

Craftsman
MARINE

BOW THRUSTERS

MANUAL

BOATING TECHNOLOGY BY CRAFTSMAN MARINE

MANOEUVRING

Thank you very much for purchasing a **Craftsman Marine** Bow and/or Stern Thruster (hereinafter simply called: **Thruster**). You have made an excellent choice and our Craftsman Marine Service Team will gladly be of the best possible assistance, if and when you will need us.

The Thrusters made by Craftsman Marine are designed and developed by engineers who are fully aware of the many requirements of the marine environment; professionals who know of the ultimate quality demands, whilst making the best use of their many years of experience.

Enjoy boating with your Craftsman Marine products on board.



STRONG ADVICE

It is highly recommended to entrust an experienced installation engineer with the complete mechanical and electrical installation, so as to ensure a flawless operating equipment. Here after a survey of the basics, for your information (only!).



DANGER TAKE CARE

Below you will find a survey of caution pictograms pertaining to this manual. Remarks that are related to safety bear this symbol:

Carefully adhere to these instructions and inform all people who are involved in the operation or the maintenance of the Thruster about these safety precautions.

- When the Thruster is in operation: do not touch any of the moving parts.
- When the Thruster is in operation several components will become very hot. Never touch these parts and avoid the use of flammable products in the vicinity of the electric motor.
- In the case of adjustment or inspection of parts of the Thruster always stop the Thruster and disconnect the battery.
- All maintenance jobs should be executed by qualified mechanics, using properly fitting tools.

If at all possible, only entrust these jobs to an authorized Craftsman Marine dealer.

Symbols related to the text below:



Pay heed to these symbols and adhere to the instructions in the text



Warning

(special attention in regard to safety risks for men or material)

Table of contents

1 Disclaimer	2	9 Thruster panels	19
		9.1 Specifications of Thruster panel	19
2 Safety	2	9.2 Control panel connection	20
Explanation of symbols	2	9.3 Settings of thruster panel	23
		9.4 Operation of thruster panels	26
3 Table of contents	3		
4 Introduction	4	10 Maintenance	28
		Regular maintenance	28
5 Specifications of the Thruster	5	Electrical maintenance	29
Knowing your Thruster	6	11 Trouble shooting	30
6 Tips for safe use	6	12 Electrical wiring diagrams	31
Tips for safe use	6		
7 Mechanical installation	8		
1. Installation of the tunnel	8		
2. Installation of the tail piece	13		
3. Installation of the electric motor	14		
Thruster 11524, 12512, 15024, 17024	15		
8 Electrical installation	16		
Caution, Preparation	16		
Power Supply	16		
Battery	16		
Cables	16		
Connection	18		

4 Introduction

A Bow Thruster (especially in combination with a Stern Thruster) is a most effective manoeuvring aid, designed to handle the boat with utmost ease, when mooring or leaving the quay or in the cramped space of a marina box, while having to cope with bad currents or adverse winds. For trouble-free operation of the Thruster, it is necessary to read and adhere to the following:

1. The technical specifications of the Thruster and the selection table
2. The selection of the power source
3. Knowing the Thruster itself
4. Correct mechanical installation
5. Correct electrical installation
6. Tips for proper use
7. Maintenance and trouble shooting

The thrust force given in the specifications is nominal and the result of standard test conditions. The actual thrust force developed is bound to vary from one boat to another, depending on various parameters, such as hull design, the power source selected, type of tunnel, protective grids at the ends of the tunnel or not, the attachment mode of the tunnel to the hull, etc. Naturally, the performance is also dependent on external conditions like the water current, the wind conditions, etc.

Specifications of the Thruster 5

Thruster	Thrust	Inside diameter of tunnel	Motor diameter	Power	Voltage	Current	Duty	Protection
	kgf	mm	mm	kW	V	A	S2	IP
THRUSTER 35 12	35	110	112	2.42	12	395	2 min	IP21
THRUSTER 55 12	55	150	125	3.49	12	500		
THRUSTER 80 12	80	185	125	4.04	12	505		
THRUSTER 80 24	80	185	125	4.04	24	270		
THRUSTER 95 12	95	185	150	5.95	12	700		
THRUSTER 115 24	115	185	150	5.95	24	370		
THRUSTER 125 12	125	250	150	6.52	12	840		
THRUSTER 150 24	150	250	150	6.52	24	430		
THRUSTER 170 24	170	250	170	11.3	24	560		

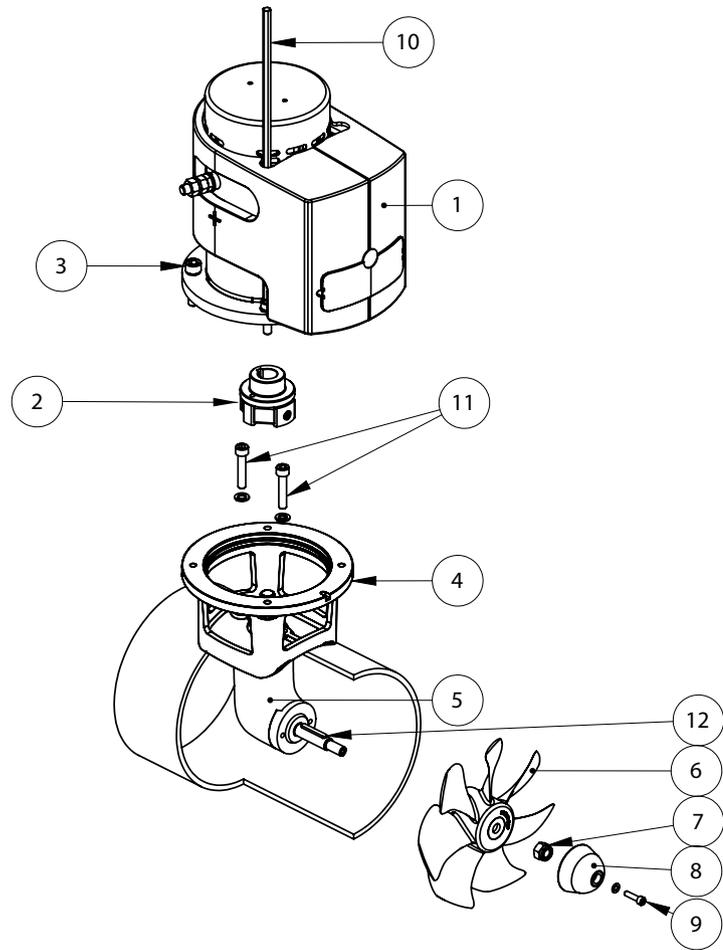
All specifications are subject to modification without prior notice.
 S2 = maximum engagement time amounts to 2 minutes per hour.

5 Specifications of the Thruster

Knowing your Thruster

The Thruster consists of the following components:

1. The electric motor with relays and relay cover
2. The flexible coupling
3. Screws for mounting the electric motor
4. The connecting flange
5. The tail piece with gasket
6. The propeller
7. Nut for mounting the propeller
8. The zinc anode
9. Screw for mounting the zinc anode
10. Hexagonal tool (35cm length) for fastening the Thruster motor on the flange
11. Screws for mounting the tail piece
12. Key for propeller



Tips for safe use

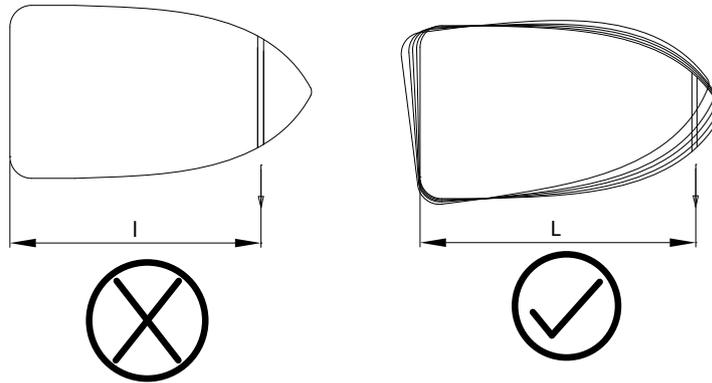
The safety of the crew members on board (and of other people) is of prime importance and the following instructions must therefore be kept in mind and strictly adhered to.

1. Carefully read and follow the installation instructions.
2. The electric motor is a heat generating source and must therefore be positioned in a dry and well ventilated area.
3. The equipment must not be operated beyond the maximum time specified, to avoid overheating of the motor.
4. It is recommended to switch off the main current supply when the equipment is not in use for long periods e.g. over the weekend.
5. Your Thruster is an "on load" starting device and it is therefore imperative to run it only when immersed in water.
6. Look out for swimmers close to the Thruster tunnel before using it.
7. Always use Craftsman Marine spare parts and accessories, so that the compatibility of the whole system is ensured.
8. Use always a CM Thruster control panel.
9. Maintain the equipment in line with the specified periodical maintenance plan.
10. Never touch any moving parts.
11. Never touch the electric motor when in operation.
12. Never store flammable products in the area of the electric motor.
13. Switch off the main current and disconnect the battery wires in the case of maintenance and during long time storage.
14. In the case of installation of more than one panel, make sure to operate the Thruster from only one panel at the time.
15. Allow the Thruster to have a battery of its own and position it as closely to the Thruster as possible.

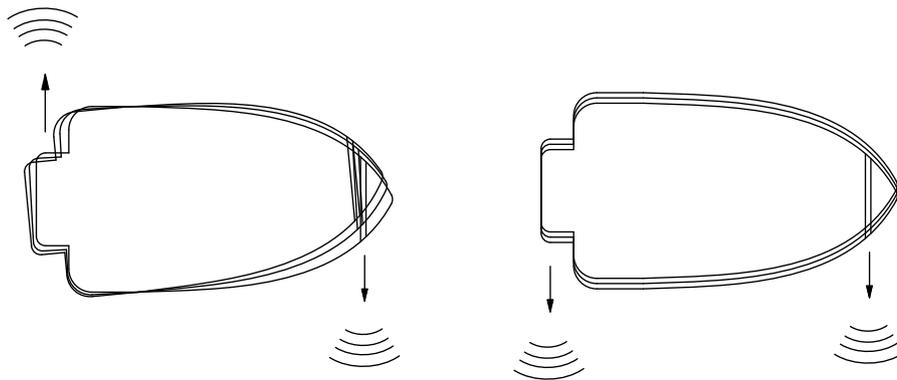
7 Mechanical installation

1. Installation of the tunnel

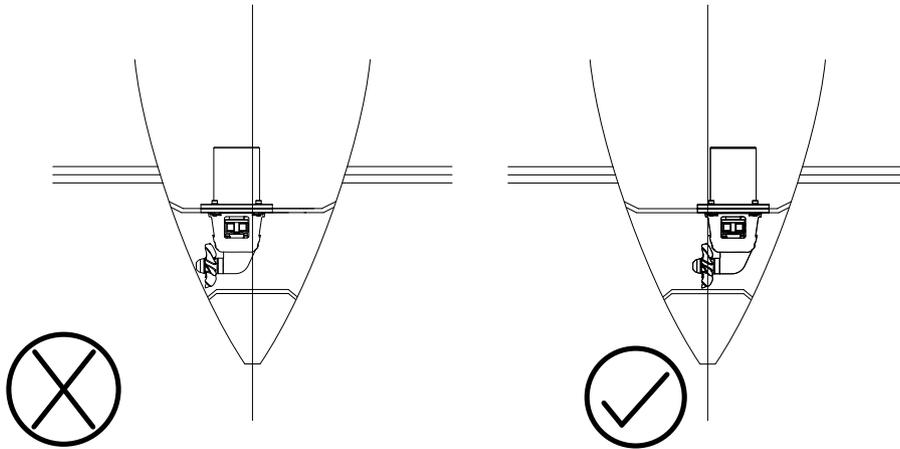
The Bow Thruster, when positioned at the most forward point in the bow, provides, by law of leverage, its optimum performance.



It is also possible to fit a Stern Thruster in combination with the Bow Thruster.



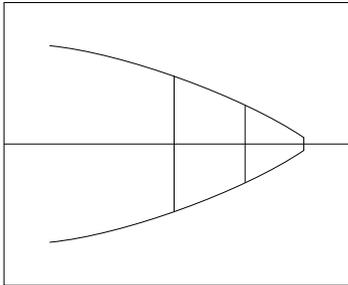
The tunnel must be positioned perpendicular to the axis of the boat, in all the directions.
The propeller must not protrude out of the tunnel.



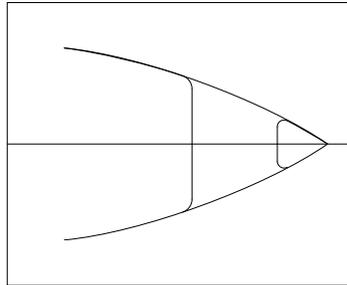
7 Mechanical installation

The tunnel can be made of steel, aluminium or fiberglass. There are three options of fitting the tunnel:

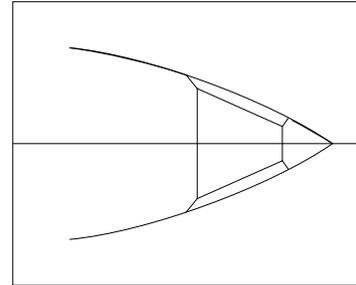
1. Blind Connection



2. Connection with a Radius ($R=0.1xD$) D = tunnel diameter



3. Connection with a Chamfer. The chamfer to be between 20 and 30mm

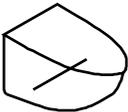
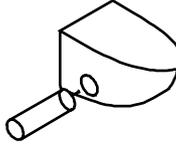


Grid bars at the ends of the tunnel reduce the thrust force and the performance of the Thruster.

However, if there is a need to fit these, on account of much debris in the water, it is necessary that the number of bars is kept to a minimum (maximum 3). The shape of the bars must be trapezoidal with no sharp edges on the bars. It is also advised to position the bars in a perpendicular direction to the wave of the bow.

7 Mechanical installation

1. Installation of the tunnel

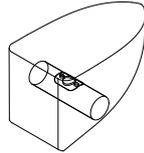
1	Mark the centre line of the tunnel. This must be perpendicular to the axis of the boat. Drill a small hole in the center at both sides of the bow.	
2	Use a simple tool to pass through the drilled centers and mark the cutout at both sides of the bow.	
3	Cutout the hull using the mark as a knife guide by appropriate method.	
4	The Tunnel may now be inserted. Based on the material of the tunnel the tunnel may be fixed with resin or welded. The sides are to be finished with 2 pack epoxy paint.	

The mechanical installation is explained in steps

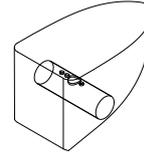
2. Installation of the tail piece

A.

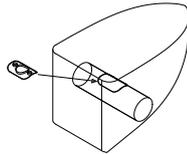
Mark the installation position of the unit with the intermediate flange so that the propeller will be in the middle of the tunnel



Drill holes through the tunnel and deburr the edges



Use the flange to mark the correct position of the holes

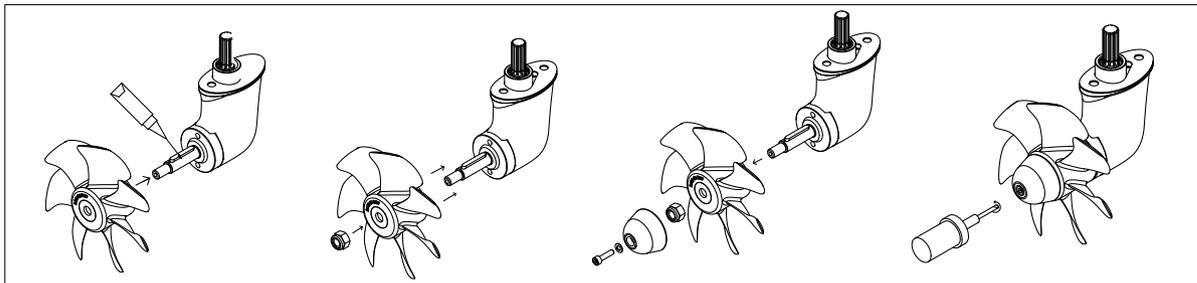


- B. Every Thruster is supplied with 2 gaskets of 1mm and 2mm thickness. Check which gasket thickness must be used to center the propeller in the tunnel. It is also possible to use both gaskets to have a distance altogether of 3mm.

Apply (Sikaflex - 292) sealant on both sides of the gasket and stick the gasket in position on the tail piece. Then position the tail piece in the correct position in the hole, drilled earlier in the tunnel.

Position the intermediate flange on top of the tunnel. The application of grease (Molykote br2plus) on all threaded joints is advisable, then firmly tighten the bolts.

Next apply grease on the propeller shaft and fit the propeller. Make sure that there is a gap between the propeller blades and the tunnel wall of at least 1.5mm at all sides. Fix the propeller using the Nylock nut and then fit the zinc anode at the end of the propeller shaft and tighten it.



7 Mechanical installation

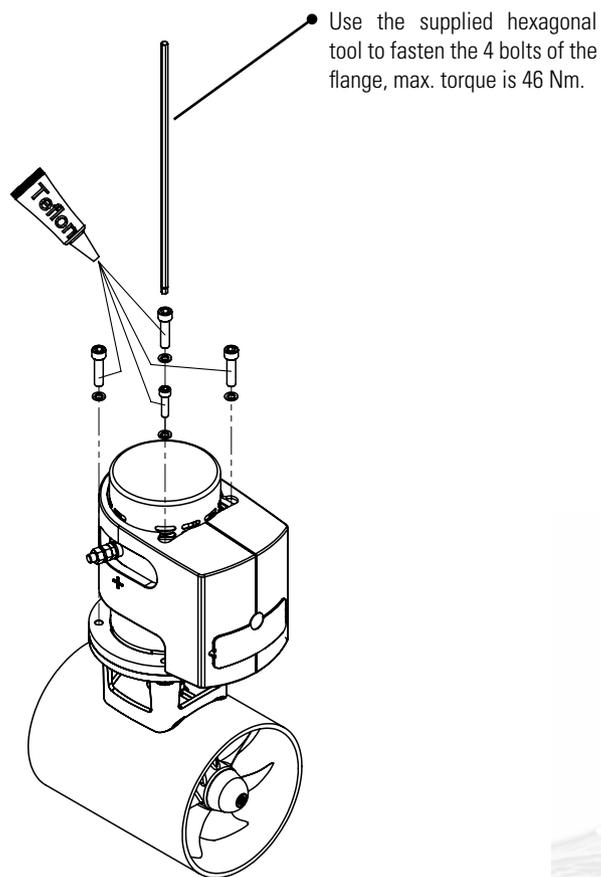
3. Installation of the electric motor

Apply a little grease to the shaft of the electric motor. With the key in position fit over the shaft, the flexible coupling and tighten the lock screw.

Insert the electric motor onto the intermediate flange.

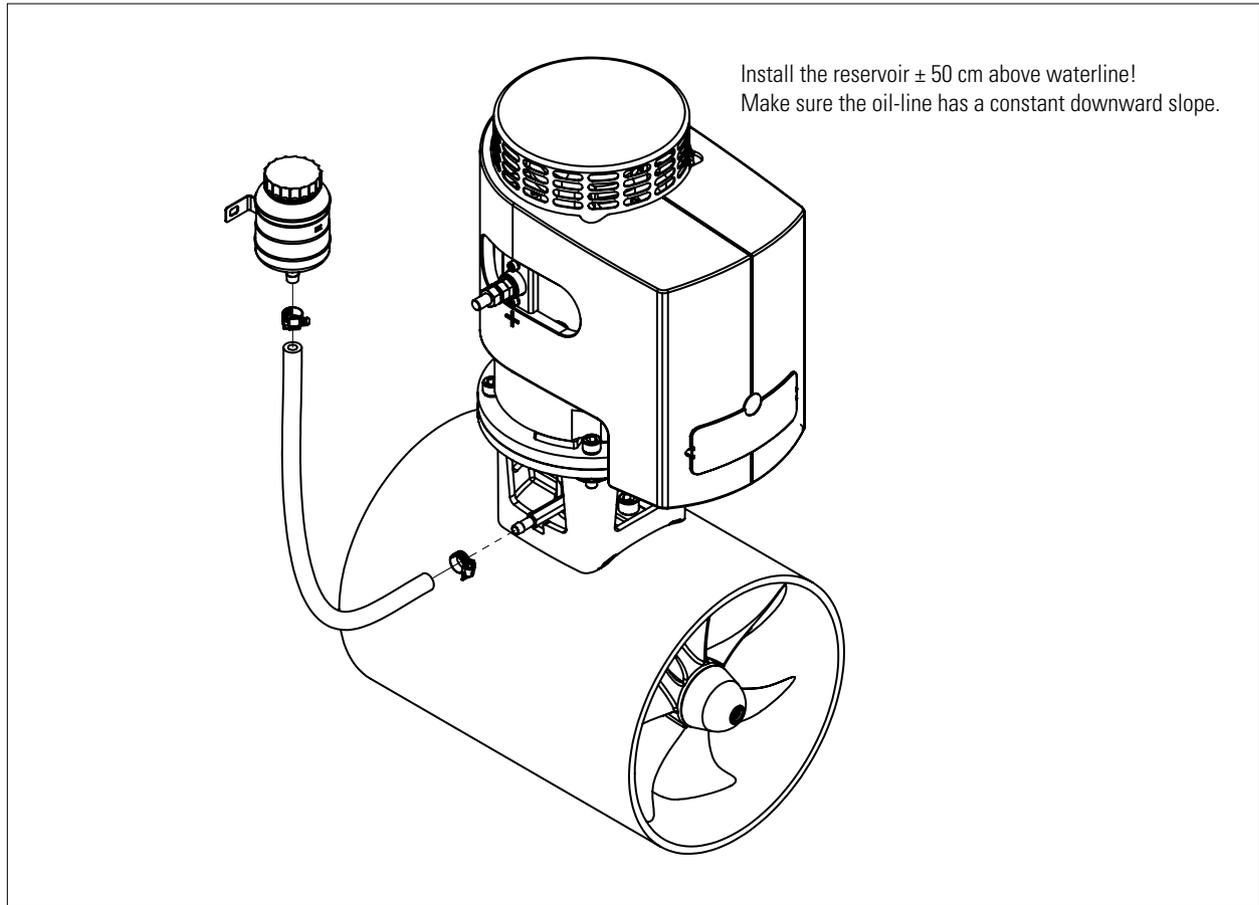
Turn the propeller by hand and make sure it rotates freely.

Then grease the screws lightly and fasten the motor onto the flange.



For Thruster11524, 12512, 15024 and 17024

Install the supplied oil reservoir and fill it with oil, type EP90.



8 Electrical installation

Caution

Switch off all other circuits before operating the assembly. Maintain a safe distance between the tools and the opposite polarities (positive/negative), where the tool can act as a conductor to create a short-circuit.



Never short-circuit the batteries, which will cause severe burns/flame/explosion. Do not connect the bare wires (without terminals) to the motor; always use terminals on the wires to ensure proper connectivity.

Preparation

A separate fuse or circuit breaker must be installed between motor and power source, so that the thruster will be protected against overload.

A “slow blow” fuse must be used to withstand the starting-up current of the motor. (see table 2)

Use the proper tools for tightening the cable terminals.

Crimp the proper terminals to the wires, to suit the motor terminal ends.

Power Supply

Battery

The battery (or the bank of batteries) should be selected to suit the appropriate size of the Thruster as indicated in the table 2.

Batteries are to be placed as close as possible to the Thruster, in a dry and cool place.

The Thruster should have its own battery (bank), independent from the starting and the domestic batteries. When connecting two or more batteries in series or parallel, ensure that the batteries are of the same type, age and with the same capacity.

Cables

Battery cables must be selected to handle the maximum current of the motor (see table 2). The battery cable size is to be selected with care, so as to avoid a voltage drop of more than 10%. (see table 2)

Thruster	Voltage	Allowed voltage loss (10%)	Current (average)	Minimum cable diameter	Max. cable length	Recommended battery capacity	Slow blow fuse type ANL
	V	V	A	mm ²	m	Ah	A
THRUSTER 3512	12	1,2	395	50	0-8	120	300
				70	8-12		
THRUSTER 5512	12	1,2	500	70	0-9	165	355
				95	9-12		
THRUSTER 8012	12	1,2	505	70	0-9	165	355
				95	9-12		
THRUSTER 8024	24	2,4	270	35	0-17	2 * 108	200
				50	17-25		
THRUSTER 9512	12	1,2	700	95	0-8	2 * 200	500
				120	8-11		
THRUSTER 11524	24	2,4	370	50	0-18	2 * 120	250
				70	18-25		
THRUSTER 12512	12	1,2	840	120	0-8	2 * 225	500
				150	8-11		
THRUSTER 15024	24	2,4	430	70	0-21	2 * 120	300
				95	21-29		
THRUSTER 17024	24	2,4	560	95	0-22	2 * 200	355
				120	22-28		

Table 2



WARNING:

The maximum operating time of 2 minutes and the output are specified when using the minimum cable length and recommended battery capacity. When using higher cable diameter with short lengths and more battery capacity, the thrust and current will be more. It is then very important that the maximum operating time is reduced, this to prevent damage on the electro motor.

8 Electrical installation

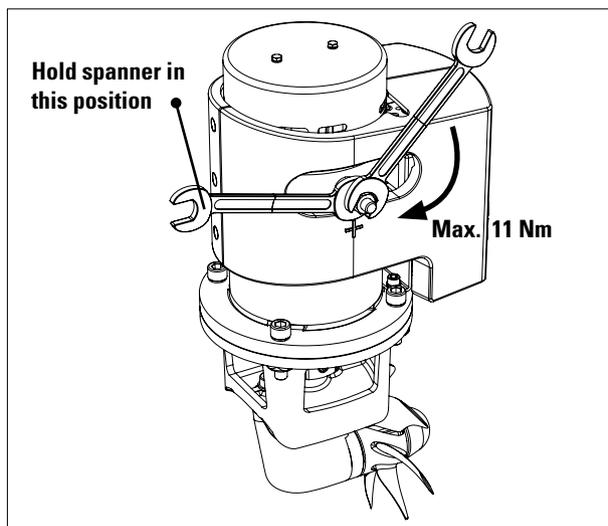
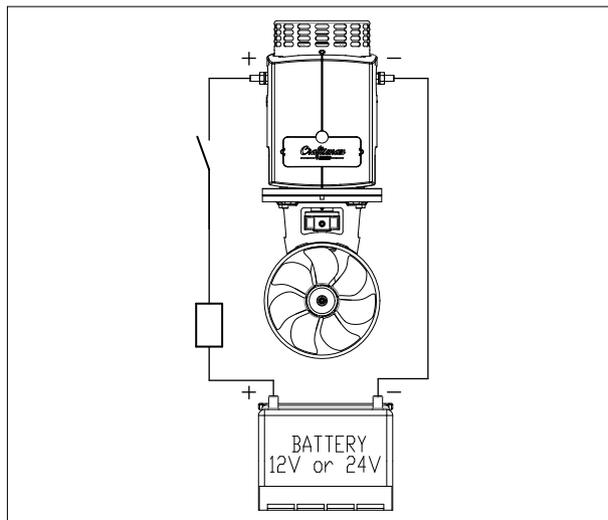
Connection

1. Connect the positive wire to the motor where the "+" symbol is indicated.
2. Connect the negative wire to the motor where the "-" symbol is indicated.

The terminals must be tightened properly, to avoid any loose connections. (max. torque of 11 Nm)

While connecting the terminals to the motor, use two spanners, one to hold the inner nut and the other one to tighten the outer nut.

Figure 1



9.1 Specifications of Thruster panel

1. Time lapse device

Integrated time lapse device when changing directions (port to starboard and vice versa).

Setting options:

1. Time lapse device as from 1 second (factory setting)
2. No time lapse delay when changing over directions.

2. Temperature safety

All electric thruster motors are provided with a temperature switch. The control panel switches the Thruster automatically off in the case of a too high temperature. This situation is indicated by means of a LED indicator and a buzzer.

3. Switching off the panel

Dependent on the settings, the panel can switch off automatically, when it has not been activated during a certain period of time.

Setting options:

1. Panel does not switch off automatically (factory setting)
2. Panel switches off after 30 minutes
3. Panel switches off after 60 minutes
4. Panel switches off after 120 minutes

4. Protection against continuous use

If the thruster is operated during more than 2 minutes continuously, this equipment can be switched off automatically, dependent on the settings.

Setting options:

1. The thruster switches off after 2 minutes of use. The LED indicator and the buzzer are activated.
2. The thrusters does NOT switch off after 2 minutes of use. The LED indicator and the buzzer are activated.

5. Detection by the relay

If an interruption occurs in the wiring of the control current circuit of the relay, the LED on the panel will blink intermittently with a red colour.

6. Protection against erroneous switching (children-proof setting)

7. Supply voltage is 12VDC or 24VDC

8. The front section of the panel is watertight in accordance with IP65

9. Dimensions

ALFA10T	: 81 x 85mm
ALFA20T	: 81 x 85mm
ALFA30T	: 81 x 136mm

9.2 Control panel connection

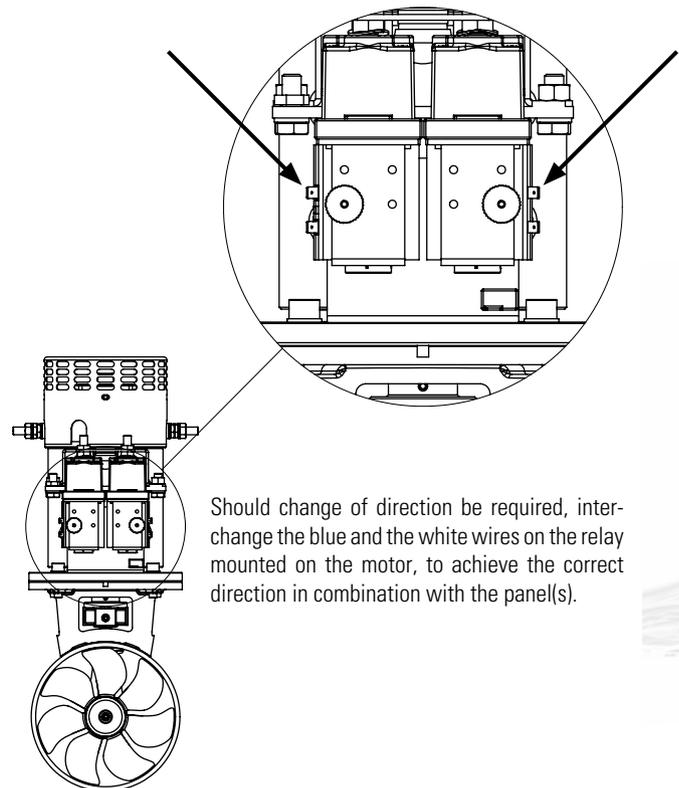
Control panel connection

Use the panel connection cables to connect the motor with the control panel(s). Panel connection cables are available in lengths of 7m, 10m, 15m or 20m.

Use the thruster panel splitter cables when connecting two or more panels in parallel.

By using Craftsman Marine control panels, any number of panels can be connected in parallel.

Please verify the correct direction of the thruster once the installation is completed.



Should change of direction be required, interchange the blue and the white wires on the relay mounted on the motor, to achieve the correct direction in combination with the panel(s).

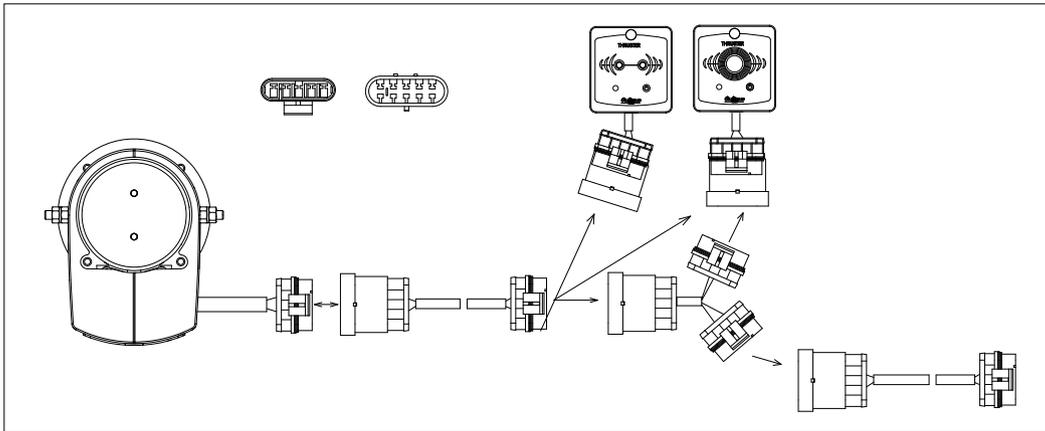


Figure 3

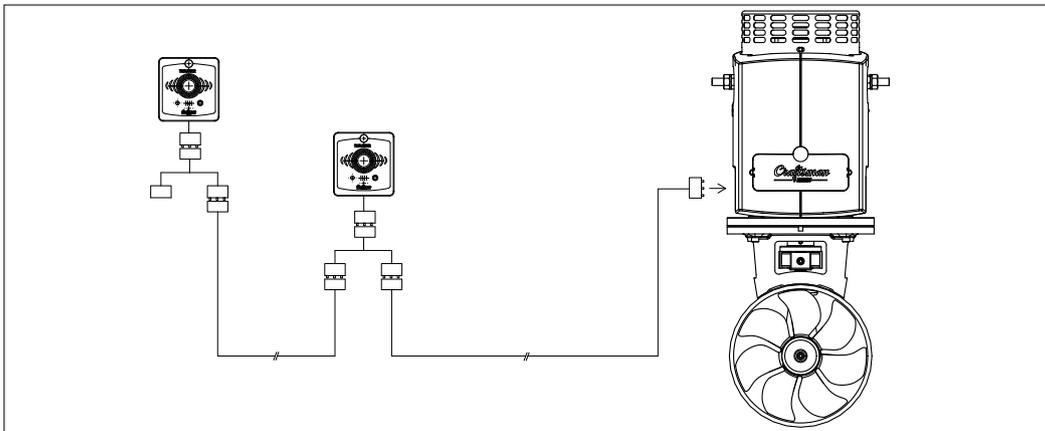


Figure 4 Connection of the Thruster panel for bow OR stern.

9.2 Control panel connection

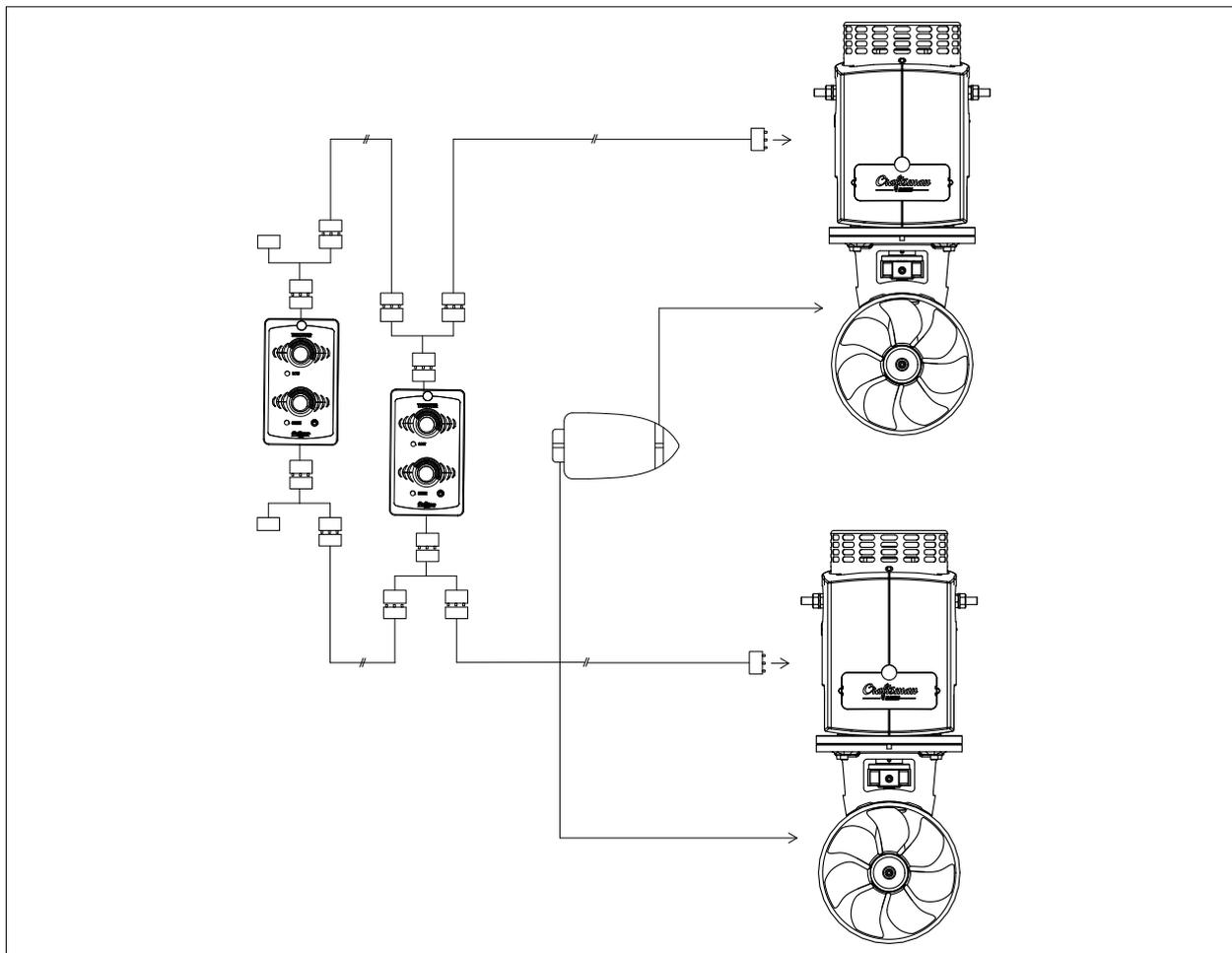


Figure 5 Connection of the Thruster panel for bow AND stern.

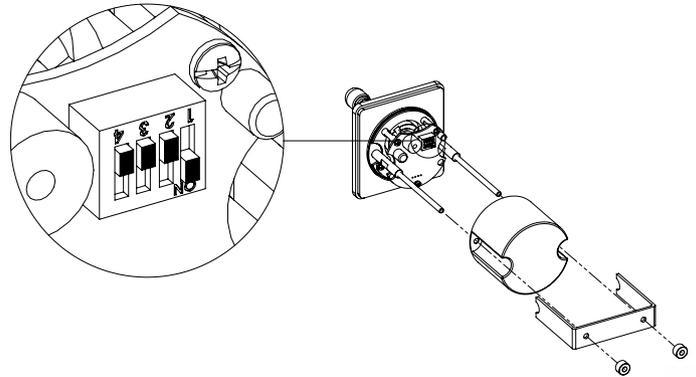
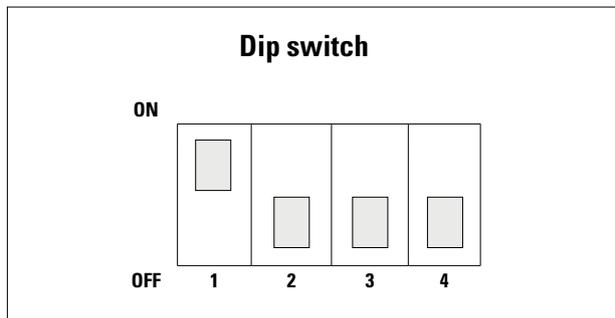
Settings of Thruster panel 9.3

In order to be able to modify the settings, the backside of the panel must be removed. By changing the positions 1 – 4 of the dip switch from OFF to ON, the settings are altered.

When dip switch settings are changed, the panel must be switched OFF and ON.

Dip switch	Description
1	Setting for time lapse device when switching over (portside <-> starboard)
2	Setting for 2 minutes' continuous use of the joy stick/push buttons
3	Setting for automatic switching off of the panel
4	

Factory setting:



9.3 Settings of Thruster panel

DIP SWITCH

Dip switch 1

ON ↓

	1	2	3	4

OFF

ON ↓

	1	2	3	4

OFF

No time lapse.

The time lapse amounts to 1 second.

Dip switch 2

ON ↓

	1	2	3	4

OFF

ON ↓

	1	2	3	4

OFF

If the joystick (or push buttons) are operated for more than 2 minutes continuously, the bow thruster will be switched off.

The LED indicator and the buzzer are activated.

If the joystick (or push buttons) are operated for more than 2 minutes continuously, the bow thruster will NOT be switched off.

The LED indicator and the buzzer are activated.

DIP SWITCHES 3 and 4:

Dip switches 3 and 4

ON			↓	↓
OFF	1	2	3	4

The panel will not be switched off automatically.

ON			↓	↓
OFF	1	2	3	4

If the panel is not engaged during more than 30 minutes, it will switch off automatically.

ON			↓	↓
OFF	1	2	3	4

If the panel is not engaged during more than 60 minutes, it will switch off automatically.

ON			↓	↓
OFF	1	2	3	4

If the panel is not engaged during more than 120 minutes, it will switch off automatically.

9.4 Operation of Thruster Panels

Switching the panel ON and OFF:

Switching the panel ON:

Push the ON/OFF key.

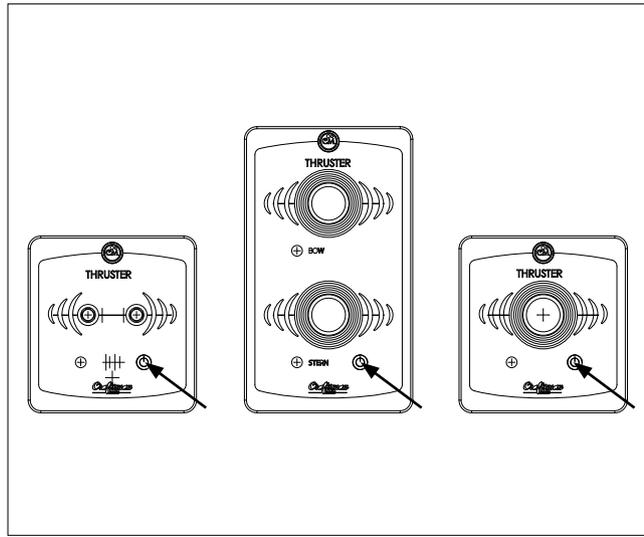
The LED will blink intermittently with a green colour and the buzzer will sound. In order to activate the panel, the ON/OFF button must be pushed again within a time lapse of 6 seconds. The green LED will be on continuously and the buzzer will stop. If the ON/OFF switch is not pushed (again) within 6 seconds' time, the panel will **not** be switched on.

Switching off the panel by hand:

Push the ON/OFF switch so as to disengage the panel.

Automatic switch off of the panel:

If the settings of the dip switches 3 and 4 have been modified, as described under the heading "Settings", the panel will switch off automatically after 30 min, 60 min or 120 min respectively.



Operation of the directional switch:

If the directional switch (push button or joystick) is operated, the Thruster will be engaged.

In the case of more than one steering position:

1. Never operate the Thruster from more than one position simultaneously.
2. Whenever the Thruster is engaged, the LED on the other steering positions will blink intermittently with a green colour.

If the directional switch is operated during more than 2 minutes continuously, the Thruster will, dependent on the setting in use:

1. be switched off; the LED indicator and the buzzer are activated. If the joystick/push button is released, the bow thruster can be operated again thereafter.
2. not be switched off; the LED indicator and the buzzer are activated.



ATTENTION:

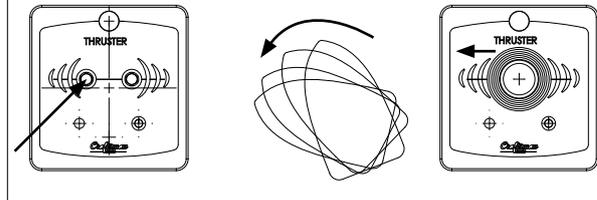
1. If the electric motor of the Thruster is engaged during more than 2 minutes, it can be seriously damaged.
2. The maximum engagement time amounts to 2 minutes **per hour**.

Each Thruster motor is provided with a temperature safety switch. If the temperature of the motor becomes excessively high, the electric motor will be disengaged automatically.

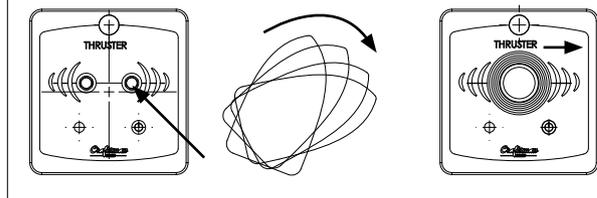
However, in emergency situations, the Thruster can still be activated (after every time lapse of 3 seconds) in a pulsating fashion. This will require first the release of the directional switch.

If the Thruster is activated directly thereafter, it will operate during 3 seconds maximum, after which the temperature safety switch will disengage the Thruster again. By releasing and engaging the directional switch again, the thruster will be operative for another 3 seconds. And so on and so forth.

Turning the boat to portside

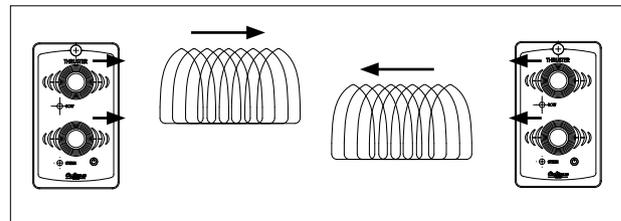


Turning the boat to starboard



Bow + Stern Operation

Move both joysticks into the same direction to achieve the following:



10 Maintenance

Regular maintenance

There are no user serviceable parts inside your Thruster and therefore, in the case of a problem, please refer to the Dealer.

However, the following parts are recommended for frequent inspection:

1. Carbon brushes
2. Zinc anode

Recommended annual maintenance

1. Remove and clean the propeller and grease the propeller shaft with Molykote br2plus.
2. Replace the zinc anode if needed.
3. Inspect all cable connections; make sure that they are clean and tight.
4. Vacuum or blow out the motor grid on top, to remove carbon dust. Avoid breathing in the carbon dust when blowing out with compressed air.
5. Inspect the motor's carbon brushes : Pull back the brush retaining springs and slide the brushes back and forth in their holders. They should be loose and slide freely.

Electrical maintenance

Only to be checked by a technician.

The carbon brushes must be checked once a year for wear and tear.
For rental boats it must be checked every two months.

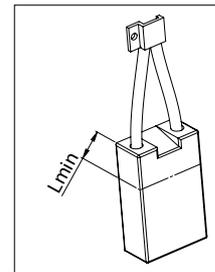


Caution

Switch off all electrical circuits before starting maintenance work.
Disconnect the battery

Maintenance

1. Make sure that the Thruster area is properly clean.
2. Clean and tighten all electrical connections on the Thruster motor, the panel and the battery.
3. Check for any damage of all wires used for the Thruster and replace if necessary.
4. Check the batteries for voltage level, as the proper functioning of the Thruster motor is directly dependent on its battery.
5. Check and tighten the motor mounting bolts.
6. Clean the cover on the motor from dust.
7. Check the carbon brushes (4) for wear, by measuring the length.
8. Clean the carbon brush for dust and replace them if the length is less than 12mm.



11 Trouble shooting

Trouble shooting

Motor does not operate	Is the battery main switch in "ON" position. *
	Is the main fuse burnt out. *
	Is the firing current circuit breaker of the control panel tripped. * (Figure 1)
	Check for damaged or disconnected cables. *
	Check if anything is blocking the propellor, piece of wood, rope etc.
Motor operates slowly/low thrust	Check the battery condition.
	Clean all electrical terminals corrosion may cause bad connections.
	Inspect the carbon brushes of the motor (to be done by technician)..
	Check if anything is blocking the propellor, piece of wood, rope etc..
Motor turns too fast but there is no thrust	Check if the propeller is damaged or lost.

* In all these cases the power LED of the panel will not be ON.

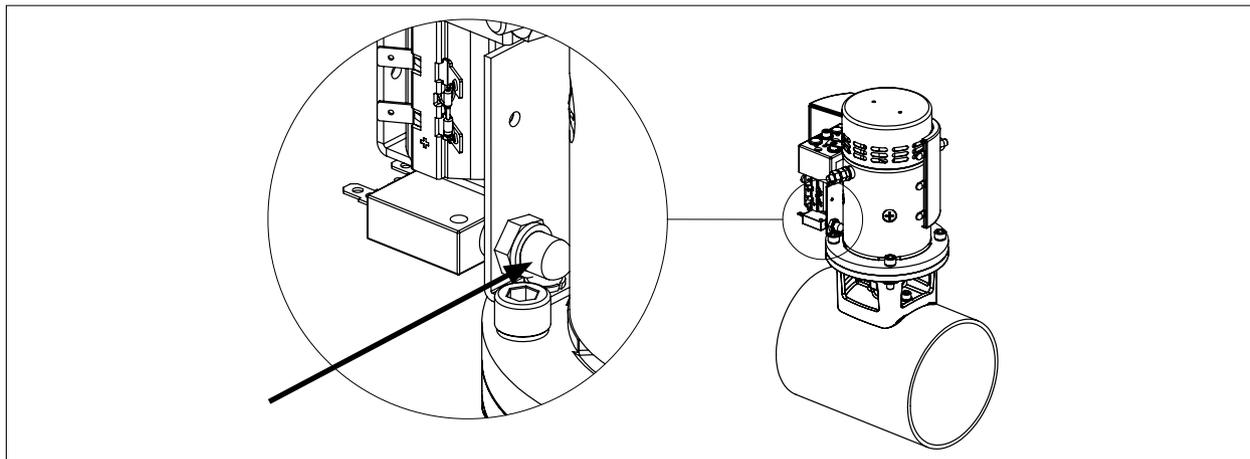
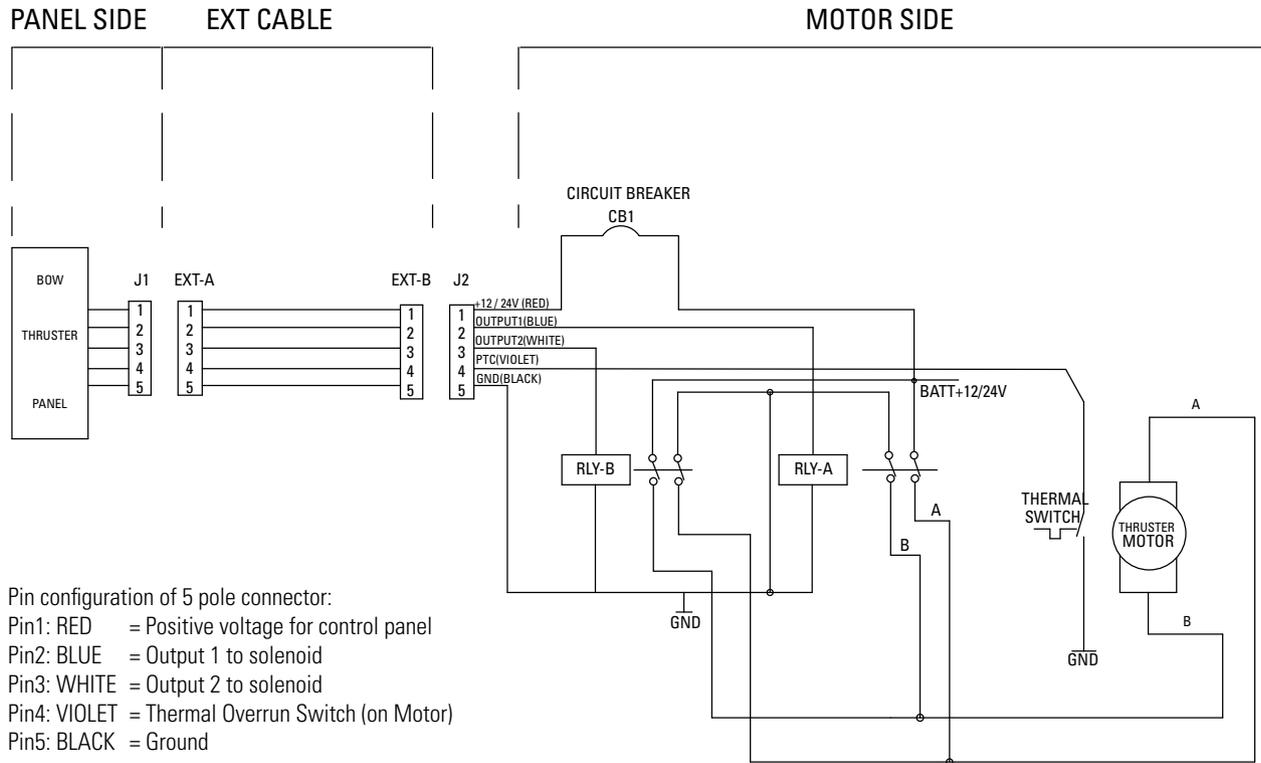
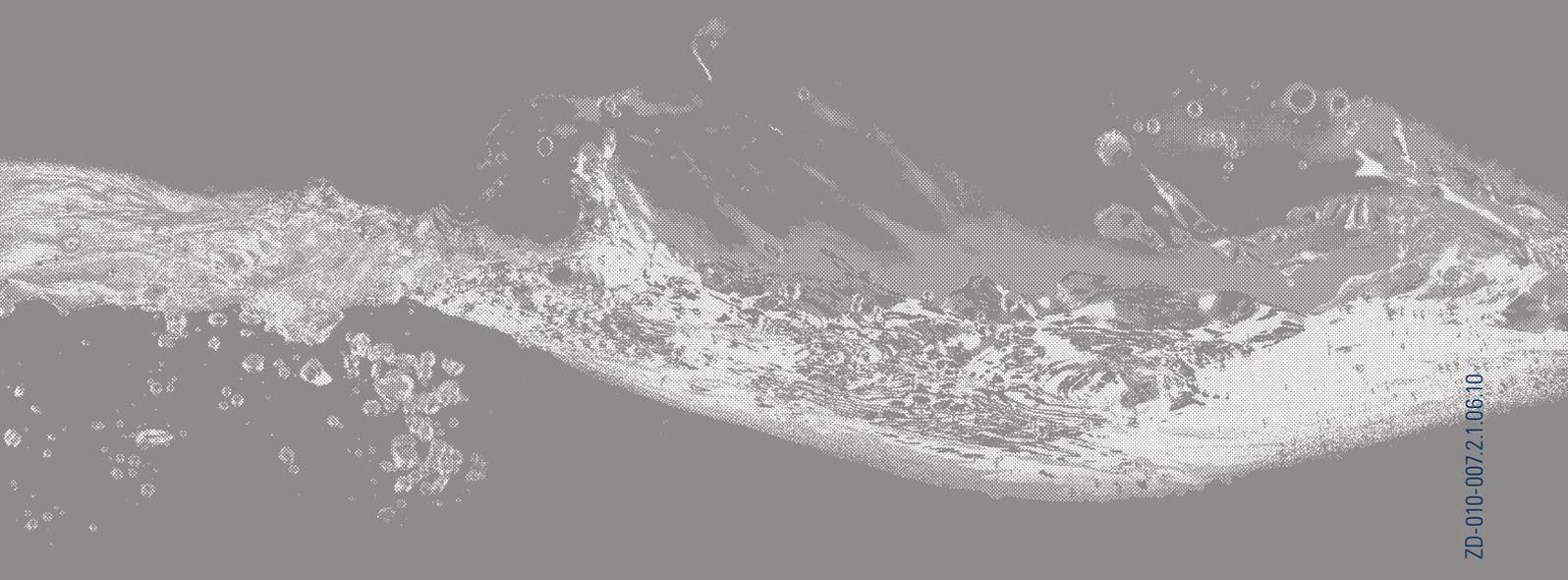


Figure 1



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