MAX POWER

CONTROL TO THE MAX

PROPORTIONAL ELECTRONIC SYSTEM

Kit for Tunnel Thrusters

CE

Installation & User Manual

Made in Greece

2020

Index

1. Product Description

Max Power has developed an innovative Proportional Electronic System that can be delivered ready to be installed on new Max Power thrusters or to upgrade older units. Making it easier to keep stock while being flexible, offering our customers more options.

Max Power's Proportional Electronic System encourages the captain to use the full potentials of Max power Thrusters. With the tips of his finger, the captain could move proportionally the stern or the bow of the boat simply by moving the joystick's lever left or right.

The installation of the Proportional Electronic System is very simple due to its plug and play connections either you have already installed an electric tunnel thruster with conventional control or you install a complete system from the beginning.

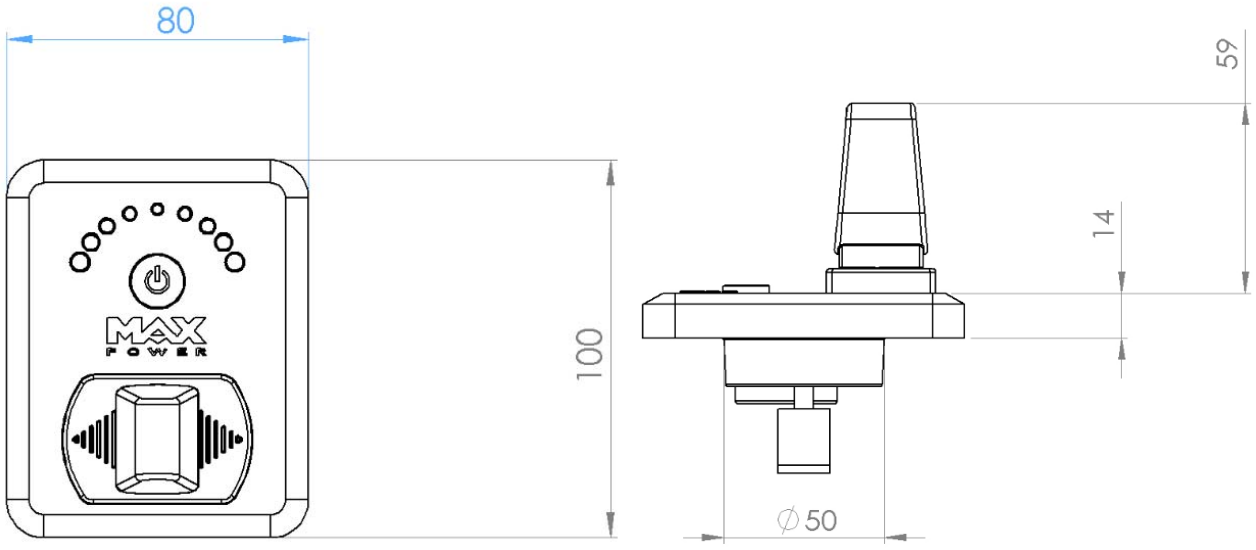
2. Proportional Joystick

- New Design
- Proportional Input to the controller
- Visual thrust LED indication
- IP67
- Plug & Play
- Easy Installation with hole diameter 51mm

2.1 Technical Specifications

Voltage Supply	12V / 24V
Current consumption	150mA (Max)
Light Indications	Yes (5 LEDs)
Buzzer Indications	Yes
Operating Temperature	-10 to +60 Degrees C°
IP Rating Front	IP67
IP Rating Back	IPx4

2.2 Dimensions



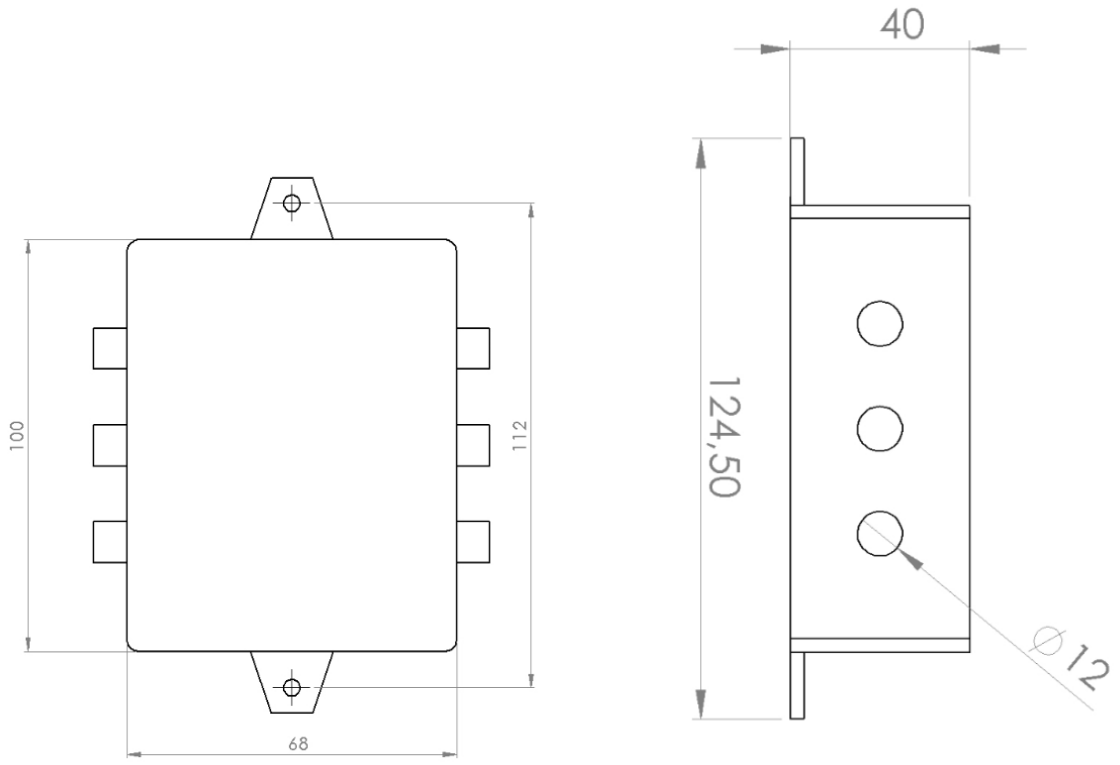
3. Proportional Electronic Controller

- Proportional input to the power module
- Plug & Play
- Child proof activation protection
- Auto power off after 30 minutes idle state
- Coil current of the power relay is not going through the control circuit
- 3sec delay switch between port and starboard thrust
- 100% Battery Isolation
- Shutdown on thruster over-heat
- Auto switch off after 2 min of continuous thrust.

3.1 Technical Specifications

Voltage Supply	12V / 24V
Current consumption	150mA (Max)
IP Rating Front	IP66
Operating Temperature	-10 to +60 Degrees C°

3.2 Dimensions



4. Proportional High-Power Unit

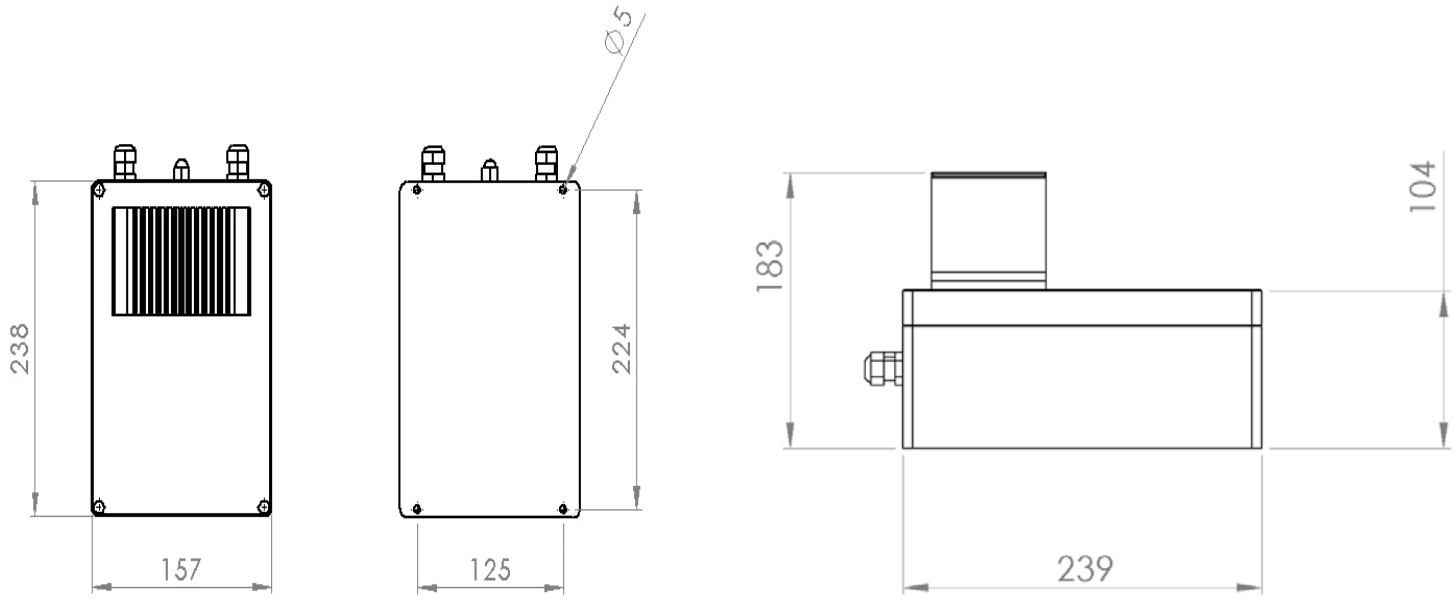
- Proportional Output to the thruster
- Able to support motors up to 25kW (900A, 24V)
- Plug & Play
- Compatible with all CT electrical Max Power thrusters

Power unit must be the closest possible to the battery pack

4.1 Technical Specifications

Voltage Supply	12V/24V
Output Voltage	20-100%
Maximum Output Current	900A
Controlled by	PWM
IP	IP65

4.2 Dimensions



5. Installation

5.1 Electrical Installation

Install a fused circuit breaker/switch in the boat's main DC distribution panel marked BOW THRUSTER. This circuit breaker/switch should ideally be supplied from a different battery bank to the one used for powering the thruster. The installer must protect the positive supply cable of the thruster's control box by means of a 8A fuse.
The size of the power cables (red & black) depends on the length of the cable run, the voltage drop in these cables should not exceed 5% of the nominal battery voltage.

For safety reasons, and in order to obtain all the functions provided by the thruster's controller, an electric battery isolator needs to be installed in the thruster's motor positive supply cable.
Max Power advises the usage of an electric battery isolator ref. OPTI3160/3 (12V) OPTI3170/3 (24V).

If an electric battery isolator is not used then simply seal-off the two grey wires coming out of the control box. It is important to isolate the thruster's motor power circuit by using a manual battery isolator after having used the thruster.

CAUTION: an incorrect electrical installation will cause rapid deterioration or even failure of the system. Excessive voltage drop will cause premature wearing of the relays and brushes.
Special attention should be given to the quality, capacity and condition of your batteries, as well as cable sections used.

Ensure that all electrical connections are correctly tightened.

Under no circumstances should any flammable products be stored next to the electrical components of the system.

Thruster motor power supply (12 V / 24 V):
These values are given as an indication, assuming that the batteries are charged at 100% with voltage either 13.8V or 25.4V.
The performance data are measured with an approx. consumption of 680A and 11V for the CT100, or 430A and 22V for the CT125, at the motor's connections.

Power wiring:
Measure the shortest and most direct route possible between the battery(ies) and the electric motor; remembering to allow for both "positive and negative" cables.
For all connections, use appropriate terminals for the chosen cable sections. It is possible to reduce the cable section to facilitate easy connection but only over a short distance. In this case, appropriated crimp fittings should be used at the connections.

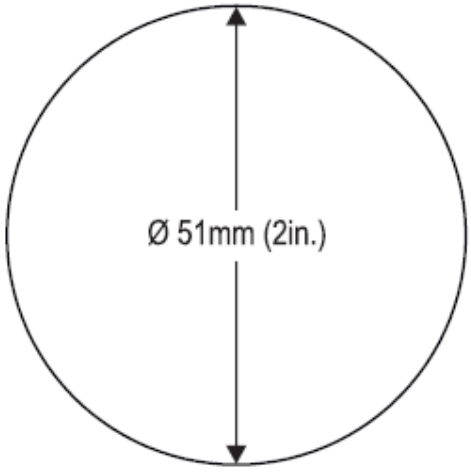
5.2 Joystick Installation and Guidelines

Joystick should be protected from the natural elements while the thruster is not in use. Install the Joystick in easily accessible positions, without obstructing the main engine and/or steering controls.

When fixing the joystick with the stainless steel screws, make sure to install the pre-cut rubber seal, as supplied with the panel, ensuring that it is in the correct place.

Please note that Joystick is only fully waterproof in its front face, if a proper installation takes place.
However the area behind the dashboard should be kept dry to avoid the risk of oxidization of the cable's connecter contacts.

The bellow illustration is for measurements usage only. Use external template when mounting.



**For full Joystick installation instructions, please refer to the “Installation Guidelines" as supplied with each Joystick.

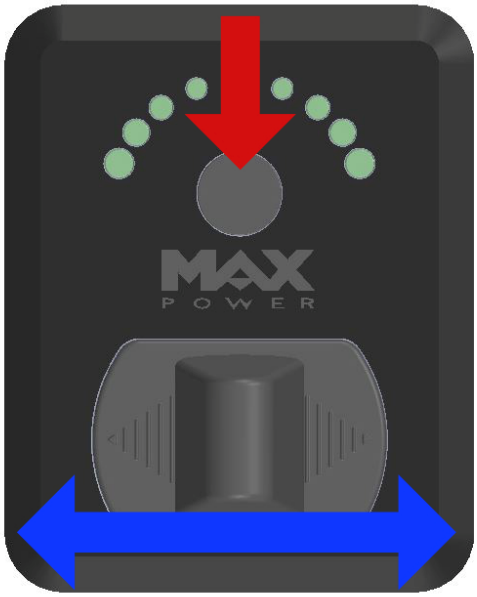
5.3 Main Power Fuse

Fuse sizes for over current protection are to be determined on the basis of the cable sections in the circuit and NOT the amperage drawn by the appliance (thruster motor) in the circuit.

5.4 Batteries

Thrusters are high amperage consumers with instantaneous demands, thus, we recommend you use maintenance-free “starting” type batteries, with high CCA outputs. For example: Exide Maxxima 900, 12V, capacity 55Ah / starting current 800CCA.

6. Use



6.1 Switch On/Off

To switch the thruster ON or OFF press the power button (red arrow) and move the joystick to the left or right for 1 second (blue arrow).
When the system switches ON the Joystick will beep once and the green LED in the center of the panel will light up.
When the system switches OFF the control panel will beep twice and the green LED in the center of the panel will fade out.

6.2 Auto Switch Off

If the thruster has not been used for a period of thirty minutes it will automatically switches itself off.

6.3 Joystick Instructions

The electronic controller provides a time delay between left and right thrust in order to avoid rapid direction changes. There is no delay when thrusting to same side.

If the user is thrusting at any direction continuously for two minutes the system will shut down the thrusting for protection reasons and the user will have to re-center the joystick and move it again to the desired thrusting direction.

In order to isolate the thruster motor power circuit, as described in the previous two paragraphs, it is necessary to install an electric battery isolator, as advised by Max Power.

6.4 Tests

Activating the thruster when the boat is out of the water is not advised under any circumstances.
Tests must be carried out with the boat in the water, the battery (ies) charged at 100% and in charge, and the engines on running function.
The maximum continuous operating runtime corresponds to 2-3min normally. However, this can be affected by the ambient temperature.

6.5 Electrical Measurements

In normal “usage” mode, i.e. thrusters running, boat in the water, with fully charged batteries under ongoing charge (alternator), electrical measurements should be made at the following points:

- ✓ At the batteries
- ✓ At the battery cut-off switch
- ✓ At the fuse
- ✓ At the electric motor’s connections
- ✓ At the power supply arriving at the thruster control box

These measurements will enable you to detect voltage drop.

NOTE: The voltage reading between the motor's negative and positive connections should be approx. 10.5V for 12V models or 22V for 24V models during operation.
The cumulative effect of voltage drops at these points can severely impair the thruster's performance.

6.6 Operation

Switch on the joystick, as previously described in the manual.

Push slowly the joystick to the left and the boat moves proportionally to the left.

Push slowly the joystick to the right and the boat moves proportionally to the right.

If, during tests the boat moves in the opposite direction, change around the blue and the brown wires on your power relay.

When maneuvering, remember that the boat's momentum continues after you release the joystick, therefore remember to release the control in advance before reaching your desired position.

Attention must be paid not to use the thruster in areas where people may be swimming or near to floating debris.

Maximum running time: 2-3 min (depending on ambient temperature).

6.7 Alarm Signals

If the thruster motor overheats the joystick will start beeping, the center green LED will flash for ten (10) seconds and then the system will power off automatically. As soon as the overheating alarm sounds, there are 10 seconds of actual thruster usage before the unit automatically shuts down.

When the user tries to switch on the system again and the temperature of the thruster is still over the protection threshold the system will switch on but the joystick will start beeping again for ten (10) seconds and then it will switch off again.

The above mentioned behavior will be repeated as long as the thruster is above the critical temperature until the thruster cools down.

If the Proportional High-Power Unit overheats the control panel will start beeping and ALL the green LEDs will flash until the Proportional High-Power Unit has cooled down.

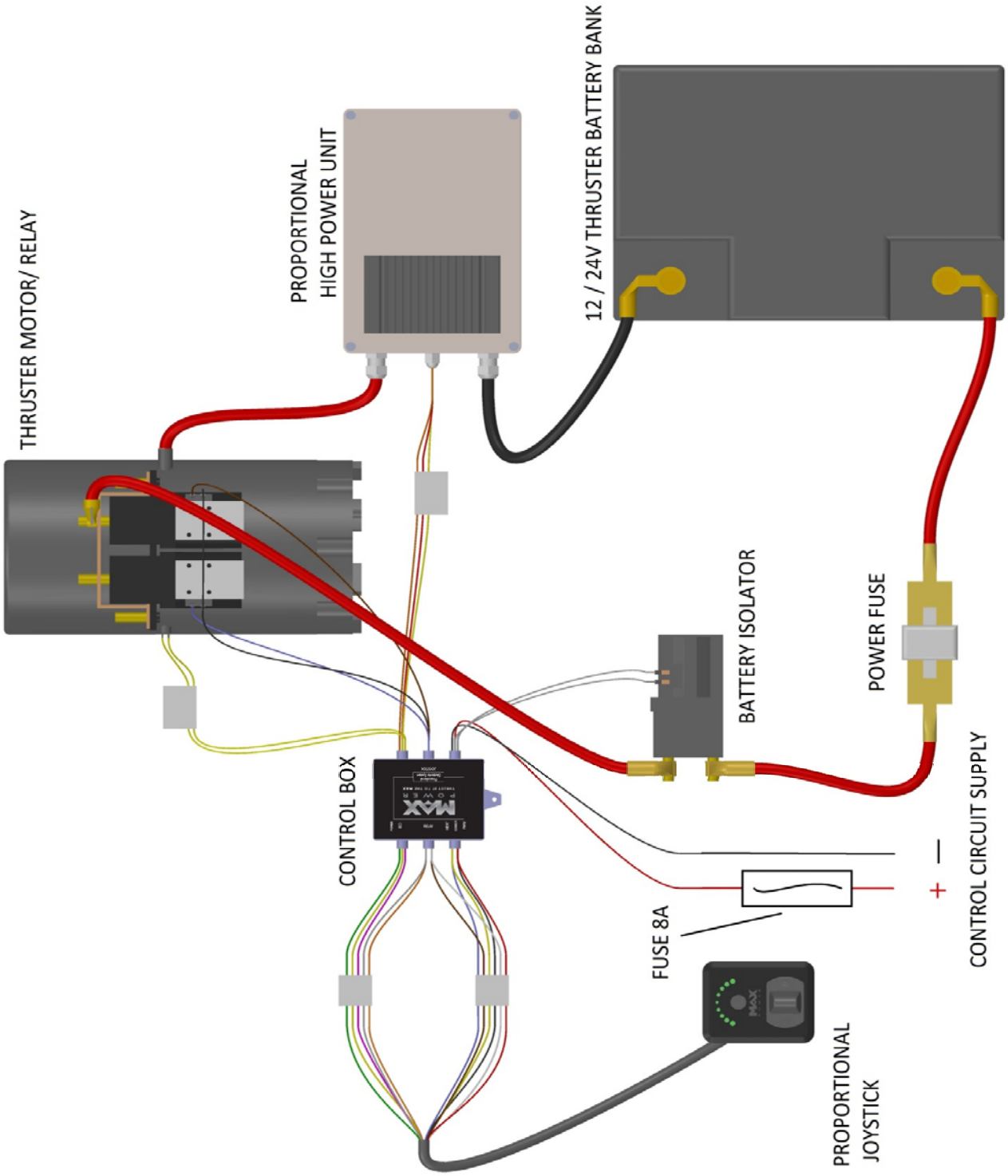
6.8 Safety Features

Switch off means to cut the power at both the DC equipment panel (control power supply) & the thruster battery isolator (thruster power supply) after having used the thruster.

Under no circumstances should any flammable products be stored next to the electric components of the thruster. Attention must be paid not to use the thruster in areas where people may be swimming near the boat.

CAUTION: Never tamper with the thruster / thruster turbine if not 100% sure that both the control and power circuits have been isolated, except if taking electrical measurements on the thruster motor or relay.

7. Total Wiring Diagram for Electric Tunnel Thrusters



8. Maintenance

Joystick should be protected from the natural elements while the thruster is not in use. The thruster requires a minimum of ongoing maintenance:

- ✓ Check the condition and charge of the batteries regularly, as voltage drop is the most frequent cause of rapid deterioration of the relay.
- ✓ Carry out a regular check of all electric components: batteries, connections, power cables.
- ✓ Remove the motor and clean out dust from the motor-brushes with compressed air.

The electric motor must be kept dry and well-ventilated.

Composite drive leg and propellers:

The composite drive leg is pre-filled with oil and sealed for its lifecycle. It does not require an oil change.

The composite drive leg does not require an anode and must not be disassembled, even partially (this would void the warranty)

When the boat is out of the water, check that there are no fishing lines, plastic bags, etc. caught in the propellers.

Paint the drive leg and propellers with antifouling (make sure that they were well prepared and primer has been used).

Always keep the propellers and tunnel clean.

To prevent the build-up of calcium on the drive shafts, which would damage the oil seals, cover the drive shaft and the oil seals' stainless steel covers with silicon grease before fitting the propeller(s). This should be done on an annual basis after the cleaning of the outside of the leg. Do not use aggressive solvents as they may damage drive leg seals. If drive leg oil seals are found to be worn, replace the drive leg with a standard exchange unit.

NOTE: All maintenance should be carried out by qualified and authorized personnel.

9. Worldwide Distribution Network

To locate the nearest Max Power distributor, please consult the section "Worldwide Distribution" on our website: www.max-power.com

10. Warranty Coverage

Introduction

The purpose of this document is to set out the terms of warranty cover offered in relation to products purchased by the End User from Max Power or its approved network of resellers.
This document will adhere to the following format:-

Section 1 Definitions
Section 2 Period of Coverage
Section 3 Warranty Registration
Section 4 Warranty Terms
Section 5 Warranty Exclusions
Section 6 Procedural Guidelines
Section 7 Service Centers

1) Definitions

Authorized Repair Number – The number given by Max Power on reporting a fault with your thruster
Dealer – An authorized Max Power sales centre
End User – The boat supplied with supplied equipment and the owner thereof
Installer – The authorized centre responsible for the installation of your thruster
Manufacturer – supplier of the equipment under warranty
Pleasure Craft – Vessels used for owner's personal use that have no commercial use (i.e Charter boats or work boats)
Resellers – Max Power approved distributors and dealers
Serial Number – Number in upper right hand corner of Warranty document
Supplier – The manufacturer (Max Power)
Warranty – The terms and conditions that are covered by the manufacturer

2) Period of Coverage

The equipment manufactured by the Supplier is guaranteed to be free from defective workmanship, components and materials under normal usage conditions for a period of two years from the date of purchase by the End User. This warranty is transferable to subsequent owners of this equipment during the period of coverage.

3) Warranty Registration

In order to register your product and activate its warranty you have to follow the link below which addresses you to the warranty registration form:

https://www.max-power.com/warranty

4) Warranty Terms

After registering your product your will receive a pdf file which includes all the terms relevant to the warranty.

5) Warranty Exclusions

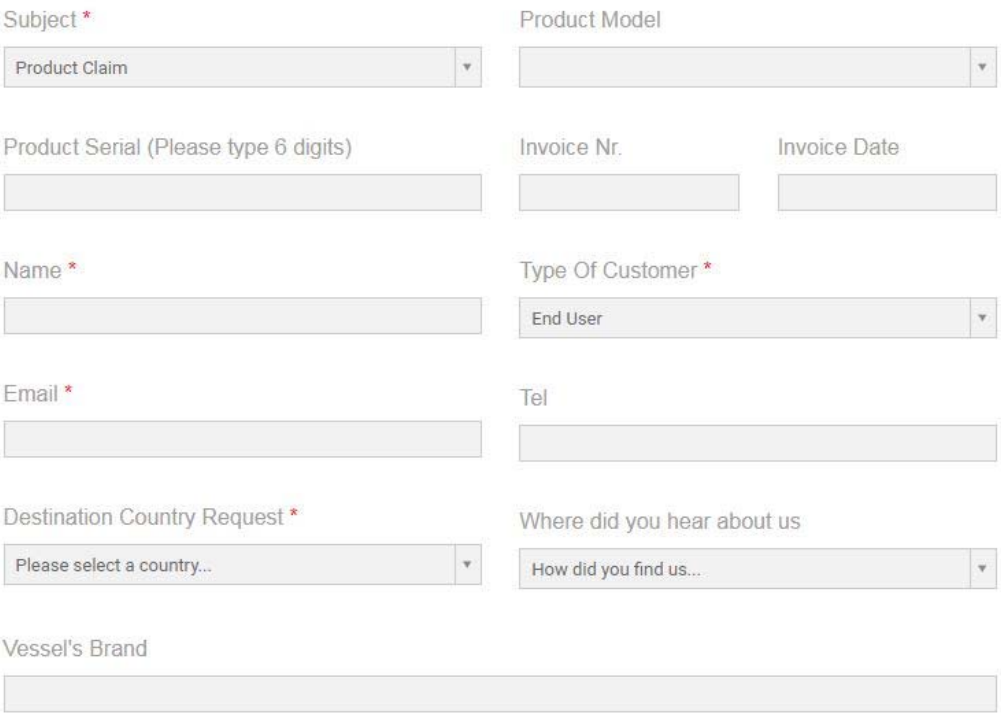
Damage due to modifications or installation contrary to published specifications
Cost of hauling the boat
Damage due to repairs performed by an unauthorized service centre
Damage due to lack of normal maintenance services
Damage due to water
Parts replaced due to normal wear and tear
Repairs performed without knowledge of manufacturer (please contact dealer to receive
Repair Authorization Number)
Tampering of equipment by the End User
Cost of travel to and from the job site
Cost of economic loss, including injury to any person, damage to property, loss of income or profit, communication, lodging, inconvenience
Consequential damage due to failure, including those arising from collision with other vessels or objects

6) Procedural Guidelines

Please, firstly check that all the wiring connections have been done with respect to the wiring diagram which can be seen in page 12 in chapter 8 “Total Wiring Diagram Electric Tunnel Thrusters”.

If all the wiring connections are correct according to the figure in page 12, then please follow the link: https://www.max-power.com/contact

Then fill the empty fields by choosing “product claim” and your details as the form below including a detailed description of the issue that you are facing with the product. After that you will receive a ticket number which addresses your issue and our expertise personnel will contact you.



The warranty as outlined above is only applicable to Max Power manufactured thrusters and optional equipment as used in marine pleasure industry. The supplier holds the exclusive right to test the product and determine whether it is defective

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