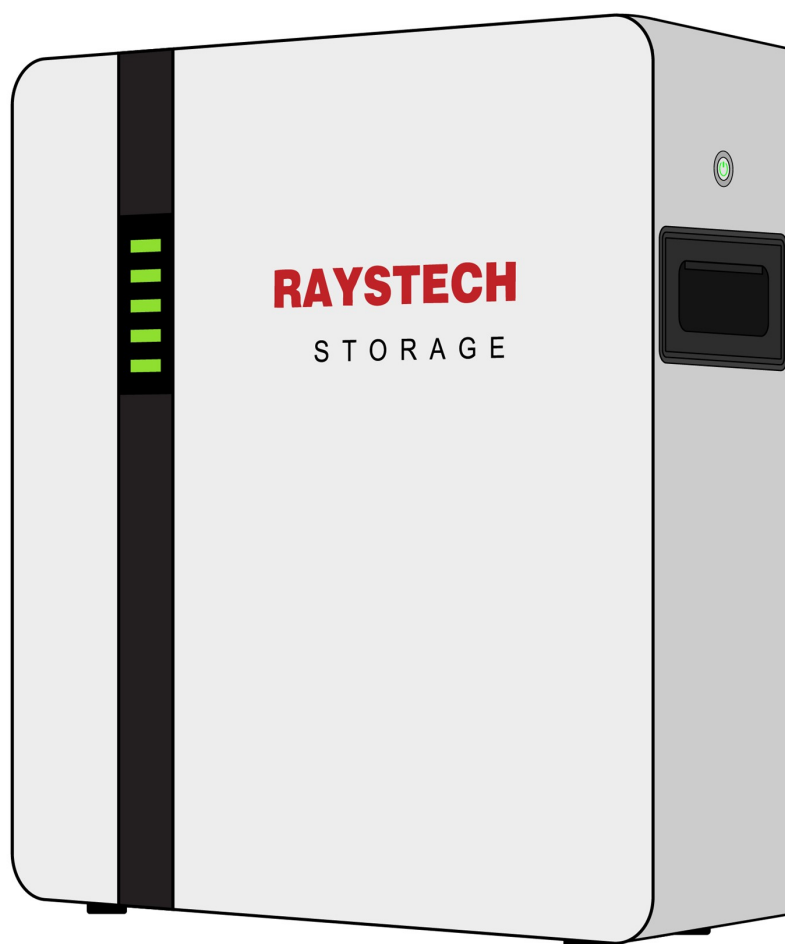


RAYSTECH

S T O R A G E

RT5427

User Manual



RAYSTECH (TIANJIN) PV ENERGY CO., LTD.

About this manual

This manual is intended for the RT5427 Energy Storage battery. These batteries can be installed in Parallel, pay more attention for the power cable and communication cable connection.

Statement

Compliant to Best Practice Guide for Battery Storage Equipment—Electrical Safety. Requirements- version 1- Pre-assembled integrated battery energy storage system equipment – Method 1 mandatory requirements and Optional requirements – a), c), e), f), g), h), i), j), k), l), m), n), o), p), q).

Declaration

RAYSTECH declares that the RT5427 complies with the essential requirements and other relevant of RE Directive 2014/53/EU and CE-RED.

Importer Name: XXX (Located in EU)

Importer Address: XXX (Located in EU)

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to which this declaration relates is in conformity with the essential requirements and other relevant requirements of the RED Directive (2014/53/EU).	24

1. Safety Introduction

1.1 Important Safety Instructions








This manual contains important instructions for:

RT5427 Energy Storage product and this manual must be followed when installing and using this product.

This product is designed and tested in accordance with international safety requirements CE, but as with all electrical and electronic equipment, certain precautions must be observed when installing and/or operating the product. To reduce the risk of personal injury and ensure the safe installation and operation of the product, you must read carefully and follow all instructions, cautions and warnings in this manual.

1.2 Warnings in this Document

A warning describes a hazard to equipment or personnel. It calls attention to a procedure or practice which if not correctly performed, could result in damage to or destruction of part or all of the RAYSTECH equipment and/or other equipment connected to the RAYSTECH equipment or personal injury.

Symbol	Description
	Caution, risk of electric shock
	Heavy enough may cause severe injury
	Keep the battery away from open flame or ignition sources
	Keep the battery away from children
	Dispose of waste batteries according to local laws and regulations
	Recycling
	Read this manual before installation and operation

For safety reasons, installers are responsible for familiarizing themselves with the contents of this manual and all warnings before performing installation.

1.3 Battery Handling Guide

- Use the battery pack only as directed.
- If the battery defective, appears cracked, broken or otherwise damaged, or fails to operate. Please contact the RAYSTECH hot line **+86-22-59901199** immediately.
- Do not attempt to open, disassemble, repair, tamper, or modify the battery.

The battery is not suitable for users to use by themselves.

- To protect the battery and its components from damage when transporting, handle with care.
- Do not subject it to any strong force.
- Do not insert foreign objects into any part of the battery pack.
- Do not use cleaning solvents to clean the battery.
- The battery not be connected directly to SELV circuit.

1.4 Response to Emergency Situations

The RAYSTECH battery is designed with multiple safety strategies to prevent hazards resulting from failures. However, RAYSTECH cannot guarantee their absolute safety for uncertain situations.

1.4.1 Leaking Batteries

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. Electrolyte is corrosive and contact may cause skin irritation and chemical burns. If one is exposed to the leaked substance, do these actions:

Inhalation: Evacuate the contaminated area, and seek medical attention immediately.

Eyes contact: Rinse eyes with flowing water for 15 minutes, and seek medical attention immediately.

Skin contact: Wash the affected area thoroughly with soap and water, and seek medical attention immediately.

Ingestion: Induce vomiting as soon as possible, and seek medical attention immediately.

1.4.2 Fire

In case of a fire, make sure that an ABC or carbon dioxide extinguisher is

nearby and does not use water to extinguish the fire.



WARNING

The battery pack may catch fire when heated above 150°

If a fire breaks out where the battery is installed, do these actions:

1. Extinguish the fire before the battery catches fire.
2. If the battery has caught fire, do not try to extinguish the fire. Evacuate people immediately.

WARNING

If the battery catches fire, it will produce poisonous gases. Do not approach.

1.4.3 Wet battery

If the battery is wet or submerged in water, do not try to access it. Contact **RAYSTECH Customer Service** or your distributor for technical assistance.

1.4.4 Damaged Battery

If the battery damaged, please contact RAYSTECH **customer service** or your distributor for help as soon as possible, because damaged battery is dangerous and must be handled with extreme caution. Damaged battery is not suit for use and may pose a danger to people or property. If the battery seems to be damaged, return it to RAYSTECH or your distributor.

CAUTION

Damaged battery might export electrolyte or flammable gas, so contact RAYSTECH for advice and information immediately we will deal with it.

1.5 Installers

RAYSTECH Energy Storage battery is suggested installing by skilled worker or electrician. A skilled worker is defined as a people who had been trained and qualified electrician or had all of the following skills and experience:

- Knowledge of the functional principles and operation of on-grid Energy Storage systems.
- Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
- Knowledge of the installation of electrical devices
- Knowledge of and adherence to this manual and all safety precautions and best practices.

1.6 Scrap Battery

For scrap battery(-ies), please treat with local laws or regulations to recycle or scrap.

1.7 Contact Information

Use the contacts for technical assistance. The phone numbers are available only during business hours on weekdays.

Tel	+86-22-59901199
Email	service@raystechgroup.com
Address	13TH Floor Tianqi International Mansion, Central Business District, Binhai New Area, Tianjin, China

2. 2.Guidance for Disconnection of Batteries During Shipment

- RT5427 is not suit for air transport.
- Cartons that have been crushed, punctured, or torn in such a way that contents are revealed shall be set aside in an isolated area and inspected by a skilled person. If the package is deemed to be not shippable, the contents shall be promptly collected, segregated, and either the consignor or consignee contacted.
- The DC circuit of RT5427 battery has been disconnected before shipping.
- We have conducted comprehensive tests to ensure the equipment distribute around the world is safe for shipping. These products shall be handled with care and immediately inspected if visibly damaged. If the carton visibly damaged, please contact with RAYSTECH **customer service** to confirm whether the battery could be used safely or not.

3. 3. Product Introduction

3.1 Technical Specifications

Product Type		RT5427
Battery Capacity		53Ah+53Ah
Max.recommended DOD		93%
Max Charge Power		5.12kW
Max Discharge Power		7.68kW
Voltage		48~56Vd.c
Nominal Voltage		51.2Vd.c
Nominal Charging Current		80A
Nominal Discharging Current		100A
Max Discharging Current		150A (3S)
Max. Charge Voltage		55.6V
Weight		47kg
Dimension(mm)(L*W*H)		530*480*165mm
Operating Condition		Indoor
Operating temperature	Charge	From 0~50°C
	Discharge	From -10~55°C
Bluetooth Frequency Range		2400~2483MHZ
Bluetooth Max.transmission power		7.5dBm
WIFI Frequency Range		2400MHZ~2483MHZ
WIFI Max.transmission power		17.8dBm
Humidity		5%-85% (No condensed water)
Over Voltage Category		II
Cooling Type		Natural cooling
Installation		Wall mounting/Ground Installation
IP rating		IP 20
Max. Connection Number		16P
Communication		CAN/ RS485
Protection Mode		Dual hardware protection
Battery Protection		Over-current/Over-voltage/Short circuit/ Under-voltage/Over temperature
Safety		Cell UL 1973
		CE/TUV
Hazardous Material classification		9
Transportation		UN 38.3
Product Warranty		10 years warranty
		Testing conditions based on temperature 25°C at the beginning of life. *Total Energy/Usable Energy measured under specific conditions from RAYSTECH 0.5C CC-CV.

3.2 Indicator and Ports

3.2.1 Indicator

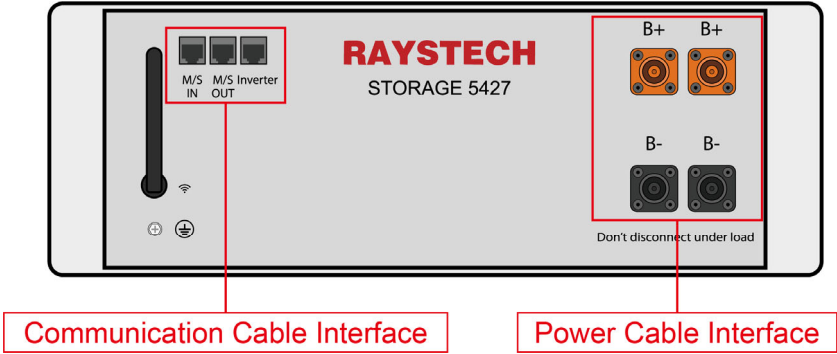
There are LED indicators on the front of the battery to show its operating status.



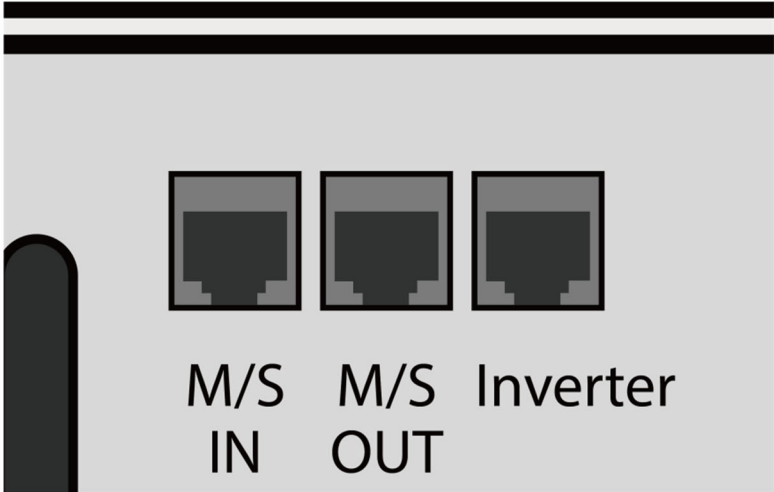
Item	Designation	Definition
1	SOC	Showing the SOC of battery

3.2.2 Ports

The power cable interface and communication cable interface.



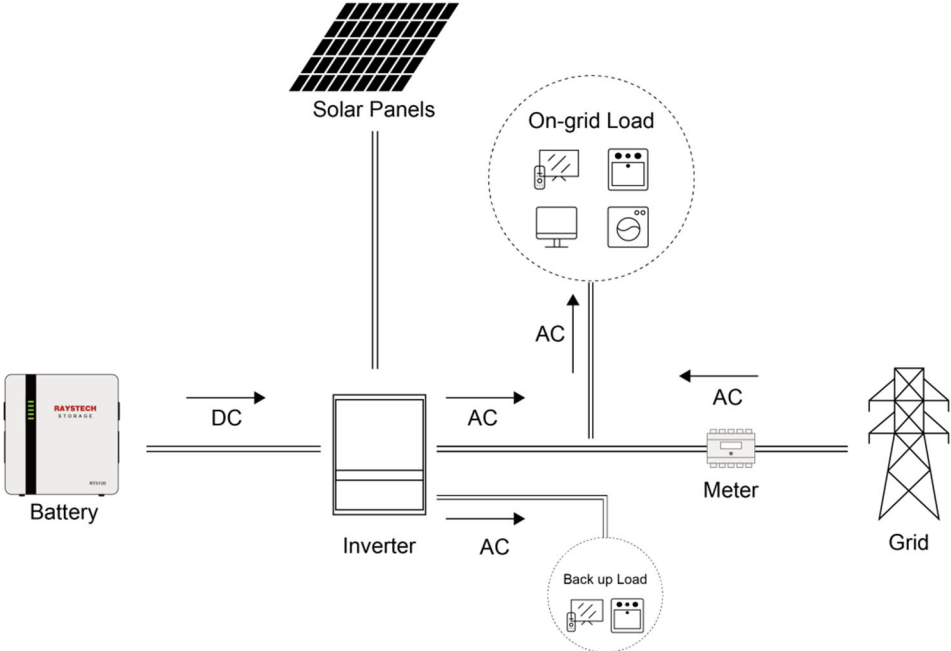
3.2.3 Communication Interface



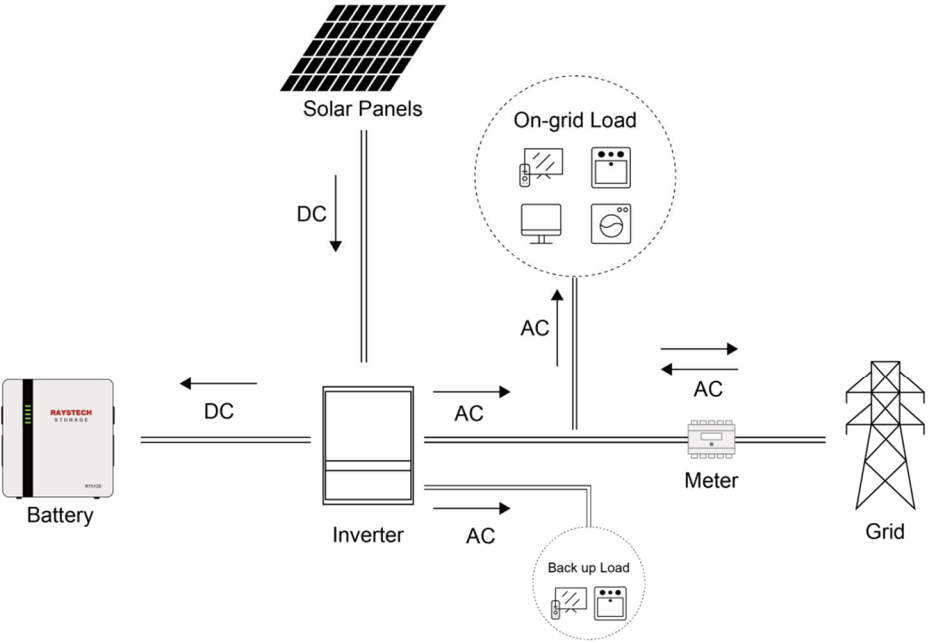
Designation	Definition
M/S IN	Communication between batteries- 'in' port
M/S OUT	Communication between batteries- 'out' port
Inverter	Communication between master battery and inverter

3.3 Solution of RAYSTECH

 NIGHT TIME



 DAY TIME



3.4 Feature

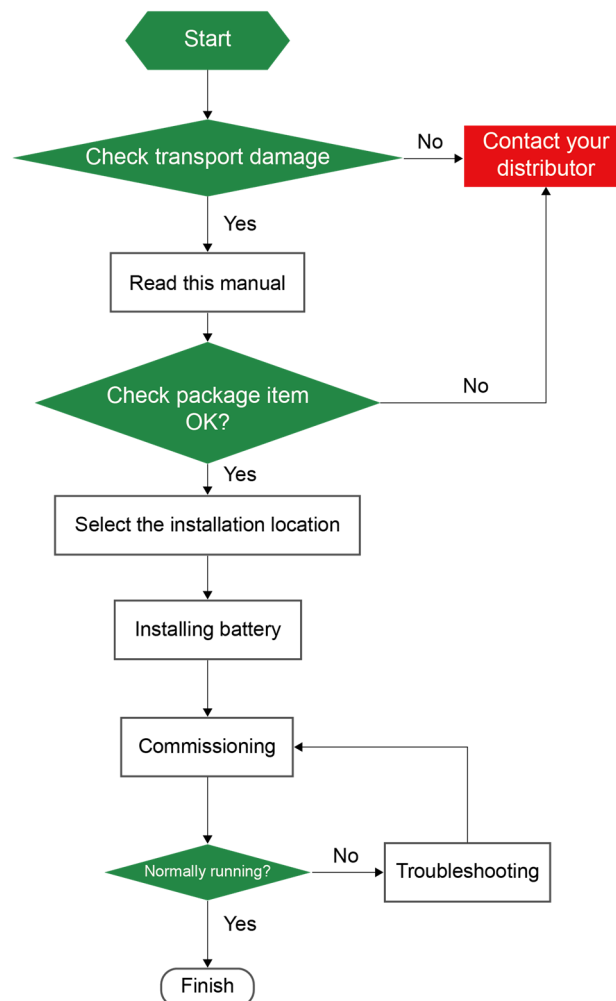
The RAYSTECH Energy Storage battery has following features:

- **Energy storage unit:** This battery is suit for photovoltaic system compatibility.
- **Battery management system (BMS):** The battery built-in BMS monitors its operation and prevents the battery from operating outside design limitations.
- **Monitor:** The battery BMS built-in with WIFI module, the battery running information could be seeing in mobile phone and computer.
- **Easy firmware update:** The BMS firmware can be updated to the latest version.
- **Expandability:** The battery capacity can be increased by adding another battery.

4. 4. Installation Prerequisites

4.1 Installation Process

The battery should be installed according to the following flow chart. The detail installation process described in chapter **5 Install process**.



4.2 Installation Position

Make sure that the installation position meets the following conditions:

- The building is designed to withstand earthquakes.
- Far away from the sea to avoid salt water and humidity.
- The floor is flat and level.
- No flammable or explosive materials nearby.
- Optimal ambient temperature is between 15°C and 30°C.
- Temperature and humidity stays at a constant level.
- Minimal dust and dirt in the area.
- No corrosive gases present, including ammonia and acid vapor.
- The battery is rated at IP20, therefore the battery is only suit for indoor usage.

If the ambient temperature is out of the operating range, battery will protect itself by shutting down. The battery optimal operate temperature is 15°C to 30°C. Frequent exposure to severe operating condition would exacerbate the performance and lifetime of the battery.

4.3 Tools

To install the battery pack, those following tools are required:

			
Phillips screwdriver	Torque wrench	Cable crimper	Wire clamp
			
Voltmeter	Tape measure	Drill	Flat-head screwdriver

In order to protect operator and installer's safety, please select and use suitable tools and measuring instruments that are certified for precision and accuracy.

4.4 Safety Instruments

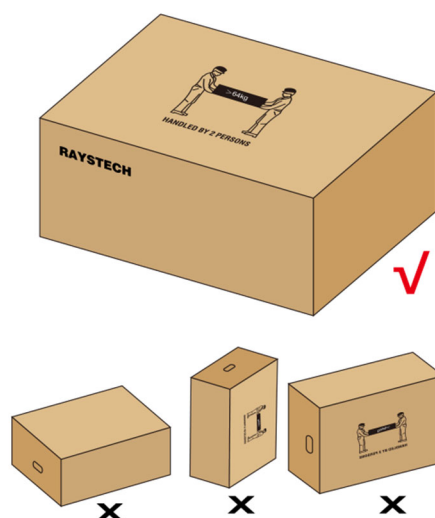
When dealing with the battery, following safety gears should be equipped. Installers must meet the relevant requirements or the domestic legislation and other relevant international standards.



4.5 Storage

If the battery is not to be installed immediately, and needs to be stored for a long period, please choose an appropriate location to store it. Instructions for storage are:

- Do not stack more than four battery boxes.
- Short-term storage environment:
Within 3 months of temperature range is $-20\sim 45^{\circ}\text{C}$.
Relative humidity $<85\%RH$. No corrosive gases.
- More than 3 months long-term storage environment:
temperature range for $-20\sim 20^{\circ}\text{C}$
Relative humidity $<65\% RH$
No corrosive gases
- Do not expose to water
- The battery box should be upright as shown in the following figure and not stacked upside down when storing the battery box.



If the battery needs to be stored over 3 months(From the date of shipment from the factory), the battery would discharge at a minimum rate and capacity degrades depended on storage time.

If the battery stored over 6 months(From the date of shipment from the factory), it is suggested to connect the battery with inverter and commissioning the system.

5. Battery Installation

5.1 Checks before Installation

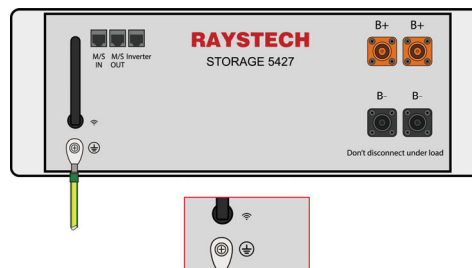
There are few things to check before installing the battery to ensure that it has no defects.

- Check the battery voltage using following instruction.
- Press and hold the panel button for 4s and release after two indicators turn on.
- Measure the voltage at the terminal interface with a voltmeter. If the voltage is lower than 48V, do not use the battery and contact customer service.

5.2 Battery Installation

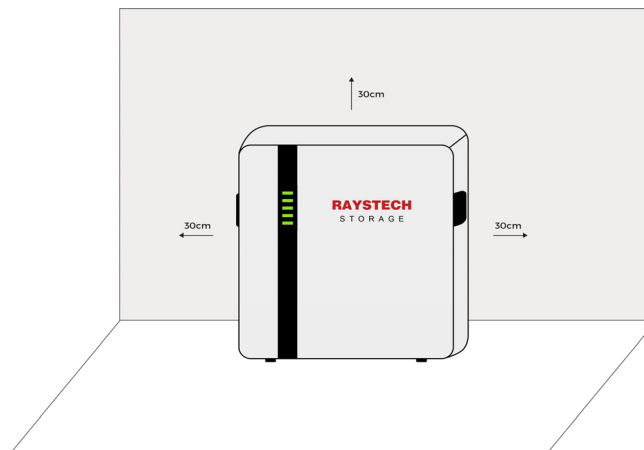
There is a grounding icon on the front of the battery:

- For Parallel connection, the grounding cable is recommended to be installed.

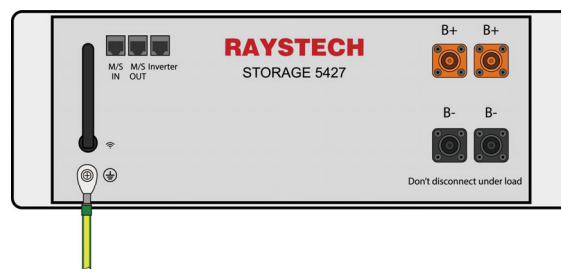


5.2.1 Ground Installation

1. Place the battery in the right place (the details about installation position described in chapter 4.2).



2.Connecting the ground cables



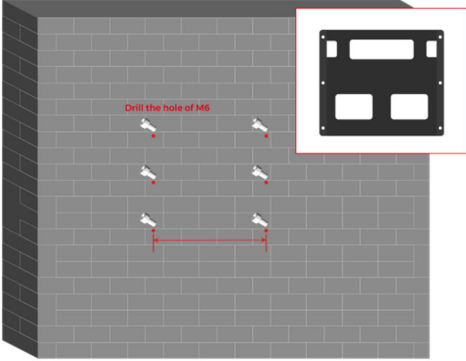
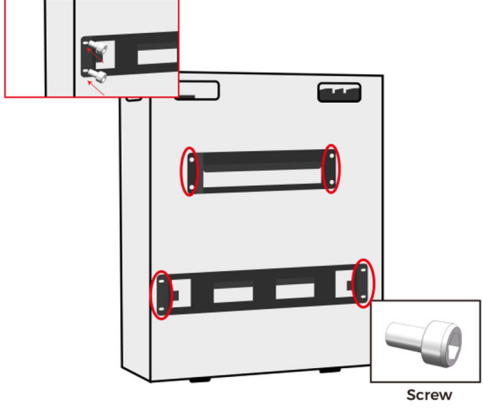
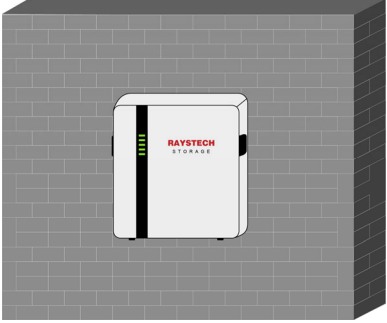
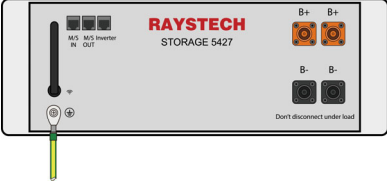
NOTICE

If more batteries are installed, the support feeds are recommended to use.

5.2.2 Wall Mounting

1.Drill holes of M6 in the wall according to the distance of the holes in the bracket.

2.Install the screws of M6 between the bracket and the battery

	
<p>3. Putting the battery on the bracket, and fixing the M5 screws of the side of bracket.</p>	<p>4. Connecting the ground cables.</p>
	

5.3 Cable Connections of the Battery

WARNING

Connect cables in accordance with local installation laws and regulations. Before connecting cables, ensure that the battery and relative devices are **OFF**. Otherwise, the high voltage of the battery may result in electric shocks.

Our products have auto wake up function built in BMS, so the batteries can wake up automatically if the DC side of inverters has more than 1.5V voltage.

After shutting down all devices, use a multimeter to measure the voltage on the DC side of the inverter, make sure the voltage below the 1V.

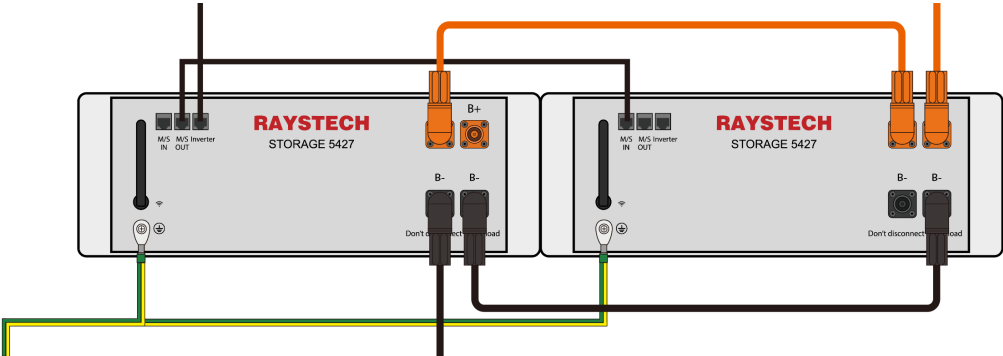
It's recommend to install the DC breaker between the batteries and inverter.

5.3.1 Parallel Connection

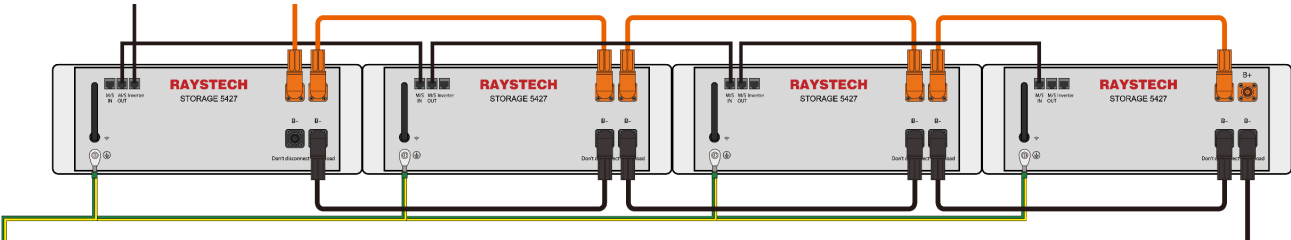
NOTICE

Before two or more batteries installed in parallel, please check the voltage of each battery and make sure the voltage difference less than 1V.

1. Two batteries installed.



2. Four batteries installed.

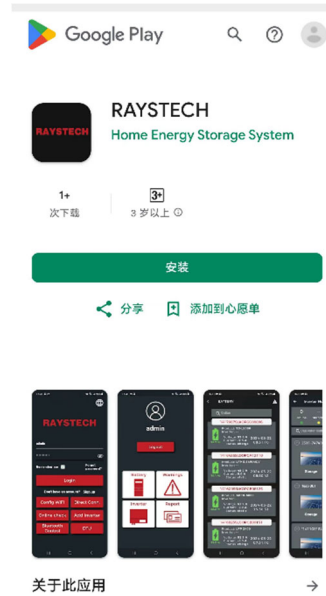
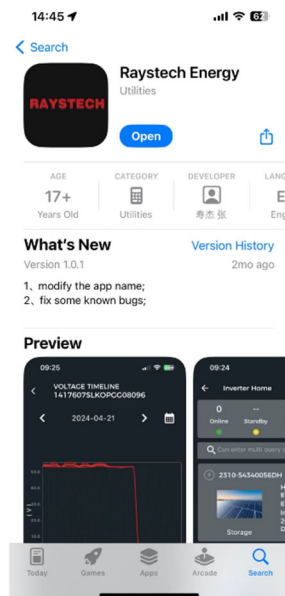


NOTICE
For wall mounting, the number of batteries should be less than 4. If more batteries are installed, a cabinet is recommended to use.

6. Configuration

6.1 APP Download

Download the app in **App Store** or Scan the following **QR Code**.
Android system, search for "**Raystech**" in the Google Play Store ;
IOS system, search for "**Raystech Energy**" in Apple App Store.



Google Play (Android)



Apple Store (iOS)

6.2 Configure Battery WIFI

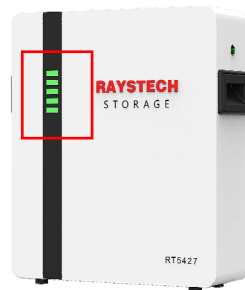
NOTICE

There are three ways to configure WIFI, choose one of them according to your needs.

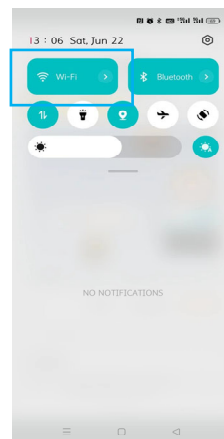
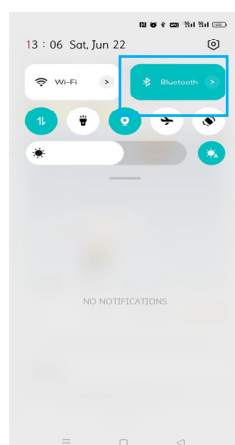
The battery has a built-in WIFI module for use with the App.



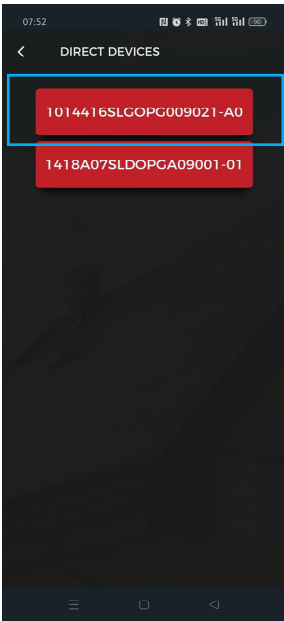
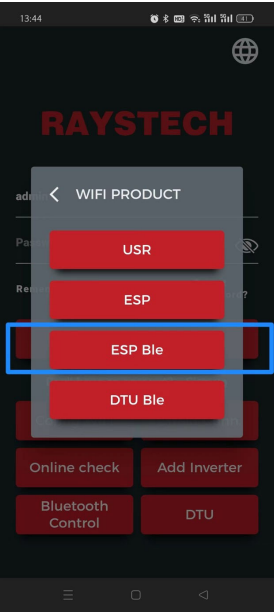
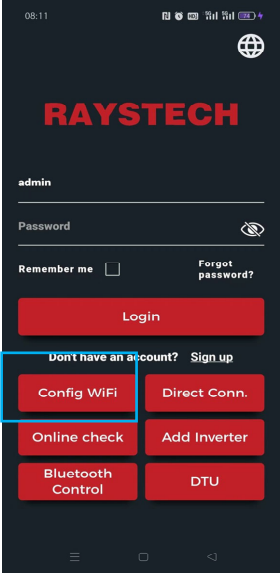
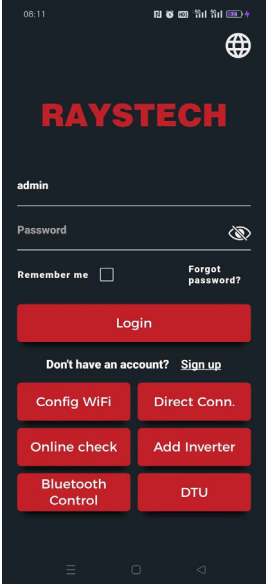
1. Press the power button and turn on the battery.



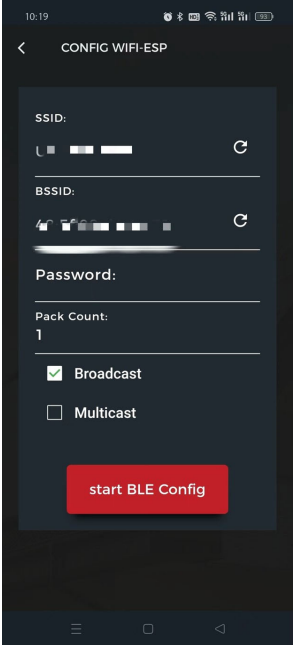
2. Turn on Bluetooth and turn on the WIFI button.



3. Click the Raystech app on your phone. On the login page, click "Configure WIFI", next click "ESP Ble", then select the battery.



4. Refresh the SSID. Enter the local wifi password, select Broadcast then press Start Smart Config.

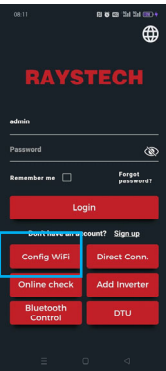
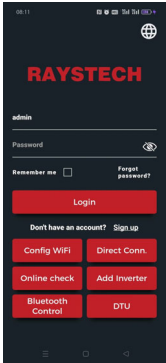


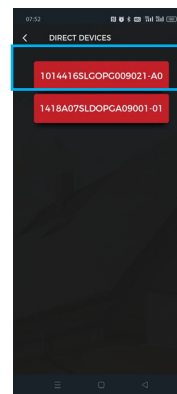
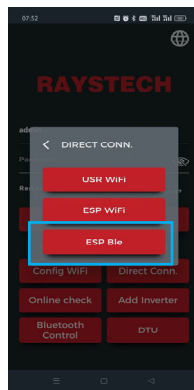
6.3 Direct Connected

1. Press the power button and turn on the battery.



3. Click the Raystech app on your phone. On the login page, click "Direct Conn.", next click "ESP Ble", then select the battery.





6.4 Register Account

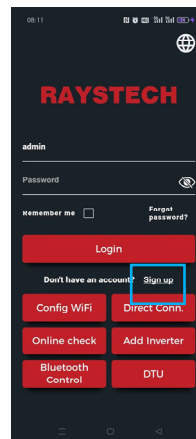
NOTICE

The Raystech battery could be registered only one time.

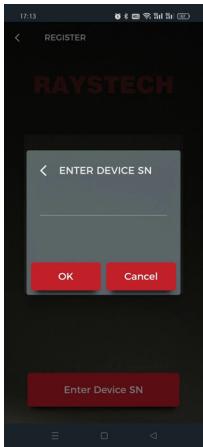
NOTICE

The Raystech battery running is not associated with registration or not

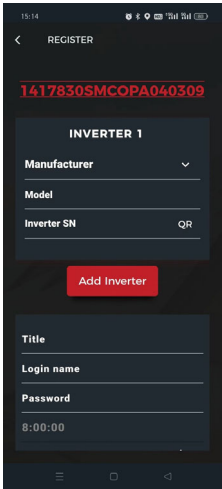
1. Open the APP monitor of battery, and select **Sign up**.



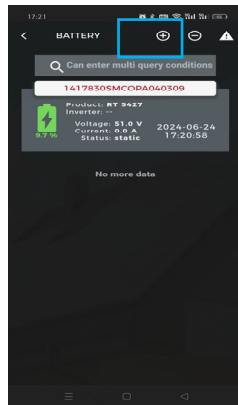
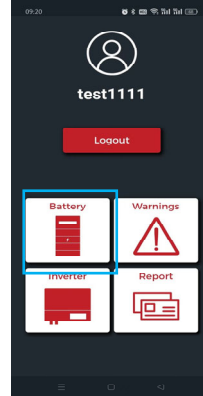
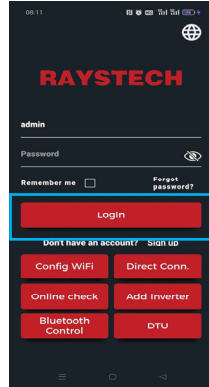
2. Scan the device QR code or enter the device SN manually, as shown in the pics:



3. Registration completion pop up after select inverter manufacturer and enter battery information.



4. If more than two batteries are used at the same time, you need to manually add additional information about another set of devices, as shown in the pics:



7. Commissioning

7.1 Commissioning Battery

If only one battery is installed, use the following steps to put it in operation:

- 1 Press the button on the upper side of the unit until the indicator lights on.
- 2 Make sure the Run light is on. If it stays off, do not use the battery and contact customer service.
- 3 Turn on the inverter. Wait for the start-up sequence to complete fully.

If two or more batteries are connected in parallel, connect the power cables and the communication cables first. Follow the steps as below:

- 1 Check battery voltage. If it is lower than 48V, charge the battery first. If more assistance is needed, contact customer service.
- 2 Press the button on the upper side of the unit until the indicator lights on.
- 3 For all batteries, make sure that the Run light is on.
- 4 Make sure the maximum voltage difference between batteries is less than 1V. If not, balance the battery voltage.
- 5 Turn on the inverter. Wait for the start-up sequence to complete fully.

7.2 Shutting Down Battery

Shut down the battery only when the battery is no charging or discharging which can be seen in your phone with APP.

Press and hold the Panel Button for 5s, release after the whole lights are off.

8. Firmware Update

If you need to upgrade the BMS software version, please contact the after-sales staff : service@raystechgroup.com.

RED Declaration of Conformity (DoC)

Unique identification of this DoC:

We,

RAYSTECH (TIANJIN) PV ENERGY CO., LTD
1-1306 TOWER 1 TIANQI INTERNATIONAL MANSION, CENTRAL BUSINESS DISTRICT,
BINHAI NEW AREA, TIANJIN, PEOPLE'S REPUBLIC OF CHINA

.....
declare under our sole responsibility that the product:

product name: RT 5427

trade name:

type or model:

relevant supplementary information:

(e.g. lot, batch or serial number, sources and numbers of items)

to which this declaration relates is in conformity with the essential requirements and other relevant requirements of the RED Directive (2014/53/EU).

The product is in conformity with the following standards and/or other normative documents:

HEALTH & SAFETY (Art. 3(1)(a)): EN 62311:2008, EN IEC 62311:2020, EN 50663:2017

EMC (Art. 3(1)(b)): EN IEC 61000-6-1:2019, EN IEC 61000-6-3:2021, EN 301 489-1 V2.2.3:2019, EN 301 489-17 V3.2.4:2020 SPECTRUM (Art. 3(2)): EN 300 328 V2.2.2:2019

OTHER (incl. Art. 3(3) and voluntary specs): N/A

Accessories: N/A

Software: N/A

Technical file held by: RAYSTECH (TIANJIN) PV ENERGY CO., LTD

Place and date of issue (of this DoC):

Signed by or for the manufacturer:

(Signature of authorised person)

Name (in print):

Title:

RAYSTECH

RAYSTECH (TIANJIN) PV ENERGY CO., LTD.

