

Pytes

User Manual

E-Box Series



V 4.0.1

Shanghai Pytes Energy Co., Ltd

About This Document

Dear Customer,

This is your Pytes E-BOX Series LFP battery used for Energy storage system. We provide safe, well-designed and high-performance standard LFP battery packs for you. The battery pack is compact and easy to install, used as the main part for an energy storage solution. It is widely used in Residential, Small Commercial and Industrial Energy Storage Solution.

This manual contains information necessary to install, operate and maintain the battery. We kindly ask you to read this manual carefully in advance.

This manual is meant for the installers and users of the battery. Only qualified installer/electrician may install and perform maintenance work.

The boundaries of its use, as described in this manual, should be kept in mind. This battery may not be used in medical or in aviation related applications. This LFP battery pack may not be used for any purposes other than described in this manual. Using the LFP battery pack for any other purpose will be considered improper use and will void the warranty of the product. Pytes cannot be held responsible for any damage caused by improper or incorrect use of the product. Read and understand this manual completely before using the product. During the use of this product, user safety instructions should always be followed to ensure the safety of installers, users, service personnel and third parties.

This is the original manual, keep it in a safe location! Please consult Pytes for the latest version of all manuals.

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Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol | Description |
|---|--|
|  | Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. |
|  | Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
|  | Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. |
|  | Indicates warning information about device or environment security which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury. |
|  | 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, a battery can present a risk of electric shock and burns by high short-circuit current. Do not short-circuit the Li-ion battery. |
|  | Caution, do not dispose of batteries in a fire, the battery may explode. |
|  | Recyclable. |
|  | Read the instruction manual before starting installation and operation. |

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1 Safety information

1.1 Personal Safety



Ensure that power is off during installation. Do not install or remove a cable with power on.

Non-Standard and improper operation on the energized equipment may cause fire, electric shocks, or explosion, resulting in property damage, personal injury, or even death.

Before operations, remove conductive objects such as watches, bracelets, bangles, rings, and necklaces to prevent electric shocks.

During operations, use dedicated insulated tools to prevent electric shocks or short circuits. The dielectric withstanding voltage level must comply with local laws, regulations, standards and specifications.

During operation, wear personal protective equipment such as protective clothing, insulated shoes, goggles, safety helmets, and insulated gloves.

General Requirements

- Do not stop protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment.
- If there is a likelihood of personal injury or equipment damage during operations, immediately stop, report the case to the supervisor, and take feasible protective measures.
- Do not power on the equipment before it is installed or confirmed by professionals.
- Do not touch the power supply equipment directly or with conducts such as damp objects. Before touching any conductor surface or terminal, measure the voltage at the contact point to ensure that there is no risk of electric shock.
- Do not touch operating equipment because the enclosure is hot.
- In the cases of a fire, immediately leave the building or the equipment area and activate the fire alarm or call emergency services. Do not enter the affected building or equipment area under any circumstances.

Personnel Requirements

- Only professionals and trained personnel are allowed to operate 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, operation, maintenance.
 - 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 or maintain the equipment must receive adequate training, be able to correctly perform all operations, and understand all necessary safety precautions and local relevant standards.
- Only qualified professionals or trained personnel are allowed to install, operate, and maintain the equipment.
- Only qualified professionals are allowed to remove safety facilities and inspect the equipment.
- Personnel who will perform special tasks such as electrical operations, working at heights, and operations of special equipment must possess the required local qualifications.
- Only authorized professionals are allowed to replace the equipment or components (including software)
- Only personnel who need to work on the equipment are allowed to access the equipment.

1.2 Electrical Safety



Before connecting cables, ensure that the equipment is intact. Otherwise, electric shocks or fire may occur.

Non-standard and improper operations may result in fire or electric shocks.

Prevent foreign matter from entering the equipment during operations. Otherwise, equipment damage, load power derating, power failure, or personal injury may occur.



For the equipment that needs to be grounded, install the ground cable first when

installing the equipment and remove the ground cable last when removing the equipment.

General Requirements

- Follow the procedures described in the document for installation, operation, and maintenance. Do not reconstruct or alter the equipment, add components, or change the installation sequence without permission.
- Obtain approval from the national or local electric utility company before connecting the equipment to the grid.
- Observe the power plant safety regulations, such as the operation and work ticket mechanisms.
- Install temporary fences or warning ropes and hang "No Entry" signs around the operation area to keep unauthorized personnel away from the area.
- Before installing or removing power cables, turn off the switches of the equipment and its upstream and downstream switches.
- If any liquid is detected inside the equipment, disconnect the power supply immediately and do not use the equipment.
- Before performing operations on the equipment, check that all tools meet the requirements and record the tools. After the operations are complete, collect all tools to prevent them from being left inside the equipment.
- When installing the equipment, use a torque tool of a proper measurement range to tighten the screws. When using a wrench to tighten the screws, ensure that the wrench does not tilt, and the torque error does not exceed 10% of the specified value.
- After the installation is complete, ensure that protective cases, insulation tubes, and other necessary items for all electrical components are in position to avoid electric shocks.
- Before maintaining a downstream electrical or power distribution device, turn off the output switch on the power supply equipment.
- During equipment maintenance, attach "Do not switch on" labels near the upstream and downstream switches or circuit breakers as well as warning signs to prevent accidental connection. The equipment can be powered on only after troubleshooting is complete.
- Do not open equipment panels.
- Check equipment connections periodically, ensuring that all screws are securely tightened.
- Only qualified professionals can replace a damaged cable.
- Do not scrawl, damage, or block any labels or nameplates on the equipment. Promptly replace labels that have worn out.
- Do not use solvents such as water, alcohol, or oil to clean electrical components inside or outside of the equipment.

Grounding

- Ensure that the grounding impedance of the equipment complies with local electrical standards.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is reliably grounded.
- Do not work on the equipment in the absence of a properly installed ground conductor.
- Do not damage the ground conductor.

Cabling Requirements

- When selecting, installing, and routing cables, follow local safety regulations and rules.
- When routing power cables, ensure that there is no coiling or twisting. Do not join or weld power cables. If necessary, use a longer cable.
- Ensure that all cables are properly connected and insulated and meet specifications.
- Ensure that the slots and holes for routing cables are free from sharp edges, and that the positions where cables are routed through pipes or cable holes are equipped with cushion materials to prevent the cables from being damaged by sharp edges or burrs.
- Ensure that cables of the same type are bound together neatly and straight and that the cable sheath is intact. When routing cables of different types, ensure that they are away from each other without entanglement and overlapping.
- When cable connection is completed or paused for a short period of time, seal the cable holes with sealing putty immediately to prevent small animals or moisture from entering.
- Secure buried cables using cable supports and cable clips. Ensure that the cables in the backfill area are in close contact with the ground to prevent cable deformation or damage during backfilling.
- If the external conditions (such as the cable layout or ambient temperature) change, verify the cable usage in accordance with the IEC-60364-5-52 or local laws and regulations. For example, check that the current-carrying capacity meets requirements.
- When routing cables, reserve at least 30 mm clearance between the cables and heat-generating components or areas. This prevents deterioration or damage to the cable insulation layer.
- When the temperature is low, violent impact or vibration may damage the plastic cable sheathing. To ensure safety, comply with the following requirements:
 - Cables can be laid or installed only when the temperature is higher than 0°C. Handle cables with caution, especially at a low temperature.
 - Cables stored at subzero temperatures must be stored at room temperature for at least 24 hours before they are laid out.
- Do not perform any improper operations, for example, dropping cables directly from a vehicle. Otherwise, the cable performance may deteriorate due to cable damage,

which affects the current-carrying capacity and temperature rise.

ESD

NOTICE

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the BMS board.

- When touching the equipment and handling boards, observe ESD protection regulations and wear ESD clothing and ESD gloves or a well-grounded ESD wrist strap.
- When holding a board, hold its edge without touching any components. Do not touch the components with bare hands.
- Package boards or modules with ESD packaging materials before storing or transporting them.

1.3 Environment Requirements



DANGER

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

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

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 from liquids. Do not install it under areas prone to condensation, such as under water pipes and air exhaust vents, or areas 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.

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.

General Requirements

- The installation and usage environment must meet relevant international, national, and local standards for lithium batteries, and are in accordance with the local laws and regulations. The user is obliged to protect the battery against fire or other hazards.
- The E-BOX 48100R is IP 20 degree, please install it indoors or in a suitably rated outdoor enclosure.
- Keep the Battery out of the reach of children and away from daily working or living areas, including but not limited to the following areas: studio, bedroom, lounge, living room, music room, kitchen, study, game room, home theater, sunroom, toilet, bathroom, laundry, and attic.
- When installing the battery in a garage, keep it away from the driveway. It is recommended that the battery be mounted on the wall higher than the bumper to prevent collision.
- Do not install the battery in places that are enclosed, unventilated, or difficult for firefighters to access. Do not place flammable or explosive materials around the battery. It is recommended that the battery be mounted on a wall to avoid contact with water.
- Install the battery in a sheltered place or install an awning over it to avoid direct sunlight or rain.
- For areas prone to natural disasters such as floods, debris flows, earthquakes, and typhoons, take corresponding precautions for installation.
- Do not install the Battery in an easily accessible position because the temperature of the enclosure and heat sink is high when the System is running.
- Do not install the Battery on a moving object, such as ship, train, or car.
- Ensure that the equipment is stored in a clean, dry, and well-ventilated area with proper temperature and humidity and is protected from dust and condensation.
- Keep the installation and operating environments of the equipment within the allowed ranges. Otherwise, its performance and safety will be compromised.
- Do not install the equipment in an environment with direct sunlight, dust, smoke, volatile or corrosive gases, infrared and other radiations, organic solvents, or salty air.
- Do not install the equipment in an environment with conductive metal or magnetic dust.
- Do not install the equipment in an area conducive to the growth of microorganisms such as fungus or mildew.
- Do not install the equipment in an area with strong vibration, noise, or electromagnetic interference.
- Ensure that the site complies with local laws, regulations, and related standards.
- Ensure that the ground in the installation environment is solid, free from spongy or soft soil, and not prone to subsidence. The site must not be located in a low-lying land prone to water or snow accumulation, and the horizontal level of the site must

be above the highest water level of that area in history.

- Do not install the equipment in a position that may be submerged in water.
- If the equipment is installed in a place with abundant vegetation, in addition to routine weeding, harden the ground underneath the equipment using cement or gravel.
- Do not install the equipment outdoors in salt-affected areas because it may be corroded. A salt-affected area refers to the region within 500 m of the coast or prone to sea breeze. Regions prone to sea breeze vary with weather conditions (such as typhoons and monsoons) or terrains (such as dams and hills).
- When installing the equipment, ensure that the installation surface is solid enough to bear the weight of the equipment.
- After installing the equipment, remove the packing materials such as cartons, foam, plastics, and cable ties from the equipment area.

1.4 Mechanical Safety



When working at heights, wear a safety helmet and safety harness or waist belt and fasten it to a solid structure. Do not mount it on an insecure moveable object or metal object with sharp edges. Make sure that the hooks will not slide off.



Ensure that all necessary tools are ready and inspected by a professional organization. Do not use tools that have signs of scratches or fail to pass the inspection or whose inspection validity period has expired. Ensure that the tools are secure and not overloaded.

Do not drill holes into the equipment. Doing so may affect the sealing performance and electromagnetic containment of the equipment and damage components or cables inside. Metal shavings from drilling may short-circuit boards inside the equipment.

General Requirements

- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed for an extended period of time.
- Do not perform operations such as arc welding and cutting on the equipment without evaluation by the Company.
- Do not install other devices on the top of the equipment without evaluation by the

Company.

- When performing operations over the top of the equipment, take measures to protect the equipment against damage.
- Use correct tools and operate them in the correct way.

Moving Heavy Objects

- Be cautious to prevent injury when moving heavy objects.
- If multiple persons need to move a heavy object together, determine the manpower and work division with consideration of height and other conditions to ensure that the weight is equally distributed.
- If two persons or more move a heavy object together, ensure that the object is lifted and landed simultaneously and moved at a uniform pace under the supervision of one person.
- Wear personal protective gears such as protective gloves and shoes when manually moving the equipment.
- To move an object by hand, approach to the object, squat down, and then lift the object gently and stably by the force of the legs instead of your back. Do not lift it suddenly or turn your body around.
- Do not quickly lift a heavy object above your waist. Place the object on a workbench that is half-waist high or any other appropriate place, adjust the positions of your palms, and then lift it.
- Move a heavy object stably with balanced force at an even and low speed. Put down the object stably and slowly to prevent any collision or drop from scratching the surface of the equipment or damaging the components and cables.
- When moving a heavy object, be aware of the workbench, slope, staircase, and slippery places. When moving a heavy object through a door, ensure that the door is wide enough to move the object and avoid bumping or injury.
- When transferring a heavy object, move your feet instead of turning your waist around. When lifting and transferring a heavy object, ensure that your feet point to the target direction of movement.
- When transporting the equipment using a pallet truck or forklift, ensure that the tynes are properly positioned so that the equipment does not topple. Before moving the equipment, secure it to the pallet truck or forklift using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Choose sea or roads in good conditions for transportation as transportation by railway or air is not supported. Avoid tilt or jolt during transportation.

Working at Heights

- Any operations performed 2 meters or higher above the ground should be supervised properly.
- Only trained and qualified personnel are allowed to work at heights.
- Do not work at heights when steel pipes are wet or other risky situations exist. After the preceding conditions no longer exist, the safety owner and relevant technical

personnel need to check the involved equipment. Operators can begin working only after safety is confirmed.

- Set a restricted area and prominent signs for working at heights to warn away irrelevant personnel.
- Set guard rails and warning signs at the edges and openings of the area involving working at heights to prevent falls.
- Do not pile up scaffolding, springboards, or other objects on the ground under the area involving working at heights. Do not allow people to stay or pass under the area involving working at heights.
- Carry operation machines and tools properly to prevent equipment damage or personal injury caused by falling objects.
- Personnel involving working at heights are not allowed to throw objects from the height to the ground, or vice versa. Objects should be transported by slings, hanging baskets, highline trolleys, or cranes.
- Do not perform operations on the upper and lower layers at the same time. If unavoidable, install a dedicated protective shelter between the upper and lower layers or take other protective measures. Do not pile up tools or materials on the upper layer.
- Dismantle the scaffolding from top down after finishing the job. Do not dismantle the upper and lower layers at the same time. When removing a part, ensure that other parts will not collapse.
- Ensure that personnel working at heights strictly comply with the safety regulations. The Company is not responsible for any accident caused by violation of the safety regulations on working at heights.
- Behave cautiously when working at heights. Do not rest at heights.

Drilling Holes

- Obtain consent from the customer and contractor before drilling holes.
- Wear protective equipment such as safety goggles and protective gloves when drilling holes.
- To avoid short circuits or other risks, do not drill holes into buried pipes or cables.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings.

1.5 Battery Safety



Do not connect the positive and negative poles of a battery together. Otherwise, the battery may be short-circuited. Battery short circuits can generate high instantaneous current and releases a large amount of energy, which may cause battery leakage,

smoke, flammable gas release, thermal runaway, fire, or explosion. To avoid battery short circuits, do not maintain batteries with power on.

Do not expose batteries at high temperatures or around heat sources, such as scorching sunlight, fire sources, transformers, and heaters. Battery overheating may cause leakage, smoke, flammable gas release, thermal runaway, fire, or explosion.

Protect batteries from mechanical vibration, falling, collision, punctures, and strong impact. Otherwise, the batteries may be damaged or catch fire.

To avoid leakage, smoke, flammable gas release, thermal runaway, fire, or explosion, do not disassemble, alter, or damage batteries, for example, insert foreign objects into batteries, squeeze batteries, or immerse batteries in water or other liquids.

Do not touch battery terminals with other metal objects, which may cause heat or electrolyte leakage.

A battery is an enclosed system and will not release any gases under normal operations. If a battery is improperly treated, for example, burnt, needle-pricked, squeezed, struck by lightning, overcharged, or subject to other adverse conditions that may cause battery thermal runaway, the battery may be damaged or an abnormal chemical reaction may occur inside the battery, resulting in electrolyte leakage or production of gases such as CO. To prevent fire or device corrosion, ensure that flammable gas is properly exhausted.

The gas generated by a burning battery may irritate your eyes, skin, and throat. Take protective measures promptly.



Install batteries in a dry area. Do not install them under areas prone to water leakage, such as air conditioner vents, ventilation vents, feeder windows of the equipment room, or water pipes. Ensure that no liquid enters the equipment to prevent faults or short circuits.

After unpacking batteries, place them in the required direction. Do not place a battery upside down or vertically, lay it on one side, tilt it, or stack it. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

Tighten the screws on copper bars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.

After batteries are discharged, charge them in time to avoid damage due to over discharging.

Statement

The Company shall not be liable for any damage or other consequences to the batteries it provides due to the following reasons:

- Batteries are damaged due to force majeure such as earthquakes, floods, volcanic eruptions, debris flows, lightning strikes, fires, wars, armed conflicts, typhoons, hurricanes, tornadoes, and other extreme weather conditions.
- Batteries are damaged because the onsite equipment operating environment or external power parameters do not meet the environment requirements for normal operation, for example, the actual operating temperature of batteries is too high or too low, or the power grid is unstable and experiences outages frequently.
- Batteries are damaged, fall, leak, or crack due to improper operations or incorrect connection.
- After being installed and connected to the system, the batteries are not powered on in time due to your reasons, which causes damage to the batteries due to overdischarge.
- Batteries are damaged because they are not accepted in time due to your reasons.
- You set battery operating parameters incorrectly.
- You use batteries of different types together, causing acceleration of capacity attenuation. For example, you use our batteries together with batteries of other vendors or with batteries of different rated capacity.
- You maintain batteries improperly, causing frequent overdischarge; you expand the load capacity without notifying us; or you have not fully charged the batteries for a long time.
- You do not perform battery maintenance based on the operation guide, such as failure to check battery terminals regularly.
- Batteries are damaged because you do not store them in accordance with storage requirements (for example, in an environment that is damp or prone to rain).
- Batteries are not charged as required during storage due to your reasons, resulting in capacity loss or other irreversible damages to the batteries.
- Batteries are damaged due to your or a third party's reasons, for example, relocating or reinstalling the batteries without complying with the Company's requirements.
- You change the battery use scenarios without notifying the Company.
- You connect extra loads to the batteries.
- The battery storage period has exceeded the upper limit.
- The battery warranty period has expired. Do not use a battery whose warranty period has expired, as this poses safety risks.

General Requirements

- Before installing, operating, and maintaining batteries, read the battery manufacturer's instructions and comply with their requirements. The safety precautions specified in this document are highly important and require special attention. For additional safety precautions, see the instructions provided by the battery manufacturer.
- Use batteries within the specified temperature range. When the ambient temperature of the batteries is lower than the allowed range, do not charge the batteries to prevent internal short circuits caused during low-temperature charging.
- Before unpacking batteries, check whether the packaging is intact. Do not use batteries with damaged packaging. If any damage is found, notify the carrier and manufacturer immediately.
- Power on batteries within 24 hours after unpacking. If batteries cannot be powered on in time, place them in a dry indoor environment without corrosive gases. During later maintenance, ensure that the power-off time does not exceed 24 hours.
- Do not use a damaged battery (such as damage caused when a battery is dropped, bumped, bulged, or dented on the enclosure), because the damage may cause electrolyte leakage or flammable gas release. In the case of electrolyte leakage or structural deformation, contact the installer or professional O&M personnel immediately to remove or replace the battery. Do not store the damaged battery near other devices or flammable materials and keep it away from non-professionals.
- Before working on a battery, ensure that there is no irritant or scorched smell around the battery.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.
- If batteries are exposed to water accidentally, do not install them. Instead, transport the batteries to a safe isolation point and dispose of them in a timely manner.
- Before installing battery packs, check whether they are abnormal. A battery pack is deemed abnormal when any of the following symptoms occurs:
 - The enclosure of the battery pack is obviously deformed or damaged.
 - The voltage between the positive and negative electrodes of the battery pack is far below the specified range.
- Check whether the positive and negative battery terminals are grounded unexpectedly. If so, disconnect the battery terminals from the ground.
- Do not perform welding or grinding work around batteries to prevent fire caused by electric sparks or arcs.
- If batteries are left unused for a long period of time, store and charge them according to the battery requirements.
- Do not charge or discharge batteries by using a device that does not comply with local laws and regulations.
- Keep the battery loop disconnected during installation and maintenance.
- Monitor damaged batteries during storage for signs of smoke, flame, electrolyte leakage, or heat.
- If a battery is faulty, its surface temperature may be high. Do not touch the battery to

avoid scalds.

- Do not stand on, lean on, or sit on the top of the equipment.
- In backup power scenarios, do not use the batteries for the following situations:
 - Medical devices substantially important to human life
 - Control equipment such as trains and elevators, as this may cause personal injury.
 - Computer systems of social and public importance
 - Locations near medical devices
 - Other devices similar to those described above.

Short-Circuit Protection

- When installing and maintaining batteries, wrap the exposed cable terminals on the batteries with insulation tape.
- Avoid foreign objects (such as conductive objects, screws, and liquids) from entering a battery, as this may cause short circuits.

Recycling

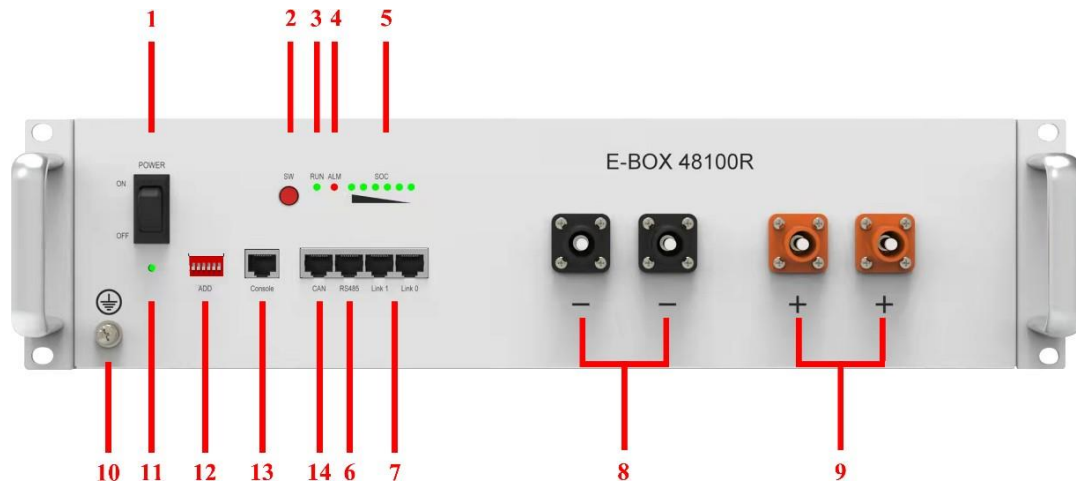
- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. Improper disposal of batteries may result in environmental pollution or an explosion.
- If a battery leaks or is damaged, contact technical support or a battery recycling company for disposal.
- If batteries are out of service life, contact a battery recycling company for disposal.
- Do not expose waste batteries to high temperatures or direct sunlight.
- Do not place waste batteries in environments with high humidity or corrosive substances.
- Do not use faulty batteries. Contact a battery recycling company to scrap them as soon as possible to avoid environmental pollution.

2 Product Introduction

2.1 Overview

E-BOX 48100R, the new generation lithium phosphate battery, safe, compact and well-designed for residential energy storage use. The battery is easy to install, normally connected with branded inverter to provide the power for the loads. It is widely applied in residential, small commercial and industrial area for energy purpose.

Appearance



- | | | | |
|---|--------------------------------------|----|-------------------|
| 1 | Power button | 8 | Negative terminal |
| 2 | Soft switch | 9 | Positive terminal |
| 3 | RUN indicator | 10 | Ground point |
| 4 | Alarm indicator | 11 | Power indicator |
| 5 | SOC indicator | 12 | DIP switch |
| 6 | RS485 port | 13 | Console port |
| 7 | Battery communication cascading port | 14 | CAN port |

Communication

There are RS-232C, RS485 and CAN communication ports on the battery. The battery status and information can be monitored and modified via computer.

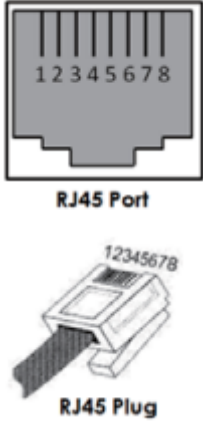
CAN

CAN communication terminal (RJ45 port) follow CAN protocol, to transfer battery data.

| Pin number | CAN Pin | Remarks |
|------------|---------|---------|
| 1 | | |
| 2 | GND | |
| 3 | | |
| 4 | CANH | |
| 5 | CANL | |
| 6 | | |
| 7 | | |
| 8 | | |

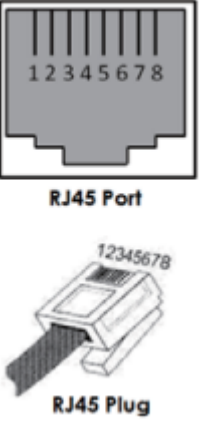
RS485

RS485 communication terminal (RJ45 port) follow RS 485 protocol to transfer battery data.

| Pin number | RS485 Pin | Remarks |
|------------|---------------------|--|
| 1 | RS485B |  RJ45 Port RJ45 Plug |
| 2 | RS485A | |
| 3 | GND | |
| 4 | | |
| 5 | | |
| 6 | GND | |
| 7 | RS485A(recommended) | |
| 8 | RS485B(recommended) | |

RS232

RS232 communication terminal (RJ45 port) follow RS232 protocol to monitor battery information or upgrade battery firmware through computer.

| Pin number | RS-232C port | Remarks |
|------------|--------------|--|
| 1 | |  RJ45 Port RJ45 Plug |
| 2 | | |
| 3 | RXD | |
| 4 | GND | |
| 5 | | |
| 6 | TXD | |
| 7 | | |
| 8 | | |

Link Port 1/0

Link port terminal (RJ45 port) follow CAN/RS485 protocol to communicate between paralleled batteries.


2.2 Label Description

Name plate

| | |
|------------------------------------|----------------|
| Pytes | |
| Battery Model | E-BOX 48100R |
| Batteries Type | Li-ion Battery |
| Operating Voltage Range | 47.5V~57.6V |
| Nominal Voltage | 51.2V |
| Rated Energy | 5.12kWh |
| Rated Capacity | 100Ah |
| Rated Charge/Discharge Current | 50A |
| Maximum Charge / Discharge Current | 50A |
| Maximum Charge / Discharge Power | 2560W |
| Operating Temperature | 0°C~35°C |
| Protective Class | Class I |
| Ingress Protection | IP20 |




CAUTION! IFpP29/176/208/[(8S)2S]E/-10+60/80

- ◆ Do not dispose of batteries in a fire. The batteries may explode.
- ◆ Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes. It may be toxic.
- ◆ A Battery can present a risk of electric shock and burns by high short-circuit current.
- ◆ Failed batteries can reach temperatures that exceed the burn thresholds for touchable surface.



S/N:

Date:

MADE IN CHINA
Shanghai PYTES Energy Co., Ltd.

Enclosure Label

DANGER

Charge the battery every six months to reach 90% SOC, in case of long-term storage.

Danger! Low DC voltage inside
Danger! Arc flash & shock hazard

IFP29/176/208/[(8S)2S]E/-10+60/80
Short-circuit Current: 1500A@300uS

ATTENTION!

Read the user's manual carefully before wire connection.

Make sure the ground connection is properly set before use.

Repair work must be carried out by authorized and trained persons only.

Do not place the battery in an area that can be touched by children or pets.

Do not place the battery near open flame or flammable material.

Do not allow the battery to be immersed in or in contact with water or other liquids.

Avoid direct sunlight and humid environment.

Do not dismantled this battery by non-qualified personnel.

Do not drop, crush, or impact the battery; do not cut or spear the battery with a sharp object.

Do not cover or wrap the battery.

Do not sit or place heavy objects on the battery.

If the battery leaks liquid, catches fire or is damaged, switch off the breaker on DC side and stay away from the battery.

Contact your supplier within 24 hours in case of failure.



2.3 Features

Battery Features

- Compact size, save your installation space.
- Secured by self-developed BMS.
- High current strike endurance.
- 10 years product warranty.
- Expandable for demands, up to 48 batteries can be connected in parallel.
- Certified class A cell from Rept, no quality and safety worry.

BMS features

Alarm and Protection

- Over charge and discharge control

- Over voltage control
- Over current control
- High/Low temperature control
- Short Circuit control
- Reverse connection control

Management and monitoring

- Cell Balance control
- Intelligent charge algorithm
- Charge/Discharge current limit
- Capacity retention calculation
- Administrator monitoring
- Event and history monitoring

3 Transportation and Storage

3.1 Transportation Requirements



Load or unload batteries with caution. Otherwise, the batteries may be short-circuited or damaged (such as leakage and crack), catch fire, or explode.



Do not move a battery by holding its terminals, bolts, or cables. Otherwise, the battery may be damaged.

Keep batteries in the correct direction during transportation. They must not be placed upside down or tilted, and must be protected against falling-down, mechanical impact, rains, snows, and falling into water during transportation.

Before unpacking, storage, and transportation, ensure that the packing cases are intact and the batteries are correctly placed according to the labels on the packing cases. Do not place a battery upside down or vertically, lay it on one side, or tilt it. Stack the batteries according to the stacking requirements on the packing cases. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

- Batteries have obtained the certifications of the UN38.3. The batteries belong to

class 9 dangerous goods.

- Batteries can be delivered to the site directly if the road or sea transportation requirements are met.
- Comply with the international regulations on the transport of dangerous goods and meet the requirements of the transportation regulatory authorities in the countries of departure, route, and destination.
- Choose sea or roads in good conditions for transportation. Do not transport batteries by railway or air. Avoid tilt or jolt during transportation.
- Maritime transport must comply with the International Maritime Dangerous Goods Code (IMDG Code).
- Road transport must comply with the Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR) or JT/T 617.
- Before transportation, check that the battery package is intact and that there is no abnormal odor, leakage, smoke, or sign of burning. Otherwise, the batteries cannot be transported.
- The packing case must be secured for transportation. Handle the case with care during loading and unloading and take moisture-proof measures during transportation.
- Exercise caution when moving batteries to prevent bumping and ensure personal safety.
- Unless otherwise specified, dangerous goods cannot be mixed with goods containing food, medicine, animal feed, or their additives in the same vehicle or container.
- Unless otherwise specified, when dangerous goods packages are loaded in the same vehicle or container as ordinary goods, they should be separated in either of the following ways:
 - Use a spacer that is as high as the packages.
 - Keep a distance of at least 0.8 m around.
- Before transporting a faulty battery (with scorch, leakage, bulge, or water intrusion), insulate its positive and negative terminals, pack it, and place it in an insulated explosion-proof box as soon as possible. Record information such as the site name, address, time, and fault symptom on the box.
- When transporting faulty batteries, avoid approaching flammable material storage areas, residential areas, or other densely populated places, such as mass transit facilities or elevators.

3.2 Storage Requirements



- Ensure that batteries are stored in a dry, clean, and ventilated indoor environment that is free from sources of strong infrared or other radiations, organic solvents, corrosive gases, and conductive metal dust. Do not expose batteries to direct

sunlight or rain and keep them far away from sources of heat and ignition.

- If a battery is faulty (with scorch, leakage, bulge, or water intrusion), move it to a dangerous goods warehouse for separate storage. The distance between the battery and any combustible materials must be at least 3 m. The battery must be scrapped as soon as possible.
- Place batteries correctly according to the signs on the packing case during storage. Do not place batteries upside down, lay them on one side, or tilt them. Stack batteries in accordance with the stacking requirements on the packing cases.
- Store batteries in a separate place. Do not store batteries together with other devices. Do not stack batteries too high. If a large number of batteries are stored onsite, the site should be equipped with qualified fire fighting facilities, such as fire sand and fire extinguishers.



Batteries should be used soon after being deployed onsite. Batteries that have been stored for an extended period should be charged periodically. Otherwise, they may be damaged.

- The storage environment must comply with local regulations and standards.
- The storage environment must be clean and dry. The product must be protected against rain and water.
- The air must not contain corrosive or flammable gases.
- The storage environment requirements are as follows:
 - Ambient temperature: -10–55°C; recommended storage temperature: 20–30°C
 - Relative humidity: 5% to 80%
- If equipment except battery packs has been stored for more than two years, it must be checked and tested by professionals before use.
- Proof that the product is stored according to the requirements must be available, such as temperature and humidity log data, storage environment photos, and inspection reports.
- Ensure that batteries are delivered based on the "first in, first out" rule.
- Ensure that the storage duration starts from the latest charge time marked on the battery packing case and that the latest charge time is updated after every charge.

4 System Installation



Note the polarities when installing batteries. Do not connect the positive and negative poles of a battery or battery string together. Otherwise, the battery may be short-circuited.

WARNING

- Tighten the screws on Busbar or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.

After unpacking batteries, place them in the required direction. Do not place a battery upside down or vertically, lay it on one side, tilt it, or stack it. Ensure that the batteries do not fall or get damaged. Otherwise, they will need to be scrapped.

CAUTION

- Slowly push or move battery packs to prevent damage and collision.
- To prevent battery packs from falling off, start the pallet truck or forklift after confirming that battery packs are securely bound.
- When moving batteries, do not remove protective components such as protective covers or waterproof caps from battery terminals.
- Exercise caution when moving batteries to prevent bumping and ensure personal safety.
- Install and secure batteries horizontally from the bottom up and from left to right to prevent falling over due to imbalance.
- When connecting batteries, ensure that the spring washer on the screw is leveled, that the protruding part of the terminal on the cable faces outwards, and that the cable is intact.
- Install and secure batteries horizontally from the bottom up and from left to right to prevent falling over due to imbalance.
- Ensure that the power circuit breaker is OFF before installing batteries.
- Keep the battery loop disconnected during installation and maintenance.

NOTICE

- Do not use a damaged battery (such as damage caused when a battery is dropped, bumped, bulged, or dented on the enclosure), because the damage may cause electrolyte leakage or flammable gas release. In the case of electrolyte leakage or structural deformation, contact the installer or professional O&M personnel immediately to remove or replace the battery. Do not store the damaged battery near other devices or flammable materials and keep it away from non-professionals.

- Before installing battery packs, check whether they are abnormal. A battery pack is deemed abnormal when any of the following symptoms occurs:
 - The enclosure of the battery pack is obviously deformed or damaged.
 - The voltage between the positive and negative electrodes of the battery pack is far below the specified range.

4.1 Checking Before the Installation

Checking the Outer Packing

Before unpacking the battery, check the outer packing for damage, such as holes and cracks, and check the battery model. If any damage is found or the battery model is not what you requested, do not unpack the product and contact your dealer as soon as possible.

Checking Deliverables

After unpacking the battery, check that the deliverables are intact and complete, and free from any obvious damage. If any item is missing or damaged, contact your dealer.

For deliverables, please check below packing list:

Packing List

| Item | Quantity |
|-------------------------------|----------|
| Battery | 1 unit |
| Cascading communication cable | 1 unit |
| Ground Cable | 1 unit |
| Battery power cable | 1 par |
| Mounting ear | 4 units |
| User Manual | 1 piece |

4.2 Preparing Tools and Instruments

| Type | Tools and Instruments |
|--------------|-------------------------------------|
| Installation | Hammer drill |
| | Torque socket wrench |
| | Torque wrench |
| | Torque screwdriver |
| | Utility knife |
| | Cable cutter |
| | Cable tie |
| | Multimeter (DC Voltage measurement) |

| | |
|-------------------------------------|--|
| | range≥600VDC, AC Voltage measurement range ≥ 600VAC) |
| | Marker |
| | Steel measuring tape |
| | Level |
| Personal protective equipment (PPE) | Insulated gloves |
| | Protective gloves |
| | Dust mask |
| | Safety boots |
| | Safety goggles |
| | Anti-static wrist ring |

4.3 Determining the Installation Position

Installation Angle Requirement

The battery can be floor-mounted and wall-mounted. The installation angle requirement is as follows:

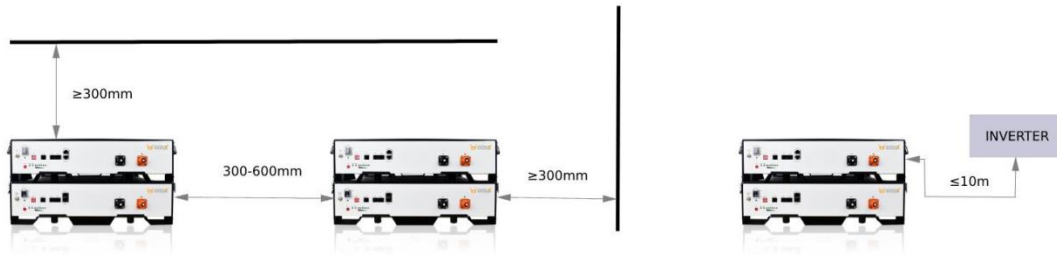
- Do not install the battery at forward tilted, back tilted, side tilted, horizontal, or upside-down positions.

Installation Position Requirements

Install the battery on a solid brick-concrete structure or concrete wall or floor. If other types of walls and floors are used, they must be made of fire-retardant materials and meet the load-bearing requirements of the equipment.

Installation Space Requirements

- During installation, ensure that there are no flammable or explosive materials around the batteries. Reserve adequate space for heat dissipation and safety isolation.
- When the battery is mounted on a wall, do not place any objects under the battery.
- When install battery, no matter it is cabinet or rack, please insure a minimum 300mm distance space for battery set. And the distance between battery and inverter should be less than 10 meters.



4.4 Equipment Installation

The IP rating of battery is IP20, and should be installed indoors or in a suitable rated outdoor enclosure.

The E-BOX 48100R battery can be floor-mounted or wall-mounted according to different scenarios, the wall-mounting parts and stacking parts are separated from battery, please refer to Pytes or installer for purchasing.

Max 48 units battery can be connected in parallel to expand capacity.

- For Floor-mounted parts, please refer to Pytes Battery Rack: 14-171385-31 and 14-171384-31. This set can also be used for stacking batteries, but within 3 pcs of battery.



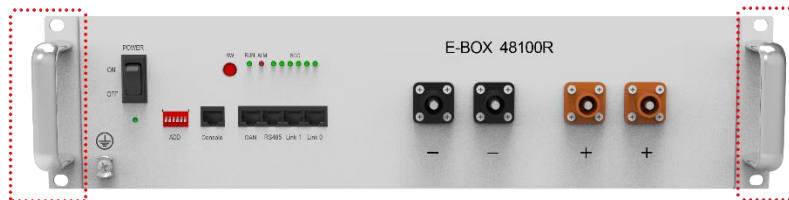
- For wall mounted parts, please refer to Pytes R-BOX battery cabinet: 05-041381-11;



- Please note: External racks, brackets, cabinets are considered outside the scope of battery certification.

4.4.1 Floor-Mounted Installation

Step 1 Dismantle the 2 mounting ears from the battery.



Step 2 Push the Front rack from rear of the battery to the front.

Step 3 Mount the Rear rack on the battery rear.

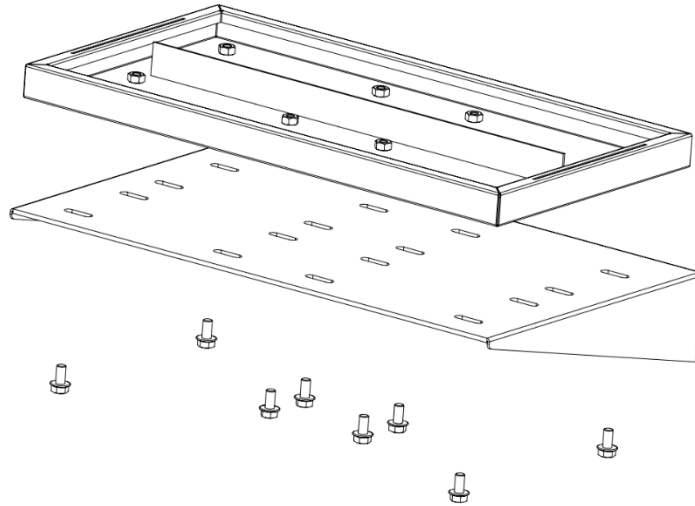
Step 4 Repeat above 3 steps to mount another battery.

Step 5 Stack one battery on the other battery, and lock snaps on both sides of rack.

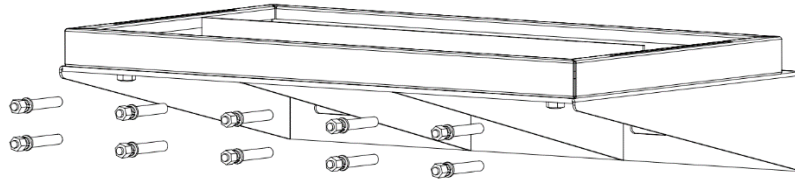
4.4.2 Wall-Mounted Installation

Step 1 Assemble the base components.

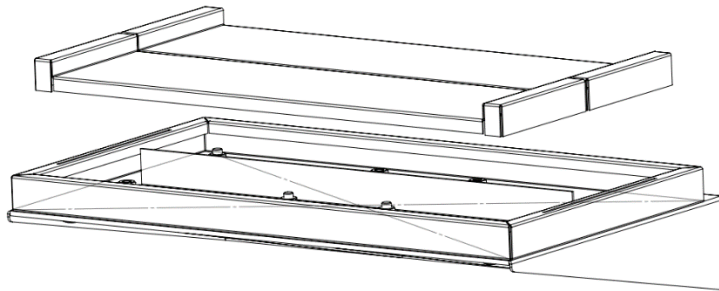
- Connect the support base to the mounting plate with 8 screws.



- Fix the base components on the wall with 10 expansion bolts.



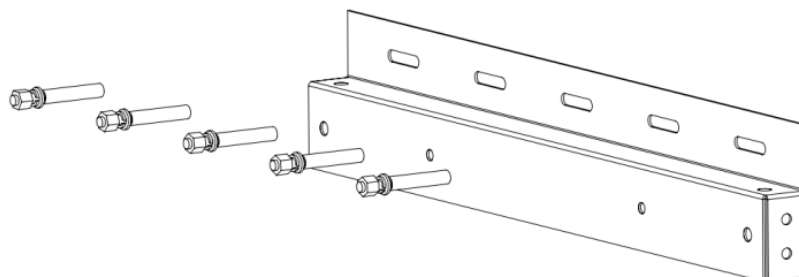
- Insert the bottom board into the base components.



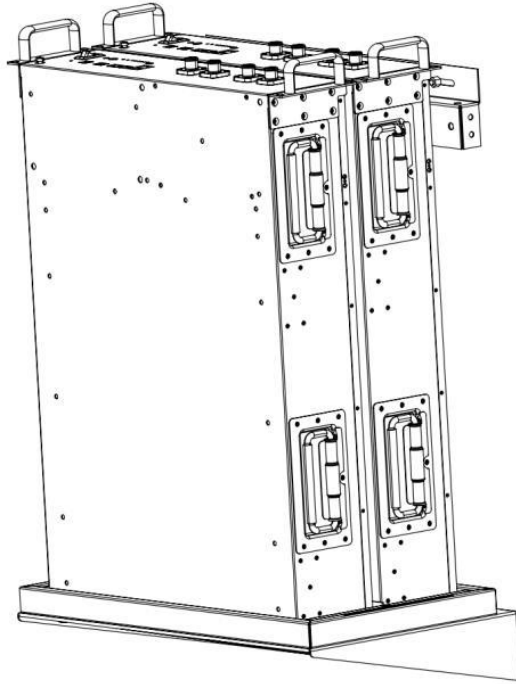
When drilling holes, avoid the water pipes and power cables buried in the wall.

Step 2 Assemble the main body.

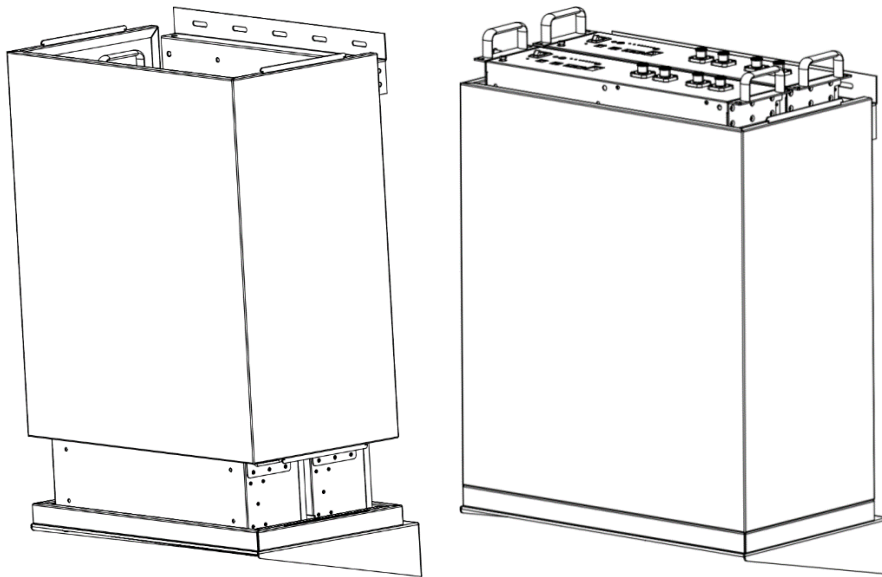
- Fix the bracket on the wall with 5 expansion bolts.



- Put the batteries on the base components.



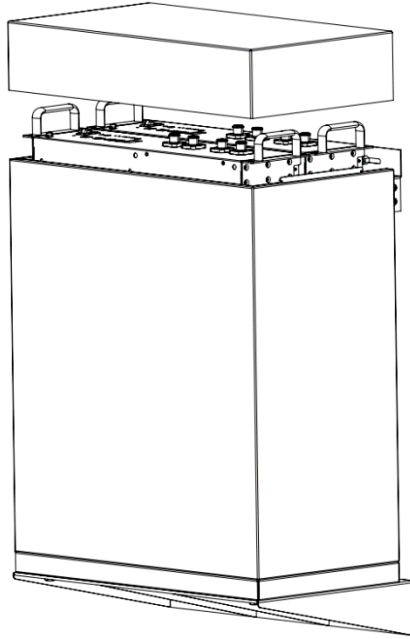
- Insert the main body into the base component and fix both sides with 4 screws.



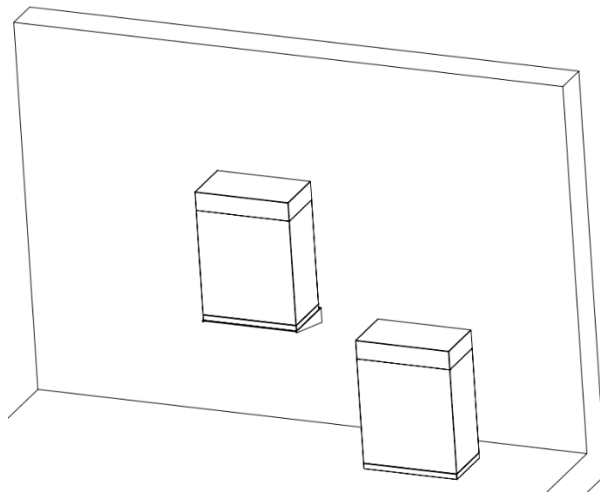
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Step 3 Assemble the cover.

- Insert the cover into the main body.



- Finish.



5. Electrical Connection

Precautions



Before connecting cables, ensure that the DC switch on the battery and all the switches connected to the battery are set to OFF. Otherwise, the voltage of the battery may result in electric shocks.

Note the polarities when installing batteries. Do not connect the positive and negative poles of a battery or battery string together. Otherwise, the battery may be short-circuited.

- Do not smoke or have an open flame around batteries.
- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.



WARNING

- The equipment damage caused by incorrect cable connections is not covered under any warranty.
- Only certified electricians are allowed to connect cables.
- Operation personnel must wear proper PPE when connecting cables.
- Tighten the screws on Busbars or cables to the torque specified in this document. Periodically confirm whether the screws are tightened, check for rust, corrosion, or other foreign objects, and clean them up if any. Loose screw connections will result in excessive voltage drops and batteries may catch fire when the current is high.
- When installing batteries, do not place installation tools, metal parts, or sundries on the batteries. After the installation is complete, clean up the objects on the batteries and the surrounding area.



CAUTION

- Do not connect two or more cables to the positive or negative power port of a battery in parallel.
- Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.

NOTICE

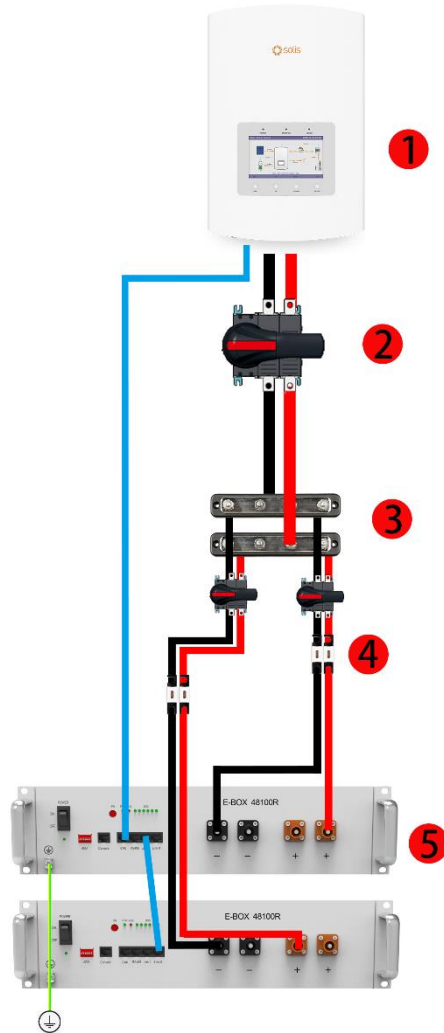
According to Installation Standard AS/NZS 5139 in Australia, it is required to install an overcurrent protection and isolation device that operates both positive and negative conductors simultaneously to be installed between inverter and battery system and also between parallel batteries.

NOTE

The cable colors shown in the electrical connection diagrams provided in this chapter are for reference only. Select cables in accordance with local cable specifications (green-and-yellow cables are only used for PE).

In this manual, we take Solis RHI-5K-48ES-5G as installation sample.

5.1 Preparing Cables



| | | | |
|---|----------------------------|---|-------------|
| 1 | Storage Inverter | 2 | DC Isolator |
| 3 | Busbar (Positive+Negative) | 4 | Fuse (150A) |
| 5 | Pytes Battery | | |

Cables prepared by the customer

| No. | Cable | Recommended Specifications | Source |
|-----|---------------------------------------|--|----------------------------|
| 1 | Battery power cable (Battery to Fuse) | 4AWG; Current: 100A Terminal: Amphenol*1+M8*1 2 pairs (Positive+Negative) | Pytes or other third party |
| 2 | Battery power | 4AWG; | Pytes or other |

| | | | |
|---|---|---|----------------------------|
| | cable (Fuse to DC Isolator) | Current: 100A Terminal: M8*2 2 pairs (Positive+Negative) | third party |
| 3 | Battery power cable (DC Isolator to busbar) | 4AWG; Current: 100A Terminal: M8*2 2 pairs (Positive+Negative) | Pytes or other third party |
| 4 | Battery power Cable (Busbar to DC Isolator) | 00AWG; Current: 200A Terminal: M8*2 1 pair (Positive+Negative) | Pytes or other third party |
| 5 | Battery power cable (DC Isolator to Inverter) | 00AWG; Current: 200A Terminal: Amphenol*1, M8*1 1 pair (Positive+Negative) | Pytes or other third party |
| 6 | BMS cable | | Pytes or other third party |

Cables delivered with the battery

| No. | Cable | Type | Source |
|-----|-------------------------|---|----------------------------|
| 1 | Battery power Cable | 4AWG, max 100A current, two Amphenol connectors | Delivered with the product |
| 2 | Battery cascading cable | Classic regular ethernet cable | Delivered with the product |
| 3 | Ground cable | Single-core outdoor copper cable | Delivered with the product |

5.2 Electrical Connections of the Battery

Installing battery Ground Cable

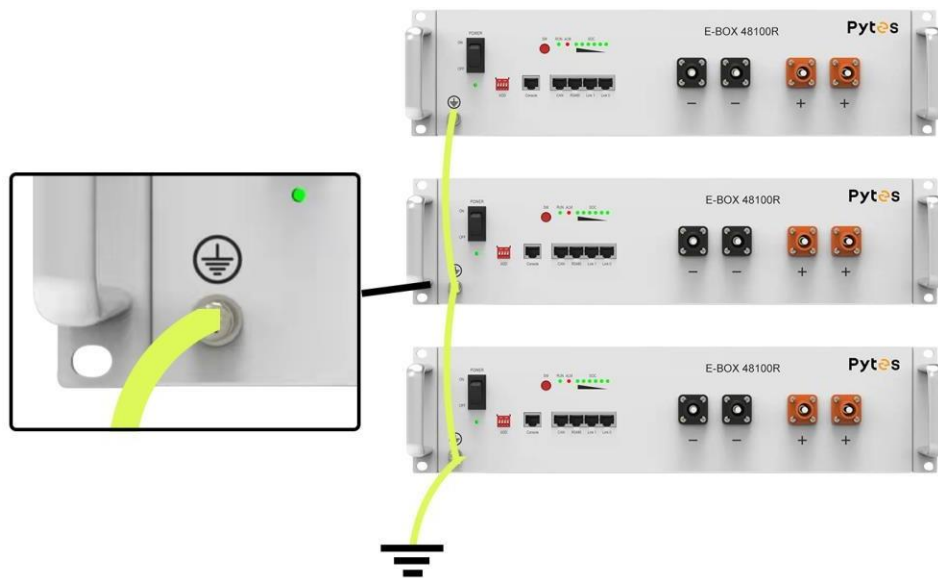


Ensure that the PE cable is securely connected. Otherwise, electric shocks may occur.

NOTE

It is recommended that silica gel or paint be used around the ground terminal after the PE cable is connected.

Step 1 Connect the PE cable to each battery Ground point, and tight the screw, as shown below:



Step 2 Connect the other terminal to a reliable external ground point.

Connecting Battery Power Cable

NOTE

In this chapter, we are using Victron Fuse holder, 150A Fuse, 250A Busbar as example, installer can choose proper device according to local regulation.

Step 1 Connecting Fuse and Fuse holder.

- Install Fuse holders for Positive cable and Negative cable on a reliable surface.
- Connect Battery positive power cable with fuse and install on Fuse holder, tighten the screw. It is recommended to use 150A fuse for each battery.
- Connect Battery negative power cable with fuse and install on Fuse holder, tighten the screw. It is recommended to use 150A fuse for each battery.
- Repeat for other batteries.



Step 2 Connect fuse with DC isolator.

- Install DC Isolator on a reliable surface,
- Connect Positive cable for DC Isolator Positive terminal and Positive Fuse, tighten the screw.
- Connect Negative cable for DC Isolator Negative terminal and Negative Fuse, tighten the screw.
- Repeat for other batteries.

Step 3 Connect DC Isolator with Busbars.

- Install positive and negative busbars on a reliable surface.
- Connect Positive cable for DC Isolator Positive terminal and Positive Busbar, tighten the screw.
- Connect Negative cable for DC Isolator Negative terminal and Negative Busbar, tighten the screw.
- Repeat for other batteries.

Step 5 Connect battery positive terminal (orange) with positive battery cable and connect battery negative terminal (black) with negative battery cable.



NOTE

Power cables use Amphenol connectors, when push in, a “Click” sound means fully connection.

Ensure the correct polarity of batteries before connecting to the battery.

When pull out the power cable, you must press the button as indicated below to loss the connector.

Step 4 Inverter side connection

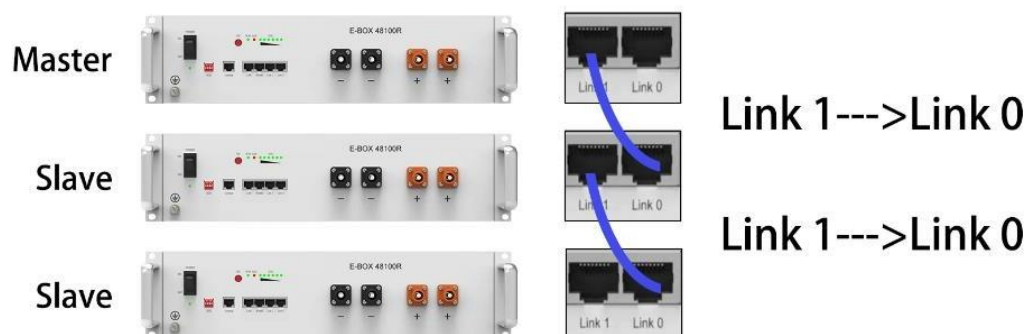
- Connect the inverter with Positive and negative busbars according to the Inverter user manual and follow local installation regulations.

5.3 Communication connections of battery

Cascading batteries

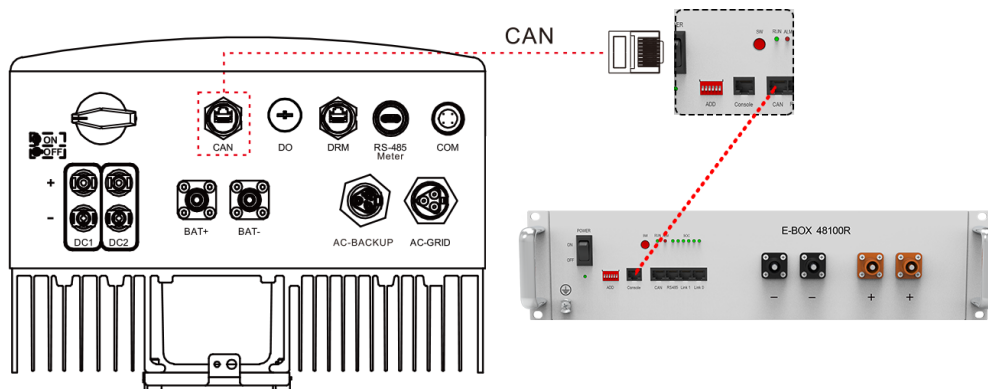
Cascading cables are classic regular ethernet cable.

Step 1 Connect the battery through link ports. From “Link 1” port of first battery to “Link 0” port of next battery. And connect battery one by one.



Installing BMS Communication Cable

The RHI-5G series uses CAN cable to communicate with Battery's BMS. The image below shows the connection of the CAN communication cables.



Step 1 Take out the CAN cable (terminal marks “CAN” on one end and “to battery” on the other end).

Step 2 Unscrew the swivel nut from CAN port.

Step 3 Insert the RJ45 terminal with CAN label into the CAN port, then fasten the swivel nut.

Step 4 Connect the other end to the CAN port of master battery.

DIP Switch Setting

Step 1 Set the right DIP setting for inverters accordingly. For Solis, the DIP switch is “0,1,0,1”.



NOTE

Different inverter will have different setting, please result installer for details.

6 System Commissioning



Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.



- During the power-on procedure, power off the batteries immediately if any fault is detected. Rectify the fault before proceeding with the procedure.
- After batteries are used for system commissioning or batteries have discharged, charge the batteries in time. Otherwise, batteries may be damaged due to overdischarge.
- Battery overdischarge and damage may occur if batteries with low SOC are stored. Batteries should be recharged in a timely manner.



Before the equipment is put into operation for the first time, ensure that the parameters are set correctly by professional personnel. Incorrect parameter settings may result in noncompliance with local grid connection requirements and affect the normal operations of the equipment.

6.1 Verification before power-on

Check items and acceptance criteria.

| No. | Check item | Acceptance Criteria |
|-----|----------------------|--|
| 1 | Battery installation | The installation is correct and reliable. |
| 2 | Cables routing | Cables are routed properly as required by the customer. |
| 3 | Cable tie | Cable ties are evenly distributed, and no burr exists. |
| 4 | Grounding | The PE cable is connected correctly, securely, and reliably. |
| 5 | Switch | The DC switch and all switches connected to the battery are OFF. |

| | | |
|---|--------------------------|--|
| 6 | Cable connection | DC power cable, cascading cable, and BMS cable are connected correctly, securely and reliably. |
| 7 | Unused terminal and port | Unused terminals and ports are locked with caps. |
| 8 | Installation environment | The installation space is proper, and the installation environment is clean and tidy. |

6.2 System Power-on

NOTICE









- After powering on inverter and turning on all battery, switch on the DC isolator between inverter and batteries.
- If no PV module is configured, turning on all inverters and pre-charging inverter first and then switch on the DC isolator between inverter and batteries.

Step 1 Power on inverter according to inverter user manual.

Step 2 Switch on power button of all batteries first, and press “SW” button on master battery for 1 second.

After battery is powered on for the first time, all indicators will light up once. Observe the battery indicator to check the running status.

LED indicators

| Battery status | RUN | ALM | SOC Indicator | | | | | | Descriptions |
|----------------|---|---|---|---|---|---|--|---|---|
| |  |  |  |  |  |  |  |  | |
| Shut down | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF | Battery is off |
| Power-on | ON | ON | ON | ON | ON | ON | ON | ON | All indicators light up once at the same time |
| Standby | Flash 1 | OFF | OFF | OFF | OFF | OFF | OFF | OFF | Battery is in standby mode |
| Charging | ON | OFF | Base on capacity | | | | | | |
| Discharge | Flash 2 | OFF | Base on capacity | | | | | | |
| Alarm | OFF | Flash 3 | OFF | OFF | OFF | OFF | OFF | OFF | Battery is in low voltage |

| Battery status | RUN | ALM | SOC Indicator | | | | | | Descriptions |
|----------------|-----|-----|---------------|-----|-----|-----|-----|-----|-------------------------------------|
| | ● | ● | ● | ● | ● | ● | ● | ● | |
| | ON | ON | ON | ON | ON | ON | ON | ON | Battery warning for barcode missing |
| Protection | OFF | ON | OFF | OFF | OFF | OFF | OFF | OFF | Battery in Protection mode |

Flash 1: 0.25 seconds ON, 3.75 seconds OFF.
Flash 2: 0.5 seconds ON, 0.5 seconds OFF.
Flash 3: 0.5 seconds ON, 1.5 seconds OFF.

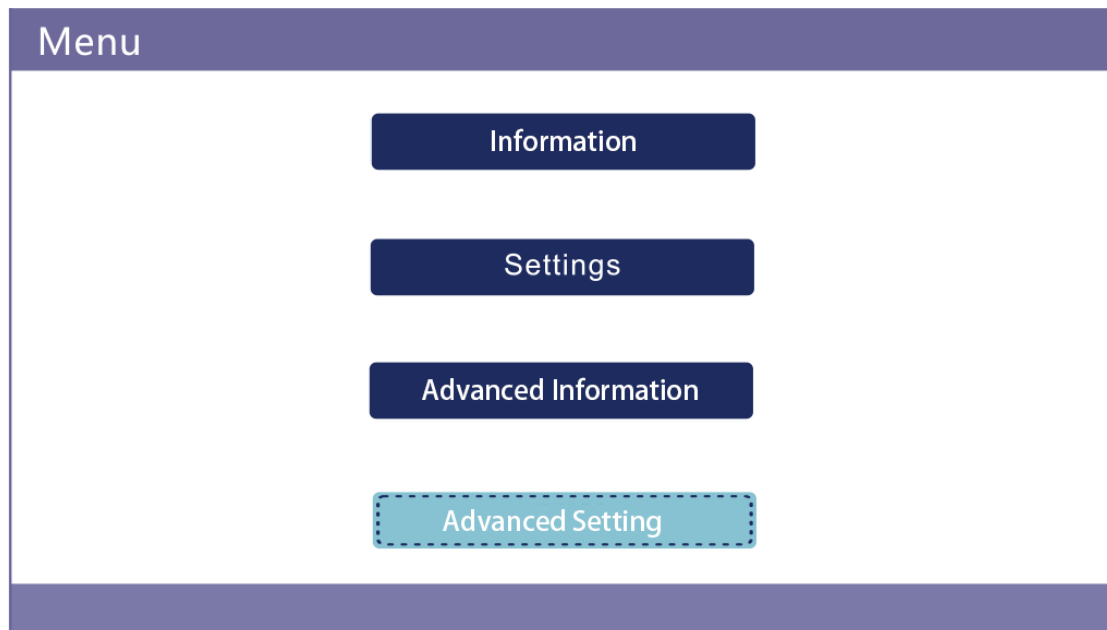
Step 3 Switch on DC isolators between batteries and Busbars

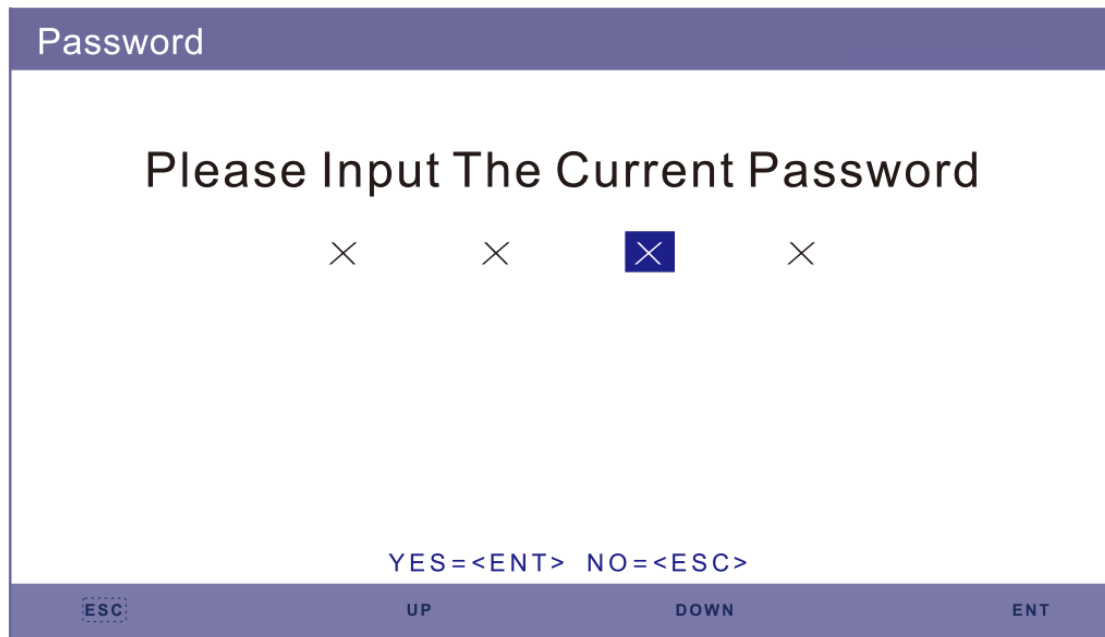
Step 4 Switch on DC isolators between Busbars and Inverters.

6.3 BMS commissioning Monitoring

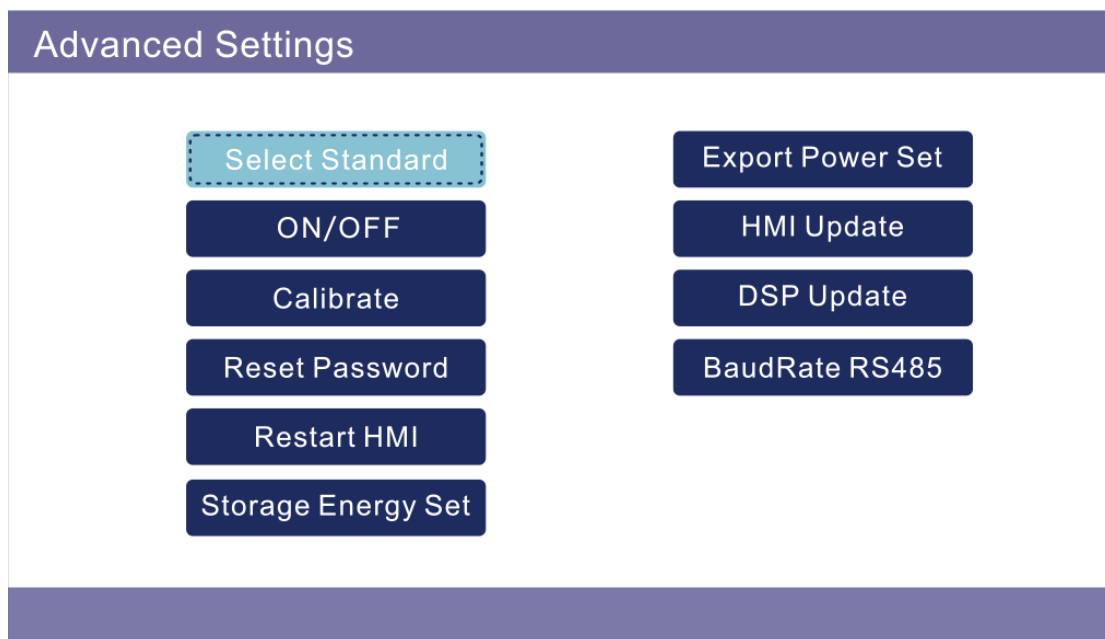
Step 1 Press “ENT” on inverter and enter the main menu. Select “Advanced Settings” from main menu, the LCD screen show the password is needed:

- Press “DOWN” to move the cursor.
- Press “UP” to change the number.
- Press “ENT” to enter the restricted section.

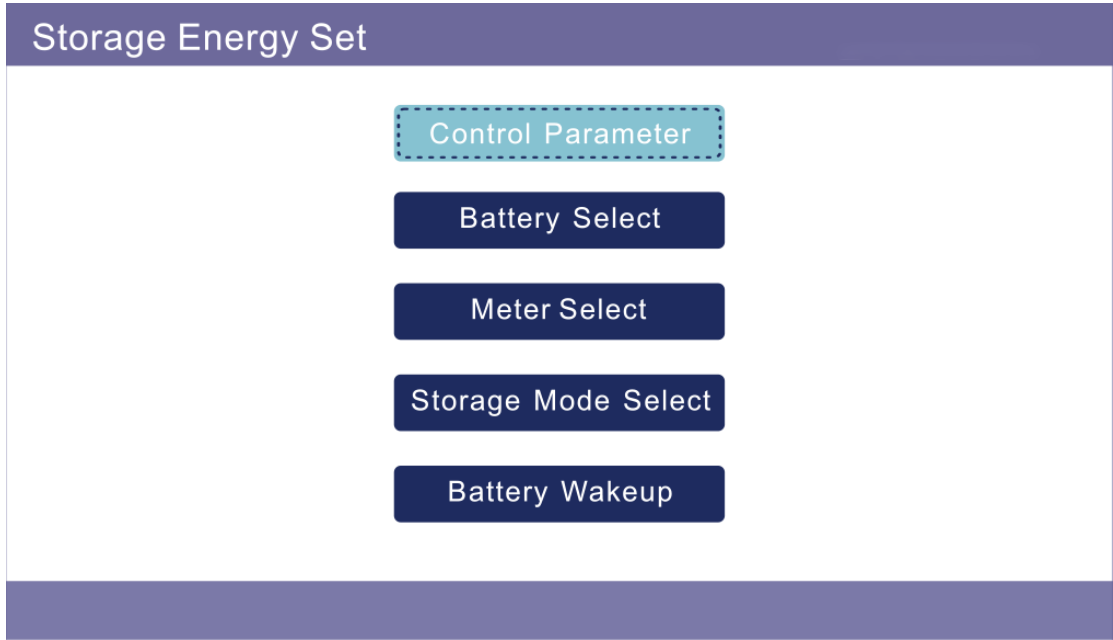




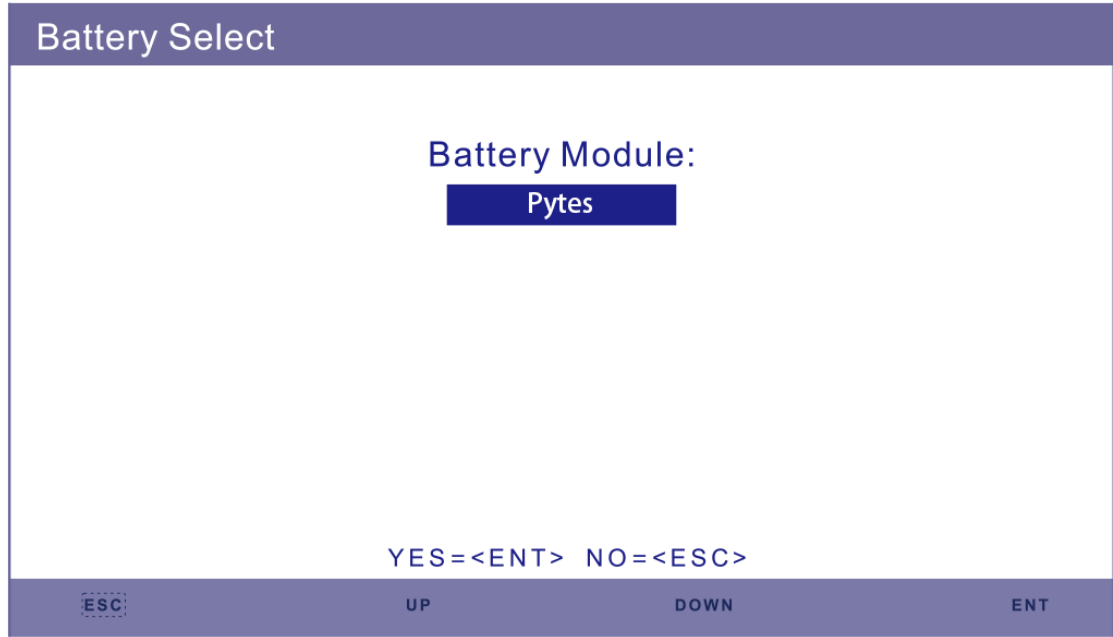
Step 2 Choose "Storage Energy Set" and then Choose "Battery Select", use "DOWN" or "UP" to choose "Pytes" and then press "ENT" to confirm.



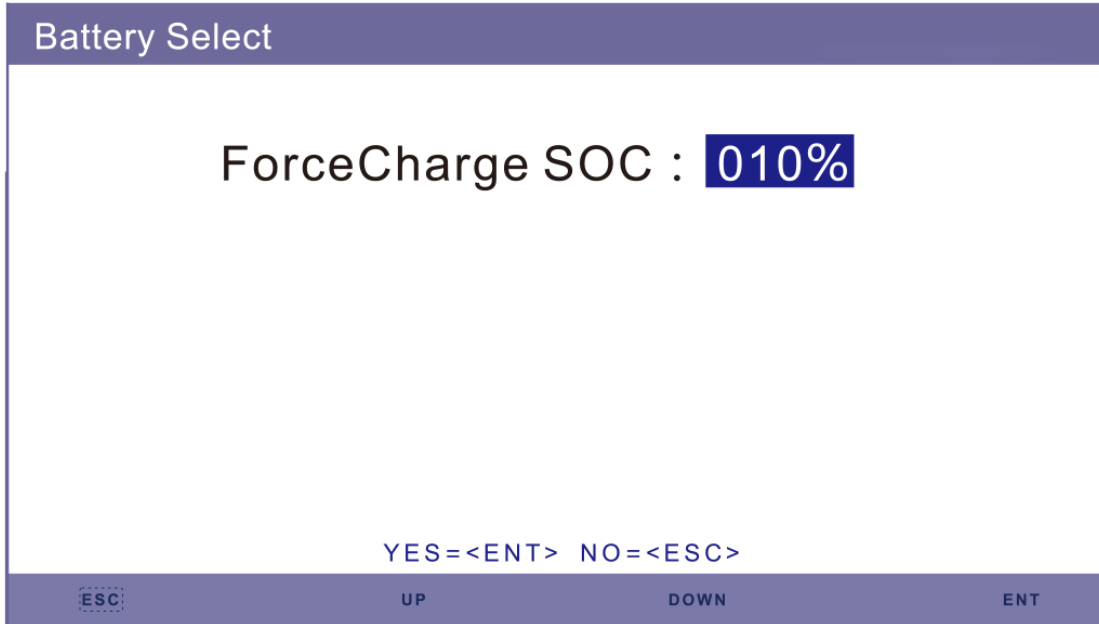
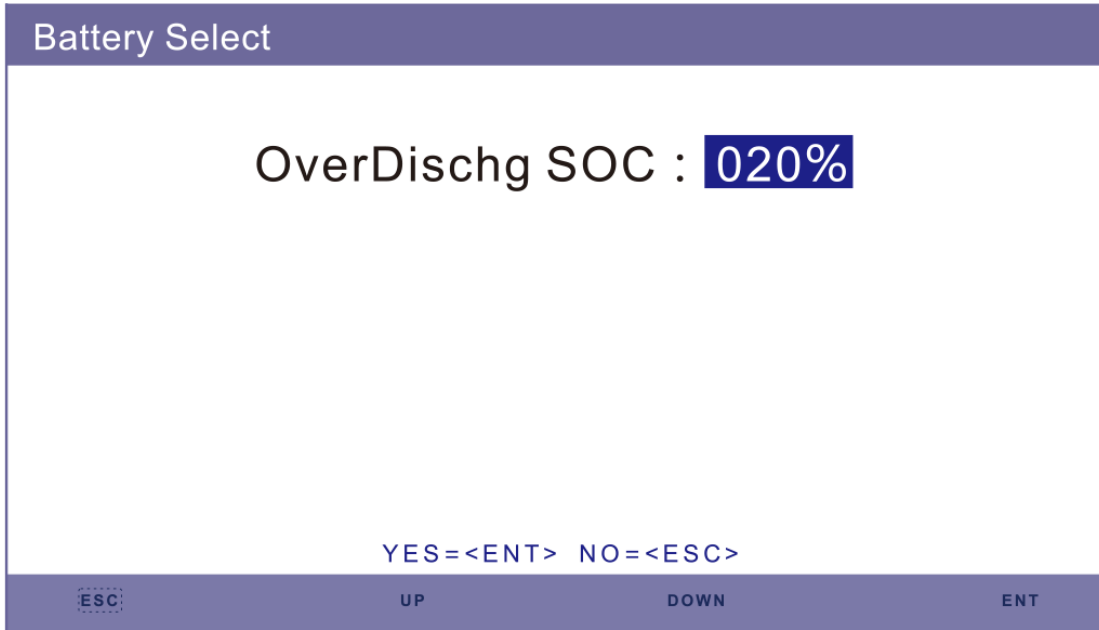
Step 3 Choose "Battery Select"



Step 2 Use "DOWN" or "UP" to choose "Pytes" and then press "ENT" to confirm.



Step 3 Set the rest inverter values according to customers' demand.



Battery monitoring

Battery BMS will connect with inverter and upload information directly. Battery information can be seen from inverter LCD or Inverter App.

7 System Maintenance



- Wear personal protective equipment and use dedicated insulated tools to avoid electric shocks or short circuits.
- Do not smoke or have an open flame around batteries.
- Do not use wet cloth to clean exposed Busbar or other conductive parts.
- Do not use water or any solvent to clean batteries.

WARNING

- Do not maintain batteries with power on. To power off the batteries before performing operations such as checking and tightening screw torques, explain the risks to the customer, obtain the customer's written consent, and take effective preventive measures.
- After batteries are discharged, charge them in time to avoid damage due to overdischarge.
- Before moving or reconnecting the equipment, disconnect the mains and batteries and wait for five minutes until the equipment powers off. Before maintaining the equipment, check that no hazardous voltages remain in the DC bus or components to be maintained by using a multimeter.

CAUTION

- Stay away from the equipment when preparing cables to prevent cable scraps from entering the equipment. Cable scraps may cause sparks and result in personal injury and equipment damage.

7.1 System Power-Off

Precautions

WARNING

- After the system powers off, the remaining electricity and heat may still cause electric shocks and body burns. Therefore, wear protective gloves 5 minutes after the system is powered off before performing any operation on the battery. You can maintain the battery only when all indicators on the battery are off.

Powering off the system

Step 1 Turn off the AC switch between the inverter and the power grid.

Step 2 Turn off the DC switch between the battery and inverter.

Step 3 Turn off the DC switch between the PV switch and the inverter if there is any.

Step 4 Turn off the DC isolators between the batteries and Busbars.

Step 5 Press “SW” button of master battery for 3 seconds, all indicators will light up and off, the slave battery will be off automatically.

Step 6 Switch off the Power button of all batteries.

7.2 Routine Maintenance

To ensure that the battery can operate properly for a long term, you are advised to perform routine maintenance on it as described in this chapter.



Before cleaning the system, connecting cables, and ensuring the grounding reliability, power off the system.

Maintenance Checklist

| Check Item | Check Method | Maintenance Interval |
|-----------------------|--|--|
| System cleanliness | <ul style="list-style-type: none">● Check periodically that the heat sinks are free from obstacles and dust. | Once every 6 to 12 months |
| System running status | <ul style="list-style-type: none">● Check that the battery is not damaged or deformed.● Check that the battery does not generate abnormal sound when it is in operation.● Check that the battery parameters are correctly set when the battery is running. | Once every 6 months |
| Electrical connection | <ul style="list-style-type: none">● Check that cables are secured.● Check that cables are intact, and that in particular, the parts touching the metallic surface is not scratched.● Check that unused | The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months. |

| | | |
|-----------------------|--|---|
| | DC input terminals are locked by caps. | |
| Grounding reliability | <ul style="list-style-type: none"> ● Check that ground cables are securely connected. | The first inspection is 6 months after the initial commissioning. From then on, the interval can be 6 to 12 months. |

7.3 Troubleshooting

Please refer to the troubleshooting methods mentioned below.

Please read the “LED indication” of this manual in Chapter 6.2 before troubleshooting to prevent false operations. For example, it doesn’t indicate the battery is faulty if the ALM alarm red light on the front panel is blinking or constantly on. When there is an "alarm" indication, it usually works well and needs no troubleshooting. When there is "protection" indication, the battery will work normally automatically after “protection” status is released.



Do not repair the battery if no authorization from Pytes!

7.3.1 Unable to start

| Problem | Troubleshooting Steps | Solution |
|--|--|--|
| Press the POWER button to the "ON" state and press the SW button for 1 second, but the LED indicator doesn't respond or all the LEDs are off after 1S. | <ol style="list-style-type: none"> 1. Confirm that the POWER button remains in the "ON" state; 2. Charge the battery correctly and observe if the battery can be charged properly. | <ol style="list-style-type: none"> 1. If the battery enters charging mode, the battery can return to normal after charging. 2. If not, please contact the local reseller or Pytes. |

7.3.2 Unable to charge

| Problem | Troubleshooting Steps | Solution |
|---------|-----------------------|----------|
|---------|-----------------------|----------|

| | | |
|---|--|--|
| The unfully charged battery cannot be charged properly. | <ol style="list-style-type: none"> 1. Confirm that the battery is turned on; 2. Check the power cable. Confirm that the power cables are correctly connected and the charging circuit is correct; 3. Check the battery indicator LED to see if the battery is under “Protection” state. If so, unplug the battery power cable, find the cause of the protection, and fix the problem, then restart the battery; 4. Check if the charging voltage meets the battery charging requirements. If not, adjust the power supply voltage to the proper range. | If the battery still does not charge properly after following the steps, please contact the local reseller or Pytes. |
|---|--|--|

7.3.3 Unable to discharge

| Problem | Troubleshooting Steps | Solution |
|--|--|---|
| The battery cannot be discharged properly. | <ol style="list-style-type: none"> 1. Confirm that the battery is turned on; 2. Check the power cables to ensure that they are properly connected. 3. Unplug the battery power cable and measure the battery power output voltage. If the battery voltage is too low, charge it immediately. 4 . Check the battery indicator LED to see if the battery is under “Protection” state. If so, unplug the battery power cables, find the cause of the protection, and fix the problem, then restart the battery; | If the battery still does not discharge properly after following the above steps, please contact the local reseller or Pytes. |

7.3.4 ALM indicator(alarm) constantly on

When the ALM indicator is constantly red and the other indicators are off, the battery is in the “Protection” state. When the condition triggered protection is released, the battery will automatically return to normal operation. There are a few issues requiring immediate measures.

| Problem | Troubleshooting Steps | Solution |
|---------|-----------------------|----------|
|---------|-----------------------|----------|

| | | |
|--|--|---|
| <p>The ALM indicator is constantly red and all other indicators are off.</p> | <p>1. Check the power cables to ensure that they are properly connected.</p> <p>2. Check whether the charging voltage, charging/discharging current, battery/cell voltage and temperature meet the relevant protection conditions, and release the “protection” state to ensure that the voltage, current and temperature are within the normal working range.</p> | <p>If the battery protection state cannot be released, or the ALM indicator is constantly on when the battery is properly charged after it is restarted, please contact your local reseller or Pytes.</p> |
|--|--|---|

7 Emergency Handling

If an accident (including but not limited to the following) occurs on the site, ensure the safety of onsite personnel first and contact the Company's service engineers.

Battery Falling or Strong Impact



If a battery is dropped or violently impacted during installation, it may become faulty and cannot be used. Using a faulty battery will cause safety risks such as cell leakage and electric shock.

If a battery has obvious damage or abnormal odor, smoke, or fire occurs, evacuate the personnel immediately, call emergency services, and contact the professionals. The professionals can use fire extinguishing facilities to extinguish the fire under safety protection.

If the appearance is not deformed or damaged, and there is no obvious abnormal odor, smoke, or fire contact the professionals to transfer the battery to an open and safe place or contact a recycling company for disposal.

Electric Shock



Before the injured person is separated from the source of electricity, onsite paramedic personnel are not allowed to touch the injured person with their hands to avoid electric shocks.

9 Technical Specifications

| Battery Model | E-BOX-48100R |
|---|-----------------------------------|
| Chemistry | LFP |
| Nominal Voltage | 51.2V |
| Voltage Range | 47.5V-57.6V |
| Nominal Capacity | 100Ah |
| Nominal Energy | 5.12kWh |
| Unit Dimension | L440mm* W620mm * H117mm (2.6U) |
| Unit Weight | 51kg |
| Standard Charge/Discharge Current | 50A |
| Maximum Continuous Charge/Discharge Current | 50A |
| Peak Current | 102A@15s |
| Round-Trip Efficiency | ≥95% |
| Communication Protocol | RS232, RS485, CAN |
| Cycle Life | ≥6000cycles@0.5C/0.5C, 25°C |
| Calendar Life | ≥10years |
| Ambient Temperature | 0°C ~ 35°C |
| Certificates | UL1973, IEC62619 / UN38.3 |
| Recommended Storage Temperature | 20~30°C |

Appendix 1 Inverter compatibility declaration

We

Certificate holder: Shanghai PYTES Energy Co., Ltd.

Address: No. 3492, Jinqian Road, Fengxian District, 201406, Shanghai, China

Telephone: +86 21 5747 5821

Web: www.pytesgroup.com

Email: ess_support@pytesgroup.com

Declare under our sole responsibility, that the products described below:

| <i>Product</i> | <i>Trade name</i> | <i>Model Number</i> |
|-------------------------|--------------------------|----------------------------|
| <i>Batteries</i> | <i>PYTES</i> | <i>E-BOX48100R</i> |

Our products are compatible with the following inverter brands and models:

| Inverter | | Communication | Cable Supply |
|-----------------|--|----------------------|---------------------|
| Brand | Type | | |
| Victron | Multi/Quattro Series 48V | CAN | RJ45 |
| Voltronic | Axpert/Infinisolar Series 48V | RS485 | RJ45 |
| Solis | RHI/RAI/S5 Series | CAN | RJ45 |
| Sol-Ark | 5/8/12/15K Hybrid Inverter | CAN | RJ45 |
| SMA | SMA Island Series | CAN | RJ45 |
| Sunsynk | Hybrid Parity (Super) Inverter | RS485 | RJ45 |
| Studer | Xtender/Compact 48v Series | CAN | RJ45 |
| SRNE | HF/HFP 48V Series | CAN | RJ45 |
| Phocos | Any-grid PSW-H 48V Series | RS485 | RJ45 |
| PowMr | POW Series | RS485 | RJ45 |
| MPP Solar | MPI Hybrid/PIP 48V/Split phase Series | RS485 | RJ45 |
| Megarevo | R Series | CAN | RJ45 |
| Luxpower | LXP/ECO Hybrid/ACS Series | CAN | RJ45 |
| Growatt | SPH /SPF/SPA Series/SC 48V | CAN/RS485 | RJ45 |
| Goodwe | SBP/ES/EM Series | CAN | RJ45 |
| Deye | Hybrid inverter-Sun Series | CAN/RS485 | RJ45 |
| Afore | Hybrid inverter-Sun Hybrid AF1/AF3 Series | CAN | RJ45 |

Name & Title: Hermann Liu/General Manager

Date: 2023-03-30