# CASTLE EX SERIES
# USER MANUAL

SANTAK®

Thanks for choosing Santak products!

All warnings and operation instructions in the manual and on the machine should be strictly followed，and this user manual should be kept properly for future reference. Do not attempt to operate the UPS until reading through all safety information and operating instructions of this manual carefully.

This manual applies to the Castle EX series products, including:

3C3 EX 20KS/3C3 EX 20KS-ISO

3C3 EX 30KS/3C3 EX 30KS-ISO

3C3 EX 40KS/3C3 EX 40KS-ISO

3C3 EX 60KS/3C3 EX 60KS-ISO

3C3 EX 80KS/3C3 EX 80KS-ISO

# Solemn Statement

## Supervision Code Statement

To ensure consumer rights and safe electricity application, help you purchase authentic SANTAK UPS, the following items should be heeded:

1. Make sure of SANTAK® 山特®
2. SANTAK Electronics (Shenzhen) Co. Ltd. never grants authorization in any form to any company to manufacture UPS;
3. Labeled on all SANTAK is an “electronic supervision code” (“electronic supervision code” is a code of product identification advocated by SIQSAQ in order to strike at fake commodities).

Inquiry method:

Website inquiry: Access the website:www.95001111.com (Product Identification, Authentification and Tracking System) and input the supervision code;

Tel inquiry: Call 95001111 to check (you may call 010-95001111 and follow the instructions to enquire the identification);

Message inquiry: Send text message to 106695001111 (available to both China Mobile and Unicom);

Any questions, you may call the telephone number at 95001111 or log on to www.95001111.com. for further details or lodge your complaints.

## Copyright Statement

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Please access www.santak.com to download the latest version of product instructions.

# Safety Instructions

## Operation Safety

1. Prior to the application, please read “Safety Instructions” carefully to ensure correct and safe application. Please keep the user manual properly.
2. During operation, attention should be paid to all warning symbols and operations should be followed strictly as required.
3. Equipment is not supposed to be used in environment that directly exposed to the sunlight or raindrops or in humid environment.
4. The equipment should not be installed close to area of thermal sources or any area where there is presence of devices such as electric heaters and furnaces.
5. Make sure the safety space should be left for proper ventilation and product maintenance when placing UPS. Refer to the instructions during installation.
6. Dry and non-conductive items should be used for cleaning.
7. In case of a fire hazard, dry powder extinguisher should be used properly. Using liquid fire extinguisher may result in electric shock hazard.
8. Storey bearing capacity of machine and batteries should be taken into consideration prior to installation.
9. Using this device, please ensure that the load power is match with the rated power of UPS and the battery specifications.

## Prohibitions

1. There is high voltage presented inside the UPS, non-licensed company or technical personnel is not allowed to open the case cover arbitrarily, otherwise there might be a danger of electric shock and loss of warranty eligibility.
2. When applied to the following equipment, please contact the dealer or Santak in advance since there might be special requirements and design for the application, setting, management and maintenance:
   A. Precision industrial, scientific and medical instruments and equipment;
   B. Equipment that might endanger physical safety such as elevator etc;
   C. Load equipment with large startup current and negative power;
3. Do not place battery to fire in order to avoid possible explosion.

## Electric Safety

1. Before electricity is switched on, make sure earthing is properly done and wire and battery polarity are correctly connected.
2. Battery protection device must be configured with over-current breaker of rated specifications.
3. When UPS relocation or wire reconnection is necessary, AC and battery should be switched off and UPS should be completely turned off, otherwise there might be a danger of electric shock because output terminal might be still electrified.
4. Please use Santak specified appendix devices and accessories.
5. Prior to connecting the power distribution system to the UPS, make sure the rated quadrupole over-current breaker is installed to break off all the input lines and thus prevent a risk of electric shock.

## Battery Safety

1. Battery service lifetime will be shortened as ambient temperature rises. Replace batteries periodically to guarantee normal UPS performance and sufficient back-up time.
2. Only personnel with proper expertise can carry out the maintenance of accumulator batteries.Replacement of accumulator batteries requires a match of same type and model with equal quantity.
3. As accumulator batteries may contain potential electric shock and short-circuit current danger, to avoid accidents that might be thus resulted, the following warnings should be observed during battery replacement:
   A. Do not wear watches, rings or similar metallic items;
   B. Use insulated tools;
   C. Put on rubber shoes and gloves;
   D. Do not place metallic tools or similar metallic parts on the batteries;
   E. Switch off load connected to the batteries before dismantling battery connection terminals.
4. Do not expose accumulator battery to fire in order to avoid possible explosion that might endanger physical safety.
5. Non-professionals are not allowed to open or destroy accumulator batteries for electrolytes in batteries contain strong acid and other dangerous substances which will cause damages to both human skins and eyes. Should electrolytes come into any contact with human body unintentionally, rinse with clean water and seek medical advice.

6. Do not cause battery positive and negative polarity short circuit otherwise electric shock or inflammation may occur.

## Maintenance

1. Working environment and storage means can affect the service term and reliability of this product to some extent. Therefore, the product is not suitable for performance in the following environment:

A. Locations where temperature exceeds the maximum or goes below the minimum temperature as required by technical specifications or humidity is improper (temperature range: 0-40℃ ; relative humidity range: 0-95%).

B. Locations where vibration and collision are constant;

C. Locations where metallic dusts，corrosive substances as well as salts and inflammable gases are present.

2. For long-term inaction, UPS (without batteries) should be kept in dry environment with temperature ranging from -25-55℃ . Before start-up, ambient temperature should be brought back to 0 or above for a certain period of time (above 2 hours).

3. Keep good ventilation; otherwise, it will lead to internal temperature rise, shorten the lifetime of the components and thus shorten the lifetime of the UPS.

4. For long-term inaction, the battery should be charged once every three moths in normal temperature environment and once every two moths in high temperature environment with no less than 10 hours; no-load discharge is not allowed, and the battery continuous discharge time should not exceed 14 hours.

# Contents

# Chapter 1 Brief introduction

## 1.1 Product introduction

Castle EX Series products are high-efficiency and high-performance, double conversion, pure-online and three phase input and three phase output UPS.This series provides perfect solution for power source protection and successfully solves problems such as blackout, boost, brownouts, sags, decaying, oscillation, high voltage impulse, voltage fluctuations, surges, harmonic distortion, disturbances, frequency fluctuation etc, So that products can be widely used in computer equipment, communications equipment and other controlling equipments, and under the impact of the load for a particular election can be installed accessories to deal with complex industrial environment. Therefore, Castle EX Series products can be applied in a diversified multi-industries field such as telecommunications, financing, transportation, government, manufacturing and energy sectors.

Manifold function of Castle EX series products to provide high-quality power supply guarantee for your device:

- Advanced DSP digital control technology to effectively improve product performance and system reliability
- N + X parallel redundancy ( support sharing batteries in parallel)
- Excellent performance of industrial environment protection
- Economy and security of ECO mode of operation allows UPS efficiency of more than 98%
- High-definition LCD interface for human-machine interaction, intuitive and convenient operation
- Powerful communication interface and remote monitoring
- Abundant optional accessories, can be flexibly configured according to actual demands.

## 1.2 Frequently used symbols

The following symbols will be frequently used in this User Manual as well as in the process of actual application; therefore, correct identification and understanding of their connotations prove necessary.

| Symbols and Indications | |
|---|---|
| Symbol | Description |
| ⚠ | Attention |
| ⚠ | Dangerous high voltage |
| ~ | Alternating current(AC) |
| ⎓ | Direct current(DC) |
| ⏚ | Grounding Protection |
| ♻ | Recycle |
| | Do not dispose with sundries |

# Chapter 2 Exterior appearance

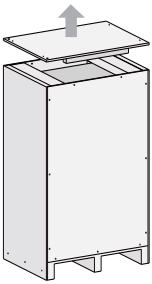
## 2.1 Unpacking inspection

1. Unpack and there should be:
1) UPS
2) Winpower Disc
3) Accessories including user manual、RoHS card and two keys of the door

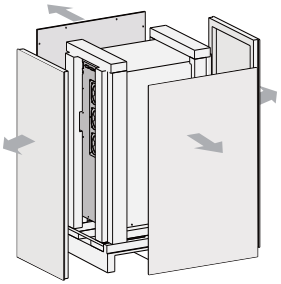
2. Check whether the UPS is damaged during the process of transportation or not. Should any damage be observed or parts be found missing, do not start the machine. Contact the forwarder and distributor immediately.

Note: Make sure that the heights of the door and some other obstacles are appropriate.

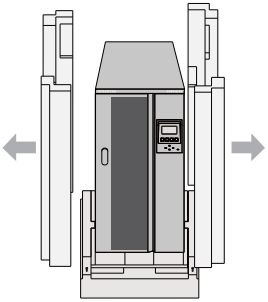
1)Remove the top cover plate by unlocking the wood screws with a sleeve.



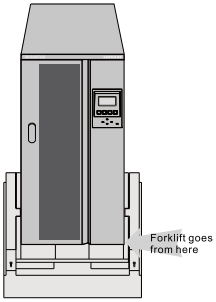
2）Remove the packing cardboards from the sides of the unit.



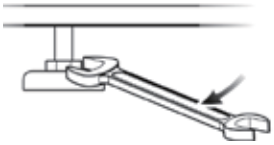
3）Remove the foam and plastic bag around the unit.



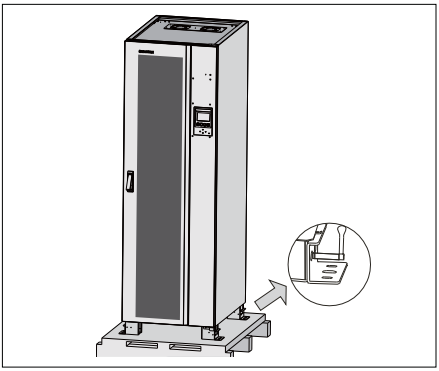
4）Move the frame smoothly from the pallet to the ground or the reserved position for installation with a forklift.

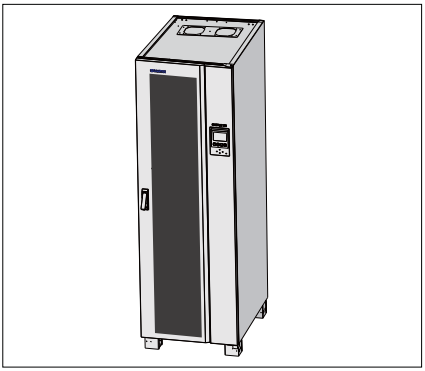



Note: 1) 3C3 EX 20KS/30KS/40KS and ISO models are provided with brake pads, rotate the wrench (NO.19) clockwise until the brake pad revolves to the ground, which can prevent the unit from moving.



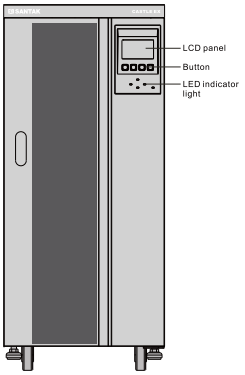
2) For 3C3 EX 60KS/80KS models, remove the iron brackets fixing the UPS with a wrench firstly, then move the frame smoothly from the pallet to the ground, and fix the UPS with the iron brackets again.



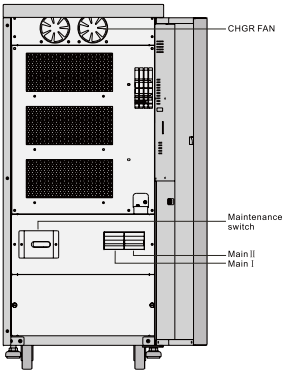


## 2.2 Exterior figure

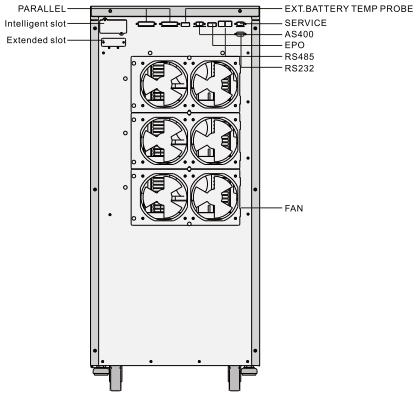
### Exterior figure of 3C3 EX 20KS/30KS/40KS UPS



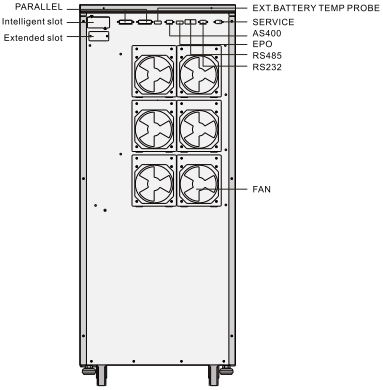

Front view




Front view(without front panel)

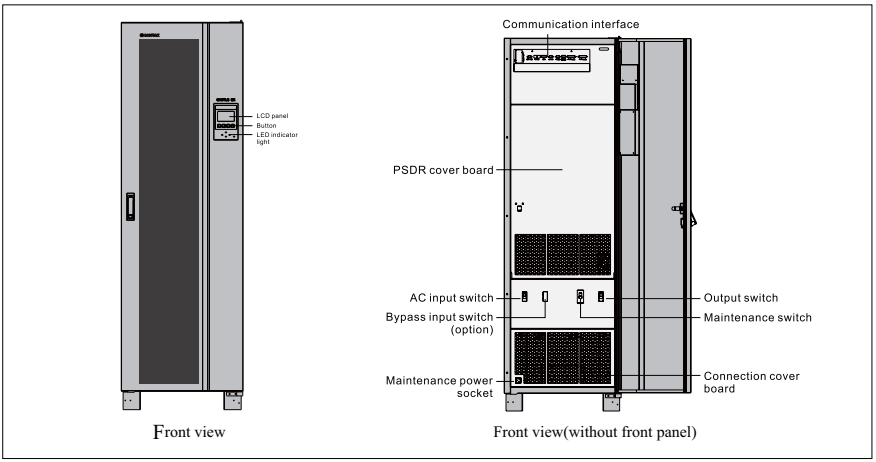



Rear view(3C3 EX 20K)



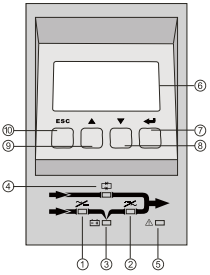

Rear view(3C3 EX 30KS/40KS)

**Exterior figure of 3C3 EX 60KS/80KS UPS**




## 2.3 Panel instructions

The LCD panel is the human-machine interface used to carry out the visual operations of the UPS, including the power-on, power-off, status display, fault alarm, parameter setting etc. And all the operations of the UPS can be realized through the LCD panel after installing the UPS. It consists of three parts: the LED indicators, LCD and function keys. Please refer to the table below for the description of the LED indicators and function keys.



Note: Please refer to Appendix 2 for detailed information of LED in accordance with the UPS status.

- Status LED Indicator: Display the current UPS operating mode or status.

| Identifier | LED Indicator | Color | Status |
|---|---|---|---|
| ① | AC | green | UPS is powered directly by AC |
| ② | Inverter | green | UPS is powering through the inverter |
| ③ | Battery | yellow | Line input fault, UPS is powering by batteries |
| ④ | Bypass | green | UPS is powering the load by AC through bypass |
| ⑤ | Fault | red | LED will solid on with continuous warning tone or flash with intermission warning tone in case of UPS abnormal function |

- LCD display screen—⑥：Display detailed UPS information

- Function Keys: selecting and opening menu items, accessing information and changing system parameters etc.

| Identifier | Key | Name | Function |
|---|---|---|---|
| ⑦ | ↵ | Confirm/ Enter | Select a menu or confirm an operation; confirm the present input password letter and enter the next password letter input process; back to the main menu from the status screen. |
| ⑧ | ▼ | Page Down | Switch to next screen display under the same menu. |
| ⑨ | ▲ | Page UP | Return to last screen display under the same menu. |
| ⑩ | Esc | Escape | Return to previous menu or cancel a certain operation; cancel the input password; back to the status screen from the main menu. |

# Chapter 3 Installation instructions

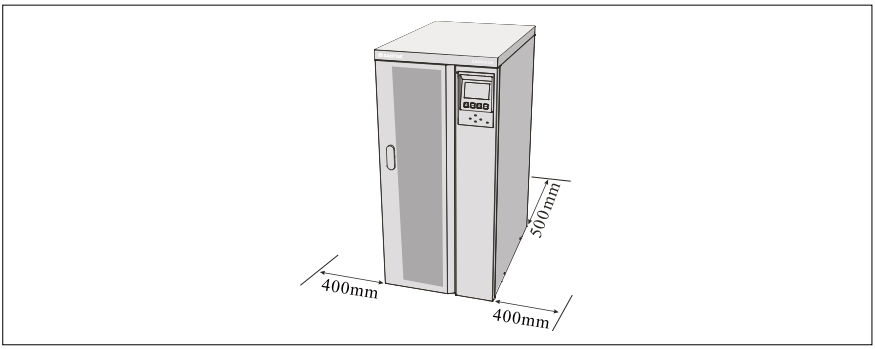
## 3.1 Installation Notice

1) The installation of Castle EX series products must be performed in compliance with the electrical code by professional personnel.
2) Install the UPS in a clean and stable environment that is free of vibration, dust, high humidity, flammable gas, and flammable liquid or caustic substance.
3) To ensure normal UPS performance, ambient temperature should range between 0-40℃. If temperature exceeds 40℃, maximum load should be decreased progressively by 12% of the rated amount along with every increase of temperature by 5℃. The maximum ambient temperature for normal UPS performance should not exceed 50℃.
4) It is suggested that battery pack should work within a temperature range from15℃ to 25℃.
5) Altitude for normal UPS function should not exceed 1000m. Should UPS be intended for application above 1000m, progressive decrease of rated output should be applied as listed in the following chart:

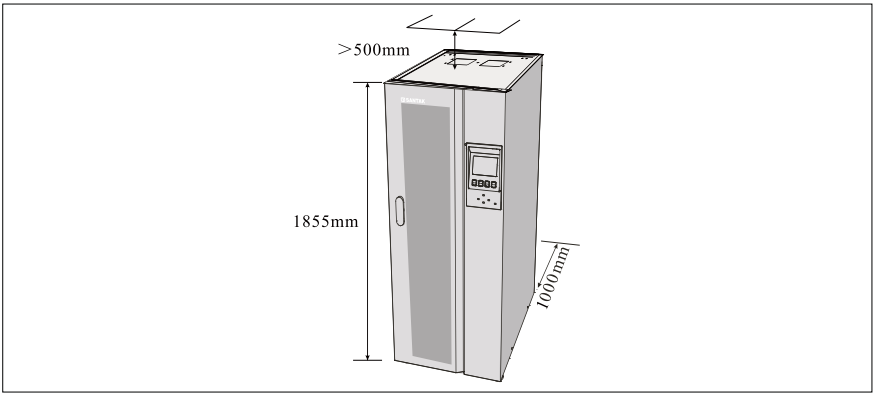
| Altitude(m) | 1000 | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 |
|---|---|---|---|---|---|---|---|---|---|
| Derating coefficient | 100% | 95% | 91% | 86% | 82% | 78% | 74% | 70% | 67% |

## 3.2 Installation space

3C3 EX 20KS/30KS/40KS series utilizes forced fan cooling and installation spot should make allowance for ventilation. Meanwhile, inside maintenance should be carried out from the front side and therefore maintenance space should also be considered in advance. Refer to the following figure for installation space:




3C3 EX 60KS/80KS series adopt the bottom air inlets and top air outlets to ensure good ventilation, do not put any sundries at the top of the UPS, and the ventilation spacing above the UPS should be no less than 500mm, otherwise the UPS internal temperature will rise dramatically. Do not install the UPS under the outtake of an air conditioner, otherwise, the water may drop into the UPS and thus cause UPS fault or a fire. There must be at least 1000mm of space reserved in front of and behind the UPS for internal and main power part maintenance,please refer to the figure below for installation space:

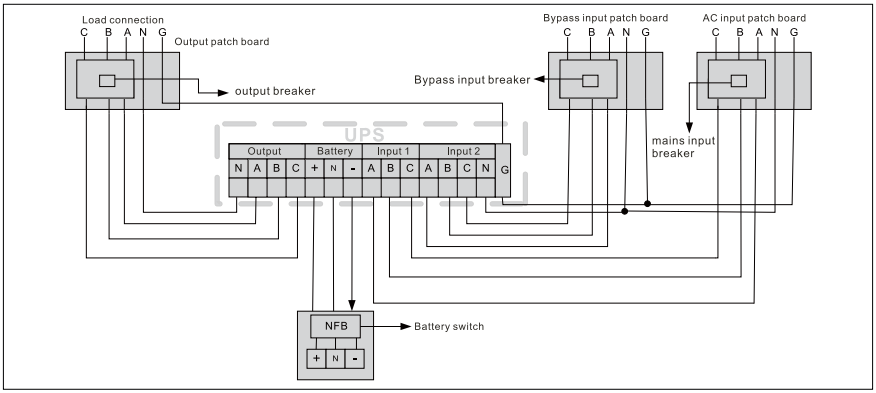


## 3.3 Installation and wiring connection diagram

3C3 EX 20KS/30KS/40KS standard models are integrated with dual power input, and 3C3 EX 60KS/80KS standard models with single power input. The switch between the single power and dual power supply can be carried out by customer service engineers according to customer’s request. All the operations should only be carried out by the technical personnel of the company or authorized by the company. Do not open the case cover arbitrarily; otherwise, electric shock may occur.

**3C3 EX 20KS/30KS/40KS wiring connection:**

**1. Wiring connection diagram:**




2. Single power input:

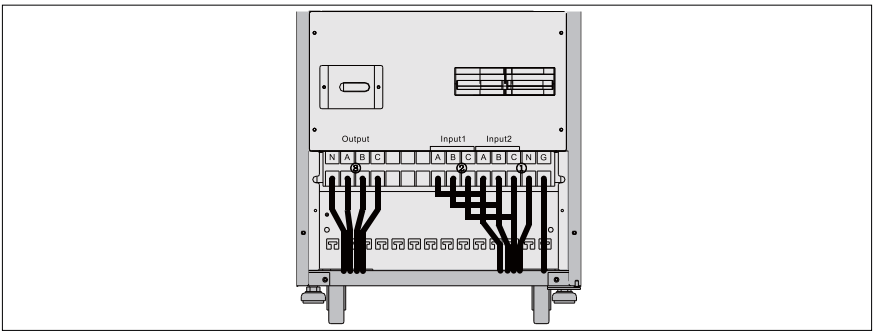
Only connect the AC (3Φ4W) to the Main 1.

(1)Ground wire should be connected to the UPS ground terminal;

(2)Connect the AC input cable to the terminal block ① ;

(3)Connect the AC three-phase input lines to the bypass three-phase input lines ②

(4)Connect the four load power wires to the terminal block ③




single power input(3Φ4W):20kVA~40kVA connection diagram

Notes:

- Please make sure that the input power is three-phase with 4 wires, and the input voltage is within the allowable voltage range (refer to Appendix 1).
- Make sure the input power is the positive phase sequence and battery polarities are correctly connected.

3. Dual power input:

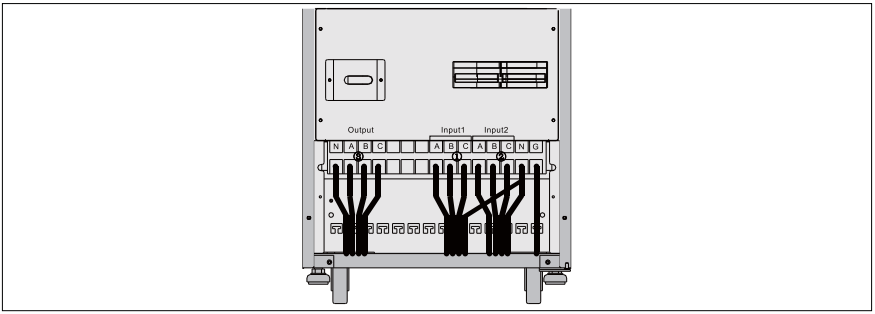
For dual power input, the conducting wire between AC input terminal and bypass input terminal must be removed firstly.

(1) Ground wire should be connected to the UPS ground terminal;

(2) Connect the four AC input wires to the terminal block ① ;

(3) Connect the four bypass input wires to the terminal block ② , N lines of the main 1 and main 2 are connected to the same terminal block;

(4) Connect the four load power wires to the terminal block ③



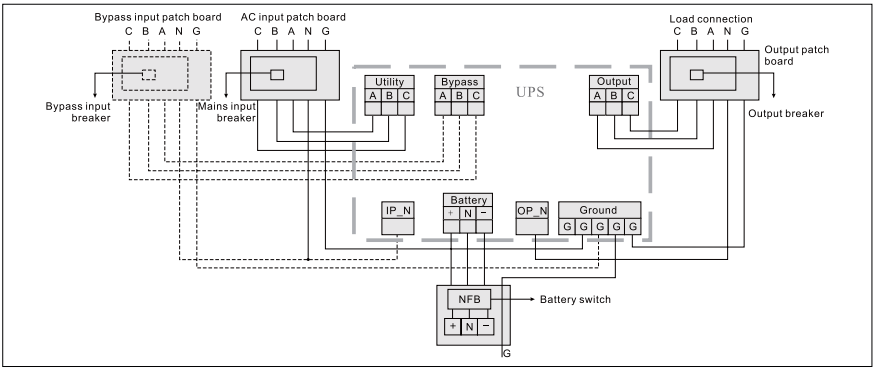

dual power input(3Φ4W):20kVA~40kVA connection diagram

Notes:

- Please make sure that the input power is three-phase with 4 wires, and the input voltage is within the allowable voltage range (refer to Appendix 1).
- Make sure the input power is the positive phase sequence and battery polarities are correctly connected.

### 3C3 EX 20KS/30KS/40KS wiring connection:

1. Wiring connection diagram:



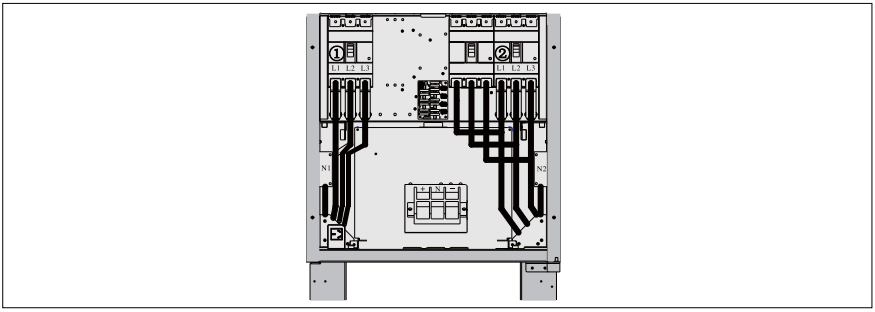

2. Single power input:

Only connect the AC (3Φ4W) to the main input terminal.

(1) Ground wire should be connected to the UPS ground terminal;

(2) Connect the AC input cable to the terminal block ① ;

(3) Connect the four load power wires to the terminal block ②




single power input(3Φ4W):60kVA~80kVA connection diagram

Notes:

- Please make sure that the input power is three-phase with 4 wires, and the input voltage is within the allowable voltage range (refer to Appendix 1).
- Make sure the input power is the positive phase sequence and battery polarities are correctly connected.

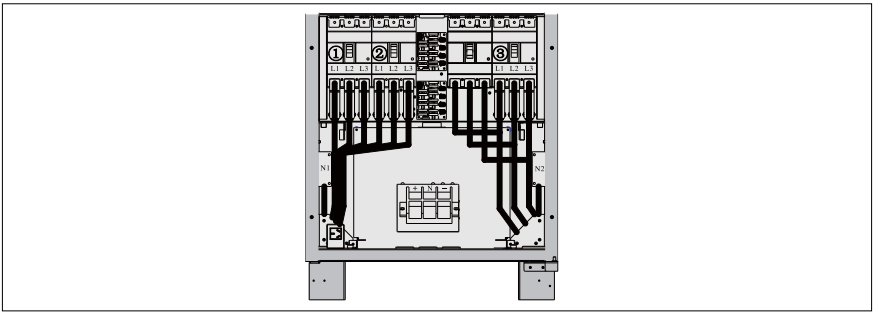
3. Dual power input:

Customers may choose the dual power input according to their needs, and the installation of the bypass input switch is carried out by the customer service engineers.

(1) Ground wire should be connected to the UPS ground terminal;

(2) Connect the AC input cable to the terminal block ① ,and the bypass input wire to the terminal block ② ;

(3) Connect the four load power wires to the terminal block ③




dual power input(3Φ4W):60kVA~80kVA connection diagram

Notes:

- Please make sure that the input power is three-phase with 4 wires, and the input voltage is within the allowable voltage range (refer to Appendix 1).
- Make sure the input power is the positive phase sequence and battery polarities are correctly connected.

## 3.4 Requirements of wiring cables and protect device for Castle EX series UPS

External batteries of Castle EX Series UPS require serial connect positive and negative of each group of 14-16 batteries (12VDC per battery) with the same capacity, nominal voltage for each group being168VDC-192VDC. Battery capacity and number of group can be selected at your option. Battery pack must be equipped with DC switch and input fuse, and overload and line voltage should also be taken into consideration for wire diameter selection. Please refer to the table below for details:

| Machine Model | Rated power | Input live wire diameter | Output live wire diameter | Battery positive /N negative wire diameter | Ground wire diameter | N wire diameter |
|---|---|---|---|---|---|---|
| 3C3 EX 20KS | 20kVA/16kW | 10AWG/ 6mm$^2$ | 10AWG/ 6mm$^2$ | 8AWG/ 10mm$^2$ | 8AWG/ 10mm$^2$ | 8AWG/ 10mm$^2$ |
| 3C3 EX 30KS | 30kVA/24kW | 8AWG/ 10mm$^2$ | 8AWG/ 10mm$^2$ | 6AWG/ 16mm$^2$ | 6AWG/ 16mm$^2$ | 6AWG/ 16mm$^2$ |
| 3C3 EX 40KS | 40kVA/32kW | 6AWG/ 16mm$^2$ | 6AWG/ 16mm$^2$ | 4AWG/ 25mm$^2$ | 4AWG/ 25mm$^2$ | 4AWG/ 25mm$^2$ |
| 3C3 EX 60KS | 60kVA/48kW | 4AWG/ 25mm$^2$ | 4AWG/ 25mm$^2$ | 2AWG/ 35mm$^2$ | 2AWG/ 35mm$^2$ | 2AWG/ 35mm$^2$ |
| 3C3 EX 80KS | 80kVA/64kW | 2AWG/ 35mm$^2$ | 2AWG/ 35mm$^2$ | 1AWG/ 50mm$^2$ | 1AWG/ 50mm$^2$ | 1AWG/ 50mm$^2$ |

| Machine Model | AC input breaker | Bypass input breaker | Battery switch | N wire switch | AC input fuse | Battery input fuse |
|---|---|---|---|---|---|---|
| 3C3 EX 20KS | 3 ϕ 50A/ 380VAC | 3 ϕ 63A/ 380VAC | 3 ϕ 125A/ 250VDC | 1 ϕ 80A/ 220VAC | 63A 690V | 30A 600V |
| 3C3 EX 30KS | 3 ϕ 63A/ 380VAC | 3 ϕ 80A/ 380VAC | 3 ϕ 150A/ 250VDC | 1 ϕ 100A/ 220VAC | 80A 690V | 30A 600V |
| 3C3 EX 40KS | 3 ϕ 80A/ 380VAC | 3 ϕ 100A/ 380VAC | 3 ϕ 200A/ 250VDC | 1 ϕ 150A/ 220VAC | 100A 690V | 30A 600V*2 |
| 3C3 EX 60KS | 3 ϕ 150A/ 380VAC | 3 ϕ 150A/ 380VAC | 3 ϕ 300A/ 250VDC | 1 ϕ 200A/ 220VAC | 100A 690V*2 | 100A 690V |
| 3C3 EX 80KS | 3 ϕ 175A/ 380VAC | 3 ϕ 175A/ 380VAC | 3 ϕ 400A/ 250VDC | 1 ϕ 250A/ 220VAC | 100A 690V*2 | 100A 690V |

Remark:

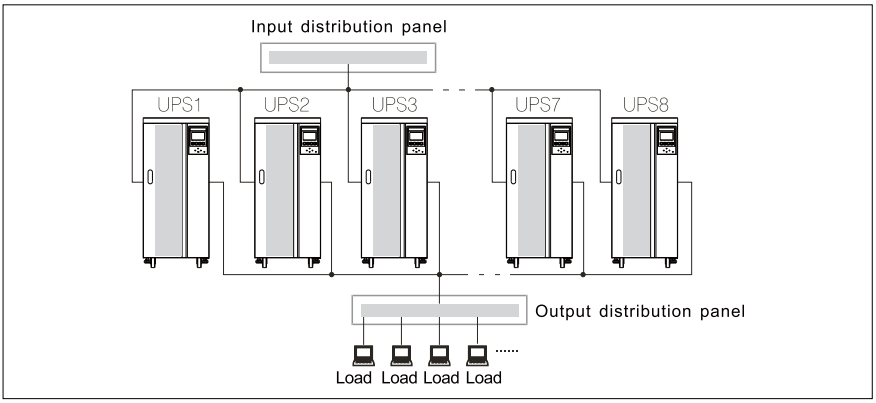
1. Prior to connecting the power distribution system to the UPS, make sure the rated triploid-pole over-current breaker is installed to break off all the input lines and the N line breaker can be configured individually.
2. When single-phase current exceeds 100A, switches of protective atmosphere should be equipped with arc control devices,It should be D-curve air switch with UL certification according to the customer requirement;
3. Battery positive/negative/N wire size: indicates UPS and battery bank wire size; red wire signifies the positive polarity and black wire the negative, while blue wire the neutral.
4. There should be the same length of the battery wires (positive, negative and N) of being no more than 40m.

## 3.5 Parallel UPS installation

1. Redundancy introduction

N+X is currently the most reliable power supply structure, in which N indicates the minimum UPS number required for the total load and X is the redundant UPS number, namely, the malfunctioning UPS number that the system can simultaneously bear. The larger X is, the higher reliability of system will be. For instance, if the total loads of a customer register 55kVA, we can use Castle 20KS for N+X design. With N taking up 3, X can be selected in accordance with reliability degree or cost requirement. Supposing customer selects X=2 and equalized UPS power supply is 11kVA for each unit, when one set of UPS breaks down with malfunction, the remaining four sets will provide power with almost 14kVA equalized current; if two sets of UPS fail, the remaining three sets of UPS are supposed to provide power supply with almost 18kVA equalized current. The maximum allowance of this system is for two sets of UPS going down at the same time, the chances of which are much smaller than those of one UPS malfunction. Therefore, the reliability degree can be largely enhanced, making it an optimal mode for application in locations where high degree of reliability is always a focus.

2. Castle EX Series UPS is capable of direct parallel connection, which only requires the parallel connection wires (optional) for 2 to 8 sets of UPS in parallel connection in order to realize power redundancy (N+X)(60KS/80KS support six sets of UPS parallel connection). Ventilation spacing between machine flanks should be a minimum of 10cm，input wiring for each set of UPS should follow the requirements for that of single unit. Each UPS input/output should be connected to the same input patch board, from which wires are distributed for load as illustrated in following figure:




Remark:

1）Common battery pack is applicable in parallel configuration; each battery pack should be of the same model and the same batch from the same manufacturer.

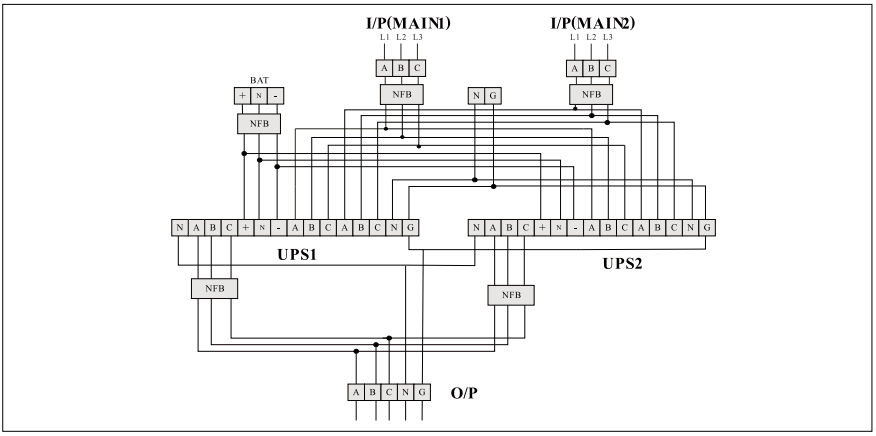
2) Requirement of output wiring length:

① When the lead from the output terminal of each set of UPS to the output patch board is less than 20m, wire difference should be less than 20%;

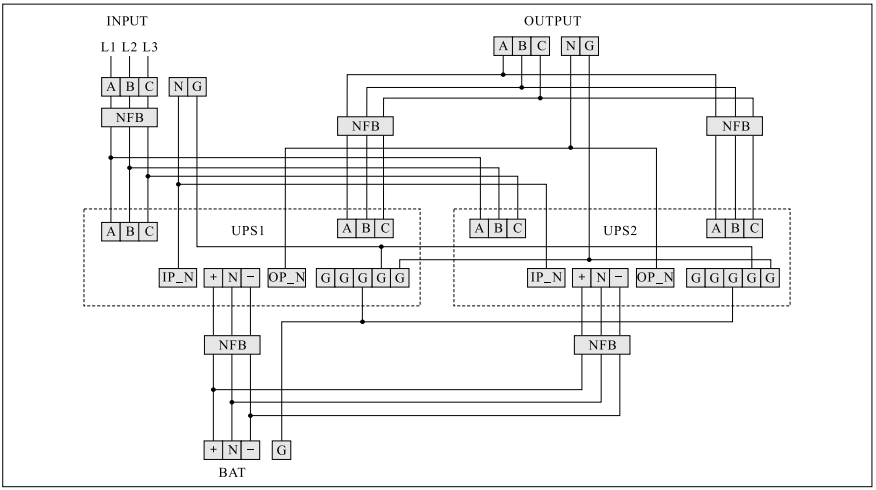
② When the lead from the output terminal of each set of UPS to the output patch board is longer than 20m, wire difference should be less than 10%.

3.Parallel machine wire connection drawing:

## 3C3 EX 20KS/30KS/40KS UPS




## 3C3 EX 60KS/80KS UPS



## 3.6 Procedures of connecting battery bank to UPS

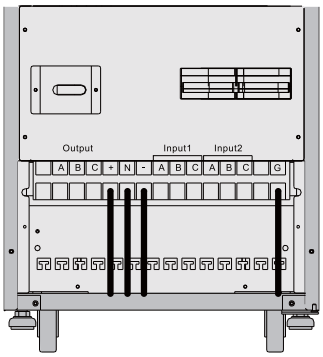
The rated over-current protection breaker should be installed between the battery bank and the UPS, please refer to the wiring table at the last section for the specification.

(1) Make sure that there are no voltages present on the input and output terminals, and there is no voltage output of the external battery socket;

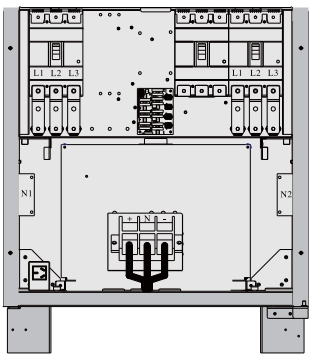
(2) Turn off the battery breaker;

(3) Remove the panel on the terminal bay and connect “+”, “N” and “-“ wires from UPS terminal bay to “+”, “N” and “-“ of the battery box; make sure the battery polarities are correctly connected;

(4) Use multimeter (DC Voltage) to measure the voltage of positive and negative batteries as well as positive and negative polarity, then close the cover of the terminal block.




3C3 EX 20KS/30KS/40KS battery connection diagram




3C3 EX 60KS/80KS battery connection diagram

Remark: Battery connection and replacement should be operated under the system shutdown, Non-professionals are not allowed to carry out the task otherwise electric shock may occur.

# Chapter 4 Operation

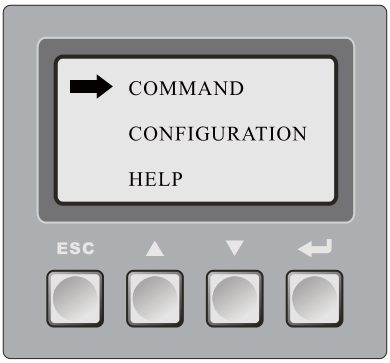
## 4.1 Single UPS operation

1. Make sure A, B and C phase sequences are correctly connected and then supply power to UPS.
2. Turn on the breaker of the battery bank (make sure that the “+”, “N” and “-” of terminal bay are in accordance with those on the output of the battery bank).
3. Switch on “input breaker” (Line input breaker: Main Ⅰ; bypass input breaker: Main Ⅱ; line input breaker for 60K/80K standard models) on the UPS and fans start to rotate for UPS self-inspection. Main menu can be accessed within about 4sec and then operations should be carried.

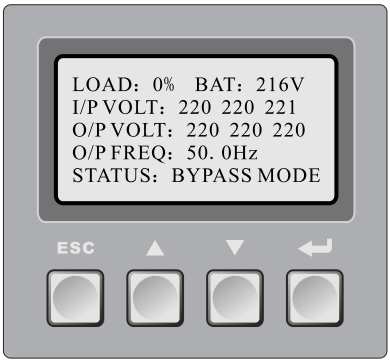
Remark: the following drawing takes 3C3 EX 20KS as an example and statistics are only for reference.

1) Power on

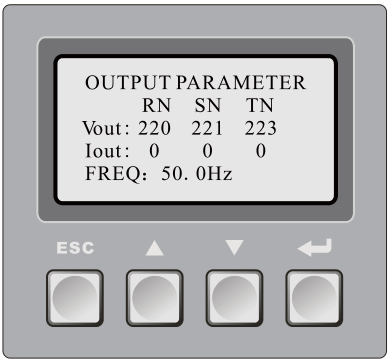

2) Automatic access within about 4s



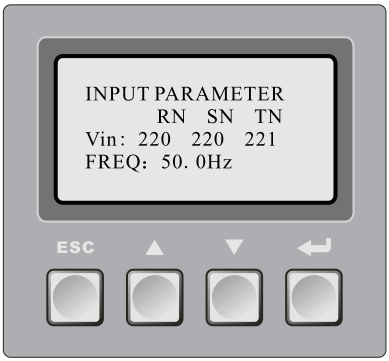
3) Press ESC to access or automatically access within 1min with no button being pressed



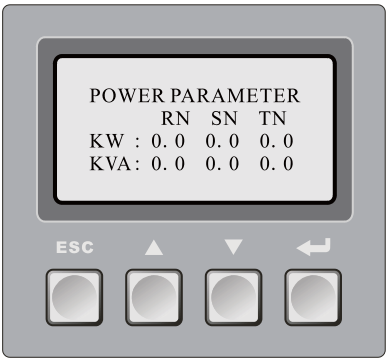

4) Press ▼ to obtain the below information



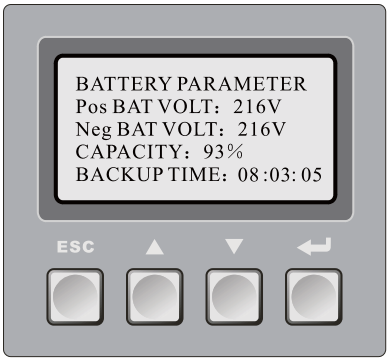

5) Press ▼ again to obtain the below information



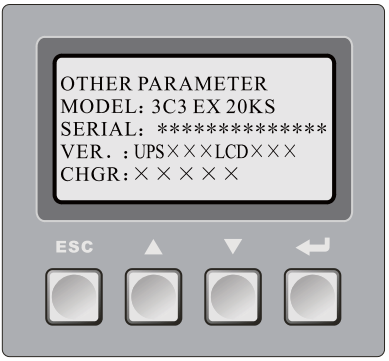

6) Press ▼ again to obtain the below information



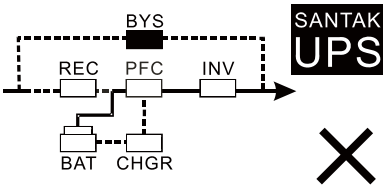
7) Press ▼ again to obtain the below information

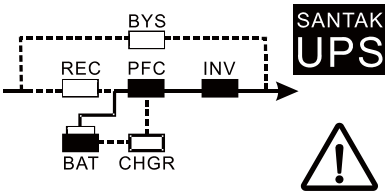



8) Press ▼ again to obtain the below information




Remark: when malfunction occurs, "x" will appear at the lower right corner of the picture while when warning occurs " ⚠ " will appear at the same position (as illustrated in the below picture with battery mode as an example).

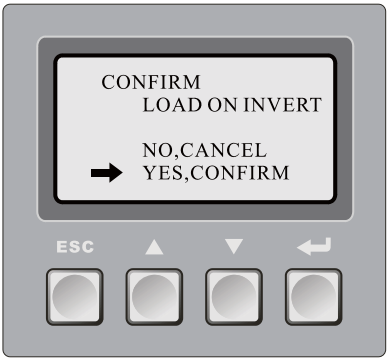



4. Start-up action (press ESC to exit the above picture)

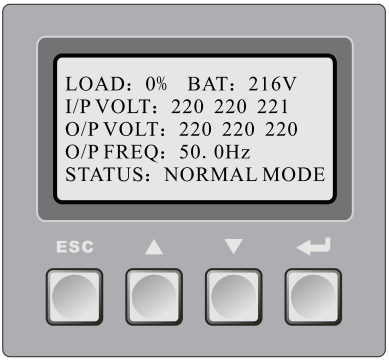
1) Switch-on picture


2) Press ENTER

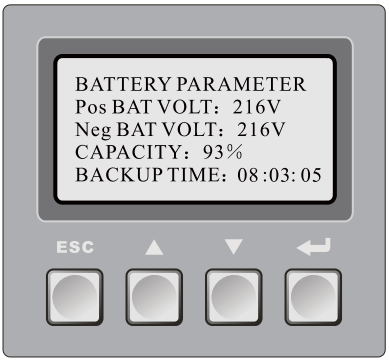


3) Select “Yes, Confirm” to switch on the machine


4) Normal Switch-on



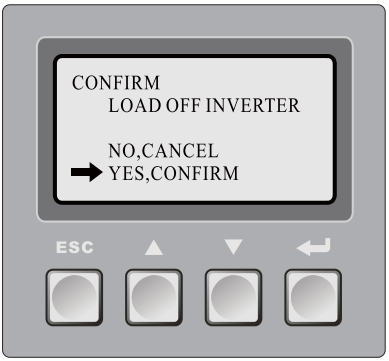

5) Battery power supply (switch off line input breaker)



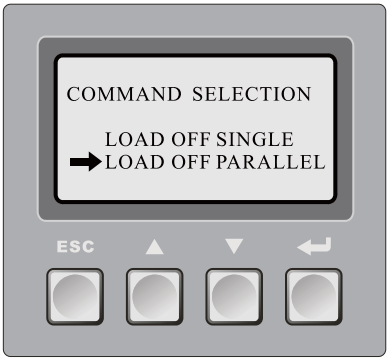

5. Switch-off action (press ESC to exit above picture)

1) Switch-off picture

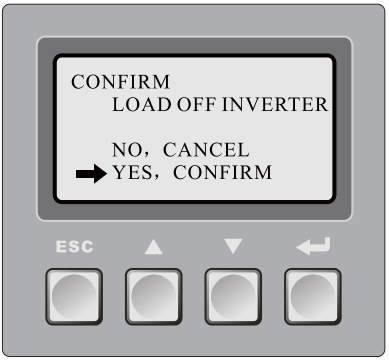

2) If it is in single machine mode, the following will appear




3) If it is in parallel machine mode, the following will appear




4) Press ENTER



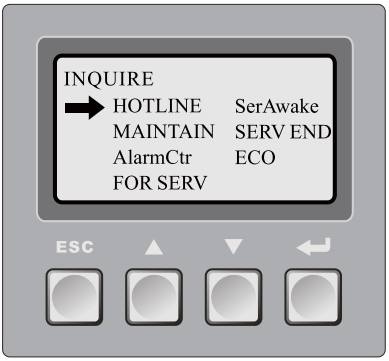

5) Select “Yes, Confirm” to switch off the machine

Remark: If you intend to switch off only one set of UPS among the parallel machine system, select “single machine switch-off”; if switch-off is intended for the entire parallel machine system, select “parallel machine switch-off”.

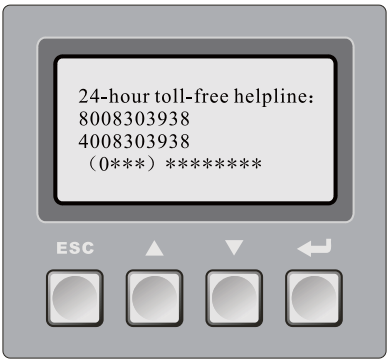
6. Help

1) Help picture


2) Press ENTER on help picture




3) Press ENTER on SERVICE HOTLINE picture



7. Setting action (press ESC to exit the above picture)

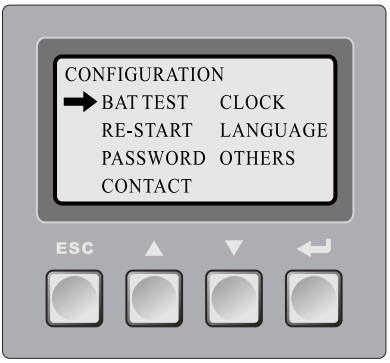
You are able to access Setting picture by using user combination (default: 1234, subject to personal modification) so as to set the following programs.

1) Setting picture (bypass power supply)


2) Press ▼


3) Input Password display


4) Input password and press ENTER



8. Castle EX Series is capable of DC start-up without AC input, panel display being similar to switch-on picture with AC supply. DC switch-on and off are available by following instructions appearing in the pictures:

- Firstly, activate DC switch-on function set under the bypass mode
- Make sure that “+”, “-” and “N” wires of batteries are properly connected to UPS
- Switch on batteries
- Lightly touch ENTER
- Manually conduct switch-on order within about 40s after LCD self-inspection

Remark: UPS will be switched off automatically if there is no operation within 40s after LCD self-inspection is completed!

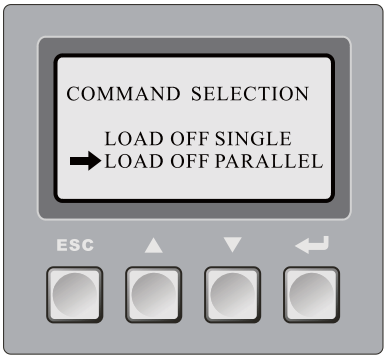
## 4.2 Parallel UPS operation

Castle EX Series is capable of direct parallel connection, customers can add additional machines on line to realize power redundancy and follow single machine operation instructions for general operation. Before parallel operation, the customer service engineers will change the stand-alone mode into the parallel mode through the LCD display panel. Then connect the parallel lines of UPS and switch on the UPS input in sequence, turn on the system through any of the single machine, then all the single machines will display “UPS is loading on”, and then switch to inverter output.

(1) Normal switch on: Follow the operation for single UPS and switch on the machine:


(2) If parallel operation fails,the following will appear:

(3) Select to switch off one of the single machines or the parallel system:

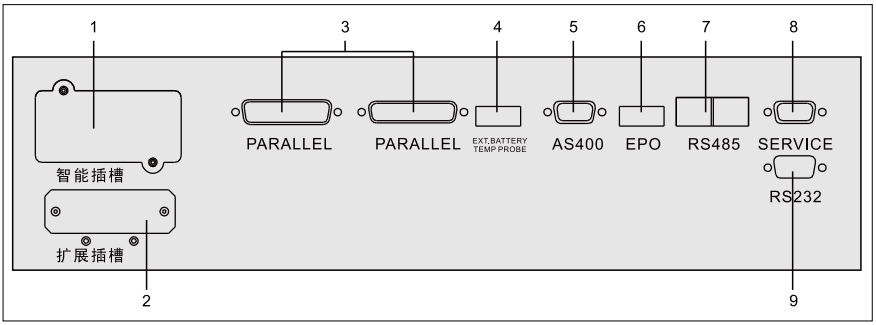



Remark: After turning on in Line mode, all UPSs will transfer to INV mode; Turn off: when turn-off is conducted under INV mode, all UPSs will simultaneously turn off inverter and then transfer to the bypass mode, if turn off the UPSs one by one, all UPSs will simultaneously transfer to the bypass mode after the last UPS completes turn-off action.

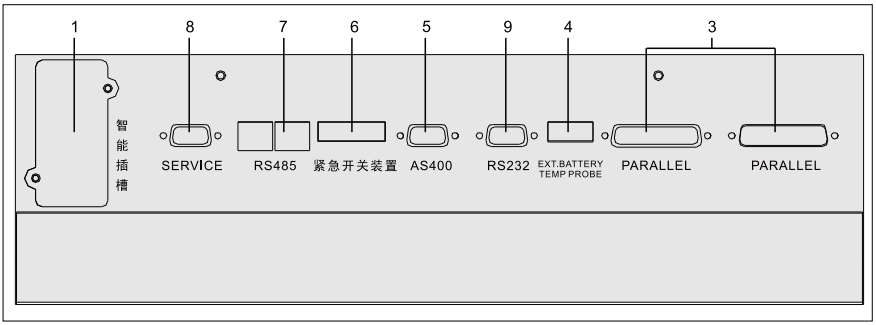
# Chapter 5 Communication Interface

Castle EX Series provides Intelligent Slot, Expanded Slot, PARALLEL, EXT.BATTERY TEMP PROBE, AS400, EPO, RS485 and RS232 as well as SERVICE Supervising Communication Interface exclusively available to Santak technical personnel.

3C3 EX 20KS/30KS/40KS




3C3 EX 60KS/80KS

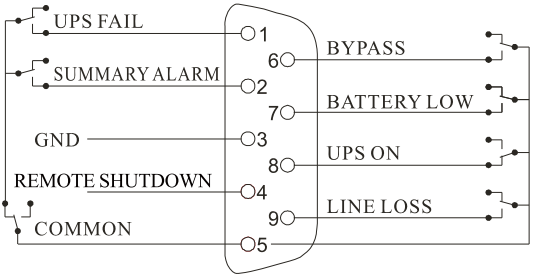



1. Intelligent slot: suitable for WebPower card (optional) of remote supervising management, enabling you to realize remote supervising management on UPS by accessing Internet. (Intelligent slot adapter card is divided into long card and short card; Castle EX Series requires the latter.)

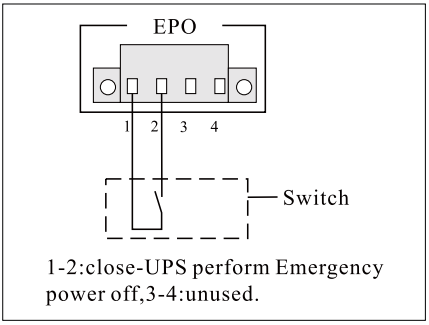
2. Expanded slot: only applicable for 20KS/30KS/40KS models, and available only to users with special requirements and not for standard configuration.
3. PARALLEL: communication connections for parallel configuration, 8 sets of UPS in parallel for 20KS/30KS/40KS models and 6 for 60KS/80KS models.
4. EXT.BATTERY TEMP PROBE: temperature interface for external battery cabinet, capable of battery temperature supervision so as to realize battery intelligent management.
5. Standard AS400 interface: provides dry-contact interface for UPS supervising, the contact signals can reflect the UPS operation states so as to realize power source management (See Appendix for AS400 Port pin definition).
6. EPO: emergency power off, which provides users having emergency power-off need with direct UPS output off function. (See Appendix for EPO external wiring diagram)
7. Standard RS485 Interface: capable of UPS supervising management when parallel machine, providing complete control over UPS power supply (See Appendix for RS485 port Pin definition).
8. SERVICE Interface: available only to Santak internal technical professionals and not open to users.
9. Standard RS232 Interface: applicable to WinPower management software (See Appendix for RS232 port Pin definition).

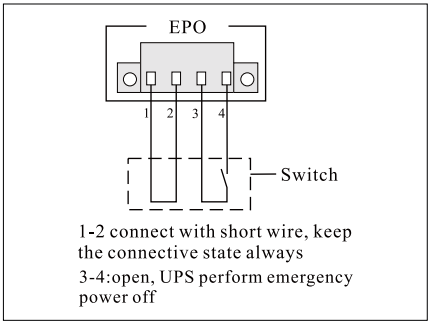
AS400 PORT：

| Pin# | Description | I/O |
|---|---|---|
| 1 | UPS Fail | Output |
| 2 | Summary Alarm | Output |
| 3 | GND | GND |
| 4 | Remote Shutdown | Input |
| 5 | Common | +12V |
| 6 | Bypass | Output |
| 7 | Battery Low | Output |
| 8 | UPS ON | Output |
| 9 | Line Loss | Output |



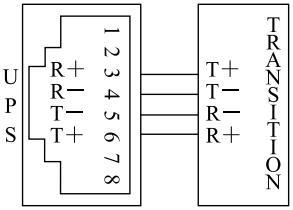

EPO external wiring diagram：



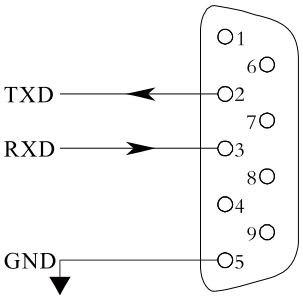

RS485 PORT：

| Pin# | Description | I/O |
|---|---|---|
| 3 | RXDA | Input |
| 4 | RXDB | Input |
| 5 | TXDB | Output |
| 6 | TXDA | Output |



RS232 PORT：

| Pin# | Description | I/O |
|---|---|---|
| 2 | TXD | Output |
| 3 | RXD | Intput |
| 5 | GND | Output |



# Chapter 6 Optional accessories

## 6.1 Power Feedback Module

Power feedback module is an optional spare part specially designed for Castle EX series to provide perfect solution for high BUS voltage by feeding back the regenerative energy to the power system or battery. And it is applicable to special fields in complex industrial environment with reliable operation and flexible installation, such as high-speed elevators, mining elevators, rolling mill, motor, tension control system of wind mechanism and principle bearing drive system of lathes etc.

## 6.2 Transformer

When the UPS is applied to load devices, there might be disturbances or malfunctions caused by the Neutral to Ground voltage. However, the installation of the special transformer to the output will make the Neutral-to Ground voltage be less than 1V; besides, the installation of the special transformer to the input will avoid three times of harmonic of the power system and reduce disturbances, thus prevent the load devices from disturbing by other devices connected to the power system. It is recommended to connect the transformer to the input or output according to application requirements. (Internal transformer for 3C3 EX 20KS/30KS/40KS-ISO models and external for 3C3 EX 60KS/80KS-ISO models; please refer to this manual for operation instructions).

## 6.3 Double Charge Boards

Castle EX Series UPS is capable of improving the charge capability and speed by battery capacity expansion. It is flexible to install an additional charge board in parallel connection with the standard charge board since there is space for double charge boards reserved.

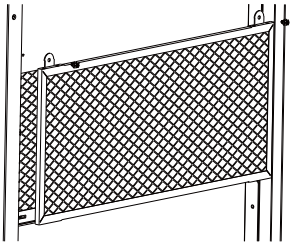
## 6.4 Temperature Sensor

For battery with short lifetime and being sensitive to temperature, the temperature sensor can be used to detect the temperature change, enable the temperature compensation function of charge voltage, the battery charge voltage will be adjusted automatically to prolong the lifetime of the battery.


temperature detect terminal　　temperature sensor

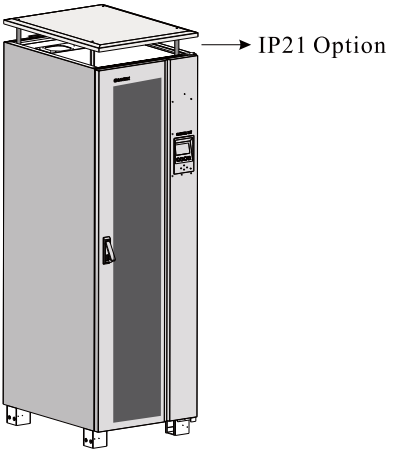
## 6.5 Dustproof Net

Dustproof net is an optional spare part specially designed for Castle EX Series UPS to work in dust environment (dust diameter no less than 1.0mm, especially metallic and metalloid dusts) in order to upgrade UPS frontal protection grade to IP51 with flexible installation and maintenance.



## 6.6 IP21 Option

Castle EX 60~80K Series UPS adopts top perforation and top and bottom ventilation, it is recommended to install the IP21 option to prevent objects with diameter larger than 12mm and water drops.



# Chapter 7 Transportation, Maintenance and Troubleshooting

## Move UPS

Make preparation for UPS relocation according to the following steps.

Remark: special equipment (folklift) is needed for loading and unloading due to the heavy weight of UPS.

1. Switch off all equipments connected to UPS.
2. Turn off UPS AC switch and battery pack switch.
3. Disconnect all wires from UPS terminal bay.

## Maintenance

Castle EX Series UPS requires minimum maintenance.

1. If battery is switched off, loaded equipments will not be covered for power-off protection.
2. Under normal circumstance, batteries should be found in poor performance, replacement should be done as soon as possible only by qualified personal with proper training. Users are not allowed to replace without authorization.

Remark:

A. Prior to battery replacement, switch off UPS and remove it from AC.

B. Take off metallic articles such as rings and watches.

C. Use screw drivers equipped with insulated handles and do not place tools or other metallic substances on the batteries.

D. Short circuit or reverse connection is forbidden for battery polarity connection.

3. It is not recommended to replace batteries individually. Complete replacement should follow instructions given by battery suppliers.
4. Make sure UPS vent are properly ventilated and clean side frames and fan vents from dusts every half a year (switch off AC and battery power prior to cleaning).

## Troubleshooting

Should maintenance prove necessary, the following steps should be followed :

1. Check if UPS input wiring is done properly.
2. Check if all air switches are tripped off.
3. Check if voltage input is within specified range.

Please refer to “Reference Table of LED indicators and LCD display” of this User Manual first and then conduct proper treatment.

| Table of Malfunctions | | |
|---|---|---|
| Symptom | LCD Display or Possible cause | Solution |
| The fault LED is lit, periodic beeps | Overloaded in bypass or inverter mode | Remove some load. Loading level shall be less than the nominal power capacity. |
| | Mains out of tolerance | Check that the input wiring and input voltage are normal |
| | Battery disconnected | Check the battery breaker and the battery wiring |
| The fault LED is lit, continuous beeps | UPS fault | Contact SANTAK customer service center |
| Battery discharging time less than 1/3 of initial discharging time | Battery exhausted | |
| | Charger fault | |
| LCD panel has no display | | Long press ESC 3S,LCD replacement. |

If problems still exist, please contact SANTAK service hotline at 400-830-3938/800-830-3938 and provide the following information:

- MODEL and SERIAL NO of the UPS;


- Failure date
- Detailed failure description (including LCD malfunction, indicator condition, buzzer information, power and load capacity etc.).

# Appendix 1
# Techinial parameters and specifications

| Model | | 3C3 EX 20KS | 3C3 EX 30KS | 3C3 EX 40KS | 3C3 EX 60KS | 3C3 EX 80KS |
|---|---|---|---|---|---|---|
| Power Rating | | 20KVA/16KW | 30KVA/24KW | 40KVA/32KW | 60KVA/48KW | 80KVA/64KW |
| Input | Connection | 3-Phase + N+G | | | | |
| | Frequency | 40-70Hz | | | | |
| | Power factor | ≥ 0.99① | | | | |
| | Utility voltage range | 380×(-45%~ +25%)VAC（when input voltage<75%, output power derating is required） | | | | |
| | Bypass Voltage range | 380×(-15%~ +15%)VAC | | | 380×(-20%~ +15%)VAC② | |
| Output | Voltage rating | Line voltage 380×(1±1%)VAC or phase voltage 220×(1±1%)VAC(with balanced load) | | | | |
| | Power factor | 0.8 | | | | |
| | Frequency tolerance | 50Hz±8%（track bypass frequency input ;when input frequency exceeds ±8% or under the mode of battery power supply, frequency output should be±0.1%of nominal） | | | | |
| | Overload time | ≥ 10min 110%<Load ≤ 125%<br>≥ 1min 125%<Load ≤ 150% | | | | |
| Efficiency | Double-conversion mode | Up to 93% | | | Up to 94% | |
| | ECO mode | Up to 98%③ | | | | |
| Operating Environment | Ambient temperature | 0~40℃ | | | | |
| | Storage temperature | –25~55℃ (without battery) | | | | |
| | Ambient humidity | 0-95% | | | | |
| | Altitude | ≤ 1000m | | | | |
| Nominal battery voltage/Rated charging voltage | 28 Pcs | ±168VDC/±189VDC | | | | |
| | 30 Pcs | ±180VDC/±202.5VDC | | | | |
| | 32 Pcs | ±192VDC/±216VDC | | | | |
| Weight | N.W/Contain transformer | 82Kg/208Kg | 110Kg/275Kg | 114Kg/314Kg | 282Kg | 306Kg |
| | G.W/Contain transformer | 122Kg/248Kg | 160Kg/325Kg | 164Kg/364Kg | 356Kg | 380Kg |
| UPS Dimension(W*D*H)（mm） | | 420×643×956 | 470×710×1150 | 470×710×1150 | 600×800×1850 | 600×800×1850 |
| Safety Standard | National Standard | GB4943 | | | | |
| | TCL certification | YD/T1095 | | | | |
| EMS | ESD | GB/T 17626.2 Level 4 | | | | |
| | RS | GB/T 17626.3 Level 3 | | | | |
| | EFT | GB/T 17626.4 Level 4 | | | | |
| | SURGE | GB/T 17626.5 Level 4 | | | | |
| EMI | Radiation and Conduction | GB 7260.2 | | | | |
| | WARNING: This is a product for commercial and industrial application in the second environment-installation restrictions or additional measures may be needed to prevent disturbances. | | | | | |

Remark:

① 3C3 EX 20KS-40KS ≥ 0.99 at 50% load;3C3 EX 60KS-80KS ≥ 0.99 at full load.

② ±15% default;-20% ～+ 15% regulate.

③ ECO mode is supported by 3C3 EX20KS-40KS only in single machine mode ;ECO mode is supported by 3C3 EX 60KS-80KS in single and parallel machine mode.

# Appendix 2 Light reference table

| NO | Working condition | Indicator | | | | | Buzzer |
|---|---|---|---|---|---|---|---|
| | | Bypass LED | Line LED | Inverter LED | Battery LED | Fault LED | |
| 1 | Standby Mode | | | | | | |
| | Normal | | | | | One flashing every 8 sec | One beep every 8 sec |
| | Fault | | | | | One flashing every 4 sec | One beep every 4 sec |
| | Overload | | | | | One flashing every 1 sec | One beep every 1 sec |
| 2 | Bypass Mode | | | | | | |
| | Normal | ● | | | | One flashing every 2 min | One beep every 2 min |
| | Fault | ● | | | | One flashing every 4 sec | One beep every 4 sec |
| | Overload | ● | | | | One flashing every 1 sec | One beep every 1 sec |
| 3 | Line Mode | | | | | | |
| | Normal | | ● | ● | | | None |
| | Fault | | ● | ● | | One flashing every 4 sec | One beep every 4 sec |
| | Overload | | ● | ● | | One flashing every 1 sec | One beep every 1 sec |
| 4 | Battery Mode | | | | | | |
| | Normal | | | ● | ● | One flashing every 4 sec | One beep every 4 sec |
| | Low battery voltage | | | ● | ★ | One flashing every 1 sec | One beep every 1 sec |
| | Overload | | | ● | ● | One flashing every 1 sec | One beep every 1 sec |
| 5 | Battery Self Diagnosis Mode | | | | | | |
| | Normal | ★ | ★ | ★ | ★ | None | None |
| | Fault | ★ | ★ | ★ | ★ | One flashing every 4 sec | One beep every 4 sec |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Low battery voltage | | | ● | ★ | One flashing every 1 sec | One beep every 1 sec |
| | Overload | | | ● | ● | One flashing every 1 sec | One beep every 1 sec |
| 6 | Fault Mode | | | | | | |
| | Normal | | | | | Long light | Long beep |
| 7 | Converter Mode | | | | | | |
| | Normal | | ● | ● | | None | None |
| | Fault | | ● | ● | | One flashing every 4 sec | One beep every 4 sec |
| 8 | ECO Mode | | | | | | |
| | Normal | ● | | One flashing every 1 min | | None | One beep every 1 min |
| | Fault | ● | | | | One flashing every 4 sec | One beep every 4 sec |

Should any display or warning message excluded in the above table be found,please contact distributor or call EATON Hot line for advice.

● Indicator light is on

★ Indicator light flashes

Warning include one or more than one of these:

1.EPO active
2.Line loss
3.Neutral loss
4.Line phase error
5.Bypass loss
6.Bypass phase error
7.Battery open
8.Low battery voltage
9.Over charger
10.Battery reverse
11.Charger failure
12.Battery over restrict
13.Battery over temperature
14.Fan over restrict
15.BUS capacitor over restrict
16.Fan failure
17.Fan disconnected
18.Low temperature Battery
19.communication disconnected
20.Auxiliary charger failure
21.Bypass N wire cut
22.Battery N wire cut
23.Address conflict

Remark:

In fault mode,there is output presented with normal bypass and the bypass LED will lit(except ECO fault or output short circuit).

# Appendix 3 Warranty

Our company promises: SANTAK its products to be offered free warranty service for three years from the date of purchase.

- To obtain service under warranty via a valid guarantee offered by dealers;
- To obtain service under warranty via serial number.

As a user of SANTAK, if your UPS fails, please contact our 400/800 hotline for the following service:

- Three-year warranty (covering batteries purchased from SANTAK);
- 24-hour toll-free helpline (See the hot line number at the warning label located on the cabinet cover);
- Nationwide warranty;
- Technical support on our web site;
- Toll-free on-site service.

This limited warranty does not apply to conditions as follows:

- Man-made fault;
- Out of warranty;
- The finished product of which the serial number is changed or lost;
- Damage or loss resulted from force majeure or external causes;
- Disassembly or modifications to the unit with no authorization;
- Disobeying provisions of operating/using the unit;
- Battery over discharged or man-made damage.