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Best Solution Lithium Battery



BSL NEW ENERGY TECHNOLOGY CO., LTD

User Manual

PowerNest

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01 Safety Instructions

1.1 Safety Symbol Description

When installing, operating and maintaining the equipment, please read this manual first and follow all safety precautions marked on the equipment and in the manual.

To ensure that users can better use this product and protect personal and property safety, please read the following symbols carefully.

Danger: Indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.

Warning: Indicates a situation with a moderately hazardous situation which, if not avoided, could result in death or serious injury.

Caution: Indicates a situation with a low risk of hazard which, if not avoided, may result in moderate or minor injury.

Illustration: Emphasis and supplementation of content may also provide tips for optimal use of the product.

1.2 General Security

Illustration:

This equipment should be used in an environment that meets the design specification requirements. Otherwise, it may cause equipment failure, and the resulting equipment malfunction or component damage, personal safety accidents, property losses, etc. are not within the scope of equipment quality guarantee. During installation, operation, and maintenance of the equipment, local laws, regulations, and norms should be followed. The safety precautions in the manual are only supplementary to local laws, regulations, and norms. In the event of any of the following situations, the company will not be held responsible.

1. The installation and usage environment exceeds the stipulations in relevant international, national and regional standards.
2. The equipment is not operated under the conditions described in this manual.
3. Unauthorized disassembly, modification of the product or alteration of the software code.
4. Failure to operate in accordance with the operation instructions and safety warnings provided in the product and documentation.
5. Equipment damage caused by abnormal natural environments (acts of nature such as earthquakes, fires, storms, floods, mudslides, etc.).
6. Damages caused by the customer's failure to follow the transportation and installation requirements.
7. Damages resulting from storage conditions not meeting the requirements specified in the product documentation.

8. Damage to the hardware or data of the equipment due to the customer's negligence, incorrect operation, or intentional damage.
9. System damage caused by reasons other than the customer, including relocation and installation of the system that does not comply with this manual, as well as adjustments, changes, or removal of identification marks that do not comply with this manual, etc.
10. Defects, failures, or damages caused by actions, events, negligence, or accidents beyond the reasonable control of the seller, including power outages or electrical failures, theft, war, riots, civil unrest, terrorism, intentional or malicious damage, etc.

Danger:

The equipment is powered on. Improper operation may cause electric shock or fire, resulting in death, serious personal injury or significant property damage. Please follow the operation procedures and safety precautions provided in this manual and other relevant documents, and operate in a standardized manner:
1. Please check that the pre-installed cables of the equipment are securely connected. Inspect the equipment for any damage, such as holes, dents or other signs of possible internal damage. Ensure that the internal components of the equipment are not displaced. It is strictly prohibited to arbitrarily modify the structure or installation sequence of the equipment.
2. Do not use water to clean the electrical components inside the equipment. If liquid enters the equipment , immediately press the emergency stop switch and notify the on-site managers.
3. Installation, wiring, maintenance and replacement operations must not be carried out while the equipment is powered on. Before touching any conductive surface or terminal, measure the voltage at the contact point and confirm that the protective ground wire of the equipment or the component to be repaired is reliably grounded. Ensure there is no risk of electric shock.
4. Except for the personnel operating the equipment, other people should not approach the equipment. Do not power on the equipment before its installation is completed or before it has been confirmed by professionals. When powering on for the first time or performing operations with the main circuit energized, at least two people must be present on site.

Illustration:

1. The operational behaviors and tools used by the users during transportation, handling, installation, wiring and maintenance must comply with the laws and regulations and relevant standards of the countries and regions where they are located.
2. It is prohibited to conduct reverse engineering, decompilation, disassembly, modification, implantation or any other derivative operations on the device software. It is not allowed to study the internal implementation of the device, obtain the source code of the device software, steal intellectual property rights, or disclose any results of performance tests of the device software in any way.

1.3 Personal safety

 **Danger:**

1. During the operation of the equipment, appropriate personal protective equipment should be worn. If any faults that may cause personal injury or equipment damage are detected, the operation should be immediately terminated, and a report should be made to the person in charge, along with the implementation of effective protective measures.
2. Before using the tools, please master the correct usage methods to avoid injuring others and damaging the equipment.
3. During the operation of the equipment, some internal shells have high temperatures and pose a risk of burns. Do not touch them.
4. To ensure personal safety and normal use, reliable grounding should be performed before use.
5. When the battery module malfunctions, the temperature may exceed the burn threshold of the accessible surface. Avoid contact.
6. Do not open or damage the battery module. The released electrolyte is harmful to the skin and eyes. Avoid contact.
7. Do not place any irrelevant items on the top of the device or insert them into any position of the device.
8. Do not place flammable items around the device.
9.Batteries must not be exposed to fire to prevent explosion and endanger personal safety.
10. Do not place the battery module in water or any other liquid.
11.Do not short-circuit the terminals of the battery module. Short-circuiting the battery will cause combustion.
12.The battery may cause electric shock and dangerous large short-circuit current.
13.Do not clean the electrical components inside and outside the equipment with water or cleaning agents.
14. Do not stand or lean against, or sit on the equipment.
15. Do not damage the various modules of the equipment.
16. When installing the battery module, if the battery module drops or is subjected to a strong impact, it will cause damage to the equipment. Do not continue to use it; otherwise, there will be safety risks (such as possible leakage of battery cells, electric shock injuries, etc.).

 **Warning:**

1. Remove watches, rings or other metal objects.
2. Use tools with insulated handles.
3. Put on rubber gloves and boots.
4. Do not place small tools or metal parts on the top of the battery module.
5. Before connecting or disconnecting the battery terminals, disconnect the charging power supply.
6. Check if the battery is accidentally grounded. If it is, remove the power supply from the ground. Touching any part of the grounded battery can cause an electric shock. If these grounds are removed during installation and maintenance, it can reduce the possibility of such an electric shock.

1.4 Battery leakage handling measures

Warning:

In case of electrolyte leakage, depending on the severity of the situation, the following emergency measures can be taken.

1. Ensure adequate ventilation. Remove all ignition sources.
2. Quickly evacuate personnel to a safe area, away from the leakage area and in the upwind direction.
3. Use personal protective equipment. Avoid inhaling vapors, smoke, gases or dust.
4. Under the condition of ensuring safety, take measures to prevent further leakage or spillage.
5. For minor leaks, dry sand or inert adsorption materials can be used to absorb the leaked substances. For large-scale leaks, embankments should be constructed for control.
6. Attachments or collected substances should be stored in appropriate sealed containers and disposed of according to local relevant laws and regulations.
7. Eliminate all ignition sources and use fire-resistant tools and riot control equipment.

Danger:

In case of leakage, avoid contact with the leaked liquid or gas. The electrolyte is corrosive and contact may cause skin irritation and chemical burns. If the battery electrolyte is contacted, the following measures should be taken.

In case of inhalation: Evacuate the contaminated area, immediately move to an area with fresh air and keep breathing unobstructed; if breathing is difficult, provide oxygen inhalation; if the patient ingests or inhales this substance, do not perform mouth-to-mouth artificial respiration; if breathing stops, immediately perform cardiopulmonary resuscitation and seek medical help immediately.

2. Eye contact: Immediately rinse the eyes with plenty of water for at least 15 minutes. Do not rub your eyes and seek medical assistance immediately.
3. Skin contact: Immediately remove the contaminated clothing, wash the skin contact area with plenty of water and soap, and seek medical assistance immediately.
4. Ingestion: Do not induce vomiting. Do not feed anything to the unconscious person through the mouth. Seek medical assistance immediately.
5. Protective measures for emergency personnel: Ensure that medical staff are aware of the product's hazardous characteristics and take personal protective measures to protect themselves and prevent the spread of contamination.

1.5 Electrical safety

1.5.1 Regular requirements

Illustration:

1. All electrical connections must comply with the electrical standards of the respective country/region.

2. Installation, operation and maintenance must be carried out strictly in accordance with the steps outlined in the manual. It is strictly prohibited to modify the equipment or change the installation sequence without authorization.
3. Temporary barriers and "Do Not Enter" signs should be set up in the work area. Non-staff members are strictly prohibited from entering.
4. Before operation, registration and inspection of tool integrity should be conducted. After operation, the tools should be counted to prevent any remaining items inside the equipment.

 **Danger:** Before making electrical connections, please ensure that the equipment is undamaged. Otherwise, it may cause electric shock or fire. Before installing power cables, make sure the cable labels are correct and the terminal insulation protection is intact. Do not power on the equipment if it has not been fully installed or has not been confirmed by professionals.

1.5.2 Cabling requirements

1. Please select cables that comply with local laws and regulations. Similar cables should be bundled together, while different types of cables should be laid separately. It is prohibited to intertwine or cross them.
2. The sharp edges of the cable troughs/through-line holes need to be removed, and protective sleeves should be added at the pipe insertion positions to prevent damage to the surface.
3. The distance between the cables and the heat-generating components should be ≥ 30mm to prevent insulation aging caused by high temperatures.
4. When laying cables in an environment below 0℃:

- All cables must be laid in an environment with a temperature above 0℃.;
- If the storage temperature is below 0℃, it is necessary to move the product to a warm environment for storage for at least 24 hours before installation.

 **Danger:**It is strictly prohibited to install or dismantle power lines while they are energized. When the core of the power line comes into contact with the conductor, an arc or electric spark will be generated, which may cause a fire or result in personal injury.

1.5.3 Grounding requirements

1. The equipment must be permanently connected to the protective ground wire. Before operation, confirm that the grounding is reliable.
2. Do not operate the equipment without installing the grounding conductor. It is strictly prohibited to damage the grounding conductor.
3. The grounding impedance must meet the local electrical standards. Regularly test the grounding reliability.
4. For three-core socket equipment, ensure that the grounding terminal is connected to the protective ground; for large contact current equipment, ground first before connecting the power supply.

1.5.4 Maintenance requirements

1. Before connecting or disconnecting the cables, the protection switch of the corresponding circuit must be turned off first.
2. Use a multimeter of the corresponding voltage level to check if it is energized to ensure that the equipment has been completely powered off.
3. During maintenance, a "Do Not Close" sign should be hung on the up and down switches, and warning signs should be posted. The equipment can be re-powered only after the fault has been completely resolved.

Illustration:

1. Before connecting the cables, it is necessary to first confirm that the cable labels are correctly identified before proceeding with the connection.
2. If the equipment has multiple input channels, all the inputs of the equipment should be disconnected. Only after the equipment is completely powered off can the operation on the equipment be carried out.
3. After the maintenance is completed, the grounding wire between the maintenance circuit and the grounding circuit should be removed.

1.6 Mechanical safety

1.When handling equipment by hand, one should make preparations for the load-bearing capacity and wear protective gloves, safety shoes and other safety equipment.
2.During the equipment transportation process, handle the equipment carefully to avoid collisions or drops. Also, prevent scratching the equipment surface, damaging the components or cables.
3.During the transportation process, if the equipment is too large in size, it may block the operators' view, so additional assistants need to be arranged to assist in the operation.

1.7 Maintenance and replacement

Please maintain the equipment under the condition of having a good understanding of the content of this manual and having appropriate tools and testing devices.
1. Before conducting maintenance work, please first power off the equipment, then follow the instructions on the delayed discharge label and wait for the corresponding time to ensure that the equipment has been powered off before operating it.
2. During the maintenance process, try to avoid irrelevant personnel entering the maintenance site. Temporary warning signs or fences should be erected for isolation.
3. If the equipment malfunctions, please contact your dealer for handling promptly.
4. The equipment can be re-powered only after the fault has been resolved. Otherwise, it may lead to the expansion of the fault or damage to the equipment.
5. Unauthorized personnel are strictly prohibited from opening the cover plate. Otherwise, there will be a risk of electric shock, and the resulting fault will not be covered by the warranty.
6. Operators and professional technicians should receive adequate training on safe operation and equipment maintenance. They should operate under sufficient preventive measures and with personal protective equipment.

7. When it is necessary to move or rewire, the power input must be cut off. Wait for 5 minutes until the internal energy of the machine has been completely discharged. Then, use a multimeter to confirm that there is no dangerous voltage on the DC bus and the internal repairable parts of the machine. Only then can maintenance be carried out.
8. The maintenance of batteries should be performed or supervised by personnel who are familiar with batteries and the necessary preventive measures.
9. When replacing the battery, please use the same type of battery.
10.After the maintenance operation is completed, it is necessary to immediately check to ensure that no tools or other components are left inside the equipment.
11. If the device is not used for a long time, please follow this manual to store and recharge the battery.

 **Danger:**

During the operation of the equipment, there is **DANGEROUS VOLTAGE**, which may cause electric shock, resulting in death, serious personal injury or serious property loss. Therefore, before performing any maintenance work, the equipment must be powered off and the safety precautions listed in this manual and other related documents must be strictly followed.

02 Product Introduction

2.1 Product Overview

The PowerNest series of low-voltage integrated cabinet energy storage systems consist of 5 different models, each equipped with a specific inverter. This design installs the inverters and batteries inside the cabinet, allowing for flexible connection to photovoltaic arrays, diesel generators, and the grid, thereby providing stable power to AC loads. Its main objective is to maximize solar power generation, reduce reliance on grid power, and ensure continuous power supply in case of power outages.

2.2 Model Description

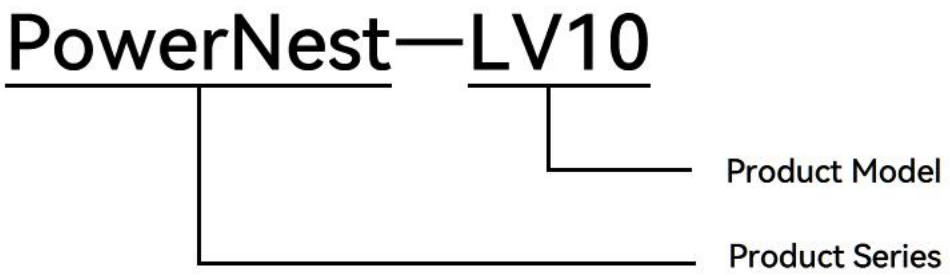

Figure 2.2

Illustration:

This product is an electrical battery device capable of charging and discharging.

Even though there are differences in appearance among different models of battery modules, the final installation effect remains consistent.

2.3 Product Appearance

LV10:

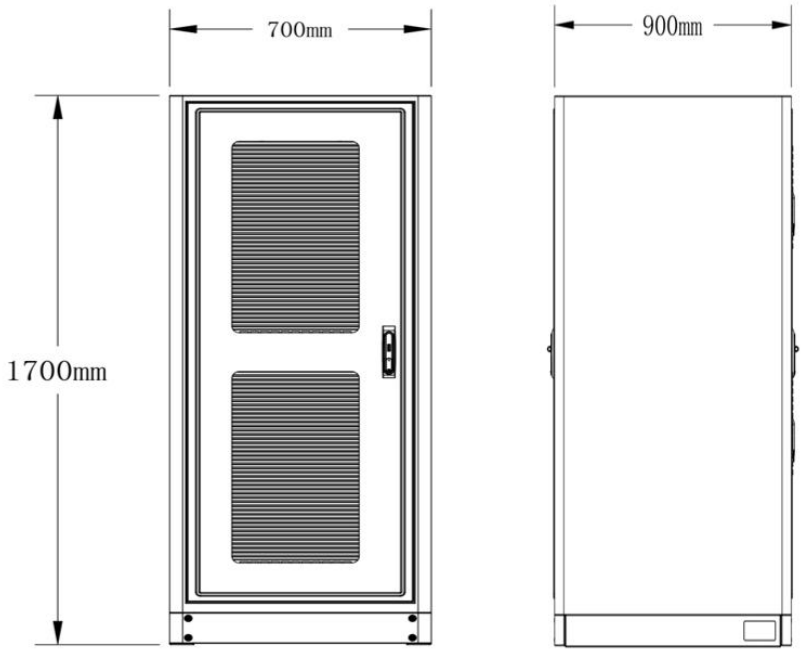

Figure 2.3-1

LV20:

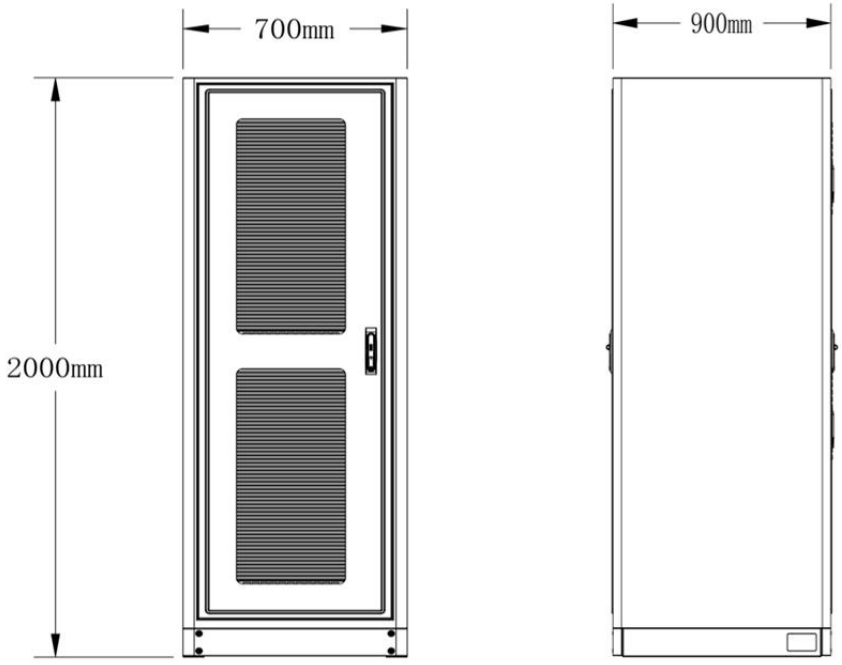

Figure 2.3-2

LV20:

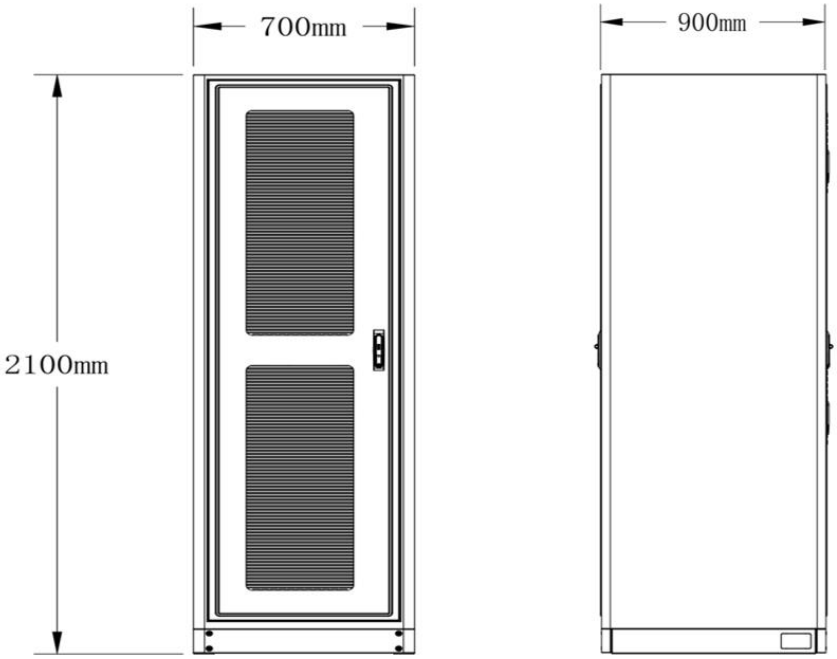

Figure 2.3-3

LV40:

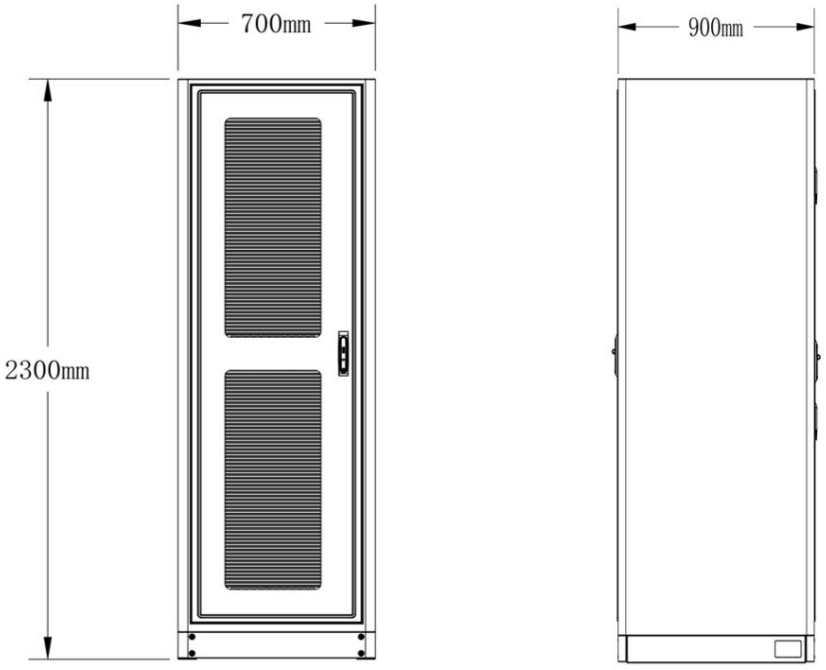

Figure 2.3-4

LV81:

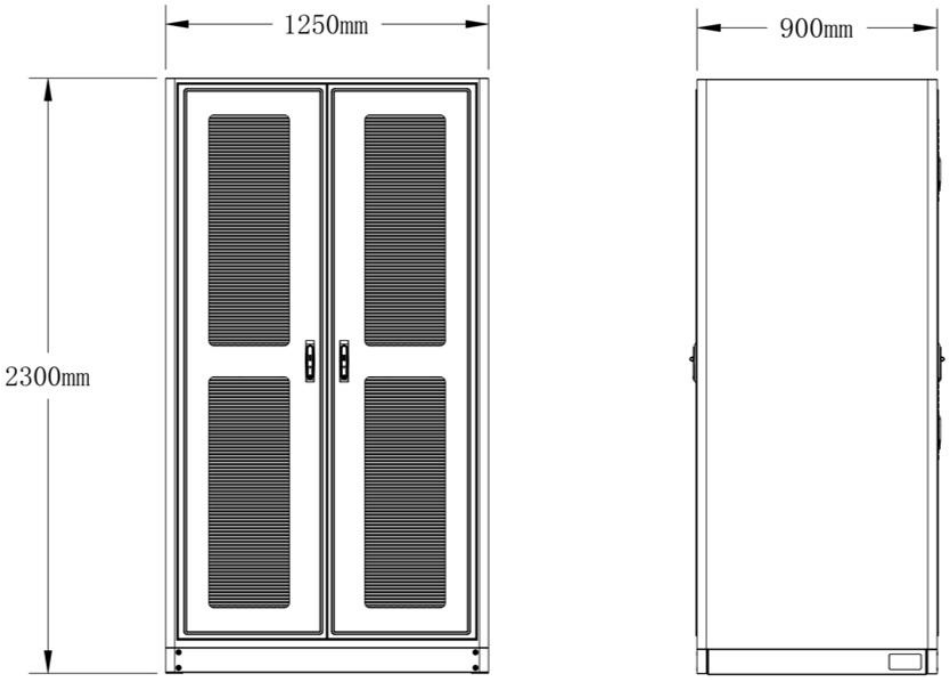

Figure 2.3-5

Illustration:

Different projects have different configurations. In practice, the actual delivery quantity shall prevail.

1.The actual height may vary slightly. Please refer to the actual installation height.

2.The series stacking can be freely combined according to the project configuration.

2.4 Product Parameters

Technical parameters of PowerNest Series

General Parameter	LV10	LV20	LV20	LV40
Battery Side Parameter				
Battery Type		LiFePO4		
Parallel battery PACK (qty.)	2/3	2/3	2/3	4
Rate Capacity（Ah）	200/300	400/600	400/600	800
Rate Voltage		51.2V		
Rate Engergy（kWh）	10.24/15.36	20.48/30.72	20.48/30.72	40.96
Operating Voltage Range		DC47V~55V		
Rate Power of Charge/Dischage（kW）	0.5P (5.12/7.68)	0.5P (10.24/15.36)	1/3P (6.82/10.24)	0.5P (20.48)
Max. Charge/Discharge Current	160A/225A	225A/360A (180A+180A)	225A/250A	450A (225A+225A)

Overcurrent protection	200A/350A	350A/500A	350A/400A	500A
Cycle life*	>6000 cycles,(25℃0.5C)90%DOD			
Inverter (optional)				
Inverter	Compatible with major inverter brands (such as Deye, Solis, Victron, etc.)			
Power range	3~10kW	3~18kW	3~15kVA (Victron)	3~20kW
Equipment protection				
Surge protection level	Secondary lightning protection for AC/DC sides			
General parameters				
Operating humidity	0~95% RH (Non-condensation)			
Operating temperature	-20℃ to 55℃ (de-rated above 45℃)			
Storage temperature	0℃~35℃			
Storage humidity	10 - 60% RH (No condensation)			
Altitude	＜3000m			
Cooling Method	Intelligent air-cooling			
Noise	＜70dB			
Fire protection	Thermal aerosol fire suppression device (optional)			
Isolation method	Non-isolated			
Protection level	IP55			
Dimensions (W*D*H, mm)	700*900*1700 (±5)	700*900*2000 (±5)	700*900*2100 (±5)	700*900*2300 (±5)
Weight	340kg±3%	498kg±3%	530kg±3%	595kg±3%

Table 2.4-1

General Parameter	LV51	LV61	LV71	LV81
Battery Side Parameter				
Battery Type	LiFePO4			
Parallel battery PACK (qty.)	5	6	7	8
Rate Capacity（Ah）	1000	1200	1400	1600
Rate Voltage	51.2V			
Rate Engergy（kWh）	51.2	61.44	71.68	81.92
Operating Voltage Range	DC47V~55V			

Rate Power of Charge/Dischage（kW）	0.4P(20.48)	0.5P(30.72)	0.43P(30.82)	3/8P(30.72)
Max. Charge/Discharge Current	450A (225A+225A)	360A (180A+180A) *2	360A (180A+180A) *2	360A (180A+180A) *2
Overcurrent protection	500A	500A+500A	500A+500A	500A+500A
Cycle life*	>6000 cycles,(25℃0.5C)90%DOD			
Inverter (optional)				
Inverter	Compatible with major inverter brands (such as Deye, Solis, Victron, etc.)			
Power range	3~20kW	3~30kW(15*2)	3~30kW(15*2)	3~30kW(15*2)
Equipment protection				
Surge protection level	Secondary lightning protection for AC/DC sides			
General parameters				
Operating humidity	0~95% RH (Non-condensation)			
Operating temperature	-20℃ to 55℃ (de-rated above 45℃)			
Storage temperature	0℃~35℃			
Storage humidity	10 - 60% RH (No condensation)			
Altitude	＜3000m			
Cooling Method	Intelligent air-cooling			
Noise	＜70dB			
Fire protection	Thermal aerosol fire suppression device (optional)			
Isolation method	Non-isolated			
Protection level	IP55			
Dimensions (W*D*H, mm)	1250*900*2300(±5)			
Weight	855kg±3%	950kg±3%	1045kg±3%	1140kg±3%

Table 2.4-2

Illustration:

1. "450A (225A+225A)" and "360A (180A+180A)" both refer to 2-pole DC circuit breakers, wired to break the positive pole only, for on/off control of the DC circuit.
2. "360A (180A+180A) × 2" indicates two independent 2-pole DC circuit breakers are configured, each corresponding to one inverter, also using positive-pole-only breaking for DC circuit on/off control.

3.Due to differences in production batches and the selected inverter model and quantity, product service life, weight, and dimensions may vary. Please refer to the actual delivered product.

2.5 Product Details

LV10:

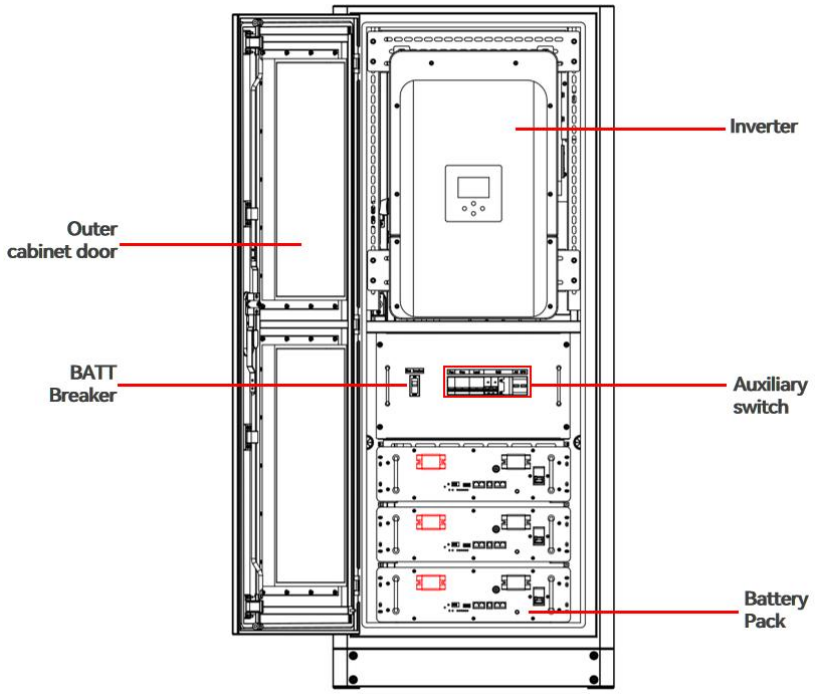

Figure 2.5-1

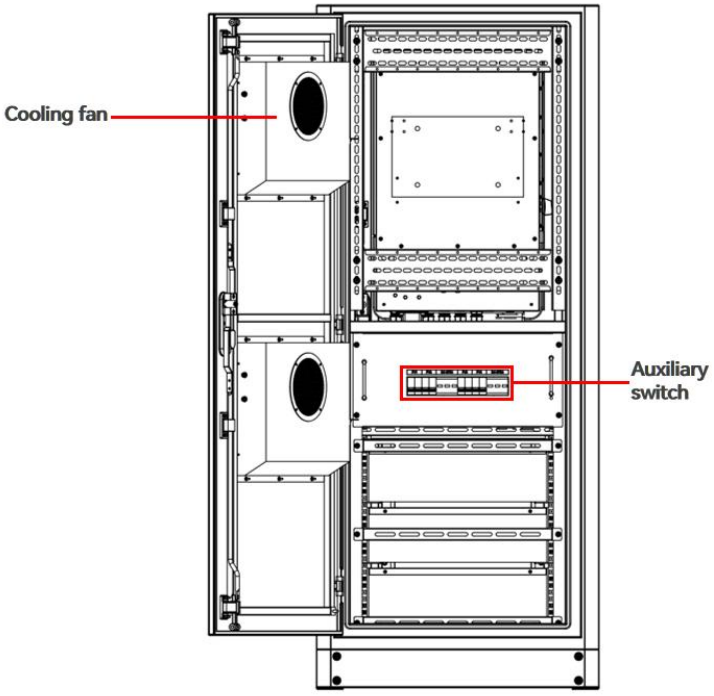

Figure 2.5-2

LV20:

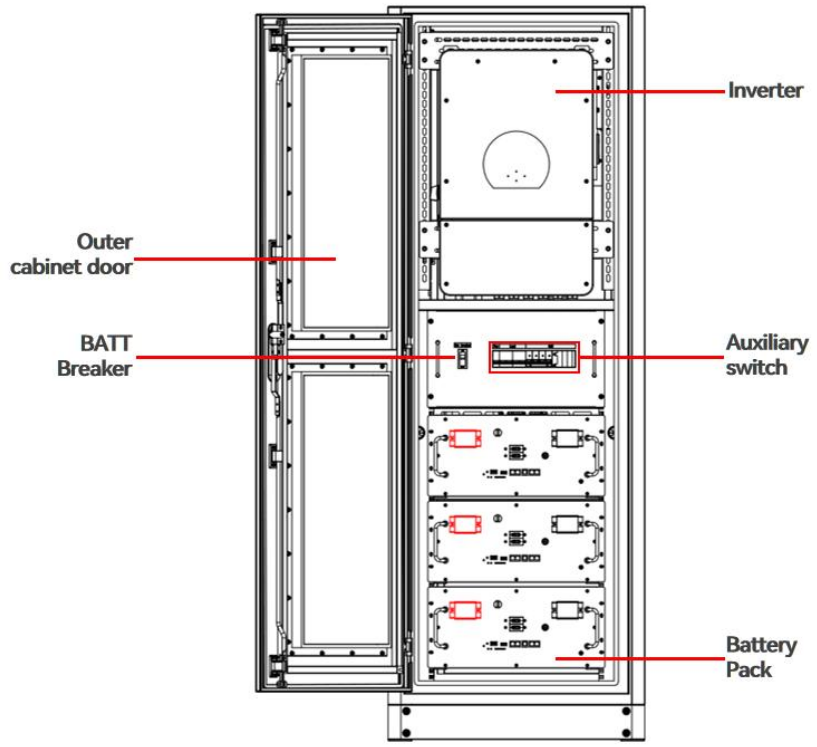

Figure 2.5-3

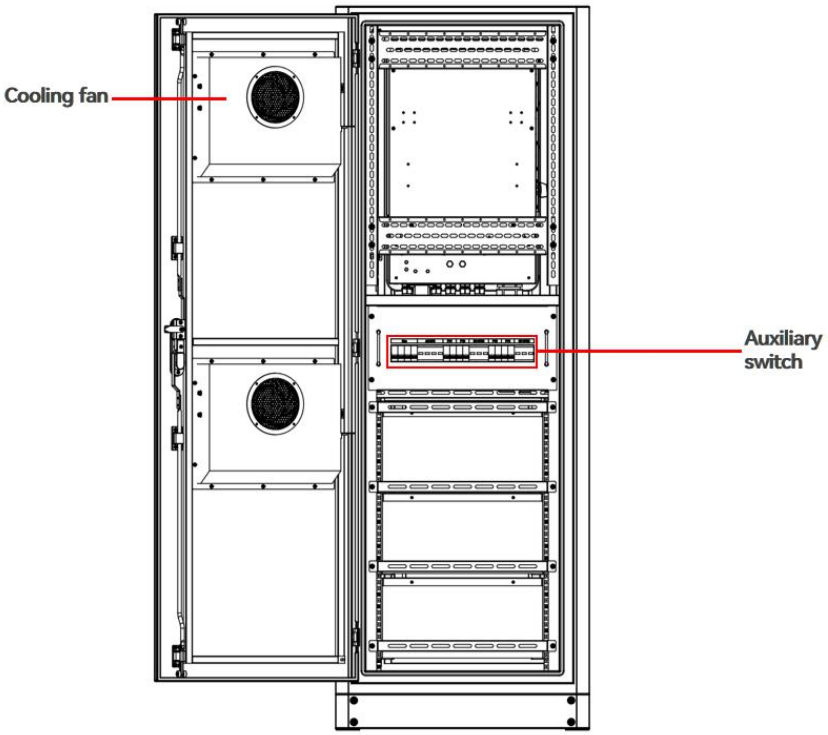

Figure 2.5-4

LV20:

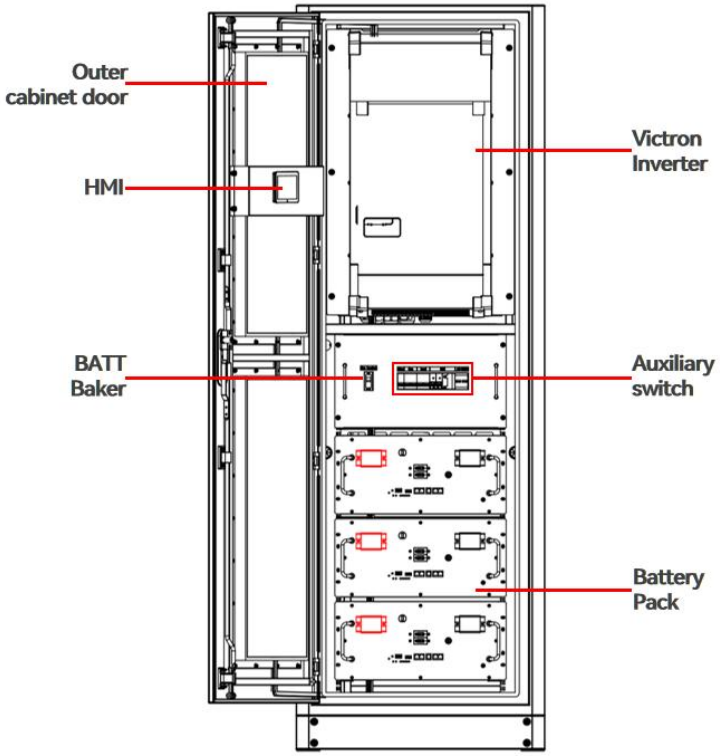

Figure 2.5-5

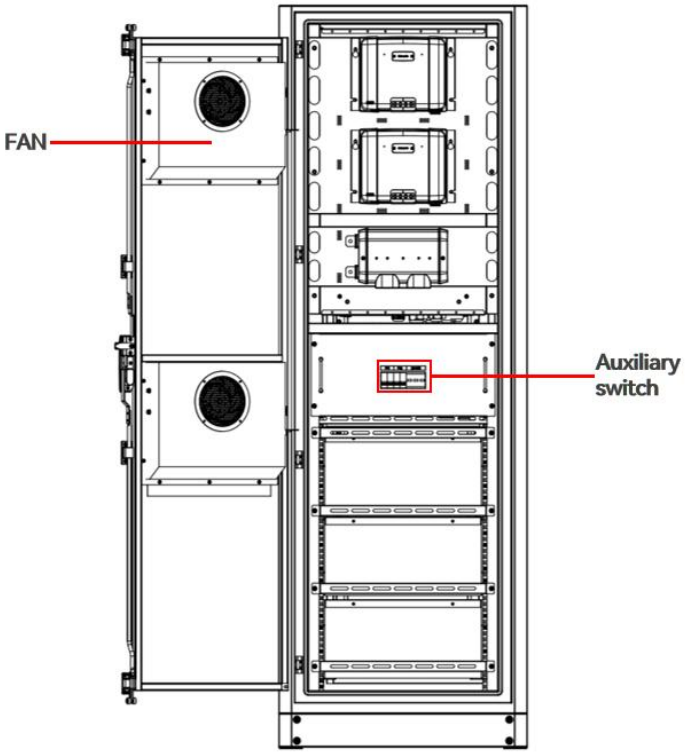

Figure 2.5-6

LV40:

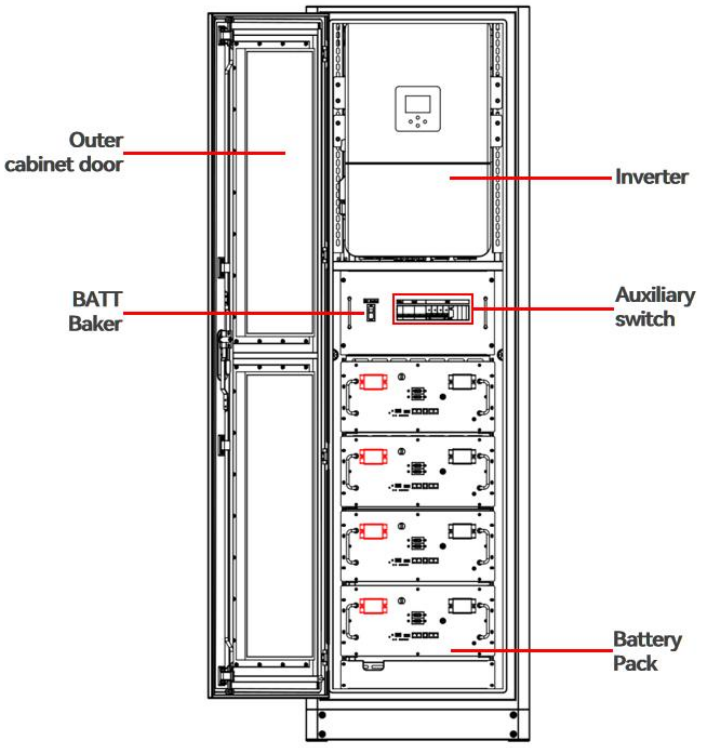

Figure 2.5-7

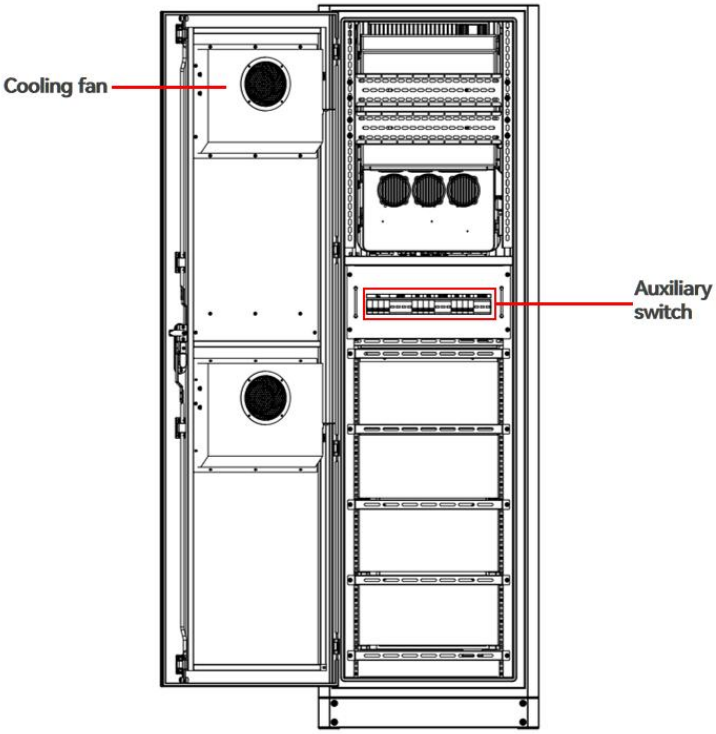

Figure 2.5-8

LV81:

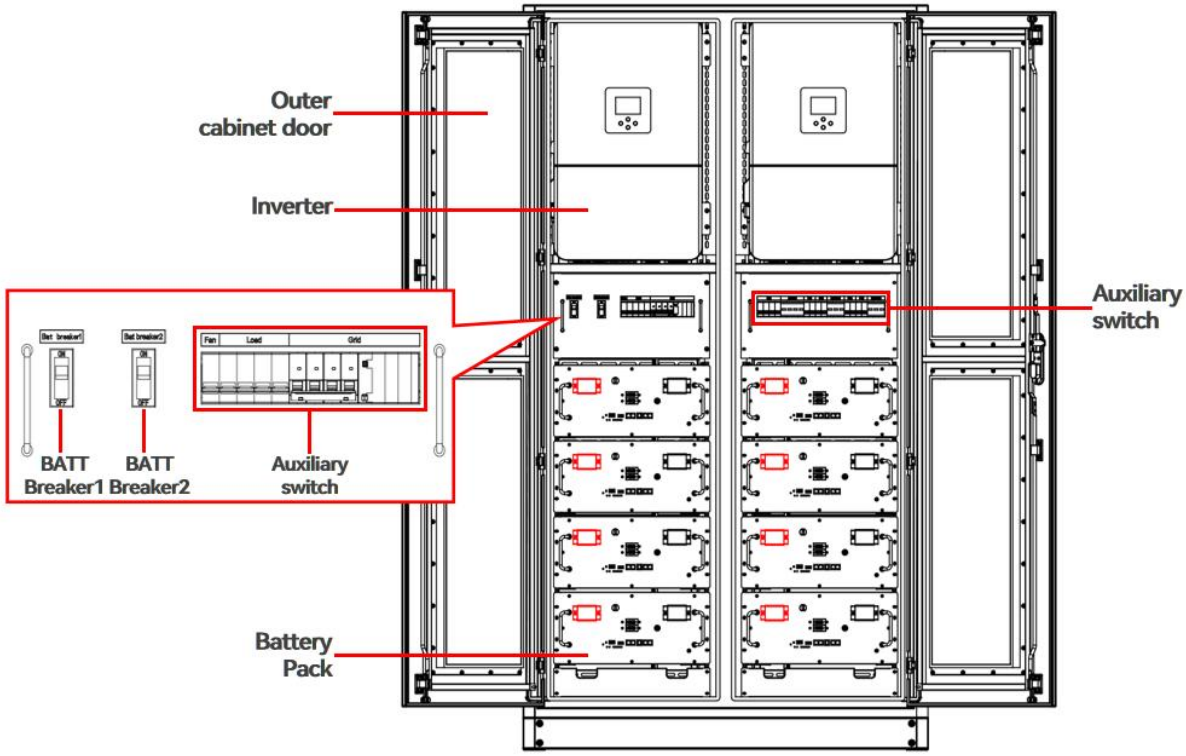

Figure 2.5-9

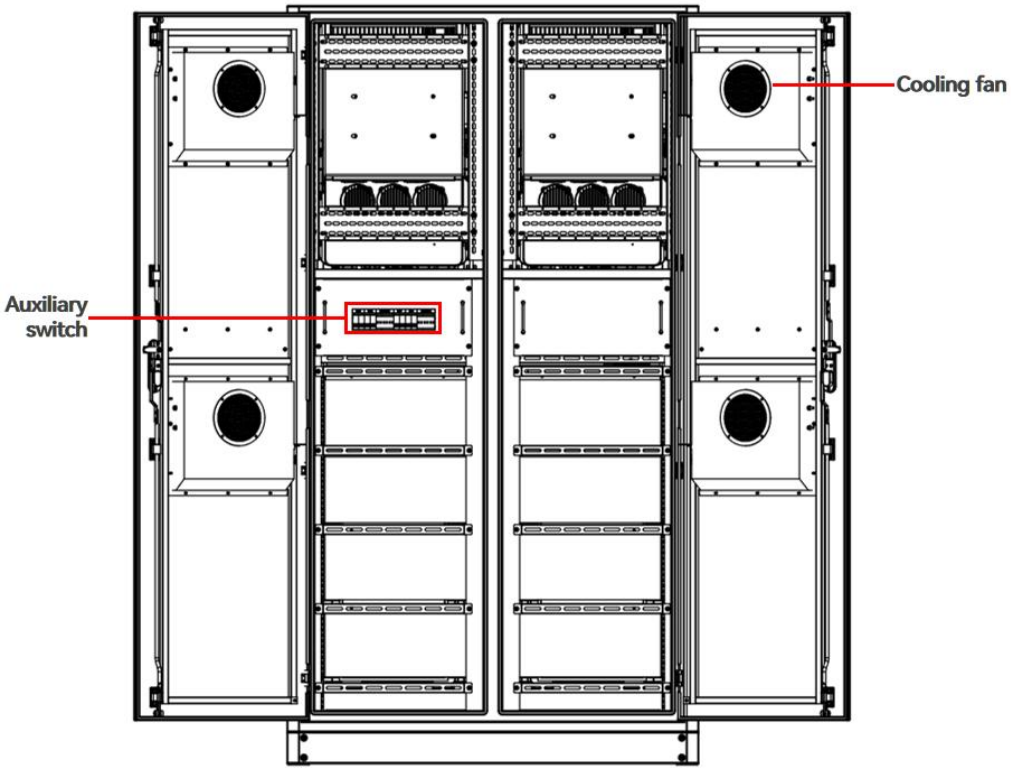

Figure 2.5-10

2.6 Product Application

PowerNest series cabinet optical storage system can be divided into four working modes according to the inverter: grid connected mode, off-grid mode, backup mode and economy mode.

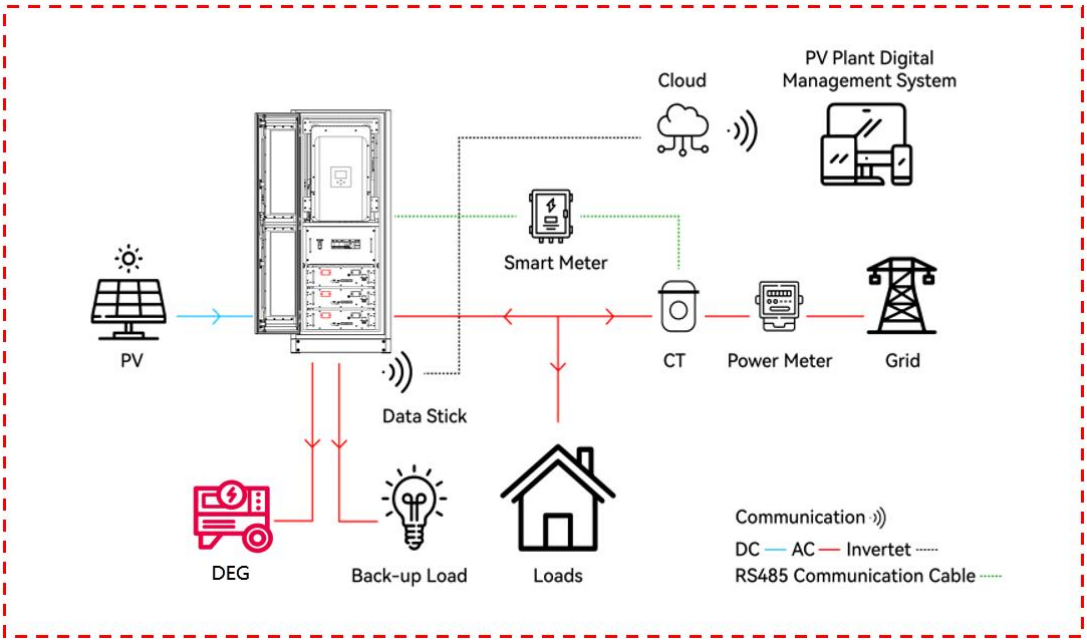

Figure 2.6

Grid connection mode:

1. Photovoltaic power generation is prioritized for load supply, and the remaining electricity is used to charge the battery; if there is still surplus power, it can be selected to be connected to the grid.
2. When the power generated by photovoltaic is not enough to support the load, the rest of the required energy is provided by the battery first, and if it is still insufficient to support the load, the power is supplied to the load through the grid.

Off-grid mode:

1. Photovoltaic and battery constitute a pure off-grid system, suitable for areas without power grid;
2. Photovoltaic power generation is prioritized for load supply, and the remaining electricity is used to charge batteries.

Backup mode:

The diesel generator only works when the power grid is abnormal, photovoltaic failure or battery power is low, and supplies the load first, and the rest of the electricity is used to charge the battery.

Economic model: (peak shaving and valley filling)

The charging price is the valley price and the discharging price is the peak price; the charging and discharging time and power can be set by the human-computer interaction screen on the inverter.

Illustration: The operating modes are described in the user manual of Inverter.

03 Product Installation

3.1 Storage before installation

1. Preparations before storage: Ensure that the outer packaging box of the equipment is intact and undamaged; do not remove it. Ensure that the desiccant inside the box is not lost to maintain internal dryness.
2. Storage environment requirements: When storing the equipment, keep it away from flammable, explosive, and corrosive items; store the equipment in a cool place to avoid direct sunlight; ensure that the storage environment is clean, with appropriate temperature and humidity range, and without condensation.
3. Battery storage requirements: The state-of-charge (SOC) range of the stored batteries should be between 25% and 50% SOC; a charge-discharge cycle should be performed for the batteries every 6 months.
4. Storage temperature range: When the temperature is between -10℃ and 0℃, the storage time should not exceed 1 month; when the temperature is between 0℃ and 35℃, the storage time should not exceed 1 year; when the temperature is between 35℃ and 45℃, the storage time should not exceed 1 month.
5. Storage humidity range: The storage humidity range is no more than 60% ROH, without condensation. If there is any dampness or condensation at the battery interface, the battery system should not be installed and proper handling should be carried out.

3.2 Pre-installation inspection

1. Outer packaging inspection: Verify whether the outer packaging is intact, including checking for any deformations, holes, cracks or other signs that may cause damage to the internal equipment.
2. Equipment model and delivery item inspection: Confirm that the equipment model matches the order; verify that the type and quantity of the delivery items are correct, and check for any damage to the appearance.

3.3 Installation Environment

1.Installation environment requirements : The equipment must not be installed in environments that are flammable, explosive or corrosive; the installation location should be kept out of reach of children and should be chosen in a place that is unlikely to be accidentally touched; at the same time, be aware that the surface of the equipment may generate high temperatures during operation to prevent burns.



Figure 3.3-1

2. **Installation space and environmental conditions :** Ensure that the installation space meets the ventilation, heat dissipation and operation space requirements of the equipment; the protection level of the equipment should be suitable for indoor installation, and the temperature and humidity of the installation environment should be maintained within the appropriate range.

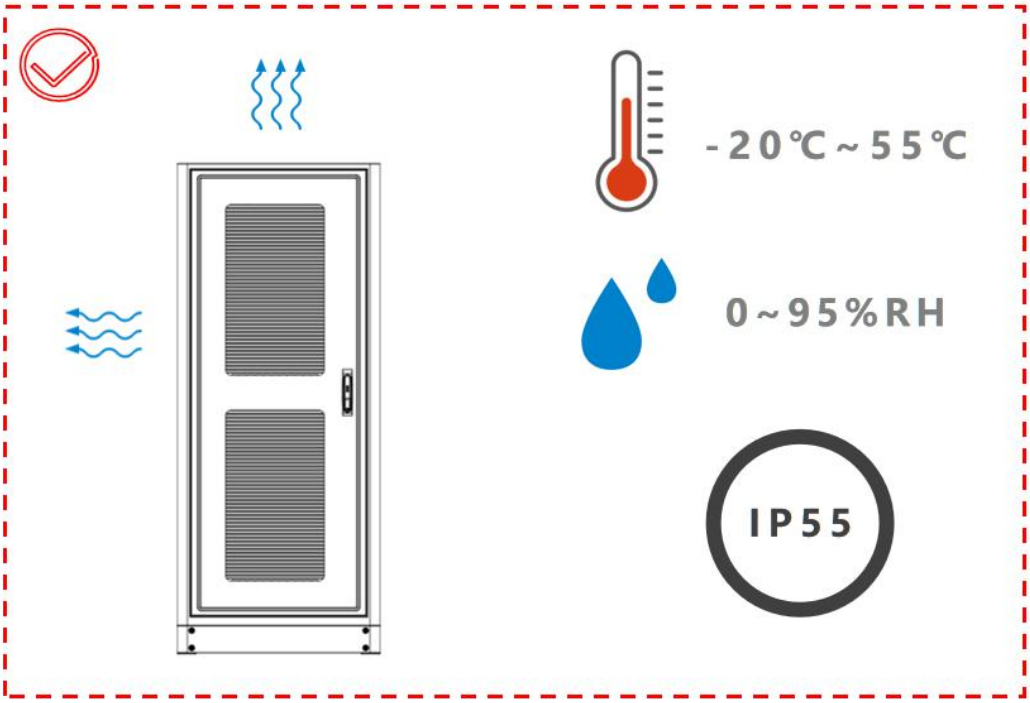

Figure 3.3-2

3.Equipment installation spacing : The installation height of the equipment should be convenient for operation and maintenance, ensuring that the indicator lights and labels are clearly visible, and the connection terminals are easy to operate. To ensure good heat

dissipation and ease of disassembly, the minimum space around the rechargeable battery must meet the following standards:

- When installing the rack or cabinet, a distance of at least 300mm should be left on both sides of the equipment.
- The distance between the two sides of the equipment should be at least 300mm - 600mm wide.

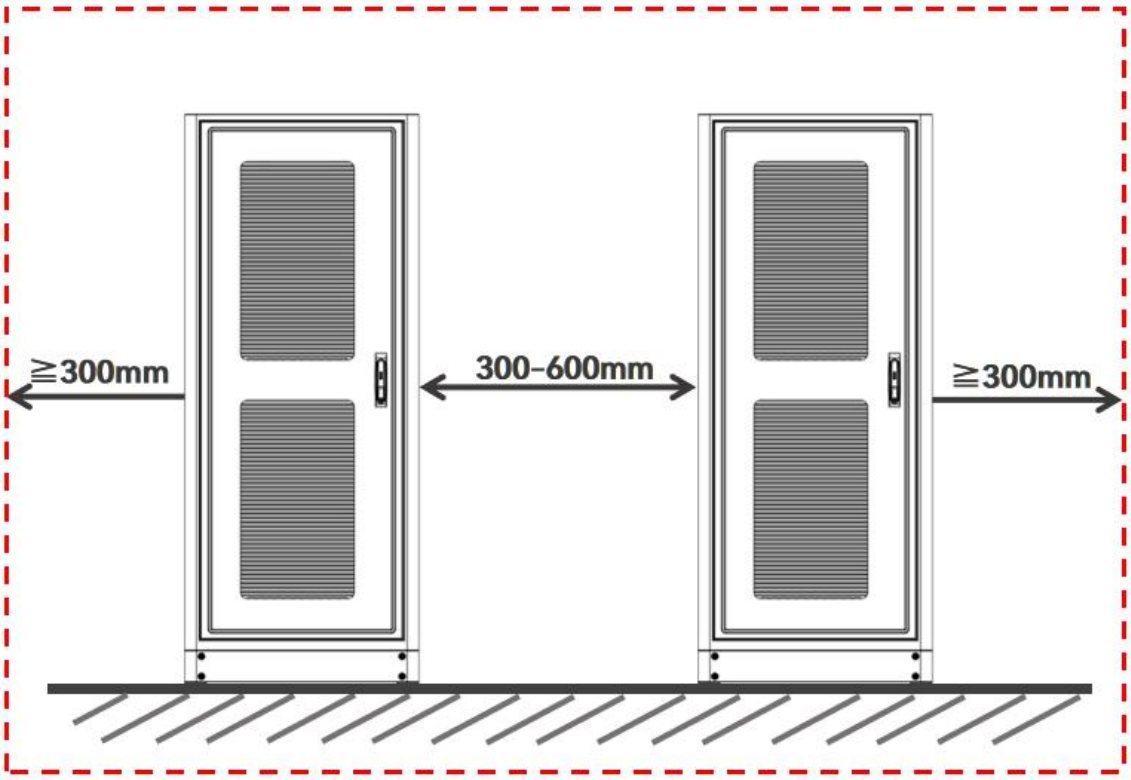

Figure 3.3-3

4.Equipment installation height and protection : The installation height of the equipment should be convenient for operation and maintenance, ensuring that the indicator lights and labels are clearly visible, and the connection terminals are easy to operate; the altitude at which the equipment is installed should not exceed 3000 meters.

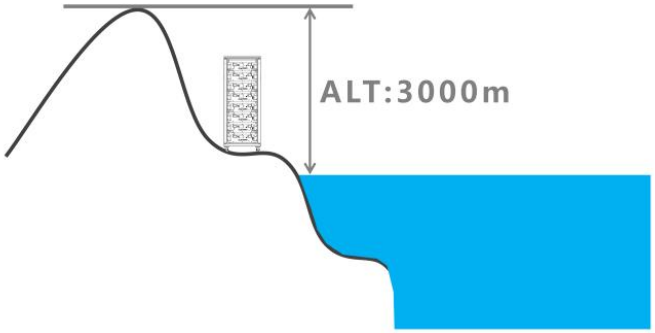

Figure 3.3-4

5.Electromagnetic interference protection : The installation location should be far away from strong magnetic fields to avoid interference; if there are radio stations or wireless communication devices below 30 MHz near the installation site, the distance between the battery and these devices should be more than 30 meters.

6.Installation carrier requirements: Use non-flammable materials (such as concrete, brick, stone or fire-resistant treated wood and metal);
The carrier should be sturdy and able to bear the weight of the equipment; the battery system should be installed against the wall and equipped with anti-toppling brackets.
7.Angle installation requirements: The equipment must be installed horizontally and must not be tilted or inverted.

3.4 Prepare tools

Installation tool list

No.	Tool Name	Legend
1	Insulating gloves	
2	Protective goggles	
3	Insulating shoes	
4	Work uniform	
5	Safety helmet	
6	Screwdriver	
7	Pliers for stripping wires	
8	Hydraulic clamp	
9	Hot air gun	
10	Multimeter	
11	Torque wrench	
12	Marker pen	

Table 3.4

Illustration: This table is for reference only. The actual tools should be in accordance with the local installation standards.

3.5 Mechanical installation

The product is pre-configured with factory settings upon delivery. The packaging diagram is shown below.

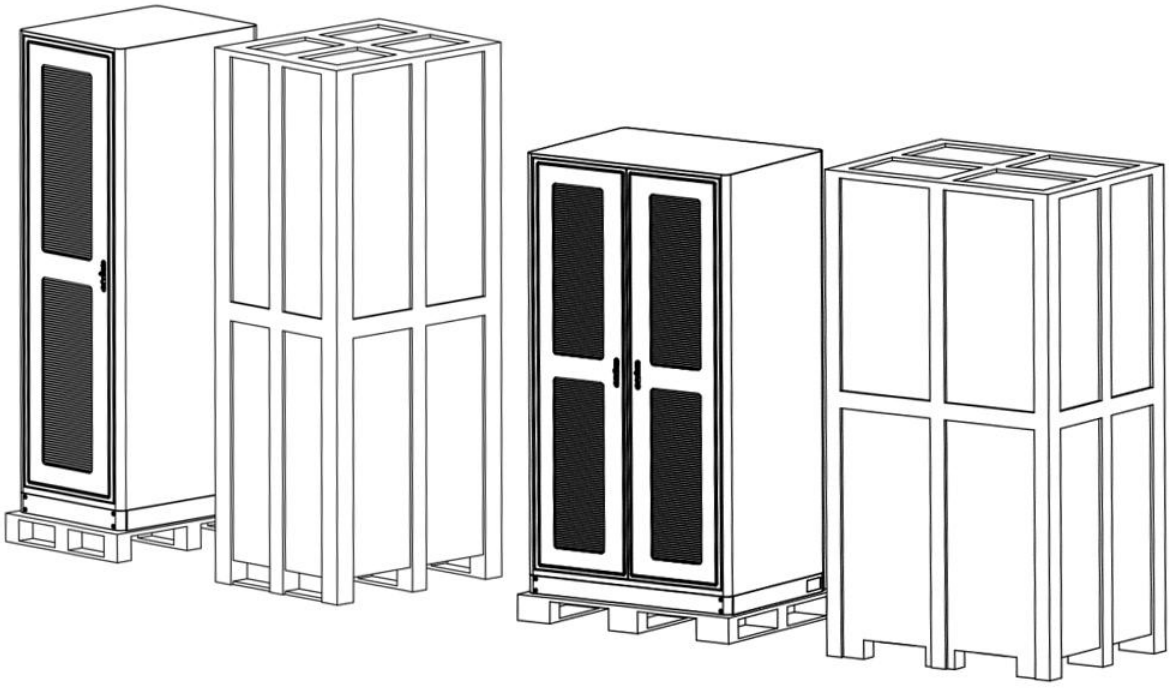

Figure 3.5-1

Illustration:

Packaging may vary slightly by model and batch. Please refer to the actual product packaging.

Danger:

Due to the weight of the product, be sure to use professional equipment for handling.
Please strictly follow the installation steps. The company shall not be held responsible for any injuries or damages caused by improper assembly or operation.

Step 1: Remove the battery

Remove the battery product from its outer packaging, while ensuring that the wall is sturdy enough to bear the weight of the battery.

Illustration:

After opening the packaging, please check if the appearance of the rechargeable battery is damaged or if any accessories are missing. If any damage or missing parts are found, please contact the dealer immediately.
When handling all packaging materials, be cautious as these materials may be reused in future storage and relocation of rechargeable batteries.

Step 2: Transporting batteries

Caution:

1. During the transportation, handling and installation processes, local laws and regulations as well as industry standards must be followed.
2. Based on the weight of the battery, appropriately arrange the handling personnel. In case of necessity, use professional handling tools for the transportation.
3. Please ensure that the battery remains balanced during the handling process and avoid dropping.
4. Before installing the equipment, please connect the grounding cable first.

Step 3: Assembly of Battery and Cabinet

Illustration:

For products that are pre-assembled at the factory, this step is already completed upon delivery.

If you receive the product with the batteries not yet assembled, please follow this step to complete the assembly.

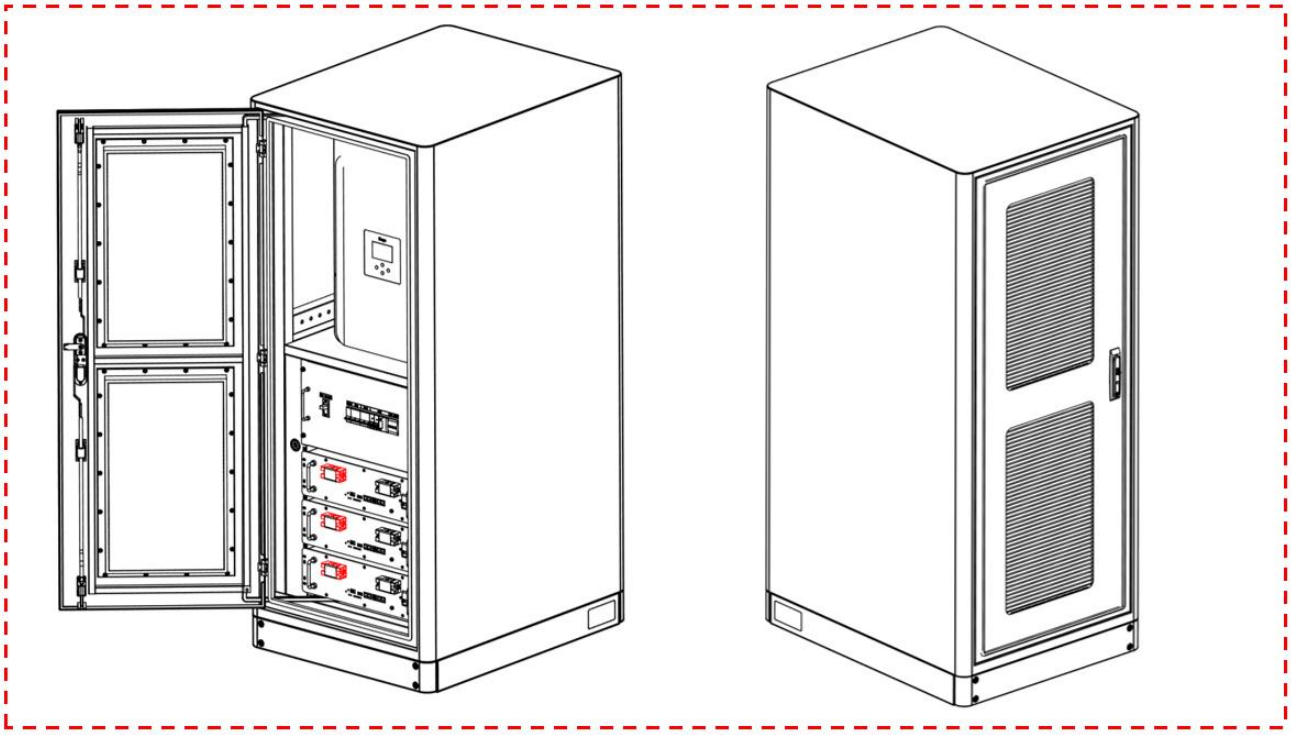

Figure 3.5-2

Installation of the cabinet:

1.Hold the product with both hands and place it into the cabinet slot.

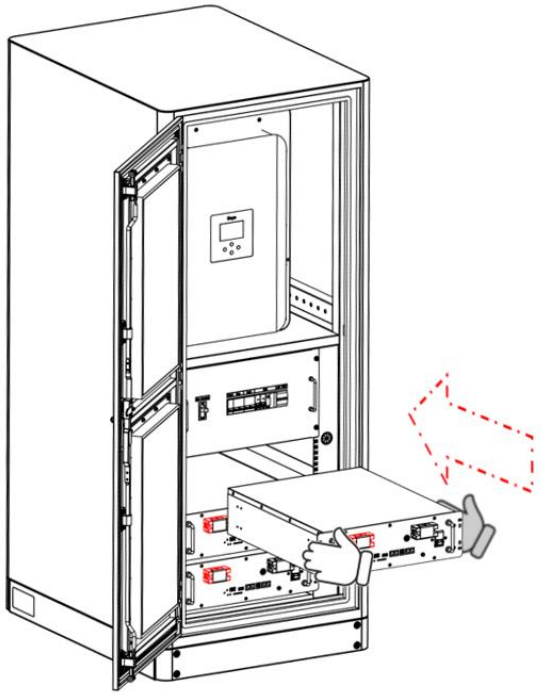

Figure 3.5-3

2.When installing the battery pack, if the packaging is too heavy, please use a special lifting device to lift the packaging so as to facilitate operation and ensure safety. Place the battery modules into the cabinet and tighten the fixing screws.

Step 4: Fixed base/frame of the cabinet / rack

When stacking batteries inside the cabinet, you must first align the battery with the cabinet slot before inserting it.

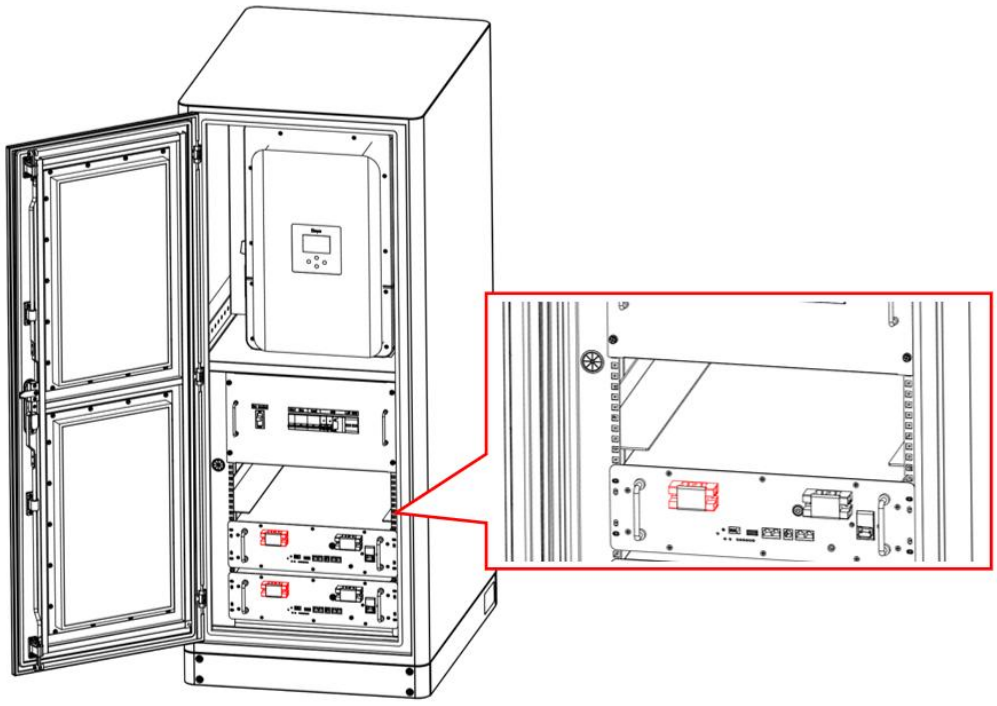

Figure 3.5-3

Step 5：Battery stack

According to the battery model listed on the delivery list, repeat this operation until the required number of battery PACK stacks have been completed.

3.6 Electrical connection

For detailed instructions on electrical and communication connections, please refer to the attached B-LFP48 user manual and inverter user manual. Please follow the instructions in the manuals for installation.

04 Operation and Maintenance

Danger:

Please use special protective gear and specialized insulation tools to prevent electric shock injuries or short-circuit faults.

Caution: 1. During the power-on process, one should observe while powering on. If any abnormal phenomenon is detected, immediately power off the battery and identify the cause. After resolving the issue, continue the power-on process.

2. After the battery installation and adjustment is completed, or after the battery discharge is finished, please promptly recharge the battery. Otherwise, it may be damaged due to over-discharge.

4.1 Pre-power-on inspection

Inspection items and acceptance criteria

No.	Inspection Items	Inspection Standards
1	Properly Installed System	Correct and reliable installation
2	Reasonable Cable Layout	Meet the user's requirements
3	A Beautifully Tied Bandage	Uniformly tied string band, with no sharp corners at the cut ends
4	Reliable Grounding	Proper and reliable grounding connection
5	Turn Off the Switch	The "inverter" and all the switches connected to the battery are all in the "OFF" position.
6	Properly Cables Connection	Correct and reliable connections of DC wires, AC wires and communication wires
7	Seal unused terminals and interfaces	The unused terminals and interfaces are covered with waterproof caps.
8	The required installation environment	Reasonable installation space, clean and tidy environment

Table 4.1

4.2 Pre-power-on inspection

The power-on/off procedures can be referred to the inverter user manual provided with the product and the user manual of the B-LFP48 product.

4.3 Mobile application (App)

Instructions for connecting the battery to the cloud platform are detailed in the supplied B-LFP48 user manual. Please refer to this manual to complete the cloud platform connection.

4.4 Inspection and Maintenance

1.If you find any issues that may affect the battery system, please contact the after-sales service immediately. Do not attempt to disassemble it by yourself.
2.If you see exposed copper wires of the conductive wire, do not touch it. To avoid high-voltage danger, contact the after-sales service immediately and do not attempt to disassemble it by yourself.
3.In case of other emergencies, contact the after-sales service immediately. Follow their instructions for operation or wait for the after-sales personnel to handle the situation on-site.

Inspection and Maintenance Form

Maintenance content	Maintenance cycle
Check if the installation of the battery system is loose. If so, tighten the corresponding position.	Once every six months
Check if the shell is damaged. If so, repaint it or contact the after-sales service center.	Once every six months
Check if the exposed wires are damaged. If so, replace the corresponding cables.	Once every six months
Check if there are any obstructions around the battery to prevent it from cooling properly.	Once every six months
Check for water or pests to prevent long-term intrusion into the battery.	Once every six months
If the battery is not used for a long time, it must be charged to at least 50% of its State of Charge (SOC) each time.	Once every six months

Table 4.9

05 Warranty service

5.1 Warranty period

When the product is used correctly, the warranty period stipulated in the business contract shall prevail.

5.2 Warranty scope

If the product is within the warranty period and any malfunction is caused by quality issues of the product itself, our company will provide free repair or replacement of the product for the customer. The customer should reserve a reasonable response time for our company's maintenance. The replaced product will be handled by our company. The customer is required to present the relevant proof of product purchase and ensure that the product trademark is clearly visible. Otherwise, our company reserves the right not to provide warranty coverage.

5.3 Disclaimer

In the following cases, the company reserves the right not to provide quality assurance, but can still offer paid repair services.

1. Beyond the warranty period;
2. Unable to provide proof of product purchase;
3. Damage caused during transportation or loading/unloading;
4. Incorrect installation, modification or damage caused by unauthorized personnel's disassembly;
5. Damage resulting from abnormal use conditions or environments;
6. Machine failure or damage caused by using non-Natong components or software;
7. Faults caused by irresistible factors such as fires, earthquakes, floods, etc.

Appendix

Appendix A-Logo Description

Identification Instructions

	Please read the endorsed documentation carefully
	Danger. Risk of electric shock!
	Hazardous Substance Labeling
	CE certification
	Transportation Safety Certification
	Flammability risk
	Keep the battery away from open flame or ignition sources.
	Recycling
	The danger of voltages. Danger to life due to high voltages in the energy storage system
	This marking indicates that this product should not be disposed with other household wastes

Appendix B-Emergency handling

When the battery drops or is subjected to a strong impact

- During installation, if the battery falls or is subjected to strong impact, it may cause internal damage. Do not continue to use it.
- If there is a noticeable odor, damage, smoke or fire, immediately evacuate the personnel and promptly call the police. Professional personnel should use fire-fighting equipment to extinguish the fire and handle the situation under the condition of ensuring safety.
- If there is no obvious deformation or damage to the appearance and no noticeable odor, smoke or fire occurs, contact professional personnel to transfer the battery to an open and safe place, or contact the company for recycling treatment.

When a flood occurs

- Ensure personal safety first, then immediately cut off the power supply of the system.
- If any part of the battery is submerged in water, do not touch it to avoid electric shock. Evacuate the scene and report it in time.
- The flooded battery has a risk of electrolyte contamination. It cannot be reused and needs to be recycled and scrapped by a professional institution.

When there is smoke or fire

- When there is a large amount of smoke in the storage room for batteries, it is strictly prohibited to open the door and enter to prevent the risk of explosion and inhalation of toxic gases by personnel.
- During the extinguishing process, all firefighters should wear full heat-insulating fireproof suits, wear fire-fighting filtering respirators or air respirators, fire helmets and masks, and insulated protective equipment such as insulated shoes. Use inert gas or Class D dry powder fire extinguishers. It is forbidden to use water-based fire extinguishing agents (initially).
- After extinguishing the fire, continuous water spraying for cooling is still required. Wait until the battery temperature cools to within ±10℃ of the room temperature, and monitor for several hours to ensure there are no signs of temperature rise before removing.

When electrocuted

- Set up warning tapes to isolate the scene and ensure that people stay away from the power source.
- Do not directly touch the victim until they have been disconnected from the power source. Avoid getting yourself electrocuted. Wear professional insulating gloves and shoes, and use insulating tools to separate the victim from the power source.
- If the injury is severe, immediately call the emergency number. Have the victim lie flat, monitor changes in their consciousness, breathing, and heartbeat. For those with severe injuries, no breathing, or no heartbeat, trained personnel with certification should perform cardiopulmonary resuscitation until medical personnel arrive.

When the battery bulges

- Immediately stop using and disconnect the power supply. Stop charging and discharging, and disconnect the power source of the device. Do not attempt to charge, freeze or puncture the battery. If you notice the device is overheating or smoking, place it in a fireproof container (metal box/sandbox) and keep it away from the device.
- For handling methods based on the degree of battery bulging:
(1) Slight deformation, no heating - safely remove and send to the recycling point
(2) Shell rupture/leaking - isolate and hand over to the hazardous waste agency for handling
(3) Accompanied by high temperature/smoke - place in the sandbox for monitoring, use water to cool down and sound the alarm.
All operations should prioritize personal safety. If unsure, evacuate immediately and contact professionals.

Appendix C-Exceptional Situation Explanation

1. What should be done if the battery pack fails to function properly after being connected to the power supply?

Answer: The most straightforward method is to connect to the host computer. Through the host computer, the fault phenomenon can be detected. Information such as alerts, protection, and faults can be displayed on the host computer interface, allowing for a rough analysis of the cause. This can also provide necessary references for further testing.

2. Under what circumstances will RS232 communication fail?

Answer: The following steps can be taken to eliminate this problem:

1) Ensure that at least one indicator light on the battery pack is on or flashing, indicating that the battery pack is in normal operation.

2) Confirm that the upper computer software selects the correct COM port (refer to the device manager).

3) Confirm that the RS232 communication line is fully inserted into the corresponding communication interface of the battery pack.

3. Under what circumstances will RS485 be unable to perform parallel battery communication?

Answer: The possible causes of parallel battery communication failure are as follows: First, confirm whether the parallel RS485 communication ports are properly connected. Then, ensure that the address dialing position of the battery pack is correct, and make sure that the RS485 terminal plug is in the correct position.

4. What is the fault alarm mechanism?

A: The battery pack has a fault alarm function, which can be checked through the upper computer software.

Faults include:

1) Sampling fault: Communication failure between the analog front-end and the main control chip. When the fault occurs, the charging and discharging function is turned off, and the fault alarm can be automatically cleared after the fault is eliminated.

2) Temperature NTC fault: Mainly detects whether the temperature NTC is short-circuited or disconnected. When the fault occurs, the charging and discharging function is turned off, and the fault alarm can be automatically cleared after the fault is eliminated.

3) Unit fault: The voltage difference between the unit is greater than 1V, or the difference between the total voltage detected and the total voltage of the unit is greater than 5V, or the minimum voltage is less than 0.5V. A broken voltage sampling line also reports the same fault. When the fault is cleared, the fault alarm can be automatically cleared.

After the battery is connected to the system, it exhibits overcurrent protection or short-circuit protection. This is not a problem of the battery pack, but rather an excessive capacity load of the electrical equipment. Charging can eliminate the alarm or extend the pre-charging circuit delay time of the battery pack.

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Best Solution Lithium Battery

User Manual

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