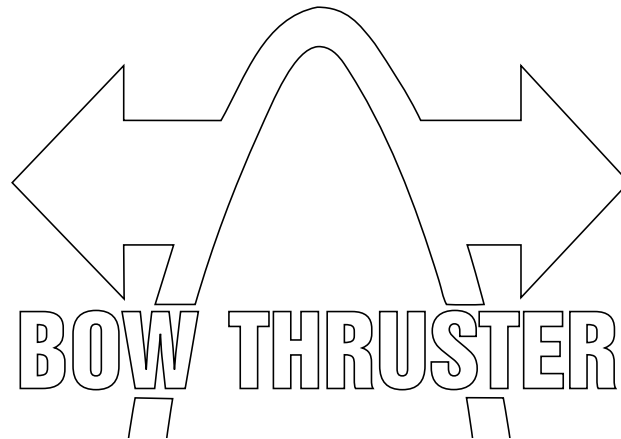




Operation manual and installation
instructions



BOW4512D

45 kgf - ø 125 mm

Content

- 1 Introduction
- 2 Safety
- 3 Use
- 4 Installation
 - 4.1 Preparation
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 - 4.3 Final assembly
- 5 Electrical installation
- 6 Maintenance
- 7 Trouble shooting
- 8 Technical data
- 9 Principal dimensions
- 10 Wiring diagram
 - 10.1 Simultaneous operation of two bow thrusters with one panel
- 11 Battery capacity, battery cables

1 Introduction

These installation instructions give guidelines for fitting the Vetus bow thruster 'BOW4512D'.

The quality of installation will determine how reliably the bow thruster performs. Almost all faults can be traced back to errors or imprecision during installation. It is therefore imperative that the steps given in the installation instructions are followed in full during the installation process and checked afterwards.

Alterations made to the bow thruster by the user will void any liability on the part of the manufacturer for any damages that may result.

The thrust given by the bow thruster will vary from vessel to vessel depending on the effect of the wind, the water displacement and the shape of the underwater hull.

- The nominal thrust quoted can only be achieved under the most favourable conditions:
- During the installation process the '**Installation recommendations for bow thrusters**', must be followed, specifically concerning:
 - Sufficiently large diameter of the battery cables so that voltage drop is reduced to a minimum.
 - The manner in which the tunnel has been connected to the hull.
 - Use of bars in the tunnel openings.
These bars should only be used where this is strictly necessary (if sailing regularly in severely polluted water.)
 - The bars must have been fitted correctly.

Following the above recommendations will result in longer life and better performance of your bow thruster.

- Carry out the recommended maintenance regularly.
- Never allow the bow thruster to operate for a long period; the maximum length of usage is restricted because of heat release in the electric motor. After use the motor must be allowed to cool off.

NOTE

The maximum continuous length of usage and the thrust as specified in the technical details are based on the recommended battery capacities and battery cables. If significantly larger batteries in combination with very short battery cables of significantly larger diameter than recommended are used then the thrust will increase. In such cases the maximum length of usage must be reduced in order to prevent damage to the motor.

2 Safety

WARNING!

When using the bow thruster watch out for swimmers or light boats which could be in the near vicinity of the bow thruster tunnel jet openings.

Pass on the safety instructions to others using the bow thruster.

General rules and laws with regard to safety and accident-prevention also need to be applied.

- Never touch the moving ends of the bow thruster whilst in operation.
- Never touch hot parts of the bow thruster and never place flammable materials in the vicinity of the bow thruster.
- Always stop the bow thruster before checking components or adjusting the bow thruster.
- Always detach the battery poles during maintenance work.
- Ensure maintenance work is safe by only using tools suitable for the purpose.
- Always deactivate the main switch when the bow thruster is not in use for long periods.

3 Use

- Switch on the main switch.
- Consult the handbook supplied with the control panels for instructions on using the bow thruster.

Never switch in one movement from starboard to portside or reverse, but wait until the propeller stands still, before giving it a command to operate the electric motor in the opposite direction.

CARE!

If 2 control panels are installed never operate the bow thruster from both panels simultaneously.

- Switch off the main switch when leaving the ship.



Make sure that the user of the vessel is supplied with the owner's manual.

4 Installation

In order to install the tunnel, consult 'Installation recommendations for bow thrusters', Vetus art. code 020571.03.

NOTE

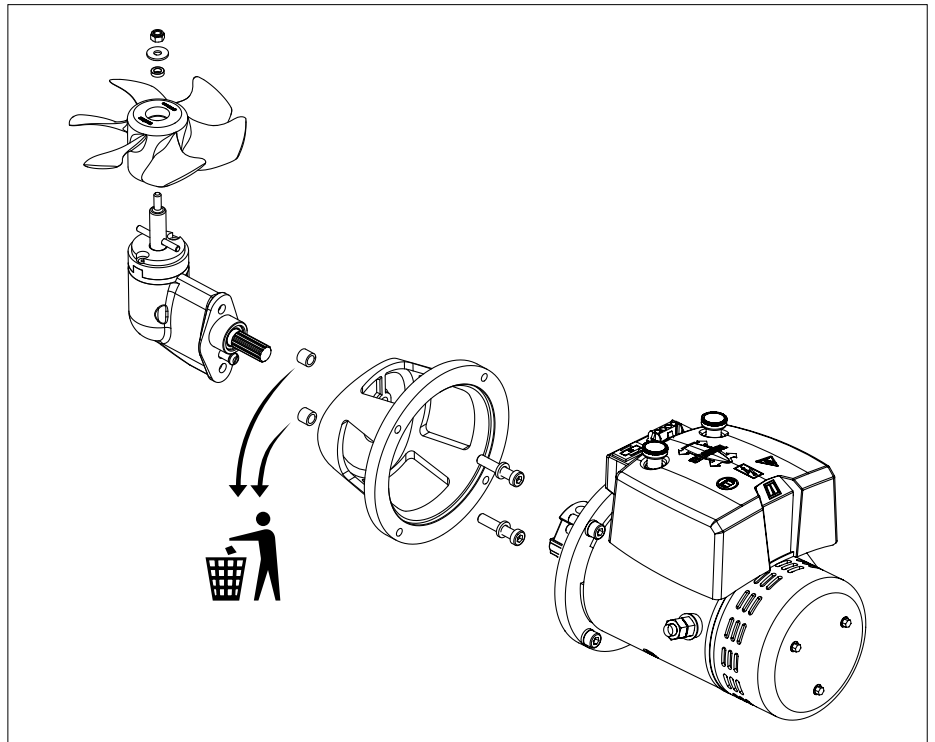
The areas in which the electric motor of the bow thruster and the battery are positioned must be dry and well ventilated.

4.1 Preparation

The bow thruster will be delivered fully assembled. Perform the following steps:

- Remove the propeller.
- Remove the motor from the intermediate flange.
- Remove the intermediate flange from the tail piece.

The 2 bushes are only required for transport and are now no longer needed.

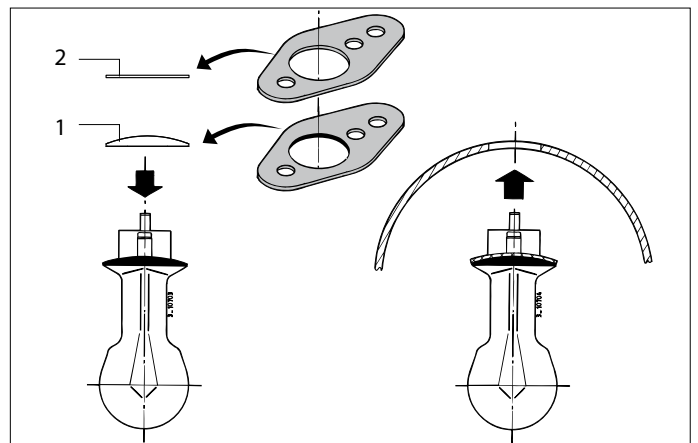


4.2 Installation tailpiece and intermediate flange

- Ensure that the plastic shim plate (1) has been positioned on the tail piece.
- Place one packing (2) between the tail piece and the tunnel.
- Apply a sealant (e.g. polyurethane or silicone) between the tail piece and packing, and between the packing and the tunnel wall.
- Place the tail piece in the hole in the tunnel.

Any extra packings used should be ones capable of justifying the tail piece.

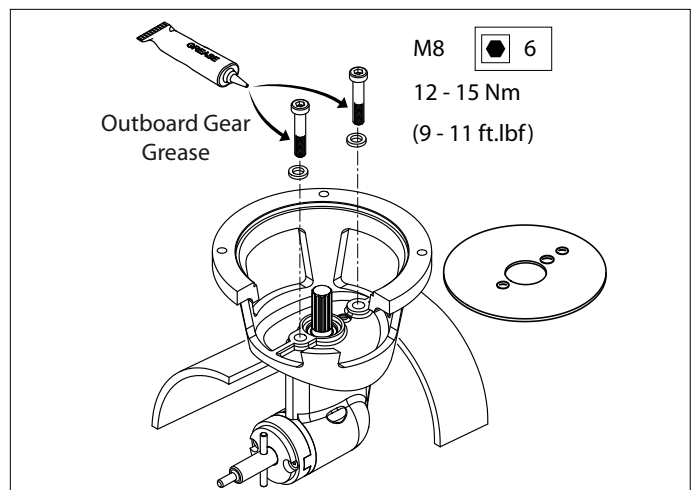
*) e.g. Sikaflex®-292.



- Grease the hole of the intermediate flange and position this flange.
- Grease the threads of the bolts with 'outboard gear grease' before inserting and tightening them.

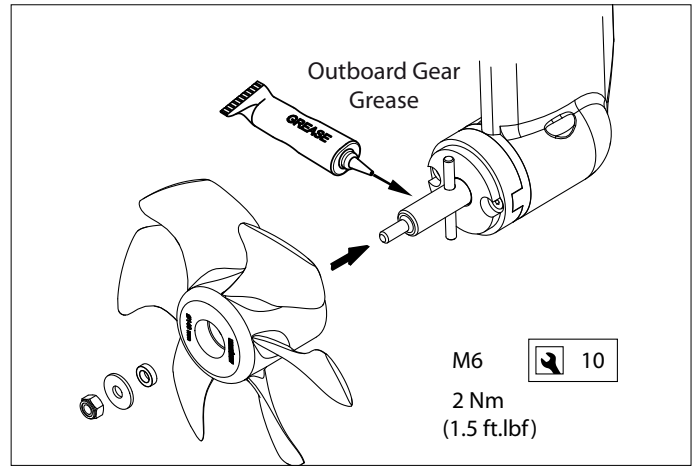
NOTE

Check for possible leaks immediately the ship returns to water.

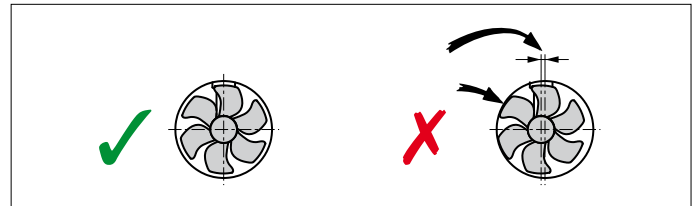


4.3 Final assembly

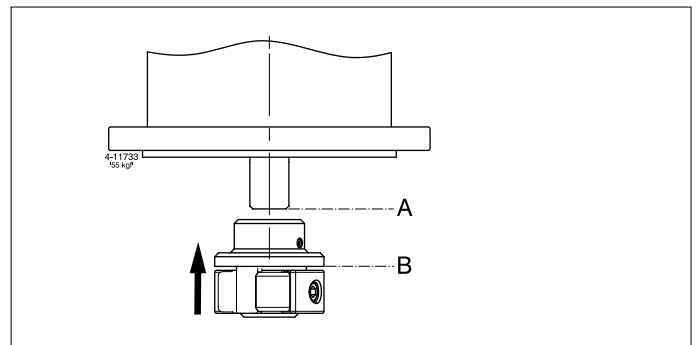
- Grease the propeller shaft with 'outboard gear grease' and install the propeller.



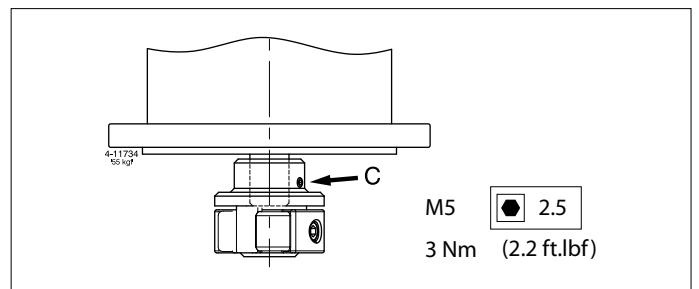
The propeller should run a minimum of 1.5 mm (1/16") free of the thrust tube wall, all round.



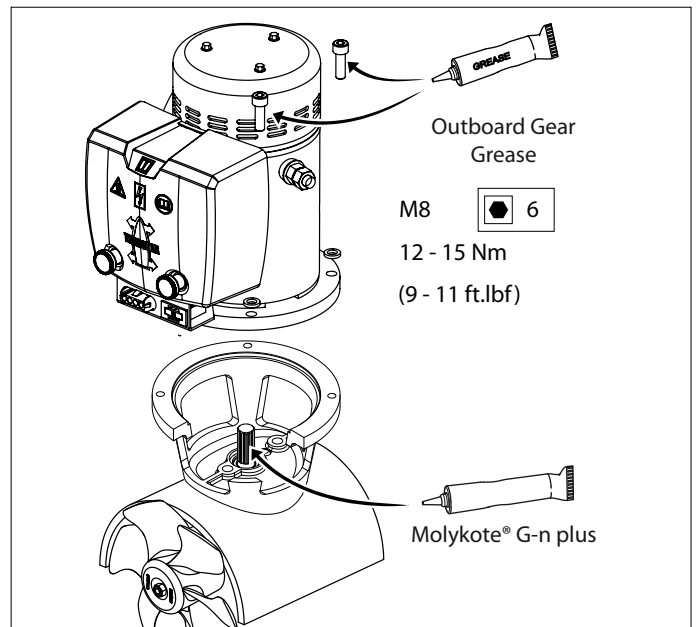
- Slide the flexible coupling onto the output spindle of the electric motor as far as necessary to allow the end of the output spindle (A) and the underside of the flange (B) to become aligned.



- Tighten the lock-screw (C).



- Grease the input shaft with an installation compound, like 'Molykote® G-n plus'.
- Grease the threads of the fastenings bolts with 'outboard gear grease' and install the electric motor to the intermediate flange.
- For a first check, turn the propeller by hand, it should turn easily, whilst being connected to the output spindle of the electric motor.



5 Electrical installation

Consult the chapter 'Electrical Management' in 'Installation recommendations for bow thrusters', Vetus art. code 020571.03.

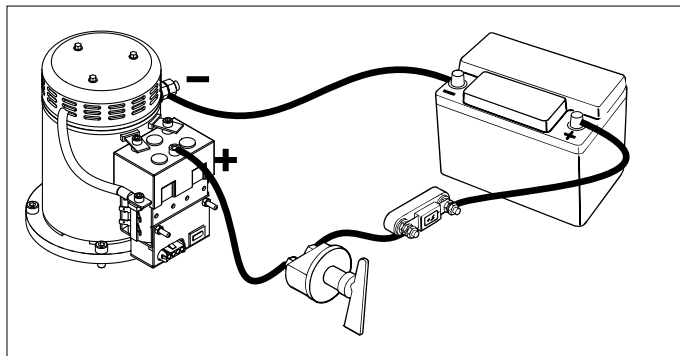
Check that the voltage, recorded on the motor type plate, is in agreement with the vessel's circuit voltage. Position the battery or batteries as close as possible to the bow thruster; the main power supply cables can then be short, which reduces the voltage drop as much as possible.

See page 69 for the applicable battery capacity, the size of main power supply cables and fuse to use.

- Connect the main power supply cables.

Make sure that no other electrical parts come loose when connecting the electric cables.

Check all electrical connections after 14 days. Electrical parts (such as bolts and nuts) may come loose as a result of fluctuations in temperature.

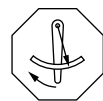


NOTE

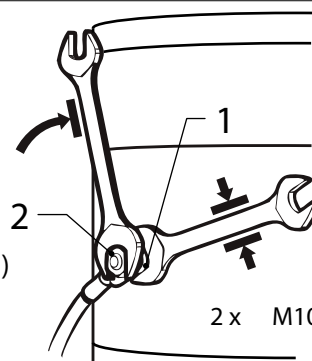
Be careful not to rotate the bolt and nut 1 while connecting the cables.

To prevent this happening, keep an open-ended spanner on nut 1 while screwing on bolt 2, without rotating this spanner. The torque for nut 2 is a 9 - 11 Nm (6.5 - 8 ft.lbf).

9 - 11 Nm



(6.5 - 8 ft.lbf)



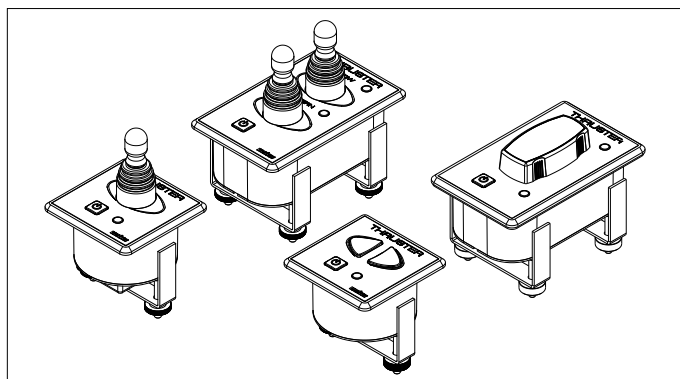
2 x M10



17

- Fit the control panel next to the steering position. There must be at least 50 mm (2") space behind the panel.

If 2 bow thrusters have to be operated simultaneously, for example on a catamaran, consult the diagram on page 68.

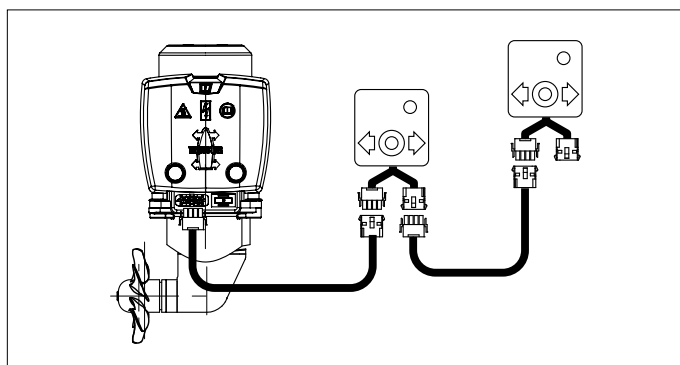


- Fit the control cable between the bow thruster and the control panel through the vessel and connect the jack connections together.

If it is necessary to cut the intermediate cable and reconnect it take care to ensure the correct colours are connected together.

N.B: The colours of the wire cores in the intermediate cable may differ from the wire core colours as used on the bow thruster motor and on the control panel!

If there are two steering positions, the second control panel can be connected to the first one.

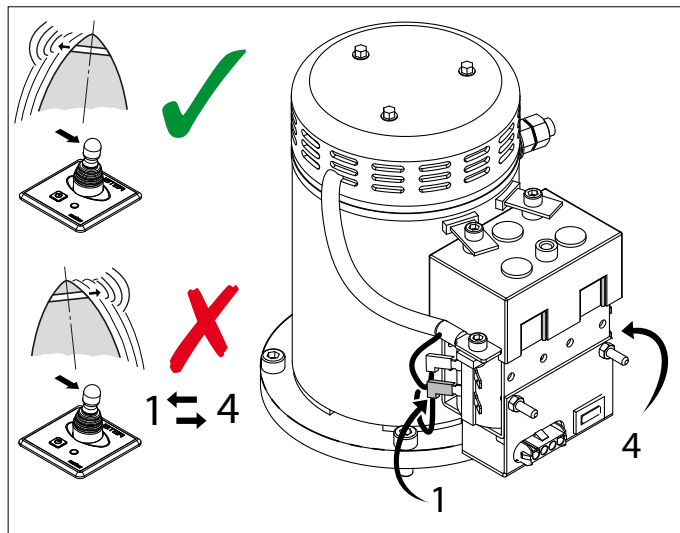


If it is found during test running that the thrust direction does not correspond with the direction switch on the control panel then the blue (no. 1) and the white (no. 4) wires on the relay must be interchanged.



WARNING!

Do NOT test the bow thruster while the ship is out of water, unless you are certain that everyone is at a safe distance from the thrust tube.
Never allow the bow thruster to run for longer than 5 seconds with the ship out of water.



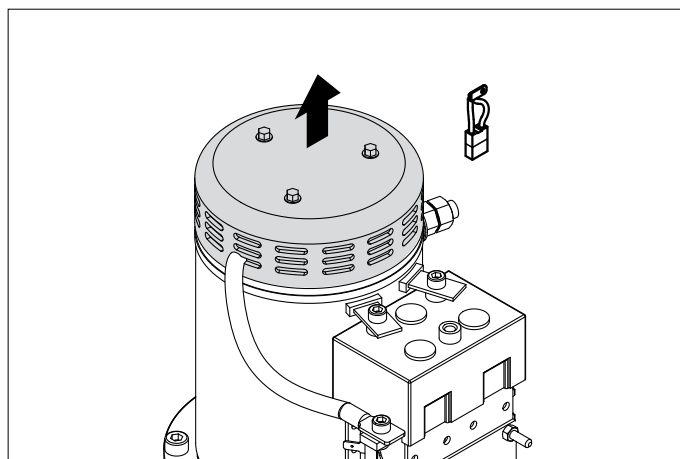
6 Maintenance

Check the carbon brushes for wear - in normal use once per year - with very intensive use of the bow thruster, e.g. with hire vessels, once every two months.

- Remove the Protective cover from the relay and then the Protective cover to the brushes.
- Clean the carbon brushes, the holders and the collector. (Blow away the dust coming off the brushes.)
- Check the length of the carbon brushes and replace before the minimum length (L min) is reached. Also check the collector for excessive wear.

For minimum length and art. code, see page 70.

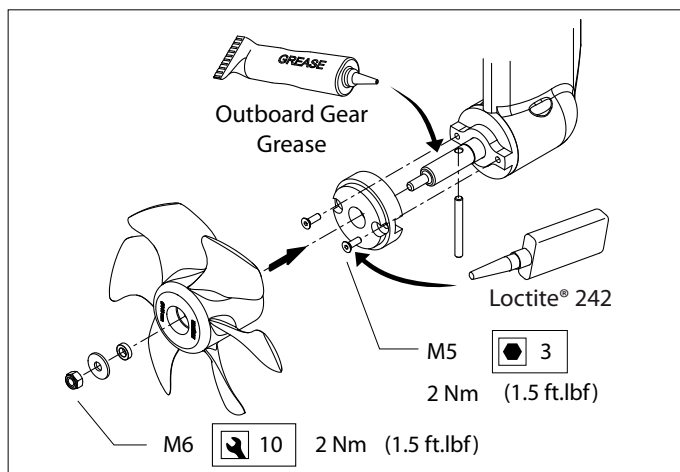
- The brushes can be taken out of the holders by releasing the retaining spring.



The bow thruster tailpiece has long-term lubrication.

The following maintenance should be carried out during a slipway service:

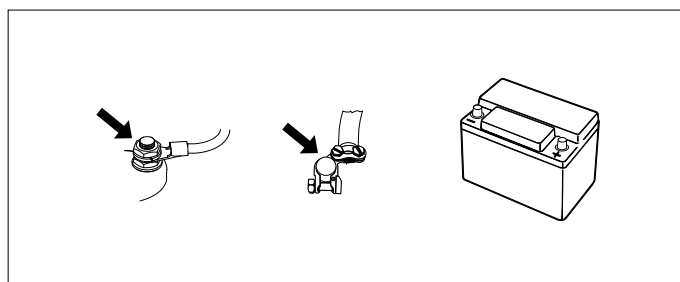
- Check the cathodic Protection and if necessary renew the zinc anode.
For the art. code for the zinc anode, see page 70.
- Provide the bolts with a screwlock (Loctite®).
- Clean the propeller shaft, grease with 'outboard gear grease' and refit the propeller on the shaft.



Six weeks after installation and at least once annually thereafter, be sure to check all of the electrical connections between the battery/batteries and the bow thruster, as well as the connections on the motor relays.

If they have been loosened previously, prevent the nut and bolt from turning while connecting the main power supply cables. This is also why you should always use a second wrench when tightening bolts.

The instructions of the manufacturer should be followed for the maintenance of the batteries. Vetus batteries are maintenance free.



7 Trouble shooting

Electric motor does not operate

- Check that the battery main switch is 'ON'.
- Check whether the control panel fuse has burnt out. ^[1]
- Check if the main fuse has burnt out. ^[2]

In all the above cases, the 'POWER' indicator LED is not lit.

- The electric motor has overheated and its thermal Protection has broken the circuit of the control current.

The panel gives a warning signal three times (. . .) and the LED will glow red.

As soon as the motor has cooled down enough, the LED will resume glowing green and the bow thruster can be put back in service.

Check if it is possible to turn the propeller. A piece of wood or similar could have been caught between the propeller and the tunnel.

Electric motor turns slowly

- The battery is flat.
- Bad electrical connection(s) due to e.g. corrosion.
- The carbon brushes are not making proper contact.
- The battery capacity is reduced because of very low temperatures.
- Weed or fishing line has become caught in the propeller.

Control panel fuse is burnt out ^[1]

- Short circuit in the operating circuit; check the wiring.

Electric motor turns (too) fast but there is no thrust

- The blades of the propeller have been damaged by a foreign object having entered the propeller or tunnel.
- The drive pin on the propeller shaft has been broken by a foreign object having entered the propeller or tunnel.

Replace the drive pin and check the propeller flange for any damage.

8 Technical data

Type	:	BOW4512D
Electric motor		
Type	:	reversible DC motor
Voltage	:	12 V DC
Current	:	375 A ^[3]
Rated output	:	3 kW
No. of revolutions	:	3400 rpm
Rating	:	S2 - 4 min. ^[3]
Protection	:	IP20
Motors conform to CE (80/336/EEC, EMC - EN60945)		
Transmission		
Gears	:	Bevel gear helical teeth
Gear ratio	:	1 : 1
Lubrication	:	oilbath, approx. 0.04 litre (1.4 fl.oz.) outboard gear oil SAE80W or EP 90
Housing	:	bronze
Propeller		
Diameter	:	122 mm (4 13/16")
No. of blades	:	6
Profile	:	asymmetrical
Material	:	polyacetal (Delrin ®)
Rated thrust	:	450 N (45 kgf, 124 lbf)
Control circuit		
Fuse	:	Blade type fuse 'ATO' 5 A
Current solenoid switch	:	2.8 A
Control circuit wires	:	1.5 mm ² (14 AWG)
Extension cable	:	6, 10, 16, 18 or 20 m (20', 33', 52', 59', or 65')
Thrust-tunnel		
Steel model		
dimensions	:	O.D. 133 mm, wall thickness 4 mm
treatment	:	blasted, coated with: SikaCor Steel Protect. Suitable for all kinds of protection systems.
Plastic model		
dimensions	:	I.D. 125 mm, wall thickness 5 mm
material	:	glass fibre reinforced polyester
Aluminium model		
dimensions	:	I.D. 125 mm, wall thickness 4 mm
material	:	aluminium, 6061 or 6062 (AlMg1SiCu)
Weight		
Excl. thrust-tunnel	:	20 kg (44 lbs)

Length of usage:

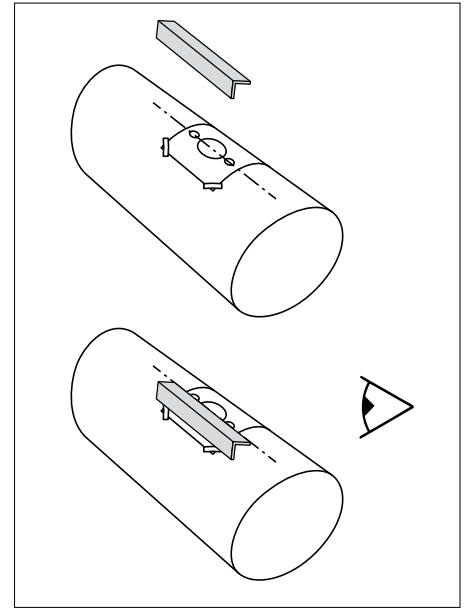
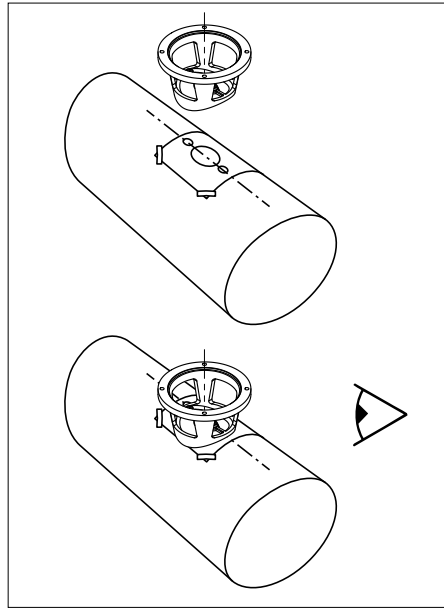
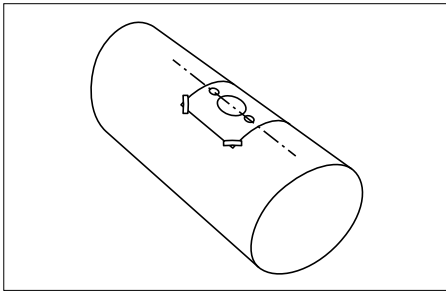
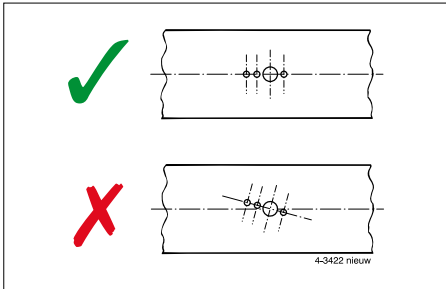
^[3] 4 min. continuously or max. 4 min. per hour at 375 A (12 Volt).

^[1] The control current fuse is in the bow thruster motor.

 **NOTE**

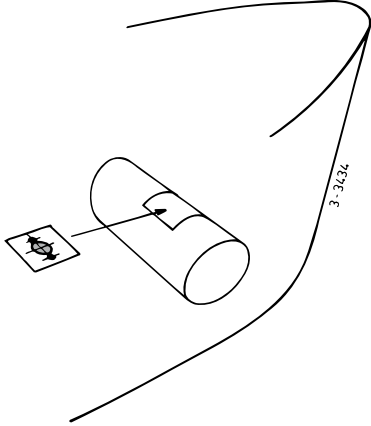
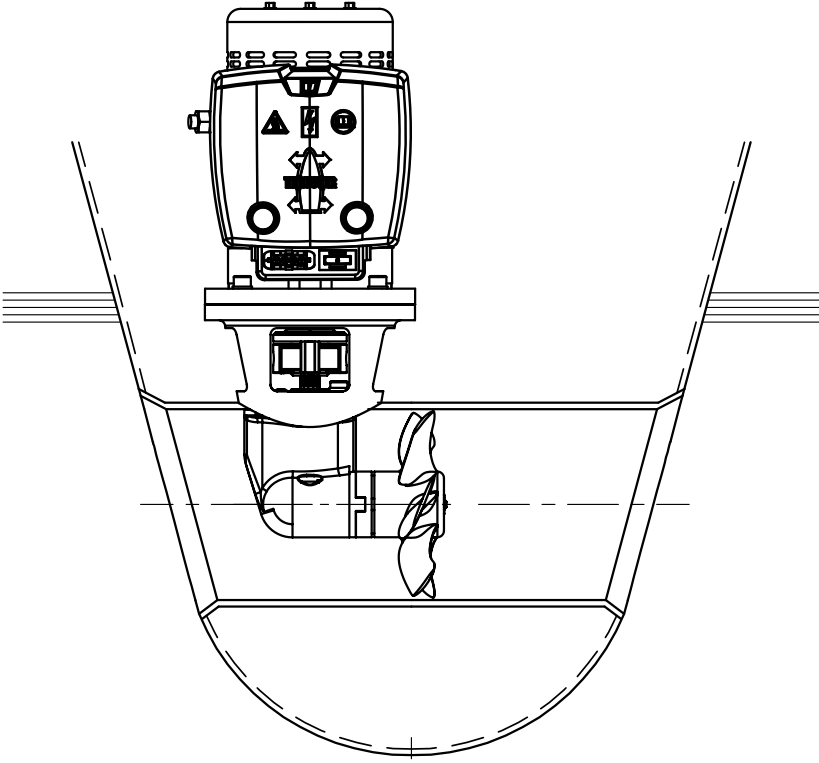
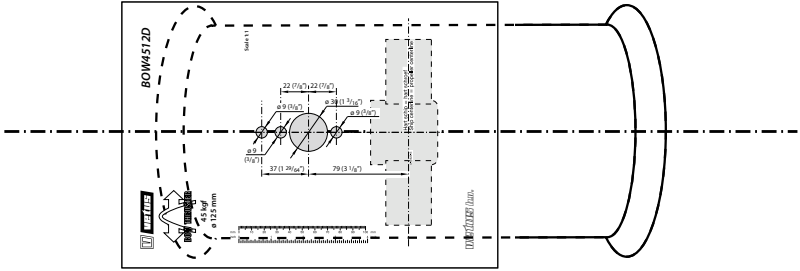
It is very important that the pattern of holes is precisely aligned with the centre line of the tunnel.

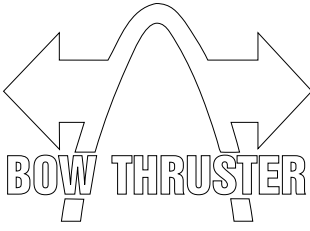
Use the intermediate flange or a length of angle profile to check whether the centre line of the drilling template is aligned with the centre line of the tunnel.



Drill pattern

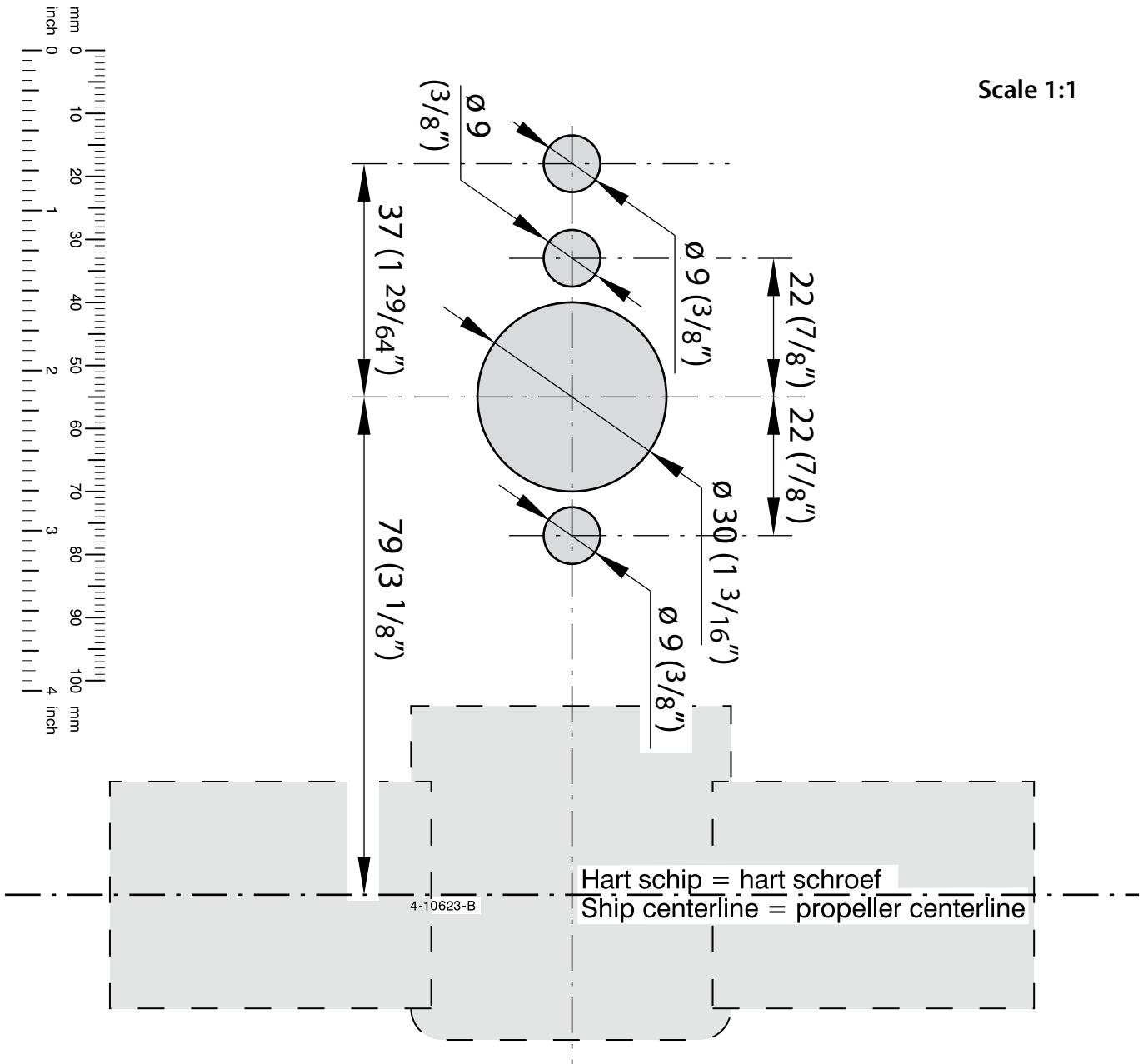
BOW4512D



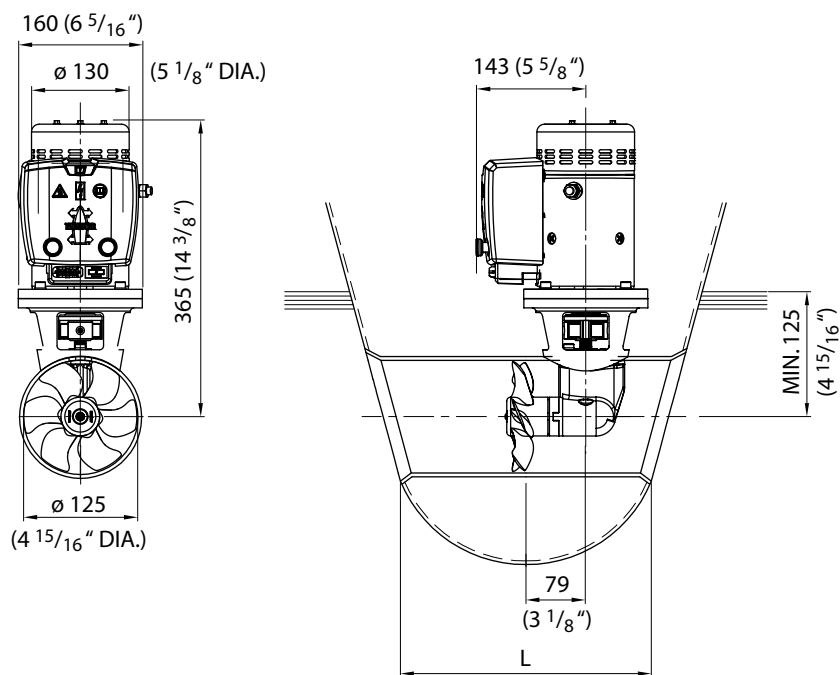


45 kgf
Ø 125 mm

Scale 1:1

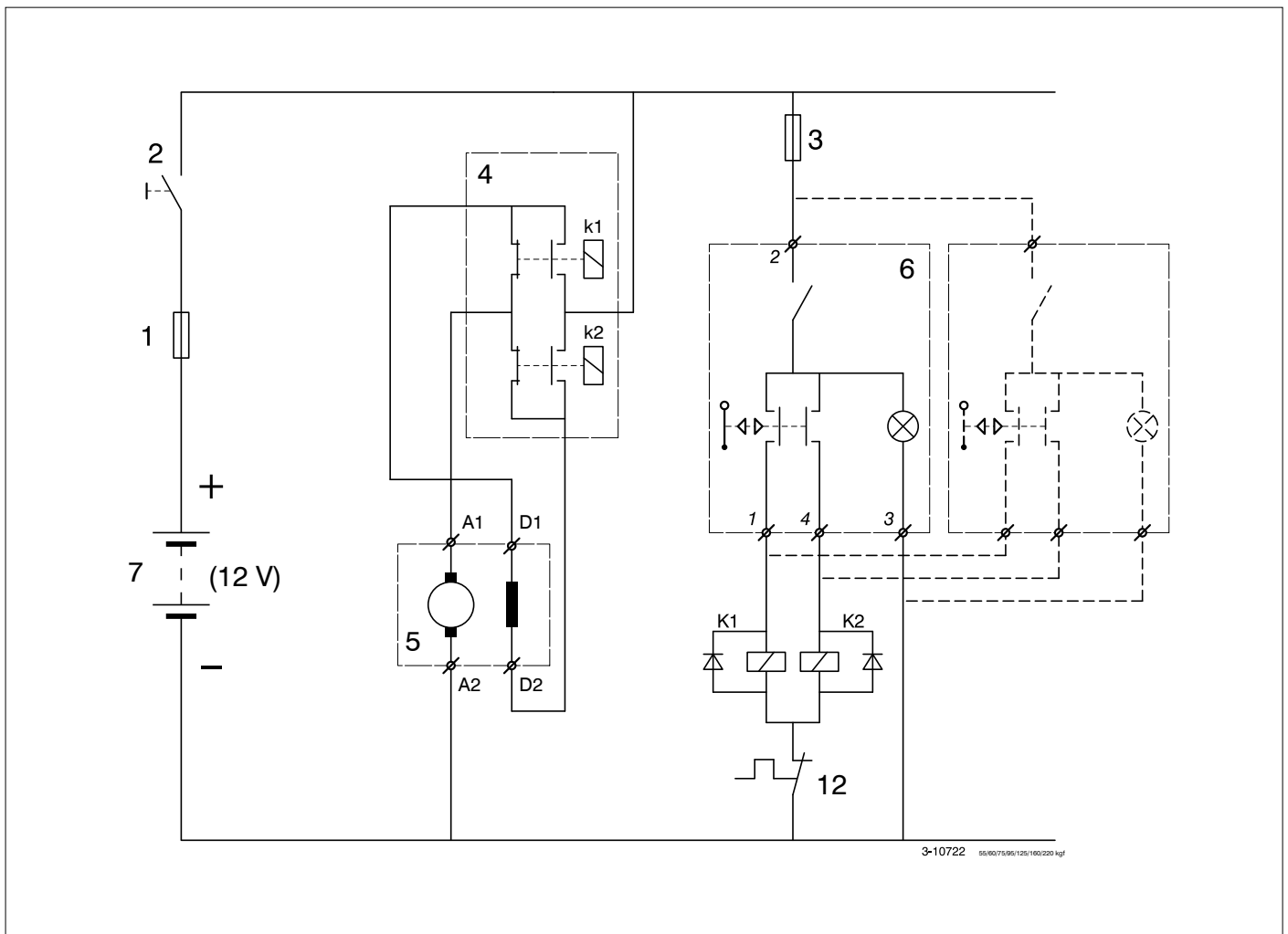


9 Principal dimensions



1 : 10

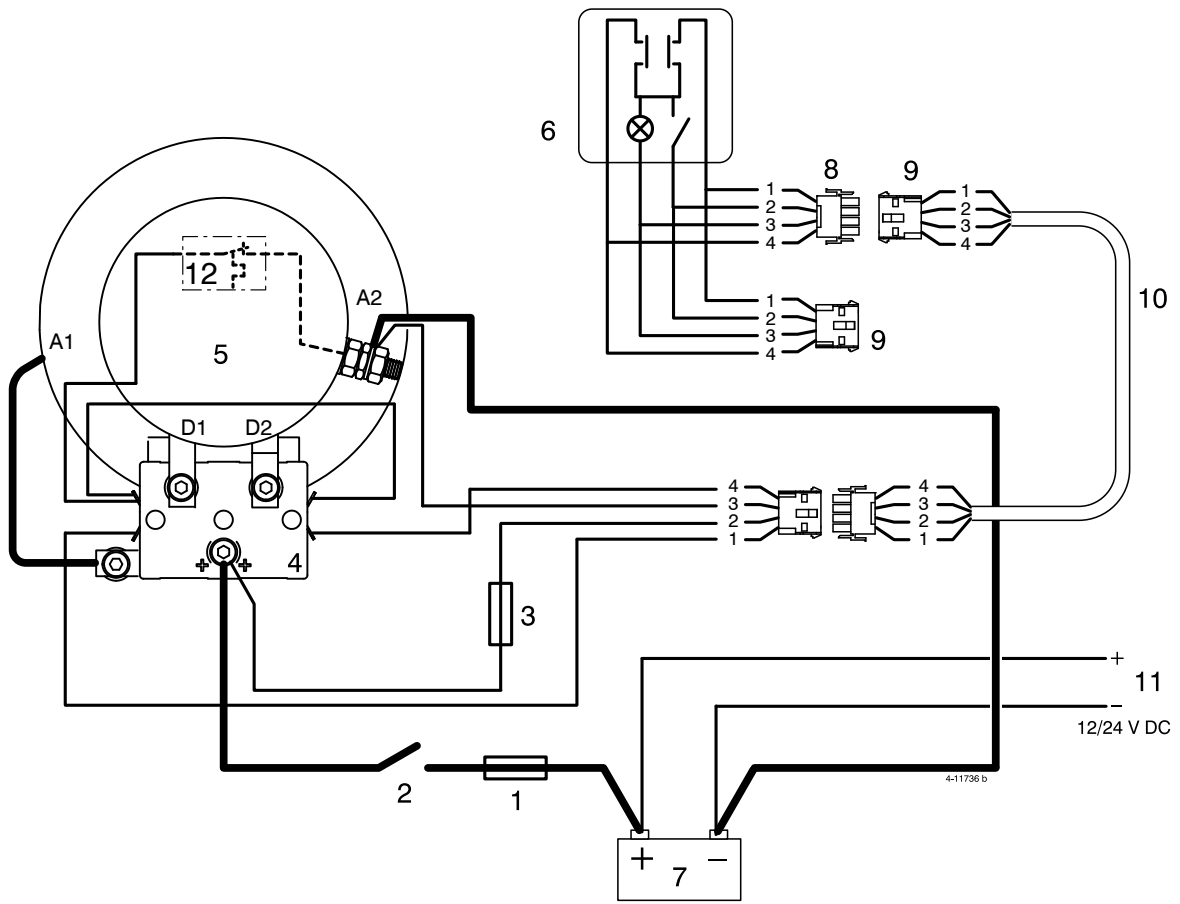
10 Wiring diagram



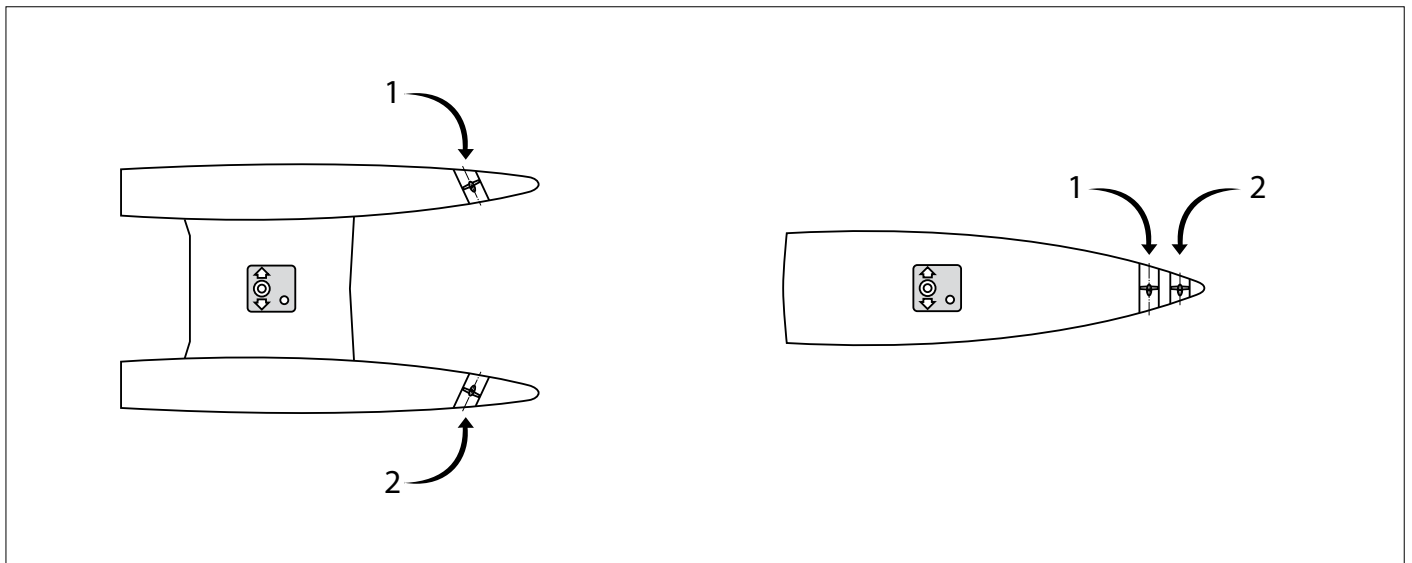
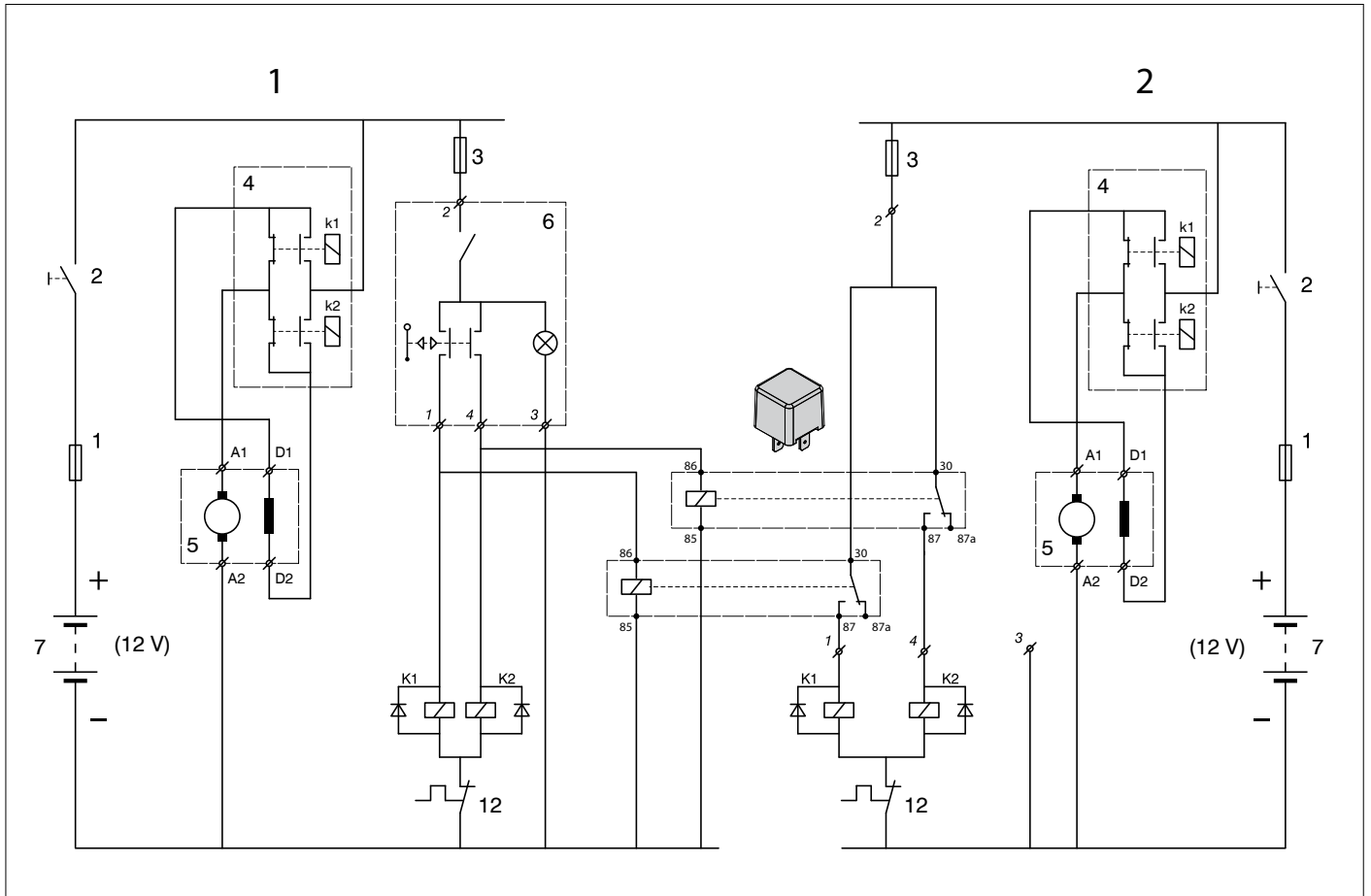
- | | |
|----|----------------------|
| 1 | Main fuse |
| 2 | Main switch |
| 3 | Control current fuse |
| 4 | Solenoid switch |
| 5 | Electromotor |
| 6 | Control panel |
| 7 | Battery |
| 8 | Plug |
| 9 | Socket |
| 10 | Extension cable |
| 11 | Alternator |
| 12 | Thermal Protection |

Wiring colour code:


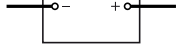
- | | |
|---|-----------|
| 1 | Blue |
| 2 | Red (+) |
| 3 | Black (-) |
| 4 | White |

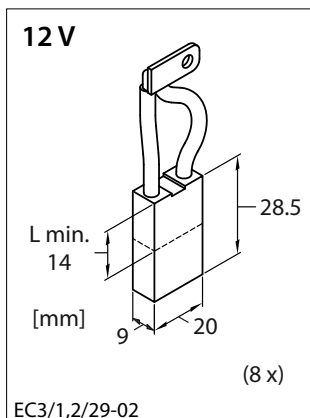
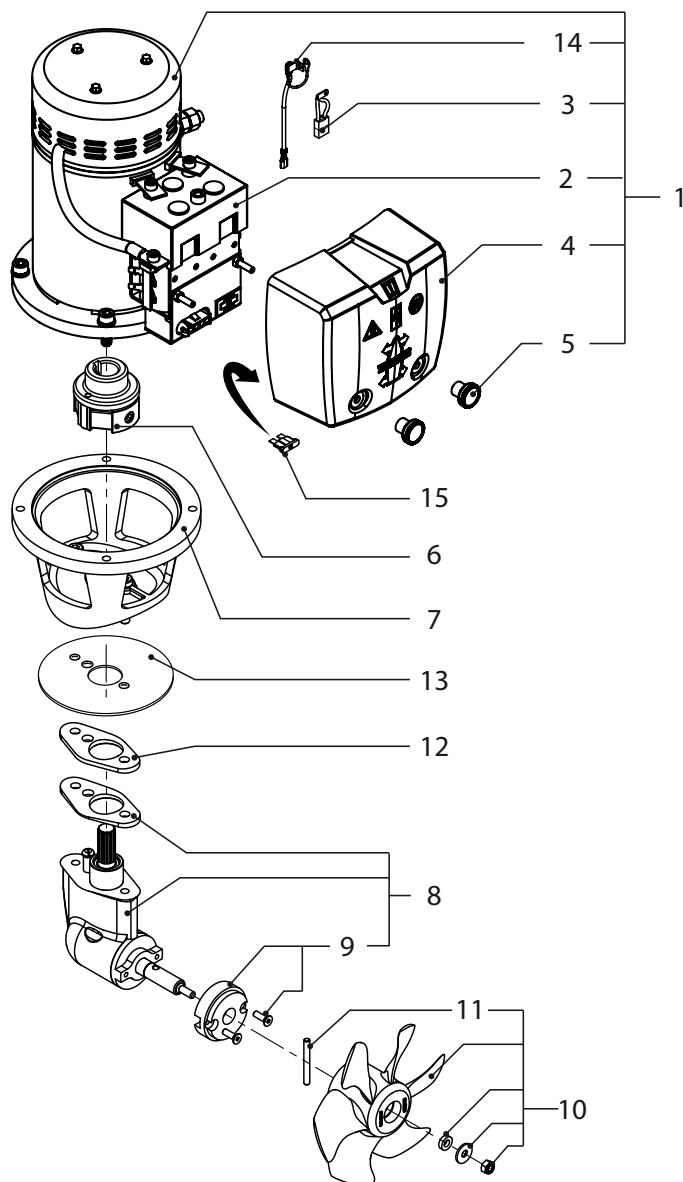


10.1 Simultaneous operation of two bow thrusters with one panel



11 Battery capacity, battery cables

Bow thruster	Battery capacity required		Total length of plus- and minus cable	Cable cross-section	Fuse	
	Minimum	Maximum			'slow blow'	Vetus art. code
BOW4512D 45 kgf - 12 V	CCA 700 - 12 V  85 Ah - 12 V BCI 31 - 700	CCA 1300 - 12 V  200 Ah - 12 V BCI 8D - 1300	0 - 12 m	70 mm ²	250 A	ZE250
			0 - 40 ft	AWG 00		



BOW4512D

Service parts

pos.	qty	part	description
1	1	SET0060	Electromotor 3 kW - 12 V for BOW4512D c/w solenoid switches
2	1	SET0015	Set of solenoid switches 12 V for BOW4512D
3	1	SET0126	Set of 8 pcs of carbon brushes for BOW4512D
4	1	BPC00100	Relais cover
5	1	SET0006	Set of 2 pcs knurled nuts
6	1	BP1202	Coupling
7	1	SET45FB	Intermediate flange
8	1	SET45T	Tailpiece compl.
9	1	SET0149	Zincanode c/w screws
10	1	SET45P	Propeller c/w drive pin and mounting set
11	1	BP1129	Propeller pins, 5 pcs
12	2	BP1020	Gasket
13	1	BP1021	Gasket 1 mm
14	1	TS110	Thermal Protection
15	1	BP256	Spare fuse 5 A

Check out the collection of trim tabs, hydrofoils and thrusters we offer.