Note

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

5.1.2 Start from Battery

The start for battery model is referring to battery cold start. The steps for the start-up are as follows:

1. Confirm the battery is correctly connected; close the external battery circuit breakers.
2. Press the red button for the battery cold start（See Fig.5-1）.The system is than powered by the battery.

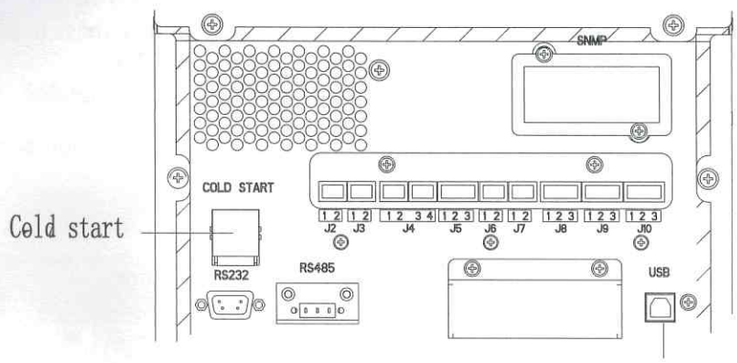


Fig.5-1 The position of the battery cold start button

3. After that, the system is starting up following steps 3 in section 5.1.1 and the system transfers to battery mode in 30S.
4. Close the external output power supply isolation to supply the load, and the system is working on battery model.

5.2 Procedure for Switching between Operation Modes

5.2.1 Switching the UPS into Battery Mode from Normal Mode

The UPS transfers to Battery model immediately after input circuit breaker disconnects from the utility.

5.2.2 Switching the UPS into Bypass Mode from Normal Mode

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

Warning

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

5.2.3 Switching the UPS into Normal Mode from Bypass Mode

Follow the path by selecting the icon of  and then s Manual ESC, the system transfer to Normal Mode

Note

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

5.2.4 Switching the UPS into Maintenance Bypass Mode from Normal Mode

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

1. Transfer the UPS into Bypass mode following section 5.2.2.
2. Open the battery breaker and close the maintenance bypass breaker. And the load is powered through maintenance bypass and static bypass.
3. The load is powered through maintenance bypass.

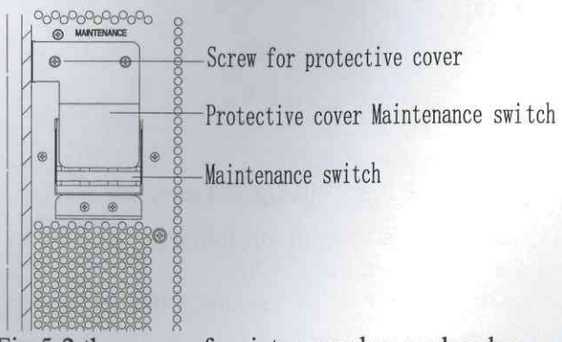


Fig.5-2 the cover of maintenance bypass breaker

Waring

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

Waring

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

Danger

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

If you need to maintain the power module, wait for 10 minutes to let the DC bus capacitor fully discharge before removing the cover.

5.2.5 Switching the UPS into Normal Mode from Maintenance Bypass Mode

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

1. After finish of maintenance, close the bypass breaker and the bypass static switch will be turned on in 30S after the LED screen goes on, the bypass indicator goes green and the load is powered through maintenance bypass and static bypass.
2. Turn off the maintenance bypass switch and fix the protection cover, and then the load is powered through bypass. The rectifier starts followed by the inverter.
3. After 60S, the system transfers to Normal mode.

Waring

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

5.3 Battery Maintenance

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

Enter the menu , as is shown in Fig.5-3 and select the icon MaintTest, the system transfers into the Battery mode for discharging. The system will discharge the batteries until the alarm of "Battery low voltage" is given Users can stop the discharging by the "Stop Test" icon StopTest.

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

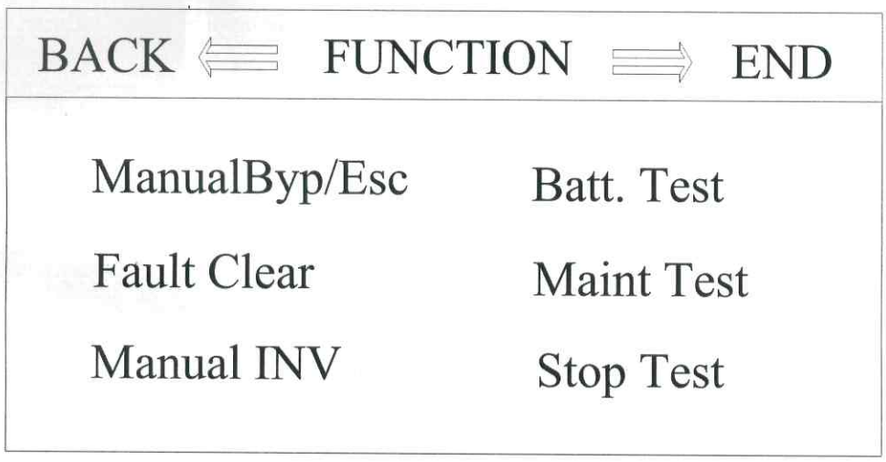


Fig.5.3 Battery maintenance

5.4 EPO

The EPO button located in the operator control and display panel (with cover to avoid disoperation, see Fig.5-5) is designed to switch off the UPS in emergency conditions (e.g., fire, flood, etc.).To achieve this, just press the EPO button, and the system will

turn off the rectifier, inverter and stop powering the load immediately (including the inverter and bypass output), and the battery stops charging or discharging.
If the input utility is present, the UPS control circuit will remain active; however, the output will be turned off. To completely isolate the UPS, users need to open the external mains input supply to the UPS

Warning

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

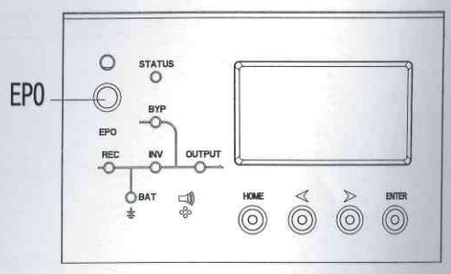


Fig .5-5 EPO Button

5.5 Installation of Parallel Operation System

5.5.1 Parallel system diagram

Up to 4 UPS could be paralleled， the parallel diagram is shown in Fig.5-6 below.

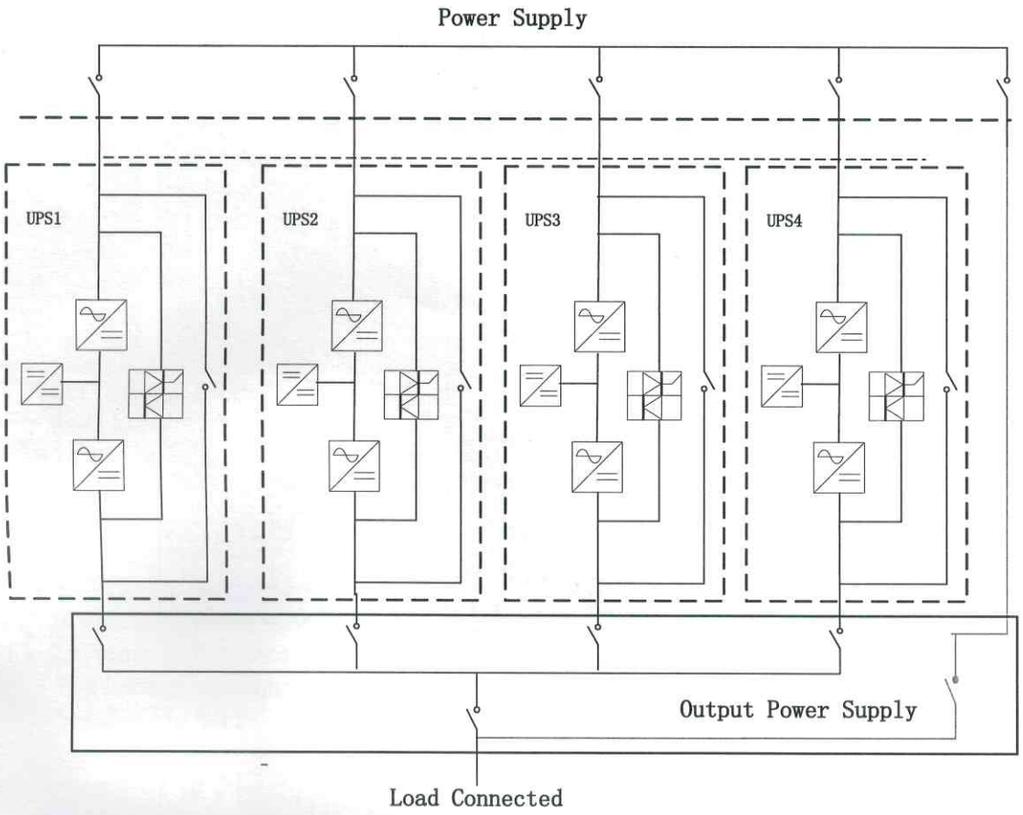


Fig. 5-6 Parallel diagram

The parallel board is located at the back of the UPS cabinet, as is shown in Fig.5-7.

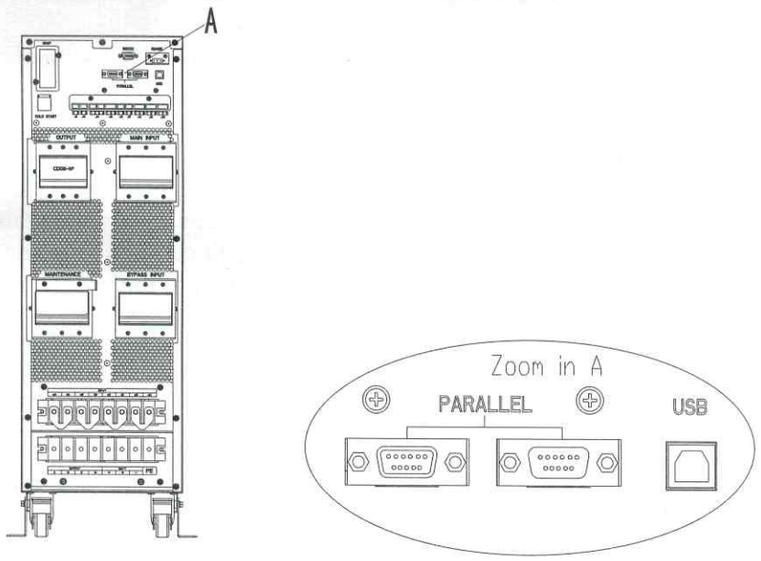


Fig.5-7 Location of the Parallel board

All the parallel cables are designed to be shielded and double insulated, and are connected between the UPS to form a loop as shown below in Fig.5-8.

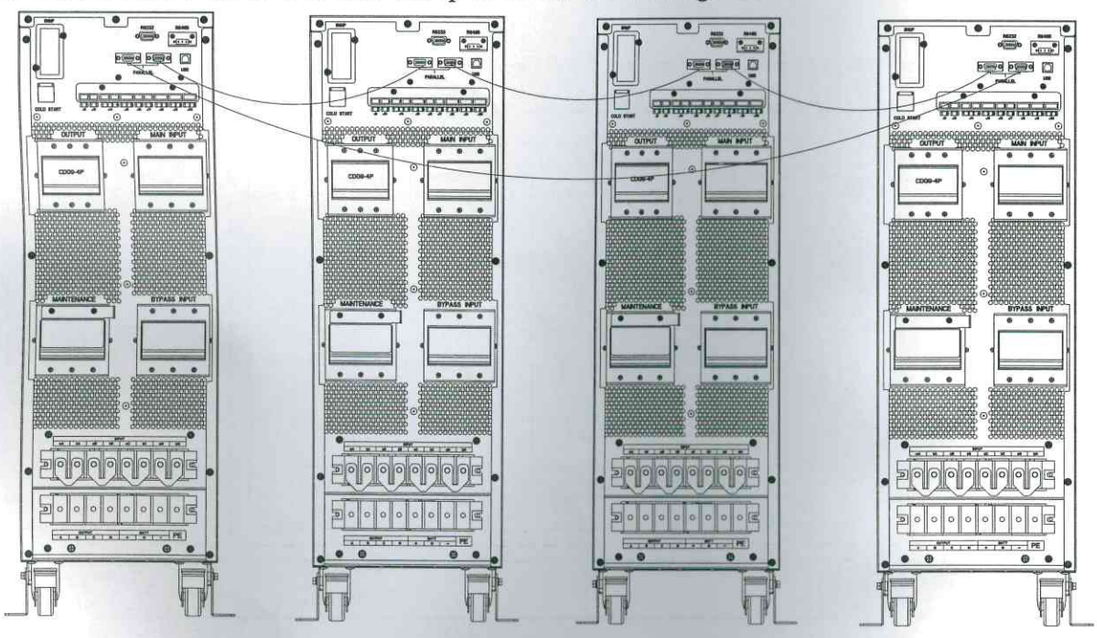


Fig.5-8 Parallel connection

5.5.2 Parallel system setting

Parallel system connection

For field installation, please connect the cables according to Fig.5-6 and Fig.5-8.

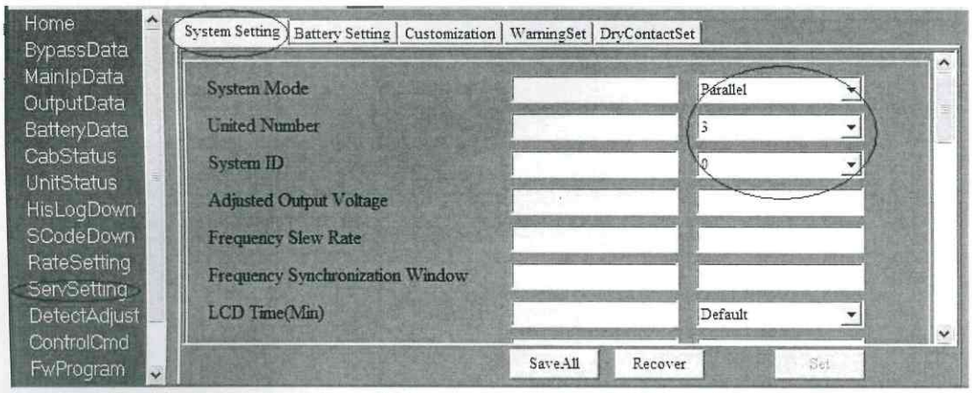
In order to assure that all units are equally utilized and to comply with relevant wiring rules, the following requirements apply:

1. All units shall be of the same rating and must be connected to the same bypass source.
2. The bypass and the main input sources must be referenced to the same neutral potential.
3. Any RCD (Residual Current detecting device), if installed, must be of an appropriate setting and located upstream of the common neutral bonding point. Alternatively, the device must monitor the protective earth currents of the system. Refer to the High Leakage Current Warning in the first part of this manual.
4. The outputs of all UPS must be connected to a common output bus.

Parallel system software setting

To change the parallel system setting, please follow the steps below.

1. With the monitoring software from manufacturer, select the page of "Service Setting" as below,



Set "System Mode" to "Parallel", and set the "United Number" to the number of units in parallel. For the setting of system ID with a system of 3 units in parallel, for example, set the number from 0 to 2 for these 3 units accordingly.

Restart the UPS when finish the setting and press the button of "Set". Here the software setting is done. Ensure all the output parameters must be set the same.

Parallel system jumper setting

There are different setting of the jumpers on the parallel board and control board for different parallel system.

The location of connectors on parallel board is shown in Fig.5-11 and control board in Fig.5-12.

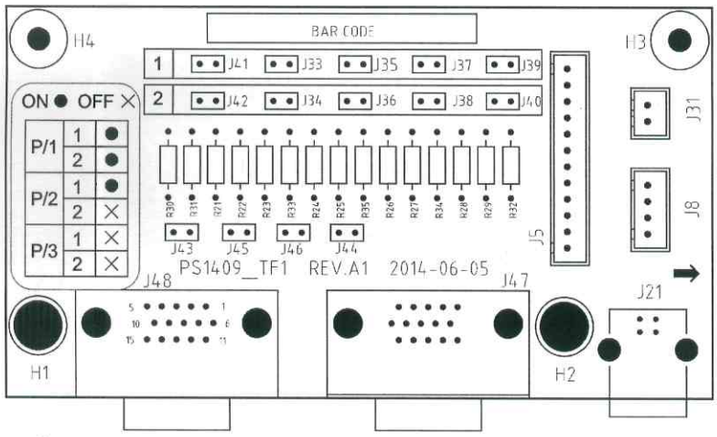
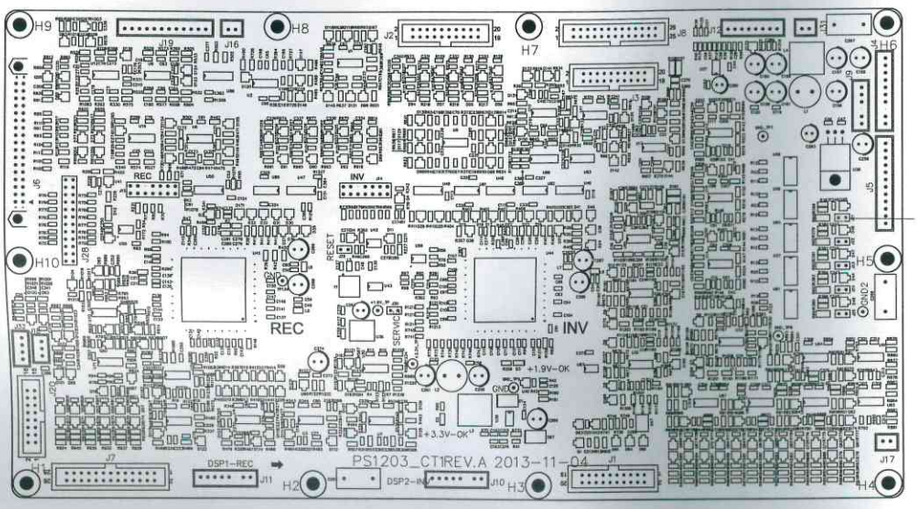


Fig.5-11 Connectors on Parallel board (PS1409_TF1, inside, back top)



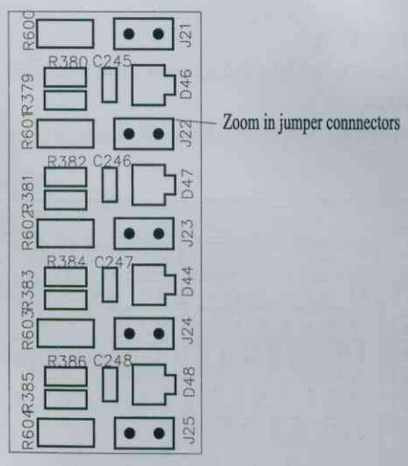


Fig.5-12 Connectors on Control board (PS1203_CT1)

1. Parallel boards settings

A. For single UPS, no need parallel board. When a parallel board is installed, connectors of J33 to J42 should be shorted by the jumpers.

B. For 2 UPS in parallel, short the connectors of J33/J35/J37/J39/J41 by jumpers on each board, keep connectors of J34/J36/J38/J39/J42 open

C. For 3 or 4 UPS in parallel, keep connectors of J33-J42 open.

2. Control boards settings

The control board is named as PS1203_CT1.

For single UPS, keep the J21-J25 shorted by jumpers

For parallel, keep all the connectors J21-J25 open. As is shown in Fig.5-12.

Note: The connectors not mentioned keep them untouched.

When all the connection and settings are finished, follow the steps below for the operation of parallel system setup.

1. Close the output and input breaker of the first unit. Wait for the start up of bypass static switch and rectifier, about 90 seconds later; the system will

transfer to normal mode. Check if there is any alarm on LCD and verify the output voltage is correct or not.

2. Turn on the second unit as the same operation with the first one; the unit will join the parallel system automatically.
3. Turn on the rest units one by one, and check the information on LCD.
4. Verify the load sharing with a certain load applied.

Warning

Ensure in the process of parallel,all the output breaker are close,all the parallel output are connected together accordingly.

6. Maintenance

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

6.1 Precautions

1. Only certified engineers are authorized to maintain the UPS.
2. The components or PCBs should be disassembled from top to bottom, so as to prevent any inclination from high gravity center of the cabinet.
3. To ensure the safety before maintaining, measure the voltage between operating parts and the earth with multimeter to ensure the voltage is lower than hazardous voltage, i.e. DC voltage is lower than 60Vdc, and AC maximum voltage is lower than 42.4Vac.
4. Wait 10 minutes before opening the cover of the power module or the bypass after pulling out from the Cabinet.

6.2 Instruction for Maintaining UPS

For the maintenance of the UPS, please refer to chapter 5.2.4 for the instruction to transfer to maintenance bypass mode. After maintenance, re-transfer to normal mode according to chapter 5.2.5.

6.3 Instruction for Maintaining Battery string

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

1. Installation. The battery should be placed in dry and cool place with good ventilation. Avoid direct sunlight and keep away from heat source. When installing, ensure the correct connection to the batteries with same specification.
2. Temperature. The most suitable storage temperature is 20 °C to 25°C. The battery life will be shortened if the battery is used under high temperature or in deep discharging status. Refer to product manual for details.
3. Charging/discharging current. The best charging current for the lead-acid battery is 0.1C .The maximum current for the battery can be 0.3C.The suggested discharging current is 0.05C-3C.
4. Charging voltage. In most of the time, the battery is in standby state. When the utility is normal, the system will charge the battery in boost mode (Constant voltage with maximum limited) to full and then transfers to the state of float charge.
5. Discharge depth. Avoid deep discharging; which will greatly reduces the life time of the battery. When the UPS runs in battery mode with light load or no load for a long time, it will cause the battery to deep discharge.
6. Check periodically. Observe if any abnormality of the battery , measure if the voltage of each battery are in balance. Discharge the battery periodically.

Warning

Daily inspection is very important!

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

Warning

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

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

Therefore, its storage, transportation, use and disposal must comply with the national or local regulations and laws about the disposal of hazardous waste and waste batteries or other standards.

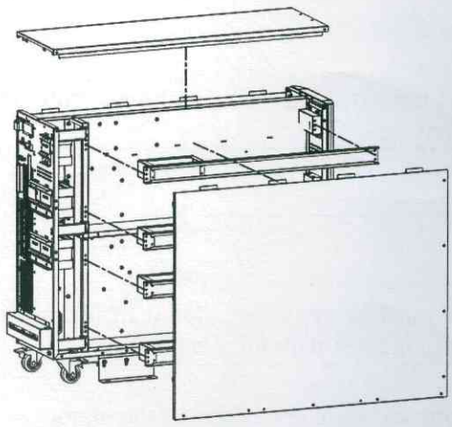
According to the national laws, the waste lead-acid battery should be recycled and reused, and it is prohibited to dispose of the batteries in other ways except recycling. Throwing away the waste lead-acid batteries at will or other improper disposal methods will cause severe environment pollution, and the person who does this will bear the corresponding legal responsibilities.

6.2.4 Installation of internal battery

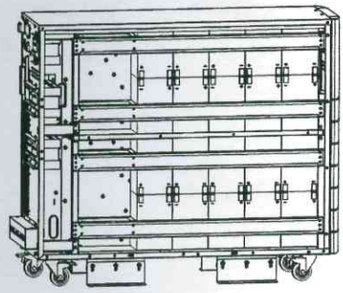
For 10kVA to 30kVA UPS with internal battery, the cable within the battery string is not provided as standard; if required, please contact your local agency.

For 10-30kV UPS, 12AH battery is to be installed as default; for 10kVA UPS, 9Ah battery can be an option, with 20pcs batteries as one string installed; for 20-30kVA UPS, with four strings installed, each string contains 20pcs.

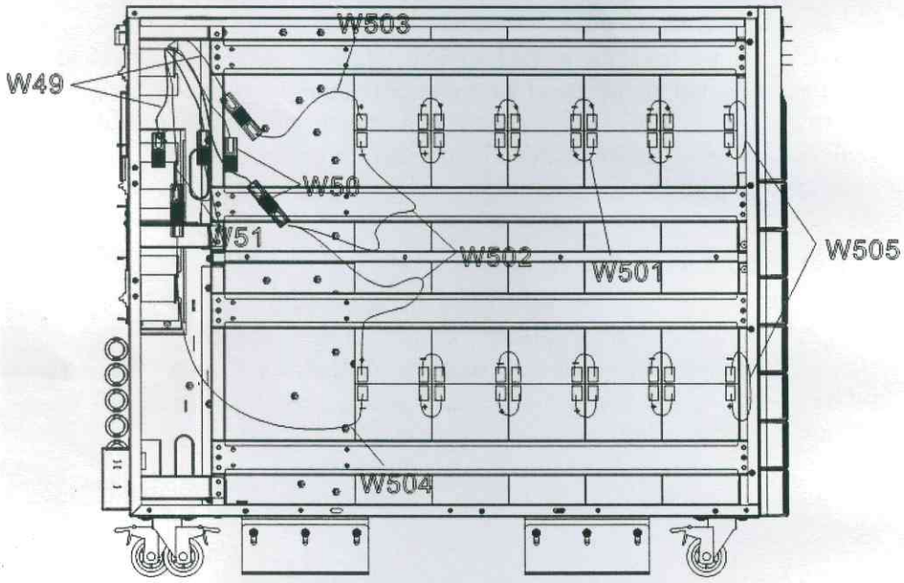
Fig.6-1-1 is the installation of 1*20*12AH battery of the 10kVA standard UPS.



1. Dismantle the covers and crossbeams



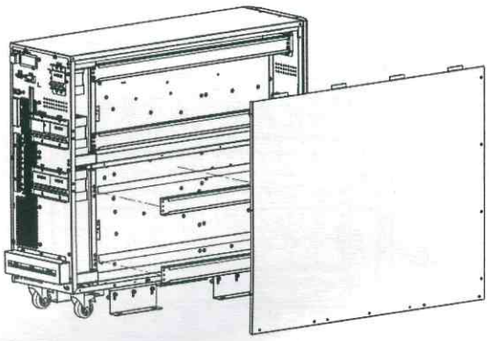
2. Install battery and fix the crossbeams



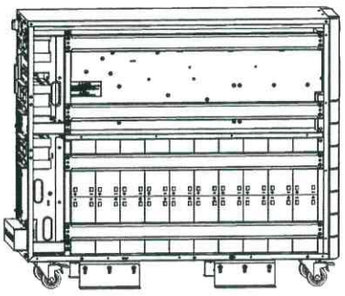
3. Connect the battery cable according to the series number and Recover the cover

*Fig.6-1-1 Installation of 1*20*12AH battery*

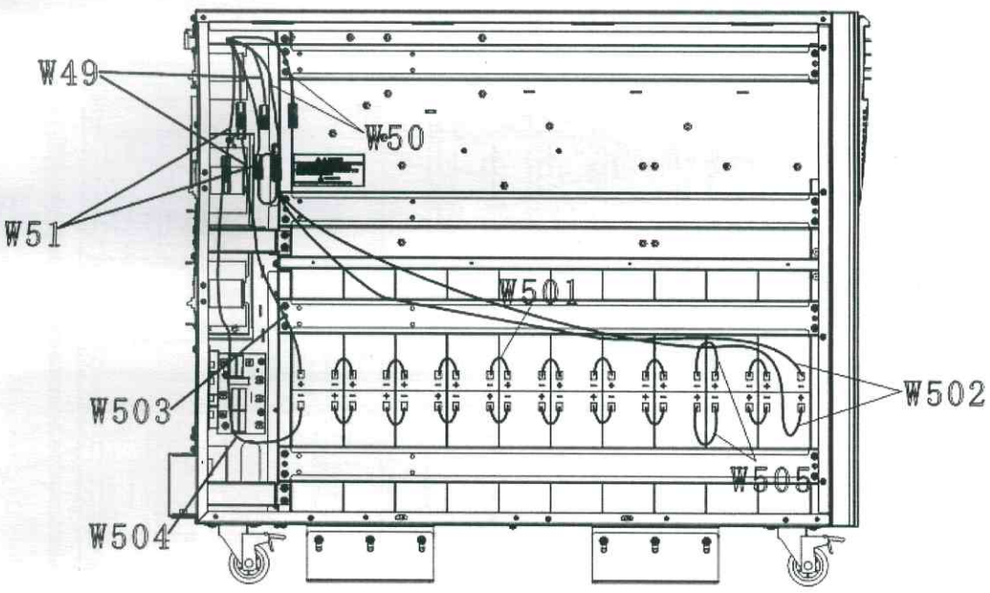
Fig.6-1-2 is the installation of 1*20*9AH battery of the 10kVA standard UPS.



1. Dismantle the covers and crossbeams



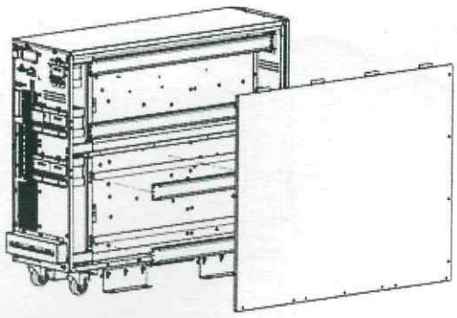
2. Install battery and fix the crossbeams



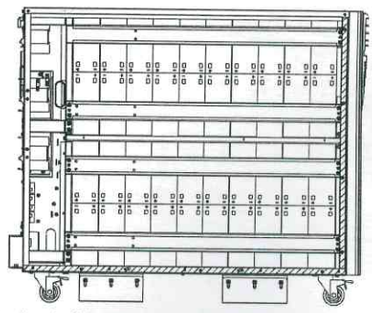
3. Connect the battery cable according to the series number and Recover the cover

*Fig.6-1-2 Installation of 1*20*9AH battery*

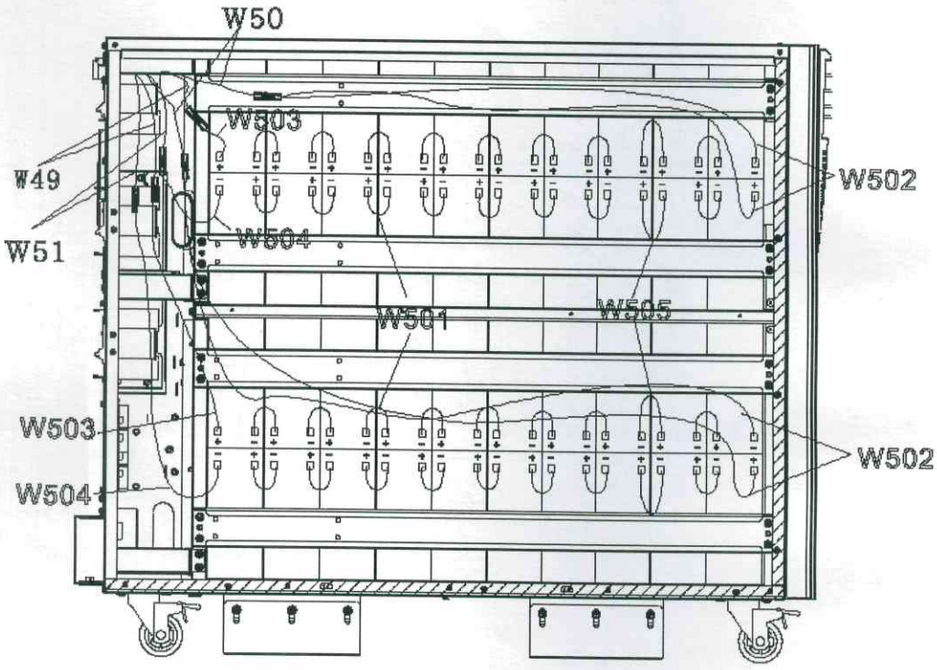
Fig.6-1-3 is the installation of 2*20* 9AH battery of the 10kVA standard UPS.



1. Dismantle the covers and crossbeams



2. Install battery and fix the crossbeams



3. Connect the battery cable according to the series number and Recover the cover

*Fig.6-1-3 Installation of 2*20* 9AH battery*

For 20kVA and 30kVAUPS the battery connection is as following

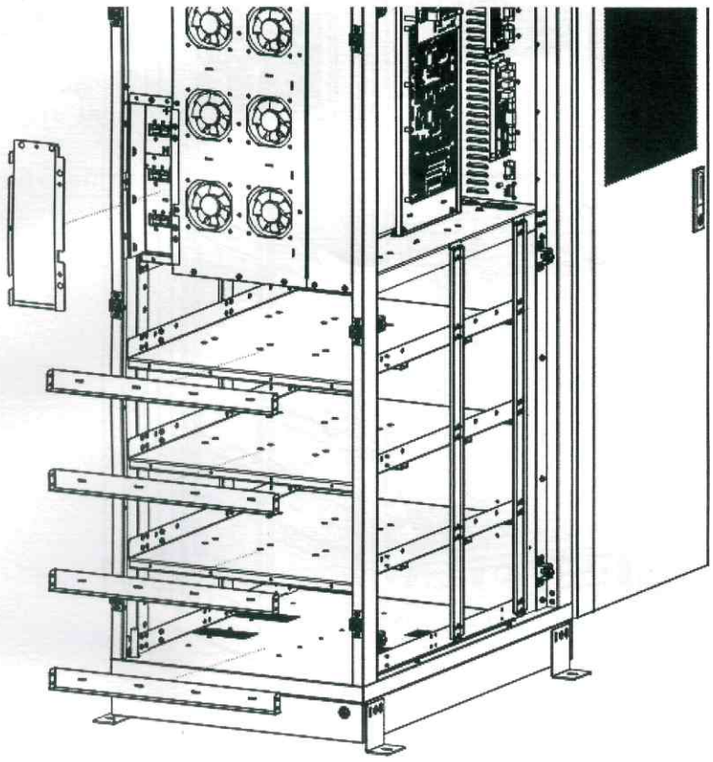


Fig 6-2 Dismantle the covers and crossbeams

For 20kVA and 30kVA the battery bank has four layers. Each layer has 20 batteries, 5 for the positive part, and 5 for the negative part, 5 batteries are contained in one package, each lay has four packages, and the Fig6-3 shows the connection of each layer.

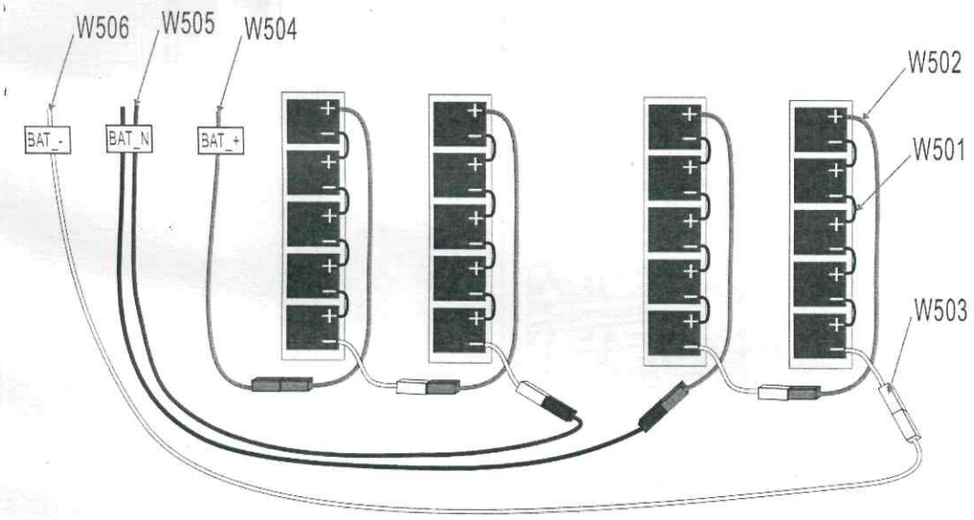


Figure 6-3 battery connection of each layer

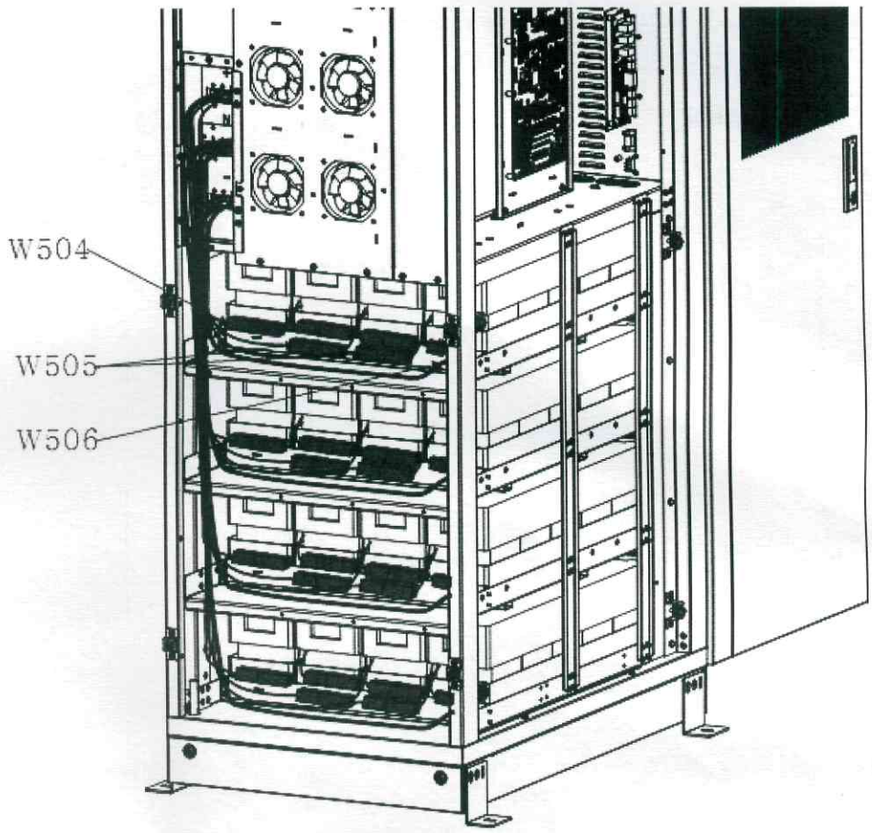


Fig 6-4，Connection between layers(Connect according to the serial number)

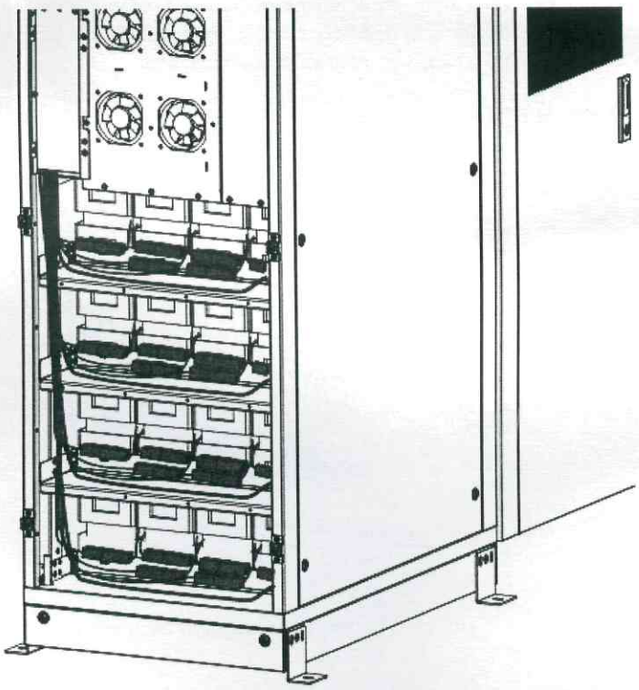


Fig 6-5，Recover the cover

Warning

Make sure the polarity of the battery is correct ;kaccording to the diagrams above.

Test and confirm the battery voltage before connectting to the main circuit.

7. Product Specification

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

7.1 Applicable Standards

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

Table 7.1 Compliance with European and International Standards

Item	Normative reference
General safety requirements for UPS used in operator access areas	EN50091-1-1/IEC62040-1-1/AS 62040-1-1
Electromagnetic compatibility (EMC) requirements for UPS	EN50091-2/IEC62040-2/AS 62040-2（C3）
Method of specifying the performance and test requirements of UPS	EN50091-3/IEC62040-3/AS 62040-3（VFI SS 111）

Note

The above mentioned product standards incorporate relevant compliance clauses with generic IEC and EN standards for safety (IEC/EN/AS60950), electromagnetic emission and immunity (IEC/EN/ AS61000 series) and construction (IEC/EN/AS60146 series and 60950).

Warning

This product conforms the EMC requirements for UPS in Category C3

and it is not suitable for medical equipments.

7.2 Environmental Characteristics

Table 7.2 Environmental Characteristics

Item	Unit	Requirements
Acoustic noise level at 1 meter	dB	58dB @ 100% load, 55dB @ 45% load(10kVA) 70dB @ 100% load, 62dB @ 45% load(20kVA/30kVA)
Altitude of Operation	m	≤1000,load derated 1% per 100m from 1000m and 2000m
Relative Humidity	%	0-95,non condensing
Operating Temperature	℃	0-40,Battery life is halved for every 10°C increase above 20°C
UPS Storage Temperature	℃	-40-70

7.3 Mechanical Characteristic

Table 7.3 Mechanical Characteristics for Cabinet

Model	Unit	10kL	10kS	20KL/30KL	20KS/30KS
Dimension W×D×H	mm	250*660*530	250*840*715	250*950*770	500*840*1400
Weight	kg	31	52	64	140
Color	N/A	BLACK			
Protection Level IEC（60529）	N/A	IP20			

7.4 Electrical Characteristics

7.4.1 Electrical Characteristics (Input Rectifier)

Table 7.5 Rectifier AC input Mains）

Item	Unit	Parameter	
Rated capacity	kVA	10K	20K/30K
Grid System	\	3 Phases + Neutral + Ground	
Rated AC Input Voltage	Vac	208/220 (three-phase and sharing neutral with the bypass input)	
Rated Frequency	Vac	50/60Hz	
Input voltage range	Vac	187~260Vac (Line-Line),full load 125V~187Vac (Line-Line),load decrease linearly according to the min phase voltage	167~260Vac (Line-Line),full load 125V~167Vac (Line-Line),load decrease linearly according to the min phase voltage
Input Frequency range	Hz	40~70	
Input Power factor	PF	>0.99	
THDI	THDI%	<5% (full Linear Load)	<4% (full Linear Load)

7.4.2 Electrical Characteristics (Intermediate DC Link)

Table 7.6 Battery

Items	Unit	Parameters
Battery bus voltage	Vdc	Rated：±120V
Quantity of lead-acid cells	Nominal	20=[1 battery(12V)] ,120=[1 battery(2V)]
Float charge voltage	V/cell （VRLA）	2.25V/cell(selectable from 2.2V/cell～2.35V/cell) Constant current and constant voltage charge mode
Temperature compensation	mV/℃/cl	3.0(selectable:0~5.0)
Ripple voltage	%	≤1
Ripple current	%	≤5
Equalized charge voltage	VRLA	2.4V/cell(selectable from : 2.30V/cell~2.45V/cell) Constant current and constant voltage charge mode
Final discharging voltage	V/cell （VRLA）	1.65V/cell(selectable from: 1.60V/cell~1.750V/cell) @0.6C discharge current 1.75V/cell (selectable from: 1.65V/cell~1.8V/cell) @0.15C discharge current (EOD voltage changes linearly within the set range according to discharge current)
Battery Charge	V/cell	2.4V/cell(selectable from : 2.3V/cell~2.45V/cell) Constant current and constant voltage charge mode
Battery Charging Power Max Current	kW	10%* UPS capacity (selectable from : 1~20% * UPS capacity)

7.4.3 Electrical Characteristics (Inverter Output)

Table 7.7 Inverter Output (To critical load)

Item	Unit	Value	
Rated capacity	kVA	10K	20K/30K
Rated AC voltage	Vac	208/220 (Line-Line)	
Rated Frequency	Hz	50/60	
Frequency Regulation	Hz	50/60Hz±0.1%	
Voltage precision	%	±1.5(0~100% linear load)	
Overload	\	<110%, 10min; 110%~125%,1min; 125%~150%,30s; >150% , 200ms	110%, 60min; 125%,10min; 150%,1min; >150%,200ms
Synchronized Range	Hz	Settable, ±0.5Hz ~ ±5Hz, default ±3Hz	
Synchronized Slew Rate	Hz	Settable, 0.5Hz/S ~ 3Hz/S, default 0.5Hz/S	
Output Power Factor	PF	1	0.9
Transient Response	%	<5% for step load (20% - 100% -20%)	
Transient recovery		< 30ms for step load (20% - 100% -20%)	
Output Voltage THDu		<1.5% from 0% to 100% linear load <6% full non-linear load according to IEC/EN62040-3	

7.4.4 Electrical Characteristics (Bypass Mains Input)

Table 7.8 Bypass Mains Input

Item	Unit	10kVA	20kVA	30kVA
Rated AC voltage	Vac	208/220 (three-phase four-wire and sharing neutral with the bypass)		
Overload	%	125% Long term operation; 125%~130% for 10min; 130%~150% for 1min; 150%~400% for 1s; >400% ,less than 200ms		110% Long term operation; 110%~125% for 1min; 125%~150% for 30S;
Current rating of neutral cable	A	1.7×In		
Rated frequency	Hz	50/60		
Switch time (between bypass and inverter)	ms	Synchronized transfer: 0ms		
Bypass voltage range	%	Settable, default -20%~+15% Upper limit: +10%, +15%, +20%, +25% Lower limit: -10%, -15%, -20%, -30%, -40%		
Bypass frequency range	%Hz	Settable, ±1Hz, ±3Hz, ±5Hz		
Synchronized Range	Hz	Settable ±0.5Hz~±5Hz, default ±3Hz		

7.5 Efficiency

Table 7.9 Efficiency

Rated power(kVA)	Unit	10kVA	20kVA	30kVA
Overall efficiency				
Normal mode(dual conversion)	%	>93	>94	>94
Battery discharging efficiency (battery at nominal voltage 240Vdc and full-rated linear load)				
Battery mode	%	>92.5	>93	>93

7.6 Display and Interface

Table 7.10 Display and Interface

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

Recycling information in accordance with the WEEE

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

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

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



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

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

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



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