

RAYSTECH

S T O R A G E

RT5120

Use Manual



About this manual

This manual is intended for the RT5120 Energy Storage battery. These batteries can be installed in Parallel and Series, pay more attention for the DIP setting and address selection.

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 RT5120 is compliance with the essential requirements and other relevant of RE Directive 2014/53/EU.

CONTENT

1. Safety Introduction.....	1
1.1 Important Safety Instructions.....	1
1.2 Warnings in this Document.....	1
1.3 Battery Handling Guide.....	2
1.4 Response to Emergency Situations.....	2
1.4.1 Leaking Batteries.....	2
1.4.2 Fire.....	2
1.4.3 Wet battery.....	3
1.4.4 Damaged Battery.....	3
1.5 Installers.....	3
1.6 Scrap Battery.....	4
2.Guidance for Disconnection of Batteries During Shipment.....	4
3. Product Introduction.....	5
3.1 Technical Specifications.....	5
3.2 Indicator and Ports.....	6
3.2.1 Indicator.....	6
3.2.2 Ports.....	6
3.2.3 Communication Interface.....	7
3.3 Solution of RAYSTECH.....	10
3.4 Feature.....	11
4. Installation Prerequisites.....	11
4.1 Installation Process.....	11
4.2 Installation Position.....	12
4.3 Tools.....	12
4.4 Safety Instruments.....	13
4.5 Storage.....	13
5. Battery Installation.....	14
5.1 Checks before Installation.....	14
5.2 Battery Installation.....	14
5.2.1 Ground Installation.....	14
5.2.2 Wall Mounting.....	15
5.3 Cable Connections of the Battery.....	16
5.3.1 Parallel Connection.....	16
6.Commissioning.....	18
6.1 Commissioning Battery.....	18
6.2 Shutting Down Battery.....	18
7.Firmware Update.....	19

1. Safety Introduction

1.1 Important Safety Instructions

This manual contains important instructions for:

RT5120 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.
- 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.

2.Guidance for Disconnection of Batteries During Shipment

- RT5120 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 RT5120 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. Product Introduction

3.1 Technical Specifications

Product Type	RT5120
Battery Capacity	50Ah+50Ah
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 Charging Current	100A
Max Discharging Current	150A (1.5c)
Max. Charge Voltage	55.6Vd.c
Weight	46kg
Dimension(mm)(L*W*H)	530*480*165mm
Operating Condition	Indoor
Charge Temperature	From 0~50°C
Discharge Temperature	From -10~55°C
Humidity	<60%(No condensed water)
Over Voltage Category	II
Cooling Type	Natural cooling
Case Material	Metal
Installation	Wall mounting/Ground Installation/Rack 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	<p>10 years warranty, 6000 cycles life</p> <p>All information contained in this document is subject to change without notice</p> <p>1)For better battery life cycles,we suggest charge in 50A(0.5C @25° C)</p> <p>2)For better battery life cycles,we suggest discharge in 50A(0.5C @25° C)</p> <p>3)Peak Current excludes repeated short duration (less than 100ms) of current pattern</p>

3.2 Indicator and Ports

3.2.1 Indicator

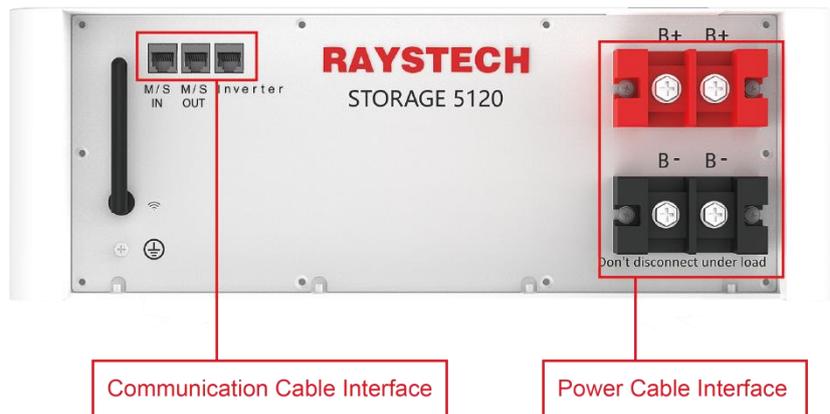
There are LED indicators on the front of the battery to show its operating status.



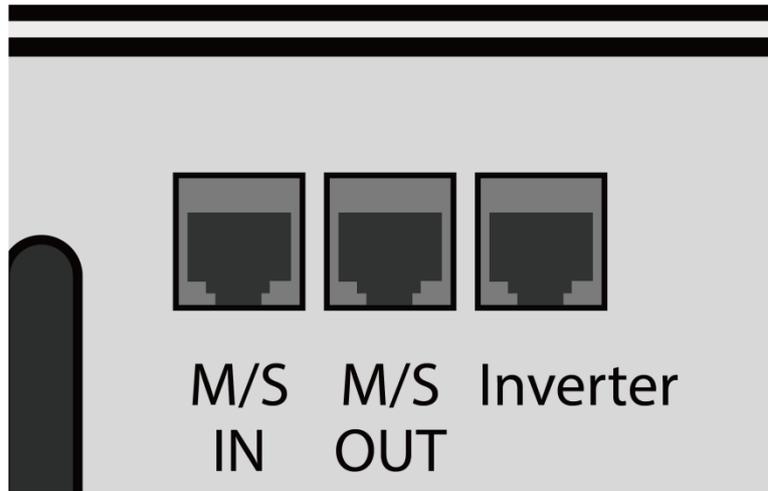
Item	Designation	Definition
1	SOC	Showing the SOC of battery

3.2.2 Ports

The power cable interface and communication cable interface.

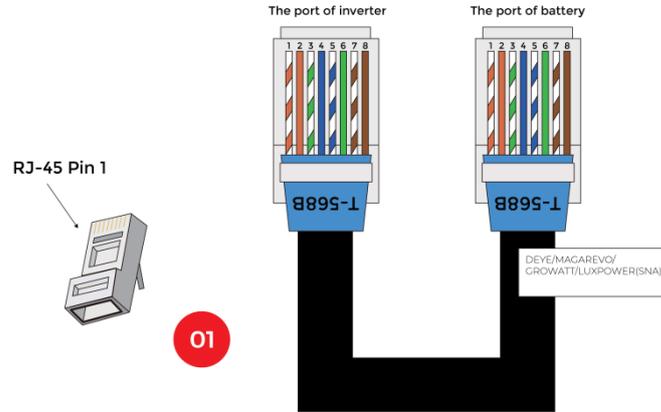


3.2.3 Communication Interface



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

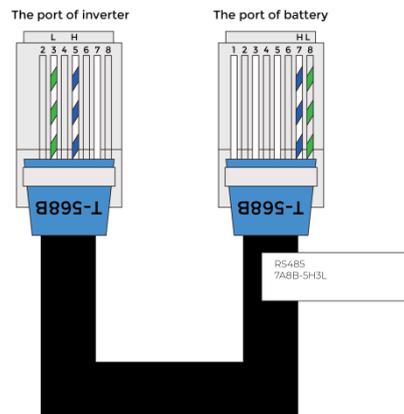
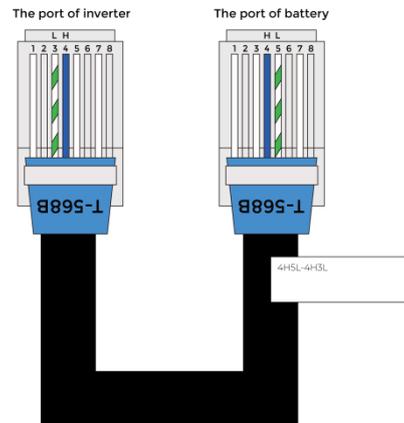
The communication cables of battery and inverter is showing as below:



01

02

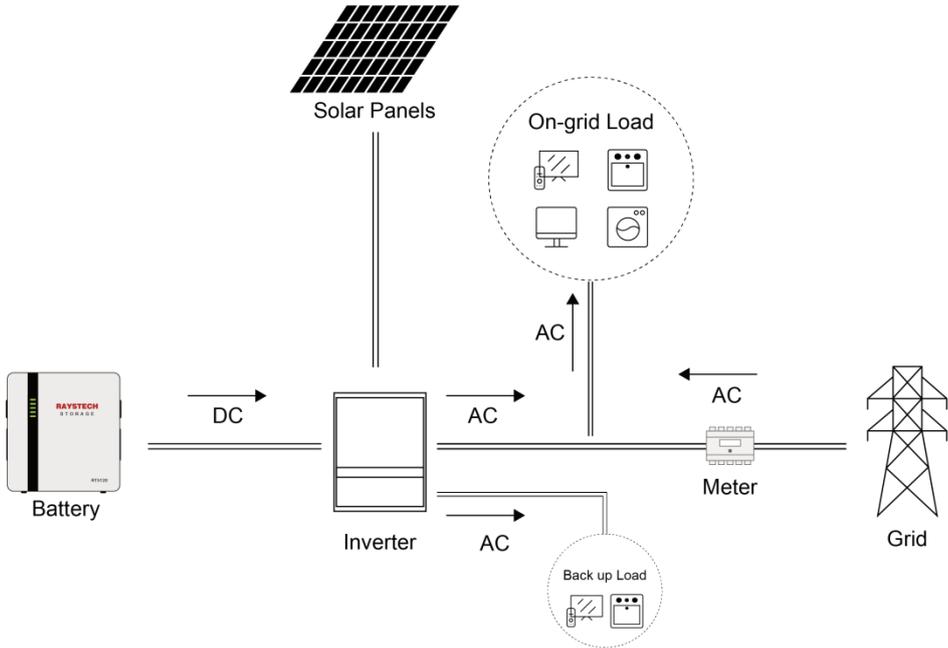
03



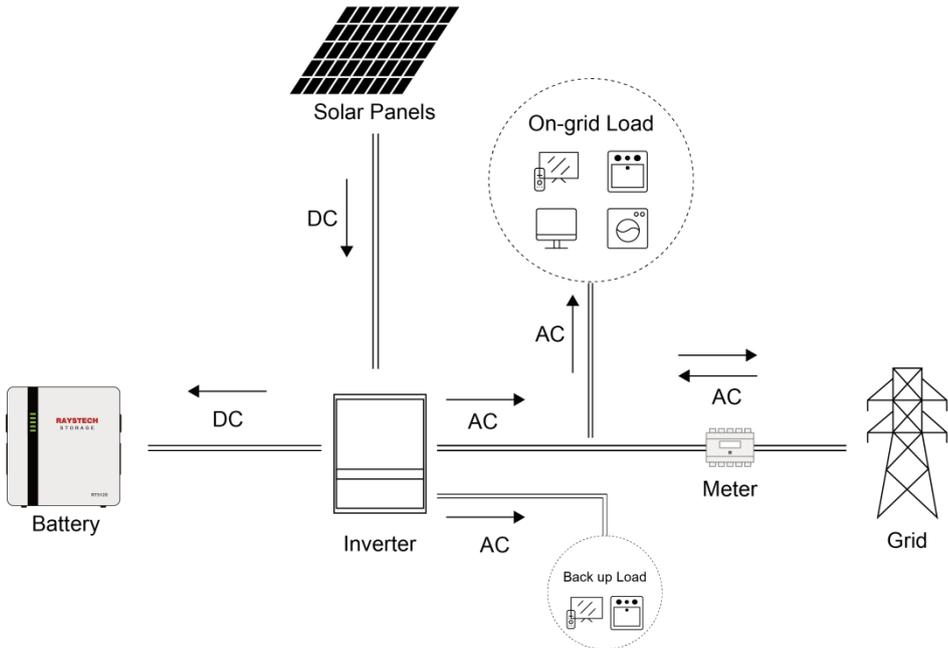
Items	Inverters
01 4H5L	SOFAR
	SOLIS
	GOODWE
	LUXPOWER(TEK)
	INVT
	MAGAREVO
	DEYE
	Thinkpower
	TBB
	Sermatec
	Growatt
	Afore
	SMA
	Solinteg
Sol-ark	
AISWEI	
02 4H3L	LuxPower(Old)
03 RS485 5A3B	Voltronic
	EPEVER

3.3 Solution of RAYSTECH

 NIGHT TIME



 DAY TIME



3.4 Feature

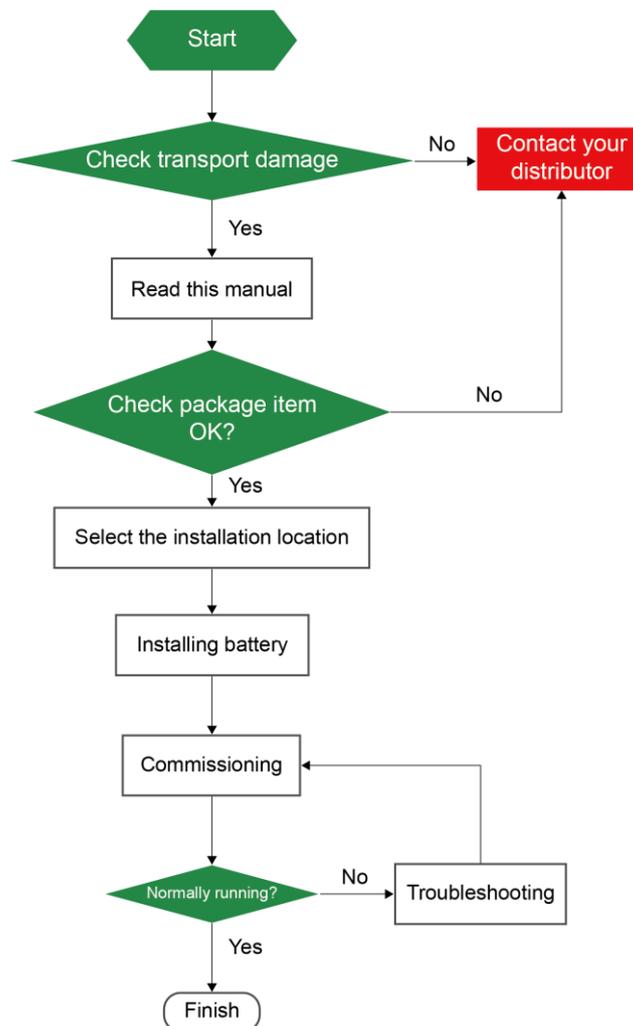
The RAYSTECH Energy Storage battery has following features:

- **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. 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.
- The temperature of battery stored recommended in the range of -20°C to 30°C .
- 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, the battery would discharge at a minimum rate and capacity degrades depended on storage time .
- If the battery stored over 6 months, it is suggested to connect the battery with inverter and commissioning the system.

5. Battery Installation

5.1 Checks before Installation

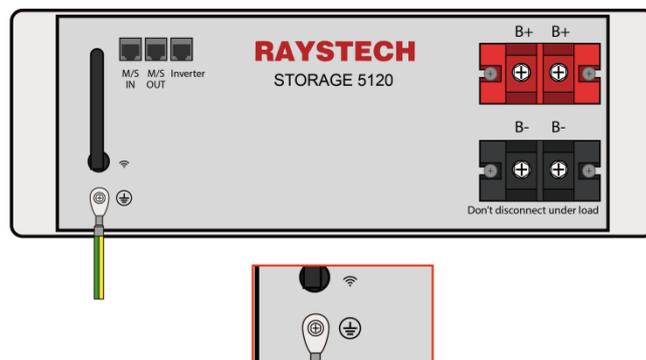
There are few things to check before installing the battery to ensure that it has no defects.

- 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

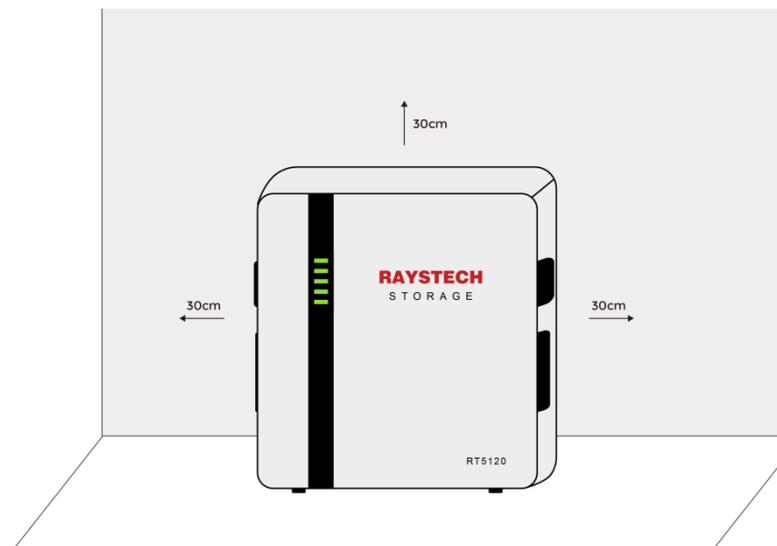
There is a grounding icon on the front of the battery:

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

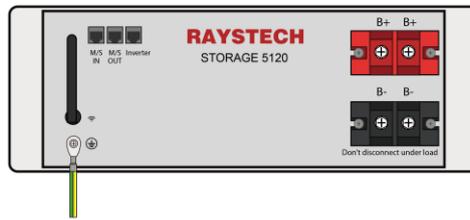


5.2.1 Ground Installation

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



2.Connecting the ground cables



5.2.2 Wall Mounting

<p>1.Drill holes of M6 in the wall according to the distance of the holes in the bracket.</p>	<p>2.Install the screws of M6 between the bracket and the battery</p>
<p>3.3.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 is **OFF**. Otherwise, the high voltage of the battery may result in electric shocks.

5.3.1 Parallel Connection

NOTICE

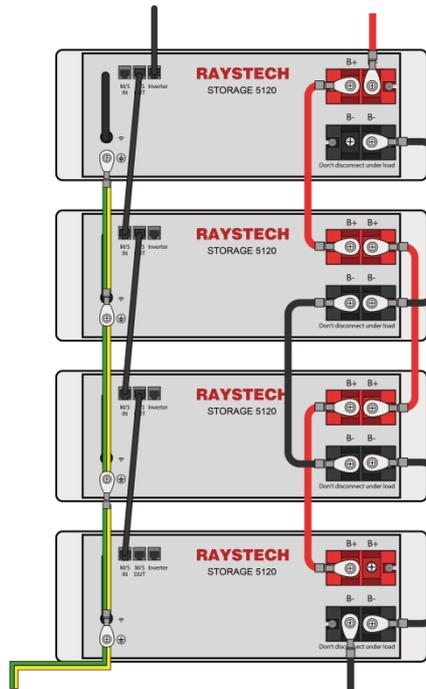
Before two or more batteries installed in parallel, please check the voltage of each battery and make sure the voltage difference less than 2.0V.

* Ground mounting

1. Connect all the communication cables and power cables showing as below.

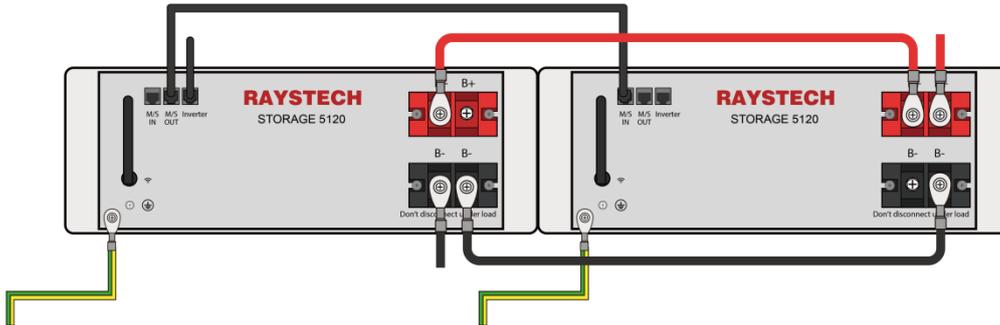
NOTICE

Notice the M/S IN and M/S OUT of the battery. It will result in communication failed if the connection is wrong.

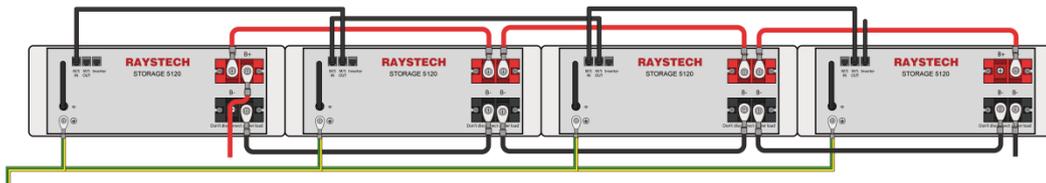


*** Wall mounting**

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. Commissioning

6.1 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 2V. If not, balance the battery voltage and connect batteries in parallel together.
- 5 Turn on the inverter. Wait for the start-up sequence to complete fully.

6.2 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.

1. Press and hold the Panel Button for 5s, release after hearing the sound of relay breaking.
2. Make sure all lights on the battery are off

6.3 Inverter Communication Settings

The different inverter communication settings are given below.

No	Inverter brand	Inverter type	Protocol type	Inverter Battery settings	Remark
1		Low Voltage	CAN	Lithium	Protocol= Default
2		Low Voltage	CAN	Lithium	Protocol =0
3		Low Voltage	CAN	Lithium	Protocol= 7
4		Low Voltage	CAN	Lithium	Protocol= L51
5		Low Voltage	CAN	Lithium	Protocol= Default
6		Low Voltage	RS485	lithium	Protocol= Lib Model: SOL-I-AX-11M
7	User defined (Voltage control)	Low voltage	\	User defined	Bulk Charge Voltage= 56V Float Charge Voltage= 55.6V Cut-off Voltage= 49.6V Charge Current= 80A Discharge Current= 100A

6.4 Parallel Communication Cable Connection

1, For communication between batteries in parallel:

- Connect the parallel comm cable from the Master's M/S OUT port to the Slave1's M/S IN port.
- Connect the parallel comm cable from the Slave1's M/S OUT port to the Slave2's M/S IN port.
- Continue this process until the last slave.

2, For communication between the battery bank and the inverter:

- Select the COM cable that is compatible with the specific inverter (COM cable provided with battery has inverter name on the strap).
- Connect that COM cable from the Master's Inverter port to the Inverter's BMS port (Check the inverter manual for this information).

7. Firmware Update

If you need to upgrade the BMS software version, please contact the after-sales staff.