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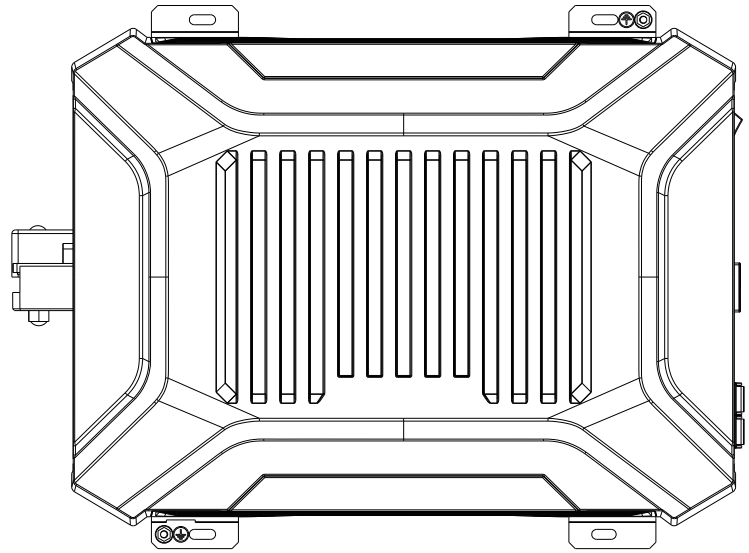
SRNE

RIU Series

Pure Sine Wave High-frequency Inverter Charger User Manual



Version:V1.02

Dear user:

Thank you for choosing our products!

Important Safety Instructions

Please keep this manual for future reference!

This product is specifically designed for low-voltage, high-current batteries. The maximum voltage must not be exceeded at either the battery terminals or the AC input. This product does not feature reverse connection protection. The manufacturer assumes no liability for any safety incidents resulting from over-voltage or reverse connection. To protect your interests, please verify that the wiring and input voltage are correct before powering on the device to avoid any danger or loss.

The manufacturer assumes no liability for any damage to the equipment resulting from use outside the specified parameters.

This manual contains all safety, installation, and operating instructions for the RIU series, frequency and pure sine wave high frequency charging inverter (here in after referred to as "the inverter charger"). Please read all instructions and precautions in the manual carefully before installation and use.

◆Non-safety voltage exists inside the inverter charger. To avoid personal injury, users shall not dissemble the inverter charger themselves. Please contact our professional maintenance personnel for repair.

◆Do not place the inverter charger within the reach of children.

◆Do not install the inverter charger in harsh environments such as moist, oily, flammable or explosive, or heavily dusty areas.

◆The AC output of the inverter charger is high voltage, so please do not touch the wiring terminals.

◆The housing of the inverter charger is super hot when it is working. Do not touch it and keep away from materials or equipment affected by high temperature.

◆Do not open the terminal protective cover when the inverter charger is working.

◆Suitable fuse or circuit breaker is recommended to be mounted outside the inverter charger.

◆Make sure to disconnect the fuse or circuit breaker near the terminals of the battery and AC output before installing and adjusting the wiring of the inverter charger.

◆After installation, check whether all wiring is tightly connected to avoid the danger of heat accumulation due to loose connection.

◆The inverter charger is off-grid. It is necessary to confirm that it is the only input device for load, and it is forbidden to use it in parallel with other input AC power to avoid damage.

◆ In order to ensure that users can protect their personal and property safety while using this product, relevant information is highlighted in the manual with following symbols. The following symbols in the manual indicate that you should read the relevant words carefully.

Warning: Electric shock that may damage devices or electrocution/injury if it is not avoided.

Attention: Potential dangers that may damage devices if they are not avoided.

Note: Important notices in operation that may trigger the device fault alarm if they are not performed.

Qualified Personnel

The installation and service of the inverter charger must be carried out by qualified personnel. Qualified personnel refer to trained and licensed electricians or installers with all the following skills and expertise:

- ◆ Knowledge of the functional principles and operation of on-grid and off-grid energy storage system:
- ◆ Knowledge of the risks and dangers associated with the installation and service of electrical devices and acceptable mitigation methods;
- ◆ Knowledge of the installation and service of electrical devices;
- ◆ Knowledge of and adherence to the user manual and all safety precautions and best practices;
- ◆ Knowledge of local installation regulations;
- ◆ Electrical license for the installation and service of energy storage system required by the county or state;

Contents

1. Introduction

1.1 Overview

The RIU series pure sine wave high frequency inverter charger integrates a pure sine wave inverter, battery charger, and utility bypass loading. Thanks to the full-digital intelligent control technology and voltage-current double closed-loop control algorithm adopted, the inverter charger has a fast dynamic response, high conversion efficiency, low harmonic component and stable operation.

This series offers an all-in-one mobile solution designed for North American 50A single-phase 120V and split-phase 240V grid applications. The 240V AC output is available only when the inverter charger is powered by a split-phase 120/240V AC source. The series incorporates a 50A AC switching relay that delivers a continuous 50A current to the AC output when connected to the grid. For single-phase 120V grid systems, use only the AC input terminals L1 and N for charging and bypass loading. For split-phase 120V/240V grid systems, use the AC input terminals L1, L2, and N for charging and bypass loading; in this mode, loading via L2 and N is not supported. Please refer to the wiring section for specific wiring instructions and safety guidelines.

Key components with high power density and long service life provide the inverter with continuous long-time and full-power output. And comprehensive electronic protections keep the entire system safer and more stable.

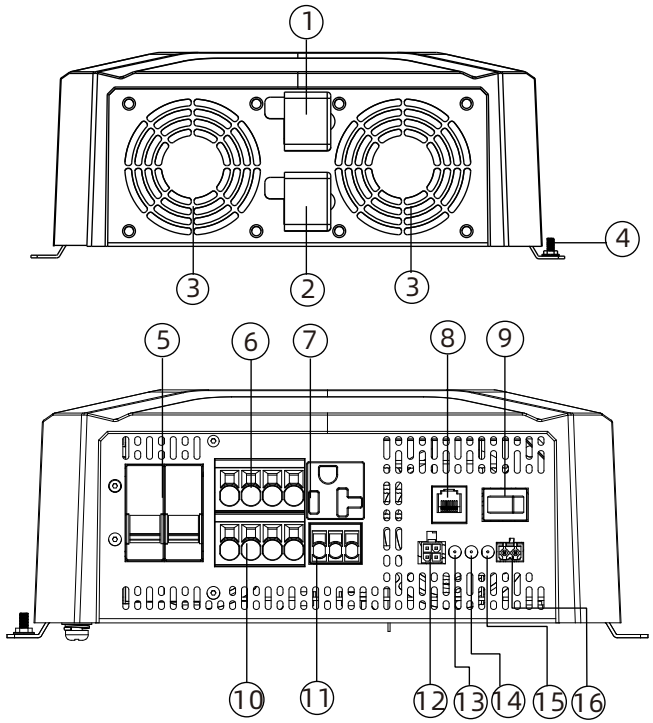
The RIU series inverter charger is specifically developed as an integrated inverter and charger for RV systems. Its strong load capacity can meet the load requirements of various types of household appliances, including air conditioner, electric kettle, hair dryer, induction cooker, coffee machine, etc, meeting the needs of household appliances in RV life.

1.2 Features

- ◆Full digital voltage-current double closed-loop control, in high response speed and reliability.
- ◆Advanced SPWM technology, pure sine wave output.
- ◆Advanced wave-alter and current-limiting technology, with impact load such as large capacitive and inductive available.
- ◆Multiple types of output sockets forms are available to meet the needs of customers in different countries and regions.
- ◆Supporting multiple battery charging such as sealed battery, gel battery, lithium battery, and maximizing energy saving.
- ◆Provided with automatic activation function of lithium battery charging.
- ◆6-Stage battery charging management function, which can quickly charge the battery and effectively extend its service life.
- ◆Maximum charging current and full cut-off current can be set, providing comprehensive care for the battery.
- ◆Automatic energy distribution, which can automatically adjust the charging power according to the size of the load power.
- ◆Input undervoltage/overvoltage protection, output overload/short circuit protection, equipment over-temperature protection, fan protection, etc.
- ◆Provided with AC power bypass, inverter output automatic and uninterrupted switching power supply, and UPS function.

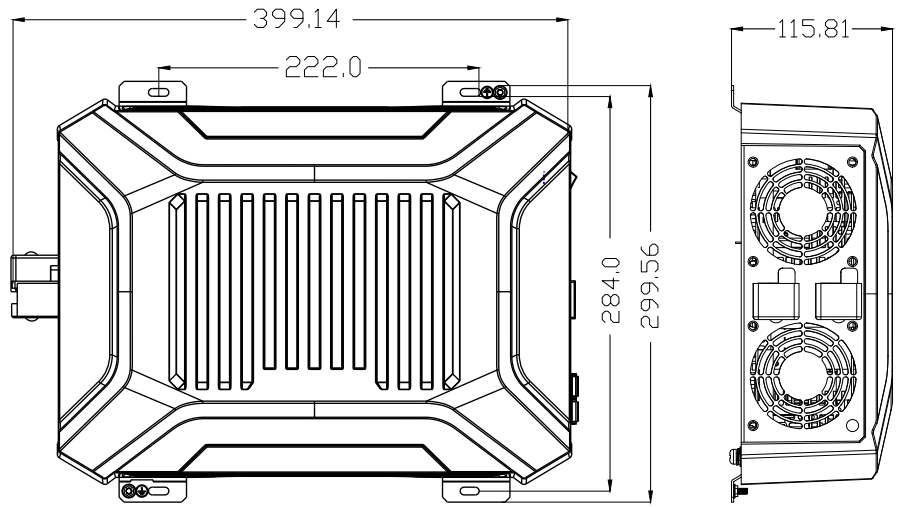
- ◆Low no-load,low standby loss, low total harmonic distortion rate(THD),and high conversion efficiency.
- ◆Intelligent air cooling control system, for detecting the output of fan blocked control.
- ◆The output voltage of /100/110/115/120/127VAC and the output frequency of 50/60Hz can be set.
- ◆The AC output is equipped with a 50A circuit breaker to ensure normal operation of the product.
- ◆Excellent EMC features and can be applied in scenarios with high requirements for power quality.
- ◆Supporting Bluetooth communication, and view product operation state/real-time data and fault state through mobile app.
- ◆Supports RS485、RV-C's CAN communication.
- ◆The design of an external remote power switch contact switch allows for remote control of the inverter charger's power through an external mechanical switch or relay.
- ◆Perfect hardware and software protection functions to ensure stable and reliable operation.
- ◆Features both single-phase and split-phase input modes to accommodate loads with different voltage requirements.

1.3 Appearance and interface description



NO.	Name	NO.	Name
①	Battery input positive terminal	⑨	Operating mode switch
②	Battery input negative terminal	⑩	240V AC output terminal
③	Cooling fans	⑪	120V AC output terminal
④	Input ground terminal	⑫	Communication interface-CAN
⑤	Output Circuit Breaker	⑬	Inverter indicator light
⑥	AC input terminal	⑭	Charging indicator light
⑦	120V output American standard socket	⑮	Fault indicator light
⑧	RS485 communication interface	⑯	External switch contact interface

1.4 Dimension drawing



Product size: 400*300*116mm
Installation size: 222*284mm
Hole size: ϕ5.5mm

2. Technical Parameters

Product model	RIU12-3KW
Inverter mode:	
Output rating	3000W
Withstand instantaneous impact power	6000W
Output power factor	1.0
Output voltage	100/110/115/120VAC(default)/127VAC(±3%)
Output frequency	50HZ/60HZ(default)(±0.1%)
Output wave	Pure sine wave
Output harmonic component	THDV<4%(pure resistance load)
Rated input voltage	12VDC
Input voltage range	10.8~15.5V
Rated output efficiency	>87.0%
Maximum output efficiency	>92%
No-load loss	<19.5W
ECO energy-saving mode loss	<6W
ECO starting power	<30W,30~100W adjustable
ECO interval time	1min,30s~30min adjustable
N-G grounding	Supported, enabled by default
Charger mode:	
AC input voltage	90~140VAC(Single phase)/180~280VAC(Phase separation)
AC input frequency	45~65HZ
Rated charging current	200A
Maximum charging current	The default is 200A, and 0~200A is adjustable.
Full cut-off current	The default 0A, 0~20A adjustable
Battery type	USE/FLD/GEL/LI/SLD(default)
Other parameters:	
AC in rated input current	50A
AC in maximum input current	The default is 50A,0 ~50A adjustable
AC out1 rated current	16A
AC out2 rated current	50A
120/240VAC output terminal rated load current	50A

AC output priority	Mains priority (default)-access to mains for charging and bypass loading; Inverter priority-when the battery voltage is greater than a certain value, the access to the mains will give priority to inverter load; When the battery voltage is less than A certain value will be switched to mains charging and bypass loading, and then it will be converted to inverter output when the battery meets the requirement of constant voltage charging for 2 hours
Battery voltage of inverter to bypass when inverter takes precedence	<13.2V(12.0~14.0V adjustable)
Inverter priority switching back condictions	Bypass output mode only (battery voltage >14.2*N (where N denotes the system voltage level) maintained for 3 minutes)/ Bypass with charging mode (constant voltage charging for 2 hours)
UPS switching time	<10ms
Circuit Breaker	50A
Transfer Relay Ac Current Rating	50A surge, 40A continuous
Communication function	Bluetooth, RS485, and CAN (RV-C)
Remote power ON/OFF interface	Supported
RTC real-time clock	Supported
Power assist	Supported
Indicator	Green-inverter indication; Yellow-charging indication; Red-Fault indication
Protection function	DC input over-voltage/ over-discharge protection, AC output overload/short-circuit protection, AC input over-voltage/ under-voltage protection, device over-temperature protection, fan stall protection
Operating ambient temperature	-20℃~60℃
Storage ambient temperature	-35℃~80℃
Relative humidity	5%~95%
Protection level	IP20
Heat-dissipating method	Natural heat dissipation + intelligent air cooling
Noise	≤60dB
Product dimension	400x300x116mm
Installation dimension	222x284Φ5.5mm
Net weight	8.7kg

3. Function Introduction

3.1 Charging curve

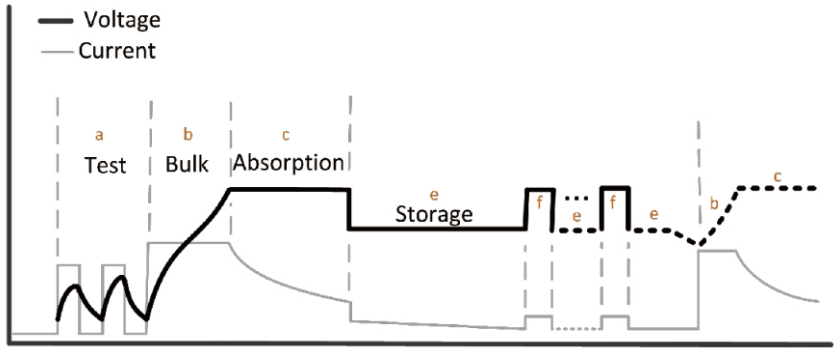


Figure 1 Charging curve of lithium battery

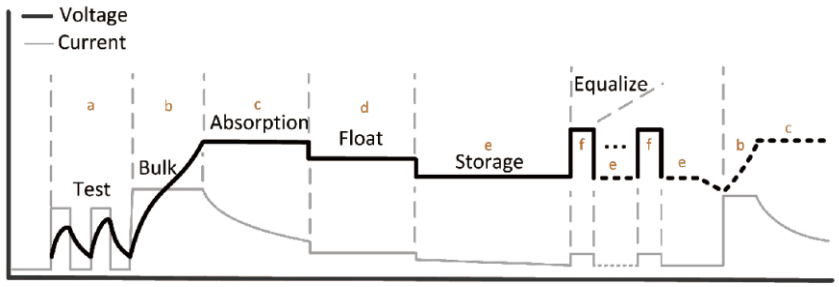


Figure 2 Charging curve of lead-acid battery

3.2 Charging stage description

Corresponding to the charging curve in 3.1 above, explain each charging stage:

3.2.1 Stage A--Precharge--Test

Lead-acid batteries or lithium batteries are deeply discharged or not charged for a long time, resulting in a very low battery voltage, even down to 0V. After the charger is connected, the charging current will be limited to 8% of the set charging current and the battery will be pre-chargered by pulse voltage. When the battery voltage is charged above 11.0V*N, it will enter "Bulk" charging.

3.2.2 Stage B--High current charging--Bulk

When the battery voltage is less than the constant charging voltage, the charger charges the battery quickly with the set charging current. When the battery voltage is charged to the constant-voltage charging voltage, it will enter "Absorption" charging.

3.2.3 Stage C--Absorption charging--Absorption

At the end of "Bulk" charging, the battery voltage rises to the "Absorption" voltage, and the charger will maintain the "Absorption"voltage to charge the battery at constant voltage.

In the lead-acid battery mode, keep the "Absorption" voltage for 2 hours (or a user-defined time), and then enter the "Float" charging;

In the lithium battery mode, if the charging current is less than 5% of the set charging current after charging at the "Absorption" voltage for 2 hours (or a user-defined time), it will enter the "Storage" charging; If the charging current is greater than 5% of the set charging current, it will continue to be charged in "Absorption" , and after more than 48 hours, it will also be charged in "Storage" to further reduce the charging voltage.

3.2.4 Stage D--Floating charge--Float

In lead-acid battery mode, after "Absorption" charging for 2 hours, the charging voltage will be further reduced to enter the "Float" charging stage. After "Float" charging is maintained for 2 hours, if the charging current is greater than 5% of the set charging current, it will continue to be charged in floating charge, and after more than 48 hours, it will also be charged in "Storage" to further reduce the charging voltage. Lithium batteries have no "Float" charging stage.

3.2.5 Stage E--Storage charging--Storage

After the battery is fully charged, the charger is always connected, which will further reduce the charging voltage, store and charge the battery, supplement the battery's own loss, and keep the battery fully charged.

In the "Storage" charging stage, if one of the following conditions is met, the "Storage" charging will be exited:

1) When the charging current is greater than 5% of the set charging current for about 10 seconds, exit "Storage" charging and enter a new charging cycle.

2) When the battery voltage is lower than "'Storage' charging voltage minus 0.3V*N" for about 10 seconds, exit "Storage" charging and enter a new charging cycle.

3.2.6 Stage F--Balanced charging--Equal

When the battery is in the "Storage" charging state for a long time, the battery is charged evenly every 7 days. The battery benefits from regular "Equalize" balanced charging, which can stir the electrolyte, vaporize the electrolyte, balance the battery voltage, complete the chemical reaction, and effectively prolong the battery life. At this stage, the charging voltage of lead-acid battery is balanced charging voltage, and the charging voltage of lithium battery is absorption charging voltage.

3.2.7 Full

In the constant voltage charging stage (as shown in "c/d" stage of Figure 1 and Figure 2), the charging current is less than "full cut-off current" for 1 minute, and the charger will stop charging. If the battery voltage is lower than the storage voltage of-0.3V*N, it will enter a new charging cycle again.

3.3 Battery parameter table

Battery type / Parameter item	Sealed lead-acid (SLD) (default)	Gel battery (GEL)	Flooded battery (FLD)	Lithium battery (LI)	Customized (USE)
Over-voltage disconnect voltage	15.5V	15.5V	15.5V	15.5V	10.8~15.5V
Over-voltage recovery voltage	14.5V	14.5V	14.5V	14.5V	10.8~14.5V
Limited charging voltage	15.2V	15.2V	15.2V	––	10.8~15.2V
Equalizing voltage	14.6V	––	14.8V	––	10.8~15.2V
Absorption voltage	14.4V	14.2V	14.6V	14.4V	10.8~15.2V
Float voltage	13.8V	13.8V	13.8V	––	10.8~15.2V
Storage voltage	13.2V	13.2V	13.2V	13.5V	10.8~15.2V
Over-discharge voltage	11.1V	11.1V	11.1V	11.1V	10.8~15.2V
Over-discharge restoring voltage	12.6V	12.6V	12.6V	12.6V	10.8~15.2V
Equalizing charging interval	7days	––	7days	––	0~60days (0 indicates off)
Equalizing charging time	60min	––	60min	––	0~60min
Absorption voltage time	120min	120min	120min	120min	10~600min
Float voltage time	120min	120min	120min	––	Equal to increasing charging time

Note: The above parameters apply at 25°C/12V. For system voltages of 12V/24V/36V/48V, the corresponding voltage points are automatically multiplied by N= 1/2/3/4,N association full text.

4. Description Of Interface Function

4.1 RS485 & CAN communication

◆RS485 communication:

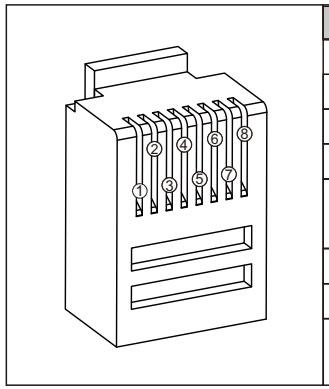
The default baud rate is 9600bps; Parity: None; Data bit: 8bit; Stop bit: 1bit

Interface type: RJ45,and matching resistance is 120R.

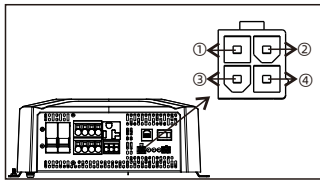
◆CAN communication

CAN 2.0B mode, extend frame, baud rate of 250kbps, support RV-C protocol, and there is no terminal resistance.

◆Interface communication line sequence definition:



No.	Definition
①	CAN_L
②	CAN_H
③	NC
④	NC
⑤	Ground/signal ground
⑥	B/D-
⑦	A/D+
⑧	Power supply positive



No.	Definition
①	NC
②	NC
③	CAN_L
④	CAN_H

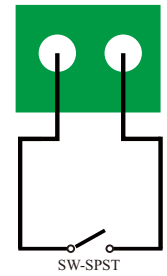
4.3 Bluetooth communication

Built-in Bluetooth communication function, real-time monitoring of inverter charger operation data, fault status and adjustment of inverter charger operation parameters through mobile phone APP.

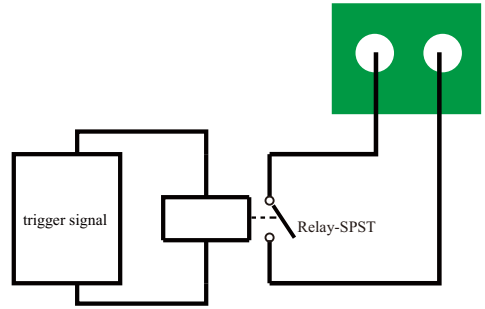
You can scan the following QR code to download the APP:

4.4 Remote ON/OFF interface of remote switch

2P switch interface: Inverter charger can work when the interface is short-circuited; inverter charger fails to work whenthe interface is open. The interface can be connected to a mechanical switch or relay to control the inverter charger to start/stop (this application requires keeping the inverter charger power supply in the I position) in practical application.



Application drawing 1: external mechanical switch



Application drawing 2: external relay switch

4.5 Operating mode switch power

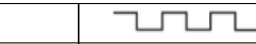
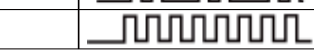
Using a 3-position rocker switch, with the Remote ON/OFF interface in the closed state, the inverter has three operating modes: OFF, Ⅰ, and Ⅱ.

Switch position	Definition of mode	Description of mode
OFF	OFF mode	The device is in off state, not working, and has no loss
Ⅰ	Normal mode	The device is in normal operating condition and can provide inverter output or charged based on the battery and AC input conditions
Ⅱ	Charging mode only	The device is only used for charging or bypass loading and will not operate in inverter mode

4.6 LED indicator

◆Inverter indicator-green; Charging indicator-yellow; Fault indicator-red.

◆ Indicators are defined as follows:

Indicator	Color	State	State description
Inverter	Green	Normally on	Inverter output
		Slow flash	Inverter ECO output
		OFF	Inoperative inverter
Charger	Yellow	Normally on	Battery is fully charged or AC in access is not charged/or only bypass output
		Slow flash	Absorption charge
		Single flash	Float charging/float or storage charging/storage
		Fast flash	Equalizing charging/equalize
		Double flash	Current-limited charging/bulk/test
		OFF	No AC in connected
Fault	Red	Normally on	System fault
		Single flash	Stand-by, no inverter or not charging
		OFF	Normal system
Definition of indicator flashing:			
Slow flash	1s ON, 1s OFF in 2s		
Single flash	0.1s ON, 1.9s OFF in 2s		
Double flash	0.1s ON, 0.1s OFF, 0.1s ON and 1.7s OFF in 2s		
Fast flash	1s ON, 0.1s OFF in 0.2s		

5. Installation Instructions

5.1 Installation precautions

Please read this manual carefully before installation to be familiar with the installation steps.

◆Be careful when installing battery. Wear safety goggles when installing a lead-acid liquid battery. Once coming into contact with the battery acid, rinse with clean water timely.

◆Keep away from metal objects to prevent short-circuit of battery.

◆The battery may produce acid gas when charging. Make sure that the ambient environment is well-ventilated.

◆When installing the cabinet, there must be enough space around the inverter charger for heat dissipation; Do not install the inverter charger and lead-acid battery in the same cabinet to avoid corrosion by acid gas generated during battery operation.

◆As false connections and corroded cables may cause extreme heat to melt the cable insulation, burn surrounding materials and even cause a fire it is necessary to ensure that the connections are tightened, and the cables are fixed with ties to avoid loose connections due to shaking of cable on the move.

◆The system connection cables selected shall have a current density ≤5A/mm².

◆During outdoor installation, direct sunlight and rainwater infiltration shall be avoided.

◆After the power switch is turned off, there is still high voltage inside the inverter charger. Do not turn on or touch the internal devices. Carry out relevant operations after the capacitor is discharged.

◆Do not install the inverter charger in harsh environments such as moist, oily, flammable or explosive, or heavily dusty areas.

◆Polarity at the battery input terminal of this product shall not be reversed. Otherwise, it may damage the device or cause unpredictable danger.

◆The AC output is a high voltage, so please do not touch the wiring.

◆Do not touch the working fan to prevent injury.

◆It is necessary to confirm that the inverter charger is the only input device for load, and it is for bidden to use it in parallel with other input AC power to avoid damage.

5.2 Wiring specifications and circuit breaker selection

Wiring and installation must comply with national and local electrical codes.

◆Battery input wiring specifications and circuit breaker selection

Model	Rated input current	Battery input wiring specifications	Circuit breaker selection
RIU12-3KW	291A	80mm²/(1AWG*2)	DC-2P-350A

◆AC output wiring specifications and circuit breaker selection

Model	Rated output current	AC output wiring specifications	Circuit breaker selection
RIU12-3KW	50A	13mm²/6AWG	AC-50A

◆AC intput wiring specifications and circuit breaker selection

Model	Rated input current	AC output wiring specifications	Circuit breaker selection
RIU12-3KW	50A	13mm²/6AWG	AC-50A

Attention: The above are reference specifications. Please select the appropriate specification and model according to actual situation.

Attention: The wiring diameter is for reference only. If the distance between the inverter charger and improve system performance.

Attention: The above only recommended wiring diameter and circuit breaker. Please select the appropriate wiring and diameter and circuit breaker to actual situations.

5.3 Check the AC Loads (Appliances)

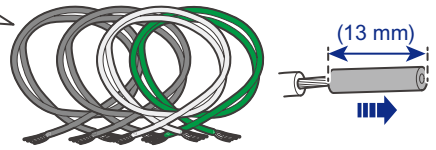
It works seamlessly with both 120V and 240V grid power systems and outputs 120V or 240V AC voltage in accordance with the AC input voltage. Choose proper accessories and cables based on the rated voltage of the connected AC loads (appliances).

AC Input Voltage	AC Output Voltage
Split-phase 120V/240V	120V/240V
Single-phase 120V	120V
0V (when grid power is unavailable)	120V

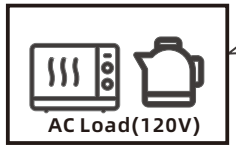
◆ Recommended Components & Accessories

Recommended Cable Size

Cable Length	Cable Size
0 ft to 10 ft	6AWG
11 ft to 20 ft	4~6AWG
21 ft to 30 ft	4AWG

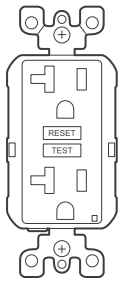


Bare Wires × 4



Total Load Power

Grid Power	Ratings
Unavailable	≤3000W @120V
Available	≤6000W @120V/240V



Recommended GFCI Spec

Grid Power	Ratings
Unavailable	≥25A@120V
Available	≥50A@120V
	≥50A@240V

A ground fault circuit interrupter, or GFCI, is a device that helps protect people from electric shock by de-energizing a circuit or part of a circuit within a specified time if a current to ground exceeds a by de-energizing a circuit or part of a circuit within a specified time if a current to ground exceeds a predetermined value that is less than that required to operate the over-current device (circuit breaker or fuse) on the service circuit. GFCIs are typically required in wet or damp locations.

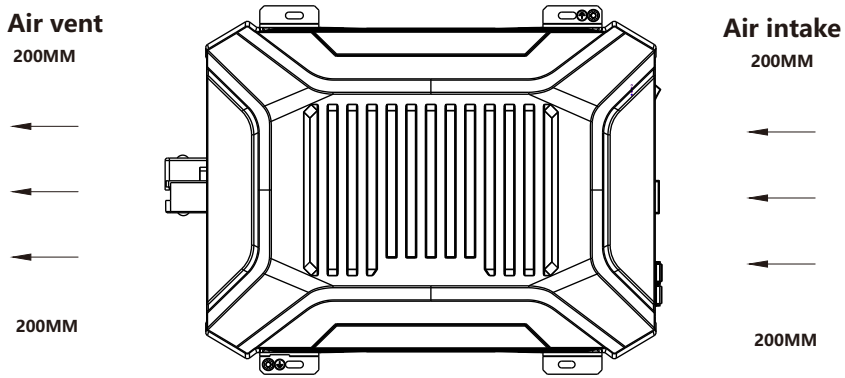
5.4 Installation and wiring

Installation steps:

Step 1: Please read the user manual carefully.

Step 2: Determine the installation position and the space for heat dissipation

Determine the installation position (wall-mounted or horizontal installation method can be adopted): when installing the inverter charger, confirm that there is enough space of at least 200m reserved between the air vent and air intake of the inverter to facilitate air circulation.



Attenion: If the device is installed in a closed box, ensure that heat dissipation is allowed through the container. Otherwise, derate to use the device.

Step 3: Wiring

Warning: The AC device shall be determined based on the inverter charger's continuous output power instantaneous impact power. Otherwise, the inverter charger may be damaged.

Attention: Before wiring, switch the inverter charger to the OFF.

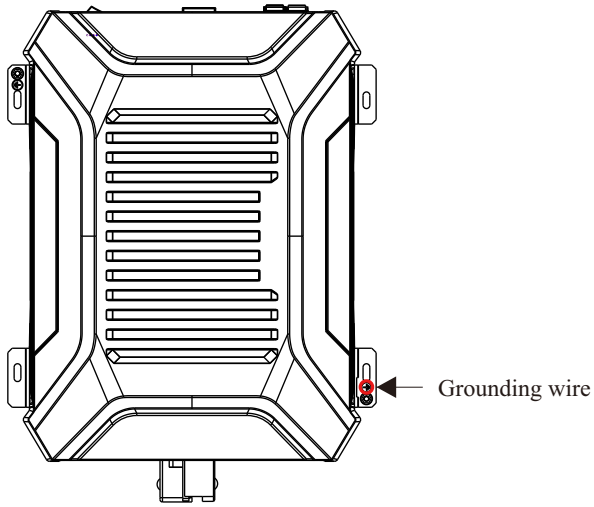
Attention: Do not close the circuit breaker or fuse during wiring, and check if the electrode leads of each component are properly connected.

Attention: A fuse must be installed at the battery terminal, selected at 2 to 5 times the rated input current of the inverter charger, and the fuse position should be no more than 150mm from the battery terminal.

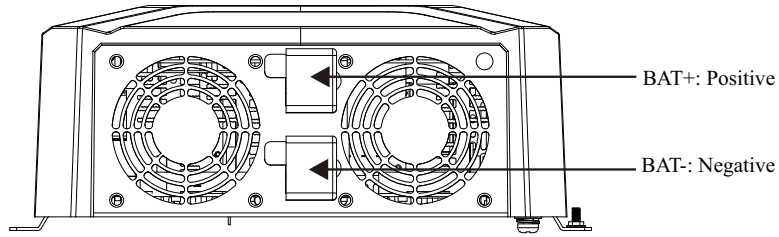
Attention: There is no reverse connection protection for the input, check if the Positive and Negative are connected correctly before connecting.

Wiring sequence:

3.1 Ground wire



3.2 Positive/Negative wires of storage battery



Attention: There is no reverse connection protection for the input, check if the Positive and Negative are connected correctly before connecting, or the inverter charger may be damaged!

3.3 AC equipment

For a split-phase 120V/240V AC input system with L1, L2, and neutral (N):

◆When the AC output is connected to L1, L2, and neutral (N), the inverter charger outputs 240V.

◆When the AC output is connected to L1 and neutral (N), the inverter charger outputs 120V.

For a single-phase 120V grid system or when no grid power is available, the inverter charger outputs 120V.

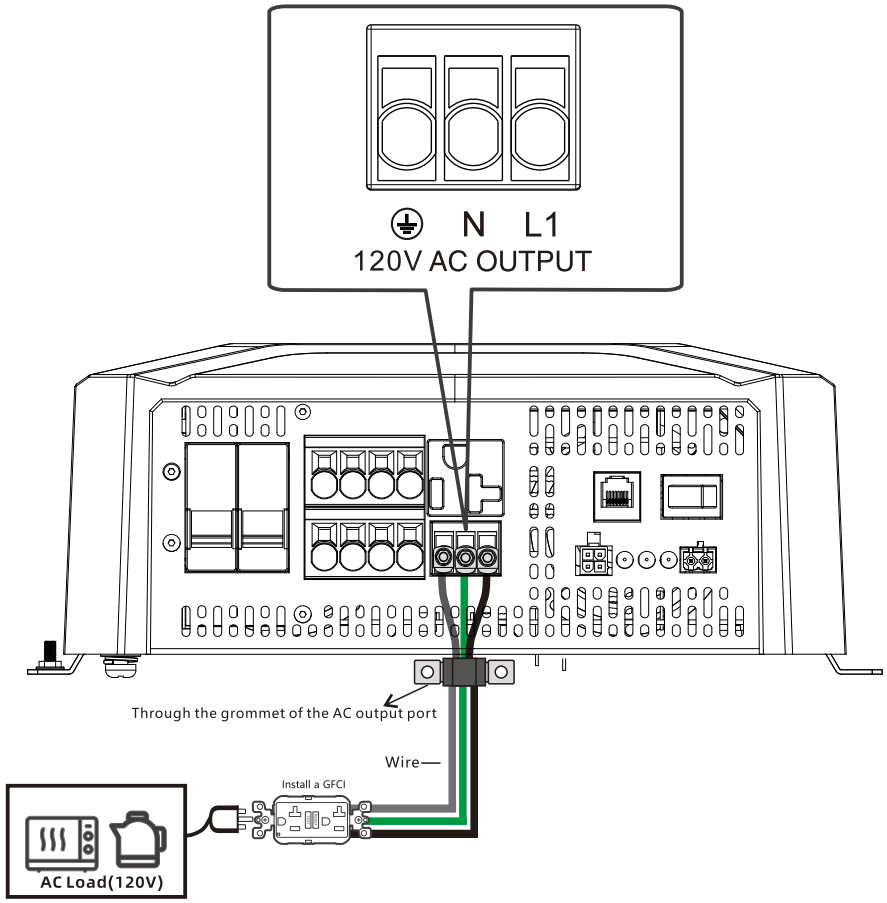
◆Single-phase output 120V

Step 1: Strip some insulation (0.39 in/10 mm) off each of the three bare wires with a wire stripper, and run the three bare wires through the grommet of the AC Output Port on the inverter charger.

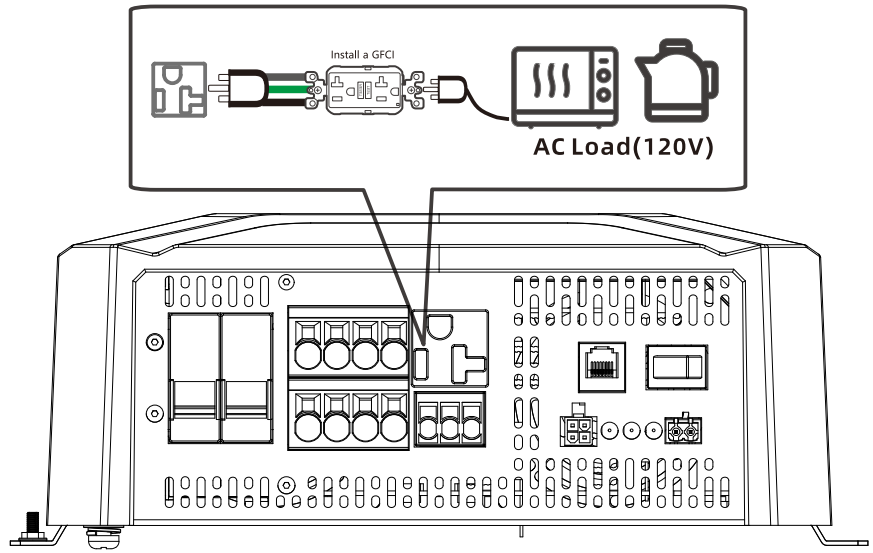
Step 2: Connect the bare wires to the live (L1), neutral (N) and ground (⏚) terminals respectively on the inverter charger.

Step 3: Locate the live, neutral, and ground terminals on the GFCI, and connect the other ends of the bare wires to the respective terminals on the GFCI. The L1 terminal of the inverter charger should be connected to the live terminal on the GFCI. The same rules apply to the neutral and ground terminals.

Step 4: To ensure optimal performance of the inverter charger, it is recommended that the GFCI should be connected to AC loads after the inverter charger is securely powered on with necessary wiring completed.



◆The inverter is equipped with a standard AC output terminal, as shown in the figure. The terminal has a maximum current rating of 16A, and an internal fuse is provided to protect the terminal from damage. Follow the connection terminal steps above.



◆**Split-phase 120V/240V**

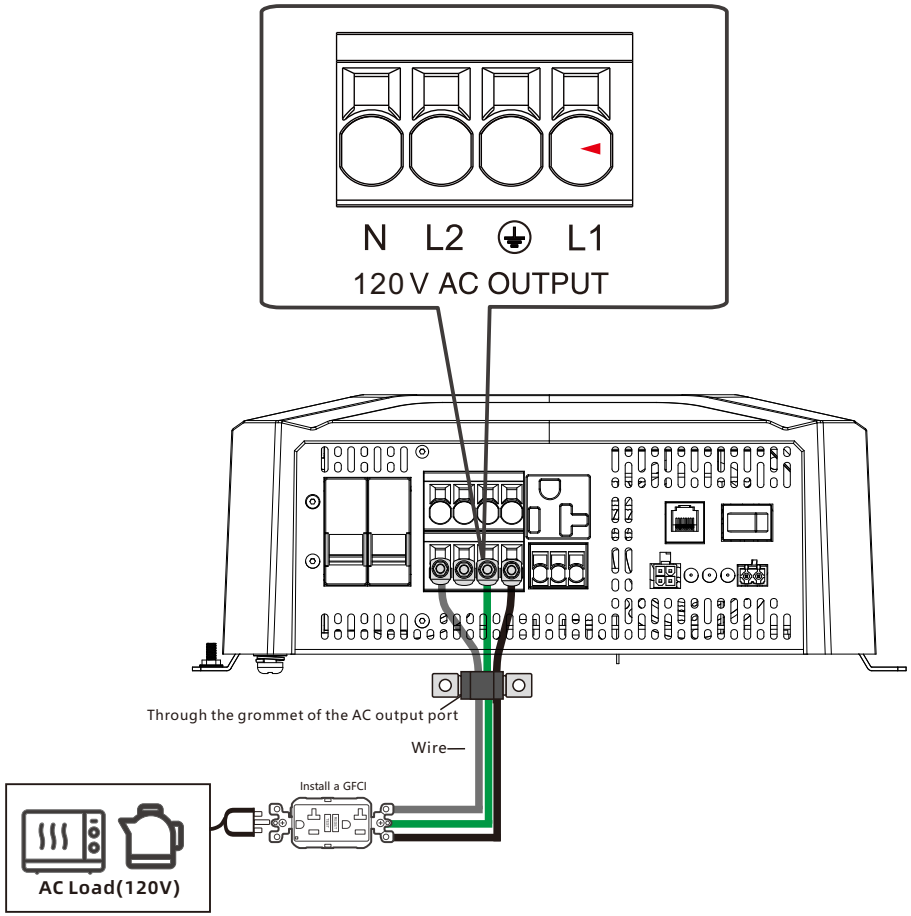
◆120V output wiring:

Step 1: Strip some insulation (0.39 in/10 mm) off each of the three bare wires with a wire stripper, and run the three bare wires through the grommet of the AC Output Port on the inverter charger.

Step 2: Connect the bare wires to the live (L1), neutral (N) and ground (⏚) terminals respectively on the inverter charger.

Step 3: Locate the live, neutral, and ground terminals on the GFCI, and connect the other ends of the bare wires to the respective terminals on the GFCI. The L1 terminal of the inverter charger should be connected to the live terminal on the GFCI. The same rules apply to the neutral and ground terminals.

Step 4: To ensure optimal performance of the inverter charger, it is recommended that the GFCI should be connected to AC loads after the inverter charger is securely powered on with necessary wiring completed.



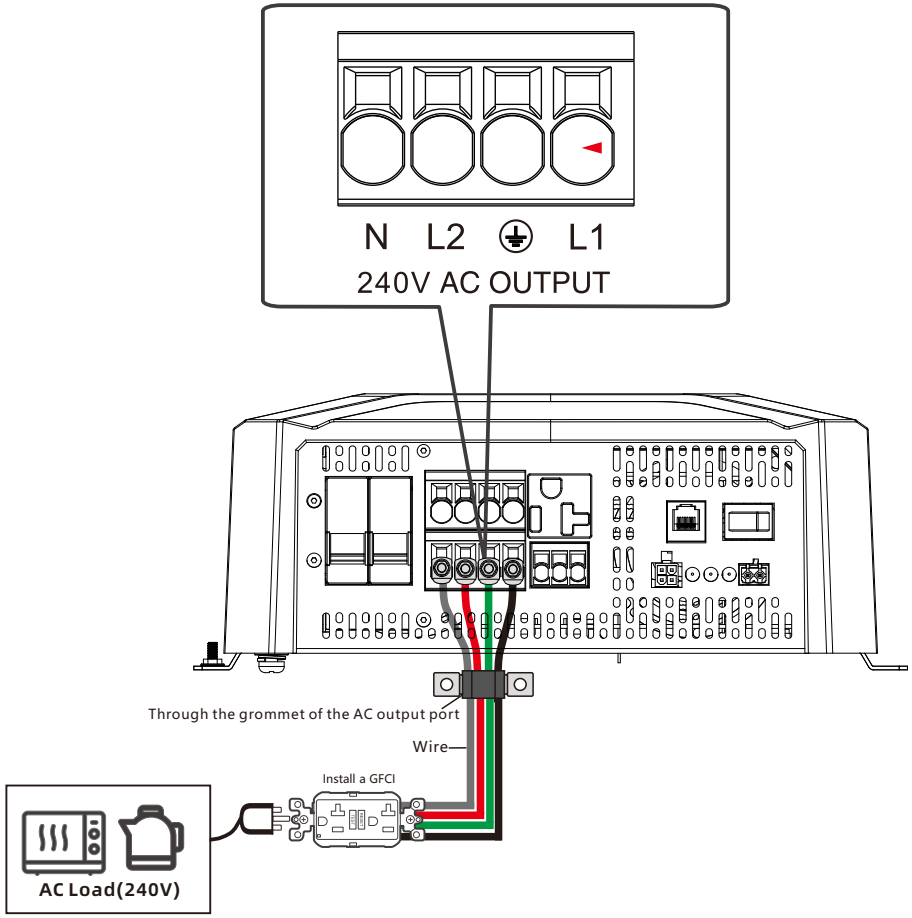
◆240V output wiring:

Step 1: Strip some insulation (0.39 in/10 mm) off each of the four bare wires with a wire stripper, and run the four bare wires through the grommet of the AC Output Port on the inverter charger.

Step 2: Connect the bare wires to the live (L1 and L2), neutral (N) and ground (⏚) terminals respectively on the inverter charger.

Step 3: Locate the live, neutral, and ground terminals on the GFCI, and connect the other ends of the bare wires to the respective terminals on the GFCI. The L1 and L2 terminals of the inverter charger should be connected to the live terminal on the GFCI. The same rules apply to the neutral and ground terminals.

Step 4: To ensure optimal performance of the inverter charger, it is recommended that the GFCI should be connected to AC loads after the inverter charger is securely powered on with necessary wiring completed.



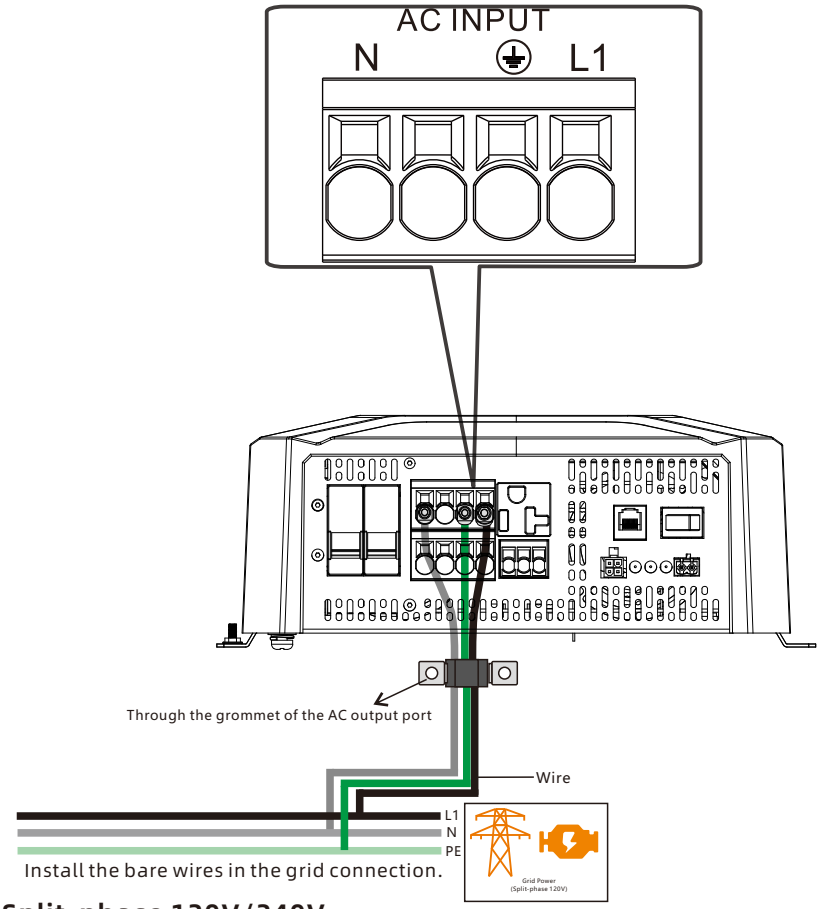
3.4 AC Input

◆Single-phase 120V

Step 1: Strip some insulation (0.39 in/10 mm) off each of the three bare wires with a wire stripper, and run the three bare wires through the grommet of the AC Input Port on the inverter charger.

Step 2: Connect the bare wires to the live (L1), neutral (N) and ground (⏚) terminals respectively on the inverter charger.

Step3: Locate the live, neutral, and ground terminals on the grid, and connect the other ends of the bare wires to the respective terminals on the grid. The L1 terminal of the inverter charger should be connected to the live terminal on the grid. The same rules apply to the neutral and ground terminals.



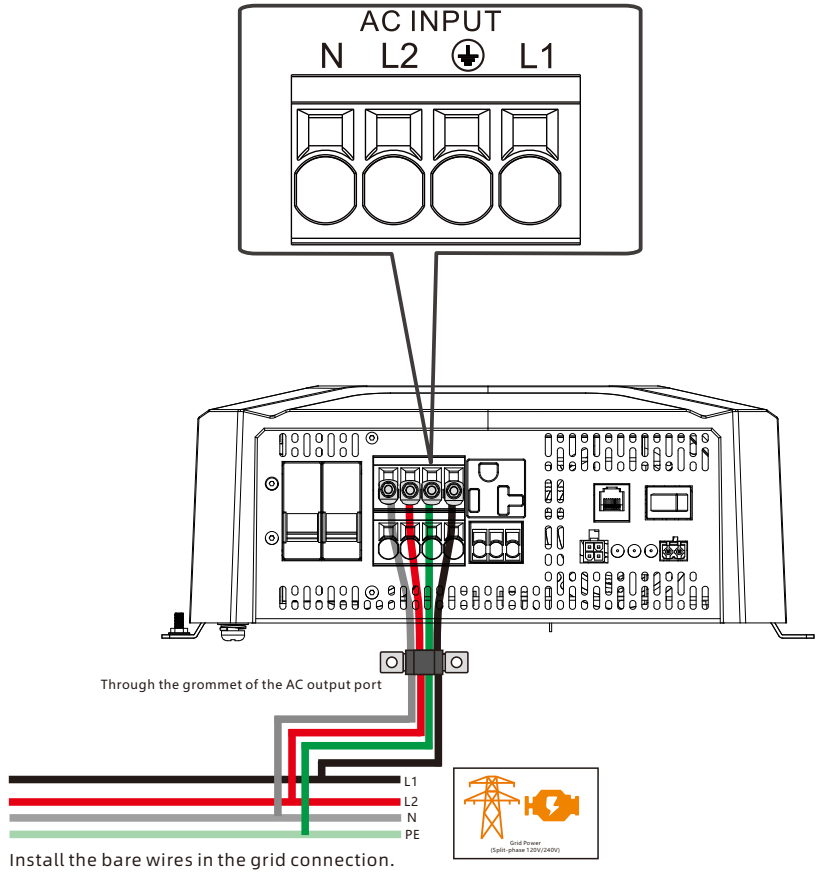
◆**Split-phase 120V/240V**

The 240VAC output is only available when the inverter charger is supplied by a split phase 120/240VAC source.

Step 1: Strip some insulation (0.39 in/10 mm) off each of the four bare wires with a wire stripper, and run the four bare wires through the grommet of the AC Input Port on the inverter charger.

Step 3: Connect the bare wires to the live (L1 and L2), neutral (N) and ground (⏚) terminals respectively on the inverter charger.

Step 4: Locate the live, neutral, and ground terminals on the grid, and connect the other ends of the bare wires to the respective terminals on the grid. The L1 terminal of the inverter charger should be connected to the live terminal (L1) on the grid. The same rules apply to the L2, neutral, and ground terminals.

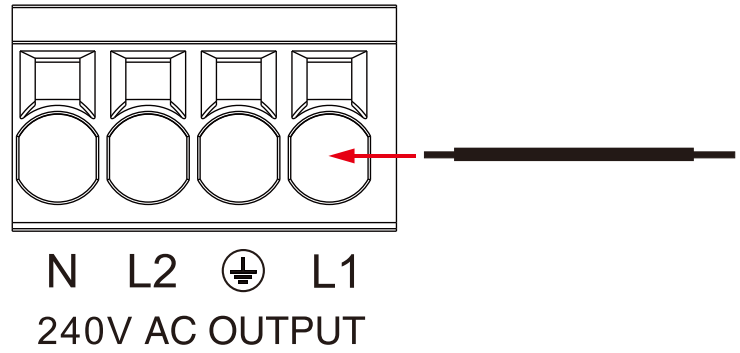


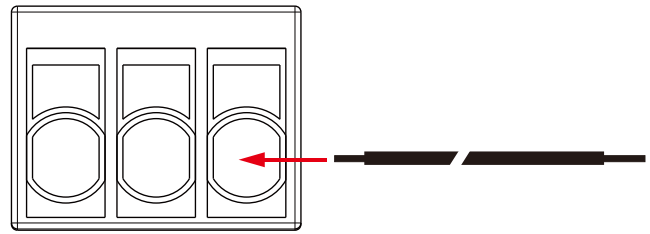
Install the bare wires in the grid connection.

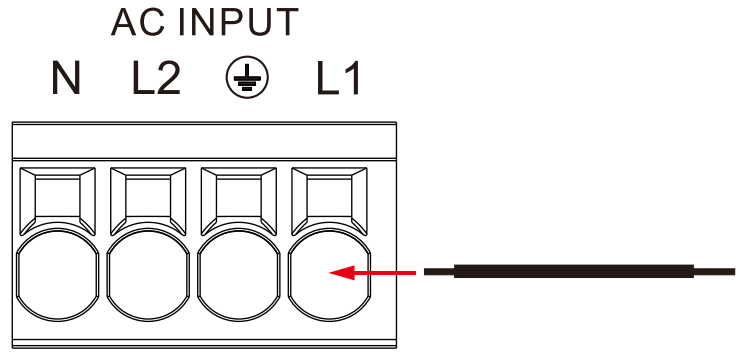
Attention: It is recommended to use 13 mm²/6AWG copper wire or thicker. The wire size can be increased as appropriate according to actual requirements.

Attention: If stranded wire is used, apply solder to the wire end to form a solid tip before inserting it into the corresponding terminal hole.

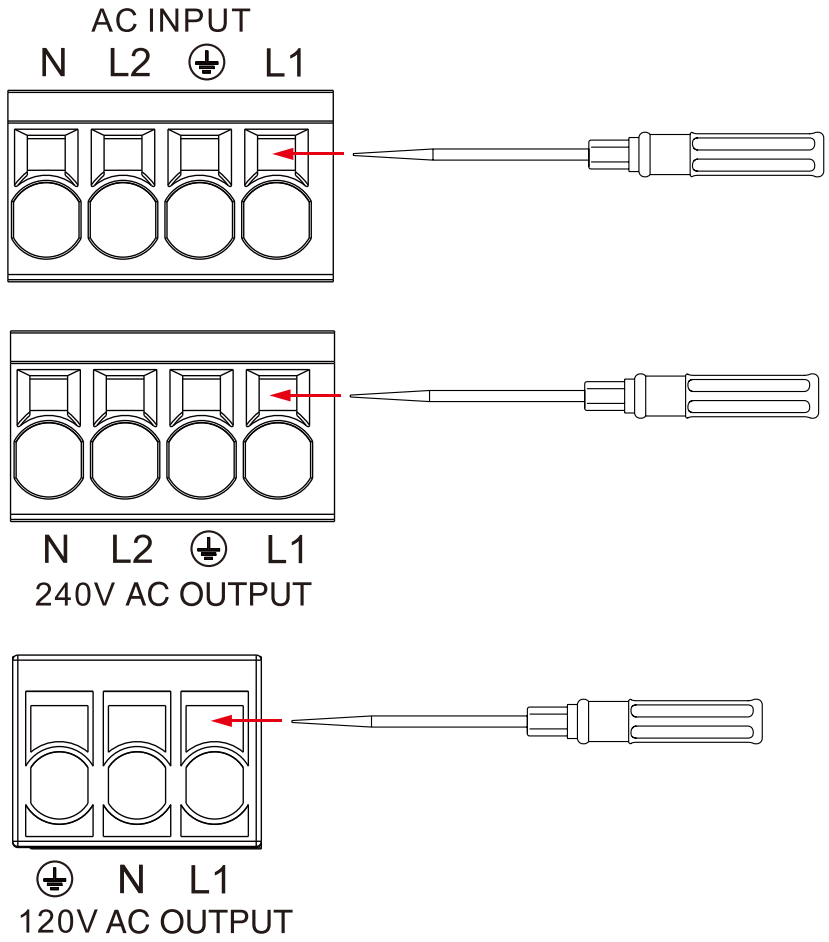
Attention: Connect the ground wire first, then connect the live wire (L) and the neutral wire (N).



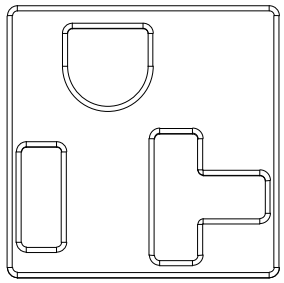




◆When removing the wiring, stop the inverter first, then use a sharp tool to insert the small hole above the interface and pull out the connection wire forcefully.



◆The inverter is equipped with a standard U.S. terminal, as shown in the figure below. The terminal has a maximum current rating of 16 A.



Step 4: Start the inverter charger

4.1 Close the circuit breaker at the DC input end of the inverter charger or the fuse at the battery end;

4.2 Short-circuit the external switch contact interface of the inverter charger (the factory default is short-circuited);

4.3 Set the inverter charger mode switch to ON position to start the inverter charger output: the running indicator light is green and the inverter charger outputs AC power normally;

4.4 Close the circuit breaker on the AC load line, turn on the AC loads one by one, and check the operating the operating status of the inverter charger and loads;

4.5 If the fault indicator turns red and the buzzer sounds after starting the inverter charger, please turn off the load and inverter charger and refer to refer to "Common Problems and Solutions" for troubleshooting. After troubleshooting follow the above steps again.

6. Protection Function

6.1 DC input overvoltage protection

When the battery voltage is greater than the input over-voltage protection voltage, turn off the AC output, fault indicator lamp and buzzer; When the battery voltage is less than the input over-voltage protection voltage of -1V*N, AC output will be restored.

Attention: Although the inverter charger has the function of DC input over-voltage protection, the input voltage of 12V system should not be higher than 20V*N.

6.2 DC input low voltage protection

When the battery voltage is less than the input low-voltage protection voltage, turn off the AC output, fault indicator and buzzer; When the battery voltage is greater than the input output, fault indicator and buzzer; When the battery voltage is greater than the input low-voltage t low-voltage protection recovery voltage, AC output is restored.

6.3 Output of overload protection

When the AC load is greater than the rated output power, corresponding protection shall be made according to different overload levels, as follows:

Load power	Possible duration
102%≤Po≤120%	1min
120% < Po≤150%	30s
Po>150%	10s

Attention: When the inverter charger has overload protection, the AC output has three automatic recovery functions (the first delay is 5s, the second delay is 10s, and the third delay is 15s). It will not recover automatically for the fourth time. Check the equipment and restart the inverter charger after troubleshooting to recover the AC output.

6.4 AC output short circuit protection

When the AC output L/N is short-circuited, the inverter charger automatically turns off the AC output, and the fault indicator lamp and buzzer prompt.

Attention: When the inverter charger is short-circuit protected, the AC output has three automatic recovery functions (the first delay of 5s, the second delay of 10s and the third delay of 15s). It won't recover automatically for the fourth time, and the AC output can only be recovered after restarting the inverter charger after troubleshooting.

6.5 AC input overcurrent protection

When the AC input current of AC in is greater than 50A, the inverter charger will automatically disconnect the AC input, fault indicator light and buzzer.

Attention: When the inverter charger has AC input over-current protection, the AC output has three automatic recovery functions (the first delay is 5s, the second delay is 10s, and the third delay is 15s). It will not recover automatically for the fourth time. Check the equipment and restart the inverter charger after troubleshooting to recover the AC output.

6.6 AC input overvoltage protection

When the AC input voltage is greater than 140VAC, the AC input will be automatically disconnected.

6.7 AC input undervoltage protection

When the AC input voltage is less than 90VAC, the AC input will be automatically disconnected.

6.8 Inverter N-G grounding protection

In the inverter mode, the relay inside the inverter charger controls the zero line to be connected with the ground line and the zero line of the analog mains transformer is grounded. At this time, the with the ground line and the zero line of the analog mains transformer is external leakage protection can work normally and play a protective role in case of leakage.

When the mains bypass is loaded, the neutral line controlled by the relay inside the inverter charger is not connected with the ground line. Because the neutral line on the mains transformer side has been grounded, the leakage protection can work normally at this time, which plays a protective role in case of leakage. If the customer connects the zero line to the ground without authorization, it will cause the leakage protection to accidentally trigger the cut-off circuit.

Attention: It is forbidden for customers to connect the neutral wire and the ground wire by themselves, which may lead to mis-operation, danger and equipment damage.

6.9 Equipment over-temperature protection

Multi-channel temperature detection is provided inside the equipment, and any temperature greater than the over-temperature protection value of the equipment will automatically turn off the AC output, and the fault indicator lamp and buzzer will prompt; When the temperature is less the recovery value of equipment over-temperature protection, the AC output will be automatically than restored.

Attention: In order to ensure that the inverter charger can run reliably and stably at full power for a long time, please ensure a good ventilation environment.

6.10 Fan Fault Protection

When the fan is blocked or cannot operate for other reasons:

(1) The inverter charger's inverter output power can only operate at up to 30% of the rated power; when the load power exceeds 30% of the rated power, the AC output and input will shut down.

(2) The inverter charger supports AC charging up to 70% of the rated charging current; if this limit is exceeded, the AC output will shut down.

Attention: When the load power is greater than 30% of the rated power, the AC output will be turned off, and the AC output has the function of automatic recovery for three times (each delay is 60s). It will not recover automatically for the fourth time. Check the equipment and restart the inverter charger after troubleshooting to recover the AC output.

Attention: In order to ensure that the inverter charger can run reliably and stably at full power for a long time, please ensure a good installation environment, avoid oil stains, wires and other blocking fans, and check whether the fans are running regularly.

7. Common Problems And Solutions

No.	Phenomenon	Cause	Possible cause	Solutions
1	Red light always on, green/ yellow off, buzzer buzzing, light no AC output	Over-low battery input voltage	1.Excessive voltage drop due to over-small battery wiring diameter. 2.Low battery power.	1.Choose the suitable wires. 2.Timely charge the battery until the low voltage recovery voltage can self-restore the output.
2	Red light always on, green/ yellow light off, buzzer buzzing, no AC output	Over-high battery input voltage	Mismatch between battery voltage and device system voltage	Measure the positive and negative terminal voltage of the device with a determine whether they are voltmeter to determine whether they are higher than the over-voltage protection voltage, and recover by adjusting the input voltage.
3	Red/green light always on, yellow light off, buzzer buzzing, With AC output	Overload	Power of load device higher than rated output power	Check whether the AC load is within the rated power range of the inverter charger.

No.	Phenomenon	Cause	Possible cause	Solutions
4	Red light always on, green/ yellow light off, buzzer buzzing, no AC output	Overload	Power of load device higher than rated output power	Check whether the AC load is within the rated power range of the inverter charger; and eliminate the load overload fault and restart the inverter charger to restore normal operation.
5	Red light always on, green/ yellow light off, buzzer buzzing, no AC output	Load short-circuited	1.AC output of the inverter charger short-circuited. 2.AC device L/N short-circuited.	Check whether the AC load wiring is short-circuited. Clear the load short-circuit fault, and restart the inverter charger to restore normal operation.
6	Red light always on, green/yello w light off, buzzer buzzing, no AC output, no charge	AC input Over-voltage	Connected AC voltage exceeded the maximum input voltage of the device by 140V.	Check whether the connection voltage AC is within the range of 90~140V.
7	Red light always on, green/yellow light off, buzzer buzzing, no AC output, no charge	AC input Under-voltage	Connected AC voltage lower than the minimum input voltage of the device by 90V.	Check whether the AC connection voltage is within the range of 90~140V.

No.	Phenomenon	Cause	Possible cause	Solutions
8	Red light always on, green/yell ow light off, buzzer buzzing, no AC output, no charge	Over-high device temperat ure	Internal temperature of device higher than the set over-temperature protection.	Improve the quality of ventilation, clear the vent, reduce the temperature around the inverter charger, and restart the device after the temperature is reduced. Please derate the amount if troubleshooting fails.
9	Red light always on, green/ yellow light off, buzzer buzzing, no AC output, no charge	Fan fault	The fan is blocked by foreign matter.	Check whether the fan works properly.
10	Red light Single flash, green/ yellow light off, no AC output, no charge	misemploy	1.AC-IN is not connected, but the equipment switch is in Ⅱ (Charge only) mode. 2. Lead-acid battery mode but equipment electricity Pool missed.	1.Turn the equipment switch to Ⅰ mode. 2.Set the correct battery type or the battery is damaged.

8. System Maintenance

In order to maintain the best long-term performance, it is recommended to conduct following checks twice a year.

- ◆Make sure that the airflow around the inverter charger is smooth and remove any dirt or debris from the heat sink.
- ◆Check whether all exposed wires are damaged by exposure to sunlight, friction with other objects around them, dryness, bite by insects or rodents, etc. The wires shall be repaired or replaced if necessary.
- ◆Verify for the consistency of indicator and display with the operation of the device. Please pay attention to any faults or errors, and take corrective actions if necessary.
- ◆Check all wiring terminals for corrosion, insulation damage, signs of high temperature or burning/discoloration, and tighten the screws.
- ◆Check for dirt, nesting insects and corrosion, and clean up as required.
- ◆The arrester failed shall be replaced in time against lightning damage to the inverter charger or even other device of the user.

Warning: Danger of electric shock! Make sure that the inverter charger power is disconnected and the power in the capacitor is discharged before carrying out the corresponding checks or operations!

The Company does not assume any liability for damage caused by:

- Improper use or use in improper site.
- Current, voltage and power of the load exceeding the limit of the inverter charger.
- Arcing,fire and explosion caused by failure to follow inverter charger markings or manual instructions.
- Disassemble and repair the inverter charger without permission.
- Force majeure.
- Damage that occurs in transportation or handling of the inverter charger.
- Damage to the machine caused by using the product outside the parameters.