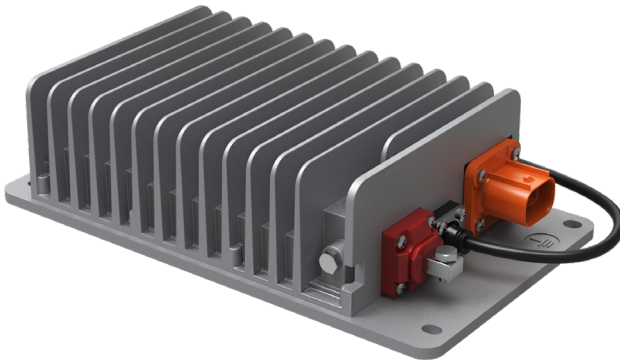


DCDC 96V-12V 1 kW

User Manual



2023.06 Version 1.0

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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, electric inboards, sup/kayak motors, reliable lithium batteries and accessories.

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

Using This Manual

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

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

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

ePropulsion considers safety of great importance and recommends that anyone that comes into close contact with its products, such as those who install, operate, maintain or service ePropulsion products, exercise care, common sense and comply with the safety information in this manual and on the machine's safety decals.

The following are the relevant information marks in the user manual or the product labels:

Hazardous or warning signs indicate a potentially hazardous or hazardous situation which, if not avoided, will result in death or serious injury. Special attention and attention should be paid to the safety of you or the products involved.



Important warning:

Tips or important informations help quickly grasp the use of the inboard motor and improve efficiency.

Please read and follow the instructions following the safety warning signs.



Caution:

When installing, operating, maintaining or serving ePropulsion products, there are many safety risks in the process. You need to be alert, perform relevant operations reasonably, and pay attention to safety. when installing, operating, maintaining or serving ePropulsion products, there are many safety risks in the process. You need to be alert, perform relevant operations reasonably, and pay attention to safety.



Electric shock hazard:

The areas or equipment may be at risk of electric shock. The equipment uses 102.4V DC power. When operating electricity-related electrical connectors, switches, cables and other electricity-related items, power off operation to prevent electric shock.



Burn hazard:

Some of the machine surfaces become very hot during operation and shortly after shutdown. Keep hands and other body parts away from hot machine surfaces.



Do not plug or unplug when the machine is running:

Do not plug or unplug electrical equipment when the machine is running to avoid the risk of electric shock.

Product Identification

Serial Number is an important document for product warranty or other after-sales services. The product serial number label of the TDC-IY-108-12 DCDC is located in the position shown in the figure below, please find this label on the product and record the Serial Number shown. Do not tear off the label, otherwise the product warranty will be void.

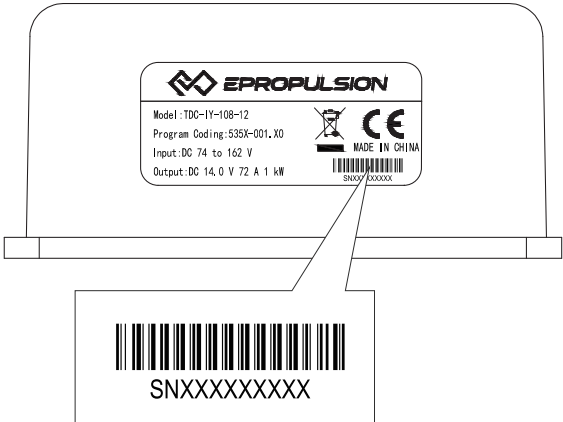


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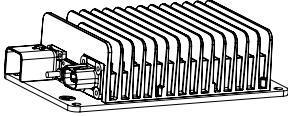
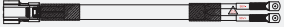
1 Product Overview


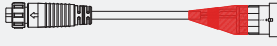
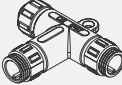

TDC-IY-108-12 series DCDC converter can be installed on electric boats , providing 12V low-voltage DC power supply for boats to supply low-voltage equipment. The output end can be connected to a 12V backup battery, and the DC/DC converter automatically manages the charge of the backup battery. This product not only has the advantages of high efficiency, small size, high stability, long life, etc., but also has the characteristics of high protection level, high reliability, and complete protection functions. It is an ideal power source for charging electric boats. The product has built-in thermal induction device, overheating protection function, and automatic recovery. The fully sealed process, with a protection rating of up to IP67, can ensure that it can work in any complex environment without causing failure.

| | | |
|----------------------|---|---|
| Main features | fully sealed process, natural convection heat dissipation | can work reliably at -40°C - + 60°C |
| | Built-in temperature sensor | output shutdown overheating conditions (internal 90°C) |
| | Protection class IP67 | It can work safely after short-term immersion without power |

1.1 In the Package

When you receive the product, unpack its package and check if all the items below are included in the package. If there is any loss or transport damage, please contact your dealer immediately.

| Product name | Number | Icon | Function description |
|---|--------|---|--|
| 96V/12V DCDC | 1 |  | It is used to supply power to 12V low voltage equipment of boats and charge 12V batteries. |
| DCDC (TDC-IY-108-12) _input power cable | 1 |  | 5M |

| Product name | Number | Icon | Function description |
|--|--------|---|---|
| DCDC output cable | 1 |  | 1.5M |
| DCDC (TDC-IY-108-12) _CAN communication cable | 1 |  | 5M |
| hexagon bolt | 1 | SS304 M6x14 | Fixed DCDC method 1, after punching, directly use the bolt nut to fix |
| Hexagon nut | 1 | SS316 M6 | / |
| Cross recessed countersunk head tapping screws | 1 | SS304 M6X16 | Fixed DCDC Method 2: Directly use self-tapping bolts to fix |
| 3-way T-connector | 1 |  | Connect the DCDC to the motor's CAN communication network |
| User Manual | 1 |  | / |

1.2 Basic functions

1. DC/DC can convert 96V DC power to 12V DC
2. DC/DC can charge the 12V backup battery
3. With input high voltage interlock function
4. Comply with CAN 2.0B communication specification, bus display working status, fault code, etc
5. Through CAN bus, display working status, remote operation diagnosis, modify working parameters, programming and other functions can be realized
6. Protection functions include input reverse connection protection, input low voltage, overvoltage protection, output overvoltage, overcurrent, short circuit protection, over temperature protection, etc
7. Input precharge function
8. Sealed waterproof structure, natural convection cooling

2 DCDC Converter Technical Indicators

2.1 Input parameter

| | |
|--------------------------------------|------------------|
| Rated voltage | DC108V / DC96V |
| Rated current | 10A / 11A |
| Maximum current | ≤18A |
| Input voltage range | 74-162V |
| Input low voltage protection setting | 70V±2V |
| Input overvoltage protection setting | 162±4V |
| Start-up time | ≈0.5S @ VIN=108V |

2.2 Output parameter

| | |
|--|---------------------|
| Rated output voltage | 14.0V±1% |
| Output voltage range | 8.0-15V |
| Rated output current | 72A |
| Peak current | 88±2A |
| Rated power | 1000W |
| Peak power | 1200W for 6 minutes |
| Maximum efficiency | ≥93% |
| Instantaneous response of output voltage | ≤50ms |
| Voltage regulation rate | 1% |
| Load regulation | 1% |
| Voltage stabilization accuracy | ≤1% |
| Steady current accuracy | ≤2% |
| Output leakage current | ≤1mA |
| Output ripple | ≤276mV @ 12V |

2.3 Communication

| | |
|------------------------|---------|
| Communication protocol | CAN2.0B |
| Baud rate | 250K |
| Terminal resistance | No |

2.4 Protection function

| | |
|--------------------------------|---|
| Overcurrent protection | Maximum current * 110% |
| Output overvoltage protection | 16-17V @ 12V |
| Output undervoltage protection | 5-6V @ 12V |
| Over temperature protection | Internal temperature 85 degrees starts to reduce power, 90 degrees protection shutdown, self-recovery |
| Input undervoltage protection | Yes, self-recovery |
| Input overvoltage protection | Yes, self-recovery |
| Short circuit protection | Yes, self-recovery |

2.5 Safety and other

| | |
|--------------------------|---|
| Withstand voltage | Input to ground: 2000VAC \leq 10mA 1min |
| Grounding resistance | The resistance between the ground point and the heat sink is less than 100 milliohms, and the test current is 25A AC. |
| Insulation resistance | Input to enclosure \geq 20M Ω , test voltage 1000VDC |
| Starting impulse current | \leq 3A |
| Current rise time | \leq 5S, overshoot \leq 5% |
| Close response time | 100% to 10% \leq 50mS, 100% to 0% \leq 200mS |

| | |
|----------------------|--|
| Protection class | IP67 |
| Vibration resistance | 10-25Hz Amplitude 1.2mm, 25-500Hz 30m/s ² , 8 hours in each direction |
| Noise | ≤ 60dB (Class A) |
| MTBF | 150000H |
| Working environment | Relative temperature 5% -95% no condensation |
| Working temperature | -40 ~ 60°C |
| Storage temperature | -40°C ~ +105°C |

2.6 Declaration of Conformity

Object of the Declaration:

Product: DCDC 96V-12V 1kW



Model: TDC-IY-108-12

We Guangdong ePropulsion Technology Co., Ltd., hereby, declares that this equipment is in compliance with the applicable Directives and European Norms, and amendments. The full text of the EU declaration of conformity is available at the following internet address: <http://yachter123.com/sy>

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

Electromagnetic Compatibility Directive 2014/30/EU

Low Voltage Directive 2014/35/EU

Applied Standards:

EN IEC 62368-1:2020+AC:2020-05

EN IEC 61000-3-2:2019+A1:2021

EN 61000-3-3:2013+A2:2021+AC:2022-01

EN 55032:2015+A11:2020; EN 55035:2017+A11:2020

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.

Manufacturer

Name: Guangdong ePropulsion Technology Limited

Address: Room 801, Building 1, 11 Daxue Road, Songshan Lake, Dongguan, Guangdong Province, China

Signature: 

Date: 2nd of June, 2023

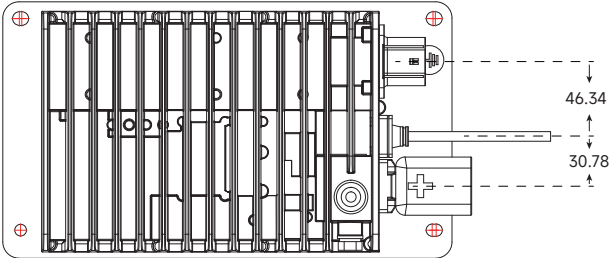
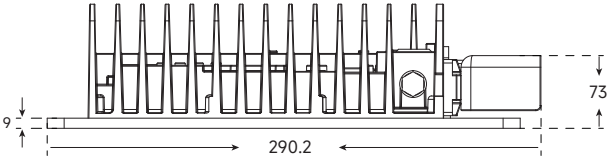
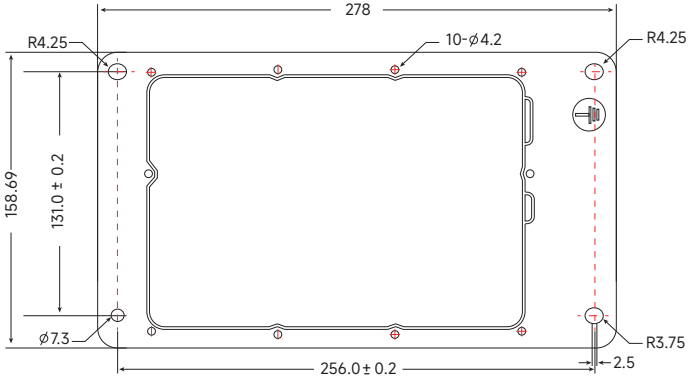
Shizheng Tao, Chief Executive Officer & Cofounder of
Guangdong ePropulsion Technology Limited

3 Protection function

| | |
|--|---|
| Overcurrent protection | Output current exceeds peak current to stop output |
| Output overvoltage protection | See technical parameter |
| Output undervoltage protection | After the output voltage is lower than 6V, the output low voltage fault is reported after 2 seconds of delay, and the output current is reduced to 30A |
| Over-temperature protection | Internal 85°C start power drop, 90°C shutdown |
| Input undervoltage protection | When the input voltage is lower than the undervoltage point for more than 1 minute, the output is turned off, and the output is restored two minutes after the fault is eliminated |
| Input overvoltage protection | The input voltage exceeds the overvoltage point, the output is turned off, and the output is restored after the fault is eliminated |
| Short circuit protection | After the output voltage is lower than 6V delay for 10 seconds, the current drops to a quarter of the rated current ; the short circuit elimination voltage returns to normal work when it rises above 6V |
| Input anti-reverse connection protection | Not working, not damaged, restored after normal wiring |
| HVIL High Voltage Interlock | DC-DC stops working when the input plug-in not inserted in place |
| Communication protection | CAN communication is invalid for more than 5 seconds, automatically stops working (optional) |

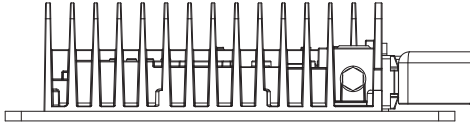
4 Mechanical installation

4.1 Installation dimension drawing (unit: mm)

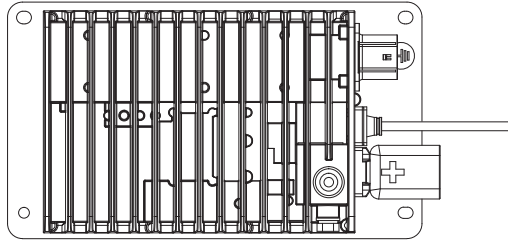


4.2 Installation method

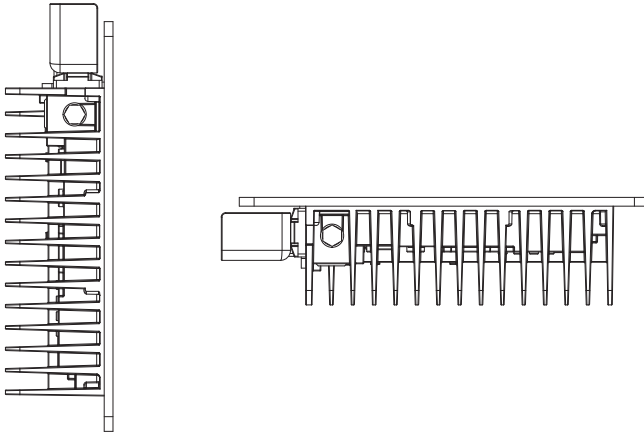
Best installation method:



General installation method:



Prohibited installation method:



Torque shall be 6 N.m when using self tapping bolts fixed the DCDC on the hull.



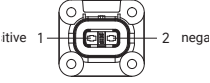
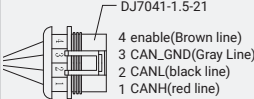

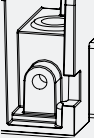
Torque shall be 7.7 N.m when using bolts and nuts fixed the DCDC on the hull.

4.3 Installation requirements

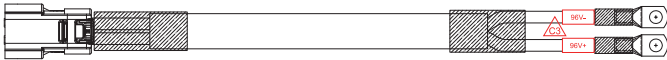
1. The radiator of the natural cooling DC/DC is preferably up, and it is forbidden to go down. There should be a distance of more than 10cm between the radiator and the obstruction
2. Natural cooling DC/DC should not be installed in a relatively closed space, and there should be free air exchange with the external space to prevent overheating
3. Output positive terminal M8 stud, torque force is 14-16N.m
4. The output negative terminal uses an external hexagon M8 flange stud, and the torque force is 14-16N.m

5 Harness connection

5.1 Interface definition

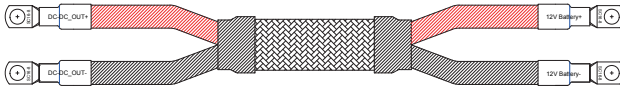
| Port name | Terminal definition | Connector model | Mating connector model | Icon |
|--------------------|---|-----------------|------------------------|---|
| Input connector | 1-DC +, 2-DC-, 3,4-HVIL (High Voltage Interlock) | TE 2103124-4 | TE 2103177-4 |  |
| Signal connector | 1-CANL, 2-CANH, 3-CANGND, (not used) 4-EN (not used) | / | / |  <p>DJ7041-1.5-21</p> <ul style="list-style-type: none"> 4 enable(Brown line) 3 CAN_GND(Gray Line) 2 CANL(black line) 1 CANH(red line) |
| DC output positive | M8 bolt hole | / | / |  |
| DC output negative | M8 threaded hole | / | / |  |

5.2 Input cable



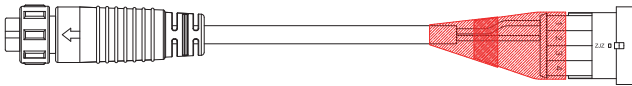
The input cable input end is used to connect the bus-bar provided by ePropulsion company. The length is approx. 5 meters. Please be careful not to reverse the positive and negative terminals.

5.3 Output cable



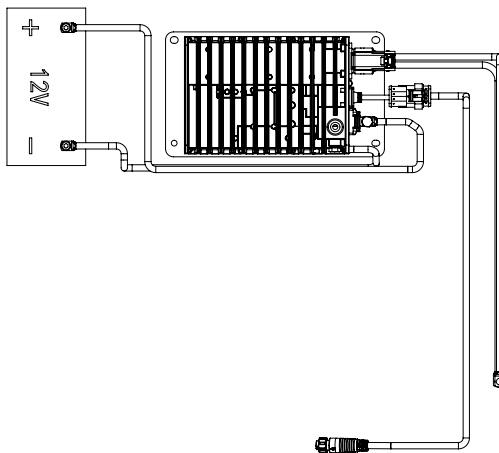
The output cable is used to connect the DCDC to the customer's 12V system (including the battery) and is approx. 1.5 meters. Please be careful not to reverse the positive and negative terminals.

5.4 Signal cable



The signal cable is used to connect the propulsion e-motor CAN network and has a length of about 5 meters.

5.5 After the cable is connected, the DCDC would as follows



6 Notes

1. The equipment of this equipment is metal. Please pay attention to reliable grounding during installation, and the resistance between the casing and the ground shall not be greater than 1 ohm.
2. The connection of the battery terminals must be reliable and must not be loose, otherwise it may cause damage to the DC-DC.
3. If you need to connect multiple DCDCs in the same CAN network, you need to check the Program Coding on the DCDC label to ensure that the last two digits of the Program Coding of each DCDC are different, support up to 4 DCDCs working on the same CAN network.
4. The output capacity of the DCDC is 1kW, the maximum output power can be adjusted through CAN communication, and the maximum output power is set at 500W by default. The maximum output power can be adjusted by Smart Display.
5. The DCDC body is IP67 rated, the 12V cable is connected to the enclosure. Please install the DCDC in a sheltered place such as the engine room, and do not install it in the weather area.

7 Warranty

Guangdong ePropulsion Technology Co., Ltd. (“ePropulsion”), China, warrants its products to be free of defects in material and workmanship under normal usage with proper installation and routine maintenance for a period of twenty-four (24) months from date of delivery of products to end customers (the “Limited Warranty Period”), the I series motor and G battery will have another extend 36 months warranty period after registration on the official website. The Limited Warranty is provided to the first end customer of ePropulsion products ONLY. The Customer is entitled to free repair or replacement of defective or non-conform parts. Any warranty claim must be made within six (6) months of discovery of issues as provided below.

If the Limited Warranty Period expires, you can still enjoy maintenance services from dealers/distributors authorized by ePropulsion (the “ePropulsion Service Partners”) with minimum maintenance charge per occurrence.




In all warranty cases, ePropulsion will only bear the repair cost and other costs (such as those related to product installation, disassemble, transportation, financing, rental, etc.) as a direct result for issues covered by the Limited Warranty only. Any costs irrelevant to or out of the scope of the Limited Warranty will be born by the Customer alone., which shall NOT include costs irrelevant such as those related to product installation, disassemble, transportation, financing, rental, etc.

Beyond the Limited Warranty, the Customer may have statutory rights in your jurisdiction according to applicable laws. Nothing in this Limited Warranty affects such rights. The Customer may have warranty claim rights arising from the purchase contract with ePropulsion Service Partners in addition to the rights granted by this Limited Warranty.

Products for commercial/professional use, even if only temporarily, are not covered by the Limited Warranty. Instead, the statutory warranty in your jurisdiction shall apply. You are encouraged to consult with ePropulsion Service Partners for applicable warranty and advice before engaging in such use.

*** Commercial/professional Use refers to application cases that have high use frequency, high-reliability requirement or aim for money making, etc.**

To keep your warranty valid, you shall follow:

-  Keep the product label intact and record the Serial Number shown on the label. Never tear the label off the product. A product without the original product label is not covered by the Limited Warranty provided by ePropulsion;
-  The Limited Warranty is not transferable and will not be reissued;
-  The Limited Warranty may change from time to time. Pls visit our website (<http://www.epropulsion.com>) for the latest version.

Capacity guarantee for high-voltage batteries

A guarantee of the capacity of the high-voltage batteries, in addition to the standard guarantee. Depending on the long-term average temperature and the usage profile, this guarantee runs for a period of up to 5 years.

Comment on average temperature:

The average temperature is calculated using the Arrhenius equation; this means that higher temperatures are given a greater weighting.

7.1 Out of Warranty

ePropulsion may refuse a warranty claim if:

- Any improper operation contradicts what is written in the user manual;
- Accident, misuse, dropping, improper care or storage, willful abuse, physical damage, overcharging, over discharging, or unauthorized repair;
- Water ingress caused by external sources such as fishing nets, submerging underwater, etc;
- Product modification, alternation, disassembly, or parts/accessories attachment, which are not expressly permitted or recommended by ePropulsion;
- Failure of, or damage caused by, any 3rd party products;
- Repositioning of the high-voltage batteries in the boat;
- The battery incorrectly charging, overcharging, over-discharging, operating in temp out of scope described in the user manual;
- Consumables are out of warranty scope (like propeller, anode...etc.);
- Purchases of product from unauthorized dealers or seller;
- Normal wear and tear and routine servicing are excluded from the warranty;

- The product gets further damaged due to improper packing during delivery. The further damaged part will be deemed as out of warranty coverage;
- Lithium battery is classified as a UN9 hazardous item, posting and packing must be in accordance with the relevant law of the local country directive. Non-compliance may result in out of warranty coverage.

7.2 Limited Warranty Claim Procedures

The Customer shall follow the warranty claim process to make a Limited Warranty claim:

1. Contact your nearest ePropulsion Service Partners and they will provide further instruction to you if such defects are covered by the Limited Warranty or theirs.
2. Send the defective product to them together with Proof of 1(st)-time Purchase (e.g., receipt, invoice, etc., with information of product purchased and date of purchase), the Confirmation of Online Warranty Registration, ex-factory Serial Number, etc. Note that all labels shall be kept intact. The warranty is valid only when the information above is correct, genuine, and complete;
3. Make sure the product is properly packed during delivery, the original package is highly recommended.
4. The ePropulsion Service Partners will conduct diagnosis and examination on the defective products to check the validity of the warranty claim.
5. If your warranty claim is accepted, the Product or its defective components/parts will be either repaired or replaced free of charge. Note that any delivery cost incurred in the process shall be bearded by you.
6. In case your warranty claim be rejected, a repair/replace cost and fee with round trip delivery cost will be estimated and sent to you for confirmation. ePropulsion Service Partners will only begin the work after your written confirmation.

WARRANTY CARD

(*In order to validate warranty, please fill in this form first and read the Warranty Policies.)

|| OWNER INFO. ||

| | | | |
|------------|--|-------|--|
| Owner Name | | | |
| Address | | | |
| Phone | | Email | |

|| DEALER INFO. ||

| | | | |
|------------|--|-------|--|
| Store Name | | | |
| Address | | | |
| Phone | | Email | |

|| PRODUCT INFO. ||

| | |
|-------------------------------|--|
| Date of Purchase (mm/dd/yyyy) | |
| Serial No. | |

Thanks for reading this user manual.

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

Guangdong ePropulsion Technology Limited

Webseite: www.epropulsion.com

E-Mail: service@epropulsion.com