EPROPULSION



NAVY 6.0 USER MANUAL

November, 2016 Version 1.1

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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, 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 parameters described in the manual. ePropulsion also reserves the intellectual property rights and industrial property rights including copyrights, patents, logos and designs, etc.

This manual is subject to update without prior notice, please visit our website www.epropulsion.com for the latest version. If you find any discrepancy between your products and this manual, or should you have any doubts concerning the product or the manual, please visit www.epropulsion.com.

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 position of serial number. Please record the serial number for access to maintenance or other after-sale services.

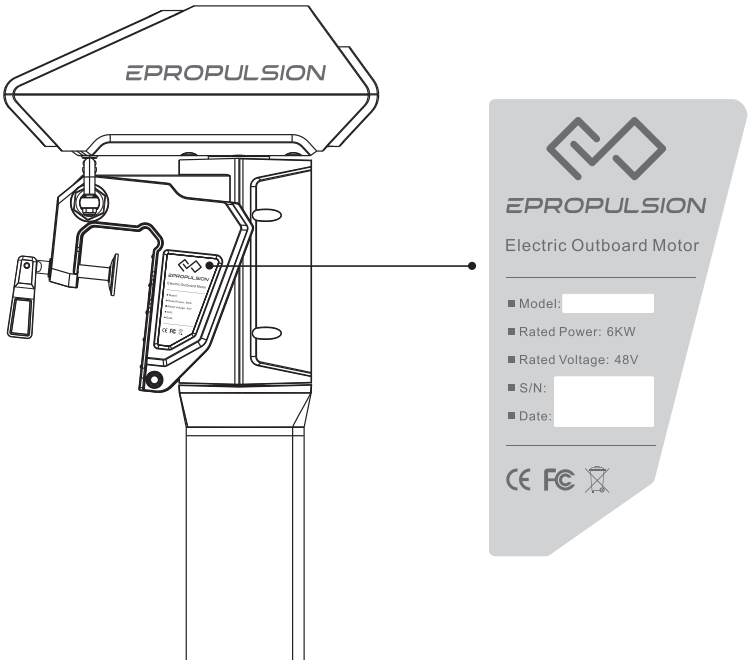


Figure 0-1

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1 Product Overview

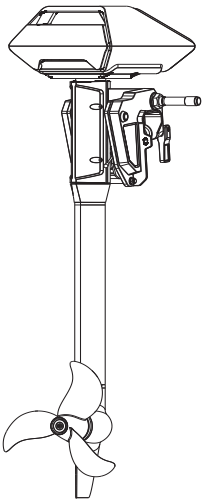
Navy 6.0 is a 6KW electric outboard motor by either remote control or tiller control. Below table shows different models of Navy 6.0.

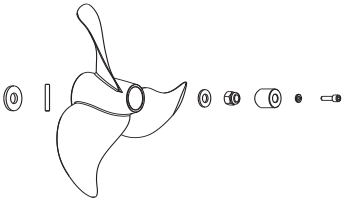
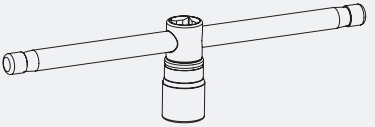
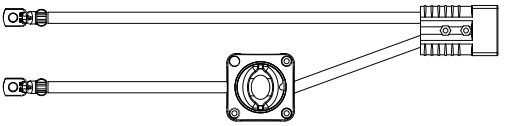
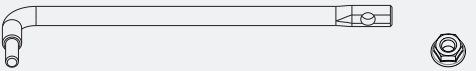
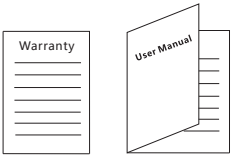
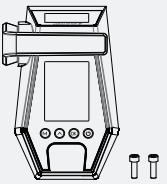
Model	Control	Shaft length
Navy 6.0T-S	Tiller	650mm/25.6"
Navy 6.0T-L	Tiller	775mm/30.5"
Navy 6.0R-S	Remote	650mm/25.6"
Navy 6.0R-L	Remote	775mm/30.5"

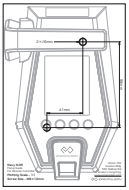
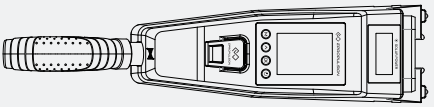
Navy 6.0R refers to the remote control version and Navy 6.0T refers to the tiller control version.

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

1.1 In the Package (R/T)

Items	Qty./Unit	Figure
Outboard Main Part (high pitch propeller)	1 set	

Items	Qty./Unit	Figure
Propeller and Accessories	1 set	
Wrench Set	1 set	
Kill Switch	2 pieces	
Battery Bridging Cable	3 pieces	
Main Switch Cable	1 piece	
Link Arm (R)	1 set	
User Manual and Warranty Claim Card	1 set	
Remote Controller (R)	1 set	

Fixing Guide (R)	1 piece	
Tiller Handle (T)	1 set	

The items marked with “R” are in the package of Navy 6.0R; and the items marked with “T” are in the package of Navy 6.0T; others without R/T mark are common items included in both Navy 6.0R package and Navy 6.0T package.

Other accessories are also required to operate the outboard motor, such as the battery, charger and communication cable, etc. Users can buy official accessories provided by ePropulsion such as Navy Battery, Navy Charger and communication cable, etc. from ePropulsion authorized dealers.

Note that there are two propellers in the package: a high-pitch propeller and a low-pitch propeller. The one displays with the outboard motor is the high-pitch propeller (Diameter: 320mm/12.6inch, Pitch: 10.8inch), and the other one separately displayed in the package is the low-pitch propeller (Diameter: 340mm/13.4inch, Pitch: 8.5inch).

Save ePropulsion original package for transport and storage.

1.2 Structure and Components

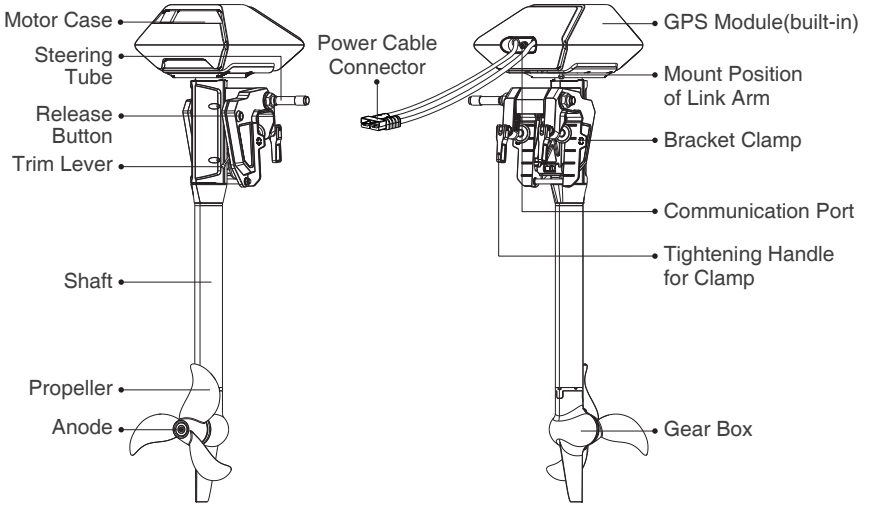


Figure 1-1 Outboard Main Part

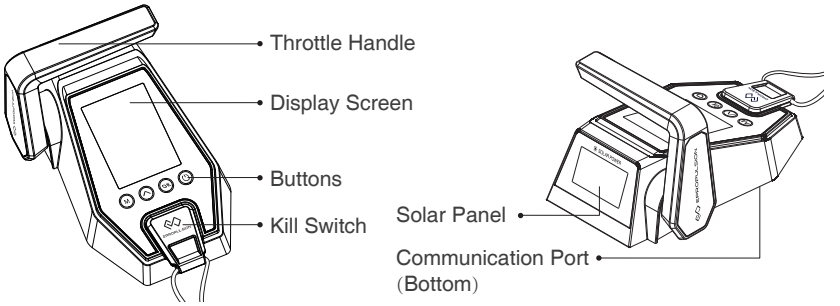


Figure 1-2 Remote Controller

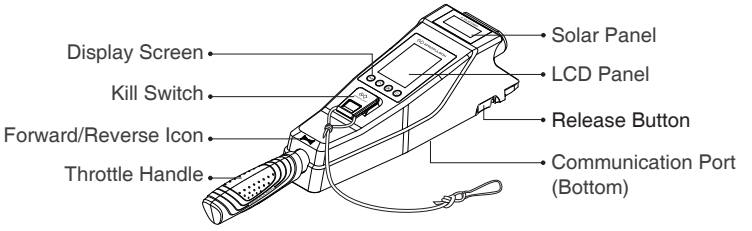


Figure1-3 Tiller Handle

1.3 Technical Data

General Data	
Type	Electric
Rated Voltage / Current	48V / 125A
Input Voltage Range	39V ~ 60V DC
Maximum Input Power (Forward / Reverse)	6KW / 2KW
Comparable Petrol Outboard	9.9HP
Maximum Overall Efficiency	55%
Rated Rotation Speed (Forward)	1550rpm
Control System	Remote / Tiller
Communication	Wireless / Wired
Communication Distance	≤10m
Dimension of Outboard Main Part: LengxWidthxHeight	413 x 308 x 1075(S) / 1200(L) (mm) 16.2" x 12.1" x 42.3"(S) / 47.2(L)
Dimension of Tiller Handle: Length x Width x Height	511mm x 118mm x 100mm / 20.1" x 4.6" x 4"
Shaft Length (S/L)	650mm (25.6") / 775mm (30.5")
Net Weight of Outboard Main Part	29Kg / 64lbs(S); 29.6Kg / 65lbs(L)
Net Weight of Tiller Handle	1.5Kg / 3.3lbs
Net Weight of Remote Controller	0.65Kg / 1.43lbs
Trim Angle	Manual 4-step: 0°, 5°, 10°, 15°
Tilt Angle	Manual: 60°
Gear Oil Capacity	285ml
Recommended Gear Oil	API GL-4 SAE 90
Coolant Capacity	630ml
Recommended Coolant	ANT
High-pitch Propeller (Diameter / Pitch)	320mm (12.6") / 10.8"
Low-pitch Propeller (Diameter / Pitch)	340mm (13.4") / 8.5"
Operating Ambient Temperature	-25°C ~ 50°C (-13°F ~ 122°F)

1.4 Important Notes

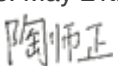
1. Check the status of the outboard and battery level before each trip.
2. The distance and speed value displayed is measured by Global Positioning System (GPS), there may exist small errors due to GPS signal strength degradation or some external environment conditions like currents, winds and change 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 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 5.6 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

ePropulsion Technology Ltd.
Rm.702, Kowloon Building, 555 Nathan Rd., Kowloon, Hong Kong

Declare conformity of design in Navy 6.0 with the following directives:
EMC-directive 2004/108/EC
MD-directive 2006/42/EC
LVD-directive 95/25/EC
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.
Applied standards:
EN 55014-1:2006+A1:2009
EN 55014-2:1997+A1:2001+A2:2008
EN 61000-3-2:2006+A1:2009+A2:2009
EN 61000-3-3:2008
EN 60204-1:2006
2006/42/EC Annex 1
EN ISO 12100-1:2003
EN ISO 12100-2:2003
EN ISO 6185-2-2001
EN ISO 8665-2006
EN ISO 9093-1-1995
EN 28848-1993
FCC Part 15

The original certificate was issued by Global-Standard Testing Service Co., Ltd. in Shenzhen, Guangdong.
Certificate NO.: GST140470225E; GST1404170225M; GST1404170225S; GST1404170225S.
Issued Date: May 21th, 2014

Signature: 

Mr. Danny Tao, Chief Executive Officer & Cofounder of ePropulsion Technology Ltd.

2 Battery and Propeller Preparation

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 longer operating duration, the battery capacity is recommended to be 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 (125Ah*48V=6000Wh), 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, the type and tonnage of boats 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 Controller 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 smaller thrust 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.

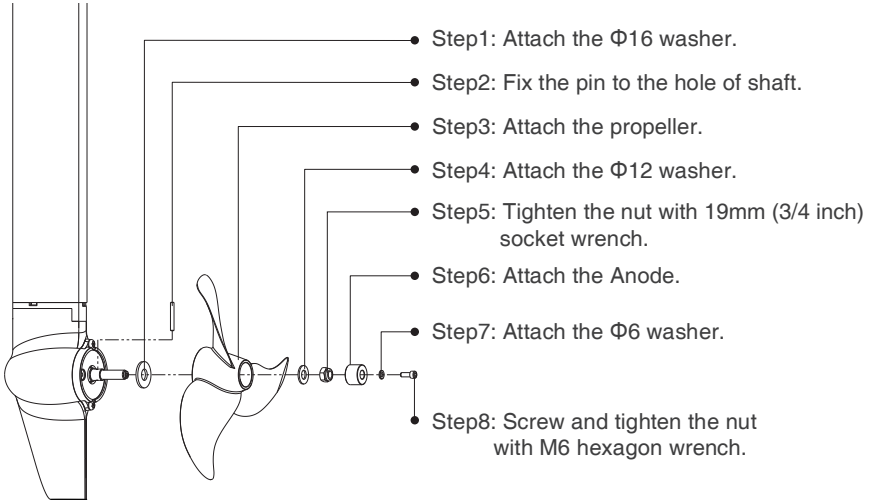


Figure 2-1

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 bottom of the boat.

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 increase reduction in both travelling speed and power efficiency.

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 information.

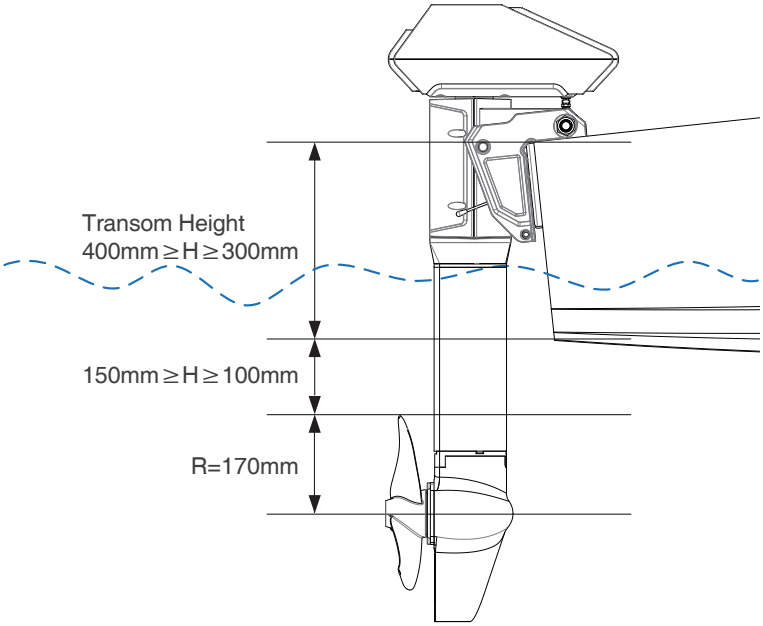


Figure 3-1

3.2 Mounting the Outboard

Method 1

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

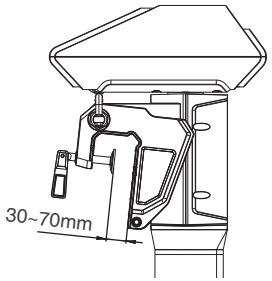


Figure 3-2

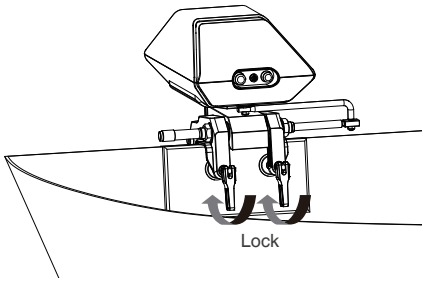


Figure 3-3

Method 2

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

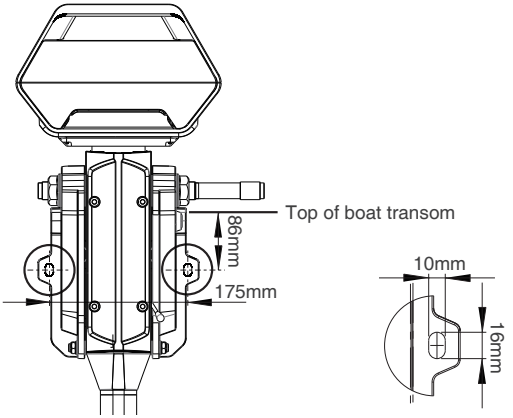


Figure 3-4

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 (R)

When use a Remote Controller, please prepare a steering wheel (not supplied with Navy 6.0) and mount it on the corresponding position to control the direction.

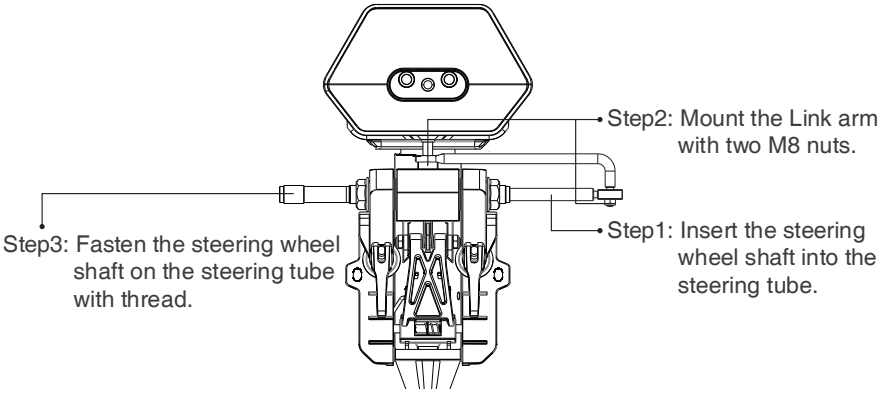


Figure 3-5

3.4 Mounting the Tiller Handle (T)

In the package of Navy 6.0T, the Tiller Handle is not mounted on the outboard motor prior to delivery. Users can mount it by one simple step:

Align the Tiller Handle to the socket of the outboard motor in the direction of arrows and plug it into the socket until it is firmly mounted.

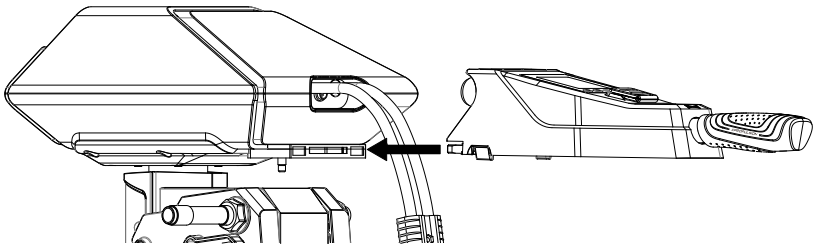


Figure 3-6

To detach the Tiller Handle from the outboard motor, please follow the two steps: First, press the release button on both sides of the Tiller Handle as indicated in Figure 3-7. Then plug the Tiller Handle out of the socket.

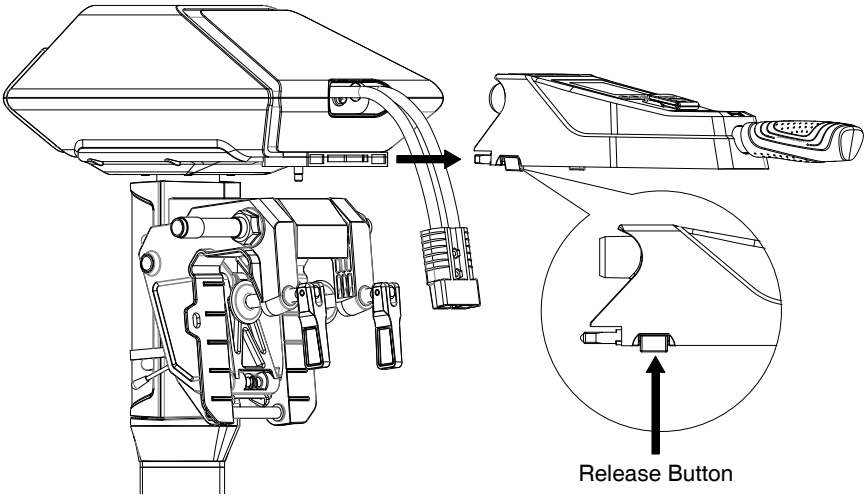


Figure 3-7

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 cables to the battery.

② Connect the main switch cables with the power cables from the outboard.

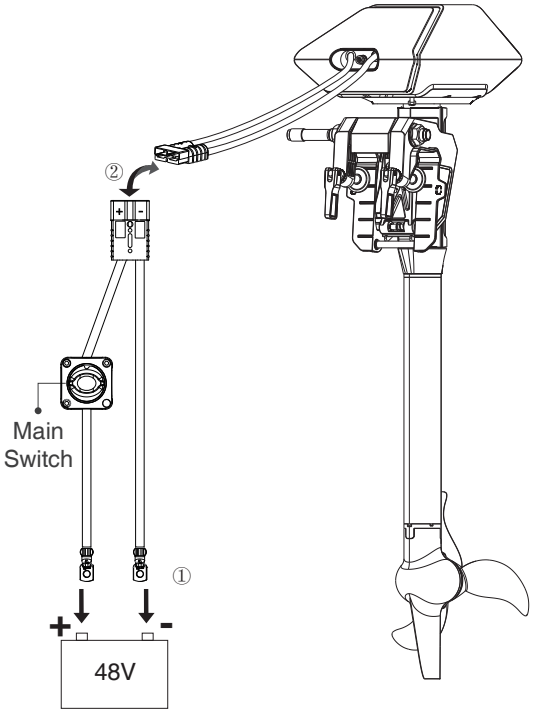


Figure 4-1

⚠ 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. If this problem is discovered, open the back cover of the switch, and tighten the screws inside.

4.2 Connecting a Navy Battery

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

① First connect the main switch cables to the Navy Battery.

② Connect the main switch cables with the power cables from the outboard.

③ Connect Navy 6.0 outboard motor to the Navy Battery with the communication cable.

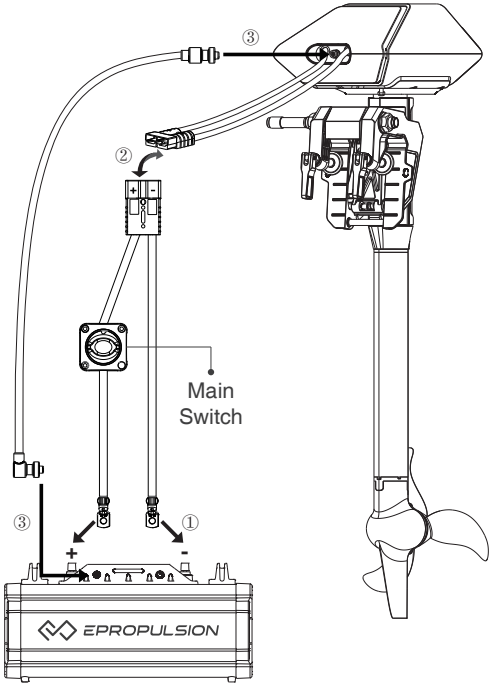


Figure 4-2

⚠ Avoid battery short-circuit during connection.

⚠ Outboard motor will stop working once the communication cable or 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. 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 as shown in Figure 4-3. Make sure to connect the main switch cable to battery positive terminal and the other cable to battery negative terminal.

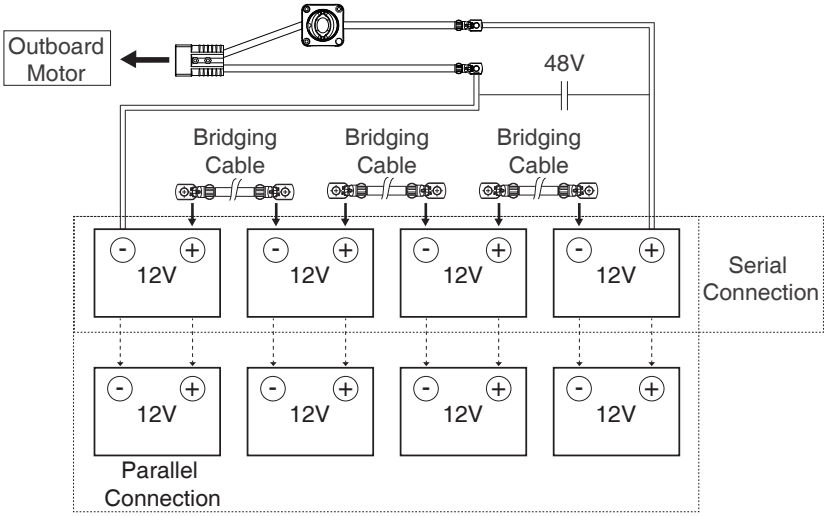


Figure 4-3

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 Controller / Tiller Handle

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

5.1 Displaying

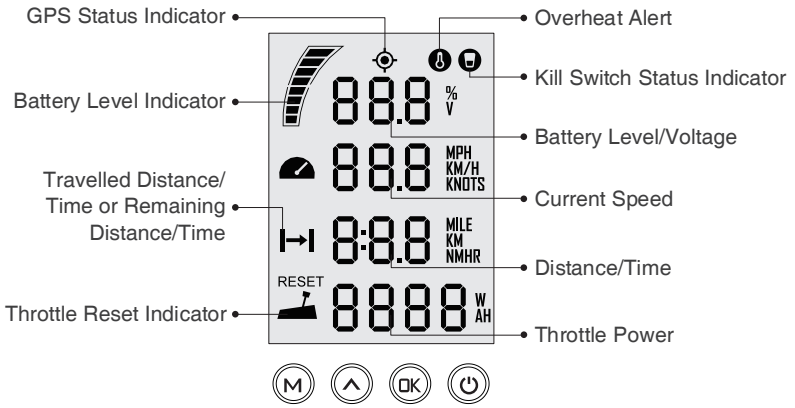
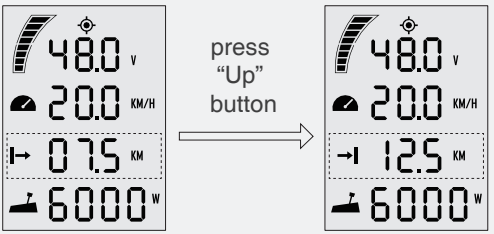
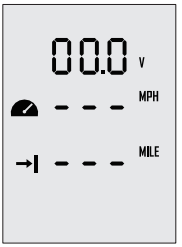
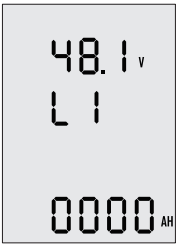


Figure 5-1

Buttons	Functions
“Power”	1. In power-off state, long press the power button to power on the Remote Controller. 2. In power-on state, long press the power button to power off the Remote Controller.

Buttons	Functions
OK “OK”	1. On setting pages, press " OK " button to save the current settings and switch to the next item. 2. On setting pages, long press the “ OK ” button, the system will save your settings, the display will exit from setting page and return to the home page. 3. In power-on state, long press the “ OK ” button to enter the remote controller pairing page.
∧ “Up”	1. On any setting page, press “ ∧ ” button to view options for current setting. 2. In power-on state, long press “ ∧ ” button for more than 10 seconds to enter the throttle calibration page. 3. On home page, press “ ∧ ” button to switch the travelling distance or time displaying icon between “ →I ” and “ I→ ”.  Main page 1 Main page 2
M “Menu”	1. In power-on state, long press “ M ” button to enter the preference setting page.  Preference setting page

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



Battery setting 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.

Icons	Functions	
	Battery level Indicator	Indicating current battery level. in graphical representation.
	Battery level/ voltage	Indicating battery information and it is configurable in preference setting page. For example: 100 %: indicates current battery level.in numeric representation. 48.0 V: indicates current battery voltage.
	GPS status indicator	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	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	Hidden: kill switch is present and working well. Shown constantly: the kill switch is detached.
	Current speed	Displaying real time cruising speed,set units (KM/H,MPH or KNOTS) in preference setting page.
	Distance/time display	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).
	Travelled distance/time or remaining distance/time	→|: 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	
RESET 8888	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 Controller and Tiller Handle 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 Charged by solar power

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 Controller/Tiller Handle toward sunlight to get better charging effect. Please refer to Figure 5-2 and Figure 5-3.

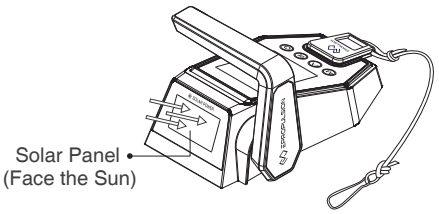


Figure 5-2

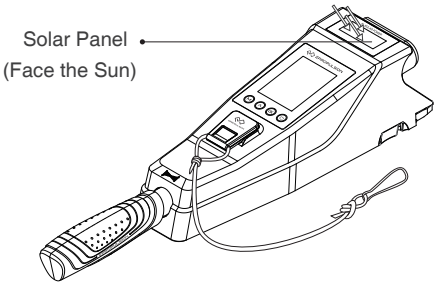


Figure 5-3

It’s recommended to charge the Remote Controller/Tiller Handle by solar power.

5.2.2 Charged by wired connection

If the Remote Controller/Tiller Handle 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 Controller/Tiller Handle.



Figure 5-4

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

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

Then, connect the outboard motor to the battery.

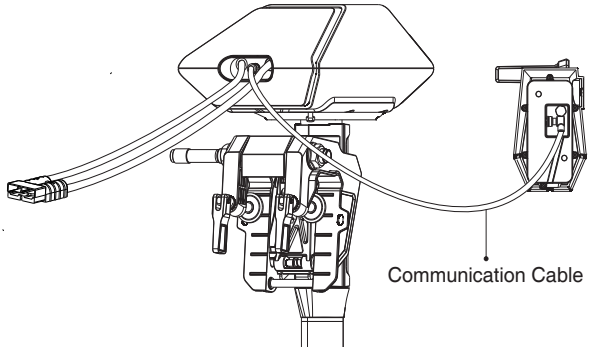


Figure 5-5

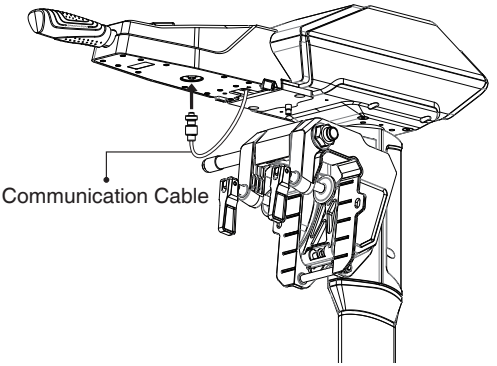


Figure 5-6

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

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

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

The charging process will stop once the communication cable disconnects.

5.3 Power Adjusting

5.3.1 Power Adjusting for Remote Controller

The Remote Controller is mainly used to adjust the input power of the outboard motor. When the battery is well connected and switched on, power on the Remote Controller to start the outboard, then slowly push the throttle forward position to increase the throttle power. The maximum forward power is 6KW and the maximum backward power is 2KW.

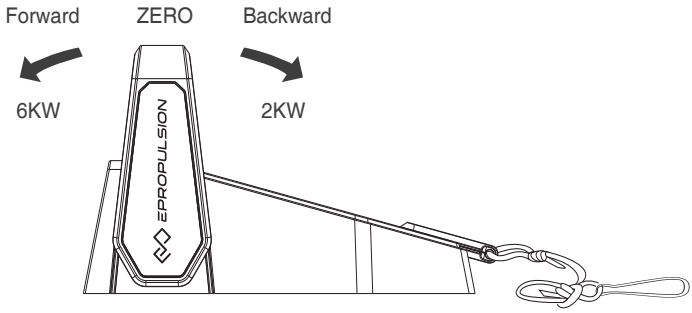


Figure 5-7

Before power on the Remote Controller, please reset the throttle to zero position.

If you find a blinking “RESET” on the display, you are reminded to reset the throttle to zero 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 Power Adjusting for Tiller Handle

The Tiller Handle is mainly used for power adjusting and steering control. When the battery is well connected and switched on, power on the Tiller

Handle to start the outboard, then turn the throttle gradually form zero position to the forward direction to start. Please refer to Figure 5-8. Change the heading direction by turning the tiller on horizontal level. The maximum forward power is 6KW and the maximum backward power is 2KW.

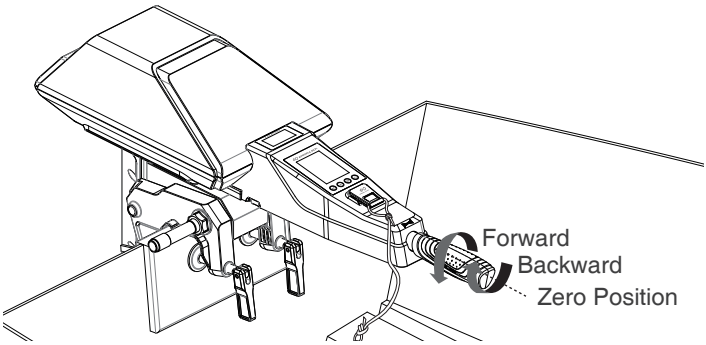


Figure 5-8

- Before power on the Remote Controller, please reset the throttle to zero position.
- If you find a blinking “RESET” on the display, you are reminded to reset the throttle to zero 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.

5.3.3 Recalibration

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



Figure 5-9

Recalibration process	LCD Displaying
Step1: Long press the “ ^ ” button (>10secs) until “CAL FO” displays.	
Step2: Push the throttle to the maximum forward power position, then press“ ^ ” button. “CAL ST” will display and “CAL” is blinking.	
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” is blinking.	
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. ⚠	
Step5: Push the throttle to zero position and press the “ M ” button and return to the main page.	

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

5.4 Use of Kill Switch

Attach the lanyard of kill switch to your wrist or life jacket. Stop the outboard by detaching the kill switch in case of emergency.

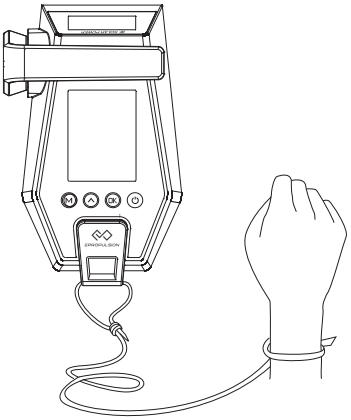


Figure 5-10

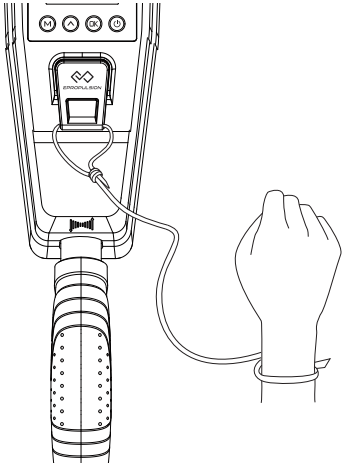


Figure 5-11

⚠ The kill switch generates magnetic field. Keep it 50cm / 20inches away from pacemakers and other medical implants.

⚠ The magnetic field of the kill switch may interfere with some electronic instruments. Keep it away from these electronic instruments.

⚠ Keep the kill switch 50cm / 20inches away from the magnetic cards (e.g. credit cards) and other magnetic media.

5.5 Pairing Remote Controller/Tiller Handle with the Outboard Motor

For Navy 6.0, the Remote Controller/Tiller Handle and the outboard motor are paired before delivery.

However, if the Remote Controller/Tiller Handle or the outboard motor 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 Controller/Tiller Handle will display as below. In this case, users should conduct pairing again.

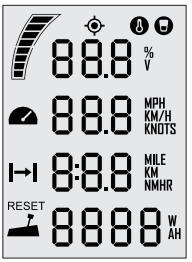


Figure 5-12

However, if the Remote Controller/Tiller Handle or the outboard motor is not replaced, but the main page of the LCD panel on the Remote Controller still displays like this, you should check and:

1) Make sure the Remote Controller is not far from the outboard motor;

2) Make sure all the equipment involved is normally powered on.

If the Remote Controller/Tiller Handle still displays like Figure 5-12 after check, it proves that an error has occurred to the outboard motor and the outboard motor needs repair.

Please follow the below procedures to pair the Remote Controller/Tiller Handle with the outboard motor.

Step1: Find the pairing code for the outboard motor. The code is composed of 7 numbers on the product label. The first 3 numbers of the pairing code are the last 3 of the serial number (S/N), and the last 4 numbers of the pairing code are the third to the sixth numbers of Date.

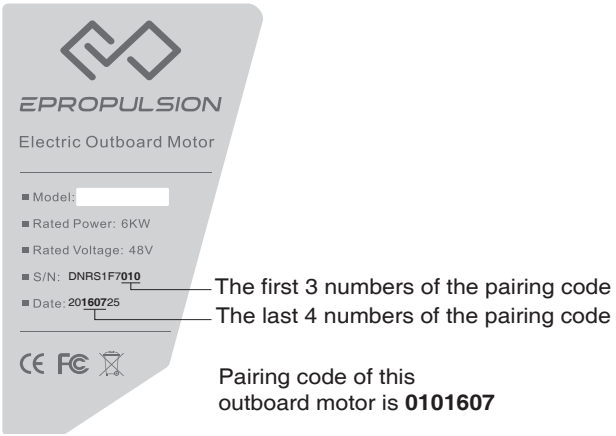


Figure 5-13

Step2: Long press the " OK " button until entering the pairing page (i.e. address setting page, Figure 5-14) of the Remote Controller/Tiller Handle. Meanwhile, ensure power supply of the outboard motor is normal. On this page, "ADD SET" refers to address setting, "0100607" indicates the pairing code.

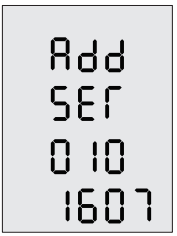


Figure 5-14

Step3: Press the " ^ " button to set each number based on the correct pairing code of the outboard motor. Then press " OK " button to save the change of the current number and automatically enter the setting status of the next number.

Step4: After setting all the numbers, long press the " OK " button to return to the main page. If the main page displays normally, the pairing succeeds; but if the main page still displays all the characters as shown in Figure 5-12, the pairing fails.

However, if pairing fails, please try again with a communication cable: First connect the Remote Controller/Tiller Handle with the outboard motor by a communication cable. Please refer to Figure 5-15 and Figure 5-16. Ensure the communication cable is well connected. Then repeat the above 4 steps to set the address again.

If the main page recovers normal display, it indicates that the problem has fixed and the wireless control function has resumed. If the problem persists, please contact your dealer for solution.

Although the Remote Controller/Tiller Handle and the outboard motor are paired before delivery, re-pairing is still required if the original Remote Controller/Tiller Handle or the outboard motor is replaced with a new one.

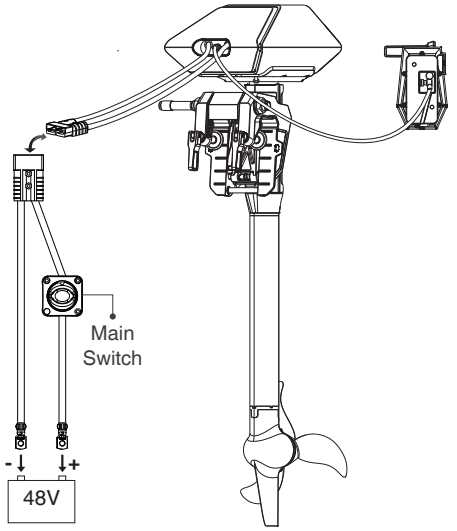


Figure 5-15

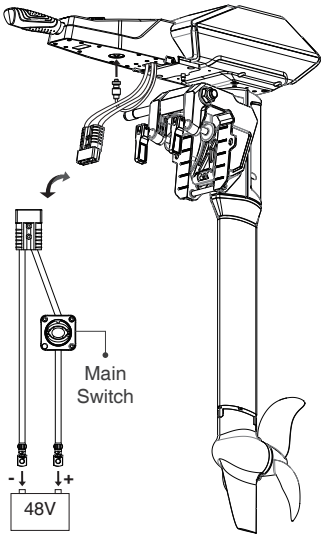


Figure 5-16

5.6 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 5-17 is an example. Please find more error codes and corresponding solutions in the below table.



Figure 5-17

Codes	Causes	Solutions
E01	The battery voltage exceeds 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.	The outboard may probably be operated at low power after the message is dismissed automatically. Please charge the battery as soon as possible.
E07	Motor idling error, caused by the propeller not immersed in water or detached from the motor shaft.	Mount the outboard properly and check if the propeller has been attached tightly.
E10	Motor stall, which may be caused by blocked propeller	Turn off the main switch, then clean up the things winding around the propeller. Test if it is possible to rotate the propeller by hand. If yes, you can continue to operate the outboard.
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.
E14	Failure was found in the motor temperature sensors.	Try to turn off the main switch and wait for 10 seconds then turn on the switch again.
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.
E30	Throttle position sensor failure, should recalibrate the throttle position sensor.	Please refer to section *5.3.3 Recalibration* to recalibrate the throttle position sensor.
E40	System running failure	Please restart the Remote Controller/Tiller Handle and the outboard.
E60	The Remote Controller/ Tiller Handle is running out of power.	Please connect the Remote Controller/Tiller Handle to the outboard by a communication cable. Please refer to section *5.2.2 Charged by Wired Connection*
All characters are displaying	The outboard motor has no power.	Connect the battery to the outboard and then turn on the main switch.
	Device addresses mismatch.	Please refer to section 5.4 *Pairing Remote Controller/Tiller Handle with the Outboard Motor* and pair the Remote Controller/Tiller Handle 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 recommended to set display preference before using a NAVY 6.0 outboard motor following the below steps.

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

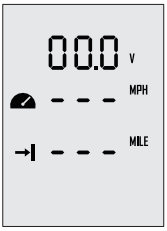


Figure 6-1

Step2: On the preference setting page, the blinking item is the object waiting to be set. Press the " ^ " button to view options for the object 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.

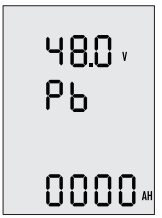
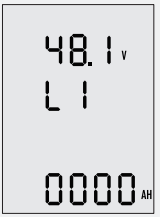
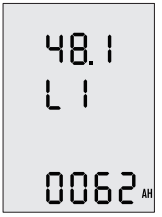
Step3: Press the " OK " button to save setting for the current item and automatically move to the next item.

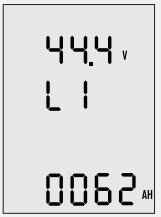
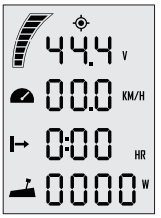
Step4: When all the items have been set, long press the " OK " button to save all the settings and return to the main page.

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-acted 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 Controller/Tiller Handle at the first time use, otherwise the batteries may not work properly.

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

Battery Configuration Process	LCD Displaying
Step1: First, turn on the main switch and the Remote Controller/Tiller Handle. Then, long press the " M " button to enter the preference setting page. Next, long press the " M " button again until entering the battery setting page. Users can see the voltage value blinking and it's ready for configuration.	
Step2: Press the " OK " button and skip to the next item: battery type. Choose the battery type according to the battery you use. Pressing the "^" button can switch the battery type options between Pb, Li and LFE. **Pb:** Lead-acid battery **Li:** Lithium battery **LFE:** Lithium-ion ferrous phosphate battery	
Step3: Press the " OK " button to save battery type and skip to the below battery capacity setting item. Press the "^" button to change the value and set the battery capacity according to the battery you use. 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: $\text{Capacity in Ah} = \frac{\textit{Capacity in Wh}}{\textit{Nominal voltage in V}}$ 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.	

Battery Configuration Process	LCD Displaying
Step4: Press the " OK " button to save battery capacity setting, and it will return to the top battery nominal voltage setting item. The voltage options are varied according to the battery types. Press the " ^ " button to view the options and select the closest nominal voltage value according to the battery you use.	
Step5: Long press the " OK " button 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 Controller 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 Controller/Tiller Handle 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 Controller/Tiller Handle.
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.
7. Press " ⏻ " button to turn on the Remote Controller/Tiller Handle 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 Controller/Tiller Handle.
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 Controller/Tiller Handle.
3. Press and hold the " ⏻ "button until the Remote Controller/Tiller Handle is powered off.
4. Turn off the main switch.
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 keep 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 Controller.
3) The main switch is off.
4) The communication between Remote Controller/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.

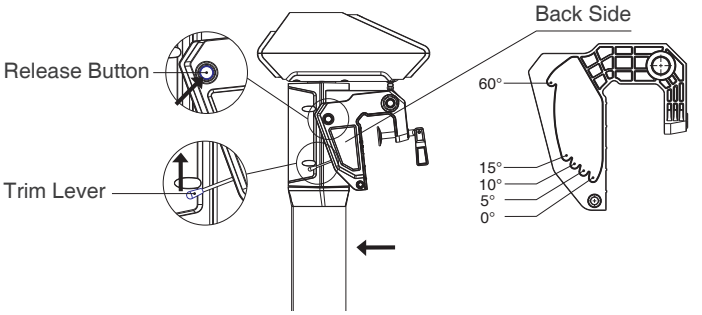


Figure 10-1

Tilting up

⚠ Detach the Tiller Handle 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.

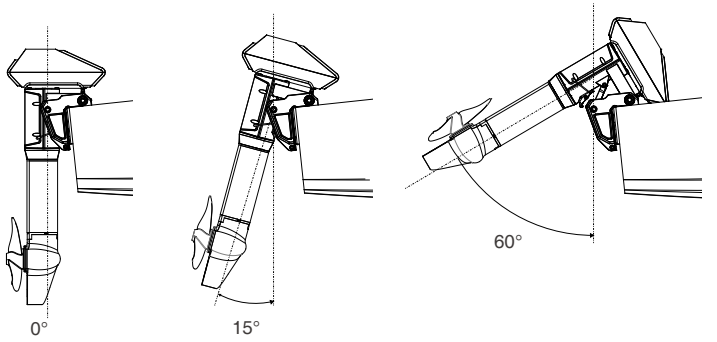


Figure 10-2

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	Initial	Every		
		10 hours (1 month)	50 hours (3 months)	100hours (6 months)	200 hours (12 months)
Anode	Check/ Replace		□	□	
Cooling Channels	Check			□	
Gear Oil	Change		■		■
Greasing Points	Grease			□	
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. Side lay the outboard on a flat and horizontal surface. Prepare a container to collect oil.
3. Screw out the hex socket flanged plug in the lower drain hole with a M6 wrench, then the screw out the upper one.

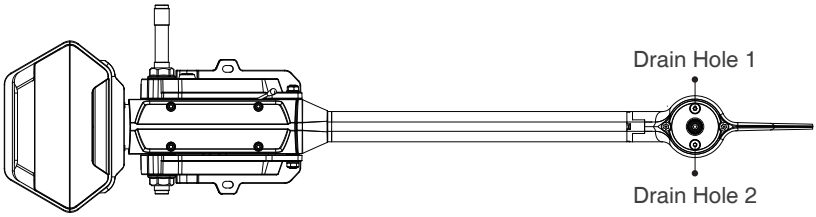


Figure 11-1

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 radiator and replenish coolant.

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

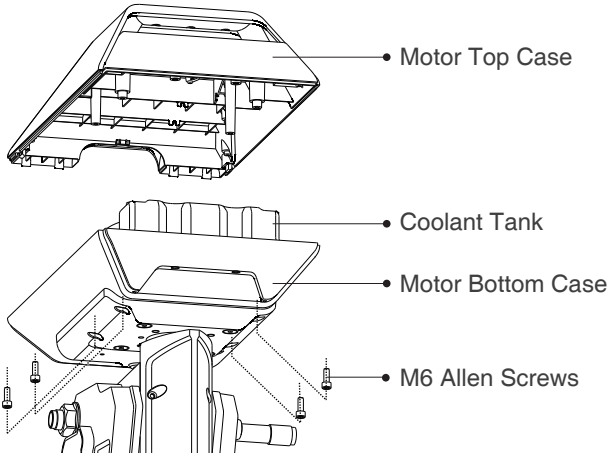


Figure 11-2

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 the liquid mixture of the recommended ANT coolant and water at a mix ratio of 7 to 3.

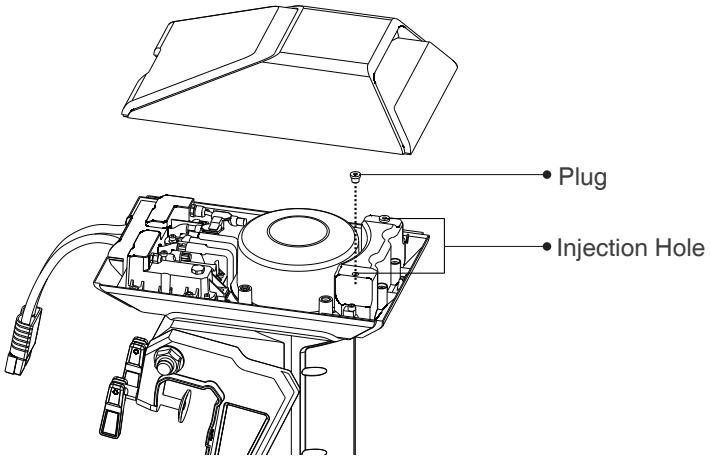


Figure 11-3

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 2.3 Propeller Assembly* 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.

12 Transportation and Storage

12.1 Transport

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

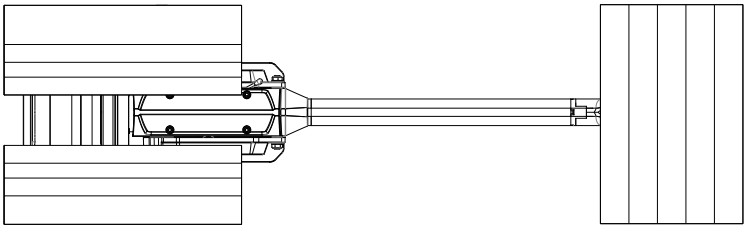


Figure 12-1

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 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

The maximum input power of Navy 6.0 has been limited to be below 6KW when the system temperature is a little high. If the system temperature continues to be warm 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 operating temperature range.

14 Warranty Claims

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 Technology Ltd. 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	Warranty Expiry Date
Navy 6.0	**Two years** after the date of purchase.
Components have been repaired or replaced	**Three months** since the date of maintenance. Note: 1. If the three-month period overlaps with 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 repaired or replaced parts continue applying to warranty during the extended period.

In order to validate the warranty, users are required to fill in the Warranty Claim 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 Claim 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 Claim 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 Claim 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 be 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.
Please contact us if you have any concerns.
We are always delighted to offer service for you.

ePropulsion Technology Ltd.
Website: www.epropulsion.com
Email: service@epropulsion.com

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