User Manual

VFI 20-80K TAP PF1 3/3 BX

Thank you for using our products!

Please strictly comply with all warnings and operation instructions specified in this manual or on the equipment, and keep this manual properly for future reference.

Do not try to operate the equipment before reading all the safety information and operation instructions.

This manual applies to PowerWalker VFI 20-80K TAP PF1 3/3 BX UPS.

Safety Instructions

General

1. Please read “Safety Precautions” carefully before using this product to ensure correct and safe use. And make sure to preserve the manual well for future reference.
2. Please pay attention to all the warning symbols and follow the instructions in the manual during operation.
3. Do not use the equipment in direct sunlight or rain, or in humid conditions.
4. Do not install the equipment near any sources of heat, such as heating devices like electric heaters or furnaces.
5. When placing UPS, there should be a safe distance around it to ensure ventilation, heat dissipation and maintenance. Please follow the instructions in the manual for installation.
6. For the purpose of cleaning, please use dry and non-conductive tools to wipe down the equipment.
7. In case of a fire, please use dry powder extinguishers in a proper manner. Liquid fire extinguishers are not allowed.
8. Please make sure the floor on which the equipment is installed is strong enough to support the weight of the equipment with battery.
9. Before using this equipment, please make sure that the load power matches the rated power of UPS and the battery specification.
10. Do not remove the equipment package before installation.
11. The contractor receiving the equipment shall be responsible for equipment protection during the storage period.
12. The equipment must be stored on a solid level floor.
13. Before the arrival of the equipment, an ambient temperature/humidity control plan shall be formulated.

Prohibited Activities

1. Having service personnel without authorization to open the UPS cabinet, which contains lethal voltages is not allowed. Unauthorized opening may cause an unsafe condition, and will void the warranty.
2. As the application, setting, management and maintenance of the following

equipment must require special consideration and design, please inquire from dealers or our company before applying to them:

A. High-precision industrial, scientific-research or medical instruments;

B. Facilities of which malfunctions may lead to life-threatening situations, such as elevator;

C. Loads with large inrush current and negative power consumption;

3. Exposing batteries to fire, which may cause explosions.

Electrical Safety

1. Please make sure that the grounding is firmly connected and that the wiring and battery polarity are correctly connected.
2. Battery protection devices must be configured with a suitable over-current circuit breaker.
3. When the UPS needs to be moved or rewired, it must be shut down, and the input air switch and battery switch must be disconnected, otherwise the output may still be charged and there is a danger of electric shock.
4. To ensure safety and product performance, please use the attachments and accessories designated by our company.
5. Before connecting the UPS, the client must install a rated quadruple overcurrent circuit breaker in the distribution system to disconnect all input lines to prevent the risk of electric shock

Battery Safety

1. The service life of a battery is shortened as the ambient temperature rises. Regular battery replacement ensures that your UPS work well and provides sufficient back-up time.
2. Battery replacement and maintenance must be performed by authorized personnel with professional knowledge in battery. Please replace an equivalent number of batteries of the same type and model.
3. There are risks of electric shock and short circuit with the battery. Please observe the following rules while replacing the battery to reduce the risks of electric shock:

A. Do not wear watches, rings or any other metallic objects;

B. Use insulated tools;

C. Wear rubber shoes and gloves;

D. Do not place metal tools or any other metallic accessories on the battery;

E. Disconnect the loads connected to the battery before removing terminals from the battery.

4. Do not expose the battery to fire to avoid the risks of explosion that may result in personal injury.
5. Non- professionals shall not open or disassemble the battery as electrolytes in the battery contain strong acid and other dangerous substances which may cause damage to skin and eyes. Please clean with water immediately and seek medical assistance if the electrolytes come in contact with human skin.
6. Do not connect the battery positive and negative poles as it may cause short circuit. Over current protection device is needed to avoid risks of burns or electric shock.

Maintenance

1. The working environment method of UPS can affect its service life and reliability. Do not use your UPS in any of the following environments where:

   A. The temperature and humidity are outside the required ranges, i.e.0-40°C and 0-95% humidity; or

   B. Your UPS is at high risks of vibration and collision;

   C. There are metal shavings, corrosive materials, salt and flammable gases.
2. If it is not used for a long period of time, the UPS (without battery) must be stored in a dry environment within -25–55°C. Before starting the UPS, the ambient temperature must be warmed up to above 0 °C and maintained for more than 2 hours.
3. Keep the air inlets and outlets clear for proper ventilation. The poor ventilation of the air inlets and outlets will lead to temperature rise inside the UPS and shorten the life of the components in the equipment, which will affect the life of the overall equipment.
4. The battery should be charged at least once every three months if it is left idle and stored in an environment with a room temperature. In a high temperature environment, the battery should be charged at least 10 hours once every two months. Do not discharge with no loads connected or discharge for more than 14 hours continuously.

Storage Requirements

Recommended storage environment and storage time of the overall equipment and spare parts:

1. Do not place the equipment in areas with moisture, temperature upheaval, dust, dirt, gravels, paint, conductive particles or corrosive gases.
2. Do not remove the equipment package before installation.
3. The contractor receiving the equipment shall be responsible for equipment protection during the storage period.
4. The equipment must be stored on a solid level floor.
5. Before the arrival of the equipment, an ambient temperature/humidity control plan shall be formulated.
6. Equipment which cannot be installed and energized immediately shall be stored indoor, and in an environment that is clean and well ventilated and that the temperature and humidity are controlled. The storage area must prevent rain, water, and chemicals and meet the requirements as shown in the following table:

Recommendations of Table B1 ANSI/ISA-71.04-2013 for the ambient gas concentration of G1 equipment:

Contaminant	Gas	Gas Concentration in ppbv
Group A	H_2S	<3
	SO_2SO_3	<10
	Cl_2	<1
	NOx	<50
Group B	HF	<1
	NH_3	<500
	O_3	<2

Transportation and storage environment requirements for storage time less than 1 year:

Transportation and storage environment with a storage time of less than 1 year (Subject to the production date on the label of equipment serial No.)	
Storage site	Indoor
Dust	Good
Storage temperature	< 40℃
Storage humidity	< 70% RH
Other	Stored with initial packages

If the actual storage condition of equipment is inconsistent with the above requirements on storage environment, please decide the storage time based on the actual storage environment.

Contents

Chapter 1 Introduction

This UPS features high efficiency, high performance, double conversion, online mode, and three-in and three-out. With perfect power source protection solutions, the UPS effectively addresses multiple power source problems such as power outage, high-voltage AC and low-voltage AC, voltage sag, damped oscillation, high-voltage impulse, voltage surge, harmonic distortion, clutter interference and frequency variation. It is widely applied for computers, communications devices and other controlling devices. You can choose our optional accessories to cope with inrush load situations in complicated industrial environment. Therefore, this UPS is the best choice for many fields, such as telecommunication, finance, transportation, government, manufacturing, energy, etc.

A variety of functions of this UPS can provide high-quality power guarantee for your equipment:

- Advanced DSP digital control technology effectively improving product performance and system reliability.
- N+X parallel redundancy (common batteries are allowed).
- Excellent protection to harsh industrial environment.
- Economical and safe ECO mode making the overall efficiency of UPS reach more than 99%.
- High-definition human-computer interaction LCD interface, allowing for intuitive and convenient operation.
- Powerful communications interface and remote monitor.
- Plenty of accessories that meet a variety of needs.

20-40k BX　　60-80k BX

Figure 1-1:Machine Appearance

1.1 Explanation of common symbols

The following symbols may appear in the manual or other occasions. You are suggested to understand the symbols and their meanings.

Symbols and Indications	
Symbol	Meaning
⚠	DANGER
⚠	HAZARDOUS VOLTAGE
~	Alternating Current (AC)
⎓	Direct Current (DC)
⏚	Protective Grounding
♻	Recycle
	Keep Surroundings Uncluttered

Chapter 2 Appearance Description

2.1 Unpacking Inspection

1. Unpack the package, the unit should contain the following items:

   1) One UPS host.

   2) Random accessories, including user manual, environmental information card, test report and single input short wiring.

2. Check if the UPS is damaged during transportation. If you find damage or missing parts, please do not turn on the UPS and contact the carrier or dealer immediately.

3. Remove the packaging:

   Remove the packaging from the 20K/30K/40K cabinet:

   Figure 1: Cut off the packaging tape and open the carton.

   Figure 2: Remove the packaging and carton.

   Figure 3: Remove the front and rear fixtures of the cabinet

The schematic diagram of unpacking is as follows:

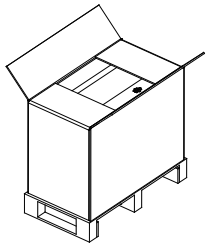


Figure 1

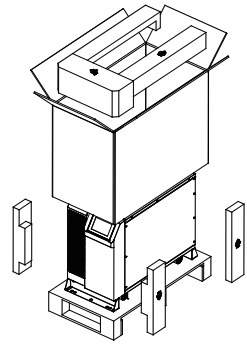


Figure 2

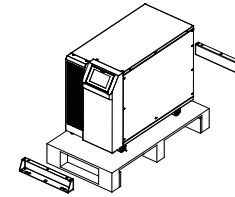


Figure 3

Figure 2-1:20-40K Unboxing diagram

Remove the packaging from the 60KS/80KS cabinet:

Figure 1: Cut off the packaging strap and remove the top cover plate of the wooden box;

Figure 2: Straighten the tongue between the side plate and the front and rear plate of the wooden box, and then remove the side plate and the front and rear plate;

Figure 3: Remove the packaging;

Figure 4: Remove the L-shaped angle iron fixed to the front and rear of the cabinet;

Figure 5: Place the ramp in front of the pallet;

Figure 6: Roll the UPS down the ramp and move it to the installation spot.

The schematic diagram of unpacking is as follows:

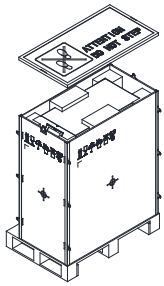


Figure 1

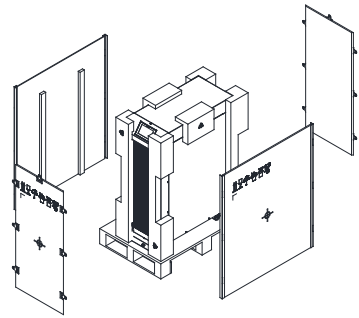


Figure 2

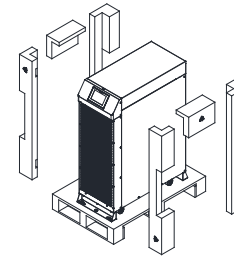


Figure 3

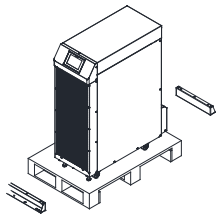


Figure 4

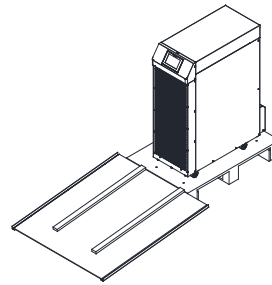


Figure 5

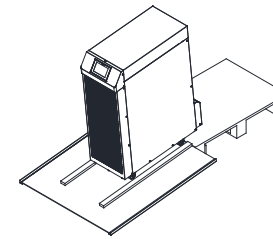


Figure 6

Figure 2-2: 60-80KS Unboxing diagram

2.2 Appearance diagram

20KS/30KS/40KS Cabinet structure diagram

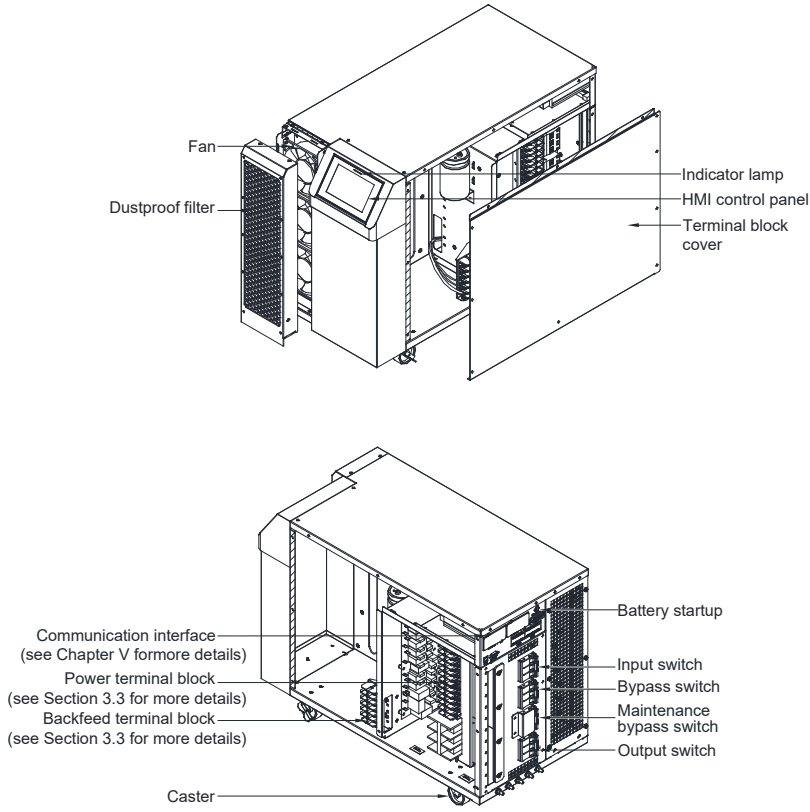


Figure 2-3: 20-40K structure diagram

20K/30K/40K Cabinet size diagram:

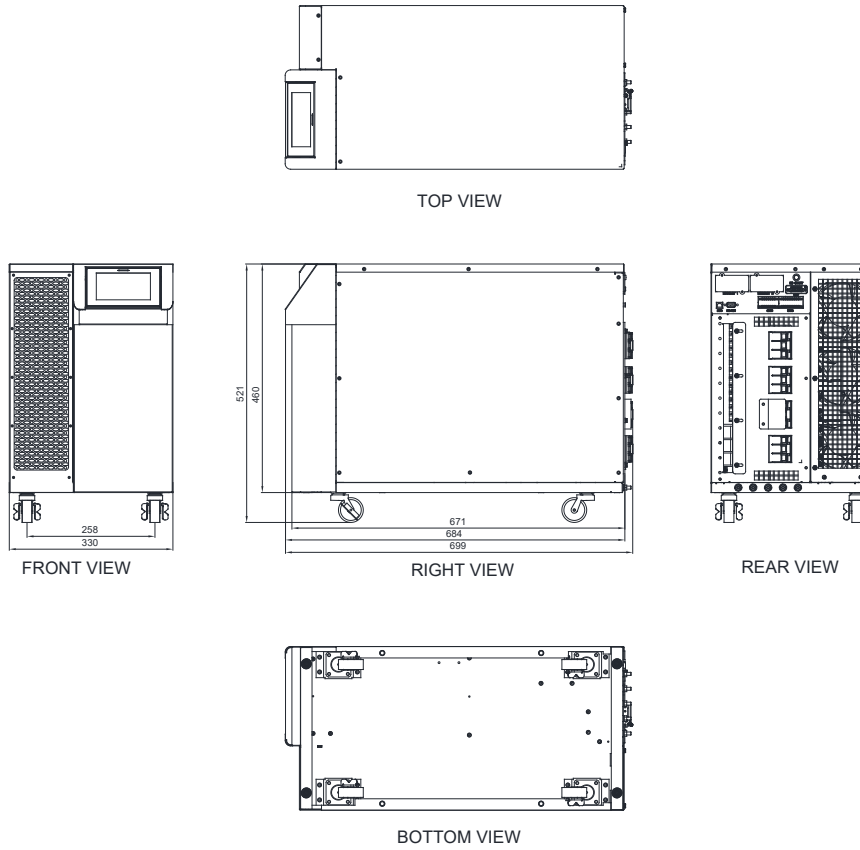


Figure 2-4: 20-40KS diagram

60K/80K Cabinet structure diagram:

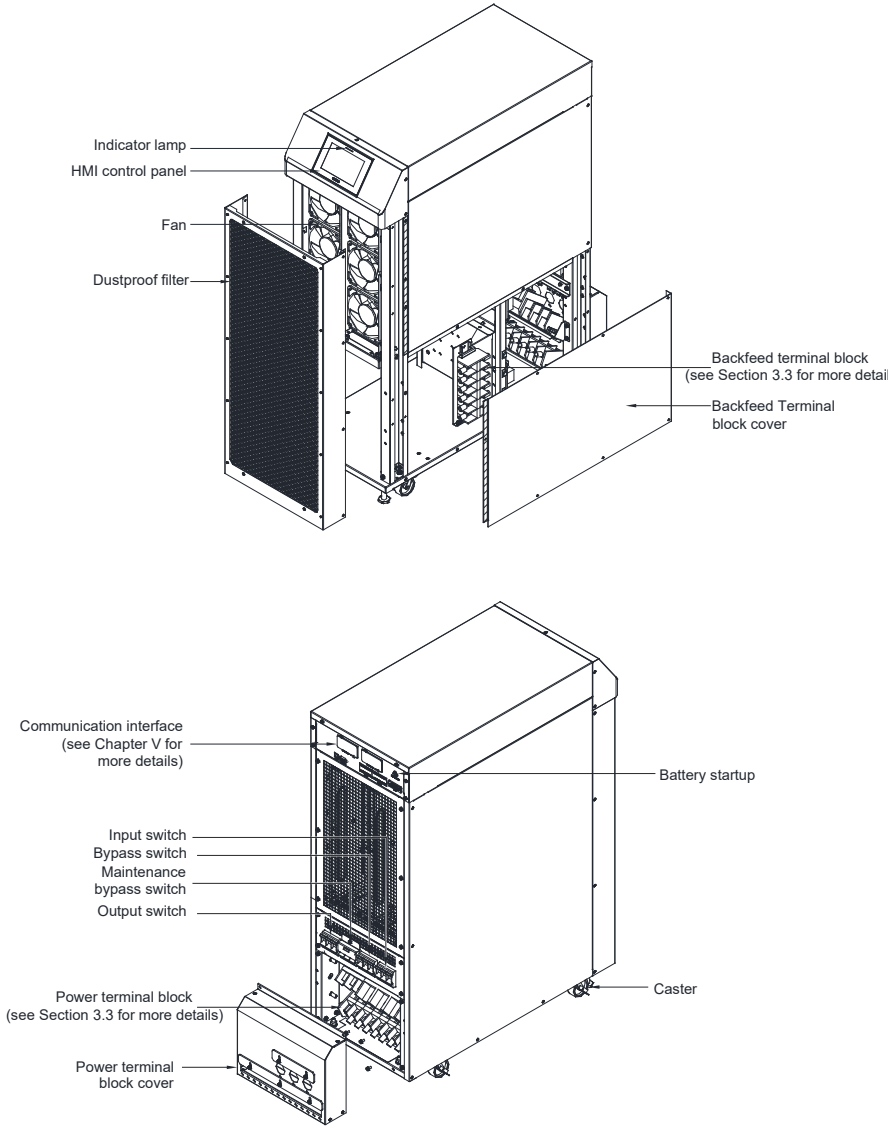


Figure 2-5: 60-80K structure diagram

60KS/80K Cabinet size diagram:

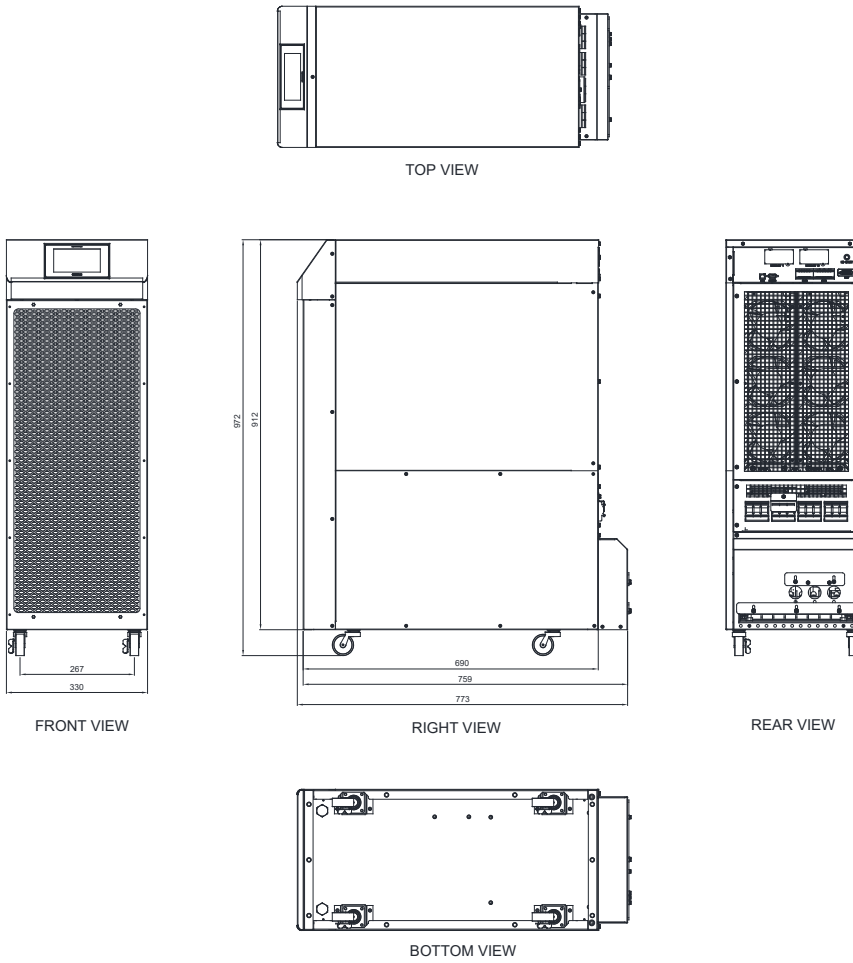


Figure 2-6: 60-80K diagram

Chapter 3 Installation Instructions

3.1 General installation notes

1. The installation of this UPS must be carried out by professionals in accordance with electrical regulations.
2. Install the UPS in a clean and stable environment to avoid vibration, dust, high humidity, combustible gases, combustible liquids or corrosive substances.
3. The ambient temperature of the UPS shall be controlled within 0–40°C. If the UPS works in an environment above 40 °C, the maximum load is required to be reduced by 12% for every increase of 5 °C. The maximum ambient temperature of the working UPS shall be no more than 50 °C, and the long working time with load in high temperature environment will affect the life of UPS.
4. The battery pack is recommended to be used between 15 and 25 °C.
5. The altitude of UPS during normal operation shall be not more than 1,000 meters (3,300 feet). If it exceeds 1,000 meters, it shall be reduced in accordance with GB/T 3859.2. If the customer operates the UPS in more than 2,000 meters, please contact our company for more information:

3.2 Installation space

This UPS adopts the forced cooling of the front fan. Therefore, the ventilation must be considered in the installation site, and the in-machine maintenance shall be carried out from the front. We should also consider reserving the maintenance space. The installation space is as follows:

From Top of Cabinet	≧ 300mm work space*
From Front of Cabinet	≧ 900mm work space
From Back of Cabinet	≧ 600mm work space*
From Right Side of Cabinet	≧ 20mm work space*
From Left Side of Cabinet	≧ 20mm work space*

* If the customer needs a small rear clearance requirement (< 600mm), please contact our customer service:

* UPS maintenance shall be carried out from the side. When the installation

space refers to the above table, please reserve the cable of ≥ 800mm to move the UPS forward during maintenance. Or increase the installation space on the left and right side to reserve the maintenance space of ≥ 600mm. Please refer to the table above for specific installation space.

3.3 Position installation diagram of user power terminal

UPS is standard with dual power inputs, and users can require customer service engineers to switch single/double power input on site based on their needs. All installations shall be operated by our company or technical personnel authorized by our company. Do not open the cover of UPS without authorization, otherwise there may be the risk of electric shock.

When the installation is planned and prepared, please carefully read and understand the following matters:

1. Before connecting the UPS, the client must install a rated three-pole overcurrent open circuit protection device in the distribution system, disconnect all phase lines, and the N-line switch can be used separately.
2. When the single-phase current exceeds 100A, the protective air circuit breaker must be equipped with an arc-extinguishing device, and the client is recommended to use the D-curve air circuit breaker certified by UL.
3. Battery positive/negative/N wiring diameter: Indicates the wiring diameter of UPS and battery box; positive denotes the red line; negative denotes the black line; and N denotes the blue line;
4. The battery line (positive, negative, N) must be the same length. It is recommended to not be more than 40m.

20K wiring mode:

Terminals:

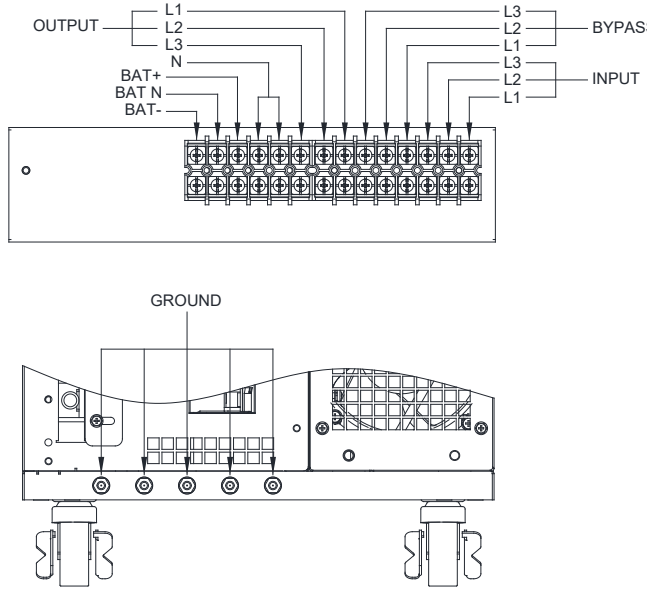


Figure 2-7: 20K Terminals

Backfeed terminal:

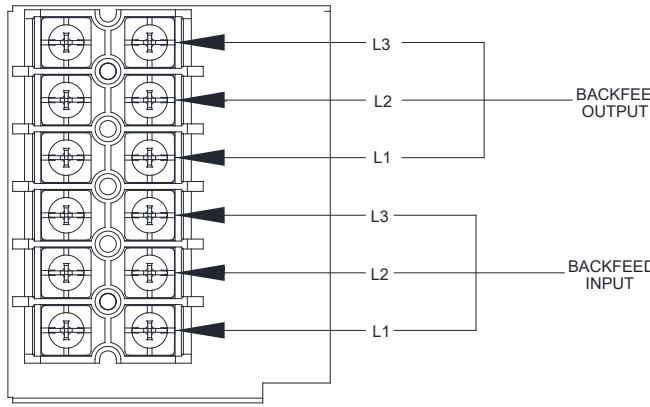


Figure 2-8: 20K Backfeed terminal

30K/40K wiring mode:

Terminals:

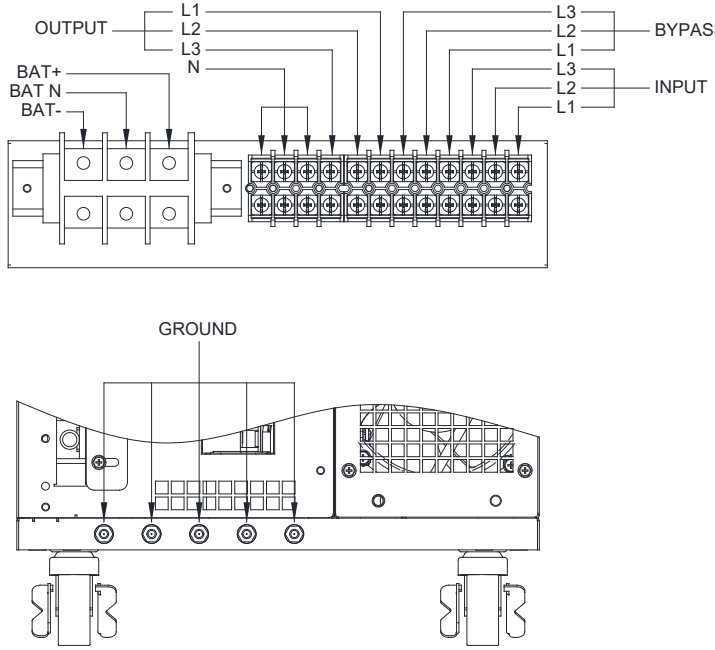


Figure 2-9: 30-40K Terminals

Backfeed terminal:

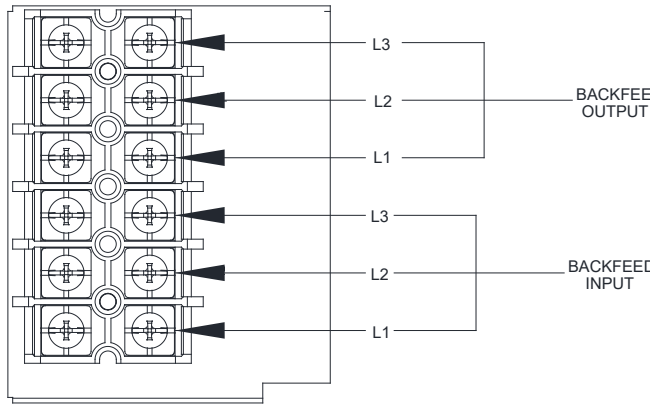


Figure 2-10: 30-40K Backfeed terminal

60K/80K wiring mode:

Terminals:

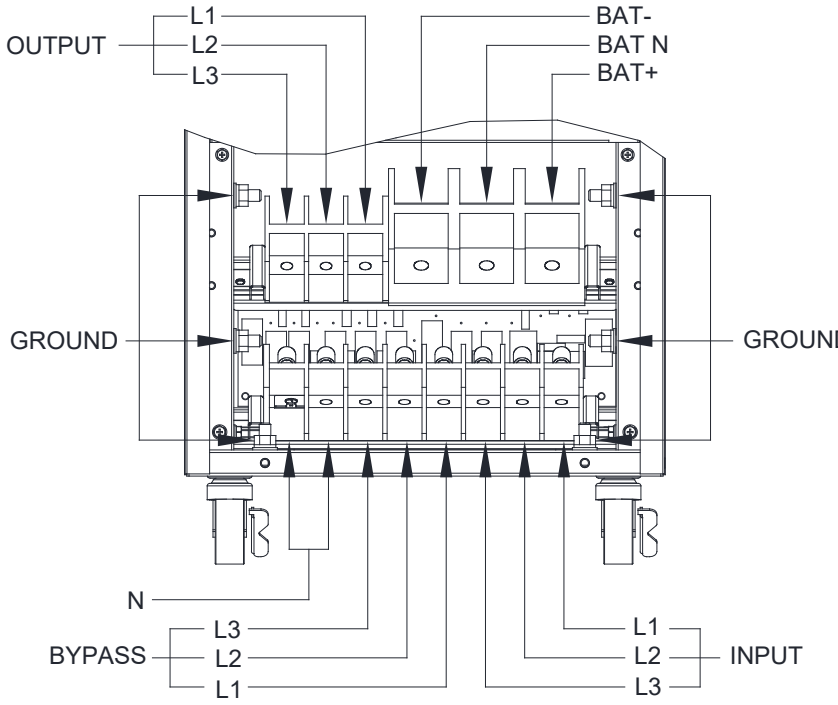


Figure 2-11: 60-80K Terminals

Backfeed terminal:

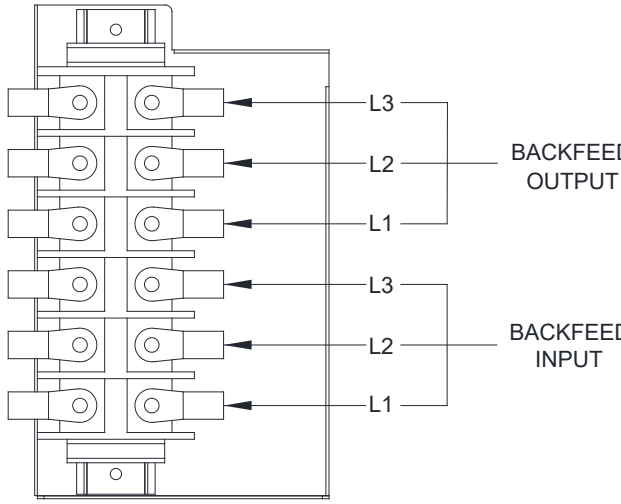


Figure 2-12: 60-80KS backfeed terminal

Precautions:

- Please make sure that the input power supply is 3-phase 4-wire and the power supply voltage is within the allowable input voltage range (see Appendix I).
- Make sure the input power phase sequence is close-wise and battery polarities are correctly connected.
- The external battery must have an N wire.

3.4 Backfeed contactor installtion

UPS reserve backfeed terminals and corresponding drive signal terminals for external backfeed contactor. The backfeed terminal is default.short-circuited and can be configured with external contactor on site, The feedback contactor shall be provided by the customer

1. Make sure the UPS is shutdown state, Disconnect the external power supply and load with UPS , The UPS input switch, bypass switch, output switch, maintenance bypass switch and battery switch are turned off.
2. Uninstall the right side cover plate of the UPS, refer to (Figure 2-3/Figure 2-5)
3. Remove the short circuit cable in the backfeed terminal, refer to(Figure 2-7~Figure 2-12)
4. Connect external backfeed contactor to the backfeed terminals(Figure 2-8/ Figure 2-10/Figure 2-12) on the UPS

   External backfeed contactor input(L1/L2/L3) ——BF_IN_L1/L2/L3 (Table3-3~Table3-4)

   External backfeed contactor output(L1/L2/L3) ——BF_OUT_L1/L2/L3(Table3-5)
5. Connect external backfeed signal to terminal CN7 (Figure 5-2) on the UPS.
6. Recommended backfeed contactor ratings should refer to table 3-8.

All installations shall be operated by our company or technical personnel authorized by our company. And do not open the cover of UPS without.

3.5 UPS wiring list and protective devices

The external battery of this UPS is to connect a set of positive and negative batteries with the same capacity in series (12V per unit). 32-44, 36 by default, with battery voltage range of 320V–607V. You can choose the capacity and the number of the battery cell based on your needs. The battery pack must be equipped with battery DC switch and input insurance, and the power wire diameter shall also be selected by considering the overload and grid voltage. The following table is for users' reference:

Table3-1: 20-40KS

Rated Capacity	Cross-sectional area Refer to IEC62040-1	Unit			
		kVA **kW**	20 20	30 30	40 40
Input /Output Voltage		Volts	400/400	400/400	400/400
AC input to UPS rectifier Full load current plus battery charging current (3) Phases		Amps	36	54	72
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×6	1×10	1×13
	max	mm^2	1×10	1×16	1×16
AC input to UPS bypass (5 lines, double inputs) Full load current (3) Phases		Amps	35	53	71
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×6	1×10	1×13
	(3) Phases	mm^2	1×10	1×16	1×16
Backfeed current and wiring (3 lines) Full load current (3) Phases		Amps	35	53	71
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×6	1×10	1×13
	max	mm^2	1×10	1×16	1×16
DC input from the battery to UPS (1) Positive pole line, (1) negative pole line, and (1) N line		Total Amps	66	99	132
Specification of wires (positive, negative, and N)(Quantity and size)	min	mm^2	1×13	1×20	1×25
	max	mm^2	1×16	1×50	1×50
AC output to critical load (5 lines) Full load current (3) Phases		Amps	31	46	62
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×6	1×10	1×13
	max	mm^2	1×10	1×16	1×16
Grounding	1.0 times				
Neutral wire (N) (AC mains/load) (nonlinear load)	1.7 times				

Table3-2: 60-80K

Rated Capacity	**Cross-sectional area Refer to IEC62040-1**	**Unit**		
		kVA **kW**	60 60	80 80
Input /Output Voltage		Volts	400/400	400/400
AC input to UPS rectifier Full load current plus battery charging current (3) Phases		Amps	108	144
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×20	1×25
	max	mm^2	1×50	1×50
AC input to UPS bypass (5 lines, double inputs) Full load current (3) Phases		Amps	106	142
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×20	1×25
	(3) Phases	mm^2	1×50	1×50
Backfeed current and wiring (3 lines) Full load current (3) Phases		Amps	106	142
DC input from the battery to UPS (1) Positive pole line, (1) negative pole line, and (1) N line		Total Amps	197	263
Specification of wires (positive, negative, and N)(Quantity and size)	min	mm^2	1×35	1×50
	max	mm^2	1×70	1×70
AC output to critical load (5 lines) Full load current (3) Phases		Amps	90	121
Specification of wires (phase A, B, C) (quantity and size)	min	mm^2	1×20	1×25
	max	mm^2	1×50	1×50
Grounding		1.0 times		
Neutral wire (N) (AC mains/load) (nonlinear load)		1.7 times		

Precautions:

- The above wire size requirements are only recommended by our company, instead of compulsory standards. The actual configuration needs to be determined according to the standard of the region and the actual conditions of users.
- This product does not provide any external overcurrent protector, but shall

comply with local regulatory requirements. If input/output disconnecting devices need to be installed, they shall be supplied by the customer.

- The number of configured battery must be even, with battery N-line.

Table3-3: 20K UPS External Power Terminals

Terminals Function	Terminals	Function	Size	Tightening Torque Nm (lb in)	Bolt specifications
AC mains input to UPS rectifier	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
	N	N	M5	2 (17.7)	13.3 mm2 (M5)
AC mains input to bypass	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
	N	N	M5	2 (17.7)	13.3 mm2 (M5)
UPS output to loads	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
	N	N	M5	2 (17.7)	13.3 mm2 (M5)
DC input	+	Battery (+)	M5	2 (17.7)	13.3 mm²(M5)
	–	Battery (-)	M5	2 (17.7)	13.3 mm2 (M5)
	N	Battery (N)	M5	2 (17.7)	13.3 mm2 (M5)
Backfeed contactor input	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
Backfeed contactor output	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
User grounding	Ground		M8	15 (133)	60 mm2 (M8)

Table3-4: 30K\40K External Power Terminals

Terminals Function	Terminals	Function	Size	Tightening Torque Nm (lb in)	Bolt specifications
AC mains input to UPS rectifier	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
	N	N	M5	2 (17.7)	13.3 mm2 (M5)
AC mains input to bypass	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
	N	N	M5	2 (17.7)	13.3 mm2 (M5)
UPS output to loads	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
	N	N	M5	2 (17.7)	13.3 mm2 (M5)
DC input	+	Battery (+)	M8	2 (17.7)	60 mm2 (M8)
	–	Battery (-)	M8	2 (17.7)	60 mm2 (M8)
	N	Battery (N)	M8	2 (17.7)	60 mm2 (M8)
Backfeed contactor input	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
Backfeed contactor output	L1	A phase	M5	2 (17.7)	13.3 mm2 (M5)
	L2	B phase	M5	2 (17.7)	13.3 mm2 (M5)
	L3	C phase	M5	2 (17.7)	13.3 mm2 (M5)
User grounding	Grounding		M8	15 (133)	60 mm2 (M8)

Table3-5: 60K\80K External Power Terminals

Terminals Function	Terminals	Function	Size	Tightening Torque Nm (lb in)	Bolt specifications
AC mains input to UPS rectifier	L1	A phase	M8	6 (53)	60mm2 (M8)
	L2	B phase	M8	6 (53)	60mm2 (M8)
	L3	C phase	M8	6 (53)	60mm2 (M8)
	N	N	M8	6 (53)	60mm2 (M8)
AC mains input to bypass	L1	A phase	M8	6 (53)	60mm2 (M8)
	L2	B phase	M8	6 (53)	60mm2 (M8)
	L3	C phase	M8	6 (53)	60mm2 (M8)
	N	N	M8	6 (53)	60mm2 (M8)
UPS output to loads	L1	A phase	M8	6 (53)	60mm2 (M8)
	L2	B phase	M8	6 (53)	60mm2 (M8)
	L3	C phase	M8	6 (53)	60mm2 (M8)
	N	N	M8	6 (53)	60mm2 (M8)
DC input	+	Battery (+)	M10	6 (53)	150 mm2 (M10)
	–	Battery (-)	M10	6 (53)	150 mm2 (M10)
	N	Battery (N)	M10	6 (53)	150 mm2 (M10)
Backfeed contactor input	L1	A phase	M8	6 (53)	60mm2 (M8)
	L2	B phase	M8	6 (53)	60mm2 (M8)
	L3	C phase	M8	6 (53)	60mm2 (M8)
Backfeed contactor output	L1	A phase	M8	6 (53)	60mm2 (M8)
	L2	B phase	M8	6 (53)	60mm2 (M8)
	L3	C phase	M8	6 (53)	60mm2 (M8)
User grounding	Grounding		M8	24 (212)	60 mm2 (M8)

Table3-6: Recommended Input Circuit Breaker Ratings

UPS models	Circuit breaker ratings	
	Load derating	400V
20K	100%	40A
30K	100%	60A
40K	100%	78A
60K	100%	120A
80K	100%	156A

Precautions:
To avoid fire, the UPS can only be connected to the circuit with the maximum rated current of the input circuit breaker in the above table.

Table3-7: Recommended Bypass Circuit Breaker and output Circuit Breaker

* The overcurrent protection switches for the bypass and output shall be provided by the customer.

UPS models	Circuit breaker ratings	
	Load derating	400V
20K	100%	36A
30K	100%	54A
40K	100%	72A
60K	100%	108A
80K	100%	144A

There is no DC disconnecting device inside the UPS. When installing an external battery, a battery disconnecting switch (circuit breaker) shall be installed between the battery and the UPS in accordance with local regulations.
The external DC input overcurrent protector and the remote position switch for disconnecting the battery shall be provided by the customer. The following table lists the ratings of circuit breakers for continuous operation.

Table3-8: Recommended Backfeed Contactor Ratings

UPS models	Backfeed contactor ratings		Magnatic contactor coil voltage
	Load derating	400V	
20K	100%	57A	24V
30K	100%	86A	24V
40KS	100%	114A	24V
60K	100%	172A	24V
80K	100%	229A	24V

the backfeed contactor shall be provide by customer

Table3-9: Recommended DC Circuit Breaker Ratings

UPS models	Circuit breaker ratings	
	Load derating	Rated Battery Voltage (20-80-VA DC 432V)
20K	100%	57A
30K	100%	86A
40K	100%	114A
60K	100%	172A
80K	100%	229A

The rated voltage and current of the battery shall be calculated based on 2V per cell.The connection between the battery and the UPS shall not produce a voltage drop greater than 1% of the nominal DC voltage at the rated battery current. If the DC input wire from the battery box to UPS is supplied by the UPS manufacturer, and the battery box and the UPS cabinet is manufactured by the same manufacturer, and not adopting the wire sizes recommended in Table 3-4 is allowed.

3.6 Parallel Installation

UPS has a direct parallel function, and the parallel line (optional) can be connected to 2 to 4 UPS units in parallel to achieve expansion or power redundancy (N+X). For parallel installation with transformer, please consult the local service representative.

The minimum clearance between two UPS units is 10cm. The input wiring requirements for paralleled UPS units are the same with those for single unit. The input/output of each UPS unit shall be connected to the same input/output patchboard, and then the load will be removed by the wiring of the patchboard. The following figure shows the parallel connection mode with 80KS cabinet as an example:

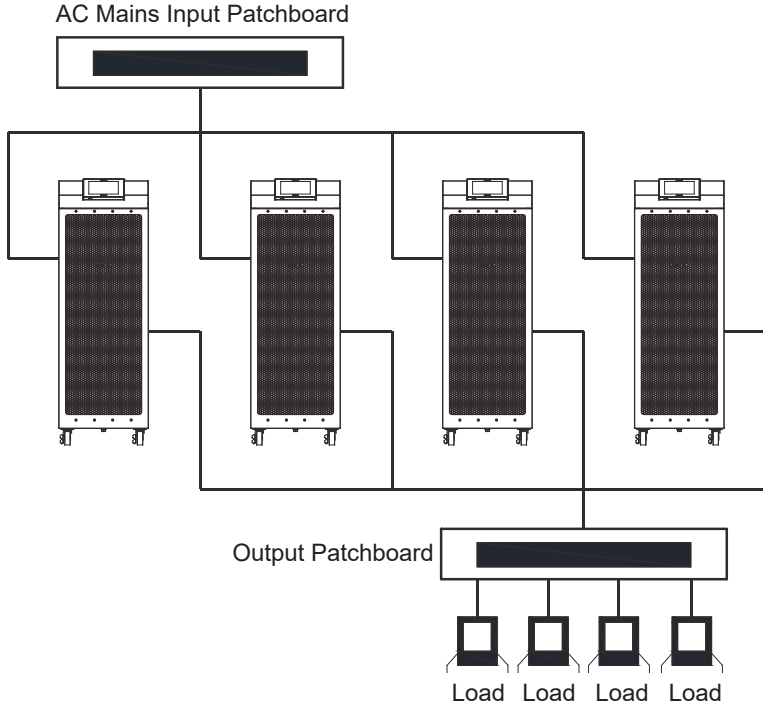


Figure 3-1: Parallel Installation

Description of parallel connection diagram:

Precautions:

- In the parallel system, the length of the power line input to the common point of the AC distribution power supply and the length of the power line output to the common point of the load of each UPS unit shall be the same, and its length shall comply with the following rules to ensure that the input and output impedance of each UPzS match and that the impedance error shall be less than ±10%. The purpose is to ensure current sharing of parallel UPS. It is recommended that the input and output cable length of the parallel system is greater than 10 meters. Input and output are 5 meters each.

  Total length 1A = 2A = 3A = 4A
  1B = 2B = 3B = 4B
  1C = 2C = 3C = 4C
- If only two UPS units are connected in parallel (redundancy), the above requirements are not mandatory, but the future expansion might be affected if the requirements are not satisfied.
- Ensure that the static bypass input of each UPS in the parallel system is the same common point, like an external bypass circuit breaker. If the rectifier input of each UPS in the parallel system is an independent distribution power supply, please consult our engineer to ensure the distribution compatibility.

For the detailed definition of the pin of the terminal CN10, please refer to Chapter V Communication Interface.

The wiring diagram of the parallel system is as follows:

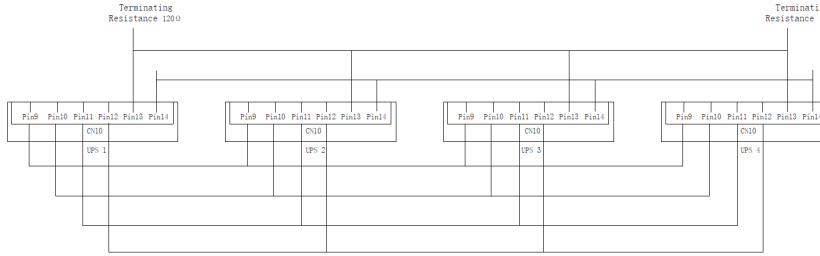


Figure 3-2 : Wiring diagram of the parrel system:

3.7 Steps of connecting the battery box to UPS

An overcurrent protection circuit breaker with rated specifications must be installed between the battery box and the UPS. The specific specifications can be found in the wiring table in the previous section.

1. Ensure that the input and output terminals of the UPS are not charged and that there is no voltage output from the external battery socket.
2. Set the battery box switch to “OFF”.
3. Open the UPS terminal block cover, and then connect the positive and negative polarity from the UPS terminal block to the positive and negative polarity on the battery box. Do not connect the positive and negative polarity of the battery inverse.
4. Use multi-meter (DC Voltage) to measure the voltage of positive and negative batteries as well as positive and negative polarity, make sure the positive and negative connectivity is correct, then put the cover back on the terminals bay

Precautions:

To prevent electric shock, the installation and replacement of battery must be performed by professional personnel and after the UPS is shut down**.**

Chapter 4 Operation

4.1 Stand-alone operation

1. Make sure that the A, B, C power supplies are connected in the correct phase sequence, and then send the power to the UPS.
2. Close the switch on the battery box (make sure that the UPS terminal block +, -, N corresponds to the +, -, N of the battery box).
3. Close the “Input Switch” on the UPS (AC mains input switch). At this time, the fan rotates for UPS self-test, UPS automatically enters the main menu, and then operates according to the following LCD display.

4.2 Use of Control Panel (HMI)

The control panel is located at the top of the front door of the UPS. Through the control panel, the UPS can be visually operated, providing convenient human-computer interaction (HMI) for UPS startup, shutdown, status display, fault alarm, parameter setting and other functions. After the UPS installation is complete, all user operations on the UPS can be done through the control panel. The control panel consists of a status indicator lamp and a HMI touch screen. The following sections describe the UPS control panel, status indicator lamps and ways to monitor the UPS operation.

Table4-1: Details of the status indicator lamp:

Operation mode	No alarm	With alarm	Description
Battery mode	Green on	Green on	The UPS is in “Battery” mode and is powered by the battery to critical loads.
Online mode	Green always on	Green on	When in “Online” mode, the UPS is in normal operation, and the power module supplies power to the critical load.
Bypass mode	Yellow always on	Yellow always on	When the UPS is in “Bypass” mode, the critical load is borne by the bypass source.
Shutdown	Load Off	Red always on	When the UPS is in “Load Off” mode, if UPS alarms, the red indicator lamp is always on, and the current active alarm is displayed on the control panel.

4.2.1 System log

When the UPS system is operating in “Online” mode, it performs monitoring on itself and the AC mains supply constantly. The system logs can be prompted by the buzzer on the UPS, the status indicator lamps or the Home screen.

Click the alarm message in the Home screen to enter the current log interface, which displays all current active alarms, notifications or commands.

- Buzzer: The system event buzzer can generate sounds to remind the operator what is happening, and emit a sound when an alarm is given. The buzzer will become silent when the alarm is cleared. The working cycle of the buzzer is 3 seconds, i.e. -0.5 seconds for sound and 2.5 seconds for silence.
- System status indicator lamps: The status indicator lamp on the UPS control panel informs the operator of the current working status of the UPS in the form of light, and its function is similar to the event buzzer.

For more fault information, please consult our company.

4.2.2 Use of touch screen

After the UPS is powered on, the touch screen displays the welcome screen, and if the UPS is turned on for the first time, enter the boot password screen (boot commissioning must be performed by our customer service engineer). Otherwise, go directly to the Home screen, as shown below:

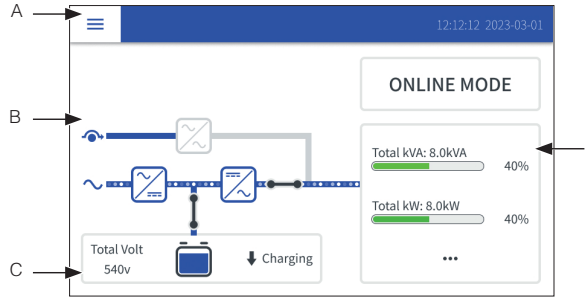


Figure 4-1: Home Interface

The HMI on the control panel provides an operating interface for the UPS system. The following figure identifies the touch screen components, which are described in the following sections.

A. The UPS status area displays the current date and time, and current alarm information.

B. The energy flow diagram area includes information on the state and operation of the energy flow diagram of UPS;

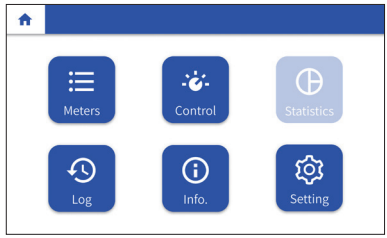
C. Click the menu bar to enter the menu screen to view more UPS information;

D. The Meters data area displays the current operating mode of the UPS, total kVA and kW, and their respective percentages. Click this area to view the detailed three-phase data.;

Screen saver for 10 minutes, i.e. If stay in any interface and no one clicks on the screen for 10 minutes, the screen automatically skips to the HOME screen, while turning off the backlight. When clicking on the screen again, the backlight lights up and the backlight restores

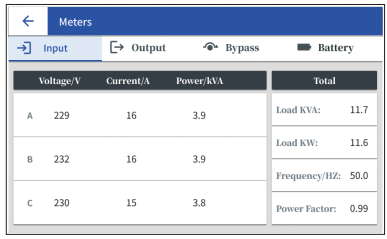
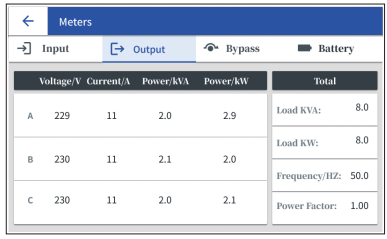
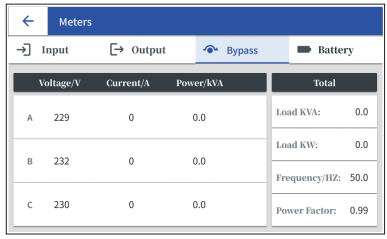
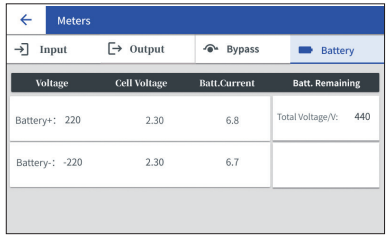
4.2.3 Use of menus

Table4-2: Click the icon "≡" in the upper left corner of the Home screen to enter the menu screen. The basic menu structure is shown in the following :

Interface	Menu	Option description
	Meters	Display the measurements of the system or critical load
	Control	Access various system control screens
	Statistics	N/A
	Log	Access the system logs, including alerts, notices and commands.
	Info.	Display the UPS and HMI information
	Setting	Access various screen control variables for system operation

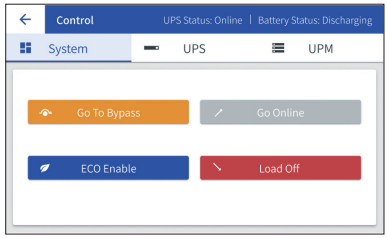
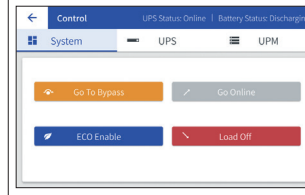
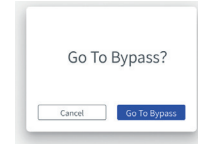
Use of Meters menu

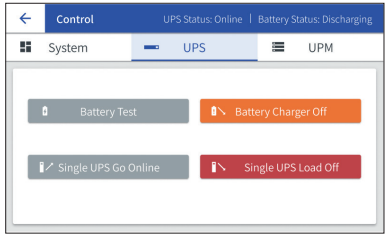
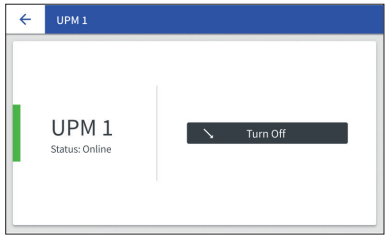
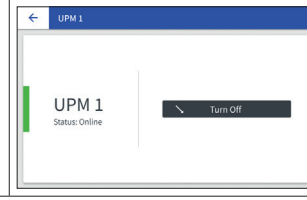
Table4-3: Click the Meters button in the menu screen to enter the Meters screen. The menu structure of Meters is shown in the following :

Interface	Menu	Option description
	Input	The “Input” screen displays the input voltage (per phase), input current (per phase), input power (per phase), and total frequency as well as total kVA, total kW, and power factor measurements of the AC mains.
	Output	The “Output” screen displays the output voltage (per phase), output current (per phase), output power (per phase), and total frequency, as well as total kVA, total kW, and power factor measurements of the AC mains.
	Bypass	The “Bypass” screen displays the bypass input voltage (phase voltage), input current (per phase), input power (per phase), and total frequency as well as total kVA, total kW, and power factor measurements of the bypass.
	Battery	The “Battery” screen displays the battery voltage, cell voltage and battery current.

Use of Control menu

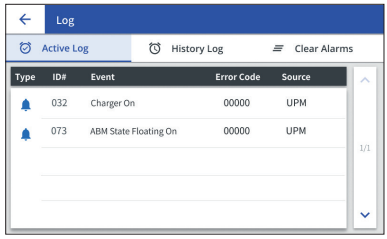
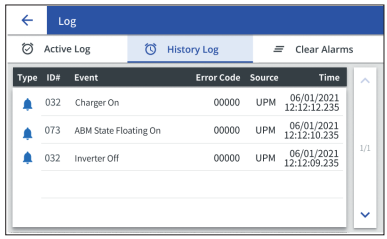
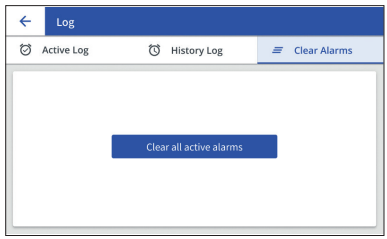
Table4-4：Click the Control button in the menu screen, then enter the initial control password “1111” and click “OK”. When the password is correct, click “Next” to enter the Control screen. The menu structure of Control is shown in the following .

Interface	Menu	Option description
	System	The “System” screen can be used for system go to bypass, go online, load off, and ECO Enable operation. In the upper part of the interface, you can view the UPS status and battery status. Method for switching the system to bypass mode: When the “Go to Bypass” button is not in gray, you can switch to bypass. 1. Click the “Go to Bypass” button to enter the switch bypass interface, as shown in the following figure:  2. Click the “Go to Bypass” button in this interface, as shown in the following figure:  3. Click the “YES” button to switch to the bypass mode. It is the same for other button functions.

Interface	Menu	Option description
	UPS	The “UPS” interface is used for battery testing, battery charger on, battery charger off, single UPS go online, single UPS load off operations. When the button is gray, it indicates that this button is currently null. In the upper part of the interface, you can view the UPS status and battery status.
	UPM	The “UPM” interface can view the UPM status, UPS status, and battery status. Click on the interface to enter the UPM turn off interface. When the button is gray, it indicates that this button is currently null. The UPM will be shut down upon a click of the “Turn Off” button on the interface. 

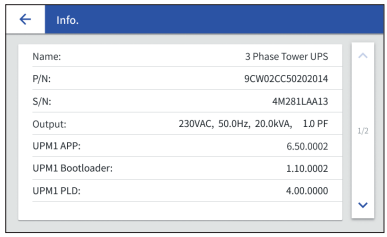
Use of Log menu

Click the Log button in the menu screen to enter the Log screen. The menu structure of Log is shown in the following table4-5:

Interface	Menu	Option description
	Active Log	On the “Active Log” screen, you can view all the alert information of the current UPS.
	History Log	On the “History Log” screen, you can view all active logs, 1,024 items on 205 pages at most.
	Clear Alarms	On the “Clear Alarms” screen, you can clear all the alert information on the “Active Log” interface.

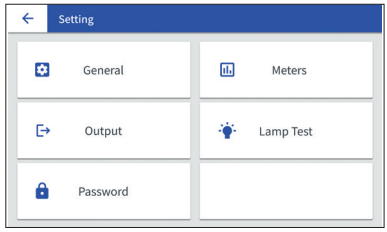
Use of Info. menu

Click the Info. button on the menu to enter the Info. interface. You can view the UPS name, serial number, UPM version number, HMI version number and other information in the Info. screen. The menu structure of the information (Info.) is shown in the following table4-6:

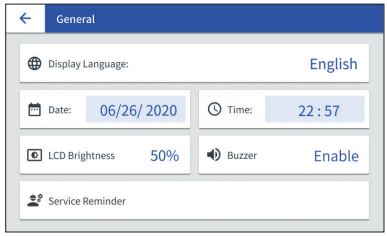
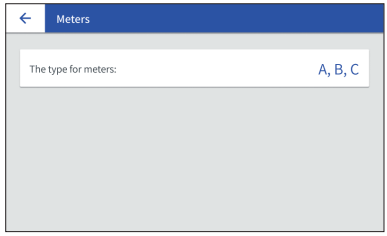
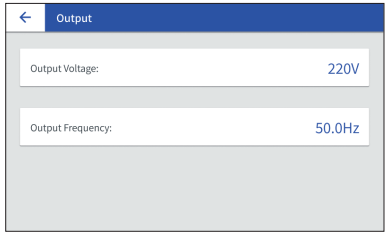
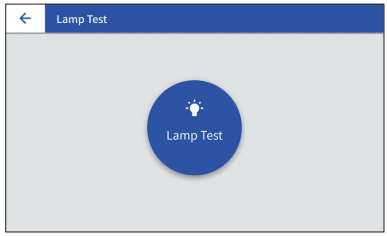
Interface	Menu	Option description
	Info.	The “Info.” screen can view the UPS name, serial number, UPM version number, HMI version number and other information.

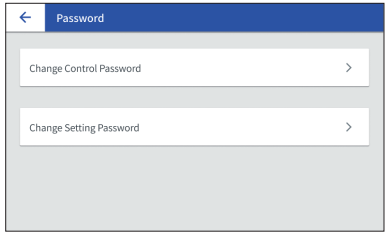
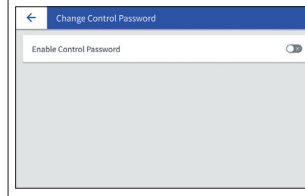
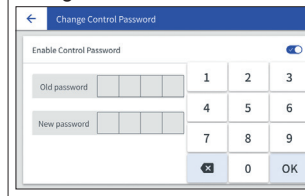
Use of Setting menu

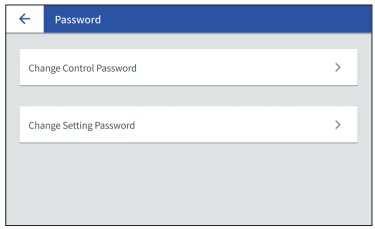
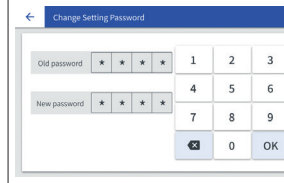
Click the Setting button in the menu interface, then enter the initial password “0101” and click the “OK” button. When the password is correct, click “Next” to enter the Setting interface. As shown in the following figure:



On the Setting interface, you can not only set the language, time, brightness, output voltage and frequency, but also modify the password. The menu structure of Setting is shown in the following table:

Interface	Menu	Option description
	General	The “General” interface sets the HMI display language, date, time, and brightness. Click the “Time” button on the “General” interface to set the hour, minute and second. When the setting is complete, click the “Save” button to save the time of this setting. Click the “Cancel” button to return to the “General” interface.
	Meters	On the “Meters” interface, you can set the UPS measurements.
	Output	On the “Output” interface, you can set the UPS output voltage and frequency.
	Lamp Test	The “Lamp Test” interface detects whether the indicator lamp on the touch control panel is normal.

Interface	Menu	Option description
	Password	On the “Password” interface, you can modify the control password and setting password. The “Change Control Password” interface is used to change the password that enters the control interface: 1. Click the “Enable Control Password” button in this interface.  2. The keyboard and password display box for modifying the control password are displayed, and the control password can be changed at this time.  3. Click the password keyboard on the right side of the interface to enter the old password and the new one, and then click the “OK” button on the keyboard. If the old password is entered correctly, the text “New Password Saved” is displayed on the interface. 

Interface	Menu	Option description
	Password	4. If the old password is entered incorrectly, the text “Wrong Old Password” is displayed on the interface, and you need to re-enter the password at this time. 
		On the “Password” interface, you can modify the control password and setting password.  The “Change Setting Password” interface is used to modify the password that enters the “Setting” interface: 1. The keyboard and password display box for modifying the setting password are displayed, and the setting password can be modified at this time.  2. Click on the keyboard on the right side of the interface to enter the old password and the new one, then click the “OK” button on the keyboard. If the old password is entered correctly, the interface displays the text “New Password Saved”. If the old password is entered incorrectly, the interface displays the text “ Wrong Old Password”. At this time, you need to re-enter the password.。

Chapter 5 Communication Interface

The UPS provides expansion slots, parallel interfaces, REPO and SERVICE monitoring communication interface for technical personnel authorized by our company.

Location map of communication interface:

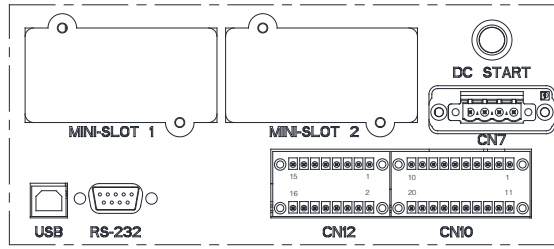


Figure 5-1: Communication Interface

- **Communication expansion slots:** The UPS has two communication expansion slots for installing MINI communication cards. MINI communication cards can be quickly installed and hot-swappable. For more information, please refer to Section 6.4 MINI Communication Card.

- **CN7**: The Terminal CN7 for External Backfeed Driver Signal.

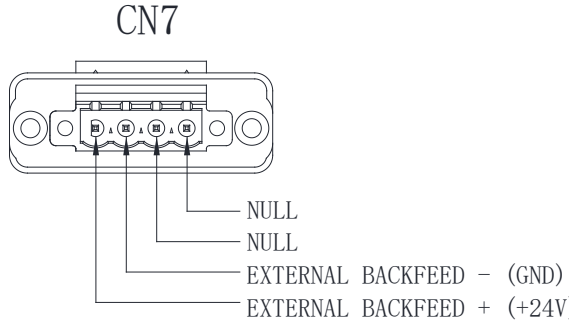


Figure 5-2 : CN7

- **CN10:** The terminal CN10 contains the parallel CAN communication signal, Pull-Chain signal, REPO signal.

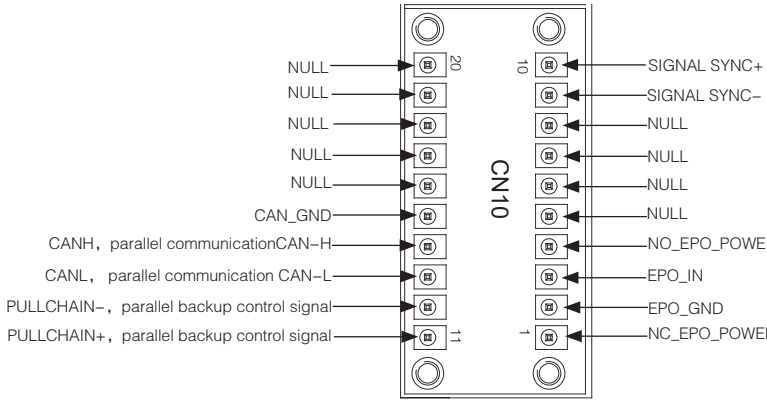
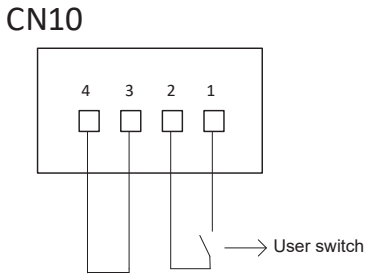
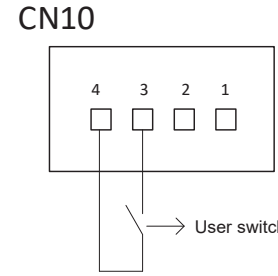


Figure 5-3 : CN10

REPO external wiring diagram:



3-4 are connected with a short cable, and keep them connected. When 1-2 are open, the UPS will perform emergency power off



When 3-4 are closed, the UPS will perform emergency power off. 1-2 are idle.

- **CN12:** This standard function can be used to connect an external alarm signal to the corresponding interface terminal of the UPS, such as a smoke alarm or an overheating alarm signal. Please use twisted-pair wires to connect the alarm device and the corresponding UPS terminals. For the configuration of external alarm signals, you need to consult our company.

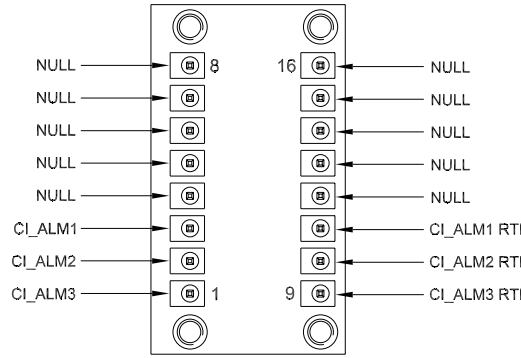


Figure 5-4 : CN12

For the use of the above communication interface, please contact our customer service.

Chapter 6 Introduction of Optional Accessories

6.1 Single input power supply

According to the customer's demand, our company can change the standard double power input to single power input through the randomly attached power jumper.

6.2 Communication cards

Our company provides a wealth of communication interfaces and communication options for users to achieve localization or remote monitoring support. The communication cards that match the UPS are as follows, which can be purchased as an option:

NMC CARD

NMC is kind of SNMP (Simple Network Management Protocol) manager to communicate UPS via Ethernet, it provides access information and send commands for the UPS. NMC supports communicating protocols which are SNMP, Modbus TCP and HTTP/HTTPS for application. Through NMS (Network Management Station) or web browser user can access UPS information via Ethernet directly, meanwhile user can manage both UPS and NMC parameters as well.

NMC provides shutdown protection for different OS, an application program which named SPS (System Protect Software) for multi-server shutdown purpose. The program provides shutdown function for different operating systems when shutdown events are appearing on UPS. Shutdown events are configurable by user. The shutdown software will proceed the automatic shutdown orderly to prevent the abnormal shut-off of the clients or servers.

CMC CARD

CMC card is an industrial Modbus card that supports standard Modbus RTU communication.

Users can carry out centralized monitoring of multiple UPSs in the local area through CMC card, for getting UPS information and status in time.

Chapter 7 Transportation, Maintenance and Troubleshooting

Transporting UPS

Please follow the following steps to prepare for UPS transportation.
Note: As the UPS is very heavy, special equipment (such as forklifts) is needed for loading and unloading.

1. Turn off all devices connected to the UPS and remove all cables connected to the UPS terminal block.
2. Disconnect the UPS AC mains power switch and battery pack switch.

Servicing and Maintenance

The preventive maintenance of the UPS system is more convenient to carry out. It includes regular inspection and maintenance. It is advised that such work is performed by professional maintenance personnel of the manufacturer, so as to ensure that the equipment works normally and that the battery is in sound condition.

1. If the battery is disconnected, loads will not be protected from power failure.
2. Under normal circumstances, early replacement should be made if the battery is found not in good condition. The battery should only be replaced by qualified personnel. Users should not replace the battery themselves. The following precautions should be observed:
    - Before replacing the battery, please shut down the UPS and disconnect the AC mains power.
    - Remove watches, rings, or other metal objects.
    - Use screwdrivers with insulated handles, and do not lay tools or metal objects on the battery. Otherwise the battery can present a risk of electrical shock or explosion from high short-circuits current.
    - Short circuit or reverse connection between the positive and negative terminals of the battery is strictly forbidden.
3. It is not recommended to replace batteries individually. All batteries should be replaced at the same time only by authorized personnel following the instructions from the battery supplier.
4. Please note that the ventilation of the UPS cooling hole is smooth. Clean the dust at the side panel and the fan vent every six months (please turn off the AC mains power and battery switch before cleaning).

Troubleshooting

Go through the following checklist if the UPS is operating abnormally:

1. Check if the input wiring of the UPS is connected correctly.
2. Check if any over-current circuit breaker has tripped.
3. Check if input voltage is within the specified limits.

Please refer to Table 4-1 Details of the status indicator lamp for appropriate handling

If there is a warning condition that is not in the list, or if the exception still exists after handling, be sure to provide the following information:

- UPS model, CTO number, equipment batch number (S/N);
- The date when the problem arose;
- A complete description of the problem (including HMI information, indicator lamp display, buzzer call, power condition, load capacity, etc.).

Appendix 1 Technical Parameters

Model		20KS	30K	40K	60K	80K
Rated capacity		20KVA/20KW	30KVA/30KW	40KVA/40KW	60KVA/60KW	80KVA/80KW
Input	Input type	Three-phase + Neutral Wire + Ground Wire				
	Frequency	40-72Hz				
	Power factor	≥0.99				
	Mains Voltage Range	Rated 230/400Vac（Optional:220/380，240/415） 190/330 ~ 276/478Vac（-15%, +20%），under 100% load 116/201 ~ 276/478Vac（-50%, +20%），under 50% load				
	Bypass Voltage Range	Rated 230/400VAC (Optional: 220/380, 240/415) 207/359-253/438 VAC (range rated voltage ±10% by default, maximum optional range ±20%)				
Output	Rated voltage	230/400 VAC, Three Phase + Neutral Wire + Ground Wire, (Optional: 220/380, 240/415)				
	Power factor	1.0				
	Frequency Tolerance	Synchronous bypass frequency range of ±4Hz				
	Overload Time	102-110% load 60 mins, 111-125% load 10 mins, 126-150% load 1 min, > 151% load 150 Ms				
Operating environment	Ambient temperature	0-40℃ UPS work in more than 40 ℃ condition, please contact our company for more information				
	Storage Temperature	-5 ~ +55℃ (packing intact) For other storage conditions, please see storage requirements in the section on precautions.				
	Ambient humidity	5-95%, no condensation. The difference between the dry bulb temperature and the wet bulb temperature of the hygroscope shall always be at least 1 degree Celsius (1.8 degrees Fahrenheit) to achieve a condensation-free environment.				
	Altitude	The altitude of UPS during normal operation shall be not more than 1,000 meters (3,300 feet). If it exceeds 1,000 meters, it shall be reduced in accordance with GB/T 3859.2. If the customer operates the UPS in more than 2,000 meters, please contact our company for more information.				

Model		20KS	30K	40K	60K	80K
Rated capacity		20KVA/20KW	30KVA/30KW	40KVA/40KW	60KVA/60KW	80KVA/80KW
Battery voltage range		320V ~ 607V				
Weight	Net weight	45Kg	48Kg	48Kg	96Kg	96Kg
	Gross weight	55Kg	58Kg	58Kg	134Kg	134Kg
Cabinet Dimensions(WxDxH)		330*521*664	330*521*664	330*521*664	330*972*773	330*972*773
Shipping Dimensions(WxDxH)		440*765*800	440*765*800	440*765*800	585*1148*880	585*1148*880
Safety standard		IEC/62040.1				
EMC		IEC/62040.2				

Warning: This product is used for commercial and industrial fields in the second type of environment and may require installation restrictions or additional measures to curb harassment.

* Non-default battery cell configuration, please make sure that you are confirmed with our sales or technical support team.