

**SMU01C**  
**V300R002C03**  
**User Manual**

**Issue**      **03**  
**Date**        **2015-01-05**

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# About This Document

## Purpose

This document describes the SMU01C in terms of its modules, panels, ports, liquid crystal display (LCD), operations, installation, and troubleshooting.





## Intended Audience


This document is intended for:

- Sales engineers
- Technical support personnel
- Maintenance personnel

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 <b>DANGER</b>	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
 <b>NOTICE</b>	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

Symbol	Description
 <b>NOTE</b>	<p>Calls attention to important information, best practices and tips.</p> <p>NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.</p>

## Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

### Issue 03 (2015-01-05)

Updated Table 6-3 LVD parameter description to add parameters related to load power-off.

Updated Table A-1 LCD menu to add the LLVD function.

The matching software version is V300R002C03SP10.

### Issue 02 (2014-03-05)

Updated Table 9-1 Alarm list to optimize alarm names.

Updated Table A-1 LCD menu to add the OLE Charger function.

The matching software version is V300R002C03SP08.

### Issue 01 (2013-04-15)

The matching software version is V300R002C03SP03.

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# Contents

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<b>About This Document</b> .....	<b>ii</b>
<b>1 Overview</b> .....	<b>1</b>
1.1 Appearance .....	1
1.2 Network Diagrams .....	1
1.3 Features .....	2
1.4 Functions .....	2
<b>2 Panel and Ports</b> .....	<b>4</b>
<b>3 Installation</b> .....	<b>7</b>
3.1 Installing an SMU01C.....	7
3.2 Installing Dry Contacts and Boolean Values Signal Cables .....	8
<b>4 LCD Operations</b> .....	<b>9</b>
<b>5 Power System Configuration</b> .....	<b>12</b>
5.1 Basic Lead-Acid Battery Parameters .....	12
5.2 Communications Parameters .....	13
<b>6 VRLA Battery Management</b> .....	<b>15</b>
6.1 Battery Charging .....	15
6.1.1 Float Charging.....	15
6.1.2 Boost Charging .....	16
6.2 Low Voltage Disconnection Protection .....	17
<b>7 Rectifier Management</b> .....	<b>21</b>
7.1 Querying Operating Information .....	21
7.2 Setting Intelligent Hibernation Parameters .....	22
<b>8 Maintenance</b> .....	<b>25</b>
8.1 Viewing Version Information .....	25
8.2 Setting Time and Date .....	25
8.3 Setting the System Type .....	26
<b>9 Alarm Management</b> .....	<b>28</b>
9.1 Alarm Setting .....	28
9.1.2 Setting Alarm Severity .....	29

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9.1.3 Associating Alarms to Dry Contact Input Ports .....	30
9.1.4 Associating Alarms to Dry Contact Output Ports.....	32
9.2 Viewing Active Alarms .....	33
9.3 Viewing Historical Alarms .....	34
9.4 Deleting Historical Alarms.....	35
9.5 Handling Alarms .....	35
9.5.1 Mains Fault .....	35
9.5.2 AC Over Volt.....	35
9.5.3 AC Under Volt.....	36
9.5.4 DC Over Volt .....	36
9.5.5 DC Under Volt .....	36
9.5.6 Batt Over Temp .....	37
9.5.7 Batt Under Temp.....	37
9.5.8 Amb.Over Temp.....	37
9.5.9 Amb.Under Temp.....	37
9.5.10 Batt Operation.....	38
9.5.11 Batt Over Curr.....	38
9.5.12 Load Fuse Trip .....	38
9.5.13 Batt. loop Trip .....	38
9.5.14 Rect Fault .....	39
9.5.15 Singl-Rect Fault .....	39
9.5.16 Multi-Rect Fault.....	39
9.5.17 Rect Comm Fault .....	39
9.5.18 Rect Protect.....	40
9.5.19 Batt Off .....	40
9.5.20 Load Off.....	40
<b>10 Troubleshooting.....</b>	<b>41</b>
<b>A LCD menu .....</b>	<b>42</b>
<b>B Technical Specifications .....</b>	<b>46</b>
<b>C Acronyms and Abbreviations.....</b>	<b>48</b>

# 1 Overview

## 1.1 Appearance

The SMU01C is a site power monitoring module that monitors Huawei box-type power modules. Figure 1-1 shows an SMU01C.

**Figure 1-1** SMU01C

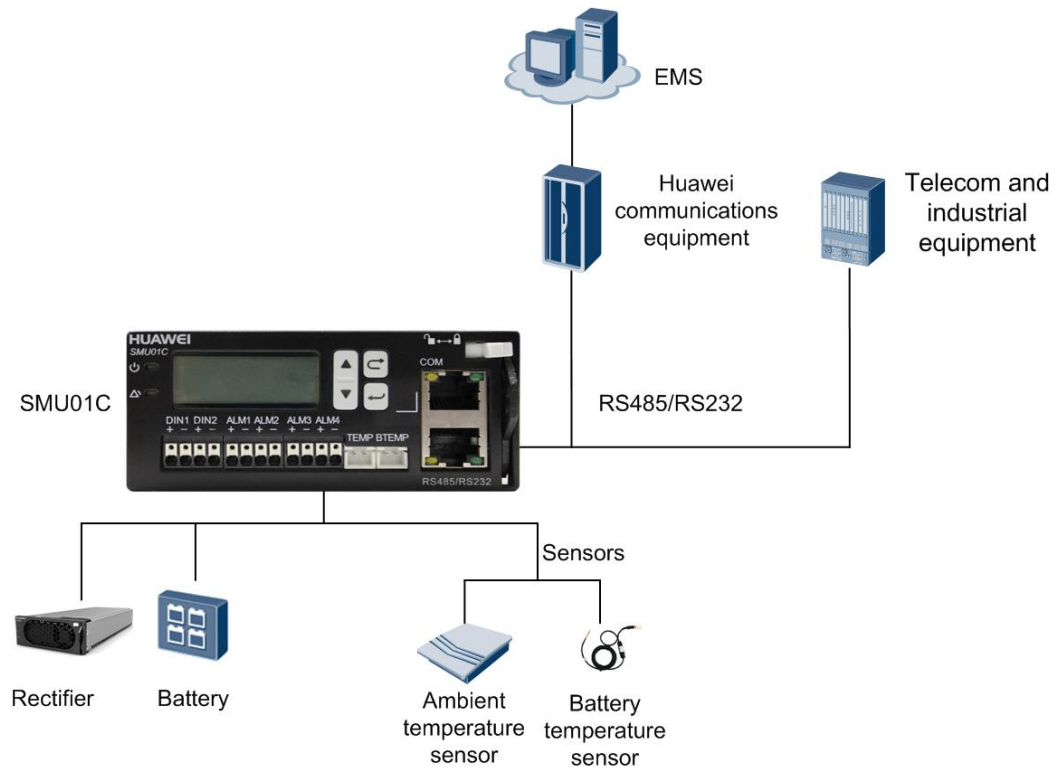


## 1.2 Network Diagrams

The SMU01C manages batteries and rectifiers, and monitors the operating environment for the power system according to the ambient temperature and battery temperature displayed on the liquid crystal display (LCD).

Figure 1-2 shows the SMU01C network diagrams (for reference only).

**Figure 1-2** SMU01C network diagrams



## 1.3 Features

- Performs comprehensive power management and battery management.
- Provides four dry contact outputs.
- Provides two dry contact inputs.
- Provides ports for battery temperature sensors and ambient temperature sensors.
- Supports Chinese and English as displayed languages.
- Is hot-swappable.

## 1.4 Functions

Table 1-1 shows the main functions of the SMU01C.

**Table 1-1** SMU01C functions

Category	Function
Battery management	Battery boost charging and float charging management
	Battery test management
	Battery current limiting management



Category	Function
	Battery temperature compensation management
	Battery high temperature protection
	Low voltage disconnection (LVD) protection
	Battery imbalance detection
	Battery capacity detection
Rectifier management	Rectifier operating information
	Rectifier power-on/off control
	Rectifier output voltage and current limiting
Energy saving	Intelligent rectifier hibernation
Detection	AC voltage
	DC voltage
	Load current
	Battery current and temperature
	Ambient temperature

# 2 Panel and Ports

## Panel

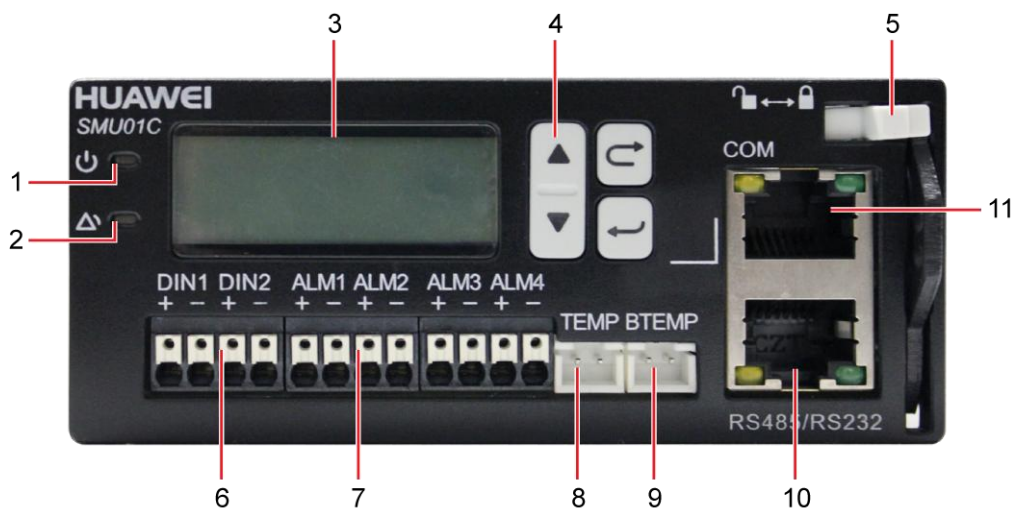


### NOTE

All ports in this manual are protected by a security mechanism.

Figure 2-1 shows an SMU01C panel.

Figure 2-1 SMU01C panel



PQ02WC0007

- |                       |                                     |                                     |
|-----------------------|-------------------------------------|-------------------------------------|
| (1) Run indicator     | (2) Major alarm indicator           | (3) LCD                             |
| (4) Button            | (5) Locking latch                   | (6) DIN port                        |
| (7) ALM port          | (8) Ambient temperature sensor port | (9) Battery temperature sensor port |
| (10) RS485/RS232 port | (11) COM port                       |                                     |

## Indicators

Table 2-1 describes the SMU01C indicators.

**Table 2-1** Indicator description

Indicator	Color	Status	Description
Run indicator	Green	Off	The SMU01C is faulty or has no power supply.
		Blinking at 0.5 Hz	The SMU01C is running properly and communicating with the host normally.
		Blinking at 4 Hz	The SMU01C is running properly but communication with the host is faulty.
Major alarm indicator	Red	Off	No major alarm is generated.
		Steady on	A major alarm is generated.



## LCD

The SMU01C provides a liquid crystal display (LCD) to display power system information in real time.

## Buttons

The SMU01C provides four buttons for setting and querying parameters. Table 2-2 describes the buttons.

**Table 2-2** Button description

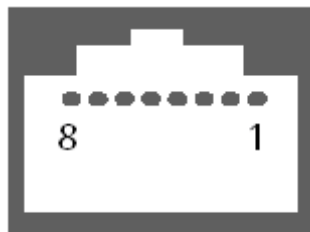
Button	Name	Description
▲ or ▼	Arrow key	Turns to the previous or next menu and sets parameter values.
	Cancel	Returns to the previous menu without saving the settings.
	Enter	<ul style="list-style-type: none"> <li>Enters the main menu from the standby screen.</li> <li>Enters a submenu from the main menu.</li> <li>Changes or saves the menu settings.</li> </ul>
<p><b>NOTE:</b></p> <ul style="list-style-type: none"> <li>After a menu is displayed, the standby screen is displayed and the LCD screen becomes dark if no button is pressed for 5 minutes.</li> <li>You need to log in again if no button is pressed for 8 minutes.</li> <li>The preset password is <b>000001</b>.</li> </ul>		

## Communication Ports

**Table 2-3** Communications port description

Communications Ports	Specifications	Protocol Compliance
COM	Supports RS485 and RS232 ports, with baud rates 9600 bit/s and 19200 bit/s respectively.	YDN protocol/Huawei master slave protocol
RS485/RS232		
<p>NOTE:</p> <p>The COM ports and RS485/RS232 ports work in active/standby mode. Either of them is at work.</p> <p>The RS485 and RS232 serial ports are mutually exclusive.</p>		

**Figure 2-2** Pins of the RJ45 port



**RJ45 Female**

**Table 2-4** COM or RS485/RS232 port pin definition

Pin	Signal	Description
1	TX+	Sends data over RS485.
2	TX-	
4	RX+	Receives data over RS485.
5	RX-	
3	RX232	Receives data over RS232.
7	TX232	Sends data over RS232.
6	PGND	Ground
8	-	-

# 3 Installation



## CAUTION

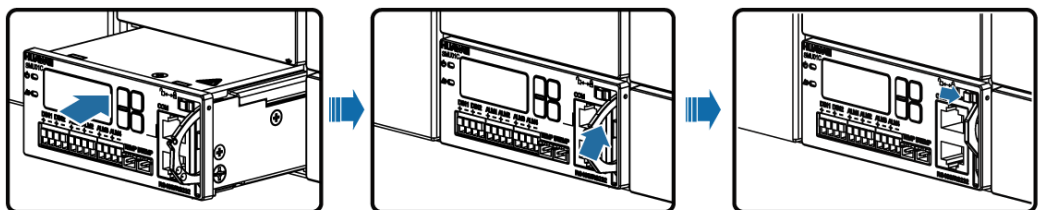
To protect an SMU01C, wear electrostatic discharge (ESD) gloves when installing or replacing the SMU01C.

## 3.1 Installing an SMU01C

To install an SMU01C, perform the following steps:

- Step 1** Hold the handle of the SMU01C, and insert the SMU01C into the correct position in the power system.
- Step 2** Push the SMU01C until its front panel aligns with the front panel of the power subrack.
- Step 3** Push the locking latch on the front panel to the right.

**Figure 3-1** Installing an SMU01C



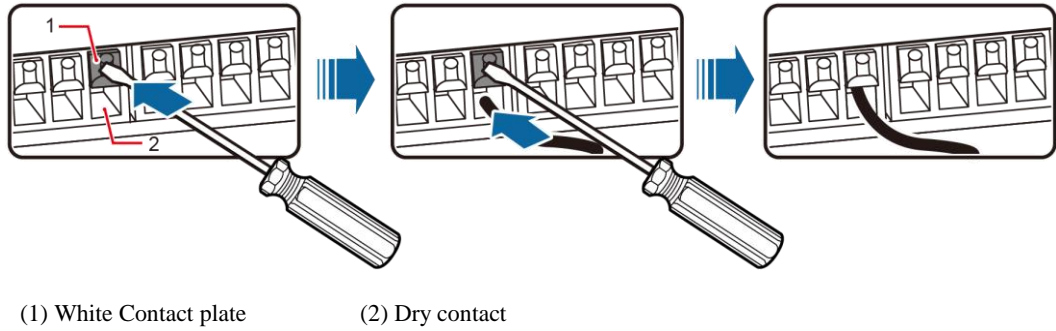
PQ071C0001

----End

## 3.2 Installing Dry Contacts and Boolean Values Signal Cables

Install dry contacts and Boolean values signal cables, as shown in Figure 3-2.

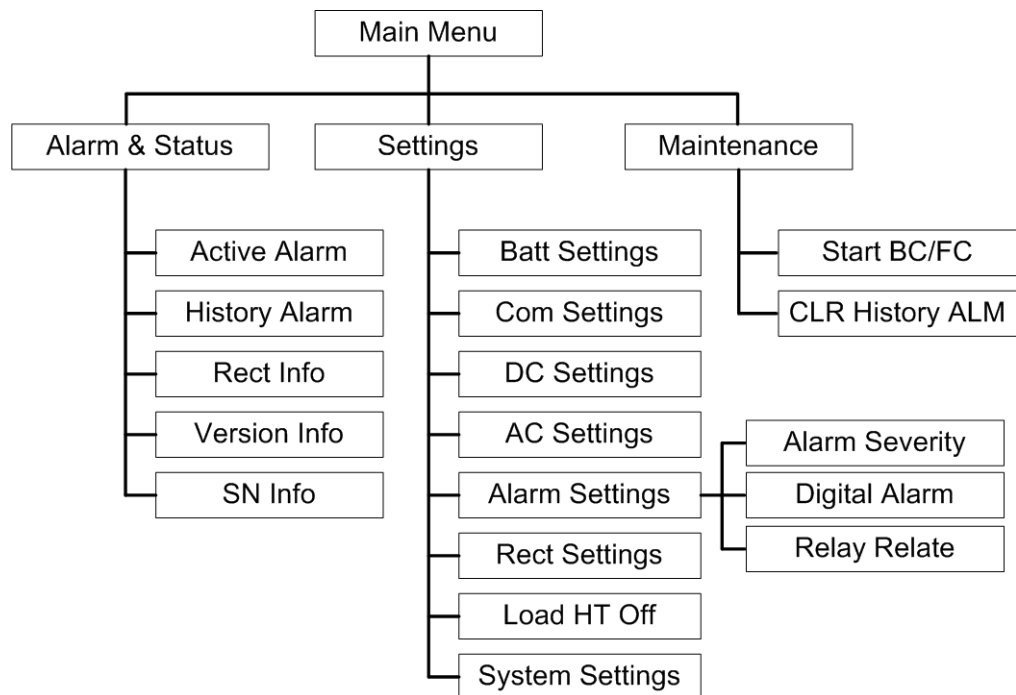
**Figure 3-2** Installing dry contacts and boolean values signal cables



# 4 LCD Operations

## LCD Menu Hierarchy

Figure 4-1 LCD menu hierarchy



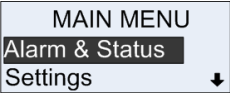
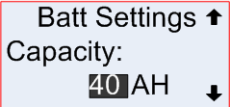
**NOTE**

Before entering Setting and Maintenance, you need to enter a password. The preset password is 000001.

## Symbol Description

Table 4-1 Symbol Description

Symbol	Description
↓ Enter	Press the Enter button once.
↓ Down	Press the Down button once.
⋮ Down	Press the Down button more than once.

Symbol	Description
Enter ↓ Down	Press the Enter button once and the Down button more than once.
	Picture bordered in black shows menu items.
	Picture bordered in red shows parameters and values.

## Display Language

After powering on the SMU01C, select English by pressing ▲ or ▼ on the LCD, and then press **Enter** to enter the standby screen.

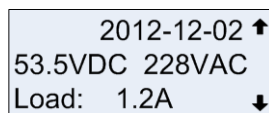
**Figure 4-2** Selecting a display language



## Viewing System Operating Information

You can view real-time information about the AC and DC status and load current on the LCD.

**Figure 4-3** Viewing system operating information



**Table 4-2** System operating information

Parameter	Description
AC voltage	AC voltage calculated by rectifiers
DC voltage	Busbar voltage collected in real time
Load current	Current that is used for driving loads: The load current equals the total rectifier output current minus the total battery current.



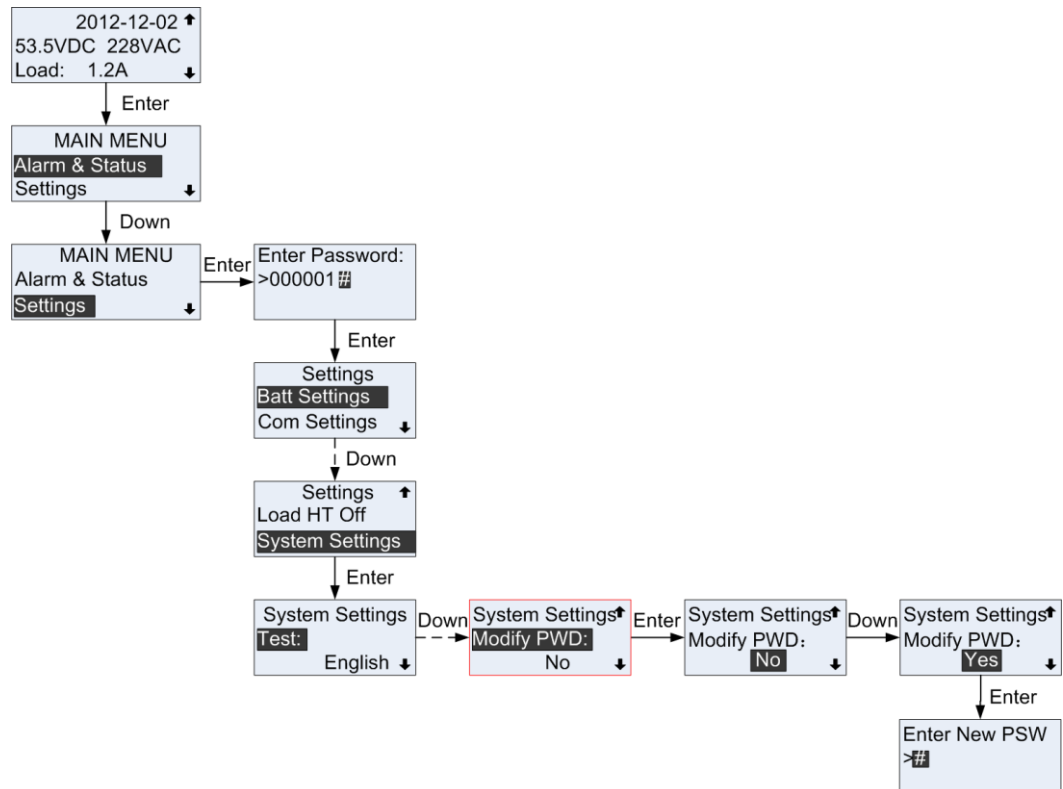
## Password Setting

You need to enter a password before entering the **Settings** and **Maintenance** menu. The preset password is **000001**. Figure 4-4 shows how to change the password.

**Step 4** Enter the page for changing user password by choosing **Main Menu > Settings > System Settings**.

**Step 5** On the **Enter New PSW** page, press **▲** or **▼** to specify a new password and then press Enter.

**Figure 4-4** Changing user password



----End

# 5 Power System Configuration

## 5.1 Basic Lead-Acid Battery Parameters

### Principles

Battery management includes battery boost charging and float charging management, discharge detection and capacity detection, etc. This management is performed based on the basic battery parameters. Therefore, configure these basic parameters as required to ensure the normal battery management.

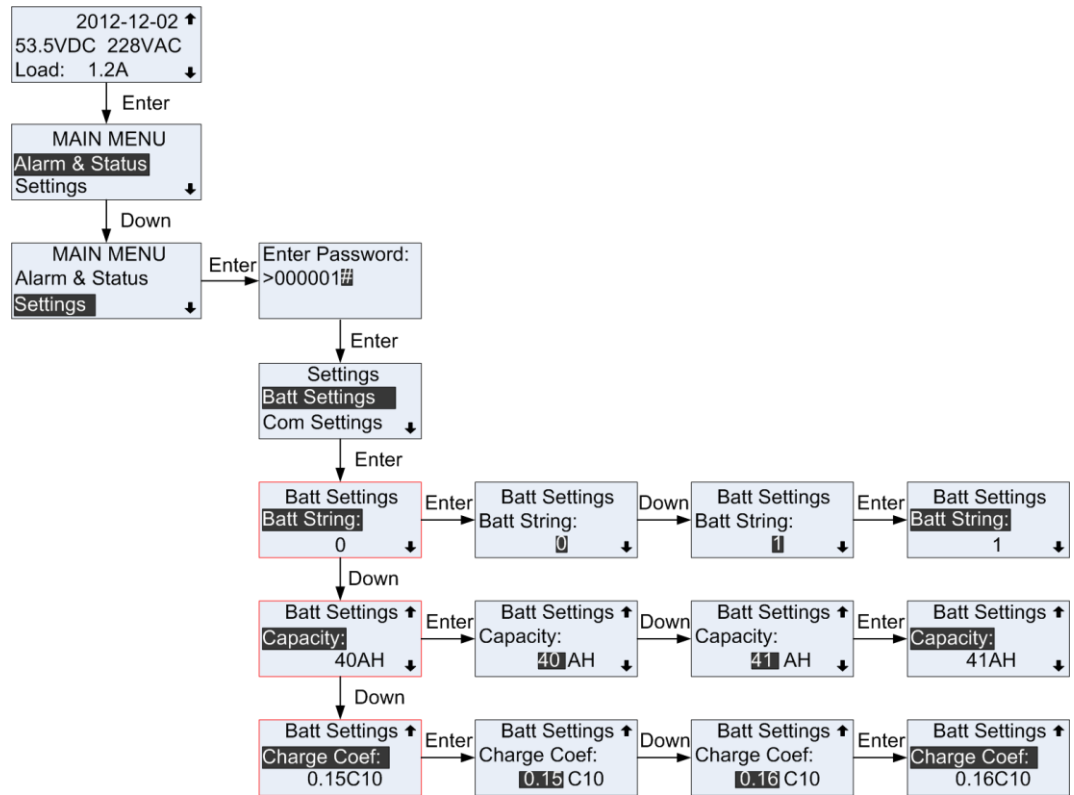
### Parameters

**Table 5-1** Basic battery parameters

Parameters	Description
Batt String	If no battery is connected, set <b>Batt String</b> to 0. If one or more battery strings are connected, set <b>Batt String</b> to 1.
Capacity	Equals to the total capacity of all connected batteries.
Charge Coef	The maximum charging current of the battery is determined by the charge coefficient multiplied by battery capacity. Examples: If the battery capacity is 100 Ah and the maximum charging current is 10 A, set the charge coefficient to 0.10.

## LCD Operation

**Figure 5-1** Setting basic battery parameters on the LCD



## 5.2 Communications Parameters

### Principles

You can manage the SMU01C locally and remotely over the RS4985, RS232 and COM ports.

**Table 5-2** Communications parameters

Network	Port	Parameter
Power and environment network/ Huawei master slave communications network	COM	Address
	RS485/RS232	Baud

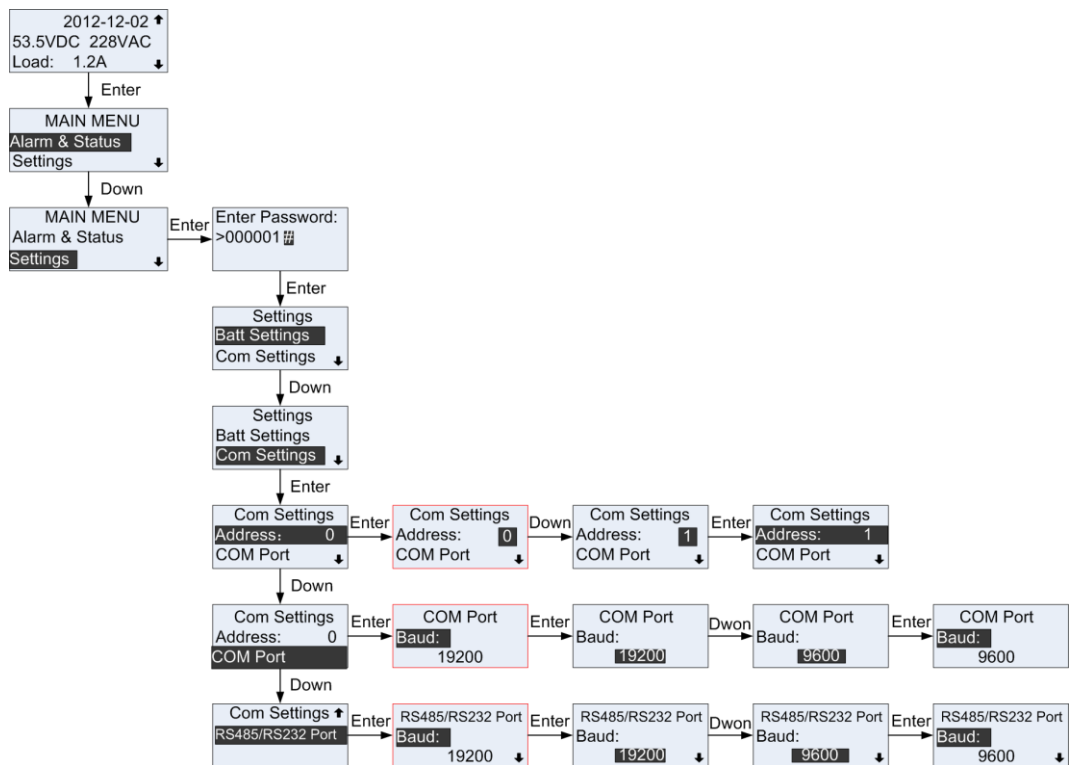
## Parameters

**Table 5-3** Communications parameters

Parameters	Description	Default Value	Value Range
Address	Communications address for the SMU01C	0	0-30
Baud	Baud rate for the SMU01C	Identified by SMU01C automatically	9600, 19200

## LCD Operation

**Figure 5-2** Setting communications parameters on the LCD



**NOTE**

The SMU01C automatically identifies Baud. Values in the preceding figure are for reference only.

# 6 VRLA Battery Management

## 6.1 Battery Charging

If the AC input to the power system is normal and meets load requirements, rectifiers supply DC power to loads and lead-acid batteries. If the AC input to the power system is abnormal or rectifiers cannot supply DC power, lead-acid batteries supply power to loads. After the AC input or DC output is restored, rectifiers supply DC power to loads and lead-acid batteries.

### 6.1.1 Float Charging

#### Principles

Lead-acid batteries discharge slowly when they are being used. To compensate for the loss caused by self-discharge, charge lead-acid batteries in float mode to ensure their full amount of electricity. Float charging also helps to maintain battery capacity after a large amount of electricity is discharged.

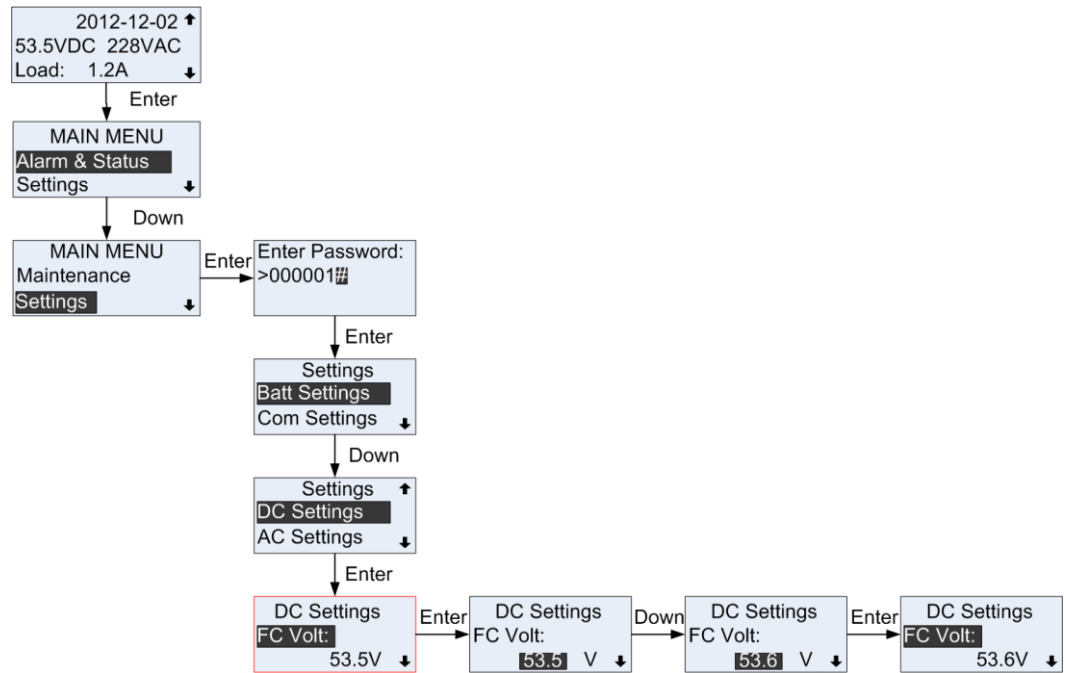
#### Parameters

**Table 6-1** Float charging parameter description

Parameters	Description	Default Value	Value Range
FC Volt	The voltage at which VRLA batteries are charged in float mode.	53.5 V	47.0 V–56.5 V ≤ Boost charge voltage

## LCD Operation

**Figure 6-1** Setting float charging parameters on the LCD



### 6.1.2 Boost Charging

#### Principles

Boost charging helps to rapidly restore battery capacity after the AC power supply is restored. After long-time float charging, batteries suffer great loss caused by self-discharge and their activity deteriorates. Boost charging is required to restore the battery activity and capacity. The boost charging voltage is higher than the float voltage.

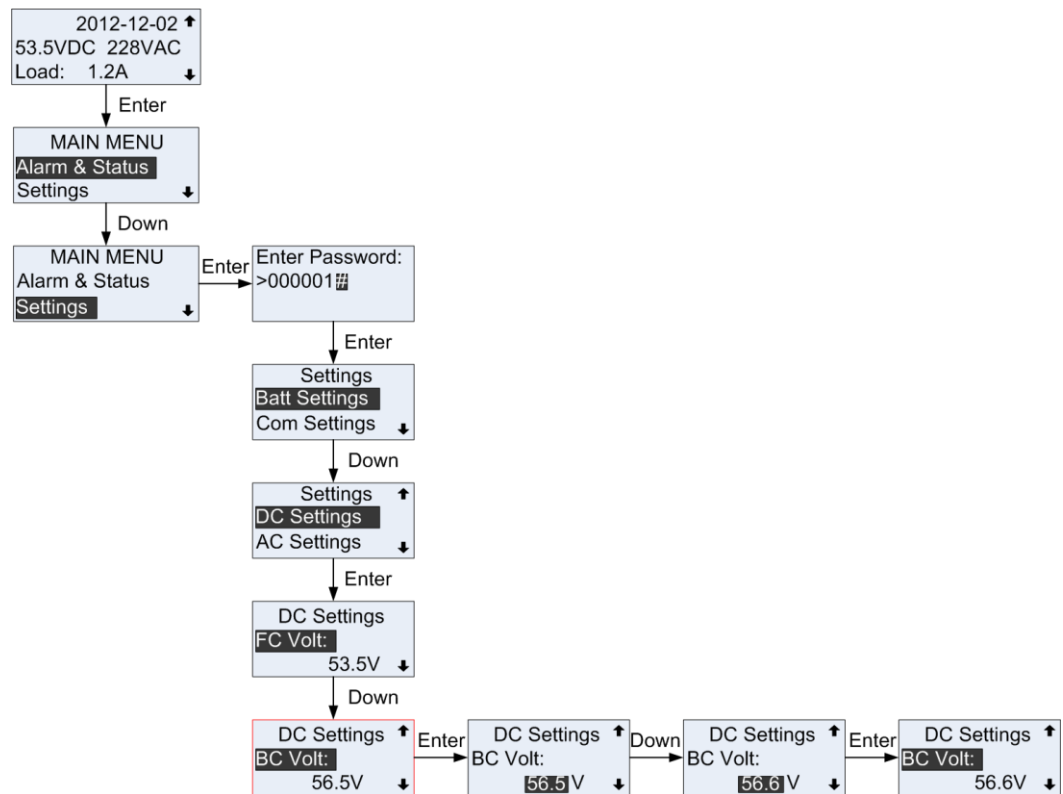
#### Parameters

**Table 6-2** Boost charging parameter description

Parameters	Description	Default Value	Value Range
BC Volt	Charge voltage at which lead-acid batteries are being charged in boost mode	56.5 V	53.5 V to 57.0 V <ul style="list-style-type: none"> <li>&gt; Float charge voltage</li> <li>&lt; DC overvoltage threshold: - 1 V</li> </ul>

## LCD Operation

**Figure 6-2** Setting boost charging parameters on the LCD



## 6.2 Low Voltage Disconnection Protection

### Principles

If an AC input is abnormal, batteries start to power loads. In this case, the SMU01C drives contactors to disconnect loads and batteries in sequence based on preset disconnection parameters. After the AC input resumes, the rectifiers begin to power loads and charge batteries.

### Parameters

**Table 6-3** LVD parameter description

Parameters	Description	Default Value	Value Range
BLVD Enabled	To enable or disable the BLVD.  If the BLVD circuit is powered off, disabling the BLVD	Yes	Yes, No

Parameters	Description	Default Value	Value Range
	means to power on the BLVD circuit.		
BLVD	If the battery voltage is lower than the value of BLVD voltage threshold, the BLVD circuit is disconnected.	43.0 V	38.0 V to 44.9 V ( $38.0\text{ V} \leq \text{BLVD Volt} \leq \text{LLVD Volt}$ )
LLVD	To enable or disable the LLVD.  If the LLVD circuit is powered off, disabling the LLVD means to power on the LLVD circuit.	No	Yes, No
LLVD	If the battery voltage is lower than the value of LLVD voltage threshold, the LLVD circuit is disconnected.	44.0 V	38.0 V to 44.9 V BLVD Volt to DC Under Volt



## LCD Operation

Figure 6-3 BLVD low voltage disconnection setting on the LCD

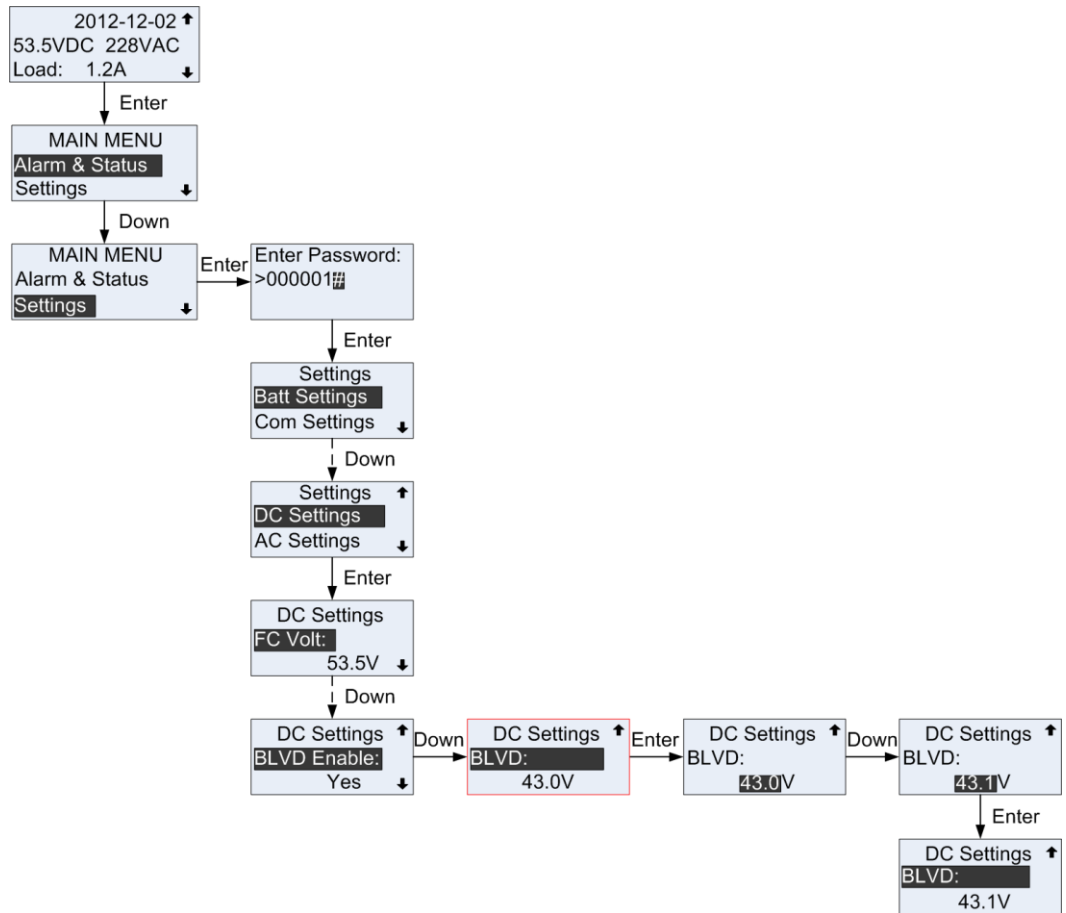
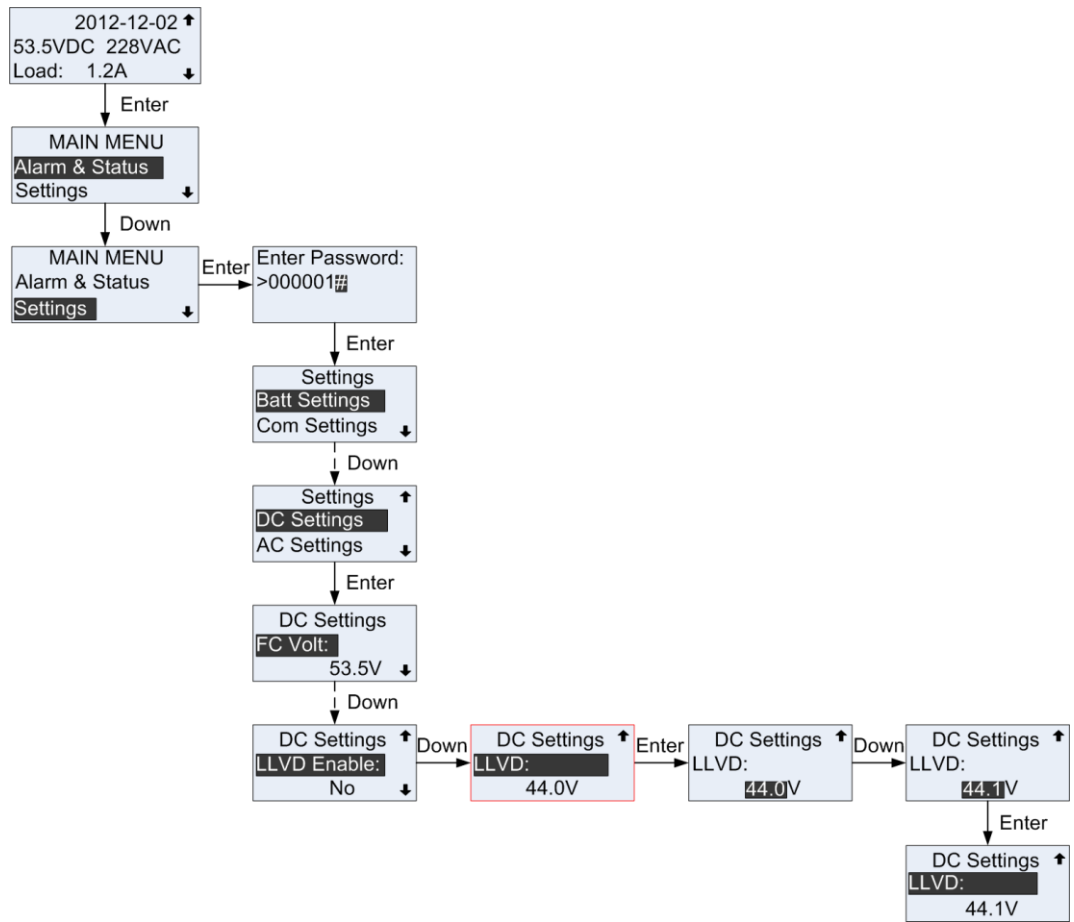


Figure 6-4 LLVD low voltage disconnection setting on the LCD



# 7 Rectifier Management

## 7.1 Querying Operating Information

### Principles

The SMU01C monitors the rectifier operating information in real time and displays the information on the LCD.

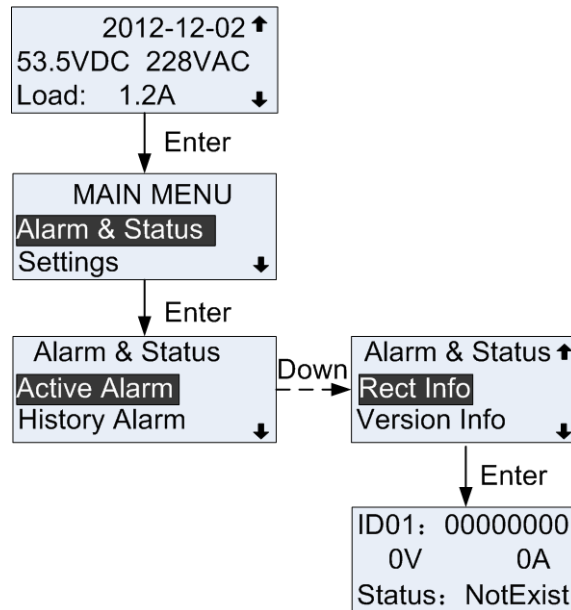
### Parameters

**Table 7-1** Rectifier operating information

Parameters	Description
DC output voltage	Detected DC bus bar voltage
Module output current	Sum of the output currents of all rectifiers
Status	Indicating the status of rectifiers

## LCD Operation

**Figure 7-1** Viewing rectifier operating information on the LCD



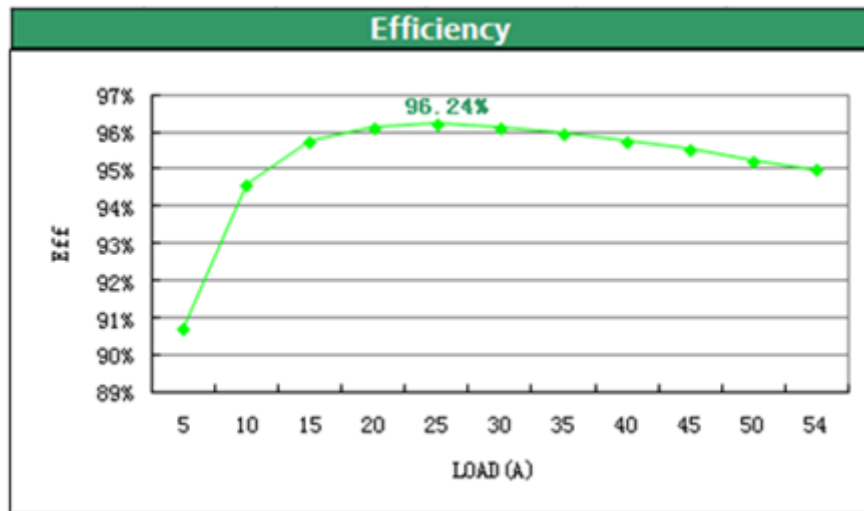
## 7.2 Setting Intelligent Hibernation Parameters

### Principles

The operation efficiency of rectifiers is low when the load is light. If the total load of the power system is light, certain rectifiers in the system operate with high load and others hibernate. This mechanism improves the operation efficiency of the system and saves energy.

Rectifiers should hibernate in turn to ensure the same aging degree. If the difference between the longest rectifier running duration and the shortest rectifier running duration exceeds the value of exchange cycle, keep all rectifiers running for 2 hours and then hibernate certain rectifiers.

**Figure 7-2** R4850G1 efficiency curve



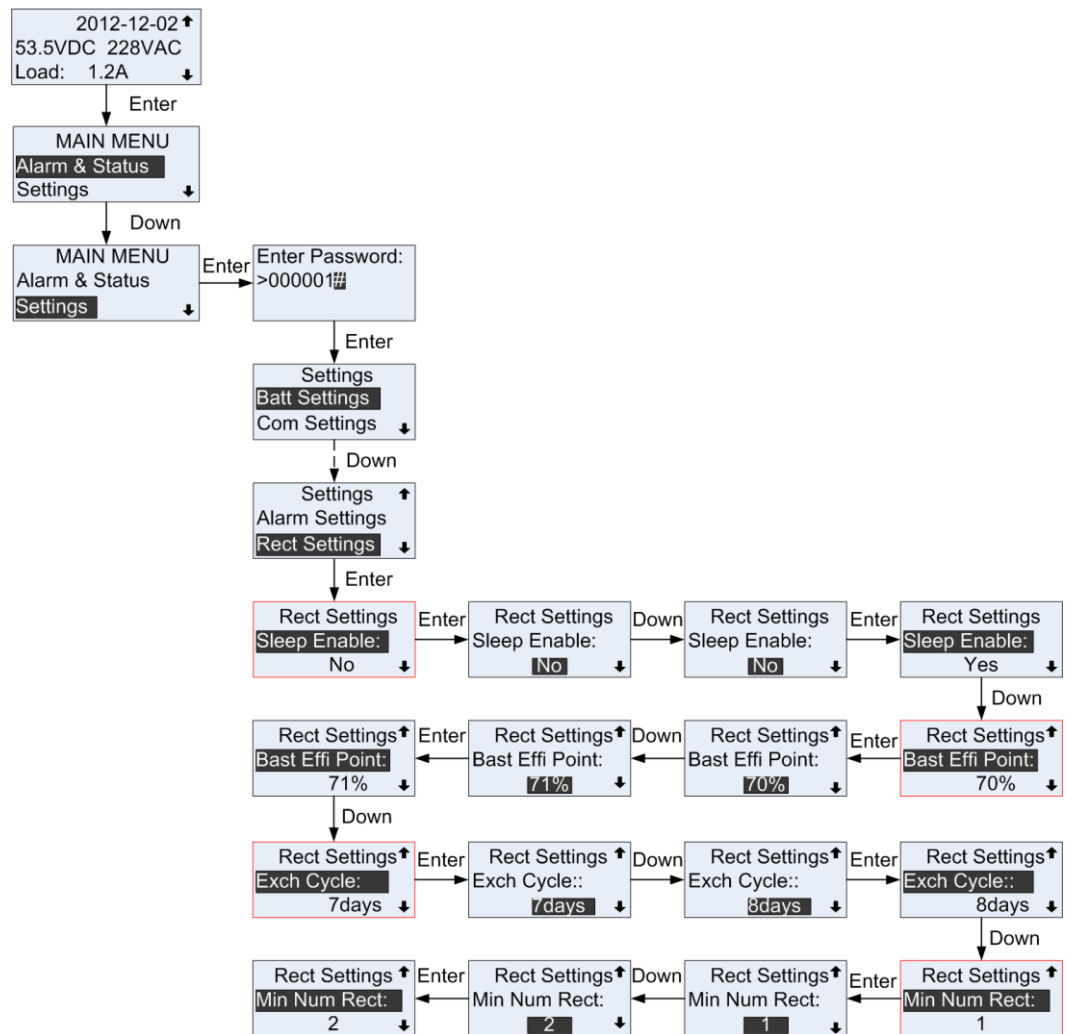
## Parameters

**Table 7-2** Parameter description for intelligent rectifier hibernation

Parameters	Description	Default Value	Value Range
Sleep Enable	Enables or disables intelligent rectifier hibernation	No	Yes, No
Best Effi Point	Loading capacity for the rectifiers running at an optimal efficiency	70%	60% to 80%
Exch Cycle	Interval between hibernation operations	7 days	5 to 30 days
Min Num Rect	Minimum number of running rectifiers	1 PCS	1 to 5 PCS

## LCD Operation

**Figure 7-3** Setting parameters for intelligent rectifier hibernation on the LCD

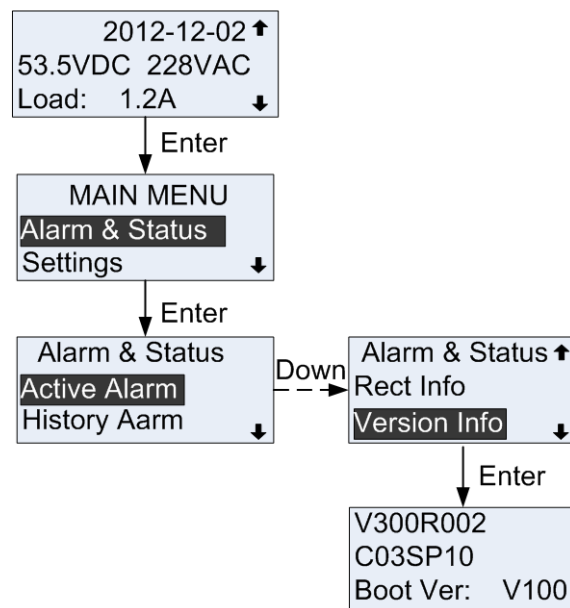


# 8 Maintenance

## 8.1 Viewing Version Information

You can view the current monitoring software version on the LCD by choosing **Main Menu > Alarm & Status > Version Info**.

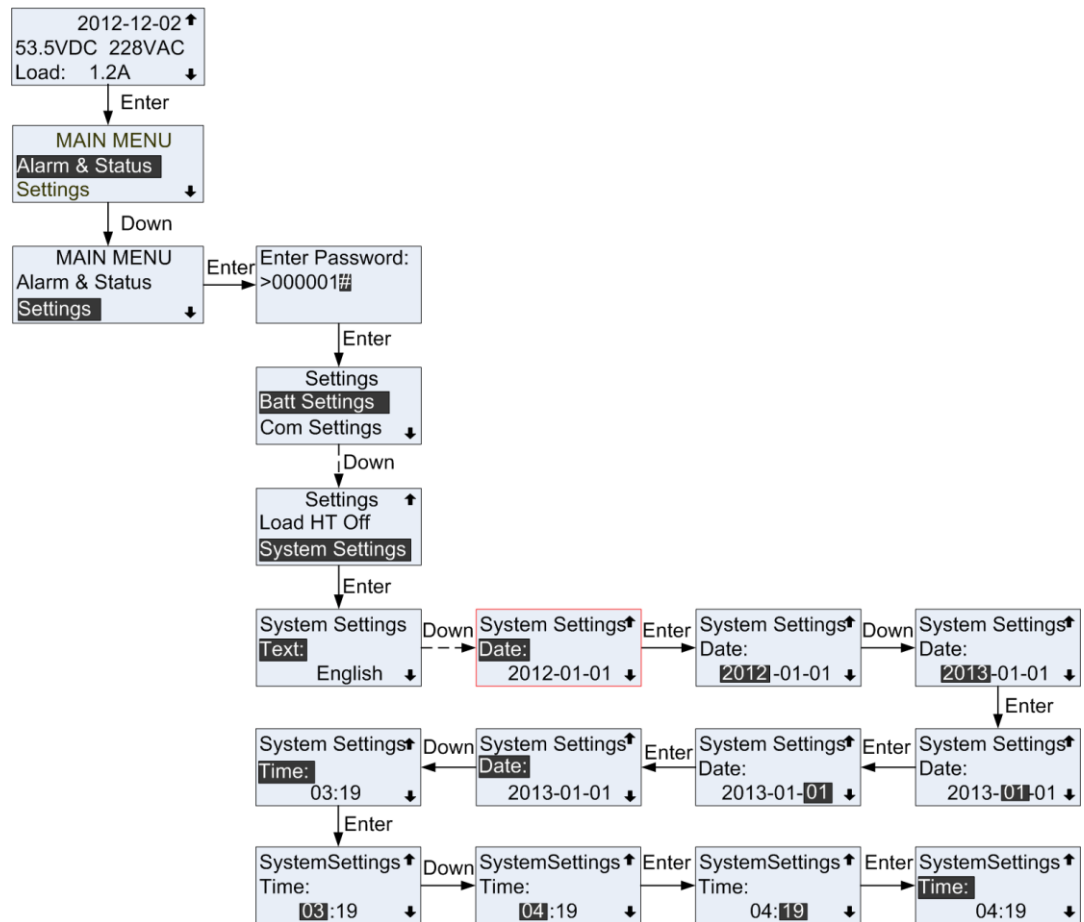
**Figure 8-1** SMU01C version information on the LCD



## 8.2 Setting Time and Date

Figure 8-2 shows how to set time and date on the LCD.

**Figure 8-2** Setting time and date on the LCD



### 8.3 Setting the System Type

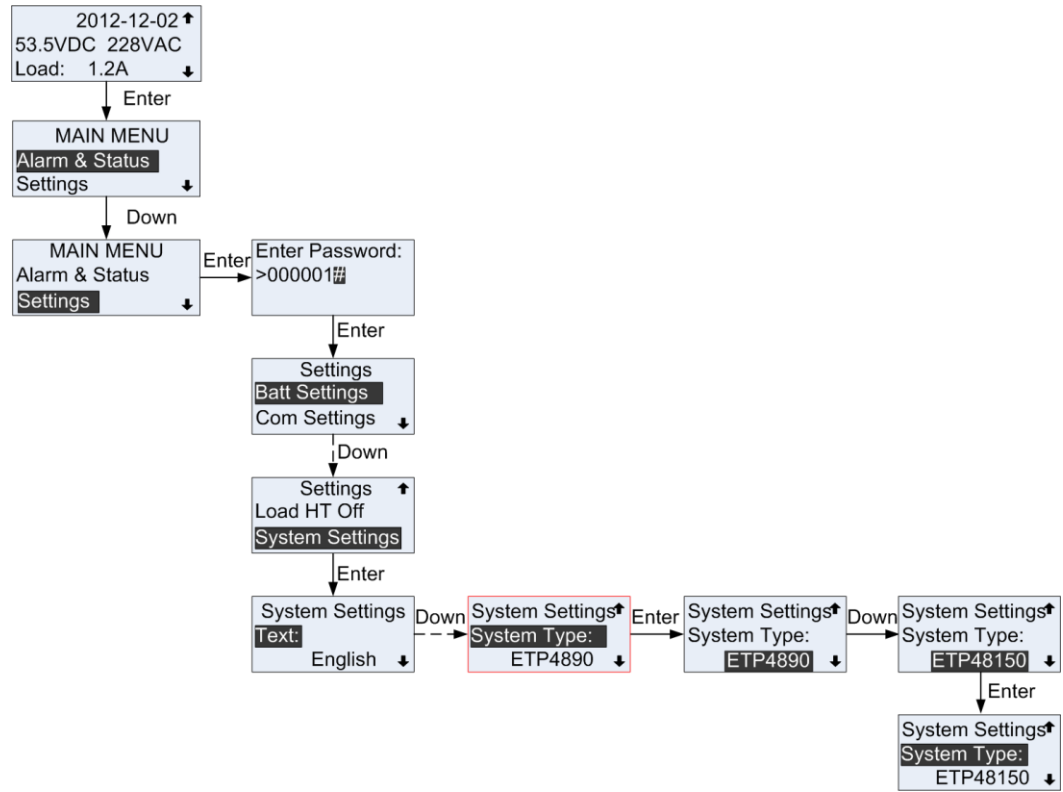
Figure 8-3 shows how to set the system type on the LCD.

**NOTE**

The default system type varies based on the subrack types. The following figure takes the EPT4890 as an example.



**Figure 8-3** Setting system type on the LCD



# 9 Alarm Management

## 9.1 Alarm Setting

Table 9-1 lists alarms for the SMU01C. You can set the alarm dry contact input port, alarm severity, alarm dry contact output port.

**Table 9-1** Alarm list

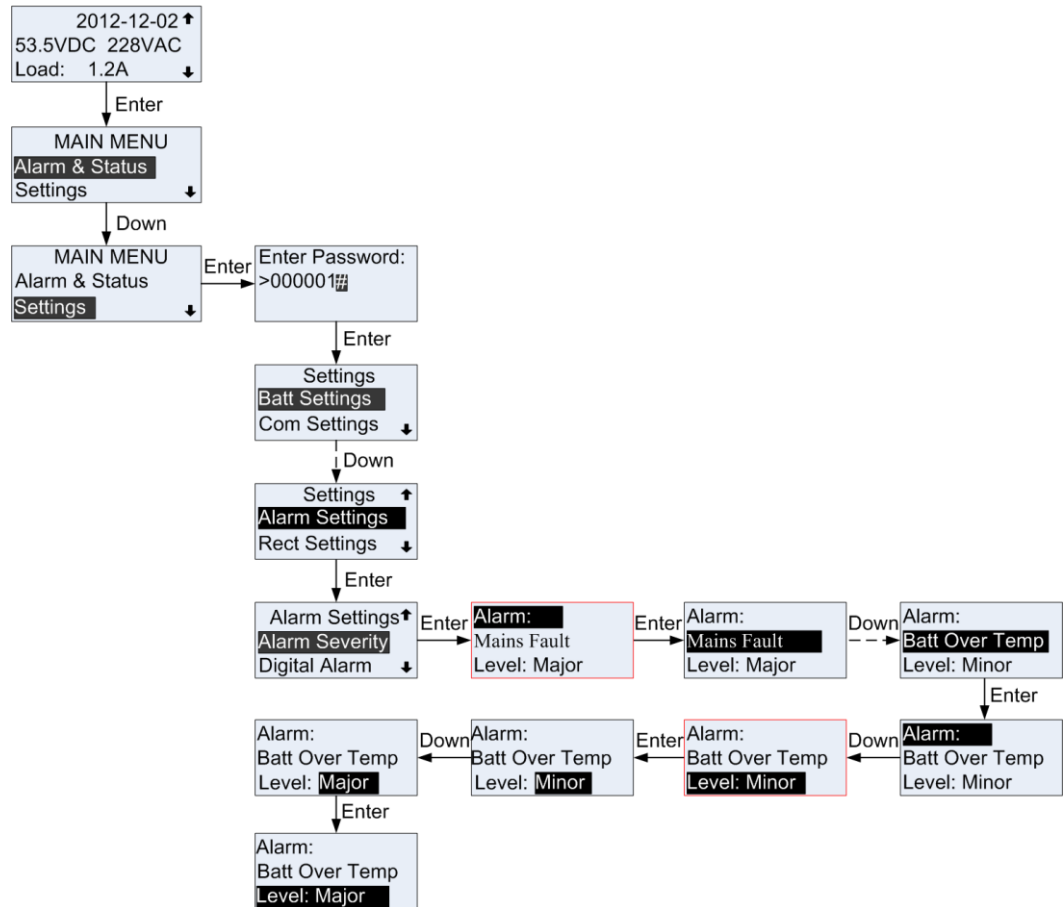
Alarm	Default Alarm Severity	Related Dry Contact
Mains Fault	Major	None
AC Over Volt	Minor	None
AC Under Volt	Minor	None
DC Under Volt	Major	None
DC Over Volt	Major	None
Batt Over Temp	Minor	None
Batt Under Temp	Minor	None
Amb.Over Temp 1	Minor	None
Amb.Under Temp 1	Minor	None
Amb.Over Temp 2	None	None
Amb.Under Temp 2	None	None
Amb.Over Humi	Minor	None
Amb.Under Humi	Minor	None
Door Alarm	Cleared	None
Water Inrush	Major	None
Smoke Alarm	Major	None
Batt Discharge	Minor	None
Batt Over Curr	Minor	None

Alarm	Default Alarm Severity	Related Dry Contact
Load Fuse Trip	Major	None
Batt Loop Trip	Major	None
Singl-Rect Fault	None	None
Multi-Rect Fault	None	None
Rect Fault	Major	None
Rect Comm Fail	Minor	None
Rect Protect	Minor	None
Batt Off	Major	None
Load Off	Major	None
Dig. Input (1-7) ALM	Minor	None
Bat Sensor (1-2) Fail	None	None
Amb.Temp (1-2) Fail	None	None
Humi Sensor Fail	None	None
Major Alarm	None	ALM1
Minor Alarm	None	ALM2

## 9.1.2 Setting Alarm Severity

Figure 9-1 shows the default severities for alarms about the SMU01C. You can modify the alarm severity on the LCD, as shown in Figure 9-1 (modifying the alarm severity for Batt Over Temp alarm).

**Figure 9-1** Modifying alarm severities



### 9.1.3 Associating Alarms to Dry Contact Input Ports

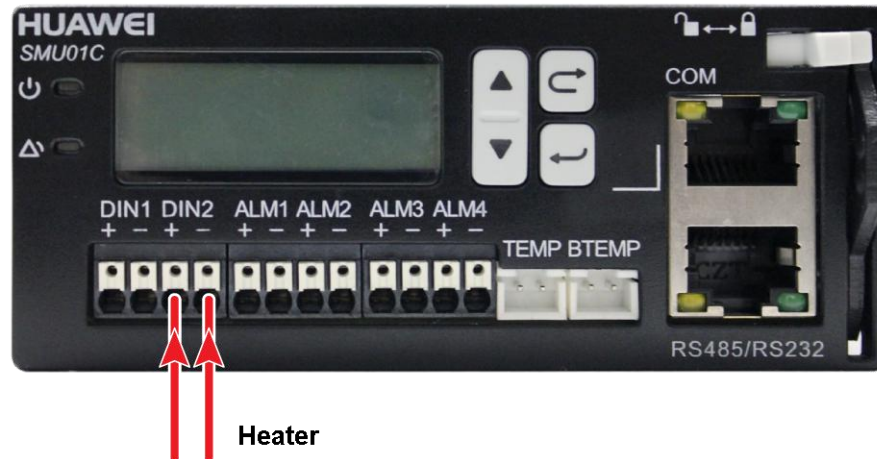
The SMU01C provides two dry contact inputs for connecting heaters and air conditioners. The SMU01C also monitors the running status of devices over the dry contacts.

The following example describes how to connect a heater to the DIN2 port.

**Step 1** Figure 9-2 shows how to connect the SMU01C to a heater.

For connecting the signal cables between the SMU01C and the heater, see Figure 9-2.

**Figure 9-2** Connecting the SMU01C to a heater



**Step 2** Read the heater instruction to check whether the dry contact status when alarms are generated matches the default dry contact status for the SMU01C. Table 9-1 shows the default configuration for the SMU01C dry contact input ports.

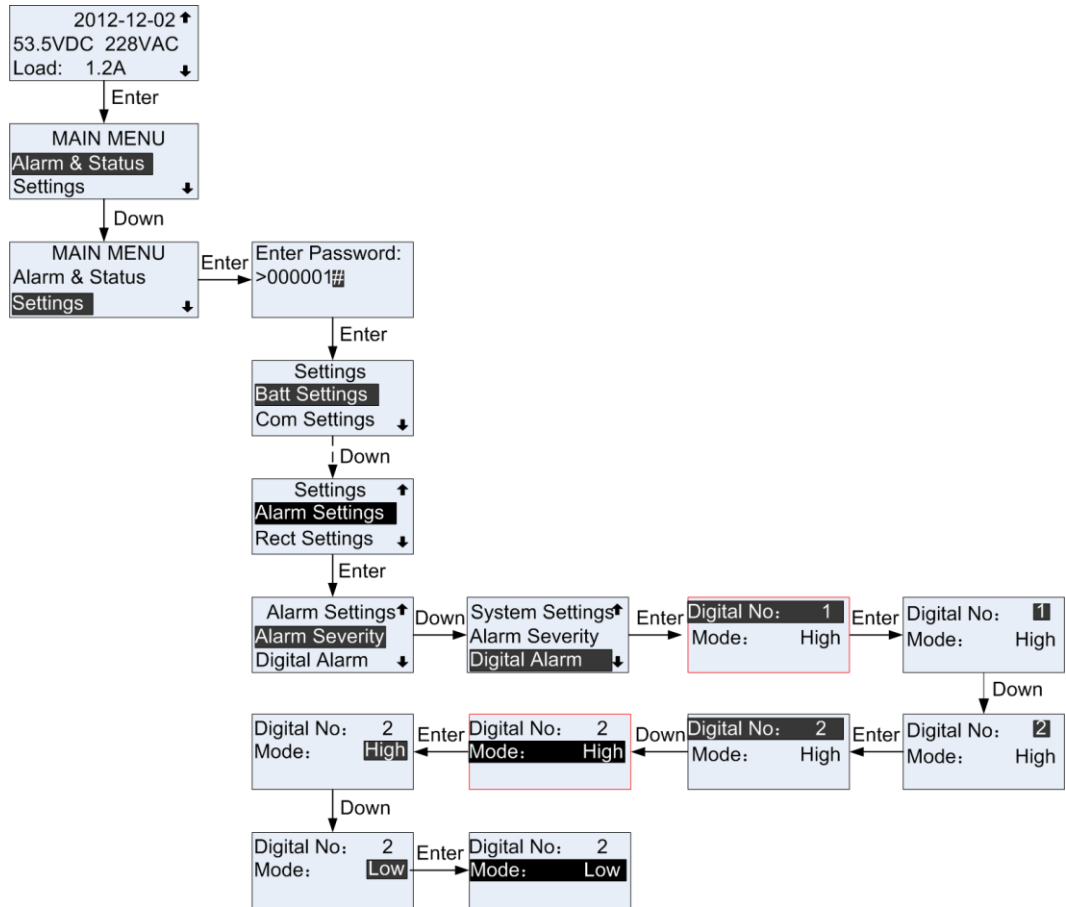
- If the heater generates alarms when the dry contact is open, perform step 3 to change the default DIN2 port status to Low.
- If the heater alarm generates alarms when the dry contact is closed, perform step 4 to check whether an alarm is generated.

**Table 9-1** Default dry contact input configurations

Dry Contact	Default Dry Contact Status (High-Close, Low-Open)
DIN1	High
DIN2	High

**Step 3** Figure 9-3 shows how to modify the default dry contact input configurations.

**Figure 9-3** Modifying default DIN2 port status



**Step 4** Check whether a heater fault alarm is generated.

If not, the default DIN2 port is successfully modified.

----End

## 9.1.4 Associating Alarms to Dry Contact Output Ports

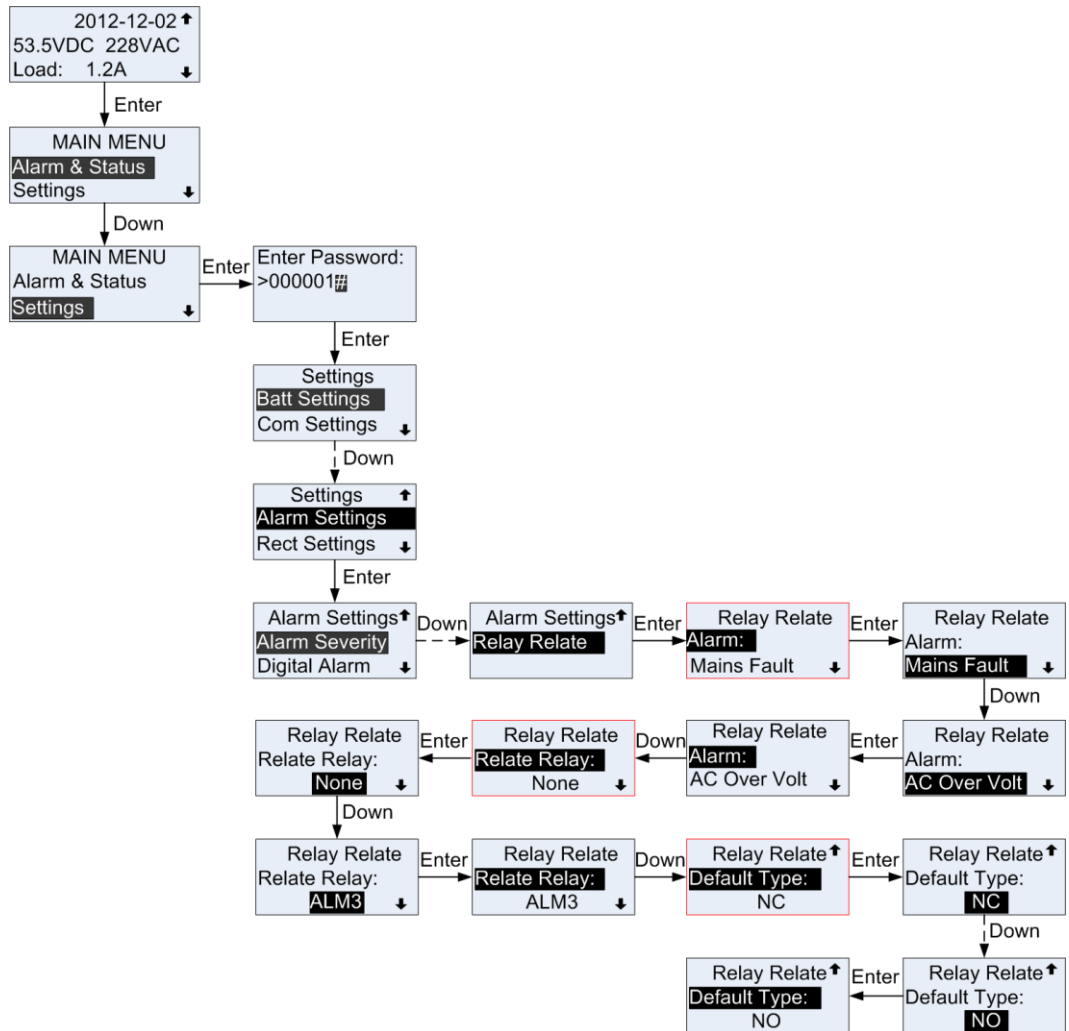
The SMU01C provides four dry contact outputs that relate to the alarms in Table 9-1. Table 9-2 lists the default dry contact output configurations. You can modify the configurations as required.

**Table 9-2** Default dry contact output configurations

Dry Contact	Alarm Association	Default Status (NO, NC)
ALM1	Major Alarm	NO
ALM2	Minor Alarm	NO
ALM3	None	NO
ALM4	None	NO

Associate the AC overvoltage alarm to ALM3. Figure 9-4 shows how to associate alarms to the dry contact output ports.

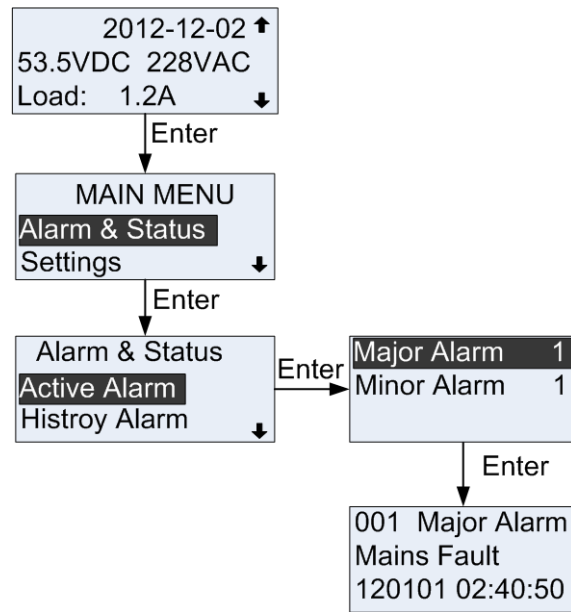
**Figure 9-4** Associating alarms to dry contact output ports



## 9.2 Viewing Active Alarms

You can view active alarms on the LCD, as shown in Figure 9-5. Parameters in the figure are for reference only.

**Figure 9-5** Viewing active alarms

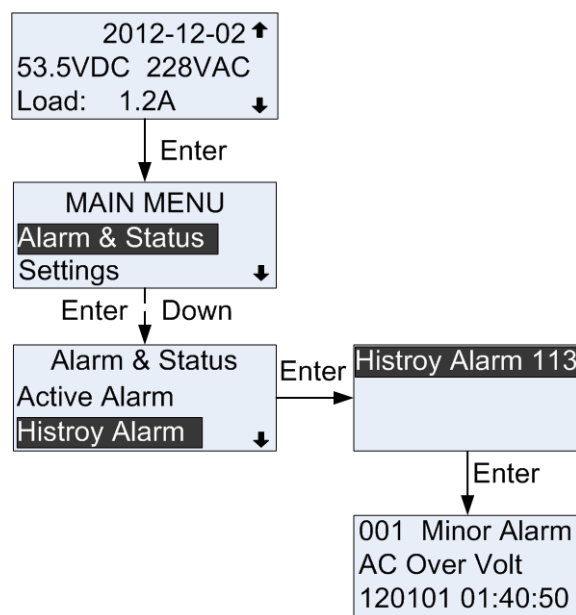


## 9.3 Viewing Historical Alarms

A maximum of 300 historical alarms are stored. You can view the historical alarms on the **History Alarm** page. If the number of historical alarms exceeds 300, newly reported alarms will cover the former ones.

Figure 9-6 shows how to view the historical alarms on the LCD. Parameters in the figure are for reference only.

**Figure 9-6** Viewing historical alarms

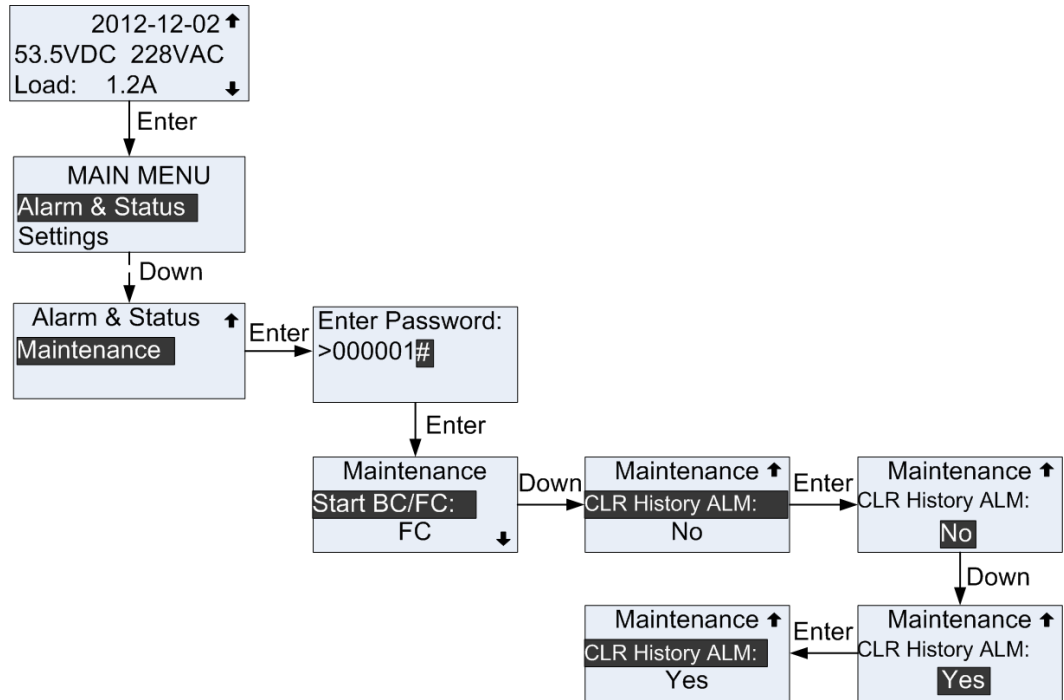




## 9.4 Deleting Historical Alarms

You can clean the historical alarms on the LCD, as shown in Figure 9-7.

**Figure 9-7** Deleting historical alarms



## 9.5 Handling Alarms

### 9.5.1 Mains Fault

#### Possible Causes

No AC power is supplied.

#### Measures

Check whether the input voltage of the AC input circuit breaker is normal. If the input voltage is abnormal, supply power to the system.

### 9.5.2 AC Over Volt

#### Possible Causes

- The AC voltage exceeds the alarm threshold.
- The AC overvoltage alarm threshold is not properly set on the monitoring unit.

## Measures

1. Check the AC input voltage. If the AC input voltage exceeds the AC overvoltage alarm threshold (280 V by default), rectify the AC input fault.
2. Adjust the AC overvoltage alarm threshold to a proper range.

## 9.5.3 AC Under Volt

### Possible Causes

- The AC voltage exceeds the alarm threshold.
- The AC undervoltage alarm threshold is not properly set on the monitoring unit.

### Measures

1. Check the AC input voltage. If the AC input voltage under the AC undervoltage alarm threshold (180 V by default), rectify the AC input fault.
2. Adjust the AC undervoltage alarm threshold to a proper range.

## 9.5.4 DC Over Volt

### Possible Causes

- A rectifier is faulty.
- The DC overvoltage alarm threshold is not properly set on the monitoring unit.

### Measures

1. Check the Fault indicator on the rectifier. If the indicator is on, replace this rectifier because it is subject to overvoltage.
2. Check the DC output voltage. If the DC output voltage (between the RTN+ busbar to the -48 V copper bar) exceeds the DC overvoltage alarm threshold (58 V by default), rectify the rectifier fault. Reset the rectifiers one by one and replace the faulty one.
3. Adjust the DC overvoltage alarm threshold to a proper range.

## 9.5.5 DC Under Volt

### Possible Causes

- The AC power fails and storage batteries are discharging.
- A rectifier is faulty.
- The DC undervoltage alarm threshold is not properly set on the monitoring unit.

### Measures

1. The alarm is automatically cleared after the AC input restores.
2. If the Fault indicator on a rectifier is steady on, replace the rectifier.
3. Adjust the DC undervoltage alarm threshold to a proper range.

## 9.5.6 Batt Over Temp

### Possible Causes

- Temperature inside the battery compartment exceeds the alarm threshold.
- The battery temperature or ambient temperature alarm threshold is not properly set on the monitoring unit.
- The temperature sensor is faulty.

### Measures

1. Lower the temperature inside the battery compartment. The alarm is automatically cleared after the temperature lowers to a proper range.
2. Adjust the battery temperature alarm threshold to a proper range.
3. Replace the faulty temperature sensor.

## 9.5.7 Batt Under Temp

### Possible Causes

- The battery temperature alarm threshold is not properly set on the monitoring unit.
- The heater is faulty.
- The temperature sensor is faulty.

### Measures

1. Adjust the battery temperature alarm threshold to a proper range.
2. Replace the heater if an alarm is generated for a faulty heater.
3. Replace the faulty temperature sensor.

## 9.5.8 Amb.Over Temp

### Possible Causes

- The ambient temperature exceeds the upper threshold.
- The ambient temperature alarm threshold is not properly set on the monitoring unit.
- The temperature sensor is faulty.

### Measures

1. Adjust the ambient temperature alarm threshold to a proper range.
2. Replace the faulty temperature sensor.

## 9.5.9 Amb.Under Temp

### Possible Causes

- Ambient temperature alarm threshold is not properly set on the monitoring unit.
- The temperature sensor is faulty.

## Measures

1. Adjust the ambient temperature alarm threshold to a proper range.
2. Replace the faulty temperature sensor.

## 9.5.10 Batt Operation

### Possible Causes

- An AC outage occurs.
- A rectifier is faulty.

### Measures

Check whether an alarm is generated for an AC outage or a faulty rectifier. Rectifier the fault by referring to related troubleshooting measures.

## 9.5.11 Batt Over Curr

### Possible Causes

- The rectifier fails to communicate with the monitoring unit.
- Storage batteries are faulty.

### Measures

1. If a rectifier is not connected properly, reset and secure it.
2. Check the storage batteries, and replace faulty ones.

## 9.5.12 Load Fuse Trip

### Possible Causes

- The load circuit breaker is OFF.
- The circuit breaker detection wire is loose.

### Measures

1. Check the load circuit breaker. If the load circuit breaker is off but not because of short circuit, switch on the load circuit breaker.
2. If the circuit breaker detection wire is loose, secure it.
3. Check whether the voltage at both ends of the circuit breaker is near 0 V using a multimeter. If yes, the circuit breaker is functional. If no, replace the circuit breaker because it is faulty.
4. If the alarm persists after the load circuit breaker is replaced, replace the monitoring unit because the alarm loop is faulty.

## 9.5.13 Batt. loop Trip

### Possible Causes

- The battery circuit breaker is OFF.

- The battery loop is faulty.

## Measures

1. Check the battery circuit breaker. If the battery circuit breaker is OFF, rectify the battery fault and switch on the battery circuit breaker.
2. Check the battery cables and connectors, and replace faulty ones.

## 9.5.14 Rect Fault

### Possible Causes

- A rectifier is faulty.

### Measures

1. If the Fault indicator on a rectifier is steady red, reset the rectifiers one by one, if the alarm persists, replace the rectifier.

## 9.5.15 Singl-Rect Fault

### Possible Causes

Only one rectifier is faulty, and redundant rectifiers are provided.

### Measures

If the Fault indicator on a rectifier is steady red, reset the rectifiers one by one, if the alarm persists, replace the rectifier.

## 9.5.16 Multi-Rect Fault

### Possible Causes

Two or more than two rectifiers are faulty.

### Measures

If the Fault indicator on a rectifier is steady red, reset the rectifiers one by one, if the alarm persists, replace the rectifier.

## 9.5.17 Rect Comm Fault

### Possible Causes

- The signal cable to the rectifier is not connected properly.
- The rectifier is removed.
- The rectifier is in poor contact.

## Measures

1. Check that the rectifier is inserted in the subrack and secured properly. If the rectifier has poor contact with the subrack, reset it and secure it to the subrack.
2. If the alarm persists, replace the rectifier.

## 9.5.18 Rect Protect

### Possible Causes

The rectifier input voltage is beyond a normal range.

The temperature at the air intake vent of the rectifier exceeds the upper threshold.

### Measures

1. Check whether the AC input voltage is greater than the rectifier AC overvoltage alarm threshold or lower than the rectifier AC undervoltage alarm threshold.
2. If the rectifier input voltage is within a normal range but the alarm persists, replace the rectifier.
3. Check whether the ambient temperature exceeds the upper threshold.

## 9.5.19 Batt Off

### Possible Causes

- The battery voltage is below the lower threshold.
- The battery temperature exceeds the upper threshold.

### Measures

1. If the AC input power is unavailable, recover the AC power supply.
2. If the ambient temperature is higher than the upper threshold, decrease the temperature.

## 9.5.20 Load Off

### Possible Causes

- The battery voltage is below the lower threshold.
- The ambient temperature exceeds the upper threshold.

### Measures

1. If the AC input power is unavailable, recover the AC power supply.
2. If the ambient temperature is higher than the upper threshold, decrease the temperature.

# 10 Troubleshooting

Table 10-1 describes the common faults and troubleshooting measures for the SMU01C.

**Table 10-1** Common SMU01C faults and troubleshooting measures

Symptom	Possible Cause	Measures
The major alarm indicator (red) is steady on.	A major alarm is generated.	Rectify faults based on the alarm information displayed on the LCD.
The Run indicator (green) blinks at 4 Hz.	Communications with the COM port fails.	Connect communications cables correctly. Reset the SMU01C.

# A LCD menu

Table A-1 LCD menu

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Range
Alarm & Status	Active Alarm	Major Alarm	-	-	-
		Minor Alarm	-	-	-
	History Alarm	-	-	-	-
	Rect Info	-	-	-	-
	Version Info	-	-	-	-
	SN Info	-	-	-	-
Settings	Batt Settings	Batt String	-	1	0-1
		Capacity	-	40AH	5 AH-1000 AH
		Charge Coef	-	0.15C10	0.05 C10-0.25C10
	Com Settings	Address	-	0	0-30
		COM Port	Baud	9600	9600, 19200
		RS485/RS232 Port	Baud	9600	9600, 19200
			Mode Select	Slave	Slave, Master
	DC Settings	FC Volt	-	53.5V	47.0 V-56.5 V ( $\leq$ BC Volt)
		BC Volt	-	56.5V	53.5 V-57.0 V (FC Volt $\leq$ BC Volt $\leq$ DC Over Volt - 1 V)
		Over Volt	-	58.0V	58.0 V-60.0 V
		Under Volt	-	45.0V	43.1 V-51.5 V (LLVD Volt $\leq$



Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Range
					DC Under Volt $\leq$ FC Volt – 2 V)
		BLVD Enable	-	Yes	Yes, No
		BLVD	-	43.0V	38.0 V–44.9 V (38.0 V $\leq$ BLVD Volt $\leq$ LLVD Volt)
		LLVD Enable	-	No	Yes, No
		LLVD	-	44.0V	BLVD Volt to DC Under Volt
	AC Settings	Over Volt	-	280VAC	181 V AC–300 V AC ( $>$ AC Under Volt)
		Under Volt	-	180VAC	60 V AC–279 V AC ( $<$ AC Over Volt)
	Alarm Settings	Alarm Severity	Alarm Name Level	-	Alarm Name Level: Minor, Major
		Digital Alarm	Digital No	1	1, 2
			Mode	High	High, Low
		Relay Relate	Alarm	Mains Fault	-
			Relate Relay	None	None, ALM1, ALM2, ALM3, ALM4
			Default Type	NO	NC, NO
	Rect Settings	Sleep Enable	-	No	Yes, No
		Best Effi Point	-	70%	60%-80%
		Exch Cycle	-	7days	5 days-30 days
		Min Num Rect On	-	1pcs	1 pcs–5 pcs
	Load HT Off	LHTD Enable	-	No	Yes, No
		Load Off Temp	-	70 ℃	50 ℃–80 ℃
		Rect Off Time	-	240Min	1–255 Min

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Range
	System Settings	Text	-	English	Chinese, English
		Batt Shunt Coef.	-	100A/50mV	1-999 A/1-99 mV
		Disp Contrast	-	3	2-5
		Modify PWD		No	Yes, No
		Date	-	2012-01-01	2000-2127 1-12 0-31
		Time	-	00:00	0-23 0-59
		System Type	-	ETP48150	ETP48150 ETP4890 ETP4830
		OLE Charger (Applicable only to TP482000B-L2 0B2, TP482000B-L2 0B3, and TP482000B-L2 0B4)	-	No	Yes, No
		Charge	-	Stop	Start, Stop
		<b>Note</b> The SMU01C restarts after you set <b>OLE Charger</b> to <b>Yes</b> and confirm the setting.  After the SMU01C restarts, the battery charging status is displayed on the LCD. Press <b>Enter</b> . The parameter setting screen is displayed.			
		Max Current		100 A	30-100 A
		Min Current		10 A	8-20 A
		Duration		24 h	12-48 h
		BC Volt		56.5 V	53.5-58.0 V
FC Volt		53.5 V	46.0-56.5 V		
OLE Charger		No	Yes, No		
Maintenance	Start BC/FC	-	-	FC	FC, BC

Main Menu	Second-Level Menu	Third-Level Menu	Fourth-Level Menu	Default Value	Range
	CLR History ALM	-	-	No	Yes, No

# B Technical Specifications

**Table B-1** Technical specifications

Category	Item	Specifications
Environmental conditions	Operating temperature	-33 °C to +70 °C
	Transportation temperature	-40 °C to +70 °C
	Storage temperature	-40 °C to +70 °C
	Operating humidity	5% to 95% (non-condensing)
	Storage humidity	5% to 95% (non-condensing)
	Altitude	0-4000 m When the altitude ranges from 3000 m to 4000 m, the operating temperature decreases by 1 °C for each additional 200 m.
Power supply	Input voltage range	36 V DC to 72 V DC
	Maximum current	0.5 A DC
Structure	Dimensions (H x W x D)	41.8 mm x 97 mm x 208 mm
	Weight	≤ 1.5 kg
EMC	CE	EN55022 CLASS B
	RE	EN55022 CLASS B
	CS	IEC61000-4-6 Power port 10 V Signal port 3 V (criterion A)
	RS	IEC61000-4-3 10 V/m (criterion A)
	ESD	IEC61000-4-2 Contact discharge: 6 kV (criterion B) Air discharge: 8 kV (criterion B) Contact discharge: 8 kV (criterion R)

Category	Item	Specifications
		Air discharge: 15 kV (criterion R)
MTBF		$\geq 250,000$ hours

# C Acronyms and Abbreviations

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**L**

**LCD**

liquid crystal display

**S**

**SMU**

site monitoring unit