

Concent

Preface.....	3
Usage.....	3
Users	3
Note.....	3
Safety Precautions.....	4
Safety Message Definition	4
Warning Label.....	4
Safety Instruction	4
Debug & Operate	5
Maintenance & Replacement	5
Battery Safety.....	6
Disposal.....	7
1 UPS Structure and Introduction	8
1.1 UPS structure	8
1.1.1 UPS Configuration	8
1.1.2 UPS Outlook	8
1.1.3 Details of UPS front and rear views.....	12
1.2 Product Introduction	16
1.2.1 UPS System Description	16
1.2.2 Operation Mode	16
2 Installation.....	20
2.1 Location	20
2.1.1 Installation Environment.....	20
2.1.2 Site Selection.....	20
2.1.3 Size and Weight.....	20
2.2 Unloading and Unpacking.....	21
2.2.1 Moving and Unpacking of the Cabinet	21
2.3 Positioning	23
2.3.1 Positioning Cabinet.....	23
2.4 Battery.....	26
2.5 Cable Entry	27
2.6 Power Cables.....	28
2.6.1 Specifications	28
2.6.2 Specifications for Power Cables Terminal	29
2.6.3 Circuit Breaker.....	29
2.6.4 Connecting Power Cables	30
2.7 Control and Communication Cables	32
2.7.1 Dry Contact Interface.....	32
2.7.2 Communication Interface.....	39
3 Control and LCD display Panel	40
3.1 LCD Indicator	40
3.2 Control and operation keys	41

3.3 LCD Screen.....	41
3.4 Menu Window.....	45
3.4 Event List	47
4 Operations.....	52
4.1 UPS start-up	52
4.1.1 Startup in normal mode.....	52
4.1.2 Start from battery	53
4.2 UPS Shut down	54
4.3 Procedure for Switching between Operation Modes.....	54
4.3.1 Switching the UPS from normal mode into battery mode	54
4.3.2 Switching the UPS from normal mode into bypass mode.....	54
4.3.3 Switching the UPS into normal mode from bypass mode.....	54
4.3.4 Switching the UPS into maintenance bypass mode from normal mode.....	54
4.3.5 Switching the UPS into normal mode from maintenance bypass mode.....	55
4.4 Battery Maintenance	56
4.5 EPO	56
4.6 Installation of parallel operation system	57
5 Maintenance.....	58
5.1 Precautions.....	58
5.2 Instruction for maintaining UPS	58
5.3. Instruction for Maintaining Battery String.....	58
6 Product Specifications.....	60
6.1 Applicable Standards.....	60
6.2 Environmental Characteristics	60
6.3 Mechanical Characteristics	61
6.4 Electrical Characteristics.....	61
6.4.1 Electrical Characteristics (Input Rectifier).....	61
6.4.2 Electrical Characteristics (Intermediate DC Link).....	61
6.4.3 Electrical Characteristics (Inverter Output)	62
6.4.4 Electrical Characteristics (Bypass Mains Input)	62
6.5 Efficiency	63
6.6 Display and Interface	63
Annex. A Installation of internal batteries	64
Annex. B Instructions of the parallel system for UPS	71

Preface

Usage

The manual contains information on installation, use, operation and maintenance of UPS. Please carefully read this manual prior to installation.

Users

Authorized Person

Note

Our company is providing a full range of technical support and service. Customers can contact our local office or customer service center for help.

The manual will update irregularly, due to the product upgrading or other reasons.

Unless otherwise agreed, the manual is only used as guide for users and any statements or information contained in this manual make no warranty expressed or implied.

Safety Precautions

This manual contains information concerning the installation and operation of UPS. Please carefully read this manual prior to installation.

The UPS cannot be put into operation until it is commissioned by engineers approved by the manufacturer (or its agent). Not doing so could result in personnel safety risk, equipment malfunction and invalidation of warranty.

Safety Message Definition

Danger: Serious human injury or even death may be caused, if this requirement is ignored.

Warning: Human injury or equipment damage may be caused, if this requirement is ignored.

Attention: Equipment damage, loss of data or poor performance may be caused, if this requirement is ignored.

Commissioning Engineer: The engineer who installs or operates the equipment should be well trained in electricity and safety, and familiar with the operation, debug, and maintenance of the equipment.

Warning Label

The warning label indicates the possibility of human injury or equipment damage, and advised the proper step to avoid the danger. In this manual, there are three types of warning labels as below.

Labels	Description
 Danger	Serious human injury or even death may be caused, if this requirement is ignored.
 Warning	Human injury or equipment damage may be caused, if this requirement is ignored.
 Attention	Equipment damage, loss of data or poor performance may be caused, if this requirement is ignored.

Safety Instruction

 Danger	✧ Performed only by commissioning engineers. ✧ This UPS is designed for commercial and industrial applications only, and is not intended for any use in life-support devices or system.
 Warning	✧ Read all the warning labels carefully before operation, and follow the instructions.

	✧ When the system is running , do not touch the surface with this label, to avoid any hurt of scald.
	✧ ESD sensitive components inside the UPS, anti-ESD measure should be taken before handling.

Move & Installation

 Danger	✧ Keep the equipment away from heat source or air outlets. ✧ In case of fire, use dry powder extinguisher only, any liquid extinguisher can result in electric shock.
 Warning	✧ Don't start the system if any damage or abnormal parts founded. ✧ Contacting the UPS with wet material or hands may be subject to electric shock.
 Attention	✧ Use proper facilities to handle and install the UPS. Shielding shoes, protective clithes and other protective facilities are necessary to aviod injury. ✧ During positioning, keep the UPS way from shock or vibration. ✧ Install the UPS in proper environment, more detail in section 2.3.

Debug & Operate

 Danger	✧ Make sure the grounding cable is well connected before connecting the power cables, the grounding cable and neutral cable must be in accordance with the local and national codes practice. ✧ Before moving or re-connecting the cables, make sure to cut off all the input power sources, and wait for at least 10 minutes for internal discharge. Use a multi-meter to measure the voltage on terminals and ensure the voltage is lower than 36V before operation.
 Attention	✧ The earth leakage current of load will be carried by RCCB OR RCD. ✧ Initial check and inspection should be performed after long time storing of UPS.

Maintenance & Replacement

 Danger	✧ All the equipment maintenance and servicing procedures involving internal access need special tools and should be carried out only by trained personnel. The components that can be accessed by opening the protective cover with tools cannot be maintenance by user.
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	✧ This UPS full complies with “IEC62040-1-1-General and safety requirements for use in operator access area UPS”. Dangerous voltages are present within the battery box. However, the risk of contact with these high voltages is minimized for non-service personnel. Since the component with dangerous voltage can only be touched by opening the protective cover with a tool, the possibility of touching high voltage component is minimized. No risk exists to any personnel when operating the equipment in the normal manner, following the recommended operating procedures in this manual.
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Battery Safety

	✧ All the battery maintenance and servicing procedures involving internal access need special tools or keys and should be carried out only by trained personnel. ✧ When connected together, the battery terminal voltage will exceed 400Vdc and is potentially lethal. ✧ Battery manufacturers supply details of the necessary precautions to be observed when working on, or in the vicinity of a large bank of battery cells. These precautions should be followed implicitly at all times. Particular attention should be paid to the recommendations concerning local environmental conditions and the provision of protective clothing, first aid and fire-fighting facilities. ✧ Ambient temperature is a major factor in determining the battery capacity and life. The nominal operating temperature of battery is 20°C. Operating above this temperature will reduce the battery life. Periodically change the battery according to the battery user manuals to ensure the back-up time of UPS. ✧ Replace the batteries only with the same type and the same number, or it may cause explosion or poor performance. ✧ When connecting the battery, follow the precautions for high-voltage operation before accepting and using the battery, check the appearance of the batteries. If the package is damaged, or the battery terminal is dirty, corroded or rusted or the shell is broken, deformed or has leakage, replace it with new product. Otherwise, battery capacity reduction, electric leakage or fire may be caused. ✧ Before operating the battery, remove the finger ring, watch, necklace, bracelet and any other metal jewelry. ✧ Wear rubber gloves. ✧ Eye protection should be worn to prevent injury from
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	accidental electrical arcs. ✧ Only use tools (e.g. wrench) with insulated handles. ✧ The batteries are very heavy. Please handle and lift the battery with proper method to prevent any human injury or damage to the battery terminal. ✧ Don't decompose, modify or damage the battery. Otherwise, battery short circuit, leakage or even human injury may be caused. ✧ The battery contains sulfuric acid. In normal operation, all the sulfuric acid is attached to the separation board and plate in the battery. However, when the battery case is broken, the acid will leak from the battery. Therefore, be sure to wear a pair of protective glasses, rubber gloves and skirt when operating the battery. Otherwise, you may become blind if acid enters your eyes and your skin may be damaged by the acid. ✧ At the end of battery life, the battery may have internal short circuit, drain of electrolytic and erosion of positive/negative plates. If this condition continues, the battery may have temperature out of control, swell or leak. Be sure to replace the battery before these phenomena happen. ✧ If a battery leaks electrolyte, or is otherwise physically damaged, it must be replaced, stored in a container resistant to sulfuric acid and disposed of in accordance with local regulations. ✧ If electrolyte comes into contact with the skin, the affected area should be washed immediately with water.
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Disposal

 Warning	✧ Dispose of used battery according to the local instructions.
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1 UPS Structure and Introduction

1.1 UPS structure

1.1.1 UPS Configuration

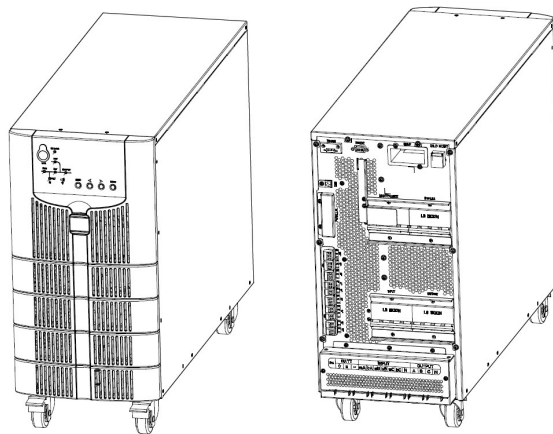
The UPS configurations are provided in Table 1-1.

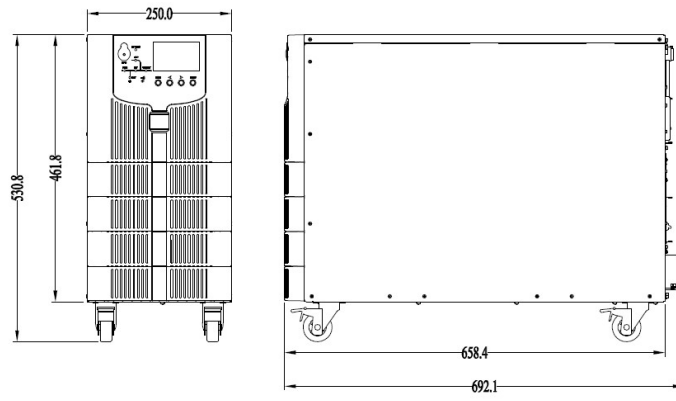
Table 1-1 UPS Configuration

Item	Components	Quantity	Remark
Standard Backup Type	Circuit Breakers	5	Standard
	Dual Input	1	Standard
	Parallel Card,	1	Optional
	Dry Contact Card	1	Optional
Long Backup Type	Circuit Breakers	4	Standard
	Dual Input	1	Standard
	Parallel Card,	1	Optional
	Dry Contact Card	1	Optional

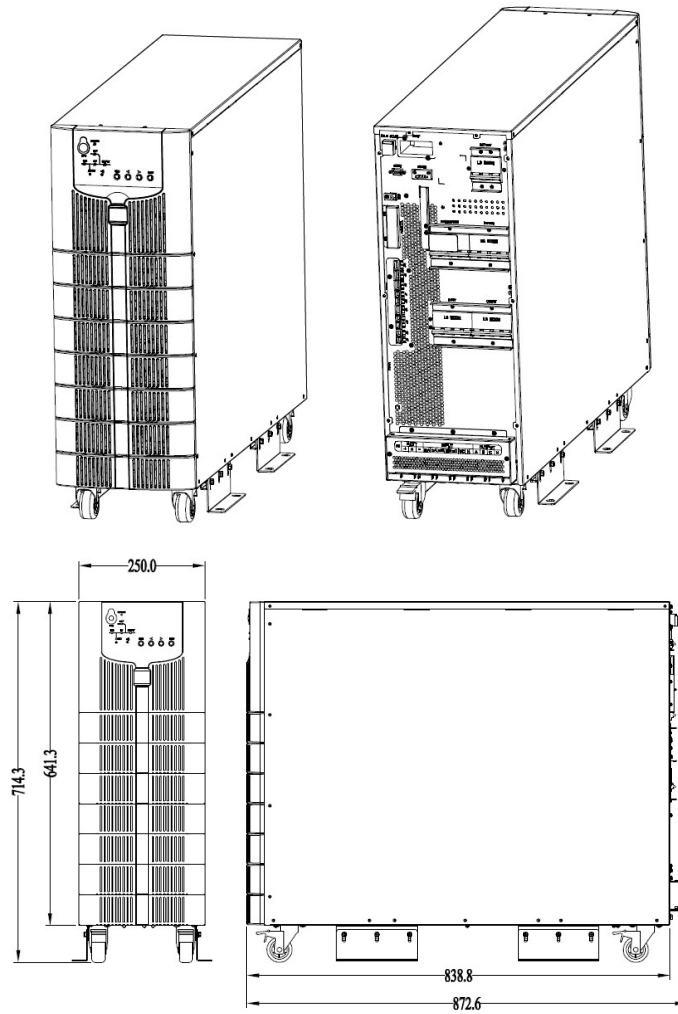
1.1.2 UPS Outlook

The UPS outlooks are shown as figure 1-1.

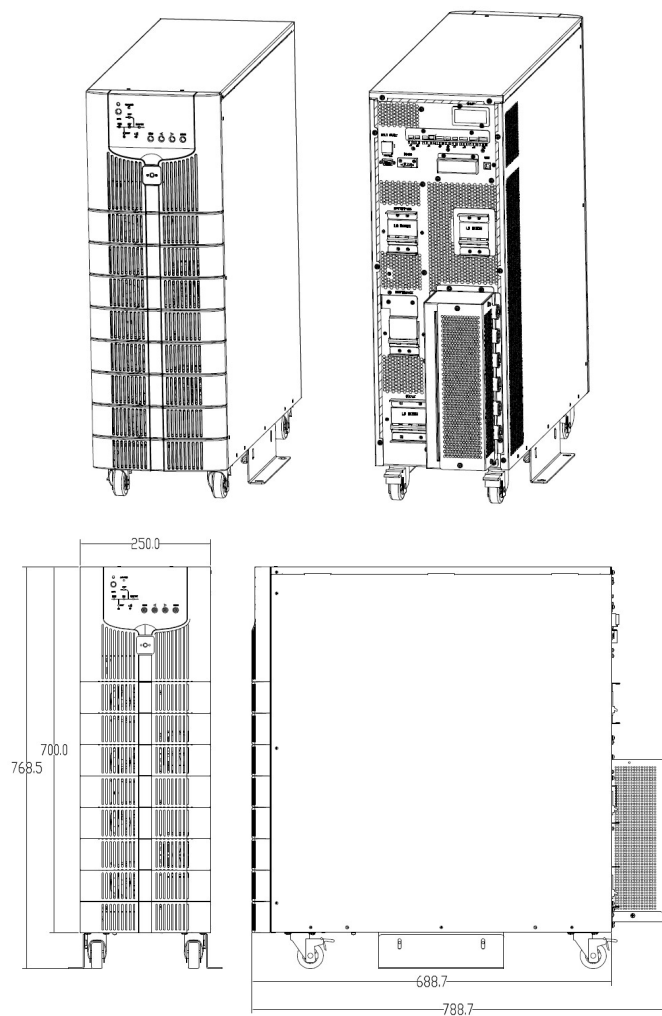




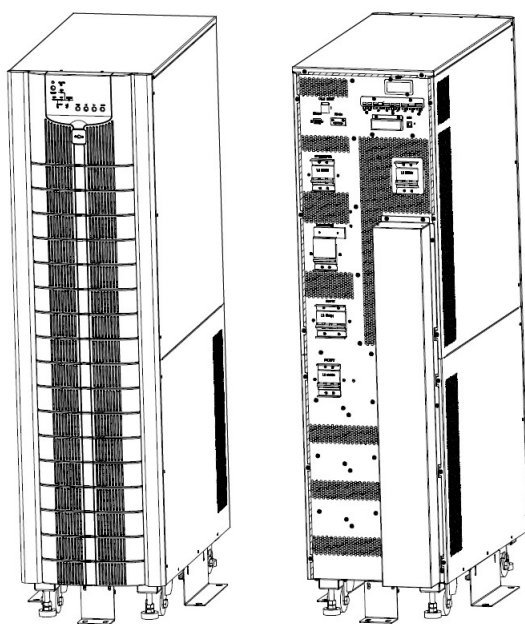
(a) The outlook of 10kVA and 15kVA long backup type (unit: mm)

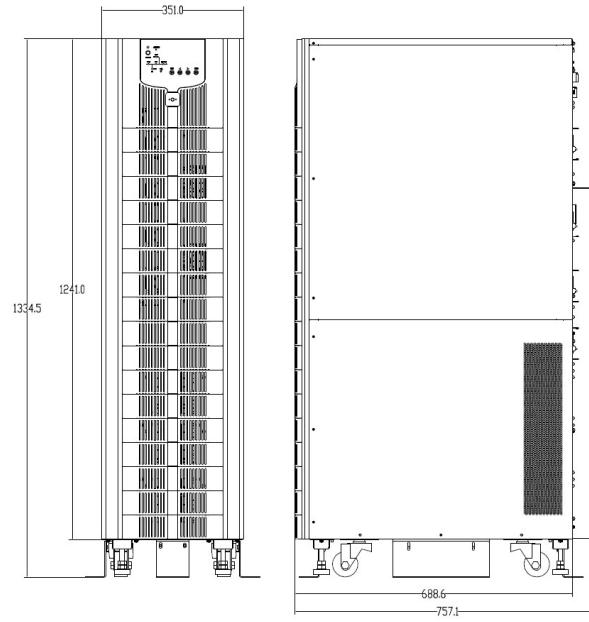


(b) The outlook of 10kVA and 15kVA standard backup type (unit: mm)

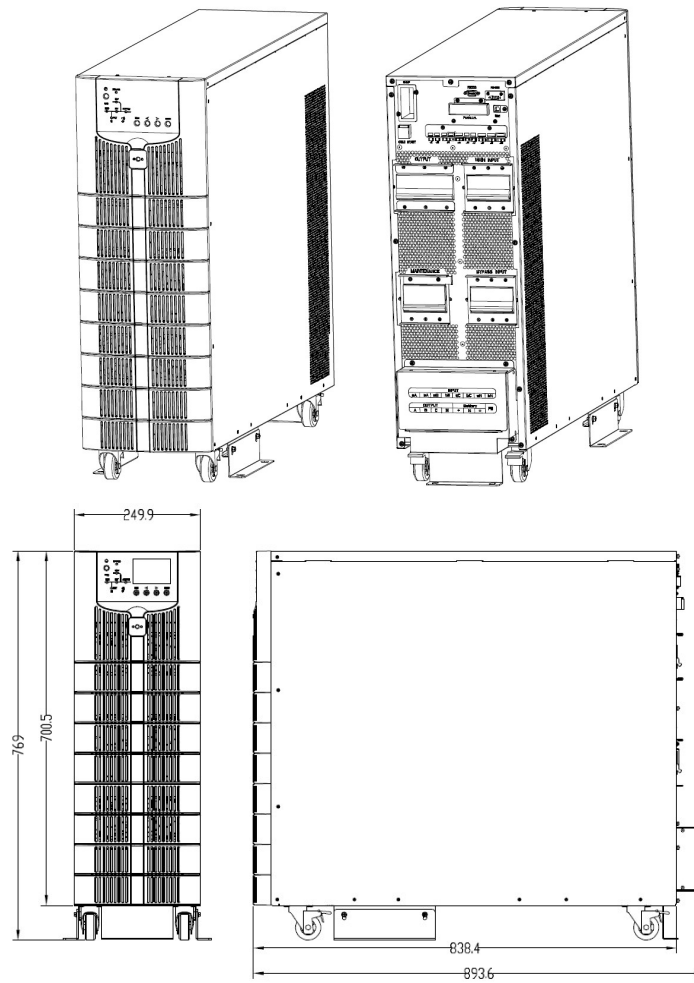


(c) The outlook of 20kVA and 30kVA long backup type (unit: mm)

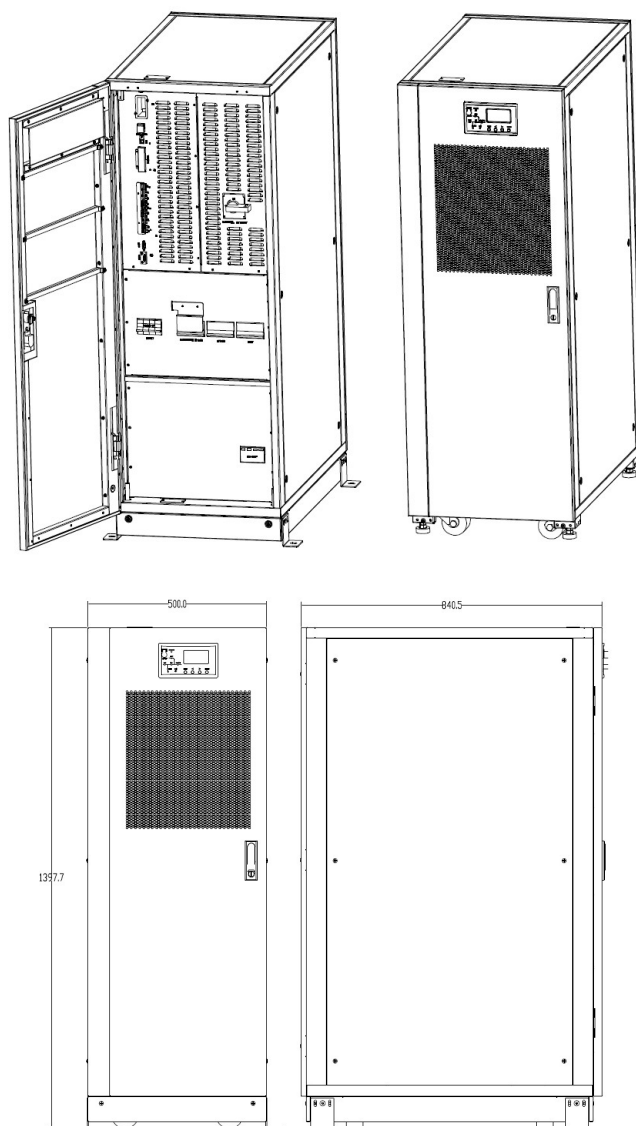




(d) The outlook of 20kVA and 30kVA standard backup type (unit: mm)



(e) The outlook of 40kVA long backup type (unit: mm)

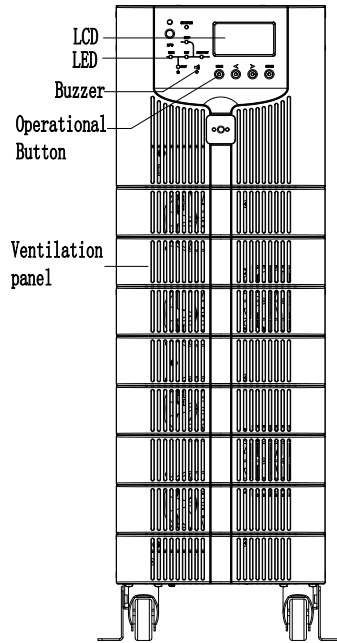


(f) The outlook of 40kVA standard backup type (unit: mm)

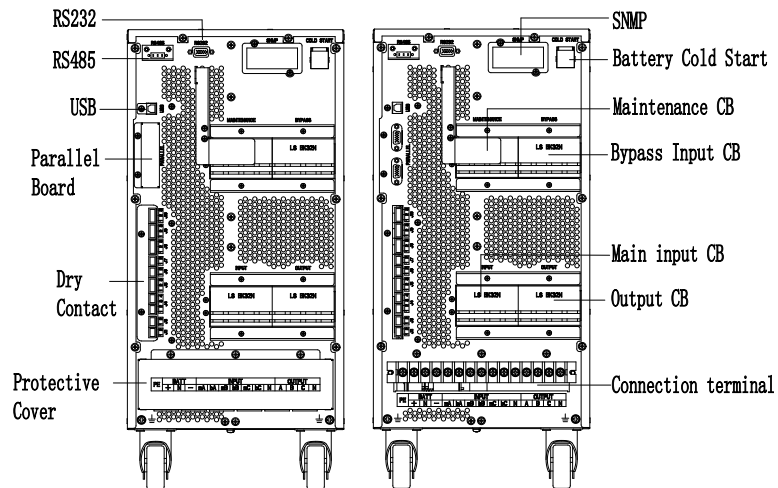
Figure 1-1 UPS Outlook

1.1.3 Details of UPS front and rear views

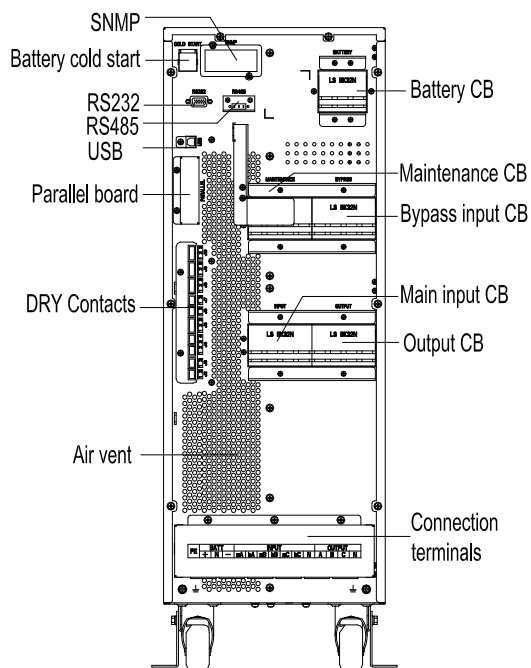
The UPS front and rear views are shown as Figure 1-2.



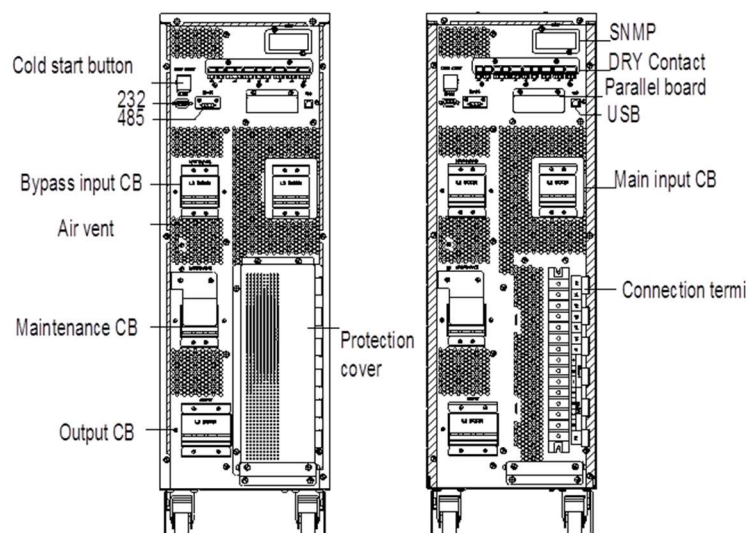
(a) The details of front view for 10-30kVA long backup and standard type



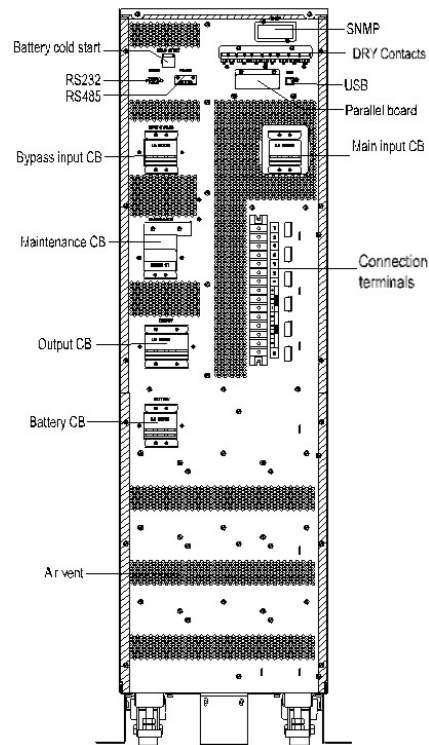
(b) The details of rear view for 10kVA and 15kVA long backup type



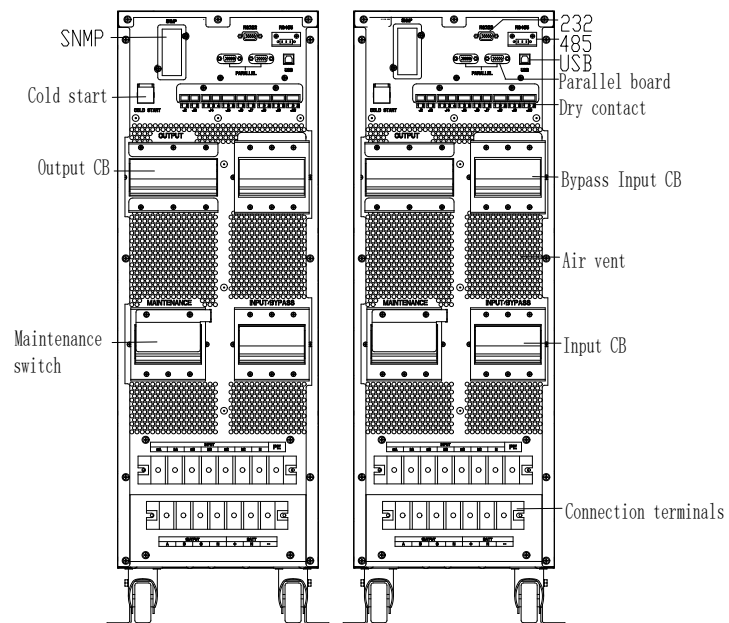
(c) The details of rear view for 10kVA and 15kVA standard backup type



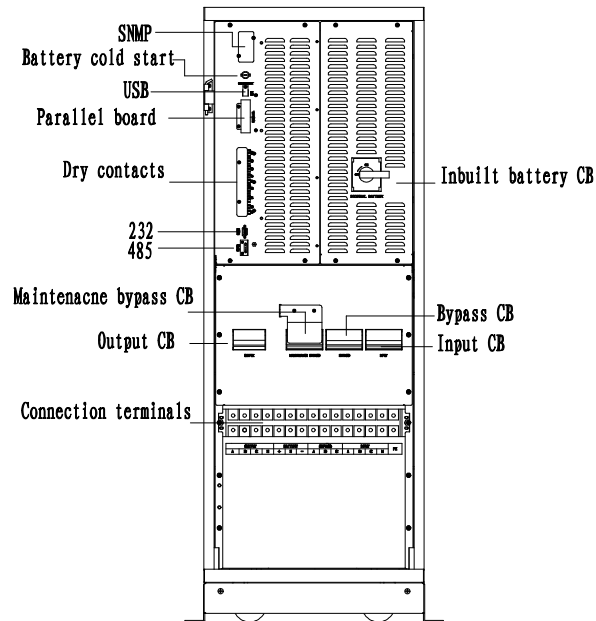
(d) The details of rear view for 20kVA and 30kVA long backup type



(e) The details of rear view for 20kVA and 30kVA standard type



(f) The details of rear view for 40Kva long backup type



(g) The details of rear view for 40kVA standard backup type
Figure 1-2 Details of UPS front and rear views

1.2 Product Introduction

1.2.1 UPS System Description

The Tower UPS is configured by the following part: rectifier, charger, inverter, static bypass switch and Maintenance bypass breaker. One or several battery strings should be installed to provide backup energy once the utility fails. The UPS structures are shown in Figure 1-3.

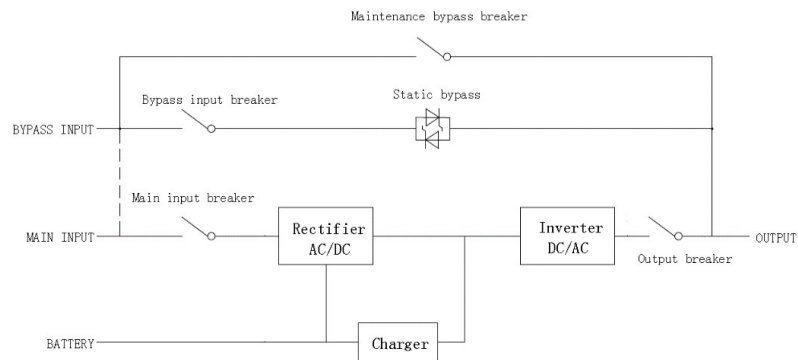


Figure 1-3 UPS Block Diagram

1.2.2 Operation Mode

The tower UPS is an on-line, double-conversion UPS that permits operation in the following modes:

- Normal mode
- Battery mode

- Bypass mode
- Maintenance mode(manual bypass)
- ECO mode
- Frequency Converter mode

1.2.2.1 Normal Mode

The inverters of power modules continuously supply AC power to the critical AC load. The rectifier derives power from the AC mains input source and supplies DC power to the inverter, meanwhile the charger derives the DC power from the rectifier and charges its associated backup batteries.

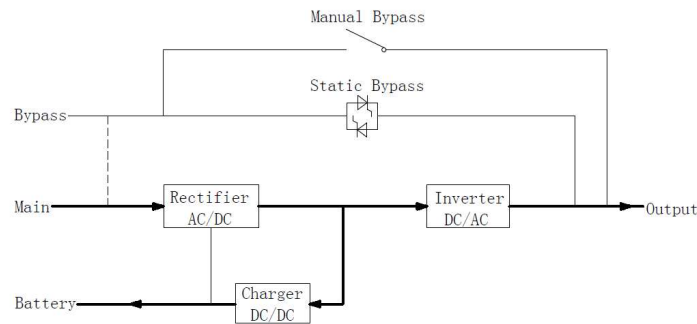


Figure 1-4 Normal mode operation diagram

1.2.2.2 Battery Mode

Upon failure of the AC mains input power, the inverters of power modules will obtain power from the batteries, and supply AC power to the critical AC load. There is no interruption to the critical load. After restoration of the AC mains input power, UPS will transfer automatically to normal mode without users' intervention.

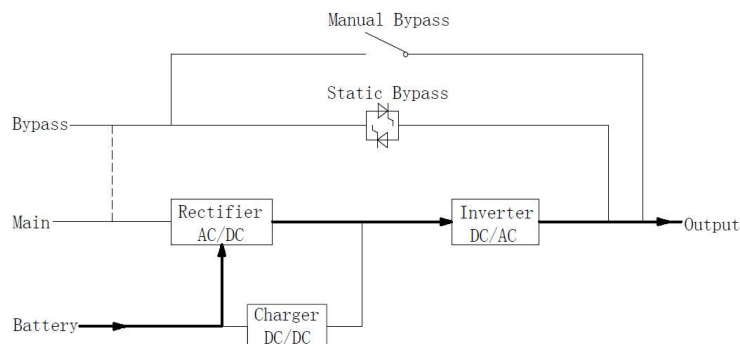


Figure 1-5 Battery Mode operation diagram

Note: With the function of “Battery Cold Start”, the UPS could start without utility. For 2-slot and 4-slot cabinet UPS, “Battery Cold Start” is optional, and for 6-slot and 10-slot cabinet UPS, it’s standard.

1.2.2.3 Bypass Mode

If the inverter overload capacity is exceeded under normal mode, or if the inverter becomes unavailable for any reason, the static switch will perform a transfer of the load from the inverter to the bypass source, without interruption to critical AC load. If the inverter is asynchronous with the bypass source, an interruption would exist in the transfer from the inverter to the bypass. This is to avoid large cross current due to the paralleling of unsynchronized AC sources. This interruption is programmable, but the typically setting is less than 3/4 of an electrical cycle, e.g. less than 15ms (50HZ) or less than 12.5ms (60HZ). The action of transfer/re-transfer can be done by the command through the monitor screen.

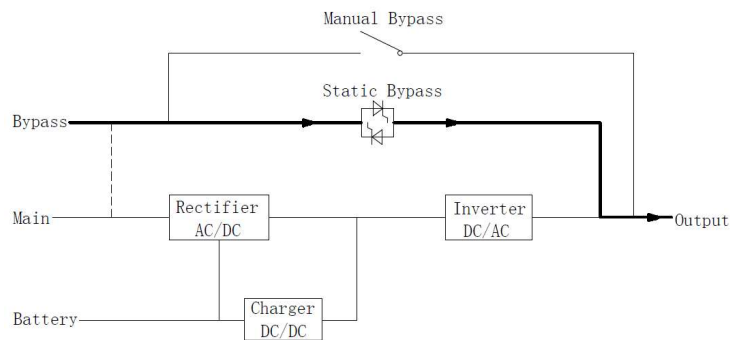


Figure 1-6 Bypass mode operation diagram

1.2.2.4 Maintenance Mode (Manual Bypass)

A manual bypass switch is available to ensure continuity of supply to the critical load when the UPS becomes unavailable e.g. during a maintenance procedure.

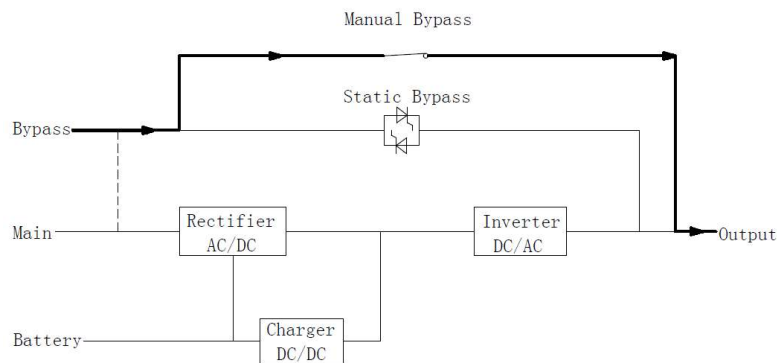


Figure 1-7 Maintenance mode operation diagram



Danger

During Maintenance mode, dangerous voltages are present on the terminal of input, output and neutral, even with all the modules and the LCD turned off.

1.2.2.5 ECO Mode

To improve system efficiency, UPS system works in Bypass Mode at normal time, and the inverter is standby, when the utility from the bypass fails, the UPS will transfer to Battery Mode and the inverter powers the load.

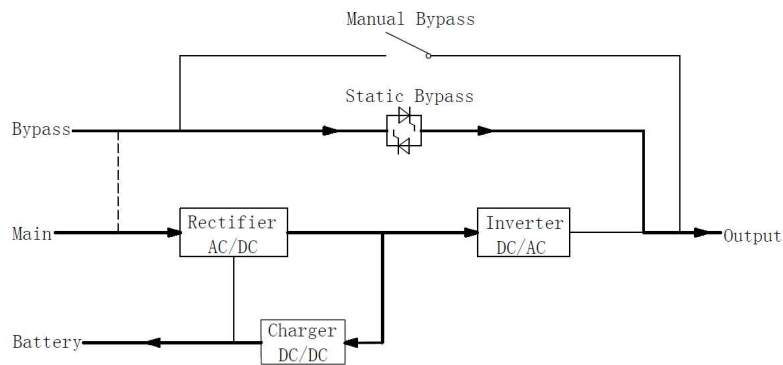


Figure 1-8 ECO Mode operation diagram

Note

There is a short interruption time (less than 10ms) when transferring from ECO mode to battery mode, it must be sure that the interruption has no effect on loads.

1.2.2.6 Frequency Converter Mode

By setting the UPS to “Frequency Converter Mode”, the UPS could present a stable output of fixed frequency (50 or 60HZ), and the bypass static switch is not available.

2 Installation

2.1 Location

As each site has its own requirements, the installation instructions in this section are as a guide for the general procedures and practices that should be observed by the installing engineer.

2.1.1 Installation Environment

The UPS is intended for indoor installation and uses forced convection cooling by internal fans. Please make sure there is enough space for the UPS ventilation and cooling.

Keep the UPS far away from water, heat and inflammable and explosive corrosive material. Avoid installing the UPS in the environment with direct sunlight, dust, volatile gases, corrosive material and high salinity.

Avoid installing the UPS in the environment with conductive dirt.

The operating environment temperature for batteries is 20°C-25°C. Operating above 25°C will reduce the battery life, and operation below 20°C will reduce the battery capacity.

The battery will generate a little amount of hydrogen and oxygen at the end of charging; ensure the fresh air volume of the battery installation environment must meet EN50272-2001 requirements.

When external batteries are used, the battery circuit breakers (or fuses) must be mounted as close as possible to the batteries, and the connecting cables should be as short as possible.

2.1.2 Site Selection

Ensure the ground or installation platform can bear the weight of the UPS cabinet, batteries and battery racks.

No vibration and less than 5 degree inclination horizontally.

The equipment should be stored in a room so as to protect it against excessive humidity and heat sources.

The battery needs to be stored in dry and cool place with good ventilation. The most suitable storage temperature is 20°C to 25°C.

2.1.3 Size and Weight

Ensure there is enough space for the placement of the UPS. The room reserved for the UPS cabinet is shown in Figure 2-1.



Attention

Ensure there is at least 0.8m before the front of the cabinet so as to easily maintain the power module and at least 0.5m behind for ventilation and cooling. The room reserved for the cabinet is shown in Figure2-1.

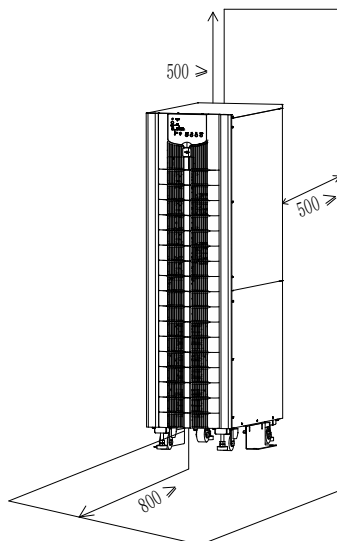


Figure 2-1 Space reserved for the cabinet (Unit: mm)

The dimension and weigh for the UPS cabinet is shown in Table 2-1

Table 1.1 Weight for the cabinet

Configuration	Dimension(W*D*H)mm	Weight
10kVA/15kVA Standard Backup Type	250*840*715	51.5kg(No Batteries Included)
10kVA/15kVA Long Backup Type	250*660*530	31kg
20kVA/30kVA Standard Backup Type	350*738*1335	89kg(No Batteries Included)
20kVA/30kVA Long Backup Type	250*680*770	52kg
40kVA Long Backup Type	250*836*770	61kg
40kVA standard Type	500*840*1400	140kg

2.2 Unloading and Unpacking

2.2.1 Moving and Unpacking of the Cabinet

The steps to move and unpack the cabinet are as follows:

1. Check if any damages to the packing. (If any, contact to the carrier)
2. Transport the equipment to the designated site by forklift, as shown in Figure2-2.

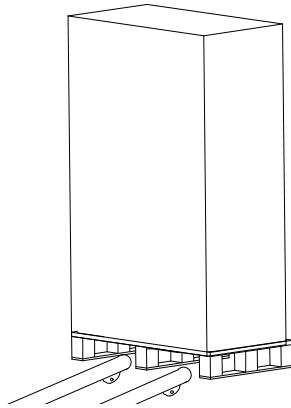


Figure 2-2 Transport to the designated site

3. Unpack the package as shown in Figure 2-3.

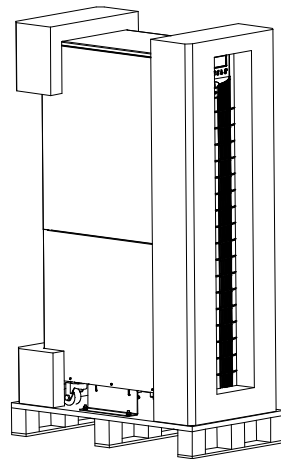


Figure 2-3 Disassemble the case

4. Remove the protective foam around the cabinet as shown in Figure 2-4.

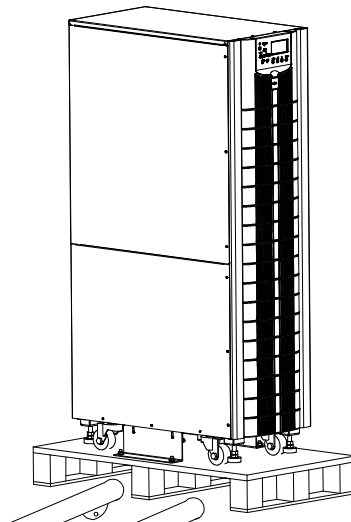


Figure 2-4 remove the protective foam

5. Check the UPS.
 - (a) Visually examine if there are any damages to UPS during transportation. If any, contact to the carrier.

(b)Check the UPS with the list of the goods. If any items are not included in the list, contact to our company or the local office.

6. Dismantle the bolt that connects the cabinet and wooden pallet after disassembly.

7. Move the cabinet to the installation position.



Attention

Be careful while removing to avoid scratching the equipment.



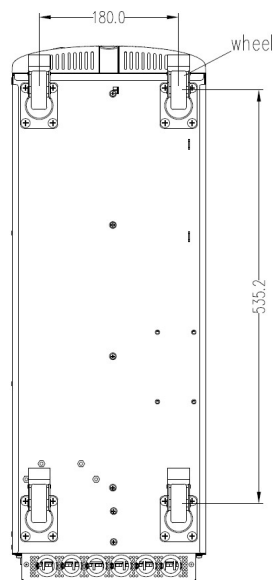
Attention

The waste materials of unpacking should be disposed to meet the demand for environmental protection.

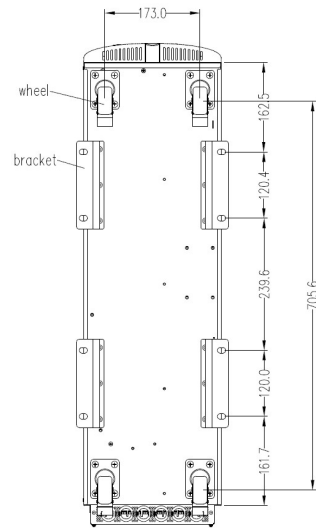
2.3 Positioning

2.3.1 Positioning Cabinet

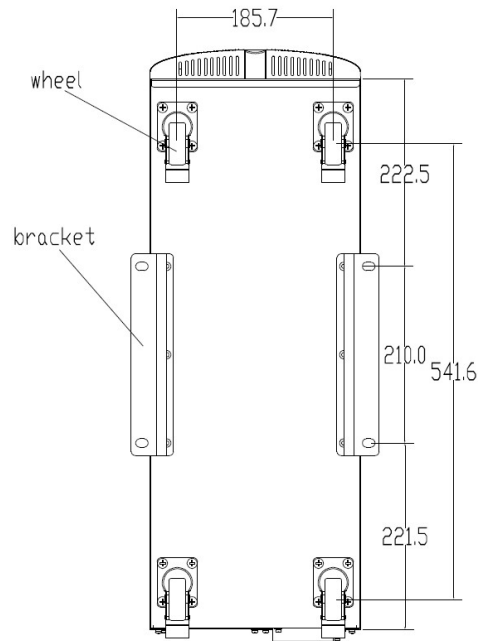
For 20kVA/30kVA/40kVA standard backup type UPS, the UPS cabinet has two way of supporting itself: One is to support itself temporarily by the four wheels at the bottom, making it convenient to adjust the position of the cabinet; The other is by anchor bolts to support the cabinet permanently after adjusting the position of the cabinet. For 10-40kva long backup type and 10kva standard backup type UPS, the UPS cabinet supports itself only by the four wheels at the bottom. The supporting structure is shown in Figure 2-5.



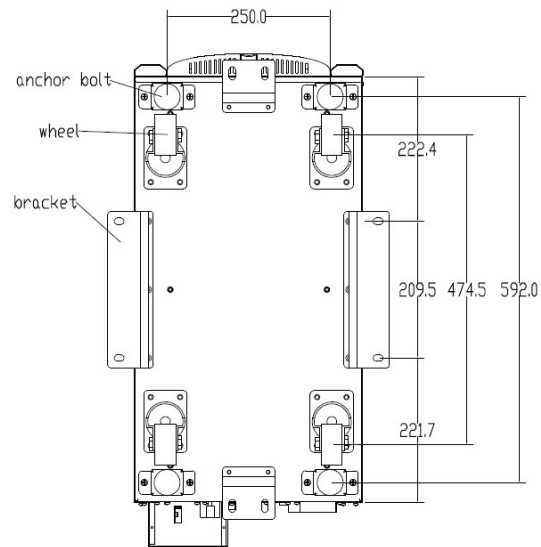
(a) 10kVA and 15kVA long backup type (Bottom, unit: mm)



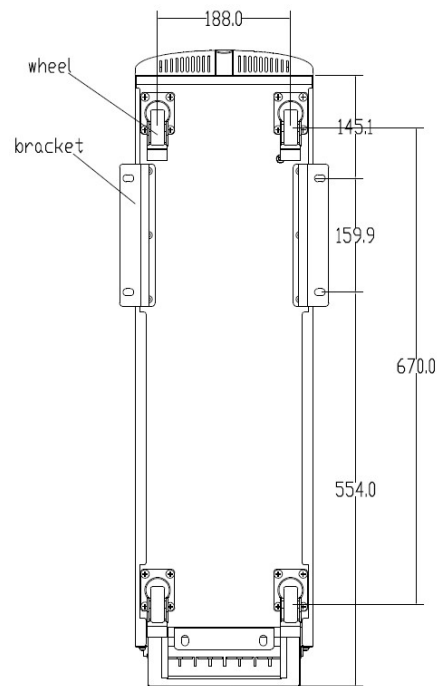
(b) 10kVA and 15kVA standard backup type (Bottom, unit: mm)



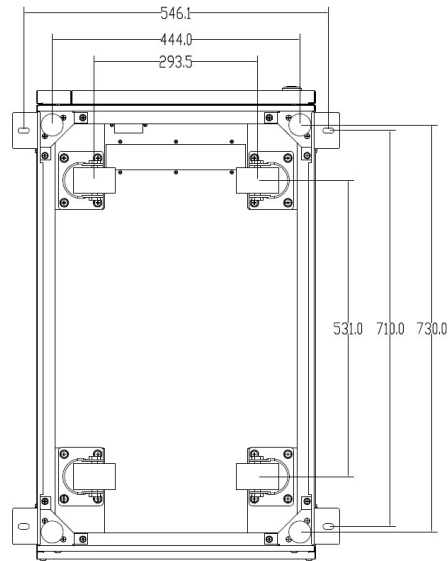
(c) 20kVA and 30kVA long backup type (Bottom, unit: mm)



(d) 20kVA and 30kVA standard backup type (Bottom, unit: mm)



(e) 40kVA long backup type (Bottom, unit: mm)



(f) 40kVA standard backup type (Bottom, unit: mm)

Figure 2-4 Supporting structure (Bottom View)

The steps to position the cabinet are as follows:

1. Ensure the supporting structure is in good condition and the mounting floor is smooth and strong.
2. Retract the anchor bolts by turning them counter clockwise using wrench, the cabinet is then supported by the four wheels.
3. Adjust the cabinet to the right position by the supporting wheels.
4. Put down the anchor bolts by turning them clockwise using wrench, the cabinet is then supported by the four anchor bolts.
5. Ensure the four anchor bolts are in the same height and the cabinet is fixed and immovable.



Attention

Auxiliary equipment is needed when the mounting floor is not solid enough to support the cabinet, which helps distribute the weight over a larger area. For instance, cover the floor with iron plate or increase the supporting area of the anchor bolts.

2.4 Battery

Three terminals (positive, neutral, negative) are drawn from the battery group and connected to UPS system. The neutral line is draw from the middle of the batteries in series (See Figure 2-5)

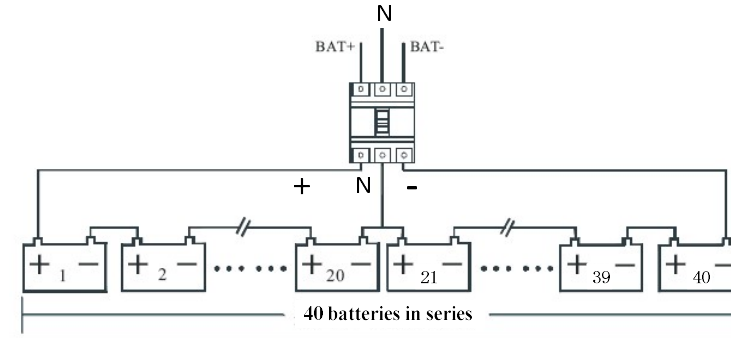


Figure 2-5 Battery connection diagram



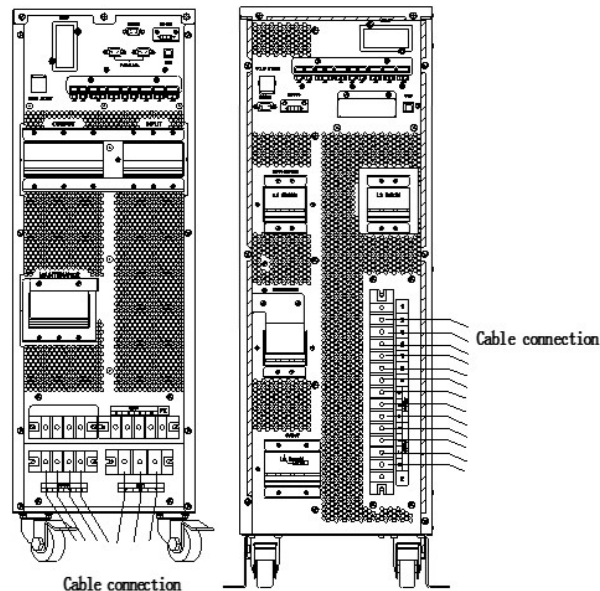
Danger

The battery terminal voltage is of more than 400Vdc, please follow the safety instructions to avoid electric shock hazard.

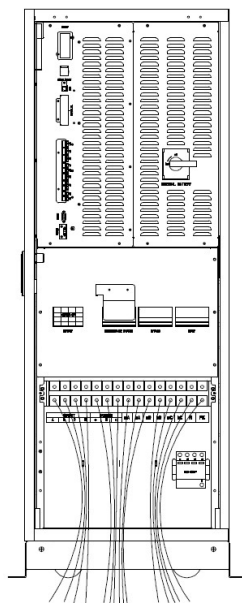
Ensure the positive, negative, neutral electrode is correctly connected from the battery unit terminals to the breaker and from the breaker to the UPS system.

2.5 Cable Entry

For 10kVA and 15kVA long or standard backup type, cables entre from the bottom of the rear side.
For 20kVA and 30kVA long or standard backup type, cables entre from the right side of the rear side.
For 40kVA long or standard backup type, cables entre from the bottom of the rear side.
These cable entry ways are shown in Figure 2-6.



(a) Cables entre from the bottom or the right side of the rear



(b) Cables entre from the bottom of the front

Figure 2-6 Cables entry

2.6 Power Cables

2.6.1 Specifications

The UPS power cables are recommended in Table 2-2.

Table 2-2 Recommended sizes for power cables

Contents			10/15kVA	20/30kVA	40kVA
Main Input	Main Input Current(A)		18/28	35/55	70
	CableSection (mm ²)	A	6	10	16
		B	6	10	16
		C	6	10	16
		N	6	10	16
Main Output	Main Output Current(A)		15/23	30/45	60
	CableSection (mm ²)	A	6	10	16
		B	6	10	16
		C	6	10	16
		N	6	10	16
Bypass Input (Optional)	Bypass Input Current(A)		15/23A	30/45A	60A
	CableSection (mm ²)	A	6	10	16
		B	6	10	16
		C	6	10	16
		N	6	10	16
	Battery Input current(A)		20/30A	40/60A	80A

Battery Input	CableSection (mm ²)	+	8	16	25
		-	8	16	25
		N	8	16	25
PE	CableSection	PE	6	10	16



Note

The recommended cable section for power cables are only for the situations described below:

- Ambient temperature: +30°C.
- AC loss is less than 3%, DC loss is less than 1%, the length of the AC power cables should be no longer than 50 meters and the length of the DC power cables should be no longer than 30 meters.
- Currents listed in the table are based on the 380V system (line to line voltage). For 400V system, the current is 0.95 times and for the 415V system the current is 0.92 times.
- The size of neutral lines should be 1.5-1.7 times the value listed above when the predominant load is non-linear.

2.6.2 Specifications for Power Cables Terminal

Specifications for power cables connector are listed as Table 2-3.

Table 2-3 Requirements for power terminal

Port	Connection	Bolt	Bolt	Torque
Mains input	Cables crimped OT terminal	M6	7mm	4.9Nm
Bypass Input	Cables crimped OT terminal	M6	7mm	4.9Nm
Battery Input	Cables crimped OT terminal	M6	7mm	4.9Nm
Output	Cables crimped OT terminal	M6	7mm	4.9Nm
PE	Cables crimped OT terminal	M6	7mm	4.9Nm

2.6.3 Circuit Breaker

The external circuit breakers (CB) for the system are recommended in Table 2-4.

Table 2-4 Recommended CB

Installed	10kVA	15kVA	20kVA	30kVA	40kVA
Input CB	32A/3P	40A/3P	63A/3P	100A/3P	100A/3P

Bypass input CB	32A/3P	40A/3P	63A/3P	63A/3P	100A/3P
Output CB	32A/3P	40A/3P	63A/3P	63A/3P	100A/3P
External	32A/3P	40A/3P	63A/3P	63A/3P	100A/3P
Battery CB	32A/3P	40A,250Vdc	63A,250Vdc	100A,250Vdc	125A,250Vdc



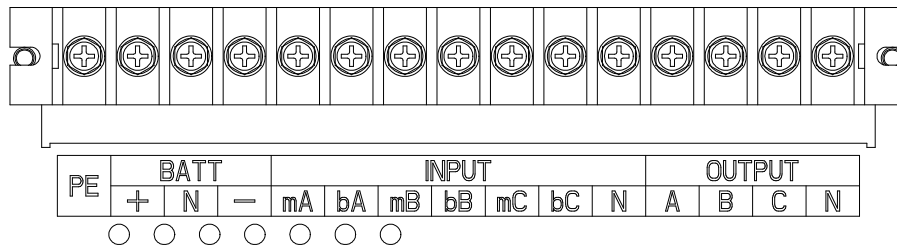
Attention

The CB with RCD (Residual Current Device) is not suggested for the system.

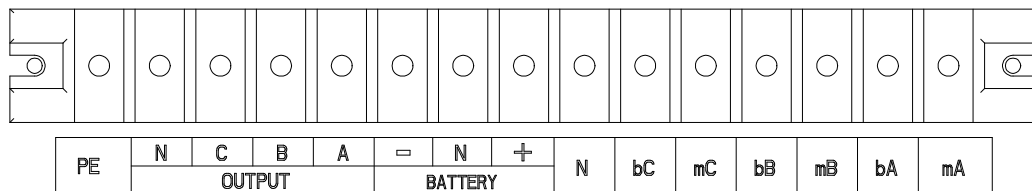
2.6.4 Connecting Power Cables

The steps of connecting power cables are as follows:

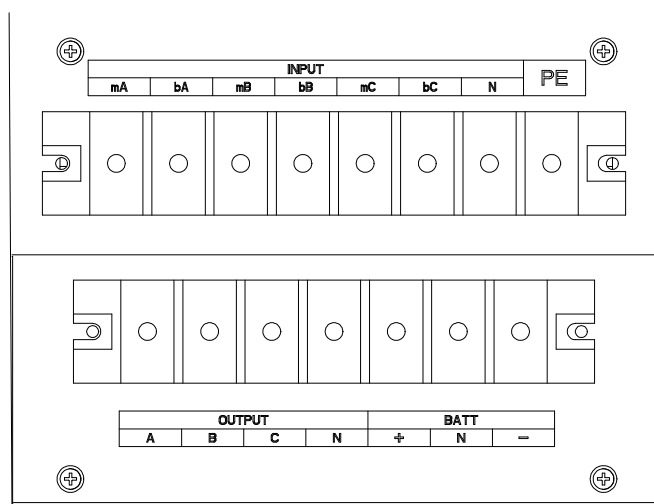
- 1) Verify that all the external input distribution switches of the UPS are completely open and the UPS internal maintenance bypass switch is open, Attach necessary warning signs to these switches to prevent unauthorized operation.
- 2) For 10kVA, 20kVA, 30kVA long backup or standard type and 40kVA long backup type, the connection terminals are in the rear of UPS, for 40kVA standard backup type, the connection terminals are in the front of UPS, remove the metal protective cover, the terminals are shown in Figure 2-7



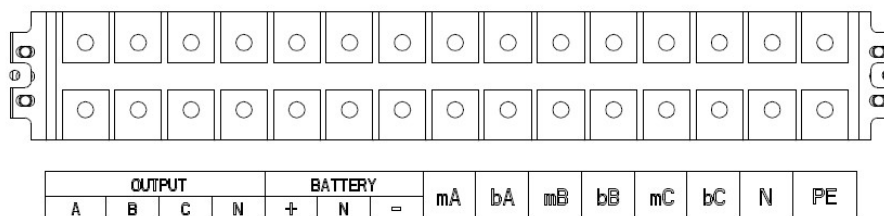
(a) Connection terminals for 10kVA/15kVA long and standard backup time



(b) Connection terminals for 20kVA/30kVA long and standard backup time



(c) Connection terminals for 40kVA long backup time



(d) Connection terminals for 40kVA standard backup time

Figure 2-7 Cable connection terminals

- 3) Connect the protective earth wire to protective earth terminal (PE).
- 4) Connect the AC input supply cables to the main input terminal and AC output supply cables to the output terminal.
- 5) Connect the battery cables to the battery terminal.
- 6) Check to ensure there is no mistake and re-install all the protective covers.

Note: mA, mB, mC standard for Main input phase A,B and C; bA,bB,bC standard for Bypass Input phase A,B and C.

Attention

The operations described in this section must be performed by authorized electricians or qualified technical personnel. If you have any difficulties, contact the manufacturer or agency.

Warning

- Tighten the connections terminals to enough torque moment, refer to Table 2-3, and please ensure correct phase rotation.
- Before connection, ensure the input switch and the power supply are off, attach warnings label to warn not to operate by others
- The grounding cable and neutral cable must be connected in accordance with local and national codes.
- When the cable holes does not goes through by cables, it should be filled by the hole stopper.

2.7 Control and Communication Cables

UPS is configured with RS232 and RS485 interfaces, dry contact, USB and SNMP card are optional, as is shown in Figure 2-8.

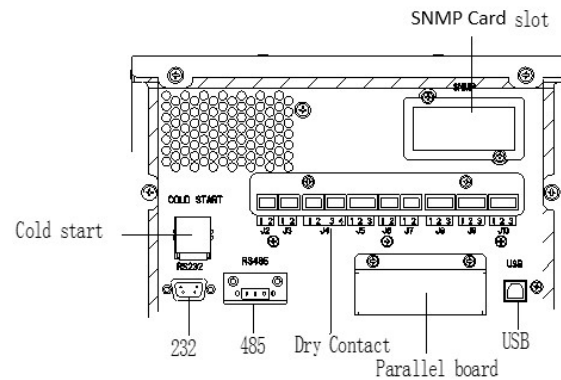


Figure 2-8 Dry contact & communication interface

2.7.1 Dry Contact Interface

The UPS provides the dry contact ports from J2 to J10, and the ports J5, J6-2, J7 can be programmable as input ports, the UPS can accept the dry contact signal from these ports to act some operations. The ports J6-1, J8, J9, and J10 can be programmable as output ports, when the UPS is in some actions, the UPS can send out the dry contact signal to external devices for indicating the status of the UPS or acting. The default definitions of these ports are shown in Table 2-5.

Table 2-5 Default Functions of the ports

Port	Name	Function
J2-1	TEMP_BAT	Detection of battery temperature
J2-2	TEMP_COM	Common terminal for temperature detection
J3-1	ENV_TEMP	Detection of environmental temperature
J3-2	TEMP_COM	Common terminal for temperature detection
J4-1	REMOTE_EPO_NC	Trigger EPO when disconnected with J4-2
J4-2	+24V_DRY	+24V
J4-3	+24V_DRY	+24V
J4-4	REMOTE_EPO_NO	Trigger EPO when short- circuited with J4-3
J5-1	+24V_DRY	+24V
J5-2	GEN_CONNECTED	Input dry contact , the function is settable , Default: interface for the generator
J5-3	GND_DRY	Ground for +24V
J6-1	BCB Drive	Output dry contact, the function is settable. Default: Battery trip signal
J6-2	BCB_Status	Input dry contact, the function is settable.

		Default: BCB Status (Alarm no battery if BCB Status is invalid).
J7-1	GND_DRY	Ground for +24V
J7-2	BCB_Online	Input dry contact, the function is settable. Default: BCB Online (when short-circuited with J7-1, it indicates BCB online, and BCB Status is available).
J8-1	BAT_LOW_ALARM_NC	Output dry contact (Normally closed), the function is settable. Default: Low battery alarm
J8-2	BAT_LOW_ALARM_NO	Output dry contact (Normally open), the function is settable. Default: Low battery alarm
J8-3	BAT_LOW_ALARM_GND	Common terminal for J8-1 and J8-2
J9-1	GENERAL_ALARM_NC	Output dry contact, (Normally closed) the function is settable. Default: Fault alarm
J9-2	GENERAL_ALARM_NO	Output dry contact, (Normally open) the function is settable. Default: Fault alarm
J9-3	GENERAL_ALARM_GND	Common terminal for J9-1 and J9-2
J10-1	UTILITY_FAIL_NC	Output dry contact, (Normally closed) the function is settable. Default: Utility abnormal alarm
J10-2	UTILITY_FAIL_NO	Output dry contact, (Normally open) the function is settable. Default: Utility abnormal alarm
J10-3	UTILITY_FAIL_GND	Common terminal for J10-1 and J10-2



Note

The input dry contact ports J5-2, J6-2, and J7 can be programmed through our MTR software, the programmable events are shown in Table 2-6.

Table 2-6 Input Programmable Events

NO.	Event	Description
1	Generator Input	The input power is supplied by the generator
2	Maint CB Close	External maintenance switch closed
3	Mute	Mute
4	BCB Status	BCB status, closed or open
5	Transfer Inverter	UPS would transfer to the inverter mode
6	BCB Online	Enable the BCB status checking
7	Transfer Bypass	UPS would transfer to the bypass mode
8	Fault Clear	Recheck the fault or alarm information
9	BMS Allow Charge	Charging is allowed

10	BMS Allow Discharge	Discharging is allowed
11	Electrolyte Leakage	Battery electrolyte leakage
12	Stop Boost Charge	Stop boost charging

Note: The output dry contact ports J6-1, J8, J9 and J10 can be programmed through our MTR software, the programmable events are shown in Table 2-7.

Table 2-7 Output Programmable Events

NO.	Event	Description
1	BCB Trip	BCB tripping
2	Byp Backfeed Trip	Bypass backfeed protective breaker tripping
3	Overload	Output is overload
4	General Alarm	General alarms
5	Output Lost	No output voltage
6	Battery Mode	UPS works in battery mode
7	Utility Fail	The power-grid fails
8	On Inverter	UPS works in inverter mode
9	Battery Charge	Batteries are being charged
10	Normal Mode	UPS works in normal mode
11	Batt Volt Low	Batteries voltage is low
12	On Bypsaa	UPS works in bypass mode
13	Batt Discharge	Batteries are discharging
14	Rectifier Ready	The rectifier is starting
15	Battery Boost Charge	Batteries are boosting charged

Note: There below take the default definitions for example to introduce the methods of application.

Interface of Battery and Environmental Temperature Detection

The input dry contact J2 and J3 can detect the temperature of batteries and environment respectively, which can be used in environment monitoring and battery temperature compensation. Interfaces diagram for J2 and J3 are shown in Figure 2-22, the description of the interface is in Table 2-8.

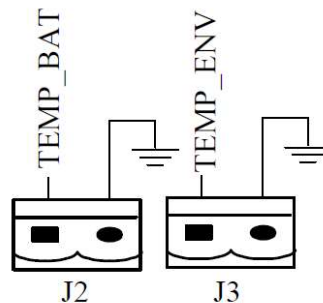


Figure 2-22 J2 and J3 for temperature detecting

Table 2-8 Description of J2 and J3

Port	Name	Function
J2-1	TEMP_BAT	Detection of battery temperature
J2-2	TEMP_COM	common terminal
J3-1	ENV_TEMP	Detection of environmental temperature
J3-2	TEMP_COM	common terminal

 Note

A specified temperature sensor is required for temperature detection, and it's optional, please confirm with the manufacturer or the local agency before the order.

Remote EPO Input Port

J4 is the input port for remote EPO. It requires connecting NC (J4-1) and +24V (J4-2) and disconnecting NO (J4-4) and +24V (J4-3) during normal operations, and EPO is triggered when disconnecting NC (J4-1) and +24V (J4-2), or connecting NO (J4-4) and +24V (J4-3). The port diagram is shown in Figure 2-23, and the port description is shown in Table 2-9.

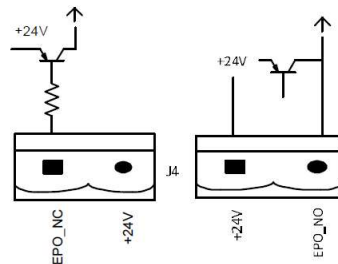


Figure 2-23 Diagram of input port for remote EPO

Table 2-9 Description of input port for remote EPO

Port	Name	Function
J4-1	REMOTE_EPO_NC	Trigger EPO when disconnect with J4-2
J4-2	+24V_DRY	+24V
J4-3	+24V_DRY	+24V
J4-4	REMOTE_EPO_NO	Trigger EPO when connect with J4-3

 Note

J4-1 and J4-2 must be connected in normal operations.

Generator Input Dry Contact

The default function of J5 is the interface for generator input, when connecting J5-2 with +24V (J5-1), the UPS judges the generator has been connected in the system. The port diagram is shown in Figure 2-24, the port description is shown in Table 2-10.

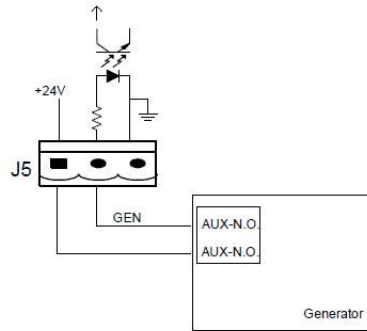


Figure 2-24 Diagram of input port for generator input

Table 2-10 Description of input port for generator input

Port	Name	Function
J5-1	+24V_DRY	+24V
J5-2	GEN_CONNECTED	Connection status of generator
J5-3	GND_DRY	Power ground for +24V

BCB Input Port

The default functions of J6 and J7 are the ports for BCB tripping and BCB status, connect J6-1 and J7-1 to BCB tripper, the port J6-1 can provide a driver signal (+24VDC, 20mA) to trip the battery breaker when EPO is triggered or EOD (end of discharge) happen. Connect J6-2 and J7-1 to BCB auxiliary contact points after shorting circuit J7-1 and J7-2, the UPS would detect the BCB status, when BCB is closed, it indicates batteries are connected, when open, it alarms batteries not connected. The port diagram is shown in Figure 2-25, and the description is shown in Table 2-11.

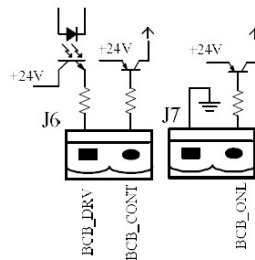


Figure 2-25 BCB Port

Table 2-11 Description of BCB port

Port	Name	Function
J6-1	BCB_DRIV	BCB contact drive, provides +24V voltage, 20mA drive signal
J6-2	BCB_Status	BCB contact status, connect with the normally open signal of BCB
J7-1	GND_DRY	Power ground for +24V
J7-2	BCB_Online	BCB on-line input (normally open), BCB is on-line when the signal is connecting with J7-1



Note

In default setting, when a circuit breaker with auxiliary contacts is used, connect J6-2 and J7-1 to auxiliary contacts terminals to get the status of the BCB, this function must be enabled by shorting J7-1 and J7-2.

Battery Warning Output Dry Contact Interface

The default function of J8 is the output dry contact interface for battery voltage low alarm, when the battery voltage is lower than the setting value, an auxiliary dry contact signal will be activated via the relay, before UPS alarms “Battery voltage low”, J8-1 and J8-3 are connected by the relay, J8-2 and J8-3 are disconnected, when UPS alarms “battery voltage low”, J8-1 and J8-3 are disconnected by the relay, J8-2 and J8-3 are connected.

The port diagram is shown in Figure 2-26, and the description is shown in Table 2-12.

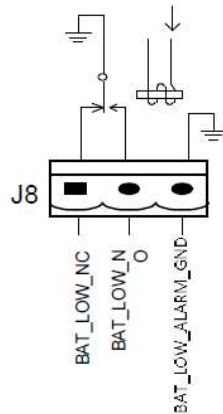


Figure 2-26 Battery warning output dry contact interface diagram

Table 2-12 Battery warning output dry contact interface description

Port	Name	Function
J8-1	BAT_LOW_ALARM_NC	Battery warning relay (normally closed) will be open during warning
J8-2	BAT_LOW_ALARM_NO	Battery warning relay (normally open) will be closed during warning
J8-3	BAT_LOW_ALARM_GND	Common terminal

General Alarm Output Dry Contact Interface

The default function of J9 is the general alarm output dry contact dry interface. When one and more warnings are triggered, an auxiliary dry contact signal will be active via the isolation of a relay. The port diagram is shown in Figure 2-27, and the description is shown in Table 2-13.

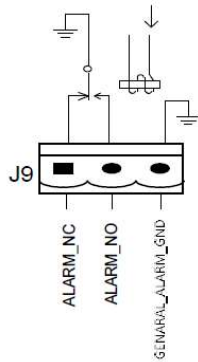


Figure 2-27 General alarm dry contact interface diagram

Table 2-13 General alarm dry contact interface description

Port	Name	Function
J9-1	GENERAL_ALARM_NC	Integrated warning relay (normally closed) will be open during warning
J9-2	GENERAL_ALARM_NO	Integrated warning relay (normally open) will be closed during warning
J9-3	GENERAL_ALARM_GND	Common terminal

Utility Fail Warning Output Dry Contact Interface

The default function of J10 is the output dry contact interface for utility failure warning, when the utility fails, the system will send a utility failure warning information, and provide an auxiliary dry contact signal via the isolation of a relay. The interface diagram is shown in Figure 2-28, and the description is shown in Table 2-13.

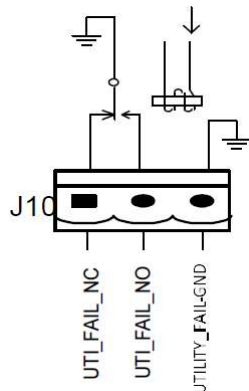


Figure 2-28 Utility failure warning dry contact interface diagram

Table 2-13 Utility failure warning dry contact interface description

Port	Name	Function
J10-1	UTILITY_FAIL_NC	Mains failure warning relay(normally closed) will be open during warning
J10-2	UTILITY_FAIL_NO	Mains failure warning relay (normally open) will be closed during warning
J10-3	UTILITY_FAIL_GND	Common terminal

2.7.2 Communication Interface

RS232, RS485 and USB ports can provide series data which can be used for commissioning and maintenance by authorized engineers or can be used for networking or integrated monitoring system in the service room. SNMP is used on site for communication (Optional).

3 Control and LCD display Panel

The structure of control and display panel for cabinet is shown in Figure 3-1.

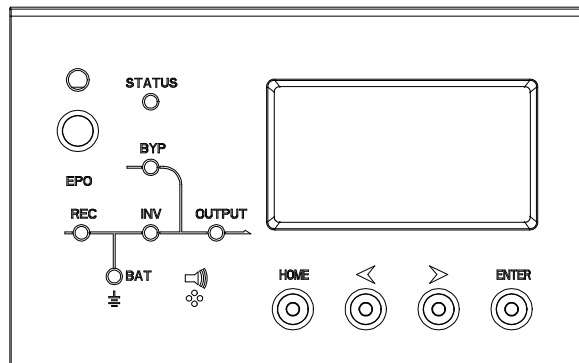


Figure 3-1 Control and display panel

The panel is divided into three functional areas: LED indicator, control and operation keys and LCD screen.

3.1 LCD Indicator

There are 6 LEDs on the panel to indicate the operating status and fault. (Refer to Figure 3-1).The descriptions of indicators are shown in Table 3-1.

Table 3-1 Status description of indicators

Indicators	State	Description
Rectifier indicator	Steady green	Rectifier normal
	Flashing green	Rectifier is starting up
	Steady red	Rectifier fault
	Flashing red	Mains input abnormal
	Off	Rectifier not operating
Battery indicator	Steady green	Battery charging
	Flashing green	Battery discharging
	Steady red	Battery abnormal (battery failure, no battery or battery reversed) or battery converter abnormal (failure, over current or over temperature) , EOD
	Flashing red	Battery low voltage
	Off	Battery and battery converter normal, battery not charging
Bypass indicator	Steady green	Load supplied by bypass
	Steady red	Bypass abnormal or out of normal range, or static bypass switch fault
	Flashing red	Bypass voltage abnormal
	Off	Bypass normal
	Steady green	Load supplied by inverter

Indicators	State	Description
Inverter indicator	Flashing green	Inverter on, start, synchronization or standby (ECO mode)
	Steady red	System output not supplied by inverter, inverter fault
	Flashing red	System output supplied by inverter, and inverter alarm
	Off	Inverter not operating for all modules
Load indicator	Steady green	UPS output ON and normal
	Steady red	UPS overload time is out, or output short, or output no power supply
	Flashing red	Overload output of UPS
	Off	No output of UPS
Status indicator	Steady green	Normal operation
	Steady red	Failure

There are two different types of audible alarm during UPS operation, as shown in Table 3-2.

Table 3-2 Description of audible alarm

Alarm	Description
Two short alarm with a long one	when system has general alarm (for example: AC fault),
Continuous alarm	When system has serious faults (for example: fuse or hardware fault)

3.2 Control and operation keys

Control and operation keys include five keys, which are used together with LCD screen. The functions description is shown in Table 3-3.

Table 3-3 Functions of Control and operation keys

Function Key	Description
EPO	Emergency power off. Long press, cut off the load power (shut down the rectifier, inverter, static bypass and battery)
HOME	Return to the main menu page
Left arrow	Select and turn the page
Right arrow	Select and turn the page
ENTER	Confirm



Attention

When bypass frequency is over track, there is interruption time (less than 10ms) for transferring from bypass to inverter.

3.3 LCD Screen

After the monitoring system starts self-test, the system enters the home page, following the welcome window. The home page is shown in Figure 3-2.

Home page consists of System Information Window, Menu Window and Current Command and Record Menu.

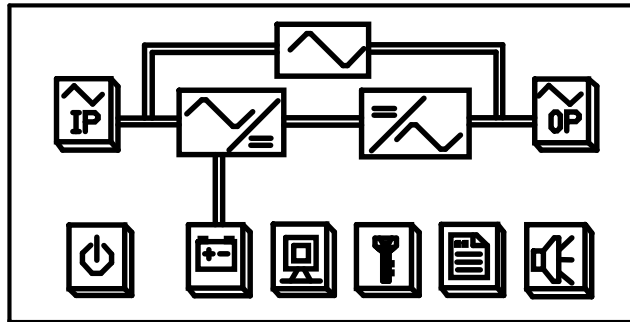
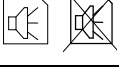
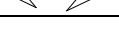


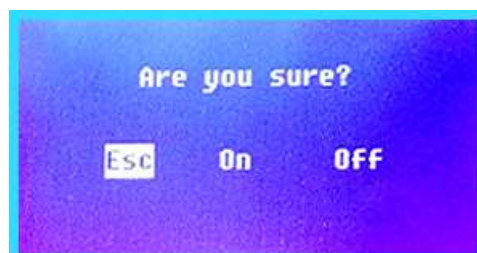
Figure 3-2 Home page

The descriptions of LCD icons are shown in Table 3-4.

Icon	Description
	Power On/Off button
	Parameters of Main & Bypass Input
	History log
	Function set(Fault Clear, Battery Test, Battery Maintenance, language set, Manual Transfer, etc.), System Configuration(For Service Engineer Only)
	Parameters of Battery, DC bus information, Temperature, etc.
	Parameters of Output & Load
	Warning, S-code and System Information(Rated parameters, Version Information)
	Mute on/off
	Page Up & Down

Select these icons, system enters the corresponding page.

Select  and press “ENTRY” button to turn off the inverter or return on the inverter or escape.



Select  and press “ENTRY” button to check the data of main input and bypass input.

HOME ← I/P MAIN ⇒ NEXT		
A	B	C
230.4V	231.3V	230.2V
49.96Hz	49.96Hz	49.96Hz
10.8 A	10.5 A	10.9 A
0.92 PF	0.92 PF	0.95 PF

BACK ← I/P BYPASS ⇒ END		
A	B	C
230.7V	230.8V	231.4V
49.96Hz	49.96Hz	49.96Hz
0.0 A	0.0 A	0.0 A
1.00 PF	1.00 PF	1.00 PF

Select  and press “ENTRY” button to check the history log.

UP ← HISTORY LOG ⇒ DOWN		
Load On UPS		S
001	2019-10-11 09:22:46	
Battery Float		S
002	2019-10-11 09:22:05	

UP ← HISTORY LOG ⇒ DOWN		
Load On Bypass		S
003	2019-10-11 09:21:32	
Bypass Voltage Abnormal		S
004	2019-10-09 16:36:19	

Select  and press “ENTRY” button to set the date and the time, the language, the communication protocol, the screen contrast, the rate (rated voltage and voltage frequency), the battery parameters (battery number, battery capacity, charging current), and operate functions (fault clear, manual to bypass, manual to inverter, battery discharging test and stop test).

HOME ← TIME SET ⇒ NEXT		
Now	2019-10-11 09:40:03	

BACK ← LANG. SET ⇒ NEXT		
Now	en	
Select	cn	en fr de it
	ru	pt es pl tr

BACK ← MODBUS SET ⇒ NEXT		
Address	001	
Comm. Mode	ASCII	
BaudRate	9600	

BACK ← COMM. SET ⇒ NEXT		
Present	MODBUS	
Select	SNT	ModBus

BACK ← CONTRAST SET ⇒ NEXT		
0		100

RATE SET		
	Now	Set
RATE IP U(LN)	220	220
RATE OP U(LN)	220	220
RATE FREQ HZ	50	50
Code	03584	03584

BATTERY SET		
	Now	Set
Batt Number	40	38
Batt AH	20.0	020.0
BattChgCurrLmt%	10	10

BACK	FUNCTION	END
ManualByp/Esc	Batt.Test	
Fault Clear	Maint Test	
Manual INU	Stop Test	

Select  and press “ENTRY” button to check the battery information (battery voltage, battery charging or discharging current, battery number, discharge times, battery capacity percentage, remaining discharging time, battery temperature, environment temperature UPS running time, total discharging time), the DC bus information (bus voltage, charging voltage, bus capacity running time, fan running time), the temperature data (inlet temperature, input SCR temperature, rectifier IGBT and inverter IGBT temperature).

HOME	BATTERY P.1	NEXT
Batt Volt	+270.0V	-270.1V
Batt Curr	+4.9 A	-4.9 A
Batt Number	40	
DischgTimes	6	
Status	Batt Float	

BACK	BATTERY P.2	NEXT
Batt Cap.	94.3 %	
Remd Time	105.1 M	
Batt Temp.	--. °C	
Env. Temp.	--. °C	
RunT	0 D	DischgT 0.0 H

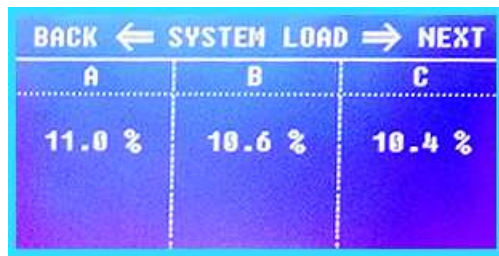
BACK	BUS DATA	NEXT
Bus Voltage	+360.0V	-359.9V
Charger Volt	+269.8V	-268.0V
BusCap Running Time	15	H
Fan Running Time	15	H

BACK	TEMP.DATA	END
Inlet/IpSCR Temp.	24.0 /33.3 °C	
Rec IGBT Temperature (A/B/C)	29.2 /27.5 /27.5 °C	
Inv IGBT Temperature (A/B/C)	39.1 /28.3 /29.2 °C	

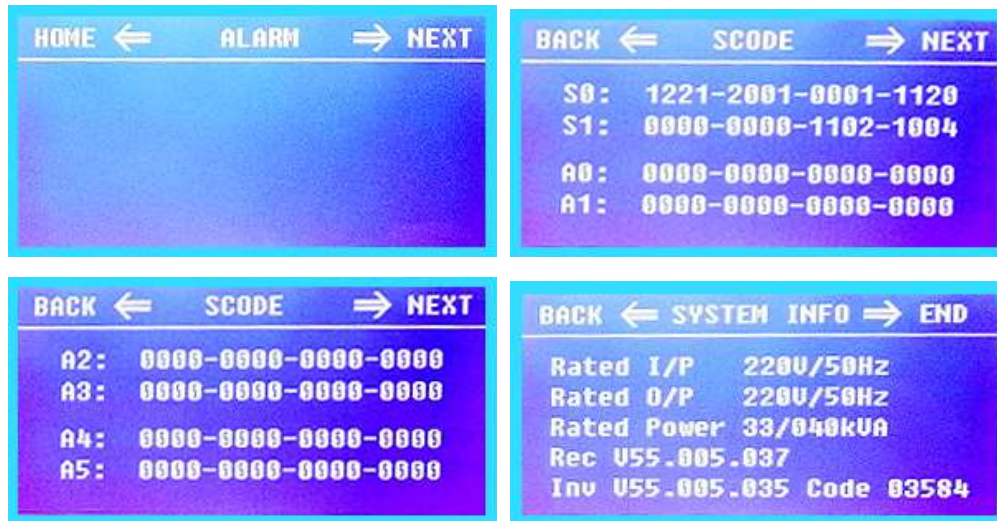
Select  and press “ENTRY” button to check the data of output as the following pictures.

HOME	O/P DATA	NEXT
A	B	C
222.8V	221.5V	221.3V
50.03Hz	50.03Hz	50.03Hz
5.9 A	5.7 A	5.6 A
1.00 PF	1.00 PF	1.00 PF

BACK	O/P LOAD	NEXT
A	B	C
11.0 %	10.6 %	10.5 %
1.3 kW	1.3 kW	1.2 kW
1.3 kVA	1.2 kVA	1.2 kVA



Select  and press “ENTRY” button to check the current alarm, SCODE information, the system rated information and the version information.



Select  and press “ENTRY” button to mute on, select  and press “ENTRY” button to mute off.

Note

The LCD will go to sleep in 2 minutes during which time if there are no warnings or faults. Press any button to wake the screen up.

3.4 Menu Window

The Menu Window displays the menu name of data window, while the data window displays the related contents of selected menu in menu window. Select UPS menu and data window to browse related parameters of UPS and set related functions. The details are given in Table 3-5.

Table 3-5 Description of UPS Menu

Menu name	Menu item	Meaning
Main input	V phase(V)	Voltage
	I phase(A)	Current
	Freq.(Hz)	Frequency
	PF	Power factor
	V phase(V)	Voltage

Menu name	Menu item	Meaning
Bypass input	Freq. (Hz)	Frequency
	I phase(A)	Current
	PF	Power factor
Output	V phase(V)	Voltage
	I phase(A)	Current
	Freq. (Hz)	Frequency
	PF	Power factor
This UPS module's load	Sout (kVA)	Apparent Power
	Pout (kW)	Active Power
	Qout (kVAR)	Reactive Power
	Load (%)	Load percent
Battery data	Environmental Temp	Environmental Temp
	Battery voltage(V)	Positive and negative battery voltage
	Battery current A)	Positive and negative battery current
	Battery Temp(°C)	Battery Temperature
	Remaining Time	Remained battery backup time
	Battery capacity (%)	Remained battery capacity
	battery boost charging	Battery is working in boost charging mode
	battery float charging	Battery is working in float charging mode
	Battery disconnected	Battery is not connected
Current alarm	Current alarm	Display all current alarm. The alarms are displayed on LCD
History log		Display all history logs.
Function Settings	Display calibration	Adjust the accuracy of LCD display
	Date format set	MONTH-DATE-YEAR and YEAR-MONTH-DATE formats can be selected
	Date & Time	Date/Time set
	Language set	User can set the language
	Communication set	/
	Control password 1	User can modify control password 1
Command	Battery maintenance test	This test will lead to the battery being partly discharged to activate battery until battery voltage is low. Bypass must be in normal condition, the battery capacity should be above 25%.
	Battery self-check test	UPS transfer to battery discharge mode to test if the battery is normal. Bypass must be in normal condition, the battery capacity should be above 25%.

Menu name	Menu item	Meaning
	Stop testing	Manually Stop the test including maintenance test, capacity test
UPS system information	Monitoring software	Monitoring software version
	Rectified software	Rectifier software version
	Inverted software	Inverter software version
	Serial No.	The serial NO set when delivered from the factory
	Rated information	System rated information
	Module model	Module model

3.4 Event List

String Sequence	LCD Display	Explanation
1	Load On UPS-Set	Load On UPS
2	Load On Bypass-Set	Load On Bypass
3	No Load-Set	No Load (Output Power Lost)
4	Battery Boost-Set	Charger is Boosting Battery Voltage
5	Battery Float-Set	Charger is Floating Battery Voltage
6	Battery Discharge-Set	Battery is Discharging
7	Battery Connected-Set	Battery cables Connected
8	Battery Not Connected-Set	Battery cables Disconnected.
9	Maintenance CB Closed-Set	Maintenance CB is Closed
10	Maintenance CB Open-Set	Maintenance CB is Open
11	EPO-Set	Emergency Power Off
12	EPO-Clear	Incident above disappears
13	Generator Input-Set	Generator as the Ac Input Source
14	Generator Input-Clear	Incident above disappears
15	Utility Abnormal-Set	Utility (Grid) Abnormal
16	Utility Abnormal-Clear	Incident above disappears
17	Bypass Sequence Error-Set	Bypass voltage Sequence is reverse
18	Bypass Sequence Error-Clear	Incident above disappears
19	Bypass Volt Abnormal-Set	Bypass Voltage Abnormal
20	Bypass Volt Abnormal-Clear	Incident above disappears
21	Bypass Module Fail-Set	Bypass Module Fail
22	Bypass Module Fail-Clear	Incident above disappears
23	Bypass Overload-Set	Bypass Over load

24	Bypass Overload-Clear	Incident above disappears
25	Bypass Overload Tout-Set	Bypass Over Load Timeout
26	Byp Overload Tout-Clear	Incident above disappears
27	BypFreq Over Track-Set	Bypass Frequency Over Track Range
28	BypFreq Over Track-Clear	Incident above disappears
29	Exceed Tx Times Lmt-Set	Transfer times (from inverter to bypass) in 1 hour exceed the limit.
30	Exceed Tx Times Lmt-Clear	Incident above disappears
31	Output Short Circuit-Set	Output shorted Circuit
32	Output Short Circuit-Clear	Incident above disappears
33	Battery EOD-Set	Battery End Of Discharge
34	Battery EOD-Clear	Incident above disappears
35	Battery Test-Set	Battery Test Starts
36	Battery Test OK-Set	Battery Test OK
37	Battery Test Fail-Set	Battery Test fails
38	Battery Maintenance-Set	Battery Maintenance Starts
39	Batt Maintenance OK-Set	Battery maintenance succeeds
40	Batt Maintenance Fail-Set	Battery maintenance fails
41	Stop Test-Set	Stop battery or battery maintenance test
42	Fault Clear-Set	Clear current alarms and faults
43	Log Clear-Set	Clear history log
44	Rectifier Fail-Set	N# Power Module Rectifier Fails
45	Rectifier Fail-Clear	Incident above disappears
46	Inverter Fail-Set	N# Power Module Inverter Fail
47	Inverter Fail-Clear	Incident above disappears
48	Rectifier Over Temp.-Set	N# Power Module Rectifier Over Temperature
49	Rectifier Over Temp.-Clear	Incident above disappears
50	Fan Fail-Set	Fan Fail
51	Fan Fail-Clear	Incident above disappears
52	Output Overload-Set	Output Over Load
53	Output Overload-Clear	Incident above disappears
54	Inverter Overload Tout-Set	Inverter Over Load Timeout
55	INV Overload Tout-Clear	Incident above disappears
56	Inverter Over Temp.-Set	Inverter Over Temperature
57	Inverter Over Temp.-Clear	Incident above disappears
58	On UPS Inhibited-Set	Inhibit system transfer from bypass to UPS (inverter)
59	On UPS Inhibited-Clear	Incident above disappears
60	Manual Transfer Byp-Set	Transfer to bypass manually
61	Manual Transfer Byp-Set	Cancel to bypass manually

62	Esc Manual Bypass-Set	Escape transfer to bypass manually command
63	Battery Volt Low-Set	Battery Voltage Low
64	Battery Volt Low-Clear	Incident above disappears
65	Battery Reverse-Set	Battery pole (positive and negative are reverse)
66	Battery Reverse-Clear	Incident above disappears
67	Inverter Protect-Set	Inverter Protect (Inverter Voltage Abnormal or Power Back feed to DC Bus)
68	Inverter Protect-Clear	Incident above disappears
69	Input Neutral Lost-Set	Input Grid Neutral Lost
70	Bypass Fan Fail-Set	Bypass Module Fan Fail
71	Bypass Fan Fail-Clear	Incident above disappears
72	Manual Shutdown-Set	N# Power Module Manually Shutdown
73	Manual Boost Charge-Set	Manually Battery Boost Charge
74	Manual Float Charge-Set	Manually Battery Float Charge
75	UPS Locked-Set	Inhibit to shut down the UPS
76	Parallel Cable Error-Set	Parallel cable in error
77	Parallel Cable Error-Clear	Incident above disappears
78	Battery or Charger Fail-Set	Battery or charger fails
79	Battery or Charger Fail-Clear	Incident above disappears
80	EOD Sys Inhibited-Set	System is inhibited to supply after the battery is EOD (end of discharging)
81	EOD Sys Inhibited-Clear	Incident above disappears
82	Signal Cable Fail-Set	Signal Cable Fail
83	Signal Cable Fail-Clear	Incident above disappears
84	Ambient Over Temp.-Set	Ambient Over Temperature
85	Ambient Over Temp.-Clear	Incident above disappears
86	INV IO CAN Fail-Set	Inverter IO CAN fails
87	INV IO CAN Fail-Clear	Incident above disappears
88	Power Share Fail-Set	Power share fails
89	Power Share Fail-Clear	Incident above disappears
90	Sync Pulse Fail-Set	Synchronous pulse fails
91	Sync Pulse Fail-Clear	Incident above disappears
92	INV Bridge Fail-Set	Inverter bridge fails
93	INV Bridge Fail-Clear	Incident above disappears
94	Outlet Temp. Error-Set	The Outlet temperature sensor is not connected or abnormal
95	Outlet Temp. Error-Clear	Incident above disappears
96	Input Curr Unbalance-Set	Input current unbalance
97	Input Curr Unbalance-Clear	Incident above disappears

98	DC Bus Over Volt-Set	DC Bus over voltage
99	DC Bus Over Volt-Clear	Incident above disappears
100	REC Soft Start Fail-Set	Rectifier soft start fails
101	REC Soft Start Fail-Clear	Incident above disappears
102	Relay Connect Fail-Set	Output relay fails
103	Relay Connect Fail-Clear	Incident above disappears
104	Relay Short Circuit-Set	Output relay is shorted
105	Relay Short Circuit-Clear	Incident above disappears
106	PWM Sync Fail-Set	PWM is not synchronous
107	PWM Sync Fail-Clear	Incident above disappears
108	Manual Transfer to INV-Set	Manual transfer to inverter
109	Input Over Curr Tout-Set	Input over-current out of time
110	Input Over Curr Tout-Clear	Incident above disappears
111	No Inlet Temp. Sensor-Set	Inlet temperature sensor is not connected or abnormal
112	No Inlet Temp Sensor-Clear	Incident above disappears
113	No Outlet Temp. Sensor-Set	Outlet temperature sensor is not connected or abnormal
114	No Outlet Temp. Sensor-Clear	Incident above disappears
115	Inlet Over Temp.-Set	Inlet over temperature
116	Inlet Over Temp.-Clear	Incident above disappears
117	Capacitor Time Reset-Set	Capacitor running time is reset
118	Fan Time Reset-Set	Fan running time is reset
119	Battery History Reset-Set	Battery history is reset
120	Battery Over Temp.-Set	Battery over temperature
121	Battery Over Temp.-Clear	Incident above disappears
122	Capacitor Expired-Set	Capacitor is expired
123	Capacitor Expired-Clear	Incident above disappears
124	Fan Expired-Set	Fan is expired
125	Fan Expired-Clear	Incident above disappears
126	INV IGBT Driver Block-Set	Inverter IGBT driver is blocked
127	INV IGBT Driver Block-Clear	Incident above disappears
128	Battery Expired -Set	Battery is expired
129	Battery Expired-Clear	Incident above disappears
130	Firmware Error-Set	Software version error
131	Firmware Error-Clear	Incident above disappears
132	No Ip SCR Temp. Sensor-Set	Input SCR temperature sensor is not connected or abnormal

133	No Ip SCR Temp. Sensor-Clear	Incident above disappears
134	Input SCR Over Temp.-Set	Input SCR is over temperature
135	Input SCR Over Temp.-Clear	Incident above disappears

4 Operations

4.1 UPS start-up

4.1.1 Startup in normal mode

The UPS must be started up by commissioning engineer after the completeness of installation. The steps below must be followed:

- 1) Ensure all the circuit breakers are open. One by one to turn on the output breaker, input breaker, bypass input breaker, and then the system starts initializing.
- 2) The LCD in front of the cabinet is lit up. The system enters the home page, as shown in Figure 3-2.
- 3) Notice the energy bar in the home page, and pay attention to the LED indicators. The “REC” indicator flashes, it indicates the rectifier is starting up. The LED indicators are listed below in Table 4-1.

Table 4-1 Rectifier starting up

Indicator	Status	Indicator	Status
Rectifier	green flashing	Inverter	off
Battery	red	Load	off
Bypass	off	Status	red

- 4) After about 30 seconds, the “REC” indicator goes steady green; it means the finish of the rectifier startup. And at the same time the static bypass switch closes, and then the inverter is starting up. The LED indicators are listed below in Table 4-2.

Table 4-2 Inverter starting up

Indicator	Status	Indicator	Status
Rectifier	green	Inverter	green flashing
Battery	red	Load	green
Bypass	green	Status	red

- 5) After 90 seconds, the UPS transfer from the bypass to the inverter after the inverter goes normal. The LED indicators are listed below in Table 4-3.

Table 4-3 Inverter supplying the load

Indicator	Status	Indicator	Status
Rectifier	green	Inverter	green
Battery	red	Load	green
Bypass	off	Status	red

- 6) The UPS is in normal mode. Close the external or internal battery circuit breaker and the UPS starts charging batteries. The LED indicators are listed below in Table 4-4.

Table 4-4 Normal mode

Indicator	Status	Indicator	Status
Rectifier	green	Inverter	green
Battery	green	Load	green
Bypass	off	Status	green

7) The startup has finished, users can close the external main output breaker, and then close the branch breakers one by one.

Note

- When the system starts, the stored setting will be loaded.
- Users can browse all events during the process of the starting up by checking the menu Log.

4.1.2 Start from battery

The start from battery refers to the battery cold start. The steps of the start-up are as follow:

- 1) Confirm the batteries are correctly connected, and then close the external battery circuit breakers.
- 2) Press and hold the red button of battery cold start until the “BAT” indicator turns green flashing, it indicates the system is been powering by the batteries. The position of the battery cold start button is shown in Figure 4-1.

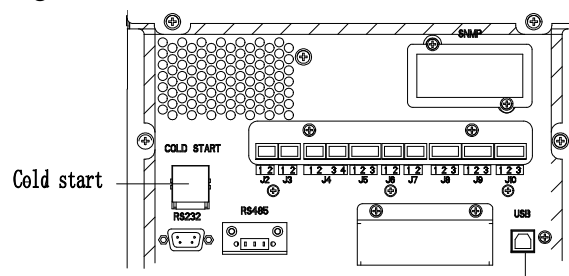


Figure 4-1 the position of the battery cold start button

- 3) After about 30 second, the “BAT” indicator turns steady green, the “INV” indicator starts green flashing, and then after 30 seconds it turns steady green and the “OUTPUT” indicator turns green from off. The LED indicators are listed below in Table 4-5

Table 4-5 the battery mode

Indicator	Status	Indicator	Status
Rectifier	red flashing	Inverter	green
Battery	green flashing	Load	green
Bypass	red flashing	Status	red

- 4) Close the external output power supply isolators to supply the loads, and the system is working in battery mode.

Note: The battery cold start is optional.

4.2 UPS Shut down

If want to shut down UPS completely, please first ensure the load is shut down correctly, and then turn off the external battery breaker, the main input breaker (internal or external), the bypass input breaker (internal or external, if have) one by one, the display screen will be off completely.

Note: If UPS in maintenance bypass mode, please also turn off the maintenance bypass breaker.

4.3 Procedure for Switching between Operation Modes

4.3.1 Switching the UPS from normal mode into battery mode

The UPS transfers to battery mode immediately after the utility (mains voltage) fails or drops down below the predefined limit.

4.3.2 Switching the UPS from normal mode into bypass mode

Follow the path by selecting the icon  and then select  to transfer the system to Bypass Mode.



Warning

Ensure the bypass is working normally before transferring to bypass mode. Or it may cause failure.

4.3.3 Switching the UPS into normal mode from bypass mode

Follow the path by selecting the icon  and then select , the system transfer to Normal Mode



Note

Normally, the system will transfer to the Normal mode automatically. This function is used when the frequency of the bypass is over track and when the system needs to transfer to Normal mode by manual.

4.3.4 Switching the UPS into maintenance bypass mode from normal mode

These following procedures can transfer the load from the UPS inverter output to the maintenance bypass supply, which is used for maintaining the UPS.

1. Transfer the UPS into Bypass mode as per the chapter 4.3.2.
2. Remove the cover of maintenance bypass breaker.
3. Turn on the maintenance bypass breaker. And the load is powered through maintenance bypass and static bypass.
4. One by one to turn off the battery breaker, input breaker, bypass input breaker and output breaker.
5. The load is powered through maintenance bypass.

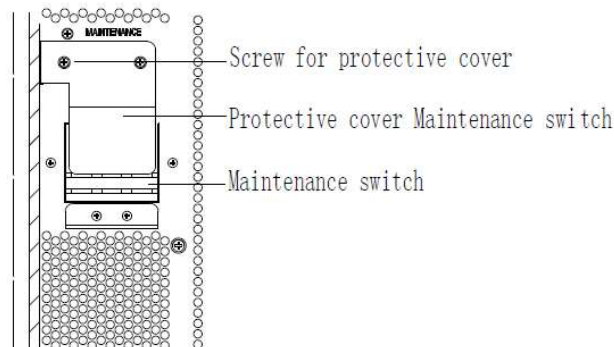


Figure 4-2 the cover of maintenance bypass breaker



Warning

Once the cover on the maintenance bypass breaker is removed, the system will transfer to bypass mode automatically.



Warning

Before making this operation, confirm the messages on LCD display to ensure that bypass supply is regular and the inverter is synchronous with it, so as not to risk a short interruption in powering the load.



Danger

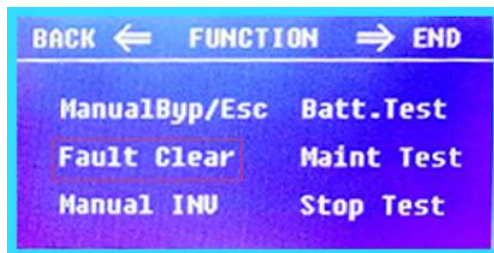
Even with the LCD turned off, the terminals of input and output may be still energized.

Wait for 10 minutes to let the DC bus capacitor fully discharge before removing the cover.

4.3.5 Switching the UPS into normal mode from maintenance bypass mode

These following procedures can transfer the load from the Maintenance Bypass mode to inverter output.

1. After finish of maintenance. One by one to turn on the output breaker, bypass input breaker, input breaker and battery breaker.
2. After 30S, the bypass indicator LED goes green and the load is powered through maintenance bypass breaker and static bypass.
3. Turn off the maintenance bypass breaker and fix the protection cover, and then the load is powered through static bypass. The rectifier starts followed by the inverter.
4. Operate "Fault Clear" as per chapter 3.3.



5. After 60S, the system transfers to normal mode.



Warning

The system will stay on bypass mode until the cover of maintenance bypass breaker is fix.

4.4 Battery Maintenance

If the battery is not discharged for a long time, it is necessary to test the condition of the battery.



Enter the menu , as is shown in Figure 4-3 and select the icon , the system transfers into the Battery mode for discharging. The system will discharge the batteries until the alarm of “Battery low voltage” is given. Users can stop the discharging by the “StopTest” icon



With the icon of , batteries will be discharged for about 30 seconds, and then re-transfer to normal mode.

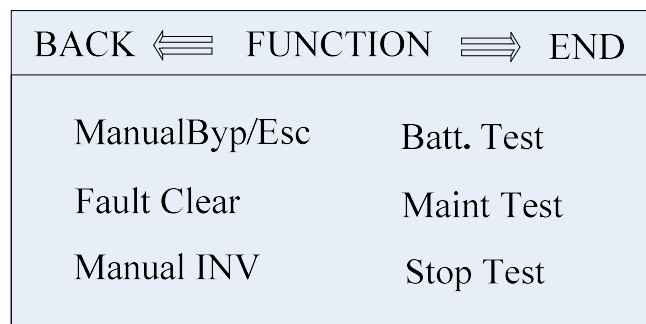


Figure 4-3 Battery maintenance



Warning

The load for the auto maintenance discharge should be 20%-100%, if not, the system will not start the process automatically.

4.5 EPO

The EPO button located in the operator control and display panel (with cover to avoid disoperation, see Figure 4-4) is designed to switch off the UPS in emergency conditions (e.g., fire, flood, etc.). To achieve this, just press the EPO button, and the system will turn off the rectifier, inverter and stop

powering the load immediately (including the inverter and bypass output), and the battery stops charging or discharging.

If the input utility is present, the UPS control circuit will remain active; however, the output will be turned off. To completely isolate the UPS, users need to open the external mains input supply to the UPS



Warning

When the EPO is triggered, the load is not powered by the UPS. Be careful to use the EPO function.

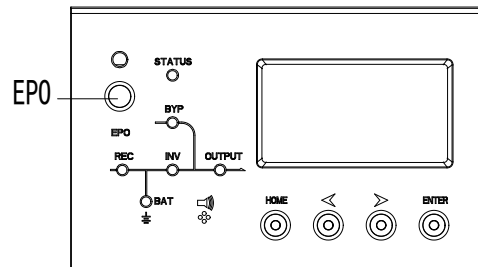


Figure 4-4 EPO button

4.6 Installation of parallel operation system

Normally 4 cabinets can be paralleled; and the parallel function is optional, if users need the function, please confirm the configuration with the supplier in advance. For the details of the parallel system, please refer to the annex “Instructions of the parallel system for UPS”.

5 Maintenance

This chapter introduces UPS maintenance, including the maintenance instructions of power module and monitoring bypass module and the replacement method of dust filter.

5.1 Precautions

Only maintaining engineers can maintain the power module and monitoring bypass module.

- 1) The power module should be disassembled from top to bottom, so as to prevent any inclination from high gravity center of the cabinet.
- 2) To ensure the safety before maintaining power module and bypass module, use a multi-meter to measure the voltage between operating parts and the earth to ensure the voltage is lower than hazardous voltage, i.e. DC voltage is lower than 60Vdc, and AC maximum voltage is lower than 42.4 Vac.
- 3) Bypass module is not recommended to hot swap; only when UPS is in Manual Bypass Mode or UPS is completely powered off, the bypass module can be disassembled.
- 4) Wait 10 minutes before opening the cover of the power module or the bypass after pulling out from the cabinet.

5.2 Instruction for maintaining UPS

For the maintenance of the UPS, please refer to chapter 4.3.4 to transfer to maintenance bypass mode. After maintenance, re-transfer to normal mode according to chapter 4.3.5.

5.3. Instruction for Maintaining Battery String

For the Lead-Acid maintenance free battery, when maintaining the battery according to requirements, battery life can be prolonged. The battery life is mainly determined by the following factors:

- 1) Installation. The battery should be placed in dry and cool place with good ventilation. Avoid direct sunlight and keep away from heat source. When installing, ensure the correct connection to the batteries with same specification.
- 2) Temperature. The most suitable storage temperature is 20 °C to 25°C.
- 3) Charging/discharging current. The best charging current for the lead-acid battery is 0.1C. The maximum charging current for the battery can be 0.2C. The discharging current should be 0.05C-3C.
- 4) Charging voltage. In most of the time, the battery is in standby state. When the utility is normal, the system will charge the battery in boost mode (constant voltage with maximum limited) to full and then transfers to the state of float charge.
- 5) Discharge depth. Avoiding deep discharge, which will greatly reduce the life time of the battery.

When the UPS runs in battery mode with light load or no load for a long time, it will cause the battery to deep discharge.

6) Check periodically. Observe if any abnormality of the battery, measure if the voltage of each battery is in balance. Discharge the battery periodically.



Warning

Daily inspection is very important!

Check and confirm the battery connection is tightened regularly, and make sure there is no abnormal heat generated from the battery.



Warning

If a battery has leakage or is damaged, it must be replaced, stored in a container resistant to sulfuric acid and disposed of in accordance with local regulations.

The waste lead-acid battery is a kind of hazardous waste and is one of the major contaminants controlled by government.

Therefore, its storage, transportation, use and disposal must comply with the national or local regulations and laws about the disposal of hazardous waste and waste batteries or other standards. According to the national laws, the waste lead-acid battery should be recycled and reused, and it is prohibited to dispose of the batteries in other ways except recycling. Throwing away the waste lead-acid batteries at will or other improper disposal methods will cause severe environment pollution, and the person who does this will bear the corresponding legal responsibilities.

6 Product Specifications

This chapter provides the specifications of the product, including environment characteristics mechanical characteristics and electrical characteristics.

6.1 Applicable Standards

The UPS has been designed to conform to the following European and international standards:

Table 6-1 Compliance with European and International Standards

Item	Normative reference
General safety requirements for UPS used in operator access areas	IEC62040-1-1
Electromagnetic compatibility (EMC) requirements for UPS	IEC62040-2
Method of specifying the performance and test requirements of UPS	IEC62040-3



Note

The above mentioned product standards incorporate relevant compliance clauses with generic IEC and EN standards for safety (IEC/EN/AS60950), electromagnetic emission and immunity (IEC/EN61000 series) and construction (IEC/EN60146 series and 60950).

6.2 Environmental Characteristics

Table 6-2 Environmental Characteristics

Item	Unit	Parameter
Acoustic noise level at 1 meter	dB	58dB @ 100% load, 55dB @ 45% load
Altitude of Operation	m	≤1000,load de-rated 1% per 100m from 1000m to 2000m
Relative Humidity	%	0-95, non-condensing
Operating Temperature	°C	0-40(for UPS only),Battery life is halved for every 10°C increase above 20°C
UPS Storage Temperature	°C	-40-70

6.3 Mechanical Characteristics

Table 6-3 Mechanical Characteristics for Cabinet

Model	Unit	10kL/15kL	10kS/15kS	20S/30S	20L/30L	40kL	40kS
Dimension W×D×H	mm	250*660*530	250*840*715	350*738*1335	250*680*770	250*836*770	500*840*1400
Weight	kg	31	51.5	89	52	61	140
Color	N/A	BLACK,RAL 7021					
Protection Level IEC (60529)	N/A	IP20					

6.4 Electrical Characteristics

6.4.1 Electrical Characteristics (Input Rectifier)

Table 6-4 Rectifier AC input Mains

Item	Unit	Parameter
Grid System	\	3 Phases + Neutral + PE
Rated AC Input Voltage	Vac	380/400/415(three-phase and sharing neutral with the bypass input)
Rated Frequency	Vac	50/60Hz
Input Frequency	Hz	40~70
Input Power factor	PF	>0.99

6.4.2 Electrical Characteristics (Intermediate DC Link)

Table 6-5 Battery

Items	Unit	Parameters
Battery bus voltage	Vdc	Rated: ±240V
Quantity of lead- acid cells	Nominal	40=[1 battery(12V)] ,240=[1 battery(2V)]
Float charge voltage	V/cell (VRLA)	2.25V/cell(selectable from 2.2V/cell~2.35V/cell) Constant current and constant voltage charge mode
Boost charge voltage	V/cell (VRLA)	2.3V/cell(selectable from : 2.30V/cell~2.45V/cell) Constant current and constant voltage charge mode

Temperature compensation	mV/°C/cell	3.0(selectable:0~5.0)
Final discharging voltage	V/cell (VRLA)	1.65V/cell(selectable from: 1.60V/cell~1.750V/cell) @0.6C discharge current 1.75V/cell (selectable from: 1.65V/cell~1.8V/cell) @0.15C discharge current (EOD voltage changes linearly within the set range according to discharge current)

Note

The default battery number is 40. When the actual battery in use is 32-44, ensure the actual number and the set number is the same, otherwise, batteries may be damaged.

6.4.3 Electrical Characteristics (Inverter Output)

Table 6-6 Inverter Output (To critical load)

Item	Unit	Parameter
Rated capacity	kVA	10~40
Rated AC voltage	Vac	380/400/415 (Line-Line)
Rated Frequency	Hz	50/60
Frequency Regulation	Hz	50/60Hz±0.1%

6.4.4 Electrical Characteristics (Bypass Mains Input)

Table 6-7 Bypass Mains Input

Item	Unit	Value
Rated AC voltage	Vac	380/400/415 (three-phase four-wire and sharing neutral with the bypass)
Overload	%	125% Long term operation; 125%~130% for 10min; 130%~150% for 1min; 150%~400% for 1s; >400% ,less than 200ms
Current rating of neutral cable	A	1.7×In
Rated frequency	Hz	50/60
Switch time (between bypass and inverter)	ms	Synchronized transfer: 0ms

Bypass voltage range	%	Settable, default -20%~+15% Upper limit: +10%, +15%, +20%, +25% Lower limit: -10%, -15%, -20%, -30%, -40%
Bypass frequency range	%Hz	Settable, ±1Hz, ±3Hz, ±5Hz
Synchronized Range	Hz	Settable ±0.5Hz~±5Hz,default ±3Hz

6.5 Efficiency

Table 6-8 Efficiency

Rated power(kVA)	Unit	10/15kVA	20/30kVA	40kVA
Normal mode(dual conversion)	%	95	95	96
Battery discharging efficiency (battery at nominal voltage 480Vdc and full-rated linear load)				
Battery mode	%	94.5	95	96

6.6 Display and Interface

Table 6-10 Display and Interface

Display	LED + LCD
Interface	Standard:RS232, RS485 Option: SNMP, Dry Contact

Annex. A Installation of internal batteries

For 10kVA to 40kVA standard UPS, internal batteries and the cables used to connect the batteries are not provided as standard; if required, please contact your local agency.

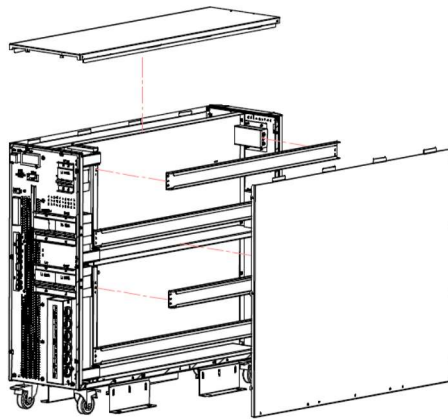
For 10-15kVA UPS, 40 pieces of 7AH/9AH batteries can be installed.

For 20-30kVA UPS, 40 pieces of 12AH battery can be installed.

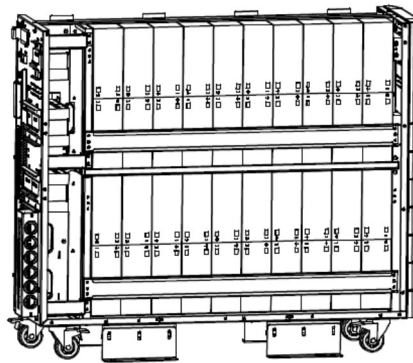
For 40kVA UPS, 80 pieces of 12Ah batteries can be installed.

For 10-15kVA standard UPS, they can contain 40 batteries, which are divided into 4 layers. Please install the batteries as per the below.

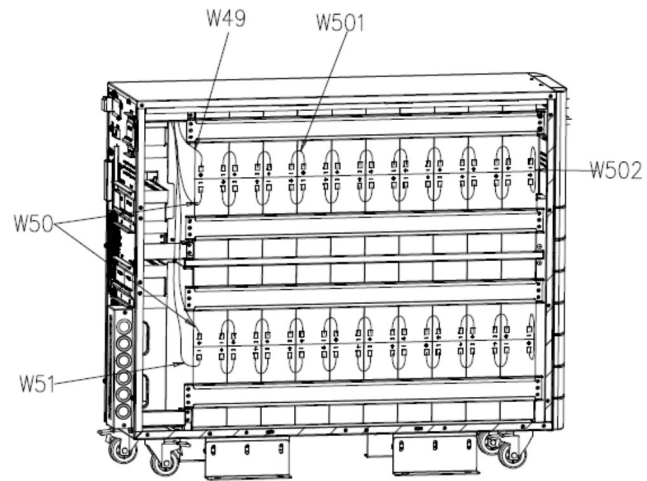
1. Dismantle the covers and crossbeams.



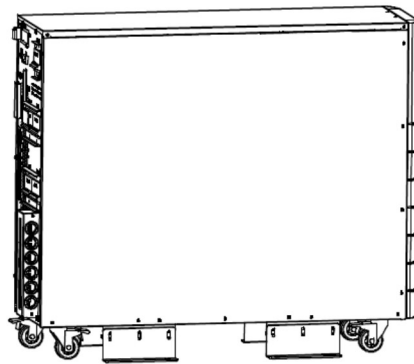
2. Install battery and fix the crossbeams.



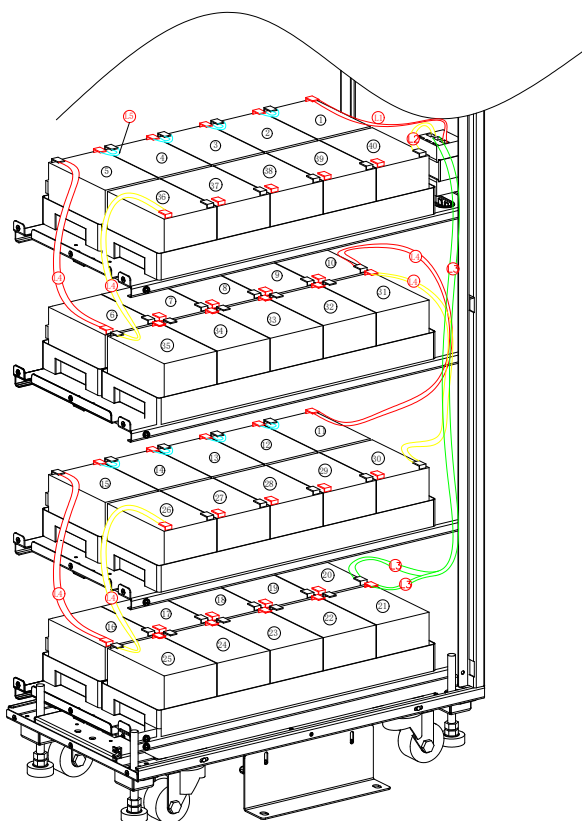
3. Connect the battery cable according to the series number.



4. Recover the cover.



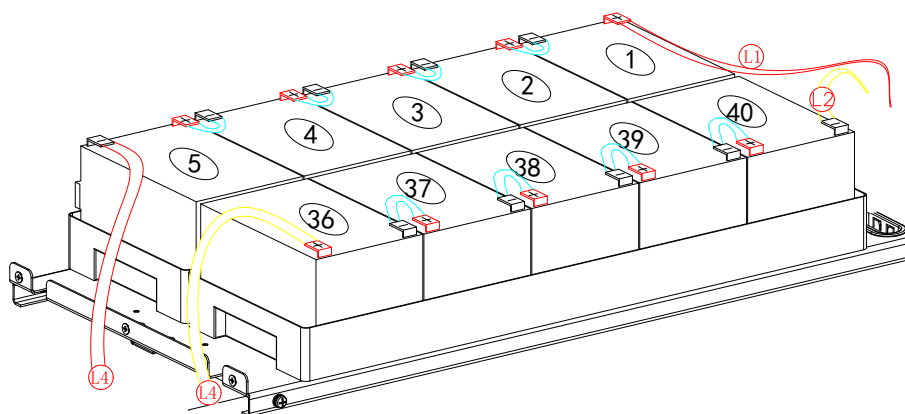
For 20-30kVA standard UPS, there are 8 groups of battery in series, and per group contains 5 blocks of 12AH batteries. The interconnection among groups is via cable with Anderson Socket. Please refer to the below diagrams.



Cable interconnection of the battery string

Layer 1

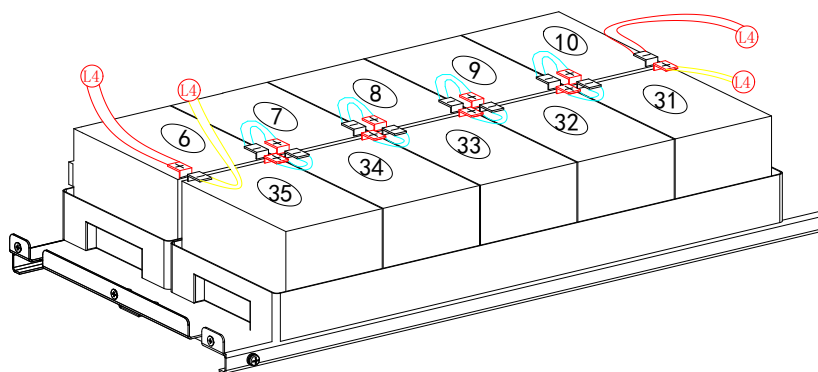
The positive of the battery 1# is connected to battery breaker CB4-2, via the cable labeled L1, and the negative of battery 40# is connected to CB4-6, via the cable labeled L2.



Cable connection of Layer 1

Layer 2

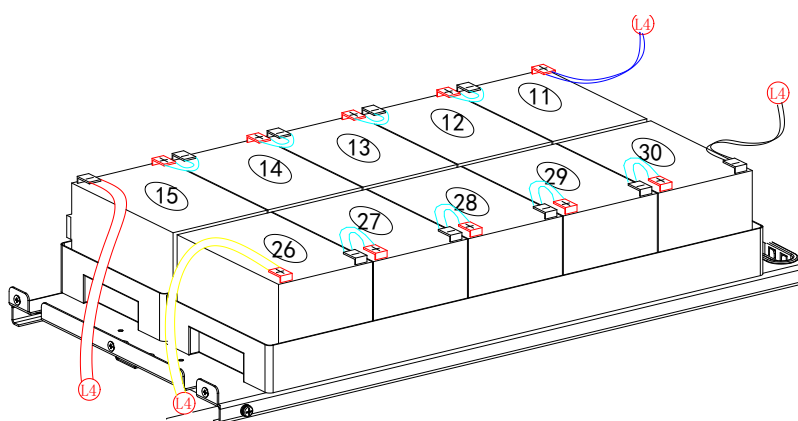
The positive of the battery 6# is connected to the negative of battery 5#, via the cable labeled L4, and the negative of battery 35# is connected to the positive of battery 36#, via the cable labeled L4.



Cable connection of Layer 2

Layer 3

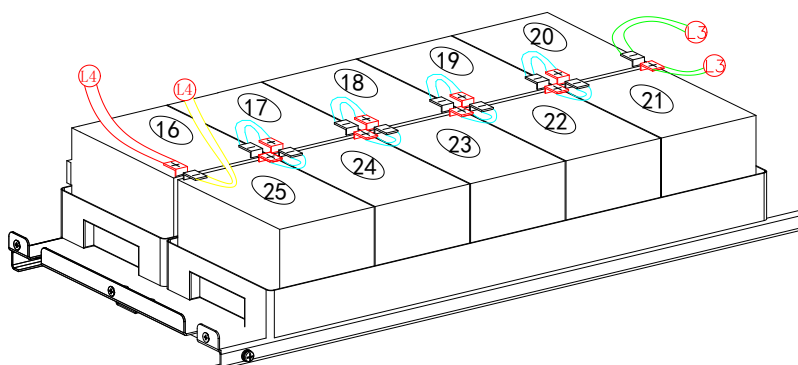
The positive of the battery 11# is connected to the negative of battery 10#, via the cable labeled L4, and the negative of battery 30# is connected to the positive of battery 31#, via the cable labeled L4.



Cable connection of Layer 3

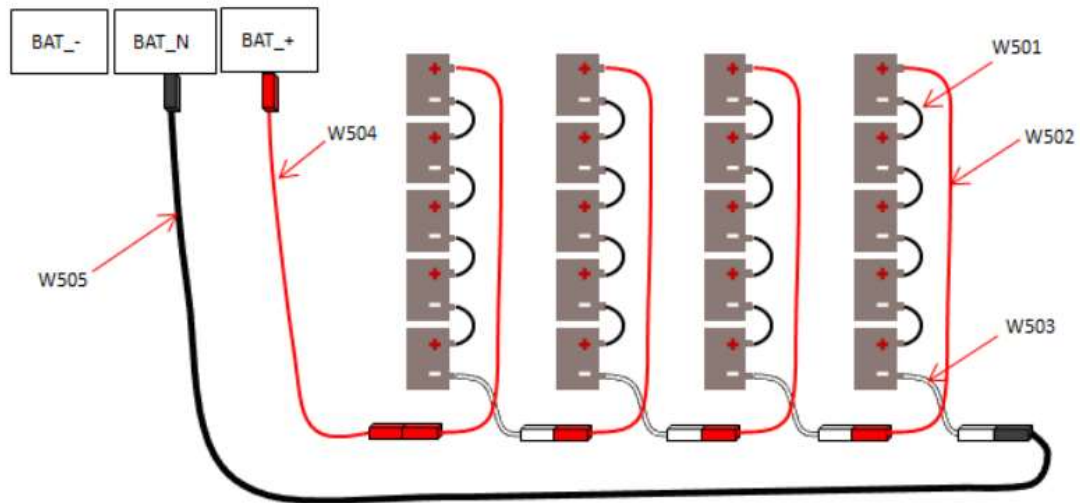
Layer 4

The positive of the battery 16# is connected to the negative of battery 15#, via the cable labeled L4, and the negative of battery 25# is connected to the positive of battery 26#, via the cable labeled L4. The negative of 20# and the positive of 21#, which are defined as the battery neutral, are connected to CB4-4.

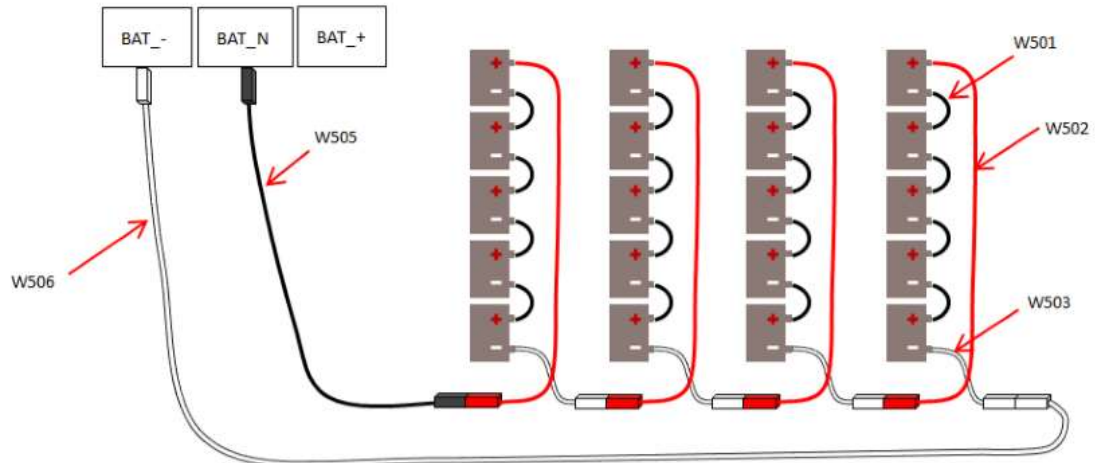


Cable connection of Layer 4

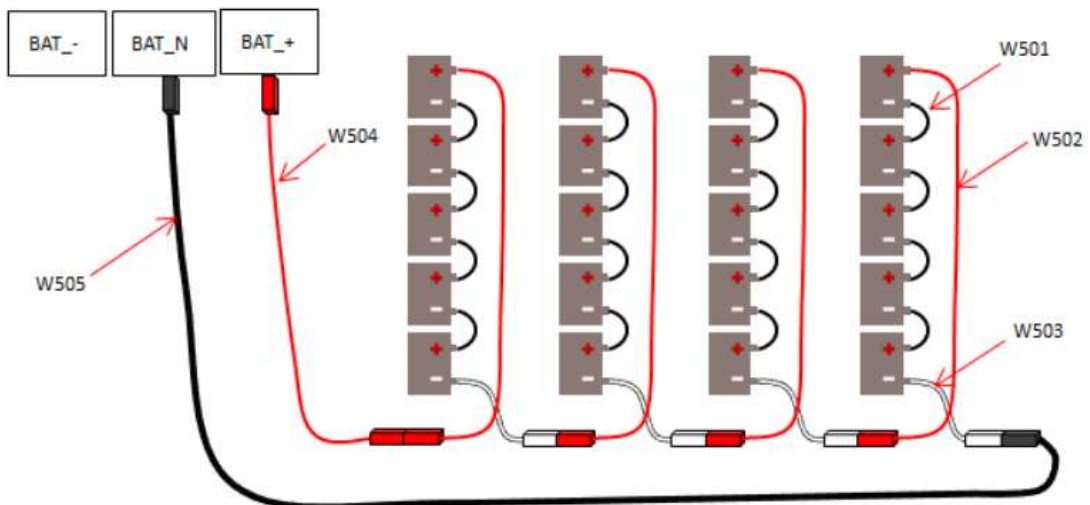
For 40kVA standard UPS, the battery bank has four layers, each layer has four packages with 5 batteries contained in one package. Below shows the connection of each layer.



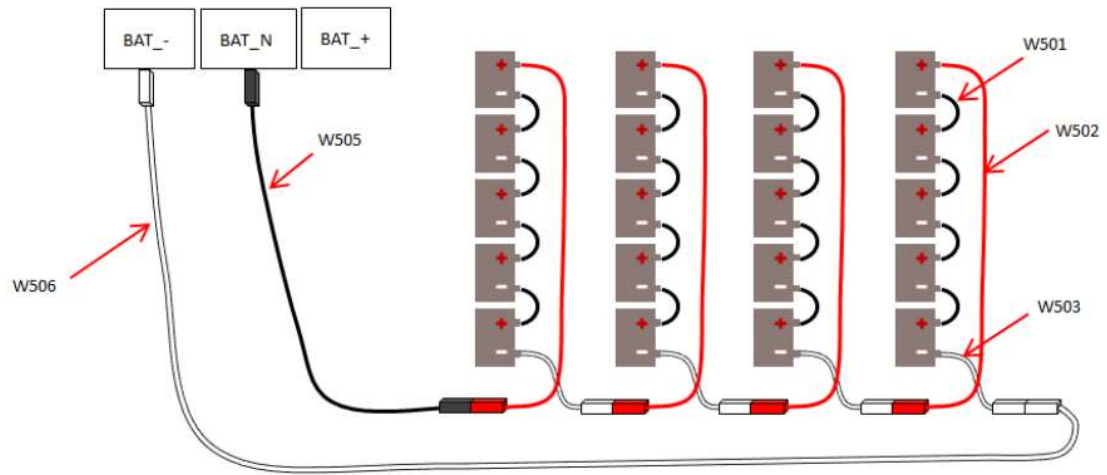
Cable connection of Layer 1



Cable connection of Layer 2

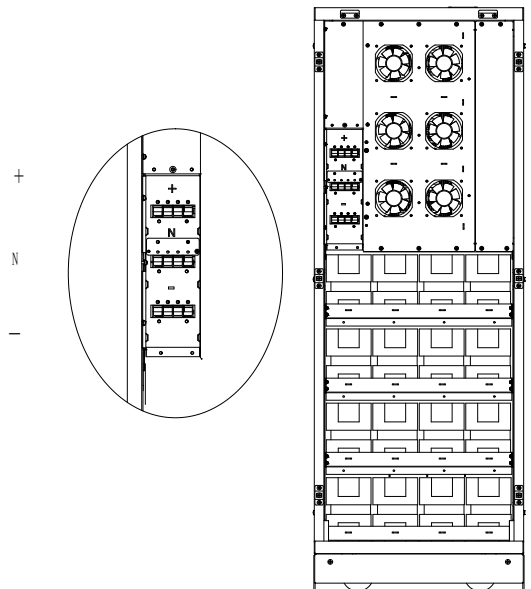


Cable connection of Layer 3



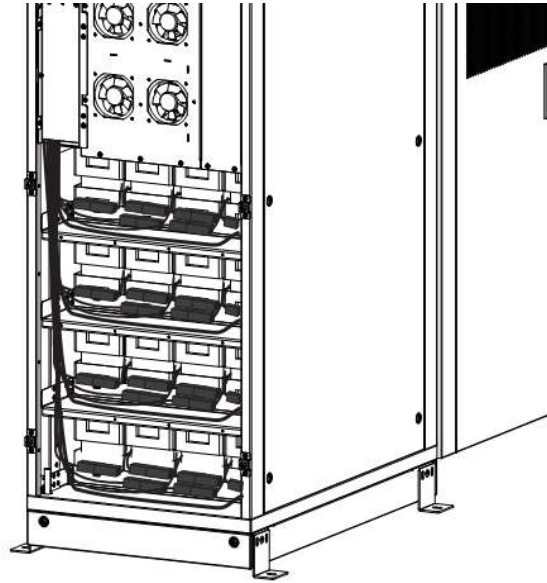
Cable connection of Layer 4

After the connection, connect the connectors as following as zoomed below.



Battery terminal connection

After connecting the terminal, recover the cover as shown below.



Recover the cover



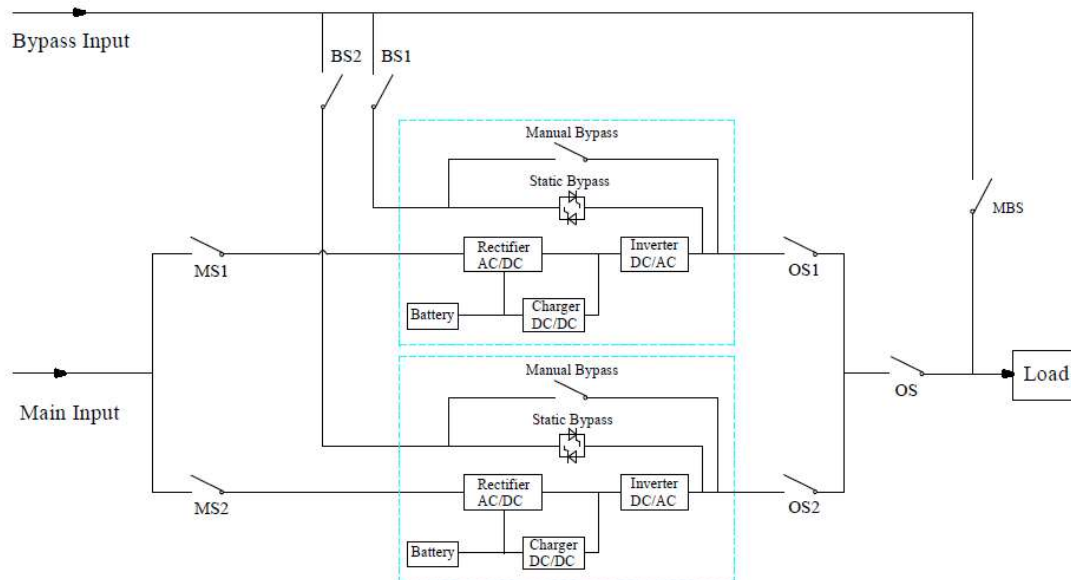
Warning

**Make sure the polarity of the battery is correct according to the diagrams above.
Test and confirm the battery voltage before connecting to the main circuit.**

Annex. B Instructions of the parallel system for UPS

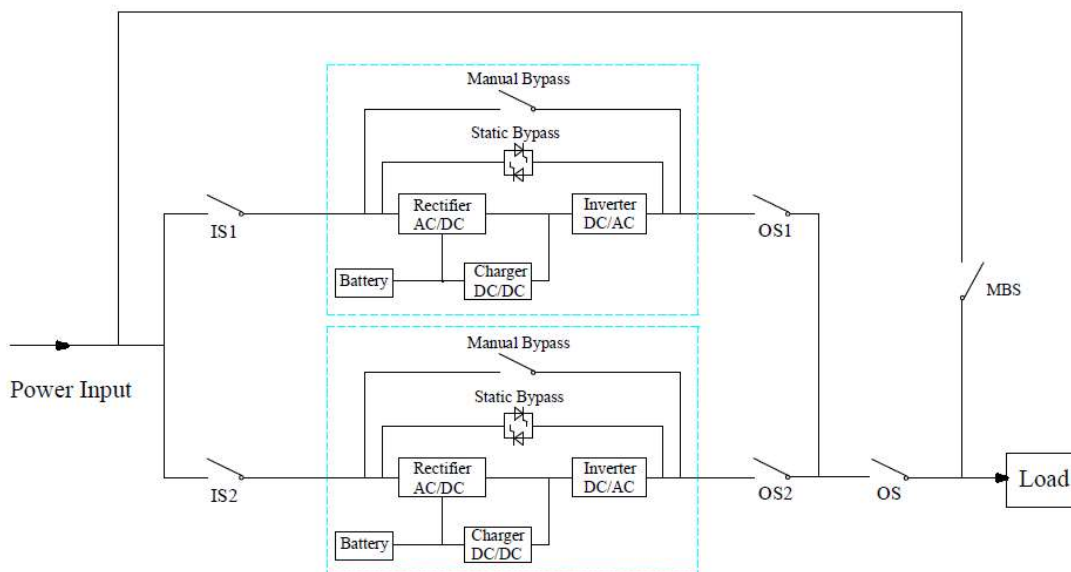
The UPS can be paralleled; the general is 2 UPSs in parallel or 3 UPSs in parallel. If more than 3 UPSs in parallel, please inform the factory in advance.

1. The power cable connection for 2 UPSs or 3 UPSs in parallel.



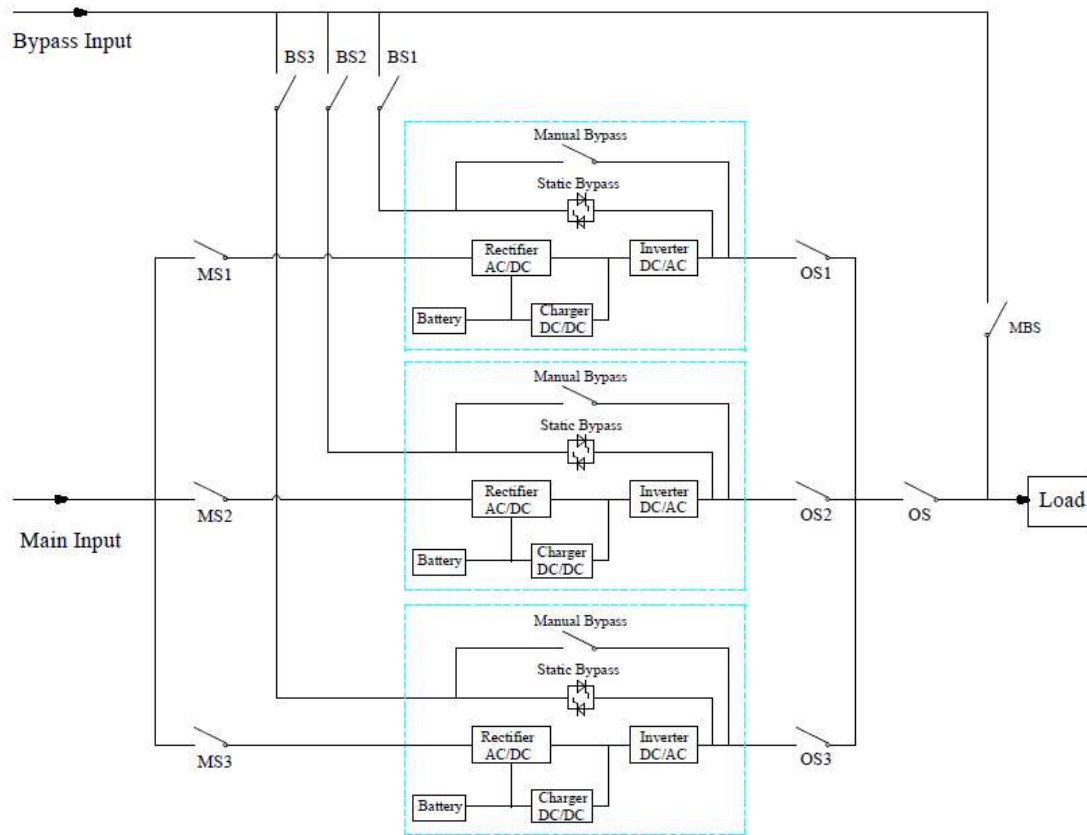
The cable connection drawing for 2 UPSs in parallel (dual input)

Note: MS1 and MS2 are the main input switches for each UPS, BS1 and BS2 are the bypass input switches, OS1 and OS2 are the output switches, OS is the output main switch of the power system, MBS is the maintenance bypass switch.



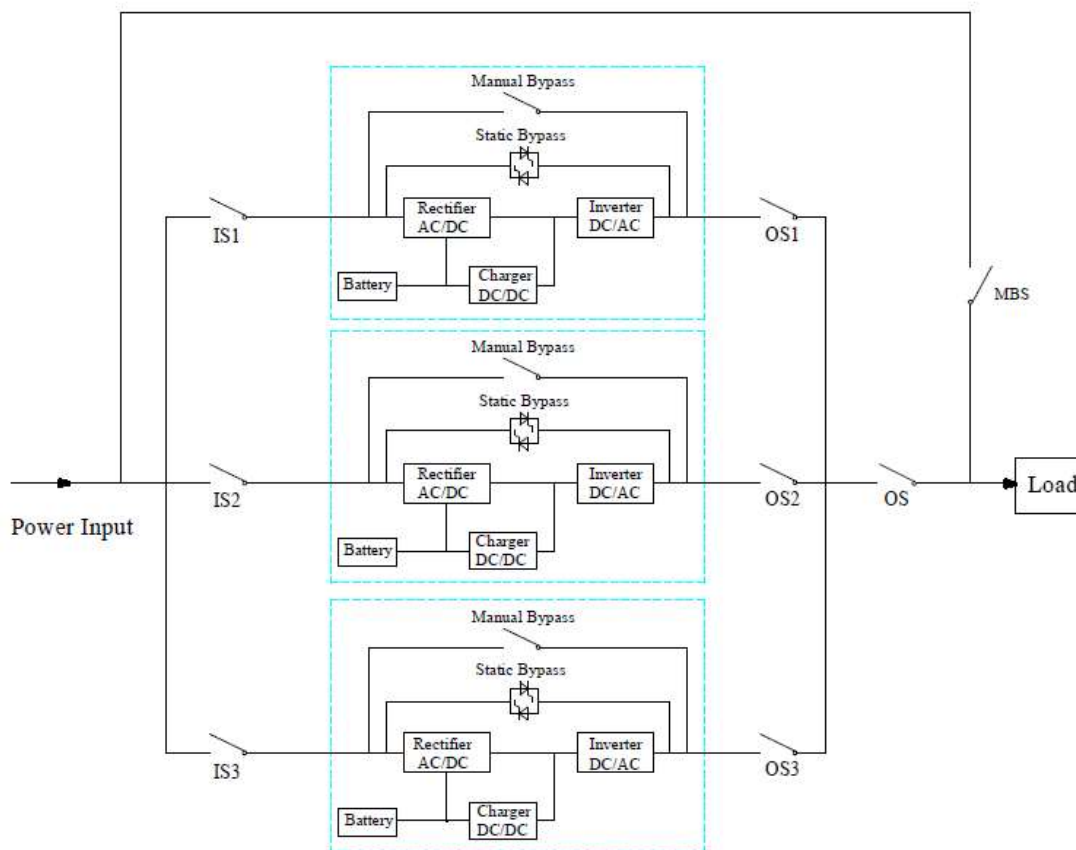
The cable connection drawing for 2UPSs in parallel (common input)

Note: IS1 and IS2 are the input switches for each UPS, OS1 and OS2 are the output switches, OS is the output main switch of the power system, MBS is the maintenance bypass switch.



The cable connection drawing for 3 UPSs in parallel (dual input)

Note: MS1, MS2 and MS3 are the main input switches for each UPS, BS1, BS2 and BS3 are the bypass input switches, OS1, OS2 and OS3 are the output switches, OS is the output main switch of the power system, MBS is the maintenance bypass switch.



The cable connection drawing for 2UPSs in parallel (common input)

Note: IS1, IS2 and IS3 are the input switches for each UPS, OS1, OS2 and OS3 are the output switches, OS is the output main switch of the power system, MBS is the maintenance bypass switch.

2. The parallel setting for UPS

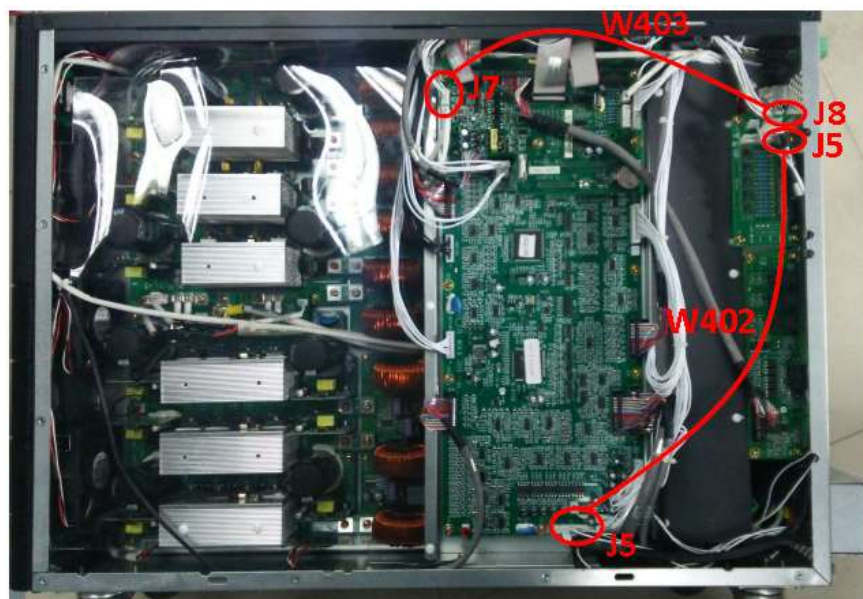
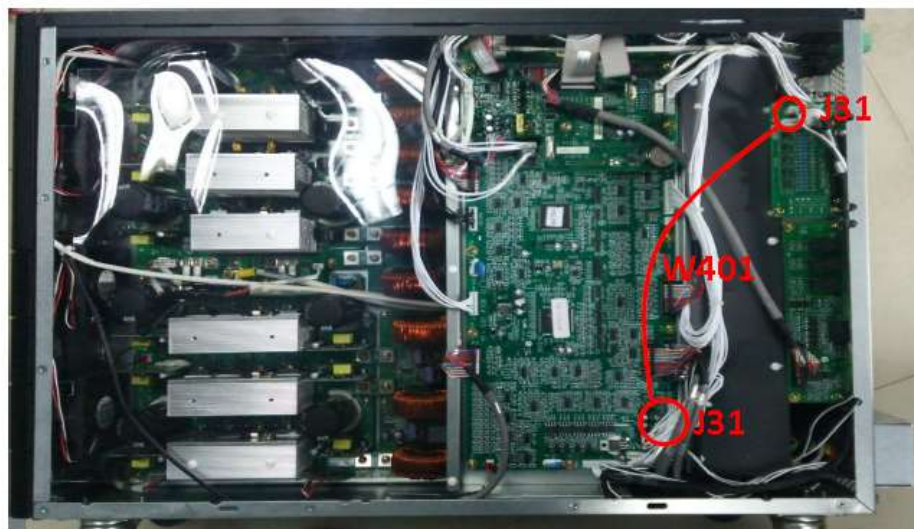
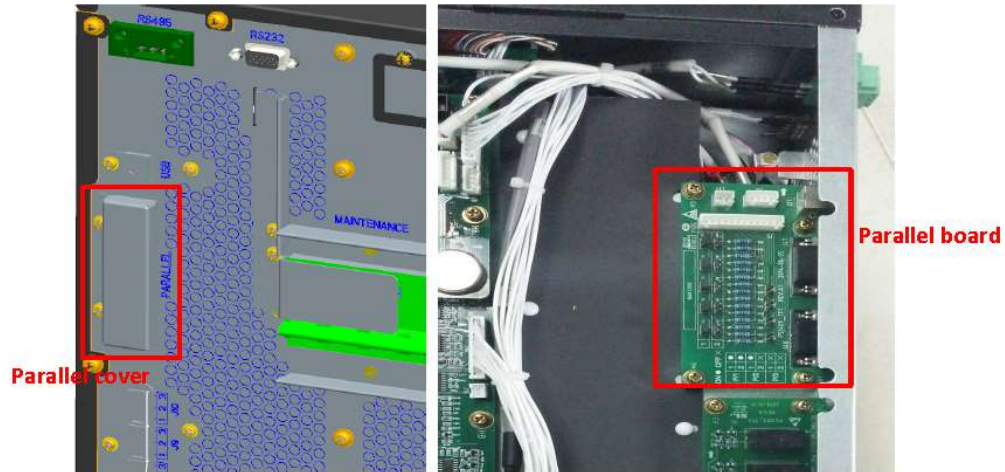
The configuration of parallel is optional; generally users should inform the factory before the order, and the factory will set the parallel parameters before the delivery. If a sudden change from a single system to a parallel system on site, please do as the operations below.

1) To install the parallel board as below

A) The parallel installation for 10-15kVA

- ★ Remove the parallel interface cover and the right side cover of UPS;
- ★ Fix the parallel board with screws;
- ★ Connect J31 on the parallel board to J31 on the control board with the cable W401;
- ★ Connect J5 on the parallel board to J5 on the control board with the cable W402;
- ★ Connect J8 on the parallel board to J7 on the pin board with the cable W403.
- ★ Reinstall the right side cover of UPS.

Note: Please refer to the below pictures.



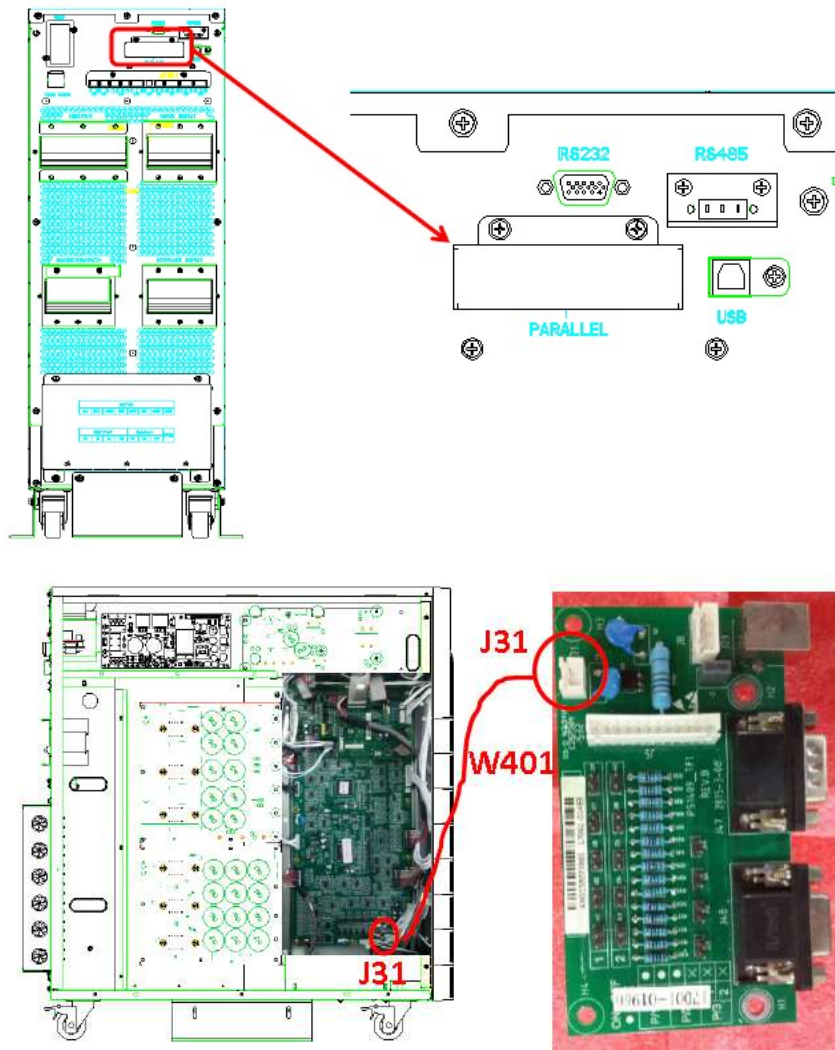
The parallel board installation for 10-15kVA UPS

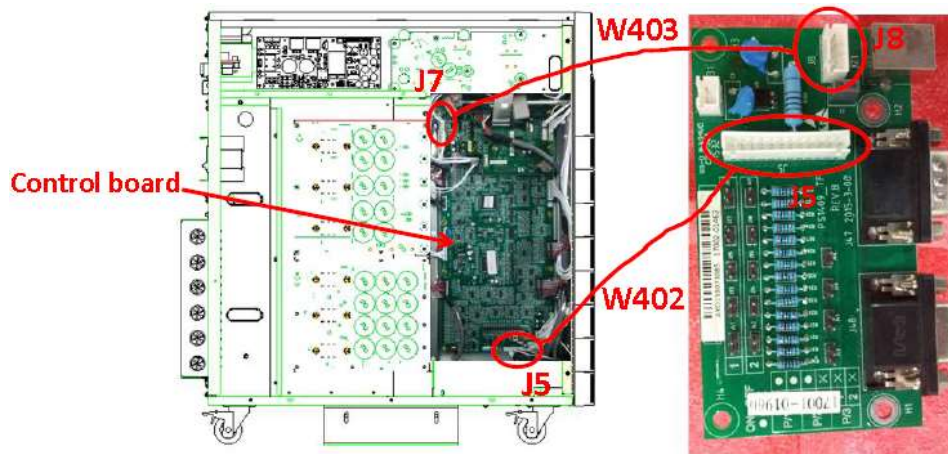
B) The parallel installation for 20-40kVA

- ★ Remove the parallel interface cover and the left side cover of UPS;
- ★ Fix the parallel board with screws;
- ★ Connect J31 on the parallel board to J31 on the control board with the cable W401;
- ★ Connect J5 on the parallel board to J5 on the control board with the cable W402;
- ★ Connect J8 on the parallel board to J7 on the pinboard with the cable W403.
- ★ Reinstall the left side cover of UPS.

Note: Please refer to the below pictures.

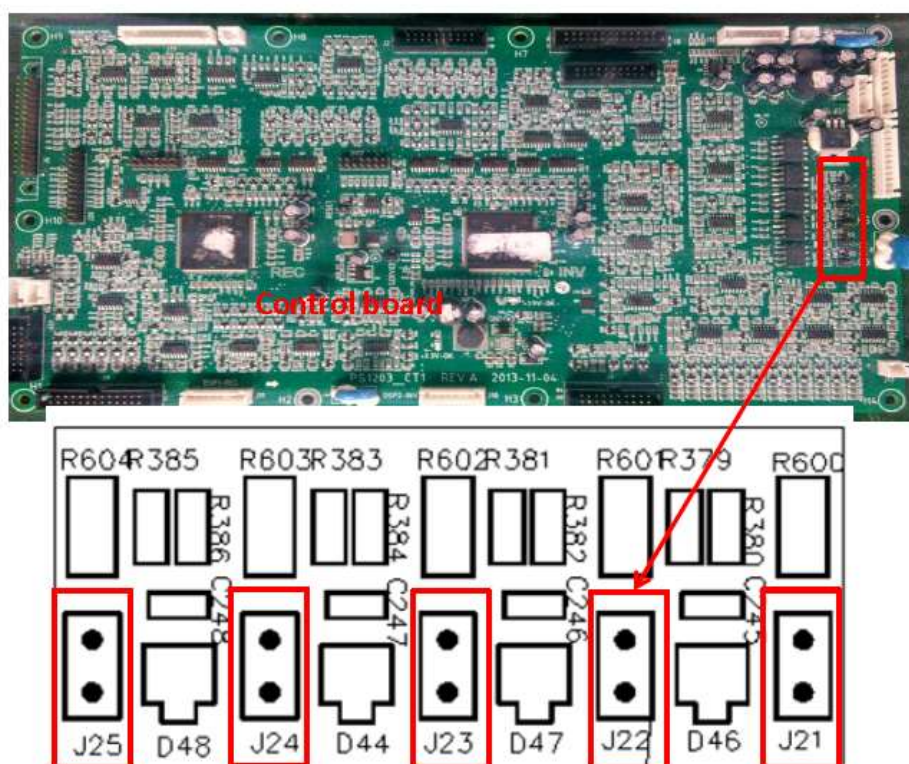
Below take 20-30k UPS for example, for 40kVA, the control board locates in the top of UPS, but the connection port and the connection way are same, for 40kVA, please also refer to the below picture.





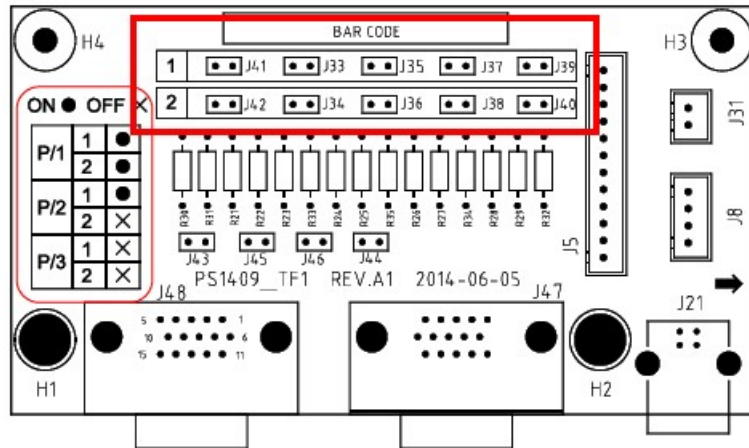
The parallel board installation for 20-40kVA UPS

2) To set the parallel board as below



The above is control board, please find the pin ports J21, J22, J23, J24 and J25.

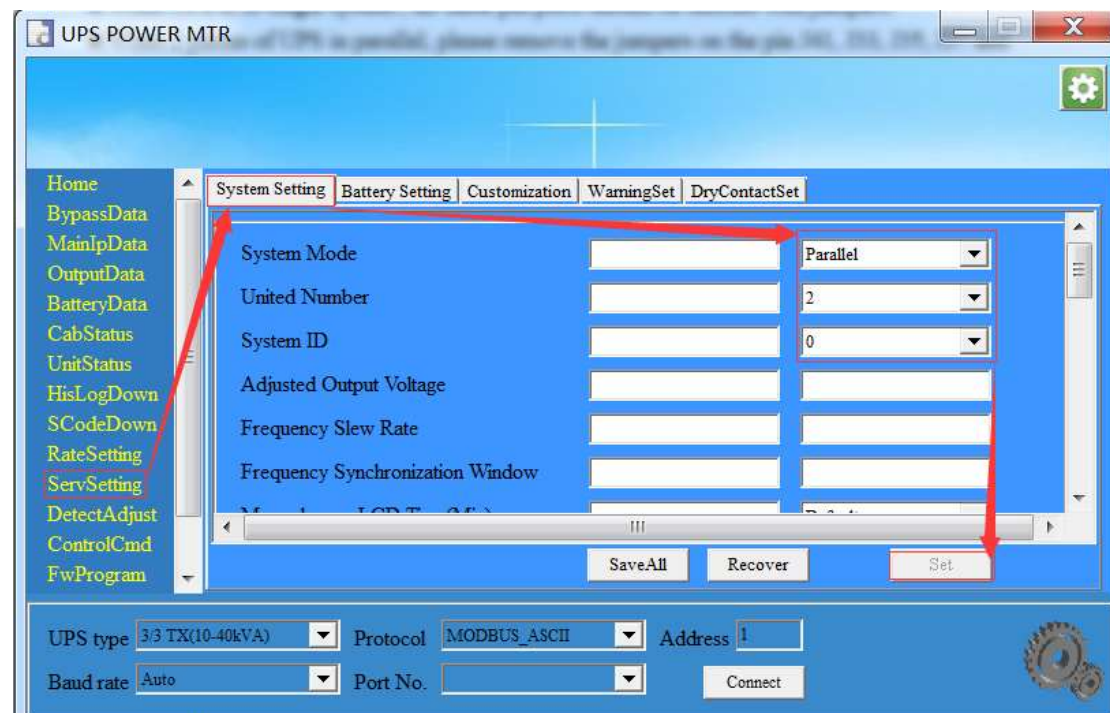
- ★When UPS is in single system, J21-J25 should be shorted with jumpers.
- ★When UPS is in parallel system, please remove the jumpers on J21 to J25.



The above is the parallel board, please find the pin ports, J41, J33, J35, J37, J39, J42, J34, J36, J38, J40.

- ★ When UPS is in single system, all these pin ports should be shorted with jumpers.
- ★ When 2 pieces of UPS in parallel, please remove the jumpers on the pin J42, J34, J36, J38 and J40, and keep J41, J33, J35, J37 and J39 shorted with jumpers.
- ★ When 3 pieces of UPS in parallel, please remove all the jumpers above.

3) To set the UPS parallel parameters through MTR software



Above is our MTR software, connect MTR to UPS, find the setting page, set as below.

- ★ 2 UPS in parallel
- The first UPS should be set as below.
- System Mode: Parallel;
- United Number: 2;
- System ID: 0;

The second UPS should be set as below.

System Mode: Parallel;

United Number: 2;

System ID: 1;

★ 3 UPS in parallel

The first UPS should be set as below.

System Mode: Parallel;

United Number: 3;

System ID: 0;

The second UPS should be set as below.

System Mode: Parallel;

United Number: 3;

System ID: 1;

The third UPS should be set as below.

System Mode: Parallel;

United Number: 3;

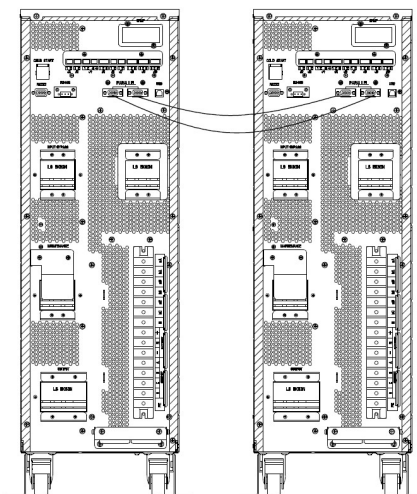
System ID: 2;

Note: Keep the other parameters same for UPS in the parallel system.

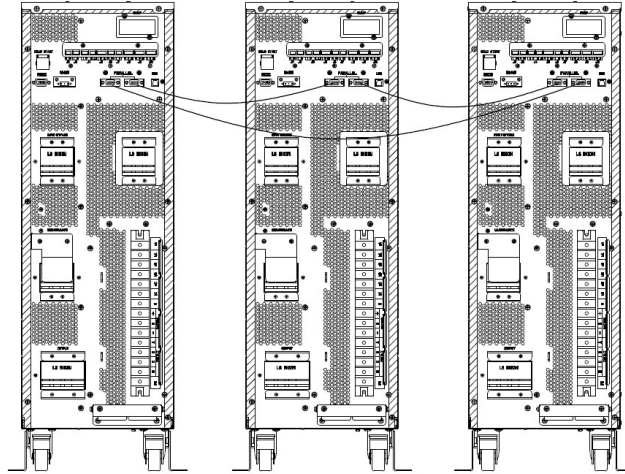
4) To connect the parallel signal cables



The parallel signal cable



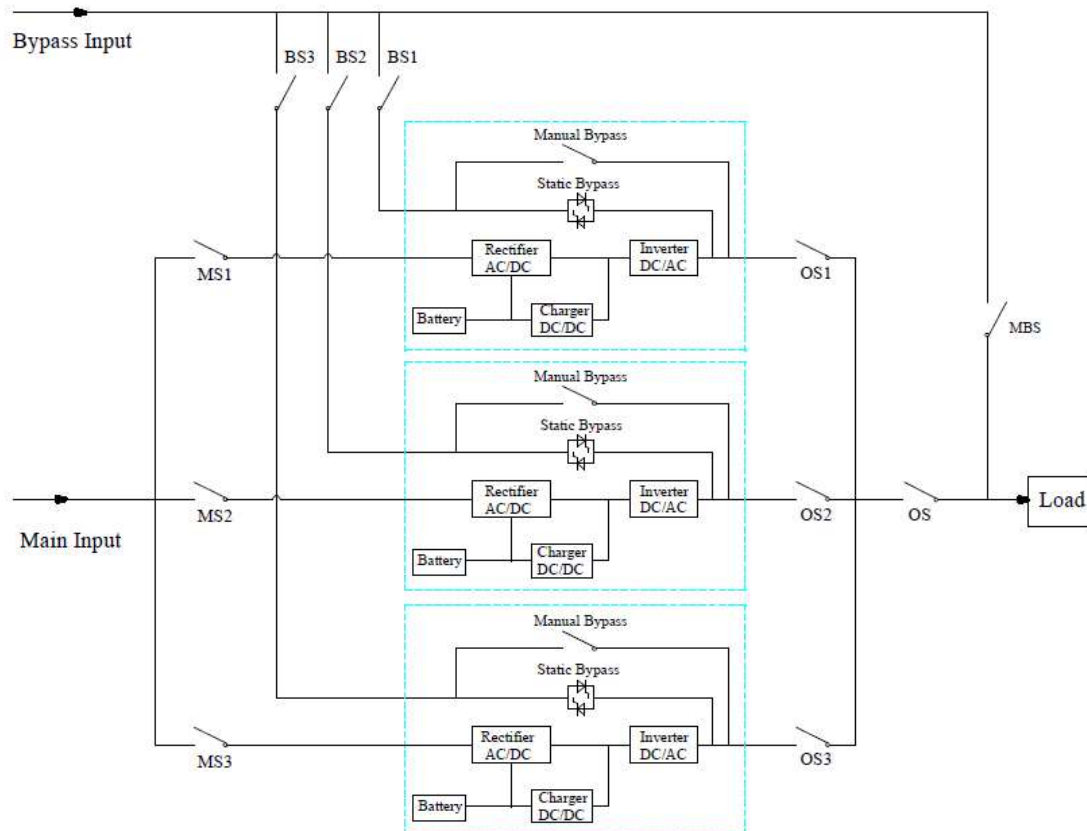
The signal cable connection for 2 UPSs in parallel



The signal cable connection for 3 UPSs in parallel

5) Testing for the parallel system

After all above done, please operate as below to test the parallel system is completed successfully. Below take the parallel system of 3 UPSs with dual input for example.



Note: Before the operation, please keep all the switches off.

1) First close OS1, and then close BS1 and MS1, the first UPS will start automatically, for the details of start, please refer to the user manual. About 2 minutes later, the first UPS will complete the start and final close the battery switch used with the first UPS. At the moment, there should be

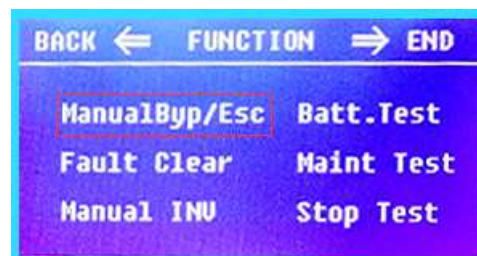
no any alarm on the display screen, users can check the information on the screen, and they should be same to that from its nameplate. If the start fails, please contact the commissioned engineer or the supplier.

2) Turn off the battery switch used with the first UPS, and then turn off BS1 and MS1, and finally turn off OS1, the first UPS would be shut down completely.

3) Operate the second UPS and the third UPS as the first UPS mentioned above.

4) After above operations and confirming there is no abnormality, please first close OS1, OS2 and OS3 one by one, and second close BS1, BS2 and BS3 one by one, and third close MS1, MS2 and MS3 one by one, after about 2 minutes, three UPSs should start successfully at the same time, and finally close the battery switches for each UPS, at the moment there should be no any alarm on the display screen.

5) Operate the function “ManualByp/Esc” on the first UPS as below, three UPSs should transfer to bypass mode at the same time, and then operate the function “ManualBypEsc”, three UPSs should retransfer to inverter mode. If there is no problem, please make the same operations on the second UPS and the third UPS.



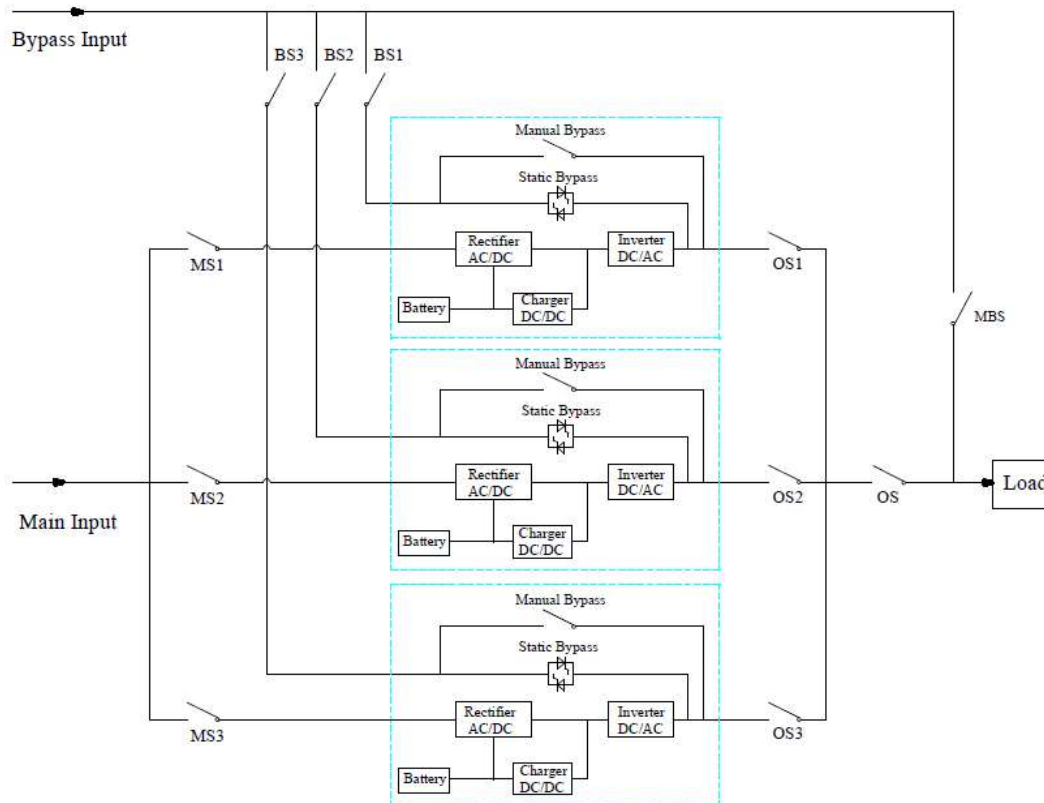
The operation interface for transferring to bypass or escaping

6) Close the main output switch OS, the system is completed, users can start their equipment one by one.

4. The operations for the parallel system

1) Shut down the UPS.

When UPSs in parallel, and if users want to shut down one UPS or all UPSs, there take the parallel system of 3 UPSs with dual input for example, please operate as below.



First turn off the battery switch used with the first UPS, and then turn off BS1 and MS1 one by one, and finally turn off OS1, the first UPS will be off. If recover, please first turn on OS1, and then turn on BS1 and MS1 one by one and finally turn on the battery switch.

If users want to shut down the second and the third UPS, please operate as above, but must note whether the remaining capacity of the system can meet the load capacity.

2) Transfer the parallel system to the maintenance bypass mode from the normal mode.

There take the parallel system of 3 UPSs with dual input for example, please operate as below.

- Operate “Transfer to Bypass” on the display screen of any one UPS, all UPSs will transfer to the bypass mode at the same time.
- Remove the metal plate on the manual bypass switch of the UPS, and then switch to bypass.
- Turn on the maintenance switch MBS.
- Turn off all the battery switches one by one.
- Turn off MS1, MS2 and MS3.
- Turn off BS1, BS2 and BS3.
- Turn off OS1, OS2, OS3 and OS. All UPSs will be off; the load is powered by the maintenance bypass.

3) Retransfer the parallel system to the normal mode from the maintenance bypass mode.

There take the parallel system of 3 UPSs with dual input for example, please operate as below.

- Turn on OS, OS1, OS2 and OS3 one by one.
- Switch the manual bypass rotation switch of each UPS to bypass.

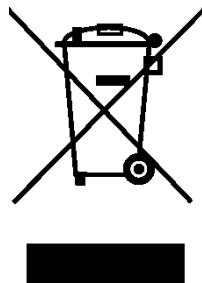
- c) Turn on BS1, BS2 and BS3 one by one, about 20 seconds later, confirm the static bypass of each UPS should be on.
- d) Turn off the maintenance bypass switch MSB
- e) Turn on MS1, MS2 and MS3. About 30 seconds later, the rectifiers of all modules should be on.
- f) Turn on all the battery switches one by one.
- g) Switch the manual rotation switch to UPS. After 90 seconds, all UPSs should transfer to the normal mode at the same time.

Recycling information in accordance with the WEEE

The product is marked with the wheelie bin symbol. It indicates that at the end of life the product should enter the recycling system.

You should dispose of it separately at an appropriate collection point and not place it in the normal waste stream.

The figure below shows the wheelie bin symbol indicating separate collection for electrical and electronic equipment (EEE).



The Horizontal bar underneath the crossed-out wheelie bin indicates that the equipment has been manufactured after the Directive came into force in 2005.

The main parts of the drive can be recycled to preserve natural resources and energy. Product parts and materials should be dismantled and separated.

Contact your local distributor for further information on environmental aspects. End of life treatment must follow international and national regulations.