

CASTLE Series
RACK 6K(S)/10K(S)

USER MANUAL



Thank you for selecting a SANTAK product to protect your electrical equipment.

This manual contains important instructions that you should follow during installation and maintenance of the UPS and batteries. Please read all instructions before operating the equipment and save this manual for future reference.

SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS. This manual contains important instructions that should be followed during installation and maintenance of the UPS and batteries.

The UPS models that are covered in this manual are intended for installation in an environment within 0 to 50°C, free of conductive contaminant.

Certification standards

- Safety: EN 62040-1
- EMC: IEC/EN 62040-2
- IEC 61000-4-2 (ESD): level 3.
- IEC 61000-4-3 (Radiated field): level 3.
- IEC 61000-4-4 (EFT): level 4.
- IEC 61000-4-5 (Fast transients): level 4.
- IEC 61000-4-6 (Electromagnetic field): level 3.
- IEC 61000-4-8 (Conducted magnetic field): level 4.
- Performance: IEC/EN 62040-3

Special symbols

The following are examples of symbols used on the UPS or accessories to alert you to important information:



RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.



Important instructions that must always be followed.



Do not discard the UPS or the UPS batteries in the trash.

This product contains sealed lead acid batteries and must be disposed as it's explain in this manual. For more information, contact your local recycling/reuse or hazardous waste center.



This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.



Information, advice, help.



Refer to the user manual.

Safety of persons

- RISK OF VOLTAGE BACKFEED. The system has its own power source (the battery). Isolate the UPS and check for hazardous voltage upstream and downstream during lockout-tagout operation. Terminal blocks may be energized even if the system is disconnected from the AC power source.
- Dangerous voltage levels are present within the system. It should be opened exclusively by qualified service personnel.
- The system must be properly grounded.
- The battery supplied with the system contains small amounts of toxic materials. To avoid accidents, the directives listed below must be observed:
 - Servicing of batteries should be performed or supervised by personnel knowledgeable about batteries and the required precautions.
 - When replacing batteries, replace with the same type and number of batteries or battery packs.
 - Do not dispose of batteries in a fire. The batteries may explode.
 - Batteries constitute a danger (electrical shock, burns). The short-circuit current may be very high.
- Precautions must be taken for all handling:
 - Wear rubber gloves and boots.
 - Do not lay tools or metal parts on top of batteries.
 - Disconnect charging source prior to connecting or disconnecting battery terminals.
 - Determine if battery is inadvertently grounded. If inadvertently grounded, remove source from ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).

Product safety

- The UPS connection instructions and operation described in the manual must be followed in the indicated order.
- CAUTION - To reduce the risk of fire, the unit connects only to a circuit provided with branch circuit overcurrent protection for :
63A rating, for 6kVA models,
100A rating, for 10kVA models
The upstream circuit breaker for Normal AC/Bypass AC must be easily accessible. The unit can be disconnected from AC power source by opening this circuit breaker.
- An additional AC contactor is used for backfeed protection and must comply with IEC/EN 62040-1 (the creep age and clearance distances shall meet the

basic insulation requirements for pollution degree 2).

- Disconnection and overcurrent protection devices shall be provided by others for permanently connected AC input (Normal AC/Bypass AC) and AC output circuits.
- Check that the indications on the rating plate correspond to your AC powered system and to the actual electrical consumption of all the equipment to be connected to the system.
- For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible
- Never install the system near liquids or in an excessively damp environment.
- Never let a foreign body penetrate inside the system.
- Never block the ventilation grates of the system.
- Never expose the system to direct sunlight or source of heat.
- If the system must be stored prior to installation, storage must be in a dry place.
- The admissible storage temperature range is -25°C to +60°C with battery(-15°C to +40°C without battery).

Special precautions

- The unit is heavy: wear safety shoes and use vacuum lifter preferentially for handling operations.
- All handling operations will require at least two people (unpacking, lifting, installation in rack system).
- Straps are provided only for unpacking manually the unit from the carton; don't use the straps to carry the unit around. The unit can slip from the straps during handling (risk of injury and product damage):
 - keep 12in / 30cm minimum distance between the straps
 - lift the unit carefully and keep it at low height
 - keep the unit horizontal during unpacking.
- Before and after the installation, if the UPS remains de-energized for a long period, the UPS must be energized for a period of 24 hours, at least once every 6 months (for a normal storage temperature less than 25°C). This charges the battery, thus avoiding possible irreversible damage.
- During the replacement of the Battery Module, it is imperative to use the same type and number of element as the original Battery Module provided with the UPS to maintain an identical level of performance and safety.

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1. Introduction

Thank you for selecting UPS to protect your electrical equipment. The UPS has been designed with the utmost care.

We recommend that you take the time to read this manual to take full advantage of the many features of your UPS (Uninterruptible Power System).

Before installing your UPS, please read the booklet presenting the safety instructions. Then follow the indications in this manual.

1.1 Environmental protection

Products are developed according to an eco-design approach.


Substances

This product does not contain CFCs, HCFCs or asbestos.

Packing

To improve waste treatment and facilitate recycling, separate the various packing components.

- The cardboard we use comprises over 50% of recycled cardboard.
- Sacks and bags are made of polyethylene.
- Packing materials are recyclable and bear the appropriate identification symbol

| Materials | Abbreviations | Number in the symbols |  |
|---------------------------|---------------|-----------------------|---|
| Polyethylene terephthalat | PET | 01 | |
| High-density polyethylene | HDPE | 02 | |
| Polyvinyl chloride | PVC | 03 | |
| Low-density polyethylene | LDPE | 04 | |
| Polypropylene | PP | 05 | |
| Polystyrene | PS | 06 | |

Follow all local regulations for the disposal of packing materials.

Product

The product is made up of recyclable materials.

Dismantling and destruction must take place in compliance with all local regulations concerning waste. At the end of its service life, the product must be transported to a processing center for electrical and electronic waste.

Battery

The product contains lead-acid batteries that must be processed according to applicable local regulations concerning batteries.

The battery may be removed to comply with regulations and in view of correct disposal.

1.2 Electronic equipment protection

The uninterruptible power system (UPS) protects your sensitive electronic equipment from the most common power problems, including power failures, power sags, power surges, brownouts, line noise, high voltage spikes, frequency variations, switching transients, and harmonic distortion.

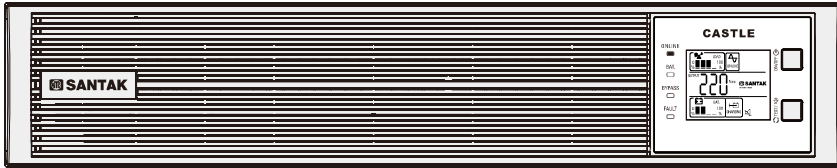
Power outages may occur unexpected, and the power quality will be erratic. These power problems have the potential to corrupt critical data, destroy unsaved work sessions, and damage hardware - causing hours of lost productivity and expensive repairs.

With the UPS, you can safely eliminate the effects of power disturbances and guard the integrity of your equipment. Providing outstanding performance and reliability, UPS's unique benefits include:

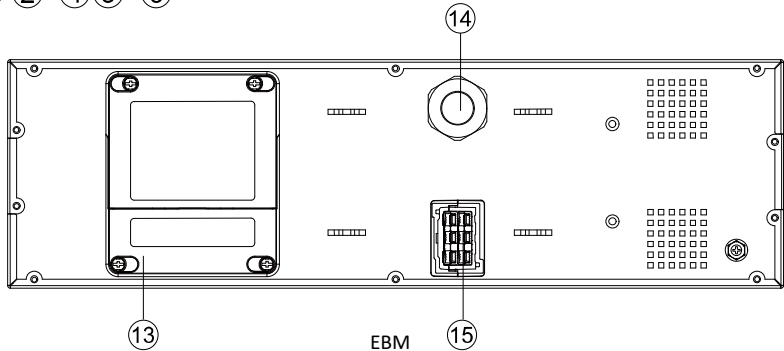
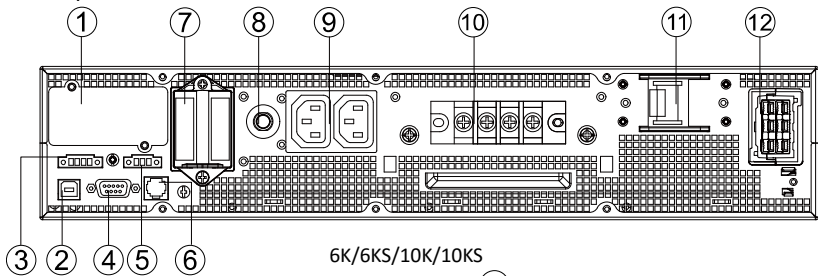
- True online double-conversion technology with high power density, utility frequency independence, and generator compatibility.
- Selectable High Efficiency mode of operation.
- Standard communication options: one RS232 communication port, one USB communication port, one dry in port and dry out port.
- Optional connectivity cards with enhanced communication capabilities.
- Firmware that is easily upgradable without a service call.

2. Presentation

2.1 Front panel

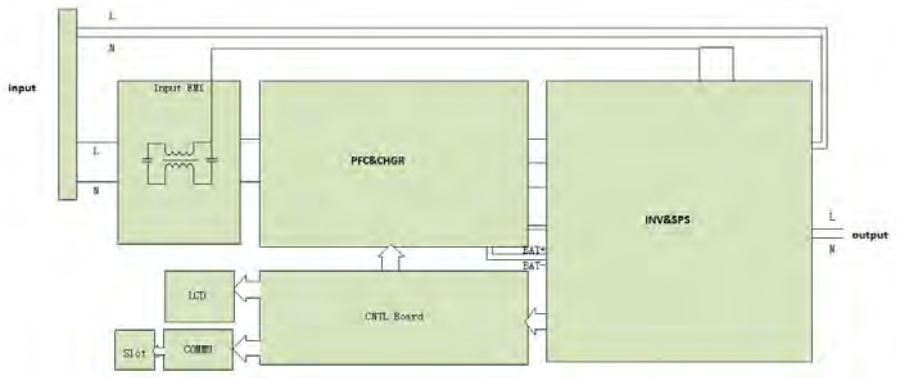


2.2 Rear panels



1. Intelligent slot
2. USB
3. Dry IN/OUT
4. RS232
5. EPO
6. RJ11 (connect to PDU, only for RT model)
7. Parallel card (optional)
8. Output breaker
9. Output socket
10. Input/Output terminal (4pole IPL, IPN, OPL, OPN. PE is screw)
11. Input breaker (optional)
12. EBM connector
13. Fuse board cover (replace EBM fuse)
14. EBM plug
15. EBM connector

2.3 Circuit diagram



3. Installation

It is recommended to move the equipment to the installation site by using a pallet jack or a truck before unpacking.

The system may be installed only by qualified electricians in accordance with applicable safety regulations.

The cabinet is heavy, please install it with at least two peoples.

3.1 Inspecting the equipment

If any equipment has been damaged during shipment, keep the shipping cartons and packing materials for the carrier or place of purchase and file a claim for shipping damage. If you discover damage after acceptance, file a claim for concealed damage.

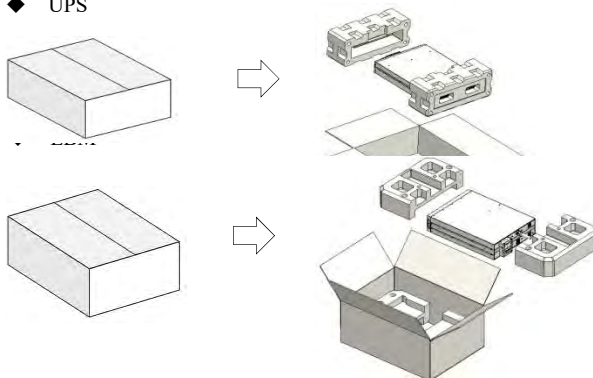
3.2 Unpacking the Unit



- Unpacking the unit in a low-temperature environment may cause condensation occurred in and on the cabinet. Do not install the unit until the inside and outside of the unit are absolutely dry (hazard of electric shock).

Remove the packing materials and lift the unit out with two people at least.

- ◆ UPS



Note:

The cabinet is heavy, please see spec weight provided on the carton/label.

Do not lift the unit's front panel and rear panel.

Discard or recycle the packaging in a responsible manner, or store it for future use.



Packing materials must be disposed in compliance with all local regulations concerning waste. Recycling symbols are printed on the packing materials to facilitate sorting.

3.3 Checking the accessory kit

Verify that the following additional items are included with the unit:

| | UPS 6K/10K | UPS 6KS/10KS | EBM |
|---------------------|------------|--------------|-----|
| Battery power cable | \ | V | * |
| USB cable | O | O | |
| RS232 cable | V | V | |
| Parallel cable | O | O | |
| Dry contractor | V | V | |
| EPO contractor | * | * | |
| Ear bracket | V | V | V |
| Rail kit | O | O | O |
| User manual | V | V | V |

V: standard configuration

*: assembled to unit

O: optional configuration

If you ordered other accessories, please contact with local sale center.

3.4 Install the unit

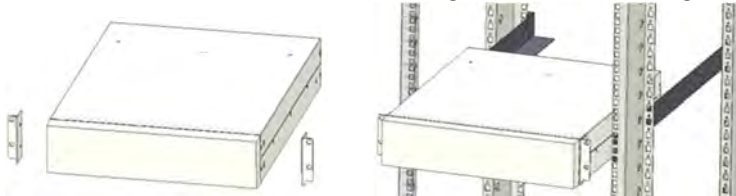
This procedure is suitable for 19 inch rack cabinet installation with a minimum of 800mm depth.

◆ UPS model

Identify the final position and keep '2U' space for this installing.

Note that you already installed a 'rail kit' to rack cabinet for this operation, and '1U' rail kit is recommended to be selected.

1. Install 'Ear bracket' to the unit by the M4 screws(flat head).
2. Slide the unit into 'rail kit' and make sure tighten the 'rack mounting screw' .



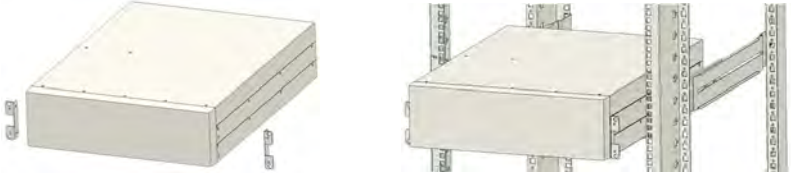
◆ EBM model

Identify the final position and keep '3U' space for this installing, and it is

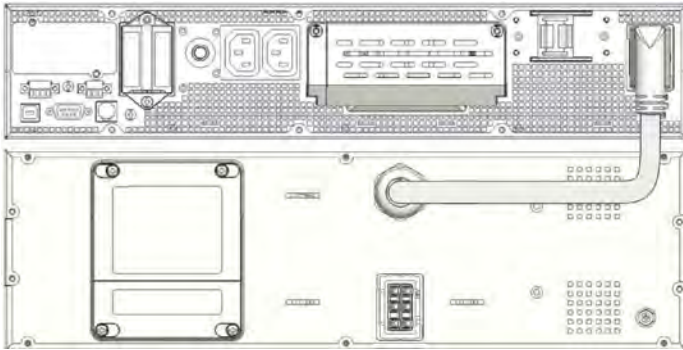
recommended to be installed below to UPS.

Note that you already installed a 'rail kit' to rack cabinet for this operation, and '2U' rail kit is recommended to be selected.

1. Install 'Ear bracket' to the unit by the M4 screws(flat head).
2. Slide the unit into 'rail kit' and make sure tighten the 'rack mounting screw' .



3.Connect EBM to UPS with 'Battery power cable'.

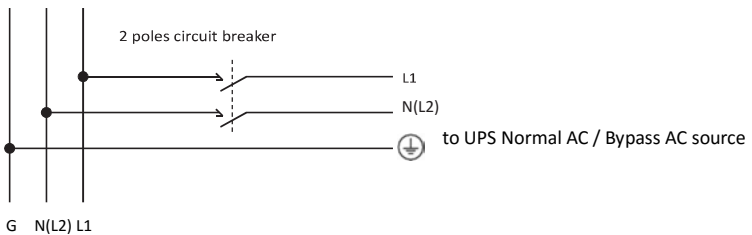


4. Power cables connection

Recommended protective devices and cable cross-sections

Recommended upstream protection

| UPS power rating | Upstream circuit |
|------------------|------------------|
| 6000VA | D curve – 63A |
| 10000VA | D curve – 100A |

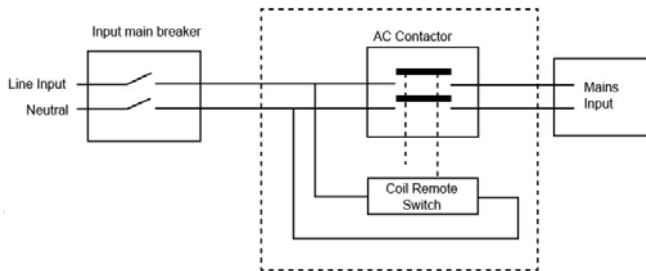


Read the Safety instructions page 3 regarding backfeed protection requirements.
Recommended cable cross-sections

| | | |
|--|-------------------------|--------------------------|
| Model | 6K | 10K |
| Protective earthing conductor Min cross section | 6mm ² (8AWG) | 10mm ² (6AWG) |
| Input L, N, G Min conductor cross section | 6mm ² (8AWG) | 10mm ² (6AWG) |
| Input fuse | 80A | 100A |
| Output L,N, Min conductor cross section | 6mm ² (8AWG) | 10mm ² (6AWG) |



It is recommended that an external isolating device should be installed between the mains input and UPS as shown in Figure



4.1 Access to terminal blocks(AC to UPS)



High leakage current:

Earth connection essential before connecting supply.

Common input/output sources connection

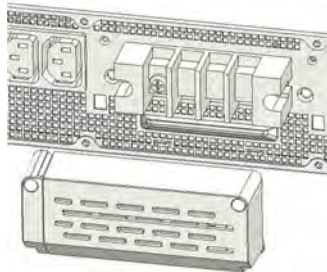


This type of connection must be carried out by qualified electrical personnel

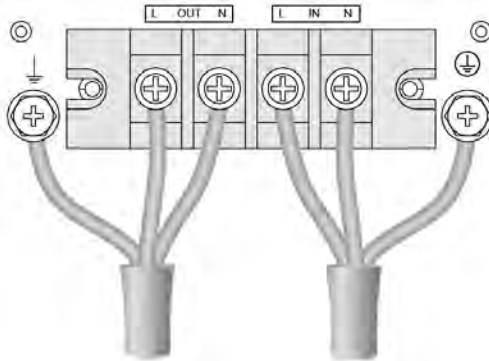
Before carrying out any connection, check that the upstream protection devices (Normal AC source and Bypass AC source) are open "O" (Off).

Always connect the ground wire first

1. Remove the cover of terminal block.



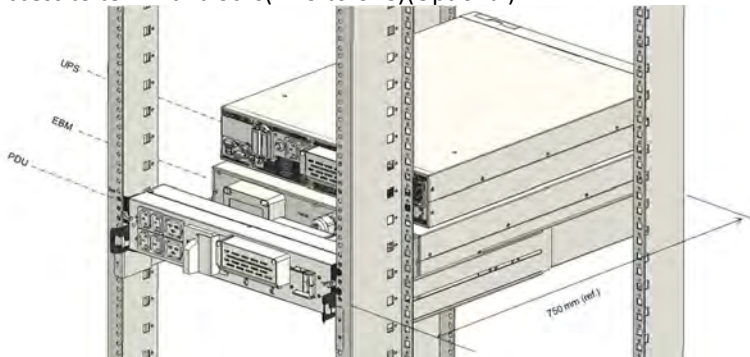
2. Connect the AC cable to terminal blocks refer to the indication on rear panel



3. Tie up the AC cable to the rear panel.

4. Install back the cover of terminal block.

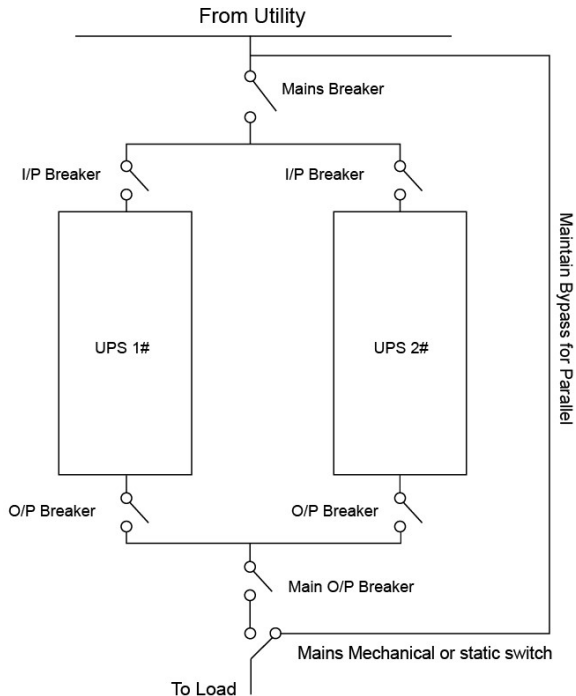
4.2 Access to terminal blocks(PDU to UPS)(Optional)



If you ordered PDU model, please connect the UPS's terminal blocks from PDU's source, detail operation please refer to PDU's user manual.

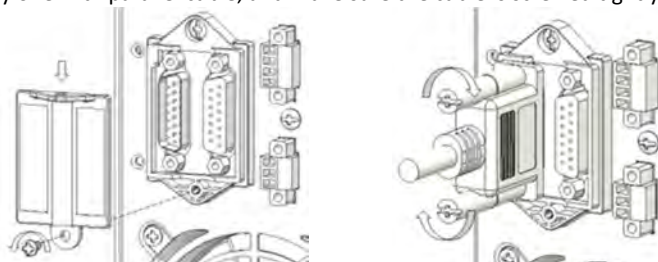
4.3 Parallel Installation and Operation(Optional)

As long as the UPS is equipped with parallel board and parallel cables, up to 3 UPSs can be connected in parallel to configure a sharing and redundant output power.

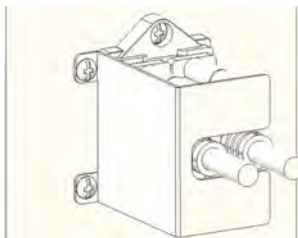


How to install a new parallel UPS system:

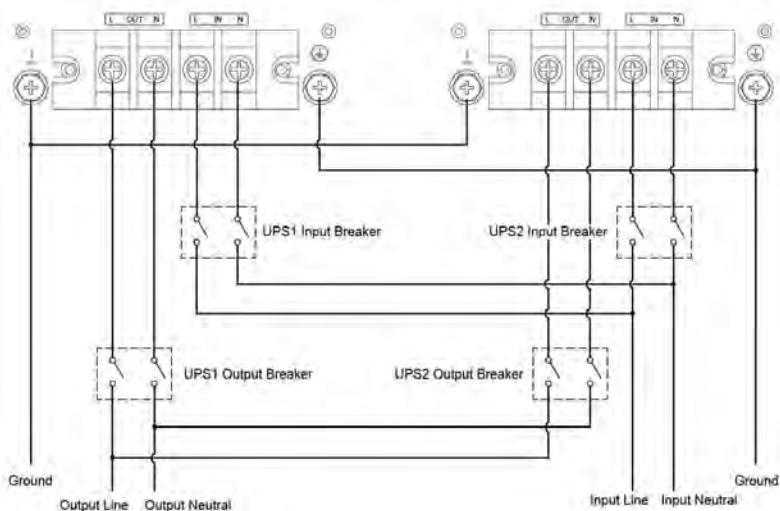
- 1) Before installing a new parallel UPS system, please prepare the input /output wires, breakers, and a main maintenance mechanical switch or static switch.
- 2) Independent battery packs for each UPS.
- 3) Remove the cover plate of parallel port on the UPS, connect each UPS one by one with parallel cable, and make sure the cable is screwed tightly.





- 4) Install 'cable locker' to protect the 'parallel cable' for each UPS.



- 5) Connect the input and output wires and make sure all the breakers are turned off.





- 6) Turn on the input breakers for the parallel UPS.
- 7) Pressing  button continuously for more than 1 second for one UPS of the system, then the system will turn to online mode.
- 8) Regulate the output voltage of the each UPS separately, and check if the difference of output voltage is less than 0.5V among the parallel system. If the difference is more than 0.5V, the UPS need to be regulated.
- 9) If the difference output voltage is less than 0.5V, turn off the input breakers to let UPS shut down. And then switch on the output breakers for all the UPS.
- 10) Switch on the input breakers for the parallel UPS. Pressing  button continuously more than 1 second for one UPS of the system, then the

system will turn to online mode, after these operations, the system will work normally in parallel mode.


Note: The output wiring requirement as below:


- 1) If the distance between the UPS and breaker panel is less than 20 meters in parallel system, the length difference between input and output cable of the UPSs is required to be less than 20%.
- 2) If the distance between the UPS and breaker panel is more than 20 meters in parallel system, the length difference between input and output cable of the UPSs is required to be less than 5%.

2. How to join a new UPS to parallel system:


- 1) Firstly, a main maintenance mechanical switch or static switch should be installed for the parallel system.
- 2) Regulate the output voltage of the new UPS: check if the output voltage difference between the new UPS and the parallel system is less than 0.5V.
- 3) Ensure the bypass of the parallel system is normal and the auto bypass setting is "enable", then press the  button to turn off the UPS, the UPS will turn to bypass mode.
- 4) Set the main maintenance switch or static switch from "UPS" to "BPS", then switch off the main output breaker, input breaker and mains breaker, then the UPS will shut down.
- 5) Connect the cable and wire for the new ups.
- 6) Switch on the input breakers and mains breaker, and make sure that every UPS work in bypass mode.
- 7) Switch on the O/P breakers and main O/P breaker, transfer the main maintenance switch or static switch from "BPS" to "UPS".
- 8) Press the  button of one UPS, all the ups will turn on, after that, the system will work in Line mode.

3. How to remove a single UPS from parallel system:

- 1) Firstly, a main maintenance mechanical switch or static switch should be installed for the parallel system.
- 2) Ensure the bypass is normal and the auto bypass setting is "enable", press the  button to turn off the UPS system, and the UPS system will turn to bypass mode.
- 3) Transfer the main maintenance switch or static switch from "UPS" to "BPS", then switch off the output breakers, input breakers and mains breaker in the parallel system, and the UPS will shut down.

- 4) Switch off the main O/P breaker and O/P breaker in the parallel system.
- 5) Remove the wanted UPS and disconnect cables/wires.
- 6) Switch on the mains breaker and input breaker of the reserved UPS, make sure the UPS work in bypass mode.
- 7) Switch on the O/P breaker and main O/P breaker.
- 8) Transfer the main maintenance switch or static switch from “BPS” to “UPS”, and press the  button to turn on the UPS, and the UPS will turn on to online mode.

3. How to remove all the UPS from parallel system:

- 1) Firstly, a main maintenance mechanical switch or static switch should be installed for the parallel system.
- 2) Ensure the bypass is normal and the auto bypass setting is “enable”, press the  button to turn off the UPS system, and the UPS system will turn to bypass mode.
- 3) Transfer the main maintenance switch or static switch from “UPS” to “BPS”, then switch off the output breakers, input breakers and mains breaker in the parallel system, and the UPS will shut down. The line will power the load via maintenance mechanical switch or static.



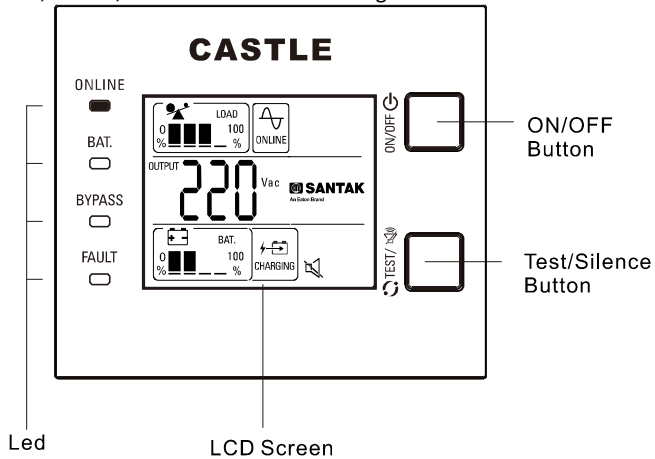
Caution

While connects battery pack with UPS, please to use standard battery cable in package. If using additional battery cable, it must follow cable specification and the maximum length of battery cable 10 meters for application. If have over 10 meters requests, please contact distributors/agents for details

5. Operation

5.1 Control panel

The UPS has a graphical LCD. It provides useful information about the UPS itself, load status, events, measurements and settings.



The following table shows the indicator status and description:

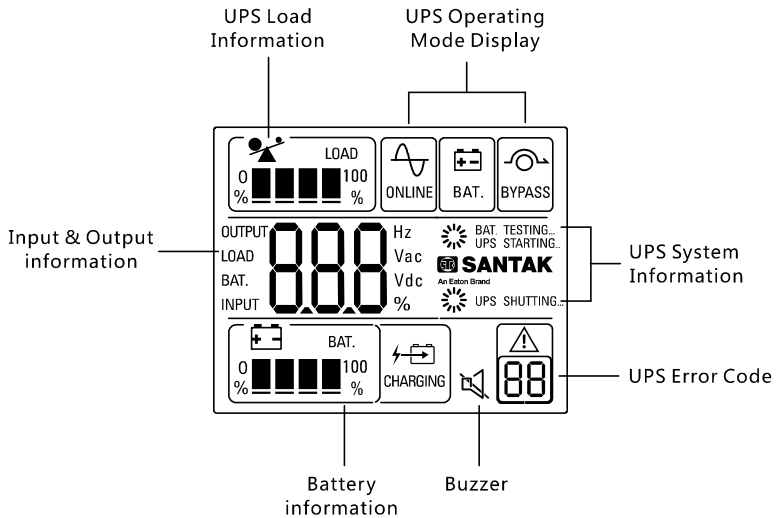
| Indicator | Status | Description |
|--------------------|--------|---|
| ONLINE (Green) | On | The UPS is operating normally on Online or on High Efficiency mode. |
| BAT. (Orange) | On | The UPS is on Battery mode. |
| Bypass (Orange) | On | The UPS is on Bypass mode. |
| | Flash | The UPS is on Standby mode. |
| Fault (Red) | On | The UPS has an active alarm or fault. |



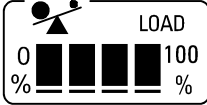

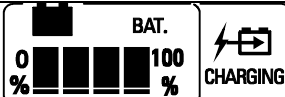






The Buzzer definition as below:


| UPS condition | Buzzer status |
|--------------------------|--|
| Fault active | Continuous |
| Over Load Warning active | 2 Beep every second |
| Other Warning active | Beep every second |
| Battery output | Beep every 4 seconds, if battery low, buzzer Beep every second |
| Bypass output | Beep every 2 minutes |

5.2 LCD description

The LCD backlight automatically dims after 2 minutes of inactivity (except UPS is fault). Press any button to wake up the screen.



| Display | Function |
|---|---|
| Input & Output Information | |
| OUTPUT LOAD BAT. INPUT  | It indicates input & output voltage/frequency value, which are displayed alternately. It also indicate load per cent and battery voltage value . |
| UPS Operating Mode Display | |
|  | It indicates UPS operating mode . |
| Load Information | |
|  | It indicates the load level. Every grid represents the level of 25%. If UPS is overloaded , the icon  would flash once time per second . |
| Battery Information | |
|  | It indicates the battery capacity. Every grid represents the capacity of 20%. If the battery charger is running , the icon  would show . |
| Buzzer | |
|  | The icon will be displayed after panel key operation or serial command mute |
|  | The icon will be displayed when the buzzer sounds normally. |
| Else | |
|  | alarm ID indicates the UPS is in Fault mode or has some warnings. It Indicates Fault kind or Warning kind, several warning kinds at the same time could be displayed alternately. The icon  would flash when having warnings . The icon  would show continuous when in Fault mode. |




| | |
|---|--|
|  | It indicates UPS Brand Logo and UPS system information . |
|---|--|

5.3 Display functions

| Button Name | Description | Setting |
|--------------|---------------------------|---|
| ON/OFF | Switch UPS operating mode | Press 0.5s or more (ON / OFF) : Standby |
| | Remove the fault alarm | When the UPS is faulty, press the key for more than 0.5s to release the UPS fault alarm |
| Test/Silence | Bat. test | ONLINE Mode, Press 4s or more |
| | Silence | Press 2s ~ 4s |
| | Setting | Press ON/OFF and Test/Silence button at the same time for 4s or more, enter into setting function |

5.4 Operation Mode

The different UPS Operating Mode would be displayed on the LCD screen corresponding to their operating modes, and they are illustrated as the following table.

| Normal Operation Mode |  ONLINE |  BAT. |  BYPASS |
|------------------------------|--|--|--|
| No Output Mode | ○ | ○ | ○ |
| Bypass Output Mode | ○ | ○ | ● |
| ONLINE/Converter Output Mode | ● | ○ | ○ |
| Battery/Battery Test Mode | ● | ● | ○ |
| ECO Mode | ● | ○ | ● |

- :Icon display
- :Icon no display

Note:

ECO mode / CVCF mode and the number of parallel machines: The alarm ID is not displayed when the UPS works normally without alarm information. The

two characters under the alarm ID are used to display the ECO mode / CVCF mode and the number of parallel machines.

If UPS is set to ECO mode, the character is displayed as EO

If UPS is set to CVCF mode, the character is displayed as CF

If the UPS is in the parallel system, the total number of parallel machines will be displayed. If the UPS is in the parallel system and is set to CVCF mode, the numbers of CF and parallel machines will be displayed alternately and will alternate once every two seconds

5.5 UPS startup and shutdown



Please make sure there is no load connected to the ups before the ups is turned on, and take on the load one by one after the UPS is turned on. Take off all of the connected loads before turning off the UPS.

Starting the UPS with utility




Verify that the total equipment ratings do not exceed the UPS capacity to prevent an overload alarm.

Start the UPS with utility:

Check all the connection is correct.

Power on the UPS, the fan begins to rotate. After that, the LCD will show the default UPS status summary screen.


Pressing  button continuously for more than 1 second, the buzzer will beep 300ms, UPS starts to turn on.

A few seconds later, the UPS turns into Line mode. If the utility power is abnormal, the UPS will transfer to Battery mode without output interruption of the UPS.

Starting the UPS on Battery




Before using this feature, the UPS must have been powered by utility power with output enabled at least once.


After connect the UPS with battery, should wait 10s before pressing the  button for pre-charging the auxiliary power supply.

Battery start can be disabled. See “Start on battery” setting in user settings refer to chapter 5.4.

To start the UPS on battery:

Check all the connection is correct.


Pressing  button continuously for more than 100ms, the UPS would be powered on. At this time the fan begins to rotate. Then LCD will show the default UPS status summary screen.

Pressing  button continuously for more than 1 second, the buzzer will beep for 300ms, UPS starts to turn on.

A few seconds later, the UPS turns into Battery mode. If the utility power comes back, the UPS will transfer to Line mode without output interruption of the UPS.

UPS shutdown with utility


To shut down the UPS with utility:

Pressing  button continuously for more than 3 seconds and the buzzer will beep 300ms. After that, the UPS will turn into Bypass mode at once.

When completing the above action, UPS output voltage is still present. In order to cut off the UPS output, simply cut off the utility power supply. A few seconds later, the ups will shut down and no output voltage is available from the UPS output terminal.

UPS shutdown without utility

To shut down the UPS without utility:

To power off the UPS by pressing  button continuously for more than 3 second, and the buzzer will beep for 300ms. The UPS will cut off the output at once.

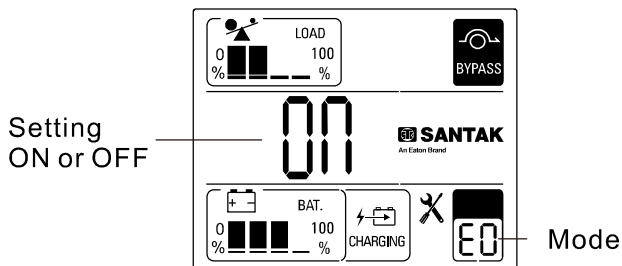
A few seconds later, the ups will shut down and no voltage is available from the UPS output.

5.6 LCD operation

The UPS can make some settings via the LCD, including:

1> ECO Setting

The ECO mode ("EO") can be set to on / off. When set to enabled, the UPS can operate in ECO mode to power the load. When set to disable, the UPS operates In normal mains mode for the load power supply, the default is not enabled.

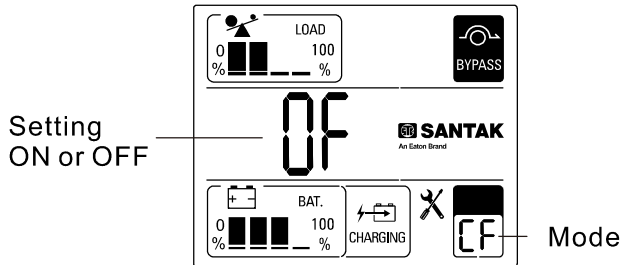


2> CVCF Setting

The CVCF mode ("CF") can be set to on / off. When set to enabled, the UPS can operate in CVCF mode as a load function. When set to Disabled, the UPS operates In

normal mains mode for the load power supply, the default is not enabled.

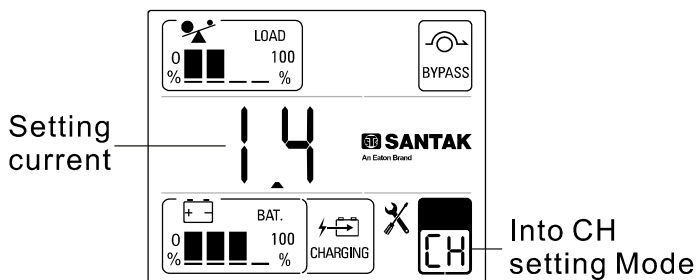
Note: Only one of ECO and CVCF can be set to enable. CVCF is automatically set to disabled when ECO is set to Enabled. ECO is automatically set to Disabled when CVCF is set to Enable.



3> Charging Current

Charging current (CH) can be setting

Standard model (6K/10K), charging current can be set to 1A/1.4A/2A/2.5A/3A /3.5A/4.0A. Long backup model (6KS/10KS), the charging current can be set to 1A to 12A (in steps of 1A), the default is 4A, the corresponding LCD display is 01/02/03/04 /05/06/07/08/09/10/11/12.



● Setting Step

Step 1: When the two keys are pressed at the same time for more than 4s (press the test key first, and then press the on / off key), the UPS enters into the setting mode and the contents to be set (EO / CF / CH) are displayed to display the corresponding Option.

Step 2: Set mode, press the power button to select the content to be set for more than 0.5s (EO, CF or CH).

Step 3: Press the test key 0.5s above, the corresponding setting options start flashing.

Step 4: Press the on/off button 0.5s above, select the corresponding setting

items (for example, "On" enable, "OF" means not enabled).

Step5: Press the test key 0.5s above, select the corresponding settings and determine the settings, the setting is completed.

Step6: The two buttons simultaneously press more than 4s or without any key operation for more than 1 minute, you can exit the setting mode, UPS resume normal working mode.

⚠ NOTE:

The LCD settings must be made when the UPS is not powered on (Standby or Bypass mode) and the UPS can not be set up after it is powered on.

After entering the setting mode, the key no longer has the power on and off and other functions. The key operation is used to set and exit the setting mode, and the key function returns to normal.

6. Communication

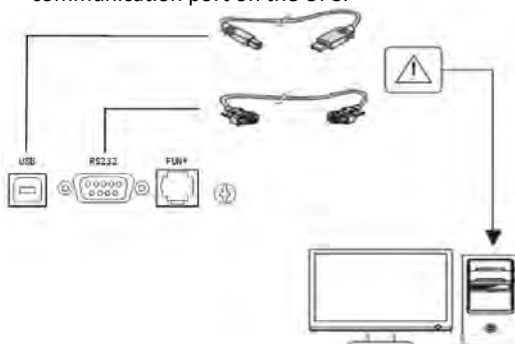
6.1 Communication ports

RS232 or USB communication ports



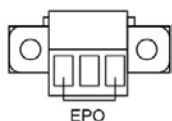
The RS232 and USB communication ports cannot operate simultaneously.

1. Communication cable to the serial or USB port on the computer.
2. Connect the other end of the communication cable to the RS232 or USB communication port on the UPS.

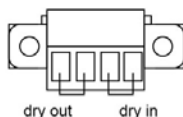


Emergency Power Off

The Emergency Power Off interface provides an emergency power off function. When the EPO function is enabled (default setting), once the EPO port is pulled out, the UPS would shut off the output and enter into EPO mode, and the UPS would not respond anything command unless the port is plugged back.



EPO



dry out dry in

Dry in & Dry out

Dry in allows remote action to switch On/ switch Off/ maintain bypass the UPS. When contact changes from closed to open, the UPS is switch On/ switch Off/ maintain bypass the UPS.

Dry out could indicate the state of UPS.

The Dry out port is normally closed, if the Dry out port is open, it indicate that the UPS is Loaded power/ On battery mode /Battery low /Battery disconnected /Bypass output/ups normal.

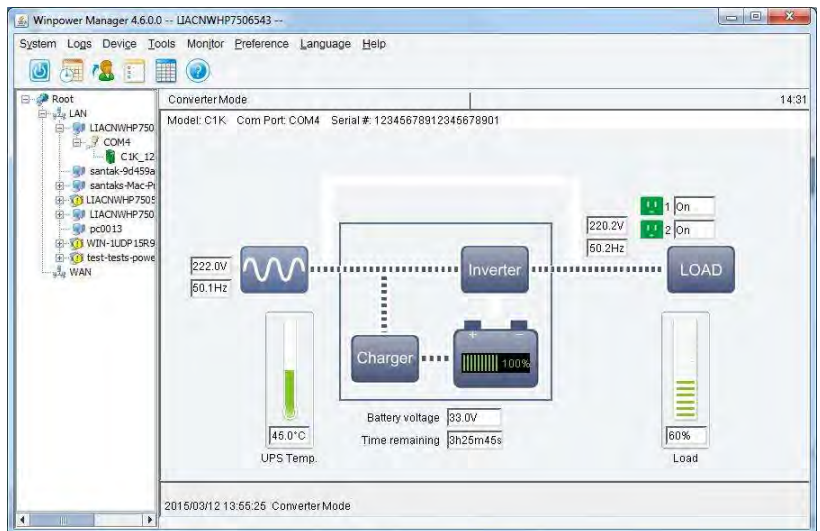
6.2 Network Management Card (Optional)

Network Management Card allow the UPS to communicate with different types of devices in variety of networking environments. The Online series has one available communication bay for the following connectivity cards:

1. Connect UPS-MS Web/SNMP Card – has SNMP and HTTP capabilities as well as monitoring through a Web browser interface; connects to a twisted-pair Ethernet (10/100BaseT) network. In addition.
2. This series UPS has AS400 card (an optional accessory) for AS400 communication protocol. Please contact your local distributor for details.

6.3 UPS Management Software

WinPower is a new software for UPS monitoring, which provides user-friendly interface to monitor and control your UPS. This unique software provides safely auto shutdown for multi-computer systems while power failure. With this software, users can monitor and control any UPS on the same LAN no matter how far from the UPSs.



stallation procedure:

1. Go to the website:

<http://www.santak.com>

2. Choose the operation system you need and follow the instruction described on the website to download the software.

When you finish installation, restart your computer, the WinPower software will appear as a green plug icon located in the system tray, near the clock.

7. UPS maintenance

7.1 Equipment care

For the best preventive maintenance, keep the area around the equipment clean and dust free. If the atmosphere is very dusty, clean the outside of the system with a vacuum cleaner.

For full battery life, keep the equipment at an ambient temperature of 25°C (77°F).



If the UPS requires any type of transportation, verify that the UPS is disconnected and turned off. The batteries are rated for a 3-5 year service life. The length of service life varies, depending on the frequency of usage and ambient temperature. Batteries used beyond expected service life will often have severely reduced runtimes. Replace batteries at least every 4 years to keep units running at peak efficiency.

7.2 Transporting the UPS



The internal UPS batteries **MUST** be disconnected before transport.



The following procedure should be performed or supervised by personnel knowledgeable about batteries and the required precaution. Keep unauthorized personnel away from batteries.

If the UPS requires any type of transportation, the batteries must be disconnected (but not removed) before the unit is transported:

1. Verify that the UPS is off and disconnected from utility power.
2. Place the UPS on a flat, stable surface with the front of the cabinet facing you.
3. Remove the UPS front cover
4. Disconnect the internal battery connectors
5. Replace the UPS front cover

7.3 Storing the equipment

If you store the equipment for a long period, recharge the battery every 6 months by connecting the UPS to utility power. The EBM charge to 90% capacity

in less than 3 hours.

However, recommends that the batteries charge for 48 hours after long-term storage.

If the date has passed and the batteries were never recharged, do not use them. Contact your service representative.

7.4 Replacing batteries



DO NOT DISCONNECT the batteries while the UPS is in Battery mode.



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

- Servicing should be performed by qualified service personnel with knowledgeable of batteries and required precautions. Keep unauthorized personnel away from batteries.
- Batteries can present a risk of electrical shock or burn from high short circuit current. Observe the following precautions:
 1. Remove watches, rings, or other metal objects,
 2. Use tools with insulated handles,
 3. Do not lay tools or metal parts on top of batteries,
 4. Wear rubber gloves and boots.
- When replacing batteries, replace with the same type and number of batteries or battery packs. Contact your service representative to order new batteries.
- Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- Never dispose of batteries in a fire. Batteries may explode when exposed to flame.
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be extremely toxic.
- Take care if the battery is inadvertently grounded. If grounded, remove source from ground. Contact with any part of a grounded battery may cause electrical shock.
- The likelihood of such shock can be reduced if such grounds are removed during installation and maintenance (applicable to equipment and remote battery supplies not having a grounded supply circuit).
- ELECTRIC ENERGY HAZARD. Do not attempt to alter any battery wiring or connectors. It may cause injury.
- Please disconnect battery charging source before battery replacing or maintenance.

Replacing the EBM(s)



The EBM is heavy. Lifting the cabinet into a rack requires two people at least.

If PDU is connected with the UPS, should turn the MBS to bypass and switch off the input and then replace the EBM(s). If PDU is not connected with the UPS, should turn off the UPS and then replace the EBM.

To replace the EBM(s):

1. Unplug the EBM power cable from the UPS.

If additional EBM(s) are installed, unplug the EBM power cable from each EBM.

2. Replace the EBM(s). See "Recycling the used equipment" refer to chapter 7.4 for proper disposal.



A small amount of arcing may occur when connecting the EBM to UPS. This is normal and will not harm personnel. Please connect the EBM cable to the UPS quickly and firmly.

3. Plug the EBM cable(s) into the battery connector(s).

4. Verify that the EBM connections are tight, and there are adequate bend radius and strain relief exist for each cable.

7.5 Recycling the used equipment

Contact your local recycling or hazardous waste center for information on proper disposal of the used equipment.



Do not dispose of the batteries in the fire. Which may cause battery explosion. The batteries must be rightly disposed according to local regulation.

Do not open or destroy the batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.



Do not discard the UPS or the UPS batteries in the trash. This product contains sealed, lead acid batteries and must be disposed of properly. For more information, contact your local recycling/ reuse or hazardous waste center.



Do not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

8. Troubleshooting

The UPS is designed for durable, automatic operation and also alert you whenever potential operating problems may occur. Usually the alarms shown by the control panel do not mean that the output power is affected. Instead,

they are preventive alarms intended to alert the user.

- Events are silent status information that are recorded into the Event log. Example = "Battery charging".
- Alarms are recorded into the Event log and displayed on the LCD status screen with the logo blinking. Some alarms may be announced by a beep every 1 second. Example = "Battery low".
- Faults are announced by a continuous beep and red LED, recorded into the Event log. Example = "Out. short circuit".

Use the following troubleshooting chart to determine the UPS alarm condition.

8.1 Typical alarms and faults

To check the Event log:

| Conditions | Possible cause | Action |
|---|---|--|
| Battery mode Battery(Orange) LED is On. 1 beep every 4 seconds. Code: 62 | A utility failure has occurred and the UPS is in Battery mode. | The UPS is powering the equipment with battery power. Prepare your equipment for shutdown. |
| Battery low Battery(Orange) LED is On. 1 beep every 1 second. Code: 12 | The UPS is in Battery mode and the battery is running low. | This warning is approximate, and the actual time to shutdown may vary significantly. Depending on the UPS load and number of Extended Battery Modules (EBMs), the "Battery Low" warning may occur before the batteries reach 20% capacity. |
| No battery Fault (Red) LED is Flash 1beep every 1 second Code: 11 | The batteries are disconnected. | Verify that all batteries are properly connected. If the condition persists, contact your service representative. |
| Bypass mode Bypass (Orange) LED is on. Code: 60 | An overload or a fault has occurred, or a command has been received and the UPS is in Bypass mode | Equipment is powered but not protected by the UPS. Check for one of the following alarms: over temperature, overload or UPS failure. |

| | | |
|---|--|--|
| <p>Power overload Fault (Red) LED is Flash 2beep every 1 second Code: 41</p> | <p>Power requirements exceed the UPS capacity</p> | <p>Remove some of the equipment from the UPS. The UPS continues to operate, but may switch to Bypass mode or shut down if the load increases. The alarm resets when the condition becomes inactive.</p> |
| <p>UPS over temperature Fault (Red) LED is On. Beep continuous. Code: 81</p> | <p>The UPS internal heat sink temperature is too high or a fan has failed. At the warning level, the UPS generates the alarm but remains in the current operating state. If the temperature rises another 2°C, the UPS transfers to Bypass mode or Standby mode.</p> | <p>Clear vents and remove any heat sources. Allow the UPS to cool. Ensure the airflow around the UPS is not restricted. Restart the UPS. If the condition continues to persist, contact your service representative.</p> |
| <p>ON Maintenance Bypass Bypass (Orange) LED is on. Code: 72</p> | <p>UPS was manually commanded to switch to bypass and will remain in bypass until commanded out of bypass</p> | <p>Check the maintain bypass switch status</p> |
| <p>In HE Mode Line(green) LED is on. Code: 63</p> | <p>The UPS is on bypass while operating on the High Efficiency setting.</p> | <p>The equipment transferred to bypass utility power as a normal function of High Efficiency operation. Battery mode is available and your equipment is protected.</p> |
| <p>Site Wiring Fault Fault (Red) LED is flash 1beep every 1 second Code: 04</p> | <p>Site Fault detection is supported on all models anytime there is a Grounding Neutral connection. Alarm triggers when the difference between ground and neutral voltage is > 15v.</p> | <p>Site Fault detection should be enabled by default. It can still be enabled / disabled from the LCD settings menu. Reconnect all input wires.</p> |

| | | |
|--|--|--|
| Back feed Fault (Red) LED is On. Beep continuous. Code: 93 | UPS has a unexpected bypass current on battery mode | Transfer to maintenance bypass and call service. |
| Inv Overload Fault Fault (Red) LED is On Beep continuous. Code: 42 | UPS has transferred to bypass or fault mode because of overload in inverter mode | The UPS transfers to Battery mode if supporting the load. Remove some of the equipment from the UPS |
| Byp Overload Fault Fault (Red) LED is On. Beep continuous. Code: 43 | UPS has cut off the output and transferred to fault mode because of overload in bypass mode or HE mode. | Remove some of the equipment from the UPS |
| Output Short Circuit Fault (Red) LED is On. Beep continuous. Code: 31 | Indicates that the UPS has detected abnormally low impedance placed on its output and considers it a short circuit | Remove all the loads. Turn off the UPS. Check if UPS output and loads is short circuit. Ensure short circuit is removed before turning on again. |
| Fan Failure Fault (Red) LED is flash 1 beep every 1 second Code: 85 | Indicates that the fan could not work normally | Check fans of UPS |
| BUS Over Voltage Fault (Red) LED is On. Beep continuous. Code: 21 | Indicates that the UPS get BUS over voltage fault because of BUS. | The UPS transfers to Bypass mode if supporting the load |
| BUS Under Voltage Fault (Red) LED is On. Beep continuous. Code: 22 | Indicates that the UPS get BUS under voltage fault | The UPS transfers to Bypass mode if supporting the load |
| BUS Unbalance Fault (Red) LED is On. Beep continuous. Code: 23 | Indicates that the positive BUS voltage and negative BUS voltage are too lopsided to fault | The UPS transfers to Bypass mode if supporting the load |
| BUS Short Fault (Red) LED is On. Beep continuous. Code: 24 | Indicates that the BUS voltage decrease very fast | Contact your service representative |

| | | |
|---|---|--|
| BUS Softstart Fail Fault (Red) LED is On. Beep continuous. Code: 25 | Indicates that the BUS could not soft start successfully | Contact your service representative |
| Inv Over Voltage Fault (Red) LED is On. Beep continuous. Code: 32 | Indicates that the UPS get invert over voltage fault | The UPS transfers to Bypass mode if supporting the load |
| Inv Under Voltage Fault (Red) LED is On. Beep continuous. Code: 33 | Indicates that the UPS get inverter under voltage fault | The UPS transfers to Bypass mode if supporting the load |
| Inv Softstart Fail Fault (Red) LED is On. Beep continuous. Code: 34 | Indicates that the inverter could not soft start successfully | Contact your service representative |
| Charger Fail Fault (Red) LED is flash 1 beep every 1 second Code: 15 | Indicates that the UPS has confirmed the charger has failed | The UPS turns off the charger until the next power recycle. Contact your service representative |
| Battery Over Voltage Fault (Red) LED is On. Beep continuous. Code: 14 | Indicates that the battery voltage is too high | The UPS will turn off the charger until the battery voltage is normal |
| Negative power Fault Fault (Red) LED is On. Beep continuous. Code: E1 | In parallel system, power of UPS is negative | Redundancy mode, the fault UPS turn to fault mode without output Increase mode, UPS1& UPS2 turn to fault mode |
| Parallel cable loss Fault (Red) LED is On. Beep continuous. Code: E2 | In parallel system, parallel cable disconnect | Disconnect parallel cable one turn to fault mode |
| Parallel system battery status Fault (Red) LED is flash 1 beep every 1 second Code: E6 | UPS1 connect battery, UPS2 without battery | Check battery connect status |

| | | |
|---|--|--|
| Line input different Fault (Red) LED is flash 1 beep every 1 second Code: E7 | Parallel system, UPS1 line ok, UPS2 line loss | Check the line input |
| Power strategy different Fault (Red) LED is flash 1 beep every 1 second Code: E9 | Parallel system, UPS mode (normal , converter, HE) different | Check UPS OP mode, Keep OP mode be the same |
| Rate power different Fault (Red) LED is flash 1 beep every 1 second Code: EA | Parallel system rate power different | Rate power different, not allow turn on UPS. Keep rate power be the same |
| HE in parallel Fault (Red) LED is flash 1 beep every 1 second Code: EB | Parallel system, UPS mode set as HE | HE not allow in parallel system, change UPS mode |

9. Specifications

9.1 Model specifications

Table 1. Power Module model list

| Model | Power Ratings |
|------------------------------|------------------|
| 6K UPS (standard model) | 6000VA / 6000W |
| 10K UPS (standard model) | 10000VA / 10000W |
| 6KS UPS (long backup model) | 6000VA / 6000W |
| 10KS UPS (long backup model) | 10000VA / 10000W |

Table 2. Extended Battery Module model list

| Model | Configuration | Battery voltage | For power ratings |
|-------|---------------|-----------------|-------------------|
| EBM | Rack | 192Vdc | 6000-10000VA |

Table 3. Weights and dimensions

| Description | Weights (kg) | Dimensions (mm) W x H x D |
|-------------|--------------|---------------------------|
| 6K UPS | 14 | 438*86.3*573 |
| 10K UPS | 16 | 438*86.3*573 |
| 6KS UPS | 14 | 438*86.3*573 |
| 10KS UPS | 16 | 438*86.3*573 |
| EBM 16 BAT | 52 | 438*129*593 |

Note: The weight in this table is reference only, please see the labels on the carton for details

Table 4. Electrical input

| | |
|----------------------|---|
| Nominal frequency | 50/60Hz auto-sensing |
| Frequency range | 40 Hz– 70 Hz≤60% rated load |
| | 45 Hz– 55 Hz(50Hz system) |
| | 54 Hz – 66 Hz (60Hz system) >60% rated load |
| | 45 Hz– 55 Hz |
| | 54 Hz – 66 Hz >60% rated load |
| Bypass voltage range | 176~264Vac (default) |
| Noise filtering | MOV for normal and common mode noise |

| Model | Default input (Voltage/Current) | Voltage at 100% Load |
|----------------|------------------------------------|-------------------------|
| 6K 16PCS BAT | 230V / 31.2A | 176~275Vac |
| 6KS 16PCS BAT | 230V / 38.7A | 176~275Vac |
| 10K 16PCS BAT | 230V / 49.9A | 176~275Vac |
| 10KS 16PCS BAT | 230V / 57.6A | 176~275Vac |

Table 5. Electrical input connections

| Model | Input connection | Input cable |
|----------|------------------|--------------|
| 6K/6KS | Hardwired | Not provided |
| 10K/10KS | | |

Table 6. Electrical output

| All models | Normal mode | Battery mode |
|----------------------------------|--|--|
| Voltage regulation | ±1% | ±1% |
| Efficiency | > 98% (High Efficiency mode) > 95% | > 93% |
| Frequency regulation | Sync with line ±10% of nominal line frequency (outside this range: ±0.1% of auto-selected nominal frequency) | ±0.1% of auto-selected nominal frequency |
| Nominal output | 208V*, 220V, 230V, 240V (voltage configurable) 6000/10000VA* 6000/10000W* | |
| Frequency | 50 or 60Hz, autosensing or configurable as a frequency converter | |
| Output overload | 100-105% : no alarm 105-125% : load transfers to Bypass mode after 10 minutes 125-150% : load transfers to Bypass mode after 30s | |
| Output overload (Bypass mode) | 100-105% : no alarm 105-125% : continue working and alarm 125-150% : UPS shuts down after 30s | |
| Voltage waveform | Sinewave | |

| | |
|---------------------|---|
| Harmonic distortion | < 1% THDV on linear load < 5% THDV on non-linear load |
| Transfer time | Online mode: 0 ms (no break) High Efficiency mode: 10ms maximum (due to loss of utility) |
| Power factor | 1 |
| Load crest ratio | 3 to 1 |

* for 208V output, the load level will be derating to 90%.

Table 7. Electrical output connections

| Model | Output connection | Output cable |
|----------|-------------------|--------------|
| 6K/6KS | Hardwired | Not provided |
| 10K/10KS | | |

Table 8. Environmental and safety

| | |
|------------------|--|
| Certifications | EN 62040-1 IEC/EN 62040-2: Cat. C3 IEC/EN 62040-3 EN 60950-1 |
| EMC (Emissions)* | Conduction: C3 IEC/EN 62040-2 Radiation: C3 IEC/EN 62040-2 |
| EMC (Immunity) | IEC 61000-4-2, Level 3 IEC 61000-4-3, Level 3 IEC 61000-4-4, Level 4 (also on signal ports) IEC 61000-4-5, Level 4, Criteria B IEC 61000-4-6, Level 3 IEC 61000-4-8, Level 4 IEC 61000-4-11 |

* for output cable < 10m.

| | |
|-----------------------|---|
| Agency markings | CE |
| Operating temperature | 0~40°C full load no derating 40~50°C output power derating to 50% load, Charger current derating 50% |
| Storage temperature | -15 to 40°C (32 to 104°F) with batteries -25 to 60°C (5 to 140°F) without batteries |
| Transit temperature | -25 to 55°C (-13 to 130°F) |
| Relative humidity | 0 to 95% no condensing |
| Operating altitude | Up to 3,000 meters (9,843 ft) above sea level with 10% derating per 1000m |
| Transit altitude | Up to 10,000 meters (32,808 ft) above sea level |
| Audible noise | < 50 dBA at 1 meter typical for 6kVA models < 55 dBA at 1 meter typical for 10kVA models |

Table 9. Battery

| | EBMs |
|----------------------------|---|
| Rack / Tower configuration | 240Vdc 20 x 12V, 7Ah 240Vdc 20 x 12V, 9Ah 192Vdc 16 x 12V, 7Ah 192Vdc 16 x 12V, 9Ah |
| Fuses | 100A for 10kVA models and EBM |
| Type | Sealed, maintenance-free, valve-regulated, lead-acid, with minimum 3-year float service life at 25°C (77°F). Lifetime is reduced above 30 °C. |
| Monitoring | Advanced monitoring for earlier failure detection and warning |
| Battery port | External ANEN-SA30 connector on power module for connection to EBM |
| EBM battery cable | 100cm for tower models |

Table 10. Communication options

| | |
|-------------------------------|--|
| Communication bay | available independent communication bay for connectivity cards |
| Compatible connectivity cards | MODBUS card NMC card AS400 card |
| Communication ports | RS-232 (DB9): 2400 bps USB: 2400 bps |
| Dry out | 2 pins jumper (normally closed) |
| Dry in | 2 pins jumper (normally closed) |
| Emergency Power Off | 3 pins jumper (normally closed) |

10 Glossary

| | |
|---------------------|--|
| Bypass AC source | Source supplying the bypass line. The equipment can be transferred to the bypass line if an overload occurs on the UPS output, for maintenance or in the event of a malfunction. |
| Frequency converter | Operating mode used to convert the AC-power frequency between the UPS input and output (50Hz -> 60Hz or 60Hz -> 50Hz). |
| Low-battery warning | This is a battery-voltage level indicating that battery power is low and that the user must take action to prevent the imminent break in the supply of power to |

| | |
|---------------------------------|---|
| | the load. |
| Backup time | Time during which the load can be supplied by the UPS operating on battery power. |
| Load | Devices or equipment connected to the UPS output. |
| HE mode | Operating mode by which the load is supplied directly by the AC source if it is within the tolerances defined by the user. This mode reduces the consumption of electrical power |
| Manual bypass | Rotary switch controlled by the user, used to connect the loads directly to the AC source. Transfer of the load to the manual bypass enables UPS maintenance without interrupting the supply of power to the connected loads. |
| Normal (double conversion) mode | The normal UPS operating mode in which the AC source supplies the UPS which in turn supplies the connected loads (after electronic double conversion). |
| Normal AC source | Normal source of power for the UPS. |
| Relay contacts | Contacts supplying information to the user in the form of signals. |
| UPS | Uninterruptible Power Supply. |

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