på er å la tunnelen stikke ut i forkant av tunnelen, og forme spoileren opp mot den (Fig. 3).

Det er alltid viktig å avrunde tunnelåpningene mest mulig for å motvirke støy og for å få mest mulig effekt av thrusteren. Mer informasjon om dette på side 10.

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 underneath 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.

## N Tunnel installasjon på seilbåter

Mange seilbåtskrog er bygget for å oppnå høy fart. De har brede skrog som ikke stikker dypt i baugen. Skrogtypen gjør det vanskelig å installere en thrustertunnel på vanlig måte, spesielt med tanke på å plassere den langt nok frem (Fig. 1).

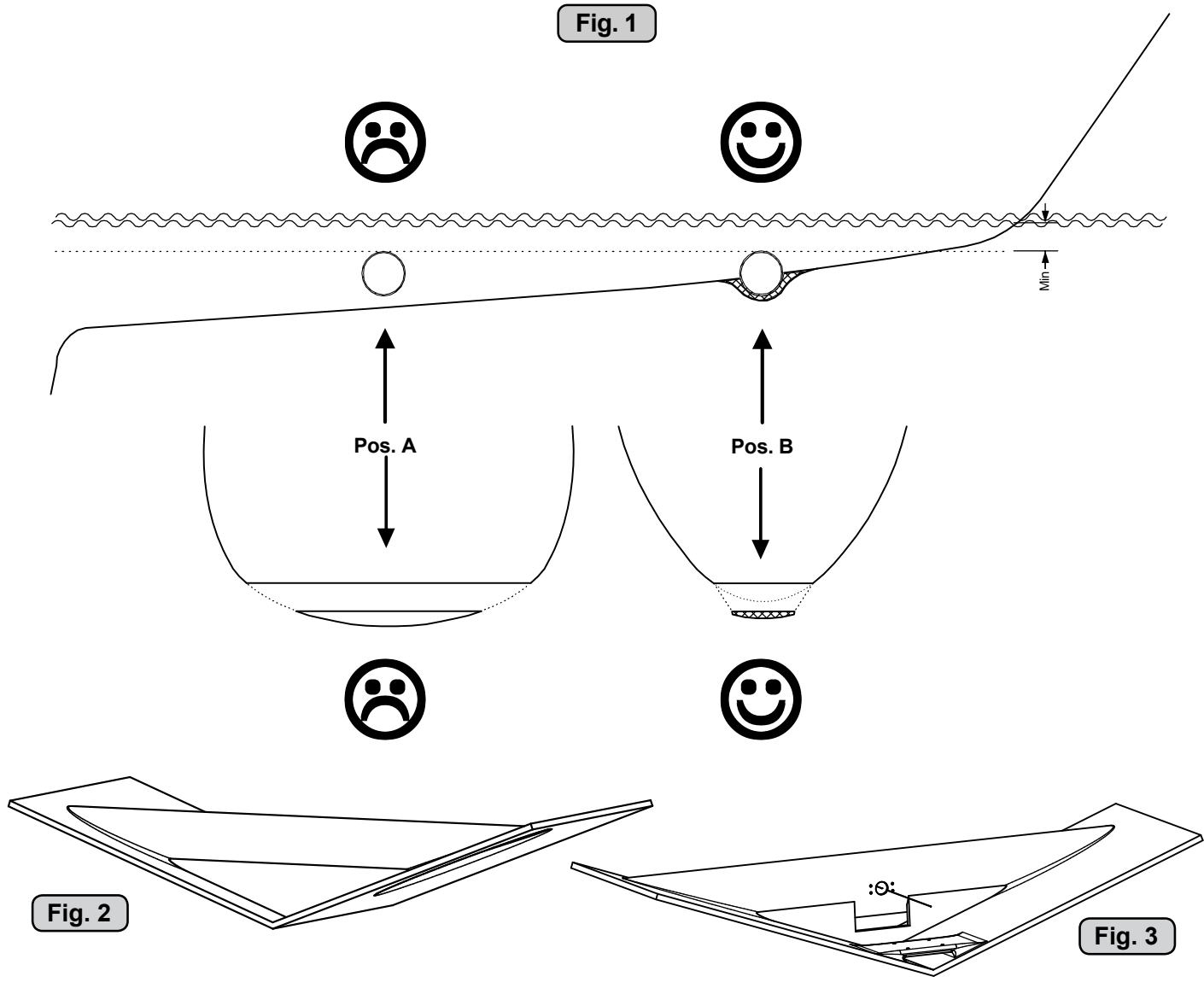
Thrustertunneler kan allikevel installeres i de fleste seilbåter. Dette gjøres ved å la en del av tunnelen stikke ut i underkant av skroget. Tunnelen er sterk nok til dette, og thrusteren blir plassert lav nok og langt nok fremme.

Dette gjøres ved at øvre halvdel av tunnelen støpes inn i skroget, tunnelen styrkes i underkant ved å støpe en kul rundt tunnelen og jevne den ut mest mulig.

Denne metoden brukes av noen av de helt største seilbåt-produzentene i verden, de viser til at den ikke gir utslag på fart under normal seilas.

Denne installasjonen kan også være gunstig for båter med flate bunner, for å unngå ekstremt lange tunneler og store ovale tunnelåpninger.



**Fig. 1****Fig. 2****Fig. 3****EN Tunnel installation in flat bottomed hulls**

Some boats are very flat bottomed and have a very shallow draft in the bow section. It might be 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 even when the hull does not directly support the fitting of a tunnel.

This is done by fitting the tunnel halfway into and halfway underneath the existing hull and then strengthening it and smoothing the waterflow 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 can also be a good installation method for flat bottomed barges to avoid extremely long tunnels and huge oval tunnel openings in the hull.

If the tunnel is over 250 cm long at its deepest point, it is recommended that it is supported by a bulkhead as suggested in fig. 2 and 3.

**NO Tunnelinstallasjon i flatbunnede skrog**

Noen båter har brede skrog som ikke stikker dypt i baugen. Skrogtypen gjør det vanskelig å installere en thrustertunnel på vanlig måte, spesielt med tanke på å plassere den langt nok frem (Fig. 1).

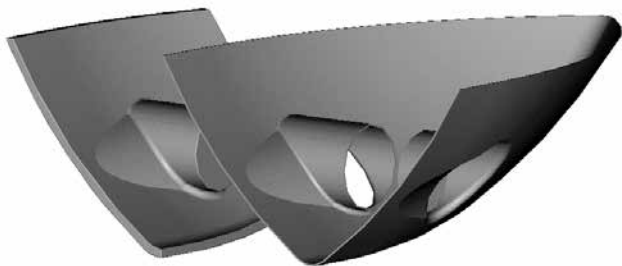
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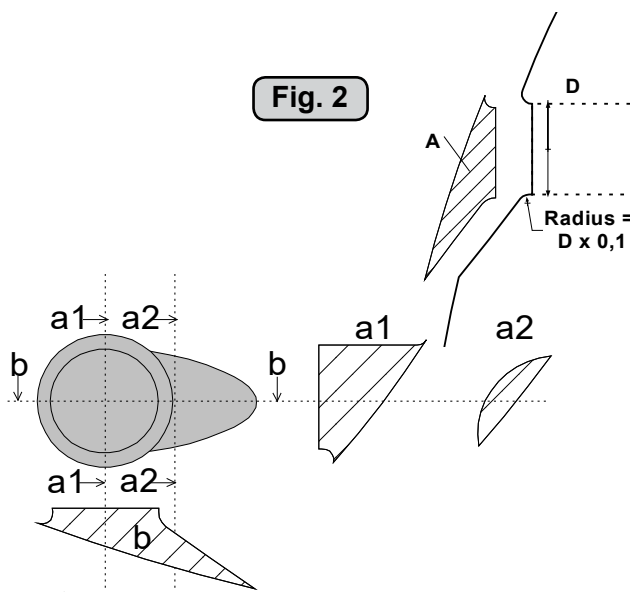
Denne installasjonen kan også være gunstig for båter med flate bunner, for å unngå ekstremt lange tunneler og store ovale tunnelåpninger.

Er tunnelen over 250 cm lang, anbefales at den støttes opp av et skott som vist på fig. 2 and 3.

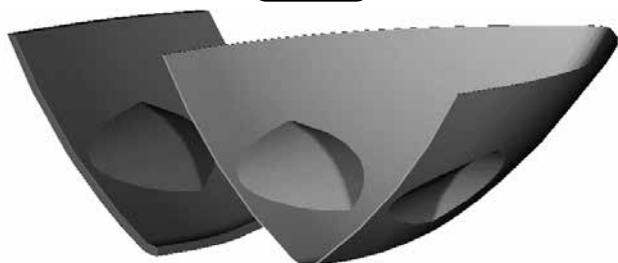
**Fig. 1**



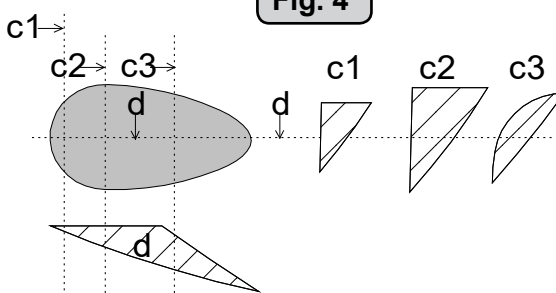
**Fig. 2**



**Fig. 3**



**Fig. 4**



**EN Series production installation**

Boat builders having thrusters as standard, or delivering a large portion of one or more models with thrusters, have the opportunity to make a perfect tunnel installation, while saving both time and money on each installation (Fig. 1).

The solution is to make an insert / plug in the hull mould, which prepares the hull for an easy tunnel installation with features for maximum thrust and minimal drag (Fig. 2).

This insert / plug in the mould is not very difficult to make, and as it will have to be a "bolt on" in the mould in order to get the boat out, you can still make boats without this hull feature. (Some boat builders have this in the hull also on boats that are delivered without a thruster as they know many people will fit this later)

By having a flat surface to fit the tunnel to, the installation time and cost for the tunnel will also be reduced as:

- it is very easy and fast to cut the now circular hole for the tunnel
- it is easier to mould inside all around the tunnel
- you save tunnel length

The plug in the mould can also be made so that it can be a fixed part of the mould, but the rounded end option must then be made later to get the hull out of the mould (Fig. 3&4).

**NO Installasjon ved serieproduksjon**

Båtbyggere som har trustere som standard eller leverer en eller flere modeller med valgfri trustere i stort antall har mulighet for å lage en perfekt tunnelinstallasjon og samtidig spare tid og penger (Fig. 1).

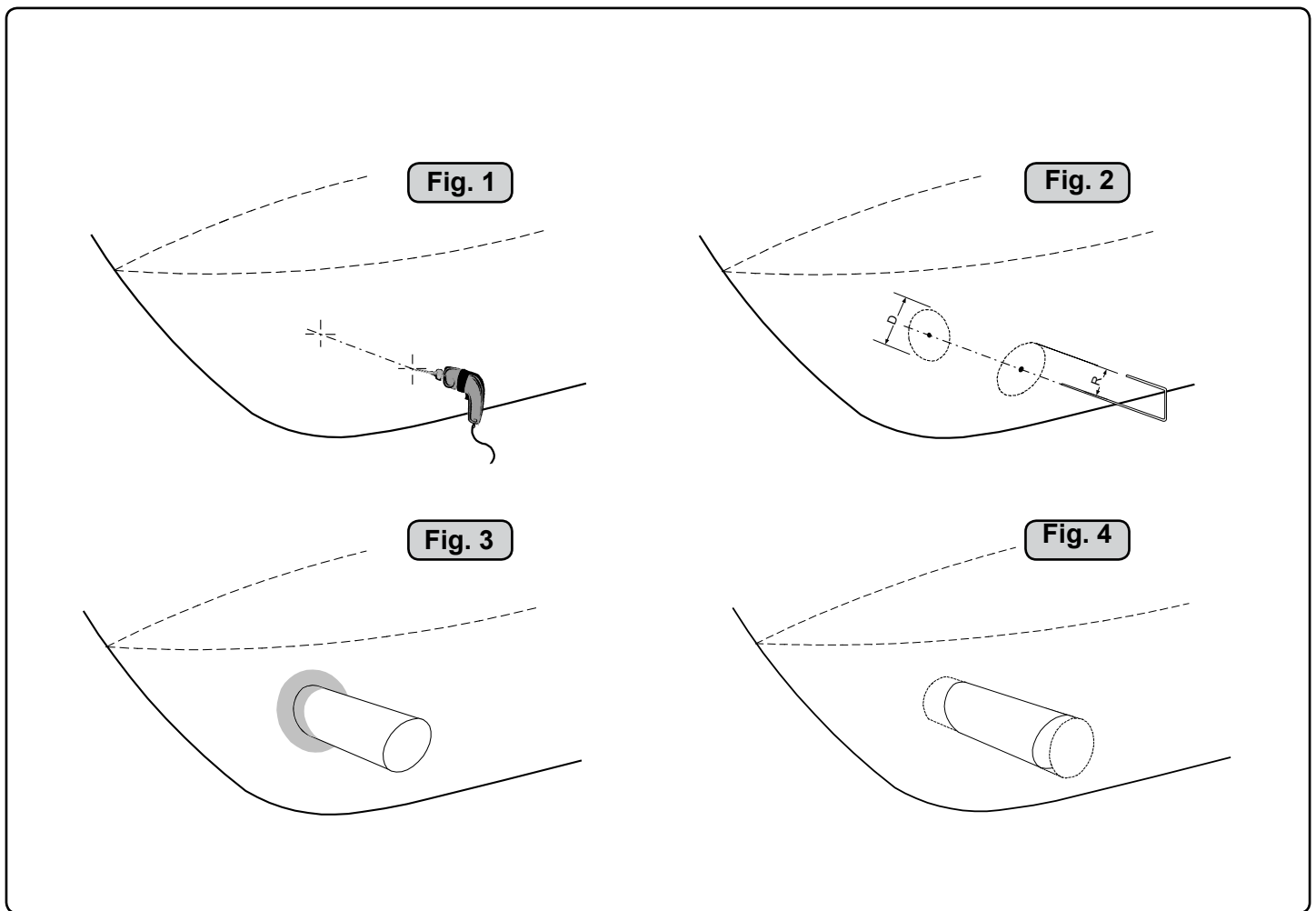
Løsningen er å lage en plugg/innsats i formen, som klargjør skroget for ankløst mulig tunnelinstallasjon og som samtidig har perfekt utforming for maksimal trust og minimal motstand (Fig. 2).

Pluggen/innsatsen er ikke komplisert å lage og siden den må skrues fast i formen på grunn av slipp kan skrogene fremdeles lages uten denne løsningen. (Enkelte båtbyggere velger også denne løsningen på båter levert uten trustere da de vet at mange vil velge å ettermontere en trustere)

Ved å ha en rett flate å montere tunnelen på, reduseres installasjonstiden og kostnaden for tunnelen siden:

- det blir veldig enkelt og raskt å skjære ut det nå sirkulære hullet til tunnelen
- det er enklere å støpe inn tunnelen langs hele omkretsen
- du sparer lengde på tunnelen

Pluggen i formen kan også lages på en slik måte at den inngår som en fast del, men da må avrundingen lages etterpå for å oppnå slipp i formen (Fig. 3&4).



**EN Tunnel installation**

*We recommend that a professional does the fiberglass fitting of the tunnel. These instructions are only general, and do not explain in any way the details of fiberglass 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 fiberglass" 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 12, 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 fiberglass.

**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 roving types of fiberglass (see page 18, 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/fiberglass. In areas where you can not access to make normal layers of resin/fiberglass, a resin/ fibre-glass mixture must be filled in that area.

**NO Tunnelinstallering**

*Sleipner Motor anbefaler at innstøping av glassfibertunnelen utføres av kyndig personell. Denne instruksjons manualen gir ikke detaljerte opplysninger om glassfiberstøping. Problemer som skyldes installering er installatørens fulle ansvar.*

Bestem plassering av tunnelen ut i fra informasjonen gitt tidligere i manualen, og de angitte mål for thrusteren du skal installere.

Merk av senter på tunnelen på babord og styrbord side. Bor et 6 mm vannrett hull, på begge sider (Fig. 1).

Bøy til og tilpass en 5 mm stålstang, som vist på fig. 2 der den tilbakebøyde enden skal markere tunnelens radius. Stikk enden inn å marker tunnelens ytre diameter, skjær ut hullet med en stikksag (Fig. 2).

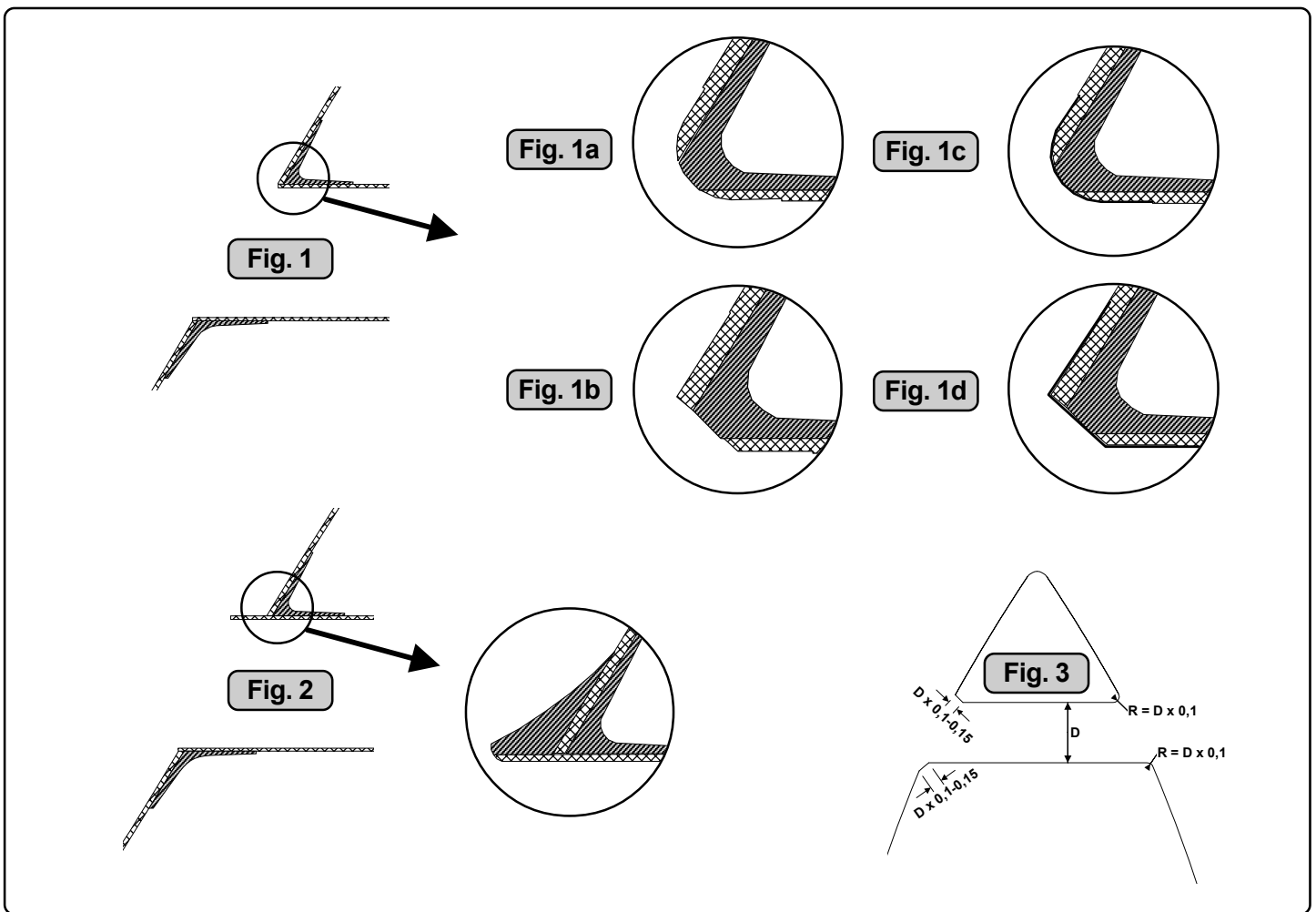
Puss av gelcoat og polyester så glassfiberen ligger bar i et 12 cm stort område rundt tunnel hullet. Dette må gjøres på innsiden og utsiden av skroget, før tunnelen støpes fast i skroget (Fig. 3).

Sett inn tunnelen å marker hvor det skal kappes for å passe i skroget (Fig. 4). Hvis det skal støpes en spoiler i forkant av tunnelen bør en del av tunnelen stikke ut i for og underkant av skroget for å støpe spoileren mot (Side 10, Fig. 2). Kapp tunnelen i ønsket størrelse. Slip lett med slipepapir, og vask med acetone der hvor det skal støpes med glassfiber.

**NB!** Det må ikke støpes der hvor thrusteren skal monteres.

Støp fast tunnelen først på innsiden av skroget, bruk minst 8 lag med 300 g Glassfibermatte, og polyester. Ved bruk av alternative materialer, glassfiber matter eller rovingtyper (Se s. 10, Fig. 1). Hvis tunnelåpningene avrundes til den optimale 10% radius må ofte legge ekstra lag med polyester glassfibermatte på innsiden av tunnelen, for å oppnå riktig tykkelse i forhold til skrogtykkelsen.

**NB!** Forsikre deg om at overgangene mellom tunel og skrog er nøye sammenstøpt. På steder en ikke kommer til med vanlige lag med polyester/glassfiber matte, sørg for og lage en blanding av polyester og glassfiber, som fylles i dette.



## EN Tunnel installation (Cont.)

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, atleast round the tunnel end as much as possible.

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

You must apply gelcoat/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 when they are delivered.**

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

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

The original Sidepower tube itself is fully waterresistant without treatment exceptin the areas where you have bonded it to the hull.

Apply gelcoat/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.**

## NO Tunnelinstallering (Forts.)

Rund av tunnelendene med en radius 10% av tunneldiameter (Fig. 1a), eller lag en skråkant 10-15% av tunneldiameter (Fig. 1c). Der dette ikke er mulig skal tunnel kantene rundes av mest mulig.

Vi anbefaler å støpe to lag utenpå tunnelavrundingen og over et område på 6-8cm (Fig. 1c & 1d).

Gelcoat eller lignende må påføres på områdene der det har blitt pusset eller støpt for å gjøre glassfiberen vanntett.

**NB ! Alle originale Side-Power tunneler er vanntette ved levering!**

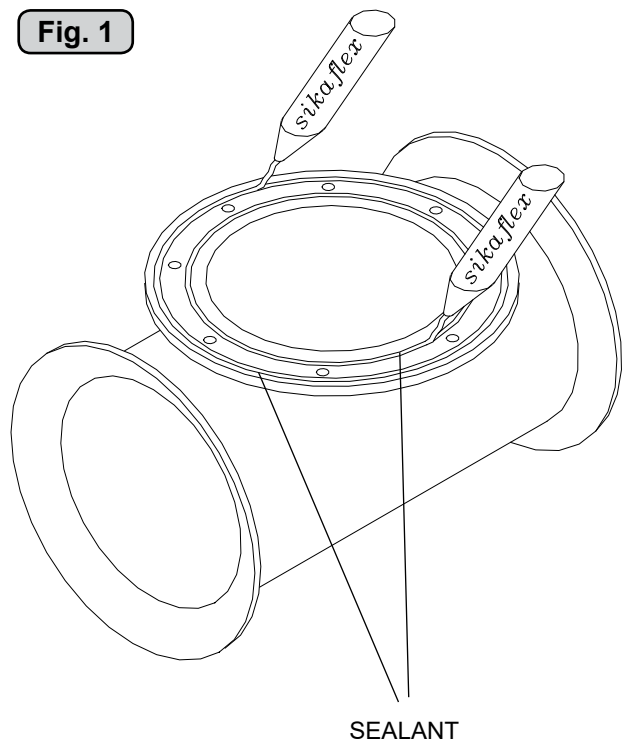
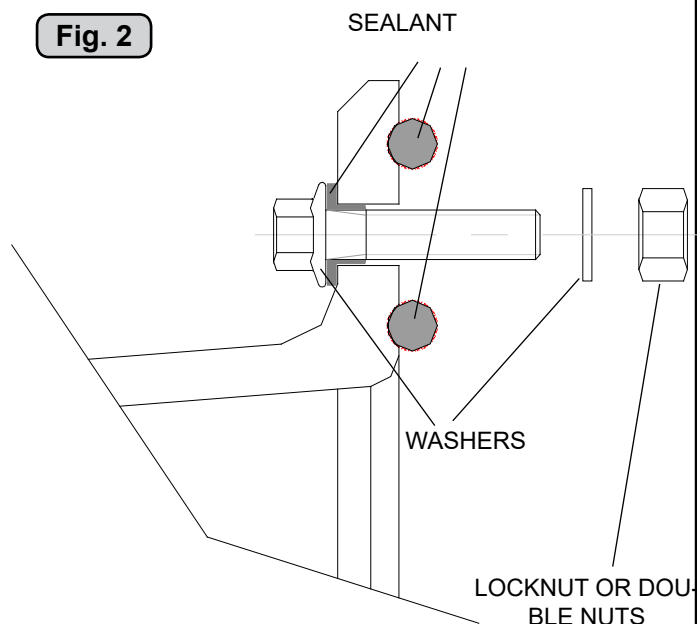
Så fremt man ikke ønsker en annen farge er det ikke nødvendig å påføre Gelcoat, Topcoat og flere lag med primer for å gjøre tunnelen vanntett.

Puss tunnelen med fint slipepapir og påfør et lag primer for å få bunnstoff til å sitte.

Side-Powertunnelen er helt vanntett uten behandling med unntak av de områder det som er støpt fast i skroget.

Påfør Gelcoat/Topcoat/epoxy og primer på de områder som er pusset ned eller støpt. Vann skal ikke ha direkte kontakt med glassfiberen i skroget fordi dette normalt ikke er vanntett.

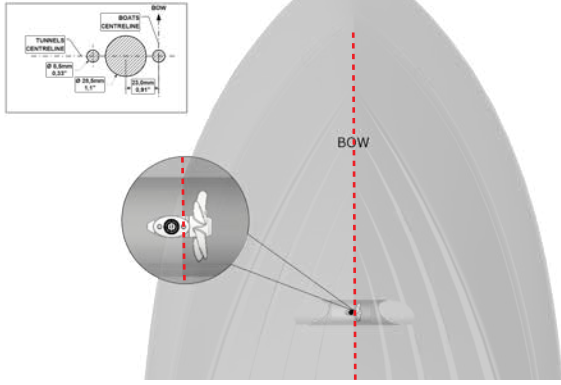
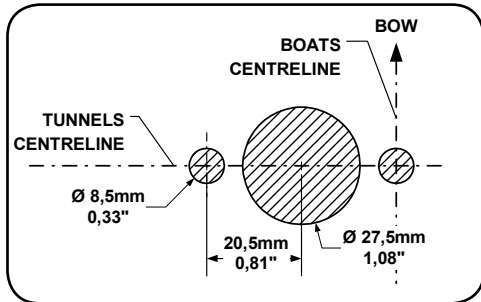
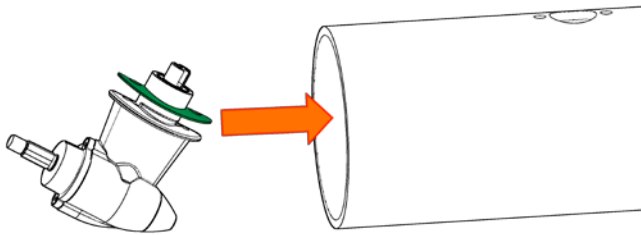
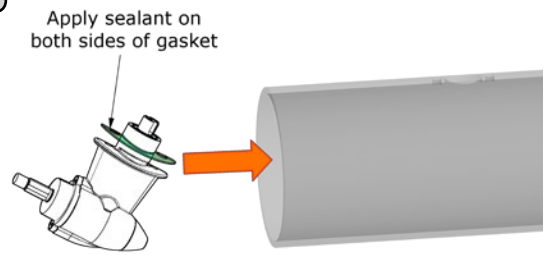
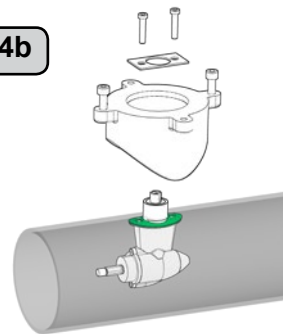
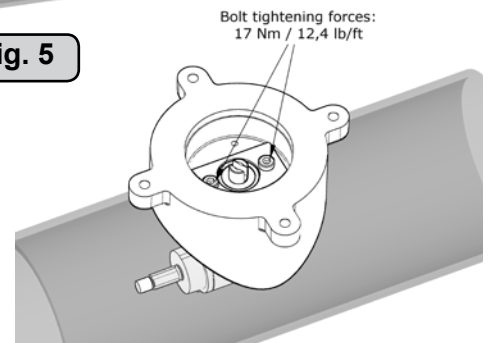
**PS! Det må ikke støpes der braketten til thrusteren skal stå. Passformen er nøyaktig tilpasset, og en feilplassert brakett kan forårsake svikt i girhus.**

**Fig. 1****Fig. 2**

### Bolt on installation of the stern tunnel

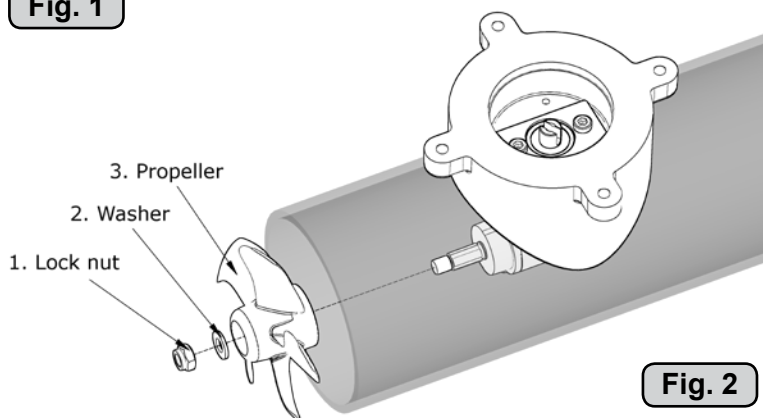
1. Make sure that there are enough space both inside and outside the transom of the boat.
2. Once the place for the installation has been decided, hold the tunnel in place in the horizontal position and mark the bolt holes. Remove the tunnel and it is then possible to calculate and mark the centre.
3. It is important that the tunnel flange sits flush on the transom. If this is not so, then the area on the transom will have to be flattened to ensure a snug fit.  
PS ! Take care with grinders as it is very easy to remove too much in fibreglass  
At this time, 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 (Sikaflex or similar) in the sealing tracks of the tunnel flange and around the bolts to make a water tight fitting (Fig. 1/2). Bolts, washers and nuts are not included as they will vary depending on the transom thickness We recommend A4 stainless with A4 lock nuts and A4 washers of a large diameter on both outside and inside.  
Bolts diameter:  $\varnothing$  10mm or 3/8" stainless steel
6. Refer to the installation manual for the recommended thruster fitting.

**If a bow thruster is also installed, we strongly advise 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 thruster manuals for advised 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 separate battery banks. If you are installing the standard Side-Power dual joystick panel this is already secured.**

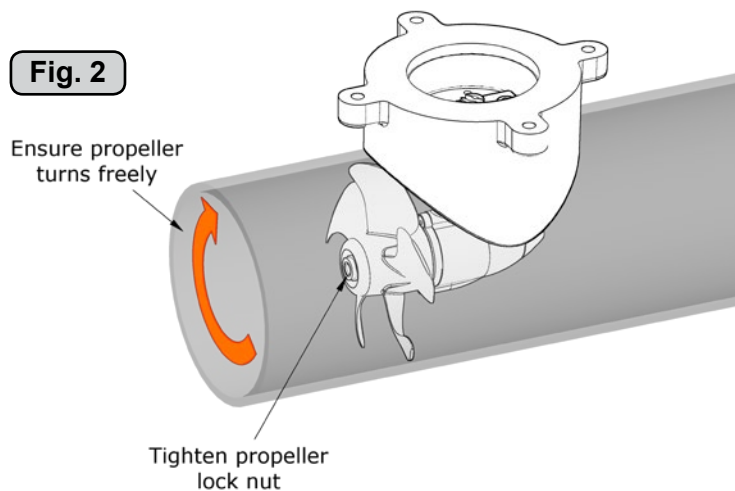
**Fig. 1****Fig. 2****Fig.3a****Fig. 3b****Fig. 4a****Fig. 4b****Fig. 5****EN****Fitting gearhouse and motor bracket**

1. Mark the centreline of the tunnel and the boats centreline. The gearhouse and propeller must be fitted as shown above for the thrust direction to correspond with the control panel **Fig. 1/2**.
2. Use the gasket or template(recommended) to mark the centre of the hole and double check the measurements. **Note! The thruster should be placed with the bolt hole as the centre (Fig. 2)**. All holes must be in-line with the tunnels' centreline for precise installation, as the clearance between the propeller and the tunnel is minimal.
3. There must be no casting where the motor bracket is to be 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 bumps or uneven parts must be ground smooth.
4. Drill the main-hole and then the two screw-holes.
5. Try the lower-unit in the tunnel (without the propeller) by using the 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. **Fig 3a/b**.
6. Apply MS Polymer sealant on both sides of the gasket, and then run the gearhouse through the main hole in the tunnel and push the gearhouse and motor-bracket gently together. **Fig 4a/b**. See sealant data sheet for correct application process.
7. Screw the lower unit and the motor-bracket together with the two provided bolts. **Tighten with 10 Nm / 7,4 lb/ft. Fig 5**.

**Fig. 1**



**Fig. 2**



**EN**

### Fitting propeller

1. Push the propeller on to the shaft and turn until the internal spline in the propeller hub aligns with the external spline on the propeller shaft. **Fig 1.**
2. Place the washer (2) on the propeller shaft and then tighten the lock-nut (1) on the propeller shaft. **Fig 2.**

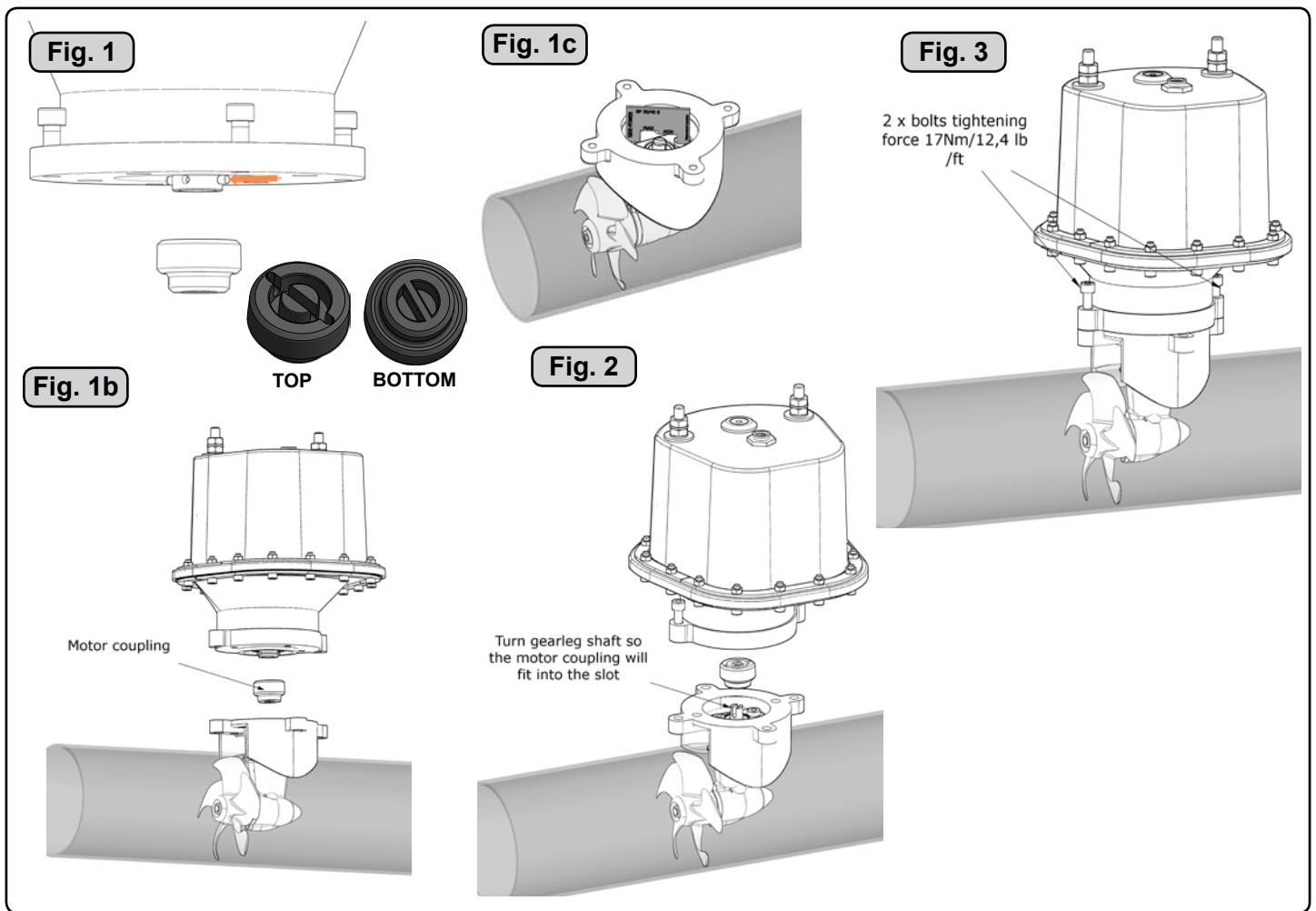
NOTE! Ensure the propeller turns freely.

**N**

### Montering av propell

1. Før propellen på akslingen, påse at spline i propellen passer på spline på aksling. **Fig 1.**
2. Sett på skiven (2) på propellakselen, deretter strammes låsemutteren (1). **Fig 2.**

NB! Kontroller at propellen roterer fritt.



**EN** **Fitting the electromotor**

1. Insert drive pin on motor shaft, tap the coupling on to the motor shaft. Turn the driveshaft in the gearhouse and the motor shaft so the track to the motor coupling has a corresponding direction. **Fig 1-1b.** Use the enclosed template to measure the driveshaft has come through the motorbracket with the correct height **Fig 1c.**
2. Slide the motor gently onto the driveshaft and motor bracket. You might have to jiggle it a bit to get it on as the fitting is tight. The electromotor can sit in all directions on the bracket. Ensure the cable terminals are available for electric installation later. **Fig2.**
3. Fasten the motor loosely to the bracket with the provided bolts.
4. Tighten the bolts holding the motor to the motor bracket with **17Nm /12,4 lb/ft as shown in Fig. 3.**
5. Check the drive system by turning the propeller, it will be a little hard to turn (because of the gear reduction and the motor), but you should easily be able to turn it by hand.

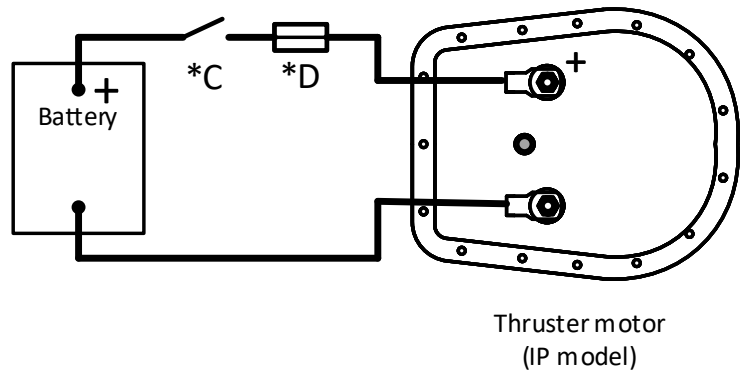
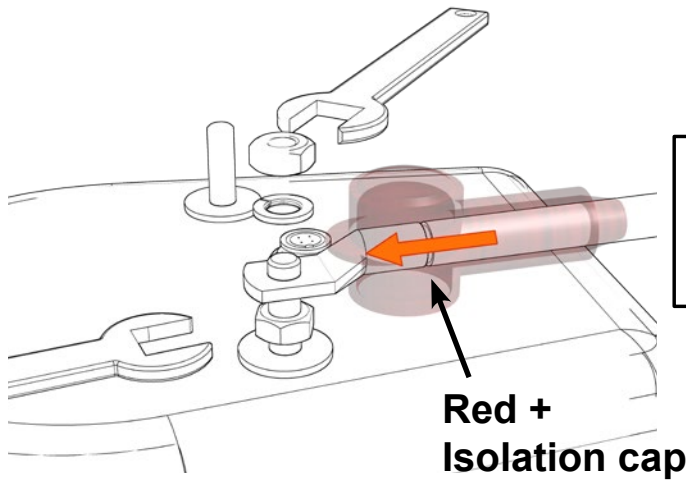
In some cases (shallow installation or workboat/fishing boat only) we recommend to protect the propeller by mounting a grid in the tunnel opening. It is important to keep a grid to a minimum and as streamlined for the thrusters waterflow as possible, as it will decrease the effect of the thruster. Do not circular profile steel as it will decrease thrust significantly.

**Note!**  
Paint the gearhouse and propeller with antifouling made for propellers. Do not paint the propeller shaft, the anodes or the end face of the gearhouse.

**Note!**  
Do not run the thruster for more than very short bursts without being in the water.

**Note!**  
If the boat is still being built when the electromotor is installed, it must be covered up to avoid dust from the building going into the motor and the solenoids. This cover must be removed before the thruster is being used.





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.
SE40/125S	12 V	315 A	DIN: 300 SAE: 570	ANL 250	mm2 AWG	35	50	70	95	95	120	120	2x95	2x95	2x120	2x120	260*
						1	1/0	2/0	3/0	3/0	4/0	4/0	2x 3/0	2x 3/0	2x 4/0	2x 4/0	

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

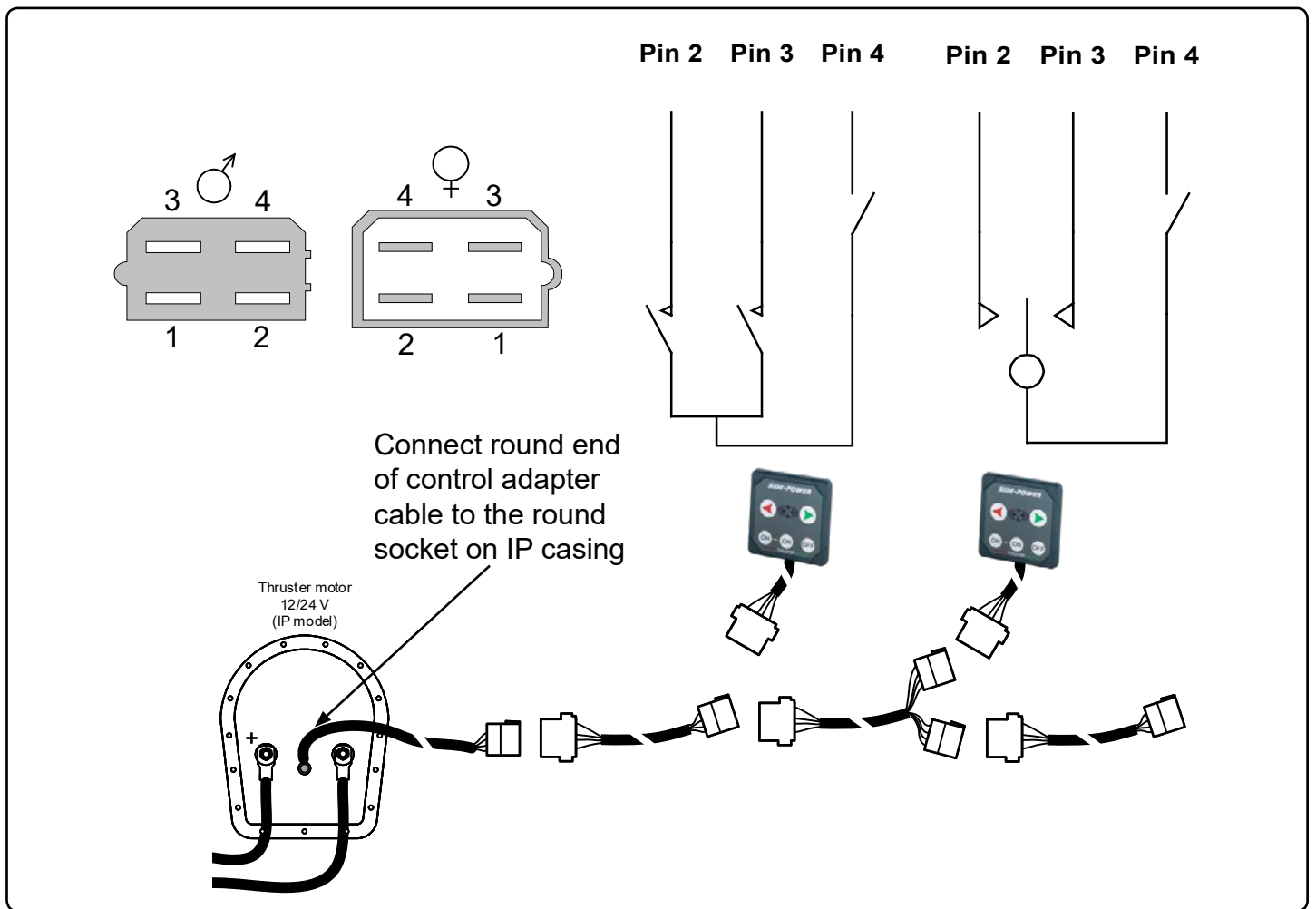
\* Minimum or recommended cable cross section in mm<sup>2</sup>

## 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 a 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 20 Nm / 14.75 lb/ft.
- The positive / plus cable connects to the "+" terminal. Bolt M10. Tighten with 20 Nm / 14.75 lb/ft. Place the included red protection cap firmly on the terminal bolt, as shown in illustration above.

### 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 electro motor flange and positive terminal on the motor and between the electro motor flange and the negative (battery -) terminal on the motor. If you feel unsure on how to perform this check, contact skilled personnel for guidance.



**Control panel and control-leads**

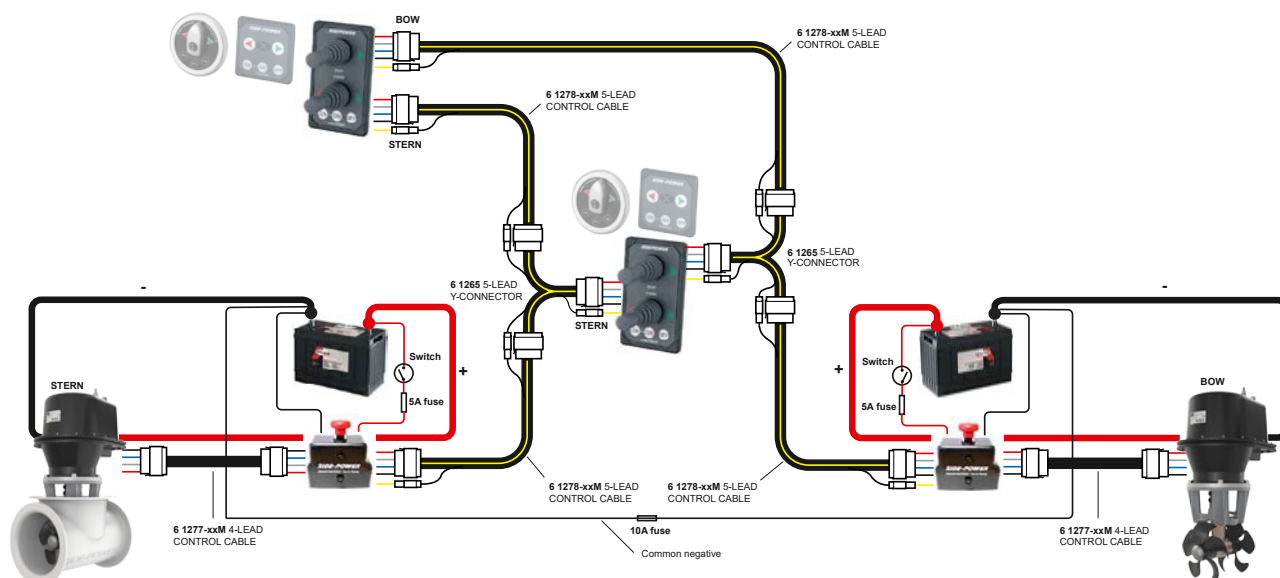
**Control panel installation: See control panel manual**

- 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 Side-Power 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 control adapter 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:**

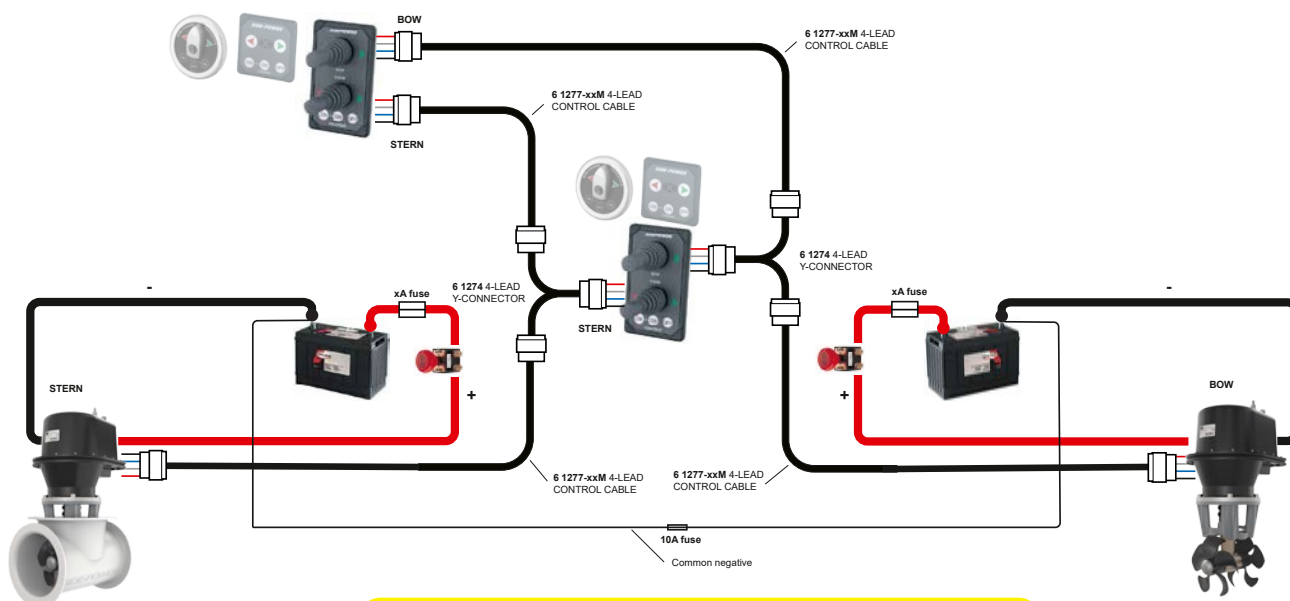
- Pin1: BLACK = Ground
- Pin2: BLUE = Engages thruster SB solenoid
- Pin3: GREY = Engages thruster Port solenoid
- Pin4: RED = Positive voltage for control panel

## With Automatic Main Switch:

**IMPORTANT!**

Common negative **MUST** be wired when using control panel 8940 and 8909C if separate battery banks are installed. (Bow and Stern thrusters combined)

## With Manual Main Switch:

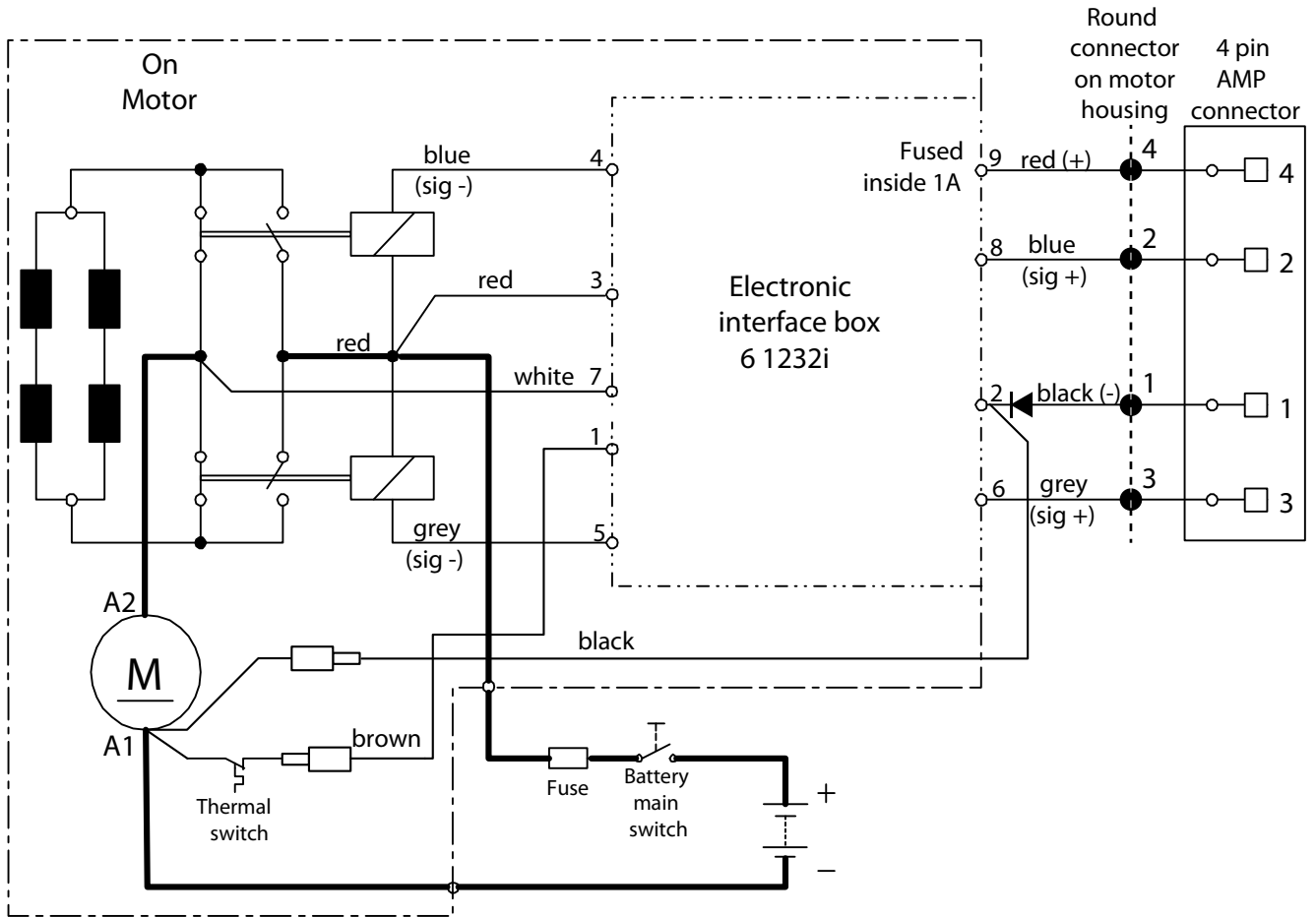
**IMPORTANT!**

Common negative **MUST** be wired when using control panel 8940 and 8909C if separate battery banks are installed. (Bow and Stern thrusters combined)

**IMPORTANT! 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 body and positive terminal on the motor and between the electro motor body and the negative (A1) terminal on the motor. If you feel unsure on how to perform this check, contact skilled personnel for guidance.

Technical wiring diagram



## Checklist

- Propeller is fastened correctly to the shaft.
- Propeller turns freely in tunnel.
- The anode holding screw is tightened well with thread glue.
- 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 control panel: .....

Voltage at thruster when running: .....

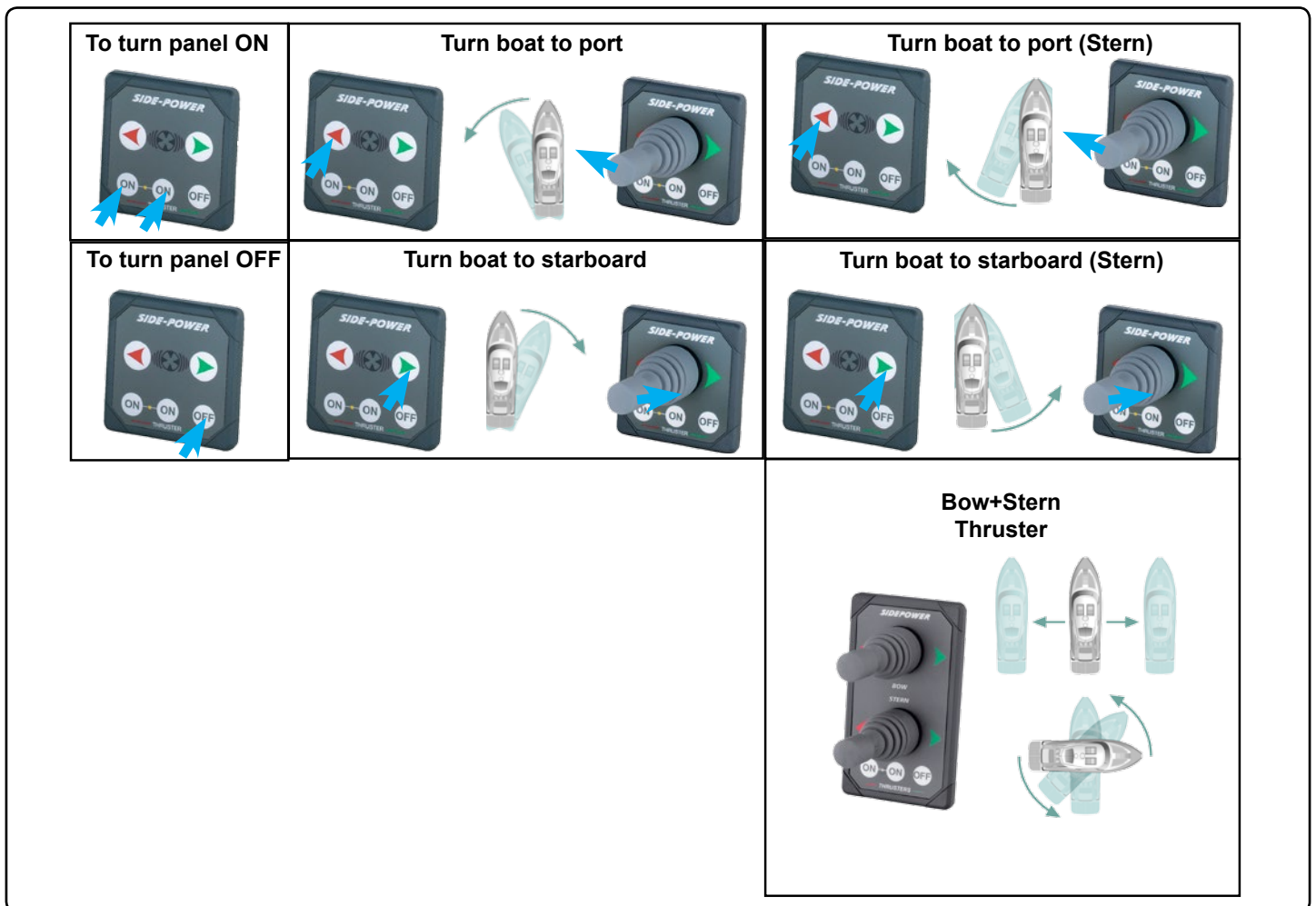
Battery cable size used: .....

Other comments by installer:

- 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 (persons/animals) 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.
- The main purpose of the thruster is to maneuver/dock the vessel. Forward/reverse speed must not exceed 4 knots when operated.

### **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 waterto avoid damages to your boat.
3. Turn the control panel on by pushing both “ON” buttons on the original Side-Power panel simultaneously. If another type of control is installed, en gage 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 joy stick 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**

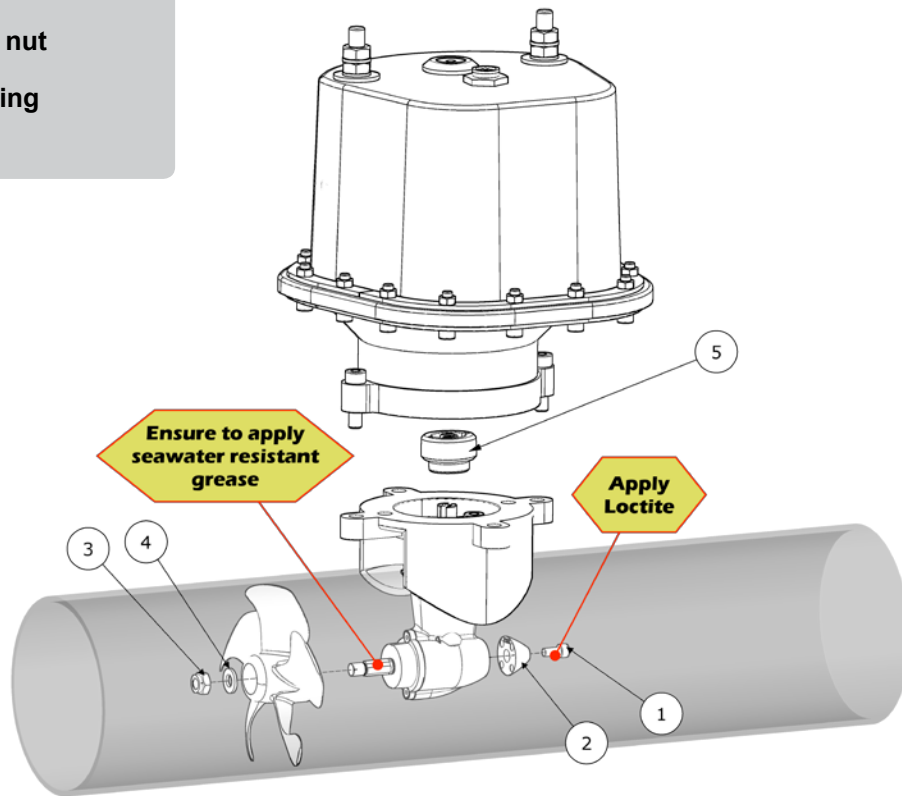
Some boats might however have installed a single stern thruster because of space limitation in the bow. In this case the stern thruster is used in the same way as a single bow thruster (see above) for moving the boat’s stern.

**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!

1. Fastening screw for anode
2. Anode
3. Propeller lock nut
4. Washer
5. Flexible coupling



## Maintenance

- » Re-tighten the bolts holding the gearhouse to the motor bracket during the first on-land service with the specified bolt tightening force (see page 13).
- » Keep the propeller and gearhouse clean from growth by painting with antifouling before every season.

Note! 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 thread glue on the screw holding the anode to ensure 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 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**



## Troubleshooting

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 drive pin on the motor shaft is broken

Remove motor and replace the drive pin

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 gear-house 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 and main plus input point:

The no load voltage should be:  
12V system =12,7V. If below 12,3V,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 continuous 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 in 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.

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

Check voltage at thruster when running

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

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 motor to see if it will release. Turn on thruster main switch. If solenoid is still in lock-in mode, contact your dealer.

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.

## SPARE PARTS

In order to present the most up to date documentation, we advise you to go to our website [www.side-power.com](http://www.side-power.com) and locate your product to find relevant spare parts.

# Worldwide sales and service



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



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