



Red

**Lithium Iron Phosphate
Battery System
User Manual**

RX-0050B

Document Version: V1.3
Issued Date: 2023-08-24

dx



About This Document

Purpose

This document describes the RX-0050B Lithium iron phosphate battery system in terms of its features, performance, working principles, appearance as well as instructions for installation, and operation and maintenance (O&M).






Intended Audience

This document is intended for:

- Sales engineers
- Technical support engineers
- System engineers
- Hardware installation engineers
- Commissioning engineers
- Maintenance engineers

Symbol Conventions

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

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
 WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
 NOTICE	Indicates a potentially hazardous situation 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.
 NOTICE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

REVISION LOG

Version Num.	Date	Purpose of Revision
V1.0	2020/12/14	This issue is the first official release.
V1.1	2023/03/29	Clarified packaging and cable connections.
V1.2	2023/08/21	Clarified product communications
V1.3	2023/08/24	Clarified product cleareances

Contents

- 1 Safety Information.....1**
 - 1.1 General Safety.....1
 - 1.2 Personnel Requirements4
 - 1.3 Electrical Safety.....5
 - 1.4 Installation Environment Requirements.....6
 - 1.5 Mechanical Safety.....6
 - 1.6 Battery Safety..... 8
 - 1.7 Others.....11
- 2 Overview.....12**
 - 2.1 Product Introduction..... 12
 - 2.1.1 Appearance..... 12
 - 2.1.2 Product Structure..... 13
 - 2.2 Battery System Specification.....14
 - 2.2.1 Cell Parameters.....14
 - 2.2.2 Battery Module Parameters.....14
 - 2.2.3 Protection Parameters.....15
- 3 Operations.....16**
 - 3.1 Installation..... 16
 - 3.2 Powering On.....18
- 4 Routine Maintenance..... 18**
 - 4.1 Monthly Maintenance..... 18
- 5 Terms.....20**

1 Safety Information

1.1 General Safety

Statement

Before installing, operating, and maintaining the equipment, read this document and observe all the safety instructions on the equipment and in this document.

The "NOTICE", "WARNING", and "DANGER" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions. Redx will not be liable for any consequence caused by the violation of general safety requirements or design, production, and usage safety standards.

Ensure that the equipment is used in environments that meet its design specifications. Otherwise, the equipment may become faulty, and the resulting equipment malfunction, component damage, personal injuries, or property damage are not covered under the warranty.

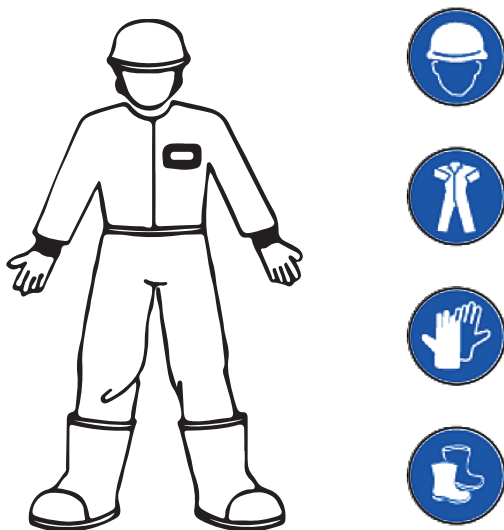
Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

Redx will not be liable for any consequences of the following circumstances:

- Operation beyond the conditions specified in this document
- Installation or use in environments which are not specified in relevant international or national standards
- Unauthorized modifications to the product or software code or removal of the product
- Failure to follow the operation instructions and safety precautions on the product and in this document
- Equipment damage due to force majeure, such as earthquakes, fire, and storms
- Damage caused during transportation by the customer
- Storage conditions that do not meet the requirements specified in this document

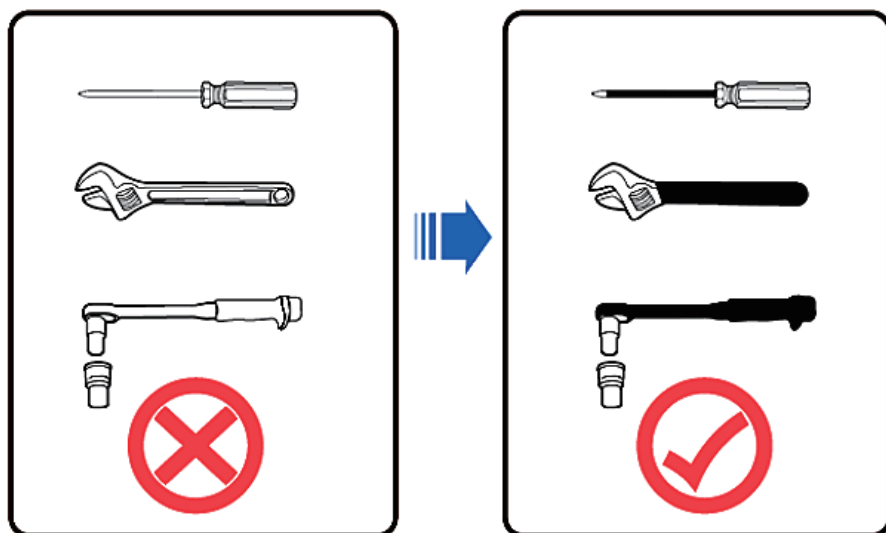
General Requirements

- Do not install, use, or operate outdoor equipment and cables (including but not limited to moving equipment, operating equipment and cables, inserting connectors to or removing connectors from signal ports connected to outdoor facilities, working at heights, and performing outdoor installation) in harsh weather conditions such as lightning, rain, snow, and level 6 or stronger wind.
- Before installing, operating, or maintaining the equipment, remove any conductive objects such as watches or metal jewelry like bracelets, bangles, and rings to avoid electric shock.
- When installing, operating, or maintaining the equipment, wear dedicated protective gears such as insulation gloves, goggles, and safety clothing, helmet, and shoes, as shown in the following figure.



- Follow the specified procedures for installation, operation, and maintenance.
- Before handling a conductor surface or terminal, measure the contact point voltage and ensure that there is no risk of electric shock.

- After installing the equipment, remove idle packing materials such as cartons, foam, plastics, and cable ties from the equipment area.
- In the case of a fire, immediately leave the building or the equipment area, and turn on the fire alarm bell or make an emergency call. Do not enter the building on fire in any case.
- Do not stop using protective devices. Pay attention to the warnings, cautions, and related precautionary measures in this document and on the equipment. Promptly replace warning labels that have worn out.
- Keep irrelevant people away from the equipment. Only operators are allowed to access the equipment.
- Use insulated tools or tools with insulated handles, as shown in the following figure.



- Do not scrawl, damage, or block any warning label on the equipment.
- Tighten the screws using tools when installing the equipment.
- Do not work with power on during installation.
- Repaint any paint scratches caused during equipment transportation or installation in a timely manner. Equipment with scratches cannot be exposed to an outdoor environment for a long period of time.
- Before operations, ensure that the equipment is firmly secured to the floor or other solid objects, such as a wall or an installation rack.
- Do not use water to clean electrical components inside or outside of a cabinet.
- Do not change the structure or installation sequence of equipment without permission.

Personal Safety

- If there is a probability of personal injury or equipment damage during operations on the equipment, immediately stop the operations, report the case to the supervisor, and take feasible protective measures.
- To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telecommunication network voltage (TNV) circuits.
- Do not power on the equipment before it is installed or confirmed by professionals.

1.2 Personnel Requirements

- Personnel who plan to install or maintain Redx equipment must receive thorough training, understand all necessary safety precautions, and be able to correctly perform all operations.
- 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 operate the equipment, including operators, trained personnel, and professionals, should possess the local national required qualifications in special operations such as high-voltage operations, working at heights, and operations of special equipment.
- Professionals: personnel who are 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 technically trained, 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
- Operators: operation personnel who may come in contact with the equipment, except trained personnel and professionals
- Only professionals or authorized personnel are allowed to replace the equipment or components (including software).

1.3 Electrical Safety

Grounding

- 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.
- Do not damage the ground conductor.
- Do not operate the equipment in the absence of a properly installed ground conductor.
- Ensure that the equipment is connected permanently to the protective ground. Before operating the equipment, check its electrical connection to ensure that it is securely grounded.

AC and DC Power



DANGER

Do not connect or disconnect power cables with power on. Transient contact between the core of the power cable and the conductor will generate electric arcs or sparks, which may cause fire or personal injury.

- Before installing or removing a power cable, turn off the power switch.
- Before connecting a power cable, check that the label on the power cable is correct.
- If the equipment has multiple inputs, disconnect all the inputs before operating the equipment.
- A damaged power cable must be replaced by the manufacturer, service agent, or professionals to avoid risks.
- High voltage operations and installation of AC-powered facilities must be performed by qualified personnel.

ESD



NOTICE

The static electricity generated by human bodies may damage the electrostatic-sensitive components on boards, for example, the large-scale integrated (LSI) circuits.

- Wear ESD gloves or a well-grounded ESD wrist strap when touching the device or handling boards or application-specific integrated circuits (ASICs).
- When holding a board, hold its edge without touching any components. Do not touch the components with your bare hands.
- Package boards with ESD packaging materials before storing or transporting them.

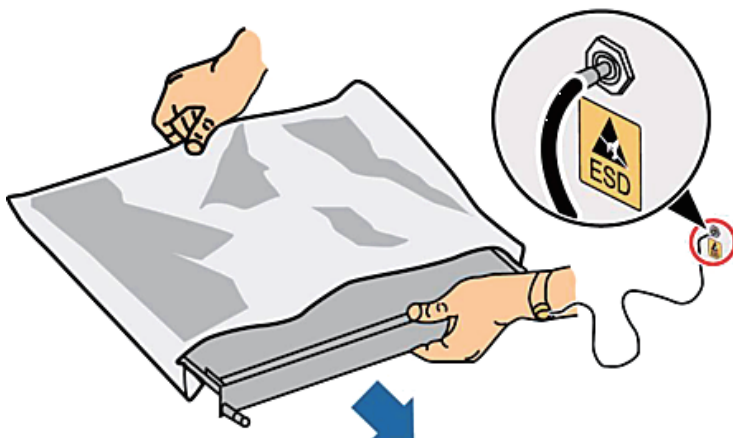


Figure 1-1 wearing an ESD wrist strap

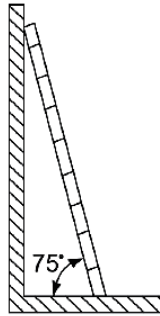
1.4 Installation Environment Requirements

- If any liquid is detected inside the equipment, immediately disconnect the power supply and contact the administrator.
- Do not expose the equipment to flammable or explosive gas or smoke. Do not perform any operation on the equipment in such environments.
- The environmental temperature must be between 0 °C and +50 °C, and the relative humidity. Between 0% and 90% (without condensation).
- Install on a sturdy supported surface

1.5 Mechanical Safety

Using Ladders

- Use wooden or fiberglass ladders when you need to perform live working at heights.
- When a step ladder is used, ensure that the pull ropes are secured and the ladder is held firm.
- Before using a ladder, check that it is intact and confirm its load bearing capacity. Do not overload it.
- Ensure that the ladder is securely positioned. The recommended angle for a ladder against the floor is 75 degrees, as shown in the following figure. An angle rule can be used to measure the angle. Ensure that the wider end of the ladder is at the bottom, or protective measures have been taken at the bottom to prevent the ladder from sliding.



- When climbing a ladder, take the following precautions to reduce risks and ensure safety:
- Keep your body steady.
- Do not climb higher than the fourth rung of the ladder from the top.
- Ensure that your body's center of gravity does not shift outside the legs of the ladder.

Drilling Holes

- When drilling holes into a wall or floor, observe the following safety precautions:



NOTICE

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

- Obtain the consent from the customer, subcontractor, and Redx before drilling.
- Wear goggles and protective gloves when drilling holes.
- When drilling holes, protect the equipment from shavings. After drilling, clean up any shavings that have accumulated inside or outside the equipment.

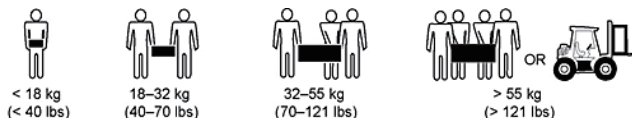
Moving Heavy Objects



DANGER

When removing a heavy or unstable component from a cabinet, be aware of unstable or heavy objects on the cabinet.

- Be cautious to avoid injury when moving heavy objects.



- When moving the equipment by hand, wear protective gloves to prevent injuries.
- Move or lift the equipment by holding its handles or lower edges. Do not hold the handles of modules (such as power supply units, fans, and boards) that are installed in the equipment because they cannot support the weight of the equipment.
- Avoid scratching the cabinet surface or damaging cabinet components and cables during equipment transportation.
- When transporting the equipment using a forklift truck, ensure that the forks are properly positioned to ensure that the equipment does not topple. Before moving the equipment, secure it to the forklift truck using ropes. When moving the equipment, assign dedicated personnel to take care of it.
- Choose railways, sea, or a road with good condition for transportation to ensure equipment safety. Avoid tilt or jolt during transportation.
- Move a cabinet with caution. Any bumping or falling may damage the equipment.

1.6 Battery Safety

Basic Requirements

Before operating batteries, carefully read the safety precautions for battery handling and master the correct battery connection methods.



DANGER

- Do not expose batteries at high temperatures or around heat-generating devices, such as sunlight, fire sources, transformers, and heaters. Excessive heat exposure may cause the batteries to explode.
- Do not burn batteries. Otherwise, the batteries may explode.
- To avoid leakage, overheating, fire, or explosions, do not disassemble, alter, or damage batteries, for example, insert sundries into batteries or immerse batteries in water or other liquids.

- Wear goggles, rubber gloves, and protective clothing to prevent skin contact with electrolyte in the case of electrolyte overflow. If a battery leaks, protect the skin or eyes from the leaking liquid. If the skin or eyes come in contact with the leaking liquid, wash it immediately with clean water and go to the hospital for medical treatment.
- Use dedicated insulated tools.
- Move batteries in the required direction. Do not place a battery upside down or tilt it.
- Keep the battery loop disconnected during installation and maintenance.
- Use batteries of specified models. Using batteries of other models may damage the batteries.
- Dispose of waste batteries in accordance with local laws and regulations. Do not dispose of batteries as household waste. If a battery is disposed of improperly, it may explode.
- The site must be equipped with qualified fire extinguishing facilities, such as firefighting sands and powder fire extinguishers.



NOTICE

To ensure battery safety and battery management accuracy, use batteries provided with the UPS by Redx. Redx is not responsible for any battery faults caused by batteries not provided by Redx.

Battery Installation

- Before installing batteries, observe the following safety precautions:
- Install batteries in a well-ventilated, dry, and cool environment that is far away from heat sources, flammable materials, moistures, extensive infrared radiation, organic solvents, and corrosive gases. Take fire prevention measures.
- Place and secure batteries horizontally.
- Note the polarities when installing batteries. Do not short-circuit the positive and negative poles of the same battery or battery string. Otherwise, the battery may be short-circuited.
- Check battery connections periodically, ensuring that all bolts are securely tightened.
- When installing batteries, do not place installation tools on the batteries.

Battery Short Circuit



DANGER

Battery short circuits can generate high instantaneous current and release a great amount of energy, which may cause equipment damage or personal injury.

To avoid battery short-circuit, do not maintain batteries with power on.

Lithium Battery

The safety precautions for lithium batteries are similar to those for lead-acid batteries except that you also need to note the precautions described in this section.



WARNING

Battery short circuits can generate high instantaneous current and release a great amount of energy, which may cause equipment damage or personal injury.

There is a risk of explosion if a battery is replaced with an incorrect model.

- A battery can be replaced only with a battery of the same or similar model recommended by the manufacturer.
- When handling a lithium battery, do not place it upside down, tilt it, or bump it with other objects.
- Keep the lithium battery loop disconnected during installation and maintenance.
- Do not charge a battery when the ambient temperature is below the lower limit of the operating temperature (charging is forbidden at 0°C). Low-temperature charging may cause crystallization, which will result in a short circuit inside the battery.
- Use batteries within the allowed temperature range; otherwise, the battery performance and safety will be compromised.
- Do not throw a lithium battery in fire.
- When maintenance is complete, return the waste lithium battery to the maintenance office.

1.7 Others Transport & Long term Storage

- For long-term storage, a charge-discharge cycle is required every 3 months according to the method specified in the specification.
- When loading and unloading the battery during transportation, please be careful not to drop it, do not stack more than 6 layers, turn it over, and ensure that the front is facing up.

Warning & Tips

Please dispose of used batteries in accordance with local laws and regulations, or let the qualified organization recycle, and do not dispose of batteries as household garbage.

Before using the battery, please read the specification and the warning signs on the surface of the battery box. Improper use of the battery may cause damage to the battery due to overheating.

Guang Dong Redx Electrical Technology Limited will not be responsible for any accidents caused by operation not in accordance with the specification. Responsibility, in order to ensure the safe use and disposal of the battery, please read the operating instructions carefully before use.

2 Overview

2.1 Product Introduction

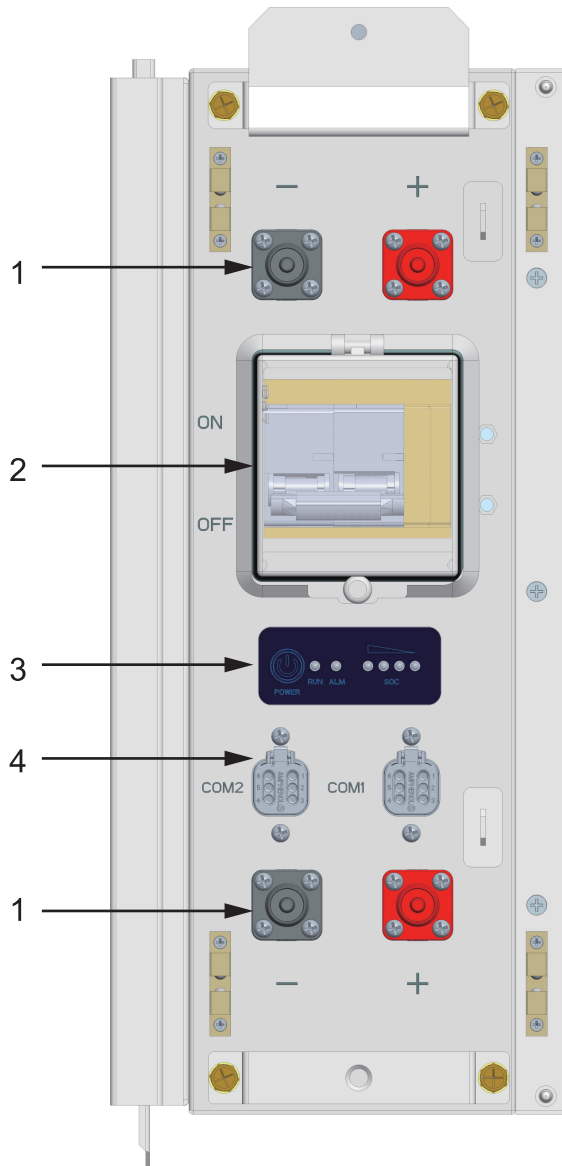
2.1.1 Appearance

Battery system



Figure 2-1 appearance

2.1.2 Product Structure



1. Power port 2.Breaker 3. Battery module 4.Start & Status display

2.2 Battery System Specification

2.2.1 Cell Parameters

No.	Items	Parameters
1	Cell type	Prismatic
2	Nominal voltage	3.2V
3	Rated capacity	100AH
4	Rated energy	320WH
5	Internal resistance	$\leq 0.4\text{m}\Omega @ 25^{\circ}\text{C}$ 1kHz AC
6	Allowed MAX charging current	1C
7	Recommended charging current	$\leq 0.5\text{C}$
8	Allowed MAX discharging current	1C @ $25\pm 5^{\circ}\text{C}$, SOC > 20%
9	Maximum pulse discharging current	2C @ $25\pm 5^{\circ}\text{C}$, 10s, SOC $\geq 20\%$

2.2.2 Battery Module Parameters

No.	Items	Parameters
1	Product name	LiFePO4 Battery System
2	Model	RX-0050B
3	Rating	51.2V, 100Ah, 5.12Kwh
4	Input	Max 56.8V d.c., 60A
5	Output	43.2 ~ 56.8V d.c., Max 60A
6	Charging temperature range	$0^{\circ}\text{C} \sim 45^{\circ}\text{C}$
7	Discharging temperature range	$-10^{\circ}\text{C} \sim 55^{\circ}\text{C}$
8	Internal resistance	$\leq 20\text{m}\Omega @ 1\text{kHz AC}$
9	Rated charge voltage	58.4V
10	Allowed MAX charging current	60A @ $25\pm 5^{\circ}\text{C}$
11	Recommended charging current	$\leq 50\text{A}$
12	Allowed MAX discharging current	60A @ $25\pm 5^{\circ}\text{C}$
13	Dimensions	W: $400\pm 2\text{mm}$ D: $620\pm 2\text{mm}$ H: $145\pm 2\text{mm}$
14	Weight	About: 56kg
15	IP Class	IP55

2.2.3 Protection Parameters

The battery contains a lithium battery protection board, which can monitor the battery operating status in real time, provide protections such as overcharge, over discharge, overcurrent, and over temperature when necessary, and cut off the input and output of the power battery for protection when necessary.

No	Items	Content	Parameters
1	Over charge	Over-charge protection for each cell	3.65V
		Over-charge release for each cell	3.45V
		Over-charge release method	Under the release voltage
2	Over discharge	Over-discharge protection each cell	2.50V
		Over-discharge release for each cell	3.15V
		Over-discharge release method	Over the release voltage
3	Over current	Charge over current protection	60A, delay time 15s (1string)
		Charge over current release	Discharge or auto release after 3min
		Discharge over current protection	70A, delay time15s (1string)
		Discharge over current release	Charge or auto release after 3min
		Short circuit protection	Break protection
4	Temperature	Discharge over temperature protection	Protect@65℃; Release@55℃;
		Discharge under temperature protection	Protect@-20℃; Release@-10℃

3 Operations

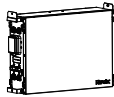
3.1 Storage

Scope of Delivery

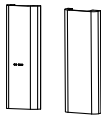
Please check the condition of the packing before unpacking. If any parts are damaged or missing, contact your local supplier for help.

The battery power cables and battery communication cables are included in the inverter box.

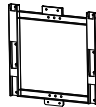
RX-0050B Accessories



Battery Body
(1PCS)



Battery Cover
(2PCS)



Battery Bracket
(1PCS)



M6*10
Countersunk Screw
(2PCS)



M6*50
Expansion Bolt
(8PCS)



M4*8
Countersunk Screw
(2pcs)



Document
(4PCS)

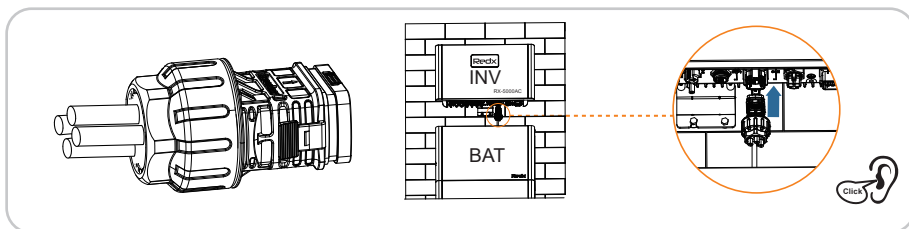


Bat Hole Template
(1PCS)

3.2 Communication with Inverter

The Redx inverter has an external data collector, users can choose either WIFI or 4G dataloggers according to their requirements, and use their computer or mobile phone APP (Redx Power) to monitor the inverter and battery status. The default datalogger in the device uses Wi-Fi to connect to the customer's Wi-Fi router to establish an Internet connection. The installer will use Bluetooth to connect to the datalogger and configure the device to connect the datalogger to the local Wi-Fi router during the installation process. The inverter communicates with the battery BMS using RS485. Redx batteries (RX-00-50 / 00-50B) are designed to connect to Redx inverters RX-5000AC / RX-5000HY / RX-7000HY. 2-8 (10-40kWh) Redx RX-0050B batteries must be installed to the listed inverters

RX-5000AC/RX-7000HY/5000HY Battery / Communication connector



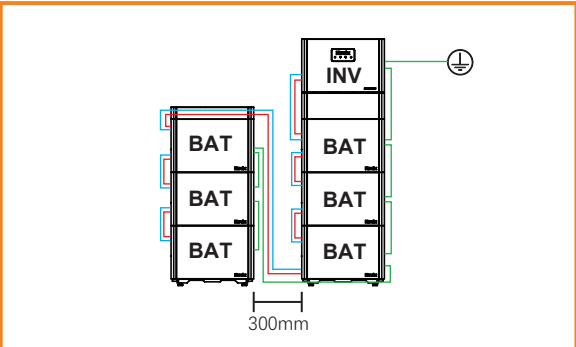
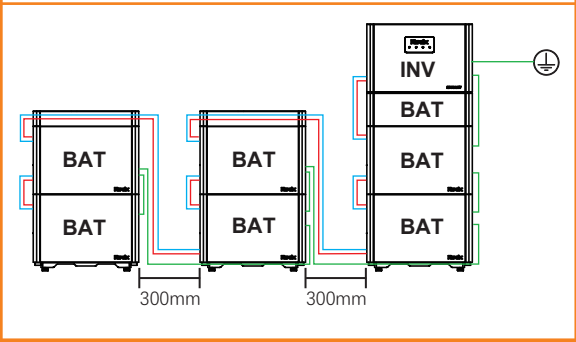
Note: The communications connector will be pre-assembled to connect the inverter to smartmeters and inverter to com1 port of bat1.

3.3 Installation

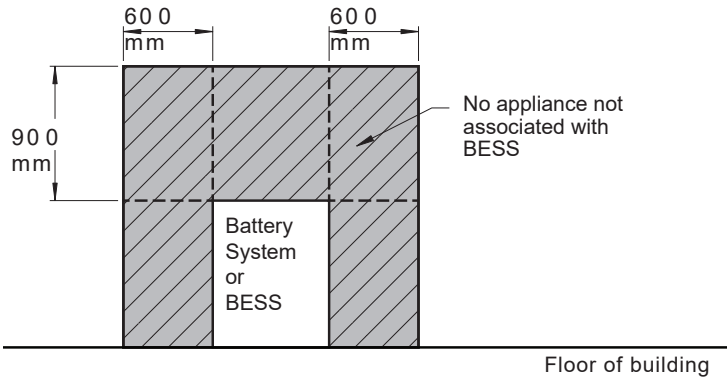
- Step 1** Use a Hole Template to determine the installation position
- Step 2** Installation of Expansion bolts
- Step 3** Secure the wall hanging section
- Step 4** Install the battery system on the wall mount
- Step 5** Secure the connection between the battery systems
- Step 6** Install the grounding section on the back of the battery system
- Step 7** Connect battery power cables
- Step 8** Connect battery communication cables
- Step 9** Install the battery system cover
- Step 10** Complete the installation.

Please follow your local standards for installation (eg: ASNZS5139) - The area inside the battery system enclosure shall allow for the following clearances:

Example installation/stacking methods for 6x RX-0050B:

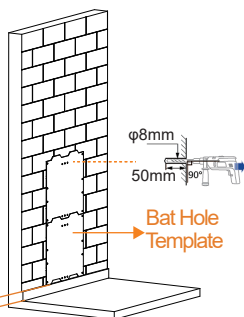
<div>30kWh (5030AC)</div>		<div>A: Inverter*1 B: Cable box S *4 C: Cable box L*1 D: Base+ Topcover*1 E: Battery*6</div>
<div>30kWh (5030AC)</div>		<div>A: Inverter*1 B: Cable box S *3 C: Cable box L*2 D: Base+ Topcover*2 E: Battery*6</div>

Appliance clearances around the BESS:

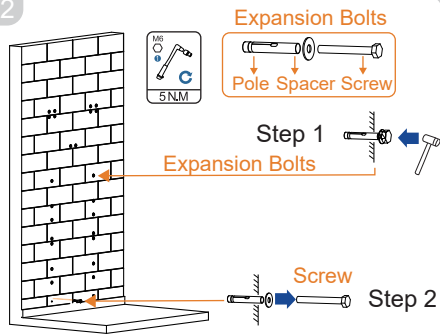


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If installing on the ground, install the base to the first battery. The first battery hole template height is 60mm from the ground.

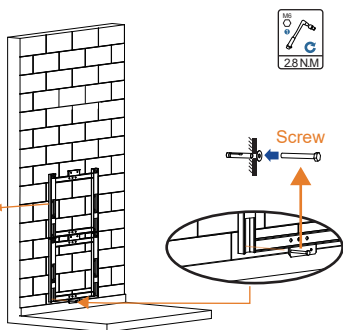


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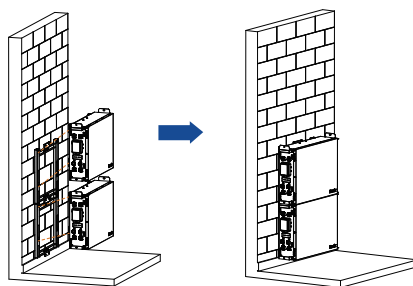


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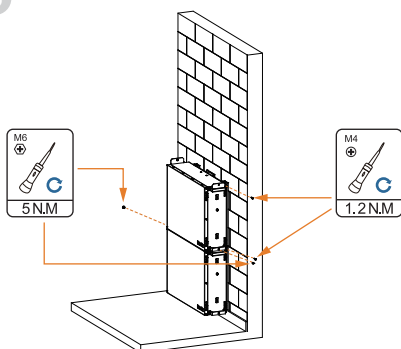
Battery Bracket



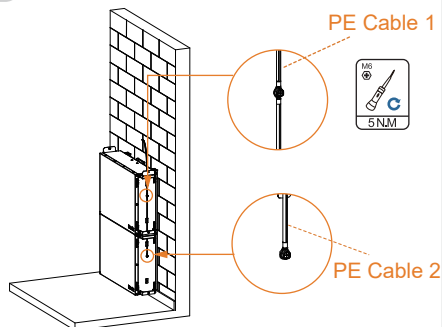
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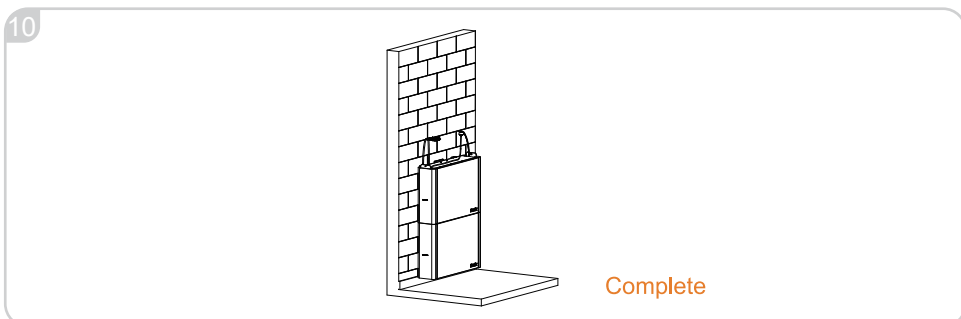
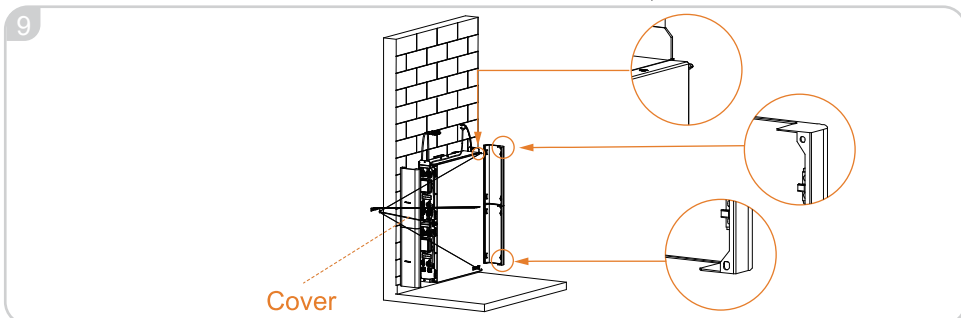
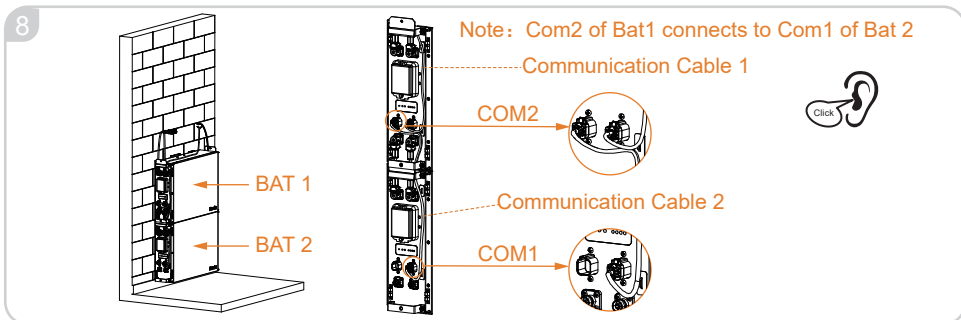
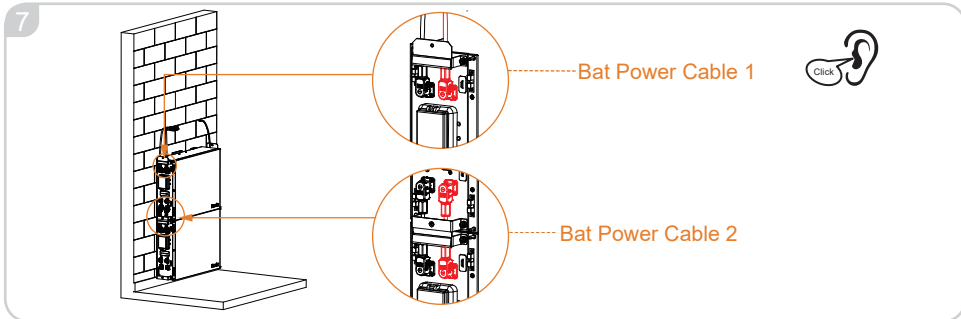


5



6





3.4 Powering on and off (Start up & Shutdown)

Start up:

- Before powering on the system, ensure that all post-installation checks are completed.
- Before powering on the battery, Check whether the fault light is on. If it is not on, it is normal.
- Before powering on the device, ensure that all loads are off.

Operating Steps

Step 1 Close the breakers on each battery.

Step 2 Close any external breakers if installed.

Step 3 Press the start button 3-6s on the high voltage module in each battery case. Release the button when the indicator turns on----End

Powering off (Shutdown) :

- Before powering off the system, ensure that all post-installation checks are completed.
- Before powering off the battery, Check whether the fault light is on. If it is not on, it is normal.
- Before powering off the device, ensure that all loads are off.

Operating Steps

Step 1 Open the breakers on each battery.

Step 2 Open any external breakers if installed.

Step 3 Press the start button 8s on the high voltage module in each battery case. Release the button when the indicator turns off----End

3.5 Specifications

No.	Items	Parameters
1	Cell type	Prismatic
2	Nominal voltage	3.2V
3	Rated capacity	100AH
4	Rated energy	320WH
5	Internal resistance	≤0.4mΩ@25℃ 1kHz AC
6	Allowed MAX charging current	1C
7	Recommended charging current	≤0.5C
8	Allowed MAX discharging current	1C @25±5℃ , SOC>20%
9	Dimensions, Weight	W:400±2mm D:620±2mm H:145±2mm , 56kg

For all product specifications, please refer to the product Spec-sheet.

4 Routine Maintenance














NOTICE

- All internal maintenance of battery must be performed by trained personnel with insulation tools. The device behind the protective cover that can only be opened with a tool is not maintainable by users. For maintenance, please consult Redx for details.
- Periodically maintain the battery according to the following requirements. Otherwise, the normal operation of the battery may be affected and the service life of the battery may be reduced.

4.1 Monthly Maintenance

The battery system should be checked at least once a month to see if the voltage and temperature of the battery cells are normal. View historical data to check whether a critical fault occurs.

					
RUN	ALM	L4	L3	L2	L1

State of system	Event	RUN	ALM	Electricity LED			
							
Shutdown	Dormancy	OFF	OFF	OFF			
Stand	Normal	Flashing 1	OFF	According to electric quantity			
Charging	Alarm	Flashing 1	Flashing 3	indicator			
	Normal	Lighting	OFF				
	Alarm	Lighting	Flashing 3				
	Over voltage protect	Lighting	OFF				
	Over current protect	Flashing 1	OFF				
Discharging	Normal	Flashing 3	OFF				
	Alarm	Flashing 3	Flashing 3				
	Under voltage protect	OFF	Flashing 3	OFF			
	Over current protect	OFF	Lighting	OFF			
Temperature	Protect	OFF	Lighting	OFF			
Failure	CELL&NTC failure	OFF	Lighting	OFF			
	Short out						
	Voltage transducer failure						
	Current transducer failure						
	MOS failure						

5 Terms

1 Cell

A single cell.

2 Battery Module

A plurality of single batteries are connected in series, parallel or series-parallel mode, and there is only a pair of positive and negative output terminals, which are used as a combination of power supply.

3 Battery Management System(BMS)

An electronic device that controls or manages the electrical or thermal performance of a battery system.

4 Battery System

The energy storage device includes the integration of the battery module or battery package, the battery management system, the high voltage circuit and the low voltage circuit.

5 Battery Capacity

The size of the storage capacity of the battery.

6 State of Charge (SOC)

The current battery unit, module, battery pack or system according to the conditions specified by the manufacturer can release the capacity as a percentage of the actual capacity, also known as the remaining capacity.

7 State of Health (SOH)

The deviation ratio between the current performance of the battery and the normally designed index.



Address: Unit 2/21 Millennium Circuit, Helensvale, QLD Australia 4212

Website: www.redx.com.au

Email: support@redx.com.au

Phone: +61 7 5672 9983

Specifications are subject to changes without advance notice

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