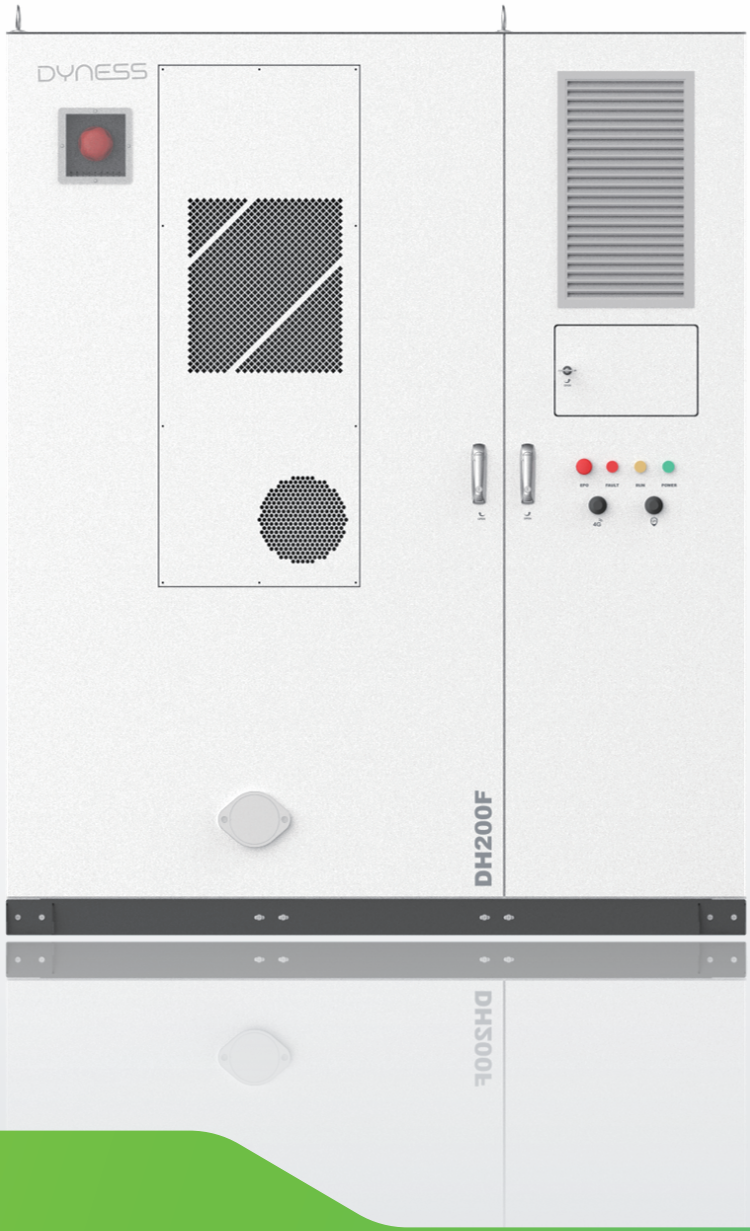


DH200F

USER MANUAL

EnerCore
Smart Outdoor Integrated
Energy Storage Cabinet

File version-20250707-V3.0-EN Information might be subject to change without notice during product improving.

Content

Statement of Law

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 laws and regulations.
When products or technologies are updated, customers can check the information on the website of Dyness.
Website: http://www.dyness.com/
Please note that products can be modified without prior notice.

Revised History

Revised Version	Revision Date	Revision Reason
1.0	2023.6.10	First publication
1.1	2023.9.14	System & module parameters, storage SOC requirements, and HMI interface updates
1.2	2023.11.28	Working principle diagrams, internal design, overseas fire protection solutions, cable specifications, operating procedure drawings updated, and lightning arrester maintenance content added
2.0	2024.7.31	Second-generation product optimization and overall content updates
3.0	2025.7.7	Third-generation product optimization and error content revisions

1. Guideline

CAUTION: Read this manual carefully before installing or operating this product. Keep this manual in a safe place for future reference.

1.1. Use of Manuals

- Manual content: This manual primarily introduces safety precautions, product features, delivery and storage, installation and use, wiring requirements, human-machine interface operation, system maintenance, and quality assurance for outdoor energy storage air-cooled integrated cabinets.
- Applicable population: This manual is suitable for professional technicians who install and maintain the ESS product, as well as users who carry out daily operation. Readers should have certain electrical knowledge.

1.2. Symbol and Abbreviation

This manual may contain the following symbols to emphasize important information, to ensure the safety of the user's personal and property when installing this product, or to facilitate the efficient operation, please read it carefully.

Table 1-1 Symbol Mark

	Indicate that there is high voltage inside the ESS cabinet, so beware of electrocution resulting in personal safety issues.
	Indicate an electrical hazard, all external power connections must be disconnected before maintenance and operation.
	Anti-temperature mark
	Ventilation mark
	Indicate that there is protective earthing (PE) terminal, which is used to prevent electric shock in the event of a fault, and needs to be firmly earthed to ensure operator safety.
	Recycle mark
	Hazardous waste, need professional recycling, can not be put into the trash can
	Instruction (User Manual) mark

References to the following products in this manual are replaced by abbreviations for ease of presentation.

Table 1-2 Abbreviation Definition

Abbreviation	Full name
ESS	Energy Storage System
PCS	Power Conversion System
EMS	Energy Management System
BMS	Battery Management System
BDU	Battery Distribution Unit
SPD	Surge Protection Device
SOC	State of Charge
SOH	State of Health
DC	Direct Current
AC	Alternating Current
PV	Photovoltaic
MPPT	Maximum Power Point Tracking
RCD	Residual Current Device
CT	Current Transformer
PE	Protective Earthing

2. Safety Instructions

2.1. Safety Principle

Related safety precautions need to be strictly followed during installation, operation and maintenance. This product is a combined high-voltage DC and three-phase AC system and should only be operated by authorized personnel.

DANGER

- Deadly high voltages are present inside the product, please observe and comply with the warning labels on the product;
- Do not touch the power grid or the contacts connected to it inside the product to prevent the risk of fatal electric shock!
- Damage to the battery may result in electrolyte leakage. If the electrolyte leaks, do not touch the leaking electrolyte or volatile gases and contact the after-sales service team immediately for assistance.

WARNING

- Transportation, installation, maintenance must comply with local regulations and this user manual;
- Installation work must be assigned to a specialized full-time operator.

PROHIBITION

- Risk of damage to the battery system or personal injury or behavior is prohibited;
- Replacement of the modules by the user is prohibited and the company will not be responsible for any damages caused.

2.2. Operator Qualifications

Only qualified electricians or professional personnel can operate the product, the operator should meet the following requirements.

- Shall be familiar with local standards and relevant electricity safety regulations;
- The operator shall have received professional training related to the installation and commissioning of electrical equipment, and should have the ability to respond to emergencies or unexpected situations that may occur during installation or trial operation.
- The operator shall have certain specialized knowledge of electronics, electrical wiring and machinery, and be familiar with electrical and mechanical schematic diagrams;
- The Operator should be fully familiar with equipment protection and standard maintenance, and operations should comply with established safety standards.

2.3. Environmental Safety Requirements

- Do not install and use the product in environments with temperature below -20°C or above 50°C;
- Do not install and use the product near any heat sources or combustible materials;
- Do not install and use the product in areas with frequent movement of personnel;
- Do not expose the product to corrosive gases or liquids;
- Keep the product installation and use away from children and animals;
- The maximum installation altitude for the product should not exceed 3000m, and it should be derated when above 2000m;
- Sufficient space should be reserved for product installation to ensure adequate ventilation;
- Isolation barriers must be set up during installation to prevent any unrelated personnel from entering the site.

2.4. Electrical Safety Requirements

The operator must ensure that: all basic information and step-by-step instructions are understood before commissioning and switching off the disconnecting circuit-breaker.

DANGER

Battery Protection Safety

Please ensure that during installation, maintenance of the equipment:

- The battery is completely disconnected;
- Have a visible warning sign at the break point to ensure no accidental reconnections.

Ground Fault Protective Safety

- When a ground fault occurs, the original non-electrified part may carry high voltage, and accidental electric shock can lead to personal safety! Ensure that there is no ground fault and take necessary protective measures before operation.

Safety Of Live Line Measurements

- Given the presence of high voltages in this equipment, protective measures (e.g., wear insulated gloves, etc.) must be taken during live line measurements, and the operator must be accompanied by a person to ensure personal safety.

Arc Protection Safety

- Avoid arc, fire and explosion hazards caused by improper operation;
- Prohibit touching uninsulated cables that may be energized;
- When a loose connection occurs in the power cable, or a screw or other component falls out accidentally, do not operate it without authorization,

and it must be handled by a qualified professional to avoid causing a larger malfunction.

2.5. Transportation and Installation Safety Requirements

WARNING

Personnel Operation Regulations

- Forklifts, cranes and other construction machinery must be operated by qualified operators if required on site;
- The operator must wear insulated protective equipment that complies with safety regulations during installation;
- When connecting the power on-site, a professional guardian must be assigned to protect the switches that need to be turned off;
- Ensure that it has no electrical connections before installation;
- Each completed project must be checked at least once and cross-checked during the installation process;
- The equipment must be installed in sequence without skipping any steps.

Wiring regulations

- Appropriate measuring devices must be used, appropriate standards and directives must be followed;
- The operating manual of the measuring device must be known before any measurement is carried out;
- Only use equipment specified by Dyness. Failure to use equipment specified by Dyness may result in impaired protection as well as injury to personnel.

Test run after installation

- Only after confirmation by professionals and obtaining permission from local electrical authorities can the equipment be put into operation;
- Before operation, please switch off all distribution circuit breakers, and it is strictly prohibited to disconnect them during product running.

DANGER

- Do not change fuse size or rating value during installation;
- It is not allowed for two or more operators to connect a single wire simultaneously during the wiring process.

2.6. Daily Operation and Maintenance

All operations of the product should follow the instructions in the User Manual. Damage to the equipment caused by violation of these instructions will void the associated liability and warranty. If necessary, contact Dyness Customer Service for repairs.

WARNING

- The software, shell and components of the product may not be changed without Dyness authorization. If changed, the corresponding liability and warranty shall be void;
- Do not remove or alter the nameplate;
- Do not open the cabinet doors in inclement weather such as rain or strong winds.

2.7. Product Obsolescence

When the product as a whole or individual internal components become aged or damaged and need to be discarded, they cannot be disposed as regular waste. Some components inside the product can be recycled and reused. Improper disposal of certain components may cause environmental pollution. Please contact qualified local professional recycling organization for proper disposal of the product and internal components.

3. Product Description

3.1. Product Overview

The product is an C&I ESS+PV all-in-one cabinet system with a storage capacity of 215kWh and a rated AC output power of 100kW. Which could provide users with peak-shaving, capacity and demand reduction, dynamic expansion, demand response and other functions. It can be widely used in charging stations, commercial buildings, manufacturing industry and other small industrial and commercial scenarios.

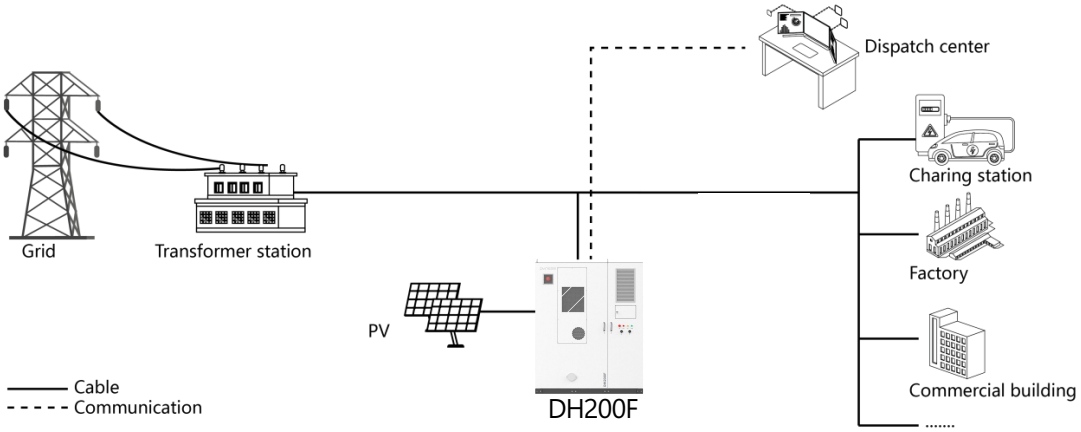


Figure 3-1 System Application

3.2. Product Model

This manual applies to outdoor air-cooling ESS products (DH200F) of EnerCore series. The definition are explained as below:

DH: Dyness high voltage series products

200: Battery capacity of standard model

F: Fan/air-cooling system

S: Indicate solar, the number after "S" stand for PV power , 000 means no PV configuration, 150 means 150kW PV connection

L: On&off-grid, the number 01 after L indicates the On&off-grid version

Table 3-1 Product Model

No.	Model	Description
1	DH200F -S000L00	All-in-one cabinet, No PV, On-grid
2	DH200F -S000L01	All-in-one cabinet, No PV, On&off-grid
3	DH200F -S150L01	All-in-one cabinet, 150kW PV, On&off-grid

3.3. Product Configuration

This product adopts a modular design, integrating PACK, PCS, EMS, BDU, MPPT (optional), STS (optional), security & fire protection systems, air conditioner system, etc. It is easy to install, operate, and maintain:

Table 3-2 Product Configuration List

Module	Function	Qty.	Config.
PACK	Used for energy storage, providing stable and continuous power output to the system.	15	Standard
PCS	Enables bidirectional conversion between direct current and alternating current.	1	Standard
EMS	System energy management and comprehensive control.	1	Standard
BDU	Battery control unit and high-voltage power supply.	1	Standard
MPPT	Dynamically adjusts photovoltaic input power to improve the power generation efficiency of the photovoltaic storage system.	3	Optional
STS	Enables switching between grid-connected and off-grid modes.	1	Optional
Security & Fire protection systems	Provides intrusion protection, emergency response, fire prevention, and effective fire extinguishing for equipment.	1	Standard
Air conditioner system	Regulates battery operating temperature to ensure that batteries operate at the most suitable temperature.	1	Standard

3.4. System Parameters

The parameter may vary without notice during product upgrade:

Table 3-3 DH200F Parameters

Model	DH200F
Battery	
Battery Type	LFP ($LiFePO_4$)
Battery Capacity	280Ah
PACK Configuration	1P16S*15
Rated Current	140A
Max. Current	160A
Voltage Range	696~864Vdc
Nominal Capacity	215kWh
On-grid AC Side	
Rated Power	100kW
AC Maximum Current	167A
AC Rated Voltage	400Vac
Wiring Method	3P4L+PE
Frequency	50Hz/60Hz
Power Factor	1(Leading)~1(Lagging)
THDi	≤3% (Rated power)
Max. Number Of Parallel Expansions	12

Off-grid AC Side (Optional)	
Rated Power	100kVA
AC Rated Voltage	400Vac
AC Maximum Current	167A
Wiring method	3P4L+PE
Frequency	50Hz/60Hz
Unbalanced Load	100%
THDv	< 3% (Liner load)
Max. Number Of Parallel Expansions	5
Photovoltaic (Optional)	
Max. Input Power	50kW*3
Max. Input Current	100A*3
Short-circuit Current	150A
Input Voltage Range	200-670Vdc
Start-up Voltage	250Vdc
MPPT Path	3
System	
Weight	2800±100kg
Dimension (W*D*H)	1845*1190*2250mm
Max. Efficiency	87%
Air Conditioner Power	3kW (Cooling), 1kW (Heating)
Operating Temperature	-20~50℃ (Derating above 45℃)
Operating Humidity	0~95%RH (Non-condensing)
Ingress Protection	IP55
Anti-corrosion Grade	C3
Cooling Method	Air-cooling
Noise	≤70dB
Elevation	3000m (Derating above 2000m)
Display	Touch screen
Fire Protection	Aerosol, Water fire system, Multi-sensor/Water ingress, Audible&Visual alarm, Explosion-proof ventilation
Communication	Ethernet/4G/RS485
Certification	CE, LVD, UN38.3

3.5. System Expansion

AC side expansion

1) Grid-connected systems can support up to 12 units in parallel, with a total system power/capacity expandable to 1.2 MW/2.58 MWh;
2) Off-grid systems can support up to 5 units in parallel, with a total system power/capacity expandable to 0.5 MW/1.075 MWh;
3) All external connections are consolidated into a combiner box, which then uniformly outputs power externally.

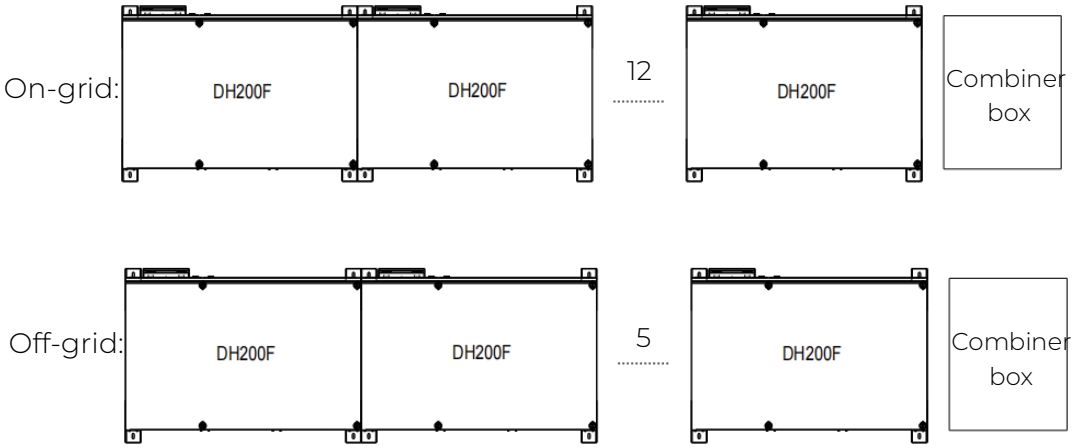


Figure 3-2 Diagram of AC Expansion Application

3.6. Appearance Design

Dimension: 1845*1190*2250mm (Fixed basement and hanging rings not included)

Net weight: Approx. 2800kg

Product IP grade: IP55

Anti-corrosion level: C3

Figure 3-3 Product Appearance

The front of the product features an audible and visual alarm, air inlet, HMI screen, emergency stop button, operation indicator light, antenna, air conditioner, and explosion-proof air inlet. The rear of the product features an explosion-proof exhaust outlet, air outlet, rear connection port, and water fire protection.

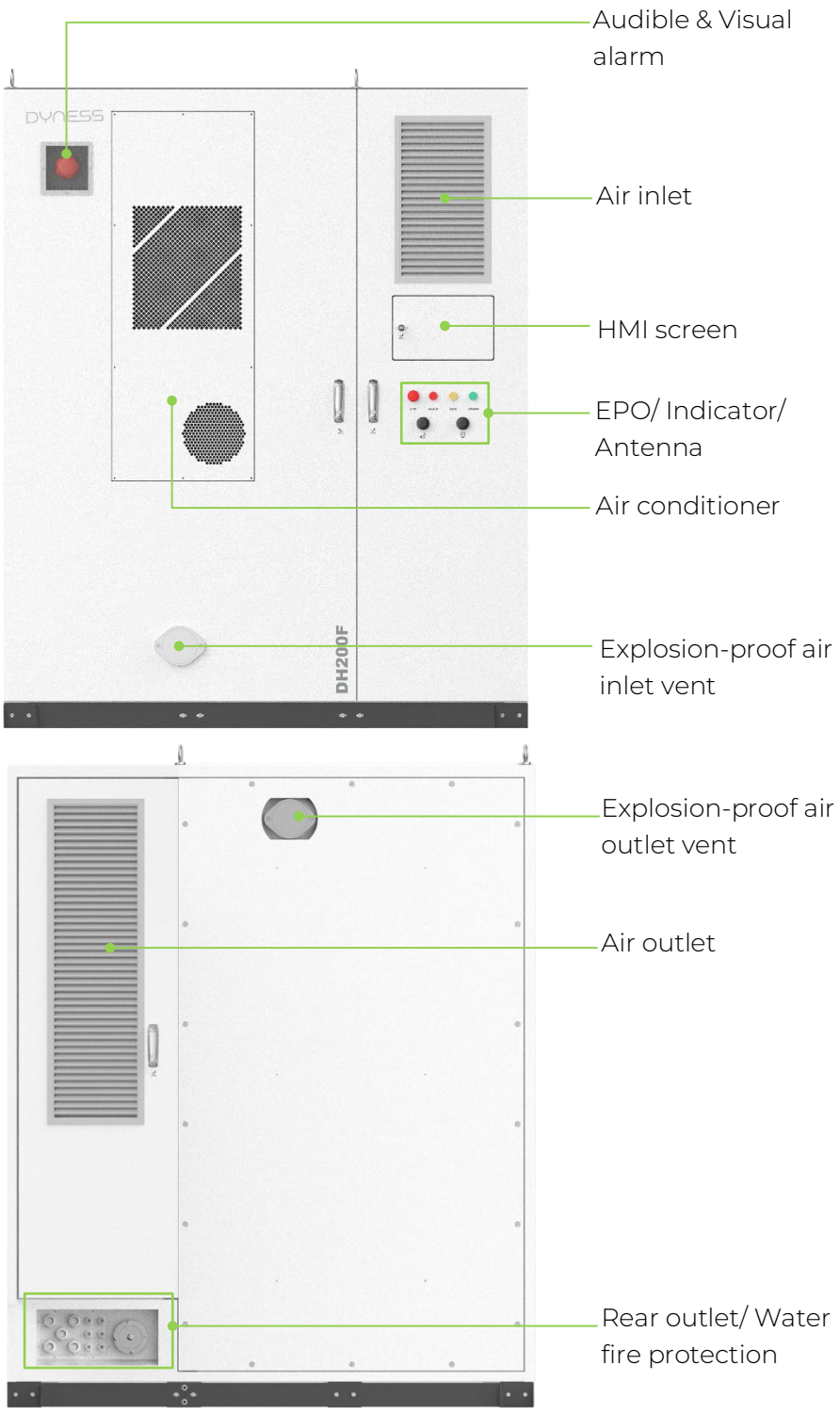


Figure 3-4 Appearance Function Diagram

Table 3-4 Definition of Appearance Functions

No.	Appearance	Name	Functions
1		Audible & Visual alarm	Audible and visual alarms provide timely warnings of emergencies.
2	/	Air inlet/outlet	Introduce external cool air and expel hot air for heat dissipation and temperature balancing.
3	/	HMI screen	User-system interaction interface.
4		EPO	Pressing the button stops the system from running.
5		Fault indicator	A steady light indicates a system fault, and the system stops running.
6		Alarm indicator	A steady light indicates an alarm, but does not affect system operation.
7		Operation indicator	A steady light indicates normal system operation, and a turned-off light indicates standby mode.
8		4G antenna(left)	Receive and transmit 4G signals.
9		GPS antenna(right)	Receive positioning signals.
10	/	Air conditioner	Regulate battery temperature to ensure safe operation, optimize efficiency, and extend lifespan
11	/	Explosion-proof air inlet/ outlet vent	Introduce fresh air and exhaust flammable gases
12	/	Rear outlet	System rear output interface, suitable for grid, load, and photovoltaic connections
13	/	Water fire protection	Connect to water-based fire suppression systems to control fire spread

* CAUTION: Do not operate the emergency stop button in a non-emergency situation.

3.7. Internal Design

The product consist of two parts: Battery compartment and electrical compartment.

Battery compartment: PACK, BDU, air conditioner, fire protection system;

Electrical compartment: PCS, MPPT(optional), STS(optional), scondary auxiliary power switch, photovoltaic isolating switch, power grid and load switch.

Wth the following internal design:

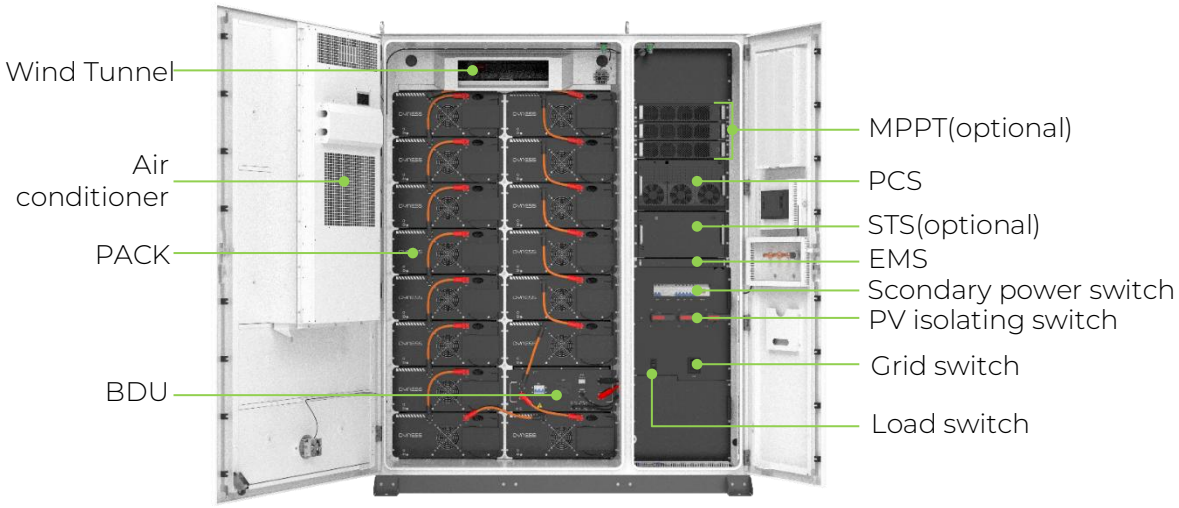


Figure 3-5 Internal Functional Diagram

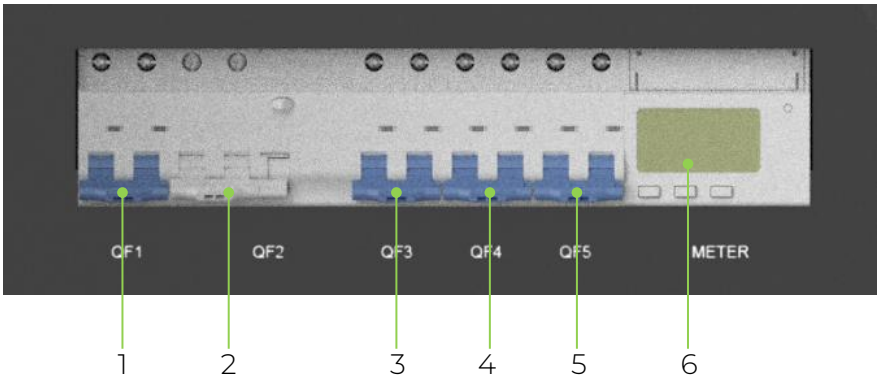


Figure 3-6 Scondary Power Switch Diagram

Table 3-5 Scondary Power Switch Function Definition

No.	Name	Functionality
1	QF1	Auxiliary power main switch
2	QF2	Air conditioning power switch
3	QF3	PACK fan power switch
4	QF4	Electrical compartment fan switch
5	QF5	BDU power switch
6	METER	Three-phase AC meter

3.8. Main Modules

3.8.1. PACK

DANGER

- Do not touch any batteries while the BESS is running;
- Only authorized operators should handle the batteries;
- End of life (should be decommissioned, disassembled and disposed of in accordance with the recycling program provided).

This system's PACK uses LFP batteries with 280Ah cells, arranged in a 1P16S configuration. The PACK has a rated capacity of 14.33kWh and a rated voltage of 51.2V. Each battery PACK is equipped with one Level 1 BIC module (slave controller) for collecting voltage and temperature parameters of the PACK, and it also has functions such as state of charge balancing and thermal management. The PACK module adopts air-cooled heat dissipation, with an IP20 protection rating, high structural reliability, and low maintenance costs.

Figure 3-7 PACK Diagram

Table 3-6 PACK Configuration

Model	HV51280F
String form	1P16S
Battery energy (kWh)	14.33
Rated voltage (Vdc)	51.2
Nominal capacity (Ah)	280
Rated charge/discharge current (A)	140
Dimension(W*D*H)	568*764*231mm
IP class	IP20
Operating temperature	Charging 0℃~+60℃
	Discharge -20℃~+60℃
Operating humidity	0%~95% RH
Storage temperature	1 month -20~45℃
	1 year 0~35℃

WARNING

- When battery leakage occurs, or there is abnormal smell from the battery, if it is difficult to determine whether the electrolyte leaks, please stop using it immediately and contact Dyness or professionals;
- Please do not touch the electrolyte directly, if skin contact accidentally, please flush with plenty of water;
- When handling leaking batteries, make sure that the power supply connected to the battery is off to prevent fire and sparks, and keep the environment well ventilated;
- Wear rubber gloves (insulation voltage>10kV) when handling leaking batteries;
- Please use gauze (ordinary medical gauze) or other liquid absorbent solids to clean the battery leakage;
- The treated battery should be placed in isolation and should not be used again;
- The above operations shall be completed by personnel designated by Dyness or qualified professionals.

3.8.2. PCS

PCS is a bidirectional current control conversion device that connects energy storage battery systems to the power grid. Its primary functions include facilitating energy exchange between batteries and the grid, controlling and managing battery charging and discharging, and enabling bidirectional conversion between DC and AC. It can convert AC to DC to charge batteries and convert battery DC to AC to feed back into the grid.

The PCS in this system has an IP20 protection rating and a rated output power of 100 kW.

Figure 3-8 PCS Diagram

Notice: Please replace the dust cover regularly, if the dust cover is blocked, the temperature will rise abnormally.

3.8.3. EMS

The EMS energy management system is an important part of the energy storage system. It communicates with PCS, BMS, MPPT (optional), STS (optional), meter, fire protection systems, air conditioner, and other equipment to control the entire ESS, enabling functions such as peak-valley arbitrage, peak-shaving, self-consumption, battery priority, backflow prevention, and transformer protection. EMS collects data and signals from local devices and employs internal control strategies to ensure the safe, reliable, efficient, and economical operation of the energy storage system.

Figure 3-9 EMS Diagram

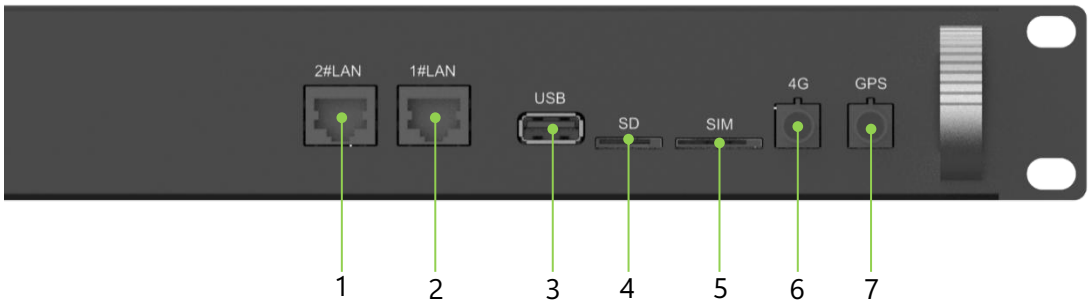


Figure 3-10 EMS Port Diagram

Table 3-7 EMS Port Function Definition

No.	Label	Definition
1	2#LAN	Ethernet Dyness cloud platform port
2	1#LAN	Ethernet MODBUS_TCP port
3	USB	USB port, EMS local program upgrade
4	SD	SD card port, used for local data storage
5	SIM	SIM card port
6	4G	4G antenna port
7	GPS	GPS antenna port

3.8.4. BDU

The BDU is equipped with a built-in BMS (Battery Management System), high-voltage contactors, high-voltage fuses, circuit breakers, and other control and

protection devices, integrating control, protection, and monitoring functions into a single unit. This reduces the need for external cables and independent components, enhancing system compactness. Through efficient power distribution, multiple layers of protection, and intelligent management, the system ensures stable operation while providing data support and operational convenience for maintenance and operations.

Figure 3-11 BDU Diagram

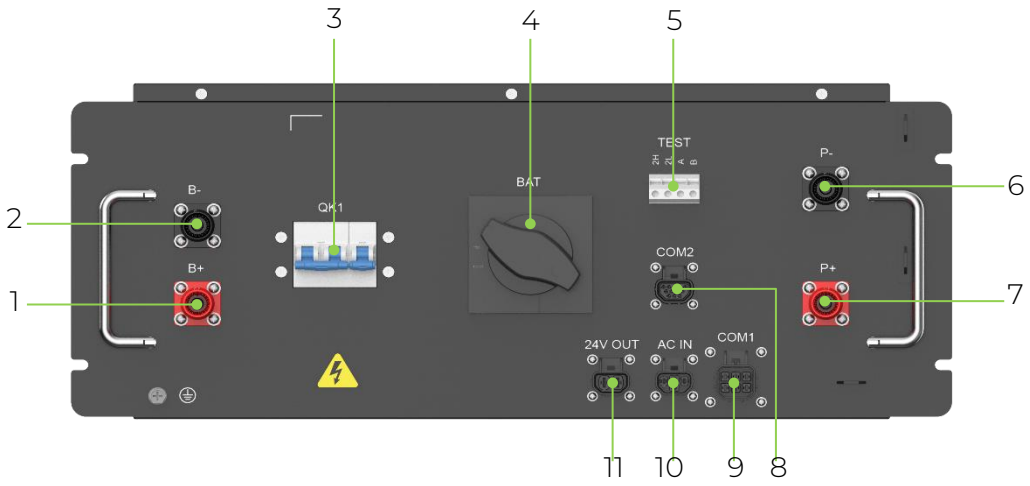


Figure 3-12 BDU Port Diagram

Table 3-8 BDU Port Definition

No.	Label	Definition
1	B+	Battery cluster positive terminal input
2	B-	Battery cluster negative terminal input
3	QK1	Switching and protection of BDU DC auxiliary power supply circuit
4	BAT	Switching and protection of battery main circuit
5	TEST	Host computer debugging port
6	P-	Battery cluster negative terminal output
7	P+	Battery cluster positive terminal output

8	COM2	BMS communication/ control
9	COM1	PACK power/ communication
10	AC IN	AC auxiliary power input
11	24V OUT	System 24V auxiliary power output

3.8.5. MPPT

Supports MPPT mode for connecting photovoltaic panels to achieve maximum power tracking or connecting to AC/DC to supply power to loads, thereby improving the conversion efficiency of photovoltaic panels. This module features protection functions such as overcurrent protection, overtemperature protection, low-voltage side overvoltage/undervoltage protection, high-voltage side overvoltage/undervoltage protection, overpower protection, low-voltage side short-circuit protection, and reverse connection protection. The DC input voltage on the photovoltaic side must exceed the highest voltage of the battery system, meaning the MPPT module connects the battery to the low-voltage side and the photovoltaic panels to the high-voltage side.
The MPPT module is an optional component in this system, with a rated output power of 50 kW. The system can be configured with up to three modules, supporting the connection of 150 kW of DC photovoltaic energy.

Figure 3-13 MPPT Diagram

3.8.6. STS

The STS module is a static transfer switch designed to supply power to critical loads from the energy storage system in the event of a power outage or grid failure. It is a switch automatic transfer system based on power electronic devices such as thyristors, used to quickly transfer electrical power from one power source to another. It features intelligent switching, rapid response, redundant design, and easy maintenance.
This system's STS is an optional module and is not included in the grid-connected version.

Figure 3-14 STS Diagram

3.8.7. Security & Fire Protection System

This system is equipped with an efficient and reliable security system and fire protection system, capable of providing intrusion protection, emergency response, fire prevention, and effective fire extinguishing for the equipment.

Security Protection System

- GPS: Positioning system installed to reduce the risk of theft.
- Limit switch: Limit switches are installed in the battery compartment and electrical compartment to prevent the door from being opened accidentally during normal operation. They can detect whether the door is closed tightly to prevent rainwater from entering.
- Water detector: A water detector is installed at the bottom of the electrical compartment. When water is detected in the cabinet, the EMS will report a water immersion fault and the system will shut down.

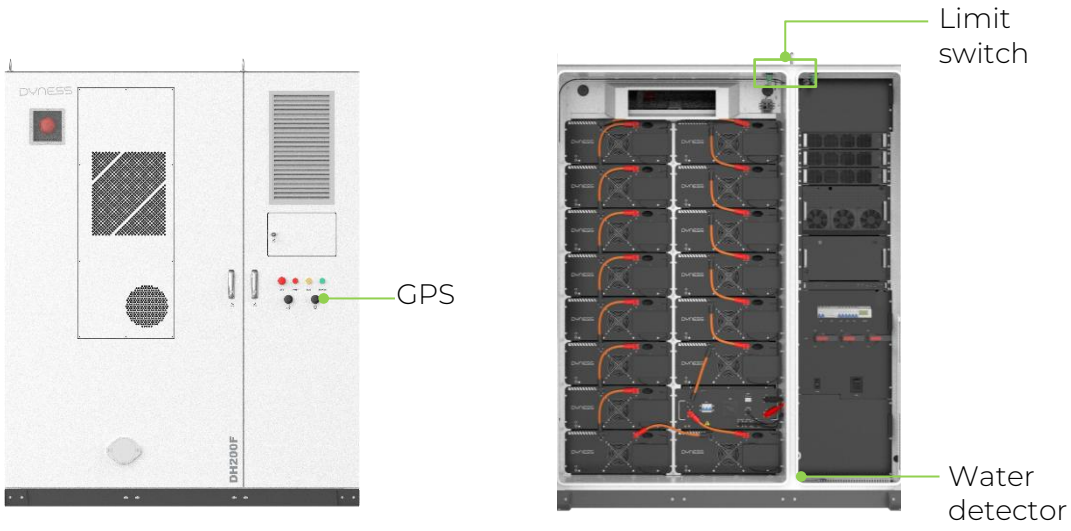
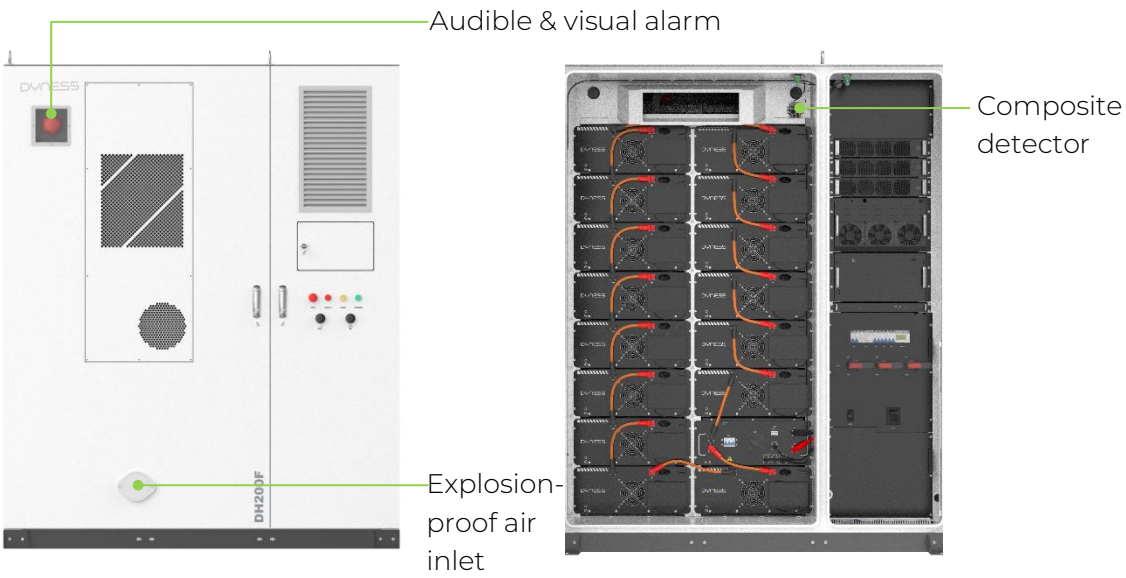


Figure 3-15 Security Protection System Diagram

Fire Protection System

- **Audible and visual alarm:** When a fire alarm is triggered, the audible and visual alarm will emit a high-decibel sound and high-frequency flashing red light.
- **Explosion-proof ventilation system**: Linked with the fire detection system, when the CO gas concentration in the battery compartment reaches the set threshold, the explosion-proof intake and exhaust valves and explosion-proof exhaust fan will be activated. When the concentration is below the threshold, the explosion-proof intake and exhaust valves and explosion-proof exhaust fan will be deactivated.
- **Composite detector**: This system installs a composite detector on the top of the battery compartment, which simultaneously detects smoke, temperature, CO gas, VOC, and other parameters, and transmits real-time data to the EMS.
- **Aerosol**: The aerosol system has two activation methods: temperature-activated and electrically activated. The temperature-activated method triggers the aerosol spray when the temperature inside the battery compartment rapidly rises to approximately 185°C or open flames are detected, causing the thermosensitive wire to ignite. The electrically activated method triggers the aerosol system when the composite detector in the protected area detects a fire, causing the EMS to immediately send an electrical activation signal to the aerosol system and provide a 24V power supply for electrical activation.
- **Water fire suppression**: When the fire spreads, large-area water spraying is used to cool down the area, preventing thermal runaway from spreading to the entire battery compartment. (If there is still a fire in the battery compartment after the aerosol fire suppression system has been discharged, the water sprinkler system can be manually activated to continuously cool down the out-of-control battery compartment.)



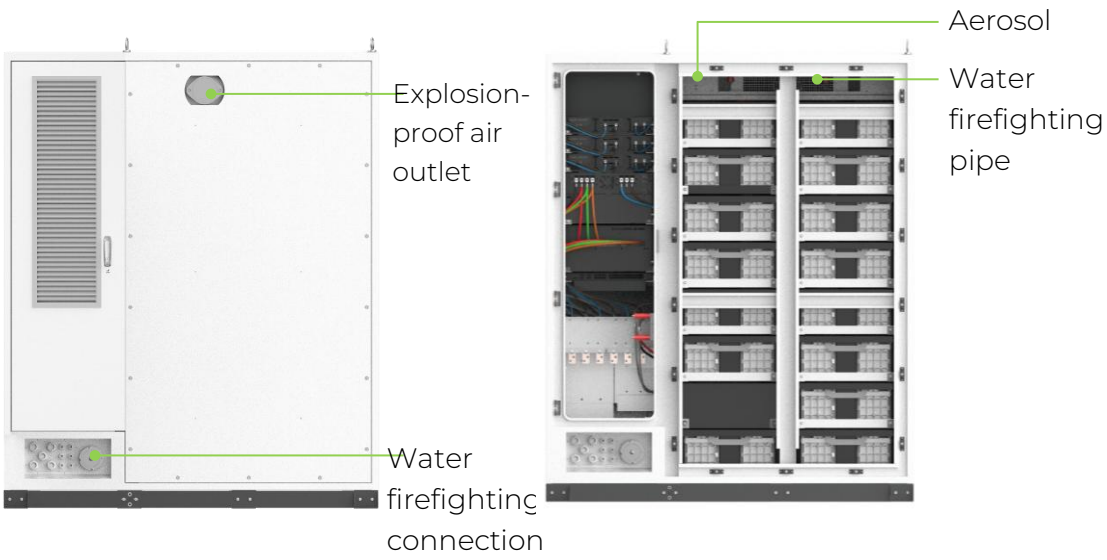


Figure 3-16 Fire Protection System Diagram

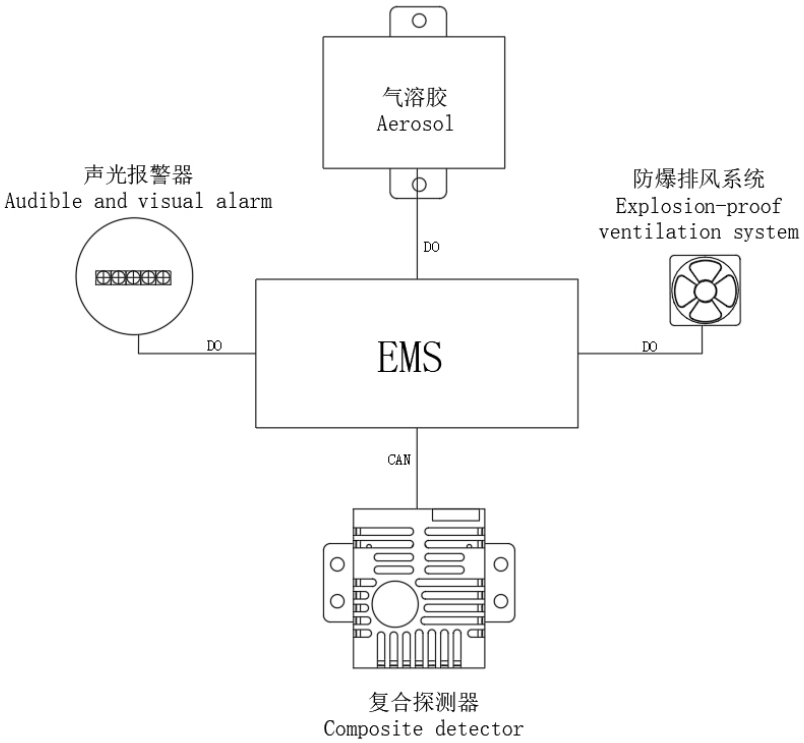


Figure 3-17 Fire Protection Schematic Diagram

The maintenance of the fire protection system should comply with the fire codes and regulations of the country/region where the project is located.

Fire protection equipment should be inspected and maintained regularly to ensure that all functional indicators are normal.

3.8.8. Air Conditioner

This system is an air-cooled system equipped with one industrial air conditioner

with a cooling capacity of 3 kW and a heating capacity of 1.5 kW.

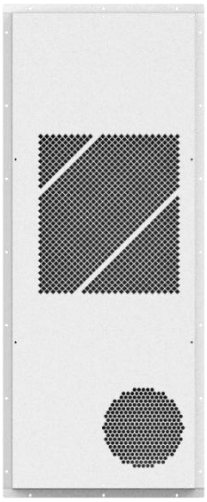


Figure 3-18 Air Conditioner Diagram

4. Delivery and Transportation Storage

Caution: Failure to transport and store in accordance with the requirements of this manual may void the warranty.

4.1. Unpacking And Checking

- After receiving the product, please check whether all the delivered components are complete against the “supply list”;
- Please check whether the actual received cabinet and the received product mode is the same as the ordered model;
- Carefully check whether the product is in good condition, the transportation process may lead to damage due to transportation collision, if any problem is found, please contact Dyness or the transportation company in time.

Shipping Requirement

- All necessary equipment in the product have been installed and fixed in the cabinet before leaving the factory, and the product can be transported as a whole during transportation.
- Please confirm that the cabinet doors of the equipment are tightly locked before transportation.
- The transportation of a single ESS cabinet requires wooden box Packaging, reserve buffer between the wooden box and ESS cabinet.
- Be sure to set up warning signs or caution tape to prevent unauthorized personnel from entering the lifting and transportation area to avoid accidents.
- Remove any existing or potential obstacles during the moving process, such as trees, cables, etc.
- Whenever possible, choose favorable weather conditions for transporting the equipment.

Requirements For Equipment Transportation Mobility

- Select a suitable crane or lifting tool according to the site conditions. The selected tool must have sufficient load-bearing capacity, arm length, and rotation radius.
- If movement on slopes or similar conditions is required, additional traction devices may be necessary.
- When carrying out ground transportation, be sure to use ropes to secure the top lifting ring of the equipment to the transport vehicle to prevent.

4.2. Lifting Transportation

- This product is equipped with a lifting ring at the top for lifting, and can be transported by lifting. The following requirements must be met when lifting the products:
- Ensure site safety when lifting;
- When lifting and installing, professional personnel should be in charge of the whole process;
- The strength of the slings should be able to withstand the weight of the

equipment;

- Ensure that all sling connections are safe and reliable, and ensure that each section of the sling connected to the corner piece is of equal length;
- The length of the slings can be adjusted appropriately according to the actual requirements of the site;
- Make sure that the equipment remains stable and does not tilt during lifting process;
- The equipment shall be suspended after being lifted from the ground by 300mm, and check that the lifting device is firmly connected before lifting.
- Take all necessary auxiliary measures to ensure safety.

Caution: The hanging rings need to be installed on site, please ensure that the hanging ring bolts are tightened before lifting.

Figure 4-1 Lifting and Transportation Diagram

4.3. Forklift Transportation

The bottom of this product is equipped with fork holes specially designed for forklift transportation. The product can be moved through the bottom fork holes on the front and back. If the installation site is flat, the product can be moved using a forklift. Forklift transportation methods should meet the following requirements:

- The forklift should be equipped with sufficient load capacity;
- The length of the pins should meet the requirements of the equipment;
- The pins should be inserted into the fork holes at the bottom of the workstation;
- Moving and lowering should be slow and steady during forklift transportation;

- Products should only be placed on stable surfaces. The area should be well-drained, free of any obstacles or protrusions;
- Under no circumstances should the unit be moved by inserting the pins into a position other than the fork holes.

Correct Shipping Method:

False Shipping Method:

Figure 4-2 Forklift Transportation Diagram

4.4. Storage Requirement

Storage Environment Requirements

- The product should be stored on dry, flat (flatness should be no more than 5mm), solid ground with sufficient load-bearing capacity and without any vegetation cover;
- To prevent condensation inside the product or soaking of the bottom of the product during the rainy season, the product should be stored on higher ground.
- The basement must be raised, and the specific elevation height should be determined according to the site geology, meteorological conditions and other conditions.
- Storage environment temperature: 0~+35℃, humidity: 0~95%(no condensation).
- Pay attention to cope with the harsh environment around, such as sudden cold, sudden heat, collision, etc., so as not to cause damage to the PACK.

Storage operation requirements

- Packing boxes should not be tilted or inverted.
- Make sure that the cabinet doors are securely locked before storage.
- Effectively protect the product's air inlet/outlet to prevent rainwater, sand, and dust from entering the interior of the cabinet.
- Due to the capacity decay that occurs during long-term storage, it is not recommended to store batteries exceeding six months.
- For products stored for a long period (more than six months), inspecting visually before installation to ensure there is no condensation and verify if the equipment is intact. Additionally, checking after powering on.

NOTE

Starting from the date of delivery, perform one charge and discharge cycle for the PACK every 6 months, to maintain the system SOC of 25~40%.

5. Installation and Use

Only qualified electrical engineers may perform electrical connection-related work. Please comply with all requirements specified in the “Safety Precautions” section of this manual. The Company shall not be liable for any personal injury or property damage resulting from failure to observe the safety precautions.

DANGER

- Do not touch the live parts!
- Ensure both AC and DC sides are not energized before installation. All electrical connections must be operated under de-energized condition;
- Check the polarity of all input cables to ensure that each input polarity is correct before wiring;
- Do not place the equipment on surfaces that are flammable.

WARNING

- The ingress of sand and moisture may damage the electrical equipment inside the ESS cabinet or affect the performance of the equipment!
- During sandstorm seasons or when the relative environmental humidity exceeds 95%, electrical connection work should be avoided.
- Wait until there are no sandstorms and the weather is clear and dry before starting any connection work.
- Avoid pulling or tugging on cables or wires forcefully to prevent damage to their insulation performance during electrical installation.

CAUTION

- All cables and wires should be ensured to have a certain amount of bending space.
- Necessary auxiliary measures should be taken to reduce the stress on cables or wires.
- After completing each step of the wiring operation, careful inspection is required to ensure correct and secure connections.
- All electrical connections must be strictly in accordance with the wiring diagram.

5.1. Installation Environmental Requirements

Site Requirements

- When selecting the installation site, full consideration should be given to the surrounding environment (climate and geological conditions, such as stress wave emission, underground water level, no high cables in the vertical upper part of the installation site, no pipelines or other underground facilities in the lower part of the installation site, and a certain safety distance should be maintained between the equipment and buildings and people, the length of the distance should be subject to the fire safety regulations of the project).
- The surrounding environment should be dry and well ventilated.
- Please ensure that there are no trees around the installation location to prevent branches or leaves from blocking the doors or air inlets of the energy storage integrated system during strong winds.
- The installation location should be away from toxic and harmful gas and flammable, explosive, corrosive, and dust-intensive materials.
- The installation location should be away from residential areas to avoid noise.

Foundation Requirements

- The foundation must provide sufficient load-bearing support for the equipment, with a bearing capacity of >3t/m², a service life of >50 years, and a level of <3mm/m².
- The height of the base must be greater than the highest historical flood level.
- Drainage facilities should be constructed in accordance with local geological conditions and municipal drainage requirements to ensure that no water accumulates at the base of the equipment. The foundation construction should meet the local maximum rainfall drainage requirements, and the discharged water should be treated in accordance with local laws and regulations.
- The equipment supports both bottom-mounted and rear-mounted wiring solutions. Users can select the appropriate foundation solution based on their actual needs:

  ① **Option 1** (bottom cable outlet): The height of the equipment foundation must be ≥300mm. When constructing the equipment foundation, the cable outlet of the energy storage system must be taken into consideration, and a trench or inlet hole must be reserved for the cable to enter and exit from the bottom of the equipment.

  ② **Option 2** (rear cable outlet): The energy storage system is placed flat on the surface of the equipment foundation, and the cable enters and exits from the rear of the equipment.

5.2. Installation Spatial Requirements

The product uses front and rear ventilation. To ensure better heat dissipation

and maintenance of the equipment, it is recommended to leave sufficient space in front of and behind the cabinet:

- The space reservation distance in front of the product is not less than 1800mm.
- The space reservation distance at the rear of the product is not less than 700mm.
- The space reservation distance of the left part of the product is not less than 1000mm.
- The space reservation distance of the right part of the product is not less than 500mm.
- The product supports side-by-side installation, with a minimum space of 100 mm reserved between cabinets.

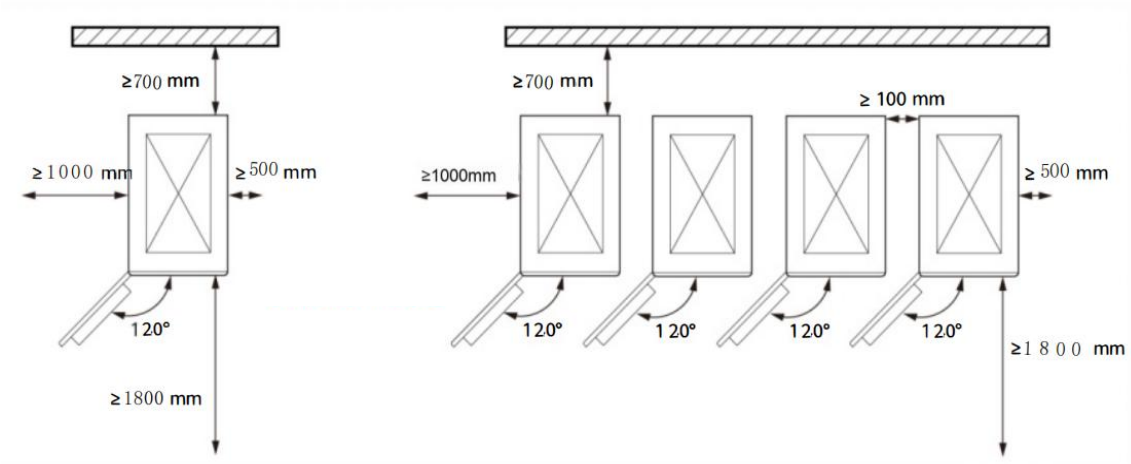


Figure 5-1 Product Installation Space Requirement

5.3. Fixed Installation

5.3.1. Check Before Installation

WARNING

Please comply with local safety regulations and operational rules during installation.

Only complete and undamaged equipment can be installed! Please ensure that before installation:

- The product cabinet itself should be complete and intact.
- All equipment in the cabinet should be complete and intact.

5.3.2. Angle Steel Fixed Installation

After transporting the outdoor cabinet to the installation location, it must be secured in place. The product cabinet base has four L-shaped angle iron mounting brackets reserved at the front and rear, as shown in the figure below.

Figure 5-2 Angle Steel Fixing Diagram

Angle steel fixing tool

The following tools may be required for installing the bracket: marker pen, electric drill, angle steel, M12 expansion bolts;

Tools are not included in the scope of supply and must be provided by the customer.

Steps for fixing angle steel

① Use a marker pen to mark the drilling positions.

② Choose an electric drill with a diameter matching the bolt's outer diameter, drill holes according to the bolt's length (hole depth slightly greater than the bolt length) until reaching the desired depth for installation.

③ Insert the bolt and expansion sleeve into the hole, tighten the nut to the end of the bolt, and use a wrench to tighten it.

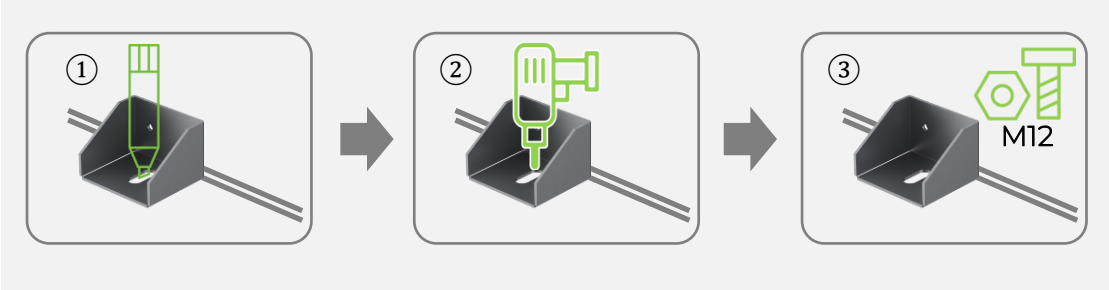


Figure 5-3 Angle Steel Fixing Steps

5.3.3. Grounding Installation

Grounding methods must comply with local regulations at the installation site. Please consider the actual site conditions and follow the instructions of power plant staff when installing external grounding.

① Reserve grounding points, which can be implemented using cables or flat steel grounding;

② Use 1 AWG grounding cables. Refer to Section 6.3 “Cable Specification Requirements” of this chapter for grounding cables and terminals;

③ The upper figure shows grid grounding, and the lower figure shows equipment protective grounding.

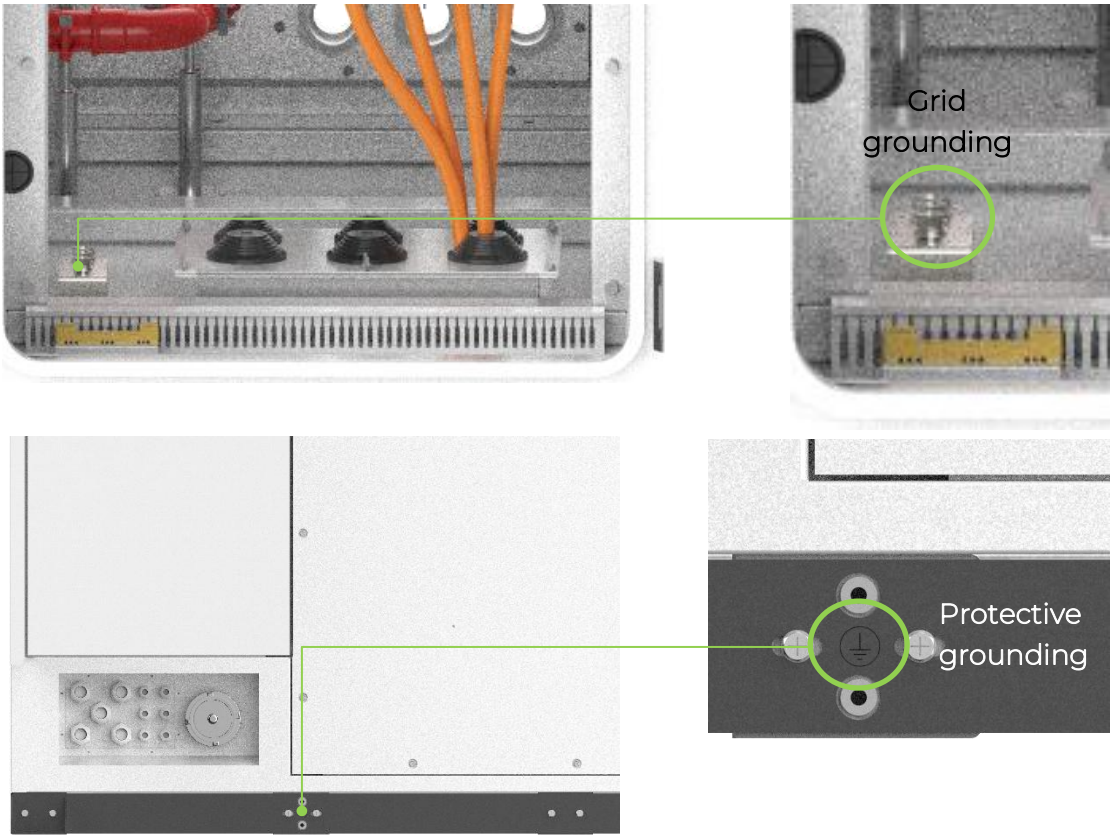


Figure 5-4 Equipment Grounding Diagram

After the grounding connection, the grounding resistance must be measured, and the specific grounding resistance value must comply with relevant region/local standards and regulations.

5.3.4. Door Operating Procedures

The product cabinet door can only be opened after the product has been securely installed. The steps for opening the cabinet door are as follows:

① Make sure that the equipment is under lock state.

② Moving the lid up above the locking hole.

③ Getting the key in the door and revolve it clockwise.

④ Rotating the handle clockwise to the position shown in the figure to open the door.

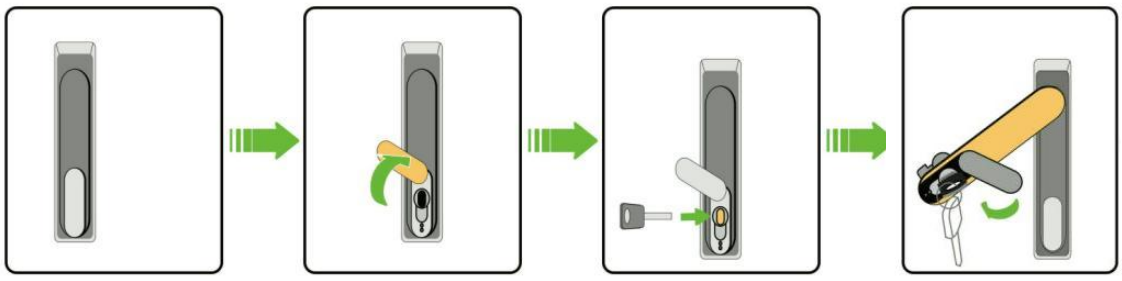


Figure 5-5 Door Open Steps

To close the cabinet door, please refer to the above opening steps (in reverse order) and pay attention to the following warning information!

WARNING

- Before closing the cabinet door, please ensure that there are no foreign objects obstructing it!
- When closing the cabinet door, ensure that both the top and bottom ends are fully closed, otherwise there is a risk of water leakage and rusting inside the cabinet.

6. Wiring Requirements

6.1. Wiring Tools

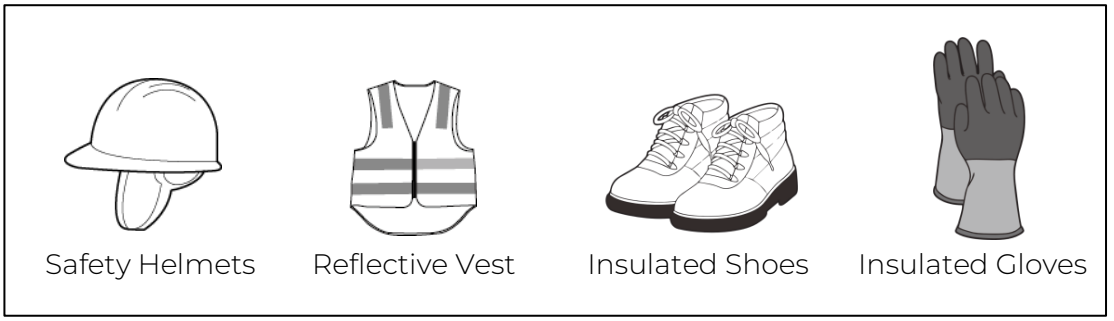


Figure 6-1 Safety Gear

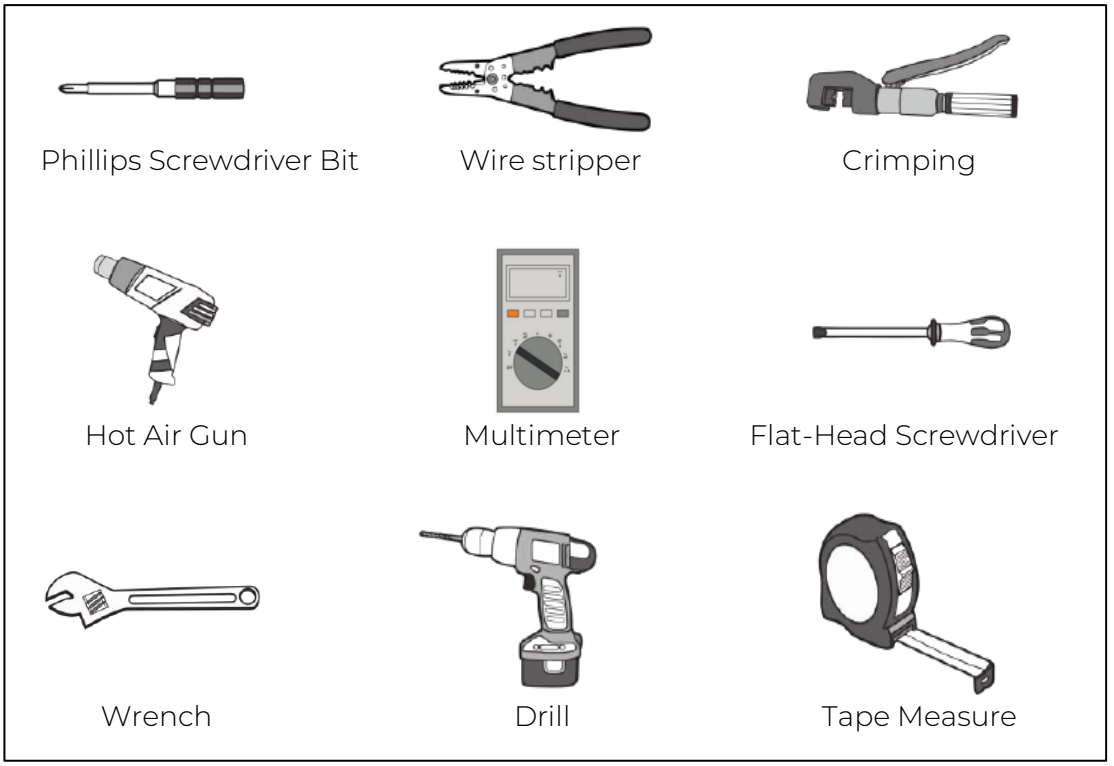


Figure 6-2 Tools

6.2. Wiring Requirements

- Based on the location and dimensions of the cable entry and exit points at the bottom of the product cabinet, sufficient space must be reserved for the AC-side cable tray during foundation construction, and cable conduits must be pre-embedded.
- Determine the specifications and quantity of perforated pipes based on the cable type and the number of incoming and outgoing cables.
- Both ends of all embedded pipes are temporarily sealed to prevent debris from entering and causing inconvenience during subsequent wiring.
- After connecting all cables, the cable entry and exit points, as well as the joints, are sealed with fire-resistant mortar or other suitable materials to prevent rodents from entering.

WARNING

- After completing the wiring, all wiring entry and exit points must be sealed!

6.3. Cable Requirements

- The conductor must have sufficient current-carrying capacity, which includes but is not limited to: environmental conditions, conductor insulation material type, cable laying method, cable material, and cross-sectional area;
- The cable diameter must be selected according to the maximum current-carrying capacity, and the length must allow for a margin;
- The specifications and materials of three-phase AC output cables must be consistent;
- Flame-retardant cables must be selected;
- The cables used must comply with local laws and regulations.

Please note: Pay attention to torque during installation. The following accessories, including power cables, control cables, terminals, transformers, etc., are to be provided by the customer.

Table 6-1 Wiring Accessories List

No.	Type	Specifications	Terminal Model	Torque
1	Power cable(On-grid)	Outdoor single-core copper cable 1/0AWG	DT/SC 50-8	12N.m
2	Power cable(On&Off-grid)Gird port	Outdoor single-core copper cable 3/0AWG	DT/SC 95-10	20N.m
3	Power cable(On&Off-grid)Load port	Outdoor single-core copper cable 1/0AWG	DT/SC 50-8	12N.m
4	PV cable	Outdoor single-core copper cable 2AWG(50kW)	DT/SC 35-8	12N.m
5	Grounding cable	Outdoor single-core copper cable/yellow-green dual color 1AWG	DT/SC 50-8	12N.m
6	Grounding bar	40*4mm	/	/
7	RS485/CAN communication line	Two-core twisted pair shielded cable 20AWG	/	/
8	Ethernet communication line	Category 6A network cable	/	/
9	Voltage sampling line	UL1015 cable 16AWG	/	/
10	Current sampling line	UL1015cable 14AWG	/	/
11	Parallel line	Shielded twisted pair cable 20AWG	/	/

12	Primary meter	ADL400-C	/	/
13	Secondary meter	DTSD1352	/	/
14	Primary transformer	0~5000A/5A(The current value depends on the project)	/	/
15	Secondary transformer	0~5A/0~20mA	/	/

6.4. Terminal Wiring Method

OT/DT/SC terminals connection steps:

① Peel off the insulation skin from the cable terminal, and the length of which should be the depth of the wire hole on the copper terminal, plus an additional 2-3mm.

② Install the heat-shrink sleeve at the cable terminal and insert the exposed copper core part of the stripped wire into the wire hole of the copper terminal (OT/DT terminal).

③ Use hydraulic pliers to firmly crimp the copper terminally.

④ Slide the heat-shrink tube onto the copper terminal (OT/DT terminal) to fully cover the wire hole. Use a heat gun to tighten the heat-shrink tube.

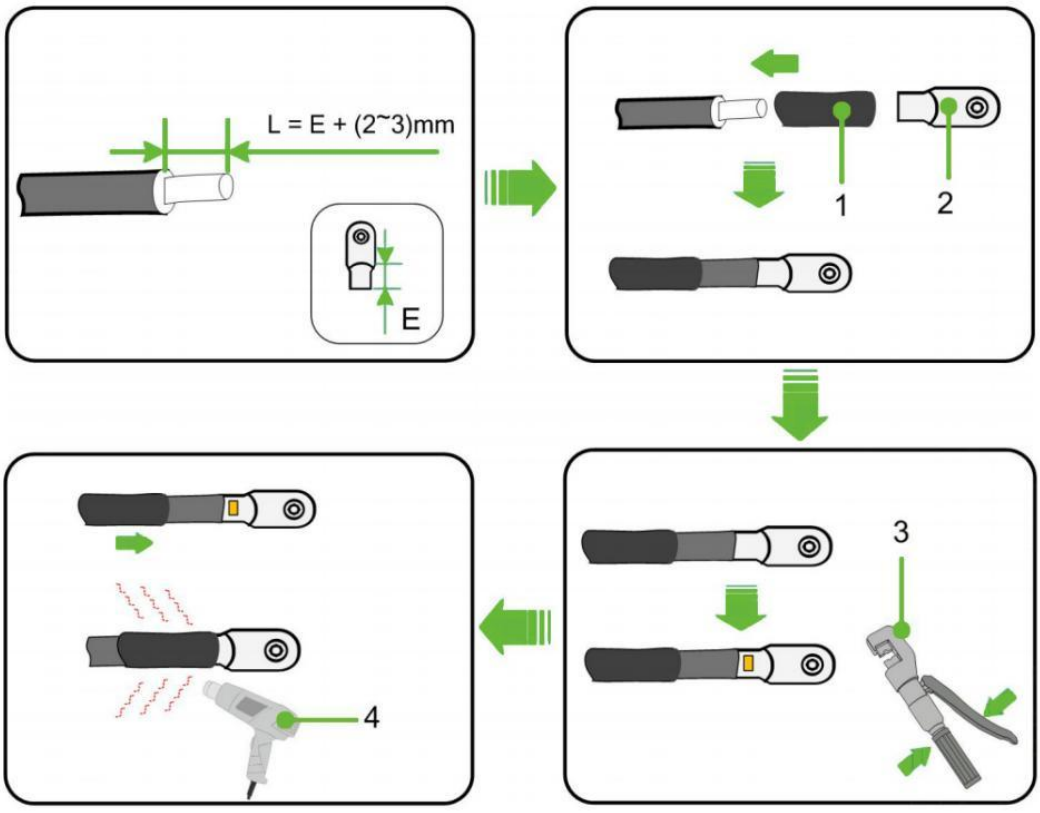


Figure 6-3 The Connection Sequence of Wiring Components

1:Heat-shrink tube, 2:OT/DT/SC terminal, 3:Crimping Pliers, 4:Hot air gun

6.5. Checking Before Wiring

Checking breakers

Please check whether the circuit breakers and other equipment in the following modules are in the OFF position:

① Check the GRID circuit breaker and LOAD circuit breaker (as shown in Figure 1);

② Check the PV1, PV2, and PV3 photovoltaic disconnect switches (as shown in Figure 2);

③ Check the secondary circuit breakers “QF1”, “QF2”, “QF3”, “QF4”, and “QF5” (as shown in Figure 3);

④ Check the BAT battery circuit breaker and QK1 circuit breaker on the battery compartment BDU (as shown in Figure 4).

Note: The FK1 surge protection switch must be in the closed position (as shown in Figure 5, located at the lower right of the electrical compartment; access requires opening the rear door for confirmation).

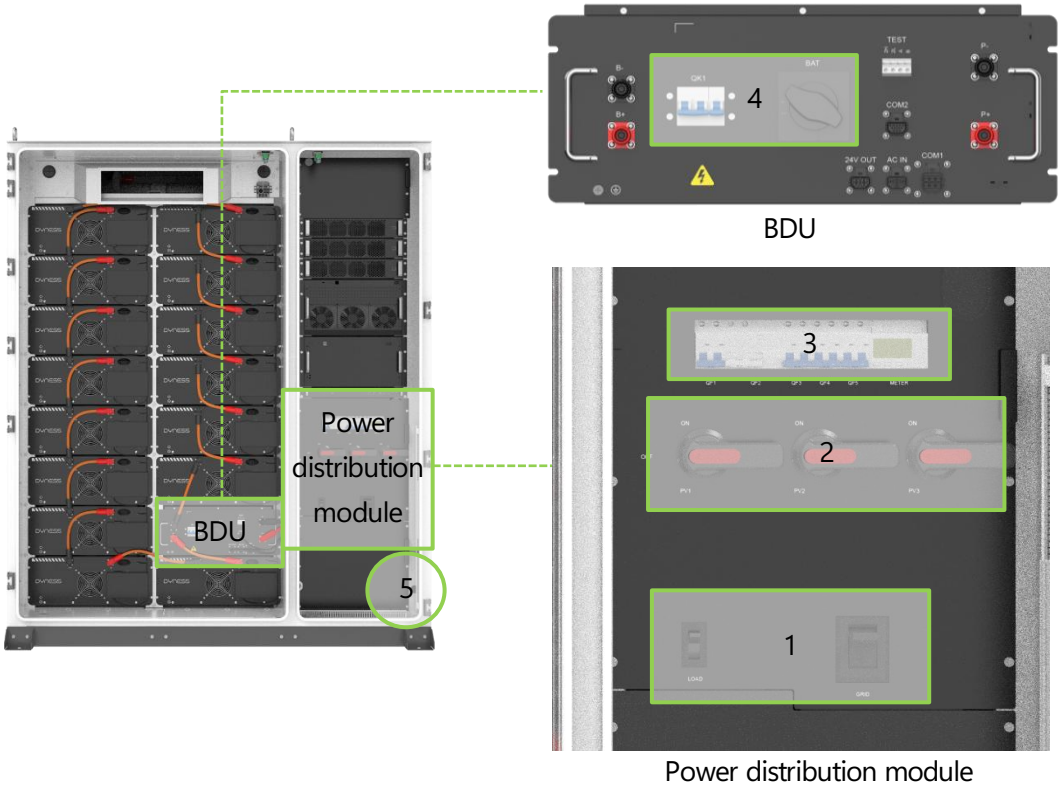


Figure 6-4 Breakers Location Diagram

1) Checking before wiring

Table 5-2 Checking List Before Wiring

No.	Checklist	Confirm
1	The cables and terminals used should meet the requirements of wire diameter and shielding	☐
2	The cable are labeled correctly.	☐

3	The related wiring accessories are ready.	☐
4	The wiring operator have worn protective devices.	☐
5	Checking if all the breakers are in disconnected position	☐

6.6. Wiring Diagram

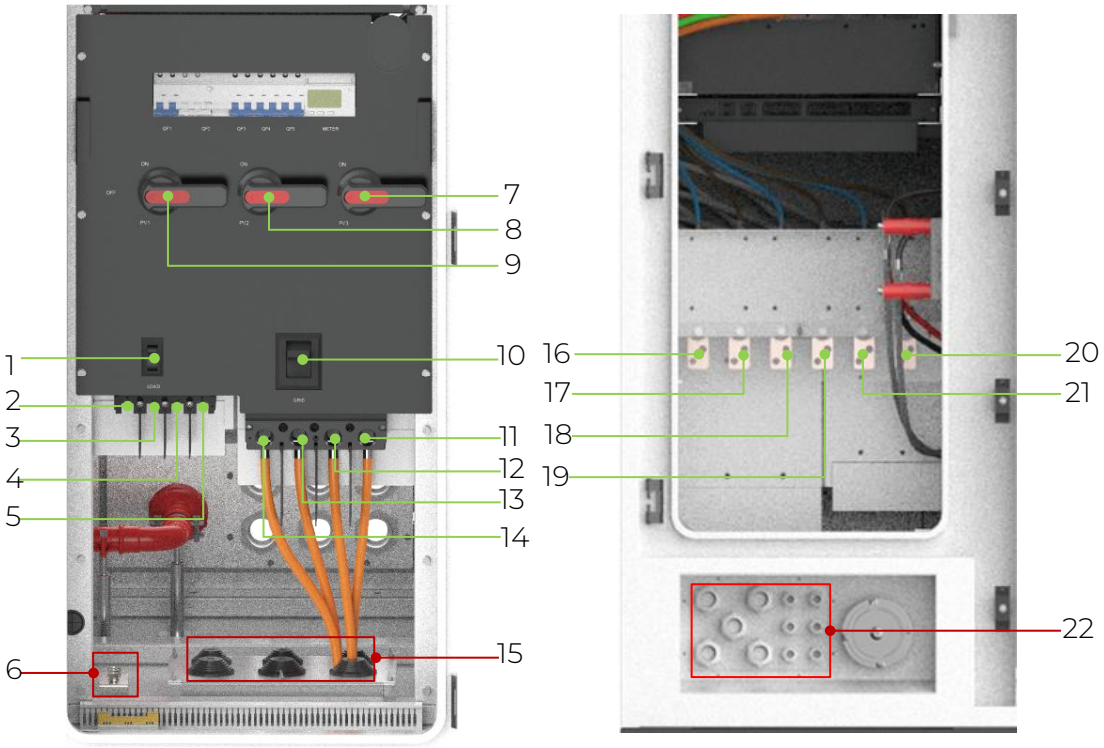


Figure 6-5 System Wiring Diagram

Table 6-3 System Wiring Function Definitions

No.	Port Function Definition	No.	Port Function Definition
1	Load-side breaker	12	Grid side phase line L3
2	Load-side phase line L1	13	Grid side phase line L2
3	Load-side phase line L2	14	Grid side phase line L1
4	Load-side phase line L3	15	Lower outlet hole
5	Load-side neutral line N	16	PV3 connected to negative terminal
6	Grounding busbar PE	17	PV3 connected to positive terminal
7	PV3 isolating switch	18	PV2 connected to negative terminal
8	PV2 isolating switch	19	PV2 connected to positive terminal
9	PV1 isolating switch	20	PV1 connected to positive terminal

10	Grid-side breaker	21	PV1 connected to negative terminal
11	Grid-side neutral line N	22	Rear outlet hole

Note: For specific wiring steps and methods, please refer to the *Quick Installation Manual*.

6.7. Checking After Wiring

After completing the wiring, in order to avoid damage to equipment and property loss, the following items must be rechecked and measured:

Table 6-4 Checklist Bfore Wring

NO.	Checklist	Confirm
1	Disconnect the battery switch and grid battery before measuring, please ensure the AC side and DC side of PCS ARE not energized.	☐
2	Please check if the negative and positive connection between battery-DC/DC-PCS, the AC phase of PCS are connected correct. Measure the resistance between the three phase, which should be in the MΩ level, if it is in kΩ level or smaller, please check the circuit.	☐
3	Check if External cables, PE cables and communication cables are well connected.	☐
4	The PE cable resistance should be less than 0.1Ω.	☐
5	Clean the installation area and ensure that there are no tools or other unrelevant objects left inside the ESS cabinet.	☐
6	Use fireproof and waterproof materials to tightly seal the openings and gaps around the ESS cabinet's entry and exit holes.	☐
7	Use fireproof and waterproof materials to tightly seal the cable entry holes and surrounding gaps of outdoor cabinets.	☐

7. HMI Operation

7.1. Main Features Overview

The HMI screen is the core interface for operators to interact with the system. It is designed to provide real-time monitoring, operational control, status diagnosis, and system configuration capabilities to ensure the safe, efficient, and stable operation of the system. It is divided into two main categories: automatic mode and remote mode.

7.1.1. Automatic Mode

In automatic mode, the system EMS can accept energy dispatching from the system HMI and Dyness cloud platform. Its main functions are as follows:

①Anti-backflow

For application where PV is not allowed to feed the grid, EMS will control PV output supply the load first, and store excess PV energy to ESS. When neither ESS nor loads can consume the excess PV energy, it will limit PV output to prevent PV feeding the gird.

②Transformer protection

Grid-side transformer protection enable, transformer protection power can be set, real-time detection of transformer-side power through the anti-reverse current meter, adjusting the charging and discharging power of the energy storage system, to avoid the transformer-side power exceeding the protection limit value.

③SOC settings

The SOC settings can be adjusted to balance system availability, maintain battery life, and increase battery safety.

④Generator settings

Supports connection to diesel generator equipment and allows for settings such as generator start-up, charging, SOC, and power limits.

⑤Reactive power compensation

Take technical measures to provide the required reactive power to the power grid or electrical equipment in order to maintain or improve system voltage levels, increase power factor, reduce line losses, optimize power grid operating efficiency, and improve power quality.

⑥Operating mode

The system provides four operating modes: Scheduled mode, Peak shaving, Self-consumption, and Battery priority, each of which executes different strategies:

a)Scheduled mode

By leveraging time-of-use electricity price differentials in the power market to "buy low and sell high", you can reduce electricity costs or increase revenue from electricity sales. Different time periods can be set based on different electricity pricing policies. The scheduling mode is divided into two types: "Any periods" and "48 periods":

- [Any periods]: Customize charging and discharging periods based on sharp,

peak, flat, and valley electricity prices;

- [48 periods]: Based on sharp, peak, flat, and valley electricity prices, charging and discharging settings are divided into a maximum of 48 time periods per day, with a minimum unit of half an hour.

b)Peak shaving

Based on user"s electricity consumption pattern, peak value and valley value are set to reduce peaks loads and fill in low-load valleys, so as to balance the power generation and consumption. The PV maximize its output under this mode, if the system enables anti-backflow function, then it will limit PV output when it triggers anti-backflow function.

- When P grid > P peak value, the ESS start discharging;
- When P grid < P valley value, the ESS start charging.

c)Self-Consumption

When the system is in self-consumption mode, photovoltaic power generation prioritizes meeting local real-time load demand, that is:

- When P_{PV} > P_{load}, excess energy is used to charge the ESS;
- When P_{PV} < P_{load}, the ESS discharges to the load to supplement the shortfall in PV power.

d)Battery priority

When the system is in battery priority mode, photovoltaic power generation prioritizes charging the battery, that is:

- When P_{DC} is high, PV energy is prioritized for charging the system battery, and excess energy is discharged to the AC side;
- When P_{DC} is insufficient, the system battery is charged by both PV and the power grid.

Table 7-1 Automatic Mode Settings Description

Item	Description
Anti-backflow	· Disable: the system has no limitation over PV output; · Enable: the system enables anti-backlow function to prevent PV output feed back to the grid.
Grid-side transformer powerprotect	If the load power exceeds the set demand power even with PV maximum output, the EMS will control the ESS system to discharge to reduce the excess power beyond the set demand power. · Disable: the system has no transformer protection control; · Enable: the system enables transformer protection function, and protect power limit value need to be set.
SOC settings	Perform SOC-related settings such as off-grid cutoff and PV inverter settings. Set SOC protection: · Disable: Do not use SOC protection. · Enable: Turn on SOC protection and set the maximum and minimum SOC limits.

Generator settings	After connecting the generator, control the generator charging status. Generator charging settings: · Off: Do not use the generator. · On: Set the generator operating conditions, such as SOC, power, and whether to start and stop automatically.
Reactive power compensation	Set system reactive compensation function. · Disable: the system won"t compensate reactive power; · Enable: the system compensate reactive power.
Operating mode	· Scheduled mode: Scheduled mode (time segment) can be set. · Peak shaving: Sharp Peak power and Flat Valley power can be set. · Self-consumption: No setup required, PV supplies the load first, and when PV is insufficient, the battery supplements it, followed by power from the grid. · Battery priority: Hold SOC can be set, and it'll charge when the SOC drops below that level, but it won't charge if it's above that level.

7.1.2. Remote Mode

In remote mode, the system only accepts remote dispatch commands from external third-party EMS. Third-party EMS can control the system through this product's EMS.

7.2. Operation System Overview

The product is equipped with a 7-inch HMI screen, which allows users to view the operating information of each module of the system and configure system parameters. The following is a display and introduction of the HMI screen's main page:

- Dashboard: Display the details of system access device;
- Data: Query the detailed data, alarm information, version information of each sub-module of the system;
- Setting: Setting the related system parameters (please notice the user could only change the EMS parameters);
- Login: The permission for login the system.

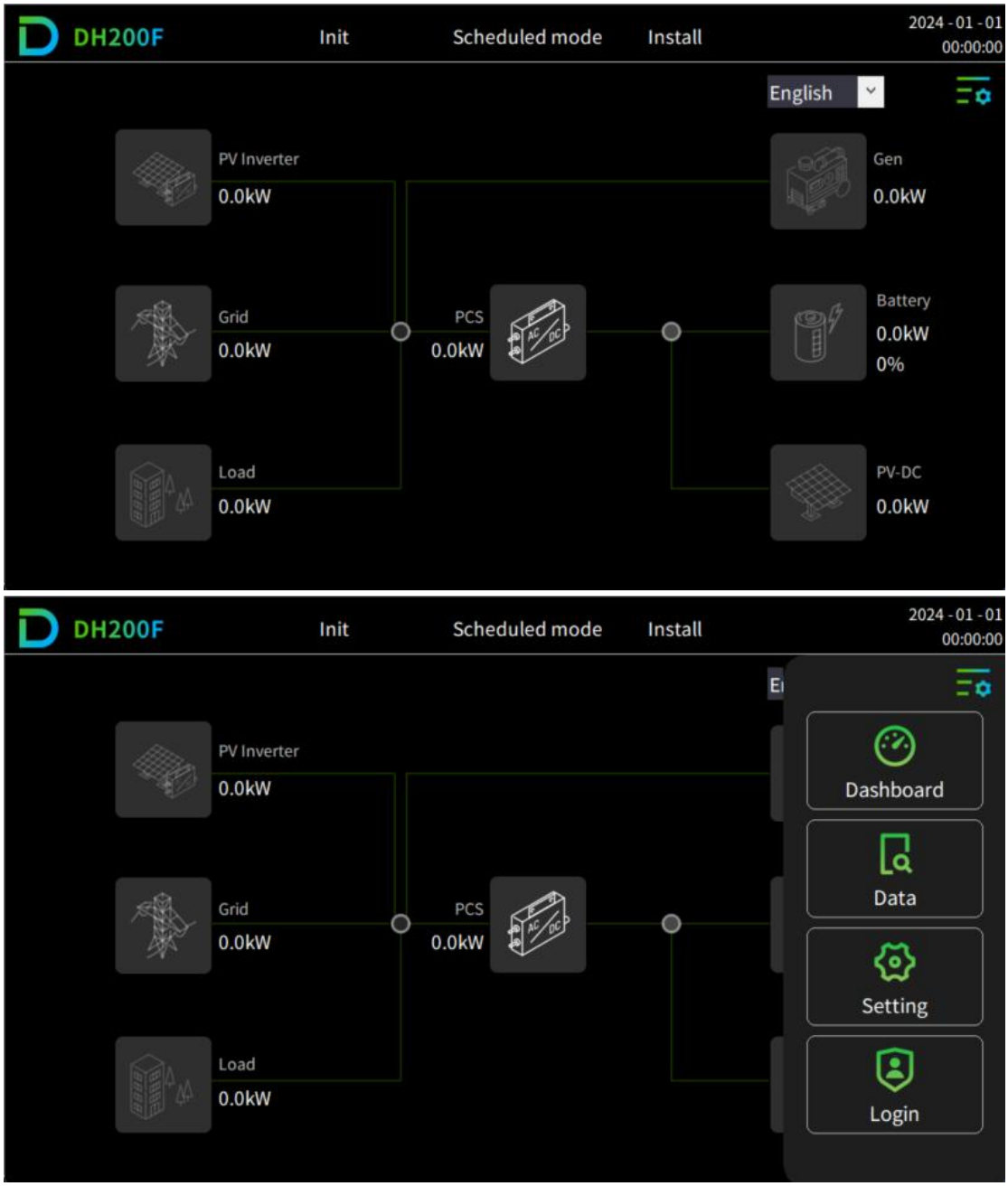


Figure 7-1 HMI Main Interface (Total 2 pages)

Note: The image is for reference only. The actual interface may differ. Please refer to the actual interface for details.

Table 7-1 HMI Interface Overview

Main window	Main menu	Level 1 sub-menu	Level 2 sub-menu	Level 3 sub-menu
Main interface	Dashboard	Grid		
		PCS		
		Battery		
		Load		
		PV-DC		
		PV Inverter		

		Gen		
	Data	EMS	Status	
			Parallel	
			INV/CHG data	
			S-P-F-V data	
		PCS data	PCS data	
		MPPT data	MPPT1	
			MPPT2	
			MPPT3	
		BMS data	Basic	
			Volt	
			Temp	
			Alarm	
		Sys data	Meter	
			FFS	
			Air-Cond	
			STS	Basic
				Alarm
		Alarm Info		
		Version Info		
	Setting	EMS	Runset	Automatic mode
				Remote mode
			SysSet	Basic Set
				Network
				Regain
	Login	Account		
		Security&Password		

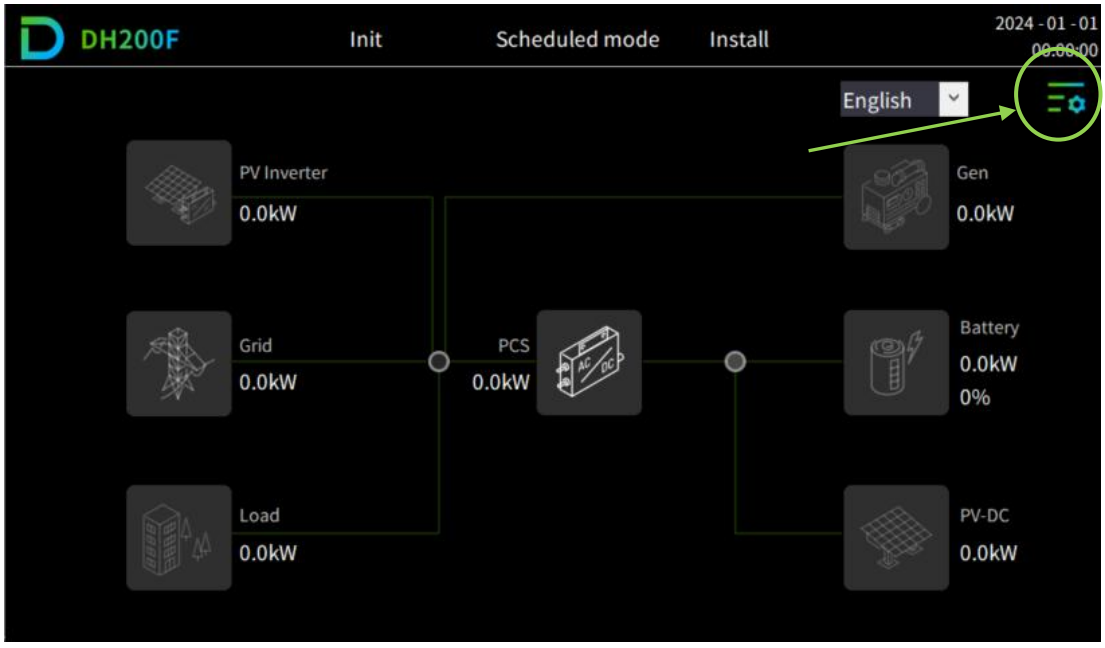
Please notice: the HMI interface may vary with version update, the images in this chapter is only for reference.

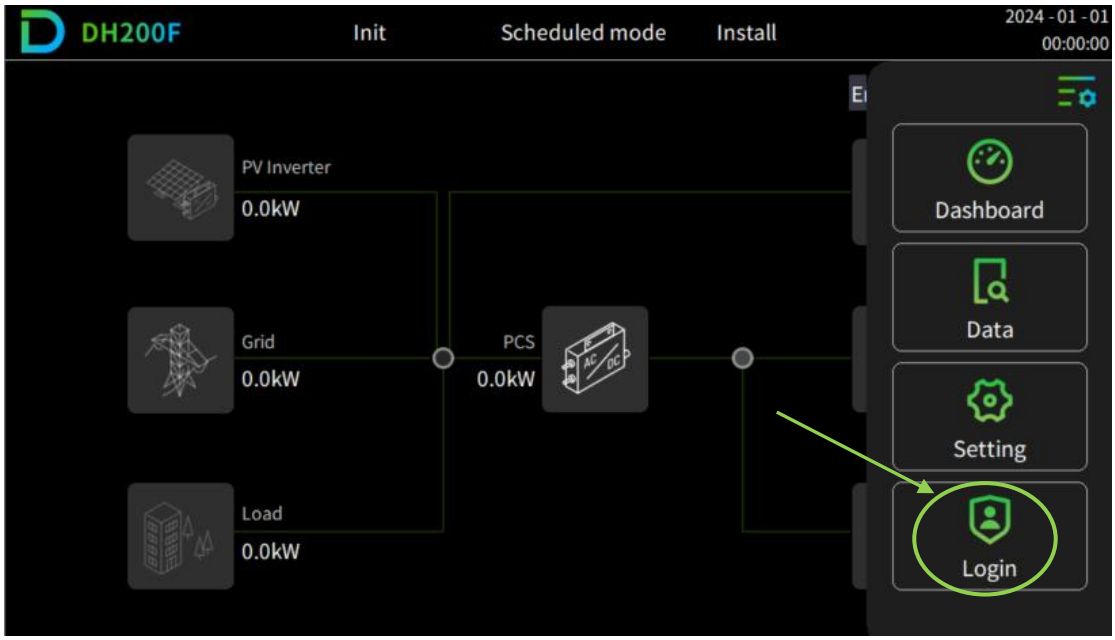
7.3. Operating Instructions

7.3.1. User Login

- Step 1: Click main menu icon  on the upper right corner of the main interface;
- Step 2: Click **"Login"** to enter the user interface under the main menu bar;
- Step 3: Select **"Install"**, input password(1111), click **"Login"**;
- Step 4: Click **"Confirm"** in the prompt popup.

——END





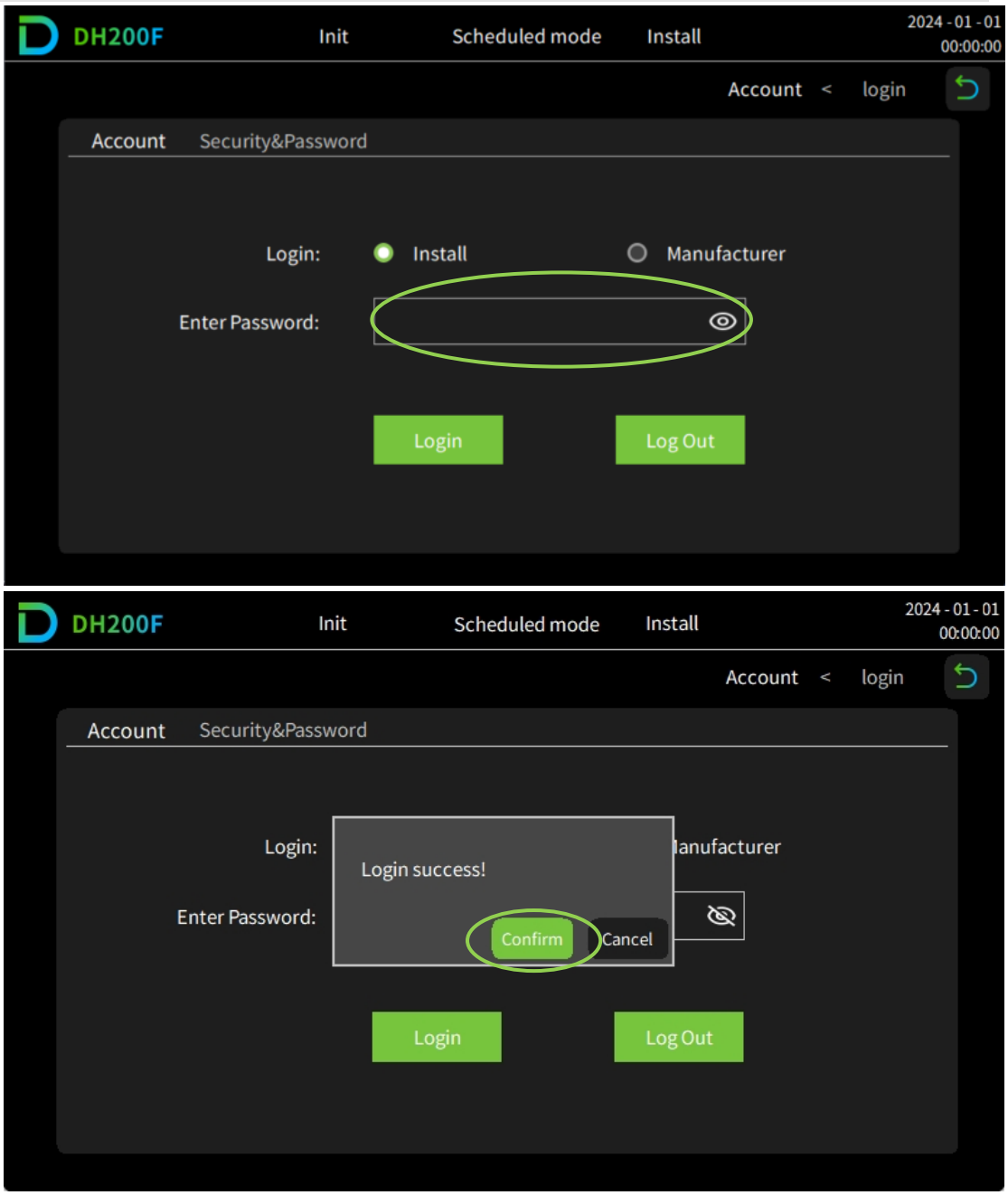


Figure 7-2 User Login Diagram (Total 4 pages)

7.3.2. Password Change

- Step 1: Login the **"Install"** (7.3.1 "User Login" for reference);
- Step 2: Click **"Security&Password"** at the upper left of navigation bar;
- Step 3: Input old password and new password, complete the setting, then click **"Confirm Modification"**.

——END

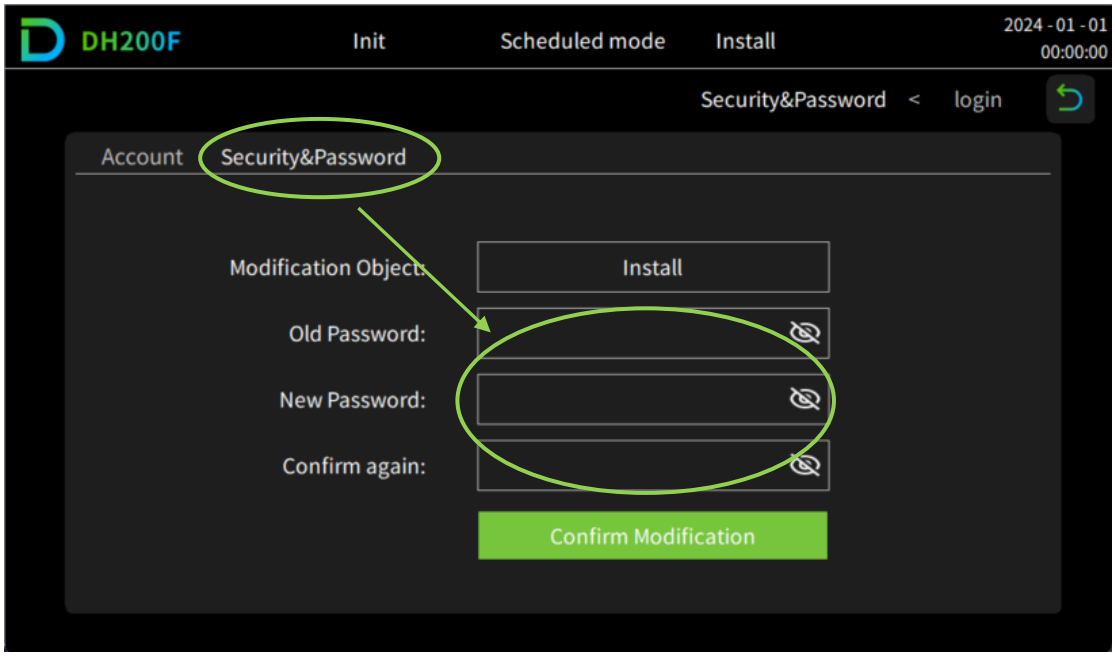


Figure 7-3 Password Change Diagram

7.3.3. Running Information

- Step 1: Click main menu icon on the upper right corner of the main interface;
- Step 2: Click "Dashboard" under main menu bar;
- Step 3: Select corresponding sub-menu as needed.

——END

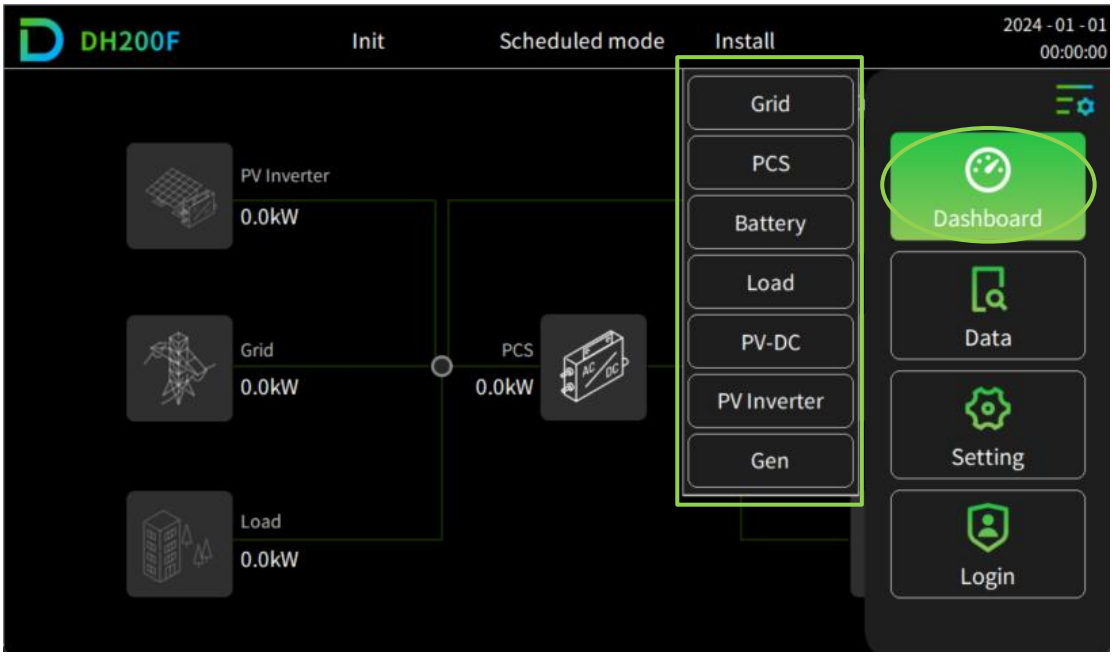


Figure 7-4 Running Information Diagram

7.3.4. Query Data

- Step 1: Click main menu icon on the upper right corner of the main interface;
- Step 2: Click **"Data"** under main menu bar;
- Step 3: Select corresponding sub-menu as needed.

——END

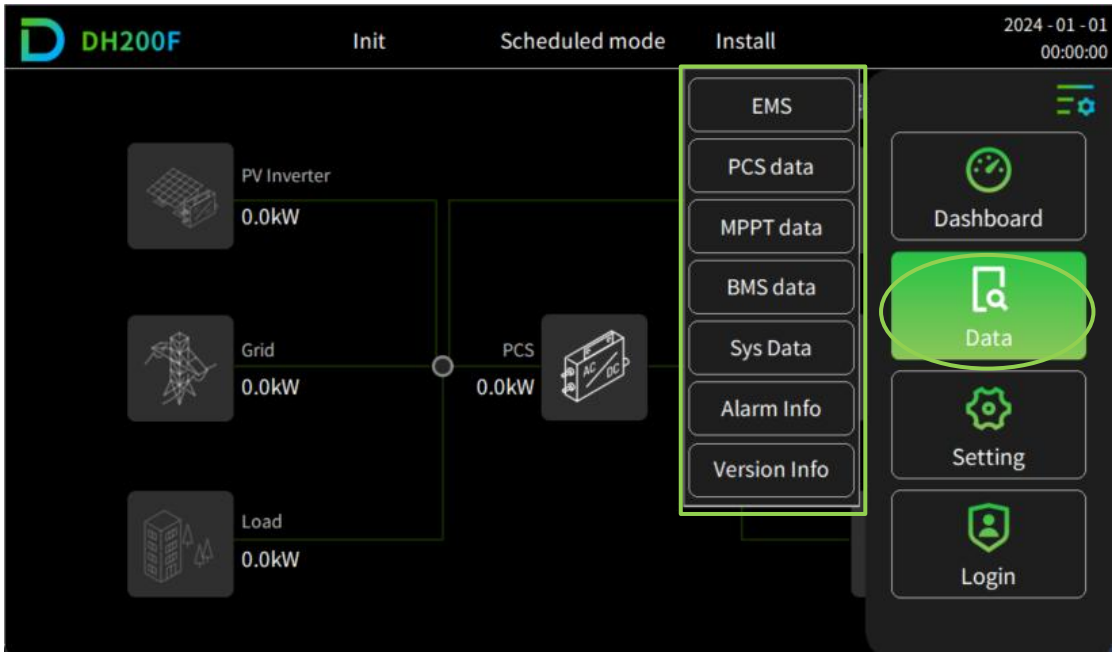


Figure 7-5 Query Data Diagram

7.3.5. Setting (Network IP settings)

System settings

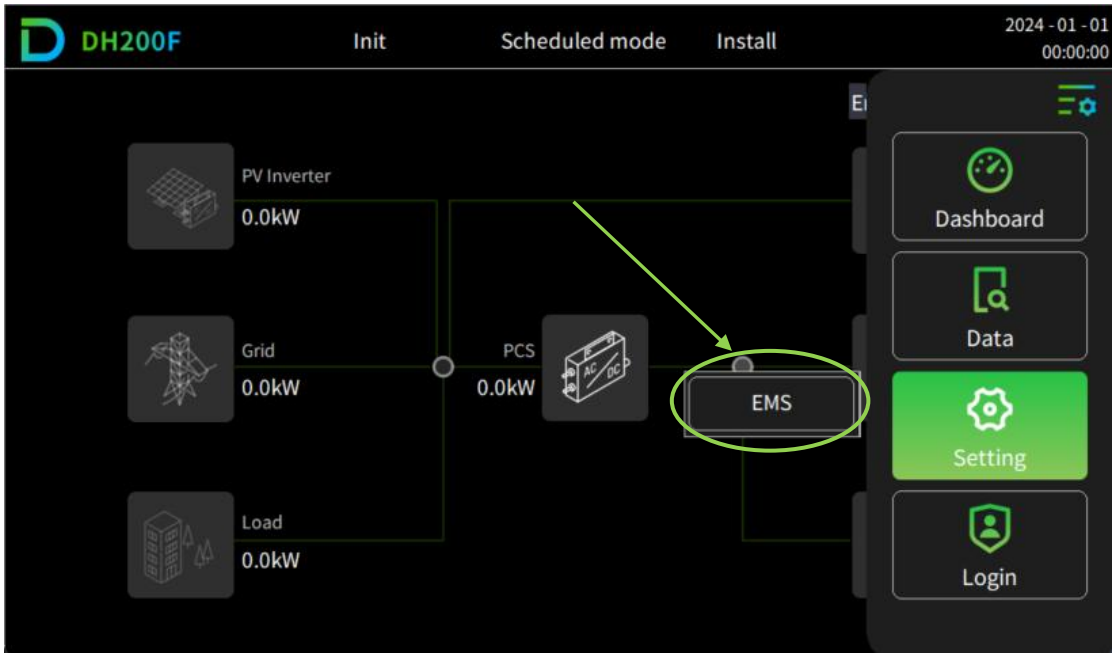
Step 1: Click main menu icon on the upper right corner of the main interface;

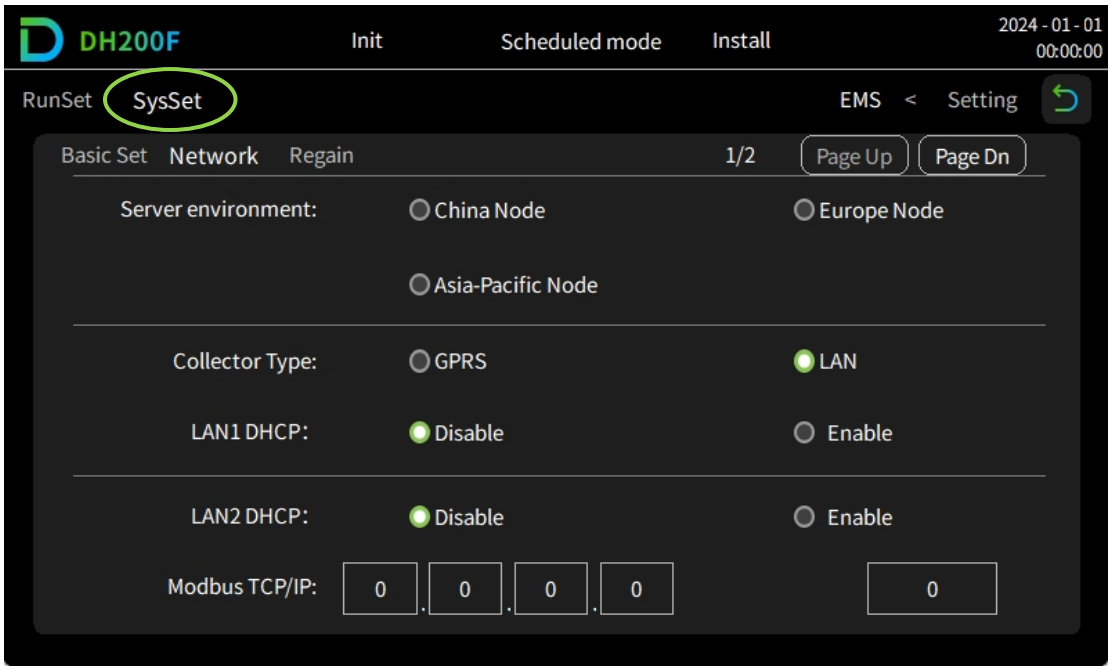
Step 2: Click "Setting"→"EMS";

Step 3: Click "SysSet" → "Network" to complete the cloud platform-related configuration (server environment, collector type) (If in remote mode, you can configure LAN2 DHCP settings), then click Page Dn.

Step 4: Configure local IP-related settings (Only available when the collector is LAN).

——END





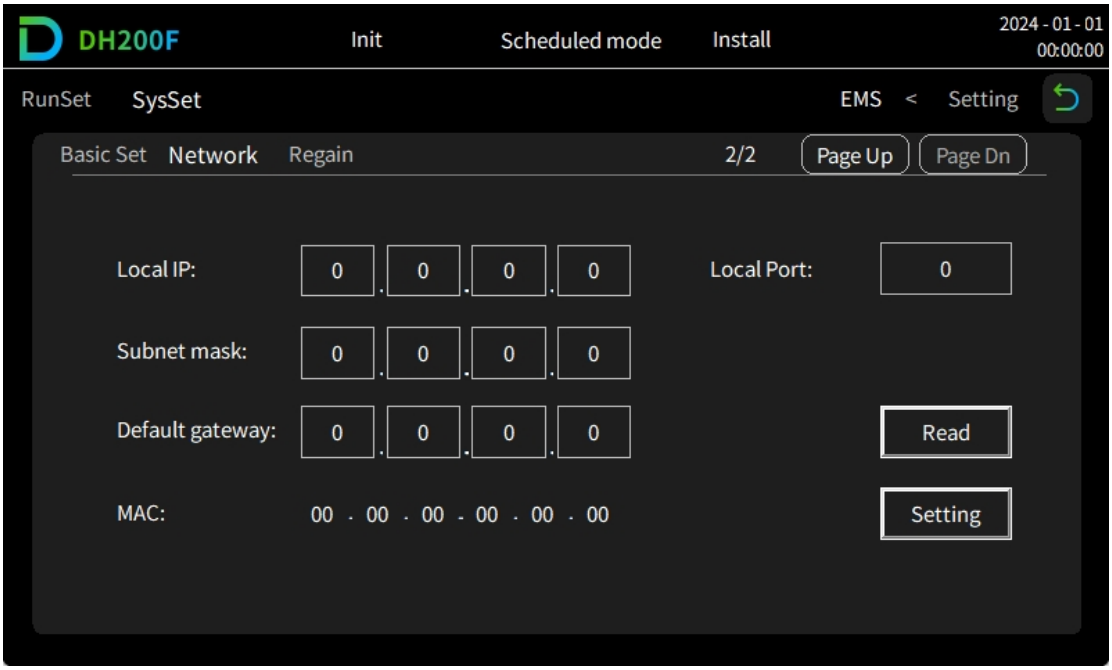


Figure 7-6 Network Setup Diagram (Total 3 pages)

7.4. Operating Settings Steps

7.4.1. Automatic Mode

- Step1: User login.
  *For specific steps, refer to "7.3.1 User Login": Permission "Install", password "1111".

- Step2: Go to the "RunSet" interface to configure settings.
  ① Click the main menu icon on the main screen;
  ② In the main menu bar, click "Setting";
  ③ In the "Setting" option bar, click the "EMS" option;
  ④ Click "Run Settings" in the navigation bar at the top left to enter the run settings interface.
  ⑤ On the **"Auto"** interface page "1/6", set the [Control Mode] to "Automatic".

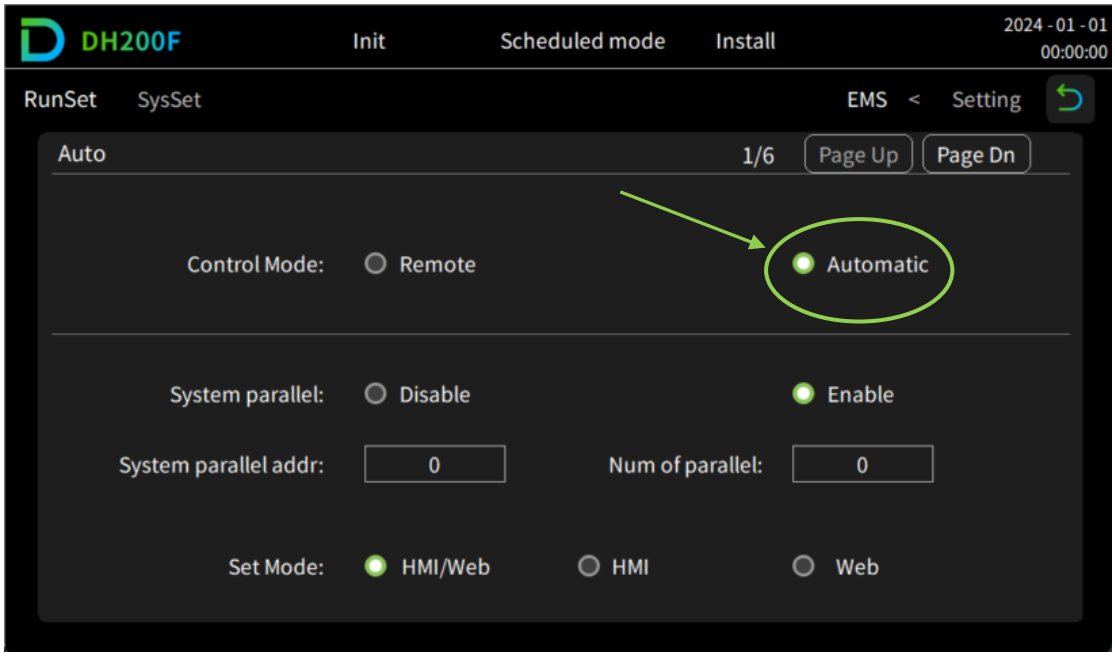


Figure 7-7 Automatic Mode Diagram

- Step3: In the "Auto" interface, set the system parallel function and operating method.

  ① Set [System parallel]. If there is only one product, enable "Disable" When multiple products are connected in parallel, enable "Enable" and set [System parallel addr] and [Number of parallel] (1 indicates the host, and the others indicate the slaves). The host needs to perform the next step, while the slaves do not need to perform the next step.

  ② Select according to your needs. If you select "Web" the remaining operations will be performed on the Dyness cloud platform. If you select "HMI/Web" or "HMI" please click on the Page Dn.

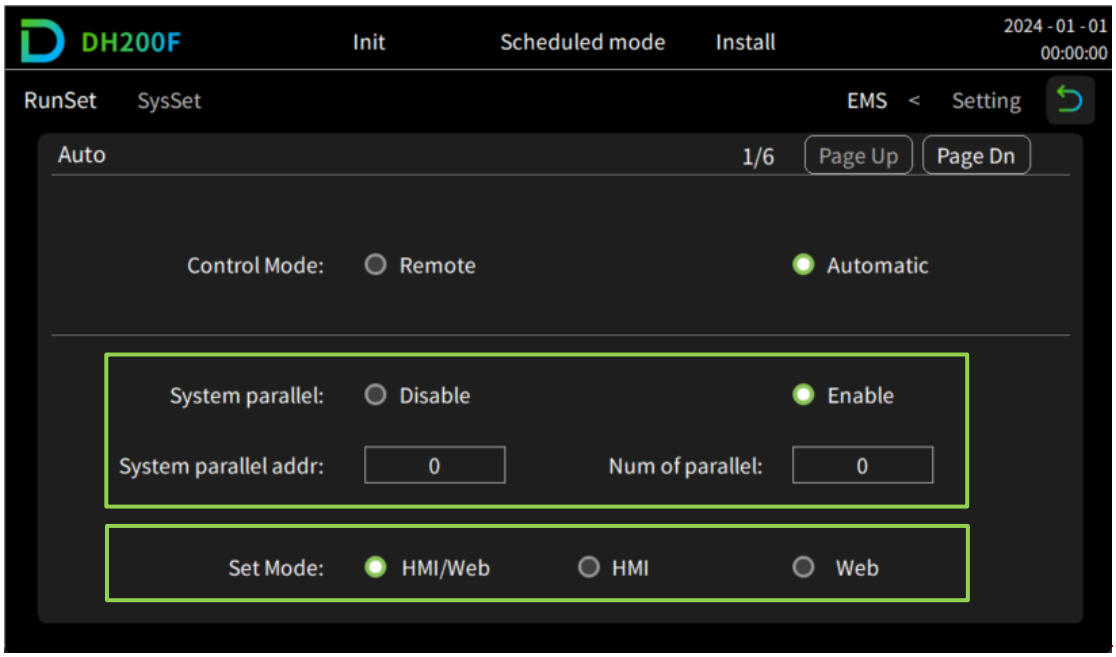


Figure 7-8 System Parallel & Operating Method Diagram

- Step 4: In the "Auto" interface, set Anti-backflow, Transformer protection, SOC, Generator, and Reactive power compensation.

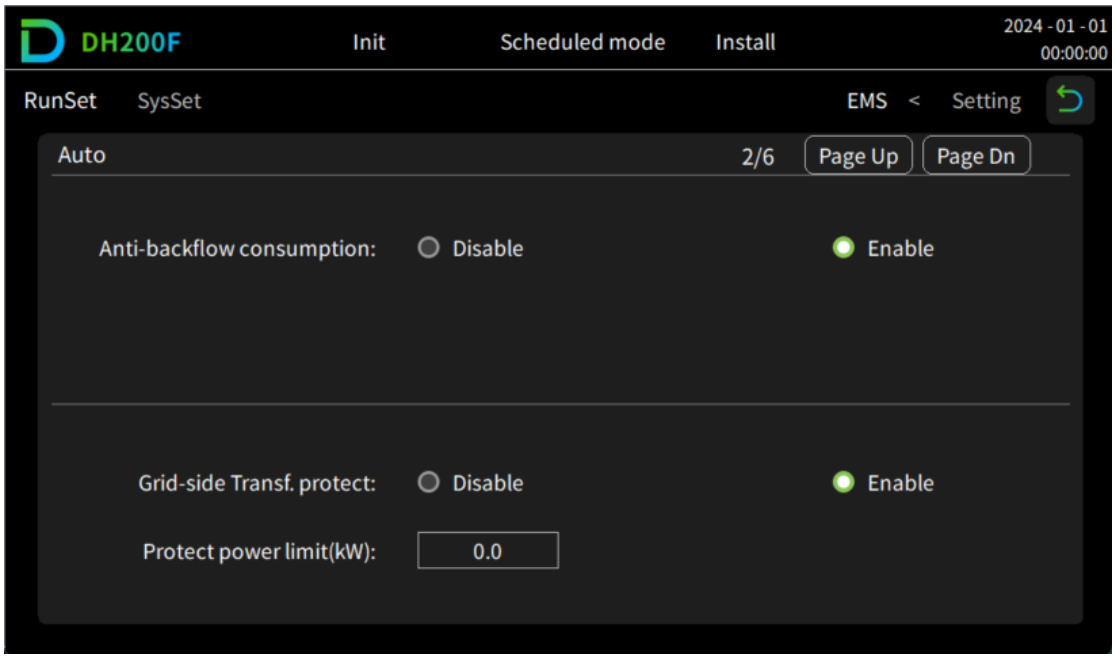
  ① On the **"Auto"** interface page "2/6", set the [Anti-backflow] and [Grid-side Transf. protect]. Select **"Disable"** or **"Enable"** as needed, then click "Page Dn";

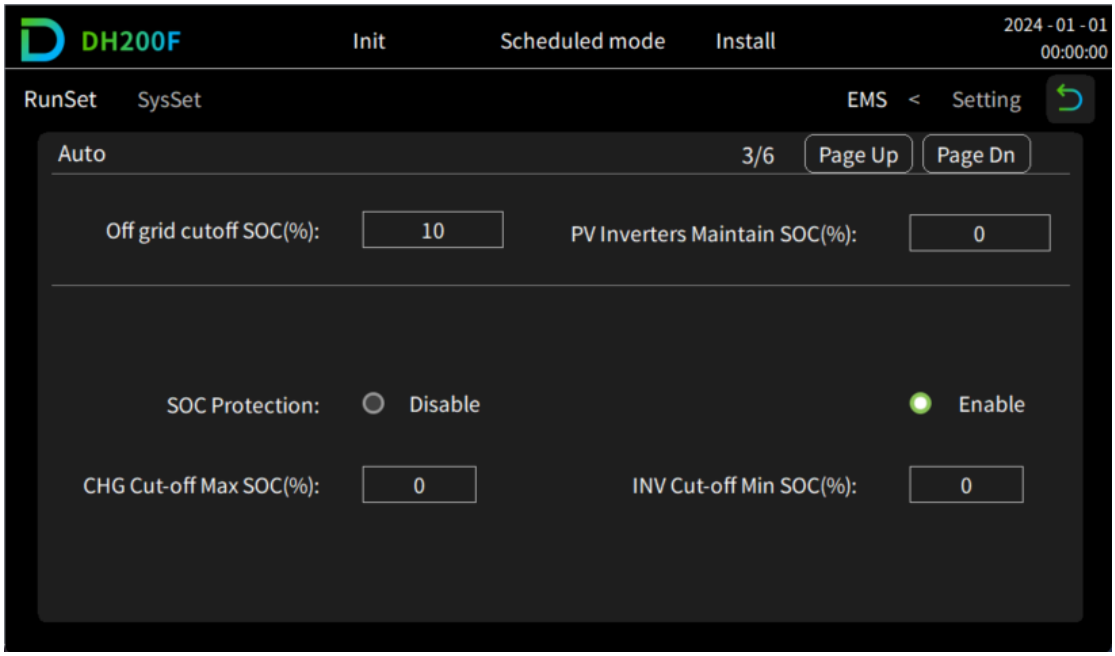
  ② On the **"Auto"** interface page "3/6", configure the [SOC] related data (off-grid cutoff SOC, PV inverter maintain SOC, SOC protection, charge/discharge cut-off SOC), then click "Page Dn";

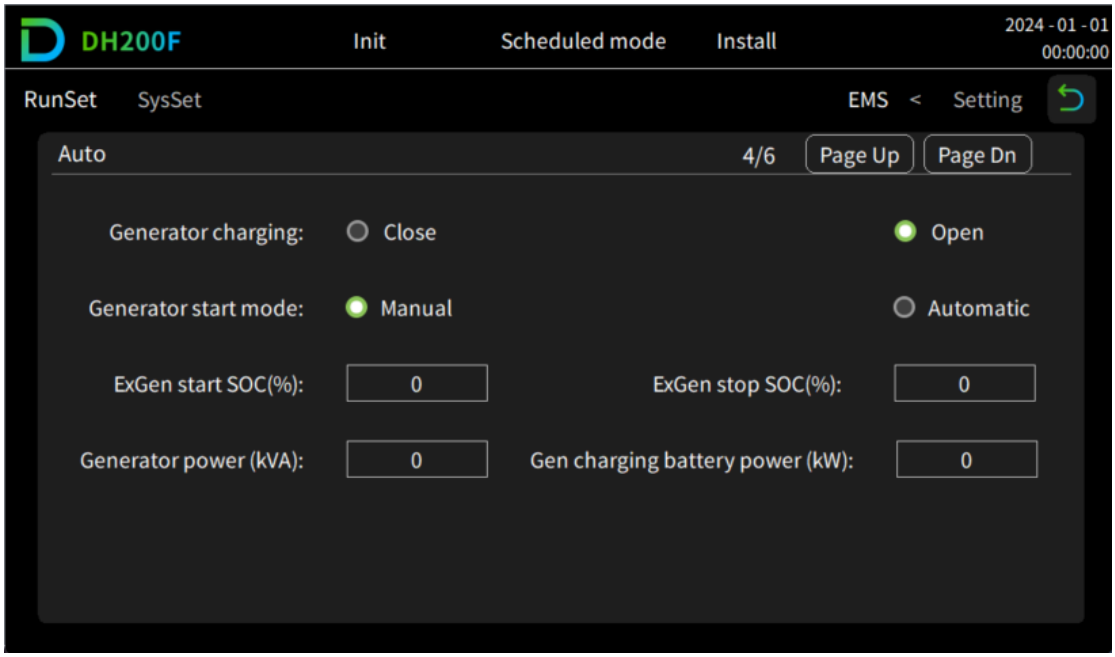
  ③ On the **"Auto"** interface page "4/6", configure the [Generator] related data (generator charging, generator start mode, generator start SOC, generator power, etc.), then click "Page Dn";

  ④ On the **"Auto"** interface page "5/6", configure the [Reactive power compensation] function, then select **"Disable"** or **"Enable"** as needed.

  ——END







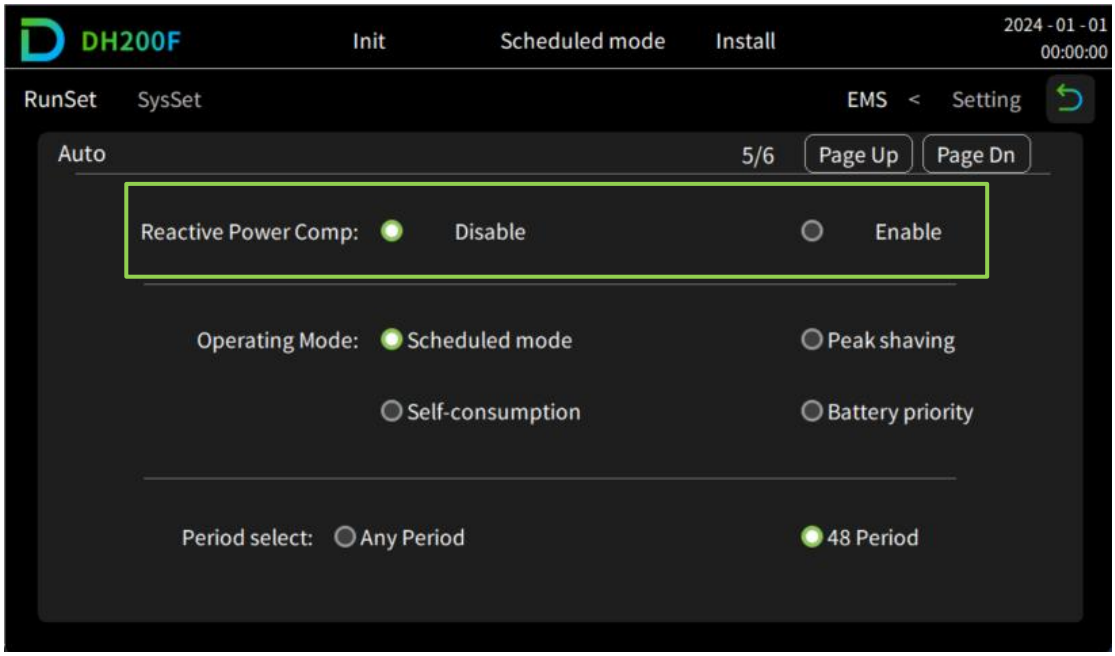
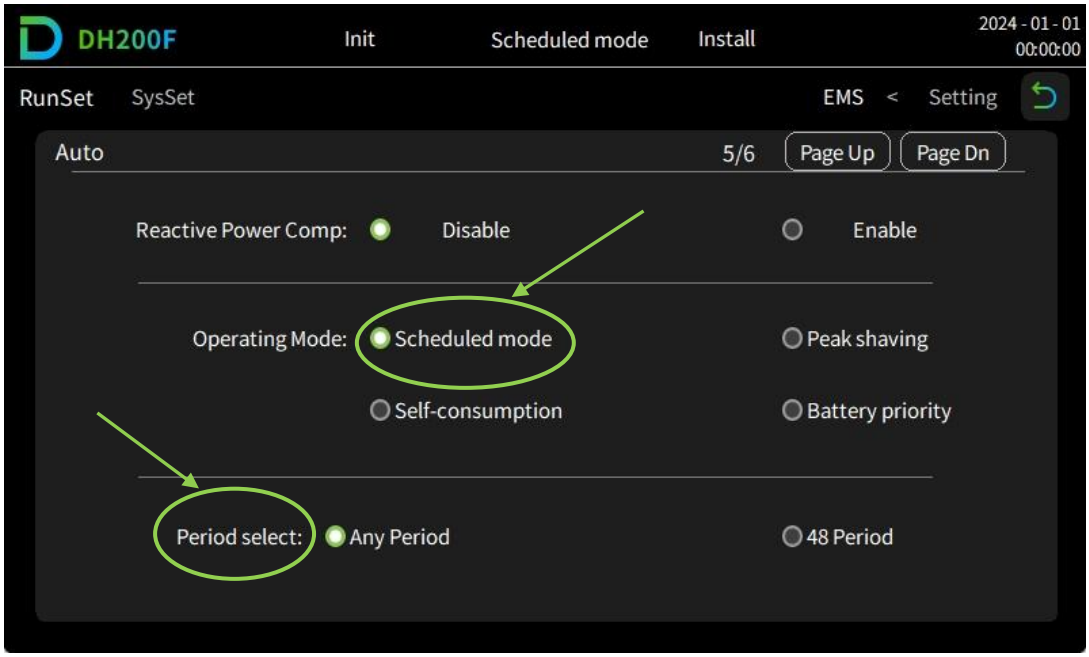


Figure 7-9 Anti-backflow, Transformer protection, SOC, Generator Diagram (Total 4 pages)

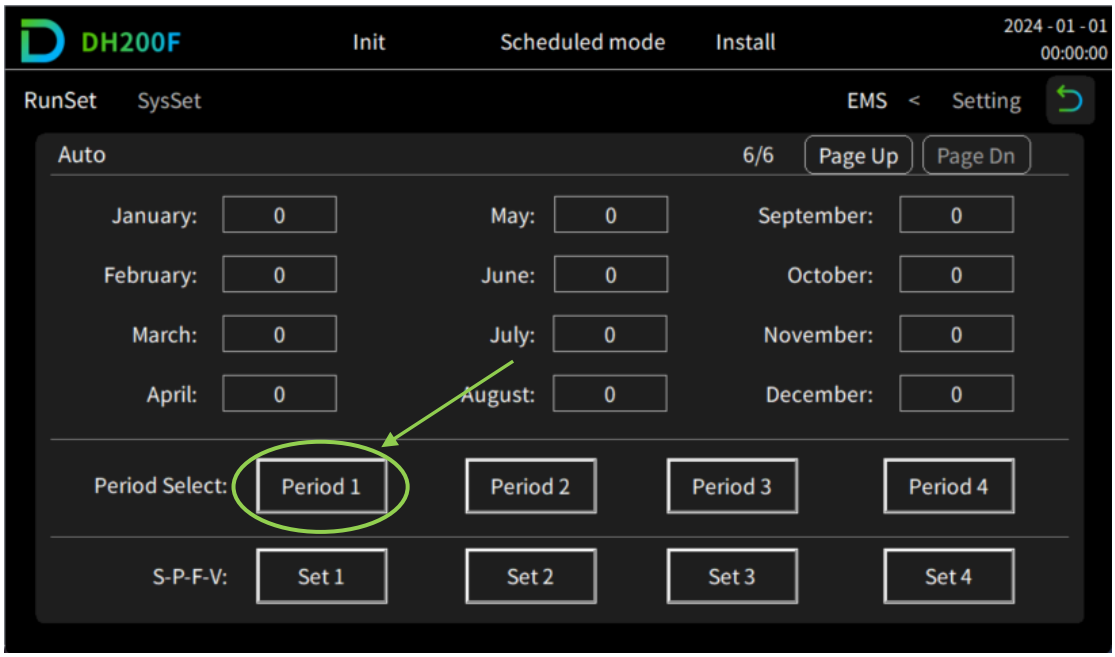
After setting the above content, you can proceed to the “Operation Mode” setting, which is related to the system operation strategy. The system is currently divided into four operation strategies: Scheduled mode, Peak shaving, Self-consumption, and Battery priority. The following is the setting method:

Scheduled mode

- Step 1: On the ”Auto” interface page ”5/6” , set the [Operating Mode] to ”Scheduled mode”, and select the [Period select] according to the project requirements (select ”Any Period” /”48 Period”, steps vary), then click “Page Dn” .

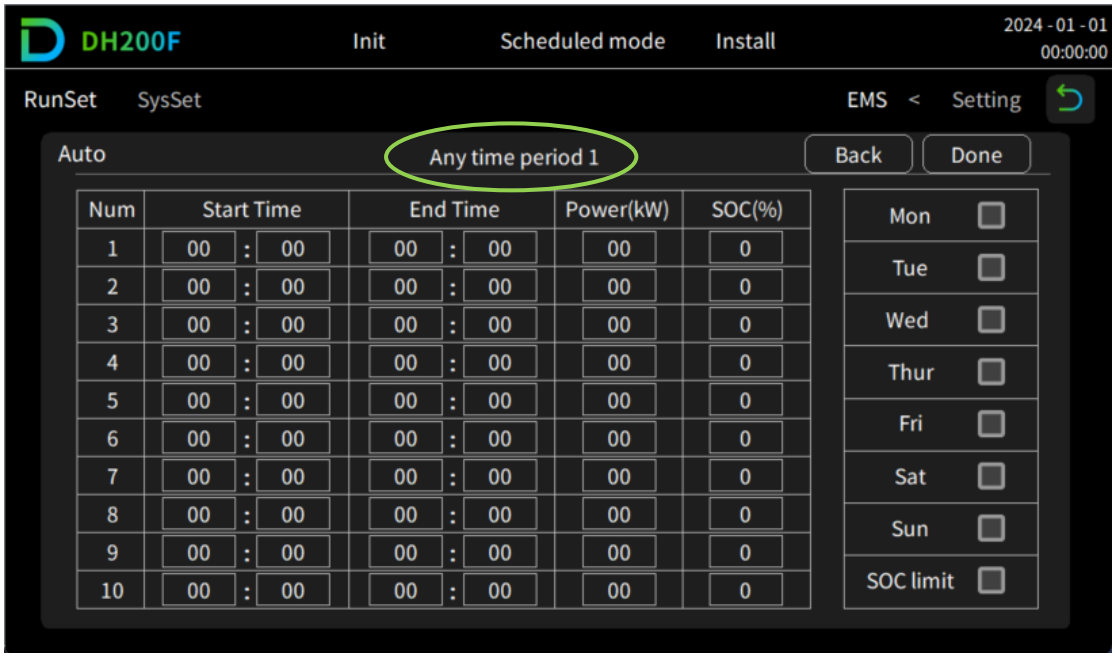


- Step 2: Select [Period Select], click "Period 1" and proceed to the next page. (Using "Period 1" as an example, a total of four periods can be set.)

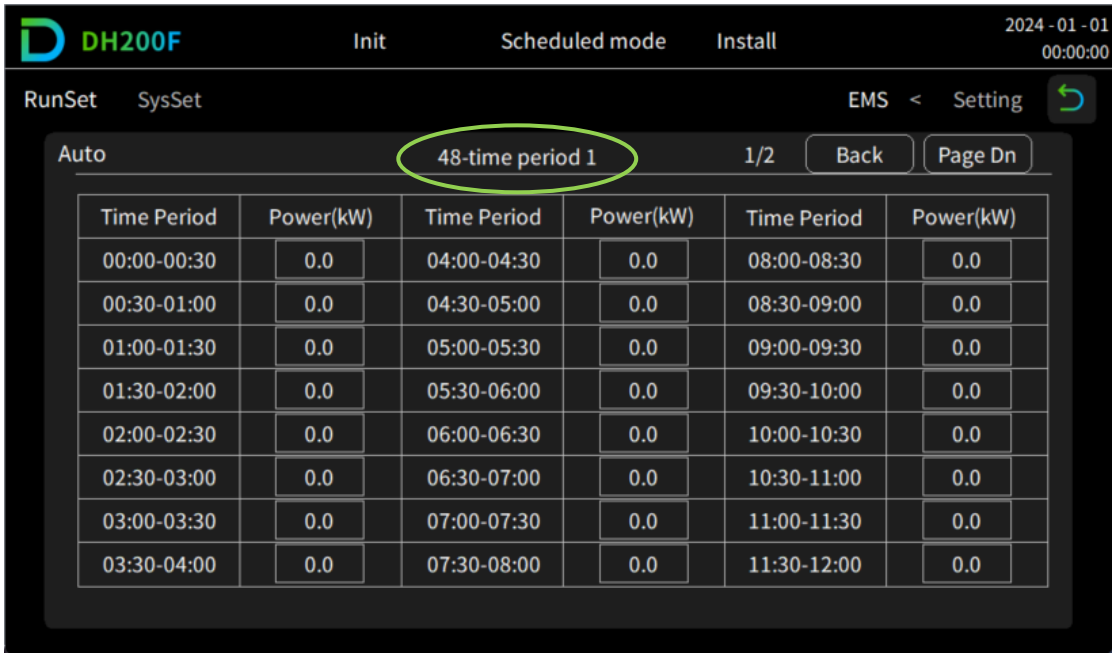


*The above pages show the same information for "Any Period" and "48 Period," but the "Time period selection" page is different. See the next page for details.

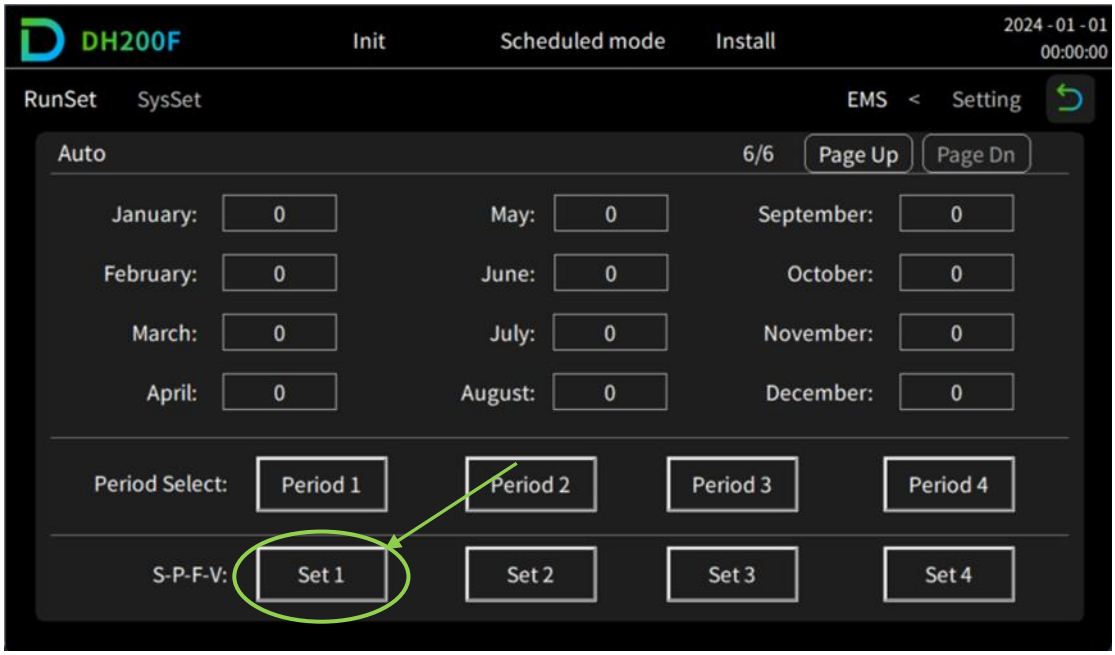
- Step 3 of "Any period": Customize the 24-hour time period and power according to your needs, and set them in chronological order from top to bottom. On the right side, you can set different operating rules for different time periods of the week from "Monday" to "Sunday." If you do not select any, the default setting is to operate according to this time period every day.



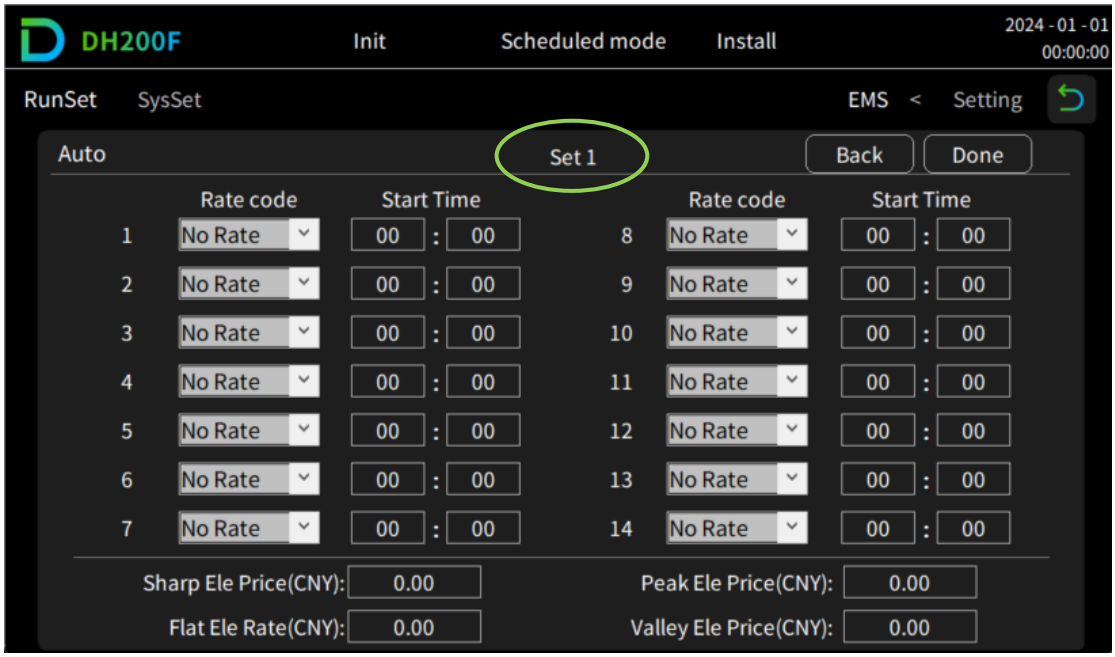
- Step 3 of the "48 Period": This mode has a unit time of 30 minutes, with a total of 48 segments (minimum unit is half an hour, dividing each day into a maximum of 48 time segments). The operating power can be set according to different unit times as needed.



- Step 4: Return to the previous page, select [S-P-F-V] click "Set 1" and proceed to the next page. (Using "Set 1" as an example, a total of four electricity price rules can be set.)



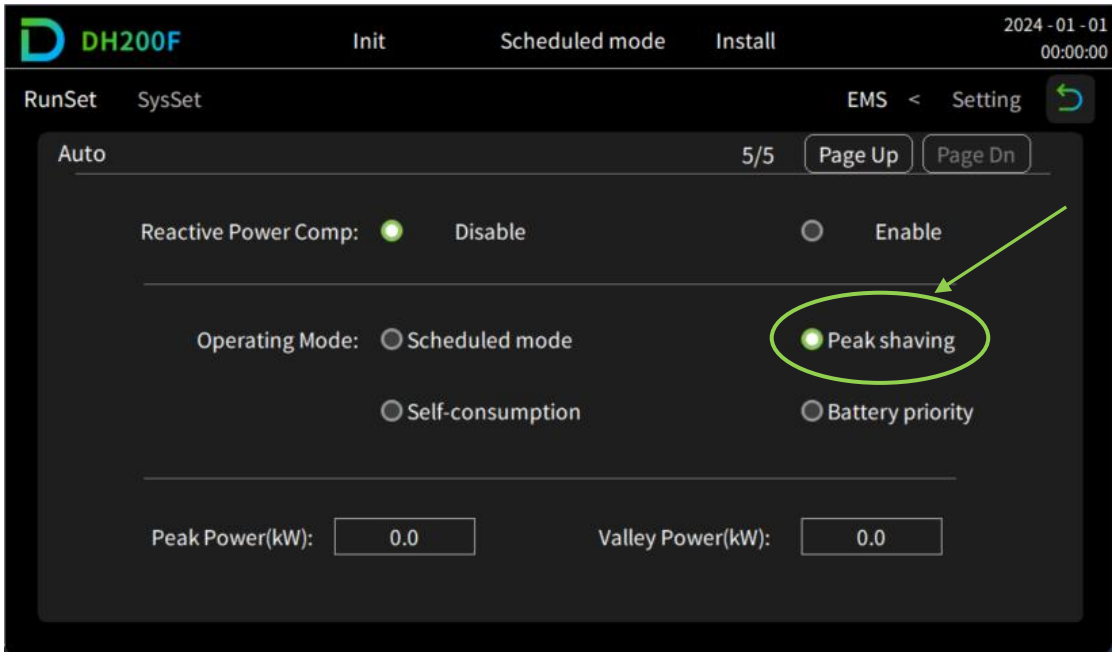
- Step 5: Set different rates and corresponding start times, peak and off-peak electricity prices.



——END

Peak shaving

- Step 1: On the "Auto" interface page "5/5", set the [Operating Mode] to "Peak shaving";
- Step 2: Set the "Peak Power" and "Valley Power" (Maximum limit for a single machine is 300kW).



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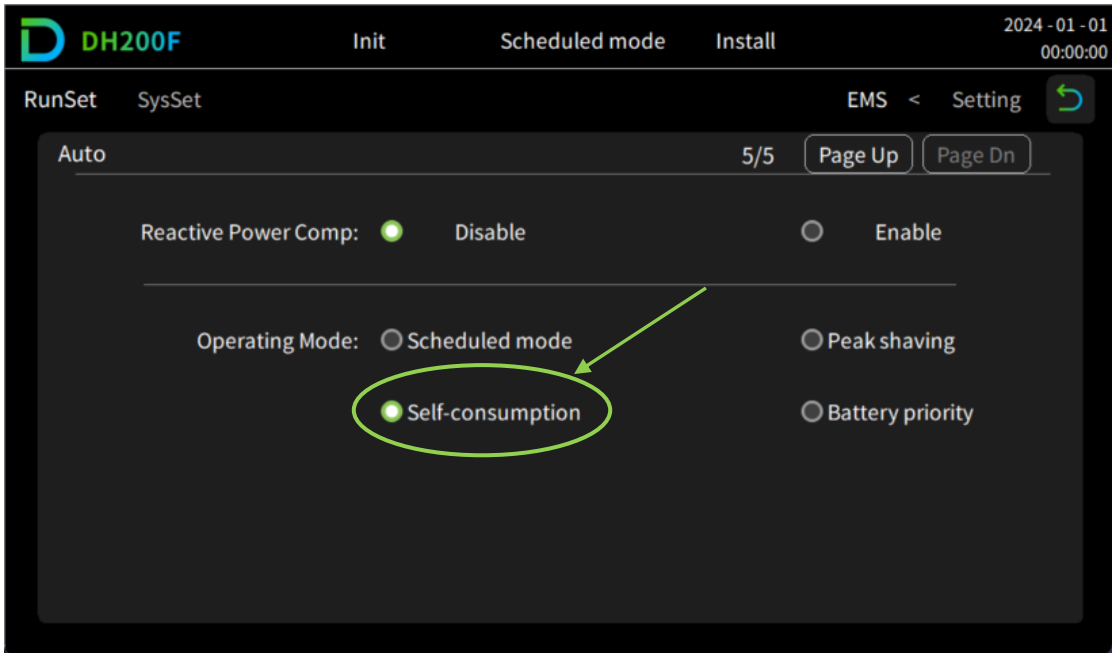
Self-consumption

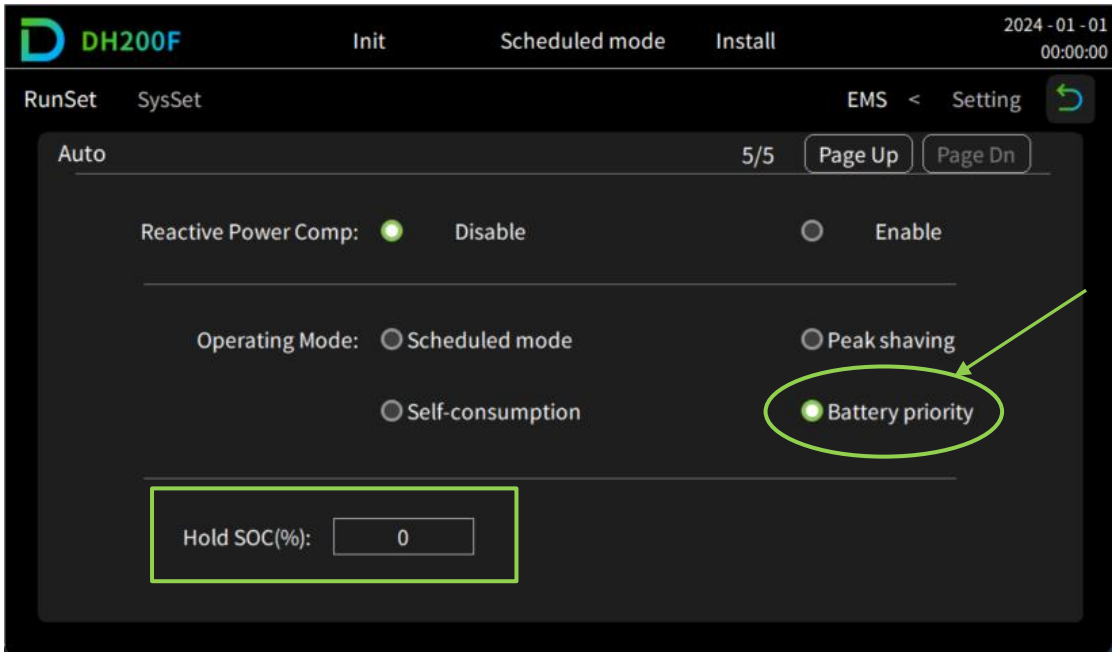
- Step 1: On the "Auto" interface page "5/5", set the [Operating Mode] to "Self-consumption".



——END

Battery priority

- Step 1: On the "Auto" interface page "5/5", set the [Operating Mode] to "Battery Priority";
- Step 2: Set the value for "Hold SOC", when the value falls below this setting, the device will prioritize charging.

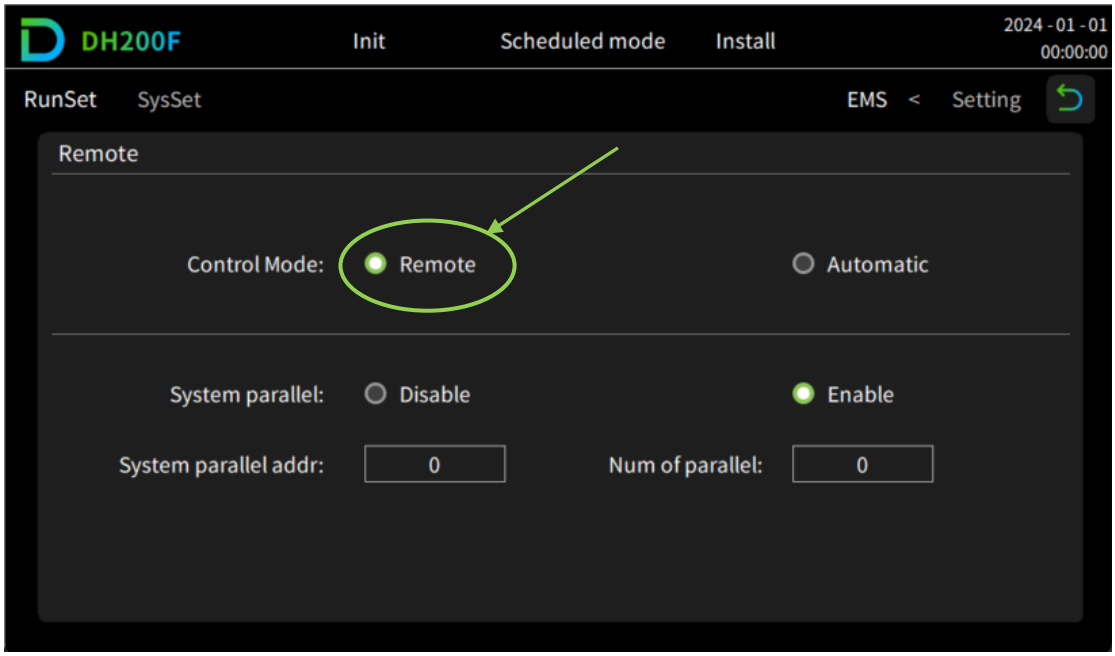


——END

7.4.2. Remote Mode

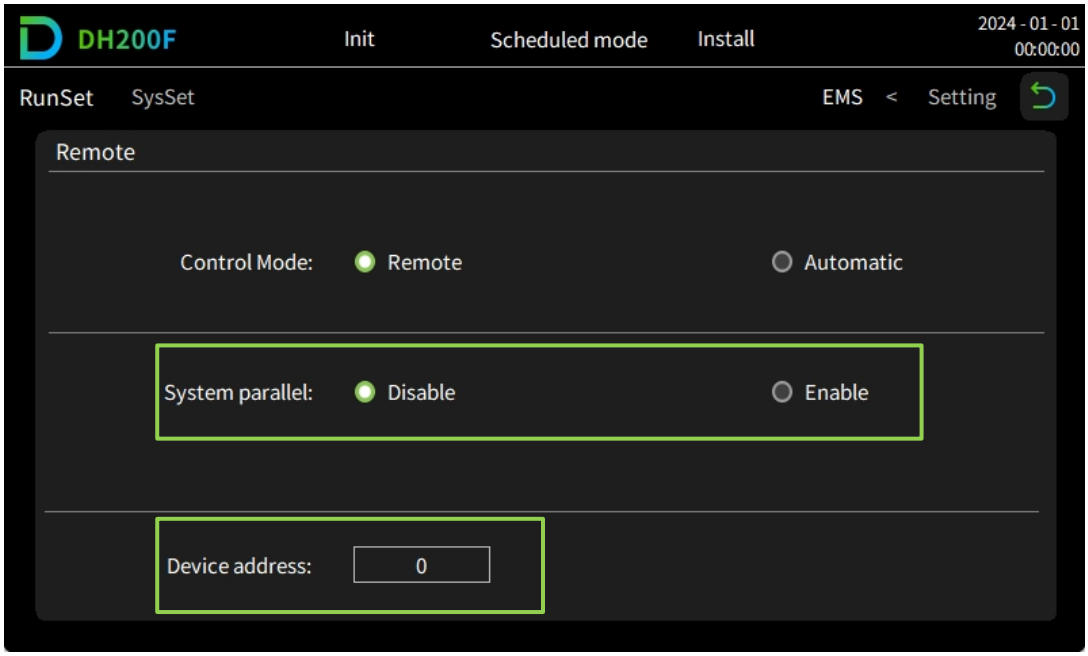
- Step1: User login.
  *For specific steps, refer to "7.3.1 User Login": Permission "Install", password "1111".

- Step 2: Go to the "Run Settings" interface to configure settings.
  ① Click the main menu icon on the main screen;
  ② In the main menu bar, click **"Setting"**;
  ③ In the **"Setting"** option bar, click the **"EMS"** option;
  ④ Click **"RunSet"** in the navigation bar at the top left to enter the run settings interface.
  ⑤ On the **"Auto"** interface page "1/6", set the **[Control Mode]** to **"Remote"**.



- Step 3: Go to the "Run Settings" interface to configure settings.

  ① Set [System Parallel], if there is only one product, enable **"Disable"**, when multiple products are connected in parallel, enable **"Enable"** and set the parallel operation address and number of parallel operations (1 indicates the host, and the others indicate the slaves).



——END

8. Fault Description

If the solution provided below still doe not solve the problem, please contact Dyness.

Table 8-1 Fault Description and Solution

Fault Phenomenon	Solution
Power light off	• Check that each circuit breaker is closed.
Running light off	• Check if EMS is in running state.
Alarm light on	• Check whether there is any alarm through the screen or the web, whether it is caused by improper operation, if not, please contact Dyness.
Show access alarm	• Check if the door is closed.
Show flood alarm	• Check whether the system is flooded, or whether the water sensor line is disconnected or damaged.
Show emergency stop Alarm	• Check whether the emergency stop switch is in the released state.
Show SPD alarm	• Check whether the surge protector is damaged and whether the fault light is on. If damaged, contact the supplier for replacement.
Show gas detector alarm	• Stop using immediately and contact the supplier.
Show temperature detector alarm	• Stop using immediately and contact the supplier.
Show smoke detector alarm	• Stop using immediately and contact the supplier.
Show other alarm	• Need to contact the manufacturer for supplier.
Abnormal anti-backflow	• Check whether the anti-backflow meter is set correctly and whether the meter is correctly installed; • Check whether the PE cable of the EMS is grounded; • If the fault information still exists, please contact the supplier.
Abnormal communication between EMS and BMS	• Shutdown to check if the communication cable is firmly connected and correct; • Restart the EMS and check if it functions normally; • If the error message still exists, please contact the supplier.
Abnormal communication between EMS and fire protection module	• Shutdown to check if the communication cable is firmly connected and correct; • Restart the EMS and check if it functions normally; • If the error message still exists, please contact the supplier.
Abnormal communication between EMS and PCS	• Shutdown to check if the communication cable is firmly connected and correct; • Restart the EMS and check if it functions normally;

	• If the error message still exists, please contact the supplier.
Abnormal communication between EMS and DCDC	• Shutdown to check if the communication cable is firmly connected and correct; • Restart the EMS and check if it functions normally; • If the error message still exists, please contact the supplier.
Abnormal communication between EMS and meter	• Shutdown to check if the communication cable is firmly connected and correct; • Restart the EMS and check if it functions normally; • If the error message still exists, please contact the supplier.
Abnormal communication between EMS and air conditioner	• Shutdown to check if the communication cable is firmly connected and correct; • Restart the EMS and check if it functions normally; • If the error message still exists, please contact the supplier.
Abnormal communication between EMS and HMI	• Check the meter cables after shutdown; • If the error message still exists, please contact the supplier.
SD card detect abnormality	• Check if the SD card is normal, if not please replace the SD card; • If the error message still exists, please contact the supplier.
Network abnormality - (default blocked)	• Check the 4G/WIFI/LAN antenna; • If the error message still exists, please contact the supplier.
EMS power loss saving abnormality	• If the error message still exists, please contact the supplier.
EMS external Flash abnormality	• If the error message still exists, please contact the supplier.
System version inconsistency abnormality	• Restart PCS and check if it is normal; • If the error message still exists, please contact the supplier.
Parallel communication loss	• Restart PCS and check if it is normal; • If the error message still exists, please contact the supplier.
Parallel host loss	• Restart PCS and check if it is normal; • If the error message still exists, please contact the supplier.
Parallel gird input inconsistency	• If the error message still exists, please contact the supplier.
Parallel input phase sequence error	• If the error message still exists, please contact the supplier.

Parallel output phase deficiency	• If the error message still exists, please contact the supplier.
Incompatible software versions prevent parallel operation	• If the error message still exists, please contact the supplier.
Inconsistent capacities prevent parallel operation	• If the error message still exists, please contact the supplier.

9. System Maintenance

WARNING

- Operational maintenance work must comply with local laws and regulations and the precautions in this manual.
- System maintenance work must be performed by professionals with electrical and power engineering knowledge and relevant qualifications.
- When performing system maintenance, wait until the outdoor cabinet's internal equipment is completely powered down before beginning inspection work. If any non-conformities are found during inspection, correct them immediately.

The system needs to be checked regularly. Here are some things to check and how often to do it. For more details, check out the *Operating and Maintenance Manual*.

Table 9-1 System maintenance checklist

Items	Checklist	Frequency
Cabinet exterior	Check if there are any flammable materials on the ESS cabinet;	Once/year
	Check if the ESS cabinet and expansion bolts are secure and free from rust;	
	Check if there are any damage, peeling paint, and oxidation on the ESS cabinet casing;	
	Check if the cabinet door locks can open smoothly;	
	Check if the sealing strips are securely fixed.	
System status	Check if the ESS cabinet and internal equipment are damaged or deformed;	Once/year
	Check if the warning signs and labels are clear and visible. Replace them if necessary;	
	Check if there are any loose or missing screws inside the ESS cabinet;	
	Check if the cable shielding layer is in good contact with the insulation sleeve;	
	Check if the grounding copper bar is securely fixed in place.	
	Check if there are any oxidation or rust inside the ESS cabinet;	
	Check if the ESS cabinet and internal equipment are damaged or deformed.	
Wiring and cable arrangement	Check if all the inlet/outlet of the ESS cabinet are sealed properly;	Once/year
	Check if there are any water leakage inside the ESS cabinet;	
	Check if the power cables are loose, tighten them according to previously specified torque;	

	Check if there are any damage for power cables and control cables, especially check for cuts on the insulation where they contact metal surfaces;	
	Check if the insulation wrapping of cable terminals are falling off;	
	Check if the PE cable connection is correct, the grounding resistance value should not exceed 1Ω;	
	Check if the equipotential connections inside the ESS cabinet are correct.	
System cleanliness	Check if the inlet/outlet of ESS cabinet are blocked. Please clean them if needed;	Once/ half year
	Check if the humidity inside is ESS cabinet is within the normal range, Please clean them if needed;	
	check if there are foreign objects, dust, dirt and condensation inside the ESS cabinet;	
	Check if there are condensation inside the ESS cabinet regularly: Once a year for areas with low relative humidity; One half year for areas with medium relative humidity; Once every one to three months for areas with high relative humidity.	
System function	Check if there are abnormal noise inside the ESS cabinet during operation;	Once/ two years
	Check if the temperature is too high inside the ESS cabinet;	
	Check if the system operates normal for startup and shutdown.	
Fan	Check the operation status of fan;	Once/year
	Check if the fan is blocked;	
	Check if there are abnormal noise during fan operation.	
Air conditioner	Check the operation status of air conditioner;	Once/year
	Check if the air conditioner is blocked;	
	Check if there are abnormal noise during air conditioner operation.	
Safety function	Check the stop function of EPO and screen, and simulate shutdown for test;	Once/half year ~ year
	Check the warning signs and other labels, please replace them if there are any damage or blur.	
Device maintenance	Perform a regular inspection for rust condition of all metal components (once every half year);	Once/half year ~ year
	Annual inspection of the contactor (auxiliary switch and micro-switch) to ensure that the product runs well;	
	Check the operating parameters (especially voltage and insulation parameter).	

10. Quality Assurance

Warranty period please refer to *Warranty Agreement*.

Service within warranty period: for Dyness ESS products that fail within warranty period, we will be responsible for handling and providing proper replacement or repair solution, offering free services or replacement of failure products. We will require valid invoices and receipts of purchase for warranty. Meanwhile, the Dyness trademark should be visible to ensure the validity of assurance.

We reserve the right not to provide warranty in the following situations:

- The ESS products exceed the free warranty period;
- Improper installation, modification or usage;
- Operation under harsh environments beyond those specified in this document or “Warranty Agreement” or “Technical Agreement”, or damage caused by abnormal natural environmental factors;
- Damage or failure caused by installation, modification and disassembly from unauthorized agencies or individuals;
- Damage or failure caused by the use of non-standard products or unauthorized components and software.

For failures caused by the above situations, Dyness could provide paid maintenance services if customer require.

If you have any problems about this product, please contact us. In order to solve your problem more quickly, please provide the following information:

- Original purchase receipt or invoice;
- Contact information, including name, phone number, email address and shipping address.
- Product information, including product model, product serial number, installation date and location, fault date and fault description, etc.

11. Appendix

Please check if the following checklist have been completed before product runs.

Table 11-1 Checklist before operation

Items	Checklist	Confirm
1	Check if the appearance is damaged and if the internal equipment is intact;	☐
2	Check if the assembly is firm;	☐
3	Check if the logo and labels of ESS cabinet and components are clear or damaged;	☐
4	Check if the grid AC cables are connected in correct phase sequence;	☐
5	Check if the PV cables are connected in correct phase sequence;	
6	Check if the communication cable connection is completed;	☐
7	Check if there are any faults of PE cable;	☐
8	Check if the liquid cooling pipes are well connected and check if there are any leakage;	☐
9	Check if the meter reads correctly;	☐
10	Check if all the connection points are correct and have good contact;	☐
11	Check if there are no abnormal situation of manual components;	☐
12	Check if the circuit breakers functioning normally;	☐
13	Check if all the buttons and related indicators are functioning normally;	☐
14	Check if the power indicator is normal;	☐
15	Check if the running indicator is normal;	☐
16	Check if fan and air conditioner is running well and no abnormal sound;	
17	Check if the HMI screen is normal and there are no error messages;	☐
18	Check if there are any tools or components left inside the ESS cabinet;	☐
19	Check if the door of ESS cabinet could open and close smoothly;	☐
20	Check that the air conditioner drain pipe is smooth and free of kinks (the end of the pipe should not touch the ground).	☐

DISCOVER YOUR NATURE

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