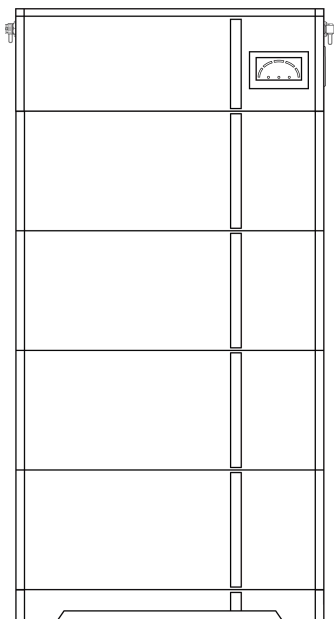




User Manual

Spring series LFP Battery

AI-W5.1-B (PDU1)



Issue: 04

Date: 20251107

How to Use This Manual

Read the manual and other related documents before performing any operation on the battery. Documents must be stored carefully and be always available.

Contents may be periodically updated or revised due to product development. The information in this manual is subject to change without notice.

All Rights Reserved

No part of this document can be reproduced in any form or by any means without the formal permission of the manufacturer.

Trademarks and Permissions

Trademarks used in this manual are owned by the manufacturer. All other trademarks or registered trademarks mentioned in this manual are owned by their respective owners.

Software Licenses

- * It is prohibited to use data contained in firmware or software developed by the manufacturer , in part or in full, for commercial purposes by any means.
- * It is prohibited to perform reverse engineering, cracking, or any other operations that compromise the original program design of the software developed by the manufacturer.

Disclaimer

The manufacturer shall not be liable for personal injury, property loss, product damage and subsequent losses under the following circumstances:

- * Damages caused by force majeure, including earthquake, flood, volcanic eruption, mudslide,, lightning, fire, war, military conflict,typhoon, hurricane, and so on.
- * Failure to comply with the provisions of this manual.
- * The installation, operation and storage environment does not meet the relevant international, national or regional standards;
- * Incorrect use of this product.
- * Unauthorized or unqualified personnel repair the product, disassembly the rack and perform other operations.
- * Use of unapproved spare parts.
- * Unauthorized modifications or technical changes to the product or software.
- * Incorrect shipment by yourself or the third party commissioned by you.
- * Unsatisfactory materials and tools from you own that do not meet the relevant international, national or regional standards.
- * Damage caused by yourself or the third party's negligence, intent, gross negligence, or improper operation.

Contents

1 Safety Instructions	3
1.1 Terms and Symbols	3
1.2 Safety Rules	4
2 Product Description	6
2.1 Product Features	6
2.2 Application Scenarios	6
2.3 Product Introduction	7
2.3.1 Manufacturing date description	7
2.3.2 System Overview	7
2.3.3 Power Distribute Unit (PDU)	8
2.3.4 Battery pack	9
2.3.5 Base	10
3 Preparation for Installation	11
3.1 Power Distribute Unit Package	11
3.2 Battery Pack package	12
4 Installation Instructions	14
4.1 Installation Personnel	14
4.2 Installation Environment	14
4.3 Layout	16
4.4 Installation clearance	16
4.5 Installing the Battery	17
4.5.1 Method 1	18
4.5.2 Method 2	20
5 Electrical Connection	23
5.1 Preparation before wiring	23
5.2 Wire connection	24
6 Operating the Product	27
6.1 Start the Battery System	27
6.2 Stop the Battery System	27
6.3 Monitoring	28
7 Inspection, Cleaning and Maintenance	29
7.1 General Information	29
7.2 Inspection	29
7.3 Cleaning	29
7.4 Maintenance	29
7.5 Storage	30
8 Troubleshooting	31
9 Technical Specifications	33
10 Environmental Disposal	35
11 Transportation Requirements	36

1 Safety Instructions



Warning!

Read and follow carefully all safety warnings and all instructions . Failure to do so may result in electrical shock, fire, serious injury, or death. Save these instructions for future reference.

1.1 Terms and Symbols

Terms /Symbols	Description
 Danger	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
 Warning	Indicates a hazard with a medium level of risk which, if not avoided, will result in death or serious injury.
 Caution	Indicates a hazard with a low level of risk which, if not avoided, will result in minor or moderate injury.
 Notice	Indicates a potentially hazardous situation which, if not avoided, could results in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.
 Note	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.
	Caution , risk of electric shock symbol indicates important safety instructions , which if not correctly followed , could result in electric shock.
	The DC input terminals of the inverter must not be grounded.
	Surface high temperature , Please do not touch the inverter case .
	CE mark of conformity
	Please read the instructions carefully before use .
	Indicate that this product is recyclable
	Do not place near open fire or incinerate. Do not use near heaters or hot temperature source.
	Attention! The risk of explosion.
	Li-ion battery
	Do not tread
	Do not run and chase

	Do not touch with your palm
	Symbol for the marking of electrical and electronics devices according to Directive 2002/96/ EC. Indicates that the device , accessories and the packaging must not be disposed as unsorted municipal waste and must be collected separately at the end of the usage . Please follow Local Ordinances or Regulations for disposal or contact an authorized representative of the manufacturer for information concerning the decommissioning of equipment.

1.2 Safety Rules

- 1) After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer.
- 2) Before installation, be sure to cut **off** the grid power and make sure the battery is in the turned-**off** mode.
- 3) Wiring must be correct. Be careful to negative pole and positive of cable and terminals. Make sure no short circuit with the external device.
- 4) It is prohibited to connect the battery and AC power directly.
- 5) Please ensured the electrical parameters of battery system are compatible to related equipment.
- 6) Do not allow the terminals to contact exposed wire or metal.
- 7) Keep out of reach of children or animals.
- 8) Do not place batteries near fire, heater or high temperature sources. This will reduce the risk of explosion or possible injury.
- 9) Batteries can explode in the presence of a source of ignition, such as open flame. An exploded battery can propel debris and chemicals. If occurs, flush with water immediately.
- 10) Do not submerge the battery in water or expose it to moisture. Do not disassemble or alter the battery in any way.
- 11) If the battery system needs to be moved or repaired, the power must be cut **off** and the battery is completely shut down.
- 12) It is prohibited to connect the battery with different type of Battery.
- 13) It is prohibited to put the batteries into use with faulty or incompatible power conversion system (hereafter refers to "PCS").
- 14) It is prohibited to disassemble the battery.
- 15) In case of fire, only dry fire extinguishers can be used. Liquid fire extinguishers are forbidden.
- 16) Please do not open, repair, or disassemble the battery except qualified personnel. We do not undertake any consequences or related responsibility which be- cause of violation of safety operation or violating of design, production, and equipment safety standards.

- 17) Battery needs to be recharged within 48 hours after fully discharged.
- 18) Do not expose cable outside.
- 19) Do not expose battery to flammable or harsh chemicals or vapors.
- 20) Do not paint any part of Battery, include any internal or external components.
- 21) Do not connect battery with PV solar wiring directly.
- 22) Any foreign object is prohibited to insert into any part of battery.
- 23) Do not strike, drop, puncture or step on the battery. A damaged battery is subjected to explosion. Properly dispose of damaged battery immediately.
- 24) In case of electrolyte leakage, keep leaked electrolyte away from contact with eye or skin. If that occurs, wash immediately with clean water for at least 10 minutes, then seek immediate medical attention.

2 Product Description

2.1 Product Features

- 1) The lithium iron phosphate battery is one of new energy storage products, which can be used to support reliable power for various types of equipment and systems. The whole module is non-toxic, non-polluting, and environmentally friendly.
- 2) This product has built-in BMS battery management system, which can manage and monitor cells information including voltage, current and temperature. What' s more, BMS can balance cells charging and discharging to extend cycle life.
- 3) Cathode material is made from LiFePO₄ with safety performance and long cycle life.
- 4) Flexible configuration. Multiple batteries can be in parallel for expanding capacity and power.
- 5) Adopted self-cooling mode rapidly reduces system noise.
- 6) The module has less self-discharge, no memory effect, excellent performance of shallow charge and discharge.
- 7) Battery module communication address auto networking, easy maintenance, support remotely monitoring and upgrade the firmware.
- 8) High-power density: flat design, stack-mounted, saving installation space.
- 9) Restricted-current charging module can help improve battery life.

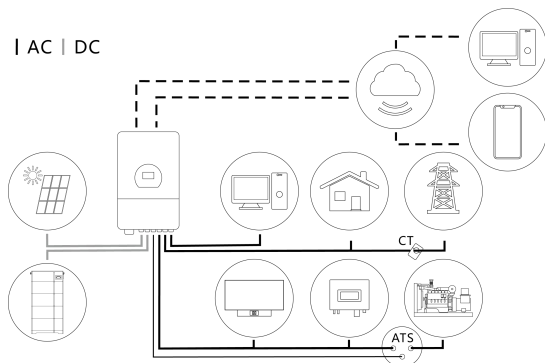
2.2 Application Scenarios

The following illustration shows basic application of this battery.

It also includes following devices to have a complete running system.

- Generator or Utility
- PV modules
- Low voltage Hybrid PCS (Charge & Discharge)

Consult with your system integrator for other possible system architectures depending on your requirements.

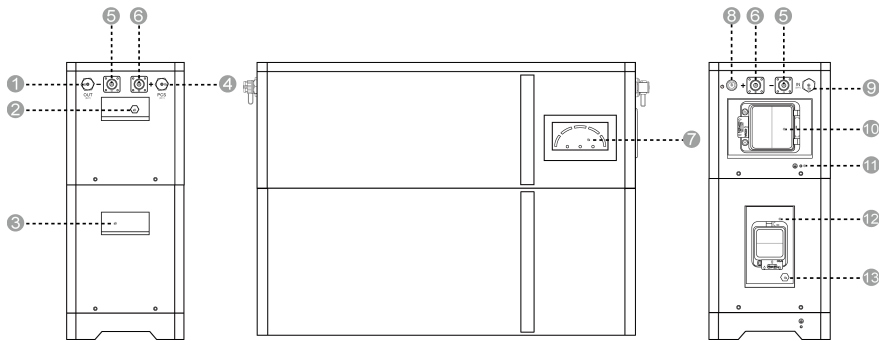


2.3 Product Introduction

2.3.1 Manufacturing date description

SN code	No.	Description
056 XX XXX X X XX XXXX 1 2 3 4 5 6 7	1	Model/Version Code: 3-digit code(e.g., 056: without heating film)
	2	Production Line Code: 2-digit code, 01–99
	3	Customer Code: 3-digit code(refer to customer code table)
	4	Production Date - Year: 1-digit code(A for 2022, cycling A–Z)
	5	Production Date - Month: 1-digit code(1–9, A/B/C representing October–December)
	6	Production Date - Day: 2-digit code, 01–31
	7	Serial Number: 4-digit code, 0001–9999
295 XX XXX X X XX XXXX 1 2 3 4 5 6 7	1	Model/Version Code: 3-digit code(e.g., 295: with heating film)
	2	Production Line Code: 2-digit code, 01–99
	3	Customer Code: 3-digit code(refer to customer code table)
	4	Production Date - Year: 1-digit code(A for 2022, cycling A–Z)
	5	Production Date - Month: 1-digit code(1–9, A/B/C representing October–December)
	6	Production Date - Day: 2-digit code, 01–31
	7	Serial Number: 4-digit code, 0001–9999

2.3.2 System Overview



1. Parallel communication port OUT	8.BMS switch
2. Breather valve (PDU)	9.Parallel communication port IN
3. Handle	10. PDU circuit breaker
4. Inverter CAN/RS485 port PCS	11. Protective earth
5. Negative battery output port	12.Battery circuit breaker
6. Positive battery output port	13.Breather valve (Battery)
7. Status indicator	

OUT port

Parallel communication terminal: (RJ45 port) To connect the “IN” terminal of next battery for communication

between multiple parallel batteries.

Handle

To help carry the battery.

PDU circuit breaker

To start or stop the PDU.

Status indicator

Indicating the operating status of the entire battery system, include SOC, RUN, ALARM, and ERROR. Refer to introduction in the section 2.3.2.

Battery circuit breaker

To power on /off the battery.

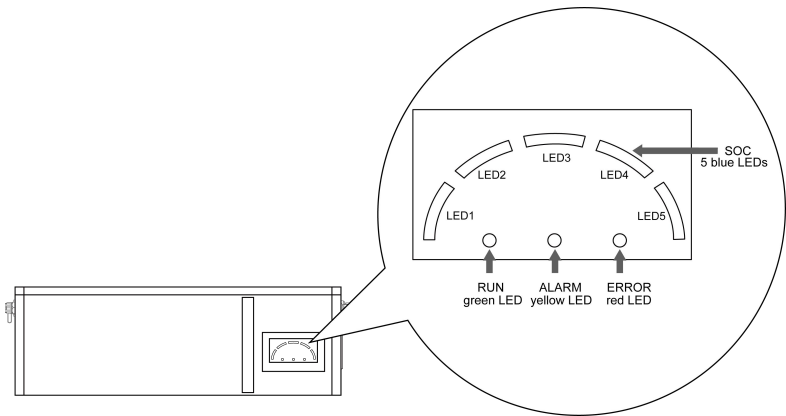
PCS port

Inverter communication terminal: (RJ45 port) follow the CAN protocol (baud rate: 500K), used to output battery information to the inverter.

IN port

Parallel communication terminal: (RJ45 port) Connect the “OUT” terminal of previous battery for communication between multiple parallel batteries.

2.3.3 Power Distribute Unit (PDU)



RUN LED: green, keep flashing when power switch is on.

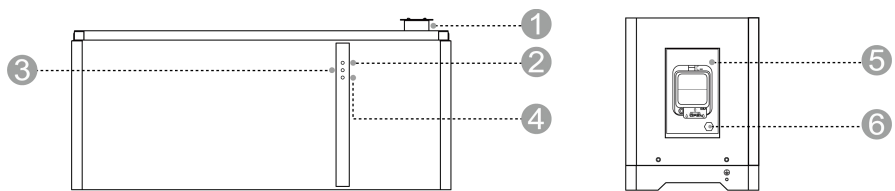
ALARM LED: yellow, flashes when battery has alarm.

ERROR LED: red, long bright if battery is protected.

SOC LED: 5 blue LEDs, battery capacity indicator, each light represents 20% capacity.

Condition	RUN	ALARM	Error	LED1	LED 2	LED 3	LED 4	LED 5
Power off	off							
Charge	 Blink	 Blink if Alarm Exists	off	 Show SOC & highest LED blink				
Discharge or Idle			off	 Show SOC & long bright				
Alarm		 Blink	off	 Other LEDs are same as above				
System error/Protect		off	 long bright					
Upgrade	Blink Fastly							
Critical Error	Blink Slowly							

2.3.4 Battery pack



1. Battery module dock terminals	4. ERROR LED
2. RUN LED	5. Battery circuit breaker
3. ALARM LED	6. Breather valve (Battery)

RUN LED: green, keep flashing when the power switch is on.

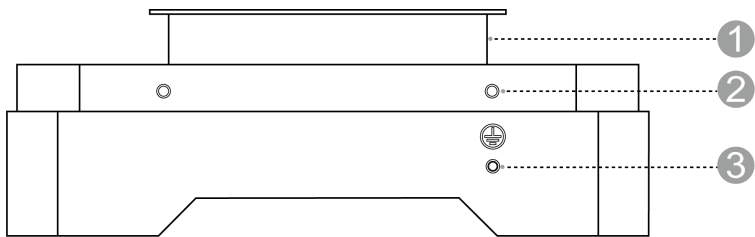
ALARM LED: yellow, flashes when the battery is in alarm.

ERROR LED: red, long bright if battery is protected.

Battery circuit breaker

To power on /off the battery.

2.3.5 Base



1. Module dock terminals	2. Screw hole
3. System earthing position	

System earthing position

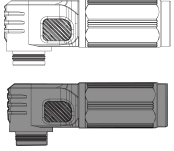
Protective earthing for the battery system connecting to the PE.

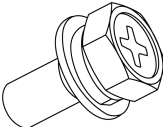
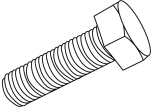
3 Preparation for Installation

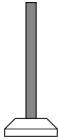
After unpacking, check that packing contents are intact and complete , and free from any damage. If any item listed in the Unpacking List is missing or damaged, contact your vendor.

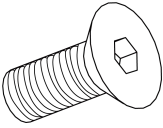
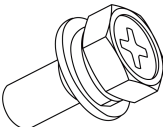
3.1 Power Distribute Unit Package

		
PDU*1	2000mm RJ45 communication cable*1	600mm ground cable*1

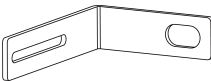
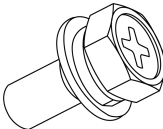
		
Positive PCS cable*1	Negative PCS cable*1	Terminal *4

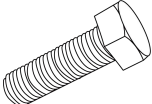
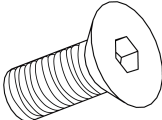
		
Fixed support*2 (thickness:2.5mm)	Bolt*2 (M4×10)	Bolt*2 (M8×40)

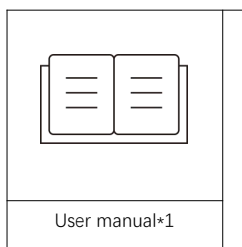
		
Washer *2	Adjusting block *4	Base*1

		
Screw*4 (M4×8)	Bolt*1 (M4×12)	User manual*1

3.2 Battery Pack package

		
Battery Pack*1	Fixed support*2 (thickness:2.5mm)	Bolt*2 (M4×10)

		
Washer *2	Bolt*2 (M8×40)	Screw*4 (M4×8)



4 Installation Instructions

4.1 Installation Personnel

- Only qualified professionals or trained personnel are allowed to install the equipment.
- Professionals:personnel who are familiar with the working principles and structure of the equipment, trained or experienced in equipment operations and are clear of the sources and degree of various potential hazards in equipment installation.
- Trained personnel:personnel who are trained in technology and safety have required experience,are aware of possible hazards on themselves in certain operations and are able to take protective measures to minimize the hazards on themselves and other people.
- Personnel who plan to install the equipment must receive all necessary safety precautions and local relevant standards.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Knowledge of electronic, electrical wiring and mechanical expertise, and be familiar with electrical and mechanical schematics.
- Understanding and complying with this document and other applicable documents.
- This product meets the testing standards of Class 9540A (Report No.2502B0615SHA-001).

4.2 Installation Environment



Danger!

Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.



Danger!

Do not store any flammable or explosive materials in equipment area.Do not cover or wrap the battery.



Danger!

Do not place the equipment near heat sources or fire sources, such as smoke, candles, heaters, or other heating devices. Overheat may damage the equipment or cause a fire.



Warning!

Install the equipment in an area far away liquids. Do not install it under areas prone to condensation, such as under water pipe and air exhaust vent, or area prone to water leakage, such as air conditioner vents, ventilation vents, or feeder windows of the equipment room. Ensure that no liquid enters the equipment to prevent faults or short circuits.



Warning!

To prevent damage or fire due to high temperature, ensure that the ventilation vents or heat dissipation systems are not obstructed or covered by other objects while the equipment is running.

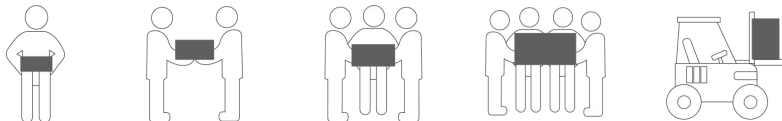
Warning!

The product is not intended for use near the sea.

- The installation and usage environment must meet relevant international, the local laws and regulations. The user is obliged to protect the equipment against fire or other hazards.
- Keep the equipment out of the reach of children and away from daily working or living area, including but not limited to the following areas: studio, bedroom, lounge, living room, music room, kitchen, game room, room theater, sunroom, toilet, bathroom, laundry, and attic.
- Do not install the equipment in places that are enclosed, poorly-ventilated without proper fire fighting facilities, or difficult for firefighters to access.
- Do not install the equipment in an easily accessible position because the temperature of the enclosure and heat sink is high when the equipment is running.
- Do not install the equipment on a moving object, such as ship, train, or car.
- Ensure that the equipment is installed in a clean, dry and well ventilated area with proper temperature, humidity and altitude range. Check for more data in the "Technical Specifications" section.
- Do not install the equipment in an environment with magnetic dust, volatile or corrosive gases, infrared and other radiations, organic solvents, conductive metal, or salty air.
- Do not install the equipment in an area conducive to growth of microorganism such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Do not install the equipment in an position that may be submerged in water.
- Keep away from the air outlet of PCS to prevent personal injury..
- The wall and floor is flat and level.
- Before installing and powering up the system, dust and iron filings must be removed to keep the environment clean. The system cannot be installed in desert areas without a shell to protect against sand.

Caution!

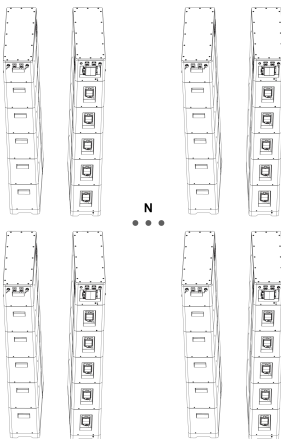
Moving heavy objects. Be careful to prevent injury when moving heavy objects. Select an suitable way to moving heavy objects according to product weight.



Weight	Method	Recommendation
<18 kg (40lbs)	Manual handling	1 person
18~32 kg (40~70lbs)	Manual handling	2 persons
32~55 kg (40~70lbs)	Manual handling	3 persons
55~68 kg (121~150lbs)	Manual handling	4 persons
> 68 kg (150lbs)	Moving device	Forklift

4.3 Layout

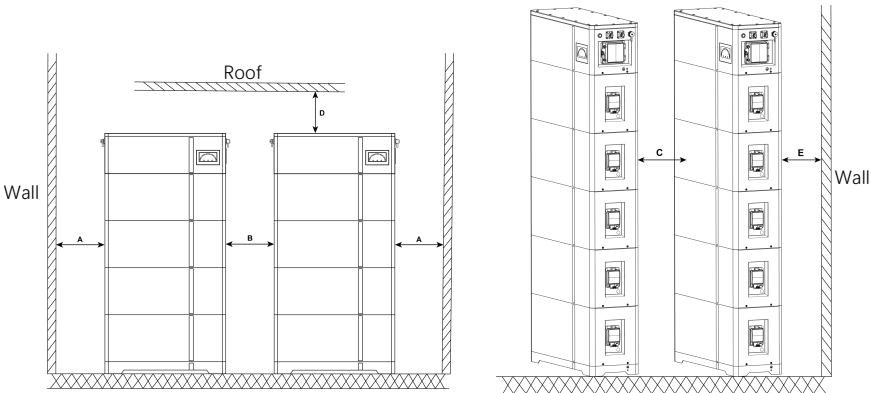
If your installation site is limited and the space is relatively narrow, you can refer to the following layout for installation.



4.4 Installation clearance



Batteries should be installed in a clean flat place with no direct sunlight, away from water and fire sources, and at a suitable temperature. The installation location is recommended to meet the size requirements of the figure below:



Item	Distance (mm)
A	≥ 600
B	≥ 300
C	≥ 20
D	≥ 600
E	10-35

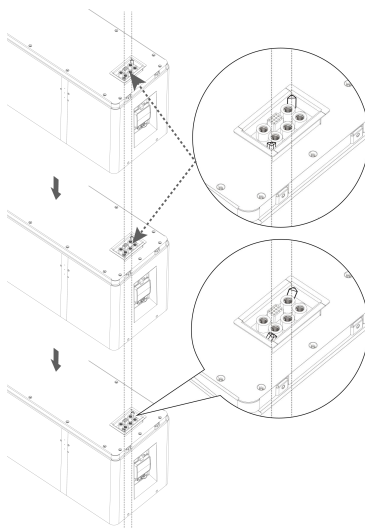
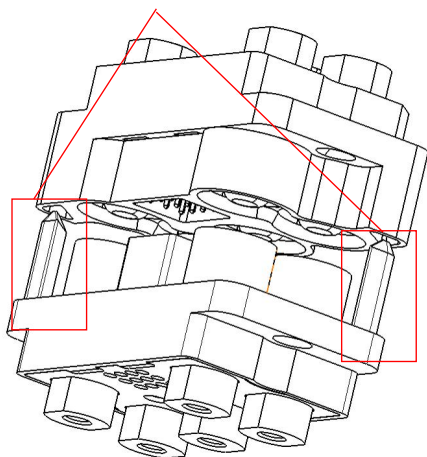
4.5 Installing the Battery



Note!

Because the assembly tolerances present in the overall vertical stacking of the product and the lower quick-connector is locked and fixed to the enclosure, the upper quick-connector is designed to be guided and floating to ensure reliable connection between the upper and lower quick-connectors.

Upper and lower quick-connectors



There are two installation methods for you to make a decision. Precede as follows:

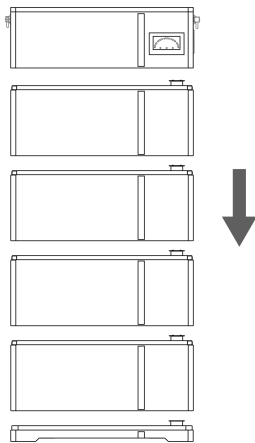


Note!

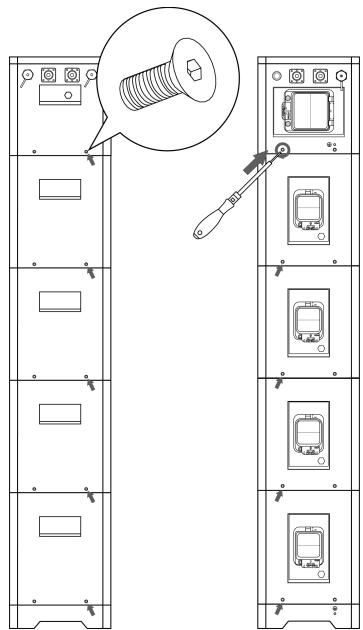
- 1) When drilling holes, pay attention to prevent dust from entering the battery, which may affect the battery performance and function.
- 2) Ensure that the floor is level enough so as to avoid to influence hole drilling, such as height or location.
- 3) After drilling, never forget to clean up the floor.

4.5.1 Method 1

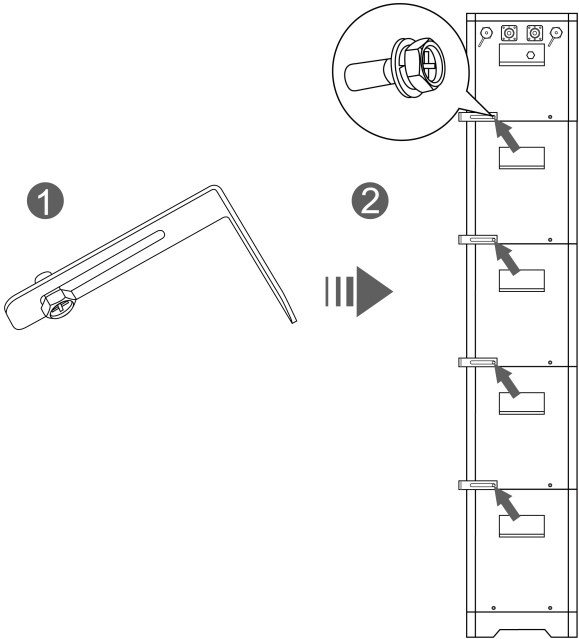
1. Take out the base and then put it onto the designated foundation. Stack batteries onto the base in turn and then place the PDU over the battery. Importantly, the quantity of stacked batteries that are regarded as one cluster, is no more than 6.



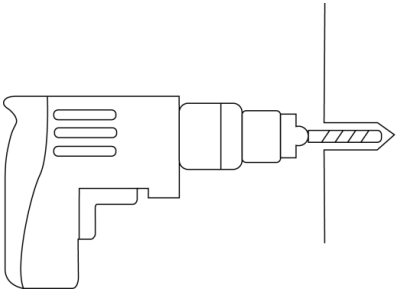
2. Secure with screws (M4×8) using a screwdriver.



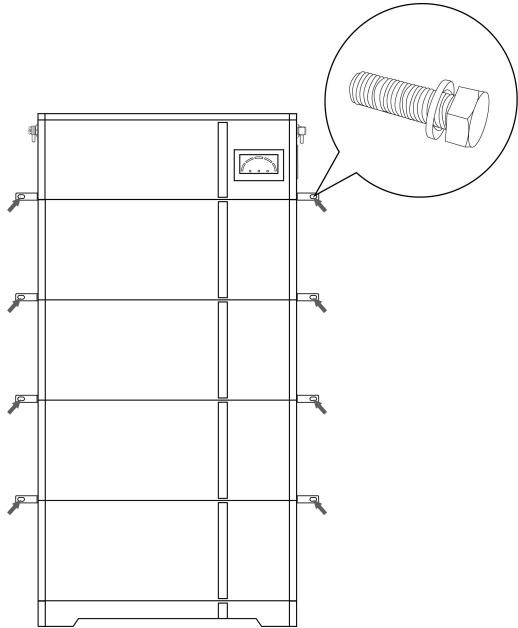
3. Use M4*10 bolts to secure fixed supports to the left and right side of batteries.



4. Choose appropriate locations on the wall for drilling assembly holes (aperture: 6mm, depth: 50mm).

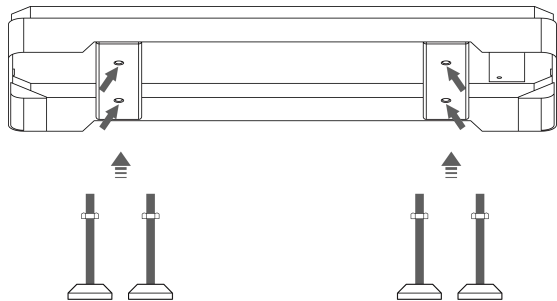


5. Secure batteries to the wall using 8 washers and hex bolts (M8×40).

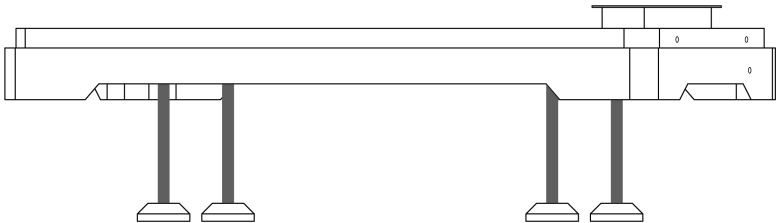


4.5.2 Method 2

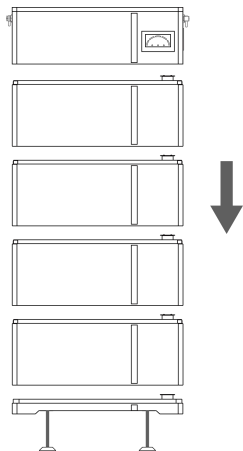
1. By rotating clockwise, the adjusting block is fixed on the base, and the length can be adjusted to 40mm.



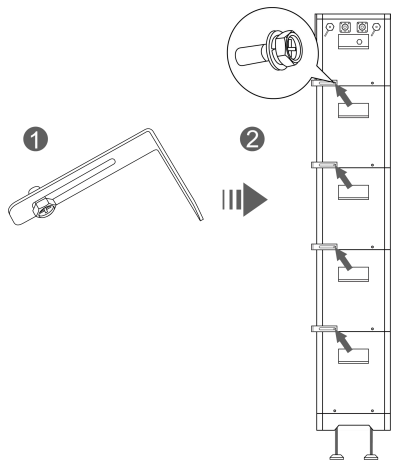
2. Adjust the height of the adjusting block by rotating it.



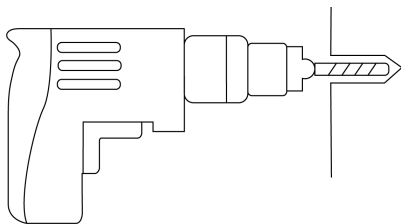
3. Stack battery packs and the PDU, and then secure with screws as mentioned in the method 1. The quantity of stacked batteries that are regarded as one cluster, is no more than 6.



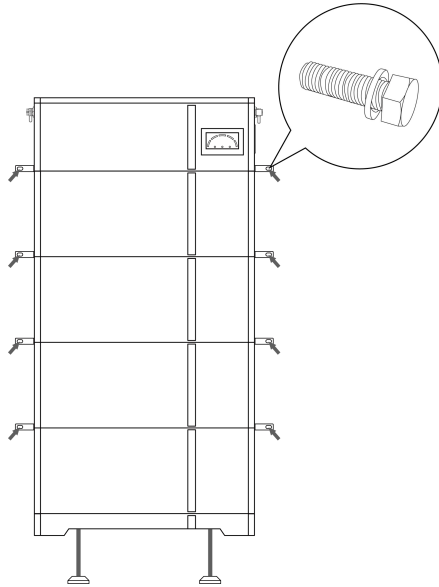
4. Use M4*10 bolts to secure fixed supports to the left and right side of batteries.



5. Choose appropriate locations on the wall for drilling assembly holes (aperture: 6mm, depth: 50mm).

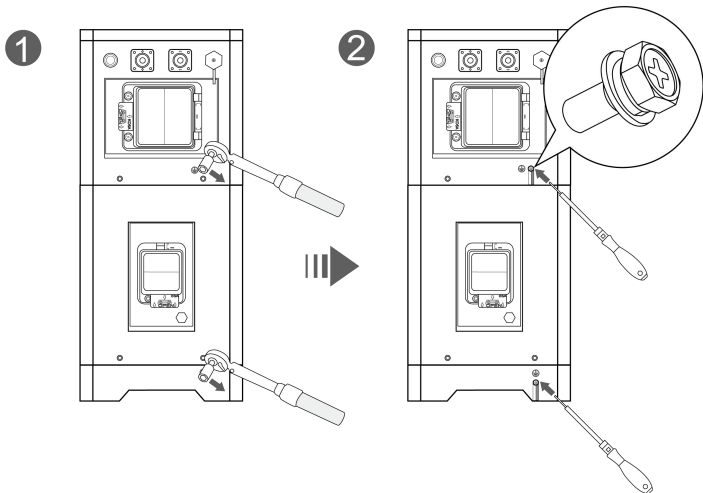


6. Secure batteries to the wall using 8 washers and hex bolts (M8×40).



4.6 Grounding

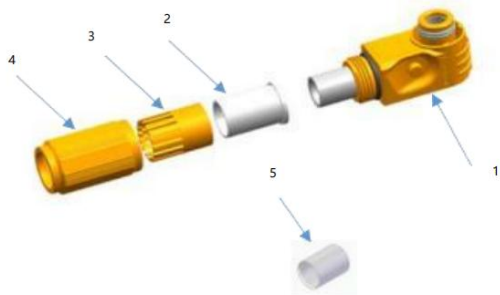
The product is equipped with grounding points on both the base and the PDU. Either point is acceptable for grounding purposes. Use a torque wrench to unfasten the M4×12 bolt on the base or PDU and take out the ground cable (the yellow and green wire) from the accessory bag. Install the ground cable and then tighten the M4×12 bolt (as shown in the following figure).Install the other end according to local regulations.



5 Electrical Connection

5.1 Preparation before wiring

Part 1: Package contents



- 1: Socket Package
- 2: Grommet
- 3: Gripping Jaw
- 4: Nut
- 5: Barrel sealing(Only for cable size 35mm²)

Part 2: Plug Assembly Instruction

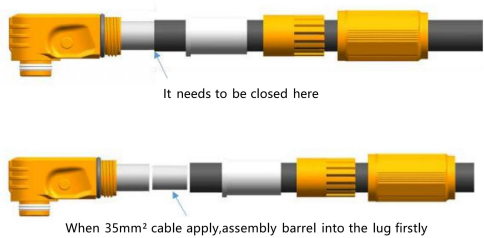
Step1: Strip off the jacket of the cable.



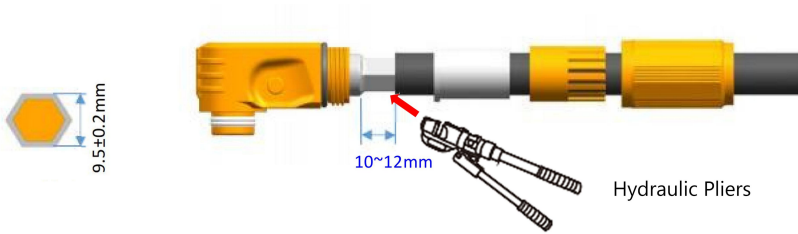
Step2: Put the nut,the Grommet and the gripping jaw on the cable as shown.



Step3: Insert the conductor into the lug.

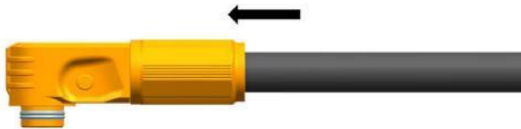


Step4: Crimping the lug as shown.



Notes: The recommended crimp sizes are only for reference. The customer should adjust them according to cable specification and crimp tool and test results including temperature rise and metallographic analysis and pullout force.

Step5: Push the seal,the jaw and the nut into the socket, then screw it.



Step6: Schematic diagram of matching plug and socket. (Warning: Do not disconnect under load)

5.2 Wire connection



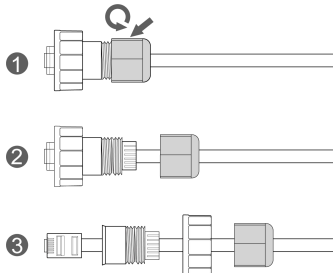
Caution !

When it comes to cable connection, it should be noted that the maximum current of single battery system is **250A**. Exceeding 250A will cause heating of the connectors and cable, and in severe cases, it will cause a fire accident. As for cables, the recommended cross section of them should be at least (**55 mm²**).



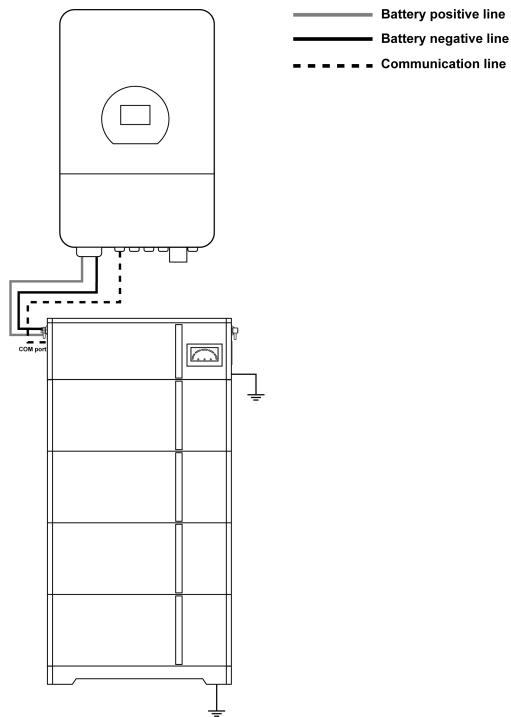
Note !

Both ends of the PCS communication cable are equipped with protective sleeves. When connecting the entire battery system to the inverter, loosen the protective sleeve on one side before inserting this end into the BMS port of the inverter, as shown in the figure.

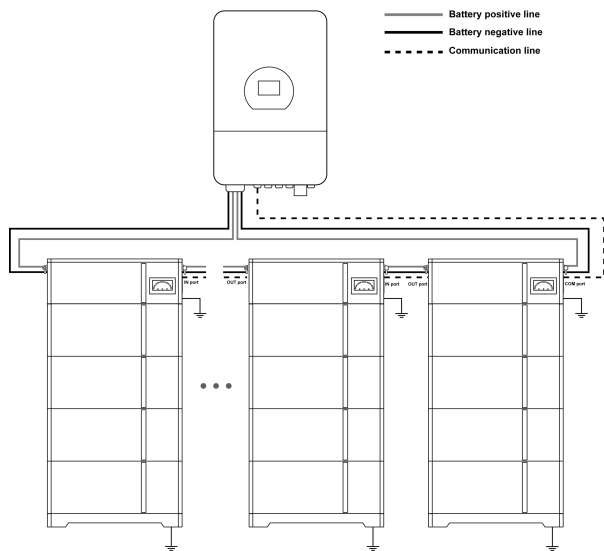


There are **3 different wiring modes** for you to meet your demands

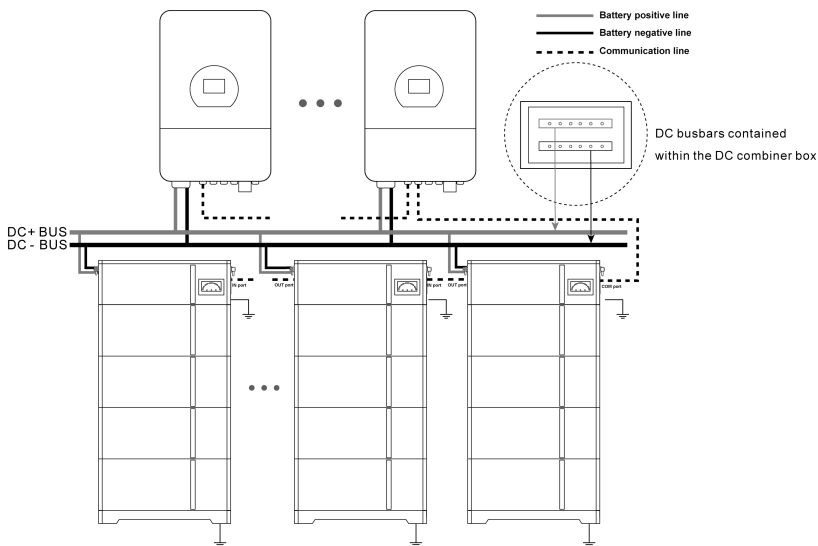
Schematic diagram of connection of single battery system:



Schematic diagram of connection of multiple battery systems:



Schematic diagram of connection of multiple PCS and battery systems:



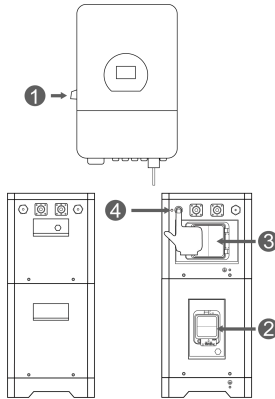
6 Operating the Product

Before operating the product, ensure that:

- All cables are wired correctly and firmly.
- All fasteners including bolts and screws are tightened firmly.
- No bystanders or animals enter into the working area.
- Keep foreign objects , especially metal , away from the battery .

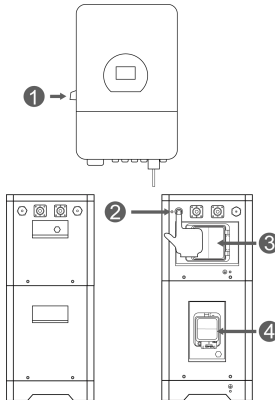
6.1 Start the Battery System

- ① Turn on the PCS switch.
- ② Turn on the circuit breaker on each battery.
- ③ Turn on the circuit breaker on the PDU .
- ④ Turn on the BMS switch on the PDU.



6.2 Stop the Battery System

- ① Turn off the PCS switch.
- ② Turn off the BMS switch on the PDU.
- ③ Turn off the circuit breaker on the PDU.
- ④ Turn off every circuit breaker on each battery.

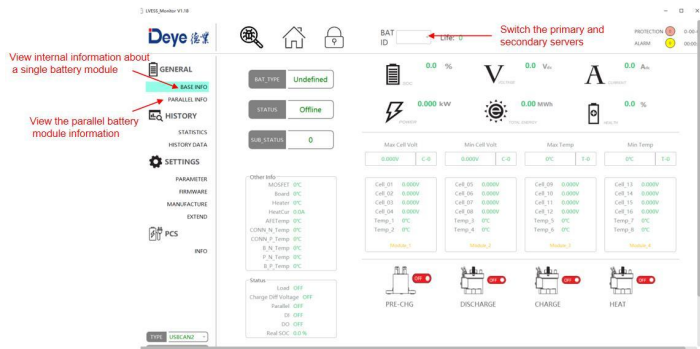


6.3 Monitoring

Mode 1: TO Monitor parallel units

The first method is to use the upper computer to connect to the communication port of any battery pack and view the status of all packs.

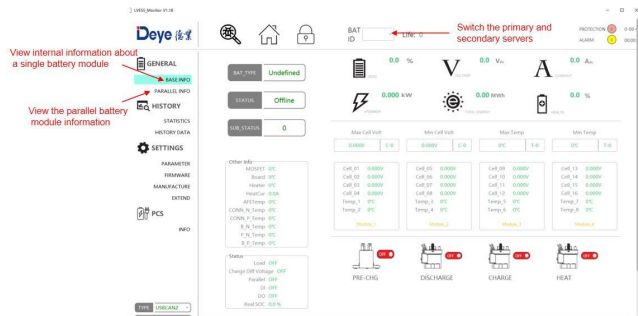
The second method is to connect the PCS communication port of the first battery pack with a network cable, and the other end is connected to the 485 communication port of the inverter. Then, connect the positive pole to the positive pole and the negative pole to the negative pole. Switch the inverter to lithium mode and check the condition of several packs through the inverter display screen.



Mode 2: TO Monitor single unit

The first method is to use the upper computer to connect to the communication port of any battery pack and view the status of all packs.

The second method is to connect the PCS communication port of the first battery pack with a network cable, and the other end is connected to the 485 communication port of the inverter. Then, connect the positive pole to the positive pole and the negative pole to the negative pole. Switch the inverter to lithium mode and check the condition of several packs through the inverter display screen.



7 Inspection, Cleaning and Maintenance

7.1 General Information

- The battery product is not fully charged. It is recommended that the installation be completed within 3 months after arrival;
- During the maintenance process, do not re-install the battery in the battery product.
- Otherwise, the performance of the battery will be reduced;
- It is forbidden to dismantle any battery in the battery product, and it is forbidden to dis- sect the battery;
- After the battery product is over-discharged, it is recommended to charge the battery within 48 hours. The battery product can also be charged in parallel. After the battery product is connected in parallel, the charger only needs to connect the output port of any product battery.
- Never attempt to open or dismantle the battery! The inside of the battery does not contain serviceable parts.
- Disconnect the Li-Ion battery from all loads and charging devices before performing cleaning and maintenance activities.
- Place the enclosed protective caps over the terminals before cleaning and maintenance activities to avoid the risk of contacting the terminals.

7.2 Inspection

- Inspect for loose and/or damaged wiring and contacts, cracks, deformations, leakage, or damage of any other kind. If damage to the battery is found, it must be replaced. Do not attempt to charge or use a damaged battery. Do not touch the liquid from a ruptured battery.
- Regularly check the battery's state of charge. Lithium Iron Phosphate batteries will slowly self-discharge when not in use or whilst in storage.
- Consider replacing the battery with a new one if you note either of the following conditions:
 - The battery run time drops below 70% of the original run time.
 - The battery charge time increases significantly.

7.3 Cleaning

If necessary, clean the Li-Ion battery with a soft, dry cloth. Never use liquids, solvents, or abrasives to clean the Li-Ion battery.

7.4 Maintenance

The Li-Ion battery is maintenance free. Charge the battery to approximately > 80% of its capacity at least once every year to preserve the battery's capacity.

7.5 Storage

- The battery product should be stored in a dry, cool, and cool environment;
- Generally, the maximum storage period at room temperature is 6 months. When the battery is stored over 6 months, it is recommended to check the battery voltage. If the voltage is higher than 51.2V, it can continue to store the battery. In addition, it is needed to check the voltage at least once a month until the voltage is lower than 51.2V. When the voltage of the battery is lower than 51.2V, it must be charged according to the charging strategy.
- The charging strategy is as follows: discharge the battery to the cutoff voltage with 0.2C(20A) current, and then charge with 0.2C(20A) current for about 3 hours. Keep the SOC of the battery at 40%-60% when stored;
- When the battery product is stored, the source of ignition or high temperature should be avoided and it should be kept away from explosive and flammable areas.

8 Troubleshooting

To determine the status of the battery system, users must use additional battery status monitoring software to examine the protection mode. Refer to the installation manual about using the monitoring software. Once the user knows the protection mode, refer to the following sections for solutions.

Fault Type	Fault Generation condition	Possible Causes	Troubleshooting
BMS fault	The cell voltage sampling circuit is faulty. The cell temperature sampling circuit is faulty	The welding point for cell voltage sampling is loose or disconnected. The voltage sampling terminal is disconnected. The fuse in the voltage sampling circuit is blown. The cell temperature sensor has failed.	Replace the battery.
Electrochemical cell fault	The voltage of the cell is low or unbalanced.	Due to large self- discharge, the cell over discharges to below 2.0V after long term storage. The cell is damaged by external factors, and short circuits, pinpricks, or crushing occur.	Replace the battery.
Overvoltage protection	The cell voltage is greater than 3.65 V in charging state. The battery voltage is greater than 58.4 V.	The busbar input voltage exceeds the normal value. Cells are not consistent. The capacity of some cells deteriorates too fast or the internal resistance of some cells is too high.	If the battery cannot be recovered due to protection against abnormality contact local engineers to rectify the fault.
Under voltage protection	The battery voltage is less than 44.8V. The minimum cell voltage is less than 2.8V	The mains power failure has lasted for a long time. Cells are not consistent. The capacity of some cells deteriorates too fast or the internal resistance of some cells is too high.	Same as above.
Charge or dis-	The maximum cell	The battery ambient temperature is	Same as above.

charge high temperature protection	temperature is greater than 60℃	too high. There are abnormal heat sources around	
Charge low temperature protection	The minimum cell temperature is less than 0 ℃	The battery ambient temperature is too low.	Same as above.
Discharge low temperature protection	The minimum cell temperature is less than - 20℃	The battery ambient temperature is too low.	Same as above.

By checking the above data and sending the data to the service personnel of our company, the service personnel of our company will reply the corresponding solution after receiving the data.

9 Technical Specifications

Main Parameter											
Model	Battery Chemistry	Battery Module Energy (kWh)	Battery Module Voltage (V)	Battery Module Capacity (Ah)	Battery Module Quantity	Nominal Voltage (V)	Operating Voltage(V)	Energy (kWh)	Usable Energy (kWh) [1]	Charge/Discharge Current (A)	
										Max. [2]	Peak(10s,25℃)
Al-W5.1-B	LiFePO4	5.12	51.2	100	1	51.2	44.8~57.6	5.12	5.12	1PDU+1pack:100; 1PDU+2pack:200; 1PDU+3pack:250; 1PDU+4pack:250; 1PDU+5pack:250; 1PDU+6pack:250 (1 PDU is compatible with at least 1 battery and at most 6 batteries)	1PDU+1pack:150; 1PDU+2pack:270; 1PDU+3pack:360; 1PDU+4pack:360; 1PDU+5pack:360; 1PDU+6pack:360 (1 PDU is compatible with at least 1 battery and at most 6 batteries)
Al-W10.2-B				200	2			10.24	10.24		
Al-W15.3-B				300	3			15.36	15.36		
Al-W20.4-B				400	4			20.48	20.48		
Al-W25.6-B				500	5			25.6	25.6		
Al-W30.7-B				600	6			30.72	30.72		
Al-W35.8-B				700	7			35.84	35.84		
Al-W40.9-B				800	8			40.96	40.96		
Al-W46.0-B				900	9			46.08	46.08		
Al-W51.2-B				1000	10			51.2	51.2		
Al-W56.3-B				1100	11			56.32	56.32		
Al-W61.4-B				1200	12			61.44	61.44		
Al-W66.5-B				1300	13			66.56	66.56		
Al-W71.6-B				1400	14			71.68	71.68		
Al-W76.8-B				1500	15			76.8	76.8		
Al-W81.9-B				1600	16			81.92	81.92		
Al-W87.0-B				1700	17			87.04	87.04		
Al-W91.1-B				1800	18			92.16	92.16		
Al-W97.2-B				1900	19			97.28	97.28		
Al-W102.4-B				2000	20			102.4	102.4		
Al-W107.5-B				2100	21			107.52	107.52		
Al-W112.6-B				2200	22			112.64	112.64		
Al-W117.7-B				2300	23			117.76	117.76		
Al-W122.8-B				2400	24			122.88	122.88		
Al-W128.0-B				2500	25			128	128		
Al-W133.1-B				2600	26			133.12	133.12		
Al-W138.2-B				2700	27			138.24	138.24		
Al-W143.3-B				2800	28			143.36	143.36		
Al-W148.4-B				2900	29			148.48	148.48		
Al-W153.6-B				3000	30			153.6	153.6		
Al-W158.7-B				3100	31			158.72	158.72		
Al-W163.8-B				3200	32			163.84	163.84		
Al-W168.9-B				3300	33			168.96	168.96		
Al-W174.0-B				3400	34			174.08	174.08		
Al-W179.2-B				3500	35			179.2	179.2		
Al-W184.3-B				3600	36			184.32	184.32		
Other Parameter											
Recommend Depth of Discharge				90%							

System Dimension (W/D/H, mm)	$[n(3 \times 720 + 600 \times (n-1))] \times 255 \times (269 + 300 \times m(3))$
System Weight (kg)	$55 \times m \times n + 27 \times n$
Master LED Indicator	Battery module: 3LED (working, alarming, protecting),
	PDU module: 5LED(SOC:20%~100%)&3LED (working, alarming, protecting)
IP Rating of Enclosure	IP65(after stacking)
Operating Temperature [4]	Charge/Discharge: $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$
Operating Temperature [5]	Charge/Discharge: $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$ (heating film being activated)
	Charge: $0^{\circ}\text{C} \sim 55^{\circ}\text{C}$ /Discharge: $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$ (heating film being deactivated)
Operating Temperature	Charge: $0^{\circ}\text{C} \sim 55^{\circ}\text{C}$ /Discharge: $-20^{\circ}\text{C} \sim 55^{\circ}\text{C}$
Storage Temperature	$0 \sim 35^{\circ}\text{C}$
Humidity	5%~95%
Altitude	$\leq 3000\text{m}$
Installation	Floor-Mounted
Communication Port	CAN2.0, RS485
Cycle Life	$\geq 6000(25^{\circ}\text{C} \pm 2^{\circ}\text{C}, 0.5\text{C}/0.5\text{C}, 90\%\text{DOD}, 70\%\text{EOL})$
Certification	UN38.3, IEC62619, CE, UK, VDE2510-50, CEI 0-21, CE-LVD, CEC
Battery PDU1	$720 \times 255 \times 238(\text{W/D/H, mm})$, 18kg
Battery Module	$720 \times 255 \times 300(\text{W/D/H, mm})$, 55kg
Battery Base	$720 \times 255 \times 68(\text{W/D/H, mm})$, 6.5kg

[1] DC Usable Energy, test conditions: 90%

DOD, 0.5C charge & discharge at 25°C .

System usable energy may vary due to system configuration parameters.

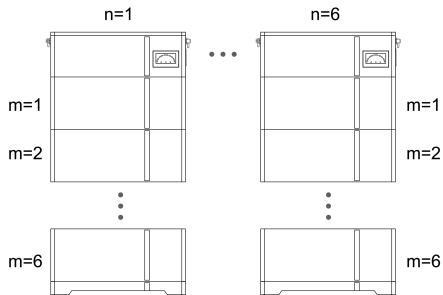
[2] The current is affected by temperature and SOC.

[3] n : the number of clusters, $1 \leq n \leq 6$;

m : the number of battery packs in per cluster, $1 \leq m \leq 6$. See the picture.

[4] Only apply to cells rated for low operating temperature

[5] Only apply to batteries cells with heating film.



10 Environmental Disposal

Used batteries can not be disposed of as household waste. You are obliged to handle waste batteries, such as removal of privacy on product, and return them to designated or authorized recovery point according to applicable regulations and standards on waste battery disposal.



Attention:

1. Do not dispose of batteries and rechargeable batteries as domestic waste!

You are legally obliged to return used batteries and rechargeable batteries.

2. Waste batteries may contain pollutants that can damage the environment or your health if improperly stored or handled.

3. Batteries also contain iron, lithium and other important raw materials, which can be recycled.

For more information, please visit <http://www.deyeess.com>. Do not dispose of batteries as household waste!



Li-ion



11 Transportation Requirements

1. The battery products should be transported after packaging and during the transportation process. Severe vibration, impact, or extrusion should be prevented to prevent sun and rain. It can be transported using vehicles such as cars, trains, and ships.
2. Always check all applicable local, national, and international regulations before transporting a Lithium Iron Phosphate battery.
3. Transporting an end-of-life, damaged, or recalled battery may, in certain cases, be specially limited or prohibited.
4. The transport of the Li-Ion battery falls under hazard class UN3480, class 9. For transport over water, air and land, the battery falls within packaging group PI965 Section I. Use Class 9 Miscellaneous Dangerous Goods and UN Identification labels for transportation of lithium-ion batteries which are assigned Class 9. Refer to relevant transportation documents.



Class 9 Miscellaneous Dangerous Goods and UN Identification Label

EU Declaration of Conformity

Product: Rechargeable Li-ion Battery System

System model: AI-W5.1-B

PDU: AI-W5.1-PDU1-B、AI-W-B-PDUP1-2、AI-W-B-PDUP3-2、AI-W5.1-PDU3-B

Name and address of the manufacturer: NINGBO DEYE ESS TECHNOLOGY CO., LTD.

No.568, South Rixian Road, Binhai Economic Development Zone, Cixi, Ningbo, Zhejiang, P.R.China

This declaration of conformity is issued under the sole responsibility of the manufacturer. Also this product is under manufacturer's warranty.

This declaration of conformity is not valid any longer: if the product is modified, supplemented or changed in any other way, as well as in case the product is used or installed improperly.

The object of the declaration described above is in conformity with the relevant Union harmonization legislation: The Electromagnetic Compatibility (EMC) Directive 2014/30/EU; the Low Voltage Directive (LVD) 2014/35/EU; the restriction of the use of certain hazardous substances (RoHS) Directive 2011/65/EU & (EU) 2015/863; the Battery Directive 2006/66/EU.

References to the relevant harmonized standards used or references to the other technical specifications in relation to which conformity is declared:

EMC:	
EN IEC 61000-6-1:2019	●
EN IEC 61000-6-3:2021	●
LVD:	
EN 62477-1	●
ROHS:	
IEC 62321-3-1:2013 IEC 62321-5:2013 IEC 62321-6:2015 IEC 62321-7-1:2015 IEC 62321-8:2017	●

Nom et Titre / Name and Title:

KunLei Yu

Test Manager

KL Yu

宁波德业储能科技有限公司

Au nom de / On behalf of:

NINGBO DEYE ESS TECHNOLOGY CO., LTD.

Date / Date (yyyy-mm-dd):

2025-02-20

A / Place :

Ningbo, China

EU DoC-v1

NINGBO DEYE ESS TECHNOLOGY CO., LTD

No.568, South Rixian Road, Binhai Economic Development Zone, Cixi, Ningbo, Zhejiang, P.R.China