KRONOS Series

Installation and Operation Manual

CONTENTS

Preface

We thank you for the trust in selecting our UPS.

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

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

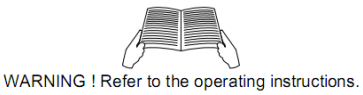
Should an abnormal message not covered in this manual appear, please contact your local authorized service agent for troubleshooting and repair.

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) Please ensure that the machine is standing upright during operation. Do not shake or tilt the machine. Avoid heavy impact.
  (3) Poor grounding will lead to current leakage. Please ensure that the AC power input is properly grounded (PE Ground) before making any connections.
  (4) Ensure 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) If the UPS needs to be moved or relocate, it must be 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 might spill into the UPS causing internal damage or electrocution.
  (8) Ensure 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.
    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.

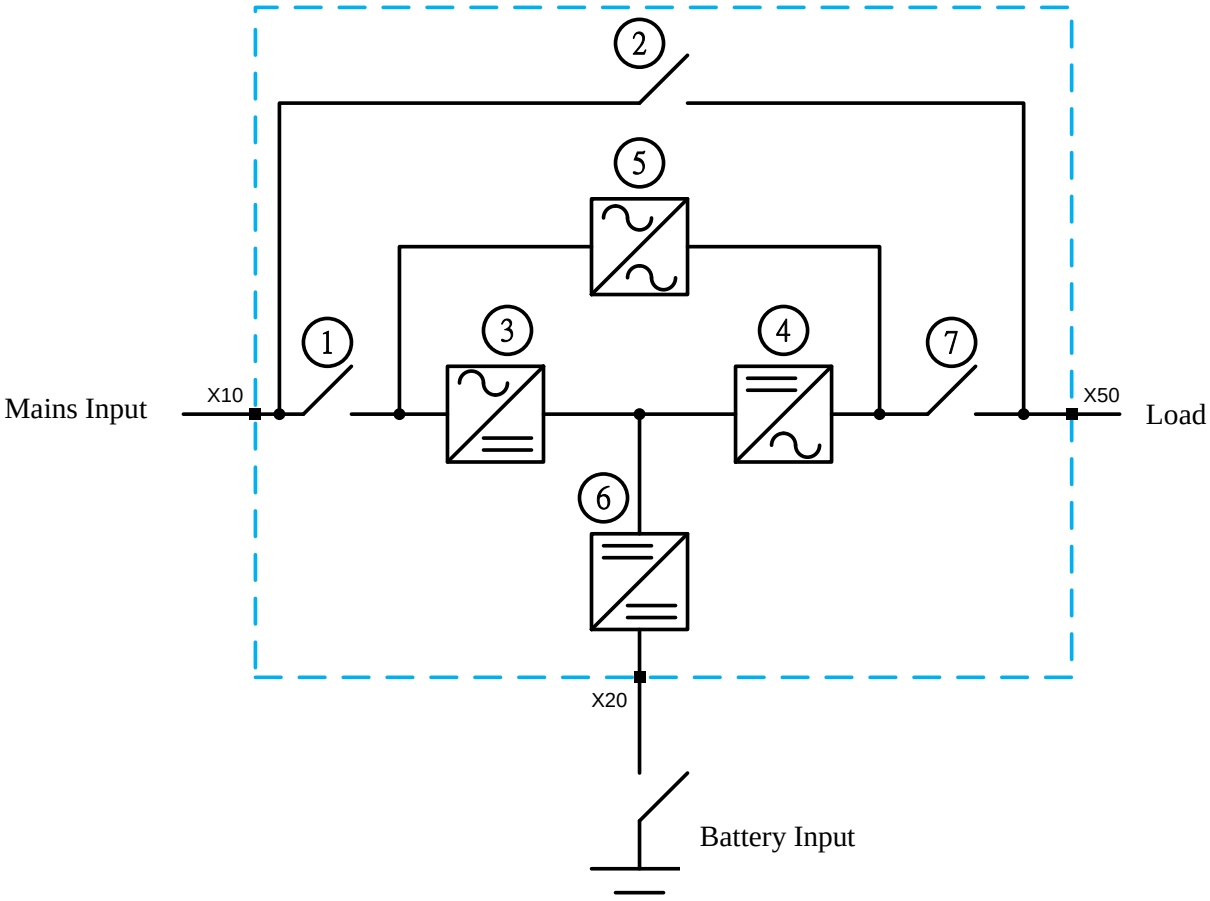
WARNING ! High voltage inside.

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

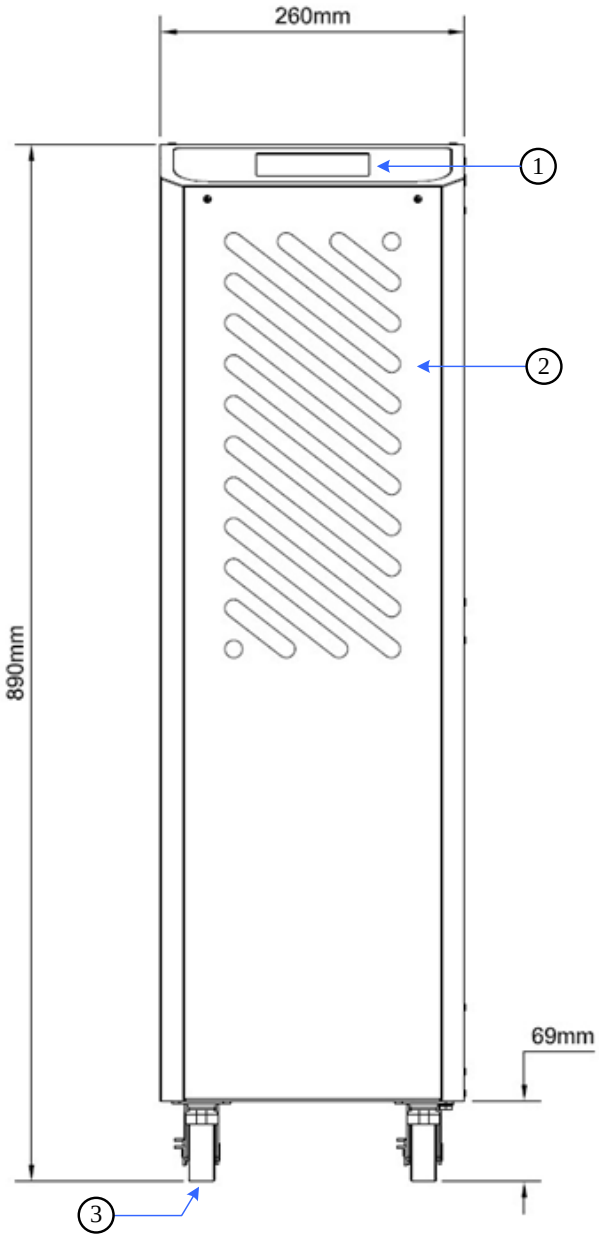
⑤ Static Switch

⑥ Charger/Booster

⑦ Output Switch

1.2 UPS Outlook View

■ 10-20KVA Front View

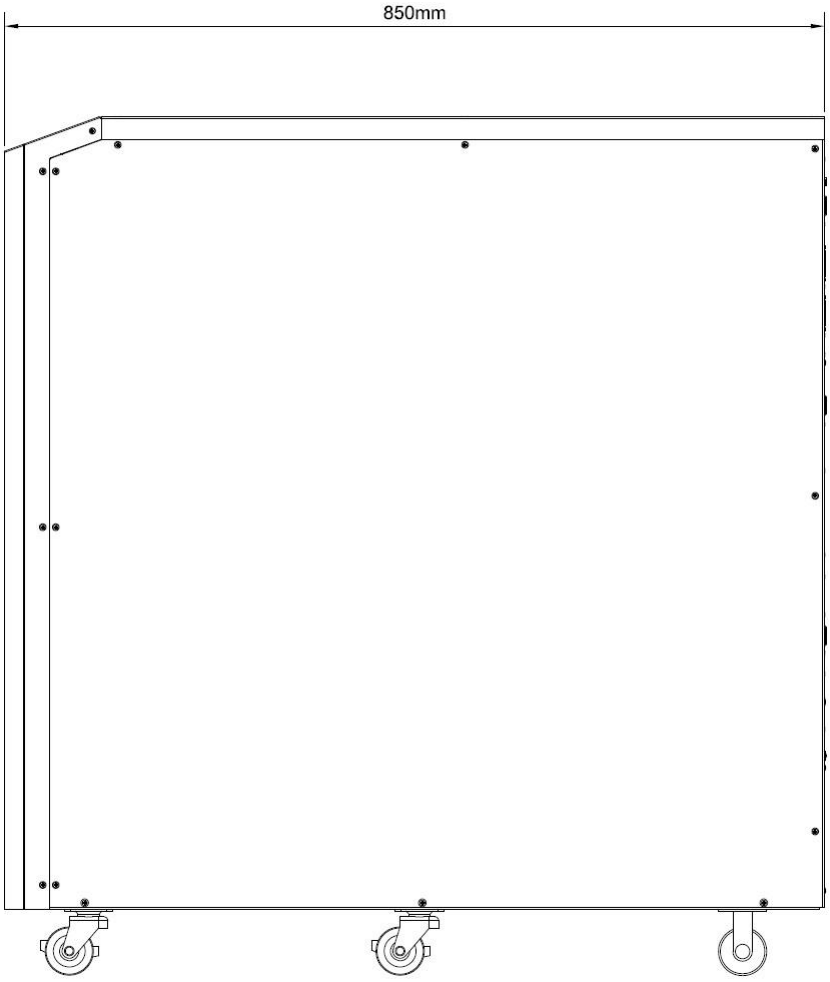


① Control Panel with Colorful LCD Touch Screen

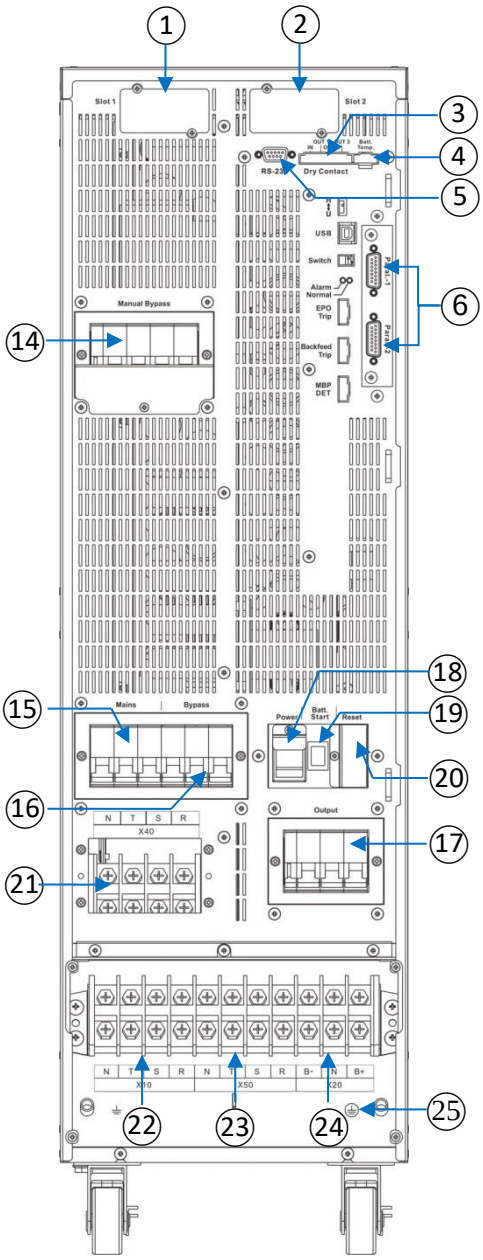
② Ventilation Grille

③ Wheels for Handling

- **10-20KVA Right Side View**



■ 10-20KVA Rear View



① Communication Card Slot 1

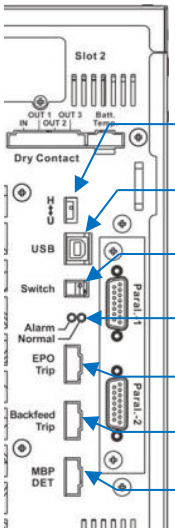
② Communication Card Slot 2

③ Output & Input 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 2-5.

⑭ Manual Bypass Switch

⑮ Mains Input Switch

⑯ Bypass Input Switch (Option)

⑰ Output Switch

⑱ Power

⑲ Batt. Start

⑳ Reset for Service Only

㉑ X40: Bypass Input Connection Terminals (R, S, T, N) (Option)

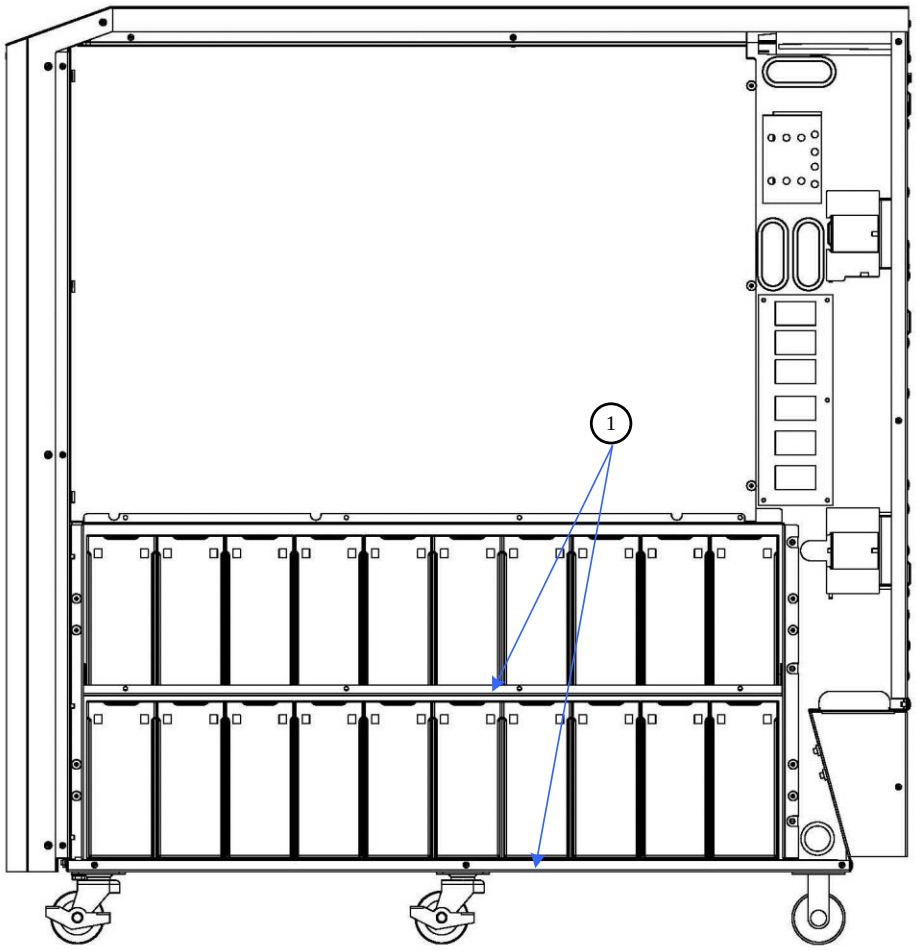
㉒ X10: Mains Input Connection Terminals (R,S,T, N)

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

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

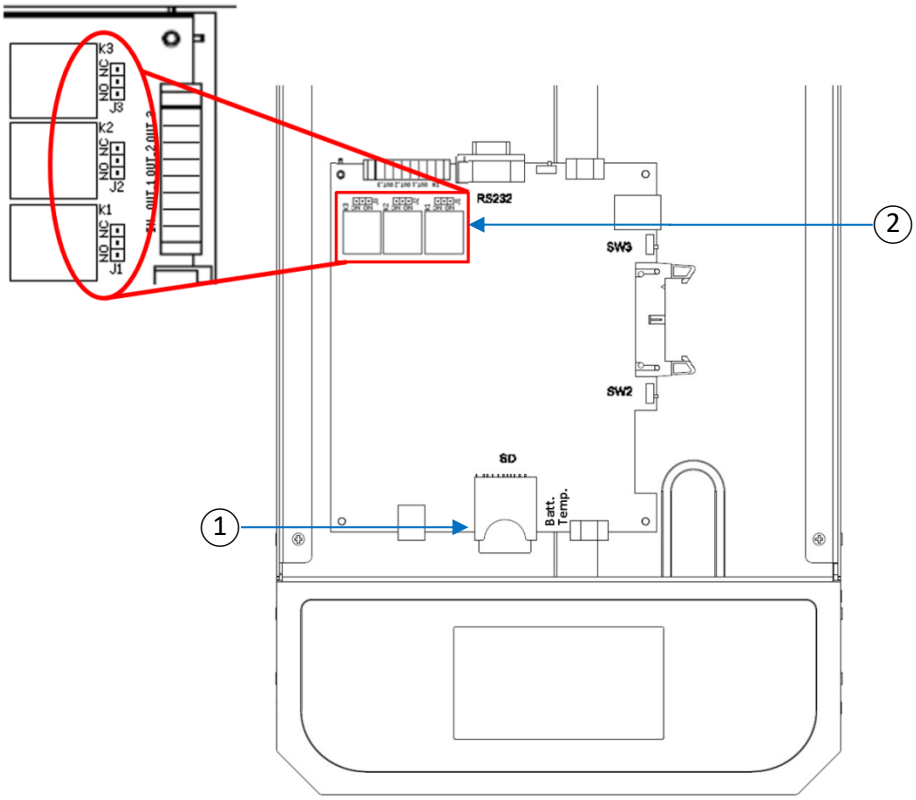
㉕ Ground Connection

■ 10-20KVA Internal Right View



① Battery Tray

■ 10-20KVA Internal Top View



① SD Card Slot

② Jumpers (J1~J3) for each output contact

Please find the detail descriptions of above items on section 2-5.

2. Installation and Wiring

2.1 Storage and Installation Environment

■ Storage Environment

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

■ Installation Environment

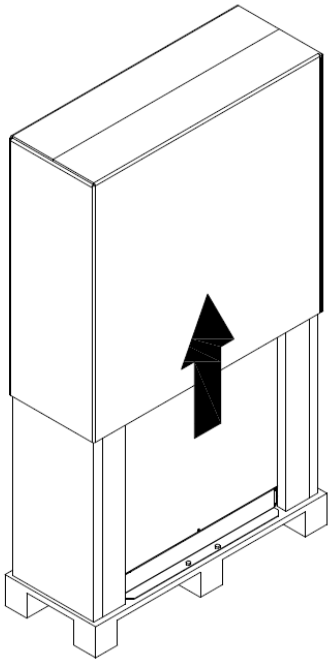
A proper installation environment not only ensures the effective operation of the UPS but also reduces the chance of failure and extends service life. Please take the following recommendations into account to select the most suitable environment and reduce the likelihood of accidents.

- Temperature 0℃~40℃ (20℃~25℃is recommended for extend batteries life span).
- 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, in jury 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.

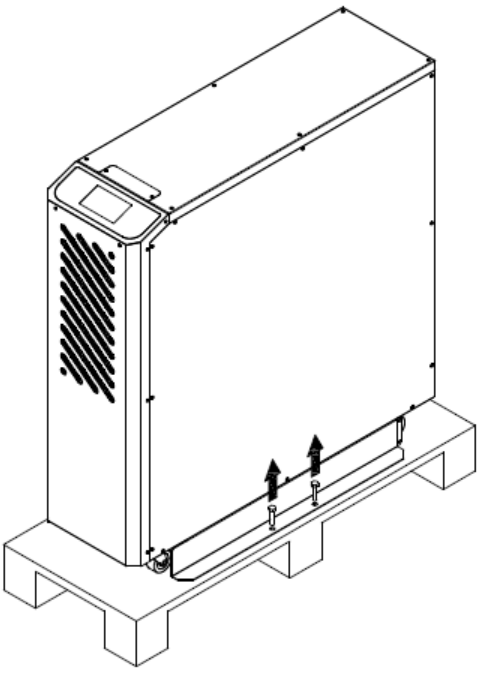
2.2 Unpacking, Removing and Fixing UPS

This section describes unpacking for wheeled UPS.

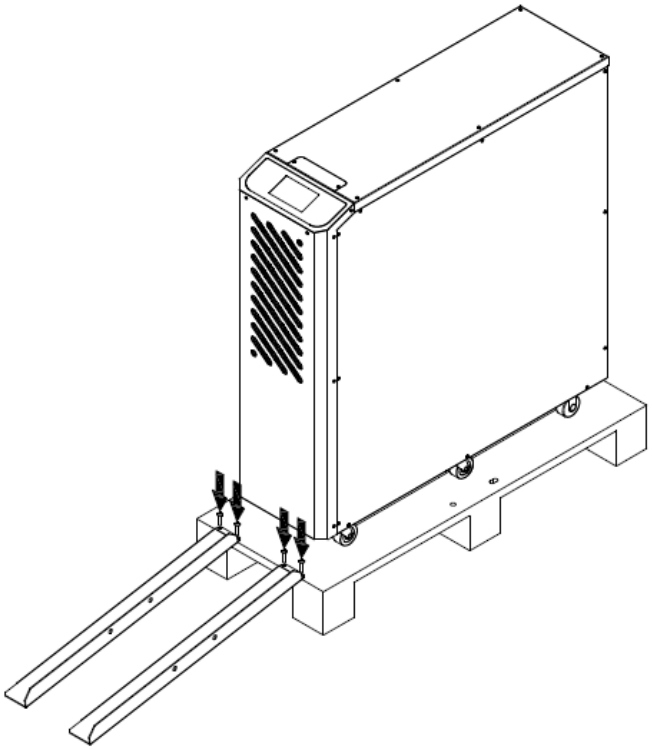
- Remove the packing materials and straps. Remove the cardboard box upwards.



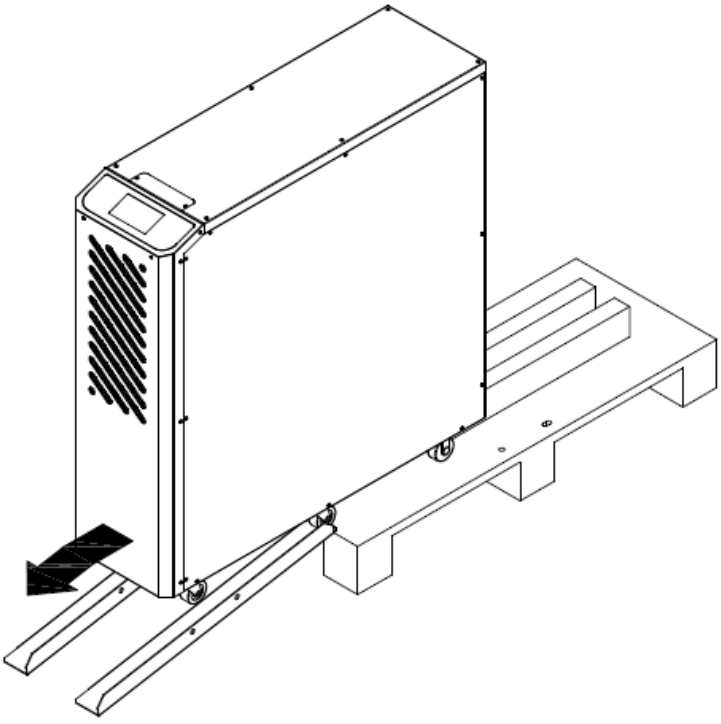
- Use the forklift to remove the UPS from pallet



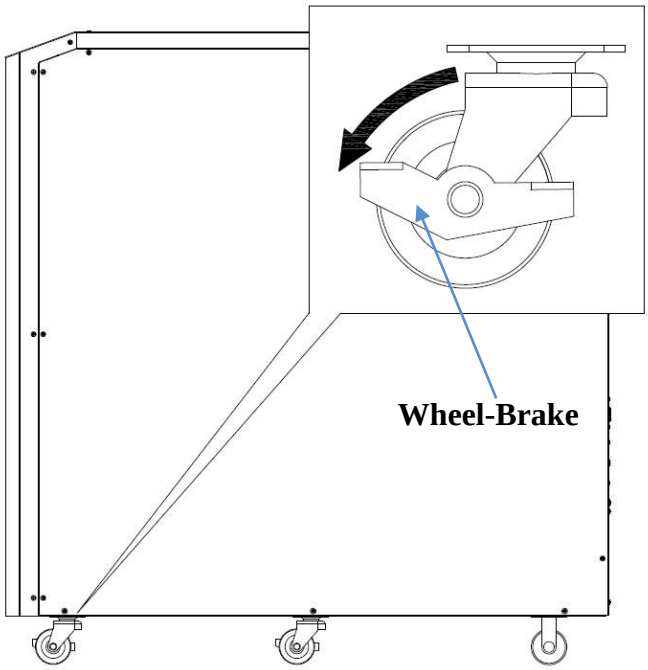
- Put 2 fastening rail kits on the pallet edge and fastening 4 screws in the pallet to stabilize the rail.



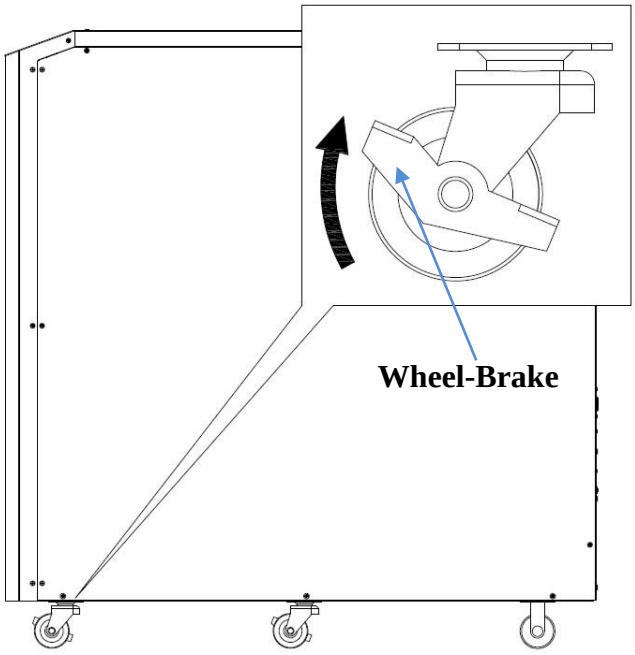
- Remove the UPS from the pallet.



- Push down the Wheel-Brake lever to lock the castor wheels.



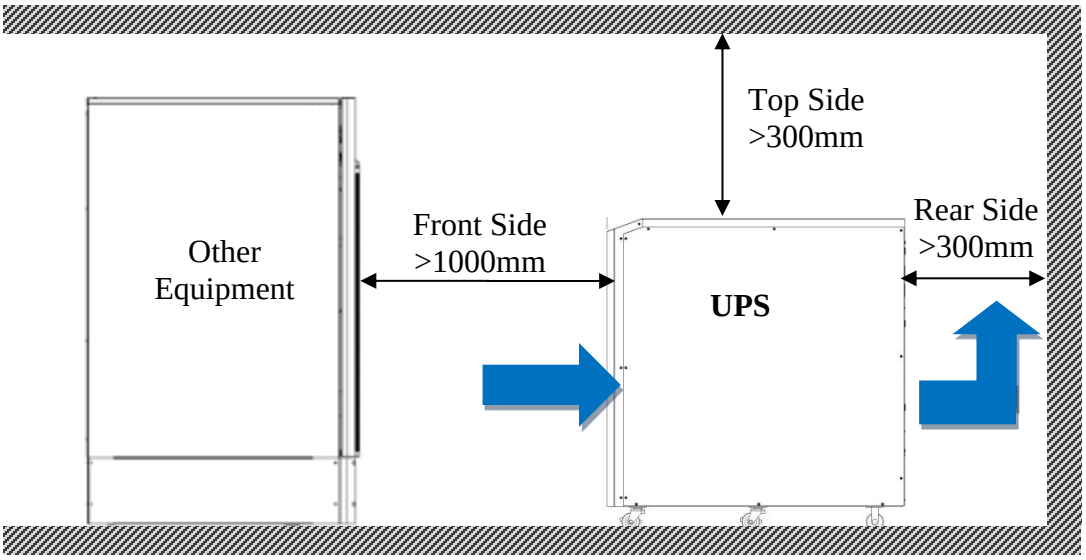
- Lift up the Wheel-Brake lever to release the castor wheels.



2.3 General Requirement for Ventilation and Maintenance

During installation ensure that the following conditions are met.

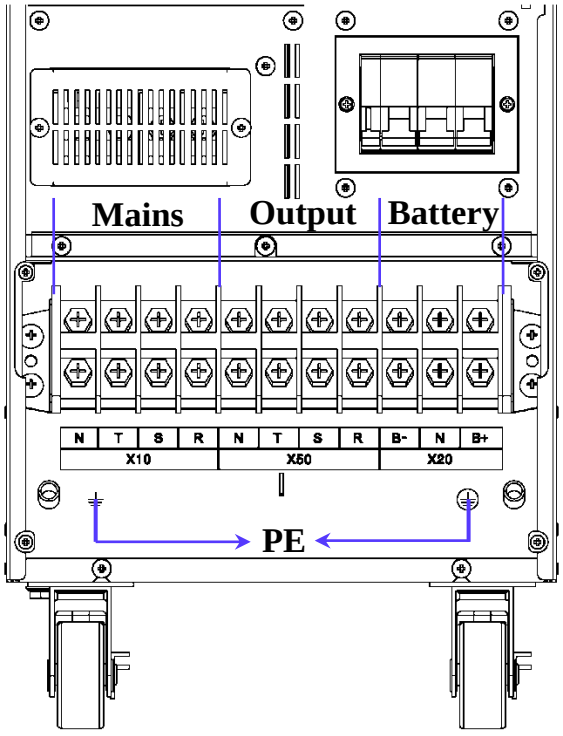
- Keep at least 1000 mm of clearance in front of the UPS to allow adequate air flow and future maintenance purposes.
- Keep at least 300 mm of clearance at rear of the UPS to allow adequate air-flow.
- Keep at least 300 mm of clearance at the top of UPS for maintenance operations.



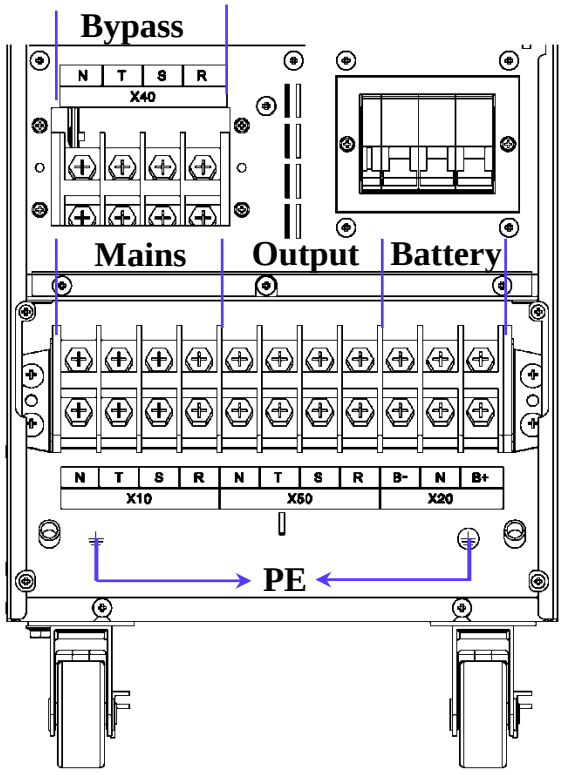
2.4 Power Cables Connections

■ Power Cable Sizing

The drawing below shows the positions of power terminals.



Single Input



Dual Inputs (Option)

■ 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 A	13.5 A	31 A
	20KVA/18KW	34 A	27 A	62 A
400 V	10KVA/9KW	16.5 A	13 A	31 A
	20KVA/18KW	33 A	26 A	62 A
415 V	10KVA/9KW	16 A	12.5 A	31 A
	20KVA/18KW	32 A	25 A	62 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(2)	PE	R/S/T/N	PE
10KVA	5 mm^2	3 mm^2	5 mm^2	3 mm^2	8 mm^2	3 mm^2
20KVA	8 mm^2	5 mm^2	6 mm^2	5 mm^2	16 mm^2	8 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.

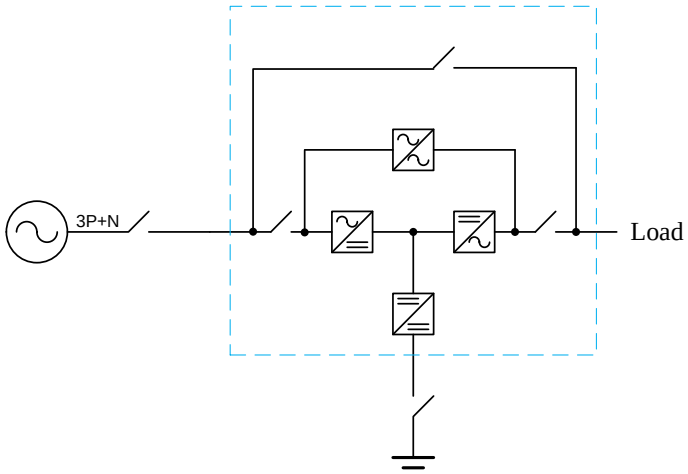
■ Recommended Circuit Breaker Size

Input/Output Voltage	Output Power	Mains Input (1)	Output/Bypass Input(1)
380 V	10KVA/9KW	30 A	25 A
	20KVA/18KW	60 A	50 A
400 V	10KVA/9KW	30 A	25 A
	20KVA/18KW	60 A	50 A
415 V	10KVA/9KW	28 A	23 A
	20KVA/18KW	55 A	45 A

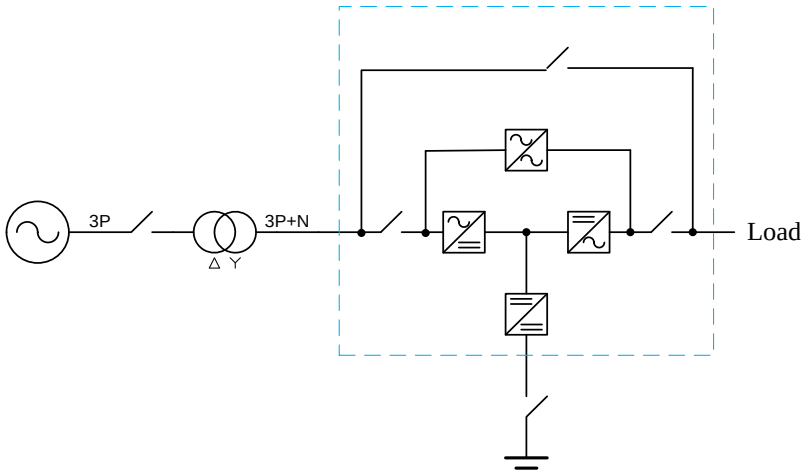
(1) The sizing takes into account 150% overload capacity

■ Electrical System Connections

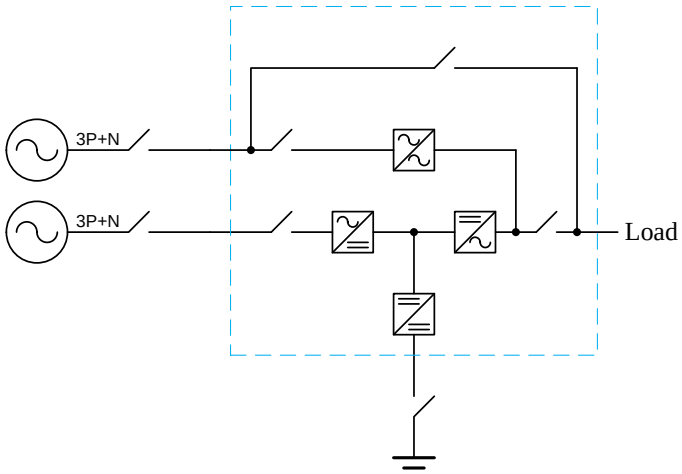
- UPS with single input



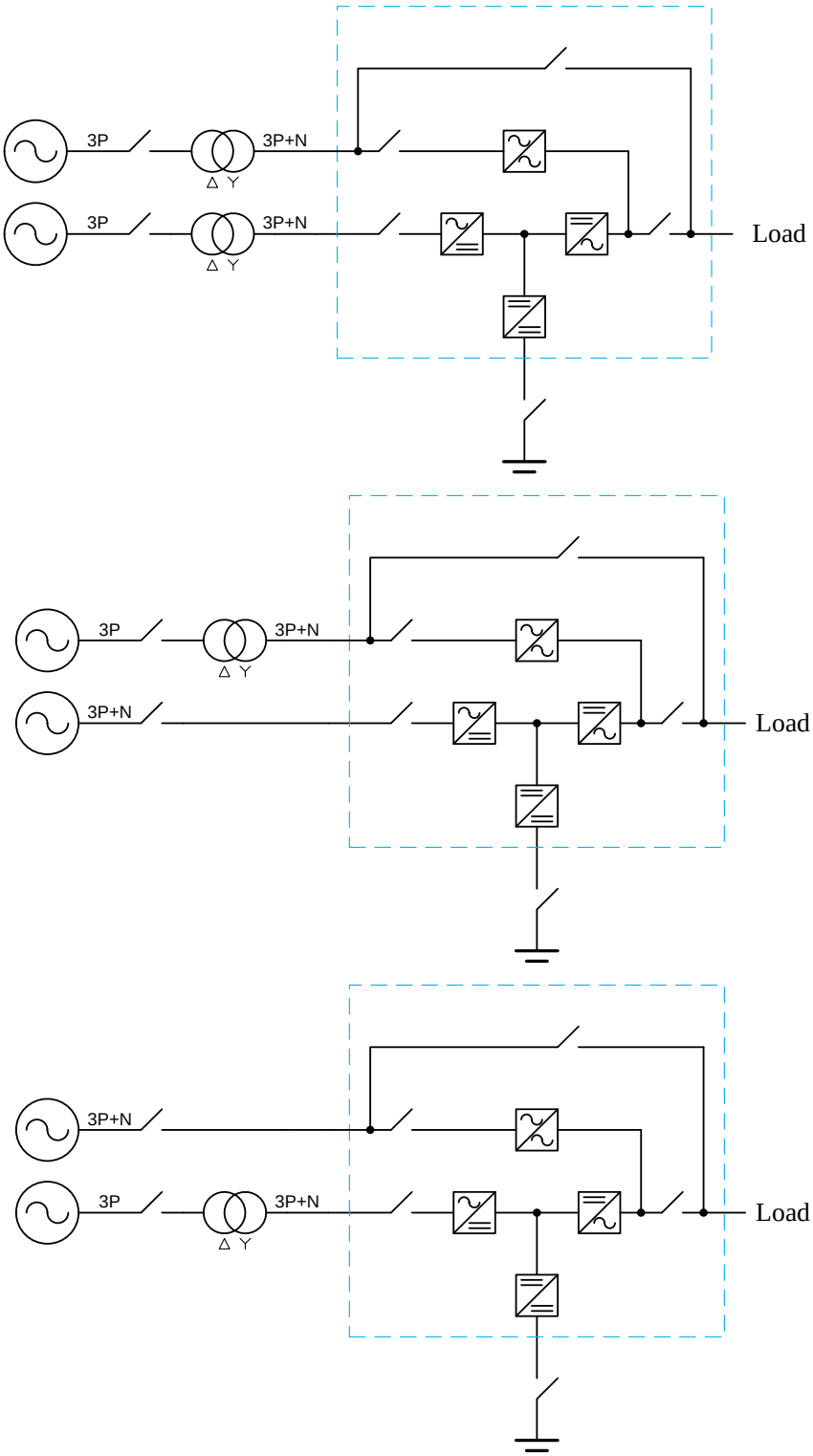
- UPS with single input and isolation transformer



- UPS with dual inputs (Option)

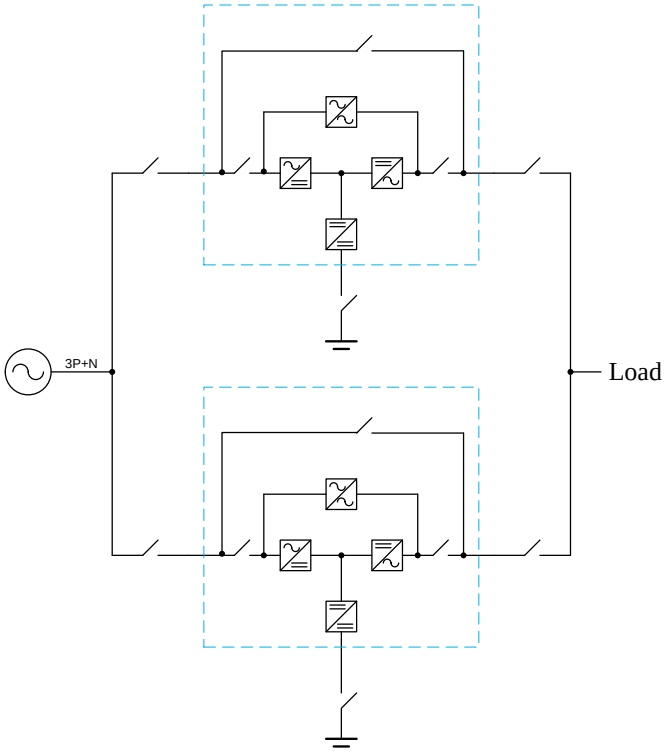


- UPS with dual inputs and isolation transformer (Option)

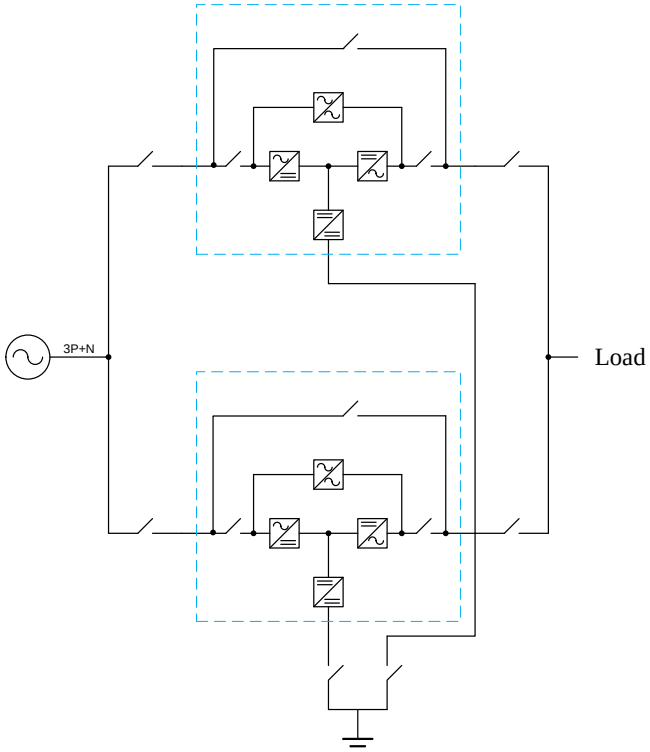


Note : You have to install an isolation transformer on one of the inputs if the two power system are different.

- UPS in parallel, use separate battery

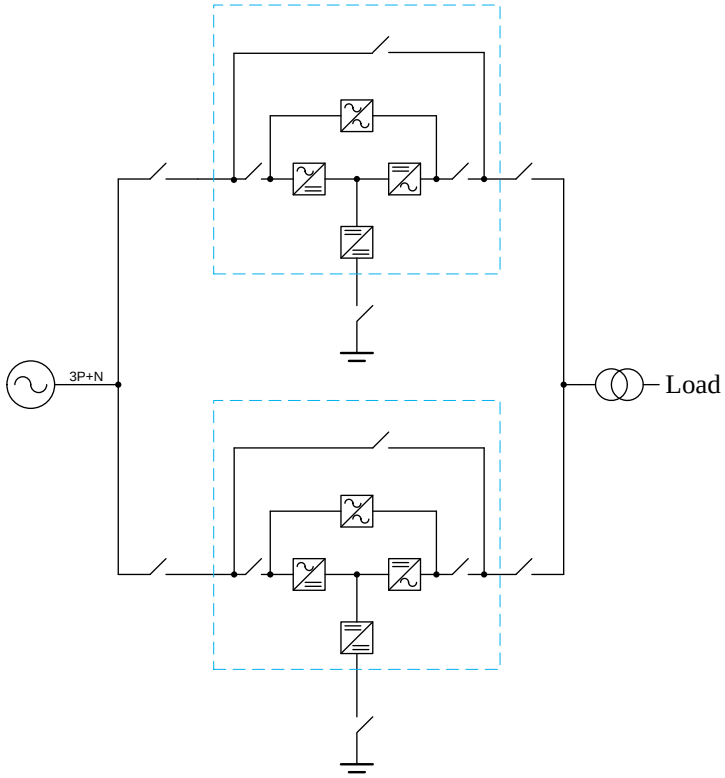


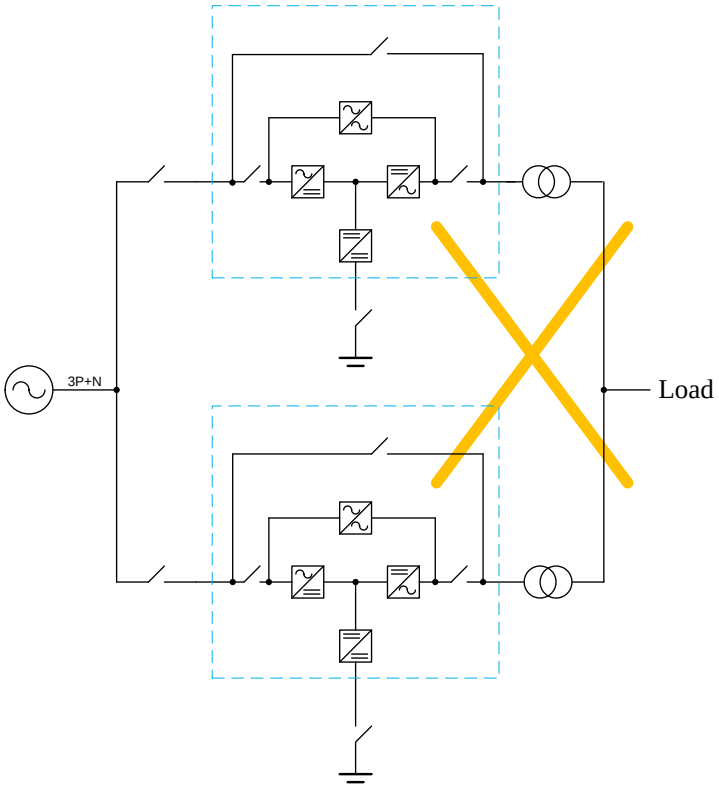
- UPS in parallel, use common battery



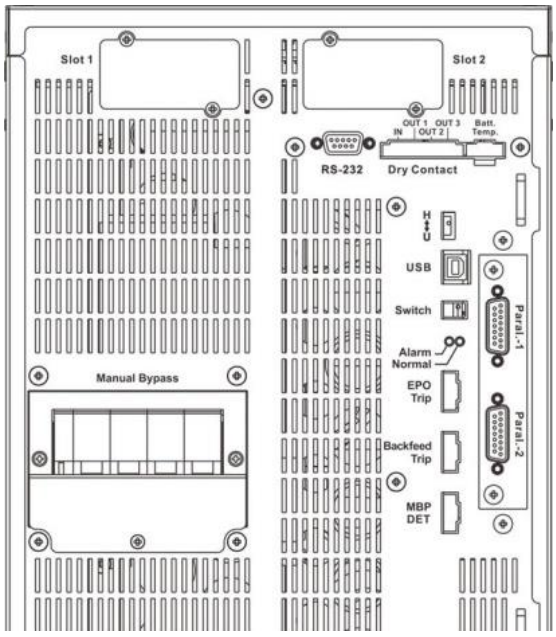
- UPS in parallel with output transformer

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





2.5 Communication Cables Connections



- **Communication Slot1**

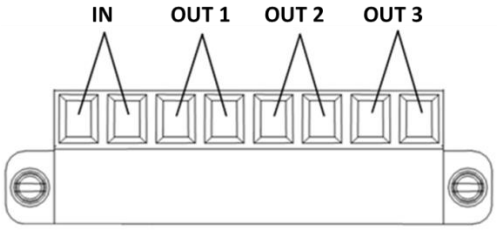
  This slot can install Relay card or RS-485 MODBUS card.

- **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.



- **Output & Input Contacts**

  The UPS provides 3 output dry contacts and 1input contact.

  Specification of Output dry contact：250 VAC/ 2 A; 30 VDC/2 A
  There have 3 jumpers (J1~J3) to set NC/NO for each output contact.

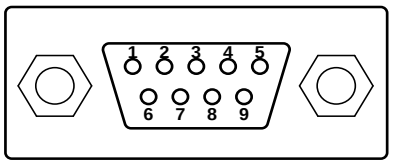
Short the input contact to send a command to UPS.

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).

- **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 the parallel UPS when operating in parallel. Please refer to section 2-6 for detail connections.

- **H↔U—communication selector**

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

- **USB**

This port is for service only.

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

To ensure stable parallel communication, please set the switch of the two farthest UPS to the "ON" position. Please refer to section 2-6 for detail.

- **LED Status Indictors**

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

- **EPO-- Emergence Power Off**

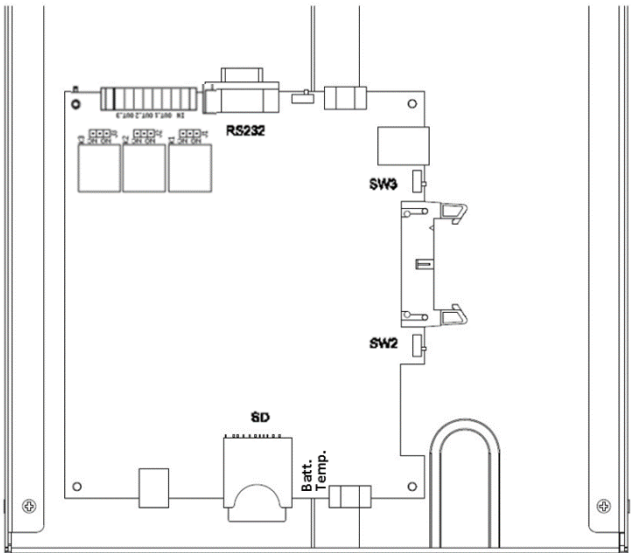
  This EPO contact allows you to turn off the UPS during an emergency. Short these contact to turn off the UPS immediately.

- **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.**

  MBP Detector is used for MBP auxiliary from bypass unit. Aux has to be NO with MBP OFF. Please make sure that MBP Det. works normal after installation.



- **SW2**

  When Relay card is installed in Slot 2, please switch to “Slot” position.
  When SNMP card is installed in Slot 2, please switch to “SNMP” position.

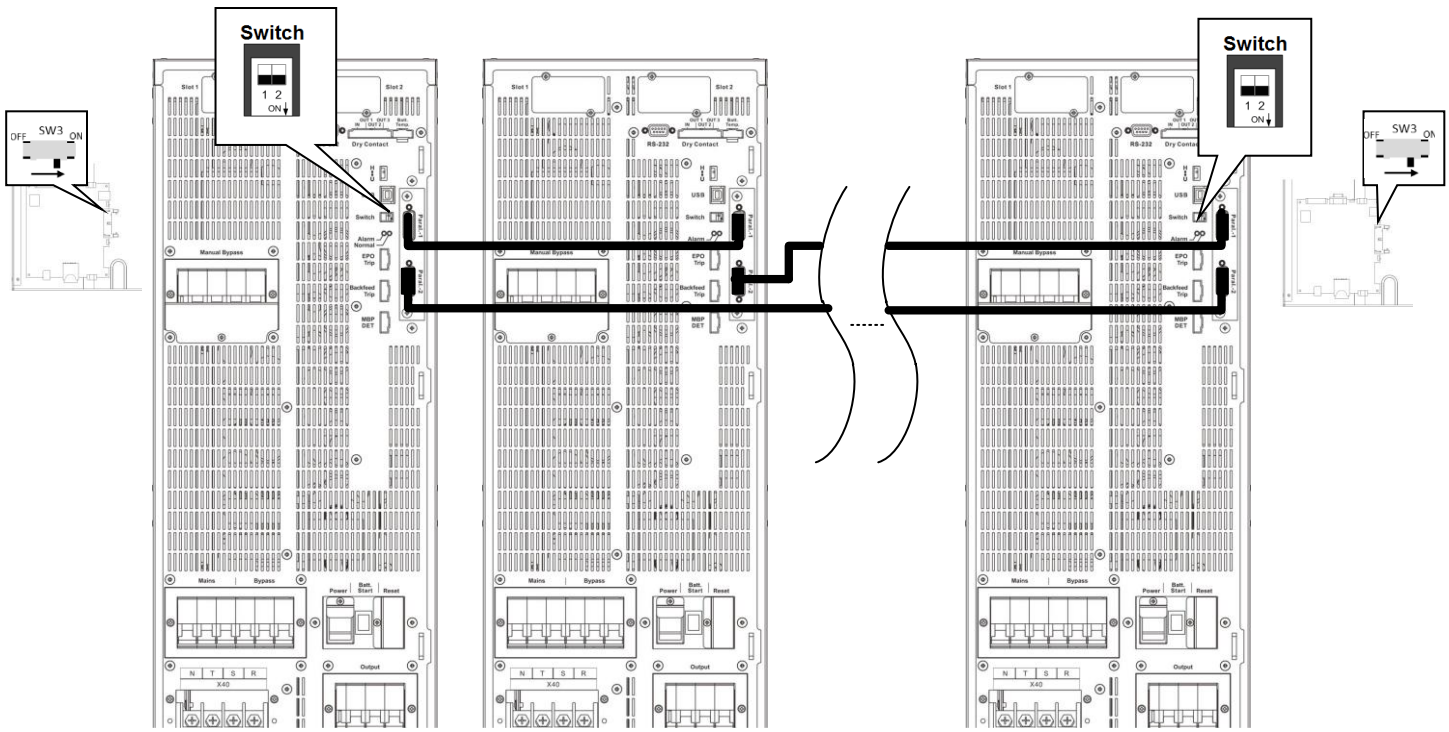
- **SW3--the switch for terminal resistor of parallel communication**

  To ensure good parallel communication quality please set the Switch of the two farthest UPS to the “ON” position. Please refer to section 2-6 for detail.

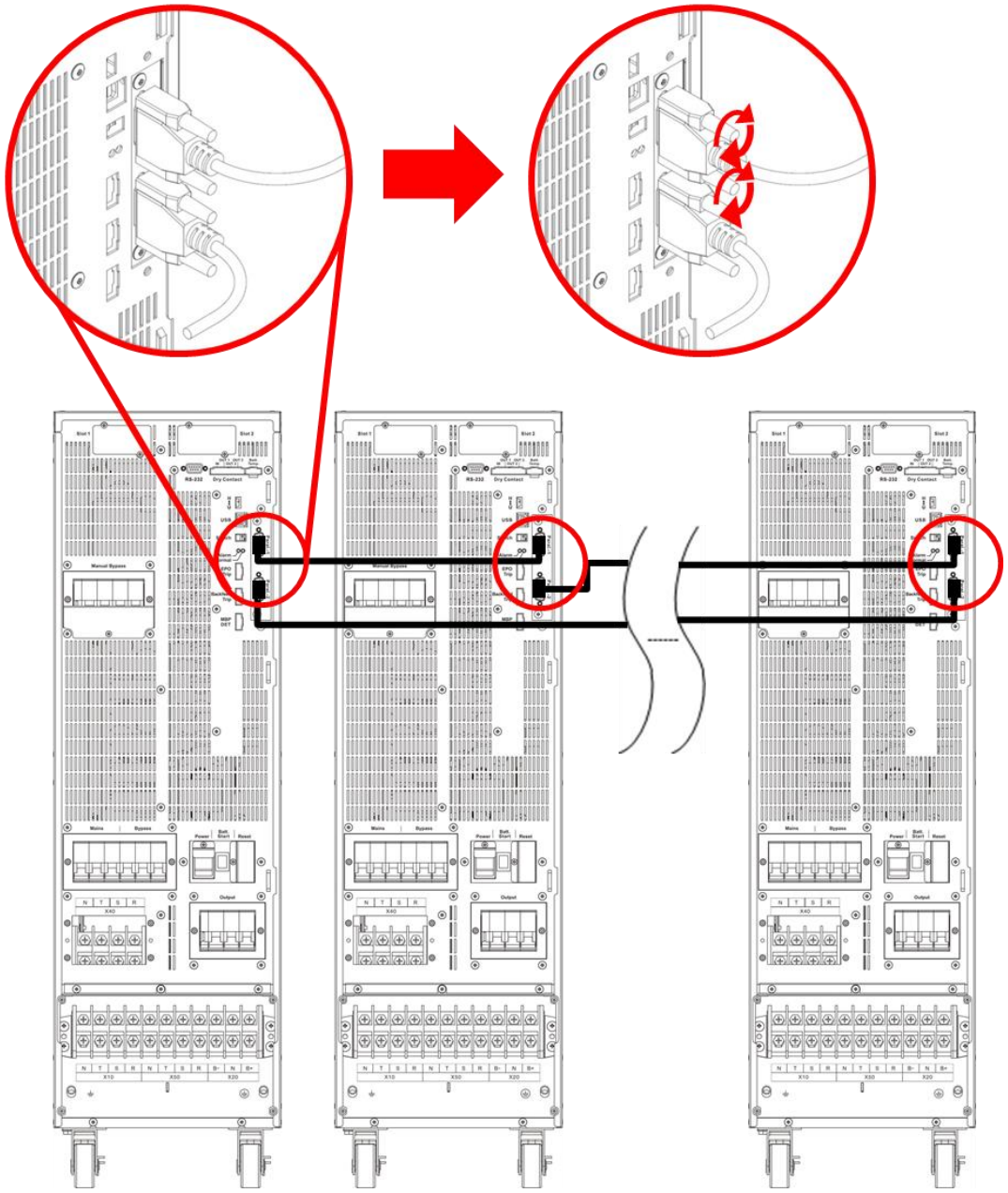
2.6 UPS Parallel Connections (Option)

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

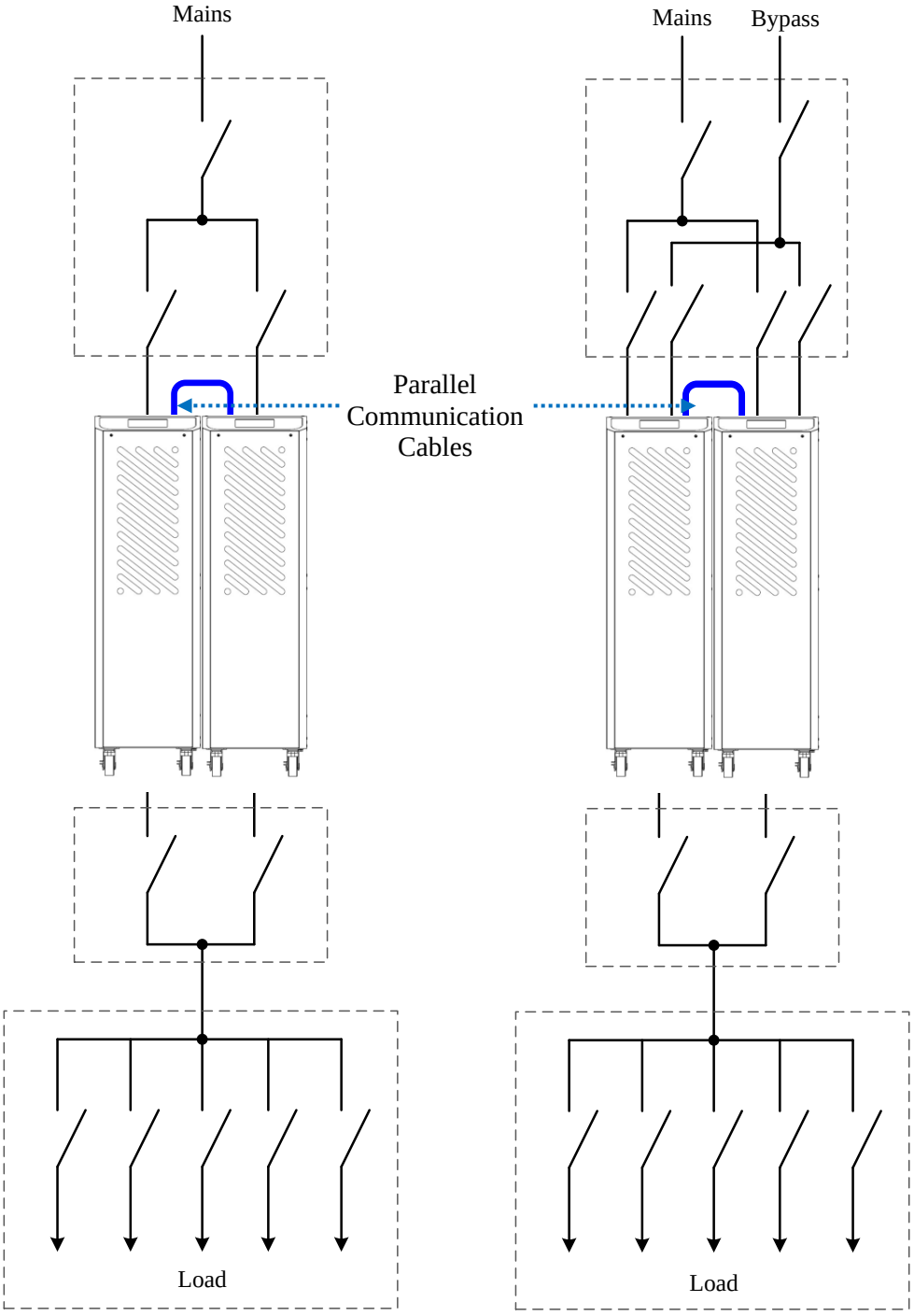
- Up to 6 UPS units can be operated in parallel.
- To make sure each UPS is equipped with parallel card (Option).
- The size and length of the input and output cables must be identical for all UPS units.
- The phase rotation must be the same for each UPS unit.
- It is recommended to use an external bypass 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.



- When installing the parallel communication cables, please plug into parallel communication cable, as shown below.



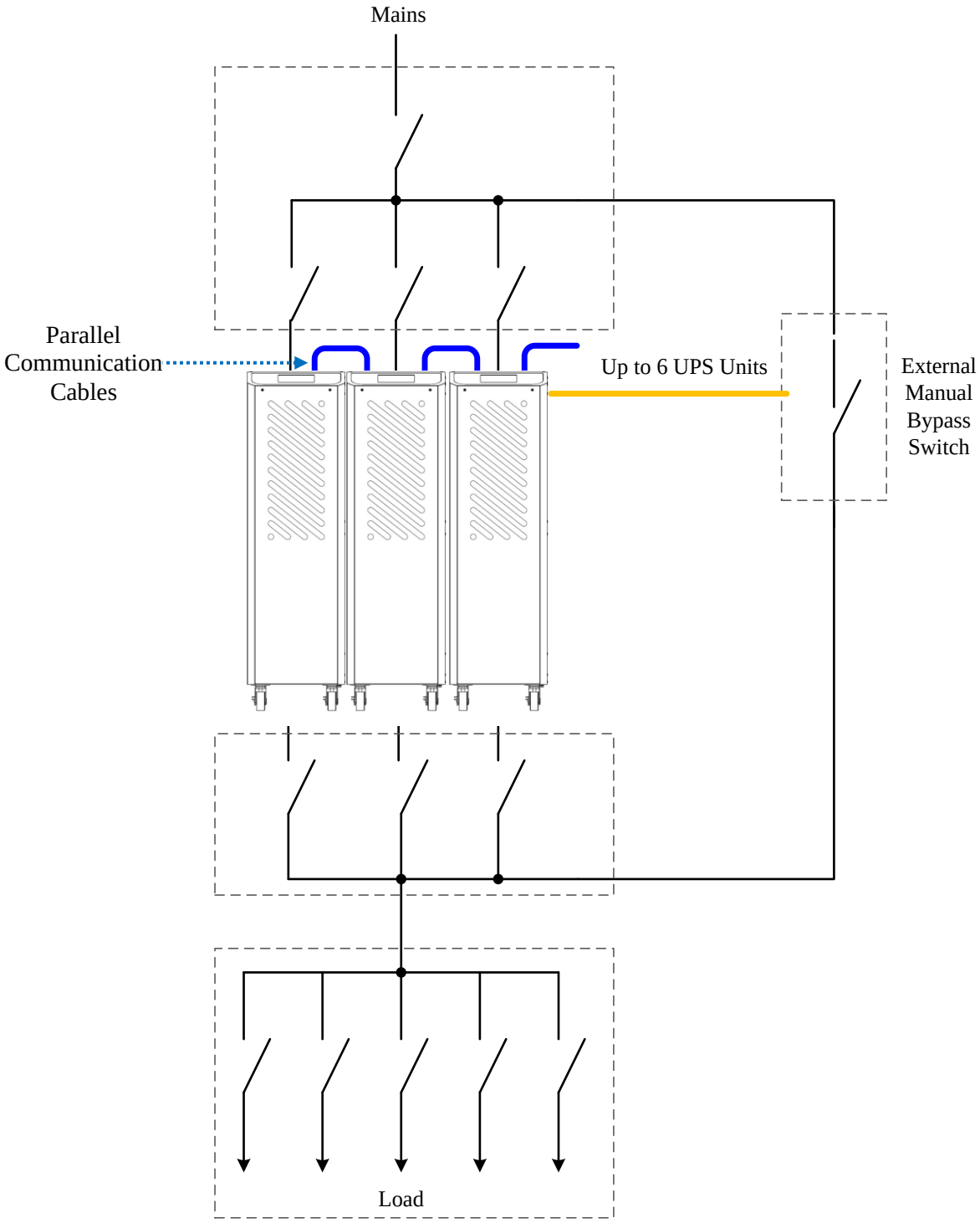
■ Recommended 1+1 parallel system configuration



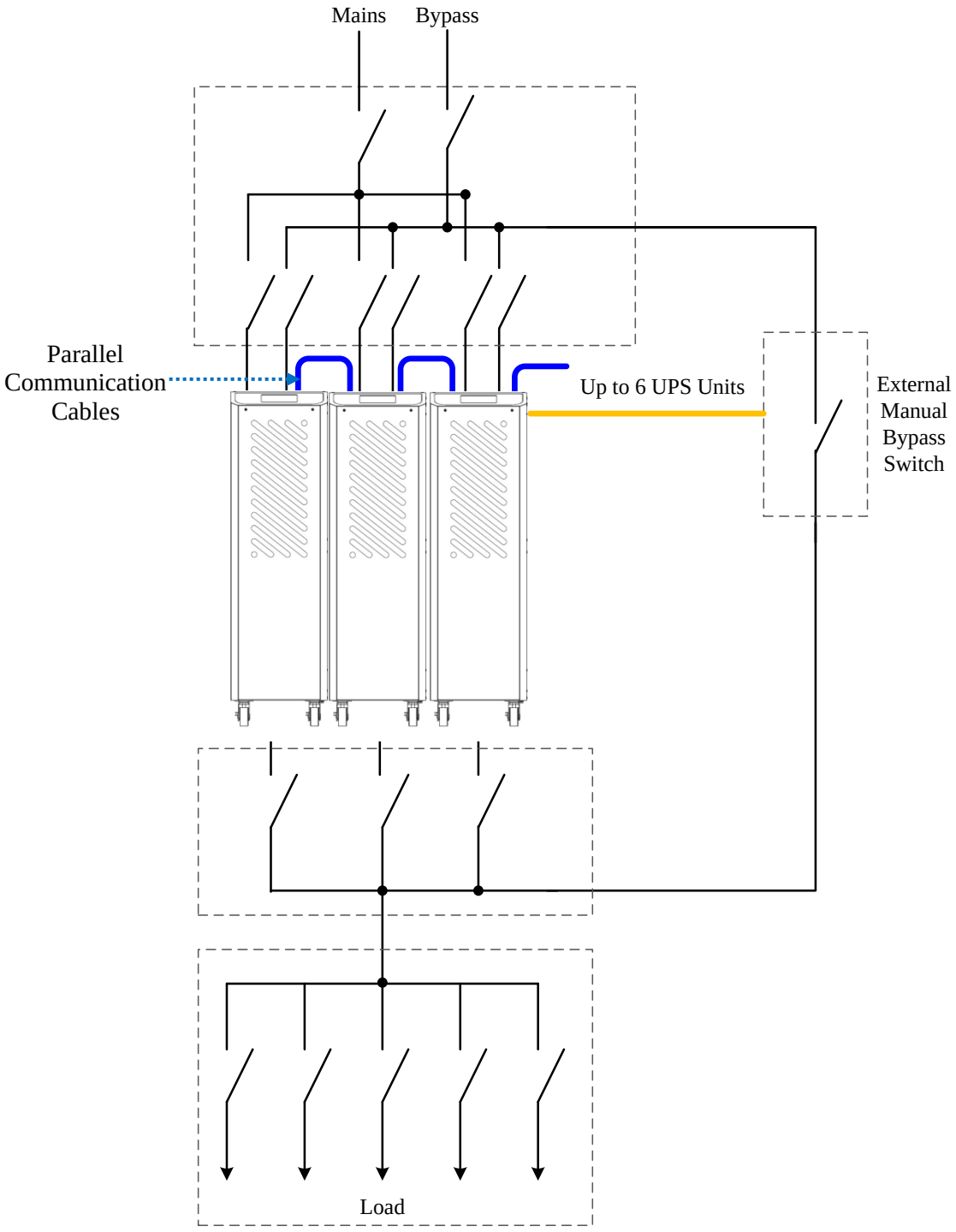
1+1 parallel, Single Input

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:

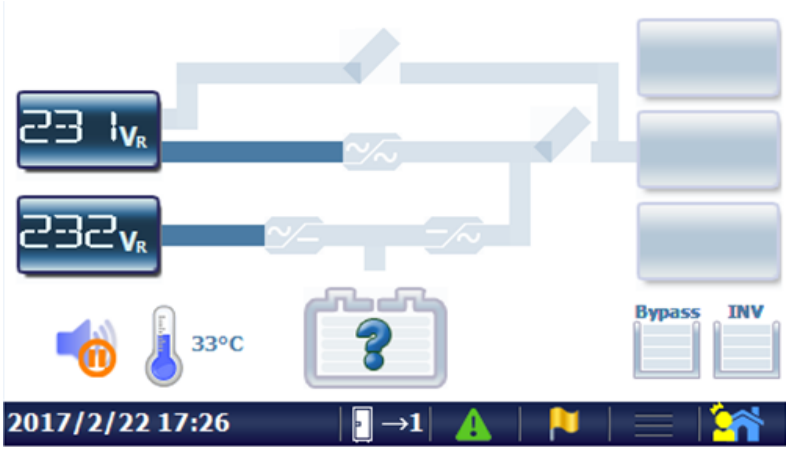
- ***UPS maintenance can only be performed by authorized and qualified technicians who are familiar with this UPS.***
- ***If the UPS is in battery mode, turn on the manual bypass switch may cut off power to the load.***

3.4 Operation Processes

3.4.1 Normal Mode Start-up

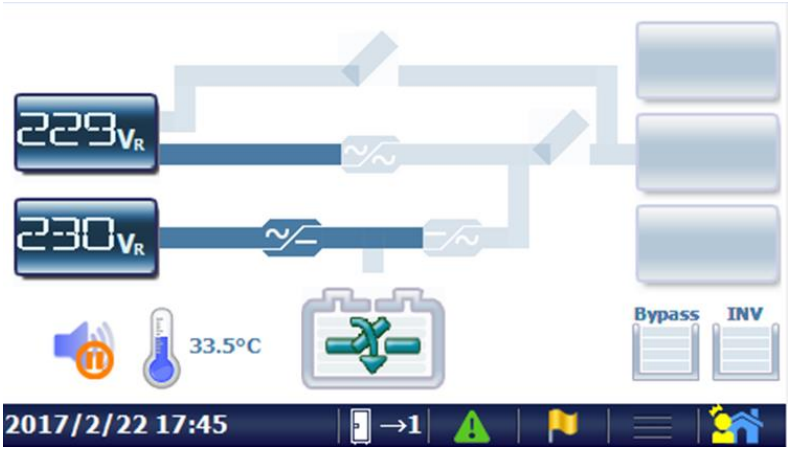
Warning! ***Please don't close the battery line switch/fuses before start-up the rectifier of UPS if the UPS with external batteries configuration.***

(1) Close UPS Mains Input and Bypass Input Switches.

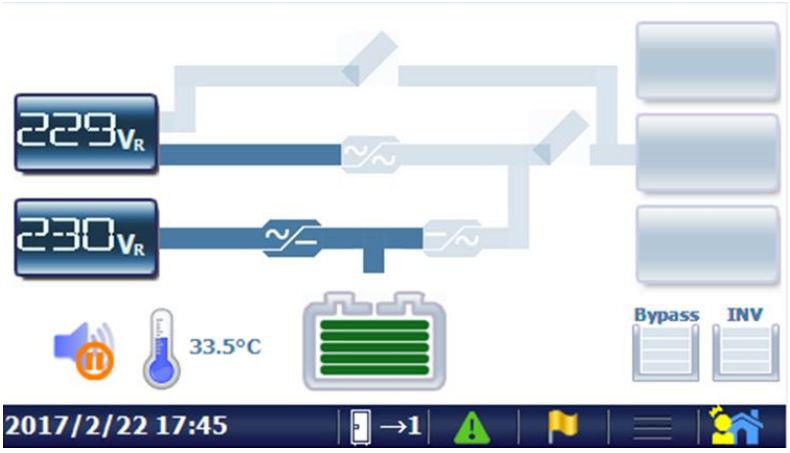


(2) Select → Command → Operation → Normal Mode on LCD display.

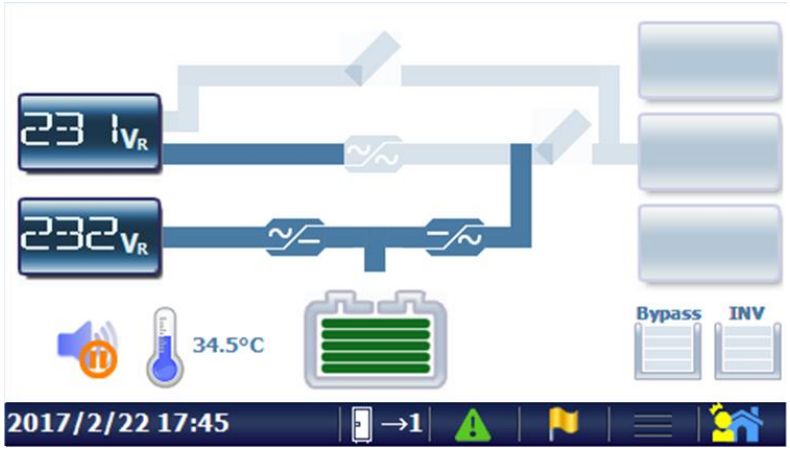
(3) Return to Mimic Display. Wait for few minutes, the rectifier will be started.



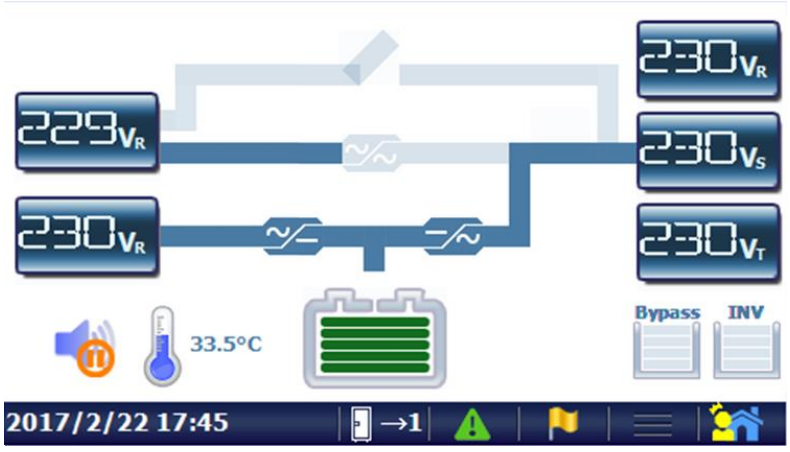
(4) Close the battery line switch/fuses to connect the batteries after rectifier turn on.



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



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

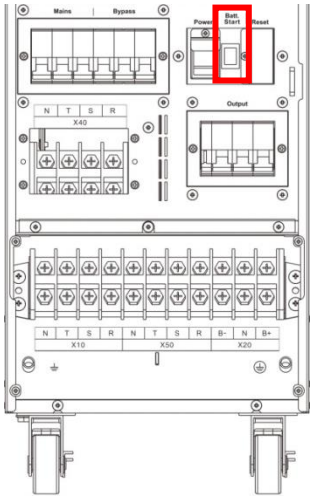


3.4.2 Cold Start

(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) In the rear of UPS, push button that indicated “Batt. Start” for 7 seconds until Panel power on, as figure shows below.



(4) Select → Command → Operation → ColdStart Precharge Ready on LCD display.

(5) Select Normal Mode to start UPS.

3.4.3 Shutdown

(1) Select → Command → Operation → Shutdown on LCD display.

3.4.4 Switch to bypass

(1) Select → Command → Operation → Load on Bypass on LCD display.

(2) The Inverter will be shutdown and bypass will supply the power to the load. If the battery is disconnected, Rectifier and Charger will be shutdown as well.

3.4.5 In Signal Input, Switch from normal mode to maintenance bypass

(1) Select → Command → Operation → Load on Bypass on LCD display.

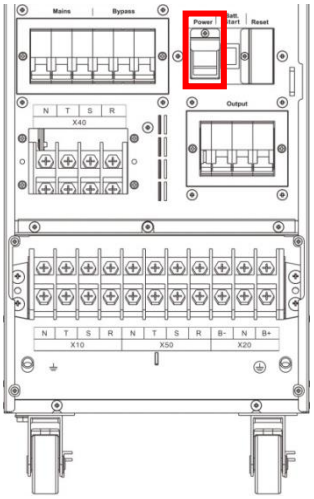
(2) The Inverter will be shutdown and bypass will supply the power to the load.

(3) Open the Battery Switch.

(4) Close the maintenance bypass switch.

(5) Open Output and Mains switch.

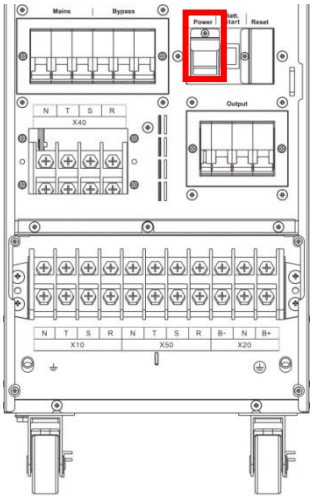
(6) In the rear of UPS, switch off button that indicated “Power” to turn off the control board power, as figure shows below.



(7) Wait at least for 10min.

3.4.6 In Signal Input, Maintenance bypass → normal mode

(1) In the rear of UPS, switch on button that indicated “Power” to turn on the control board power, as figure shows below.



(2) Close Output and Mains Input switches.

(3) Select → Command → Operation → Load on Bypass on LCD display.

(4) Open maintenance bypass switch.

(5) Select → Command → Operation → Normal Mode on LCD display.

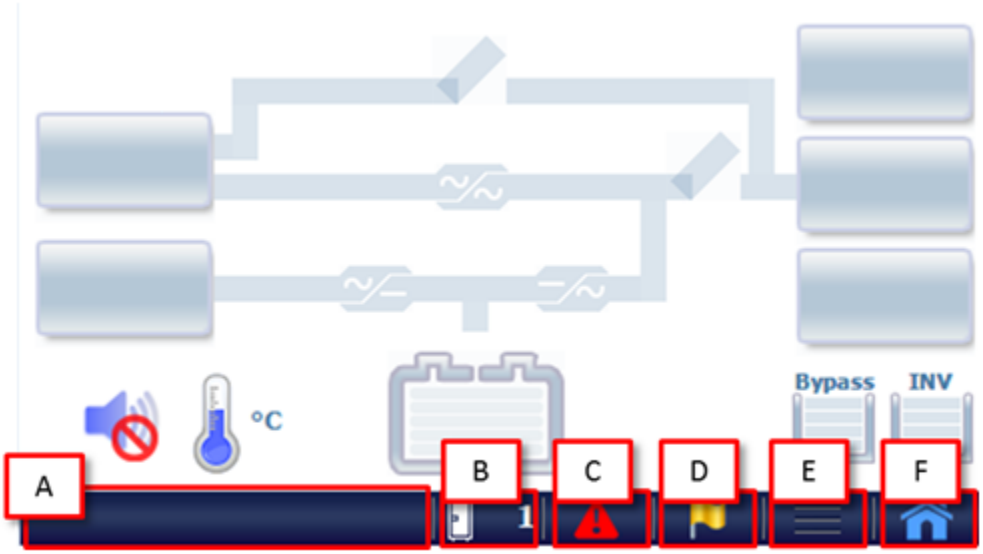
(6) Return to Mimic Display. Wait for few minutes, the rectifier will be start and the icon  will show you when can close the Battery line switch/fuses to connect the batteries.

4. Control Panel Operation and Function Description

Each UPS is equipped with a LCD touch panel to provide the user with a simple and intuitive user interface that is easy to learn. The touch panel offers a combination of graphics and numbers that make it easy to determine the input/output voltage, frequency, load and battery level at a glance. The current status of the UPS is displayed at the main screen. User also can have the real time input/output voltage, frequency, current and battery information from the touch panel.

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

4.1 Screen Introduction



【A】Display current time, status and information of UPS.

【B】Indicate Single or Parallel system, and select the desire UPS unit to check the information.

: Single Unit

: Parallel System

【C】Click here to see the alarm message.

: The green pattern indicates that UPS is normal.

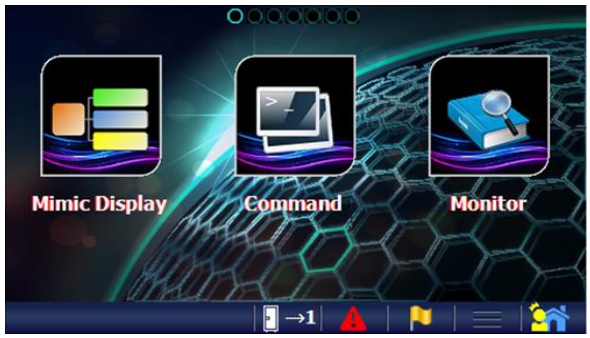
: The red pattern indicates that UPS abnormal conditions occurred.

【D】Click here to see the status.

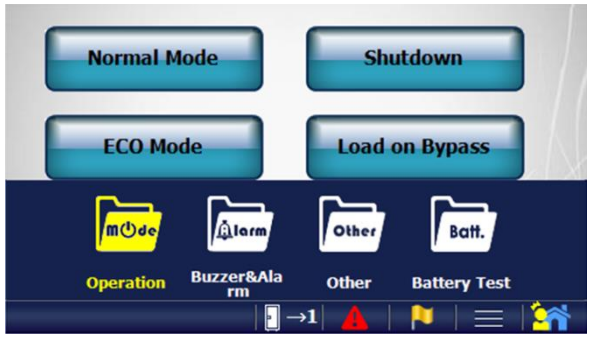
【E】Enter to Sub-Menu, please refer to section 4-2 for more detail.

【F】Enter to Menu, please refer to section 4-2 for more detail.

4.2 Menu



Click  to enter to Menu screen as shown in above picture. Slide the screen to switch to other menu page and click the menu icon to enter to the desire function.



Click  to hide/show the sub-menu.

The button below will appear on some function pages.

Button	Function
	Click it to save the new setting
	Click it to reload the data
	Click it to go to Mimic Display

■ **All menu functions are showing as below table.**

Menu	Sub-Menu	Functions
Mimic Display		Display the UPS status、alarm、operating mode and measurements. Please refer to section 4-3 for more detail.
Command(1)	Operation	• Normal Mode • ECO Mode • Converter Mode • Shutdown • Load on Bypass • Cold Start Pre-charge Ready
	Buzzer & Alarm	• Enable/Disable buzzer • Clear Latch Alarm and Buzzer
	Other	• Force Charger on • Recovery Backfeed Protection Signal • Clear UPS Maintenance Alarm
	Battery Test	• Battery Test. • Turn off The Battery Test.
Monitor	Identification	Display UPS information
	Real Time Information	Display real time measurements of input, output, bypass and battery.
	Maintenance Code	Display the maintenance code to check the UPS status.
	Version	Display the control MCU software and firmware version.
Configuration	Alarm	Set alarm latch function. • General Alarm • Mains Alarm • Bypass Alarm • Over Temperature • Vbatt. Low • Inverter Overload • Bypass Overload • EPO Activated
	Main	Select the measurements on Mimic Display.
	Bypass	
	Output	

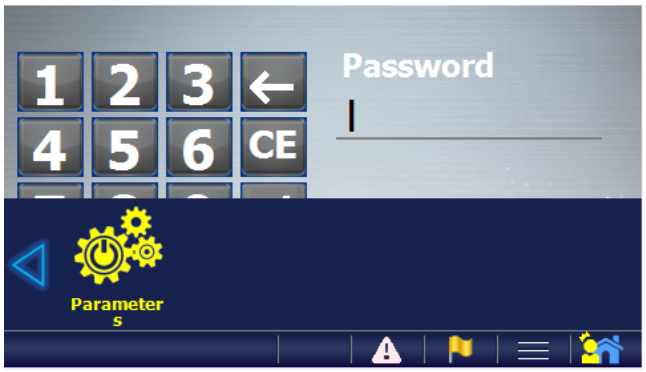
Menu	Sub-Menu	Functions
Management	Schedule	Display the schedule.
	Schedule Setting(1)	To define the schedule for ECO mode.
	Battery Test Schedule(1)	To define the schedule for battery test.
Setting	Language	Select the display language
	Update Prog.	Upgrade the software of LCD touch display.
	General	Set the turn off time of LCD backlight.
	Date and Time	Set date and time.
	Peripherals(1)	Set communication card.
	Parameters(1)	UPS parameters which can be modified.
Event Log		Display the event log list of UPS.
Permission Setting	Login/Logout	Login with the password(2)
	Password Modification(1)	Change user password.

(1) This function menu only appears after login; please refer to “Permission Setting”.
(2) Default password is “3366”.

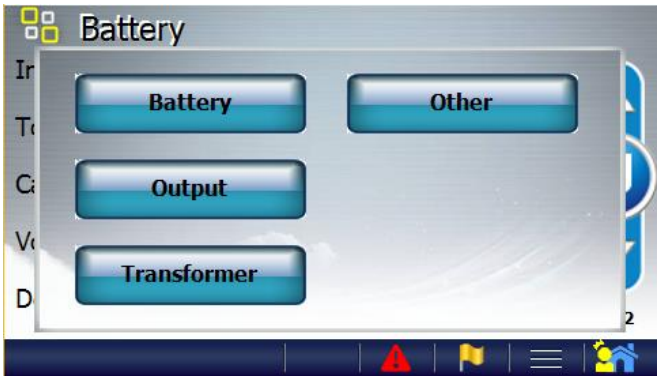
■ **Enter in the Parameters Page**

From the menu enter in the Setting Icon then tap the blue arrow to see additional Parameters

Use the login password (Default is: 3366) and press enter



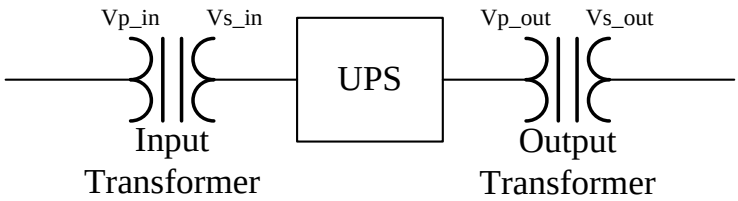
Now you are able to modify the UPS parameters, ensure the converters are off to save them



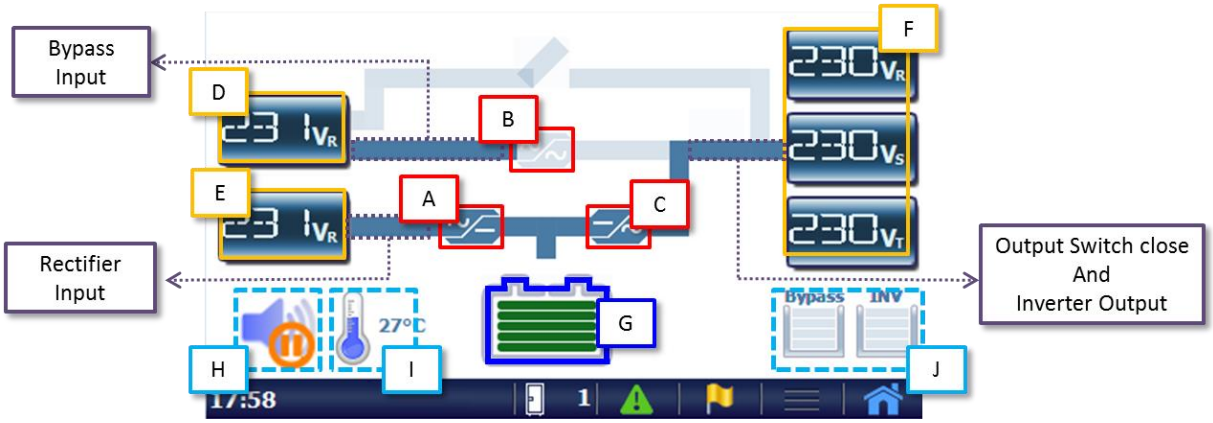
UPS parameters which can be modified by the user from the control panel are listed in the table below.

Parameters	Content	Range	Default
Battery	Independent/Common	Ind. / Common	Common
	Total cell number	192 ~ 240	240
	Capacity	1~1000	88
	Voltage Temperature compensation	Yes / No	No
	Detect the Battery connecting	Yes / No	Yes
	Charger current	0.0~1.0	0.1
	CV Charger voltage [V/cell]	2.000~2.550	2.300
	FV Charger voltage [V/cell]	2.000~2.550	2.250
	Vbatt. Low [V/cell]	1.850 ~ 1.883	1.850
	Vbatt. Min [V/cell]	1.600 ~ 1.900	1.670
	Battery test 2 minutes	Yes / No	Yes
Output	Output voltage	220、230、240	230
	Output frequency	50、60	50
	Fine adjustment voltage	-8 ~ 8	0
Transformer	Input transformer	No / Mains & Bypass	No
	Input transformer ratio(1)	0.00~10.00	0
	Output transformer	No / Yes	No
	Output transformer ratio(1)	0.00~10.00	0
Other	Unit number	1 ~ 6	1
	Number of units in parallel system	1 ~ 6	1
	Set EPO logic	NO/NC	NO

(1) Transformer ratios can be calculated as following,
Input transformer ratio = Vp_in/Vs_in; Output transformer ratio = Vp_out/Vs_out



4.3 Mimic Display



【A】is Rectifier、【B】is Static Switch and 【C】is Inverter.

The fade pattern indicates this part isn't activated.

The blue pattern indicates this part is activated.

The red pattern indicates this part is occurred abnormal condition.

【D】Display the bypass input measurements.

【E】Display the mains input measurements.

【F】Display the output measurements.

The abnormal measurements will have red background.

Click【D】【E】【F】 to change the measure parameter and press for 3 seconds to enter to Real Time Information.

【G】Display the status of battery.

Press it for 3 second to enter to Real Time Information.

The battery isn't connected.

The green pattern indicates the battery is charging.

The yellow pattern indicates the battery is discharging.

【H】Alarm silence button. Click it to silence the alarm and press for 3 seconds to enable/disable the buzzer.

Buzzer is enabled and Buzzer is disabled.

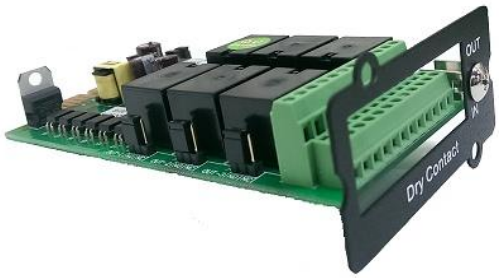
【I】Display UPS internal temperature.

Press for 3 seconds to enter to Real Time Information.

【J】Overload counter

5. Options

5.1 Dry Contact Card



This card provides six output dry contacts and six 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.

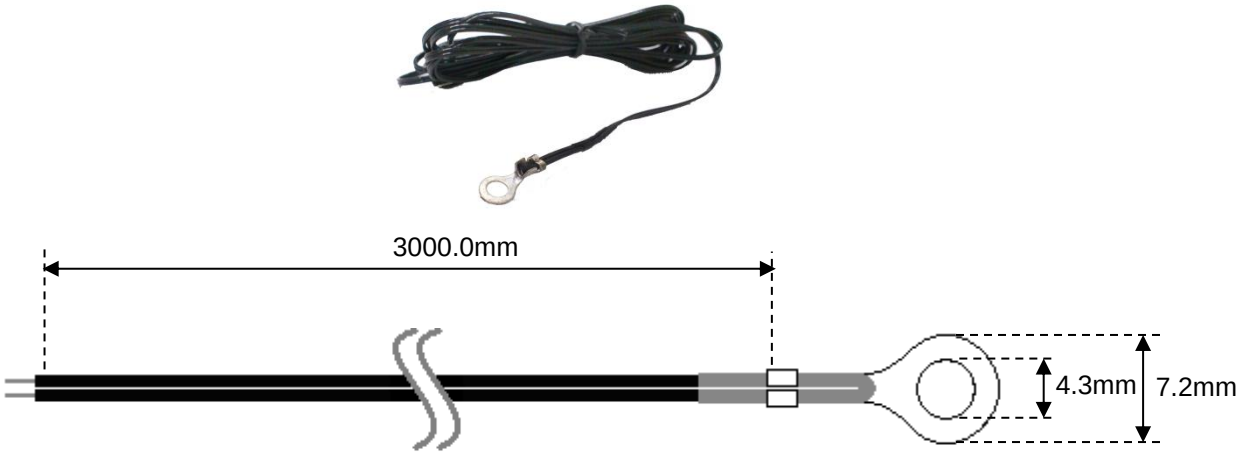
5.2 RS-485 MODBUS Card

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



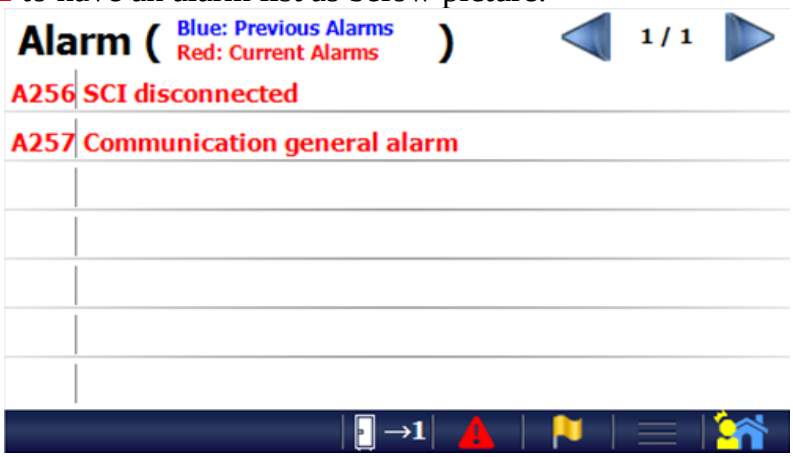
Measure the battery temperature.

5.5 Parallel Communication Card

The parallel communication cards are required to parallel the UPS and the 1.5 meters parallel communication cable is included.
A longer parallel communication cable is available if parallel more than 2 UPS.

6. Troubleshooting

In the event of failure, the display area on the control panel will highlight the problem area in red. The “Alarm” symbol will also blink to warn that there is a problem with the UPS. Click to have an alarm list as below picture.



We recommend checking the error code using the following method when troubleshooting: Click →Monitor→Maintenance Code to bring up the screen shown below. If you can provide the maintenance code to the authorized distributor, this will speed up troubleshooting. You also can click “Export” to save the maintenance code in SD card.

7. Technical Specification

Capacity		10 KVA	20 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	7A
Common Battery for Parallel Configuration		Yes	
Internal Battery		Available for housing 12V 7/9Ah 40pcs x 2 strings	
Maximum Efficiency			
VFI Mode		>93.5%	>94.5%
ECO Mode		> 98%	> 98%
Backup		>92%	>93%

Capacity	10 KVA	20 KVA
HMI & Communication		
Display and MMI	4.3" Colorful LCD Touch Screen	
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
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	

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