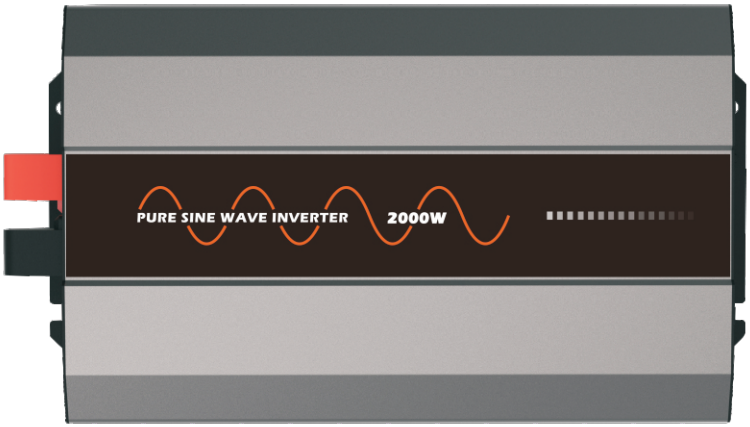
Epoch-M Series
Pure Sine Wave Inverter



User Manual

User Manual_Epoch-M Series_V1.1_QI
CE, RoHS, ISO9001:2015
Subject to change without notice!

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Dear Users:
Thank you very much for choosing our Epoch-M Series pure sine wave inverter.
This manual provides important recommendations related to the inverter, including installation, operation, and precautions. Please read this manual carefully before using the product. Read it with special care in your own interest, and please pay attention to the safety recommendations indicated herein.

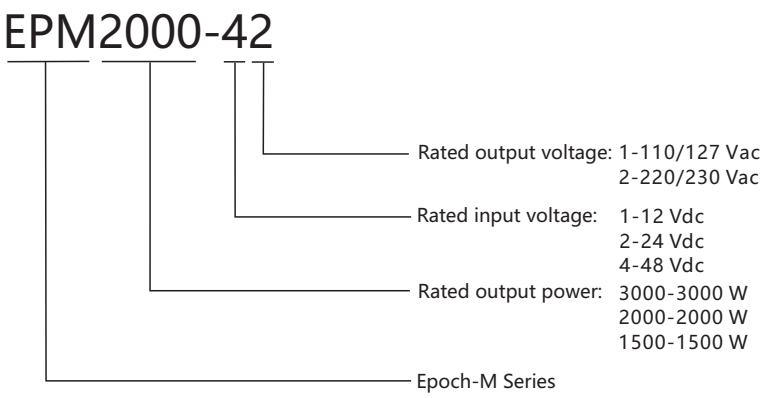
1.Overview

The new-generation fully digital intelligent Epoch-M Series inverter is a general-purpose pure sine wave high-frequency inverter that converts DC power to AC power. This series features high reliability, high efficiency, complete protection functions, and ease of installation and operation. It is widely used in DC-to-AC conversion applications, such as household appliances, power tools, industrial equipment, and other AC loads. It is especially suitable for solar photovoltaic power generation systems.

1.1 Features

- Complete electrical isolation between input and output.
- Adopts advanced SPWM technology with pure sine wave output.
- Fully digital intelligent dual closed-loop voltage/current control for ultra-fast response and high stability.
- Dynamic current-loop control ensures reliable inverter operation.
- Wider DC input voltage range.
- Ultra-low output harmonics(THD≤2 %).
- LED indication of input voltage range, normal output, and fault status.
- Complete protection functions: input under/over-voltage, output overload/short-circuit, and over-temperature protection.
- User-selectable output voltage and frequency.
- Optional low-power mode.
- Industrial-grade design for a wider operating temperature range; delivers full rated power for continuous operation.
- Superior EMC performance for power-quality-sensitive applications.

1.2 Model Naming Convention



2.Safety Instructions and Liability Waiver

2.1 Safety Instructions

Please retain this manual for future reference.

The following symbols are used in this manual to indicate potential hazards or important safety instructions. Please exercise caution when encountering these symbols.



WARNING: Indicates a potentially hazardous situation. Extra caution is required when performing this operation.



CAUTION: Indicates critical steps for safe and correct operation of the inverter.



WARNING:
1)There are no user-serviceable parts inside the inverter. Do not disassemble or attempt to repair the inverter.
2)Install the inverter in a well-ventilated location. The heat sink may become very hot during operation.
3)Keep children away from the battery and inverter.

2.2 Liability Waiver

Please follow the safety recommendations of the battery manufacturer. If you have any questions, please contact your dealer or installer. The manufacturer assumes no liability for any loss or damage caused by failure to follow the recommendations or specifications mentioned in this manual, or by disregard of the battery manufacturer's recommendations. The manufacturer assumes no responsibility in the event of maintenance service provided by unauthorized personnel, improper use, incorrect installation, or faulty system design.

2.3 Safety Precautions

After receiving the inverter, first check whether it has been damaged during transportation. If any problems are found, please contact the transport company or manufacturer promptly.



WARNING: The installation of the entire system must be performed by professional technicians!



WARNING: When the inverter is operating, the enclosure will generate a large amount of heat and reach a high temperature. Do not touch it, and keep it away from materials or equipment susceptible to high temperatures.



WARNING: When installing the inverter, it is essential to assess whether there is an arc hazard in the operating area.



CAUTION: The inverter must be connected to a battery for use. The recommended minimum battery capacity(Ah) is 5 times the inverter's rated output power divided by the battery voltage.



WARNING: This product is an off-grid inverter. It is strictly prohibited to connect it to the utility grid for grid-tied operation. Grid connection will cause permanent damage to the inverter.



WARNING: The inverter is only allowed to operate as a single unit. Connecting the output terminals of multiple inverters in parallel or in series is prohibited; otherwise, equipment damage will result.



WARNING: When the inverter is operating, the AC output is high voltage. Do not touch the wiring terminals to avoid electric shock.



WARNING: Do not open the inverter enclosure for operation while the inverter is running.



WARNING: The following operations may cause arcing, fire, explosion, or other hazardous conditions inside the inverter. In the event of an accident, it must be handled by professional technicians; improper handling may result in more serious accidents.

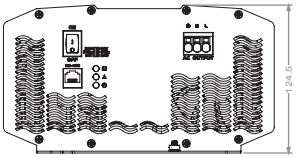
- Touching the ends of cables that may be live and are not insulated;
- Touching wiring terminals that may be live or components inside the inverter;
- Loose power cable connections;
- Screws or other parts accidentally falling into the inverter;
- Incorrect operation by untrained, non-professional personnel.

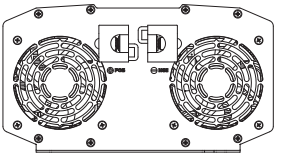


WARNING: Do not open the enclosure or attempt repairs. Risk of electric shock!

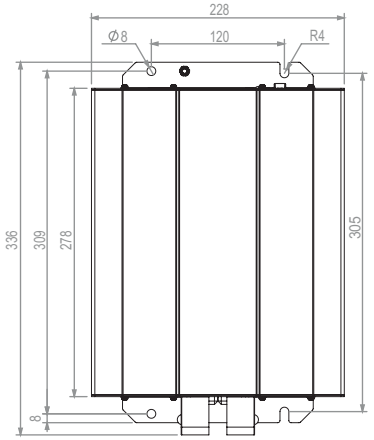
- The inverter may only be restarted after all faults affecting its safety performance have been eliminated.
- The inverter contains no user-serviceable parts inside. If any repair service is required, please contact our after-sales service department.

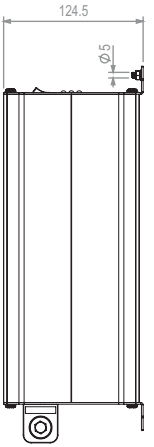
3.Dimensions(Unit: mm)



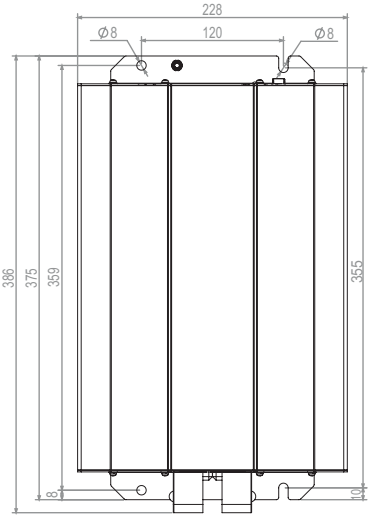


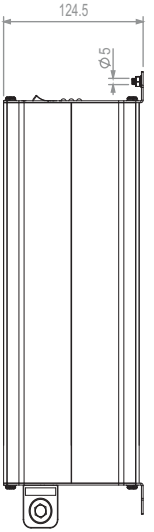
■ EPM1000-21、EPM1000-22



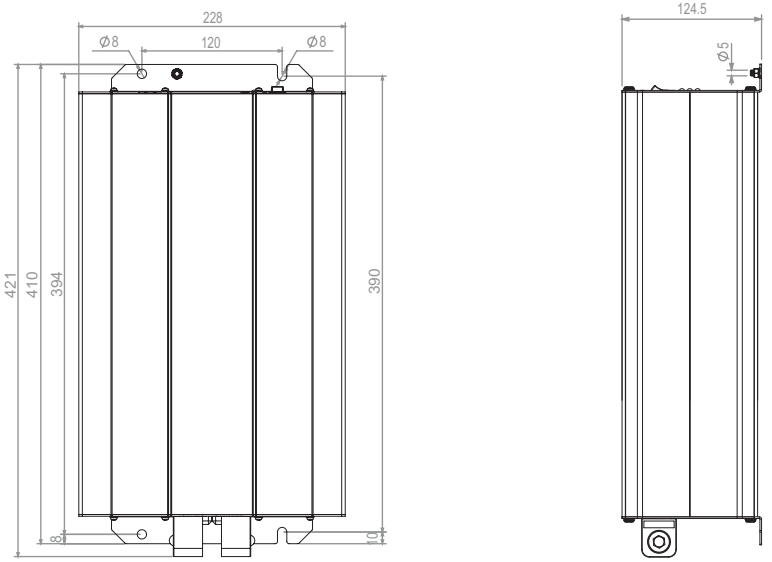


■ EPM1500-41、EPM1500-42

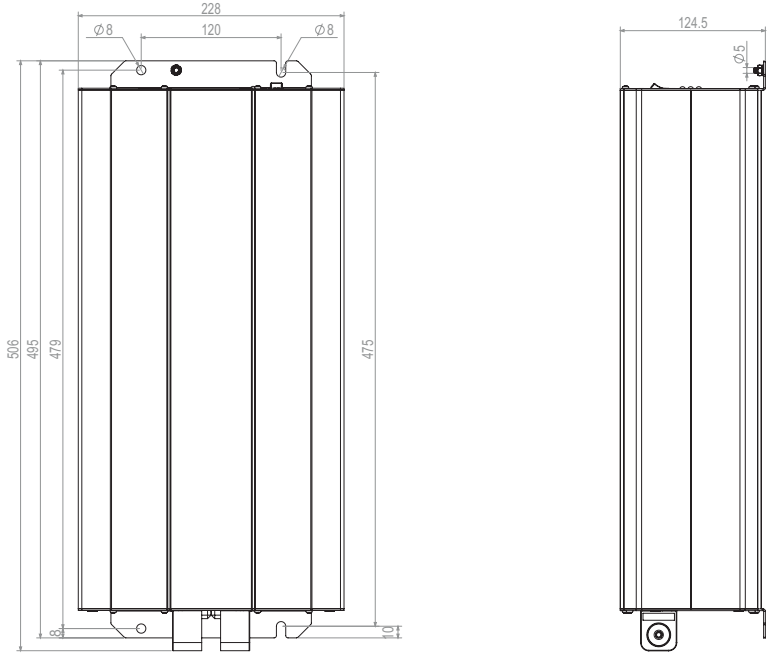




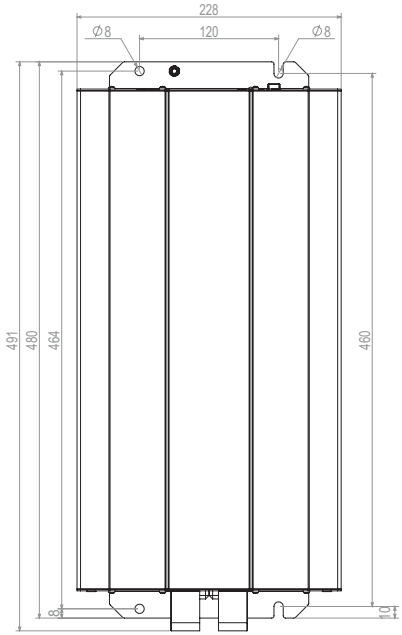
■ EPM2000-41、EPM2000-42

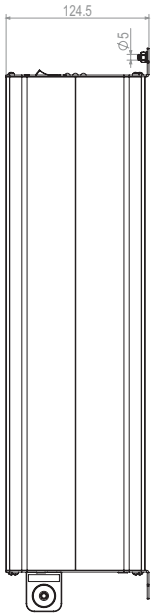


■ EPM3000-41



■ EPM3000-42

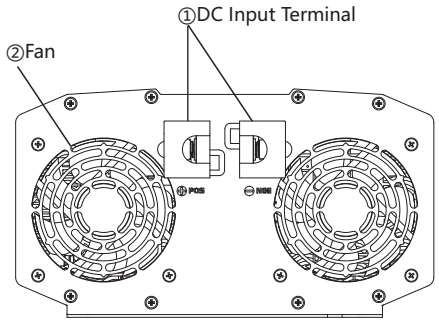


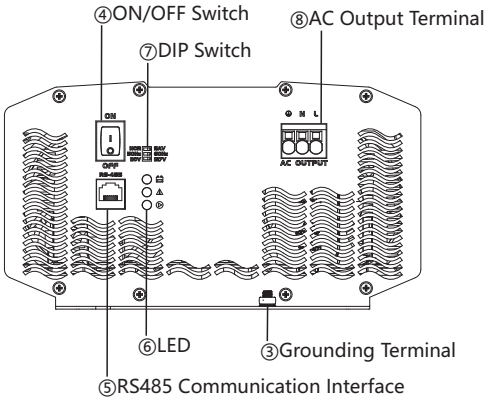


4.Structure, Display, Communication, Settings and Other Instructions

4.1 Structure

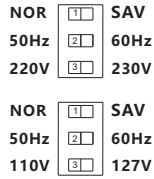
■ EPM1000-21、EPM1000-22、EPM1500-41、EPM1500-42、EPM2000-41、EPM2000-42、EPM3000-41、EPM3000-42





4.2 DIP Switch

This series of inverters allows flexible adjustment of output power consumption, voltage, and frequency, enabling users to configure the settings according to their specific requirements.
SAV/NOR: NOR is the normal output mode; SAV is the low-power (power-saving) mode, which checks the load status once every 10 seconds. When the load power exceeds 20 W, the inverter activates continuous output.
50/60 Hz: The output frequency is adjustable.
220/230 Vac(or 110 V/127 Vac): The output voltage is adjustable.



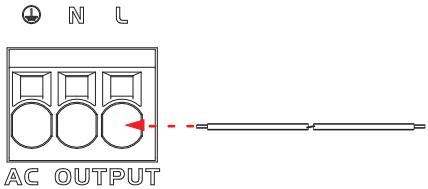
4.3 LED Display

	LED	Status	Function
Battery	Battery LED (Tri-Color)	Red:ON	Vbat < 22 V(@24 V);Vbat < 46 V(@48 V)
		Green:ON	22≤Vbat < 23 V(@24 V);46≤Vbat < 54 V(@48 V)
		Yellow:ON	23≤Vbat < 32 V(@24 V);54≤Vbat < 64 V(@48 V)
		Red:Flash(1 s/1 s)	Over-Temperature Protection(OTP)
		Red:Flash(0.25 s/0.25 s)	Low Voltage Protection(LVD)
		Red:Flash(3 s/3 s)	Over-Voltage Protection(OVP)
		Red:Flash(4 s/4 s)	LVD+OTP
		Red:Flash(6 s/6 s)	OVP+OTP
Fault	Fault LED (RED)	Flash(0.25 s/0.25 s)	The inverter is about to be protected under heavy load.
		ON	Output Overload, Short Circuit Protection, No Output in Low-Power Mode
Output	Output LED (Green)	ON	Normal Operation
		OFF	Fault Protection Status
	Buzzer	Continuous Beep	Internal Hardware Protection, Bus Overcurrent Protection

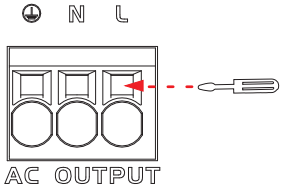
4.4 AC Output Terminal

4.4.1 AC Output Interface Definition

The AC output interface varies depending on the product model. Please refer to the actual product. The following description uses a terminal as an example only.
※ Maximum applicable conductor cross-sectional area for the AC output terminal: 6 mm².
※ If stranded flexible conductors are used, tin the wire ends with solder before inserting them into the corresponding terminals.

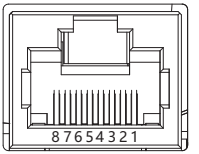


※ To remove the wiring, first stop the inverter, then insert a sharp tool into the small hole above the connector and pull out the connecting wire firmly.



4.5 RS485 Communication Interface

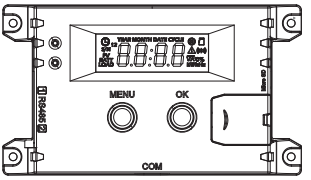
PIN	Definition	Description
1	+5V DC	5 VDC/200 mA
2	NC	/
3	+5V DC	5 VDC/200 mA
4	RS485-A	RS485-A
5	RS485-B	RS485-B
6	GND	Grounding
7	NC	/
8	NC	/



4.6 Optional Accessories

Cyber-Dlog-2

The Cyber-Dlog-2 is a data storage unit that can be connected to the inverter to display and store the operating data and fault information of the connected device. It features a compact appearance and simple operation. The LCD screen displays system parameters and various fault alarm messages in real time, making it convenient for users to monitor the operating status of the entire system.



5.Installation

CAUTION: Read all instructions and precautions in this manual before installation!

5.1 Installation Precautions

①Take great care when installing the battery. When installing a lead-acid liquid battery, wear protective goggles. If the battery acid comes into contact with your skin or eyes, rinse immediately with clean water.
②Avoid placing metal objects near the battery to prevent short circuits.
③Loose connections and corroded wires may generate excessive heat, melting the wire insulation, igniting surrounding materials, and even causing a fire. Therefore, ensure that all connectors are tightened securely, and secure the wires with cable ties to prevent them from loosening due to vibration during mobile applications.
④For system wiring selection, the conductor current density shall not exceed 3.5 A/mm².
⑤For outdoor installation, avoid direct sunlight and rainwater ingress.
⑥Do not install the inverter in harsh environments such as damp, oily, flammable, explosive, or dusty areas.
⑦The AC output carries high voltage. Do not touch the wiring terminals.
⑧ Do not touch the fan while it is running to avoid injury.

WARNING: Before installing the inverter, ensure that the inverter is not connected to any electrical power source.

WARNING: Check that all wiring connections are secure to avoid the danger of heat buildup caused by loose connections.

WARNING: The enclosure of the inverter must be connected to earth ground. The cross-sectional area of the conductor connecting the protective grounding terminal to earth ground shall not be less than 4 mm².

CAUTION: Input the DC voltage strictly in accordance with the specifications in the parameter table. A DC input voltage that is too high or too low will affect the normal operation of the inverter and may even damage it.

CAUTION: The cable length from the battery to the inverter is recommended not to exceed 3 m. If the cable length exceeds 3 m, the conductor current density shall be reduced.

CAUTION: It is recommended to install a fuse or circuit breaker between the battery and the inverter, with a rated current of 1.25 times the rated battery current.

WARNING: Do not install the inverter and lead-acid liquid batteries in a sealed space. The battery may generate flammable gas, and sparks at the connection terminals could cause a fire.

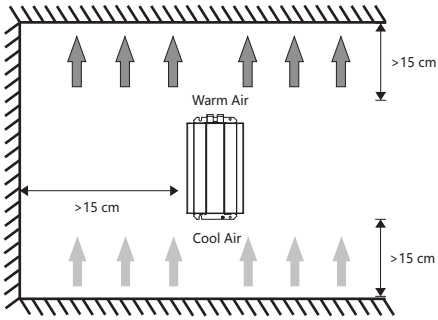
WARNING: The AC output interface shall only be connected to loads. Connecting it to any other power source or mains supply is strictly prohibited, as this may damage the inverter. The inverter must be stopped before connecting loads.

CAUTION: It is recommended to connect the DC input terminal of the inverter directly to the battery terminals. Do not connect it directly to the terminals of the charging power source. Otherwise, voltage spikes generated by the charging power source may cause overvoltage or even damage to the inverter.

5.2 Installation Site Requirements

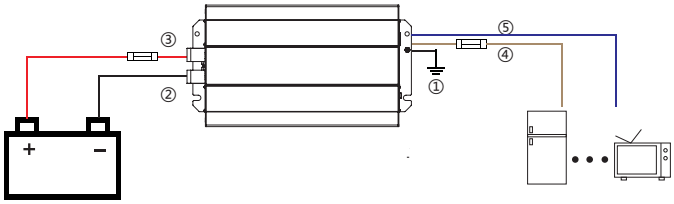
Do not install the inverter in locations exposed to direct sunlight, high temperatures, moisture, or other heat sources. Protect the inverter from dust and moisture.
The inverter shall be wall-mounted or horizontally mounted on a non-flammable surface. Ensure adequate airflow through the inverter's heat sink, and leave at least 15 cm of clearance above and below the inverter to allow natural convection cooling.

CAUTION: When the inverter is installed inside a sealed enclosure, ensure that the inverter can dissipate heat reliably through the enclosure.



5.3 Installation and Wiring

To protect the battery, we strongly recommend installing a fuse at the battery terminals to provide short-circuit protection. Do not touch uninsulated connectors. Use only insulated tools, select appropriate cables, and perform the wiring in the following order:



CAUTION: AC devices must be selected according to the continuous output power of the inverter. However, the surge power of the AC device must not exceed the instantaneous surge power that the inverter can withstand; otherwise, the inverter may be damaged.

NOTE:
1.Before wiring, be sure to set the inverter switch to the OFF position!
2.During wiring, do not close the circuit breaker or fuse, and make sure that the positive and negative leads of all components are connected correctly.

NOTE: A fuse must be installed at the battery terminal. It shall be selected at 1.25 times the rated battery current, and the fuse shall be located no more than 150 mm from the battery terminal.

Step 1: Grounding
Connect the inverter's grounding terminal to earth.
Step 2: Connect the Battery
Connect the battery to the input terminals of the inverter with correct polarity (the battery polarity icon is marked on the inverter). Make sure the terminals are tightened securely during installation.
Step 3: Connect the AC Load
Connect the electrical appliances to the AC output terminals of the inverter.
Step 4: Start the Inverter
1)Tighten all cables connected to the inverter and clear any debris around the inverter (leave approximately 15 cm of clearance).
2)Close the circuit breaker at the DC input terminal of the inverter or the fuse at the battery terminal.
3)Turn on the inverter switch to start the inverter. The green indicator stays on and AC power is output normally.
4)Turn on the AC loads one by one, and check the operating status of the inverter and the loads.
5)If the fault indicator turns red with a buzzer alarm after the inverter is started, turn off the loads and the inverter immediately, and refer to Troubleshooting. After the fault is cleared, repeat the above steps.

6.Protection Functions and Troubleshooting

6.1 Protection

- **Input Reverse Polarity Protection**
  To avoid damaging the internal components of the inverter, it is recommended to install a fuse at the battery terminal.
- **Input Overvoltage Protection and Recovery**
  When the DC input voltage exceeds 32 V (for a 24 V inverter) / 64 V (for a 48 V inverter), the inverter shuts down the discharge and enters the overvoltage protection status. When the voltage drops to 29 V / 58 V, the inverter resumes operation.
- **Input Low Voltage Protection and Recovery**
  When the DC input voltage is lower than 21.6 V (for a 24 V inverter) / 43.2 V (for a 48 V inverter), the inverter will automatically stop discharging and enter the low voltage protection status to prevent the battery from being damaged by over-discharge. When the voltage rises above 25 V (for a 24 V inverter) / 50 V (for a 48 V inverter), the inverter resumes operation.
- **Output Short Circuit Protection**
  If a short circuit occurs at the load output, the inverter will immediately cut off the load and enter the short circuit protection status. It features 3 automatic recovery attempts, once every 5 s. After the 4th short circuit protection is triggered, automatic recovery will no longer be performed, and the inverter must be restarted to restore AC output.
- **Output Overload Protection**
  If the discharge power exceeds the rated power of the inverter, the inverter will enter the overload protection status. It features 3 automatic recovery attempts, once every 5 s. After the 4th overload protection is triggered, automatic recovery will no longer be performed, and the inverter will shut down the AC output after a delay according to the overload ratio. After the overload fault is cleared, the inverter must be restarted to resume operation.
- **Inverter Over-Temperature Protection**
  The inverter detects its internal temperature through an internal temperature sensor. When the internal temperature exceeds 85 °C, the inverter stops working. After the temperature drops to 60 °C, the inverter resumes operation.

6.2 Troubleshooting

WARNING: High voltage inside the inverter!
Do not open it or attempt to perform maintenance or repair by yourself, as this may result in electric shock!

Faults	Reason	Troubleshooting
Battery LED is red, and flash(0.25 s/0.25 s)	Low DC input voltage	Measure the DC input voltage to determine whether it is below the allowable value (21.6 V/43.2 V)*. The inverter will recover automatically after the input voltage is adjusted.
Battery LED is red, and flash(3 s/3 s)	High DC input voltage	Measure the DC input voltage to determine whether it is above the allowable value (32 V/64 V)*. The inverter will recover automatically after the input voltage is adjusted.
Battery LED is red, and flash(1 s/1 s)	Over-temperature	Improve ventilation, do not block the vents, and reduce the temperature around the power source. Restart the device after the temperature drops to 60 °C.
Fault LED flash, and flash(0.25 s/0.25 s)	Load too high; protection imminent	Check whether the load exceeds the rated output power of the inverter.
Fault LED stays on	Load short-circuit or overcurrent	Check whether the output is overloaded, whether the output wiring is short-circuited, or whether the DIP switch is set to low-power mode. Clear the fault and restart the inverter to resume normal operation.
Output LED is off	Inverter is abnormal	Identify the cause of the fault. Normal operation will resume once the fault is cleared.

*The values before and after the slash apply to 24 V/48 V inverters respectively.

6.3 Maintenance

To maintain optimal long-term performance, it is recommended to perform the following checks at least twice a year. Confirm that the airflow around the inverter is not blocked, and remove any dirt or debris from the heat sink.

- Check all wires for damage. Repair or replace them if necessary.
- Verify that the indications and displays are consistent with the device status. Pay attention to any fault or error messages, and take corrective measures if necessary.
- Check all wiring terminals for signs of corrosion, insulation damage, high temperature, or burning/discoloration, and tighten the terminal screws.
- Check for dirt or corrosion, and clean as required.

WARNING: Electric Shock Hazard!
Before inspection and maintenance, disconnect all power sources from the inverter and wait for 20 min to allow the internal capacitors to fully discharge before proceeding.

7.Technical Data

Item	EPM1000-21	EPM1000-22
Electrical Parameters		
Input Rated Voltage	24 V	
Input Voltage Range	21.6-32 Vdc	
No Load Current	≤0.6 A@24 Vdc	≤0.8 A@24 Vdc
Output Voltage	110/127 Vac	220/230 Vac
Continuous Power	1000 W	
60s Overload	1100 W-1600 W	
1.5s Overload	1600 W-2000 W	
Surge Power	< 2000 W	
Output Mode	Single-phase electricity	
Output Wave	Pure sine wave	
Output Frequency	50/60 Hz	
Output Distortion THD	THD≤2 %(Pure Resistive Load)	
Rated Output Efficiency *1	90.1 %	91.1 %
Max. Output Efficiency *2	91.0 %	91.5 %
SAV Mode	0.36 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.	0.18 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.
DC Current	45 A	
Shutdown Status	< 1 mA	
Fuse	30 A*4	
Environment Parameters		
Dimension	336*228*124.5 mm	
Hole Size	φ8 mm	
Net Weight	4.3 kg	
Ambient Temperature	-20 ℃~+50 ℃	
Storage Temperature	-35 ℃~+70 ℃	
Relative Humidity	< 95 %(Non-Condensing)	
Altitude	< 5000 m(Derating to operate according to GB7260 at a height exceeding 1000m)	
Other Parameters		
Insulation	Between AC output terminals and metal case: ≥550MΩ	
Dielectric Strength	Between the AC output terminals and the enclosure: test voltage AC 1500 V, 1 min	
Application	Household appliances, portable devices, vehicles, yachts, solar systems, etc.	

*1.The DC input is at rated voltage, and the continuous output power refers to the pure resistive full-load power.
*2.The DC input is at rated voltage, and the maximum efficiency is measured under different load power conditions.
*3.Select the appropriate inverter according to the voltage standards of different countries.

Item	EPM1500-41	EPM1500-42
Electrical Parameters		
Input Rated Voltage	48 V	
Input Voltage Range	43.2-64 Vdc	
No Load Current	≤0.3 A@48 Vdc	≤0.4 A@48 Vdc
Output Voltage	110/127 Vac	220/230 Vac
Continuous Power	1500 W	
60s Overload	1600 W-2300 W	
1.5s Overload	2300 W-3000 W	
Surge Power	< 3000 W	
Output Mode	Single-phase electricity	
Output Wave	Pure sine wave	
Output Frequency	50/60 Hz	
Output Distortion THD	THD≤2 %(Pure Resistive Load)	
Rated Output Efficiency *1	91.7 %	93.6 %
Max. Output Efficiency *2	93.2 %	94.3 %
SAV Mode	0.18 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.	0.17 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.
DC Current	35 A	
Shutdown Status	< 1 mA	
Fuse	20 A*4	
Environment Parameters		
Dimension	386*228*124.5 mm	
Hole Size	φ8 mm	
Net Weight	5 kg	4.8 kg
Ambient Temperature	-20 ℃~+50 ℃	
Storage Temperature	-35 ℃~+70 ℃	
Relative Humidity	< 95 %(Non-Condensing)	
Altitude	< 5000 m(Derating to operate according to GB7260 at a height exceeding 1000m)	
Other Parameters		
Insulation	Between AC output terminals and metal case: ≥550MΩ	
Dielectric Strength	Between the AC output terminals and the enclosure: test voltage AC 1500 V, 1 min	
Application	Household appliances, portable devices, vehicles, yachts, solar systems, etc.	

*1.The DC input is at rated voltage, and the continuous output power refers to the pure resistive full-load power.
*2.The DC input is at rated voltage, and the maximum efficiency is measured under different load power conditions.
*3.Select the appropriate inverter according to the voltage standards of different countries.

Item	EPM2000-41	EPM2000-42
Electrical Parameters		
Input Rated Voltage	48 V	
Input Voltage Range	43.2-64 Vdc	
No Load Current	≤0.3 A@48 Vdc	≤0.4 A@48 Vdc
Output Voltage	110/127 Vac	220/230 Vac
Continuous Power	2000 W	
60s Overload	2100 W-3000 W	
1.5s Overload	3000 W-4000 W	
Surge Power	< 4000 W	
Output Mode	Single-phase electricity	
Output Wave	Pure sine wave	
Output Frequency	50/60 Hz	
Output Distortion THD	THD≤2 %(Pure Resistive Load)	
Rated Output Efficiency *1	90.6 %	93 %
Max. Output Efficiency *2	93.1 %	94.2 %
SAV Mode	0.23 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.	0.2 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.
DC Current	45 A	
Shutdown Status	< 1 mA	
Fuse	30 A*4	
Environment Parameters		
Dimension	421*228*124.5 mm	
Hole Size	φ8 mm	
Net Weight	5.4 kg	
Ambient Temperature	-20 ℃~+50 ℃	
Storage Temperature	-35 ℃~+70 ℃	
Relative Humidity	< 95 %(Non-Condensing)	
Altitude	< 5000 m(Derating to operate according to GB7260 at a height exceeding 1000m)	
Other Parameters		
Insulation	Between AC output terminals and metal case: ≥550MΩ	
Dielectric Strength	Between the AC output terminals and the enclosure: test voltage AC 1500 V, 1 min	
Application	Household appliances, portable devices, vehicles, yachts, solar systems, etc.	

*1.The DC input is at rated voltage, and the continuous output power refers to the pure resistive full-load power.
*2.The DC input is at rated voltage, and the maximum efficiency is measured under different load power conditions.
*3.Select the appropriate inverter according to the voltage standards of different countries.

Item	EPM3000-41	EPM3000-42
Electrical Parameters		
Input Rated Voltage	48 V	
Input Voltage Range	43.2-64 Vdc	
No Load Current	≤0.3 A@48 Vdc	≤0.4 A@48 Vdc
Output Voltage	110/127 Vac	220/230 Vac
Continuous Power	3000 W	
60s Overload	3100 W-4500 W	
1.5s Overload	4500 W-6000 W	
Surge Power	< 6000 W	
Output Mode	Single-phase electricity	
Output Wave	Pure sine wave	
Output Frequency	50/60 Hz	
Output Distortion THD	THD≤2 %(Pure Resistive Load)	
Rated Output Efficiency *1	91.2 %	92.6 %
Max. Output Efficiency *2	94.16 %	95.05 %
SAV Mode	0.2 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.	0.18 A; The load is detected every 10 s. If the load exceeds 20 W, the output remains continuous.
DC Current	70 A	
Shutdown Status	< 1 mA	
Fuse	30 A*5	
Environment Parameters		
Dimension	506*228*124.5 mm	491*228*124.5 mm
Hole Size	φ8 mm	
Net Weight	6.8 kg	6.6 kg
Ambient Temperature	-20 ℃~+50 ℃	
Storage Temperature	-35 ℃~+70 ℃	
Relative Humidity	< 95 %(Non-Condensing)	
Altitude	< 5000 m(Derating to operate according to GB7260 at a height exceeding 1000m)	
Other Parameters		
Insulation	Between AC output terminals and metal case: ≥550MΩ	
Dielectric Strength	Between the AC output terminals and the enclosure: test voltage AC 1500 V, 1 min	
Application	Household appliances, portable devices, vehicles, yachts, solar systems, etc.	

*1.The DC input is at rated voltage, and the continuous output power refers to the pure resistive full-load power.
*2.The DC input is at rated voltage, and the maximum efficiency is measured under different load power conditions.
*3.Select the appropriate inverter according to the voltage standards of different countries.