SOROTEC®

Power Solutions Expert



USER MANUAL

MODEL : UPS TOWER & RACK

High Frequency Online UPS (PF=1.0)
1KVA - 10KVA

www.sorotec.com.vn

SAFETY PRECAUTIONS

Operating Safety

1. Before using this product, please carefully read the “Safety Precautions” section to ensure correct and safe operation, and keep this user manual properly.

2. During operation, pay attention to all warning labels and operate according to instructions.

3. Avoid using the device under direct sunlight, rain, or in humid environments.

4. Do not install this device near heat sources or similar equipment such as electric heaters or electric stoves.

5. Ensure adequate ventilation and safe clearance around the UPS. Please refer to the installation instructions.

6. Use a dry cloth or dry tools for cleaning or maintenance.

7. In case of fire, use a dry powder fire extinguisher correctly. Using liquid fire extinguishers may cause electric shock.

Electrical Safety

1. Battery life is shortened when ambient temperature increases. Periodic battery replacement helps ensure normal UPS operation and backup time.

2. Battery maintenance must be performed by qualified personnel.

3. There is a risk of electric shock and short circuit from batteries. To avoid personal injury, observe the following precautions when replacing batteries:
   - o A. Do not wear watches, rings, or other metal objects.
   - o B. Use insulated tools.
   - o C. Do not place metal tools or metal parts on the batteries.
   - o D. Disconnect battery cables before removing battery terminals.

4. Do not dispose of batteries in fire to avoid explosion and personal injury.

5. Unqualified personnel must not open or damage batteries. Batteries contain hazardous substances such as strong acids, which may cause injury to skin and eyes. If electrolyte contact occurs, rinse immediately with plenty of water and seek medical attention.

6. Do not short-circuit the positive and negative terminals of the battery, as this may cause electric shock or fire.

USE AND MAINTENANCE

1. The operating and storage environment affects product lifespan and reliability. Do not use the UPS in the following environments:
   - o A. Low or high temperature, or humidity beyond specifications
     (Operating temperature: 0°C–40°C, Relative humidity: 20%–90%)
   - o B. Locations with vibration or mechanical shock.
   - o C. Environments with metal dust, corrosive substances, salt, or flammable gases.

2. If the UPS (without batteries) is not used for a long time, store it in a dry environment at a temperature between -15°C and +60°C. Before starting the UPS, allow the environment to warm above 0□ for more than 2 hours.

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▶1. INTRODUCTION

* This UPS series is an online standard sine wave uninterruptible power supply system with an integrated maintenance bypass switch, which can provides high-quality and reliable AC power for precision equipment.

* It can be used in a wide range of fields, from computer equipment, communication systems to industrial automatic control systems.

* Thanks to its online design, unlike standby UPS systems. The input voltage is continuously regulated and filtered. When mains power fails, the system will provide power from the backup battery without interruption. In case of overload or inverter fault, the UPS transfers to bypass mode and draws power directly from the mains. If the overload condition is removed, the system will automatically switch back to power supply mode via the inverter.

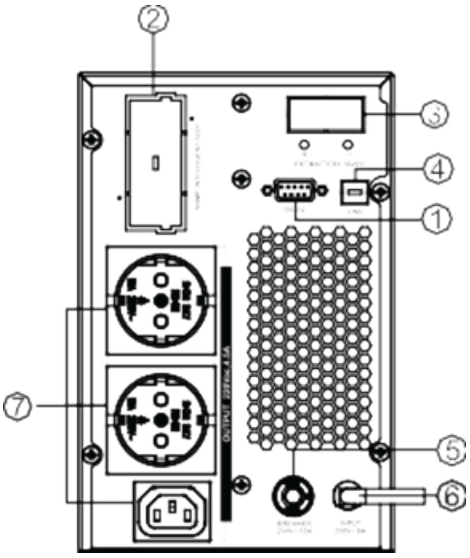
This manual applies to the following products:

- 1KT: Standard UPS with built-in batteries.
- 1KT XL: Long time backup UPS, connected to external battery.
- 2KT: Standard UPS with built-in batteries.
- 2KT XL: Long time backup UPS, connected to external battery.
- 3KT: Standard UPS with built-in batteries.
- 3KT XL: Long time backup UPS, connected to external battery.
- 6KT: Standard UPS with built-in batteries.
- 6KT XL: Long time backup UPS, connected to external battery.
- 10KT: Standard UPS with built-in batteries.
- 10KT XL: Long time backup UPS, connected to external battery.
- 6KR/10KR (XL): Rack product line (external batteries required)

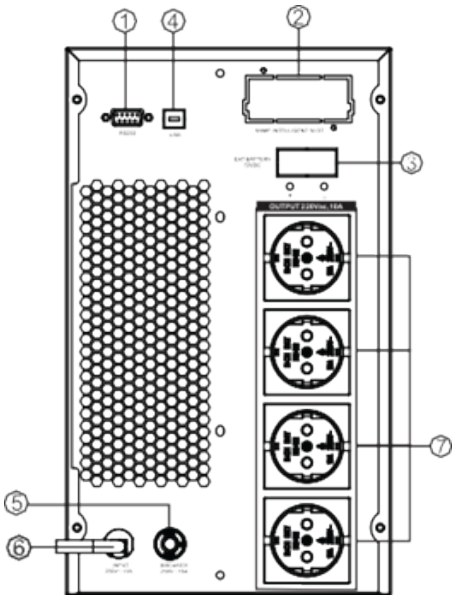
1.1 Symbol

SYMBOLS AND MEANINGS	
Symbol	Meaning
	Caution
	Danger
	Alternating Current (AC)
	Direct Current (DC)
	Protective Earth
	Protective Earth Connection
	Loop
	Do not throw into the trash
	Overload
	Battery
	Power ON / OFF

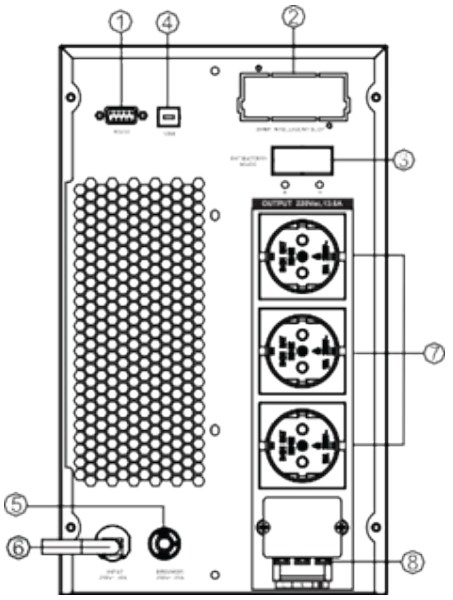
1.2 REAR PANEL VIEW:



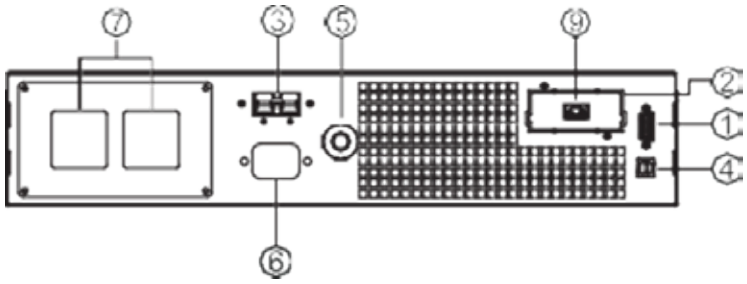
1KT (XL)



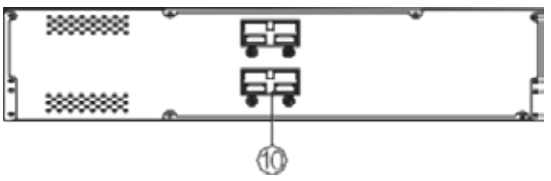
2KT (XL)



3KT (XL)



1KR/2KR/3KR (XL)

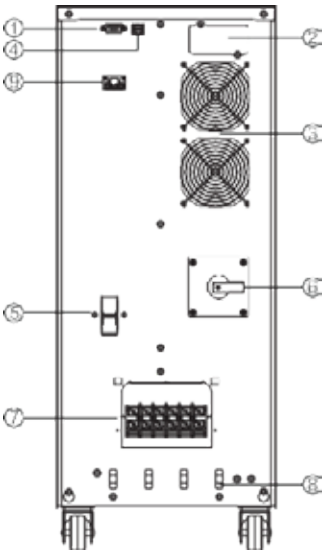


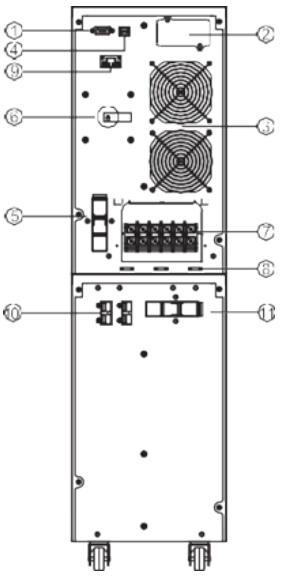
Battery pack

Computer communication port

1. Intelligent slot
2. External battery connector (L models only)
3. USB port (optional)
4. Input circuit breaker
5. AC input
6. Output sockets
7. Output terminal
8. Emergency Power Off – EPO (optional)
9. Battery communication

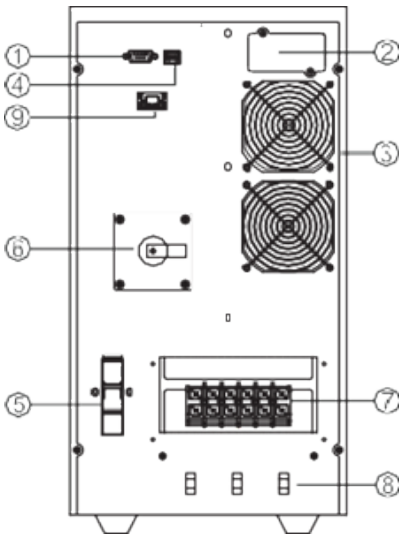
1.2 REAR PANEL VIEW:

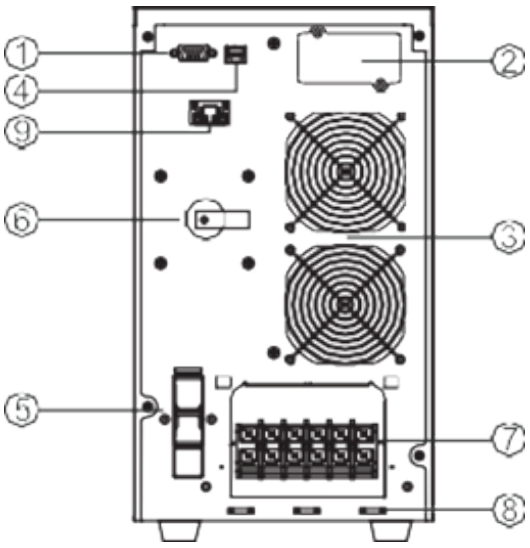




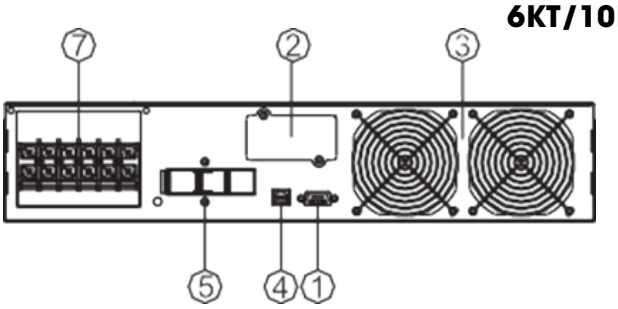
6KT/10KT (XL)
Rear view

6KT/10KT

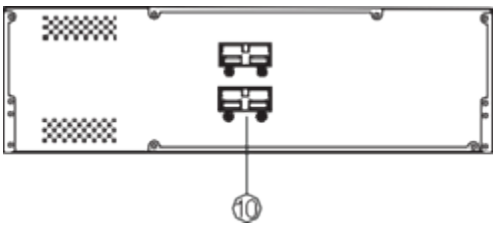




6KT/10KT (XL)



6KR/10KR (XL)



Battery pack

1. Computer communication port
2. Intelligent slot (optional))
3. Cooling fan
4. USB port (optional)
5. Input protection switch
6. Maintenance bypass switch (optional)
7. Terminal block
8. Mounting bracket
9. Emergency Power Off (EPO)
10. Battery communication interface
11. Battery protection switch

1.3 SPECIFICATIONS:

Model	Internal battery	1KT/1KR	2KT/2KR	3KT/3KR
	Extended battery	1KT XL/1KR XL	2KT XL/2KR XL	3KT XL/3KR XL
Phase		1 Phase		
Power		1KVA/1KW	2KVA/2KW	3KVA/3KW
Input				
Input Voltage Range (Vac)		110 - 300VAC, 110 – 176VAC, 280 – 300VAC (Power limit)		
Input Frequency (Hz)		50/60Hz ± 6Hz		
Input Power Factor		≥ 0.99		
Output				
Output Voltage Range (Vac)		220VAC±1% (208, 220, 230, 240 selectable)		
Output Frequency (Hz)		50/60Hz±0.1%		
Power Factor		1		
On Battery Waveform		Pure sine wave		
Typical Transfer Time		0ms		
Overload Protection				
Battery Mode		102% ~ 110% load : 30 minutes		
		110% ~ 130% load : 10 minutes		
		130% ~ 150% load : 30 seconds		
		>150% load : 200 mili seconds		
Line Mode		102% ~ 110% load: 1 seconds		
		110% ~ 130% load : 10 seconds		
		130% ~ 150% load : 3 seconds		
		>150% load : 200 mili seconds		
Machine Efficiency				
AC mode		Full load 94.5% 220VAC	Full load 95.5% 220VAC	
DC mode	Internal battery	Full load 89.5% 24VDC	Full load 91.5% 72VDC	Full load 91.5% 72VDC
	External battery	Full load 89.5% 36VDC		Full load 91.5% 96VDC
AC mode				
Default	Battery	12V9Ah	12V7.2Ah	12V9Ah
	Quanlity	2	6	6
	Charge Current (A)	1A	(1A~12A) Configurable	(1A ~ 4A) Configurable
Extend	Battery	12V	12V	12V
	Quanlity	3	6	8
	Charge Current (A)	(1A~12A) Configurable	(1A~12A) Configurable	(1A~12A) Configurable
Charging mode		2 / 3 stage charging		
Display				
LCD / Led		Load, battery capacity, AC mode, battery mode, bypass mode, fault indication		
Warning				
AC mode		Beep every 4 seconds		
Low battery		Beep every 1 seconds		
Overload		Beep every 1 seconds		
Fault		Continuous beep		
Physical Size				
Internal battery	Tower	D*W*H (mm)	295*144*225 ± 2%	405*190*325 ± 2%	410*190*325 ± 2%
		N.W (kg)	9kg ± 2%	21.64kg ± 2%	23.23kg ± 2%
	Rack	D*W*H (mm)	380*440*88 ± 2%	550*440*88 ± 2%	550*440*88 ± 2%
		N.W (kg)	11kg ± 2%	22.22kg ± 2%	24.14kg ± 2%
Extended battery	Tower	D*W*H (mm)	290*145*222 ± 2%	408*145*225 ± 2%	410*145*225 ± 2%
		N.W (kg)	3.6kg ± 2%	5.43kg ± 2%	5.66kg ± 2%
	Rack	D*W*H (mm)	380*440*88 ± 2%	380*440*88 ± 2%	380*440*88 ± 2%
		N.W (kg)	5.63kg ± 2%	6.55kg ± 2%	6.86kg ± 2%
Environmental				
Temperature and humidity		20-90% relative humidity and temperature 0-40°C (non-condensing)		
Noise level		Less than 50dBA from a distance of 1 meter		
Control and management				
RS-232		Windows® 2000/2003/XP/Vista/2008, Windows® 7/8, Linux, Unix		
Smart slot (optional)		SNMP Card		
Certifications		CE-EMC, CE-LVD, EN/IEC 62040, GB/T 7260, GB/T 4943, YD/T 1095, TLCetc.		

Model	Internal battery	6KT/6KR	10KT/10KR
	Extended battery	6KT XL/6KR XL	10KT XL/10KR XL
Phase		1 Phase	
Power		6KVA / 6KW	10KVA / 10KW
Input			
Input Voltage Range (Vac)		110 - 300VAC, 110 – 176VAC, 276 – 300VAC (Power limit)	
Input Frequency (Hz)		50/60Hz ± 6Hz	
Input Power Factor		≥ 0.99	
Output			
Output Voltage Range (Vac)		220VAC±1% (208, 220, 230, 240 Configurable)	
Output Frequency (Hz)		50/60Hz±0.1%	
Power Factor		1	
On Battery Waveform		Pure sine wave	
Typical Transfer Time		0ms	
Overload Protection			
Battery Mode		102% ~ 110% load : 30 minutes	
		110% ~ 130% load : 10 minutes	
		130% ~ 150% load : 30 seconds	
		>150% load : 200 mili seconds	
Line Mode		102% ~ 110% load: 10 minutes	
		110% ~ 130% load : 1 minute	
		130% ~ 150% load : 10 seconds	
		>150% load : 500 mili seconds	
Machine Efficiency			
AC mode		Maximum efficiency: 95.5%, full-load efficiency: 95%	
DC mode		Maximum Efficiency 95.3% - Full load Efficiency 94,8% (20 battery)	
Battery			
Internal battery	Battery	12V7.2Ah	12V9Ah
	Quanlity	16	16
	Charge Current (A)	(1A~12A) Configurable	(1A~12A) Configurable
Extended battery	Ắc quy	12V	12V
	Quanlity	16/20	16/20
	Charge Current (A)	(1A~12A) Configurable	(1A~12A) Configurable
Charging mode		2 / 3 stage charging	
Display			
LCD / led		Load, battery capacity, AC mode, battery mode, bypass mode, fault indication	
Warning			
AC mode		Beep every 4 seconds	
Low battery		Beep every 1 seconds	
Overload		Beep every 1 seconds	
Fault		Continuous beep	
Physical Size			
Tower	Internal battery/ Extended battery	D*W*H (mm)	454*188*610 ± 2%	454*188*610 ± 2%
		N.W (kg)	51.5kg ± 2%	59.5kg ± 2%
		D*W*H (mm)	390*190*317 ± 2%	395*190*317 ± 2%
		N.W (kg)	9kg ± 2%	9.8kg ± 2%
Rack	Internal battery/ Extended battery	D*W*H (mm)	380*440*88 ± 2%	380*440*88 ± 2%
		N.W (kg)	9kg	9.8kg
		Rack height (U)	2	
Rack Battery	D*W*H (mm)		690*440*88 ± 2%	690*440*88 ± 2%
	N.W (kg)		49.5kg ± 2%	54Kg ± 2%
	Rack height (U)		2	
Environmental				
Temperature and humidity		20-90% relative humidity and temperature 0-40°C (non-condensing)	
Noise level		Less than 50dBA from a distance of 1 meter	
Control and management			
RS-232		Windows® 2000/2003/XP/Vista/2008, Windows® 7/8, Linux, Unix	
Smart slot (optional)		SNMP Card	
Certifications		CE-EMC, CE-LVD, EN/IEC 62040, GB/T 7260, GB/T 4943, YD/T 1095, TLCetc.	

▶2. Lắp đặt

⚠ Warning

* Disconnect the AC input breaker before installation. For long backup models, disconnect the battery breaker as well.

⚠ Note:

1. Installation and wiring must be performed by qualified technical personnel in compliance with local regulations
2. UPS must be properly grounded.

▶2.1 Inspection

* Check the UPS for any damage during transportation.
* Do not power on the UPS if damage is found. Notify the carrier or supplier immediately.

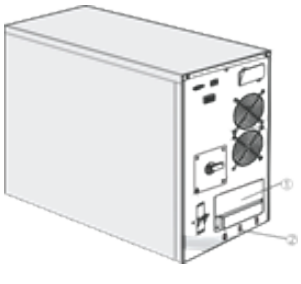
♻ Recycling: Packaging materials are recyclable. Please retain them for future use.

▶2.2 Wiring Requirements

⚠ *Warning: Ensure cable size matches UPS capacity.*

Model	AWG/mm2			
	Input	Output	Bettery	Earth wire
10KT/KR (XL)	10 (6mm2)	10 (6mm2)	10 (6mm2)	10 (6mm2)
6KT/KR (XL)	8 (6mm2)	8 (6mm2)	8 (6mm2)	8 (6mm2)

▶2.3 3 UPS Connection



⚠ Warning:

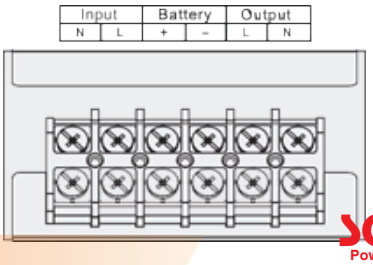
The AC input breaker current rating must exceed the UPS maximum input current.

1. Remove terminal cover.
2. Connect input and output cables to terminals ①.
3. Secure cables with clamps.
4. Replace terminal cover and tighten screws ②.
5. Turn ON the input breaker to power the UPS.

⚠ Warning:

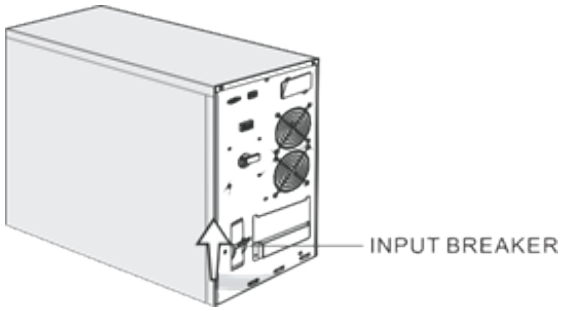
*When connecting the wires, make sure that the input wire, output wire, and the corresponding terminals are all securely connected.

▶ Terminals block:



6. Reattach the cover and tighten it with a screwdriver①.

7. After connecting the cables and AC power, switch the UPS INPUT CIRCUIT BREAKER to the 'ON' position, and the UPS will be powered.



▶2.4 External Battery Connection (Long Backup Models)

* The nominal direct current (DC) voltage of the external battery pack is 192VDC. Each battery pack consists of 16 12V batteries connected in series. To achieve longer backup time, multiple battery packs can be connected together.

* The battery connection procedure is very important; if you do not follow the procedure correctly, you may face the danger of electric shock. Therefore, please carefully follow these steps:

▶1. Set the battery breaker to the 'OFF' position and connect the batteries in series.

▶2. Select the appropriate battery cable to connect the battery bank and the UPS (refer to table 2.2). A DC switch must be connected between the battery bank and the UPS. The switch's load capacity must not be lower than the specification stated in the general section.

Model	6KT / 6KR (XL)	10KT / 10KR (XL)
Battery voltage	192VDC	192VDC
Battery current	34A Max	56A Max

⚠ Warning:

* Do not connect battery terminals to UPS before completing wiring.

▶3. Connect the other end of the battery cable to the UPS before connecting it to the battery pack. Make sure the UPS is not connected to any load, then switch the battery pack to 'ON', and then turn on the AC power — at this point, the UPS will start charging

▶2.5 Computer Connection:

* RS232: Connect UPS to PC using RS232 cable

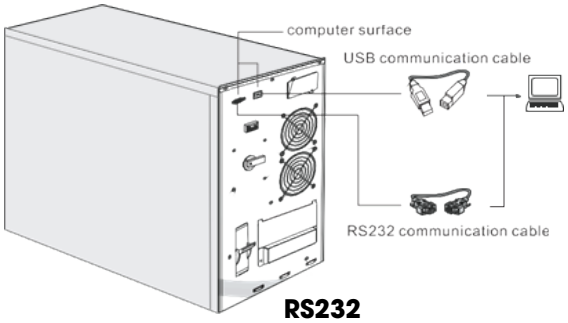
▶1. Use an RS232 cable to connect to the computer's RS232 port first.

▶2. Then, connect the other end of the RS232 cable to the RS232 port of the UPS.

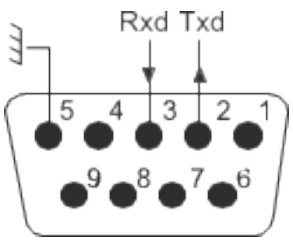
* USB: Connect UPS to PC using USB cable

▶1. Use a USB cable to first connect to the computer's USB port.

▶2. Then, connect the other end of the USB cable to the USB port of the UPS.

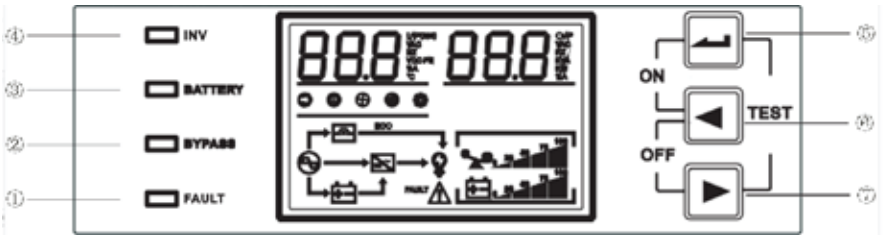


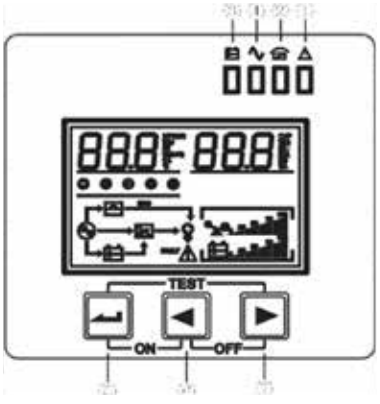
RS232

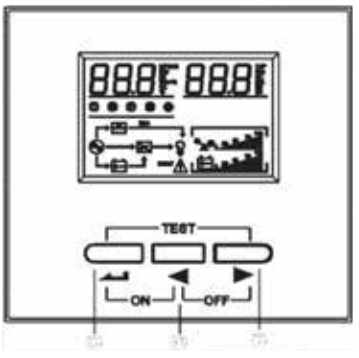


▶3. Bảng điều khiển

▶3.1 LCD Display Functions







Display	Function
Fault Notificationt	
FAULT	A fault has occurred
△	Warning
888	Error Code
	Mute Function
888	VAC : Input / Output AC Voltage VDC : DC Voltage
Load Infomation	
	Load capacity : 25% 50% 75% 100%
Battery Infomation	
	Battery Capacity : 25% 50% 75% 100%
Other Infomation	
	Utility Power
	Battery
	Bybass
	Inverter
	Output
	Fan
	Setting
	ECO (Energy Saving Mode)
	Maintenance

▶3.2 LED Indicators

1. **Fault Indicator (Red):**
   - o **Flashing: UPS alarm condition.**
   - o **Solid ON: Serious fault.**
2. **Bypass Indicator (Yellow):**
   - o **Solid ON: UPS operates in Bypass or ECO mode.**
   - o **Flashing: In standby mode when frequency transfer is not completed or bypass failure occurs.**
3. **Battery Indicator (Yellow):**
   - o **Solid ON: UPS in Baterry mode or Battery self-test mode.**
   - o **Flashing with alarm: Battery low.**
4. **Inverter Indicator (Green):**
   - o **Solid ON: UPS operates in inverter mode (inverter supplying power).**

▶3.3 Button Functions:

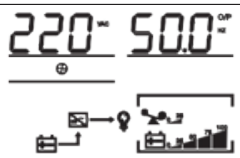
Button	Function
(↵ + ◀) Press and hold both buttons for 3 seconds	Turn ON UPS
(◀ + ▶) Press and hold both buttons for 3 seconds	Turn OFF UPS
(↵ + ◀) Press and hold both buttons for 3 seconds	Online mode: Battery test Alarm mode: Mute alarm
↵	Select Button
(◀ , ▶) Page turning/query key	Switch display pages

▶3.4 UPS Status Table (LED & Buzzer

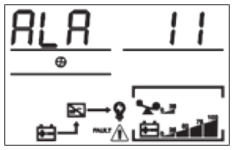
Buzzer Sound	Description
Continuous beep	Fault
Beep every second	Battery low
	Overload
Beep every 2 minutes	Bypass mode

▶3.5 UPS Operating Status & LCD Display

AC Mode	
LCD Display	Instruction
	UPS provides stable AC output when input voltage is within acceptable range. Battery is charged in this mode.

Battery Mode	
LCD Display	Instruction
	When AC input is out of range or power failure occurs, UPS switches to battery mode. Battery supplies load and buzzer sounds every 4 seconds.

Chế độ bỏ qua	
LCD Display	Instruction
	When AC power is supplied, UPS starts automatically in bypass mode. Buzzer sounds every 2 minutes.

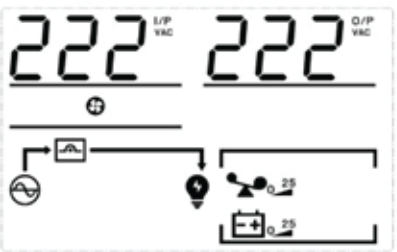
Fault Status	
LCD Display	Instruction
	When UPS fails, LCD displays fault code.

▶3.6 Parameter Inquiry:

- Normally, LCD has 8 display pages. Press the query button ◀ ▶ for 1–2 seconds to switch pages showing input, battery, output, load, software version, temperature, etc. If alarm occurs, one extra alarm page is added. If UPS fault occurs, LCD automatically switches to fault code page. Normal homepage displays output voltage and frequency.

Press and bold ◀ ▶ for 2 seconds to enter auto-scroll mode. LCD scrolls every 2 seconds.
Long press again to stop scrolling.

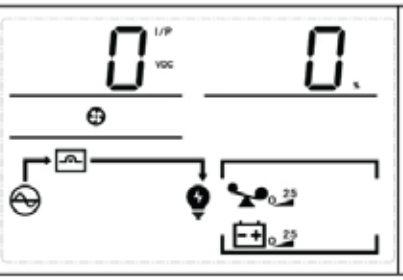
LCD Display 1: UPS input & output voltage



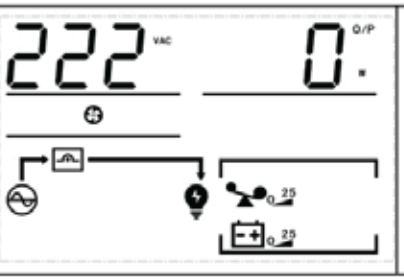
LCD Display 2: UPS input & output frequency



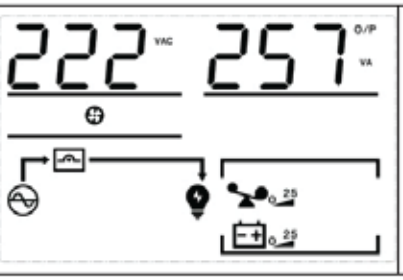
LCD Display 3: Battery voltage and capacity



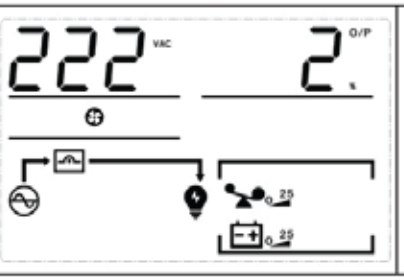
LCD Display 4: Output voltage and Output active power



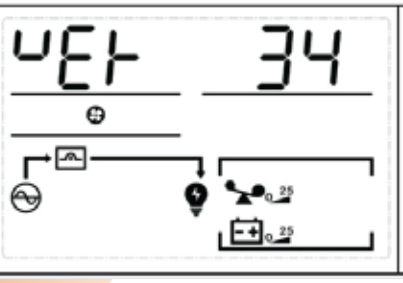
LCD Display 5: Output voltage and output complex power



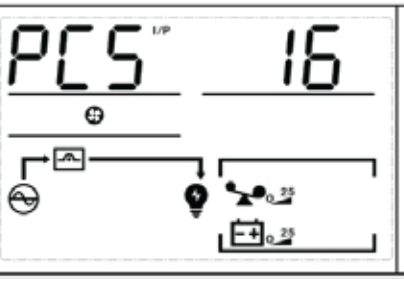
LCD Display 6: Output voltage and load percentage



LCD Display 7: UPS system software version



LCD Display 8: connected battery quantity



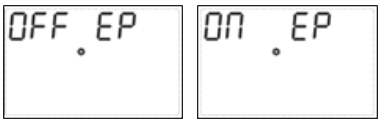
▶3.7 Function Settings:

1. Output Voltage Setting :

LCD Display	Setting
	1. Press and hold function setting button ↵ for over 3 seconds to enter setting menu. Press and hold the page switch button until the output voltage setting page is displayed (OPU flashes). 2. Pess Confirm ↵ for 2 seconds to enter the OPU output voltage setting page. The OPU indicator lights up, and the numbers on the left side of OPU continue flashing. Press the page switch buttons ◄ or ► for 1–2 seconds to select the desired output voltage (208V, 220V, 230V, 240V). 3. Press the confirm button ↵ to select the desired voltage. 4. Wait 30 seconds to exit to homepage.

2. Other Settings:

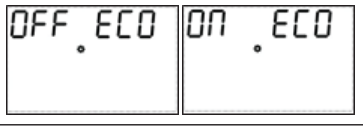
▶2-1 : EP Mode

LCD Display	Setting
	Set the EP mode, then return to the function setting page. The LCD display will show the battery quantity, EPO, charging current, and other functions. (The UPS is factory preset. Please contact technical support for guidance if parameter changes are required.)

▶2-2 : Low Battery Cut-off Voltage

LCD Display	Setting
	The available EOD setting options are: DEF: 9.8V, 9.9V, 10V, 10.2V, 10.5V By default, the EOD value changes according to load conditions:10.5V tải dưới 25% 10.5V: Load below 25% 10.2V: Load above 25% and below 50% 10V: Load above 50%

▶2-3 : ECO Mode

LCD Display	Setting
	The ECO mode is disabled by default and can be enabled through settings.

▶2-4 : Neutral & Live Reverse Alarm Function

LCD Displayt	Setting
	The alarm function is disabled by default.

▶5. Alarm Codes & Solutions

- When the alarm icon ⚠ on the LCD display is flashing, the UPS is in an alarm state. Press the page switch button to enter the fault status page.

Alarm Code	Status	Cause	Solution
1	Battery not connected	1. Battery disconnected 2. Battery failure	1. Check battery connection 2. Replace battery
2	Battery voltage low	1. Battery voltage low talarm threshold	1. Recharge battery
4	Input N-L reversed	1. Input N-L reversed 2. Ground not connected	1. Reverse N-L wiring 2. Connect ground
8	Battery over-voltage	Battery voltage exceeds rated value	Check charging voltage
9	Charger fault	Charger hardware abnormal	Contact supplier
10	Over-temperature alarm	1. Fan failure 2. Blocked airflow 3. Overload 4. NTC failure 5. IGBT power failure	1. Check fan 2. Clean UPS 3. Check load
12	Fan fault	1. Fan cable loose 2. Fan failure	Check fan and wiring
13	Fuse open	Fuse blown	Contact supplier
14	EEPROM fault	EEPROM chip failure	Contact supplier
21	Overload	Load exceeds rated capacity	Check load
22	Load locked 3 times	Load locked 3 times	Turn off and restart the UPS
23	EPO	EPO fault	Check EPO connection

▶6. Battery Maintenance and Replacement:

- This UPS series requires minimal maintenance. The standard batteries used are sealed, maintenance-free types and do not require regular servicing. However, the batteries must be charged periodically to achieve the expected service life. The UPS automatically charges the batteries when AC utility power is available.

- If the UPS is not used for an extended period, it is recommended to recharge the UPS every 4–6 months. In high-temperature environments, the batteries should be discharged once every 2 months, and the charging time should be no less than 12 hours.

- Under normal operating conditions, the typical battery service life is 3–5 years. If battery failure is detected, the batteries must be replaced. Battery replacement must be performed by qualified service personnel.

- When replacing batteries, ensure that the quantity and capacity of the replacement batteries are identical to those originally installed.

- Do not replace individual batteries. When battery replacement is required, replace the entire battery set and follow the specified replacement procedures.
- Under normal conditions, it is recommended to discharge the batteries once every 4–6 months.