

Installation Guide

For Hydraulic Thruster Models
SH400



SLEIPNER MOTOR AS

P.O. Box 519

N-1612 Fredrikstad

Norway

www.sleipnergroupp.com

DOCUMENT ID: 6074

REVISION: 9

DATE: 2023

LANGUAGE: EN

MI

Contents

Installation Manual

Responsibility of the Installer	3
General Installation Consideration and Precaution Guidelines.....	3
Product Measurements	4
Product Specifications.....	5
Flow and Pressure Specifications	5
Technical Requirements / Hydraulic Hose Connections To Motor.....	6
Positioning of the tunnel / thruster	7
Tunnel Length	8
Tunnel installation in sail boats.....	9
Water Deflection	10
Tunnel ends	11
Tunnel installation	12 - 13
Stern tunnel installation	14
Gear Leg & Motor Bracket Installation.....	15
Propeller Installation.....	18
Motor Installation	19
Oil Tank Installation.....	20
Crossover Valve	21
S-Link System Description	22
Control Panel Installation	23
Pre-delivery Checklist	24
Service and Support	25
Product Spare Parts and Additional Resources	25
Warranty Statement	25



Sleipner Motor AS
P.O. Box 519, Arne Svendsensgt. 6-8
N-1612 Fredrikstad, Norway

MC_0020

Failure to follow the considerations and precautions can cause serious injury, damage and will render all warranties given by Sleipner Motor as VOID.

MC_0411

Responsibility of the Installer

MC_0038

The installer must read this document to ensure necessary familiarity with the product before installation.

Instructions in this document cannot be guaranteed to comply with all international and national regulations. It is the responsibility of the installer to follow all applicable international and national regulations when installing Sleipner products.

The recommendations given in this document are guidelines ONLY, and Sleipner strongly recommends that advice is obtained from a person familiar with the particular vessel and applicable regulations.

This document contains general installation instructions intended to support experienced installers. If you are not skilled in this type of work, please contact professional installers for assistance.

If required by local regulation, electrical work must be done by a licensed professional.

Appropriate health and safety procedures must be followed during installation.

Faulty installation of Sleipner products will render all warranties given by Sleipner Motor AS.

Ensure appropriate access to Sleipner products during installation planning for service, inspection and component replacement.

General Installation Consideration and Precaution Guidelines

MC_0440

For thruster systems

MC_0425

- Do not install the thruster in a position where you need to cut a stiffener/ stringer/ support that may jeopardise the hull integrity without checking with the boat builder this can be done safely.
- Paint the gear leg and propellers with anti-fouling. **(NB: Do not paint the anodes, sealing, rubber fittings or propeller shafts)**
- There is only room for a thin coat of primer and two layers of anti-fouling between the tunnel and the propellers.
- Never run the thruster out of water without load. Operated at no load, the thruster can reach extremely high speed, damaging the system.

If an original Sleipner hydraulic system is NOT installed, please ensure the following:

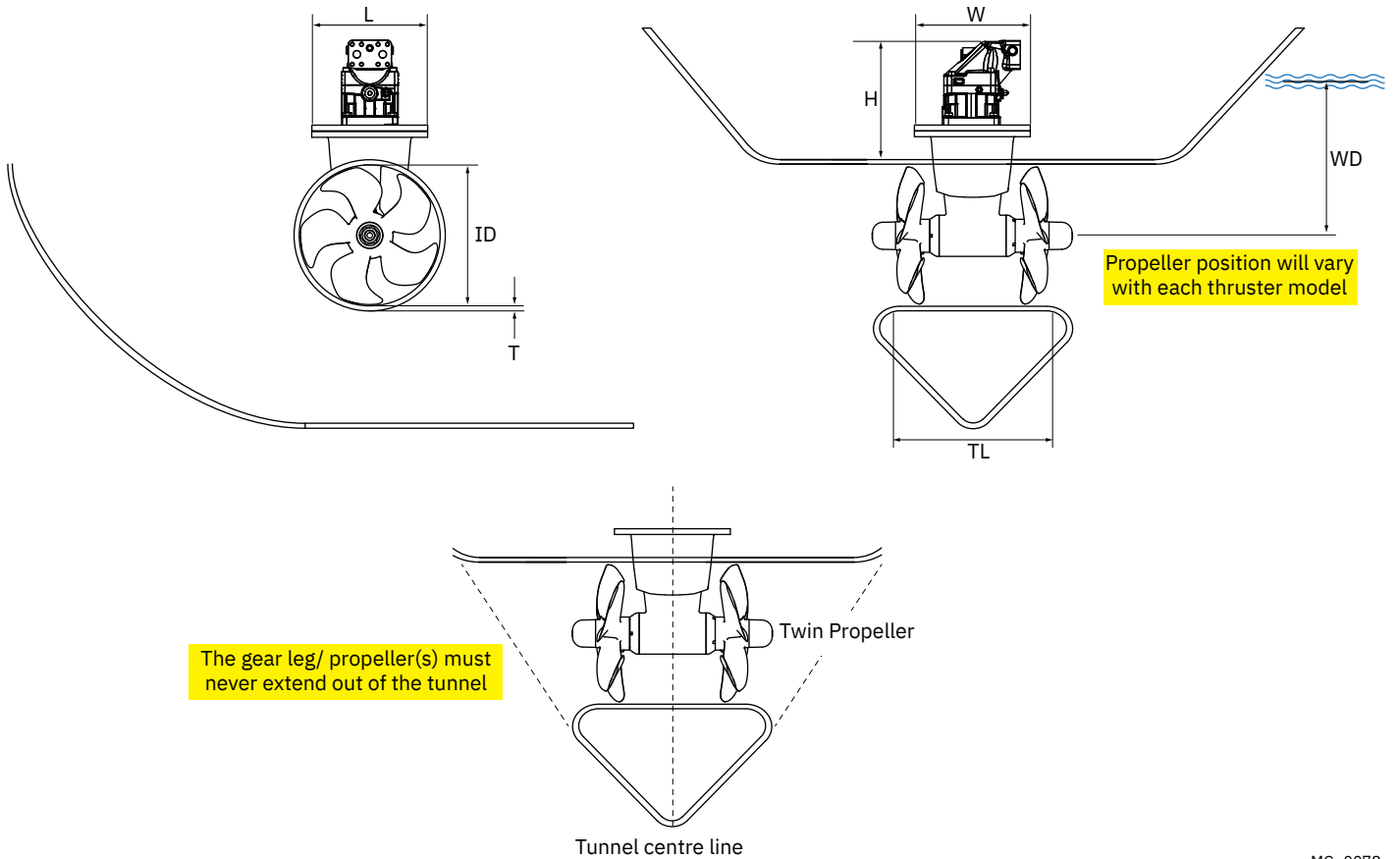
MC_0009

- Install an oil filter to keep the oil clean.
- Fit an oil cooler to ensure that the maximum oil temperature is below 75°C. Recommended operation temperature of hydraulic oil is 40-60°C.
- Hydraulic thrusters are supplied with hydraulic motors only.
- The installed hydraulic system is the responsibility of the fitter/ installer and must be within the limitations outlined in this manual to ensure no damage is caused to the thruster.
- The hydraulic valve must have flow and pressure limits that are either set within or can be adjusted to the limits of the thrusters capability.
- We strongly advise that a shock valve is fitted and set to 10% - 15% above the chosen maximum pressure set in the valve. This will prevent the system from being damaged if the propellers are blocked for any reason.
- Install a device to ensure the drive direction cannot be suddenly changed, as this can severely damage the gear leg. **(NB: Use a electric control system or a valve that ensures minimum 1 second delay when changing drive direction.)**

When installing an S-Link™ system connect ONLY original Sleipner S-Link™ products or other authorized control equipment directly to the S-Link™ bus. Connecting non-authorized third-party equipment, it must always be connected through a Sleipner supplied interface product. Any attempt to directly control or connect into the S-Link™ control system without a designated and approved interface will render all warranties and responsibilities of all of the connected Sleipner products. If you are interfacing the S-Link™ bus by agreement with Sleipner through a designated Sleipner supplied interface, you are still required to install at least one original Sleipner control panel to enable efficient troubleshooting if necessary.

MC_0105

Measurement code	Measurement description	SH400	
		mm	inch
ID	Internal tunnel diameter	300	11.81
H	Motor Height	356	14.02
W	Width	258	10.16
L	Length	258	10.16
WD	Water Depth	450	17.72
TL	Minimum tunnel length	370	14.57
TL (recommended)	Recommended tunnel length	550	21.65
T (min)	Minimum tunnel wall thickness	10	0.39
T (max)	Maximum tunnel wall thickness	12	0.47



Product Specifications

MC_0196

Product	Lubrication	Light Duty Thrust is kg	Heavy Duty Thrust is kg	Power Output kW / Hp	Weight kg / lbs	Maximum Operation Time
SH400	Oil bath from tank EP-90	400 kg / 400 lbs	400 kg / 400 lbs	30 kW / 41 hp	31 kg / 68.34 lbs	Continuous

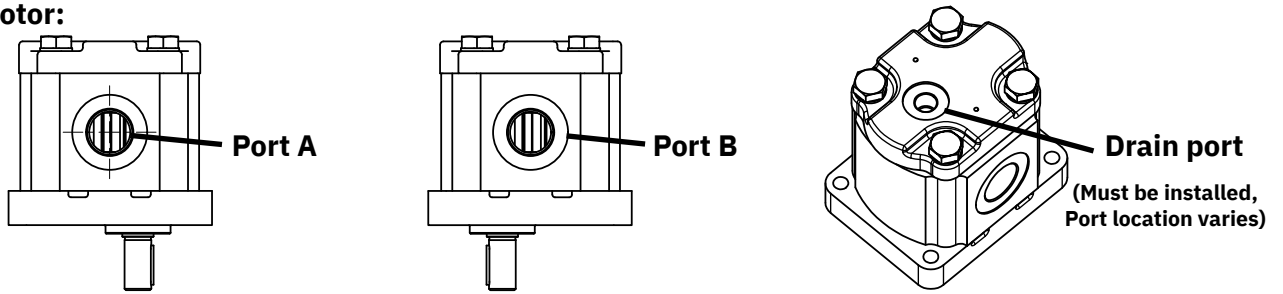
Flow and Pressure Specifications

MC_0196

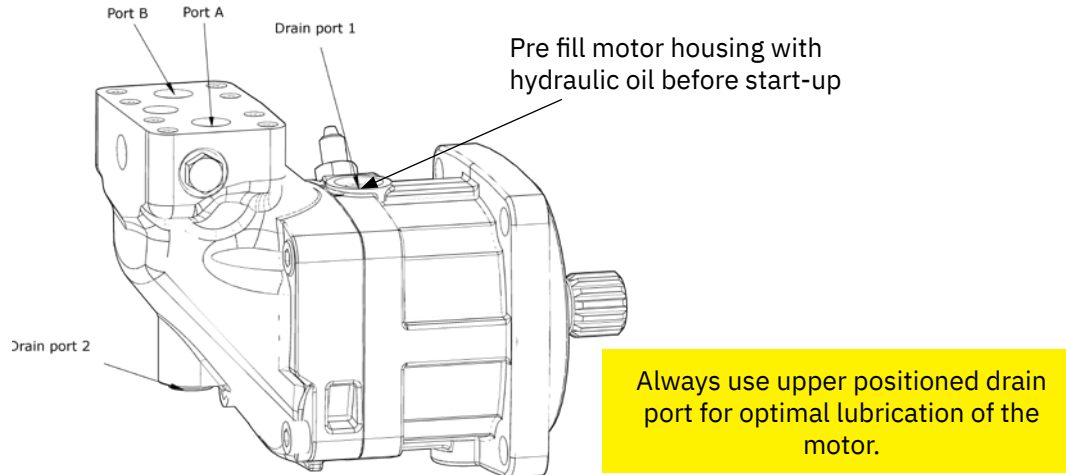
Thruster model	Motor type		60 %		80 %		100 %	
			Flow	Pressure	Flow	Pressure	Flow	Pressure
SH400	U,G,P 19	L/min-Bar	43.5	195	50.2	260	54.2	302 ¹⁾
		USG-PSI	11.49	2828	13.26	3771	14.32	4380 ¹⁾
	BA 23	L/min-Bar	52.3	163	60.4	218	67.5	272
		USG-PSI	13.82	2364	15.96	3162	17.83	3945

1) Max. thrust: 370kg

U, P & G-motor:



BA-motor:



Motor type	Port A/B**	Port flange threads	Drain port
U6	1/2" BSP	—	1/4" BSP
U8	1/2" BSP	—	1/4" BSP
U10	3/4" BSP	—	1/4" BSP
U11	3/4" BSP	—	1/4" BSP
U14	3/4" BSP	—	1/4" BSP
U16	3/4" BSP	—	1/4" BSP
U19	3/4" BSP	—	1/4" BSP
U26	3/4" BSP	—	1/4" BSP*
U29	3/4" BSP	—	1/4" BSP*
U33	3/4" BSP	—	1/4" BSP*
U37	3/4" BSP	—	1/4" BSP*
U37	3/4" BSP	—	1/4" BSP*
U50	1" BSP	—	1/4" BSP*
P42	1" 3000 PSI SAE J518/ ISO 6162 Code 61	3/8-16 UNC-2B, 22 deep	1/4" BSP*
P52	1 1/2" 3000 PSI SAE J518/ ISO 6162 Code 61	M12 x 1,75, 19 deep	1/4" BSP*
G45	1 1/4" BSP	—	1/4" BSP*
BA16	1.1/16" - 12UN-2B	—	9/16" UNF-18
BA19	3/4" BSP	—	3/8" BSP*
BA32/ BA23	1/2" 6000 PSI SAE J518/ ISO 6162 Code 62	5/16-18 UNC-2B, 18 deep	3/4" UNF-16
BA40	3/4" 6000 PSI SAE J518/ ISO 6162 Code 62	3/8-16 UNC-2B, 20 deep	3/4" UNF-16
BA45	3/4" 6000 PSI SAE J518/ ISO 6162 Code 62	3/8-16 UNC-2B, 21 deep	3/4" UNF-16
BA60	3/4" 6000 PSI SAE J518/ ISO 6162 Code 62	3/8-16 UNC-2B, 22 deep	7/8" UNF-14

* Drain port connector must not extend internally beyond 10,5mm from end face.

** Use only parallel threaded adaptors, preferably with soft seal. Do not use plumbing tape, hemp, tread sealant or similar products.

Aim to install the thruster as far forward as possible (1)

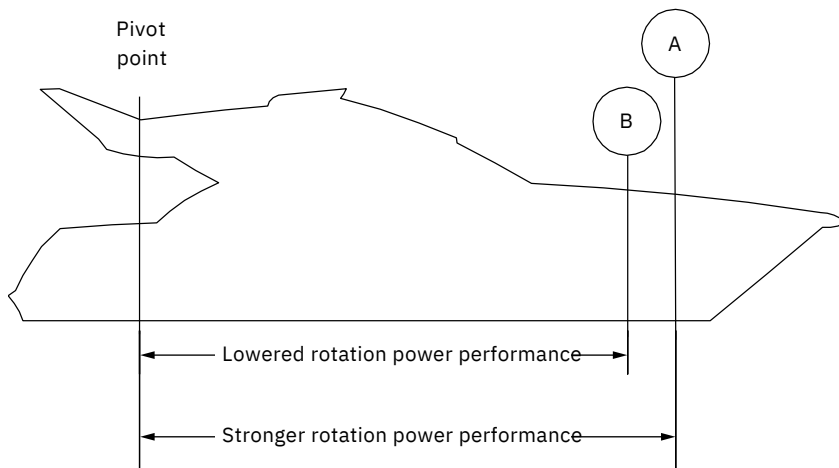
Due to the leverage effect around the boats' pivot point. The distance difference from the boat pivots' point to the thruster will determine the amount of real rotation power for the boat.

Aim to install the thruster as deep as possible under the waterline (2)

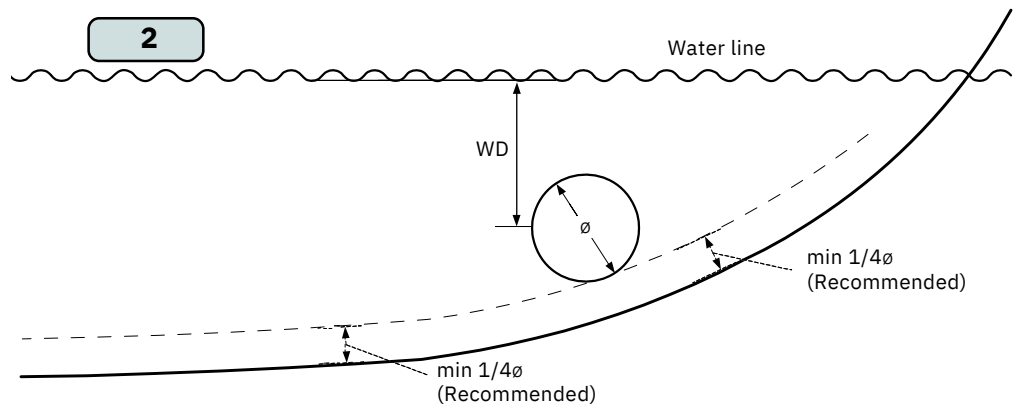
Deeper installations prevent air from being sucked into the tunnel from the surface, resulting in reduced thrust performance and increase noise levels during operation. Deeper installations increase water pressure for maximum efficiency from the thruster.

The centre of the tunnel should be as a general rule minimum of 1 x the tunnel diameter below the waterline. **(NB: Refer to product measurements to define your products recommended depth below the waterline.)** The installer must make evaluations based on thruster performance, boat type and operating conditions. As a general recommendation, the position of the tunnel should not be a minimum of 1/4 of the diameter of the tunnel from the boat keel. **(NB: This can be overlooked depending on the installation methods defined in this manual.)**

1



2



MG_0001

Optimal tunnel length

Achieving the correct tunnel length depends on many factors from the hull type, operation and environmental conditions.

Tunnels should avoid being longer than 4 x the tunnel diameter as this will reduce thruster performance. **(NB: Installing long length tunnels can flex/bend over time and may require additional support. Consult with a naval architect.)**

1. Do not allow the variable length of the tunnel walls to vary in length excessively.
EG. The top tunnel wall is x 4 longer than the bottom wall.
2. If the tunnel is too long, the friction inside will reduce the water speed and thereby the thrust.
3. If the tunnel is too short (typically only in the bottom section of the tunnel) cavitation problems can occur as water flow will not be able to "straighten" itself before reaching the propeller. This cavitation will reduce performance and increase noise during operation.

Thruster within the tunnel

It is important the propellers and the lower unit/ gear leg must be entirely inside the thruster tunnel. Propellers that protrude from the tunnel will not perform as intended.

4. Standard Use

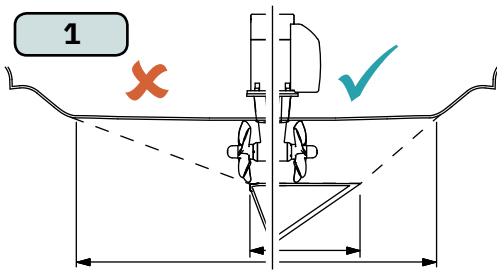
Tunnel length must be long enough to ensure the propellers are not extruding the tunnel. **(NB: Refer to product measurements to define your products recommended tunnel length.)**

5. Flat Bottom Hull

Tunnel lengths must be longer than the standard measurement outlined within the manual to ensure a circular vacuum is not created between the thruster and the bottom of the boat.

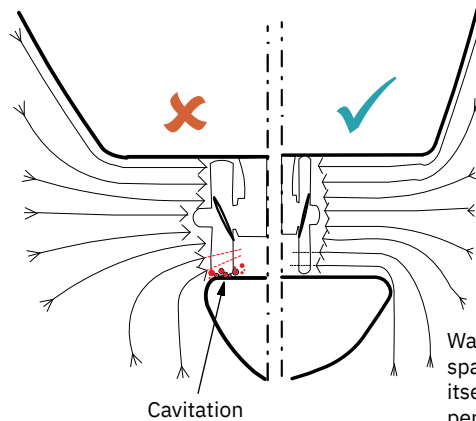
6. High-Speed Boats

Tunnel lengths must be increased to protect the propeller from damage when crashing against the water surface during high-speed cruising. **(NB: This can include the length of a spoiler)**



Do not allow the variable length of the tunnel walls to vary in length excessively.
EG. the top tunnel wall is x 4 longer than the bottom wall.

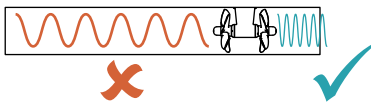
3



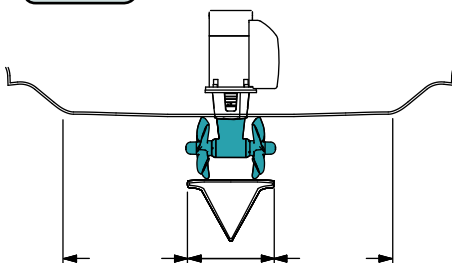
Cavitation

Water flow must have space to "straighten" itself for best performance.

2

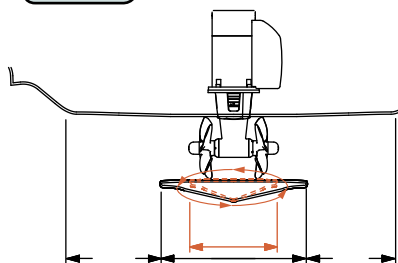


4 STANDARD USE



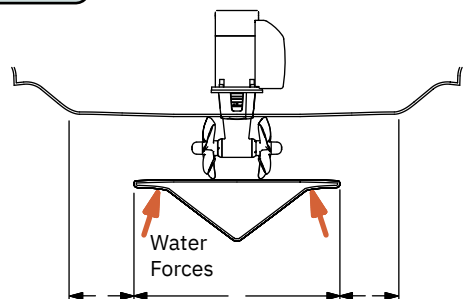
The gear leg/ propeller(s) must never extend out of the tunnel

5 FLAT BOTTOM HULL



Increase tunnel length to prevent a circular water vacuum cavity between the propeller and the hull of the boat.

6 HIGH-SPEED OPERATION



Increase tunnel length to protect the propeller from water forces when high-speed cruising.

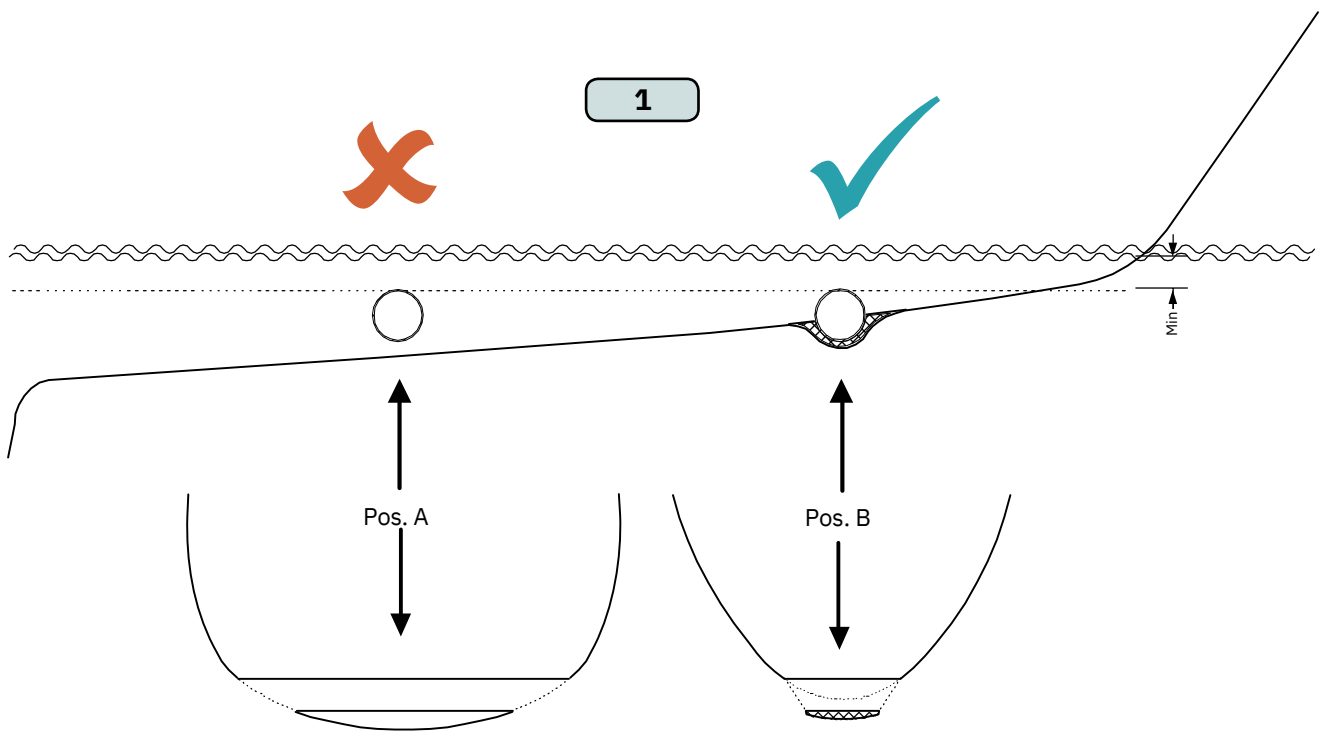
MG_0048

Some sail boats have a flat bottom and shallow draft in the bow section. This can make installing the thruster as far forward from the boats main pivot point difficult. **(Fig. 1).**

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

Instead fit the tunnel halfway into the underneath section of the existing hull. Strengthen it with a deflector/ spoiler directing the water flow around the tunnel. This will allow installation of the thruster in the proper position on the boat, maintaining the reliability and space advantages of the tunnel thruster.

This installation is being used by some of the world's largest sail boat builders and has proven to give little to no speed loss during normal cruising. This can also be an installation method for flat bottomed barges to avoid extremely long tunnels and large oval tunnel openings in the hull.



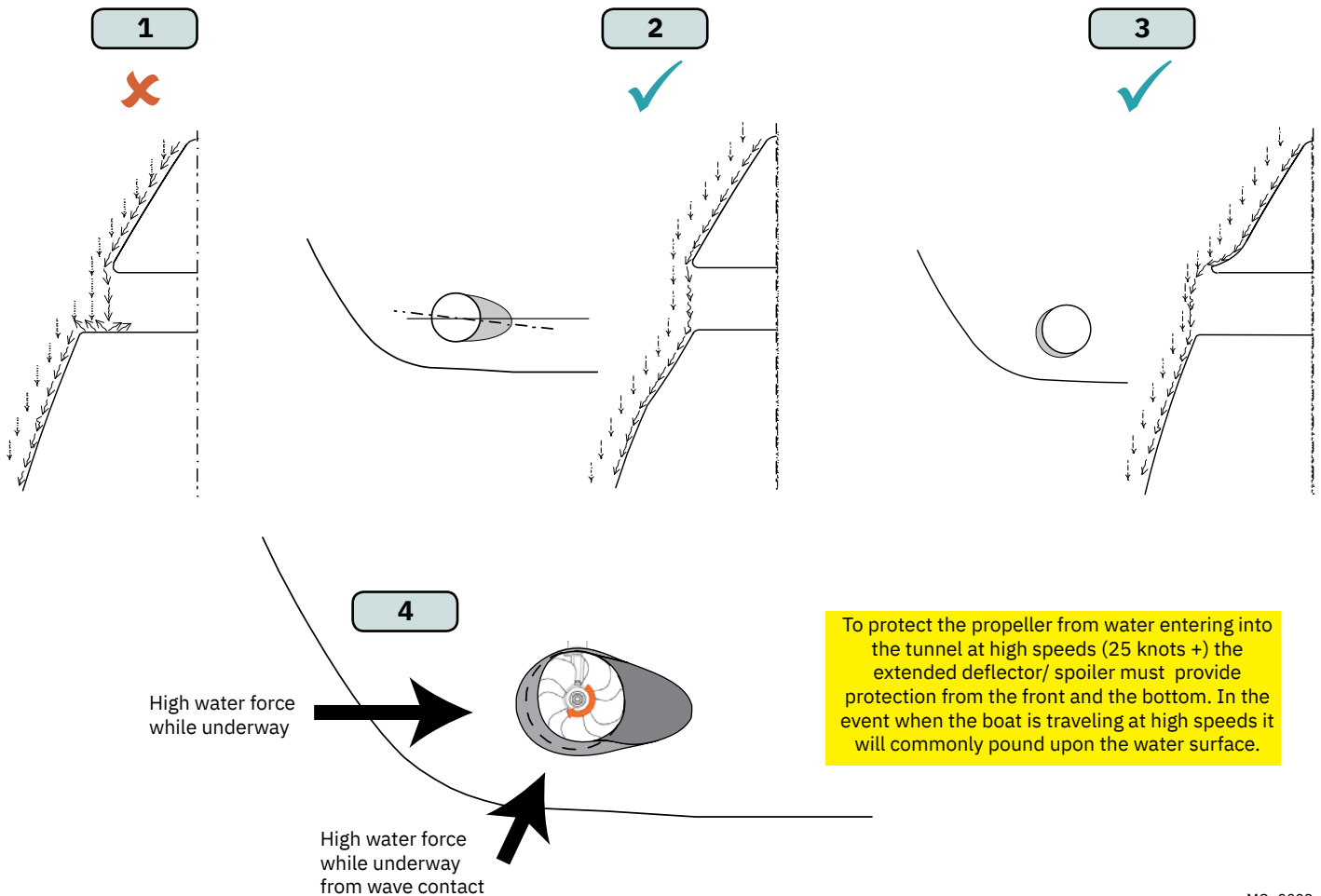
MG_0004

1. A possible problem in sail boats or fast powerboats is that a non-rounded surface can generate drag from the back face of the tunnel, as it creates a "flat" area facing the flow of water.

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

2. The best solution which generally reduces the most drag is to make a recess in the hull at the back of the tunnel. As the back face is removed water can flow freely past the tunnel entry. The depth and shape of this recess will depend on the boat and the angle facing up/ down aft of the tunnel insert. Normally it is angled slightly down because of the water flow on this area.
3. Making a deflector/ spoiler in front and underneath the tunnel can also reduce damage to the thruster and drag. The deflector/ spoiler will push the water flow out from the hull so water can pass by the back face of the tunnel. The shape and size of this deflector/ spoiler will depend on the hull shape. The easiest way of making the deflector/ spoiler is to retain a part of the lower forward area of the tunnel while installing the tube. Use this area as support to mould a soft curve/spoiler shape from the hull.
4. The thruster propeller can spin (passively) producing noise while sailing or cruising as water is forced through the tunnel. Water-flow directed through the tunnel at high speeds, during turning or as the boat bumps waves while underway can also damage the thruster.

(NB: As a rule, you should not see the back face of the tunnel when standing directly in front of the boat looking aft.)



Rounded tunnel ends will maximise thrust and minimise noise and cavitation.

For best performance round the tunnel connection to the hull-side as much as possible. The minimum rounding has a radius of 10% of the diameter of the tunnel.

Significant advantages of a rounded tunnel over a sharp tunnel to hull connections are:

1. A rounded tunnel end will prevent the creation of turbulence/ cavitation created from a sharp tunnel end when water passes by the tunnel.
 - The turbulence/ cavitation will block the outer area of the tunnel and thereby reduces the effective tunnel diameter and thrust.
 - Turbulence/ cavitation on the propeller will lessen the thrusters performance and create excess noise.
2. For steel/ aluminium hulls angled tunnel ends also offer similar performance as a rounded connection.
3. A rounded tunnel end makes the thruster draw water from along the hull-side, creating a vacuum that will suck the boat sideways and thereby give additional thrust.
 - With a sharp tunnel end, the thruster will be unable to take water from along the hull-side, and you will not gain the desired vacuum and additional thrust. This “free” extra thrust in optimal installations be 30 - 40% of the total thrust.

(NB: A Sleipner thruster propeller does not produce cavitation at working speed. Therefore, any cavitation and cavitation noise in the tunnel will be caused during improper tunnel installation.)

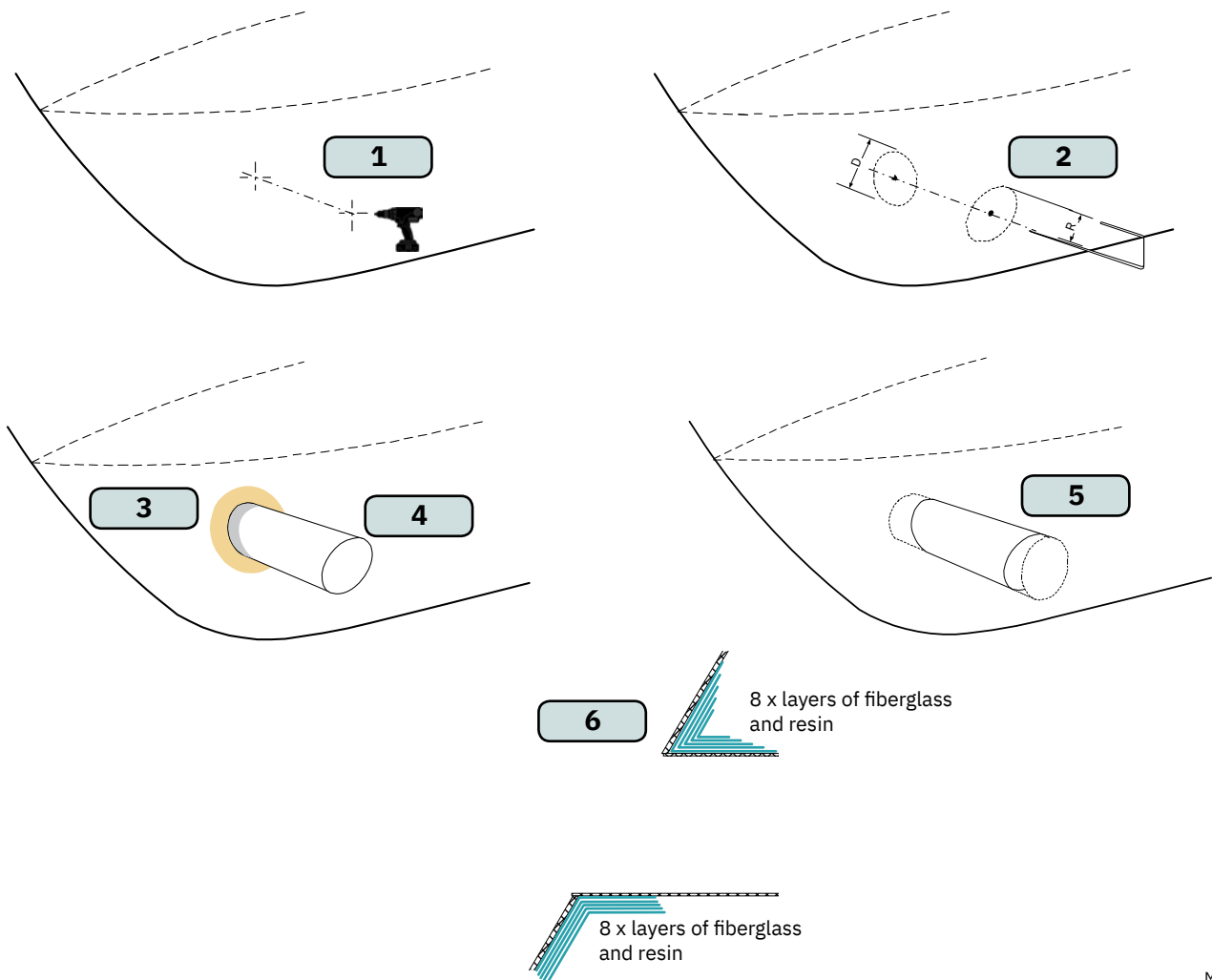


IMPORTANT

We recommend that a professional does the fibreglass, steel or aluminium fitting of the tunnel. These instructions are only general instructions 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.

1. Find the position in the boat considering the information earlier in this manual and the applicable measurements for the thruster model you are installing. Mark the centre of the tunnel on both sides of the hull. Drill a hole horizontally at these marks.
2. Mark the circle for the tunnel opening (outside diameter of the tunnel) and cut the hole.
3. Grind off the gel coat to the “real fibreglass” area 12cm around the hole on both inside and outside the hull to cast the tunnel to the hull (**Fig. 3**).
4. Insert the tunnel and mark its shape to fit the hull. (**NB: if you are installing with a deflector/ spoiler, leave a part of the tunnel in the front and underside of the tunnel that will cover the back face.**)
5. Cut the tunnel ends to the desired shape and lightly sand its surface. Clean the area with acetone or similar where you are going to apply fibreglass. (**NB: Do not cast or add fibreglass to the area were the thruster will be placed.**)
6. Cast the tunnel to the inside of the hull, use at least eight layers of 300g fibreglass and resin, preferably alternating mat and rowing types of fibreglass. To round the tunnel ends to a 10% radius make further layers inside to preserve the desired hull thickness.

(**NB: Ensure gaps between the tunnel and the hull are completely filled with resin/ fibreglass. In areas where you can not access to make layers of resin/ fibreglass, a resin/ fibreglass mixture must be used in that area.**)

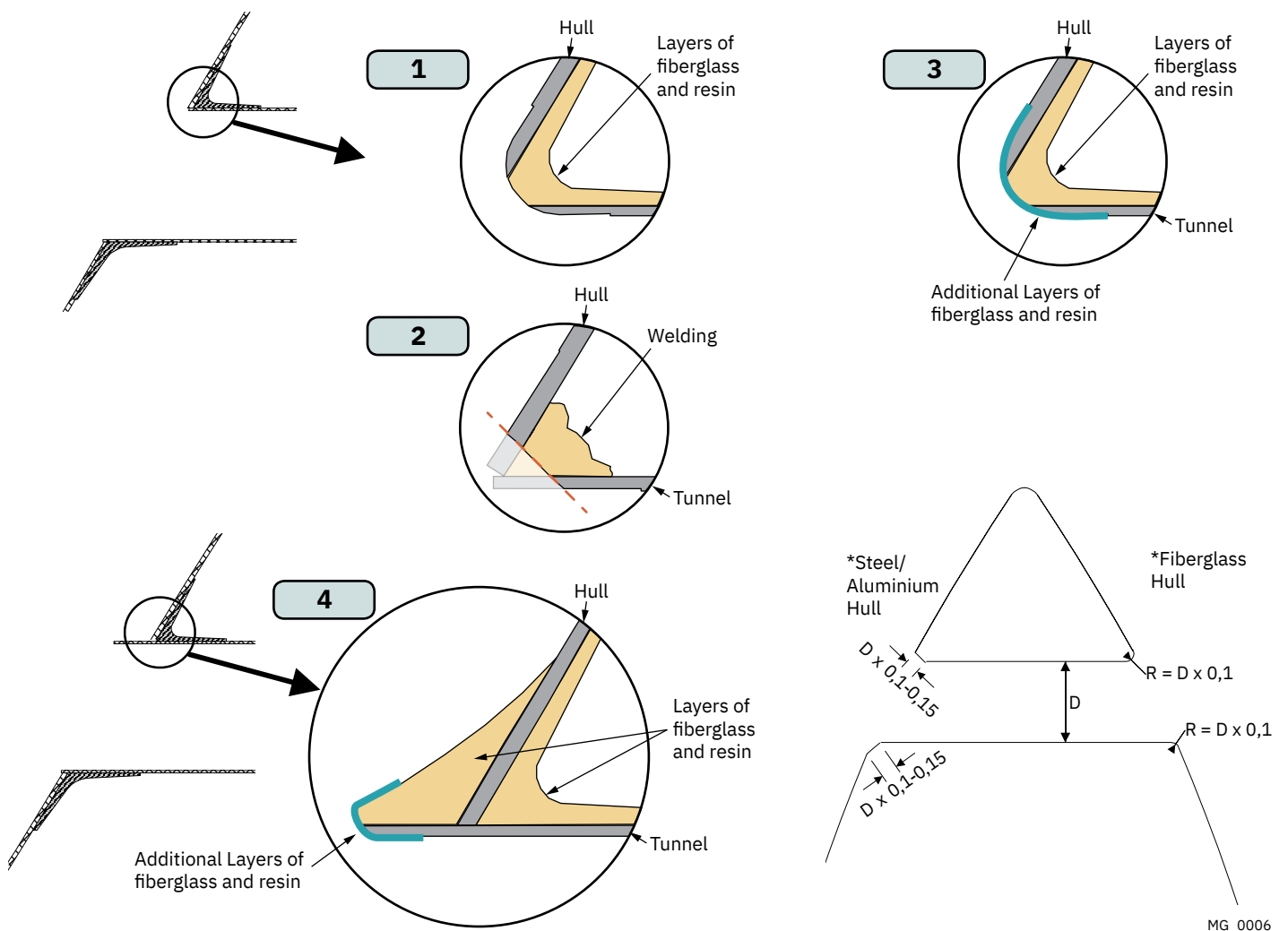


With tunnel installed and cast.

1. Round the edges with a radius of 10% of the tunnel diameter.
2. For steel/ aluminium hulls make a slope with a length of 10-15% of the tunnel diameter.
(NB: If this is not possible, round the tunnel end as much as possible.)
3. Additionally cast two layers on the outside of the tunnel/ hull in a 10cm area
4. Follow the same method if making the deflector/ spoiler.

You must apply gel coat to areas you have grounded/ moulded to make waterproof. These areas allow water access to the hull which is typically not waterproof without these applications outside. **(NB: All original Sleipner tunnels are fully waterproof when delivered except in the areas where you have cut and bonded it to the hull.)**

IMPORTANT
Avoid all casting where the motor-bracket is to be placed, as this will cause misfit and possible failure to the gear house.



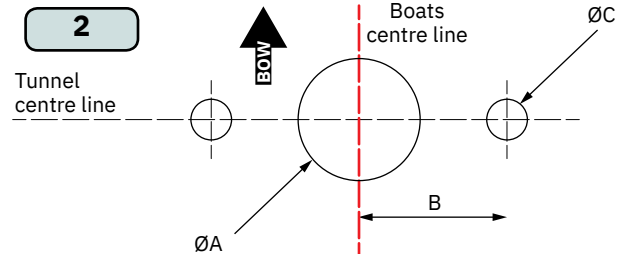
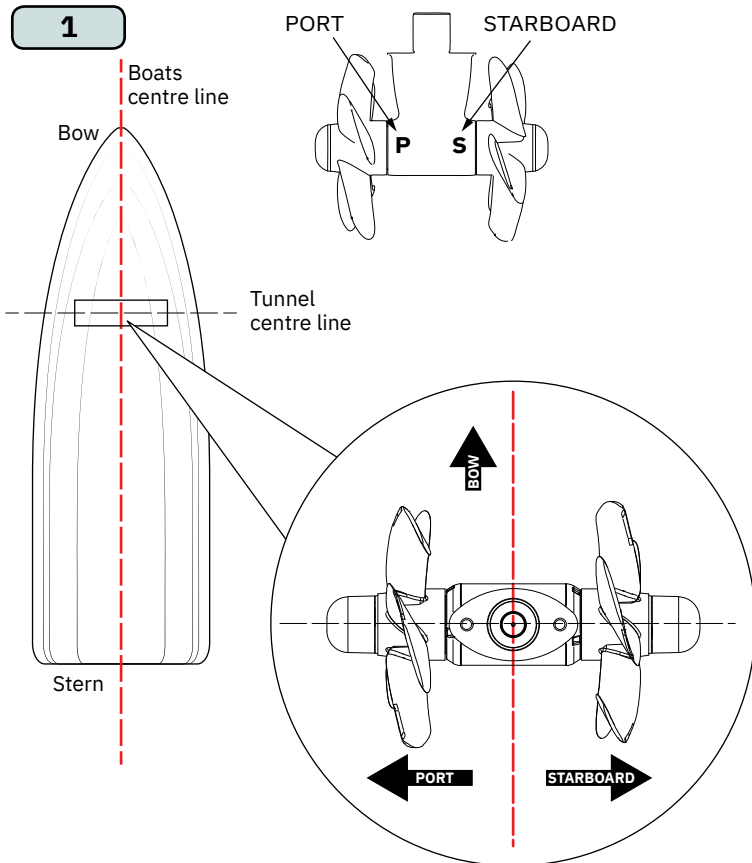
For **Stern Thruster** installation please refer to the supplied manual in your Sleipner product delivery



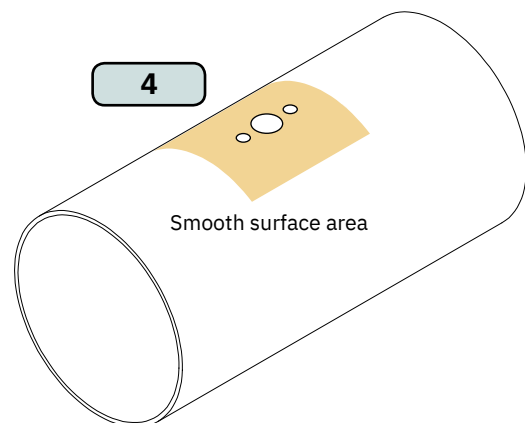
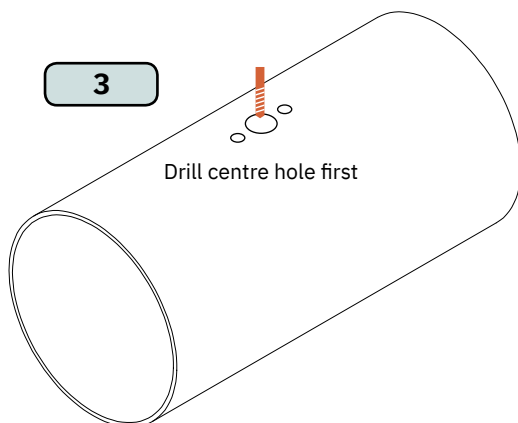
For supporting stern tunnel installation documentation, we advise you to visit our website www.sleipnergroun.com and find your Sleipner stern tunnel model.

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

1. Mark the tunnel centreline and the boat's centreline. **(NB: Install the gear leg and propeller as shown for the thrust direction to correspond with the control panel. Position gear leg with the P-mark facing port and the S-mark facing starboard.)**
2. Use the gasket or template (recommended) to mark the hole centres and double-check the measurements. The centre hole MUST be placed using the boat centreline as shown above. **(NB: All holes must be in-line with the tunnels' centreline for correct installation, clearance between the propeller and the tunnel is minimal.)**
3. Drill the main centre hole followed by the two screw-holes.
4. Smooth the surface of the tunnel. A rough surface will cause possible failure/movement of the gear leg. The motor bracket must rest steadily on the tunnel.



Models	Measurements					
	ØA		B		ØC	
	mm	inch	mm	inch	mm	inch
SE/SEP/SE IP/SEP IP 80/185T	32	1.3	28	1.1	9	0.4
SE/SEP/SE IP/SEP IP 100/185T						
E100/185T						
SH100/185T						
SE/SEP/SE IP/SEP IP 120/215T	46	1.8	40	1.6	11	0.4
SE/SEP/SE IP/SEP IP 130/250T						
SE/SEP/SE IP/SEP IP 170/250TC						
SE/SEP/SE IP/SEP IP 210/250TC						
E130/250T						
E150/215T						
E170/250TC						
E210/250TC						
E240/250TC						
SH160/215T						
SH240/250TC						
SAC 240/250TC						
SE/SEP/SE IP/SEP IP 250/300TC	51	2	48	1.9	11	0.4
SE/SEP/SE IP/SEP IP 300/300TC						
E250/300TC						
E300/300TC						
SH300/300TC						
SH320/300TC						
SAC320/300TC						
SH360/300TC	67	2.6	48	1.9	11	0.4
SH400/300TC						
SAC360/300TC						
SAC400/300TC						
SH420/386TC	83	3.3	70	2.8	17	0.7
SH550/386TC						
SH700/412						
SAC450/386TC						
SAC520/386TC						
SAC700/412						



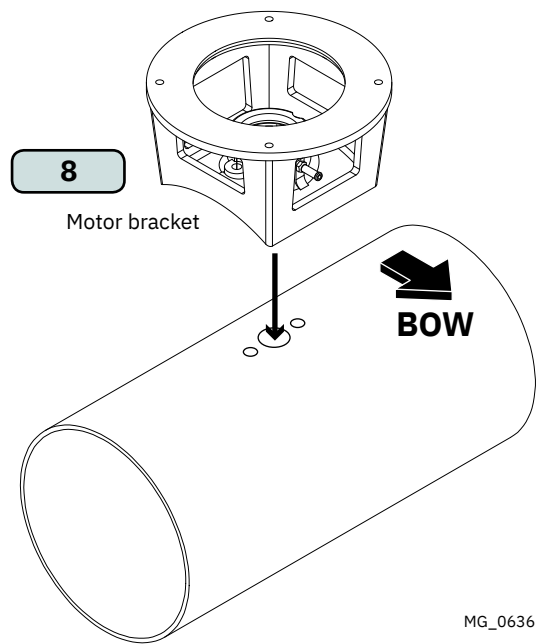
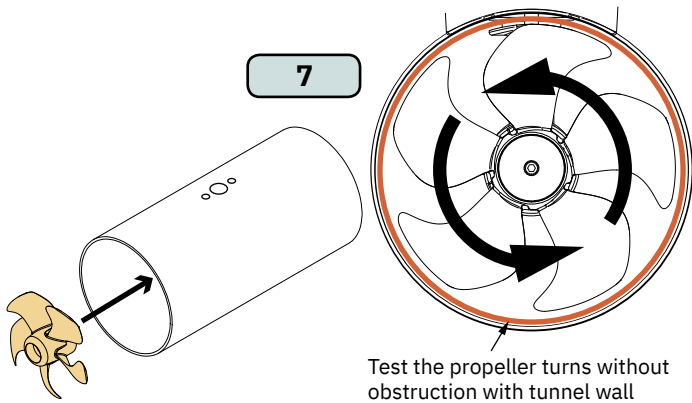
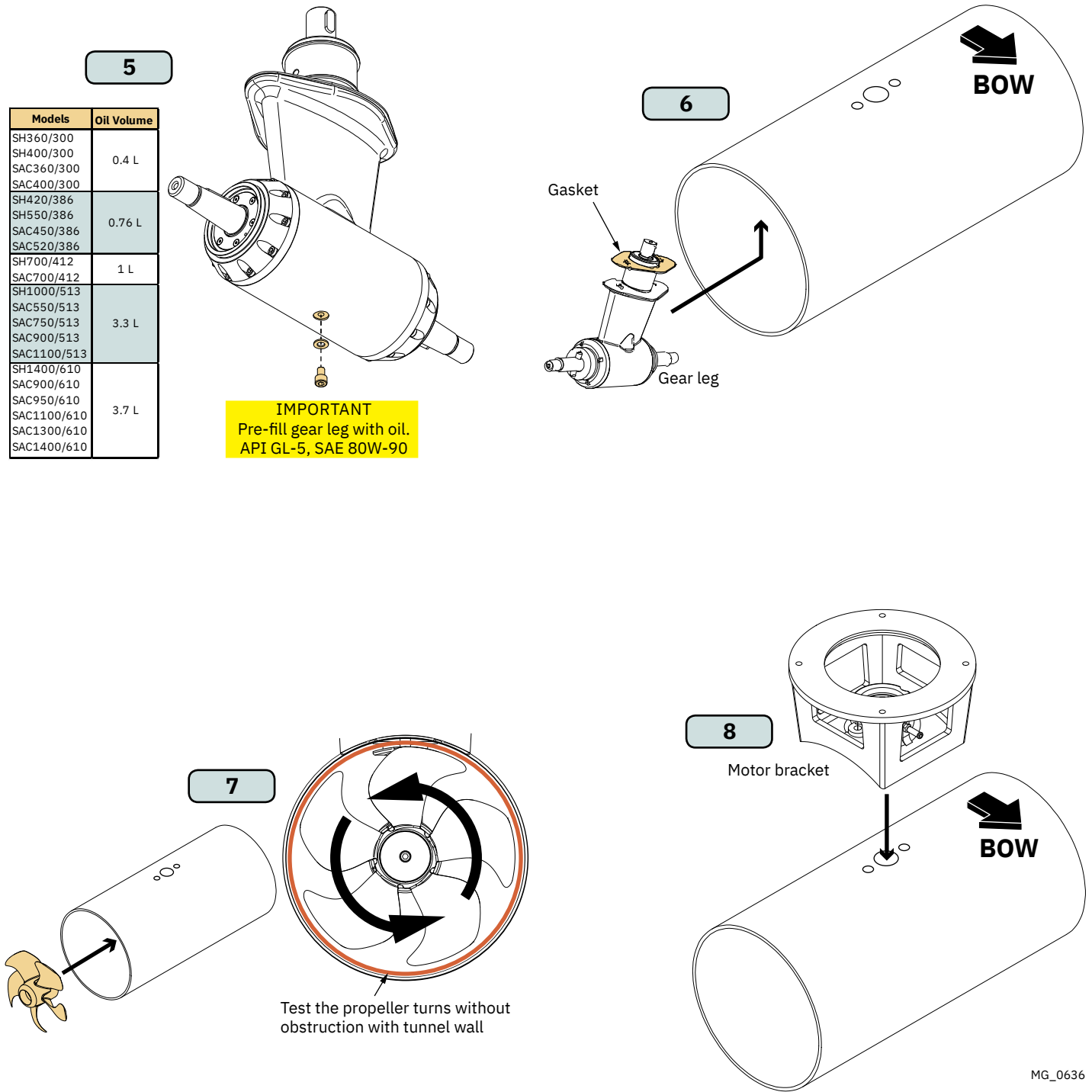
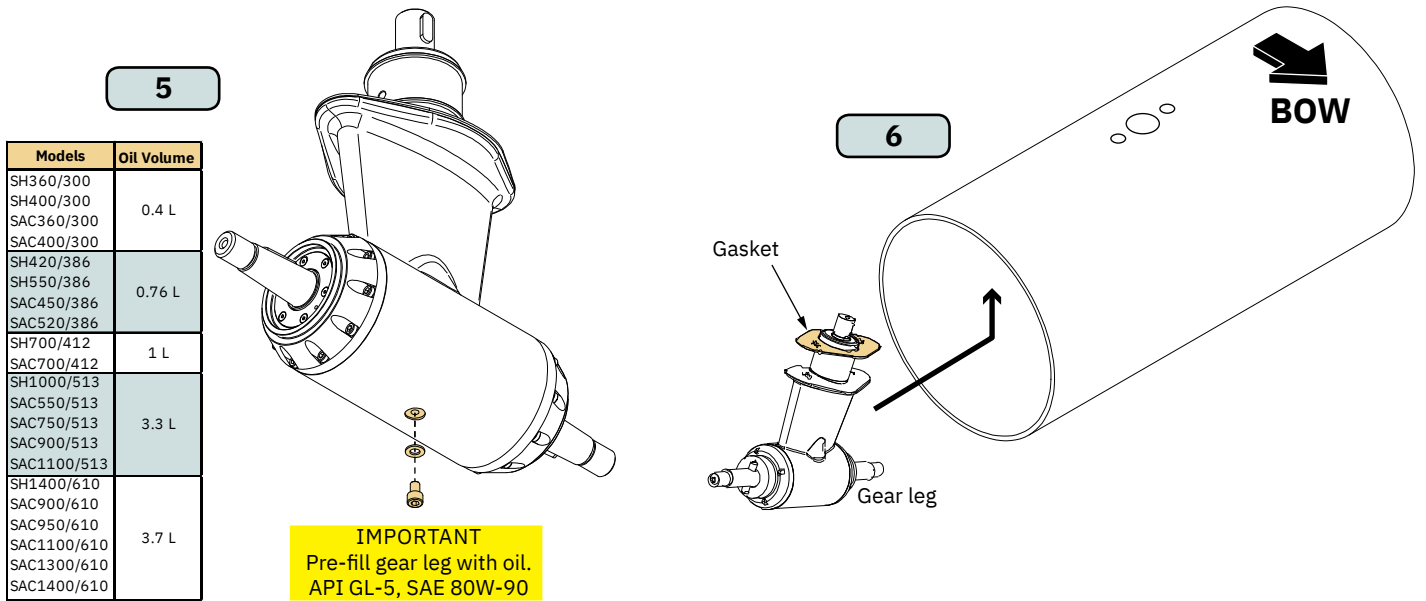
! Please refer to the graphic for special considerations relating to your model !

- Fill the gear leg with oil as shown above through the hole of the oil drain screw. Ensure to insert the copper gasket and fasten after adding oil into the gear leg.

IMPORTANT

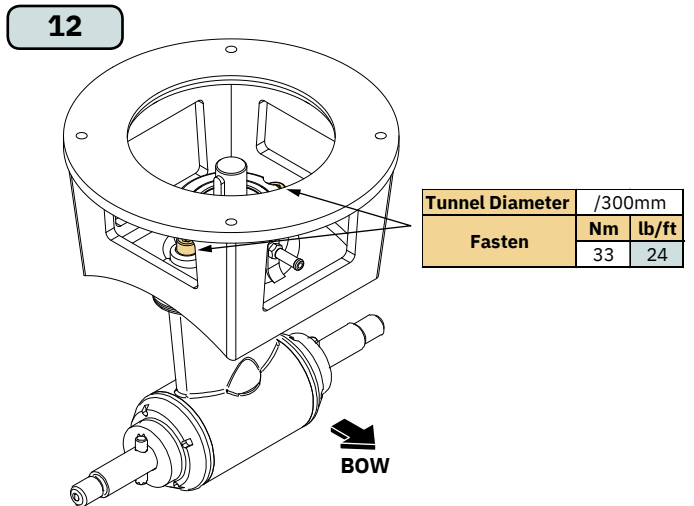
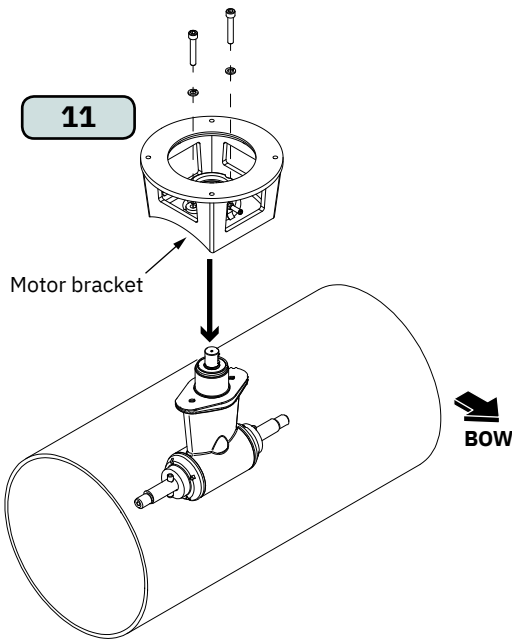
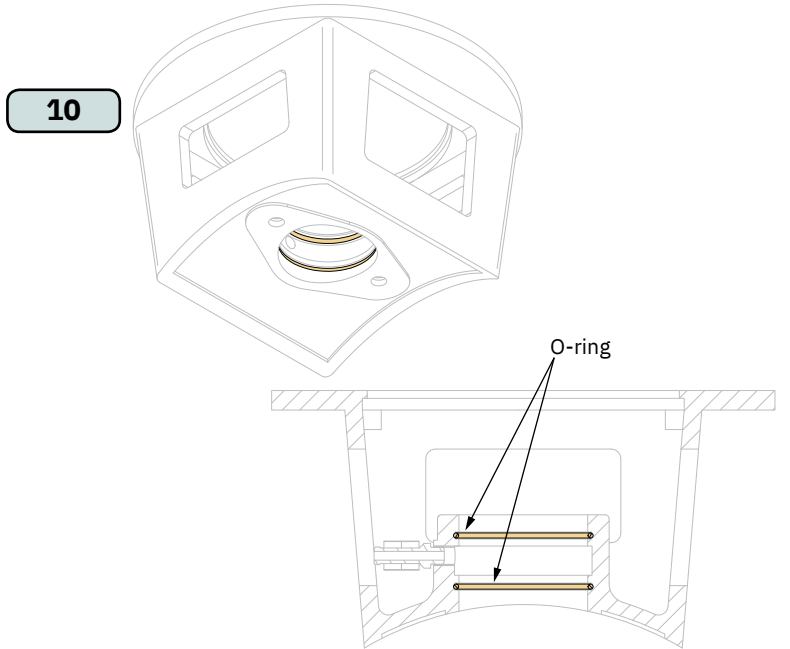
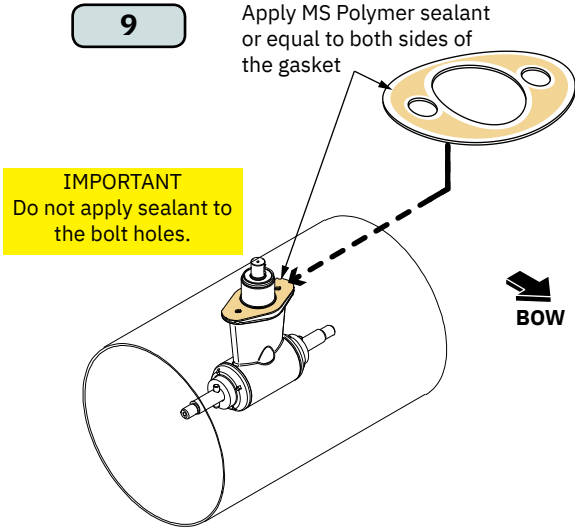
Ensure there is oil or grease on the O-rings in the motor bracket before mounting with the gear house. No lubrication could cause serious damage to the O-rings. NB: The gear leg neck and the inner surface of the motor bracket must remain clean.

- Place the gear leg (without the propeller) with the gasket on inside the tunnel.
- Place the propeller on the gear leg (**NB: Do not secure the propeller with securing parts**) to ensure it is centred and rotates freely with the same clearance from each blade to the tunnel wall.
- Place top motor bracket and bolt plate to measure the drive shaft has come through the motor bracket at the correct height. Remove the gear leg and propeller for final installation.



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

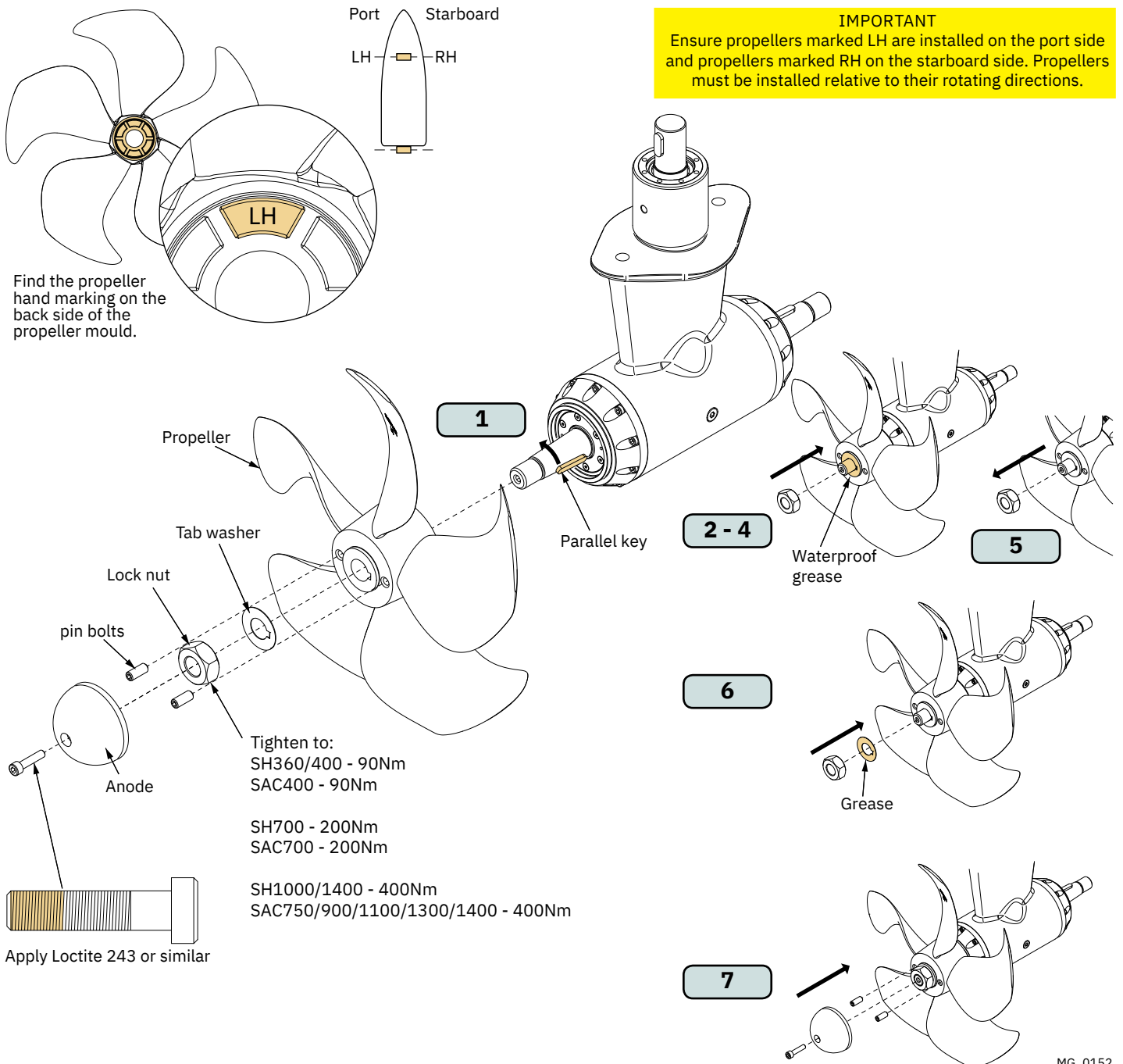
9. Apply appropriate sealant to both sides of the gasket and place on the gear leg. Place the gear leg in the tunnel (without the propeller). Use appropriate sealant to ensure that no leakages occur. **(NB: See your sealant data sheet for the correct application process.)**
10. Apply a little oil or grease on the O-rings in the motor bracket before mounting it together with the gear house, to prevent damaging the O-rings during insertion. **(NB: The gear leg neck and the inner surface of the motor bracket must remain clean.)**
11. Install the top motor bracket and gear leg gently together.
12. Fasten the gear leg and the motor bracket with the bolts provided. Tighten to torque as shown.



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

1. Rotate the propeller shaft so the shaft key way is facing up. Remove the tape holding the parallel key in place on the propeller shaft.
2. Insert the propeller onto the propeller shaft until the propeller key aligns into the slot/ groove in the propeller. **(NB: Installation requires almost no gap (approximately 1mm) between the propeller and the gear leg.)**
3. Apply waterproof grease only to the thread where the bolt will be fastened to achieve required torque tension. **DO NOT** apply grease to the internal propeller core.
4. Without the washer fasten the propeller lock-nut to the required torque.
5. Remove the propeller lock-nut from the shaft.
6. Grease the washer surface facing the propeller lock-nut. Insert the washer on the propeller shaft and re-fasten the propeller lock-nut to required torque tension. **(NB: Ensure the washer tab is inserted into the slot/ groove in the propeller.)**
7. Insert the two anode pins on the propeller and the anode to the end of the propeller and fasten the anode holding screw. Apply a thread glue (Loctite or similar) to ensure that the anode holding screw does not unscrew itself from during the rotation of the propeller.

IMPORTANT
Ensure propellers marked LH are installed on the port side and propellers marked RH on the starboard side. Propellers must be installed relative to their rotating directions.



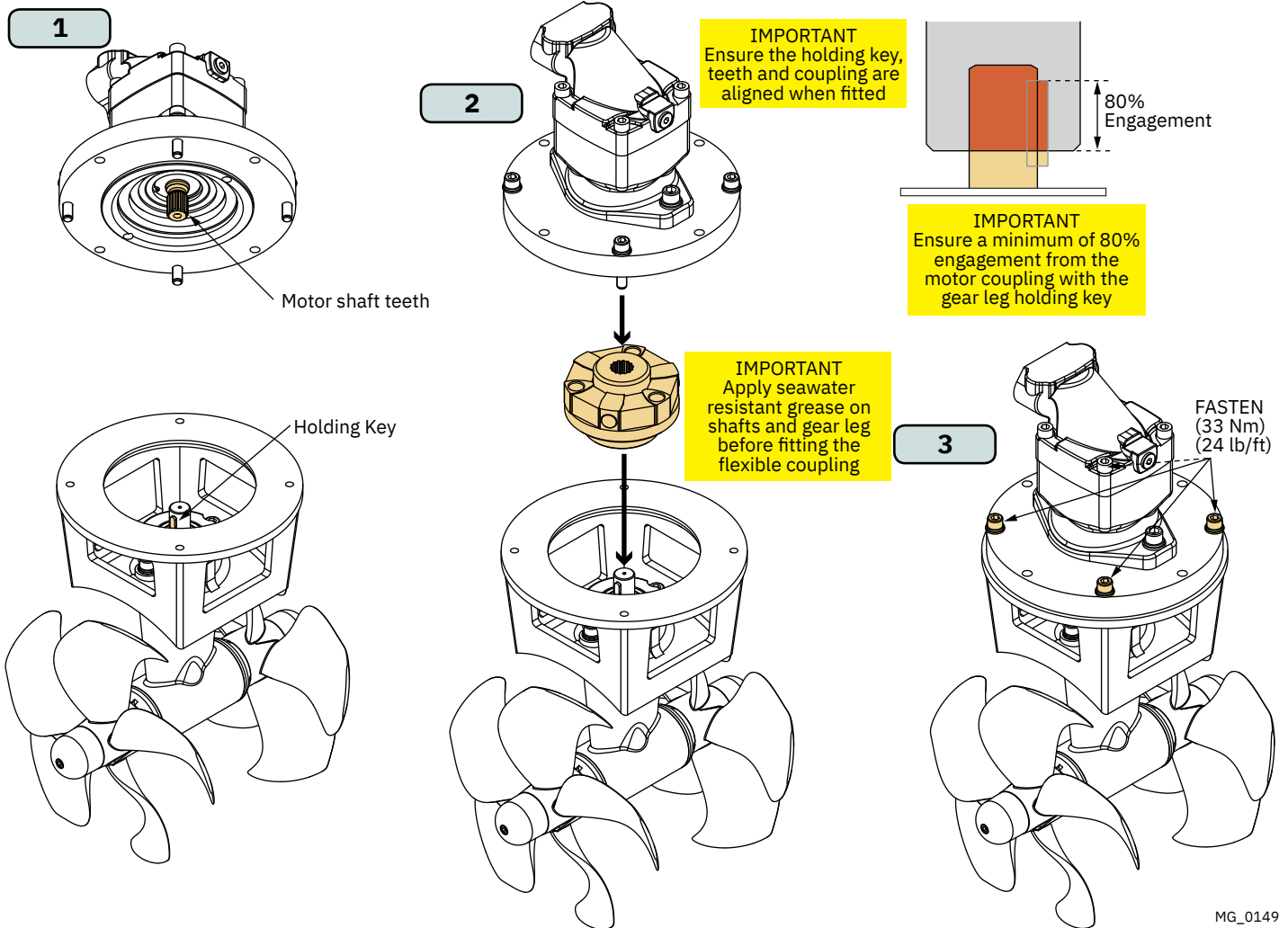
MG_0152

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

1. Align the holding keys to allow the fitting of the coupling to the driveshaft. Apply seawater resistant grease on the shafts before fitting the flexible coupling.
2. Place the motor onto the bracket while inserting the coupling ensuring the couplings engage together correctly (top and bottom). **(NB: The motor can be placed in all directions on the motor bracket. However, ensure the hose terminals are accessible for connection installation later.)**
3. Fasten the bolts holding the motor to the motor bracket with the defined torque.
4. Check the drive shafts are engaged by rotating the propeller. **(NB: Rotating the propellers can be hard due to the gear reduction and the motor, however the propeller must be able to rotate via hand power.)**

IMPORTANT

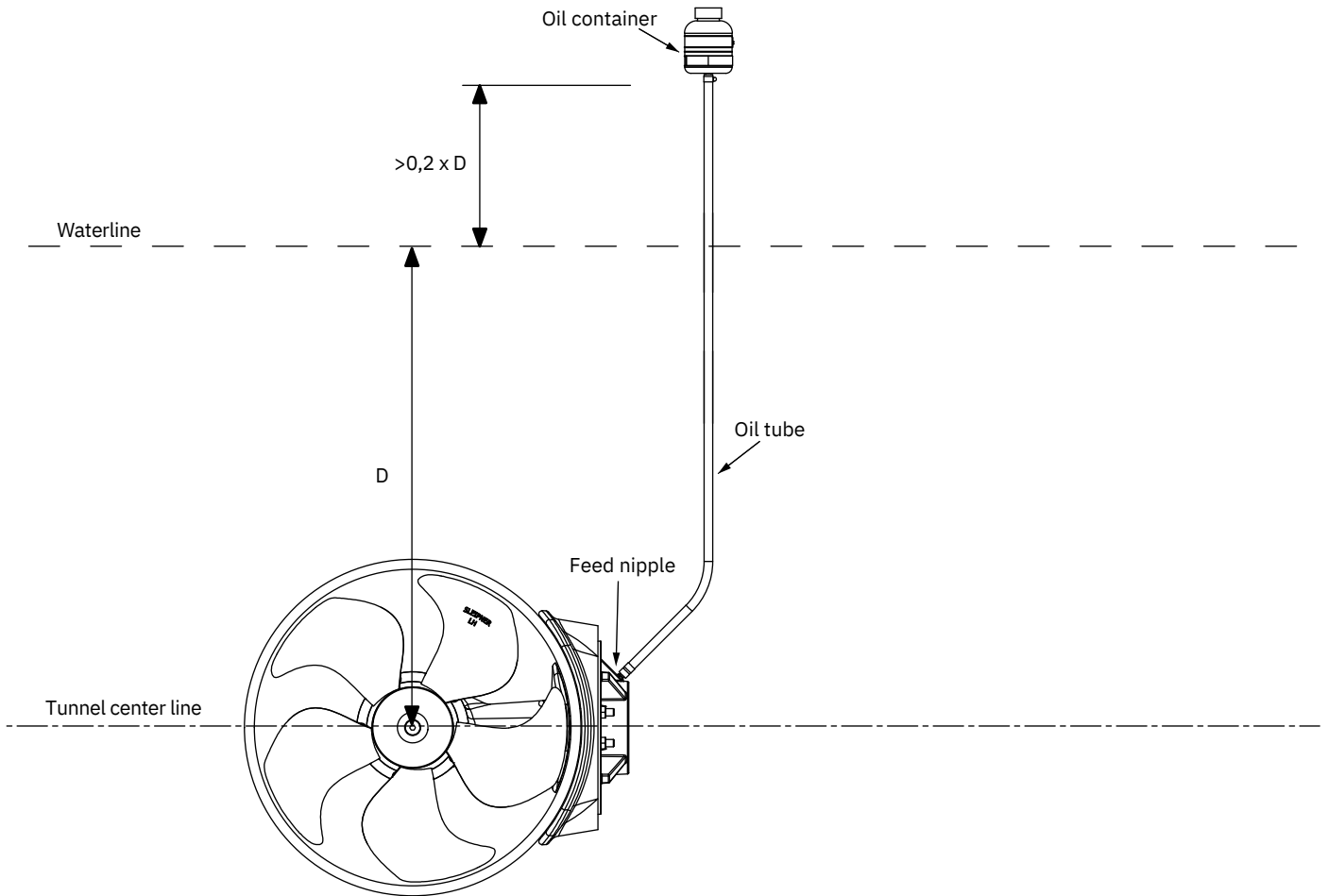
The hydraulic motor must be covered until hose pipes have been connected to avoid dust entering the motor hose pipes inlets during future fabrication or maintenance.



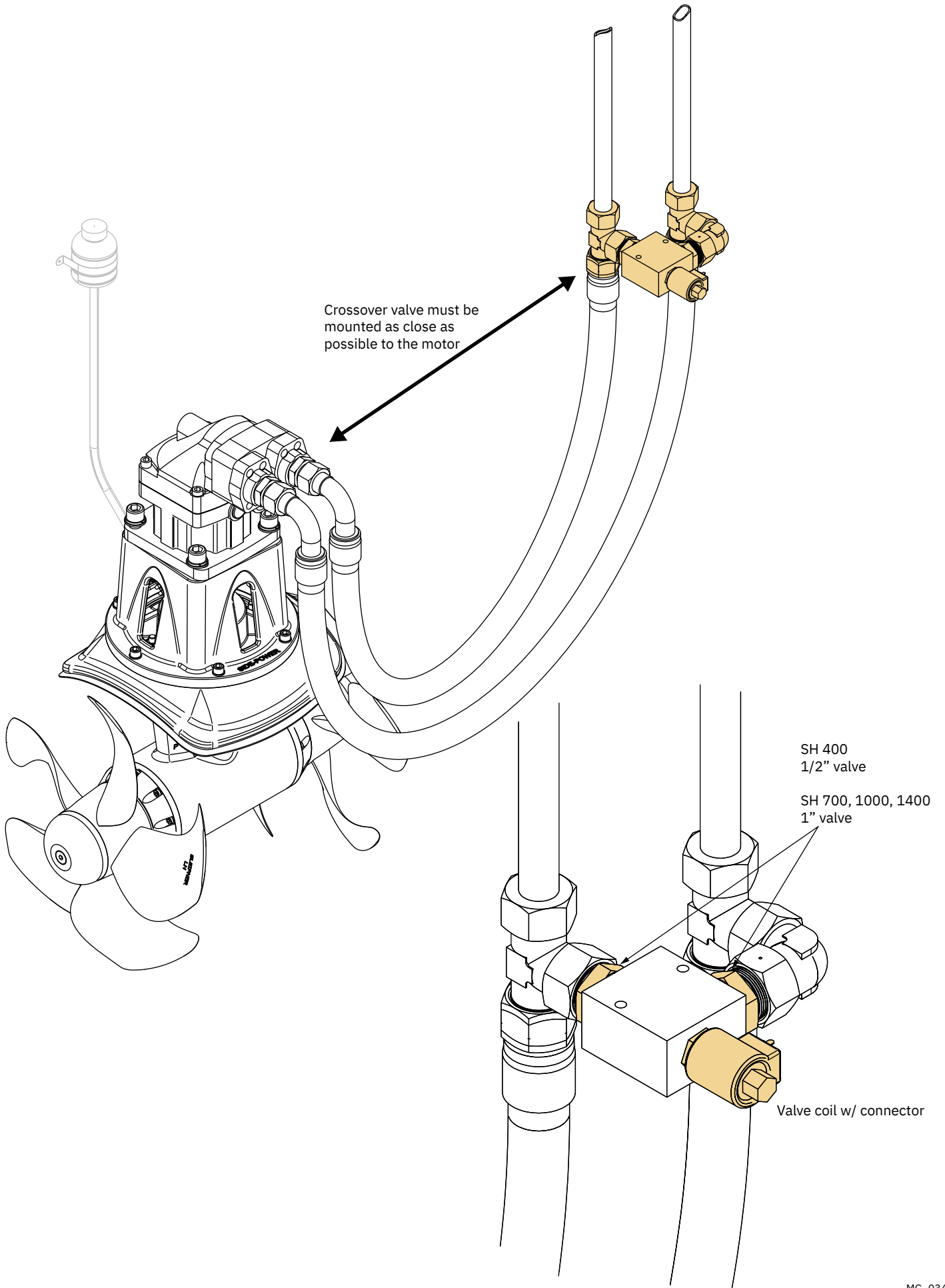
! Please refer to the graphic for special considerations relating to your model !

1. Install the oil container above the waterline by at least 20% of the distance from the waterline to the centre of the tunnel. This ensures enough overpressure for the oil in the gear leg.
2. Install the oil tube from the oil container to the feed nipple on the motor bracket. Fasten both the tube clamp screws. **(NB: Ensure the oil tube has no loops and forms an airlock to stop the oil flow. Ensure the oil tube angle is sufficient to allow oil to flow freely into the gear leg.)**
3. Fill the oil container with the same gear oil used in the gear leg. The oil container works as an indicator to ensure oil is in the gear leg at all times.

(NB: Fill and drain the gear leg simultaneously while replacing the oil to ensure the system is never empty.)



Crossover Valve



S-Link is a CAN-based control system used for communication between Sleipner products installed on a vessel. The system uses BACKBONE Cables as a common power and communication bus with separate SPUR Cables to each connected unit. Only one S-Link POWER cable shall be connected to the BACKBONE Cable. Units with low power consumption are powered directly from the S-Link bus.

Main advantages of S-Link system:

- Compact and waterproof plugs.
- BACKBONE and SPUR Cables have different colour coding and keying to ensure correct and easy installation. BACKBONE Cables have blue connectors and SPUR Cables have green connectors.
- Different cable lengths and BACKBONE Extenders make the system scalable and flexible to install.

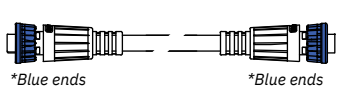
Installation of S-Link cables:

Select appropriate cables to keep the length of BACKBONE- and SPUR Cables to a minimum. In case of planned installation with total BACKBONE Cable length exceeding 100 meters please consult your local distributor. The S-Link cables should be properly fastened when installed to avoid sharp bend radius, cable chafing and undesired strain on connectors. Locking mechanism on connectors must be fully closed. To ensure long lifetime, cables, T-Connectors and Extenders should not be located so that they are permanently immersed in water or other fluids. It is also recommended to install cables such that water and condensation do not run along the cables and into the connectors.

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

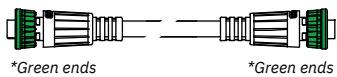
To reduce the risk of interference, avoid routing the S-Link cables close to equipment such as radio transmitters, antennas or high voltage cables. The backbone must be terminated at each end with the END Terminator.

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



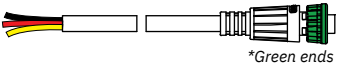
BACKBONE Cable

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



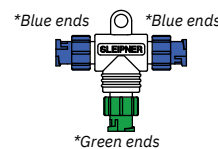
SPUR Cable

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



POWER Cable

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



T-Connector

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



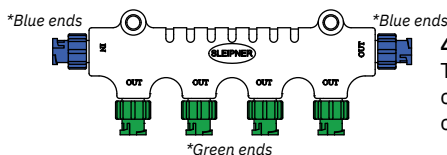
BACKBONE Extender

Connects two BACKBONE Cables to extend the length.



END Terminator

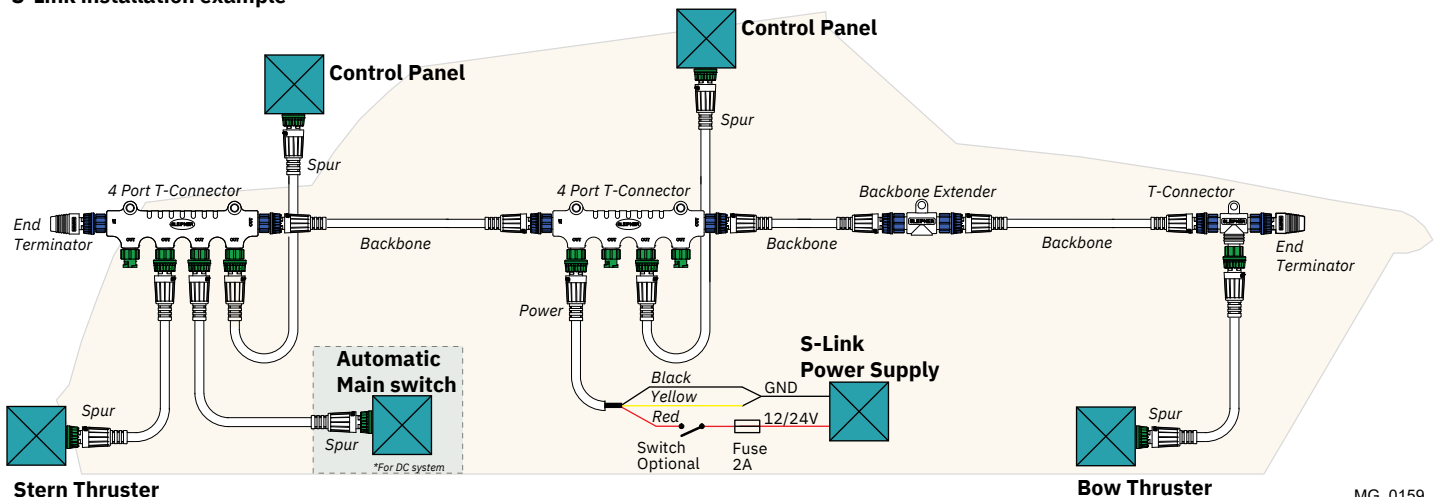
Must be one at each end of the BACKBONE bus.



4-Port T-Connector

The 4-PORT T-connector allows multiple SPUR Cables to be connected. The 4-PORT T-connector comes with two sealing caps to protect unused ports.

S-Link installation example



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



- Propeller is fastened correctly to the shaft.
- Propeller turns freely in tunnel.
- Lower-unit is filled with gear oil.
- Oil-drain screw is tightened and the copper seal is present.
- The anode holding screw is tightened well with thread glue.
- Anti-fouling have been applied to the gear house and propeller but NOT on the anode or the gear house lid where the propeller is fastened.
- Oil tank is fitted above the waterline as required and filled with gear oil.
- Correct drive direction as per control panel.
- The bolts holding the gear house and motor bracket together are tightened correctly.
- The bolts holding the motor to its bracket are tightened correctly.

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

Signed:

Date:

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

Thruster type:

Serial number:.....

Date of delivery:.....

Correct drive direction as per control panel:

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

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

Other comments by installer:

.....

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

Product Spare Parts and Additional Resources

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

Warranty statement

1. Sleipner Motor AS (The “Warrantor”) warrants that the equipment (parts, materials, and embedded software of products) manufactured by the Warrantor is free from defects in workmanship and materials for purpose for which the equipment is intended and under normal use and maintenance service (the “Warranty”).
2. This Warranty is in effect for two years (Leisure Use) or one year (Commercial and other Non-leisure Use) from the date of delivery/purchase by the end user, with the following exceptions;
 - (a) For demonstration vessels, or vessels kept on the water, the dealer is considered as the end user from 6 months after their launch of the vessel;
 - (b) The warranty period starts no later than 18 months after the first launch of the vessel.
 Please note that the boat manufacturer and dealer must pay particular attention to correct maintenance and service both by the products manuals as well as general good practice for the location the boat is kept in the period the boat is in their care. In cases where the 6 and 18 months grace periods for boat builders and dealers are passed, it is possible to obtain a full warranty upon inspection and approval of the warrantor or such representative.
3. Certain parts, classified as wearable or service parts, are not covered by the warranty. A failure to follow the required maintenance and service work as described in the product manual render all warranty on parts or components directly or indirectly affected by this void. Please also note that for some parts, time is also a factor separately from actual operational hours.
4. This Warranty is transferable and covers the equipment for the specified warranty period.
5. The warranty does not apply to defects or damages caused by faulty installation or hook-up, abuse or misuse of the equipment including exposure to excessive heat, salt or fresh water spray, or water immersion except for equipment specifically designed as waterproof.
6. In case the equipment seems to be defective, the warranty holder (the “Claimant”) must do the following to make a claim:
 - (a) Contact the dealer or service centre where the equipment was purchased and make the claim. Alternatively, the Claimant can make the claim to a dealer or service centre found at www.sleipnergrouper.com. The Claimant must present a detailed written statement of the nature and circumstances of the defect, to the best of the Claimant’s knowledge, including product identification and serial nbr., the date and place of purchase and the name and address of the installer. Proof of purchase date should be included with the claim, to verify that the warranty period has not expired;
 - (b) Make the equipment available for troubleshooting and repair, with direct and workable access, including dismantling of furnishings or similar, if any, either at the premises of the Warrantor or an authorised service representative approved by the Warrantor. Equipment can only be returned to the Warrantor or an authorised service representative for repair following a pre-approval by the Warrantor’s Help Desk and if so, with the Return Authorisation Number visible postage/shipping prepaid and at the expense of the Claimant.
7. Examination and handling of the warranty claim:
 - (a) If upon the Warrantor’s or authorised service Representative’s examination, the defect is determined to result from defective material or workmanship in the warranty period, the equipment will be repaired or replaced at the Warrantor’s option without charge, and returned to the Purchaser at the Warrantor’s expense. If, on the other hand, the claim is determined to result from circumstances such as described in section 4 above or a result of wear and tear exceeding that for which the equipment is intended (e.g. commercial use of equipment intended for leisure use), the costs for the troubleshooting and repair shall be borne by the Claimant;
 - (b) No refund of the purchase price will be granted to the Claimant, unless the Warrantor is unable to remedy the defect after having a reasonable number of opportunities to do so. In the event that attempts to remedy the defect have failed, the Claimant may claim a refund of the purchase price, provided that the Claimant submits a statement in writing from a professional boating equipment supplier that the installation instructions of the Installation and Operation Manual have been complied with and that the defect remains.
8. Warranty service shall be performed only by the Warrantor, or an authorised service representative, and any attempt to remedy the defect by anyone else shall render this warranty void.
9. No other warranty is given beyond those described above, implied or otherwise, including any implied warranty of merchantability, fitness for a particular purpose other than the purpose for which the equipment is intended, and any other obligations on the part of the Warrantor or its employees and representatives.
10. There shall be no responsibility or liability whatsoever on the part of the Warrantor or its employees and representatives based on this Warranty for injury to any person or persons, or damage to property, loss of income or profit, or any other incidental, consequential or resulting damage or cost claimed to have been incurred through the use or sale of the equipment, including any possible failure or malfunction of the equipment or damages arising from collision with other vessels or objects.
11. This warranty gives you specific legal rights, and you may also have other rights which vary from country to country.

Patents

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

Dotted lines for note-taking.

© **Sleipner Group**, All rights reserved
The information given in the document was right at the time it was published. However, Sleipner Group cannot accept liability for any inaccuracies or omissions it may contain. Continuous product improvement may change the product specifications without notice. Therefore, Sleipner Group cannot accept liability for any possible differences between product and document.

Learn more about our products at
www.sleipnergroun.com



SLEIPNER GROUP

P.O. Box 519

N-1612 Fredrikstad

Norway

www.sleipnergroun.com

Made in Norway

