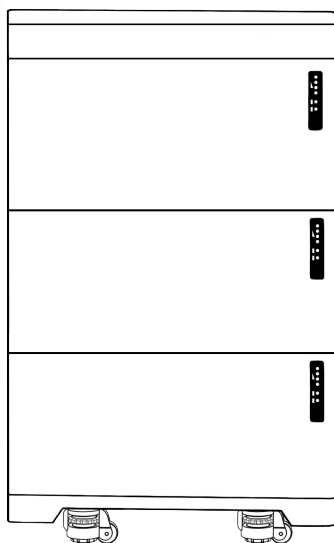


DC400V Battery



User Manual

Contents

1. Overview	3
1.1 General Safety Precautions	3
1.2 Product Overview	4
1.3 Application scenarios	4
2. Product Description	5
2.1 Product specifications and model parameters	5
2.2 Appearance description	7
3. Electrical characteristics	8
3.1 BMU Setting	8
3.2 Basic System Management Parameters	9
4. Installation Instructions	10
4.1 General Installation Requirements	10
4.2 Installation Process	10
4.3 Electrical Connections	11
4.4 Communication line connection	11
5. Operation and maintenance	11
5.1 Equipment operation	11
5.2 Status Light Description	12
6. APP Instructions	13
6.1 Application Download	13
6.2 Register	14
6.3 Login	15
6.4 Add power station	16
6.5 Add collector	16
6.5.1 Add collector and configure network	16
6.5.2 Network mode configuration	17
6.6 Query the status of the collector	18
6.7 Data browsing	18
6.8 Device Settings	19

1. Overview

This manual introduces the main features, performance indicators, external structure, and system principles of the HV-DC400V series products. It also provides installation, usage and operation instructions, maintenance and management information to facilitate customers' understanding of the product application.

1.1 General Safety Precautions

Please read this section carefully and follow the safety precautions before installing, maintaining, or operating the equipment.

To avoid accidents and safety incidents.

- The following symbols are only supplementary safety precautions for each operation and do not represent all safety precautions.

symbol	illustrate
	This is used to warn of potential dangerous situations that, if not avoided, could result in death or serious personal injury.
	This is used to convey safety warnings about equipment or the environment. Failure to take precautions may result in equipment damage, data loss, reduced equipment performance, or other unforeseen consequences. "Caution" does not involve personal injury.
	Used to highlight important/critical information, best practices, and tips. This "instruction" is not a safety warning and does not involve information about personal injury, equipment damage, or environmental harm.

- Personnel responsible for product installation, operation, and maintenance must undergo professional skills training, possess basic safe operating knowledge, and have [the necessary qualifications/qualifications].

Only those with the corresponding qualifications are allowed to perform the work.

- The operation, installation, and maintenance of the equipment must be carried out in accordance with the relevant equipment precautions and safety instructions issued by the company, because all

Our company will not be liable for any consequences resulting from improper operation or violation of safety standards for equipment use.

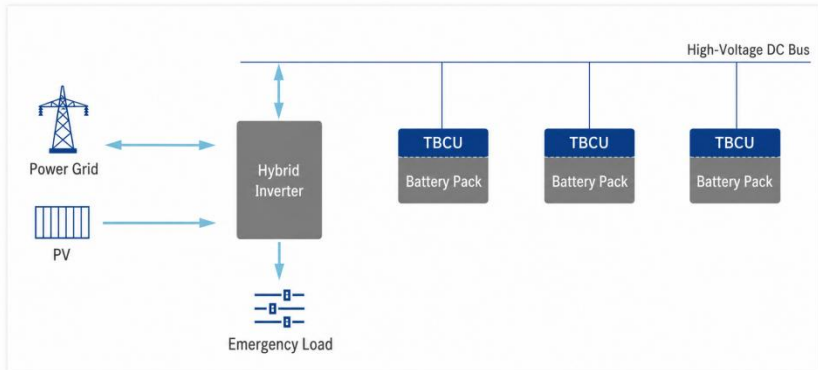
The company shall not be liable for any of the following situations:

- Unauthorized modification of products
- Failure to operate in accordance with product performance requirements and the operating instructions and safety warnings specified in this document
- Use of the product in harsh environments (electricity, input voltage, temperature, humidity, etc.) beyond those specified in this manual, or use in abnormal natural environments or due to human error that could cause equipment damage.
- Any installation and use environment that exceeds the requirements specified in the relevant international standards
- Unauthorized disassembly, alteration of the product, or modification of the software code.
- Equipment damage caused by abnormal natural environment

1.2 Product Overview

The HV-DC400V series consists of a DC-DC bidirectional converter, a battery management system (BMU), and a 25.6V 314AH battery module. The system employs dual-chip digital control, enabling closed-loop DC-DC control, buck-boost conversion, and bidirectional energy flow. It provides various protections for the lithium battery pack and calculates SOC and SOH. It allows for real-time monitoring of individual cell voltage and temperature, and also enables passive cell balancing. Advantages include high conversion efficiency, real-time battery status monitoring, external communication, and natural heat dissipation.

1.3 Application scenarios



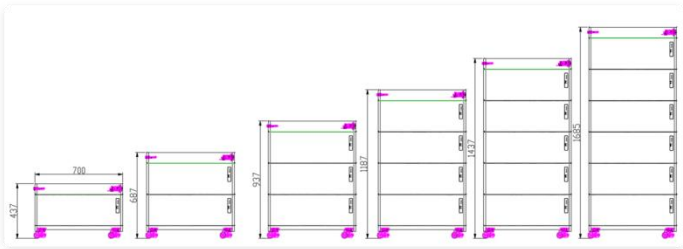
- High-voltage parallel connection of DC side for home energy storage
- Small-scale industrial and commercial energy storage DC-side high-voltage parallel connection



2. Product Description

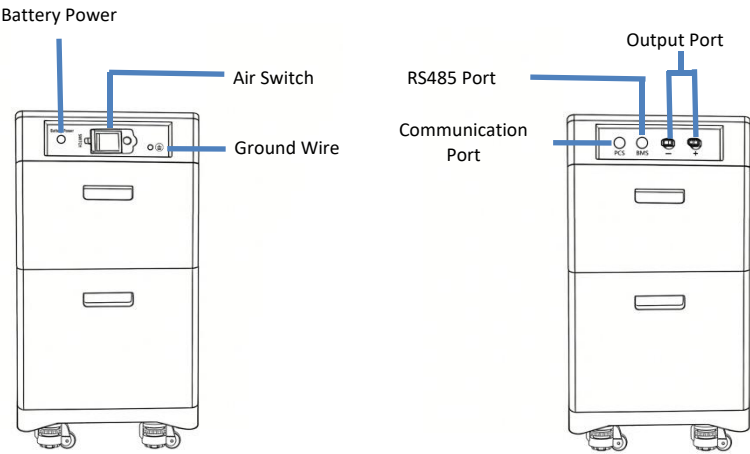
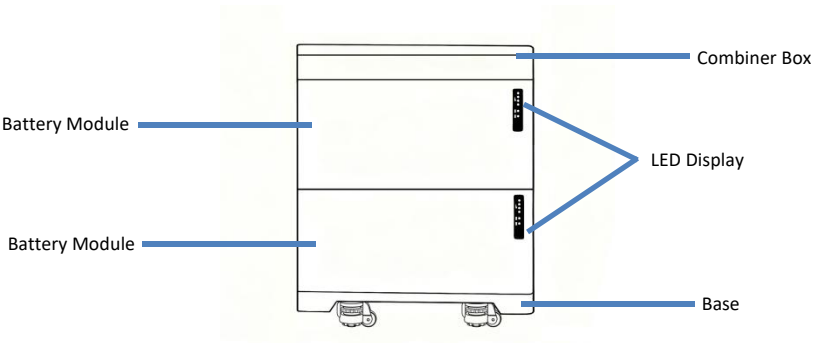
2.1 Product specifications and model parameters

This document mainly covers the following product models , as shown in Table 1-1 :

model	HV-DC400V- 8kWh	2P- HV- DC400V- 8kWh	3P-HV- DC400V - 8kWh	4P-HV- DC400V - 8kWh	5P-HV- DC400V - 8kWh	6P-HV- DC400V - 8kWh
						
Inverter board model	TBCU25400-4K2I					
Number of inverter boards	1					
Battery Model	1S8P-314Ah(8038.4Wh,25.6V,Kg)					
Number of batteries	1	2	3	4	5	6
size	700*360*437mm	700*360*687mm	700*360*937mm	700*360*1187mm	700*360*1437mm	700*360*1685mm
Energy capacity	8,038.4Wh	16076.8Wh	24115.2Wh	32153.6Wh	40192Wh	48230.4Wh
Operating voltage (VDC)	350~450					
Rated voltage (VDC)	400					
Maximum continuous output power (W)	4200					
BMU parameters						
Number of voltage detection	Route 8					

channels	
Number of temperature detection channels	Route 8
Battery current detection	-375A ~ +375A, $\leq \pm 1\%$
Basic characteristics	
Safety regulations and EMC standards	IEC60730, IEC62477, IEC61000-6-1/3
Maximum number of parallel connections	16
Switching Time	6ms
Work mode	Charging, discharging, standby, power off (hibernation), repair
Isolation methods	High frequency isolation
Cooling method	Natural cooling
Protect	Over-temperature protection, over-current protection, short-circuit protection, overcharge protection, over-discharge protection, cell overvoltage protection, etc.
Protection level	When used with the complete unit, it can achieve IP65 and above.
Operating temperature	-20° C to 50° C, no reduction in amount
Storage temperature	-40° C ~ 70° C
relative humidity	5% ~ 95%, non-condensing
Working altitude	4000m MAX, >2000m derating
Communication interface	CAN, 232, 485

2.2 Appearance description



3. Electrical characteristics

3.1 Basic Battery Management Parameters (BMU Settings, which can be changed according to actual application)

Function Name	Project List	default value	set up	Set range
Number of battery cells	Number of battery cells	8	Unspeakable	/
Individual cell voltage alarm	Overvoltage alarm voltage	3520mV	Can be set	3200~4000mV
	Undervoltage alarm voltage	3050mV	Can be set	2500~3200mV
Individual overvoltage protection	Overvoltage protection voltage	3630mV	Can be set	3200~4000mV
	Overvoltage protection delay	2s	Can be set	1~5 s
	Overvoltage protection recovery voltage	3330mV	Can be set	3000~4000mV
Individual undervoltage protection	Undervoltage protection voltage	2950mV	Can be set	2500~3200mV
	Undervoltage protection delay	2s	Can be set	1~5 s
	Undervoltage recovery voltage	3200mV	Can be set	2500~3400mV
Cell temperature alarm	High temperature alarm during charging/discharging	47℃	Can be set	35~57℃
	Low temperature alarm during charging	2℃	Can be set	-8~4℃
	Low temperature discharge alarm	-9℃	Can be set	-14~4℃
Cell temperature protection	High temperature protection	49℃	Can be set	35~57℃
	High temperature recovery	48℃	Can be set	35~57℃
	Low temperature protection	1℃	Can be set	-8~4℃
	Low temperature recovery	2℃	Can be set	-8~5℃
Ambient temperature protection	Environmental high temperature protection	85℃	Can be set	85~110℃
	Environmental low temperature protection	0℃	Can be set	30~15℃
Cell balancing function	Balanced activation conditions	During charging, the voltage difference is greater than 30mV, and Vcell is greater than 3350mV.		
	Equalization	Pressure difference < 20mV or Vcell = 3300mV		

	shutdown condition			
	Equalizing turn-on voltage	3350mV	Can be set	3350~3500 mV
	Equal opening pressure difference	30mV	Can be set	30~50 mV
Battery capacity settings	Cell rated capacity	314AH	Unspeakeable	/

3.2 Basic System Management Parameters

Function Name	Project List	default value	set up	Set range
Manual button function	Power on	When the device is powered off 1 second of pressing the button	Unspeakeable	/
	Power off	Under normal working conditions, Press the button for 5-30 seconds	Unspeakeable	/
Discharge state	Discharge voltage value	400V	Unspeakeable	/
	Discharge current	10.5A	Unspeakeable	/
	Discharge power	4200W	Can be set	4200W MAX
Charging status	Charging current	164A	Unspeakeable	/
	Charging power	4200W	Can be set	4200W MAX
Power supply/output/discharge side Overvoltage protection	Overvoltage protection point	480V	Can be set	480~500V
	Delay time	2 s	Can be set	0.5~2 s
	Overvoltage protection recovery point	470V	Can be set	470~490V
Power supply/output/discharge side Undervoltage protection	Undervoltage protection point	330V	Unspeakeable	/
	Delay time	2 s	Can be set	0.5~2 s
	Undervoltage protection recovery point	340V	Unspeakeable	/

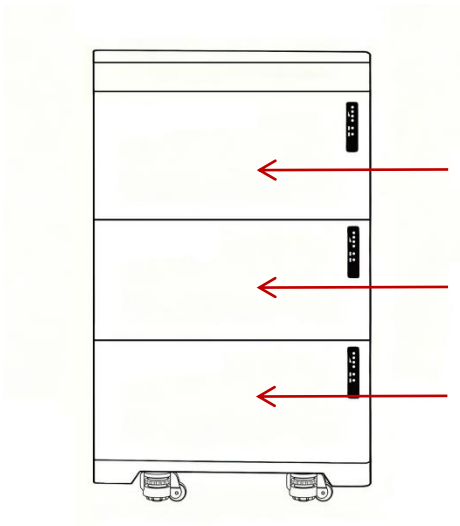
4. Installation Instructions

4.1 General Installation Requirements

1. The equipment must not be installed in flammable, explosive, or corrosive environments.
2. The temperature and humidity of the equipment installation environment must be within a suitable range.
3. The installation location should be out of reach of children and should not be installed in easily accessible locations.
4. The installation space must meet the equipment's ventilation and heat dissipation requirements as well as the operating space requirements.

4.2 Installation Process

- Step 1: Place the base in the appropriate position;
Step 2: Stack the battery modules on the base in order (note the order).



4.3 Electrical Connections

Connection with the inverter:

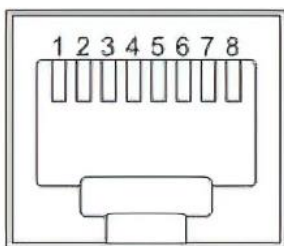
Connect the power harness connector end to the output port (" + ") of the combiner box. (marked with " - "), the wire end is connected to the inverter's DC port.

Connect one side of the communication harness to the BMS 485 port and the other side to the inverter.

Connection with external modules

For details on connecting the equipment to mains power, loads, photovoltaics, and diesel generators, please refer to the inverter's user manual.

4.4 Communication line connection



RS485

The top of the combiner box has two communication interfaces, BMS and PCS, which use RJ45 crystal head connectors for communicating with the inverter and connecting to the host computer.

RS485 - 8P8C vertical RJ45 socket		
RJ45 pin	Definition Description	
PCS-4/BMS-4	CAN-1H	
PCS-5/BMS-5	CAN-1L	
PCS-7/BMS-7	CAN-2L	
PCS-8/BMS-8	CAN-2H	
PCS-1/BMS-1	RS485-A	
PCS-2/BMS-2	RS485-B	

5. Operation and maintenance

5.1 Equipment operation

1. Pre-operation checks: Check the appearance, ensure all circuit breakers and switches are in the open position, and check that the grounding wire is connected.
2. Startup procedure: Press the power switch button. After the battery module starts normally, push up the combiner box circuit breaker.
3. Power-off procedure: Disconnect the circuit breaker in the combiner box to reduce the device power to 0, then press the switch button to turn off the battery module.

5.2 Status Light Description



Four green capacity indicator lights, one red alarm indicator light, and one green operation indicator light .

Condition		Charge				Discharge			
Capacity indicator lamp		L1	L2	L3	L4	L1	L2	L3	L4
power (%)	0~25%	Flash 2	OFF	OFF	OFF	ON	OFF	OFF	OFF
	25~50%	ON	Flash2	OFF	OFF	ON	ON	OFF	OFF
	50~75%	ON	ON	Flash 2	OFF	ON	ON	ON	OFF
	75~100~	ON	ON	ON	Flash2	ON	ON	ON	ON
Running indicator light		ON				Flash			

Status	Warning/Normal/ Protection	ON/OFF	Run	Alert	LED Battery Level Indicator				explain
		●	●	●	●	●	●	●	
Shut down	Sleep mode	ON	OFF	OFF	OFF	OFF	OFF	OFF	Light off
Standby	normal	ON	Flash 1	OFF	According to the electricity indication				standby mode
	warning	ON	Flash 1	Flash 3					Module low voltage
charge	normal	ON	ON	OFF	According to the power indicator (the maximum LED of the power indicator flashes 2)				The maximum power LED flashes (flash 2), and the ALM does not flash during the overshoot.
	warning	ON	ON	Flash 3					
	Overcharge Protection	ON	ON	OFF	ON	ON	ON	ON	If there is no mains supply,the indicator turns to standby
	Temperature , over current , failure ,	ON	OFF	ON	OFF	OFF	OFF	OFF	Stop charging

	protection								
discharge	normal	ON	Flash 3	OFF	According to the electricity indication				
	warning	ON	Flash 3	Flash 3					
	UVLO	ON	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
	Temperature, over current, short out, reversed polarity , FAIL-SAFE	ON	OFF	ON	OFF	OFF	OFF	OFF	Stop discharge
Invalid		OFF	OFF	ON	OFF	OFF	OFF	OFF	Stop charging and discharging

Flashing mode	ON	OFF
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5S
Flash 3	0.5s	1.5s

6. APP Instructions

6.1 Application Download

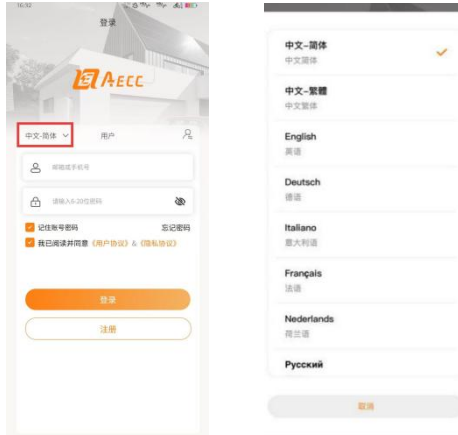
You can download the APP by scanning the QR code on your mobile terminal, as shown in the picture:



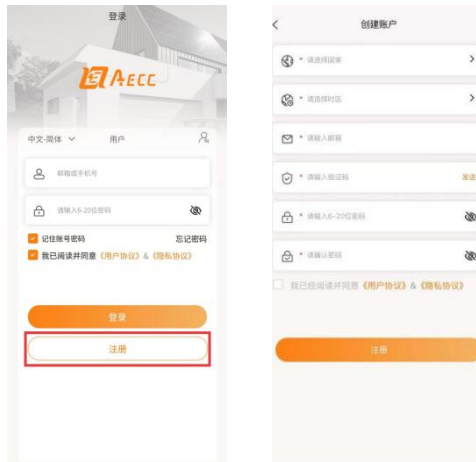
6.2 Register

When using the app for the first time, you need to log in to the app after registering an account. If you already have an account or registered through the APP application, you can directly enter your account and password to log in. If you have any other questions, you can check the 'Registration Process' and 'Add Power Station' to complete the initialization steps.

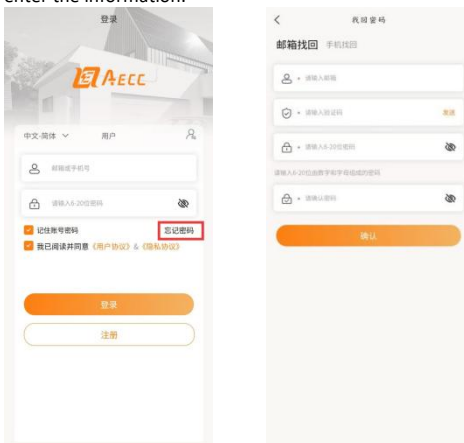
1. Multi language switching: To meet the needs of international users, the APP supports a total of 11 languages, including Simplified Chinese, Traditional Chinese, English, etc. You can click on the function in the upper right corner to switch languages to meet the needs of users in different regions, as shown in the figure.



2. Registration: Click the [Register] button to jump to the registration prompt and complete the account registration.



3. Retrieve Password: Click the [Forgot Password] button to jump to the password retrieval page, and follow the prompts to enter the information.



Registration steps:

Step 1: Enter the registration page

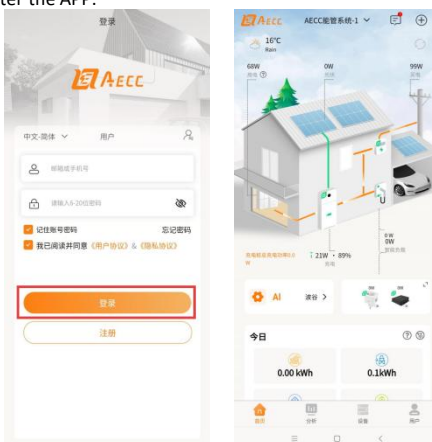
Please click the registration button on the login page below to enter the registration page.

Step 2: Follow the prompts to complete registration

Fill in the email address, please enter the correct email account according to the prompts and verify. The APP supports email account registration; After successful verification, please check the checkbox in the agreement column to indicate that you have agreed to the User Agreement and Privacy Agreement; After successfully registering and completing the account information, jump back to the login interface and correctly enter the newly registered account and password to log in.

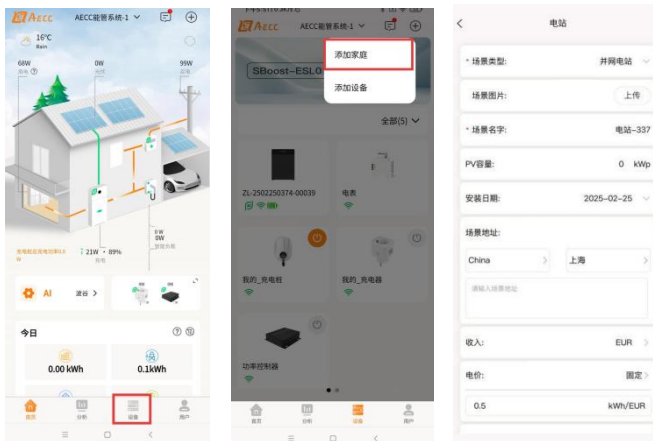
6.3 Login

After completing the account registration, enter the corresponding account and password, and click the [Login] button to enter the APP.



6.4 Add power station

1. After entering the APP, click on "Device" to enter the device page.
2. Click the [+] button in the upper right corner to enter the page for filling in power station information.
3. Fill in the power station information according to the prompts, click "Save" to successfully add the power station.



6.5 Add collector

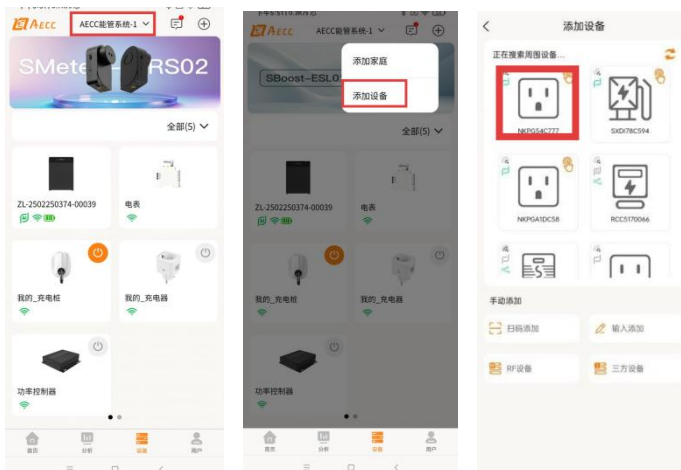
6.5.1 Add collector and configure network

Connect the machine power supply to ensure that the machine can be used normally.

1. Select the power station to be used;
2. Click the add [+] button in the upper right corner of the "Home" page to enter the collector addition page;
3. WiFi:
Scan the SN code of the WiFi module or manually enter the serial number or click on the device icon that has already been loaded to add it.

4G:

Scan the SN code of the 4G module or manually enter the serial number or click on the device icon that has already been loaded to add it.



6.5.2 Network mode configuration

4G:

After selecting the device, the app will automatically configure it. Please ensure that the location and Bluetooth permissions for your phone and app are turned on. Please be patient and wait for a few seconds for network access

Configuration successful. If the network configuration is unsuccessful, please check if the mobile location permission is enabled and if the Bluetooth permission is enabled. After confirmation, please follow the prompts again.

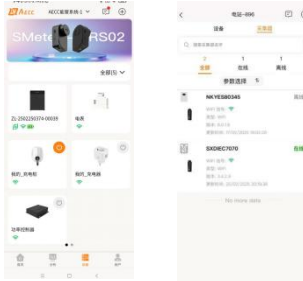
WiFi:

Please ensure that the location and Bluetooth permissions for your phone and app are enabled. Then select or enter the WiFi name and password to connect to the network, click "Next" to enter the next page, please wait patiently for a few seconds for the network configuration to succeed. If the network configuration is not successful, please check if the mobile location permission is enabled, Bluetooth is the permission enabled? After confirmation, please follow the prompts again.



6.6 Query the status of the collector

Return to the homepage, click on "Devices" to enter the device display page, select the power station and click to enter the corresponding device viewing page, swipe left to enter the collector status page, and refresh the drop-down page. If the collector's green "online" light is on, it means that the collector is in use. If the gray "offline" is displayed, it indicates that the collector is not in use. Swipe right and wait for two minutes. Pull down to refresh the page and display the list of power station equipment.



6.7 Data browsing

6.7.1 Understand data browsing

Based on the login account type or associated business, relevant data related to power station monitoring and operation can be summarized, supporting browsing of multiple power stations and data browsing of individual power stations. You can view the corresponding data variables through date filtering to facilitate your quick understanding and use of data charts and ranking system styles, meeting your global monitoring and analysis of power stations.

6.7.2 Service usage scenario

- As an operator or installer, it is necessary to understand the power generation status and equipment status of the power station, analyze and maintain the summary of power station data, in order to reduce labor costs and improve power generation efficiency.
- As investors, we need to monitor the energy conversion process of newly added power plants. By browsing, it is possible to quickly view the power generation data of all power plants, making it convenient for investors to predict risks and analyze returns for all power plants.
- As an operations specialist, I am able to quickly and clearly understand the tasks at hand and the work orders that need to be processed. During the processing, I am able to check the basic information of the power station, analyze the causes of the power station's alarms, and make timely repairs to avoid loss of power generation.

6.7.3 Function Overview

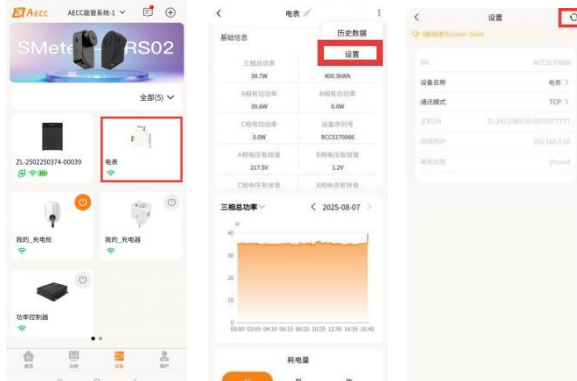
Check today's energy, status, total energy, total revenue, and installation date. The collection and summary of power station data information mainly includes "power station status announcement" and "power station distribution" data. The power station status announcement is to distinguish and screen the current status of each power station, and the distribution of power stations is displayed based on latitude and longitude to quickly understand the basic information, condition, and status of each power station.



6.8 Device Settings

For the convenience of users in device management, device parameters can be set through the APP. Function Description:

Remote setting prerequisite: The user first needs to add the device and ensure that the device is connected to the power grid and in an online state.





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