



**NRG**  
PRO RT



## **USER MANUAL NRG PRO RT II 6-10KVA**

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# 1. Safety

Important safety instructions – Save these instructions

There exists dangerous voltage and high temperature inside the UPS. During the installation, operation and maintenance, please abide the local safety instructions and relative laws, otherwise it will result in personnel injury or equipment damage. Safety instructions in this manual act as a supplementary for the local safety instructions. Our company will not assume the liability that caused by disobeying local safety instructions.

## 1.1 Safety notes

1. Even no connection with utility power, 220/230/240VAC voltage may still exist at UPS outlet !
2. For the sake of human being safety, please well earth the UPS before starting it .
3. Don't open or damage battery, for the liquid spilled from the battery is strongly poisonous and do harmful to body !
4. Please avoid short circuit between anode and cathode of battery, otherwise, it will cause spark or fire !
5. Don't disassemble the UPS cover, or there may be an electric shock !
6. Check if there exists high voltage before touching the battery
7. Working environment and storage way will affect the lifetime and reliability of the UPS. Avoid the UPS from working under following environment for long time
  - ◆ Area where the humidity and temperature is out of the specified range(temperature 0 to 40℃, relative humidity 5%-95%)
  - ◆ Direct sunlight or location nearby heat
  - ◆ Vibration Area with possibility to get the UPS crashed.
  - ◆ Area with erosive gas, flammable gas, excessive dust, etc
8. Keep ventilations in good conditions otherwise the components inside the UPS will be over-heated which may affect the life of the UPS.

## 1.2 Symbols used in this guide



### **WARNING!**

Risk of electric shock



### **CAUTION!**

Read this information to avoid equipment damage

## **2. Main Features**

### **2.1 Summarization**

This series UPS is a kind of single phase in single phase out high frequency online UPS, it provides two capacities: The 6kVA and 10kVA. The products are modularized and adopt the N+X redundancy. It can flexibly increase the number of the UPS modules according to the load capacity which is convenient for flexible allocation and gradually investment.

The UPS can solve most of the power supply problems, such as blackout, over-voltage, under-voltage, voltage sudden drop, oscillating of decreasing extent, high voltage pulse, voltage fluctuation, surge, inrush current, harmonic distortion (THD), noise interference, frequency fluctuation, etc..

This UPS can be applied to different applications from computer device, automatic equipment, communication system to industry equipment.

### **2.2 Functions and Features**

#### **◆1Phase In/1Phase Out UPS**

It is 1Phase In/1Phase Out high-density UPS system, of which input current is kept in balance. No unbalance problem might occur. And also support for single phase input.

#### **◆Digital Control**

This series UPS is controlled by Digital Signal Processor(DSP); ehance, it increases reliability, performance, self-protecton, self-diagnostics and so on.

#### **◆Battery Configurable from 16pcs to 20pcs**

The battery voltage of this series UPS can be configured at 16pcs, 18pcs or 20pcs according to your convenience.

#### **◆Intelligent Charging Method**

The series UPS adopts advanced three-stage charging method—

1<sup>st</sup> stage: high current constant current charging

to guarantee to charge back to 90%;

2<sup>nd</sup>-stage: Constant Voltage

In order to vitalize battery and make sure batteries are fully charged

3<sup>rd</sup> stage: floating mode.

With this 3-stage charging method, it extends the life of the batteries and guarantees fast charging.

#### **◆LCD Display**

With LCD plus LED displays, the user may easily get UPS status and its operational parameters, such as input/output voltage, frequency & load%, battery % and ambient temperature, etc..

#### **◆Intelligent Monitoring Function**

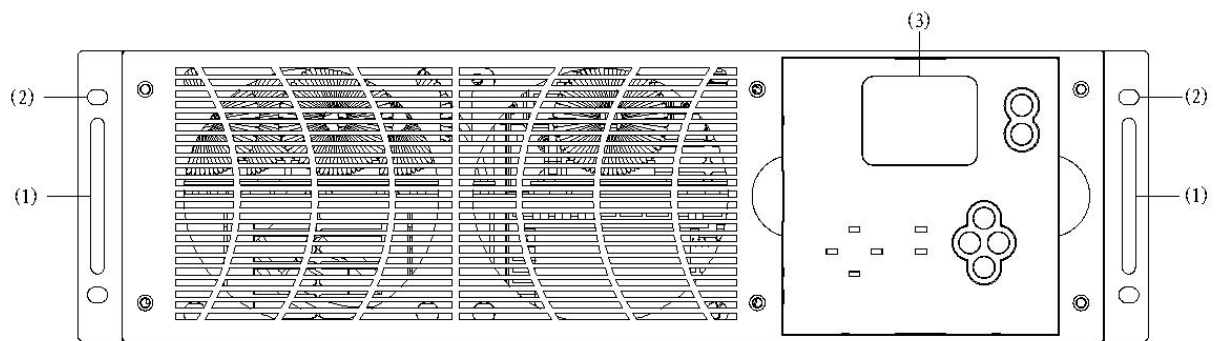
Via optional SNMP Card, you may remotely control and monitor the UPS.

## 3. Installation

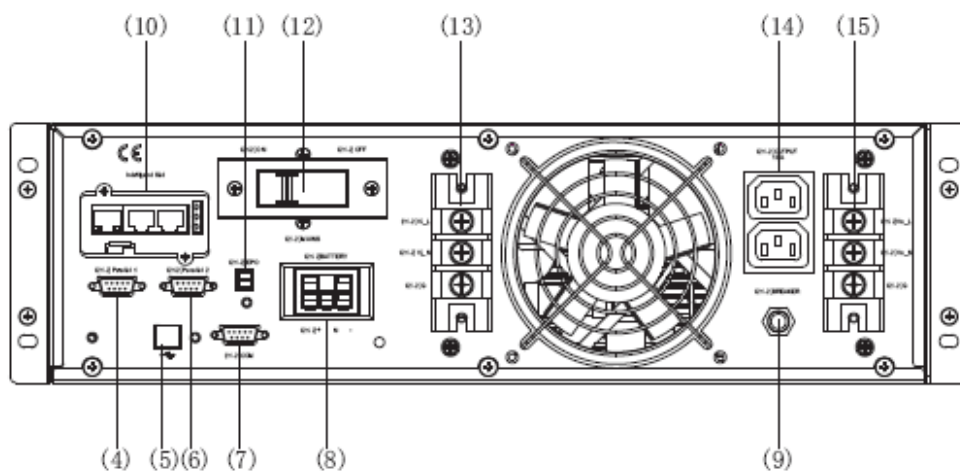
### 3.1 Unpack checking

1. Don't lean the UPS when moving it out from the packaging
2. Check the appearance to see if the UPS is damaged or not during the transportation, do not switch on the UPS if any damage found. Please contact the dealer right away.
3. Check the accessories according to the packing list and contact the dealer in case of missing parts.

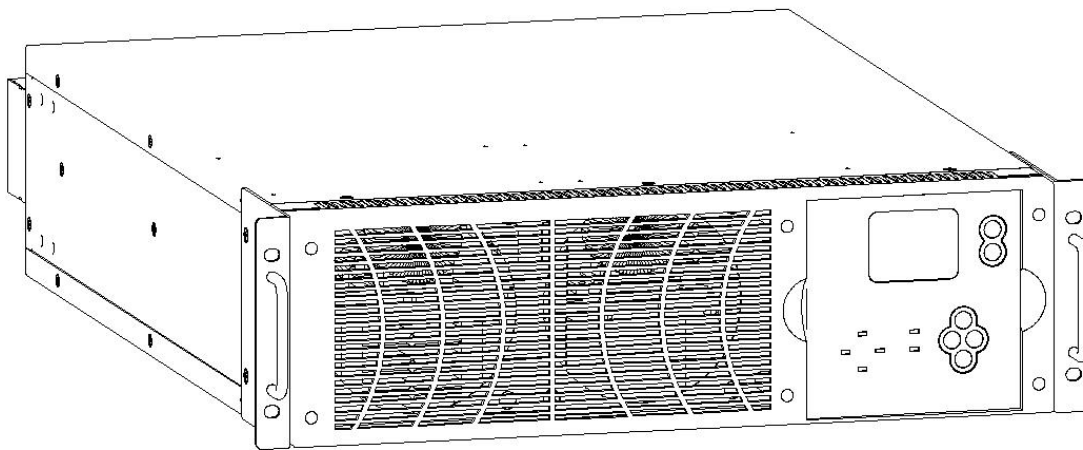
### 3.2 UPS Module Outlook



Front View



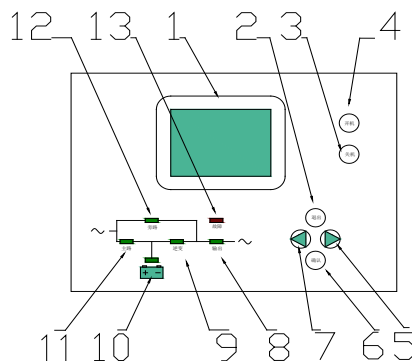
Rear View



**Side View**

(1) handles (2) fixing screw hole (3) LCD Display (4) Parallel Port 1 (5) USB port (6) Parallel Port 2 (7) COM(RS232) (8) Battery Slot (9) Output breaker (10) Intelligent slot (11) EPO (12) Input breaker (13) Input terminal (14) Output IEC (15) Output terminal

### 3.3 LCD control panel



**LCD control panel introduction**

(1) LCD screen (2) ESC (3) OFF button (4) ON button (5) forward button (6) Enter (7) backward button (8) Output Indicator (9) Inverter Indicator (10) Battery Indicator (11) Mains (AC) Indicator (12) Bypass Indicator (13) Fault Indicator

### 3.4 Installation notes

◆Please place the UPS in a clean, stable environment, avoid the vibration, dust, humidity, flammable gas and liquid, corrosive objects. To avoid from high room

temperature, a system of room extractor fans is recommended to be installed. Optional air filters are available if the UPS operates in a dusty environment.

◆The environment temperature around the UPS should keep in a range of 0°C~40°C. If the environment temperature exceeds 40°C, the rated load capacity should be reduced by 12% per 5°C. The max temperature can't be higher than 50°C.

◆If the UPS is dismantled under low temperature, it might be in a condensing condition. The UPS can't be installed unless the internal and external of the equipment is fully dry. Otherwise, there will be in danger of electric shock.

◆Batteries should be mounted in an environment where the temperature is within the required specs. Temperature is a major factor in determining battery life and capacity. In a normal installation, the battery temperature is maintained between 15°C and 25°C. Keep batteries away from heat sources or main air ventilation area, etc.



#### **WARNING!**

Typical battery performance data are quoted for an operating temperature between 20°C and 25°C. Operating it above this range will reduce the battery life while operation below this range will reduce the battery capacity.

◆Should the equipment not be installed immediately it must be stored in a room so as to protect it against excessive humidity and or heat sources.



#### **CAUTION!**

An unused battery must be recharged every 6months. Temporarily connecting the UPS to a suitable AC supply and activating it for the time required for recharging the batteries are required.

◆The highest altitude that UPS may work normally with full load is 1500 meters. The load capacity should be reduced when this UPS is installed in place whose altitude is higher than 1500 meters, shown as the following table:

(Load coefficient equals max load in high altitude place divided by nominal power of the UPS)

| Altitude (m)     | 1500 | 2000 | 2500 | 3000 | 3500 | 4000 | 4500 | 5000 |
|------------------|------|------|------|------|------|------|------|------|
| Load coefficient | 100% | 95%  | 90%  | 85%  | 80%  | 75%  | 70%  | 65%  |

◆To get the UPS completely monitored by the software, you just simply connect RS232 cable to each end of the computer and the UPS respectively.

### **3.5 External Protective Devices**

For safety reasons, it is necessary to install, external circuit breaker at the input A.C. supply and the battery. This chapter provides guidelines for qualified installers that must have the knowledge of local wiring practices for the equipment to be installed.

#### **◆External Battery**

The UPS and its associated batteries are protected against the effect of

over-current through a DC compatible thermo-magnetic circuit-breaker (or a set of fuses) located close to the battery.

#### ◆UPS Output

Any external distribution board used for load distribution shall be fitted with protective devices that may avoid the risk of UPS overloaded.

#### ◆Over-current

Protection device shall be installed at the distribution panel of the incoming main supply. It may identify the power cables current capacity as well as the overload capacity of the system .



#### CAUTION !

Select a thermo magnetic circuit-breaker with an IEC 60947-2 trip curve C (normal) for 125% of the current as listed below.

### 3.6 Power Cables

◆The cable design shall comply with the voltages and currents provided in this section, Kindly follow local wiring practices and take into consideration the environmental conditions (temperature and physical support media) .

#### WARNING !



UPON STARTING, PLEASE ENSURE THAT YOU ARE AWARE OF THE LOCATION AND OPERATION OF THE EXTERNAL ISOLATORS WHICH ARE CONNECTED TO THE UPS INPUT/BYPASS SUPPLY OF THE MAINS DISTRIBUTION PANEL.CHECK TO SEE IF THESE SUPPLIES ARE ELECTRICALLY ISOLATED, AND POST ANY NECESSARY WARNING SIGNS TO PREVENT ANY INADVERTENT OPERATION

### Cable Dimension

| UPS module | Cable Dimension             |                              |                             |                              |
|------------|-----------------------------|------------------------------|-----------------------------|------------------------------|
|            | AC Input (mm <sup>2</sup> ) | AC Output (mm <sup>2</sup> ) | DC Input (mm <sup>2</sup> ) | Grounding (mm <sup>2</sup> ) |
| 6KVA       | 6                           | 6                            | 6                           | 6                            |
| 10KVA      | 10                          | 10                           | 10                          | 10                           |



#### CAUTION!

Protective earth cable: Connect each cabinet to the main ground system. For Grounding connection, follow the shortest route possible.



### WARNING!



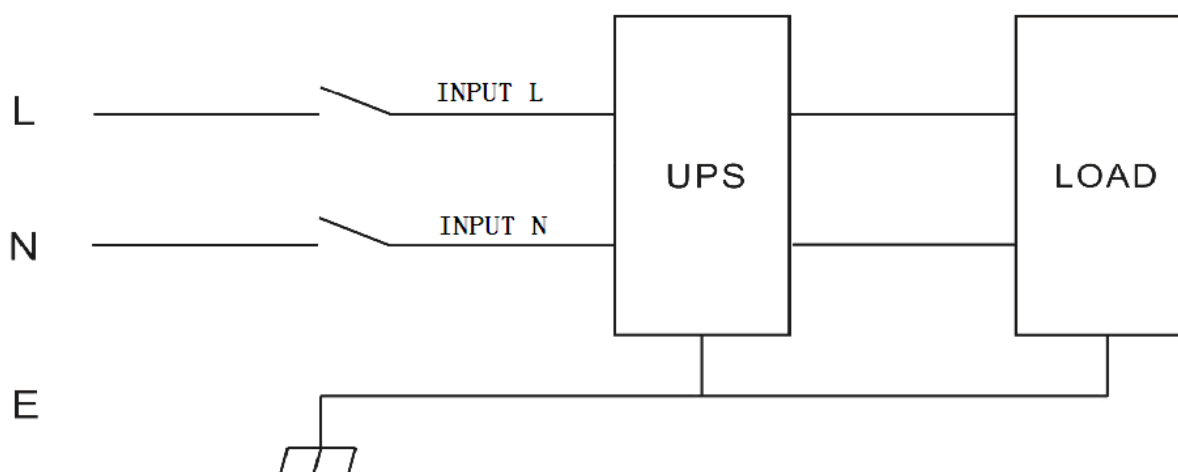
FAILURE TO FOLLOW ADEQUATE EARTHING PROCEDURES MAY RESULT IN ELECTROMAGNETIC INTERFERENCE OR IN HAZARDS INVOLVING ELECTRIC SHOCK AND FIRE

## 3.7 Power cable connect

Once the equipment has been finally positioned and secured, connect the power cables as described in the following procedure.

Verify the UPS is totally isolated from its external power source and also all power isolators of the UPS are open. Check to see if they are electrically isolated, and post any necessary warning signs to prevent their inadvertent operation .

Choose appropriate power cable, and pay attention to the diameter of the connection terminal of the cable that should be greater than or equal to that of the connection poles;



Input connection “single phase + ground”



### WARNING!

If the load equipment is not ready to accept power on the arrival of the commissioning engineer then ensure that the system output cables are safely isolated at their ends

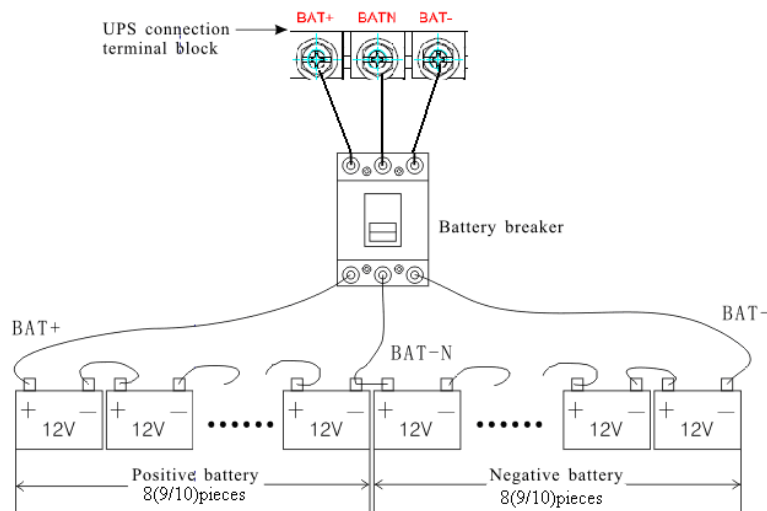


### CAUTION!

The earthing and neutral bonding arrangement must be in accordance with local and national codes of practice.

### 3.8 Battery connection

The UPS uses a positive and negative double battery framework, total 16(optional 18/20) pieces in series. A neutral cable is retrieved from the joint between the cathode of the 8<sup>th</sup> (9<sup>th</sup>/10<sup>th</sup>) and the anode of the 9<sup>th</sup> (10<sup>th</sup>/11<sup>th</sup>) of the batteries. Then the neutral, the battery positive and the battery negative are connected with the UPS respectively. The battery sets between the Battery anode and the neutral are called positive batteries and that between neutral and cathode are called negative ones. Users can choose the capacity and the numbers of the batteries according to their demands. The connection is shown as following:



#### Note:

The BAT+ of the UPS connect poles is connected to the anode of the positive battery, the BAT- is connected to the cathode of the positive battery and the anode of the negative battery, the BAT- is connected to the cathode of the negative battery.

Factory default setting for battery quantity is 16pcs and for battery capacity is 7AH (charger current 1A). When connecting 18pcs or 20pcs batteries, please re-set battery quantity and its capacity after UPS starts at AC mode. Charger current could be adjusted automatically according to battery capacity selected. (Also charger current is selectable). Via the setting tool, all related parameter settings can be performed. These corresponding settings are done though LCD.



#### CAUTION!

Ensure correct polarity battery string series connection. i.e. inter-tier and inter block connections are from (+) to (-) terminals. Don't mix batteries with different capacity or different brands, or even mix up new and old batteries, either.

**WARNING!**

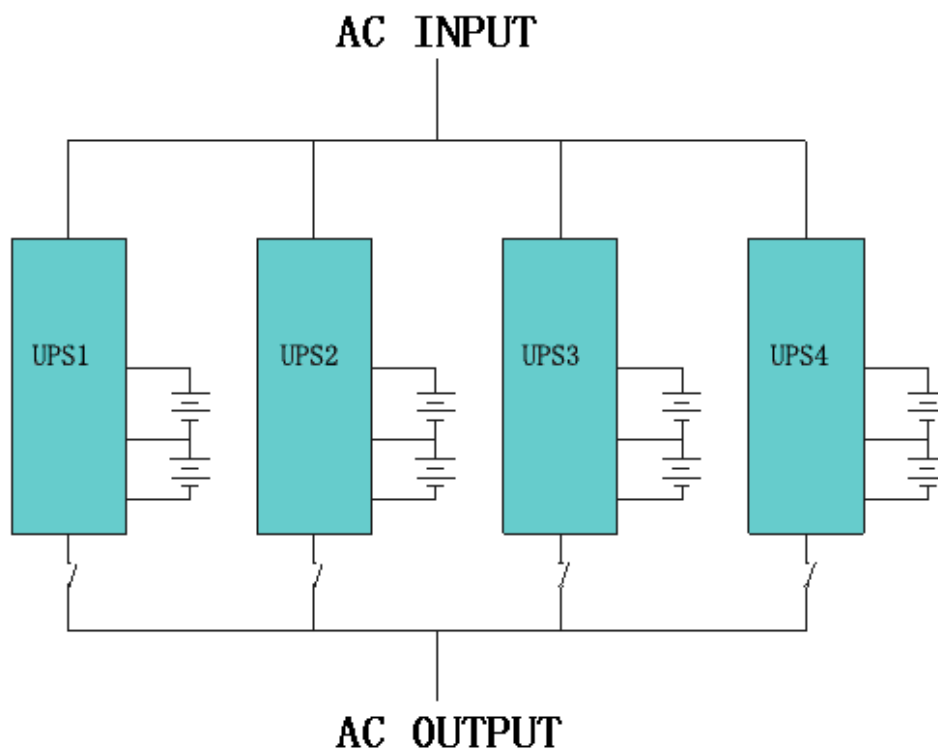
Ensure correct polarity of string end connections to the Battery Circuit Breaker and from the Battery Circuit Breaker to the UPS terminals i.e. (+) to (+) / (-) to (-) but disconnect one or more battery cell links in each tier. Do not reconnect these links and do not close the battery circuit breaker unless authorized by the commissioning engineer.

### 3.9 UPS Multi—Module Installation

The basic installation procedure of a parallel system comprising of two or more UPS modules is the same as that of single module system. The following sections introduce the installation procedures specified to the parallel system.

#### 3.9.1 Cabinet installation

Connect all the UPSes needed to be put into parallel system as below picture.



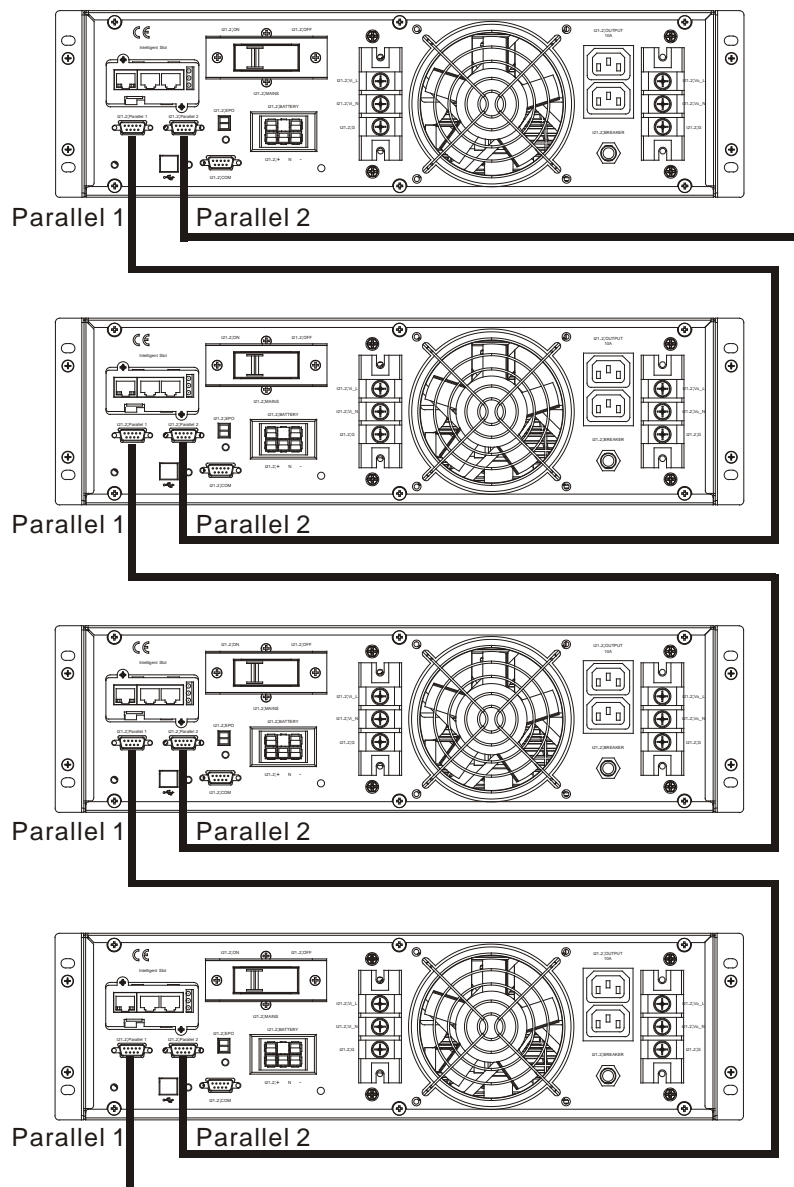
Make sure each UPS input breaker is in “off” position and there is no any output from each UPS connected. Battery groups can be connected separately or in parallel, which means the system itself provides both separate battery and common battery.

**WARNING!**

Make sure the N、L lines are correct, and grounding is well connected.

### 3.9.2 Parallel cable installation

Shielded and double insulated control cables available must be interconnected in a ring configuration between UPS modules as shown below. The parallel control board is mounted on each UPS module. The ring configuration ensures high reliability of the control.



### 3.9.3 Requirement for the parallel system

A group of paralleled modules behave as one large UPS system but with the advantage of presenting higher reliability. In order to assure that all modules are equally utilized and comply with relevant wiring rules, please follow the requirements below:

- 1) All UPS must be of the same rating and be connected to the same bypass source.
- 2) The Bypass and the Main input sources must be referenced to the same neutral potential.

- 3) The outputs of all the UPS modules must be connected to a common output bus.
- 4) The length and specification of power cables including the bypass input cables and the UPS output cables should be the same. This facilitates load sharing when operating in bypass mode.

## 4. Operation

### 4.1 Operation Modes

The UPS is a double-conversion on-line UPS that may operate in the following alternative modes:

#### ◆Normal mode

The rectifier/charger derives power from the AC Mains and supplies DC power to the inverter while floating and boosting charge the battery simultaneously. Then, the inverter converts the DC power to AC and supplies to the load.

#### ◆Battery mode (Stored Energy Mode)

If the AC mains input power fails, the inverter, which obtains power from the battery, supplies the critical AC load. There is no power interruption to the critical load. The UPS will automatically return to Normal Mode when AC recovers.

#### ◆Bypass mode

If the inverter is out of order, or if overload occurs, the static transfer switch will be activated to transfer the load from the inverter supply to bypass supply without interruption to the critical load. In the event that the inverter output is not synchronized with the bypass AC source, the static switch will perform a transfer of the load from the inverter to the bypass with power interruption to the critical AC load. This is to avoid paralleling of unsynchronized AC sources. This interruption is programmable but typically set to be less than an electrical cycle e.g. less than 15ms (50Hz) or less than 13.33ms (60Hz).

#### ◆ECO Mode

When the UPS is at AC Mode and the requirement to the load is not critical, the UPS can be set at ECO mode in order to increase the efficiency of the power supplied. At ECO mode, the UPS works at Line-interactive mode, so the UPS will transfer to bypass supply. When the AC is out of set window, the UPS will transfer from bypass to Inverter and supplies power from the battery, then the LCD shows all related information on the screen.

#### ◆Parallel redundancy mode (system expansion)

To achieve a higher capacity and / or increase reliability, the outputs of up to four UPS modules can be programmed to operate in parallel and the built-in parallel controller in each UPS ensures automatic load sharing.

## 4.2 Turn on/off UPS

### 4.2.1 Connecting with Utility



#### CAUTION!

MAKE SURE GROUNDING IS PROPERLY DONE!

- ◆ Set the Battery Breaker to the “ON” position according to the user’s manual.
- ◆ Switch on the UPS



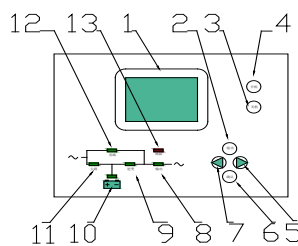
#### CAUTION!

Check to see if the load is safely connected with the output of the UPS. If the load is not ready to receive power from the UPS, make sure that it is safely isolated from the UPS output terminals

The internal fan of the UPS starts spinning, the UPS is performing self-diagnostics until buzzer beeps twice to show the UPS is normal. Then, the UPS goes to bypass supply, Utility LED and Bypass LED turn Green, the inverter is starting up now. When the inverter is checked “normal”, the UPS goes to working mode and the load is supplied by the inverter now.

No matter the UPS is operated normally or not, the LCD display will indicate current status. The top lines display the UPS operational status and the bottom lines indicate alarm conditions when they occur.

### 4.2.2 Black(Cold) start procedure



#### CAUTION!

Follow these procedures when the input AC Utility Failure, but battery is normal

- ◆ Turn on the battery switch.

The battery will feed the Auxiliary power board.

- ◆ Trigger the cold start buttons at the position 4 in above drawing.

When battery normal, rectifier starts operation, 30s later, inverter starts and operates, INV and output light up.



### **CAUTION!**

Wait for approximately 30 seconds before you press the black start key

#### **4.2.3 Inverter Off**

When the Utility is normal, press “Off” button for approx. 1 sec until beep sounds, the inverter LED will extinguish, the bypass LED on, then the UPS turns to bypass supply.

When the UPS is on battery mode or without AC, press “Off” button for approx. 1 sec until beep sounds, the output of the UPS is off, fan stop spinning. After 60 seconds, all the LED on the LCD display extinguish.

#### **4.2.4 Disconnecting with Utility**



### **CAUTION!**

This procedure should be followed to completely shut down the UPS and the LOAD. After all power switches, isolators and circuit breakers are opened, there will be no output.

- ◆ After the inverter is off, turn the Utility and battery breakers to “OFF”, then the LCD display will extinguish completely and fan stops spinning in 60 seconds. If there are external battery packs connected, please also turn the battery breaker to “OFF”.



### **WARNING!**

Wait for about 5 minutes for the internal D.C. bus bar capacitors to be completely discharged.

#### **4.3 LCD Display instruction**

- 1) The main interface below comes out when the power is connected or the system is cold start. See Fig1

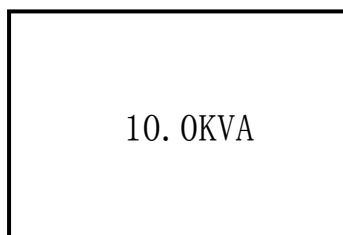


Fig.1: Main interface

- 2) Press ESC/ ◀ or ▶ button, it will change to the basic status interface , see Fig2 below

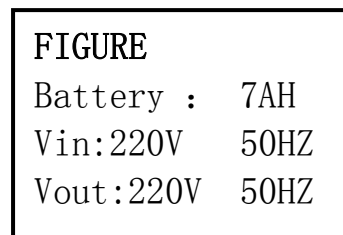


Fig.2: Basic status interface

- 3) Press the ENT button, it will change to main menu, see Fig3,

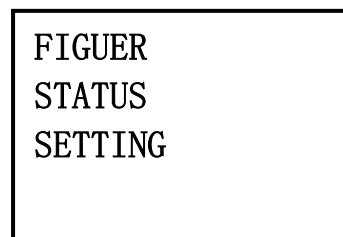


Fig.3: Main menu

- 4) An arrow icon will come out on the LCD when pressing the ENT, then the data info, status info, setting info can be selected by pressing the right or left arrow button, and checking the details by pressing
- 5) Select and confirm the data info to be viewed in detail. It contains the details of the AC input /output , inverter, battery , BUS, parallel , temperature. See Fig 4 to 12 below.

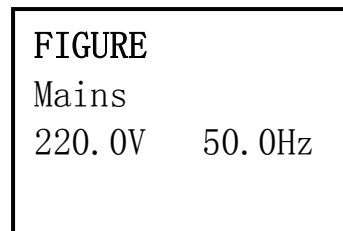


Fig.4: Main input info

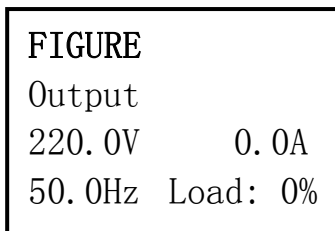


Fig.5: Output info

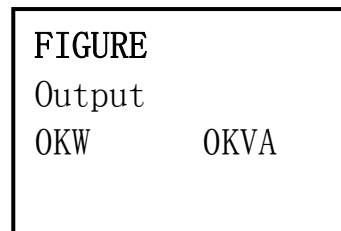


Fig.6: Output info

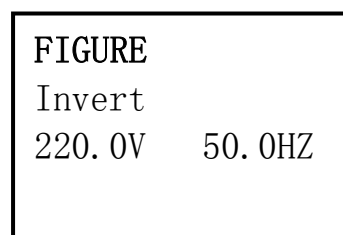


Fig.7: Inverter info

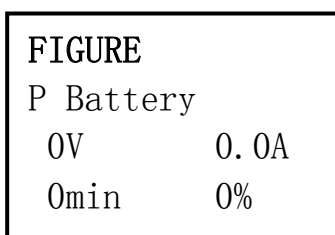


Fig.8: Battery info

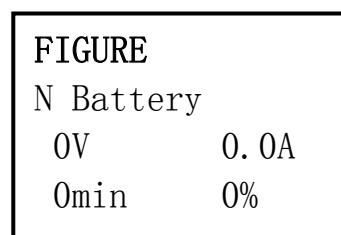


Fig.9 battery info

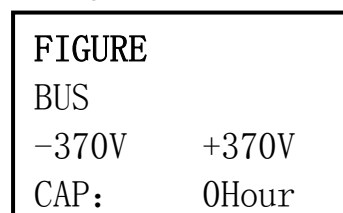


Fig.10: bus info

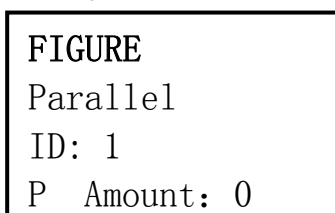


Fig.11: Parallel info

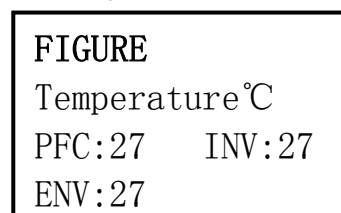


Fig.12: Temperature info



- 6) Select and confirm the status info can view the details, including status information, alarm information, code, power rating and version. See Fig 13 to 14

```
STATUS
Code: 11
Fault : 0. 0.0.0
Model: 06.0KVA
```

Fig.13: main menu

```
STATUS
Version
V03B05D002
```

Fig.14: main menu

- 7) Select and confirm setting menu, setting information will be displayed on the screen, which includes user set, system set, parallel set, battery sett, revise set. See Fig 15 to 19

```
SETTING
Mode: NOR
Batt num: 16
Batt cap: 7AH
```

Fig.15: setting menu

```
SETTING
V-Level: 220V
F-Level: 50Hz
```

Fig.16: setting menu

```
SETTING
V-upper 15%
V-lower -45%
```

Fig.17: setting menu

```
SETTING
Buzzer: Enable
```

Fig.18: setting menu

```
SETTING
Parallel set
ID 1
P-amount 2
P-Redund 0
```

Fig.29: Parallel setting

## 4.4 Working Mode and transferring

Usually, the UPS should be set to work in AC mode, so it will transfer to battery mode automatically without interruption when AC fails. When the UPS is overloaded, it will transfer to bypass mode without interruption. When the inverter is defective or over temperature occurred inside the UPS, the UPS will transfer to bypass mode if the bypass is normal.

### 4.4.1 Transfer to bypass if overload

When the load of UPS is beyond normal range and lasts for the time set, it will

transfer to bypass mode and beeps twice every second, then the load is powered by AC directly. Please decrease the load immediately until the alarm is eliminated. The UPS will start the inverter after 5 mins. In order to protect the load and the UPS, it is required to set the limitation times of transferring to bypass mode due to overload in 1 hour. If it exceeds the limitation times set, the UPS will keep in bypass mode.

#### **4.4.2 Normal mode to battery mode**

The UPS will go to battery mode if the AC is failed. The UPS will shut down automatically if batteries are drained. When AC recovers, the UPS will start the inverter automatically.

#### **4.4.3 Go to bypass mode due to over temperature**

The temperature inside UPS may be high if ambient temperature is high or the ventilation is poor, then the UPS will go to Bypass mode, fault indicator will be on (red), the LCD will display that the inner temperature is high, long beeps will come. If so, please cut off the input power of the UPS, move objects that affecting the ventilation far from the UPS if any or increase the distance between the UPS and the wall. Wait until the UPS temperature becomes normal then restart it.

#### **4.4.4 Output short circuit**

When the UPS output is in short circuit, the UPS will cut off the output, fault indicator will be on ( red ), the LCD will display output is in short circuit, long beeps come. If so, please disconnect the load in short circuit, cut off the UPS input power and wait for 10mins, the UPS will shut down automatically or press the off button to shut down in after 10s. Before restarting the UPS, please make sure that the short circuit problem has been solved.

### **4.5 UPS monitoring**

Please refer to the instruction of the UPS monitoring software provided.

### **4.6 LCD operation menu**

#### **1 Main menu switching**

Pressing the left/right arrow and ENT button can switch among alarm info, running parameter and function settings. Press ENT to enter alarm info, running parameters or function settings. To enter function settings, double pressing on ENT is required.

#### **2 Submenu switching**

- 1) Press the arrow button can view the details after entering the running function interface, and press ESC to return to main menu.
- 2) Press the arrow button can view the details after entering the function settings interface, press the ESC to return to main menu
- 3) Parameter which has been selected and changed will be highlighted. Press arrow

button to change the value and press ENT to confirm it. Once confirmed, it will not be highlighted.

- 4) Press the arrow button can view the detailed alarm info after entering the alarm info interface, press the ESC to return to main menu

### 3 Priority of info displayed on LCD

- 1) If there is alarm but no valid operation on buttons, the alarm info with top priority will be shown on LCD automatically
- 2) When there isn't any alarm and the LCD is displaying the submenu of running parameters, such as output current, these parameters will be always displayed on the LCD if no further operation on buttons. If the LCD is not displaying the submenu of running parameters, it will return to main menu in 30s as long as there isn't any operation on buttons

## Appendix 1 Specifications

|          |                          |  |           |
|----------|--------------------------|--|-----------|
| Capacity |                          | 6KVA/5.4W  | 10KVA/9KW |
| Type     |                          | 6KVA; 10KVA  |           |
| input    | Input mode               | Single phase + Ground                                      |           |
|          | Power factor             | $\geq 0.99$  |           |
|          | rating voltage           | 220VAC/230VAC/240VAC (can be set)                          |           |
|          | rating frequency         | 50Hz/60Hz (auto sensing)                                   |           |
|          | Voltage range            | 120~276VAC   |           |
|          | Frequency range          | 45~55Hz/54~66Hz  |           |
|          | Bypass voltage range     | 220Vac max: 10%, 15%, 20% or 25%, default : 25%            |           |
|          |                          | 230Vac max: 10%, 15% or 20%, default +20%                  |           |
|          | Bypass frequency range   | 240Vac max: +10% or 15%, default +15%                      |           |
|          |                          | min: 20%, 30% or 45%, default 45%                          |           |
| battery  | THDI                     | $\pm 1\%$ 、 $\pm 2\%$ 、 $\pm 4\%$ 、 $\pm 5\%$ 、 $\pm 10\%$ |           |
|          |                          | $\leq 3\%$ (100% linear load, input THDV $\leq 1\%$ )      |           |
|          | THDI                     | $\leq 5\%$ (100% non liner load, input THDV $\leq 1\%$ )   |           |
|          |                          |  |           |
|          | Battery number           | 16/18/20pcs (can be set)                                   |           |
| output   | Battery type             | VRLA   |           |
|          | Charge model             | Boost charge or float charge auto switch                   |           |
|          | Charge time              | Boost charge up to 20Hr(Max)                               |           |
|          | Charge current(A)        | 1A (S) /10A (H)  |           |
|          | Output type              | Single phase + Ground                                      |           |
|          | Output precision         | 1.0%;  |           |
| output   | Voltage distortion (THD) | $\leq 2\%$ at 100% liner load                              |           |
|          |                          | $\leq 5\%$ at 100% non-liner load                          |           |
|          | Rating voltage           | 220/230V /240V   |           |
|          | Frequency precision      | $\pm 0.1\%$  |           |

|        |                                      |   |
|--------|--------------------------------------|---|
|        | Rating Frequency                     | 50Hz/60Hz                                   |
|        | Frequency track speed                | 1Hz/s                                       |
|        | Overload                             | 105%~110%, 1Hr                              |
|        |                                      | 110%~125% 10min                             |
|        |                                      | 125%~150% 1min                              |
|        |                                      | ≥150% 200ms                                 |
|        | Peak value factor                    | 3:1   |
|        | Efficiency at normal                 | ≥90%  |
|        | Dynamic respond                      | 5.0%  |
|        |                                      | 20ms  |
|        | DC heft                              | ≤500mV                                      |
| Switch | Between Normal mode and battery mode | 0ms   |
|        | Between inverter and bypass          | 0ms。  |
|        |                                      | unlock: <15ms (50Hz), <13.33ms (60Hz)       |
|        | Norse                                | <55dB (1m)                                  |
|        | Display                              | LCD+LED                                     |
|        | Safety                               | Meeting IEC62040-1 GB4943。                  |
|        | Max input voltage                    | 320Vac, 1Hr                                 |
|        | EMI                                  | Conduction : IEC 62040-2                    |
|        |                                      | Radiation : IEC 62040-2                     |
|        |                                      | Harmonics : IEC 62040-2                     |
|        | EMS                                  | IEC 62040-2                                 |
|        | MTBF                                 | 250,000Hr 1+1 400,000Hr                     |
|        | MTTR                                 | 30min                                       |
|        | Isolation resistance                 | > 2MΩ (500Vdc)                              |
|        | Isolation intension                  | 2820Vdc, <3.5mA, 1min                       |
|        | Surge                                | Meeting IEC60664-1 1.2/50uS+8/20uS 6kV/3kA. |
|        | Protection                           | IP20  |
|        | Parallel circumfluence               | 1+1≤8%, N+1≤3%                              |
|        | Parallel equal current               | 1+1≤8%, N+1≤10%                             |

## Appendix 2 communication port definition

USB communication port

|   |   |
|---|---|
| 1 | 2 |
| 4 | 3 |

Definition of Male port:

Pin 1 VCC , Pin 2 D-  
pin 3 D+ , Pin 4 GND

Application: use UPSilon2000 Power Management software

Available functions of the USB

- Monitor UPS power status
- Monitor UPS alarm info
- Monitor UPS running parameters
- Timing off/on setting

## Appendix 3 Option

1. Dry contact card
2. SNMP card
3. Parallel card

## Appendix 4 UPS message table

This section lists the event and alarm messages that the UPS might display. The messages are listed in alphabetical order. This section is listed with each alarm message to help you troubleshoot problems .

### 4.1 Operational Status and Mode(s)

| item | Content Displayed        | LED        |            |            |            |
|------|--------------------------|------------|------------|------------|------------|
|      |                          | Fault      | Bypass     | Battery    | Inverter   |
| 1    | Initialized              | EXTINGUISH | EXTINGUISH | EXTINGUISH | EXTINGUISH |
| 2    | Standby Mode             | EXTINGUISH | EXTINGUISH | X          | EXTINGUISH |
| 3    | No Output                | EXTINGUISH | EXTINGUISH | X          | EXTINGUISH |
| 4    | Bypass Mode              | EXTINGUISH | LIGHT      | X          | EXTINGUISH |
| 5    | Utility Mode             | EXTINGUISH | EXTINGUISH | X          | LIGHT      |
| 6    | Battery Mode             | EXTINGUISH | EXTINGUISH | LIGHT      | EXTINGUISH |
| 7    | Battery Self-diagnostics | EXTINGUISH | EXTINGUISH | LIGHT      | EXTINGUISH |
| 8    | Inverter is starting up  | EXTINGUISH | X          | X          | EXTINGUISH |
| 9    | ECO Mode                 | EXTINGUISH | X          | X          | X          |
| 10   | EPO Mode                 | LIGHT      | EXTINGUISH | X          | EXTINGUISH |
| 11   | Maintenance Bypass Mode  | EXTINGUISH | EXTINGUISH | EXTINGUISH | EXTINGUISH |
| 12   | Fault Mode               | LIGHT      | X          | X          | X          |

**Note:** “X” shows that it will determined by other conditions.

### 4.2 Alarm Information

| Item | UPS Alarm Warning                                    | Buzz              | LED           |
|------|--|-------------------|---------------|
| 1    | Rectifier Fault                                      | Beep continuously | Fault LED lit |
| 2    | Inverter fault(Including Inverter bridge is shorted) | Beep continuously | Fault LED lit |
| 3    | Inverter Thyristor short                             | Beep continuously | Fault LED lit |
| 4    | Inverter Thyristor broken                            | Beep continuously | Fault LED lit |
| 5    | Bypass Thyristor short                               | Beep continuously | Fault LED lit |
| 6    | Bypass Thyristor broken                              | Beep continuously | Fault LED lit |
| 7    | Fuse broken  | Beep continuously | Fault LED lit |
| 8    | Parallel relay fault                                 | Beep continuously | Fault LED lit |
| 9    | Fan fault  | Beep continuously | Fault LED lit |
| 10   | Reserve  | Beep continuously | Fault LED lit |
| 11   | Auxiliary power fault                                | Beep continuously | Fault LED lit |
| 12   | Initialization fault                                 | Beep continuously | Fault LED lit |
| 13   | P-Battery Charger fault                              | Beep continuously | Fault LED lit |
| 14   | N-Battery Charger fault                              | Beep continuously | Fault LED lit |
| 15   | DC Bus over voltage                                  | Beep continuously | Fault LED lit |
| 16   | DC Bus below voltage                                 | Beep continuously | Fault LED lit |
| 17   | DC bus unbalance                                     | Beep continuously | Fault LED lit |
| 18   | Soft start failed                                    | Beep continuously | Fault LED lit |

| Item | UPS Alarm Warning            | Buzz               | LED                 |
|------|------------------------------|--------------------|---------------------|
| 19   | Rectifier Over Temperature   | Twice per second   | Fault LED lit       |
| 20   | Inverter Over temperature    | Twice per second   | Fault LED lit       |
| 21   | Reserve                      | Twice per second   | Fault LED lit       |
| 22   | Battery reverse              | Twice per second   | Fault LED lit       |
| 23   | Cable connection error       | Twice per second   | Fault LED lit       |
| 24   | CAN comm. Fault              | Twice per second   | Fault LED lit       |
| 25   | Parallel load sharing fault  | Twice per second   | Fault LED lit       |
| 26   | Battery over voltage         | Once per second    | Fault LED blinking  |
| 27   | Mains Site Wiring Fault      | Once per second    | Fault LED blinking  |
| 28   | Bypass Site Wiring Fault     | Once per second    | Fault LED blinking  |
| 29   | Output Short-circuit         | Once per second    | Fault LED blinking  |
| 30   | Rectifier over current       | Once per second    | Fault LED blinking  |
| 31   | Bypass over current          | Once per second    | BPS LED blinking    |
| 32   | Overload                     | Once per second    | INV or BPS blinking |
| 33   | No battery                   | Once per second    | BATTERY blinking    |
| 34   | Battery under voltage        | Once per second    | BATTERY blinking    |
| 35   | Battery low pre-warning      | Once per second    | BATTERY blinking    |
| 36   | Internal Communication Error | Once per second    | Bypass LED lit      |
| 37   | DC component over limit.     | Once per 2 seconds | INV blinking        |
| 38   | Parallel Overload            | Once per 2 seconds | INV blinking        |
| 39   | Mains volt. Abnormal         | Once per 2 seconds | BATTERY LED lit     |
| 40   | Mains freq. abnormal         | Once per 2 seconds | BATTERY LED lit     |
| 41   | Bypass Not Available         |                    | BPS blinking        |
| 42   | Bypass unable to trace       |                    | BPS blinking        |
| 43   | Inverter on invalid          |                    |                     |