
User Manual of Komco 48V 50A Intelligent Charger



Remember to keep this manual in a safe place for future reference.

SECURITY CONSIDERATIONS

Pre-Operation Instructions:

Prior to operating the products from our company, it is imperative that you read and comprehend the instructions and safety precautions thoroughly to minimize the potential for accidents. Please be advised that the “Caution,” “Attention,” “Warning,” and “Danger” notices within the product and its manual are not exhaustive of all safety considerations; they serve merely as an addition to the various operational safety precautions.

Individuals responsible for installing and operating our product series must master the correct procedures and all associated safety measures before handling the equipment.

When utilizing the products and equipment supplied by our company, the user must adhere to the applicable industry safety standards and strictly follow the equipment-specific precautions and special safety instructions outlined in this manual.

Electrical safety (Electric hazards)

High Voltage

Danger	When the power system is running, some parts are with high voltage. Touch directly or touch these parts via wet objects will cause fatal danger.
--------	--

The installation of AC power equipment must comply with the safety standards of the related industries. The operator who installs the AC power equipment must have the qualifications of operating high voltage and alternating current. Wearing watches, bracelets, bangles, rings, or other conductive objects on your hands while operating is forbidden. If the cabinet is humid, please turn off the power immediately. When operating in the humid environment, water should be strictly prevented from entering the equipment. In the process of installation, the prohibitory signs must be hung on switches and buttons that are not allowed to operate.

Danger	Construction of high voltage lines may cause fire or electric shock accidents. The connection and routing of AC cables must follow the local laws and regulations. Only the people who have the qualifications of operating high voltage and alternating current can carry out the high voltage operations.
--------	---

Tools

Warning	When carrying out various operations of high voltage and alternating current, you must use special tools rather than ordinary tools.
---------	--

Thunderstorm

Danger	It is forbidden to carry out operation with high voltage, alternating current, iron tower and mast in thunderstorm.
--------	---

In thunderstorm, strong electromagnetic fields will appear in the atmosphere. Therefore, it is important to guarantee the grounding of equipment in order to avoid being damaged by lightning.

Static Electricity

Attention	Static electricity generated by human body can damage electrostatic sensitive components on circuit boards, such as large-scale integrated circuits (IC). In order to prevent electrostatic damage to sensitive components, the wrist must be worn and the other end of the wrist must be well grounded before contacting equipment, holding insert boards, circuit boards, IC chips, etc.
-----------	--

Short Circuit

Danger	It is forbidden to short-circuit the negative pole and positive pole of the DC power supply or short-circuit the non-earth electrode to the ground. The power supply equipment is a constant voltage DC power supply device. Short-circuit will cause equipment burnout and endanger personal security.
--------	---

You must check the polarity of cables and connecting terminals carefully during live working.

Due to compact system distribution space, you should choose the operating space before operating.

Forbid to wear watches, bracelets, bangles, rings and other conductive objects on the hand during the operation.

You must use insulation tools during the operation.

Battery

Danger	Before the battery operation, please read the safety precautions about carrying out the battery and the ways of connecting batteries accurately.
--------	--

Lack of standardized operation of the battery will cause danger. During operation, you must pay attention to avoid battery short circuit or electrolyte overflow and loss. The overflow of electrolyte will pose a potential threat to the equipment. It will corrode metal objects and circuit boards, cause damage to equipment and short the circuit board.

Before installing and operating the battery, in order to ensure safety, you should pay attention to the following matters:

Take off watches, bracelets, bangles, rings and other conductive objects on the hand.

Use safety goggles and make preventive measures.

Put on rubber gloves and wear apron to prevent electrolyte from overflowing.

Others

Safety and Regulatory Requirements

Attention	When changing the input fuse of the control panel and auxiliary power supply, the fuse with the same specification must be used to meet the safety requirements.
-----------	--

Sharp Corner

Danger	When carrying equipment with hand, you should wear protective gloves to prevent sharp cuts.
--------	---

Power Cable

Attention	Before connecting cables, please confirm that the cable and cable labels correspond to the actual installation.
-----------	---

contents

1. Product Summarization.....	1
2. Introduction of Operational Principle.....	1
2.1 Working Principle Overview.....	1
2.2 Why Multi-Stage Charging is Necessary.....	2
3. Charging Curve.....	3
3.1 LiFePO ₄ Battery Charging Curve.....	3
3.2 Lead-Acid Battery Charging Curve.....	4
3.3 Customized Mode Charging Curve.....	5
4. Specification.....	6
5. Installation Instructions.....	7
5.1 Installation Attention.....	7
5.2 Connection Of AC Input Wire.....	7
5.3 Check Before Starting Machine.....	8
6. Instruction of the Panel and LCD Screen.....	8
6.1 LCD screen and buttons.....	8
6.2 Charge Status List.....	10
7. Operation Method.....	10
Charging Operation Steps.....	10
8. Protection And Fault List.....	11
8.1 Input Protection.....	11
8.2 Output Protection.....	11
8.3 Other Protections.....	11
8.4 Protect Actions.....	11
8.5 Fault List.....	11
9. Maintenance.....	12
9.1 Daily Inspection.....	12
9.2 Periodic Inspection and Maintenance.....	13
10. Packaging, Transportation and Storage.....	13
10.1 Packaging.....	13
10.2 Transportation.....	13
10.3 Storage.....	13

1. Product Summarization

This 48-volt 50-amp intelligent battery charger is ideally suited for forklifts and other industrial applications that require or benefit from high-amp output smart chargers and necessitate single-phase input due to availability.

Featuring three charging modes designed for lead-acid and lithium batteries, this charger also supports custom charging modes to accommodate most of your charging needs. Users can set charging parameters based on their specific requirements for more precise battery charging, thereby extending battery life. The charging process of the charger is governed by a microprocessor, which follows a preset program to charge the battery safely and efficiently. It ensures the battery is fully charged and automatically stops the output, eliminating the need for manual timer settings. The charger employs intelligent control and air-cooled cooling, offering high power density in a compact footprint. It boasts active power factor correction, high efficiency, and reliability, along with reverse battery connection protection.

The LCD screen provides a clear and intuitive display of real-time charging status and fault information. This charger is cost-effective and robust, more than capable of handling most forklift applications, designed to operate quietly and efficiently under continuous use. The linear transformer and microprocessor control are engineered to provide years of trouble-free service.

2. Introduction of Operational Principle

The 48V 50A charger is designed for charging electric forklift batteries and features specific charging modes for lead-acid batteries, lithium iron phosphate (LiFePO₄) batteries, as well as a customizable charging mode. Here is an overview of its working principle and the rationale for multi-stage charging:

2.1 Working Principle Overview

The charger operates by converting AC power from the electrical grid into a DC output that matches the battery's voltage and current requirements. The charging process is controlled by an advanced microprocessor that manages the following stages:

(a) Constant Current (CC) Stage: In this initial stage, the charger supplies a constant current to the battery until it reaches a predefined voltage level. This stage is crucial for quickly restoring the battery's capacity without causing damage.

(b) Constant Voltage (CV) Stage: Once the battery reaches the predefined voltage, the charger switches to the CV stage. Here, the charger maintains a constant voltage while gradually reducing the current. This stage allows the battery to reach its full charge level.

(c) Float Charging Stage: After the battery is fully charged, the charger enters the float stage. In this mode, the charger supplies a lower voltage to maintain the battery's full charge without overcharging. This stage helps extend the battery's lifespan and ensures it's ready for use at any time.

2.2 Why Multi-Stage Charging is Necessary

(a) Battery Safety: Multi-stage charging ensures that the battery is charged safely without overcharging or overheating. Different battery chemistries have specific charging requirements, and the multi-stage process adapts to these needs.

(b) Battery Longevity: By following a controlled charging process, multi-stage charging helps extend the battery's lifespan. Overcharging or undercharging can damage the battery, reducing its overall performance and durability.

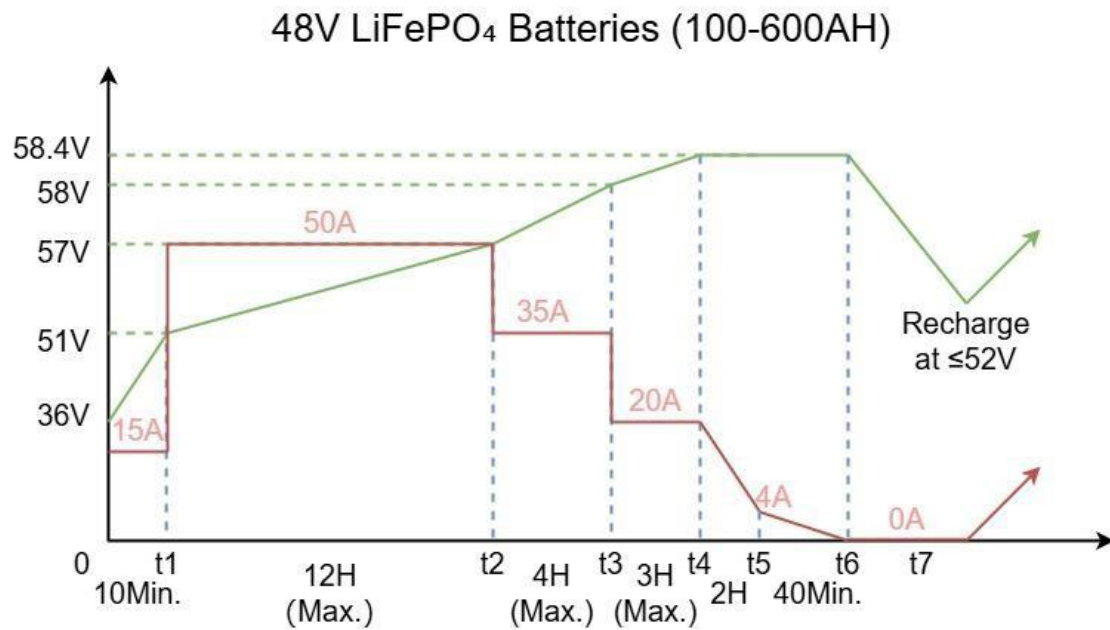
(c) Optimal Charging Efficiency: Each stage of the charging process is designed to maximize charging efficiency. The CC stage quickly restores the battery's capacity, while the CV stage fine-tunes the charging process to achieve a full charge.

(d) Customization: The customizable charging mode allows users to set specific parameters such as charging voltage, float voltage, and charging time. This flexibility ensures that the charger can be tailored to various battery types and user preferences.

In summary, the 48V 50A charger's multi-stage charging process ensures safe, efficient, and customized charging for different battery types, ultimately prolonging battery life and maintaining optimal performance.

3. Charging Curve

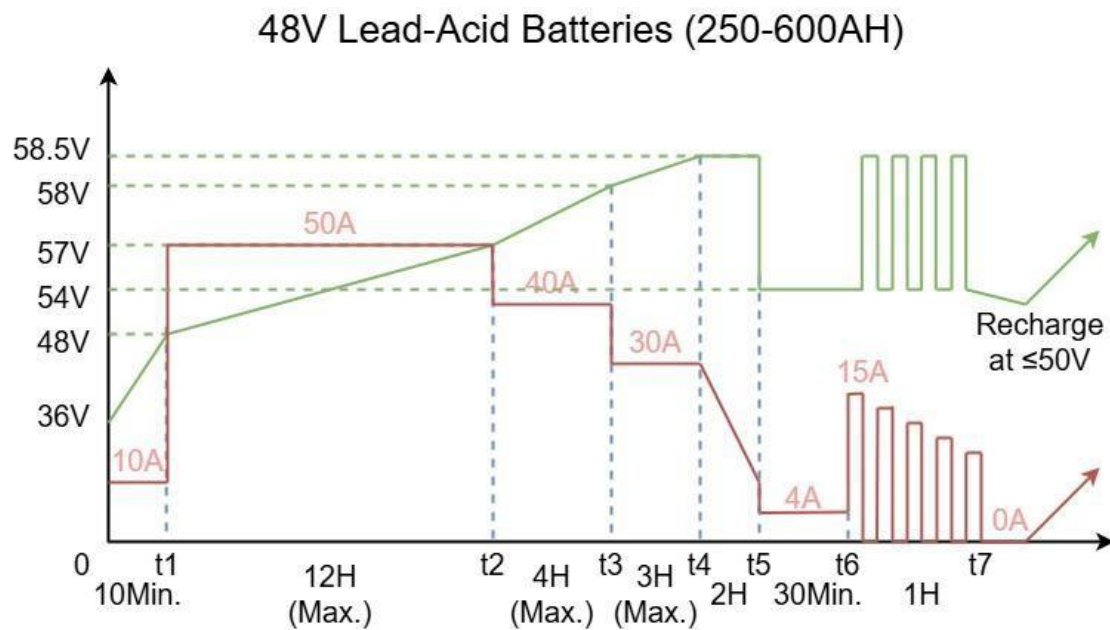
3.1 LiFePO₄ Battery Charging Curve



*The charger will be unable to charge the battery if the battery voltage falls below 36V.

*Standby Mode: Once charging is complete, the green light will stay on, signifying that the charger is in standby mode. Should the battery self-discharge and the voltage fall to 52V, the charger will automatically commence charging again.

3.2 Lead-Acid Battery Charging Curve



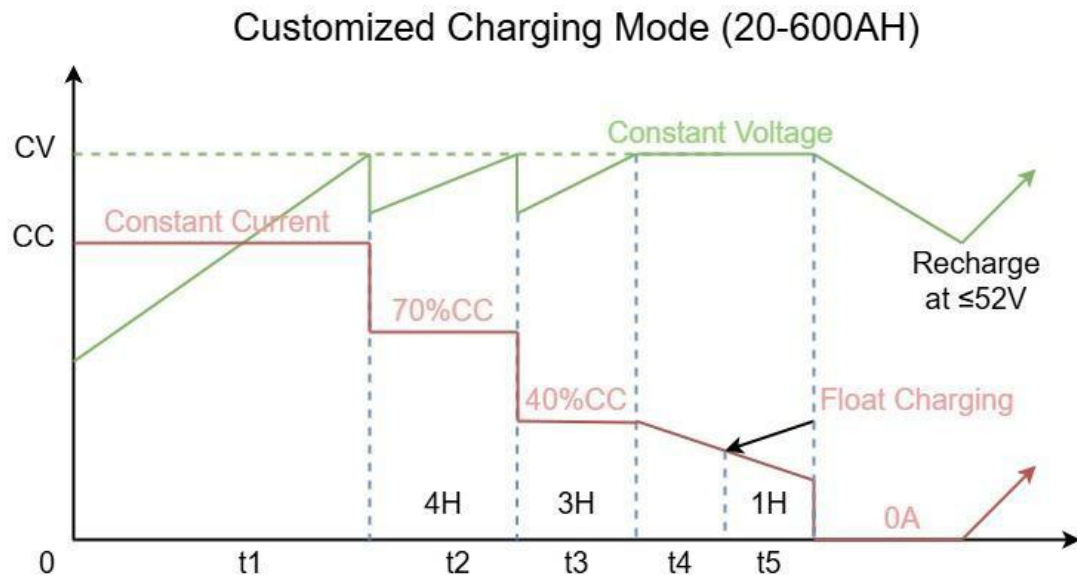
*The charger will be unable to charge the battery if the battery voltage falls below 36V.

*Standby Mode: Once charging is complete, the green light will stay on, signifying that the charger is in standby mode. Should the battery self-discharge and the voltage fall to 50V, the charger will automatically commence charging again.

*Float Charging: Phase t5-t6, the float voltage is set at 54V with a current limit of below 5A. The charging duration is 30 minutes.

*Pulse Charging: Phase t6-t7, the voltage is increased to 58.5V and then charging is halted. When the voltage drops below 55V, charging resumes with a maximum current of 15A. This phase lasts for 1 hour.

3.3 Customized Mode Charging Curve



*The charger will be unable to charge the battery if the battery voltage falls below 5V.

*Customizable Parameters: Constant voltage value, constant current value, float charging current value, float charging time.

*Float Charging: Phase t5, float charging begins when the current is less than or equal to the set float charging current value. Charging will stop after 1 hour (customizable duration).

*Standby Mode: Once charging is complete, the green light will stay on, signifying that the charger is in standby mode. Should the battery self-discharge and the voltage fall to 50V, the charger will automatically commence charging again.

4. Specification

Model	48V50A
DC Output	
Max. Output Power	2.85kW
Rated Output Current	50A
Output Voltage Range	5V-58.5V
Protection	Short circuit, Overcurrent, Overvoltage, Reverse Connection and Reverse Current Protection
AC Input	
Rated Input Voltage	220Vac $\pm$ 15%
Frequency	47Hz-63Hz
Power Factor	≥ 0.99
Input protection	Overvoltage, Under-voltage, Overcurrent and Lack of phase Protection
Working environment	
Working Environment Temperature	-20℃~45℃work normally, 45℃~65℃ reduce output, over 65℃ Shutdown
Storage Temperature	-40℃~75℃
Relative Humidity	0-95%
Dimensions and weight	
Outline Dimensions	36*16*33cm
Net Weight	9kg
Protection Class	IP54
OTHERS	
Output Connector Spec.	Anderson 175A bipolar connector
Heat Dissipation Mode	Air-cooling

5. Installation Instructions

5.1 Installation Attention

The voltage and current of some components in the power supply system are very high. In order to ensure personal safety, the following regulations should be observed at all times:

- 1) Only those who have been trained about the power system and get sufficient knowledge of the power system can install the power supply system. During installation, you have to observe the safety regulations and local safety regulations listed above.
- 2) System voltage may reach 240Vdc or 265Vac, which is a dangerous voltage. Insulation protection should be done during installation and operation to ensure personal safety.
- 3) If you want to operate in the power system cabinet, please ensure the charger is disconnected from the power. The power input and battery power must be disconnected. Place the power supply equipment in the locked room and lock the cabinet. The key should be kept by the person in charge.

5.2 Connection Of AC Input Wire

Model	Description
48V50A	Live line 1: 1.8m*2.5mm ² ;
	Live line 2: 1.8m*2.5mm ² ;

This device is designed with enhanced power capabilities, necessitating a 240-volt power supply. It is wired to dual live wires each delivering 120 volts relative to the neutral wire, and collectively providing 240 volts between them. When setting up the wiring, Simply connect each of the two live wires from the power source to the corresponding live wires on the unit.

Note: The device can also operate when connected to a 120V power source; however, the charging current will be reduced to half of the rated charging current.

Attention:

- 1) Each cable diameter of a single charger for the AC input is larger than the recommended cable diameter.

2) Each charger should be connected to the electric supply via a small circuit breaker.

Model	Description
48V50A	Circuit breaker $\geq 25A$

5.3 Check Before Starting Machine

When the charger has been connected, please check it carefully before starting the charger. Contents are as follows:

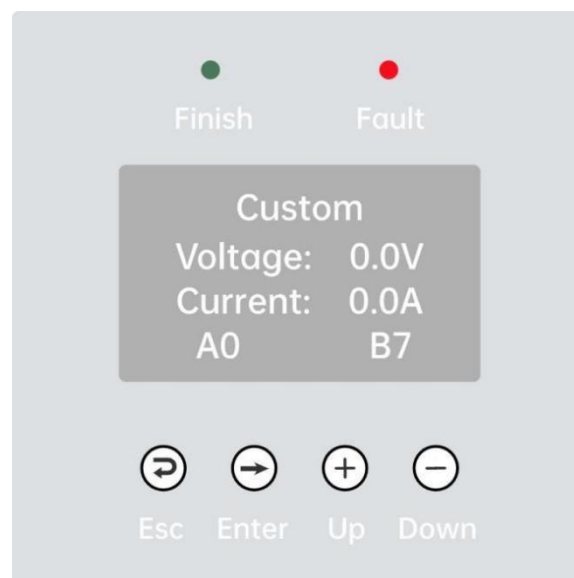
- 1) Confirm that the input power meets the requirement of the charger, and the AC input cable is connected correctly.
- 2) Switch the breaker or air switch off the input power supply and charger to ON position.
- 3) Then, the charger is switched on and enters the standby interface. Please confirm that the charger screen shows normally and no fault appears.

Note: Please turn off the input power of the charger immediately, if an abnormal condition is detected during the start-up process.

6. Instruction of the Panel and LCD Screen

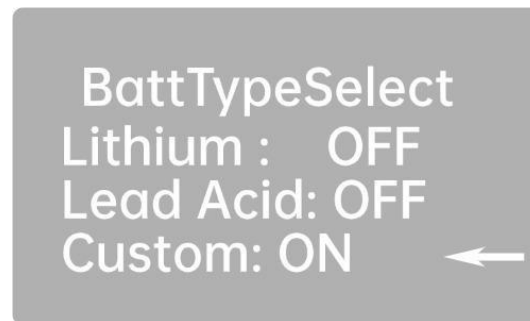
6.1 LCD screen and buttons

Section 1: Press and hold the "Enter" button to access the battery type selection interface.



Section 2: Select Battery Type: Use the "Up" /"Down" button to navigate the cursor and make your selection.

1) LiFePO4 Battery Select "ON" at the position corresponding to the lithium battery and long press the "Enter" button to confirm.

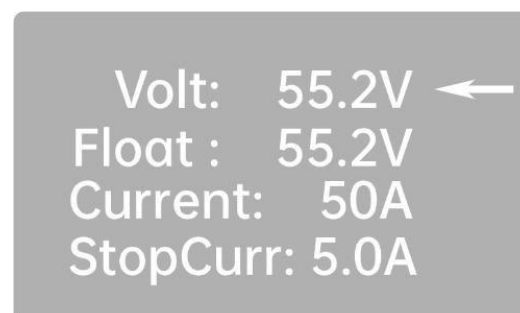


2) Lead-Acid Battery Select "ON" at the position corresponding to the lead-acid battery and long press the "Enter" button to confirm.

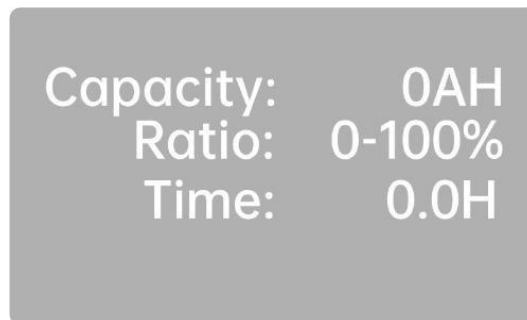
3) Custom Select "ON" at the position corresponding to custom settings and long press the "Enter" button to confirm.

Section 3: After selecting the battery type (lithium or lead-acid) on the selection interface, the screen will automatically return to the main screen once confirmed, and charging will begin based on your selection.

Section 4: If you select the custom option, after confirmation, navigate to the sub-menu. Use the "Enter" button to scroll through the options and press the "Up" /"Down" buttons to adjust the charging voltage(CV), charging current(CC), float voltage, float(stop) current and timing functions to your personalized settings. Once the adjustments are complete, press the ESC button to return to the main screen, or the system will automatically save and return to the main display page after 60 seconds.



Section 5: During the charging process, you can press the "Up" /"Down" buttons to view more detailed charging data. Check the corresponding charging status by referring to the status codes displayed in the status bar.



6.2 Charge Status List

A1	Low current pre-charging, up to 10min
A2	Full charge (100% current/50A)
A3	Reduced current charging (70-80% current/35-40A)
A4	Reduced current charging (40% current/20A)
A5	Constant voltage charging
A6	Equalize battery
A7	Timed Float Charge
A8	Pulse repair
OK	Charge completion

7. Operation Method

Charging Operation Steps

- 1) Ensure the forklift is stable and turn off the power.
- 2) Inspect the charger, cables, and connectors for any visible damage. Make sure the connectors and your hands are dry before proceeding to the next step.
- 3) Connect the charger's plug to the battery.

-
- 4) After connecting the battery, turn on the power switch. The charging will start automatically, and the charging indicator light will flash.
- 5) Once the automatic charging is complete, the indicator light will turn green. Turn off the power, disconnect the plug, and the charging process is finished.

8. Protection And Fault List

8.1 Input Protection

Overvoltage; Undervoltage; Overcurrent; Phase loss protection.

8.2 Output Protection

Short circuit; Overcurrent; Overvoltage; Reverse polarity.

8.3 Other Protections

Overheat Protection: When the temperature exceeds 90°C, the charger stops outputting. The indicator light turns red and remains steady, and the fault message will display "B4". The fault can only be cleared when the temperature decreases.

8.4 Protect Actions

1)General Protection: Input overvoltage, undervoltage, charger overheating, battery undervoltage, battery reverse polarity, battery not connected, battery fault protection, etc. Charging can resume automatically once the fault is cleared.

2)Non-self-recovering Protection: Input overcurrent, output overcurrent, communication fault.

8.5 Fault List

B1	Reverse Polarity/Not Connected/0V	Check if the connection between the charger and the battery is correct
B2	Battery UnderVoltage (<36V)	Check battery pack voltage
B3	Battery OverVoltage (>68V)	Check battery pack voltage

B4	Overtemperature (>90° C)	Stop charging and check for proper heat dissipation
B5	Overcurrent (>55A)	Stop charging. Check charger output current, cable for damage, and ensure proper connections between charger and battery
B6	Battery Disconnected During Charging	Check connections between charger and battery
B7	Communication Fault/Machine Fault	For this fault code or unlisted issues, please reach out to the manufacturer

9. Maintenance

To ensure the long-term reliable and continuous operation of the charger and to prevent potential issues, regular or daily inspections should be conducted, with attention to the following items:

9.1 Daily Inspection

During operation, visually inspect the charger to confirm that there are no abnormal conditions. Typically, check the following points:

- 1) The operational performance meets the standard technical specifications.
- 2) The surrounding environment complies with the standard specifications (see the table of operating environments).
- 3) Check for any debris, water stains, or dust inside the charger gun. If found, clean with a dry cloth.
- 4) There are no unusual noises, vibrations, or abnormal odors.
- 5) Confirm that the fan is operating normally.
- 6) There are no signs of overheating or discoloration.
- 7) The input voltage is within the normal working range.
- 8) All connection terminals are securely fastened.

9) Check for any damage to the insulation of input and output cables, such as exposed copper wires. If any issues are found, immediately stop using the charger and replace the cable harness with a new one.

9.2 Periodic Inspection and Maintenance

1) Every 30 days (adjustable based on environmental conditions), clean the fan exhaust of the charger to remove any accumulated debris, ensuring the vent is unobstructed and maintaining air flow for effective heat dissipation of the entire unit.

2) Regularly inspect the charger's input and output terminals to ensure they are properly connected. Proper connection is essential to ensure normal charging.

10. Packaging, Transportation and Storage

10.1 Packaging

This product is packaged in a rigid packaging box, which includes the installation and operation manual.

10.2 Transportation

Transportation of this product should be carried out with the packaging intact. During handling, avoid severe vibration and impact to prevent moisture and rain damage.

10.3 Storage

This product should be stored in an indoor environment with a temperature range of -40 to +75°C, relative humidity not exceeding 95%, free from corrosive gases, and with good air circulation. The recommended storage period is 6 months.