POWER SOLID

40KVA
ONLINE UPS

PS-POU40KT3#32BC0KR

USER MANUAL

WWW.POWERSOLID.VN

Foreword

Welcome to use our product, please read this manual thoroughly. It includes instructions of safety installation and operation about three-phase in and three-phase out UPS. Its installation and maintenance must be performed by qualified engineer authorized by manufacturer or agent. The UPS is designed only for commercial or industrial use, not allowed to power life support equipment. It is without warranty of the damage caused by deregulation.

Note: It is subject to make changes to the product described in this manual at any time and without prior notice for reasons of improvement. Please contact us for latest information.

Content

Functions and characteristics

1. Full digital
   Full digital technology based on double DSP, eliminate the zero drift commonly by analog, make it easy to update and maintenance; convenient to use modern control methods; advanced logic management; provide rich interactive interface

2. Reliability
   High reliability Thyristor phase-controlled rectifier, IGBT module based full-bridge inverter; inverter isolation transformer; the battery is directly connected to DC BUS, which achieves zero transfer time from utility to battery; SCR based static switch achieves zero transfer time from inverter to bypass and vice versa

3. Excellent input and output characteristics
   Input power wall-in, benefit the connection of generation and power transfer generator power limit mode, Wide input voltage range, compliant to most voltage standard: 380V/400V/415V 50Hz/60Hz; Output PF 0.9(lag);

4. Professional battery management(PBM)
   Intelligent auto transition between equalizing charge and floating charge;
   Battery backup time prediction, Periodic self-test; lengthen battery life

5. N+X parallel mode
   Only connect the parallel cable and do some setting can achieve the parallel mode, the master can be set at will, when the master fault, one of the slaves will be master automatically. It can be connected in parallel eight units max..

6. Load Bus Synchronization (LBS)
   LBS realizes the synchronization of the two system, it provides high reliability of STS for the dual power supply system

7. Perfect protection
   Over voltage protection, over frequency protection, over-current protection, over bus voltage protection, over-temperature protection, auxiliary power supply failure protection, output overload protection, output short-circuit protection, emergency shutdown

8. Perfect monitoring
   RS232 and RS485, large-screen LCD panel;
   monitor section monitors the status of the UPS, transfers command, records failure events in the history record, and communicates with host computer

Safety instruction

This manual contains installation and operation, please keep it!

There is dangerous voltage and high temperature inside the UPS. During the installation, operation and maintenance, please abide the local safety instructions and relative laws, otherwise it will result in personnel injury or equipment damage. Safety instructions in this manual act as a supplementary for the local safety instructions.

1. There is high leakage current inside, so ground first before connecting to utility.
2. Though the utility isnôt connected in, there is still AC voltage at output, so please open all the switches within the front panel when cut off the output of the UPS.
3. Please donôt open the cover of the UPS, there is risk of electric shock.
4. Battery replacement must be done by professional. The inside of the battery may contain the toxic ingredients, so the waster batteries should be sent to special department for appropriate treatment. Do not open or damage the battery. The short circuit is prohibited, or it may cause an explosion, fire and corrosion, which may do harm to the person.
5. When replacing the fuse, please use the fuse of the same specification.
6. All the internal maintenance must be done by the professionally trained person.
7. All the communication lines must use shielded cables to protect signals from the interference. In a residential environment, this product may cause radio interference, therefore some appropriate measures must be taken. For example, move the UPS for some distance to reduce the interference.

Storage

The storage place must meet the following requirements:

Temperature: 0Ņ ~ 40Ņ (32ⁱ ~ 104ⁱ)

Relative humidity: 95%

Installation environment

When select the installation room, please take note of the following:

1. The place must be dry, clean and well-ventilated.
2. Check whether the floor is strong enough to bear the weight of UPS and battery box.
3. Check whether the room is large enough for installation and maintenance.
4. When UPS is running, check whether the ambient temperature is between 0Ņ ~ 40Ņ.
5. The recommended temperature is between 20Ņ ~ 25Ņ. The operating life of the battery will decreased due to the increasing temperature. The temperature rises 10Ņ, the life will be half.
6. Don't place the machine directly in sunlight or near the heat source.

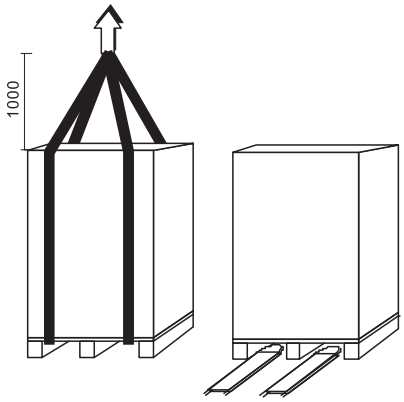
In order to meet the above requirements, it is necessary to eliminate the heat dissipated by UPS, two methods can be used:

Natural ventilation

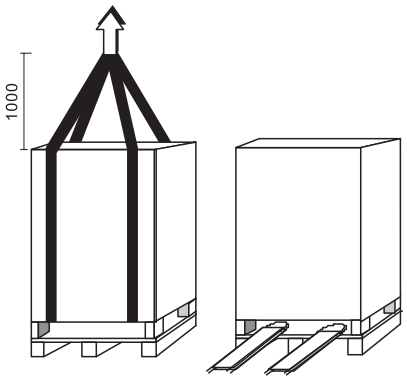
Forced cooling (air conditioner system)

Installation preparation

1. Remove the packaging carefully, don't damage the original packaging, check if the machine is damaged in transit. If it is found damaged, please don't start the machine and notify the carrier and dealer.
2. Check if the equipment is just the right type you ordered.



Please carry it in an appropriate way



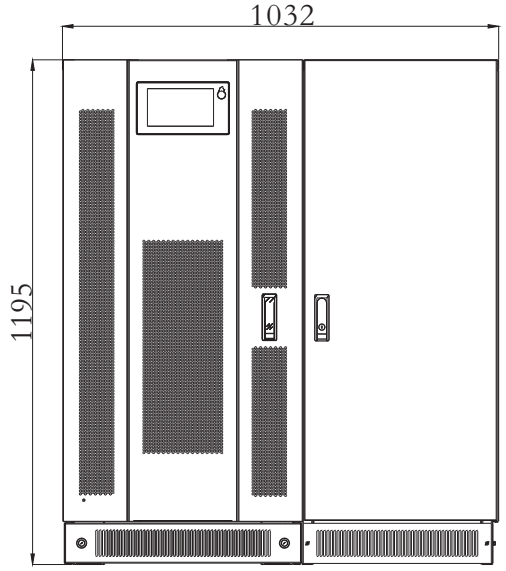
Unloaded from the pallet

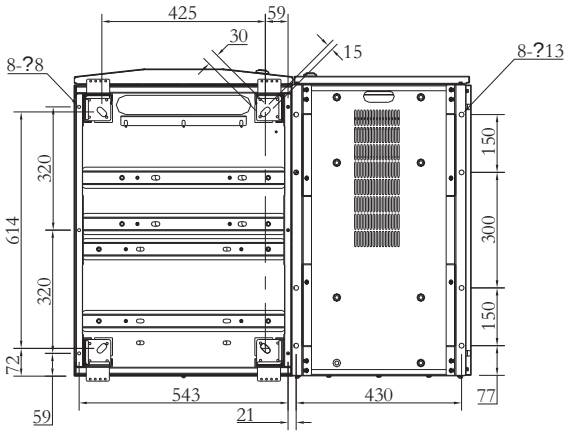
Placement

When placing the UPS, keep in mind the following points:

1. Leave at least 1m of unobstructed space in front of the machine for maintenance.
2. Leave at least 50cm of unobstructed space at the back of machine for properly ventilated.
3. Leave at least 20cm of unobstructed space both the two sides of the machine for maintenance.
4. Do not rest any object on top of the UPS.

40K





Bottom view

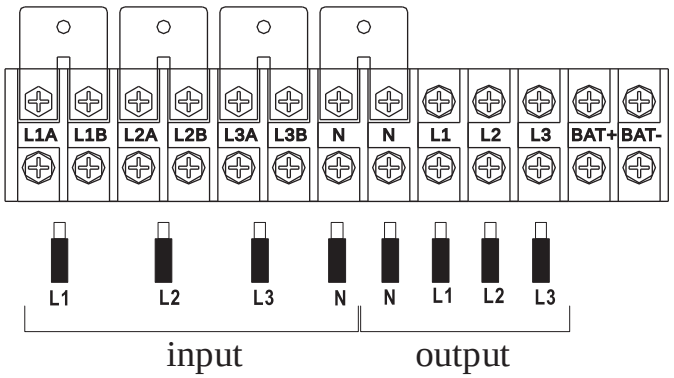
Connection

Only both the UPS is disconnected from the utility and the switch is off, can the connection be performed. Remove the switch panel.

The first step: connect the ground wire to the grounding bar

MAINS and LOAD CONNECTION

10-80KVA(MAINS and BYPASS line TOGETHER)

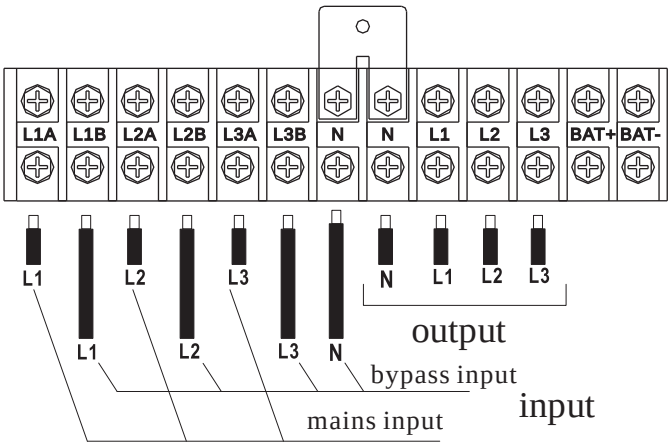


L1A, L2A, L3A, N: mains input
L1B, L2B, L3B, N: bypass input
LxA=LxB, mains input and bypass input have been connected

For input and output wire size, please refer to the table (maximum size in bracket)

	size(mm^2)		
	Input	Ground	Output
kVA	L1/L2/L3/N	PE	L1/L2/L3/N
40	25(35)	25(35)	25(35)

10-80KVA (mains and bypass line separate)



L1A, L2A, L3A, N: mains input
L1B, L2B, L3B, N: bypass input
The connection between LxA and LxB has been removed

Startup process

After complete the connection and checking, make sure the input switch of UPS is closed.

Warning:

There may be voltage present at the output during the following operation. Please open the switch connected to the load if necessary.

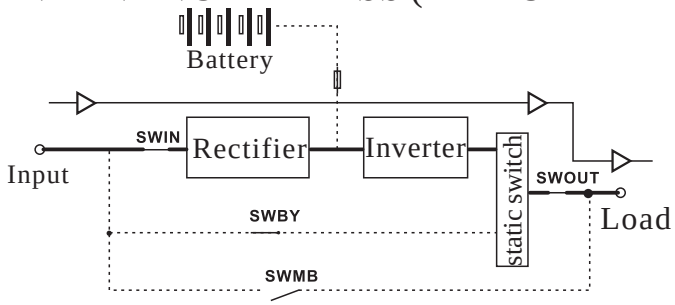
1. Close the SWBY and SWOUT of the UPS.
   The LCD begins to run. When the UPS starts, it will work in bypass mode at first. Now, the status of led indicators is as following: bypass led (BYPASS) and load led (OUTPUT) light green, battery led (BAT.) lights red, warning led (STATUS) lights yellow.
2. Close the SWIN
   The rectifier starts, its led (RECTIFIER) blinks in green. About 15 seconds later, the rectifier begins to work normally, and the green led lights.
3. Check the DC bus voltage and polarity of the battery, then, close the external battery switch.
4. When the system detects the presence of the battery, the red battery led (BAT.) extinguished.
5. Check and open the internal maintenance bypass switch (SWMB)
6. Press the button INVERTER ON and hold it for at least 2 seconds.
   The inverter begins to start, when inverter synchronizes to bypass, the inverter led (INVERTER) blinks. When the inverter starts, UPS transfer to inverter mode from bypass mode. Now, bypass led (BYPASS) extinguished and the inverter led lights green.
7. Make sure that there is no alarm message displays in LCD screen, and the led status is as follows: RECTIFIER/INVERTER/OUTPUT light green, the others extinguished.

Internal protection

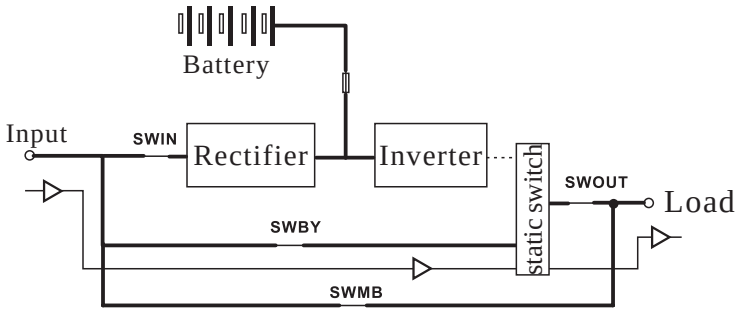
The specifications about the fuses and switches installed in the input and output lines are as follows, a fuse must be replaced of the same type.

	Breaker		Switch	Fuse
[KVA]	SWIN	SWBY	SWOUT	Battery fuse
40	80A˜ 3P˜ C	80A˜ 3P˜ C	63A˜ 3P˜	140A/660V(aR)

MAINTENANCE BYPASS (MANUAL BYPASS)

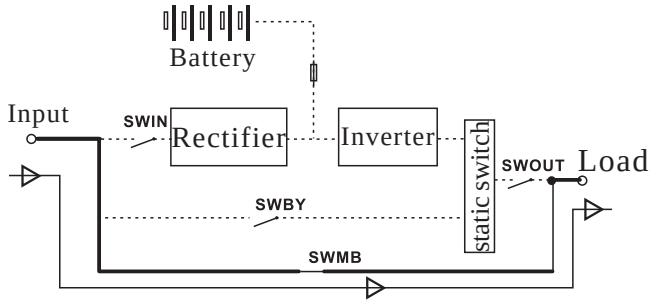


Status a. normal operation



Status b

1. Press the button "INVERTER OFFò on the control panel. The inverter will be off, and the load will be powered by bypass. The inverter LED will be off, alarm LED will be on.
2. Close switch SWMB
   The maintenance bypass is connected to the static bypass in parallel. The operation message will be show on the LCD.
3. Open the output switch (SWOUT), the load is fed directly by maintenance bypass. If it is necessary to turn off rectifier and battery, please go on the following steps:
4. Press the button ñEPOò on the front panel for at least 2 seconds.
   It will turn off the rectifier, inverter, static switch and battery contactor.



Status c

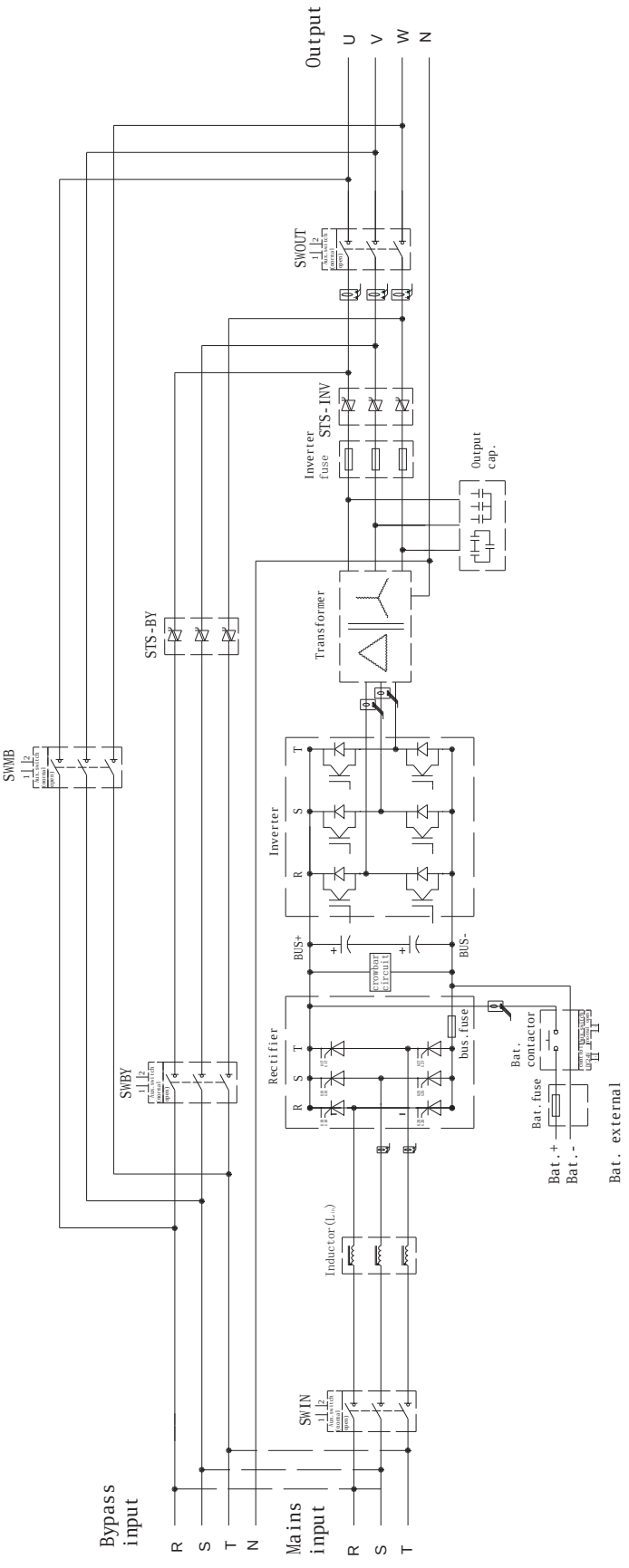
Open the input switch (SWIN) and bypass switch (SWBY)

When finishing the maintenance, close the SWIN, SWBY and SWOUT to restart the UPS.

Press the button ñFAULT CLEARò to exit EPO command. Turn off SWMB, press the ñINVERTER ONò button on the control panel for more than 2 seconds to get the UPS back to normal operation.

Modes of operation

Block diagram



Rectifier

Represent the input stage, perform the AC/DC conversion, the functions are as follows:

1. Power the inverter with DC
2. Charge the battery automatically

External battery

When there is no power input, the battery provides power to load.

Inverter

Represent the output stage, convert the DC voltage from RECTIFIER or BATTERY to sine AC voltage.

Static switch

It is an automatic or manual switch. It is used to transfer from the inverter mode to bypass mode or vice versa.

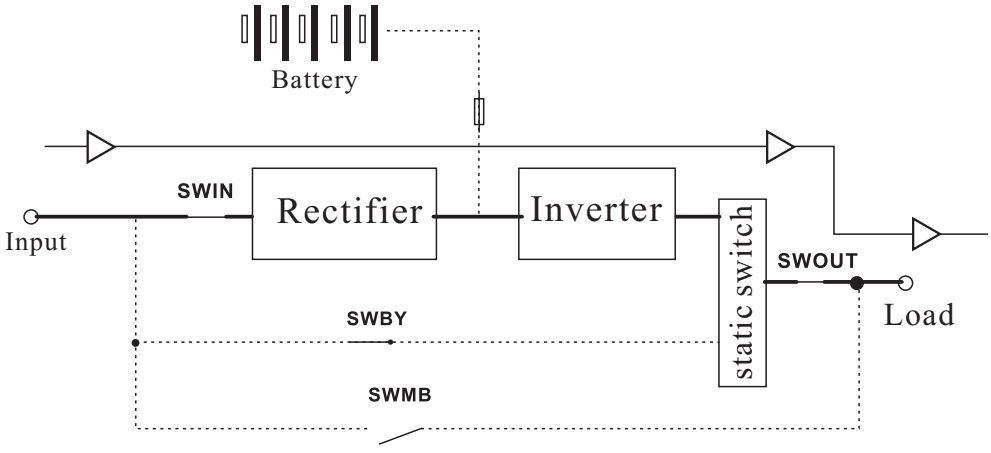
Manual maintenance bypass switch (SWMB)

This switch is only for maintenance, when it closed, the load is directly powered by mains. With the SWMB closed and the other switches open, no voltage inside the equipment (voltages are present only at the input and output terminals and switches area).

Note: the neutral is not interrupted

LINE MODE

The mains power is present, the SWIN, SWBY, SWOUT are closed, the SWMB is open.



The load is powered by inverter. The rectifier converts the AC voltage to DC voltage to power inverter and charges the battery. The leds of RECTIFIER, INVERTER and OUTPUT are lit green.

Note: when the mains power failure, the load remains to be powered by UPS, using energy from the battery.

Load energy backfeed protection

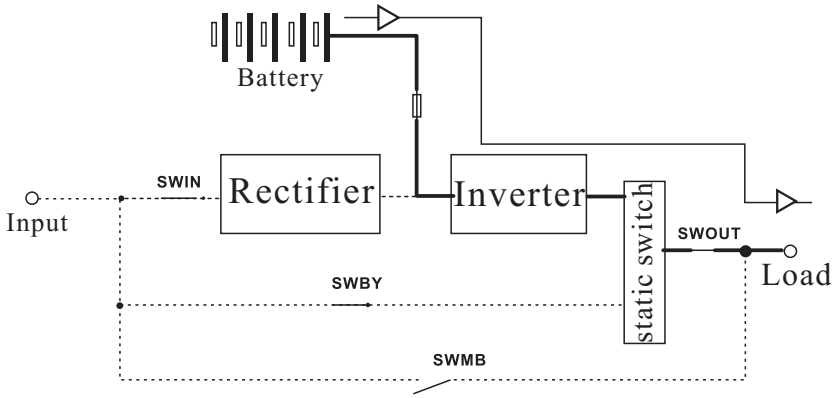
If the load carried by the UPS output is a motor-type load, energy will be backfeed to power terminal when the motor is braking, the Crowbar-circuit which connected to the UPS bus will be activated in time to absorb the energy from the motor load, ensure UPS bus stability and battery life.

Technical Specification

Three-phase input three-phase output	
Rated capacity(VA)	40KAVA
Active power(W)	36KW
INPUT	
Voltage Range	380/400/415Vac (-25%～+20%) three phase
Frequency Range	50/60Hz±5Hz auto identification
Power Factor	＞0.8(no filter) ＞0.9(with filter)
OUTPUT	
Voltage Range	380/400/415Vac ±1%
Rated output current	60A
Frequency	Auto learning
Frequency stability(battery mode)	50/60Hz±0.05%
Wave form	Sine wave
Power Factor	0.9(lag)
Total harmonic distortion	＜3% (linear load) / ＜5%(nonlinear load)
Overload capacity	105%≤60min <110% / 110%≤10min<125%
Crest Factor	3：1 (max)
Efficiency	90%
Transfer time	
Line mode? Battery mode	0ms
Bypass	
Rated voltage	380/400/415Vac (three phase four wire)
Voltage protection range	-40%～+20%
Rated frequency	50/60Hz
Frequency protection range	±20%
Transfer time	0ms/1ms
Overload capacity(In)	15In, 10ms 5In, 5s
Battery	
Voltage (VDC)	384VDC
Panel	
LED	input, inverter, bypass, battery and output
LCD	input and output voltage, frequency, power factor, battery voltage, battery current and status, load percentage, UPS status, history record, setting
Communication	
interface	Dry contact, RS232, RS485, SNMP card slot
Working environment	
Running Temperature	0～40℃
Relative humidity	0～95% (without condensing)
Storage temperature	-25℃～55℃
Noise at 1	＜63dB
Optional Harmonic Filter, SNMP adapter, Bypass current-sharing inductor	

BATTERT MODE

Mains power is off, the SWIN, SWBY and SWOUT are closed, the SWMB is open.



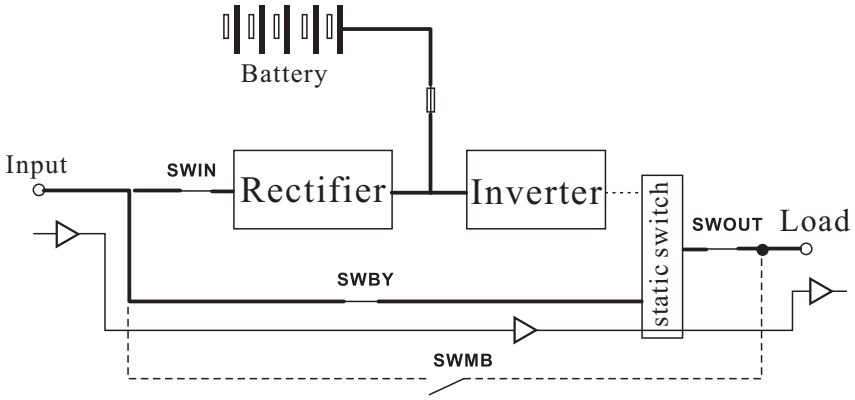
If the mains power is off or out of range, battery discharges to provide power to load. The green led of BAT., INVERTER and OUTPUT on the front panel are on, STATUS is on, and the buzzer alarms.

Note:

When the battery voltage drops below the pre-alarm value, the led BAT. will blink, now, save the data under this condition. The battery will run out and UPS cuts off its power to load if mains power remains off.

BYPASS MODE

Mains power present, the SWIN, SWBY, SWOUT are closed, the SWMB is open.



If the inverter fails or over-load, and the inverter is synchronous with the bypass, the static switch will be activated, the inverter mode will be transferred to bypass mode without interruption. If asynchronous, the output will be interrupted when transfer. The led of the BYPASS and OUTPUT are on, STATUS led is on. The buzzer alarms.

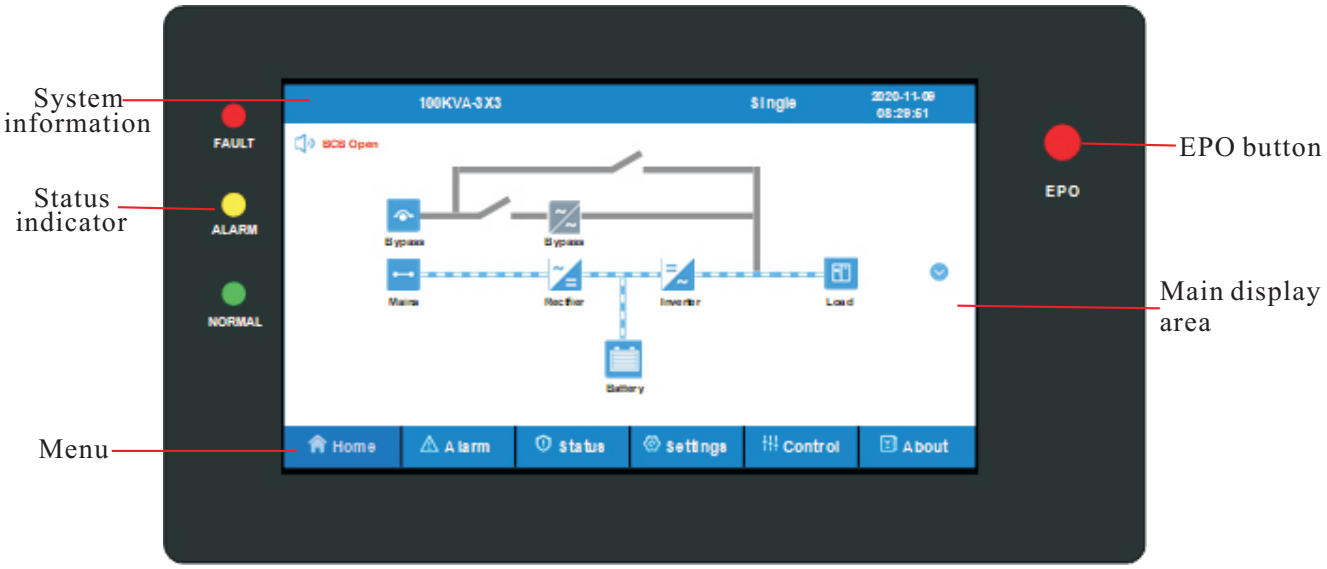
Note: In case of over-load, reduce the load to the permitted range, then UPS will be back to inverter mode, otherwise, the load will not be protected by UPS.

Operation of Touch screen

This chapter offers a detailed introduction about the function and usage of the UPS Touch screen panel, and its display information, including detailed menu information and prompt window information, and UPS alarm message list.

Introduction

The touch screen, located at the front of the machine, is used to control the UPS and query all of its parameters, including battery status ,event log and alarm messages.
The display panel can be divided into five parts by function: system information,menu, main display area,status indicator and EPO button. The above parts of the panel and name is showed in Figure below.



UPS operation control touch screen

System Information

This part shows the logo, model, and capacity of the UPS.

Status indicator

Three are 3 indicator lights in the status indicator area, which are used to show the working status of the UPS. The status meaning of each indicator light is described as shown in the follwing table.

LED	State	Mean
FAULT	Red	UPS Failed
	OFF	UPS no fault
ALARM	Yellow	UPS Alarm
	OFF	UPS no alarm
NORMAL	Green	UPS normal
	OFF	UPS failure or alarm

Buzzer alarm

When the UPS is running, three different sounds of alarm can be followed, which are described as shown in the follwing table.

A single short buzz of alarm	Press any function key to send the alarm
A buzz of alarm every other second	In case of UPS warnings (e.g. abnormity in the main path voltage), such alarm will be active
continuous buzz of alarm	In case of UPS failure (e.g. blown fuse of the main path or other hardware failures), such alarm will be active

Main display area

This part is the main display, the content varies depending on the menu.

Menu

The panel offers seven menu items. Function description of each item is showed in Table below.

N.O.	Menu	Description
1	Home	mimic operation diagram of UPS
2	Alarm	Display the faults of UPS
3	Status	Real-time status, history record, download
4	Settings	Settings for data & time, communication baud rate and address selection
5	Control	Operation of the UPS: UPS ON/OFF, fault alarm on/off etc.
6	About	Software version, manufacturer info

Touch screen interface is user-friendly. With the easy-to-use menu-driven operating system, it is convenient to get the parameters of input/output/load/battery status of the UPS and acquire the current status and alarm messages of the UPS timely, and conduct relevant function setup and control operations. Moreover, the panel can provide at most 10000 historical alarm records, which serve as a credible basis for fault diagnosis.

Detailed Menu

①Home

The Main menu offers the mimic operation diagram of UPS. The symbols SWIN(QF1), SWBY (QF2),SWMB(QF3), SWOUT(QF5) represents the mains input/bypass input/maintenance/ output switch. The indicators shows the power path and status of UPS. The function description is showed in Table.

Name	icon	Status	Indication
Rectifier		Green on	Rectifier works normally
		Green flickers	AC is normal, but rectifier is not working
		Red on	Rectifier fault
		off	Rectifier does not work, mains input abnormal
Bypass		Green on	Load is powered by bypass input
		Red on	Bypass power supply is abnormal or beyond acceptable range; or fault of bypass switch
		off	Bypass normal, but does not power the load
Battery		Green	The battery is normal
		Yellow	Pre-alarm end of battery discharge
		Red	Abnormity occurs to the battery (battery fault, no battery or reversed battery connection) or the battery switch
Inverter		Green on	Inverter provides the load with power supply
		Green flickers	Inverter starts up, operates, synchronizes, or is in the stand-by state (ECO mode)
		Red on	Inverter fault
		off	Inverter out of work

②Alarm

There are three submenus: Real, Record, Export. It is showed as table below.

NO.	items	content	description
1	Current	real-time status	the real-time status of UPS
2	History	history record	history record of the UPS

③Status

The status menu displays the UPS operation data. The main display area shows the content according to the selected submenu on the left column. Through the menu, users can get relevant UPS parameters. Detailed description is shown in Table below.

NO.	submenu	items	description	
1	Mains	Line Voltage(V)	Mains input line to line voltage	
		Phase Current(A)	Mains input phase current	
		Phase Frequency(Hz)	Mains input frequency	
2	Bypass	Phase Voltage(V)	Bypass input phase voltage	
		Phase Current(A)	Bypass input frequency	
		Line Voltage(V)	Bypass input line to line voltage	
3	Output	Phase Voltage(V)	Output phase voltage	
		Phase Current(A)	Output phase current	
		Phase Current(A)	Output frequency	
		Line voltage(V)	Output line to line voltage	
		Power Factor	Power factor of load	
4	Load	Apparent Power(kVA)	Apparent power	
		Active Power(kW)	Active power	
		Reactive Power(kVar)	Reactive power	
		Load(%)	Percentage of UPS rated load	
		Peak Ratio	Crest factor of the output current	
5	Parallel	Apparent Power(kVA)	Apparent power	Available for parallel configuration, none for single mode
		Active Power(kW)	Active power	
		Reactive Power(kVar)	Reactive power	
6	Battery	Voltage(V)	Bus voltage of the battery	
		Current(A)	Bus current of the battery	
		Temperature(℃)	temperature of the battery group(℃)	
		Remaining Time(Minute)	The remaining working time of the battery	
		Charging Status	Battery boost charging/Battery float charging/Not charging	

④Settings

The item is for UPS parameters settings. Including the Time, Address, Language. Detailed description is shown in Table.

NO.	items	content	description
1	General	Date &Time	Date and time settings Year-month-day-hour-minute-second
		Change Password	Change password
		Screen Calibration	Screen Calibration
2	Communication	UPS Address	Address for UPS co mmunication
		RS232 Baud	9600/4800/2400 settable
		RS485 Baud	9600/4800/2400 settable
3	Log	Reset Log / Export Log	Reset Log / Export Log
4	Language	Chinese / English	touch screen display language
Users can enter this menu only with the correct passwo rd. The initial password is 9662			

⑤Control

ON/OFF, Common, Command are sub items of the Control menu. Detailed description is shown in Table.

NO.	items	content	description
1	INV ON/OFF	Power On	Press the button to start the inverter
		Power Off	Press the key to shut off the inverter, UPS will go to bypass mode if on inverter mode
2	SELF-TEST	Maintenance Test	Manually start the battery maintenance test. In the process, th battery will partially discharge for a rough evaluation of the batter capacity. To meet the test requirements, the load must be betwee 20% and 80%; and the battery must have just been in the course o a floating charge for more than 5 minutes continuously.
		System Test	Manually start the system test (i.e. UPS self-detection). After the system test proceeds for about 5 seconds, a window will be poppe up on the screen to show the test result: No faults detected, Fault o Alarm.
		Stop Test	Manually stop the battery maintenance test, battery capacity test o system test.
		Force Boost Charging	When the battery is not in the course of equalizing charge, manuall initiate a forced equalizing charge for the battery.
		Stop Boost Charging	Manually stop a forced equalizing charge for the battery.
3	GENERAL	Fault Clear	In case that UPS is off because of failure and alarm conditions are removed, press this button to clear the fault.
		Buzzer Toggle	When an alarm is activated, press this button once for silence of th alarm buzzer. If a new fault occurs, the buzzer will start an alarm once again. In case that the buzzer fails to give an alarm, press thi button to test the sounds of alarm.

⑥About

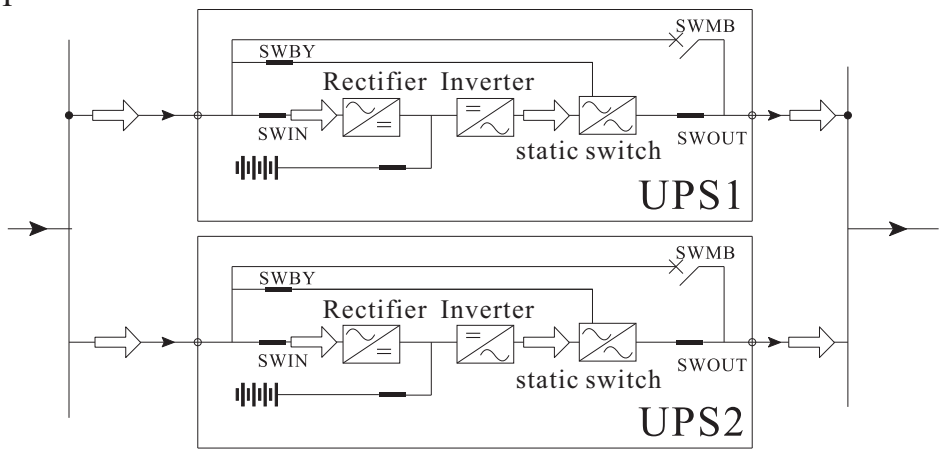
This menu offers HMI Version, Vendor, Monitor/Rectifier/Inverter version information.

EPO button

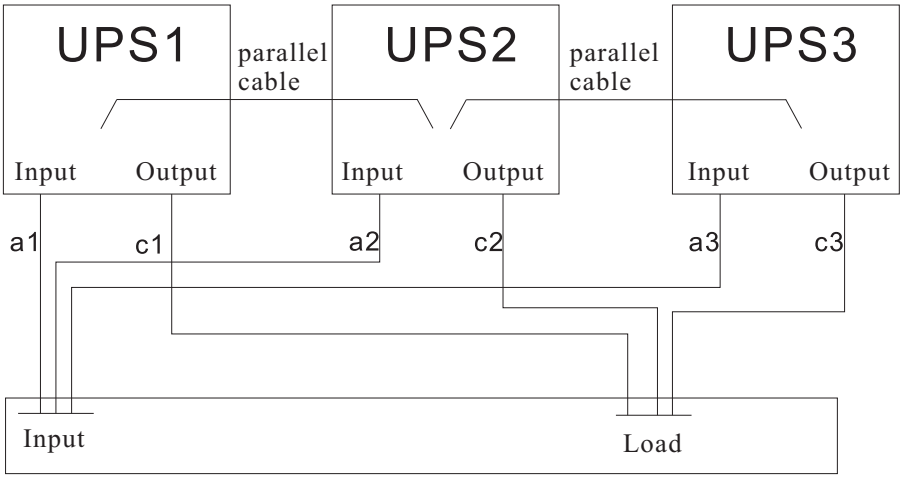
When the UPS is running, three different sounds of alarm can be followed, which are described as shown in the follwing table.

Appendix

Parallel operation



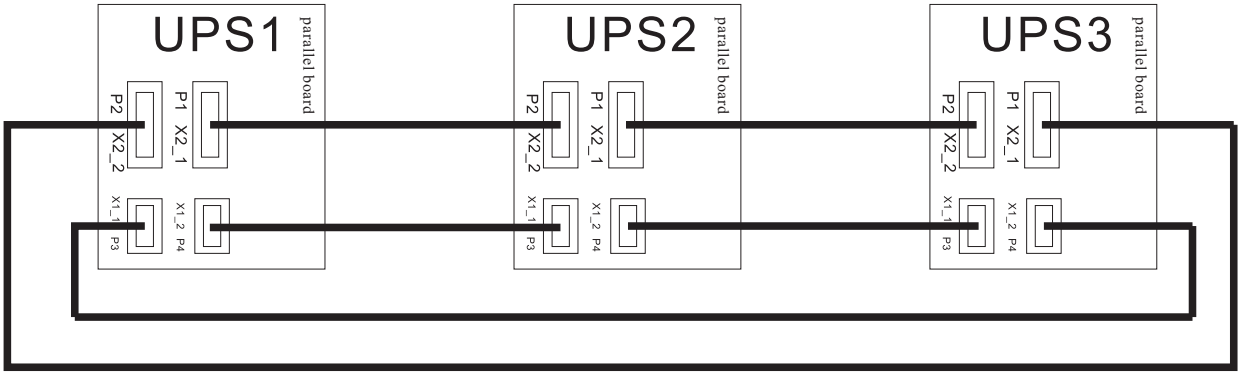
parallel connection diagram



input and output cable connection diagram

the length of the input and output wire is nearly the same，for example:

A1=a2=a3, c1=c2=c3 or a1+c1=a2+c2=a3+c3



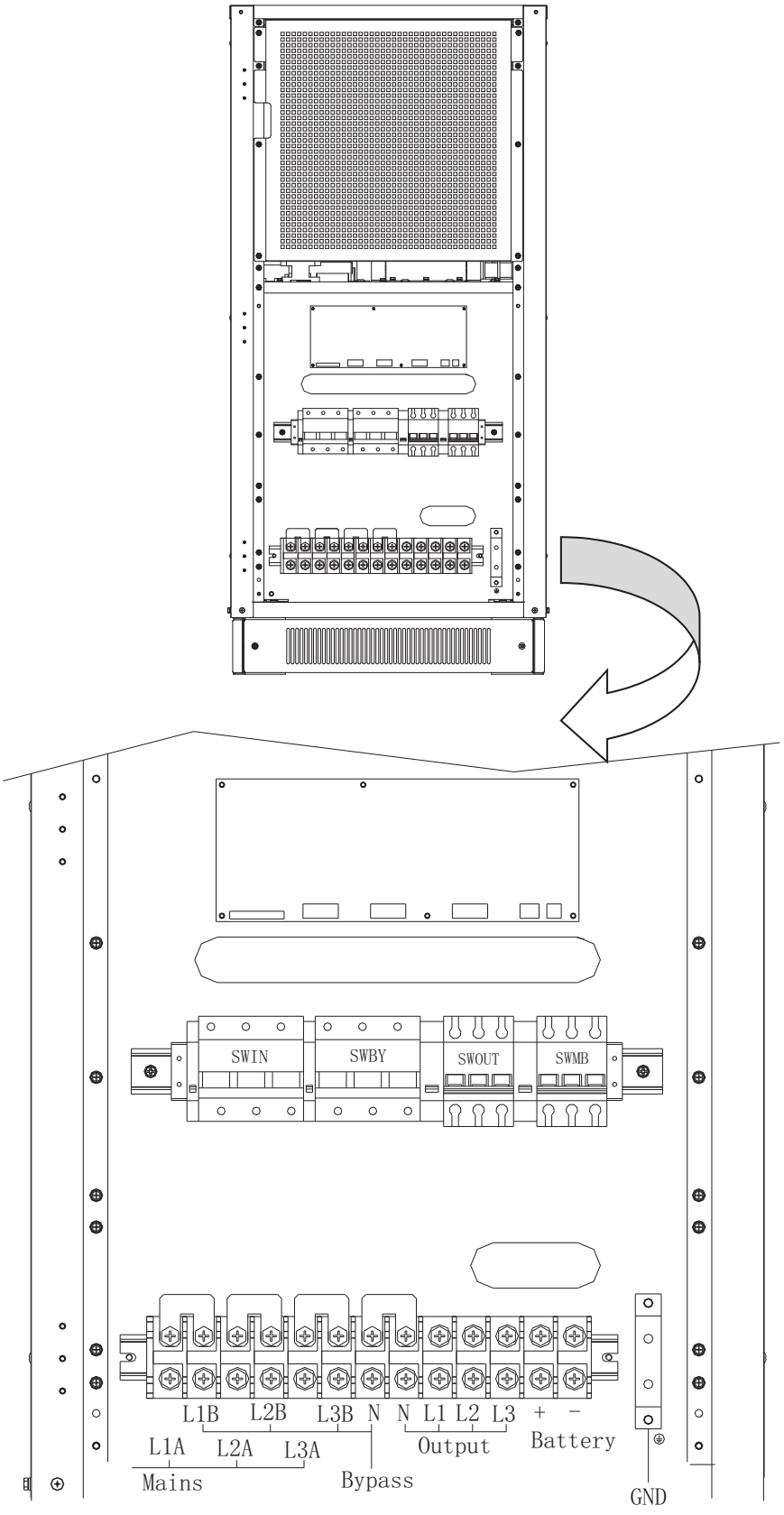
parallel connection diagram

The two parallel cables from the parallel boards X1-1and X2-2 of one UPS are respectively connected to the parallel boards X1-2and X2-1 of the next UPS.

Appendix

Structure

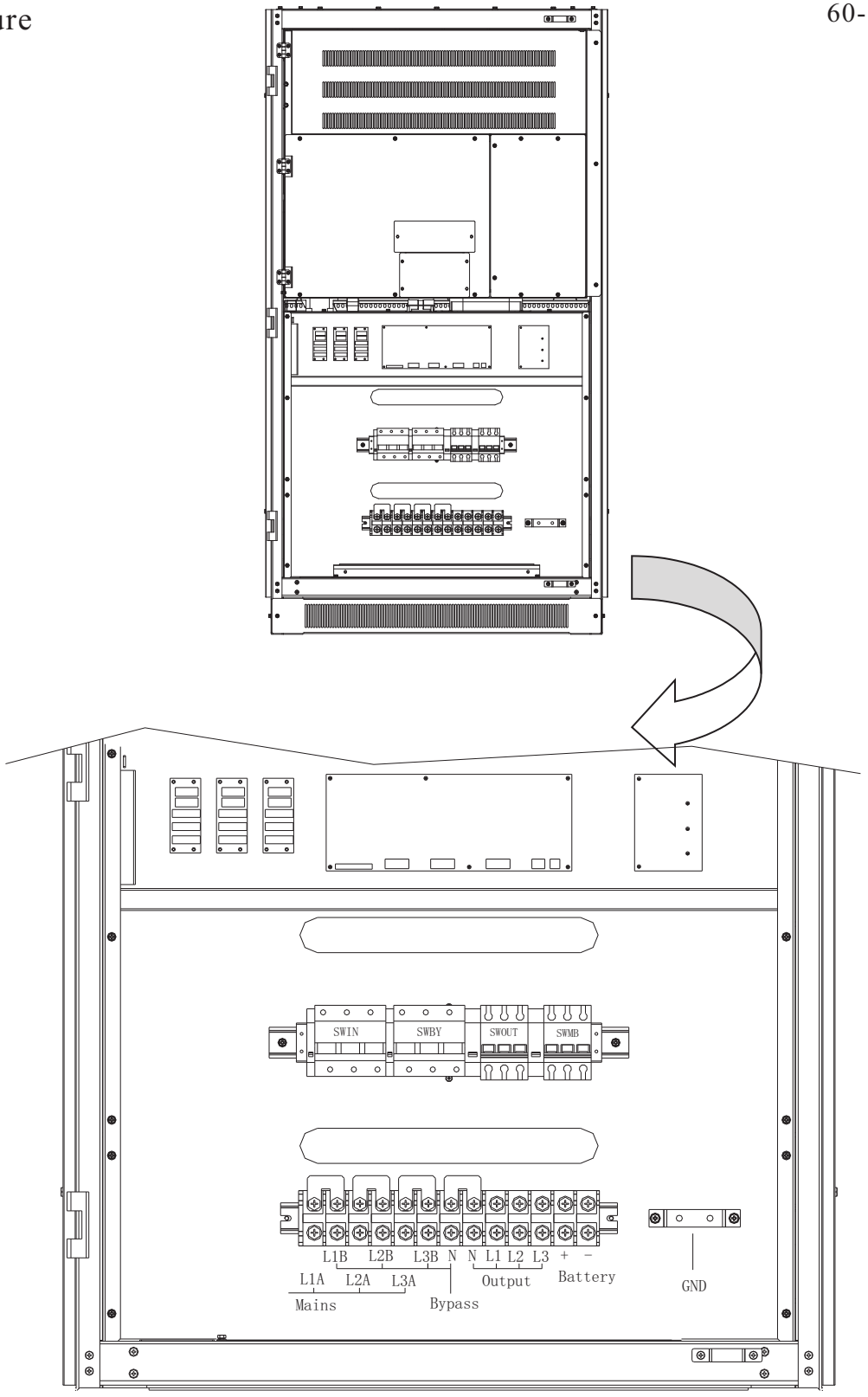
10-40KVA



Appendix

Structure

60-80KVA



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