ET Series Lithium Battery UPS

(Single Phase) 1-10KVA

USER MANUAL

Preface

About This Manual

Thank you for purchasing our power product. This product is a high-performance lithium-battery UPS with true pure sine wave output, adopting DSP digital technology and high-frequency PWM inverter technology. It is suitable for finance, telecom, government, transportation, manufacturing, education, electric power and other industries, providing a stable and reliable AC uninterruptible power system for computer equipment, communication equipment, precision instruments/meters and network terminal equipment.

This manual introduces information about the UPS, including functions and features, performance specifications, appearance and structure, system principle and operating modes. It also provides installation instructions, usage and operation, maintenance management, transportation and storage.

This manual is a technical document delivered with the equipment. Please read it carefully before any installation, commissioning or setting operation.

Due to product version upgrades or other reasons, the content of this document may be updated from time to time and may contain defects, redundancies or typographical errors. This document is for guidance only. Unless otherwise specifically promised in our sales contract or order confirmation, all statements, information and recommendations in this document do not constitute any express or implied warranty.



Note:

The input and output voltages of this equipment are dangerous high voltages. Improper operation may endanger life. Please read this manual carefully before installation and operation, and pay attention to all warning signs and statements on the equipment. Unauthorized maintenance personnel must not remove the cabinet of the power equipment.

Declaration

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

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Chapter 1 Product Overview

1.1 Product Introduction

The ET series is an online double-conversion UPS specially designed for LiFePO4 batteries. It monitors the battery charge/discharge current in real time to achieve accurate battery capacity and charging management. The product adopts DSP digital technology, high-frequency PWM and double-conversion technology. The built-in-battery models are equipped with a large capacity of brand-new Class-A LiFePO4 cells, featuring excellent performance, high reliability, 0 ms transfer, small size, light weight, long service life and long backup time during power outages. With cloud monitoring technology, the power status can be checked remotely and power-failure alerts can be received in time. It is especially suitable for servers, medical products, industrial PCs and other precision equipment, and for scenarios with requirements on installation space, remote management or centralized monitoring.

1.2 Product Features

- Suitable for harsh environments

Ultra-wide input voltage of 110VAC~300VAC and ultra-wide frequency range, with built-in class 3/4 lightning protection, ensure normal power supply even in very harsh power environments. Power factor correction (PFC) greatly reduces pollution to the mains grid.

- Automatic start-up, unattended operation

The UPS starts automatically once connected to mains. This avoids the situation where the user forgets to power on and the UPS stays in bypass mode, resulting in no protection in case of a power outage. It is more suitable for base stations, sites or remote areas requiring unattended operation.

- Built-in large-capacity Class-A LiFePO4 battery

Class-A LiFePO4 battery has high safety and stability, and its service life far exceeds that of lead-acid batteries: float service life can reach more than 10 years and cycle life more than 1200 cycles, truly realizing an integrated maintenance-free UPS system. Compared with lead-acid batteries of the same capacity, it is smaller and lighter. With the optional LiFePO4 battery, the full-load backup time exceeds 30 minutes without increasing the size of the main unit, providing much better backup performance than the 5-10 minutes of lead-acid batteries.

- Industry-leading DSP digital control technology

Adopts industry-leading DSP digital control technology with a high-performance all-digital DSP central processing chip. Data processing is accurate and fast, making the UPS outstanding in performance, reliable in quality, powerful in load capacity and higher in efficiency.

❖ Online double-conversion design with zero transfer time

Adopts the latest true online double-conversion architecture. The transfer time among mains, battery and bypass modes is zero, effectively ensuring the safety and reliability of load operation.

❖ Energy saving and environmental protection

This product is a green product complying with the national administrative measures for pollution control of electronic information products, causing no harm to the environment or human body.

❖ Compatible with various generators

The input frequency range can be up to +/-10Hz, making it easier to work with various generators. The generator power passing through the UPS can effectively isolate the poor power generated by the generator, providing pure, safe and stable power for loads.

❖ Meeting application requirements in different countries

According to different power systems, users can set the output voltage to 208/220/230/240Vac, and the UPS automatically adapts to the 50Hz or 60Hz frequency of the power system. Flexible and compatible, no customization required.

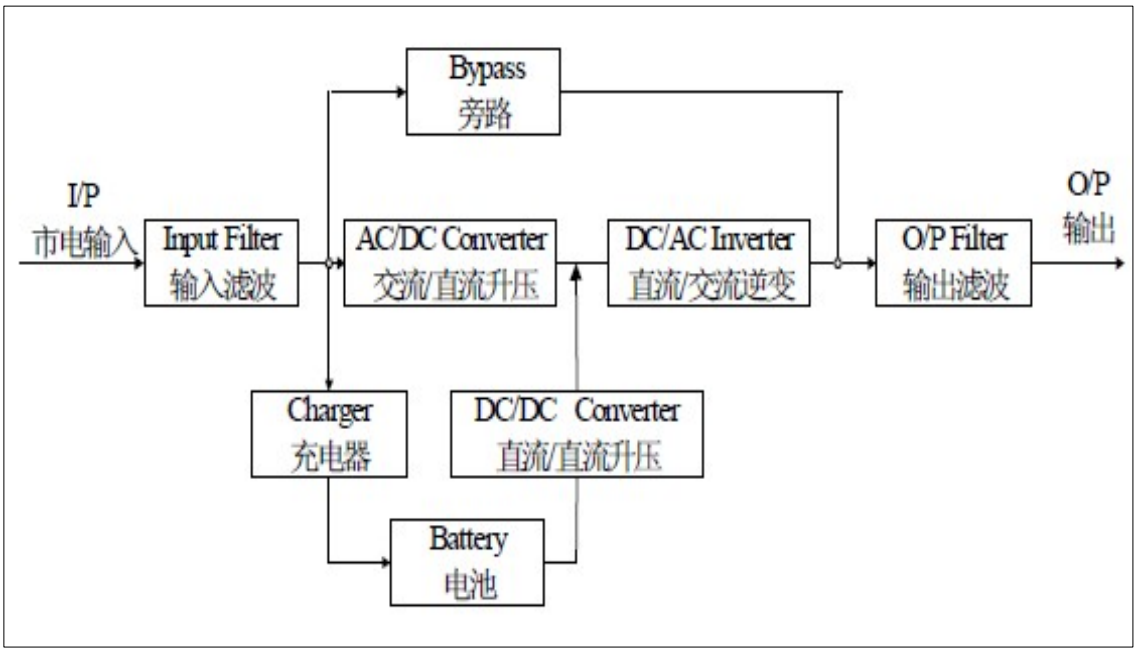
❖ High-reliability electrical and mechanical design

The mainboard adopts highly reliable power device protection and strict triple-proof treatment, improving adaptability to load environments and effectively extending the product service life.

❖ Highly intelligent management

Provides a standard RS232 port; combined with cloud/IoT technology, intelligent management functions such as centralized monitoring and mobile monitoring can be realized. Modbus485, dry contact and other monitoring methods can also be expanded. Remote power on/off is supported, and Windows or Linux computers, servers and mainstream VM servers can be shut down automatically during power outages. Compatible with NAS server communication.

1.3 Working Principle



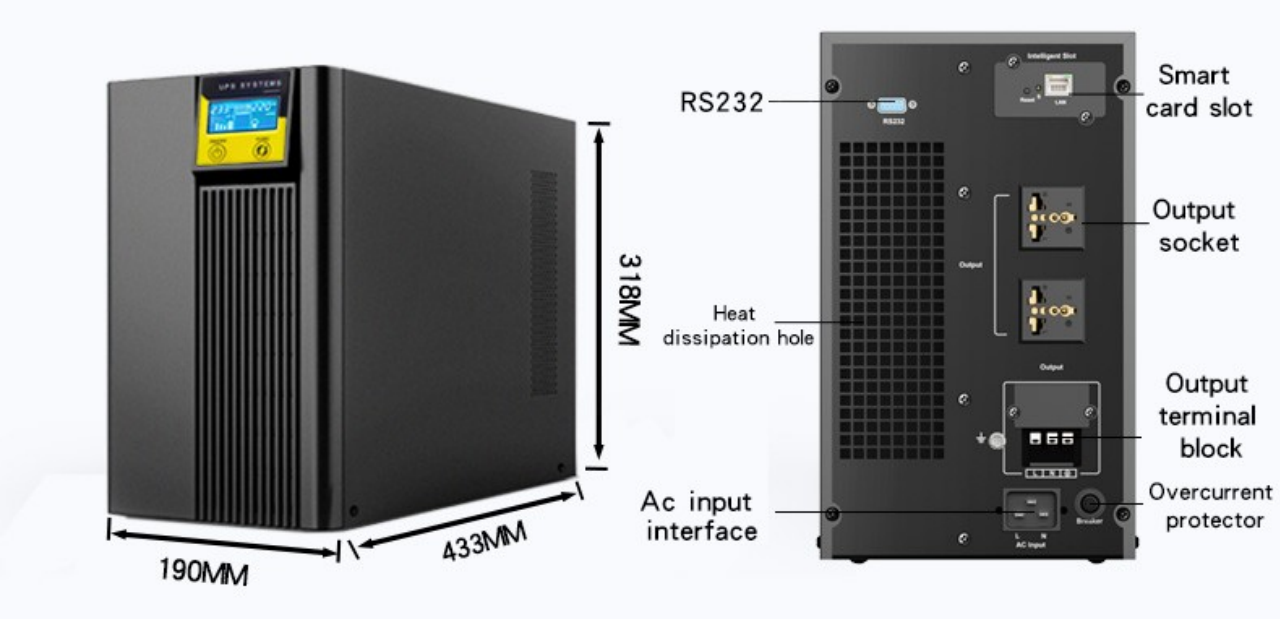
- Input filter: filters the input mains and provides clean power for the UPS.
- AC/DC boost: converts the filtered mains from AC to DC and boosts the DC.
- DC/DC boost: boosts the DC when the UPS works in battery mode.
- DC/AC inverter: converts the boosted DC into stable AC output.
- Bypass: automatically transfers to bypass mode when the UPS is overloaded or the inverter fails.
- Output filter: filters the UPS output and provides clean power for loads.

1.4 Product Appearance

1.4.1 ET1-3K

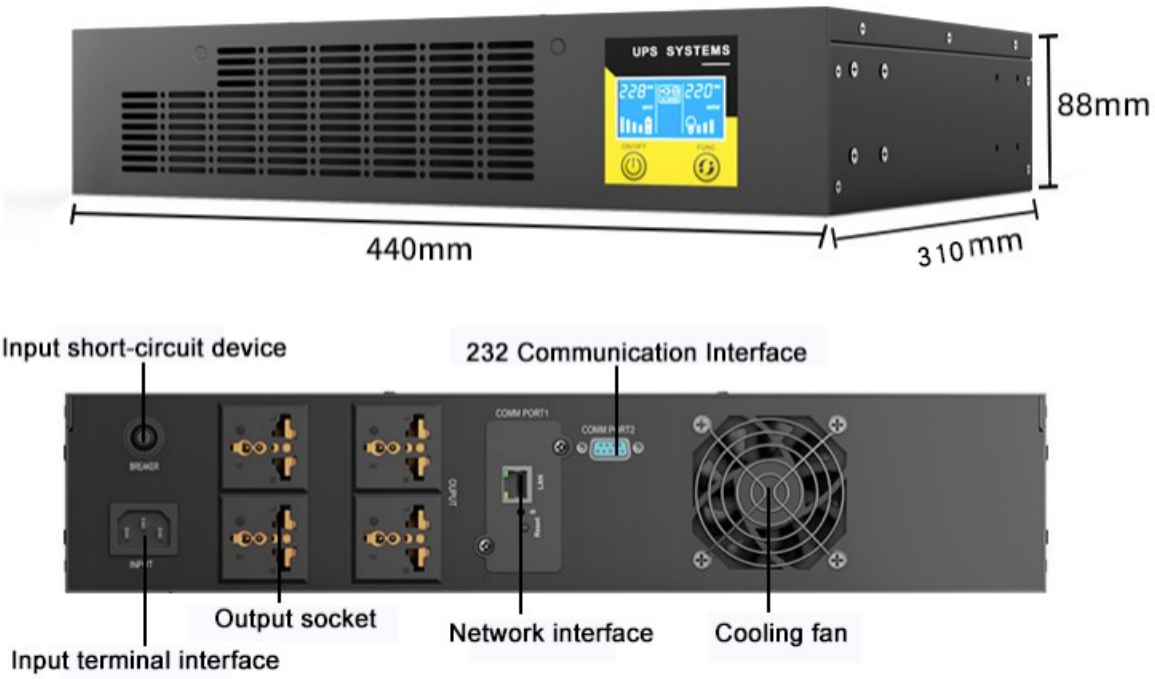


ET1K Front and Rear View

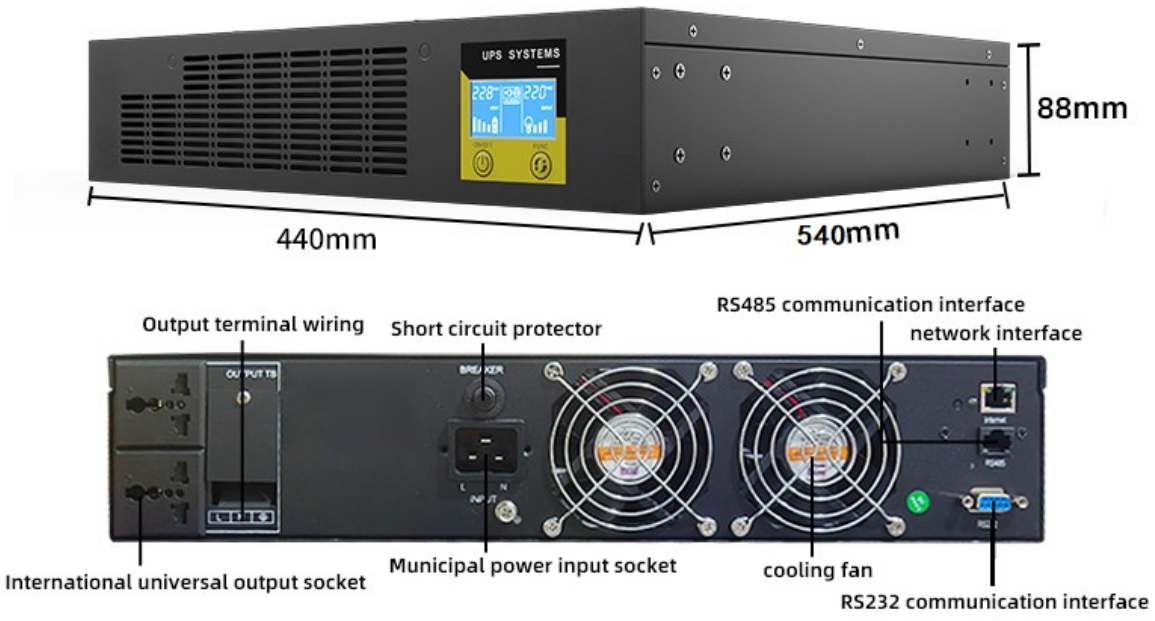


ET2/3K Front and Rear View

1.4.2 ET1-3KR

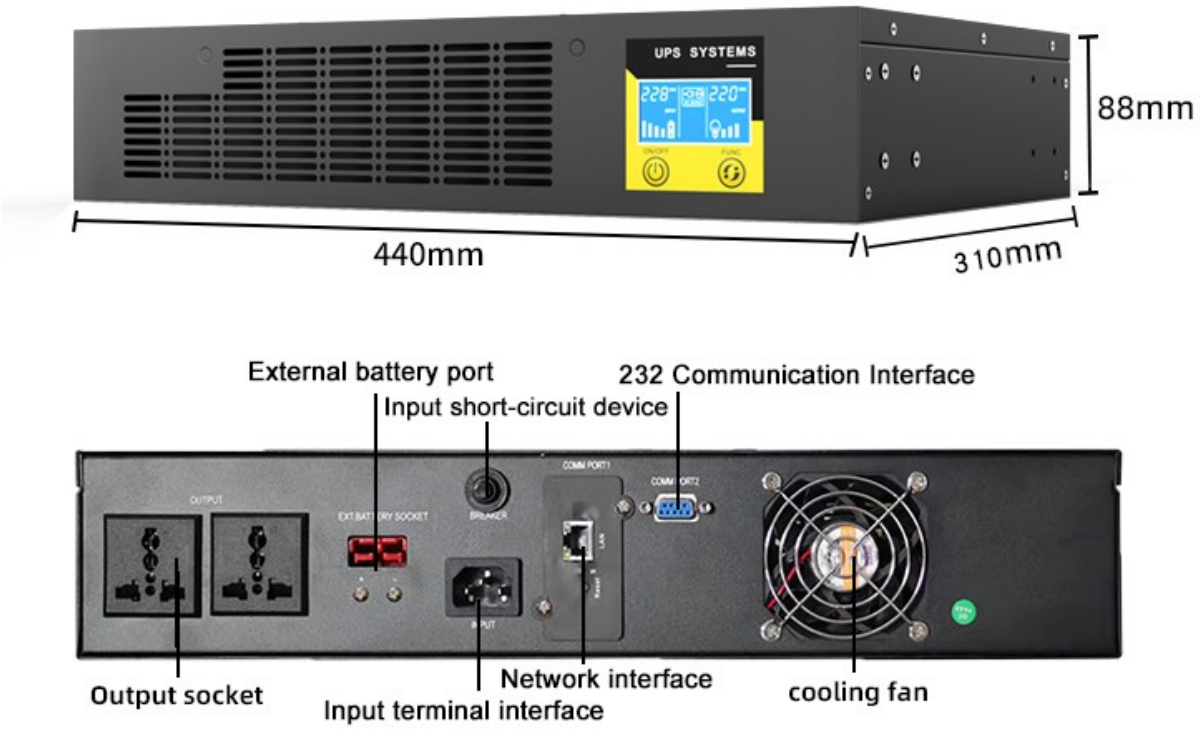


ET1KR Front and Rear View

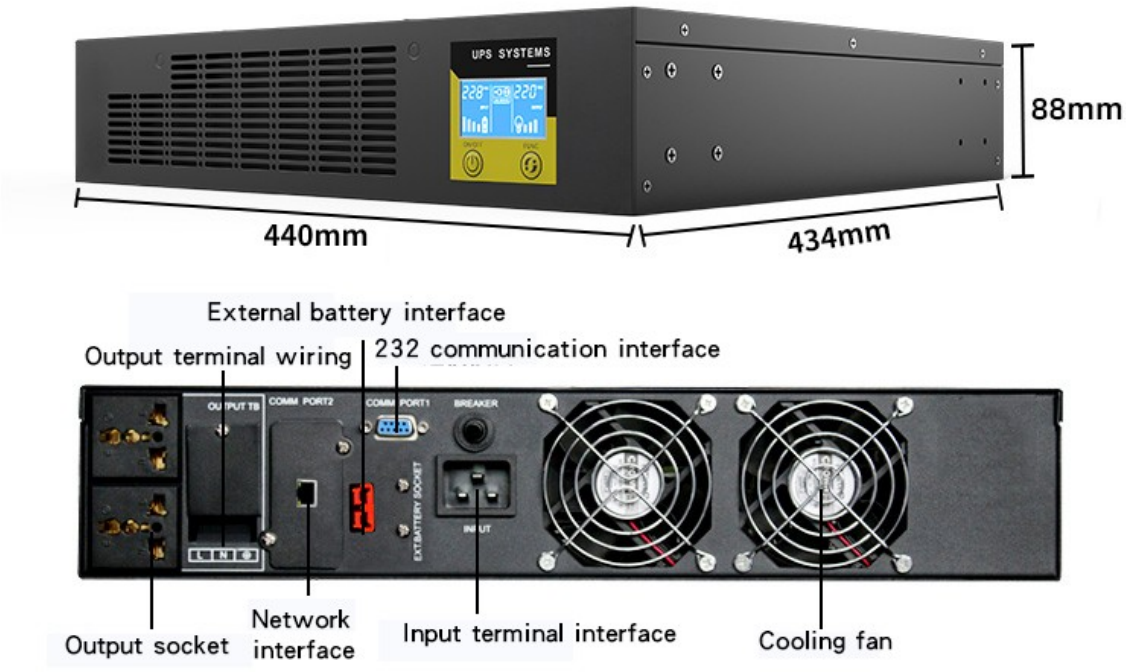


ET3KR Front and Rear View

1.4.3 ET1-10KRS



ET1KRS Front and Rear View



ET3KRS Front and Rear View



ET6KRS Front and Rear View

Chapter 2 Installation

2.1 Unpacking Inspection

1. Unpack the UPS and visually check the appearance for transport damage.
2. Check the accessories against the packing list.
3. If transport damage or missing accessories is found, contact the dealer immediately.

Packing list:

UPS Model	Item	Qty	Unit
Standard model	User Manual	1	pc
	Warranty Card	1	pc
Long-backup model	User Manual	1	pc
	Warranty Card	1	pc
	External battery cable	1	pc

Note: The inverter equipment shall be installed and commissioned by the manufacturer or engineers authorized by the manufacturer.

2.2 Installation Precautions

- The UPS should be placed in a well-ventilated area, away from water, flammable gas, corrosives and other dangerous articles. The installation environment shall meet the product specifications.
- Do not place the UPS on its side. Keep the air inlet on the front panel, the air outlet on the rear panel and the side outlets unobstructed.
- If the UPS is unpacked and used at low temperature, condensation may occur. Do not install or use it until it is completely dry inside and out, otherwise there is a risk of electric shock.
- Place the UPS near the mains input socket. In any emergency, unplug the mains input plug and disconnect the battery input immediately. All power sockets shall be connected to protective earth..

2.3 Wiring

The ET series UPS provides two wiring methods: socket type and terminal block type.

UPS of 3KVA and below generally adopt the socket type wiring (terminal block type can also be customized), with standard input cable and external battery cable (not for built-in-battery models).

For UPS above 3KVA, the current is greater than 10A and the terminal block wiring method is generally adopted.

2.3.1 Terminal Block Wiring

Steps:

1) Remove the terminal block cover;

2) Wire with proper cables; see the wiring table for details. Note: the wiring tables for tower and rack models are the same;

Model	Max. input current	Input breaker (L)	Input wire size	Max. output current	Output wire size	Max. battery current	Battery wire size
ET1K/ ET1KR(S)	5.7A	32A	≥1mm2	3.6A	≥1mm2	20A	≥4mm2
ET2K/ ET2KR(S)	11.9A	32A	≥1mm2	7.2A	≥1mm2	40A	≥6mm2
ET3K/ ET3KR(S)	16A	32A	≥1.5mm2	11A	≥1.5mm2	60A	≥10mm2
ET6KS	31A	32A	≥6mm2	27A	≥6mm2	120A	≥25mm2
ET10KS	50A	50A	≥10mm2	45A	≥10mm2	200A	≥40mm2

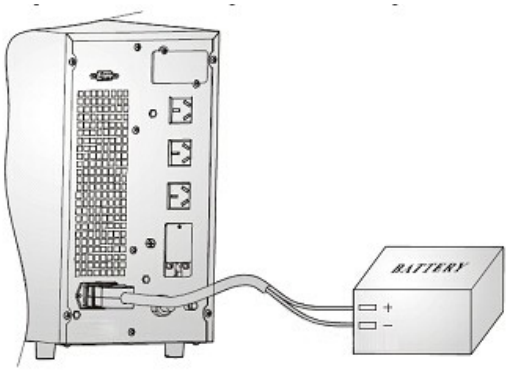
It is recommended to configure air switches (circuit breakers) at the UPS input, output and battery connections for safe operation. It is recommended to select the breaker with a rating greater than 150% of the actual maximum current and greater than 150% of the maximum operating voltage. The battery breaker shall be a DC-type air switch.

3) After wiring, check that all cables are securely connected;

4) Refit the terminal block cover onto the cabinet.

***Warning: Non-professionals must not wire loads via the terminal block to avoid electric shock.***

2.3.2 Battery Connection Cable



The battery connection cable is a standard accessory. If a longer battery cable is needed, please consult the dealer. The battery cable must not be extended indefinitely, otherwise the normal use of the UPS will be affected.

2.4 Communication

2.4.1 RS-232

The RS232 communication port is standard on the main unit. Connect it to a computer via a serial cable; the corresponding graphical monitoring software can be downloaded from our website for remote monitoring of the UPS. The communication protocol can also be downloaded from the website.

For the RS232 communication protocol and the use of the cloud card, please refer to the relevant documents.

2.4.2 RS485 Modbus (Optional)

In industrial control, it realizes data exchange and control command transmission with the UPS. Refer to the relevant documents for details.

2.4.3 Cloud Network Monitoring / Mobile Monitoring (Optional)

The network cloud monitoring card (factory pre-installed) can be selected before purchase, enabling mobile monitoring and remote centralized monitoring. Refer to the relevant documents for details.

2.4.4 Dry Contact (Optional)

Dry contact signals include mains status, battery status, inverter status, etc. Refer to the relevant documents for details.

Chapter 3 Operation

3.1 Control Panel



① Battery Mode
② Mains Mode
③ Bypass Mode
④ Input Voltage
⑤ Mute
⑥ Battery Capacity
⑦ On-off Key
⑧ Output Voltage
⑨ Warning
⑩ Load
⑪ Function Key

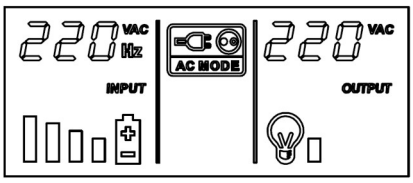
3.2 Start-Up

According to the presence of mains and the mode setting of the UPS, there are the following UPS start-up conditions.

Make sure the UPS is powered on and enters the inverter working state, otherwise the UPS will not protect the loads.

Make sure the battery has a certain amount of charge. The built-in or external battery of the UPS is generally not fully charged, and the charge will further drop after transportation and storage. It is recommended to charge the battery for 10 hours before the first use of the UPS, or follow the battery manufacturer's advice, so as to ensure sufficient backup time.◦

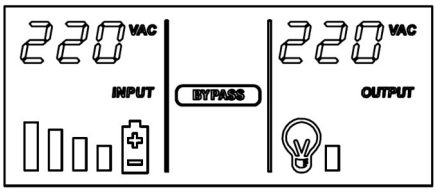
✧ In unattended mode with mains: This series of UPS defaults to unattended mode. Once the mains is connected, the UPS starts automatically and transfers to the AC (inverter) working mode (AC MODE).



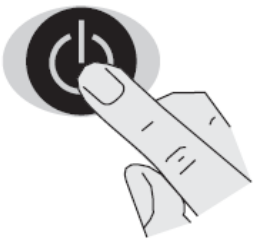
Working state in AC mode

✧ In non-unattended mode with mains:

If the UPS is set to have bypass output after shutdown (this series defaults to bypass output in standby), the UPS enters the standby-with-bypass-output state after the mains is connected, as shown in the figure below. At this time, press the power button for 2 seconds, and then the UPS enters the AC working mode (AC MODE).

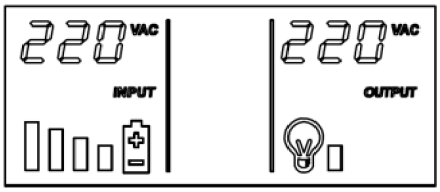


UPS standby with bypass output mode diagram



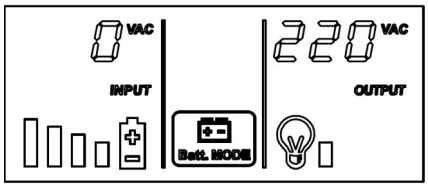
Press the power button manually

If the UPS is set to have no bypass output after shutdown, the UPS enters the standby-without-bypass-output state after the mains is connected, as shown in the figure below. At this time, press the power button for 2 seconds, and then the UPS enters the AC working mode (AC MODE).



UPS standby without bypass output mode diagram

✧ Start on battery only (DC cold start):



When the mains is not connected or the connected mains is abnormal (generally meaning the frequency or voltage is beyond the working range, see the specification table), i.e. in the DC cold start state, press the power button for 2 seconds, and then the UPS enters the battery working mode (DC MODE).

3.3 Shutdown

Method: press and hold the on/off button for more than 2 seconds.

When working in AC mode:

If the UPS is set to have bypass output in standby, it enters bypass mode. To cut off power completely, disconnect the mains input.

If the UPS is set to have no bypass output in standby, it disconnects the output and enters standby mode.

When working in battery mode:

The UPS shuts down the output directly; after about 10-30 seconds, the fan stops completely and the panel goes off automatically.

3.4 Battery Self-Test

During UPS operation, the user can manually start the battery self-test function to check the battery status. The battery self-test can be started as follows:

■ Via the function key

In AC mode, press and hold the function key for more than 2 seconds; the UPS transfers to battery mode and performs the battery self-test. The default duration of the battery self-test is 10 seconds. During the self-test, if a battery fault occurs, the UPS will automatically transfer back to AC mode.

■ Via the monitoring software

The user can also start the battery self-test via the monitoring software.

3.5 Mute Operation

When the UPS works in battery mode, it gives an alarm beep (in battery mode, once every four seconds; when the battery voltage is very low, once per second). The user can mute the alarm manually or restart the alarm. Note: in battery mode, only the four-second alarm can be muted. Methods:

- Via the function key

In battery and bypass modes, press and hold the function key for more than 2 seconds until a "beep" is heard. When the UPS has an alarm, this action cancels the alarm; when the UPS has no alarm, this action starts the alarm.

- Via the monitoring software

The user can also mute via the monitoring software.

Chapter 4 Maintenance

4.1 Routine Maintenance

- Keep the environment clean to avoid dust or chemical pollution to the UPS.
- Check the wiring terminals of the input and output cables every six months. Check carefully and measure whether the contact is good.
- Check the working state of the fan regularly to prevent debris from blocking the air outlet. Replace it in time if damaged.
- Check the UPS working condition regularly

  If the mains is normal, the UPS should work in AC mode; if the mains is abnormal, the UPS should work in battery mode. No fault should be displayed in either working state.
- Check the UPS mode transfer regularly

  Disconnect the mains input to simulate a mains failure; the UPS should transfer to battery mode and run normally. Then reconnect the mains input; the UPS should transfer back to AC mode and work normally.
- Check the UPS indicator display regularly

  During the above two checks, check whether the UPS indicator display is consistent with its actual working mode.

4.2 Battery Maintenance

The battery is an important part of the UPS system. Battery life depends on the ambient temperature and the number of discharge cycles. Using at high temperature or deep discharge will shorten the battery service life.

- When connected to the mains, the UPS charges the battery continuously no matter whether it is powered on or off, and provides over-charge and over-discharge protection.
- The ambient temperature for battery use should be kept between 15 and 25 as far as possible.
- If the UPS is not to be used for a long time, it is recommended to charge it every 3 months.
- In normal use, charge and discharge the battery once every 4 to 6 months: discharge until shutdown and then recharge. When used in high-temperature areas, charge and discharge the battery once every 2 months. For standard UPS, each charging time shall not be less than 10 hours.
- Batteries should not be replaced individually. Follow the battery supplier's instructions when replacing.

- Under normal conditions, the battery service life is more than 5 years. If the condition is found to be poor, it must be replaced earlier. Battery replacement must be performed by professionals.

Chapter 5 Troubleshooting

When your UPS behaves abnormally, please check and troubleshoot according to the table below first. If the problem still exists, contact the customer service center.

5.1 Troubleshooting

Fault 11	UPS shut down due to internal over-temperature	Make sure the UPS is not overloaded, the vents are not blocked and the room temperature is not too high. Wait 10 minutes for the UPS to cool down and then restart. If it fails, contact your supplier.
Fault 3~8	UPS shut down due to internal fault	Please contact your supplier.
Fault 14	UPS over-charge protection activated	UPS charger fault. Please contact your supplier.
Mains input values flashing	Mains voltage or frequency is out of the UPS input range (at start-up the UPS beeps twice per second, eight beeps in a row)	The UPS is now working in battery mode. Save the data and close the applications, and make sure the mains is within the input voltage or frequency range allowed by the UPS.
Mains input values flashing	Live and neutral wires of the mains are reversed; the UPS beeps once every two minutes	Reconnect the mains so that the live and neutral wires are correctly connected.
	UPS overload in battery mode or faulty load device	Check the load level and remove non-critical equipment, recalculate the load power and reduce the number of loads connected to the UPS, and check whether the load device is faulty.
Fault 15	UPS fan not connected or fan damaged	Please contact your supplier.
Fault 1	UPS output short circuit	Turn off the UPS and remove all loads. Make sure no load is faulty or short-circuited internally, then restart. If it fails, contact your supplier.
Battery values flashing on the display	Battery voltage too low or battery not connected	Check the UPS battery part and connect the battery properly. If the battery is damaged, contact your supplier.
Fault 14	UPS charging circuit fault	Please contact your supplier.
Short backup time	Battery not fully charged	Keep the UPS connected to the mains for more than 10 hours

6.2 ET1~3KR Specifications

Model		ET1KR	ET2KR	ET3KR
Rated Output Capacity		1000VA/900W	2000VA/1800W	3000VA/2700W
Operating Mode		Online double conversion		
AC Input	Rated Voltage	220Vac (adjustable 230/240V)		
	Rated Frequency	50Hz/60Hz auto-sensing		
	Input Voltage Range	(172~268) ±7Vac		
	Input Frequency Range	(45~55) ±0.5Hz / (55~65) ±0.5Hz		
Battery	Rated Battery Voltage (V)	24	48	
	Cell Type	Class-A LiFePO4		
	Cells in Series	8S	16S	
	Built-in Battery Capacity (Wh)	460.8	921.6	1228.8
	Battery Life	Float-charge life >10 years; cycle life >1200 cycles		
	Cell Protection	Per-cell overcharge, over-discharge, imbalance, over-current, short-circuit, etc.		
	Cell Balancing	Yes		
	Battery Level Management	Yes		
	Low Voltage Alarm / Low Voltage Shutdown	22/21-30V	44/42-60V	
	Charging Voltage	28.8±0.2V	57±0.3V	
	Charging Current	2A	3A	
	Charging Method	Constant current, then constant voltage		
	Charging Time	8 hours to 90% charge		
	Backup Time	Half load: 50 min; full load: 30 min		Half load: 42 min; full load: 23 min
AC Output	Output Voltage	220Vac ±3% (inverter output)		
	Output Frequency	50/60±5Hz (normal AC input); 50/60Hz±1% (abnormal AC input)		
	Dynamic Voltage Transient	<5%		
	Transient Recovery Time	< 60ms		
	Waveform	Sine wave, THD <3% (linear load); THD <8% (non-linear load)		
	Output Power Factor	0.8		
	Overload Capability	In mains mode, 130% for ≥20s; in battery mode, 120% for ≥20s		
	Output Current Crest Factor	3:1		
	DC-to-AC Transfer Time	0ms		
	Inverter-to-Bypass Transfer Time	<4ms		
Communication		Standard RS232; optional RS485 (Modbus), dry contact, SNMP and other monitoring functions		
Protection		Battery input over-voltage and under-voltage protection; overload, over-temperature, short-circuit, output over-voltage and under-voltage protection		
Weight (Kg)	Net Weight	9.5	20.6	23
Dimensions & Packing (W*H*D) mm	Net Dimensions	432*88*310	432*88*540	432*88*540
	Packing Dimensions	538*190*402	538*168*660	538*168*660
Operating Environment	Temperature	-35℃ ~ +40℃ (battery must not go below 0℃)		
	Humidity	20%~90%, non-condensing		
	Altitude	No derating below 1000m; derate 1% for every 100m above 1000m		
Storage Environment	Temperature	-40℃~+45℃		
	Humidity	20%~90%, non-condensing		