LX2000 Monitoring Module

User Manual

CONTENTS

Chapter I　LX2000 Monitoring System

This chapter introduces LX2000 monitoring system, including the sections of overview, system composition, system configuration and system functions.

1.1 Overview

LX2000 monitoring module is a monitoring product developed by Ningbo LongXing Telecommunications Equipment Manufacturing Co., Ltd.; a power monitoring system is formed by this monitoring module together with LongXing's rectifier modules and distribution plug-in frame (or distribution cabinet), realizing interactive operations in human-machine interfaces, monitoring of system operating state, uploading and downloading of operating data, intelligent battery management, and automatic energy-saving management. LX2000 monitoring module provides several communication interfaces such as RS232/RS485, network interface and dry contacts; with networking flexibility, it can realize remote monitoring.

1.2 System Composition

LX2000 monitoring module, together with rectifier modules, distribution plug-in frame (or distribution cabinet) and other devices, forms a communication power monitoring system. Fig. 1-1 shows the system monitoring solution.
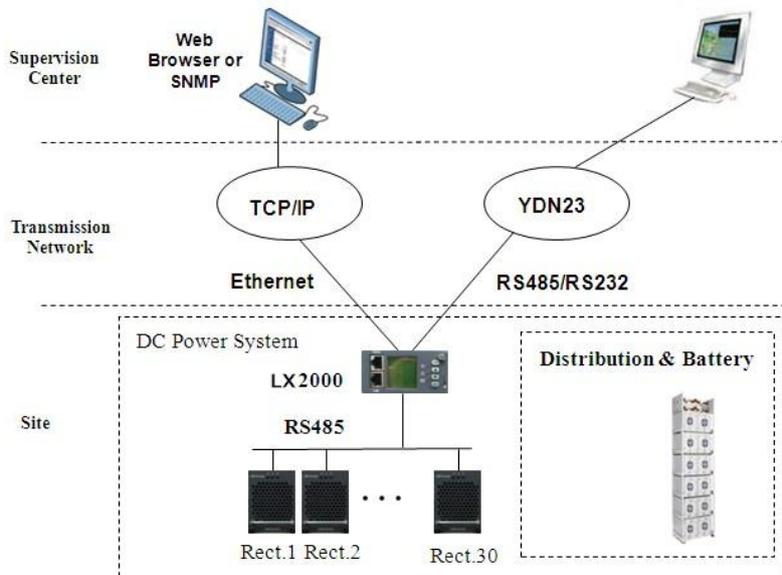
Fig. 1-1 LX2000 monitoring system solution

1.3 System Configuration

Table 1-1　Power system configuration

Name	Model	Quantity	Remark
Monitoring module	LX2000	1pcs	/
Rectifier module	MR48-3000	Max. 20pcs	500A system supports 10pcs
Distribution plug-in frame (or distribution cabinet)	-	1pcs	

1.4 System Functions

1.4.1 Display and Setting Function

The monitoring module is equipped with a 128×128 LCD unit, three indicators and four function buttons; the interface language can be switched between Chinese and English (8×8 Chinese characters can be displayed); simple and efficient, the user interface can display operating parameters, operating state, alarm state, setup parameters, system configuration data and control parameters of the power system.

1.4.2 Control Function

The monitoring module can send corresponding action commands to the monitored object according to the system operating state; such commands mainly include control of rectifier module on/off switching and battery equalizing/floating charge switching, change of current-limiting point of rectifier module, and adjustment of voltage of rectifier module.

The monitoring module supports automatic and manual system control modes. In automatic mode, all functions of battery management can be fulfilled automatically; in manual mode, only the functions of battery equalizing charge time protection and capacity calculation can be realized, and other functions of battery management need to be completed manually. The switching between automatic and manual control modes can be achieved through button setting, but a correct password should be entered.

1.4.3 Four Remote Functions

Remote metering:
The background host can obtain real-time analog values through the monitoring module;
Remote signaling:
The background host can obtain real-time digital values through the monitoring module;
Remote control:
The background host can control rectifier module on/off switching and equalizing/floating charge switching through the monitoring module;
Remote adjustment:
The background host can adjust the output voltage and current-limiting point of rectifier modules through the monitoring module.

1.4.4 Alarming and Logging Function

The monitoring module can make sound-light alarms against system faults based on data acquired, generate corresponding actions and report to the background host. There are three levels of alarms: MAJOR alarm, OBSERVATION alarm and NO alarm. Users are allowed to set the level of each alarm according to the actual situation and also set the corresponding relay output or NO relay output for each alarm type.

Users have access to history alarm logs and current logs. The history alarm logs include alarm type, occurrence time, and end time, while the current logs only cover alarm type and occurrence time; the logs are displayed in chronological order of occurrence time. At most 1000pcs of history alarm logs can be saved cyclically.

1.4.5 Intelligent Battery Management Function

The monitoring module is designed with the perfect automatic battery management function, efficiently prolonging the battery service life.
◆ Automatic equalizing and floating charge, intelligent charge current-limiting management, load disconnect, battery protection;
◆ Three discharge test modes: timed test, quick test and constant-current test.

1.4.6 Intelligent Energy-saving Management

The monitoring module is designed with the auto sleep mode which realizes energy saving.

1.4.7 Communication Function

The monitoring module can communicate with the background host and subordinate devices; the communication with the background host supports RS232, RS485 and Ethernet modes, realizing flexible networking and remote monitoring; Ethernet-based communication supports web browsing and remote upgrade; the monitoring module can support RS485 mode through communication with subordinate devices.

1.4.8 Dry Contact Output Function

The monitoring unit has 8 dry contact outputs which can be set to correlate with different alarm signals. In case of a system alarm, the monitoring unit outputs the alarm signal through the set dry contact.

Chapter II Introduction to LX2000 Monitoring Module

This chapter gives a brief introduction to the functions of front panel indicators and operation buttons of the monitoring module, and introduces in detail the contents on main display screens, access approaches, how to conduct system control, information inquiry and parameter setting.

2.1 Description of Operation Panel

128×128 dot matrix LCD is adopted, on which 8×8 Chinese characters can be displayed; Chinese or English can be selected as the interface language.

Table 2-1 gives the definition of each indicator:

Table 2-1   Description of indicators

Indicator	Normal state	Fault state	Fault cause
RUN (Green)	On	Off	No power supply to the monitoring module
Alarm (Yellow)	Off	On	Observation alarms
Major alarm (Red)	Off	On	Major alarm

Table 2-2 gives the definition of each function button:

Table 2-2   Description of function buttons

Key	Function	
ESC	Return to the upper level menu	After long pressing the ESC and ENT buttons simultaneously, the monitoring module will be reset and restarted.
ENT	"Go to next menu" or "confirm" the operation. When any setting is changed, the ENT button should be pressed before the new setting becomes effective.	
UP	The cursor can be moved among menu items by pressing the UP or DN button; to set a parameter option, the UP or DN button can be pressed to change the option value.	When a parameter option value is a string of characters that need to be set separately, the UP or DN button can be pressed to change the option value of each character; after selecting the value, press the ENT button, and the cursor will move to the next character automatically.
DN		

Table 2-3 gives the definition of RS232/RS485 communication interface:
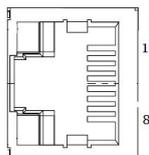
Table 2-3 Description of RS232/RS485 communication interface

Pin No.	1	2	3	4	5	6	7	8
Signal name	RS485+	-	RS485-	TX232	-	RX232	-	GND232

Table 2-4 gives the definition of LAN Ethernet network interface:
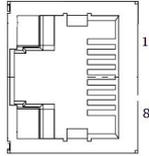
Table 2-4 Description of LAN Ethernet network communication interface

Pin No.	1	2	3	4	5	6	7	8
Signal name	TX+	TX-	RX+	-	-	RX-	-	-

2.2 Alarms

The control- and the rectifier-units are equipped with LEDs that provide rele-vant information regarding system- and unit-status, and guide the service technician to the right unit in case of trouble.

The alarm events are classified into different alarm categories. Different alarm categories have different visual/audible alarms and alarm callback activities.

Table 2-5 Monitoring Module alarm categories

Alarm Category	Red LED	Yellow LED	Alarm Buzzer
No Alarm	Off	Off	Off
Observation Alarm	-	On	Off
Major Alarm	On	-	On

The audible alarm is silenced if the user presses any key on LX2000, if the fault that triggers the alarm is cleared or after 3 min (settable).The audible alarm can be disabled from a menu in the LCD display.

The alarm LED stops emitting light if all the faults that trigger the alarm are cleared.

2.3 Main LCD Screens

In this chapter, several display screens are frequently mentioned; this section introduces the display content on and the approach to entering each screen.

2.2.1 System Information Screen

When the monitoring module is powered on, the language selection interface will appear and the monitoring module will be initialized. The default language is English. After initialization, the first page of system information will appear.

The system information screen shows the main information, including DC voltage and current, system state, battery state, energy management information, etc., as shown in Fig. 2-1. There will be a difference for the displayed actual value.

```
            2013-12-06

  Float

  53.5V      100A

  Auto       Normal
```
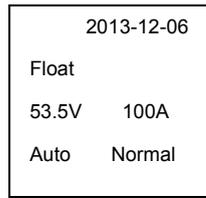
Fig. 2-1   System information screen

1. After initialization, the first system information screen appears.

2. At the Main Menu screen, press ESC to return to the first system information screen.

3. If no operation is conducted on the monitoring module keypad for 8 minutes, the LCD will return to the first system information screen.

4. When the ESC button is pressed under the system information screen, the model and software version of the monitoring module will be displayed.

5. When the ESC and ENT buttons are simultaneously pressed under the system information screen, the monitoring module will be reset and restarted a few seconds later.

2.2.2 Password Confirmation Screen

During the operation, the system will prompt you to enter password, Only the correct operation password will allow you to enter the screen you need. Fig. 2-2 shows the password confirmation screen. You can press the ESC button to abort the operation or press the ENT button to enter the password.

```
  Login:
  Password:



```
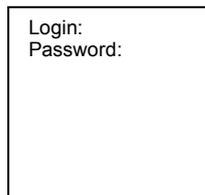
Fig. 2-2   Password confirmation screen

When entering the password, you can press UP or DN button to modify numbers, and then press the ENT button to confirm the password and at the same time move the cursor one position to the right. After entering the password, press the ENT button for confirmation. If the password is correct, the system will enter the next screen; if not, an "Incorrect Password" prompt will show up on the display screen. If the ESC button is pressed when entering the password, it will return to main menu screen.

The monitoring module has three levels of password: user password (default: 1), engineer password (default: 2); administrator password (default: 654321)

After entering the setting interface using the correct password, users no longer need to enter the password again when operating the buttons continuously. However, if the time interval between adjacent operations is longer than 2min, users will be required to enter the password again. If the high level password is the same as the low level password, when the password is entered, the monitoring module will display the high level setting menu.

2.2.3 Main Menu Screen

The main menu is the top menu of the monitoring module. All settings, controls and status of rectifier module information and alarm information are achieved through the submenus under the main menu. Fig. 2-3 shows the main menu.

```
┌─────────────────────┐
│ MAIN MENU           │
│    Status           │
│    Settings         │
│    Rect Control     │
│                     │
│                     │
│                     │
└─────────────────────┘
```
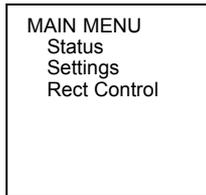
Fig. 2-3 Main menu screen

1. Press the ENT button under any sub-screen of the status screen to enter the main menu screen.

2. Press the ESC button under any submenu of the main menu to return to the main menu screen level by level.

2.2.4 Status Screen

The status screen is a Level 1 submenu screen under the main menu; under the status screen, there are also several submenu screens. It mainly displays active alarm, history alarm, AC status, DC status, rectifiers status, etc.. Fig. 2-4 shows the status screen.

```
┌─────────────────────┐
│ Status              │
│    Active Alarm     │
│    History Alarm    │
│    AC Status        │
│    DC Status        │
│    Rectifiers       │
│                     │
└─────────────────────┘
```
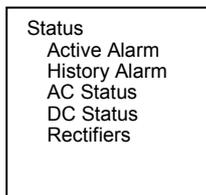
Fig. 2-4   Status screen

1. Press the UP or DN button to select the "status" submenu in the main menu screen; press the ENT button to confirm the selection and enter the status screen.

2. Press the ESC button under any submenu of the status menu to return to the status screen level by level.

2.2.5 Setting Screen

The setting screen is a Level 1 submenu screen under the main menu; under the setting screen, there are also several submenu screens for setting all parameters of the power system. The setting screen has password protection; users can enter this screen only after typing in the correct password. Fig. 2-5 shows the setting screen.

```
┌─────────────────────┐
│ Settings            │
│    Alarm Settings   │
│    Batt. Settings   │
│    AC Settings      │
│    DC Settings      │
│    Energy saving    │
│    Sys Settings     │
│    Comm Settings    │
└─────────────────────┘
```
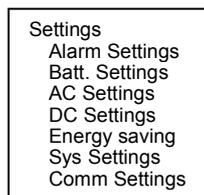
Fig. 2-5   Setting screen

1. Press the UP or DN button to select the "Setting" submenu in the main menu screen; after the ENT button is pressed for confirmation, the password confirmation screen shows up.

2. Enter the correct password in the password confirmation screen; press the ENT button to enter the setting screen.

In the setting screen, different levels of password have different permissions; the default value and operation permissions of each level of password are given in Table 2-6.

Table 2-6　Operation permissions of passwords

Level	Operation permissions	Default password
User	General parameter setting	1
Engineer	System reset, password reset and system type modification apart from all permissions of user password	2
Administrator	Modification of each level of password and browsing of system parameters that can only be set by the background apart from all permissions of engineer password	654321

After entering the setting interface using the correct password, users no longer need to enter the password again when operating the buttons continuously. However, if the time interval between adjacent operations is longer than 2min, users will be required to enter the password again. If the high level password is the same as the low level password, when the password is entered, the monitoring module will display the high level setting menu.

2.2.6 Output Control Screen

The output control screen is a Level 1 submenu screen under the main menu. It is mainly used for the operator to conduct real-time control of the system. The output control screen has password protection; users can enter this screen only after typing in the correct password. In the output control screen, user password (default: 1), engineer password (default: 2) and administrator password (default: 654321) have exactly the same control operation permissions. Fig. 2-6 shows the output control screen.

```
Sys Mode: Manual      Rect Control
Up/Down to Ctrl       Start: FC
                      Batt: Reconnect
                      Load: Reconnect
                      RectTrim: 53.5V
                      RectLimit:110%
                      Rect DC: 1-On
```

Fig. 2-6　Output control screen

1. Press the UP or DN button to select the "Output Control" submenu in the main menu screen; press the ENT button for confirmation, and then enter the password confirmation screen; enter the correct password, and press the ENT button. If the "Sys Mode" at this point is set to "Manual", you can press the DN button to enter the output control screen; if the "Sys Mode" at this point is set to "Auto", you cannot enter the manual output control screen. In other words, manual output setting is allowed only in "Manual" control mode.

2.4 Information Inquiry

2.3.1 View of Active Alarm

When a new alarm is generated in the system, a active alarm screen will pop up automatically on the LCD screen if the monitoring module has no button operation within 1min. Users can view the details of all active alarms in the system according to the following steps.

Press the UP or DN button to select the "Active Alarm" submenu in the information inquiry screen; press the ENT button for confirmation, and then enter the active alarm information screen.

1. If there is no active alarm, users cannot enter the alarm prompt screen. If there is a previous alarm, the alarm will disappear after users enter the active alarm information screen, and the screen will display "Currently no alarm in the system".

2. If there is a active alarm in the system, the screen will display the information shown in Fig. 2-7.

```
Alarm      1/3
DC Volt Low
Major Alarm
131210 09:20:15
```
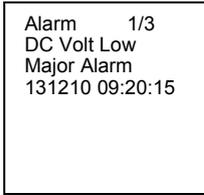
Fig. 2-7   Active alarm information screen

The above figure suggests that three active alarms are present in the system; users can press the UP or DN button to view all active alarm information.

The above figure contains alarm sequence number, alarm level, alarm name and occurrence time. The alarms are displayed in chronological order of occurrence time; the latest alarm is shown as the first one.

2.3.2 View of History Alarm

1．Press the UP or DN button to select the "History Alarm" submenu in the information inquiry screen; press the ENT button to enter the history alarm information screen.

1）If there is no history alarm in the system, users cannot go to the next menu.

2）If there is a current alarm in the system, the screen will display the information shown in Fig. 2-8.

```
1/20
DC Volt Low
131210 09:20:15
131210 10:13:34
```
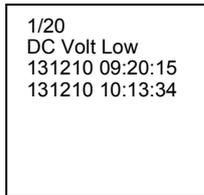
Fig. 2-8   History alarm information screen

At most 1000pcs of history alarm logs can be saved cyclically in the monitoring module; the earliest alarm logs will be deleted if there are more than 1000pcs.

2. Press the UP or DN button to view the rest history alarms.

3. Repeatedly press the ESC button under any history alarm information screen to return to the main menu until the initial system information screen.

2.3.3 Inquiry of AC Information

Press the DN button to select the "AC Information" submenu in the information inquiry screen; after pressing the ENT button, users can enter the AC information screen. The screen displays Phase A, B and C AC voltages of the system, as shown in Fig. 2-9.

```
Ac1 Volt
Phase A :   220V
Phase B :   220V
Phase C :   220V
```
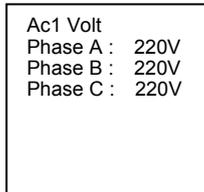
Fig. 2-9   AC information screen

2.3.4 Inquiry of DC Information

Press the DN button to select the "DC Information" submenu in the information inquiry screen; after pressing the ENT button, users can enter the DC information screen. The screen displays the information shown in Fig. 2-10.

```
Sys Volt:    53.5V
Sys Load:   100A
BattCurr:     2A
BattCap:    100%
BattTemp:   25℃
AmbTemp:   25℃
```

Fig. 2-10   DC information screen

2.3.5 Inquiry of Rectifier Module Information

  Notice

If the monitoring module has not detected any rectifier module, you cannot view rectifier module information.

Press the UP or DN button to select the "Module Information" submenu in the information inquiry screen; after confirmation, enter the rectifier module information screen, as shown in Fig. 2-11.

```
Rect: 1/20
Curr Limit: 110%
Out Volt:   53.5V
Out Curr:    10A
On/Off State: Off
```

Fig. 2-11   Rectifier module information screen

"1/20" in the above figure represents that the currently displayed information is the module information of slot 1; you can press the ENT button to view the information of the next in-position module; the monitoring module can display the information of at most 20 rectifier modules. The information of modules not in position is not displayed.

2.5 Output Control

  Notice

Load off accident may be caused during battery disconnect operation. Please operate with caution!

1. Press the UP or DN button to select "Output Control" in the main menu screen; after the ENT button is pressed, a password confirmation screen will pop up.

2. Enter the correct password in the password confirmation screen; press the ENT button to enter the output control screen; if the current management mode is "Auto", it is needed to first switch to the manual mode to realize manual output control.

```
SysMode: Manual   | Rect Control
Up/Down to Ctrl   | Start: FC
                  | Batt: Reconnect
                  | Load: Reconnect
                  | RectTrim: 53.5V
                  | RectLimit:110%
                  | Rect DC: 1-On
```

Fig. 2-12   Output control screen

3. Press the UP or DN button to select the desired control; then, press the ENT button for confirmation; a corresponding prompt pops up on the display screen. Press the ENT button to confirm the selection and enforce the control activity; press the ESC button to abort the operation. If the control condition cannot be satisfied, the monitoring module will prompt control failure. The content of each control item is introduced as follows:

1) Start: Including equalizing charge, floating charge and test. When this item is selected, the foresaid

three options will be displayed cyclically if the UP or DN button is pressed. In case of AC power failure alarm or busbar undervoltage, the system will not execute the commands of equalizing charge and battery test. Battery test is not allowed in case of module communication interruption. After completion of battery test, the management mode will automatically return to "Auto".

2) Battery: Including battery connect and disconnect. In case of battery branch circuit alarm, the system will not execute connect or disconnect operation.

3) Load: Including load connect and disconnect.

4) Module voltage regulating: The control range is 42V～58V. If the control voltage exceeds the module overvoltage alarm threshold, the system will not execute the command of module voltage regulating.

5) Module current limiting: The control range is 10％～110％.

The control commands of module voltage regulating and module current limiting can be executed only when the system is in floating charge state.

5. Press the ESC button to return to the main menu screen level by level; then, change the management mode from "Manual" to "Auto". After change, press the ESC button again to return to the system information screen level by level.

2.6 Parameter Setting

The power system parameters are classified into seven types, including alarm parameters, battery parameters, AC parameters, DC parameters, energy-saving parameters, system parameters and communication parameters. In actual applications, users need to set battery number and battery capacity according to actual battery condition in system configuration; for other parameters, the factory defaults are recommended. The method for setting each type of parameters is introduced as follows:

2.8.1. Alarm Settings

Press the UP or DN button to select "Alarm settings" in the parameter setting screen; after pressing the ENT button, users can enter the alarm parameter setting screen, as shown in Fig. 2-13.

```
Alarm Settings
   Alarm Level
   Alarm Control
   DI Settings
   DO Settings
```
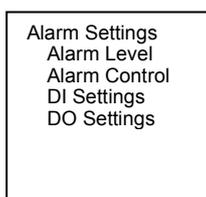
Fig. 2-13   Alarm parameter setting screen

There are three submenus under the alarm parameter menu; the content of each submenu is introduced as follows:

Alarm Level

Press the UP or DN button to select "Alarm Level" in the alarm parameter setting screen; after pressing the ENT button, users can enter the alarm level setting screen, as shown in Fig. 2-14.

```
Alarm Type：
DC Volt Low
Level: MA
Out Relay:     No
```
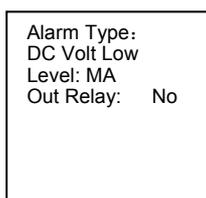
Fig. 2-14   Alarm level setting screen

Press the UP or DN button to move the cursor onto the option requiring modification; press the ENT button to enter the modification mode; press the UP or DN button to select the corresponding content; then, press the ENT button for confirmation.

There are three levels of alarms in the monitoring module: MA alarm, OB alarm and NO alarm.

MA alarm: In case of a major alarm, the operating performance of the power system will be affected significantly; no matter when such alarm takes place, users are required to immediately take proper measures to handle the problem. The red alarm indicator of the power system turns on, and a sound alarm is generated at the same time.

OB alarm: In case of a observation alarm, the power system can temporarily maintain normal DC output; if such alarm occurs during attended time, proper measures should be taken immediately to handle the problem; if not, the problem should be handled once attended time begins. The yellow alarm indicator of the power system turns on.

NO alarm: In case of NO alarm, there will be no sound or light indication.

Table 2-7 gives the alarms in the monitoring module and their default settings.

Table 2-7   Names and default settings of alarms in the monitoring module

Serial No.	Alarm	Description	Default alarm level	Default related relay
1	Observation Alarm	All observation Alarm.	Observation	None
2	Major Alarm	All major Alarm.	Major	None
3	SPD Alarm	An alarm will be sent when SPD failure.	Major	1
4	Digital2 Alarm	User programmable.	Observation	None
5	Digital3 Alarm	User programmable.	Observation	None
6	Digital4 Alarm	User programmable.	Observation	None
7	Digital5 Alarm	User programmable.	Observation	None
8	Digital6 Alarm	User programmable.	Observation	None
9	Digital7 Alarm	User programmable.	Observation	None
10	Digital8 Alarm	User programmable.	Observation	None
11	Load Fuse Alarm	Load failure caused by overload, short circuit, manual disconnect, and alarm circuit failure.	Major	None
12	Batt Fuse Alarm	Batt Failure caused by overload, short circuit, manual disconnect, and alarm circuit failure.	Major	6
13	Manual Mode	Battery management is in manual control mode.	Observation	None
9	Boost Charge	The battery is in boost charge state.	None	None
10	Batt Test	The battery is in test state.	Observation	None
11	Batt Discharge	Battery being discharging.	Observation	None
12	Batt1 Imbalance	Battery String 1 mid-voltage Imbalance.	Observation	None
13	Batt2 Imbalance	Battery String 2 mid-voltage Imbalance.	Observation	None
14	Batt3 Imbalance	Battery String 3 mid-voltage Imbalance.	Observation	None
15	Batt4 Imbalance	Battery String 4 mid-voltage Imbalance.	Observation	None
16	Curr Imbalance	Current Imbalance of rectifier modules.	Major	None
17	DC Volt Fail	Actual output voltage is different from both the measured DC bus voltage and different from the voltage reported by the rectifier to monitoring module. The error exceeds the threshold.	Observation	None
18	Short Test Fail	Short Test Fault, In short test, difference in discharging current of two batteries is bigger than setting value.	Observation	None
19	Batt Test Fail	Battery discharging time shorter than expected.	Observation	None
20	LVD1	Load disconnect or manual control of load disconnect.	Major	None

Serial No.	Alarm	Description	Default alarm level	Default related relay
21	LVD2	Battery disconnect or manual control of battery protection.	Major	2
22	AC PH Fail	AC input power failure of the system.	Major	3
23	System Maintain	Time to maintain system.	None	None
24	Rect Comm Fail	The communication between rectifier module and monitoring module is interrupted.	Major	4
25	Rect AC Fail	AC input overvoltage, undervoltage or power failure of rectifier module.	Major	4
26	Rect TempHigh	The internal temperature of the rectifier exceeds the threshold.	Major	4
27	Rect Fail	Fault of rectifier module.	Major	4
28	Rect HVSD	Overvoltage protection for rectifier module.	Major	4
29	Rect FanFail	Fan fault of rectifier module.	Major	4
30	DC Volt Low-	The DC output voltage is lower than the DC under voltage alarm threshold.	Major	5
31	DC Volt Low	The DC output voltage is lower than the DC Low voltage alarm threshold.	Major	None
32	DC Volt High	The DC output voltage is higher than the DC high voltage alarm threshold.	Major	None
33	DC Volt High+	The DC output voltage is higher than the DC over voltage alarm threshold.	Major	5
34	Batt Over Chg	Charging current of battery higher than the setting of "Over" (Charging over current limit).	None	None
35	Bat Temp Low	The battery temperature is lower than the low temperature alarm threshold.	Observation	None
36	Bat Temp High	The battery temperature is higher than the high temperature alarm threshold.	Observation	None
37	Bat Temp High+	The battery temperature is higher than the over temperature alarm threshold.	Observation	None
38	Ambient Low	The ambient temperature is lower than the low temperature alarm threshold	Observation	None
39	Ambient High	The ambient temperature is higher than the high temperature alarm threshold.	Observation	None
40	Ambient High+	The ambient temperature is higher than the over temperature alarm threshold.	Observation	None
41	AC PH Fail	System phase failure	Observation	None
42	AC Low	The AC input voltage is lower than the AC undervoltage alarm threshold.	Observation	None
43	AC High	The AC input voltage is higher than the AC overvoltage alarm threshold .	Observation	None
44	Save Power	The power system is in energy-saving state.	Observation	None
45	SavePowerFault	The power system is subjected to energy-saving failure.	Major	None

Alarm Control

Press the UP or DN button to select "Alarm Control" in the alarm parameter setting screen; after pressing the ENT button, users can enter the alarm control screen, as shown in Fig. 2-15.

```
Alarm Control
Voice Sign: 3min
Clear: History
```
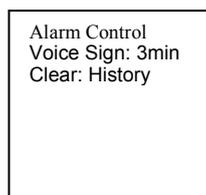
Fig. 2-15   Alarm control screen

The "Alarm Sound Duration" option can be used to set the beeping duration of the buzzer; 3min, 10min, 1h, 4h, Normally open and Normally closed are available for selection.

The "Clear" option can be used to clear history data of the monitoring module; for example, if "History

Alarm" is selected, all history alarm information saved in the monitoring module will be cleared.

DI Settings

The alarm mode setting works only for user-defined digital alarms. Press the UP or DN button to select "DI Settings" in the alarm parameter setting screen; after pressing the ENT button, users can enter the alarm mode setting screen, as shown in Fig. 2-16.

```
DI Settings
DI No:        5
Digital5 Alarm
DI Normal:   Open
```
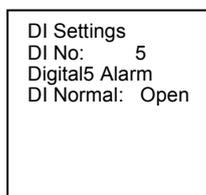
Fig. 2-16　DI settings screen

Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to modify the parameter value, and press the ENT button again for confirmation. Users are allowed to define the digital names; a user-defined name should comprise at most 16 digits or English characters.

Table 2-8　Factory defaults in DI settings screen

DI No.	DI name	DI Normal	Description
1	SPD Alarm	Close	The default setting is SPD Alarm.
2	Digital2 Alarm	Open	User programmable.
3	Digital3 Alarm	Open	User programmable.
4	Digital4 Alarm	Open	User programmable.
5	Digital5 Alarm	Open	User programmable.
6	Digital6 Alarm	Open	User programmable.
7	Digital7 Alarm	Open	User programmable.
8	Digital8 Alarm	Open	User programmable.

DO Settings

Press the UP or DN button to select "DO Settings" in the alarm parameter setting screen; after pressing the ENT button, users can enter the alarm mode setting screen, as shown in Fig. 2-17.

```
DO Settings
DO No:        1
DO Normal: Open
```
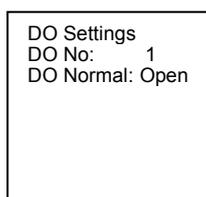
Fig. 2-17　DO settings screen

Table 2-9　Factory defaults in DO settings screen

DO No.	DO Normal	Description
1	Open	The alarm dry contact is normally opened output.
2	Open	The alarm dry contact is normally opened output.
3	Open	The alarm dry contact is normally opened output.
4	Open	The alarm dry contact is normally opened output.
5	Open	The alarm dry contact is normally opened output.
6	Open	The alarm dry contact is normally opened output.
7	Open	The alarm dry contact is normally opened output.
8	Open	The alarm dry contact is normally opened output.

2.8.2. Setting of Battery Parameters

Battery parameters are important parameters which should be set correctly; they affect the battery service life.

Press the UP or DN button to select "Battery Settings" in the parameter setting screen; after pressing the ENT button, users can enter the battery parameter setting screen, as shown in Fig. 2-18.

```
Bat. Settings
    Basic Settings
    LVD Settings
    Charge
    Battery Test
    Temp. Comp
```
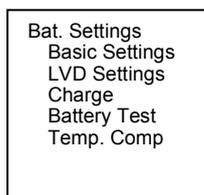
Fig. 2-18 Battery Settings screen

Battery parameters include five types of parameters: basic parameters, disconnect protection, charge management, battery test and temperature compensation coefficient. The setting methods are introduced as follows.

Setting of Basic Parameters

1. Press the UP or DN button to select "Basic Settings" in the battery parameter setting screen; after the ENT button is pressed, the basic battery parameter setting screen appears, as shown in Fig. 2-19.

```
Batt. Fuse:      2
Batt. Shunt1:   Y
Batt. Shunt2:   Y
Shunt Coeff:
-Current:     250A
-Volt:         75mV
```
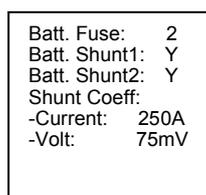
Fig. 2-19   Basic settings screen

2. Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button for confirmation; the monitoring module will save the set value automatically. Table 2-10 gives the setting ranges and factory defaults of basic battery parameters.

Table 2-10   Setting ranges and factory defaults of basic battery parameters

Parameter	Range	Factory setting	Value description
Batt String (number of battery strings)	0～4	2	You should set this parameter according to the actual battery configuration. If Batt Shunt is set as Y, there should be batteries actually configured
Batt Shunt1	Y, N	Y	Select 'Y' when a corresponding shunt is configured, otherwise, select 'N'. Battery management aims at only the batteries connected to the shunt
Batt Shunt2		Y	
Shunt Coefficient Current	1～2000	250A	This parameter can be set according to actual applications; generally, it is set to the factory default.
Shunt Coefficient Voltage	1～500	75mV	

LVD parameters

Press the UP or DN button to select "LVD Settings" in the battery parameter setting screen; after the ENT button is pressed, the LVD Setting screen appears, as shown in Fig. 2-20.

```
LVD1 Enable:   Y
LVD2 Enable:   Y
LVD1 Volt: 44.0V
LVD2 Volt: 43.2V
```
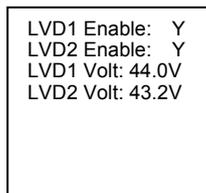
Fig. 2-20   LVD settings screen.

Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button to confirm and save the value.

LVD1 means the monitoring module opens the LVD1 contactor, so that the non-priority load will be powered off. In this way, the battery remaining capacity can sustain the priority load longer.

LVD2 means the monitoring module opens the LVD2 contactor. In this way, the battery will stop powering the load, preventing over-discharge.

The value description of the LVD parameters is listed in Table 2-11.

Table 2-11   LVD parameters description

Parameter	Range	Factory setting	Value description
LVD1 Enable	Y, N	Y	Select 'Y' to enable LVD1/ LVD2 function
LVD2 Enable		Y	Select 'N' to disable the LVD1/ LVD2 function
LVD Mode	Time, voltage	Voltage	Select Voltage, when the monitoring module detects that the battery voltage is lower than the preset LVD1 Volt, the load will be disconnected, and so is the battery when the battery voltage is lower than the preset LVD2Volt.
LVD1 Volt	35V ~ 56V	44.0V	
LVD2 Volt		43.2V	
LVD1 Time	3min ~ 1,000min	300min	Select Time, when the discharge time reaches the preset LVD1 Time, the monitoring module will disconnect the load; when the discharge time reaches the preset LVD2 Time, it will disconnect the battery
LVD2 Time		600min	

Charge management parameters

Press the UP or DN button to select "Charge Management" in the battery parameter setting screen; after the ENT button is pressed, the charge management setting screen appears; the setting screen is divided into three sections, as shown in Fig. 2-21.

```
Capacity: 100AH    -Cap:        80.0%    Boost Limit Time:
Float:       53.5V  Const Boost:             1080min
Boost:       56.4V  -Current: 0.010C
Limit:       0.100C -Time:       180min
Over:        0.300C Cyc  Boost:
Auto Boost:         - Enable:       Yes
-Enable:      Yes   - Period:     2400h
-Current: 0.060C    - Time:       720min
```

Fig. 2-21   Charge management setting screen

Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button to confirm and save the value.

The charging management parameter value description is listed in Table 2-12.

Table 2-12   Charging management parameter value description

Parameter	Range	Factory setting	Value description
Rated Ah (rated capacity)	10 Ah~5000Ah	100Ah	The capacity of the total battery strings. You should set this parameter according to the actual battery configuration

Parameter	Range	Factory setting	Value description	
Float	42V~58V	53.5V	In the FC state, all rectifiers output voltage according to the set Float	The Boost must be higher than the Float
Boost		56.4V	In the BC state, all rectifiers output voltage according to the set Boost	
Limit (current limit)	$0.1\ C_{10}$~$0.25\ C_{10}$	$0.1\ C_{10}$	When the monitoring module detects that the battery charging current is higher than the Limit, it will control the current of the rectifiers, through which it can limit the battery charging current. C10 is the battery rated capacity, generally set to 10 ~ 20% of the rated capacity of one battery string.	
Over (over current point)	$0.3\ C_{10}$~$1.0\ C_{10}$	$0.3\ C_{10}$	When the monitoring module detects that the battery charging current is higher than the Over, it will raise the battery charge over-current alarm	
Automatic Boost	Y, N	Y	Select 'Y', and BC will be conducted when conditions allow	
To Boost Current	$0.050\ C_{10}$~$0.080\ C_{10}$	$0.06\ C_{10}$	The monitoring module will control the system enter the BC state when the battery capacity decreases to the value of To Boost Capacity, or when the charge current reaches the To Boost Current. The charge voltage will be the Boost	
To Boost Capacity	10%~99%	80%		
Constant BC Current	$0.002\ C_{10}$~$0.02\ C_{10}$	$0.01\ C_{10}$	The system in the BC state will enter the FC state when the charge current decreases to the Constant BC Curr and after the Duration. The battery charge voltage then will be the Float	
Duration (of constant BC)	30min~1440min	180min		
Cyclic Boost	Y, N	Y	Select 'Y', and the monitoring module will control the system to enter the Cyclic Boost when the FC time reaches the Cyclic Boost Interval. The battery charging voltage is the preset Boost, and the time is the preset Cyclic Boost Time	
Cyclic Boost Interval	48 h~8760h	2400h		
Cyclic Boost Time	30min~2880min	720min		
Boost Limit	60min~2880min	1080min	To ensure safety, the monitoring module will forcefully control the system to enter the FC state if during the BC state, the BC time reaches the Boost Limit, or abnormalities occur (such as AC failure, battery route faulty, and rectifier communication failure)	

The BC/FC switchover diagram is shown in Fig. 2-22.
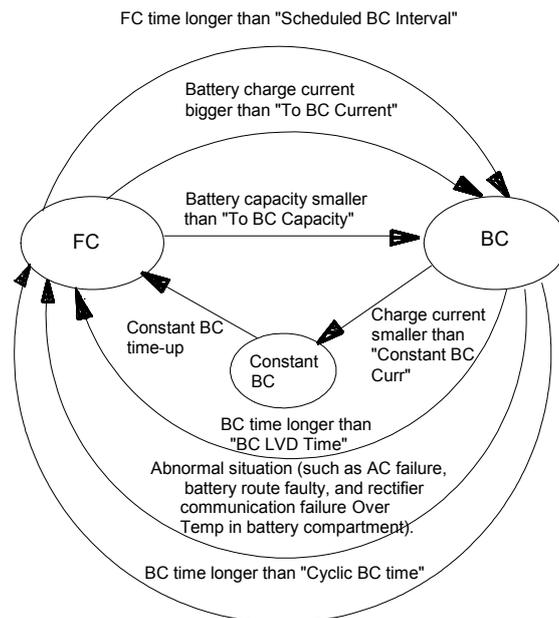
Fig. 2-22 BC/FC switchover diagram

Battery test parameters

1. Press the UP or DN button to select "Battery Test" in the battery parameter setting screen; after the ENT button is pressed, the battery test parameter screen appears; the setting screen is divided into three sections, as shown in Fig. 2-23.

```
End Test:              07-01-00 00:00      - Enable:      No
 -Volt:      45.2V     10-01-00 00:00      - Current:  9999A
 -Time:    300min     Short Test:
 -Cap:      0.700C    -Enable:       No
Cyc Test En:   N      -Alarm:        10A
Cyc Test Time：       -Period:      720h
   01-01-00 00:00     -Time:        5min
   04-01-00 00:00     Stable Test:
```

Fig. 2-23   Battery parameter setting screen

2. Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button to confirm and save the value.

The monitoring module provides the battery test function. After battery test is started, the output voltage of rectifier module is first adjusted to the set value of "Test End Voltage", and the battery begins to discharge. When the battery voltage reaches the set value of "Test End Voltage", or the discharge time reaches the parameter of "Test End Time", or the battery capacity reaches the set value of "Test End Capacity", the monitoring module ends the battery test; the output voltage of rectifier module recovers to the normal floating charge voltage; the power system charges the battery; and the system shifts to auto battery management.

In case of any system abnormality during battery test, the monitoring module will automatically end the battery test.

The value description of the parameters is listed in Table 2-13.

Table 2-13 Battery test parameters description

Parameter	Range	Factory setting	Value description
Battery Test Voltage	43.1V～57.9V	45.2V	The monitoring module will stop the test and change to FC if the battery voltage reaches the Battery Test Voltage, or the discharge time reaches Battery Test Time, or the battery capacity reaches Test End Cap.
Battery Test Time	5 min～1440min	300min	
Test End Capacity	$0.01C_{10}$～$0.95C_{10}$	$0.7C_{10}$	
Timed Test Allowed	Y, N	N	When the parameter Planned Test is set to Y, the monitoring module will test the battery according to the 4 sets of test time.
Timed Test Time 1	Month, Day, Hour	1 Month 1 Day 0 Hour	When the timed test function is enabled, the power system automatically starts battery test at the set point of "Timed Test Time".
Timed Test Time 2		4 Month 1 Day 0 Hour	
Timed Test Time 3		7 Month 1 Day 0 Hour	
Timed Test Time 4		10 Month 1 Day 0 Hour	
Short Test	Y, N	N	Whether using Short Test function
Alarm Current	1 A～100A	10A	If the battery is not discharged within the ShortTest Cycle, the monitoring module will start a short test, whose operation time is set by the parameter ShortTest Duration. By the end of the test, if the difference in the discharge currents of batteries is bigger than the Alarm Current, the battery
ShortTest Cycle	24 h～8760h	720h	
ShortTest Duration	1min～60min	5min	

Parameter	Range	Factory setting	Value description
			discharge imbalance alarm will be raised. This alarm will automatically end after 5min of delay. Also you can end it by confirming it
StableTest Enable	Y, N	N	The stable test is conducted with constant battery current, whose value is set through the parameter StableTest Current. If the parameter StableTest Enable is set to Y, and the test will be started once the battery satisfies the test condition
StableTest Current	0 A～9999A	9999A	

Fig. 2-24 shows the operating principles of the test function
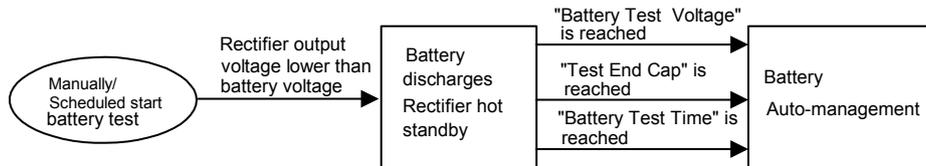
Fig. 2-24　Operating principles of the test function

Setting of Temperature Compensation Parameters

1. Press the UP or DN button to select "Temperature Compensation Coefficient" in the battery parameter setting screen; after the ENT button is pressed, the temperature compensation coefficient setting screen appears, as shown in Fig. 2-25.

```
CenterTemp:25 ℃
Coeff:     72mV/℃
Batt T H2:    50℃
Batt T H1:    50℃
Batt T L1:     0℃
```

Fig. 2-25　Temperature compensation coefficient setting screen

2. Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button to confirm and save the value.

The value description of the parameters is listed in Table 2-14.

Table 2-14　Temperature compensation coefficient parameters description

Parameter	Range	Factory setting	Value description	
Center Temp	10℃～40℃	25℃	$FC = (BattTemp – Center Temp) * Temp Comp$	
Temp. Comp Coeff	0～500mV/℃	72mV/℃	Upon alarms such as Rect Com Failure, DC Under-volt and DC Voltage High, the monitoring module will not do temperature compensation to the battery FC voltage.	
Battery Temp,	Y, N	Y	The Battery Temp and Ambient Temp refer to the measurement of the battery or ambient temperature sensor at the local power system. None means there is no measurement input.	
Ambient Temp		Y		
Over	10℃～100℃	50℃	When the detected battery temperature is higher than the Over, the monitoring module will raise an alarm	The High must not be higher than the Over
High	10℃～100℃	50℃	When the detected battery temperature is higher than the High, the monitoring module will raise an alarm	

Parameter	Range	Factory setting	Value description
Low	-40℃～10℃	0℃	The monitoring module will raise an alarm when the detected battery temperature is lower than the Low

2.8.3. Setting of AC Parameters

Press the UP or DN button to select "AC Parameters" in the parameter setting screen; after pressing the ENT button, users can enter the AC parameter setting screen, as shown in Fig. 2-26.

```
Over Volt:    280V
Low Volt:     180V
Under Volt:   80V
AC In:        No
AC PH:        3-PH
```

Fig. 2-26   AC parameter setting screen

Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button to confirm and save the value.

Table 2-15 gives the setting instructions for AC parameters.

Table 2-15   Setting instructions for AC parameters

Parameter	Range	Factory setting	Value description
OverVolt	50V～300V	280V	When the AC input line voltage of the system is greater than this set value, the monitoring module sends an AC OverVolt alarm.
LowVolt	50V～300V	180V	When the AC input line voltage of the system is less than this set value, the monitoring module sends an AC LowVolt alarm. It should be less than the set value of "AC OverVolt Alarm".
UnderVolt	50V～300V	80V	When the AC line voltage of the system is less than this set value, the monitoring module generates an AC UnderVolt alarm.
AC In	No, Manual, Auto	No	When there are two ways of AC input, the AC input switch mode should be selected.
AC PH	1-PH, 3-PH	3-PH	It should be set according to the actual configuration of the power system; "Single-phase" or "Three-phase" are optional.

2.8.4. Setting of DC Parameters

Press the UP or DN button to select "DC Parameters" in the parameter setting screen; after pressing the ENT button, users can enter the DC parameter setting screen, as shown in Fig. 2-27.

```
OverVolt2：57.6V      -Volt：    60mV
OverVolt1：57.6V
LowVolt1：  45.0V
LowVolt2：  45.0V
Amb High：   40℃
Amb Low：    -5℃
L-Shunt En：   N
-Current：   700A
```

Fig. 2-27   DC parameter setting screen

Press the UP or DN button to select the parameter to be set, and press the ENT button to confirm the selection; then, press the UP or DN button again to select the parameter value, and press the ENT button to confirm and save the value.

Table 2-16 gives the setting instructions for DC parameters.

Table 2-16　Setting instructions for DC parameters

Parameter	Range	Factory setting	Value description
OverVolt2	40V～60V	57.6V	When the system DC voltage is greater than the set value, the system sends a DC over voltage alarm.
OverVolt1		57.6V	When the system DC voltage is greater than the set value, the system sends a DC high voltage alarm; it should be less than the DC over voltage alarm threshold.
LowVolt1		45.0V	When the system DC voltage is less than the set value, the system sends a DC low voltage alarm; it should be less than the DC high voltage alarm threshold.
LowVolt2		45.0V	When the system DC voltage is less than the set value, the system sends a DC under voltage alarm; it should be less than the DC low voltage alarm threshold.
Amb High	10℃～100℃	40℃	When the ambient temperature is greater than the set value, the system sends a high ambient temperature alarm.
Amb Low	−40℃～10℃	-5℃	When the ambient temperature is less than the set value, the system sends a low ambient temperature alarm; it should be less than the high ambient temperature alarm threshold.
L-Shunt En	Y, N	N	It should be set according to the actual condition of the system.
L-Shunt Coefficient（Current）	1～2000 A	500A	This parameter is void in this system.
L-Shunt Coefficient（Volt）	1～500 mV	75mV	

2.8.5. Setting of Energy Saving Parameters

Press the UP or DN button to move the arrow onto "Energy Saving" in the parameter setting screen; after pressing the ENT button, users can enter the password setting interface. After entering the correct password, users can enter the energy-saving parameter setting screen, as shown in Fig. 2-28.

```
Save Enable：  N
Cyc Period：168h
Rect Work： 80%
Save Stop：72%
Rect Limit：1
```
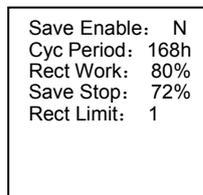
Fig. 2-28　Energy Saving parameter setting screen

Energy Saving parameters are advanced parameters which can be set only after entering the advanced password. If the system is expected to run in the energy-saving mode, the parameter of "Energy Saving Allowed" should be set to "Yes"; if not, the parameter should be set to "No". The parameter of "Switching Period" can be set according to the actual situation. The principles of system energy-saving operation are introduced in detail as follows:

1. Operating principles

In the energy-saving mode, the monitoring module controls some rectifier modules to turn off and makes the rectifier modules powered on bear all loads. Each rectifier module powered on works at the optimal efficiency point whenever possible, to improve the utilization rate of the rectifier module and reduce energy consumption. For rectifier modules having entered the off state, the monitoring module will power them on after a certain period of time (i.e., the set value of "Switching Period" shown in Fig. 2-28); after these rectifier modules run for some time, the monitoring module will control the rectifier modules having worked for a long period to turn off again. The two states switch in cycles, ensuring that the rectifier modules in the system start working closely. In case of change in battery current or load current in the

system, the monitoring module will control some working rectifier modules to turn off according to the actual situation, or control some rectifier modules in off state to turn on and start working. Under any circumstances, the system will ensure that at least one rectifier module works after turned on.

2. Preconditions

The system can run in the energy-saving mode only when the system is equipped with battery and the load current has no instant oscillation (i.e., the parameter of "System Energy-saving Allowed" is set to "Yes".)

3. Advantages

The energy-saving mode enables rectifier modules to work at the optimal efficiency point, therefore can save power for the system.

It can balance the working time of rectifier modules in the system and prolong the service life of rectifier modules.

Rectifier modules in off state can avoid damage caused by AC impact and reduce failures caused by lightning stroke, etc..

4. Handling of abnormalities

In case of busbar voltage fault (DC undervoltage), all rectifier modules will turn on.

In case of rectifier module alarms (e.g., communication interruption), all rectifier modules will turn on.

In case of no monitoring module in the system or communication interruption between rectifier modules and monitoring module, all rectifier modules will turn on automatically.

Table 2-17 gives the setting instructions for energy-saving parameters

Table 2-17 Setting instructions for energy-saving parameters

Type	Parameter	Range	Factory setting	Value description
Energy Saving	Save Enable	Yes, No	No	It can be set to "Yes" only when the system is equipped with battery and the load current has no instant oscillation.
	Cyc Period	1～8760h	168h	The time during which the rectifier modules are in on and off states. It should be set according to actual requirements.
	Rect Work	30%～90%	80%	The working point with optimal efficiency at which the rectifier modules work normally
	Rect Limit	1～12pcs	1	The minimum number of rectifier module working after turned on.

2.8.6. Setting of System Parameters

Press the UP or DN button to select "System Parameters" in the parameter setting screen; after pressing the ENT button, users can enter the system parameter setting screen, as shown in Fig. 2-29.

```
Lang:    English       Reset Para:    N
Tzon:GMT+08:00         Op1 PWD：******
Date: 2014-03-25       Op2 PWD：******
Time:   16:15:30       Adm PWD：******
System Type:
       48V/500
ComDownload: N
Reset PWD:    N
```

Fig. 2-29   System parameter setting screen

Press the UP or DN button to move the arrow onto "System Parameters" in the parameter setting screen; after pressing the ENT button, users can enter the password setting interface. After entering the correct password, users can enter the system parameter setting screen. Different levels of password allow setting of different system parameters, introduced as follows:

1.Enter the user password

After the user password (factory default: 1) is entered, parameters like "Language", "Time Zone", "Date", "Time" and "User Password" can be set.

2. Enter the engineer password

After the engineer password (factory default: 2) is entered, parameters including "System Reset", "Password Reset" and "System Type" can be set apart from system parameters that can be set with the user password.

If "System Reset" is set to "Yes", after the ENT button is pressed, the monitoring module will display the prompt information shown in Fig. 2-30.

```
Confirm
ENT Continue
ESC Quit
```
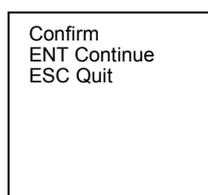
Fig. 2-30　System reset prompt information screen

Press the ESC button to abort the reset operation. Press the ENT button to execute the reset operation; at this moment, all parameters will return to the defaults of the monitoring module. It is suggested that system reset operation should be executed only when the monitoring module cannot be set normally and its normal operation cannot be realized through power supply disconnection, restoration or other methods.

3. Enter the administrator password

After the administrator password (factory default: 654321) is entered, all parameters can be set.

Table 2-18　Setting of system parameters

Type		Parameter	Range	Factory setting	Value description
Basic parameters	User	Language	Chinese, English	English	Set according to your need
		Flip	H, V	H	The direction of LCD display. H: Horizontal　V: Vertical
		Set Date	2,000 ~ 2,099	2014-03-25	Set the time according to the current actual time, regardless of whether it is a leap year or not
		Set Time	Hour, min, sec	00:00:00	
	Engineer	Init PWD (Initialize password)	Y, N	N	Selecting Y can reset the user level and Engineer level passwords to the defaults
		Init Param (Initialize parameters)	Y, N	N	Selecting Y can reset all the parameter to the defaults
		System Type		48V/500	The system type can not be changed
	Administrator	Change Password	-	User: 1 Engineer: 2 Administrator: 654321	At most 6 characters

2.8.7. Setting of Communication Parameters

Press the UP or DN button to select "Communication Parameters" in the parameter setting screen; after pressing the ENT button, users can enter the communication parameter setting screen, as shown in Fig. 2-31.

```
Address: 1
BaudRate: 9600
IP/Subnet/Gate:
192 . 168 . 70 . 2
255 . 255 . 255 . 0
192 . 168 . 70 . 1
```

Fig. 2-31   Communication parameter setting screen

Table 2-19   Setting of communication parameters

Parameter	Range	Factory setting	Value description
Address	1～254	1	The addresses of power systems that are at the same monitored office should be different
BaudRate	1200/2400/4800 /9600/19200bps	9600bps	Make sure the baud rates of both the sending and receiving parties are the same
IP	-	192.168.70.2	
Subnet	-	255.255.255.0	Set according to your need
Gateway	-	192.168.70.1	

2.7 Background Monitoring

This power system applies to unattended operations; short-range background monitoring can be realized via RS232/RS485, and long-range background monitoring can be realized via Ethernet. Through background monitoring, all important parameters of the power system can be detected and remotely controlled.

In the background monitoring system, the background computer realizes information exchange with the monitoring module of the power system through the communication device. The connection is shown in Fig. 2-32.
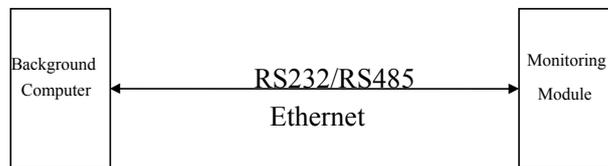
Fig. 2-32   Schematic diagram of background monitoring

Operating principle: The background computer sends commands to the monitoring module of the power system according to the communication protocol; the monitoring module responds the background computer with the required data according to the commands received.

2.7.1 Handling the Monitoring module through the Web interface

The monitoring module is equipped with a web server with a default IP address 192.168.70.2.

The monitoring module web server can be connected to a PC:

■ directly by using a crossed type network cable

■ through a LAN

The monitoring module is accessed through the Ethernet port at the front of the connecting unit.

2.7.2 Connecting via LAN or WAN

Note: For safety reasons, it is not recommended to connect to the monitoring module web server through the Internet (although it is possible).

1. Connect a standard network cable between the Ethernet port placed at the front of the connecting

board and a LAN outlet.

2. Check that your computer is equipped with a network card and is connected to your LAN and/or WAN (via a standard network cable).

3. Check that your services, protocols and adapters are correctly installed and configured. If you are not sure how your computer is to be installed and configured, contact your network administrator for advice. The network connection to be used is an ordinary TCP/IP (Internet) connection.

4. Connect to the monitoring module web server by entering the Web server's IP address or domain name. Use the settings that were made in the installation.

5. It is possible to change the web server's IP address in display menu Parameter settings/Comm Settings / IP/Subnet/Gate.

2.7.3 Login page.

In "Internet Explorer", enter the IP address programmed into the Controller and press *ENTER*. The following WEB Interface window opens.

Enter a valid User Name and Password, then click OK. By default, there are two "User Name" and "Password" combinations, one is "admin" and "654321", the other is "operator" and "1".

The username of "admin" has the highest authority and the username "operator" has no authority for uploading and downloading configuration files.

2.7.4 WEB GUI

This WEB GUI provides a full function to customer. Via a PC connected internet, you can control the power system, view the working status, change the parameters, download the Alarm history record.

2.7.5 SNMP communication

SNMP is a technology used for network management. The technology is based on implementing an information base called MIB (Managed Information Base). This MIB contains parameters that are interesting from a management perspective. All LAN connected equipment that support SNMP shall also support a default MIB called MIB-II.

The SNMP Agent responds to requests received via the SNMP protocol and also actively sends traps to a specified manager when certain MIB values change state. This is used to actively inform a manager when an alarm situation is recognised.

SNMP communication can be established via LAN.