CASTLE Series

3C3 HD 100K-200K UPS

USER MANUAL

SANTAK

Thank you for using our products!

Please strictly comply with all warnings and operation instructions specified in this manual or on the equipment, and keep this manual properly for future reference.

Do not try to operate the equipment before reading all the safety information and operation instructions.

The manual applies to the 3C3 HD series, including:

3C3 HD-100kVA

3C3 HD-120kVA

3C3 HD-160kVA

3C3 HD-200kVA

Safety Precautions

Operating Safety

1. Please read “Safety Precautions” carefully before using this product to ensure correct and safe use. And make sure to preserve the manual well for future reference.
2. Please pay attention to all the warning symbols and follow the instructions in the manual during operation.
3. Do not use the equipment in direct sunlight or rain, or in humid conditions.
4. Do not install the equipment near any sources of heat, such as heating devices like electric heaters or furnaces.
5. Please make sure there is adequate space for ventilation or maintenance around the UPS. Please follow the instructions in the manual for installation.
6. For the purpose of cleaning, please use dry and non-conductive tools to wipe down the equipment.
7. In case of a fire, please use dry powder extinguishers. Liquid fire extinguishers are not allowed.
8. Please make sure the floor on which the equipment is installed is strong enough to support the weight of the equipment with a battery pack.
9. Please make sure the load power matches the rated power of the UPS and the battery capacity.
10. Do not remove the equipment package before installation.
11. The contractor receiving the equipment shall be responsible for equipment protection during its storage period.
12. The equipment must be stored on a solid-level floor.
13. Before the arrival of the equipment, an ambient temperature/humidity control plan shall be formulated.

Prohibited Activities

1. Having service personnel without authorization from Santak to open the UPS cabinet, which contains lethal voltages, is not allowed. Unauthorized opening may cause an unsafe condition, and will void the warranty.
2. To apply the UPS to the following types of loads or equipment, the application, configuration, management, and maintenance of which may be

subject to special requirements, please inquire from dealers or Santak in advance:

A. High-precision industrial, scientific-research, or medical instruments and equipment;

B. Facilities the malfunctions of which may lead to life-threatening situations, such as elevators;

C. Loads with large inrush current and negative power consumption;

3. Exposing batteries to fire, which may cause explosions.

Electrical Safety

1. Please make sure that the grounding is firmly connected and the wiring and battery polarity are correctly connected.
2. Battery protection devices must be configured with a suitable over-current circuit breaker.
3. Before you remove your UPS or reconnect the wiring, please shut down your UPS and disconnect the air circuit breaker and the battery to ensure that the output terminals do not carry live voltage which may cause an electric shock.
4. To ensure the safety and the best performance of your UPS, please choose from the accessories recommended by Santak.
5. A proper four-pole over-current circuit breaker shall be installed before connecting clients to your UPS to prevent electric shock by disconnecting all the input wiring.

Battery Safety

1. The service life of a battery is shortened as the ambient temperature rises. Regular replacement or maintenance of battery can ensure normal work of UPS, and sufficient standby time.
2. Battery replacement and maintenance must be performed by authorized personnel with professional knowledge of electrical engineering and batteries. Please replace an equivalent number of batteries of the same type and model.
3. There are risks of electric shock and short circuits with the battery. Please observe the following rules while replacing the battery to reduce the risks of electric shock:

A. Do not wear watches, rings or any other metallic objects;

B. Use insulated tools;

C. Wear rubber shoes and gloves;

D. Do not place metal tools or any other metallic accessories on the battery;

E. Disconnect the loads connected to the battery before removing terminals from the battery.

4. Do not expose the battery to fire to avoid the risks of explosion that may result in personal injury.

5. Non-professionals shall not open or disassemble the battery as the electrolytes in the battery contain strong acid and other hazardous substances which may cause damage to skin and eyes. Please clean with water immediately and seek medical assistance if the electrolytes come in contact with your skin.

6. Do not connect the battery's positive and negative poles as it may cause a short circuit. Over-current protection device is needed to avoid risks of burns or electric shock.

Maintenance

1. The working environment and storage method of UPS can affect its service life and reliability. Do not use your UPS in any of the following environments where:

   A. High- and low-temperature and humid places that exceed the technical specifications (temperature 0–40°C, relative humidity 0–95%). The difference between the dry bulb temperature and the wet bulb temperature of the hygroscope shall stay at 1 degree Celsius (1.8 degrees Fahrenheit) or wider to ensure a non-condensing environment.

   B. Your UPS is at high risks of vibration and collision;

   C. There are metal shavings, corrosive materials, salt and flammable gases.

2. If the UPS will be left unused for a long time, the UPS (without battery) must be stored within the following storage temperature range in a dry environment: -25–55°C. Before the UPS is turned on, ensure the ambient temperature rises to above 0°C and remain 2 hours.

3. Keep the air inlets and outlets clear for proper ventilation. Poor ventilation will cause the temperature inside your UPS to rise, shortening the service life of the UPS and its components.

4. 4. The battery should be charged at least once every three months if it is

left idle and stored in an environment with room temperature, or at least once every two months if left idle in a high-temperature environment; each charge should take more than 10 hours. Do not discharge with no loads connected or discharge for more than 14 hours continuously.

Storage Requirements

Recommended storage environment and storage time of the overall equipment and spare parts:

1. Please do not place the equipment in an environment with violent humidity and temperature changes, dust, dirt, rubbles, paint, conductive particles or corrosive gases.
2. Do not remove the equipment package before installation.
3. The contractor receiving the equipment shall be responsible for equipment protection during its storage period.
4. The equipment must be stored on a solid level floor.
5. Before the arrival of the equipment, an ambient temperature/humidity control plan shall be formulated.
6. Equipment that cannot be installed and energized immediately shall be stored indoors, and in an environment that is clean and well-ventilated and that the temperature and humidity are controlled. The storage area must be protected from rain, water, and chemicals, and meet the requirements in the following table:

ANSI/ISA-71.04-2013 Table B1 Gas concentrations recommended for G1 equipment environment:

Contaminant	Gas	Gas Concentration / ppbv
Group A	H_2S	<3
	SO_2SO_3	<10
	Cl_2	<1
	NO_x	<50
Group B	HF	<1
	NH_3	<500
	O_3	<2

Transportation and storage environment requirements for storage time less than 1 year:

Environment for transportation and storage within 1 year (Subject to the production date on the label of equipment serial No.)	
Storage site	Indoor
Dust	Good
Storage temperature	< 40℃
Storage humidity	< 70% RH
Other	Stored with initial packages

If the actual storage condition of the equipment is inconsistent with the above requirements on the storage environment, please decide the storage time based on the actual storage environment.

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Chapter 1 Introduction

The 3C3 HD series are high-efficiency pure online UPS products with excellent performance that provide double conversion, and three-phase input and output. With perfect power source protection solutions, the 3C3 HD effectively address multiple power source problems such as power outage, high-voltage AC and low-voltage AC, voltage sag, damped oscillation, high voltage impulse, voltage surge, harmonic distortion, clutter interference and frequency variation, the 3C3 HD series is widely applied for computers, communications devices and other controlling devices safely. You can choose our optional accessories to enhance your UPS to cope with inrush load situations in complicated industrial environments. For governments and a range of industries including telecommunications, financing, transportation, manufacturing and energy, the 3C3 HD series is the best choice of UPS.

The following functions of the 3C3 HD series ensure high-quality power for your equipment:

- Advanced DSP digital control technology effectively improving product performance and system reliability.
- N+X parallel redundancy (common batteries are allowed).
- Excellent protection from harsh industrial environments.
- High-resolution HMI that ensures clear and easy operation.
- Powerful communications interface and remote monitor.
- Plenty of accessories that meet a variety of needs.

1.1 Explanation of common symbols

The following symbols may appear in the manual or other occasions. You are suggested to understand the symbols and their meanings.

Symbols and meanings	
Symbol	Definition
⚠	Danger
⚠	Hazardous Voltage
~	Alternating Current (AC)
⎓	Direct Current (DC)
⏚	Protective Grounding
♻	Recycle
🗑	Keep surroundings uncluttered

Chapter 2 Appearance

2.1 Unpacking Inspection

1. Unpack the package, the unit should contain the following items:

   1) UPS.

   2) Accessories, including the user manual and test reports.

2. Check whether the UPS is damaged during delivery. In case of any damage or any component missing, please do not start the UPS and contact the carrier or dealer forwarder or distributor immediately.

3. Remove packaging materials:

   Remove the packaging materials of the 100K/120K cabinet:

   Figure 1: Cut packing straps, and remove paper corner protectors and the top cover plate of the carton.

   Figure 2: Lift the carton upwards.

   Figure 3: Remove cushioning materials;

   Figure 4: Remove the L-shaped angle irons fixed on the front and rear sides of the cabinet and loosen the anchor screws;

   Figure 5: Align the holes of the ramp and pallet, and install the ramp. Roll the UPS down the ramp and move it to the installation spot.

The unpacking diagram is shown below.

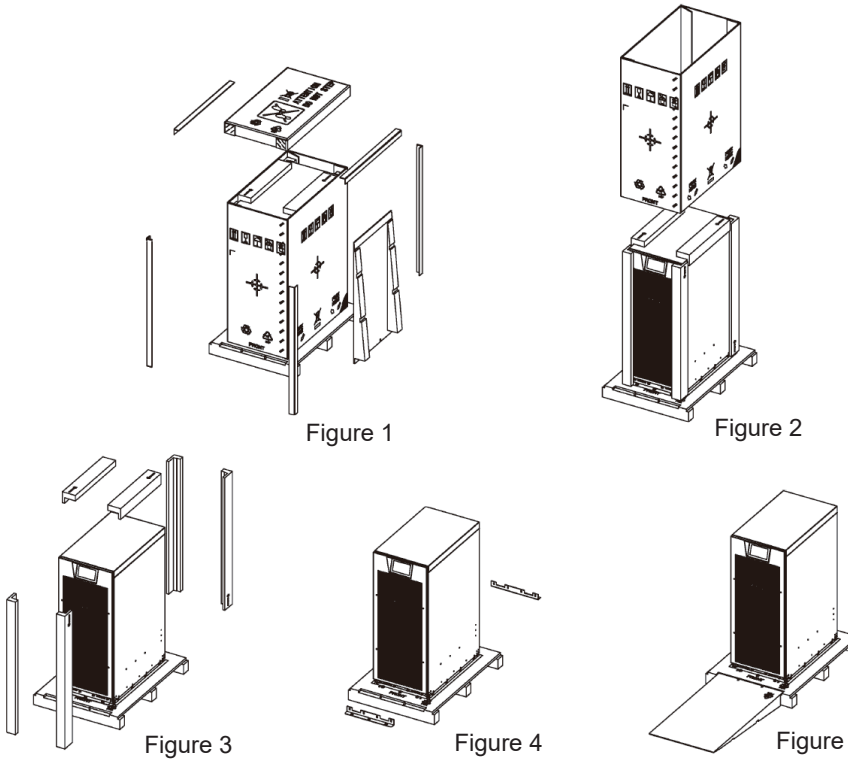


Figure 2-1:100-120KS Unboxing diagram

Remove the packaging from the 160KS/200KS cabinet:

Figure 1: Cut packing straps, and remove paper corner protectors and the top cover plate of the carton.

Figure 2: Open and remove the carton;

Figure 3: Remove packaging materials;

Figure 4: Remove the L-shaped angle irons fixed on the front and rear sides of the cabinet;

Figure 5: Place the ramp in front of the pallet, roll the UPS down the ramp, and move it to the installation spot.

The unpacking diagram is shown below.

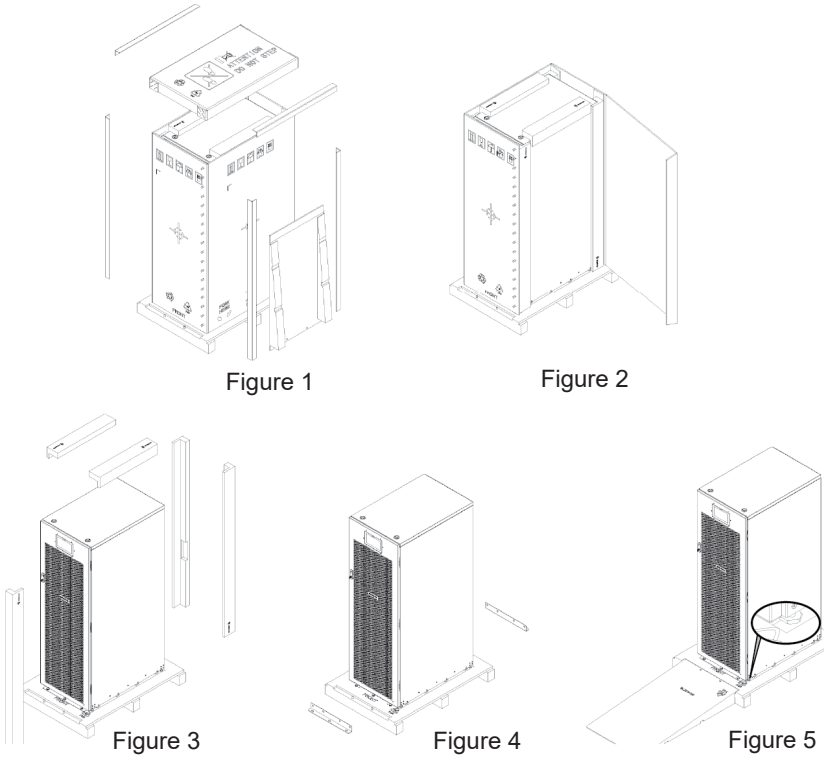


Figure 2-2: 160-200KS Unboxing diagram

2.2 UPS cabinet dimensions

100K/120K cabinet structure:

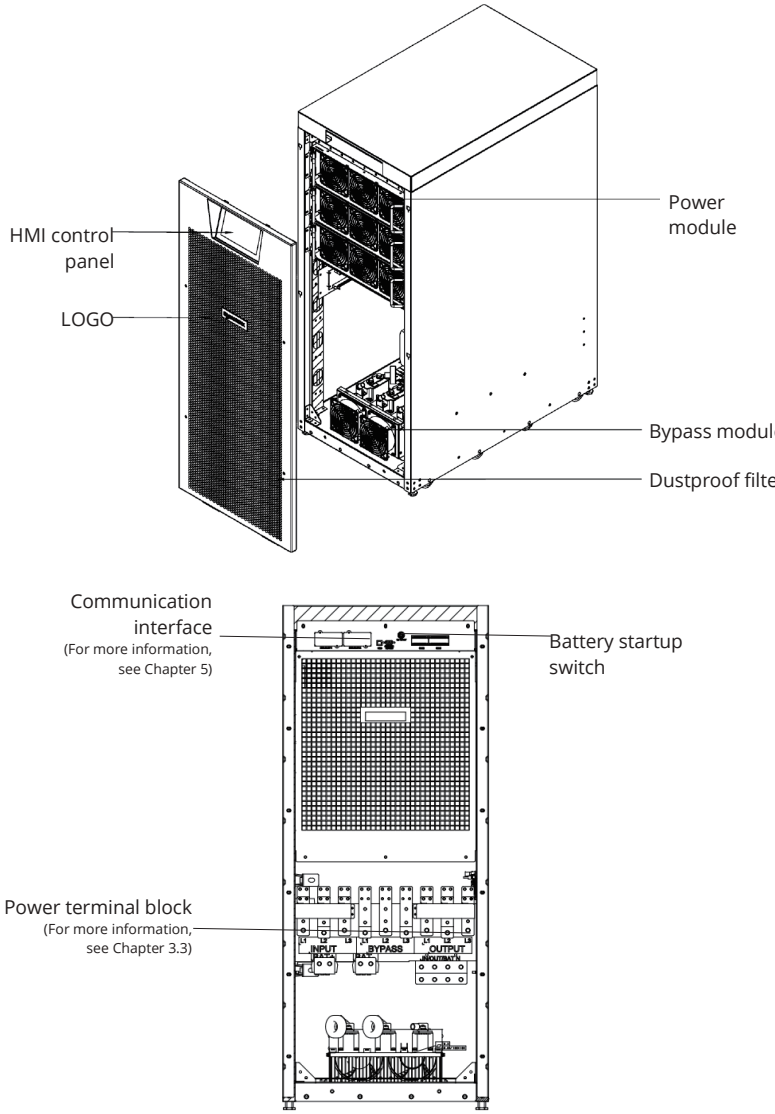


Figure 2-3: **100K/120K** structure diagram

100K/120K cabinet dimensions:

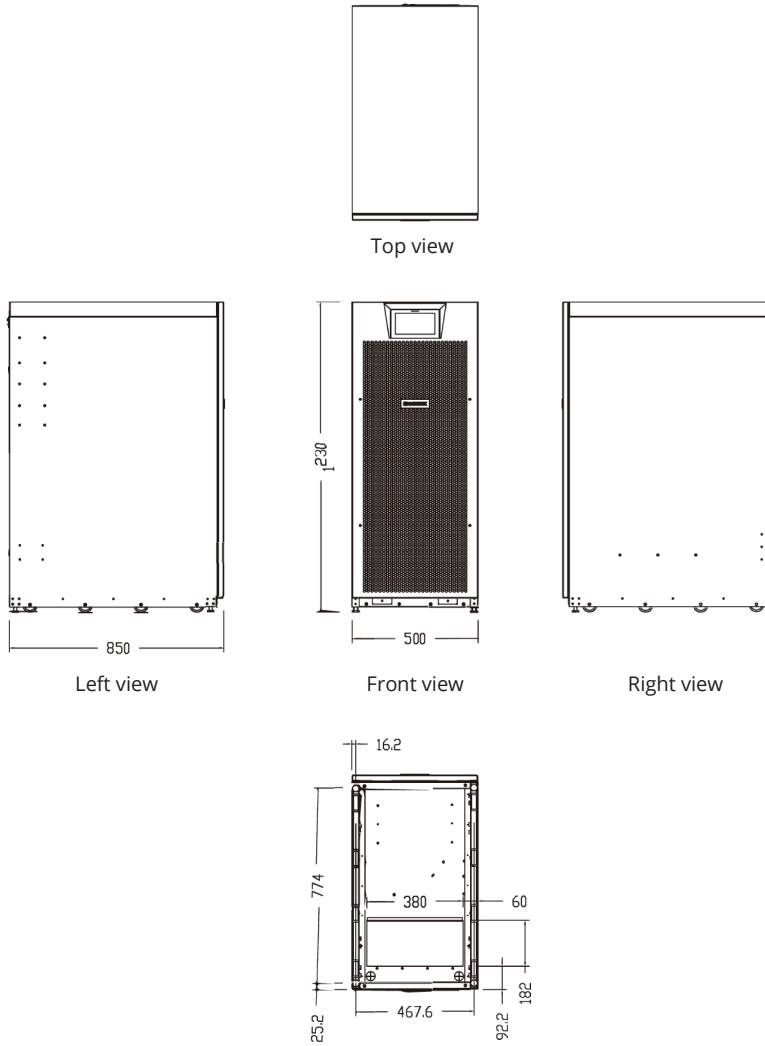
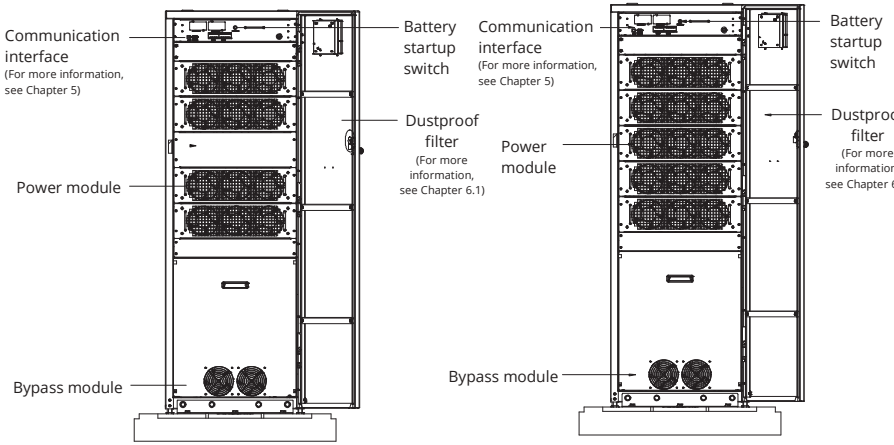


Figure 2-4: 100-120KS diagram

160KS/200KS Cabinet structure:



160K front view

200K front view

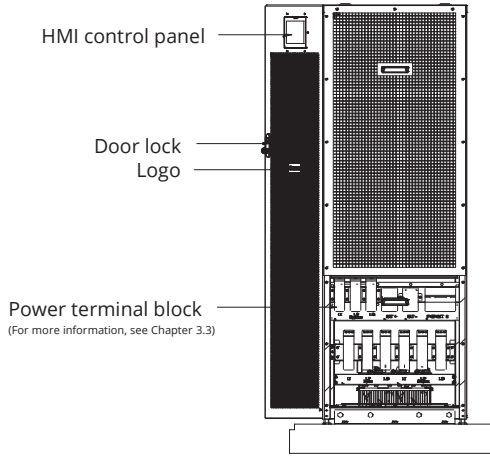


Figure 2-5: 160-200KS structure diagram

160KS/200KS Cabinet dimensions:

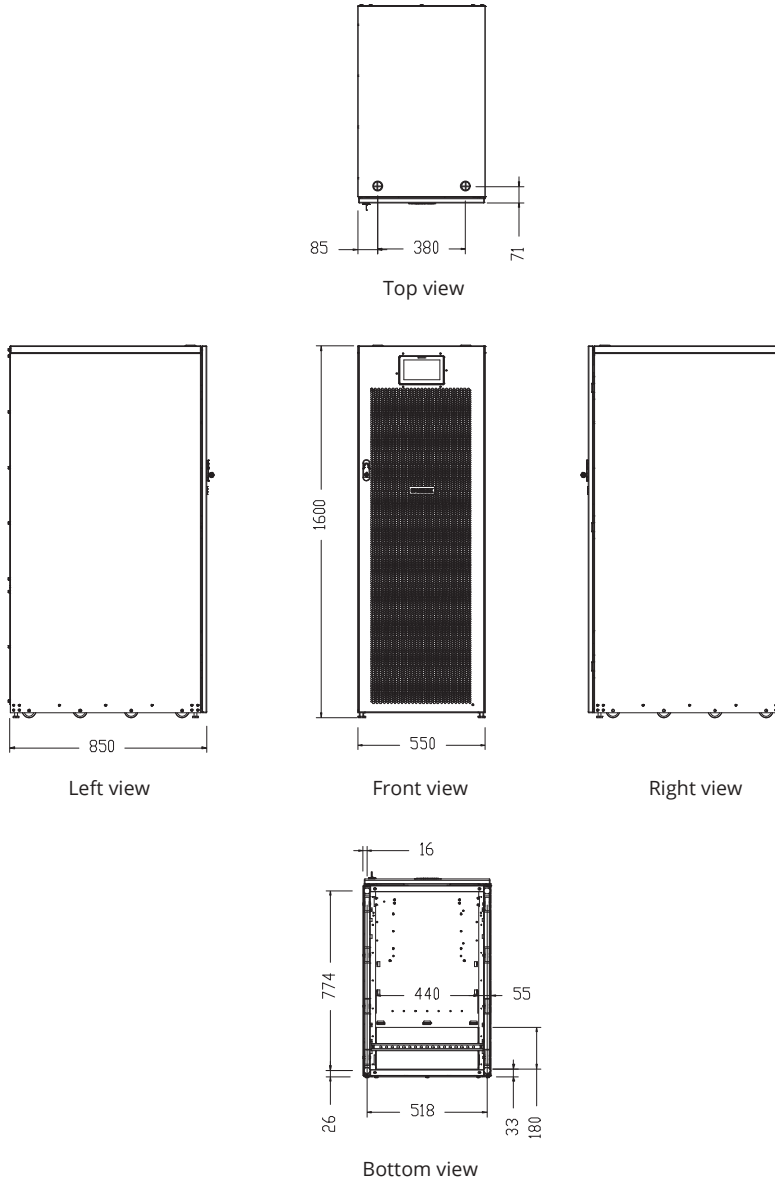


Figure 2-6: 160-200KS diagram

Chapter 3 Installation

3.1 Precautions

1. The installation of the 3C3 HD series UPS products must be performed by professional personnel in compliance with the electrician law.
2. The UPS shall be installed in a clean, stable environment free of vibration, dust, high humidity, flammable gases, flammable liquids, or corrosive substances.
3. The ambient temperature of the UPS shall be controlled within 0–40°C. If the ambient temperature exceeds 40°C, the UPS should be de-rated by 12% for every increase of 5°C in the temperature. The maximum ambient temperature should not exceed 50°C as UPS operating with loads in high-temperature environments for a long time will result in the reduction of the battery life.
4. It is suggested that the battery packs be used at a temperature within the range of 20–25°C.
5. The UPS altitude shall not exceed 1,000 meters (3,300 feet) to ensure normal operation of the system. If the altitude exceeds 1,000 meters, use the UPS at a reduced capacity according to provisions of IEC 60146-1-2. If customers will use the equipment above 2,000 meters, please call the Santak local distributors for more information.

3.2 Installation space

The 3C3 HD series uses forced cooling with front-facing fans. Ventilation issues must be considered for the installation site. Meanwhile, a maintenance space should be reserved to facilitate internal part maintenance, and the reference space for installation is provided below:

From Top of Cabinet	≧ 300mm of operating space*
From Front of Cabinet	≧ 900mm of operating space
From Back of Cabinet	≧ 600mm of operating space*
From Right Side of Cabinet	≧ 50mm of operating space*
From Left Side of Cabinet	≧ 50mm of operating space*

* If the customer needs a small rear clearance requirement (< 600mm), please contact our customer service:

* UPS maintenance is performed on the front and rear sides. Please refer to the table above for installation space, and reserve ≥ 850mm of cables to facilitate the forward movement of UPS during maintenance.

3.3 Position installation diagram of user power terminal

The standard model of 3C3 HD series UPS adopts dual feed. The power input configuration can be switched between dual feed and single feed on-site by the customer service engineer as required. All installation operations should only be carried out by Santak or Santak authorized technical personnel. Do not open the cabinet cover without authorization, as it may entail a risk of electric shock.

When the installation is planned and prepared, please carefully read and understand the following matters:

1. Before connecting to the UPS, a proper three-pole over-current circuit breaker should be installed in the power distribution system, with Phase A, Phase B, and Phase C disconnected, and Neutral switch is optional.
2. For single-phase current exceeding 100A, the air circuit breakers used must feature an arc-extinguishing device. It is suggested that clients be equipped with UL-listed D-curve air circuit breakers.
3. Positive/negative/neutral battery wire diameters: refers to the diameters of wires used to connect the UPS and the battery box. The positive wire is in red, negative wire in black, and neutral pole in blue.
4. The positive, negative, and neutral battery wires must be of the same length, and should not be longer than 40m.

100K/120KS wiring mode:

Terminals:

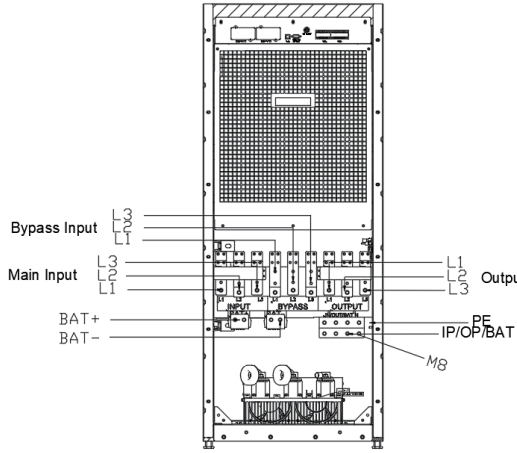


Figure 3-1:100-120KS Wiring diagram

160K/200K cabinet wiring:

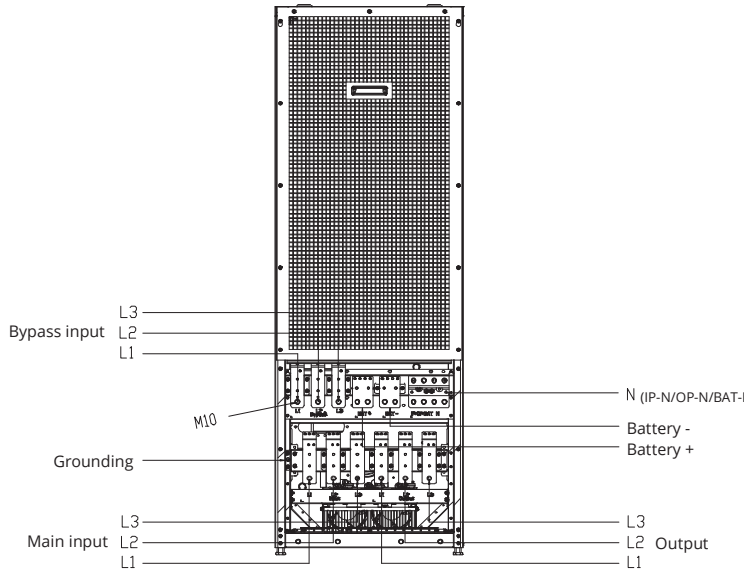


Figure 3-2: 160K/200K Wiring diagram

Precautions:

- Please make sure the input power is three-phase with 5 wires, and that the input voltage is within the allowable voltage range (see Appendix 1).
- Make sure the input power phase sequence is close-wise and battery polarities are correctly connected.
- In the case of connection with an external battery, an N wire shall be provided.

3.4 UPS wiring and protective devices

External batteries of 3C3 HD series UPS should be a group of battery packs (12V per cell, 32–44 cells, 36 cells by default) with the same capacity connected in series to positive and negative poles, and the battery voltage should be within 320V–607V. You can select the battery capacity and number of packs according to your needs. The battery packs must be equipped with a DC switch and DC fuse, and overload and line voltage should also be taken into consideration for wire diameter selection. Please refer to the table below for details:

Table3-1: 100/200K UPS

Rated Capacity	Cross-sectional area Refer to IEC62040-1	Unit				
		kVA kW	100 100	120 120	160 160	200 200
Input /Output Voltage		Volts	400/400	400/400	400/400	400/400
AC input to UPS rectifier Full load current plus battery charging current (3) Phases		Amps	165	198	264	330
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×70	1×95	1×120	1×150
	max	mm^2	1×120	1×150	1×185	1×240
AC input to UPS bypass (5 lines, double inputs) Full load current (3) Phases		Amps	176	211	281	351
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×70	1×95	1×120	1×150
	(3) Phases	mm^2	1×120	1×150	1×185	1×240
DC input from the battery to UPS (1) Positive pole line, (1) negative pole line, and (1) N line		Total Amps	332	399	532	665
Specification of wires (positive, negative, and N) (Quantity and size)	min	mm^2	2×70	2×95	2×120	2x150
	max	mm^2	2×120	2×150	2×185	2×240
AC output to critical load (5 lines) Full load current (3) Phases		Amps	145	174	232	290
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×70	1×95	1×120	1×150
	max	mm^2	1×120	1×150	1×185	1×240
Grounding	1.0 times					
Neutral wire (N) (AC mains/load) (nonlinear load)	1.7 times					

Table3-2: 100K/120 UPS External power supply terminal

Terminals Function	Terminals	Function	Bus landing	Tightening Torque Nm (lb in)	Bolt specifications
AC mains input to UPS rectifier	L1	A phase	(M8)	15 (133)	(M8)
	L2	B phase	(M8)	15 (133)	(M8)
	L3	C phase	(M8)	15 (133)	(M8)
	N	N	(M8)	15 (133)	(M8)
AC mains input to bypass	L1	A phase	(M8)	15 (133)	(M8)
	L2	B phase	(M8)	15 (133)	(M8)
	L3	C phase	(M8)	15 (133)	(M8)
	N	N	(M8)	15 (133)	(M8)
UPS output to loads	L1	A phase	(M8)	15 (133)	(M8)
	L2	B phase	(M8)	15 (133)	(M8)
	L3	C phase	(M8)	15 (133)	(M8)
	N	N	(M8)	15 (133)	(M8)
DC input	+	Battery (+)	(M8)	15 (133)	(M8)
	–	Battery (-)	(M8)	15 (133)	(M8)
	N	Battery (N)	(M8)	15 (133)	(M8)
User grounding	Ground		(M8)	15 (133)	(M8)

Table3-4: 160KS\200KS External Power Terminals

Terminals Function	Terminals	Function	Bus landing	Tightening Torque Nm (lb in)	Bolt specifications
AC mains input to UPS rectifier	L1	A phase	M10	28 (248)	M10
	L2	B phase	M10	28 (248)	M10
	L3	C phase	M10	28 (248)	M10
	N	N	M10	28 (248)	M10
AC mains input to bypass	L1	A phase	M10	28 (248)	M10
	L2	B phase	M10	28 (248)	M10
	L3	C phase	M10	28 (248)	M10
	N	N	M10	28 (248)	M10
UPS output to loads	L1	A phase	M10	28 (248)	M10
	L2	B phase	M10	28 (248)	M10
	L3	C phase	M10	28 (248)	M10
	N	N	M10	28 (248)	M10
DC input	+	Battery (+)	M10	28 (248)	M10
	–	Battery (-)	M10	28 (248)	M10
	N	Battery (N)	M10	28 (248)	M10
User grounding	Grounding		M10	28 (248)	M10

Table3-6: Recommended Input Circuit Breaker Ratings

UPS models	Circuit breaker ratings	
	Load derating	400V
3C3 HD–100kVA	100%	200A
3C3 HD–120kVA	100%	250A
3C3 HD–160kVA	100%	320A
3C3 HD–200kVA	100%	400A

Precautions:
To prevent fire hazards, please connect the UPS to a circuit with the maximum current rated by the input circuit breaker in the table above.

Table3-7: Recommended Bypass Bus Circuit Breaker and output Circuit Breaker Ratings

* Overcurrent protection switches for the bypass and output shall be provided by customers.

UPS models	Circuit breaker ratings	
	Load derating	400V
3C3 HD–100kVA	100%	210A
3C3 HD–120kVA	100%	260A
3C3 HD–160kVA	100%	340A
3C3 HD–200kVA	100%	420A

There is no DC disconnector available inside the UPS. If an external battery is installed, a battery disconnector (circuit breaker) should be installed between the battery and the UPS following local regulations.
The external DC input overcurrent protector and the remote position switch for disconnecting the battery are provided by the customer. The following table lists the ratings of circuit breakers rated for continuous operations.

Table3-7: Recommended DC Circuit Breaker Batings

UPS models	Circuit breaker ratings	
	Load derating	Rated current of battery (100-200kVA DC 432V)
3C3 HD–100kVA	100%	280A
3C3 HD–120kVA	100%	330A
3C3 HD–160kVA	100%	440A
3C3 HD–200kVA	100%	550A

3.5 Parallel Installation

The UPS supports parallel installation. Parallel connection wires (self-manufactured) can connect 2 to 4 UPS units in parallel to achieve capacity expansion or power redundancy (N+X). For transformer parallel connection, please consult our local service representative.

The bypass, input, and output of each machine should all be connected to a circuit breaker with the corresponding power.

The minimum clearance distance between two UPS units is 50cm. The input wiring requirements for each UPS unit are the same as those for a single unit. The input/output wires of each UPS unit should be connected to the same input/output patch board, from which wires are distributed for load. The figure below demonstrates the parallel wiring using the 120K cabinet as an example:

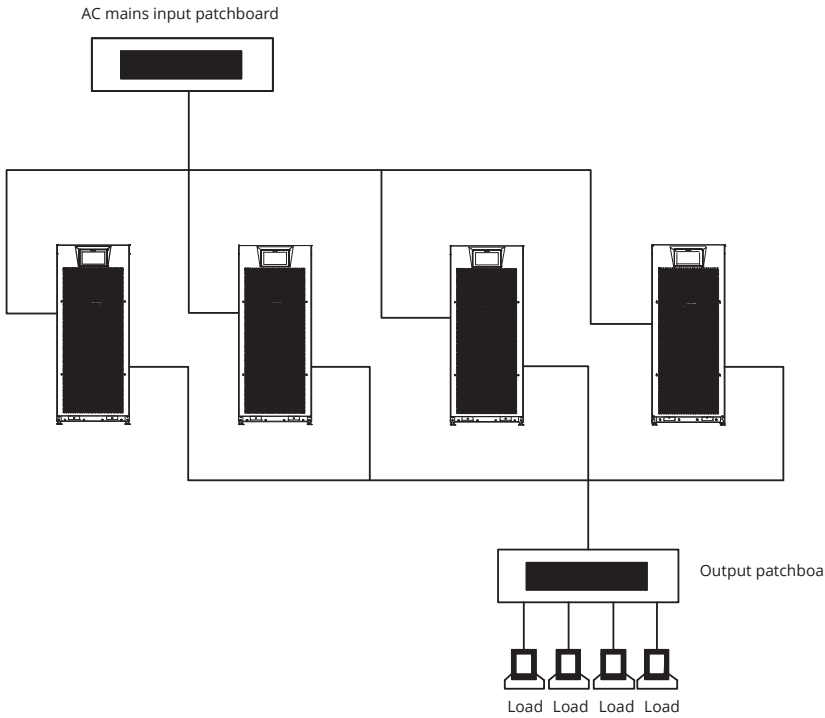


Figure 3-3: Parallel Installation

Description of parallel connection diagram:

Precautions:

- In a parallel system, the electric line from the input of each UPS to the common point of the AC power source shall be identical to that from the output to the common point of the load in length. The length shall meet the following regulations to ensure that the input resistance and output resistance of each UPS match each other, and resistance error shall be controlled within ±10%. The purpose is to ensure the current sharing of parallel UPS units. It's advised that the input and output cables of the parallel system are longer than 10m in total, 5m for input and output each.

  Total length 1A = 2A = 3A = 4A
  1B = 2B = 3B = 4B
  1C = 2C = 3C = 4C
- If only two UPS units are connected in parallel (redundancy), the above requirements are not mandatory, but the future expansion might be affected if the requirements are not satisfied.
- Ensure that the static bypass input of each UPS in the parallel system is the same common point, like an external bypass circuit breaker. If the rectifier input of each UPS in the parallel system is an independent distribution power supply, please consult our engineer to ensure the distribution compatibility.

For a detailed definition of terminal CN10 PIN, refer to Chapter 5 Communication Interface.

100K/120K single unit wiring

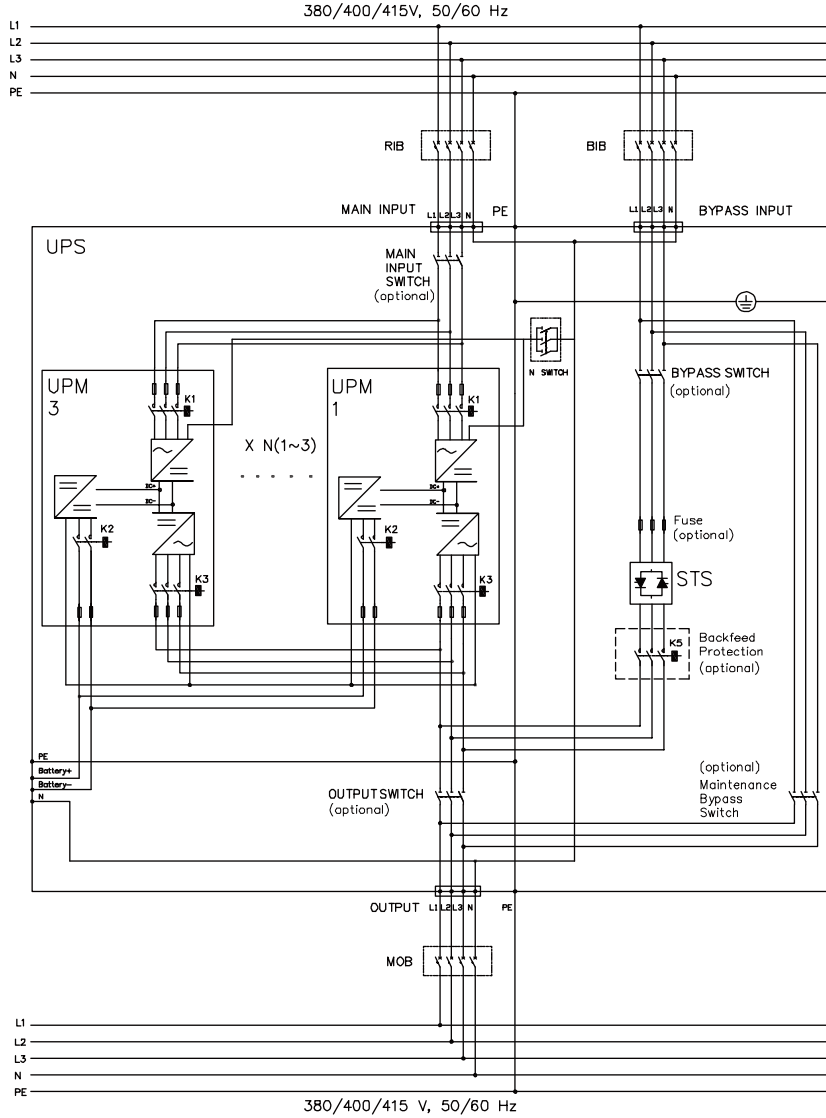


Figure 3-4: Single wiring diagram

160K/200K single unit wiring

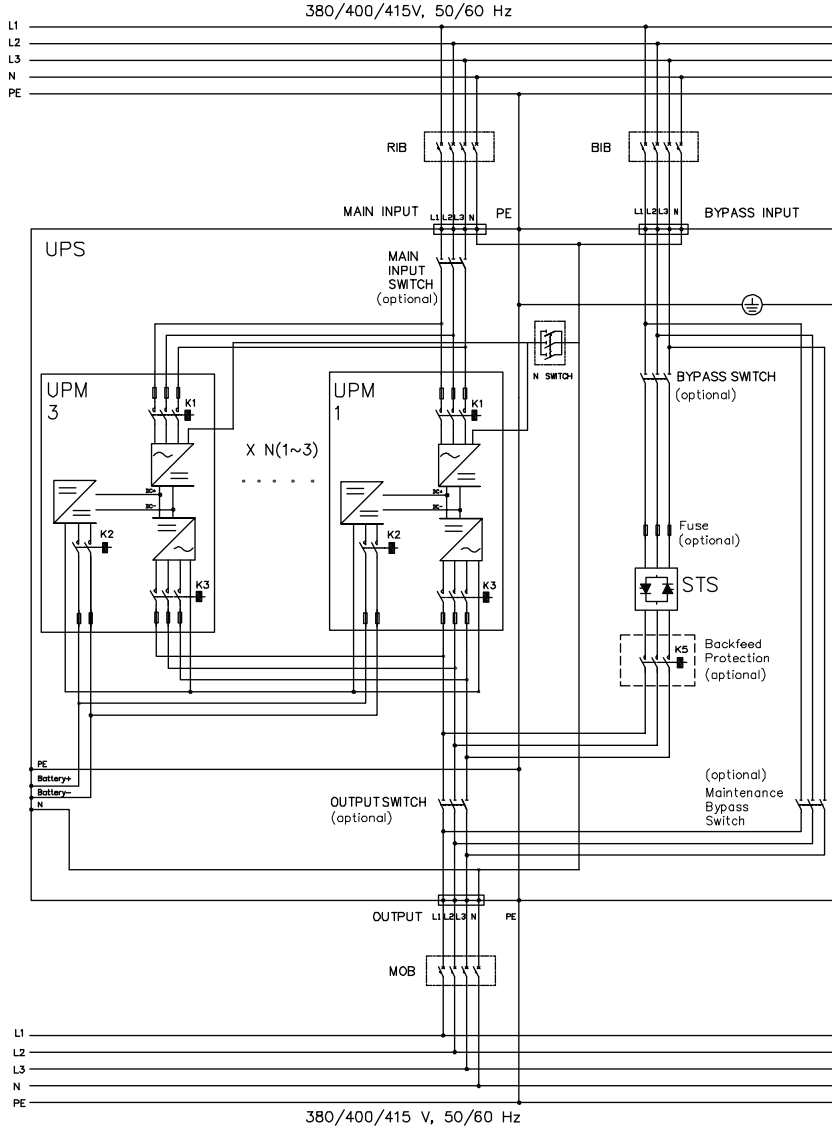


Figure 3-5: Single wiring diagram

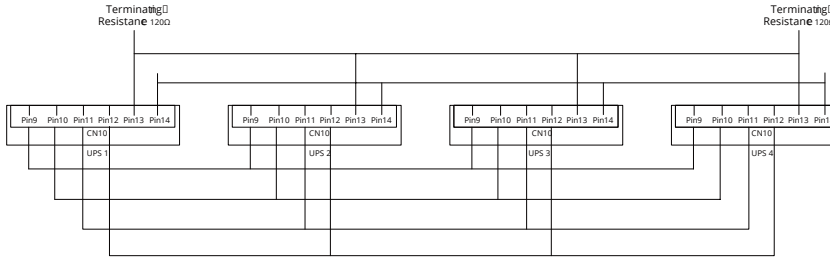


Figure 3-6: Parallel wiring diagram

3.6 Steps of connecting the battery box to UPS

A proper over-current circuit breaker should be installed between the battery cabinet and the UPS. To choose the right circuit breakers, please refer to the tables in the above section.

1. Make sure the input and output terminals are non-electrified.
2. Switch off the battery breaker of battery cabinet.
3. Remove the cover on the terminal block and connect the "+", "-", and "N" wires from the UPS terminal block to the "+", "-", and "N" wires of the battery box; make sure the battery polarities are correct.
4. 4. Use a multi-meter (DC Voltage) to measure the voltage of positive, negative, and neutral battery poles as well as positive and negative polarity, make sure the positive, negative, and neutral connections are correct, then put the cover back on the terminal block.

Precautions:

To prevent electric shock, the installation and replacement of the battery must be performed by professional personnel after the UPS is shut down.

Chapter 4 Procedure

4.1 Single-UPS operations

1. Make sure Phases A, B, and C are in the correct phase sequence, and then supply power to the UPS.
2. Turn on the battery (make sure that the battery "+", "-", and "N" terminals are correctly connected to the UPS terminal block).
3. Confirm the MBS is not closed and that the anti-maloperation lock is locked.*
4. Close the "Input Switch" and "Bypass Switch", and confirm that the fan is running to perform UPS self-test.*
5. Close the "Output Switch". *
6. Confirm that the screen display is normal, and the main menu is displayed automatically.

*: Models with switch

4.2 Use of Control Panel (HMI)

The control panel is located at the top of the front door of the UPS. Through the control panel, the UPS can be visually operated, providing convenient human-computer interaction (HMI) for UPS startup, shutdown, status display, fault alarm, parameter setting and other functions. After the UPS installation is complete, all user operations on the UPS can be done through the control panel. The control panel consists of a status indicator lamp and a HMI touch screen. The following sections describe the UPS control panel, status indicator lamps and ways to monitor the UPS operation.

Table4-1: Detailed introduction of status indicator lights:

Operation mode	No alarm	With alarm	Description
Battery mode	Green lamp flashes	Green lamp flashes	The UPS is in the "Battery" mode and the battery supplies power to the critical load.
Online mode	Green light on	Green lamp flashes	In the "Online" mode, the UPS operates normally and the power module supplies power to the critical load.
Bypass mode	Steady yellow	Steady yellow	When the UPS is in the "Bypass" mode, the critical load is powered by the bypass source.
Shutdown	Off	Red light on	The UPS is in the "Off" mode. If the UPS triggers an alarm, the red indicator is always on and the control panel displays the current active alarm.

4.2.1 System log

When the UPS system operates in the "Normal" mode, it monitors itself and the input AC mains power supply constantly. System logs are prompted through the buzzer, the status indicator, or the Home screen of the UPS.

Click on the alarm display area of the Home page to go to the current log interface where the alarms, notifications, or commands of all the current activities are displayed.

- Buzzer: The system event buzzer can generate sounds to remind the operator what is happening, and emit a sound when an alarm is given. The buzzer will become silent when the alarm is cleared. The operating cycle of the buzzer is 3 seconds, namely, it rings for 0.5 seconds and then stays silent for 2.5 seconds.
- System status lamp indicators: The status indicators on the UPS control panel inform the operator of the current status of the UPS in the form of lamps, similar to the event buzzer in function.

4.2.2 Touch screens

After the equipment is powered on, the touch screen displays the Santak welcome interface. Click on the welcome interface, and the startup password input interface is displayed if the equipment is started for the first time after leaving the factory (startup debugging must be performed by Santak's customer service engineers). Otherwise, the Home interface is displayed directly, as shown in the figure below.

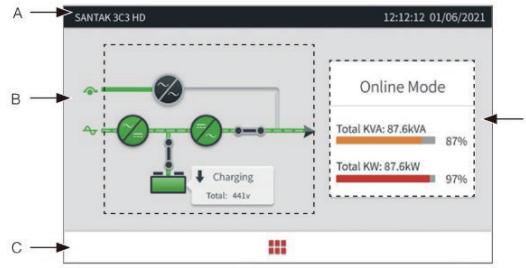


Figure 4-1: Home Interface

The LCD on the control panel provides an operating interface for the UPS system. The figure below shows touch screen components, which will be explained in the following chapters.

A. The UPS status area displays the Santak equipment model, the current date and time, and active alarm messages.

B. The energy flow chart area shows the energy flow status and operation of the UPS;

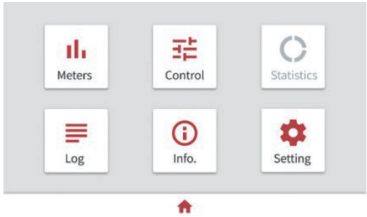
C. Click on the menu bar to go to the menu interface and view more UPS information;

D. The Meters area displays the current operating mode of the UPS, the total kVA and kW, and their respective percentages. Click this area to view the detailed three-phase data.

If there is no click on the screen for 10 minutes in any interface, the screen will automatically switch to the HOME interface, and meanwhile the backlight is turned off. Upon on a click on the screen, the backlight will turn on again.

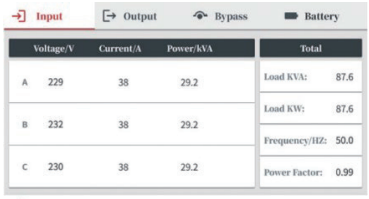
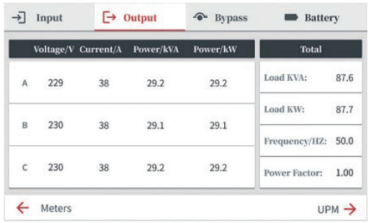
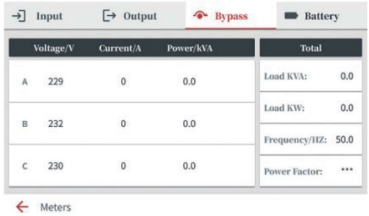
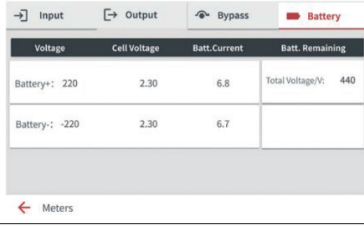
4.2.3 Menus

Click “” at the lower part of the Home page to go to the menu interface. The basic menu structure is shown in the table below：

Interface	Menu	Option description
	Meters	Display the measurements of the system or critical load
	Control	Access various system control screens
	Statistics	Access and view specific operating values of the system. Such operations shall be performed by Santak's service engineers.
	Log	Access the system logs, including alerts, notices and commands.
	Info.	Display the UPS and HMI information
	Setting	Access various screen control variables for system operation

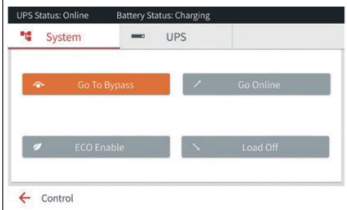
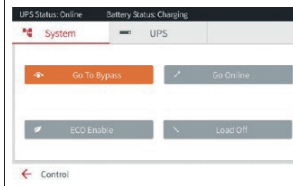
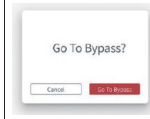
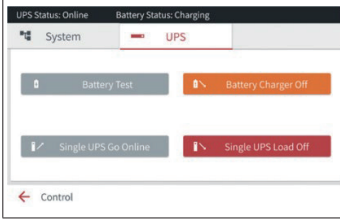
4.2.3.1 Meters menu

Click Meters interface in the menu to go to the Meters interface. The Meters menu structure is shown in the table below :

Interface	Menu	Option description
	Input	The "Input" screen displays the input voltage (per phase), input current (per phase), input power (per phase), total frequency, as well as total kVA, total kW, and measured power factor of the AC mains power supply.
	Output	The "Output" screen displays the output voltage (per phase), output current (per phase), output power (per phase), total frequency, as well as total kVA, total kW, and measured power factor of the AC mains power supply.
	Bypass	The "Bypass" screen displays the input voltage (phase voltage), input current (per phase), input power (per phase), total frequency, as well as total kVA, total kW, and measured power factor of the bypass.
	Battery	The "Battery" screen displays the battery voltage and cell voltage.

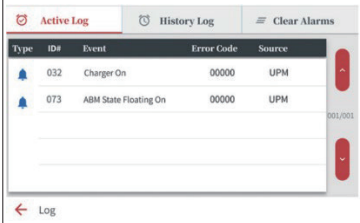
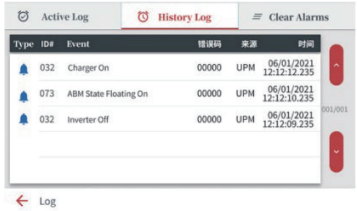
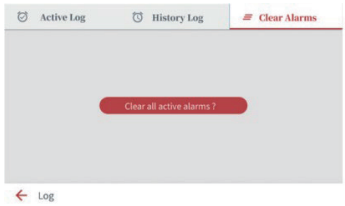
4.2.3.2 Control menu

Click Control in the menu interface, enter the initial control password "11111111", and click "OK". After the password is verified, click "Next" to go to the Control interface. The Control menu structure is shown in the table below.

Interface	Menu	Option description
	System	In the "System" interface, you can perform system-to-bypass switching, system startup, system shutdown, and ECO-enabling operations. In the upper part of the interface, you can view the UPS status and battery status. Method for switching the system to bypass mode: When the "Go To Bypass" button is not in grey, you can switch to bypass. 1. Click "Go To Bypass" to go to the bypass switching interface, as shown in the figure below.  2. Click "Go To Bypass" in this interface, as shown in the figure below.  3. Click "OK" button to switch to the bypass mode. It is the same for other button functions.
	UPS	In the "UPS" interface, you can perform battery test, battery charger turning on/ off, and single UPS startup/shutdown operations. When the button is gray, it indicates that this button is currently null. In the upper part of the interface, you can view the UPS status and battery status.

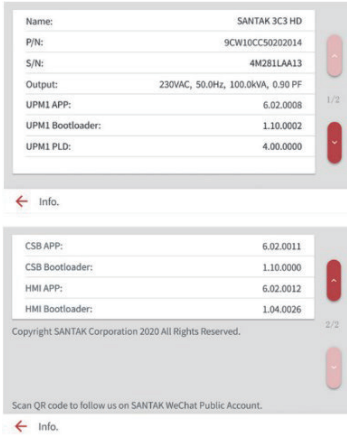
4.2.3.3 Log menu

Click the Log button in the menu interface to go to the Log interface. The Log menu structure is shown in the table below.

Interface	Menu	Option description
	Active Log	The "Active Log" interface displays all the current alarm messages of the UPS.
	History Log	The "History Log" interface displays all the historical alarm messages, up to 1,024 items on 205 pages.
	Clear Alarms	The "Clear Alarms" interface allows you to clear all the alarm messages in the current alarm interface.

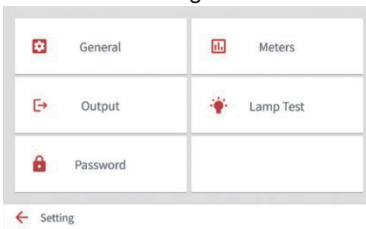
4.2.3.4 Info. menu

Click the Info. Button on the menu to go to the Info. interface. The "Info." interface displays the UPS name, serial number, UPM version number, HMI version number, and other information. The Info. menu structure is shown in the table below.

Interface	Menu	Option description
	Info.	The "Info." interface displays the UPS name, serial number, UPM version number, HMI version number, and other information.

4.2.3.5 Setting menu

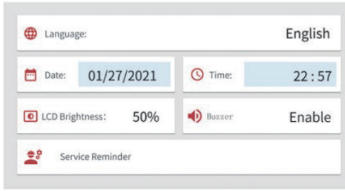
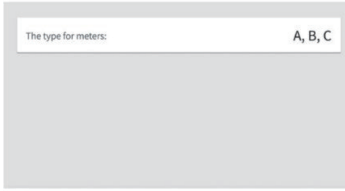
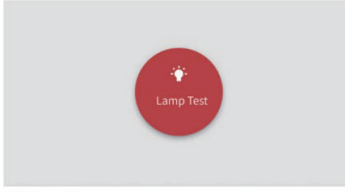
Click Setting in the menu interface, enter the initial password "01010101" and click "OK". After the password is verified, click "Next" to go to the Setting interface, as shown in the figure below.

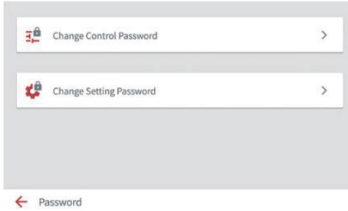
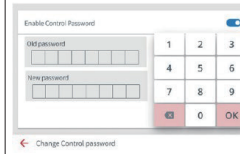
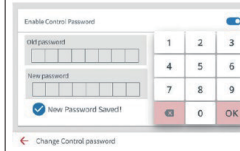


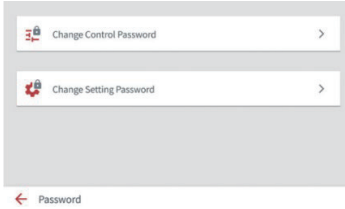
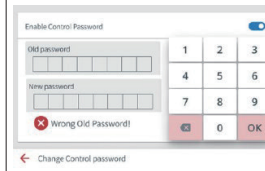
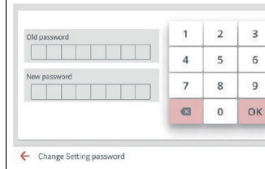
In the Setting interface, you can set the language, time, brightness, and output voltage and frequency, and modify the password. The Setting menu structure is shown in the table below.

Use of Log menu

Click the Log button in the menu screen to enter the Log screen. The menu structure of Log is shown in the following.

Interface	Menu	Option description
	Active Log	In the "General" interface, you can set the HMI display language, date, time, brightness, buzzer enabling/disabling, and service reminder. Click "Time" in the General interface to set the hour, minute, and second. Click "Save" to save the time settings. Click "Cancel" to go back to the "General" interface.
	History Log	In the "Parameters" interface, you can set the UPS measurement formats.
	Clear Alarms	In the "Output" interface, you can set the UPS output voltage and frequency.
	Lamp Test	In the "Lamp Test" interface, you can check whether those indicators on the touch control panel are normal.

Interface	Menu	Option description
	Password	In the “Password” interface, you can modify and set the control password. **The Change Control Password interface is used to modify the password for entering the control interface:** 1. Click “Enable Control Password” in this interface. 2. When the keyboard and password display box for modifying the control password are displayed, you can modify the control password.  3. Click the keyboard on the right side of the interface to enter the old and new passwords, then click "OK" on the keyboard. If the old password is verified, “New Password Saved!” will be prompted in the interface. 

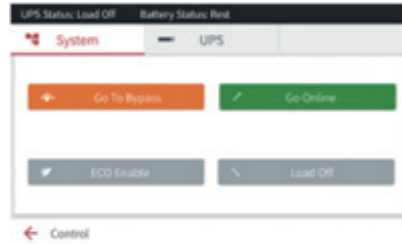
Interface	Menu	Option description
	Password	4. If the old password is incorrect, the interface prompts "Wrong Old Password", and you need to enter the password again.  In the “Password” interface, you can modify and set the control password. The Change Setting Password interface is used to modify the password for entering the setting interface: 1. When the keyboard and password display box for modifying the setting password are displayed, you can modify the setting password.  2. Click the keyboard on the right side of the interface to enter the old and new passwords, then click "OK" on the keyboard. If the old password is verified, "New Password Saved" will be prompted in the interface. If the old password is incorrect, the interface prompts "Wrong Old Password”, and you need to enter the password again.

4.2.4 HMI startup

Go to the Home page and click " ▦ " menu button:

Click Control to go to the control page:

Click "Go Online" on the control page to start-up:



4.2.5 Service reminders

When a service expires, the Home interface prompts "Service Maintenance reminders”, as shown in the figure below.

Service reminders include the following four types:

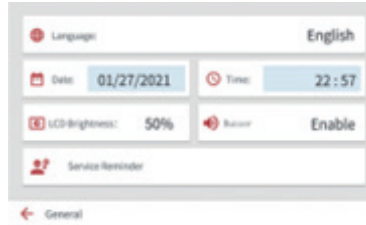
1. Preventive maintenance reminder
2. Battery replacement reminder
3. Capacitor replacement reminder
4. Fan replacement reminder

Click "Service Maintenance Reminder" to go to the following interface. Prompts in red indicate that those reminders have expired. Prompts in gray mean those reminders have not expired or have not been enabled.

If all four service reminders have expired, click "Dismiss for 6 months” or "Remind me 1 month later”, and then those four service reminders will be enabled again on the set date and time.

Click "About More" to see details about the prompt.

Users can set the service reminder function on the submenu under General, as shown in the 4.2.3.5 section.



Click "Service Reminder" to go to the following interface.

Click "Fan Replacement" to go to the following interface, where you can set the time interval of the service reminder and enable/disable the service reminder. If disabled, the reminder will not be displayed when it expires, and the timing will not be reset. If enabled, the reminder will be actuated when the set time expires. When the setting is completed and the “Save” button is clicked, the reminder date and enable/disable status will appear on the interface.
The operation method is the same for the other three service reminder pages.

The service reminder enters effect only after it is set up by a customer service engineer. To enable this function, please contact our engineers.

Chapter 5 Communication Interface

The 3C3 HD series UPS provides an expansion slot, a parallel interface, REPO and a special-purpose service monitoring and communication interface for Santak's technical personnel or technical personnel authorized by Santak.

Communication interface location:

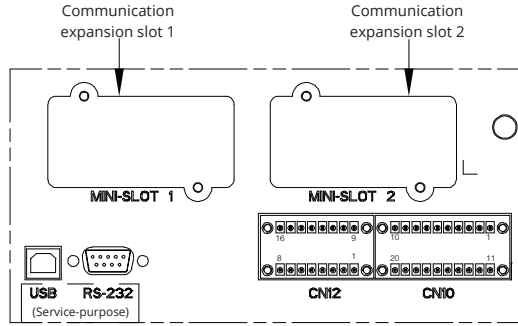


Figure 5-1: Communication Interface

- **Communication expansion slot:** The UPS has 2 communication expansion slots for installing MINI communication cards. MINI communication cards support quick and hot plugs. Please see section 6.5 MINI Communication Cards for other information.
- **CN10:** Terminal CN10 includes parallel CAN communication signal, Pull-Chain signal, and REPO signal.

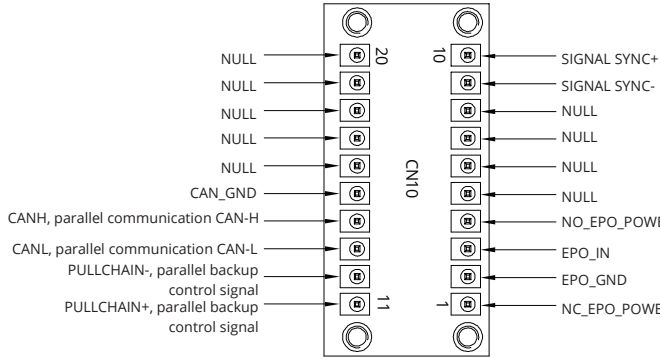
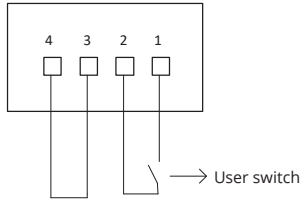


Figure 5-2 : CN10

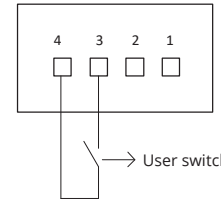
REPO external wiring:

CN10



Keep 3-4 connected by a short wire. Disconnect 1-2 to enable UPS emergency shutdown.

CN10



Close 3-4 to enable UPS emergency shutdown.
Keep 1-2 idle.

- CN12: This standard function can be used to connect the external alarm signal to the corresponding terminals of the UPS, such as a smoke alarm or overheat alarm signal. Please use twisted-pair wires to connect the external alarm device and the corresponding UPS terminals. For external alarm signal configuration, please consult Santak's service personnel.

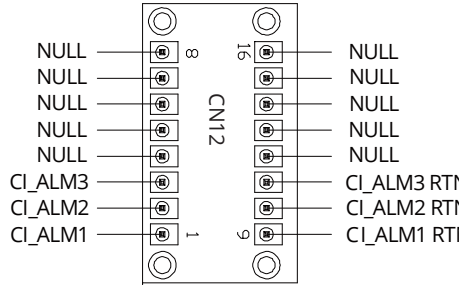


Figure 5-2 : CN12

- **CN12:** This standard function can be used to connect an external alarm signal to the corresponding interface terminal of the UPS, such as a smoke alarm or an overheating alarm signal. Please use twisted-pair wires to connect the alarm device and the corresponding UPS terminals. For the configuration of external alarm signals, you need to consult our company.

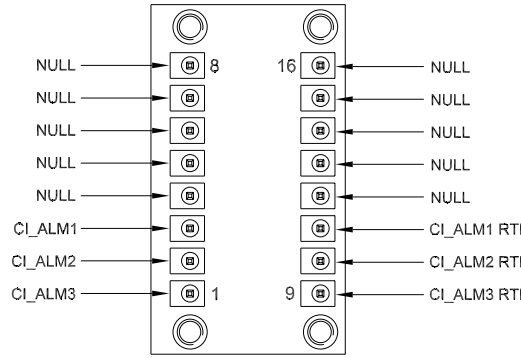


Figure 5-4 : CN12

For the use of the above communication interface, please contact our customer service.

Chapter 6 Optional Accessories

6.1 Dustproof filter

Dustproof filter is a standard accessory specially designed to significantly enhance the UPS's dust resistance in dusty environments (dust diameter no less than 1.0mm, especially metallic and metalloid dust). It is easy to install, replace, and clean.

6.2 Temperature sensor

The battery is a component of limited service life and is sensitive to temperatures. The temperature sensor can detect battery temperature changes and enable the function of temperature compensation for battery charging on the control panel so that battery charging voltage levels are adjusted automatically to prolong the battery life.

6.3 Single input power supply

The standard single feed 3C3 HD series can be upgraded to dual feed according to customer's needs by using an optional power jumper.

6.4 Anti-seismic components

For venues featuring higher reliability for mounting, anti-seismic components are adopted to enhance the stability of the unit. Anti-seismic components are suitable for ground mounting only.

6.5 MINI communication cards

3C3 HD provides a range of communication interfaces and connectivity options to support users' local control or remote monitoring. The MINI communication cards that match this UPS are listed below and can be purchased as needed:

Second-generation gigabit network card

The second-generation gigabit network card is the new-generation network communication card for connecting the UPS with Ethernet and the Internet. It has many novel features, enabling a remarkably increased network communication speed and a safer, and more reliable confidentiality protocol to provide emergency power-off, data saving, and other services to authorized IT personnel.

Industrial gateway cards

The industrial gateway card integrates many features of an SNMP card, such as the features of an SNMP agent, HTTP/web server, and a Modbus card. The card provides continuous, reliable, and accurate network monitoring of a UPS system through a Building Management System (BMS). The user can utilize customized features such as remote shutdown and removal, and receive UPS system prompts in real time without going to the scene in person.

Standard AS400/RS232 card (fittings with the main unit)

This card provides 2 types of interfaces through one DB9 interface. In dry contact mode, the UPS information is transferred to the alarm system, PLC, or computer system in a plain pattern through the dry contact relay point. The information sent under standard settings includes normal operation signal, bypass mode signal, battery mode signal, AC mains mode signal, battery fault signal, and battery low voltage signal. The RS232 mode provides an RS232 interface connecting to a personal computer or the UPS control display. A jumper is used to select the interface (drycontact or RS232).

Chapter 7 Transportation, Maintenance and Troubleshooting

Transporting the UPS

Prepare for transporting the UPS according to the following steps.

Note: Special equipment, such as a forklift, is needed for loading and unloading the UPS due to its heavy weight.

1. Turn off all equipment that is being powered by the UPS, and disconnect all connectors to the UPS terminal block.
2. Disconnect the UPS from the AC mains switch and battery pack.

Servicing and Maintenance

The preventive maintenance of the UPS system is more convenient to carry out. It includes regular inspection and maintenance. It is advised that such work is performed by professional maintenance personnel of the manufacturer to ensure that the equipment works normally and that the battery is in sound condition.

1. If the battery is disconnected, loads will not be protected from power failure.
2. Under normal circumstances, early replacement should be made if the battery is found not in good condition. The battery should only be replaced by qualified personnel. Users should not replace the battery themselves. The following precautions should be observed:
   - Turn off and disconnect the UPS from the AC mains before battery replacement.
   - Remove watches, rings, or other metal objects.
   - Use screwdrivers with insulated handles, and do not lay tools or metal objects on the battery. Otherwise, the battery can present a risk of electrical shock or explosion from a high short-circuit current.
   - Short circuit or reverse connection between the positive and negative terminals of the battery is strictly forbidden.
3. It is not recommended to replace batteries individually. All batteries should be replaced at the same time only by authorized personnel following the instructions from the battery supplier.
4. Keep the air inlets and outlets clear for proper ventilation and clean side frames and fan vents from dust every 6 months (disconnect the UPS from AC mains and turn off the battery before the cleaning).

Troubleshooting

Go through the following checklist if the UPS is operating abnormally:

1. Check if the input wiring of the UPS is connected correctly.
2. Check if any over-current circuit breaker has tripped.
3. Check if input voltage is within the specified limits.

Please refer to the following Table of Malfunctions for proper handling:

Operation mode	With an alarm	Solution
Battery mode	Green lamp flashes	Check whether the AC mains/bypass is normal.
Online mode	Green lamp flashes	Check whether the bypass/battery is normal.
Bypass mode	Steady yellow	Check whether the bypass/battery is normal.
Shutdown	Red light on	Check whether the system configuration is normal; and whether the AC mains/battery/ bypass is normal.
HMI black screen		When the screen sleeps, gently touch the screen with your finger.

- UPS model, CTO number, equipment batch number (S/N);
- The date when the fault occurred;
- A complete description of the problem (including indications from the HMI panel, lamp indicators, buzzer, power condition, and load capacity).

Chapter 8 WARRANTY

The product is warranted against defects in materials and workmanship for a period of twenty-four(24) months from its original date of purchase. The local office or distributor may grant a warranty period different to the above. Please refer to local terms of liability as defined in the supply contract.

The UPS manufacturer is not responsible for

- Any costs resulting from a failure if the installation, commissioning, repair, alternation, or ambient conditions of the equipment do not fulfil the requirements specified in the documentation delivered with the unit and other relevant documentation.
- Equipment subjected to misuse, negligence or accident.
- Equipment comprised of materials provided or designs stipulated by the purchaser.

The warranty is only valid if the installation inspection and initial start up of the UPS unit is carried out by a service engineer approved by Santak. Service and maintenance of the UPS shall also be performed only by a service engineer approved by Santak. Otherwise the warranty will be voided.

If the product fails to meet its published specifications due to a defect in material and workmanship, covered by this warranty, the seller will repair or replace the warranted product. Such repair or replacement will be made by Santak or by a service provider approved by Santak. Repair or replacement during the warranty period does not extend the original warranty. Warranty does not cover taxes, which will be due in connection with replacement or repair of the product.

Batteries are warranted against failures in material and workmanship, not against the normal aging and reduction of ampere-hour capacity. The product storage environment has to meet manufacturer's specifications, failure to do this will cause the warranty to be voided.

Under no circumstances shall the manufacturer, its suppliers or subcontractors be liable for special, indirect, incidental or consequential damages, losses or penalties.

The technical data, information and specifications are valid at the time of printing. The UPS manufacturer reserves the right to modifications without prior notice.

Appendix I Specifications

Model		3C3 HD-100K	3C3 HD-120K	3C3 HD-160K	3C3 HD-200K
Rated capacity		100KVA/100KW	120KVA/120KW	160KVA/160KW	200KVA/200KW
Input	Input type	3 phases + N wire + ground wire			
	Frequency	40-72Hz			
	Power factor	≥0.99			
	Mains Voltage Range	Rated 230/400Vac（Optional:220/380，240/415） 190/330 ~ 276/478Vac（-15%, +20%），under 100% load 116/201 ~ 276/478Vac（-50%, +20%），under 50% load			
	Bypass Voltage Range	Rated 230/400Vac (Optional: 220/380, 240/415) 195/338–264/458VAC (default rated voltage range ±15%, max. selection range ±20%)			
Output	Rated voltage	230/400 Vac, 3 phases + neutral wire + ground wire (Optional: 220/380, 240/415)			
	Power factor	1.0			
	Frequency Tolerance	Synchronous bypass frequency range of ±4Hz			
	Overload Time	60 min for 102-110% load, 10 min for 111-125% load, 1 min for 126-150% load, and 150 ms for >151% load.			
Operating environment	Ambient temperature	0-40℃			
	Storage Temperature	-5 ~ +55℃ (packing intact) For other storage conditions, please see storage requirements in the section on precautions.			
	Ambient humidity	5-95%, no condensation. The difference between the dry bulb temperature and the wet bulb temperature of the hygroscope shall always be at least 1 degree Celsius (1.8 degrees Fahrenheit) to achieve a condensation-free environment.			
	Altitude	The altitude of UPS during normal operation shall be not more than 1,000 meters (3,300 feet). If it exceeds 1,000 meters, it shall be reduced in accordance with GB/T 3859.2. If the customer operates the UPS in more than 2,000 meters, please contact our company for more information.			
Battery voltage range		320V ~ 607V			

Weight	Net weight	167kg	167kg	257kg	282kg
	Gross weight	211kg	211kg	306kg	331kg
Cabinet Dimensions(WxDxH)		500*850*1230	500*850*1230	550*850*1600	550*850*1600
Shipping Dimensions(WxDxH)		800*1100*1407	800*1100*1407	800*1100*1780	800*1100*1780
Safety standard		IEC 62040-1			
EMC		IEC 62040-2			
		Warning: This product is intended for commercial and industrial application in secondary environments. Installation restrictions or additional measures may be needed to prevent disturbances.			

* For non-default battery configurations, please confirm with the Santak local distributors.

Appendix II Harmful Substances

Component name	Harmful substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Batteries	×	○	○	○	○	○
Printed circuit assembly	×	○	○	○	○	○
Power cord outlet terminal	×	○	○	○	○	○
Box hardware	×	○	○	○	○	○
Switches/circuit breakers	○	○	×	○	○	○

This table is formulated according to SJ/T 11364.

×: Indicates that the content of the harmful substance in all homogeneous materials of the component is below the limit specified in GB/T 26572.

○: Indicates that the content of the hazardous substance in at least one homogeneous material of the part exceeds the limit requirement specified in GB/T 26572.

Exemption clauses of environment-friendly use period: The specific environment-friendly use period is only in line with the corresponding laws and regulations of the People's Republic of China, and does not mean that our company provides guarantees or bears any obligations to customers. During the environment-friendly use period, it is assumed that the customer will use the product under normal conditions according to the User Manual. The environmental service life of some assemblies of this product (for example, assemblies with batteries) may be lower than the environmental service life of this product.

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