ATESS

IC261-400S/BC261 Liquid-Cooled Energy Storage System

User Manual

Foreword

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This product complies with the design requirements for environmental protection and personal safety. The storage, use and disposal of the product shall be in accordance with the product manual, relevant contract or relevant national laws

and regulations.

Manual description

The IC261-400S/BC261 energy storage systems provide energy storage for users. During the day, the excess power can be stored in the battery. At night or when needed, the stored electrical energy can be used to supply power to the electrical equipment, which can improve the efficiency of PV power generation, peak filling and valley filling, and emergency power backup.

This user manual system details the basic structure, parameters, basic procedures and methods of installation and operation and maintenance of the equipment.

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1 About This Manual

1.1 Applicable Products

This manual is applicable to the IC261-400S/BC261 commercial and industrial energy storage systems. This user manual includes the following content:

- Introduction to the components of the liquid-cooled energy storage battery cabinet.
- Process and steps for installing and wiring the liquid-cooled energy storage battery cabinet.
- Common questions and solutions. Please strictly follow the instructions in the manual.

1.2 Applicable Personnel

This manual is intended for the installation personnel, operators, and qualified technicians of the ATESS energy storage system. The liquid-cooled battery cabinet must be installed by professional technicians who meet the following requirements:

- Should possess certain electrical and mechanical expertise and be familiar with electrical and mechanical schematics.
- Should have received professional training related to the installation and trial operation of electrical equipment.
- Carefully read this manual and understand the safety instructions related to operation.
- Familiarize yourself with local standards and relevant safety regulations for electrical systems.
- Unauthorized personnel are not allowed to operate the energy storage integration system and should maintain a safe distance from the system to avoid accidents.

1.3 Symbol Usage

To ensure the personal and property safety of users during the installation of this product, and to use this product efficiently, the manual provides relevant information and highlights it with appropriate symbols. Please read this manual and other related materials carefully before operation, especially the precautions and operating instructions in the manual, to avoid accidents.

The prompts in the manual such as "Danger," "Warning," and "Caution" do not represent all safety matters that should be followed, but serve as supplementary safety precautions for various operations.

Danger!
"Danger"indicates a high potential hazard, and failure to avoid it may result in serious accidents, including injury or death.
Warning!
"Warning"indicates a moderate potential hazard, and failure to avoid it may lead to serious accidents, including injury or death.
Caution!
"Caution"indicates a low level of potential hazard, which, if not avoided, may result in moderate to minor injury to personnel or damage to equipment.
Instructions
Operating instructions or guidelines.

Symbols and labels	Instructions
	High voltage danger! Live batteries can pose a life-threatening risk!
	Danger! Risk of electric shock
	Explosion risk
	Batteries contain corrosive electrolytes; please avoid contact with leaking liquids or gases
	Be careful when lifting heavy objects
	Flammable batteries, keep away from fire sources
	Keep children away

	Consult the product manual
	Protective eyewear must be worn
	Do not dispose of after the battery life has ended with household waste
	Used batteries should be placed in designated locations and recycled according to local environmental laws
	External grounding label, must be securely grounded to ensure operator safety

1.4 Manual Usage

Please read this manual carefully before transporting or installing this product. Also, keep this manual and other materials included with the product components together, ensuring that relevant personnel can access them at any time.

To provide customers with the best user experience, the product user manual is continuously improved and updated. If the received manual slightly differs from the product, it may be due to a product version upgrade, and the actual product should be considered the standard. The manual will be continuously updated and modified, and the latest version can be obtained from ATESS. Please contact AETSS for the latest version of the manual or to report suggestions for improvement.

1.5 Abbreviations

Abbreviation	Full Name
AC	Alternating Current
BCU	Battery Cluster Unit
BIC	Battery Interface Cabinet
BMS	Battery Management System
BMU	Battery Module Unit
CAN	Control Area Network
DC	Direct Current
DH	Dehumidifier

Abbreviation	Full Name
ESS	Energy Storage System
FSS	Fire Suppression System
HV	High Voltage
HVB	High Voltage Box
LFP	Lithium Iron Phosphate
IP	Ingress Protection
ISO SPI	Isolated Serial Peripheral Interface
LOTO	Lockout Tagout
LVP	Low Voltage Panel
MSD	Manual Service Disconnect
MV	Medium Voltage
SOC	State Of Charge Battery State of Charge
SOH	State Of Health Battery Health Status
SOP	State Of Power Power Supply Status
SPD	Surge Protection Device (Lightning Arrester)

2 Safety Precautions

All safety instructions in this manual must be strictly followed at all times. To avoid potential injuries and property damage during installation or operation, and to effectively extend the lifespan of the energy storage integration system, please read all safety instructions carefully.

2.1 Electrical Safety

DANGER!

- Do not touch any terminals or conductors connected to the grid circuit, as this may result in fatal danger.
- Before installation, ensure the battery is intact. Otherwise, electric shock or fire may occur.
- Do not connect or disconnect the power cable while the battery is powered. This may cause arcing and sparks, leading to burns or personal injury.
- Before connecting the power cable, check that the positive or negative terminals are correct.
- Do not connect batteries in parallel with different types.
- Do not connect the battery directly to AC power.
- Do not connect the battery to a faulty or non-compliant inverter or charger.
- Do not open the machine's casing without authorization, as this poses a risk of electric shock.
- Before maintenance, ensure the power grid is disconnected and the battery is powered off.
- Before operation, ensure the grounding cable is connected correctly.

Warning!

- If the battery is not used for an extended period, charge it every 6 months.
- Charge the battery within 10 days after it is fully discharged.
- Ensure the battery cables are connected correctly.
- When installing or servicing the battery, ensure the battery is powered off and use a multimeter to confirm there is no voltage at the positive and negative terminals.

Caution!

- Please use dedicated insulated tools for battery installation and maintenance.
- When connecting cables, ensure all batteries are powered down.
- Please ensure the communication connections are correctly linked to the battery and inverter/PCS.
- Please ensure the dip switch settings for single or multiple batteries in parallel are correct.
- When the BMS communicates with the inverter, check the inverter alarms or SOC readings.
- When overheating, smoke, alarms, or other fault indications occur, immediately stop system operation.

Instructions!

- Strictly adhere to all safety precautions outlined in this manual or other relevant documents.
- Do not attempt to disassemble, modify, or replace any part of the battery without permission.
- All installation, replacement, and maintenance operations must be performed by trained professional technicians.

2.2 Environmental Safety

Warning!

- Ensure the battery is installed in a dry, well-ventilated environment.
- The installation location must be away from direct sunlight and rain.
- The installation location must be away from sources of fire.
- The installation location must be away from water sources, such as faucets, sewage pipes, and spray devices, to prevent water ingress.
- It is prohibited to expose the battery to flammable or explosive gases or fumes.
- It is prohibited to place the battery near corrosive products or flammable and explosive products.
- Keep children away from the product.
- Please do not operate the equipment in the following situations:
- In the event of sandstorms, strong winds, hail, or when the air humidity exceeds 95%, please do not open the energy storage cabinet door; during rainy or humid weather conditions, avoid opening the energy storage battery cabinet door for maintenance or repair operations.
- The working and service life of the battery depend on the operating temperature.
- Operate the battery at temperatures equal to or higher than the ambient temperature.
- The recommended operating temperature range is 0°C to 45°C.

2.3 Transportation Safety

Warning!

- Only intact outdoor energy storage cabinets can be installed and used.
- This battery product belongs to Class 9 hazardous materials.
- Please protect the packaging box from the following conditions.

  Getting wet from rain, snow, or falling water.

  Falling or mechanical impact.

  Inverted or tilted.

  Avoid impacts or falls during transportation or operation of the battery.

3 Product Overview

3.1 Product Model

Technical Parameters	Specification Parameters	
Model	IC261-400S	BC261
Nominal Capacity	261KWh	
Rated AC Voltage	400VAC	/

3.2 System Parameters

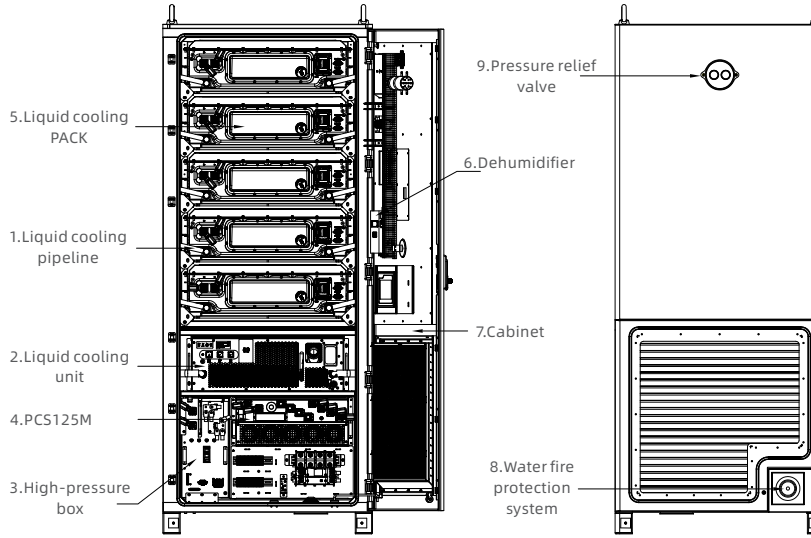
Technical Parameters	Specification Parameters		Remarks
Model	IC261-400S	BC261	
DC Battery Side			
Cell Type	LI-ION(LiFePO4)		
Cell Specification	3.2V/314Ah		
System Configuration	1P260S		
Nominal Capacity	261KWh		
Nominal Voltage	832V		
Voltage Range	728V-936V		
Standard Charge and Discharge Rate	0.5P		
AC PCS Side			
Rated Power	125KW(LOAD)/ 187.5KW(GRID)	NO PCS	
Rated AC Voltage	400VAC		
AC Voltage Range	340V-440V		
Rated Frequency	50/60Hz		
Frequency Range	46~54Hz/56~64Hz		
THDI	<3%(@Pac,r)		
Power Factor PF	-0.9~+0.9		
Wiring Method	3P4W		
Maximum Efficiency	98.5%		
Grid Connection Switching	YES(≤10ms)	NO	

Technical Parameters	Specification Parameters		Remarks
Model	IC261-400S	BC261	
Conventional Parameters			
Dimensions (W/H/D)	1050*2400*1350mm		
Weight (kg)	2700	2620	
Operating temperature range	-20℃~55℃ (discharge) 0℃~55℃ (charge)		
Storage temperature	-20℃ - +45℃		
Protection level	IP55 C4 (C5 optional)		
Noise	70dB(A)@1m		
Maximum altitude	≤3000m		
Standby Power Loss	<100W		
Cooling Method	Liquid Cooling (Battery) Intelligent Air Cooling (PCS)		
Fire Protection	Aerosol (Warehouse Level)		
Dehumidification	588ml/d		
Communication Interface	RS485/CAN/TCP		
Certification	CE		

3.3 Appearance Design

The energy storage system outputs AC voltage and achieves the purpose of charging and discharging the energy storage battery through a bidirectional converter (PCS). The energy storage system consists of an integrated battery pack, a bidirectional converter (PCS), a battery management system (BMS), an energy management system (EMS), a temperature control system (TMS), and a fire protection system (FSS). The energy storage system meets national standards. The product's appearance design and the introduction of each component are described as follows.

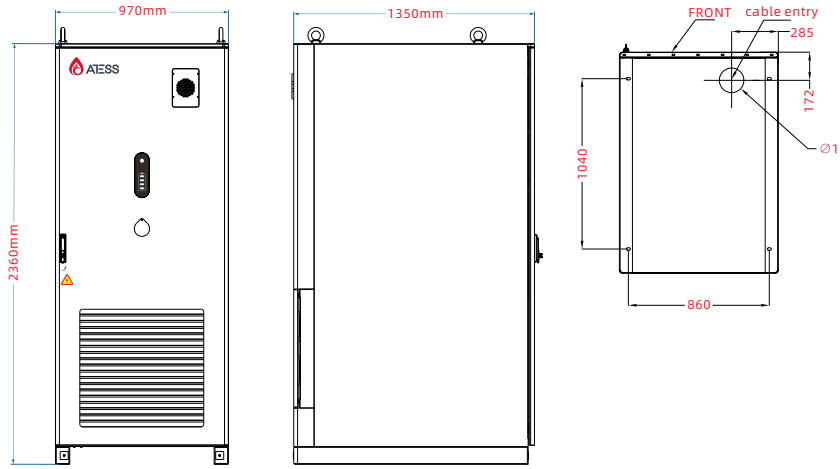
3.3.1 Appearance Introduction



Serial Number	Single Cabinet	Main Cabinet	Sub Cabinet	Description
1	Liquid cooling pipeline	Liquid cooling pipeline	Liquid cooling pipeline	Directing liquid, left in and right out
2	Liquid cooling unit	Liquid cooling unit	Liquid cooling unit	Maintaining the energy storage system temperature within an appropriate range
3	High-pressure box	High-pressure box	High-pressure box	Controlling battery charging and discharging
4	Energy storage inverter	Energy storage inverter	Energy storage inverter	Conversion device between the power grid and the battery, capable of charging the battery
5	Liquid cooling PACK	Liquid cooling PACK	Liquid cooling PACK	Storing and Releasing Electrical Energy
6	Dehumidifier	Dehumidifier	Dehumidifier	Eliminate condensation
7	Cabinet	Cabinet	Cabinet	Liquid-cooled cabinet
8	Water fire protection system	Water fire protection system	Water fire protection system	Water fire protection system interface (KN65)
9	Pressure relief valve	Pressure relief valve	Pressure relief valve	Automatic pressure relief for thermal runaway

Note: The above image shows the appearance of the commercial and industrial energy storage cabinet (subject to actual delivery).

3.3.2 Appearance dimensions



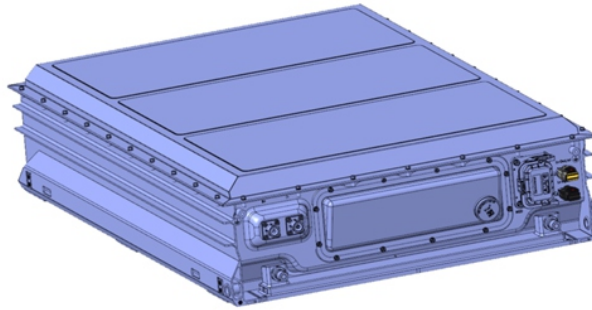
3.3.3 LED Indicator Lights

Two LED indicator lights are installed on the surface of the cabinet, primarily for "Operation" and "Fault" indication.

Name	Color	Instructions
Operation Indicator Light	Green	Waiting + Relay closed, light blinks once for 2 seconds
		Charging + Relay closed, stays on
		Relay open, stays off
	Blue	Discharge + Relay closed, always on
Fault	Red	Level 3 fault and above: Always on
SOC Indicator Light	Green	SOC 100%, all indicator lights on
		SOC 75~99%, the first indicator flashes once for 1s, the rest stay on
		SOC 50~74%, the first indicator is off, the second indicator flashes once for 1s, the rest stay on
		SOC 25~49%, the first and second indicators are off, the third indicator flashes once for 1s, the rest stay on
		SOC 25~49%, the first and second indicators are off, the third indicator flashes once for 1s, the rest stay on
		SOC 1~24%, the first, second, and third indicators are off, the fourth indicator flashes once for 1s
		SOC 0%, SOC indicator light is off

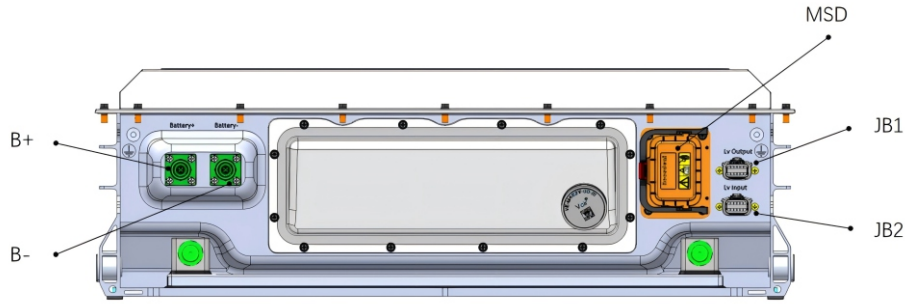
3.4 Component Introduction

3.4.1 PACK



A battery system specifically designed for energy storage station systems, which contains 52 314Ah battery cells, a Battery Management Unit (BMU) system, and a liquid cooling system for fire protection; the battery cells are the most basic battery units. The BMU is responsible for collecting temperature information from the battery cells and the internal box, as well as communicating with other devices. The liquid cooling system is responsible for the heat dissipation of the entire battery PACK, while the fire protection system is responsible for fire warning and firefighting for the PACK system.

Project Name	Specification Parameters	Remarks
Combination Method	1P52S	
Nominal Capacity	314Ah	0.5P Constant Power Charge and Discharge
Nominal Energy	52.25kWh	
Nominal Voltage	166.4VDC	3.2V/Cell(1P52S)
Charge Cut-off Voltage	189.8VDC	3.65V/Cell(1P52S)
Discharge Cut-off Voltage	130VDC	2.5V/Cell(1P52S)
Rated Charging Power	0.5P	
Rated Discharge Power	0.5P	
Operating Temperature	Charging: 0~55℃	
	Discharging: -30~55℃	
Storage temperature	-30℃≤T≤60℃	

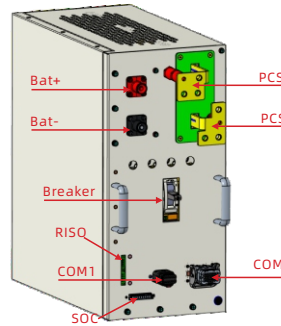


Serial No.	Name	Model	Device Identification
1	High Voltage Connector Socket (Black)	FSPC22180Q-M8B1	B-
2	High Voltage Connector Socket (Orange)	FSPC22180P-M8A1	B+
3	High Voltage Connector Socket (Black)	FSPC80180Q-70B3	B-
4	High Voltage Connector Socket (Orange)	FSPC80180P-70A3	B+
5	Low Voltage Communication Connector Socket 2	477259010(Black)	JB2
6	Low Voltage Communication Connector Socket 2	1600746006(Black)	JB2
7	Low Voltage Communication Connector Socket 1	477259040(Gray)	JB1
8	Low Voltage Communication Connector Socket 1	1600746009(Gray)	JB1
9	Plug	343450001	JB1, JB2
10	MSD plug	RC-MSD14-T-C9	MSD
11	MSD socket	RC-MSD14-Z-A	MSD

Cell parameters

Nominal Capacity	314Ah
Nominal Energy	1004.8Wh
Nominal Voltage	3.2V
Working Voltage	0~55℃: 2.5V-3.65V, -30~0℃: 2.0V-3.65V
Battery internal resistance	<0.30m@10s,50%SOC,25℃
Operating Temperature	Discharge: -30℃≤T≤60℃, Charge: 0℃<T≤55℃

3.4.2 BPU



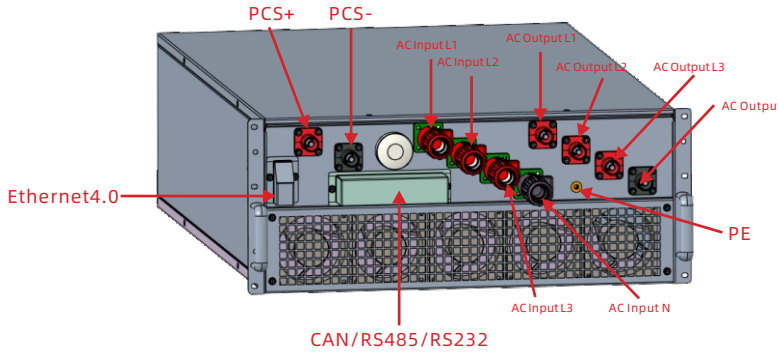
Serial No.	Name	Model	Device
1	Battery connection socket (black)	VP-ESBX-SSSABO001	BAT-
2	Battery Connection Socket (Red)	VP-ESBX-SSSARO001	BAT+
3	High Voltage Box Signal Terminal Socket	FLV2932N-15001K	COM2
4	Energy Storage Inverter Socket (Red)	VP-ESBX-SSSARO001	PCS+
5	Energy Storage Inverter Plug (Red)	VP-ESBX-EP70ARO001	PCS+
6	Energy Storage Inverter Socket (Black)	VP-ESBX-SSSABO001	PCS-
7	Energy Storage Inverter Plug (Black)	VP-ESCX-EP70AB0001	PCS-
8	Pack Communication Terminal Socket	molex 477259010	COM1
9	SOC/POWER Indicator Light Socket	AMP 1-178288-7	SOC
10	High Voltage Insulation Module Socket	PLTB1.5-04-BF-3.81, PLTB1.5-04-BF-3.50	RISO
11	High Voltage Plastic Enclosed Circuit Breaker	Ex9MDY2HVTM320 2P+SHT21 (24V)/1500V/320A	Break

The BPU high voltage control box is a high voltage power circuit management unit specifically designed by ATESS for industrial and commercial energy storage cabinets. It serves as an intermediate unit connecting the battery cluster and the energy storage inverter. The high voltage control box features functions such as battery cluster voltage and current collection, battery cluster circuit contactor control, and protection. It houses circuit breakers, relays, fuses, current sensors, the Battery Cluster Control Unit (BCU), and DC power supplies. The design of the high voltage control box fully considers the electrical characteristics, heat dissipation performance, safety performance, and operability of each component, ensuring a reasonable spatial layout with compact structure, flexible configuration, and reliable safety features. The built-in Battery Cluster Control Unit (BCU) in the high voltage control box has CAN and 485 communication buses, enabling

communication between the high voltage control box and the energy storage battery management module, liquid cooling system, dehumidification system, energy storage inverter PCS, and fire control system, facilitating control, protection, thermal management, and data communication of the energy storage battery cluster.

Project Name	Specification Parameters
Operating Voltage Range	DC350-950V
Maximum Operating Current	200A
DC Power Supply Output	24V/5A
Communication Method	CAN/RS485
Dimensions	W*H*D(mm):290*321*550

3.4.3 PCS



The bidirectional energy storage inverter is a conversion device between the power grid and the battery, capable of charging and discharging the battery. It can invert the direct current from the battery into alternating current that can be fed into the grid, and it can also rectify the alternating current from the grid into direct current that can be charged into the battery. The bidirectional energy storage inverter can be used in grid-connected mode.

Technical Parameters	Specification Parameters	
Model	PCS125MS	PCS215M
AC		
Rated Capacity	125KVA(LOAD)/187.5KVA(GRID)	215KVA
Rated Input Voltage	400VAC	690VAC

Rated Input Current	180A(LOAD)/271A(GRID)	180A
Input Voltage Range	340V-440V	586.5V-759V
Rated Frequency	50/60Hz	
Frequency Range	46~54HZ/56~64HZ	
THDI	<3%(@Pac,r)	
Power Factor PF	-0.9~+0.9	
Wiring Method	3P4W	3P3W
Maximum Efficiency	98.5%	
DC Battery		
Battery Voltage	600-900V	1000-1500V
Maximum Charge and Discharge Power of Battery	125KW	215KW
Maximum Charge and Discharge Current of Battery	208A	200A
Charging Voltage Regulation Accuracy	±1%	
Charging voltage steady current accuracy	±1%	
Charging voltage ripple	<3%	
Charging current ripple	<2%	
Protection		
Battery Disconnect device	FUSE	
ACD is connect device	/	
Battery over/under voltage protection	Possess	
AC Overvoltage Protection	Possess	
Grid Monitoring Management	Possess	
Output Short Circuit Protection	Possess	
Overheat Protection	Possess	
Conventional Parameters		
Dimensions (W/H/D/)	520/220/800mm	520/220/720mm
Weight	80kg	75kg
Operating temperature range	-25...+55℃	
Protection level	IP55	
Noise	75dB(A)@1m	
Maximum altitude	6000m（超过3000m需降额）	
Standby Power Loss	<100W	
Cooling Method	Intelligent air cooling	
Topological structure	No isolation transformer	
Communication Interface	RS485/CAN/TCP	
Certification	CE	

3.4.4 TMS

The chiller unit is a cooling product developed for applications such as heat dissipation of energy storage batteries, suitable for scenarios where the internal battery heat generation is significant and internal equipment is sensitive to environmental temperature. This product is fully functional, integrating upper computer communication, alarm, and other features, with high reliability and easy installation, requiring no complex debugging.

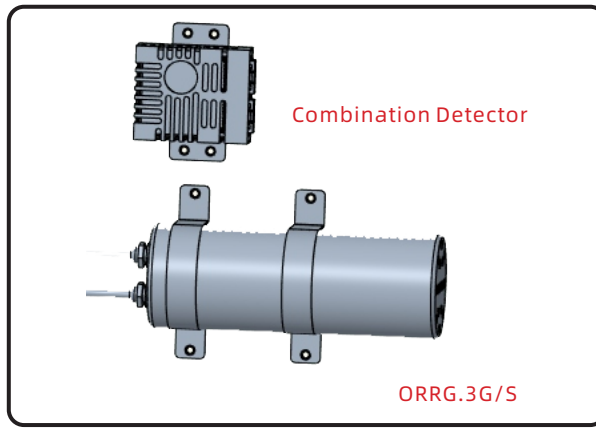
Project Name	Specification Parameters
Rated operating voltage	AC220V
Operating Voltage Range	AC176-264V
Frequency	50/60HZ
Cooling Capacity	5kW
Heating Capacity	2kW
Circulating Water Flow	50L/min
Rated Cooling Power	2.3kW
Rated Heating Power	2.3kW

3.4.5 DH

The intelligent dehumidification device uses a semiconductor refrigeration dehumidification method, actively drawing humid air from a closed space into the dehumidification duct with the help of a fan. The moisture in the air condenses into water after passing through the semiconductor refrigeration unit, which is then discharged through a water pipe, achieving excellent dehumidification.

Project Name	Specification Parameters
Working power supply	AC220V 0.7A (MAX)
Rated Power	≤68W (dehumidification power 60W)
Dehumidification power	60W
Temperature measurement range	-20℃~85 ℃
Humidity measurement range	20%RH ~ 98%RH
Dehumidification start value	25%RH ~ 98%RH
Temperature start value	1℃~55℃
Communication Method	RS485
Operating Temperature	Temperature -25 ~ 85℃
Dehumidification efficiency	588mL±5%/24h(60W 35℃RH=85%working condition)

3.4.6 FSS



Integrated aerosol automatic fire extinguishing device for energy storage cabinet, model: QRR0.3G/S, equipped with 1 fire extinguishing device containing 300g of extinguishing agent, forming a cabin-level fire extinguishing system. The 4-in-1 composite detector independently controls the operation of the cabin-level fire extinguishing system.

Project Name	Specification Parameters
Working power supply	DC24V/4A
Working current	<30mA
Operating Temperature	-40 ~ 85℃
Communication Method	CAN
Data acquisition cycle	1S
Measurement range	CO: 0 ~ 1000ppm; Temperature: -40℃~125℃
VOC alarm value	Threshold alarm
Smoke alarm value	0.3db/m (adjustable)

Control logic

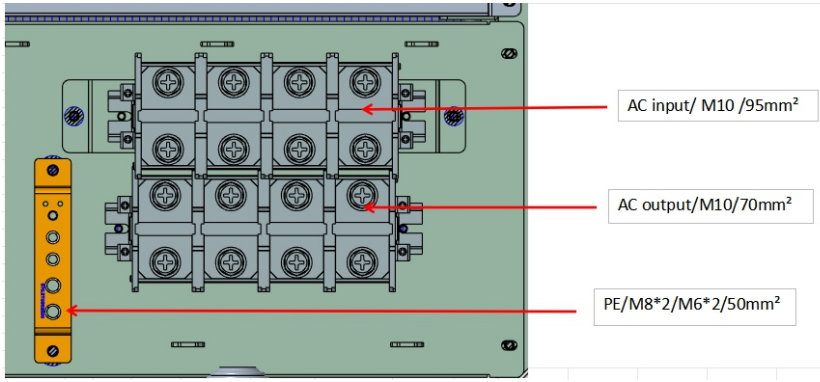
Alarm parameters	CO concentration (ppm)	Smoke dB/m	Temperature (℃)	VOC
Level 1	240			
				Threshold alarm
			≥70	
Level 2	600	0.4		
			≥75	
Level 3	240		≥80	
		0.4	≥80	

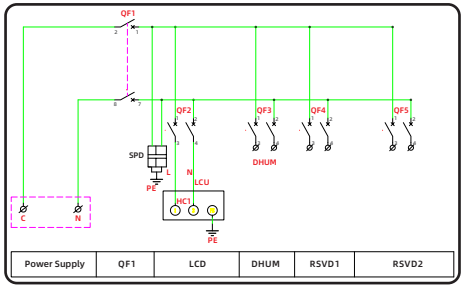
1. When the composite detector issues a Level 1 alarm, the controller uploads the alarm signal to the BMS and activates the audible and visual alarm. On-site manual inspection can confirm any anomalies, and appropriate actions can be taken based on the actual situation.

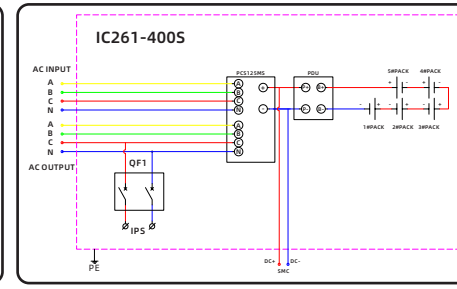
2. When the composite detector issues a Level 2 alarm, the controller uploads the alarm signal to the BMS and activates the audible and visual alarm. On-site manual inspection can confirm any anomalies, and appropriate actions can be taken based on the actual situation. If interlocking with other devices is required, it should be set according to actual needs.

3. When the composite detector issues a Level 3 alarm, the controller uploads the alarm signal to the BMS and activates the audible and visual alarm, while also starting the thermal aerosol fire extinguishing device; the extinguishing agent gas provides total immersion protection for the battery cabinet.

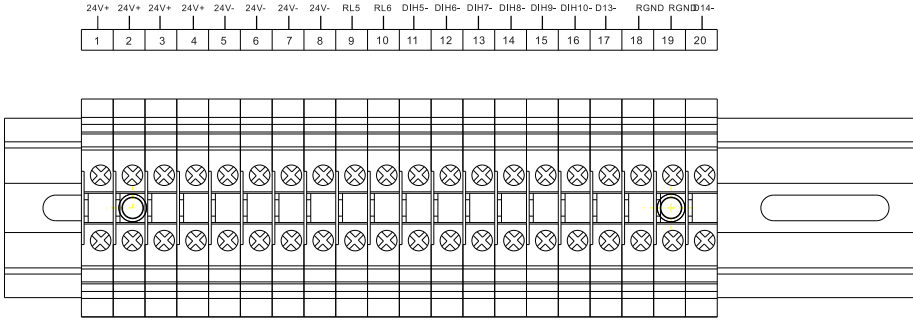
3.4.7 Definition of AC power distribution

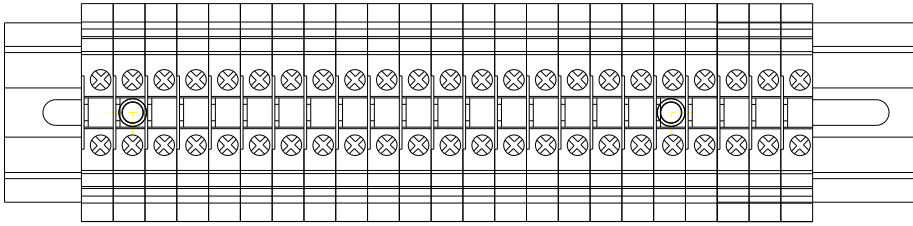






3.4.8 Communication wiring definition





Serial Number	Definition	Remarks
1	24V+	24VDC Power Positive
2		
3		
4		

Serial Number	Definition	Remarks
5	24V+	24VDC Power Positive
6		
7		
8		
9	Rl5	Reserved Control Output Port 5 (24VDC)
10	RL6	Reserved Control Output Port 6 (24VDC)
11	DIH5-	Emergency Stop
12	DIH6-	Reserved Input Check Port 6 (Active High)
13	DIH7-	Reserved Input Check Port 7 (Active High)
14	DIH8-	Reserved Input Check Port 8 (Active High)
15	DIH9-	Reserved input check port 9 (high level effective)
16	DIH10-	Reserved input check port 10 (high level effective)DI3-
17	DI3-	Reserved input check port I3 (low level effective)
18	RGND	
19	RGND	Reserved input check port I4 (active low)
20	DI4-	
21	DRY1-1	Reserved dry contact output 1
22	DRY1-2	
23	DRY2-1	Reserved Dry Contact Output 2
24	DRY2-2	
25	CAN2_GND	CAN2 Communication Port
26	CAN2_L	
27	CAN2_L	
28	CAN2_H	
29	CAN2_H	
30	CAN1_L	CAN1 Communication Port
31	CAN1_H	
32	485_1_A	RS485_1 communication port
33	485_1_A	
34	485_1_B	
35	485_1_B	
36	485_2_A	RS485_2 communication port
37	485_2_A	
38	485_2_B	
39	485_2_B	
40	485_3_A	RS485_3 communication port
41	485_3_A	
42	485_3_B	
43	485_3_B	

3.4.9 DC busbar cabinet

ATESS Batt-Master Cabinet 9R-314S is mainly used to aggregate and distribute current among various battery clusters. The busbar cabinet consists of 1 DC cabinet body, busbar copper strips, auxiliary isolation distribution up to 2kVA, power-on indicator light, LCD, etc.

Technical Parameters	Description
Number of battery cluster input channels	9
Maximum working voltage per channel	1500VDC
Maximum working current per channel	250A
Maximum bus voltage	1500VDC
Maximum bus current	2500A
Display	7-inch touch screen
Screen communication method	RS485
Rated output voltage of distribution	230Vac
Maximum output power of the distribution	2KVA
Operating temperature range	-20℃ ~ +55℃
Altitude	≤3000m
Protection level	IP54

4 Packaging, Transportation, and Storage

4.1 Packaging

The energy storage device must withstand external influences from sea and land, so appropriate packaging solutions must be implemented to prevent water and dust contamination. Additionally, for maritime transport, the packaging design should prevent mechanical damage and the effects of harsh weather conditions.

The packaging steps are as follows:

Step 1: The packaging personnel wipe the finished energy storage cabinet.

Step 2: Print cabinet documentation: product user manual, certificate of conformity, inspection report, etc., and seal them in plastic.

Step 3: Cover the prepared cabinet with a dust bag and secure it with tape.

Step 4: Wrap the corners of the product with cardboard strips, secure them with tape, and then use stretch film to secure the finished energy storage.

Caution!

- The surface of the cabinet must not have obvious stains.
- The cardboard strips must not be bent and should cover all corners of the cabinet.
- The dust bag must not be damaged and should completely cover the cabinet.

4.2 Transportation

The energy storage device is transported using any means of transportation, such as cars, trains, or ships. During transportation, the product must be handled with care, protected from rain and direct sunlight, and should not experience severe vibrations, impacts, or be placed upside down.

1. Transportation and storage temperature (short-term within 4 weeks): -20℃~60℃;
2. Storage vibration: maximum 0.3mm (2-9Hz), maximum 0.1g;
3. Seismic vibration: maximum 9mm (5-35Hz), maximum 2g;
4. Transport and storage shock: maximum 10g

During storage, ensure that the surrounding environmental conditions meet the requirements for transport and storage temperatures.

4.3 Storage

4.3.1 Storage Requirements

The following specifies the storage conditions for the BESS energy storage system: the storage requirements for the ESS and its components (such as battery cells/modules, HVB, liquid cooling units, etc.) at any time after delivery, before operation, and during operation. Improper storage of the ESS can lead to product damage. After delivery to the customer, the customer is responsible for the storage of the BESS. If the BESS is not connected to auxiliary power and PCS power for more than 24 hours, it should be stored.

4.3.2 Storage Precautions

Before installation, we recommend storing the ESS in a location that meets the following conditions:

1. Avoid rain.
2. Avoid direct sunlight.
3. Maintain a distance of more than 2 meters from any heat source.
4. Keep at least 20 centimeters above the ground.
5. Position at least 50 centimeters away from walls, windows, or air inlets.
6. Maintain humidity below 95% RH (no condensation) and provide a floor that can support the weight of the equipment.

At all times, the storage of BESS must meet the following requirements:

1. Avoid harmful gases, flammable and explosive materials, and corrosive chemicals.
2. Keep the temperature between -20℃ and 60℃.

Caution!

- The ideal temperature to reduce the attenuation effect is 20 ±3℃.
- Energy attenuation accelerates when the temperature exceeds 25℃.
- The optimal storage temperature is between 15℃ and 25℃.

1. Maintain altitude: <3000 meters.
2. To prevent any cell voltage from dropping below 2.8V, it is recommended to charge and discharge the product at least once every 6 months after leaving the factory, and to charge and discharge it to 25-50% SOC.
3. Prevent mechanical damage to the equipment.
4. Avoid strong magnetic fields.
5. Prohibit water immersion: No part of the equipment should be submerged in water.
6. Prevent small animals from entering the equipment.
7. Secure the equipment door lock.

4.3.3 Long-term storage precautions

If the energy storage device has not used the auxiliary power and PCS power for three months or longer, it is considered to be in a long-term storage state. In addition to general storage conditions, the following long-term storage requirements must also be met:

1. The customer is obligated to maintain each cell's voltage >2.8V and SOC >5%.

2. All battery maintenance work described in the operation and maintenance manual must be performed.

3. Any ESS must undergo capacity validation testing and re-inspection.

It is recommended to charge and discharge components that have been stored for a long time, and to charge and discharge them to 25-50% SOC at least every six months after leaving the factory.

1. In cases of long-term non-use and storage for more than 3 months, the ESS can maintain a SOC of 25-50%. It is recommended to charge and discharge once every six months.

2. Long-term storage of the ESS may cause irreversible damage to the battery.

4.3.3.1 Charging and Discharging Steps

Step 1: Use the upper computer to check that there are no alarms in the energy storage cabinet.

Step 2: Use the PCS to issue a constant power charge of 0.5P.

Step 3: Charge to a SOC of 40-60% in the cabinet, stop charging, and complete the replenishment.

Instructions!

Please refer to the "Power On and Off" section of this document for power on and off operations.

4.3.3.2 Modify Storage Condition Specifications

With prior written approval from ATESS, the storage condition specifications described in this document may be modified based on the further conditions of the energy storage equipment.

4.4 Unboxing Acceptance

1. ATESS recommends using a forklift to transport the equipment. To avoid tipping, please secure the box containing the equipment to the forklift with ropes before moving. Exercise caution during movement, as impacts or falls may cause damage to the equipment.

2. Before opening the outer packaging, check if it is intact. Be careful when opening the outer packaging, as the equipment is heavy. Do not allow the equipment to tip over, as this may cause injury to personnel or damage to the equipment.

3. After opening the packaging, please check if the fastening components and removable parts are loose. If they are loose, immediately notify the carrier and manufacturer. If the on-site environment is poor, please take dust and condensation prevention measures after removing the packaging (such as using dust covers, plastic film, or fabric coverings) to avoid condensation or dust corrosion inside the battery.

5 Installation of Equipment

5.1 Mechanical Installation

5.1.1 Site Requirements

The layout of the energy storage system varies depending on the region, industry, and application scenario.

Currently, the following standards are available for reference:

GB51048-2022 "Design Specification for Electrochemical Energy Storage Power Stations"

GB 50016 "Fire Protection Design Specification for Buildings"

NFPA855-2023 "Installation Standard for Stationary Energy Storage Systems"

5.1.1.1 Surrounding Environment

1. Energy storage systems or energy storage power stations must be located in environments with no risk of fire or explosion.

2. The site must meet the necessary area requirements for emergencies and should allow for expansion based on lifecycle needs.

3. Choose a well-ventilated location.

The following sites and areas should not be selected as station locations:

1. Seismic fault zones and areas with seismic intensity greater than nine.

2. Areas directly threatened by mudslides, landslides, quicksand, sinkholes, etc..

3. Within the boundaries of the mining collapse (dislocation) area.

4. Within the blast danger zone.

5. Areas that may be flooded after the dam or levee failure.

6. Important sanitary protection zones for water supply sources.

7. Protection zones for historical relics and monuments.

5.1.1.2 Fire Safety

There should be no vegetation or flammable plants within a 3m radius of the energy storage system or energy storage station installation site to prevent wildfires caused by high summer temperatures from igniting the energy storage system. For safety, the distance between the energy storage system and residential buildings should be >12m, and the distance from schools, hospitals, and other densely populated buildings should be >30.5m. If this safety distance cannot be met, a firewall should be constructed between the energy storage system and the buildings.

The safety distance from the energy storage system to Class A production buildings is 212m, to Class B production buildings is 210m, and to Class C, D, and E production buildings with fire resistance ratings of Class I and II is 210m, while the safety distance to Class III production buildings is 212m. If the exterior walls of adjacent buildings are non-combustible and have no doors or windows, and no exposed combustible eaves, the fire separation distance can be reduced by 25% to 3m.

The safety distance from the energy storage system to production buildings should comply with local fire safety regulations or standards.

If the above safety distance cannot be met, a firewall must be installed between the battery equipment room, energy storage room, or energy storage installation area and Class C, D, and E buildings. A firewall with a fire resistance rating of no less than 3 hours should be installed for safety protection, and the length and height of the firewall should exceed the outer profile of the energy storage system by 1m. Additionally, space requirements for equipment transportation, installation, and maintenance should be considered.

The site should have convenient transportation conditions and reliable fire suppression system equipment.

The installation, debugging, and operation phases of the energy storage system should adhere to the principle of fire safety first: at least 2 gas fire extinguishers should be placed near each unit.

The exhaust system of the energy storage system should be more than 4.6 meters away from heating, ventilation, and air conditioning (HVAC) intakes, windows, doors, unloading platforms, and fire sources of other buildings or facilities.

Please reserve a water fire extinguishing system interface at the energy storage system site.

Note: Other unspecified content should comply with local fire safety requirements and the regulations of the management department at the installation site.

5.1.1.3 Flood Prevention

The installation level should be higher than the historical highest water level in the area and at least 300mm above the horizontal ground; the installation location should not be in low-lying areas.

If unavoidable, when setting up in areas prone to water accumulation, water barriers, drainage facilities, or ground elevation measures should be implemented.

Cable trenches should not be used as drainage pathways; fire-stopping measures should be implemented at cable entry points (such as holes where cables pass through walls or floors).

The design elevation of large electrochemical energy storage system sites should be higher than the flood level with a frequency of 1% or the historical highest internal flooding level.

The design elevation of medium and small electrochemical energy storage system sites should be higher than the flood level with a frequency of 2% or the historical highest internal flooding level.

When the design elevation of the station area cannot meet the above requirements, an alternative site should be selected, or different flood prevention and drainage measures should be taken for different situations.

The elevation of flood control facilities for energy storage stations affected by wind and waves along rivers, lakes, and seas should consider a wave height with a frequency of 2% and a safety freeboard of 0.5m.

Note: For other unspecified requirements, follow the local department's review settings for the area where the equipment is located.

5.1.1.4 Distance from Pollution Sources

The energy storage system should not be located in dusty or corrosive gas environments and can be used in the following or better conditions:

1. Outdoor environments more than 2000m from the coast. The use of energy storage systems is not recommended when the distance from the coast is between 500m and 2000m (if necessary, confirmation with the dealer or our company's engineers is required). Energy storage systems cannot be used when the distance from the coast is less than 500m.

2. More than 1500m to 3000m from heavy pollution sources such as smelting plants, coal mines, and thermal power plants.

3. More than 1000m to 2000m from moderate pollution sources such as chemical, rubber, and electroplating industries.

4. More than 500m to 1000m from light pollution sources such as food processing, leather, heating boilers, slaughterhouses, centralized garbage dumps, and sewage treatment plants.

5.1.1.5 Installation and Transportation

1. The overall layout should be neat and aesthetically pleasing. The layout diagram is for reference only, and detailed design should be carried out by a professional design unit based on on-site survey conditions before project implementation.

2. When designing a conventional flat layout, appropriate fire and transportation passages and lifting spaces should be set up. The width of the fire passage should be 4m, and the width of the transportation passage should not be less than 3m. The inner turning radius of the road should not be less than 7m.

3. It is recommended to use solid walls or fences for isolation and protection in the energy storage equipment area. The fence should have a lock, and its height should be greater

than 2.2 meters. Firewalls can replace part or all of the walls, and the designer can consider this comprehensively. The outer spacing should not be less than 1m, mainly for the installation and maintenance of related accessories.

4. When there are protective walls or fences around the energy storage system, if the protective facility is a solid wall and the container has side-opening doors (non-walk-in containers), to ensure the maintenance of battery modules and other sub-devices, the spacing on the door-opening side should not be less than 1.5m (if a forklift is needed to replace the battery module, the spacing should be at least 2.5m), and the spacing on the side wall should not be less than 0.6m.

5. The height of the external circulation air intake of the battery energy storage system should be less than 300mm from the ground, and there should be no obstructions within this height range: there should be no obstructions within 0.5m on both sides of the external circulation air intake and at the front end, to ensure smooth air flow in and out, or to avoid short-circuiting of the air intake and exhaust.

6. On-site, sufficient consideration should be given to the system connection position and the cable routing and length between systems to improve the rationality and economy of the layout design.

Note: The roads must meet the requirements of national and local governments.

5.1.2 Site Layout

To better display the layout diagram, the equipment diagram has been simplified to a top view.

5.1.2.1 Battery Cabinet Spacing

Considering the principles of heat dissipation performance, safety, and maintenance convenience during cabinet integration, the following recommendations are made for different installation methods: For left and right cabinet integration, a spacing of ≥100mm is recommended (the cabinets can be closely integrated, depending on the actual construction situation); for back-to-back installation, a spacing of ≥1000mm is recommended; for face-to-face installation, the relative cabinet doors and operational space must be considered, with a recommended spacing of ≥4000mm.

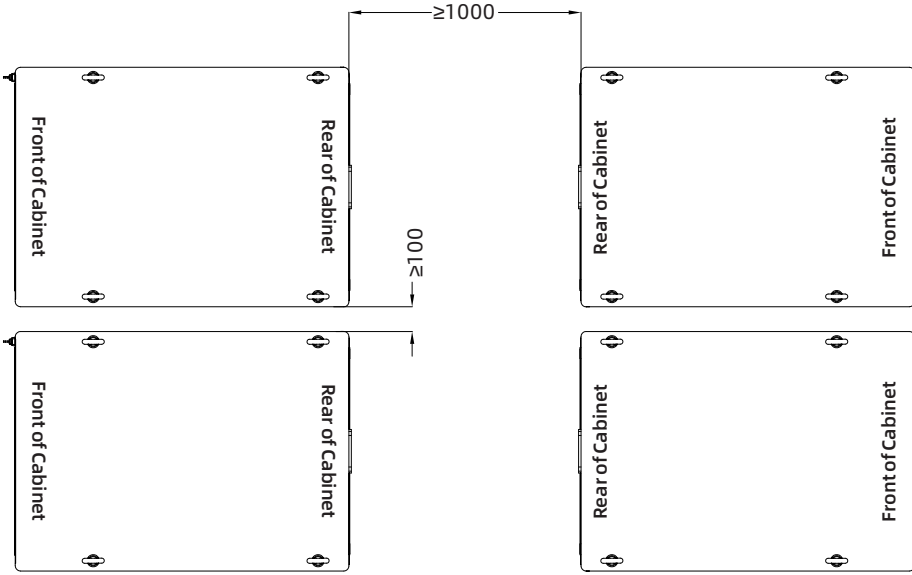
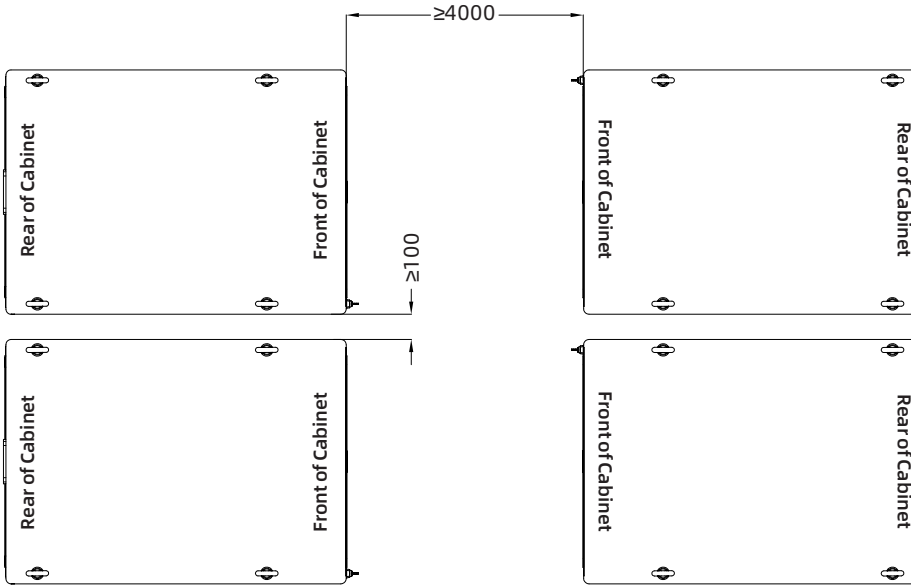


Figure 5 - 1: Back-to-back installation diagram of left and right cabinets



5-2: Face-to-face installation of left and right cabinets

5.1.2.2 Distance between battery cabinet and wall/fence

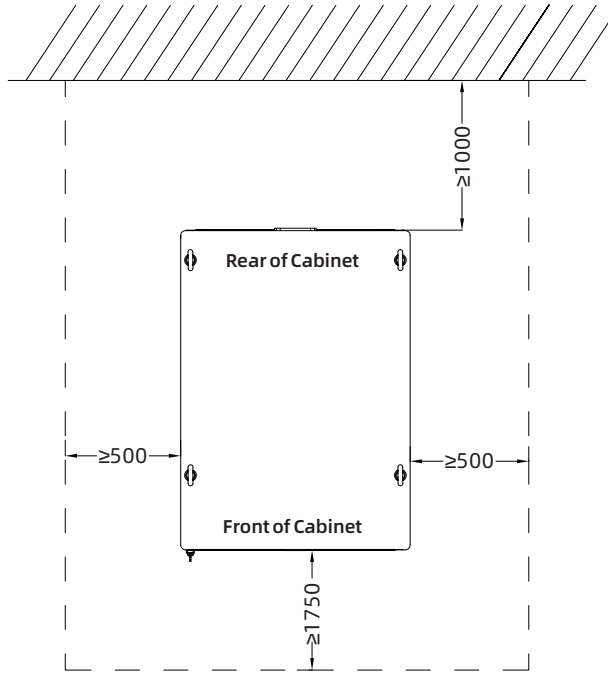


Figure 5 - 3 Distance between cabinet body and wall/fence

5.1.2.3 Liquid-cooled battery cabinet foundation construction drawing

The weight of the liquid-cooled battery cabinet is approximately 4 tons, with a 350X350mm concrete support column at the bottom, a ground clearance of no less than 300mm, prefabricated steel plates and nuts on the support column, and the cabinet's bottom frame fixed with M12 bolts (recommended torque: 40Nm) connected to the support column.

Foundation design requirements:

1. The energy storage system must be installed on a concrete or other non-combustible surface, ensuring that the installation plane is level, firm, flat, and has sufficient load-bearing capacity, with no depressions or inclinations.

2. The equipment foundation should be configured based on the total weight of the equipment, which is 4t; if the foundation's load-bearing capacity is insufficient, it must be re-evaluated.

3. The bottom of the foundation pit for the equipment must be compacted and leveled.

4. After excavation of the equipment foundation, it is strictly prohibited to allow water to disturb the site; if water disturbance occurs, further excavation and replacement of fill are

required.

5. Level error between the equipment foundation and the cabinet contact surface ≤ 3mm.

6. The foundation must be higher than the local historical highest water level and at least 300mm above the horizontal ground.

7. Drainage facilities should be constructed in accordance with local geological conditions and municipal drainage requirements to ensure that no water accumulates at the equipment foundation. The foundation construction should meet the drainage requirements for the maximum historical rainfall in the area, and the discharged water must be treated according to local laws and regulations.

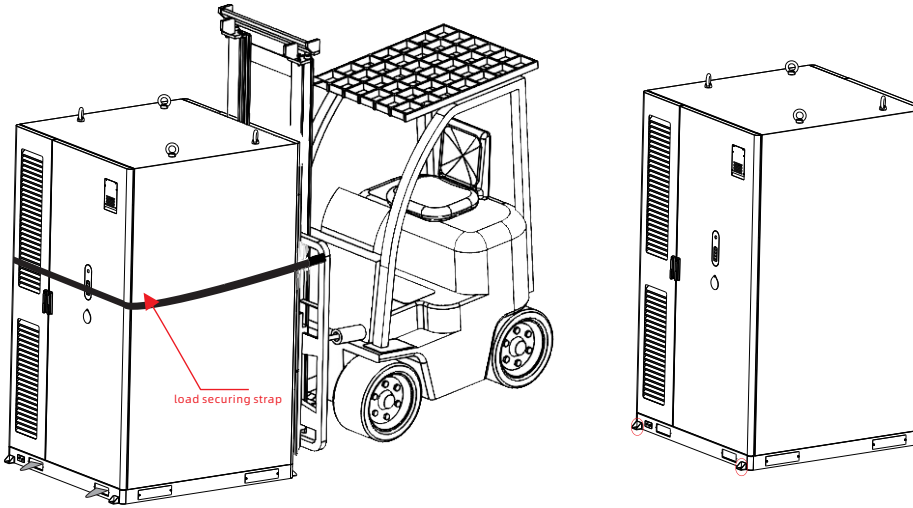
8. When constructing the equipment foundation, the issue of cable outlets for the energy storage system must be considered, and trenches or inlet holes should be reserved.

9. Reserved holes in the equipment foundation and inlet holes at the bottom of the equipment should be sealed.

10. The foundation drawing cannot be used as the final construction drawing and is for reference only. Users must verify the design parameters of the energy storage system foundation based on the installation environment, geological conditions, and seismic requirements of the project site.

5.1.3 Forklift Requirements

As shown in Figure 5-5, a forklift of ≥3.5 tons should be used, arranged according to the actual site conditions. The fork prongs should be inserted into the forklift holes near both sides, extending 50mm beyond the cabinet, and must be raised and lowered evenly.



5 - 5 Forklift Schematic Diagram

5.1.4 Equipment Fixed Installation

After transporting the outdoor cabinet to the installation location, secure it. Choose between welding or M12 bolt fixation based on actual needs. The welding fixation method involves welding the bottom of the cabinet to the foundation. After completion, apply anti-corrosion treatment to the welded areas. The M12 bolt fixation method is shown in Figure 5-6, with four mounting holes reserved at the bottom of the cabinet.

5.2 Electrical Connections

Before installing the battery, ensure that the power switch is in the OFF position.

During the battery installation process, do not place installation tools, metal parts, or debris on the battery. After installation, promptly clean any items on or around the battery.

When transporting the battery, do not remove protective components from the battery terminals, such as protective covers or waterproof caps.

Please do not move or operate under the forklift arms.

Only operate the battery module tooling after the forklift has come to a stop.

5.2.1 Installation and Debugging Tools

Serial Number	Name	Model Specifications	Unit	Quantity
1	Diagonal Cutting Pliers	/	PCS	1
2	Screwdriver	2/4/6/8mm	PCS	1
3	Cable Tie	/	PCS	1
4	Multimeter	DC 1500V	PCS	1
5	Impact Drill	/	PCS	1
6	Socket Wrench	Socket Wrench Set	PCS	1
7	Open-end wrench	Open-end Wrench Set	PCS	1
8	Socket Torque Wrench	/	PCS	1
9	PV Cable Plugging Tool	/	PCS	1

Protective tools are shown in the table below:

Serial Number	Name
1	Safety Shoes
2	Safety Helmet
3	Safety Gloves
4	Safety Goggles
5	Dust Mask

5.2.2 Open the Cabinet Door

Before connecting the cable, open the cabinet door. Slide the lock cover upward to the keyhole, insert the key and turn it clockwise, then rotate the handle to open the front door.

5.2.3 Prepare the Cable

Instructions!

The cable color illustrations in this manual are for reference only. Please select cables according to local cable standards, and ensure that the cables comply with local laws and regulations.

The selected cable must meet the following conditions:

1. Has sufficient current-carrying capacity.

2. The cable diameter must be selected according to the maximum current-carrying capacity, and the length must have a margin.

3. The specifications and materials of the three-phase AC output cables should be consistent.

4. Be sure to choose flame-retardant cables. To facilitate on-site installation for customers, Hongzheng Energy Storage has connected all the internal cables of the energy storage battery cabinet (including auxiliary power supply wiring) before delivery. Upon arrival at the installation site, only the network cable, AC side incoming cable, and grounding protection need to be installed.

Note: For specific models, please contact our technical pre-sales support department.

Serial Number	Name	Model
1	Communication cable	ZR-YJV22-0.6/1kV-3*70+1*35mm^2
2	Communication Cable	RS485 Communication Cable

5.2.3.1 Cable Entry and Specification Description

The cable connecting the industrial storage battery cabinet and external devices can enter the interior through the cable entry at the bottom of the cabinet. It is recommended to prioritize using the left side entry hole.

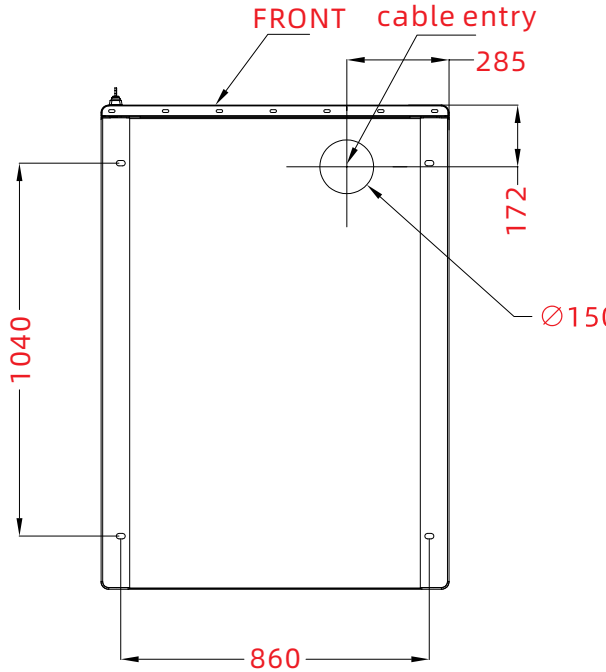


Figure 5-8 Schematic Diagram of Bottom Cable Entry and Exit

5.2.3.2 Crimping OT/SC Terminals

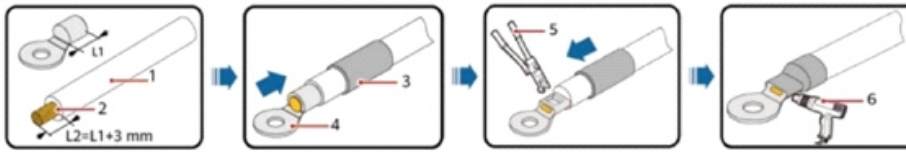


Figure 5-9 Schematic Diagram of Crimping Terminals

Note: Prioritize SC terminals

5.2.4 Grounding Connection

The grounding method must comply with the standards and regulations of the installation location.

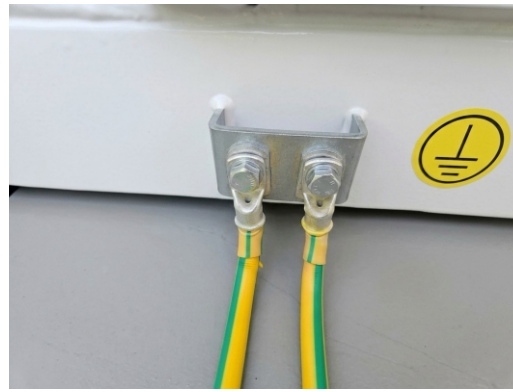
5.2.4.1 Introduction

There are two types of grounding methods: using welded flat steel or using grounding cables. The specific method is determined by the design institute.

Flat steel grounding refers to using flat steel materials as grounding materials, burying the flat steel underground, and achieving grounding through the conductivity of the underground soil, mainly used to eliminate static electricity. It is commonly used in situations where static electricity needs to be eliminated, such as chemical plants and oil storage tanks. Chinese standards also recommend the use of flat steel grounding.

Figure 5 - 10 Flat Steel Grounding

Cable grounding usually refers to the grounding system of power cables, which mainly includes grounding wires, grounding electrodes, and grounding networks, used to protect the power grid and equipment. Its main function is to protect the power grid and equipment. If there is leakage or other faults in the power grid or equipment, the grounding wire discharges to the ground, ensuring personal safety and equipment protection. It is commonly used in large power equipment and power grids, high-voltage transmission lines, and other situations that require protection. In these situations, cable grounding can effectively protect equipment and the power grid from the effects of leakage and other faults.



Cable Grounding

5.2.4.2 Grounding Flat Steel (Recommended Use)

Tear off the protective tape at the grounding point and weld the hot-dip galvanized flat steel to the grounding point (the overlap area of the flat steel and the cabinet body is 60mm x 90mm). After completion, the entire fixed surface must be sprayed.

The open-circuit voltage on the battery side must not exceed the maximum DC input voltage of the energy storage inverter; an excessively high open-circuit voltage on the battery side may cause damage to the energy storage inverter.

When a grounding fault is found on the battery side, the fault must be cleared before connecting the DC input terminals of the energy storage inverter.

Using a 50mm to 95mm copper grounding cable, reliably connect the grounding point to the cabinet grounding point. (There is tape on the factory grounding point, which needs to be removed before wiring.) Crimp the SC terminal and use an M12 bolt to secure the SC terminal to the wiring hole, with a tightening torque of 80N.m. Please install the external grounding according to the actual situation on-site and follow the instructions of the power station staff. After completing the grounding connection, the grounding resistance must be measured, and the value should not exceed 4Ω. The specific grounding resistance must comply with national/local relevant standards and regulations.

5.2.5 AC Wiring

5.2.5.1 Safety Precautions

When connecting AC power, disconnect the upstream AC circuit breaker to ensure that the terminal is voltage-free.

When connecting to the power grid, it must be approved by the relevant departments and comply with all safety instructions and regulations related to the power grid.

5.2.5.2 PCS Wiring Steps

Step 1: Disconnect the upstream AC circuit breaker and use a multimeter to measure to ensure the terminal is voltage-free.

Step 2: Bring the cable into the bottom entry hole of the energy storage cabinet, connect the three-phase four-wire copper bus, and connect to the PCS through the AC plastic circuit breaker.

Step 3: Ensure the correct sequence of AC cable connections.

5.2.6 Auxiliary Power Supply

The auxiliary power supply is powered by the PCS terminal, and the wiring has been completed before leaving the factory, so no wiring operation is required by the customer.

5.2.7 Communication Wiring

The communication cable connection is located at the high-voltage box network port.

6 View and configure parameters

6.1 Introduction

There are two ways to view and configure battery parameters:

Method 1: Use the battery's dedicated PC software and communication cable to view and configure parameters on a computer.

Method 2: Use the battery's communication cable to connect to the DC cabinet's display screen to view and configure parameters. (Note: This method is not supported if the system does not include a DC cabinet.)

The two methods mentioned above are described in detail below.

Note: The host computer and screen are optional accessories (non-standard configuration).

6.2 View and configure battery parameters via host computer

6.2.1 Required tools

1) Host computer software (download from official website or via QR)

2) 485 serial port cable

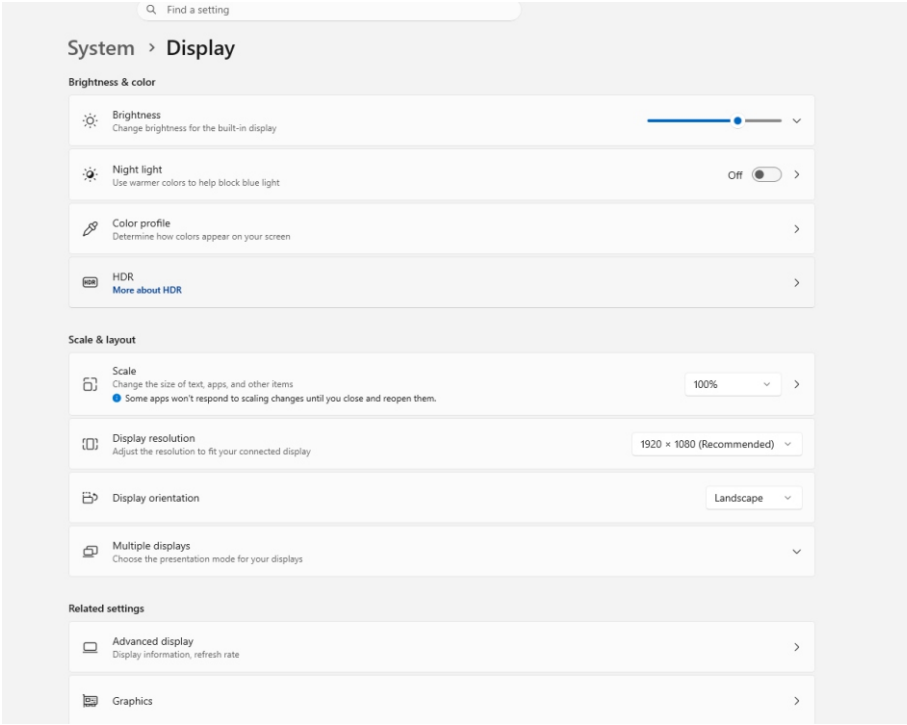
3) 485 communication cable

4) computer

6.2.2 Operating Steps

1) Configure computer settings

Choose 100% for computer layout size; choose 1920*1080 for display resolution

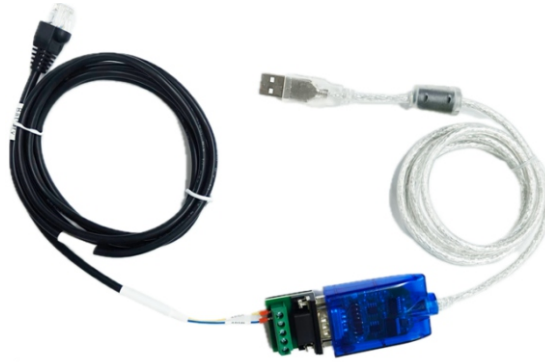


2) Wiring between host computer and battery

● Connect RJ45 terminal the black communication cable to the COM1 or COM2 of the battery BPU.

● Connect 485A (yellow wire) to the T/R+ terminal of the 485 serial port cable, connect 485B (blue wire) to the T/R- terminal of serial port cable.

● Connect USB terminal of 485 serial port cable to the computer.



3) Unzip the host computer compression package

Batt_updev-260608.zip

4) Open the host computer, click

① COM SET to enter.

② select the corresponding port (this computer - management - set manager - port).

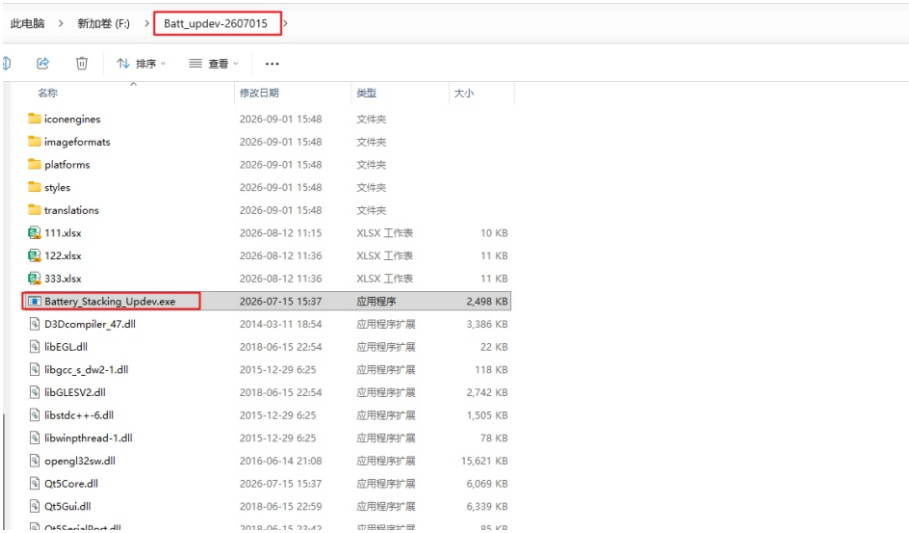
③ select 115200 serial port baud rate.

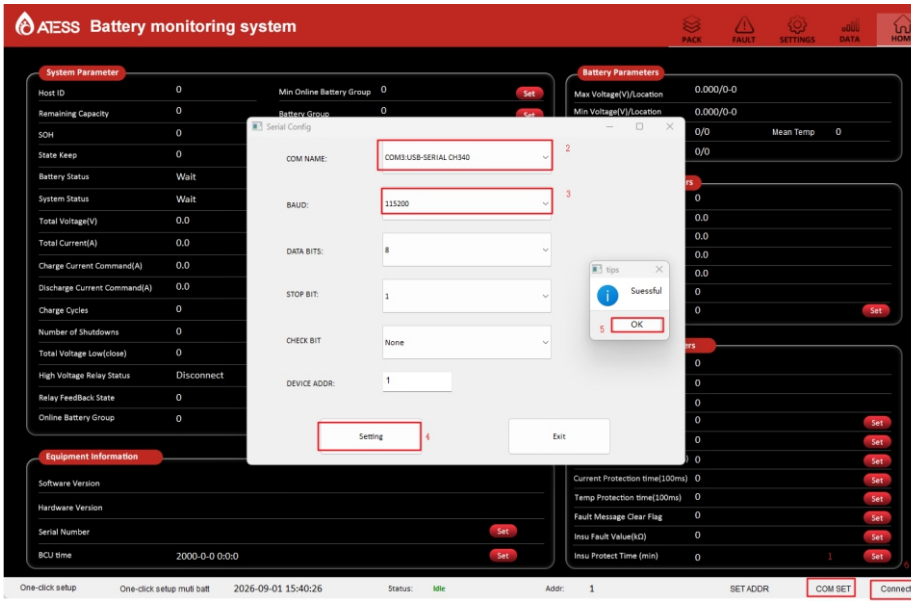
④ select the BCU address to be viewed.

⑤ click set, a prompt will appear.

⑥ click OK, and finally click.

⑦ connect. The page shows that the connection is successful.

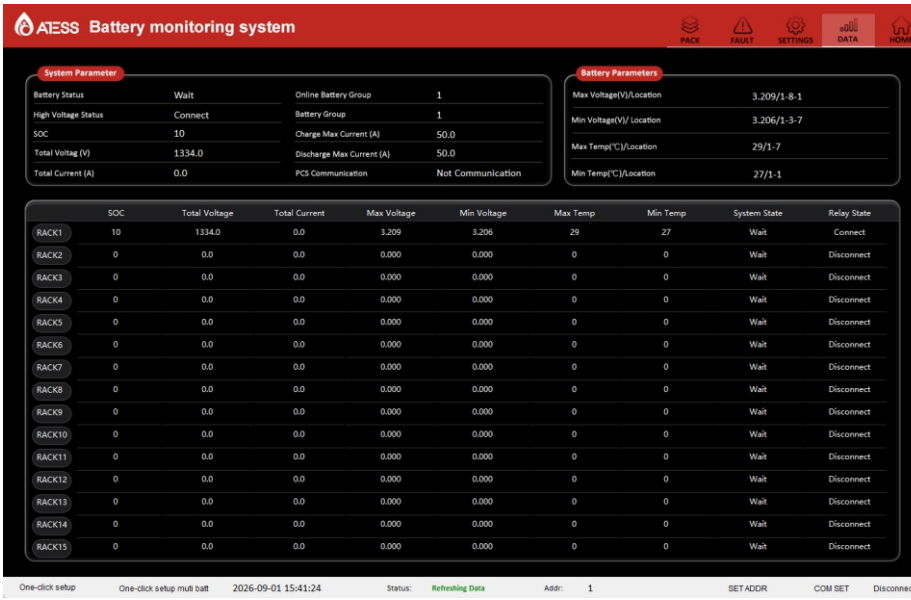




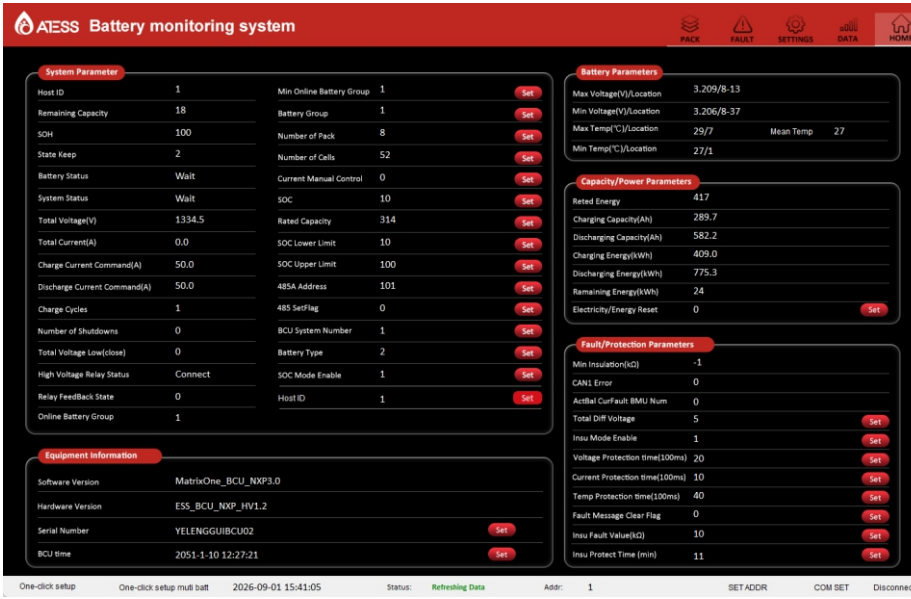
6.2.3 Parameter viewing and setting

(1) DATA

The host device (default BCU address 1) has data, and the DATA page parameter is used to view system battery data information.


ATESS Battery monitoring system
PACK
FAULT
SETTINGS
DATA
HOME
System Parameter
Battery Status Wait
High Voltage Status Connect
SOC 10
Total Voltag (V) 1334.0
Total Current (A) 0.0
Online Battery Group 1
Battery Group 1
Charge Max Current (A) 50.0
Discharge Max Current (A) 50.0
PCS Communication Not Communication
Battery Parameters
Max Voltage(V)/Location 3.209/1-8-1
Min Voltage(V)/ Location 3.206/1-3-7
Max Temp(℃)/Location 29/1-7
Min Temp(℃)/Location 27/1-1
SOC Total Voltage Total Current Max Voltage Min Voltage Max Temp Min Temp System State Relay State
RACK1 10 1334.0 0.0 3.209 3.206 29 27 Wait Connect
RACK2 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK3 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK4 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK5 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK6 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK7 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK8 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK9 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK10 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK11 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK12 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK13 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK14 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
RACK15 0 0.0 0.0 0.000 0.000 0 0 Wait Disconnect
One-click setup
One-click setup muti batt
2026-09-01 15:41:24
Status: Refreshing Data
Addr: 1
SET ADDR
COM SET
Disconnect

(2) HOME


ATESS Battery monitoring system
PACK
FAULT
SETTINGS
DATA
HOME
System Parameter
Host ID 1
Remaining Capacity 18
SOH 100
State Keep 2
Battery Status Wait
System Status Wait
Total Voltage(V) 1334.5
Total Current(A) 0.0
Charge Current Command(A) 50.0
Discharge Current Command(A) 50.0
Charge Cycles 1
Number of Shutdowns 0
Total Voltage Low(close) 0
High Voltage Relay Status Connect
Relay FeedBack State 0
Online Battery Group 1
Min Online Battery Group 1 Set
Battery Group 1 Set
Number of Pack 8 Set
Number of Cells 52 Set
Current Manual Control 0 Set
SOC 10 Set
Rated Capacity 314 Set
SOC Lower Limit 10 Set
SOC Upper Limit 100 Set
485A Address 101 Set
485 SetFlag 0 Set
BCU System Number 1 Set
Battery Type 2 Set
SOC Mode Enable 1 Set
Host ID 1 Set
Equipment Information
Software Version MatrixOne_BCU_NXP3.0
Hardware Version ESS_BCU_NXP_HV1.2
Serial Number YELENGGUIBCU02 Set
BCU time 2051-1-10 12:27:21 Set
Battery Parameters
Max Voltage(V)/Location 3.209/8-13
Min Voltage(V)/Location 3.206/8-37
Max Temp(℃)/Location 29/7
Mean Temp 27
Min Temp(℃)/Location 27/1
Capacity/Power Parameters
Reted Energy 417
Charging Capacity(Ah) 289.7
Discharging Capacity(Ah) 582.2
Charging Energy(kWh) 409.0
Discharging Energy(kWh) 775.3
Ramaining Energy(kWh) 24
Electricity/Energy Reset 0 Set
Fault/Protection Parameters
Min Insulation(kΩ) -1
CAN1 Error 0
ActBal CurFault BMU Num 0
Total Diff Voltage 5 Set
Insu Mode Enable 1 Set
Voltage Protection time(100ms) 20 Set
Current Protection time(100ms) 10 Set
Temp Protection time(100ms) 40 Set
Fault Message Clear Flag 0 Set
Insu Fault Value(kΩ) 10 Set
Insu Protect Time (min) 11 Set
One-click setup
One-click setup muti batt
2026-09-01 15:41:05
Status: Refreshing Data
Addr: 1
SET ADDR
COM SET
Disconnect

System Parameter

Num	Data Name	Value	Modify Ranges
1	Host ID	(View based on actual battery group)	1~15
2	Remaining Capacity	50(Rated capacity * SOC * 0.01)	-
3	SOH	100(The state of health of the battery)	-
4	State Keep	0	-
5	Battery Status	0:Wait, 1:Fault, 2:ForbidCharge, 3:ForbidDischarge, 4:Charging, 5:Discharging	-
6	System Status	0:Wait, 1:Charging, 2:Discharging, 3:Fault	-
7	Total Voltage（V）	-(Total Voltage of the battery)	-
8	Total Current (A)	-(Total Current of the battery)	-
9	Charge Current Command (A)	50 (Maximum charging current limit of the battery Cluster)	-
10	Discharge Current Command (A)	50 (Maximum discharge current limit of battery cluster)	-
11	Charge Cycles	-	-
12	Number of Shutdowns	0 (Cumulative shutdown times due to level 3 or above faults)	-
13	Total Voltage Low (close)	0	-
14	High Voltage Relay Status	1(Relay status (connect, disconnect))	-
15	Relay FeedBack State	-	-
16	Online Battery Group	-(The number of battery clusters operating normally in the system)	-
17	Min Online Battery Group	-(Minimum number of battery clusters required for normal operation of the system)	1~15
18	Battery Group	-(The total number of battery clusters in the system)	1~15
19	Number of Pack	8 (Number of BMUs in a single battery cluster)	1~15

Num	Data Name	Value	Modify Ranges
20	Number of Cells	52 (Number of cells collected by a single BMU)	1~52
21	Current Manual Control	0 (manually modify the charging demand current, the maximum charging current no longer checks the charging current table)	0~310
22	SOC	30	0~100
23	Rated Capacity	100 (Battery type related data verification)	0~100
24	SOC Lower Limit	10 (Discharge SOC lower limit parameter)	0~20
25	SOC Upper Limit	100(charging SOC upper limit parameter)	90~100
26	485A Address	101 (Automatically set according to BCU address and system number)	1~200
27	485 SetFlag	0	0~1
28	BCU System Number	The BCU system numbers for the same system must be the same; however, the system numbers for different battery systems under the same collector cannot be the same. For example: Battery System 1 (all BCU systems are numbered as 1)	1~30
29	Battery Type	2 0:100AH 1C 1:100AH 0.5C 2:314AH 0.5C	0~2
30	SOC Mode Enable	0 (0: SOC is calculated based on the number of charge and discharge cycles 1: SOC is determined based on the actual charge and discharge capacity)	0~1

Battery Parameters

Num	Data Name	Value	Modify Ranges
1	Max Temp / Location	-(Location: Max Temp. PACK Num)	-
2	Min Temp / Location	-(Location: Min Temp. PACK Num)	-
3	Max Voltage /Location	-(Location: Max Voltage PACK Num-Cell Num)	-
4	Max Voltage /Location	-(Location: Min Voltage PACK Num-Cell Num)	-

Capacity/ Power Parameters

Num	Data Name	Value	Modify Ranges
1	Rated Energy	261	-
2	Charging Capacity（KWH）	0(Total charging capacity of battery cluster)	-
3	Discharging Capacity（KWH）	0(Total discharge capacity of battery cluster)	-
4	Charging Energy（KWH）	0(Total charging Energy of battery cluster)	-
5	Discharging Energy（KWH）	0(Total discharge Energy of battery cluster)	-
6	Remaining Energy（KWH）	0(Remaining Energy of battery cluster)	-
7	Electricity/Energy Reset	0(0: charge and discharge capacity is not cleared to 0 1: charge and discharge capacity is cleared to 0)	0~1

Fault / Protection Parameters

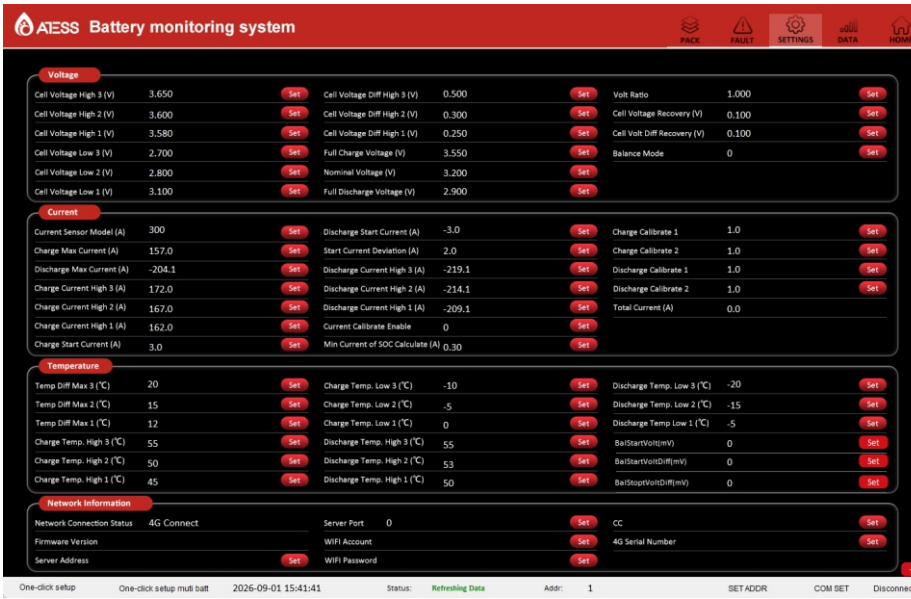
Num	Data Name	Value	Modify Ranges
1	Min Insulation(KΩ)	-The insulation value of the system operation.This value must be observed to trigger an insulation fault. It cannot be -1 (-1 means that the insulation module is not connected)	-
2	CAN1 Error	00 (If a communication failure between BMU and BCU is reported, this parameter needs to be checked. The value indicates that the communication with the BMU address has timed out.)	-
3	ActBal CurFault BMU Num	0	-
4	Total Diff Voltage	5(Total pressure difference fault value of multiple parallel battery packs)	0~10
5	InsuMode Enable	1(0:Insulation faults are detected according to normal logic 1:Insulation faults are detected based on the inverter status and communication status)	0~1
6	Voltage Protection time(100ms)	20(voltage fault duration judgment time)	0~60
7	Current Protection time(100ms)	10(Current fault duration judgment time)	0~60
8	Temp Protection time(100ms)	40(temperature fault duration judgment time)	0~60
9	Fault Message Clear Flag	0	0~1
10	Insu Fault Value(KΩ)	10 (minimum insulation value less than this parameter will trigger insulation fault)	0~1000
11	Insu Protect Time(min)	11(Insulation fault protection time)	1~1440

Equipment Information

Num	Data Name	Value	Modify Ranges
1	Serial Number	-(BCU serial number)	' 0'~'9', 'A'~'Z', 'a'~'z'
2	Hardware Version	-(BCU Hardware number)	'0'~'9', 'A'~'Z', 'a'~'z'
3	Software Version	-(BCU Software number)	'0'~'9', 'A'~'Z', 'a'~'z'
4	BCU Time	-(BCU Time)	Year:2025~2099 Month:1~12 Day:1~31 Hour:0~23 Minute:0~59 Second:0~59

(3)SETTINGS

① Voltage\Temperature\Current\NetWork



Voltage

Num	Data Name	Value	Modify Ranges
0	Cell Voltage High 3(V)	3.65	3~4.5
1	Cell Voltage High 2(V)	3.6	3~4.5
2	Cell Voltage High 1(V)	3.58	3~4.5

Num	Data Name	Value	Modify Ranges
3	Cell Voltage Low 3（V）	2.7	2~3.3
4	Cell Voltage Low 2（V）	2.8	2~3.3
5	Cell Voltage Low 1（V）	2.87	2~3.3
6	Cell Voltage Diff High 3（V）	0.5	0.1~0.5
7	Cell Voltage Diff High 2（V）	0.3	0.1~0.5
8	Cell Voltage Diff High 1（V）	0.25	0.1~0.5
9	Full Charge Voltage (V)	3.55 (The maximum voltage value of the battery cluster when it triggers the charging prohibition state during charging)	3.2~4.5
10	Nominal Voltage (V)	3.2	2.5~4
11	Full Discharge Voltage (V)	2.9 (The minimum voltage value at which the battery cluster triggers the discharge-inhibited state during discharge)	2~3.2
12	Volt Ratio	1	1~5
13	Cell Voltage Recovery（V）	0.1	0.1~0.5
14	Cell Volt Diff Recovery（V）	0.1	0.1~0.5
15	Balance Mode	0(Passive balancing system, balancing mode set to 0. Active balancing system: balancing mode set to 1 (active and passive balancing switch)	-1~1

Current

Num	Data Name	Value	Modify Ranges
0	Current Sensor Model（A）	300	-
1	Charge Max Current(A)	157	100~900
2	Discharge Max Current(A)	-204	(-900)~(-100)
3	Charge Current High 3(A)	172	1~900
4	Charge Current High 2(A)	167	1~900
5	Charge Current High 1(A)	162	1~900
6	Charge Start Current(A)	3	1~20
7	Discharge Start Current(A)	-3	(-20) ~ (-1)
8	Start Current Deviation (A)	2	1~20
9	Discharge Current High 3 (A)	-219.1	(-900)~(-1)

Num	Data Name	Value	Modify Ranges
10	Discharge Current High 2 (A)	-214.1	(-900)~(-1)
11	Discharge Current High 1 (A)	-209.1	(-900)~(-1)
12	Current Calibrate Enable	0	0~1
13	Min Current of SOC Calculate(A)	0.3	0~9.9
14	Charge Calibrate 1	-(Current calibration charge and discharge parameters)	1~280
15	Charge Calibrate 2		1~280
16	Discharge Calibrate 1		(-280) ~ (-1)
17	Discharge Calibrate 2		(-280) ~ (-1)
18	Total Current(A)	-	-

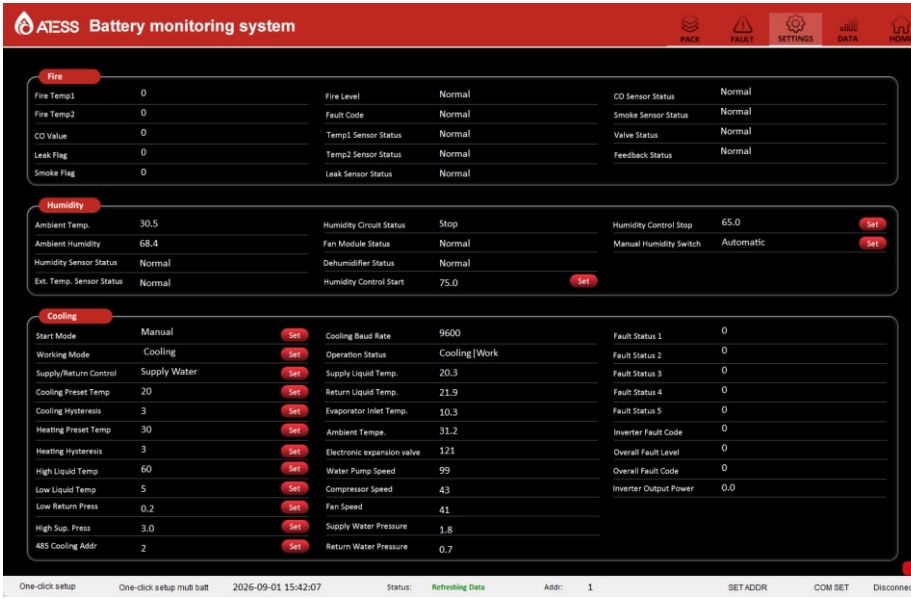
Temperature

Num	Data Name	Value	Modify Ranges
0	Temp Diff Max 3(℃)	25	1~25
1	Temp Diff Max 2(℃)	15	1~25
2	Temp Diff Max 1(℃)	12	1~25
3	Charge Temp. High 3(℃)	55	35~65
4	Charge Temp. High 2(℃)	50	35~65
5	Charge Temp. High 1(℃)	45	35~65
6	Charge Temp. Low 3(℃)	-10	(-20)~10
7	Charge Temp. Low 2(℃)	-5	(-20)~10
8	Charge Temp. Low 1(℃)	0	(-20)~10
9	Discharge Temp. High 3(℃)	55	35~65
10	Discharge Temp. High 2(℃)	53	35~65
11	Discharge Temp. High 1(℃)	50	35~65
12	Discharge Temp. Low 3(℃)	-20	(-20)~10
13	Discharge Temp. Low 2(℃)	-15	(-20)~10
14	Discharge Temp Low 1(℃)	-5	(-20)~10

Network Information

Num	Data Name	Value	Modify Ranges
0	Network Connection Status	0：4G Connect 1：Wifi Connect 2：Disconnect (Enerlog Connection Status)	-
1	Server Address	47.57.139.213	'0'~'9', 'A'~'Z'
2	Server Port	5279	'0'~'9', 'A'~'Z'
3	Firmware Version	- (Enerlog Firmware Version)	'0'~'9', 'A'~'Z'
4	WIFI Account	-(When connecting to the WIFI module, fill in the WIFI module account)	'0'~'9', 'A'~'Z'
5	WIFI Password	-(When connecting to the WIFI module, fill in the WIFI module password)	'0'~'9', 'A'~'Z'
6	CC	-(Fill in the verification code of the Enerlog)	'0'~'9', 'A'~'Z'
7	4G Serial Number	-(Fill in the Enerlog serial number)	'0'~'9', 'A'~'Z'

② CoolingHumidityFire



Cooling Parameter

Num	Data Name	Value	Modify Ranges
0	Start Mode	0: Supply Water 1: Return Water	0~1
1	Working Mode	0: Standby 1: Cooling 2: Heating 3: Self-Circulation 4: Automatic	0~4
2	Supply/Return Control	0:Supply WaterReturn Water	0: Supply Water 1: Return Water
3	Cooling Preset Temp	Unit 1℃	0~90
4	Cooling Hysteresis	Unit 1℃	0~9
5	Heating Preset Temp	Unit 1℃	0~99
6	Heating Hysteresis	Unit 1℃	0~9
7	High Liquid Temp	Unit 1℃	0~65
8	Low Liquid Temp	Unit 1℃	-40~30
9	Low Return Press	Unit 0.1bar	0~2
10	High Sup. Press	Unit 0.1bar	0~20
11	485 Cooling Addr	2	0~128
12	Cooling Baud Rate	0:9600	
13	Operation Status	Low byte (mode): 0: Standby 1: Start 2: Work 3: Stop 4: Fault High byte (mode): 0: Standby 1: Cooling 2: Heating 3: Self-Circulation	
14	Supply Liquid Temp.	Unit 0.1℃	
15	Return Liquid Temp.	Unit 0.1℃	
16	Evaporator Inlet Temp.	Unit 0.1℃	
17	Ambient Tempe.	Unit 0.1℃	
18	Condenser Tempe.	Unit 0.1℃	
19	electronic expansion valve	Unit 1Step	
20	Water Pump Speed	Unit 1%	
21	Compressor Speed	Unit 1RPS	
22	Fan Speed	Unit 1RPS	
23	Supply Water Pressure	Unit 0.1bar	

Num	Data Name	Value	Modify Ranges
24	Return Water Pressure	Unit 0.1bar	
25	Fault Status 1	Hexadecimal display	
26	Fault Status 2	Hexadecimal display	
27	Fault Status 3	Hexadecimal display	
28	Fault Status 4	Hexadecimal display	
29	Fault Status 5	Hexadecimal display	
30	Inverter Fault Code		
31	Overall Fault Level		
32	Overall Fault Code		
33	Inverter Output Power	Unit 0.1kW	

Humidity Parameter

Num	Data Name	Value	Modify Ranges
0	Ambient Temp.	Unit 0.1℃	
1	Ambient Humidity	Unit 0.1%RH	
2	Humidity Sensor Status	0:Normal 1: Fault	
3	Ext. Temp. Sensor Status	0:Normal 1: Fault	
4	Humidity Circuit Status	0: Start 1: Stop	
5	Fan Module Status	0: Normal 1: Fault	
6	Dehumidifier Status	0: Normal 1: Fault	
7	Humidity Control Start	Unit 0.1%RH	25~98
8	Humidity Control Stop	Unit 0.1%RH	25~98
9	Manual Humidity Switch	0: Manual 1: Automatic	0~1

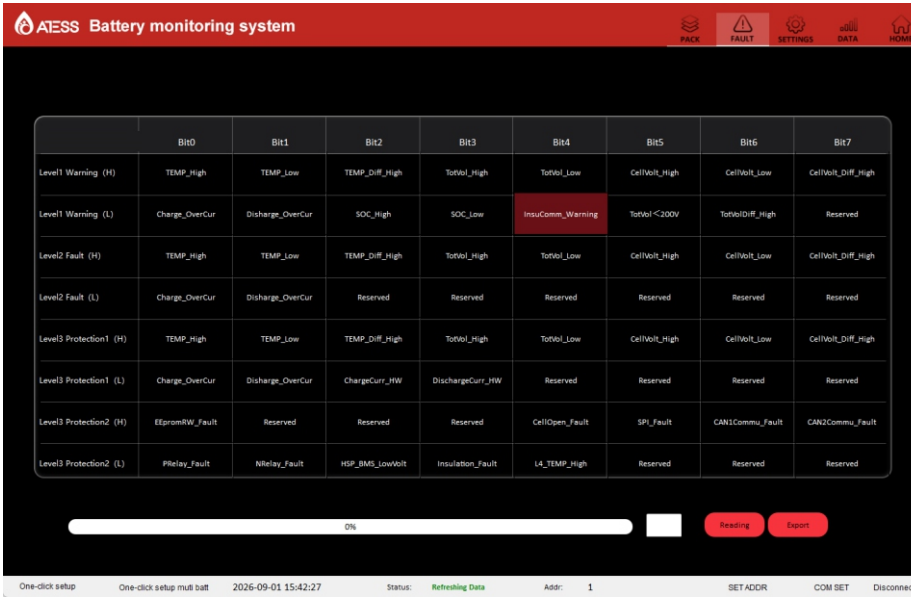
Fire Parameter

Num	Data Name	Value	Modify Ranges
0	Fire Temp1	Unit 1℃	
1	Fire Temp2	Unit 1℃	
2	CO Value	0xAA: Normal 0x55: Warning	
3	Leak Flag	0xAA: Normal 0x55: Warning	

Num	Data Name	Value	Modify Ranges
5	Fire Level	0: Normal 1: Level 1 Warning 2: Level 2 Warning 3: Level 3 Warning	
6	Fault Code	0: Normal 1: Started 2: Sensor Fault 3: Hardware Fault	
7	Temp1 Sensor Status	0: Normal 1: Abnormal 2: No Such Config.	
8	Temp2 Sensor Status	0: Normal 1: Abnormal 2: No Such Config.	
9	Leak Sensor Status	0: Normal 1: Abnormal 2: No Such Config.	
10	CO Sensor Status	0: Normal 1: Abnormal 2: No Such Config.	
11	Smoke Sensor Status	0: Normal 1: Abnormal 2: No Such Config.	
12	Valve Status	0: Normal 1: Abnormal	
13	Feedback Status	0: Normal 1: Abnormal 2: No Such Config.	

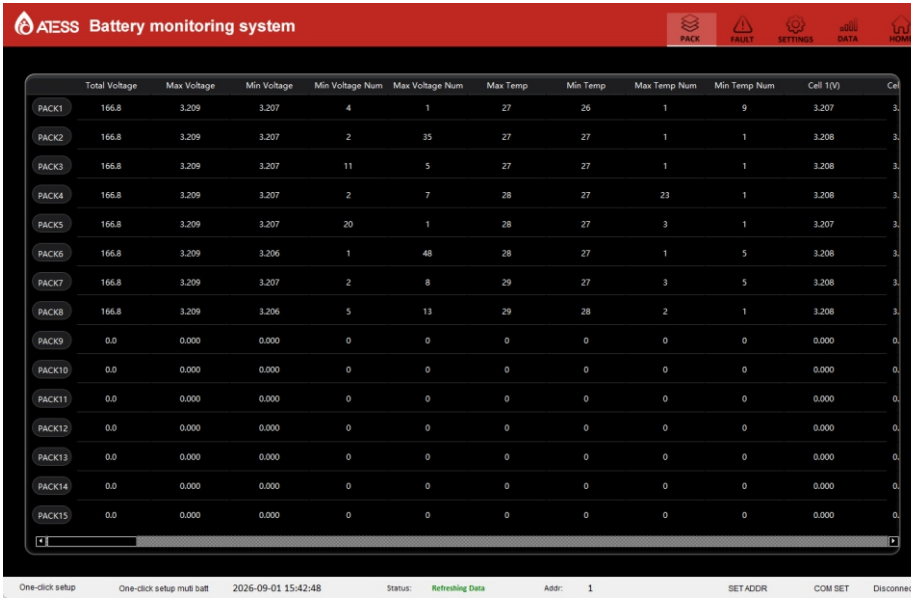
(4) FAULT

① Output the number of exported fault entries (1~64)
② Click Reading
③ Observe the progress bar reaching 100%
④ Click Export



(5) PACK

The scroll bar allows you to view the voltage, temperature, and BMU version number of the battery cell (52 battery cells, 26 battery temp).



	Total Voltage	Max Voltage	Min Voltage	Min Voltage Num	Max Voltage Num	Max Temp	Min Temp	Max Temp Num	Min Temp Num	Cell 1(V)	Cel
PACK1	166.8	3.209	3.207	4	1	27	26	1	9	3.207	3.
PACK2	166.8	3.209	3.207	2	35	27	27	1	1	3.208	3.
PACK3	166.8	3.209	3.207	11	5	27	27	1	1	3.208	3.
PACK4	166.8	3.209	3.207	2	7	28	27	23	1	3.208	3.
PACK5	166.8	3.209	3.207	20	1	28	27	3	1	3.207	3.
PACK6	166.8	3.209	3.206	1	48	28	27	1	5	3.208	3.
PACK7	166.8	3.209	3.207	2	8	29	27	3	5	3.208	3.
PACK8	166.8	3.209	3.206	5	13	29	28	2	1	3.208	3.
PACK9	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.
PACK10	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.
PACK11	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.
PACK12	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.
PACK13	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.
PACK14	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.
PACK15	0.0	0.000	0.000	0	0	0	0	0	0	0.000	0.

6.3 View and configure battery parameters via screen

6.3.1 Wiring between battery and screen

Requirement tools

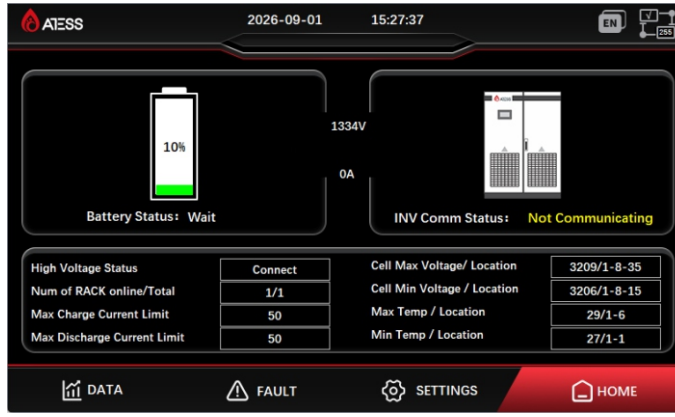
(1) Communication cable

(2) Screen

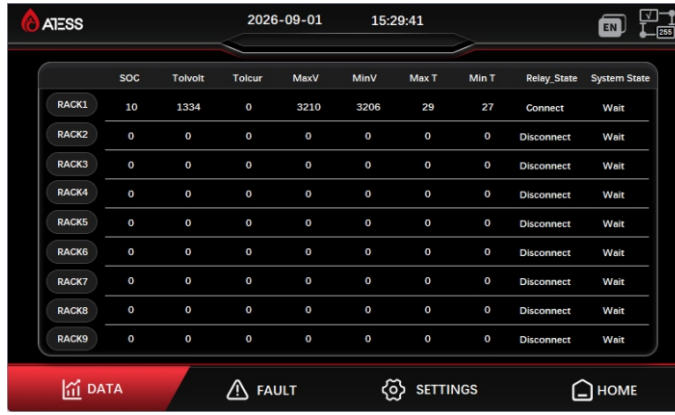
Connect the RJ45 terminal of black communication cable to COM1 or COM2 of the BPU, connect the 485 wires to the screen of the DC cabinet.

6.3.2 Parameter viewing and setting

(1) Home

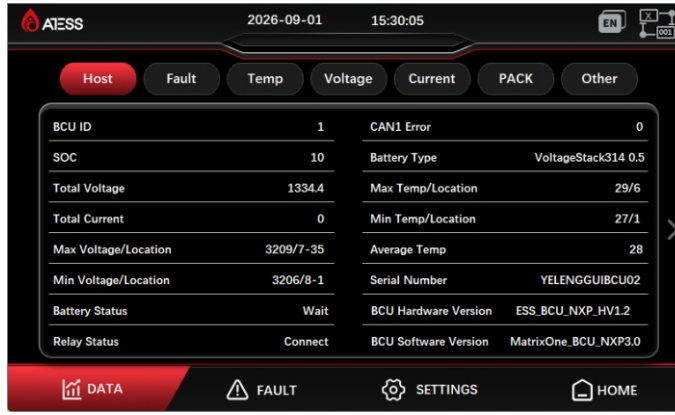


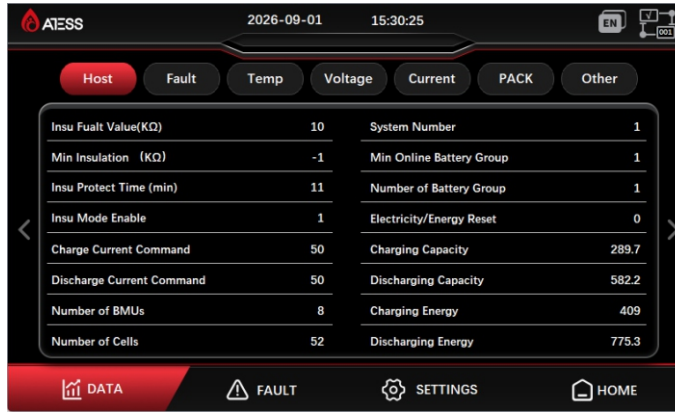
(2) DATA

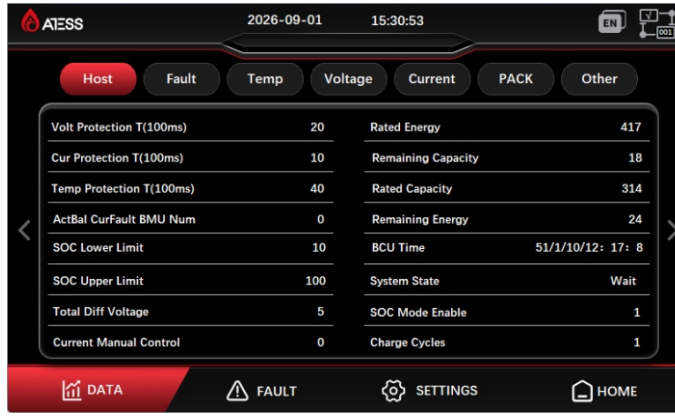


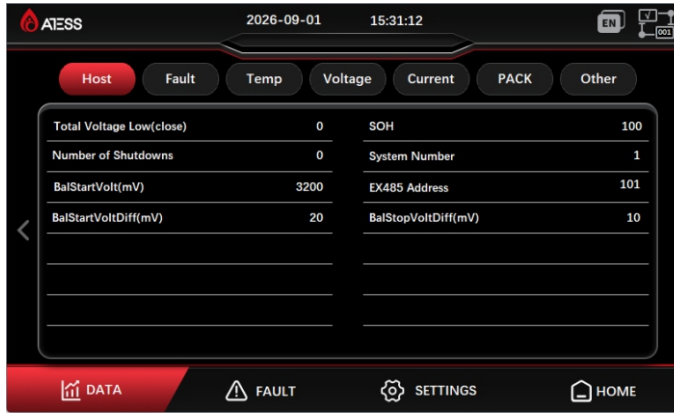
	SOC	Tolvolt	Tolcur	MaxV	MinV	Max T	Min T	Relay_State	System State
RACK1	10	1334	0	3210	3206	29	27	Connect	Wait
RACK2	0	0	0	0	0	0	0	Disconnect	Wait
RACK3	0	0	0	0	0	0	0	Disconnect	Wait
RACK4	0	0	0	0	0	0	0	Disconnect	Wait
RACK5	0	0	0	0	0	0	0	Disconnect	Wait
RACK6	0	0	0	0	0	0	0	Disconnect	Wait
RACK7	0	0	0	0	0	0	0	Disconnect	Wait
RACK8	0	0	0	0	0	0	0	Disconnect	Wait
RACK9	0	0	0	0	0	0	0	Disconnect	Wait

① Host page

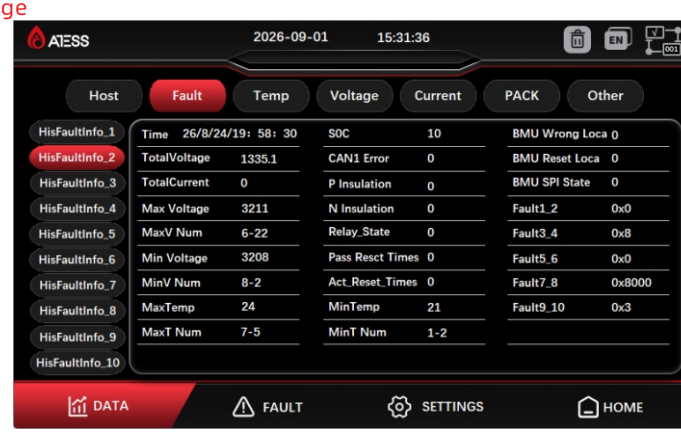

AIESS
2026-09-01
15:30:05
EN
Host
Fault
Temp
Voltage
Current
PACK
Other
BCU ID 1
SOC 10
Total Voltage 1334.4
Total Current 0
Max Voltage/Location 3209/7-35
Min Voltage/Location 3206/8-1
Battery Status Wait
Relay Status Connect
CAN1 Error 0
Battery Type VoltageStack314 0.5
Max Temp/Location 29/6
Min Temp/Location 27/1
Average Temp 28
Serial Number YELENGGUIBCU02
BCU Hardware Version ESS_BCU_NXP_HV1.2
BCU Software Version MatrixOne_BCU_NXP3.0
DATA
FAULT
SETTINGS
HOME


AIESS
2026-09-01
15:30:25
EN
Host
Fault
Temp
Voltage
Current
PACK
Other
Insu Fuait Value(KΩ) 10
Min Insulation (KΩ) -1
Insu Protect Time (min) 11
Insu Mode Enable 1
Charge Current Command 50
Discharge Current Command 50
Number of BMUs 8
Number of Cells 52
System Number 1
Min Online Battery Group 1
Number of Battery Group 1
Electricity/Energy Reset 0
Charging Capacity 289.7
Discharging Capacity 582.2
Charging Energy 409
Discharging Energy 775.3
DATA
FAULT
SETTINGS
HOME

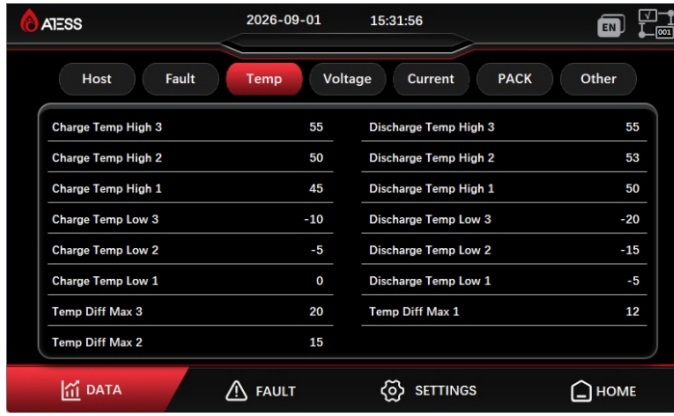

AIESS
2026-09-01
15:30:53
EN
Host
Fault
Temp
Voltage
Current
PACK
Other
Volt Protection T(100ms) 20
Cur Protection T(100ms) 10
Temp Protection T(100ms) 40
ActBal CurFault BMU Num 0
SOC Lower Limit 10
SOC Upper Limit 100
Total Diff Voltage 5
Current Manual Control 0
Rated Energy 417
Remaining Capacity 18
Rated Capacity 314
Remaining Energy 24
BCU Time 51/1/10/12: 17: 8
System State Wait
SOC Mode Enable 1
Charge Cycles 1
DATA
FAULT
SETTINGS
HOME



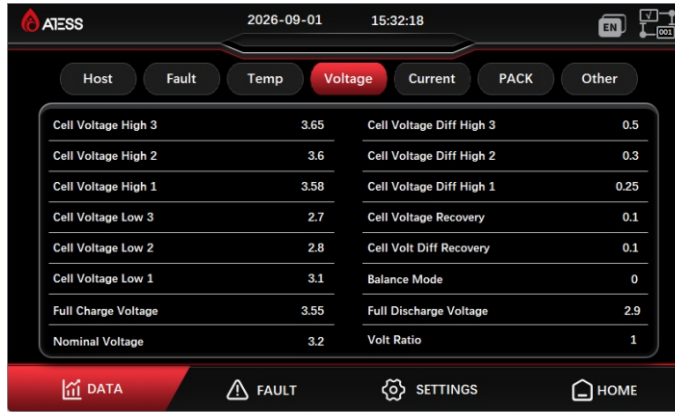
② Fault page



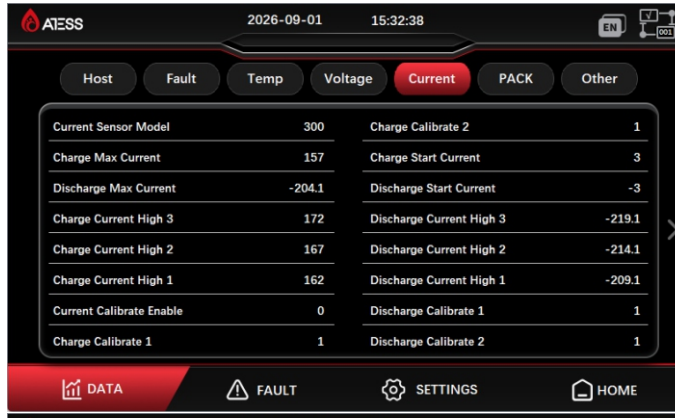
③ Temp page

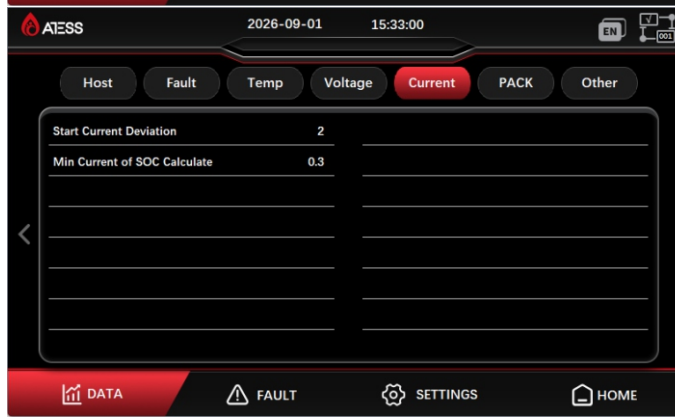


④ Voltage page

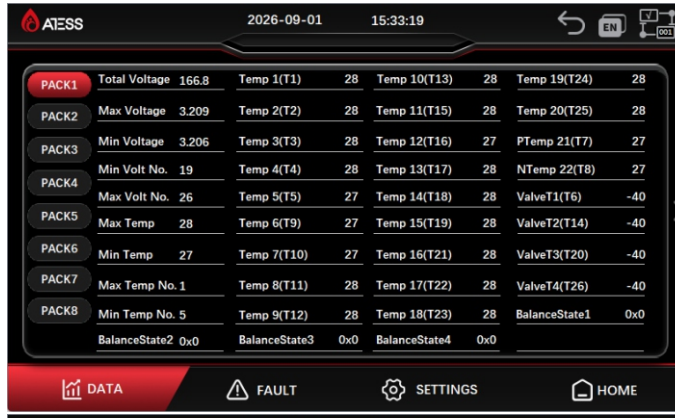


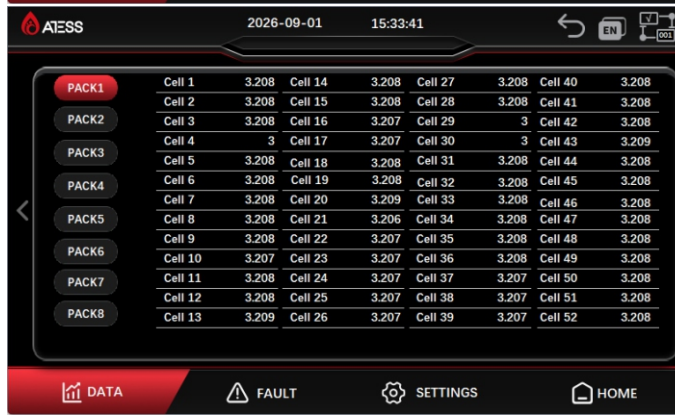
⑤ Current page



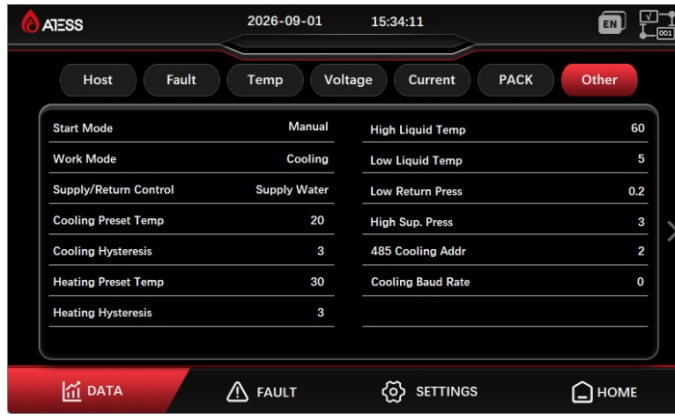


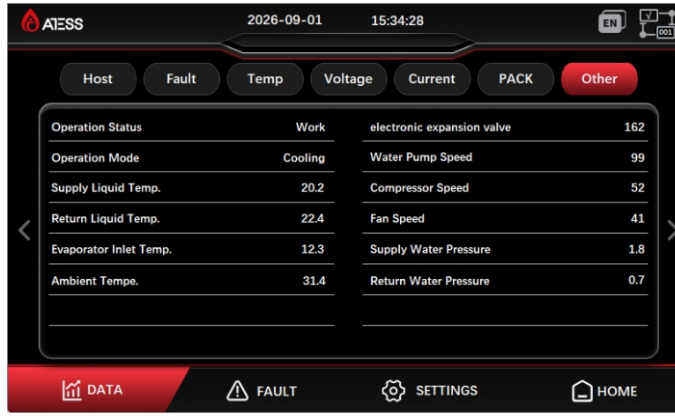
⑥ PACK page

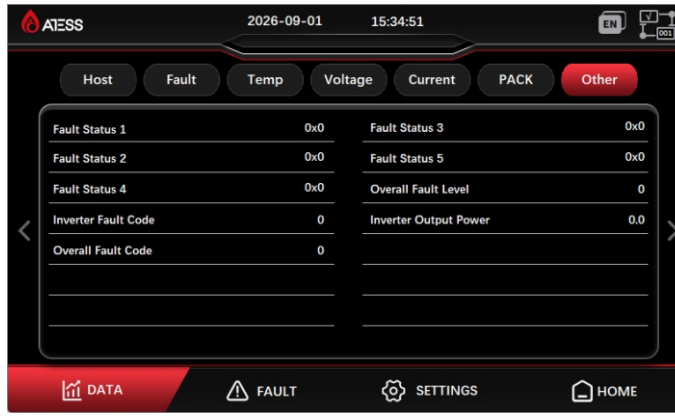


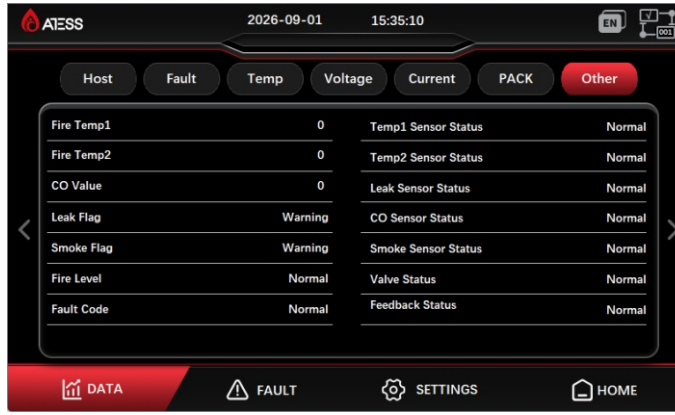


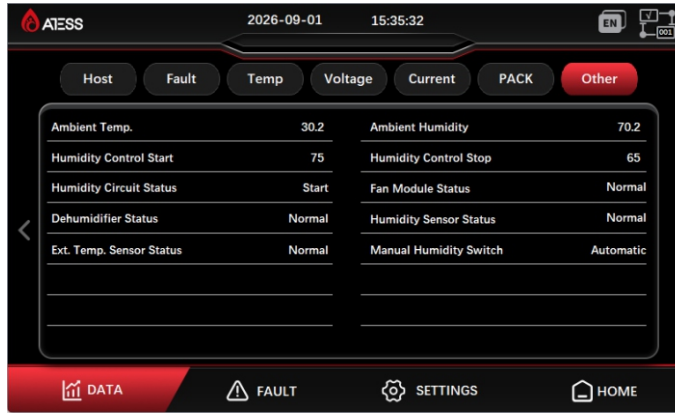
⑦ Other Page



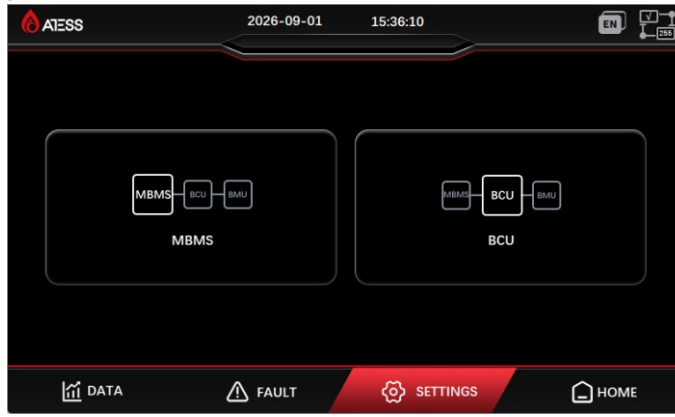

ATESS
2026-09-01
15:34:28
EN
001
Host
Fault
Temp
Voltage
Current
PACK
Other
Operation Status Work
Operation Mode Cooling
Supply Liquid Temp. 20.2
Return Liquid Temp. 22.4
Evaporator Inlet Temp. 12.3
Ambient Tempe. 31.4
electronic expansion valve 162
Water Pump Speed 99
Compressor Speed 52
Fan Speed 41
Supply Water Pressure 1.8
Return Water Pressure 0.7
DATA
FAULT
SETTINGS
HOME


ATESS
2026-09-01
15:34:51
EN
001
Host
Fault
Temp
Voltage
Current
PACK
Other
Fault Status 1 0x0
Fault Status 2 0x0
Fault Status 4 0x0
Inverter Fault Code 0
Overall Fault Code 0
Fault Status 3 0x0
Fault Status 5 0x0
Overall Fault Level 0
Inverter Output Power 0.0
DATA
FAULT
SETTINGS
HOME


ATESS
2026-09-01
15:35:10
EN
001
Host
Fault
Temp
Voltage
Current
PACK
Other
Fire Temp1 0
Fire Temp2 0
CO Value 0
Leak Flag Warning
Smoke Flag Warning
Fire Level Normal
Fault Code Normal
Temp1 Sensor Status Normal
Temp2 Sensor Status Normal
Leak Sensor Status Normal
CO Sensor Status Normal
Smoke Sensor Status Normal
Valve Status Normal
Feedback Status Normal
DATA
FAULT
SETTINGS
HOME

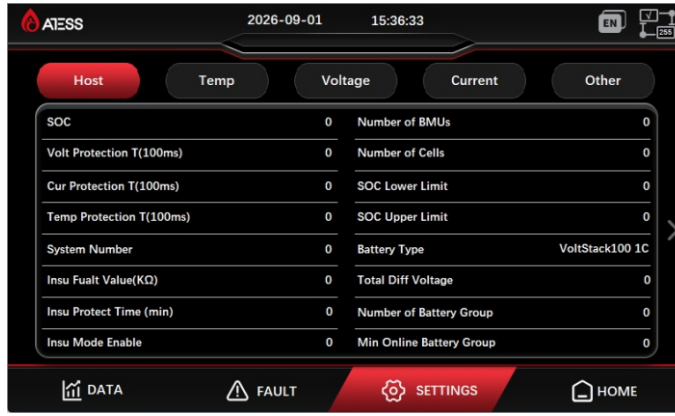


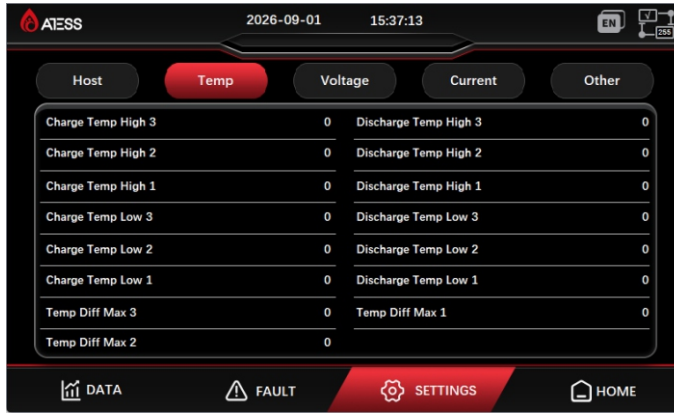
(3) SETTINGS

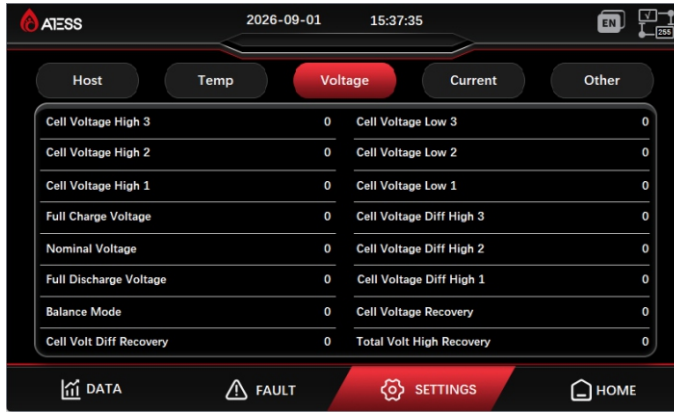


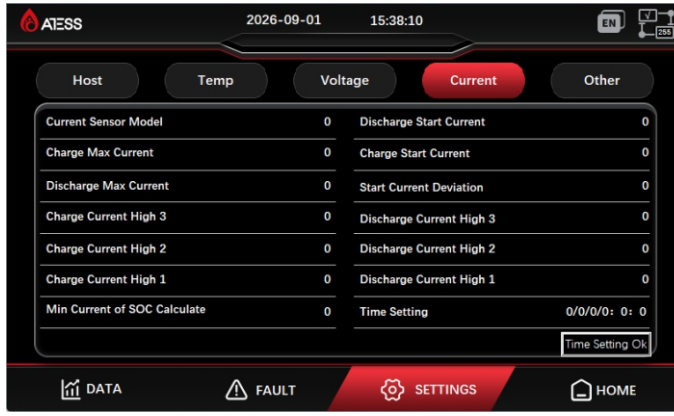
① MBMS setting

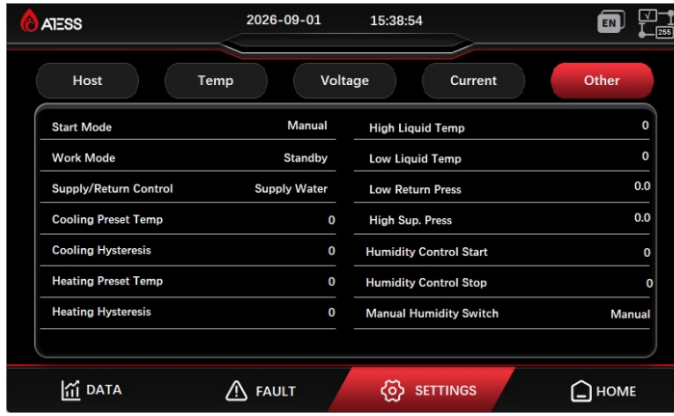
Modify the single-machine or multi-parallel battery cluster protection Parameters.




ATESS
2026-09-01
15:37:13
EN
Host
Temp
Voltage
Current
Other
Charge Temp High 3 0
Charge Temp High 2 0
Charge Temp High 1 0
Charge Temp Low 3 0
Charge Temp Low 2 0
Charge Temp Low 1 0
Temp Diff Max 3 0
Temp Diff Max 2 0
Discharge Temp High 3 0
Discharge Temp High 2 0
Discharge Temp High 1 0
Discharge Temp Low 3 0
Discharge Temp Low 2 0
Discharge Temp Low 1 0
Temp Diff Max 1 0
DATA
FAULT
SETTINGS
HOME

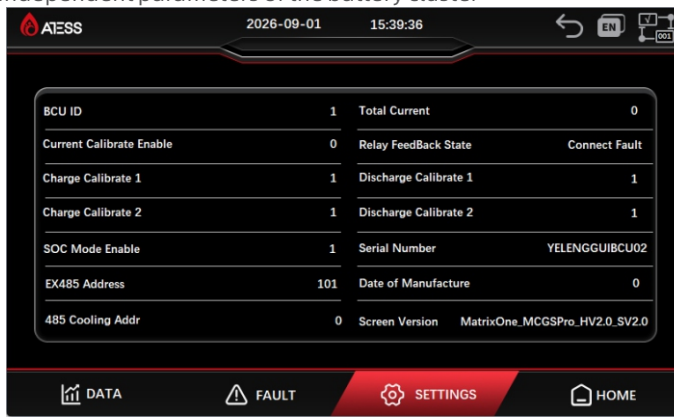

ATESS
2026-09-01
15:37:35
EN
Host
Temp
Voltage
Current
Other
Cell Voltage High 3 0
Cell Voltage High 2 0
Cell Voltage High 1 0
Full Charge Voltage 0
Nominal Voltage 0
Full Discharge Voltage 0
Balance Mode 0
Cell Volt Diff Recovery 0
Cell Voltage Low 3 0
Cell Voltage Low 2 0
Cell Voltage Low 1 0
Cell Voltage Diff High 3 0
Cell Voltage Diff High 2 0
Cell Voltage Diff High 1 0
Cell Voltage Recovery 0
Total Volt High Recovery 0
DATA
FAULT
SETTINGS
HOME


ATESS
2026-09-01
15:38:10
EN
Host
Temp
Voltage
Current
Other
Current Sensor Model 0
Charge Max Current 0
Discharge Max Current 0
Charge Current High 3 0
Charge Current High 2 0
Charge Current High 1 0
Min Current of SOC Calculate 0
Discharge Start Current 0
Charge Start Current 0
Start Current Deviation 0
Discharge Current High 3 0
Discharge Current High 2 0
Discharge Current High 1 0
Time Setting 0/0/0/0: 0: 0
Time Setting Ok
DATA
FAULT
SETTINGS
HOME

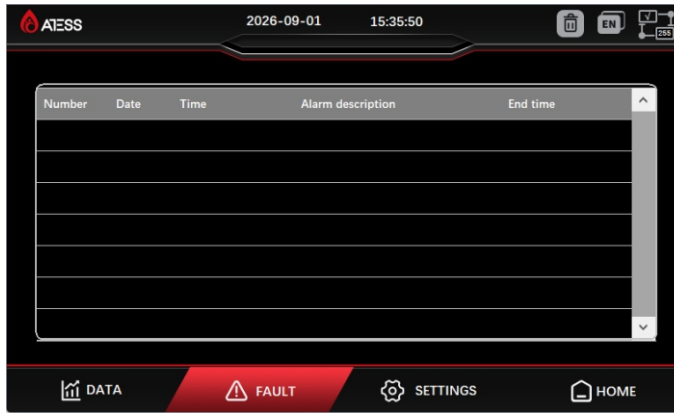


② BCU setting

Modify the independent parameters of the battery cluster



(4) FAULT



7 Operation and Maintenance

Instructions

Due to the effects of temperature, humidity, dust, and vibration, the components inside the integrated cabinet energy storage device may experience aging and wear, leading to potential failures within the device. Therefore, it is necessary to implement daily and regular maintenance for the integrated cabinet energy storage device to ensure its normal operation and lifespan. All measures and methods that help keep the integrated cabinet energy storage device in good working condition fall within the scope of maintenance work.

Note
● Only qualified electrical engineers are allowed to operate and maintain the incoming line equipment. ● Please refer to the shutdown maintenance procedure before performing maintenance to ensure the equipment is powered down. ● During maintenance, to ensure the safety of operators, the following safety laws must be strictly followed: Ensure that the energy storage device in the integrated cabinet cannot be accidentally re-energized. Ensure reliable grounding. For potentially live components adjacent to the operating parts, use insulating materials for insulation covering. Implement effective safety precautions.

The system configuration EMS has the following functions.

1. Real-time data collection, including AC side power parameters, DC side power parameters, PCS operating parameters, BMS, operating parameters, environmental parameters, etc..

2. Historical data storage, including PCS startup and shutdown, PCS fault information, battery cluster fault information, fire protection, and air conditioning real-time data storage.

3. OTA upgrades throughout the entire lifecycle of the system.

4. Battery grid connection logic control.

5. Receive control commands from the cloud platform or other dispatch systems and upload data. Real-time battery operation data and alarm information can also be accessed anytime through the mobile internet platform.

7.1 Power On and Off Operations

7.1.1 Power On Operations

1. Pre-power-on inspection

AC incoming line wiring installation is complete, and screws are securely fastened.

All construction tools and debris inside the cabinet are cleaned up.

All circuit breakers and air switches are in the off position.

The DC circuit breaker knob is in the OFF position.

2. Check the grid voltage

Use a multimeter to measure AC voltage

Yellow, green, and red phase voltage: 380V-400V measurement

Yellow, green, and red to blue voltage: 220V-230V

The grid voltage must be normal before proceeding to the next step of powering on.

3. Power on the high voltage box

4. Power on the circuit breaker

Sequentially close the socket circuit breakers: liquid cooling unit circuit breaker, fan circuit breaker, high voltage box circuit breaker, 24V circuit breaker.

5. Power on the main circuit breaker

6. Close the main circuit breaker

7.1.2 Power Down Operation

1. Disconnect the AC main circuit breaker

2. Disconnect the micro circuit breaker

Sequentially disconnect the socket circuit breaker: liquid cooling unit circuit breaker: fan circuit breaker: 24V circuit breaker.

3. Disconnect the HVB DC switch

7.2 Energy Storage System Debugging

7.2.1 Purpose

Confirm that the equipment meets operational conditions and that the system self-check is normal.

7.2.2 Scope of Application

Applicable to the power-on testing phase of energy storage cabinets in industrial and commercial energy storage projects.

7.2.3 Safety Work Specifications

Electric work personnel must hold a "Special Operations Certificate" to be approved for independent operation on the job.

Work must be carried out without power.

All insulation and testing tools should be properly stored, prohibited from being used for other purposes, and regularly inspected and calibrated.

To ensure safety, it is essential not to stack miscellaneous items inside the container and to maintain cleanliness inside.

The energy storage cabinet should not be connected to other electrical devices at will, and the internal electrical settings and connections of the equipment must not be arbitrary.

Make changes.

Do not directly touch live parts to prevent electric shock.

It must be operated by two professionals, one operating and one supervising.

During the testing process, it is strictly prohibited for anyone to touch the lines or equipment being tested. Relevant safety measures must be taken (such as proper grounding,Work badge, etc.).

Wear insulated protective gear according to standard dress code. Reference standards:

"Regulations for Maintenance of Electrochemical Energy Storage Power Stations"GB/T42315

"Regulations for Commissioning of Electrochemical Energy Storage Power Stations"GB/T42737-2023

"Safety Regulations for Electrochemical Energy Storage Power Stations"GB/T42288

"Operation and Maintenance Regulations for Energy Storage Power Stations"GB/T40090-2021.

7.2.4 Preconditions

7.2.4.1 On-site Environment Inspection

1. Installation work has been completed.
2. Access pathways around the installation area are clear.
3. Flammable and explosive materials must not be present near the container.

4. Check and confirm that there are no corrosive substances near the laying position of the outdoor cabinet's external connection cables, and that the cables are not waterlogged.

5. Check the ambient temperature at the site and confirm that the humidity is within the normal operating range.

7.2.4.2 Debugging Tools

Laptop, network cable.

7.2.5 Power-On Testing

7.2.5.1 Battery Module Total Voltage and Polarity Detection

Testing Tool: Multimeter

Testing Process: Use a multimeter to measure the voltage and polarity of the battery module, confirming that the battery module's consistency is good.

7.2.5.2 Cluster Total Voltage Detection

Testing Tool: Multimeter

Testing Process: Use a multimeter to measure the total voltage of the battery cluster, confirming that the consistency of the batteries within the cluster is good.

7.2.5.3 Outdoor Cabinet Circuit Inspection

1. The power cables for the energy storage cabinet have been laid out.

2. Check each power cable connection point, using a torque wrench to verify the torque and ensure secure connections.

3. The site is equipped with a system for trial operation power supply.

4. Check and confirm that the energy storage cabinet has completed safe and reliable grounding.

5. Shake the cables inside the outdoor cabinet by hand to confirm that there are no loose or falling cables.

6. Visually confirm that the cable insulation inside the cabinet is undamaged.

7. Check the crimped terminals to ensure they are properly crimped and will not come off when pulled.

8. Check and confirm that the three-phase connections of the PCS are correctly connected, with no short circuits or reverse connections between the AC phases and ground, as well as between the DC positive and negative terminals and ground.

9. Check and confirm that the battery power cable connections are correct, with no reverse connections (positive and negative).

10. Check that the communication harness connections are correct.

Testing Tool: Multimeter

Testing process: Use a multimeter to measure the total voltage of the battery pack and confirm that the consistency between the batteries in the pack is good.

7.2.5.4 Insulation Testing

Testing Tool: Megger

Testing Process: Use a megger to check the insulation value of the cable.

7.2.5.5 Grounding Test

Testing Tool: Megger

Testing Process: Use a megger to check the grounding resistance value, ensuring that the grounding is solid and reliable.

7.2.5.6 Power-on Test for Energy Storage Cabinet

Testing Tool: Multimeter Testing Process: Use a multimeter to check the three-phase voltage of the circuit, phase sequence, and voltage to the neutral wire, confirming that the installation is secure.

7.2.6 Thermal Management System Inspection

7.2.6.1 Liquid Cooling Unit Inspection

1. Confirm that the fixing bolts of the liquid cooling unit are not loose, and that the torque line positions are aligned.

2. Ensure that the exhaust valve is in the closed position before the chiller operates.

3. If the liquid cooling unit has not been used for a long time (approximately 4 months), power the unit before starting it to activate the compressor heating belt (do not start the circulation water pump). This will heat and vaporize the refrigerant liquid accumulated in the compressor; otherwise, starting it directly may adversely affect the compressor. The heating duration of the compressor heating belt should be no less than 4 hours.

4. When the ambient temperature is low (below -10°C) and the unit is powered on for the first time, the heating duration of the compressor heating belt must be no less than 4 hours. When starting up in low-temperature conditions, the high viscosity of the lubricating oil may cause the compressor to have difficulty starting and result in abnormal

loading/unloading conditions. Therefore, preheating through the compressor heating belt is necessary. Do not cut off the power supply when the unit is shut down to ensure that the compressor heating belt continues to heat.

5. The communication of the liquid cooling unit is normal.

7.2.6.2 Liquid Cooling Pipeline

1. Confirm that the exhaust valve of the cluster pipeline is in the open position when the liquid cooling system is operating.

2. Check whether the quick-connect fittings of the pipeline are well connected and ensure that the pipeline fixing components are not loose.

3. Visually inspect the system pipeline for any liquid leaks, mainly checking the pipeline joints and the floor inside the cabin for any coolant residue.

7.2.6.3 Dehumidifier

1. Ensure that the dehumidifier is installed securely, communication is normal.

2. ck the dehumidifier's drainage pipe for dust, dirt, or debris. Ensure that the drainage pipe outlet leads outside the unit. If the drainage pipe is blocked, clean it with compressed air or mild soapy water to ensure smooth drainage.

7.2.7 Fire System Inspection

1. Check whether the pressure value of the fire storage tank is within the normal range, and ensure that the fire detector communication is normal.

2. Check that the fire detector is functioning properly without any fault alarms.

3. Check if the starting circuit is loose.

4. Check for any unusual situations such as strange odors.

7.3 Troubleshooting

Serial Number	Alarm or Fault Description	Cause Analysis and Reference Solutions
1	No Voltage Value Collected	Eliminate communication issues; please measure whether there is voltage at the terminal of the connected device. If not, please check the collection line.

Serial Number	Alarm or Fault Description	Cause Analysis and Reference Solutions
2	Voltage value is too low	It may be due to excessive voltage drop on the collection line. Please measure whether the voltage at the terminal and the pole voltage are consistent. If they are different, please check the collection line.
3	Voltage value is intermittent	It may be due to poor contact of the collection line. Please check the corresponding collection line.
4	Alarm and protection for voltage, current, temperature, etc.	For such alarms, please check the host alarm records and compare them with the battery parameter settings range.

7.4 Product Maintenance

7.4.1 Safety Precautions

Warning!

There is a lethal high voltage inside the energy storage integrated system cabinet equipment. Accidental contact poses a risk of fatal electric shock.

After shutting down, please wait at least 10 minutes before opening the cabinet door. Before performing maintenance work, ensure that the equipment inside is completely de-energized.

Only qualified and authorized personnel are allowed to perform maintenance and other operations on the energy storage integration system.

During maintenance work, do not leave metal parts such as screws and washers inside the energy storage integration system, as this may damage the equipment.

The supplier is not responsible for equipment failures caused by the customer's failure to follow preventive periodic maintenance.

7.4.2 Maintenance Introduction

7.4.2.1 Overview

The ATESS equipment integration system has an IP55/66 protection rating, making it suitable for outdoor use. However, harsh environments or prolonged operation can still lead to aging of the energy storage integration system or damage to internal components. Guidance for operation and maintenance work is essential to promptly identify defects and anomalies, make correct judgments, and take effective measures to eliminate potential hazards, preventing accidents and ensuring the normal operation of the energy storage system.

7.4.2.2 Preventive Periodic Maintenance (Every Two Years)

Inspection Content	Inspection Method
Power Station Foundation	The energy storage foundation is free from sinking, tilting, and cracking, and the steel-supported platform's main load-bearing beams and columns are rust-free.
Safety facilities	Safety warning signs are complete, correctly hung, and effective in providing warnings.
System status and cleanliness	Please check the following items, and if any do not meet the requirements, correct them immediately: Check whether the outdoor battery cabinet and internal equipment are damaged or deformed. Check for any abnormal noise from the internal equipment during operation. Check if the temperature inside the outdoor battery cabinet is too high. Check if the humidity and dust levels inside the outdoor battery cabinet are within normal ranges. Clean if necessary. Check if the air intake and exhaust ports of the outdoor battery cabinet are blocked.
Warning Label	Check whether warning signs and labels are clear and visible, without damage. If necessary, replace them.
Grounding of cable shielding	Check whether the cable shielding is in good contact with the insulating sleeve: Is the grounding busbar securely fixed?
Lightning protection devices and fuses	Check whether lightning protection devices and fuses are properly secured.
Corrosion condition	Check for oxidation or rust inside the outdoor battery cabinet.

7.4.2.3 Preventive periodic maintenance (once a year)

Inspection Content	Inspection Method
External cabinet	Please check the following items, and if any do not meet the requirements, correct them immediately: Check whether there are flammable materials on top of the outdoor battery cabinet. Check whether the welding points of the foundation steel plate of the outdoor battery cabinet are secure and whether there is any rust. Inspect the outer shell of the battery outdoor cabinet for any damage, paint peeling, oxidation, etc. Check if the cabinet door lock can be opened flexibly. Check if the sealing strips are fixed properly.
Inside the cabinet	Check if there are any foreign objects, dust, dirt, or condensation inside the battery outdoor cabinet.

Inspection Content	Inspection Method
Inlet and outlet	Check the temperature of the radiator and the dust. If necessary, use a vacuum cleaner to clean the heat dissipation module, etc. (once a month)
Wiring and cable arrangement	Inspection work should only begin after the internal equipment of the battery outdoor cabinet is completely powered off! During the inspection, please correct any non-compliance immediately upon discovery. Check whether the cable arrangement is standard and if there are any short circuits. If any abnormalities are found, they must be corrected immediately. Check whether all entry and exit holes of the outdoor battery cabinet are well sealed. Check for any water ingress inside the outdoor battery cabinet, and check if the power cable connections are loose. Retighten them according to the previously specified torque. Check for any damage to the power cables and control cables, especially if there are any signs of cuts on the insulation where they contact metal surfaces. Check if the insulation wrapping on the electrical cable terminals is intact and not peeling off.
Fire protection system	Check all electrical terminal/wire harness interconnections to ensure that the monitoring module and alarm module are in normal condition, and verify that the pressure gauge displays pressure within the normal range. (Once a month)
Grounding and equipotential connections	Check if the grounding connections are correct, and ensure that the grounding resistance does not exceed 4Ω. Check if the equipotential connections inside the outdoor battery cabinet are correct.
Fan	Check the operating status of the fan Check if the fan is blocked Check for any abnormal noise while the fan is running
Screws	Check if there are any screws dropped from the outdoor battery cabinet

7.4.2.4 Preventive periodic maintenance (once every six months)

Inspection Content	Inspection Method
Safety functions	Check the emergency stop button. In low power operation of the energy storage cabinet, press the emergency stop to see if it stops; normal if it stops, abnormal if it does not stop Check if the fire alarm is functioning properly and if the indicator light is on Check the body warning labels and other equipment labels. If any are found to be unclear or damaged, please replace them promptly.

Inspection Content	Inspection Method
Liquid Cooling System	The system is operating normally, with no dirt at the inlet and outlet of the cooling system, the condenser is clean, the coolant level is normal, the pressure is normal, and there are no leaks in the circulation pipes.
Component Inspection and Maintenance	Check if the cabinet fan is operating normally. Check the temperature of the radiator and the dust. If necessary, use a vacuum cleaner to clean the heat dissipation module and other components. Inspect the filter mesh, and clean it promptly if necessary. In general environments, the filter mesh should be cleaned every six months. The cleaning frequency may vary in different environments; in areas with high dust and pollution, it is recommended to check at least every three months and clean immediately if dust accumulation is severe. The steps for cleaning the filter mesh are as follows: Step 1: Open the cabinet door, remove the filter mesh frame, and take out the filter mesh (some filter meshes can be directly pulled out from the frame). Step 2: Rinse with clean water or use a blower to remove dust from the filter mesh (ensure it is thoroughly dried after rinsing). Step 3: Install the filter mesh frame and close the cabinet door. Note! It is essential to check the ventilation of the air intake. Otherwise, if the module cannot be effectively cooled, it may fail due to overheating. Note! It is essential to check the ventilation of the air intake. Otherwise, if the module cannot be effectively cooled, it may fail due to overheating. Conduct regular inspections of rust on all metal components (every six months). Annual inspection of contactors (auxiliary switches and micro switches) to ensure their mechanical operation is good. Annual inspection of circuit breakers: check maintenance (whether they operate normally, and the over/under voltage protection functions are intact). Check operating parameters (especially voltage and insulation, etc.).
Warning Label	Check whether warning signs and labels are clear and visible, without damage. If necessary, replace them.
Grounding of cable shielding	Check whether the cable shielding is in good contact with the insulating sleeve: Is the grounding busbar securely fixed?
Lightning protection devices and fuses	Check whether lightning protection devices and fuses are properly secured.
Corrosion condition	Check for oxidation or rust inside the outdoor battery cabinet.

Instructions
● The table only provides recommended routine maintenance cycles for products; the actual maintenance cycle should be determined based on the specific installation and usage environment of the product. Factors such as the scale of the power station, its location, and the on-site environment can all affect the routine maintenance cycle of the product. ● If in a harsh environment with heavy sand or dust, be sure to shorten the maintenance cycle and increase the frequency of maintenance.

7.4.3 System Cleaning

7.4.3.1 Overview

When dust accumulates inside the energy storage cabinet, it can block the air inlets and outlets or enter internal equipment, potentially leading to equipment failure, shortening the lifespan of the devices, or reducing power generation. Therefore, it is necessary to periodically clean the energy storage system based on the environmental factors such as temperature, humidity, dust, and internal equipment vibration to ensure the normal operation of the equipment.

7.4.3.2 Cleaning Tools

It is recommended to use a vacuum cleaner for cleaning inside the energy storage cabinet and the foundation, as sweeping can stir up dust and pose safety issues.

7.4.3.3 Lock and Hinge Lubrication

Regularly lubricate and maintain the locks and hinges, and check if they are functioning properly.

7.4.3.4 Seal Inspection

Regularly inspect the equipment seals and replace them in a timely manner to prevent rainwater from entering the energy storage system.

7.4.3.5 Touch-up Painting Measures

If there is minor damage to the paint on-site, sand down the rust and apply anti-rust paint, then apply the finish coat after it dries.

8 Technical Services and Training

On-site service for the energy storage system is a crucial part of product manufacturing. Our company places great emphasis on on-site debugging and testing of products. We have a professional after-sales service technical support team, which establishes a fixed service group for each application site, with designated leaders and team members, strictly following debugging procedures to test and validate the products on-site, ensuring that no loose connection points are overlooked.

- Conduct on-site electrical handover tests in collaboration with the on-site users.
- Check the fixing condition of each connection point, confirm whether the current-carrying capacity of high current components is sufficient: whether the electrical distance of high voltage components meets the requirements, and whether the electrical installation complies with the standards.
- Inspection of dust-proof measures for the conversion module.
- Whether the equipment functions meet the technical specifications of the device.
- Develop a detailed training plan for users, covering device principles, operation and maintenance, operational training, emergency handling, and common problem-solving measures.
- The company's marketing department regularly organizes follow-up visits to understand the operational status of the equipment and the problems encountered, continuously improving products through customer feedback to further enhance product reliability.
- The purpose of on-site service is to ensure the safe and normal operation of the supplied equipment. We will send qualified on-site service personnel.
- Conditions that our on-site service personnel must meet:
- Comply with laws and regulations, and adhere to all rules and systems on-site.
- Possess a strong sense of responsibility and professionalism, and arrive on time.
- Understand the design of the equipment, be familiar with its structure, have similar or relevant field work experience, and be able to correctly carry out on-site equipment installation.
- In good health and adaptable to on-site work.

Our on-site service personnel are primarily responsible for equipment follow-up, unboxing inspection of goods, handling equipment quality issues, installation and commissioning, and participating in trial operation and performance acceptance tests. Before installation and commissioning, our technical service personnel will provide technical briefings to Party A, explaining and demonstrating the procedures and methods to be carried out. For critical processes (see table below), our technical service personnel must confirm and sign off on the construction situation; otherwise, Party A cannot proceed to the next process.

Serial Number	Process Name	Time	Main Work Content	Remarks
1	Placement of Energy Storage Equipment	1 day	Unloading and positioning of energy storage equipment	Your company will arrange personnel and equipment, and we will be responsible for guiding the installation.
2	Installation of Energy Storage Equipment	1-2 days	Installation and Wiring of Energy Storage Devices	The power cables, control cables, and other internal components of the energy storage equipment are our responsibility, while the external power cables, control lines, and signal lines are the responsibility of your company. Our personnel will guide Party A. The personnel completed the installation and wiring of the equipment.
3	Control System Debugging	1 day	Control System Debugging	Before this, your company guarantees that it has the conditions for supplying 380V power.
4	Trial operation of energy storage system	2 days	48-hour continuous load trial operation of the energy storage system	Before this, your company guarantees that the equipment meets the operating conditions.

9 Scrapping and Recycling

9.1 Product Scrapping

When the energy storage battery cabinet or internal components reach their maximum service life, they must not be disposed of with household waste. Some internal components can be recycled, while others may cause environmental pollution. Please contact a local authorized recycling agency for disposal.

9.2 Battery Recycling

Currently, our company does not conduct battery recycling. Customers need to contact local recycling agencies for self-handling.

SHENZHEN ATESS POWER TECHNOLOGY CO.,LTD

ATESS Industrial Park, No.23 Zhulongtian Road, Shuitian Community,
Shiyan Street, Baoan District, Shenzhen, China

Tel: +86 755 2998 8492

Web: www.atesspower.com

Email: info@atesspower.com

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