USER MANUAL

Online UPS: Avenger Series

Rack Mount (RM)

120 VAC – 220 VAC

Capacity: 1 KVA ~ 1.5 KVA ~ 2 KVA ~ 3 KVA

REVISION	DESCRIPTION	DATE
Rev. 1.3	Formal Release	2017/02/03

Danger: For your safety

Improper use on this equipment can lead to an imminently hazardous situation which, if not avoided, will result in death or serious injury.

Warning: Caution

Unsafe practices that could endanger health, safety and cause financial damage.

Important

Any important technical and operating information on the equipment, should not neglected.

Annotation

Sy-G reserves the right to alter the features of its products without prior notice.

CONTENTS

1. Safety Warning

Please comply with all warnings and operating instructions in this manual strictly. Save this manual properly and read carefully the following instructions before installing the unit. **Do not** operate this unit before reading through all safety information and operating instructions carefully.

1.1. Transportation

Please transport the UPS system only in the original package to protect against shock and impact.

1.2. Preparation

- Condensation may occur if the UPS system is moved directly from cold to warm environment.
  The UPS system must be absolutely dry before being installed.

PLEASE ALLOW AT LEAST TWO HOURS FOR THE UPS SYSTEM TO ACCLIMATE THE ENVIRONMENT.

- **Do not** install the UPS system near water or in moist environments.
- **Do not** install the UPS system where it would be exposed to direct sunlight or near heater.
- **Do not** block ventilation holes in the UPS housing.

1.3. Installation

- **Do not** connect appliances or devices which would overload the UPS system (e.g. laser printers) to the UPS output sockets.
- Place cables in such a way that no one can step on or trip over them.
- **Do not** connect domestic appliances such as hair dryers to UPS output sockets.
- The UPS can be operated by any individuals with no previous experience.
- Connect the UPS system only to an earthed shockproof outlet which must be easily accessible and close to the UPS system.
- Please use only VDE-tested, CE-marked (or UL-marked for 100/110/115/120/127 VAC models) mains cable (e.g. the mains cable of your

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computer) to connect the UPS system to the building wiring outlet (shockproof outlet).

- Please use only VDE-tested, CE-marked (or UL-marked for 100/110/115/120/127 VAC models) power cables to connect the loads to the UPS system.
- When installing the equipment, it should ensure that the sum of the leakage current of the UPS and the connected devices does not exceed 3.5mA.
- Temperature Rating - Units are considered acceptable for use in a maximum ambient of 40 °C (104 °F).
- For Pluggable Equipment - The socket-outlet shall be installed near the equipment and shall be easily accessible.

1.4. Operation

- **Do not** disconnect the mains cable on the UPS system or the building wiring outlet (shockproof socket outlet) during operations since this would cancel the protective earthing of the UPS system and of all connected loads.
- The UPS system features its own, internal current source (batteries). The UPS output sockets or output terminals block may be electrically live even if the UPS system is not connected to the building wiring outlet.
- In order to fully disconnect the UPS system, first press the **OFF/Enter** button to disconnect the mains (commercial power).
- Prevent no fluids or other foreign objects from inside of the UPS system.

1.5. Maintenance, service and faults

THE UPS SYSTEM OPERATES WITH HAZARDOUS VOLTAGES. REPAIRS MAY BE CARRIED OUT ONLY BY QUALIFIED MAINTENANCE PERSONNEL.

- **Caution -** Risk of electric shock. Even after the unit is disconnected from the mains (commercial power), components inside the UPS system are still connected to the battery and electrically live and dangerous.
- Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals of high capability capacitor such as BUS-capacitors.
- Only persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.
- **Caution -** Risk of electric shock. The battery circuit is not isolated from the

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input voltage. Hazardous voltages may occur between the battery terminals and the ground. Before touching, please verify that no voltage is present!

- **Do not** dispose of batteries in a fire. The batteries may explode.
- **Do not** open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- Batteries may cause electric shock and have a high short-circuit current.

Please take the precautionary measures specified below and any other measures necessary when working with batteries:

1) **Remove watches, rings, or other metal objects.**
2) **Use tools with insulated handles.**
3) **Wear rubber gloves and boots.**
4) **Do not lay tools or metal parts on top of batteries.**
5) **Disconnect charging source and load prior to installing or maintaining the battery.**
6) **Remove battery grounds during installation and maintenance to reduce likelihood of shock.**
7) **Remove the connection from ground if any part of the battery is determined to be grounded.**

- When changing batteries, install the same number and same type of batteries or battery packs.

For UPS with internal mounting Batteries

- Instructions shall carry sufficient information to enable the replacement of the battery with a suitable manufacturer and catalogue number.
- Safety instructions to allow access by Service Personnel shall be stated in the installation/service handbook.
- If batteries are to be installed by Service Personnel, instructions for interconnections, including terminal torque, shall be provided.
- **Do not** attempt to dispose of batteries by burning them. This could cause battery explosion.
- **Do not** open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.
- Please replace the fuse only with the same type and amperage in order to avoid fire hazards.
- **Do not** dismantle the UPS system.

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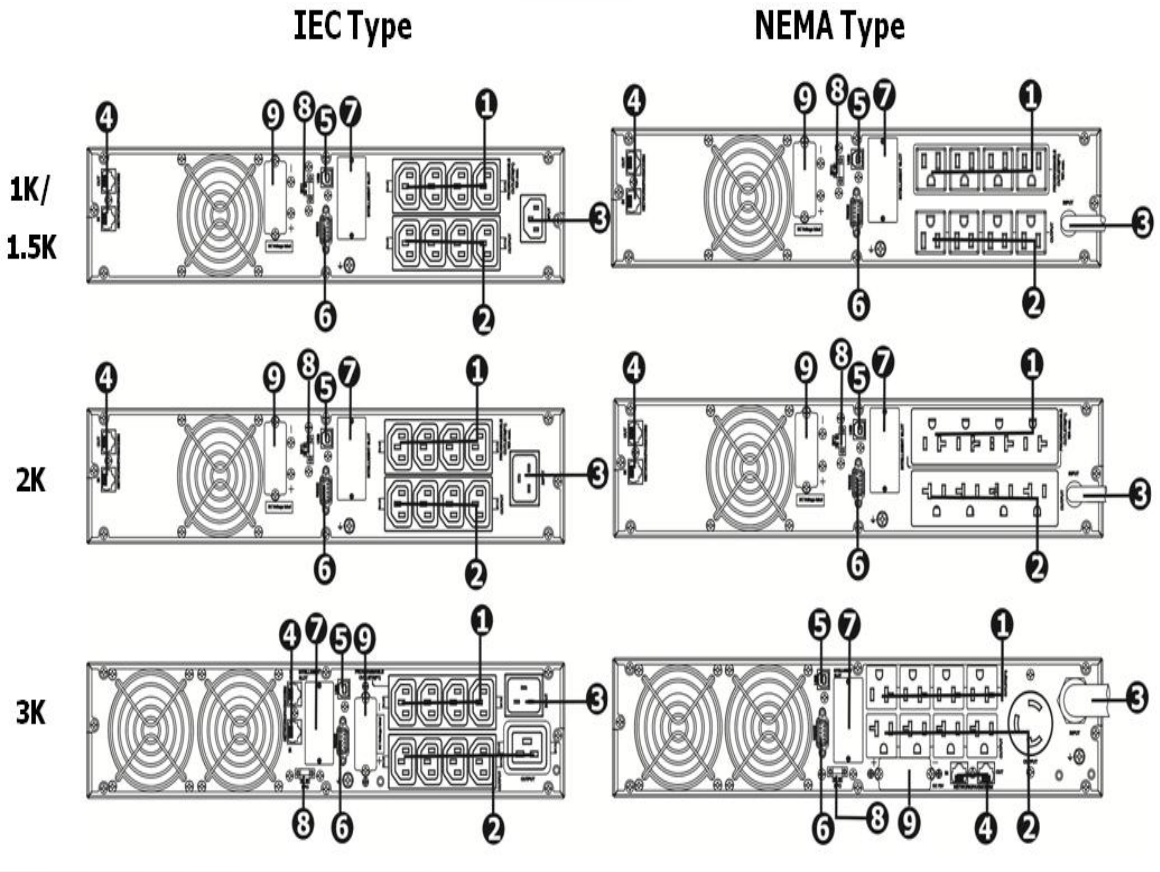
2. Installation and Setup

Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. Please keep the original package in a safe place for future use.

There are two different types of connector for the UPS (In and Out) online. Please see the following model table.

2.1. Rear Panel View



Description UPS

1. Programmable outlets: connect to non-critical loads.
2. Output receptacles: connect to mission-critical loads.
3. AC input
4. Network/Fax/Modem surge protection.
5. USB communication port.
6. RS-232 communication port.
7. SNMP intelligent slot.
8. Emergency power off function connector (EPO).
9. External battery connection.

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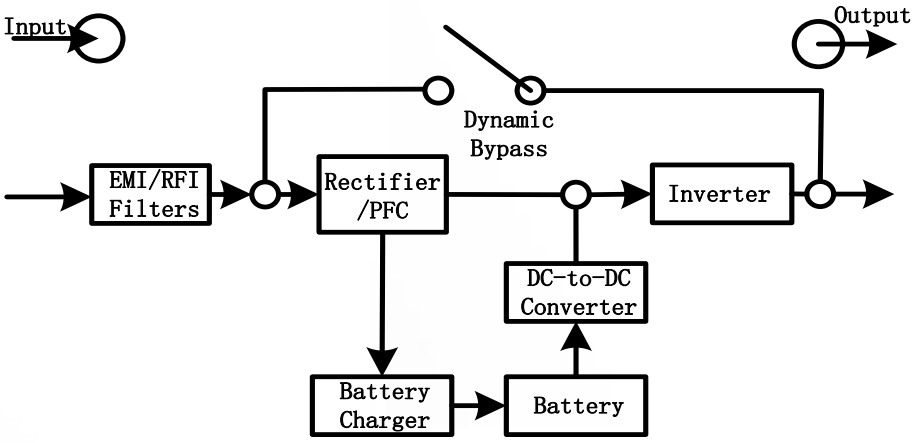
2.2. Operating principle

The operating principle of the UPS is show as below:

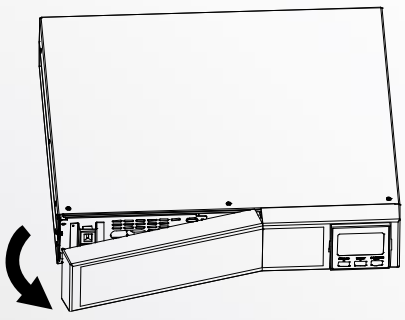


The UPS is composed of mains input, EMI/RFI filters, rectifier/PFC, inverter, battery charger, DC-to-DC convert, battery, dynamic bypass and UPS output.

2.3. Install the UPS

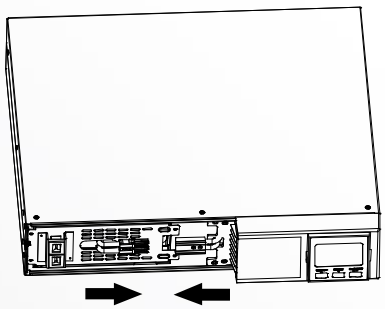
For safety consideration, the UPS is shipped out from factory without connecting battery wires. Before install the UPS, please follow below steps to re-connect battery wires first.

STEP 1



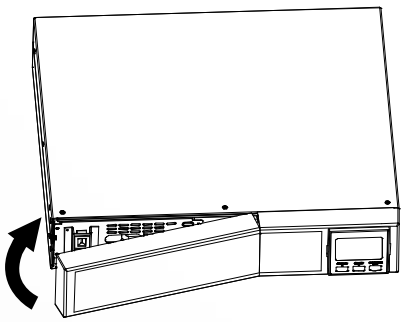
Remove front panel.

STEP 2



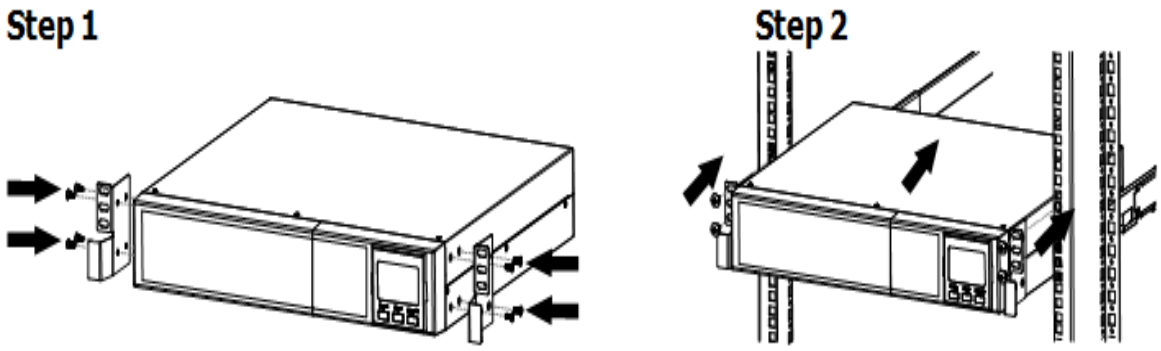
Connect the AC input and re-connect battery wires.

STEP 3

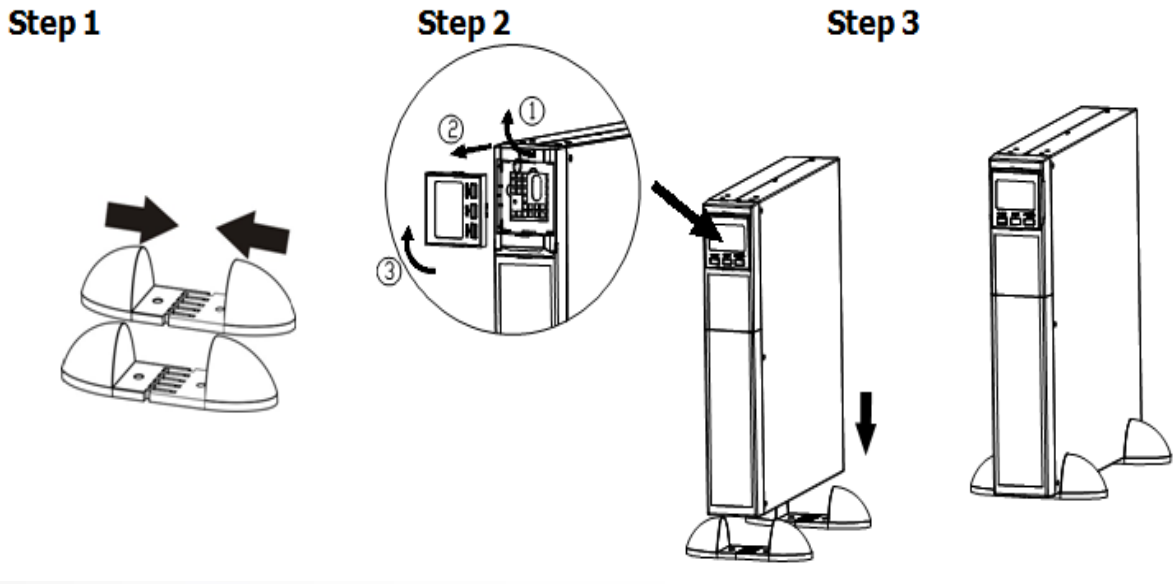


Put the front panel back to the unit.

Rack mount installation



Stand alone installation



2.4. Setup the UPS

Before installing the UPS, please read below to select proper location to install UPS.

1. UPS should be placed on the flat and clean surface. Place it in an area away from vibration, dust, humidity, high temperature, flammable liquids, gases, corrosive and conductive contaminants. Install the UPS indoors in a clean environment, where it is away from window and door. Maintain minimum clearance of 100mm in the bottom of the UPS to avoid dust and high temperature.

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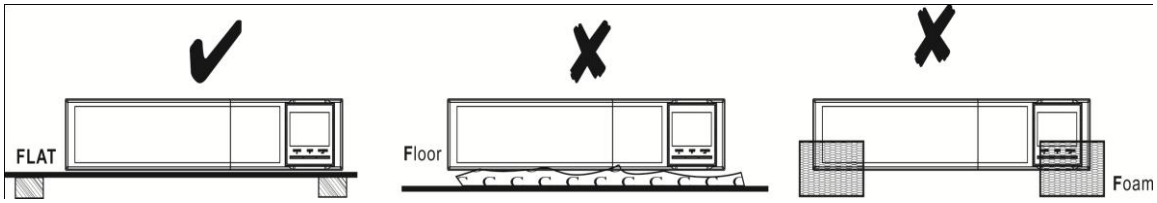


2. Maintain an ambient temperature range of 0 ºC to 45 ºC for UPS optimal operation. For every 5ºC above 45ºC, the UPS will derate 12% of nominal capacity at full load. The highest working temperature requirement for UPS operation is 50 ºC.

3. It is necessary to maintain a maximum altitude of 1.000 meters to maintain normal operation of the UPS at full load. If used in high altitude areas, reduce the connected load. The decrease of the energy with respect to the altitude are describe below:

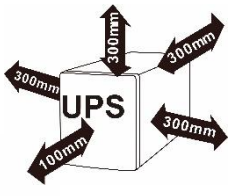
ALTITUDE (m)	Derating factor [1]
1.000	1.0
1.500	0.95
2.000	0.91
2.500	0.86
3.000	0.82
3.500	0.78
4.000	0.74
4.500	0.7
5.000	0.67

Based on density of dry air = 1.225 kg/m^3 at sea-level +15 °C.

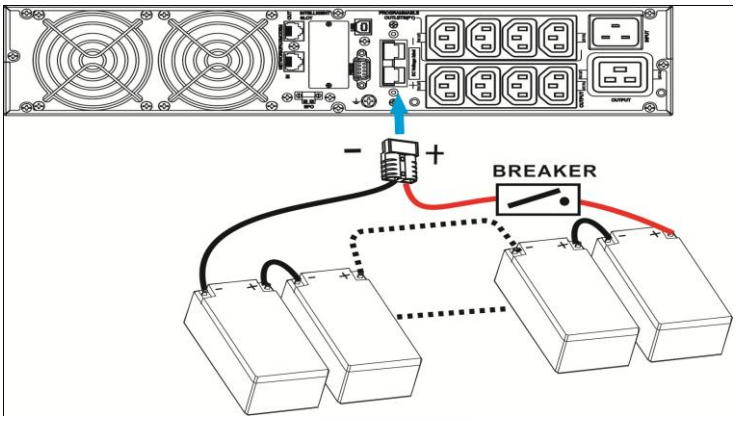
[1] – Since fans lose efficiency with altitude, forced air-cooled equipment will have a smaller derating.

4. Place UPS:

The equipment has a fan for cooling. Therefore, place the UPS in a well-ventilated area. It' s required to maintain minimum clearance of 100mm in the front of the UPS and 300mm in the back and two sides of the UPS for heat dissipation and easy-maintenance.



5. Connect to External Battery Pack



When connecting external battery packs, please be sure to connect polarity correctly. Connect positive pole of battery pack to positive pole of external battery connector in UPS and negative pole of battery pack to negative pole of external battery connector in UPS. **Reversing the polarity will cause UPS internal fault**. It' s recommended to add one breaker between positive pole of battery pack and positive pole of external battery connector in UPS to prevent damage to battery packs from internal fault.

The required specification of breaker: voltage ≧ 1.25 x battery voltage/set; current ≧ 50A

Please choose battery size and connected numbers according to backup time requirement and UPS specifications. To extend battery lifecycle, it' s recommended to use them in the temperature range of 15 ºC to 25 ºC.

Step 1: External battery connection

Plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords.

- For **200/208/220/230/240 VAC** models: The power cord is supplied in the UPS package.
- For **100/110/115/120/127 VAC** models: The power cord is attached to the UPS.

The input plug is a **NEMA 5-15P for 1 KVA and 1.5 KVA** models, **NEMA 5-20P for 2 KVA** model and **NEMA 5-30P for 3KVA** model.

NOTE: Check if the site wiring fault indicator lights up in LCD panel. It will be illuminated when the UPS is plugged into an improperly wired utility power outlet (Refer to Troubleshooting section). Please also check if there is a circuit breaker against over current and short circuit between the mains and AC input of the UPS for safety operation. The recommended protection value as following:

- For **200/208/220/230/240 VAC** models: **10A for the 1KVA and 1.5KVA** models, **16A for the 2KVA and 3KVA** models.
- For **100/110/115/120/127 VAC** models: **15A for the 1K and 1.5K** models, **20A for 2K model and 30A for 3K** model.

Step 2: UPS input connection

There two kinds of outputs: **programmable outlets and general outlets**. Please connect **non-critical devices to the programmable outlets and critical devices to the general outlets.**

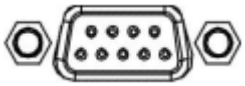
During power failure, you may extend the backup time to critical devices by setting shorter backup time for non-critical devices.

Step 3: Communication connection

Communication Ports

USB

RS-232



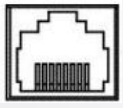
Intelligent

To allow for unattended UPS shutdown/start-up and status monitoring, connect the communication cable one end to the USB/RS-232 port and the other to the communication port of your PC. With the monitoring software installed, you can schedule UPS shutdown/start-up and monitor UPS status through PC.

The UPS is equipped with intelligent slot perfect for either SNMP or AS400 card. When installing either SNMP or AS400 card in the UPS, it will provide advanced communication and monitoring options.

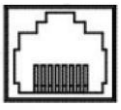
Step 4: Network connection

Network (IN)



Fax

Phone surge port (OUT)

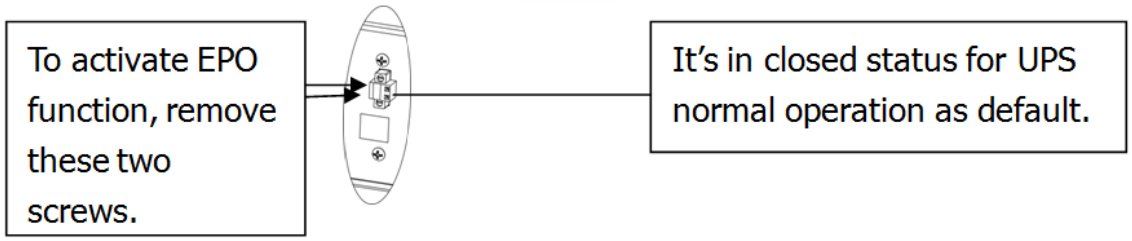


Connect a single modem/phone/fax line into surge-protected "IN" outlet on the back panel of the UPS unit. Connect from "OUT" outlet to the equipment with another modem/fax/phone line cable.

Step 5: Disable and enable EPO function

This UPS is equipped with EPO function. By default, the UPS is delivered from factory with **PIN 1 and PIN 2 closed** (a metal plate is connected to **PIN 1 and PIN 2**) for UPS normal operation. To activate EPO function, remove two screws on EPO port and metal plate will be removed.

NOTE: The EPO function logic can be set up via LCD setting. Please refer to program 16 in UPS setting for the details.



Step 6: Turn on the UPS

Press the **ON/Mute button** on the front panel for two seconds to power on the UPS.

NOTE: The battery charges fully during the first five hours of normal operation. **Do not** expect full battery run capability during this initial charge period.

Step 7: Install software

For optimal computer system protection, install UPS monitoring software to fully configure UPS shutdown. Use supplied RS-232 or USB communication cable to connect RS-232/USB port of UPS and RS-232/USB port of PC. **Then, follow below steps to install monitoring software.**

1. Insert the included installation CD into CD-ROM drive and then follow the on-screen instructions to proceed software installation. If there no screen shows 1 minute after inserting the CD, please execute setup.exe file for initiating software installation.
2. Follow the on-screen instructions to install the software.
3. When your computer restarts, the monitoring software will appear as an orange plug icon located in the system tray, near the clock.

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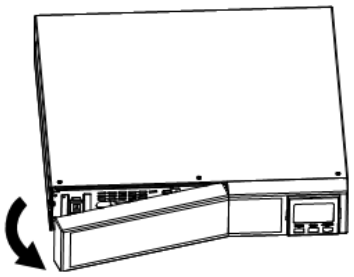
2.5. Battery Replacement

NOTICE: This UPS is equipped with internal batteries and user can replace the batteries without shutting down the UPS or connected loads. (Hot-swappable battery design) Replacement is a safe procedure, isolated from electrical hazards.

NOTE: Upon battery disconnection, equipment is not protected from power outages.

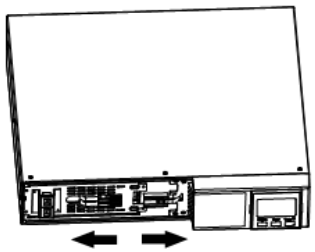
CAUTION!! Consider all warnings, cautions, and notes before replacing batteries.

Step 1



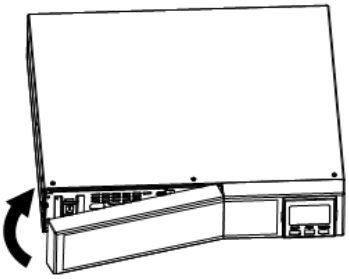
Remove front panel.

Step 2



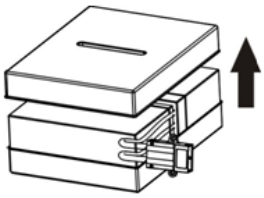
Disconnect battery wires.

Step 3



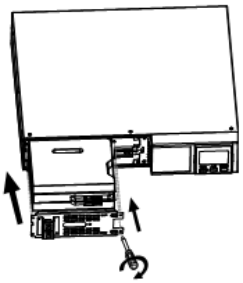
Pull out the battery box by removing two screws on the front panel.

Step 4



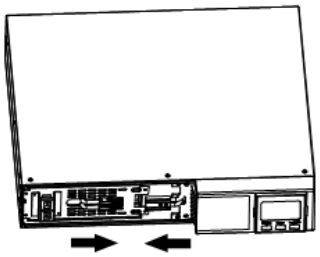
Remove the top cover of battery box and replace the inside batteries.

Step 5



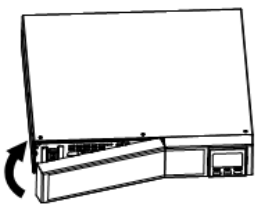
After replacing the batteries, put the battery box back to original location and screw it tightly.

Step 6



Re-connect the battery wires.

Step 7



Put the front panel back to the unit.

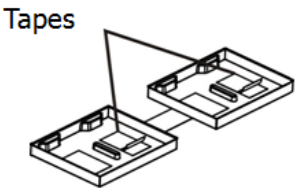
2.6. Battery kit Assembly (OPTIONAL)

NOTICE: Please assemble battery kit first before installing it inside of UPS.

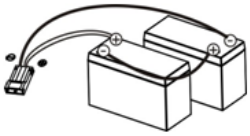
Please select correct battery kit procedure below to assemble it.

Battery Kit - 2 Units

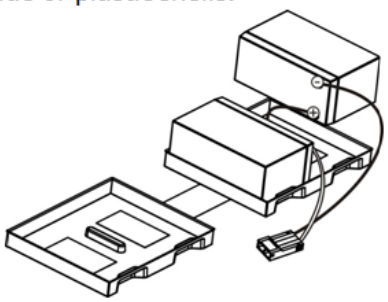
Step 1: Remove adhesive tapes.



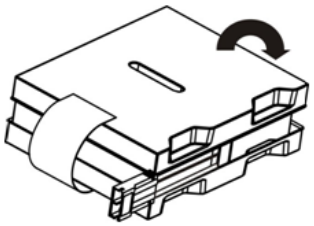
Step 2: Connect all battery terminals by following below chart.



Step 3: Put assembled battery packs on one side of plastic shells.

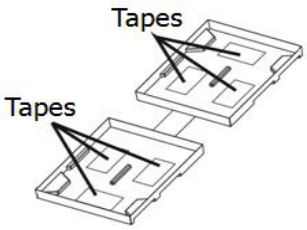


Step 4: Cover the other side of plastic shell as below chart. Then, battery kit is assembly well.

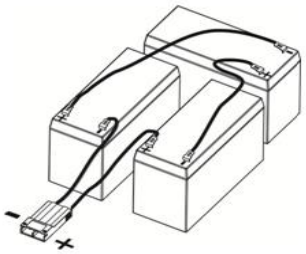


Battery Kit - 3 Units

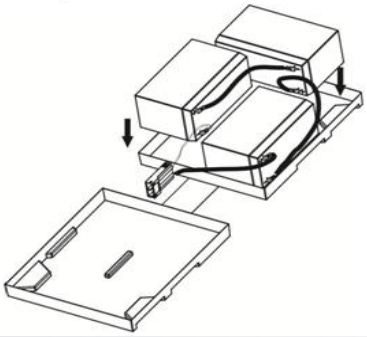
Step 1: Remove adhesive tapes.



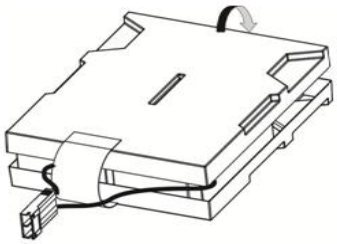
Step 2: Connect all battery terminals by following below chart.



Step 3: Put assembled battery packs on one side of plastic shells as below chart.

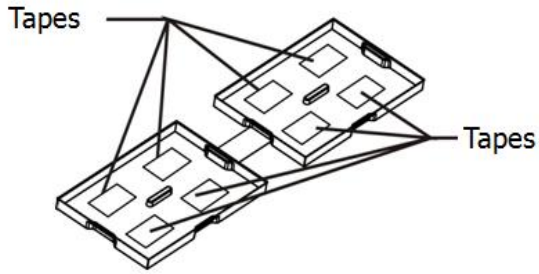


Step 4: Cover the other side of plastic shell as below chart. Then, battery kit is assembly well.

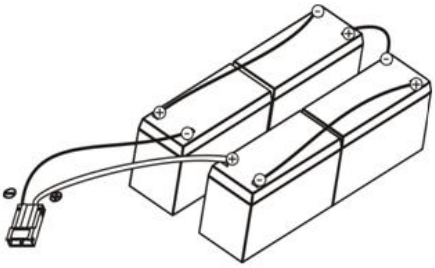


Battery Kit - 4 Units

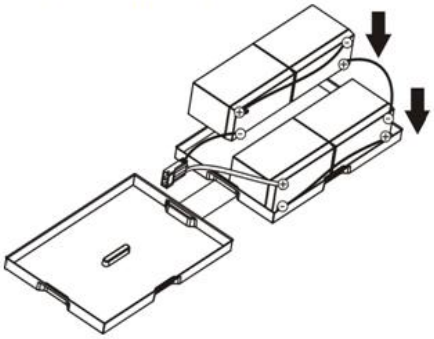
Step 1: Remove adhesive tapes.



Step 2: Connect all battery terminals by following below chart.



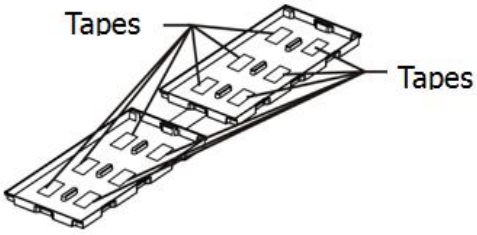
Step 3: Put assembled battery packs on one side of plastic shells.



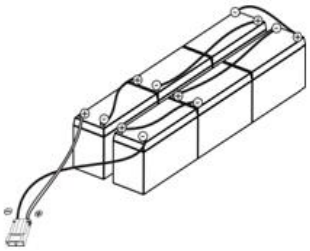
Step 4: Cover the other side of plastic shell as below chart. Then, battery kit is assembly well.

Battery Kit - 6 Units

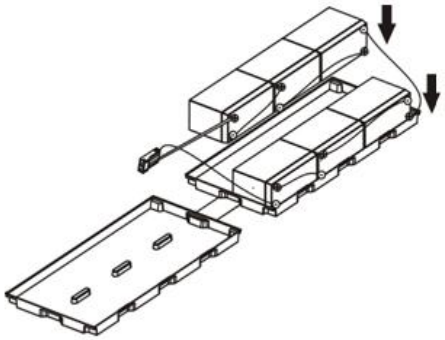
Step 1: Remove adhesive tapes.



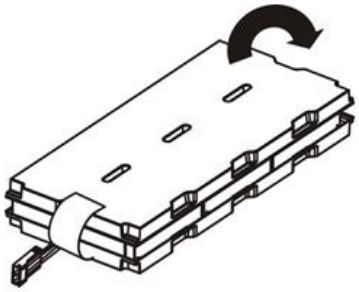
Step 2: Connect all battery terminals by following below chart.



Step 3: Put assembled battery packs on one side of plastic shells.



Step 4: Cover the other side of plastic shell as below chart. Then, battery kit is assembly well.



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3. Operations

3.1. Button Operation

BUTTON	FUNCTION
ON/Mute Button	○ Turn on the UPS: Press and hold **ON/Mute button for at least 2 seconds to turn on the UPS**. ○ Mute the alarm: After the UPS is turned on in battery mode, press and hold this button for at **least 3 seconds to disable or enable the alarm system**. But it is not applied to the situations when warnings or errors occur. ○ Up key: Press this button to display previous selection in UPS setting mode. ○ Switch to UPS self-test mode: Press **ON/Mute buttons for 3 seconds to enter UPS self-testing** while in AC mode, ECO mode, or converter mode.
OFF/Enter Button	○ Turn off the UPS: Press and hold this button at **least 2 seconds to turn off the UPS**. UPS will be in standby mode under power normal or transfer to bypass mode if the bypass enable setting by pressing this button. ○ Confirm selection key: Press this button to confirm selection in UPS setting mode.
Select Button	○ Switch LCD message: Press this button to change the LCD message for input voltage, input frequency, input current, battery voltage, battery current, battery capacity, ambient temperature, output voltage, output frequency, load current and load percent. ○ Setting mode: Press and hold this button for **3 seconds to enter UPS setting mode** when Standby and Bypass mode. ○ Down key: Press this button to display next selection in UPS setting mode.
ON/Mute + Select Button	○ Switch to bypass mode: When the main power is normal, **press ON/Mute and Select buttons simultaneously for 3 seconds**. Then UPS will enter to bypass mode. This action will be ineffective when the input voltage is out of acceptable range. ○ Exit setting mode or return to the upper menu: When working in setting mode, press **ON/Mute and Select buttons simultaneously for 0.2 seconds** to return to the upper menu. If it' s already in top menu, press these two buttons at the same time to exit the setting mode.

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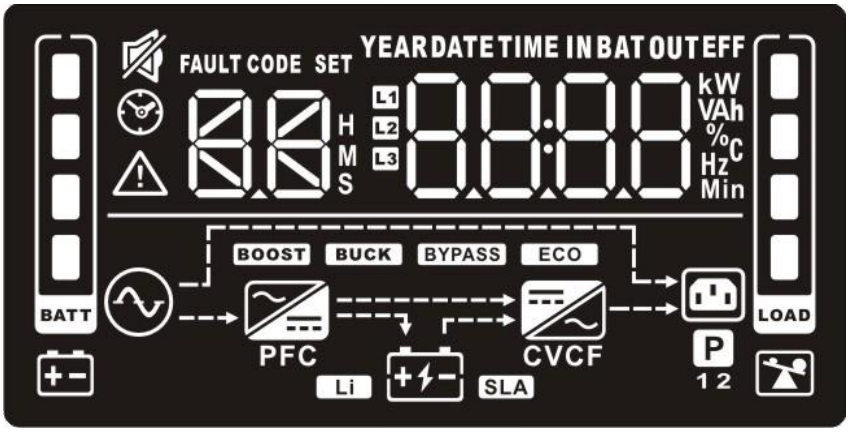
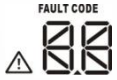
3.2. LCD Panel



DISPLAY	FUNCTION
Backup time information	
	Indicates the estimated backup time. H: hours, M: minute, S: second.
Configuration and fault information	
	Indicates the configuration items, and the configuration items are listed in details in section 3-5.
	Indicates the warning and fault codes, and the codes are listed in details in section 3-7 and 3-8.
Mute operation	
	Indicates that the UPS alarm is disabled.
Input, Battery, Temperature, Output & Load information	
	Indicate the input voltage, input frequency, input current, battery voltage, battery current, battery capacity, ambient temperature, output voltage, output frequency, load current and load percent. k: kilo, W: watt, V: voltage, A: ampere, %: percent, ℃: centigrade degree, Hz: frequency
Load information	
	Indicates the load level by 0-24%, 25-49%, 50-74% and 75-100%.
	Indicates overload.
Programmable outlets information	
P	Indicates that programmable management outlets are working.
Mode operation information	
	Indicates the UPS connects to the mains.
	Indicates the battery is working.
	Indicates charging status
BYPASS	Indicates the bypass circuit is working.
ECO	Indicates the ECO mode is enabled.

	Indicates the AC to DC circuit is working.
PFC	Indicates the PFC circuit is working.
	Indicates the inverter circuit is working.
CVCF	Indicates the UPS is working in converter mode.
	Indicates the output is working.
Battery information	
	Indicates the battery level by 0-24%, 25-49%, 50-74%, and 75-100%.
	Indicates low battery.

3.3. Audible Alarm

Battery Mode	Sounding every 5 seconds.
Low Battery	Sounding every 2 seconds.
Overload	Sounding every second.
Fault	Continuously sounding.
Bypass Mode	Sounding every 10 seconds.

3.4. LCD display wordings index

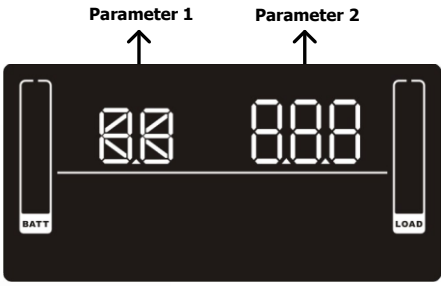
ABBREVIATION	DISPLAY CONTENT	MEANING
ENA		Enable
DIS		Disable
ESC		Escape
HLS		High loss
LLS		Low loss
AO		Active open
AC		Active close
EAT		Estimated autonomy time
RAT		Running autonomy time
OK		OK
ON		ON
BL		Battery Low
OL		Over Load
OI		Over input current
NC		Battery No Connect

OC	OC	Over Charge
SF	SF	Site wiring fault
EP	EP	EPO
TP	tP	Temperature
CH	CH	Charger
BF	bF	Battery Fault
BV	bv	Bypass Out Range
FU	FU	Bypass frequency unstable
BR	bR	Battery Replace
EE	EE	EEPROM error

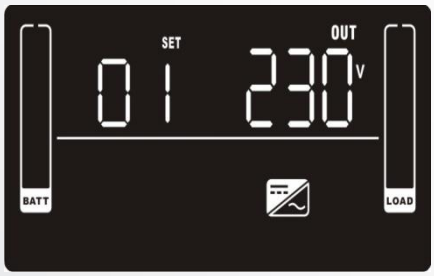
3.5. UPS Setting

Parameter 1: It' s for program alternatives. Refer to below table.

Parameter 2 is the setting options or values for each program.



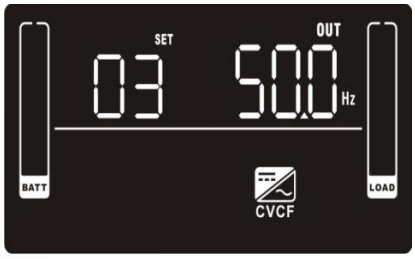
01: Output voltage setting.

INTERFACE	SETTING
	**Parameter 2: Output voltage** For **200/208/220/230/240 VAC** models, you may choose the following **output voltage:** **200:** presents output voltage is **200Vac.** **208:** presents output voltage is **208Vac.** **220:** presents output voltage is **220Vac.** **230: presents output voltage is 230Vac (Default).** **240:** presents output voltage is **240Vac.** For **100/110/115/120/127 VAC** models, you may choose the following output voltage: **100:** presents output voltage is **100Vac.** **110:** presents output voltage is **110Vac.** **115:** presents output voltage is **115Vac**. **120: presents output voltage is 120Vac (Default).** **127:** presents output voltage is **127Vac.**

02: Frequency Converter enable/disable.

INTERFACE	SETTING
	**Parameter 2: Enable or disable converter mode.** **CF ENA:** Converter modes **enable**. **CF DIS: Converter mode disable (Default).**

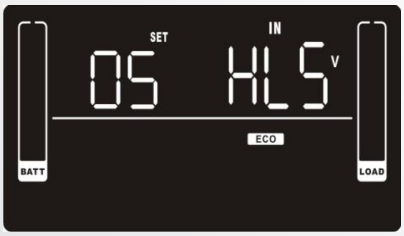
03: Output frequency setting.

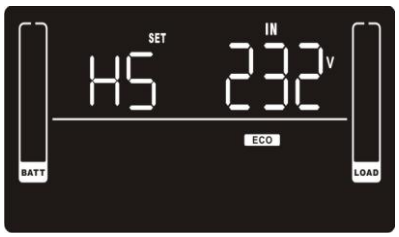
INTERFACE	SETTING
	**Parameter 2: Output frequency setting.** You may set the initial frequency on battery mode: **BAT 50:** presents output frequency is **50Hz.** **BAT 60:** presents output frequency is **60Hz.** If **converter mode enable**, you may choose the following **output frequency**: **CF 50:** presents output frequency is **50Hz.** **CF 60:** presents output frequency is **60Hz.**

04: ECO enable/disable.

INTERFACE	SETTING
	**Parameter 2: Enable or disable ECO function.** **ENA:** ECO mode **enable.** **DIS: ECO mode disable (Default).**

05: ECO voltage range setting.

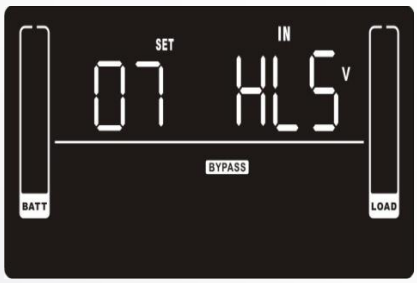
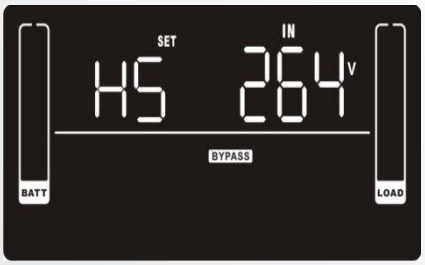
INTERFACE	SETTING
	**Parameter 2: Set the acceptable high voltage point and low voltage point for ECO mode.** **Press the Down key or Up key.** **HLS: High loss voltage in ECO mode.** For **200/208/220/230/240 VAC** models, the setting range are from **+7V to +24V** of the nominal voltage **(Default: +12V).**

	For **100/110/115/120/127 VAC** models, the setting range is from **+3V to +12V** of the nominal voltage **(Default: +6V).** **LLS: Low loss voltage in ECO mode.** For **200/208/220/230/240 VAC** models, the setting range is from **-7V to -24V** of the nominal voltage. **(Default: +12V).** For **100/110/115/120/127 VAC** models, the setting range is from **-3V to -12V** of the nominal voltage **(Default: -6V).**

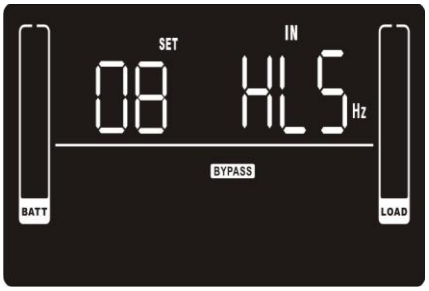
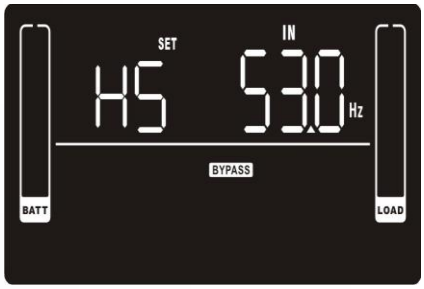
06: Bypass mode enable/disable.

INTERFACE	SETTING
	**Parameter2: Enable or disable Bypass function.** **ENA:** Bypass mode **enable.** **DIS: Bypass mode disable (Default).**

07: Bypass voltage range setting.

INTERFACE	SETTING
 	**Parameter2: Set the acceptable high voltage point and acceptable low voltage.** **Press the Down key or Up key to set.** **HLS: Bypass high voltage point.** For **200/208/220/230/240 VAC** models: 230-264: setting the high voltage point from 230Vac to 264Vac (Default: 264Vac). For **100/110/115/120/127 VAC** models: 120-140: setting the high voltage point from 115Vac to 132Vac (Default: 132Vac). **LLS: Bypass low voltage point.** For **200/208/220/230/240 VAC** models: 170-220: setting the low voltage point from 170Vac to 220Vac (Default: 170Vac). For **100/110/115/120/127 VAC** models: 85-115: setting the high voltage point from 85Vac to 115Vac (Default: 85Vac).

08: Bypass frequency range setting.

INTERFACE	SETTING
 	**Parameter 2: Set the acceptable high frequency point and acceptable low frequency point for Bypass mode.** **By pressing the Down key or Up key.** **HLS: Bypass high frequency point** For **50Hz output frequency** models: **51-55Hz:** setting the frequency high loss point from 51Hz to 55HZ **(Default: 53.0Hz)** For **60Hz output frequency** models: **61-65Hz:** setting the frequency high loss point from 61Hz to 65Hz **(Default: 63.0Hz)** **LLS: Bypass low Frequency point** For **50Hz output frequency** models: **45-49Hz:** setting the frequency low loss point from 45Hz to 49HZ **(Default: 47.0Hz)** For **60Hz output frequency** models: **55-59Hz:** setting the frequency low loss point from 55Hz to 59Hz **(Default: 57.0Hz)**

09: Programmable outlets enable/disable

INTERFACE	SETTING
	**Parameter 2: Enable or disable programmable outlets.** **ENA:** Programmable outlets **enable.** **DIS: Programmable outlets disable (Default)**

10: Programmable outlets setting

INTERFACE	SETTING
	**Parameter 2: Set up backup time limits for programmable outlets.** **0-999:** setting the backup time limits in minutes **from 0-999** for programmable outlets which connect to non-critical devices on battery mode. **(Default: 999)**

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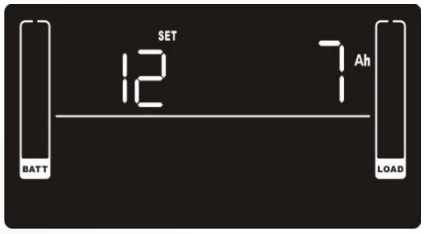
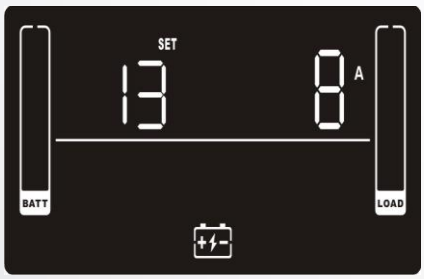
11: Autonomy limitation setting

INTERFACE	SETTING
	**Parameter 2: Set up backup time on battery mode for general outlets.** **0-999:** setting the backup time in minutes **from 0-999** for general outlets on battery mode. **DIS: Disable the autonomy limitation and the backup time will depend on battery capacity. (Default)** **NOTE:** When **setting as "0", the backup time** will be only **10 seconds**.

12: Battery total AH setting

INTERFACE	SETTING
	**Parameter 2: Set up the battery total AH of the UPS.** **7-999:** setting the battery total capacity from 7-999 in AH. Please set the correct battery total capacity if external battery bank is connected.

13: Maximum current setting

INTERFACE	SETTING
	**Parameter 2: Set up the charger maximum current.** For **low voltage** model with **24/36/48 VDC** **1/2/4/6/8:** setting the charger maximum current. **1/2/4/6/8 in Ampere. (Default: 2A)** For **low voltage** and high voltage model with **72/96 VDC** **1/2/4/6/8** setting the charger maximum current. **1/2/4/6/8 in Ampere. (Default: 2A)** **NOTE:** Please **set the appropriate charger current based on battery capacity used**. The recommended charging current is 0.1C~0.3C of battery capacity as following **table for reference**:

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Battery capacity(AH)	Total charging current (A)
7~20	2
20~40	4
40~60	6
60~80	8
80~100	10
100~150	12

14: Charger Boost voltage setting

INTERFACE	SETTING
	**Parameter 2: Set up the charger boost voltage.** **2.25-2.40:** setting the charger boost voltage from **2.25 V/cell to 2.40V/cell. (Default: 2.36V/cell)**

15: Charger Float voltage setting

INTERFACE	SETTING
	**Parameter 2: Set up the charger float voltage.** **2.20-2.33:** setting the charger float voltage from **2.20 V/cell to 2.33V/cell. (Default: 2.28V/cell)**

16: EPO logic setting

INTERFACE	SETTING
	**Parameter 2: Set EPO function control logic.** **AO: Active Open (Default).** When **AO is selected as EPO logic**, it will activate EPO function with **PIN 1 and PIN 2 in open status.** AC: Active Close. When **AC is selected as EPO logic**, it will activate EPO function with PIN 1 and PIN 2 in close status.

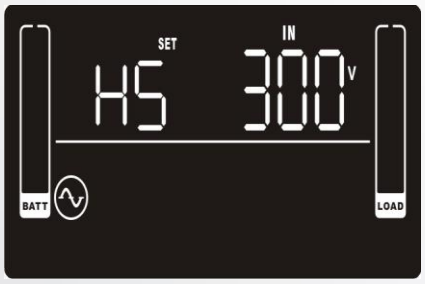
17: External output isolation transformer connection

INTERFACE	SETTING
	**Parameter 2: Allow or disallow external output isolation transformer connection.** **AO: Active Open (Default).** **ENA:** If selected, It's allowed to connect to an external output isolation transformer. **DIS: If selected, (Default)** It's not allowed to connect to external output isolation transformer.

18: Display setting for autonomy time

INTERFACE	SETTING
	**Parameter 2: Set up the display setting for autonomy time.** **EAT: If EAT is selected, (Default)** It will display the remaining autonomy time. **RAT:** If RAT is selected, It will show accumulated autonomy time so far.

19: Acceptable input voltage range setting

INTERFACE	SETTING
 	**Parameter 2: Set the acceptable high voltage point and acceptable low voltage.** **By pressing the Down key or Up key.** **HLS: Input high voltage point** For **200/208/220/230/240 VAC** models: **280/290/300: setting the high voltage point in parameter 2. (Default: 300Vac)** For **100/110/115/120/127 VAC** models: **140/145/150: setting the high voltage point in parameter 2. (Default: 150Vac)** **LLS: Bypass low voltage point** For **200/208/220/230/240 VAC** models: **110/120/130/140/150/160: setting the low voltage point in parameter 2. (Default: 110Vac)** For **100/110/115/120/127 VAC** models: **55/60/65/70/75/80: setting the low voltage point in parameter 2. (Default: 55Vac)**

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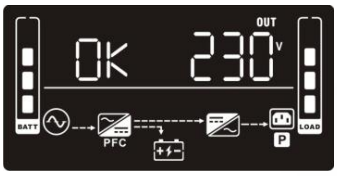
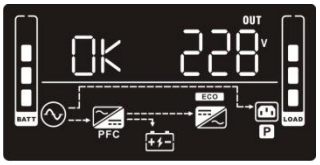
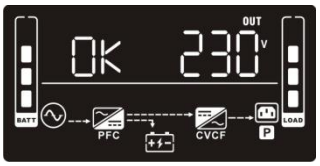
00: Exit setting

INTERFACE	SETTING
	Exit the setting mode.

3.6. Operating Mode Description

OPERATING MODE	DESCRIPTION	LCD DISPLAY
Online mode	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at online mode.	
ECO mode	Energy saving mode: When the input voltage is within voltage regulation range, UPS will bypass voltage to output for energy saving. The UPS will also charge the battery at ECO mode.	
Frequency Converter mode	When input frequency is within 40 Hz to 70 Hz, the UPS can be set at a constant output frequency, 50 Hz or 60 Hz. The UPS will still charge battery under this mode.	
Battery mode	When the input voltage is beyond the acceptable range or power failure, the UPS will backup power from battery and alarm is sounding every 5 seconds.	
Standby mode	UPS is powered off and no output supply power, but still can charge batteries.	
Fault mode	When a fault has occurred, the ERROR icon and the fault code will be displayed.	

3.7. Faults Reference Code

FAULT EVENT	FAULT CODE	ICON	FAULT EVENT	FAULT CODE	ICON
Bus start fail	01	x	Battery voltage too high	27	x
Bus over	02	x	Battery voltage too low	28	x
Bus under	03	x	Charger output short	2A	x
Inverter soft start fail	11	x	Over temperature	41	x
Inverter voltage high	12	x	Overload	43	
Inverter voltage Low	13	x	Charger failure	45	x
Inverter output short	14	x	Over input current	49	x

3.8. Warning indicator

WARNING	ICON (FLASHING)	CODE	ALARM
Low Battery	⚠	bL	Sounding every 2 seconds
Overload	⚠	OL	Sounding every second
Over input current	⚠	OI	Sounding 2 beep every 10 seconds
Battery is not connected	⚠	nC	Sounding every 2 seconds
Over Charge	⚠	OC	Sounding every 2 seconds
Site wiring fault	⚠	SF	Sounding every 2 seconds
EPO enable	⚠	EP	Sounding every 2 seconds
Over temperature	⚠	tP	Sounding every 2 seconds
Charger failure	⚠	CH	Sounding every 2 seconds
Battery fault	⚠	bF	Sounding every 2 seconds (At this time, UPS is off to remind users something wrong with battery)
Out of bypass voltage range	⚠ BYPASS	bV	Sounding every 2 seconds
Bypass frequency unstable	⚠	FU	Sounding every 2 seconds
Battery replacement	⚠	bt	Sounding every 2 seconds
EEPROM error	⚠	EE	Sounding every 2 seconds

NOTE: "SITE WIRING FAULT" function can be enabled/disable via software.

4. Troubleshooting

If the UPS system does not operate correctly, please solve the problem by using the table below.

SYMPTOM	POSSIBLE CAUSE	REMEDY
No indication and alarm even though the mains are normal.	The AC input power is not connected well.	Check if input power cord firmly connected to the mains.
	The AC input is connected to the UPS output.	Plug AC input power cord to AC input correctly.
The icon ⚠ and the warning code EP flashing on LCD display and alarm is sounding every 2 seconds.	EPO function is activated.	Set the circuit in closed position to disable EPO function.
The icon ⚠, ∿ and the warning code SF flashing on LCD display and alarm is sounding every 2 seconds.	Line and neutral conductors of UPS input are reversed.	Rotate mains power socket by 180° and then connect to UPS system.
The icon ⚠, + − and the warning code nC flashing on LCD display and alarm is sounding every 2 seconds.	The external or internal battery is incorrectly connected.	Check if all batteries are connected well.
Fault code is shown as 27 on LCD display and alarm is continuously sounding.	Battery voltage is too high or the charger is fault.	Contact your dealer.
Fault code is shown as 28 on LCD display and alarm is continuously sounding.	Battery voltage is too low or the charger is fault.	Contact your dealer.
The icon ⚠, ⚙ and the warning code OL flashing on LCD display and alarm is sounding every second.	UPS is overload	Remove excess loads from UPS output.
	UPS is overloaded. Devices connected to the UPS are fed directly by the electrical network via the Bypass.	Remove excess loads from UPS output.
	After repetitive overloads, the UPS is locked in the Bypass mode. Connected devices are fed directly by the mains.	Remove excess loads from UPS output first. Then shut down the UPS and restart it.
Fault code is shown as 49 on LCD display and alarm is continuously sounding.	UPS is over input current.	Remove excess loads from UPS output.

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Fault code is shown as 43 and the icon  is lighting on LCD display. Alarm is continuously sounding.	The UPS shut down automatically because of overload at the UPS output.	Remove excess loads from UPS output and restart it.

SYMPTOM	POSSIBLE CAUSE	REMEDY
Fault code is shown as 14 on LCD display and alarm is continuously sounding.	The UPS shut down automatically because short circuit occurs on the UPS output.	Check output wiring and if connected devices are in short circuit status.
Fault code is shown as 01, 02, 03, 11, 12, 13 and 41 on LCD display and alarm is continuously sounding.	A UPS internal fault has occurred. There are two possible results: 1. The load is still supplied, but directly from AC power via bypass. 2. The load is no longer supplied by power.	Contact your dealer
Battery backup time is shorter than nominal value.	Batteries are not fully charged	Charge the batteries for at least 5 hours and then check capacity. If the problem still persists, consult your dealer.
	Batteries defect	Contact your dealer to replace the battery.
Fault code is shown as 2A on LCD display and alarm is continuously sounding.	The short circuit occurs on the charger output.	Check if battery wiring of connected external pack is in short circuit status.
Fault code is shown as 45 on LCD display. At the same time, alarm is continuously sounding.	The charger does not have output and battery voltage is less than 10V/PC.	Contact your dealer.

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5. Storage and Maintenance

Operation

The UPS system contains no user-serviceable parts. If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced. In this case, please contact your dealer.

BE SURE TO DELIVER THE SPENT BATTERY TO A RECYCLING FACILITY OR SHIP IT TO YOUR DEALER IN THE REPLACEMENT BATTERY PACKING MATERIAL.

Storage

Before storing, charge the UPS 5 hours. Store the UPS covered and upright in a cool, dry location. During storage, recharge the battery in accordance with the following table:

STORAGE TEMPERATURE	RECHARGE FREQUENCY	CHARGING DURATION
-25°C - 40°C	Every 3 months	1-2 hours
40°C - 45°C	Every 2 months	1-2 hours

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6. Technical Specifications

MODEL	1 KVA		1.5 KVA	2 KVA		3 KVA
Phase	Single phase with ground					
Capacity [1]	1000 VA / 1000 W		1500 VA / 1500 W	2000 VA / 2000 W		3000 VA/3000 W
INPUT						
Nominal Voltage	100/110/115/120/127 VAC or 200/208/220/230/240 VAC					
Voltage Range	55-150 VAC ± 5% or 110-300 VAC ± 5% @ 50% load 80-150 VAC ± 5% or 160-300 VAC ± 5% @ 100% load					
Frequency Range	40 Hz - 70 Hz					
Power Factor	≥ 0.99 @ full load					
Harmonic Distortion (THDi)	≤ 5%					
Rectifier	IGBT					
OUTPUT						
Output Voltage	100[1]/110[1]/115[1]/120/127 VAC or 200[1]/208[1]/220/230/240 VAC					
AC Voltage Regulation (Batt. Mode)	± 1%					
Frequency Range (Synchronized Range)	57-63 Hz or 47-53 Hz					
Frequency Range (Batt. Mode)	60 Hz ± 0.1 Hz or 50 Hz ± 0.1 Hz					
Current Crest Ratio	3:1 (max)					
Harmonic Distortion (THDv)	≤ 2% THD (Linear Load) , ≤ 4% THD (Non-linear Load)					
Transfer Time	Zero (AC to DC) ; 4 ms (Inverter to Bypass)					
Waveform	Pure Sine Wave					
EFFICIENCY						
AC Modo	≥ 89% @ full charged battery			≥ 91% @ full charged battery		
ECO Mode	≥ 96 % @ full charged battery					
Battery Mode	≥ 88%			≥ 90%		
BATTERY						
Battery Type	12 V / 9 Ah	12 V / 7 Ah	12 V / 9 Ah	12 V / 9 Ah	12 V / 7 Ah	12 V / 9 Ah
Numbers	2	3	3	4	6	6
Typical Recharge Time	3 hours recover to 95% capacity for internal battery @ 2A charging current					
Charging Current	100/110/115/120/127 VAC models: default 2A, max. 8A adjustable 200/208/220/230/240 VAC models: default 2A, max. 12A adjustable				Default 2 A; max. 8A adjustable	
Charging Voltage	27.4 VDC ± 1%	41.1 VDC ±1%	41.1 VDC ± 1%	54.8 VDC ± 1%	82.1 VDC ± 1%	82.1 VDC ± 1%
INDICATORS						
LCD Display	UPS status, Load level, Battery level, Input/Output voltage, Discharge timer, and Fault conditions					
ALARM						
Battery Mode	Sounding every 5 seconds					
Low Battery	Sounding every 2 seconds					
Overload	Sounding every second					
Fault	Continuously sounding					
PHYSICAL						
Dimensions (DxWxH) (mm)	410 x 438 x 88		410 x 438 x 88	510 x 438 x 88	630 x 438 x 88	630 x 438 x 88
Net Weight (without battery) (kg)	6.6	7.8	8.1	9.4	10.6	12.4
Net Weight (w/built-int battery) (kg)	11.6	14.1	15.5	19.5	23.3	27.5
ENVIRONMENT						
Running Humidity & Temperature	20 - 90 % RH (Non-condensing) @ 0 - 40°C					
Noise Level	< 50 dB @ 1 meter					
MANAGEMENT						
Smart RS-232 /USB	Supports Windows® 2000/2003/XP/Vista/2008, Windows®7/8, Linux, Unix and MAC					
Optional SNMP	Power management from SNMP manager and web browser					
STANDARDS & CERTIFICATIONS						
Quality	ISO 9001 ; ISO 14001					
Compliance	EMC, EN62040-2 C1, EN62040-2 C2					

[1] - Derate capacity to 80% when the output voltage is adjusted to 100VAC/200VAC/208VAC.

SY-G reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on SY-G products previously or subsequently sold.

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