

USER MANUAL



IPR SERIES

Pure Sine Wave Inverter

IPR1012, IPR1512, IPR2012, IPR3012
IPR1011, IPR1511, IPR2011, IPR3011

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Preface

Copyrights

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Disclaimers

Before using the product, please read this manual carefully to ensure you fully understand the product and can use it correctly. Please keep this manual properly for future reference after reading. Improper use of this product may cause serious injury to you or others, or result in product damage and property loss. By using this product, you are deemed to have understood, acknowledged, and accepted all terms and contents in this manual. BEIJING EPSOLAR TECHNOLOGY CO., LTD. shall not be liable for any losses caused by the user's failure to use the product in accordance with this manual.

The warranty does not apply to the following conditions:

- Damage caused by improper use or inappropriate environments (such as the humid, salt spray, corrosive, greasy, flammable, explosive, dust accumulative or other harsh environments).
- The actual current/voltage/power exceeds the limit value of the inverter.
- Damage caused by operating temperature exceeding the rated temperature range.
- Electric arc, fire, explosion and other accidents caused by failure to follow inverter labels or manual instructions.
- Unauthorized disassembly and maintenance of the inverter.
- Damage caused by force majeure such as lightning strikes, rainstorms, mountain torrents and utility failures.
- Damage occurred during transportation or loading/unloading the inverter.

Scope of application

This user manual describes the installation, electrical connection, commissioning, maintenance and troubleshooting of the IPR series pure sine wave inverter (hereinafter referred to as "inverter"). The IPR series includes the following product models:

IPR1012, IPR1512, IPR2012, IPR3012, IPR1011, IPR1511, IPR2011, IPR3011

This manual is only intended for professionals who are familiar with local regulations, standards and electrical systems, have received professional training, and know the product well.

Symbol definition

To ensure the user's personal and property safety during operation, as well as the efficient use of this product, relevant safety instructions are provided in the manual and highlighted with the corresponding symbols. To prevent personal injury and property damage, please fully understand and strictly follow these highlighted information. The symbols used in this manual are as follows:



DANGER

Indicates a high-level hazard that, if not avoided, will result in serious injury or death.



WARNING

Indicates a medium-level hazard that, if not avoided, could result in death or serious injury.



CAUTION

Indicates a low-level hazard that, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates an important reminder during the operation which, if ignored, may result in an equipment error alarm.

Tip

Indicates recommendation for reference.



Read through the user manual before any operations.

Important Safety Instructions

Please keep this manual for future reference.

1. Requirements for professional and technical personnel

- Professionally trained.
- Familiar with related safety specifications for the electrical system.
- Read this manual carefully and master related safety precautions.

2. Operations for professional and technical personnel

- Install the inverter to a specified location.
- Conduct trial operations for the inverter.
- Operate and maintain the inverter.

3. Safety precautions before installation



DANGER

- Keep the inverter out of the reach of children.
- When installing the inverter, please evaluate whether there is a risk of electric arc in the operation area.

NOTICE

- After receiving the inverter, check if there is any damage during transportation. If you find any problem, please contact the transportation company or us in time.
- When placing or moving the inverter, follow the instructions in the manual.
- The inverter needs to be connected to a battery. The battery's minimum capacity (Ah) is recommended to be five times the current that equals the inverter's rated output power divided by the battery's voltage.
- This inverter is an off-grid type. It is strictly prohibited to connect the inverter to the grid. Otherwise, the inverter will be damaged.
- This inverter is only allowed for stand-alone operation. It is prohibited to connect multiple units in parallel or series. Otherwise, the inverter will be damaged.

4. Safety precautions for mechanical installation



DANGER

Before installation, ensure the inverter has no electrical connection.

NOTICE

Ensure enough heat dissipation space for the inverter before installation. Do not install the inverter in a harsh environment such as humid, greasy, flammable, explosive, or dust accumulation. Do not install the inverter in the closed space, do not cover or block the vent.

5. Safety precautions for electrical connection



DANGER

Do not install the inverter close to the flooded lead-acid battery because the terminals' sparkle may ignite the hydrogen released by the battery.



WARNING

Check whether wiring is tight to avoid the danger of heat accumulation due to loose connections.

NOTICE

- The protective grounding is connected to the ground. The cross-section of the wire should not be less than 4mm².
- The DC input voltage must strictly follow the parameter table. Too high or too low DC input voltage will affect the inverter's normal operation and may even damage it.
- It is recommended that the connection length between the battery and the inverter be less than 3 meters. If greater than 3 meters, please reduce the current density of the connection wire.
- A fuse or breaker should be used between battery and inverter; the fuse or breaker's rated current should be twice the inverter rated input current.
- The AC output terminal is only for the load connection. Do not connect it to another power source or utility. Otherwise, the inverter will be damaged. Turn off the inverter when connecting loads.
- Do not connect battery chargers or other similar products to the input terminal of the inverter. Otherwise, the inverter will be damaged.

6. Safety precautions for inverter operation



DANGER

The inverter's AC output is of high voltage, do not touch the wiring connection to avoid electric shock.



WARNING

- When the inverter is working, the shell will generate much heat, and the temperature is very high; please do not touch it.
- When the inverter is running, please do not open the cabinet.

7. Dangerous operations which would cause electric arc, fire or explosion

- Touch the wire end that hasn't been insulation treated and maybe electriferous.
- Touch the terminals or internal inverter modules that may be electriferous.
- The connection of the power cable is loose.
- Screw or other spare parts inadvertently fall into the inverter.
- Improper operations by untrained non-professional or technical personnel.



DANGER

Once an accident occurs, it must be handled by professional and technical personnel. Improper operations would cause more serious accidents.

8. Safety precautions for stopping the inverter

- The internal conductive modules could be touched after the inverter stopped running for 10 minutes.
- The inverter is allowed to restart after removing the faults, which affects the safety performance.
- There are no serviceable parts inside. If any maintenance service is required, please contact our service personnel.



DANGER

Do not touch or open the shell after the inverter is powered off within 10 minutes.

9. Safety precautions for inverter maintenance

- It is recommended to check the inverter with testing equipment to ensure no voltage and current.
- When conducting the electrical connection and maintenance, post a temporary warning sign or put up barriers to prevent the unrelated personnel from entering the electrical connection or maintenance area.
- An improper operation of the inverter may cause personal injury or equipment damage.
- It is recommended to wear an antistatic wrist strap or avoid unnecessary contact with the circuit board.

1 General Information

1.1 Product overview

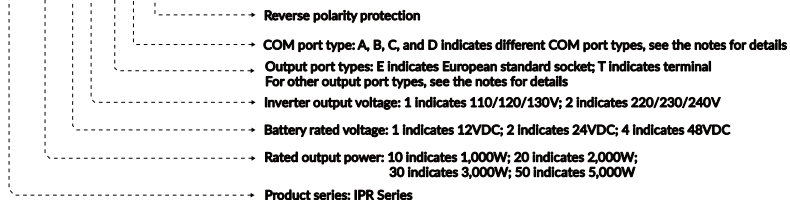
The IPR series is a high-frequency pure sine wave inverter with AC input load-carrying function, meeting the requirements of inverter or AC power supply. This inverter adopts RS485 and CAN/LIN for external communication, and the CAN communication adopts the RV-C communication protocol dedicated to RVs, enabling convenient access to the RV system to realize the display and control of the inverter, and with ultra-low standby power consumption. Advanced voltage and current double closed-loop control algorithm brings the inverter precise power control, guarantees high stability and high conversion efficiency of the inverter. The inverter features high response speed, high conversion efficiency and low THD. The inverter can be widely used in DC to AC solar off-grid systems, such as homes, RVs or camping with high-quality and reliable power supply.

Features

- Pure sine wave output: stable frequency and voltage, low ripple, ensuring stable operation of various electronic devices
- Outstanding load capacity: suitable for various resistive, inductive and capacitive loads, applying to the air conditioners, refrigerators, electric tools, etc.
- Electrically isolated design for input and output
- Automatic switch of AC input (when the AC input is normal, the AC input supplies power to the load)
- Input reverse polarity protection
- Support RS485 communication, connected with optional accessories for remote monitoring
- Support CAN communication and adopt the RV-C communication protocol dedicated to RVs, with high system compatibility
- External switch contact design, the inverter can be turned on/off remotely via a relay
- Input undervoltage/overvoltage protection, output overload/short circuit protection, and overtemperature protection
- Low no-load loss, low standby loss, low THD, and high conversion efficiency
- Air cooling controlled by dual conditions of temperature and load
- Output power factor up to 1, and operate at full load power for a long time
- High power density and long-life components to ensure product stability

Naming rules

IPR 20 1 2-E A R



Notes:

● Explanations for the COM port

A: the communication port is configured with one RS485 port.

B: the communication port is configured with one RS485 port and one BMS port.

C: the communication port is configured with one RS485 port and one CAN port.

D: the communication port is configured with one RS485 port and one LIN port.

● Explanations for the AC output port

Suffix	Instruction	Figure
A	Australia socket	
C	Chinese dual-socket	
E	European socket	
F	French socket	
GFCI ⁽¹⁾	American socket	

N	American socket (for products rated 1,500W and below)	
	American socket (for products rated 2,000W and above)	
T	Terminal	
UK	United Kingdom socket	

(1) GFCI socket needs to be tested after power-on to ensure proper operation.

Preparation

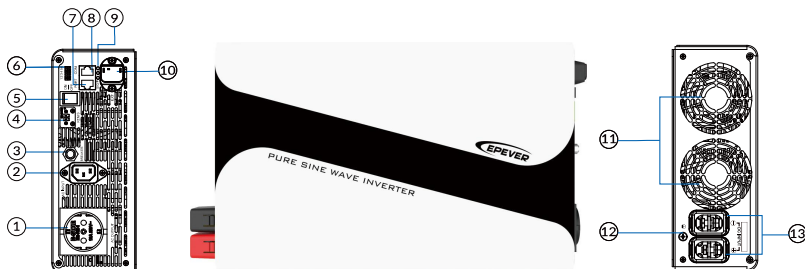
Connect a circuit breaker and load (it is recommended to use a night light to observe the status conveniently) to the GFCI socket. Turn on the inverter after confirming the wiring.

Testing

- If the red indicator is solid ON, it indicates that the GFCI socket is damaged; please replace a new one.
- If the indicator is green ON after it flashes in red three times, connect the circuit breaker, and the night light will be turned on. Then, press the “TEST” button to observe the testing status:
 - The “TEST” button always pops up, and the night light keeps solid ON. It indicates that the GFCI wiring is incorrect; please correct it.
 - The “TEST” button goes down, while the “RESET” button pops up. The green indicator and the night light are turned off, indicating the GFCI socket is normal (**Note:** Press the “RESET” button again to recover the power supply output).

1.2 Product exterior

1.2.1 Appearance and ports



No.	Description	No.	Description
1	AC output port ⁽¹⁾	8	RS485 communication port (COM) ⁽⁶⁾
2	AC input port ⁽²⁾	9	Status indicator ⁽⁷⁾
3	Overload protector ⁽³⁾	10	WIFI/Bluetooth interface (EXT)
4	External switch port ⁽⁴⁾	11	Cooling fan ⁽⁸⁾
5	Inverter switch	12	Grounding terminal
6	Function DIP switch ⁽⁵⁾	13	DC input terminal
7	CAN (RV-C protocol)/BMS communication port/LIN (PORT)		

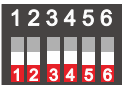
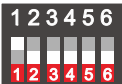
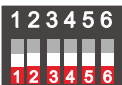
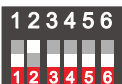
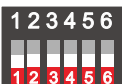
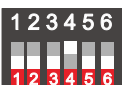
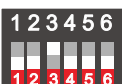
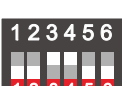
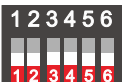
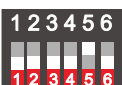
(1) The AC output terminal varies with different products. Please refer to the real product.

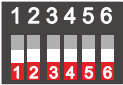
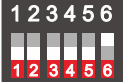
(2) The AC input port can be connected to the utility or generator. It is recommended to use utility input. When connected to a generator, it must be a digital inverter generator.

(3) The overload protector is mainly used to protect the bypass circuit, and the AC output load power shall not exceed the inverter's rated power.

(4) The port is used for external or remote control of the inverter's on/off status. For example, connect external rocker switch contacts or external relay NC/NO contacts to this port, then the inverter can be turned on/off. The port is non-polarized. Do not connect power supply to the port.

(5) Function DIP switch settings

Number	Function	Setting				Figure	Description
1	ECO power saving mode	0: Normal mode					The parameter takes effect immediately after correct setting.
		1: Power saving mode					
2	BMS enable	0: BMS is disabled					The parameter takes effect immediately after correct setting.
		1: BMS is enabled					
3/4	Uset inverter voltage	3	4	Inverter voltage		/	After modifying the parameter, restart the inverter for the correct setting to take effect.
		0	0	220V	110V		
		0	1	240V	130V		
		1	0	230V	120V		
		1	1	Inverter voltage setting error alarm (buzzer sounds continuously).			
5	FRE inverter frequency	0: 50Hz					After modifying the parameter, restart the inverter for the correct setting to take effect.
		1: 60Hz					

6	BOND status	0: BOND relay not energized (the output neutral N is not connected to the chassis ground).		After modifying the parameter, restart the inverter for the correct setting to take effect.
		1: Inverter outputs for 100ms, and BOND relay energizes (the output neutral N is connected to the chassis ground), the relay automatically disconnects upon AC input switch-in.		

(6) RS485 communication port can be connected to various modules – including display screen, Bluetooth, WiFi, and PC – to enable parameter setting and remote monitoring.

(7) Indicators include status indicator (S), AC input indicator (G) and fault indicator (F). For the indicator and buzzer status under different working conditions, please refer to Chapter [6 Troubleshooting](#).

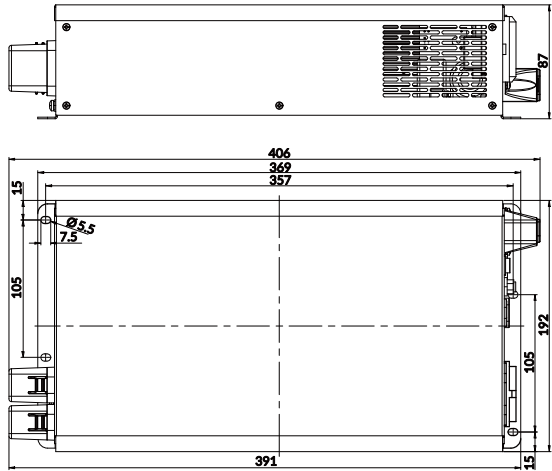
(8) Conditions to start and stop the cooling fan

Conditions to Start the Cooling Fan		
Temperature control	Heat sink temperature is higher than 45℃, or the internal inverter temperature is higher than 45℃.	All IPR models
Power control	The output power is higher than 50% of the rated power.	
Conditions to Stop the Cooling Fan		
Temperature control	Heat sink temperature is lower than 38℃, and the internal inverter temperature is lower than 38℃.	All IPR models
Power control	The output power is lower than 40% of the rated power.	

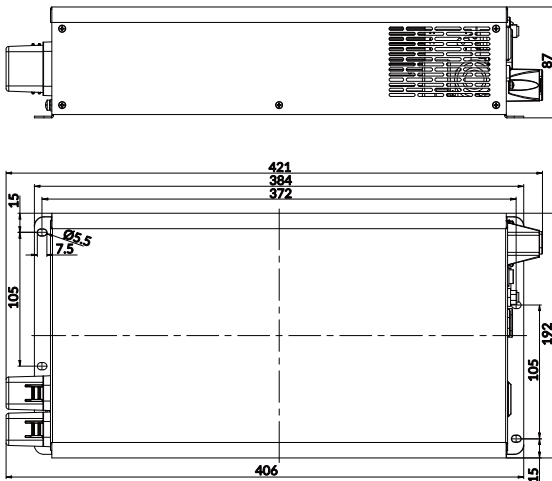
1.2.2 Dimensions

(Unit: mm)

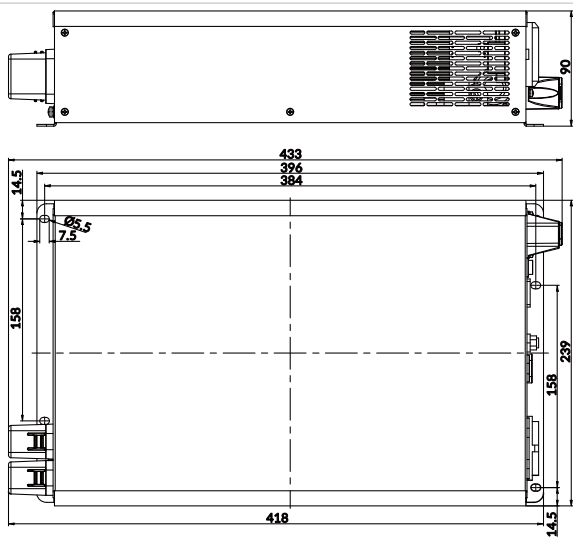
IPR1012, IPR1011



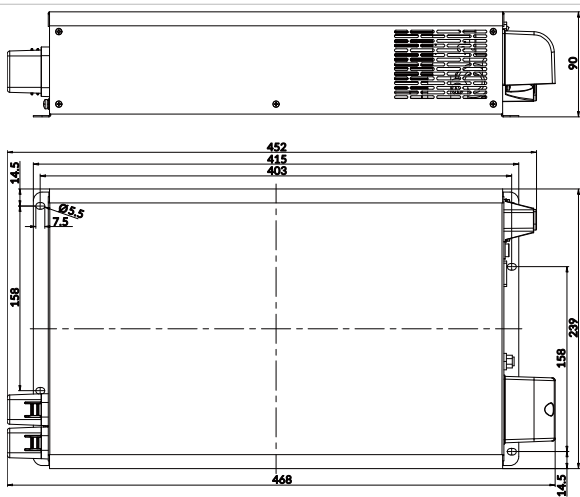
IPR1512, IPR1511



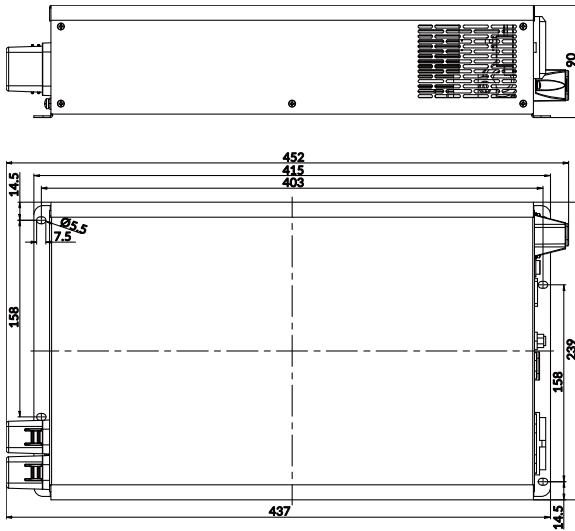
IPR2012, IPR2011



IPR3011

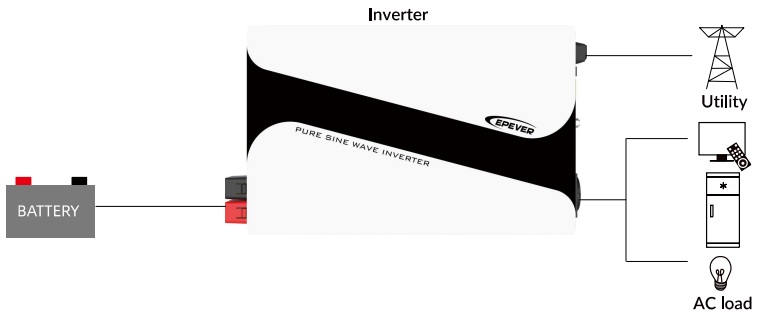


IPR3012



1.3 System schematic diagram

The following takes IPR2012 as an example to introduce the connection.



NOTICE

It is recommended to directly connect the inverter DC input terminal to the battery terminal. Do not connect it to the charge source terminal. Otherwise, the charging voltage spikes of the charge source may cause overvoltage in the inverter.

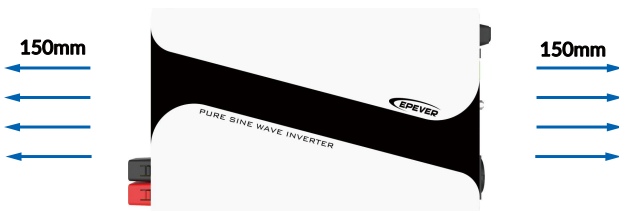
2 Installation and Connection

2.1 Precautions

- Read all the installation instructions carefully in the manual before installation.
- Be very careful when installing the batteries. When installing the open-type lead-acid battery, please wear eye protection and rinse with clean water in time for battery acid contact.
- Keep the battery away from any metal objects, which may cause a short circuit of the battery.
- Loose power connectors and corroded wires may result in high heat, melt wire insulation, burn surrounding materials, or cause a fire. Ensure tight connections and secure cables with cable clamps to prevent them from swaying in moving applications.
- The DC input voltage must strictly follow the parameter table. Too high or too low DC input voltage affects the normal operation and may damage the inverter. DC input 12V: Surge voltage < 20V.
- Select the system cables according to $3.5\text{A}/\text{mm}^2$ or less current density.
- Avoid direct sunlight and rain infiltration when installing it outdoor.
- After turning off the power switch, do not open or touch the internal component immediately. Performing related operations after 10 minutes are recommended.
- Do not install the inverter in the humid, salt spray, corrosive, greasy, flammable, explosive, dust accumulative or other severe environments.
- The AC output is of high voltage, do not touch the wiring connection to avoid electric shock.
- To prevent injury, do not touch the fan while it is working.

2.2 Installation requirements

The inverter shall be installed in a place with sufficient airflow through the dissipation pad of the inverter. And a minimum clearance of 150mm from the upper and lower edges of the inverter is recommended to ensure natural thermal convection. The following takes IPR2012 as an example to introduce the wiring.



NOTICE

Do not install the inverter in an enclosed cabinet, as it will affect device cooling. If installed in an enclosed cabinet, ensure effective ventilation and avoid full-load operation. Otherwise, over-temperature protection may activate.

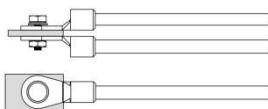
2.3 Wire size and circuit breaker

The wiring and installation methods conform to the national and local electrical code requirements.

2.3.1 Battery

Model	Battery Wire Size	Ring Terminal	Circuit Breaker
IPR1012 IPR1011	25mm ² /3AWG	RNB38-6S	DC/2P—125A
IPR1512 IPR1511	35mm ² /2AWG	RNB38-6S	DC—100A (2P in parallel)
IPR2012 IPR2011	2*25mm ² /3AWG	RNB38-6S*2	DC—125A (2P in parallel)
IPR3012 IPR3011	2*35mm ² /2AWG	RNB38-6S*2	DC—125A (3P in parallel)

According to the recommended battery wire size, two battery wires, connected in parallel, are necessary for IPR2012, IPR3012, IPR2011, and IPR3011. For connection method, refer to the figure below.



NOTICE

- The wire size is only for reference. If there is a long distance between the inverter and the battery, thicker cables can be used to reduce the voltage drop and improve system performance.
- The above wire size and circuit breaker size are for reference only; please choose a suitable wire and circuit breaker according to the actual situation.

2.3.2 AC output

Model	Wire Size	Circuit Breaker
IPR1012	1.5mm ² /15AWG	AC/2P—10A
IPR1512	1.5mm ² /15AWG	AC/2P—10A
IPR2012	2.5mm ² /13AWG	AC/2P—16A
IPR3012	4mm ² /11AWG	AC/2P—25A
IPR1011	2.5mm ² /13AWG	AC/2P—16A
IPR1511	4mm ² /11AWG	AC/2P—25A
IPR2011	4mm ² /11AWG	AC/2P—32A
IPR3011	6mm ² /10AWG	AC/2P—50A

2.3.3 AC input

Model	Wire Size	Circuit Breaker
IPR1012	1.5mm ² /15AWG	AC/2P—10A
IPR1512	1.5mm ² /15AWG	AC/2P—16A
IPR2012	2.5mm ² /13AWG	AC/2P—20A
IPR3012	4mm ² /11AWG	AC/2P—32A
IPR1011	2.5mm ² /13AWG	AC/2P—20A
IPR1511	4mm ² /11AWG	AC/2P—32A
IPR2011	4mm ² /11AWG	AC/2P—40A
IPR3011	6mm ² /10AWG	AC/2P—63A

NOTICE

- The wire size is only for reference. If there is a long distance between the inverter and the battery, thicker cables can be used to reduce the voltage drop and improve system performance.
- The above wire size and circuit breaker size are for reference only; please choose a suitable wire and circuit breaker according to the actual situation.

2.4 Device connection

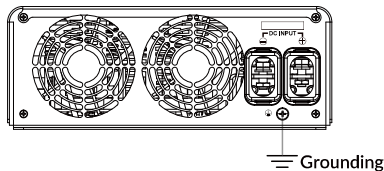
2.4.1 Connecting the ground cable (PE)

NOTICE

- Select the AC equipment according to the continuous output power of the inverter. However, the inrush power of the AC equipment must not exceed the instantaneous inrush power that the inverter can withstand; otherwise, the inverter may be damaged.
- Turn off the inverter switch before wiring.
- Please do not connect the circuit breaker or fuse during the wiring and ensure that the poles' leads are connected correctly.
- A fuse whose current is 2 to 2.5 times the inverter's input rated current must be installed on the battery side with a distance from the battery no longer than 150mm.
- The terminals and ports on the side vary from the inverter models.

The following wiring sequence is illustrated in the appearance "IPR2012".

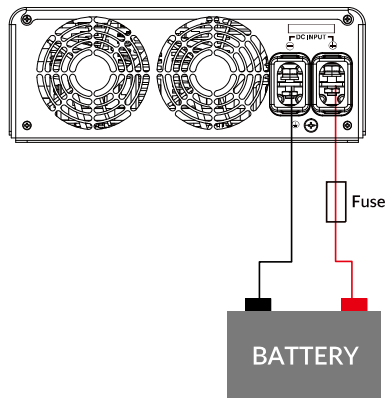
The specifications of ground cable must be greater than or equal to that of AC output, please refer to Section [2.3 Wire size and circuit breaker](#) for AC output cable specifications of different models.



2.4.2 Connecting the battery

A fast-acting fuse must be installed on the battery side, conformed to the following requirements:

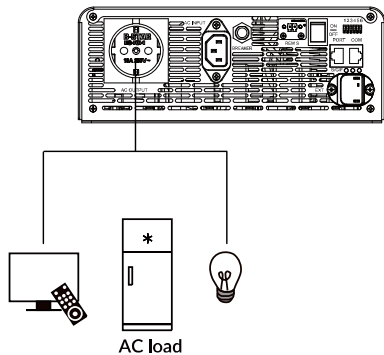
- Fast-acting fuse voltage is 1.5 to 2 times the inverter's rated voltage.
- Fast-acting fuse current is 2 to 2.5 times the inverter's rated current.
- Distance between the fast-acting fuse and the battery cannot be farther than 150mm.



2.4.3 Connecting the AC loads

NOTICE

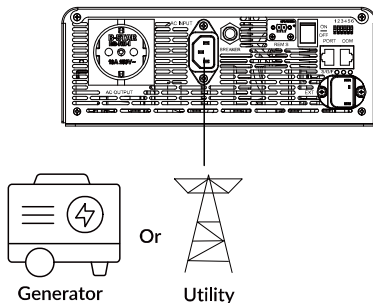
The AC loads shall be determined by the continuous output power of the inverter. The surge power of the AC load must be lower than the instantaneous surge power of the inverter, otherwise, the inverter will be damaged.



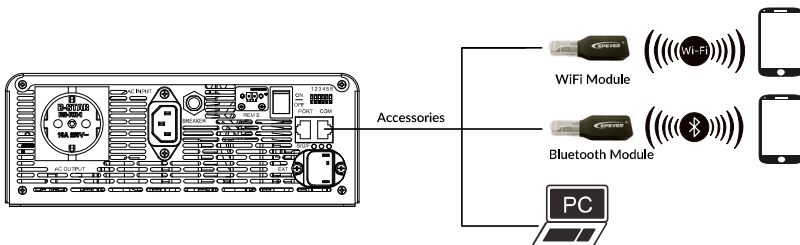
2.4.4 Connecting the utility

DANGER

- Electric shock hazard! When there is AC power at the AC INPUT port and meets the power supply requirements, the AC OUTPUT port will have AC output even if the inverter's local switch is not turned on, as the inverter has an internal AC output function by default. Do not touch the port.
- Electric shock hazard! The AC input indicator is ON only when the AC input frequency is between 30Hz and 80Hz. When the indicator is OFF, AC input and output terminals may have AC. Do not touch the wiring connections (Operate the AC input and output with the AC input air switch disconnected).
- Electric shock hazard! The utility input can generate dangerous high voltage, disconnect the circuit breaker or fast-acting fuse before wiring, and ensure that the electrode leads are connected correctly. The battery must not be grounded after connected to the utility.
- The inverter casing must be reliably grounded (to shield the outside electromagnetic interference effectively and prevent electric shock to the human body from the casing).



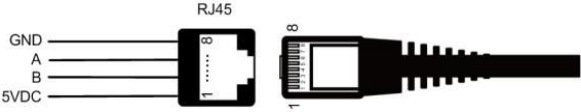
2.4.5 Connecting the accessories



a) Connect the RS485 communication port (COM)

The RS485 COM port adopts an RJ45 female socket. Connect the communication modules such as display screen, Bluetooth, WiFi, 4G or PC modules to the RS485 COM port. You can remotely monitor the inverter and set parameters. For detailed configuration procedures, please refer to the instruction manuals for communication modules including the cloud APP, WiFi, Bluetooth, TCP and 4G modules (**Note:** The 4G module shall be supplied with independent power).

The RJ45 pins are defined as follows:

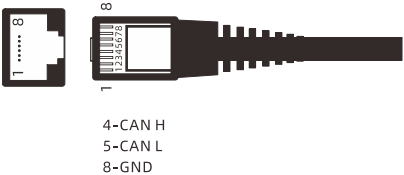


Pin	Definition	Instruction	Pin	Definition	Instruction
1	+5VDC	5V/300mA	5	NC	/
2	NC	/	6	RS485-A	RS485-A
3	RS485-B	RS485-B	7	NC	/
4	NC	/	8	GND	Power GND

b) CAN communication port (PORT)

The CAN COM port adopts an RJ45 female socket, and uses the RV-C communication protocol to communicate with CAN bus devices that support the RV-C protocol.

The RJ45 pins are defined as follows:

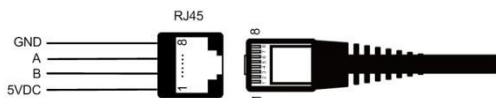


Pin	Definition	Instruction	Pin	Definition	Instruction
1	NC	/	5	CAN-L	CAN-L
2	NC	/	6	NC	/
3	NC	/	7	NC	/
4	CAN-H	CAN-H	8	GND	Power GND

c) BMS communication port (PORT)

The BMS COM port adopts an RJ45 female socket. When the system uses lithium batteries with BMS function, connect the BMS-Link module and lithium batteries through the port. With the setting of the BMS protocol number, the BMS-Link module can convert the BMS protocols of different lithium battery manufacturers into our standard protocols to realize the communication between the inverter and lithium batteries BMS of different manufacturers.

The RJ45 pins are defined as follows:



Pin	Definition	Instruction	Pin	Definition	Instruction
1	NC	/	5	NC	/
2	NC	/	6	GND	Power GND
3	NC	/	7	RS485-A	/
4	NC	/	8	RS485-B	/

d) LIN communication port (PORT)

The LIN COM port adopts an RJ45 female socket, and the system uses LIN communication for convenient centralized control.

The RJ45 pins are defined as follows:

Pin	Definition	Instruction	Pin	Definition	Instruction
1	NC	/	5	NC	/
2	NC	/	6	NC	/
3	NC	/	7	LIN	/
4	NC	/	8	GND	Power GND

e) Built-in WiFi/Bluetooth communication port (EXT)

Connect to the built-in WiFi/Bluetooth module of the inverter through the WiFi/Bluetooth switch on your phone. The phone APP enables remote monitoring and parameter setting of the inverter through the WiFi/Bluetooth signals. For detailed configuration procedures, please refer to the cloud APP manual.

3 Operation

3.1 Checking before powering on

Check whether the inverter is installed correctly and securely before powering on.

3.2 Operating the device

Step 1: Connect the breaker at the inverter DC input terminal or the fast-acting fuse at the battery terminal.

Step 2: Turn on the inverter switch, and the status indicator (S) will be solid ON, which states a normal AC output.

Step 3: Connect the circuit breaker on the AC load line, turn on the AC loads one by one and check the inverter's running status and the loads.

Step 4: If the fault indicator is ON and the buzzer alarms after powering the inverter, please immediately turn off the load and the inverter. Clear the faults according to Chapter 6 [Troubleshooting](#). After clearing the faults, please operate the inverter again by following the above steps.

NOTICE

When supplying power for different loads, it is recommended to first turn on the load with a large impulse current. And then turn on the load with a smaller impulse current after the load output is stable.

3.3 Parameters setting

IPR parameters such as BMS Protocol, Battery Overvoltage Alarm Voltage, Overvoltage Alarm Recovery Voltage, Undervoltage Protection Voltage, Undervoltage Protection Recovery Voltage, 485 COM ID, Power Saving Mode Power Threshold, Power Saving Mode Close Time, Buzzer Switch, Utility Overfrequency Protection, Utility Underfrequency Protection, Utility Overvoltage Protection, Utility Undervoltage Protection, Load Switch, Clear Fault and Factory Reset can be set by phone APP or PC software.

3.3.1 Power saving mode

Users can enable the power saving mode by the DIP switch. When the load power is lower than the power saving mode threshold, the output voltage is turned on for 3s and turned off for 10s. When the load power exceeds the power saving mode threshold, the output is in normal mode. The power saving mode threshold (20VA by default) and output off time (10s by default) can be set by PC software or phone APP.

Parameters user define:

Parameters	Default	User Define
Output Voltage Class ⁽¹⁾	110VAC	110VAC/120VAC/130VAC
	220VAC	220VAC/230VAC/240VAC
Output Frequency Class ⁽¹⁾	220/230/240VAC: 50Hz 110/120/130VAC: 60Hz	50Hz/60Hz
Power Saving Mode Power Threshold ⁽³⁾	20VA	5–300VA
Power Saving Mode Close Time ⁽³⁾	10S	5–3600S
Undervoltage Protection Voltage ⁽³⁾	10.8V	10.5V to (Undervoltage Protection Recovery Voltage minus 1V)
Undervoltage Protection Recovery Voltage ⁽³⁾	12.5V	(Undervoltage Protection Voltage plus 1V) to Overvoltage Alarm Recovery Voltage
Overvoltage Alarm Recovery Voltage ⁽³⁾	14.5V	Undervoltage Protection Recovery Voltage to (Overvoltage Alarm Voltage minus 1V)
Overvoltage Alarm Voltage ⁽³⁾	16V	(Overvoltage Alarm Recovery Voltage plus 1V) to 16.2V
COM ID ⁽²⁾	3	1–247
Utility Overfrequency Protection Frequency ⁽³⁾	70.0Hz	65.0–70.0Hz
Utility Underfrequency Protection Frequency ⁽³⁾	40.0Hz	40.0–45.0Hz
Utility Overvoltage Disconnect Voltage ⁽³⁾	140V	110V system: 130.0–150.0V
	280V	220V system: 260.0–300.0V
Utility Overvoltage Reconnect Voltage ⁽³⁾	135.0V	110V system: 125.0–145.0V
	275.0V	220V system: 255.0–295.0V
Utility Undervoltage Disconnect Voltage ⁽³⁾	80.0V	110V system: 70.0–90.0V
	160.0V	220V system: 140.0–180.0V

Utility Undervoltage Recovery Voltage ⁽³⁾	85.0V	110V system: 75.0–95.0V
	165V	220V system: 145.0–185.0V

- (1) After configuring the parameters marked with (1), restart the inverter for the modification to take effect. The inverter will resume work according to the new parameter value.
- (2) After configuring the parameters marked with (2), restart and reconnect the inverter for the modification to take effect.
- (3) After configuring the parameters marked with (3), the parameter takes effect immediately after modification.

4 Maintenance

To maintain long-term working performance, it is recommended to have the following items inspected twice a year.

- Ensure proper ventilation/heat dissipation around the inverter; clean dirt or debris from the heat sink.
- Check whether the insulation of exposed cables have been damaged by sunlight, friction with objects, insects or rodents, etc. Repair or replace the cables if necessary.
- Check whether the indicator and display are consistent with the actual operation of the equipment, and note fault/error displays and take corrective actions if needed.
- Inspect terminal blocks for corrosion, insulation damage or high-temperature burn marks; check that terminal screws are tight.
- If the lightning arrester has failed, replace it in time to avoid lightning strikes' damage to the inverter or even other equipment.



DANGER

Electric shock hazard! Ensure that the power supply of the inverter is disconnected when performing the above operations, and the power in the battery to be discharged before performing the corresponding checks or operations.

5 Protections

5.1 Input voltage protection

- The following rules must be followed when modifying the battery's input voltage parameters:
 - A. Overvoltage limit voltage (16.7V) $\geq$ Overvoltage alarm voltage $\geq$ Overvoltage alarm recovery voltage plus 1V.
 - B. Overvoltage alarm recovery voltage $\geq$ Undervoltage protection recovery voltage.
 - C. Undervoltage protection recovery voltage $\geq$ Undervoltage protection voltage plus 1V.
 - D. Undervoltage protection voltage $\geq$ Undervoltage limit voltage (10.5V).
- Detail status is shown as the following when the input voltage protection occurs.

Input Voltage Protection	Status
Input overvoltage limit	The load output is switched OFF. The status indicator (S) fast flashes. Buzzer beeps.
Input overvoltage alarm	The load output is not switched OFF. The status indicator (S) fast flashes. Buzzer beeps.
Input overvoltage alarm recovery	The status indicator (S) is solid ON. The output is normal.
Input undervoltage protection	The load output is switched OFF. The status indicator (S) slowly flashes. Buzzer beeps.
Input undervoltage protection recovery	The status indicator (S) is solid ON. Resume normal output.

NOTICE

Although the inverter is supplied with the input overvoltage protection, the surge voltage cannot higher than 20V for the 12V system. Otherwise, the inverter may be damaged.

5.2 Overload protection

Product Model	Overload Condition	Overload Status
IPR1012 IPR1512 IPR2012 IPR3012	$1.05P_e < S < 1.2P_e$ (S: Output power; Pe: Rated power)	The output is switched OFF after 30 seconds. Status indicator (S) is solid ON. Fault indicator (F) slowly flashes. Buzzer beeps.
IPR1011 IPR1511 IPR2011 IPR3011	$S > 1.2P_e$ (S: Output power; Pe: Rated power)	The output is switched OFF after 10 seconds. Status indicator (S) is solid ON. Fault indicator (F) slowly flashes. Buzzer beeps.

NOTICE

When the short circuit protection happens, the AC output will be recovered automatically three times (AC output recovers after 5s, 10s, and 15s delay for the 1st, 2nd and 3rd protection respectively). The AC output will not be recovered for the 4th protection, you need to restart the inverter to recover the AC output.

5.3 Output short circuit protection

Faults	Instruction
The output is switched OFF. Buzzer beeps. Fault indicator (F) fast flashes.	When the short circuit protection happens, the AC output will be recovered automatically three times (AC output recovers after 5s, 10s, and 15s delay for the 1st, 2nd and 3rd protection respectively). The AC output will not be recovered for the 4th protection, you need to restart the inverter to recover the AC output.

5.4 Inverter over temperature protection

Faults	Instruction
Fault indicator (F) is solid ON	The inverter stops working after the temperature of the heat sink or the internal modules is higher than a set value.
Fault indicator (F) is OFF	The inverter resumes work after the temperature of the heat sink and the internal modules is lower than (Overtemperature Protection minus 10°C).

5.5 AC input (utility or generator) overvoltage/undervoltage protection

Protection	Condition	Instruction
AC input overvoltage disconnect	AC input voltage > AC input overvoltage disconnect voltage	Output switches to inverter. Status indicator (S) is solid ON. AC input indicator (G) fast flashes. Fault indicator (F) is OFF. Buzzer sounds.
AC input overvoltage recovery	AC input voltage < (AC input overvoltage disconnect voltage minus 5V)	Output switches to AC input. AC input indicator (G) is solid ON. Fault indicator (F) is OFF.
AC input undervoltage disconnect	AC input voltage < AC input undervoltage protection voltage	Output switches to inverter. Status indicator (S) is solid ON. AC input indicator (G) slowly flashes. Fault indicator (F) is OFF. Buzzer sounds.
AC input undervoltage recovery	AC input voltage > (AC input undervoltage protection voltage plus 5V)	Output switches to AC input. AC input indicator (G) is solid ON. Fault indicator (F) is OFF.

5.6 AC input overfrequency/underfrequency protection

Protection	Condition	Instruction
AC input overfrequency disconnect	AC input frequency > AC input overfrequency disconnect frequency	Output switches to inverter. Status indicator (S) is solid ON. AC input indicator (G) alternates between two fast flashes and one slow flash.
AC input underfrequency disconnect	AC input frequency < AC input underfrequency protection	Fault indicator (F) is OFF. Buzzer sounds.
AC input overfrequency recovery	AC input frequency < (AC input overfrequency disconnect frequency minus 3Hz)	Output switches to AC input. AC input indicator (G) is solid ON.
AC input underfrequency recovery	AC input frequency > (AC input underfrequency disconnect frequency plus 3Hz)	Fault indicator (F) is OFF.

5.7 AC input overload protection

Inverter Status	Condition	Instruction
Turned ON	$1.05P_e < S < 1.2P_e$ (S: Output power; Pe: Rated power)	Switch to inverter after delay for 30s, no inverter output. AC input indicator (G) alternates between two fast flashes and one slow flash. Fault indicator (F) is slowly flashing.
	$1.2P_e < S < 1.5P_e$ (S: Output power; Pe: Rated power)	Switch to inverter after delay for 10s, no inverter output. AC input indicator (G) alternates between two fast flashes and one slow flash. Fault indicator (F) is slowly flashing.
	$S > 1.5P_e$ (S: Output power; Pe: Rated power)	Switch to inverter after delay for 3s, no inverter output. AC input indicator (G) alternates between two fast flashes and one slow flash. Fault indicator (F) is slowly flashing.

Turned OFF	When overloaded, the protection is activated by the overload protector.	No output when the overload protector's button pops out, output returns to normal after the output resumes normal.
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6 Troubleshooting



A high voltage occurs inside the inverter. Do not try to repair or maintain the inverter by yourself, and it may cause an electric shock.

The silk-screened labels S/G/F on the end cover refer to the status indicator (S)/AC input indicator (G)/fault indicator (F) respectively.

Status	Possible Reasons	Troubleshooting
Status indicator (S) slowly flashes (1/4Hz). Fault indicator (F) is OFF. Buzzer sounds.	The battery input voltage is too low.	Check whether the battery voltage is lower than the Undervoltage Protection Voltage by a multi-meter. The inverter resumes output after increasing the battery voltage to the Undervoltage Protection Recovery Voltage.
Status indicator (S) fast flashes (1Hz). Fault indicator (F) is OFF. Buzzer sounds.	The battery input voltage is too high.	Check whether the battery voltage exceeds the Overvoltage Limit Voltage by a multi-meter. The inverter resumes output after decreasing the battery voltage to the Overvoltage Alarm Recovery Voltage.
Status indicator (S) is solid ON. Fault indicator (F) slowly flashes (1/4Hz). Buzzer sounds.	Overload	Check whether the AC load's power is within the inverter's rated power; clear the overload faults and restart the inverter.
Status indicator (S) is solid ON. Fault indicator (F) fast flashes (1Hz). Buzzer sounds.	Load short-circuit	Check the load connection carefully. Clear the short circuit faults and restart the inverter.

Status indicator (S) is solid ON. Fault indicator (F) is solid ON. Buzzer sounds.	Inverter over-temperature	Improve the ventilation situation and cool the surrounding temperature. It is recommended to restart the inverter after the temperature drops. If the fault cannot be cleared after performing the above operations, decline the rated power.
Status indicator (S) is solid ON. AC input indicator (G) fast flashes. Fault indicator (F) is OFF. Buzzer sounds.	AC (utility) input voltage overvoltage	Check whether the AC input voltage exceeds the Utility Overvoltage Disconnect Voltage by a multi-meter. The inverter resumes work after adjusting the input voltage.
Status indicator (S) is solid ON. AC input indicator (G) fast flashes. Fault indicator (F) is OFF. Buzzer sounds.	AC (utility) input voltage undervoltage	Check whether the AC input voltage is lower than the Utility Overvoltage Disconnect Voltage by a multi-meter. The inverter resumes work after adjusting the AC input voltage.
Status indicator (S) is solid ON. AC input indicator (G) alternates between two fast flashes and one slow flash. Fault indicator (F) is OFF. Buzzer sounds.	AC (utility) input voltage frequency abnormal	Check whether the AC input frequency is lower than the AC Input Underfrequency Disconnect Frequency or exceeds the AC Input Overfrequency Disconnect Frequency by a multi-meter. The inverter resumes work after adjusting the AC input voltage frequency.
Status indicator (S) is solid ON. AC input indicator (G) alternates between two fast flashes and one slow flash. Fault indicator (F) slowly flashes. Buzzer sounds.	AC (utility) input overload	Check whether the AC load's power is within the inverter's rated power; clear the overload faults and restart the inverter.

Overload protector disconnect	AC (utility) input overload	When the AC load exceeds the inverter's rated power, reduce the AC load within the rated load, manually reset the overload protector, and the AC input resumes work.
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7 Technical Specifications

Model	IPR1012	IPR1512	IPR2012	IPR3012
Battery Input (DC)				
Voltage Range	10.8 to 16.0VDC			
Rated Voltage	12VDC			
Rated Current	101.8A	154.3A	205.8A	315.7A
AC Input				
Rated Current of AC Overload Protector	5A	8A	10A	15A
Input Voltage Range	190 to 265VAC			
Input Frequency Range	45 to 55Hz/55 to 65Hz			
AC Output				
Rated Output Power	1,000W@40℃ @battery rated voltage	1,500W@40℃ @battery rated voltage	2,000W@40℃ @battery rated voltage	3,000W@40℃ @battery rated voltage
Rated Output Current	4.5A	6.8A	9.09A	13.6A
Output Voltage Waveform	Pure Sine Wave			
Rated Output Voltage	220VAC (-5% to ±3%); 230VAC(-7% to +3%); 240VAC (-11% to +3%)			
Output Frequency	50/60Hz ± 0.2%			
THDu	≤ 3% (Resistive load)			
Transient Surge Output Power	2,000W	3,000W	4,000W	6,000W
Power Factor	0.2 to 1 (Load power ≤ Continuous output power)			
Efficiency				
Rated Output Efficiency	90.5%	89.5%	90.0%	88.0%

Maximum Output Efficiency	> 92.5%	> 94.0%	> 94.0%	> 94.0%
Environmental Parameters				
Operating Temperature	-20℃ to +60℃ (> 40℃ derating)			
Storage Temperature	-35℃ to +70℃			
Relative Humidity	≤ 95% (N.C.)			
Altitude	< 3,000m (> 2,000m derating)			
Ingress Protection	IP20			
Noise Emission	< 60dB (full load)			
Mechanical Parameters				
Dimensions (L × W × H)	406mm × 192mm × 87mm	421mm × 192mm × 87mm	433mm × 239mm × 90mm	452mm × 239mm × 90mm
Mounting Dimensions (L × W)	357mm × 105mm	372mm × 105mm	384mm × 158mm	403mm × 158mm
Mounting Hole Size	Φ 5.5mm	Φ 5.5mm	Φ 5.5mm	Φ 5.5mm
Weight	4.3kg	4.8kg	5.9kg	6.9kg
Input Terminal	M6			
Others				
No-load Current	< 1A	< 0.9A	< 1.2A	< 1.3A
Standby Current	< 0.3A	< 0.3A	< 0.3A	< 0.3A
Communication Method	RS485/CAN (RV-C)/LIN/BMS/Bluetooth/WiFi			

Model	IPR1011	IPR1511	IPR2011	IPR3011
Battery Input (DC)				
Voltage Range	10.8 to 16.0VDC			
Rated Voltage	12VDC			
Rated Current	106.4A	159.6A	215.3A	326.8A
AC Input				
Rated Current of AC Overload Protector	10A	15A	20A	30A
Input Voltage Range	85 to 140VAC			
Input Frequency Range	45 to 55Hz/55 to 65Hz			
AC Output				
Rated Output Power	1,000W@40℃ @battery rated voltage	1,500W@40℃ @battery rated voltage	2,000W@40℃ @battery rated voltage	3,000W@40℃ @battery rated voltage
Rated Output Current	9.09A	13.6A	18.18A	27.3A
Output Voltage Waveform	Pure Sine Wave			
Rated Output Voltage	110VAC (±3%); 120VAC (-6% to +3%); 130VAC (-13% to +3%)			
Output Frequency	50/60Hz ± 0.2%			
THDu	≤ 4% (Resistive load)			
Transient Surge Output Power	2,000W	3,000W	4,000W	6,000W
Power Factor	0.2 to 1 (Load power ≤ Continuous output power)			
Efficiency				
Rated Output Efficiency	87.5%	87.5%	86%	85%
Maximum Output Efficiency	> 93.0%	> 93.0%	> 93.0%	> 94.0%

Environmental Parameters				
Operating Temperature	-20℃ to +60℃ (> 40℃ derating)			
Storage Temperature	-35℃ to +70℃			
Relative Humidity	≤ 95% (N.C.)			
Altitude	< 3,000m (> 2,000m derating)			
Ingress Protection	IP20			
Noise Emission	< 60dB (full load)			
Mechanical Parameters				
Dimensions (L × W × H)	406mm × 192mm × 87mm	421mm × 192mm × 87mm	433mm × 239mm × 90mm	468mm × 239mm × 90mm
Mounting Dimensions (L × W)	357mm × 105mm	372mm × 105mm	384mm × 158mm	403mm × 158mm
Mounting Hole Size	Φ 5.5mm	Φ 5.5mm	Φ 5.5mm	Φ 5.5mm
Weight	4.5kg	5.0kg	6.1kg	7.0kg
Input Terminal	M6			
Others				
No-load Current	< 1A	< 1.1A	< 1.2A	< 1.5A
Standby Current	< 0.3A	< 0.4A	< 0.3A	< 0.3A
Communication Method	RS485/CAN (RV-C)/LIN/BMS/Bluetooth/WiFi			

8 Technical Support

For technical inquiries regarding our products, please contact us through the following channels:

Service Hotline: 010-82894896/82894112

0752-3889706

0755-89236770

Email: support@epeer.com

For more product information, please visit: www.epeer.com.

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