



# IC418/BC418 Liquid-Cooled Energy Storage System

User Manual

# Foreword

## Legal Notices

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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 IC418/BC418 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 IC418-690/BC418 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                | IC418-690                | BC418 |
| Nominal Capacity     | 418KWh                   |       |
| Rated AC Voltage     | 690VAC                   | /     |

### 3.2 System Parameters

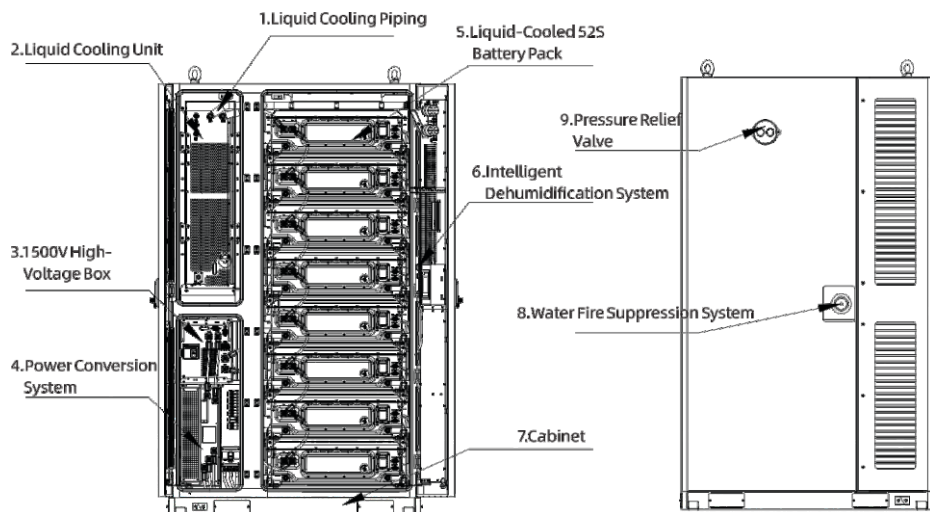
| Technical Parameters               | Specification Parameters |        | Remarks |
|------------------------------------|--------------------------|--------|---------|
| Model                              | IC418-690                | BC418  |         |
| DC Battery Side                    |                          |        |         |
| Cell Type                          | LI-ION(LiFePO4)          |        |         |
| Cell Specification                 | 3.2V/314Ah               |        |         |
| System Configuration               | 1P416S                   |        |         |
| Nominal Capacity                   | 418KWh                   |        |         |
| Nominal Voltage                    | 1331.2V                  |        |         |
| Voltage Range                      | 1164.8V-1497.6V          |        |         |
| Standard Charge and Discharge Rate | 0.5P                     |        |         |
| AC PCS Side                        |                          |        |         |
| Rated Power                        | 215KW                    | NO PCS |         |
| Rated AC Voltage                   | 690VAC                   |        |         |
| AC Voltage Range                   | 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                      | 3P3W                     |        |         |
| Maximum Efficiency                 | 98.5%                    |        |         |
| Grid Connection Switching          | NO                       |        |         |

| Technical Parameters           | Specification Parameters                                  |       | Remarks |
|--------------------------------|-----------------------------------------------------------|-------|---------|
| Model                          | IC418-690                                                 | BC418 |         |
| <b>Conventional Parameters</b> |                                                           |       |         |
| Dimensions (W/H/D)             | 1400*2400*1450mm                                          |       |         |
| Weight (kg)                    | 3605                                                      | 3535  |         |
| Operating temperature range    | -20°C~55°C (discharge)<br>0°C~55°C (charge)               |       |         |
| Storage temperature            | -20°C - +45°C                                             |       |         |
| Protection level               | IP55 C4 (C5 optional)                                     |       |         |
| Noise                          | 70dB(A)@1m                                                |       |         |
| Maximum altitude               | ≤3000m                                                    |       |         |
| Standby Power Loss             | <100W                                                     |       |         |
| Cooling Method                 | Liquid Cooling (Battery)<br>Intelligent Air Cooling (PCS) |       |         |
| Fire Protection                | Aerosol (Warehouse Level)                                 |       |         |
| Dehumidification               | 588ml/d                                                   |       |         |
| Communication Interface        | RS485/CAN                                                 |       |         |
| 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.

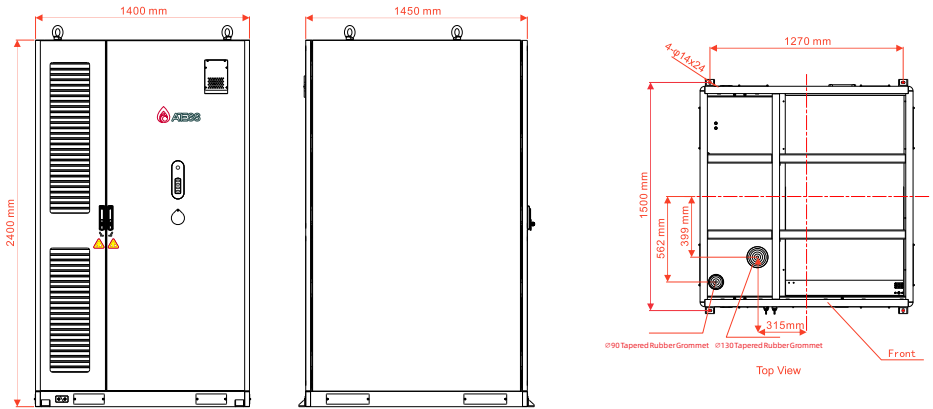
#### 3.3.1 Appearance Introduction



| 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



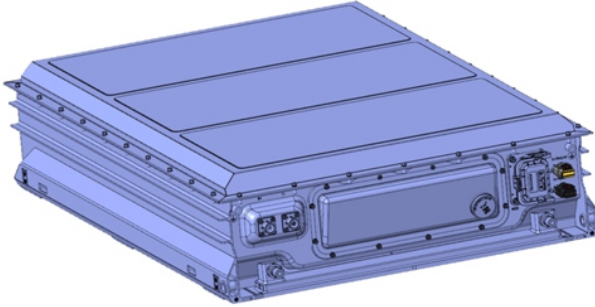
### 3.3.3 LED Indicator Lights

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                                                                             |

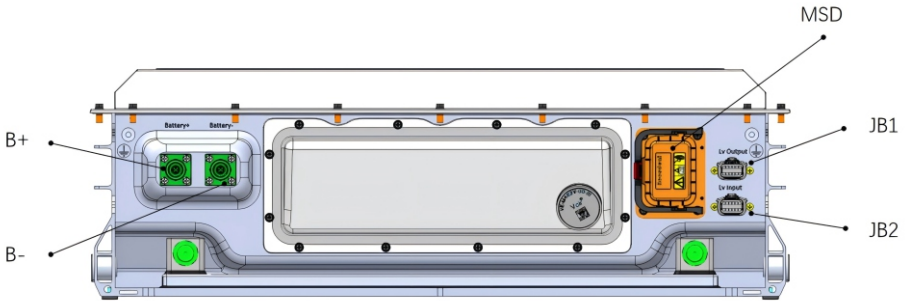
## 3.4 Component Introduction

### 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°C: 2.5V-3.65V, -30~0°C: 2.0V-3.65V     |
| Battery internal resistance | <0.30m@10s,50%SOC,25°C                      |
| Operating Temperature       | Discharge: -30°C≤T≤60°C, Charge: 0°C<T≤55°C |

### 3.4.2 BPU



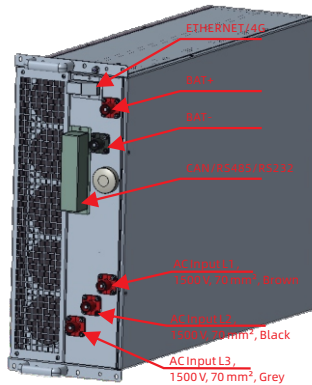
| Serial No. | Name                                          | Model                                    | Device |
|------------|-----------------------------------------------|------------------------------------------|--------|
| 1          | Battery connection socket (black)             | VP-ESBX-SSSABO001                        | 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   | DC250-1500V              |
| 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                | PCS125M                  | PCS215M |
| AC                   |                          |         |
| Rated Capacity       | 125KVA                   | 215KVA  |
| Rated Input Voltage  | 400VAC                   | 690VAC  |

|                                                 |                          |             |
|-------------------------------------------------|--------------------------|-------------|
| Rated Input Current                             | 180A                     | 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/)                             | 550/220/680mm            |             |
| Weight                                          | 70kg                     |             |
| Operating temperature range                     | -25...+55℃               |             |
| Protection level                                | IP54                     |             |
| 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                |             |
| 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.

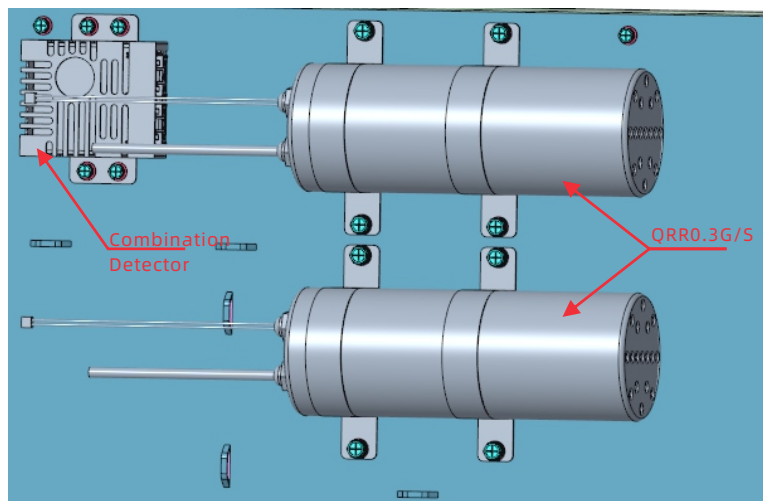
| Project Name            | Specification Parameters                 |
|-------------------------|------------------------------------------|
| Rated operating voltage | AC220V                                   |
| Operating Voltage Range | AC176-264V                               |
| Frequency               | 50/60HZ                                  |
| Cooling Capacity        | 8kW                                      |
| Heating Capacity        | 2kW                                      |
| Circulating Water Flow  | 50L/min                                  |
| Cooling Input Power     | 3.8kW (ambient 45°C @ outlet water 18°C) |
| Heating input 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°C~85°C                                     |
| Humidity measurement range    | 20%RH ~ 98%RH                                  |
| Dehumidification start value  | 25%RH ~ 98%RH                                  |
| Temperature start value       | 1°C~55°C                                       |
| Communication Method          | RS485                                          |
| Operating Temperature         | Temperature -25 ~ 85°C                         |
| Dehumidification efficiency   | 588mL±5%/24h(60W 35°C RH=85%working condition) |

### 3.4.6 FSS



Integrated aerosol automatic fire extinguishing device for energy storage cabinet, model: QRR0.3G/S, equipped with 2 fire extinguishing devices 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.

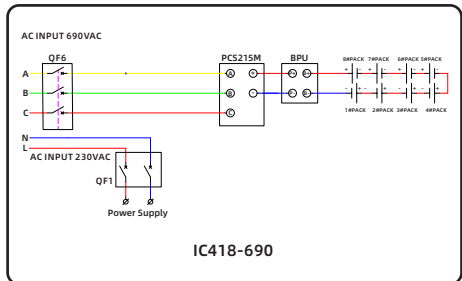
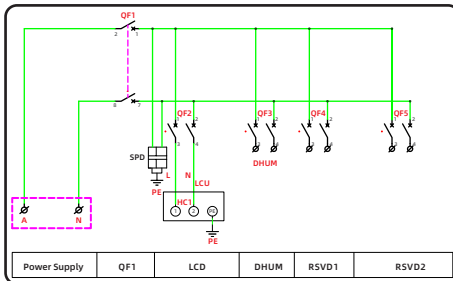
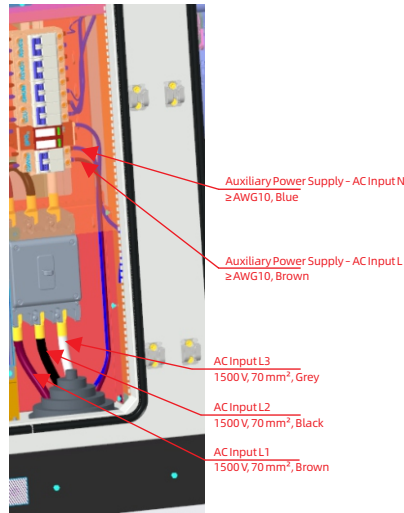
| Project Name           | Specification Parameters                |
|------------------------|-----------------------------------------|
| Working power supply   | DC24V/4A                                |
| Working current        | <30mA                                   |
| Operating Temperature  | -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

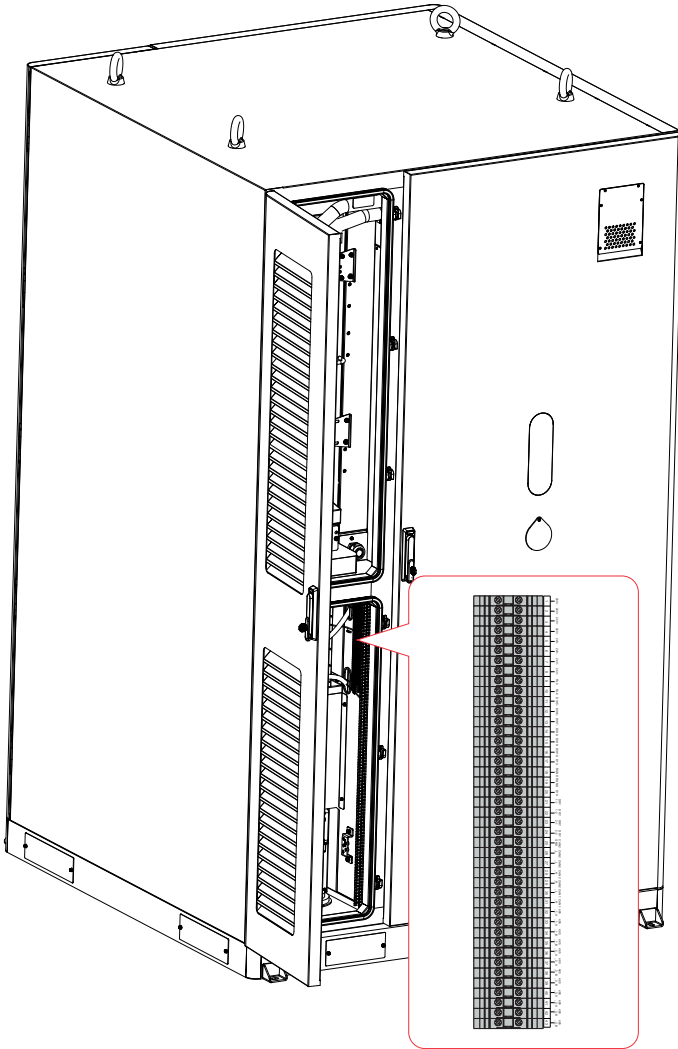
| Alarm parameters | CO concentration (ppm) | Smoke dB/m | Temperature (℃) | VOC             |
|------------------|------------------------|------------|-----------------|-----------------|
| Level 1          | 240                    |            |                 |                 |
|                  |                        |            | ≥70             | Threshold alarm |
| Level 2          | 600                    | 0.4        | ≥75             |                 |
|                  |                        |            | ≥80             |                 |
| Level 3          | 240                    | 0.4        | ≥80             |                 |
|                  |                        |            | ≥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             | RI5        | 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°C ~ +55°C       |
| 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):  $-20^{\circ}\text{C}\sim 60^{\circ}\text{C}$ ;
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°C and 60°C.

**Caution!**



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

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  $\geq 100\text{mm}$  is recommended (the cabinets can be closely integrated, depending on the actual construction situation); for back-to-back installation, a spacing of  $\geq 1000\text{mm}$  is recommended; for face-to-face installation, the relative cabinet doors and operational space must be considered, with a recommended spacing of  $\geq 4000\text{mm}$ .

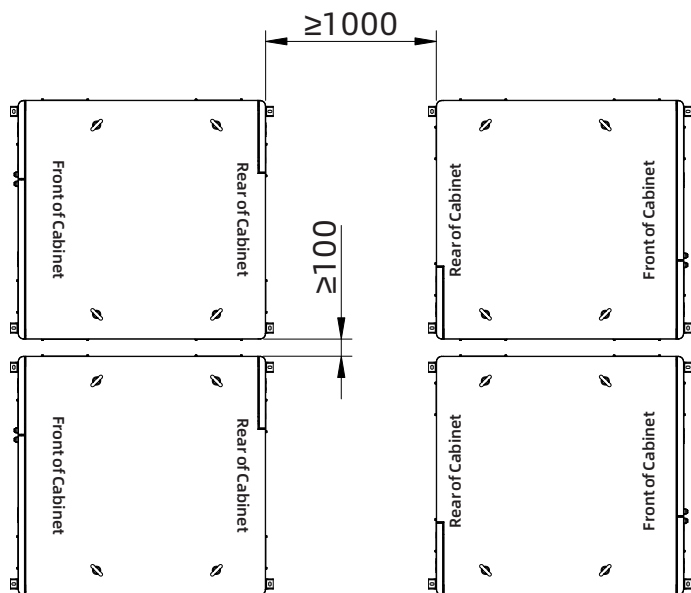
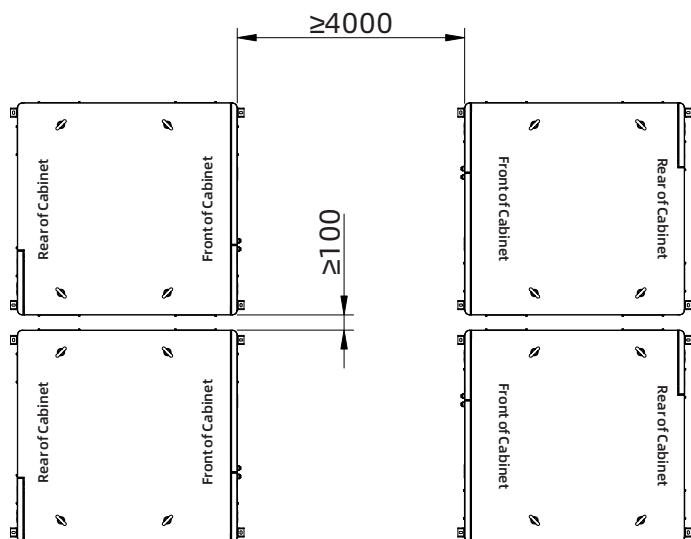


Figure 5 - 1: Back-to-back installation diagram of left and right cabinets



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

### 5.1.2.2 Distance between battery cabinet and wall/fence

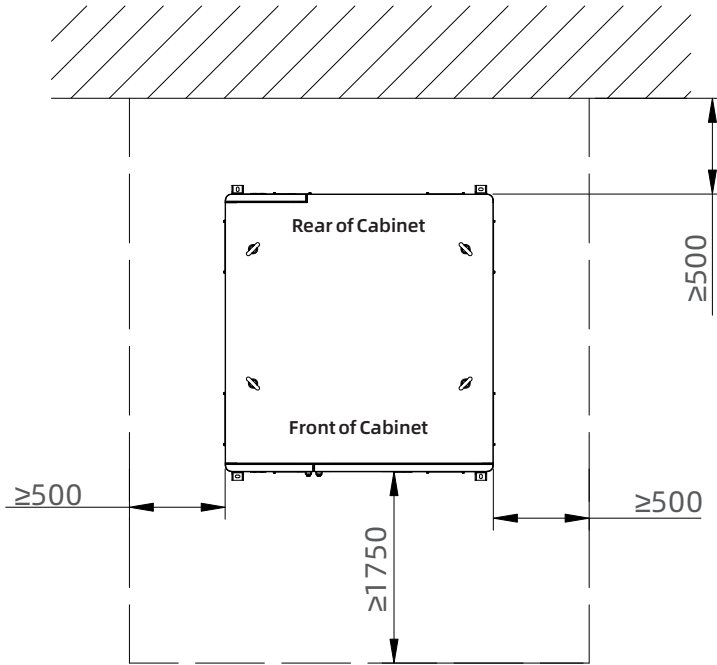


Figure 5 - 3 Distance between cabinet body and wall/fence

### 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:

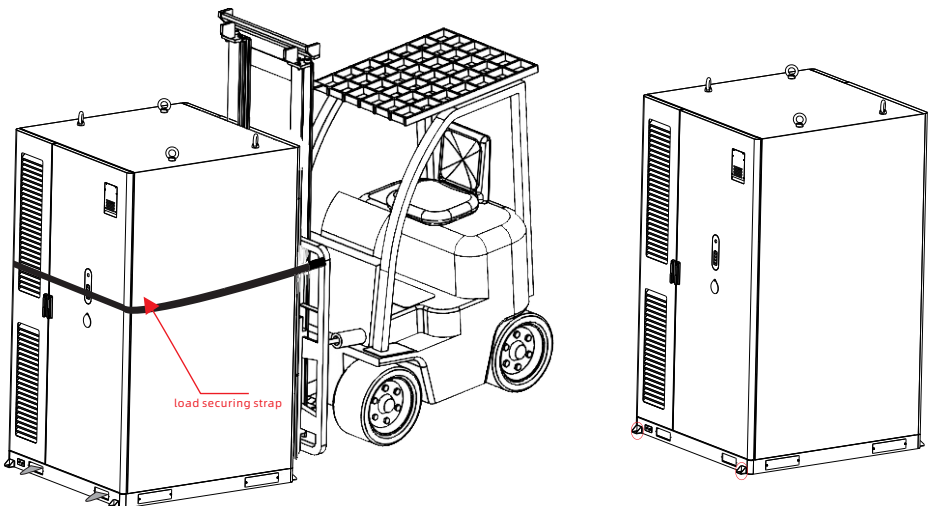
1. The energy storage system must be installed on a concrete or other non-combustible surface, ensuring that the installation plane is level, firm, flat, and has sufficient load-bearing capacity, with no depressions or inclinations.
2. The equipment foundation should be configured based on the total 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  $\leq 3\text{mm}$ .
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  $\geq 3.5$  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 <sup>2</sup> |
| 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.

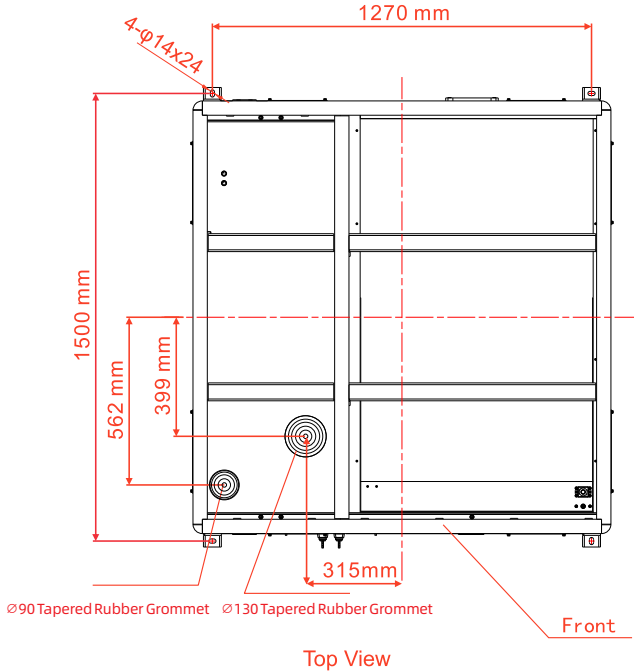


Figure 5-8 Schematic Diagram of Bottom Cable Entry and Exit

### 5.2.3.2 Crimping OT/SC Terminals

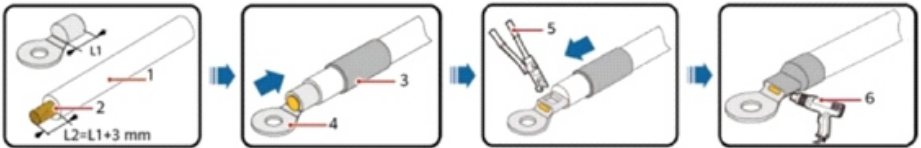


Figure 5-9 Schematic Diagram of Crimping Terminals

**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

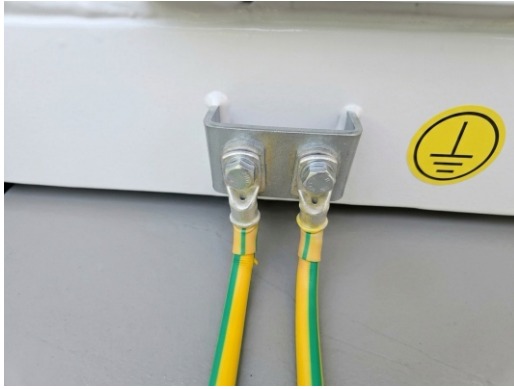
There are two types of grounding methods: using welded flat steel or using grounding cables. The specific method is determined by the design institute.

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

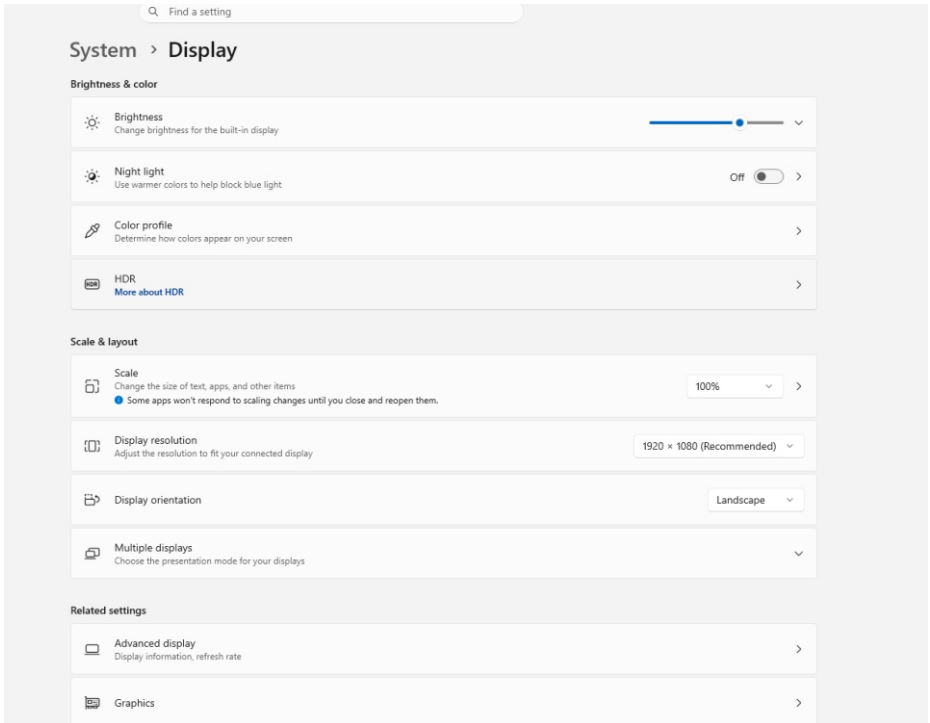
#### 6.2.1 Required tools

- 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

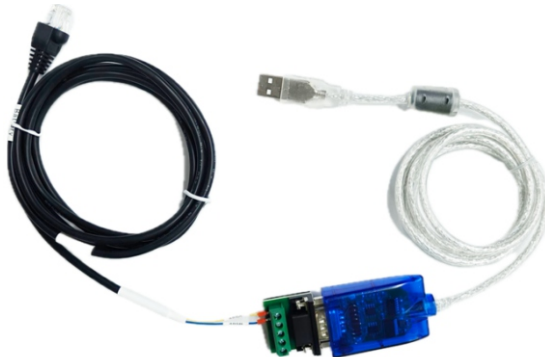
- 1) Configure computer settings

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.

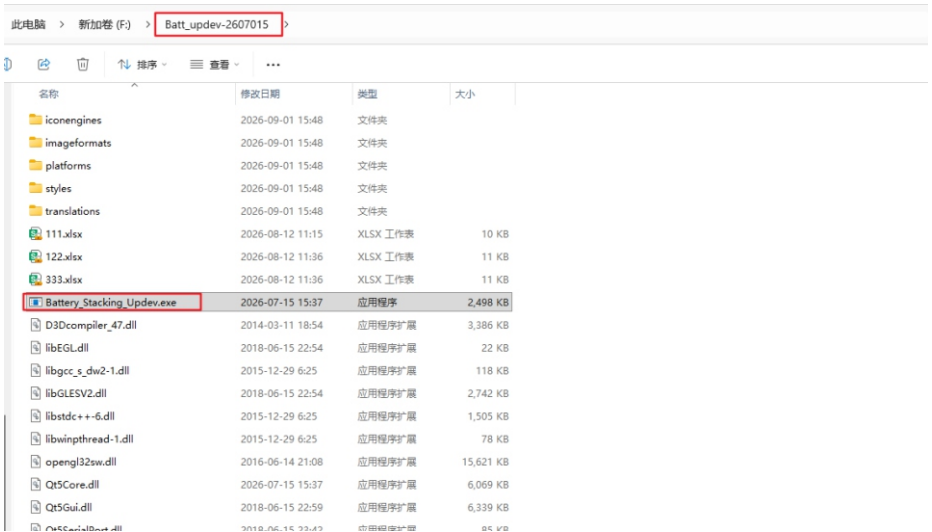


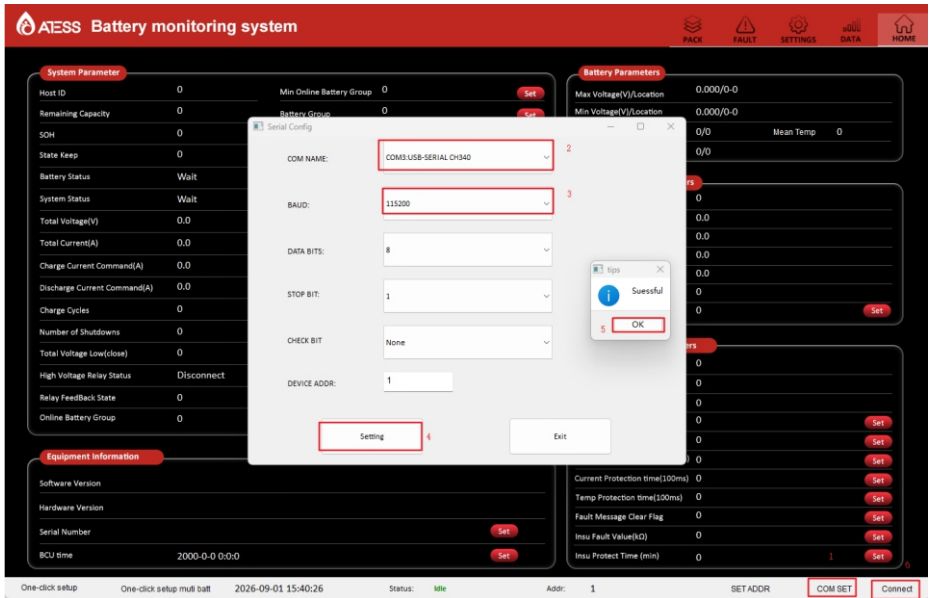
### 3) Unzip the host computer compression package

**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.

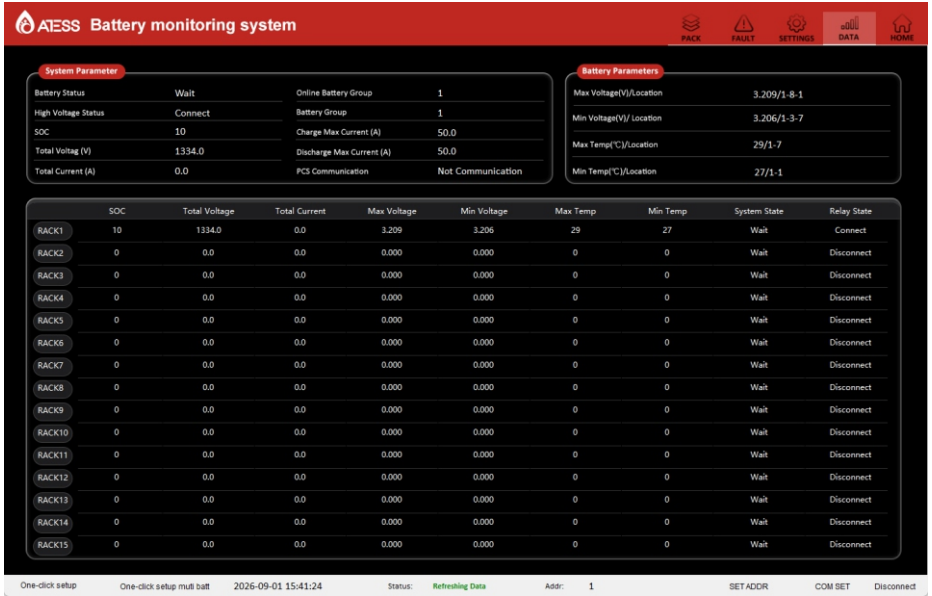




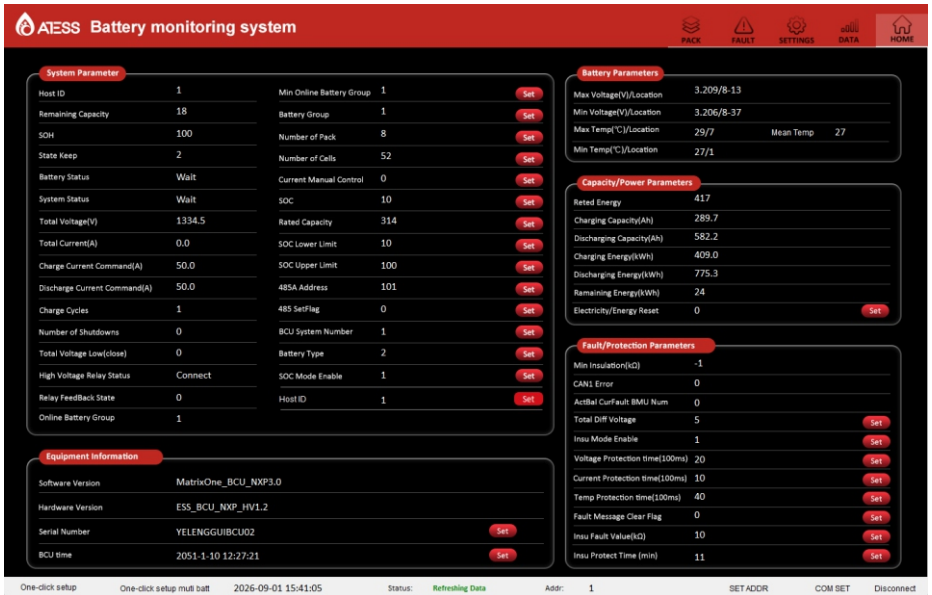
## 6.2.3 Parameter viewing and setting

### (1) DATA

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



## (2) HOME



## 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,<br>1:Fault,<br>2:ForbidCharge,<br>3:ForbidDischarge,<br>4:Charging,<br>5:Discharging | -             |
| 6   | System Status                 | 0:Wait,<br>1:Charging,<br>2:Discharging,<br>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<br>0:100AH 1C<br>1:100AH 0.5C<br>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               | 418                                                                                                         | -             |
| 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<br>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<br>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<br>Month:1~12<br>Day:1~31<br>Hour:0~23<br>Minute:0~59<br>Second:0~59 |

## (3) SETTINGS

### ① Voltage\Temperature\Current\Network

**AESS Battery monitoring system**

**Voltage**

|                         |       |     |                              |       |     |                             |       |     |
|-------------------------|-------|-----|------------------------------|-------|-----|-----------------------------|-------|-----|
| Cell Voltage High 3 (V) | 3.650 | Set | Cell Voltage Diff High 3 (V) | 0.500 | Set | Volt Ratio                  | 1.000 | Set |
| Cell Voltage High 2 (V) | 3.600 | Set | Cell Voltage Diff High 2 (V) | 0.300 | Set | Cell Voltage Recovery (V)   | 0.100 | Set |
| Cell Voltage High 1 (V) | 3.580 | Set | Cell Voltage Diff High 1 (V) | 0.250 | Set | Cell Volt Diff Recovery (V) | 0.100 | Set |
| Cell Voltage Low 3 (V)  | 2.700 | Set | Full Charge Voltage (V)      | 3.550 | Set | Balance Mode                | 0     | Set |
| Cell Voltage Low 2 (V)  | 2.800 | Set | Nominal Voltage (V)          | 3.200 | Set |                             |       |     |
| Cell Voltage Low 1 (V)  | 3.100 | Set | Full Discharge Voltage (V)   | 2.900 | Set |                             |       |     |

**Current**

|                           |        |     |                                  |        |     |                       |     |     |
|---------------------------|--------|-----|----------------------------------|--------|-----|-----------------------|-----|-----|
| Current Sensor Model (A)  | 300    | Set | Discharge Start Current (A)      | -3.0   | Set | Charge Calibrate 1    | 1.0 | Set |
| Charge Max Current (A)    | 157.0  | Set | Start Current Deviation (A)      | 2.0    | Set | Charge Calibrate 2    | 1.0 | Set |
| Discharge Max Current (A) | -204.1 | Set | Discharge Current High 3 (A)     | -219.1 | Set | Discharge Calibrate 1 | 1.0 | Set |
| Charge Current High 3 (A) | 172.0  | Set | Discharge Current High 2 (A)     | -214.1 | Set | Discharge Calibrate 2 | 1.0 | Set |
| Charge Current High 2 (A) | 167.0  | Set | Discharge Current High 1 (A)     | -209.1 | Set | Total Current (A)     | 0.0 | Set |
| Charge Current High 1 (A) | 162.0  | Set | Current Calibrate Enable         | 0      | Set |                       |     |     |
| Charge Start Current (A)  | 3.0    | Set | Min Current of SOC Calculate (A) | 0.30   | Set |                       |     |     |

**Temperature**

|                          |    |     |                             |     |     |                            |     |     |
|--------------------------|----|-----|-----------------------------|-----|-----|----------------------------|-----|-----|
| Temp Diff Max 3 (°C)     | 20 | Set | Charge Temp. Low 3 (°C)     | -10 | Set | Discharge Temp. Low 3 (°C) | -20 | Set |
| Temp Diff Max 2 (°C)     | 15 | Set | Charge Temp. Low 2 (°C)     | -5  | Set | Discharge Temp. Low 2 (°C) | -15 | Set |
| Temp Diff Max 1 (°C)     | 12 | Set | Charge Temp. Low 1 (°C)     | 0   | Set | Discharge Temp. Low 1 (°C) | -5  | Set |
| Charge Temp. High 3 (°C) | 55 | Set | Discharge Temp. High 3 (°C) | 55  | Set | BatStart(Volt)(mV)         | 0   | Set |
| Charge Temp. High 2 (°C) | 50 | Set | Discharge Temp. High 2 (°C) | 53  | Set | BatStart(VoltDiff)(mV)     | 0   | Set |
| Charge Temp. High 1 (°C) | 45 | Set | Discharge Temp. High 1 (°C) | 50  | Set | BatStop(VoltDiff)(mV)      | 0   | Set |

**Network Information**

|                           |            |               |   |     |                  |     |
|---------------------------|------------|---------------|---|-----|------------------|-----|
| Network Connection Status | 4G Connect | Server Port   | 0 | Set | CC               | Set |
| Firmware Version          |            | WiFi Account  |   | Set | 4G Serial Number | Set |
| Server Address            |            | WiFi Password |   | Set |                  |     |

One-click setup    One-click setup multi batt    2026-09-01 15:41:41    Status: Refreshing Data    Addr: 1    SET ADDR    COM SET    Disconnect

## 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.<br>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(°C)        | 25    | 1~25          |
| 1   | Temp Diff Max 2(°C)        | 15    | 1~25          |
| 2   | Temp Diff Max 1(°C)        | 12    | 1~25          |
| 3   | Charge Temp. High 3(°C)    | 55    | 35~65         |
| 4   | Charge Temp. High 2(°C)    | 50    | 35~65         |
| 5   | Charge Temp. High 1(°C)    | 45    | 35~65         |
| 6   | Charge Temp. Low 3(°C)     | -10   | (-20)~10      |
| 7   | Charge Temp. Low 2(°C)     | -5    | (-20)~10      |
| 8   | Charge Temp. Low 1(°C)     | 0     | (-20)~10      |
| 9   | Discharge Temp. High 3(°C) | 55    | 35~65         |
| 10  | Discharge Temp. High 2(°C) | 53    | 35~65         |
| 11  | Discharge Temp. High 1(°C) | 50    | 35~65         |
| 12  | Discharge Temp. Low 3(°C)  | -20   | (-20)~10      |
| 13  | Discharge Temp. Low 2(°C)  | -15   | (-20)~10      |
| 14  | Discharge Temp Low 1(°C)   | -5    | (-20)~10      |

## Network Information

| Num | Data Name                 | Value                                                                            | Modify Ranges    |
|-----|---------------------------|----------------------------------------------------------------------------------|------------------|
| 0   | Network Connection Status | 0: 4G Connect<br>1: Wifi Connect<br>2: Disconnect<br>(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

PACK
FAULT
SETTINGS
DATA
HOME

### Fire

|            |   |                     |        |                     |        |
|------------|---|---------------------|--------|---------------------|--------|
| Fire Temp1 | 0 | Fire Level          | Normal | CO Sensor Status    | Normal |
| Fire Temp2 | 0 | Fault Code          | Normal | Smoke Sensor Status | Normal |
| CO Value   | 0 | Temp1 Sensor Status | Normal | Valve Status        | Normal |
| Leak Flag  | 0 | Temp2 Sensor Status | Normal | Feedback Status     | Normal |
| Smoke Flag | 0 | Leak Sensor Status  | Normal |                     |        |

### Humidity

|                          |        |                         |        |                        |           |                  |
|--------------------------|--------|-------------------------|--------|------------------------|-----------|------------------|
| Ambient Temp.            | 30.5   | Humidity Circuit Status | Stop   | Humidity Control Stop  | 65.0      | <span>Set</span> |
| Ambient Humidity         | 68.4   | Fan Module Status       | Normal | Manual Humidity Switch | Automatic | <span>Set</span> |
| Humidity Sensor Status   | Normal | Dehumidifier Status     | Normal |                        |           |                  |
| Ext. Temp. Sensor Status | Normal | Humidity Control Start  | 75.0   |                        |           | <span>Set</span> |

### Cooling

|                       |              |                  |                            |                |                       |     |
|-----------------------|--------------|------------------|----------------------------|----------------|-----------------------|-----|
| Start Mode            | Manual       | <span>Set</span> | Cooling Baud Rate          | 9600           | Fault Status 1        | 0   |
| Working Mode          | Cooling      | <span>Set</span> | Operation Status           | Cooling   Work | Fault Status 2        | 0   |
| Supply/Return Control | Supply Water | <span>Set</span> | Supply Liquid Temp.        | 20.3           | Fault Status 3        | 0   |
| Cooling Preset Temp   | 20           | <span>Set</span> | Return Liquid Temp.        | 21.9           | Fault Status 4        | 0   |
| Cooling Hysteresis    | 3            | <span>Set</span> | Evaporator Inlet Temp.     | 10.3           | Fault Status 5        | 0   |
| Heating Preset Temp   | 30           | <span>Set</span> | Ambient Temp.              | 31.2           | Inverter Fault Code   | 0   |
| Heating Hysteresis    | 3            | <span>Set</span> | Electronic expansion valve | 121            | Overall Fault Level   | 0   |
| High Liquid Temp      | 60           | <span>Set</span> | Water Pump Speed           | 99             | Overall Fault Code    | 0   |
| Low Liquid Temp       | 5            | <span>Set</span> | Compressor Speed           | 43             | Inverter Output Power | 0.0 |
| Low Return Press      | 0.2          | <span>Set</span> | Fan Speed                  | 41             |                       |     |
| High Sup. Press       | 3.0          | <span>Set</span> | Supply Water Pressure      | 1.8            |                       |     |
| 485 Cooling Addr      | 2            | <span>Set</span> | Return Water Pressure      | 0.7            |                       |     |

One-click setup    One-click setup multi batt    2025-09-01 15:42:07    Status: Refreshing Data    Addr: 1    SET ADDR    COM SET    Disconnect

## Cooling Parameter

| Num | Data Name                  | Value                                                                                                                                                              | Modify Ranges                      |
|-----|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 0   | Start Mode                 | 0: Supply Water<br>1: Return Water                                                                                                                                 | 0~1                                |
| 1   | Working Mode               | 0: Standby<br>1: Cooling<br>2: Heating<br>3: Self-Circulation<br>4: Automatic                                                                                      | 0~4                                |
| 2   | Supply/Return Control      | 0: Supply Water<br>1: Return Water                                                                                                                                 | 0: Supply Water<br>1: Return Water |
| 3   | Cooling Preset Temp        | Unit 1°C                                                                                                                                                           | 0~90                               |
| 4   | Cooling Hysteresis         | Unit 1°C                                                                                                                                                           | 0~9                                |
| 5   | Heating Preset Temp        | Unit 1°C                                                                                                                                                           | 0~99                               |
| 6   | Heating Hysteresis         | Unit 1°C                                                                                                                                                           | 0~9                                |
| 7   | High Liquid Temp           | Unit 1°C                                                                                                                                                           | 0~65                               |
| 8   | Low Liquid Temp            | Unit 1°C                                                                                                                                                           | -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):<br>0: Standby<br>1: Start<br>2: Work<br>3: Stop<br>4: Fault<br>High byte (mode):<br>0: Standby<br>1: Cooling<br>2: Heating<br>3: Self-Circulation |                                    |
| 14  | Supply Liquid Temp.        | Unit 0.1°C                                                                                                                                                         |                                    |
| 15  | Return Liquid Temp.        | Unit 0.1°C                                                                                                                                                         |                                    |
| 16  | Evaporator Inlet Temp.     | Unit 0.1°C                                                                                                                                                         |                                    |
| 17  | Ambient Tempe.             | Unit 0.1°C                                                                                                                                                         |                                    |
| 18  | Condenser Tempe.           | Unit 0.1°C                                                                                                                                                         |                                    |
| 19  | electronic expansion valve | Unit 1 Step                                                                                                                                                        |                                    |
| 20  | Water Pump Speed           | Unit 1%                                                                                                                                                            |                                    |
| 21  | Compressor Speed           | Unit 1RPS                                                                                                                                                          |                                    |
| 22  | Fan Speed                  | Unit 1RPS                                                                                                                                                          |                                    |
| 23  | Supply Water Pressure      | Unit 0.1 bar                                                                                                                                                       |                                    |

| 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 0.1 kW         |               |

### 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<br>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

**Battery monitoring system**

|                        | Bit0           | Bit1              | Bit2            | Bit3             | Bit4             | Bit5          | Bit6            | Bit7               |
|------------------------|----------------|-------------------|-----------------|------------------|------------------|---------------|-----------------|--------------------|
| Level1 Warning (H)     | TEMP_High      | TEMP_Low          | TEMP_Diff_High  | TotVol_High      | TotVol_Low       | CellVolt_High | CellVolt_Low    | CellVolt_Diff_High |
| Level1 Warning (L)     | Charge_OverCur | Discharge_OverCur | SOC_High        | SOC_Low          | InsuComm_Warning | TotVol-C200V  | TotVolDiff_High | Reserved           |
| Level2 Fault (H)       | TEMP_High      | TEMP_Low          | TEMP_Diff_High  | TotVol_High      | TotVol_Low       | CellVolt_High | CellVolt_Low    | CellVolt_Diff_High |
| Level2 Fault (L)       | Charge_OverCur | Discharge_OverCur | Reserved        | Reserved         | Reserved         | Reserved      | Reserved        | Reserved           |
| Level3 Protection1 (H) | TEMP_High      | TEMP_Low          | TEMP_Diff_High  | TotVol_High      | TotVol_Low       | CellVolt_High | CellVolt_Low    | CellVolt_Diff_High |
| Level3 Protection1 (L) | Charge_OverCur | Discharge_OverCur | ChargeCurr_HW   | DischargeCurr_HW | Reserved         | Reserved      | Reserved        | Reserved           |
| Level3 Protection2 (H) | EEPromRW_fault | Reserved          | Reserved        | Reserved         | CellOpen_fault   | SPI_fault     | CAN1Commu_fault | CAN2Commu_fault    |
| Level3 Protection2 (L) | PIrelay_fault  | NIrelay_fault     | HSP_BMS_lowVolt | Insulation_fault | L4_TEMP_High     | Reserved      | Reserved        | Reserved           |

0%

Reading

Export

One-click setup
One-click setup multi batt
2026-09-01 15:42:27
Status: Refreshing Data
Addr: 1
SET ADDR
COM SET
Disconnect

## (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).

AESS Battery monitoring system

PACK

FAULT

SETTINGS

DATA

HOME

|        | 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) | Cell 1 |
|--------|---------------|-------------|-------------|-----------------|-----------------|----------|----------|--------------|--------------|-----------|--------|
| 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.     |

One-click setup

One-click setup multi batt

2026-09-01 15:42:48

Status: Refreshing Data

Addr: 1

SET ADDR

COM SET

Disconnection

One-click setup    One-click setup mult batt    2026-09-01 15:42:48    Status: Refreshing Data    Addr: 1    SET ADDR    COM SET    Disconnect

## 6.3 View and configure battery parameters via screen

### 6.3.1 Wiring between battery and screen

Requirement tools

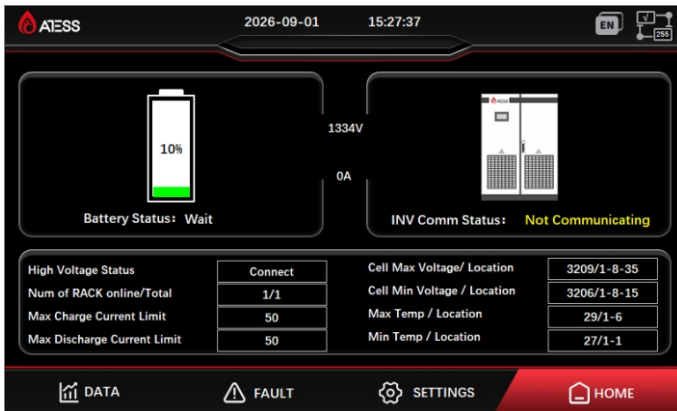
(1) Communication cable

(2) Screen

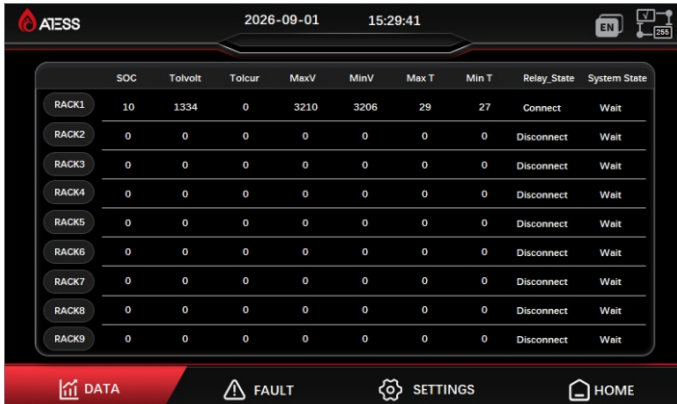
Connect the RJ45 terminal of black communication cable to COM1 or COM2 of the BPU, connect the 485 wires to the screen of the DC cabinet.

### 6.3.2 Parameter viewing and setting

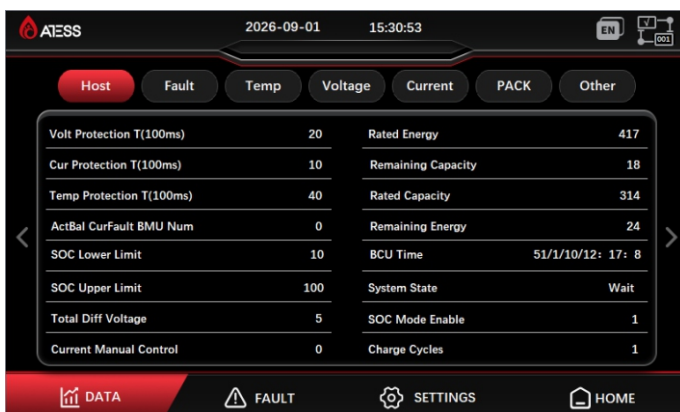
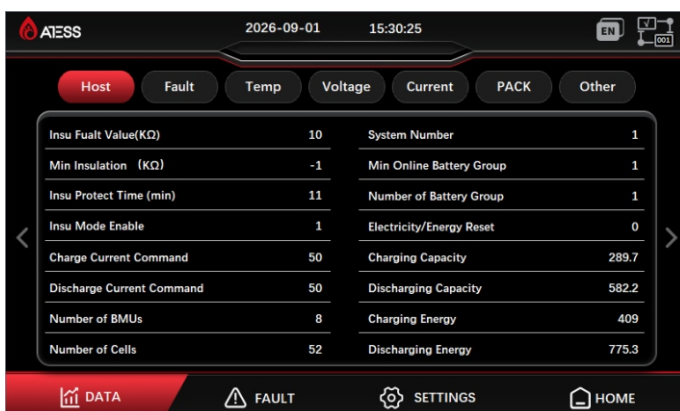
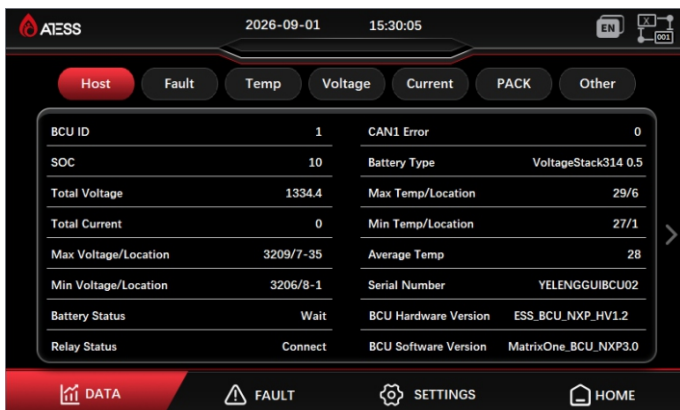
(1) Home

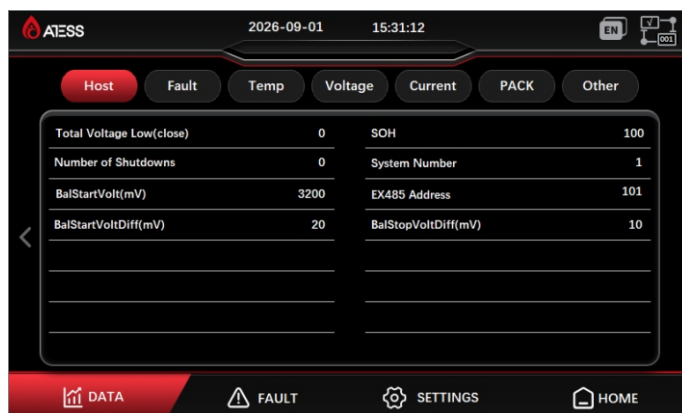


(2) DATA



## ① Host page

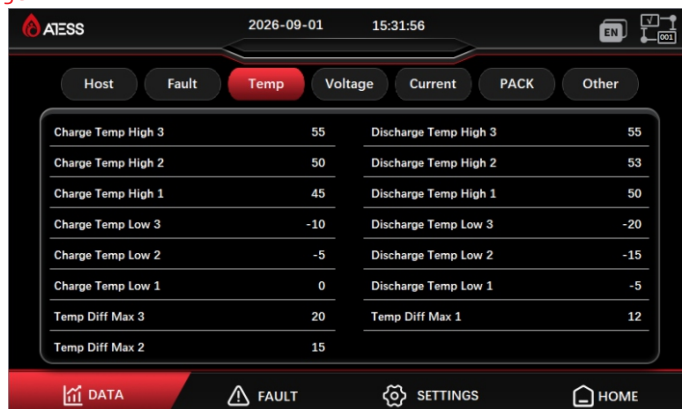




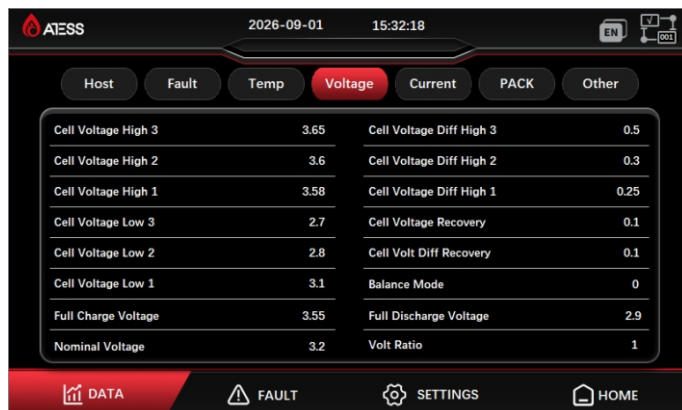
## ② Fault page



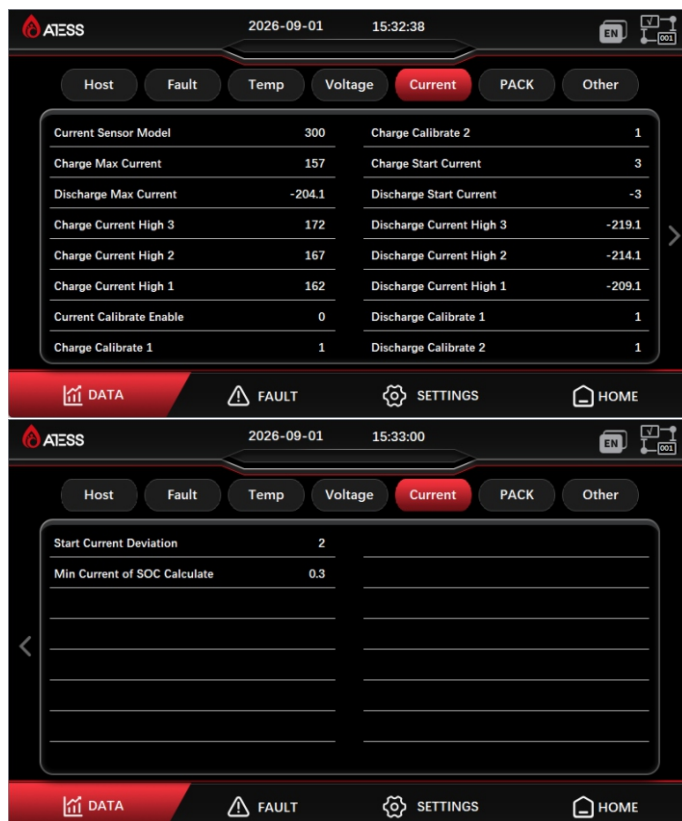
## ③ Temp page



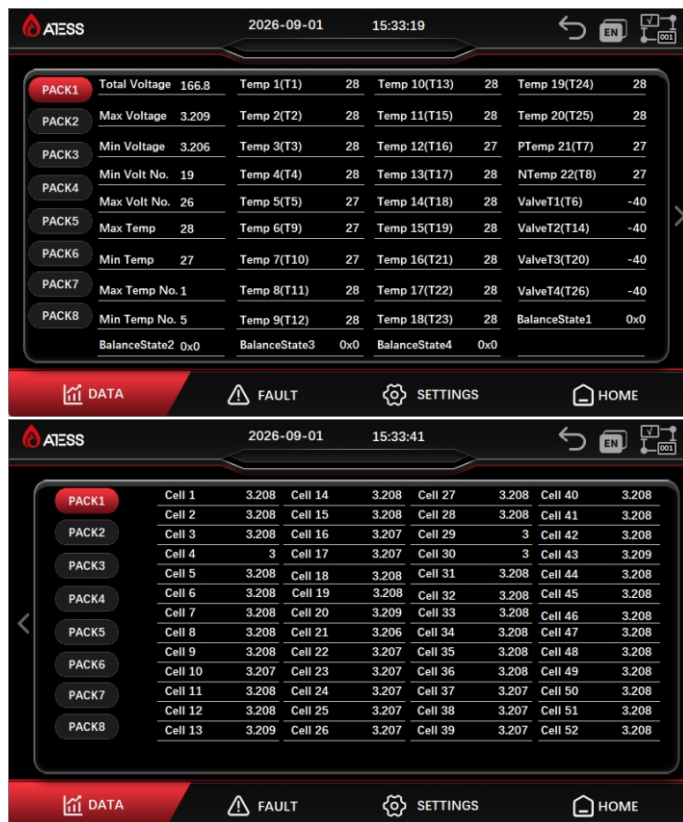
## ④ Voltage page



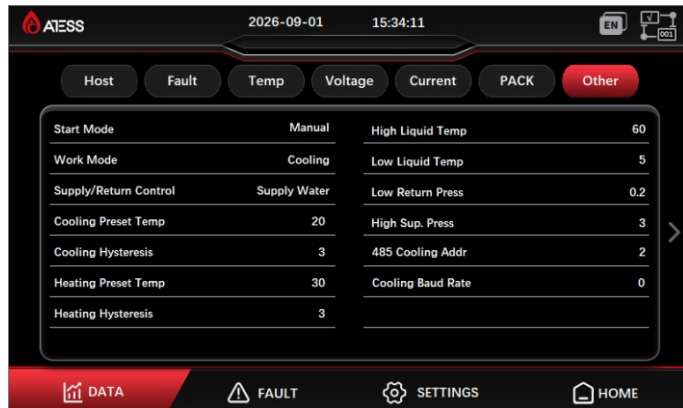
## ⑤ Current page

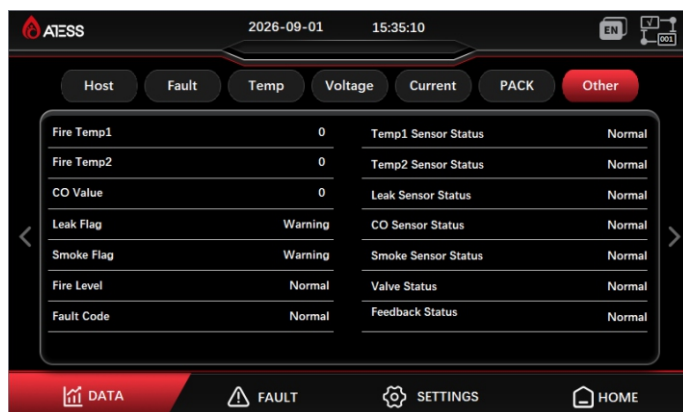
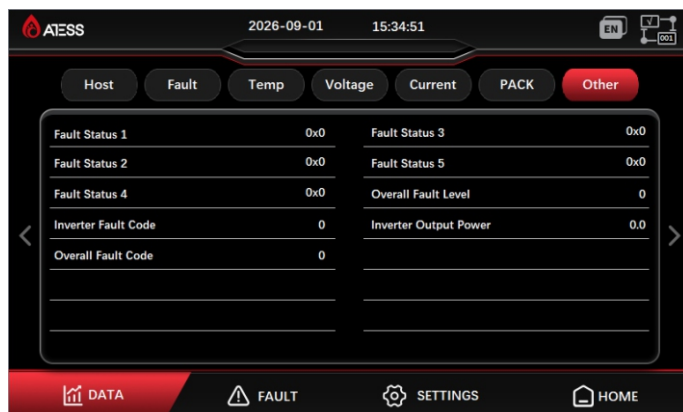
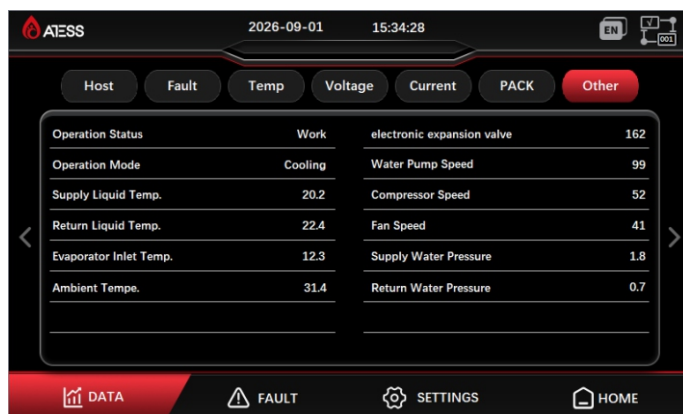


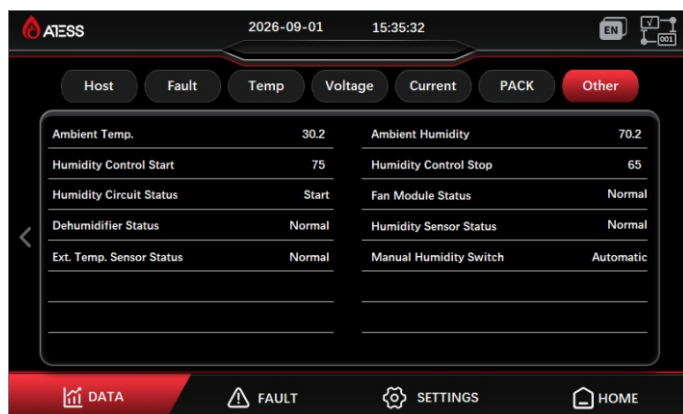
## ⑥ PACK page



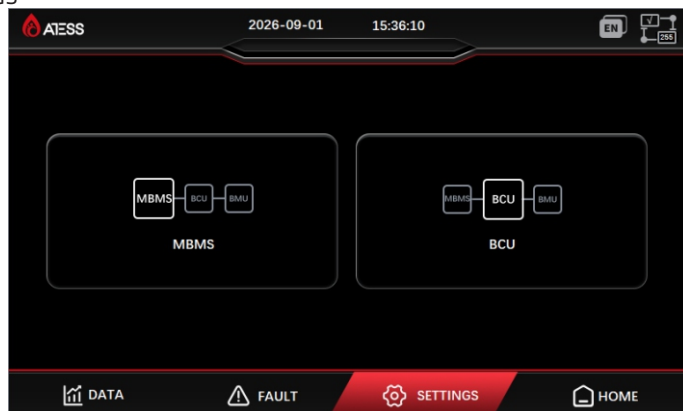
## ⑦ Other Page





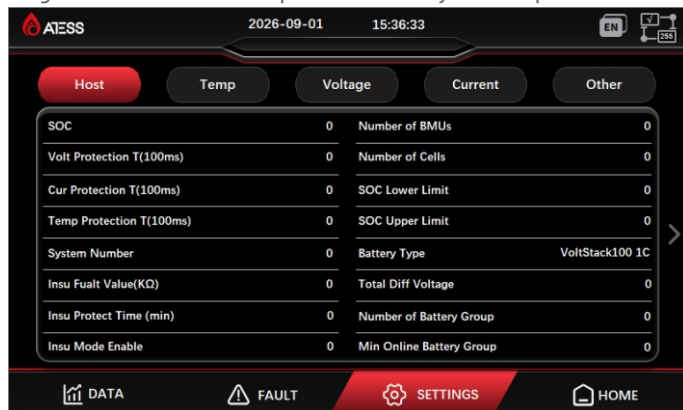


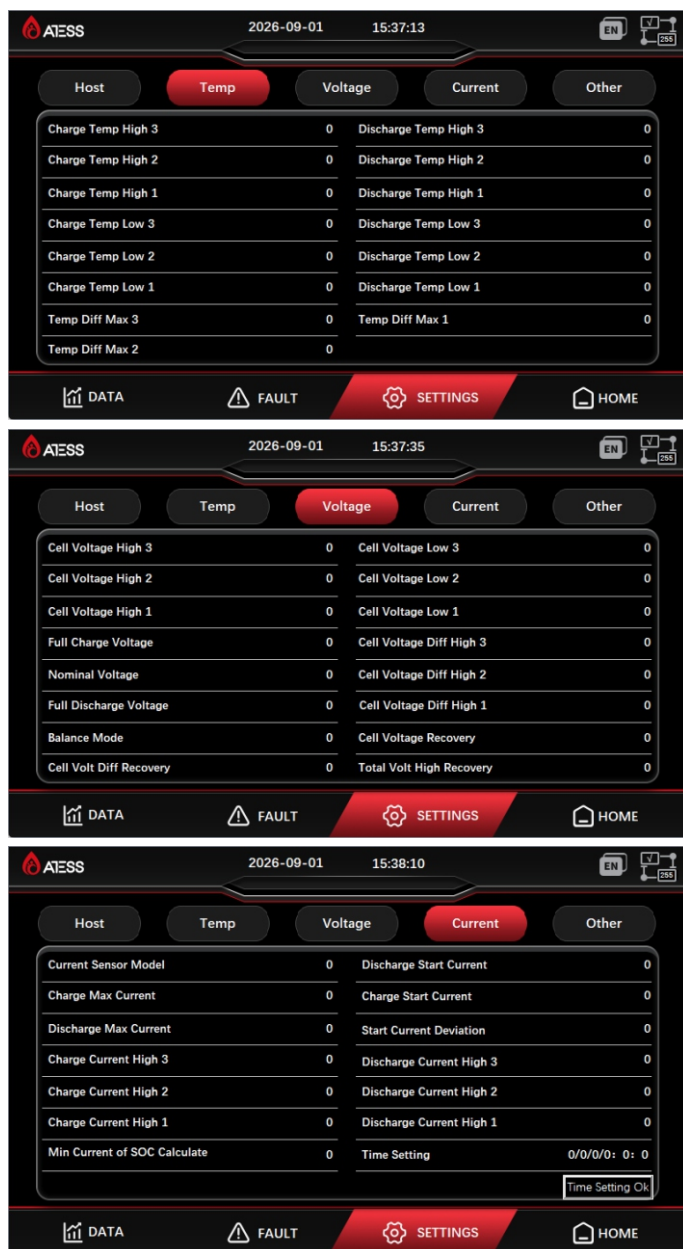
### (3) SETTINGS

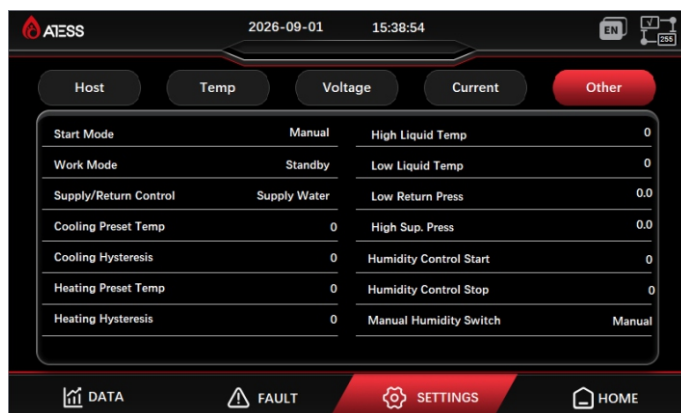


#### ① MBMS setting

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

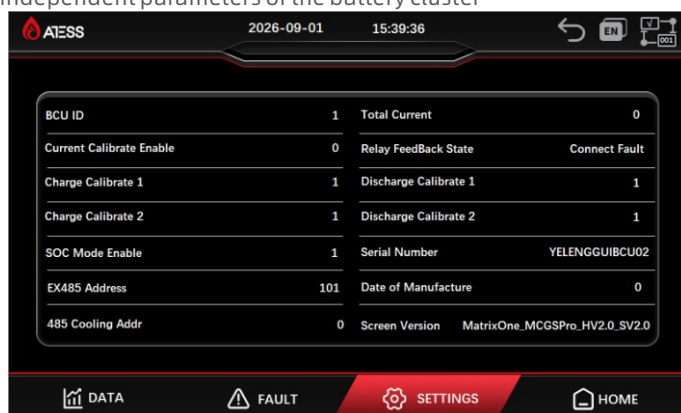




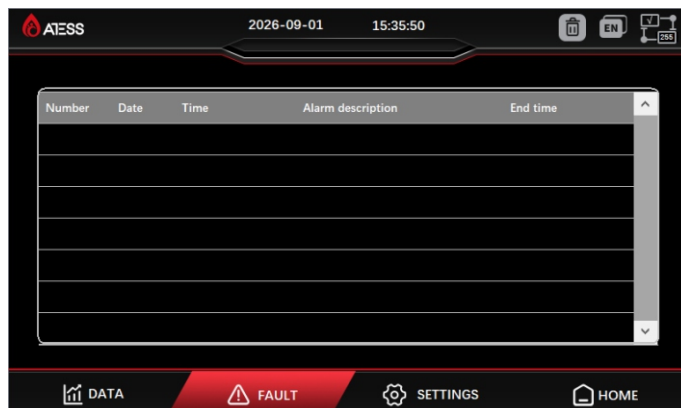


## ② BCU setting

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. Check 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          | <p>Please check the following items, and if any do not meet the requirements, correct them immediately:</p> <p>Check whether the outdoor battery cabinet and internal equipment are damaged or deformed.</p> <p>Check for any abnormal noise from the internal equipment during operation.</p> <p>Check if the temperature inside the outdoor battery cabinet is too high.</p> <p>Check if the humidity and dust levels inside the outdoor battery cabinet are within normal ranges. Clean if necessary.</p> <p>Check if the air intake and exhaust ports of the outdoor battery cabinet are blocked.</p> |
| 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   | <p>Please check the following items, and if any do not meet the requirements, correct them immediately:</p> <p>Check whether there are flammable materials on top of the outdoor battery cabinet.</p> <p>Check whether the welding points of the foundation steel plate of the outdoor battery cabinet are secure and whether there is any rust.</p> <p>Inspect the outer shell of the battery outdoor cabinet for any damage, paint peeling, oxidation, etc.</p> <p>Check if the cabinet door lock can be opened flexibly.</p> <p>Check if the sealing strips are fixed properly.</p> |
| 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            | <p>Inspection work should only begin after the internal equipment of the battery outdoor cabinet is completely powered off!</p> <p>During the inspection, please correct any non-compliance immediately upon discovery.</p> <p>Check whether the cable arrangement is standard and if there are any short circuits. If any abnormalities are found, they must be corrected immediately.</p> <p>Check whether all entry and exit holes of the outdoor battery cabinet are well sealed.</p> <p>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.</p> <p>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.</p> <p>Check if the insulation wrapping on the electrical cable terminals is intact and not peeling off.</p> |
| 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 | <p>Check if the grounding connections are correct, and ensure that the grounding resistance does not exceed 4Ω.</p> <p>Check if the equipotential connections inside the outdoor battery cabinet are correct.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Fan                                     | <p>Check the operating status of the fan</p> <p>Check if the fan is blocked</p> <p>Check for any abnormal noise while the fan is running</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 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   | <p>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</p> <p>Check if the fire alarm is functioning properly and if the indicator light is on</p> <p>Check the body warning labels and other equipment labels. If any are found to be unclear or damaged, please replace them promptly.</p> |

| 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   | <p>Check if the cabinet fan is operating normally.</p> <p>Check the temperature of the radiator and the dust. If necessary, use a vacuum cleaner to clean the heat dissipation module and other components.</p> <p>Inspect the filter mesh, and clean it promptly if necessary.</p> <p>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:</p> <p>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).</p> <p>Step 2: Rinse with clean water or use a blower to remove dust from the filter mesh (ensure it is thoroughly dried after rinsing).</p> <p>Step 3: Install the filter mesh frame and close the cabinet door.</p> <p>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.</p> <p>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.</p> <p>Conduct regular inspections of rust on all metal components (every six months).</p> <p>Annual inspection of contactors (auxiliary switches and micro switches) to ensure their mechanical operation is good.</p> <p>Annual inspection of circuit breakers: check maintenance (whether they operate normally, and the over/under voltage protection functions are intact).</p> <p>Check operating parameters (especially voltage and insulation, etc.).</p> |
| 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.



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