



TM120B User Manual

TM120B 用户手册



苏州百胜动力科技有限公司
Suzhou Parsun Power Technology CO., LTD.

Ver:1.00 BLD:20260226

Acknowledgement

Dear customers,

Thank you for purchasing Parsun products. We place great importance on efficiency, safety, and comfort of our products. Before delivery, we conduct rigorous testing to optimize your experience. Before using TM120B, please read this manual carefully to ensure its correct and safe use.

You're seen as having read the contents of this manual after starting using TM120B. Please do not lend TM120B to anyone that has not read this manual. Parsun is not responsible for any accidental losses resulting from the failure in following the operations mentioned in this manual.

This manual will be updated from time to time. Upon discovering that your product does not match the contents of this manual, please do not hesitate to contact us via the official website www.parsunpower.cn, and we will send you a satisfactory reply. This manual is available in multiple languages, so the content may not be exactly the same. Parsun reserves the right to the final interpretation of this manual.

We strive to continuously improve and optimize our products. For any suggestions on our products, please feel free to contact us via the official website at www.parsunpower.cn.

Symbols

This manual contains some symbols. Please understand these symbols according to the following meanings.



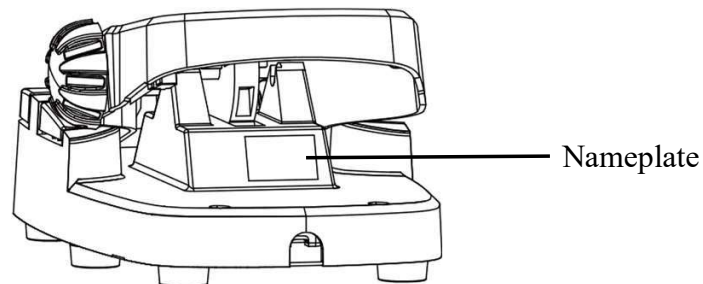
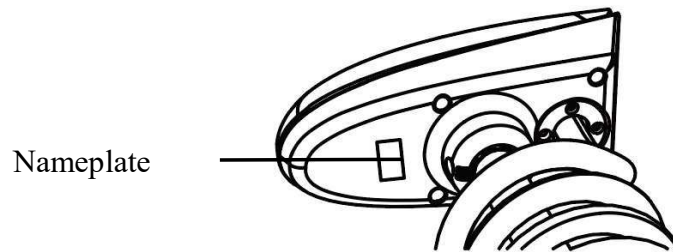
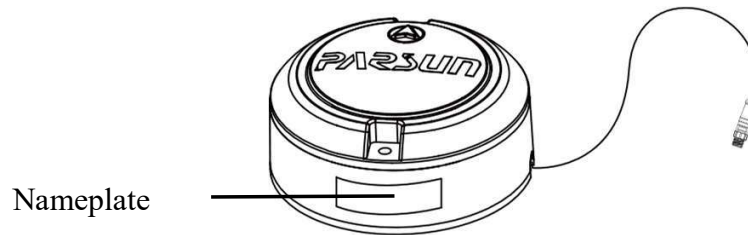
Warnings or special attention



Note

Product SN

TM120B consists of multiple components, of which S/N is printed on the machine's nameplate and recorded at the S/N on the nameplate. It can help you order spare parts from your distributor, and apply for product warranty services, and other after-sales services, and can also serve as a reference once the machine is stolen. Please do not remove the nameplate.



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1 Product Overview

1.1 Safety instructions

TM120B is used for marine propulsion systems and is powered by a battery, thus it is inherently dangerous to some extent. Before using it, please carefully read the safety and warning instructions in this manual. Failure to follow these instructions may result in personal injury or machine damage.

1.1.1 Safety features

The following are the common safety features of TM120B.

Safety features	Description
Overcurrent protection	When the current is too high, TM120B will stop running to protect the motor.
Overtemperature protection	When the temperature is too high, TM120B will automatically reduce power to protect the motor.
Locked-rotor protection	If the propeller is entangled by debris, TM120B will stop running to prevent damage.
Overvoltage protection	When the battery voltage is too high, TM120B will be prohibited from starting.
Undervoltage protection	When the battery voltage is too low, the underwater unit will be prohibited from starting.

1.1.2 Precautions

Battery

The rated voltage of TM120B is 24V and 12V respectively, and the max. current supported is 36A and 40A. If you are not using Parsun's standard battery, please select a battery according to the following parameters.

When TM120B voltage is 24V, choose a battery with a voltage of 17-32V and a continuous discharge current above 50A.

When TM120B voltage is 12V, choose a battery with a voltage of 10-18V and a continuous discharge current above 50A.

If the voltage used is beyond the scope, TM120B may give out an alarm and produce fault and irreparable damages.

Positioning accuracy

The precision of position holding may be affected by the following factors:

- In the areas with shelters, such as valleys and bridges, or due to weather influence or if satellite is just above TM120B, TM120B's GPS signal may be instable.
- Proximity to high-voltage lines, radar, or metal objects may cause magnetic interference.
- Too high wind speed or too large or complex water current.
- Low battery power, which results in reduced thrust.

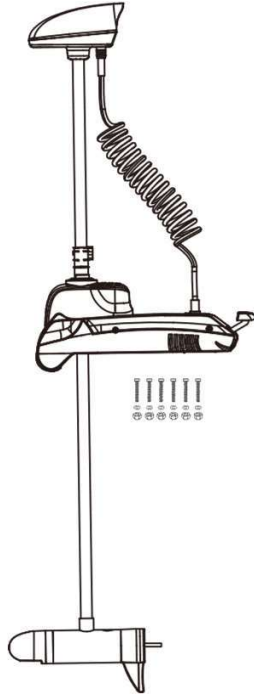
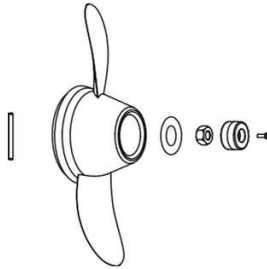
Safety Precautions

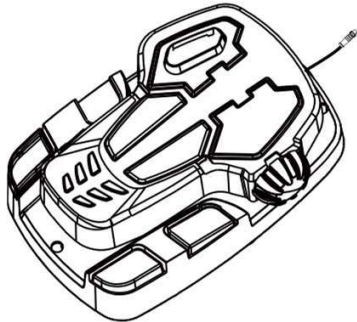
- Before use, ensure you are familiar with the basic operations, such as starting/stopping, steering, retracting, and deploying.
- Before use, please check the battery level.
- Before use, ensure that the base screws are securely fastened.
- When operating TM120B, do not apply excessive force to the foot pedal.
- Do not use the automatic control function in areas with heavy boat traffic, narrow waterways, poor visibility, or extreme sea conditions.
- When folding or unfolding TM120B, do not place your fingers on moving parts.
- After driving, disconnect TM120B from the battery.
- After operation, stow the TM120B on the deck.
- When connecting the battery, make sure the polarity is correct and the connection is secure.

- Keep the battery terminals clean and free of conductive materials.
- After use in saltwater, clean the TM120B's surface with fresh water.
- Before installing or removing the propeller, ensure the TM120B has been powered off.

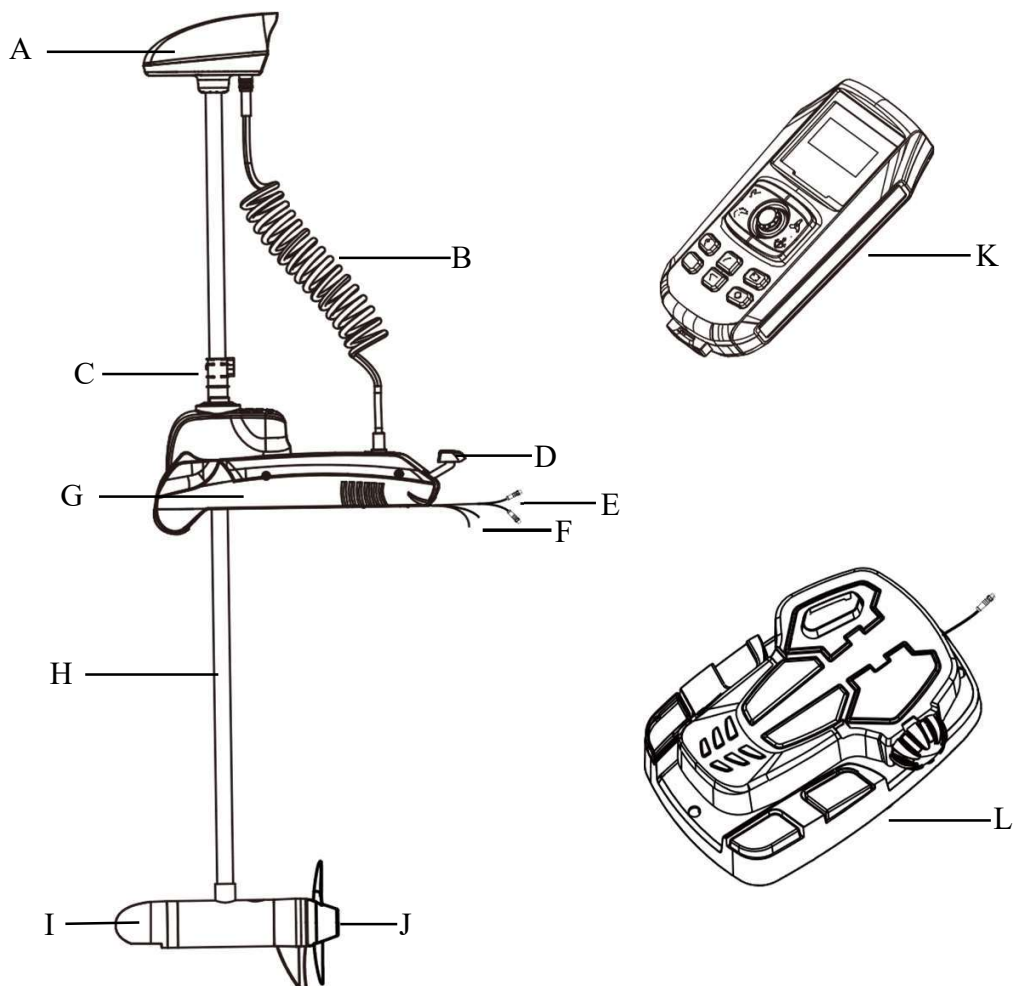
1.2 Packing list

The items in TM120B package are as follows. After opening the package, please check if any item is missing or damaged. If any, please contact your dealer.

Items	Diagram
Unit x1 M8 Hex Socket Bolt x6 Flat Washer 8 x6 M8 Lock Nut x6	
Remote Control x1	
Φ4 Pin x1 Propeller x1 Flat Washer 10 x1 Lock Nut x1 Sacrificial Anode x1 M3*10 Hex Socket Bolt x1	

Heading Sensor x1 4.2*50 Self-tapping Screws x2 (optional)	
Pedal x1 (optional)	

1.3 Parts



A GNSS Module

B Spring Harness

C Height Adjuster

D Retracting/deploying
Pedal

E Communication Harness

F Anode/Cathode Power
Supply Harness

G Base

H Main Rod

I Motor

J Propeller

K Remote Control

L Pedal

1.4 Specification

TM120-B	24V	12V
Rated voltage	24V	12V
Operating voltage	17-32V	10-18V
Max. thrust	90lb	55lb
Rated speed	1,900rpm	1,800rpm
Max. current	36A	40A
Propeller diameter/W pitch	250 mm / 128 mm	
Weight (excluding pedals)	19.5kg	18kg
Shaft length	50"/65"/75"/85"	50"/65"
Speed	Adjustable	
Motor type	DC brushed motor	
Control method	Pedal, remote control, APP	
Lift mode	Manual lift	
Motor waterproof rating	IP68	
Overall waterproof rating	IP66	

1.5 Declaration of Conformity

Object of the Declaration

Product: Electric Outboard Motor

Model: TM120B-2450F, TM120B-2450S

TM120B-2465F, TM120B-2465S

TM120B-2475F, TM120B-2475S, TM120B-2485F, TM120B-2485S

TM120B-1250F, TM120B-1250S, TM120B-1265F, TM120B-1265S.



Company name: Suzhou Parsun Power Technology CO., LTD.

Address: 3rd Floor, BLD 2, Block 1, District 3. No.20 Datong Road, SND, Suzhou.
JiangSu, China

This product is hereby declared to be in conformity with the following directives:

EMC Directive (Electromagnetic Compatibility Directive) 2014/30/EU

RoHS (Restriction of Hazardous Substances Directive) 2015/863/EU

RED Directive (Radio Equipment Directive) 2014/53/EU

FCC Part 15 (Title 47 of the Code of Federal Regulations, Part 15): This device must not cause harmful interference and must accept any interference received.

Applicable Standards:

EN 55012:2007

EN 301489-1:2009

EN 303413:2007

EN 301489-17:2020

EN 50663:2017

EN 61000-6-1:2009

EN 301489-18:2022

EN 300328:2019

EN 301489-19:2019

EN 62479:2010

EN IEC 63000:2018

FCC Part 15 “Federal Communications Commission Rules, Part 15”: This device must not cause harmful interference and must accept any interference received.

EU Conformity Statement

Hereby, PARSUN declares that the radio equipment type is in compliance with Directive 2014/53/EU.

RF Exposure Information

This device has been tested and meets applicable limits for Radio Frequency (RF) exposure.

Caution: The user is cautioned that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. 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. NOTE: 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.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

RF Parameters

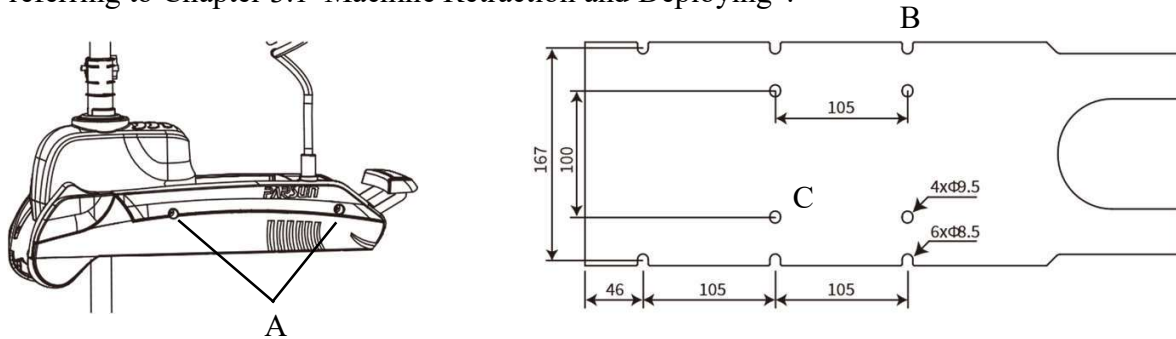
1. RF Function: Bluetooth Low Energy (BLE) Wireless Data Transmission

- Frequency Band: 2402 MHz - 2480 MHz
- Transmitter Power: ≤ 0.68 dBm (For remote control)
- ≤ -7.52 dBm (For Trolling Motor)

2 Installation

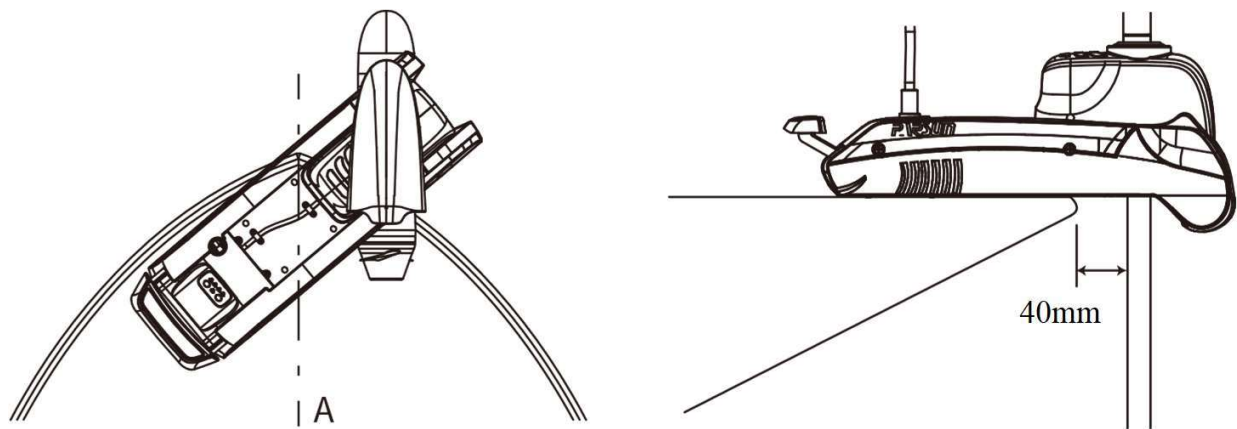
2.1 Install the unit

Step 1: Take off the right and left coverplates (A) on both sides through the mounting holes on the base and six mounting holes (B) will appear; after the unit is retracted, the four mounting holes (C) at the middle of base will be seen; TM120B can be retracted and deployed by referring to Chapter 3.1 “Machine Retraction and Deploying”.



Step 2: Place TM120B on the ship's deck, align the shaft as close as possible to the ship's keel (A). For installation, it is recommended to use 6 screws; otherwise, use at least 4.

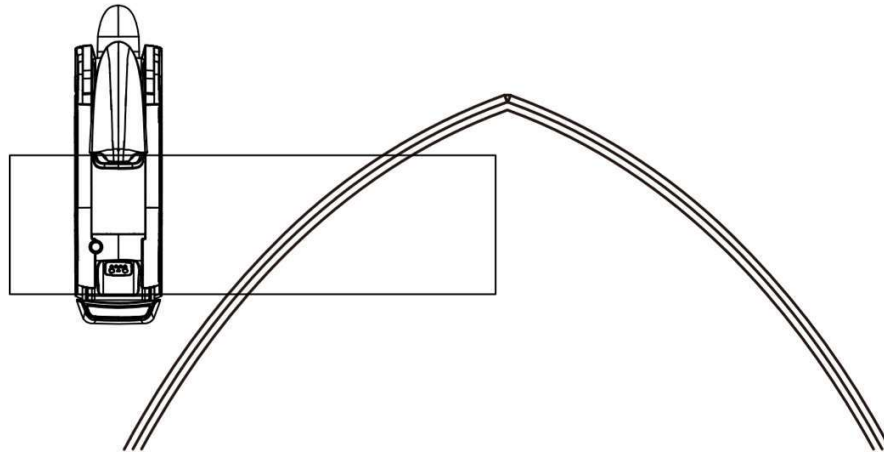
During installation, leave a gap of at least 40 mm between the shaft and the upper edge of the ship's gunwale or front segment of extension bracket.



(Deck mounting mode)

If TM120B can't be mounted on the deck, mount it outboard by fixing an extension board on the boat deck before fixing TM120B onto the extension board.

Note: Ensure that the extension board has enough strength to prevent crack of extension board and falling of machine into water.

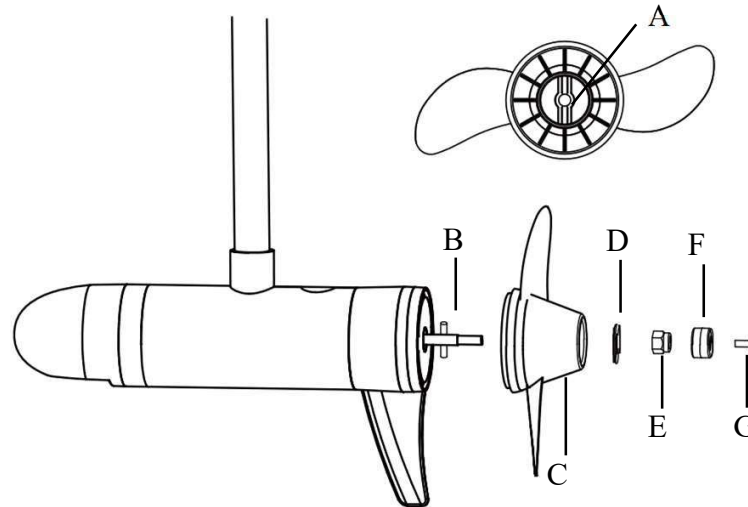


(Outboard mounting mode)

2.2 Install the propeller

Insert pin (B) onto the motor shaft, then align the slot (A) of the propeller with the pin and install it onto the motor shaft. Install the propeller (C), washer (D), locknut (E), anode (F), and screw (G) in sequence.

Note: Ensure the correct installation sequence and fasten the propellers, to prevent running faults of machine or personal injury.



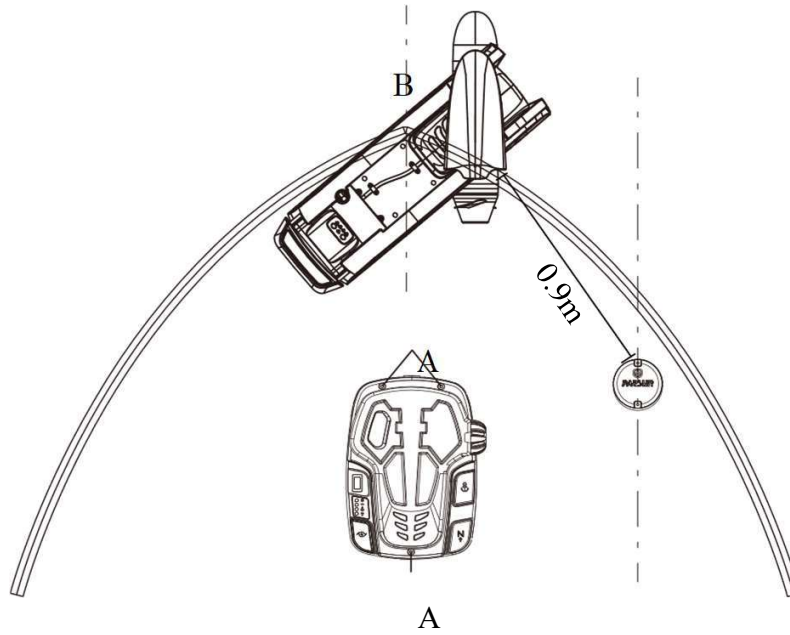
2.3 Install the pedals (optional) and heading sensor (optional)

On the foot pedal there are three holes (A), which can be used to secure the machine to the deck of the boat. Fix it onto the deck to prevent the foot pedal from moving.

The heading sensor should be installed horizontally, with the arrow pointing forward and aligned parallel to the keel (B) of the boat; it is recommended to install it close to the keel.

The heading sensor should be installed as far away from unit as possible, at least 0.9m (1 foot), to avoid magnetic field interference.

The heading sensor should be installed as far away from the power cable and other electronic equipment, to avoid magnetic field interference on the working effects of heading sensor.

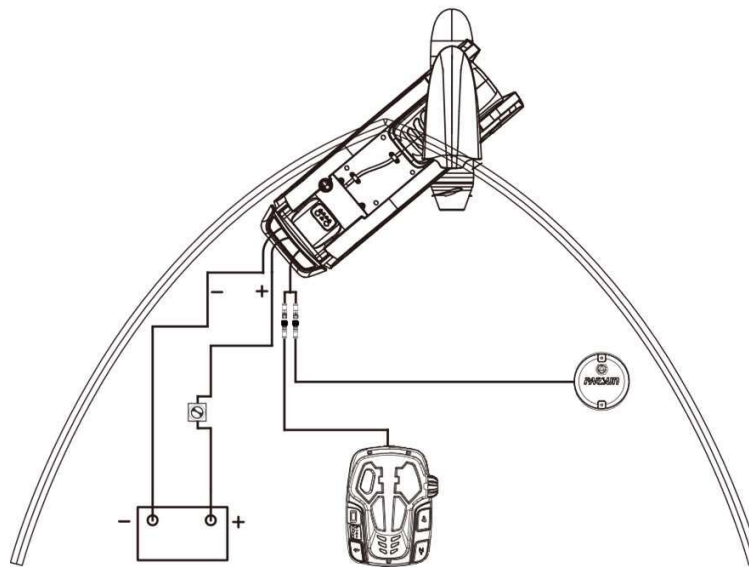


2.4 Connect wiring harness

Connect the red power cable from the unit to the anode of battery, and the black power cable to the cathode of battery. Connect the harness of pedal and heading sensor to the communication line of the unit respectively.



It is recommended to add a switch in the middle of the wiring harness.



3 Unit

3.1 Fold and unfold TM120B

Unfold

Step 1: Press the retracting/deploying pedal (A), hold the main rod, and push it to the limit position of the base.

Step 2: Push the main rod forward and upwards, until it is vertical to the base.

Step 3: Release the retracting/deploying pedal (A).



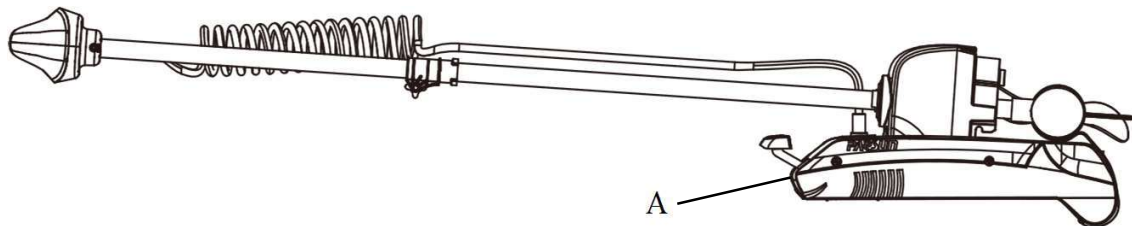
Ensure TM120B is locked completely when unfolding it.

Fold

Step 1: Press the retracting/deploying pedal (A), press the main rod until it is parallel to the unit and base, and then pull the unit to the back.

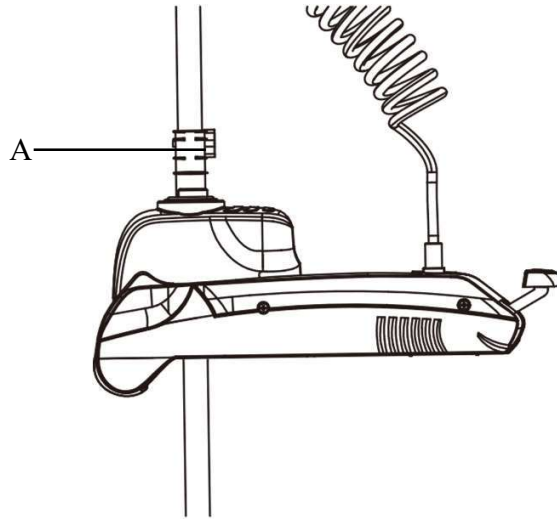
Step 2: Rotate the motor until it is parallel to the base.

Step 3: Pull the unit back to the end, and then release the retracting/deploying pedal (A).

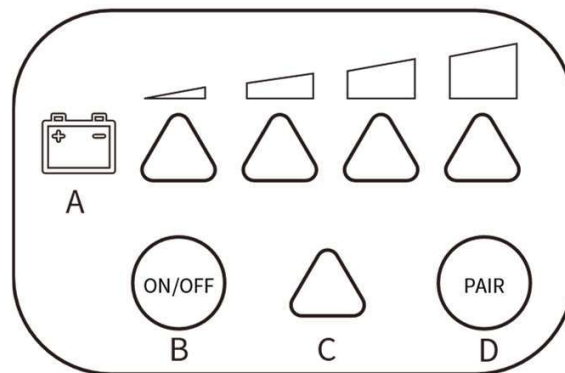


3.2 Adjust height

Loosen the height adjuster (A), then move TM120B up or down to the desired position, and re-tighten the height adjuster (A).



3.3 Panel



No.	Function	Description
A	On/Off indicator	Green indicator is normally on or flickers On/Off indicator has 4 bars in total, the battery level increases from the left to the right; see 3.3.1 “On/Off indicator” for details.
B	On/Off button	When TM120B is powered off, press this button to power it on.

		When TM120B is powered on, press and hold it for 3s to power it off.
C	Status indicator	Starting: White. Idle (GPS not located): Yellow. Idle (GPS located): Green. Running (motor started): Blue. Alarm: Yellow. Error: Red.
D	Pairing/anchoring button	Press and hold this button for 2s, and the unit will beep for 3 times to enter the pairing mode; meanwhile, the remote control can also enter pairing mode to complete pairing. Press this button to start anchoring mode of the unit, and then press it again to quit anchoring mode.

3.3.1 Power level *indicator*

Indicator	TM120B-24V	TM120V-12V
1 bar flickering	<22.2V	<11.5V
1 bar normally on	22.2 V~23.0V	11.5 V~11.9V
2 bars normally on	23.0 V~23.8V	11.9 V~12.2V
3 bars normally on	23.8 V~24.6V	12.2 V~12.5V
4 bars normally on	>24.6V	>12.5V

3.4 Anti-tangling of spring wire

When spring wire is tangled for over 1 circle under non-manual mode, it will trigger anti-tangling and the motor will be powered off temporarily, the ship controller will rotate automatically to untangle, and then return to the angle that triggers anti-tangling; then, the motor will be powered on automatically.

When the spring wire is winded for over 1 circle under manual mode, it will trigger limit protection and the motor can't rotate anymore.



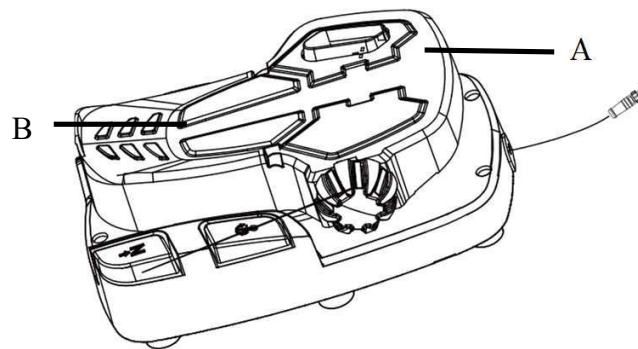
Ensure that the spring wire is not tangled when the unit is powered on, so that anti-tangling protection can become effective normally.

4 Pedal

4.1 Steering

Press down the front end (A) of the pedal to turn the boat to starboard; when it is fully pressed, TM120B turns 180° to the right.

Press down the rear end (B) of the pedal to turn the boat to port; when it is fully pressed, TM120B turns 180° to the left.

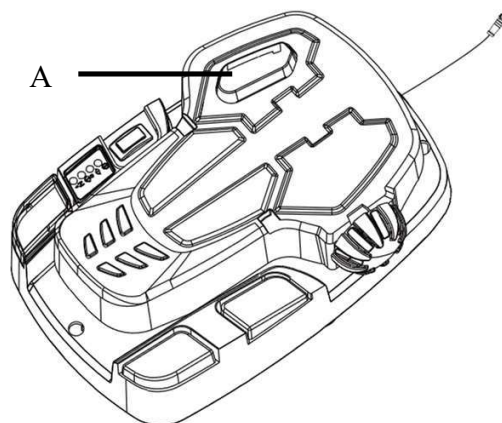


4.2 Momentary switch

After pressing the momentary switch (A), the propeller will operate (premise: the speed control knob is not in the OFF position). When the momentary switch is released, the propeller will stop.



When TM120B is in the retracted position, propeller running is prohibited; do not operate the propeller when it is not underwater.

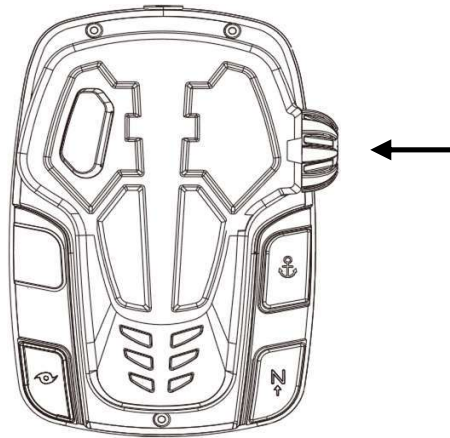


4.3 Level adjustment

Rotate the level adjustment knob to change the settings of TM120B; there are a total of 10 levels, and there is no active setting when it is in the OFF position.



The levels are not linear.

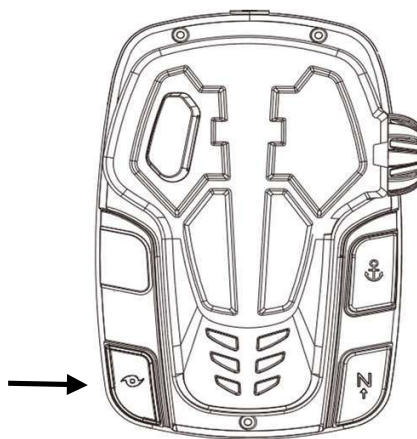


4.4 Continuous switch

After pressing the continuous operation switch, if the speed adjustment knob is not in the OFF position, the propeller will keep running. Press the continuous operation switch again to stop the propeller. Under continuous mode, you can change the steering direction through the pedal.



After pressing the momentary switch and any function, the function will be disabled.



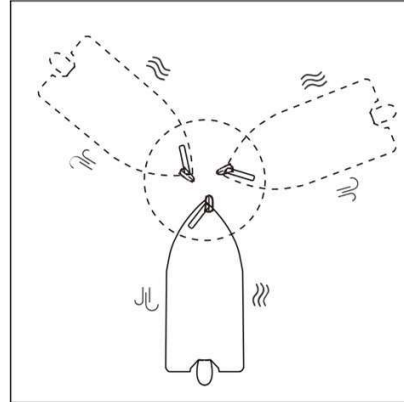
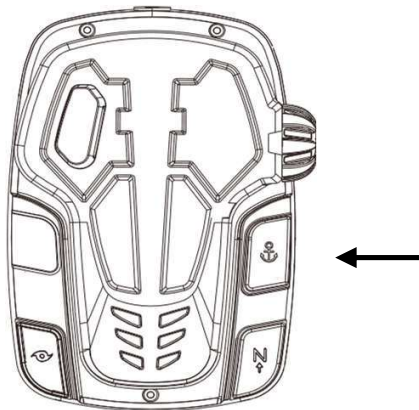
4.5 Anchoring (electronic anchor)

Keep the boat in its current position.



Any pedal operation will stop this function.

In this mode, the course of the boat will be affected by wind or current.

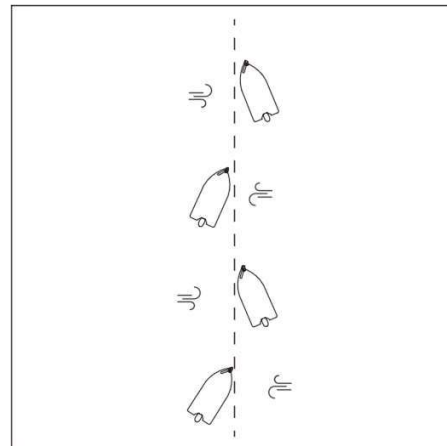
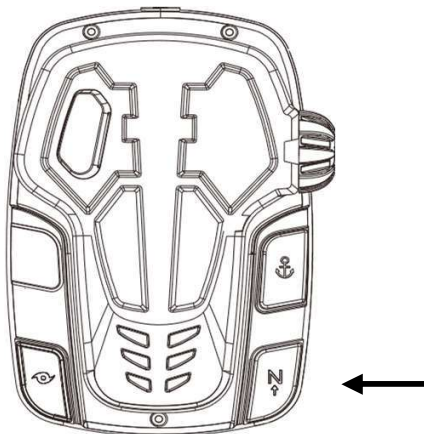


4.6 Bow/heading hold

TM120B will plot an invisible route in the direction indicated by the heading. During this period, the boat will automatically follow the route, and the speed can be adjusted using the control knob. Under bow/heading hold mode, the steering direction can be changed through the remote control, the boat will replan its route along with the adjusted direction, and sail along with the new route.



This function will stop after triggering other modes.



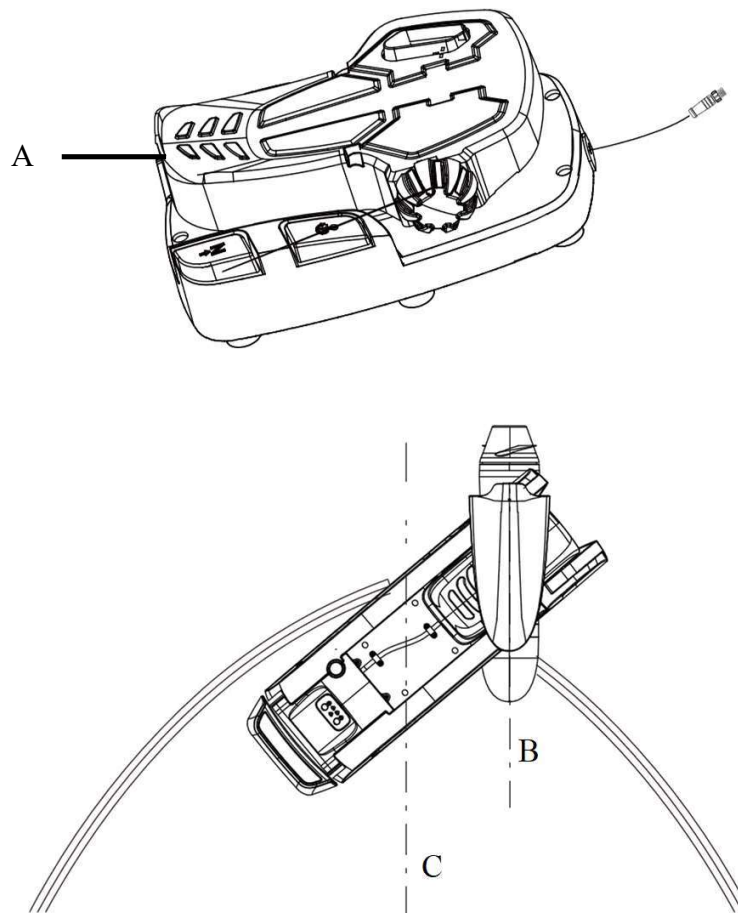
4.7 Steering calibration

1. Adjust the foot pedal to the maximum backward tilt (A)
2. Rotate the left joystick of remote control to rotate the unit anticlockwise for 180° relatively to the keel, so that its head (B) of machine is parallel to the keel line of the boat (C) and the head points towards the stern of the boat.
3. Conduct calibration on the “Remote control calibration” - “Keel calibration page”.



Be sure to perform this operation the first time you use the TM120B, as it will affect the steering control.

When there's major deviation between headset and pedal control direction, please calibrate the steering direction again.



5 Remote Control

5.1 Appearance of the remote control



5.2 Functional description of remote joysticks and buttons

Joystick:

Push up: Push up to increase the main motor level by 1; push up continuously to increase the main motor level continuously.

Push down: Push down to decrease the main motor level by 1; push down continuously to decrease the main motor level continuously.

Push left: Rotate the unit to the left.

Push right: Rotate the unit to the right.

Press button:

(↑) Bow/heading hold mode on/off button.

⚓ Main motor on/off button.

⚙️ Cruise mode on/off button.

⚓ Anchoring mode on/off button.

📍 Buttons of navigation function menu.

📄 Route record mode on button.

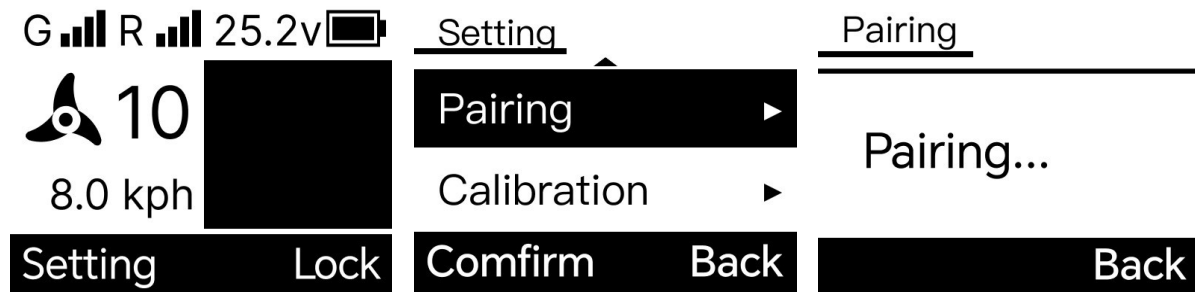
▲ Menu up button.

▼ Menu down button.

● Left mapping button of left menu, press and hold it to turn on/off the remote control.

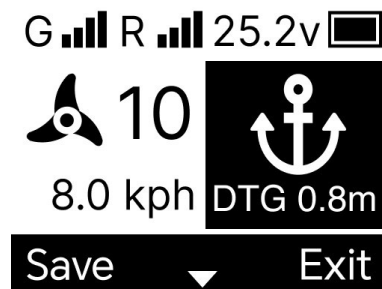
● Right mapping button of right menu.

5.3 Pairing of remote control and unit



1. Press the “Up” or “Down” button of remote menu on the homepage, switch the bottom menu bar of screen to display “Setting” on the left side, and display “Lock screen” menu bar on the right side.
2. Press the left selection button of the menu to enter setting page. Press the “Up” or “Down” button to switch and select the “Pairing” menu, press the “Menu left selection” button and select “Pairing” to enter the pairing page; remain on this page, and then press the “Pairing” button on the unit control panel; pairing will succeed when you hear 5 beeps in succession.

5.4 Description of remote control screen display



Top status bar:

- G** GNSS system signal
- R** Remote control signal
- 25.2v** Voltage of unit battery
- Remote control power level

Middle operation status bar:

Main motor rotation status of unit: The blade rotation speed increases along with level increase, or blades will stop when motor level is 0 or when motor is powered off.

10 The main motor level of unit can be adjusted within Level 0-10.

8.0 kph Current drive speed of the unit.

 Current mode of the unit.

Bottom menu bar:

设置 锁屏

Setting: Press the left “Mapping” of the menu to enter the setting page.

Screen lock: Press and hold the “Lock” button of remote control.

5.5 Screen display under different modes

- Bow hold mode



The bow direction is consistent with HDG value.

- Heading hold mode



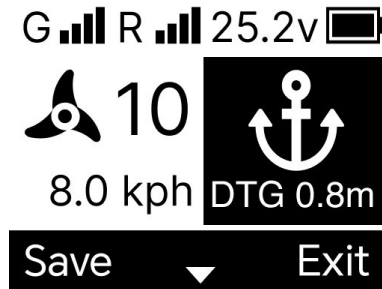
The unit drives in a straight line, and the direction is consistent with BRG value.

- Cruise mode



The unit drive speed is close to the target speed.

- Anchoring mode



DTG is the distance to the anchoring point.

- Navigation mode



Track is the serial number in route menu, D is the remaining distance to the start point of route.

- GoTo mode



DTG is the remaining length and distance to the destination.

- Record route mode



DIST is the recorded route distance.

- Enable [Cruise mode] & [Bow hold mode] at the same time



- Enable [Cruise mode] & [Heading hold mode] at the same time



- Enable [Cruise mode] & [Navigation mode] at the same time



- Enable [Cruise mode] & [GoTo mode] at the same time



- Enable [Cruise mode] & [Record route mode] at the same time



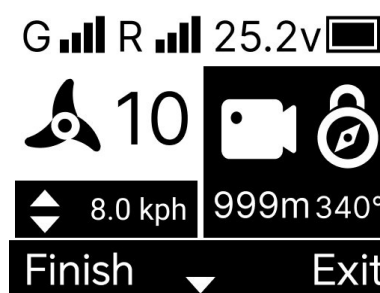
- Enable [Record route mode] & [Bow hold mode] at the same time



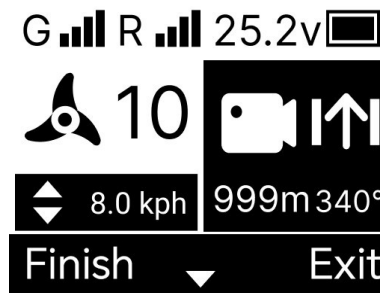
- Enable [Record route mode] & [Heading hold mode] at the same time



- Enable [Record route mode] & [Cruise mode] & [Bow hold mode] at the same time



- Enable [Record route mode] & [Cruise mode] & [Heading hold mode] at the same time



5.6 Unit working mode

5.6.1 Bow hold mode

Firstly, set the function of “bow/heading hold” button of the remote control as “bow hold mode”.

1. Press the “Up” or “Down” button of the remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the hold mode menu, press the “Select left” button to select “Hold mode” and enter the hold mode setting page.
4. Press the “Up” or “Down” button to select “Heading hold”, then press the “Select left” button to save the settings.

Then, press the “Bow/heading hold” button of remote control under [Manual mode], [Cruise mode] and [Record route mode], to trigger [Bow hold mode].



- After this mode is enabled, the unit will move along with the direction of its bow.
- This mode can be enabled under [Manual mode], [Cruise mode] and [Record route mode], all of which can be enabled with this mode.
- Press the “Bow/heading hold” button of remote control again to exit [Bow hold mode].

Change bow direction

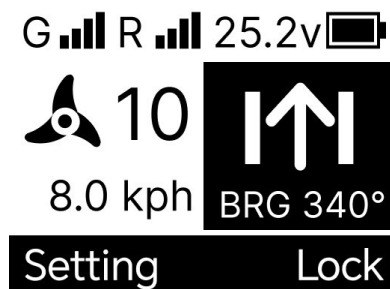
Press the “Motor left rotation” & “Motor right rotation” buttons under [Bow hold mode] to change the bow direction of unit.

5.6.2 Heading hold mode

Firstly, enable “Heading hold mode” through the “Bow/heading hold” button of the remote control

1. Press the ““Up” or “Down” button” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the hold mode menu, press the “Select left” button to select “Hold mode” and enter the hold mode setting page.
4. Press the “Up” or “Down” button of menu to select “Heading hold”, then press the “Select left” button to save the settings.

press the “Heading/bow hold on/off” button of remote control to enable [Heading hold mode].



- After this mode is enabled, the unit will enter straight line driving along with the current bow hold direction.
- This mode can be enabled under [Manual mode], [Cruise mode] and [Record route mode], all of which can be enabled with this mode.
- Press the “Bow/heading hold” button again to exit [Bow hold mode].

Change heading direction

Press the “Push left” or “Push right” button of remote control joystick under [Heading hold mode] to change the straight line drive direction of unit.

5.6.3 Cruise mode

Press the “Cruise on/off” button of remote control to enable [Cruise mode].



- After this mode is enabled, the unit will drive along with the current speed, and set the current speed as the target speed.
- This mode can be enabled under [Bow hold mode], [Heading hold mode], [Record route mode], [Route mode] and [GoTo mode], all of which can be enabled with this mode.
- Press the “Cruise mode on/off” button of remote control again to exit [Cruise mode].

Change target speed

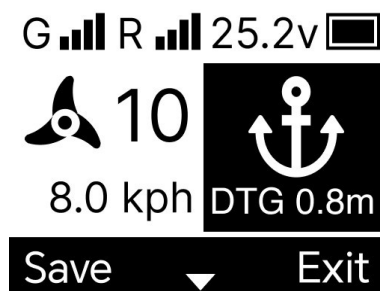
Press the “Push up” or “Push down” button of remote control joystick under [Cruise mode] to change the target speed of unit.

Push up the remote control joystick to increase the target speed by +0.2kph.

Push down the remote control joystick to decrease the target speed by -0.2kph.

5.6.4 Anchoring mode

Press the “Anchoring on/off” button of remote control to enable [Anchoring mode].



- After this mode is enabled, the motor will be powered on automatically, and the unit will anchor by taking the instantaneous coordinates where instruction is received as the anchor point.
- Under this mode, the manual steering control of motor is invalid.
- Power off the motor under this mode to recover the steering control of motor.

- Press the “Anchor” button of remote control again to exit [Anchoring mode].

5.6.5 Navigation mode

Press the “Navigation function menu” button of remote control to enter navigation page, then select “Route” and enter navigation - route page. Select the position where route is saved, press the “Menu left mapping” button, select to end point/to start point and enable [Navigation mode].



- After this mode is enabled, the motor will be powered on automatically and unit will drive along with the set route.
- There are two options when this mode is enabled
- To Start, start from the “end point” of route and end at the “start point”.
- To End, start from the “start point” of route and end at the “end point”.
- Depart from the nearest point of route, whatever the mode.
- [Cruise mode] can be entered along with this mode.
- Press “Exit” in the menu bar at the bottom of the screen to exit [Navigation mode].

Invert route

Enter [Navigation mode], press the “Up” or “Down” button of remote control menu, switch the screen bottom menu to show invert route on the left side, and show quit menu bar on the right side. Press the “Menu left mapping” button to invert the route. After inversion is done, To Start on screen will become To End; on the contrary, To End will become To Start.

5.6.6 GoTo mode

Press the “Navigation function menu” button of remote control to enter navigation page, then select waypoint to enter navigation - waypoint page. Select a position where waypoint is saved, press the “Menu left mapping” button to enable [GoTo mode].



- After this mode is enabled, the motor will be powered on automatically and the unit will drive to the target waypoint along with straight line.
- This mode can be enabled under [Bow/heading hold mode], [Cruise mode] and [Navigation mode], and [Cruise mode] can be enabled along with this mode.
- This mode is invalid under [Record route mode] and [Anchoring mode].
- [Anchoring mode] will be enabled automatically after reaching the target waypoint.
- Press Exit of bottom menu bar to exit [GoTo mode].

5.6.7 Record route mode

Press the “Enable route record mode” button of remote control to enable [Record route mode].



- After this mode is enabled, the ship controller can record the track of route.
- This mode can be enabled under [Manual mode], [Bow hold mode], [Heading hold mode] and [Cruise mode], all of which can be enabled with this mode.
- This mode is invalid under [Navigation mode], [GoTo mode] and [Anchoring mode].
- The longest distance of recorded route is 5km. When exceeding 5km, the remote control will save the recorded route automatically and quit [Record route mode]
- Press Exit of screen bottom menu bar to quit [Record route mode].

Save the recorded route

Enter [Record route mode], press the “Up” or “Down” button of remote control menu, switch the screen bottom menu bar to show completion on the left side, and show quit menu bar on the right side. Press [Menu left mapping] button to quit [Record route mode] and save the route to the remote control.

5.6.8 Anchoring shifting

After “Heading sensor” is connected, the anchor point can be shifted through push left, right push, push up and push down joystick of remote control under anchoring mode.

- Single push left: Move the anchor point to the left by 1m in comparison with heading sensor direction.
- Single push right: Move the anchor point to the right by 1m in comparison with heading sensor direction.
- Single push up: Move the anchor point to the front by 1m in comparison with heading sensor direction.
- Single push down: Move the anchor point to the back by 1m in comparison with heading sensor direction.

5.7 Remote control setting

5.7.1 Calibration

Calibrate the ship controller magnetometer and heading sensor magnetometer.

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the calibration menu, press the “Select left” button and select “Calibrate” to enter calibration page, the propeller starts calibration, and the interface shows calibration progress bar. After calibration is done, the page shows completion and jumps to setting list page.

5.7.2 Ship size

The ship size setting may cause different thrust of motor, to balance the thrust of ships with different sizes. Please confirm whether the ship size setting matches your ship;

otherwise, it may affect the accuracy of function mode

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the ship size menu, then press the “Select left” button to select “Ship size” and enter ship size setting page.
4. Press the “Up” or “Down” button to select the current ship size, then press the “Select left” to save the settings.

5.7.3 Measuring unit

When it is set as metric unit, the unit of remote control is m, km and kph; when it set as British unit, the unit of remote control is ft, nm and mph

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the measurement unit menu, press the “Select left” button, select “Measurement unit” to enter measurement menu setting page.
4. Press the “Up” or “Down” button to select “Metric unit” or “British unit”, then press the “Select left” and select “Save settings”.

5.7.4 Language

Set remote control language

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the language menu, press the “Select left” to select “Language” and enter language setting page.
4. Press the “Up” or “Down” button to select “English” or “Chinese”, then press the “Select left” to save the settings and change the language of remote control.

5.7.5 Backlight

Set backlight brightness

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search backlight menu, press the “Select left” to select “Backlight” and enter setting - backlight page.
4. Press the “Up” or “Down” button to select “Brightness” and enter brightness setting page.
5. Press the “Up” or “Down” button to select different brightness, then press the “Select left” to save the settings.

Set backlight on time

1. Enter setting - backlight page.
2. Press the “Up” or “Down” button to select “Backlight time”, enter backlight time setting page.
3. Press the “Up” or “Down” button to select the backlight lasting time, then press the “Select left” to save the settings.

5.7.6 Auto shutdown

Set the auto shutdown time of remote controller. Auto shutdown will be executed only when ship control system is not connected

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right side.
2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the auto shutdown menu, press the “Select left” button and select “Auto shutdown” to enter setting - auto shutdown page.
4. Press the “Up” or “Down” button to select auto shutdown time of idle remote control, then press the “Select left” button to save the settings.

5.7.7 Propeller revolving speed

Set display propeller as icon or propeller revolving speed

1. Press the “Up” or “Down” button of remote control on the homepage to switch the screen bottom menu, show the setting menu bar on the left side and show screen lock on the right

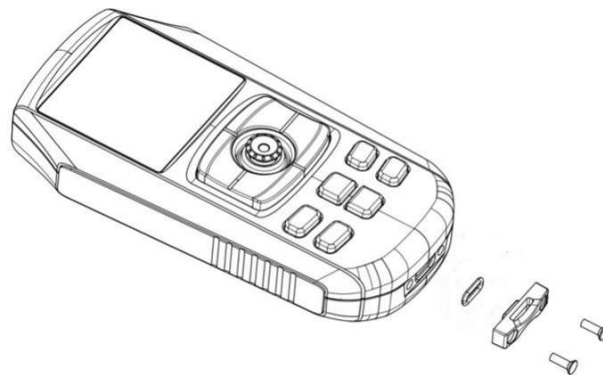
side.

2. Press the “Select left” button to enter the setting page.
3. Press the “Up” or “Down” button to search the auto shutdown menu, press the “Select left” and select “Propeller revolving speed” to enter setting - propeller revolving speed page.
4. Press the “Up” or “Down” button to select the display style of propeller revolving speed, then press the “Select left” to save the settings.

5.8 Remote control charging

Remove the cover of the charging port at the bottom of the remote control for charging. Please use a device with Type-C charging port, charging voltage of 5V and current of 1A for charging the remote control.

 After charging is done, lock the cover of charging port and ensure that the seal ring is on the cover.



6 Fault Code and Prompt

6.1 Unit indicator and buzzer

Prompt tone mode	Unit indicator	Description
NA	Green indicator in slow flickering	Remote control is not connected.
	Red indicator in slow flickering	Ship control panel tilt is over 80°, please lay it flat.
	White indicator in slow flickering	Spring wire is broken or socket is loose.
One beep	NA	Motor level up/down (motor is powered on).
		Power on/off motor.
		Enable or disable anchoring, navigation, cruise, bow/heading hold, record route mode.
One beep	Red indicator in slow flickering	Unit failure, refer to “Fault Codes”
Three beeps	Green indicator in fast flickering	Remote control pairing in progress.
Five beeps	NA	Remote control pairing succeeds.
Two continuous beeps	Yellow indicator in slow flickering	Too low working voltage For 12V model, voltage should be >10V. For 24V model, voltage should be >17V.
		When the temperature inside the drive is too high, please power off the motor, and ensure that the surroundings of drive are

		clear and normally ventilated.
Two continuous beeps	Yellow indicator in fast flickering	Please remove the foreign matters which are wrapped around the propeller of motor.
Three continuous beeps	Yellow indicator in fast flickering	Too high working voltage. For 12V model, voltage should be < 18V. For 24V model, voltage should be < 32V.
		Spring wire is blocked, please untangle it.
		Unit current exceeds the threshold; check if the propeller is blocked.

6.2 Heading sensor indicator

Indicator	Description
Green indicator in slow flickering	Normal lighting
Green indicator in fast flickering	Excessive tilting angle
Red indicator in slow flickering	Communication disconnected
Red indicator in fast flickering	Sensor error

6.3 Remote control fault prompt

Fault prompt	Description
Too high power voltage	Too high working voltage. For 12V model, voltage should be < 18V. For 24V model, voltage should be < 32V.
Too low power voltage	Too low working voltage. For 12V model, voltage should be >10V.

	For 24V model, voltage should be >17V.
Too high unit current	Please remove the foreign matters which are wrapped around the propeller of motor.
Steering motor error	Spring wire is blocked, please untangle it.
Too high drive temperature	Drive internal temperature is too high, please power off the motor, and ensure that the surroundings of drive are clear and ventilation is normal.
Motor error	Unit current exceeds the threshold, please confirm whether propeller is blocked.
Ship control gyroscope error	Use remote control to recalibrate the accelerometer.
Ship control accelerometer error	Keep away from magnetic object.
Magnetic field has major changes.	Keep away from magnetic object.
Too high magnetic field interference	Keep away from magnetic object.
Magnetometer timeout	Ship control sensor error, repairing is required.
GPS module error	GPS module has error, try to restart the unit.
System power supply error	Ship control power supply error, repairing is required.
Sensor error	Ship control sensor error, repairing is required.

7 Maintenance

7.1 Routine maintenance

Proper maintenance helps extend the service life of TM120B. Please maintain TM120B in accordance with the following regulations.

- Disconnect the battery when TM120B is not in use.
- Store TM120B on deck when not in use.
- Rinse the unit's surface with fresh water after use in a saltwater environment.
- Check whether the base mounting screws are loose.
- Inspect the propeller for scratches, fractures, entanglement, etc.
- Check the wiring harness for any damage to the insulation, breakage, and similar issues.

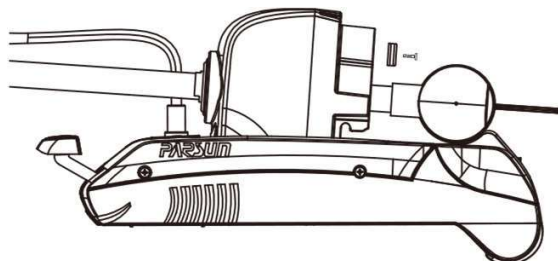
7.2 Maintenance schedule

Item	Interval	Operation
Terminal	Once a week	Check the wire harness electronics for corrosion or dirt.
Spring wire	Every 6 months	Visually inspect for any damage or breakage.
Anode	Every 6 months	Check if the anode has failed.

7.3 Anode replacement

TM120B is equipped with two anodes. One is located on the propeller; for replacement, refer to “Propeller Installation.”

The other anode is positioned beneath the steering device; please replace it by referring to the diagram below.



8 Warranty

8.1 Limited Warranty

Suzhou Parsun Power Technology Co., Ltd. (hereinafter referred to as "Parsun Power") promises that, provided the product is correctly installed, routinely maintained, and used normally, it will be free from defects in materials and workmanship for twenty-four months from the date of delivery to the end customer. This warranty is only provided to the first end customer of Parsun Power products. During this period, the customer has the right to request free repair or replacement of defective or non-compliant parts; i.e., "Limited Warranty Period".

During the warranty period, Parsun Power bears the repair costs directly caused by the product issues and other related expenses (such as costs related to product installation, disassembly, transportation, financing, leasing, etc.) only. Any expenses unrelated to or exceeding the scope of the limited warranty will be borne by the customer. After the warranty period expires, customer can still enjoy repair services provided by Parsun Power and its authorized dealers/distributors (hereinafter referred to as "Parsun Power Service Partners") by charging the lowest repairing fees.

In addition to the warranty services herein, customers may have statutory rights under the applicable laws of their jurisdiction. The contents specified in the warranty provisions do not affect such statutory rights. Besides the rights granted under the warranty services, customers also have the warranty claim rights pursuant to the purchase contract that they conclude with Parsun Power Service Partners.

The warranty provisions herein do not apply to the products used for commercial or professional purposes (such as the scenarios with a high frequency of use, requiring high reliability or for profitable purpose, even if the machine is such used temporarily). The legal warranty provisions within the local judicial region shall prevail. You are recommended to consult the Parsun Power Service Partners to learn the warranty policies and relevant suggestions before using TM120B for such purpose.

To ensure that your warranty application can be resolved in a timely manner, please learn and

comply with the following guidelines:

- Any warranty claim should be submitted within six (6) months from the date the issue is discovered. Failure to submit the claim within six months will be deemed a waiver of the warranty, and no warranty service will be provided.
- Keep TM120B's label intact and record the S/N on its label. Do not remove TM120B's label. The warranty service does not apply to the products with no original product label.
- This limited warranty is non-transferable and applies only to the original end customer.

8.2 Exceptions

- The warranty service ceases to apply in any of the following circumstances:
- Improper operation that does not comply with the instructions specified in the user manual.
- Problems caused by accidents, misuse, dropping, falling, improper maintenance or storage, intentional damage, physical damage, overcharging, over-discharging, or unauthorized repairs.
- Water ingress caused by external factors such as fishing nets or prolonged underwater immersion.
- Unauthorized modification, alteration, disassembly, or installation of additional parts (accessories) on the product.
- Damage caused by the fault of any third-party product or any third-party product.
- Consumables are beyond the warranty scope (e.g., propellers, anodes, etc.).
- Products purchased from unauthorized dealers or sellers.
- Normal wear and routine maintenance are not covered by the warranty.
- Further damage occurring during transportation due to improper packaging (beyond the scope of the warranty).
- Lithium batteries are classified as Class 9 hazardous goods under the United Nations. Their shipment and packaging must comply with the relevant regulations of the local country. Non-compliance may result in the failure in enjoying the warranty services.

8.3 Process for applying for warranty (claim)

Customers shall apply for warranty (claim) as per the warranty (claim) procedure.

1. Contact the Parsun Power Service Partners near you. If the relevant faults fall under the

warranty scope of Parsun or Parsun Power Service Partners, they will provide further guidance for you.

2. You need to provide and submit the purchase proofs (such as receipt, invoice; product information and purchase date must be included in the proofs), the warranty card, factory serial number together with the faulty product to the Service Partners. Please make sure that all the labels remain intact. The warranty will only be valid if the above information is accurate, authentic, and complete.
3. Ensure that the product is properly packaged during transportation; it is highly recommended to use the original packaging.
4. The Parsun Power Service Partners will diagnose and inspect the faulty product to verify the validity of the warranty claim.
5. If your warranty claim is approved, the product or the defective components/parts will be repaired or replaced free of charge. Please be noted that all shipping costs incurred during this process will be borne by you.
6. If your warranty claim is denied, the Service Partners will estimate the repair/replacement costs and round-trip shipping fees and send the list of estimated costs to you for confirmation. The Parsun Power Service Partners will not take the following actions until receiving your written approval.

Special notice:

These warranty policies are subject to changes time to time. We will inform our service partners immediately in case of any change. Where necessary, please consult our sales and after-sales person, or local service partners in advance. Thank you!