aolithium | Trinasolar

Grid-connected lithium battery system for household

Product Manual

- Please read the product manual carefully before installing and using the lithium battery system (Following called "product").
- The information in this manual was accurate at the time of publication, It is subject to change without notice.
- The illustrations in this manual are intended only to aid in understanding the concept and installation of the product and may differ from the actual product.
- The construction and installation of the products must be carried out by professional and technical personnel who are trained and familiar with knowledge related to electrical installation and meet local requirements.

Contents

Safety And Precautions 1

- Electric shock and short circuit may occur during the installation of the product, please strictly observe the safety precautions in this manual.
- If any abnormalities occur during installation, please stop the installation immediately and contact the manufacturer.
- Do not perform installation and connection operations outside of this manual.
- Installation of the product must be carried out by a trained technician who is familiar with the electrical installation and meets local requirements. To ensure safety, strictly follow the procedures in this manual.

1.1 Secuity Signs

The hazards and damages that may result from misuse are classified according to their extent as follows:

⚠ Warning	If not operated as required, it can trigger dangerous occurrences, resulting in serious injury, death or serious property damage.
⚠ Attention	If not operated as required, it can trigger a dangerous occurrence, resulting in bodily injury or equipment damage.

The meanings of the safety symbols used in this manual are described as follows:

	General Prohibition		General Tips
	Risk of electric shock		Prohibition of disassembly & dismantling
	Ground wire must be connected		

1.2 Security Matters For Product Installation

	⚠ Warning
	• Do not install the product in direct sunlight or direct rain, preferably on the back side of the house, or add a roof over the product. • Do not place the product near flammable and explosive substances. • Do not install the product in areas of high humidity or where it may be flooded. • Do not install the product in areas where the altitude is higher than 2000 meters. • Do not install the product in a moving or vibrating environment, such as a car. • Do not install the product in poorly ventilated, narrow and closed or dusty areas. • Do not use the product for medical purposes. • Do not install the product in an area where corrosive gases are present. • Do not install the product in an area accessible to children. • Do not install the system in heavily saline areas. (Please refer to JRA9002-1991 for salt damage area classification) • Do not install the product in lightning-prone areas or areas susceptible to lightning strikes.

1.3 Secuity Matters For Electrical Connection

⚠ Warning	
	• The product needs to be grounded reliably. Do not ground the product to the ground of water pipe, gas pipe, lightning rod and telephone line.
	• When installing, hands must be kept dry and must not touch the product with wet hands. Otherwise there is a risk of electric shock. • For the wire that the user may touch, it needs to be protected by a sleeve and fixed reliably. Otherwise there is a risk of electric shock.
	• Do not touch the internal part of the product marked as inaccessible with bare hands. • Do not wear metal parts such as watches and necklaces while working. • When working, tools need to have insulation protection, need to wear protective gloves, wear protective shoes. • For system maintenance, the lithium battery system must be disconnected from the PCS and the battery • System before the system can be operated. When performing maintenance on the lithium battery system, the circuit breaker inside the lithium battery system needs to be disconnected first.
	• Private disassembly, dismantling and modification of the product is prohibited. It may lead to electric shock, personal injury and product damage.
	• The output terminals of the battery system need to be fixed with bolts according to the specified torque. Poor contact of the terminals can lead to fire.

⚠ Attention	
	• Please select the cable according to the cable size and requirements specified in the product manual. • The output terminals of the battery system need to be fixed with bolts according to the specified torque. Poor contact of the terminals can lead to fire.

1.4 Secuity matters for System Use

⚠ Warning	
	• Do not pour or wet the product with water. Otherwise the risk of electric shock, smoke, fire, etc. • Do not leave the product in standby and discharged state for a long time. It may lead to battery damage. • Do not leave the product in the alarm state for a long time without dealing with it. Otherwise it may lead to battery damage. • If you find lithium battery leakage, please do not touch the liquid, when the liquid touches your eyes or skin, please rinse with clean water and seek medical attention. • • The power or signal canles and their sleeves connected to other components(e.g.PCS) must be fixed reliably. There is a risk of electric shock, fire and damage to the machine. • Do not life expired lithium battery system. There is a risk of personal injury, smoke, and fire.
	• Do not dispose of the lithium battery system without permission or with household garbage. When disposing of it, please contact the manufacturer.

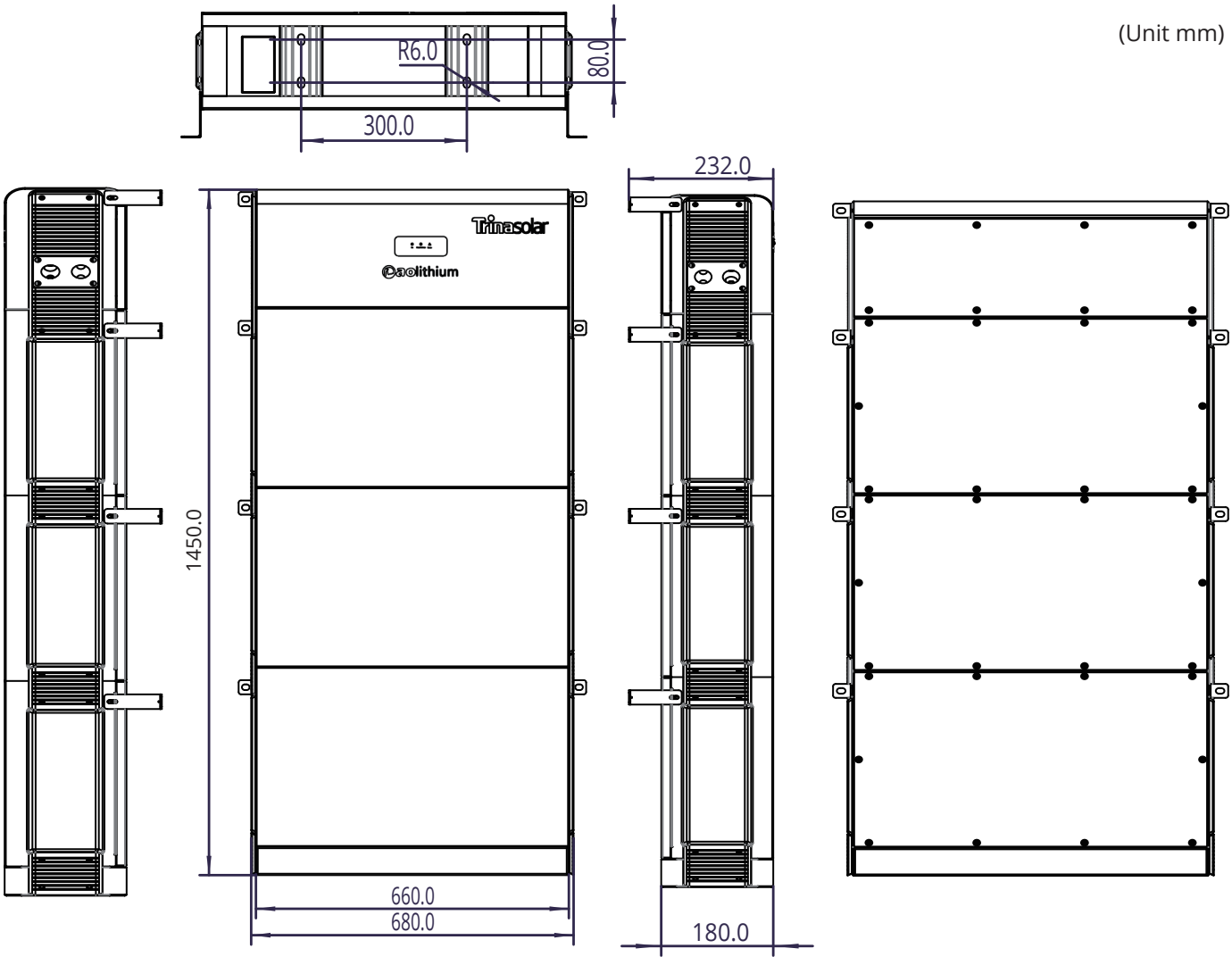
⚠ Attention

- Do not sit or stand on top of the product, otherwise there is a risk of falling and injury. Do not stack debris on the product.
- Daily maintenance, please use a dry and soft cloth to wipe the surface. Please do not wipe with alcohol, organic solvents, strong acid and alkaline substances. It will lead to discoloration and paint loss.

Product introduction 2

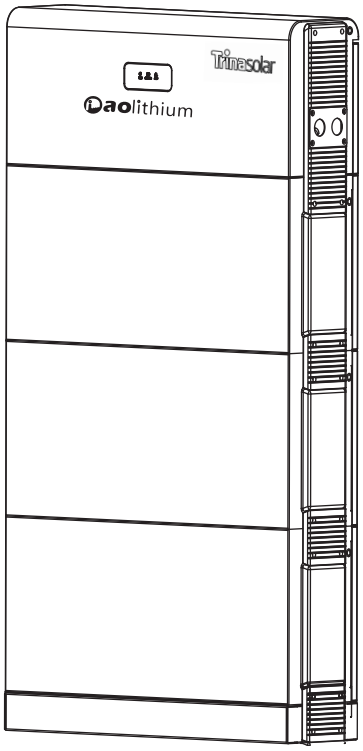
2.1 Product Size

(Unit mm)



2.2 Part Name

<Overall Chart >



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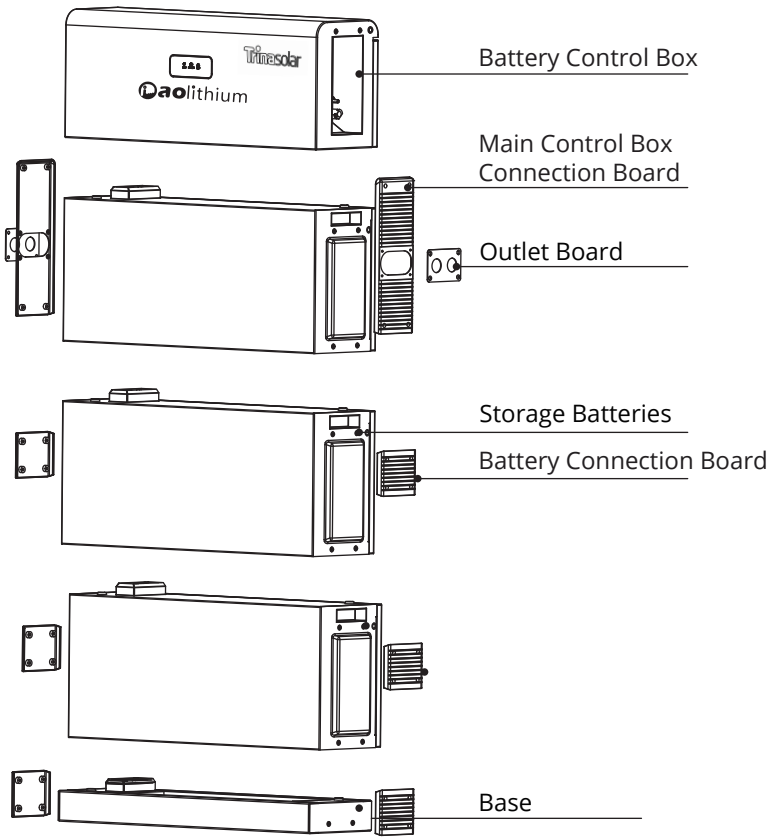
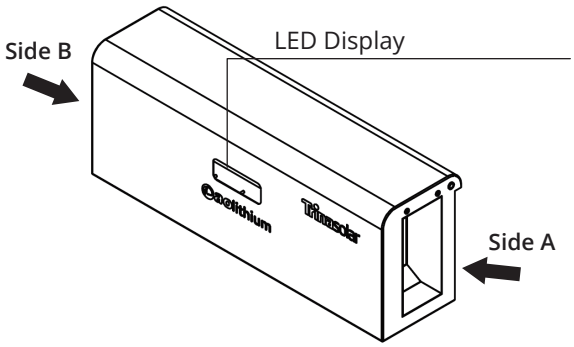
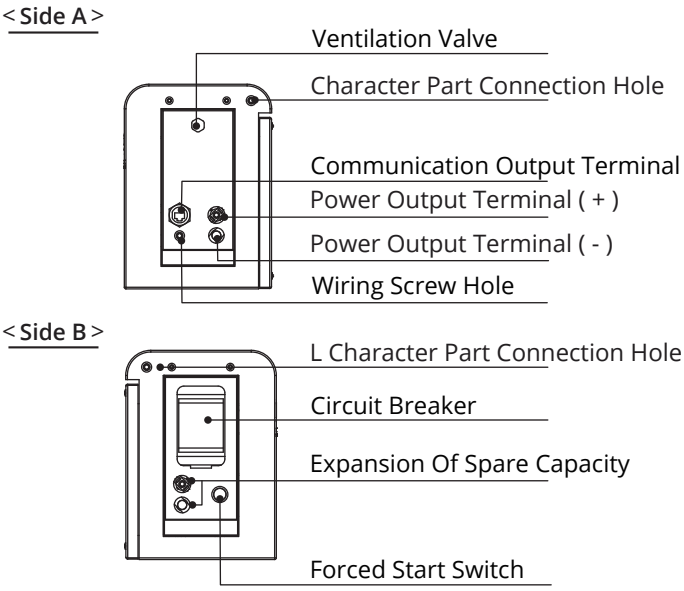


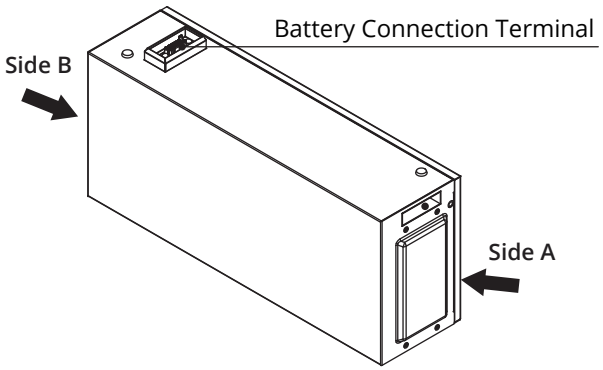
2.3 Part Details

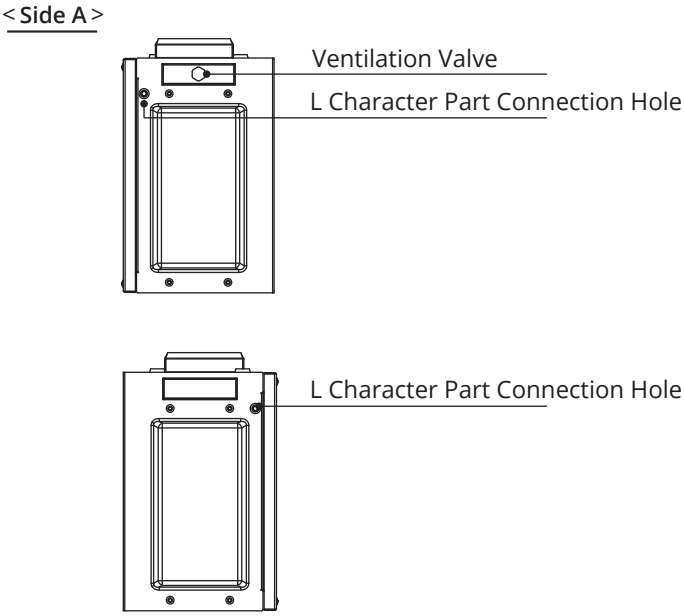
Main Control Box



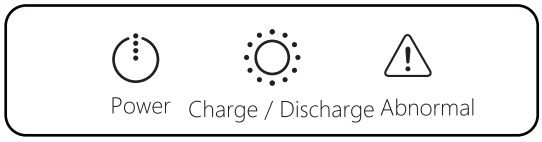


Battery Box





2.4 System Indicator



Illustrations	Indicator Light	Status	Meaning
	Power indication	Green	System operate
		Off	System not powered up
Charge/Discharge	Charge/discharge indication	Orange	Charge
		Green	Discharge
		Off	Standby
Abnormal	Fault indication	Orange	Failure
		Off	No Failure

Packing list 3

3.1 Check Before Unpacking

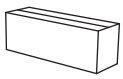
Before shipping, the products and packaging are rigorously inspected and tested to ensure the reliability of the packaging. However, there is still a risk of damage during transportation.

Before installation, please check the shipping package carefully. If damage to the outer packaging of the product may cause damage to the product, or if, after opening the packaging, you find that the product has been damaged, please contact the manufacturer immediately.

If it is necessary to return the product, please use the original packaging used for shipping.

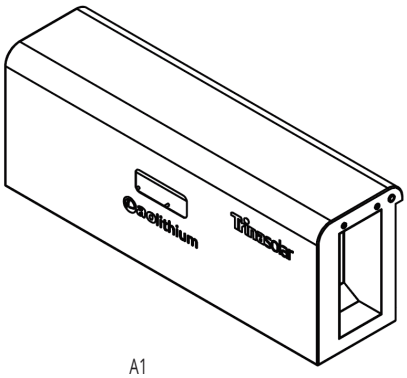
The total weight of the battery box including packaging is about 51 kg. For personal safety, two people are needed for unpacking and installation.

3.2 Number Of Packing Boxes

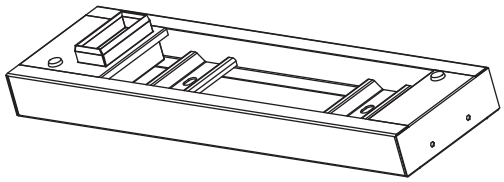
Packaging illustration	Name of packing box	Number of boxes
	Main control box packaging	1
	Battery box packaging	3

3.3 Packing List

A:Main control box packaging

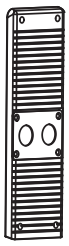


A1



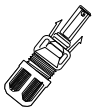
A2

A3



A4

A5



A6

A7

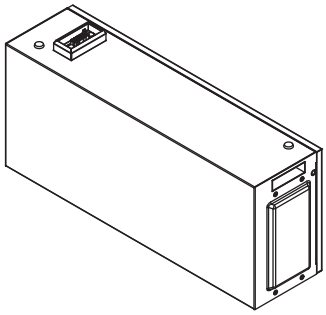
A8

A9

A10

No	Name	Num
A1	Battery control box	1
A2	Base	1
A3	Packing list	1
A4	Main control connection board	2
A5	Connection plate	6
A6	Porwer terminals	1
A7	Porwer terminals	1
A8	L-shaped connecting parts	8
A9	Socket head cap screws	32
A10	Philips screw	16

B: Battery Box Packaging



B1

B2

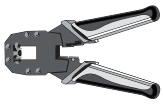
No	Part Name	Num
B1	Battery box	1
B2	Packing list	1

4 Product Installation

4.1 Installation On Tools And Protection Tools

4.1.1 Installation Tools

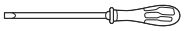
The following tools may be used during the installation process.



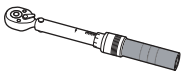
Plier

Mark Pen

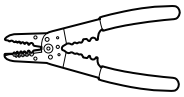
Phillips Screwdriver



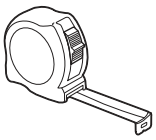
Flat Screwdriver



Torque Wrench



Wire Stripping Pliers



Ruler

Electric Drill

Hot Air Gun

MC4 Disassembly Tool

4.1.2 Protection Tools

Please wear the following safety equipment when handling the battery system.

Operating Gloves

Insulation Gloves

Protective Glasses

Labor Safety Shoes

4.2 Self-provided Cables And Auxiliary Materials

x2

K

Power Cables

x1

M

Network Cable

x1

O

Ground Cable

x1

P

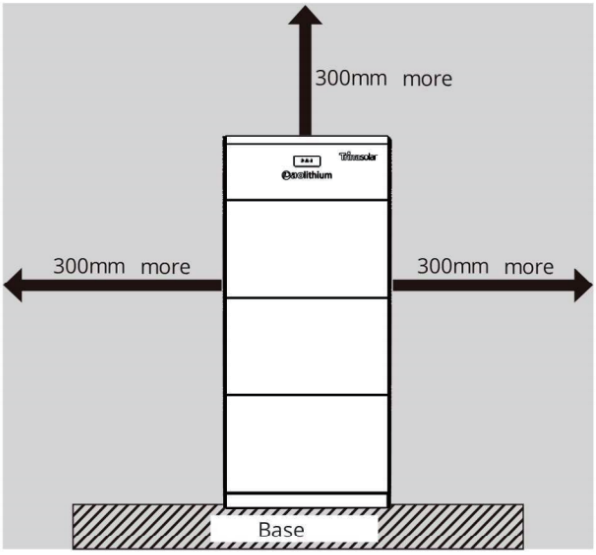
Heat Shrink Tube

4.3 Installation On Space Requirements

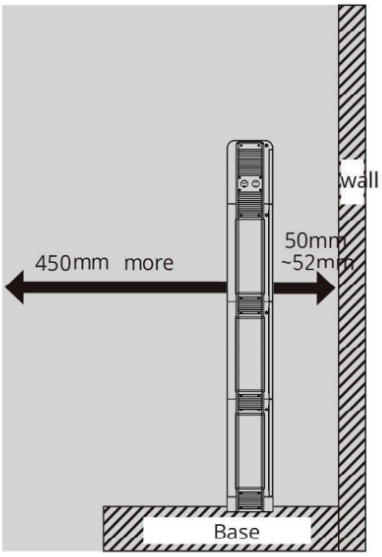
During installation, sufficient space should be reserved between the product and the wall and other objects to facilitate the installation and operation of the product as well as ventilation and heat dissipation.

- Please make sure the space behind the battery system is more than 50mm.
- Make sure the sides of the battery system are more than 300mm.
- Make sure the front of the battery system is more than 450mm.
- Please make sure the upper space of the battery system is more than 300mm.
- The height of the installation foundation depends on the local snow or water level, and it is recommended to be more than 200mm above the ground and ensure that it will not be flooded by water or snow.

<Frontview>



<Sideview>



4.4 System Installation

Step 1: Base Mounting

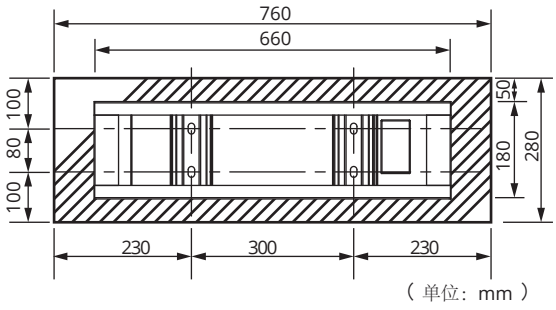


Figure1: Dimensional drawing of the base

- Using a pencil, draw the appropriate markings on the foundation and punch holes in the foundation as shown in the dimensional drawing of the base.

※ The back of the battery system needs to be 50-52mm away from the wall

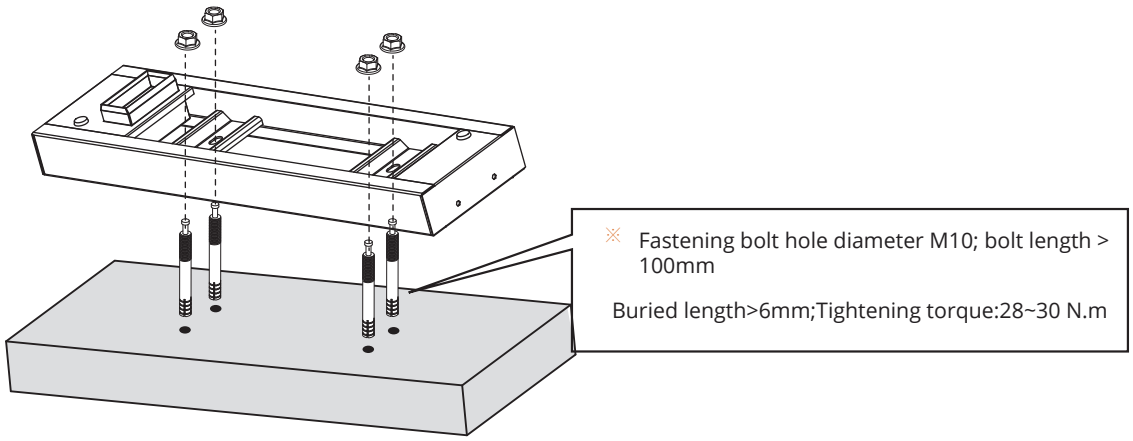
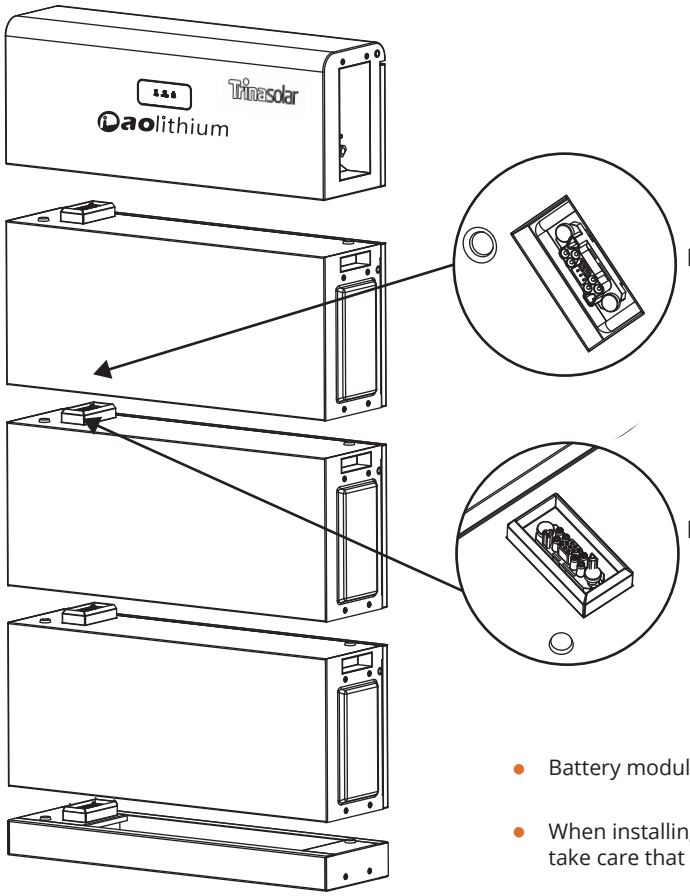


Figure 2 Base mounting diagram

Step 2: Installation Of Battery Control Unit And Battery Unit

Take out the battery module from the box and put one battery module on the base, paying attention to the installation direction of the battery module. The connector of the battery module and the connector of the base should be on the same side.



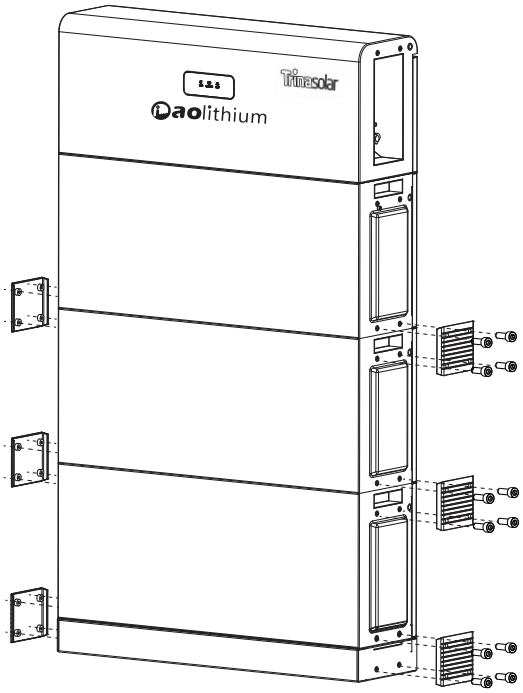
Module Bottom Connector

Module Top Connector Block Top Connector

Construction points

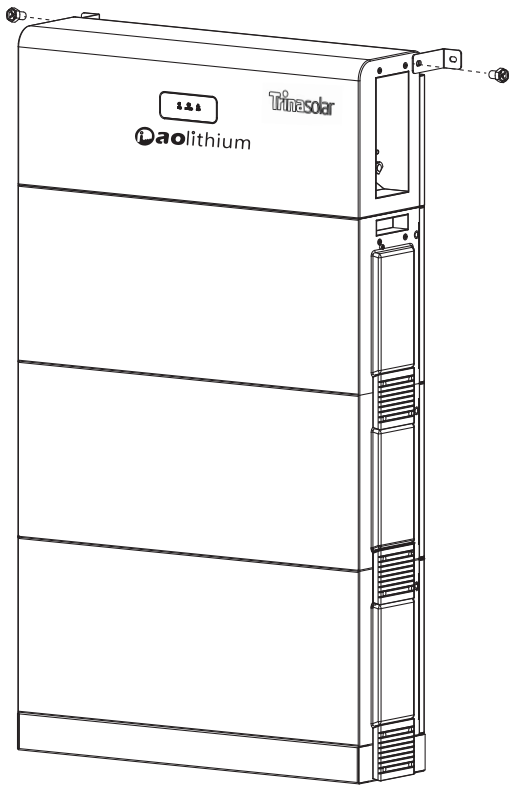
- Battery modules are installed in no order
- When installing the battery control unit, take care that the LED indicator faces the front.
- The topmost battery module and battery control box are mounted at a certain height, using auxiliary equipment such as ladders for installation if necessary.

Step 3: Fixed Connection Plate



- The connection plate is fixed with screws from top to bottom so that the adjacent battery box is fixed with the battery box without offset.

Step 4: L-shaped Connector Fixation



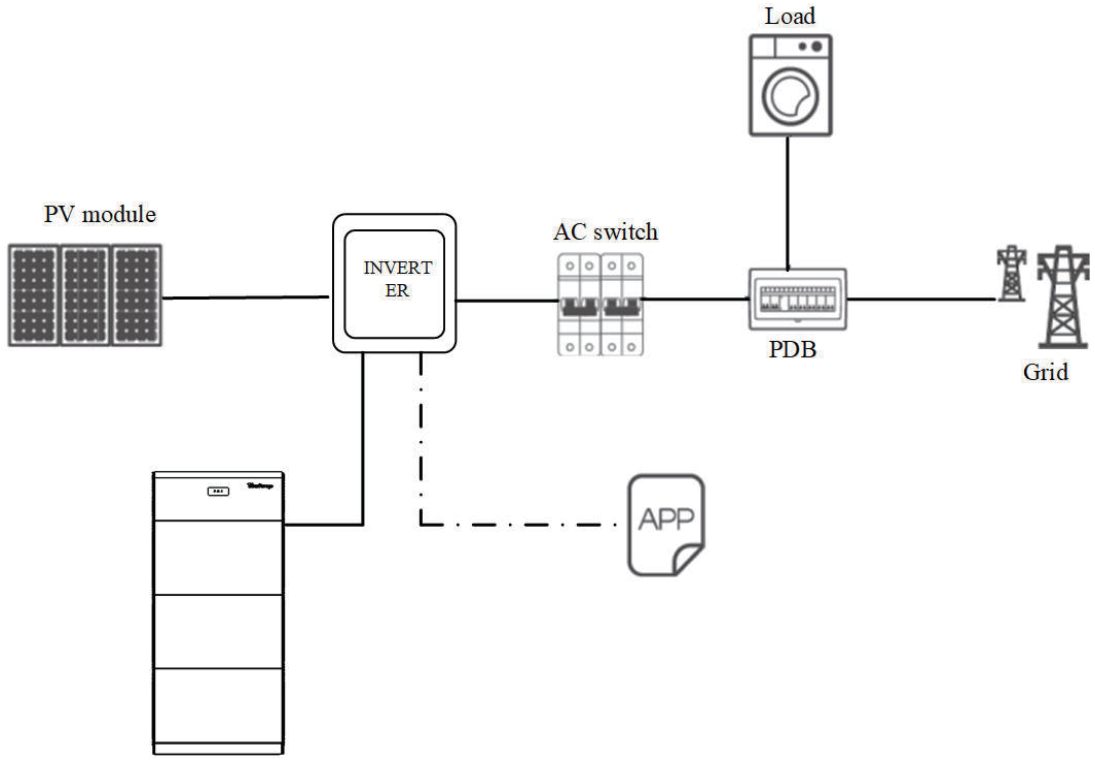
- Using the L-shaped connector, secure the battery system to the wall and tighten the screws.

4.5 Electrical Connection And System Start-up

- Before connecting the battery cables, make sure that they are disconnected from the entire system.
- Please work in accordance with the technical requirements of local electrical equipment.

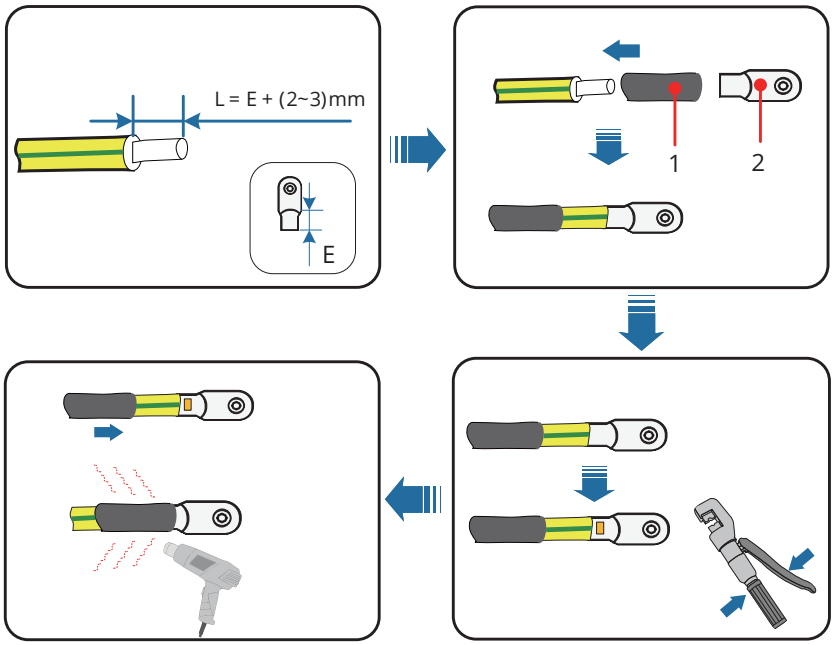
4.5.1 System Architecture

Residential rooftop PV grid-connected systems generally consist of PV modules, battery systems, grid-connected inverters,management systems, AC switches, distribution boxes, etc.



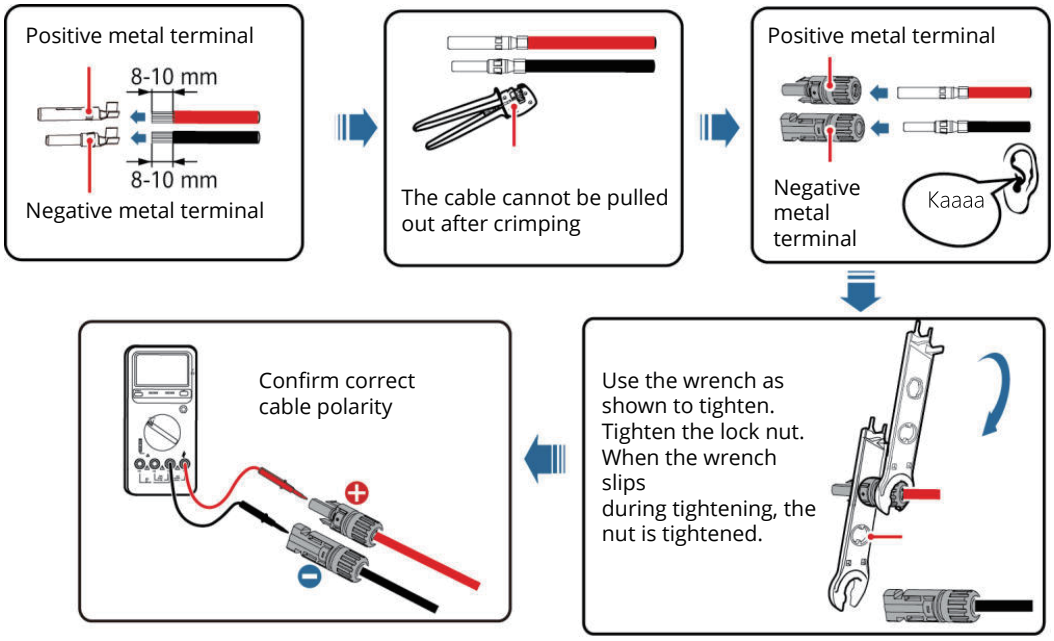
4.5.2 Cable Preparation

1. Making Cables, Crimping OT/OD Terminals



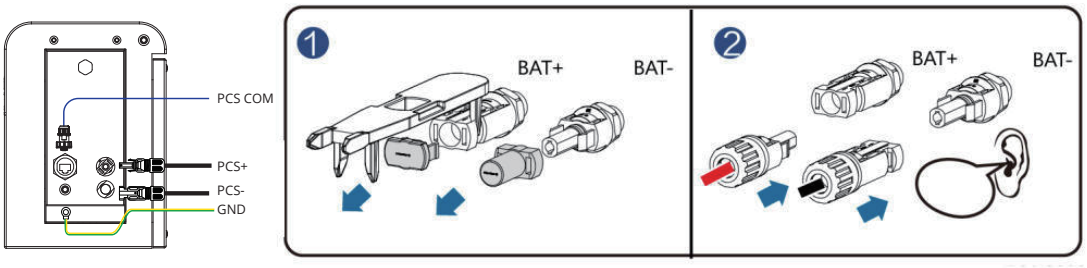
1 Heat Shrinkable Tubing 2 OT or OD terminal

2. Installation Of DC Harness

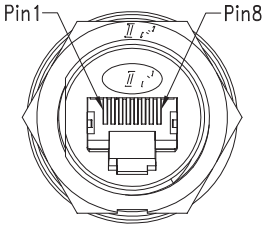


- The battery terminals use Staubli MC4 positive and negative metal terminals and the DC connectors supplied with the solar inverter. The use of incompatible positive and negative metal terminals and DC connectors may lead to serious consequences. Damage caused to the equipment is not covered by the warranty.

- When connecting cables, special insulated tools must be used. Make sure that the battery connection cable has the correct polarity. Reversing the battery cable connection may result in battery damage.



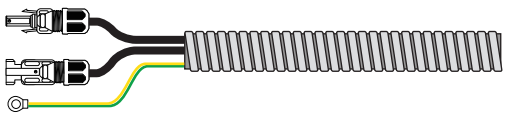
Communication Line Sequence



8	Blue	RS485-B1
7	White	RS485-A1
5	Green	CAN2H
4	Yellow	CAN2L
2	Red	Enable
1	Black	GND
NO	Wire Color	

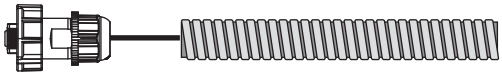
- When the signal line is placed, it should be placed separately from the power line and away from strong interference sources to avoid interruption of communication.

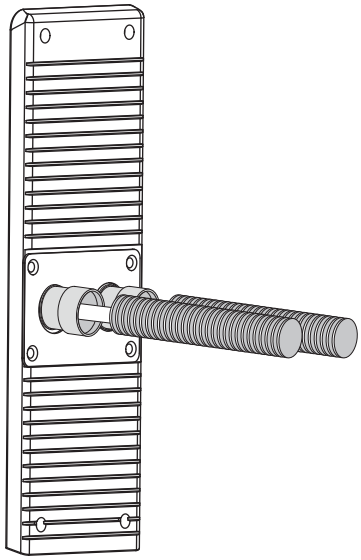
Power Cables



- The crimped power and communication wires are passed through the PF tube separately.

Communication Cable



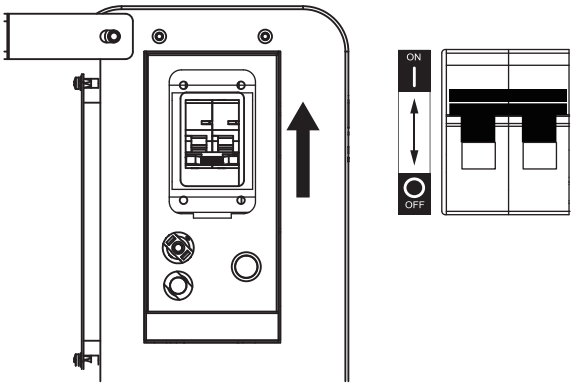


- The power cable and communication cable should be wired through the threading holes on the right side of the board, with the front hole for the communication cable and the back hole for the power cable.
- Fix the PF pipe connector on the jack of the main control terminal block.

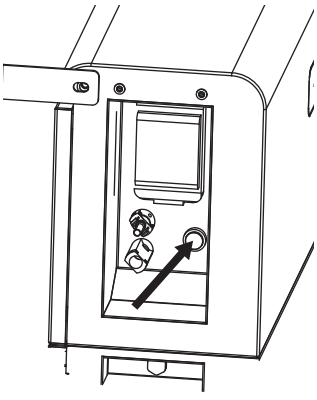
4.5.3 Power on commissioning

1. The battery is properly installed and secure.
2. The cable arrangement should be done according to the customer's requirements.
3. The grounding wire is properly and firmly connected.
4. The battery switch and all other switches connected to the battery are disconnected.
5. Make sure the DC input power cable and communication cable are properly and firmly connected.
6. The installation space is reasonable and the installation environment is clean and tidy.

- Please make sure the power supply of the power regulator is on and the power regulator is in a communication capable state.
- Set the circuit breaker to "ON" and then press the forced start button, the LED power indicator will light up.



Step 1: Push the breaker to the ON side



Step 2: Press the button

- If the power indicator does not light up, it may be that the connector between the batteries is not connected correctly, please confirm that the connector is connected correctly. If the problem is still not solved, please consult the sales store by phone.

System Use 5

5.1 Routine Maintenance Of Lithium Battery System

Daily Maintenance

During daily use, check the following items:

1. Is the warning light on? If the warning light is on, please contact the manufacturer to troubleshoot in time.
2. Are there any abnormal sounds and smells? If so, please stop the system operation immediately and contact the manufacturer.
3. Whether the external surface is rusted and corroded.

Maintenance Method

Please use a dry and soft cloth for wiping. Please do not wipe with alcohol, organic solvents, strong acid and alkaline substances.

5.2 Emergency Handling

The lithium battery system consists of several lithium batteries and BMS system. Due to the nature of lithium batteries, we cannot guarantee their absolute safety. In the event of any health and life threatening hazards.

1. Contact the fire or other relevant security authorities immediately.
2. Notify relevant persons within the danger area to evacuate.

The following first aid measures can be taken when it is safe to do so.

Fire

1. Disconnect the power switch of the PCS connected to the lithium battery system.
2. Disconnecting the power switch between the grid and the PCS.
3. Use fire extinguishers to extinguish the fire. ABC fire extinguisher is not effective for battery fire, and D fire extinguisher is prohibited.

Water

1. Disconnect the power switch of the PCS connected to the lithium battery system.
2. Disconnecting the power switch between the grid and the PCS.
3. Cut off the water source and drain the water around the system.

Product Repair And Disassembly 6

- The repair and disassembly of the lithium battery system must be operated by professional technicians who are trained and familiar with the knowledge related to electrical installation and meet local requirements.

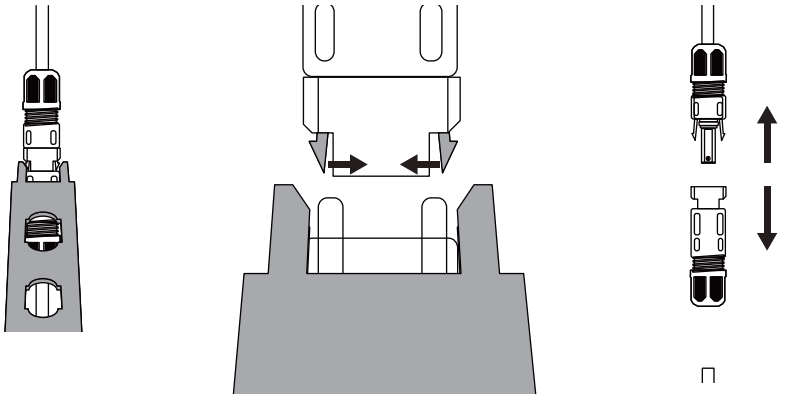
6.1 Disassembly Notes

Before disassembly, turn off the DC circuit breaker of the PCS (if any), turn off the circuit breaker between the grid and the PCS, and disconnect the connection wire between the Li-ion battery system and the PCS.

After disassembling the Li-ion battery system, please pack each part in the original box provided by the manufacturer. If the original packaging is not available, please make sure that the packaging used can support the weight of the battery box, please refer to the detailed parameters in the product specification.

If the lithium battery needs to be disposed of, please refer to the provisions of Chapter 7.3 on battery disposal.

1. Open the side cover of the chassis, set the circuit breaker to the OFF position, and measure the voltage between the positive and negative terminals, which is less than the safe voltage before operation.
2. Remove the ""+"" "-"" power cable connected to the main control box and unplug the signal cable.
3. Loosen the screws and remove the left and right side covers of the battery system.
4. Disconnecting the signal wires between the battery boxes and between the battery boxes and the main control box.
5. Remove the main control box and the three battery boxes in order from top to bottom.
6. Removing the anchor screw of the base and removing the base.
7. Cover the top cover of the main control box and pack the main control box, 3 battery boxes, left and right side covers, base and each auxiliary parts.



6.3 Fuse List

Serial No.	Bit Number	Specification
1	F1	DC 690V 63A
2	Inside the battery box	DC 690V 63A
3	Inside the battery box	DC 690V 63A
4	Inside the battery box	DC 690V 63A

Others 7

7.1 Shipping

The lithium battery system complies with Part 3, clause 38.3 of the United Nations Manual of Tests and Criteria for the Transport of Dangerous Goods, for which specific rules are available.

7.2 Storage

- Ensure that the storage warehouse is dry, clean and well ventilated.
- Do not store with flammable materials.
- Do not store with food, drinks and feed.
- Keep away from oxidizing agents, strong acids and alkaline substances.
- Prevention of heating as well as overheating.
- Protect from direct sunlight.
- Prohibit children from approaching.
- Storage temperature as per the product specification.
- Storage humidity not exceeding 90% (non-condensing).
- If storage for more than 30 days is expected, please periodically (recommended every 3 months) fill the SOC to about 50%; store the same batch at the same temperature conditions.

7.3 Waste And Recycling

If the battery system has exceeded its service life, please follow the relevant local standards for disposal. Do not dispose of the battery system as general garbage or large garbage.

7.4 Limitation Of Liability

Direct or indirect damage caused by the following causes is not covered by the warranty:

- Transport or storage does not meet the requirements.
- Incorrect installation and operation.
- Use of the product in an unsuitable environment.
- Inadequate ventilation.
- Failure to comply with safety instructions during operation.
- Installation or maintenance by non-professional personnel.
- Caused by faults in external equipment and overcurrent.
- Force majeure.
- External influences, such as unusual physical or electrical stresses.
- Use an unconfirmed PCS to connect the lithium battery system.

Product Specification 8

No.	Part Name	Parameters
1	System Model	TSHE-S3-15A
2	Cell Type	LFP LiFePO4 Battery
3	Rated voltage (V)	153.6 V (3.2 V/cell)
4	Rated energy (kWh)	15.36 kWh
5	Effective energy (kWh)	15kWh
6	SOC Range	10%~100%
7	Combination method	48 series 1 parallel (16 series 1 parallel×3pack)
8	Maximum use current	30 A DC
9	Charge termination voltage	170.4 V
10	Discharge termination voltage	134.4V
11	Operating ambient temperature range	(Charge) 0～54℃ (Discharge) -20℃～54℃
12	Storage temperature range	-30℃ ~ 60℃
13	Storage humidity range	0 ~ 90% (No condensation)
14	Self-discharge rate	≦3.0% (Storage ambient temperature 25℃, SOC 50%, new battery within 3 months after manufacture)
15	Cooling method	Natural air cooling
16	Battery System Communication	CAN2.0B
17	Protection level	IP65
18	Height (m)	≤2000 m less
19	Size （mm ）	680mm x 1450 mm x 180 mm
20	Weight （kg ）	Battery box：47.5 kg；Main control box：12.5 kg；System：159kg
21	Installation method	Standing installation, wall mounting
22	Installation site	Indoor and outdoor (except heavy salt damage, dust, toxic gas and other environments).