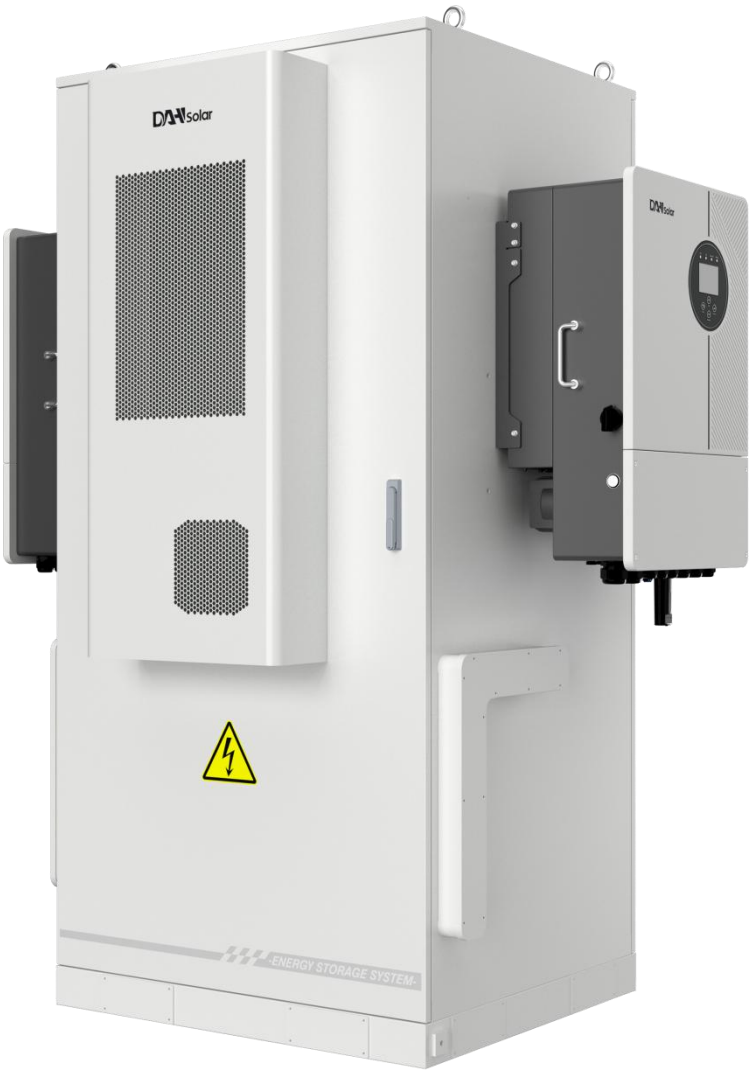
DAH Solar

DHN-HVC05/15/16 Series

USER MANUAL



ABOUT THIS MANUAL

This manual contains important operating instructions for the DHN-HVC series outdoor energy storage system cabinet.Users should read this manual carefully before installation or commissioning.For safety reasons, technicians responsible for installing and maintaining this system must be qualified, properly trained, and competent, and must strictly follow the instructions in this document.

ADDITIONAL INFORMATION

Product information is subject to change without prior notice. The user manual will be updated regularly. Please visit DAH New Energy official website www.dahsolar.com to obtain the latest version.

Statement of Law

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- This product is designed in compliance with environmental protection and personal safety requirements. The storage, use and disposal of the product shall be subject to the product manual, relevant contracts or applicable laws and regulations.
- The content of this document will be updated irregularly due to product version upgrades or other reasons. Unless otherwise agreed, the content of this document shall not replace the safety precautions in the product label. All descriptions in this document are for usage guidance only.

Revision History

Revised Version	Revision Date	Revision Reason
1.0	2026/04/22	First publication

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1.Guideline

Note: Please read this manual carefully before installing or operating the product. Keep this manual properly for future reference.

1.1 Use of Manuals

- **Manual Content**:: This manual mainly describes the safety precautions, functions and specifications, delivery and storage, installation and wiring, start-up/shutdown procedures, maintenance and warranty of the energy storage product,Please use this manual in conjunction with the product manuals of other components.
- **Target Users:** This manual is intended for professional technicians responsible for the installation and maintenance of the energy storage product, as well as users performing daily operations. Readers should possess basic electrical knowledge.

	• All descriptions in this manual are for the standard outdoor cabinet energy storage system.If you have special requirements, please inform our staff when placing an order.The actual product you receive shall prevail. •This manual cannot cover all possible situations during operation, maintenance, inspection and servicing Please contact our company promptly if you encounter any conditions not explained in this manual. • Images contained in this document are for illustrative purposes only and may vary depending on the specific product model. • DHN New Energy reserves all rights of interpretation.

1.2 Symbol and Abbreviation

This manual may contain the following symbols to highlight important information, To ensure user personal and property safety during product installation, or to facilitate efficient operation. Please read carefully.

Table 1-1 Symbol Mark

Symbol	Description
	Indicates high voltage inside the energy storage cabinet; prevent electric shock to avoid personal injury.
	Indicates electrical hazards. Disconnect all external power connections before maintenance and operation.
	High 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

Table 1-2 Symbol Definition

	**DANGER**
Indicates a high potential hazard that, if not avoided, will result in death or serious injury.	
	**WARNING**
Indicates a moderate potential hazard that, if not avoided, could result in death or serious injury.	
	**CAUTION**
Indicates a low potential hazard that if not avoided, may result in moderate or minor injury to personnel.	
	**Supplement**
Supplements are intended to emphasize and supplement the content, and may also provide tips for the optimized use of the product.	

Table 1-3 Abbreviation Definition

Abbreviation	Full Name
ESS	Energy Storage System
BMS	Battery Management System
PACK	Battery Module
PDU	Power Distribution Unit
SOC	State of Charge
SOH	State of Health
DC	Direct Current
PE	Protective Earthing

2.Safety Instructions

2.1 Safety Principle

During installation, operation and maintenance, relevant safety precautions must be strictly followed.This product is an integrated high-voltage DC system and shall only be operated by personnel authorized by DHN New Energy.

 DANGER	•Fatal high voltage exists inside the product. Please observe and comply with the warning labels on the product. • Do not touch the power grid or the internal contacts connected to it to avoid the risk of fatal electric shock! • Battery damage may result in electrolyte leakage. In case of electrolyte leakage, do not touch the leaked electrolyte or volatile gas. 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 Qualifications Operator

- 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 or use this product in environments below -20°C or above 55°C.
- Do not install or use this product near any heat sources or flammable materials.
- Do not install or use this product in areas with frequent pedestrian traffic.
- Do not expose the product to corrosive gases or liquids.
- Install and use the product away from children and animals.
- The maximum installation altitude shall not exceed 3000 m. and it should be derated when above 2000m;
- Reserve sufficient space for installation to ensure adequate ventilation.
- Isolation barriers must be installed during setup to prevent unauthorized 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** • During equipment installation and maintenance, ensure: The battery is completely disconnected; • Have a visible warning sign at the break point to ensure no accidental reconnections. **Ground Fault Protection Safety** • When a ground fault occurs, normally non-live parts may become energized with high voltage, which may cause fatal electric shock! Before operation, ensure no ground fault exists and take necessary protective measures. **Safety Of Live Line Measurements** •Since high voltage is present in this equipment, protective measures (such as wearing insulated gloves) must be taken when measuring live circuits. An operator must be accompanied by another person to ensure personal safety. **Arc Protection Safety** • Avoid arc, fire and explosion hazards caused by improper operation. • Don't operate the equipment if power cables are loose, or screws or other components fall out accidentally. Only qualified professionals may perform such repairs to avoid further damage.
 **WARNING**	**Personnel Operation Regulations** • If required on site, construction machinery such as forklifts and cranes must be operated by qualified operators. • During installation, operators must wear insulated protective equipment that complies with safety regulations. •When performing power connection on site, a professional supervisor must be assigned to lock out the switches that need to be turned off. • Ensure the equipment is completely disconnected from all electrical connections before installation. • Each completed phase during installation must be inspected and cross-checked at least once. • The equipment must be installed in sequence; no steps shall be skipped. **Wiring Regulations** • suitable measuring equipment shall be used, in compliance with relevant standards and instructions. • Before any measurement you must understand the operation manual of the measuring equipment. • Only equipment designated by DHN New Energy shall be used.Using non-designated equipment may result in impaired protection functions and personal injury. **Post-Installation Commissioning** • The equipment may only be put into operation after confirmation by professionals and approval from the local power authority. • Before operation, disconnect all distribution circuit breakers. Closing is strictly prohibited during product operation.

2.5 Transportation and Installation Safety Requirements

 WARNING	• Do not change the fuse size or rating during installation. • During wiring, two or more operators are not allowed to connect the same conductor simultaneously.

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 DHN New Energy Customer Service for repairs.

 WARNING	• The software, shell and components of the product may not be changed without DHN New Energy authorization. If changed, the corresponding liability and warranty shall be void; • Don't remove or alter the nameplate; Don't 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 System Overview

- This product is an outdoor battery cabinet, including battery PACK, PDU, fire protection system, air conditioning system, etc.
- It is used with a wall-mounted inverter to convert to AC output, and can be widely applied in small industrial and commercial scenarios such as charging stations, commercial buildings and manufacturing industries.

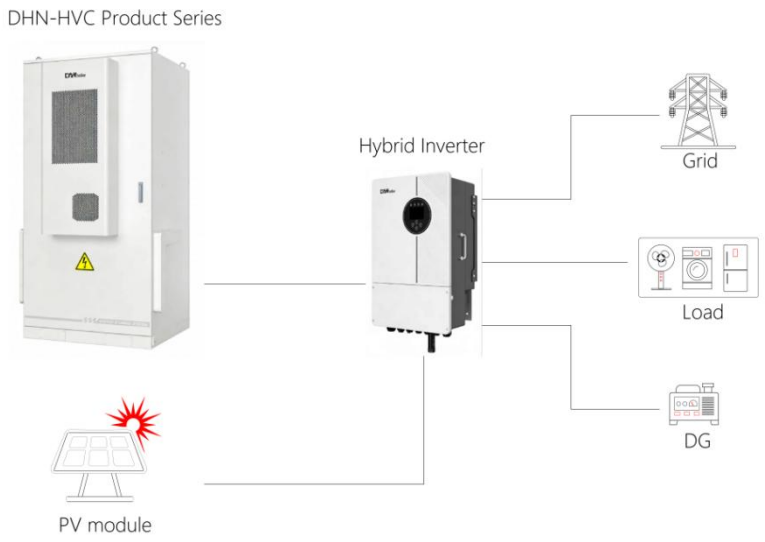


Figure 3-1 System Application Principle

3.2.Product Model

This manual applies to the DHN-HVC series outdoor battery cabinet (DHN-HVC16x15-G1). The model definition is explained as follows:

- DHN-HVC: Product name of outdoor cabinet
- HV: High voltage
- C: Outdoor cabinet
- 16: DHN New Energy 51.2V 314Ah 16.076 kWh high-voltage energy storage battery(05: DHN New Energy 51.2V 102Ah 5.22 kWh high-voltage energy storage battery;15: DHN New Energy 51.2V 280Ah 14.336 kWh high-voltage energy storage battery)
- X15: Composed of 15 units
- (X7: composed of 7 units; X12: composed of 12 units)
- G1: First generation

3.3.Product Configuration

- This product adopts a modular design for easier installation, operation and maintenance.
- The product includes battery packs, PDU, fire protection system, air conditioning system, etc.
- The product is equipped with independent photoelectric smoke detectors, temperature control system, aerosol fire suppression and other devices to enhance safety.
- The product is equipped with disconnection devices such as circuit breakers, fuses and relays to achieve reliable power-off, ensuring the safety of personnel and equipment.

Table 3-1 Key Module of The Product

Module	Function	Qty.	Config.
PACK	For electrical storage	7~15	Standard
PDU	Collect battery information and control battery charging and discharging	1~2	Standard
Fire Protection system	Timely warning of battery thermal runaway and making correct instructions.	1	Standard

Air conditioner system	Adjust battery working temperature to ensure it works under optimal temperature.	1	Standard

3.4.System Parameters

Table 3-2 Battery System Parameters

Model	DHN-HVC05x12-G1	DHN-HVC15x7-G1	DHN-HVC16x7-G1	DHN-HVC15x15-G1	DHN-HVC16x15-G1
Battery System					
Battery Model	DHN-HVRES05-G1	DHN-HVRES15-G1	DHN-HVRES16-G1	DHN-HVRES15-G1	DHN-HVRES16-G1
Battery Type	LiFePO4				
Battery Capacity （Ah）	102	280	314	280	314
Charge/Discharge Current(A)-Recommend	50	140	157	140	157
Charge/Discharge Current(A)-Max	100	160	180	160	180
Rated Voltage（V）	614.4	358.4		768	
Operating Voltage(V)	480~700.8	280~408.8		600~876	
System Nominal Energy (kWh)	62	100	112	215	241
Basic Parameters					
Weight（kg）	1400	1600		2600	
Dimension（mm）	1160x2230x1060	665x2360x1170		1255x2360x1200	
IP Rating of Enclosure	IP55				
Anti-corrosion Grade	C3				
Cooling Method	Air-cooling				
Fire protection	Aerosol fire protection				
Operating Temperature(℃)	Charge:0-+50/Discharge:-20~+55				
Storage Temperature（℃）	0~+35				
Recommend Depth of Discharge(%)	≤90				
Cycle Life(25+2° C,0.5C/0.5C,70%EOL)	≥6000	≥8000			
Communication Methods	CAN2.0/RS485				
Warranty Period(years)	5				
Certification	IEC61000-CE,IEC62619-CB,UN38.3				

3.5.Appearance Design

- Take model DHN-HVC16x15-G1 as an example:
- Dimensions (WHD): 1255 x 2360 x 1200 mm(Excluding lifting lugs)
- Net weight: Approx. 2600 kg
- Product protection degree: IP55
- Corrosion protection grade: C3



Figure 3-2 Product Appearance

3.6.Internal Design

This product is an outdoor battery cabinet, including battery packs, PDU, fire protection system, air conditioning system, etc.

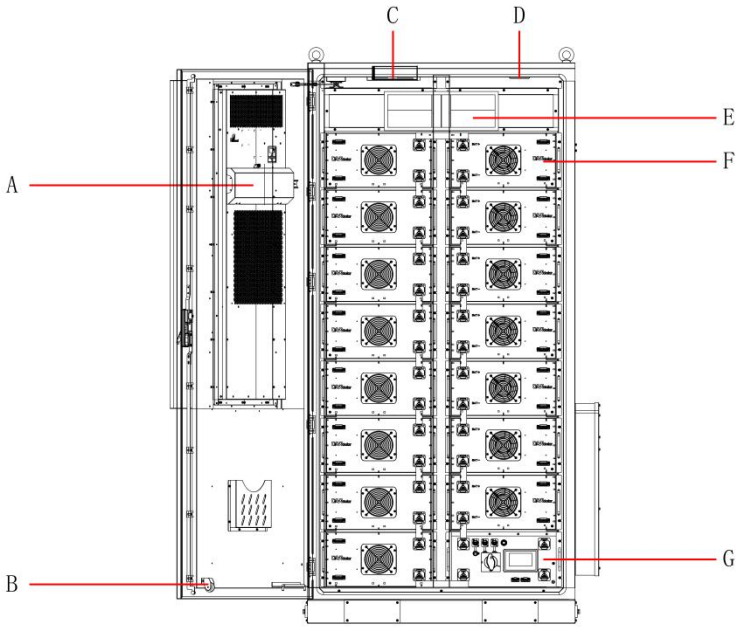


Figure 3-3 Internal Structure

Table 3-3 Internal Structure Description

No.	Module	Description
A	Air Conditioner	Maintains the battery system temperature within an appropriate range
B	Anti-Drop	Wheel Prevents door panel sagging due to gravity after closing, which could affect protection rating
C	Fire Protection Device	Aerosol fire suppression device that monitors fire signals inside the cabinet and implements fire extinguishing
D	Smoke Detector	Detects smoke
E	Independent Air Duct	Provides temperature control for each battery cluster
F	Battery System	Stores and discharges electrical energy
G	Power Distribution Unit	Battery charge and discharge control device

3.7.Main Modules

3.7.1 PACK

- Each PACK adopts a 314Ah LFP battery, featuring excellent safety and high energy density.
- Battery configuration: 1P16S
- Capacity: 16.076kWh per PACK
- Cooling: Forced air cooling by fans
- Protection class: IP20
- Pollution-free modular assembly, high structural reliability and low maintenance cost.

The PACK is equipped with a built-in aerosol fire suppression device linked to the BMS system. When abnormal cell temperature or signs of thermal runaway are detected, fire extinguishing is activated quickly to suppress flame spread.

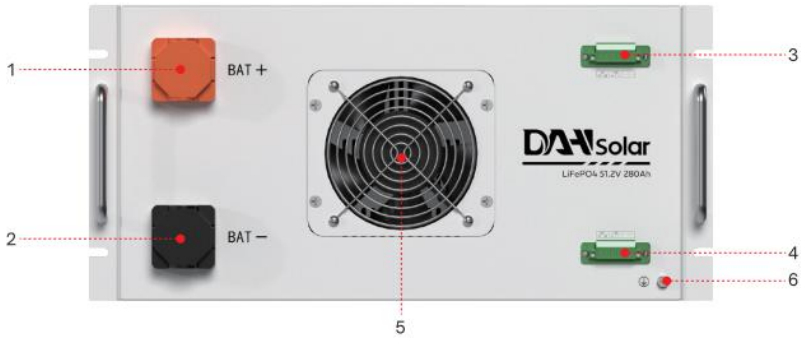


Figure 3-4 PACK

Table 3-4 PACK Configuration

NO.	Interface Name	Definition
1	Positive Socket	Battery output positive terminal; supports battery series connection
2	Negative Socket	Battery output negative terminal; supports battery series connection
3	Communication Port IN	Supports battery communication; powers the battery fan
4	Communication Port OUT	Supports battery communication; powers the battery fan
5	Fan	Battery heat dissipation
6	Grounding	Shell ground connection

Table 3-5 PACK Configuration

Parameter	5kWh Energy Storage Battery	15kWh Energy Storage Battery	16kWh Energy Storage Battery
Battery Model	DHN-HVRES05-G1	DHN-HVRES15-G1	DHN-HVRES16-G1
Battery Type	LiFePO4		
Nominal Energy (kWh)	5.12	14.34	16.076
Nominal Voltage (V)	51.2		
Nominal Capacity (Ah)	100	280	314
Recommended Charge/Discharge Current (A)	50	140	157
Max Charge/Discharge Current (A)	100	160	180
Dimension (W × H × D, mm)	482.6×140×550	488×230×790	

IP Rating of Enclosure	IP20	
Operating Temperature (℃)	Charging: 0~+60 / Discharging: -20~+60	Charging: 0~+55 / Discharging: -20~+55
Storage Temperature (℃)	0~+35	
Recommended Depth of Discharge (%)	≤90	
Cycle Life (25 ± 2 ℃, 0.5C/0.5C, 70% SOH)	≥6000	≥8000
Communication Methods	CAN2.0/RS485	
Warranty Period (years)	5	
Certification	UN38.3/CE-IEC61000/CB-IEC62619	

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 DHN New Energy 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 DHN New Energy or qualified professionals.

3.7.2 PDU

- Collect cell information from the PACK BMU, conduct comprehensive analysis, and implement control.
- Calculate the battery SOC and SOH based on the collected information, and perform overall control of the battery system.
- Battery Pack Protection: Using real-time monitored battery data, determine whether abnormalities such as overcharge, over-discharge, and over-temperature exist in the battery pack, and take corresponding protection measures to ensure stable and safe battery operation. Extend battery life by monitoring and adjusting battery consistency.
- Data Communication: Report data to the BAU or EMS; issue commands to the BMU.
- For detailed LCD display interfaces and operations, refer to the Operation Manual for High-Voltage Rack-Mounted Energy Storage System.



Figure 3-5 PDU

Table 3-6 PDU Interface Identification

NO.	Interface Name	Definition
1	Battery Access Positive Socket	Connect the positive terminal of the battery
2	Battery Access Negative Socket	Connect the negative terminal of the battery
3	Communication Port	Support the communication between PDU and the inverter
4	COM_IN	Battery Cluster Parallel Network Port-IN
5	COM_OUT	Battery Cluster Parallel Network Port-OUT
6	Weak Current Switch	Control the on-off of the BMS and display screen
7	Power Switch	Control the on-off of the main current circuit
8	DC Output Positive Socket	Connect the DC positive terminal of the inverter
9	DC Output Negative Socket	Connect the DC negative terminal of the inverter
10	COM1	Quick plug communication port between battery module and PDU
11	COM2	Quick plug port to power the battery fan
12	Display Screen	Support status monitoring and human-device interaction
13	Wi-Fi Communication Antenna	Support Wi-Fi communication
14	Grounding	Shell ground connection

3.7.3 Safety System

The system is equipped with an efficient and reliable fire protection system and alarm devices, which can effectively extinguish fires and issue alarms in case of fire or emergency.

Fire Protection System

The product is equipped with independent photoelectric smoke fire detectors and aerosol fire suppression devices on the top of the battery compartment.

1) Functional Description of Independent Photoelectric Smoke Fire Detector

Fire Alarm

- When the smoke concentration reaches the response threshold in standby mode, the detector will output sound and light alarm signals.
- Fire Alarm Status:Buzzer: continuous beep,Indicator: red light ON.

Self-Test

- Press the [Self-Test/Mute] button briefly when the detector is in standby mode. The detector will enter self-test status.
- Self-Test Status: Buzzer: beeps 5 times: "beep, beep, beep..." Indicator: red light ON
- The detector automatically returns to standby mode after self-test.

Mute

- Press the [Self-Test/Mute] button briefly during an alarm to mute the sound (mute duration: 60 seconds).
- Mute Status:Buzzer: stops sounding,Indicator: red light ON
- Mute Period:If the smoke concentration remains above the response threshold after muting, the detector will trigger an audible alarm again after 60 seconds.

Reset

- When the detector is in mute status (red indicator ON, buzzer silent), short press the [Self-Test/Mute] button again to reset the detector to standby mode.
- When the smoke dissipates during an alarm, the alarm will be released and the detector will automatically return to standby mode.



Figure 3-5 Independent Photoelectric Smoke Fire Detector

2) Fire Extinguishing Device

- The fire extinguishing device is activated by a thermal sensing line. The thermal sensing line is located on the side of the device.
- The thermal activation line is a triggering device that automatically senses changes in ambient temperature.
- When the ambient temperature exceeds 180°C or open flame is detected, it will ignite automatically and activate the fire extinguishing device quickly and reliably.
- The casing will be hot after the device has completely discharged. Do not touch it. Allow natural cooling or other cooling methods before handling.
- To ensure safety, do not disassemble this device without authorization. For any inquiries, please contact DHN New Energy.

Table 3-7 Fire Protection System Parameters

Item	Parameter
Product Model	QRR0.3G/S-HSXN
Applicable Space (m^3)	≤3
Extinguishing Concentration (g/m^3)	100
Thermal Spacing (℃)	≤400℃ at 0.1m; ≤200℃ at 0.15m; ≤75℃ at 0.5m
Thermal Activation Temperature (℃)	180±15
Discharge Time (s)	≤25
Casing Temperature (℃)	≤200
Extinguishing Agent Dosage (g)	300±6
Discharge Distance (m)	>1
Operating Temperature (℃)	-50~+95
Valid Period (years)	10

3.7.4 Air Conditioning System

- The air conditioning system is used for heat dissipation of the energy storage system. Equipped with this air conditioner, the energy storage system can maintain a stable and suitable temperature and humidity environment.

- The operation of the air conditioner is fully automatic according to the temperature inside the cabinet. The controller detects the cabinet return air temperature via the internal circulation temperature sensor, compares it with the set value, and then controls the operation of the compressor or fan accordingly.

1) Cooling

Cooling startup point = cooling point + cooling sensitivity. When the temperature in side the cabinet exceeds the cooling startup point, the cooling will start; when the temperature inside the cabinet is lower than the cooling point, the cooling will stop.

Table 3-8 Cooling parameter setting point

Parameter	Default value	Setting range	Unit	Setting point description
Cooling point	30	[15 ~ 50]	℃	The temperature point at which cooling stops
Cooling sensitivity	5	[1 ~ 10]	℃	The sensitivity of the temperature control

2) Heating

Heating startup point = heating point - heating sensitivity. When the temperature in side the cabinet is lower than the heating startup point, the heating will start; when the temperature inside the cabinet is higher than the heating point, the heating will stop.

Table 3-9 Heating parameter setting point

Parameter	Default value	Setting range	Unit	Setting point description
Heating point	15	[-15 ~ 25]	℃	The temperature point at which heating stops
Heating sensitivity	10	[1 ~ 10]	℃	The sensitivity of the temperature control

3) Dehumidification

Dehumidification Start Point = Dehumidification Point + Sensitivity, when the ambient temperature inside the cabinet is higher than the Dehumidification start point, the dehumidifier will work; when the ambient temperature inside the cabinet is lower than the Dehumidification point, the dehumidifier stops working.

Table 3-10 Dehumidifier Parameter Setting Point

Parameter	Default value	Setting range	Unit	Setting point description
Dehumidification Point	60	[40 ~ 90]	%	The point at which the dehumidifier stops working
Sensitivity	10	[1 ~ 30]	%	Sensitivity of controlling the humidity



Figure 3-6 Air Conditioner Appearance

Table 3-11 Air Conditioning System Parameters

Parameter	Unit	MC30HDNC1A
Dimensions, Weight & Installation		
Overall Dimensions (W×D×H)	mm	500 × 250 × 1300
Overall Dimensions with Flange (W×D×H)	mm	550 × 250 × 1350
Net Weight	kg	62
Installation Method	/	Door-mounted
Application Environment	/	Outdoor
Environmental Protection & Performance		
Operating Ambient Range	℃	-40 ~ +25 (Heating)
		-25 ~ +55 (Cooling)
Noise Level	dB(A)	70
IP Rating	/	IPX5
Refrigerant	/	R134a
Cooling / Heating Capacity		
Cooling Capacity @L35/L35	W	3000 (@50Hz)
		3200 (@60Hz)
Heating Capacity @L5	W	2500
Power Consumption		
Cooling Input Power @L35/L35	W	1100 (@50Hz)
		1350 (@60Hz)
Rated Cooling Input Current @L35/L35 50Hz	A	5.2
Air Volume		
Internal Circulation Air Volume	m^3/h	700
Power Standard		
Power Supply Range	V, Hz	220±15%, 50Hz
		220±10%, 60Hz
Rated Cooling/Heating Current (Rated Max. Current)	A	9.0/12.0
Maximum Operating Current	A	12

4.Unpacking Inspection, Transportation and Storage

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

4.1.Unpacking and Checking

- Upon receipt, inspect all delivered components against the Packing List for completeness.
- Verify that the received cabinet and product model match the ordered model.
- Carefully check the product for damage that may have occurred during transit. Contact DHN New Energy promptly if any issues are found.
- Inspect before opening the PACK packaging. Do not open if abnormalities are detected; contact DHN New Energy. Check the quantity of all internal components against the Packing List. Contact DHN New Energy if any parts are missing or damaged.

Packing List

Take the packing list for the 241 kWh (DHN-HVC16x15-G1) high-voltage outdoor cabinet energy storage system as an example:

DHN-HVC16x15-G1 Packing List

No.	Name	Specifications	Quantity	Figure
1	Battery Cabinet	DHN-CAB16-8×2	1	
2	Battery_L	51.2V/314Ah	8	
3	Battery_R	51.2V/314Ah	7	
4	Battery Communication cable to PDU	L=1000mm/Unshielded Twisted Pair	1	
5	Battery Communication cable (Long)	L=1140mm/Unshielded Twisted Pair	1	
6	Battery Communication cable (Short)	L=150mm/Unshielded Twisted Pair	13	
7	Battery connection copper busbar (Long)	W221×H60×t3.0mm	2	
8	Battery connection copper busbar (Short)	W136×H27×t3.0mm	14	
9	PDU	W440×H230×D510mm	1	
10	PDU Power positive cable to inverter	6AWG/L=2000mm Red	2	
11	PDU Power negative cable to inverter	6AWG/L=2000mm Black	2	

12	PDU Communication cable to inverter	L=2000mm/Dual RJ45 connector/Yellow	1	
13	Grounding Wire	10AGW/L=260mm yellow&green	16	
14	RJ45 plug	Parallel 120R Terminal Resistor	1	
15	Rain eave for inverter	W700×H55×D400mm	1	/
16	Outdoor cabinet base baffle	W235×H95×t1.5mm	8	/
17	Expansion bolts	M12×80/Internal expansion type	4	
18	Hexagon socket head combination screw	M12×20	4	
19	Cross recessed hexagon socket head combination screw	M5×20	64	
20	Cross recessed pan head combination screw	M4×10	37	
21	Air conditioning accessories	/	1	/
22	Packing list	/	1	

4.1.1 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;
- 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.

4.1.2 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 excessive tilting during transportation.

4.2.Lifting Transportation

Lifting lugs are provided on the top of this product for hoisting transportation. The lugs shall be installed on site. Ensure the lifting lug bolts are fully tightened before lifting.

- Lifting must comply with the following requirements:

- Ensure on-site safety during lifting.
- Lifting and installation shall be performed by qualified personnel throughout the process.
- Use flexible slings or straps for handling; single-strap load capacity ≥ 5 t.
- The rated lifting capacity of the hoisting equipment shall be no less than 1.2 times the weight of the energy storage cabinet to be lifted.
- Ensure all slings are securely connected, with equal length for each sling attached to corner fittings; adjust length as needed on site.
- Keep the unit stable and level during lifting; ensure cabinet door is locked.
- Suspend the unit 300 mm above ground, verify secure connections, then lift further.
- Take all necessary auxiliary measures to ensure safety.

Note: For outdoor cabinets, hoisting units with PCS/hybrid inverters installed is strictly prohibited.

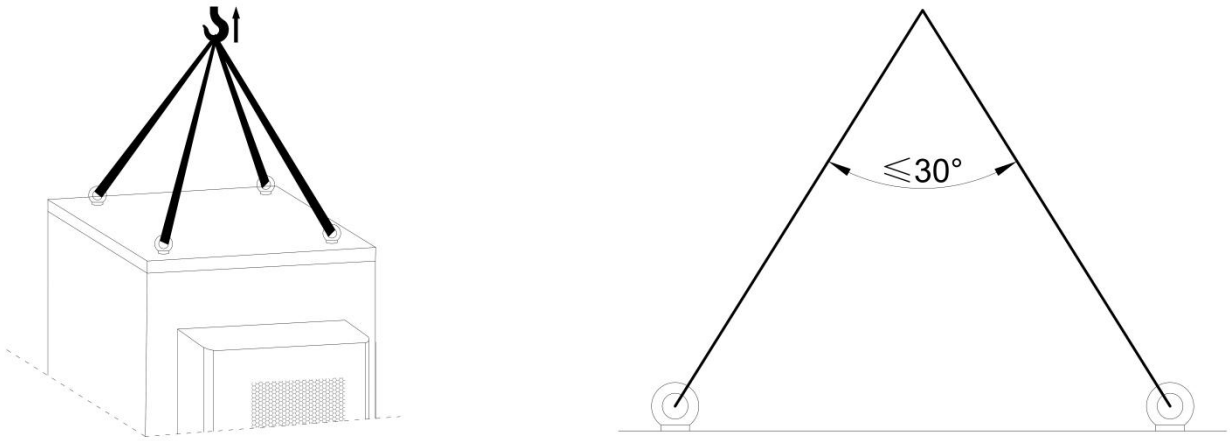


Figure 4-1 Lifting Transportation

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 left and right. 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.

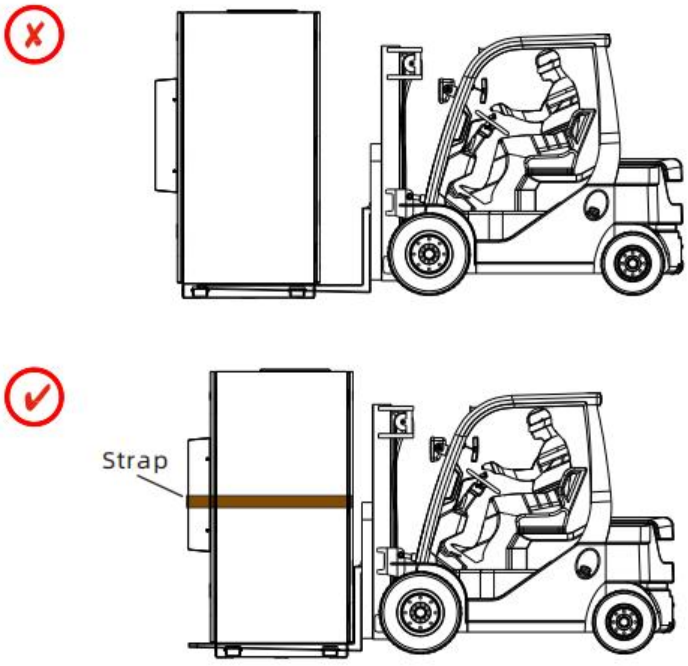


Figure 4-2 Forklift Transportation

4.4.Storage Requirement

4.4.1 Storage Environment Requirements

- The product shall be stored on a dry, flat (flatness should be no more than 5mm), solid ground with sufficient load-bearing capacity and no vegetation.
- To prevent internal condensation or bottom immersion during the rainy season, the product shall be stored on high ground.
- The foundation must be elevated; the specific height shall be determined according to on-site geological and meteorological conditions.
- Storage environment:Temperature: 0 ~ +35 °C;Humidity: 0 ~ 95% (non-condensing)
- Avoid harsh environments such as sudden cooling, sudden heating, and impact to prevent damage to the battery PACK.

4.4.2 Storage Operating Requirements

- The packing case shall not be tilted or inverted
- Ensure the cabinet door is locked before storage.
- Effectively protect the air inlet/outlet of the product to prevent rainwater and dust from entering the cabinet.
- Capacity degradation occurs during long-term storage; battery storage over 6 months is not recommended.
- For products stored for a long term (over 6 months):
- Conduct a visual inspection before installation to ensure no condensation and verify the equipment is intact.Perform an inspection after power-on.
- Carry out regular inspections.

Note: If the battery module is to be stored for more than 30 days, adjust the SOC to 50%–55% and perform one charge-discharge cycle every 6 months.

5.Installation

- The installation and use of batteries involve extensive professional knowledge.
- Therefore, please ensure that technicians possess valid technical certificates before operation.
- Be sure to read this manual prior to installation to understand product information and safety precautions.
- Personnel must be trained, qualified technicians with full knowledge of the entire PV system, power grid,battery system, operating principles, as well as national and local standards.
- Installers must use insulated tools and wear personal protective equipment.
- Equipment damage caused by failure to comply with the storage, transportation, installation, and operation requirements specified in this manual is not covered under warranty.
- Don't install or use batteries near explosive or flammable substances.
- Use the battery in a well-ventilated environment with an ambient temperature range of -20 °C to +55 °C
- The recommended operating temperature is 10 °C to 30 °C.
- When the ambient temperature exceeds 45 °C or is below 10 °C, the charge and discharge power of the battery may be derated.

DANGER	• Don't touch live parts!Ensure that both the AC side and DC side are de-energized before installation.All electrical connections must be performed in a de-energized state. • Check the polarity of all input cables before wiring to ensure correct polarity for each input. • Do not place the equipment on flammable surfaces.
WARNING	• Sand and moisture intrusion may damage electrical equipment inside the ESS cabinet or affect equipment performance! • Electrical connection work shall be avoided during sandstorm seasons or when the ambient relative humidity exceeds 95%; •Wait until there are no sandstorms and the weather is clear and dry before starting any connection work. During electrical installation, avoid pulling cables or wires forcefully to prevent damage to their insulation.
NOTE	• Sand and moisture intrusion may damage electrical equipment inside the ESS cabinet or affect equipment performance! • Electrical connection work shall be avoided during sandstorm seasons or when the ambient relative humidity exceeds 95%; •Wait until there are no sandstorms and the weather is clear and dry before starting any connection work. • During electrical installation, avoid pulling cables or wires forcefully to prevent damage to their insulation.

5.1.Installation Environmental Requirements

5.1.1 Site Requirements

- When selecting the installation location, fully consider the surrounding environment (climatic and geological conditions, such as stress wave release, groundwater level).
- There shall be no high-voltage lines vertically above the installation site, and no pipelines or other underground facilities below the site.

- Ensure the equipment base is higher than the local historical highest water level.
- A certain safety distance shall be maintained between the equipment and buildings as well as personnel, with the distance subject to the fire safety requirements of the project.
- The equipment must be installed on a solid and level surface; tilting and shaking are prohibited.
- The surrounding environment shall be dry and well-ventilated.
- The installation location shall be far away from toxic and harmful gases, as well as flammable, explosive,corrosive, and dust-intensive substances.
- The installation location shall be far away from residential areas to avoid noise interference.
- If the ESS cabinet is installed in an area with salt damage or pollution, corrosion may occur.

The ESS cabinet is suitable for the following environments or better:

- Outdoor environment more than 2000 meters away from the coast;
- Installation within 2000 meters from the coast is not recommended.(If installation is mandatory, please confirm with our engineers.)
- More than 3000 meters away from heavy pollution sources such as smelters, coal mines, thermal power plants, etc.
- More than 2000 meters away from medium pollution sources such as chemical plants, rubber plants,electroplating plants, etc.
- More than 1000 meters away from light pollution sources such as food processing plants, leather factories
- heating boilers, slaughterhouses, centralized waste treatment plants, sewage treatment stations, etc

5.1.2 Foundation Requirements

- The foundation shall provide sufficient load-bearing support for the equipment.
- The foundation height shall be higher than the local historical highest flood level.
- Foundation bearing capacity: > 3000 kg/m2
- Foundation service life: > 50 years
- Foundation levelness: < 3 mm/m2
- The ESS cabinet should be raised to against the rain. The recommended mounting height of the base is about 300mm-500mm higher than the ground.
- Drainage measures shall be constructed according to local geological conditions.

5.1.3 Wiring Requirements

- According to the position and size of cable inlet/outlet sufficient space shall be reserved for the AC-side cable trough during foundation construction, and cable conduits shall be pre-embedded in advance.
- The specification and quantity of pre-embedded conduits shall be based on the type and quantity of cables.
- Both ends of all pre-embedded conduits shall be temporarily sealed to prevent impurities from entering,otherwise, it will cause inconvenience for later wiring.
- If the power cord is insufficient in length, replace it rather than splicing or welding.
- After all cables are connected, cable inlets, outlets and connectors shall be sealed with fireproof mud or other suitable materials to prevent rodents from entering.

5.2.Installation Spatial Requirements

To ensure sufficient space for proper cooling and maintenance of the equipment, it is recommended to reserve adequate clearance around the cabinet installation location.
As shown in the figure below:

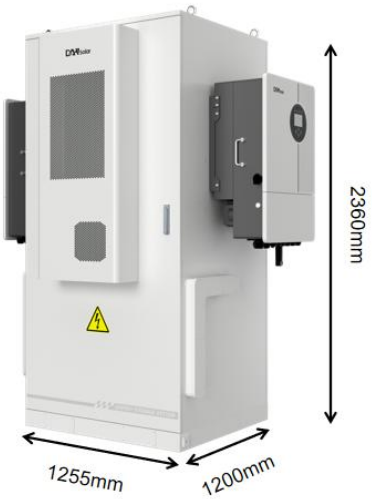


Figure 5-1 Single Product Dimension

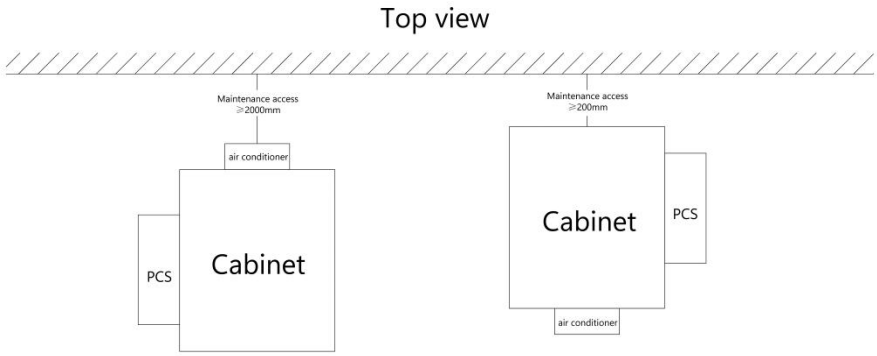


Figure 5-2 Space For Single Product Installation

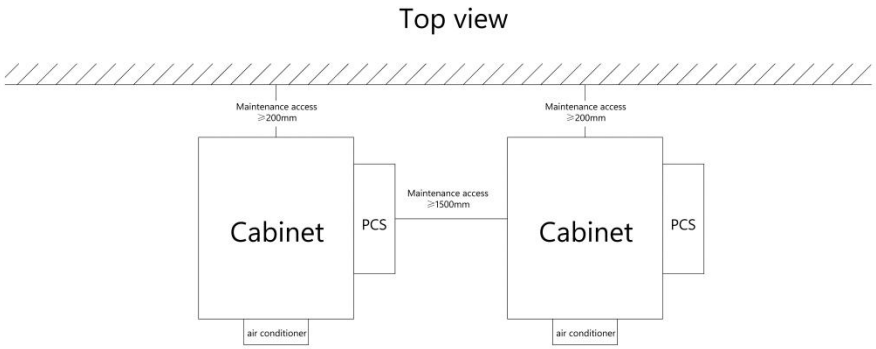


Figure 5-3 Installation Drawing of Multiple Products

5.3. Installation Procedure

Product installation shall follow the steps below. Refer to this chapter for detailed procedures:

a. Deliver the goods to the site
b. Check before installation
c. Open the outdoor cabinet door
d. Prepare cables and terminals, and attach labels to them
e. Check that all switches are in the OFF position
f. Connect the PE cable
g. Install the battery PACK

h. Connect the PCS (refer to the PCS installation manual)
i. Connect the PACK electrical cables and communication cables
j. Power-on

5.4.Preparation Before Installation

5.4.1 Tool Preparation


Insulated Gloves


Safety Goggles


Safety Shoes

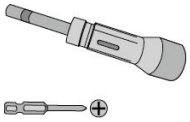

Protective Suit

Figure 5-4 Safety Gear


Phillips Screwdriver Bit


Wire stripper


Crimping


Torque wrench（Complete Set）


Multimeter (Range：1000-1500V)


Flat-Head Screwdriver


Socket wrench set


Drill (Φ16mm)


Tape Measure

Figure 5-5 Tools

5.5.Fixed Installation

5.5.1 Fixed ESS Cabinet

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.

The product is supplied with four expansion bolts as standard.Installation may use either Figure 5-6 (1) 500×1065 hole spacing or Figure 5-6 (2) 580×940 hole spacing, depending on the actual on-site installation environment.

1) Level the foundation

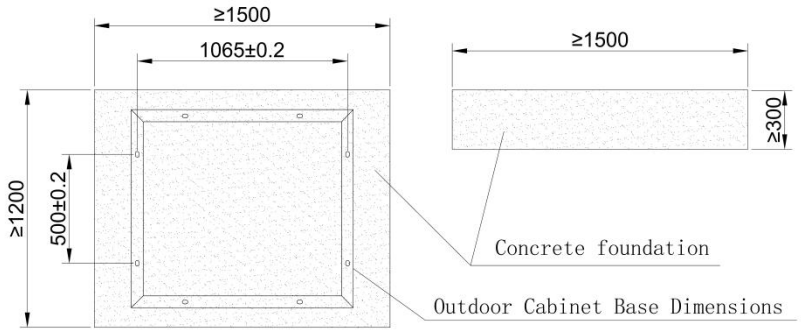


Figure 5-6 （1）Foundation Positioning

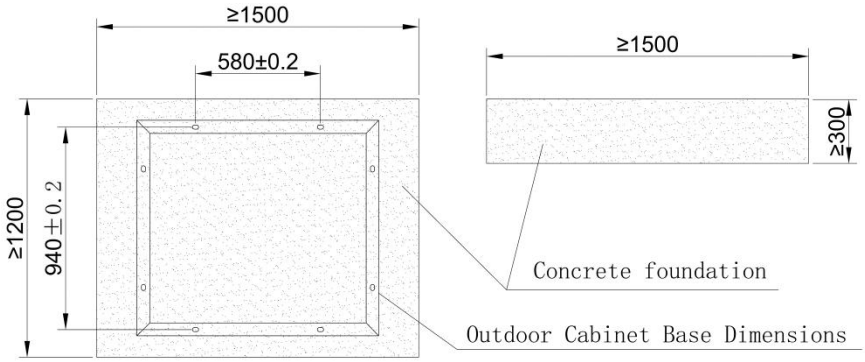


Figure 5-6 （2）Foundation Positioning

2) Drill holes on the foundation

a. Mark the hole positions at the intended installation location according to the dimensions shown in the figure below.
b. Drill holes at the marked positions.
c. Insert expansion bolts into the holes.
d. Tighten the bolts to expand the sleeves.
e. Remove the bolts.

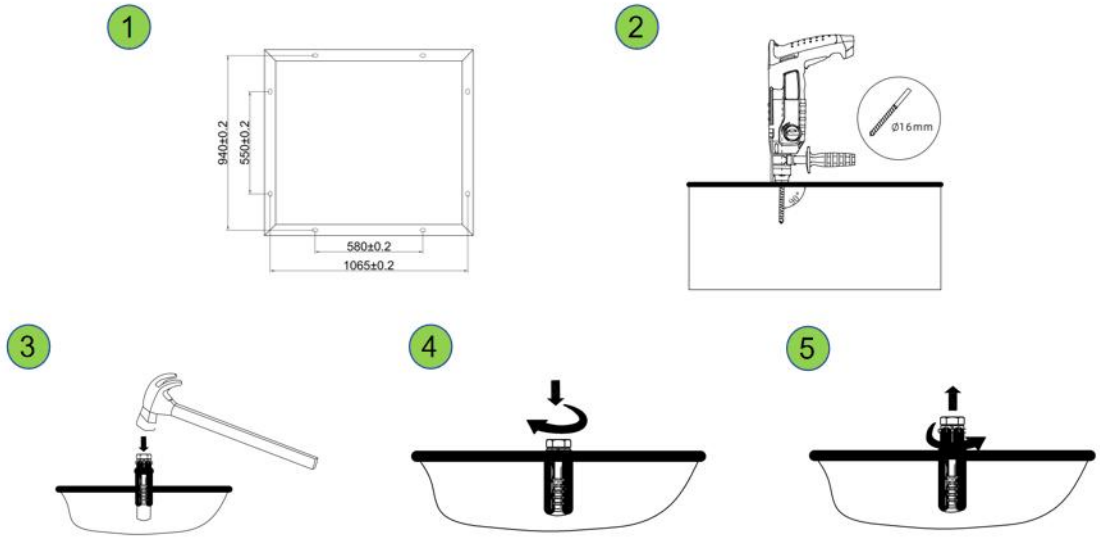


Figure 5-7 Concrete Foundation Drilling Process

3) Secure the cabinet to the foundation

- Move the cabinet onto the foundation, aligning the mounting holes in the cabinet base with the expansion bolt holes on the foundation.
- Insert four expansion bolts (M12×80) into the cabinet base mounting holes in sequence using a torque wrench, and tighten them into the expansion sleeves fixed in the foundation.
- Tighten the bolts gradually in a diagonal sequence to ensure the cabinet is level without tilting. The recommended tightening torque is 60 N·m.
- Verify that all four feet of the cabinet are firmly in contact with the foundation, with no suspension or wobble.
- After fixing is complete, clean the installation site and remove temporary supports and packaging protection materials.
- Subsequent electrical connections and equipment commissioning may only be carried out after the cabinet is fixed and level acceptance is qualified.

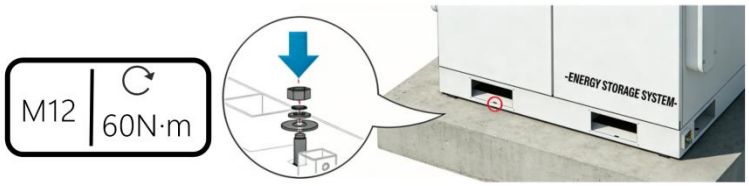


Figure 5-8 Cabinet Fixing

4) Forklift Hole Baffle Installation

- After the cabinet is fixed, the forklift holes must be closed to prevent foreign matter ingress and meet the protection rating requirements. Before installation, confirm that the cabinet is fully secured and level, and prepare 16 outdoor cabinet base baffles included in the accessories (dimensions: W235×H95×T1.5mm) and matching fasteners.
- Align the baffles with the forklift hole openings on both sides of the cabinet base. Install 4 baffles on each side, ensuring the baffle edges are flush with the cabinet base. Secure the baffles to the base frame using cross-recessed pan head combination screws (M4×10) with a recommended tightening torque of 4 N·m. It is recommended to install 4 screws per baffle to ensure sealing performance.
- Clean up any metal debris generated during installation to keep the cabinet base clean. Once the forklift hole baffles are installed, the cabinet base forms a fully enclosed structure, effectively preventing intrusion by small animals, rain splashing, and dust accumulation.

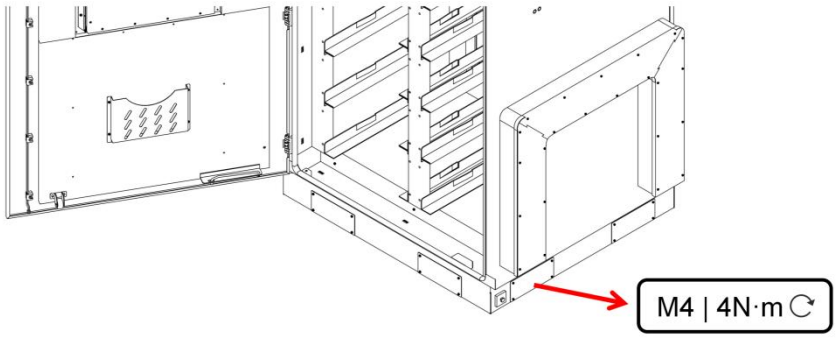


Figure 5-9 Forklift Hole Baffle Installation

5.5.2 Installation PCS

- The battery cabinet supports side-mounted PCS, which can be installed on either side as required to adapt to different project scenarios.
- Before assembly, confirm that the PCS model matches the battery cabinet, and check that the PCS appearance is free of damage and internal components are intact.

Follow these steps for side-mounted installation:

- Move the PCS to the intended installation side of the battery cabinet, ensuring the mounting surface is clean and free of foreign matter.
- Mark the mounting holes on the side wall of the battery cabinet according to the PCS installation manual.
- Use suitable bolts to connect the PCS mounting bracket to the battery cabinet frame. The tightening torque shall meet the requirements specified in the PCS manual,The factory-specified tightening torque for our inverters is 50 N·m..
- The electrical connection between PCS and battery cabinet includes DC power cables and communication cables.
- Before connection, confirm that the DC-side circuit breaker of the PCS is in the OFF position.
- Connect the DC cables led from the PDU to the PCS DC terminals according to the correct polarity.
- Ensure the plugs of the communication cables are fully locked.
- For some projects, the PCS is pre-installed on the outdoor energy storage cabinet before delivery and shipped as a complete unit.The actual delivery form shall be subject to the specific project.

5.5.3 Install the Rain Shield

- After completing the electrical connections, install a rain shield on the top of the PCS.The rain shield dimensions are Width 700 × Height 55 × Depth 400 mm, fixed with five M4×10 cross-recessed pan head combination screws.During installation, ensure the eave tilts outward for smooth drainage.Check the tightening status of all screws and confirm no looseness.
- The rain shield is used to protect the top of the PCS from direct rain erosion and extend the service life of the equipment. Before installation, confirm that the PCS is securely fixed and the top surface is clean and dry.
- Place the rain shield on top of the PCS and adjust its position so that the eave faces outward and all edges are aligned. Align the mounting holes of the rain shield with the pre-drilled holes on the PCS top, and fasten with four M4×10 screws. During installation, first lightly tighten the two diagonal screws, confirm the shield is level with no warped edges, then fully tighten the remaining screws one by one.

5.5.4 Door Opening Procedure

a. Ensure the equipment is in the locked state.
b. Push the lock cover upward over the lock hole.
c. Insert the key into the door lock and turn it clockwise.
d. Rotate the handle clockwise to the position shown in the figure to open the door.

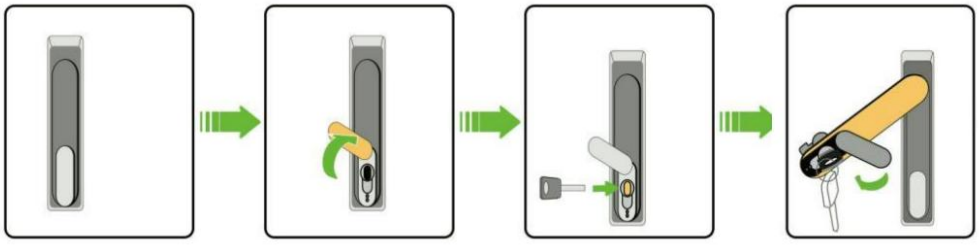


Figure 5-10 Door Opening Steps

5.6.PE Wiring

Grounding Requirements:

- The grounding impedance of the equipment shall comply with the requirements of local electrical safety standards.
- The equipment shall be permanently connected to the grounding conductor in the building electrical system.
- Check that the equipment is reliably grounded before operation.
- The grounding conductor shall be removed last when disassembling or maintaining the equipment.Do not start the equipment if the grounding conductor is not installed.
- Any violation of grounding conductor requirements is prohibited.

During grounding, consider the actual site conditions and follow the instructions of the power station staff.The grounding connection is shown below:

- Reserved grounding points can be grounded via cables/flat steel.
- Use 6AWG grounding cable. For requirements of grounding cables and terminals, refer to Section 5.5.2.



Figure 5-11 Grounding

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

5.7.Battery PACK Installation

- In accordance with safety transportation requirements, the battery packs may be disassembled and packed separately before the outdoor cabinet is shipped. If the battery packs are not disassembled, the battery pack installation steps are not required.
- Check and confirm that the number of batteries is correct and that there is no obvious damage to the surface of the battery wooden cases, in accordance with the packing list.
- Unpack and inspect whether the batteries are damaged during transportation, and verify that the actual items are consistent with the quantity specified in the packing list.
- For single-cluster systems, battery modules shall use R-Box (The R-Box will be automatically select-ed prior to shipment for the single-cluster system orders).
- For dual-cluster systems, the R-Box shall be pushed into the right side of the dual-cluster rack, and L-Box into the left side of the rack respectively.
- PDU shall be pushed into the top of the rack in the single cluster system and into the bottom right side of the rack in dual-cluster systems.
- Use a lift to hoist the batteries to be level with the rack installation position, ensuring that the bottom of the battery insertion box is level with the upper surface of the rack guide rails,Push the battery pack horizontally and

slowly into the rack until it fits tightly against the fixing points. If manual installation is adopted,pay attention to protection to prevent injury from slipping and falling.

Refer to the assembly drawing below, push the modules (Power Distribution Unit PDU and battery PACK) of the specified model and quantity into the cabinet, and secure them with the corresponding screws.

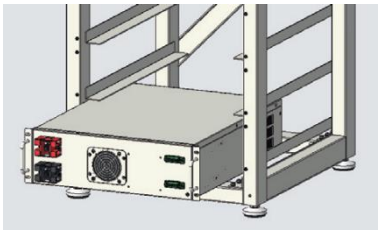
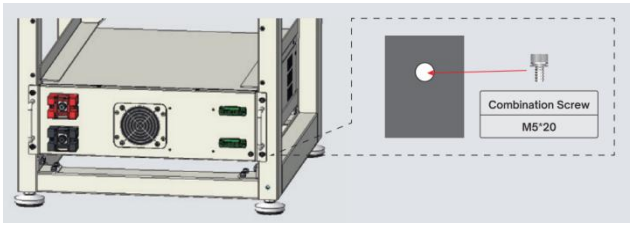
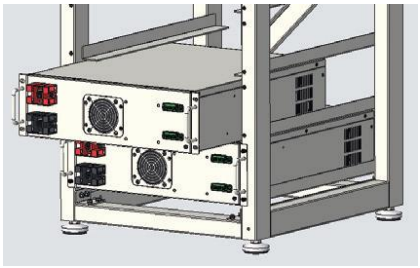
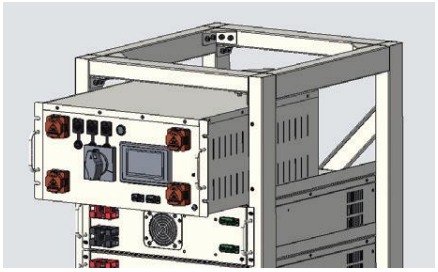
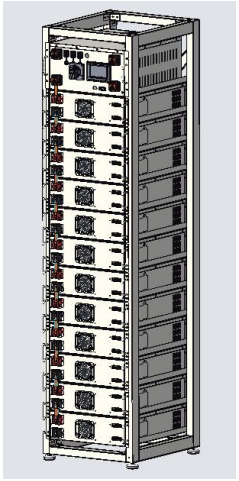
<table>
<tr><th colspan="3">5kWh Energy Storage System Assembly Diagram (Example: single cluster-13 units)</th></tr>
<tr><td colspan="2">01/ Install the first battery module</td><td>02/ Secure the module to the rack with 4 screws (M5*20)</td></tr>
<tr><td colspan="2"></td><td>
</td></tr>
<tr><td>03/ Repeat the operation to install the rest battery modules</td><td>04/ Install the PDU</td><td>05/ Finished appearance</td></tr>
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Figure 5-12 Installation of a Single Cluster System

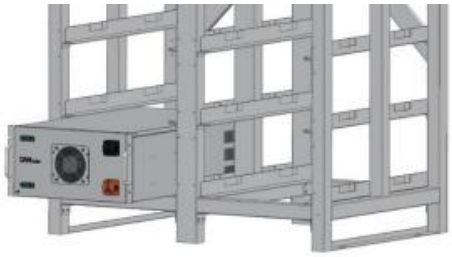
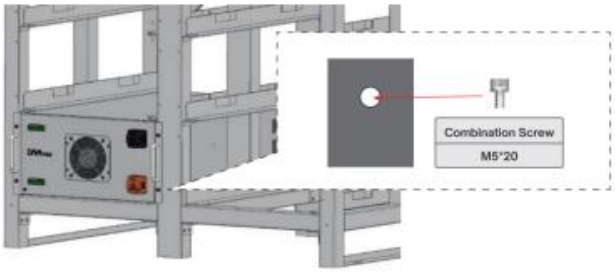
<table>
<tr><th colspan="3">16kWh Energy Storage System Assembly Diagram (Example: dual clusters-16 units)</th></tr>
<tr><td colspan="2">01/ Install the first battery module</td><td>02/ Secure the module to the rack with 4 screws (M5*20)</td></tr>
<tr><td colspan="2"></td><td>
</td></tr>
<tr><td>03/ Repeat the operation to install the rest battery modules</td><td>04/ Install the PDU</td><td>05/ Finished appearance</td></tr>
</table>



Figure 5-13 Installation of Dual Cluster System

5.8.Checking Before Wiring

5.8.1 Checking Breakers

Check that the power rotary switches below are in the OFF position, as shown in the figure.

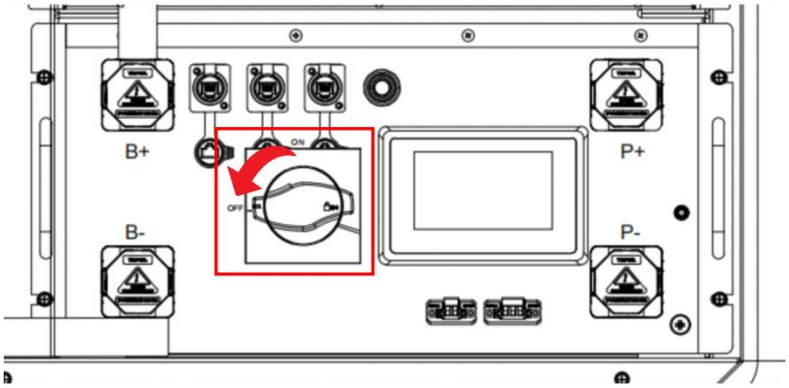


Figure 5-14 Position of Power Rotary Switch

5.8.2 Checking Before Wiring

Table 5-1 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	☐

5.8.3 Wiring Accessories Requirements

Cable Requirements:

- Having sufficient current-carrying capacity. The cable diameter must satisfy the maximum current-carrying capacity, and the length must allow for a margin.
- Be sure to choose flame-retardant cables.

- The cables used shall comply with the requirements of the local laws and regulations.
- Notice: The following accessories need to be prepared by the customer.

Table 5-2 Wiring Accessories

NO.	Type	Function	Specifications	Qty.	Notes
1	PE Cable	Grounding cable	6 AWG	As demand	
2	Cable terminal	Copper terminal	DT/SC 16-10	As demand	
3	Control cable	For connecting to other external devices	16 AWG	As demand	
4	Grounding bar	For grounding	40*4mm	As demand	

5.9.Electrical Wiring and Communication Wiring

WARNING	•To prevent personal injury and equipment damage, take proper protective measures during wiring (wear insulated gloves, insulated shoes, etc.).

5.9.1 Internal Electrical Wiring

To ensure product safety, the battery PACK power cables are delivered with the product and shall be installed on site as follows:

Note: Install the grounding wire according to the figure below before connecting any cables .

PACK Cable Connection
Use the screws supplied with the battery to connect the battery copper bars under safe conditions: • Remove the battery terminal plastic covers, connect the copper bars in series by linking the negative terminal of the previous PACK to the positive terminal of the next PACK. Ensure the connection sequence is correct. Tighten the screws securely, then reinstall the battery terminal plastic covers. • Tightening torque at battery terminals: 8-10 N·m . Note: After each copper bar connection, install the battery terminal plastic cover before proceeding to the next copper bar connection.
PACK to PDU Connection
• Connect the positive terminal of the PACK to B+ of the PDU. • Connect the negative terminal of the PACK to B- of the PDU. Note: Terminal color coding for PACK and PDU: • Orange: Positive (+) • Black: Negative (-)

5.9.2 Internal Communication Wiring

Refer to the figure below:

Communication Wiring Between PACKS
• Use short battery communication cables and long battery communication cables to connect the lower terminal of the

communication port of the previous PACK to the upper terminal of the communication port of the next PACK.Ensure the connection sequence is correct.

• Ensure correct alignment during insertion to avoid pin damage caused by forced connection.

• Tighten the fastening screws on the communication cable after insertion.

• After completing each connection, gently pull the cable to confirm the latch is fully engaged, preventing poor contact during later operation.

PACK to PDU Connection

• Use the battery-to-PDU communication cables (dual-row long type) to connect the spare communication ports of the bottom-left PACK to the COM1 and COM2 communication ports of the PDU respectively.

on

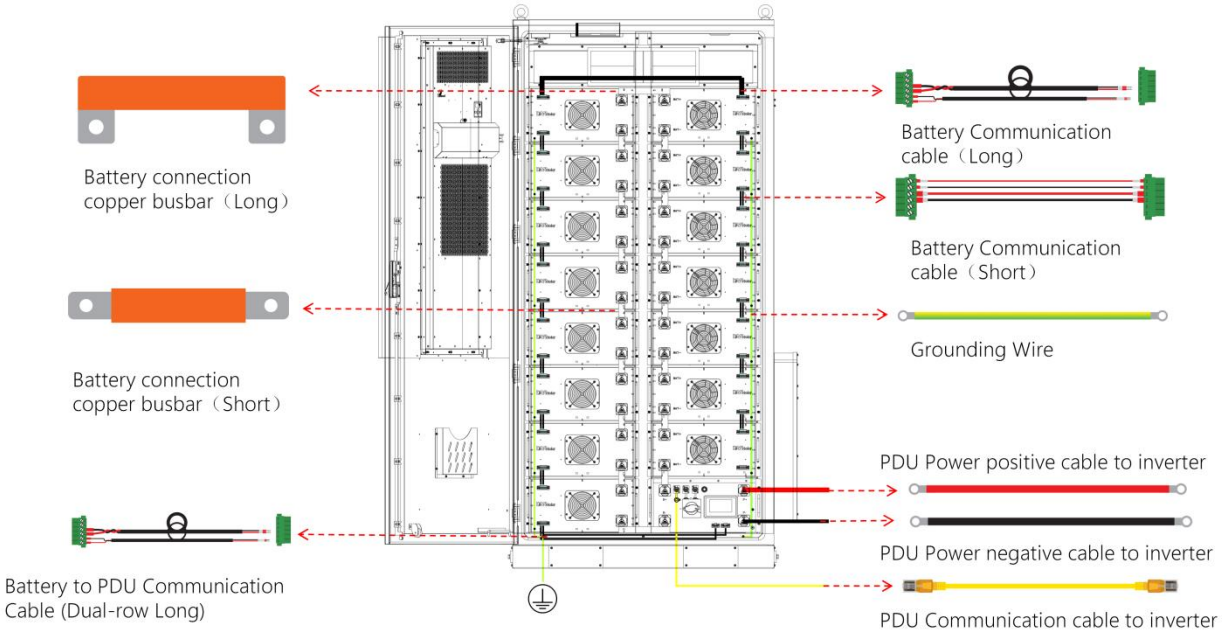


Figure 5-15 PACK Wiring



Figure 5-16 Communication Cable Screw Installation

5.9.3 Cable routing in cable trunking

- Cable routing in the cabinet trunking shall comply with standardized paths and fixing requirements to ensure neat arrangement, good heat dissipation and convenient later maintenance. The cabinet is equipped with four trunking holes from top to bottom: positive battery power cable trunk, negative battery power cable trunk, communication cable trunk, and AC mains cable trunk for air conditioner, as shown in Figure 5-19.
- After routing is completed, tighten the nuts with a torque wrench to the rated torque corresponding to the specification to maintain the cabinet's IP rating and prevent loosening and water ingress. Check the sealing of the four trunking holes to ensure the sealing rings are fully compressed and lock nuts are securely fastened without

gaps or looseness, preventing rain or moisture from entering the cabinet, and preparing for subsequent door closing and system commissioning.

- Internal cables are routed to external corresponding equipment through outlet holes, as shown in Figure 5-16.
- PV cables, grid or load cables are connected through external inlet holes. After cable installation, thoroughly seal all gaps at external inlet holes with fireproof putty to ensure no voids or looseness. After sealing, verify that the fireproof putty is fully filled, level, free of cracks or peeling, as shown in Figure 5-17.

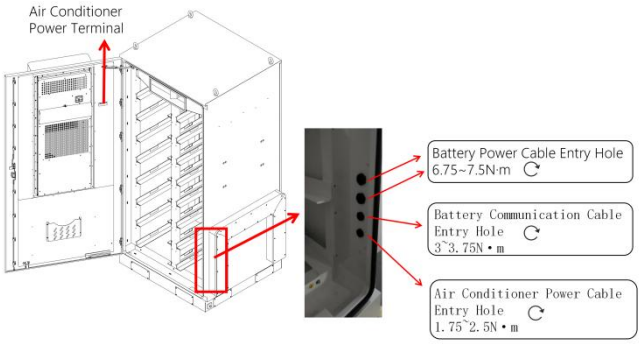


Figure 5-17 Internal Cable Entry Holes

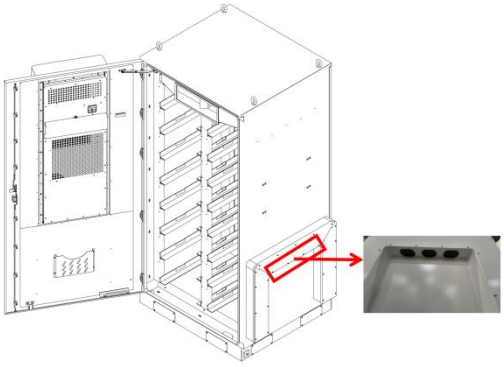


Figure 5-18 Cable Outlet Holes

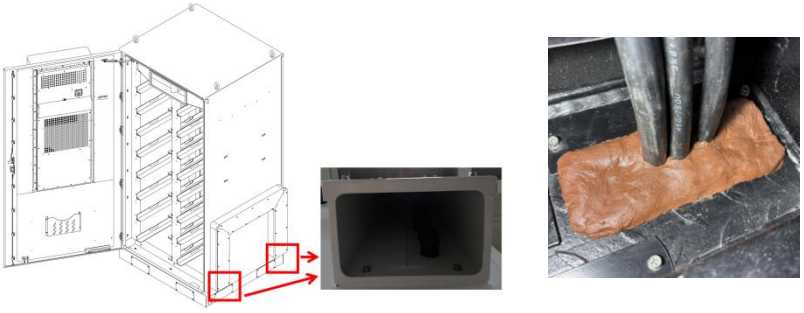


Figure 5-19 External Cable Entry Holes

5.9.4 External Wiring

This product supports connection to high-voltage inverters / high-voltage PCS.For detailed definitions, refer to Section 3.7.2.

Note: If you purchase a high-voltage inverter / high-voltage PCS separately to connect with this product,please pay attention to the battery port type on the inverter side.

- Both ends of the standard-configured battery power cable of this product are oT ring terminals.
- If it does not match the battery port of the inverter, please use the original battery power cable supplied with the inverter, or contact the inverter manufacturer to obtain compatible cables or adapter solutions.

5.10.Parallel Wiring

The battery cabinet supports multi-cluster parallel operation, with a maximum parallel quantity of 15 clusters. In multi-cluster parallel operation, all battery cabinets realize coordinated control via dedicated communication cables to ensure consistent charge and discharge status of each battery cluster.

5.10.1 Parallel Architecture Classification

- Small-scale parallel (≤ 4 clusters)Directly use the secondary BMS (BCU) module integrated in the PDU of the battery cabinet to complete parallel control, no extra hardware required.
- Large-scale parallel (> 4 clusters)An additional tertiary BMS (BAU) device is required for cluster management.For this configuration, please contact DHN New Energy for customized solutions.

5.10.2 The parallel wiring procedures for four or fewer battery cabinets are as follows:

1) Communication Cable Connection

a. Connect the COM OUT port of the first battery cabinet to the COM IN port of the second battery cabinet using a parallel communication cable.
b. For more cabinets in parallel, connect the COM OUT of the previous cabinet to the COM IN of the next cabinet in sequence.
c. Install a terminating resistor (RJ45 plug with 120Ω in parallel) on the COM OUT port of the last battery cabinet to eliminate signal reflection.
d. Connect the COM PCS port of the first battery cabinet to the battery communication port of the inverter using a communication cable.The first battery cabinet acts as the master to communicate with the inverter; ensure the communication protocols are matched.

2) Power Cable Connection

a. Connect the P+ terminal of each battery cabinet to the positive input terminal of the combiner cabinet respectively.
b. Connect the P- terminal of each battery cabinet to the negative input terminal of the combiner cabinet respectively.
c. Ensure all parallel cables have the same length, and the cable cross-section meets the total current carrying requirement.
d. Connect the positive output terminal of the combiner cabinet to the positive battery port of the inverter using the main cable.
e. Connect the negative output terminal of the combiner cabinet to the negative battery port of the inverter using the main cable.

Note: The combiner cabinet shall be provided by the customer.Specifications for different parallel quantities:

- 2 clusters in parallel: 4-input combiner cabinet is recommended.
- 4 clusters in parallel: 8-input combiner cabinet is required.

1) Outdoor Cabinet Specification Requirements

- The rated current of the combiner cabinet shall be no less than 1.25 times the sum of rated currents of all battery cabinets, with sufficient operating redundancy reserved.
- The cabinet is equipped with dedicated circuit breakers and comprehensive protection devices including short-circuit, overload, grounding, over-voltage and under-voltage protection.
- For outdoor installation, the IP rating of the outdoor cabinet shall be no less than IP54 to meet outdoor application requirements.

4) Grounding Continuity Check

- 1.Confirm that the PE terminals of all parallel battery cabinets are reliably grounded.
- 2.Measure the overall grounding resistance of the parallel system; the value shall comply with local electrical codes.

Precautions

- The parallel system must use battery cabinets of the same model, capacity and batch. Mixed use of different configurations is prohibited.
- After completing the parallel cable connections, check the polarity one by one. Reverse connection is strictly forbidden.
- The total voltage of the parallel system shall not exceed the maximum DC input voltage allowed by the PCS.
- After finishing parallel wiring, perform post-wiring inspection according to Section 5.11.Only after confirmation can the startup procedure be carried out.

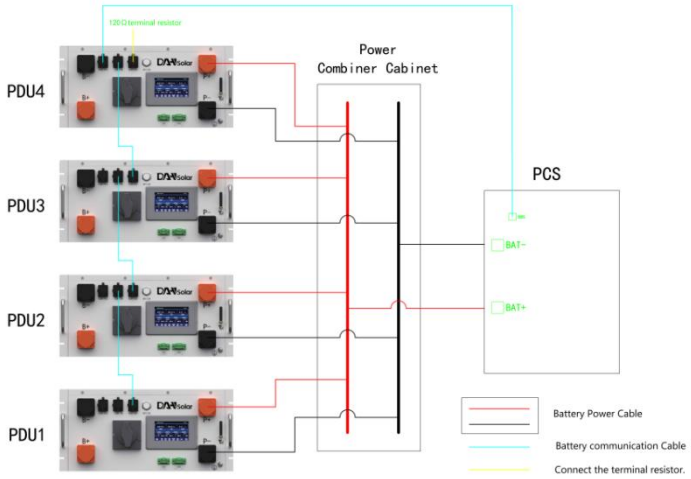


Figure 5-20 Parallel Wiring Diagram

6.Power On and Power Off

6.1.Power On Process

6.1.1 Precautions

- The product can only be put into operation after being confirmed by professionals and obtaining permission from the local power department.
- For a product that has been out of service for a long time, a comprehensive and detailed inspection must be carried out before power-on to ensure that all indicators meet the requirements before power-on.
- Battery installation and operation must be performed by professional technicians.
- Don’t touch any parts with potential difference.
- A warning sign shall be hung on the battery:"No touching by non-professionals"
- If any abnormality is found during the startup phase, shut down the system immediately.
- Don’t operate again until the problem is identified and resolved.
- Ensure the inverter is turned off before inspecting the battery system.

6.1.2 Pre-Power Inspection

Table 6-1 Checklist Before Power On

No.	Inspection Item	Confirmation
1	Disconnect the battery switch and grid-side switch before measurement, ensuring that both the AC and DC sides of the PCS are completely de-energized.	☐
2	Verify the correct connection of battery positive/negative terminals and PCS AC phase sequence. Measure the insulation resistance between three phases, which must reach the MΩ level. If it is kΩ or lower, inspect the circuit.	☐
3	Check that external cables, PE cables, and communication cables are securely connected without looseness.	☐
4	PE cable resistance < 0.1Ω; cables are intact with no damage or cracks.	☐
5	Clean the installation area and confirm no tools, parts, or other irrelevant items are left inside the ESS cabinet.	☐
6	Seal all openings and gaps around the ESS cabinet's cable entry/exit holes tightly with fireproof and waterproof materials.	☐
7	The equipment is in good condition with no damage, corrosion, or paint chipping. Touch up any chipped paint areas and replace damaged labels promptly to ensure clear visibility.	☐
8	Cable sheaths are intact with no obvious damage; conduit hoses for routed cables are in good condition.	☐
9	Cable connection positions are consistent with the design; terminals are fabricated per specifications and securely connected. Labels at both ends of each cable are clear and oriented uniformly.	☐
10	Cables are routed neatly and aesthetically; cable tie ends are trimmed flush with no sharp edges exposed. Leave sufficient slack at bends without tension; routing is straight and smooth with no crossing or kinking inside the cabinet.	☐
11	Verify that AC/DC voltages meet startup requirements and confirm no over voltage risk with a multimeter.	☐
12	Check for condensation inside the cabinet. If present, ventilate the ESS cabinet until condensation is completely eliminated.	☐
13	Inspect signal/power cables for residual wire ends, metal shavings, or other foreign objects that may cause short circuits.	☐
14	Check PE cable connections to confirm no grounding faults.	☐

6.1.3 Startup Procedure

- Use a multimeter to measure the voltage between BAT+ and BAT- (within the voltage range of the system).
- Close the battery switches (the low-voltage control switch and the main power switch).
- Turn on the switches of the PCS sections (refer to the PCS manual for PCS switches).

After completing the above steps in sequence, check the system operating status and parameters on the inverter screen to verify whether all functions are activated and operating normally.

6.2.Power Off Process

- Shut down the inverter following the steps in the inverter manual or instructions, and ensure it stops operating.
- Turn off the DC and/or PV switches on the inverter, as well as the AC-side circuit breaker.
- Turn off the power switch and low-voltage control switch on the battery system high-voltage box.

WARNING	· After operating step by step, the system will stop running, and the product indicators and screen will go out. After the inspection is completed, wait for five minutes to perform maintenance and inspection operations.

7.Screen Operation Of PDU

7.1.User mode

- First boot and enter user mode (Figure 7-1)
- Click anywhere on the screen to pop up the following button (Figure 7-2)



Figure 7-1

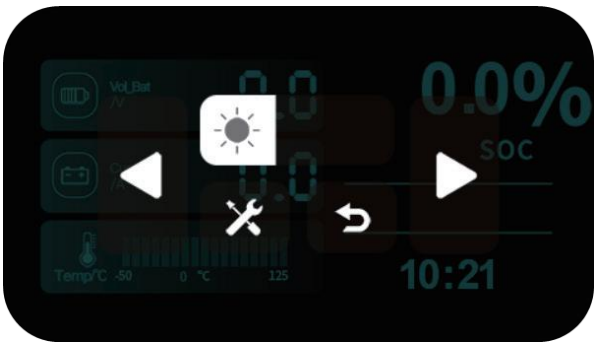


Figure 7-2

Table 7-1 Description of Display Interface Operation Symbols

SYMBOL	EXPLANATION
	Click to switch different user mode styles (including day/night mode)
	Slide left and right to adjust screen brightness
	Click to enter engineering mode to view more information
	Click to return to the interface

7.2.Engineering Mode

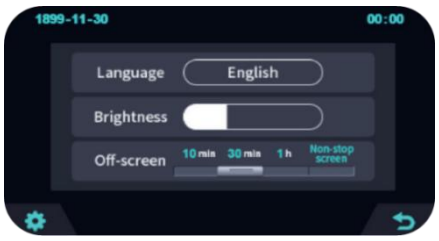
Enter engineering mode. The display layout will be as follows:

- Date displayed at the top left
- Faults displayed between the date and time
- Time displayed on the right temperature, and lowest temperature
- Central area displaying total voltage, SOC, total current, highest voltage, lowest voltage, highest
- The navigation menu is displayed at the bottom, allowing to switch to viewing interface details.



Figure 7-3 Engineering Mode Interface

Table 7-2 Description of System Display Interface Function Options

Settings		• Click to switch Languages. • Slide to adjust brightness. • Check off-screen time
Cell vol Cell Voltage		· Slide left and right to view the voltage value of each cell
Cell Temp Cell Temperature		•Slide left and right to view the temperature of each cell
Running Status Running Status		Check BMS running status: . System state . Battery status · Permissible current values

8.Fault Description

Under normal operation, some temporary alarms will automatically clear,If the solution provided below still doe not solve the problem, please contact DHN New Energy.

Table 7-1 Fault Description And Solution

Fault Phenomenon	Possible Causes	Solutions

High-voltage Box Screen Turns Off Automatically	· Enters screen-off mode due to long-term inactivity	· Touch the screen or adjust the screen-off time
High-voltage Box Screen Remains Black with No Battery Voltage Output	· Power switch and low-voltage switch not closed	· Check if the power switch and low-voltage switch are turned on
Excessively High Single Cell Voltage	· BMS hardware failure	· Power off and wait for 5 minutes, then restart. ·If the fault persists, please contact the distributor/our customer service center.
Excessively Low Single Cell Voltage / Excessively Low Total Voltage	· Over-discharging (exceeding DOD) · BMS communication failure	· Check the current battery level. If over-discharged, stop discharging and switch to charging mode · Check if the communication cables and copper bars between the battery and high-voltage box are loose. ·If the fault persists, please contact the distributor/our customer service center.
Excessively High Total Voltage	· BMS communication failure	· Check if the communication cables between the battery and high-voltage box are loose. ·If the fault persists, please contact the distributor/our customer service center.
Excessively High Charging Current	·PCS communication failure	· Contact the PCS manufacturer to troubleshoot PCS communication and control faults and fix command abnormalities.
Excessively High Discharging Current	PCS overload / communication failure	·Contact the PCS manufacturer to troubleshoot PCS communication and control faults and rectify abnormal commands. ·If the fault persists, please contact the distributor or our customer service center.
Excessively Low Single Cell Temperature	·The air conditioning heating system fails to start or malfunctions ·BMS hardware failure ·Ambient temperature is too low	·Check whether the air conditioner is operating. ·Install the equipment within the specified temperature range. ·If the fault persists, please contact the distributor or our customer service center.
Excessively High Single Cell Temperature	·The air conditioning cooling system fails to start or malfunctions ·BMS hardware failure ·Excessively high ambient temperature	·Check whether the air conditioner is operating. ·Install the equipment within the specified temperature range. ·If the fault persists, please contact the distributor or our customer service center.
Low SOC	·Long-term storage at low SOC, resulting in excessively low battery voltage	·Charge the battery. ·If the fault persists, please contact the distributor or our customer service center.
Excessive cell voltage difference / Excessive cell temperature difference / Cell voltage fault / Cell temperature fault	·BMS hardware failure	·Power off, wait for 5 minutes, then restart. ·If the fault still exists, please contact the distributor or our customer service center.

Sparks Occur When Connecting Power Cables	· Reverse polarity of power cables · Oxidized or loose terminals with poor contact · Live wiring without power cutoff · Damaged cable insulation causing short circuit and electric leakage · Excessively high contact resistance caused by loose terminals	· Cut off power immediately, check the polarity of power cables, and correct the wiring · Clean the oxide layer on the terminals and tighten the connection terminals · Strictly implement power cutoff operation and confirm no power before wiring · Check the cable insulation layer and replace damaged cables · Tighten the terminals to ensure good contact and reduce contact resistance
Communication Failure Between Battery and Inverter	· Loose, broken, or poorly contacted communication cables · Mismatched communication protocols · Faulty communication module of BMS or inverter	· Check the communication cables, tighten the plugs, and replace broken wires · Verify and unify the communication protocol between BMS and inverter · Contact the distributor/our customer service center
Abnormal System Noise	· Relay activation/disconnection · Fan failure (stuck, worn) · Loose wiring terminals and fasteners · Internal component failure of inverter	· A single sound during high-voltage box startup or shutdown is a normal phenomenon · Shut down to inspect the fan, clean foreign objects, or contact the distributor/our customer service center to replace the faulty fan · Tighten all terminals and fasteners · Contact the PCS manufacturer for troubleshooting

9.System Maintenance

WARNING	• Operation and maintenance work must comply with the laws and regulations of your region and the precautions in this manual; • Maintenance of the system must be carried out by qualified operators with knowledge of power and electricity; • Start inspecting only after the internal equipment of the ESS cabinet is completely powered off during system maintenance! During the inspection, if non-conformance are found, please correct them immediately.
Prohibition	• Daily cleaning and maintenance of the air conditioner does not require removal of the outer cover; direct water rinsing is allowed.The outer cover may only be disassembled from the inside during equipment maintenance, and disassembly of the air conditioner outer cover is strictly prohibited under normal circumstances. • Removing the outer cover may easily cause loss of equipment sealing, compromising protection performance and operational safety.If the outer cover must be removed for maintenance purposes, sealant must be evenly applied during reinstallation to ensure reliable sealing and prevent failures caused by poor sealing.

9.1.Safety Precautions

- The energy storage cabinet contains lethal high voltage inside. Accidental contact may result in fatal electric shock.
- After shutdown, wait at least 5 minutes before opening the cabinet door.
- Before maintenance, ensure the equipment is completely de-energized.
- After disconnecting the power supply, hang warning signs at the disconnection points to prevent unauthorized power-on during maintenance.
- To avoid accidental hazards, maintenance personnel shall wear insulated protective equipment during maintenance.
- Qualified Personnel:Only authorized and qualified personnel are allowed to perform maintenance on the energy storage cabinet.

Operation Guidelines

- During maintenance, do not leave screws, washers, or other metal parts inside the cabinet, to avoid equipment damage.
- Environmental Requirements:Sandstorms or moisture may damage electrical components or degrade performance.

Prohibited conditions

Do not open the cabinet during sandstorms or when the ambient relative humidity exceeds 95%.Maintenance shall only be performed in dry, sandstorm-free weather.

Power Disconnection Verification

- Disconnect all AC/DC side switches and the front/rear circuit breakers of the cabinet.Before maintenance, verify that the cable terminals are de-energized to prevent electric shock.
- During system operation, potential issues may occur due to ambient temperature, humidity, dust, vibration, and aging of internal components of the inverter.To ensure long-term stable operation of the energy storage system, it is necessary to arrange maintenance personnel to perform regular inspections according to Table 8-1, so that problems can be detected and handled in a timely manner.
- For systems installed in sandy, dusty, salt-spray or heavy industrial park areas:quarterly maintenance is recommended.
- For energy storage systems installed in areas with favorable climate conditions:semi-annual maintenance is recommended.

Table 9-1 System Maintenance Checklist

Item	Inspection Checklist	Frequency
Cabinet Exterior	Check for flammable materials on the ESS cabinet.	Once per year
	Verify that the ESS cabinet and expansion bolts are secure and free from corrosion.	
	Inspect the ESS cabinet enclosure for damage, paint peeling, or oxidation.	
	Check if the cabinet door lock can be opened smoothly.	
	Verify that the sealing strips are securely fixed.	
	Inspect the ESS cabinet and internal equipment for damage or deformation.	
	Check if warning signs and labels are clearly visible,Replace if necessary.	
Cabinet Interior	Check for loose or missing screws inside the ESS cabinet.	Once per year
	Verify good contact between cable shielding and insulating sleeves, and ensure the grounding copper busbar is securely fastened.	
	Inspect the ESS cabinet interior for oxidation or corrosion.	
	Check that the humidity inside the ESS cabinet is within the normal range; clean if necessary.	

	Check for foreign objects, dust, dirt, or condensation inside the ESS cabinet.	
	Check for water leakage inside the ESS cabinet.	
	Verify correct equipotential bonding inside the ESS cabinet.	
	Check for abnormal noise inside the ESS cabinet during operation.	
	Check for excessively high temperature inside the ESS cabinet.	
	Check if the humidity inside the ESS cabinet is within the normal range; clean if necessary.	Low humidity areas: Once per year
		Medium humidity areas: Once per 6 months
		High humidity areas: Once every 1–3 months
Wiring & Cable Routing	Check that all cable entry/exit ports of the ESS cabinet are properly sealed.	Once per year
	Check for loose power cables.	
	Inspect power and control cables for damage, paying special attention to insulation cuts where cables contact metal surfaces.	
	Check that the insulation covering on cable terminals has not peeled off.	
	Verify correct PE cable connections; the grounding resistance shall not exceed 1 Ω.	
	Regularly inspect the grounding flat steel for rust or corrosion. Touch up and reapply anti-corrosion paint if paint is peeled; replace the grounding flat steel if corroded.	
Fire Protection System	Conduct comprehensive inspection and maintenance on the thermal aerosol temperature-sensitive self-start fire suppression device: • Inspect the aerosol fire suppression device for physical damage. • Observe the operation indicators of smoke and heat detectors to verify normal sensor operation.	Once per year
Fan	Check the operating status of the battery fans.	Once per 6 months
	Check if the battery fans are blocked.	
	Check for abnormal noise during battery fan operation.	
Air Conditioner	Check the operating status of the air conditioner.	Once per 6 months
	Check if the air inlet and outlet of the air conditioner are blocked.	
	Check for abnormal noise during air conditioner operation.	

10.Quality Assurance

Warranty period please refer to "Technical Agreement"and " Warranty Agreement".

Service within warranty period
• For any DHN New Energy ESS products that fail during the warranty period, we will be responsible for troubleshooting and provide appropriate replacement or repair solutions, including free service or replacement of defective products.A valid invoice and proof of purchase are required for warranty service.Meanwhile, the DHN New Energy trademark shall be clearly visible to validate the warranty.

We reserve the right to void the warranty under the following conditions:

- Equipment damage caused by earthquakes, floods, volcanic eruptions, mudslides, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, extreme weather events and force majeure;
- Operation not in accordance with the usage conditions specified in this manual;
- Installation and operating environment not complying with relevant international, national or regional standards;
- Equipment installation and operation performed by unqualified personnel;
- Failure to follow the operating instructions and safety warnings provided in the product and documentation;
- Unauthorized disassembly, modification of the product or alteration of software code;
- Damage caused by transportation by you or a third party authorized by you;
- Damage resulting from storage conditions not meeting the requirements specified in the product documentation;
- Materials and tools provided by you not complying with local laws, regulations and relevant standards;
- Damage caused by negligence, intentional acts, gross negligence, improper operation on your part or by a third party, or for reasons not attributable to our company.

For failures caused by the above conditions, paid repair services can be provided by DHN New Energy upon customer request.If you have any questions about this product, please contact us.To resolve your issue more efficiently, please provide the following information:

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

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