BOW THRUSTERS
MANUAL
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.

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

**DANGER**

Attention (especially with a view to a safety risk for man or material)

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!).

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

Pay attention to the symbols and read the instructions in the text.

Attention

(especially with a view to a safety risk for man or material)
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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

<table>
<thead>
<tr>
<th>Thruster</th>
<th>Thrust</th>
<th>Inside diameter of tunnel</th>
<th>Motor diameter</th>
<th>Power</th>
<th>Voltage</th>
<th>Current</th>
<th>Duty</th>
<th>Protection</th>
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<tbody>
<tr>
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<td>kgf</td>
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<td>kW</td>
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<td>A</td>
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<td>170 24</td>
<td>170</td>
<td>250</td>
<td>170</td>
<td>11.3</td>
<td>24</td>
<td>560</td>
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</tbody>
</table>

All specifications are subject to modification without prior notice.
S2 = maximum engagement time amounts to 2 minutes per hour.
5 Specifications of the 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.
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.
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**
   \[(R=0.1\times D)\]
   \(D = \text{tunnel diameter}\)

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

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>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.</td>
</tr>
<tr>
<td>2</td>
<td>Use a simple tool to pass through the drilled centers and mark the cutout at both sides of the bow.</td>
</tr>
<tr>
<td>3</td>
<td>Cutout the hull using the mark as a knife guide by appropriate method.</td>
</tr>
<tr>
<td>4</td>
<td>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.</td>
</tr>
</tbody>
</table>
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.

Use the flange to mark the correct position of the holes. Drill holes through the tunnel and deburr the edges.

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.

Use the supplied hexagonal tool to fasten the 4 bolts of the flange, max. torque is 22 Nm.
For Thruster 12512, 15024 and 17024

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

Install the reservoir ± 50 cm above waterline!
Make sure the oil-line has a constant downward slope.
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.

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.

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.

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)
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 electric motor.

**Warning:** Thruster Voltage, voltage loss (10%), Current (average), Minimum cable diameter, Max. cable length, Recommended battery capacity, Slow blow fuse type ANL.

<table>
<thead>
<tr>
<th>Voltage (V)</th>
<th>Current (A)</th>
<th>Cable Diameter (mm²)</th>
<th>Max. Cable Length (m)</th>
<th>Recommended Battery Capacity (Ah)</th>
<th>Slow Blow Fuse Type ANL</th>
</tr>
</thead>
<tbody>
<tr>
<td>170.24</td>
<td>150.24</td>
<td>125.12</td>
<td>115.24</td>
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<td>355</td>
<td>300</td>
<td>500</td>
<td>250</td>
<td>500</td>
<td>200</td>
</tr>
</tbody>
</table>
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.
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.

   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

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. 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.

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. 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

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 (childproof 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.
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.

<table>
<thead>
<tr>
<th>Dip switch</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Setting for time lapse device when switching over (portside &lt;-&gt; starboard)</td>
</tr>
<tr>
<td>2</td>
<td>Setting for 2 minutes’ continuous use of the joy stick/push buttons</td>
</tr>
<tr>
<td>3</td>
<td>Setting for automatic switching off of the panel</td>
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<tr>
<td>4</td>
<td></td>
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</tbody>
</table>

Factory setting:
9.3 Settings of Thruster panel

DIP SWITCH

Dip switch 1

No time lapse.

Dip switch 2

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:

The panel will not be switched off automatically.

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

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

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

DIP SWITCHES 3 and 4:

ON

OFF 1 2 3 4

ONTHE PANEL WILL NOT BE SWITCHED OFF AUTOMATICALLY.

OFF 1 2 3 4

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

OFF 1 2 3 4

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

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.

**Bow + Stern Operation**
Move both joysticks into the same direction to achieve the following:

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.
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.
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 propeller, 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 only).
- Check if anything is blocking the propeller, 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
Pin configuration of 5 pole connector:
Pin1: RED = Positive voltage for control panel
Pin2: BLUE = Output 1 to solenoid
Pin3: WHITE = Output 2 to solenoid
Pin4: VIOLET = Thermal Overrun Switch (on Motor)
Pin5: BLACK = Ground