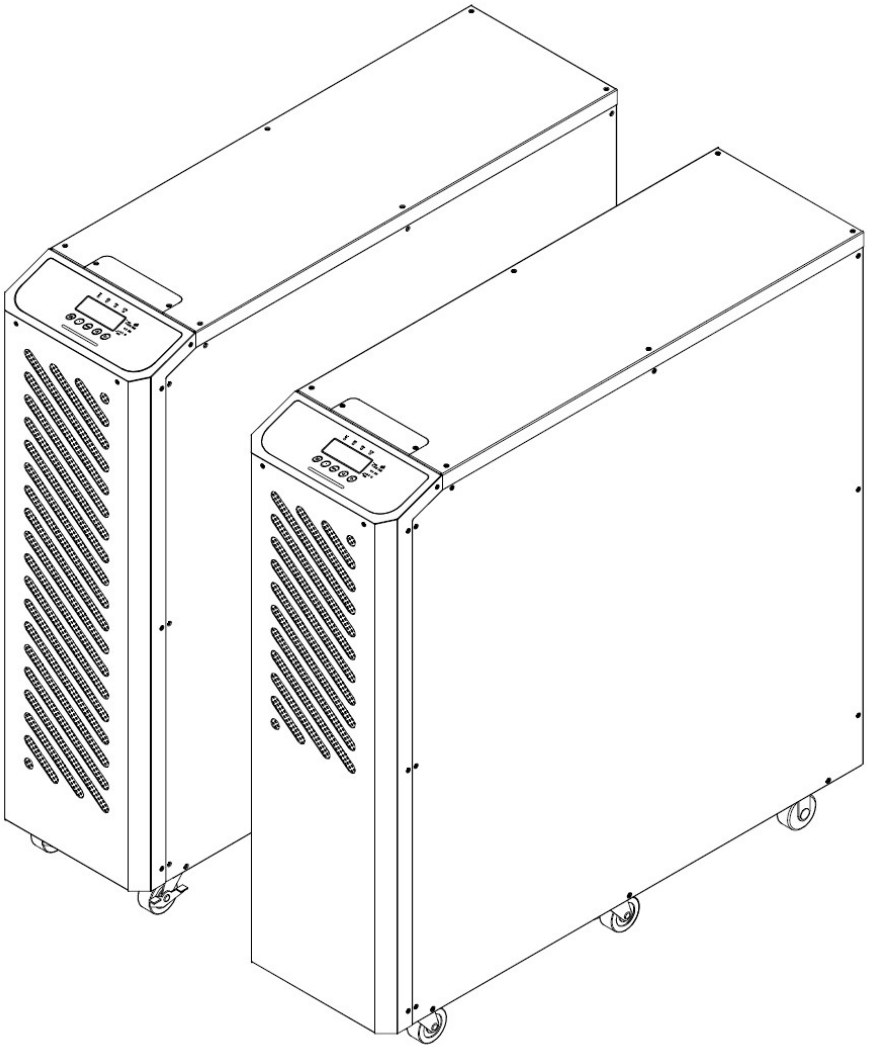
KRONOS Series

10-40 kVA UPS

Installation and Operation Manual



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Preface

We thank you for the trust in selecting our UPS.

Our equipment complies with the European Community directives for professional equipment and is authorize to use the CE marking.

CE

The purpose of this manual is to introduce the operating principles of the UPS and to provide instructions for its safe operation. The manual also provides troubleshooting assistance should an abnormal message or behavior occur.

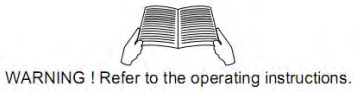
Should an abnormal message not covered in this manual appear, please contact your local authorized service agent for troubleshooting and repair.

All of the installation, operation, and maintenance of this device must be performed by authorized and qualified technicians who are familiar with this manual.

Safety

- **Important Rules**
  (1) Please follow these UPS operating instructions to ensure safe and proper operation.
  (2) When the UPS is being moved or operated, please ensure that the machine is standing vertically. Do not shake or tip over the machine. Avoid heavy impact.
  (3) Poor grounding will lead to unexpected current leakage. Please ensure that the AC power input is properly grounded (PE Ground) before making any connections.
  (4) Please make sure that the UPS is placed in an insulated environment before use and that there is no electrocution hazard to the operating personnel.
  (5) Do not connect the neutral wire with the ground and make sure that the input voltage is correct.
  (6) Once the UPS has been switched on, if the UPS needs to be moved then it must be fully switched off and fully discharged. If the UPS is not discharged, the UPS will switch to battery power after grid power is disconnected and pose an electrocution hazard.
  (7) Do not place any objects, liquid containers, or coverings over the UPS. The liquid spilt into the UPS or heat prevented from dissipating could lead to internal damage or cause electrocution.
  (8) Make sure that the battery specifications match the UPS requirements before connecting any external batteries.
  (9) Please follow the rules below before engaging in any activity that involves the battery.
    a. Remove all metallic items such as rings, watches and jewelry before working on the battery.
    b. Please use insulated tools.
    c. Do not open or damage the battery. The toxic liquid inside will harm the skin and eyes.
    d. Keep batteries away from fire to prevent explosion.
- **Symbols**

Please follow the instructions and warnings on the UPS.



WARNING ! Refer to the operating instructions.

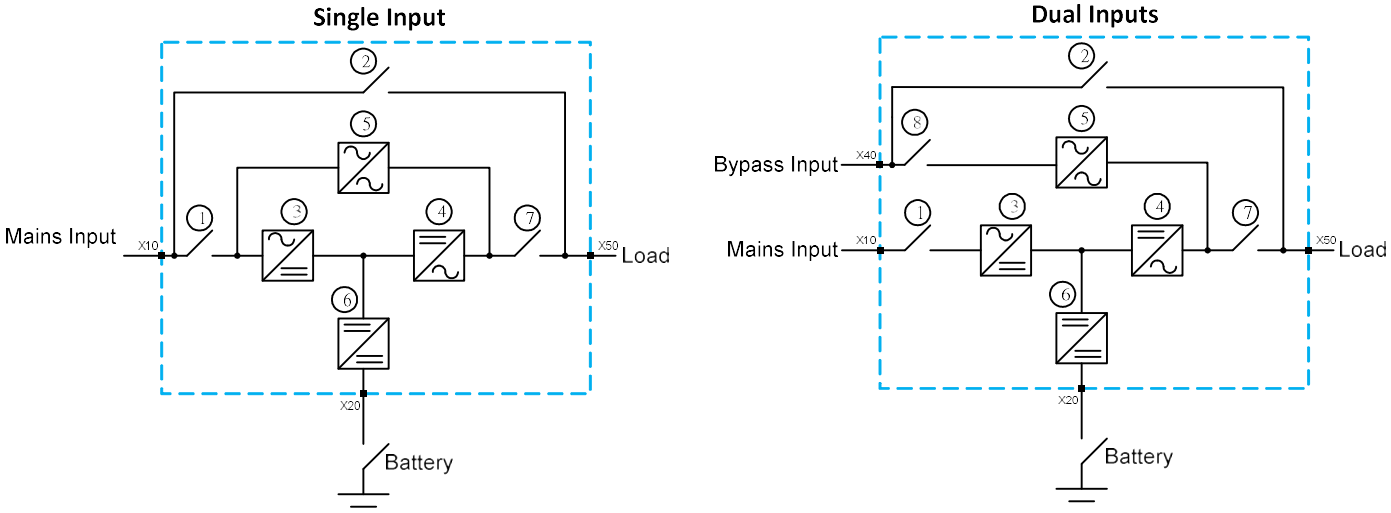
WARNING ! High voltage inside.

Ground

1. Function Description

1.1 UPS Block Diagram

The system block diagram is shown as below.



① Input Switch

② Manual Bypass Switch

③ Rectifier

④ Inverter

⑤ Static Switch

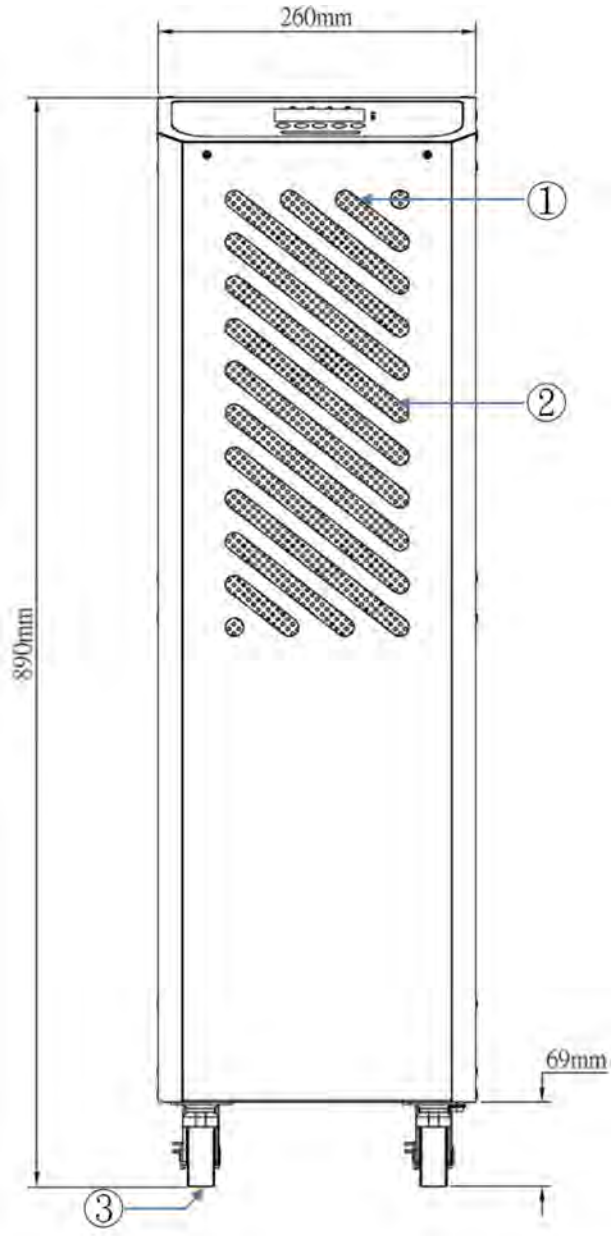
⑥ Charger/Booster

⑦ Output Switch

⑧ Bypass Switch

1.2 UPS Outlook View

- **10-20kVA Front View**

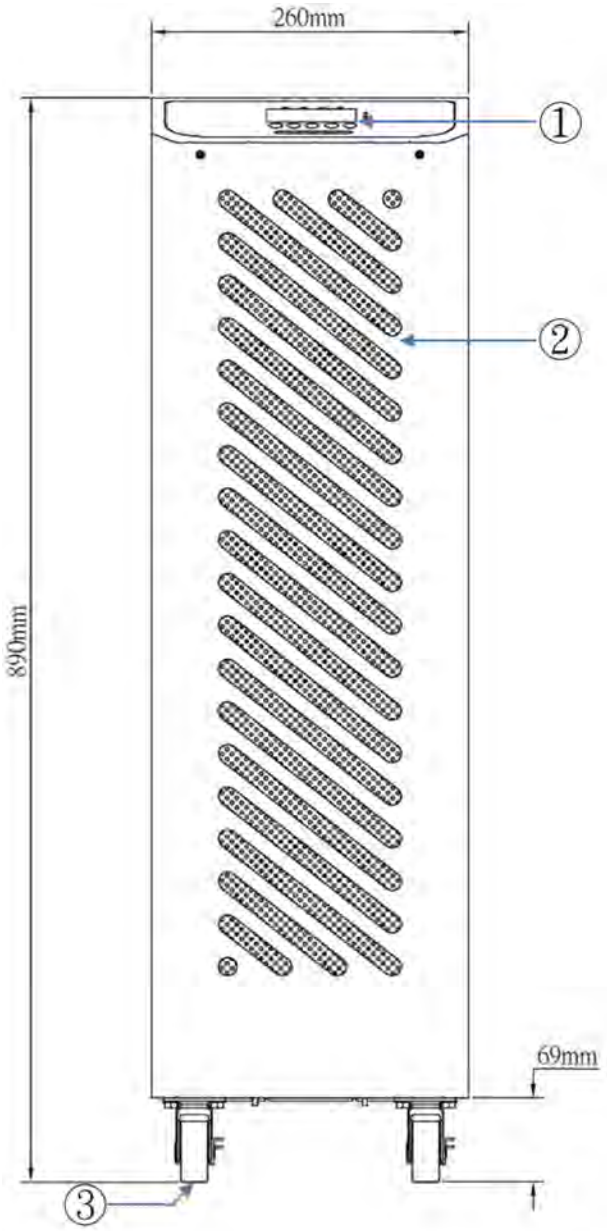


① LCD Display

② Ventilation Grille

③ Wheels for Handling

■ **30-40kVA Front View**

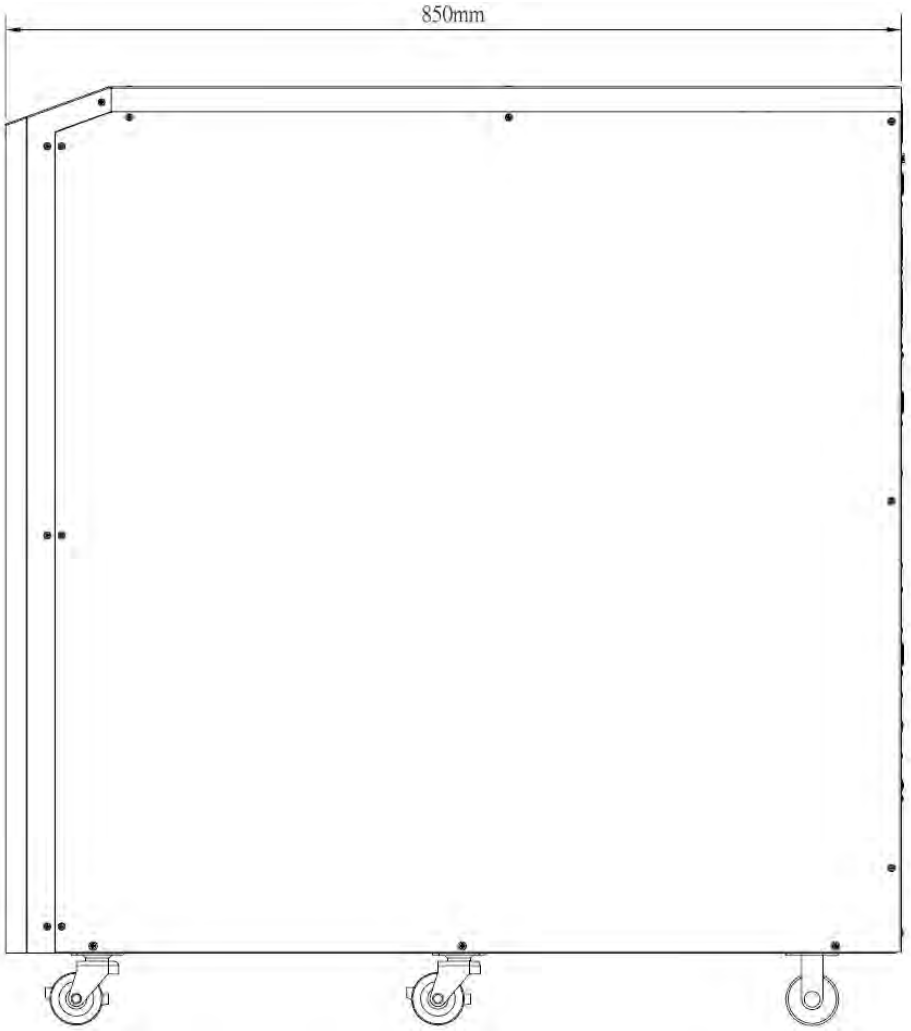


① LCD Display

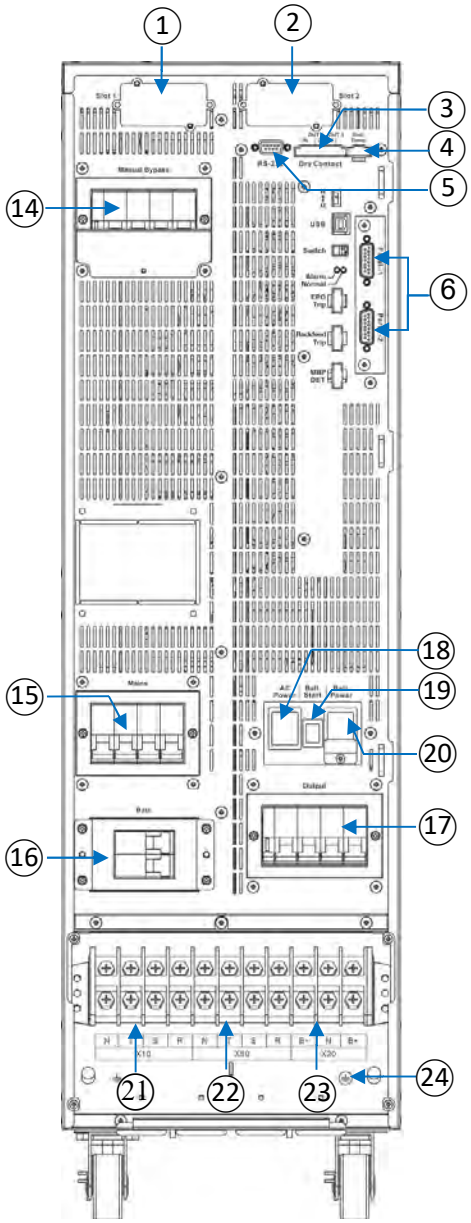
② Ventilation Grille

③ Wheels for Handling

■ **10-40kVA Right Side View**



■ 10-20kVA Rear View (Single Input)



① Communication Slot 1

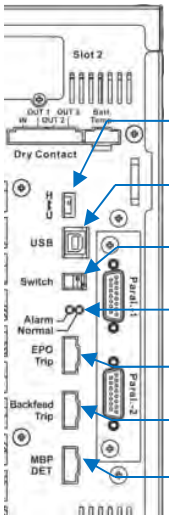
② Communication Slot2

③ Dry Contacts

④ External Battery Temperature Connector

⑤ RS-232 Port for Setting Software

⑥ Parallel Communication Ports(Option)



⑦ Communication Selector for Service Only

⑧ USB Port for Service Only

⑨ Terminal Resistor Setting Switch for Parallel Communication

⑩ Status LED Indictors

⑪ EPO

⑫ Backfeed Protection

⑬ MBP Detector

Please find the detail descriptions of above items on section 2-6.

⑭ Manual Bypass Switch

⑮ Mains Input Switch

⑯ Battery Switch (Option)

⑰ Output Switch

⑱ AC Working Power

⑲ Batt. Start

⑳ Batt. Working Power

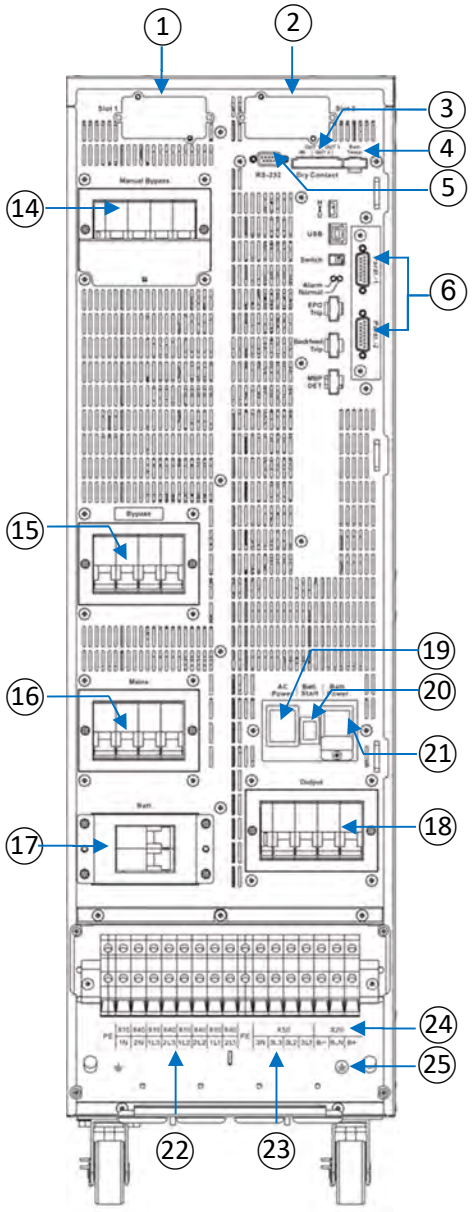
㉑ X10: Mains Input Connection Terminals (N,T,S,R)

㉒ X50: Output Connection Terminals (N,T,S,R)

㉓ X20: External Battery Connection Terminals(B-,N,B+)

㉔ Ground Connection

■ 10-20kVA Rear View (Dual Inputs)



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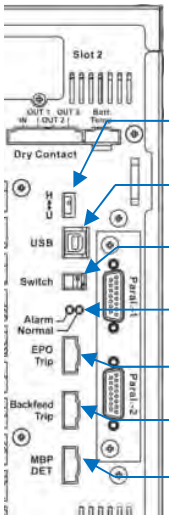
⑤ RS-232 Port for Setting Software

⑥ Parallel Communication Ports(Option)



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⑮ Bypass Input Switch (Option)

⑯ Mains Input Switch

⑰ Battery Switch (Option)

⑱ Output Switch

⑲ AC Working Power

⑳ Batt. Start

㉑ Batt. Working Power

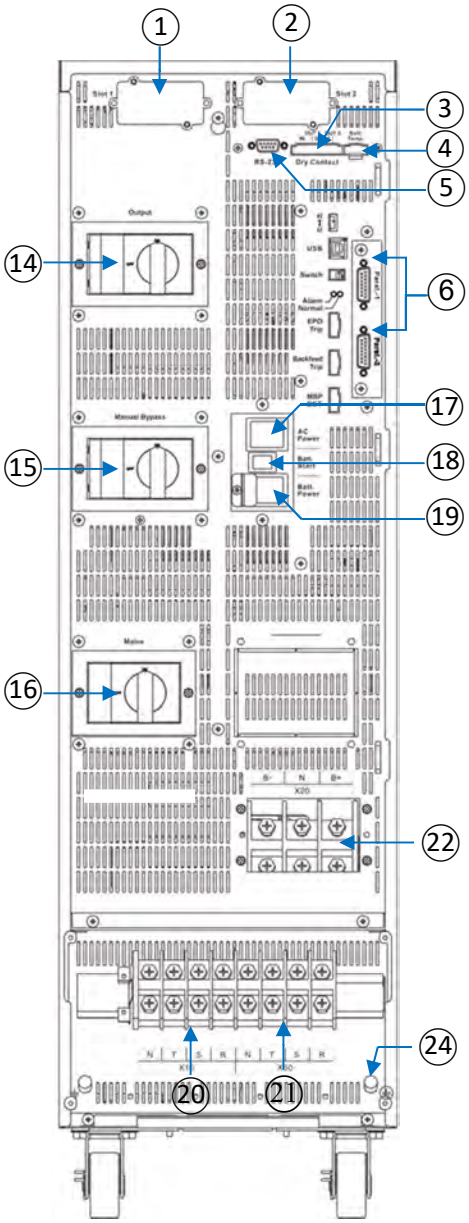
㉒ X10/X40: Mains/Bypass Input Connections Terminal (1N, 2N, 1L3, 2L3, 1L2, 2L2, 1L1, 2L1)

㉓ X50: Output Connection Terminals (N,T,S,R)

㉔ X20: External Battery Connection Terminals(B-,N,B+)

㉕ Ground Connection

■ 30-40kVA Rear View (Single Input)



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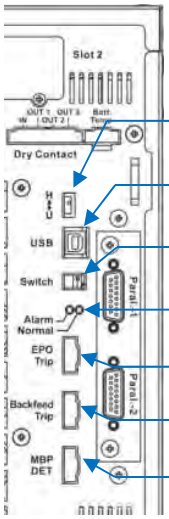

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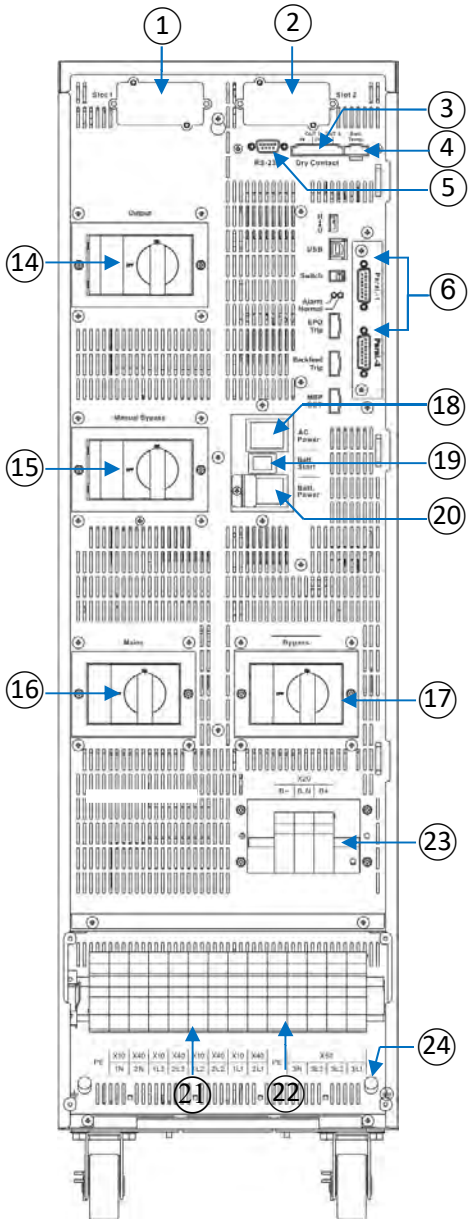
㉒ X20: External Battery Connection Terminals(B-,N,B+)

㉓ Ground Connection

■ 30-40kVA Rear View (Dual Inputs)



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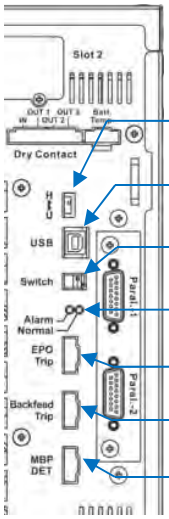
⑥ Parallel Communication Ports(Option)



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⑭ Output Switch

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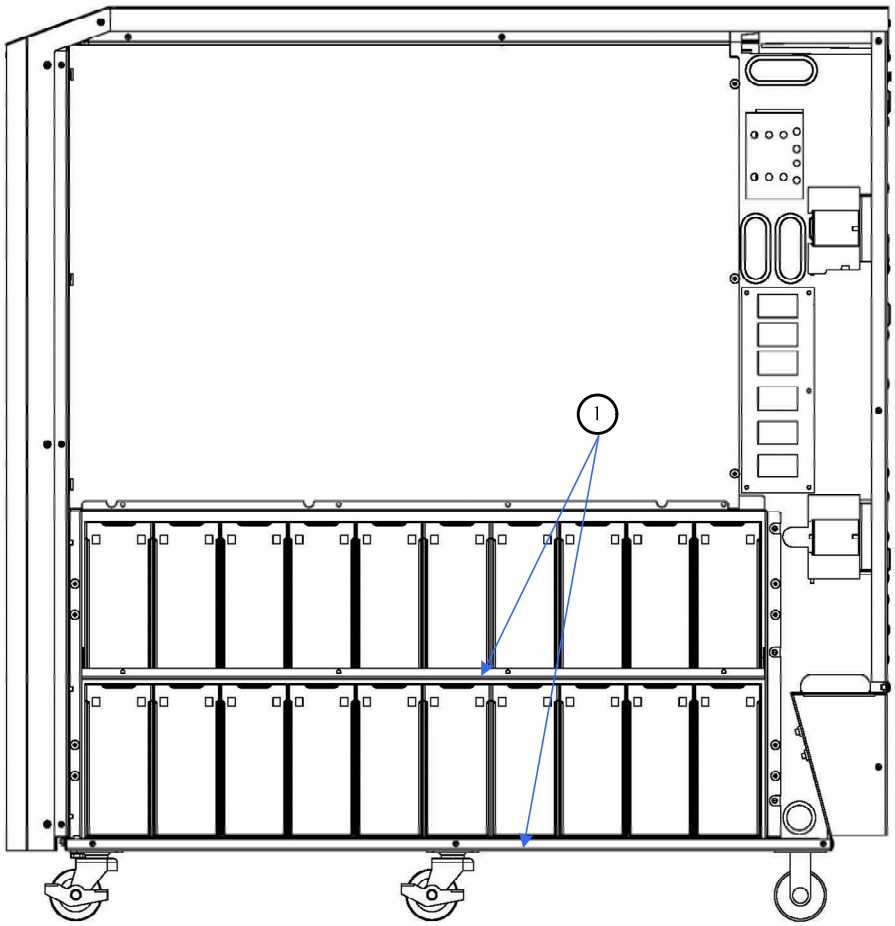
㉓ X20: External Battery Connection Terminals(B-,N,B+)

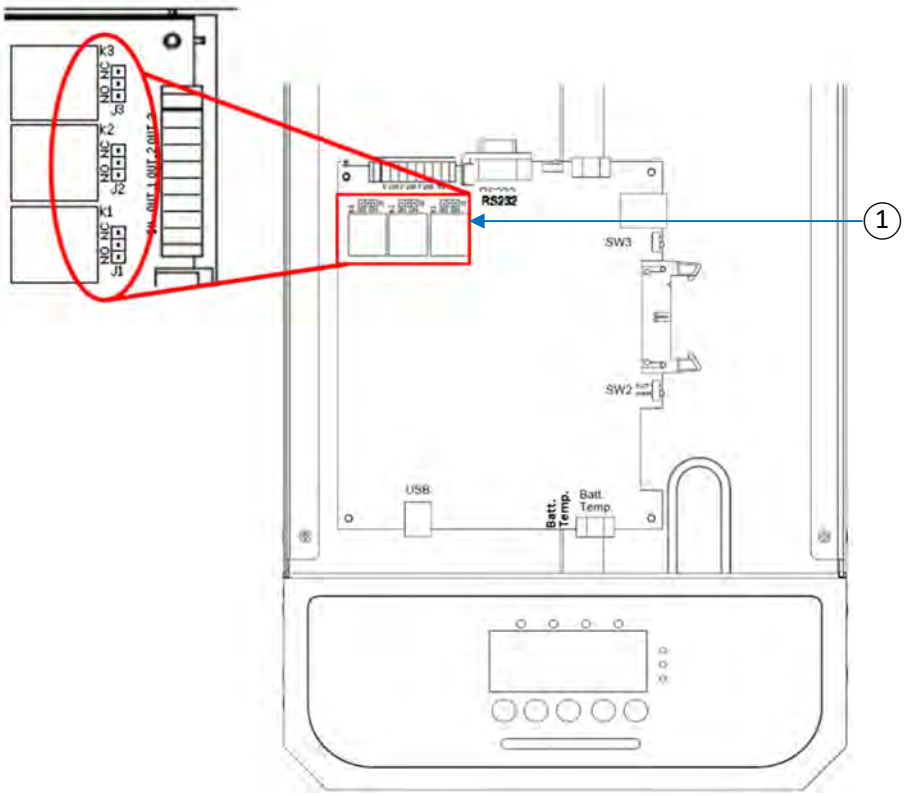
㉔ Ground Connection

■ 10-20kVA Internal Right View



① Battery Tray

■ 10-40kVA Internal Top View



① Jumpers (J1~J3) for each output contact

Please find the detail descriptions of above items on section 2-6.

2. Installation and Wiring

2.1 Storage and Installation Environment

■ **Storage Environment**

- Temperature-20℃~70℃
- Relative Humidity≦95%

■ **Installation Environment**

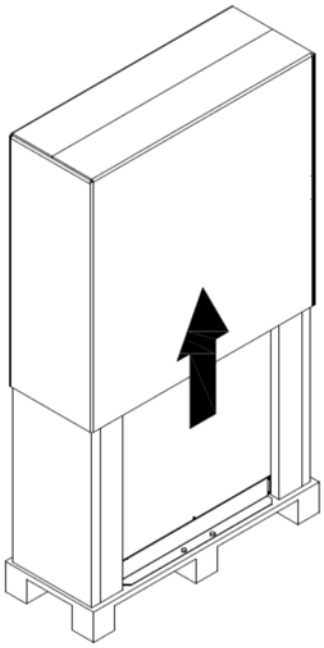
A proper installation environment not only ensures the effective operation of the UPS but also reduces the chance of failure and extends service life. Please take the following recommendations into account to select the most suitable environment and reduce the likelihood of accidents.

- Temperature0℃~40℃ (20℃~25℃is recommended for extend batteries life time).
- Relative Humidity ≦95% (without condensation)
- Altitude1000m at normal power. Over 1000m above sea level, the maximum output current must be derated by 1% every additional 100m.
- This product must not be used in an environment with sparks, smoke or gas to prevent arcing, injury and fire hazards.
- Avoid using dusty materials, volatile gases, or corrosive substances with a high salt-content in the environment where the UPS is installed.
- The installation location of the UPS should be well-ventilated. During charging, the chemical reaction of the battery generates small amounts of gases. If there is a crack in the battery then this may pose an environmental hazard.
- Do not place in a location near a heat source as this will shorten the battery life.
- Do not place outdoors and avoid direct exposure to sunlight.
- Please ensure that the environment where the UPS is placed is free from animals that may damage the wiring, such as: rats and other small animals.
- Please ensure that the floor is strong enough to hold the UPS and battery. It must keep the equipment stable to ensure that it won't suffer damage in a fall.
- We recommend placing a fire extinguisher near the UPS in case of an emergency.

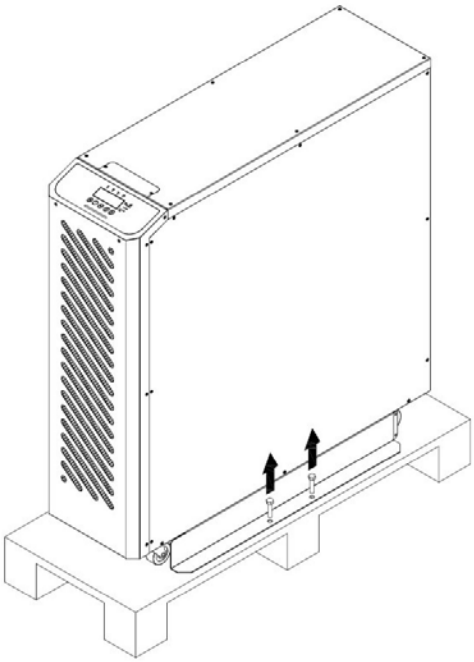
2.2 Unpacking, Removing and Fixing UPS

This section describes the unpacking and removing processes for wheel type.

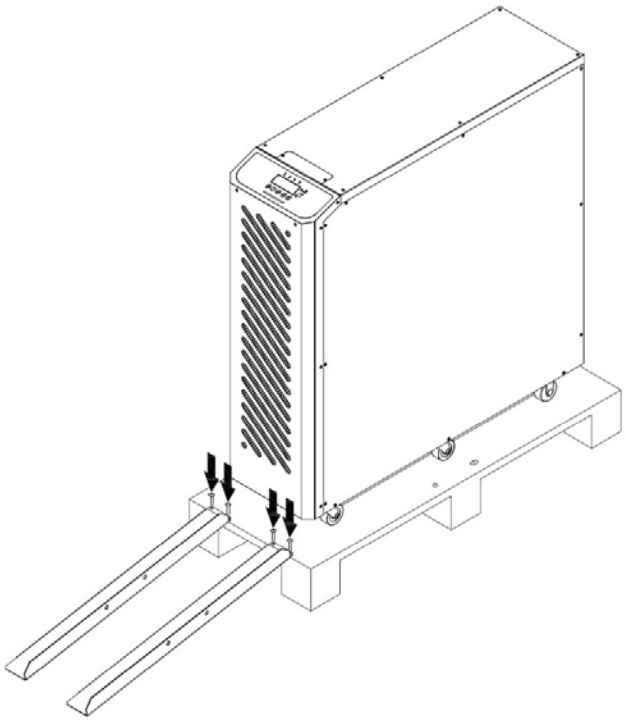
- Remove the packing materials and cut straps. Remove the cardboard box.



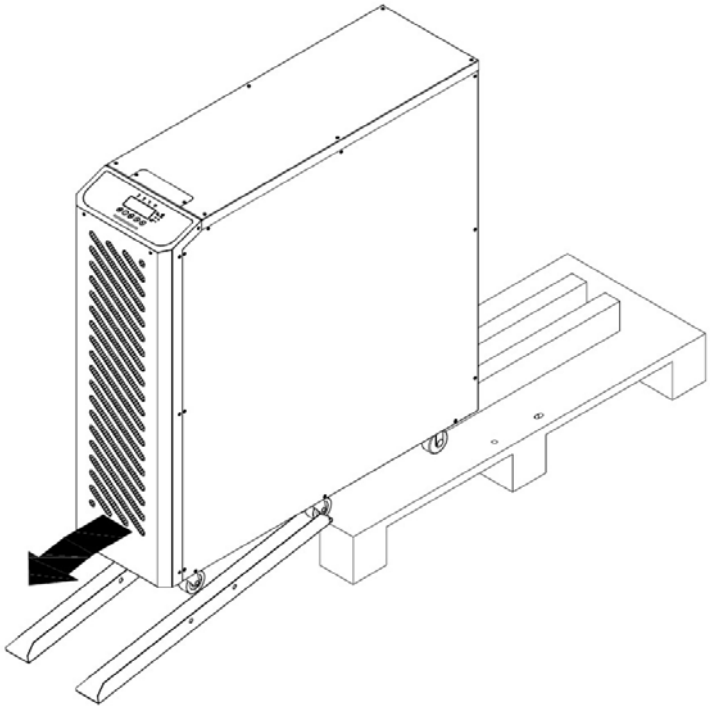
- Unscrew the fastening rail kits on the right and left side.



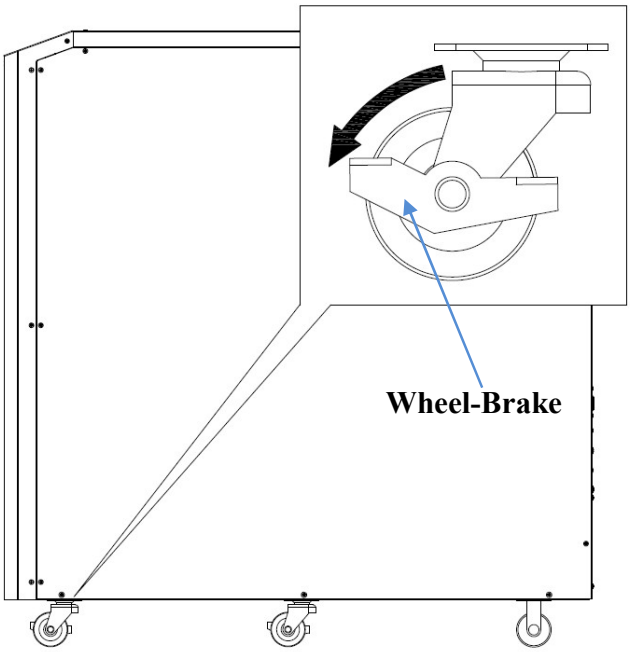
- Put 2 fastening rail kits on the pallet edge and make them steady by fastening 4 screws in the pallet.



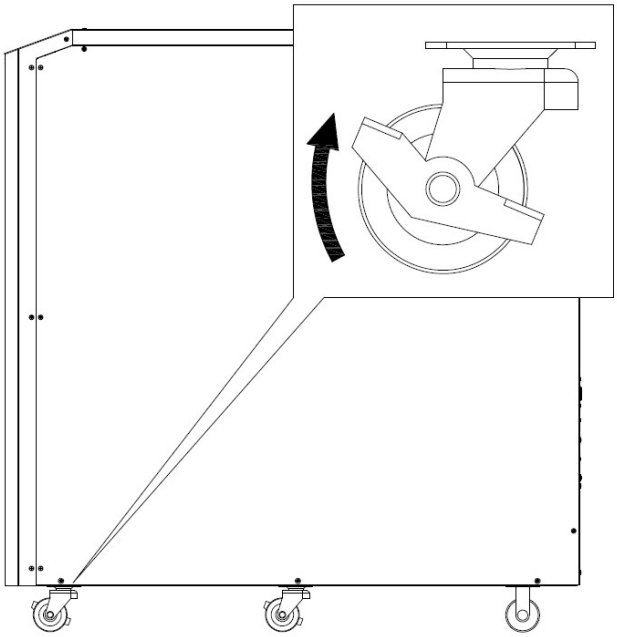
- Remove the UPS from the pallet.



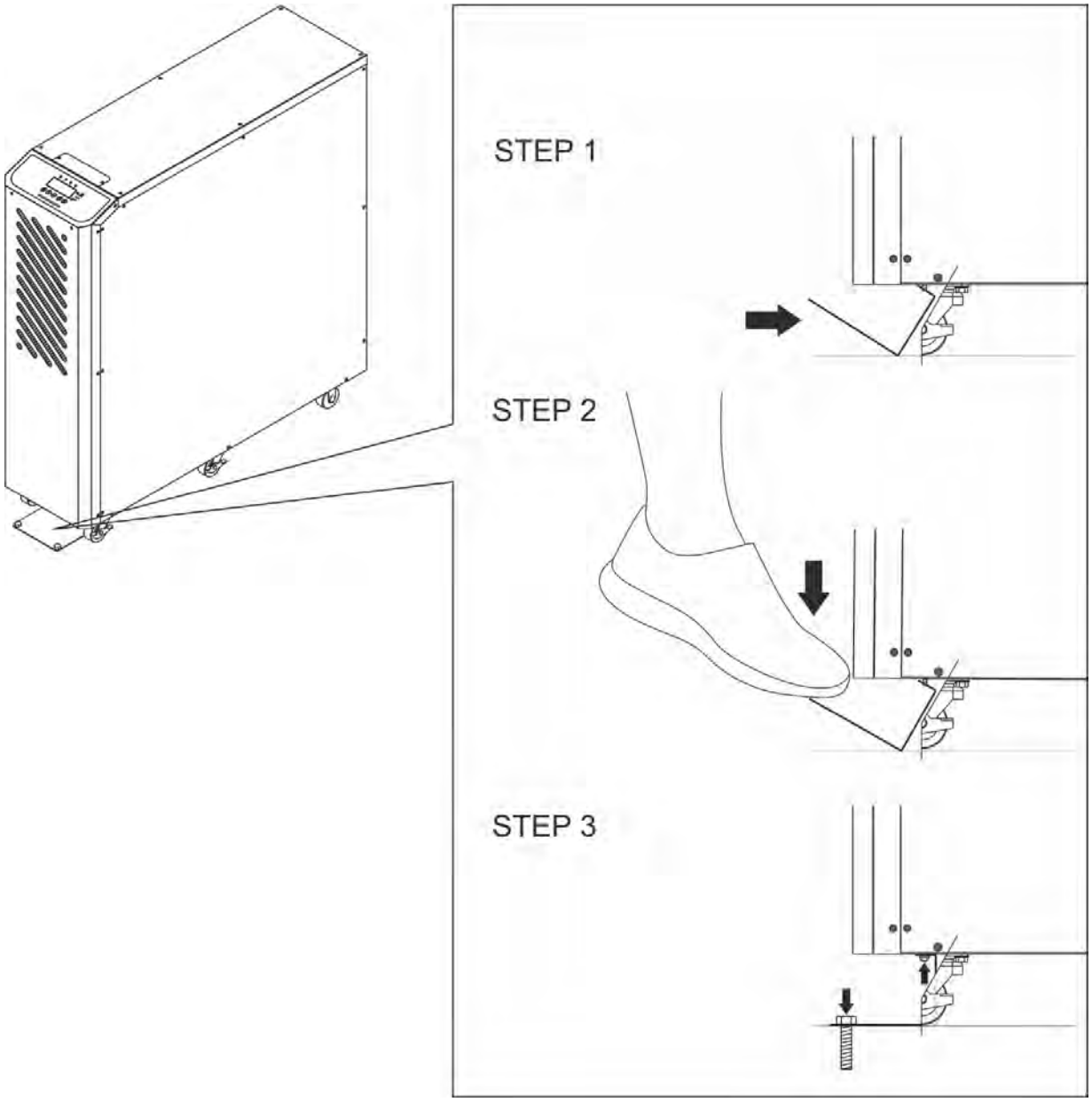
- Block the wheel-brakes to fix the UPS.



- Raise the wheel-brakes for remove the UPS.



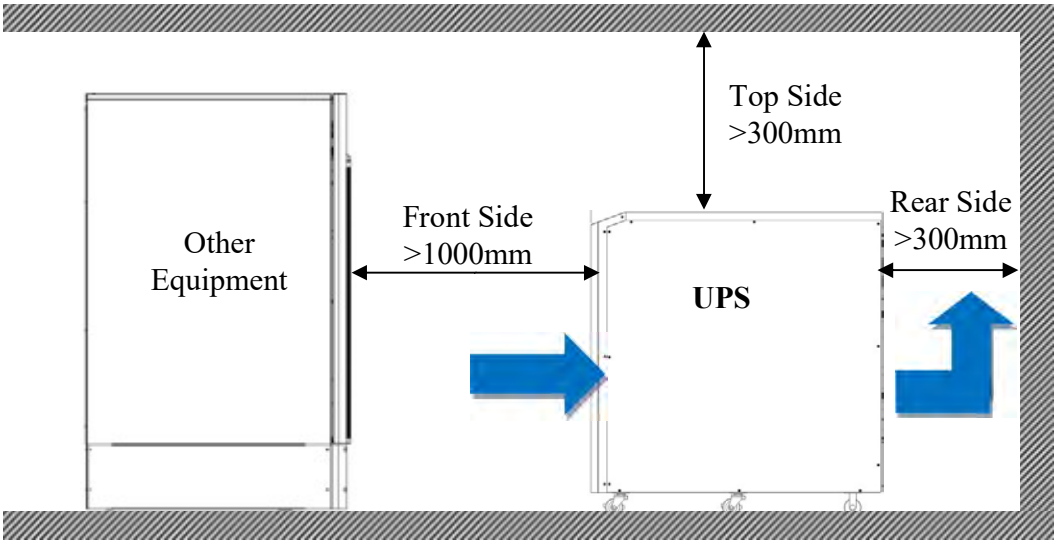
- As follow step to fix the UPS.



2.3 General Requirement for Ventilation and Maintenance

During installation ensure that the following conditions are met.

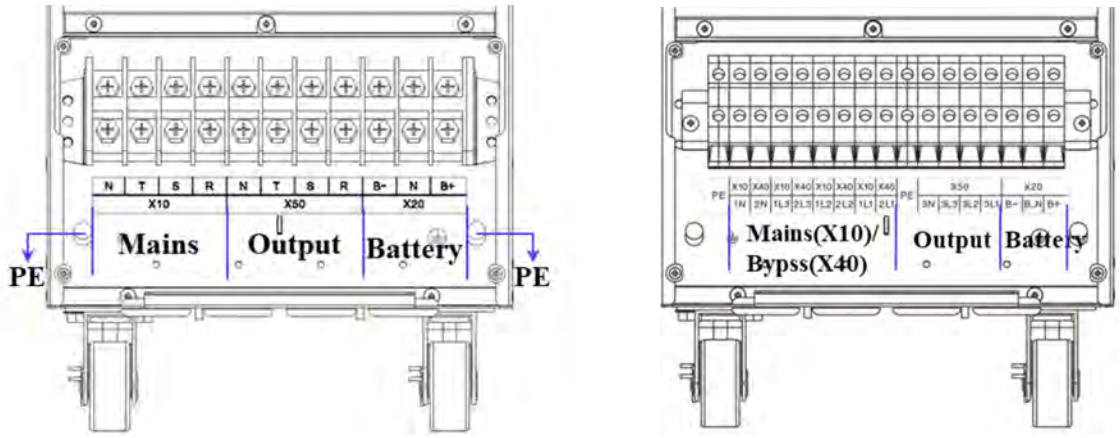
- Keep at least 1000 mm of free space in front of the UPS for air flow and future maintenance purposes.
- Keep at least 300mmof free space in rear of the UPS for air-flow space.
- Keep at least 300mm of free space in the top of UPS for maintenance operations.



2.4 Power Cables Connections

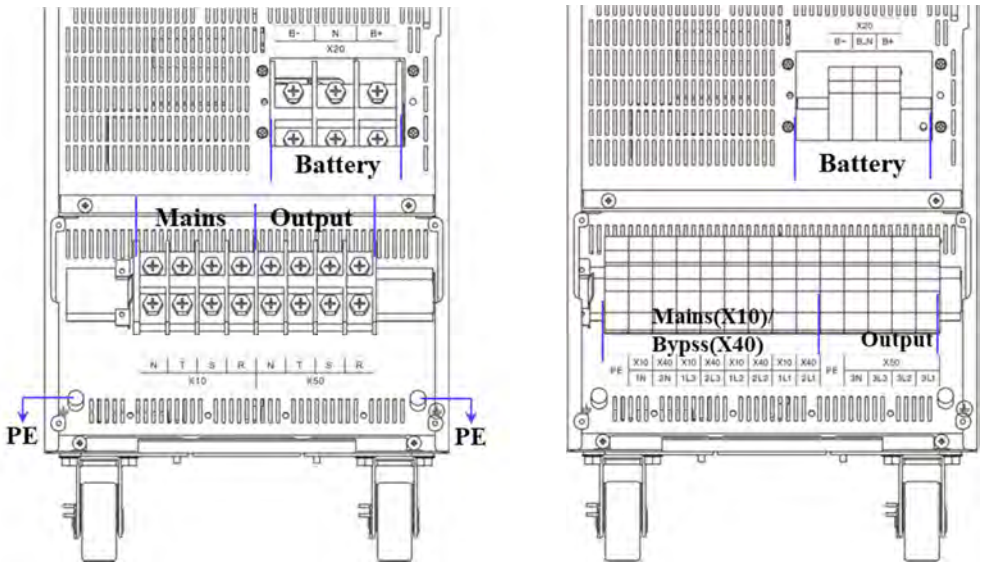
- **Power Cable Sizing**

  The drawing below shows the positions of power terminals.



Single Input **Dual Inputs (Option)**

10-20kVA Power Terminal Positions



Single Input **Dual Inputs (Option)**

30-40kVA Power Terminal Positions

■ Maximum Current

Input/Output Voltage	Output Power	Maximum Input Current(1)	Max. Output/Bypass Input Current(2)	Max. Battery Discharge Current(3)
380 V	10KVA/9KW	17.4 A	15.2 A	31 A
	20KVA/18KW	34.4 A	30.4 A	62 A
	30KVA/27KW	50.9 A	45.6 A	76 A
	40KVA/36KW	67.7 A	60.8 A	101 A
400 V	10KVA/9KW	16.5 A	14.4 A	31 A
	20KVA/18KW	32.7 A	28.9 A	62 A
	30KVA/27KW	48.4 A	43.3 A	76 A
	40KVA/36KW	64.3 A	57.7 A	101 A
415 V	10KVA/9KW	15.9 A	13.9 A	31 A
	20KVA/18KW	31.5 A	27.8 A	62 A
	30KVA/27KW	46.6 A	41.7 A	76 A
	40KVA/36KW	62.0 A	55.6 A	101 A

(1) The UPS is operating at rated voltage, rated power and batteries are charging but regardless of the overload.
(2) The UPS is operating at rated voltage and rated power but regardless of the overload.
(3) 12Vbattery blocks × 32pcs. The UPS is operating at rated voltage and rated power but regardless of the overload.

■ Recommended Size of Cables

Capacity	Mains Input(1)	Output/Bypass Input(1)	External Battery(1)
	R/S/T/N/PE	R/S/T/N/PE(2)	B+/N/B-/PE
10KVA	4 mm^2	4 mm^2	10 mm^2
20KVA	10 mm^2	6 mm^2	16 mm^2
30KVA	16 mm^2	16 mm^2	35 mm^2
40KVA	25 mm^2	25 mm^2	50 mm^2

(1) The recommended maximum length of cabling is less than 10meters.
(2) Please over size neutral line N by 1.7 times of the phase line for non-linear loads.

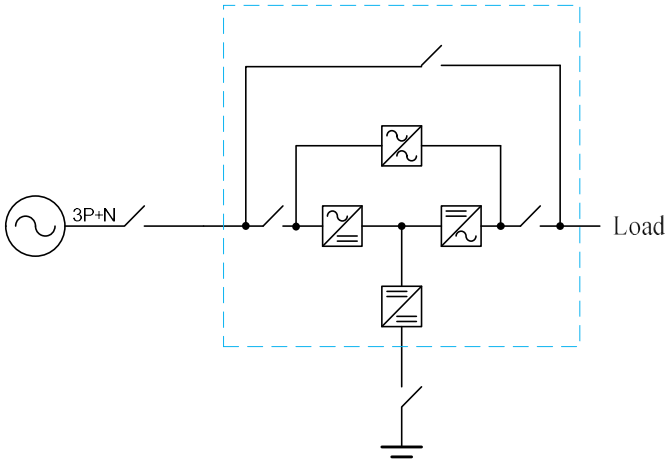
■ Recommended Circuit Breaker Size

Input/Output Voltage	Output Power	Mains Input (1)	Output/Bypass Input(1)
380 V	10KVA/9KW	20 A	20 A
	20KVA/18KW	40 A	40 A
	30KVA/27KW	63 A	50 A
	40KVA/36KW	80 A	80 A
400 V	10KVA/9KW	20 A	16 A
	20KVA/18KW	40 A	32 A
	30KVA/27KW	63 A	50 A
	40KVA/36KW	80 A	80 A
415 V	10KVA/9KW	20 A	16 A
	20KVA/18KW	40 A	32 A
	30KVA/27KW	63 A	50 A
	40KVA/36KW	80 A	80 A

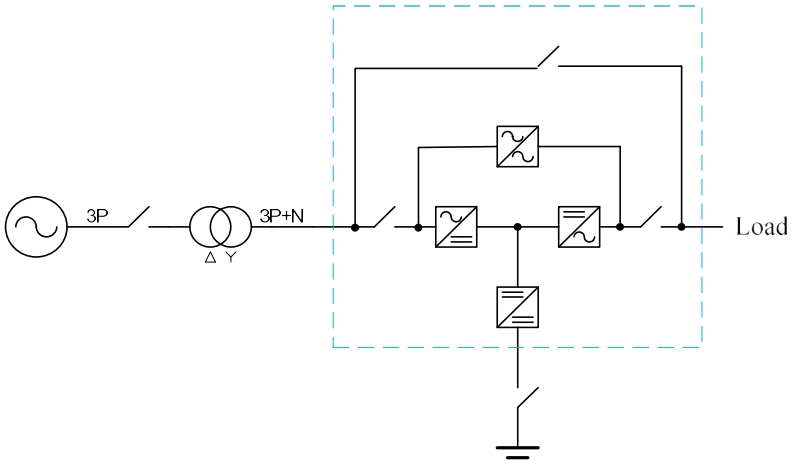
(1) The sizing takes into account 150% overload capacity

■ Electrical System Connections

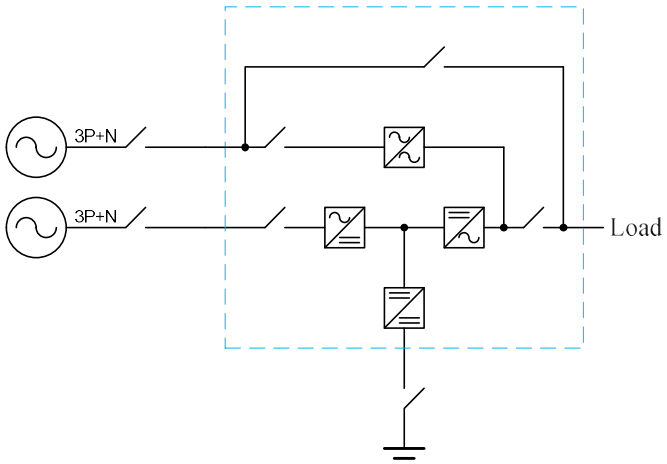
- UPS with single input



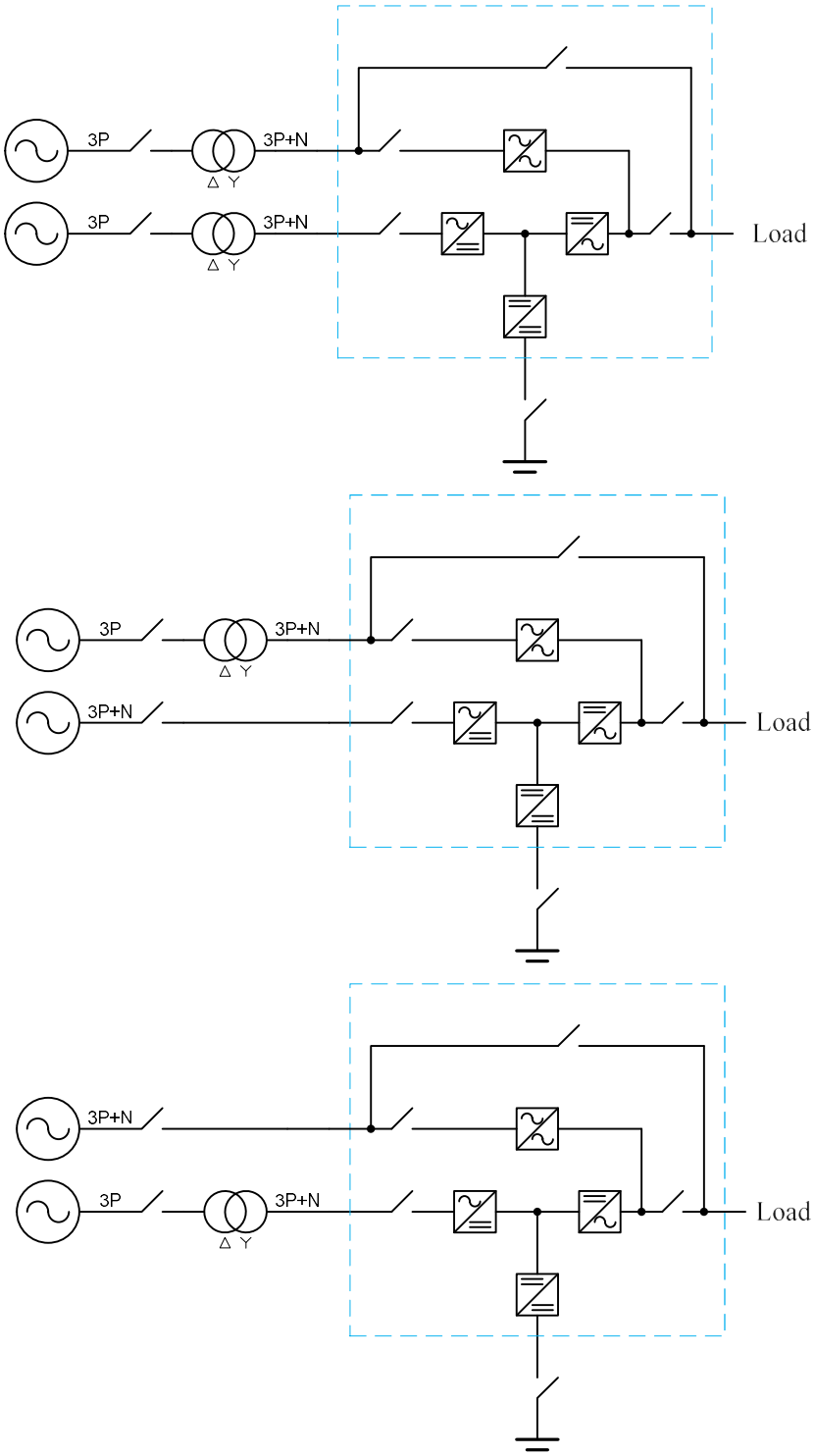
- UPS with single input and isolation transformer



- UPS with dual inputs (Option)

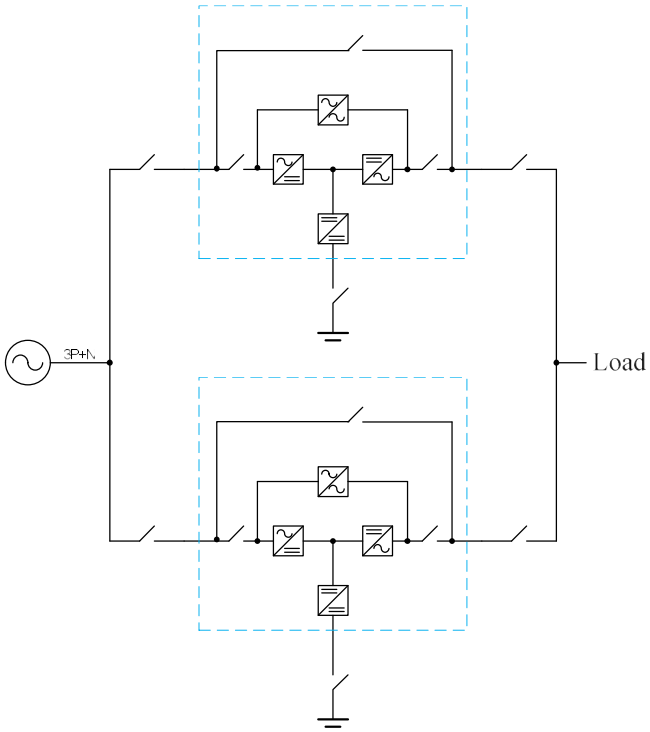


- UPS with dual inputs and isolation transformer (Option)

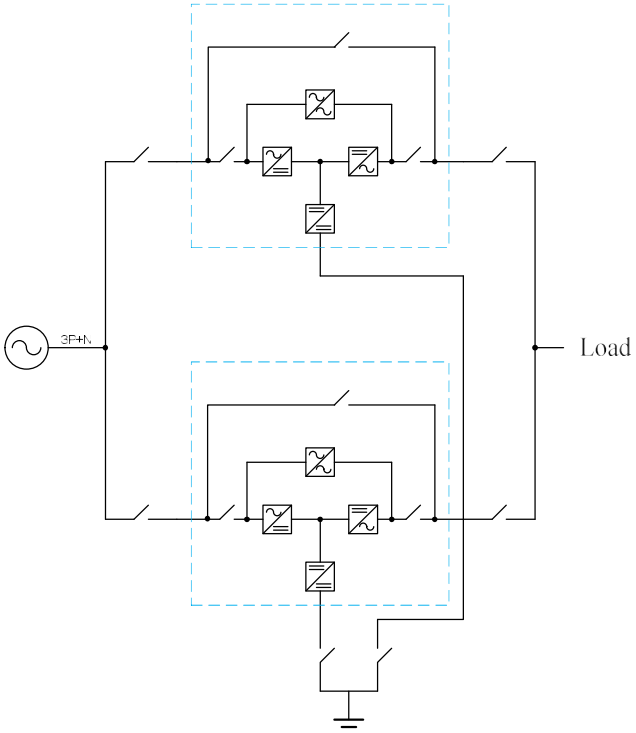


Note : You have to install an isolation transformer on one of the inputs if the two power system are different.

- UPS in parallel, use separate battery

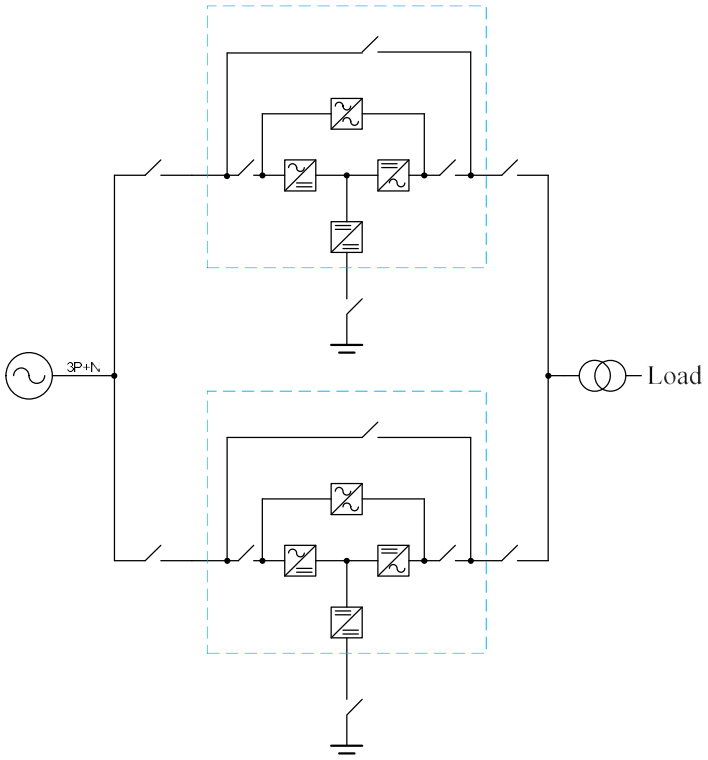


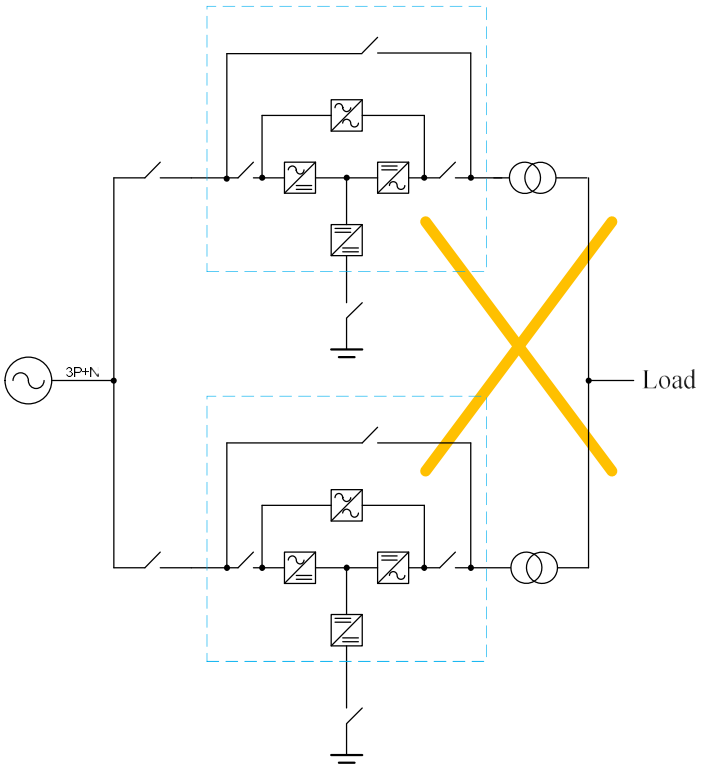
- UPS in parallel, use common battery



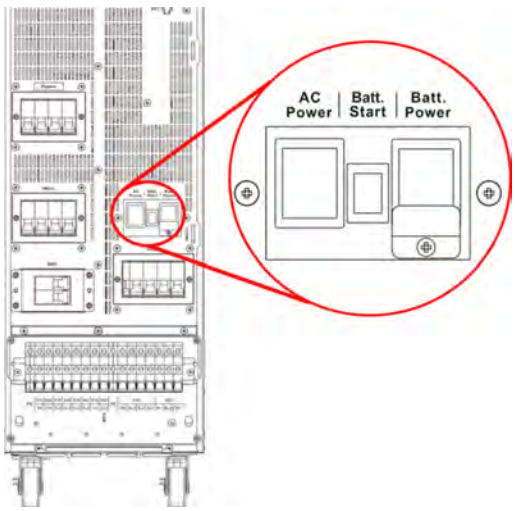
- UPS in parallel with output transformer

  Please do not use separate output transformer for each UPS. A common output transformer is recommended.

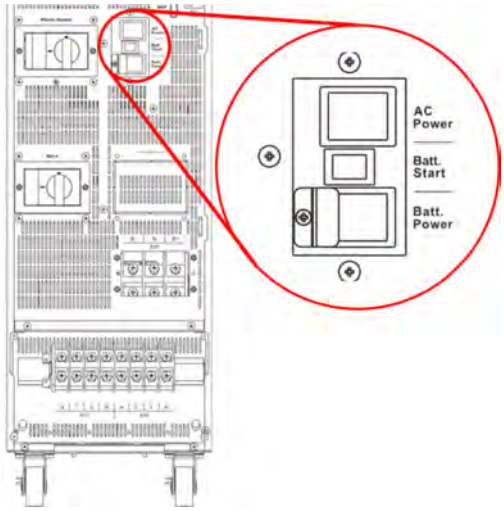




2.5 Auxiliary Power Supply Control Switch and Button



10-20kVA



30-40kVA

- **AC Power**

  This is auxiliary power switch for the working power.

  Please ensure this Power switch is on before turn on UPS. Don't switch off it when UPS is working.

- **Batt. Start**

  User can start-up UPS by battery when main input power is not available.

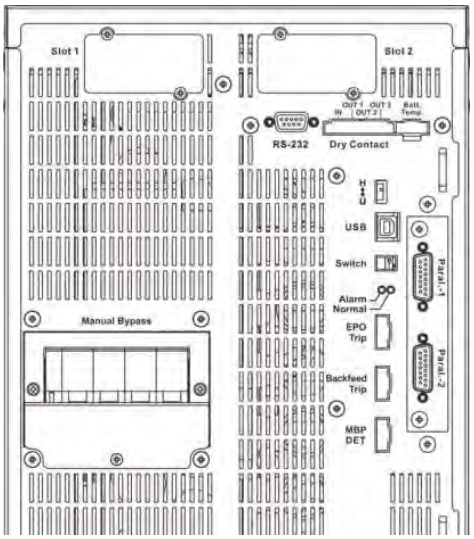
  Please ensure **Batt. Power** switch is on before push this button.

  Please find the detail descriptions of above items on section3.4.2.

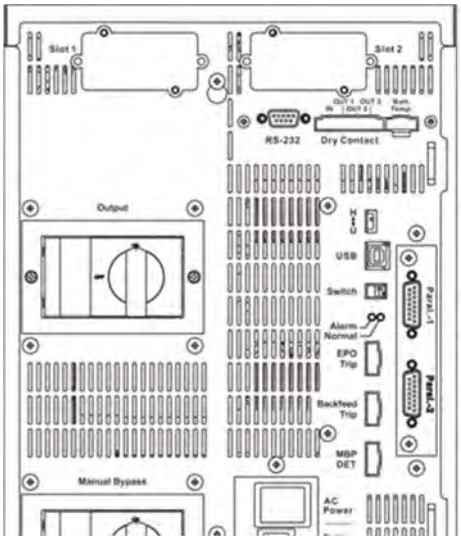
- **Batt. Power**

  This only for start-up UPS by battery.
  Please find the detail descriptions of above items on section3.4.2.

2.6 Communication Cables Connections



10-20kVA



30-40kVA

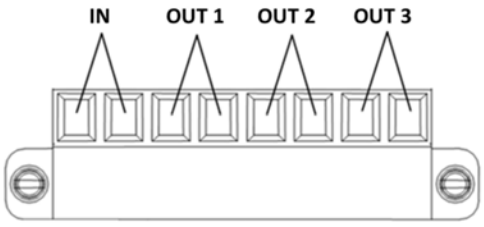
- **Dry Contacts**

The UPS provides 3 output dry contacts and1 input contact.

Specification of Output dry contact：250 VAC/ 2 A; 30 VDC/2 A
There are 3 jumpers (J1~J3) to set NC/NO for each output contact.
To short the input contact for send a command to UPS.

The user can change the definition for each contact, please contact the local authorized service agent to change the setting.

Jumper (J1~J3) are displayed in Internal Top View (Please check section 1-2.UPS Outlook View).



Default Definition	
General alarm	OUT-1
Load on inverter	OUT-2
Load on Bypass	OUT-3
Normal mode	IN

- **Communication Slot1**

This slot can install Relay card or RS-485 MODBUS card.

- **Communication Slot2**

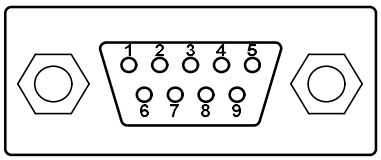
  This slot can install Relay card or SNMP card. Please ensure the SW2 switch to correct position when this slot is used.

- **Batt. Temp.--External battery temperature connector**

  Connect to external battery temperature sensor. Please refer to section 5-4.

- **RS-232**

  Pin Assignment:



2→TX (OUT)
3→RX (IN)
5→Ground

Baud Rate	57600bps
Data Length	8 bits
Stop Bit	1 bit
Parity	None

  This port is available for change the setting of UPS by setting software.

- **Paral-1&Paral-2—parallel communication port**

  Parallel communication cables are required to connect UPS each other when UPSs operation in parallel. Please refer to section 2-7for detail connections.

- **H↔U—communication selector**

  This switch is to select HMI or USB port. Please ensure this switch on “H” position for ensure HMI port is workable.

- **USB**

  This port is for service only.

- **Switch—the switch for terminal resistor of parallel communication**

  To ensure good parallel communication quality, please set the switch of the two farthest UPS to the “ON” position. Please refer to section 2-7 for detail.

- **LED Status Indictors**

  Normal: The UPS is normal.
  Alarm: The UPS has some abnormal conditions.

- **EPO-- Emergence Power Off**

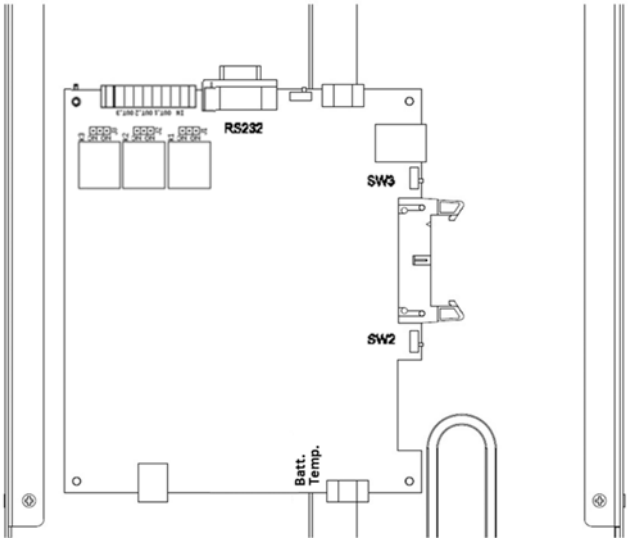
  This EPO contact allows you to turn off the UPS in case of emergency. Short this contact to turn off the UPS immediately.

- **Backfeed Trip**

  The UPS provide a backfeed protection contact to trip the external electromechanical device for isolation from the power circuit. The backfeed protection is for ensuring personnel safety against any risk of accidental energy return to the input circuit. It imposes the automatic opening of an switching device in case of a malfunction of the static switch.

- **MBP Det.**

  In case of external manual bypass switch has been installed with UPS system, this detector should be connected to auxiliary of external manual bypass switch.



- **SW2**

  When Relay card is installed in Slot2, please switch to “Slot” position.
  When SNMP card is installed in Slot2, please switch to “SNMP” position.

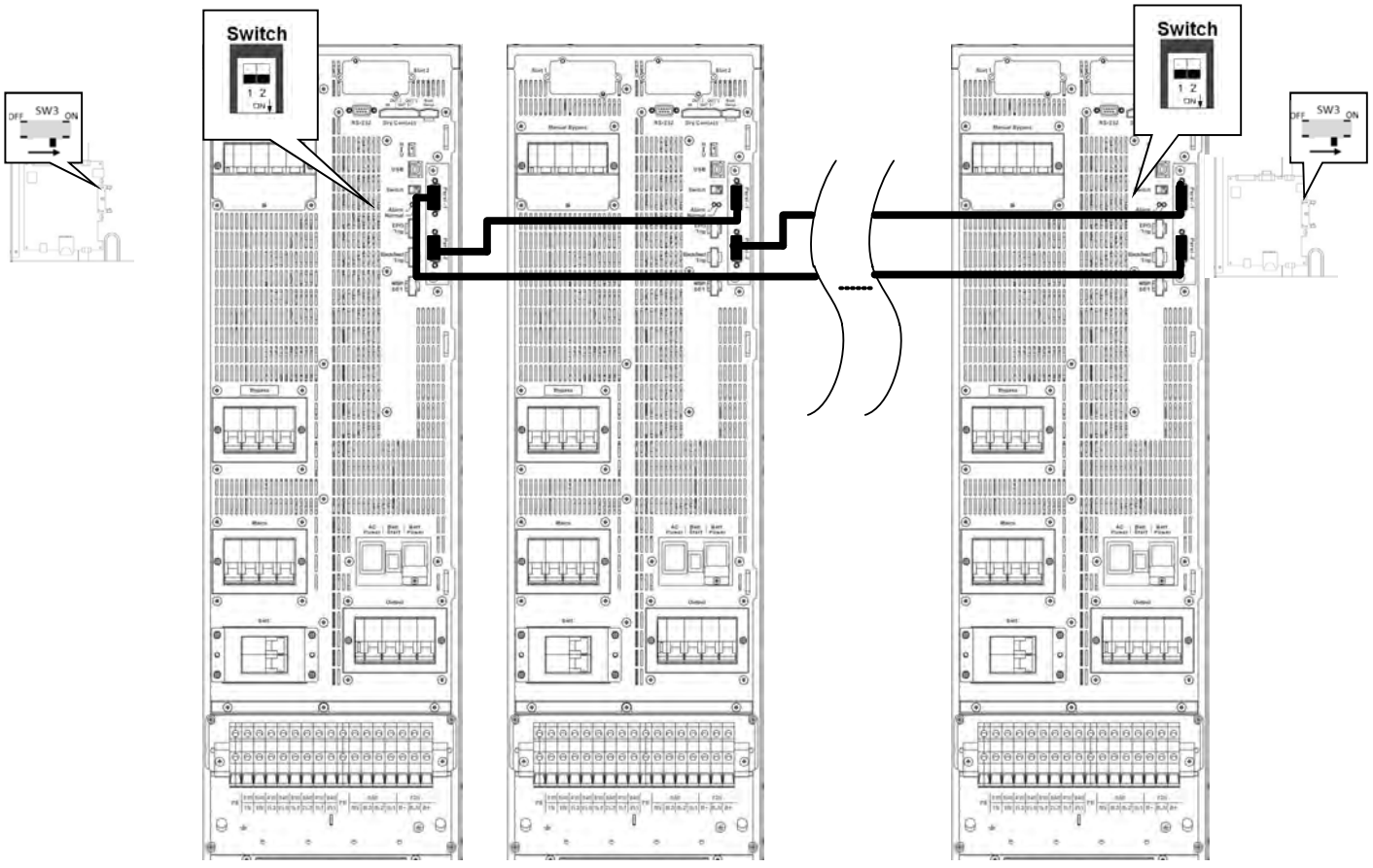
- **SW3--the switch for terminal resistor of parallel communication**

  To ensure good parallel communication quality, please set the switch of the two farthest UPS to the “ON” position. Please refer to section 2-7 for detail.

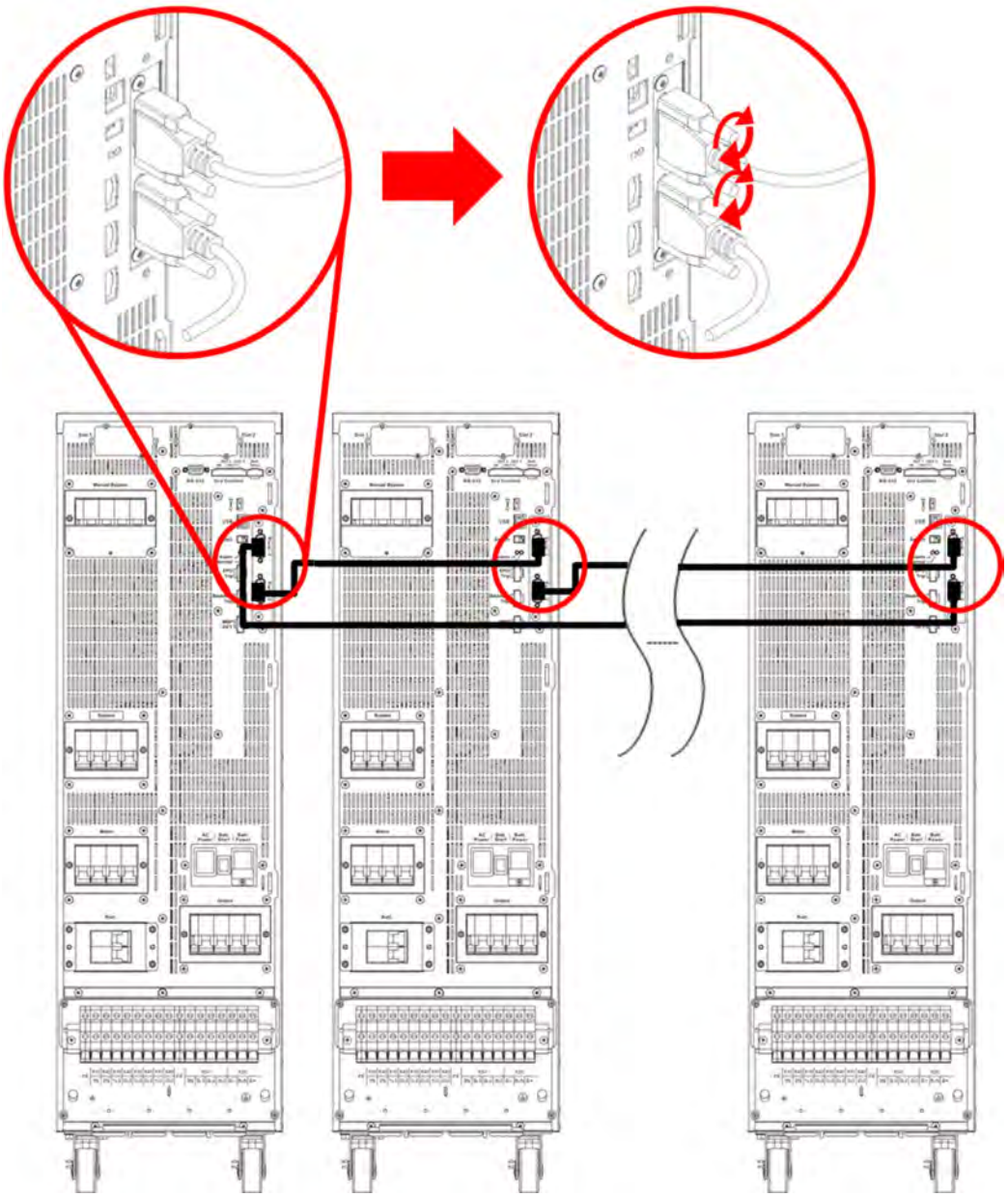
2.7 UPS Parallel Connections (Option)

The UPS can be operated in parallel for extend the capacity and enhances system reliability.

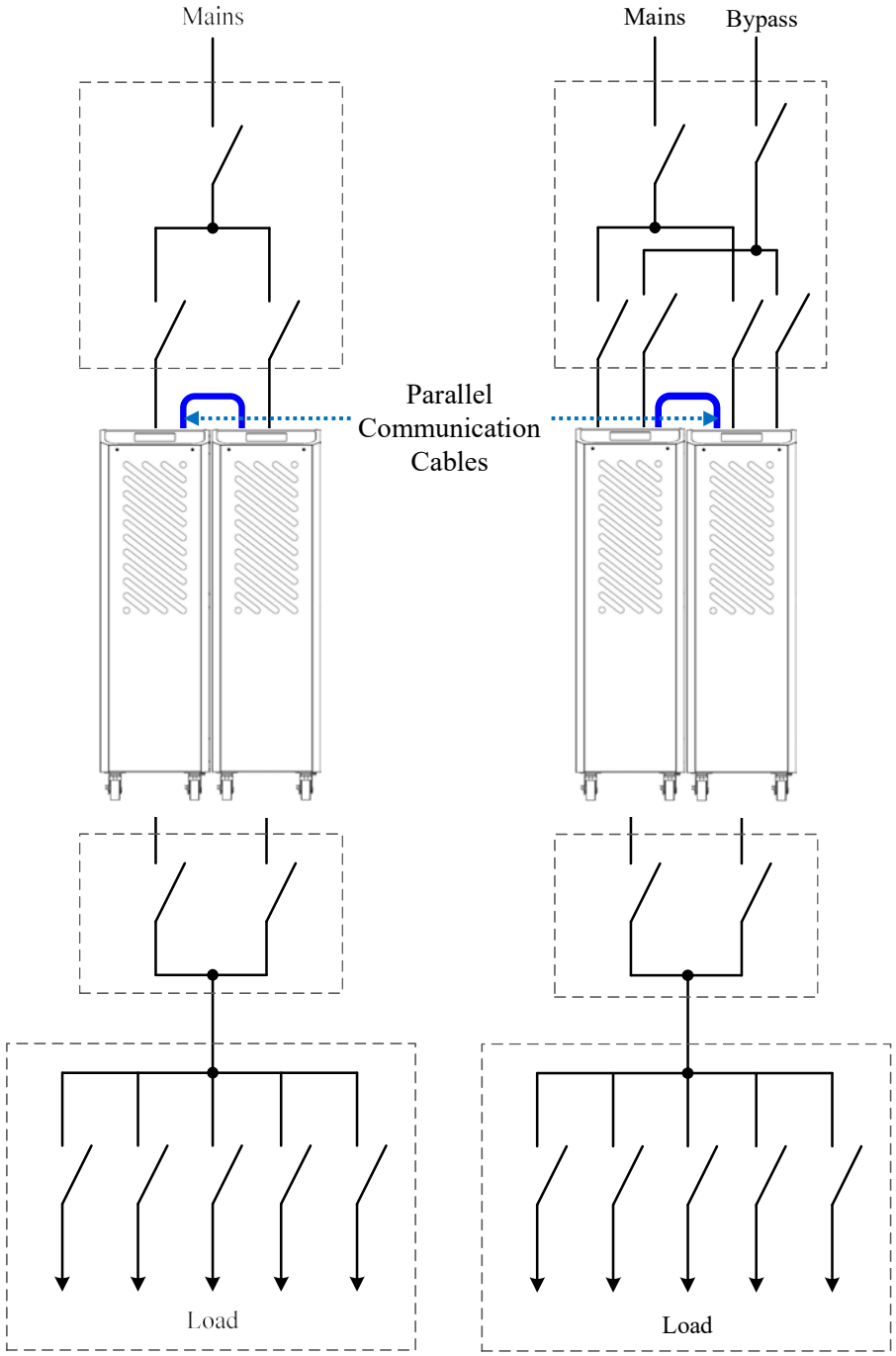
- Up to 6 UPS units can be operated in parallel.
- To make sure each UPS is equipped with parallel card (Option).
- The size and length of the input and output cables must be identical for all UPS units.
- The phase rotation must be the same for each UPS unit.
- It is recommended to use an external bypass cabinet to facilitate maintenance and system testing for parallel operation system.
- Parallel configuration must be performed by authorized and qualified technicians who are familiar with this UPS.
- Parallel communication cables are requested to connect to UPS each other.
- Please only use the parallel communication cables which are supplied with UPS manufacturer for ensure UPS can operate correctly in a parallel configuration.
- The parallel communication cables must be connected in a ring topology, and the maximum total length of the parallel communication cables must be less than 38 meters. To ensure good communication quality you must set the Switch & SW3 of the two farthest UPS to the “ON” position as shown in below. (Please reference to section 2.6 for SW3)



- When UPS operation in Parallel, please plug into parallel communication cables, as shown below.



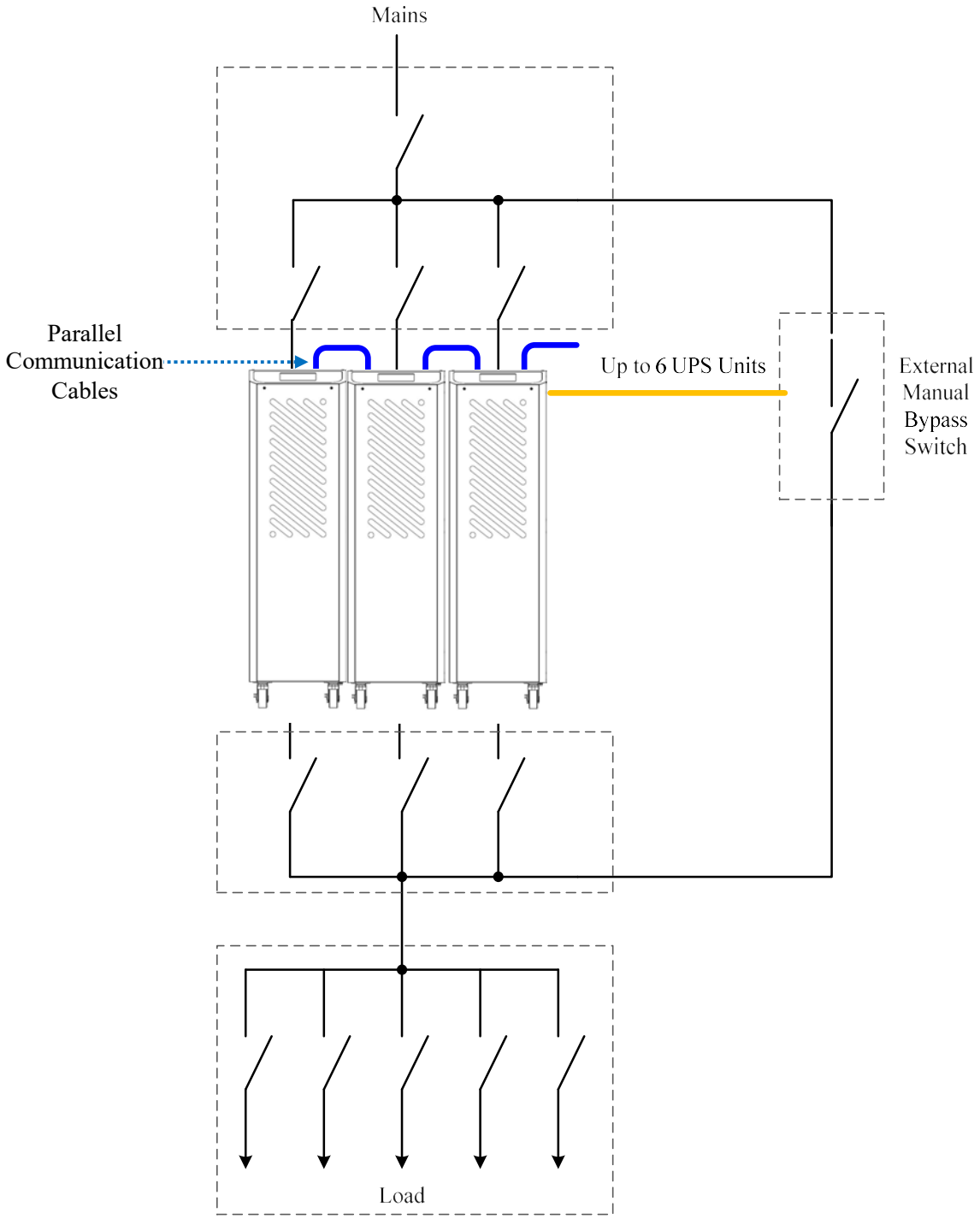
■ mended 1+1 parallel system configuration



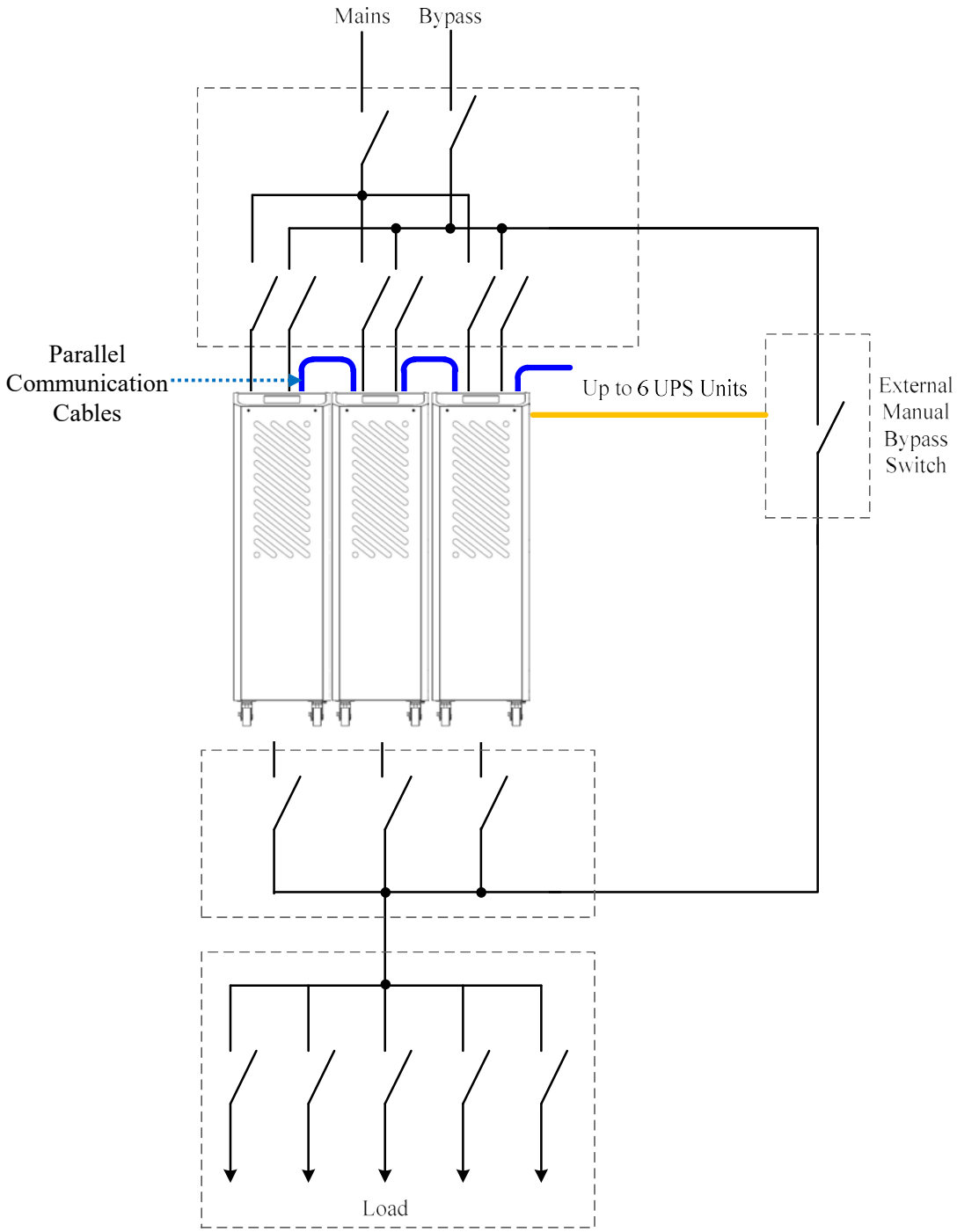
1+1 parallel, Single Input

1+1 parallel, Dual Inputs(Option)

■ Recommended N+1 parallel for single input system configuration



■ Recommended N+1 parallel for dual inputs system configuration



3. Operation Descriptions

3.1 Operating Mode

The UPS provides the following operating modes:

- **Normal Mode(Online Mode)**
  In Normal mode, grid power is passed through Rectifier then used to charge the battery and provide power through the Inverter simultaneously. Different output voltages settings can be set in VFI mode. The three options are 380/220V, 400/230V and 415/240V. These can be fine-tuned by ±8V.
- **Economy Mode (ECO)**
  Economy Mode effectively improves overall efficiency. In ECO Mode grid power is routed through the Static Switch to the load. At the same time, grid power continues to charge the battery in DC/DC mode through Rectifier following the same setup as VFI Mode. Inverter is also kept ready to switch power supply modes at any time. If VFI mode is set then power can be quickly routed from Bypass to Inverter.

  Attention: In ECO Mode, the power supply frequency and voltage will be less stable. Please check the load requirements and use ECO Mode with care.
- **Converter Mode**
  Converter Mode allows the user to provide a power supply with constant voltage and constant frequency based on their power requirements. The frequency can be set to 50HZ or 60HZ. The voltage options are 380/220V, 400/230V and 415/240V. These can be fine-tuned by ±8V. When Converter mode is used, in the event of grid power failure then power is provided from the battery in Back-up mode. In the event of the battery running low, UPS overload, Inverter failure or module overheating, the entire system will shut down.

3.2 Online Operations

An online UPS provides stable power that is not affected by an unstable main power supply (ex. grid power). Through the online UPS, grid power can provide a clean, noise-free power supply environment.
The online architecture offers three types of power supply methods depending on the power environment.

- **Normal Mode**
  When grid power is normal, once Rectifier has been turned on at the main power supply then the battery is charged in DC/DC mode while the required power is supplied via Inverter at the same time.
- **Bypass Mode**
  In the event of UPS overload, Inverter failure or module overheating, the power supply circuit switches from Inverter to the bypass output.
- **Battery Mode**
  When the UPS detects a failure in the main power supply then power is provided from the battery instead. The touch screen at the front of the module will also display current battery level to remind the user.

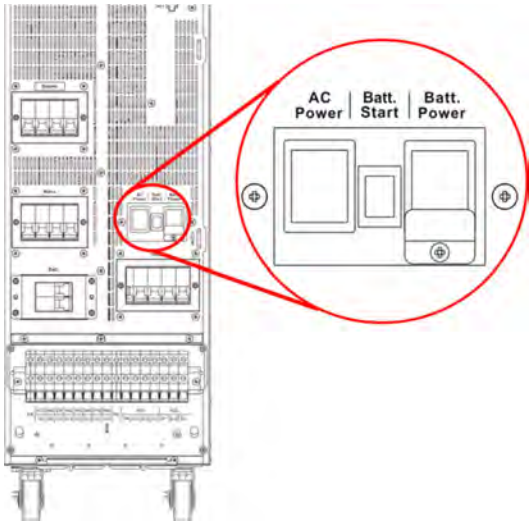
3.3 Manual Bypass Operation

When the manual bypass switch is activated, the load is powered directly from the bypass input. This operation is useful when maintenance needs to be carried out on UPS since service personnel can work on the installation without having to cut off the power to the load.

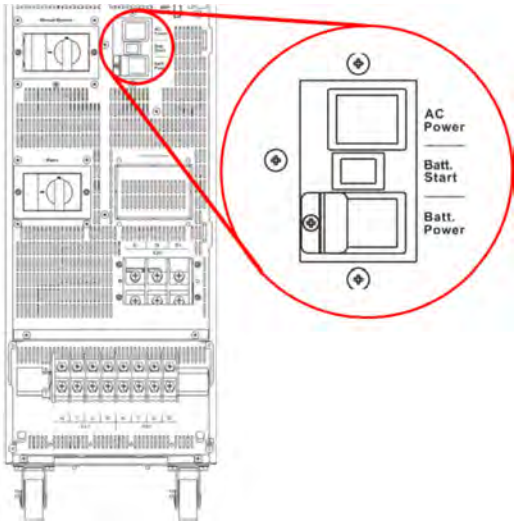
Attention:

- ***UPS maintenance can only be performed by authorized and qualified technicians who are familiar with this UPS.***
- ***If the UPS is in battery mode, turn on the manual bypass switch may cut off power to the load.***

3.4 Operation Processes



10-20kVA



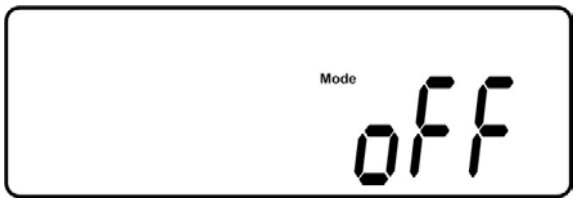
30-40kVA

3.4.1 Normal Mode Start-up

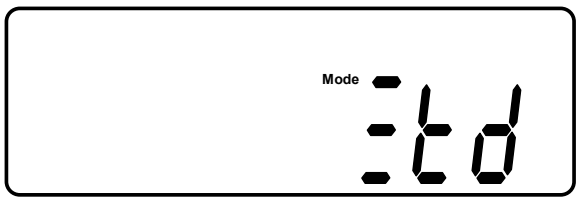
(1) In the rear of UPS, switch ON the ***AC Power*** switch.

(2) Close UPS Mains Input and Bypass Input Switches if equipped.

(3) Hold down and then click on LCD display,and it will take you to the 【setting page】.

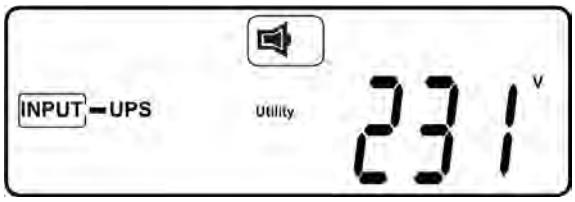


(4) Press to select Normal Mode on LCD display.

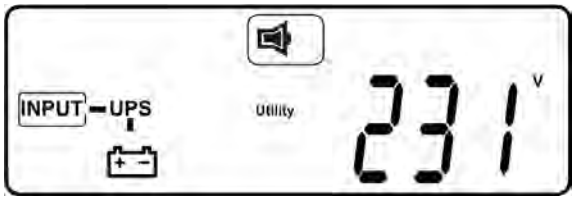


(5) Press to excute the command on LCD disaply.

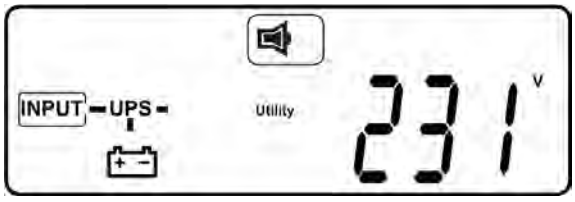
(6) Hold down and then click to return to flow chart Display. Wait for few minutes, the rectifier will be started.



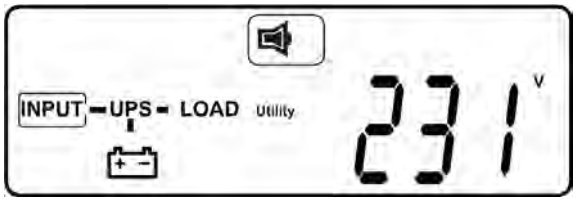
(7) Close the battery switch/fuses to connect the batteries after rectifier has been turned on.



(8) The inverter will be started and supply output voltage.



(9) Close UPS Output Switch to supply the power to the load.



3.4.2 Cold Start

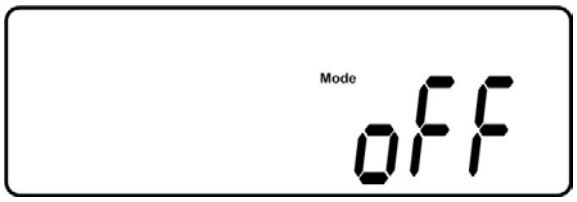
(1) User can start-up UPS by battery when main input power is not available.

(2) If the UPS with external batteries configuration, it must to make sure the batteries are connected.

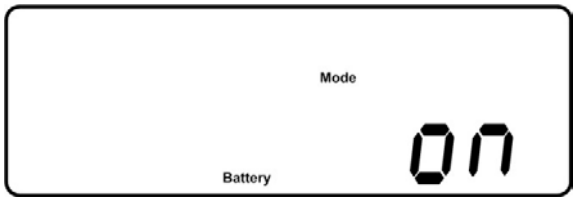
(3) Switch ON the ***Batt. Power*** switch in the rear of UPS.

(4) In the rear of UPS, push button and hold down the button that indicated "**Batt. Start**" for 7 seconds at least.

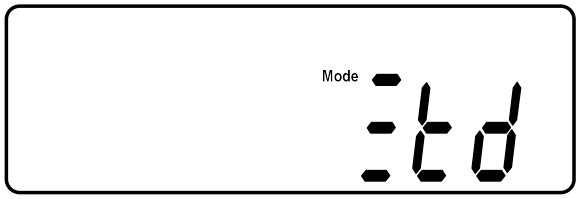
(5) Hold down and then click on LCD display,and it will take you to the 【setting page】.



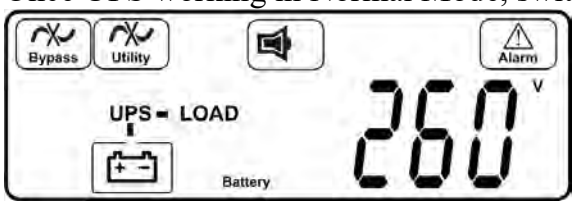
(6) Press to select Mode Battery on and then press to excute the commad on LCD display.



(7) Press to selectNormal Mode and then then press to start UPS on LCD display.

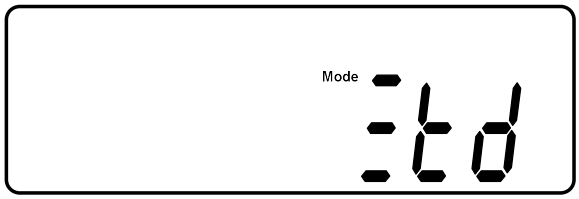


(8) Once UPS working in Normal Mode, switch OFF the ***Batt. Power*** switch.

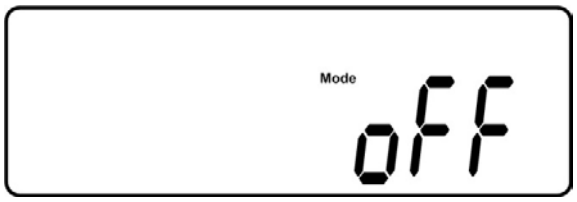


3.4.3 Shutdown

(1) Hold down and then click on LCD display,and it will take you to the 【setting page】.



(2) Press to select Mode oFF and then press to excute the command on LCD display.

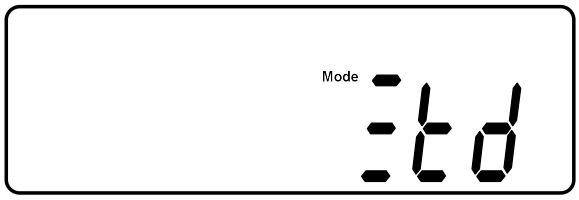


Attention:

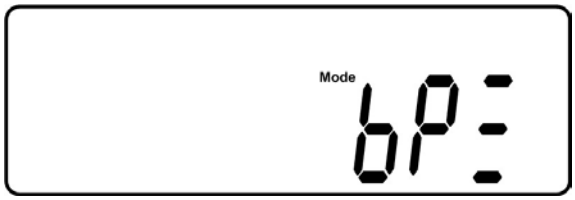
- ***IMMEDIATE LOAD OFF!***
- ***For turn off the working power, switch OFF both AC Power and Batt. Power switches in the rear of UPS.***

3.4.4 Switch to bypass

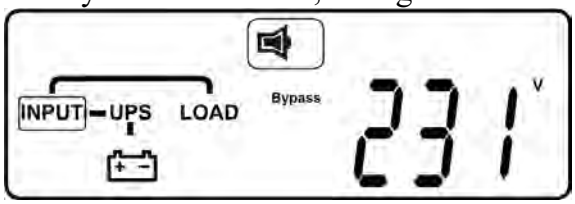
(1) Push and then click on LCD display, and it will take you to the 【setting page】.



(2) Click to select Mode bps and then press to excute the command on LCD display



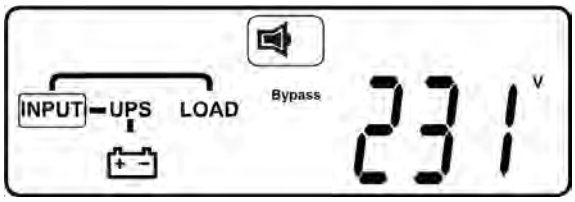
(3) The Inverter will be shut down and bypass will supply the power to the load. If the battery is disconnected, Charger will be shut down as well.



3.4.5 Switch from normal mode to maintenance bypass

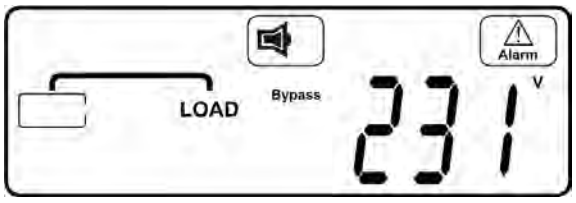
(1) Follow the processes in section 3.4.4 to switch to bypass.

(2) The Inverter will be shut down and bypass will supply the power to the load.



(3) Open/disconnected the external battery Switch/fuses if equipped.

(4) Close the maintenance bypass switch.



(5) Follow the processes in section 3.4.3 to shutdown UPS.

(6) Open Output and Mains/Bypass Input switch.

(7) In the rear of UPS, switch OFF***AC Power*** and ***Batt. Power*** switches.

3.4.6 Maintenance bypass → normal mode

(1) In the rear of UPS, switch ON ***AC Power*** switch for start working Power.

(2) Close Output and Mains /Bypass Input switch.

(3) Follow the processes in section 3.4.4 to switch to bypass.

(4) Open maintenance bypass switch.

(5) Follow the processes in section3.4.1 to start-up UPS.

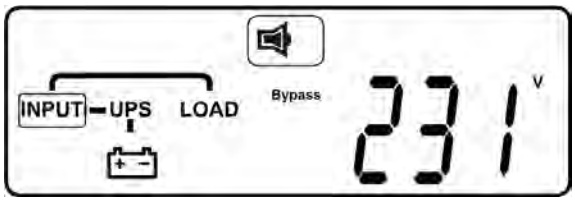
3.4.7 ECO mode

(1) Hold down and then click on LCD display, and it will take you to the 【setting page】.

(2) Press to select Mode ECo and then press to excute the command on LCD display

(3) The inverter will be standby and bypass supply output voltage.

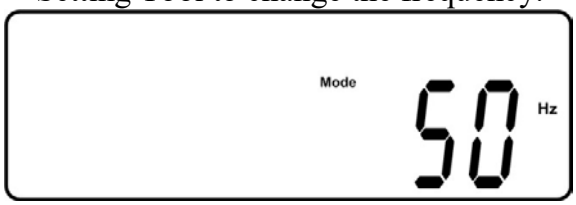
(4) Close UPS Output Switch to supply the power to the load.

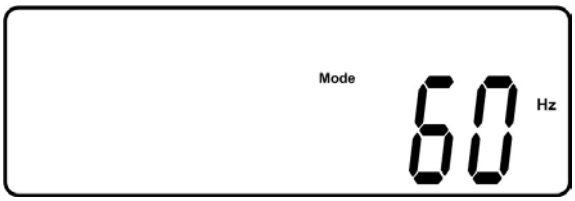


3.4.8 Converter mode (CVCF)

(1) Hold down and then click on LCD display, and it will take you to the 【setting page】.

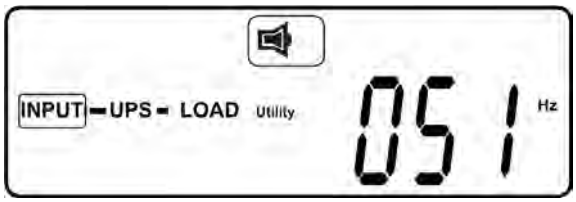
(2) Press to selectConvertermode and then press to excute the command on LCD display. It will display the existing setting of output frequency. Please use Setting Tool to change the frequency.

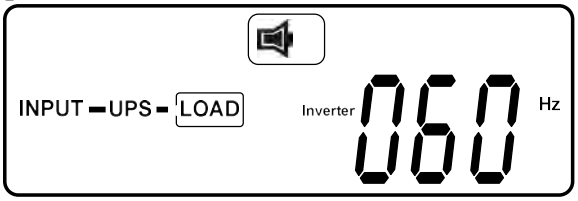




(3) The inverter will be started and supply output voltage.

(4) Close UPS Output Switch to supply the power to the load.



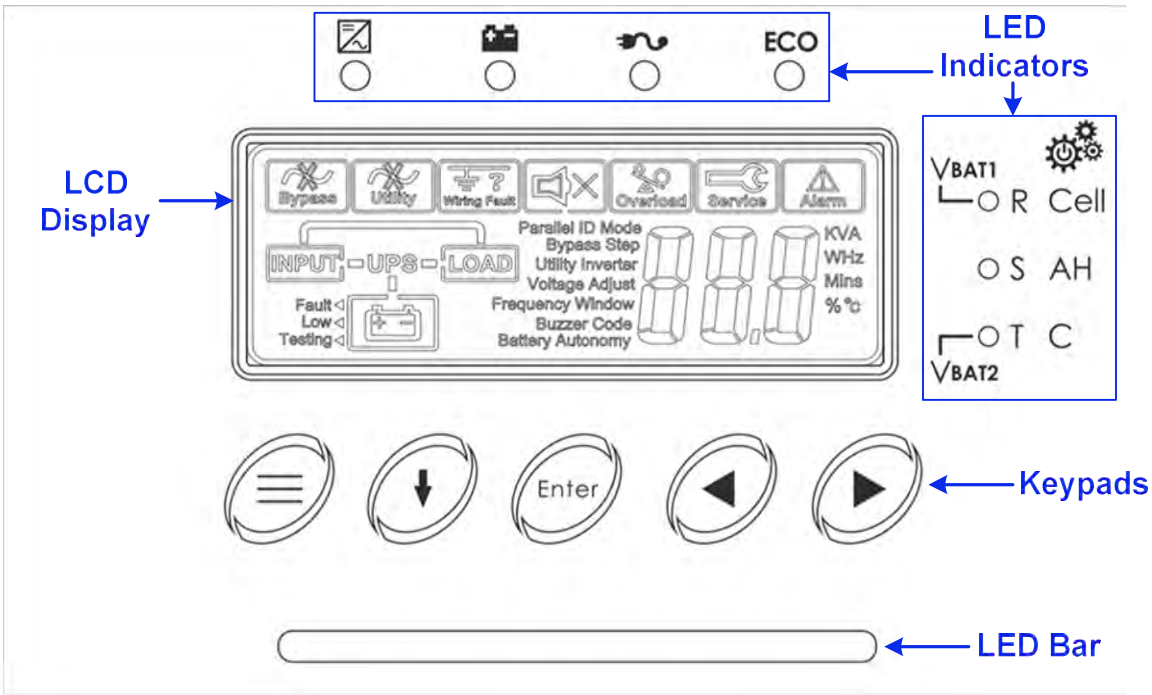


4. Control Panel Operation and Function Description

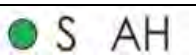
Each UPS is equipped with LCD control panel that includes LCD display, LED indicators and operation keypads to provide a simple user interface. User can have the real time input/output voltage, frequency, current and battery information and change UPS settings from the panel.

Please refer to below section for learn more detail information and functions of the LCD panel.

4.1 Screen Introduction

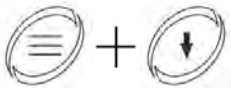


4.2 LED Indicators

LED Indicator	Color	Description
	Green	Load on Inverter
	Yellow	In backup mode
	Green	Load on Bypass
	Green	In ECO mode
	Green	Represent the battery string positive voltage or R phase voltage or the number of battery cells.
	Green	Represent S phase voltage or battery AH
	Green	Represent battery string positive voltage or T phase voltage or battery charge C-rate

LED Bar : Green light means the UPS is normal, and Red light means the UPS is abnormal.

4.3 Keypads

Keypad	Description
	Menu switch button
	Sub-Menu switch button
	Hold down  and then click  to switch the Main-Menu between "Real time information" and "Setting/Command".
	Confirm and change the setting
	Go to previous information
	Go to next information

4.4 Symbols on the LCD Display Panel

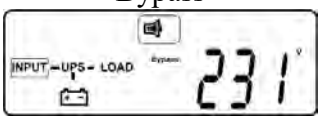
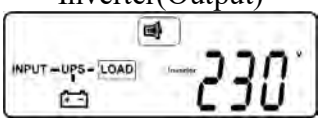
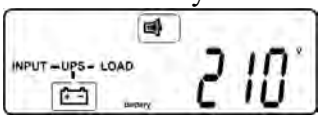
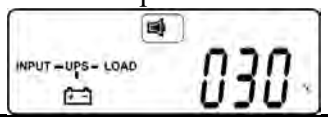
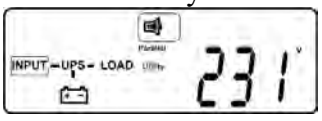
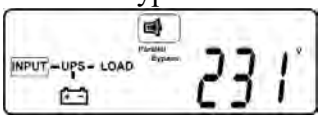
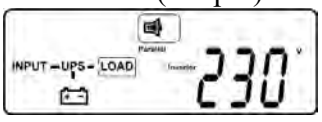
Item	Symbol	Description
1	INPUT	Utility or Bypass Source.
2	Low ◄	Battery Low.
3	Fault ◄	Battery Abnormal
4	Testing ◄	Battery is testing.
5	Overload	UPS Overloading.
6	Service	UPS is working in maintenance mode.
7	Bypass	Bypass Input Abnormal, UPS fails to transfer to bypass, Bypass Abnormal at ECO mode.
8	Utility	Utility Input Abnormal.
9		Buzzer on/off.
10	Alarm	UPS has abnormal status.
11	INPUT – UPS – LOAD	UPS Flow Chart.
12	88.8 KVA WHz Mins %°c	3-Digit Measurement Display.
13		Indicates the item to be measured.

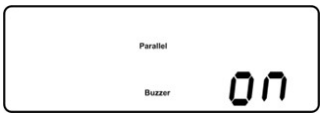
4.5 Alarm code

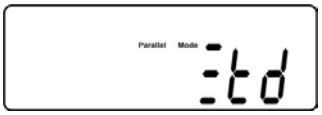
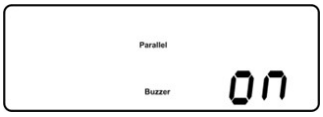
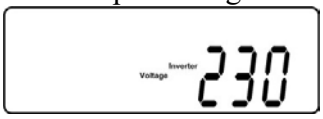
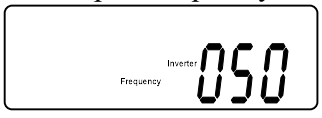
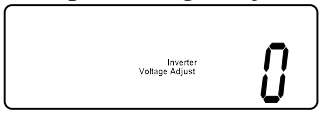
Item	Symbol	Description
1	no	UPS Normal
2	ERR	Abnormal communication with DSP.
3	119	Parallel communication error.
4	001	General alarm.
5	002	General inverter alarm.
6	003	General mains alarm
7	004	General Discharger alarm.
8	005	General Charger alarm.
9	006	General Bypass alarm.
10	010	Over temperature alarm.

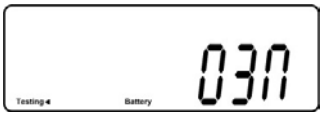
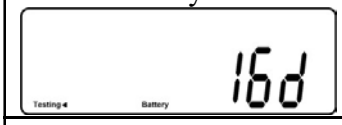
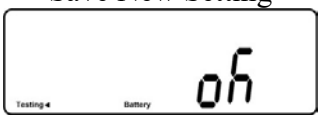
4.7 Function Menu

All menu functions are showing as below table.

Main-Menu	Menu	Sub-Menu	Functions
Real time information	**Measurement**	Utility 	Display the UPS input measurements. Press or to change the parameters. V=>A=>KVA=>KW=>Hz
		Bypass 	Display the UPS bypass measurements. Press or to change the parameters. V=>A=>KVA=>KW=>Hz
		Inverter(Output) 	Display the UPS output measurements. Press or to change the parameters. V=>A=>KVA=>KW=>%=>Hz
		Battery 	Display the UPS battery measurements. Press or to change the parameters. V_{BAT1}=>I_{BAT1}=>V_{BAT2}=>I_{BAT2}=>KW=>%
		Temperature 	Display the UPS inner temperature measurement.
	Parallel Measurement(1)	Utility 	Display the UPS input measurements. Press or to change the parameters. V=>A=>KVA=>KW=>Hz
		Bypass 	Display the UPS bypass measurements. Press or to change the parameters. V=>A=>KVA=>KW=>Hz
		Inverter(Output) 	Display the UPS output measurements. Press or to change the parameters. V=>A=>KVA=>KW=>%=>Hz
		Battery 	Display the UPS battery measurements. Press or to change the parameters. V_{BAT1}=>I_{BAT1}=>V_{BAT2}=>I_{BAT2}=>KW=>%

Real time information	**UPS Mode**		Display the UPS in which mode. a. oFF : Shutdown b. Battery on : Cold Start Recharge Ready c. Std : Normal Mode d. Eco : ECO Mode e. 050 or 060: Converter Mode Frequency f. byS : Load on Bypass
	Parallel UPS Mode(1)		Display parallel UPS in which mode. a. oFF : Shutdown b. Battery on : Cold Start Recharge Ready c. Std : Normal Mode d. Eco : ECO Mode e. 050 or 060:Converter Mode Frequency f. byS : Load on Bypass
	Alarm List		Display the UPS alarm code.
	Battery Test Status/Result		Display the UPS battery test result. a. oFF : Battery test disable. b. on: Battery is testing c. 146 : Battery not pass test d. PAS: Battery test pass e. FAL: Battery test fail/unfinished. f. 150 : Battery test conditions don't match g. 151: Waiting battery test.
Setting/ Command	**Single Unit Command**	Mode 	Press ◄ or ► to select UPS command. a. oFF : Shutdown b. Battery on : Cold Start Recharge Ready c. Std : Normal Mode d. Eco : ECO Mode e. 50 or 60: Converter Mode Frequency f. byS : Load on Bypass Press Enter to execute the command.
		Buzzer 	Press ◄ or ► to change buzzer setting. a. on : Enable buzzer. b. oFF: Disable buzzer c. 11:Clear latch alarm and muted Press Enter to confirm the setting.

Setting/ Command	**Parallel Command(1)**	Mode 	Press or to select UPS command. a. OFF : Shutdown b. Battery On : Cold Start Recharge Ready c. Std : Normal Mode d. Eco : ECO Mode e. 50 or 60: Converter Mode Frequency f. byS : Load on Bypass Press to execute the command.
		Buzzer 	Press or to change buzzer setting. a. On : Enable buzzer. b. OFF: Disable buzzer c. 11 :Clear latch alarm and muted Press to confirm the setting.
	Battery Setting	Cells 	Press or to change the number of battery cells. 192=>194…=>240 Press to confirm the setting.
		AH 	Press or to change the battery capacity AH. 1=>2=>…=>999 Press to confirm the setting.
		C 	Press or to change the battery charge C-rate. 0.0=>0.1…=>1.0 Press to confirm the setting.
	Inverter Voltage Setting	Output Voltage 	Press or to change the output rated voltage. 220=>230=>240 Press to confirm the setting.
		Output Frequency 	Press or to change the output frequency. 50=>60 Press to confirm the setting.
		Output Voltage Adjust 	Press or to adjust output voltage. -8=>-7…=>+8 Press to confirm the setting.

Setting/ Command	**Parallel Setting**	Parallel ID 	Press ◄ or ► to change the UPS ID. 1=>2…=>6 Press Enter to confirm the setting.
		Number of Parallel UPS 	Press ◄ or ► to change the number of parallel UPS. 1=>2…=>6 Press Enter to confirm the setting.
	Battery Test Schedule(2)	Year 	Press ◄ or ► to change the year setting. 19=>20…=>99 This means 2019,2020…2099.
		Month 	Press ◄ or ► to change the month setting. 01=>02…=>12
		Day 	Press ◄ or ► to change the day setting. 01=>02…=>31
		Hour 	Press ◄ or ► to change the hour setting. 00=>01…=>24
		Interval Weeks 	Press ◄ or ► to set the interval weeks of battery test. off=>01…=>99 off: Battery Test Disable
		Save New Setting 	Press Enter to save the new setting of battery test schedule.

(1) This menu only appears when UPS is working in parallel mode.

(2) Setting the battery test start date& time (Year/Month/Day/Hour) and interval weeks. The UPS will do the battery test every interval weeks since the start time automatically if the Battery Test is enabled.

5. Options

5.1 Dry Contact Card

This card provides three output dry contacts and three input contact. These contacts are programmable and user can change the definition for each contact. Please refer to Dry Contact Card manual for more detail.

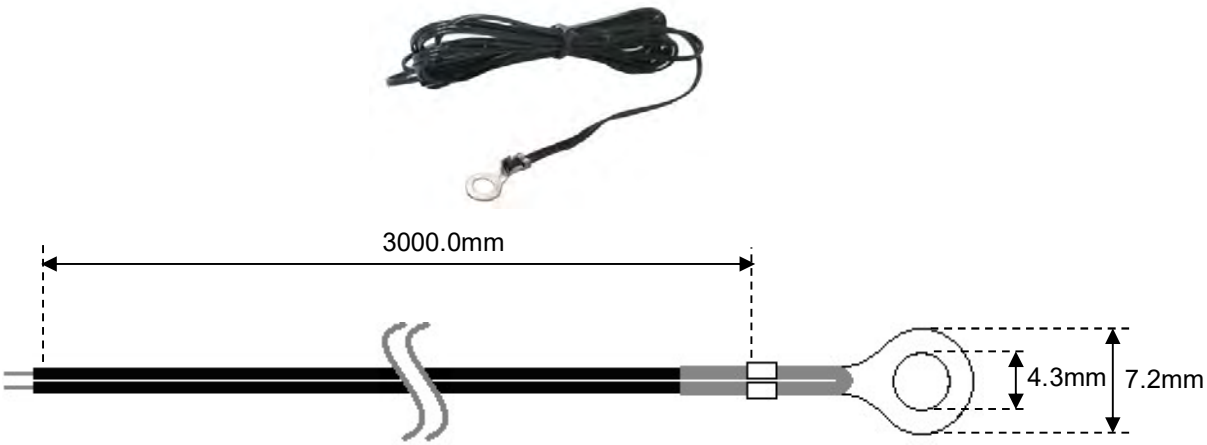
5.2 RS-485 MODBUS Card

RS-485 ports with JBUS/MODBUS protocol. Please refer to RS-485 Card manual for more detail.

5.3 SNMP Card

This is the Ethernet network card with TCP/IP, HTTP and SNMP protocols.

5.4 Temperature Sensor



Measure the battery temperature.

5.5 Parallel Communication Card

The parallel communication cards are required when UPS in parallel and it comes with 1.5 meters parallel communication cable.
A longer parallel communication cable is available for more UPS in parallel.

6. Technical Specification

Capacity		10 kVA	20 kVA	30 kVA	40 kVA
Input					
Voltage		400V 3 Phase + N			
Voltage Tolerance		±20% @100% load, -40% ~-20% @50% load			
Frequency		40 ~ 70Hz			
Power Factor		≧ 0.99			
THDi		≦3%			
Output					
Voltage		380/400/415V 3 Phase + N			
Voltage Tolerance		±1% (Static Load)			
Frequency		50/60Hz			
Frequency Tolerance		±0.01% (free running)			
Power Factor		0.9			
Crest Factor		3:1			
Voltage Harmonic Distortion		≦2% with linear load;			
		≦5% with distorting load			
Overload		110% for 60 minutes, 125% for 10 minutes, 150% for 1minutes (<105% overload continuously without alarm, >= 105% <110% continuously with alarm)			
Bypass					
Voltage		380/400/415V 3 Phase + N			
Voltage Tolerance		Preventive range ±10% (Adjustable ±5% ~ ±15%) Critical range ±25% (Adjustable ±16% ~ ±30%)			
Frequency		50/60Hz			
Frequency Tolerance		±1Hz / ±3Hz (Selectable)			
Battery					
Number of batteries		12V,26/28/30/32/ 34/36/38/40pcs configurable	12V,32/34/36/38/40pcs configurable		
Charging Current	100% Load	3.5A	7.0A	10A	13A
	80% Load	7.0A	14A(1)	20A	26A(1)
Common Battery for Parallel Configuration		Yes			
Internal Battery		Available for housing 12V 7/9Ah 40pcs		N.A.	
Maximum Efficiency					
VFI Mode		>93.5%	>94.5%	>95%	>95%
ECO Mode		> 98%			
Backup		>92%	>93%	>94%	>94%

(1) To increase the charging current please refer to your sales contact

Capacity	10 kVA	20 kVA	30 kVA	40 kVA
HMI & Communication				
Display and MMI	LCD Display			
Built-in Communication Port	RS-232, EPO, Dry Contacts			
Optional Communication	2 Communication Slots for SNMP Card, RS-485 MODBUS Card, Dry Contact Card			
Mechanical Characteristic				
Dimensions (W x D x H) mm	260 x 850 x 890 (Wheel type)			
Weight (w/o battery)	74 kg	76 kg	85 kg	88 kg
Protection Grade	IP20			
Color	RAL 9005			
Environment				
Storage Temperature	-20℃ ~ 70℃			
Storage Humidity	≦ 95%			
Operation Temperature	0 ~ 40℃			
Operation Humidity	0 ~ 95% (w/o condensation)			
Operating Altitude	<1000 m without derating (1)			
Tested to standards	LVD : EN62040-1			
	EMC requirements : EN62040-2			
Mark	CE			
Noise (at 1 meter)	<52dBA	<52dBA	<58dBA	<58dBA

(1)Over 1000m above sea level, the maximum output capacity must be derated by 1% every additional 100m.