Uninterruptible Power Supply

NH SERIES ● 3PHASE

user manual

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0. IMPORTANT SAFETY INSTRUCTIONS

- This manual contains important instructions for the unit that should be followed during installation and maintenance of the UPS and batteries. Before attempting to wire or operate the unit, read all instructions thoroughly.
- Install the on-line UPS in a well ventilated area, away from flammable liquids and gases. Do not let the unit come in contact with water.
- External slits and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect from overheating these openings must not be blocked or covered. Objects must never be inserted into ventilation holes or openings.
- Do not stand beverage containers on the unit.
- This UPS was designed to power all modern computer loads and associated peripheral devices, such as monitors, modems, cartidge tape drives, external floppy drives etc.. Do not use it for pure inductive or capacitive loads. It is not rated to power life support equipment.
- All recorded media, such as diskettes, tapes and cartridges should be kept a minimum of 60cm from the UPS. Otherwise, the magnetic field created by operation of the UPS may erase data on those devices.
- All repairs or installation should be performed by qualfied service personnel. The UPS contains voltages which are potentially hazardous. The output receptacles may be alive even when the UPS is not connected to the mains.
- Rick of a possible electrocution is possible when battery is connected to the UPS. Therefore, do not forget to disconnect the batteries before any service is to be done on the UPS. To disconnect, remove the battery fuse its holder which is located at the rear panel of the battery cabinet.
- Isolate Uninterruptible Power Supply(UPS) before working on the circuit. A readily accessible disconnect device shall be incorporated in the fixed wiring.
- HIGH LEAKAGE CURRENT – Earth connection essential before connecting supply.
- The disconnect device shall be a four-pole device and shall disconnect all line conductors and the neutral conductor.
- ATTENTION, hazardous through electrical shock. Also with disconnection of this unit from the mains, hazardous voltage still may be accessible through supply from the battery(ies). The battery supply should therefore be disconnected in the plus and the minus pole when maintenance or service work inside the UPS is considered.
- Do not dispose of batteries in a fire, the battery may explode.
- Do not open or mutilate the battery or batteries, released electrolyte is harmful to the skin and eyes.
- A battery can present a risk of electric shock and chemical hazard. The following precaution should be observed when working on batteries.
  - Remove watches, rings or other metal objects.
  - Use only tools with insulated handles.
- The UPS only be installed in accordance with the requirements of IEC 60364-4-48.
- The compliance with the following standards provides the conformity:

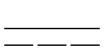
- EN 50091-1-1
- EN 50091-2 Class A
- IEC 61000-4-2 Level 4
- IEC 61000-4-3 Level 3
- IEC 61000-4-4 Level 4
- IEC 61000-4-5 Level 4
- IEC 61000-4-6

WARNING

This is a class A-UPS product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take additional measures.

SYMBOL INTRODUCTION

PROTECTIVE GROUNDING TERMINAL: A TERMINAL WHICH MUST BE CONNECTED TO EARTH GROUND PRIOR TO MAKING ANY OTHER CONNECTION TO THE EQUIPMENT.



A TERMINAL TO WHICH OR FROM WHICH A DIRECT CURRENT OR VOLTAGE MAY BE APPLIED OR SUPPLIED.

THIS SYMBOL INDICATES THE WORD "PHASE".

1. Introduction

The NH-series UPS is a dedicated design for large scales of power systems applying on all kinds of data process systems, communication systems, satellite systems, computer network systems, medical device systems, safety and emergency systems, monitoring systems, and all factory facilities.

The NH-series UPS employs a high frequency SPWM (Sinusoidal Pulse-Width Modulation) inverter technology. The inverter uses an advanced IGBT module capable to reduce the MTTR (Mean Time to Repair) and easier to be maintained, came with advantages in high efficiency, low thermal loss, low noise, small volume, and long life expectancy. The control implements on MCU that simplifies complicated control circuits and reduces number of components.

A LCD display with multi-language graphical interfaces makes user easier to operate with accurate outputs. System block diagrams and statuses are also available on the interface providing users with clearly operating modes and overall conditions. Users can also implement long-distance monitoring by using various communication ports via computers or network systems. As a result, direct monitoring and controls on the UPS are available for users, which all messages on the interface are generated by MCU. If exclusive software---UPSentry is installed, 31 sets UPS status could be monitoring at the same time via only one PC reducing man forces and facilitating centralized control. The circuit boards of NH-Series could Interchangeable that minimized component-inventory management. Friendly design concepts of NT series UPS to provide optimal and durable quality power and to be the protector of the best power related devices for customers.

Besides, in order to improve the reliability, the NH-series provides two possibilities:

Hot standby redundancy: is achieved by dual loops design. (1+1 Redundancy)

Parallel redundancy: No need of extra parallel control card, you can expand the total backup capacity by simply linking another unit via a DELTA cable. A single cabinet can install four power modules and each module has 20KVA capacity. As a result, NH-series can backup up to 80KVA in one cabinet. By parallel expansion (two cabinets), the possible total capacity will be 160KVA.

1-1. Advanced Features

- Power Rating: 15/20/30/40/60/80 KVA
  (15/20/30/40KVA can be with internal battery).
- Up to 4 modules work in parallel in one single cabinet
- 1+1 parallel redundant expansion and no need of extra parallel control card. Maximum total output power is 160KVA.
- High input power factor(pf > 0.99) and low input current (THD: < 5%). Save the installation cost and reduce the pollution of utility.
- Overall high efficiency > 94%.Modular design with power module redundancy.
- Dual input – separated rectifier and bypass input.
- Built-in manual and static bypass switch for maintenance.
- Built-in SRAM, record up to 500 real-time event logs.
- Redundant auxiliary power and control circuit. Double insurance of the performing reliability.
- Scheduled battery test and battery replacement warning.
- Local and remote emergency power off function (LEPO and REPO).
- Compatible with generator design.
- Double conversion and IGBT technology.
- Multi-interface for monitoring and critical controlling.
- User-friendly LCD display and LED indicators.
- External battery pack available to extend the backup time.

2. Operation

Delta NH-series operates in four basic modes:

2-1 Normal Mode (Single Installation)

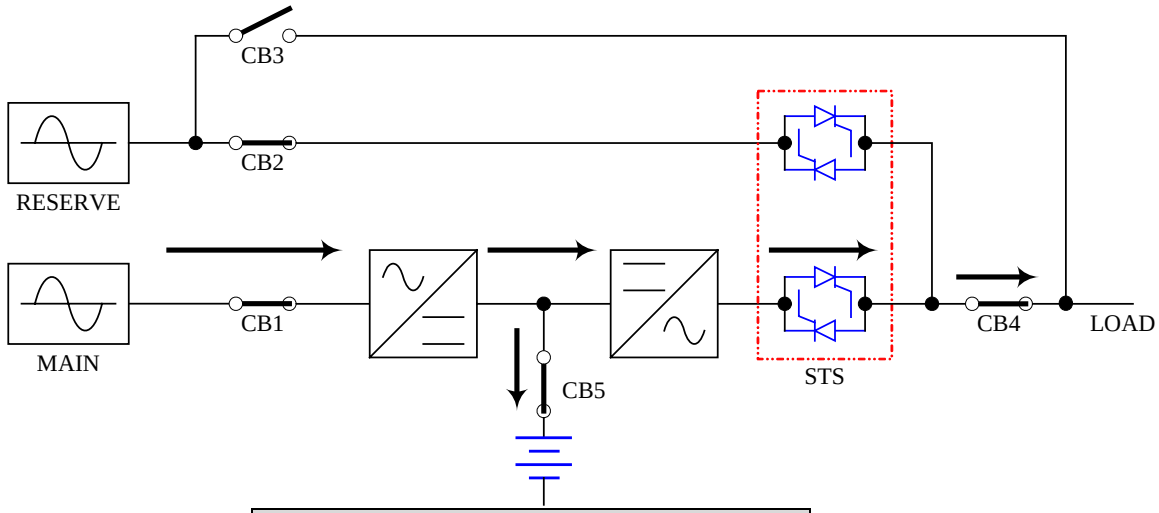


Fig. 2-1 Normal Mode Block Diagram

Under normal mode, utility power supplies to the rectifier and then transferred into DC power to supply the inverter and charge the batteries. Inverter will modulate and transfer the DC power into AC power to the load. This the “Double Conversion” technology to regulate the utility into pure and stable power to your precious equipment. (Refer to Fig. 2-1)

2-2 Backup Mode (Single Installation)

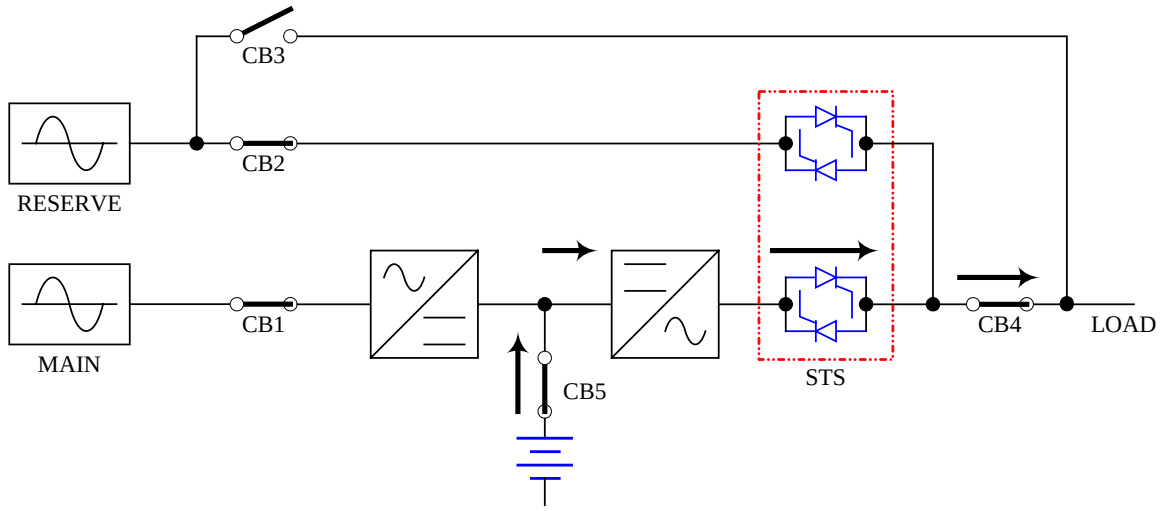


Fig. 2-2 Backup Mode Block Diagram

When there is a power event (blackout, transient, surge, fluctuation…), UPS will automatically switch from normal mode into backup mode. Battery (internal or external) will provide emergency power to the inverter and then the loads. (Refer to Fig. 2-2)

2-3 Reserve Mode (Single Installation)

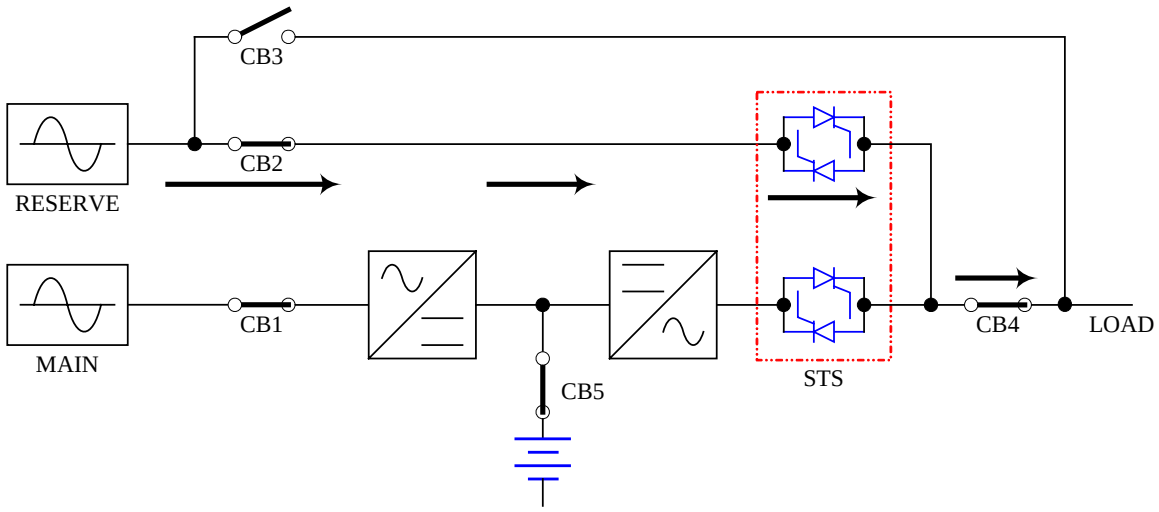


Fig. 2-3 Reserve Mode Block Diagram

When inverter malfunctions under（1）Over temperature（2）Overloading（3）Output short circuit(4)Output voltage abnormal(5)Battery terminates to backup, inverter will shutdown. If UPS detects the reserve power exists and normal, then UPS will automatically switch into reserve mode to make sure the supply to the loads. When all troubles are eliminated, UPS will switch back to the normal mode immediately. (Refer to Fig. 2-3)

2-4 Bypass Mode (Single Installation)

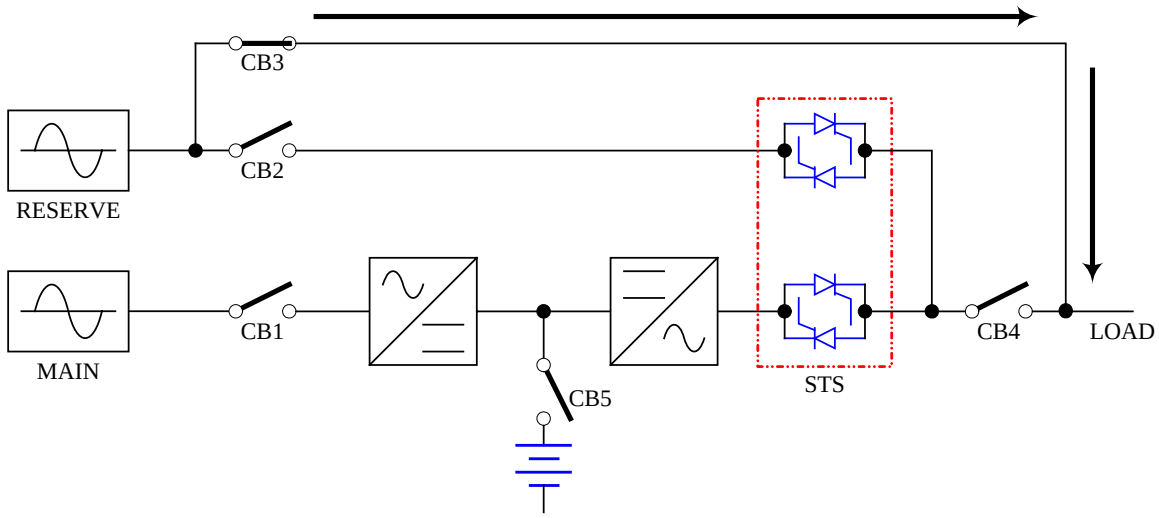


Fig. 2-4 Bypass Mode Block Diagram

Under maintenance or repair service condition, you will need to cut off the UPS power but not the power to your equipment. Make sure the reserve power exists first, then manually switch UPS into bypass mode. At this time, there is no power inside UPS. The service engineer can do the maintenance or repair job safely but keep your equipment supplied. (Refer to Fig. 2-4)

2-5 Normal Mode (Parallel)

Delta NH-series provide 1+1 parallel combination to get redundancy or expand the total capacity.

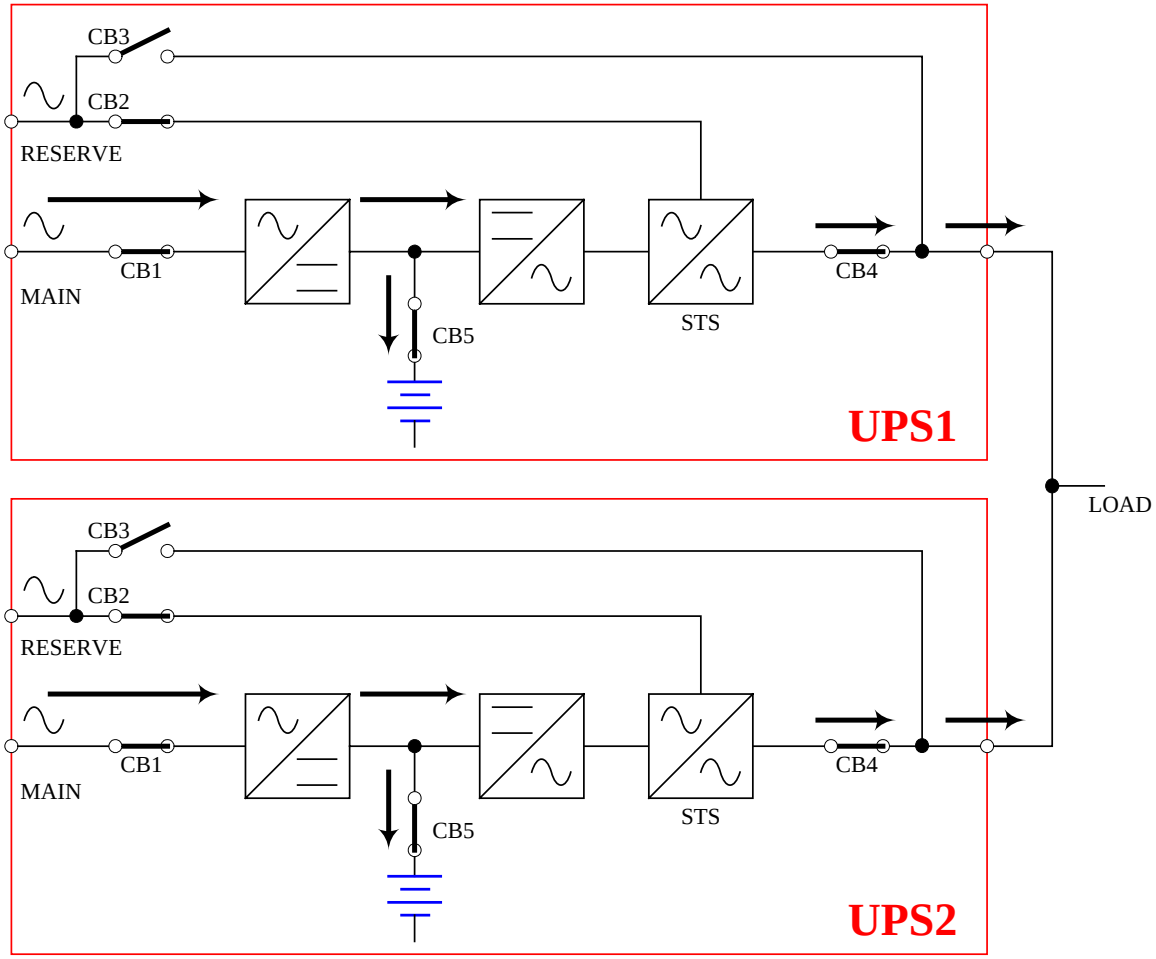


Fig. 2-5 Normal Mode in parallel redundancy

Under this installation，the loading is shared by two UPS units. If there is something wrong in one of them, the loading will be totally handle by another. In case the loading is greater than one UPS can take, UPS will shutdown and then switch to the reserve mode. (Refer to Fig. 2-5)

2-6 Backup Mode (Parallel)

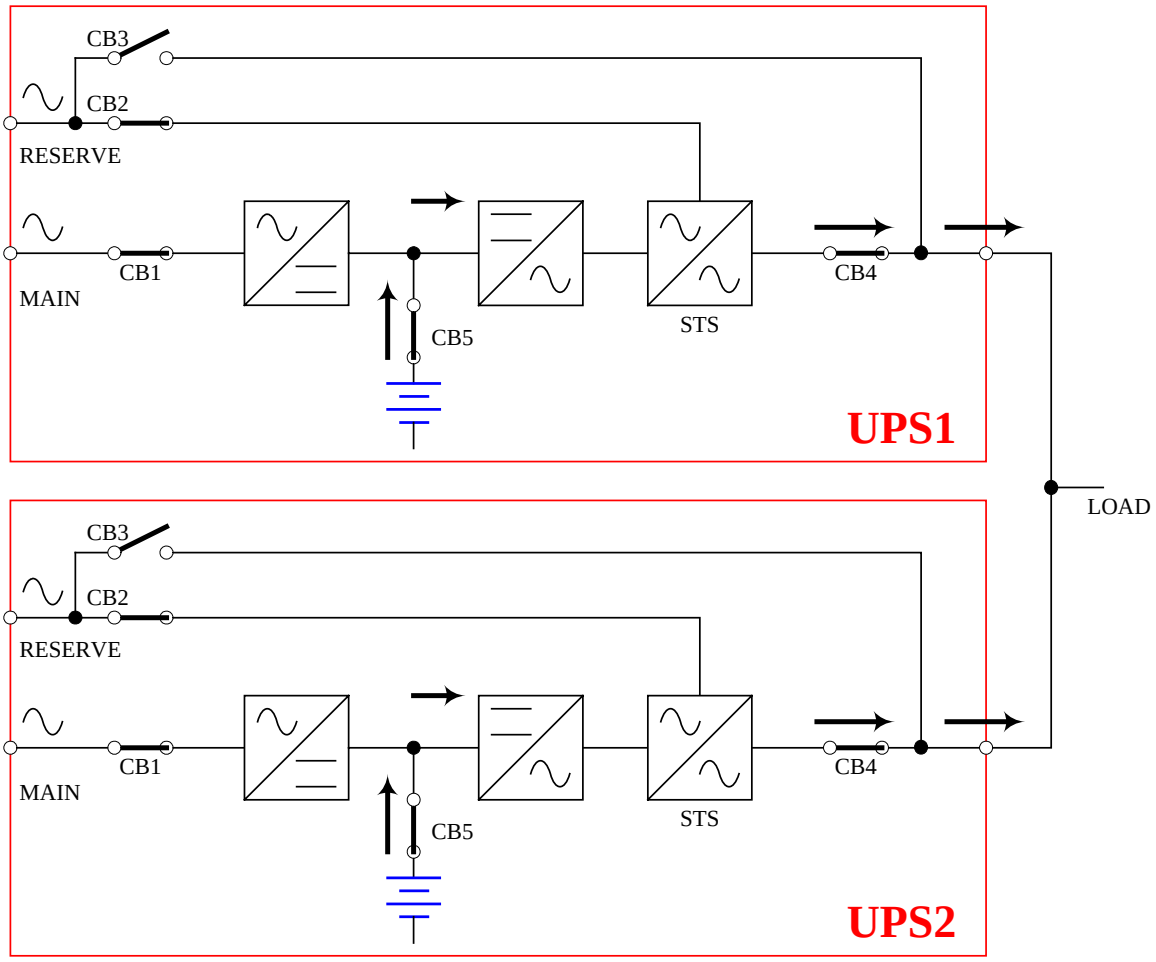


Fig. 2-6 Backup Mode in parallel redundancy

Loading is shared by two UPS units when there is blackout. (Refer to Fig. 2-6)

2-7 Reserve Mode (Parallel)

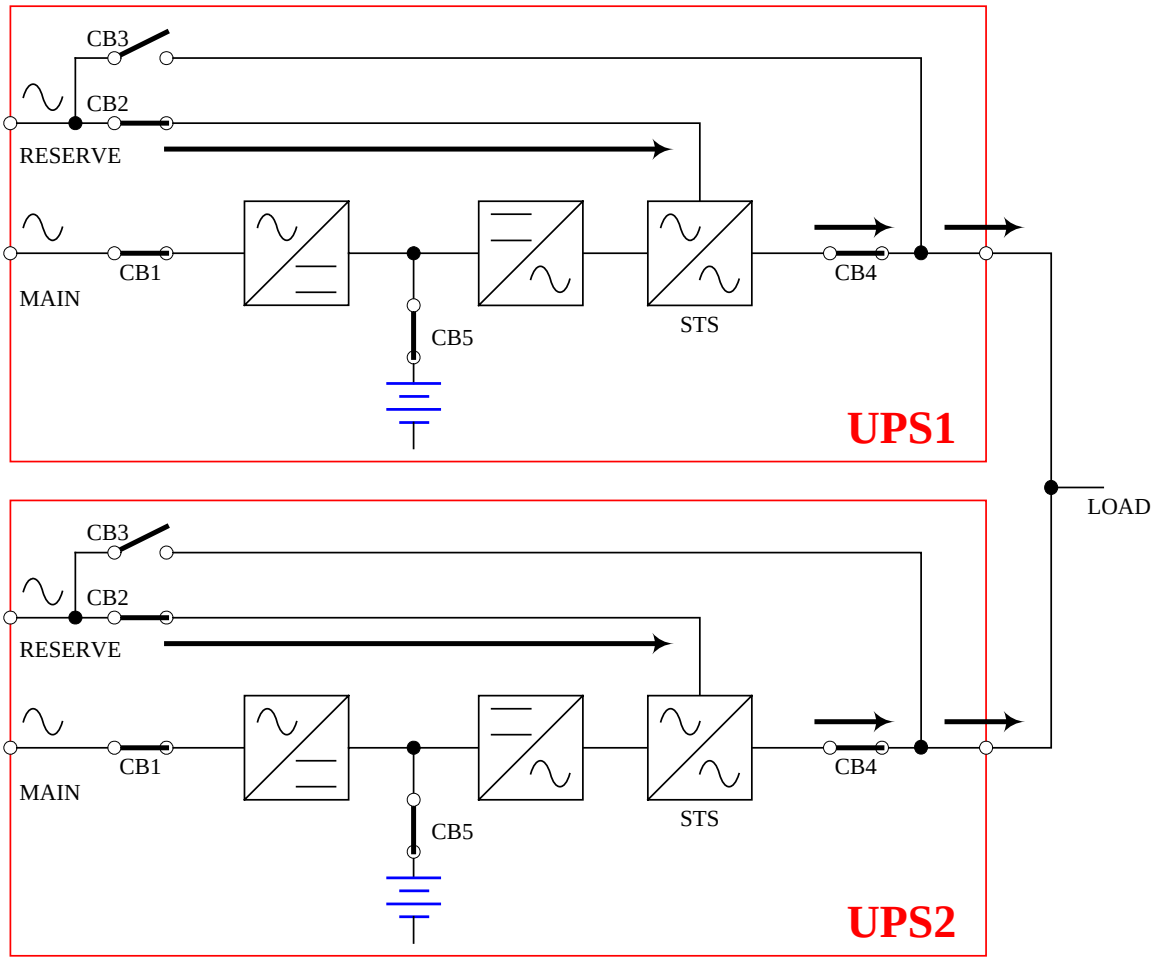


Fig. 2-7 Reserve Mode in parallel redundancy

The same as chapter 2-3 except two UPS share the loading. (Refer to Fig. 2-7)

2-8 Bypass Mode (Parallel)

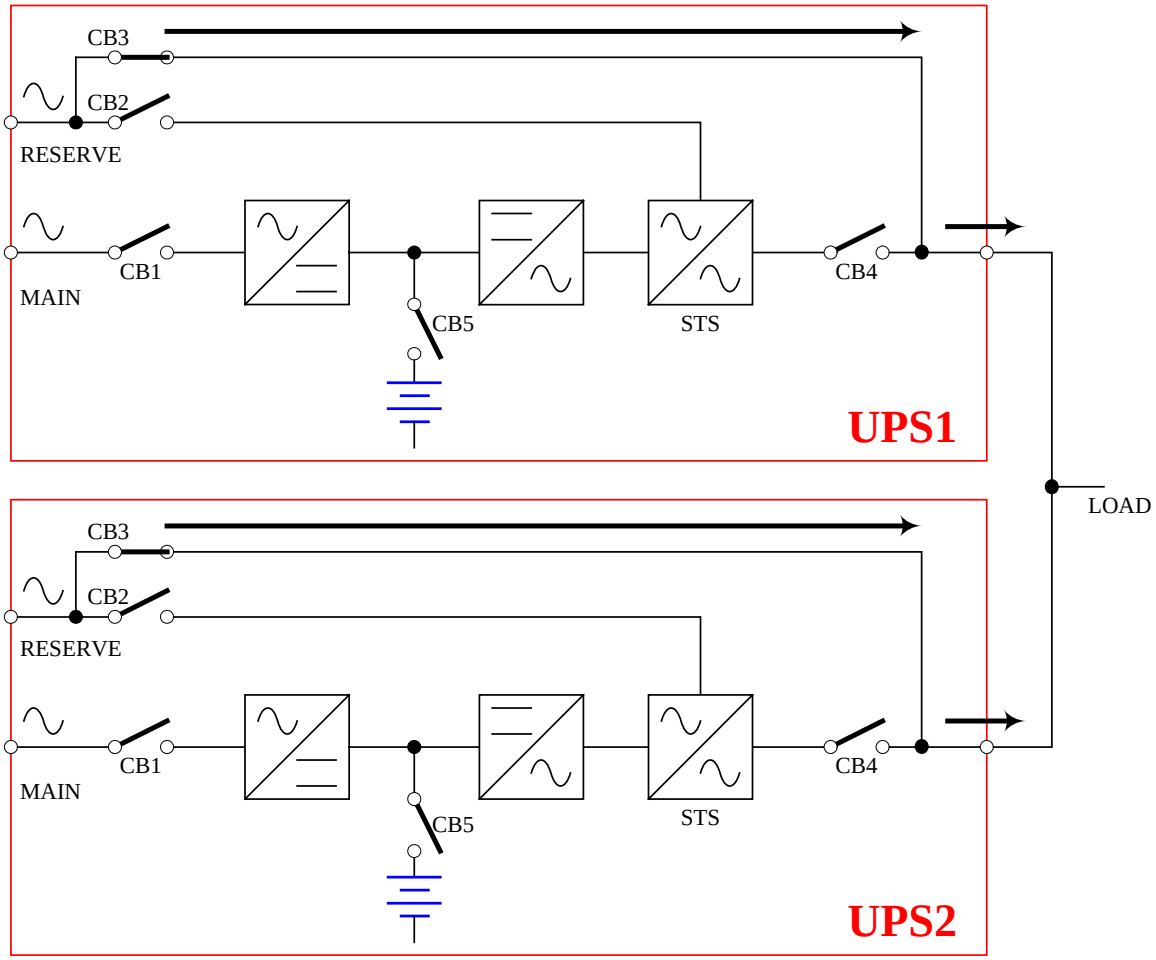


Fig. 2-8 Bypass Mode in parallel redundancy

The same as chapter 2-4 except two UPS share the load. Remember that both UPS should be switched into bypass mode. (Refer to Fig. 2-8)

2-9 Hot Standby Redundancy

If you just want to double insurance the UPS operation, you can utilize one extra UPS to be the reserve source of main UPS. This installation will make sure the output power source for loading is still present even when the main UPS malfunctions. （Refer to Fig. 2-9）.

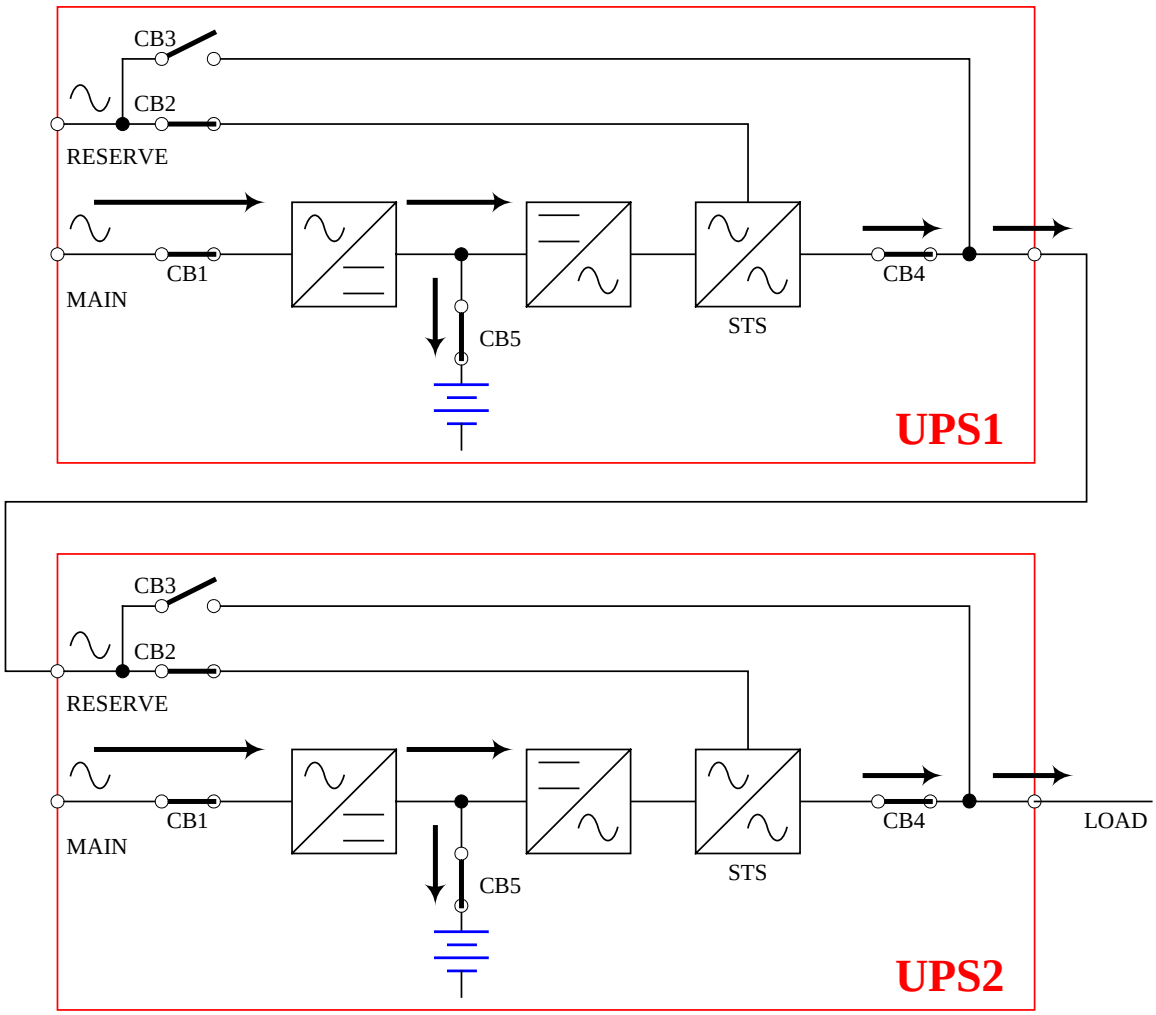


Fig. 2-9 Hot Standby Redundancy

3. General View

3-1. Appearance

External Battery Pack

Power unit

LCD Display and Control Panel

3-1-1 Dimension

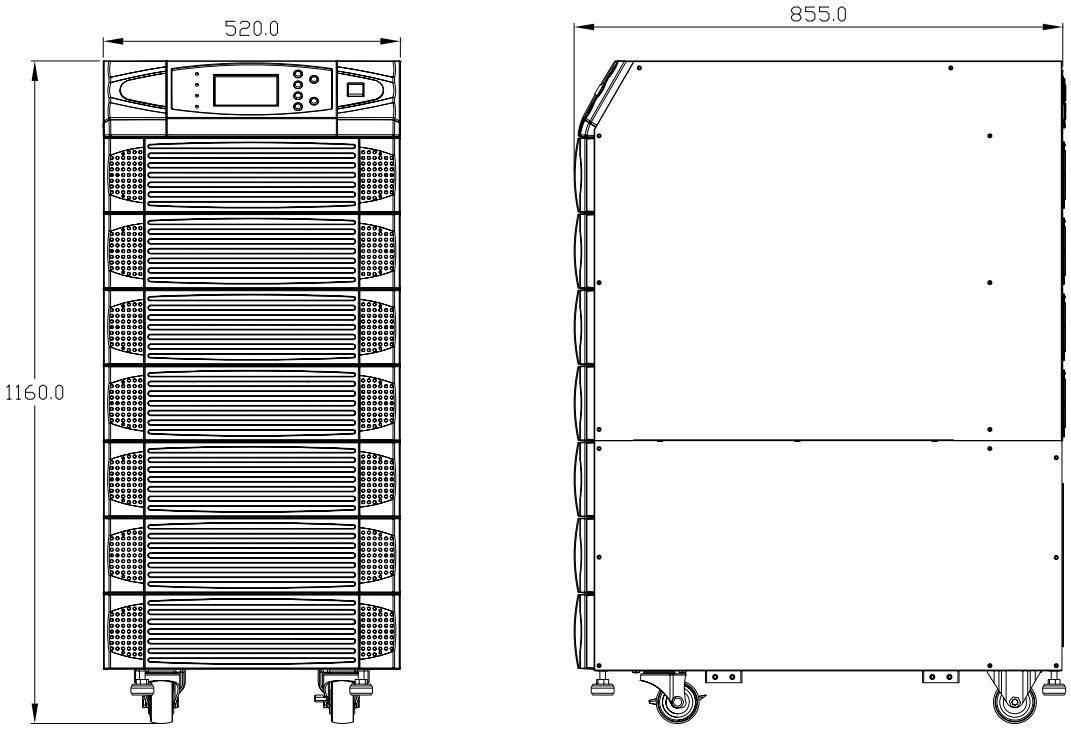


Fig. 3-1 Power Unit (mm)

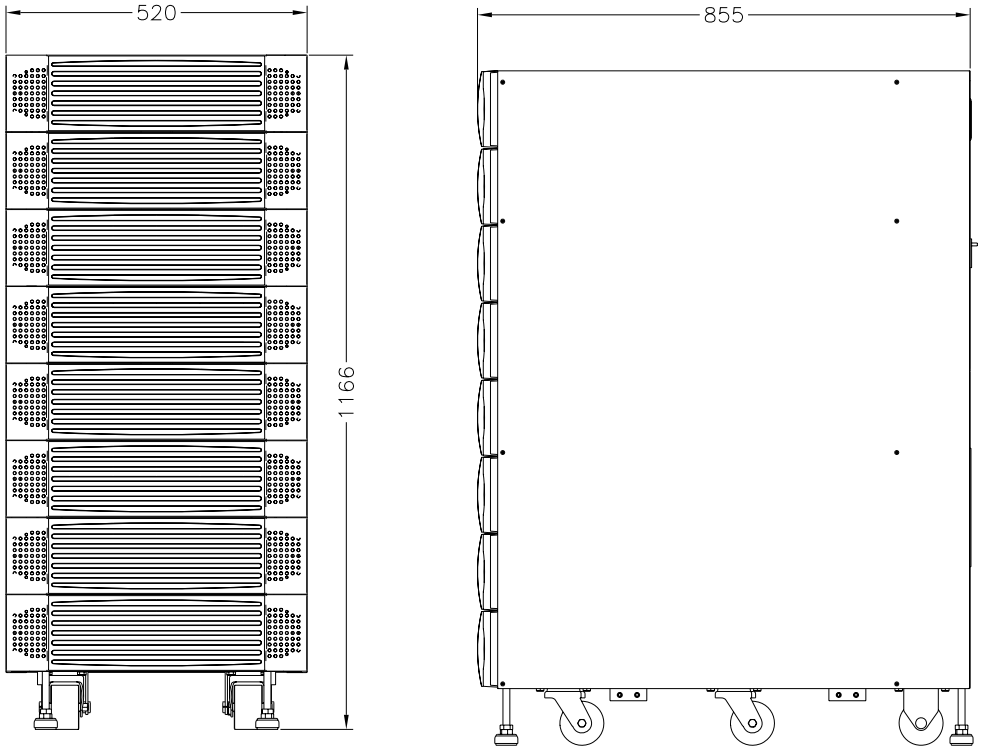


Fig. 3-2 External Battery Pack (mm)

3-2 Function

3-2-1 Front Panel

1. LCD Display and Control Panel / LED indicators :

- Display UPS status and message
- Setup parameters and control buttons
- On/Off UPS
- EPO: Emergency Power Off

Please refer to Chapter 6-1 for more details.

2. Power Modules :

- Bezel can be easily removed for the purpose of maintenance.
- Minimum capacity of each power module is 15KVA, standard 3U (132cm) height.
  Maximum modules can be installed are four unit, i.e. maximum capacity in a single cabinet is 80KVA.

3. Protectors :

- Bezel can be easily removed for the purpose of installation or maintenance.
- There are four protectors: Input、Bypass、Manual Bypass、Output.
- All protectors are no fuse breaker type.

3-2-2 Rear Panel

1. Interfaces:

- Provide multi-interface for monitoring and control purpose
- There are :
  (1) Two multi-function slots (SNMP card、Relay I/O control card、Mobus card are optional accessories)
  (2) Parallel link communication
  (3) Input and Output Dry Contact
  (4) RS232 : Delta's software "UPSentry Smart 2000" or "InsightPower Manager" are optional choice for central monitoring and control purpose)

2. Power Module and wiring:

- Remove the cover, you can perform wiring for power modules.

3. I/O wiring terminal block:

- Remove cover, you can perform wiring for input、output and external battery.
- Input power source : 3 phases (R、S、T and neutral N)
- Bypass input source : 3 Phases (R、S、T and neutral N)
- External battery pack : positive(+)、negative(-) and neutral N
- UPS output : 3 Phases (R、S、T and neutral N)
- Protection Earth : For safety

3-3 Specification

Table 3-1 Delta NH-series Technical Data

Capacity				15kVA/12KW	20kVA/16KW	30kVA/24KW	40kVA/32KW	50kVA/40KW	60kVA/48KW	80kVA/64KW
Input	Rating Voltage		V	220/380 , 230/400 , 240/415 (3Φ 4W+Earth)						
	Voltage regulation		%	-25 ~ +20						
	Input current harmonic distortion (Full Load)		%	< 5						
	PFC (Full Load)			> 0.99						
	Frequency		Hz	50 / 60						
	Frequency tolerance		Hz	45 ~ 65						
Output	Output Voltage		V	220/380 , 230/400 , 240/415 (3Φ 4W+Earth)						
	Output Frequency		Hz	50 / 60						
	Total Harmonic (Linear Load)		%	≦3						
	Voltage regulation	Static	%	±1						
		Dynamic	%	±7 (10% ~ 90% Linear Load)						
	Frequency regulation	Interior oscillator	Hz	±0.05						
		synchronized	%	±5						
	Overload			≦125% : 10minutes ; ≦150% : 1minute						
Audible Warning	Battery backup			Intermittent						
	UPS abnormal			continuous						
Display	LED			UPS status : Normal、Bypass、Backup、Fault						
	LCD			Input/Output、Bypass、Inverter、Frequency、Loading and Battery voltage、current UPS abnormal message and intelligent self diagnosis						
Remote	Monitor			Monitor up to 31 PCs、Graphically display records and historical data、Fault records retrieved						
	Control			Remote control the Inverter and alarm、setup password、auto-dial warning						
Interface	Standard			RS232, Dry Contact Output						
	Optional			SNMP card, Modbus card, Relay I/O control card, Environmental sensor box, SNMP+5 Ports Hub						
Others	Parallel Redundancy			Yes (1+1 for two UPSs of the same capacity only!)						
	EPO			Standard (Local and Remote)						
	SRAM event log			Yes (500 records)						
	Parameter configuration			Yes						
	Hot Standby Installation			Feasible						
	Battery temperature compensation			Optional						
	Battery Start			Standard						
Overall	Efficiency	Normal	%	94						
		ECO	%	97						
	Transfer Time		ms	0						
	Temperature		℃	0～40						
	Humidity (Non condensed)		%	90						
	Noise (One meter)		dBA	65	65	68	68	70	70	70
	Dimension	Width	mm	520						
		Depth	mm	850						
		Height	mm	1165						
	Weight		Kg	125	125	175	175	210	210	244

4. Installation

4-1 Before Installation

Due to different installation environment, we strongly recommend you to read this manual carefully before installation. Only qualified service personnel can perform installation and maintenance.

4-2 Package Inspections

External It's not predictable that UPS or battery pack will suffer what kind of impact or accident during transportation. We recommend you to inspect the container for any obvious damage or mishandling.

Internal

1. When you unpack the container, immediately examine the UPS or battery pack cabinet.
2. Check the rating label on the rear side of cabinet. Confirm the model name and rating match what you ordered.
3. Examine any parts is damaged or loosened.
4. Examine any accessory is missing. NH-series has the following accessory:
   - RS232 cable : 1 pcs (Length = 1.8m)
   - Parallel communication cable : 1 pcs (Length = 2m)
   - Remote EPO -wiring connector : 1 set (2 contacts module)
   - Input dry contact -wiring connector : 1 set (4 contacts module)
   - Output dry contact –wiring connector : 1 set (12 contacts module)
   - Software CD : 1 pcs

If the following condition happens:

- **Any damage observed, either external or internal**
- **Any accessory is missing or damaged**

Please contact your dealer or local agent for assistance

4-3 Storing for delayed installation

1. If the installation is not immediately performed after unpacking, please store UPS under:
   - Temperature is below 40℃
   - Relative humidity is below 90%
2. If the installation schedule will be over 6 months after you receive UPS, please recharge batteries at least 8 hours before use.

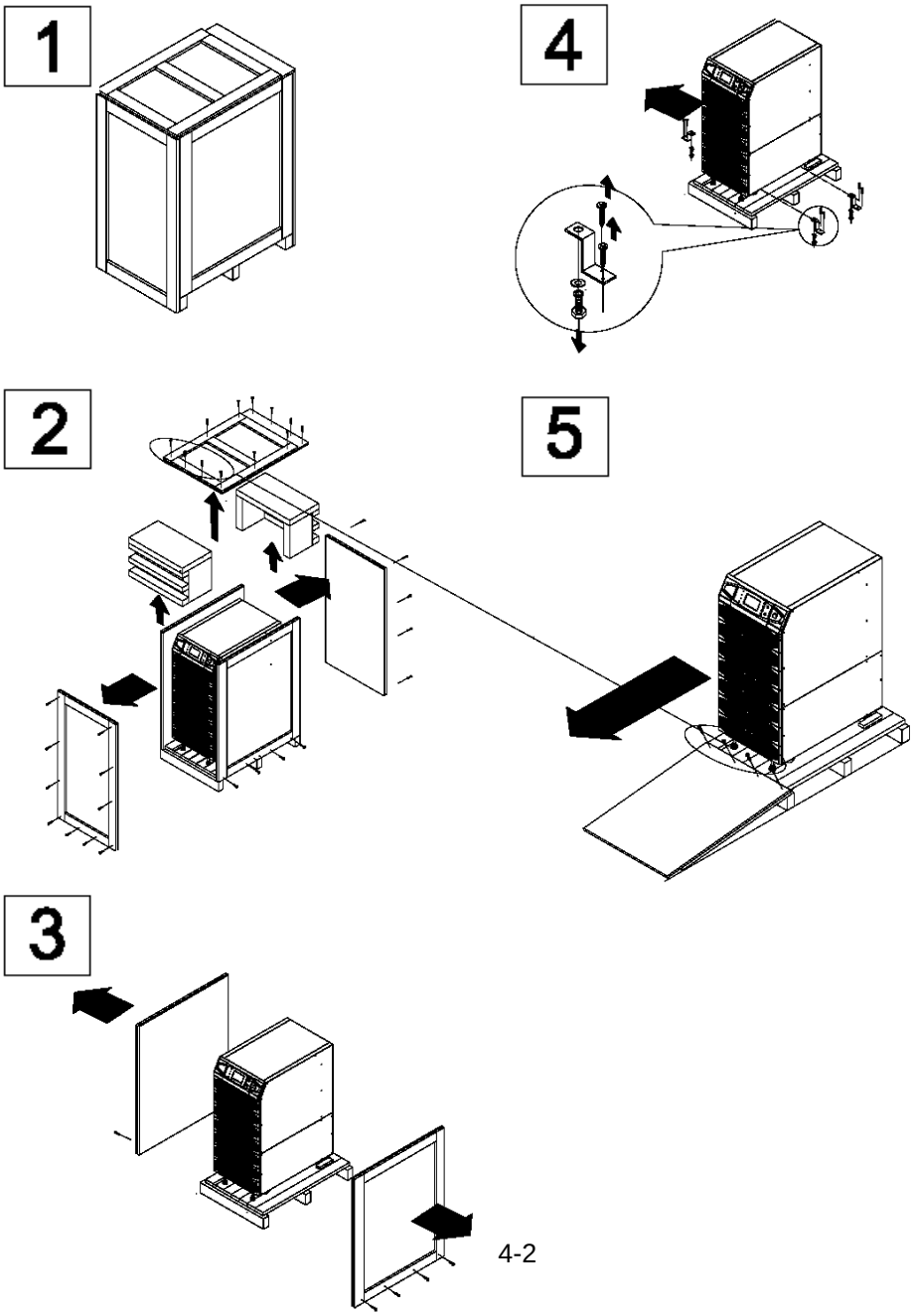
Charging procedure:

- Connect UPS to the utility. If external battery pack is ordered, please connect the battery pack to the UPS.
- Start UPS. At this time, UPS will charge the battery by internal charging circuit.

3. Remain sealed as original packing. Prevent any possible damage from mouse or similar creatures.

Connect and power the loading only when the battery is fully charged. It can make sure that UPS can provide backup power to the loads when blackout occurs.

4-4 Unpacking procedure



4-5 Location

4-5-1 Moving

1. NH-series UPS has casters to roll at a short distance to your desired location. Under unpacking procedure, employ a suitable machine with sufficient capacity to move UPS.

Please pay extremely attention when unbolt UPS from shipping pallet. Prevent any accident caused by unexpected moving.

2. Casters are suitable for moving on even surface. Avoid moving UPS on bumpy route. This may cause damage of UPS or tip-over accident.
3. When you need to move UPS for a long distance, please employ a suitable machine but not by casters of UPS.
4. Refer to Table 4-1 to get the weight of UPS and external battery pack.

4-5-2 Positioning

1. Position UPS or external battery pack by suitable machine.
2. Refer to Table 4-1 and 4-2 , make sure to position UPS at a suitable floor which can sustain for the weight.
3. When UPS has positioned, please make sure to use the stop of casters to remain UPS in stable condition.

◆ **Table 4-1 Floor Loading for UPS**

Input : 220/380 Vac / Output : 220/380 Vac							
Capacity (KVA)	**15**	**20**	**30**	**40**	**50**	**60**	**80**
Weight (Kg)	**125**	**125**	**175**	**175**	**210**	**210**	**244**
Floor Loading (kg/㎡)	**283**	**283**	**396**	**396**	**475**	**475**	**552**

◆ **Table 4-2 Floor Loading for External Battery Pack**

40 pcs	
Capacity (Ah)	**12V/26AH**
Weight (kg)	**470**
Floor Loading (kg/㎡)	**1064**

4-5-3 Environment

1. NH-series is for in-house use only.
2. The installation space should be conditioned at temperature 25^{o}C, related humidity <90%.
3. Keep the circumstance neatly clean. Prevent any possible damage from mouse or similar creatures, use suitable conduits for I/O wiring and severely protected..
4. UPS needs good ventilation and heat dissipation. NH series utilize fans to achieve heat dissipation. The air-flow circulates from front to the rear bezel. Therefore, we strongly recommend that :
   (1) At least 100cm clearance in front of UPS to permit free passage of service engineer and ventilation purpose.
   (2) At least 50cm clearance between UPS rear bezel and wall to permit free passage of service engineer and ventilation purpose.
   (3) At least 50cm clearance between the top of UPS and the ceiling to permit free passage of service engineer.
   (4) At least 100cm clearance in front of external battery cabinet for maintenance and at least 50cm between rear bezel and the wall for ventilation.
5. Recommend install fire extinguisher beside UPS for emergency use.

Don’t use any air conditioning or similar facilities that blow air directly onto the rear side of UPS.

4-6 Wiring

4-6-1 Preparations:

1. De-energize all input (AC or DC) or output power source of UPS before installing cables or making any electrical connections.
2. Make sure that all cables are correctly marked according to the purpose. Also the polarity, phase and diameter.
3. If UPS input/output power source is WYE-WYE (Y connection), then **"Neutral"** and **"Ground"** should not be connected!
   If input power source has V_{NG}>0, the solution is install an isolation transformer before UPS and input power source. Then connect "Neutral" and "Ground" of UPS together.

4-6-2 Wiring (Single Unit)

Notice:

- Confirm the Ph-R、S、T of each cable.
- Confirm the polarity of battery cable.
  a. Connect battery's 「+」、「-」and「N」 to UPS's related terminal.
  b. Connect ground of external battery cabinet to UPS's ground.
- Confirm the connection of UPS's ground to protective earth.

Wrong cabling will result in severe damage of UPS and accident.

Wiring procedure:

1. Remove cover at the rear side. See Fig. 4-1

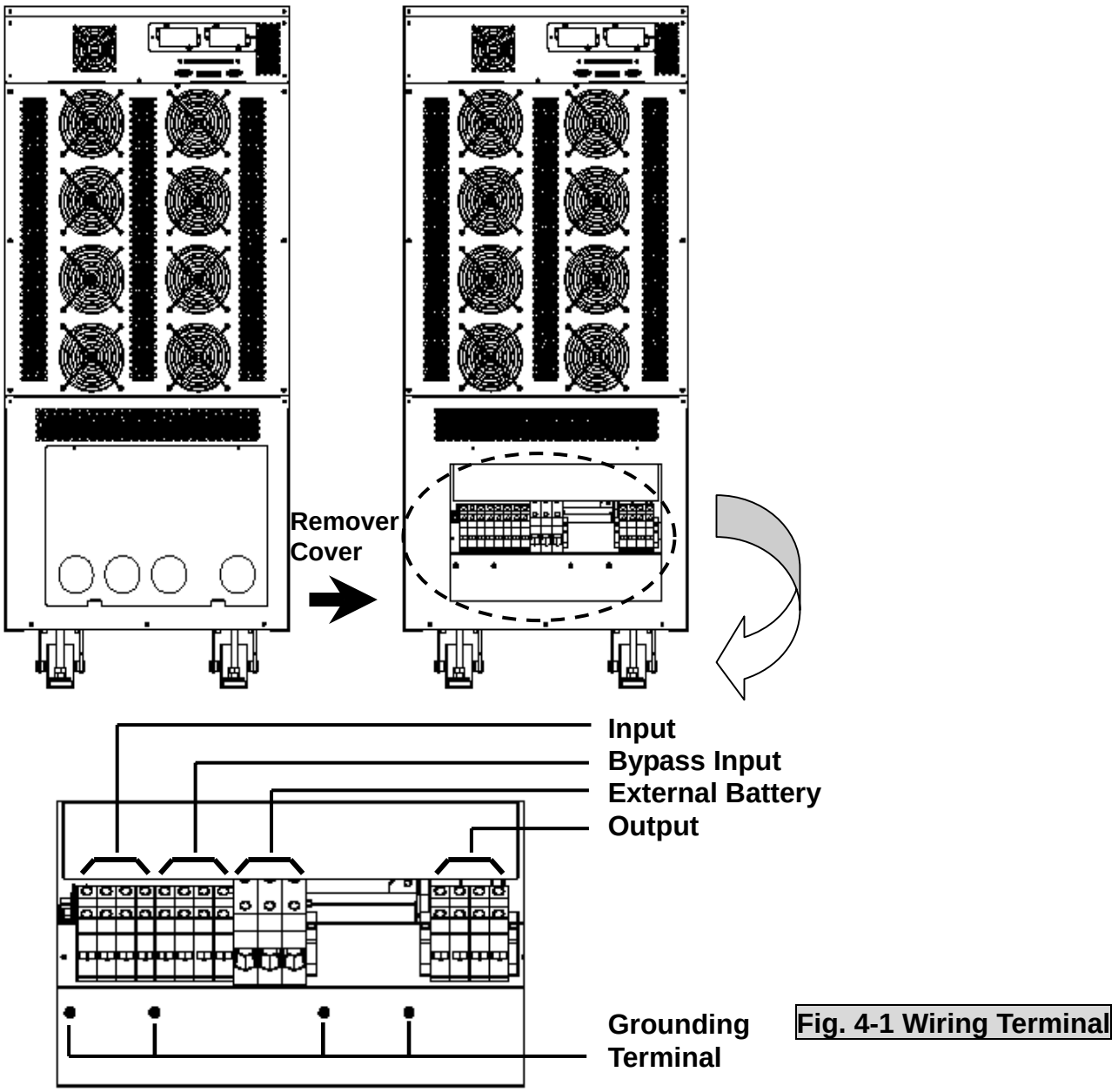


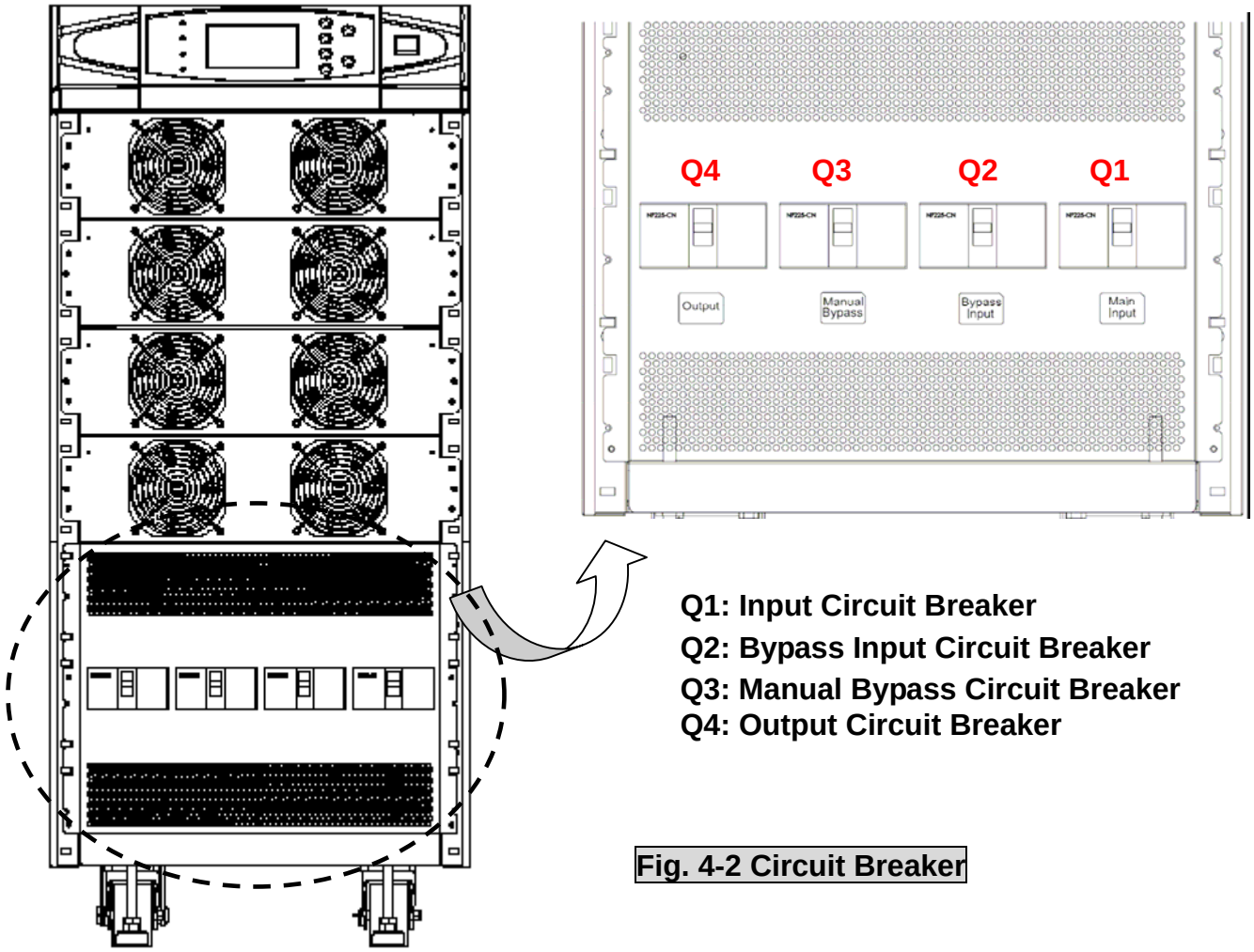
Fig. 4-1 Wiring Terminal

Terminal block (Refer to Fig 4-1):

- Input / Bypass : Ph-R、S、T and Neutral
- Output : Ph-R、S、T and Neutral
- External Battery : Positive(+), Negative(-) and neutral
- Grounding : Protection

2. The rating voltage of standard model is 220/380VAC, 230/400VAC or 240/415VAC.
3. Battery rating voltage is ±240VDC. (12VDC / 20pcs x 2 strings)
4. Confirm input and bypass input circuit breaker (Q1 and Q2) are cut off (Refer to Fig.4-2)
5. Confirm manual bypass circuit breaker (Q3) is cut off.

6. Confirm UPS output circuit breaker (Q4) is cut off.
7. According to UPS model you select, using suitable cable and lug (Refer to Table 4-3).
8. Connect all cables to the right terminal or location as indicated (Refer to Fig. 4-1).



Q1: Input Circuit Breaker
Q2: Bypass Input Circuit Breaker
Q3: Manual Bypass Circuit Breaker
Q4: Output Circuit Breaker

Fig. 4-2 Circuit Breaker

◆ **Table 4-3 Input/Output Electrical Data**

VA	Input (V)	Output (V)	Input Breaker (A)	Cable (mm^2)	Reserve Breaker (A)	Reserve Cable (mm^2)	Output Breaker (A)	Output Cable (mm^2)	Battery Cable (mm^2)	Battery Fuse (A)
15K	**220/380**	**220/380**	**50**	**14**	**50**	**14**	**50**	**14**	**14**	**60**
20K	**220/380**	**220/380**	**50**	**14**	**50**	**14**	**50**	**14**	**14**	**60**
30K	**220/380**	**220/380**	**75**	**14**	**75**	**14**	**75**	**14**	**14**	**80**
40K	**220/380**	**220/380**	**75**	**14**	**75**	**14**	**75**	**14**	**14**	**120**
50K	**220/380**	**220/380**	**100**	**22**	**100**	**22**	**100**	**22**	**22**	**140**
60K	**220/380**	**220/380**	**125**	**22**	**125**	**22**	**125**	**22**	**22**	**160**
80K	**220/380**	**220/380**	**150**	**38**	**150**	**38**	**150**	**38**	**38**	**220**

*** Please follow the statute according to the installation region, select suitable breaker and cable.**

4-6-3 Wiring (Parallel Redundancy, single input)

1. Confirm input and bypass input breaker (Q1 and Q2) is cut off (Refer to Fig. 4-2).
2. Confirm manual bypass circuit breaker (Q3) is cut off.
3. Confirm output breaker (Q4) is cut off.
4. According to UPS model you select, using suitable cable and lug (Refer to Table 4-3).
5. Connect all cables to the right terminal or location as indicated (Refer to Fig. 4-1).
6. Connect parallel communication cable between UPS1 and UPS2 (Refer Fig. 4-3).

1. For parallel redundancy installation, the total cable length of input must be equal to output. This regulation prevent unbalanced loading share between two UPSs under reserve mode.

i.e. : Res1 + OP1 = Res2 + OP2 (Deviation must be less than 10%)

2. Two UPSs must be the same rating/capacity for parallel installation. Different rating can't link to the other and may result in accident.

3. NH series can only parallel link to another one UPS (1+1 redundancy), please don't parallel link more than two UPSs.

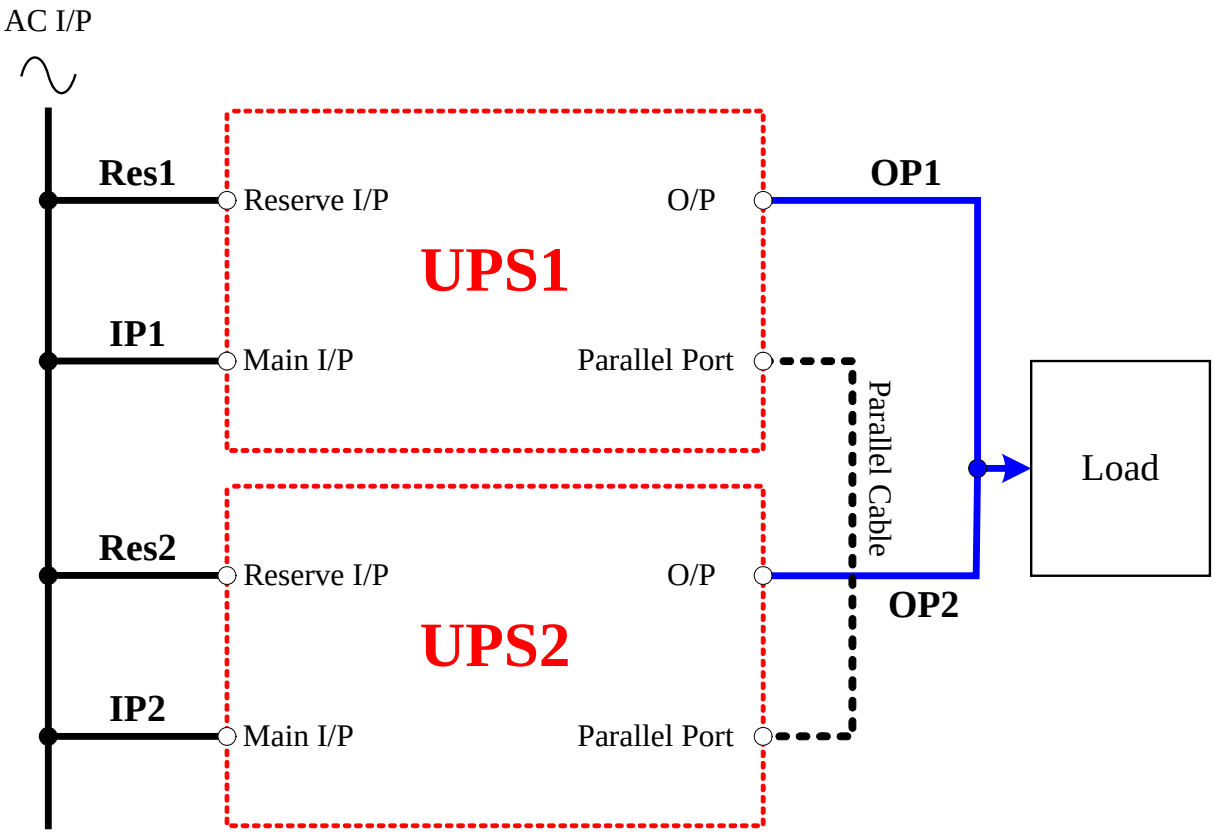


Fig. 4-3 Wiring (Parallel Redundancy, single input)

4-6-4 Wiring (Parallel Redundancy, dual input)

1. Confirm input and bypass input breaker (Q1 and Q2) is cut off (Refer to Fig. 4-2).
2. Confirm manual bypass circuit breaker (Q3) is cut off.
3. Confirm output breaker (Q4) is cut off.
4. According to UPS model you select, using suitable cable and lug (Refer to Table 4-3).
5. Connect all cables to the right terminal or location as indicated (Refer to Fig. 4-1).
6. Connect parallel communication cable between UPS1 and UPS2 (Refer Fig. 4-4).

1. For parallel redundancy installation, the total cable length of input must be equal to output. This regulation prevent unbalanced loading share between two UPSs under reserve mode.

i.e. : Res1 + OP1 = Res2 + OP2 (Deviation must be less than 10%)

2. Two UPSs must be the same rating/capacity for parallel installation. Different rating can't link to the other and may result in accident.

3. NH series can only parallel link to another one UPS (1+1 redundancy), please don't parallel link more than two UPSs.

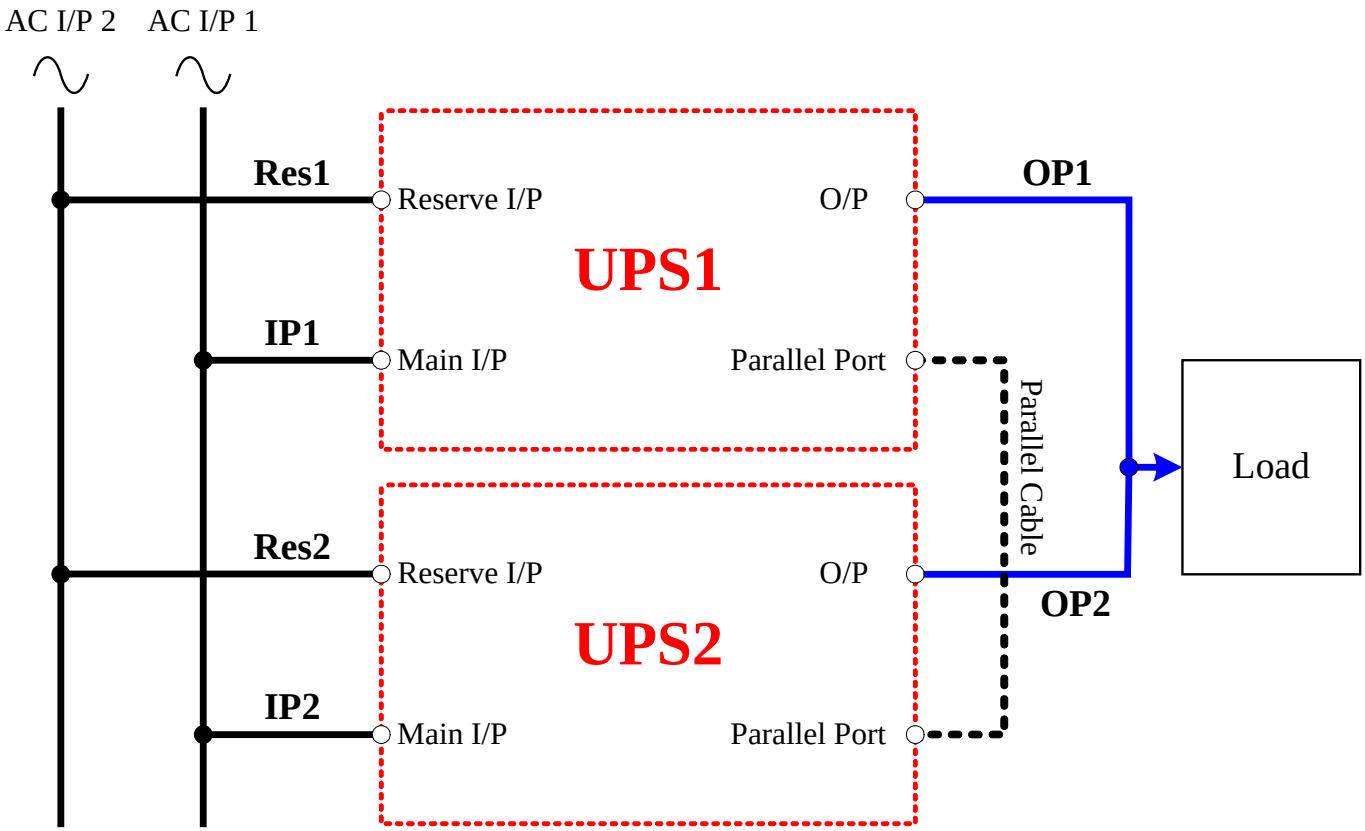


Fig. 4-4 Wiring (Parallel Redundancy, dual input)

4-7 Interface

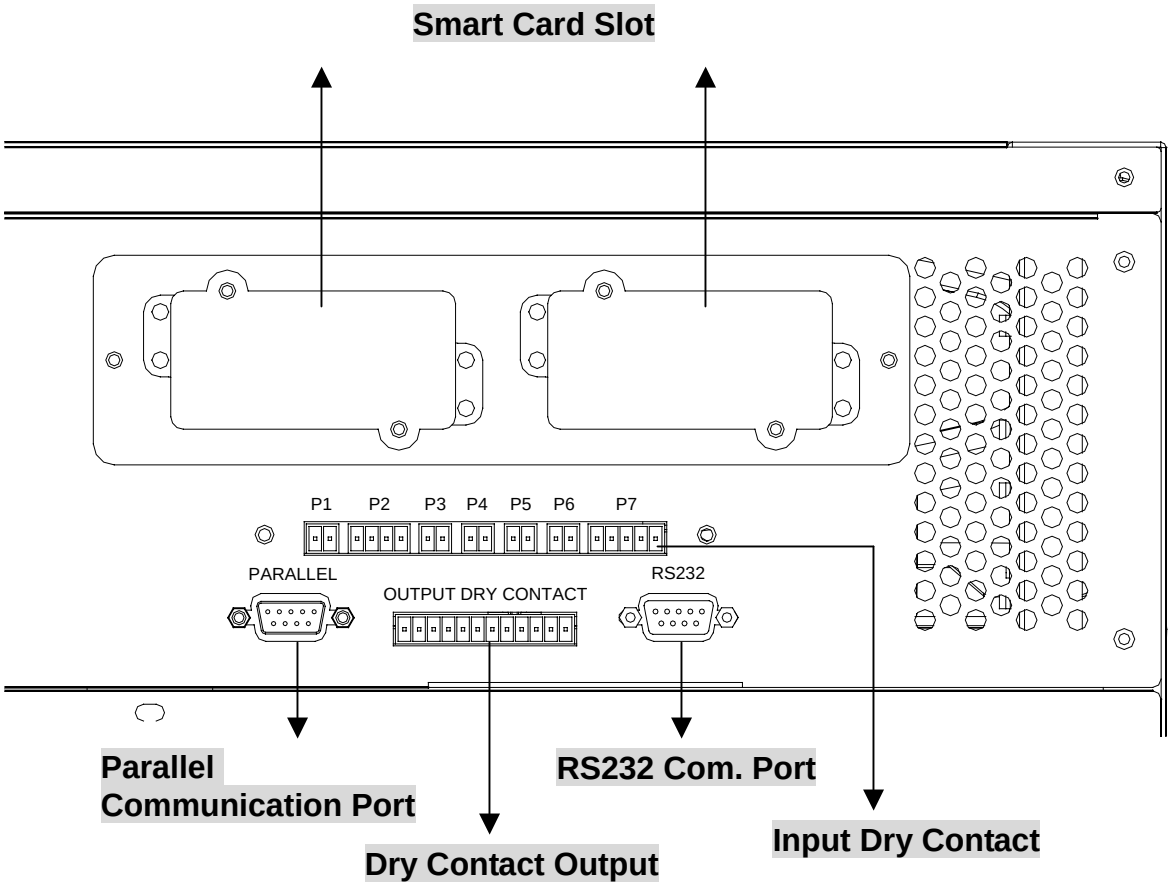


Fig. 4-5 Interface

4-7-1 Input Dry Contact

P1：REPO (Remote Emergency Power Off)
P2：Input contact (Two sets)
P3：External Battery Cabinet Temperature 1
P4：External Battery Cabinet Temperature 2
P5：External Battery Cabinet Temperature 3
P6：External Battery Cabinet Temperature 4
P7：External Battery Status

1. P1 : REPO

NH series provide a convenient method to let the user can shutdown UPS when an emergency event happens.

Simply connect cable from remote site to this terminal. Install a button or switch thereby the user can easily push the button to turn off UPS. This contact is normal open.

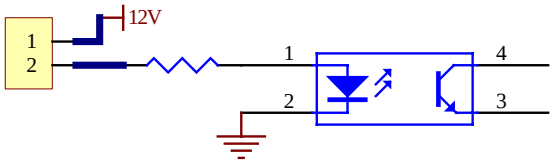


Fig. 4-6 REPO Circuit Detail

2. P2 : Input Dry Contact (Two sets)

NH series provide two sets of dry contact input to receive external signals, then UPS can take corresponding response.
These contacts are normal open.

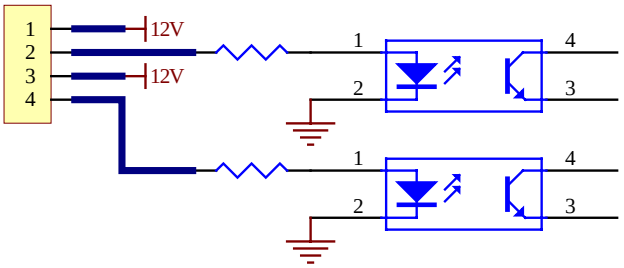


Fig. 4-7 Input Dry Contact Circuit Detail

3. P3~P6 : External Battery Cabinet Temperature (Optional)：

You can order this optional accessory to detect the temperature of external battery cabinet.

4. P7 : External Battery Status (Optional)

You can order this optional cable to detect the status of external battery cabinet. This function is only for cabinet ordered from DELTA.

Pin1：+12V
Pin2：Detection cable connected
Pin3：External battery cabinet breaker’s status :
- Signal is active : breaker is on
- Signal is inactive : breaker is off

Pin4：reserved
Pin5：Reference voltage

4-7-2 Output Dry Contact

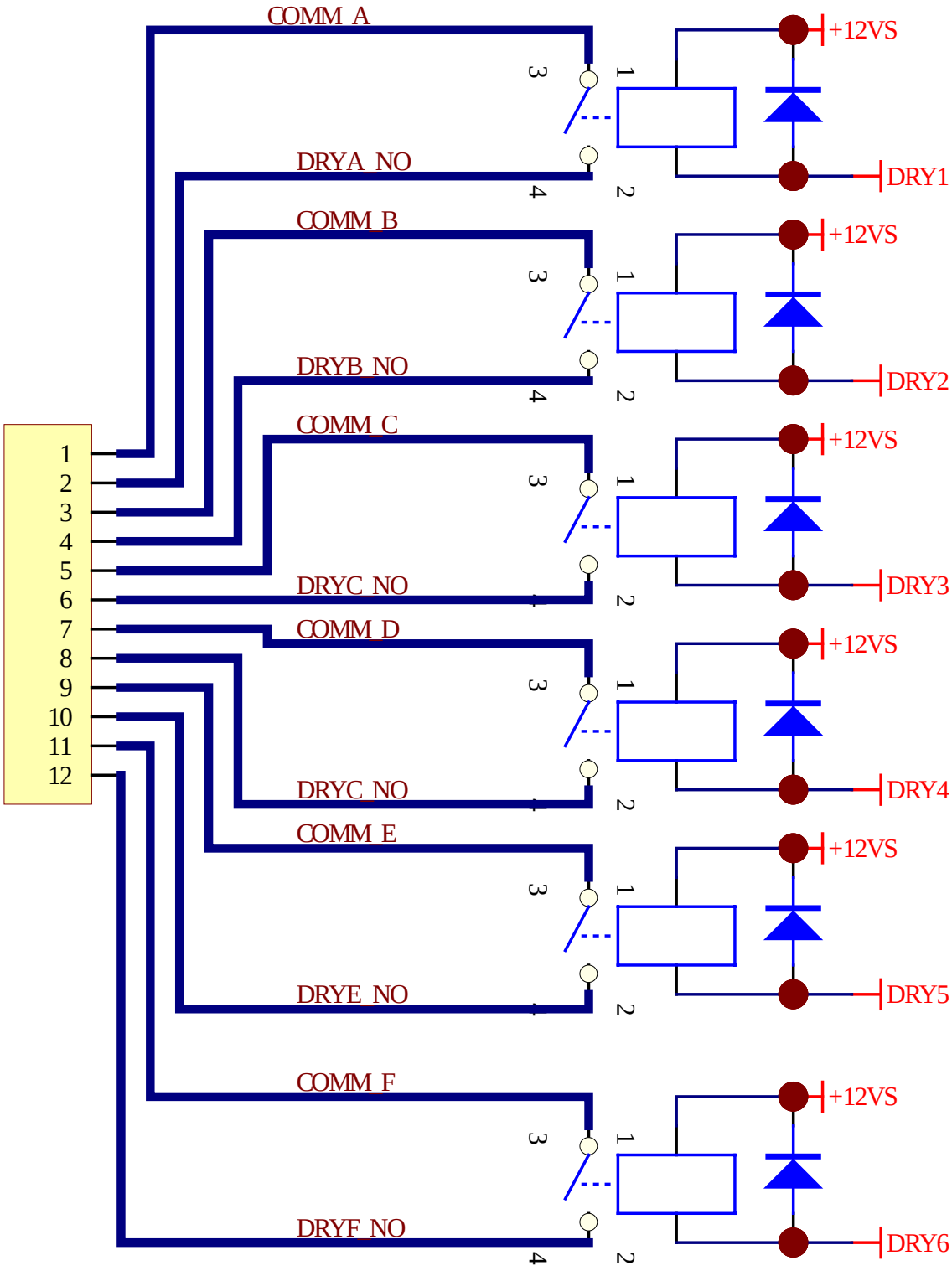


Fig. 4-8 Output Dry Contact Detail

NH series provide 6 dry contact outputs. These contacts can be setup to normal open or normal close. The default message is：

Contact	Message	Description
Pin1-2	Load on inverter	UPS is working normally
Pin3-4	Load on auto bypass	UPS is in bypass mode
Pin5-6	Mains1 input fail when load on inverter	Utility is blackout or abnormal. UPS is in backup mode
Pin7-8	Battery low	UPS is in backup mode, and the battery voltage is close to the terminative limit. (Battery voltage is lower than 220V)。
Pin9-10	Bypass input abnormal	Bypass is abnormal(frequency、phase), the output frequency will follow the rating
Pin11-12	Battery test failure	Perform battery test, the battery voltage is lower than default value.

There are another 13 choices:

Contact	Message	Description
7.	Internal communication failure	Module’s communication is not normal
8.	External parallel communication failure	When parallel redundancy installation, the parallel communication is not normal
9.	Output overload warning/shutdown	The loading is over UPS rating output.
10.	Power module fault shutdown	Module fails and UPS is shutdown
11.	Power module warning	Module has error. But UPS still can function normally
12.	EPO activated	Emergency power off the UPS.
13.	Load on manual bypass	UPS transfers into manual bypass mode
14.	Battery cabinet over temperature warning/shutdown	Temperature is too high
15.	Output voltage abnormal	Output voltage is too high or too low
16.	Battery need replace	Overdue for battery replacement (Compare with system setup)
17.	Bypass over temperature warning/shutdown	Bypass “static transfer switch” is over temperature
18.	Battery ground fault	Grounding error
19.	Bypass static switch fault	Bypass “static transfer switch” is abnormal

4-7-3 RS232 Port

Connect with computer via RS232 cable of the accessory.
DELTA develops a lot of powerful soft wares such as “UPSentry Smart 2000”, “InsightPower Manager” to integrate UPS into your system. Please see chapter 7 for detail information.

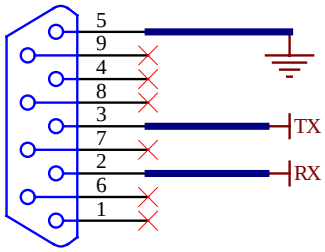


Fig. 4-9 RS232 Circuit

4-7-4 Parallel Communication Port

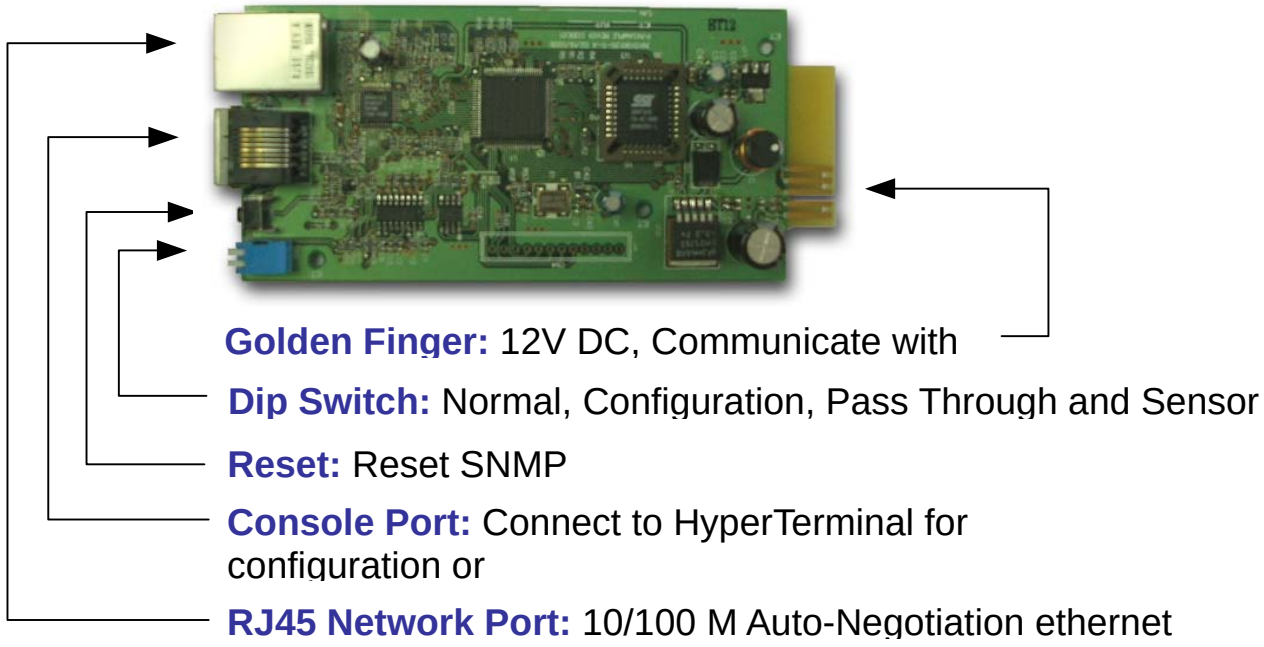
For redundancy or expansion installation, you simply connect two UPSs via parallel communication cable.

Use the parallel communication cable within the accessory pack. Link UPS with unsuitable cable may result in accident.

4-7-5 Smart Card Slot

NH series provide two smart slots and DELTA develops many powerful smart cards for different applications.

1. SNMP Card (Optional)



Features:

- SNMP agent and web server implemented for UPSSupport the following protocols: ARP, IP, ICMP, SNMPv1, SNMPv3 USM, UDP, TCP, HTTP, FTP, TFTP, SMTP, BOOTP, SNTP, DN and Telnet
- Security login by MD5
- Users level management
- Firmware upgrade for new features through TFTP
- Batch configuration through FTP
- Save UPS event log and history values in EEPROM
- Schedule shutdown, restart and test UPS
- Wake On LAN packet to wakeup PC
- Send e-mail and SNMP trap to notify users
- Provide InsightPower Client software to protect public operating systems
- Provide InsightPower Manager to monitor all of the UPS information in the network
- Provide InsightPower EzSetting software to easily configure at the first time and upgrade firmware

Technical Spec.

Network Connection	RJ-45
Temperature	0~40℃
Humidity	10~80% (relative)
Input Power	9~24V DC
Power Consumption	1 Watt (Maximum)
Dimension (L x W)	130 x 60 mm
Weight	58 g

Dip Switch Mode

SW1	SW2	Mode
ON	ON	Configuration
ON	OFF	For Environmental Sensor
OFF	ON	Pass Through
OFF	OFF	Normal

2. Programmable Relay I/O Card (Optional)

Features:

- ◆ UPS status information presented as 6 contact closuresProgrammable output contacts, monitors the UPS events that users really concern in different application practices
- ◆ Configurable UPS shutdown delay time
- ◆ Configurable input signal as shutdown UPS or battery test
- ◆ Has the ability to protect up to 6 computers unattended shutdown gracefully

Technical Spec.

Input Power	8 ~ 20VDC
Temperature	0 ~ 40℃
Humidity	10 ~ 80 %
Power Consumption	1.2 Watt.(Maximum)
Dimension(L x W)	130x60mm
Weight	200 g

Relay I/O

	Maximum	
	DC Voltage	DC Current
R1~R6	24V	1A
Imput	24V	10mA

I/O Definition

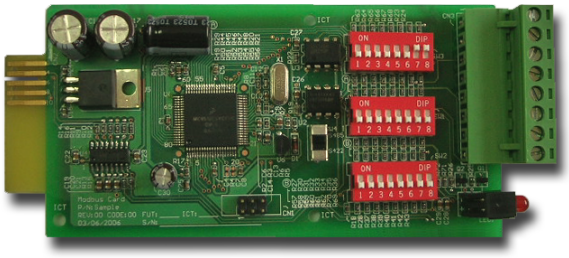
GND-R: Relay Grounding		
Common: 12 ~ 24VDC		
	Default	
R1	Summary Alarm	
R2	Input Power Fail	
R3	Battery Low	
R4	UPS in Bypass Mode	
R5	Overload	
R6	Over Temperature	
Input : Remote shutdown or battery test		
Tx: Transmit to PC, connect to RS232 pin-2		
Rx: Receive from PC, connect to RS232 pin-3		
GND-C: Ground for configuration, connect to RS232 pin-5		
	OFF(Default)	ON
SW1	Normal Open	Normal Close
SW2	Default Settings	Customized Settings

3. ModBUS Card (Optional)

Features:

- ◆ Translate UPS RS232 protocol into another RS232 and RS422/485 Modbus protocol.Device ID is adjustable by 8 dip switches, the value is from 0 to 255.
- ◆ RS422/485 terminal resistor is selectable by dip-switch, easy to install.
- ◆ Baud rate and parity options are also adjustable by dip switches.
- ◆ 2 LEDs to indicate communication status.

Input Power	8 ~ 20VDC
Temperature	0 ~ 40℃
Humidity	10 ~ 80 %
Power Consumption	1 Watt. (Maximum)
Dimension (L x W)	130x60mm
Weight	150 g



I/O Definition

GND	Ground for RS232
RS232-Tx	Tx to PC
RS232-Rx	Rx from PC
RS422-T+ RS422-D+	T+ for RS422 or D+ for RS485
RS422-T- RS422-D-	T- for RS422 or D- for RS485
RS422-R+	R+ for RS422
RS422-R-	R- for RS422

4-8 Other Optional Accessories

1. Environmental Sensor:

Features:

- ◆ Real-time temperature/humidity and other environmental condition monitoring.
- ◆ Monitors the status of 4 user-provide contact devices to protect your critical equipments.

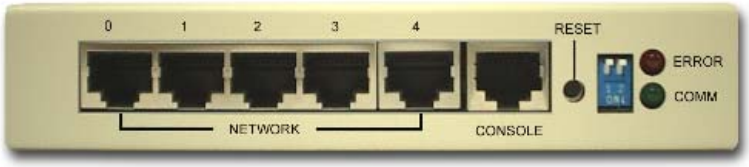
Technical Spec.

Temperature Range	0℃ ~ 65℃
Accuracy	± 2% of full scale
Humidity Range	10% ~ 90%
Accuracy	± 8% (full scale for 15~35℃)
Contact Input	4 sets
Pin-1	Common
Pin-2	Smoke
Pin-3	Fire
Pin-4	Water
Pin-5	Security
Contact Configuration	Normal Open or Normal Close
Dimension (W x D x H)	60 x 50 x 18 mm
Weight	142 g

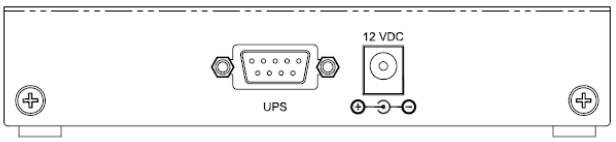
2. SNMP+ 5 Ports Switching Hub

Features:

- ◆ Fast ethernet 5 ports 10/100M smart switching hub
- ◆ SNMP agent and web server implemented for UPS Support the following protocols: ARP, IP, ICMP, SNMPv1, SNMPv3 USM, UDP, TCP, HTTP, FTP, TFTP, SMTP, BOOTP, SNTP, DN and Telnet
- ◆ Security login by MD5
- ◆ Users level management
- ◆ Firmware upgrade for new features through TFTP
- ◆ Batch configuration through FTP
- ◆ Save UPS event log and history values in EEPROM



- ◆ Schedule shutdown, restart and test UPS
- ◆ Wake On LAN packet to wakeup PC
- ◆ Send e-mail and SNMP trap to notify users
- ◆ Provide InsightPower Client software to protect public operating systems
- ◆ Provide InsightPower Manager to monitor all of the UPS information in the network
- ◆ Provide InsightPower EzSetting software to easily configure at the first time and upgrade firmware



Technical Spec.

Network connection	RJ-45
Temperature	0~40℃
Humidity	10~80% (Relative)
Input Power	12V DC
Power Consumption	4.5 Watt. (Maximum)
Dimension (W x D x H)	65x143 x 28 mm
Weight	320 g

Dip Switch Mode

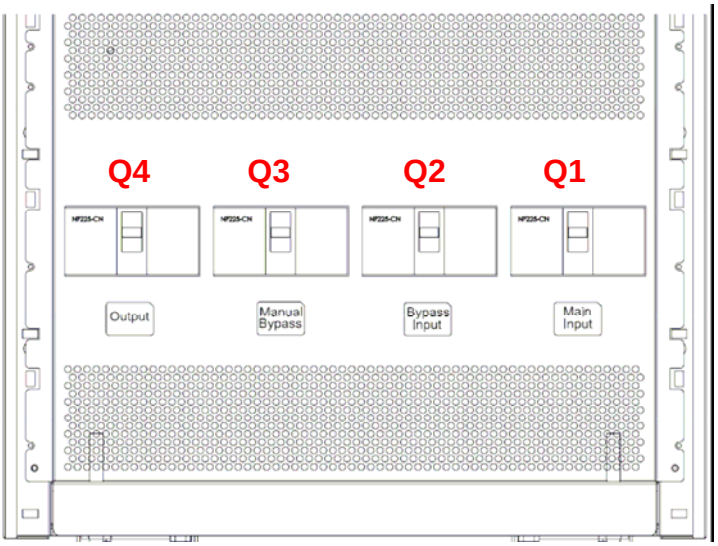
SW1	SW2	Mode
ON	ON	Configuration
ON	OFF	Environmental Sensor
OFF	ON	Pass Through Mode
OFF	OFF	Normal

5. Operating Procedure

5-1 Start up Procedure (Single Unit)

Preliminary Check：

- All circuit breakers are cut off, including the breaker or fuse of the external battery cabinet.
- Confirm there is no voltage potential between **NEUTRAL** and **Ground**.
- Confirm the input power source matches the rating (Voltage、frequency、phase and battery) of UPS you install.



Q1 : Input Circuit Breaker
Q2 : Bypass Input Circuit Breaker
Q3 : Manual Bypass Circuit Breaker
Q4 : Output Circuit Breaker

Start up procedure:

1. If there is external battery cabinet connected, switch on the circuit breaker of battery cabinet. Confirm **Q3** is cut off.
2. Switch on the **Q2** and **Q4**.
   LCD display will be activated. After initializing process, LCD display will show **"ON AUTO BYPASS"**. In the meantime, UPS output is supplied by the bypass source and the LED indicator **"BYPASS"** turns on.
3. Switch on the **Q1.** If input power source is normal, UPS is ready to start up.
4. Press button **" I "** for 3 seconds until you hear a beep then release button. Inverter will activate and synchronize with bypass source. UPS transfers from bypass into inverter therefore output will be supplied by inverter. **"BYPASS"** indicator turns off and **"NORMAL"** indicator turns on.

5-2 Battery Start (Single Unit)

1. Switch on circuit breaker of external battery cabinet and confirm **Q3** is cut off.
2. Press button **" I "** for 3 seconds until you hear a beep then release button.
3. UPS starts up by DC-bus soft start. Inverter will activate and follow default frequency.
4. Inverter will supply UPS output, and **"BATTERY"** LED indicator turns on.

5-3 Powering Down (Single Unit)

This procedure will shutdown UPS and also the output for loads. Confirm all loads are turned off first!

1. Press button **" O "** for 3 seconds until you hear a beep then release button.
   If originally UPS is in
   - normal mode : Then UPS will transfer to bypass mode. LCD display will show **"ON AUTO BYPASS"**
   - Battery mode : Then UPS will shutdown Inverter and cut off the output power.
2. Switch off **"Q1"**.
3. Switch off **"Q2"**.
4. Confirm UPS turns off and all circuits are off.
5. If there is external battery cabinet connected, switch off the circuit breaker of battery cabinet.
6. Switch off **"Q4"**.

5-4 Manual Bypass Start up (Single Unit)

If UPS is in normal mode, press button **" O "** for 3 seconds until you hear a beep then release button. Then UPS will automatically transfer to bypass mode.

1. Confirm UPS is in bypass mode.
2. Switch on **"Q3"**.
3. Switch off **"Q4"**.

1. Only for maintenance purpose, you can turn on manual bypass switch "Q3". If you switch on Q3 under normal condition, then inverter will turn off and output will be supplied by manual bypass source.

2. Manual bypass mode ensures that UPS supplies the loads from manual bypass source. The service engineer can perform maintenance process at this mode without interrupting the loads. At this moment, UPS is still energized by input power source. If service personnel want to replace any circuit board or component, please power down UPS (Refer to 5-3) first.

5-5 Start up Procedure (Parallel Redundancy)

Preliminary check:

1. All circuit breakers are cut off, including the breaker or fuse of the external battery cabinet.
2. Confirm there is no voltage potential between **NEUTRAL** and **Ground**.
3. Confirm the input power source matches the rating (Voltage、frequency、phase and battery) of UPS you install.

For parallel redundancy installation, you must set the ID code of each UPS to be "01" and "02" by configuring the control panel.

Start up procedure:

1. Connect two UPS with parallel communication cable. Ensure the connector is fastened to the DB9 port.
2. If there is an external battery cabinet is connected, switch on the breaker of external battery cabinet.
3. Switch on **“Q2”** of each UPS. The LCD display will show **”ON AUTO BYPASS”**.
4. Switch on **“Q1”** of each UPS.
5. Press button **” I ”** for 3 seconds until you hear a beep then release button. Inverter will activate and synchronize with bypass source.
6. Repeat step 5 for another UPS. When the inverter of both UPSs activate normally, they will transfer to normal mode at the same time.
7. Check out the output voltage of both UPSs. The deviation of each phase between two UPSs should be less than 5V. If it is confirmed, then switch on **“Q4”** of both UPSs.

5-6 Powering Down (Parallel Redundancy)

If you need to turn off one of the paralleled UPSs:

1. press button **” O ”** of the UPS you want to turn off. Last for 3 seconds until you hear a beep then release button.
   - If the other UPS can take over the total loads, then the turn-off one will shutdown inverter. LCD display shows **”LOAD NOT POWERED”** for the turn-off one. The working UPS shows **”ONLINE MODE”**.
   - If the total loads is greater than one UPS can take over, then both UPSs will shutdown inverter and transfer to bypass mode. Both UPS shows **”ON AUTO BYPASS”**.
2. Switch off **“Q1”** and **“Q4”** of the UPS you want to power it off.
3. Switch off **“Q2”** of the UPS you want to power off.
4. When the UPS is totally powered off, the LCD display will de-energized.
5. Switch off the breaker of external battery cabinet connected.

5-7 Manual Bypass Start ups (Parallel Redundancy)

Only for maintenance purpose, you can turn on manual bypass switch. If you switch on Q3 under normal condition, then inverter will turn off and output will be supplied by manual bypass source.

5-7-1 Online Mode transfers into Manual Bypass Mode

1. press button **" O "** of the UPS you want to turn off. Last for 3 seconds until you hear a beep then release button.
   - If the other UPS can take over the total loads, then the turn-off one will shutdown inverter. LCD display shows **"LOAD NOT POWERED"** for the turn-off one. The working UPS shows **"ONLINE MODE"**.
   - If the total loads is greater than one UPS can take over, then both UPSs will shutdown inverter and transfer to bypass mode. Both UPS shows **"ON AUTO BYPASS"**.

2. Repeat Step1 for another UPS.
1. Switch off **"Q1"** of both UPSs.
2. Confirm both UPSs are completely shutdown.
3. Switch on "Q3" of both UPS. Reserve power source supplies the loads. LCD display shows **"ON MANUAL BYPASS"**.
4. Switch off **"Q4"** and **"Q2"** of both UPSs. LCD display will be de-energized.
5. Switch off circuit breaker of external battery cabinet.
6. In this mode, only **"Q4"** and terminal block has hazard voltage. Service personnel can perform maintenance work.

5-7-2 Manual Bypass Mode transfers into Online Mode

1. Switch on the circuit breaker of external battery cabinet.
2. Switch on **"Q2"** and **"Q4"** of both UPSs.
   Switch off **"Q3"** of both UPSs. Both UPS shows **"ON AUTO BYPASS"**.
3. Switch on **"Q1"** of both UPSs.
4. Press on **" I "** for 3 seconds until you hear a beep then release button.
5. Repeat step5 for another UPS. When When the inverter of both UPSs activate normally, they will transfer to normal mode at the same time.

6. Display and Configuration

6-1. Control Panel

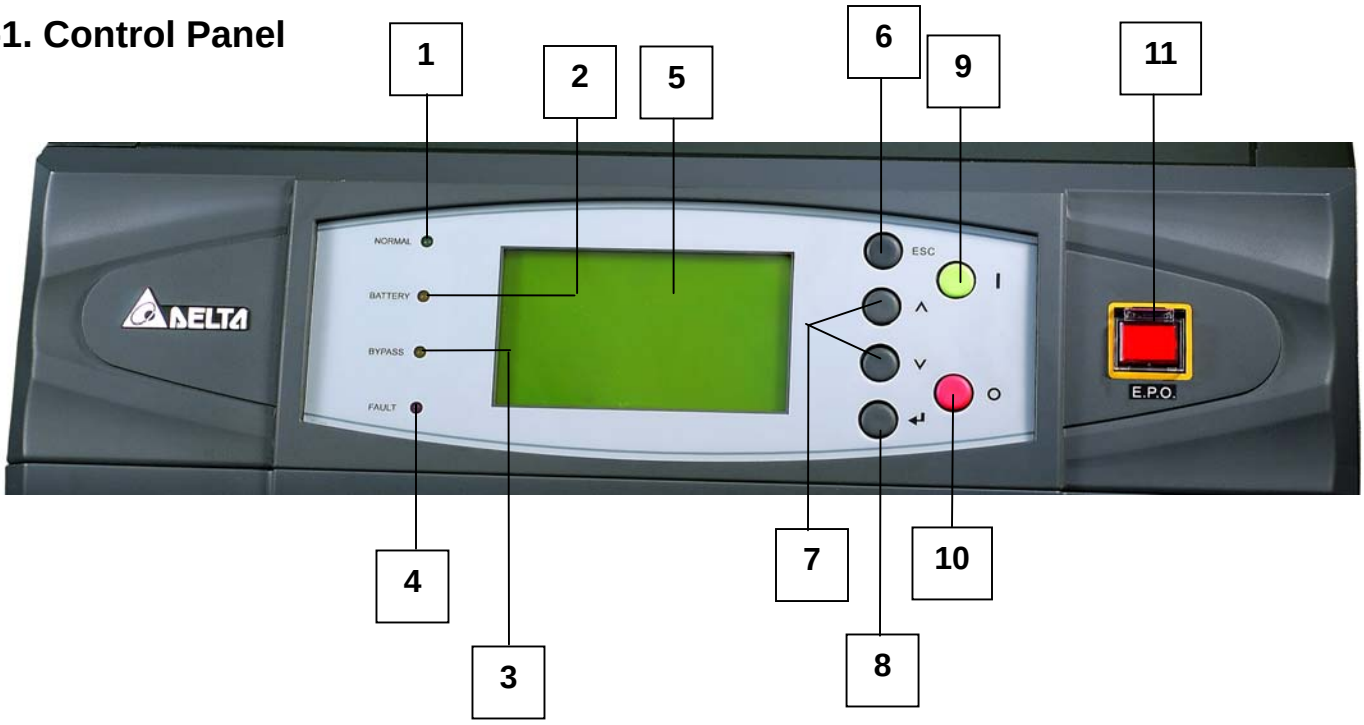


Fig. 6-1 Control Panel

1. Normal (Green): Turn on when UPS input power is normal
2. Battery (Amber): Turn on when UPS is in backup mode
3. Bypass (Amber): Turn on when UPS is in manual bypass mode
4. Fault (Red): Turn on when any fault occurs
5. LCD Display: LCD screen, Multi-language (Chinese tradition/Big5, English)
6. ESC: page up
7,8. Configuration:
   ▲ and ▼ : cursor up or down
   ⏎ : Confirm setup

9. ON: Press for 3 seconds to start up UPS (Inverter On)
10. OFF: Press for 3 seconds to power down UPS (Inverter Off)
11. EPO: Emergency Power Off. Press EPO will completely power down UPS

6-2 LCD Display

NH series UPS provide user-friendly LCD screen to show messages.

6-2-1 LCD Display Hierarchy:

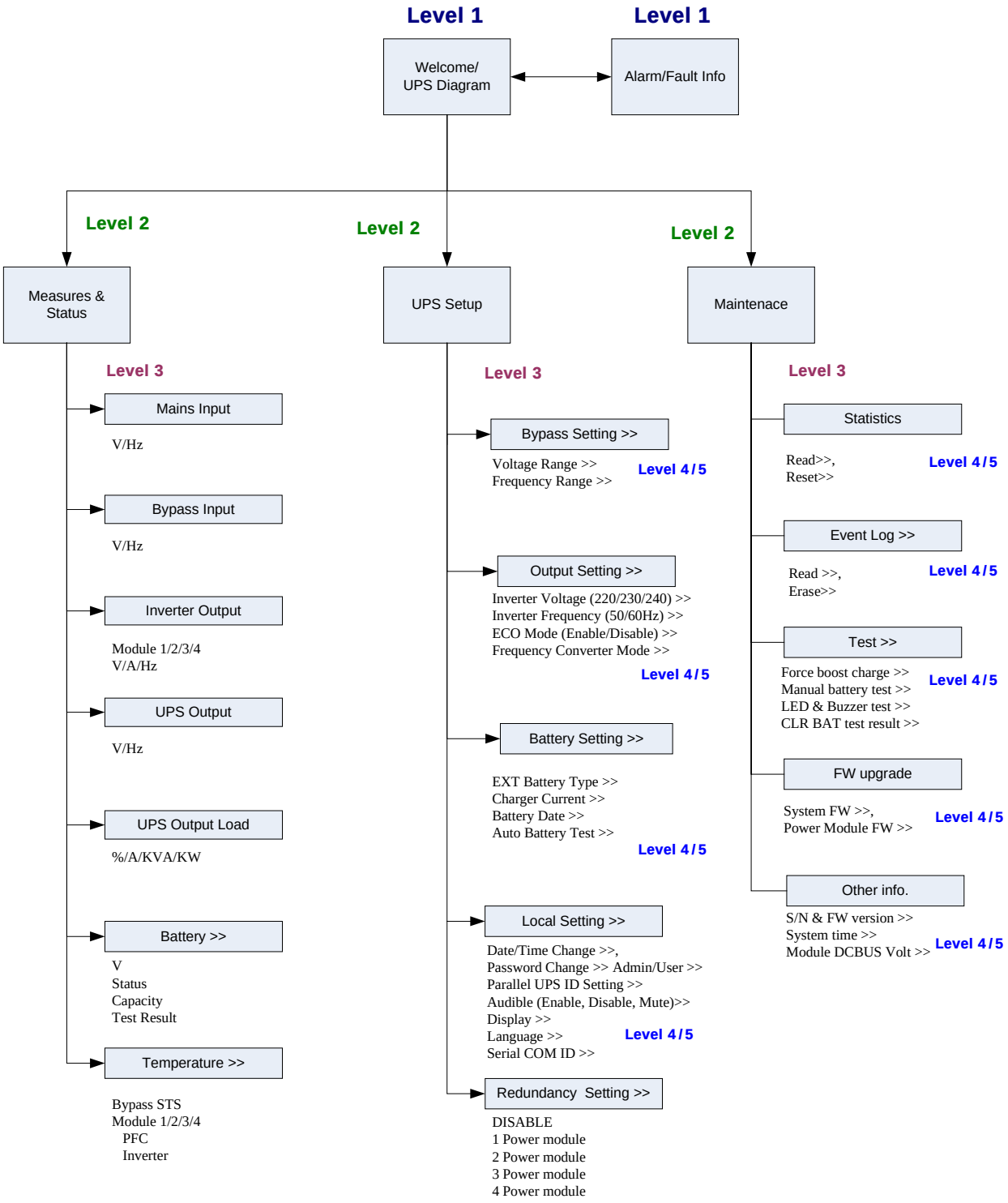
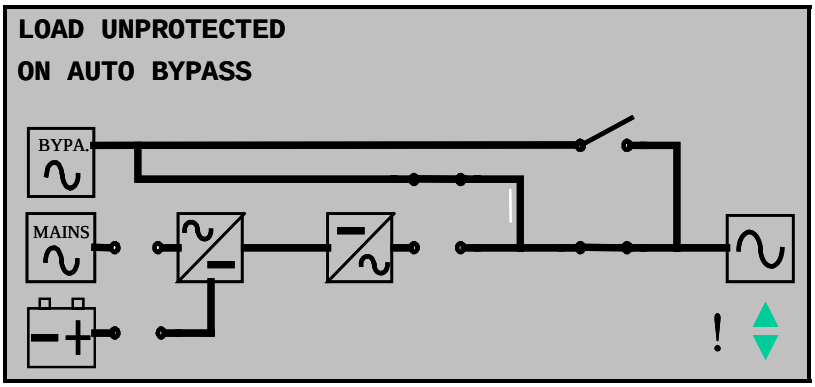


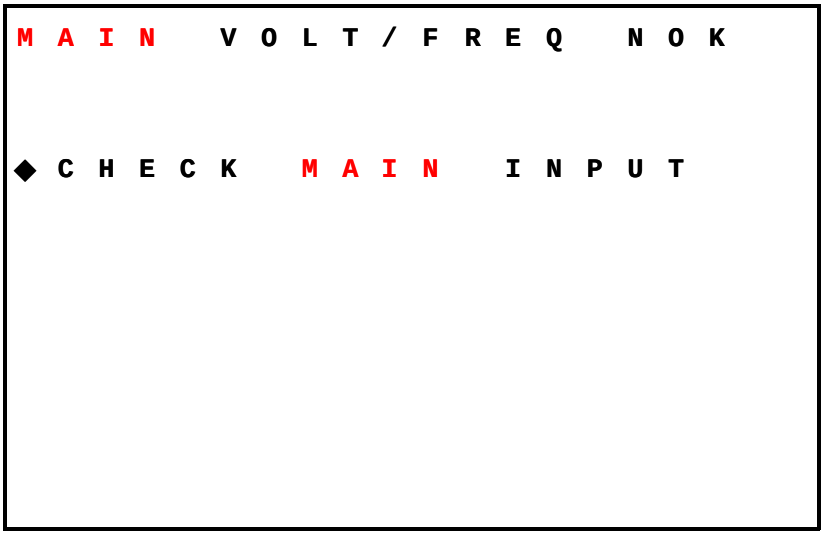
Fig. 6-2 LCD Display Hierarchy

6-3 Default Screen

After UPS starts up and completes the self-test, screen will show:



1. When any event occurs, you will see the sign "!" flashes. You can press "⮟" to see the details. For example :



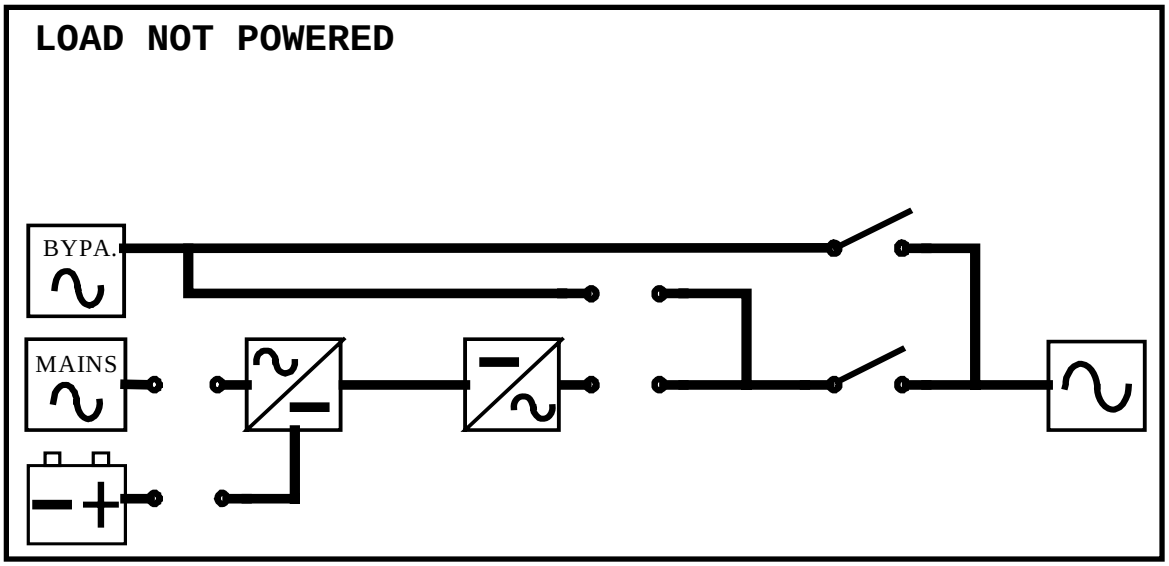
Press "⮟" again will go to the next message. If there is no further message, then the screen will back to default screen.

2. Press "ESC" at any time will back to default screen.

6-3-1 Status Display

LCD display will show the different status of UPS:

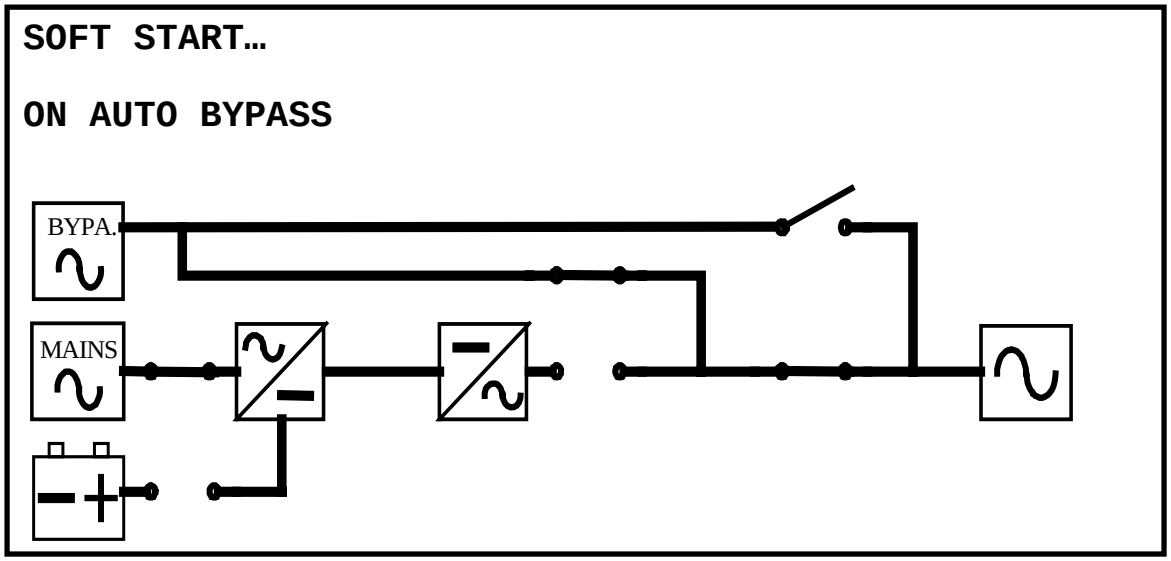
1.



This message means: The loads behind UPS are not powered. UPS cuts off the output.
Maybe due to:

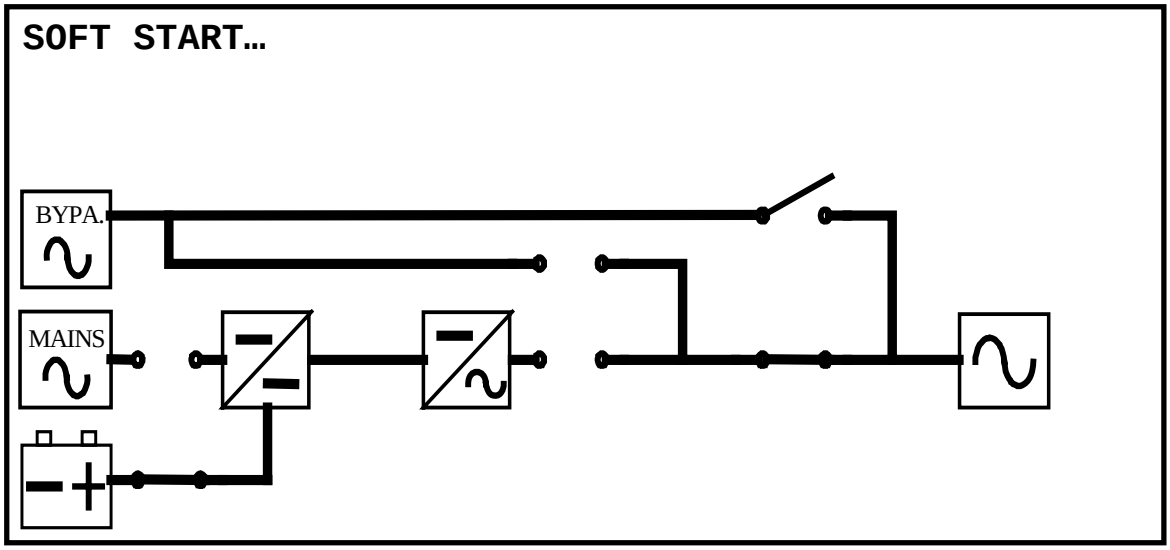
- UPS automatically shutdown by itself.
- Manually switch off the output circuit breaker.

2.



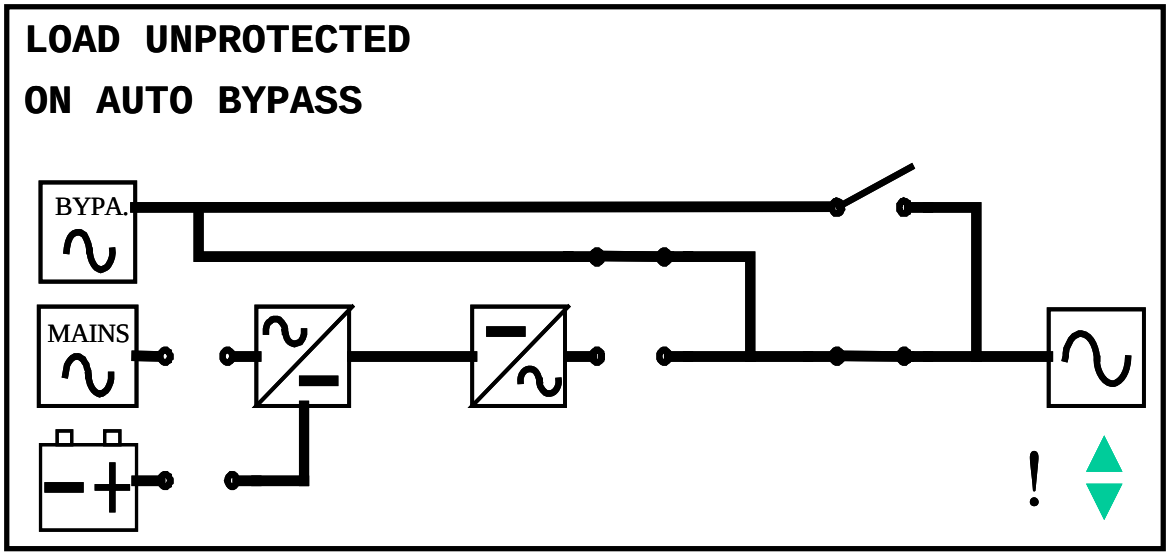
This message means: The loads are supplied power by bypass source due to UPS startup initially

3.



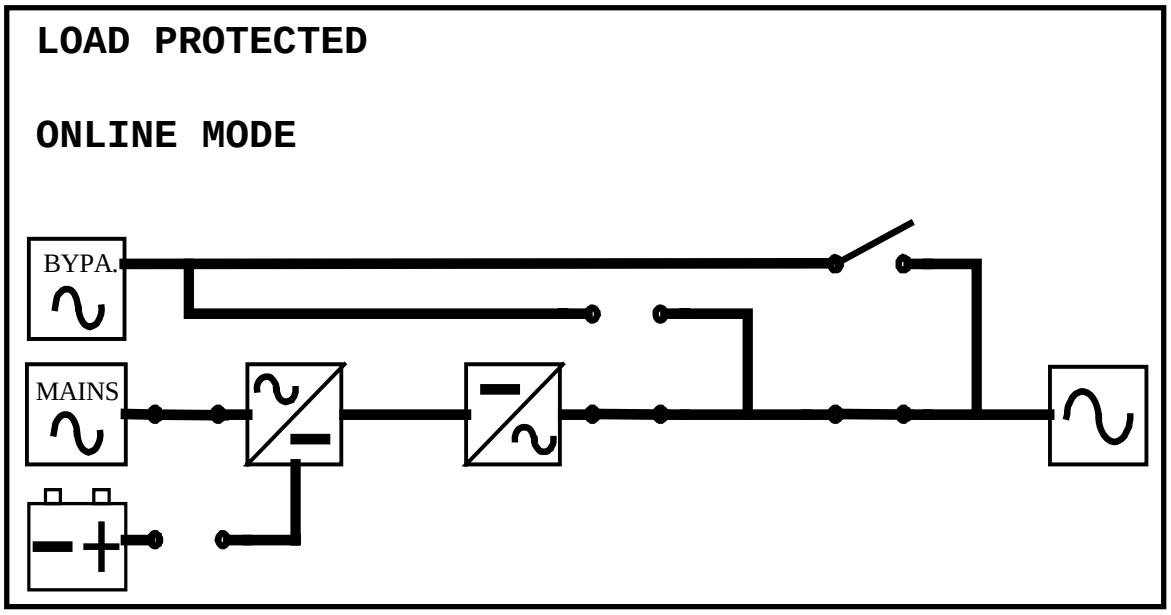
This message means UPS startup by battery power.

4.



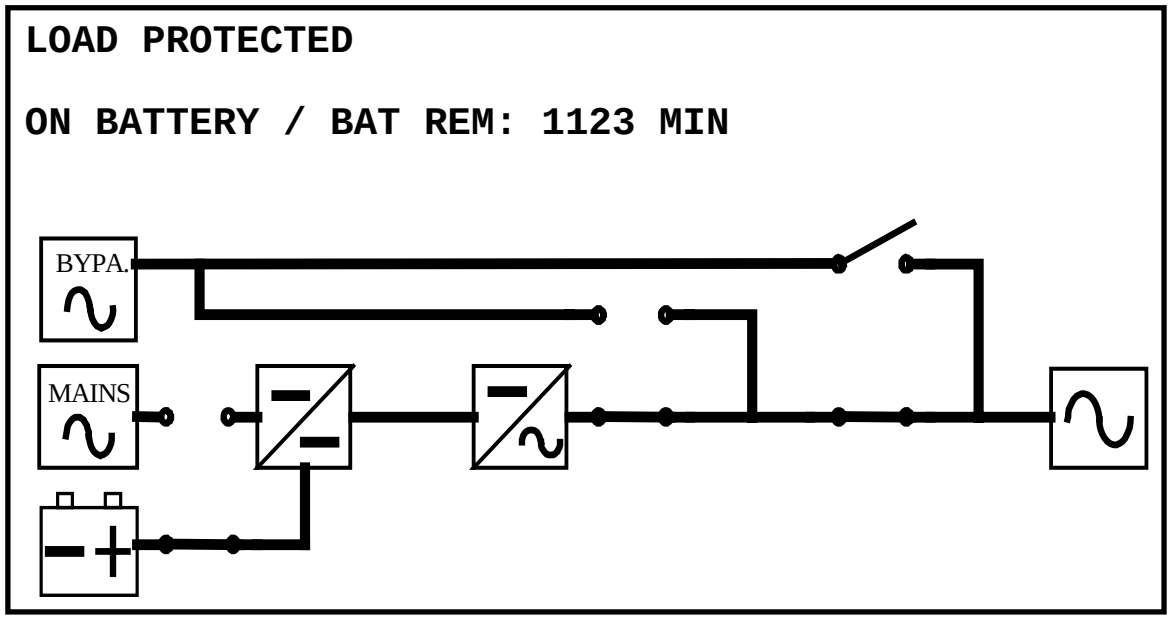
This message means: UPS is in bypass mode. In the mean time, main power source and battery are cut off. So the loads may loose power if the bypass source suddenly fails.

5.



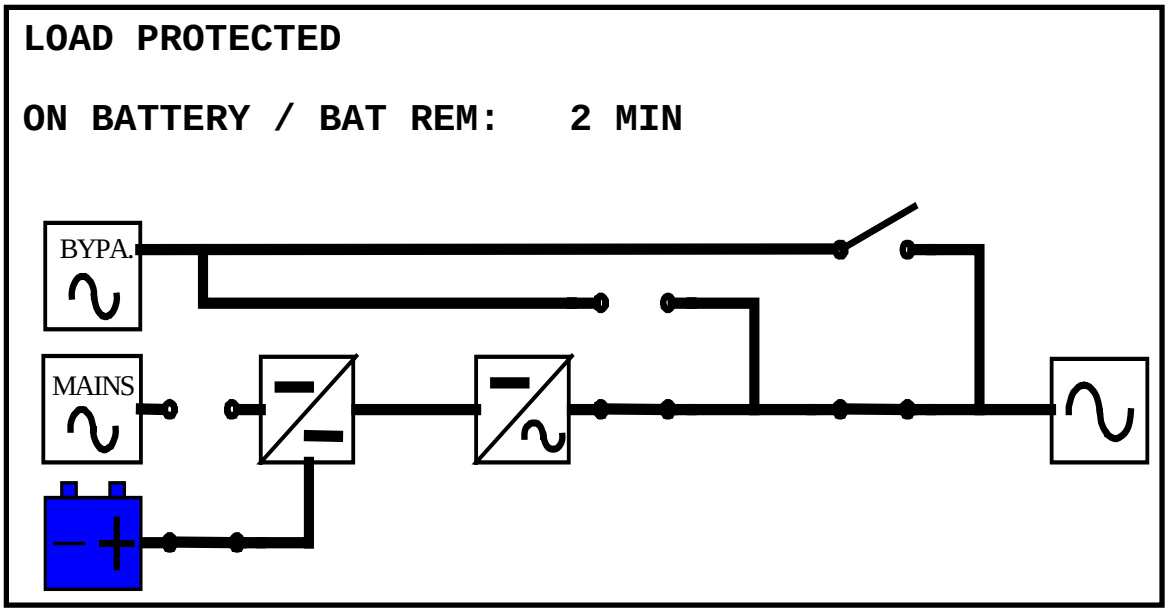
This message means: UPS is operating under normal condition (normal mode).

6.



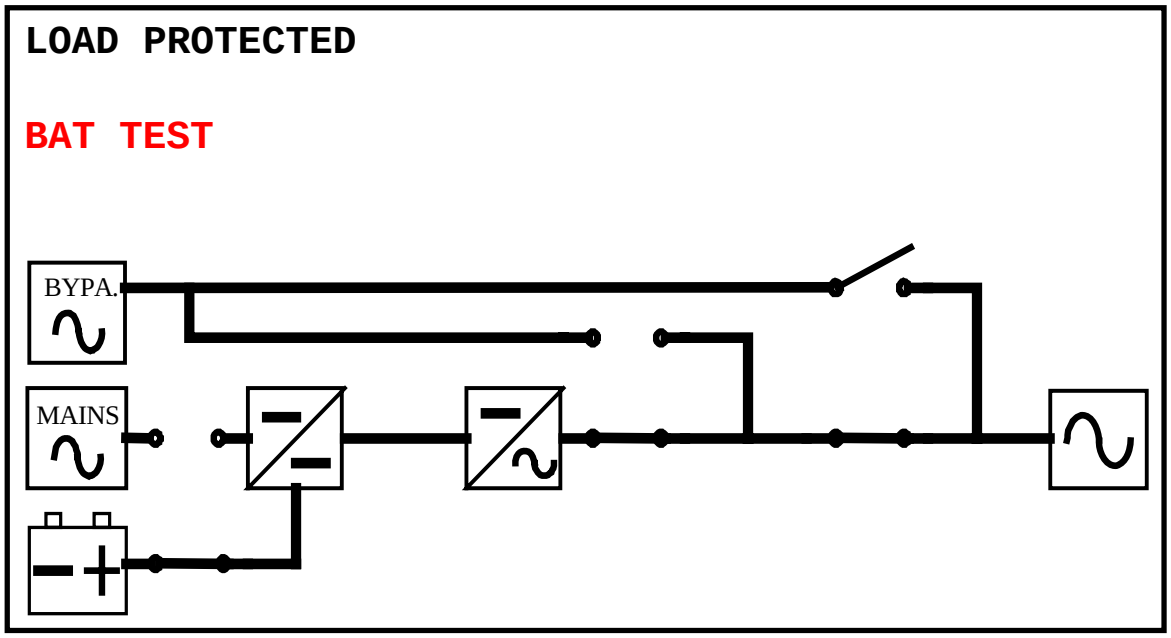
This message means: UPS is in battery backup mode. Loads are supplied by battery power.

7.



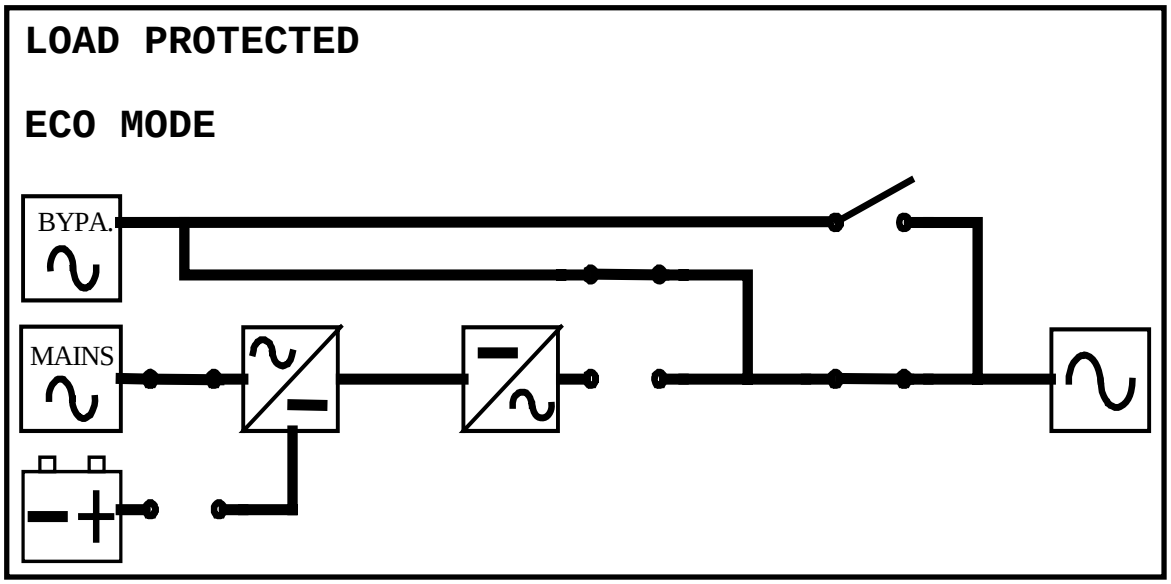
This message means: UPS is in battery backup mode and remaining backup time only 2 minutes left. Battery power is nearly exhausted.

8.



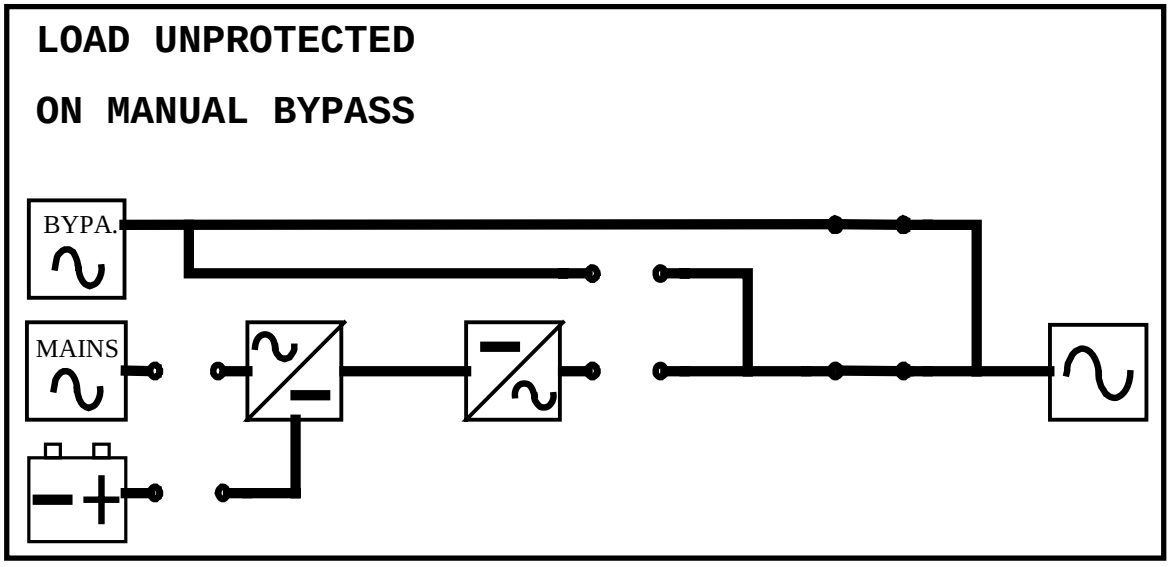
This message means: UPS is performing “battery test”.

9.



This message means: UPS is in ECO (Economic Operation) mode. Loads are supplied power by bypass source.

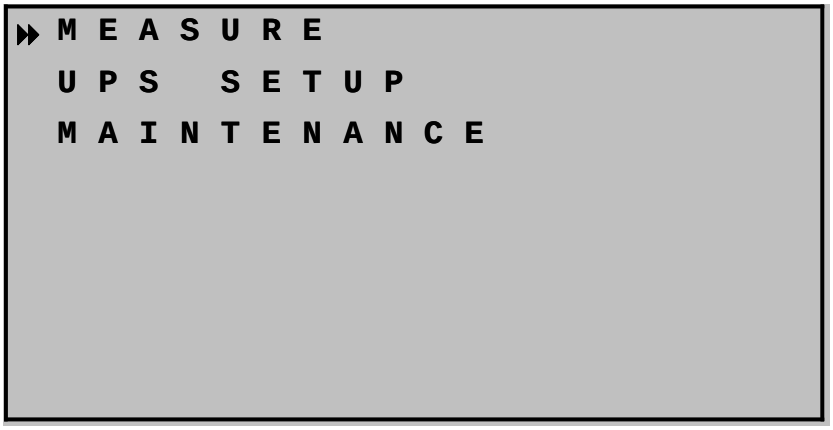
10.



This message means: UPS is in manual bypass mode. When service personnel performs the maintenance work, UPS must be transferred into this mode first.
In the mean time, main power source and battery are cut off. So the loads may loose power if the bypass source suddenly fails.

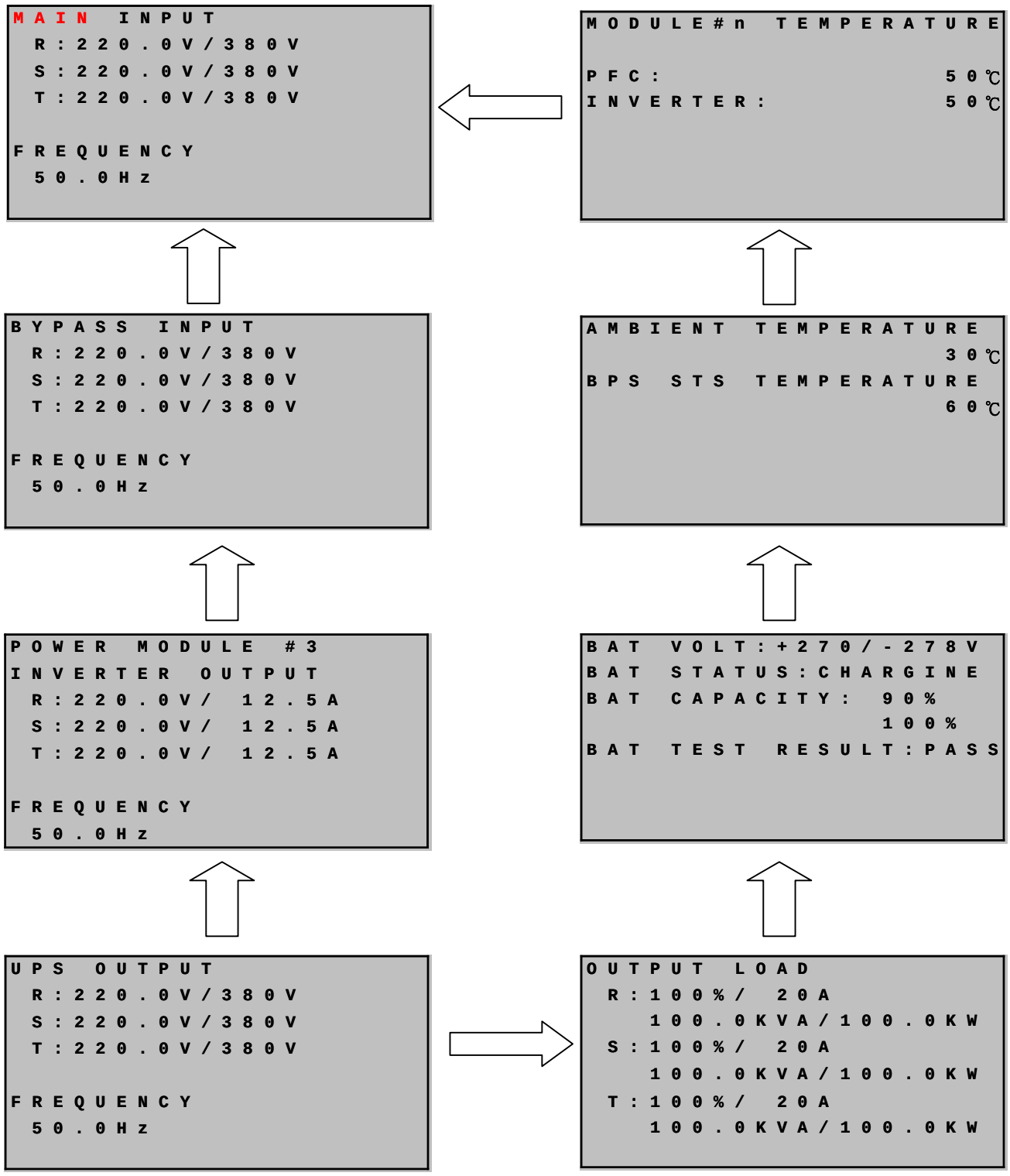
6-4 Main Menu

Press **“⏎ ”** in default screen will change into the main menu:



Press **“⮟”** or **”⮝”** to select desired item, then confirm by press **“⏎ ”.**

MEASURE
Move cursor by **“⮟”** or **”⮝”** to **“Measure”**. Select this item by press **”⏎ ”**.
Move cursor by **“⮟”** or **”⮝”** to see all the status of UPS.

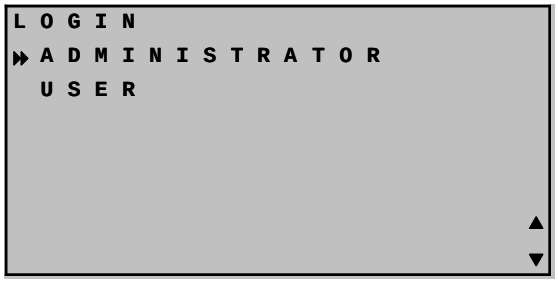

MAIN INPUT
R:220.0V/380V
S:220.0V/380V
T:220.0V/380V
FREQUENCY
50.0Hz
MODULE#n TEMPERATURE
PFC: 50℃
INVERTER: 50℃
BYPASS INPUT
R:220.0V/380V
S:220.0V/380V
T:220.0V/380V
FREQUENCY
50.0Hz
AMBIENT TEMPERATURE
30℃
BPS STS TEMPERATURE
60℃
POWER MODULE #3
INVERTER OUTPUT
R:220.0V/ 12.5A
S:220.0V/ 12.5A
T:220.0V/ 12.5A
FREQUENCY
50.0Hz
BAT VOLT:+270/-278V
BAT STATUS:CHARGINE
BAT CAPACITY: 90%
100%
BAT TEST RESULT:PASS
UPS OUTPUT
R:220.0V/380V
S:220.0V/380V
T:220.0V/380V
FREQUENCY
50.0Hz
OUTPUT LOAD
R:100%/ 20A
100.0KVA/100.0KW
S:100%/ 20A
100.0KVA/100.0KW
T:100%/ 20A
100.0KVA/100.0KW

6-5 UPS SETUP

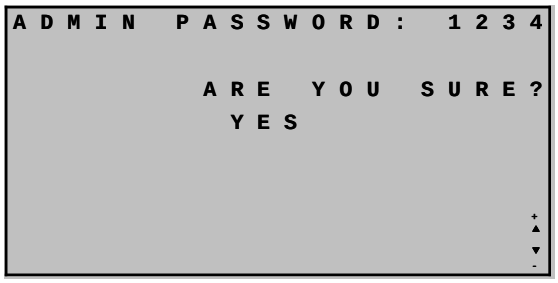
Move cursor by **"⮟"** or **"⮝"** to **"Measure"**. Select this item by press **"⏎ "**
Before get into the **"UPS SETUP"**, you have to login first:

1. The login screen is as right. Move cursor to select your correct ID, then press **"⏎ "** to go to next page.

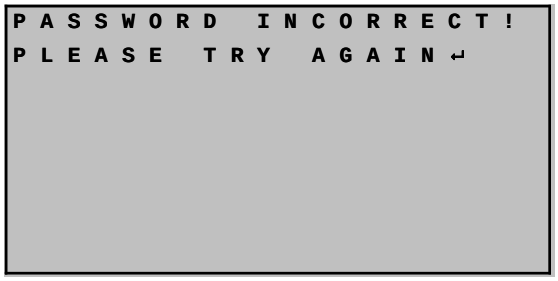
ADMINISTRATOR: Qualified service personnel
User: The authorization is only to check the parameter but not to configure



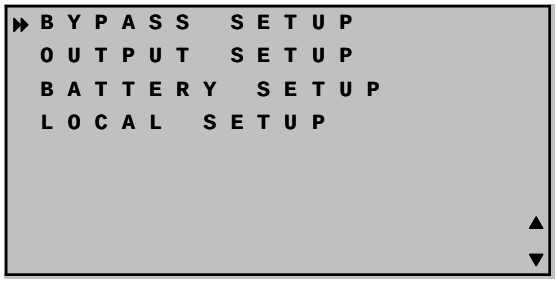
2. The password consists of 4 digitals. Use **"⮟"** or **"⮝"** to select the first number then press **"⏎ "** will go to the next digital. After all digitals are select, press **"⏎ "** to confirm choice.



3. If password is wrong, please press **"⏎ "** to re-select.



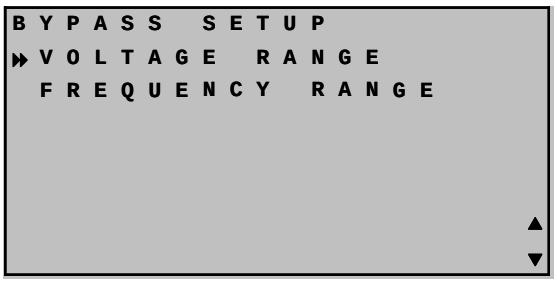
4. If password is correct, screen will show the setup menu.



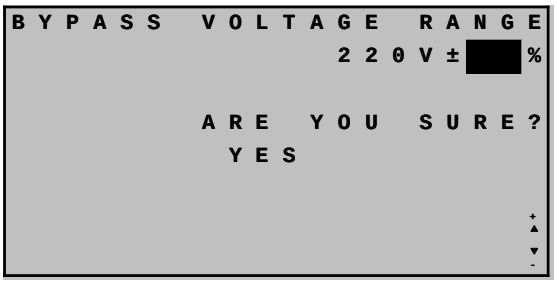
a. BYPASS SETUP

Move cursor by **"⮟"** or **"⮝"** to **"BYPASS SETUP"**. Select this item by press **"⏎ "**

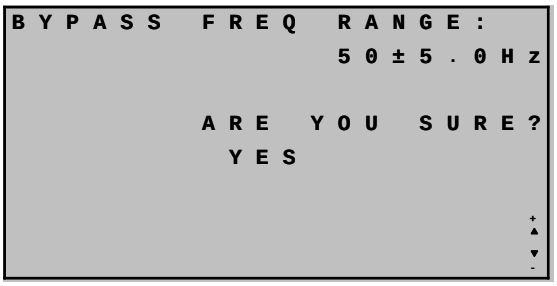
1. Move cursor by **"⮟"** or **"⮝"** to select **"VOLTAGE RANGE"** or **"FREQUENCY RANGE"**.
Press **"⏎ "** to confirm the choice.



2. Move cursor by **"⮟"** or **"⮝"** to select voltage range then Press **"⏎ "** to confirm the choice.



3. Move cursor by **"⮟"** or **"⮝"** to select frequency range then Press **"⏎ "** to confirm the choice.



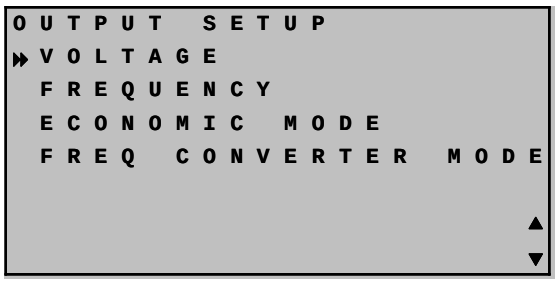
Press "ESC" will go back to "UPS SETUP" menu

b. OUTPUT SETUP

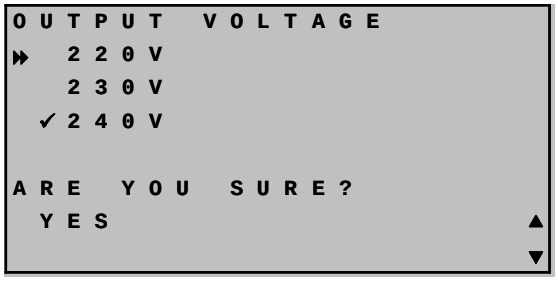
Move cursor by **"⮟"** or **"⮝"** to **"OUTPUT SETUP"**. Select this item by press **"⏎ "**

All the parameter in this segment can only be changed under "Bypass Mode".

1. Move cursor by **"⮟"** or **"⮝"** to select the desired item. Press **"⏎ "** to confirm the choice.

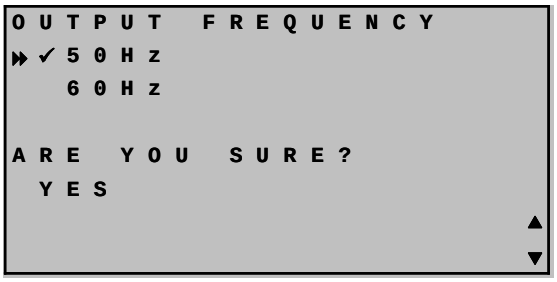


2. Move cursor by **"⮟"** or **"⮝"** to select the desired output voltage. Press **"⏎ "** to confirm the choice.

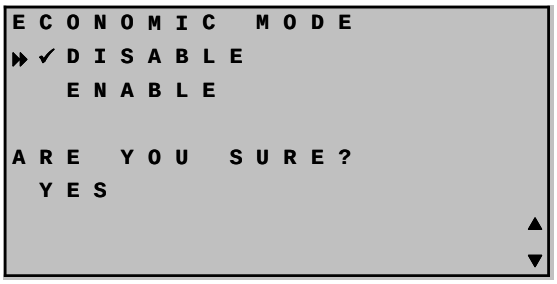


3. Move cursor by **"⮟"** or **"⮝"** to select the desired frequency. Press **"⏎ "** to confirm the choice.

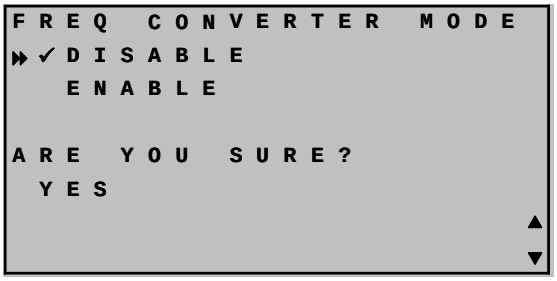
(This output frequency is for battery start condition or when frequency converter mode is enabled!)



4. Move cursor by **"⮟"** or **"⮝"** to select the desired mode. Press **"⏎ "** to confirm the choice.



5. Move cursor by **"⮟"** or **"⮝"** to select the desired mode. Press **"⏎ "** to confirm the choice.



Press "ESC" will go back to "UPS SETUP" menu

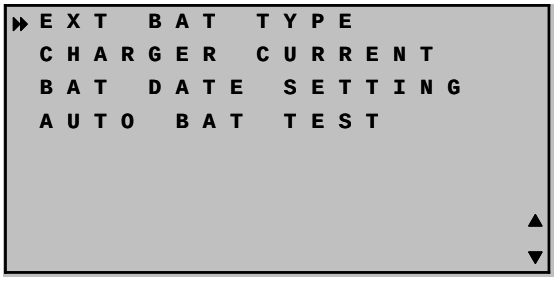
c. BATTERY SETUP

Move cursor by **"⮟"** or **"⮝"** to **"BATTERY SETUP"**. Select this item by press **"⏎ "**

All the parameters in this segment can only be changed under "Bypass Mode".

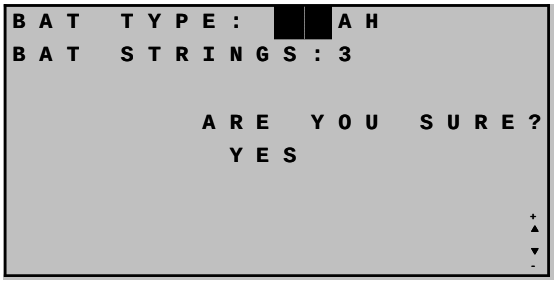
1. Move cursor by **"⮟"** or **"⮝"** to select the desired item.

   Press **"⏎ "** to confirm the choice.



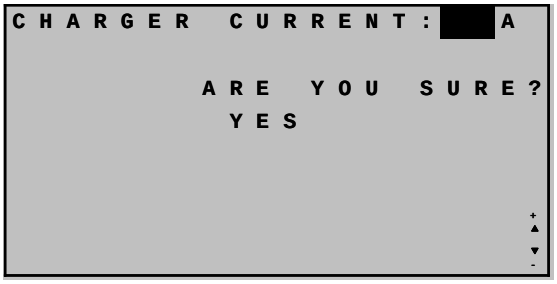
2. Move cursor by **"⮟"** or **"⮝"** to select the desired battery type and strings.

   Press **"⏎ "** to confirm the choice.
   (Type：26 / 40 / 100AH)
   (String：1 / 2 / 3 / 4)



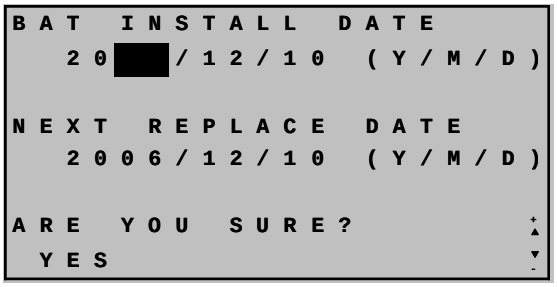
3. Move cursor by **"⮟"** or **"⮝"** to select the desired charging current.

   Press **"⏎ "** to confirm the choice.
   (Default：7A)



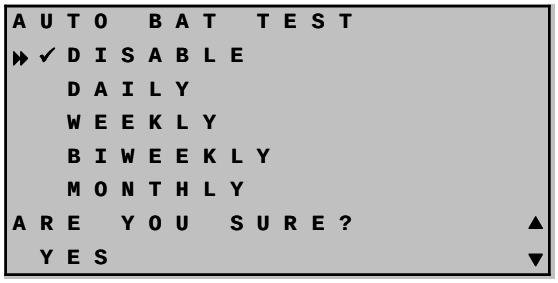
4. Move cursor by **"⮟"** or **"⮝"** to select the installation date and the next replacing date.

   Press **"⏎ "** to confirm the choice.



5. Move cursor by **"⮟"** or **"⮝"** to select the auto battery testing schedule.

   Press **"⏎ "** to confirm the choice.



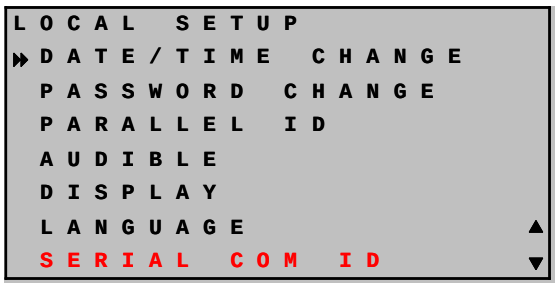
Press "ESC" will go back to "UPS SETUP" menu

d. LOCAL SETUP

Move cursor by **"⮟"** or **"⮝"** to **"LOCAL SETUP"**. Select this item by press **"⏎ "**

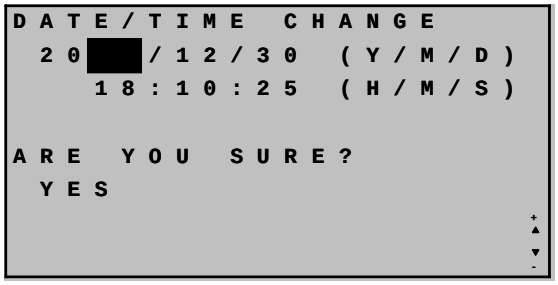
1. Move cursor by **"⮟"** or **"⮝"** to select the desired item.

   Press **"⏎ "** to confirm the choice.



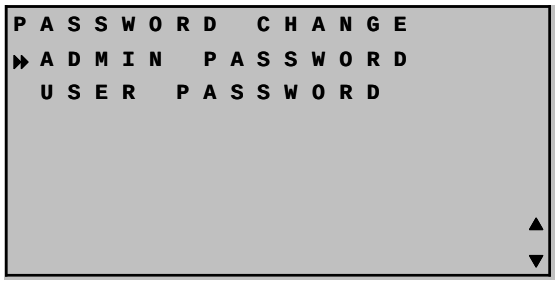
2. Move cursor by **"⮟"** or **"⮝"** to change the "DATE/TIME".

   Press **"⏎ "** to confirm the choice. (This item is user accessible!)



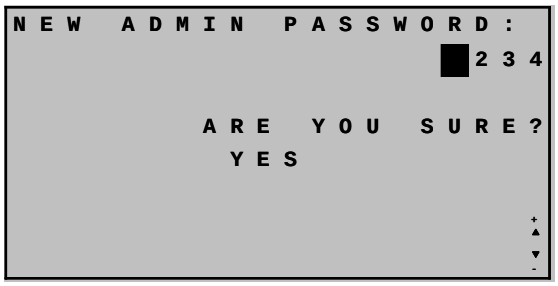
3. Move cursor by **"⮟"** or **"⮝"** to select the desired item.

   Press **"⏎ "** to confirm the choice.



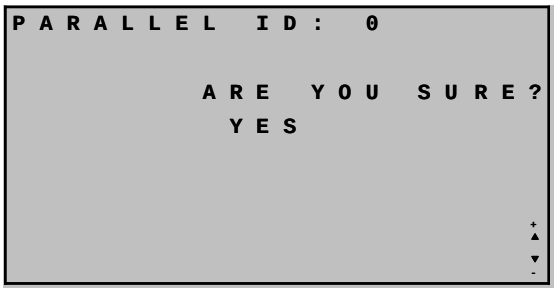
   Move cursor by **"⮟"** or **"⮝"** to change the password.

   Press **"⏎ "** to confirm the choice.



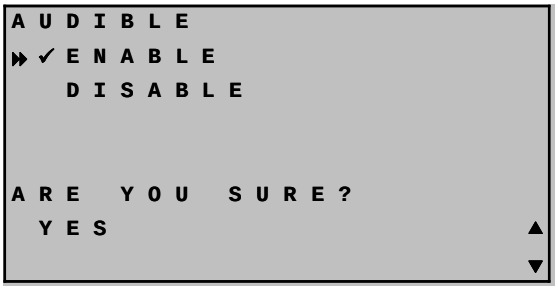
4. Move cursor by **"⮟"** or **"⮝"** to setup the ID of UPS for parallel redundancy installation.

   Press **"⏎ "** to confirm the choice.



5. Move cursor by "⮟" or "⮝" to setup the audible alarm.

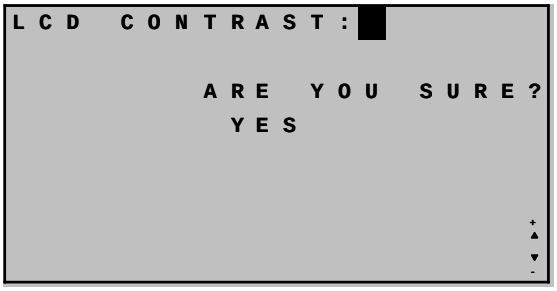
Press "⏎ " to confirm the choice.



6. Move cursor by "⮟" or "⮝" to setup the contrast of LCD screen.

Press "⏎ " to confirm the choice.

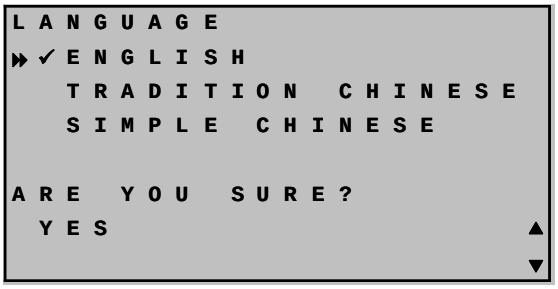
(This item is user accessible!)



7. Move cursor by "⮟" or "⮝" to select the language of LCD screen.

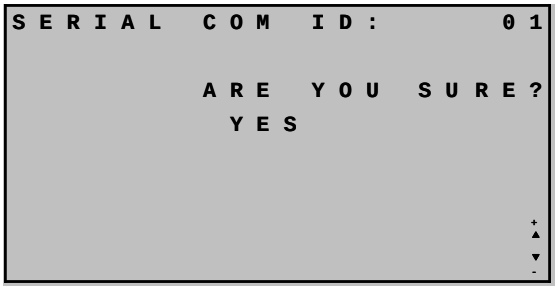
Press "⏎ " to confirm the choice.

(This item is user accessible!)



8. Move cursor by "⮟" or "⮝" to setup the ID of serial port.

Press "⏎ " to confirm the choice.



⚠ **For standard RS232 connection, this ID is meaningless. If the connection is via RS485/RS422 transfer connector to RS232, then the ID can be setup to 00, 01…….99)**

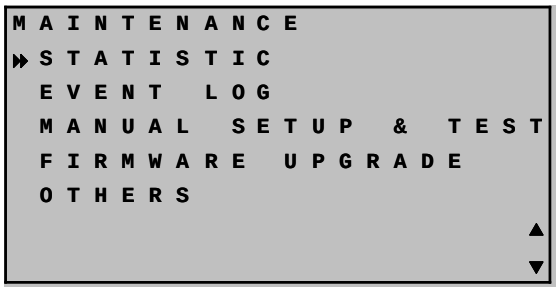
Press "ESC" will go back to "UPS SETUP" menu

6-6 Maintenance

Move cursor **"⮟"** or **"⮝"** to the **"MAINTENANCE"** in the main menu, then confirm by press **"⏎ "**.

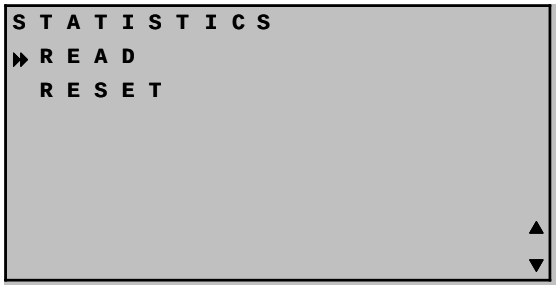
1. Move cursor by **"⮟"** or **"⮝"** to select the desired item.

   Press "⏎ " to confirm the choice.

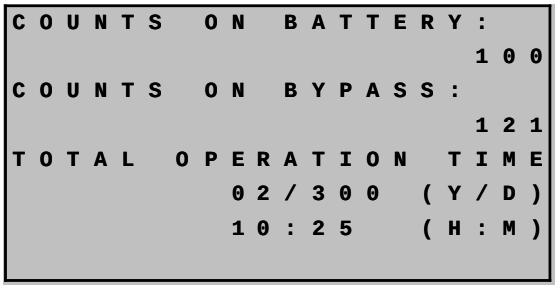


2. Move cursor by **"⮟"** or **"⮝"** to read the statistic data.

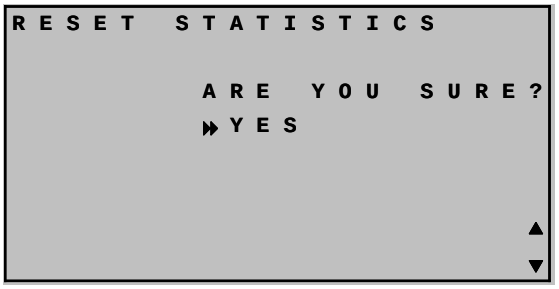
   Press "⏎ " to confirm the choice.



Statistic data example

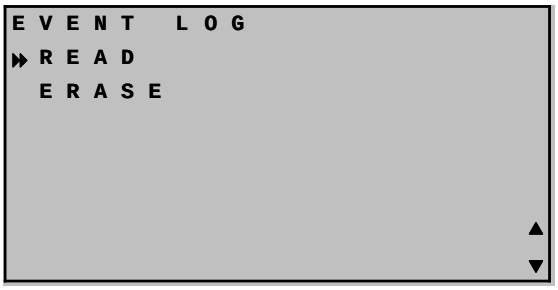


Execute **"RESET"** function will reset all statistic data
(This item is only accessible for administrator! Password will be confirmed again!)

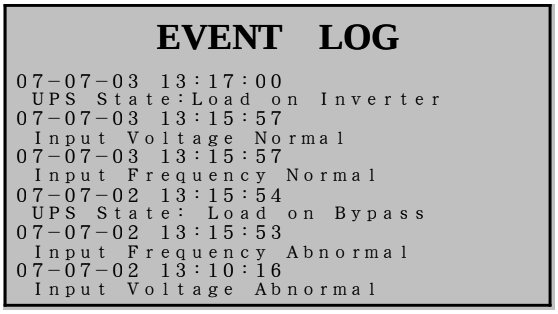


2. Move cursor by **"⮟"** or **"⮝"** to select the desired item.

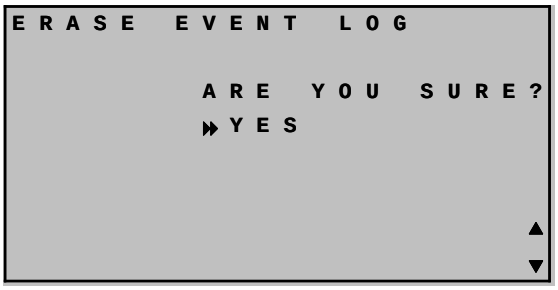
Press **"⏎ "** to confirm the choice.



Event log example

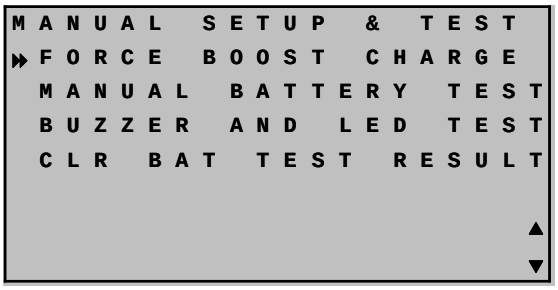


Execute **"ERASE EVENT LOG"** function will reset all statistic data (This item is only accessible for administrator! Password will be confirmed again!)

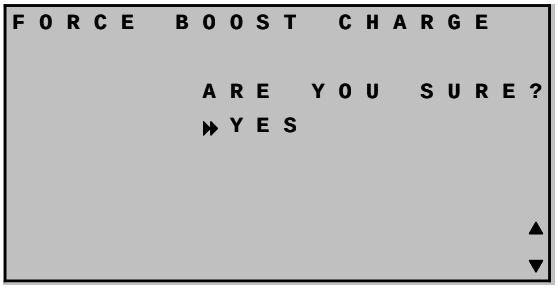


3. Move cursor by **"⮟"** or **"⮝"** to select the desired item.

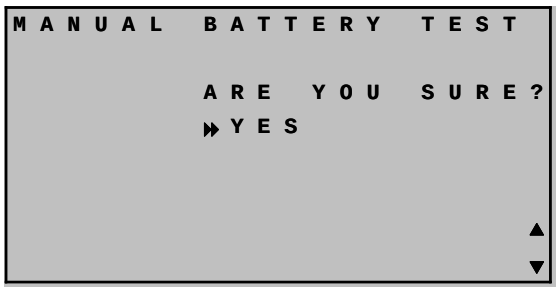
Press **"⏎ "** to confirm the choice.



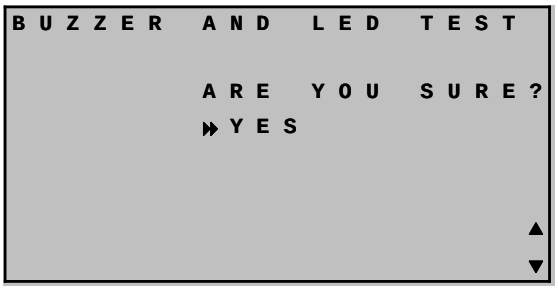
Press **"⏎ "** to execute **"FORCE BOOST CHARGE"**.
(This item is only accessible for administrator! Password will be confirmed again!)



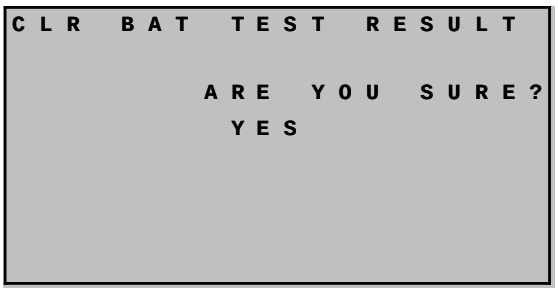
Press “⏎ ” to execute **“MANUAL BATTERY TEST”**.
(This item is only accessible for administrator. Password will be confirmed again!)



Press “⏎ ” to execute **“BUZZER AND LED TEST”**.
(This item is only accessible for administrator! Password will be confirmed again!)

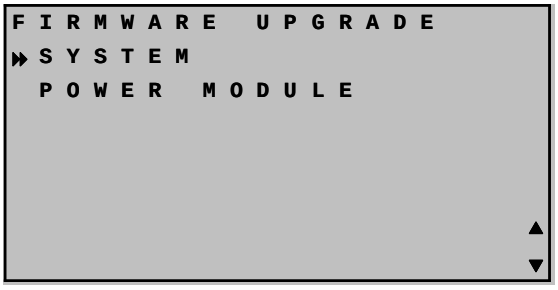


Press “⏎ ” to execute **“CLR BAT TEST RESULT”**. This will clear all battery test results in log.



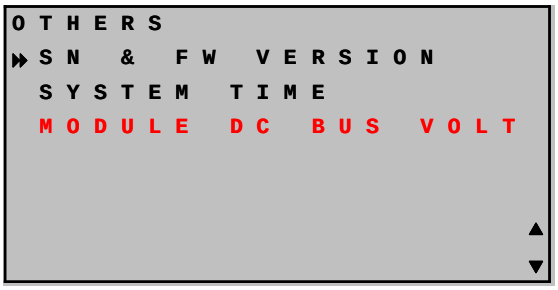
4. Move cursor by “⮟” or ”⮝” to select the desired item.

Press ”⏎ ” to confirm the choice.
(This item is only accessible for administrator! Password will be confirmed again!)



5. Move cursor by “⮟” or ”⮝” to select the desired item.
Press ”⏎ ” to confirm the choice.

- SN & FW version: serial number and firmware version of UPS
- System Time: Date and time
- Module DC Bus volt: The remaining voltage of DC bus. Service personnel can confirm it when perform maintenance.



Press “ESC” will go back to “Main Menu”

7. Power Management Software

7-1 DELTA Software Family

◆ Communication Port

	RS232	USB	RS485	SNMP
InsightPower Client				◆
UPSentry Smart 2000	◆	◆		
InsightPower Manager	◆		◆	◆
Shutdown Agent				◆

◆ Application

	Shutdown OS	Centralized Management	Remote Monitoring
InsightPower Client	◆		◆
UPSentry Smart 2000	◆		◆
InsightPower Manager		◆	◆
Shutdown Agent	◆		

◆ Support OS

	Windows	Linux	FreeBSD	Mac OSX	SCO	Sun Solaris	HP-UX	IBM AIX
InsightPower Client	◆							
UPSentry Smart 2000	◆	◆	◆	◆	◆	◆	◆	◆
InsightPower Manager	◆							
Shutdown Agent	◆	◆	◆	◆	◆	◆	◆	◆

7-2 UPSentry Smart 2000

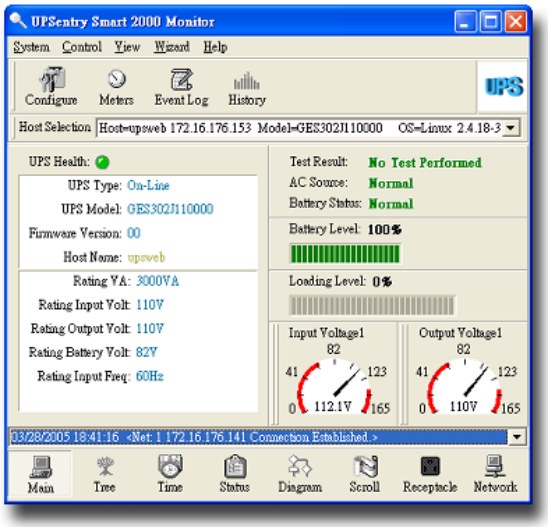
DELTA develops a power software family to easily integrate UPS into your system. “UPSentry Smart 2000” supports all popular OS such as Windows, Linux, FreeBSD …etc.

Advanced Features:

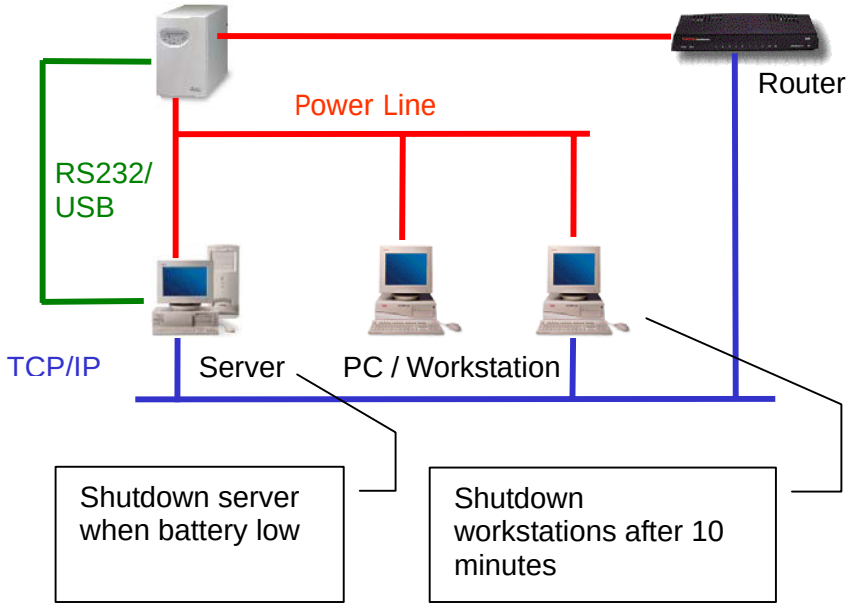
- Supports RS232 and USB protocols
- Multi-lingual design (English, French, German, Spanish, Portuguese, Italian, Polish, Chinese and Japanese)
- Multi-servers shutdown/wakeup in various operating systems, use the Master/Slave software structure need not to purchase another SNMP card
- Unattended operating systems shutdown and files saving
- Supports Windows hibernation feature
- Programmable actions(FlexAction)
- Remote and local UPS real-time management
- Supports SNMP get, set and trap commands
- Built-in mini Web server

Support OS:

- Microsoft Windows 95, 98, Me, NT4, 2000, XP, 2003, Vista
- Mac OSX
- Linux
- FreeBSD
- SCO OpenServer
- Sun Sparc and x86
- HP-UX
- IBM AIX



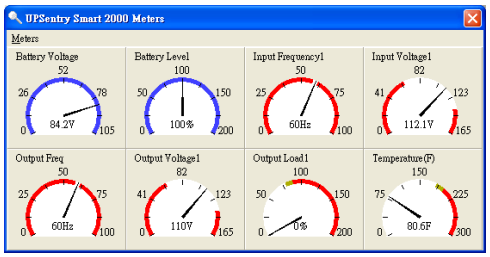
Main Frame



Remote Shutdown PC

7-2-1 Flexible Management Tools

"UPSentry Smart 2000" provides powerful tools for administrator of data center, MIS, IDC.

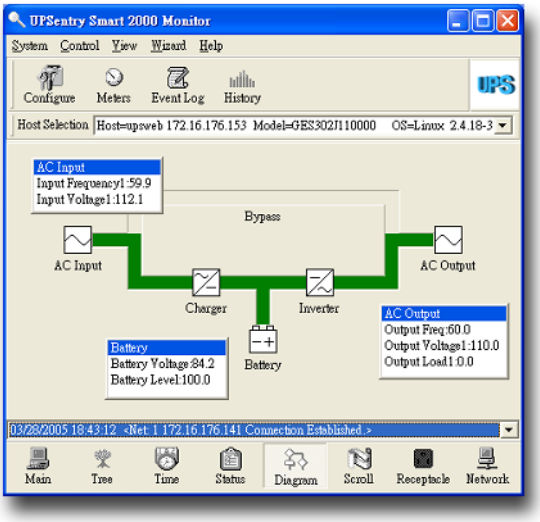


Real-time meters

1. Real-Time Monitoring, record and analysis

Real-Time meters: 4（single phase）or 12（3 phases）meters. Each meter is user-defined to display power information (voltage, current, frequency…) or UPS's status.

Power Events: Record date/time/description of power events such as blackout、power recover、bypass etc.
Provide data for administrator to analyze and print out.



UPS status chart

Historical Data: Record (by graphic) the input/output voltage/frequency、loading、battery volts、UPS model、fault etc.

Block diagram and status: Display UPS status in graphical format. Such as input/output voltage/frequency、battery volts、backup time.

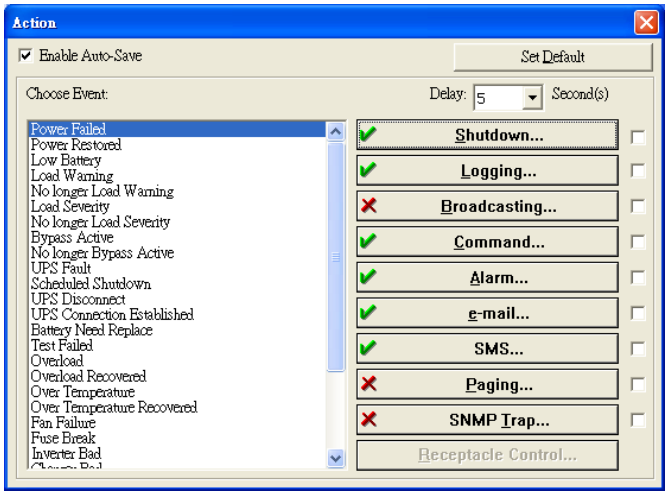
2. Power Event Management

"UPSentry Smart 2000" provides a lot of flexible tools to manage different power events or UPS status（Blackout、recover、battery low、overload、fault、battery test etc.）. Administrator can formulate a contingency plan in advance to handle all kinds of threats from power events.

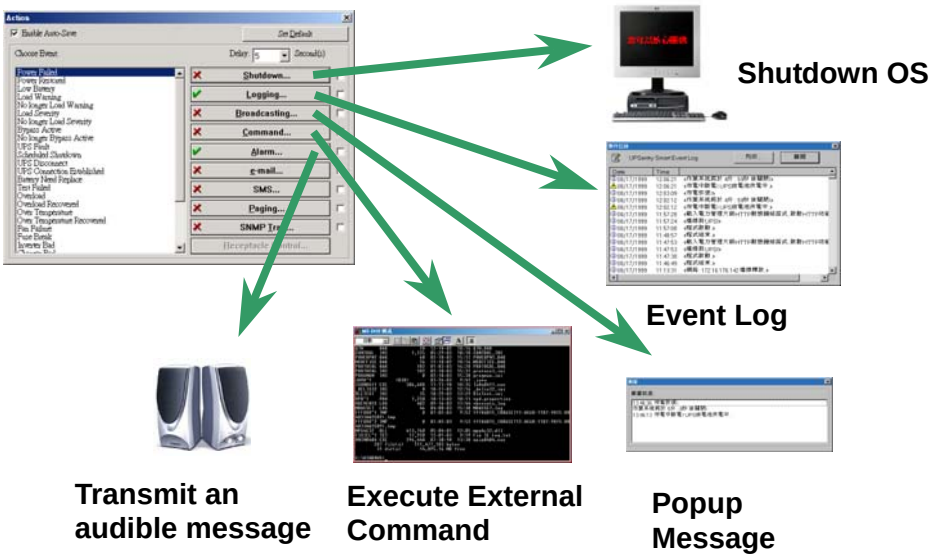
UPSentry Smart 2000 provides flexible actions:

(1) Gracefully shutdown PC/Server
(2) Event log
(3) Network broadcast
(4) Auto-paging
(5) email
(6) SMS (short message)
(7) Audible alarm
(8) Execute external command

Moreover, "delay" setup can block frequently meaningless transients. For areas of unstable power quality, administrator won't suffer from many notifications only when true power events happen.



Programmable action for power event



3. Overload Warning Setup

Administrator can setup two stage of overload limit between 0%-100%. Warning message will popup when reach the loading limit.

4. Scheduled Shutdown/Auto Restart

UPSentry Smart 2000 can perform OS shutdown process before UPS turns off. All the process is automatically proceeding to protect precious, critical equipment, and also the data.

Besides, administrator can plan a shutdown and restart schedule to meet user-defined application.

5. Audible Warning Message

Administrator can prepare a pre-record voice message and text.

When power event happens, “UPSentry Smart 2000” will transmit the pre-record voice message and popup the text.

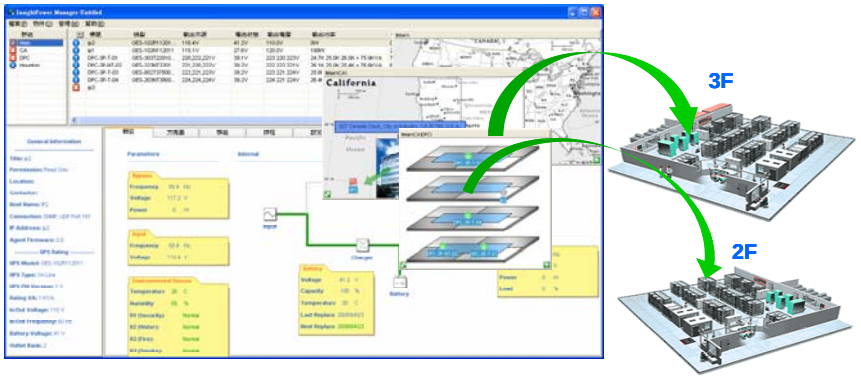
7-3 InsightPower Manager

For data center or large scale factory, administrator need a convenient tool to centrally control and monitor UPSs. DELTA develops “InsightPower Manager” to achieve this purpose.

Features:

- Centralized UPS management system via TCP/IP network
- Supports RS232, RS485 and SNMP connections
- Supports database connection through ODBC
- Hierarchical design, allows unlimited nodes
- Client/Server design, multiple remote Monitor programs can connect to a Service program
- Programmable actions
- Batch SNMP configuration
- Remote and local UPS real-time management
- Generate routine reports
- Schedule shutdown/restart and test UPS

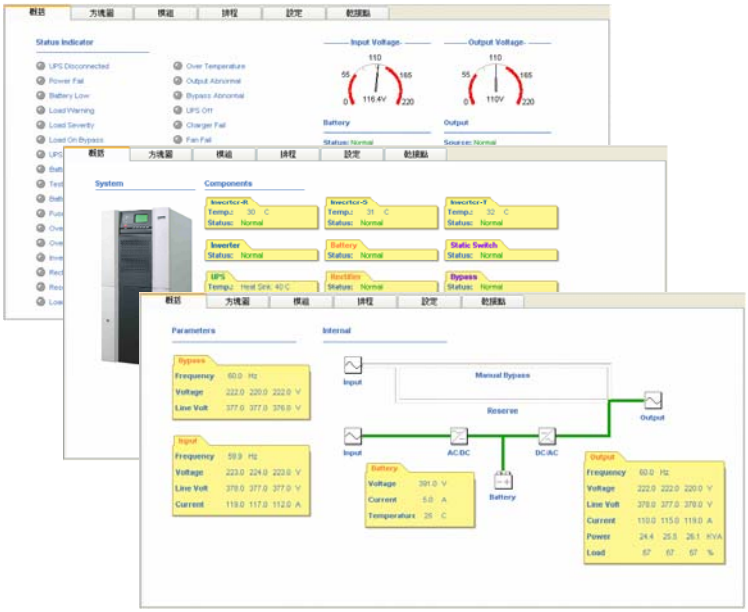
save the users operation log, UPS event log and historical parameters in database



Centralized Management

Display:

1. Display: Display UPS status by group or individual.
2. Hierarchical structure: Show the UPS location and the related condition.
3. Multiple views formats: Meters, block diagram, lamp alarms, graph chart.



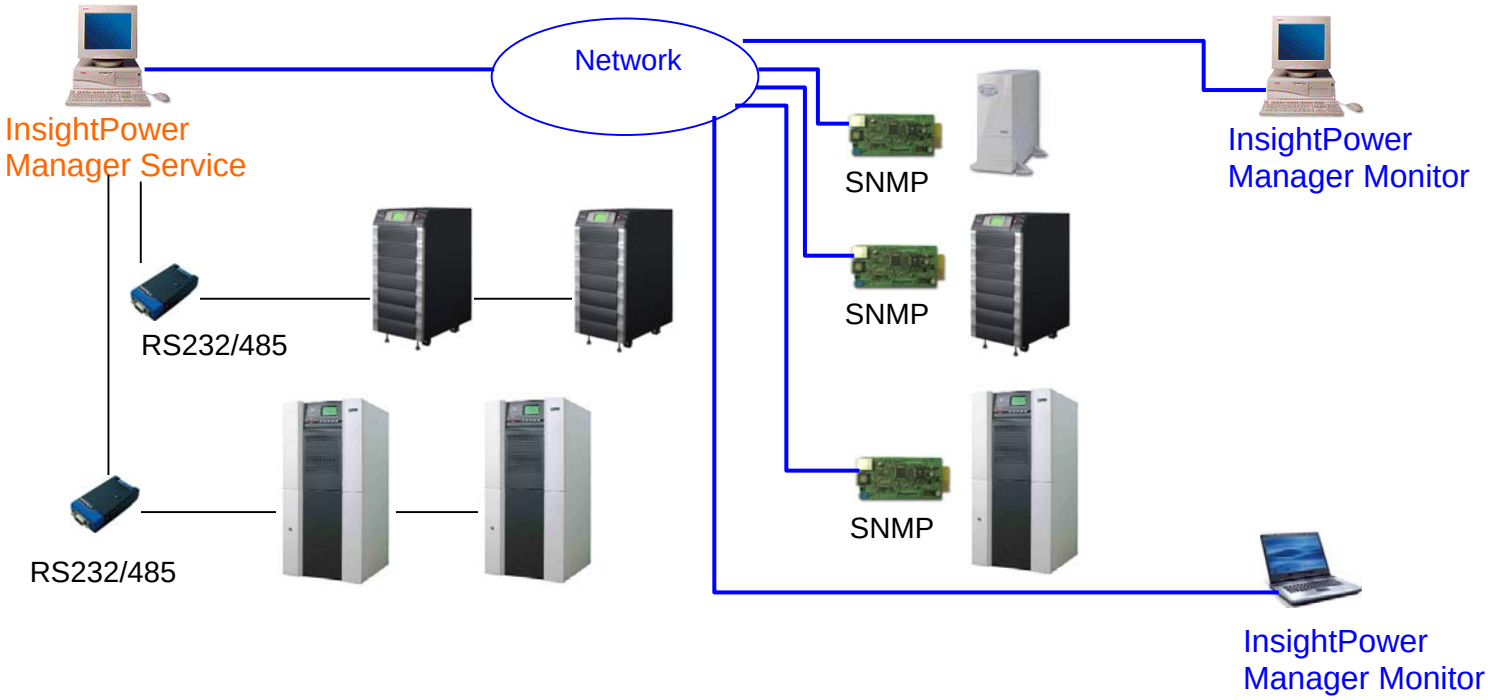
Hierarchical structure

Power Event Management:

- Event log
- Network broadcasting
- Audible alarm
- Email
- SMS(short message) notification

Event Log:

- Record events and operation by date/time
- Generate historical report and can be transferred into EXCEL file
- Setup a periodically analyzing report.



Remote UPS Monitoring