

MARUSON[®]

TECHNOLOGY CORP.

Power Solutions All Your Needs

**TACOMA TOWER SERIES
6KVA/10KVA
On-Line UPS**

USER MANUAL

Maruson Technology Corporation

16050 Kaplan Ave., City of Industry, CA 91744, U.S.A.

Tel: +1-714-8706888 Fax: +1-8704888 Toll Free: 1-888-MARUSON

E-Mail: Info@MarusonUSA.com

Website: www.MarusonUSA.com

**All trademarks are the property of their respective owners. Product specifications are subject to change without prior notice.*

CONTENT:

- 1. Safety and EMC Instructions 1**
 - 1.1 Installation..... 1
 - 1.2 Operation 2
 - 1.3 Maintenance, Servicing and Faults 2
 - 1.4 Transport 3
 - 1.5 Storage 4
 - 1.6 Standards 4
- 2. Description of Commonly Used Symbols 5**
- 3. Introduction 6**
 - 3.1 Feature 6
 - 3.2 Electrical specifications 7
 - 3.3 Operating Environment 8
 - 3.4 Typical backup time (Typical values at 25°C in minutes) 8
 - 3.5 Dimensions and weights 8
- 4. Installation 10**
 - 4.1 Moving to the installation site 10
 - 4.2 Unpacking and inspection 10
 - 4.3 Input and output power wires and protective earth ground installation..... 11
 - 4.4 Operating procedure for connecting with the external battery 17
 - 4.5 EPO Connection 18
- 5. Operation..... 19**
 - 5.1 Display Panel..... 19
 - 5.2 Operating mode..... 22
 - 5.3 Turning on and Turning off UPS..... 23
 - 5.4 LCD operation 24
- 6. Special function..... 30**
 - 6.1 HE function 30
 - 6.2 Converter function 31
 - 6.3 Parallel function 31
- 7. Trouble Shooting..... 37**
 - 7.1 Trouble Shooting According To Warning Indication 37
 - 7.2 Trouble Shooting According To Fault Indication 38

7.3 Trouble Shooting In Else Cases	39
8. Battery Maintenance	41
9. Communication Port.....	42
9.1 USB Interface	42
9.2 Dry contact Interface	42
9.3 RS-232 Interface (optional)	43
9.4 Intelligent slot.....	43
10. Software	44
Free Software Download – WinPower	44

1. Safety and EMC Instructions

Please carefully read the following user manual and the safety instructions before installing the unit or using the unit!

1.1 Installation

- ★ This is permanently connected equipment and must be installed by qualified maintenance personnel.
- ★ Condensation may occur if the UPS is moved directly from a cold to a warm environment. The UPS must be absolutely dry before being installed. Please allow an acclimatization time of at least two hours.
- ★ Do not install the UPS near water or in damp environment.
- ★ Do not install the UPS where it would be exposed to direct sunlight or near heat.
- ★ Do not connect appliances or items of equipment which would overload the UPS (e.g. laser printers, etc) to the UPS output.
- ★ Place cables in such a way that no one can step on or trip over them.
- ★ Connect UPS with the earth reliably before connecting to the building wiring terminal, and external battery source must also be earthed.
- ★ An integral single emergency switching device which prevents further supply to the load by the UPS in any mode of operation should be provided in the building wiring installation.
- ★ An appropriate disconnect device as short-circuit backup protection should be provided in the building wiring installation.
- ★ The equipment is powered by two sources: the mains source, the internal battery or the external battery source.

- ★ With the installation of the equipment, the sum of the leakage current of the UPS and the connected load should not exceed 5% of rated value of input current.
- ★ Do not block ventilation openings in the UPS's housing. Ensure allow at least 50cm of space in the front and back of the UPS.
- ★ Suitable for mounting on concrete or other non-combustible surface only.

1.2 Operation

- ★ Do not disconnect the mains cable on the UPS or the building wiring terminals during operation since this would remove the protective earth from the UPS and all connected loads.
- ★ The UPS output terminal block may still be electrically lived even if the UPS is not connected to the building wiring terminal, for there is internal current source (batteries).
- ★ In order to fully disconnect the UPS, first turn the input breaker to the "OFF" position, then disconnect the mains lead.
- ★ Indiscriminate operation of switches may cause output loss or damage to equipment. Refer to instruction before conducting any control.
- ★ While the UPS work as a parallel system, the external parallel cable should be reinforced insulation.
- ★ Ensure that no liquid or other foreign objects can enter the UPS.

1.3 Maintenance, Servicing and Faults

- ★ Do not remove the enclosure since the UPS operates with hazardous voltages. It is to be serviced only by qualified maintenance personnel.

- ★ **Caution** - risk of electric shock. Even after the unit is disconnected from the mains power supply (building wiring terminal), components inside the UPS are still connected to the batteries which are potentially dangerous.
- ★ Before carrying out any kind of service and/or maintenance, isolate the UPS and disconnect the batteries. Verify that no current is present and no hazardous voltage exists in the capacitor or BUS capacitor.
- ★ Batteries must be replaced only by qualified personnel.
- ★ Batteries have a high short-circuit current and pose a risk of shock. Take all precautionary measures specified below and any other necessary measures when working with batteries:
 - Remove all jewellery, wristwatches, rings and other metal objects
 - Use only tools with insulated grips and handles
- ★ When changing batteries, replace with the same quantity and the same type of batteries.
- ★ Do not attempt to dispose of batteries by burning them. Doing so may cause an explosion.
- ★ The UPS may be connected to external battery module (EBM). Proper disposal of batteries is required. Refer to your local codes for disposal requirements.
- ★ Do not open or destroy batteries. Effluent electrolyte can cause injury to the skin and eyes and may be toxic.
- ★ Replace the fuse only by a fuse of the same type and of the same spec in order to avoid fire hazards.

1.4 Transportation

- ★ Please transport the UPS only in the original packaging to protect against shock and impact.

1.5 Storage










- ★ The UPS must be stored in the room where it is ventilated and dry.

1.6 Standards

* Safety	
IEC/EN 62040-1: 2008	
* EMI	
Conducted Emission.....IEC/EN 62040-2: 2006	Category C3
Radiated Emission.....IEC/EN 62040-2: 2006	Category C3
* EMS	
ESD.....IEC/EN 61000-4-2: 2005	Level 3
RS.....IEC/EN 61000-4-3: 2006	Level 3
EFT.....IEC/EN 61000-4-4: 2006	Level 4
SURGE.....IEC/EN 61000-4-5: 2005	Level 4
CS.....IEC/EN 61000-4-6: 2006	Level 3
MS.....IEC/EN 61000-4-8: 2004	Level 3
Voltage Dips.....IEC/EN 61000-4-11: 2004	
Low Frequency Signals.....IEC/EN 61000-2-2: 2006	
Warning: This is a product for commercial and industrial application in the second environment-installation restrictions or additional measures may be needed to prevent disturbances.	

2. Description of Commonly Used Symbols

Some or all of the following symbols may be used in this manual. It is advisable to familiarize yourself with them and understand their meaning:

Symbol and Explanation			
Symbol	Explanation	Symbol	Explanation
	Alert you to pay special attention		Caution of high voltage
	Protective ground		Protective bonding conductor
	Alternating current source (AC)		Direct current source (DC)
	Do not dispose with ordinary trash		Recycle
	Turn on or turn off the UPS		

3. Introduction

This on-line series is an uninterruptible power supply incorporating double-conversion technology. It provides protection specifically for computer equipments, communication servers, and data centers.

The double-conversion principle eliminates all mains power disturbances. A rectifier converts the alternating current from the mains power to direct current. On the basis of this DC voltage, the inverter generates an AC sinusoidal voltage, which constantly supplies the loads. In the event of power failure, the maintenance-free batteries power the inverter.

This manual covers the UPS listed as follows. Please confirm whether it is the model you intend to purchase by performing a visual inspection of the Model No. on the rear panel of the UPS.

Model No.	Type	Model No.	Type
6K	Standard	6KL	Extended backup time
10K		10KL	

“L” Model: Extended backup time

3.1 Feature

This series UPS is a new generation of UPS, which provides outstanding reliability and the most cost-performance ratio in the industry. The product has the following benefits:

- True online double-conversion technology with high power density, frequency independence, and generator compatibility.
- Output power factor is 0.9, true sine wave output, suitable for almost all critical equipment.
- High input power factor ≥ 0.99 , overall high efficiency ≥ 0.88 , and saves power and wiring expense for the user. Also offers low input current distortion to avoid power pollution.

- Outstanding adaptability to the worst mains input condition.
- Extra wide input voltage and frequency range and waveform to avoid excessive dissipating limited battery energy.
- Internal charger can be up to 4Amps to decrease recharging time of batteries. Optional external large charging current charger (up to 12Amps) can be supplied.
- N+X parallel redundancy to increase the reliability and flexibility. Number of parallel operating UPS is up to 2.
- HE mode with high efficiency ≥ 0.92 , save power expense for user.
- Internal output ISO transformer.
- Start-able without battery.
- Provides multiple output options.

3.2 Electrical Specifications

INPUT		
Model No.	TAC-6K(L)	TAC-10K(L)
Phase	Single	
Voltage	110~276VAC	
Frequency	(45~55)/(54~66) Hz	
Current(A)	26	43
THDI	< 5% @ full load	
Power Factor	≥ 0.99 @ full load	

* Rated current while input rated voltage is 240VAC.

OUTPUT		
Model No.	TAC-6K(L)	TAC-10K(L)
Power rating	6kVA/5.4kW	10kVA/9kW
Voltage	120V×2*/240V/208V× (1 ± 2%) VAC	

THDV	< 2% @ full linear load
------	-------------------------

* Each 120V output only can take half an UPS rating.

BATTERIES		
Model No.	TAC-6K(L)	TAC-10K(L)
Internal BAT number and type	20×12V 7Ah	20×12V 9Ah
Current of external BAT pack	32Amax	54Amax

3.3 Operating Environment

Operating Temperature	0 °C to 45 °C
Operating humidity	< 95%
Altitude	< 1000m*
Storage temperature	-15 °C to 50 °C

*The load capacity should be derated 1% every 100m heightened on the basis of 1000m.

3.4 Typical backup time (Typical values at 25°C in minutes)

Model No.	100 % Load
TAC-6K	7.5
TAC-10K	5

3.5 Dimensions and Weights

Model No.	Dimensions W×H×D (mm)	Net Weight (kg)
TAC-6K	300 x 830 x 693	115
TAC-6KL	300 x 830 x 693	71
TAC-10K	300 x 830 x 693	138
TAC-10KL	300 x 830 x 693	86

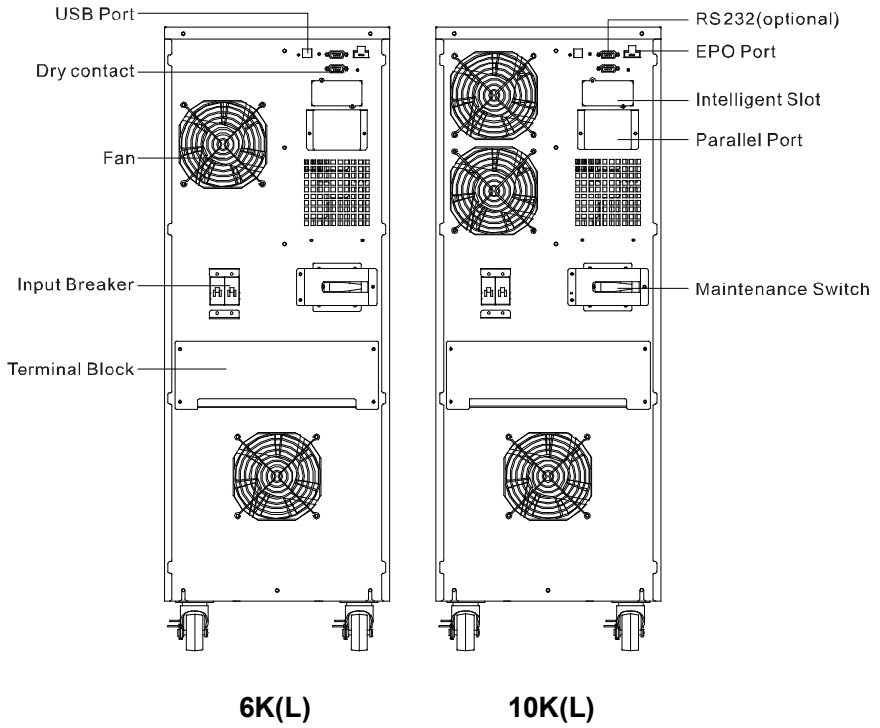


Fig. 3-1 Back View of 6K(L)/10K(L)

4. Installation

The system may be installed and wired only by qualified electricians in accordance with applicable safety regulations!

When installing the electrical wiring, please note the nominal amperage of your incoming feeder.

4.1 Moving to the Installation Site

This series of UPS has wheels, making it easier to move the UPS to the installation site after it has been unpacked. However, if the receiving area is far from the installation site, it is highly recommended to move the UPS by using a pallet jack or a truck before unpacking the UPS.

4.2 Unpacking and Inspection

1. At the installation site, the utmost care should be taken when removing the packaging in order to avoid damaging the equipment. Cut the plastic poly-straps around the shipping container and remove the corrugated carton and the PS foam on the top of the UPS. With one or two people on each side of the UPS, carefully lift the UPS out of the pallet.

Warning: Take precautions when cutting the plastic poly-straps. The plastic poly-straps around the shipping container are under tension. When cutting, take care not to face the poly-strap; they will spring back and may cause eye injury.



The shipping materials are recyclable. After unpacking, save them for later use or dispose of them appropriately.

-
2. Check all packaging materials to ensure no items are missing. The shipping package contains:
 - 1 UPS
 - 1 USB cable
 - 1 parallel cable (optional)
 - 1 parallel port cover plate
 - 1 user manual
 - 1 RS232 cable (optional)
 - EPO connector
 3. Inspect the appearance of the UPS to see if there is any damage during transportation. Do not turn on the unit and notify the carrier and dealer immediately if there is any damage or lacking of some parts.

4.3 Input and Output Power Wires and Protective Earth Ground Installation

4.3.1 Notes for Installation

- 1) The UPS must be installed in a location with good ventilation and far away from water, inflammable gas, and any other corrosive agents.
- 2) Ensure the air vents on the front and back of the UPS are not blocked. Allow at least 0.5m of space on each side.
- 3) Condensation to water drops may occur if the UPS is unpacked in a very low temperature environment. In this case it is necessary to wait until the UPS is fully dried inside and out before proceeding installation and use. Otherwise there is risk of electric shock.

4.3.2 Installation

For safety, please cut off the mains power switch before installation!

Use cable cross section and protective device specification

Model	6k	10k
Protective earthing conductor Min cross section	6mm ² (8AWG)	10 mm ² (6AWG)
Input L, N, G Min conductor cross section	6mm ² (8AWG)	10 mm ² (6AWG)
Input breaker	40A/250VAC	63A/250VAC
Output L,N, Min conductor cross section	6mm ² (8AWG)	10 mm ² (6AWG)
External Battery Cabinet Positive Pole(+), Negative pole(-), Neutral Pole Min conductor cross section	6mm ² (8AWG)	10 mm ² (6AWG)
External Battery Cabinet Fuse in Positive Pole(+), Negative pole(-), Neutral Pole	30A/240VDC	60A/240VDC
External Battery Cabinet Breaker in Positive Pole(+), Negative pole(-), Neutral Pole	32A/240VDC	50A/240VDC
Torque for fixing above terminals	3Nm (22.1b-in)	

- 1) It is suggested to install an external isolating device against current backfeed between Mains input and UPS (see Fig.4-1). After the device is installed, it must add a warning label with the following wording or the equivalent on the external AC contactor: RISK OF VOLTAGE BACKFEED. Isolate the UPS before operating on this circuit, then check for hazardous voltage between all terminals.

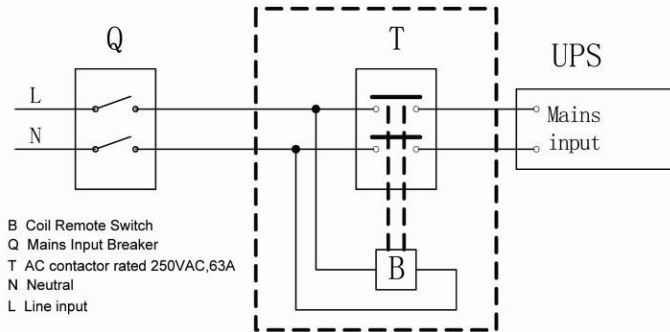


Fig.4-1 Typical external isolating device installation

- 2) Whether the UPS is connected to the mains power or not, the output of the UPS may be electrically live. The parts inside the unit may still have hazardous voltage after turning off the UPS. To ensure the UPS has no output, shut off UPS power and cut off the mains power supply; wait until the UPS shuts down completely.
- 3) Open the terminal block cover located on the rear panel of UPS (please refer to the appearance diagram).
- 4) For 6KVA UPS, it is recommended to select the UL1015 8AWG/6mm² or other insulated wire which complies with AWG Standard for the UPS input and output wirings.
- 5) For 10KVA UPS, it is recommended to select the UL1015 6AWG/10mm² or other insulated wire which complies with AWG Standard for the UPS input and output wirings.
- 6) Ensure the capacity of mains power supply. Do not use the wall receptacle as the input power source for the UPS, as its rated current is less than the UPS's maximum input current. Otherwise the receptacle may be burned and destroyed.
- 7) The protective earth ground wire should be installed first according to the following diagram. It is better to use green wire or green wire with yellow ribbon wire.
- 8) Connect other input and output wires to the corresponding input and output terminals according to the following diagram.

■ Option: 1

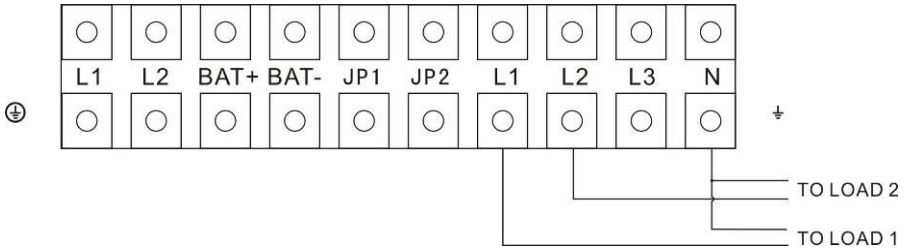


Fig.4-2 Connection details of output terminals for 6K(L)/10K(L)

You can direct 2 sets of 120V single phase output on L1-N & L2-N. Each set is able to offer 50% of UPS rating.

Important Note: If floating neutral is not allowed, please connect corresponding neutral to protecting earthing.

■ Option: 2

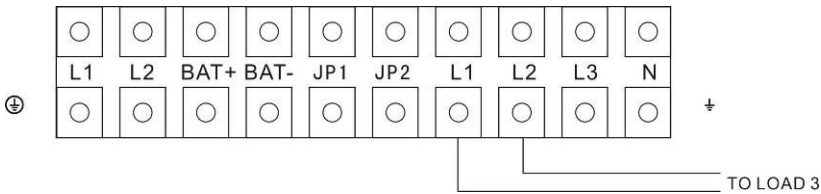


Fig.4-3 Connection details of output terminals for 6K(L)/10K(L)

You can get the 240V single phase output at L1-L2 for 100% of UPS rating.

Important Note: If floating neutral is not allowed, please connect corresponding neutral to protecting earthing.

■ Option: 3

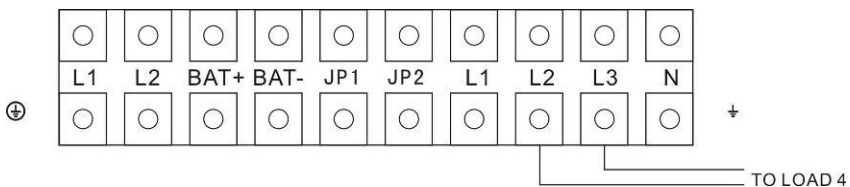


Fig.4-4 Connection details of output terminals for 6K(L)/10K(L)

You can get the 208V single phase output at L2-L3 for 100% of UPS rating.

Important Note: If floating neutral is not allowed, please connect corresponding neutral to protecting earthing.

■ **Option: 4**

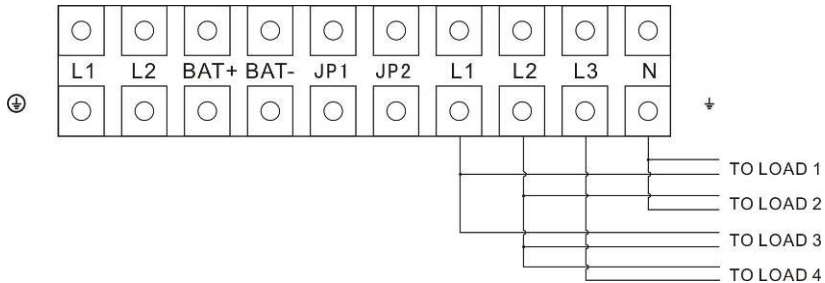


Fig.4-5 Connection details of output terminals for 6K(L)/10K(L)

You can get the 240V single-phase output at L1-L2, and also can get the 120V single phase output on L1-N & L2-N and 208V single phase output on L2-L3. However, the total output current should not be larger than 25A for 6K(L) and 42A for 10K(L). You MUST connect the load with this limitation. Please refer to the Note first before installation.

Notes:

If one of the load current on L1-N or L2-N is larger than 25A for 6K(L) and 42A for 10K(L), the UPS will still operate normally WITHOUT overload warning because the total load is under the specification. However, the ISO transformer would over heat due to the high current and get damage later. Hence, the installation must be done with technician and make sure that the load current does not exceed this limitation.

- 9) Ensure the connection between the wires and the terminal block is reliable and tight.

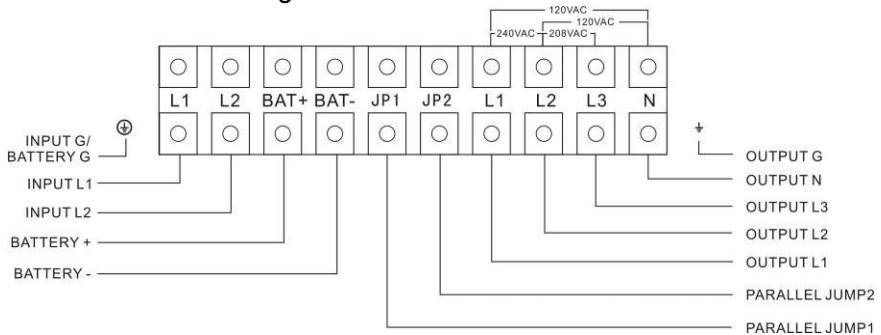


Fig. 4-6 Input and output Terminal Block wiring diagram

Important notes: If the UPS is used in single mode, JP1 and JP2 must be connected. If the UPS is used in parallel mode, the Jumper between JP1 and JP2 must be removed.

- 10) Install an output breaker between the output terminal of UPS and the load, and the breaker should with leakage current protective function if necessary.
- 11) Turn off all the loads first before connecting the load with the UPS, then perform the connection and finally turn on the loads one by one.
- 12) After completing the installation, check to make sure all wires are connected correctly and securely.
- 13) Suggest charging the batteries for 8 hours before use. After installation, turn on the mains power switch and turn the input breaker in the “ON” position (the UPS will charge the batteries automatically). The UPS can also be used immediately without charging the batteries, but the backup time may be less than the standard value.
- 14) If it is necessary to connect the inductance load (e.g. monitor or a laser printer) to the UPS, the start-up power should be used

for calculating the capacity of the UPS, as its start-up power consumption is too big to make the UPS which capacity is small fail easily.

4.4 Operating Procedure for Connecting with the External Battery

1. The nominal DC voltage of external battery pack is 240VDC. Each battery pack consists of 20 pieces of 12V maintenance-free batteries in series. To achieve longer backup time, it is possible to connect multiple battery packs, but the principle of “same voltage, same type” must be strictly followed.
2. For 6KVA, select the UL1015 8AWG/6mm² respectively or other insulated wire which complies with AWG Standard for the UPS battery wirings.
3. For 10KVA, select the UL1015 6AWG/10mm² respectively or other insulated wire which complies with AWG Standard for the UPS battery wirings.
4. The external battery pack must be independent connected for each UPS. It is prohibited that two UPS use the same external battery pack.
5. The procedures for installing battery packs should be followed strictly. Otherwise, it may encounter the risk of electric shock.
 - 1) Ensure the UPS is not powered on and the mains input breaker is set in the “OFF” position.
 - 2) A DC breaker must be installed between the external battery pack and the UPS. The capacity of breaker must be not less than the data specified in the general specification.
 - 3) Set the external battery pack breaker in “OFF” position and connect the 20 pieces of batteries in series.
 - 4) Connect the external battery pack to the battery terminals. Check the polarity of connection is correct.
 - 5) Set the breaker of the battery pack in the “ON” position.

- 6) Set the mains input breaker in the “ON” position, the UPS would power on and start to charge the battery pack.

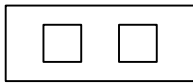
4.5 EPO Connection

4.5.1 Introduction

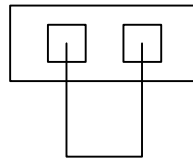
Emergency power off function (which the UPS supplies) is when an emergency occurs (such as the failure of load), the UPS can cut off the output immediately by operating the EPO port manually.

4.5.2 The Connection

Normally the EPO connector is closed with a wire on the rear panel, which is supplied in the accessory. Once the connector is open, the UPS will stop the output and enter EPO status.



Enable the EPO status



Disable the EPO status

Fig. 4-7 Default EPO status

To recover to normal status, first EPO connector should be closed, and enter LCD menu (illustrated in the chapter of 5.4.5) to clear EPO status, then UPS would stop alarm and recover to Bypass model. And UPS needs be turned on by manual operation.

The polarity of connector could be inversed by setting in LCD menu in the chapter of 5.4.7. Contact your local distributor for further information before modifying the settings.

5. Operation

5.1 Display Panel

The UPS has a four-button dot matrix LCD with dual color backlight. Standard backlight is used to light up the display with white text and a blue background. When the UPS has a critical alarm, the backlight changes the text to dark amber and the background to amber. Besides the LCD, the UPS has four colorized LEDs to provide more convenient information.

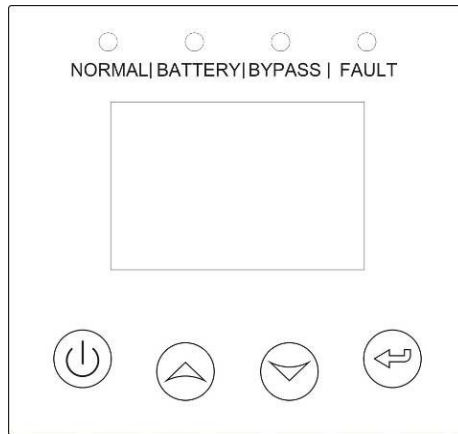



Fig. 5-1 Control Panel

Table 5-1 Control Button Functions

Button	Function	Illustration
	Power on	When the unit has no power and is connected with battery, press this button for >100ms & <1s to power on
	Turn on	When the unit is powered on and is in Bypass Mode, press this button for >1s to turn on
	Turn off	When the unit has been turned on, press this button for >3s to turn off




	Enter main menu	When displaying default UPS status summary screen, press this button for >1s to enter the main menu tree
	Exit main menu	Press this button for >1s to exit the present menu to default system status display menu without executing a command or changing a setting
	Scroll up	Press this button for >100ms & <1s to scroll up the menu option
	Scroll down	Press this button for >100ms & <1s to scroll down the menu option
	Enter next menu tree	Press this button for >100ms & <1s to select the present menu option, or enter next menu, but do not change any setting
	Select one menu option	Press this button for >100ms & <1s to select the present menu option, or enter next menu, but do not change any setting
	Confirm the present setting	Press this button for >1s to confirm the edited options and change the setting

Table 5-2 LED Definition

UPS State	Normal LED (Green)	Battery LED (Yellow)	Bypass LED (Yellow)	Fault LED (Red)
Bypass mode with no output			★	↑
Bypass mode with output			●	↑
Turning on	△	△	△	△
Line mode	●			↑
Battery mode	●	●		↑
HE mode	●		●	↑
Battery test mode	△	△	△	△
Fault mode			↑	●
Warning mode	↑	↑	↑	★

Note:

- : Lights constantly
- △: #1 - #4 Lightened circularly
- ★: Flashing
- ↑: Depended on the fault/warning status or other status

Table 5-3 Alarm Definition

UPS Condition	Buzzer Status
Fault active	Continuous
Warning active	Beep every second
Battery output	Beep every 4 seconds, if battery low, buzzer Beep every second
Bypass output	Beep every 2 minutes
Overload	Beep twice every second

The UPS provides useful information about UPS itself (e.g. load status, events, measurements, identification, and settings) through the front panel display.

During powering on, the LCD will display the Welcome logo for several seconds and then enter to the default page which shows the UPS status summary.

The display automatically returns to the default UPS status summary screen when no button has been pressed for 15 minutes. The UPS status summary screen provides the following information:

- Status summary (including mode and load)
- Alarm status (if any are present)
Notes: alarm including fault and warning information
- Battery and charger status (including battery voltage, charge level and charger status)
- Running information including parallel UPS and running time

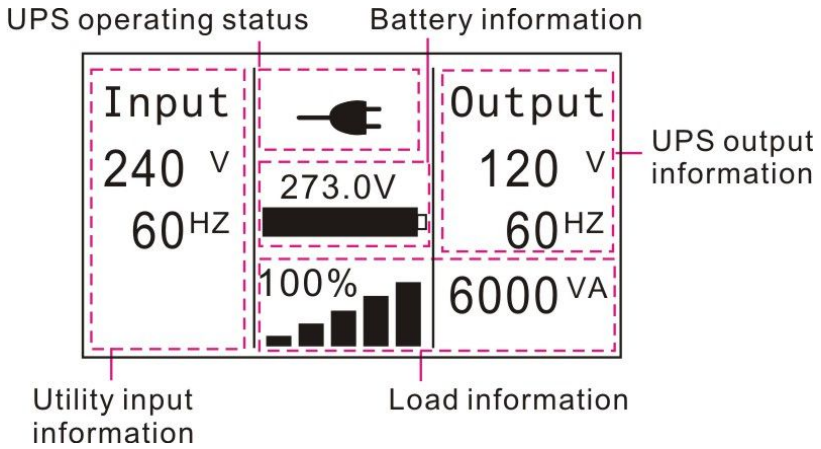






Fig. 5-2 The default LCD display

The more detailed operation of LCD is illustrated in the section 5.4.

5.2 Operating Mode

The different graphic symbol could be displayed corresponding to current operating mode or status.

Operating Mode	Indicator	Description
Line mode		The UPS is drawing utility power and performing double conversion to supply power to the connected equipment.
Battery mode		The UPS is supplying battery power to the connected equipment.
Bypass with output		The UPS is sending utility power to the connected equipment directly.
Bypass without output		The UPS works at bypass mode but doesn't send utility power to the connected equipment.
HE mode		The UPS works at bypass mode normally and transfers to inverter mode once the utility power is loss or abnormal.
Converter mode		Both the output voltage and frequency are constant.


Warning mode		The UPS gets a warning.
Fault mode		The UPS gets a fault.
Overload		The load is beyond of UPS rating.
Battery test		Test batteries.

5.3 Turning On and Turning Off UPS


Attention: The UPS can only be turned on while connected with the mains the first time.

Attention: Please switch off the connected loads first before turning on the UPS. Switch on the loads one by one after the UPS is turned on. Switch off all connected loads before turning off the UPS.


5.3.1 Turning On UPS with Mains

- 1) Check all connections are correct. Check the breaker of external battery pack is in “ON” position.
- 2) Set input breaker in “ON” position. At this time the fan begins to rotate, LCD will show “WELCOME”. Then LCD will show the default UPS status summary screen after UPS finishing self-test.
- 3) By pressing  button continuously for more than 1 second, the buzzer will beep for 1s, UPS starts to turn on.
- 4) A few seconds later, the UPS turns into Line mode. If the mains power is abnormal, the UPS will transfer to Battery mode without output interruption of the UPS.


5.3.2 Turning On UPS without Mains

- 1) Check all the connection is correct. Check the breaker of external battery pack is in “ON” position.
- 2) By pressing  button continuously for more than 100ms, the


UPS will power on. At this time the fan will start rotating; LCD will show “WELCOME”. Then LCD will show the default UPS status summary screen after UPS finishes self-testing.

- 3) By pressing the  button continuously for more than 1s, the buzzer will beep for 1s and will UPS turn on.
- 4) A few seconds later, the UPS will turn to Battery Mode. If the mains power comes back, the UPS will transfer to Line Mode without output interruption of the UPS.

5.3.3 Turning Off UPS with Mains

- 1) To turn off the inverter of UPS by pressing  button continuously for more than 3s and the buzzer will beep for 3s. The UPS will turn into Bypass mode at once.
- 2) When completing the above action, UPS output voltage is still present. In order to cut off the UPS output, simply cut off the mains power supply. A few seconds later, LCD display shuts down and no output voltage is available from the UPS output terminal.



5.3.4 Turning Off UPS Without Mains


- 1) To power off the UPS by pressing  button continuously for more than 3s, and the buzzer will beep 3s. The UPS will cut off the output at once.
- 2) A few seconds later, LCD shuts down and no voltage is available from the UPS output.

5.4 LCD Operation

Except the default UPS status summary screen, the user could get more useful information about UPS current status, detailed various measurements, old events which ever occurred, UPS own identification, and could change the settings to fit the user's requirements, and optimize the function of UPS.

5.4.1 The Main Menu

In the default UPS status summary screen, when pressing  or  <1s, detailed information about the alarm, parallel system, and battery will be shown.

In the default UPS status summary screen, when pressing  >1s, the display would enter main menu tree.

The main menu tree includes six branches: UPS status menu, event log menu, measurement menu, control menu, identification menu, and setting menu.

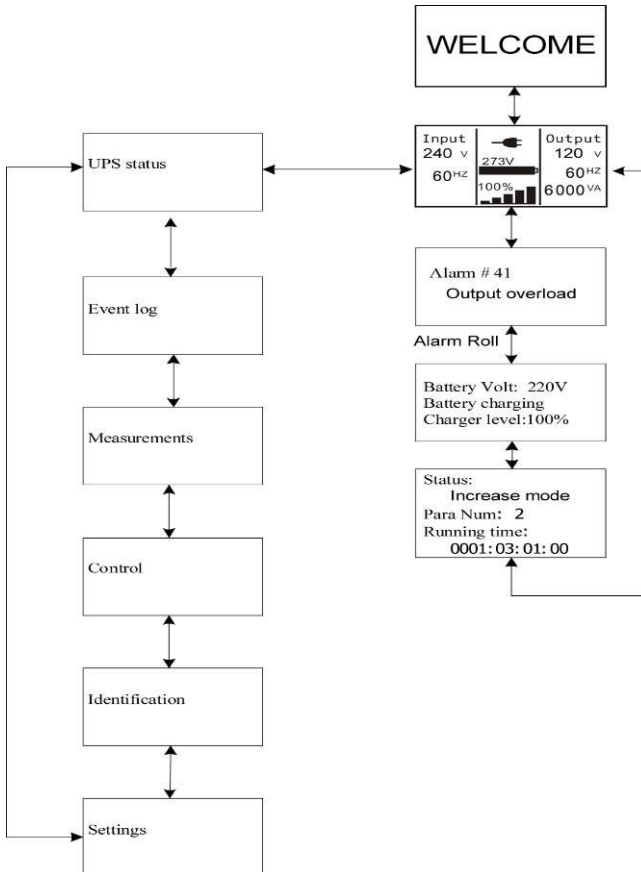




Fig. 5-14 Main Menu Tree


5.4.2 The UPS Status Menu



By pressing  on the menu of “UPS status”, the display would enter the next UPS status menu tree.

The content of UPS status menu tree is same as the default UPS status summary menu.


By pressing  >1s, the display would return the last main menu tree.

5.4.3 The Event Log Menu


By pressing  on the menu of “Event Log”, the display will enter the next event menu tree.

All the old events such as alarms and faults have been recorded here. The information includes the illustration, the event code, and the operating time of UPS when the event happened. By press  or  <1s, all the event could be displayed one by one.


The max number of record is 50, when the number is larger than 50, the oldest one would be changed to the newest information.

By pressing  >1s, the display will return the previous main menu tree.


5.4.4 The Measurement Menu

By pressing  on the menu of “Measurement”, the display would enter the next measurement menu tree.

A lot of detailed useful information can be checked here (e.g. the output voltage and frequency, the output current, the load capacity, the input voltage and frequency, etc.).


By pressing  >1s, the display would return the previous main menu tree.

5.4.5 The Control Menu


By pressing  on the menu of “Control”, the display would enter the next control menu tree.

- 1) Single UPS turn off: Turns off one UPS which currently operating in a parallel system and the other UPS will continue working to supply the load in the parallel system.
- 2) Single UPS battery test: Control one UPS currently operating in a parallel system to do the battery test separate from the battery in the paralleled UPS.
- 3) Parallel UPS battery test: Control all UPS in a parallel system to run the battery test at the same time.
- 4) Clear EPO status: Once EPO status is enabled, the UPS output will cut off. To recover to normal status, first EPO connector should be closed and enter this menu to clear EPO status. Then UPS will stop the alarm and recover to Bypass model. UPS must be turned on by manual operation.
- 5) Reset fault status: When fault occurs, UPS would keep in Fault mode and alarm. To recover to normal status, enter this menu to reset error status, then UPS would stop alarm and recover to bypass mode. And the reason of fault should be checked and deleted before UPS is turned on again by manual operation.
- 6) Restore factory settings: All settings will revert to default factory settings. This can only be done in Bypass Mode.

5.4.6 The Identification Menu

Press  on the menu of “Identification” to display the next identification menu tree.

The identification information such as UPS serial number, firmware serial number, and model type will be shown here.

By pressing  >1s, the display will return the previous main menu tree.

5.4.7 The Setting Menu

Please contact your local distributor for further information before using the settings. Some settings will change the specifications and some settings will enable or disable some functions. Unsuitable options set by user may result in potential failures or protecting function loss; even directly damage the load, battery, or UPS.

Most of settings can only be done while UPS is in Bypass Mode.





By pressing  on the menu of "Identification", the display will enter the next setting menu tree if "User password" is disabled. If "User password" is enabled, the user should enter the password by pressing , , and , then enter the next setting menu tree.

Table 5-4

Submenu Item	Optional Values	Default Value
User password*	enabled/disabled	disabled
Audio alarm	enabled/disabled	enabled
Rated output voltage	120V×2/240V/208V	120V×2/240V/208V
Output frequency	autosensing/50/60Hz	autosensing
Power strategy**	normal/high efficiency/ converter	normal
DC start	enabled/disabled	enabled
Site wiring fault alarm	enabled/disabled	disabled
Ambient temperature warning	enabled/disabled	enabled
Automatic battery tests period	0-31days	7days
Auto Restart	enabled/disabled	enabled
Automatic overload restart	enabled/disabled	enabled
Auto Bypass	enabled/disabled	enabled
Short circuit clearance	enabled/disabled	disabled
Bypass voltage low limit	110~215V	176V

Bypass voltage high limit	245~276V	264V
Bypass frequency low limit	1%~10%	10%
Bypass frequency high limit	1%~10%	10%
HE voltage low limit	1%~10%	5%
HE voltage high limit	1%~10%	5%
HE frequency low limit	1%~10%	5%
HE frequency high limit	1%~10%	5%
Set running time	Day:hour:minute:second 0000:0000:00~9999:23:59:59	Running time
LCD contrast	-5~+5	0

* Password is **AAAA** when enabled.

** Read the chapter of 6.1 and 6.2, before using high efficiency or converter function.

6. Special Function

The series UPS has some special functions, which could satisfy some special application of the user. These functions have their own features; please contact your local distributor for further information before using the function.

6.1 HE Function

6.1.1 Brief Introduction of HE Function

If HE function is enabled, after the UPS is turned on, the power used by the load is directly supplied from the mains power via internal filter while the utility power is in normal range so the high efficiency could be gained in HE Mode (also called economy mode). Once the mains power is loss or abnormal, the UPS will transfer to Line Mode or Battery Mode and the load is supplied continuously.

The great virtue is overall high efficiency ≥ 0.92 of UPS, to save power for user.

The disadvantages: 1) the load can not be protected as well as in Line Mode since the load is directly supplied from the mains; 2) the transfer time of UPS output from HE mode to Battery mode is about 10ms.

So the function is not suitable to some sensitive loads and regions where the mains power is unstable.

6.1.2 Set the Function

The function can be enabled through the LCD setting in Bypass Mode.

Enter the power strategy setting menu by following section 5.4.7.

6.2 Converter Function

6.2.1 Brief Introduction of Converter Function

In converter mode, the UPS would free run with fixed output frequency (50Hz or 60Hz). Once the mains power is loss or abnormal, the UPS would transfer to Battery Mode and the load is supplied continuously.

The great virtue is the output frequency is fixed, which is required by some very sensitive loads.

The disadvantage is the load capacity of UPS should be derated to 60% in converter mode.

6.2.2 Set the Function

The function could be enabled through the LCD setting in Bypass mode.

Enter the power strategy setting menu by following chapter of 5.4.7.

6.3 Parallel Function

6.3.1 Brief Introduction of the Redundancy

$N+X$ is currently the most reliable power supply structure. N represents the minimum UPS number that the total load needs, X represents the redundant UPS quantity, i.e. the fault UPS quantity that the system can handle simultaneously. When the X is larger, the reliability of the power system is higher. For occasions where reliability is highly depended on, $N+X$ is the optimal mode.

As long as the UPS is equipped with parallel cables, up to 2 UPS can be connected in parallel to realize output power sharing and power redundancy.

6.3.2 Parallel Installation and Operation

How to Install a New Parallel UPS System:

- 1) Before installing a new parallel UPS system, user needs to prepare the input and output wires, the output breaker, and the parallel cable.
- 2) Users need to use a standard 25-pin communication cable, which should have 25 cores, corresponding stitches and shield, as the UPS parallel cable. The length of the parallel cable is appropriate to be less than 3m. And there is one standard parallel cable in the accessories of every UPS.
- 3) Remove the cover plate of the parallel port on the UPS, connect each UPS one by one with the parallel cable, and re-screw the Parallel port cover (which is supplied in the accessories).
- 4) Strictly follow section 4, the wiring requirement of single UPS to perform the wiring of each UPS.
- 5) Connect the output wires of each UPS to an output breaker panel.
- 6) Disconnect the Jumper on JP1 and JP2 of the terminal block first, and connect each output breaker to a main output breaker and then to the loads.
- 7) Each UPS needs an independent battery pack.
- 8) Please refer to the wiring diagram in the following diagram.
- 9) The distance between the UPS in parallel and the breaker panel is required to be less than 20 meters. The difference between the wires of input and output of the UPS is required to be less than 20%.

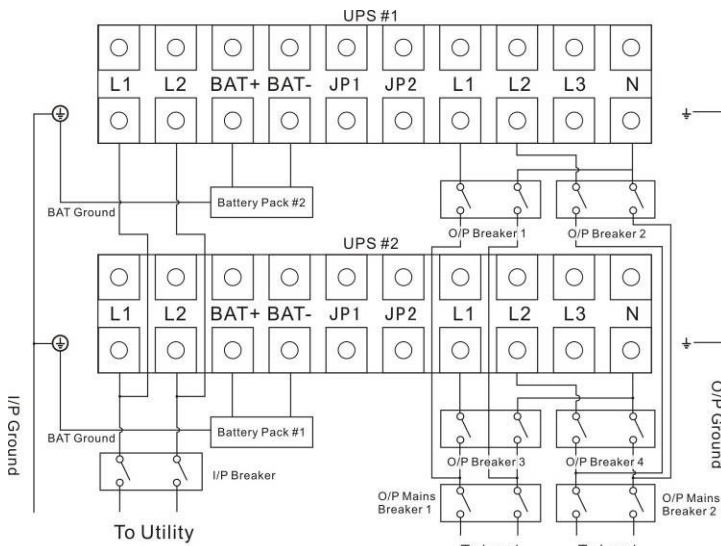


Fig.6-1 Parallel wiring diagram with option 1 output for 6K(L)/10K(L)

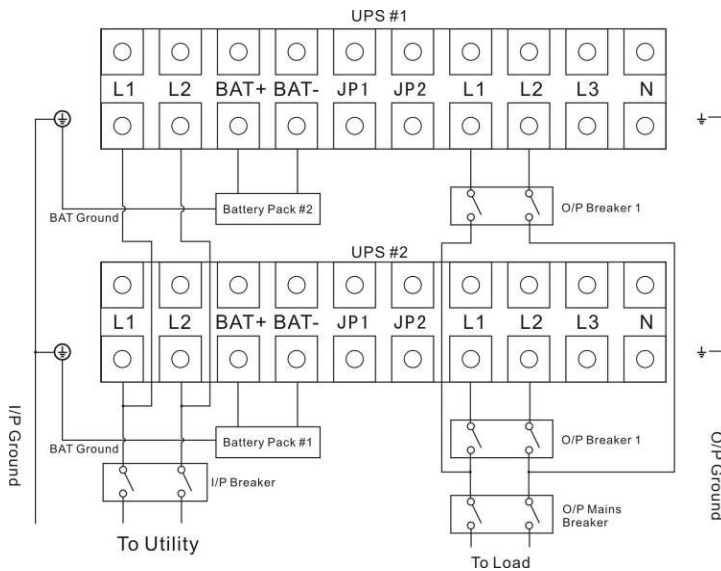


Fig.6-2 Parallel wiring diagram with option 2 output for 6K(L)/10K(L)

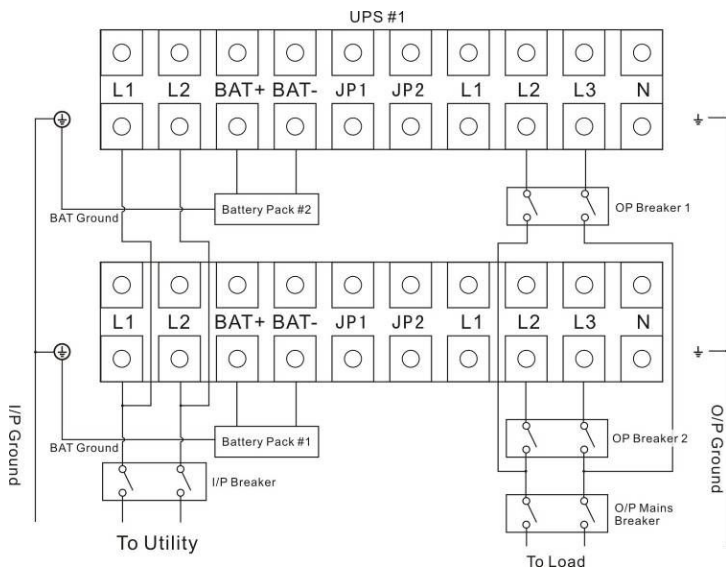


Fig.6-3 Parallel wiring diagram with option 3 output for 6K(L)/10K(L)

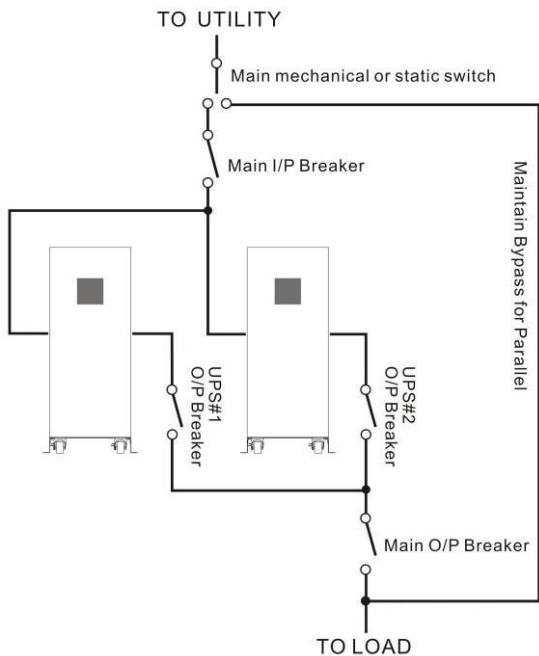






Fig. 6-4 Parallel System Installation Diagram


- 10) Do not switch on the output breaker of each UPS, switch on the input breaker of the each UPS, the UPS should work in bypass with output, observe their display to check if there are any warning or fault information, measure the output voltage of each UPS separately to check if the voltage difference between them is less than 1V. If the difference is more than 1V, check the wiring.
- 11) Press the  button of one UPS, each UPS will start to turn on and all the UPS will transfer to INV Mode together. Measure the output voltage of each UPS separately to check if the voltage difference between them is less than 0.5V. If the difference is more than 0.5V, the UPS needs to be regulated.
- 12) Press the  button of one UPS, each UPS will start to turn off and transfer to the Bypass Mode and switch on the output breaker of each UPS to parallel all the output of UPS together.
- 13) Press the  button of one UPS, each UPS would start to turn on, after turning on, the UPS should work parallel in the Line mode.

How to Join a New UPS to a Parallel System:

- 1) First the parallel system must have one main maintenance mechanical switch or static switch installed.
- 2) Regulate the output voltage of the new UPS separately: check if the output voltage difference between the new UPS and the parallel system is less than 0.5V.
- 3) Ensure the bypass of the parallel system is normal and the bypass setting is “enable”. Remove the cover plate of the maintenance switch on the rear panel of each UPS (the UPS system would transfer to bypass automatically). Then set the maintenance switch of each UPS from “UPS” to “BPS”.
- 4) Set the main maintenance switch or static switch from “UPS” to “BPS”, switch off the main output breaker and the main input breaker, the UPS will shut down.

- 5) Ensure the UPS shuts down completely. Add the new UPS and reinstall the new UPS parallel system by following step 1) through 9) of the previous chapter titled, “install a new parallel UPS system”.
- 6) Switch on the main input breaker and the main output breaker, and set the main maintenance switch or static switch from “BPS” to “UPS”, then set the UPS own maintenance switch from “BPS” to “UPS” and screw the maintenance cover plate back again. Press the  button of one UPS, each UPS will start to turn on, after turning on, the UPS should work in parallel in Line Mode.

How to Remove a Single UPS from a Parallel System:

- 1) First the parallel system must be installed one main maintenance mechanical switch or static switch.
- 2) Ensure the bypass is normal and the bypass setting is “enable”, remove the cover plate of maintenance switch on the rear panel of each UPS, the UPS system would transfer to bypass automatically, set the own maintenance switch of each UPS from “UPS” to “BPS”.
- 3) Set the main maintenance switch or static switch from “UPS” to “BPS”, switch off the main output breaker and the main input breaker, and the UPS would shut down.
- 4) Ensure the UPS has shut down completely, remove the wanted UPS and reinstall the new UPS parallel system by following step 1) to 9) of last chapter - “install a new parallel UPS system”.
- 5) If the removed UPS or the remained UPS will be used in a stand-alone mode, then JP1 and JP2 on the terminal block should be connected with a short connection wire.
- 6) Switch on the main input breaker and the main output breaker, and set the main maintenance switch or static switch from “BPS” to “UPS”, then set the UPS own maintenance switch from “BPS” to “UPS” and screw the maintenance cover plate back again. Press the  button of one UPS, each UPS would

start to turn on, after turning on, the UPS should work parallel in the Line Mode.

7. Troubleshooting

If the UPS system does not operate correctly, first check the operating information on the LCD display.

Please attempt to solve the problem using the table below. If the problem still persists, consult your dealer.

7.1 Trouble Shooting According To Warning Indication

Problem Displayed	Possible cause	Remedy
EPO Active	EPO connector is open	Check the EPO connector status
On Maintain Bypass	Maintain bypass switch is open	Check the maintain bypass switch status
Battery Disconnect	Battery pack is not connected correctly	Do the battery test to confirm. Check the battery bank is connected to the UPS. Check the battery breaker is turn on.
Battery low	Battery voltage is low	When audible alarm sounding every second, battery is almost empty.
Output Overload	Overload	Check the loads and remove some non-critical loads. Check if some loads are failed.
Fan Failure	Fan abnormal	Check if the fan is running normally.
Battery Over Voltage	Battery voltage is higher than normal value	Check if the battery quantity is right.
Ambient Over Temperature	The ambient temperature is too high	Check the environment ventilation.
Heat-sink Over Temperature	Inside temperature of UPS is too high	Check the ventilation of UPS and the ambient temperature.

Para Cable Male Loss	The parallel cable is disconnected	Check the parallel cable.
Para Cable Female Loss	The parallel cable is disconnected	Check the parallel cable.
Para Bat Differ	The battery packs of some UPS are disconnected	Check if all the battery pack is connected.
Para Line Differ	The mains input of some UPS is disconnected	Check the building wiring and input cable. Check if the input breaker is closed. Ensure the UPS are connected to same input source.
Para Work Mode Differ	There are different power strategy setting in parallel system	The UPS with different power strategy setting (Ex. one Line mode and one Converter mode) are forbidden to parallel.
Para Rate Power Differ	There are different UPS in parallel system	The UPS with different capacity (Ex. one 6KVA and one 10KVA) are forbidden to parallel.
ECO In Para	HE function is enabled in parallel system	HE function is forbidden in parallel system.

7.2 Trouble Shooting According To Fault Indication

Problem Displayed	Possible cause	Remedy
Inv Overload Fault	Overload	Check the loads and remove some non-critical loads. Check if some loads are failed.
Bypass Overload Fault	Overload	Check the loads and remove some non-critical loads. Check if some loads are failed.
Output Short Circuit	Output short circuit	Remove all the loads. Turn off the UPS. Check if UPS output and loads is short circuit.

		Ensure short circuit is removed before turning on again.
Heat-sink Over Temperature Fault	Inside temperature of UPS is too high	Check the ventilation of UPS and the ambient temperature.
Negative Power Fault	The load is pure inductive and capacitive	Remove some non-critical loads. Bypass supplies the load first, ensure there is no overload, then turn on UPS.
Cable male and female Loss fault	The parallel cable is disconnected	Check the parallel cable.

7.3 Trouble Shooting In Else Cases

Problem	Possible cause	Remedy
No indication, no warning tone even though system is connected to mains power supply	No input voltage	Check the building wiring and input cable. Check if the input breaker is closed.
BYPASS LED light up even though the power supply is available	Inverter not switched on	Press On-Switch "I" to turn on UPS.
BATTERY LED lights up, and audible alarm sounding every 1 beep in every 4 seconds	Input voltage and/or frequency are out of tolerance	Check input power source. Check the building wiring and input cable. Check if the input breaker is closed.
Emergency supply period shorter than nominal value	Batteries not fully charged / batteries defect	Charge the batteries for at least 12 hours and then check capacity.

Please have the following information at hand before calling the After-Sales Service Department:

1. Model number, serial number
2. Date on which the problem occurred
3. LCD/LED display information, Buzzer alarm status
4. Mains power condition, load type and capacity, environment temperature, ventilation condition
5. The information (battery capacity, quantity) of external battery

pack if the UPS is “L” model

6. Other information for complete description of the problem

8. Battery Maintenance

Battery replacement should be performed by qualified personnel.

- This series UPS only requires minimal maintenance. The battery used for standard models are value regulated sealed lead-acid maintenance free battery. These models require minimal repairs. The only requirement is to charge the UPS regularly in order to maximize the expected life of the battery. When being connected to the mains power, whether the UPS is turned on or not, the UPS keeps charging the batteries and also offers the protective function of overcharging and over-discharging.
- The UPS should be charged once every 4 to 6 months if it has not been used for a long time.
- In the regions of hot climates, the battery should be charged and discharged every 2 months. The standard charging time should be at least 12 hours.
- Under normal conditions, the battery life lasts 3 to 5 years. In case if the battery is found not in good condition, earlier replacement should be made.
- Replace batteries with the same number and same type of batteries.
- Do not replace the battery individually. All the batteries should be replaced at the same time following the instructions of the battery supplier.
- If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced.

9. Communication Port

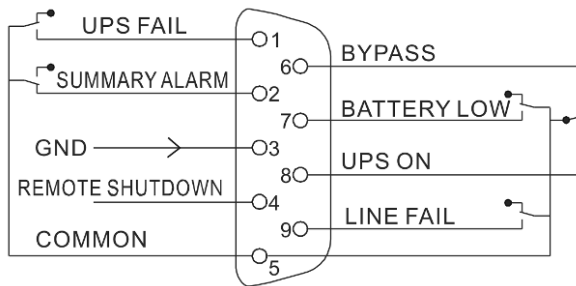
9.1 USB Interface

The USB port is compliance with USB 1.1 protocol for its communication software.

9.2 Dry contact Interface

This series UPS has independent dry contact interface. Please contact your local distributor for details. The following is the pin assignment and description of DB-9 connector.

Pin #	Description	I/O	Pin #	Description	I/O
1	UPS Fail	Output	6	Bypass	Output
2	Summary Alarm	Output	7	Battery Low	Output
3	GND	Input	8	UPS ON	Output
4	Remote Shutdown	Input	9	Line Loss	Output
5	Common	Input			



9.3 RS-232 Interface (optional)

The RS-232 port is available for UPS monitoring, control, and firmware updates.

The cable pins for the RS-232 communication port are identified in the following illustration.

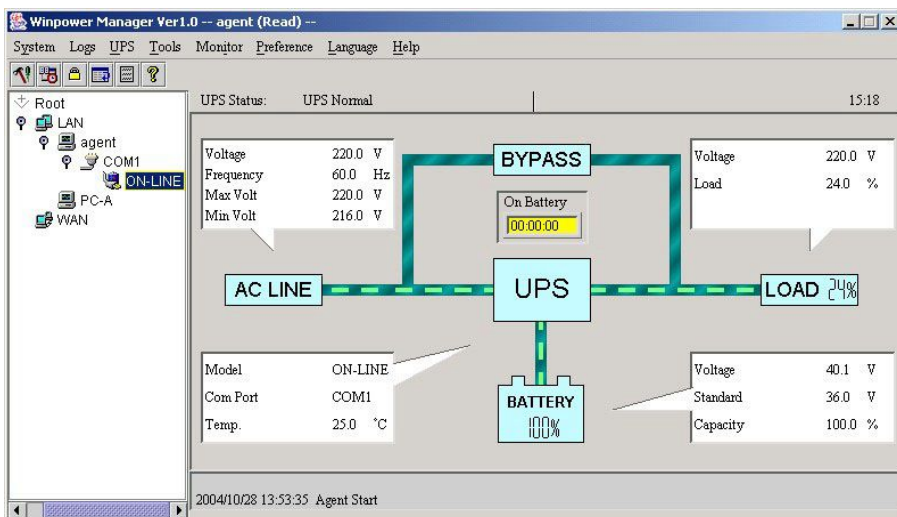
9.4 Intelligent slot

This series is equipped with an intelligent slot for other optional card to achieve remote management of the UPS through internet / intranet. Please contact your local distributor for further information.

10. Software

Free Software Download – WinPower

WinPower is an UPS monitoring software, which provides user-friendly interface to monitor and control UPS. This unique software provides safely auto shutdown for multi-computer systems while power failure. With this software, users can monitor and control any UPS on the same LAN, which communicated with local computer through RS232 or USB protocol, no matter how far from the UPS.



Installation procedure:

1. Go to the website:
<http://www.ups-software-download.com/>
2. Choose the operation system you need and follow the instruction described on the website to download the software.
3. When downloading all required files from the internet, enter the serial No: **511C1-01220-0100-478DF2A** to install the software.

When the computer restarts, the WinPower software will appear as a green plug icon located in the system tray, near the clock.

