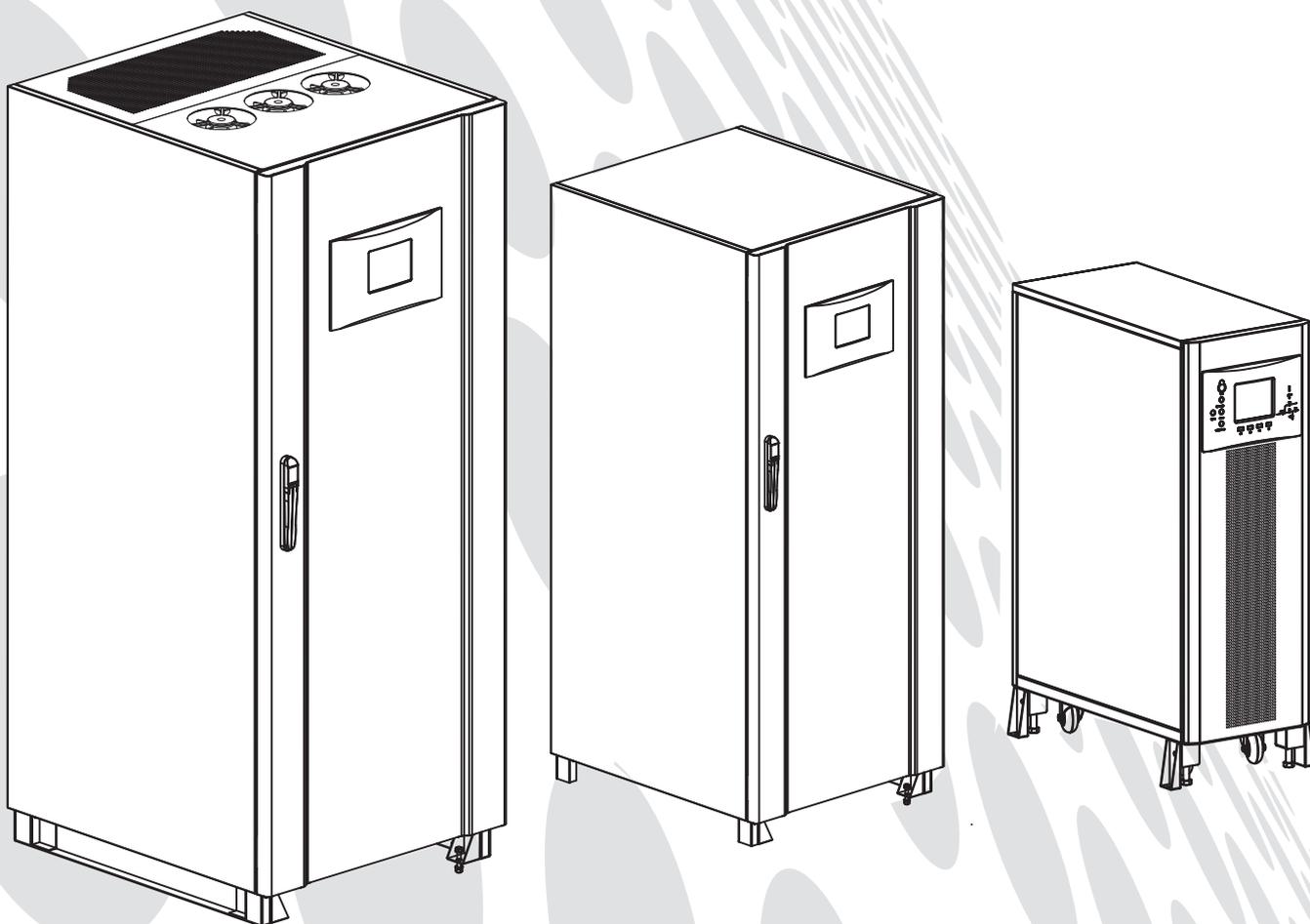


Operation Manual

On-Line UPS 10kVA-120kVA



PREFACE

Notes

This manual contains instruction of mounting, application, and operation of UPS. The manual should be care completely read before mounting the system and it shall not take any operations on UPS before finishing reading all safety instruction and operation instruction. This manual contains significant information, please obey all warnings and operation instructions stated in the manual and on the machine, and the manual shall be kept well.

Safety

The uninterrupted power system must be grounded before operation.

Battery shall be replaced by qualified maintenance personnel. The battery of lose useful worth is toxic waste according to environment contaminate prevention and cure laws, so wasted battery shall be recovered by its classification in accordance with requirement of environmental protection.

Warning

Selling of this product is only for partner who has general information on this product. It is necessary to know some other mounting requirements or measures to prevent an accident.

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1 Safety Instruction and Cautions

 **Caution: please do read all contents of this article before any operation of the machine to avoid personal injury or equipment damage caused by mal-operation.**

- UPS output end still has electricity even there is some fault of main power. By demand of EN 50091-1, installer must identify the electric wires and plugs supplied by UPS and inform them to user.
- Whole series UPS batteries are external, so we suggest installing the batteries only when UPS can electrify. What needs attention is that it will cause irreversible damage if batteries are failed to be charged for more than 2-3 months.
- UPS provides a cooled forced air by the internal fan. The cold wind get into the UPS mainly through the front door, hot air discharge through the top or back wind gate, therefore, do not block the ventilation holes (wind gate).
- When executing the operation of maintenance mode (please refer to chapter 4 for specific operation steps), switching the UPS to bypass output are required before closing the maintenance switch to avoid damage of the UPS caused by short circuit of two-way power supply.
- Parts marked with yellow labels inside the machine are untouchable by user to avoid electric shock.
- After power failure of machine, maintenance sockets still have main power, please identify whether the switch of UPS external power supply is off or not to avoid electric shock.
- Data line supplemented for the machine is crosswire used for RS232 communication, the disk is monitoring driving disk of RS232 communication.
- Please cut off switch of external battery if UPS is not used (especial when it is not used for a long time) to avoid irreversible damage of battery due to deep discharge.
- If bypass power changes strongly (When the voltage is more or less than 10% of rated voltage), please be careful to use ECO mode of UPS for power supply of the load, because power down of the load is possible (maximum power down time: 10ms).
- It must ground before connecting power supply or operating the machine to avoid personal injury due to leakage current. It shall ensure to disconnect of all power supplies and full discharge of electrolytic capacity (When the bus voltage is less than 36V) before mounting or maintenance of the machine.
- Please pay special attention to emphasized words and with “”, which are safety instructions and cautions.
- The action mode of EPO function of the UPS by default is “switching to bypass”. If needs the action mode of EPO function to be “cutting off the output”, please contact after-sales services.

2 Introduction of Product

2.1 Brief Introduction of Product

This series of UPS is full digital with high performance by utilizing DSP control technology. This series of UPS is connected between the main power and the important load, and supply high quality power continuously. It adopts high-frequent double-conversion pulse width modulation (PWM) and digital signal processor (DSP), and its output voltage cannot be affected by input voltage, frequency change, and interference of main power.

As shown in Figure 2-1, power supply of AC main power is inputted from RCB, transferred to DC power supply, and then can charge the battery at any time by BCB. At the same time, it supplies power to inverter, which can transfer this DC power supply to pure AC power supply without interference of main power. When main power is disconnected, battery can supply standby power supply to the load through inverter. If inverter is faulted or over-loaded, it can supply power to the load through input load switch SBCB and static bypass SB by AC bypass. In addition, if it needs to repair or maintain the UPS, it can supply power to the load by maintenance bypass load switch MBCB by manual control. When UPS is under normal operation, all switches shall be on except maintenance bypass switch and cold start switch of battery.

Remark: For 10-40kVA UPS, battery breakers are inbuilt, 60-120kVA battery breakers are external.

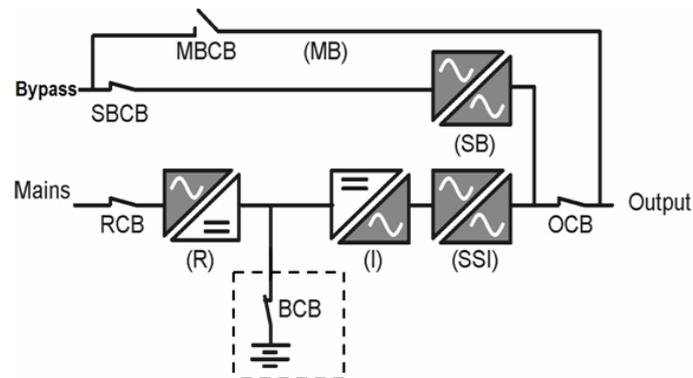


Figure 2-1: Stand-alone System Functional Block Diagram

2.1.1 Separated bypass input

Figure 2-1 describes stand-alone function power supply” (i.e. independent main power input of bypass). In configuration of separated bypass, static bypass and maintenance bypass share an independent bypass power supply and are connected by an independent power switch and specific bypass power supply.

Short circuit is taken for rectifying input terminal and bypass input terminal before assembly of UPS. If separated bypass input is adopted, it shall disconnect the short circuit of rectifying input terminal and bypass input terminal before connection of input cable.

onal block diagram of UPS with “separated bypass

2.1.2 Rectifier

Rectifier of this series of UPS adopts three-phase six-pulse SCR rectification to transfer the three-phase voltage of main power to continuous DC voltage. The design power can ensure full load of inverter and maximum charging current of battery pack.

2.1.3 Inverter

EA890 series UPS use mature IGBT inverter technology, continuous voltage from rectifier or battery, converted into an alternating voltage with constant amplitude and frequency.

Inverter adopts full digital control circuit and 32 bits microprocessor. Distortion factor of output sine wave produced by it is low due to superior processing ability, and it only has little distortion when load has high peak current.

2.1.4 Static change-over switch

“Static switch” shown in Figure 2-1 adopts controlled silicon as change-over device to transfer the load from power supply by inverter and by main power and vice versa. Under normal operation, it can achieve uninterrupted switch between inverter and static bypass power supply only when inverter output and static bypass power supply must be completely synchronous. Synchronization of inverter output and static bypass power supply is achieved by inverter control circuit. When frequency of static bypass power supply is within the allowed synchronizing range, inverter control circuit can let inverter output frequency to trace the frequency of static bypass power supply.

In addition, UPS can control maintenance bypass by manual. If it needs to power off the UPS for daily maintenance and repair, UPS can provide power supply to key loads through maintenance bypass.



Caution: When UPS is under bypass mode, load cannot be protected by UPS if voltage or frequency changes or power is down.

2.1.5 Battery and charger

Battery pack is mounted in external battery cabinet. Charge and discharge control function of battery is integrated on the main control panel completely. In accordance with DIN41773, battery shall be charged after partial or full discharge every time, and float charge of battery shall be continued to compensate self-discharge loss of the battery.

2.2 Operating Mode

This series of UPS is a kind of online double-conversion UPS system, its operating modes are as follows:

- Main power supply mode
- Battery mode
- Bypass mode
- Maintenance mode (manual bypass)
- Economic (ECO) mode
- Parallel redundancy mode

2.2.1 Main power supply mode

Main power supplies AC power supply to rectifier of UPS, rectifier supplies DC power supply to inverter, and then inverter supplies uninterrupted AC power supply for the load. At the same time, rectifier supplies even charge current or float charge voltage to battery.

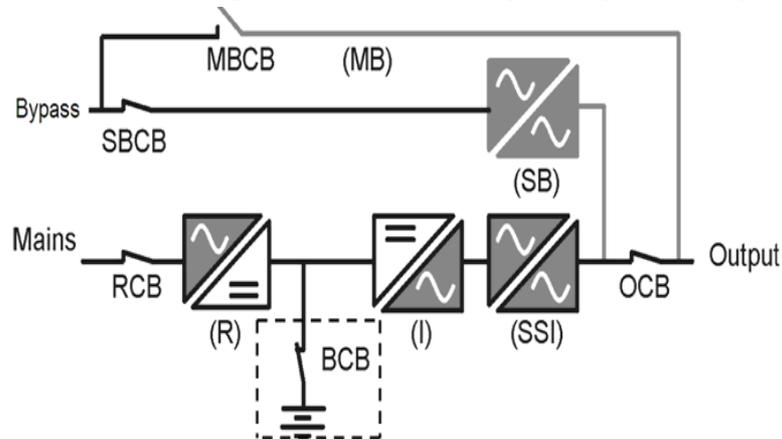


Figure 2-2: Main Power Supply Mode

2.2.2 Battery mode

The working mode that battery supplies standby power supply to load through inverter is called battery mode. When main power fault occurs, the system will switch to battery mode automatically, power supply is ensured by battery until preset standby time, the power supply of load is supplied by inverter through static switch, and the power supply of load is not interrupted. When main power recovers, the system will switch to main power supply mode automatically without any manual operation and power supply for load is not interrupted. If standby time of battery is due but main power still is not recovered, the system will switch to bypass mode automatically and uninterruptedly.

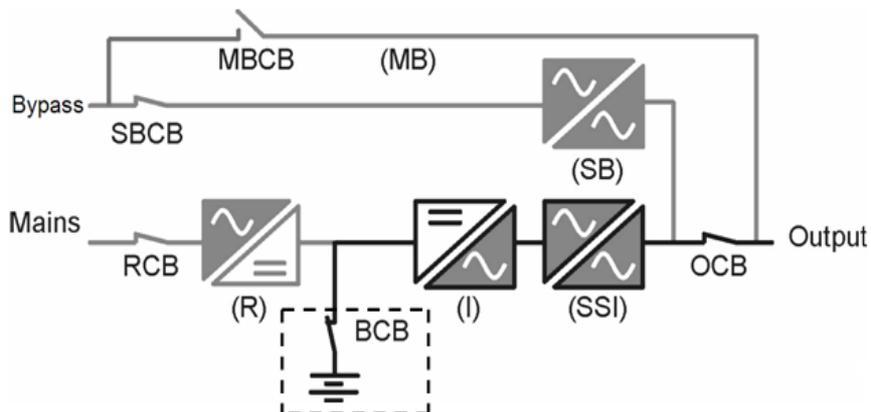


Figure 2-3: Battery Mode

2.2.3 Bypass mode

Under power supply by inverter mode, if fault such as inverter circuit fault and due time of inverter overload, or switching to bypass mode by hand occurs, static switch will switch the load to inverter power supply mode to static bypass power supply and power supply for the load is not interrupted. If inverter and bypass are not synchronous at that time, UPS will switch off the inverter static switch and switch on the bypass static switch and power supply for the load is not interrupted.

⚠ Caution: When UPS is under bypass mode, load cannot be protected by UPS if voltage or frequency changes or power is down.

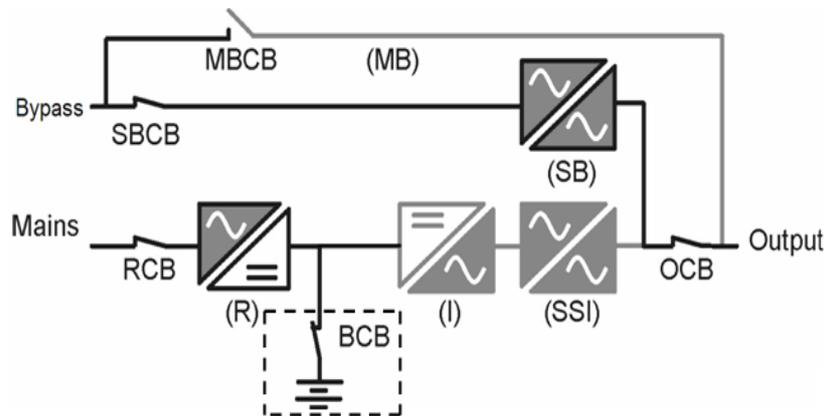


Figure 2-4: Bypass Mode

2.2.4 Maintenance mode (manual bypass)

If daily maintenance or repair is needed for UPS, it can switch the load to maintenance bypass through maintenance bypass switch and the power supply for load is not interrupted. Maintenance bypass switch is located inside the UPS stand-alone machine, whose capacity can meet overall load capacity requirements of the unit.

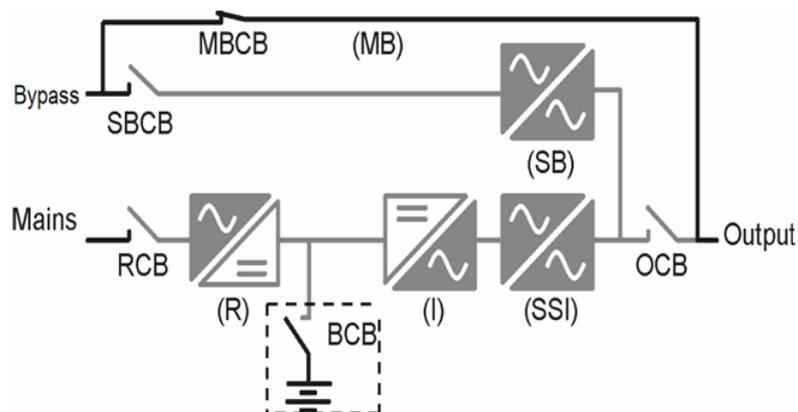


Figure 2-5: Maintenance Bypass Mode

2.2.5 Parallel redundancy mode (system expansion)

To improve capacity and reliability of the system, it can set direct parallel of several stand-alone UPSs to control logic by paralleled machine of every UPS to ensure automatic even distribution of load of all units.

In parallel system, if there is any fault of one machine, there will be no output of faulted machine, and other machines without faults provide power supply for the load. If all machines of parallel system are faulted, the system will switch to bypass mode.

Parallel machine can be paralleled by 6 stand-alone machines at most.

2.2.6 Economic (ECO) mode (only for stand-alone system)

If economic mode is selected and the bypass power supply is normal, power supply of load will be provided by bypass preferentially, and double-conversion UPS is in standby mode to save the energy. When bypass power supply is in ECO working range, power supply of load will be provided by bypass; when it exceeds this range, system will switch to inverter output, but power supply of load will be interrupted with interval of 5ms at least and 10ms at most.

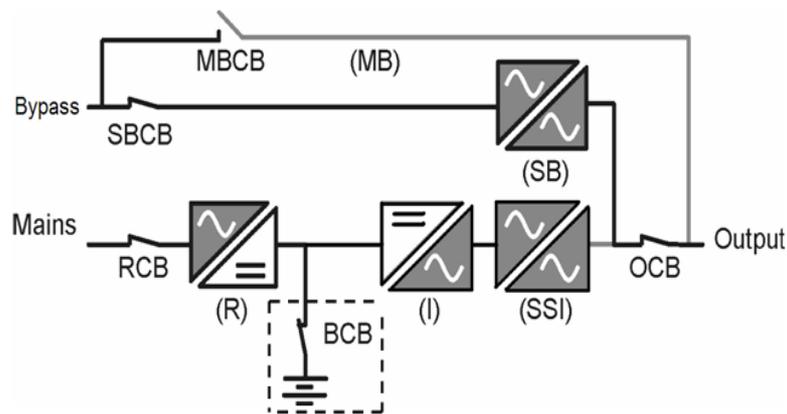


Figure 2-6: ECO Mode

2.3 Features of Product

2.3.1 Performance features

- Three-inlet and three-outlet, support 380/400/415V, 50/60Hz grid system
- Pure online double-conversion type, can provide optimum power supply quality
- Strong mixed load capacity and high over-load capacity
- Direct connection of battery to bus, and good output shock resistance
- Unique ventilation design, compact unit structure, and small volume
- With output transformer, strong ability to take unbalanced load
- Full isolation of input and output, no risk of DC series of load, and high safety
- DSP full digital control, achieving full digital of rectification and inverter converter
- Self-diagnostic function, complete fault protecting function, and 10,000 historical records
- Module design, easy and fast field maintenance
- Overlong mean time between failures (MTBF) (>200,000h)
- Mean time to repair (MTTR) (<0.5h)

- Support LCD touch screen and key, easy operation
- Super-large LCD interface display, and friend man-machine interface
- Equip with battery cold start function
- Option part: bypass insulation transformer, harmonic suppression filter, and SNMP, lightning protection device

2.3.2 Performance parameters of the product

Table2-1: specifications

Rated capacity (KVA)		10	15	20	30	40	60	80	100	120
Mains input	Rated input voltage Vac	Line voltage 380 / 400 / 415 V								
	Input mode	Three phase three lines								
	Voltage range	± 25% (- 10%~ + 25% charging the battery available)								
	Frequency range	(50 / 60) ± 5 Hz								
Bypass input	Rated input voltage	Phase voltage 220V								
	Voltage range	Bypass upper limit 10%, 15%, 20%, 25% (settable), 20% by default Bypass lower limit 10%, 20%, 30%, 40%, 50%, 60% (settable), 20% by default								
	Input mode	Three phases four lines								
	Frequency range	(50 / 60) ± 5Hz								
ECO input	Rated input voltage	Phase voltage 220 / 230 / 240 V								
	Voltage range	ECO upper limit 5%,10%,15% (settable), 10% by default ECO Lower limit 5%,10%,15% (settable), 10% by default								
	Frequency range	(50/60) ± 2 Hz								
Output	Rated output voltage	220V Three phases four lines								
	Power factor	0.9								
	Frequency tracking range	(50/60) ± 3Hz								
	Normal transfer time	Mains ←→battery :0ms, bypass ←→inverter :0ms								
	Inverter overload capacity	Load ≤ 105%, long time work; 105% < load ≤ 110%, transfer to bypass in 60 min 110% < load ≤ 125%, transfer to bypass in 10 min 125% < load ≤ 150%, transfer to bypass in 1 min 150% < load ≤ 200%, transfer to bypass in 200 ms 200% < load, inverter off (UPS shutdown) in 100 ms and transfer to bypass output								

	Bypass overload capacity	Load current \leq 150 % rated current, long time working 150% < load current \leq 200%, UPS shut down in 1 min 200% rated current < load current, UPS shut down in 100 ms									
	ECO output interval	In ECO mode, when there is bypass fault, the output time of interval is max.10 ms									
System	Display	LCD + LED									
	EMI	IEC62040-2									
	EMS	IEC61000-4-2 (ESD) IEC61000-4-3 (RS) IEC6100-4-4 (EFT) IEC6100-4-5 (Surge)									
	Insulation resistance	> 2M Ω (500 VDC)									
	Insulation strength	2820 Vdc, leak current less than 1 mA, 1 min no flashover									
	Surge protection	Meet the standard of IEC60664-1 IV requirement, can bear 1.2 / 50 us + 8 / 20 us wave mixing ability not less than 6KV / 3KA									
	Battery number	12V, 30 pcs by default (28 to 32 pcs adjustable)									
	Connection mode	Bottom cable entry									
	Dimensions: WxDxH (mm)	400×800×1100						600× 700× 1500	700×800×1700		
	Gross weight (kg)	Without battery	200	207	217	252	302	480	620	660	720
	Net weight (kg)		158	165	175	210	260	460	590	630	690
	IP class (IEC 60529)	IP 20									

2.3.3 Full monitor

Monitor of this series of UPS is complete, and it can take operational control to UPS and inquire all parameters, battery status, and event and warning information of UPS through operational display panel.

- 1) Liquid crystal display

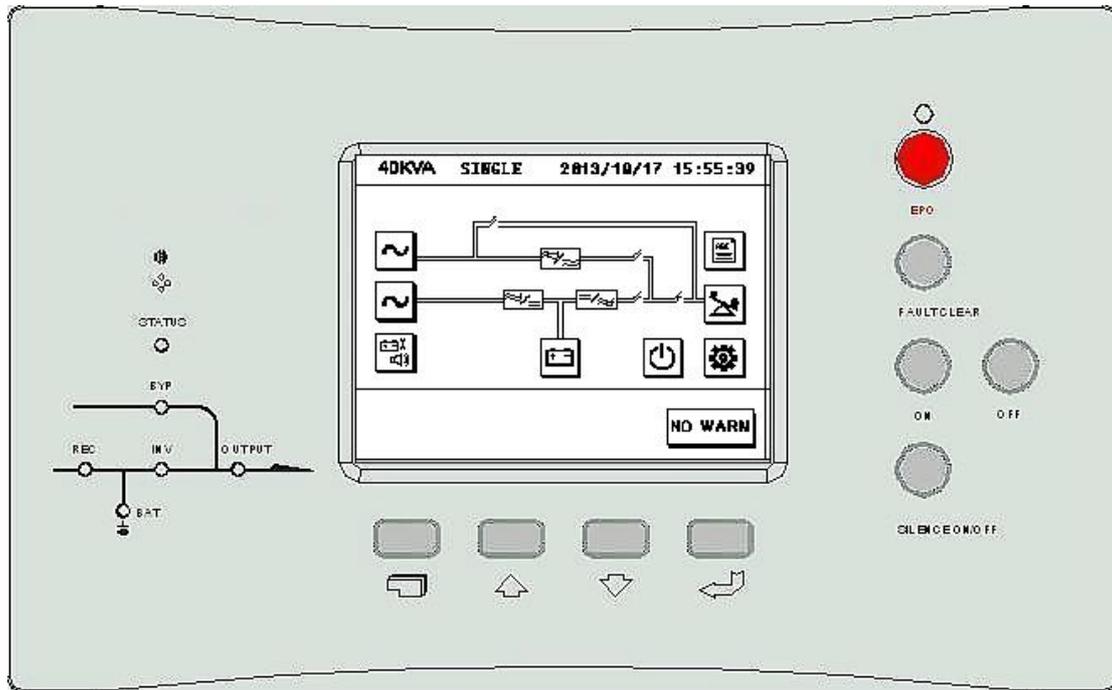


Figure 2-7: Liquid Crystal Panel

- UPS basic information
- UPS name
- UPS model
- Current time and date
- UPS machine number of parallel system
- UPS warning information
- Real-time data

All listed parameters below shall be listed on liquid crystal screen. All displayed electrical capacity shall be updated every 500ms, and error between display value and actual value is lower than 2%.

- Main input
 - Three-phase main input line voltage
 - Three-phase main input current
 - Three-phase main input frequency
- Bypass input
 - Phase voltage of three-phase bypass input
 - Bypass input frequency
- UPS output
 - Three-phase output phase voltage
 - Three-phase output current
 - Three-phase power factor
 - Three-phase output frequency

- Load information
 - Three-phase load percentage
 - Active power of three-phase output
 - Apparent power of three-phase output
- Battery
 - Battery voltage
 - Battery current
- Logs of historical event
 - It shall update logs of historical event if there is any fault
 - It can record 10,000 historical events at most
- Menu language
 - Support 2 languages: Chinese and English
- Settable information
 - Date format
 - Date and time
 - Baud rate

2) LED display

Power flow of the system is displayed by 5 bi-color LEDs.

- Rectifier
- Battery
- Bypass
- Inverter
- Load

It means corresponding circuit is under normal operation when LED is green, it means corresponding circuit is under abnormal operation when LED is red, and it means corresponding circuit is under startup or ready status when LED is flashing. Red LED is used for fault warning.

3) Operating mode

Panel operation provides LCD touch screen and 9 keys, including 4 menu keys (switch “”, up “”, down “”, and enter “”), power-on “ON”, power-off “OFF”, emergency power off “EPO”, fault muffle “SILENCE ON/OFF”, and fault clear “FAULT CLEAR”.

- 4 menu keys and LCD touch screen can be used to select the menu displayed by liquid crystal display screen.
- ON/OFF is used to turn on / off the UPS system.
- Emergency Power Off key (EPO) is used to quickly switch to bypass or cut off the output in case of emergency. After pressing EPO button, the UPS needs power off completely so that the system can exit emergency power off condition.
- FAULT CLEAR is used to clear fault lock condition.
- SILENCE` ON/OFF is used to turn off the warning of buzzer.

2.3.4 Perfect fault protection and warning

1) Warning information

UPS also can give warning information to remind user when any case of followings occurs besides giving warning information for fault

Table 2-2: Warning Tip

Overload of output	Effectiveness of maintenance bypass	On of EPO
Open circuit of bypass	Disconnection of battery	Disconnection of fan

2) Fault protection

UPS can give audible and visual alarm if there is any fault, and it can inquire the type and time of fault in menu of historical history.

Table 2-3: Fault Protection

Fault Protection Item	Operating Method of UPS
O / P-A Volt Low	Switch off rectifier, inverter, inverter static switch, and output to bypass; after clearing the fault, UPS can exit fault mode and recover normal working condition by pressing "FAULT CLEAR" on panel and power supply of load is not interrupted.
O / P-A Volt High	
O / P-B Volt Low	
O / P-B Volt High	
O / P-C Volt Low	
O / P-C Volt High	
O / P-A Current Fault	
O / P-B Current Fault	
O / P-C Current Fault	
O / P Freq Low	
O / P Freq High	
DC Volt High	
DC Volt Low	
Bus Short Circuit	
Heatsink Overtemp	
REC Fault	
I / P Soft Start Fail	
REC IGBT Over Current	
INV IGBT Over Current	
Inv Soft Start Fail	
INV Thyristor Fault	
INV Fault	
Fuse Fault	
ECO To Inv Fail	
Parallel Line Fault	
Parallel Curr Fault	
BATT Over Temp	
CHG Fault	
BYP Thyristor Fault	Power off (ECO mode, output to inverter)
Byp Over Load Time En	Power off
O / P Short Circuit	Power off
Line Fault	Do not switch on rectifier
Byp Fault	No switch

2.3.5 Modular design, full front maintenance

It considers operability of field maintenance for structure design, adopts advanced front maintenance design concept, and achieves modular design by different functions of UPS so that it is easy and simple for mounting and maintenance.

1) 10 ~ 40KVA model diagram



Figure 2-8: 10 ~ 40KVA model diagram

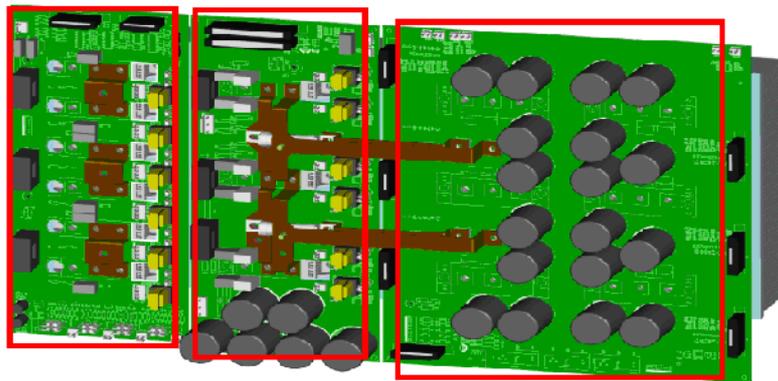


Figure 2-9: 10 ~ 40KVA rectifier, inverter and static bypass module

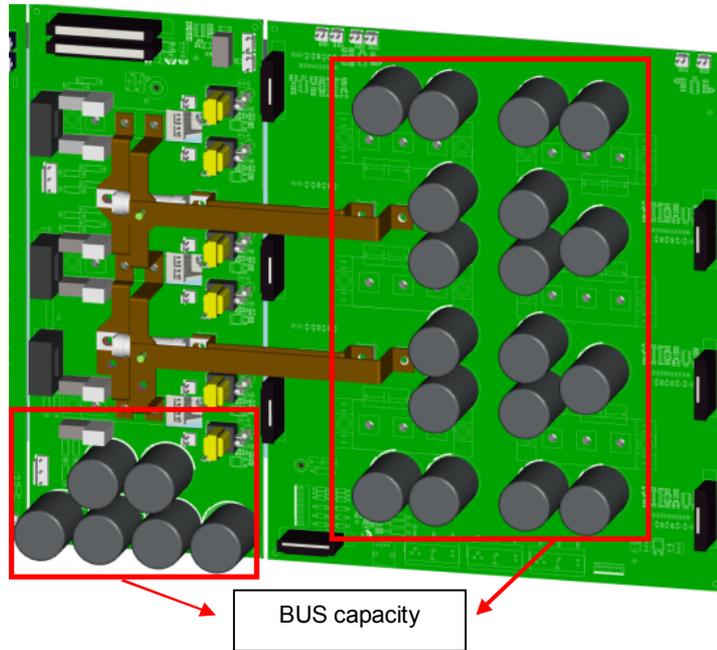


Figure 2-10: 10 ~ 40KVA BUS capacitance

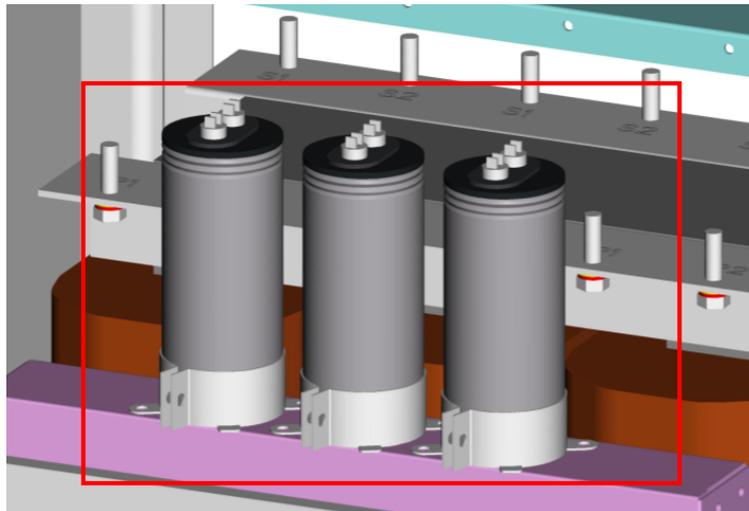


Figure 2-11: 10 ~ 40KVA AC output module

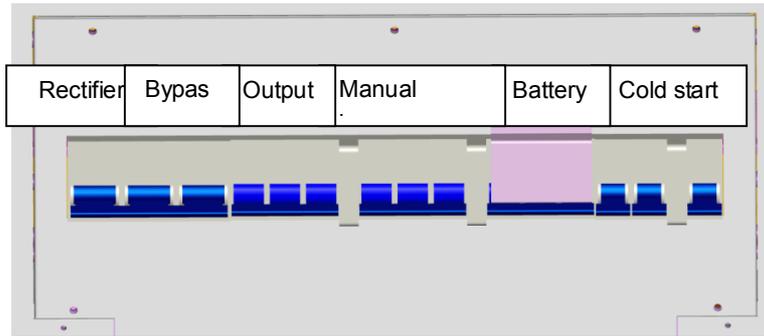


Figure 2-12: 10 ~ 40KVA breakers

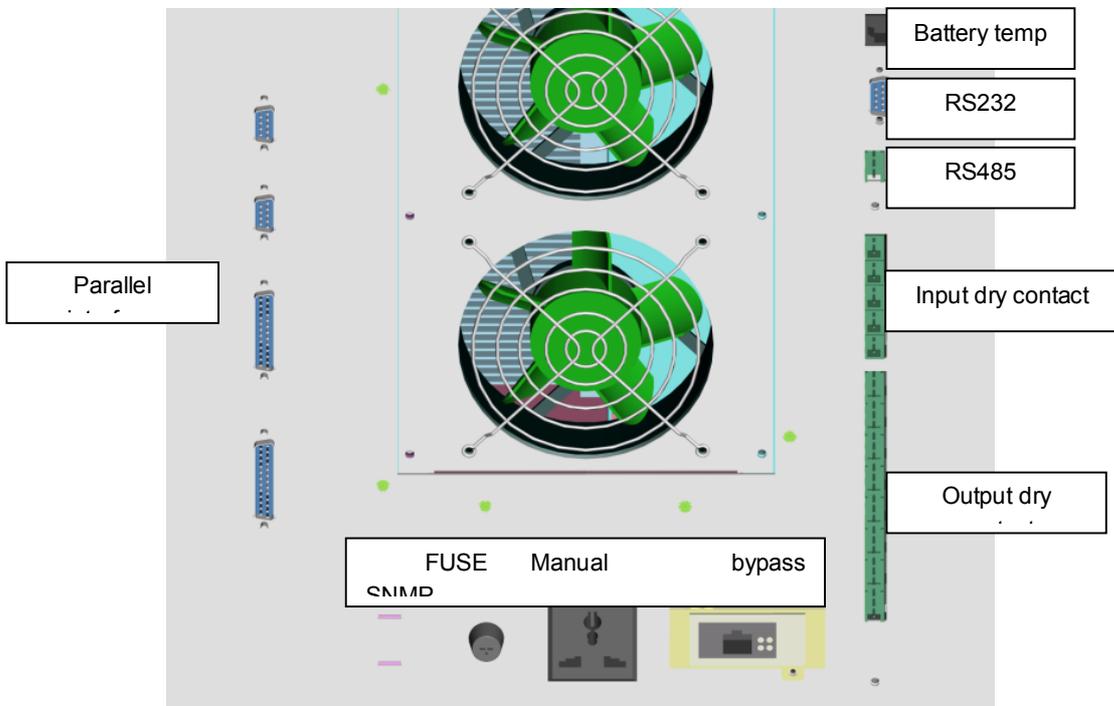


Figure 2-13: 10 ~ 40KVA communication interface diagram

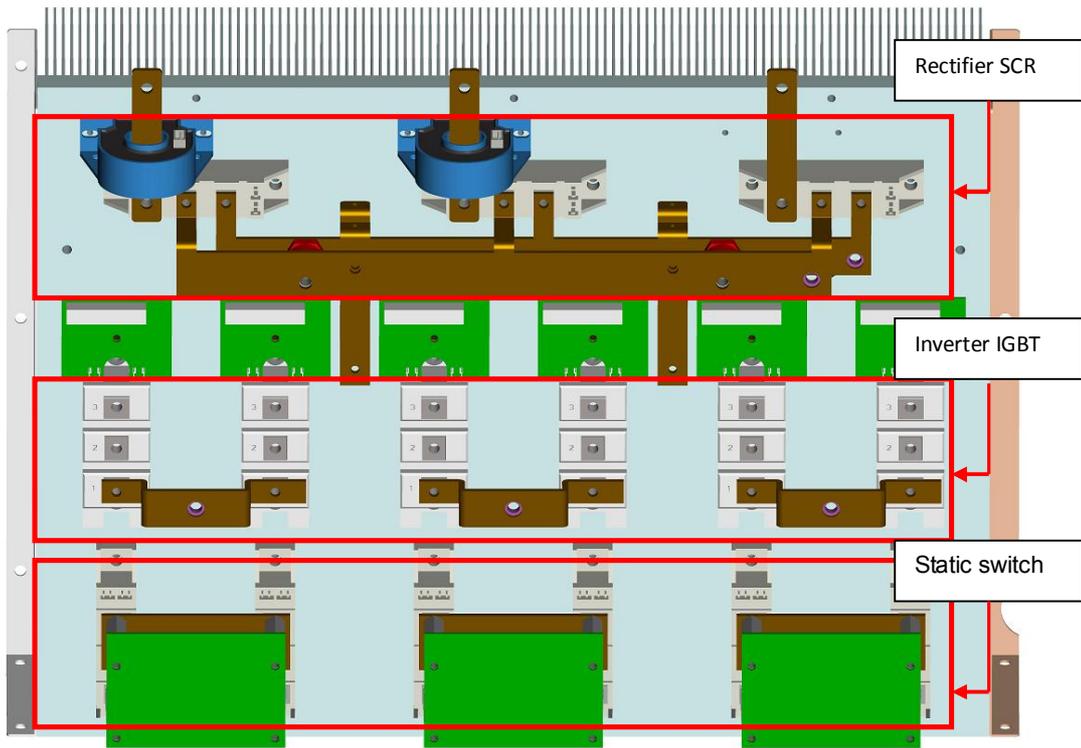


Figure 2-15: 60KVA UPS rectifier, Inverter, and STS Module

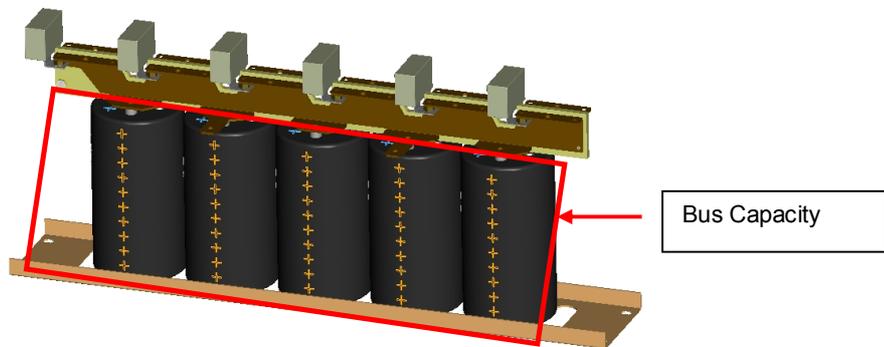


Figure 2-16: 60KVA UPS rectifier Bus Capacity Module

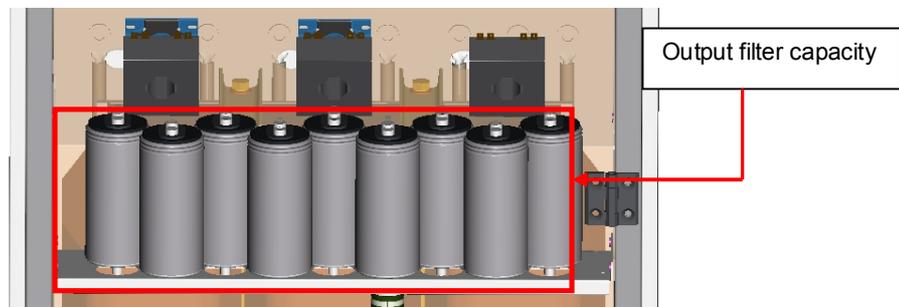


Figure 2-17: 60KVA UPS AC Output Capacity Module

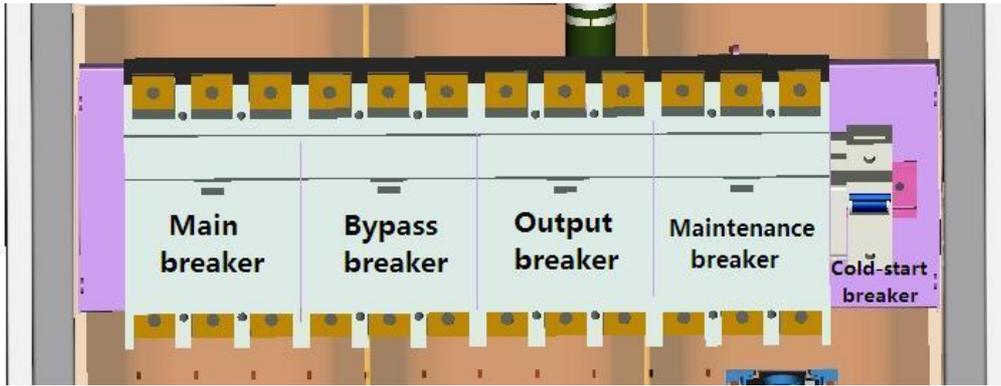


Figure 2-18: 60KVA UPS diagram of load switch

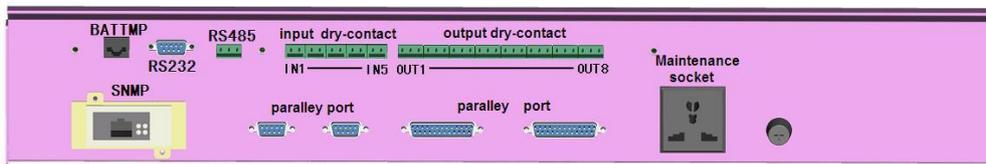


Figure 2-19: 60KVA UPS diagram of Communication Interface

2) Diagram of 80 ~ 120KVA module



Figure 2-20: 80 ~ 120KVA UPS Physical Model of Internal Door

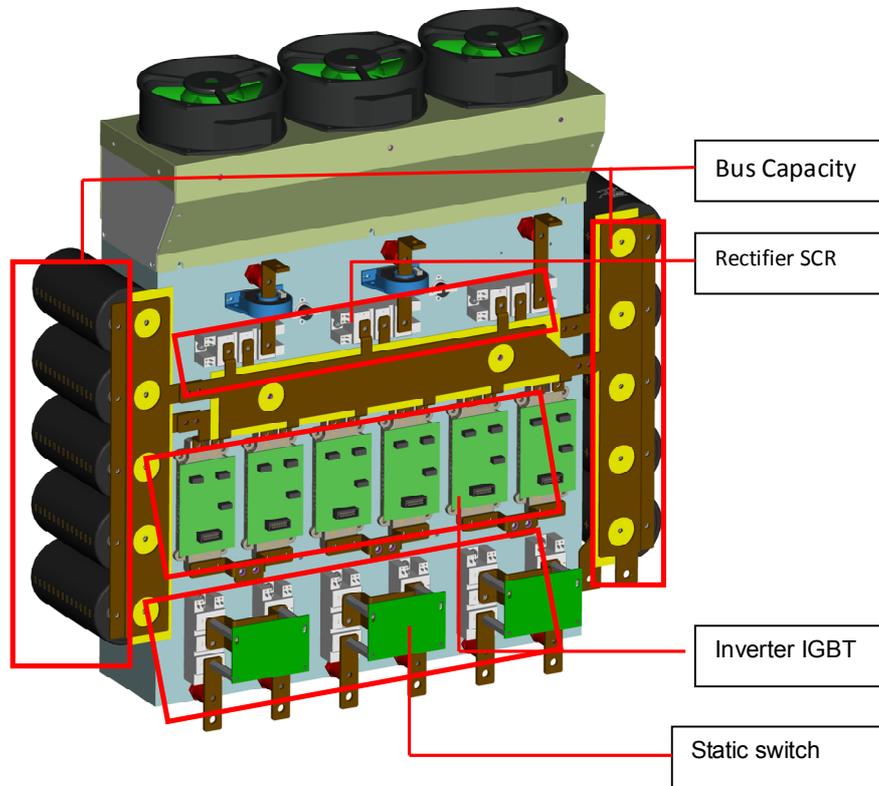


Figure 2-21: 80 ~ 120KVA UPS Rectifier, Inverter, STS and Bus Capacity Module

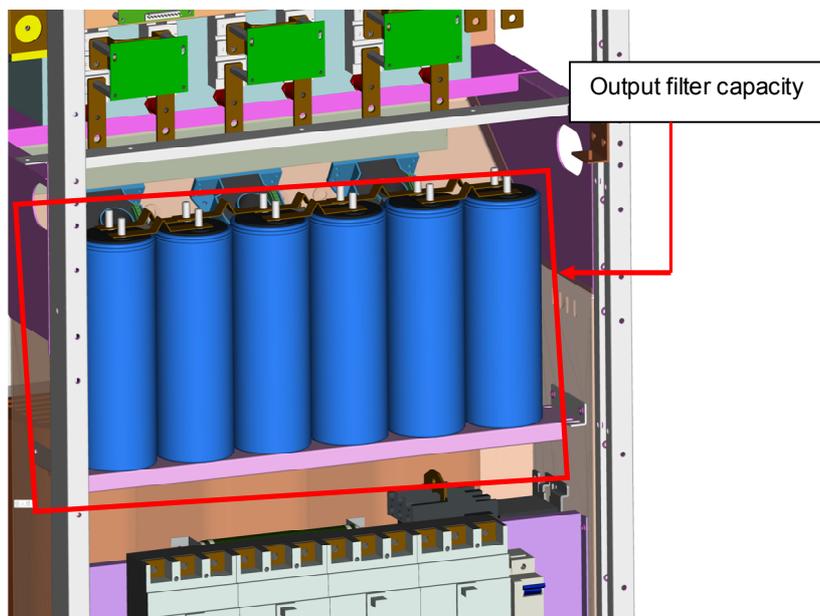


Figure 2-22: 80 ~ 120KVA UPS Output filter capacity Module

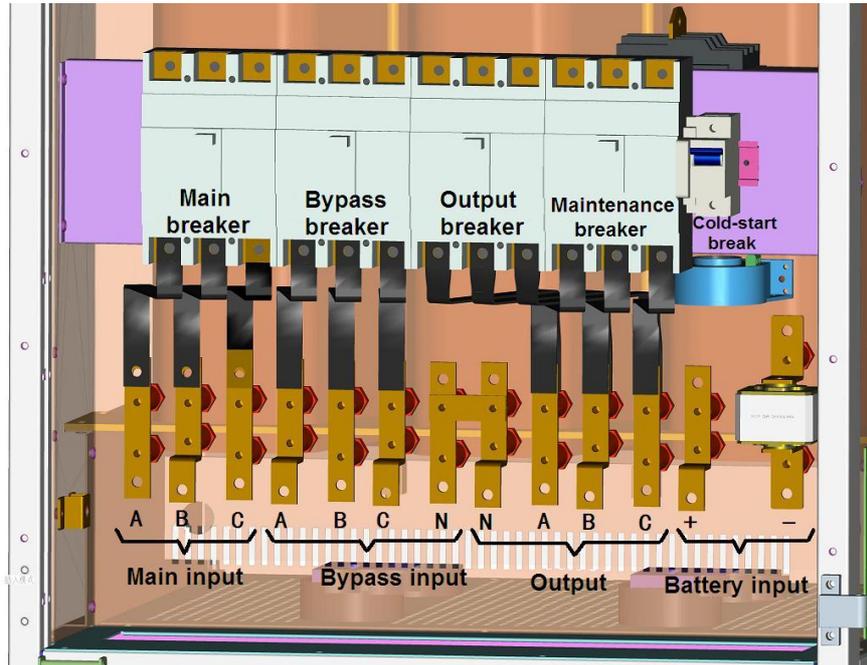


Figure 2-23: 80~120KVA UPS diagram of load switch and Wiring Terminals

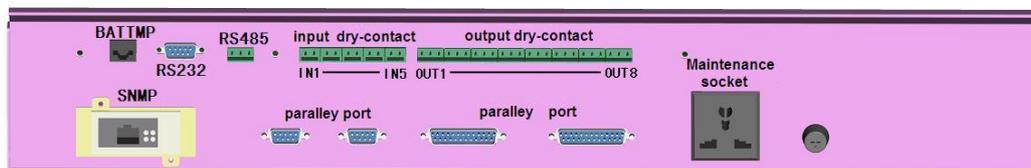


Figure 2-24: 80~120KVA UPS diagram of Communication Interface

2.3.6 Option part

- Bypass isolation transformer
Completely isolate input and output, reduce harmonic wave and interference signal, and can be isolated when carrying non-linear load to avoid pollution of grid.
- Harmonic suppression filter
Restrict harmonic pollution of grid and reduce influence to other system of the grid.
- SNMP card
It can achieve remote UPS management by internet.
- Lightning protection device
It is used to control overvoltage caused by lightning surge in power distribution

3 Mounting of UPS System

This chapter introduces site selection of UPS and requirements of wiring.

Every site has its unique features, so this chapter doesn't introduce detailed mounting steps, but only is to provide instructional general mounting steps and methods for qualified installer so that he/she can treat it on basis of actual site condition.



Caution:

- When taking electric connection, ground the UPS firstly and ensure to disconnect all switches until finishing mounting of UPS.
- Mounting of UPS shall be taken by qualified engineer in accordance with instructions in this chapter and combining local standard. Other equipments not mentioned in this manual are supplemented with detailed mechanical and electrical mounting information when delivery.
- Mounting of battery shall be careful specially. When connecting battery, voltage in battery terminal will exceed 360VDC, which can cause death. Please wear eye shield to avoid eye injury due to accidental electric arc, remove all metal accessories such as ring and watch, use tools with insulated handle, and wear rubber gloves. If electrolyte of battery leaks or battery is damaged, it must be replaced, put into container resisting corrosion of sulfuric acid, and disposed in accordance with local provisions. If skin touches the electrolyte, flush with clean water immediately.

3.1 Initial Inspection

Take following inspections before mounting the UPS:

- Take visual inspection internal and external surface of UPS and battery to check whether there is any damage due to transportation. If yes, please report to carrier immediately.
- Check technical data table of the product to ensure correctness of equipment. Technical data table of UPS is located in the label in inner side of front door to show model, capacity, and main parameters of the UPS.

3.2 Site Selection

3.2.1 UPS room

It shall pay attention to following requirements when selecting UPS room:

- UPS must be mounted in the clean and dry room with level ground (related humidity: 5%~90%) without dust and being far away from pollutants and combustibles.
- Have proper room temperature: UPS can run in indoor environment with temperature of 0~40℃, but temperature when starting it shall be higher than 0℃, and the ideal operating temperature is 25℃. User shall ensure full ventilation of the room so that the equipment can radiate completely; if necessary, it shall install indoor exhaust fan or precision air-condition to avoid rising of room temperature. This equipment is not applicable in outdoors.
- Altitude: lower than 1,000m, and please de-rate for use if it is higher than this altitude.
- Proper space and bearing capacity are as follows.

Table 3-1: 10 ~ 120KVAUPS dims and weight

Rated power (KVA)	10	15	20	30	40	60	80	100	120
W – mm	400					600	700		
D – mm	800					700	800		
H – mm	1100					1500	1700		
Net weight/KG (without battery)	158	165	175	210	260	460	590	630	690

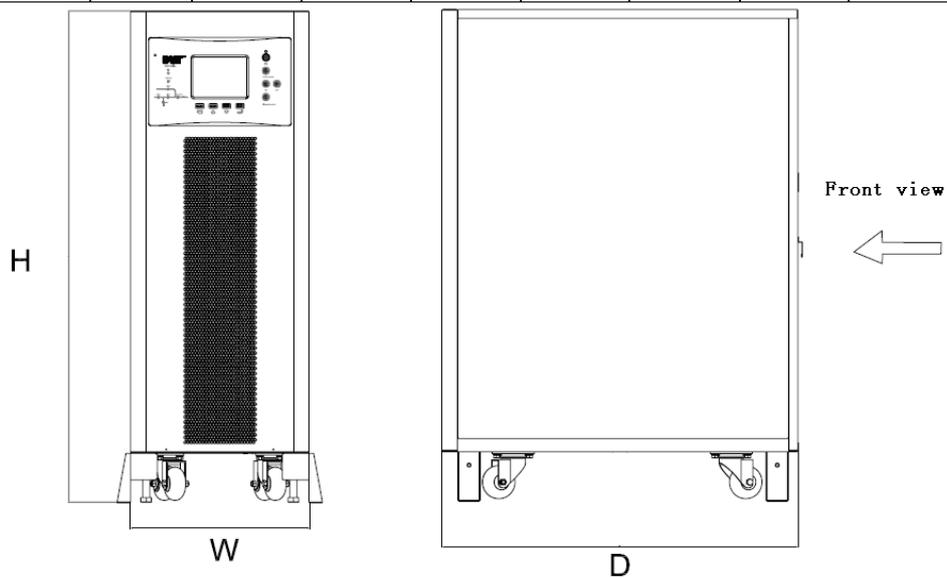


Figure 3-1 : 10 ~ 40KVA outlook

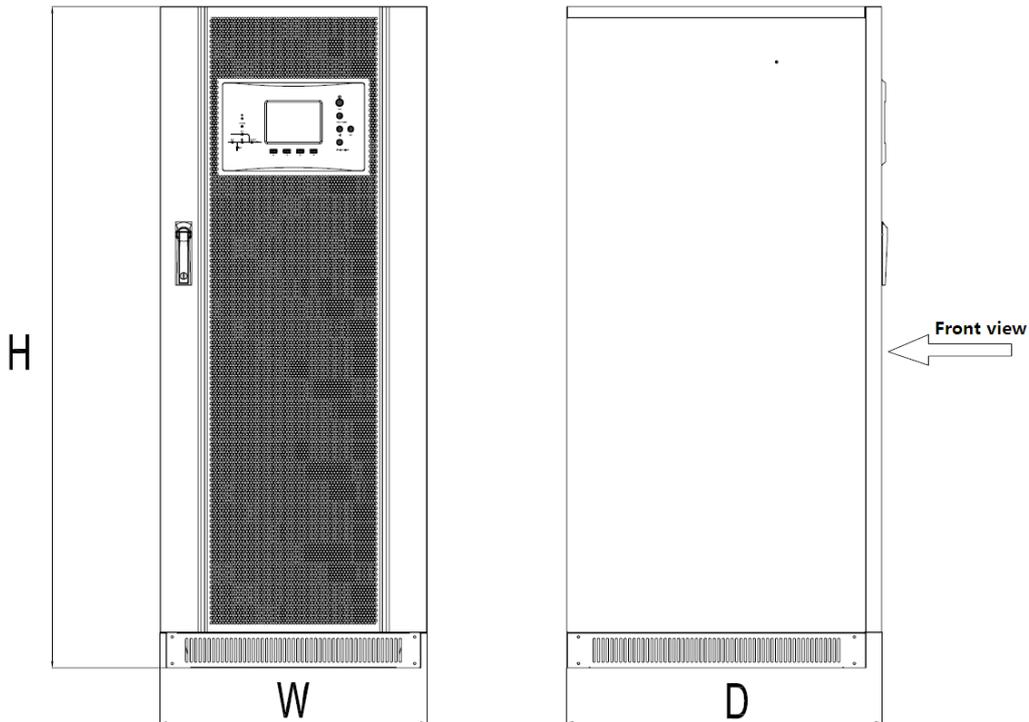


Figure 3-2: Appearance of Machine with 60 ~ 120KVA

3.2.2 External battery room

Ambient temperature for battery shall be constant, ambient temperature is the main factor to affect capacity and service life of battery. Standard temperature of battery is $20^{\circ}\text{C} \sim 25^{\circ}\text{C}$, it will shorten service life of battery if it runs in space with higher ambient temperature, and it will reduce capacity of the battery if it runs in space with lower ambient temperature. In general condition, allowed ambient temperature of battery is $15^{\circ}\text{C} \sim 25^{\circ}\text{C}$. To avoid forming of explosive mixed gas of hydrogen and oxygen, battery shall be far away from heat source and have reasonable ventilation (EN50091-1 annex N). It shall mount the battery switch in the place, which is near the battery, and it shall ensure the shortest distance from battery to UPS.

3.2.3 Storage

If it is not for immediate installation, please put UPS vertically complying with instructions in the package, store in dry and sheltered room together with its package to avoid dust and high temperature.

If the machine room or place storing the equipment needs to be decorated or UPS will not be used for a long time, it must cover the UPS by package to prevent dust or other matters accessing into the UPS to influence reliability of it.

3.3 Position Determination

Components layout in the UPS ensures that the maintenance and inspection can be done through front door and the side. Make sure enough space is kept at the back of UPS so that UPS can get good ventilation and raise cooling efficiency, details please refer to Figure 3-3, Figure 3-4, Figure 3-5. Open the door of the UPS, you will see the power supply terminal, auxiliary terminal and power supply operation breaker.

Position selection of UPS shall ensure:

- Easy wiring;
- Enough operational space;
- Good ventilation to meet radiation requirements;
- No corrosive gas around it;
- Be far away from combustible;
- No excessive moistening and high temperature source;
- Be not dirty environment;
- Meet fire control requirements;
- Optimum working ambient temperature is $+ 20^{\circ}\text{C} \sim + 25^{\circ}\text{C}$, which is the temperature range of maximum efficiency of battery.

3.3.1 Operating space

EA890 series 10~60KVA UPS Wind gate at the front door and the rear plate side, when placed 1000 mm spacing should be retained from behind to the wall ;the UPS of 80~120KVA has air grids in front door and upper , so it should be kept 1,000mm distance from ceiling to ensure good ventilation for UPS. For convenient daily maintenance, it shall have enough space in front of UPS besides complying with local provisions to ensure free access of personal when its door is open. It must be kept 50mm distance at least between two UPS, to ensure it is not blocked to open the each door.

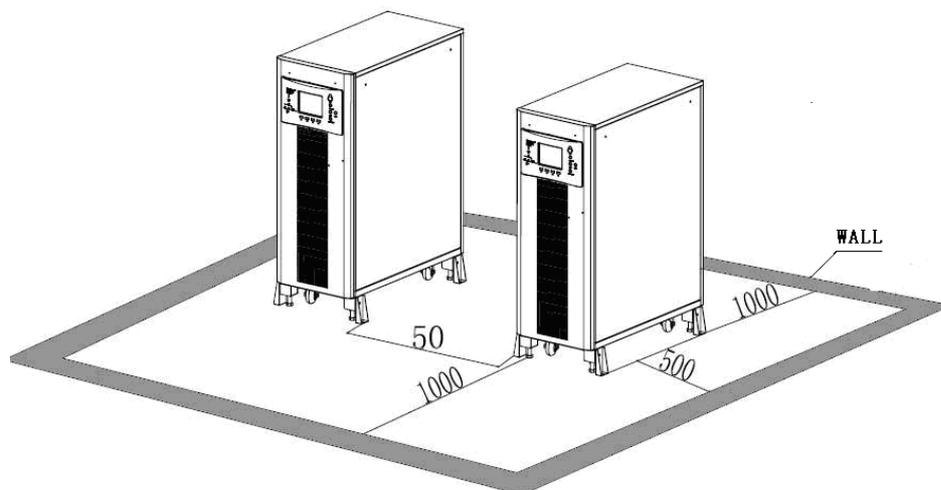


Figure 3-3: 10 ~ 40 KVA installation diagram (Unit: mm)

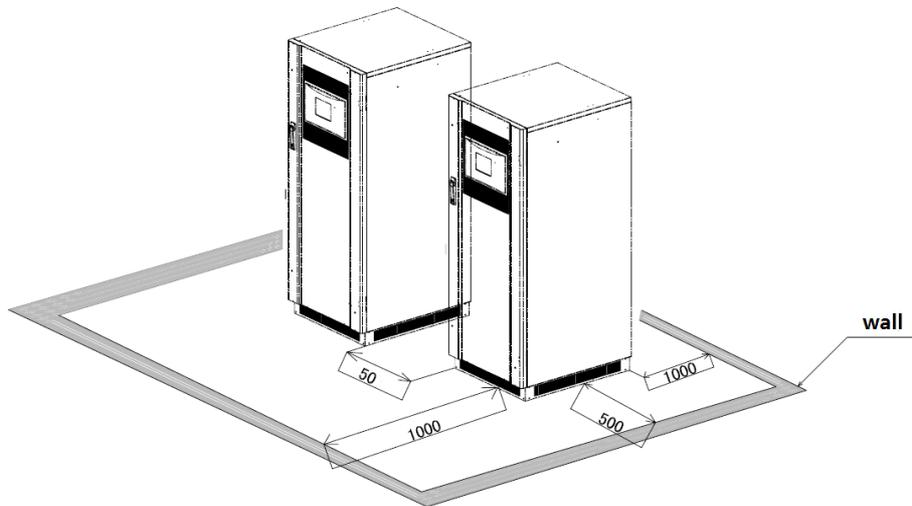


Figure 3-4: 60KVA UPS diagram of Installation Space (Unit: mm)

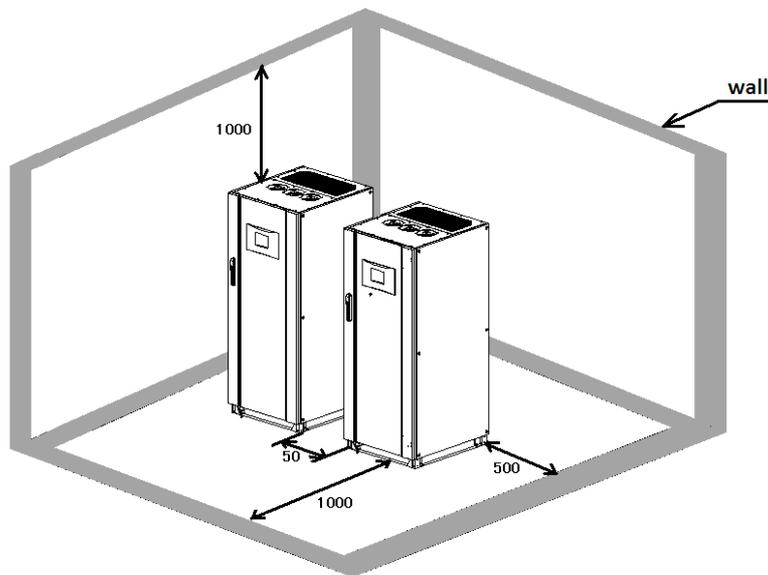


Figure 3-5: 80 ~ 120 KVA UPS Diagram of Installation Space (Unit: mm)

3.3.2 Carry of machine cabinet

Lifting device used to carry the UPS cabinet must have enough lifting capacity (Overall weight of UPS can see Table 3-1). Before putting it in final location, it can lift or carry UPS by pallet truck or forklift; it only can use forklift after removing fastening panels in two sides. UPS 10 ~ 40KVA can be carried out by the casters after removing pallets, the bracket legs should be propped fixed when chassis installation location determined.

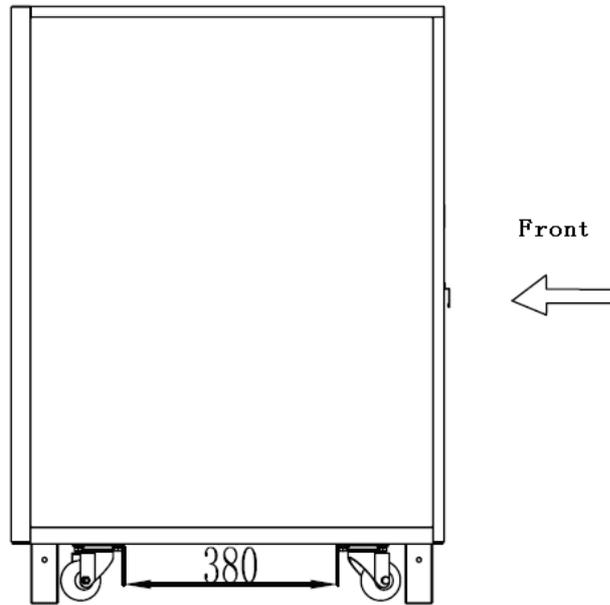


Figure 3-6 : 10 ~ 40 KVA transport (Unit: mm)

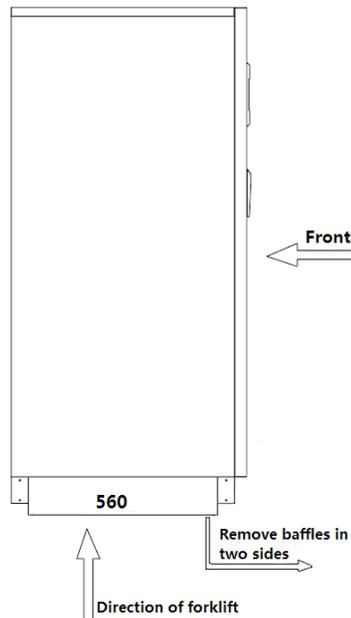


Figure 3-7: Carry of 60~120KVA (Unit: mm)

3.3.3 Wiring mode

EA890 series UPS and battery cabinets are used under way line incoming. When wiring, open the front door of UPS, remove the bezel below (For 10 ~ 40KVA models in the back-end), you can see the terminal block to connect the power cable.

3.4 External Protective Devices

It must mount breaker or other protective devices in input location of external power supply of UPS system. This chapter only provides general guidance for installing engineer, who shall know local wiring locations of mounted equipment.

Before connecting the rectifier and bypass input with main power, it must add proper over-current protective device between the main power and UPS. According to EN50091-1 and in consideration of leakage current of UPS, it can use leakage current protector with adjustable threshold. External battery shall be equipped with DC breaker for over-current protection of UPS and battery.

 **Caution:** If leakage current protector is used to provide power supply of UPS, it may cause spurious triggering of protecting device due to high leakage current of RFI filtering.

3.5 Power Cable

When designing external connecting cable, it shall consider current capacity of power cable and over-load capacity of the system as well as ambient temperature and physical supporting medium. Installing engineer shall determine it by referring related local laws and regulations and actual condition of user. Length of connecting cable is 2~50m in general, excessive length can cause low voltage, and corresponding cross section of cable shall be increased.

Table 3-2: UPS Terminals

Terminal	Rectifier input	Bypass input	output	Battery (28, 29, 30pcs can be adjusted, the default is 30pcs)	Ground line
Wiring Mode	Three-phase three-line	Three-phase four-line	Three-phase four-line	Positive and negative	

Table 3-3: UPS rated current

Rated capacity (KVA)	Rated current (A)						
	Full load、input current when battery under float charging			Full load (PF = 0.9)output current			Discharging current when battery in low voltage(300V)
	R	S	T	U	V	W	
10	17	17	17	15	15	15	33
15	25	25	25	23	23	23	50
20	33	33	33	30	30	30	67
30	50	50	50	45	45	45	100
40	67	67	67	61	61	61	130

60	100	100	100	91	91	91	195
80	135	135	135	122	122	122	260
100	167	167	167	152	152	152	326
120	200	200	200	182	182	182	391



Caution:

- Connection of external connecting cable can refer national and local electric regulations.
- Connecting cable between battery and UPS shall not have 1% voltage pressure of nominal DC voltage under rated current of battery.

3.6 Wiring Terminal

It can see terminal strips of connecting power cable by open front door of UPS and removing lower protective cover of the machine. (For 10 ~ 40KVA models in the back-end)

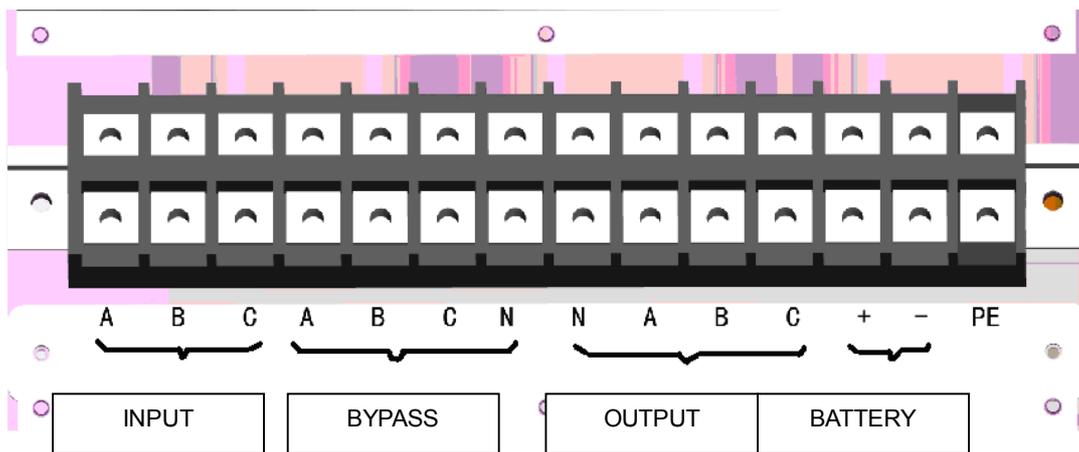


Figure 3-8: 10~40KVA UPS terminal

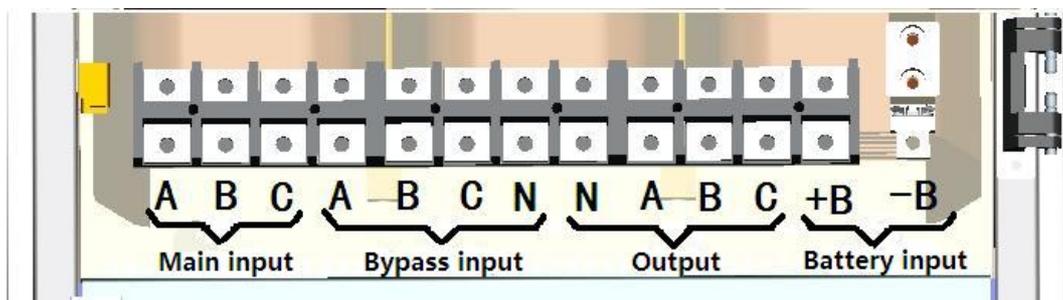


Figure 3-9: Wiring Terminals of 60KVA UPS

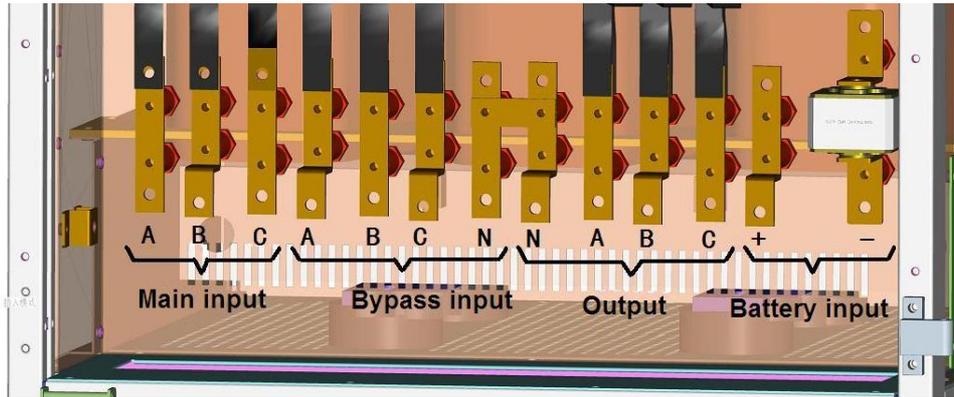


Figure 3-10: Wiring Terminals of 80 ~120KVA UPS

3.7 Wiring

3.7.1 Wiring of stand-alone system

Connect power line by following steps after full positioning of the equipment:

- Ensure full disconnection of all input distribution switches and internal power supply switches of UPS. Mark warning signs for these switches to prevent mal-operation of them by others.
- It can see terminal strips of connecting power cable by opening front door of UPS and removing lower protective cover.
- Connect protect ground and other necessary grounding cable to grounding bolts in bottom of power supply device for UPS. All UPS cabinets shall be connected with users' grounding devices.
- Select one of following two steps on basis of mounting mode (isolated bypass or public input) to mark and connect the input cable

Connection of isolated bypass

- If bypass and rectifier adopt two main power inputs, it shall disconnect the short connection of rectifier input terminal and bypass input terminal of terminal strip, connect the rectifier input cable to rectifier input terminal (Main input: A/B/C), and then connect the bypass input cable to bypass input terminal (Bypass input: A/B/C/N). Pay attention to correct phase sequence.

Connection of public input

- If bypass and rectifier adopt the same main power input, it shall connect the AC input cable to bypass input terminal of UPS (Bypass input: A/B/C/N), confirm short connection of rectifier input terminal and bypass input terminal, and ensure correct phase sequence.

Note: It has taken short connection of rectifier input terminal and bypass input terminal when assembling the UPS.

Output connection of the system

- Connect output cable to output terminal of UPS (output: A/B/C/N) and key load. If the load is not ready for electrification when debugging engineer comes to the site, please keep safety insulation part in end of output cable of the system well.

Connection of external battery

Connection of battery can see chapter 4.5 in EN50091-1.

Battery cabinet must connect the protective ground independently.

- Connect the battery cable to battery terminal (Battery input +/-) of UPS and battery switch. When connecting battery terminal and battery switch, it shall connect from switch end and pay attention to cable pole of the battery.

-

3.7.2 Wiring of parallel system

Signal line connection of parallel system

There are 4 parallel interfaces for every machine (two are DB25, and the other two are DB9). Parallel line connection of DB25 for parallel system shall form a closed loop, so does DB9. Two parallel lines of the same loop shall be as near as possible when wiring, which can reduce interference to parallel line. The wiring diagram is shown in Figure 3-11.

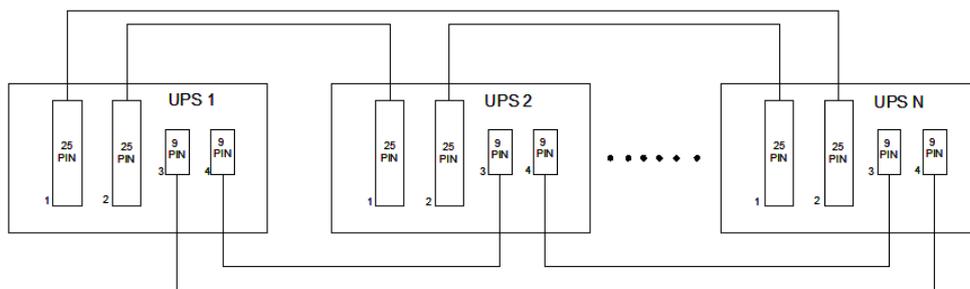


Figure 3-11: Diagram of Parallel Signal cable Connection

Connection of parallel power cable

For input and output wiring of parallel system, it shall connect the input terminal of every machine together, so does the output terminal, after full positioning of the machine. Wiring diagram is shown in Figure 3-12.

If it adopts isolated bypass connection, connect rectifier input terminal of every machine together, so does the bypass input terminal, and ensure correct phase sequence.

Working mode of battery cable is the same with that of stand-alone machine, every UPS has independent battery pack, and UPS cannot share the battery pack.

⚠ Caution: To realize even current of parallel UPS, length of power cable from input terminal to AC distribution connecting terminal of every UPS shall be the same, so is length of power cable from output terminal to load connecting terminal, to ensure same resistance of input and output of every UPS.

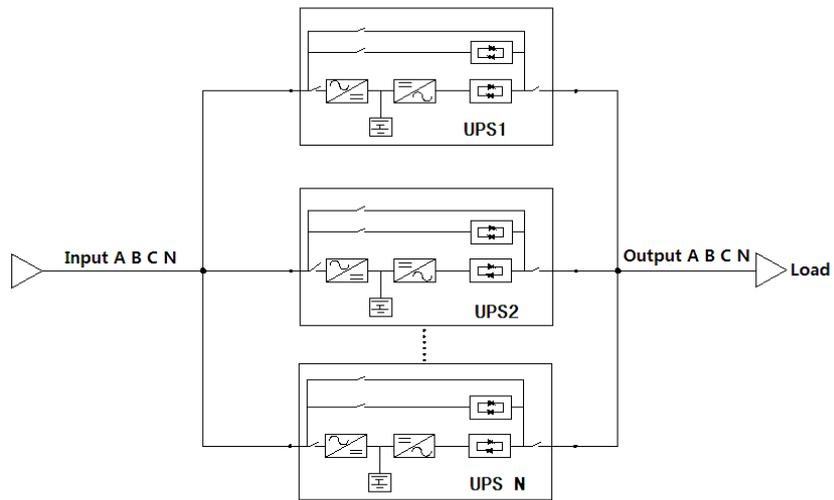


Figure 3-12: Diagram of Power Cable Connection of Parallel System

3.8 Control Cable and Communication

On basis of detail requirements of the site, it may require auxiliary connection for UPS to achieve management of battery system (battery temperature sensor), communication with personal computer, sending warning signal to external device, or realizing remote emergency power off. It can see lower communication interfaces and dry contact ports by opening front door of UPS, as shown in Figure 3-12 and Figure 3-13

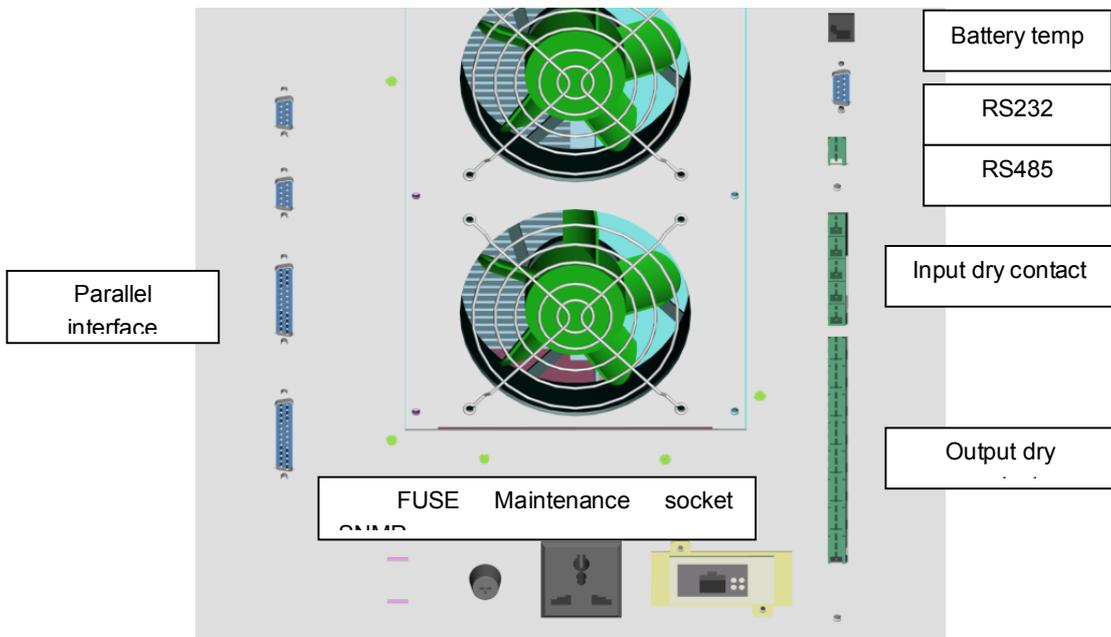


Figure 3-12 10~40KVA communication interface

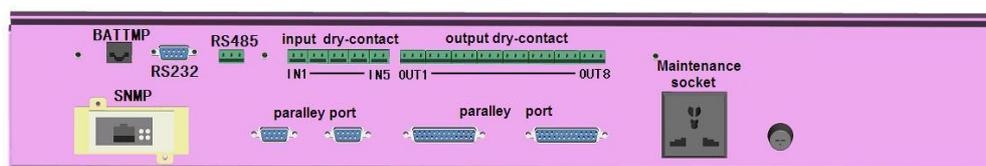


Figure 3-13 60~120KVA Communication Interface

Communication Interface:

- Temperature detection interface of battery (BATTMP)
- User communication interface RS232 and RS485 (user background monitor)
- SNMP port (realizing remote management of UPS by network)
- Parallel interface (communication interface of parallel system)
- Input and output dry contact



It shall note following points for wiring of auxiliary cable:

- If conduit is adopted for wiring, communication line and power line shall use separate conduits.
- Wiring of remote EPO switch must comply with local regulations.
- Auxiliary cable must be double-layer insulated twisted cable, whose cross section area shall be $0.5 \sim 1.5 \text{mm}^2$ when the wiring distance is $25 \sim 50 \text{m}$.

3.8.1 External battery temperature detection interface

The first interface in left shown in Figure 3-13 and Figure 3-14 (BATTMP) is the temperature sensor interface of battery and temperature sensor of battery shall connect external battery cabinet.

Arrangement of battery temperature sensor

Interface is shown in Figure 3-15.

pin 1: +5V (power supply of temperature sensor)

Pin 2: BAT-T (battery temperature single)

Pin 3~8 is empty, they are unused.

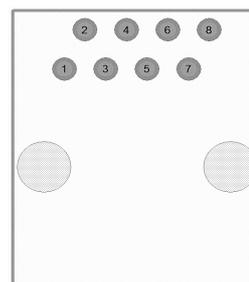


Figure 3-15: Pin Arrangement of Temperature Sensor Interface of Battery

3.8.2 Serial port communication

RS232 provides serial data and is used as port of background monitoring software directly. If client requires, it only can use data line supplemented with the machine to connect the communication interface module directly.

RS485 provides serial data and is used as port of background monitoring software. If client requires, it only needs a serial data line to connect the communication interface module directly.

Pin Arrangement of RS485 interface in figure 3-16

Pin 1 is 485+

Pin 2 is 485-

Pin 3 is power supply ground

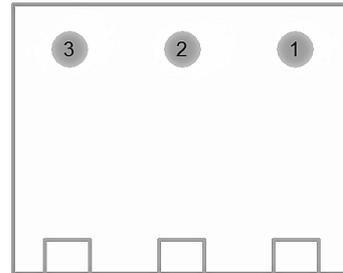


Figure 3-16: Pin Arrangement of RS485 interface

3.8.3 SNMP interface

This series of UPS provides SNMP card communication interface used for field installation of communication option part SNMP card to realize remote management of UPS by network. The interface is in the communication interface module. (the SNMP card interface is shown in Figure 3-13 and Figure 3-14)

3.8.4 Definition of dry contact port Pin arrangement of dry contact IN 1—5 interface is shown in Figure 3-17.

Pin 1 is power supply +12V

Pin 2 is power supply ground

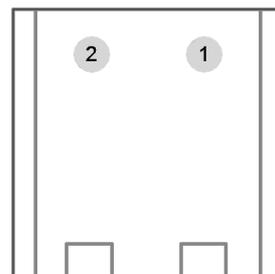


Figure 3-17 Pin Arrangement of Dry Contact IN 1—5 Interface

Pin arrangement of dry contact OUT 1—8

Interface is shown in Figure 3-18.

Pin 1 is normally open contact

Pin 2 is public terminal

Pin 3 is normally closed contact

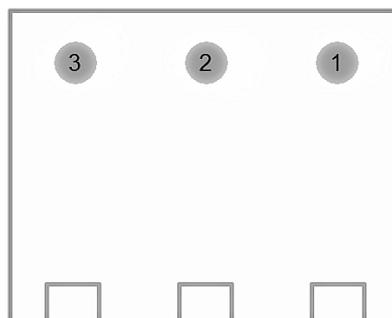


Figure 3-18: Pin Arrangement of Dry Contact OUT 1—8 Interface

Table 3-4: Definitions of Dry Contact Ports

Port Name	Signal Definition	Close Condition
IN-1	—	—
IN-2	Power on	—
IN-3	Power off	—
IN-4	Bypass/Inverter output	—
IN-5	EPO	—
OUT-1	Fan fault	Fan fault
OUT-2	Fault warning	Fault warning
OUT-3	Power on	Power on
OUT-4	Low voltage of battery	Low voltage of battery
OUT-5	Over-load of output	Over-load of output
OUT-6	Main power supply mode	Main power supply mode
OUT-7	Battery mode	Battery mode
OUT-8	Bypass mode	Bypass mode

3.8.5 Application of dry contact port

- Input dry contact ports include power on, power off, bypass/inverter output, and emergency power off (EPO). When using power on, power off, bypass/inverter output, and emergency power off (EPO), it only needs to take short connection of two terminals of input dry contact. When using above functions, it must use shield cable for connection to prevent mal-operation caused by interference so that the load is in power down or any other influence is caused. If it doesn't need to use this function, it shall take short connection of dry contact for emergency power off (EPO) and disconnect other input dry contacts.

- Output dry contacts include operating mode and fault warning of the machine (detailed definitions can be seen in Table 3-4). Every output dry contact port is equipped with a normally open switch and a normally closed switch, and user can select it on basis of actual condition. Pin arrangement of ports is shown in Figure 3-17.

3.9 Maintenance Sockets

Maintenance sockets (as shown in Figure 3-12, Figure 3-13) can supply power to the tools which need power, when engineer doing maintenance (220V/50HZ) .

For example: Electric iron, digital oscilloscope, the maximum current can be passed for repair is 5A.



Caution

- The action mode of EPO by default is “switching to bypass”. When operating EPO function, the UPS switches to bypass output. If needs the action mode of EPO to be “cutting off the output”, please set the action mode of EPO correct before turning on the UPS. “Cutting off the output” can only be set to use this function when you confirm to cut off the output of the UPS.
- When executing “bypass output”, UPS system will set the manual bypass as “open” to switch to bypass mode, and it shall operate by monitoring panel if it needs to switch off manual bypass.
- When UPS is in bypass mode, the load cannot be protected by UPS if voltage and frequency changes or power is failure.

4 Operation Instructions

Before start of UPS, it must ensure that it has been mounted completely by authorized maintenance engineer and check whether all electric connections are normal to ensure normal operation of the system. After successful start of UPS, it can run under any operating mode described in chapter 1. This chapter describes all operational steps of operator under different operating modes, including operational steps of UPS on/off steps, switching load to bypass, accessing and exiting maintenance bypass, and parallel system.



Caution: All operational keys and LED displays mentioned in operational steps can see chapter 5.



Caution: Before executing any operational steps mentioned in this chapter, please read the guidance care completely to avoid personal injury or equipment damage due to mal-operation.

4.1 Turn the UPS On (access to mains inverter power supply mode)

This step is used for turning on the UPS under condition of UPS power down completely, that is, it hasn't provided power supply for the load by UPS or by maintenance bypass switch before this. It is assumed that the UPS has been mounted completely and debugged by engineer, and switch of external power supply is switched on.

Warning:

- This operational step can bring main power voltage for UPS output terminal.
 - If needs to disconnect subordinate load connection, please make warning sign in load connection location.
 - Any part whose protective cover only can be opened by tools is inoperable part by user.
 - Only qualified maintenance personnel can open this kind of protective cover.
- ❶ Ensure all switches of the UPS are disconnected.
 - ❷ Close the rectifier switch. After normal display of LCD, click on/off icon “” in main interface, select “ON”, and then press “YES”; or using button operation: it can start up the UPS by pressing “ON” on panel for more than 1 s. At this moment, the rectifier carry out the task of delay start (default delay time 10 s), then the rectifier begins soft start, the indicator (REC) on the panel flashes in green. The rectifier completes soft start in about 10 s, the indicator turns to green and is illuminated, and the inverter makes soft start, the indicator (INV) flashes in green, and then the inverter operates normally in about 3 s, the inverter supply power to the UPS.

Status of LED indicator light is shown in Table 4-1:

Table 4-1

LED No.	REC	INV	OUTPUT	BAT	BYP	STATUS
Display status	Off	Off	Green	Red	Green	Red

③ Wait until the indicator light of inverter is green. Close the UPS bypass switch.

Status of LED indicator light is shown in Table 4-2.

Table 4-2

LED No.	REC	INV	OUTPUT	BAT	BYP	STATUS
Display status	Green	Green	Red	Red	Green	Red

④ Close the battery switch. After the UPS system detects batteries exists, the red indicator light of battery (BAT) on the panel will be off. Check battery datas in home page on the panel, the battery voltage displayed shall be 300 V~410 V.

⑤ At last, close the UPS output switch, check the lower left corner of the display screen to see if there is any warning, UPS should work in mains inverter mode, and the display status of LED can be seen in Table 4-3:

Table 4-3

LED No.	REC	INV	OUTPUT	BAT	BYP	STATUS
Display status	Green	Green	Green	Off	Off	Green

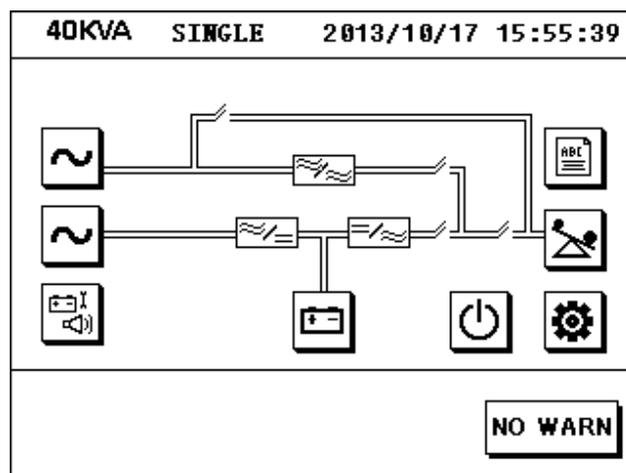


Figure 4-1: Power Flow Diagram after Normal Boot

4.2 ECO Mode On and Off

If need UPS to operate in ECO mode, please set it to ECO mode before turning on the UPS and it will be effective after power down.

4.2.1 Steps for startup ECO mode

Click set icon  in main interface and menu of “advanced setting” (enter right password), and click to enter “mode setting”, select “ECO mode” and then press “YES”, here, the ECO mode is not effective, please make the UPS power down, and then power up, then the configured “ECO mode” become effective. Operate according to normal start up steps, the UPS will work in ECO mode. The display status of LED can be seen in Table 4-4:

Table 4-4

LED No.	REC	INV	OUTPUT	BAT	BYP	STATUS
Display status	Green	Green and flashing	Green	Off	Green	Green

4.2.2 Steps for shutoff ECO mode

Click set icon  in main interface and menu of “advanced setting” (enter right password), and access “mode setting” by clicking, select “UPS mode” and then press “YES”, here, the UPS mode is not effective, please make the UPS power down, and then power up, then the configured “ECO mode” become effective. Operate according to normal start up steps, the UPS will work in UPS mode.

4.3 Manual Bypass Enable

If need to manually switch inverter power supply to bypass power supply, manual bypass Enable function can be used.

Operation steps are as follows: click set icon  in main interface and menu of “advanced setting” (enter right password), then enter “mode setting”, the press “YES” to enter the current mode. Click and enter “basic parameter” setting, and press “Manual Byp ”, select “ON”, and then press “YES”, here, the output is switched to bypass power supply, it will display “Manual Byp On” in left bottom corner of LCD display screen. It can be set as “OFF” if needs to switch off the manual bypass.



Caution: When UPS is under bypass mode, the load cannot be protected by UPS if voltage and frequency are fluctuated or power is failure.

4.4 Operational Steps of Maintenance Bypass

Caution please read warning information in chapter 1 care completely and operate maintenance bypass care completely, or otherwise it may damage the UPS or cause power down of load, and even cause risk of personal safety.

4.4.1 Access maintenance mode (stand-alone)

Following operational steps can switch the load from status of UPS power supply protection to condition, which can ensure its connection with AC input bypass power supply directly through maintenance bypass switch.

- ❶ Click set icon  in main interface and menu of “USER”, access “BYP” by click, select “ON”, and then press “YES”. At that time, UPS can provide power supply to the load through static bypass.
- ❷ Manually close the maintenance switch. At this time, power supply of load is provided by power supply of both maintenance bypass and UPS static bypass.
- ❸ Clicking On/Off icon  in main interface, select option of “OFF” and press “YES” to turn off the UPS. Or keyboard operation can be used: press “OFF” on the panel for more than 1s, press switch button  to switch to keyboard operation mode, press up  and down  to select option of “OFF”, and then press  to confirm and turn off the UPS.
- ❹ Manually disconnect the rectifier switch, bypass switch, battery switch, and output switch, here, the operation of switching UPS output to maintenance bypass has been finished, power supply of load is provided by maintenance bypass, fan stops, and UPS is turned off completely. When the BUS voltage is lower than 36V, maintenance can be done by personnel, but the load has no protection if AC power is abnormal.

4.4.2 Exit maintenance mode (stand-alone)

After finishing maintenance, it can switch the load from state of no AC power fault protection to state of UPS power supply protection by executing following operational steps.

- ❶ Care completely check whether there is any object left in UPS cabinet, and whether internal connecting wire of UPS has recovered to state before maintenance.
- ❷ Close the rectifier input switch. After liquid crystal display become normal, click on/off icon  in main interface, select “ON”, and then press “YES”. Or use button operation: start up the UPS by pressing “ON” on panel for more than 1s. Care completely observe whether rectifier and inverter of UPS are working normally. If it is normal, continue the following steps; if not, please turn off the UPS and disconnect the rectifier input switch, and then continue the maintenance.
- ❸ Close the bypass input switch after normal operation of rectifier and inverter of UPS.
- ❹ Check whether the manual bypass enable (Manual Byp) is ON or not in set menu , if not, set it to be “ON”.

- ⑤ Switch on output switch. At that time, power supply of load is provided by power supply of both maintenance bypass and UPS static bypass.
- ⑥ Disconnect maintenance switch.
- ⑦ Close external battery switch, and set “BYP” on panel as “OFF”. At that time, operation of exiting maintenance status is finished; the load is switched from status of no AC power fault protection to state of UPS power supply protection.

4.5 Trun the UPS On by Cold Start of Battery

Operational steps of powering on by battery are as follows:

- ① Switch on cold start switch of battery and external battery switch. 10-40KVA models battery breaker should be closed.
- ② After LCD display become normal, click on/off icon “

 **Caution:** It needs to disconnect cold start switch of battery after powering on by cold start of battery.

4.6 Battery Manual Maintenance Mode

To prolong service life of battery, it is suggested to take manual maintenance for battery once 2 or 3 months. Steps to access battery manual maintenance are as follows:

- ① Click test command icon “

 **Caution:** If select “battery test (time)”, the UPS makes discharge test of 5 min. If select “battery test (voltage)”, the UPS discharges till the battery voltage gets to 360V. If select “battery test (EOD)”, the UPS discharges to 300V. The time and voltage point can be set in battery parameters of advanced setting.

- ② If UPS output is switched to static bypass without interruption and “Bat selftest success” is displayed in lower left corner of LCD screen, it means battery manual maintenance has been finished. After finishing battery manual maintenance, rectifier and inverter of UPS start normally, output is switched to inverter output without interruption, and battery is charged. If necessary, maintenance personal can stop manual maintenance and recover normal working mode of UPS only by selecting “CLR TEST” in menu of “TEST CMD”.

4.7 Turn the UPS Off (completely turn off the UPS and load)

It shall follow following steps to completely power off UPS and disconnect power supply of load. All power supply switches and breakers are disconnected, and UPS does not provide power supply to the load.

- ❶ Cut off all loads of UPS.
- ❷ It can power off the machine by clicking on/off icon  in main interface, selecting “OFF”, and then entering. Or it can use button operation: it can power off UPS by pressing “OFF” on panel for more than 1S, pressing switch button  to switch it to button operation mode, pressing up  and down  to select “OFF”, and then pressing . This operation can power off the rectifier and inverter, disconnect static switch, and disconnect power supply of the load.
- ❸ Disconnect the mains switch, bypass switch, output switch and battery switch.
- ❹ Ensure maintenance switch is in disconnection condition.
- ❺ Along with switch off all internal power supplies supported by main power, all LED indicator lights on panel are off, and LCD display is off.
- ❻ To ensure full disconnection of power supply for UPS, it must disconnect external distribution switch and external output switch, and mark warning signs.

4.8 Steps of Emergency Power Off (EPO)

For this model of UPS, when execute EPO function, it will turn to two modes, the default is bypass mode, press the red EPO button on the panel, the UPS will execute EPO function. EPO function is used to turn off the UPS in case of emergency (e.g. fire, flood, etc.). The system will switch off the rectifier and inverter, and rapidly switch the output to bypass status, and batteries stop charging or discharging. If need the action mode of EPO to be “cutting off the output”, please set the action mode of EPO to be “cutting off the output” before turning on the UPS, at this time, if press EPO button, the UPS will switch off the rectifier and inverter and disconnect the output, and the load will power off.

If the UPS still has main power input, the control circuit of UPS still has electricity, but the UPS output has been cut off. If it needs to cut off main power supply of UPS completely, it shall disconnect the UPS external mains power input switch.

The UPS must be powered down completely, that is, the UPS doesn't exit emergency power off status until disconnecting all input switches (including battery switch) by manual.

 **Caution:** When executing emergency power off (EPO) operation (EPO is set to be “cutting off the output” mode), the UPS system will disconnect load power supply (disconnect output), and this function only can be used when ensure to disconnect the UPS outputs.

4.9 Turn the Parallel UPS On / Off

4.9.1 Notes for parallel operations

- During normal operation of parallel system, it cannot take plug operation for parallel machine.
- Before loading, all output switch of parallel system must be switched on and all output terminals must be connected together. After loading, not all output switches of parallel system can be disconnected except that the machine is powered off.
- Before using maintenance bypass, manual bypass “BYP” of all machines in parallel system shall be set as “ON”, and then switch on maintenance switch.
- When parallel system is working, bypass switches of all machines in parallel system must be in the same status.

4.9.2 Turn the parallel UPS On

- ❶ Please ensure all wirings of the machine and parallel systems are correct;
- ❷ Switch on all bypass switches of all machines in parallel system;
- ❸ Switch on output switch of UPS1 firstly, switch on rectifier switch of UPS1, and then press “ON” of it, REC indicator light starts flash, fan starts run(10-40KVA models fans start to work when close rectifier breaker or bypass breaker), and UPS1 starts bypass output. About 15S later, green BYP indicator light is off, green INV indicator light is on, and the machine starts inverter output. Switch on battery switch of UPS1, REC, INV, OUT, and STATUS indicator lights on panel are green, and BYP and BAT indicator lights are off.
- ❹ Please start the UPS2, UPS3..... UPS N by above sequences in step 3;
- ❺ After starting all machines, they indicator lights are the same with those of UPS1. By now, start of parallel system is finished;
- ❻ Before loading, please ensure all output switches of parallel system are switched on and output terminals are connected together;
- ❼ Please take operations in step 2 to add a stand-alone machine to the parallel system.

4.9.3 Turn the parallel UPS Off

- ❶ Switch off all loads;
- ❷ Clicking on/off icon  in main interface, selecting “OFF”, and then press “YES”, This operation can power off the rectifier and inverter, disconnect static switch, and disconnect power supply of the load, please be care completely. After powering off the machine, disconnect output switch, battery switch, rectifier switch, and bypass switch of UPS1, and REC, INV, OUT, BYP, and BAT indicator lights on panel are off;
- ❸ Switch off UPS2, UPS3.....UPS N by above sequences in step 2;
- ❹ Please take operations in step 2 to exit a stand-alone machine from the parallel system.

4.9.4 Operational steps of maintenance mode of parallel system

- ❶ Set manual bypass “BYP” of UPS1, UPS2, UPS3.....UPS N as “ON” by sequence;
- ❷ Switch on maintenance switch of the machine needing maintenance, clicking on/off icon “” in main interface, selecting “OFF”; and then press “YES”. Disconnect output switch, battery switch, rectifier switch, and bypass switch of the machine;
- ❸ It can start maintenance after the machine is under full power down condition and electrolytic capacity is discharged completely (When the bus voltage is less than 36V);
- ❹ After finishing maintenance, care completely check whether there is any object left in the UPS cabinet, and recover internal wiring of UPS to status before maintenance. Switch on rectifier switch and bypass switch, press “ON”, the fan start run (10-40KVA models fans start to work when close rectifier breaker or bypass breaker). At that time, the machine is operating under bypass mode. About 15S later, green INV indicator light is flashing continually, which means operations of powering on the machine are finished;
- ❺ Ensure all machines in parallel system are under bypass mode, switch on output switch of the maintained machine, and then disconnect its maintenance switch;
- ❻ Switch on battery switch of the machine, and set “manual bypass” of UPS1, UPS2, UPS3 UPS N as “off” by sequence. At that time, REC, INV, OUT, STATUS indicator lights of all machines are green, BYP and BAT indicator lights are off, and all machines in parallel system are switched to main power supply mode.

 **Caution:** If parallel line is disconnected when parallel system is under maintenance mode, other machines in parallel system may under power down condition, and it is suggested to power off other machines in parallel system if it needs to disconnect the parallel line for maintenance.

4.10 Reset Operations after Fault Warning

If UPS is powered off due to rectifier or inverter caused by over-temperature or over-load or over-voltage of bus, it shall adopt proper measures to clear it on basis of warning information displayed in display screen, and then reset to normal working condition of UPS by following steps.

It shall execute following steps after user confirm that the fault has been cleared and there is no remote EPO signal:

- ❶ Press “FAULT CLEAR” on panel to exit the UPS system from fault mode.
- ❷ UPS starts automatically; rectifier, inverter, and inverter static switch start, and UPS accesses normal operating mode.

4.11 Automatic Start

When power supply is failure, UPS can provide power supply to load through battery system until final voltage 300V of battery discharge is reached by battery discharge, UPS stops inverter output, and the output is switched to static bypass. When main power is recovered, UPS can start automatically, recover inverter output power supply, and charge the battery. Automatic start function is also applicable for bypass mode.

4.12 Language Selection

LCD menu and data provides English and Chinese for selection. It can select language by clicking set icon  in main interface, and clicking “语言 LANG” in “USER”.

4.13 Change Current Date and Time

It can set current time of UPS by clicking set icon  in main interface and “TIME” in “USER”.

4.14 Control Password

System is equipped with password protection to restrict operation of some control, and the initial password is “12345678”. After starting control password, it can execute UPS and battery test operations after passing the password verification.

In setting menu , the options in “advanced setting” has to be entered the maintenance password then it can be operated; the operation must be operated by authorized maintenance engineer.

5 Operation Control and Display Panel

5.1 Introduction of Monitoring Panel

Operation display panel of UPS is located in front panel. It can inquire all parameters, UPS, battery status, and event and warning information of UPS by operation and display panel. Operation display panel can be divided into four parts by different functions: simulated state diagram, multi-functional LCD touch screen, menu key, and control operation key.

Simulated state diagram; LCD touch screen and menu; Control operation key

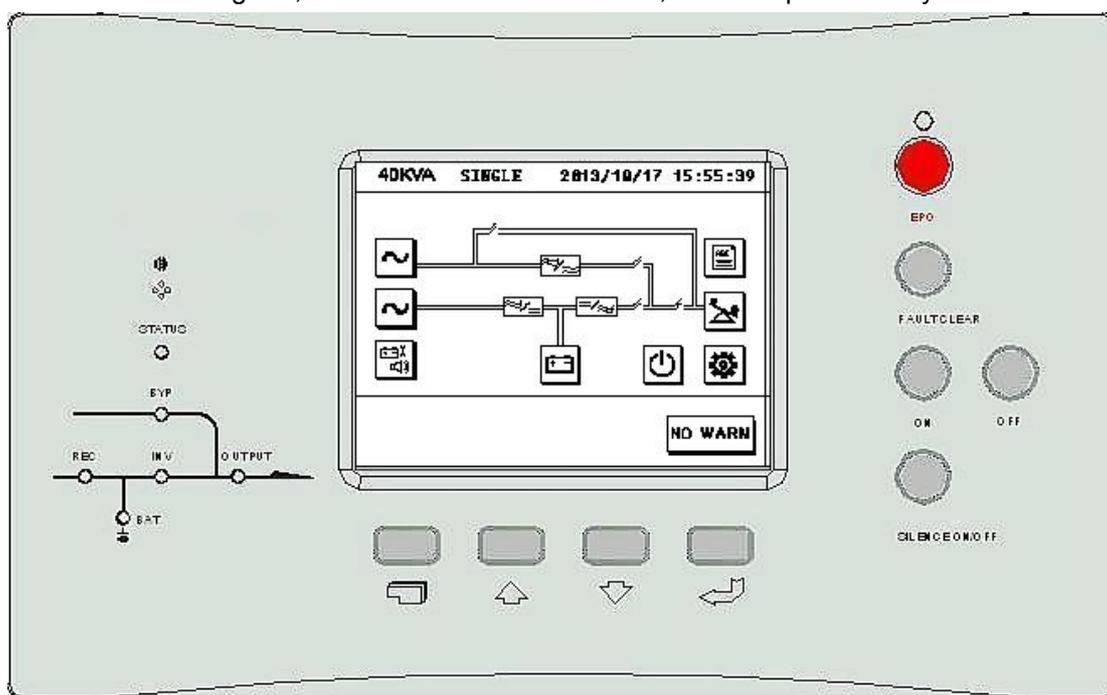


Figure 5-1: Operation Control and Display Panel of UPS

Table 5-1: Descriptions of Silk-screen for Operation Display Panel of UPS and Icon of LCD Display Screen

Monitoring panel	Icon/Silk-screen	Meaning
LED indicator light	REC	Rectifier indicator light
	INV	Inverter indicator light
	OUTPUT	Load indicator light
	BAT	Battery i indicator light
	BYP	Bypass input indicator light
	STATUS	UPS status and warning indicator light
Icons of LCD touch screen		Set
		Battery

		On/off	
		Input parameter	
		Output parameter	
		Bypass parameter	
		Battery self-inspection and maintenance	
		Historical record	
		Return to main interface	
		Return to last menu	
		Down	
		Up	
		Left	
		Right	
		Switch of up and down line	
		Enter	
		Delete	
Operation key	EPO	Emergency power off	
	ON	On	
	OFF	Off	
	FAULT CLEAR	Fault reset	
	SILENCE ON/OFF	Warning mutt off	
	Icons of menu		Switch
			Up
			Down
			Enter

5.1.1 Simulated state diagram

Simulated state diagram is equipped with LED indicator light to display all working paths and current working statuses of UPS.

Table 5-2: Description of Rectifier Indicator Light (REC) Status

Green and normal light	Normal operation of rectifier
Green and flashing	Main power supply is normal, and rectifier is under soft start
Red and normal light	Fault of rectifier
Off	Rectifier cannot operate

Table 5-3: Description of Battery Indicator Light (BAT) Status

Green and normal light	Normal discharge of battery
Green and flashing	Low-voltage discharge of battery or manual maintenance test of battery
Red and normal light	Abnormality of battery (battery fault, no battery)
Off	Battery is charging

Table 5-4: Description of Bypass Indicator Light (BYP) Status

Green and normal light	Power supply of load is provided by bypass
Red and normal light	Bypass power supply is abnormal or exceeds normal range or bypass static switch is under fault
Off	Normality of bypass

Table 5-5: Description of Inverter Indicator Light (INV) Status

Green and normal light	Power supply of load is provided by inverter
Green and flashing	Inverter starts or is under standby status (ECO mode)
Red and normal light	Fault of inverter
Off	Inverter cannot operate

Table 5-6: Description of Load Indicator Light (Output) Status

Green and normal light	UPS has output and is normal
Red and normal light	UPS output switch is disconnected or has output, but is under over-load
Off	UPS has no output

Table 5-7: Description of Operation Status (STATUS)

Green and normal light	Normal operation
Yellow and normal light	UPS warning
Red and normal light	UPS fault

5.1.2 Audio alarm (buzzer)

UPS can give three different of audio alarms during its operation:

Table 5-8: Description of Audio Alarm of Buzzer

Short single alarm	Give this alarm when pressing any functional operation key
Continual alarm	Give this alarm when UPS is under fault
Distant alarm	Give this alarm once 2 seconds when battery is discharging
	Give this alarm once 1 second when battery is discharging and voltage is lower than low-voltage alarm point

5.1.3 Functional operation key

Table 5-9

EPO	Is used to cut off power supply of load, and switch off rectifier, inverter, and static switch
ON	Is used to switch on rectifier, inverter, and static switch, and provide power supply to load
OFF	Is used to cut off power supply of load, and switch off rectifier, inverter, and static switch
FAULT CLEAR	Clear the fault
SILENCE ON/OFF	It can mutt off the warning sound by pressing it and restart the buzzer by pressing it again.

5.1.4 Operations of LCD touch screen and menu key

LCD display interface is friend and can provide 320×240 raster graphics to display. LCD can display real-time warning information and provide 10,000 historical warning records for user's inquiry to provide reliable basis for fault diagnosis.

User can execute various operational commands through LCD touch screen interface, check input, output, load, and battery parameter conveniently, and obtain current UPS status and warning information timely. Besides, LCD can display version information of control software and monitor board software.

There are four menus in total, and they functions are as follows:

Table 5-10: Meaning Description of Menu Icon

Button icon				
Function	Switch	Up	Down	Enter

LCD display screen supports two control modes: button control and touch control.

- Button control

Press button of “” under any interface to switch to button control mode, the selected icon is displayed in reverse, move the cursor by pressing button of “” or “”, press “” to select the icon where cursor locates at, and press “” to return to touch screen control mode.

- Touch control

Take operations by clicking corresponding icons in LCD screen.

5.1.5 Calibration of LCD touch screen

Click set icon “” in main interface and menu of “user set”, select “calibration of touch screen”, click cross cursor “+” in touch screen in according to corresponding tips, and every location shall be clicked for 7 times. After tip shows that calibration of touch screen is finished, it means calibration of it is finished.

5.1.6 Description of menu details

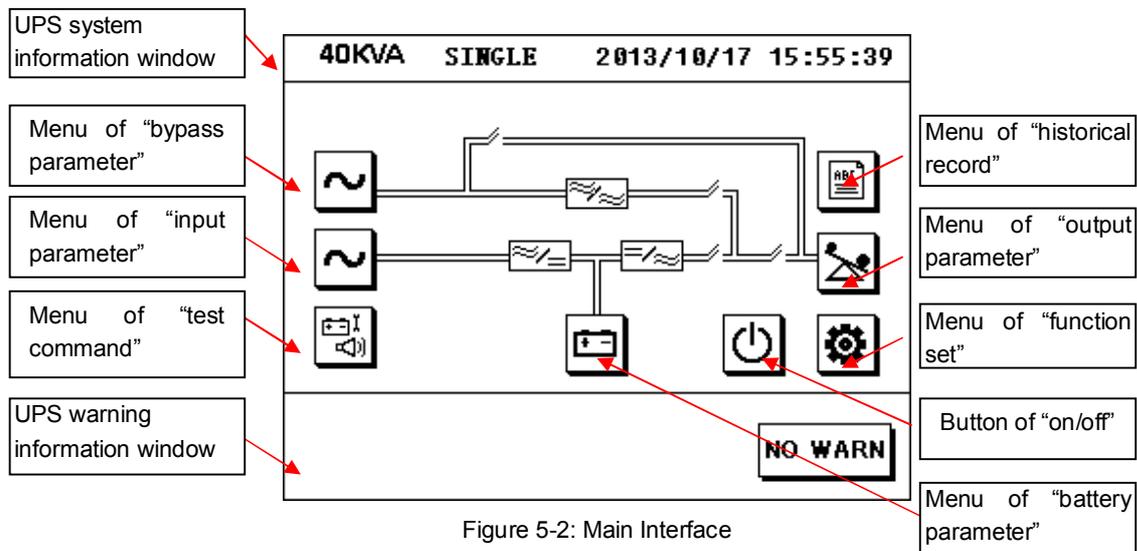


Figure 5-2: Main Interface

UPS system information window: to display basic information of UPS, including current time, date, UPS series name, configuration, and status. Information in this window cannot be operated by user, and detailed explanations are listed in Table 5-11:

Table 5-11: Item Description of UPS System Information Window

Display Window	Meaning
40 KVA	UPS series name
(Configuration) stand-alone online Parallel system (1/N) Hot standby host/slave	Stand-alone online: double-conversion stand-alone system Parallel system (1 / N): parallel redundant system Hot standby host/slave: hot standby system
2013-01-05	Current date (format: year-month-date)
15:26	Current time (format: 24 hours, hour: minute: second)

Select menu icon by LCD touch screen to check data window.

Table 5-12: UPS Menu Icon and UPS Data Window

Menu Icon	Menu Name	Menu Item	Explanation
	Input parameter	Line voltage (V)	Line voltage
		Phase current (A)	Phase current
		Frequency (Hz)	Frequency
	Bypass parameter	Phase voltage (V)	Phase voltage
		Frequency (Hz)	Frequency
	Output parameter	Phase voltage (V)	Phase voltage
		Phase current (A)	Phase current
		Frequency (Hz)	Frequency
		Power factor	Power factor
	Load parameter	Apparent power (KVA)	Sout: apparent power
		Active power (KW)	Pout: Active power
		Load percentage (%)	Load (UPS rated load percentage)
	Parallel parameter	Apparent power (KVA)	Sout: apparent power
		Active power (KW)	Pout: Active power
No parallel data for stand-alone system		UPS is set to have load of the machine and have no load of the system	
	Battery parameter	Battery voltage (V)	Bus voltage of battery
		Battery current (A)	Charging and discharging current of battery
		Battery discharge	Battery is discharging
		Battery is under even charge	Battery is in even charge status
		Battery is under float charge	Battery is in float charge status
		No battery	Battery is not connected
	Historical record	Historical record information	Display all historical record information

	Maintenance set		Used for operation of maintenance personal
	User set	ECO mode set	User can set on/off of ECO mode
		Manual bypass set	User can set on/off of manual bypass
		Communication protocol set	2 background communication protocols for option
		Language set	(Language option) 2 languages for option
		Date and time	Set current date and time of UPS
		Date format	User can set display format of date
		Password set	User can change the control password
	System information	Calibration of touch screen	Calibrate correctness of touch screen
		UPS model	Provide UPS model information, e.g.: 220 V - 50 Hz
Monitor version		Provide version information of monitoring software	
	Test command	Control version	Provide version information of control software
		Manual maintenance	Manual maintenance of battery takes partial discharge for battery to get data of battery capacity. The load must be 20 % ~ 80 %.
		Stop test	Stop the manual maintenance of battery, stop manual self-inspection of battery or system test by manual

5.1.7 Current information record window

This window records events of UPS under current operating mode, and does not record the solved status.

Click “current alarm” in main interface to browse the events.

For complete historical record, please see historical record information in “”.

Event list of UPS displayed in front panel of it can be seen in Table 5-13.

5.2 Event List Displayed by Liquid Crystal Panel

Table 5-13: Displayed Event List

UPS Event	Explanation
Bat is equal charging exist	Battery status (is under even charge)
Bat is float charging exist	Battery status (is under float charge)
Bat is discharging exist	Battery status (is discharging)
Rectifier work exist	Rectifier operates normally
Bat none exist	Inspect battery and battery wiring
O/P switch on exist	Switch of UPS output power supply is switched on
O/P switch off exist	Switch of UPS output power supply is switched off

Bypass can be powered exist	Bypass can provide power supply
Bypass is not powered exist	Bypass cannot provide power supply
Inverter soft start exist	Inverter is under soft start
Inverter work exist	Inverter operates normally
Inverter can not powered exist	Inverter cannot provide power supply
Inverter not power exist	Inverter doesn't provide power supply
Power Inverter exist	Inverter is providing power supply
Maintenance bypass on exist	Power supply switch of maintenance bypass is switched on
Maintenance bypass off exist	Power supply switch of maintenance bypass is switched off
EPO exist	Emergency power off: directly pressing EPO button on panel or receiving external emergency power off command
Inv STS On exist	Inverter static switch is switched on
Inv STS Off exist	Inverter static switch is switched off
Manual Bypass on exist	Manual bypass is valid
Manual Bypass off exist	Manual bypass is invalid
AC fault exist	Main power is under fault
AC fault clear	Main power is normal
Rectifier fault exist	Rectifier is under fault
Rectifier fault clear	Rectifier is normal
Inverter fault exist	Output voltage of inverter exceeds limited value, and load is switched to bypass
Inverter fault clear	Inverter is normal
Bypass fault exist	Bypass is under fault
Bypass fault clear	Bypass is normal
A phase O/P volt low exist	Output voltage of phase A is low
A phase O/P volt high clear	Output voltage of phase A is high
A phase O/P volt abnormal clear	Output voltage of phase A is normal
B phase O/P volt low exist	Output voltage of phase B is low
B phase O/P volt high exist	Output voltage of phase B is high
B phase O/P volt abnormal clear	Output voltage of phase B is normal
C phase O/P volt high exist	Output voltage of phase C is low
High output voltage of phase C exist	Output voltage of phase C is high
C phase O/P volt abnormal clear	Output voltage of phase C is normal
AC volt abnormal exist	Main power voltage is abnormal
AC volt abnormal clear	Main power voltage is normal
AC frequency abnormal exist	Main power frequency is abnormal
AC frequency abnormal clear	Main power frequency is normal
Line opposite exist	Main input phase sequence is reverse
Line opposite clear	Main input phase sequence is normal
I/P Soft-start failure exist	Rectifier cannot start due to low voltage of DC bus
I/P Soft-start failure clear	Input soft start is normal
Bus overvolt exist	Rectifier and inverter are switched off due to high voltage of DC bus: check whether there is any fault in side of rectifier
Bus overvolt clear	Voltage of bus is normal
Bus volt low shutdown exist	Voltage of DC bus is low
Bus volt low shutdown clear	Voltage of bus is normal
Bypass sequence reversed exist	Phase sequence of bypass voltage is connected reversely. Under normal condition, phase B is lagged for 120 degree than phase A,

	and phase C is lagged for 120 degree than phase B. Inspect and check whether phase sequence of UPS bypass power supply is correct. If not, correct it.
Bypass sequence reversed clear	Phase sequence of bypass is correct
Bypass volt abnormal exist	Bypass voltage is abnormal
Bypass volt abnormal clear	Bypass voltage is normal
Bypass thyristor fault exist	One or more static switch(s) is disconnected or short connected in side of bypass. This fault is locked until de-electrifying.
Bypass thyristor fault clear	Bypass thyristor is normal
Bypass frequency ultratrace exist	Bypass frequency is abnormal
Bypass frequency ultratrace clear	Bypass frequency is normal
Overload timeout exist	UPS is under over-load and exceeds allowed over-load time. Note 1: phase with maximum load will display overtime of over-load. Note 2: if the load exceeds rated value, it will report to be "output over-load". Note 3: if it exceeds allowed over-load time, inverter static switch will be switched off, and the load is switched to bypass; inverter is under standby status. If bypass is under power down, load is switched to inverter, which only can be achieved for 5 times within an hour. Note 4: if load rate for phase with maximum load is reduced lower than 90%, system will switch to inverter power supply mode. It can check whether the warning is true or not by inquiring the load percentage displayed by LCD panel. Note 5: after automatic power off due to overtime of over-load, it must clear the fault to restart the machine.
Overload timeout clear	
Hour switch frequency limit exist	Over-load switch times within previous 1 hour exceed set value so that load stays in bypass power supply status. Within 1 hour, UPS can reset automatically and switch to inverter power supply status.
Hour switch frequency limit clear	Switch times limitation within this hour
Fan fault exist	One or more radiation fan (s) is / are under fault
Fan fault clear	Fan is normal
Heatsink Overtemp exist	Temperature of radiator is too high
Heatsink Overtemp clear	Temperature of radiator is normal
Inverter IGBT overcurr exist	Pulse width modulation module of inverter is under over-current
Inverter IGBT overcurr clear	Current of inverter IGBT is normal
O/P overload exist	It will give this alarm when load exceeds 105% of rated value. Alarm can reset automatically when over-load status is cleared. 1. It can check whether the warning is true or not by inquiring the load percentage displayed by LCD panel. 2. If it is true, it shall measure actual output current to confirm correctness of display value. Disconnect unimportant load. In parallel system, it also can cause this alarm if load is imbalance.
O/P overload clear	Output is not under over-load
Byp overload time delay exist	Load current > 150%, 1min; load current > 200%, 200ms
Inverter Thyristor fault exist	One or more static switch(s) is disconnected or short connected in side of inverter.
Inverter Thyristor fault clear	Inverter thyristor is normal
O/P short circuit exist	Output is under short circuit
O/P short circuit clear	

Fault clear exist	Press button of FAULT CLEAR (fault reset)
Bat contactor on exist	Battery contactor on
Bat contactor off exist	Battery contactor off
Bus short circuit exist	Bus short circuit
Bus short circuit clear	
Bat overtemp exist	Battery over temperature
Bat overtemp clear	Battery temperature normal
Fuse damaged exist	Fuse damaged
Fuse damaged clear	Fuse normal
Parallel connection fault exist	Parallel connection fault
Parallel connect fault clear	Parallel connection normal
DC fault (10~40KVA)	Contact pulls, bus voltage and the battery voltage sampling values sampled values differ by more than 15V (Average in one minute)
Configuration error (10~40KVA)	PC power settings and hardware does not match

6 Daily Management and Maintenance

6.1 Machine Room Management

Machine room management includes environmental safety management and equipment management in machine room.

- Basic tasks of environmental safety management include: ensure ambient temperature, relative humidity, clean class, electrostatic interference, noise, and strong current electromagnetic interference in machine room can meet related requirements, guarantee stable performance, reliable operation, and safe production of equipment, and assure normal power supply of electric equipments.
- Basic requirements of equipment management are: guarantee perfect mechanical performance of equipment, electric performance can meet related standard and requirements, stable and reliable operation of equipment, and complete technical data and original records related to the equipment.

6.2 Maintenance Guidance

Correct maintenance (including preventative maintenance and remedial maintenance) is the key to achieve optimum operation of UPS and can ensure long service life of equipment. Preventative maintenance includes some procedures executed frequently, which are used to prevent fault of the system and to ensure maximum operating efficiency of the system. Remedial maintenance includes looking for fault of the system to achieve effective maintenance.

6.3 Safety Precautions

To safely and success completely execute maintenance of the system, it must follow related safety precautions, use necessary tools and testing devices, be operated by qualified maintenance personal, and pay attention to following safe operation regulations:

- Do remember it has danger voltage inside UPS even if it is not under operation.
- Ensure UPS operations and maintenance personal must be familiar with the equipment and content of this manual.
- Please do not wear metal or silver jewelries such as ring and watch when operating UPS.
- Do not take safe operation regulations for granted, and please study to personal who is familiar with it if there is any question.
- Be careful of danger voltage inside the UPS, and inspect and ensure power supply is under safety status when taking maintenance and debugging.

6.4 Preventative Maintenance

Steps for preventative maintenance are described in following, and it can improve operational efficiency and reliability of UPS system after finishing all these steps.

- Keep clean environment and avoid dust or chemical pollution of UPS.
- Keep clean of area around the UPS system and ensure unblock access to the equipment.
- Inspect the wiring terminals of input and output cable once half a year to check and measure whether the contact is well.
- Periodically check working status of radiation fan to prevent block of it by foreign matter, and replace it if there is any damage.
- Periodically inspect battery voltage and working status of UPS.

6.5 Usage and Maintenance of Storage Battery

6.5.1 Charging and discharging of storage battery

Storage battery pack is the key component to guarantee uninterrupted power supply of UPS. Storage battery pack is connected in branch circuit of storage battery for UPS system. If main power is normal, power supply system takes float charge or even charge for storage battery; if main power is failure, storage battery provides power supply for user equipment through inverter.

6.5.2 Selection of storage battery

- Selection of capacity of storage battery is determined by required current of electric equipment of power supply system and expected discharging period of storage battery. For example, if discharging current of storage battery for power supply system is 100A and continual power supply by storage battery under AC power failure is expected to be 2h, the required storage battery capacity for the system = discharging current of storage battery × continual power supply period under AC power failure = 200Ah. The actual required capacity of storage battery is the calculated theoretical value adding a surplus value. Selection of battery capacity shall be little high instead of lowing, but it shall not higher than 20% of required capacity of electric equipment.
- Storage batteries with different capacities cannot be used in series, and storage batteries with different voltages cannot be used in parallel.
- Storage battery packs with different capacities cannot be used in parallel (if internal resistances of batteries are different, capacities cannot be saturated simultaneously due to different current during charging, and it will cause a over-charged battery pack and a under-charged battery pack; and battery packs will discharge mutually during discharging).

6.5.3 Notes for usage and maintenance of storage battery

- Total capacity is sum of capacities of all storage batteries when several packs of storage batteries are parallel.
- Using temperature of storage battery is 0~40°C. Service life of storage battery is in inverse proportion with temperature of storage battery, so it shall completely consider

radiation when it is operated under condition, which is easy to cause high temperature of storage battery, to prevent temperature rise of storage battery (when temperature of storage battery rises, corrosion of polar plate caused by sulfuric acid will be worse so that the service life is shorten). If possible, it shall equip air-conditioning device in machine room to prolong service life of storage battery.

- After finishing installation of power supply system, it must charge the storage battery used for the first time or not used for a long time before usage. Storage battery can loss its capacity during storing due to self-discharging for a long time, and it cannot reach corresponding performance if it is not charged.
- It shall check and fasten all connecting parts and connecting wires of fasteners for battery pack to prevent accident.

Annex

1 Product Specifications

Product design shall meet following standards:

European and international standards

Table 7-1

Item	Standard
General safety requirements for operational area of UPS	EN 50091-1-1/IEC 62040-1-1 / AS 62040-1-1
UPS EMC requirements	EN 50091-2 / IEC 62040-2 / AS 62040-2 (A class)
Determination method and test requirements of UPS performance	EN 50091-3 / IEC 62040-3 / AS 62040-3 (VFI SS III)

Environmental characteristics of product are as follows:

Table 7-2: Environmental Characteristics

Rated power, KVA	Unit	30	40	60	80	100	120
Noise within 1m	dB	55-60dB					
Altitude	m	≤1,000m (1,000m above, lower the power for 1% for every increased 100m), maximum altitude is 4,000m					
Relative humidity	—	5%~95%, no condensation					
Working temperature	°C	0~40  Caution: service life of battery will be reduced for a half if temperature rises for 10°C when it is higher than 20°C					
Storage and transportation temperature of UPS	°C	-20~70°C					

2 Operation Instructions of SNMP Card Short Message Platform

2.1 Connections Set of iStars Hardware

2.1.1 Hardware interface



Figure 7-1 Lateral View of iStars (External Card)



Figure 7-2 Lateral View of iStars (External Card)



Figure 7-3 Lateral View of iStars (Internal Card)

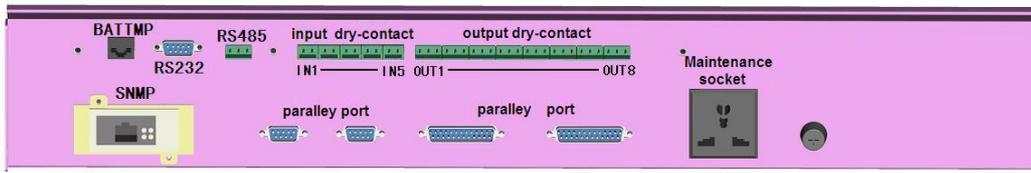


Figure 7-4: Communication Module of 60~120KVA UPS

2.1.2 Description and connection of all ports for iStars

- NET** port: Ethernet 10/100M network port, connected with network port of computer
- UPS** port: using RS232 series line, connected with RS232 port of UPS (external DB9 port; internal golden finger port)
- DC9V** port: DC9V power supply port
- GPRS** port: GPRS short message module port (DB9 port)
- Y/G/R** indicator light: LED three-color indicator light

2.1.3 Description of LED indicator lights

Table 7-3: Description of LED Indicator Lights

Description of LED Indicator Light		
Type	Indication signal	Description
Red light	Fault indicator light	Red light flashes if UPS communication is interrupted or has other system fault.
Green light	Power supply indicator light	Green light is normally on after start and normal operation of the system, which means operation of the system.
Yellow light	Communication indicator light	Flashing yellow light means there is some data communication with UPS, it means giving command if the light is on, and it means having received the command if it is off.

2.2 Introduction

Before logging in the web page, enter "Function setting" option in the control panel of this series of UPS and set the communication protocol as "EA protocol", and then the following operations can be carried out.

After finishing hardware connection and setting of iStars and network, according to the IP address of iStars obtained by iSearch, use the browser of any PC, input IP address of iStars, and then it can enter into the monitoring page of iStars to remotely monitor the UPS or set related information.

⚠ Make sure that the IP address is under the same net work segment with the host IP.

- Start the browser.
- Input IP address of iStars (for example: 192.168.6.6).
- Input the username and password, click and confirm to enter into the monitoring page.
An initial account with default username: admin and passwords: admin is set. User can add or delete corresponding user account and authority in setting pages.



Figure 7-5 Webpage Login Interface of iStars

2.3 UPS Web Interface

After entering into iStars webpage, current login username and its authority, system functional menu and status will be displayed in home page.

There are four items for major functional options of system menu:

UPS Information and Status, Setting and Control, Log Query, Assistant Function

The screenshot displays the iStars web interface. The top navigation bar includes the iStars logo, a user welcome message 'Welcome • admin', permission 'rw', and system time '2010/12/22 10:47:54'. A left sidebar contains a menu with buttons for 'System Status Info', 'UPS Status Info', 'Settings and Control', 'Log Query', and 'Assistant Function'. The main content area is titled 'System Status Info' and contains three tables:

iStars Information			
System Name	同城机房	Hardware Version	iStars_HWV2.0
System Administrator	cccc	Firmware Version	iStars_SWV4.09
System Location	China, PG, EAST	SN	120130319080099
Total Running Time	2 Days 21:08:02		

UPS System	
UPS Last Selftest Time	
UPS Next Selftest Time	
Email Daily Report Time	16:00
Time of Send Alarm Information before Shutdown UPS(Min)	30

Network Status			
MAC Address	00:50:02:F8:D3:32	Primary DNS Server	8.8.8.8
Connection Type	100Mbps Full-duplex	Secondary DNS Server	61.28.10.68
IP Address	192.168.169.4	Time Server	time.nist.gov
Subnet Mask	255.255.248.0	Email Server	192.168.0.9
Gateway IP Address	192.168.169.1	Login IP Address	192.168.169.3

Figure 7-6 Homepage of Webpage of iStars

2.4 Email Setting

This page determines whether transfer information to the destination Email address, when iStars detects related event of UPS. This page contains Email set, Email address of receiver (used to record the received event), Email address of receiver (used to receive the daily log), and test set. After settings are completed, click on "Apply" and the operation is completed.

Setting and Control > Email Setting

Email Setting

Email Setting	
Email Server	192.168.0.9
Email Ports	25
Email Address Sender	panxiang@eastups.com
Email Transmission is Encrypted Using SSL	No
Email Account	panxiang@eastups.com
Email Password	*****

Email Address of Recipient(Receiving the Event Log Available)		
Email Sent When the Event Occurs, Warning: Yes		
Account 1	Fukw@eastups.com	Event Set
Account 2	panxiang@eastups.com	Event Set
Account 3		Event Set
Account 4		Event Set
Account 5		Event Set
Account 6		Event Set
Account 7		Event Set
Account 8		Event Set

Email Address of Recipient(Receiving Daily Report Available)	
Daily Reports sent on Time	Yes 16:00
Account 1	
Account 2	
Account 3	
Account 4	

Apply

Test Set		
Test E-mail Recipient	panxiang@eastups.com	Send Email

Figure 7-7 Page of Email Setting

Email Setting

Email Server

This address is used to set the server address of Email receiver, set format is website format such as www.google.com, and it also can be written as IP address format such as 192.168.6.188.

Email Ports

Set of receiving port of Email. Set format is integer.

Email Address Sender

This address is used to set the Email address of sender.

Email Transmission is Encrypted Using SSL

Option whether SSL encrypted transmit is used for Email.

Account Number

Set Email account of sender, which shall be the same as Email address of sender.

Password

Set Email account password of sender.

Email Address of Recipient (Receiving the Event Log Available)

Email Sent When the Event Occurs, Warning

It can set whether send the related event by Email when fault of UPS is detected.

Account Number 1~8

E-mail account of receiver.

Selected

It can select partial or all events detected by iStars to send to the setting Email account, and detailed events can be seen in Figure 7-8 UPS Event Page.

Current Location: Setting and Control > Email Setting > Event Set

Event Set

Yes	No	UPS Event
<input type="checkbox"/>	<input type="checkbox"/>	Battery Fault
<input type="checkbox"/>	<input type="checkbox"/>	Battery Low
<input type="checkbox"/>	<input type="checkbox"/>	Battery EOD
<input type="checkbox"/>	<input type="checkbox"/>	Battery Mode
<input type="checkbox"/>	<input type="checkbox"/>	Bypass Mode
<input type="checkbox"/>	<input type="checkbox"/>	Bypass Fault
<input type="checkbox"/>	<input type="checkbox"/>	Input Fault
<input type="checkbox"/>	<input type="checkbox"/>	Output Fault
<input type="checkbox"/>	<input type="checkbox"/>	The UPS Output Shutdown as Requested
<input type="checkbox"/>	<input type="checkbox"/>	The UPS Remote Shutdown
<input type="checkbox"/>	<input type="checkbox"/>	UPS Fault
<input type="checkbox"/>	<input type="checkbox"/>	Temperature Over MAI*value
<input type="checkbox"/>	<input type="checkbox"/>	Load Over MAI*value
<input type="checkbox"/>	<input type="checkbox"/>	Test is in Progress
<input type="checkbox"/>	<input type="checkbox"/>	UPS Test Failed
<input type="checkbox"/>	<input type="checkbox"/>	Communications Between iStars and the UPS Fault
<input type="checkbox"/>	<input type="checkbox"/>	UPS Output is on Off State
<input type="checkbox"/>	<input type="checkbox"/>	UPS System is on Off State
<input type="checkbox"/>	<input type="checkbox"/>	UPS Will Turn Off
<input type="checkbox"/>	<input type="checkbox"/>	UPS Shutdown Delay Countdown is Underway
<input type="checkbox"/>	<input type="checkbox"/>	UPS is on Standby Mode
<input type="checkbox"/>	<input type="checkbox"/>	Charger Fault
<input type="checkbox"/>	<input type="checkbox"/>	Fan Fault
<input type="checkbox"/>	<input type="checkbox"/>	Fuse Fault
<input type="checkbox"/>	<input type="checkbox"/>	Temperature exceed the preset limit value
<input type="checkbox"/>	<input type="checkbox"/>	Humidity exceed the preset limit value
<input type="checkbox"/> All Yes	<input type="checkbox"/> All No	

Back Apply

Figure 7-8 Page of UPS Event

Email Address of Recipient (Receiving Daily Report Available)

Daily Reports Sent on Time

This option is used to set whether sending daily log.

Account Number 1~4

Email account of setting receiving of daily log.

Test Set

Test E-mail Recipient

It is used to set Email address of receive. If the email function is ok, receiver will receive a test mail.

2.5 SMS Setting

SMS Setting is similar with that of Email setting, and iStars sends the data and events with form of short message. It includes SMS communication status, and SMS setting, receive text messages by mobile phone, test set. After settings are completed, click on "Apply" and the operation is completed.

Current Location: Setting and Control > SMS Setting

SMS Setting

SMS Status	
Communication status	Communication Failed
Signal Quality	
Manufacturer	
Model	
Software Version	
Operator	
SMS Service Centre Address	

SMS Setting	
Network Standard	GSM
When the Event Occurs to Send Short Message Alarm	Yes

Phone Number to Receive Event Notifications			
Phone Number: "Country Code + Phone Number", for example: Chinese mobile number is 13333333333 and country code is 86, so the phone number is 8613333333333.			
Event Set: Click to set the received alarm event types.			
Phone Number 1	8615918305074	Event Set	Enable Control
Phone Number 2	8610086	Event Set	Disable Control
Phone Number 3	8610086	Event Set	Disable Control
Phone Number 4	8610086	Event Set	Disable Control
Phone Number 5	8610086	Event Set	Disable Control

Figure 7-9 Page of SMS Setting

SMS Status

Display the communication status, signal quality, manufacturers and other relevant information of iStars external GPRS module.

Message Setting

Message setting includes network system setting, and sending message when UPS is abnormal.

Phone Number 1~8

Set mobile phone number of receiver.

Selected

It can select partial or all events detected by iStars to send to the setting Mobile phone number, and detailed events can be seen in Figure 7-8 UPS Event Page.

Test Set

Test the mobile phone of message receiver, and whether mobile phone number of receiver can receive the message. The receiver will receive a test message if the function is ok.