

eSSA EMS controller / Pre-Charge Unit User Manual



2025.05 Version 1.0

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THANK YOU

Thank you for purchasing a product from ePropulsion, the world leaders in clean, safe, and reliable electric marine propulsion systems and energy solutions. We are confident that you will be satisfied with your new device and welcome your feedback at www.epropulsion.com.

Conditions of Use

Before using this product, please read this user manual carefully to ensure you understand how to operate it correctly and safely. Do not use the electric energy product until you comprehend its operation. By using this product, you confirm that you have fully read, understood, and agreed to all contents of this manual. Avoid lending the product to anyone unfamiliar with its use.

ePropulsion is not liable for any economic loss or personal injury resulting from non-compliance with the instructions provided in this manual.

Please note that ePropulsion has a policy of continuous product optimisation, and reserves the right to update the contents of this manual at any time. Please visit www.epropulsion.com to obtain the latest version. If you find any discrepancies between your product and this manual or have any questions about the product or this manual, please visit the website www.epropulsion.com or contact us. ePropulsion reserves the right to make the final interpretation of this manual.

This manual is available in multiple languages, and in the event of any discrepancies between different language versions, the English version shall prevail.

ePropulsion also retains all relevant intellectual property and industrial rights, including copyrights, patents, trademarks, and designs.

Safety Warning

ePropulsion attaches great importance to safety and reducing risk to individuals and property. We advise any person who comes into close contact with our products to exercise caution, use common sense, follow the instructions in this manual, and pay particular attention to the safety information in the manual and on product labels. Such persons include those who install, operate, maintain and service the product.

The following information symbols are found in the user manual and/or on labels attached to the product:

Danger or Warning Signs:

These signs indicate potential hazards or significant risks that, if not avoided, could result in death or serious personal injury. Extra caution and attention should be exercised regarding your

safety or the safety of the product.



Important warning:

Tips or important points of information that help quickly grasp the use of the outboard motor and improve efficiency. Please read and follow the instructions following the safety warning signs.



Caution:

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



Electric shock hazard:

These areas or components may pose a risk of electric shock. The equipment uses 102.4V DC power. When accessing or opening electrical connectors, switches, cables and other electricity-related items, turn off the power to prevent electric shock.



Burn hazard:

Some parts of the outboard become very hot during operation and may remain hot when turned off. Keep hands and other body parts away from these areas.



Do not connect or disconnect when the outboard is running:

These parts of the outboard may pose a risk of electric shock if connected to or disconnected from the power supply during operation.

Product Serial Number

The serial number is located as shown below. Please take note of it and keep it in a safe place, as it may be required when purchasing accessories or if you need service or warranty.

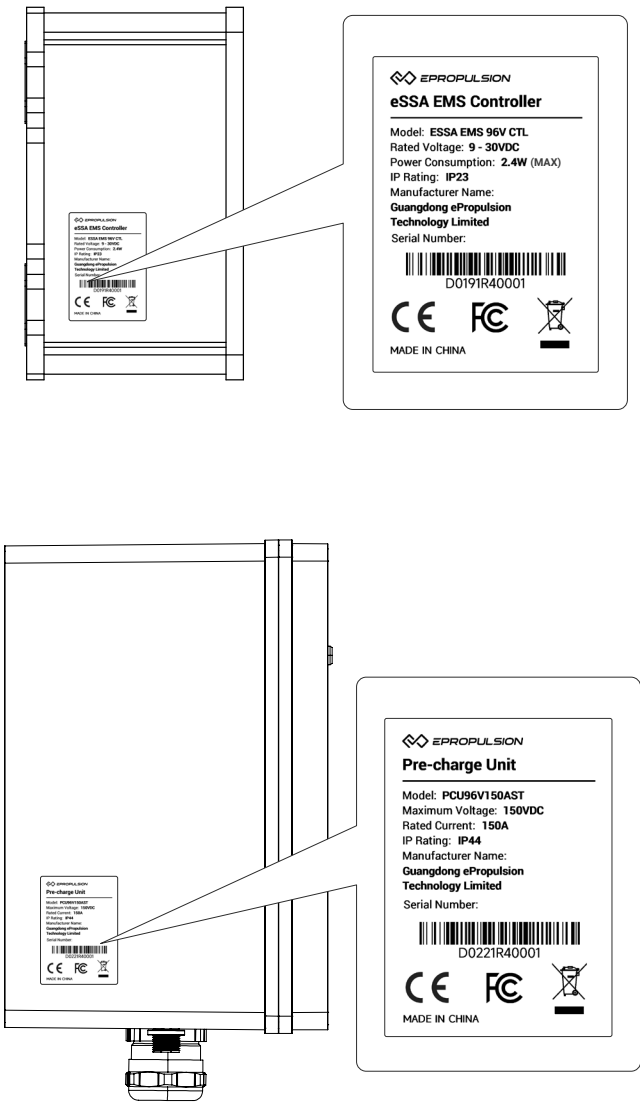


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1 Product Introduction

eSSA EMS controller

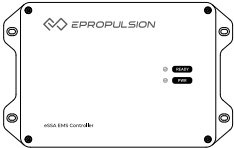
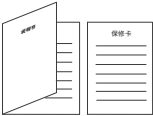
The eSSA EMS Controller is a device that manages energy input and output from the ePropulsion system, intelligently regulating the flow of energy and limiting the power generated or consumed. It is equipped with multiple communication interfaces and both digital and analog input/output modules to interact with various in-house and external energy devices. This controller enables real-time monitoring, control, and management of the overall system.

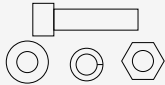
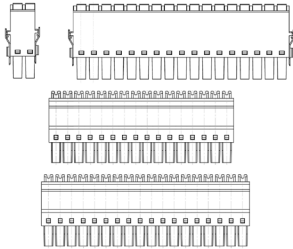

Pre-Charge Unit

The Pre-Charge Unit is designed to safely connect and disconnect high voltage connections with multiple devices. High voltage connections with several devices exhibit significant capacitance within their bus. To connect and disconnect safely without generating excessive voltage spikes, the unit charges the capacitors using a relay and resistor connected in series, with a variable time delay. These components form the essential building blocks and functionality of the pre-charge unit.

1.1 In the Package

eSSA EMS controller

Items	Qty.	Figure
eSSA EMS controller	1	
Silica Gel Desiccant	1	/
User Manual	1	

Items	Qty.	Figure
Hex Socket Round Head Screw M4×16	6	
Plain Washer M4x8x1	6	
Spring Washer M4	6	
Hex Nut M4	6	
Socket Connector, LC8M-3.81-16P-1Y-00A	2	
Socket Connector, LC8-2.54-16P-1Y-00F	2	
Socket Connector, LC8-2.54-18P-1Y-00F	2	
Socket Connector, LC8M-3.81-2P-1Y-00A	2	
Cable crimp terminal, Max 0.35mm ²	36	
Cable crimp terminal, Max 1.5mm ²	20	

Pre-Charge Unit

Items	Qty.	Figure
Pre-Charge Unit 96VDC 150A	1	
Silica Gel Desiccant	1	/
User Manual	1	/
Phillip Combination Screw M4×25	6	
Plain Washer M4×9×0.8	6	
Hex Nut M4	6	
Cable lug SC25-8	3	
Heat shrinkable sleeve (red)	1	
Heat-shrink tubing (black)	1	

1.2 Specification

eSSA EMS controller

Content	Parameters
Operating Voltage Range	9-30V
Power Consumption	2.4W(MAX)
Protection Rating	IP23
Dimensions	175*130*65mm
Weight	1.3Kg
Certifications	CE、FCC

Pre-Charge Unit

Content	Parameters
Rated Voltage	102.4V
Rated Current	150A
Pre-charge Resistance	20Ω
Shell Material	ABS
Protection Rating	IP44
Dimensions	150*200*100mm
Weight	1.8Kg
Certifications	CE、FCC

1.3 Declaration of Conformity

We Guangdong ePropulsion Technology Limited, hereby, declare that this equipment is in compliance with the applicable Directives and European Norms, and amendments.

Object of the Declaration:

Product: eSSA EMS controller

Model: ESSA EMS 96V CTL

Product: Pre-Charge Unit
Model: PCU96V150A

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

Electromagnetic Compatibility (EMC) Directive 2014/30/EU
Restriction of Hazardous Substances Directive 2011/65/EU and
Delegated Directive (EU) 2015/863
Regulation on General Product Safety 2023/988
EC REACH Regulation (EC 1907/2006)
Low Voltage Directive 2014/35/EU



Applied Standards:

EN IEC 61000-6-2:2019
EN IEC 61000-6-3:2021
IEC 61439-1:2020

FCC Compliance Statement:

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: 

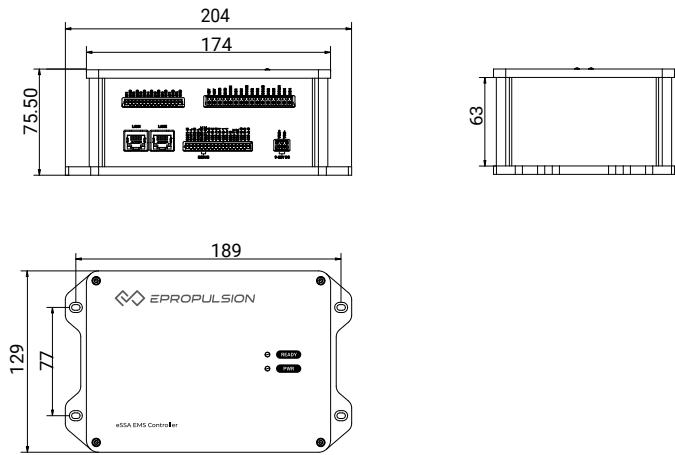
Date: 2nd of June, 2025

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

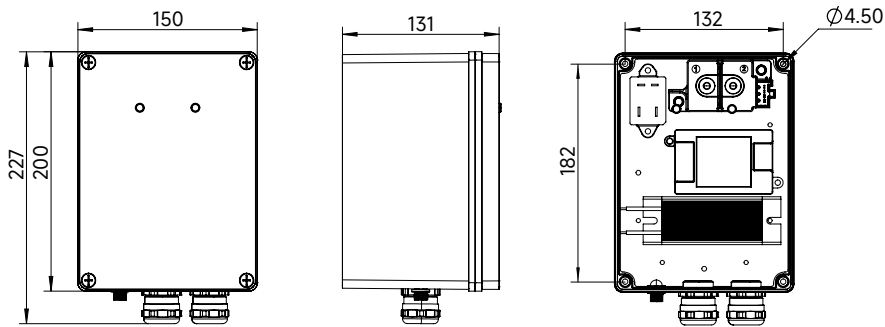
2 Product Wiring & Installation

2.1 Dimensions

1. eSSA EMS Controller:



2. Pre-Charge Unit:



2.2.2 Installation Requirements

Tools Required:

1. M4 Hex Socket Wrench
2. Wire Stripper
3. Crimping Tool
4. Torque Wrench

Materials Required:

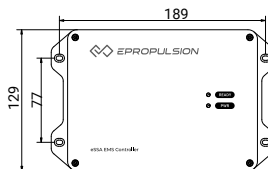
1. eSSA EMS Controller (includes 4 socket connectors, 4 screws, 4 plain washers, 4 spring washers, 4 hex nuts).

Installation Instructions



Requirements:

The product must be mounted on a vertical wall plane with sufficient structural strength to support the unit (weight: 2 kg). Reserve 10 cm of clearance below the product as shown.

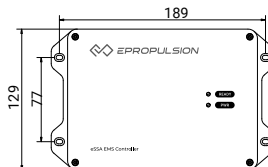


Protection rating:

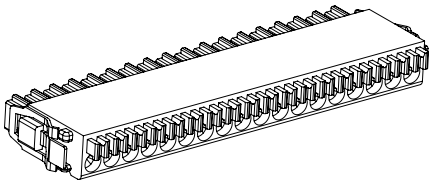
IP23. Install in a dry, clean compartment with minimal water splash risk.

Installation Steps:

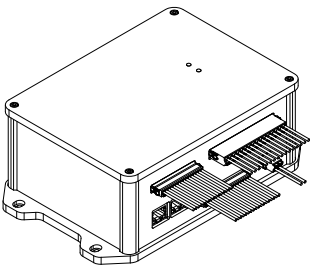
1. Cable Preparation: Strip 1 cm of insulation using a wire stripper to expose the conductor, then crimp with a terminal.
2. Unpack the Product: Remove the eSSA EMS Controller, screws, plain washers, spring washers, and hex nuts from the packaging.
3. Fixing: Drill holes at designated positions (see diagram). Secure the product using M4×16 screws, spring washers, plain washers, and hex nuts. Tighten with a torque wrench to 1.5 N·m.



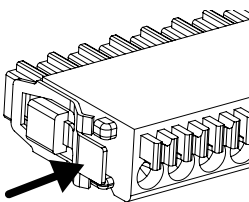
4. Wiring: Press the orange spring on the socket connector, insert the prepared cables (according to system requirements), and connect them to the socket.



5. Connector Installation: Align the socket connector with the product's base interface and ensure full insertion.



6. Connector Removal: Press the metal clips on both sides to detach the socket connector.

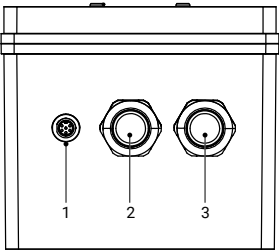


Post-Installation Checks:

- 1. Before power-on, confirm that the wires are securely connected to the socket connectors.
- 2. Before power-on, ensure that the socket connectors are firmly attached to the product base.
- 3. After power-on, check if the READY indicator turns on.

2.3 Pre-Charge Unit Interface Diagram & Installation Requirements

2.3.1 Interface Diagram



Port 1: RS485 communication cable (use ePropulsion cables).

Port 2/3: Power cable positive input/output (25mm² cable, outer diameter 13–18 mm).

Interface	Label	Purpose	Connection Method	Pin Definition	Wire Specifications
Port 1	RS485	Communication	6Pin connector	1: 12V+ 2: A 3: 12V+ 4: B 5: 12V- 6: 12V-	Spirit/Navy Communication Extension Cable 5m
Port 2	IN+	Positive input	Bolted Connection, Cable Crimped with SC25-8 Terminal	102.4V+	25mm ² , Outer Diameter 13-18
Port 3	OUT+	Positive output	Bolted Connection, Cable Crimped with SC25-8 Terminal	102.4V+	25mm ² , Outer Diameter 13-18

2.3.2 Installation Requirements

Tools Required:

1. Phillips Screwdriver (PH2)
2. Cable Cutter: EC-50M
3. Wire Stripper: SW-1018
4. Manual Hydraulic Crimping Tool
5. Torque Wrench

Materials Required:

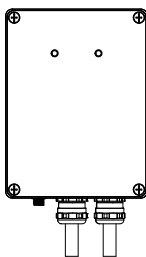
1. Pre-Charge Unit (includes 2 SC25-8 terminals, 4 screws, 4 plain washers, 4 hex nuts, and heat-shrink tubing)
2. Heat Gun

Installation Instructions



Requirements:

The product must be mounted on a vertical wall plane with sufficient structural strength to support the unit (weight: 2.5 kg). Reserve 20 cm of cable bending space below the product.

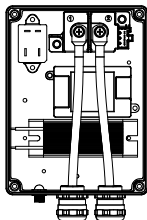


Protection rating:

IP44. Install in a dry, clean compartment with minimal water splash risk.

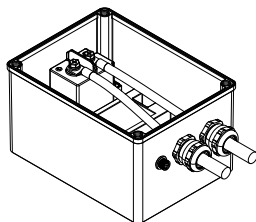
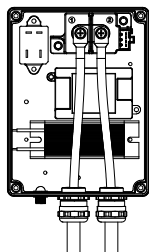
Installation Steps:

1. Drill holes at designated positions (see diagram).



2. Unpack the Pre-Charge Unit, screws, and terminal kit.
3. Remove the four screws to open the panel. Disconnect the cable by pressing the connector latch.
4. Secure the unit using the provided screws, washers, and hex nuts.
5. Tighten screws with a Phillips screwdriver.

6. Remove cable glands and extract dust plugs.
7. Feed cables through glands, crimp terminals (refer to 2.3.3).
8. Route cables through the unit's ports according to the diagram.



9. Stack terminals at fixed points and secure with screws.
10. Tighten screws to 9 N·m using a torque wrench.
11. Reinstall glands and tighten.
12. Reattach the panel.
13. Connect the communication cable and tighten.

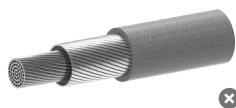
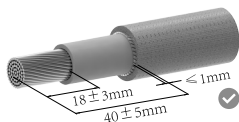
Pre-Power Checks:

Confirm all cable connections are secure.

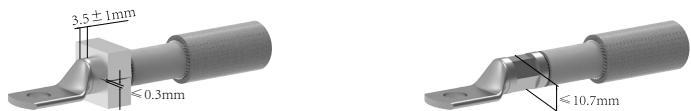
2.3.3 Crimping cable connectors

(1) Strip back the insulation/shielding as follows:

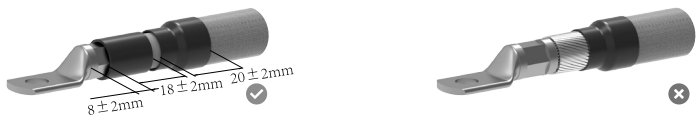
- outer sheath and metal shielding layer by 40 ± 5 mm. When cut, the metal shielding layer must not extend more than 1mm beyond the outer sheathing. (Contact between the metal shielding layer and terminals or inner cores will cause insulation failure.)
- inner sheaths (on positive and negative cables) by 18 ± 3 mm





(2) Slide the terminals over the inner cores and crimp at approx. 3.5mm from the terminal end. After crimping, the height of the uncrimped sides should be 10.7mm or less (if more, crimp again).



(3) Fit heat shrink tubing over the joints between the terminals and the inner cables, and (separately) over the shielding layer. Leaving the joints or the shielding exposed to air may result in insulation and system failure.



 Please use the crimping tool corresponding to the specifications of the terminal to ensure a proper crimping process. Make sure the crimping is fully seated. Otherwise, poor crimping may lead to local heating and severe damage.

 During the crimping process, pay special attention to prevent the shield layer from contacting the terminal and core wire, to avoid leakage or short circuits.

3 Functions

eSSA EMS controller

The eSSA EMS controller is an Energy Management System controller. It manages and controls the scheduling of energy system equipment. It also enables human-machine interaction through a 10-inch touch panel HMI.

Pre-Charge Unit

The Pre-Charge Unit can safely connect or disconnect high-voltage systems with different capacities. It can also automatically adjust and control the connection time of high-voltage systems.

4 Limited 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 the date of delivery of invoice (the "Limited Warranty Period"). 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-conforming parts. Any warranty claim must be made within six (6) months of discovery of issues as provided below.

If the Limited Warranty Period has expired, you can still enjoy maintenance services from dealers/distributors authorized by ePropulsion (the "ePropulsion Service Partners") who will endeavour to keep costs to a minimum.

In all warranty cases, ePropulsion will only bear the repair or replacement cost for items that are covered by the Limited Warranty. Any costs not covered by the Limited Warranty – such as those related to product installation, disassembly, transportation, financing, rental, etc – shall be borne by the customer alone.

Beyond the Limited Warranty, the Customer may have statutory rights in their 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 used for commercial or professional purposes*, 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 Purposes include those where the product is used with the intention of making profit, or high frequency, or very high reliability requirements, etc .**

To keep your warranty valid, please note the following:



Products without the original product label will not be covered by ePropulsion's Limited Warranty. Keep the product label intact and record the serial number from it. Never remove the label from the product;



The Limited Warranty is not transferable and will not be reissued;



The Limited Warranty may change from time to time. Please 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 longer life.

Comment on average temperature:

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

4.1 Warranty Exclusions

ePropulsion may refuse a warranty claim if:

- The product is operated in contradiction to what is written in the user manual;
- Damage is caused by accident, misuse, dropping, improper care or storage, wilful abuse, physical damage, unauthorized repair;
- Water ingress is caused by external sources such as fishing nets, submersion, etc;
- Product has been modified, altered, dismantled, or had parts/accessories attached in any way not expressly permitted or recommended by ePropulsion;
- Due to failure of, or damage caused by, any 3rd party products;
- The high-voltage batteries have been repositioned in the boat, without contacting ePropulsion service. Repositioning may result in changes to cabling, and other risks to system operation;
- The battery has been incorrectly charged, overcharged, over-discharged, or operated in temp out of scope described in the user manual;
- Consumables (such as replacement propeller, anodes, oil/fluids...etc.);
- Purchases of products from unauthorized dealers or sellers;
- Normal wear and tear and routine servicing;
- Damage caused by improper packing or handling of the product during its return. The additional damage part will be deemed out of warranty;
- Incorrect shipping of lithium batteries. These are classed as a UN9 hazardous item, and must be shipped in accordance with regulations in your jurisdiction. Non-compliance may result in warranty exclusion.

4.2 Limited Warranty Claim Procedures

The process shown below must be followed in order to make a Limited Warranty claim:

1. Contact your nearest ePropulsion Service Partner with details of the problem. They will advise if such defects are covered by the Limited Warranty or any additional rights you may have from your purchase.
2. Send the defective product to them (or the Service Partner they advise) together with Proof of 1(st)-time (first 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 must be kept intact. Warranty claims will only be valid only when the information above is correct, genuine, and complete.
3. Make sure the product is properly packed during delivery, the original packaging is highly recommended.
4. The ePropulsion Service Partner will examine and diagnose 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 borne by you.
6. If your warranty claim is rejected, a repair/replacement 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 that you wish to proceed with the repair/replacement and will pay for it.

ePropulsion

(*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

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E-Mail: service@epropulsion.com