



NAVY 6.0 USER MANUAL

April, 2019 Version 1.5

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Acknowledgement

Thanks for choosing ePropulsion products, your trust and support in our company are sincerely appreciated. We are dedicated to providing high-performance electric outboards, as well as thrusters, reliable lithium batteries and accessories.

Welcome to visit www.epropulsion.com and contact us if you have any concerns.

Using This Manual

Before use of the product, please read this user manual thoroughly to understand the correct and safe operations. By using this product, you hereby agree that you have fully read and understood all contents of this manual. ePropulsion accepts no liability for any damage or injury caused by operations that contradict this manual.

Due to ongoing optimization of our products, ePropulsion reserves the rights of constantly adjusting the contents described in the manual. ePropulsion also reserves the intellectual property rights and industrial property rights including copyrights, patents, logos and designs, etc.

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ePropulsion reserves the rights of final interpretation of this manual.

This manual is multilingual, in case of any discrepancy in the interpretation of different language versions, the English version shall prevail.

Symbols

The following symbols will help to acquire some key information.

 Important instructions or warnings

 Useful information or tips

Product Identification

Below picture indicates the serial numbers of NAVY 6.0. Please note the position of the serial numbers and record them for access to warranty services and other after-sale services.

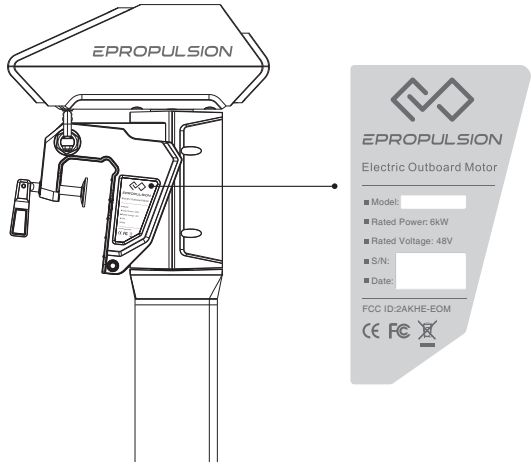


Figure 0-1

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1 Product Overview

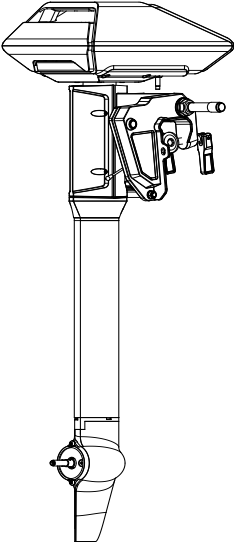
NAVY 6.0 is a 6kW electric outboard motor by either remote control or tiller control. Below table shows different models of NAVY 6.0.

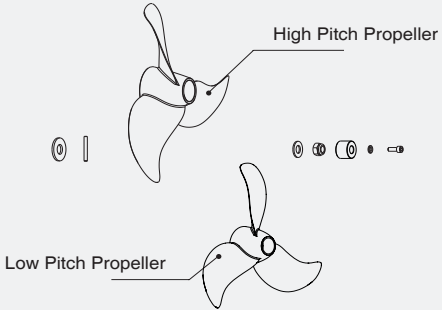
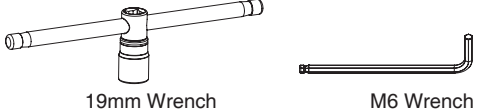

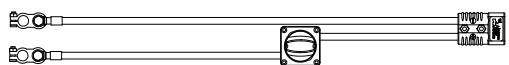
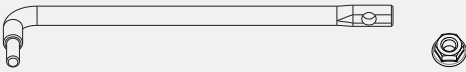
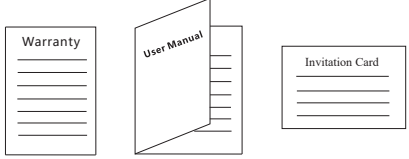
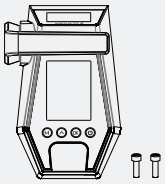
Model	Control	Shaft length
NAVY 6.0-S	Tiller/Remote	640mm/25.2"
NAVY 6.0-L	Tiller/Remote	765mm/30.1"

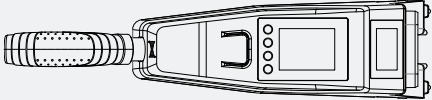
💡 Tiller handle or Remote control is necessary when operating the outboard motor, but it is not included in the NAVY 6.0. It need be purchased separately by users from ePropulsion authorized dealers.

💡 NAVY 6.0-S refers to the short shaft version, which is recommended for transom height of 300mm~400mm; NAVY 6.0-L refers to the long shaft version, which is recommended for transom height of 400mm~500mm.

1.1 In the Package

Items	Qty./Unit	Figure
Outboard Main Part	1 set	

Items	Qty./Unit	Figure
Propeller Assy.	2 sets	 <p>High Pitch Propeller</p> <p>Low Pitch Propeller</p>
Wrench Set	1 set	 <p>19mm Wrench</p> <p>M6 Wrench</p>
Battery Bridging Cables	3 pieces	
Main Switch Cable	1 piece	
Link Arm	1 set	
User Manual, Warranty Card & Invitation Card	1 set	 <p>Warranty</p> <p>User Manual</p> <p>Invitation Card</p>
Remote Control (Purchase Separately)	1 set	

Tiller (Purchase Separately)	1 set	
---------------------------------	-------	--

- 💡 Other accessories not included in the package are also required to operate the outboard motor, such as NAVY remote control or NAVY Tiller Handle, NAVY battery, NAVY charger and communication cable, etc. Users can buy official accessories provided by ePropulsion such as NAVY Remote Control, NAVY Tiller Handle, NAVY Battery, NAVY Charger and communication cable, etc. from ePropulsion authorized dealers.
- 💡 Note that the two propellers in the package differ in specifications: the high-pitch propeller (Diameter: 320mm/12.6inch, Pitch: 10.8inch) and the low-pitch propeller (Diameter: 340mm/13.4inch, Pitch: 8.5inch). They share the accessories.
- 💡 Save ePropulsion original package for transport and storage.

1.2 Parts and Diagrams

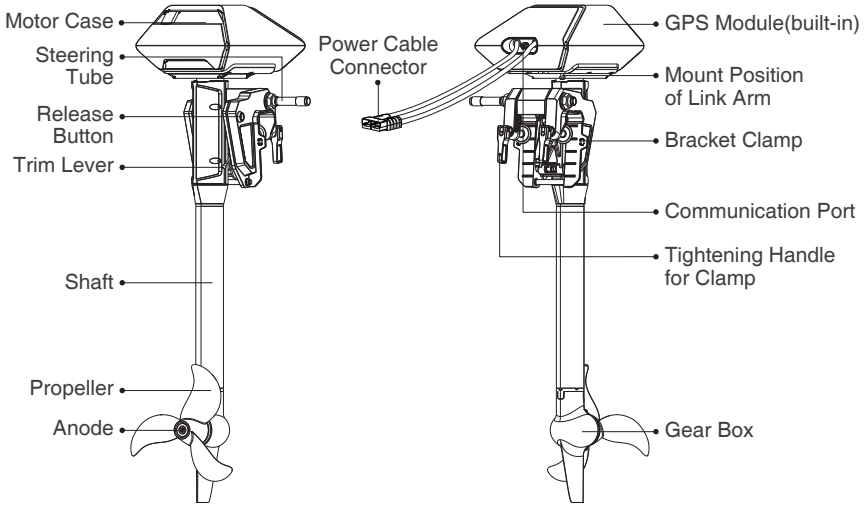


Figure 1-1 Outboard Main Part

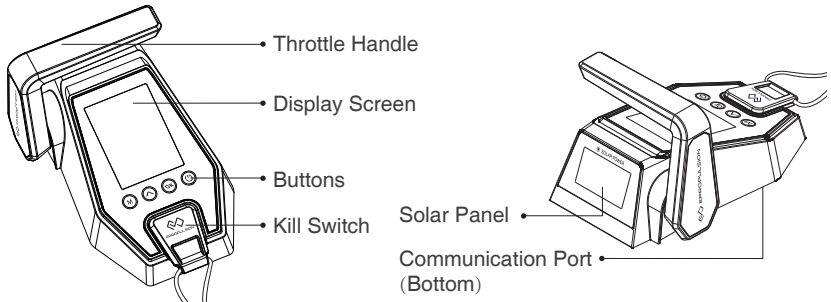


Figure 1-2 Remote Control (Purchase separately)

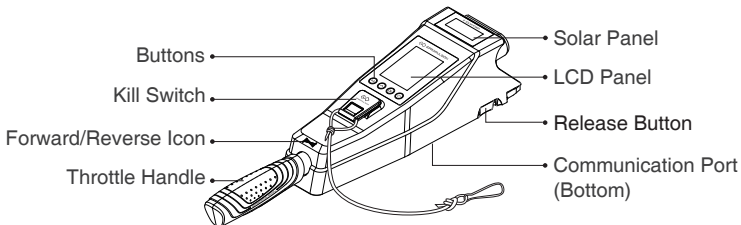


Figure 1-3 Tiller Handle (Purchase separately)

1.3 Specifications

NAVY 6.0-S/L	
Type	Electric
Rated Voltage / Current	48 V / 125 A
Input Voltage Range	39 V ~ 60 V DC
Maximum Input Power (Forward / Reverse)	6 kW / 4 kW
Comparable Petrol Outboard	9.9 hp
Maximum Overall Efficiency	57%
Maximum Rotation Speed (Forward)	1550 rpm
Control System	Remote / Tiller
Communication	Wireless / Wired
Communication Distance	≤10m
Dimension (L x W x H)	413 x 308 x 1075(S) / 1200(L) (mm) 16.2" x 12.1" x 42.3"(S) / 47.2(L)
Shaft Length (S/L)	640 mm (25.2") / 765 mm (30.1")
Weight	27.7 kg / 61 lbs. (S) 28.4 kg / 62.6 lbs. (L)
Trim Angle	Manual 4-step: 0°, 5°, 10°, 15°
Tilt Angle	Manual: 60°
Gear Oil Capacity	285 ml
Recommended Gear Oil	API GL-4 SAE 90
Coolant Capacity	630 ml
Recommended Coolant	ANT
High-pitch Propeller (Diameter / Pitch)	320 mm (12.6") / 10.8"
Low-pitch Propeller (Diameter / Pitch)	340 mm (13.4") / 8.5"
Operating Ambient Temperature	-25°C ~ 50°C (-13°F ~ 122°F)

1.4 Important Notes

1. Check the status of the outboard and battery level before each trip.
2. The distance and speed value displayed is measured by Global Positioning System (GPS), there may exist small errors due to GPS signal strength degradation or some external environment conditions like currents, winds and change of course.
3. Ensure the top of outboard is uncovered to avoid GPS signal attenuation.
4. Familiarize yourself with all the outboard operations, including starting, steering, stopping, trim adjusting and tilting.
5. Only adults who have fully read and understood this manual are allowed to operate this product.
6. Follow the boat manufacturer's instructions to choose a suitable outboard. Do not overload neither the boat nor the outboard.
7. Stop the outboard immediately if someone falls overboard during the trip.
8. Protect the battery from dropping into water or short-circuiting.
9. Follow the battery manufacturer's instructions and pay attention to short circuit, over-heat, over-charge and over-discharge.
10. Operate the outboard only when the propeller is underwater.
11. Tilt up the outboard motor above water after use.
12. Wash the outboard in time with fresh water after sailing in salt water.
13. Clean all electronic contacts with contact spray about every two months.
14. Do not leave the outboard in water if the boat speed reaches 90km/h which is driven by other power such as sailing or rowing.
15. An error code will display on the panel if the outboard malfunctions. Put the throttle to zero position and turn off the main switch, then refer to *Chapter 5.7 Warning Messages* for details and solutions.
16. For safety consideration, the system will shut down automatically when the temperature of the motor or driver rise too high or the battery voltage drops too low during operation.
17. Users are responsible to assemble the propeller and steering wheel. If other assembly or disassembly is required, please contact your dealer. ePropulsion accepts no liability for any damage or malfunction caused by operations that violate this manual.

1.5 Declaration of Conformity

Object of the declaration:

Product Description: Electric Outboard Motor

Model: NAVY 6.0, NAVY 6.0-S, NAVY 6.0-L, NAVY 6.0R-S, NAVY 6.0R-L,
NAVY 6.0T-S, NAVY 6.0T-L, NAVY 6.0P, NAVY 6.0C

Company Name: Dongguan ePropulsion Intelligence Technology Limited

Company Address: Room 202, Bldg.17A, Headquarter No.1, 4th XinZhu Road, SongShan Lake District, Dong Guan City, Guang Dong Province, China

The object of the declaration is in conformity with the following **directives:**

EMC-directive	2014/30/EU
MD-directive	2006/42/EC
RED-directive	2014/53/EU

Applied standards:

EN 55014-1:2006+A1:2006+A2:2011	
EN 55014-2:2015	EN 61000-3-2:2014
EN 61000-3-3:2013	EN 60204-1: 2016
EN ISO 12100:2010	EN 301 489-3: 2002 V1.4.1
EN 301 489-1:2008 V1.8.1	

This device complies with **part 15 of the FCC Rules:** Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference and,
- (2) This device must accept any interference received, including interference that may cause undesired operation.

The original certificate was issued by

Shenzhen An-Teng Testing Service Co., Ltd. in Shenzhen, China.

CE Test Report NO.: ATT1709040251D, ATT1709040251E, ATT1709040251M
Issued Date: September 30, 2017

FCC Test Report NO.: GTS201709000032E01
Issued Date: July 05, 2017

Signature: 

Shizheng Tao, Chief Executive Officer & Cofounder of
Dongguan ePropulsion Intelligence Technology Limited

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

2 Preparations

2.1 Selecting the Battery

Lithium-based and lead-acid batteries can be used to supply power for NAVY 6.0. Considering the high performance in energy density and discharge ability, lithium-based batteries are more preferable. To ensure that NAVY 6.0 can work at its full power continually, the batteries are required to possess over 125A of continuous discharge current. To ensure at least one hour of duration, the battery capacity should reach 6000Wh or above.

The rated continuous discharge current is affected by the battery type and quantity of parallel batteries. To use lead-acid batteries, conventional lead-acid or AGM or GEL batteries are acceptable, while starter batteries are not recommended. Traction batteries or deep cycle batteries are more preferable as they give power over sustained period of time. Besides, the deep cycle marine batteries are also capable.

Battery capacity is a major factor that affects trip duration and distance. For instance, a battery with 48V of rated voltage completely discharges at a continuous current of 125A in 1 hour, so its rated capacity is 6000Wh ($125\text{Ah} \times 48\text{V} = 6000\text{Wh}$), we also can say its rated capacity is 125Ah. The maximum power of NAVY 6.0 is 6kW which means the system can be running at full power for about 1 hour when using this battery. You can select a battery with proper capacity based on your requirements for travelling time and distance. Note that the operating time and distance are also affected by the input power of the outboard plus the external environment and temperature. In addition, boat type and load also play important roles.

Users can choose NAVY Battery designed by ePropulsion for NAVY outboard motors, which is a type of Lithium-ion battery with 3000Wh capacity. When using with NAVY 6.0, two or more sets of NAVY Battery are required in parallel. And communication cables should be used to connect NAVY batteries and NAVY 6.0 outboard motor for internal information exchange.

Users can connect four 12V batteries in series to make a 48V battery set and use it to supply power for NAVY 6.0. Users can also enlarge the battery capacity by parallel configuration.

! When using NAVY Batteries, the batteries will work well once being correctly connected. When using non-ePropulsion batteries, before starting the outboard, users should configure the batteries via the Remote Control for the first time use, otherwise the batteries may not work properly.

! Only use the same batteries (same model, same capacity, same age and same manufacturer) in series or in parallel configuration. Variations in the batteries will cause damage to them.

2.2 Selecting and Mounting the Propeller

Two types of propellers are available for NAVY 6.0. Users can select a proper propeller based on different conditions. For a heavily loaded boat with large thrust, a low pitch propeller is more appropriate. Inversely, for a lightly loaded boat with a fast running speed, a high pitch one is preferable.

In the delivery package, there are two sets of propellers, including a low-pitch propeller and a high-pitch propeller. The low-pitch propeller with a larger diameter generates larger thrust at low speed, while the high-pitch propeller generates proper thrust to propel boats at high speed. It is recommended to use the high-pitch propeller if the boat speed can reach 15km/h or above, as the propeller can't work at full performance at low speed. Figure 2-1 displays how to mount a propeller correctly.

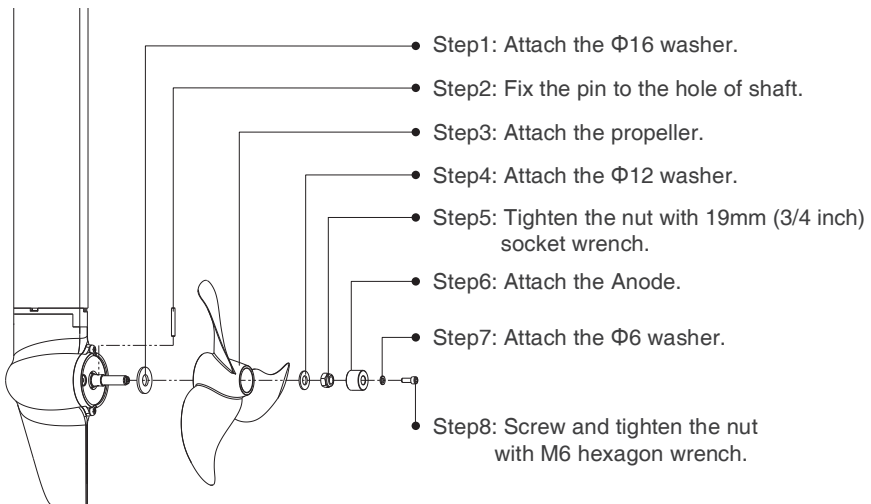


Figure 2-1

3 Mounting the Outboard Motor

Select an outboard with proper shaft length according to the transom height of your boat. The top of the propeller should be 100mm to 150mm below the water.

The outboard should be mounted on the centerline of your boat. If the boat shape is asymmetric, please consult your dealer for proper solution.

3.1 Position of Mounting

The mounting height of the outboard affects the running speed seriously. When the mounting height is too high, cavitation may occur, which may lead to speed slowdown, energy waste, and propeller damage. When the mounting height is too low, the water resistance will reduce both travelling speed and performance of the outboard.

In general, the optimal mounting height is affected by the specific conditions of a boat. In order to get the optimal mounting height, it's suggested to test running by mounting the outboard at different heights. Please consult your dealer for more help.

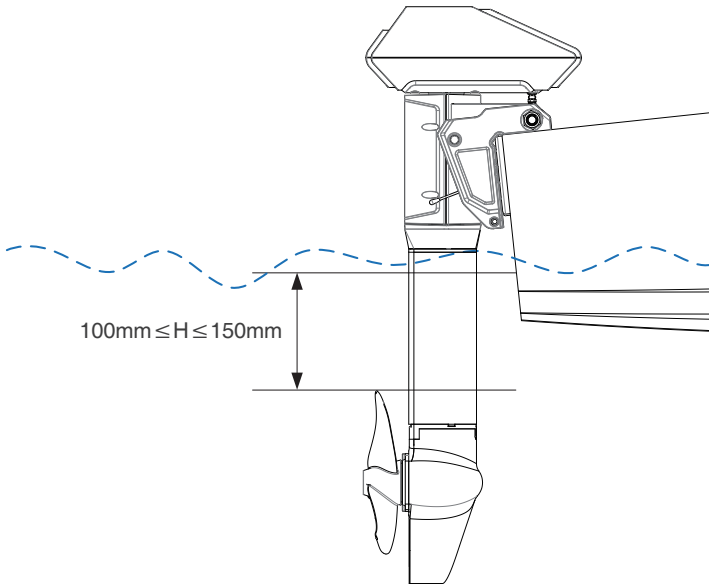


Figure 3-1 NAVY 6.0

3.2 Mounting the Outboard

Method 1

Rotate the two clamps in clockwise direction to fix the outboard onto transom.

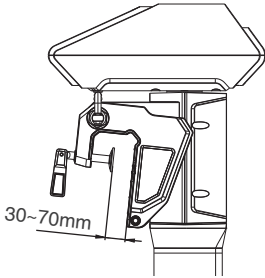


Figure 3-2

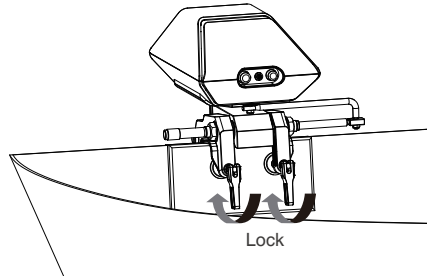


Figure 3-3

Method 2

Use two screws to fix the outboard to the boat. The dimensions of the two mounting holes are shown below.

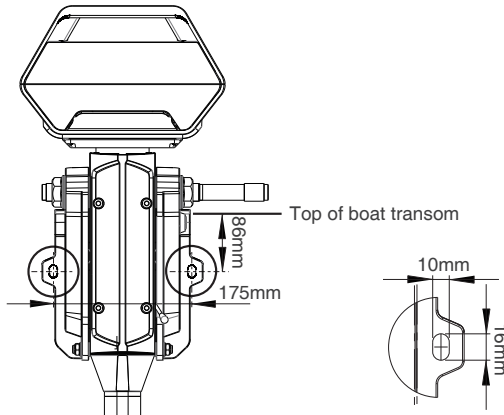




Figure 3-4

 Ensure the outboard is firmly fixed as loosened clamp screws may cause the outboard to fall into water or get damaged. Check the screws or clamps every time before use since they may be loosened because of mechanical vibrations.

 A cable is recommended to be used to avoid complete loss of your outboard in case it falls off the transom. Use the cable to connect your outboard and a secure mounting point on the boat.

3.3 Mounting the Steering System



Before using Remote Control, please follow the fixing guide to fix the Remote Control in the proper position.

When using the Remote Control, please prepare a steering wheel (not supplied with NAVY 6.0 or the Remote Control) and mount it on the corresponding position to control the direction.

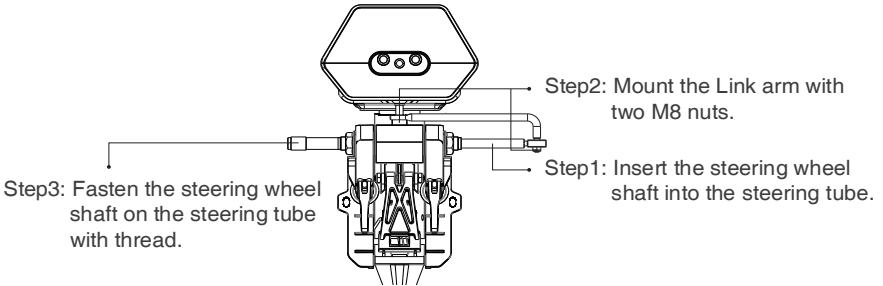


Figure 3-5

3.4 Mounting the Tiller

Before using the Tiller Handle, users should mount it by one simple step:

Align the Tiller to the mounting recess of the outboard motor in the direction of the arrow and plug in the Tiller until a click sound is heard.

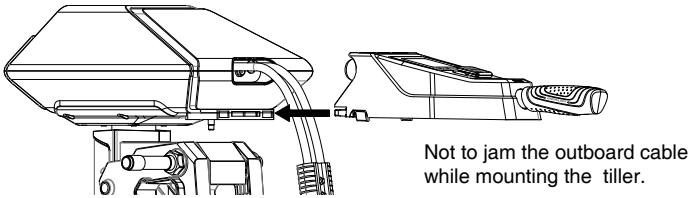


Figure 3-6



If it is the first time to mount the Tiller Handle to the outboard, it is necessary to install the tiller handle holder on the outboard (Figure 3-7) before mounting the Tiller Handle.

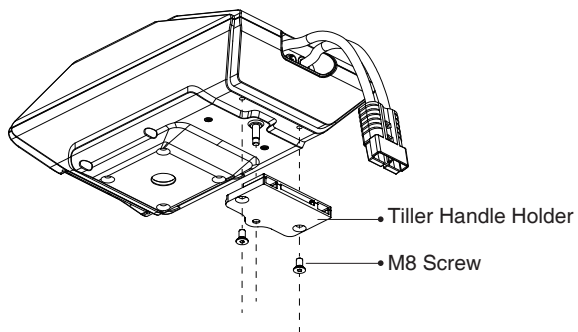


Figure 3-7

To detach the Tiller: press the release buttons (Figure 3-8) on both sides of the Tiller Handle and plug it out.

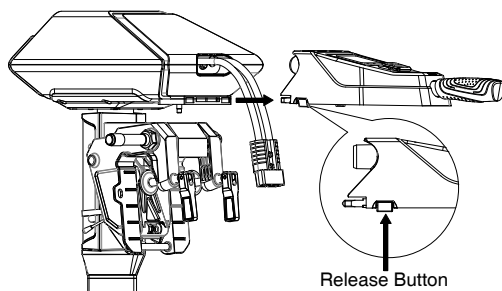


Figure 3-8

4 Connecting the Battery

4.1 Connecting a 48V Battery

When using a battery, make sure the main switch is off before connection.

- ① First connect the main switch cable to the battery.
- ② Connect the main switch cables with the power cable from the outboard.

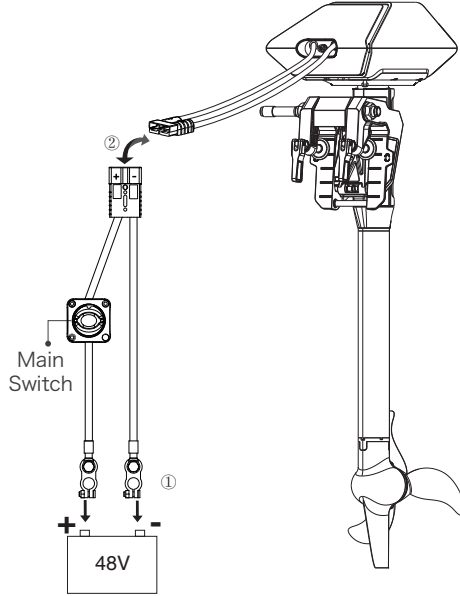


Figure 4-1

- ⚠️ Avoid battery short-circuit during connection.
- ⚠️ Outboard motor will stop working once the power cable disconnects.
- 💡 Clockwisely rotate the main switch to power on the battery before use.
- 💡 Users can also enlarge the battery capacity by connecting multiple batteries in parallel.
- 💡 The main switch and power cable are connected by the fixing screws that may loosen after long-time use. Loosen screws will lead to poor contact, which may result in overcurrent or other errors. If this problem is discovered, open the back cover of the switch, and tighten the screws inside.

4.2 Connecting NAVY Batteries

When using NAVY batteries, make sure the main switch is off before connection.

- ① First connect two batteries in parallel by a communication cable and two battery bridging cables.
- ② Connect the main switch cable to the NAVY Battery.
- ③ Connect the main switch cable with the power cable from the outboard.
- ④ Connect NAVY 6.0 outboard motor to the NAVY Battery with a communication cable.

💡 It's recommended to connect the communication cable to obtain accurate battery information.

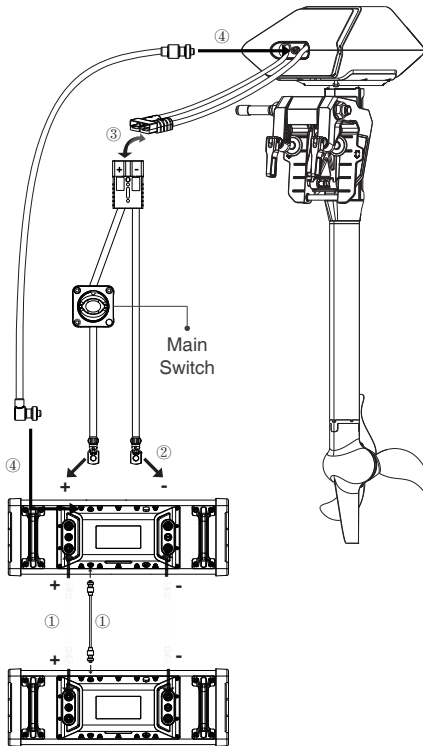








Figure 4-2

-  Avoid battery short-circuit during connection.
-  NAVY outboard motor will stop once the power cable disconnects.
-  Use communication cables to connect NAVY Batteries when multiple NAVY Batteries are used in parallel.
-  Clockwisely rotate the main switch to power on the battery before use.
-  Users can also enlarge the battery capacity by connecting multiple batteries in parallel.
-  The main switch and the power cable are connected by the fixing screws that may loosen after long-time use. Loosen screws will lead to poor contact, which may result in overcurrent or other errors. If this problem is discovered, open the back cover of the switch, and tighten the screws inside.

4.3 Batteries in Series/Parallel

When connecting four 12V batteries in series to make a 48V battery set to supply power for NAVY 6.0, use bridging cables to connect batteries in series (Figure 4-3). Make sure to connect the main switch cable to battery positive terminal and the other cable to battery negative terminal.

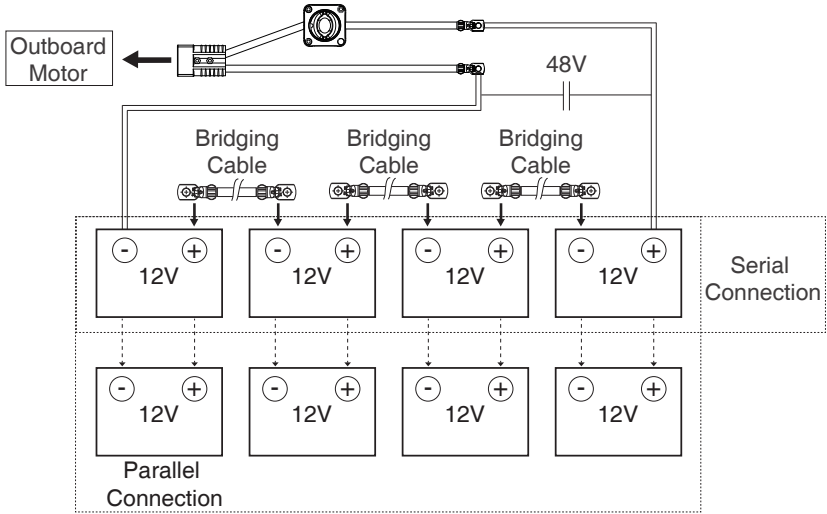




Figure 4-3

-  Only use the same batteries (same model, same capacity, same age and same manufacturer) in series and/or in parallel. Variations in batteries will cause damage.
-  Never reverse the polarity. Please pay more attention when connecting batteries in series and/or in parallel configuration. Always double check by referring to Figure 4-3.

5 Remote Control / Tiller

The Remote Control/Tiller is used for starting and stopping the NAVY outboard motor, adjusting the motor speed, configuring the battery parameters, displaying the system information and messages, etc. The Remote Control/Tiller is powered by either solar power or the built-in lithium battery. Both Remote Control and Tiller wirelessly/wiredly communicates with the outboard control system built in the main outboard motor. The only functional difference between Remote Control and Tiller is the steering method: the Tiller itself owns the steering capability, while the Remote Control requires an additional steering wheel to help steer.

5.1 Displaying

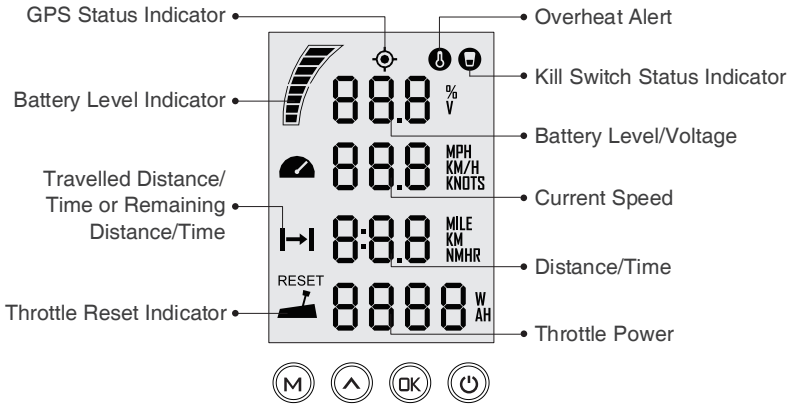

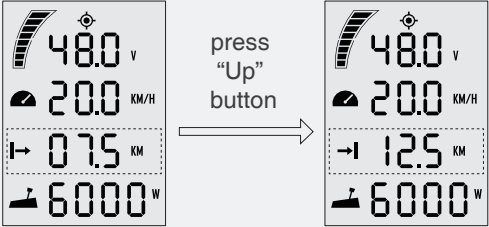
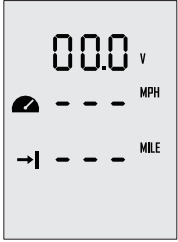


Figure 5-1

Buttons	Functions
 <p>“Power”</p>	<ol style="list-style-type: none"> 1. In power-off state, press and hold the power button to power on the Remote Control/Tiller. 2. In power-on state, press and hold the power button to power off the Remote Control/Tiller.


Buttons	Functions
<p>OK "OK"</p>	<ol style="list-style-type: none"> 1. On setting pages, press "OK" button to save the current settings and switch to the next item. 2. On setting pages, press and hold "OK" button to save the settings and return to the home page simultaneously. 3. In power-on state, when the home page displays or all the characters display on the page, press "OK" button and hold 5s to enter the Remote Control pairing page.
<p>^ "Up"</p>	<ol style="list-style-type: none"> 1. On any setting page, press "^" button to view options for current setting. 2. If the home page displays in power-on state, long press "^" button for 10s to enter the throttle calibration page. 3. On home page, press "^" button to switch the travelling distance or time displaying icon between "→ " and " →". <div style="text-align: center;">  <p>press "Up" button</p> <p>Main page 1 Main page 2</p> </div>
<p>M "Menu"</p>	<ol style="list-style-type: none"> 1. In power-on state, press and hold "M" button to enter the preference setting page. <div style="text-align: center;">  <p>Preference setting page</p> </div>

2. On preference setting page, press and hold “M” button to enter the battery setting page.





















Battery setting page


3. On any page, press “M” button to return home page.

 If users enter the page without setting any parameters, the current parameters displayed on the page will be saved as user parameters by default.

 When powering on, " 545 10 12 " indicates the system is initializing.

Icons	Functions	
	Battery level indicator	Indicating approximate battery level. The solid blocks represent remaining battery.
	Battery level/voltage	Indicating accurate current battery level percentage/battery voltage which is configurable in preference setting page. For example: 100%: indicates current battery level 48.0V: indicates current battery voltage. If the voltage is below 42V, the max input power of the outboard motor will be lower than 6kW.
	GPS status indicator	<ul style="list-style-type: none">  Hidden: no satellite signal is received or GPS does not work.  Blink: GPS is connecting to satellites.  Shown constantly: GPS is in use.

Icons	Functions	
	Over-heat alert	<ul style="list-style-type: none">  Hidden: system temperature is in normal range.  Blink: system temperature is a little high and the maximum input power of motor has been lowered than 6kW.  Shown constantly: system is over temperature and the outboard will stop working. The outboard motor can't be started until the system temperature drops to a certain level.
	Kill switch status indicator	<ul style="list-style-type: none">  Hidden: kill switch is well attached and works well.  Shown constantly: the kill switch is detached.
	Current speed	<p>Displaying real time cruising speed. Set units (KM/H, MPH or KNOTS) in preference setting page.</p>
	Distance/time display	<p>Displaying real time travel distance/time. Set units (MILE, KM (kilometer) and NM (nautical mile)) in preference setting page. The time unit is HR (hour).</p>
	Travelled distance/time or remaining distance/time	<ul style="list-style-type: none">  Remaining distance or time that outboard can travel. Set units (MILE, KM (kilometer) and NM (nautical mile)) in preference setting page.  Travelled distance or time.

Icon	Function	
	Throttle Power	Displaying real time input power to the system. A blinking “RESET” indicating the throttle should be reset to zero position.

5.2 Charging

Both the Remote Control and Tiller have a built-in lithium battery for power supply. The battery will be charged automatically under normal use: get charged by solar power or wired connection.

5.2.1 Charging by solar power (Recommended)

When the solar panel receives enough sunshine, it will generate electricity to charge the built-in lithium battery. While charging the battery by solar power, it's suggested to face the solar panel of the Remote Control/Tiller toward sunlight to get better charging effect. (Figure 5-2 and Figure 5-3).

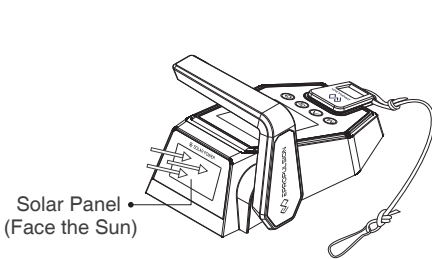


Figure 5-2

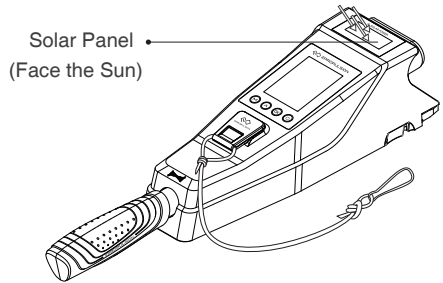


Figure 5-3



It's recommended to charge the Remote Control/Tiller by solar power.

5.2.2 Charging by wired connection

If the Remote Control/Tiller can't get enough solar power for a long time, the battery level will run out. In this case, a warning message with an error code E60 (Figure 5-4) will display on the LCD panel to remind you to charge the Remote Control/Tiller. Now you can connect the outboard and the battery by communication cable to charge the Remote Control/Tiller.



Figure 5-4

Please follow the below steps to charge the Remote Control/Tiller by wired connection.

First, connect the Remote Control/Tiller to the outboard motor by a communication cable first (Figure 5-5/Figure 5-6);

Then, connect the outboard motor to the battery.

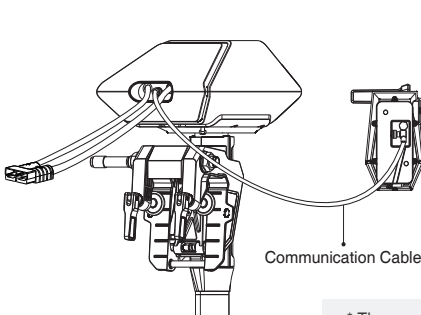


Figure 5-5

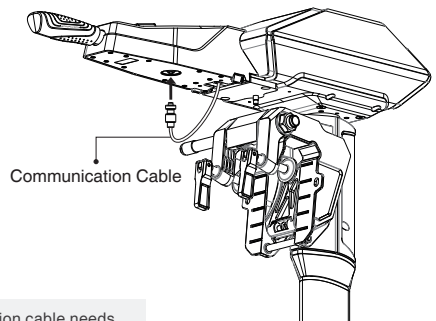






Figure 5-6

* The communication cable needs to be purchased separately.

 During long-term storage, ensure to charge the Remote Control battery every 6 months to avoid over-discharge.

 It's recommended to switch off the Remote Control/Tiller while connecting the communication cable. When the Remote Control/Tiller is switched on while charging, as the outboard main part and Remote Control/Tiller are in communication, the working outboard motor will stop at once the communication cable disconnects.

 The communication cable is not included in this package. Please purchase one from your dealer if you choose this charging method.

 After long-term storage, charge the Remote Control before use.

5.3 Power Adjusting

! Attach the kill switch to the Remote Control/Tiller before operation (Refer to 5.4 Use of Kill Switch).

5.3.1 Default Maximum Forward/Backward Power

When the battery is well connected and switched on, power on the Remote Control/Tiller. Push/Turn the throttle to increase the throttle power. The maximum forward power is 6kW and the maximum backward power by default is 4kW.

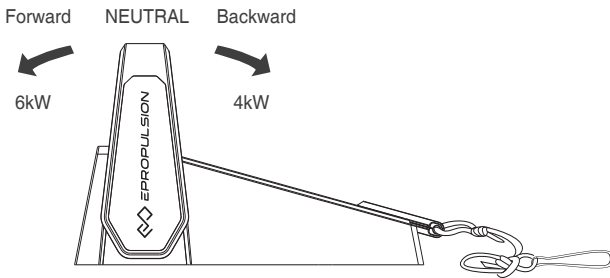


Figure 5-7

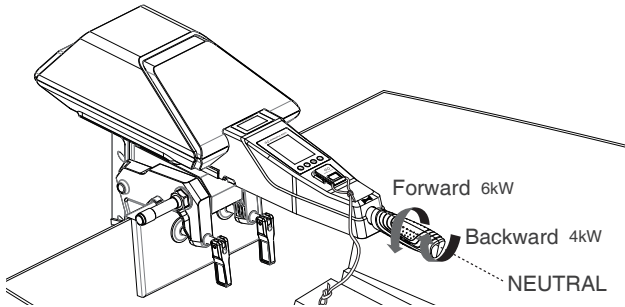


Figure 5-8

- 💡** Before power on the Remote Control, please reset the throttle to neutral position.
- 💡** If you find a flickering “RESET” on the display, you are reminded to reset the throttle to neutral position.
- 💡** If you turn the throttle from the forward position to the backward position directly, the motor will first stop shortly, then start turning to the reverse direction.

5.3.2 Adjusting Maximum Forward/Backward Power

For safety purposes, we set 4kW as default maximum backward throttle power. However, users can set the maximum forward/backward throttle power on their own. Make sure the battery is powered off before adjusting.

Step 1: Turn on the Remote Control/Tiller. The home page displays.

Step 2: Long press (5s) “M” button and “^” button simultaneously to enter the maximum forward/backward power setting page.

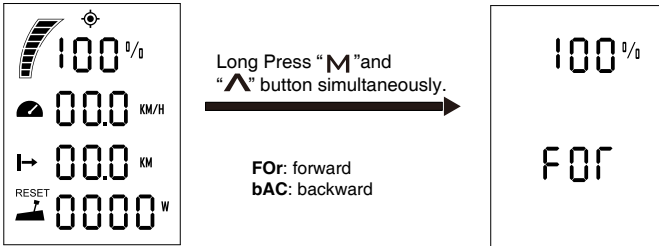



Figure 5-9

Step 3: If the parameter is flickering, you can press “^” button to change the parameter. If you do not want to change the flickering parameter, press “OK” button to switch to the next parameter.

 If you want to set the maximum backward power to 4kW, you can switch to bAC and set the percentage to 67%, eg. 4kW / 6kW ≈ 67%.






Step 4: Long press the “OK” button until it returns to the home page. The setting is finished.


5.3.3 Recalibration


The throttle position sensor should be recalibrated if the below error code displays.



Figure 5-10

Recalibration process	LCD Displaying
<p>Step1: Long press “^” button for 10s until “CAL FO” displays.</p>	
<p>Step2: Push the throttle to the maximum forward power position, then press“^” button. “CAL ST” will display and “CAL” will be blinking.</p>	
<p>Step3: Pull the throttle to the middle (zero) position where you can hear a click sound, then press “^” button, “CAL bA” will display and “CAL” will be blinking.</p>	
<p>Step4: Pull/Turn the throttle to the maximum backward power position, then press “^” button. “CAL FO” will display and calibration is completed. A blinking “RESET” will display to remind you to reset the throttle to zero position.</p>	
<p>Step5: Push/Turn the throttle to zero position and press “M” button and return to the main page.</p>	

 Carry out the throttle calibration procedures strictly as the above sequence.

 When recalibrating a Remote Control, please “pull or push” the throttle. When recalibrating a Tiller, please “turn” the throttle.

5.4 Use of Kill Switch

- Locate the kill switch to the right place on the Remote/Tiller and tie its lanyard to your wrist or life jacket.
- Stop the outboard in emergency by detaching the kill switch.
- To run the motor again, first attach the kill switch then start the motor.

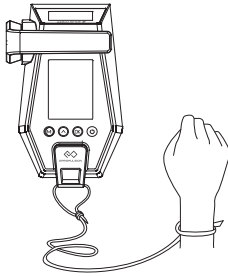


Figure 5-11

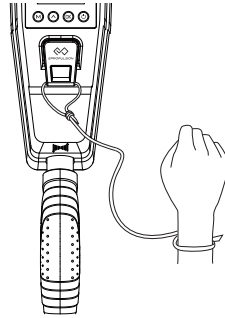


Figure 5-12

- ⚠ The kill switch generates magnetic field. Keep it 50cm / 20inches away from medical implants like pacemakers and magnetic cards (e.g. credit card) as well as other magnetic media.
- ⚠ The magnetic field of the kill switch may interfere with some electronic instruments. Keep it away from these electronic instruments.

5.5 Wirelessly Pairing Control System to the Outboard

Step1: Switch off both NAVY outboard and Remote Control/Tiller.

Hold the remote within 0.5m to the head part of the outboard, or mount the tiller to the outboard.

Step2: Press and hold the “⏻” button on the Remote or Tiller to switch on.

Step3: Press “OK” button and hold 5s to enter the pairing setting page (Figure 5-13). On this page, you can find blinking “Add” (address) and “SER” (set), and a countdown timer “060” (60s).



Figure 5-13

Step4: Switch on NAVY power. Wait for them to get paired in a few seconds.

Step5: After pairing, the LCD screen will display as Figure 5-14 for 5s, then returning to home page automatically.

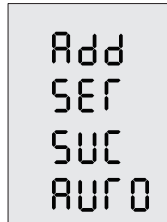


Figure 5-14

💡 If pairing fails within 60s, go back to **Step3** and try again.

💡 If “555” shows on start-up, it indicates system initialization.

💡 After pairing Remote Control/Tiller Handle to the Outboard, it can switch between wireless and wired communication automatically.

5.6 Pairing Control System to the Outboard by Wire

5.6.1 Pairing to the Outboard with a 48V Battery by Wire

- Step1:** Switch off both NAVY outboard and Remote Control/Tiller.
- Step2:** Connect NAVY outboard and Remote Control/Tiller Handle with a communication cable. Please refer to Figure 5-15 or Figure 5-16.
- Step3:** Switch on both NAVY outboard and Remote Control/Tiller and wait for them to get paired.
- Step4:** Pairing succeeds until home page displays. Then disconnect the communication cable.

💡 If “595
in if” shows on start-up, it indicates system initialization.

💡 After pairing Remote Control/Tiller Handle to the Outboard, it can switch between wireless and wired communication automatically.

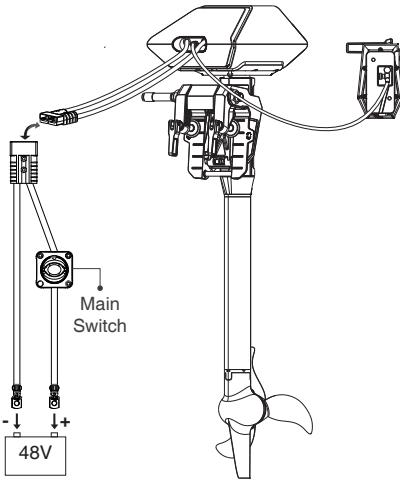


Figure 5-15

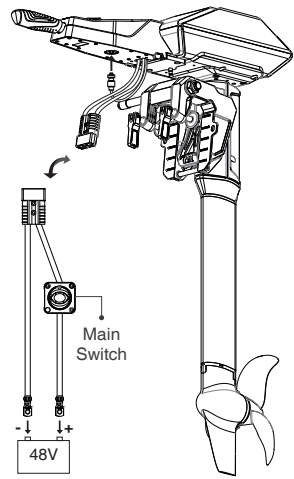


Figure 5-16

5.6.2 Pairing to the Outboard with a NAVY Battery by Wire

- Step1:** First connect the main switch cables to the NAVY Battery.
- Step2:** Connect the main switch cables with the power cables from the outboard.
- Step3:** Connect NAVY outboard motor to the NAVY Battery with the communication cable.
- Step4:** Connect the NAVY Control System to the NAVY Battery with the communication cable.

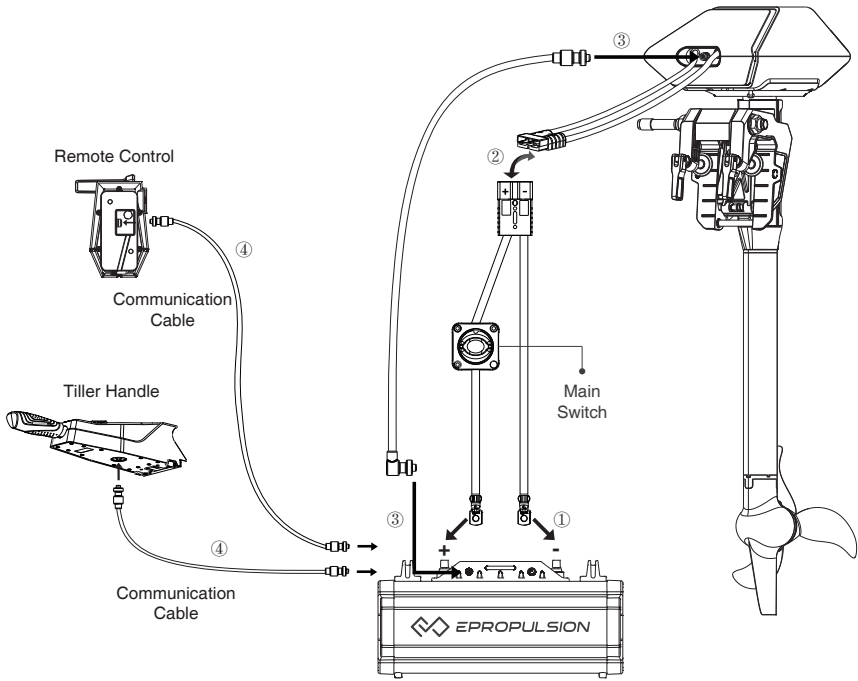


Figure 5-17

💡 If “555” shows on start-up, it indicates system initialization.

💡 After pairing Remote Control/Tiller Handle to the Outboard, it can switch between wireless and wired communication automatically.

💡 If the Control System or the outboard is replaced with a new one, the original wireless link will break and wireless communication failure will occur. The main page of the LCD panel on the Remote Control/Tiller Handle will display as below. In this case, users should conduct pairing again.

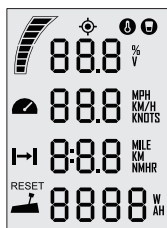


Figure 5-18

💡 However, if the Remote Control/Tiller Handle and the outboard motor are not replaced, but the LCD panel still displays like this, you should check and:

- 1) Make sure the Remote Control is not far from the outboard motor;
- 2) Make sure all the equipment involved is normally powered on.

If the Remote Control/Tiller Handle still displays like Figure 5-18 after check, it indicates an error has occurred. Please contact your dealer for repair.

5.7 Warning Messages

When the outboard motor is running in abnormal conditions or out of order, a warning message with an error code will display on the LCD screen. Figure 5-19 is an example. Please find more error codes and corresponding solutions in the below table.




Figure 5-19

Code	Cause	Solution
E01	Battery voltage is over the operating range.	Replace a battery based on suggested operation specifications.
E02	Propeller may be blocked, causing motor overcurrent	Please refer to the solution to E10.
	Motor fails or circuit board fails causing motor overcurrent	Try to turn off the main switch and wait for 10 seconds then turn on the switch again.
E06	The battery voltage level is too low.	Operate the outboard at low power. Please charge the battery as soon as possible.
E10	Motor stall, which may be caused by blocked propeller	Turn off power, then clean up the things winding around the propeller. Test if the propeller can be rotated by hand before operation.
E11	The temperature of motor is too high.	Stop operating the outboard and wait until the temperature falls within the normal operating temperature range.

Code	Cause	Solution
E12	The temperature of circuit board is too high.	Stop operating the outboard and wait until the temperature falls within the normal operating temperature range.
E15	Failure was found in the circuit board temperature sensors.	Try to turn off the main switch and wait for 10 seconds then turn on the switch again.
E16	Calibration Abnormality of Current Sensor	Please contact the dealer for help.
E22	MCU Communication Abnormality	Please restart to see if the error disappears, if not, please contact your dealer for help.
E25	The remote is not paired to the outboard	Pair the remote to the outboard.
E30	Throttle position sensor failure, should recalibrate the throttle position sensor.	Please refer to section 5.3.3 <i>Recalibration</i> to recalibrate the throttle position sensor.
E40	System running failure	Please restart the Remote Control/ Tiller and the outboard.
E56	Communication Error between NAVY outboard and NAVY battery	Check if the communication cable between NAVY outboard and NAVY battery is well connected, if yes, please restart the system.

Code	Cause	Solution
E57	NAVY battery overcurrent	<ol style="list-style-type: none"> 1. Ensure the paralleled NAVY batteries have similar voltage with pressure difference within 2V. 2. Ensure the power cable and battery are firmly connected to avoid poor contact. 3. Restart the battery when the error occurs and keep the parallel state for 30 minutes to wait for the batteries to self-balance the voltage. 4. If the error occurs, users can also continue operating after restarting the battery, but do not operate at full power state. The operating power is suggested to be lower than two thirds of full power. Please fully charge the battery after use.
E60	The Remote Control/Tiller is running out of power.	Please connect the Remote Control/Tiller to the outboard by a communication cable. Please refer to section 5.2.2 <i>Charged by Wired Connection</i>
All characters display	The motor has no power.	Connect the battery to the outboard and then turn on the main switch.
	Device addresses mismatch.	Please refer to section 5.5 <i>Wirelessly Pairing Control System to the Outboard</i> or section 5.6 <i>Pairing Control System to the Outboard by Wire</i> and pair the Remote Control/Tiller with the outboard motor again.

 If the problem persists, please consult your ePropulsion authorized dealer for assistance.

6 Configurations

6.1 Preference Settings

It's advised to set display preference by these steps before operation.

Step1: In power-on state, press “M” button and hold to enter the preference setting page as shown in Figure 6-1. Users can choose display items based on personal needs and preference.

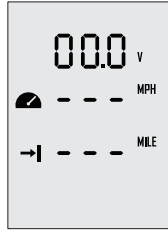


Figure 6-1

Step2: On the preference setting page, the blinking item is the object waiting to be set. Press the “^” button to view options for the blinking item. For example, in Figure 6-1, if “V” is blinking on the preference setting page, it means that “V” has other alternate options. Just press the “^” button, and “V” will switch to “%”, i.e. the displayed item is switched from voltage to battery level.

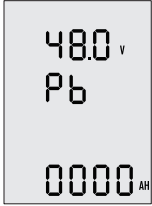
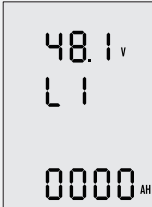

Step3: Press “OK” button to save setting for the current item and skip to the next item simultaneously.

Step4: When all the items have been set well, long press the “OK” button to save all the settings and return to the main page.

6.2 Battery Configuration

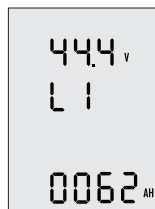
Accurate battery configuration helps achieve precise estimation of the battery's discharging state. When using an ePropulsion NAVY Battery (standard), battery configuration is self-activated by the control system given that all the communication cables are well connected. When not using NAVY Batteries, users should manually configure the batteries via Remote Control/Tiller at the first time use, so the battery level will display more accurate.

⚠ Battery configuration should be carried out if a battery with different type/capacity/voltage is connected to NAVY 6.0 for the first time.

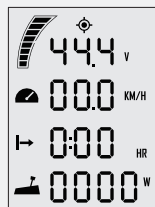
Battery Configuration Process	LCD Displaying
<p>Step1: First, turn on the main switch and the Remote Control/Tiller.</p> <p>Then, press “M” button and hold to enter the preference setting page.</p> <p>Next, press “M” button and hold again to enter the battery setting page. Users can see the voltage value blinking and it’s ready for configuration.</p>	
<p>Step2: Press “OK” button and skip to the next item: battery type.</p> <p>Choose the battery type according to the battery you use.</p> <p>Pressing “^” button to switch the battery type options between Pb, Li and LFE.</p> <p>Pb: Lead-acid battery Li: Lithium battery LFE: Lithium-ion ferrous phosphate battery</p>	
<p>Step3: Press “OK” button to save battery type and skip to the below battery capacity setting item.</p> <p>Press “^” button to change the value and set the battery capacity according to the battery you use.</p> <p>Note that the unit of capacity is “Ah”, usually the capacity of battery is expressed in “Wh”, and we can get the capacity in “Ah” by following the below formula:</p> $\text{Capacity in Ah} = \frac{\text{Capacity in Wh}}{\text{Nominal voltage in V}}$ <p>Eg. if users use a 3000Wh Lithium battery with 48.1V nominal voltage, then the battery is about 62.37Ah, so you can set 62Ah as the capacity setting.</p>	

Step4: Press “ **OK** ” button to save battery capacity setting and return to the top battery nominal voltage setting item.

The voltage options are varied according to the battery types. Press “ **▲** ” button to view the options and select the closest nominal voltage value according to the battery you use.



Step5: Press “ **OK** ” button and hold to save all the settings and return to the main page.



! Lithium batteries, lead acid batteries and lithium iron phosphate batteries are recommended to use with NAVY 6.0. Other types of battery may fail to make NAVY 6.0 work properly.

! When you use the below batteries, please set battery type and rated voltage value based on the parameters in the following table.

Battery type	Nominal Voltage options									
LI	43.2V	44.4V	45.6V	46.8V	48.1V	49.4V	50.4V	51.8V	53.2V	
Pb	44.0V	46.0V	48.0V	50.0V	52.0V	54.0V				
LFE	44.8V	48.0V	51.2V							

! Update the battery configuration is necessary if a different type of battery has been applied.

💡 When using non-ePropulsion batteries, before starting the outboard, users should configure the batteries via the Remote Control for the first time use, otherwise the batteries may not work properly.

7 Checklist before Use

1. Ensure the propeller is correctly and firmly mounted on the outboard.
2. Ensure the outboard is correctly and firmly mounted on the boat.
3. Ensure the throttle and steering wheel are installed in proper position before turning on the power.
4. Ensure the throttle travels smoothly with no obstacles.
5. Before connecting the battery, check and make sure there is no poor contacts or defects in cables.
6. Check and ensure the main switch is able to power on and off normally. After that, turn off the main switch.
7. Ensure the battery has enough power.
8. Ensure the Remote Control/Tiller has enough power.




Start the outboard only when the propeller is beneath water, as the rotating propeller is dangerous.



If the cable is immersed in water, please dry it completely before connecting it to the battery or power on the system.


8 Starting the Outboard


1. Complete the check list.
2. Remove the kill switch from the Remote Control/Tiller.
3. Push/Turn the throttle to zero position.
4. Connect the battery to the outboard.
5. Fix the outboard with a proper trim angle.
6. Turn on the main switch. If the outboard is connected to a NAVY battery, please also press the battery power button to power on.
7. Press “” button to turn on the Remote Control/Tiller and the main page will display.
8. Carry out preference setting and battery configuration if necessary.
9. Tie the kill switch to your wrist or life vest, then attach the kill switch on the Remote Control/Tiller.
10. Push/Turn the throttle slowly to start your outboard.

9 Stopping the Outboard

Usually, it's recommended to stop the outboard as the following procedures.

1. Return the throttle to zero position.
2. Wait until the outboard stops, then detach the kill switch from the Remote Control/Tiller Handle.
3. Press and hold the “⏻” button until the Remote Control/Tiller Handle is powered off.
4. Turn off the main switch. If the outboard is connected to a NAVY battery, please also press the battery power button to power off.
5. Tilt the outboard above water surface or detach it from boat.

 If the outboard motor will not be used soon, it's recommended to tilt the outboard out of water, otherwise erosion may occur. In addition, it is recommended to apply protective coating.

 The outboard will stop if one of the situations occurs.

- 1) The throttle is in zero position.
- 2) The kill switch is not in the correct position of Remote Control/Tiller Handle.
- 3) The main switch is off.
- 4) The communication between Remote Control/Tiller Handle and outboard breaks.
- 5) The connection between battery and outboard breaks.
- 6) Failure exists in the control system (e.g. motor is blocked or the low battery voltage level is detected).

10 Trim Angle Adjusting

⚠ Only adjust the outboard trim angle when the outboard is stationary.

There are five trim angle options including 60°,15°,10°,5° and 0°. Adjust the outboard trim angle based on specific conditions. E.g. when the boat is in shallow water or the outboard is not in use, tilt the outboard and adjust the trim angle to 60°. For normal operation, fix it to a proper trim angle where the shaft is vertically downward during operation. Be reminded that the best trim angle varies by boat type, operation conditions, weather, etc.

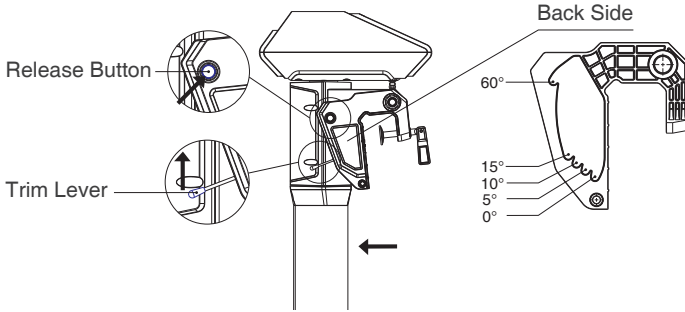


Figure 10-1

Tilting up

⚠ Detach the Tiller first before tilting the outboard motor up to the position with max trim angle.

Pull up the trim lever with one hand, and lift the outboard shaft with the other hand to enlarge the trim angle to a particular degree. Then, release the trim lever to lock the trim angle.

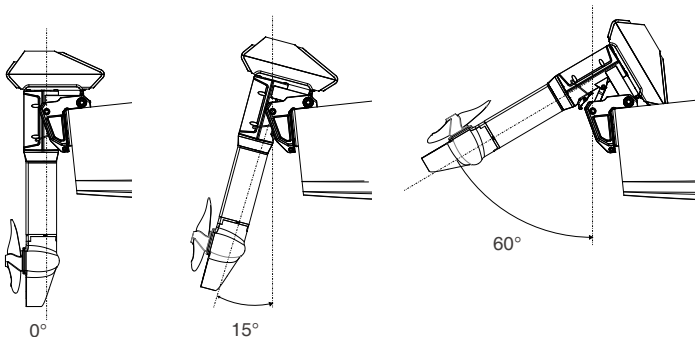


Figure 10-2

Tilting Down

The release button is raised when the trim angle is maximum at 60° position. Press the release button and tilt up the propeller shaft slightly to about 80° position, then lay it down, and the outboard shaft will return to 0° position.



It's suggested to test with different trim angles to find the optimal trim angle for the boat and operation. Note that the speed should be increased gradually during the test, and check if there are any abnormal situations. Stop the outboard and decrease the trim angle if necessary.



Slight and gentle operations are recommended when tilting up and down.






The trim lever is only used to increase the trim angle from 0° to 60°. If users want to decrease the trim angle, eg. from 15° to 5°, follow these steps: first, tilt the outboard shaft to the maximum angle (60°); then, press the release button to return the outboard shaft to the 0° position; last, use the trim lever to tilt up the shaft to the 5° position.

11 Maintenance

11.1 Notes

Regular maintenance helps to keep your outboard in optimal operation state. Do not start the outboard in shallow water. Adjust the trim angle to 60° to avoid running aground. Only use the outboard in water deep enough.


Washing the outboard with fresh water after sailing in salt water in order to avoid erosion.

-  Disconnect the battery with the outboard before maintenance.
-  Conduct the maintenance work according to the instructions from ePropulsion authorized dealers.
-  Only use ePropulsion original components for replacement and maintenance.

11.2 Maintenance Time Table

Regular maintenance helps to keep the outboard in its optimal operating state. The following table shows a general maintenance schedule, the time could be adjusted according to specific needs.

Item	Operations	Every	
		100hours (6 months)	100hours (12 months)
Anode	Check/Replace	□	
Cooling Circuit	Check	□	
Gear Oil	Replace		■
Propeller and Pin	Check/Replace	□	

 The “□” symbol indicates checks may carry out by users. The “■” symbol indicates work should be carried out by your dealer.

11.3 Changing Gear Oil

In order to reduce gear wear, regular gear oil replacement is necessary. It's suggested to contact your dealer for the oil change. The oils like GL-4 and SAE 90 are recommended. Conduct the oil change operations as the steps below.

1. Disassemble the anode, propeller and pin in sequence.
2. Lay the outboard on a flat surface with its drain holes facing up. Prepare a container and place it beside the gear box to collect oil.
3. Screw out the plug in Hole 1 with an M6 wrench, then screw out the plug in Hole 2.

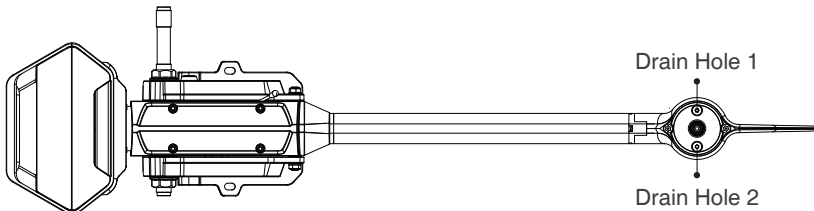


Figure 11-1

4. Shift and lean the outboard to allow the oil drain completely.
5. Turn the outboard to make the drain hole face upwards, fill 260ml new oil in the gear box, then screw the plug.
6. Apply some anaerobic adhesive or use thread seal tape before screwing the plugs into the drain holes.
7. Assemble the pin, propeller and anode in sequence, then the oil change process is completed.

11.4 Replenishing Coolant

Good coolant circulation is critical for the high performance of an outboard. The coolant is designed to be no need of changing within the lifecycle of an outboard except for abnormal conditions which lead to coolant leak, coolant reduce, or chemical failure. On these conditions, the cooling effect will be weakened. If the outboard is experiencing over-temperature, the system will run into trouble, and the overheat warning will display with the error code E11 or E12. If over-temperature occurs frequently, it's necessary to check the cooling system and replenish coolant.

1. Use an M6 Allen wrench to screw out four screws fixing the motor case.

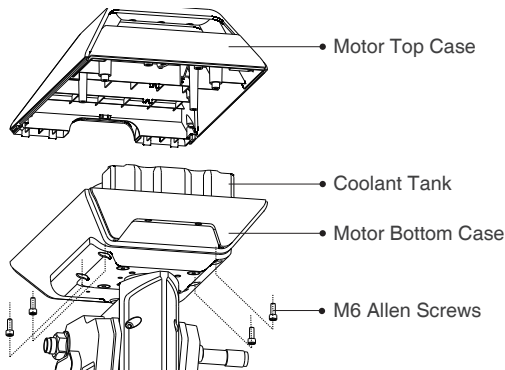


Figure 11-2

2. Check the coolant tank. If it's not filled, pull the flange out of the injection hole on the coolant tank, then replenish the coolant tank with 30% ANT coolant and 70% water. The lowest application temperature for the 30% solution is -12°C and for 40% solution is -20°C .

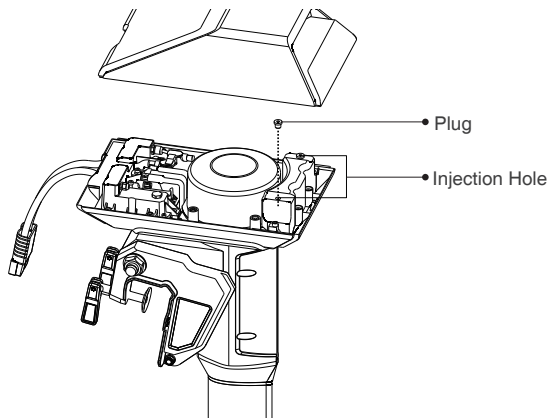


Figure 11-3


3. Plug the injection hole after filling up, and thoroughly clean up any leaks or spills.

4. Close the motor case and fix the screws with thread-locker.

💡 If the coolant tank is fully filled, other faults may exist. Please consult your dealer for further check and solutions.

11.5 Propeller Maintenance

 Disconnect the battery with outboard before maintenance.

 Gloves are recommended to protect your hand from sharp propeller edges.

Check the propeller according to the following instructions, then refer to then refer to *section 2.2 Selecting and Mounting the Propeller* to replace a new propeller if necessary.

1. Check the propeller blades for wear, cavitation erosion and other damage.
2. Check the pin for wear and damage.
3. Check for water plants, fishing net or line twine around the propeller.
4. Replace a new anode if necessary.

11.6 Replacing the Anode

Please refer to the figure below to replace a new anode if necessary.

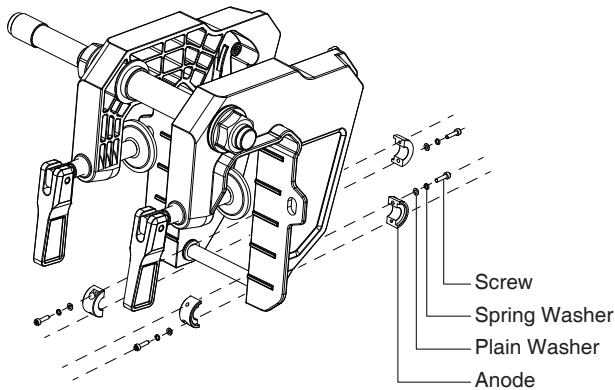


Figure 11-4

12 Transportation and Storage

12.1 Transport

For long distance transport, please use the ePropulsion original packing materials to pack the outboard before delivery.

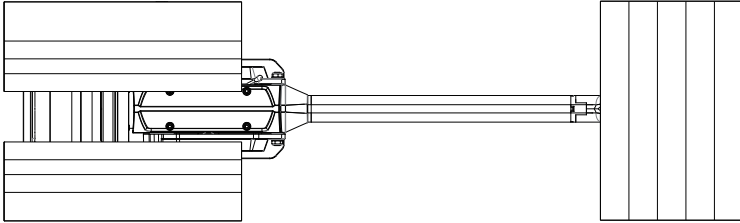


Figure 12-1

12.2 Placement

When placing the outboard on a surface, ensure the surface is flat and horizontal. It's better to put some damping cushion underneath.

12.3 Storage

If you are not using the outboard motor for more than 2 months, it's advised to contact your dealer to clean and check the outboard prior to storage. It's recommended to pack the outboard with ePropulsion original packing materials for storage.

- ⚠ Get adequate damping protection measures before transport and storage. And ensure the propeller receives no pressure if the propeller is mounted on the propeller shaft.
- ⚠ Store the outboard in a well-ventilated and dry area without direct sunshine.
- ⚠ Ensure the ambient temperature is proper ($-25^{\circ}\text{C}\sim 50^{\circ}\text{C}$) during storage to avoid the coolant from freezing.

13 Emergency Situations

13.1 Collision

If the outboard strikes some object beneath the water, please follow below procedures.

1. Stop the outboard immediately and then turn off the main switch.
2. Check the mechanical structure to see if there are damages.
3. Return to the nearest harbor or pier in low power.
4. Call your dealer to check the outboard.

13.2 Sodden Outboard

If the outboard is sodden, stop it immediately and turn off the main switch then disconnect the battery. Bring the outboard to the dealer. And ensure the outboard is thoroughly inspected before operating it again.

13.3 Low Battery Level

When the battery voltage is lower than 42V, the throttle power will be limited gradually along with the voltage drop. When the battery voltage drops below 39V, the outboard will stop automatically to prevent battery over-discharge. If this happens when the outboard is far away from the shore, and there is an alternative battery, it's recommended to wait until the battery voltage recovered to 42V or above. You can restart the outboard with throttle power below 1000W.

13.4 Over-temperature Protection

When the operating temperature is high, the max input power will be limited within 6kW, and the power will decrease with the rise of temperature. If the system temperature keeps rising and surpasses a threshold, the outboard motor will shut down automatically to avoid over-temperature. Users should stop operating the outboard and wait until the temperature falls within the normal range.

14 Warranty

The ePropulsion limited warranty is provided for the first end purchaser of an ePropulsion product. Consumers are entitled to a free repair or replacement of defective parts or parts which do not conform with the sales contract. This warranty operates in addition to your statutory rights under your local consumer law.

14.1 Warranty Policies

ePropulsion warrants its products to be free of defects in material and workmanship for a limited period since the date of purchase. Once a fault is discovered, the user has the right to make a warranty claim under the ePropulsion warranty policy.

Product/Parts	Warranty Expiration Date
NAVY 6.0	Two years after the date of purchase.
Repaired/Replaced Parts	Three months since the date of maintenance. Notes: <ol style="list-style-type: none">1. If the three-month period overlaps the original warranty period, the warranty against these replaced or repaired parts still expires two years after the date of purchase.2. If the three-month period exceeds the original warranty period, the warranty of the repaired or replaced parts expires by the end of the third month since date of maintenance.






In order to validate the warranty, users are required to fill in the Warranty Card in the package in advance.



Keep the product label in an intact state and record the serial number on the label. Never tear the label off the product. An ePropulsion product without the original product label will not be applicable to warranty services provided by ePropulsion.




The warranty is valid only when the information is correct and complete.


-  Free warranty is only validated upon the presentation of legal serial number, Warranty Card, and evidence of purchase from an authorized ePropulsion dealer.
-  Valid date of purchase should be established by the first-hand purchaser with original sales slip.
-  Free warranty is not transferable and will not be reissued.

14.2 Out of Warranty

Make sure the product is properly packed during delivery, the original ePropulsion package is recommended. If the product got further damaged due to improper packing during delivery, the furtherly damaged part will be deemed as out of warranty coverage.

In addition, faults or damages caused by the following reasons are also excluded from warranty scope within the covered period:

- Any improper operation contradicts the user manual.
 - Accident, misuse, wishful abuse, physical damage overcharging or unauthorized repair.
 - Dropping, improper care or storage.
-  You should be noted that minor faults like normal wear and tear that pose no influence on the intended function of the product are also not covered by the warranty.

-  Consumables are out of warranty scope.

14.3 Warranty Claim Procedures

If you find your product defective, you can make a claim to your dealer following below procedures:

1. Fill in the Warranty Card correctly and completely in advance. Then make your warranty claim by sending it to your authorized ePropulsion service partner together with valid proof of purchase. Usually these documents are required when making a warranty claim: the Warranty Card, ex-factory serial number, and evidence of purchase.
2. Send the defective product to your authorized ePropulsion service point after getting the confirmation. Note that the label should be kept intact. You can also deliver the product to your authorized ePropulsion dealer

after getting confirmation.

3. The defective components or parts will be either repaired or replaced according to the diagnosis made by the ePropulsion authorized service partner.
4. If your warranty claim is accepted, the equipment will be repaired or replaced free of charge. Note that any delivery cost incurred in the process is at your charge.
5. After careful examination and confirmation by ePropulsion authorized dealer, the defective or faulty components will be repaired or replaced with brand new ones against the actual condition.
6. In case your warranty claim is rejected, an estimated repair charge with round trip delivery cost will be sent for confirmation. ePropulsion authorized service point will conduct maintenance accordingly only after your confirmation.



If warranty expires, you can still enjoy maintenance services from authorized ePropulsion service partners with minimum maintenance charge.

Thanks for reading this user manual.

If you have any concerns or find any problems while reading, please don't hesitate to contact us. We are delighted to offer service for you.

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