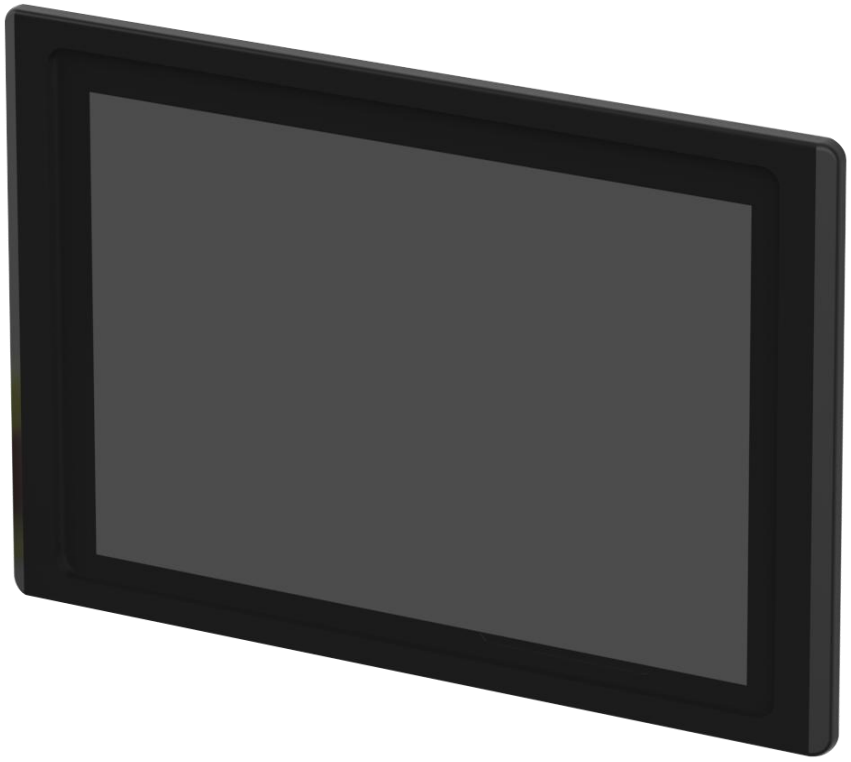
SUNWODA ENERGY



OASIS Series Product

LCU User Manual

Preface

Thank you sincerely for purchasing and exploring products developed and manufactured by Shenzhen Sunwoda Energy Technology Co., Ltd. (hereinafter referred to as "Sunwoda"). We genuinely hope that our products and this manual will meet your needs. Your valuable feedback is warmly welcomed, and we will continuously improve and enhance our offerings.

 The content is subject to change based on the latest physical product, and revisions may be made without prior notice.

Due to product version upgrades or other reasons, this document may be updated periodically. Unless otherwise agreed, this document serves solely as a product guide. All statements, information, and recommendations provided herein do not constitute any express or implied warranties.

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For updates or additional information, please contact Sunwoda.

Content

I. About This Manual

1.1 Attention

This product is a specialized piece of equipment. To ensure correct and safe installation, operation, and other procedures, please thoroughly read this manual before proceeding. Installation personnel must be professionally trained, possess electrical engineering expertise, and be fully familiar with local power grid regulations and relevant requirements. The company shall not be held liable for any loss or injury resulting from failure to comply with the operational guidelines emphasized in this manual.

The Local Control Unit (LCU) serves as the core management unit for the OASIS series products. This manual provides detailed information on its product features and usage methods. Due to product iterations, manual content will be continuously updated. For specific product details, please refer to the actual product you have purchased.

Finally, we hope this product fully meets your needs and look forward to receiving your valuable feedback. Please feel free to contact us with any requests or inquiries.

1.2 Applicable Model

This manual applies to the following product model：

System Product: A200 Series, L261 Series

LCU : LCU100-E01

Software Version：V1.2

1.3 Target Group

This product must only be operated by qualified professionals (technicians who have undergone specialized training and possess the necessary qualifications for equipment operation to perform installation, configuration, and maintenance tasks). Such professionals must possess the following fundamental competencies:

(1) Have received specialized training and understand how to address hazards and risks associated with the installation and use of electrical equipment.

(2) Possess knowledge of the installation and commissioning of standard electrical equipment and related devices, and be familiar with the regulatory requirements of local standards and codes.
(3) Hold valid electrical certification.

II. Safety Information

Pre-Operation Safety Checks

1. Power Safety

(1) Before installing or maintaining the equipment, disconnect all input power sources (AC/DC) and confirm no live components are exposed.

(2) Before powering on, verify the supply voltage (18V~32V DC) meets rated requirements to prevent overvoltage damage.

2. Environmental Requirements

(1) Do not operate in environments with humidity >95%, temperature >65°C, or presence of flammable gases.

(2) Ensure installation location has adequate ventilation and is free from strong electromagnetic interference (e.g., transformers, high-frequency equipment).

3. Emergency Response Procedures

(1) In case of equipment abnormalities (e.g., smoke emission, unusual noises, overheating), immediately press the emergency stop button and cut off the main power switch.

(2) For major malfunctions, contact Sunwoda technical support immediately. Do not disassemble internal modules without authorization.

III. Product Introduction

3.1 System Introduction

The Local Controller Unit (LCU) serves as the core management unit of the energy storage system, with the following primary functions:

N0.	Function	Description	Note
1	Communication Functions	Supports external CAN, RS485, and ETH communication.	
2	Data Management	Supports battery stack and battery cluster information display. Real-time data storage at one-second intervals, with a minimum storage duration of six months. Local/remote data export.	
3	Device Control	Supports remote and local upgrades	
4	Protection Function	Battery fault diagnosis and protection Features delayed power-off data backup upon unauthorized power disconnection	

3.2 Technical Parameter

Item	Description
Product Model	LCU100-E01
Processor	ARM Cortex-A55，quad-core，1.8GH
Memory	RAM：4GB LPDDR4　ROM：32GB eMMC
Operating System	Linux
Display	10.1-inch capacitive touchscreen, 1280*800 resolution
Power Supply	DC 18V~32V
Power Consumption	≤10W
Watchdog	Software watchdog, resettable upon fault
RTC	Time synchronization accuracy 20ms/month
Power Supply	DC 18V~32V
Power Consumption	≤10W
Operating Temperature	-20℃~65℃
Storage Temperature	-40℃~85℃
Relative Humidity	5%~95%，non-condensing
Altitude	＜3000m
Cooling Method	Chassis Heat Sink
Protection Rating	IP65（screen）
Size（W*H*D）	288*190*41mm
Weight	1.8kg

Interface Configuration

Item	Description
Ethernet	3 ports (2x Gigabit Ethernet, 1x 100Mbps Ethernet)
USB	2 ports (USB 3.0 Type-A (supports peripheral expansion))
Serial Port	5 ports (isolated RS485, supports Modbus RTU protocol)
CAN	2 ports (isolated CAN 2.0B, adjustable baud rate (50Kbps~1Mbps))
DI/DO	10 channels/6 channels (digital input/output, supports dry contact signals)
Wireless Communication	1 channel (Built-in WiFi/Bluetooth module (optional 4G module))
Storage Expansion	1 channel (TF card slot (supports up to 512GB))

3.3 Structure Diagram

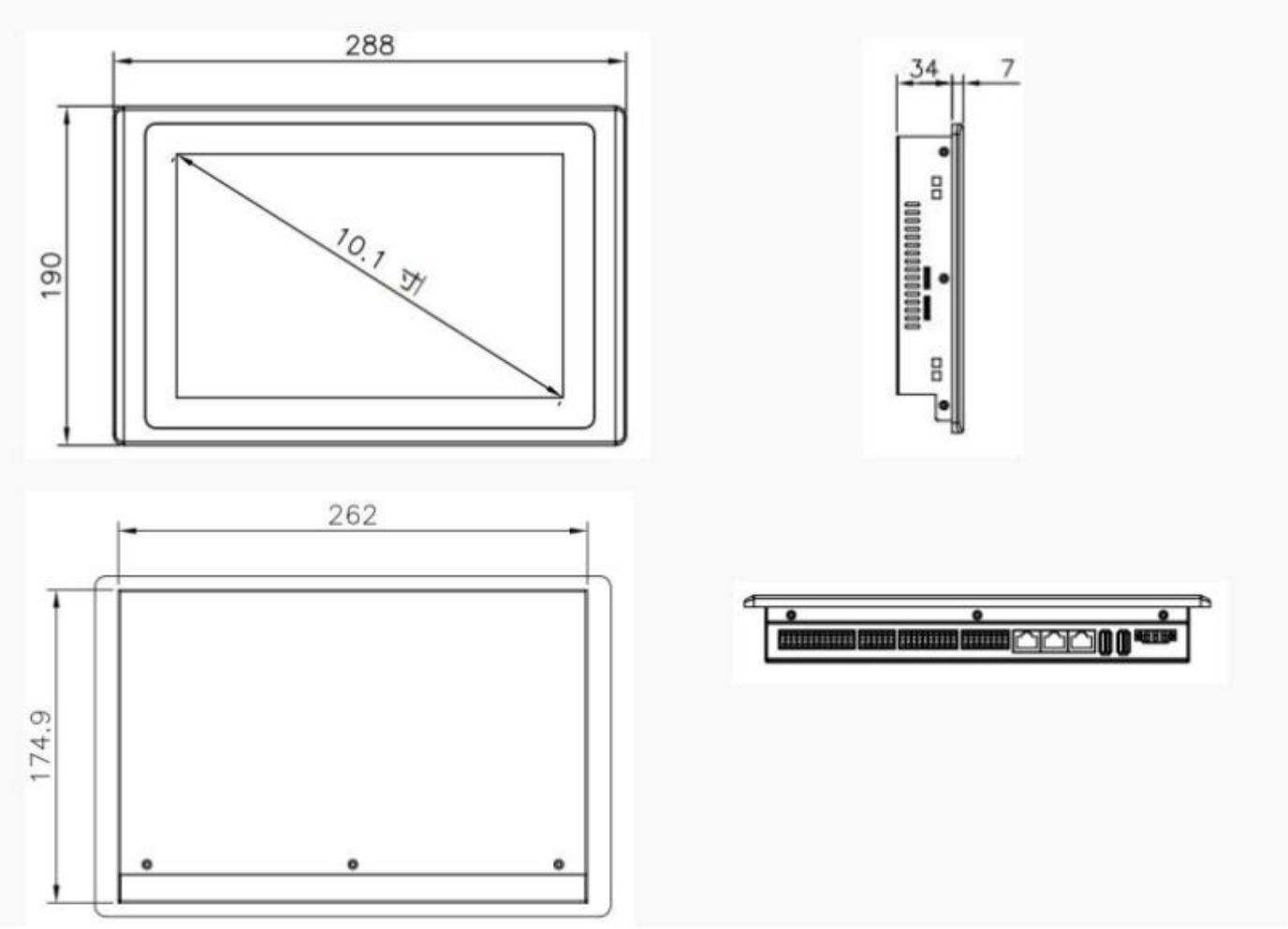
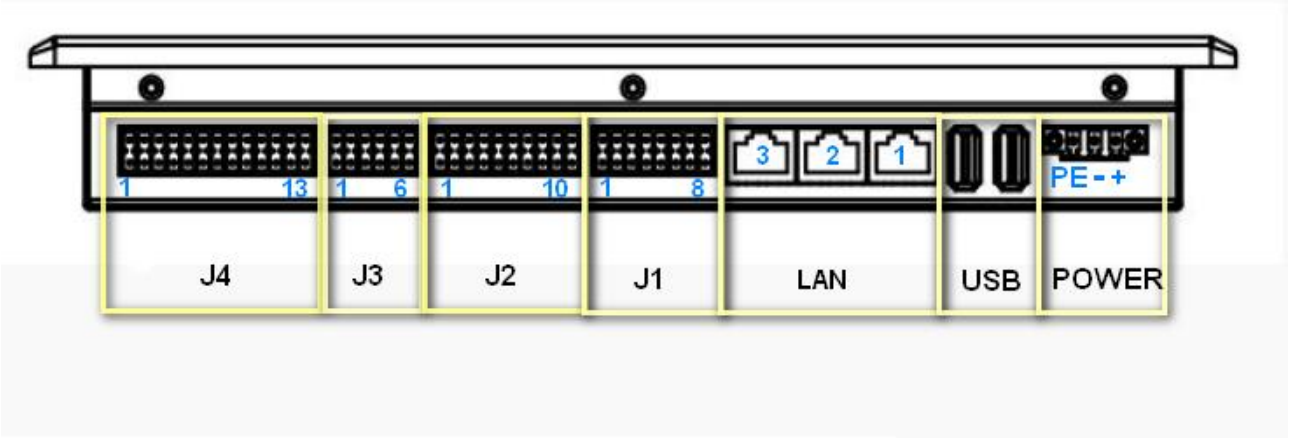


Figure 3.4.1 Dimension Diagram



J1 Connector（DI）

Socket Model：15EDGRHC_3R5_16P

Plug Model：KF2EDGKS-3.5-2*8P

Number of Pins：16

Pin	9	10	11	12	13	14	15	16
Definition	/	/	DI10H	DI8H	DI6H	DI4H	DI2H	VSS
Pin	1	2	3	4	5	6	7	8
Definition	/	/	DI9H	DI7H	DI5H	DI3H	DI1H	VDD

J2 Connector（RS485）

Socket Model：15EDGRHC_3R5_20P

Plug Model：KF2EDGKS-3.5-2*10P

Number of Pins：20

Pin	11	12	13	14	15	16	17	18	19	20
Definition	/	RG4	/	RG3	/	RG2	/	RG1	/	RG0
Pin	1	2	3	4	5	6	7	8	9	10
Definition	4B	4A	3B	3A	2B	2A	1B	1A	0B	0A

J3 Connector（CAN）

Socket Model：15EDGRHC_3R5_12P

Plug Model：KF2EDGKS-3.5-2*6P

Number of Pins：12

Pin	7	8	9	10	11	12
Definition	/	/	/	CG1	/	CG0
Pin	1	2	3	4	5	6
Definition	/	/	1L	1H	0L	0H

J4 Connector（DO）

Socket Model：15EDGRHC_3R5_26P

Plug Model：KF2EDGKS-3.5-2*13P

Number of Pins：26

Pin	14	15	16	17	18	19	20	21	22	23	24	25	26
Definition	/	/	/	/	/	/	/	D5-	D4-	D3-	D2-	D1-	D0-
Pin	1	2	3	4	5	6	7	8	9	10	11	12	13
Definition	/	/	/	/	/	/	/	D5+	D4+	D3+	D2+	D1+	D0+

IV. Human-Machine Interaction Guide (Battery Mode)

4.1 Function Bar Overview

4.1.1 Menu Bar

The left side of each interface features five primary menu options: [Overview] (Home), [Auxiliary Equipment], [Alarm], [Data Query], and [Operation]. Selected options display in blue text.

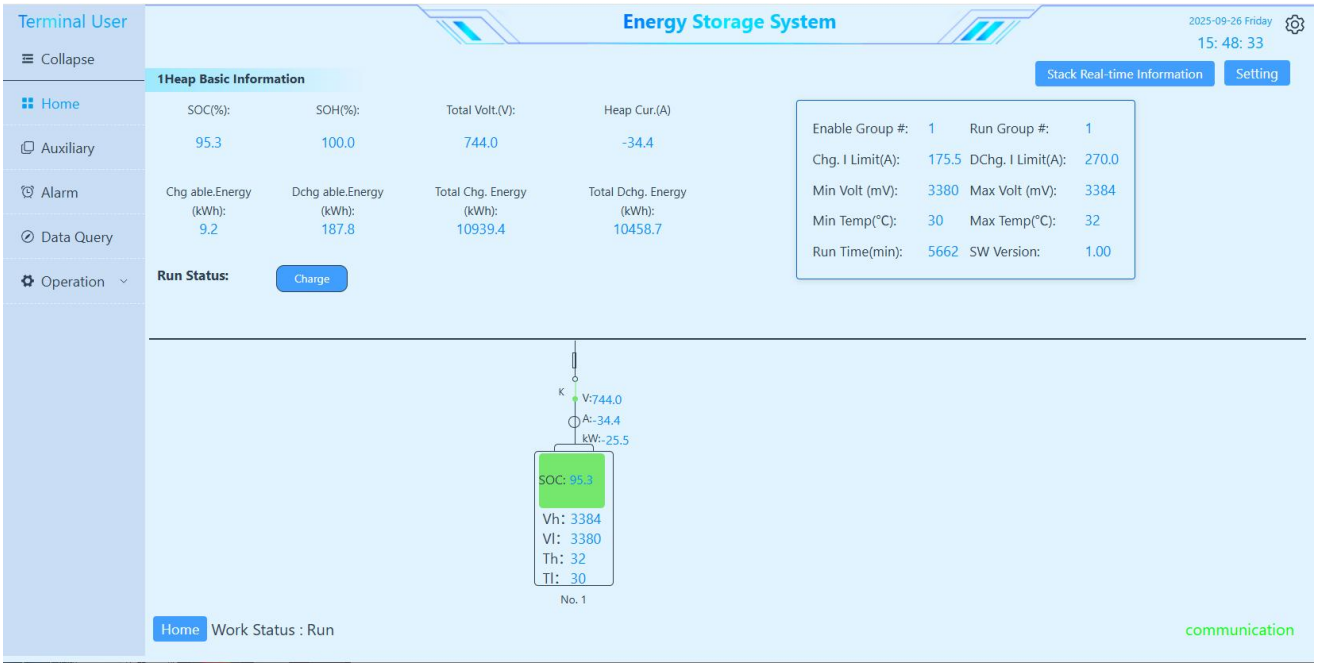


Figure 4.1.1.1 Menu Bar Overview

1) Overview: Battery overview information.

2) Auxiliary Equipment: DIDO status information.

3) Fault Alarms: Displays current alarms, historical alarms, historical events, and fault recordings.

4) Data Query: Historical data download and export, storage status display.

5) Operations Center: For local operations and maintenance, including OTA, log recording, file download, and other functions.

4.1.2 Status Bar

The bottom sidebar of each interface displays key system status information, including operational status and communication status.

The communication connection indicator reflects the connection status between the EMS and HMI. A green “communication” status indicates a successful connection, while a red “communication” status indicates no connection. Clicking “Reconnect” and entering the IP address will establish the

connection.

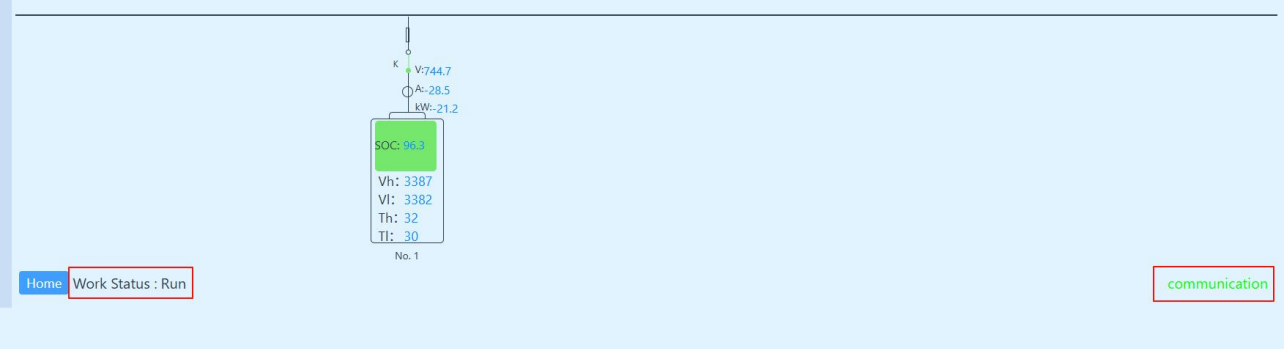


Figure 4.1.2.1 Status Bar

Figure 4.1.2.2 Unconnected Display

4.2 Introduction to the Toolbar

4.2.1 Battery Data

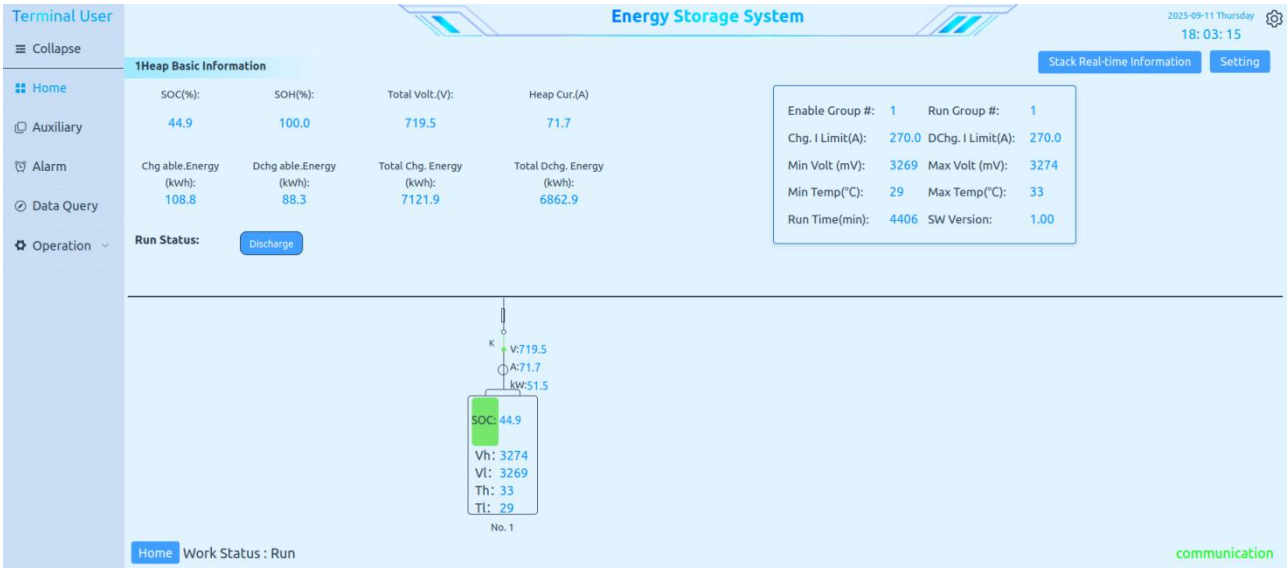


Figure 4.2.1.1 Battery Stack Information

Stack Real-time Information: Click the “Stack Real-time Information” icon in the upper-right corner to view detailed stack information.

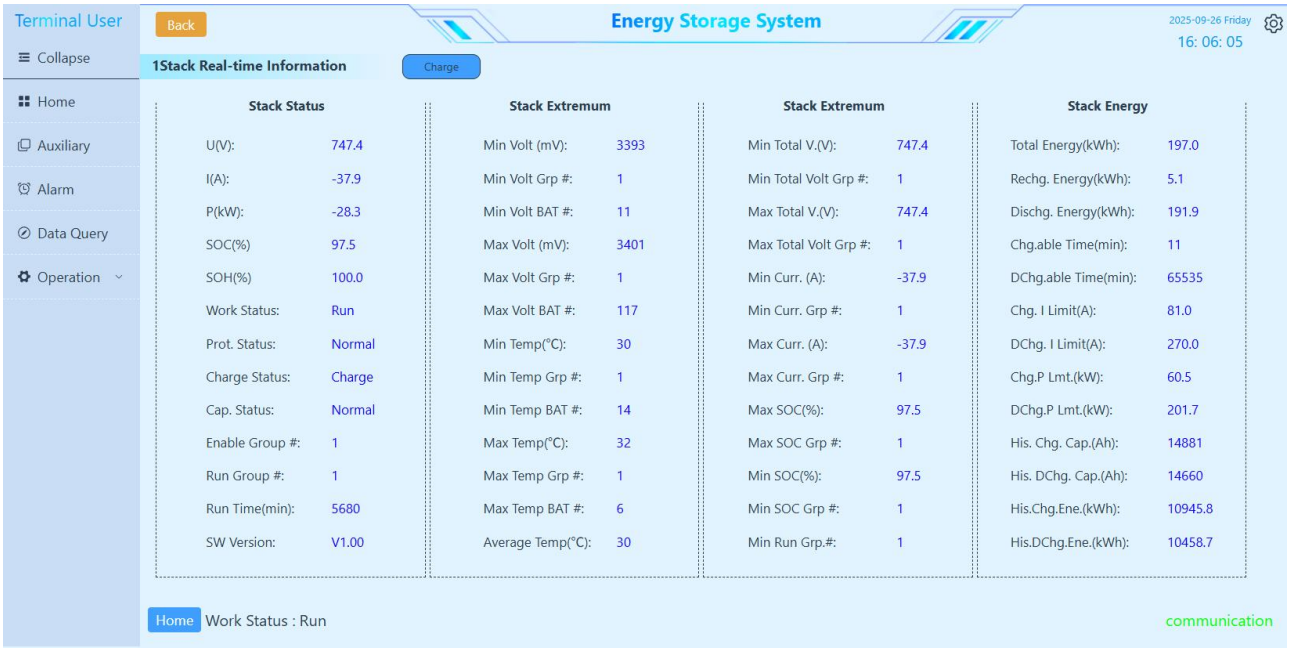


Figure 4.2.1.2 Battery Stack Details

Stack Key Parameters: Click the “Setting” icon in the upper right corner to configure the battery stack's key parameters.

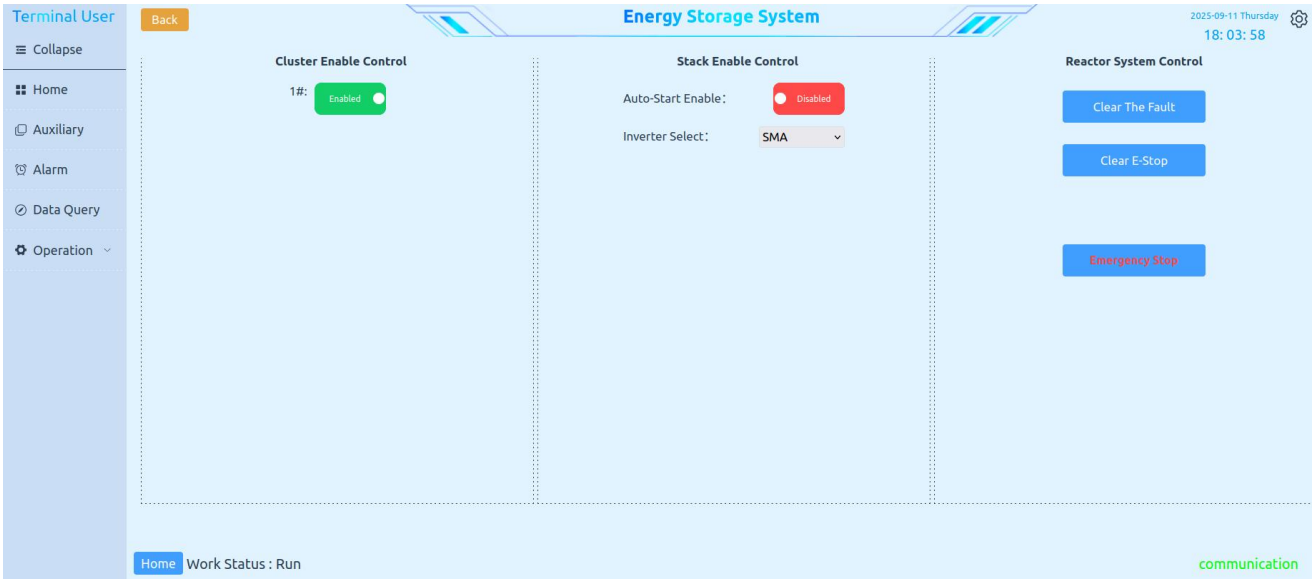


Figure 4.2.1.3 Battery Stack Parameter Settings

Name	Description	Attribute
Cluster Enable Control	Display and control the total number of configured clusters, enabling or disabling any cluster individually.	Reading and Writing
Auto-Start Enable	This parameter displays based on the total configured clusters. For example, with 16 clusters configured, this interface shows the enable status for	Reading and Writing

	all 16 clusters, each controllable separately.	
Clear Fault	After enabling, the battery automatically closes all system circuit contactors during fault-free operation or after fault recovery.	Reading and Writing
Clear Emergency Stop	To clear a startup failure fault (e.g., reported during startup when main contactor closure conditions are not met, such as during safety voltage), manually click the fault clear button.	Reading and Writing
Emergency Stop	After pressing the hardware or software emergency stop button, click the emergency stop clear button to restore normal operation (for hardware emergency stop, first release the emergency stop button).	Reading and Writing

Cluster Real-Time Information: Click the battery icon on the topology map to view detailed information for a single cluster.

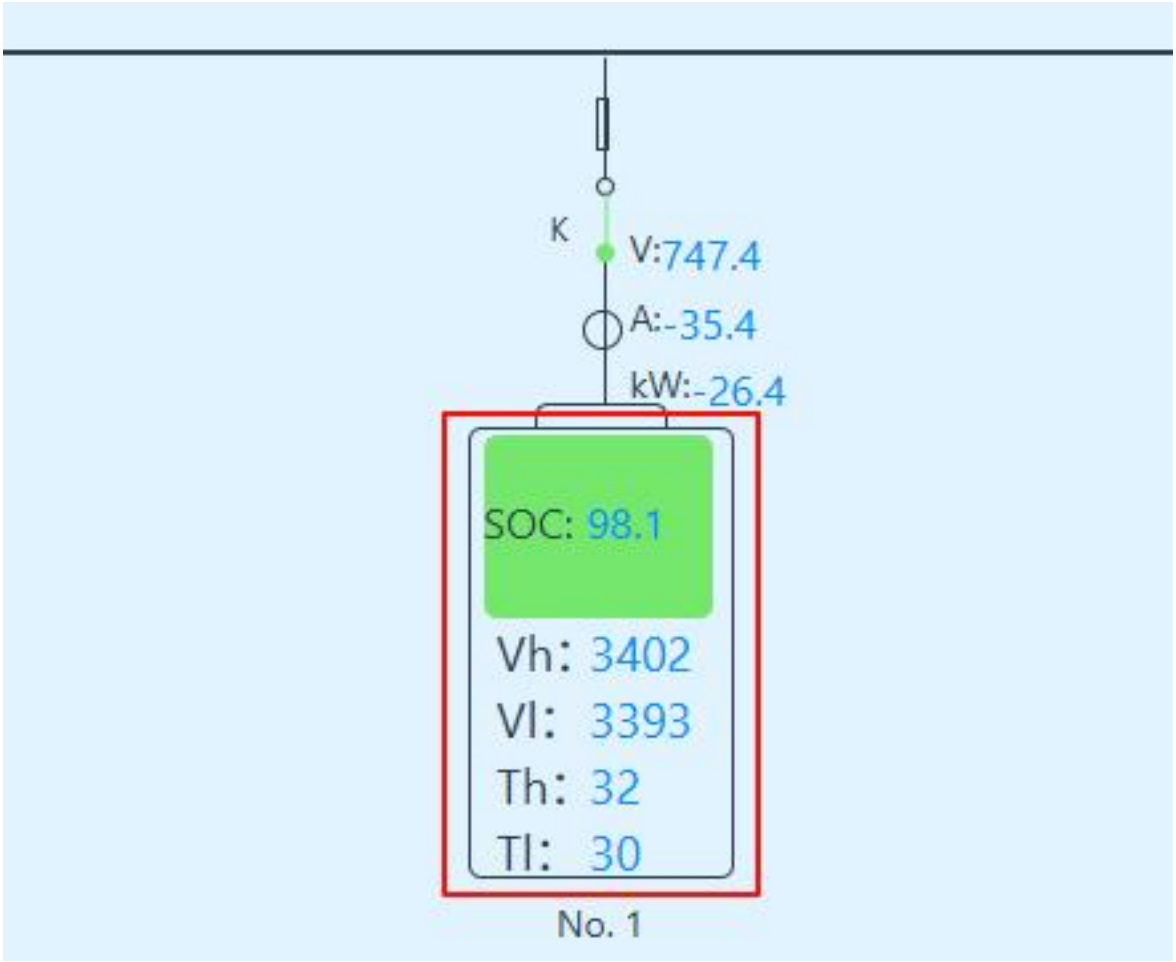


Figure 4.2.1.4 Battery Display Parameters in Topology Diagram

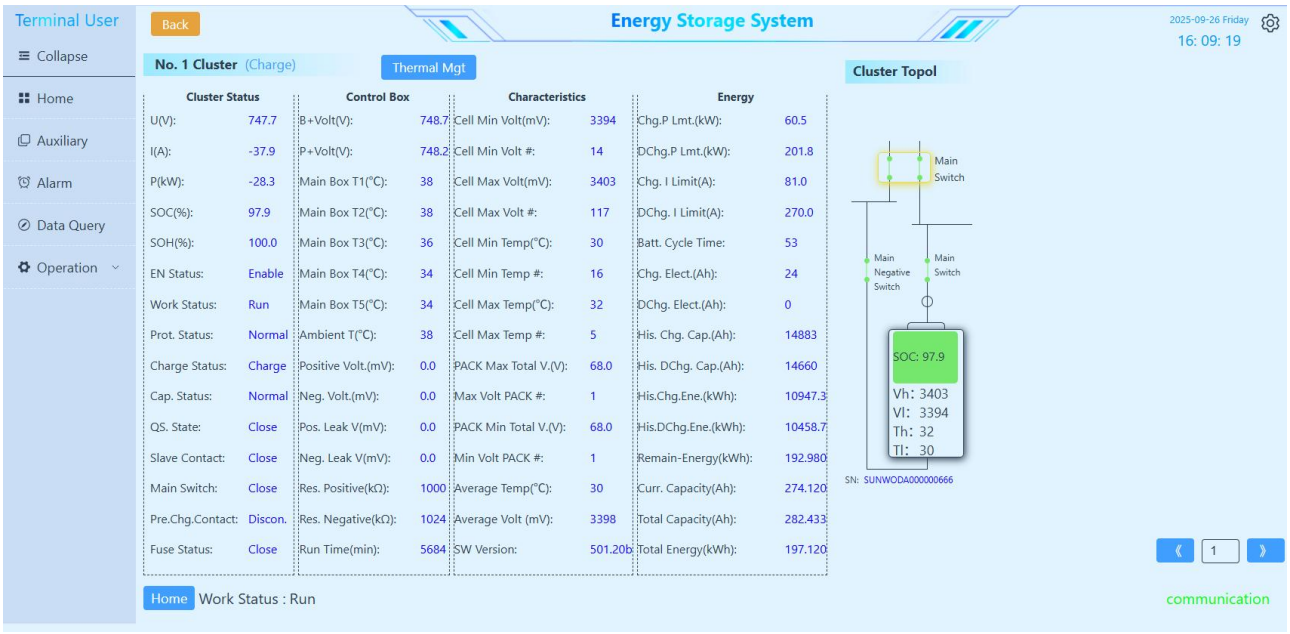


Figure 4.2.1.5 Single Cluster Details

4.2.2 Auxiliary Equipment

Click the [Accessory Devices] button on any other interface to enter the “Accessory Devices” details screen. This screen displays the data and status of devices connected to DIDO.

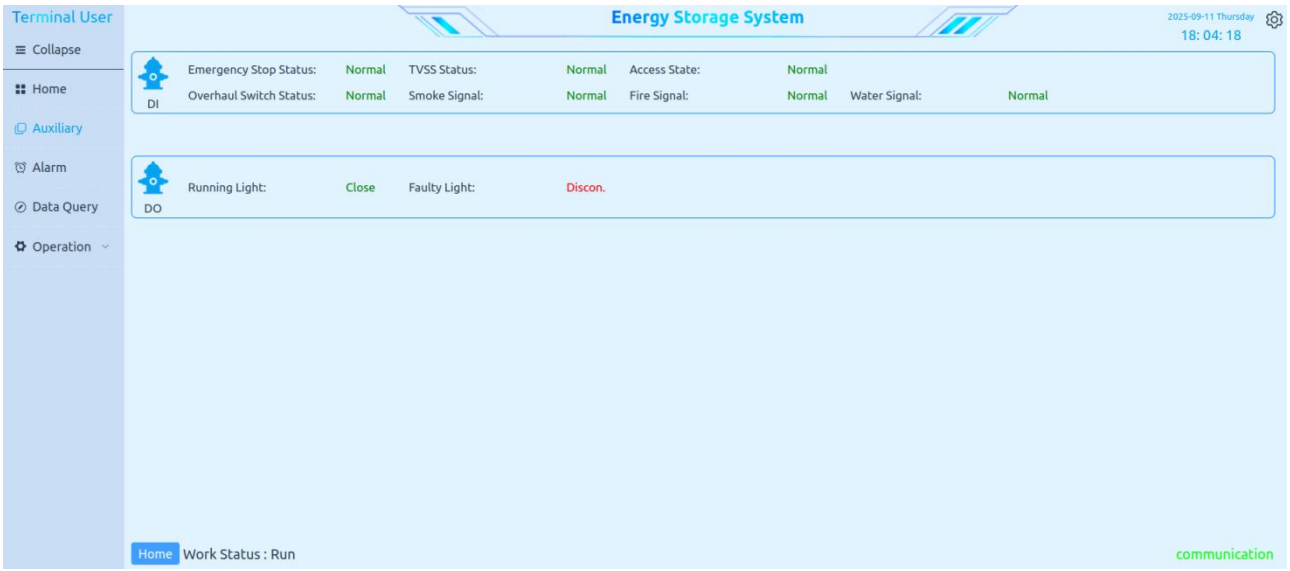


Figure 4.2.2.1 Auxiliary Equipment Information

4.2.3 Fault Alarm

Click the [Fault Alarm] button on any other interface to enter the “Alarm” details screen. Here, users can view alarm information including [Current Alarms], [Historical Alarms], [Historical

Events], and [Fault Recordings]. This enables timely monitoring of system faults and facilitates fault analysis through historical data.

Alarm Level Reference Table:

Name	Level	Action
Event	1	Pop-up alert: Automatically logs event information
Alarm	2	Pop-up alert: Automatically logs alarm information
Standby	3	Pop-up alert: Battery current limiting at 0, automatically logs information
Fault	4	Pop-up alert: Red light steady, battery current limiting at 0, battery disconnected from charge/discharge circuit, automatically logs fault information

(1) Current Alarms

Displays active alarm information within the system, including device type, alarm name, alarm severity level, and occurrence time. Each page shows up to 10 alarm entries; additional entries are displayed via pagination.

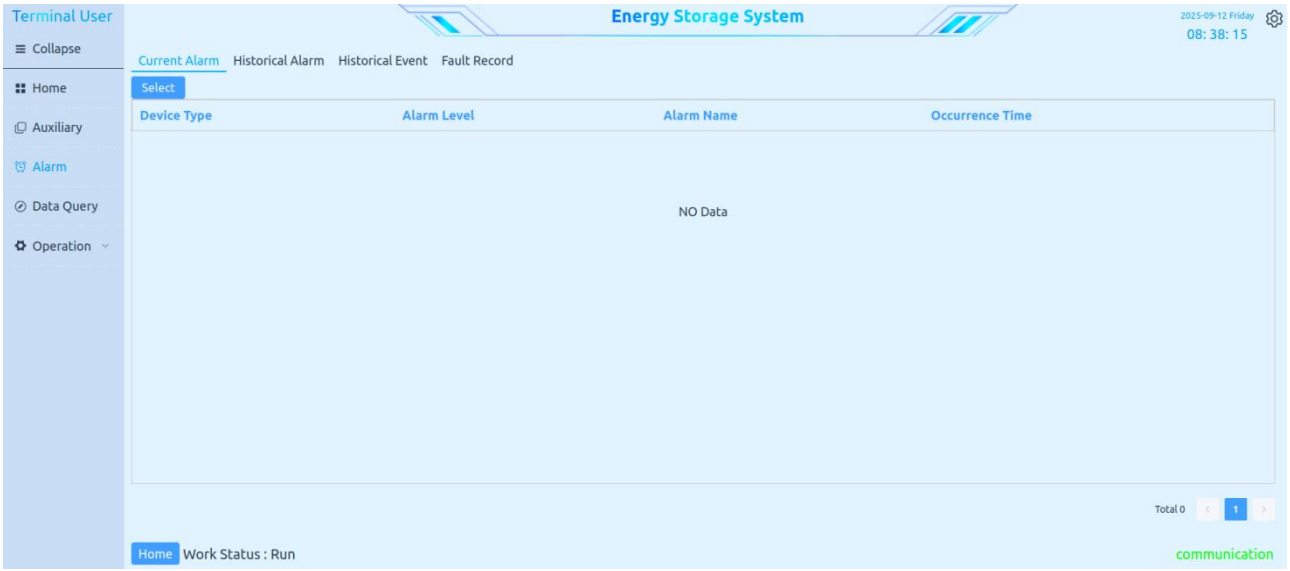


Figure 4.2.3.1 Current Alarm Information

In addition to viewing alerts on this page, the system will display pop-up alerts. Users can dismiss the pop-up by clicking it or waiting 5 seconds for it to automatically disappear. However, the alert information will remain until the corresponding clearance conditions are met.

(2) Historical Alarms

Customize the time range to view past alarm events, including device type, alarm name, severity level, occurrence time, and resolution time. Each page displays up to 10 alarms, with additional entries shown on subsequent pages.

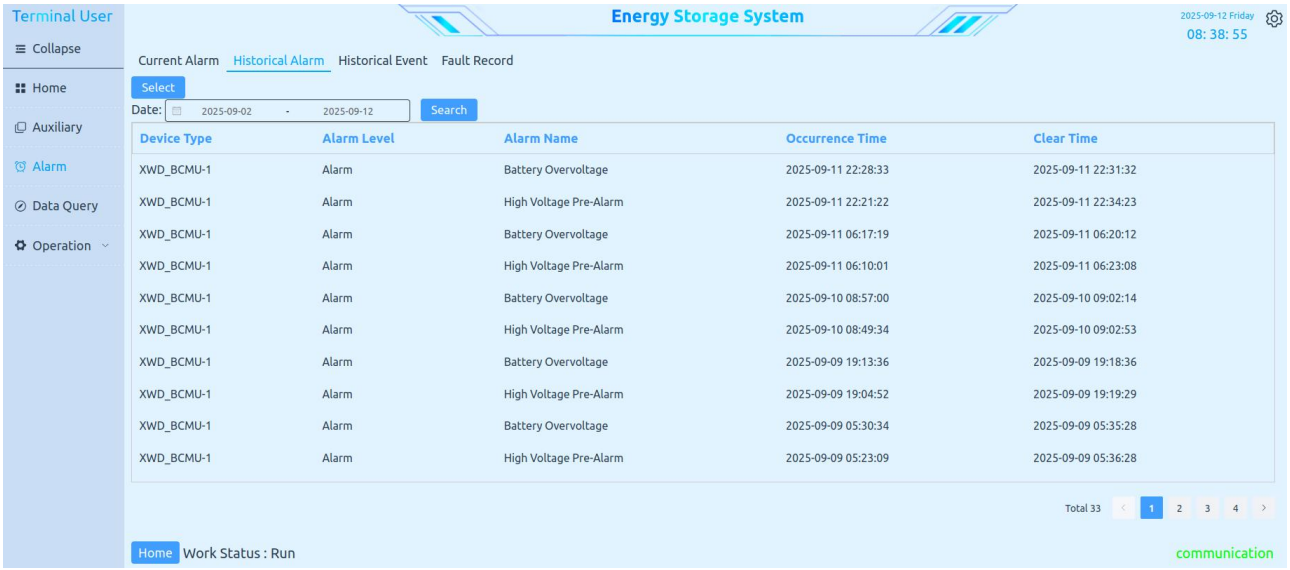


Figure 4.2.3.2 Historical Alarm Information

(3) Historical Events

This feature also supports custom time queries, displaying information about events that have already occurred in the system. This includes device type, alert level, alert name, and occurrence time. Each page displays up to 10 event entries, with additional entries shown on subsequent pages.

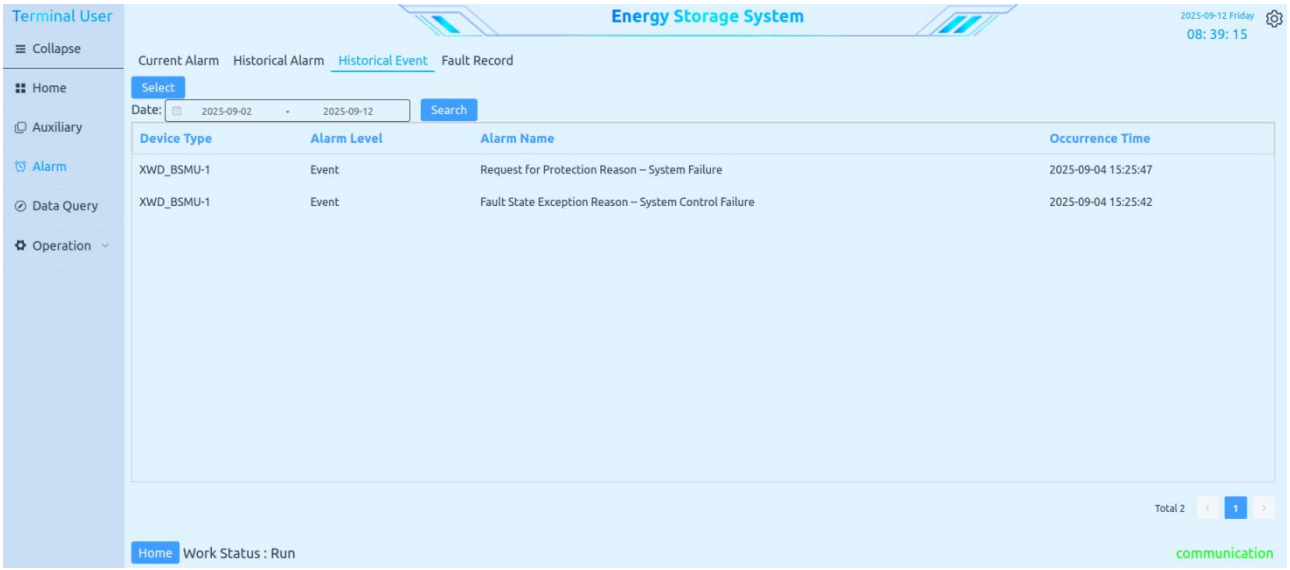


Figure 4.2.3.3 Historical Event Information

(4) Fault Recording

Used to download and export recording files in “ .csv ” format. File names include the fault occurrence time. Each page displays up to 10 recording entries, with pagination for additional files.

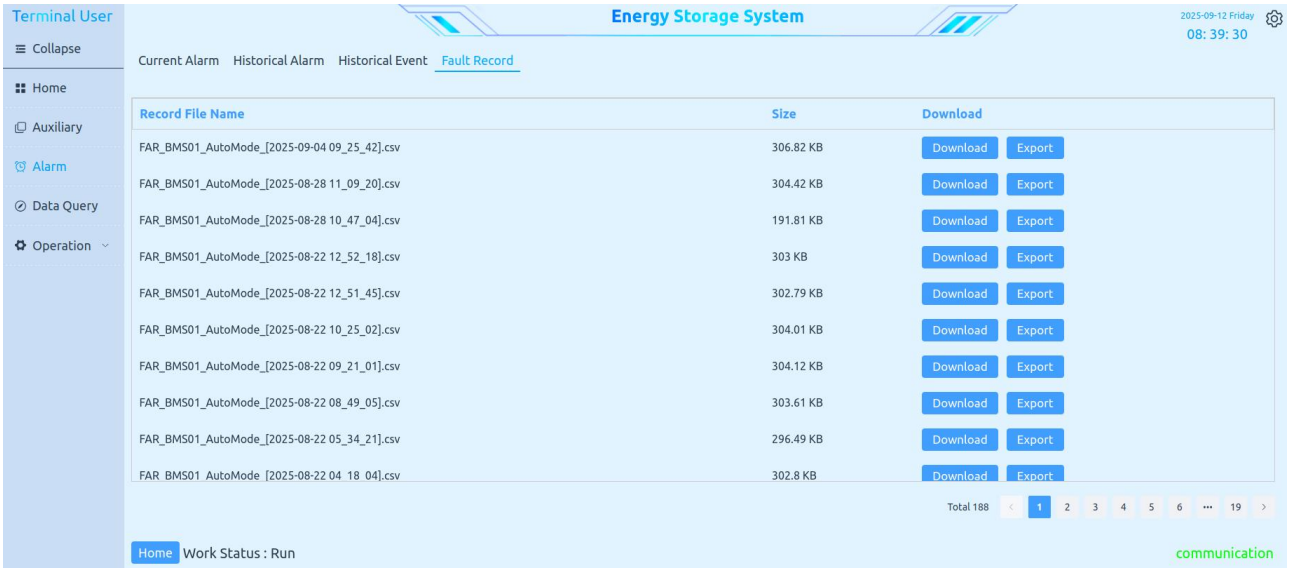


Figure 4.2.3.4 Fault Recording Information

4.2.4 Data Query

Click the [Data Query] button on any other interface to access the historical data query page. This page allows downloading and exporting historical operational data at the second level, with files compressed and stored by day.

The page also displays storage status and remaining memory space. Users can click “Select” to query files by date for single days, months, or years. If numerous files exist, use the “Search” function to filter results. Queried files can be downloaded locally or exported to external storage devices like USB drives.

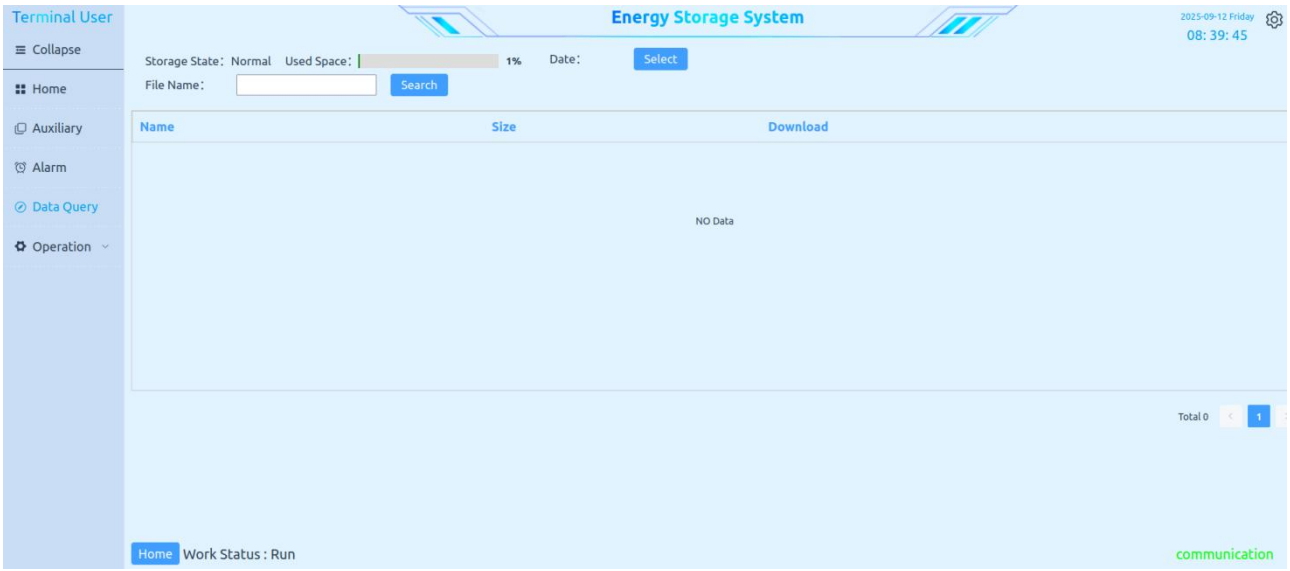


Figure 4.2.4.1 Data Query

4.2.5 Operation Center

Click the [Maintenance Center] button on any other interface to enter the maintenance operation interface. This interface includes the Version Upgrade (OTA) and File Download (FILE List) functional modules.

(1) Version Upgrade

Click the [Version Upgrade] button to enter the upgrade interface, where you can upgrade the local controller and BMS. The upgrade process involves selecting a secret key, choosing the upgrade file, and then initiating the upgrade. Logs during the upgrade process can be viewed in the log interface below.

Upgrade Process: Select Key → Select Upgrade File → Upgrade.

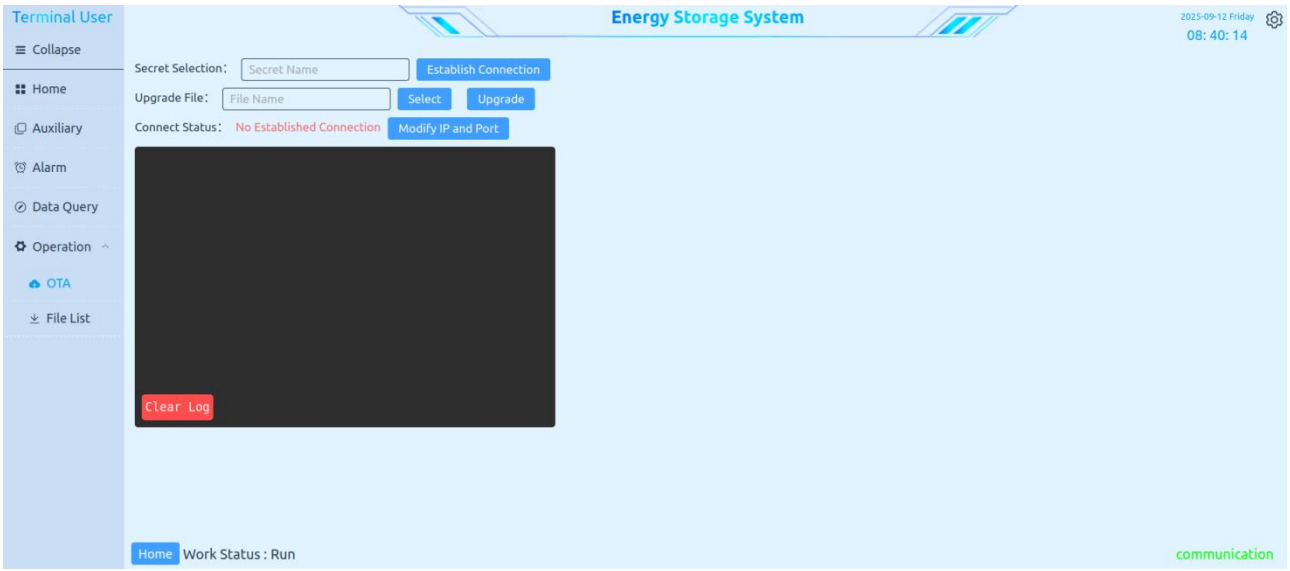


Figure 4.2.5.1 Operations Center

(2) File Download

Click [File Download] to access the file list, where you can download or export configuration files.

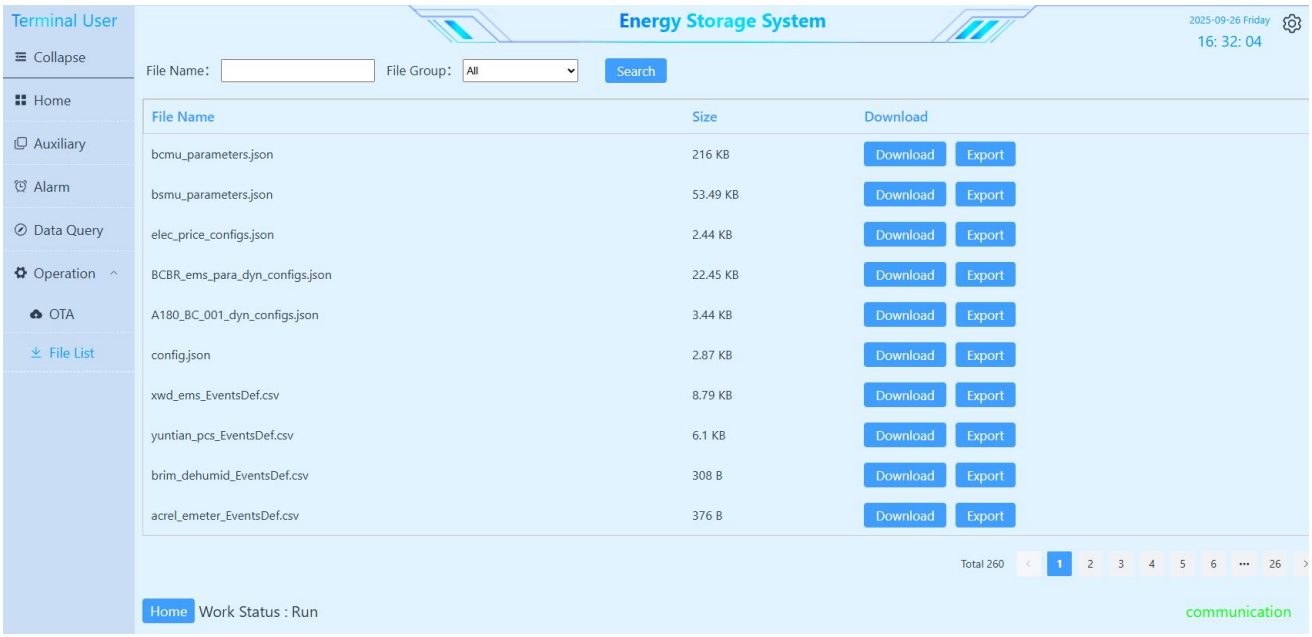


Figure 4.2.5.2 File Download

4.2.6 Others

(1) Settings Center

Click the gear “Settings” icon in the top-right corner to open the settings panel on the left.

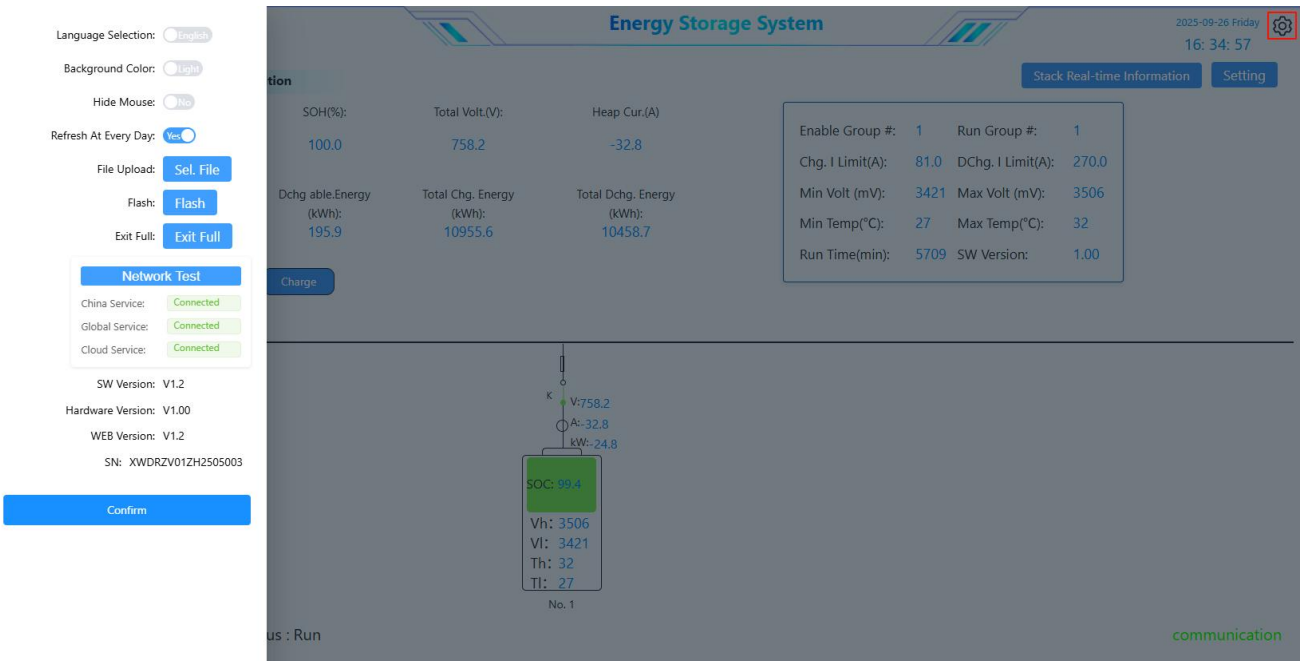


Figure 4.2.6.1 Setting the Center

Feature Overview:

Language Selection: Currently supports Chinese and English.

Background Selection: Currently supports dark and light themes. We recommend selecting the "Light" background for outdoor daytime use.

Hide Mouse: Used to toggle whether the mouse cursor is hidden.

Zero-Hour Refresh: Used to periodically clear system cache.

Refresh: Click the refresh button to manually clear cache.

Exit Fullscreen: Used to exit fullscreen mode. This function requires password verification.

(2) Pop-ups

Prompts appear in the bottom-left corner for operation errors or login timeouts.

Alerts or fault notifications appear in the top-right corner.

Taps or a 5-second timeout clear alert displays.

(3) Screen Sleep

If no interaction (e.g., touch, input) occurs within 3 minutes, the HMI enters sleep mode and turns off the screen. Touch the screen to wake it up.

V. Human-Machine Interaction Guide (All-in-One Mode)

5.1 Function Bar Overview

5.1.1 Menu Bar

The left side of the interface features seven primary menu bars: [Overview] (Home), [Auxiliary Equipment], [Alarm], [Data Query], [Curve Report], [Strategy Management], and [Operation Center].

Selected items are highlighted in blue text.

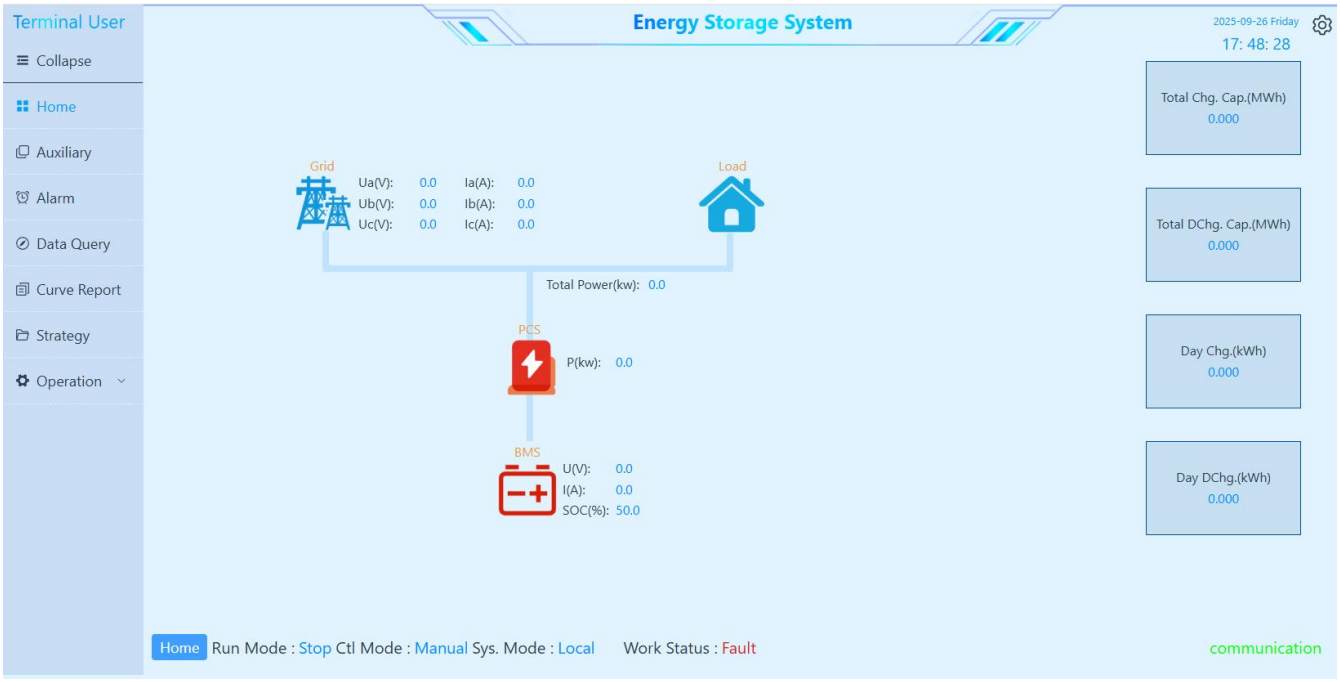


Figure 5.1.1.1 Menu Bar Overview

1) Overview: Summary information for PCS and BMS.

2) Auxiliary Equipment: Displays DIDO status information, gas detector status, and electricity meter summary.

3) Fault Alarms: Includes displays for current alarms, historical alarms, historical events, and fault recording playback.

4) Data Query: Historical data download and export, storage status display.

5) Curve Reports: Presents system and PCS data over a period in graphical form.

6) Policy Management: Configuration and management of battery charge/discharge policies and parameters.

7) O&M Center: Supports local operations and maintenance, including OTA updates, log recording, file downloads, and more.

5.1.2 Status Bar

Below each interface is a status bar displaying the operating mode, control mode, system mode, operational status, and communication status.

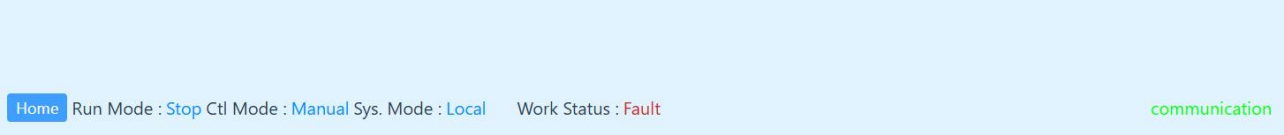


Figure 5.1.2.1 Status Bar

The communication connection indicator displays the status of the EMS and HMI connection. A green "communication" status indicates a successful connection, while a red "communication" status indicates no connection. After clicking "Reconnect," enter the IP address to establish the connection.

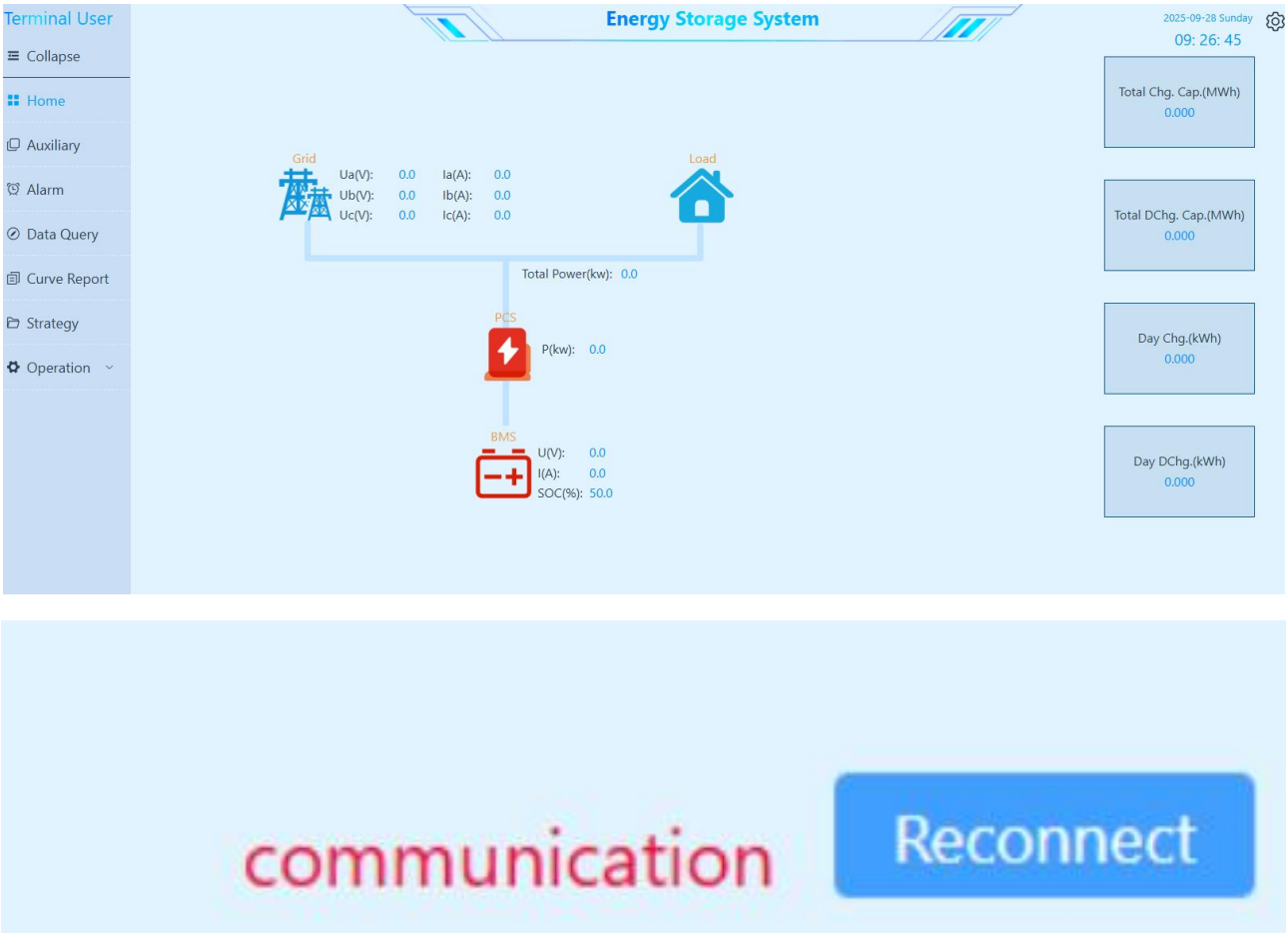


Figure 5.1.2.2 Unconnected Display

5.2 Introduction to the Toolbar

5.2.1 All-in-One Data

The overview interface displays data from the integrated PCS and BMS. As shown in the figure below, the topology diagram presents PCS power, BMS voltage/current, and SOC. The right side shows total energy storage charge, total energy storage discharge, daily charge, and daily discharge.

(1) PCS Data

Clicking the PCS icon in the topology diagram opens the PCS detailed data interface.

Basic Functions Page: The top row contains basic start/stop and reset operations, along with AC active power settings. The four columns below display PCS power, voltage/current, fault status, system status, and other information.

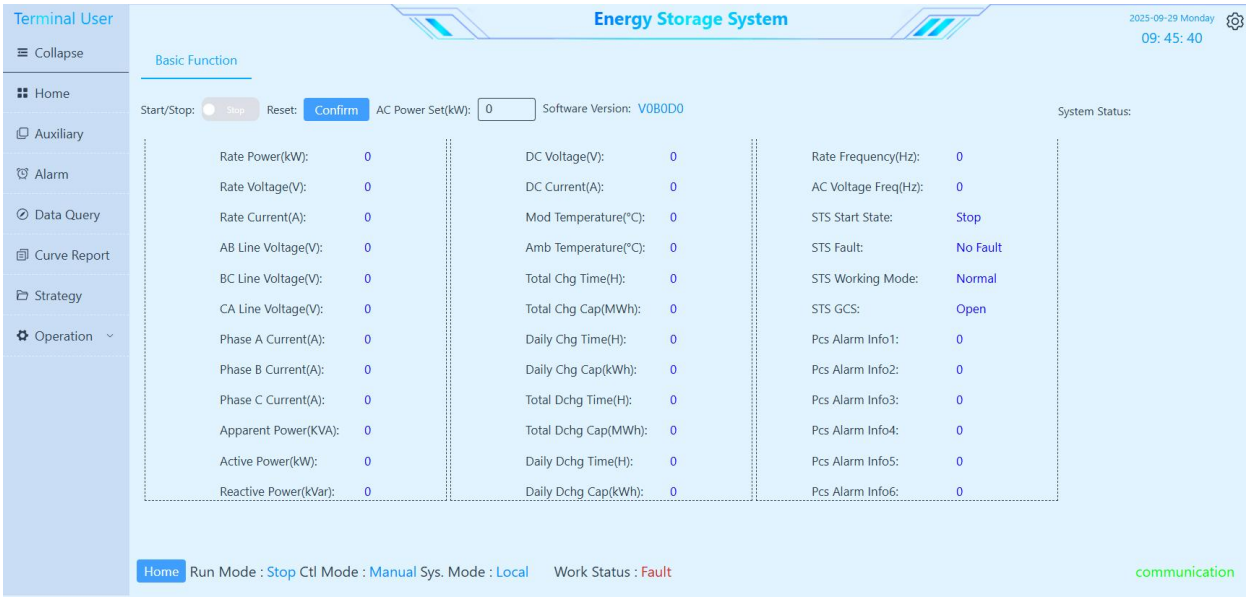


Figure 5.2.1.1 Basic Functions Page

(2) BMS Data

Clicking the BMS topology diagram on the Overview page takes you to the BMS Data page. The upper section primarily displays the battery's status overview data, with two buttons in the upper-right corner: Stack Real-Time Information and Settings. The lower section shows individual cell cluster information.

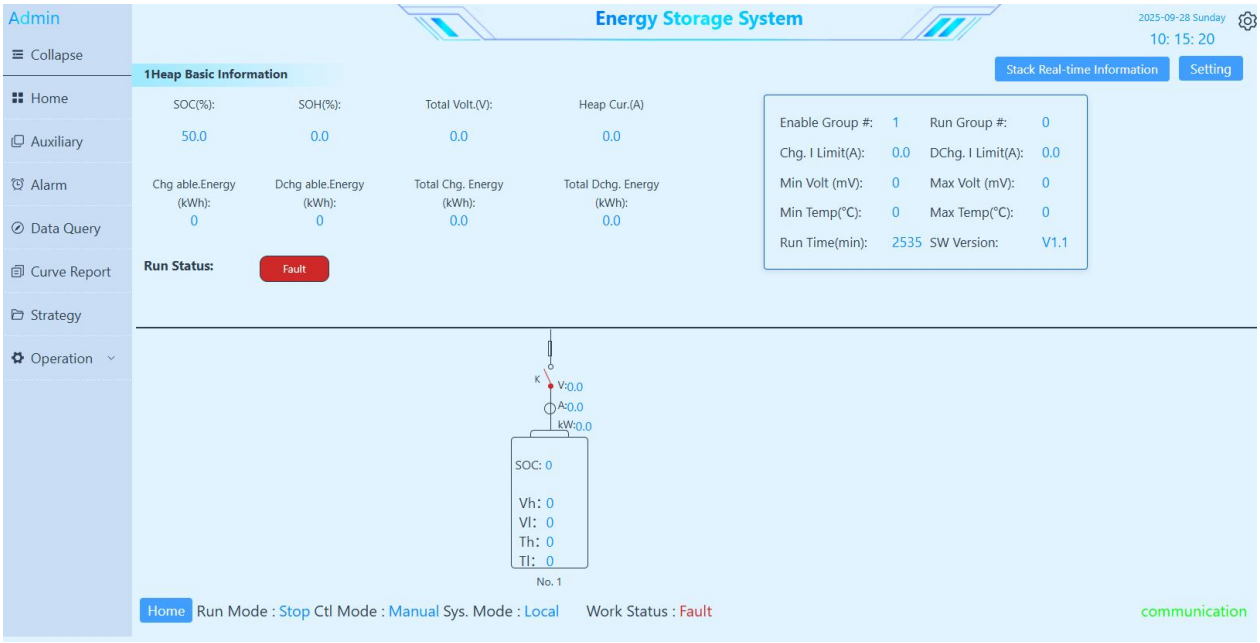


Figure 5.2.1.2 BMS Data

Single-Cell Battery Information: Click the single-cell battery icon to access the single-cell battery information page. A back button is located in the upper-left corner.

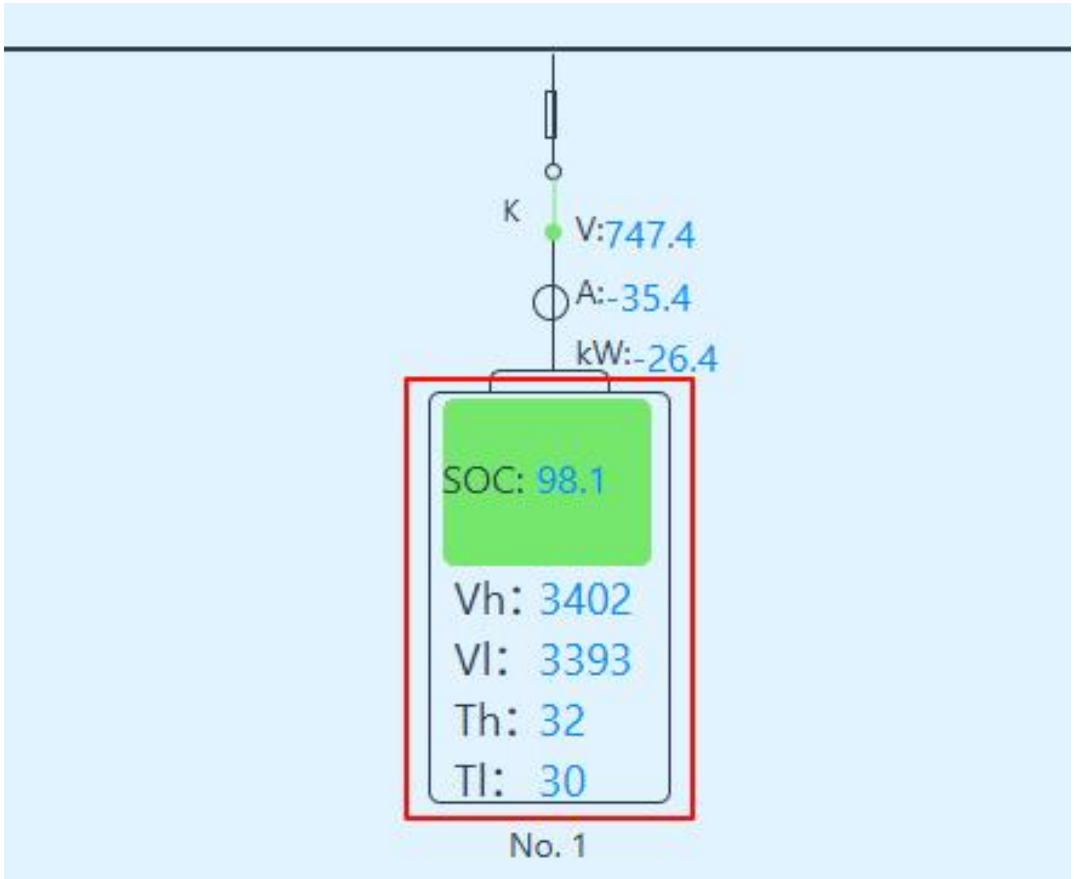


Figure 5.2.1.3 Battery Display Parameters in Topology Diagram

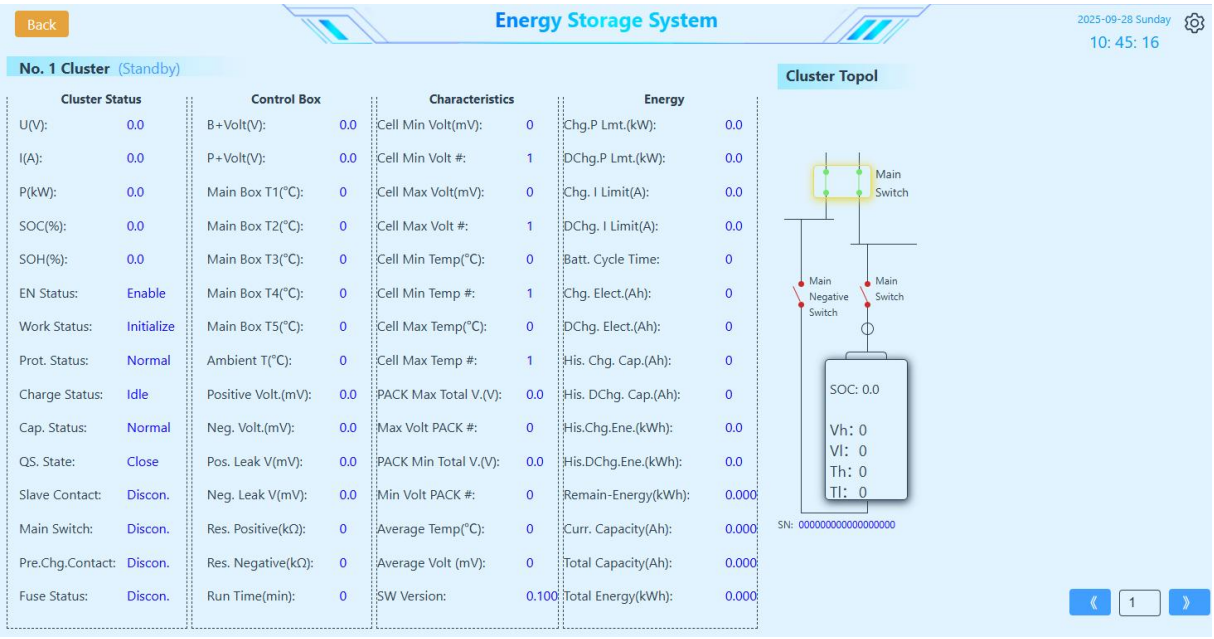


Figure 5.2.1.4 Single-Cell Battery Details

Stack Real-Time Information: Click the Stack Real-Time Information button in the upper-right corner of the BMS Data page to access the Stack Real-Time Information page.

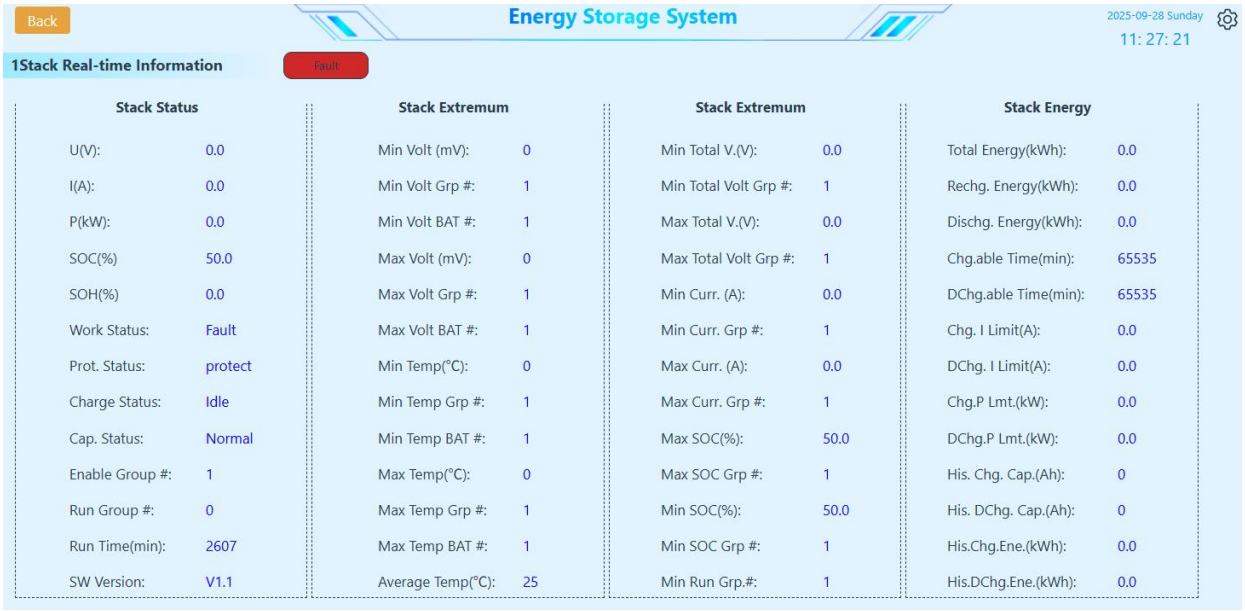


Figure 5.2.1.5 Stack Real-Time Information

Battery Stack Settings: Click the “Settings” icon in the upper-right corner to access the page and configure key parameters for the battery stack.

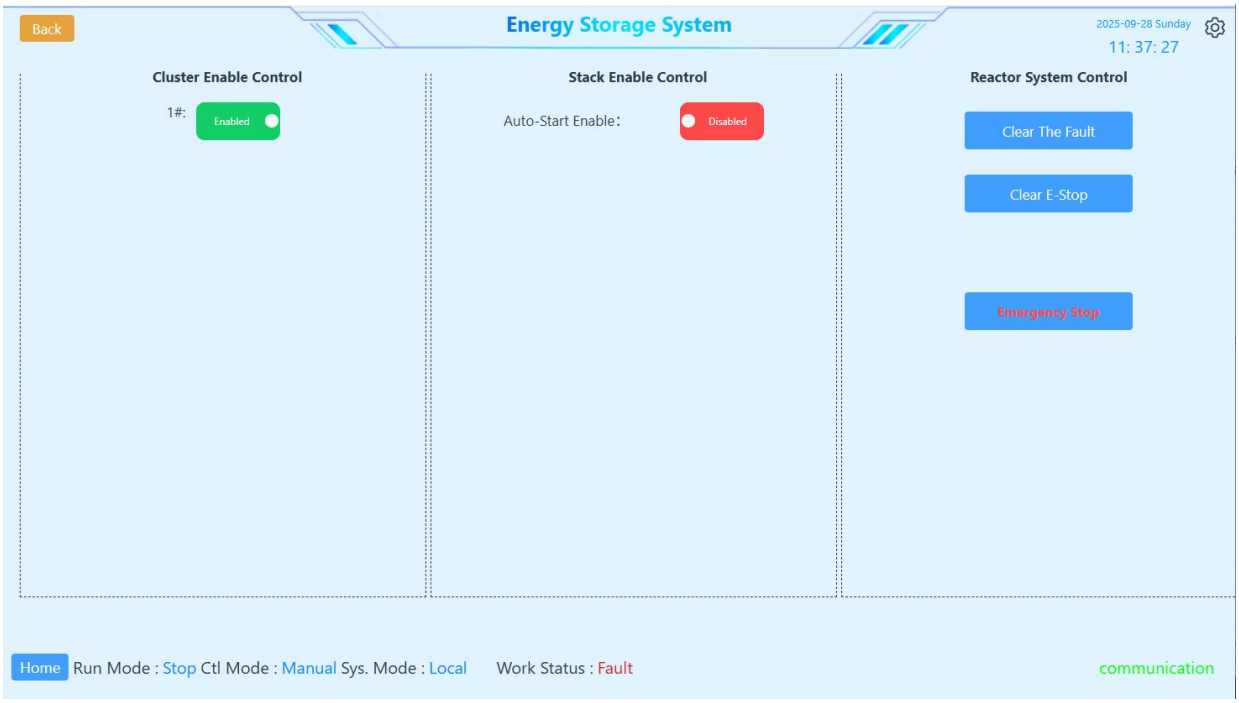


Figure 5.2.1.6 Heap Settings Interface

5.2.2 Auxiliary Equipment

Click “Auxiliary Devices” in the left menu bar to access the Auxiliary Devices homepage. The page displays the operational status of DIDO-connected devices along with brief information about gas detectors and electricity meters. Clicking the icon bar for either gas detectors or electricity meters will take you to their respective detailed information pages.

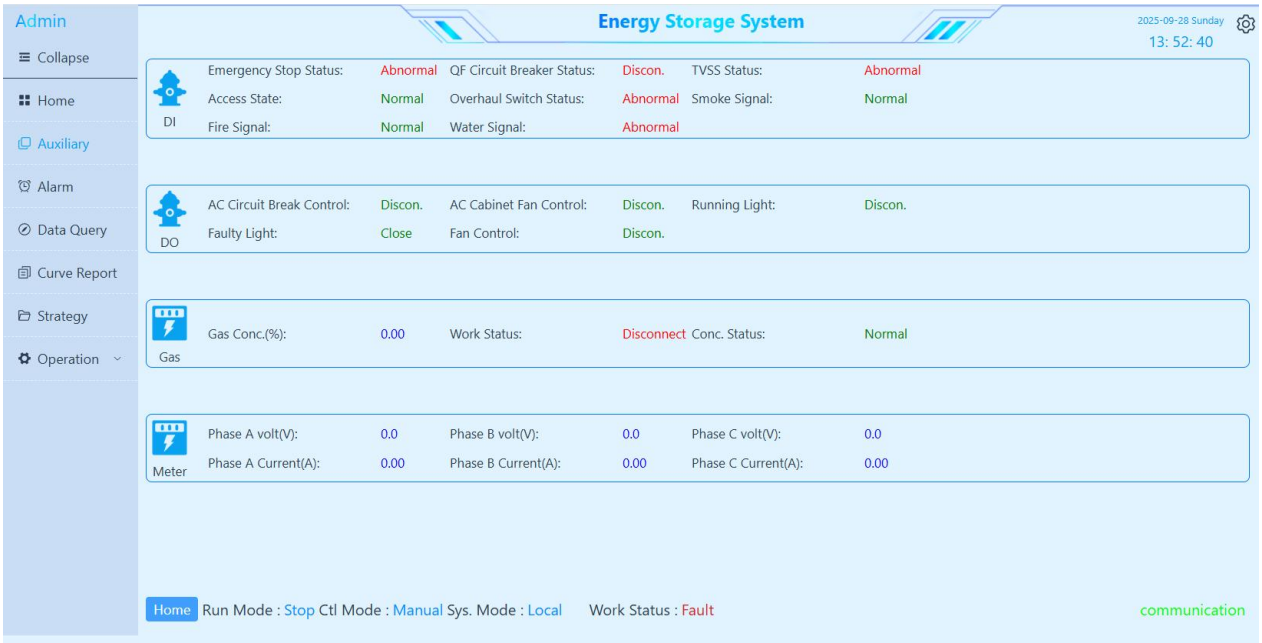


Figure 5.2.2.1 Auxiliary Equipment Home Page

Gas Detector Details Page displays detailed parameters including combustible gas concentration, operational status, concentration status, single-unit status, protection threshold, and safety threshold.

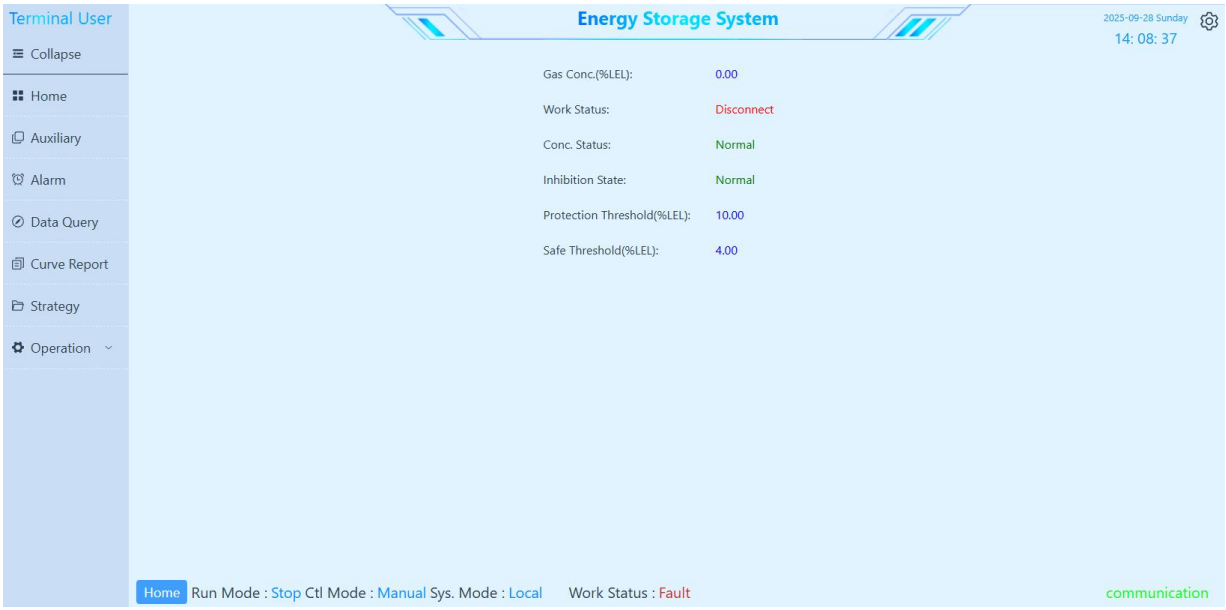


Figure 5.2.2.2 Gas Detector Details

The meter details page displays comprehensive information such as current, voltage, and power.

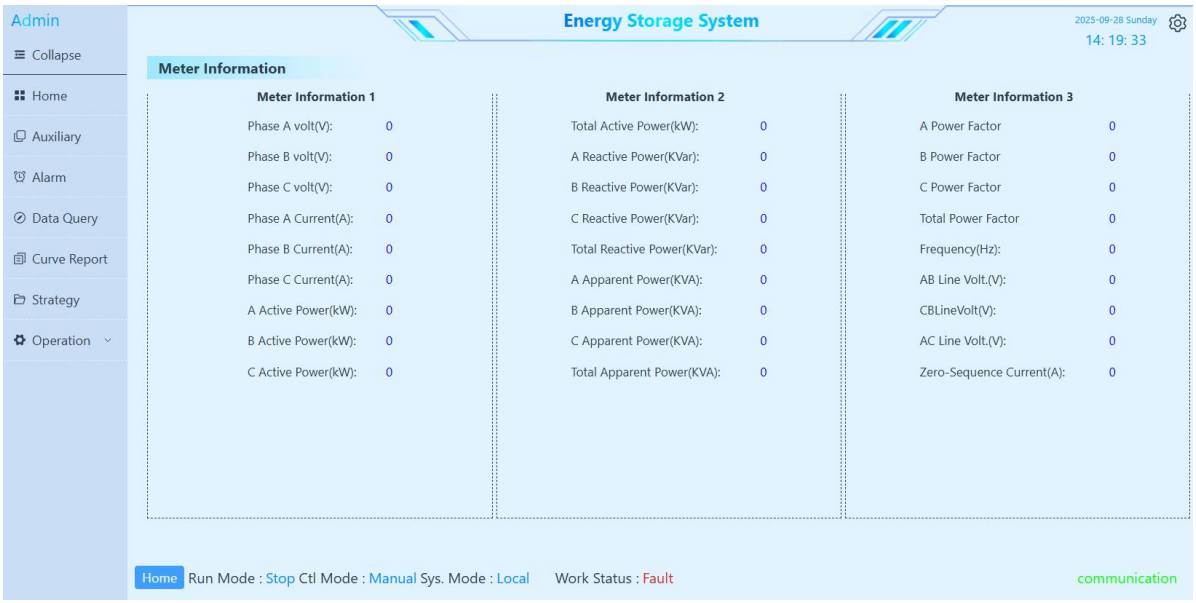


Figure 5.2.2.3 Electricity Meter Details Page

5.2.3 Fault Alarm

Click the [Fault Alarm] button in the left menu bar to enter the “Alarm” details interface. Here, users can view alarm information including [Current Alarms], [Historical Alarms], [Historical Events], and [Fault Recordings] to promptly grasp system fault conditions and perform fault analysis using historical data.

Alarm Severity Level Reference Table:

Name	Level	Action
Event	1	Pop-up alert: Automatically logs event information
Alarm	2	Pop-up alert: Automatically logs alarm information
Standby	3	Pop-up alert: Battery current limiting at 0, automatically logs information
Fault	4	Pop-up alert: Red light steady, battery current limiting at 0, battery disconnected from charge/discharge circuit, automatically logs fault information

(1) Current Alarms

Displays active alarm information within the system, including device type, alarm name, alarm severity level, and occurrence time. Each page shows up to 10 alarm entries; additional entries are displayed via pagination.

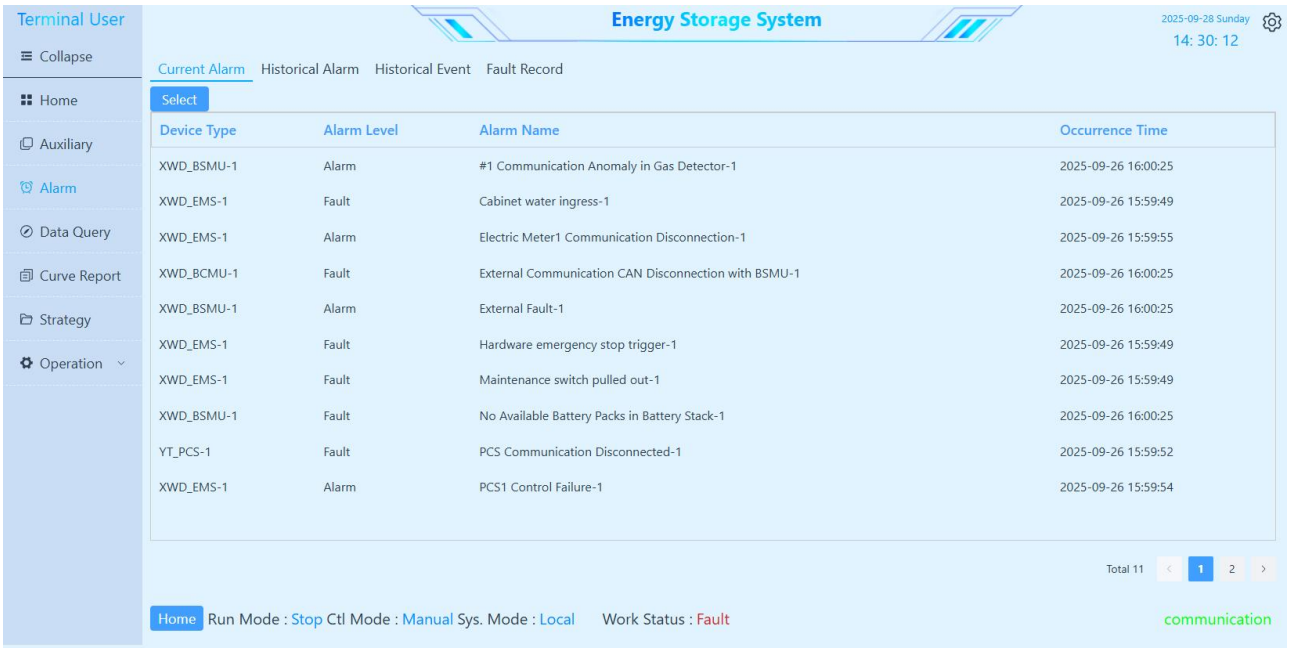


Figure 5.2.3.1 Current Alarms

In addition to viewing alarms on this page, the system displays pop-up alerts. Users can dismiss the pop-up by clicking it or waiting 5 seconds, after which it automatically disappears. However, the alarm information remains until the corresponding clearance conditions are met.

(2) Historical Alarms

Customize the time range to view past alarm events, including device type, alarm name, severity level, occurrence time, and resolution time. Each page displays up to 10 alarms, with additional entries shown on subsequent pages.

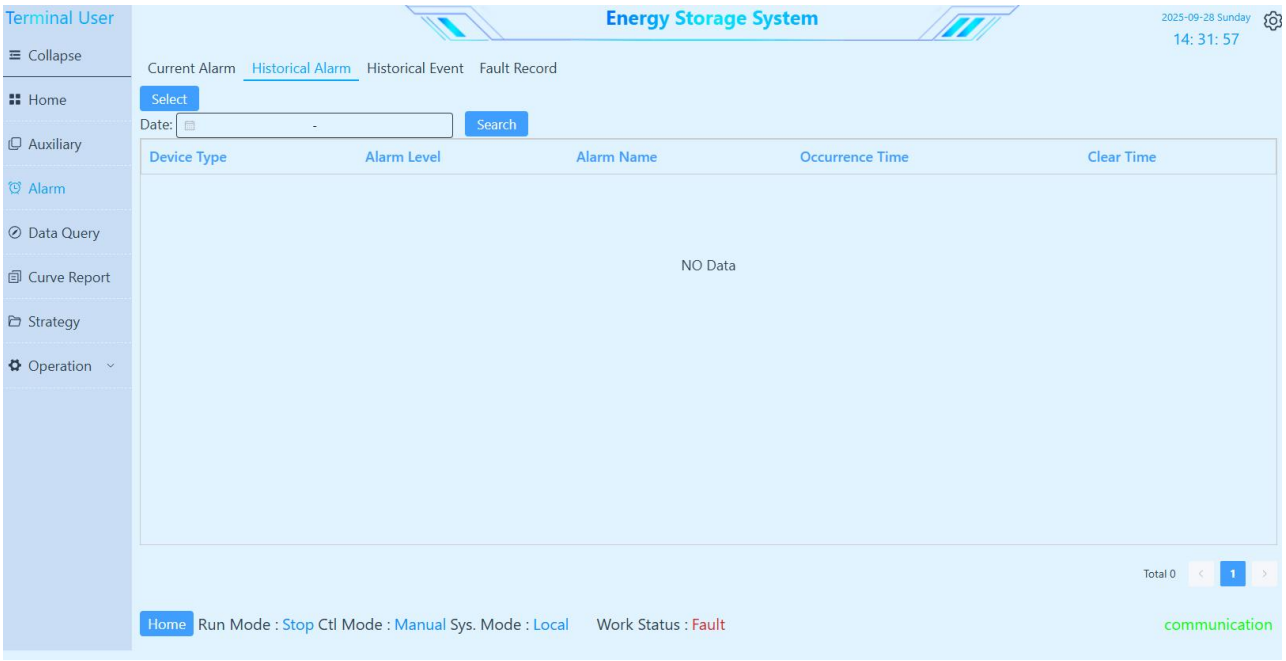


Figure 5.2.3.2 Historical Alarms

(3) Historical Events

This feature also supports custom time queries, displaying information about events that have occurred in the system. This includes device type, alarm level, alarm name, and occurrence time. Each page displays a maximum of 10 event entries, with additional entries shown on subsequent pages.

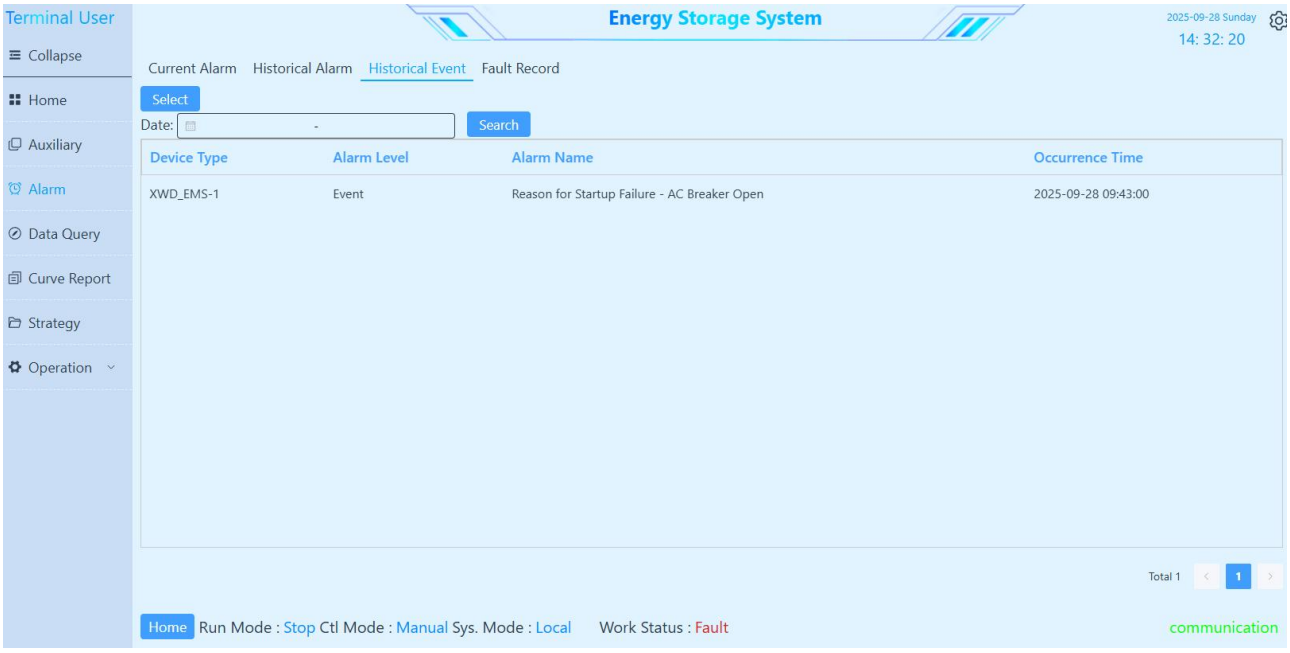


Figure 5.2.3.3 Historical Events

(4) Fault Recording

Used to download and export recording files in “.csv” format. File names include the fault occurrence time. Each page displays up to 10 recording entries, with pagination for additional files.

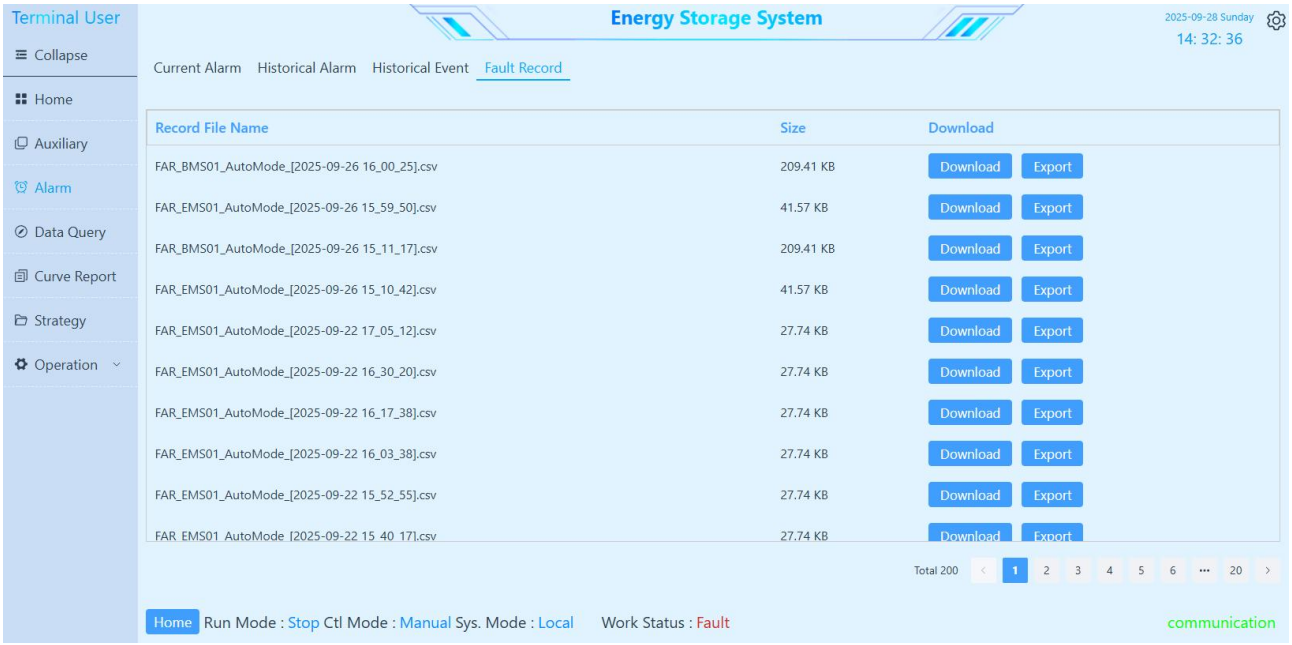


Figure 5.2.3.4 Fault Recording Waveform

5.2.4 Data Query

Click the [Data Query] button on any other interface to access the historical data query page. This page allows downloading and exporting historical operational data in second-level granularity, with files compressed and stored by day.

The page also displays storage status and remaining memory space. Users can click “Select” to query files by date for single days, months, or years. If numerous files exist, use the “Search” function to filter results. Queried files can be downloaded locally or exported to external storage devices like USB drives.

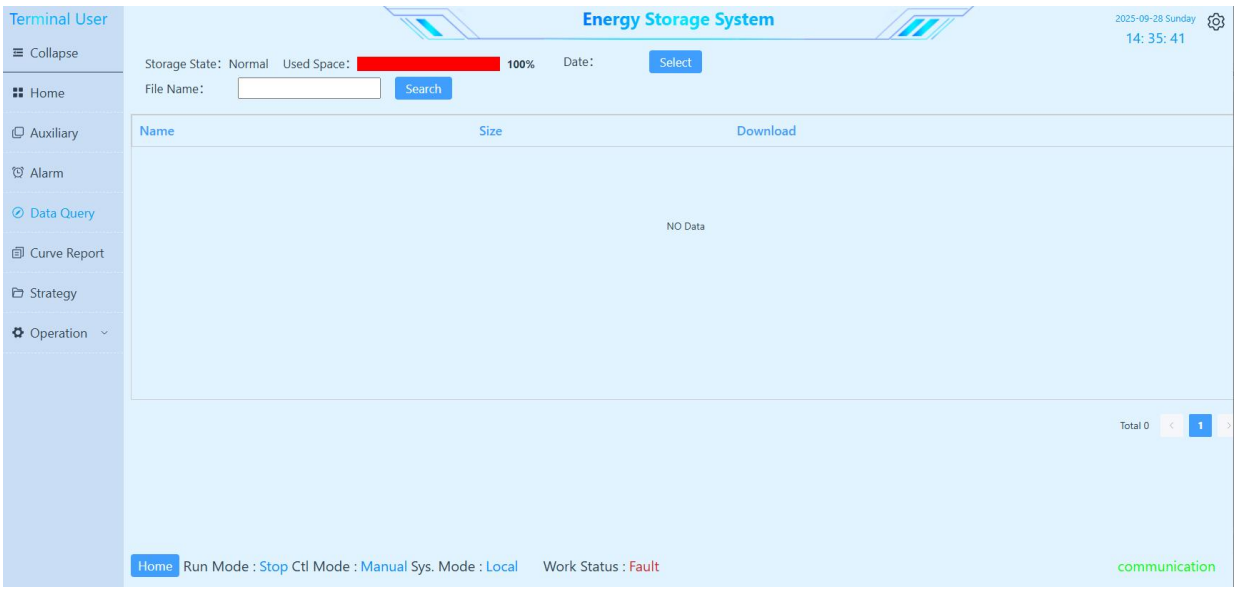


Figure 5.2.4.1 Data Query

5.2.5 Curve Report

Click [Curve Reports] in the left menu bar to access the curve report page. On this page, you can filter by date and project to display data in report format.

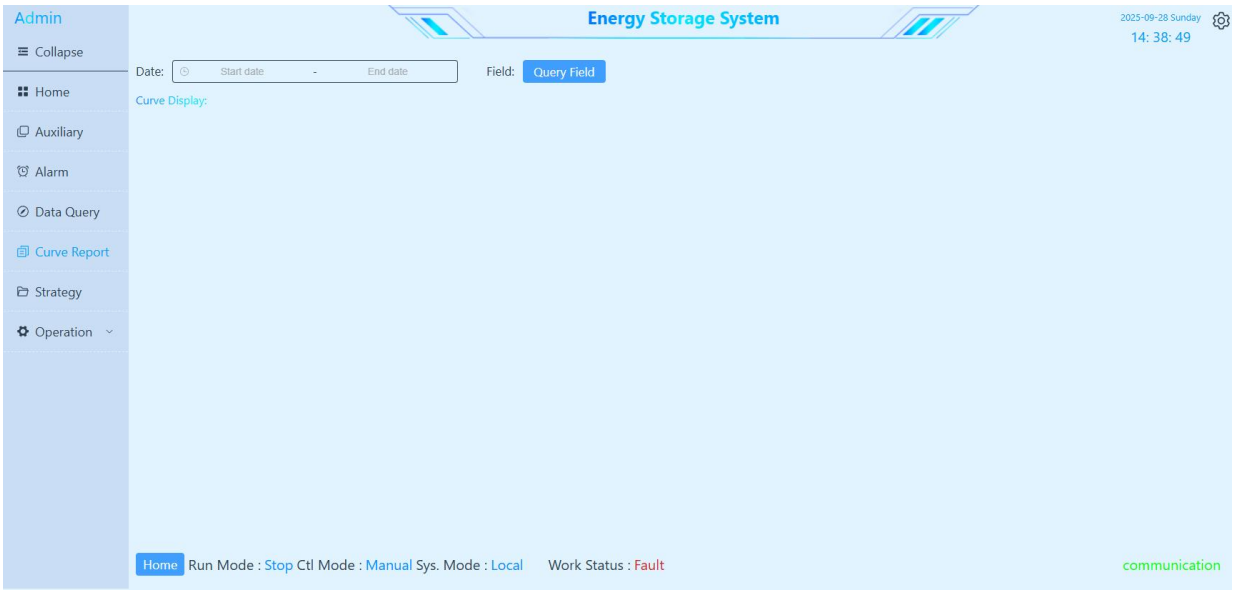


Figure 5.2.5.1 Initial Page of Curve Report

Click the date field to select the start and end times, then press OK to confirm your selection.

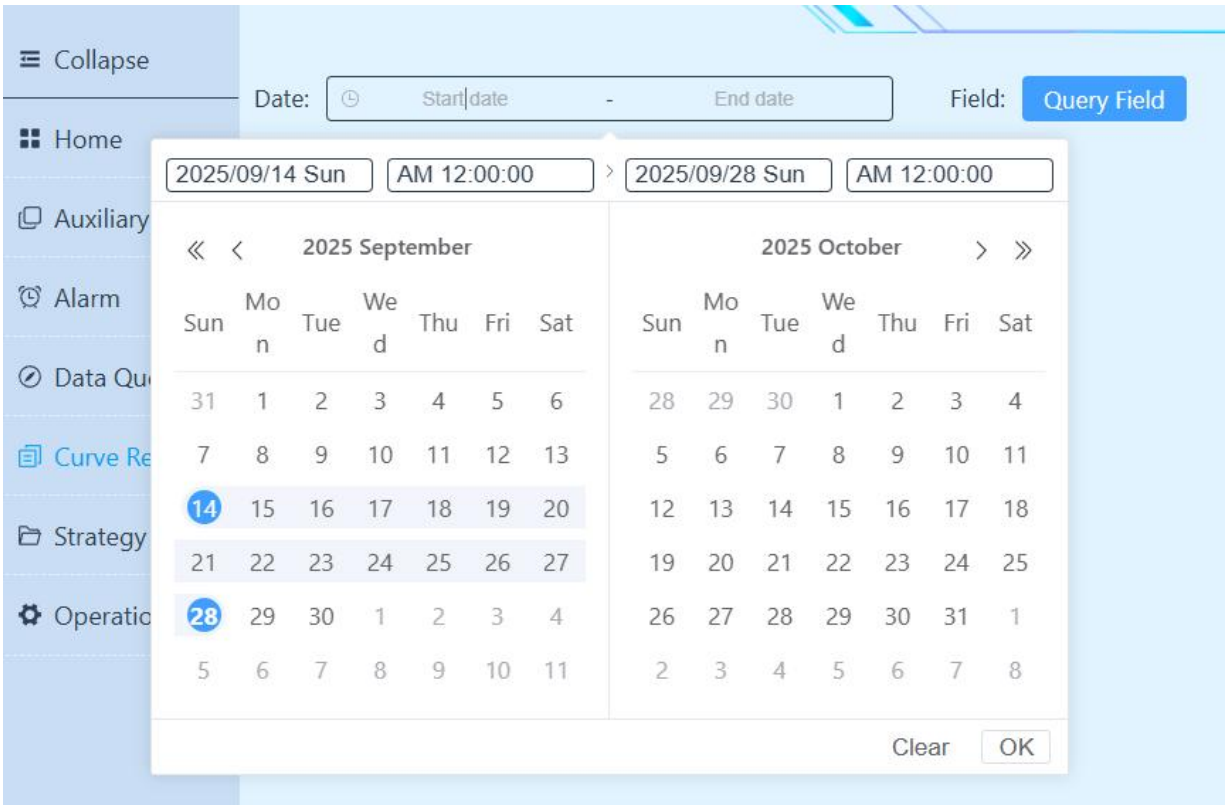


Figure 5.2.5.2 Selecting Dates for Curve Reports

Click the Query Field to open the field selection dialog. Check the desired fields and confirm.

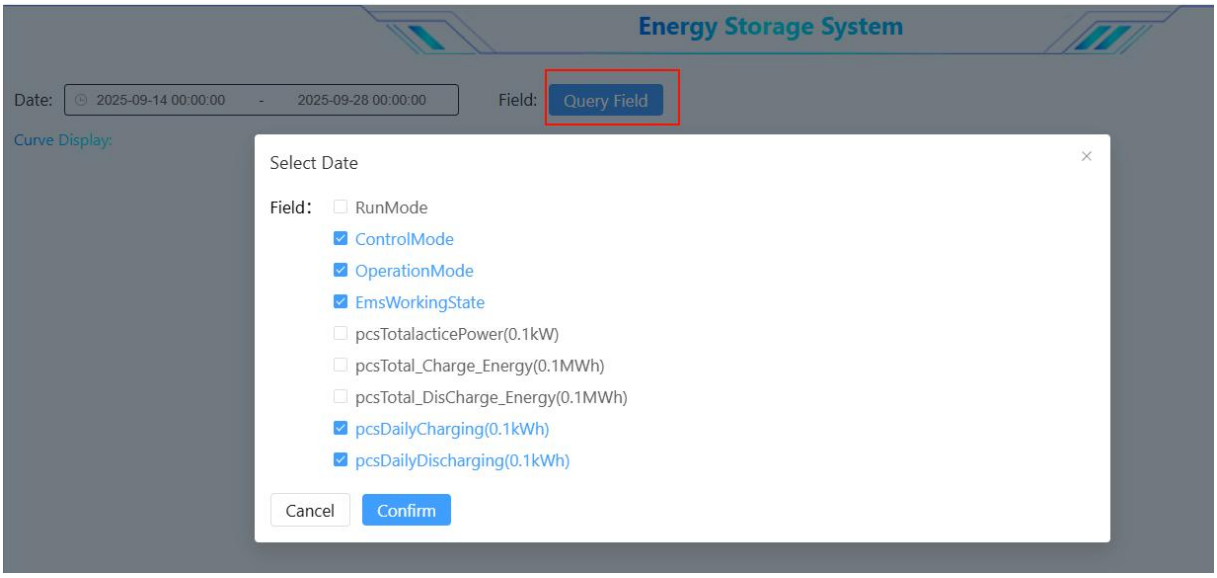


Figure 5.2.5.3 Curve Chart Field Selection

After selecting the date and confirming the fields, the data will be displayed in a curve chart format.

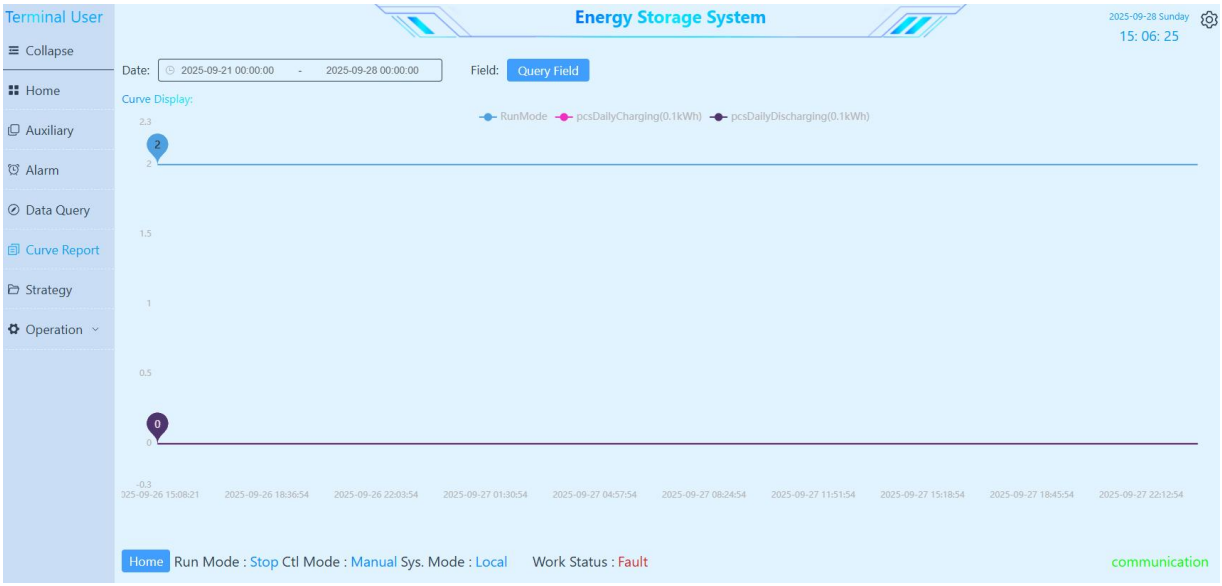


Figure 5.2.5.4 Curve Display

5.2.6 Strategic Management

Click [Policy Management] in the left menu bar to access the policy management page, where you can configure and manage battery charging and discharging policies and parameters.

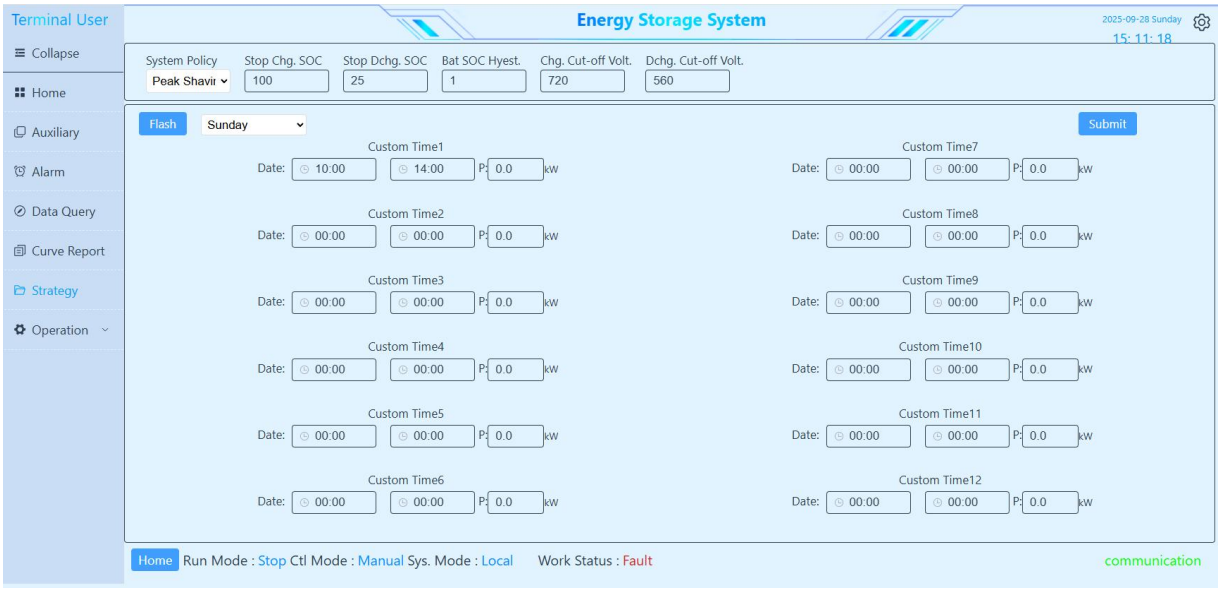


Figure 5.2.6.1 Policy Management Page

5.2.7 Operation Center

Click [Operations Center] in the left menu bar to enter the Operations Center page. Then select [Version Upgrade] (OTA) and [File Download] (File List) from the dropdown options.

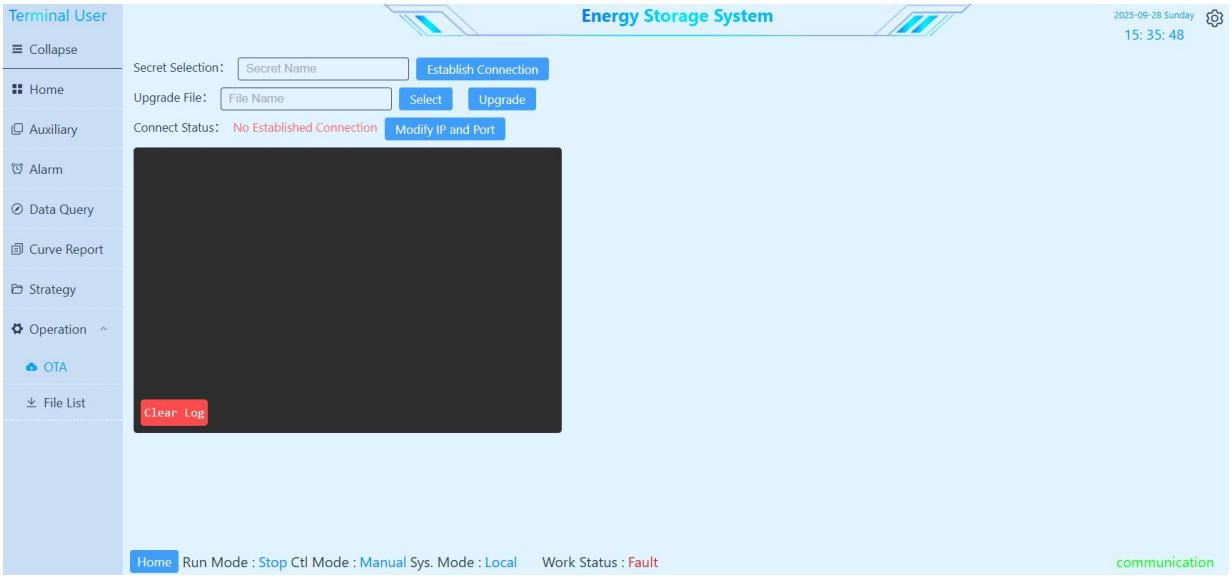


Figure 5.2.7.1 Operations Center Page

(1) Version Upgrade

Click the [Version Upgrade] button to enter the upgrade interface, where you can upgrade the local controller and BMS. The upgrade process involves selecting a secret key, choosing the upgrade file, and initiating the upgrade. Upgrade logs can be viewed in the log interface below.

Upgrade Process: Select Secret Key → Select Upgrade File → Upgrade.

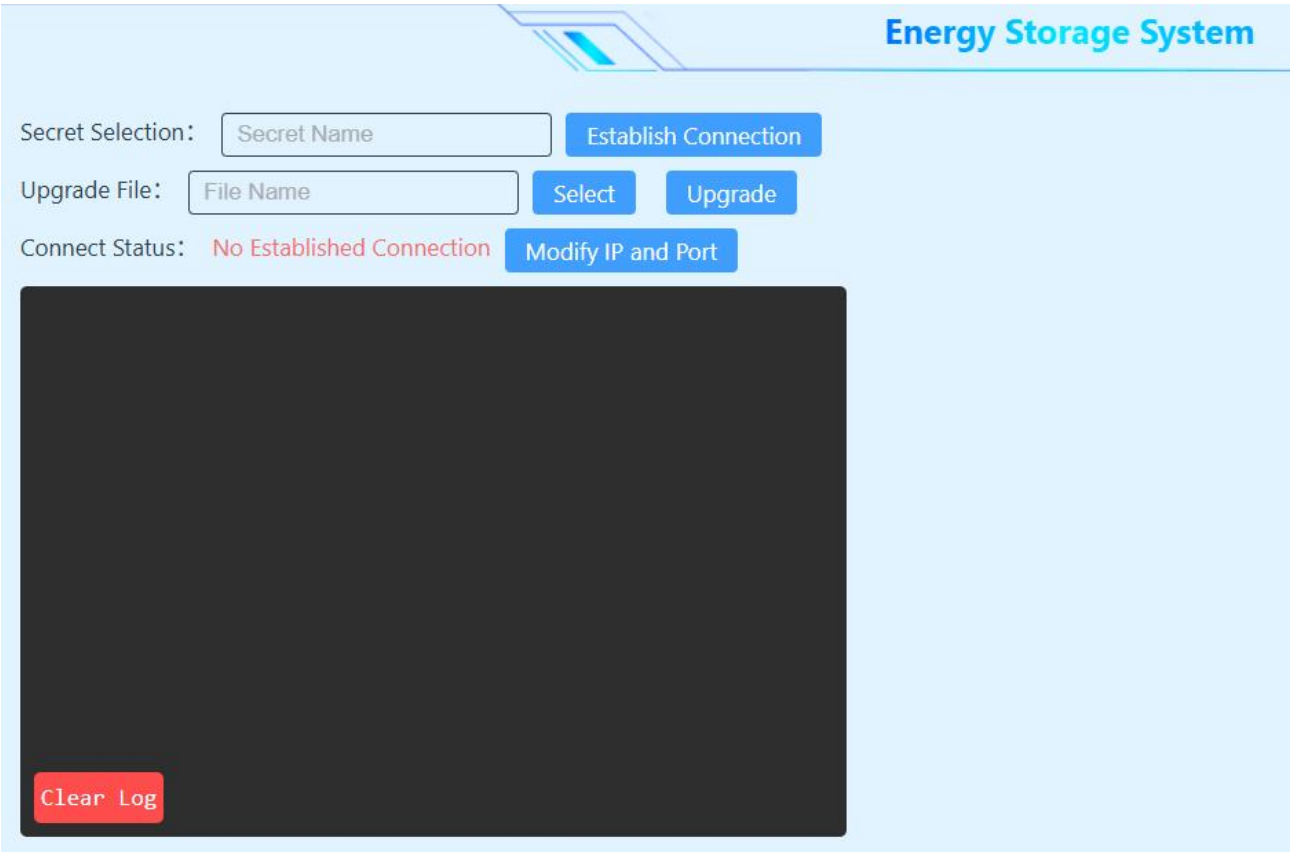


Figure 5.2.7.2 Version Upgrade Options

(2) File Download

Click [File Download] to access the file list, where you can download or export configuration files. A file search function is available at the top.

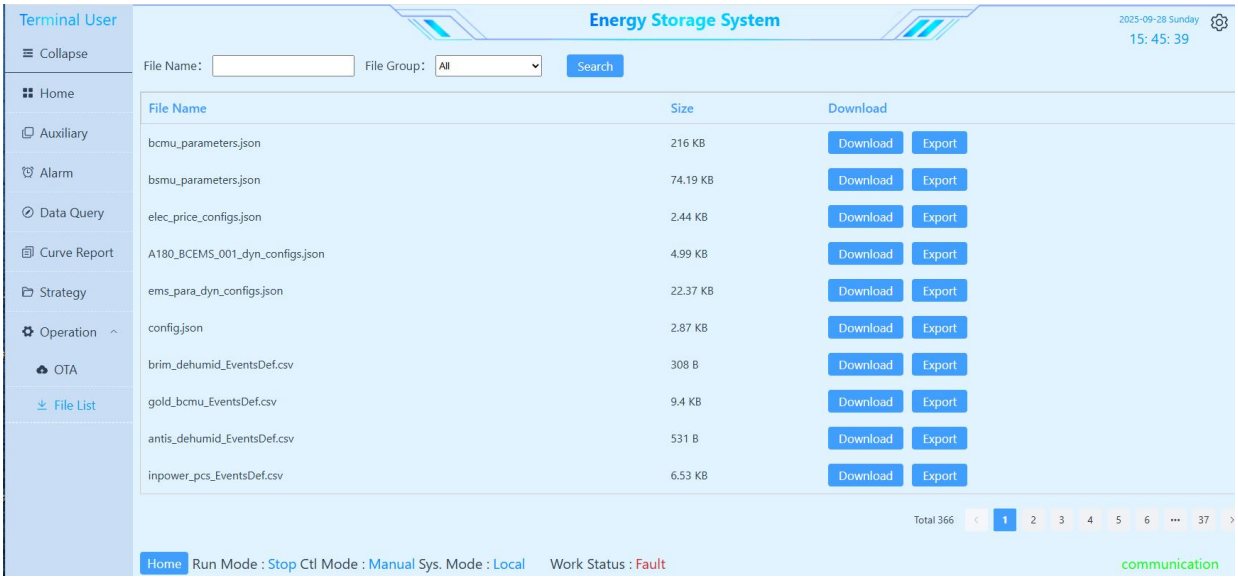


Figure 5.2.7.3 File Download Interface

5.2.8 Others

(1) Settings Center

Click the gear “Settings” icon in the upper-right corner to open the settings panel on the left.

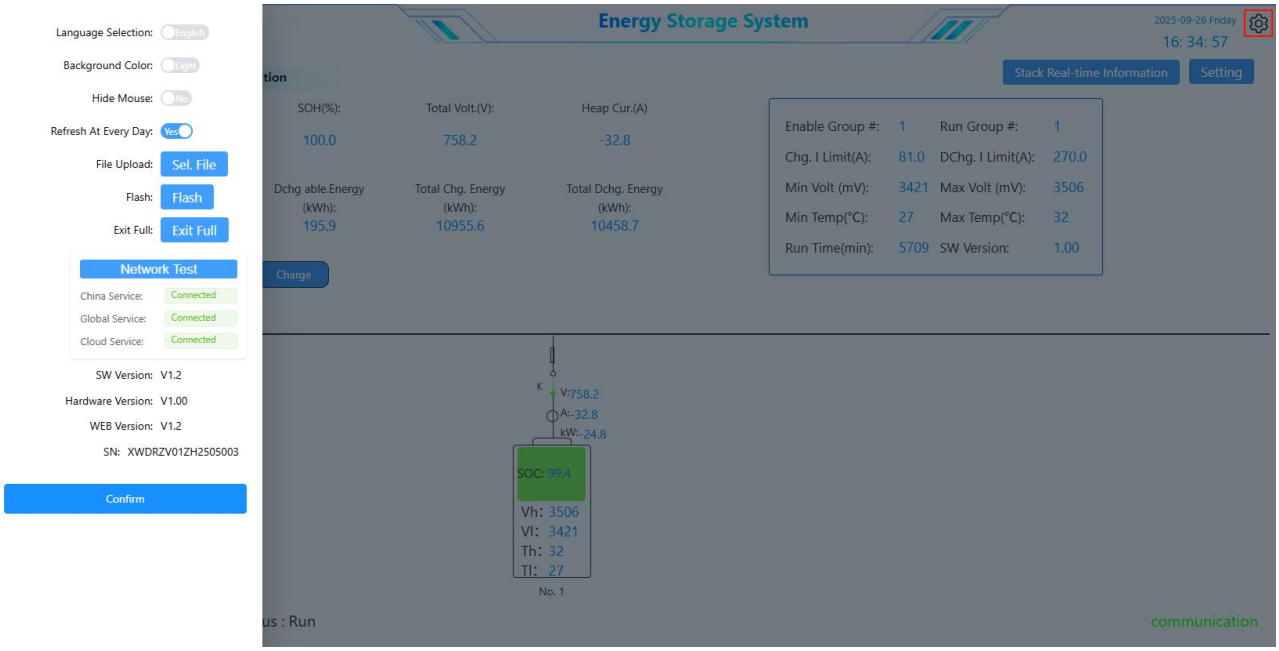


Figure 5.2.8.1 Setting the Center

Feature Overview:

Language Selection: Currently supports Chinese and English.

Background Selection: Currently supports dark and light themes. We recommend selecting the “Light” background for outdoor daytime use.

Hide Mouse: Used to toggle whether the mouse cursor is hidden.

Zero-Hour Refresh: Used to periodically clear system cache.

Refresh: Click the refresh button to manually clear cache.

Exit Fullscreen: Used to exit fullscreen mode. This function requires password verification.

(2) Pop-ups

Prompts appear in the bottom-left corner for operation errors, login timeouts, etc.

Alerts or fault notifications appear in the top-right corner.

Tap or wait 5 seconds to clear alert displays.

(3) Screen Sleep

If no interaction (e.g., touch, input) occurs within 3 minutes, the HMI enters sleep mode and turns off the screen. Touch the screen to wake it up.

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